



# SAR TEST REPORT

**Applicant** ZTE Corporation  
**FCC ID** SRQ-Z6251  
**Product** LTE/WCDMA/GSM Multi-Mode Digital  
Mobile Phone  
**Model** Z6251  
**Report No.** R2108A0760-S1  
**Issue Date** October 25, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **IEEE 1528- 2013, ANSI C95.1: 1992, IEEE C95.1: 1991**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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# 1 Test Laboratory

## 1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

## 1.2 Test facility

### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

## 1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
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## 1.4 Laboratory Environment

|                                                                                                                                                                                                 |                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Temperature                                                                                                                                                                                     | Min. = 18°C, Max. = 25 °C |
| Relative humidity                                                                                                                                                                               | Min. = 30%, Max. = 70%    |
| Ground system resistance                                                                                                                                                                        | < 0.5 $\Omega$            |
| Ambient noise is checked and found very low and in compliance with requirement of standards.<br>Reflection of surrounding objects is minimized and in compliance with requirement of standards. |                           |

## 2 Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for the EUT are as follows:

Table 1: Highest Reported SAR

| Mode          | Highest Reported SAR (W/kg) |                                       |                                     |                                                  |
|---------------|-----------------------------|---------------------------------------|-------------------------------------|--------------------------------------------------|
|               | 1g SAR Head                 | 1g SAR Body-worn<br>(Separation 15mm) | 1g SAR Hotspot<br>(Separation 10mm) | Product Specific<br>10-g SAR<br>(Separation 0mm) |
| GSM 850       | 0.128                       | 0.229                                 | 0.623                               | NA                                               |
| GSM 1900      | 0.121                       | 0.255                                 | 1.038                               | NA                                               |
| WCDMA Band II | 0.261                       | 0.702                                 | 1.157                               | NA                                               |
| WCDMA Band IV | 0.188                       | 0.538                                 | 1.071                               | NA                                               |
| WCDMA Band V  | 0.187                       | 0.290                                 | 0.462                               | NA                                               |
| LTE FDD 2     | 0.324                       | 0.767                                 | 0.988                               | NA                                               |
| LTE FDD 4     | 0.266                       | 0.826                                 | 0.905                               | NA                                               |
| LTE FDD 5     | 0.243                       | 0.380                                 | 0.631                               | NA                                               |
| LTE FDD 12    | 0.201                       | 0.230                                 | 0.389                               | NA                                               |
| LTE TDD 41    | 0.686                       | 0.741                                 | 0.916                               | <b>2.929</b>                                     |
| LTE TDD 66    | 0.286                       | <b>0.949</b>                          | 0.955                               | NA                                               |
| LTE TDD 71    | 0.198                       | 0.192                                 | 0.477                               | NA                                               |
| Wi-Fi (2.4G)  | 1.244                       | 0.167                                 | 0.360                               | NA                                               |
| Wi-Fi (5G)    | <b>1.260</b>                | 0.600                                 | <b>1.324</b>                        | NA                                               |
| BT            | 0.168                       | 0.058                                 | 0.058                               | NA                                               |

Date of Testing: September 28, 2021 ~ October 21, 2021

Date of Sample Received: August 27, 2021

Note: 1. The device is in compliance with SAR for Uncontrolled Environment /General Population exposure limits (1.6 W/kg and 4.0 W/kg) specified in ANSI C95.1: 1992/IEEE C95.1: 1991, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

2.All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.



Note: 1) For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits according to the FCC rule § 2.1093, the ANSI C95.1: 1992/IEEE C95.1: 1991, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013.

Table 2: Highest Simultaneous Transmission SAR

| Exposure Configuration                                                                     | 1g SAR Head | 1g SAR Body-worn (Separation 15mm) | 1g SAR Hotspot (Separation 10mm) | Product Specific 10-g SAR (Separation 0mm) |
|--------------------------------------------------------------------------------------------|-------------|------------------------------------|----------------------------------|--------------------------------------------|
| Highest Simultaneous Transmission SAR (W/kg)                                               | 1.568       | 1.549                              | 1.591                            | 2.929                                      |
| Note: The detail for simultaneous transmission consideration is described in chapter 10.3. |             |                                    |                                  |                                            |

### 3 Description of Equipment under Test

#### Client Information

|                      |                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------|
| Applicant            | ZTE Corporation                                                                                                |
| Applicant address    | ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China |
| Manufacturer         | ZTE Corporation                                                                                                |
| Manufacturer address | ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China |

#### General Technologies

|                                                                                                             |                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Application Purpose                                                                                         | Original Grant                                                                                                                        |
| EUT Stage                                                                                                   | Identical Prototype                                                                                                                   |
| Model                                                                                                       | Z6251                                                                                                                                 |
| SN                                                                                                          | 862947050003473                                                                                                                       |
| Hardware Version                                                                                            | Z6251HW1.0                                                                                                                            |
| Software Version                                                                                            | Z6251_CCv1.0.0B08                                                                                                                     |
| Antenna Type                                                                                                | Internal Antenna                                                                                                                      |
| Device Class                                                                                                | B                                                                                                                                     |
| Wi-Fi Hotspot                                                                                               | Wi-Fi 2.4G<br>Wi-Fi 5G U-NII-1&U-NII-3                                                                                                |
| Power Class                                                                                                 | GSM 850: 4<br>GSM 1900: 1<br>UMTS Band II/IV/V: 3<br>LTE FDD 2/4/5/12/66/71: 3<br>LTE TDD 41: 3                                       |
| Power Level                                                                                                 | GSM 850: level 5<br>GSM 1900: level 0<br>UMTS Band II/IV/V: all up bits<br>LTE FDD 2/4/5/12/66/71: max power<br>LTE TDD 41: max power |
| EUT Accessory                                                                                               |                                                                                                                                       |
| Battery                                                                                                     | Manufacturer: SCUD (Fujian) Electronics Co., LTD.<br>Model: Li3839T44P8h866445                                                        |
| Note: The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant. |                                                                                                                                       |

## Wireless Technology and Frequency Range

| Wireless Technology |                                                                                                                                     | Modulation                | Operating mode                                                                                                  | Tx (MHz)                   |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------|
| GSM                 | 850                                                                                                                                 | Voice(GMSK)<br>GPRS(GMSK) | <input type="checkbox"/> Multi-slot Class:8-1UP<br><input type="checkbox"/> Multi-slot Class:10-2UP             | 824 ~ 849                  |
|                     | 1900                                                                                                                                | EGPRS(GMSK,8PSK)          | <input checked="" type="checkbox"/> Multi-slot Class:12-4UP<br><input type="checkbox"/> Multi-slot Class:33-4UP | 1850 ~ 1910                |
|                     | Does this device support DTM (Dual Transfer Mode)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No              |                           |                                                                                                                 |                            |
| UMTS                | Band II                                                                                                                             | QPSK, 16QAM               | HSDPA UE Category:14                                                                                            | 1850 ~ 1910                |
|                     | Band IV                                                                                                                             |                           | HSUPA UE Category:7                                                                                             | 1710 ~ 1755                |
|                     | Band V                                                                                                                              |                           | HSPA+ Category:6                                                                                                | 824 ~ 849                  |
| LTE                 | FDD 2                                                                                                                               | QPSK, 16QAM,<br>64QAM     | Category 5                                                                                                      | 1850 ~ 1910                |
|                     | FDD 4                                                                                                                               |                           |                                                                                                                 | 1710 ~ 1755                |
|                     | FDD 5                                                                                                                               |                           |                                                                                                                 | 824 ~ 849                  |
|                     | FDD 12                                                                                                                              |                           |                                                                                                                 | 699 ~ 716                  |
|                     | TDD 41                                                                                                                              |                           |                                                                                                                 | 2496 ~ 2690                |
|                     | FDD 66                                                                                                                              |                           |                                                                                                                 | 1710 ~ 1780                |
|                     | FDD 71                                                                                                                              |                           |                                                                                                                 | 663 ~ 698                  |
|                     | Does this device support Carrier Aggregation (CA) <input checked="" type="checkbox"/> Yes downlink only <input type="checkbox"/> No |                           |                                                                                                                 |                            |
|                     | Does this device support SV-LTE (1xRTT-LTE)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                    |                           |                                                                                                                 |                            |
| BT                  | 2.4G                                                                                                                                | Version 5.0 LE            |                                                                                                                 | 2402 ~2480                 |
| Wi-Fi               | 2.4G                                                                                                                                | DSSS, OFDM                | 802.11b/g/n HT20                                                                                                | 2412 ~ 2462                |
|                     | 5G                                                                                                                                  | OFDM                      | 802.11a/n HT20/ HT40/<br>ac VHT20/ VHT40/ VHT80                                                                 | 5150 ~ 5250<br>5725 ~ 5850 |
|                     | Does this device support MIMO <input type="checkbox"/> Yes(1TX, 1RX) <input checked="" type="checkbox"/> No                         |                           |                                                                                                                 |                            |



## 4 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE 1528- 2013, ANSI C95.1: 1992, IEEE C95.1: 1991, the following FCC Published RF exposure KDB procedures:

IEC 62209-1

### Reference Standards

KDB 248227 D01 802.11Wi-Fi SAR v02r02

KDB 447498 D01 General RF Exposure Guidance v06

KDB 648474 D04 Handset SAR v01r03

KDB 690783 D01 SAR Listings on Grants v01r03

KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04

KDB 865664 D02 RF Exposure Reporting v01r02

KDB 941225 D01 3G SAR Procedures v03r01

KDB 941225 D05 SAR for LTE Devices v02r05

KDB 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02

KDB 941225 D06 Hotspot Mode v02r01

## 5 Operational Conditions during Test

### 5.1 Test Positions

#### 5.1.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2013 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

#### 5.1.2 Body Worn Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is  $> 1.2 \text{ W/kg}$ , the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

### 5.1.3 Phablet SAR test considerations

For smart phones, with a display diagonal dimension  $> 15.0$  cm or an overall diagonal dimension  $> 16.0$  cm, that can provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets and support voice calls next to the ear, unless it is confirmed otherwise through KDB inquiries, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance.

- a) The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
- b) The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at  $\leq 25$  mm from that surface or edge, in direct contact with a flat phantom, for product specific 10-g SAR according to the body-equivalent tissue dielectric parameters in KDB Publication 865664 D01 to address interactive hand use exposure conditions. The 1-g SAR at 5 mm for UMPC mini-tablets is not required. When hotspot mode applies, product specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR  $> 1.2$  W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold. The normal tablet procedures in KDB Publication 616217 are required when the overall diagonal dimension of the device is  $> 20.0$  cm. Hotspot mode SAR is not required when normal tablet procedures are applied. Product specific 10-g SAR is also not required for the front (top) surface of larger form factor full size tablets. The more conservative normal tablet SAR results can be used to support phablet mode product specific 10-g SAR.
- c) The simultaneous transmission operating configurations applicable to voice and data transmissions for both phone and mini-tablet modes must be taken into consideration separately for 1-g and 10-g SAR to determine the simultaneous transmission SAR test exclusion and measurement requirements for the relevant wireless modes and exposure conditions.

## 5.2 Measurement Variability

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

- 1) When the original highest measured SAR is  $\geq 0.80$  W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was  $> 1.20$  or when the original or repeated measurement was  $\geq 1.45$  W/kg ( $\sim 10\%$  from the 1-g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was  $\geq 1.5$  W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is  $> 1.20$ .
- 4) Repeated measurements are not required when the original highest measured SAR is  $< 0.80$  W/kg

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

## 5.3 Test Configuration

### 5.3.1 GSM Test Configuration

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

Output power of reductions:

**Table 3: The allowed power reduction in the multi-slot configuration**

| Number of timeslots in uplink assignment | Permissible nominal reduction of maximum output power (dB) |
|------------------------------------------|------------------------------------------------------------|
| 1                                        | 0                                                          |
| 2                                        | 0 to 3,0                                                   |
| 3                                        | 1,8 to 4,8                                                 |
| 4                                        | 3,0 to 6,0                                                 |

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. GSM voice and GPRS data use GMSK, which is a constant amplitude modulation with minimal peak to average power difference within the time-slot burst. For EDGE, GMSK is used for MCS 1 – MCS 4 and 8-PSK is used for MCS 5 – MCS 9; where 8-PSK has an inherently higher peak-to-average power ratio. The GMSK and 8-PSK EDGE configurations are considered separately for SAR compliance. The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance. The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode.

### 5.3.2 UMTS Test Configuration

#### 5.3.2.1 3G SAR Test Reduction Procedure

The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations modes according to output power, exposure conditions and device operating capabilities. Maximum output power is verified by applying the applicable versions of 3GPP TS 34.121.

#### 5.3.2.2 Head SAR

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest SAR configuration in 12.2 kbps RMC for head exposure.

### 5.3.2.3 Body-worn accessory SAR

SAR for body-worn accessory configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the EUT with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the EUT, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC

### 5.3.2.4 Release 5 HSDPA Test Configuration

The 3G SAR test reduction procedure is applied to HSDPA body-worn accessory configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures in the “Release 5 HSDPA Data Devices” section of this document, for the highest SAR body-worn accessory exposure configuration in 12.2 kbps RMC. EUT with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

HSDPA should be configured according to the UE category of a test device. The number of HSDSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors ( $\beta_c$ ,  $\beta_d$ ), and HS-DPCCH power offset parameters ( $\Delta_{ACK}$ ,  $\Delta_{NACK}$ ,  $\Delta_{CQI}$ ) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

**Table 4: Subtests for UMTS Release 5 HSDPA**

| Sub-set                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | $\beta_c$         | $\beta_d$         | $\beta_d$<br>(SF) | $\beta_c/\beta_d$ | $\beta_{hs}$<br>(note 1, note 2) | CM(dB)<br>(note 3) | MPR(dB) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|----------------------------------|--------------------|---------|
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2/15              | 15/15             | 64                | 2/15              | 4/15                             | 0.0                | 0.0     |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 12/15<br>(note 4) | 15/15<br>(note 4) | 64                | 12/15<br>(note 4) | 24/15                            | 1.0                | 0.0     |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15/15             | 8/15              | 64                | 15/8              | 30/15                            | 1.5                | 0.5     |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15/15             | 4/15              | 64                | 15/4              | 30/15                            | 1.5                | 0.5     |
| <p>Note 1: <math>\Delta_{ACK}</math>, <math>\Delta_{NACK}</math> and <math>\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c</math></p> <p>Note 2: CM=1 for <math>\beta_c/\beta_d = 12/15</math>, <math>\beta_{hs}/\beta_c = 24/15</math>.</p> <p>Note 3: For subtest 2 the <math>\beta_c/\beta_d</math> ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1, TF1) to <math>\beta_c = 11/15</math> and <math>\beta_d = 15/15</math>.</p> |                   |                   |                   |                   |                                  |                    |         |

### 5.3.2.5 Release 6 HSUPA Test Configuration

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body-worn accessory configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures in the “Release 6 HSPA Data Devices” section of this document, for the highest body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When VOIP is applicable for next to the ear head exposure in HSPA, the 3G SAR test reduction procedure is applied to HSPA with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body-worn accessory measurements is tested for next to the ear head exposure.

Due to inner loop power control requirements in HSPA, a communication test set is required for output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA are configured according to the  $\beta$  values indicated in Table 2 and other applicable procedures described in the ‘WCDMA EUT’ and ‘Release 5 HSDPA Data Devices’ sections of this document

**Table 5: Sub-Test 5 Setup for Release 6 HSUPA**

| Sub-set | $\beta_c$            | $\beta_d$            | $\beta_d$<br>(SF) | $\beta_c/\beta_d$    | $\beta_{hs}^{(1)}$ | $\beta_{ec}$ | $\beta_{ed}$                               | $\beta_{ed}$<br>(SF) | $\beta_{ed}$<br>(codes) | CM <sup>(2)</sup><br>(dB) | MPR<br>(dB) | AG <sup>(4)</sup><br>Index | E-TFCI |
|---------|----------------------|----------------------|-------------------|----------------------|--------------------|--------------|--------------------------------------------|----------------------|-------------------------|---------------------------|-------------|----------------------------|--------|
| 1       | 11/15 <sup>(3)</sup> | 15/15 <sup>(3)</sup> | 64                | 11/15 <sup>(3)</sup> | 22/15              | 209/225      | 1039/225                                   | 4                    | 1                       | 1.0                       | 0.0         | 20                         | 75     |
| 2       | 6/15                 | 15/15                | 64                | 6/15                 | 12/15              | 12/15        | 94/75                                      | 4                    | 1                       | 3.0                       | 2.0         | 12                         | 67     |
| 3       | 15/15                | 9/15                 | 64                | 15/9                 | 30/15              | 30/15        | $\beta_{ed1}$ 47/15<br>$\beta_{ed2}$ 47/15 | 4                    | 2                       | 2.0                       | 1.0         | 15                         | 92     |
| 4       | 2/15                 | 15/15                | 64                | 2/15                 | 4/15               | 2/15         | 56/75                                      | 4                    | 1                       | 3.0                       | 2.0         | 17                         | 71     |
| 5       | 15/15 <sup>(4)</sup> | 15/15 <sup>(4)</sup> | 64                | 15/15 <sup>(4)</sup> | 30/15              | 24/15        | 134/15                                     | 4                    | 1                       | 1.0                       | 0.0         | 21                         | 81     |

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$ .

Note 2: CM = 1 for  $\beta_c/\beta_d = 12/15$ ,  $\beta_{hs}/\beta_c = 24/15$ . For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the  $\beta_c/\beta_d$  ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 10/15$  and  $\beta_d = 15/15$ .

Note 4: For subtest 5 the  $\beta_c/\beta_d$  ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 14/15$  and  $\beta_d = 15/15$ .

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Figure 5.1g.

Note 6:  $\beta_{ed}$  cannot be set directly; it is set by Absolute Grant Value.

**Table 6: HSUPA UE category**

| UE E-DCH Category | Maximum E-DCH Codes Transmitted | Number of HARQ Processes | E-DCHTTI (ms) | Minimum Spreading Factor | Maximum E-DCH Transport Block Bits | Max Rate (Mbps) |
|-------------------|---------------------------------|--------------------------|---------------|--------------------------|------------------------------------|-----------------|
| 1                 | 1                               | 4                        | 10            | 4                        | 7110                               | 0.7296          |
| 2                 | 2                               | 8                        | 2             | 4                        | 2798                               | 1.4592          |
|                   | 2                               | 4                        | 10            | 4                        | 14484                              |                 |
| 3                 | 2                               | 4                        | 10            | 4                        | 14484                              | 1.4592          |



|                                                                                                                                                                                                                  |   |   |    |                  |       |        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|----|------------------|-------|--------|
| 4                                                                                                                                                                                                                | 2 | 8 | 2  | 2                | 5772  | 2.9185 |
|                                                                                                                                                                                                                  | 2 | 4 | 10 | 2                | 20000 | 2.00   |
| 5                                                                                                                                                                                                                | 2 | 4 | 10 | 2                | 20000 | 2.00   |
| 6<br>(No DPDCH)                                                                                                                                                                                                  | 4 | 8 | 2  | 2 SF2 & 2        | 11484 | 5.76   |
|                                                                                                                                                                                                                  | 4 | 4 | 10 | SF4              | 20000 | 2.00   |
| 7<br>(No DPDCH)                                                                                                                                                                                                  | 4 | 8 | 2  | 2 SF2 & 2<br>SF4 | 22996 | ?      |
|                                                                                                                                                                                                                  | 4 | 4 | 10 |                  | 20000 | ?      |
| NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.<br>UE Categories 1 to 6 supports QPSK only. UE Category 7 supports QPSK and 16QAM.<br>(TS25.306-7.3.0) |   |   |    |                  |       |        |

### 5.3.2.6 HSPA, HSPA+ and DC-HSDPA Test Configuration

SAR test exclusion may apply to 3GPP Rel. 6 HSPA and Rel. 8 DC-HSDPA. When SAR measurement is required for HSPA or DC-HSDPA, a KDB inquiry is required to confirm that the wireless mode configurations in the test setup have remained stable throughout the SAR measurements. Without prior KDB confirmation to determine the SAR results are acceptable, a PAG is required for equipment approval.

SAR test exclusion for HSPA, HSPA+ and DC-HSDPA is determined according to the following:

1) The HSPA procedures are applied to configure 3GPP Rel. 6 HSPA devices in the required sub-test mode(s) to determine SAR test exclusion.

2) SAR is required for Rel. 7 HSPA+ when SAR is required for Rel. 6 HSPA; otherwise, the 3G SAR test reduction procedure is applied to (uplink) HSPA+ with 12.2 kbps RMC as the primary mode. Power is measured for HSPA+ that supports uplink 16 QAM according to configurations in Table C.11.1.4 of 3GPP TS 34.121-1 to determine SAR test reduction.

3) SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

4) Regardless of whether a PBA is required, the following information must be verified and included in the SAR report for devices supporting HSPA, HSPA+ or DC-HSDPA:

a) The output power measurement results and applicable release version(s) of 3GPP TS 34.121. Power measurement difficulties due to test equipment setup or availability must be resolved between the grantee and its test lab.

b) The power measurement results are in agreement with the individual device implementation and specifications. When Enhanced MPR (E-MPR) applies, the normal MPR targets may be modified according to the Cubic Metric (CM) measured by the device, which must be taken into consideration.

c) The UE category, operating parameters, such as the  $\beta$  and  $\Delta$  values used to configure the device for testing, power setback procedures described in 3GPP TS 34.121 for the power measurements, and HSPA/HSPA+ channel conditions (active and stable) for the entire duration of the measurement according to the required E-TFCI and AG index values.

5) When SAR measurement is required, the test configurations, procedures and power measurement



results must be clearly described to confirm that the required test parameters are used, including E-TFCI and AG index stability and output power conditions.

**Table 7: HS-DSCH UE category**

| HS-DSCH category      | Maximum number of HS-DSCH codes received | Minimum inter-TTI interval | Maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI<br>NOTE 1 | Total number of soft channel bits | Supported modulations without MIMO operation or dual cell operation | Supported modulations with MIMO operation and without dual cell operation | Supported modulations with dual cell operation     |
|-----------------------|------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------------|----------------------------------------------------|
| Category 1            | 5                                        | 3                          | 7298                                                                                          | 19200                             | QPSK, 16QAM                                                         | Not applicable (MIMO not supported)                                       | Not applicable (dual cell operation not supported) |
| Category 2            | 5                                        | 3                          | 7298                                                                                          | 28800                             |                                                                     |                                                                           |                                                    |
| Category 3            | 5                                        | 2                          | 7298                                                                                          | 28800                             |                                                                     |                                                                           |                                                    |
| Category 4            | 5                                        | 2                          | 7298                                                                                          | 38400                             |                                                                     |                                                                           |                                                    |
| Category 5            | 5                                        | 1                          | 7298                                                                                          | 57600                             |                                                                     |                                                                           |                                                    |
| Category 6            | 5                                        | 1                          | 7298                                                                                          | 67200                             |                                                                     |                                                                           |                                                    |
| Category 7            | 10                                       | 1                          | 14411                                                                                         | 115200                            |                                                                     |                                                                           |                                                    |
| Category 8            | 10                                       | 1                          | 14411                                                                                         | 134400                            |                                                                     |                                                                           |                                                    |
| Category 9            | 15                                       | 1                          | 20251                                                                                         | 172800                            |                                                                     |                                                                           |                                                    |
| Category 10           | 15                                       | 1                          | 27952                                                                                         | 172800                            |                                                                     |                                                                           |                                                    |
| Category 11           | 5                                        | 2                          | 3630                                                                                          | 14400                             | QPSK                                                                |                                                                           |                                                    |
| Category 12           | 5                                        | 1                          | 3630                                                                                          | 28800                             |                                                                     |                                                                           |                                                    |
| Category 13           | 15                                       | 1                          | 35280                                                                                         | 259200                            | QPSK, 16QAM, 64QAM                                                  |                                                                           |                                                    |
| Category 14           | 15                                       | 1                          | 42192                                                                                         | 259200                            |                                                                     |                                                                           |                                                    |
| Category 15           | 15                                       | 1                          | 23370                                                                                         | 345600                            | QPSK, 16QAM                                                         |                                                                           |                                                    |
| Category 16           | 15                                       | 1                          | 27952                                                                                         | 345600                            |                                                                     |                                                                           |                                                    |
| Category 17<br>NOTE 2 | 15                                       | 1                          | 35280                                                                                         | 259200                            | QPSK, 16QAM, 64QAM                                                  | –                                                                         |                                                    |
|                       |                                          |                            | 23370                                                                                         | 345600                            | –                                                                   | QPSK, 16QAM                                                               |                                                    |
| Category 18<br>NOTE 3 | 15                                       | 1                          | 42192                                                                                         | 259200                            | QPSK, 16QAM, 64QAM                                                  | –                                                                         |                                                    |
|                       |                                          |                            | 27952                                                                                         | 345600                            | –                                                                   | QPSK, 16QAM                                                               |                                                    |
| Category 19           | 15                                       | 1                          | 35280                                                                                         | 518400                            | QPSK, 16QAM, 64QAM                                                  |                                                                           |                                                    |
| Category 20           | 15                                       | 1                          | 42192                                                                                         | 518400                            |                                                                     |                                                                           |                                                    |
| Category 21           | 15                                       | 1                          | 23370                                                                                         | 345600                            | -                                                                   | -                                                                         | QPSK, 16QAM                                        |
| Category 22           | 15                                       | 1                          | 27952                                                                                         | 345600                            |                                                                     |                                                                           | QPSK, 16QAM, 64QAM                                 |
| Category 23           | 15                                       | 1                          | 35280                                                                                         | 518400                            |                                                                     |                                                                           |                                                    |
| Category 24           | 15                                       | 1                          | 42192                                                                                         | 518400                            |                                                                     |                                                                           |                                                    |

### 5.3.3 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

#### A) Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

#### B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to

3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

### **C) A-MPR**

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

### **D) Largest channel bandwidth standalone SAR test requirements**

#### **1) QPSK with 1 RB allocation**

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is  $\leq 0.8$  W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is  $> 1.45$  W/kg, SAR is required for all three RB offset configurations for that required test channel.

#### **2) QPSK with 50% RB allocation**

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

#### **3) QPSK with 100% RB allocation**

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100% RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.

#### **4) Higher order modulations**

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is  $> \frac{1}{2}$  dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is  $> 1.45$  W/kg.

### **E) Other channel bandwidth standalone SAR test requirements**

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is  $> \frac{1}{2}$  dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is  $> 1.45$  W/kg.

### **5.3.4 Additional requirements for TDD LTE specification**

For Time-Division Duplex (TDD) systems, SAR must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP LTE TDD configurations.

TDD LTE Band supports 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table: Uplink-downlink configurations for uplink-downlink configurations and Table: Configuration of special subframe (lengths of DwPTS/GP/UpPTS) for Special subframe configurations.

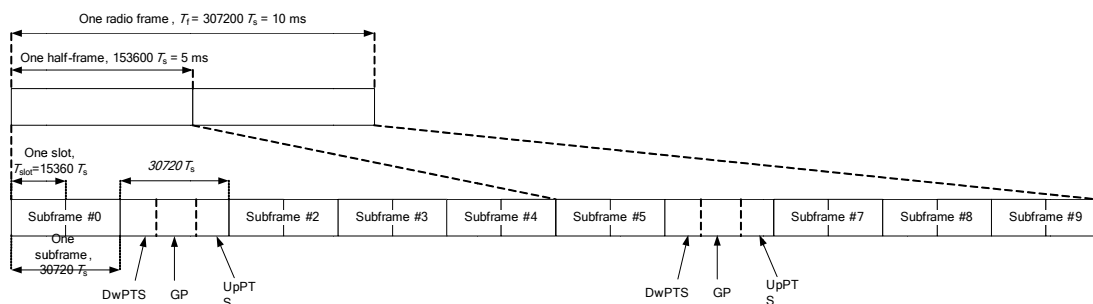


Figure 1: Frame structure type 2

**Table 8: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)**

| Special subframe configuration | Normal cyclic prefix in downlink |                                |                                  | Extended cyclic prefix in downlink |                                |                                  |
|--------------------------------|----------------------------------|--------------------------------|----------------------------------|------------------------------------|--------------------------------|----------------------------------|
|                                | DwPTS                            | UpPTS                          |                                  | DwPTS                              | UpPTS                          |                                  |
|                                |                                  | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink |                                    | Normal cyclic prefix in uplink | Extended cyclic prefix in uplink |
| 0                              | $6592 \cdot T_s$                 | $2192 \cdot T_s$               | $2560 \cdot T_s$                 | $7680 \cdot T_s$                   | $2192 \cdot T_s$               | $2560 \cdot T_s$                 |
| 1                              | $19760 \cdot T_s$                |                                |                                  | $20480 \cdot T_s$                  |                                |                                  |
| 2                              | $21952 \cdot T_s$                |                                |                                  | $23040 \cdot T_s$                  |                                |                                  |
| 3                              | $24144 \cdot T_s$                |                                |                                  | $25600 \cdot T_s$                  |                                |                                  |
| 4                              | $26336 \cdot T_s$                |                                |                                  | $7680 \cdot T_s$                   | $4384 \cdot T_s$               | $5120 \cdot T_s$                 |
| 5                              | $6592 \cdot T_s$                 | $4384 \cdot T_s$               | $5120 \cdot T_s$                 | $20480 \cdot T_s$                  |                                |                                  |
| 6                              | $19760 \cdot T_s$                |                                |                                  | $23040 \cdot T_s$                  |                                |                                  |
| 7                              | $21952 \cdot T_s$                |                                |                                  | $12800 \cdot T_s$                  |                                |                                  |
| 8                              | $24144 \cdot T_s$                |                                |                                  | -                                  | -                              | -                                |
| 9                              | $13168 \cdot T_s$                |                                |                                  | -                                  | -                              | -                                |

**Table 9: Uplink-downlink configurations**

| Uplink-downlink configuration | Downlink-to-Uplink Switch-point periodicity | Subframe number |   |   |   |   |   |   |   |   |   |
|-------------------------------|---------------------------------------------|-----------------|---|---|---|---|---|---|---|---|---|
|                               |                                             | 0               | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0                             | 5 ms                                        | D               | S | U | U | U | D | S | U | U | U |
| 1                             | 5 ms                                        | D               | S | U | U | D | D | S | U | U | D |
| 2                             | 5 ms                                        | D               | S | U | D | D | D | S | U | D | D |
| 3                             | 10 ms                                       | D               | S | U | U | U | D | D | D | D | D |
| 4                             | 10 ms                                       | D               | S | U | U | D | D | D | D | D | D |
| 5                             | 10 ms                                       | D               | S | U | D | D | D | D | D | D | D |
| 6                             | 5 ms                                        | D               | S | U | U | U | D | S | U | U | D |

According to Figure 1, one radio frame is configured by 10 subframes, which consist of Uplink-subframe, Downlink-subframe and Special subframe. For TDD-LTE, the Duty Cycle should be calculated on Uplink-subframes and Special subframes, due to Special subframe containing both Uplink transmissions. So for one radio frame, Duty Cycle can be calculated with formula as below. The count of Uplink subframes are according to Table: Uplink-downlink configurations:

$$\text{Duty cycle} = (30720Ts * \text{Ups} + \text{Uplink Component} * \text{Specials}) / (307200Ts)$$

About the uplink component of Special subframes, we can figure out by Table: Configuration of special subframe (lengths of DwPTS/GP/UpPTS):

$$\text{Uplink Component} = \text{UpPTS}$$

In conclusion, for the TDD LTE Band, Duty Cycle can be calculated with formula as below. All these sets are ok when we test, or we can set as below.

$$\text{Duty cycle} = [(30720Ts * \text{Ups}) + \text{UpPTS} * \text{Specials}] / (307200Ts)$$

And we can get different Duty cycles under different configurations:

| Uplink-downlink configuration | Subframe number |   |   | Configuration of special subframe |                   |                                  |                   |                                    |                   |                                  |                   |
|-------------------------------|-----------------|---|---|-----------------------------------|-------------------|----------------------------------|-------------------|------------------------------------|-------------------|----------------------------------|-------------------|
|                               |                 |   |   | Normal cyclic prefix in downlink  |                   |                                  |                   | Extended cyclic prefix in downlink |                   |                                  |                   |
|                               |                 |   |   | Normal cyclic prefix in uplink    |                   | Extended cyclic prefix in uplink |                   | Normal cyclic prefix in uplink     |                   | Extended cyclic prefix in uplink |                   |
|                               | D               | S | U | configuration 0~4                 | configuration 5~9 | configuration 0~4                | configuration 5~9 | configuration 0~3                  | configuration 4~7 | configuration 0~3                | configuration 4~7 |
| 0                             | 2               | 2 | 6 | 61.43%                            | 62.85%            | 61.67%                           | 63.33%            | 61.43%                             | 62.85%            | 61.67%                           | 63.33%            |
| 1                             | 4               | 2 | 4 | 41.43%                            | 42.85%            | 41.67%                           | 43.33%            | 41.43%                             | 42.85%            | 41.67%                           | 43.33%            |
| 2                             | 6               | 2 | 2 | 21.43%                            | 22.85%            | 21.67%                           | 23.33%            | 21.43%                             | 22.85%            | 21.67%                           | 23.33%            |
| 3                             | 6               | 1 | 3 | 30.71%                            | 31.43%            | 30.83%                           | 31.67%            | 30.71%                             | 31.43%            | 30.83%                           | 31.67%            |
| 4                             | 7               | 1 | 2 | 20.71%                            | 21.43%            | 20.83%                           | 21.67%            | 20.71%                             | 21.43%            | 20.83%                           | 21.67%            |
| 5                             | 8               | 1 | 1 | 10.71%                            | 11.43%            | 10.83%                           | 11.67%            | 10.71%                             | 11.43%            | 10.83%                           | 11.67%            |
| 6                             | 3               | 2 | 5 | 51.43%                            | 52.85%            | 51.67%                           | 53.33%            | 51.43%                             | 52.85%            | 51.67%                           | 53.33%            |

SAR test Plan: For TDD LTE, SAR should be tested with the highest transmission duty factor (63.33%) using Uplink-downlink configuration 0 and Special subframe configuration 7 for Frame structure type

**Physical Cell Setup**

- DL Cell Bandwidth: 20.0 MHz
- UL Cell Bandwidth: 20.0 MHz
- Physical Cell ID: 0
- Cyclic Prefix: Normal
- Sounding RS (SRS): ☐
- TDD**
  - Use Carrier Specific: ☐
  - Uplink Downlink Configuration**

| Subframe Number | Direction |
|-----------------|-----------|
| 0               | ↓         |
| 1               | ↑         |
| 2               | ↑         |
| 3               | ↑         |
| 4               | ↑         |
| 5               | ↓         |
| 6               | ↑         |
| 7               | ↑         |
| 8               | ↑         |
| 9               | ↑         |

**LTE**

LTE 1 TX Meas.

LTE 1 RX Meas.

Go to...

Routing

**LTE Signaling**

**ON**

Config ...

### 5.3.5 Wi-Fi Test Configuration

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; These are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the *initial test position(s)* by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The *initial test position(s)* is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the *reported SAR* for the *initial test position* is:

- $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the *initial test position* to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the *reported SAR* is  $\leq 0.8$  W/kg or all required test positions are tested.
  - ✧ For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - ✧ When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the *initial test position* and subsequent test positions, when the *reported SAR* is  $> 0.8$  W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the *reported SAR* is  $\leq 1.2$  W/kg or all required test channels are considered.
  - ✧ The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.

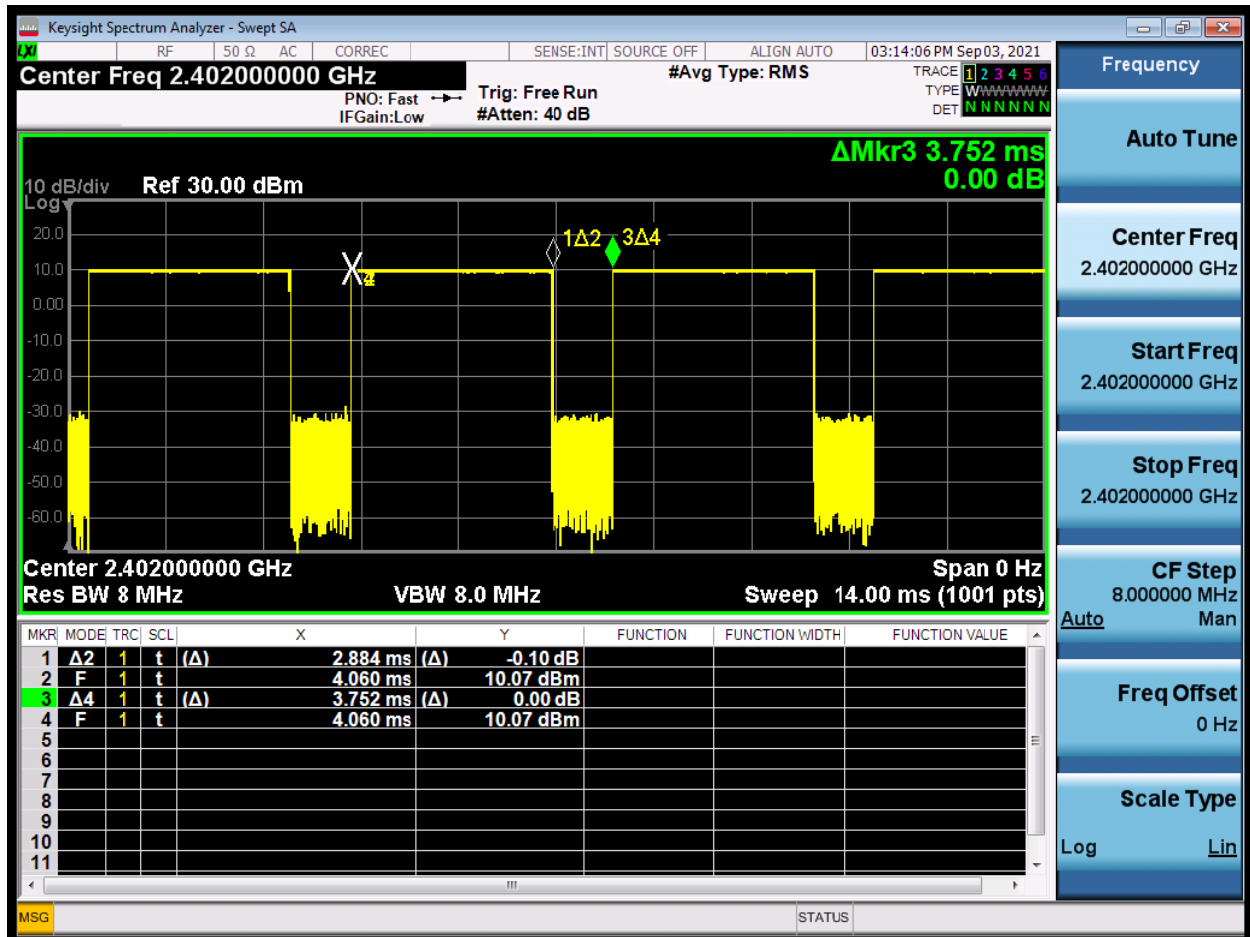
To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

### 5.3.6 BT Test Configuration

For BT SAR testing, BT engineering testing software installed on the EUT can provide continuous transmitting RF signal with maximum output power. And the CBT control the EUT operating with hopping off and data rate set for DH5.

The SAR measurement takes full account of the BT duty cycle and is reflected in the report, and the duty factor of the device is as follow:

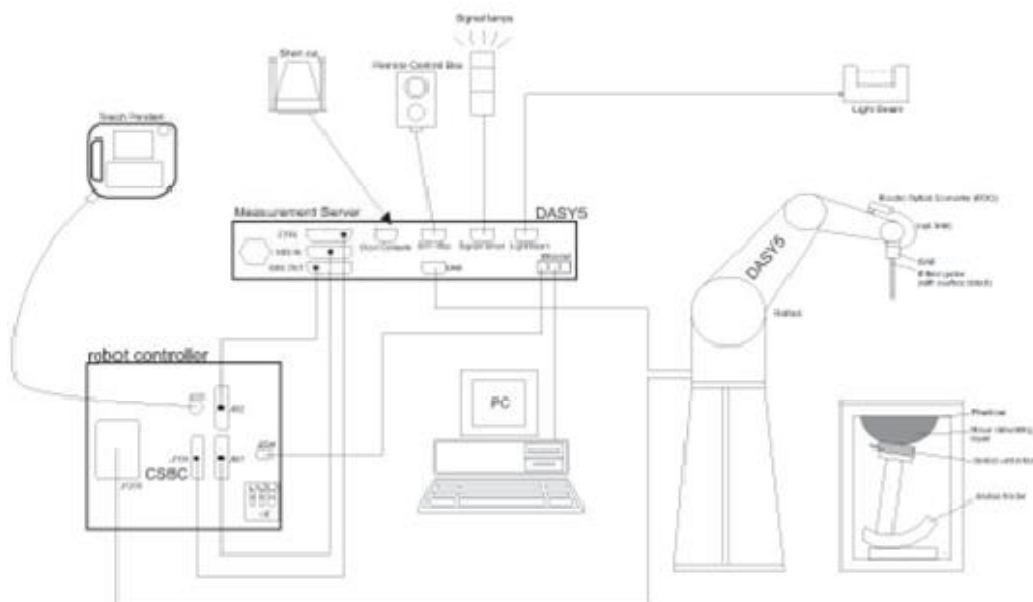


Note: Duty factor= Ton (ms)/ T(on+off) (ms)=2.884/3.752=76.9%

## 6 SAR Measurements System Configuration

### 6.1 SAR Measurement Set-up

The DASY system for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

## 6.2 DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

### EX3DV4 Probe Specification

|               |                                                                                                                                                                                                            |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction  | Symmetrical design with triangular core<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE)                                                |
| Calibration   | ISO/IEC 17025 calibration<br>service available                                                                                                                                                             |
| Frequency     | 10 MHz to > 6 GHz<br>Linearity: $\pm 0.2$ dB<br>(30 MHz to 6 GHz)                                                                                                                                          |
| Directivity   | $\pm 0.3$ dB in HSL (rotation around probe axis)<br>$\pm 0.5$ dB in tissue material (rotation normal to probe axis)                                                                                        |
| Dynamic Range | 10 $\mu$ W/g to > 100 mW/g Linearity:<br>$\pm 0.2$ dB (noise: typically < 1 $\mu$ W/g)                                                                                                                     |
| Dimensions    | Overall length: 330 mm (Tip: 20 mm)<br>Tip diameter: 2.5 mm (Body: 12 mm)<br>Typical distance from probe tip to dipole centers: 1 mm                                                                       |
| Application   | High precision dosimetric measurements in any exposure Scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |



### E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than  $\pm 10\%$ . The spherical isotropy was evaluated and found to be better than  $\pm 0.25$ dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.



$$\text{SAR} = C \Delta T / \Delta t$$

Where:  $\Delta t$  = Exposure time (30 seconds),  
 $C$  = Heat capacity of tissue (brain or muscle),  
 $\Delta T$  = Temperature increase due to RF exposure.

Or

$$\text{SAR} = |E|^2 \sigma / \rho$$

Where:  $\sigma$  = Simulated tissue conductivity,  
 $\rho$  = Tissue density ( $\text{kg/m}^3$ ).

### 6.3 SAR Measurement Procedure

#### Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

#### Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

|                                                                                                        | ≤3 GHz                                                                                                                                                                                                                                                            | > 3 GHz                                                    |
|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface | 5 ± 1 mm                                                                                                                                                                                                                                                          | $\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$ |
| Maximum probe angle from probe axis to phantom surface normal at the measurement location              | 30° ± 1°                                                                                                                                                                                                                                                          | 20° ± 1°                                                   |
| Maximum area scan spatial resolution:<br>$\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$              | ≤ 2 GHz: ≤ 15 mm<br>2 – 3 GHz: ≤ 12 mm                                                                                                                                                                                                                            | 3 – 4 GHz: ≤ 12 mm<br>4 – 6 GHz: ≤ 10 mm                   |
|                                                                                                        | When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device. |                                                            |

## Zoom Scan

Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz.

|                                                                                                                                                                                                                                                                            |                                           |                                                                                             | ≤3GHz                               | > 3 GHz                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------|
| Maximum zoom scan spatial resolution: $\Delta x_{\text{zoom}} \Delta y_{\text{zoom}}$                                                                                                                                                                                      |                                           |                                                                                             | ≤2GHz: ≤8mm<br>2 – 3GHz: ≤5mm*      | 3 – 4GHz: ≤5mm*<br>4 – 6GHz: ≤4mm*                    |
| Maximum zoom scan spatial resolution, normal to phantom surface                                                                                                                                                                                                            | Uniform grid: $\Delta z_{\text{zoom}}(n)$ |                                                                                             | ≤5mm                                | 3 – 4GHz: ≤4mm<br>4 – 5GHz: ≤3mm<br>5 – 6GHz: ≤2mm    |
|                                                                                                                                                                                                                                                                            | Graded grid                               | $\Delta z_{\text{zoom}}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface | ≤4mm                                | 3 – 4GHz: ≤3mm<br>4 – 5GHz: ≤2.5mm<br>5 – 6GHz: ≤2mm  |
|                                                                                                                                                                                                                                                                            |                                           | $\Delta z_{\text{zoom}}(n>1)$ : between subsequent points                                   | ≤1.5• $\Delta z_{\text{zoom}}(n-1)$ |                                                       |
| Minimum zoom scan volume                                                                                                                                                                                                                                                   | X, y, z                                   |                                                                                             | ≥30mm                               | 3 – 4GHz: ≥28mm<br>4 – 5GHz: ≥25mm<br>5 – 6GHz: ≥22mm |
| Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.                                                                                                                          |                                           |                                                                                             |                                     |                                                       |
| * When zoom scan is required and the <u>reported</u> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is ≤ 1.4W/kg, ≤8mm, ≤7mm and ≤5mm zoom scan resolution may be applied, respectively, for 2GHz to 3GHz, 3GHz to 4GHz and 4GHz to 6GHz. |                                           |                                                                                             |                                     |                                                       |

## Volume Scan Procedures

The volume scan is used to assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

## Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

## 7 Main Test Equipment

| Name of Equipment                   | Manufacturer    | Type/Model        | Serial Number | Last Cal.  | Cal. Due Date |
|-------------------------------------|-----------------|-------------------|---------------|------------|---------------|
| Network analyzer                    | Agilent         | E5071B            | MY42404014    | 2021-05-15 | 2022-05-14    |
| Dielectric Probe Kit                | HP              | 85070E            | US44020115    | 2021-05-15 | 2022-05-14    |
| Power meter                         | Agilent         | E4417A            | GB41291714    | 2021-05-15 | 2022-05-14    |
| Power sensor                        | Agilent         | N8481H            | MY50350004    | 2021-05-15 | 2022-05-14    |
| Power sensor                        | Agilent         | E9327A            | US40441622    | 2021-05-15 | 2022-05-14    |
| Dual directional coupler            | Agilent         | 778D-012          | 50519         | /          | /             |
| Dual directional coupler            | Agilent         | 777D              | 50146         | /          | /             |
| Dual directional coupler            | UCL             | UCL-DDC0<br>56G-S | 20010600118   | /          | /             |
| Amplifier                           | INDEXSAR        | TPA-005060<br>G01 | 13030502      | 2021-05-15 | 2022-05-14    |
| Wireless communication tester       | Anritsu         | MT8820C           | 6201342015    | 2020-12-13 | 2021-12-12    |
| Wireless communication tester       | Key sight       | E5515C            | MY48360988    | 2020-12-13 | 2021-12-12    |
| Wideband radio communication tester | R&S             | CMW 500           | 113645        | 2021-05-15 | 2022-05-14    |
| Base Station Simulator              | R&S             | CMW270            | 100673        | 2021-05-15 | 2022-05-14    |
| E-field Probe                       | SPEAG           | EX3DV4            | 3677          | 2021-08-12 | 2022-08-11    |
| DAE                                 | SPEAG           | DAE4              | 1317          | 2021-02-23 | 2022-02-22    |
| Validation Kit 750MHz               | SPEAG           | D750V3            | 1045          | 2020-08-28 | 2023-08-27    |
| Validation Kit 835MHz               | SPEAG           | D835V2            | 4d020         | 2020-08-28 | 2023-08-27    |
| Validation Kit 1750MHz              | SPEAG           | D1750V2           | 1033          | 2020-02-25 | 2023-02-24    |
| Validation Kit 1900MHz              | SPEAG           | D1900V2           | 5d060         | 2020-08-27 | 2023-08-26    |
| Validation Kit 2450MHz              | SPEAG           | D2450V2           | 786           | 2020-08-27 | 2023-08-26    |
| Validation Kit 2600MHz              | SPEAG           | D2600V2           | 1025          | 2021-04-23 | 2024-04-22    |
| Validation Kit 5GHz                 | SPEAG           | D5GHzV2           | 1151          | 2020-02-27 | 2023-02-26    |
| Temperature Probe                   | Tianjin jinming | JM222             | 381           | 2021-05-15 | 2022-05-14    |
| Hygrothermograph                    | Anymetr         | HTC - 1           | TY2020A001    | 2021-05-15 | 2022-05-14    |
| Twin SAM Phantom                    | Speag           | SAM1              | 1534          | /          | /             |



|                    |         |        |   |   |   |
|--------------------|---------|--------|---|---|---|
| Software for Test  | Speag   | DASY52 | / | / | / |
| Softwarefor Tissue | Agilent | 85070  | / | / | / |

## 8 Tissue Dielectric Parameter Measurements & System Verification

### 8.1 Tissue Verification

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within  $\pm 2^\circ\text{C}$  of the temperature when the tissue parameters are characterized. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 24 hours of use; or earlier if the dielectric parameters can become out of tolerance.

#### Target values

| Frequency (MHz) | Water (%) | Salt (%)                       | Sugar (%) | Glycol (%) | Preventol (%) | Cellulose (%) | $\epsilon_r$ | $\sigma(\text{s/m})$ |
|-----------------|-----------|--------------------------------|-----------|------------|---------------|---------------|--------------|----------------------|
| 750             | 41.448    | 1.452                          | 56        | 0          | 0.1           | 1.0           | 41.9         | 0.89                 |
| 835             | 41.450    | 1.450                          | 56        | 0          | 0.1           | 1.0           | 41.5         | 0.90                 |
| 1750            | 55.240    | 0.310                          | 0         | 44.450     | 0             | 0             | 40.1         | 1.37                 |
| 1900            | 55.242    | 0.306                          | 0         | 44.452     | 0             | 0             | 40.0         | 1.40                 |
| 2450            | 62.700    | 0.500                          | 0         | 36.800     | 0             | 0             | 39.2         | 1.80                 |
| 2600            | 55.242    | 0.306                          | 0         | 44.452     | 0             | 0             | 39.0         | 1.96                 |
| Frequency (MHz) | Water (%) | Diethylenglycol monohexylether |           |            | Triton X-100  |               | $\epsilon_r$ | $\sigma(\text{s/m})$ |
| 5250            | 65.53     | 17.24                          |           |            | 17.23         |               | 35.9         | 4.71                 |
| 5750            | 65.53     | 17.24                          |           |            | 17.23         |               | 35.4         | 5.22                 |

# Measurements results

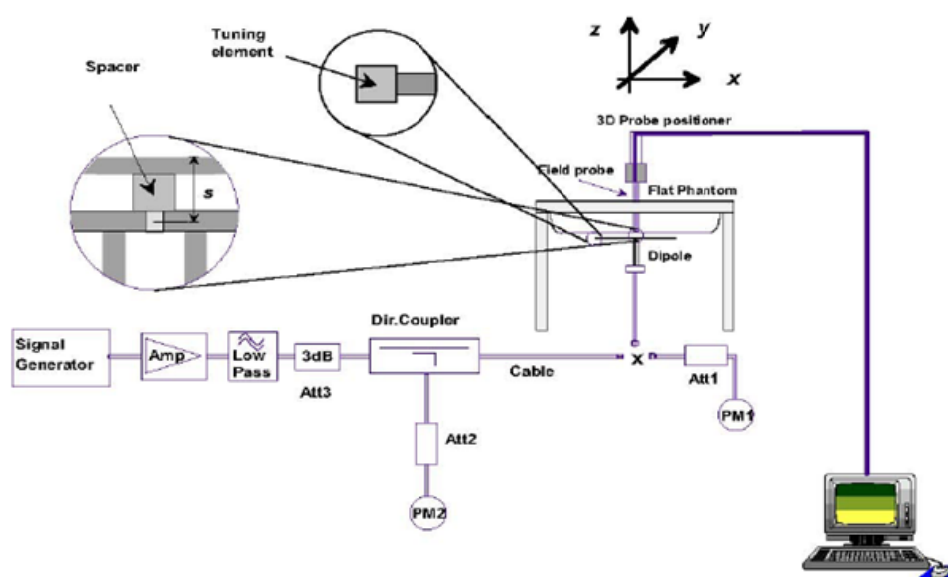
| Frequency<br>(MHz) | Test Date  | Temp<br>℃ | Measured Dielectric<br>Parameters |                | Target Dielectric<br>Parameters |                | Limit<br>(Within ±5%)   |                     |
|--------------------|------------|-----------|-----------------------------------|----------------|---------------------------------|----------------|-------------------------|---------------------|
|                    |            |           | $\epsilon_r$                      | $\sigma$ (s/m) | $\epsilon_r$                    | $\sigma$ (s/m) | Dev<br>$\epsilon_r$ (%) | Dev<br>$\sigma$ (%) |
| 750                | 9/29/2021  | 21.5      | 42.3                              | 0.88           | 41.9                            | 0.89           | 0.95                    | -1.12               |
| 835                | 9/28/2021  | 21.5      | 41.4                              | 0.88           | 41.5                            | 0.90           | -0.24                   | -2.22               |
| 1750               | 9/30/2021  | 21.5      | 40.2                              | 1.34           | 40.1                            | 1.37           | 0.25                    | -2.19               |
| 1900               | 10/1/2021  | 21.5      | 40.1                              | 1.41           | 40.0                            | 1.40           | 0.25                    | 0.71                |
| 2450               | 10/2/2021  | 21.5      | 38.6                              | 1.81           | 39.2                            | 1.80           | -1.53                   | 0.56                |
| 2600               | 10/9/2021  | 21.5      | 38.4                              | 1.94           | 38.4                            | 1.96           | 0.00                    | -1.02               |
| 5250               | 10/14/2021 | 21.5      | 35.5                              | 4.80           | 35.9                            | 4.71           | -1.11                   | 1.91                |
| 5750               | 10/21/2021 | 21.5      | 34.9                              | 5.21           | 35.4                            | 5.22           | -1.41                   | -0.19               |

Note: The depth of tissue-equivalent liquid in a phantom must be  $\geq 15.0$  cm for SAR measurements  $\leq 3$  GHz and  $\geq 10.0$  cm for measurements  $> 3$  GHz.

## 8.2 System Performance Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured using the dielectric probe kit and the network analyzer. A system check measurement for every day was made following the determination of the dielectric parameters of the Tissue simulates, using the dipole validation kit. The dipole antenna was placed under the flat section of the twin SAM phantom.

System check is performed regularly on all frequency bands where tests are performed with the DASY system.



Picture 1 System Performance Check setup



Picture 2 Setup Photo

**Justification for Extended SAR Dipole Calibrations**

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss ( $< -20$  dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01:

| Dipole                                  |                | Date of Measurement | Return Loss(dB) | $\Delta$ % | Impedance ( $\Omega$ ) | $\Delta\Omega$ |
|-----------------------------------------|----------------|---------------------|-----------------|------------|------------------------|----------------|
| Dipole D750V2<br>SN: 1045               | Head<br>Liquid | 8/28/2020           | -26.6           | /          | 54.3                   | /              |
|                                         |                | 8/27/2021           | -26.2           | 1.5        | 53.9                   | 0.4            |
| Dipole D835V2<br>SN: 4d020              | Head<br>Liquid | 8/28/2020           | -26.2           | /          | 54.8                   | /              |
|                                         |                | 8/27/2021           | -26.5           | -1.1       | 55.2                   | -0.4           |
| Dipole D1900V2<br>SN: 5d060             | Head<br>Liquid | 8/28/2020           | -23.3           | /          | 52.5                   | /              |
|                                         |                | 8/27/2021           | -23.0           | 1.3        | 51.9                   | 0.6            |
| Dipole D2450V2<br>SN: 786               | Head<br>Liquid | 8/28/2020           | -26.9           | /          | 54.5                   | /              |
|                                         |                | 8/27/2021           | -27.1           | -0.7       | 53.8                   | 0.7            |
| Dipole D1750V2<br>SN: 1033              | Head<br>Liquid | 2/25/2020           | -38.3           | /          | 48.8                   | /              |
|                                         |                | 2/26/2021           | -40.0           | -1.7       | 49.9                   | 1.1            |
| Dipole D5GHzV2<br>SN: 1151<br>(5250MHz) | Head<br>Liquid | 2/27/2020           | -23.4           | /          | 52.4                   | /              |
|                                         |                | 2/26/2021           | -23.8           | -0.4       | 50.0                   | -2.4           |
| Dipole D5GHzV2<br>SN: 1151<br>(5600MHz) | Head<br>Liquid | 2/27/2020           | -22.6           | /          | 57.0                   | /              |
|                                         |                | 2/26/2021           | -21.5           | 1.1        | 55.6                   | -1.4           |
| Dipole D5GHzV2<br>SN: 1151<br>(5750MHz) | Head<br>Liquid | 2/27/2020           | -25.0           | /          | 55.9                   | /              |
|                                         |                | 2/26/2021           | -26.8           | -1.8       | 52.5                   | -3.4           |

**System Check results**

| Frequency (MHz)                                                                               | Test Date  | Temp $^{\circ}\text{C}$ | 250mW /100mW Measured SAR <sub>1g</sub> (W/kg) | 1W Normalized SAR <sub>1g</sub> (W/kg) | 1W Target SAR <sub>1g</sub> (W/kg) | $\Delta$ % (Limit $\pm 10\%$ ) | Plot No. |
|-----------------------------------------------------------------------------------------------|------------|-------------------------|------------------------------------------------|----------------------------------------|------------------------------------|--------------------------------|----------|
| 750                                                                                           | 9/29/2021  | 21.5                    | 2.13                                           | 8.52                                   | 8.37                               | 1.79                           | 1        |
| 835                                                                                           | 9/28/2021  | 21.5                    | 2.44                                           | 9.76                                   | 9.65                               | 1.14                           | 2        |
| 1750                                                                                          | 9/30/2021  | 21.5                    | 8.95                                           | 35.80                                  | 35.90                              | -0.28                          | 3        |
| 1900                                                                                          | 10/1/2021  | 21.5                    | 9.88                                           | 39.52                                  | 39.50                              | 0.05                           | 4        |
| 2450                                                                                          | 10/2/2021  | 21.5                    | 13.70                                          | 54.80                                  | 52.30                              | 4.78                           | 5        |
| 2600                                                                                          | 10/9/2021  | 21.5                    | 13.88                                          | 55.52                                  | 56.10                              | -1.03                          | 6        |
| 5250                                                                                          | 10/14/2021 | 21.5                    | 7.87                                           | 78.70                                  | 78.00                              | 0.90                           | 7        |
| 5750                                                                                          | 10/21/2021 | 21.5                    | 7.66                                           | 76.60                                  | 77.40                              | -1.03                          | 8        |
| Note: Target Values used derive from the calibration certificate Data Storage and Evaluation. |            |                         |                                                |                                        |                                    |                                |          |

### 8.3 SAR System Validation

Per FCC KDB 865664 D02v01, SAR system verification is required to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles are used with the required tissue-equivalent media for system validation, according to the procedures outlined in FCC KDB 865664 D01 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point must be validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status, measurement frequencies, SAR probes, calibrated signal type(s) and tissue dielectric parameters has been included.

| Frequency<br>[MHz] | Date      | Probe<br>SN | Probe<br>Type | Probe Cal Point |      | PERM<br>(Er) | COND<br>(Σ) | CW Validation |                    |                   | Mod. Validation |                |      |
|--------------------|-----------|-------------|---------------|-----------------|------|--------------|-------------|---------------|--------------------|-------------------|-----------------|----------------|------|
|                    |           |             |               |                 |      |              |             | Sensitivity   | Probe<br>Linearity | Probe<br>Isotropy | Mod.<br>Type    | Duty<br>Factor | PAR  |
| 750                | 8/12/2021 | 3677        | EX3DV4        | 750             | Head | 42.81        | 0.85        | PASS          | PASS               | PASS              | FDD             | PASS           | N/A  |
| 835                | 8/12/2021 | 3677        | EX3DV4        | 835             | Head | 42.22        | 0.90        | PASS          | PASS               | PASS              | GMSK            | PASS           | N/A  |
| 1750               | 8/12/2021 | 3677        | EX3DV4        | 1750            | Head | 39.91        | 1.32        | PASS          | PASS               | PASS              | NA              | N/A            | N/A  |
| 1900               | 8/12/2021 | 3677        | EX3DV4        | 1900            | Head | 39.43        | 1.42        | PASS          | PASS               | PASS              | GMSK            | PASS           | N/A  |
| 2450               | 8/12/2021 | 3677        | EX3DV4        | 2450            | Head | 38.19        | 1.83        | PASS          | PASS               | PASS              | OFDM            | PASS           | PASS |
| 2600               | 8/12/2021 | 3677        | EX3DV4        | 2600            | Head | 37.60        | 1.99        | PASS          | PASS               | PASS              | TDD             | PASS           | N/A  |
| 5250               | 8/12/2021 | 3677        | EX3DV4        | 5250            | Head | 35.36        | 4.83        | PASS          | PASS               | PASS              | OFDM            | N/A            | PASS |
| 5600               | 8/12/2021 | 3677        | EX3DV4        | 5600            | Head | 34.43        | 5.29        | PASS          | PASS               | PASS              | OFDM            | N/A            | PASS |
| 5750               | 8/12/2021 | 3677        | EX3DV4        | 5750            | Head | 34.07        | 5.47        | PASS          | PASS               | PASS              | OFDM            | N/A            | PASS |

NOTE: While the probes have been calibrated for both CW and modulated signals, all measurements were performed using communication systems calibrated for CW signals only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664D01v01 for scenarios when CW probe calibrations are used with other signal types. SAR systems were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5dB), such as OFDM according to KDB 865664.

## 9 Normal and Maximum Output Power

KDB 447498 D01 at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

### 9.1 GSM Mode

| GSM 850<br>Full<br>Power&Receiver<br>on&Receiver<br>off&Hotspot on  |            | Burst-Averaged output power(dBm) |                       |               |                | Division<br>Factors | Frame-Averaged output power(dBm) |                       |               |                |
|---------------------------------------------------------------------|------------|----------------------------------|-----------------------|---------------|----------------|---------------------|----------------------------------|-----------------------|---------------|----------------|
|                                                                     |            | Tune-up                          | Channel/Frenqucy(MHz) |               |                |                     | Tune-up                          | Channel/Frenqucy(MHz) |               |                |
|                                                                     |            | MAX                              | 128<br>/824.2         | 190<br>/836.6 | 251<br>/848.8  |                     | MAX                              | 128<br>/824.2         | 190<br>/836.6 | 251<br>/848.8  |
| GSM                                                                 | CS         | 33.50                            | 32.89                 | 33.14         | 33.18          | 9.03                | 24.47                            | 23.86                 | 24.11         | 24.15          |
| GPRS/<br>EGPRS<br>(GMSK)                                            | 1 Tx Slot  | 33.50                            | 32.87                 | 33.14         | 33.15          | 9.03                | 24.47                            | 23.84                 | 24.11         | 24.12          |
|                                                                     | 2 Tx Slots | 33.00                            | 32.26                 | 32.52         | 32.54          | 6.02                | 26.98                            | 26.24                 | 26.50         | 26.52          |
|                                                                     | 3 Tx Slots | 31.50                            | 30.66                 | 30.89         | 30.93          | 4.26                | 27.24                            | 26.40                 | 26.63         | 26.67          |
|                                                                     | 4 Tx Slots | 30.50                            | 29.63                 | 29.86         | 29.90          | 3.01                | <b>27.49</b>                     | 26.62                 | 26.85         | 26.89          |
| EGPRS<br>(8PSK)                                                     | 1 Tx Slot  | 28.50                            | 27.93                 | 28.01         | 28.18          | 9.03                | 19.47                            | 18.90                 | 18.98         | 19.15          |
|                                                                     | 2 Tx Slots | 27.50                            | 26.81                 | 26.89         | 26.96          | 6.02                | 21.48                            | 20.79                 | 20.87         | 20.94          |
|                                                                     | 3 Tx Slots | 25.50                            | 24.59                 | 24.68         | 24.87          | 4.26                | 21.24                            | 20.33                 | 20.42         | 20.61          |
|                                                                     | 4 Tx Slots | 24.50                            | 23.55                 | 23.67         | 23.85          | 3.01                | 21.49                            | 20.54                 | 20.66         | 20.84          |
| GSM 1900<br>Full<br>Power&Receiver<br>on&Receiver<br>off&Hotspot on |            | Burst-Averaged output power(dBm) |                       |               |                | Division<br>Factors | Frame-Averaged output power(dBm) |                       |               |                |
|                                                                     |            | Tune-up                          | Channel/Frenqucy(MHz) |               |                |                     | Tune-up                          | Channel/Frenqucy(MHz) |               |                |
|                                                                     |            | MAX                              | 512<br>/1850.2        | 661<br>/1880  | 810<br>/1909.8 |                     | MAX                              | 512<br>/1850.2        | 661<br>/1880  | 810<br>/1909.8 |
| GSM                                                                 | CS         | 31.00                            | 30.55                 | 30.47         | 30.39          | 9.03                | 21.97                            | 21.52                 | 21.44         | 21.36          |
| GPRS/<br>EGPRS<br>(GMSK)                                            | 1 Tx Slot  | 31.00                            | 30.55                 | 30.48         | 30.38          | 9.03                | 21.97                            | 21.52                 | 21.45         | 21.35          |
|                                                                     | 2 Tx Slots | 30.50                            | 29.81                 | 29.76         | 29.66          | 6.02                | 24.48                            | 23.79                 | 23.74         | 23.64          |
|                                                                     | 3 Tx Slots | 28.50                            | 28.06                 | 27.98         | 27.88          | 4.26                | 24.24                            | 23.80                 | 23.72         | 23.62          |
|                                                                     | 4 Tx Slots | 27.50                            | 26.96                 | 26.87         | 26.78          | 3.01                | <b>24.49</b>                     | 23.95                 | 23.86         | 23.77          |
| EGPRS<br>(8PSK)                                                     | 1 Tx Slot  | 28.00                            | 27.46                 | 27.32         | 27.07          | 9.03                | 18.97                            | 18.43                 | 18.29         | 18.04          |
|                                                                     | 2 Tx Slots | 27.00                            | 26.51                 | 26.37         | 26.06          | 6.02                | 20.98                            | 20.49                 | 20.35         | 20.04          |
|                                                                     | 3 Tx Slots | 25.00                            | 24.48                 | 24.28         | 24.12          | 4.26                | 20.74                            | 20.22                 | 20.02         | 19.86          |
|                                                                     | 4 Tx Slots | 24.00                            | 23.37                 | 23.29         | 23.08          | 3.01                | 20.99                            | 20.36                 | 20.28         | 20.07          |

Notes:The worst-case configuration and mode for SAR testing is determined to be as follows:

1. Standalone: GSM 850 GMSK (GPRS) mode with 4 time slots for Max power, GSM 1900 GMSK (GPRS) mode with 4 time slots for Max power, based on the output power measurements above..

## 9.2 WCDMA Mode

The following tests were completed according to the test requirements outlined in the 3GPP TS34.121 specification.

| WCDMA          |          | Band II(dBm)<br>Full Power&Receiver<br>on&Receiver off&Hotspot on |       |        |         | Band IV(dBm)<br>Full Power&Receiver<br>on&Receiver off&Hotspot on |              |        |         | Band V(dBm)<br>Full Power&Receiver<br>on&Receiver off&Hotspot on |       |              |         |
|----------------|----------|-------------------------------------------------------------------|-------|--------|---------|-------------------------------------------------------------------|--------------|--------|---------|------------------------------------------------------------------|-------|--------------|---------|
| Tx Channel     |          | 9262                                                              | 9400  | 9538   | Tune-up | 1312                                                              | 1413         | 1513   | Tune-up | 4132                                                             | 4183  | 4233         | Tune-up |
| Frequency(MHz) |          | 1852.4                                                            | 1880  | 1907.6 | Limit   | 1712.4                                                            | 1732.6       | 1752.6 | Limit   | 826.4                                                            | 836.6 | 846.6        | Limit   |
| RMC            | 12.2kbps | <b>24.03</b>                                                      | 23.93 | 23.91  | 24.50   | 23.92                                                             | <b>23.97</b> | 23.93  | 24.50   | 24.10                                                            | 24.07 | <b>24.16</b> | 25.00   |
| AMR            | 12.2kbps | 24.13                                                             | 23.85 | 23.81  | 24.50   | 24.06                                                             | 24.01        | 23.89  | 24.50   | 24.22                                                            | 24.15 | 24.16        | 25.00   |
| HSDPA          | Sub 1    | 23.43                                                             | 23.59 | 23.27  | 24.00   | 23.28                                                             | 23.33        | 23.29  | 24.00   | 23.50                                                            | 23.41 | 23.80        | 24.50   |
|                | Sub 2    | 23.69                                                             | 23.45 | 23.41  | 24.00   | 23.42                                                             | 23.49        | 23.29  | 24.00   | 23.52                                                            | 23.65 | 23.54        | 24.50   |
|                | Sub 3    | 23.01                                                             | 23.03 | 22.81  | 23.50   | 22.78                                                             | 23.05        | 22.81  | 23.50   | 23.20                                                            | 23.09 | 23.14        | 24.00   |
|                | Sub 4    | 23.05                                                             | 22.85 | 22.91  | 23.50   | 22.98                                                             | 22.95        | 23.09  | 23.50   | 23.06                                                            | 23.01 | 23.32        | 24.00   |
| HSUPA          | Sub 1    | 22.63                                                             | 22.51 | 22.29  | 23.00   | 22.28                                                             | 22.33        | 22.41  | 23.00   | 22.48                                                            | 22.47 | 22.52        | 23.50   |
|                | Sub 2    | 21.93                                                             | 21.97 | 21.91  | 22.50   | 21.94                                                             | 22.07        | 21.95  | 22.50   | 22.22                                                            | 21.97 | 22.18        | 23.00   |
|                | Sub 3    | 22.51                                                             | 22.53 | 22.35  | 23.00   | 22.58                                                             | 22.35        | 22.33  | 23.00   | 22.56                                                            | 22.73 | 22.62        | 23.50   |
|                | Sub 4    | 21.55                                                             | 21.37 | 21.53  | 22.00   | 21.46                                                             | 21.63        | 21.39  | 22.00   | 21.76                                                            | 21.59 | 21.60        | 22.50   |
|                | Sub 5    | 22.99                                                             | 23.07 | 23.03  | 23.50   | 23.00                                                             | 23.03        | 23.09  | 23.50   | 23.22                                                            | 23.01 | 23.04        | 24.00   |
| DC-HSDPA       | Sub 1    | 23.63                                                             | 23.29 | 23.33  | 24.00   | 23.58                                                             | 23.63        | 23.43  | 24.00   | 23.74                                                            | 23.63 | 23.80        | 24.50   |
|                | Sub 2    | 23.51                                                             | 23.53 | 23.53  | 24.00   | 23.30                                                             | 23.45        | 23.41  | 24.00   | 23.66                                                            | 23.51 | 23.70        | 24.50   |
|                | Sub 3    | 23.05                                                             | 22.89 | 22.75  | 23.50   | 22.82                                                             | 22.87        | 22.93  | 23.50   | 23.26                                                            | 23.13 | 23.32        | 24.00   |
|                | Sub 4    | 22.89                                                             | 22.99 | 22.79  | 23.50   | 23.04                                                             | 22.99        | 22.87  | 23.50   | 23.14                                                            | 22.99 | 23.24        | 24.00   |
| HSPA+          | 16QAM    | 21.89                                                             | 22.03 | 21.75  | 22.50   | 21.88                                                             | 22.03        | 21.99  | 22.50   | 22.26                                                            | 22.05 | 22.30        | 23.00   |

Note: 1.Per KDB 941225 D01, SAR for each exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".

### 9.3 LTE Mode

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3**

| Modulation | Channel bandwidth / Transmission bandwidth (N <sub>RB</sub> ) |         |       |        |        |        | MPR (dB) |
|------------|---------------------------------------------------------------|---------|-------|--------|--------|--------|----------|
|            | 1.4 MHz                                                       | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz |          |
| QPSK       | > 5                                                           | > 4     | > 8   | > 12   | > 16   | > 18   | ≤ 1      |
| 16 QAM     | ≤ 5                                                           | ≤ 4     | ≤ 8   | ≤ 12   | ≤ 16   | ≤ 18   | ≤ 1      |
| 16 QAM     | > 5                                                           | > 4     | > 8   | > 12   | > 16   | > 18   | ≤ 2      |
| 64 QAM     | ≤ 5                                                           | ≤ 4     | ≤ 8   | ≤ 12   | ≤ 16   | ≤ 18   | ≤ 2      |
| 64 QAM     | > 5                                                           | > 4     | > 8   | > 12   | > 16   | > 18   | ≤ 3      |

| LTE FDD Band 2<br>Full Power& Receiver on<br>&Receiver off |            |         |           | Conducted Power(dBm)    |            |              | Tune-up<br>Limit |
|------------------------------------------------------------|------------|---------|-----------|-------------------------|------------|--------------|------------------|
| Bandwidth                                                  | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              |                  |
|                                                            |            |         |           | 18607/1850.7            | 18900/1880 | 19193/1909.3 |                  |
| 1.4MHz                                                     | QPSK       | 1       | 0         | 23.38                   | 23.14      | 23.29        | 24.00            |
|                                                            |            | 1       | 2         | 23.44                   | 23.37      | 23.37        | 24.00            |
|                                                            |            | 1       | 5         | 23.14                   | 23.21      | 23.13        | 24.00            |
|                                                            |            | 3       | 0         | 23.37                   | 23.31      | 23.40        | 24.00            |
|                                                            |            | 3       | 2         | 23.33                   | 23.28      | 23.34        | 24.00            |
|                                                            |            | 3       | 3         | 23.26                   | 23.38      | 23.14        | 24.00            |
|                                                            |            | 6       | 0         | 22.34                   | 22.43      | 22.23        | 23.00            |
|                                                            | 16QAM      | 1       | 0         | 22.27                   | 21.87      | 22.49        | 23.00            |
|                                                            |            | 1       | 2         | 22.25                   | 22.21      | 22.74        | 23.00            |
|                                                            |            | 1       | 5         | 21.94                   | 22.01      | 22.07        | 23.00            |
|                                                            |            | 3       | 0         | 22.29                   | 22.22      | 22.66        | 23.00            |
|                                                            |            | 3       | 2         | 22.31                   | 22.28      | 22.72        | 23.00            |
|                                                            |            | 3       | 3         | 22.20                   | 22.50      | 22.05        | 23.00            |
|                                                            |            | 6       | 0         | 21.34                   | 21.46      | 21.44        | 22.00            |
|                                                            | 64QAM      | 1       | 0         | 22.10                   | 21.62      | 21.80        | 22.50            |
|                                                            |            | 1       | 2         | 22.18                   | 22.06      | 22.01        | 22.50            |
|                                                            |            | 1       | 5         | 21.82                   | 21.87      | 21.46        | 22.50            |
|                                                            |            | 3       | 0         | 21.80                   | 21.96      | 22.36        | 22.50            |
|                                                            |            | 3       | 2         | 21.80                   | 21.97      | 22.38        | 22.50            |
|                                                            |            | 3       | 3         | 21.97                   | 22.31      | 21.86        | 22.50            |
|                                                            |            | 6       | 0         | 20.89                   | 21.25      | 21.17        | 22.00            |



| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|-----------|------------|---------|-----------|-------------------------|------------|--------------|---------------|
|           |            |         |           | 18615/1851.5            | 18900/1880 | 19185/1908.5 |               |
| 3MHz      | QPSK       | 1       | 0         | 23.40                   | 23.18      | 23.32        | 24.00         |
|           |            | 1       | 7         | 23.42                   | 23.40      | 23.41        | 24.00         |
|           |            | 1       | 14        | 23.17                   | 23.26      | 23.17        | 24.00         |
|           |            | 8       | 0         | 22.47                   | 22.43      | 22.53        | 23.00         |
|           |            | 8       | 4         | 22.45                   | 22.38      | 22.46        | 23.00         |
|           |            | 8       | 7         | 22.36                   | 22.49      | 22.24        | 23.00         |
|           |            | 15      | 0         | 22.34                   | 22.47      | 22.26        | 23.00         |
|           | 16QAM      | 1       | 0         | 22.30                   | 21.89      | 22.52        | 23.00         |
|           |            | 1       | 7         | 22.28                   | 22.21      | 22.78        | 23.00         |
|           |            | 1       | 14        | 21.96                   | 22.05      | 22.10        | 23.00         |
|           |            | 8       | 0         | 21.40                   | 21.35      | 21.78        | 22.00         |
|           |            | 8       | 4         | 21.42                   | 21.41      | 21.84        | 22.00         |
|           |            | 8       | 7         | 21.30                   | 21.62      | 21.18        | 22.00         |
|           |            | 15      | 0         | 21.37                   | 21.50      | 21.47        | 22.00         |
|           | 64QAM      | 1       | 0         | 22.13                   | 21.64      | 21.83        | 22.50         |
|           |            | 1       | 7         | 22.21                   | 22.06      | 22.03        | 22.50         |
|           |            | 1       | 14        | 21.84                   | 21.86      | 21.49        | 22.50         |
|           |            | 8       | 0         | 20.91                   | 21.09      | 21.48        | 22.00         |
|           |            | 8       | 4         | 20.91                   | 21.10      | 21.50        | 22.00         |
|           |            | 8       | 7         | 21.07                   | 21.43      | 20.99        | 22.00         |
|           |            | 15      | 0         | 20.92                   | 21.29      | 21.20        | 22.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|           |            |         |           | 18625/1852.5            | 18900/1880 | 19175/1907.5 |               |
| 5MHz      | QPSK       | 1       | 0         | 23.37                   | 23.16      | 23.28        | 24.00         |
|           |            | 1       | 13        | 23.40                   | 23.36      | 23.38        | 24.00         |
|           |            | 1       | 24        | 23.14                   | 23.21      | 23.13        | 24.00         |
|           |            | 12      | 0         | 22.44                   | 22.38      | 22.49        | 23.00         |
|           |            | 12      | 6         | 22.43                   | 22.34      | 22.41        | 23.00         |
|           |            | 12      | 13        | 22.34                   | 22.47      | 22.20        | 23.00         |
|           |            | 25      | 0         | 22.34                   | 22.46      | 22.24        | 23.00         |
|           | 16QAM      | 1       | 0         | 22.27                   | 21.85      | 22.49        | 23.00         |
|           |            | 1       | 13        | 22.25                   | 22.19      | 22.75        | 23.00         |
|           |            | 1       | 24        | 21.93                   | 22.03      | 22.06        | 23.00         |
|           |            | 12      | 0         | 21.38                   | 21.31      | 21.75        | 22.00         |
|           |            | 12      | 6         | 21.39                   | 21.36      | 21.80        | 22.00         |
|           |            | 12      | 13        | 21.27                   | 21.57      | 21.14        | 22.00         |
|           |            | 25      | 0         | 21.35                   | 21.46      | 21.42        | 22.00         |
|           | 64QAM      | 1       | 0         | 22.10                   | 21.64      | 21.80        | 22.50         |
|           |            | 1       | 13        | 22.18                   | 22.08      | 22.00        | 22.50         |
|           |            | 1       | 24        | 21.85                   | 21.84      | 21.45        | 22.50         |
|           |            | 12      | 0         | 20.89                   | 21.05      | 21.49        | 22.00         |



|           |            | 12      | 6         | 20.88                   | 21.05      | 21.46        | 22.00         |
|-----------|------------|---------|-----------|-------------------------|------------|--------------|---------------|
|           |            | 12      | 13        | 21.04                   | 21.38      | 20.95        | 22.00         |
|           |            | 25      | 0         | 20.90                   | 21.25      | 21.15        | 22.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|           |            |         |           | 18650/1855              | 18900/1880 | 19150/1905   |               |
| 10MHz     | QPSK       | 1       | 0         | 23.39                   | 23.17      | 23.31        | 24.00         |
|           |            | 1       | 25        | 23.43                   | 23.41      | 23.42        | 24.00         |
|           |            | 1       | 49        | 23.16                   | 23.25      | 23.16        | 24.00         |
|           |            | 25      | 0         | 22.47                   | 22.43      | 22.53        | 23.00         |
|           |            | 25      | 13        | 22.46                   | 22.39      | 22.45        | 23.00         |
|           |            | 25      | 25        | 22.36                   | 22.51      | 22.25        | 23.00         |
|           |            | 50      | 0         | 22.38                   | 22.48      | 22.28        | 23.00         |
|           | 16QAM      | 1       | 0         | 22.29                   | 21.88      | 22.51        | 23.00         |
|           |            | 1       | 25        | 22.28                   | 22.23      | 22.78        | 23.00         |
|           |            | 1       | 49        | 21.96                   | 22.05      | 22.09        | 23.00         |
|           |            | 25      | 0         | 21.41                   | 21.36      | 21.79        | 22.00         |
|           |            | 25      | 13        | 21.41                   | 21.40      | 21.83        | 22.00         |
|           |            | 25      | 25        | 21.30                   | 21.62      | 21.18        | 22.00         |
|           |            | 50      | 0         | 21.38                   | 21.51      | 21.46        | 22.00         |
|           | 64QAM      | 1       | 0         | 22.12                   | 21.63      | 21.82        | 22.50         |
|           |            | 1       | 25        | 22.21                   | 22.08      | 22.03        | 22.50         |
|           |            | 1       | 49        | 21.84                   | 21.86      | 21.48        | 22.50         |
|           |            | 25      | 0         | 20.92                   | 21.10      | 21.49        | 22.00         |
|           |            | 25      | 13        | 20.90                   | 21.09      | 21.49        | 22.00         |
|           |            | 25      | 25        | 21.07                   | 21.43      | 20.99        | 22.00         |
|           |            | 50      | 0         | 20.93                   | 21.30      | 21.19        | 22.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|           |            |         |           | 18675/1857.5            | 18900/1880 | 19125/1902.5 |               |
| 15MHz     | QPSK       | 1       | 0         | 23.38                   | 23.13      | 23.29        | 24.00         |
|           |            | 1       | 38        | 23.41                   | 23.40      | 23.39        | 24.00         |
|           |            | 1       | 74        | 23.13                   | 23.20      | 23.12        | 24.00         |
|           |            | 36      | 0         | 22.45                   | 22.39      | 22.50        | 23.00         |
|           |            | 36      | 18        | 22.43                   | 22.34      | 22.41        | 23.00         |
|           |            | 36      | 39        | 22.33                   | 22.48      | 22.21        | 23.00         |
|           |            | 75      | 0         | 22.36                   | 22.44      | 22.23        | 23.00         |
|           | 16QAM      | 1       | 0         | 22.24                   | 21.86      | 22.49        | 23.00         |
|           |            | 1       | 38        | 22.26                   | 22.20      | 22.76        | 23.00         |
|           |            | 1       | 74        | 21.93                   | 22.01      | 22.06        | 23.00         |
|           |            | 36      | 0         | 21.38                   | 21.34      | 21.76        | 22.00         |
|           |            | 36      | 18        | 21.38                   | 21.35      | 21.79        | 22.00         |
|           |            | 36      | 39        | 21.28                   | 21.58      | 21.15        | 22.00         |
|           |            | 75      | 0         | 21.35                   | 21.46      | 21.42        | 22.00         |
|           | 64QAM      | 1       | 0         | 22.07                   | 21.61      | 21.80        | 22.50         |



|           |            | 1       | 38        | 22.19                   | 22.05        | 22.01        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
|           |            | 1       | 74        | 21.85                   | 21.85        | 21.49        | 22.50         |
|           |            | 36      | 0         | 20.91                   | 21.12        | 21.50        | 22.00         |
|           |            | 36      | 18        | 20.88                   | 21.06        | 21.48        | 22.00         |
|           |            | 36      | 39        | 21.05                   | 21.39        | 20.96        | 22.00         |
|           |            | 75      | 0         | 20.90                   | 21.25        | 21.15        | 22.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 18700/1860              | 18900/1880   | 19100/1900   |               |
| 20MHz     | QPSK       | 1       | 0         | 23.35                   | 23.09        | 23.26        | 24.00         |
|           |            | 1       | 50        | <b>23.40</b>            | <b>23.36</b> | <b>23.37</b> | 24.00         |
|           |            | 1       | 99        | 23.11                   | 23.19        | 23.09        | 24.00         |
|           |            | 50      | 0         | <b>22.42</b>            | 22.34        | <b>22.46</b> | 23.00         |
|           |            | 50      | 25        | 22.41                   | 22.30        | 22.38        | 23.00         |
|           |            | 50      | 50        | 22.30                   | <b>22.43</b> | 22.17        | 23.00         |
|           |            | 100     | 0         | 22.33                   | <b>22.39</b> | 22.19        | 23.00         |
|           | 16QAM      | 1       | 0         | 22.20                   | 21.82        | 22.44        | 23.00         |
|           |            | 1       | 50        | 22.22                   | 22.18        | 22.72        | 23.00         |
|           |            | 1       | 99        | 21.91                   | 21.98        | 22.04        | 23.00         |
|           |            | 50      | 0         | 21.35                   | 21.30        | 21.73        | 22.00         |
|           |            | 50      | 25        | 21.35                   | 21.33        | 21.76        | 22.00         |
|           |            | 50      | 50        | 21.25                   | 21.53        | 21.11        | 22.00         |
|           |            | 100     | 0         | 21.33                   | 21.42        | 21.39        | 22.00         |
|           | 64QAM      | 1       | 0         | 22.05                   | 21.57        | 21.75        | 22.50         |
|           |            | 1       | 50        | 22.15                   | 22.03        | 21.97        | 22.50         |
|           |            | 1       | 99        | 21.79                   | 21.79        | 21.43        | 22.50         |
|           |            | 50      | 0         | 20.86                   | 21.04        | 21.43        | 22.00         |
|           |            | 50      | 25        | 20.84                   | 21.02        | 21.42        | 22.00         |
|           |            | 50      | 50        | 21.02                   | 21.34        | 20.92        | 22.00         |
|           |            | 100     | 0         | 20.88                   | 21.21        | 21.12        | 22.00         |

| LTE FDD Band 2<br>Hotspot on |            |         |           | Conducted Power(dBm)    |            |              | Tune-up<br>Limit |
|------------------------------|------------|---------|-----------|-------------------------|------------|--------------|------------------|
| Bandwidth                    | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              |                  |
|                              |            |         |           | 18607/1850.7            | 18900/1880 | 19193/1909.3 |                  |
| 1.4MHz                       | QPSK       | 1       | 0         | 22.77                   | 22.65      | 22.61        | 23.50            |
|                              |            | 1       | 2         | 22.91                   | 22.84      | 22.82        | 23.50            |
|                              |            | 1       | 5         | 22.51                   | 22.51      | 22.68        | 23.50            |
|                              |            | 3       | 0         | 22.72                   | 22.69      | 22.63        | 23.50            |
|                              |            | 3       | 2         | 22.75                   | 22.80      | 22.71        | 23.50            |
|                              |            | 3       | 3         | 22.69                   | 22.61      | 22.71        | 23.50            |
|                              |            | 6       | 0         | 21.73                   | 21.74      | 21.70        | 22.50            |
|                              | 16QAM      | 1       | 0         | 22.22                   | 22.11      | 22.20        | 22.50            |
|                              |            | 1       | 2         | 22.20                   | 22.23      | 22.21        | 22.50            |



|           |            | 1       | 5         | 21.84                   | 21.88      | 21.93        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|------------|--------------|---------------|
|           |            | 3       | 0         | 21.63                   | 21.65      | 21.69        | 22.50         |
|           |            | 3       | 2         | 21.71                   | 21.76      | 21.83        | 22.50         |
|           |            | 3       | 3         | 21.67                   | 21.72      | 21.82        | 22.50         |
|           |            | 6       | 0         | 20.63                   | 20.74      | 20.69        | 21.50         |
|           | 64QAM      | 1       | 0         | 21.03                   | 20.74      | 21.10        | 21.50         |
|           |            | 1       | 2         | 21.09                   | 20.99      | 21.07        | 21.50         |
|           |            | 1       | 5         | 20.92                   | 20.90      | 20.87        | 21.50         |
|           |            | 3       | 0         | 20.98                   | 20.88      | 20.99        | 21.50         |
|           |            | 3       | 2         | 21.06                   | 20.95      | 21.11        | 21.50         |
|           |            | 3       | 3         | 21.16                   | 21.10      | 21.16        | 21.50         |
|           |            | 6       | 0         | 20.52                   | 20.49      | 20.62        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|           |            |         |           | 18615/1851.5            | 18900/1880 | 19185/1908.5 |               |
| 3MHz      | QPSK       | 1       | 0         | 22.79                   | 22.69      | 22.64        | 23.50         |
|           |            | 1       | 7         | 22.89                   | 22.87      | 22.86        | 23.50         |
|           |            | 1       | 14        | 22.54                   | 22.56      | 22.72        | 23.50         |
|           |            | 8       | 0         | 21.82                   | 21.81      | 21.76        | 22.50         |
|           |            | 8       | 4         | 21.87                   | 21.90      | 21.83        | 22.50         |
|           |            | 8       | 7         | 21.79                   | 21.72      | 21.81        | 22.50         |
|           |            | 15      | 0         | 21.73                   | 21.78      | 21.73        | 22.50         |
|           | 16QAM      | 1       | 0         | 22.25                   | 22.13      | 22.23        | 22.50         |
|           |            | 1       | 7         | 22.23                   | 22.23      | 22.25        | 22.50         |
|           |            | 1       | 14        | 21.86                   | 21.92      | 21.96        | 22.50         |
|           |            | 8       | 0         | 20.74                   | 20.78      | 20.81        | 21.50         |
|           |            | 8       | 4         | 20.82                   | 20.89      | 20.95        | 21.50         |
|           |            | 8       | 7         | 20.77                   | 20.84      | 20.95        | 21.50         |
|           |            | 15      | 0         | 20.66                   | 20.78      | 20.72        | 21.50         |
|           | 64QAM      | 1       | 0         | 21.06                   | 20.76      | 21.13        | 21.50         |
|           |            | 1       | 7         | 21.12                   | 20.99      | 21.09        | 21.50         |
|           |            | 1       | 14        | 20.94                   | 20.89      | 20.90        | 21.50         |
|           |            | 8       | 0         | 20.49                   | 20.41      | 20.51        | 21.00         |
|           |            | 8       | 4         | 20.57                   | 20.48      | 20.63        | 21.00         |
|           |            | 8       | 7         | 20.66                   | 20.62      | 20.69        | 21.00         |
|           |            | 15      | 0         | 20.55                   | 20.53      | 20.65        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|           |            |         |           | 18625/1852.5            | 18900/1880 | 19175/1907.5 |               |
| 5MHz      | QPSK       | 1       | 0         | 22.76                   | 22.67      | 22.60        | 23.50         |
|           |            | 1       | 13        | 22.87                   | 22.83      | 22.83        | 23.50         |
|           |            | 1       | 24        | 22.51                   | 22.51      | 22.68        | 23.50         |
|           |            | 12      | 0         | 21.79                   | 21.76      | 21.72        | 22.50         |
|           |            | 12      | 6         | 21.85                   | 21.86      | 21.78        | 22.50         |
|           |            | 12      | 13        | 21.77                   | 21.70      | 21.77        | 22.50         |



|           | 16QAM      | 25      | 0         | 21.73                   | 21.77      | 21.71        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|------------|--------------|---------------|
|           |            | 1       | 0         | 22.22                   | 22.09      | 22.20        | 22.50         |
|           |            | 1       | 13        | 22.20                   | 22.21      | 22.22        | 22.50         |
|           |            | 1       | 24        | 21.83                   | 21.90      | 21.92        | 22.50         |
|           |            | 12      | 0         | 20.72                   | 20.74      | 20.78        | 21.50         |
|           |            | 12      | 6         | 20.79                   | 20.84      | 20.91        | 21.50         |
|           |            | 12      | 13        | 20.74                   | 20.79      | 20.91        | 21.50         |
|           |            | 25      | 0         | 20.64                   | 20.74      | 20.67        | 21.50         |
|           | 64QAM      | 1       | 0         | 21.03                   | 20.76      | 21.10        | 21.50         |
|           |            | 1       | 13        | 21.09                   | 21.01      | 21.06        | 21.50         |
|           |            | 1       | 24        | 20.95                   | 20.87      | 20.86        | 21.50         |
|           |            | 12      | 0         | 20.47                   | 20.37      | 20.52        | 21.00         |
|           |            | 12      | 6         | 20.54                   | 20.43      | 20.59        | 21.00         |
|           |            | 12      | 13        | 20.63                   | 20.57      | 20.65        | 21.00         |
|           |            | 25      | 0         | 20.53                   | 20.49      | 20.60        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|           |            |         |           | 18650/1855              | 18900/1880 | 19150/1905   |               |
| 10MHz     | QPSK       | 1       | 0         | 22.78                   | 22.68      | 22.63        | 23.50         |
|           |            | 1       | 25        | 22.90                   | 22.88      | 22.87        | 23.50         |
|           |            | 1       | 49        | 22.53                   | 22.55      | 22.71        | 23.50         |
|           |            | 25      | 0         | 21.82                   | 21.81      | 21.76        | 22.50         |
|           |            | 25      | 13        | 21.88                   | 21.91      | 21.82        | 22.50         |
|           |            | 25      | 25        | 21.79                   | 21.74      | 21.82        | 22.50         |
|           |            | 50      | 0         | 21.77                   | 21.79      | 21.75        | 22.50         |
|           | 16QAM      | 1       | 0         | 22.24                   | 22.12      | 22.22        | 22.50         |
|           |            | 1       | 25        | 22.23                   | 22.25      | 22.25        | 22.50         |
|           |            | 1       | 49        | 21.86                   | 21.92      | 21.95        | 22.50         |
|           |            | 25      | 0         | 20.75                   | 20.79      | 20.82        | 21.50         |
|           |            | 25      | 13        | 20.81                   | 20.88      | 20.94        | 21.50         |
|           |            | 25      | 25        | 20.77                   | 20.84      | 20.95        | 21.50         |
|           |            | 50      | 0         | 20.67                   | 20.79      | 20.71        | 21.50         |
|           | 64QAM      | 1       | 0         | 21.05                   | 20.75      | 21.12        | 21.50         |
|           |            | 1       | 25        | 21.12                   | 21.01      | 21.09        | 21.50         |
|           |            | 1       | 49        | 20.94                   | 20.89      | 20.89        | 21.50         |
|           |            | 25      | 0         | 20.50                   | 20.42      | 20.52        | 21.00         |
|           |            | 25      | 13        | 20.56                   | 20.47      | 20.62        | 21.00         |
|           |            | 25      | 25        | 20.66                   | 20.62      | 20.69        | 21.00         |
|           |            | 50      | 0         | 20.56                   | 20.54      | 20.64        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |              | Tune-up Limit |
|           |            |         |           | 18675/1857.5            | 18900/1880 | 19125/1902.5 |               |
| 15MHz     | QPSK       | 1       | 0         | 22.77                   | 22.64      | 22.61        | 23.50         |
|           |            | 1       | 38        | 22.88                   | 22.87      | 22.84        | 23.50         |
|           |            | 1       | 74        | 22.50                   | 22.50      | 22.67        | 23.50         |



|           |            | 36      | 0         | 21.80                   | 21.77        | 21.73        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
|           |            | 36      | 18        | 21.85                   | 21.86        | 21.78        | 22.50         |
|           |            | 36      | 39        | 21.76                   | 21.71        | 21.78        | 22.50         |
|           |            | 75      | 0         | 21.75                   | 21.75        | 21.70        | 22.50         |
|           | 16QAM      | 1       | 0         | 22.19                   | 22.10        | 22.20        | 22.50         |
|           |            | 1       | 38        | 22.21                   | 22.22        | 22.23        | 22.50         |
|           |            | 1       | 74        | 21.83                   | 21.88        | 21.92        | 22.50         |
|           |            | 36      | 0         | 20.72                   | 20.77        | 20.79        | 21.50         |
|           |            | 36      | 18        | 20.78                   | 20.83        | 20.90        | 21.50         |
|           |            | 36      | 39        | 20.75                   | 20.80        | 20.92        | 21.50         |
|           |            | 75      | 0         | 20.64                   | 20.74        | 20.67        | 21.50         |
|           | 64QAM      | 1       | 0         | 21.00                   | 20.73        | 21.10        | 21.50         |
|           |            | 1       | 38        | 21.10                   | 20.98        | 21.07        | 21.50         |
|           |            | 1       | 74        | 20.95                   | 20.88        | 20.90        | 21.50         |
|           |            | 36      | 0         | 20.49                   | 20.44        | 20.53        | 21.00         |
|           |            | 36      | 18        | 20.54                   | 20.44        | 20.61        | 21.00         |
|           |            | 36      | 39        | 20.64                   | 20.58        | 20.66        | 21.00         |
|           |            | 75      | 0         | 20.53                   | 20.49        | 20.60        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 18700/1860              | 18900/1880   | 19100/1900   |               |
| 20MHz     | QPSK       | 1       | 0         | 22.74                   | 22.60        | 22.58        | 23.50         |
|           |            | 1       | 50        | <b>22.87</b>            | <b>22.83</b> | <b>22.82</b> | 23.50         |
|           |            | 1       | 99        | 22.48                   | 22.49        | 22.64        | 23.50         |
|           |            | 50      | 0         | 21.77                   | 21.72        | 21.69        | 22.50         |
|           |            | 50      | 25        | <b>21.83</b>            | <b>21.82</b> | <b>21.75</b> | 22.50         |
|           |            | 50      | 50        | 21.73                   | 21.66        | 21.74        | 22.50         |
|           |            | 100     | 0         | <b>21.72</b>            | 21.70        | 21.66        | 22.50         |
|           | 16QAM      | 1       | 0         | 22.14                   | 22.06        | 22.15        | 22.50         |
|           |            | 1       | 50        | 22.17                   | 22.20        | 22.19        | 22.50         |
|           |            | 1       | 99        | 21.81                   | 21.85        | 21.90        | 22.50         |
|           |            | 50      | 0         | 20.69                   | 20.73        | 20.76        | 21.50         |
|           |            | 50      | 25        | 20.75                   | 20.81        | 20.87        | 21.50         |
|           |            | 50      | 50        | 20.72                   | 20.75        | 20.88        | 21.50         |
|           |            | 100     | 0         | 20.62                   | 20.70        | 20.64        | 21.50         |
|           | 64QAM      | 1       | 0         | 20.98                   | 20.69        | 21.05        | 21.50         |
|           |            | 1       | 50        | 21.06                   | 20.96        | 21.03        | 21.50         |
|           |            | 1       | 99        | 20.89                   | 20.82        | 20.84        | 21.50         |
|           |            | 50      | 0         | 20.44                   | 20.36        | 20.46        | 21.00         |
|           |            | 50      | 25        | 20.50                   | 20.40        | 20.55        | 21.00         |
|           |            | 50      | 50        | 20.61                   | 20.53        | 20.62        | 21.00         |
|           |            | 100     | 0         | 20.51                   | 20.45        | 20.57        | 21.00         |



| LTE FDD Band 4<br>Full Power& Receiver on<br>&Receiver off& Hotspot on |            |         |           | Conducted Power(dBm)    |              |              | Tune-up<br>Limit |
|------------------------------------------------------------------------|------------|---------|-----------|-------------------------|--------------|--------------|------------------|
| Bandwidth                                                              | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |                  |
|                                                                        |            |         |           | 19957/1710.7            | 20175/1732.5 | 20393/1754.3 |                  |
| 1.4MHz                                                                 | QPSK       | 1       | 0         | 22.59                   | 22.61        | 22.58        | 23.50            |
|                                                                        |            | 1       | 2         | 22.93                   | 22.86        | 22.88        | 23.50            |
|                                                                        |            | 1       | 5         | 22.71                   | 22.56        | 22.51        | 23.50            |
|                                                                        |            | 3       | 0         | 22.52                   | 22.59        | 22.57        | 23.50            |
|                                                                        |            | 3       | 2         | 22.54                   | 22.59        | 22.60        | 23.50            |
|                                                                        |            | 3       | 3         | 22.67                   | 22.64        | 22.65        | 23.50            |
|                                                                        |            | 6       | 0         | 21.65                   | 21.65        | 21.69        | 22.50            |
|                                                                        | 16QAM      | 1       | 0         | 21.78                   | 21.42        | 21.78        | 22.50            |
|                                                                        |            | 1       | 2         | 21.76                   | 21.70        | 21.94        | 22.50            |
|                                                                        |            | 1       | 5         | 21.52                   | 21.38        | 21.72        | 22.50            |
|                                                                        |            | 3       | 0         | 21.57                   | 21.61        | 21.63        | 22.50            |
|                                                                        |            | 3       | 2         | 21.59                   | 21.63        | 21.66        | 22.50            |
|                                                                        |            | 3       | 3         | 21.72                   | 21.69        | 21.63        | 22.50            |
|                                                                        |            | 6       | 0         | 20.70                   | 20.75        | 20.72        | 21.50            |
|                                                                        | 64QAM      | 1       | 0         | 20.75                   | 21.21        | 20.95        | 22.00            |
|                                                                        |            | 1       | 2         | 21.00                   | 21.47        | 21.23        | 22.00            |
|                                                                        |            | 1       | 5         | 20.80                   | 21.20        | 20.84        | 22.00            |
|                                                                        |            | 3       | 0         | 21.00                   | 21.01        | 20.99        | 22.00            |
|                                                                        |            | 3       | 2         | 21.01                   | 21.04        | 21.02        | 22.00            |
|                                                                        |            | 3       | 3         | 21.12                   | 21.09        | 21.05        | 22.00            |
|                                                                        |            | 6       | 0         | 20.14                   | 20.12        | 20.17        | 21.00            |
| Bandwidth                                                              | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up<br>Limit |
|                                                                        |            |         |           | 19965/1711.5            | 20175/1732.5 | 20385/1753.5 |                  |
| 3MHz                                                                   | QPSK       | 1       | 0         | 22.61                   | 22.65        | 22.61        | 23.50            |
|                                                                        |            | 1       | 7         | 22.91                   | 22.89        | 22.92        | 23.50            |
|                                                                        |            | 1       | 14        | 22.74                   | 22.61        | 22.55        | 23.50            |
|                                                                        |            | 8       | 0         | 21.62                   | 21.71        | 21.70        | 22.50            |
|                                                                        |            | 8       | 4         | 21.66                   | 21.69        | 21.72        | 22.50            |
|                                                                        |            | 8       | 7         | 21.77                   | 21.75        | 21.75        | 22.50            |
|                                                                        |            | 15      | 0         | 21.65                   | 21.69        | 21.72        | 22.50            |
|                                                                        | 16QAM      | 1       | 0         | 21.81                   | 21.44        | 21.81        | 22.50            |
|                                                                        |            | 1       | 7         | 21.79                   | 21.70        | 21.98        | 22.50            |
|                                                                        |            | 1       | 14        | 21.54                   | 21.42        | 21.75        | 22.50            |
|                                                                        |            | 8       | 0         | 20.68                   | 20.74        | 20.75        | 21.50            |
|                                                                        |            | 8       | 4         | 20.70                   | 20.76        | 20.78        | 21.50            |
|                                                                        |            | 8       | 7         | 20.82                   | 20.81        | 20.76        | 21.50            |
|                                                                        |            | 15      | 0         | 20.73                   | 20.79        | 20.75        | 21.50            |
|                                                                        | 64QAM      | 1       | 0         | 20.78                   | 21.23        | 20.98        | 22.00            |



|           |            | 1       | 7         | 21.03                   | 21.47        | 21.25        | 22.00         |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
|           |            | 1       | 14        | 20.82                   | 21.19        | 20.87        | 22.00         |
|           |            | 8       | 0         | 20.11                   | 20.14        | 20.11        | 21.00         |
|           |            | 8       | 4         | 20.12                   | 20.17        | 20.14        | 21.00         |
|           |            | 8       | 7         | 20.22                   | 20.21        | 20.18        | 21.00         |
|           |            | 15      | 0         | 20.17                   | 20.16        | 20.20        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 19975/1712.5            | 20175/1732.5 | 20375/1752.5 |               |
| 5MHz      | QPSK       | 1       | 0         | 22.58                   | 22.63        | 22.57        | 23.50         |
|           |            | 1       | 13        | 22.89                   | 22.85        | 22.89        | 23.50         |
|           |            | 1       | 24        | 22.71                   | 22.56        | 22.51        | 23.50         |
|           |            | 12      | 0         | 21.59                   | 21.66        | 21.66        | 22.50         |
|           |            | 12      | 6         | 21.64                   | 21.65        | 21.67        | 22.50         |
|           |            | 12      | 13        | 21.75                   | 21.73        | 21.71        | 22.50         |
|           |            | 25      | 0         | 21.65                   | 21.68        | 21.70        | 22.50         |
|           | 16QAM      | 1       | 0         | 21.78                   | 21.40        | 21.78        | 22.50         |
|           |            | 1       | 13        | 21.76                   | 21.68        | 21.95        | 22.50         |
|           |            | 1       | 24        | 21.51                   | 21.40        | 21.71        | 22.50         |
|           |            | 12      | 0         | 20.66                   | 20.70        | 20.72        | 21.50         |
|           |            | 12      | 6         | 20.67                   | 20.71        | 20.74        | 21.50         |
|           |            | 12      | 13        | 20.79                   | 20.76        | 20.72        | 21.50         |
|           |            | 25      | 0         | 20.71                   | 20.75        | 20.70        | 21.50         |
|           | 64QAM      | 1       | 0         | 20.75                   | 21.23        | 20.95        | 22.00         |
|           |            | 1       | 13        | 21.00                   | 21.49        | 21.22        | 22.00         |
|           |            | 1       | 24        | 20.83                   | 21.17        | 20.83        | 22.00         |
|           |            | 12      | 0         | 20.09                   | 20.10        | 20.12        | 21.00         |
|           |            | 12      | 6         | 20.09                   | 20.12        | 20.10        | 21.00         |
|           |            | 12      | 13        | 20.19                   | 20.16        | 20.14        | 21.00         |
|           |            | 25      | 0         | 20.15                   | 20.12        | 20.15        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 20000/1715              | 20175/1732.5 | 20350/1750   |               |
| 10MHz     | QPSK       | 1       | 0         | 22.60                   | 22.64        | 22.60        | 23.50         |
|           |            | 1       | 25        | 22.92                   | 22.90        | 22.93        | 23.50         |
|           |            | 1       | 49        | 22.73                   | 22.60        | 22.54        | 23.50         |
|           |            | 25      | 0         | 21.62                   | 21.71        | 21.70        | 22.50         |
|           |            | 25      | 13        | 21.67                   | 21.70        | 21.71        | 22.50         |
|           |            | 25      | 25        | 21.77                   | 21.77        | 21.76        | 22.50         |
|           |            | 50      | 0         | 21.69                   | 21.70        | 21.74        | 22.50         |
|           | 16QAM      | 1       | 0         | 21.80                   | 21.43        | 21.80        | 22.50         |
|           |            | 1       | 25        | 21.79                   | 21.72        | 21.98        | 22.50         |
|           |            | 1       | 49        | 21.54                   | 21.42        | 21.74        | 22.50         |
|           |            | 25      | 0         | 20.69                   | 20.75        | 20.76        | 21.50         |
|           |            | 25      | 13        | 20.69                   | 20.75        | 20.77        | 21.50         |



|           |            | 25      | 25        | 20.82                   | 20.81        | 20.76        | 21.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
|           |            | 50      | 0         | 20.74                   | 20.80        | 20.74        | 21.50         |
|           | 64QAM      | 1       | 0         | 20.77                   | 21.22        | 20.97        | 22.00         |
|           |            | 1       | 25        | 21.03                   | 21.49        | 21.25        | 22.00         |
|           |            | 1       | 49        | 20.82                   | 21.19        | 20.86        | 22.00         |
|           |            | 25      | 0         | 20.12                   | 20.15        | 20.12        | 21.00         |
|           |            | 25      | 13        | 20.11                   | 20.16        | 20.13        | 21.00         |
|           |            | 25      | 25        | 20.22                   | 20.21        | 20.18        | 21.00         |
|           |            | 50      | 0         | 20.18                   | 20.17        | 20.19        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 20025/1717.5            | 20175/1732.5 | 20325/1747.5 |               |
| 15MHz     | QPSK       | 1       | 0         | 22.59                   | 22.60        | 22.58        | 23.50         |
|           |            | 1       | 38        | 22.90                   | 22.89        | 22.90        | 23.50         |
|           |            | 1       | 74        | 22.70                   | 22.55        | 22.50        | 23.50         |
|           |            | 36      | 0         | 21.60                   | 21.67        | 21.67        | 22.50         |
|           |            | 36      | 18        | 21.64                   | 21.65        | 21.67        | 22.50         |
|           |            | 36      | 39        | 21.74                   | 21.74        | 21.72        | 22.50         |
|           |            | 75      | 0         | 21.67                   | 21.66        | 21.69        | 22.50         |
|           | 16QAM      | 1       | 0         | 21.75                   | 21.41        | 21.78        | 22.50         |
|           |            | 1       | 38        | 21.77                   | 21.69        | 21.96        | 22.50         |
|           |            | 1       | 74        | 21.51                   | 21.38        | 21.71        | 22.50         |
|           |            | 36      | 0         | 20.66                   | 20.73        | 20.73        | 21.50         |
|           |            | 36      | 18        | 20.66                   | 20.70        | 20.73        | 21.50         |
|           |            | 36      | 39        | 20.80                   | 20.77        | 20.73        | 21.50         |
|           |            | 75      | 0         | 20.71                   | 20.75        | 20.70        | 21.50         |
|           | 64QAM      | 1       | 0         | 20.72                   | 21.20        | 20.95        | 22.00         |
|           |            | 1       | 38        | 21.01                   | 21.46        | 21.23        | 22.00         |
|           |            | 1       | 74        | 20.83                   | 21.18        | 20.87        | 22.00         |
|           |            | 36      | 0         | 20.11                   | 20.17        | 20.13        | 21.00         |
|           |            | 36      | 18        | 20.09                   | 20.13        | 20.12        | 21.00         |
|           |            | 36      | 39        | 20.20                   | 20.17        | 20.15        | 21.00         |
|           |            | 75      | 0         | 20.15                   | 20.12        | 20.15        | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 20050/1720              | 20175/1732.5 | 20300/1745   |               |
| 20MHz     | QPSK       | 1       | 0         | 22.56                   | 22.56        | 22.55        | 23.50         |
|           |            | 1       | 50        | <b>22.67</b>            | <b>22.65</b> | <b>22.65</b> | 23.50         |
|           |            | 1       | 99        | 22.65                   | 22.54        | 22.47        | 23.50         |
|           |            | 50      | 0         | 21.57                   | 21.62        | 21.63        | 22.50         |
|           |            | 50      | 25        | 21.62                   | 21.61        | 21.64        | 22.50         |
|           |            | 50      | 50        | <b>21.71</b>            | <b>21.69</b> | <b>21.68</b> | 22.50         |
|           |            | 100     | 0         | 21.64                   | 21.61        | <b>21.65</b> | 22.50         |
|           | 16QAM      | 1       | 0         | 21.46                   | 21.37        | 21.73        | 22.50         |
|           |            | 1       | 50        | 21.73                   | 21.67        | 21.92        | 22.50         |



|  |       |     |    |       |       |       |       |
|--|-------|-----|----|-------|-------|-------|-------|
|  |       | 1   | 99 | 21.49 | 21.35 | 21.69 | 22.50 |
|  |       | 50  | 0  | 20.63 | 20.69 | 20.70 | 21.50 |
|  |       | 50  | 25 | 20.63 | 20.68 | 20.70 | 21.50 |
|  |       | 50  | 50 | 20.77 | 20.72 | 20.69 | 21.50 |
|  |       | 100 | 0  | 20.69 | 20.71 | 20.67 | 21.50 |
|  | 64QAM | 1   | 0  | 20.70 | 21.16 | 20.90 | 22.00 |
|  |       | 1   | 50 | 20.97 | 21.44 | 21.19 | 22.00 |
|  |       | 1   | 99 | 20.77 | 21.12 | 20.81 | 22.00 |
|  |       | 50  | 0  | 20.06 | 20.09 | 20.06 | 21.00 |
|  |       | 50  | 25 | 20.05 | 20.09 | 20.06 | 21.00 |
|  |       | 50  | 50 | 20.17 | 20.12 | 20.11 | 21.00 |
|  |       | 100 | 0  | 20.13 | 20.08 | 20.12 | 21.00 |

| LTE FDD Band 5<br>Full Power& Receiver on<br>&Receiver off& Hotspot on |            |         |           | Conducted Power(dBm)    |             |             | Tune-up<br>Limit |
|------------------------------------------------------------------------|------------|---------|-----------|-------------------------|-------------|-------------|------------------|
| Bandwidth                                                              | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             |                  |
|                                                                        |            |         |           | 20407/824.7             | 20525/836.5 | 20643/848.3 |                  |
| 1.4MHz                                                                 | QPSK       | 1       | 0         | 24.04                   | 24.21       | 24.44       | 25.00            |
|                                                                        |            | 1       | 2         | 24.30                   | 24.33       | 24.23       | 25.00            |
|                                                                        |            | 1       | 5         | 24.14                   | 24.16       | 24.33       | 25.00            |
|                                                                        |            | 3       | 0         | 24.18                   | 24.21       | 24.21       | 25.00            |
|                                                                        |            | 3       | 2         | 24.09                   | 24.21       | 24.16       | 25.00            |
|                                                                        |            | 3       | 3         | 24.21                   | 24.18       | 24.22       | 25.00            |
|                                                                        |            | 6       | 0         | 23.20                   | 23.26       | 23.10       | 24.00            |
|                                                                        | 16QAM      | 1       | 0         | 23.56                   | 23.37       | 23.31       | 24.00            |
|                                                                        |            | 1       | 2         | 23.54                   | 23.49       | 23.06       | 24.00            |
|                                                                        |            | 1       | 5         | 23.45                   | 23.35       | 23.29       | 24.00            |
|                                                                        |            | 3       | 0         | 23.18                   | 23.17       | 23.20       | 24.00            |
|                                                                        |            | 3       | 2         | 23.21                   | 23.21       | 23.14       | 24.00            |
|                                                                        |            | 3       | 3         | 23.25                   | 23.21       | 23.21       | 24.00            |
|                                                                        |            | 6       | 0         | 22.15                   | 22.23       | 22.25       | 23.00            |
|                                                                        | 64QAM      | 1       | 0         | 23.19                   | 22.97       | 23.33       | 23.50            |
|                                                                        |            | 1       | 2         | 23.41                   | 23.15       | 23.24       | 23.50            |
|                                                                        |            | 1       | 5         | 23.16                   | 22.98       | 23.30       | 23.50            |
|                                                                        |            | 3       | 0         | 23.02                   | 23.03       | 23.18       | 23.50            |
|                                                                        |            | 3       | 2         | 23.07                   | 23.05       | 23.21       | 23.50            |
|                                                                        |            | 3       | 3         | 23.07                   | 23.03       | 23.10       | 23.50            |
|                                                                        |            | 6       | 0         | 22.06                   | 22.12       | 22.16       | 23.00            |
| Bandwidth                                                              | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             | Tune-up<br>Limit |
|                                                                        |            |         |           | 20415/825.5             | 20525/836.5 | 20635/847.5 |                  |
| 3MHz                                                                   | QPSK       | 1       | 0         | 24.06                   | 24.25       | 24.47       | 25.00            |



|           |            | 1       | 7         | 24.28                   | 24.36       | 24.27       | 25.00         |
|-----------|------------|---------|-----------|-------------------------|-------------|-------------|---------------|
|           |            | 1       | 14        | 24.17                   | 24.21       | 24.37       | 25.00         |
|           |            | 8       | 0         | 23.28                   | 23.33       | 23.34       | 24.00         |
|           |            | 8       | 4         | 23.21                   | 23.31       | 23.28       | 24.00         |
|           |            | 8       | 7         | 23.31                   | 23.29       | 23.32       | 24.00         |
|           |            | 15      | 0         | 23.20                   | 23.30       | 23.13       | 24.00         |
|           | 16QAM      | 1       | 0         | 23.59                   | 23.39       | 23.34       | 24.00         |
|           |            | 1       | 7         | 23.57                   | 23.49       | 23.10       | 24.00         |
|           |            | 1       | 14        | 23.47                   | 23.39       | 23.32       | 24.00         |
|           |            | 8       | 0         | 22.29                   | 22.30       | 22.32       | 23.00         |
|           |            | 8       | 4         | 22.32                   | 22.34       | 22.26       | 23.00         |
|           |            | 8       | 7         | 22.35                   | 22.33       | 22.34       | 23.00         |
|           |            | 15      | 0         | 22.18                   | 22.27       | 22.28       | 23.00         |
|           | 64QAM      | 1       | 0         | 23.22                   | 22.99       | 23.36       | 23.50         |
|           |            | 1       | 7         | 23.44                   | 23.15       | 23.26       | 23.50         |
|           |            | 1       | 14        | 23.18                   | 22.97       | 23.33       | 23.50         |
|           |            | 8       | 0         | 22.13                   | 22.16       | 22.30       | 23.00         |
|           |            | 8       | 4         | 22.18                   | 22.18       | 22.33       | 23.00         |
|           |            | 8       | 7         | 22.17                   | 22.15       | 22.23       | 23.00         |
|           |            | 15      | 0         | 22.09                   | 22.16       | 22.19       | 23.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             | Tune-up Limit |
|           |            |         |           | 20425/826.5             | 20525/836.5 | 20625/846.5 |               |
| 5MHz      | QPSK       | 1       | 0         | 24.04                   | 24.20       | 24.44       | 25.00         |
|           |            | 1       | 13        | 24.27                   | 24.36       | 24.25       | 25.00         |
|           |            | 1       | 24        | 24.13                   | 24.15       | 24.32       | 25.00         |
|           |            | 12      | 0         | 23.26                   | 23.29       | 23.31       | 24.00         |
|           |            | 12      | 6         | 23.19                   | 23.27       | 23.23       | 24.00         |
|           |            | 12      | 13        | 23.28                   | 23.28       | 23.29       | 24.00         |
|           |            | 25      | 0         | 23.22                   | 23.27       | 23.10       | 24.00         |
|           | 16QAM      | 1       | 0         | 23.53                   | 23.36       | 23.31       | 24.00         |
|           |            | 1       | 13        | 23.55                   | 23.48       | 23.08       | 24.00         |
|           |            | 1       | 24        | 23.44                   | 23.35       | 23.28       | 24.00         |
|           |            | 12      | 0         | 22.27                   | 22.29       | 22.30       | 23.00         |
|           |            | 12      | 6         | 22.28                   | 22.28       | 22.21       | 23.00         |
|           |            | 12      | 13        | 22.33                   | 22.29       | 22.31       | 23.00         |
|           |            | 25      | 0         | 22.16                   | 22.23       | 22.23       | 23.00         |
|           | 64QAM      | 1       | 0         | 23.16                   | 22.96       | 23.33       | 23.50         |
|           |            | 1       | 13        | 23.42                   | 23.14       | 23.24       | 23.50         |
|           |            | 1       | 24        | 23.19                   | 22.96       | 23.33       | 23.50         |
|           |            | 12      | 0         | 22.13                   | 22.19       | 22.32       | 23.00         |
|           |            | 12      | 6         | 22.15                   | 22.14       | 22.31       | 23.00         |
|           |            | 12      | 13        | 22.15                   | 22.11       | 22.20       | 23.00         |
|           |            | 25      | 0         | 22.07                   | 22.12       | 22.14       | 23.00         |



| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
|           |            |         |           | 20450/829               | 20525/836.5  | 20600/844    |               |
| 10MHz     | QPSK       | 1       | 0         | 24.01                   | 24.16        | <b>24.41</b> | 25.00         |
|           |            | 1       | 25        | <b>24.26</b>            | <b>24.32</b> | 24.23        | 25.00         |
|           |            | 1       | 49        | 24.11                   | 24.14        | 24.29        | 25.00         |
|           |            | 25      | 0         | 23.23                   | <b>23.24</b> | <b>23.27</b> | 24.00         |
|           |            | 25      | 13        | 23.17                   | 23.23        | 23.20        | 24.00         |
|           |            | 25      | 25        | <b>23.25</b>            | 23.23        | 23.25        | 24.00         |
|           |            | 50      | 0         | 23.19                   | <b>23.22</b> | 23.06        | 24.00         |
|           | 16QAM      | 1       | 0         | 23.26                   | 23.32        | 23.26        | 24.00         |
|           |            | 1       | 25        | 23.51                   | 23.46        | 23.04        | 24.00         |
|           |            | 1       | 49        | 23.42                   | 23.32        | 23.26        | 24.00         |
|           |            | 25      | 0         | 22.24                   | 22.25        | 22.27        | 23.00         |
|           |            | 25      | 13        | 22.25                   | 22.26        | 22.18        | 23.00         |
|           |            | 25      | 25        | 22.30                   | 22.24        | 22.27        | 23.00         |
|           |            | 50      | 0         | 22.14                   | 22.19        | 22.20        | 23.00         |
|           | 64QAM      | 1       | 0         | 23.14                   | 22.92        | 23.28        | 23.50         |
|           |            | 1       | 25        | 23.38                   | 23.12        | 23.20        | 23.50         |
|           |            | 1       | 49        | 23.13                   | 22.90        | 23.27        | 23.50         |
|           |            | 25      | 0         | 22.08                   | 22.11        | 22.25        | 23.00         |
|           |            | 25      | 13        | 22.11                   | 22.10        | 22.25        | 23.00         |
|           |            | 25      | 25        | 22.12                   | 22.06        | 22.16        | 23.00         |
|           |            | 50      | 0         | 22.05                   | 22.08        | 22.11        | 23.00         |

| LTE FDD Band 12<br>Full Power &Receiver on<br>&Receiver off &Hotspot on |            |         |           | Conducted Power(dBm)    |             |             | Tune-up<br>Limit |
|-------------------------------------------------------------------------|------------|---------|-----------|-------------------------|-------------|-------------|------------------|
| Bandwidth                                                               | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             |                  |
|                                                                         |            |         |           | 23017/699.7             | 23095/707.5 | 23173/715.3 |                  |
| 1.4MHz                                                                  | QPSK       | 1       | 0         | 23.81                   | 23.70       | 23.70       | 24.50            |
|                                                                         |            | 1       | 2         | 23.93                   | 23.81       | 23.83       | 24.50            |
|                                                                         |            | 1       | 5         | 23.80                   | 23.67       | 23.70       | 24.50            |
|                                                                         |            | 3       | 0         | 23.61                   | 23.73       | 23.81       | 24.50            |
|                                                                         |            | 3       | 2         | 23.62                   | 23.75       | 23.83       | 24.50            |
|                                                                         |            | 3       | 3         | 23.78                   | 23.70       | 23.76       | 24.50            |
|                                                                         |            | 6       | 0         | 22.73                   | 22.78       | 22.84       | 23.50            |
|                                                                         | 16QAM      | 1       | 0         | 22.87                   | 23.00       | 22.92       | 23.50            |
|                                                                         |            | 1       | 2         | 22.85                   | 23.08       | 22.98       | 23.50            |
|                                                                         |            | 1       | 5         | 22.67                   | 22.99       | 22.87       | 23.50            |
|                                                                         |            | 3       | 0         | 22.60                   | 22.75       | 22.81       | 23.50            |
|                                                                         |            | 3       | 2         | 22.65                   | 22.79       | 22.82       | 23.50            |
|                                                                         |            | 3       | 3         | 22.76                   | 22.75       | 22.72       | 23.50            |



|           | 64QAM      | 6       | 0         | 21.74                   | 21.77       | 21.80       | 22.50         |
|-----------|------------|---------|-----------|-------------------------|-------------|-------------|---------------|
|           |            | 1       | 0         | 22.35                   | 22.62       | 22.53       | 23.00         |
|           |            | 1       | 2         | 22.46                   | 22.80       | 22.70       | 23.00         |
|           |            | 1       | 5         | 22.27                   | 22.65       | 22.46       | 23.00         |
|           |            | 3       | 0         | 22.24                   | 22.37       | 22.41       | 23.00         |
|           |            | 3       | 2         | 22.25                   | 22.43       | 22.44       | 23.00         |
|           |            | 3       | 3         | 22.37                   | 22.38       | 22.32       | 23.00         |
|           |            | 6       | 0         | 21.36                   | 21.36       | 21.42       | 22.50         |
|           |            |         |           |                         |             |             |               |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             | Tune-up Limit |
|           |            |         |           | 23025/700.5             | 23095/707.5 | 23165/714.5 |               |
| 3MHz      | QPSK       | 1       | 0         | 23.83                   | 23.74       | 23.73       | 24.50         |
|           |            | 1       | 7         | 23.91                   | 23.84       | 23.87       | 24.50         |
|           |            | 1       | 14        | 23.83                   | 23.72       | 23.74       | 24.50         |
|           |            | 8       | 0         | 22.71                   | 22.85       | 22.94       | 23.50         |
|           |            | 8       | 4         | 22.74                   | 22.85       | 22.95       | 23.50         |
|           |            | 8       | 7         | 22.88                   | 22.81       | 22.86       | 23.50         |
|           |            | 15      | 0         | 22.73                   | 22.82       | 22.87       | 23.50         |
|           | 16QAM      | 1       | 0         | 22.90                   | 23.02       | 22.95       | 23.50         |
|           |            | 1       | 7         | 22.88                   | 23.08       | 23.02       | 23.50         |
|           |            | 1       | 14        | 22.69                   | 23.03       | 22.90       | 23.50         |
|           |            | 8       | 0         | 21.71                   | 21.88       | 21.93       | 22.50         |
|           |            | 8       | 4         | 21.76                   | 21.92       | 21.94       | 22.50         |
|           |            | 8       | 7         | 21.86                   | 21.87       | 21.85       | 22.50         |
|           |            | 15      | 0         | 21.77                   | 21.81       | 21.83       | 22.50         |
|           | 64QAM      | 1       | 0         | 22.38                   | 22.64       | 22.56       | 23.00         |
|           |            | 1       | 7         | 22.49                   | 22.80       | 22.72       | 23.00         |
|           |            | 1       | 14        | 22.29                   | 22.64       | 22.49       | 23.00         |
|           |            | 8       | 0         | 21.35                   | 21.50       | 21.53       | 22.50         |
|           |            | 8       | 4         | 21.36                   | 21.56       | 21.56       | 22.50         |
|           |            | 8       | 7         | 21.47                   | 21.50       | 21.45       | 22.50         |
|           |            | 15      | 0         | 21.39                   | 21.40       | 21.45       | 22.50         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |             | Tune-up Limit |
|           |            |         |           | 23035/701.5             | 23095/707.5 | 23155/713.5 |               |
| 5MHz      | QPSK       | 1       | 0         | 23.81                   | 23.69       | 23.70       | 24.50         |
|           |            | 1       | 13        | 23.90                   | 23.84       | 23.85       | 24.50         |
|           |            | 1       | 24        | 23.79                   | 23.66       | 23.69       | 24.50         |
|           |            | 12      | 0         | 22.69                   | 22.81       | 22.91       | 23.50         |
|           |            | 12      | 6         | 22.72                   | 22.81       | 22.90       | 23.50         |
|           |            | 12      | 13        | 22.85                   | 22.80       | 22.83       | 23.50         |
|           |            | 25      | 0         | 22.75                   | 22.79       | 22.84       | 23.50         |
|           | 16QAM      | 1       | 0         | 22.84                   | 22.99       | 22.92       | 23.50         |
|           |            | 1       | 13        | 22.86                   | 23.07       | 23.00       | 23.50         |
|           |            | 1       | 24        | 22.66                   | 22.99       | 22.86       | 23.50         |



|           |            | 12      | 0         | 21.69                   | 21.87        | 21.91        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
|           |            | 12      | 6         | 21.72                   | 21.86        | 21.89        | 22.50         |
|           |            | 12      | 13        | 21.84                   | 21.83        | 21.82        | 22.50         |
|           |            | 25      | 0         | 21.75                   | 21.77        | 21.78        | 22.50         |
|           | 64QAM      | 1       | 0         | 22.32                   | 22.61        | 22.53        | 23.00         |
|           |            | 1       | 13        | 22.47                   | 22.79        | 22.70        | 23.00         |
|           |            | 1       | 24        | 22.30                   | 22.63        | 22.49        | 23.00         |
|           |            | 12      | 0         | 21.35                   | 21.53        | 21.55        | 22.50         |
|           |            | 12      | 6         | 21.33                   | 21.52        | 21.54        | 22.50         |
|           |            | 12      | 13        | 21.45                   | 21.46        | 21.42        | 22.50         |
|           |            | 25      | 0         | 21.37                   | 21.36        | 21.40        | 22.50         |
|           |            |         |           |                         |              |              |               |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 23060/704               | 23095/707.5  | 23130/711    |               |
| 10MHz     | QPSK       | 1       | 0         | 23.78                   | 23.65        | 23.67        | 24.50         |
|           |            | 1       | 25        | <b>23.89</b>            | <b>23.80</b> | <b>23.83</b> | 24.50         |
|           |            | 1       | 49        | 23.77                   | 23.65        | 23.66        | 24.50         |
|           |            | 25      | 0         | 22.66                   | 22.76        | <b>22.87</b> | 23.50         |
|           |            | 25      | 13        | 22.70                   | <b>22.77</b> | <b>22.87</b> | 23.50         |
|           |            | 25      | 25        | <b>22.82</b>            | 22.75        | 22.79        | 23.50         |
|           |            | 50      | 0         | 22.72                   | 22.74        | <b>22.80</b> | 23.50         |
|           | 16QAM      | 1       | 0         | 22.64                   | 22.95        | 22.87        | 23.50         |
|           |            | 1       | 25        | 22.82                   | 23.05        | 22.96        | 23.50         |
|           |            | 1       | 49        | 22.64                   | 22.96        | 22.84        | 23.50         |
|           |            | 25      | 0         | 21.66                   | 21.83        | 21.88        | 22.50         |
|           |            | 25      | 13        | 21.69                   | 21.84        | 21.86        | 22.50         |
|           |            | 25      | 25        | 21.81                   | 21.78        | 21.78        | 22.50         |
|           |            | 50      | 0         | 21.73                   | 21.73        | 21.75        | 22.50         |
|           | 64QAM      | 1       | 0         | 22.30                   | 22.57        | 22.48        | 23.00         |
|           |            | 1       | 25        | 22.43                   | 22.77        | 22.66        | 23.00         |
|           |            | 1       | 49        | 22.24                   | 22.57        | 22.43        | 23.00         |
|           |            | 25      | 0         | 21.30                   | 21.45        | 21.48        | 22.50         |
|           |            | 25      | 13        | 21.29                   | 21.48        | 21.48        | 22.50         |
|           |            | 25      | 25        | 21.42                   | 21.41        | 21.38        | 22.50         |
|           |            | 50      | 0         | 21.35                   | 21.32        | 21.37        | 22.50         |

| LTE TDD Band 41<br>Full Power &Receiver off |                |            |              | Conducted Power(dBm)    |                  |                |                  |                  | Tune-<br>up<br>Limit |
|---------------------------------------------|----------------|------------|--------------|-------------------------|------------------|----------------|------------------|------------------|----------------------|
| Bandwi<br>dth                               | Modula<br>tion | RB<br>size | RB<br>offset | Channel/Frequency (MHz) |                  |                |                  |                  |                      |
|                                             |                |            |              | 39675/<br>2498.5        | 40148/<br>2545.8 | 40620/<br>2593 | 41093/<br>2640.3 | 41565/<br>2687.5 |                      |
| 5MHz                                        | QPSK           | 1          | 0            | 25.69                   | 25.63            | 25.53          | 25.55            | 25.26            | 26.50                |
|                                             |                | 1          | 13           | 25.79                   | 25.82            | 25.84          | 25.76            | 25.00            | 26.50                |
|                                             |                | 1          | 24           | 25.69                   | 25.65            | 25.63          | 25.61            | 25.05            | 26.50                |



|           |            | 12      | 0         | 24.81                   | 24.73      | 24.74      | 24.86      | 2s4.51     | 25.50         |
|-----------|------------|---------|-----------|-------------------------|------------|------------|------------|------------|---------------|
|           |            | 12      | 6         | 24.86                   | 24.84      | 24.75      | 24.84      | 24.52      | 25.50         |
|           |            | 12      | 13        | 24.83                   | 24.80      | 24.70      | 24.73      | 24.46      | 25.50         |
|           |            | 25      | 0         | 24.81                   | 24.82      | 24.75      | 24.74      | 24.51      | 25.50         |
|           | 16QAM      | 1       | 0         | 24.77                   | 24.68      | 24.61      | 24.83      | 24.85      | 25.50         |
|           |            | 1       | 13        | 24.75                   | 24.78      | 24.82      | 24.81      | 24.92      | 25.50         |
|           |            | 1       | 24        | 24.65                   | 24.82      | 24.68      | 24.76      | 24.98      | 25.50         |
|           |            | 12      | 0         | 23.73                   | 23.75      | 23.58      | 23.74      | 23.93      | 24.50         |
|           |            | 12      | 6         | 23.86                   | 23.86      | 23.64      | 23.77      | 23.96      | 24.50         |
|           |            | 12      | 13        | 23.83                   | 23.91      | 23.60      | 23.77      | 24.02      | 24.50         |
|           |            | 25      | 0         | 23.80                   | 23.78      | 23.62      | 23.68      | 23.87      | 24.50         |
|           | 64QAM      | 1       | 0         | 23.77                   | 23.86      | 23.70      | 23.68      | 23.91      | 24.50         |
|           |            | 1       | 13        | 23.73                   | 23.91      | 23.58      | 23.77      | 23.86      | 24.50         |
|           |            | 1       | 24        | 23.60                   | 23.71      | 23.51      | 23.66      | 23.78      | 24.50         |
|           |            | 12      | 0         | 23.34                   | 23.45      | 23.32      | 23.44      | 23.40      | 23.50         |
|           |            | 12      | 6         | 23.12                   | 23.28      | 23.05      | 23.25      | 23.39      | 23.50         |
|           |            | 12      | 13        | 23.13                   | 23.28      | 23.09      | 23.24      | 23.38      | 23.50         |
|           |            | 25      | 0         | 23.24                   | 23.36      | 23.30      | 23.41      | 23.42      | 23.50         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |            |            |            |            | Tune-up Limit |
|           |            |         |           | 39700/2501              | 40160/2547 | 40620/2593 | 41080/2639 | 41540/2685 |               |
| 10MHz     | QPSK       | 1       | 0         | 25.71                   | 25.64      | 25.56      | 25.54      | 25.25      | 26.50         |
|           |            | 1       | 25        | 25.82                   | 25.87      | 25.88      | 25.77      | 25.01      | 26.50         |
|           |            | 1       | 49        | 25.71                   | 25.69      | 25.66      | 25.60      | 25.04      | 26.50         |
|           |            | 25      | 0         | 24.84                   | 24.78      | 24.78      | 24.86      | 24.51      | 25.50         |
|           |            | 25      | 13        | 24.89                   | 24.89      | 24.79      | 24.85      | 24.53      | 25.50         |
|           |            | 25      | 25        | 24.85                   | 24.84      | 24.75      | 24.73      | 24.48      | 25.50         |
|           |            | 50      | 0         | 24.85                   | 24.84      | 24.79      | 24.78      | 24.52      | 25.50         |
|           | 16QAM      | 1       | 0         | 24.79                   | 24.71      | 24.63      | 24.82      | 24.84      | 25.50         |
|           |            | 1       | 25        | 24.78                   | 24.82      | 24.85      | 24.81      | 24.94      | 25.50         |
|           |            | 1       | 49        | 24.68                   | 24.84      | 24.71      | 24.76      | 24.98      | 25.50         |
|           |            | 25      | 0         | 23.76                   | 23.80      | 23.62      | 23.75      | 23.94      | 24.50         |
|           |            | 25      | 13        | 23.88                   | 23.90      | 23.67      | 23.76      | 23.95      | 24.50         |
|           |            | 25      | 25        | 23.86                   | 23.96      | 23.64      | 23.77      | 24.02      | 24.50         |
|           |            | 50      | 0         | 23.83                   | 23.83      | 23.66      | 23.69      | 23.88      | 24.50         |
|           | 64QAM      | 1       | 0         | 23.79                   | 23.85      | 23.72      | 23.67      | 23.90      | 24.50         |
|           |            | 1       | 25        | 23.76                   | 23.91      | 23.61      | 23.77      | 23.88      | 24.50         |
|           |            | 1       | 49        | 23.59                   | 23.73      | 23.54      | 23.66      | 23.78      | 24.50         |
|           |            | 25      | 0         | 23.37                   | 23.44      | 23.32      | 23.45      | 23.38      | 23.50         |
|           |            | 25      | 13        | 23.14                   | 23.32      | 23.08      | 23.24      | 23.38      | 23.50         |
|           |            | 25      | 25        | 23.16                   | 23.33      | 23.13      | 23.24      | 23.38      | 23.50         |
|           |            | 50      | 0         | 23.27                   | 23.41      | 23.34      | 23.42      | 23.39      | 23.50         |
| Bandwidth | Modulation | RB      | RB        | Channel/Frequency (MHz) |            |            |            |            | Tune-         |



| Bandwidth | Modulation | RB size | RB offset | 39725/<br>2503.5        | 40173/<br>2548.3 | 40620/<br>2593 | 41068/<br>2637.8 | 41515/<br>2682.5 | up<br>Limit               |
|-----------|------------|---------|-----------|-------------------------|------------------|----------------|------------------|------------------|---------------------------|
| 15MHz     | QPSK       | 1       | 0         | 25.70                   | 25.60            | 25.54          | 25.53            | 25.21            | 26.50                     |
|           |            | 1       | 38        | 25.80                   | 25.86            | 25.85          | 25.75            | 25.00            | 26.50                     |
|           |            | 1       | 74        | 25.68                   | 25.64            | 25.62          | 25.57            | 24.99            | 26.50                     |
|           |            | 36      | 0         | 24.82                   | 24.74            | 24.75          | 24.84            | 24.47            | 25.50                     |
|           |            | 36      | 18        | 24.86                   | 24.84            | 24.75          | 24.82            | 24.48            | 25.50                     |
|           |            | 36      | 39        | 24.82                   | 24.81            | 24.71          | 24.70            | 24.45            | 25.50                     |
|           |            | 75      | 0         | 24.83                   | 24.80            | 24.74          | 24.76            | 24.48            | 25.50                     |
|           | 16QAM      | 1       | 0         | 24.74                   | 24.69            | 24.61          | 24.77            | 24.82            | 25.50                     |
|           |            | 1       | 38        | 24.76                   | 24.79            | 24.83          | 24.79            | 24.91            | 25.50                     |
|           |            | 1       | 74        | 24.65                   | 24.80            | 24.68          | 24.73            | 24.94            | 25.50                     |
|           |            | 36      | 0         | 23.73                   | 23.78            | 23.59          | 23.72            | 23.92            | 24.50                     |
|           |            | 36      | 18        | 23.85                   | 23.85            | 23.63          | 23.73            | 23.90            | 24.50                     |
|           |            | 36      | 39        | 23.84                   | 23.92            | 23.61          | 23.75            | 23.98            | 24.50                     |
|           |            | 75      | 0         | 23.80                   | 23.78            | 23.62          | 23.66            | 23.83            | 24.50                     |
|           | 64QAM      | 1       | 0         | 23.74                   | 23.83            | 23.70          | 23.62            | 23.88            | 24.50                     |
|           |            | 1       | 38        | 23.74                   | 23.88            | 23.59          | 23.75            | 23.85            | 24.50                     |
|           |            | 1       | 74        | 23.60                   | 23.72            | 23.55          | 23.67            | 23.77            | 24.50                     |
|           |            | 36      | 0         | 23.36                   | 23.44            | 23.33          | 23.44            | 23.37            | 23.50                     |
|           |            | 36      | 18        | 23.12                   | 23.29            | 23.07          | 23.22            | 23.35            | 23.50                     |
|           |            | 36      | 39        | 23.14                   | 23.29            | 23.10          | 23.22            | 23.34            | 23.50                     |
|           |            | 75      | 0         | 23.24                   | 23.36            | 23.30          | 23.39            | 23.35            | 23.50                     |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |                  |                |                  |                  | Tune-up<br>Limit<br>(dBm) |
|           |            |         |           | 39750/<br>2506          | 40185/<br>2549.5 | 40620/<br>2593 | 41055/<br>2636.5 | 41490/<br>2680   |                           |
| 20MHz     | QPSK       | 1       | 0         | 25.67                   | 25.56            | 25.51          | 25.50            | <b>25.17</b>     | 26.50                     |
|           |            | 1       | 50        | <b>25.79</b>            | <b>25.82</b>     | <b>25.83</b>   | <b>25.74</b>     | 24.96            | 26.50                     |
|           |            | 1       | 99        | 25.66                   | 25.63            | 25.59          | 25.55            | 24.98            | 26.50                     |
|           |            | 50      | 0         | 24.79                   | 24.69            | 24.71          | <b>24.81</b>     | 24.42            | 25.50                     |
|           |            | 50      | 25        | <b>24.84</b>            | <b>24.80</b>     | <b>24.72</b>   | 24.80            | <b>24.44</b>     | 25.50                     |
|           |            | 50      | 50        | 24.79                   | 24.76            | 24.67          | 24.67            | 24.40            | 25.50                     |
|           |            | 100     | 0         | <b>24.80</b>            | 24.75            | 24.70          | 24.73            | <b>24.43</b>     | 25.50                     |
|           | 16QAM      | 1       | 0         | 24.52                   | 24.65            | 24.56          | 24.60            | 24.78            | 25.50                     |
|           |            | 1       | 50        | 24.72                   | 24.77            | 24.79          | 24.75            | 24.89            | 25.50                     |
|           |            | 1       | 99        | 24.63                   | 24.77            | 24.66          | 24.71            | 24.91            | 25.50                     |
|           |            | 50      | 0         | 23.70                   | 23.74            | 23.56          | 23.69            | 23.88            | 24.50                     |
|           |            | 50      | 25        | 23.82                   | 23.83            | 23.60          | 23.70            | 23.88            | 24.50                     |
|           |            | 50      | 50        | 23.81                   | 23.87            | 23.57          | 23.72            | 23.93            | 24.50                     |
|           |            | 100     | 0         | 23.78                   | 23.74            | 23.59          | 23.64            | 23.79            | 24.50                     |
|           | 64QAM      | 1       | 0         | 23.72                   | 23.79            | 23.65          | 23.60            | 23.84            | 24.50                     |



|  |  |     |    |       |       |       |       |       |       |
|--|--|-----|----|-------|-------|-------|-------|-------|-------|
|  |  | 1   | 50 | 23.70 | 23.86 | 23.55 | 23.71 | 23.83 | 24.50 |
|  |  | 1   | 99 | 23.54 | 23.66 | 23.49 | 23.61 | 23.71 | 24.50 |
|  |  | 50  | 0  | 23.31 | 23.44 | 23.26 | 23.39 | 23.42 | 23.50 |
|  |  | 50  | 25 | 23.08 | 23.25 | 23.01 | 23.18 | 23.31 | 23.50 |
|  |  | 50  | 50 | 23.11 | 23.24 | 23.06 | 23.19 | 23.29 | 23.50 |
|  |  | 100 | 0  | 23.22 | 23.32 | 23.27 | 23.37 | 23.46 | 23.50 |

| LTE TDD Band 41<br>Receiver on |            |         |           | Conducted Power(dBm)    |                  |                |                  |                  | Tune-<br>up<br>Limit |
|--------------------------------|------------|---------|-----------|-------------------------|------------------|----------------|------------------|------------------|----------------------|
| Bandwidth                      | Modulation | RB size | RB offset | Channel/Frequency (MHz) |                  |                |                  |                  |                      |
|                                |            |         |           | 39675/<br>2498.5        | 40148/<br>2545.8 | 40620/<br>2593 | 41093/<br>2640.3 | 41565/<br>2687.5 |                      |
| 5MHz                           | QPSK       | 1       | 0         | 22.88                   | 22.92            | 22.77          | 22.80            | 22.78            | 23.50                |
|                                |            | 1       | 13        | 23.20                   | 22.75            | 22.77          | 22.94            | 22.83            | 23.50                |
|                                |            | 1       | 24        | 22.98                   | 22.94            | 23.04          | 22.72            | 23.12            | 23.50                |
|                                |            | 12      | 0         | 21.99                   | 21.94            | 21.86          | 21.94            | 21.81            | 22.50                |
|                                |            | 12      | 6         | 22.13                   | 22.06            | 21.92          | 21.93            | 21.88            | 22.50                |
|                                |            | 12      | 13        | 22.06                   | 22.06            | 21.85          | 21.78            | 21.72            | 22.50                |
|                                |            | 25      | 0         | 21.98                   | 21.95            | 21.93          | 21.80            | 21.80            | 22.50                |
|                                | 16QAM      | 1       | 0         | 22.28                   | 21.96            | 21.97          | 22.21            | 21.92            | 22.50                |
|                                |            | 1       | 13        | 22.26                   | 22.12            | 22.19          | 22.19            | 22.12            | 22.50                |
|                                |            | 1       | 24        | 22.23                   | 22.23            | 22.00          | 22.00            | 21.83            | 22.50                |
|                                |            | 12      | 0         | 21.05                   | 20.96            | 20.89          | 20.97            | 20.94            | 21.50                |
|                                |            | 12      | 6         | 21.13                   | 21.07            | 20.98          | 21.01            | 20.94            | 21.50                |
|                                |            | 12      | 13        | 21.10                   | 21.12            | 20.96          | 20.85            | 20.82            | 21.50                |
|                                |            | 25      | 0         | 21.08                   | 21.03            | 20.93          | 20.95            | 20.82            | 21.50                |
|                                | 64QAM      | 1       | 0         | 21.18                   | 21.08            | 20.93          | 21.02            | 21.15            | 21.50                |
|                                |            | 1       | 13        | 21.12                   | 21.08            | 20.96          | 21.02            | 21.11            | 21.50                |
|                                |            | 1       | 24        | 21.09                   | 21.04            | 20.87          | 21.04            | 21.06            | 21.50                |
|                                |            | 12      | 0         | 19.87                   | 19.76            | 19.66          | 19.73            | 19.79            | 20.50                |
|                                |            | 12      | 6         | 20.04                   | 19.95            | 19.83          | 19.92            | 19.99            | 20.50                |
|                                |            | 12      | 13        | 20.03                   | 20.00            | 19.87          | 19.93            | 20.02            | 20.50                |
|                                |            | 25      | 0         | 19.96                   | 19.93            | 19.83          | 19.86            | 19.95            | 20.50                |
| Bandwidth                      | Modulation | RB size | RB offset | Channel/Frequency (MHz) |                  |                |                  |                  | Tune-<br>up<br>Limit |
|                                |            |         |           | 39700/<br>2501          | 40160/<br>2547   | 40620/<br>2593 | 41080/<br>2639   | 41540/<br>2685   |                      |
| 10MHz                          | QPSK       | 1       | 0         | 22.90                   | 22.93            | 22.80          | 22.82            | 22.79            | 23.50                |
|                                |            | 1       | 25        | 23.23                   | 22.80            | 22.81          | 22.97            | 22.88            | 23.50                |
|                                |            | 1       | 49        | 23.00                   | 22.98            | 23.07          | 22.74            | 23.16            | 23.50                |
|                                |            | 25      | 0         | 22.02                   | 21.99            | 21.90          | 21.97            | 21.86            | 22.50                |
|                                |            | 25      | 13        | 22.16                   | 22.11            | 21.96          | 21.96            | 21.93            | 22.50                |
|                                |            | 25      | 25        | 22.08                   | 22.10            | 21.90          | 21.80            | 21.76            | 22.50                |
|                                |            | 50      | 0         | 22.02                   | 21.97            | 21.97          | 21.84            | 21.82            | 22.50                |



|           | 16QAM      | 1       | 0         | 22.30                   | 21.99            | 21.99          | 22.23            | 21.95            | 22.50               |
|-----------|------------|---------|-----------|-------------------------|------------------|----------------|------------------|------------------|---------------------|
|           |            | 1       | 25        | 22.29                   | 22.16            | 22.22          | 22.22            | 22.16            | 22.50               |
|           |            | 1       | 49        | 22.26                   | 22.25            | 22.03          | 22.03            | 21.85            | 22.50               |
|           |            | 25      | 0         | 21.08                   | 21.01            | 20.93          | 21.00            | 20.99            | 21.50               |
|           |            | 25      | 13        | 21.15                   | 21.11            | 21.01          | 21.03            | 20.98            | 21.50               |
|           |            | 25      | 25        | 21.13                   | 21.17            | 21.00          | 20.88            | 20.87            | 21.50               |
|           |            | 50      | 0         | 21.11                   | 21.08            | 20.97          | 20.98            | 20.87            | 21.50               |
|           | 64QAM      | 1       | 0         | 21.20                   | 21.07            | 20.95          | 21.04            | 21.14            | 21.50               |
|           |            | 1       | 25        | 21.15                   | 21.08            | 20.99          | 21.05            | 21.11            | 21.50               |
|           |            | 1       | 49        | 21.08                   | 21.06            | 20.90          | 21.03            | 21.08            | 21.50               |
|           |            | 25      | 0         | 19.90                   | 19.81            | 19.66          | 19.76            | 19.84            | 20.50               |
|           |            | 25      | 13        | 20.06                   | 19.99            | 19.86          | 19.94            | 20.03            | 20.50               |
|           |            | 25      | 25        | 20.06                   | 20.05            | 19.91          | 19.96            | 20.07            | 20.50               |
|           |            | 50      | 0         | 19.99                   | 19.98            | 19.87          | 19.89            | 20.00            | 20.50               |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |                  |                |                  |                  | Tune-up Limit       |
|           |            |         |           | 39725/<br>2503.5        | 40173/<br>2548.3 | 40620/<br>2593 | 41068/<br>2637.8 | 41515/<br>2682.5 |                     |
| 15MHz     | QPSK       | 1       | 0         | 22.89                   | 22.89            | 22.78          | 22.81            | 22.75            | 23.50               |
|           |            | 1       | 38        | 23.21                   | 22.79            | 22.78          | 22.95            | 22.87            | 23.50               |
|           |            | 1       | 74        | 22.97                   | 22.93            | 23.03          | 22.71            | 23.11            | 23.50               |
|           |            | 36      | 0         | 22.00                   | 21.95            | 21.87          | 21.95            | 21.82            | 22.50               |
|           |            | 36      | 18        | 22.13                   | 22.06            | 21.92          | 21.93            | 21.88            | 22.50               |
|           |            | 36      | 39        | 22.05                   | 22.07            | 21.86          | 21.77            | 21.73            | 22.50               |
|           |            | 75      | 0         | 22.00                   | 21.93            | 21.92          | 21.82            | 21.78            | 22.50               |
|           | 16QAM      | 1       | 0         | 22.25                   | 21.97            | 21.97          | 22.18            | 21.93            | 22.50               |
|           |            | 1       | 38        | 22.27                   | 22.13            | 22.20          | 22.20            | 22.13            | 22.50               |
|           |            | 1       | 74        | 22.23                   | 22.21            | 22.00          | 22.00            | 21.81            | 22.50               |
|           |            | 36      | 0         | 21.05                   | 20.99            | 20.90          | 20.97            | 20.97            | 21.50               |
|           |            | 36      | 18        | 21.12                   | 21.06            | 20.97          | 21.00            | 20.93            | 21.50               |
|           |            | 36      | 39        | 21.11                   | 21.13            | 20.97          | 20.86            | 20.83            | 21.50               |
|           |            | 75      | 0         | 21.08                   | 21.03            | 20.93          | 20.95            | 20.82            | 21.50               |
|           | 64QAM      | 1       | 0         | 21.15                   | 21.05            | 20.93          | 20.99            | 21.12            | 21.50               |
|           |            | 1       | 38        | 21.13                   | 21.05            | 20.97          | 21.03            | 21.08            | 21.50               |
|           |            | 1       | 74        | 21.09                   | 21.05            | 20.91          | 21.04            | 21.07            | 21.50               |
|           |            | 36      | 0         | 19.89                   | 19.83            | 19.67          | 19.75            | 19.86            | 20.50               |
|           |            | 36      | 18        | 20.04                   | 19.96            | 19.85          | 19.92            | 20.00            | 20.50               |
|           |            | 36      | 39        | 20.04                   | 20.01            | 19.88          | 19.94            | 20.03            | 20.50               |
|           |            | 75      | 0         | 19.96                   | 19.93            | 19.83          | 19.86            | 19.95            | 20.50               |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |                  |                |                  |                  | Tune-up Limit (dBm) |
|           |            |         |           | 39750/<br>2506          | 40185/<br>2549.5 | 40620/<br>2593 | 41055/<br>2636.5 | 41490/<br>2680   |                     |



|       |       |     |    |              |              |              |              |              |       |
|-------|-------|-----|----|--------------|--------------|--------------|--------------|--------------|-------|
| 20MHz | QPSK  | 1   | 0  | 22.86        | 22.85        | 22.75        | 22.78        | 22.71        | 23.50 |
|       |       | 1   | 50 | <b>23.20</b> | 22.75        | 22.76        | <b>22.94</b> | 22.83        | 23.50 |
|       |       | 1   | 99 | 22.95        | <b>22.92</b> | <b>23.00</b> | 22.69        | <b>23.10</b> | 23.50 |
|       |       | 50  | 0  | 21.97        | 21.90        | 21.83        | <b>21.92</b> | 21.77        | 22.50 |
|       |       | 50  | 25 | <b>22.11</b> | <b>22.02</b> | <b>21.89</b> | 21.91        | <b>21.84</b> | 22.50 |
|       |       | 50  | 50 | 22.02        | <b>22.02</b> | 21.82        | 21.74        | 21.68        | 22.50 |
|       |       | 100 | 0  | <b>21.97</b> | 21.88        | 21.88        | 21.79        | <b>21.73</b> | 22.50 |
|       | 16QAM | 1   | 0  | 22.06        | 21.93        | 21.92        | 21.83        | 21.89        | 22.50 |
|       |       | 1   | 50 | 22.23        | 22.11        | 22.16        | 22.16        | 22.11        | 22.50 |
|       |       | 1   | 99 | 22.21        | 22.18        | 21.98        | 21.98        | 21.78        | 22.50 |
|       |       | 50  | 0  | 21.02        | 20.95        | 20.87        | 20.94        | 20.93        | 21.50 |
|       |       | 50  | 25 | 21.09        | 21.04        | 20.94        | 20.97        | 20.91        | 21.50 |
|       |       | 50  | 50 | 21.08        | 21.08        | 20.93        | 20.83        | 20.78        | 21.50 |
|       |       | 100 | 0  | 21.06        | 20.99        | 20.90        | 20.93        | 20.78        | 21.50 |
|       | 64QAM | 1   | 0  | 21.13        | 21.01        | 20.88        | 20.97        | 21.08        | 21.50 |
|       |       | 1   | 50 | 21.09        | 21.03        | 20.93        | 20.99        | 21.06        | 21.50 |
|       |       | 1   | 99 | 21.03        | 20.99        | 20.85        | 20.98        | 21.01        | 21.50 |
|       |       | 50  | 0  | 19.84        | 19.75        | 19.60        | 19.70        | 19.78        | 20.50 |
|       |       | 50  | 25 | 20.00        | 19.92        | 19.79        | 19.88        | 19.96        | 20.50 |
|       |       | 50  | 50 | 20.01        | 19.96        | 19.84        | 19.91        | 19.98        | 20.50 |
|       |       | 100 | 0  | 19.94        | 19.89        | 19.80        | 19.84        | 19.91        | 20.50 |

| LTE TDD Band 41<br>Hotspot on |            |         |           | Conducted Power(dBm)    |                  |                |                  |                  | Tune-<br>up<br>Limit |
|-------------------------------|------------|---------|-----------|-------------------------|------------------|----------------|------------------|------------------|----------------------|
| Bandwidth                     | Modulation | RB size | RB offset | Channel/Frequency (MHz) |                  |                |                  |                  |                      |
|                               |            |         |           | 39675/<br>2498.5        | 40148/<br>2545.8 | 40620/<br>2593 | 41093/<br>2640.3 | 41565/<br>2687.5 |                      |
| 5MHz                          | QPSK       | 1       | 0         | 23.78                   | 23.82            | 23.78          | 23.81            | 23.68            | 24.50                |
|                               |            | 1       | 13        | 24.02                   | 23.65            | 24.01          | 23.97            | 23.73            | 24.50                |
|                               |            | 1       | 24        | 23.88                   | 23.84            | 23.88          | 23.76            | 23.88            | 24.50                |
|                               |            | 12      | 0         | 22.89                   | 22.84            | 22.91          | 22.92            | 22.81            | 23.50                |
|                               |            | 12      | 6         | 23.03                   | 22.96            | 22.94          | 22.99            | 22.88            | 23.50                |
|                               |            | 12      | 13        | 22.96                   | 22.96            | 23.06          | 22.79            | 22.82            | 23.50                |
|                               |            | 25      | 0         | 22.78                   | 22.85            | 22.84          | 22.84            | 22.70            | 23.50                |
|                               | 16QAM      | 1       | 0         | 23.08                   | 22.86            | 22.87          | 22.97            | 22.82            | 23.50                |
|                               |            | 1       | 13        | 23.06                   | 23.02            | 23.09          | 22.95            | 23.02            | 23.50                |
|                               |            | 1       | 24        | 23.13                   | 23.13            | 23.00          | 23.17            | 23.03            | 23.50                |
|                               |            | 12      | 0         | 21.95                   | 21.86            | 21.79          | 21.99            | 21.84            | 22.50                |
|                               |            | 12      | 6         | 22.03                   | 21.97            | 21.88          | 21.99            | 21.84            | 22.50                |
|                               |            | 12      | 13        | 21.84                   | 21.89            | 21.86          | 21.80            | 21.80            | 22.50                |
|                               |            | 25      | 0         | 21.88                   | 21.93            | 21.83          | 21.90            | 21.82            | 22.50                |
|                               | 64QAM      | 1       | 0         | 22.18                   | 21.95            | 21.88          | 21.96            | 22.12            | 22.50                |
|                               |            | 1       | 13        | 22.02                   | 21.97            | 21.92          | 21.96            | 21.98            | 22.50                |



|           |            | 1       | 24        | 22.17                   | 22.01        | 21.92      | 22.07        | 22.10        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|------------|--------------|--------------|---------------|
|           |            | 12      | 0         | 20.98                   | 20.82        | 20.84      | 20.85        | 20.91        | 21.50         |
|           |            | 12      | 6         | 21.13                   | 20.93        | 20.90      | 20.97        | 21.04        | 21.50         |
|           |            | 12      | 13        | 21.11                   | 20.94        | 20.91      | 20.96        | 21.06        | 21.50         |
|           |            | 25      | 0         | 21.22                   | 20.98        | 20.95      | 21.00        | 21.16        | 21.50         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |            |              |              | Tune-up Limit |
|           |            |         |           | 39700/2501              | 40160/2547   | 40620/2593 | 41080/2639   | 41540/2685   |               |
| 10MHz     | QPSK       | 1       | 0         | 23.80                   | 23.83        | 23.81      | 23.83        | 23.69        | 24.50         |
|           |            | 1       | 25        | 24.05                   | 23.70        | 24.05      | 24.00        | 23.78        | 24.50         |
|           |            | 1       | 49        | 23.90                   | 23.88        | 23.91      | 23.78        | 23.92        | 24.50         |
|           |            | 25      | 0         | 22.92                   | 22.89        | 22.95      | 22.95        | 22.86        | 23.50         |
|           |            | 25      | 13        | 23.06                   | 23.01        | 22.98      | 23.02        | 22.93        | 23.50         |
|           |            | 25      | 25        | 22.98                   | 23.00        | 23.11      | 22.81        | 22.86        | 23.50         |
|           |            | 50      | 0         | 22.82                   | 22.87        | 22.88      | 22.88        | 22.72        | 23.50         |
|           | 16QAM      | 1       | 0         | 23.10                   | 22.89        | 22.89      | 22.99        | 22.85        | 23.50         |
|           |            | 1       | 25        | 23.09                   | 23.06        | 23.12      | 22.98        | 23.06        | 23.50         |
|           |            | 1       | 49        | 23.16                   | 23.15        | 23.03      | 23.20        | 23.05        | 23.50         |
|           |            | 25      | 0         | 21.98                   | 21.91        | 21.83      | 22.02        | 21.89        | 22.50         |
|           |            | 25      | 13        | 22.05                   | 22.01        | 21.91      | 22.01        | 21.88        | 22.50         |
|           |            | 25      | 25        | 21.87                   | 21.94        | 21.90      | 21.83        | 21.85        | 22.50         |
|           |            | 50      | 0         | 21.91                   | 21.98        | 21.87      | 21.93        | 21.87        | 22.50         |
|           | 64QAM      | 1       | 0         | 22.20                   | 21.94        | 21.90      | 21.98        | 22.11        | 22.50         |
|           |            | 1       | 25        | 22.05                   | 21.97        | 21.95      | 21.99        | 21.98        | 22.50         |
|           |            | 1       | 49        | 22.16                   | 22.03        | 21.95      | 22.06        | 22.12        | 22.50         |
|           |            | 25      | 0         | 21.01                   | 20.87        | 20.84      | 20.88        | 20.96        | 21.50         |
|           |            | 25      | 13        | 21.15                   | 20.97        | 20.93      | 20.99        | 21.08        | 21.50         |
|           |            | 25      | 25        | 21.14                   | 20.99        | 20.95      | 20.99        | 21.11        | 21.50         |
|           |            | 50      | 0         | 21.25                   | 21.03        | 20.99      | 21.03        | 21.21        | 21.50         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |            |              |              | Tune-up Limit |
|           |            |         |           | 39725/2503.5            | 40173/2548.3 | 40620/2593 | 41068/2637.8 | 41515/2682.5 |               |
| 15MHz     | QPSK       | 1       | 0         | 23.79                   | 23.79        | 23.79      | 23.82        | 23.65        | 24.50         |
|           |            | 1       | 38        | 24.03                   | 23.69        | 24.02      | 23.98        | 23.77        | 24.50         |
|           |            | 1       | 74        | 23.87                   | 23.83        | 23.87      | 23.75        | 23.87        | 24.50         |
|           |            | 36      | 0         | 22.90                   | 22.85        | 22.92      | 22.93        | 22.82        | 23.50         |
|           |            | 36      | 18        | 23.03                   | 22.96        | 22.94      | 22.99        | 22.88        | 23.50         |
|           |            | 36      | 39        | 22.95                   | 22.97        | 23.07      | 22.78        | 22.83        | 23.50         |
|           |            | 75      | 0         | 22.80                   | 22.83        | 22.83      | 22.86        | 22.68        | 23.50         |
|           | 16QAM      | 1       | 0         | 23.05                   | 22.87        | 22.87      | 22.94        | 22.83        | 23.50         |
|           |            | 1       | 38        | 23.07                   | 23.03        | 23.10      | 22.96        | 23.03        | 23.50         |
|           |            | 1       | 74        | 23.13                   | 23.11        | 23.00      | 23.17        | 23.01        | 23.50         |
|           |            | 36      | 0         | 21.95                   | 21.89        | 21.80      | 21.99        | 21.87        | 22.50         |



|           | 64QAM      | 36      | 18        | 22.02                   | 21.96        | 21.87        | 21.98        | 21.83        | 22.50               |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|--------------|--------------|---------------------|
|           |            | 36      | 39        | 21.85                   | 21.90        | 21.87        | 21.81        | 21.81        | 22.50               |
|           |            | 75      | 0         | 21.88                   | 21.93        | 21.83        | 21.90        | 21.82        | 22.50               |
|           |            | 1       | 0         | 22.15                   | 21.92        | 21.88        | 21.93        | 22.09        | 22.50               |
|           |            | 1       | 38        | 22.03                   | 21.94        | 21.93        | 21.97        | 21.95        | 22.50               |
|           |            | 1       | 74        | 22.17                   | 22.02        | 21.96        | 22.07        | 22.11        | 22.50               |
|           |            | 36      | 0         | 21.00                   | 20.89        | 20.85        | 20.87        | 20.98        | 21.50               |
|           |            | 36      | 18        | 21.13                   | 20.94        | 20.92        | 20.97        | 21.05        | 21.50               |
|           |            | 36      | 39        | 21.12                   | 20.95        | 20.92        | 20.97        | 21.07        | 21.50               |
|           |            | 75      | 0         | 21.22                   | 20.98        | 20.95        | 21.00        | 21.16        | 21.50               |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |              |              | Tune-up Limit (dBm) |
|           |            |         |           | 39750/2506              | 40185/2549.5 | 40620/2593   | 41055/2636.5 | 41490/2680   |                     |
| 20MHz     | QPSK       | 1       | 0         | 23.76                   | 23.75        | 23.76        | 23.79        | 23.61        | 24.50               |
|           |            | 1       | 50        | <b>24.02</b>            | 23.65        | <b>24.00</b> | <b>23.97</b> | 23.73        | 24.50               |
|           |            | 1       | 99        | 23.85                   | <b>23.82</b> | 23.84        | 23.73        | <b>23.86</b> | 24.50               |
|           |            | 50      | 0         | 22.87                   | 22.80        | 22.88        | 22.90        | 22.77        | 23.50               |
|           |            | 50      | 25        | <b>23.01</b>            | <b>22.92</b> | 22.91        | <b>22.97</b> | <b>22.84</b> | 23.50               |
|           |            | 50      | 50        | 22.92                   | <b>22.92</b> | <b>23.03</b> | 22.75        | 22.78        | 23.50               |
|           |            | 100     | 0         | 22.77                   | 22.78        | 22.79        | <b>22.83</b> | <b>22.63</b> | 23.50               |
|           | 16QAM      | 1       | 0         | 22.96                   | 22.83        | 22.82        | 22.99        | 22.79        | 23.50               |
|           |            | 1       | 50        | 23.03                   | 23.01        | 23.06        | 22.92        | 23.01        | 23.50               |
|           |            | 1       | 99        | 23.11                   | 23.08        | 22.98        | 23.15        | 22.98        | 23.50               |
|           |            | 50      | 0         | 21.92                   | 21.85        | 21.77        | 21.96        | 21.83        | 22.50               |
|           |            | 50      | 25        | 21.99                   | 21.94        | 21.84        | 21.95        | 21.81        | 22.50               |
|           |            | 50      | 50        | 21.82                   | 21.85        | 21.83        | 21.78        | 21.76        | 22.50               |
|           |            | 100     | 0         | 21.86                   | 21.89        | 21.80        | 21.88        | 21.78        | 22.50               |
|           | 64QAM      | 1       | 0         | 22.13                   | 21.88        | 21.83        | 21.91        | 22.05        | 22.50               |
|           |            | 1       | 50        | 21.99                   | 21.92        | 21.89        | 21.93        | 21.93        | 22.50               |
|           |            | 1       | 99        | 22.11                   | 21.96        | 21.90        | 22.01        | 22.05        | 22.50               |
|           |            | 50      | 0         | 20.95                   | 20.81        | 20.78        | 20.82        | 20.90        | 21.50               |
|           |            | 50      | 25        | 21.09                   | 20.90        | 20.86        | 20.93        | 21.01        | 21.50               |
|           |            | 50      | 50        | 21.09                   | 20.90        | 20.88        | 20.94        | 21.02        | 21.50               |
|           |            | 100     | 0         | 21.20                   | 20.94        | 20.92        | 20.98        | 21.12        | 21.50               |



| LTE FDD Band 66<br>Full Power &Receiver on<br>&Receiver off &Hotspot on |            |         |           | Conducted Power(dBm)    |             |                   | Tune-up<br>Limit |
|-------------------------------------------------------------------------|------------|---------|-----------|-------------------------|-------------|-------------------|------------------|
| Bandwidth                                                               | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |                   |                  |
|                                                                         |            |         |           | 131979/1710.<br>7       | 132322/1745 | 132665/1779.<br>3 |                  |
| 1.4MHz                                                                  | QPSK       | 1       | 0         | 22.53                   | 22.39       | 22.37             | 23.50            |
|                                                                         |            | 1       | 2         | 22.75                   | 22.67       | 22.70             | 23.50            |
|                                                                         |            | 1       | 5         | 22.60                   | 22.50       | 22.45             | 23.50            |
|                                                                         |            | 3       | 0         | 22.55                   | 22.64       | 22.61             | 23.50            |
|                                                                         |            | 3       | 2         | 22.66                   | 22.62       | 22.57             | 23.50            |
|                                                                         |            | 3       | 3         | 22.72                   | 22.57       | 22.58             | 23.50            |
|                                                                         |            | 6       | 0         | 21.69                   | 21.71       | 21.69             | 22.50            |
|                                                                         | 16QAM      | 1       | 0         | 22.25                   | 22.17       | 22.31             | 22.50            |
|                                                                         |            | 1       | 2         | 22.23                   | 22.22       | 22.24             | 22.50            |
|                                                                         |            | 1       | 5         | 22.09                   | 22.03       | 22.15             | 22.50            |
|                                                                         |            | 3       | 0         | 21.65                   | 21.56       | 21.69             | 22.50            |
|                                                                         |            | 3       | 2         | 21.69                   | 21.61       | 21.73             | 22.50            |
|                                                                         |            | 3       | 3         | 21.66                   | 21.61       | 21.71             | 22.50            |
|                                                                         |            | 6       | 0         | 20.67                   | 20.58       | 20.72             | 21.50            |
|                                                                         | 64QAM      | 1       | 0         | 20.82                   | 20.74       | 20.96             | 22.00            |
|                                                                         |            | 1       | 2         | 20.86                   | 20.82       | 20.93             | 22.00            |
|                                                                         |            | 1       | 5         | 20.80                   | 20.78       | 20.85             | 22.00            |
|                                                                         |            | 3       | 0         | 20.59                   | 20.54       | 20.63             | 22.00            |
|                                                                         |            | 3       | 2         | 20.60                   | 20.52       | 20.67             | 22.00            |
|                                                                         |            | 3       | 3         | 20.61                   | 20.56       | 20.65             | 22.00            |
|                                                                         |            | 6       | 0         | 19.64                   | 19.60       | 19.72             | 21.00            |
| Bandwidth                                                               | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |                   | Tune-up<br>Limit |
|                                                                         |            |         |           | 131987/1711.<br>5       | 132322/1745 | 132657/1778.<br>5 |                  |
| 3MHz                                                                    | QPSK       | 1       | 0         | 22.55                   | 22.43       | 22.40             | 23.50            |
|                                                                         |            | 1       | 7         | 22.73                   | 22.70       | 22.74             | 23.50            |
|                                                                         |            | 1       | 14        | 22.63                   | 22.55       | 22.49             | 23.50            |
|                                                                         |            | 8       | 0         | 21.65                   | 21.76       | 21.74             | 22.50            |
|                                                                         |            | 8       | 4         | 21.78                   | 21.72       | 21.69             | 22.50            |
|                                                                         |            | 8       | 7         | 21.82                   | 21.68       | 21.68             | 22.50            |
|                                                                         |            | 15      | 0         | 21.69                   | 21.75       | 21.72             | 22.50            |
|                                                                         | 16QAM      | 1       | 0         | 22.28                   | 22.19       | 22.34             | 22.50            |
|                                                                         |            | 1       | 7         | 22.26                   | 22.22       | 22.28             | 22.50            |
|                                                                         |            | 1       | 14        | 22.11                   | 22.07       | 22.18             | 22.50            |
|                                                                         |            | 8       | 0         | 20.76                   | 20.69       | 20.81             | 21.50            |
|                                                                         |            | 8       | 4         | 20.80                   | 20.74       | 20.85             | 21.50            |



|           |            | 8       | 7         | 20.76                   | 20.73       | 20.84         | 21.50         |
|-----------|------------|---------|-----------|-------------------------|-------------|---------------|---------------|
|           |            | 15      | 0         | 20.70                   | 20.62       | 20.75         | 21.50         |
|           | 64QAM      | 1       | 0         | 20.85                   | 20.76       | 20.99         | 22.00         |
|           |            | 1       | 7         | 20.89                   | 20.82       | 20.95         | 22.00         |
|           |            | 1       | 14        | 20.82                   | 20.77       | 20.88         | 22.00         |
|           |            | 8       | 0         | 19.70                   | 19.67       | 19.75         | 21.00         |
|           |            | 8       | 4         | 19.71                   | 19.65       | 19.79         | 21.00         |
|           |            | 8       | 7         | 19.71                   | 19.68       | 19.78         | 21.00         |
|           |            | 15      | 0         | 19.67                   | 19.64       | 19.75         | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |               | Tune-up Limit |
|           |            |         |           | 131997/1712.5           | 132322/1745 | 132647/1777.5 |               |
| 5MHz      | QPSK       | 1       | 0         | 22.52                   | 22.41       | 22.36         | 23.50         |
|           |            | 1       | 13        | 22.71                   | 22.66       | 22.71         | 23.50         |
|           |            | 1       | 24        | 22.60                   | 22.50       | 22.45         | 23.50         |
|           |            | 12      | 0         | 21.62                   | 21.71       | 21.70         | 22.50         |
|           |            | 12      | 6         | 21.76                   | 21.68       | 21.64         | 22.50         |
|           |            | 12      | 13        | 21.80                   | 21.66       | 21.64         | 22.50         |
|           |            | 25      | 0         | 21.69                   | 21.74       | 21.70         | 22.50         |
|           | 16QAM      | 1       | 0         | 22.25                   | 22.15       | 22.31         | 22.50         |
|           |            | 1       | 13        | 22.23                   | 22.20       | 22.25         | 22.50         |
|           |            | 1       | 24        | 22.08                   | 22.05       | 22.14         | 22.50         |
|           |            | 12      | 0         | 20.74                   | 20.65       | 20.78         | 21.50         |
|           |            | 12      | 6         | 20.77                   | 20.69       | 20.81         | 21.50         |
|           |            | 12      | 13        | 20.73                   | 20.68       | 20.80         | 21.50         |
|           |            | 25      | 0         | 20.68                   | 20.58       | 20.70         | 21.50         |
|           | 64QAM      | 1       | 0         | 20.82                   | 20.76       | 20.96         | 22.00         |
|           |            | 1       | 13        | 20.86                   | 20.84       | 20.92         | 22.00         |
|           |            | 1       | 24        | 20.83                   | 20.75       | 20.84         | 22.00         |
|           |            | 12      | 0         | 19.68                   | 19.63       | 19.76         | 21.00         |
|           |            | 12      | 6         | 19.68                   | 19.60       | 19.75         | 21.00         |
|           |            | 12      | 13        | 19.68                   | 19.63       | 19.74         | 21.00         |
|           |            | 25      | 0         | 19.65                   | 19.60       | 19.70         | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |             |               | Tune-up Limit |
|           |            |         |           | 132022/1715             | 132322/1745 | 132622/1775   |               |
| 10MHz     | QPSK       | 1       | 0         | 22.54                   | 22.42       | 22.39         | 23.50         |
|           |            | 1       | 25        | 22.74                   | 22.71       | 22.75         | 23.50         |
|           |            | 1       | 49        | 22.62                   | 22.54       | 22.48         | 23.50         |
|           |            | 25      | 0         | 21.65                   | 21.76       | 21.74         | 22.50         |
|           |            | 25      | 13        | 21.79                   | 21.73       | 21.68         | 22.50         |
|           |            | 25      | 25        | 21.82                   | 21.70       | 21.69         | 22.50         |
|           |            | 50      | 0         | 21.73                   | 21.76       | 21.74         | 22.50         |
|           | 16QAM      | 1       | 0         | 22.27                   | 22.18       | 22.33         | 22.50         |



|           |            | 1       | 25        | 22.26                   | 22.24        | 22.28         | 22.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|---------------|---------------|
|           |            | 1       | 49        | 22.11                   | 22.07        | 22.17         | 22.50         |
|           |            | 25      | 0         | 20.77                   | 20.70        | 20.82         | 21.50         |
|           |            | 25      | 13        | 20.79                   | 20.73        | 20.84         | 21.50         |
|           |            | 25      | 25        | 20.76                   | 20.73        | 20.84         | 21.50         |
|           |            | 50      | 0         | 20.71                   | 20.63        | 20.74         | 21.50         |
|           |            | 1       | 0         | 20.84                   | 20.75        | 20.98         | 22.00         |
|           | 64QAM      | 1       | 25        | 20.89                   | 20.84        | 20.95         | 22.00         |
|           |            | 1       | 49        | 20.82                   | 20.77        | 20.87         | 22.00         |
|           |            | 25      | 0         | 19.71                   | 19.68        | 19.76         | 21.00         |
|           |            | 25      | 13        | 19.70                   | 19.64        | 19.78         | 21.00         |
|           |            | 25      | 25        | 19.71                   | 19.68        | 19.78         | 21.00         |
|           |            | 50      | 0         | 19.68                   | 19.65        | 19.74         | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |               | Tune-up Limit |
|           |            |         |           | 132047/1717.5           | 132322/1745  | 132597/1772.5 |               |
| 15MHz     | QPSK       | 1       | 0         | 22.53                   | 22.38        | 22.37         | 23.50         |
|           |            | 1       | 38        | 22.72                   | 22.70        | 22.72         | 23.50         |
|           |            | 1       | 74        | 22.59                   | 22.49        | 22.44         | 23.50         |
|           |            | 36      | 0         | 21.63                   | 21.72        | 21.71         | 22.50         |
|           |            | 36      | 18        | 21.76                   | 21.68        | 21.64         | 22.50         |
|           |            | 36      | 39        | 21.79                   | 21.67        | 21.65         | 22.50         |
|           |            | 75      | 0         | 21.71                   | 21.72        | 21.69         | 22.50         |
|           | 16QAM      | 1       | 0         | 22.22                   | 22.16        | 22.31         | 22.50         |
|           |            | 1       | 38        | 22.24                   | 22.21        | 22.26         | 22.50         |
|           |            | 1       | 74        | 22.08                   | 22.03        | 22.14         | 22.50         |
|           |            | 36      | 0         | 20.74                   | 20.68        | 20.79         | 21.50         |
|           |            | 36      | 18        | 20.76                   | 20.68        | 20.80         | 21.50         |
|           |            | 36      | 39        | 20.74                   | 20.69        | 20.81         | 21.50         |
|           |            | 75      | 0         | 20.68                   | 20.58        | 20.70         | 21.50         |
|           | 64QAM      | 1       | 0         | 20.79                   | 20.73        | 20.96         | 22.00         |
|           |            | 1       | 38        | 20.87                   | 20.81        | 20.93         | 22.00         |
|           |            | 1       | 74        | 20.83                   | 20.76        | 20.88         | 22.00         |
|           |            | 36      | 0         | 19.70                   | 19.70        | 19.77         | 21.00         |
|           |            | 36      | 18        | 19.68                   | 19.61        | 19.77         | 21.00         |
|           |            | 36      | 39        | 19.69                   | 19.64        | 19.75         | 21.00         |
|           |            | 75      | 0         | 19.65                   | 19.60        | 19.70         | 21.00         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |               | Tune-up Limit |
|           |            |         |           | 132072/1720             | 132322/1745  | 132572/1770   |               |
| 20MHz     | QPSK       | 1       | 0         | 22.50                   | 22.34        | 22.34         | 23.50         |
|           |            | 1       | 50        | <b>22.71</b>            | <b>22.66</b> | <b>22.70</b>  | 23.50         |
|           |            | 1       | 99        | 22.57                   | 22.48        | 22.41         | 23.50         |
|           |            | 50      | 0         | 21.60                   | <b>21.67</b> | <b>21.67</b>  | 22.50         |



|  |       |     |    |              |       |       |       |
|--|-------|-----|----|--------------|-------|-------|-------|
|  |       | 50  | 25 | 21.74        | 21.64 | 21.61 | 22.50 |
|  |       | 50  | 50 | <b>21.76</b> | 21.62 | 21.61 | 22.50 |
|  |       | 100 | 0  | <b>21.68</b> | 21.67 | 21.65 | 22.50 |
|  | 16QAM | 1   | 0  | 22.21        | 22.12 | 22.26 | 22.50 |
|  |       | 1   | 50 | 22.20        | 22.19 | 22.22 | 22.50 |
|  |       | 1   | 99 | 22.06        | 22.00 | 22.12 | 22.50 |
|  |       | 50  | 0  | 20.71        | 20.64 | 20.76 | 21.50 |
|  |       | 50  | 25 | 20.73        | 20.66 | 20.77 | 21.50 |
|  |       | 50  | 50 | 20.71        | 20.64 | 20.77 | 21.50 |
|  |       | 100 | 0  | 20.66        | 20.54 | 20.67 | 21.50 |
|  | 64QAM | 1   | 0  | 20.77        | 20.69 | 20.91 | 22.00 |
|  |       | 1   | 50 | 20.83        | 20.79 | 20.89 | 22.00 |
|  |       | 1   | 99 | 20.77        | 20.70 | 20.82 | 22.00 |
|  |       | 50  | 0  | 19.65        | 19.62 | 19.70 | 21.00 |
|  |       | 50  | 25 | 19.64        | 19.57 | 19.71 | 21.00 |
|  |       | 50  | 50 | 19.66        | 19.59 | 19.71 | 21.00 |
|  |       | 100 | 0  | 19.63        | 19.56 | 19.67 | 21.00 |

| LTE FDD Band 71<br>Full Power& Receiver on& Receiver off&<br>Hotspot on |            |         |           | Conducted Power(dBm)    |              |              | Tune-up<br>Limit |
|-------------------------------------------------------------------------|------------|---------|-----------|-------------------------|--------------|--------------|------------------|
| Bandwidth                                                               | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              |                  |
|                                                                         |            |         |           | 133147/665.5            | 133297/680.5 | 133447/695.5 |                  |
| 5MHz                                                                    | QPSK       | 1       | 0         | 23.57                   | 23.64        | 23.54        | 24.50            |
|                                                                         |            | 1       | 13        | 23.86                   | 23.85        | 23.87        | 24.50            |
|                                                                         |            | 1       | 24        | 23.68                   | 23.79        | 23.73        | 24.50            |
|                                                                         |            | 12      | 0         | 22.63                   | 22.54        | 22.76        | 23.50            |
|                                                                         |            | 12      | 6         | 22.64                   | 22.56        | 22.75        | 23.50            |
|                                                                         |            | 12      | 13        | 23.02                   | 22.74        | 22.85        | 23.50            |
|                                                                         |            | 25      | 0         | 22.80                   | 22.68        | 22.82        | 23.50            |
|                                                                         | 16QAM      | 1       | 0         | 23.15                   | 22.50        | 22.42        | 23.50            |
|                                                                         |            | 1       | 13        | 23.13                   | 22.77        | 22.68        | 23.50            |
|                                                                         |            | 1       | 24        | 22.90                   | 22.61        | 22.52        | 23.50            |
|                                                                         |            | 12      | 0         | 21.57                   | 21.45        | 21.76        | 22.50            |
|                                                                         |            | 12      | 6         | 21.62                   | 21.49        | 21.79        | 22.50            |
|                                                                         |            | 12      | 13        | 21.97                   | 21.69        | 21.87        | 22.50            |
|                                                                         |            | 25      | 0         | 21.78                   | 21.64        | 21.79        | 22.50            |
|                                                                         | 64QAM      | 1       | 0         | 22.57                   | 22.27        | 22.12        | 23.00            |
|                                                                         |            | 1       | 13        | 22.79                   | 22.46        | 22.39        | 23.00            |
|                                                                         |            | 1       | 24        | 22.57                   | 22.30        | 22.16        | 23.00            |
|                                                                         |            | 12      | 0         | 21.34                   | 21.19        | 21.53        | 22.50            |
|                                                                         |            | 12      | 6         | 21.34                   | 21.19        | 21.46        | 22.50            |
|                                                                         |            | 12      | 13        | 21.66                   | 21.38        | 21.55        | 22.50            |



|           |            | 25      | 0         | 21.48                   | 21.33        | 21.49        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 133172/668              | 133297/680.5 | 133422/693   |               |
| 10MHz     | QPSK       | 1       | 0         | 23.59                   | 23.65        | 23.57        | 24.50         |
|           |            | 1       | 25        | 23.89                   | 23.90        | 23.91        | 24.50         |
|           |            | 1       | 49        | 23.70                   | 23.83        | 23.76        | 24.50         |
|           |            | 25      | 0         | 22.66                   | 22.59        | 22.80        | 23.50         |
|           |            | 25      | 13        | 22.67                   | 22.61        | 22.79        | 23.50         |
|           |            | 25      | 25        | 23.04                   | 22.78        | 22.90        | 23.50         |
|           |            | 50      | 0         | 22.84                   | 22.70        | 22.86        | 23.50         |
|           | 16QAM      | 1       | 0         | 23.17                   | 22.53        | 22.44        | 23.50         |
|           |            | 1       | 25        | 23.16                   | 22.81        | 22.71        | 23.50         |
|           |            | 1       | 49        | 22.93                   | 22.63        | 22.55        | 23.50         |
|           |            | 25      | 0         | 21.60                   | 21.50        | 21.80        | 22.50         |
|           |            | 25      | 13        | 21.64                   | 21.53        | 21.82        | 22.50         |
|           |            | 25      | 25        | 22.00                   | 21.74        | 21.91        | 22.50         |
|           |            | 50      | 0         | 21.81                   | 21.69        | 21.83        | 22.50         |
|           | 64QAM      | 1       | 0         | 22.59                   | 22.26        | 22.14        | 23.00         |
|           |            | 1       | 13        | 22.82                   | 22.46        | 22.42        | 23.00         |
|           |            | 1       | 24        | 22.56                   | 22.32        | 22.19        | 23.00         |
|           |            | 12      | 0         | 21.37                   | 21.24        | 21.53        | 22.50         |
|           |            | 12      | 6         | 21.36                   | 21.23        | 21.49        | 22.50         |
|           |            | 12      | 13        | 21.69                   | 21.43        | 21.59        | 22.50         |
|           |            | 25      | 0         | 21.51                   | 21.38        | 21.53        | 22.50         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 133197/670.5            | 133297/680.5 | 133397/690.5 |               |
| 15MHz     | QPSK       | 1       | 0         | 23.58                   | 23.61        | 23.55        | 24.50         |
|           |            | 1       | 38        | 23.87                   | 23.89        | 23.88        | 24.50         |
|           |            | 1       | 74        | 23.67                   | 23.78        | 23.72        | 24.50         |
|           |            | 36      | 0         | 22.64                   | 22.55        | 22.77        | 23.50         |
|           |            | 36      | 18        | 22.64                   | 22.56        | 22.75        | 23.50         |
|           |            | 36      | 39        | 23.01                   | 22.75        | 22.86        | 23.50         |
|           |            | 75      | 0         | 22.82                   | 22.66        | 22.81        | 23.50         |
|           | 16QAM      | 1       | 0         | 23.12                   | 22.51        | 22.42        | 23.50         |
|           |            | 1       | 38        | 23.14                   | 22.78        | 22.69        | 23.50         |
|           |            | 1       | 74        | 22.90                   | 22.59        | 22.52        | 23.50         |
|           |            | 36      | 0         | 21.57                   | 21.48        | 21.77        | 22.50         |
|           |            | 36      | 18        | 21.61                   | 21.48        | 21.78        | 22.50         |
|           |            | 36      | 39        | 21.98                   | 21.70        | 21.88        | 22.50         |
|           |            | 75      | 0         | 21.78                   | 21.64        | 21.79        | 22.50         |
|           | 64QAM      | 1       | 0         | 22.54                   | 22.24        | 22.12        | 23.00         |
|           |            | 1       | 13        | 22.80                   | 22.43        | 22.40        | 23.00         |
|           |            | 1       | 24        | 22.57                   | 22.31        | 22.20        | 23.00         |



|           |            | 12      | 0         | 21.36                   | 21.26        | 21.54        | 22.50         |
|-----------|------------|---------|-----------|-------------------------|--------------|--------------|---------------|
|           |            | 12      | 6         | 21.34                   | 21.20        | 21.48        | 22.50         |
|           |            | 12      | 13        | 21.67                   | 21.39        | 21.56        | 22.50         |
|           |            | 25      | 0         | 21.48                   | 21.33        | 21.49        | 22.50         |
| Bandwidth | Modulation | RB size | RB offset | Channel/Frequency (MHz) |              |              | Tune-up Limit |
|           |            |         |           | 133222/673              | 133322/683   | 133372/688   |               |
| 20MHz     | QPSK       | 1       | 0         | 23.55                   | 23.57        | 23.52        | 24.50         |
|           |            | 1       | 50        | <b>23.86</b>            | <b>23.85</b> | <b>23.86</b> | 24.50         |
|           |            | 1       | 99        | 23.65                   | 23.77        | 23.69        | 24.50         |
|           |            | 50      | 0         | 22.61                   | 22.50        | 22.73        | 23.50         |
|           |            | 50      | 25        | 22.62                   | 22.52        | 22.72        | 23.50         |
|           |            | 50      | 50        | <b>22.98</b>            | <b>22.70</b> | <b>22.82</b> | 23.50         |
|           |            | 100     | 0         | <b>22.79</b>            | 22.61        | 22.77        | 23.50         |
|           | 16QAM      | 1       | 0         | 22.79                   | 22.47        | 22.37        | 23.50         |
|           |            | 1       | 50        | 23.10                   | 22.76        | 22.65        | 23.50         |
|           |            | 1       | 99        | 22.88                   | 22.56        | 22.50        | 23.50         |
|           |            | 50      | 0         | 21.54                   | 21.44        | 21.74        | 22.50         |
|           |            | 50      | 25        | 21.58                   | 21.46        | 21.75        | 22.50         |
|           |            | 50      | 50        | 21.95                   | 21.65        | 21.84        | 22.50         |
|           |            | 100     | 0         | 21.76                   | 21.60        | 21.76        | 22.50         |
|           | 64QAM      | 1       | 0         | 22.52                   | 22.20        | 22.07        | 23.00         |
|           |            | 1       | 13        | 22.76                   | 22.41        | 22.36        | 23.00         |
|           |            | 1       | 24        | 22.51                   | 22.25        | 22.14        | 23.00         |
|           |            | 12      | 0         | 21.31                   | 21.18        | 21.47        | 22.50         |
|           |            | 12      | 6         | 21.30                   | 21.16        | 21.42        | 22.50         |
|           |            | 12      | 13        | 21.64                   | 21.34        | 21.52        | 22.50         |
|           |            | 25      | 0         | 21.46                   | 21.29        | 21.46        | 22.50         |

## 9.4 WLAN Mode

| Wi-Fi 2.4G<br>Full Power<br>Mode | Channel<br>/Frequency(MHz) | Maximum Output Power (dBm) |              |
|----------------------------------|----------------------------|----------------------------|--------------|
|                                  |                            | Tune-up                    | Meas.        |
| 802.11b<br>(1M)                  | 1/2412                     | 15.00                      | 14.33        |
|                                  | 6/2437                     | 15.00                      | <b>14.77</b> |
|                                  | 11/2462                    | 15.00                      | 14.35        |
| 802.11g<br>(6M)                  | 1/2412                     | 14.00                      | 13.23        |
|                                  | 6/2437                     | 14.00                      | 13.64        |
|                                  | 11/2462                    | 14.00                      | 12.88        |
| 802.11n-HT20<br>(MCS0)           | 1/2412                     | 14.00                      | 13.16        |
|                                  | 6/2437                     | 14.00                      | 13.42        |
|                                  | 11/2462                    | 14.00                      | 12.85        |

Note: Initial test configuration is 802.11b mode.

| Wi-Fi 5G<br>(U-NII-1)<br>Mode | Channel<br>/Frequency(MHz) | Maximum Output Power (dBm) |              |
|-------------------------------|----------------------------|----------------------------|--------------|
|                               |                            | Tune-up                    | Meas.        |
| 802.11a<br>(6M)               | 36/5180                    | 13.00                      | <b>12.61</b> |
|                               | 40/5200                    | 13.00                      | 12.31        |
|                               | 44/5220                    | 13.00                      | 12.35        |
|                               | 48/5240                    | 13.00                      | 12.38        |
| 802.11n-HT20<br>(MCS0)        | 36/5180                    | 12.00                      | 10.92        |
|                               | 40/5200                    | 12.00                      | 11.11        |
|                               | 44/5220                    | 12.00                      | 11.22        |
|                               | 48/5240                    | 12.00                      | 11.56        |
| 802.11n-HT40<br>(MCS0)        | 38/5190                    | 12.00                      | 10.99        |
|                               | 46/5230                    | 12.00                      | 11.33        |
| 802.11ac-VHT20<br>(MCS0)      | 36/5180                    | 12.00                      | 10.91        |
|                               | 40/5200                    | 12.00                      | 11.09        |
|                               | 44/5220                    | 12.00                      | 11.25        |
|                               | 48/5240                    | 12.00                      | 11.56        |
| 802.11ac-VHT40<br>(MCS0)      | 38/5190                    | 12.00                      | 10.97        |
|                               | 46/5230                    | 12.00                      | 11.36        |
| 802.11ac-VHT80<br>(MCS0)      | 42/5210                    | 12.00                      | 10.90        |

Note. Initial test configuration is 802.11a mode, since the highest maximum output power.

| Wi-Fi 5G<br>(U-NII-3)                                                                     | Channel<br>/Frequency(MHz) | Maximum Output Power (dBm) |              |
|-------------------------------------------------------------------------------------------|----------------------------|----------------------------|--------------|
|                                                                                           |                            | Tune-up                    | Meas.        |
| Mode                                                                                      |                            |                            |              |
| 802.11a<br>(6M)                                                                           | 149/5745                   | 14.00                      | 13.42        |
|                                                                                           | 157/5785                   | 14.00                      | <b>13.50</b> |
|                                                                                           | 165/5825                   | 14.00                      | 12.94        |
| 802.11n-HT20<br>(MCS0)                                                                    | 149/5745                   | 13.00                      | 12.01        |
|                                                                                           | 157/5785                   | 13.00                      | 11.73        |
|                                                                                           | 165/5825                   | 13.00                      | 11.56        |
| 802.11n-HT40<br>(MCS0)                                                                    | 151/5755                   | 13.00                      | 11.89        |
|                                                                                           | 159/5795                   | 13.00                      | 11.56        |
| 802.11ac-HT20<br>(MCS0)                                                                   | 149/5745                   | 13.00                      | 11.93        |
|                                                                                           | 157/5785                   | 13.00                      | 11.85        |
|                                                                                           | 165/5825                   | 13.00                      | 11.57        |
| 802.11ac-HT40<br>(MCS0)                                                                   | 151/5755                   | 13.00                      | 11.89        |
|                                                                                           | 159/5795                   | 13.00                      | 11.54        |
| 802.11ac-HT80<br>(MCS0)                                                                   | 155/5775                   | 13.00                      | 11.50        |
| Note. Initial test configuration is 802.11a mode, since the highest maximum output power. |                            |                            |              |

## 9.5 Bluetooth Mode

| BT            | Conducted Power(dBm)   |                |                | Tune-up Limit<br>(dBm) |
|---------------|------------------------|----------------|----------------|------------------------|
|               | Channel/Frequency(MHz) |                |                |                        |
|               | Ch 0/2402 MHz          | Ch 39/2441 MHz | Ch 78/2480 MHz |                        |
| GFSK          | 5.83                   | 5.09           | 4.02           | 6.00                   |
| $\pi/4$ DQPSK | 2.72                   | 1.59           | 0.72           | 4.00                   |
| 8DPSK         | 2.84                   | 1.58           | 0.81           | 4.00                   |
| BLE           | Ch 0/2402 MHz          | Ch 19/2440 MHz | Ch 39/2480 MHz | Tune-up Limit<br>(dBm) |
| GFSK(1M)      | 1.39                   | 3.16           | 1.26           | 4.00                   |
| GFSK(2M)      | 1.37                   | 3.21           | 1.32           | 4.00                   |

## 10 Measured and Reported (Scaled) SAR Results

### 10.1 EUT Antenna Locations

| Overall (Length x Width): 166.3 mm x 75.5 mm        |           |            |           |            |          |             |
|-----------------------------------------------------|-----------|------------|-----------|------------|----------|-------------|
| Overall Diagonal: 173.0mm/Display Diagonal: 162.0mm |           |            |           |            |          |             |
| Distance of the Antenna to the EUT surface/edge     |           |            |           |            |          |             |
| Antenna                                             | Back Side | Front side | Left Edge | Right Edge | Top Edge | Bottom Edge |
| MB Antenna                                          | <25mm     | <25mm      | <25mm     | <25mm      | >25mm    | <25mm       |
| LB Antenna                                          | <25mm     | <25mm      | >25mm     | <25mm      | >25mm    | <25mm       |
| LTE 41 Antenna                                      | <25mm     | <25mm      | <25mm     | >25mm      | <25mm    | >25mm       |
| BT/Wi-Fi Antenna                                    | <25mm     | <25mm      | >25mm     | <25mm      | <25mm    | >25mm       |
| Hotspot mode, Positions for SAR tests               |           |            |           |            |          |             |
| Mode                                                | Back Side | Front side | Left Edge | Right Edge | Top Edge | Bottom Edge |
| MB Antenna                                          | Yes       | Yes        | Yes       | Yes        | N/A      | Yes         |
| LB Antenna                                          | Yes       | Yes        | N/A       | Yes        | N/A      | Yes         |
| LTE 41 Antenna                                      | Yes       | Yes        | Yes       | N/A        | Yes      | N/A         |
| BT/Wi-Fi Antenna                                    | Yes       | Yes        | N/A       | Yes        | Yes      | N/A         |

Note: 1. Per KDB 941225 D06, when the overall device length and width are  $\geq 9\text{cm} \times 5\text{cm}$ , the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

2. For smart phones with an overall diagonal dimension is 173.0mm. Per KDB 648474 D04, for smart phones with a display diagonal dimension  $> 15.0\text{ cm}$  or an overall diagonal dimension  $> 16.0\text{ cm}$ , product specific 10-g SAR must be tested as a phablet to determine SAR compliance. For Phablet, Since hotspot mode 1-g *reported* SAR  $< 1.2\text{ W/kg}$ , product specific 10-g SAR is no required.

3. Per FCC KDB 447498 D01, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

a)  $\leq 0.8\text{ W/kg}$  or  $2.0\text{ W/kg}$ , for 1-g or 10-g respectively, when the transmission band is  $\leq 100\text{MHz}$

b)  $\leq 0.6\text{ W/kg}$  or  $1.5\text{ W/kg}$ , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.

c)  $\leq 0.4\text{ W/kg}$  or  $1.0\text{ W/kg}$ , for 1-g or 10-g respectively, when the transmission band is  $\geq 200\text{ MHz}$ .

4. When the original highest measured SAR is  $\geq 0.80\text{ W/kg}$ , the measurement was repeated once.

## 10.2 Measured SAR Results

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. For GSM, when multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

3. For WCDMA, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for the secondary mode.

4. For LTE, QPSK with 100% RB allocation, SAR is required when and the highest reported SAR for 1 RB and 50% RB allocation in are  $\geq 50\%$  limit(1g).



## Head SAR

| Band     | Test Position | Power Reduction | Dist. (mm) | Mode      | RB  | offset | Ch./Freq. (MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR1g | Power Drift (dB) | Scaling Factor | Report SAR1g | Plot No. |
|----------|---------------|-----------------|------------|-----------|-----|--------|-----------------|---------------|----------------------|----------------|------------------|----------------|--------------|----------|
| GSM 850  | Left cheek    | Receiver on     | 0          | GSM       | -   | -      | 190/836.6       | 33.50         | 33.14                | 0.118          | 0.069            | 1.09           | 0.128        | 9        |
|          | Left Tilt     | Receiver on     | 0          | GSM       | -   | -      | 190/836.6       | 33.50         | 33.14                | 0.048          | -0.025           | 1.09           | 0.052        | /        |
|          | Right cheek   | Receiver on     | 0          | GSM       | -   | -      | 190/836.6       | 33.50         | 33.14                | 0.117          | -0.065           | 1.09           | 0.127        | /        |
|          | Right Tilt    | Receiver on     | 0          | GSM       | -   | -      | 190/836.6       | 33.50         | 33.14                | 0.048          | 0.020            | 1.09           | 0.052        | /        |
| GSM 1900 | Left cheek    | Receiver on     | 0          | GSM       | -   | -      | 661/1880        | 31.00         | 30.47                | 0.107          | 0.026            | 1.13           | 0.121        | 10       |
|          | Left Tilt     | Receiver on     | 0          | GSM       | -   | -      | 661/1880        | 31.00         | 30.47                | 0.094          | -0.010           | 1.13           | 0.106        | /        |
|          | Right cheek   | Receiver on     | 0          | GSM       | -   | -      | 661/1880        | 31.00         | 30.47                | 0.102          | 0.140            | 1.13           | 0.115        | /        |
|          | Right Tilt    | Receiver on     | 0          | GSM       | -   | -      | 661/1880        | 31.00         | 30.47                | 0.062          | -0.070           | 1.13           | 0.070        | /        |
| WCDMA II | Left cheek    | Receiver on     | 0          | RMC 12.2K | -   | -      | 9400/1880       | 24.50         | 23.93                | 0.229          | -0.120           | 1.14           | 0.261        | 11       |
|          | Left Tilt     | Receiver on     | 0          | RMC 12.2K | -   | -      | 9400/1880       | 24.50         | 23.93                | 0.190          | -0.120           | 1.14           | 0.217        | /        |
|          | Right cheek   | Receiver on     | 0          | RMC 12.2K | -   | -      | 9400/1880       | 24.50         | 23.93                | 0.215          | 0.025            | 1.14           | 0.245        | /        |
|          | Right Tilt    | Receiver on     | 0          | RMC 12.2K | -   | -      | 9400/1880       | 24.50         | 23.93                | 0.140          | -0.040           | 1.14           | 0.160        | /        |
| WCDMA IV | Left cheek    | Receiver on     | 0          | RMC 12.2K | -   | -      | 1413/1732.6     | 24.50         | 23.97                | 0.154          | -0.024           | 1.13           | 0.174        | /        |
|          | Left Tilt     | Receiver on     | 0          | RMC 12.2K | -   | -      | 1413/1732.6     | 24.50         | 23.97                | 0.142          | -0.022           | 1.13           | 0.160        | /        |
|          | Right cheek   | Receiver on     | 0          | RMC 12.2K | -   | -      | 1413/1732.6     | 24.50         | 23.97                | 0.166          | -0.020           | 1.13           | 0.188        | 12       |
|          | Right Tilt    | Receiver on     | 0          | RMC 12.2K | -   | -      | 1413/1732.6     | 24.50         | 23.97                | 0.132          | 0.090            | 1.13           | 0.149        | /        |
| WCDMA V  | Left cheek    | Receiver on     | 0          | RMC 12.2K | -   | -      | 4183/836.6      | 25.00         | 24.07                | 0.135          | 0.020            | 1.24           | 0.167        | /        |
|          | Left Tilt     | Receiver on     | 0          | RMC 12.2K | -   | -      | 4183/836.6      | 25.00         | 24.07                | 0.061          | 0.090            | 1.24           | 0.075        | /        |
|          | Right cheek   | Receiver on     | 0          | RMC 12.2K | -   | -      | 4183/836.6      | 25.00         | 24.07                | 0.151          | 0.010            | 1.24           | 0.187        | 13       |
|          | Right Tilt    | Receiver on     | 0          | RMC 12.2K | -   | -      | 4183/836.6      | 25.00         | 24.07                | 0.055          | 0.110            | 1.24           | 0.068        | /        |
| LTE 2    | Left cheek    | Receiver on     | 0          | QPSK      | 1   | 50     | 18700/1860      | 24.00         | 23.40                | 0.282          | -0.180           | 1.15           | 0.324        | 14       |
|          |               | Receiver on     | 0          | QPSK      | 50% | 0      | 19100/1900      | 23.00         | 22.46                | 0.279          | 0.120            | 1.13           | 0.316        | /        |
|          | Left Tilt     | Receiver on     | 0          | QPSK      | 1   | 50     | 18700/1860      | 24.00         | 23.40                | 0.267          | -0.030           | 1.15           | 0.307        | /        |
|          |               | Receiver on     | 0          | QPSK      | 50% | 0      | 19100/1900      | 23.00         | 22.46                | 0.247          | 0.000            | 1.13           | 0.280        | /        |
|          | Right cheek   | Receiver on     | 0          | QPSK      | 1   | 50     | 18700/1860      | 24.00         | 23.40                | 0.256          | 0.080            | 1.15           | 0.294        | /        |
|          |               | Receiver on     | 0          | QPSK      | 50% | 0      | 19100/1900      | 23.00         | 22.46                | 0.237          | -0.120           | 1.13           | 0.268        | /        |
|          | Right Tilt    | Receiver on     | 0          | QPSK      | 1   | 50     | 18700/1860      | 24.00         | 23.40                | 0.166          | 0.040            | 1.15           | 0.191        | /        |
|          |               | Receiver on     | 0          | QPSK      | 50% | 0      | 19100/1900      | 23.00         | 22.46                | 0.158          | 0.050            | 1.13           | 0.179        | /        |
| LTE 4    | Left cheek    | Receiver on     | 0          | QPSK      | 1   | 50     | 20050/1720      | 23.50         | 22.67                | 0.198          | -0.024           | 1.21           | 0.240        | /        |
|          |               | Receiver on     | 0          | QPSK      | 50% | 50     | 20050/1720      | 22.50         | 21.71                | 0.159          | -0.150           | 1.20           | 0.191        | /        |
|          | Left Tilt     | Receiver on     | 0          | QPSK      | 1   | 50     | 20050/1720      | 23.50         | 22.67                | 0.194          | 0.020            | 1.21           | 0.235        | /        |
|          |               | Receiver on     | 0          | QPSK      | 50% | 50     | 20050/1720      | 22.50         | 21.71                | 0.169          | -0.042           | 1.20           | 0.203        | /        |
|          | Right cheek   | Receiver on     | 0          | QPSK      | 1   | 50     | 20050/1720      | 23.50         | 22.67                | 0.220          | 0.170            | 1.21           | 0.266        | 15       |
|          |               | Receiver on     | 0          | QPSK      | 50% | 50     | 20050/1720      | 22.50         | 21.71                | 0.183          | 0.050            | 1.20           | 0.220        | /        |
|          | Right Tilt    | Receiver on     | 0          | QPSK      | 1   | 50     | 20050/1720      | 23.50         | 22.67                | 0.180          | 0.030            | 1.21           | 0.218        | /        |
|          |               | Receiver on     | 0          | QPSK      | 50% | 50     | 20050/1720      | 22.50         | 21.71                | 0.129          | 0.020            | 1.20           | 0.155        | /        |
| LTE 5    | Left cheek    | Receiver on     | 0          | QPSK      | 1   | 0      | 20600/844       | 25.00         | 24.41                | 0.199          | 0.130            | 1.15           | 0.228        | /        |
|          |               | Receiver on     | 0          | QPSK      | 50% | 0      | 20600/844       | 24.00         | 23.27                | 0.123          | -0.030           | 1.18           | 0.146        | /        |



|        |             |             |   |      |     |    |             |       |       |       |        |      |       |    |
|--------|-------------|-------------|---|------|-----|----|-------------|-------|-------|-------|--------|------|-------|----|
|        | Left Tilt   | Receiver on | 0 | QPSK | 1   | 0  | 20600/844   | 25.00 | 24.41 | 0.089 | -0.050 | 1.15 | 0.102 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 0  | 20600/844   | 24.00 | 23.27 | 0.056 | 0.110  | 1.18 | 0.067 | /  |
|        | Right cheek | Receiver on | 0 | QPSK | 1   | 0  | 20600/844   | 25.00 | 24.41 | 0.212 | -0.110 | 1.15 | 0.243 | 16 |
|        |             | Receiver on | 0 | QPSK | 50% | 0  | 20600/844   | 24.00 | 23.27 | 0.181 | 0.025  | 1.18 | 0.214 | /  |
|        | Right Tilt  | Receiver on | 0 | QPSK | 1   | 0  | 20600/844   | 25.00 | 24.41 | 0.088 | -0.020 | 1.15 | 0.101 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 0  | 20600/844   | 24.00 | 23.27 | 0.074 | 0.010  | 1.18 | 0.087 | /  |
| LTE 12 | Left cheek  | Receiver on | 0 | QPSK | 1   | 25 | 23060/704   | 24.50 | 23.89 | 0.119 | 0.034  | 1.15 | 0.137 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 0  | 23130/711   | 23.50 | 22.87 | 0.125 | 0.039  | 1.16 | 0.145 | /  |
|        | Left Tilt   | Receiver on | 0 | QPSK | 1   | 25 | 23060/704   | 24.50 | 23.89 | 0.049 | 0.070  | 1.15 | 0.056 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 0  | 23130/711   | 23.50 | 22.87 | 0.046 | 0.150  | 1.16 | 0.054 | /  |
|        | Right cheek | Receiver on | 0 | QPSK | 1   | 25 | 23060/704   | 24.50 | 23.89 | 0.175 | 0.190  | 1.15 | 0.201 | 17 |
|        |             | Receiver on | 0 | QPSK | 50% | 0  | 23130/711   | 23.50 | 22.87 | 0.148 | 0.180  | 1.16 | 0.171 | /  |
| LTE 41 | Left cheek  | Receiver on | 0 | QPSK | 1   | 50 | 39750/2506  | 23.50 | 23.20 | 0.207 | 0.040  | 1.07 | 0.222 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 25 | 39750/2506  | 22.50 | 22.11 | 0.159 | 0.030  | 1.09 | 0.174 | /  |
|        | Left Tilt   | Receiver on | 0 | QPSK | 1   | 50 | 39750/2506  | 23.50 | 23.20 | 0.163 | 0.035  | 1.07 | 0.175 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 25 | 39750/2506  | 22.50 | 22.11 | 0.126 | 0.028  | 1.09 | 0.138 | /  |
|        | Right cheek | Receiver on | 0 | QPSK | 1   | 50 | 39750/2506  | 23.50 | 23.20 | 0.640 | 0.075  | 1.07 | 0.686 | 18 |
|        |             | Receiver on | 0 | QPSK | 50% | 25 | 39750/2506  | 22.50 | 22.11 | 0.490 | 0.038  | 1.09 | 0.536 | /  |
| LTE 66 | Left cheek  | Receiver on | 0 | QPSK | 1   | 50 | 132072/1720 | 24.50 | 23.53 | 0.203 | 0.150  | 1.25 | 0.254 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 50 | 132072/1720 | 23.50 | 22.44 | 0.146 | 0.150  | 1.28 | 0.186 | /  |
|        | Left Tilt   | Receiver on | 0 | QPSK | 1   | 50 | 132072/1720 | 24.50 | 23.53 | 0.218 | 0.030  | 1.25 | 0.273 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 50 | 132072/1720 | 23.50 | 22.44 | 0.169 | -0.050 | 1.28 | 0.216 | /  |
|        | Right cheek | Receiver on | 0 | QPSK | 1   | 50 | 132072/1720 | 24.50 | 23.53 | 0.229 | -0.023 | 1.25 | 0.286 | 19 |
|        |             | Receiver on | 0 | QPSK | 50% | 50 | 132072/1720 | 23.50 | 22.44 | 0.178 | 0.048  | 1.28 | 0.227 | /  |
| LTE 71 | Left cheek  | Receiver on | 0 | QPSK | 1   | 50 | 133222/673  | 24.50 | 23.86 | 0.161 | 0.180  | 1.16 | 0.187 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 50 | 133222/673  | 23.50 | 22.98 | 0.141 | 0.027  | 1.13 | 0.159 | /  |
|        | Left Tilt   | Receiver on | 0 | QPSK | 1   | 50 | 133222/673  | 24.50 | 23.86 | 0.067 | 0.140  | 1.16 | 0.077 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 50 | 133222/673  | 23.50 | 22.98 | 0.062 | 0.030  | 1.13 | 0.070 | /  |
|        | Right cheek | Receiver on | 0 | QPSK | 1   | 50 | 133222/673  | 24.50 | 23.86 | 0.171 | 0.022  | 1.16 | 0.198 | 20 |
|        |             | Receiver on | 0 | QPSK | 50% | 50 | 133222/673  | 23.50 | 22.98 | 0.151 | 0.030  | 1.13 | 0.170 | /  |
|        | Right Tilt  | Receiver on | 0 | QPSK | 1   | 50 | 133222/673  | 24.50 | 23.86 | 0.066 | 0.180  | 1.16 | 0.077 | /  |
|        |             | Receiver on | 0 | QPSK | 50% | 50 | 133222/673  | 23.50 | 22.98 | 0.049 | 0.040  | 1.13 | 0.056 | /  |



| Band       | Test Position       | Power Reduction | Dist. (mm) | Mode    | Duty Cycle | Ch./Freq. (MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR1g | Power Drift (dB) | Scaling Factor | Report SAR1g | Plot No. |
|------------|---------------------|-----------------|------------|---------|------------|-----------------|---------------|----------------------|----------------|------------------|----------------|--------------|----------|
| Wi-Fi 2.4G | Left cheek          | Full power      | 0          | 802.11b | 100.0%     | 1/2412          | 15.00         | 14.33                | 1.040          | -0.050           | 1.17           | 1.213        | /        |
|            |                     | Full power      | 0          | 802.11b | 100.0%     | 6/2437          | 15.00         | 14.77                | 1.180          | -0.020           | 1.05           | 1.244        | 21       |
|            |                     | Full power      | 0          | 802.11b | 100.0%     | 11/2462         | 15.00         | 14.35                | 1.070          | 0.010            | 1.16           | 1.243        | /        |
|            | Left Tilt           | Full power      | 0          | 802.11b | 100.0%     | 1/2412          | 15.00         | 14.33                | 0.976          | -0.050           | 1.17           | 1.139        | /        |
|            |                     | Full power      | 0          | 802.11b | 100.0%     | 6/2437          | 15.00         | 14.77                | 1.080          | 0.140            | 1.05           | 1.139        | /        |
|            |                     | Full power      | 0          | 802.11b | 100.0%     | 11/2462         | 15.00         | 14.25                | 1.030          | 0.000            | 1.19           | 1.224        | /        |
|            | Right cheek         | Full power      | 0          | 802.11b | 100.0%     | 6/2437          | 15.00         | 14.77                | 0.606          | 0.000            | 1.05           | 0.639        | /        |
|            | Right Tilt          | Full power      | 0          | 802.11b | 100.0%     | 6/2437          | 15.00         | 14.77                | 0.577          | -0.010           | 1.05           | 0.608        | /        |
|            | Left cheek Repeated | Full power      | 0          | 802.11b | 100.0%     | 11/2462         | 15.00         | 14.25                | 1.010          | 0.028            | 1.19           | 1.200        | /        |
| U-NII-1    | Left cheek          | Full power      | 0          | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 0.692          | 0.030            | 1.15           | 0.793        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 40/5200         | 13.00         | 12.31                | 0.765          | -0.051           | 1.17           | 0.897        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 44/5220         | 13.00         | 12.35                | 0.696          | 0.150            | 1.16           | 0.808        | /        |
|            | Left Tilt           | Full power      | 0          | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 1.100          | 0.038            | 1.15           | 1.260        | 22       |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 40/5200         | 13.00         | 12.31                | 1.060          | 0.110            | 1.17           | 1.243        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 44/5220         | 13.00         | 12.35                | 1.050          | -0.047           | 1.16           | 1.220        | /        |
|            | Right cheek         | Full power      | 0          | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 0.741          | -0.091           | 1.15           | 0.849        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 40/5200         | 13.00         | 12.31                | 0.713          | -0.051           | 1.17           | 0.836        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 44/5220         | 13.00         | 12.35                | 0.712          | 0.036            | 1.16           | 0.827        | /        |
|            | Right Tilt          | Full power      | 0          | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 0.756          | -0.090           | 1.15           | 0.866        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 40/5200         | 13.00         | 12.31                | 0.875          | 0.024            | 1.17           | 1.026        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 44/5220         | 13.00         | 12.35                | 0.940          | -0.043           | 1.16           | 1.092        | /        |
|            | Left Tilt Repeated  | Full power      | 0          | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 1.030          | 0.011            | 1.15           | 1.180        | /        |
| U-NII-3    | Left cheek          | Full power      | 0          | 802.11a | 100.0%     | 149/5745        | 14.00         | 13.42                | 0.672          | 0.020            | 1.14           | 0.768        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.634          | -0.050           | 1.12           | 0.711        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 165/5825        | 14.00         | 12.94                | 0.496          | 0.029            | 1.28           | 0.633        | /        |
|            | Left Tilt           | Full power      | 0          | 802.11a | 100.0%     | 149/5745        | 14.00         | 13.42                | 0.924          | 0.100            | 1.14           | 1.056        | 23       |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.796          | 0.150            | 1.12           | 0.893        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 165/5825        | 14.00         | 12.94                | 0.774          | -0.104           | 1.28           | 0.988        | /        |
|            | Right cheek         | Full power      | 0          | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.591          | 0.033            | 1.12           | 0.663        | /        |
|            | Right Tilt          | Full power      | 0          | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.42                | 0.776          | 0.076            | 1.14           | 0.887        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 149/5745        | 14.00         | 13.50                | 0.784          | 0.087            | 1.12           | 0.880        | /        |
|            |                     | Full power      | 0          | 802.11a | 100.0%     | 165/5825        | 14.00         | 12.94                | 0.752          | 0.152            | 1.28           | 0.960        | /        |
|            | Left Tilt Repeated  | Full power      | 0          | 802.11a | 100.0%     | 149/5745        | 14.00         | 13.42                | 0.916          | 0.000            | 1.14           | 1.047        | /        |
| Bluetooth  | Left cheek          | Full power      | 0          | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.117          | 0.170            | 1.35           | 0.158        | /        |
|            | Left Tilt           | Full power      | 0          | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.124          | -0.030           | 1.35           | 0.168        | 24       |
|            | Right cheek         | Full power      | 0          | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.069          | 0.026            | 1.35           | 0.093        | /        |



|  |            |            |   |     |       |        |      |      |       |        |      |       |   |
|--|------------|------------|---|-----|-------|--------|------|------|-------|--------|------|-------|---|
|  | Right Tilt | Full power | 0 | DH5 | 76.9% | 0/2402 | 6.00 | 5.83 | 0.069 | -0.020 | 1.35 | 0.093 | / |
|--|------------|------------|---|-----|-------|--------|------|------|-------|--------|------|-------|---|

## Body-worn SAR

| Band     | Test Position | Power Reduction | Dist. (mm) | Mode | RB   | offset | Ch./Freq. (MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR1g | Power Drift (dB) | Scaling Factor | Report SAR1g | Plot No. |
|----------|---------------|-----------------|------------|------|------|--------|-----------------|---------------|----------------------|----------------|------------------|----------------|--------------|----------|
| GSM 850  | Back Side     | Receiver off    | 15         | GSM  | -    | -      | 190/836.6       | 33.50         | 33.14                | 0.211          | -0.010           | 1.09           | 0.229        | 25       |
|          | Front Side    | Receiver off    | 15         | GSM  | -    | -      | 190/836.6       | 33.50         | 33.14                | 0.133          | 0.018            | 1.09           | 0.144        | /        |
| GSM 1900 | Back Side     | Receiver off    | 15         | GSM  | -    | -      | 661/1880        | 31.00         | 30.47                | 0.226          | 0.012            | 1.13           | 0.255        | 26       |
|          | Front Side    | Receiver off    | 15         | GSM  | -    | -      | 661/1880        | 31.00         | 30.47                | 0.139          | 0.039            | 1.13           | 0.157        | /        |
| WCDMA II | Back Side     | Receiver off    | 15         | RMC  | -    | -      | 9400/1880       | 24.50         | 23.93                | 0.616          | -0.020           | 1.14           | 0.702        | 27       |
|          | Front Side    | Receiver off    | 15         | RMC  | -    | -      | 9400/1880       | 24.50         | 23.93                | 0.442          | 0.060            | 1.14           | 0.504        | /        |
| WCDMA IV | Back Side     | Receiver off    | 15         | RMC  | -    | -      | 1413/1732.6     | 24.50         | 23.97                | 0.476          | -0.030           | 1.13           | 0.538        | 28       |
|          | Front Side    | Receiver off    | 15         | RMC  | -    | -      | 1413/1732.6     | 24.50         | 23.97                | 0.265          | 0.100            | 1.13           | 0.299        | /        |
| WCDMA V  | Back Side     | Receiver off    | 15         | RMC  | -    | -      | 4183/836.6      | 25.00         | 24.07                | 0.234          | 0.027            | 1.24           | 0.290        | 29       |
|          | Front Side    | Receiver off    | 15         | RMC  | -    | -      | 4183/836.6      | 25.00         | 24.07                | 0.138          | 0.030            | 1.24           | 0.171        | /        |
| LTE 2    | Back Side     | Receiver off    | 15         | QPSK | 1    | 50     | 18700/1860      | 24.00         | 23.40                | 0.668          | -0.026           | 1.15           | 0.767        | 30       |
|          |               | Receiver off    | 15         | QPSK | 50%  | 0      | 19100/1900      | 23.00         | 22.46                | 0.592          | 0.015            | 1.13           | 0.670        | /        |
|          | Front Side    | Receiver off    | 15         | QPSK | 1    | 50     | 18700/1860      | 24.00         | 23.40                | 0.385          | -0.028           | 1.15           | 0.442        | /        |
|          |               | Receiver off    | 15         | QPSK | 50%  | 0      | 19100/1900      | 23.00         | 22.46                | 0.348          | 0.120            | 1.13           | 0.394        | /        |
| LTE 4    | Back Side     | Receiver off    | 15         | QPSK | 1    | 50     | 20050/1720      | 23.50         | 22.67                | 0.682          | -0.050           | 1.21           | 0.826        | 31       |
|          |               | Receiver off    | 15         | QPSK | 1    | 50     | 20175/1732.5    | 23.50         | 22.65                | 0.636          | 0.011            | 1.22           | 0.773        | /        |
|          |               | Receiver off    | 15         | QPSK | 1    | 50     | 20300/1745      | 23.50         | 22.65                | 0.654          | 0.049            | 1.22           | 0.795        | /        |
|          |               | Receiver off    | 15         | QPSK | 50%  | 50     | 20050/1720      | 22.50         | 21.71                | 0.519          | 0.030            | 1.20           | 0.623        | /        |
|          |               | Receiver off    | 15         | QPSK | 100% | 0      | 20300/1745      | 22.50         | 21.65                | 0.538          | -0.014           | 1.22           | 0.654        | /        |
|          | Front Side    | Receiver off    | 15         | QPSK | 1    | 50     | 20050/1720      | 23.50         | 22.67                | 0.392          | 0.021            | 1.21           | 0.475        | /        |
|          |               | Receiver off    | 15         | QPSK | 50%  | 50     | 20050/1720      | 22.50         | 21.71                | 0.303          | -0.090           | 1.20           | 0.363        | /        |
| LTE 5    | Back Side     | Receiver off    | 15         | QPSK | 1    | 0      | 20600/844       | 25.00         | 24.41                | 0.332          | -0.070           | 1.15           | 0.380        | 32       |
|          |               | Receiver off    | 15         | QPSK | 50%  | 0      | 20600/844       | 24.00         | 23.27                | 0.306          | 0.024            | 1.18           | 0.362        | /        |
|          | Front Side    | Receiver off    | 15         | QPSK | 1    | 0      | 20600/844       | 25.00         | 24.41                | 0.228          | -0.038           | 1.15           | 0.261        | /        |
|          |               | Receiver off    | 15         | QPSK | 50%  | 0      | 20600/844       | 24.00         | 23.27                | 0.186          | 0.019            | 1.18           | 0.220        | /        |
| LTE 12   | Back Side     | Receiver off    | 15         | QPSK | 1    | 25     | 23060/704       | 24.50         | 23.89                | 0.200          | -0.050           | 1.15           | 0.230        | 33       |
|          |               | Receiver off    | 15         | QPSK | 50%  | 0      | 23130/711       | 23.50         | 22.87                | 0.163          | 0.110            | 1.16           | 0.188        | /        |
|          | Front Side    | Receiver off    | 15         | QPSK | 1    | 25     | 23060/704       | 24.50         | 23.89                | 0.143          | -0.049           | 1.15           | 0.165        | /        |
|          |               | Receiver off    | 15         | QPSK | 50%  | 0      | 23130/711       | 23.50         | 22.87                | 0.125          | 0.030            | 1.16           | 0.145        | /        |
| LTE 41   | Back Side     | Receiver off    | 15         | QPSK | 1    | 50     | 40620/2593      | 26.50         | 25.83                | 0.635          | 0.040            | 1.17           | 0.741        | 34       |
|          |               | Receiver off    | 15         | QPSK | 50%  | 25     | 39750/2506      | 25.50         | 24.84                | 0.394          | -0.090           | 1.16           | 0.459        | /        |
|          | Front Side    | Receiver off    | 15         | QPSK | 1    | 50     | 40620/2593      | 26.50         | 25.83                | 0.235          | 0.080            | 1.17           | 0.274        | /        |
|          |               | Receiver off    | 15         | QPSK | 50%  | 25     | 39750/2506      | 25.50         | 24.84                | 0.187          | 0.000            | 1.16           | 0.218        | /        |
| LTE 66   | Back Side     | Receiver off    | 15         | QPSK | 1    | 50     | 132072/1720     | 24.50         | 23.53                | 0.759          | 0.070            | 1.25           | 0.949        | 35       |
|          |               | Receiver off    | 15         | QPSK | 1    | 50     | 132322/1745     | 24.50         | 23.47                | 0.554          | 0.060            | 1.27           | 0.702        | /        |
|          |               | Receiver off    | 15         | QPSK | 1    | 50     | 132572/1770     | 24.50         | 23.49                | 0.583          | 0.050            | 1.26           | 0.736        | /        |



## SAR Test Report

Report No.: R2108A0760-S1

|        |            |              |    |      |      |    |             |       |       |       |        |      |       |    |
|--------|------------|--------------|----|------|------|----|-------------|-------|-------|-------|--------|------|-------|----|
| LTE 71 | Front Side | Receiver off | 15 | QPSK | 50%  | 50 | 132072/1720 | 23.50 | 22.44 | 0.465 | -0.043 | 1.28 | 0.594 | /  |
|        |            | Receiver off | 15 | QPSK | 100% | 0  | 132072/1720 | 23.50 | 22.41 | 0.439 | -0.170 | 1.29 | 0.564 | /  |
|        |            | Receiver off | 15 | QPSK | 1    | 50 | 132072/1720 | 24.50 | 23.53 | 0.360 | -0.030 | 1.25 | 0.450 | /  |
|        |            | Receiver off | 15 | QPSK | 50%  | 50 | 132072/1720 | 23.50 | 22.44 | 0.268 | -0.160 | 1.28 | 0.342 | /  |
|        | Back Side  | Receiver off | 15 | QPSK | 1    | 50 | 133222/673  | 24.50 | 23.86 | 0.166 | -0.020 | 1.16 | 0.192 | 36 |
|        |            | Receiver off | 15 | QPSK | 50%  | 50 | 133222/673  | 23.50 | 22.98 | 0.138 | -0.060 | 1.13 | 0.156 | /  |
|        | Front Side | Receiver off | 15 | QPSK | 1    | 50 | 133222/673  | 24.50 | 23.86 | 0.079 | -0.110 | 1.16 | 0.092 | /  |
|        |            | Receiver off | 15 | QPSK | 50%  | 50 | 133222/673  | 23.50 | 22.98 | 0.069 | -0.070 | 1.13 | 0.077 | /  |

| Band       | Test Position | Power Reduction | Dist. (mm) | Mode    | Duty Cycle | Ch./Freq. (MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR1g | Power Drift (dB) | Scaling Factor | Report SAR1g | Plot No. |
|------------|---------------|-----------------|------------|---------|------------|-----------------|---------------|----------------------|----------------|------------------|----------------|--------------|----------|
| Wi-Fi 2.4G | Back Side     | Full power      | 15         | 802.11b | 98.0%      | 6/2437          | 15.00         | 14.77                | 0.155          | 0.184            | 1.08           | 0.167        | 37       |
|            | Front Side    | Full power      | 15         | 802.11b | 98.0%      | 6/2437          | 15.00         | 14.77                | 0.091          | 0.032            | 1.08           | 0.098        | /        |
| U-NII-1    | Back Side     | Full power      | 15         | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.41                | 0.524          | 0.120            | 1.15           | 0.600        | 38       |
|            | Front Side    | Full power      | 15         | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.41                | 0.262          | 0.030            | 1.15           | 0.300        | /        |
| U-NII-3    | Back Side     | Full power      | 15         | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.164          | 0.160            | 1.12           | 0.184        | 39       |
|            | Front Side    | Full power      | 15         | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.105          | 0.078            | 1.12           | 0.118        | /        |



## Hotspot SAR

| Band     | Test Position      | Power Reduction | Dist. (mm) | Mode      | RB | offset | Ch./Freq. (MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR1g | Power Drift (dB) | Scaling Factor | Report SAR1g | Plot No. |
|----------|--------------------|-----------------|------------|-----------|----|--------|-----------------|---------------|----------------------|----------------|------------------|----------------|--------------|----------|
| GSM 850  | Back Side          | Hotspot on      | 10         | 4TX Slots | -  | -      | 190/836.6       | 30.50         | 29.86                | 0.538          | -0.150           | 1.16           | 0.623        | 40       |
|          | Front Side         | Hotspot on      | 10         | 4TX Slots | -  | -      | 190/836.6       | 30.50         | 29.86                | 0.286          | 0.020            | 1.16           | 0.331        | /        |
|          | Left Edge          | Hotspot on      | 10         | 4TX Slots | -  | -      | 190/836.6       | 30.50         | 29.86                | 0.000          | 0.000            | 1.16           | 0.000        | /        |
|          | Right Edge         | Hotspot on      | 10         | 4TX Slots | -  | -      | 190/836.6       | 30.50         | 29.86                | 0.245          | 0.035            | 1.16           | 0.284        | /        |
|          | Bottom Edge        | Hotspot on      | 10         | 4TX Slots | -  | -      | 190/836.6       | 30.50         | 29.86                | 0.195          | 0.018            | 1.16           | 0.226        | /        |
| GSM1900  | Back Side          | Hotspot on      | 10         | 4TX Slots | -  | -      | 661/1880        | 27.50         | 26.87                | 0.847          | 0.010            | 1.16           | 0.979        | /        |
|          | Front Side         | Hotspot on      | 10         | 4TX Slots | -  | -      | 661/1880        | 27.50         | 26.87                | 0.483          | 0.059            | 1.16           | 0.558        | /        |
|          | Left Edge          | Hotspot on      | 10         | 4TX Slots | -  | -      | 661/1880        | 27.50         | 26.87                | 0.314          | -0.072           | 1.16           | 0.363        | /        |
|          | Right Edge         | Hotspot on      | 10         | 4TX Slots | -  | -      | 661/1880        | 27.50         | 26.87                | 0.000          | 0.000            | 1.16           | 0.000        | /        |
|          | Bottom Edge        | Hotspot on      | 10         | 4TX Slots | -  | -      | 661/1880        | 27.50         | 26.87                | 0.569          | 0.028            | 1.16           | 0.658        | /        |
|          | Back Side          | Hotspot on      | 10         | 4TX Slots | -  | -      | 512/1850.2      | 27.50         | 26.96                | 0.870          | -0.100           | 1.13           | 0.985        | /        |
|          |                    | Hotspot on      | 10         | 4TX Slots | -  | -      | 810/1909.8      | 27.50         | 26.78                | 0.862          | 0.041            | 1.18           | 1.017        | /        |
| WCDMA II | Back Side          | Hotspot on      | 10         | RMC       | -  | -      | 9262/1852.4     | 24.50         | 24.03                | 0.947          | -0.012           | 1.11           | 1.055        | /        |
|          |                    | Hotspot on      | 10         | RMC       | -  | -      | 9400/1880       | 24.50         | 23.93                | 0.897          | 0.010            | 1.14           | 1.023        | /        |
|          |                    | Hotspot on      | 10         | RMC       | -  | -      | 9538/1907.6     | 24.50         | 23.91                | 1.010          | -0.040           | 1.15           | 1.157        | 42       |
|          | Front Side         | Hotspot on      | 10         | RMC       | -  | -      | 9400/1880       | 24.50         | 23.93                | 0.459          | -0.030           | 1.14           | 0.523        | /        |
|          | Left Edge          | Hotspot on      | 10         | RMC       | -  | -      | 9400/1880       | 24.50         | 23.93                | 0.317          | 0.027            | 1.14           | 0.361        | /        |
|          | Right Edge         | Hotspot on      | 10         | RMC       | -  | -      | 9400/1880       | 24.50         | 23.93                | 0.049          | 0.015            | 1.14           | 0.056        | /        |
|          | Bottom Edge        | Hotspot on      | 10         | RMC       | -  | -      | 9400/1880       | 24.50         | 23.93                | 0.642          | 0.080            | 1.14           | 0.732        | /        |
|          | Back Side Repeated | Hotspot on      | 10         | RMC       | -  | -      | 9538/1907.6     | 24.50         | 23.91                | 0.992          | 0.032            | 1.15           | 1.136        | /        |
| WCDMA IV | Back Side          | Hotspot on      | 10         | RMC       | -  | -      | 1413/1732.6     | 24.50         | 23.97                | 0.759          | 0.000            | 1.13           | 0.858        | 43       |
|          |                    | Hotspot on      | 10         | RMC       | -  | -      | 1312/1712.4     | 24.50         | 23.92                | 0.937          | -0.080           | 1.14           | 1.071        |          |
|          |                    | Hotspot on      | 10         | RMC       | -  | -      | 1513/1752.6     | 24.50         | 23.93                | 0.826          | 0.060            | 1.14           | 0.942        |          |
|          | Front Side         | Hotspot on      | 10         | RMC       | -  | -      | 1413/1732.6     | 24.50         | 23.97                | 0.398          | 0.100            | 1.13           | 0.450        | /        |
|          | Left Edge          | Hotspot on      | 10         | RMC       | -  | -      | 1413/1732.6     | 24.50         | 23.97                | 0.301          | -0.022           | 1.13           | 0.340        | /        |
|          | Right Edge         | Hotspot on      | 10         | RMC       | -  | -      | 1413/1732.6     | 24.50         | 23.97                | 0.055          | 0.015            | 1.13           | 0.062        | /        |
|          | Bottom Edge        | Hotspot on      | 10         | RMC       | -  | -      | 1413/1732.6     | 24.50         | 23.97                | 0.828          | 0.064            | 1.13           | 0.935        | /        |
|          |                    | Hotspot on      | 10         | RMC       | -  | -      | 1312/1712.4     | 24.50         | 23.92                | 0.836          | 0.031            | 1.14           | 0.955        | /        |
|          |                    | Hotspot on      | 10         | RMC       | -  | -      | 1513/1752.6     | 24.50         | 23.93                | 0.818          | -0.080           | 1.14           | 0.933        | /        |
|          | Back Side Repeated | Hotspot on      | 10         | RMC       | -  | -      | 1312/1712.4     | 24.50         | 23.92                | 0.922          | 0.000            | 1.14           | 1.054        | /        |
| WCDMA V  | Back Side          | Hotspot on      | 10         | RMC       | -  | -      | 4183/836.6      | 25.00         | 24.07                | 0.373          | -0.090           | 1.24           | 0.462        | 44       |
|          | Front Side         | Hotspot on      | 10         | RMC       | -  | -      | 4183/836.6      | 25.00         | 24.07                | 0.231          | 0.042            | 1.24           | 0.286        | /        |
|          | Left Edge          | Hotspot on      | 10         | RMC       | -  | -      | 4183/836.6      | 25.00         | 24.07                | 0.051          | 0.011            | 1.24           | 0.063        | /        |
|          | Right Edge         | Hotspot on      | 10         | RMC       | -  | -      | 4183/836.6      | 25.00         | 24.07                | 0.138          | -0.035           | 1.24           | 0.171        | /        |



|        |                    |            |    |      |      |    |              |       |       |       |        |      |       |    |
|--------|--------------------|------------|----|------|------|----|--------------|-------|-------|-------|--------|------|-------|----|
|        | Bottom Edge        | Hotspot on | 10 | RMC  | -    | -  | 4183/836.6   | 25.00 | 24.07 | 0.106 | 0.060  | 1.24 | 0.131 | /  |
| LTE 2  | Back Side          | Hotspot on | 10 | QPSK | 1    | 50 | 18700/1860   | 23.50 | 22.87 | 0.776 | 0.024  | 1.16 | 0.897 | /  |
|        |                    | Hotspot on | 10 | QPSK | 1    | 50 | 18900/1880   | 23.50 | 22.83 | 0.827 | 0.018  | 1.17 | 0.965 | /  |
|        |                    | Hotspot on | 10 | QPSK | 1    | 50 | 19100/1900   | 23.50 | 22.82 | 0.845 | 0.000  | 1.17 | 0.988 | 45 |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 25 | 18700/1860   | 22.50 | 21.83 | 0.604 | -0.012 | 1.17 | 0.705 | /  |
|        | Front Side         | Hotspot on | 10 | QPSK | 1    | 50 | 18700/1860   | 23.50 | 22.87 | 0.403 | 0.035  | 1.16 | 0.466 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 25 | 18700/1860   | 22.50 | 21.83 | 0.358 | 0.072  | 1.17 | 0.418 | /  |
|        | Left Edge          | Hotspot on | 10 | QPSK | 1    | 50 | 18700/1860   | 23.50 | 22.87 | 0.241 | -0.018 | 1.16 | 0.279 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 25 | 18700/1860   | 22.50 | 21.83 | 0.173 | 0.012  | 1.17 | 0.202 | /  |
|        | Right Edge         | Hotspot on | 10 | QPSK | 1    | 50 | 18700/1860   | 23.50 | 22.87 | 0.104 | 0.035  | 1.16 | 0.120 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 25 | 18700/1860   | 22.50 | 21.83 | 0.068 | -0.090 | 1.17 | 0.079 | /  |
|        | Bottom Edge        | Hotspot on | 10 | QPSK | 1    | 50 | 18700/1860   | 23.50 | 22.87 | 0.623 | 0.020  | 1.16 | 0.720 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 25 | 18700/1860   | 22.50 | 21.83 | 0.573 | 0.040  | 1.17 | 0.669 | /  |
|        | Back Side          | Hotspot on | 10 | QPSK | 100% | 0  | 18700/1860   | 22.50 | 21.72 | 0.635 | 0.000  | 1.20 | 0.760 | /  |
|        | Back Side Repeated | Hotspot on | 10 | QPSK | 1    | 50 | 19100/1900   | 23.50 | 22.82 | 0.831 | -0.036 | 1.17 | 0.972 | /  |
| LTE 4  | Back Side          | Hotspot on | 10 | QPSK | 1    | 50 | 20050/1720   | 23.50 | 22.67 | 0.663 | 0.012  | 1.21 | 0.803 | /  |
|        |                    | Hotspot on | 10 | QPSK | 1    | 50 | 20175/1732.5 | 23.50 | 22.65 | 0.744 | -0.120 | 1.22 | 0.905 | 46 |
|        |                    | Hotspot on | 10 | QPSK | 1    | 50 | 20300/1745   | 23.50 | 22.65 | 0.739 | -0.020 | 1.22 | 0.899 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 20050/1720   | 22.50 | 21.71 | 0.545 | 0.013  | 1.20 | 0.654 | /  |
|        | Front Side         | Hotspot on | 10 | QPSK | 1    | 50 | 20050/1720   | 23.50 | 22.67 | 0.588 | 0.010  | 1.21 | 0.712 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 20050/1720   | 22.50 | 21.71 | 0.487 | 0.049  | 1.20 | 0.584 | /  |
|        | Left Edge          | Hotspot on | 10 | QPSK | 1    | 50 | 20050/1720   | 23.50 | 22.67 | 0.386 | -0.028 | 1.21 | 0.467 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 20050/1720   | 22.50 | 21.71 | 0.256 | 0.010  | 1.20 | 0.307 | /  |
|        | Right Edge         | Hotspot on | 10 | QPSK | 1    | 50 | 20050/1720   | 23.50 | 22.67 | 0.075 | 0.029  | 1.21 | 0.091 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 20050/1720   | 22.50 | 21.71 | 0.050 | -0.099 | 1.20 | 0.060 | /  |
|        | Bottom Edge        | Hotspot on | 10 | QPSK | 1    | 50 | 20050/1720   | 23.50 | 22.67 | 0.596 | 0.050  | 1.21 | 0.722 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 20050/1720   | 22.50 | 21.71 | 0.438 | 0.022  | 1.20 | 0.525 | /  |
|        | Back Side          | Hotspot on | 10 | QPSK | 100% | 0  | 20300/1745   | 22.50 | 21.65 | 0.469 | -0.010 | 1.22 | 0.570 | /  |
|        | Back Side          | Hotspot on | 10 | QPSK | 1    | 0  | 20600/844    | 25.00 | 24.41 | 0.551 | -0.030 | 1.15 | 0.631 | 47 |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 20600/844    | 24.00 | 23.27 | 0.488 | 0.047  | 1.18 | 0.577 | /  |
| LTE 5  | Front Side         | Hotspot on | 10 | QPSK | 1    | 0  | 20600/844    | 25.00 | 24.41 | 0.346 | -0.020 | 1.15 | 0.396 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 20600/844    | 24.00 | 23.27 | 0.296 | 0.019  | 1.18 | 0.350 | /  |
|        | Left Edge          | Hotspot on | 10 | QPSK | 1    | 0  | 20600/844    | 25.00 | 24.41 | 0.000 | 0.000  | 1.15 | 0.000 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 20600/844    | 24.00 | 23.27 | 0.000 | 0.000  | 1.18 | 0.000 | /  |
|        | Right Edge         | Hotspot on | 10 | QPSK | 1    | 0  | 20600/844    | 25.00 | 24.41 | 0.239 | 0.021  | 1.15 | 0.274 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 20600/844    | 24.00 | 23.27 | 0.192 | -0.015 | 1.18 | 0.227 | /  |
|        | Bottom Edge        | Hotspot on | 10 | QPSK | 1    | 0  | 20600/844    | 25.00 | 24.41 | 0.000 | 0.000  | 1.15 | 0.000 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 20600/844    | 24.00 | 23.27 | 0.000 | 0.000  | 1.18 | 0.000 | /  |
| LTE 12 | Back Side          | Hotspot on | 10 | QPSK | 1    | 25 | 23060/704    | 24.50 | 23.89 | 0.338 | 0.030  | 1.15 | 0.389 | 48 |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 23130/711    | 23.50 | 22.87 | 0.252 | -0.020 | 1.16 | 0.291 | /  |
|        | Front Side         | Hotspot on | 10 | QPSK | 1    | 25 | 23060/704    | 24.50 | 23.89 | 0.227 | 0.048  | 1.15 | 0.261 | /  |
|        |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 23130/711    | 23.50 | 22.87 | 0.120 | 0.012  | 1.16 | 0.139 | /  |



|               |                    |            |    |      |      |    |              |       |       |       |        |      |       |    |
|---------------|--------------------|------------|----|------|------|----|--------------|-------|-------|-------|--------|------|-------|----|
|               | Left Edge          | Hotspot on | 10 | QPSK | 1    | 25 | 23060/704    | 24.50 | 23.89 | 0.000 | 0.000  | 1.15 | 0.000 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 23130/711    | 23.50 | 22.87 | 0.000 | 0.000  | 1.16 | 0.000 | /  |
|               | Right Edge         | Hotspot on | 10 | QPSK | 1    | 25 | 23060/704    | 24.50 | 23.89 | 0.244 | 0.039  | 1.15 | 0.281 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 23130/711    | 23.50 | 22.87 | 0.197 | -0.082 | 1.16 | 0.228 | /  |
|               | Bottom Edge        | Hotspot on | 10 | QPSK | 1    | 25 | 23060/704    | 24.50 | 23.89 | 0.094 | 0.000  | 1.15 | 0.108 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 0  | 23130/711    | 23.50 | 22.87 | 0.089 | 0.015  | 1.16 | 0.103 | /  |
| LTE 41<br>TDD | Back Side          | Hotspot on | 10 | QPSK | 1    | 50 | 39750/2506   | 24.50 | 24.02 | 0.735 | 0.020  | 1.12 | 0.821 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 40620/2593   | 23.50 | 23.03 | 0.412 | 0.019  | 1.11 | 0.459 | /  |
|               |                    | Hotspot on | 10 | QPSK | 1    | 50 | 40620/2593   | 24.50 | 24.00 | 0.816 | 0.070  | 1.12 | 0.916 | 49 |
|               |                    | Hotspot on | 10 | QPSK | 1    | 50 | 41055/2636.5 | 24.50 | 23.97 | 0.693 | -0.011 | 1.13 | 0.783 | /  |
|               | Front Side         | Hotspot on | 10 | QPSK | 1    | 50 | 39750/2506   | 24.50 | 24.02 | 0.136 | 0.024  | 1.12 | 0.152 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 40620/2593   | 23.50 | 23.03 | 0.090 | 0.059  | 1.11 | 0.100 | /  |
|               | Left Edge          | Hotspot on | 10 | QPSK | 1    | 50 | 39750/2506   | 24.50 | 24.02 | 0.421 | 0.030  | 1.12 | 0.470 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 40620/2593   | 23.50 | 23.03 | 0.262 | 0.021  | 1.11 | 0.292 | /  |
|               | Right Edge         | Hotspot on | 10 | QPSK | 1    | 50 | 39750/2506   | 24.50 | 24.02 | 0.000 | 0.000  | 1.12 | 0.000 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 40620/2593   | 23.50 | 23.03 | 0.000 | 0.000  | 1.11 | 0.000 | /  |
|               | Top Edge           | Hotspot on | 10 | QPSK | 1    | 50 | 39750/2506   | 24.50 | 24.02 | 0.091 | -0.016 | 1.12 | 0.102 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 40620/2593   | 23.50 | 23.03 | 0.040 | 0.022  | 1.11 | 0.045 | /  |
|               | Back Side          | Hotspot on | 10 | QPSK | 100% | 0  | 41055/2636.5 | 23.50 | 22.83 | 0.531 | 0.035  | 1.17 | 0.620 | /  |
|               | Back Side Repeated | Hotspot on | 10 | QPSK | 1    | 50 | 40620/2593   | 24.50 | 24.00 | 0.812 | 0.000  | 1.12 | 0.911 | /  |
| LTE 66        | Back Side          | Hotspot on | 10 | QPSK | 1    | 50 | 132072/1720  | 23.50 | 22.71 | 0.796 | -0.030 | 1.20 | 0.955 | 50 |
|               |                    | Hotspot on | 10 | QPSK | 1    | 50 | 132322/1745  | 23.50 | 22.66 | 0.752 | 0.010  | 1.21 | 0.912 | /  |
|               |                    | Hotspot on | 10 | QPSK | 1    | 50 | 132572/1770  | 23.50 | 22.70 | 0.778 | -0.012 | 1.20 | 0.935 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 132072/1720  | 22.50 | 21.76 | 0.568 | -0.038 | 1.19 | 0.674 | /  |
|               | Front Side         | Hotspot on | 10 | QPSK | 1    | 50 | 132072/1720  | 23.50 | 22.71 | 0.432 | 0.015  | 1.20 | 0.518 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 132072/1720  | 22.50 | 21.76 | 0.325 | 0.060  | 1.19 | 0.385 | /  |
|               | Left Edge          | Hotspot on | 10 | QPSK | 1    | 50 | 132072/1720  | 23.50 | 22.71 | 0.284 | 0.032  | 1.20 | 0.341 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 132072/1720  | 22.50 | 21.76 | 0.232 | -0.046 | 1.19 | 0.275 | /  |
|               | Right Edge         | Hotspot on | 10 | QPSK | 1    | 50 | 132072/1720  | 23.50 | 22.71 | 0.072 | 0.021  | 1.20 | 0.086 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 132072/1720  | 22.50 | 21.76 | 0.040 | 0.100  | 1.19 | 0.047 | /  |
|               | Bottom Edge        | Hotspot on | 10 | QPSK | 1    | 50 | 132072/1720  | 23.50 | 22.71 | 0.788 | 0.032  | 1.20 | 0.945 | /  |
|               |                    | Hotspot on | 10 | QPSK | 1    | 50 | 132322/1745  | 23.50 | 22.66 | 0.732 | 0.090  | 1.21 | 0.888 | /  |
|               |                    | Hotspot on | 10 | QPSK | 1    | 50 | 132572/1770  | 23.50 | 22.70 | 0.719 | 0.120  | 1.20 | 0.864 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 132072/1720  | 22.50 | 21.76 | 0.617 | -0.028 | 1.19 | 0.732 | /  |
|               | Back Side          | Hotspot on | 10 | QPSK | 100% | 0  | 132072/1720  | 22.50 | 21.68 | 0.621 | 0.017  | 1.21 | 0.750 | /  |
| LTE 71        | Back Side          | Hotspot on | 10 | QPSK | 1    | 50 | 133222/673   | 24.50 | 23.86 | 0.234 | -0.120 | 1.16 | 0.271 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 133222/673   | 23.50 | 22.98 | 0.201 | -0.010 | 1.13 | 0.227 | /  |
|               | Front Side         | Hotspot on | 10 | QPSK | 1    | 50 | 133222/673   | 24.50 | 23.86 | 0.219 | 0.140  | 1.16 | 0.254 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 133222/673   | 23.50 | 22.98 | 0.167 | 0.010  | 1.13 | 0.188 | /  |
|               | Left Edge          | Hotspot on | 10 | QPSK | 1    | 50 | 133222/673   | 24.50 | 23.86 | 0.141 | -0.100 | 1.16 | 0.163 | /  |
|               |                    | Hotspot on | 10 | QPSK | 50%  | 50 | 133222/673   | 23.50 | 22.98 | 0.086 | -0.010 | 1.13 | 0.097 | /  |
|               | Right Edge         | Hotspot on | 10 | QPSK | 1    | 50 | 133222/673   | 24.50 | 23.86 | 0.412 | -0.030 | 1.16 | 0.477 | 51 |



|  |             |            |    |      |     |    |            |       |       |       |        |      |       |   |
|--|-------------|------------|----|------|-----|----|------------|-------|-------|-------|--------|------|-------|---|
|  |             | Hotspot on | 10 | QPSK | 50% | 50 | 133222/673 | 23.50 | 22.98 | 0.296 | -0.040 | 1.13 | 0.334 | / |
|  | Bottom Edge | Hotspot on | 10 | QPSK | 1   | 50 | 133222/673 | 24.50 | 23.86 | 0.091 | -0.180 | 1.16 | 0.106 | / |
|  |             | Hotspot on | 10 | QPSK | 50% | 50 | 133222/673 | 23.50 | 22.98 | 0.069 | -0.160 | 1.13 | 0.077 | / |

| Band       | Test Position     | Power Reduction | Dist. (mm) | Mode    | Duty Cycle | Ch./Freq. (MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR1g | Power Drift (dB) | Scaling Factor | Report SAR1g | Note |
|------------|-------------------|-----------------|------------|---------|------------|-----------------|---------------|----------------------|----------------|------------------|----------------|--------------|------|
| Wi-Fi 2.4G | Back Side         | Full power      | 10         | 802.11b | 98.0%      | 6/2437          | 15.00         | 14.77                | 0.335          | 0.150            | 1.08           | 0.360        | 52   |
|            | Front Side        | Full power      | 10         | 802.11b | 98.0%      | 6/2437          | 15.00         | 14.77                | 0.206          | 0.021            | 1.08           | 0.222        | /    |
|            | Left Edge         | Full power      | 10         | 802.11b | 98.0%      | 6/2437          | 15.00         | 14.77                | 0.039          | 0.049            | 1.08           | 0.042        | /    |
|            | Right Edge        | Full power      | 10         | 802.11b | 98.0%      | 6/2437          | 15.00         | 14.77                | 0.075          | 0.022            | 1.08           | 0.081        | /    |
|            | Top Edge          | Full power      | 10         | 802.11b | 98.0%      | 6/2437          | 15.00         | 14.77                | 0.253          | 0.019            | 1.08           | 0.272        | /    |
| U-NII-1    | Back Side         | Full power      | 10         | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 0.397          | -0.056           | 1.09           | 0.434        | /    |
|            | Front Side        | Full power      | 10         | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 0.201          | 0.018            | 1.09           | 0.220        | /    |
|            | Left Edge         | Full power      | 10         | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 0.084          | 0.019            | 1.09           | 0.092        | /    |
|            | Right Edge        | Full power      | 10         | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 0.040          | 0.021            | 1.09           | 0.043        | /    |
|            | Top Edge          | Full power      | 10         | 802.11a | 100.0%     | 36/5180         | 13.00         | 12.61                | 1.110          | 0.020            | 1.09           | 1.214        | /    |
|            |                   | Full power      | 10         | 802.11a | 100.0%     | 40/5200         | 13.00         | 12.31                | 0.957          | -0.025           | 1.17           | 1.122        | /    |
|            |                   | Full power      | 10         | 802.11a | 100.0%     | 44/5220         | 13.00         | 12.35                | 1.140          | -0.050           | 1.16           | 1.324        | 53   |
|            | Top Edge Repeated | Full power      | 10         | 802.11a | 100.0%     | 44/5220         | 13.00         | 12.35                | 1.070          | 0.100            | 1.16           | 1.243        | /    |
| U-NII-3    | Back Side         | Full power      | 10         | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.348          | -0.105           | 1.12           | 0.390        | /    |
|            | Front Side        | Full power      | 10         | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.106          | -0.073           | 1.12           | 0.119        | /    |
|            | Left Edge         | Full power      | 10         | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.019          | 0.081            | 1.12           | 0.021        | /    |
|            | Right Edge        | Full power      | 10         | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.049          | 0.131            | 1.12           | 0.055        | /    |
|            | Top Edge          | Full power      | 10         | 802.11a | 100.0%     | 157/5785        | 14.00         | 13.50                | 0.679          | 0.060            | 1.12           | 0.762        | 54   |
| Bluetooth  | Back Side         | Full power      | 10         | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.043          | 0.077            | 1.35           | 0.058        | 55   |
|            | Front Side        | Full power      | 10         | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.025          | -0.108           | 1.35           | 0.034        | /    |
|            | Left Edge         | Full power      | 10         | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.002          | -0.029           | 1.35           | 0.003        | /    |
|            | Right Edge        | Full power      | 10         | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.009          | -0.051           | 1.35           | 0.012        | /    |
|            | Top Edge          | Full power      | 10         | DH5     | 76.9%      | 0/2402          | 6.00          | 5.83                 | 0.024          | 0.027            | 1.35           | 0.032        | /    |



## Product-specific 10g SAR

| Band  | Test Position | Power Reduction | Dist. (mm) | Mode | RB | offset | Ch./Freq. (MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR10g | Power Drift (dB) | Scaling Factor | Report SAR10g | Plot No. |
|-------|---------------|-----------------|------------|------|----|--------|-----------------|---------------|----------------------|-----------------|------------------|----------------|---------------|----------|
| LTE41 | Back Side     | Receiver off    | 0          | QPSK | 1  | 50     | 40620/2593      | 26.50         | 25.83                | 2.510           | -0.040           | 1.17           | 2.929         | 56       |
|       |               | Receiver off    | 0          | QPSK | 1  | 50     | 39750/2506      | 26.50         | 25.79                | 2.240           | 0.010            | 1.18           | 2.638         | /        |
|       |               | Receiver off    | 0          | QPSK | 1  | 50     | 41055/2636.5    | 26.50         | 25.74                | 2.290           | 0.000            | 1.19           | 2.728         | /        |

## 0mm SAR Evaluate

| Band       | Test Position | Power Reduction | Mode | RB   | offset | Channel Frequency(MHz) | Tune-up (dBm) | Measured power (dBm) | Measured SAR10g | Measured SAR1g | Scaling Factor | Report SAR1g | 0mm SAR |
|------------|---------------|-----------------|------|------|--------|------------------------|---------------|----------------------|-----------------|----------------|----------------|--------------|---------|
| LTE 2      | Back Side     | Hotspot on      | QPSK | 1    | 50     | 18700/1860             | 24.00         | 23.50                | 0.461           | 0.897          | 1.12           | 1.007        | NO      |
|            |               | Hotspot on      | QPSK | 1    | 50     | 18900/1880             | 24.00         | 23.50                | 0.474           | 0.965          | 1.12           | 1.083        | NO      |
|            |               | Hotspot on      | QPSK | 1    | 50     | 19100/1900             | 24.00         | 23.50                | 0.493           | 0.988          | 1.12           | 1.109        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 18700/1860             | 22.50         | 22.50                | 0.353           | 0.705          | 1.00           | 0.705        | NO      |
|            | Front Side    | Hotspot on      | QPSK | 1    | 50     | 18700/1860             | 24.00         | 23.50                | 0.252           | 0.466          | 1.12           | 0.523        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 18700/1860             | 23.00         | 22.50                | 0.224           | 0.418          | 1.12           | 0.469        | NO      |
|            | Left Edge     | Hotspot on      | QPSK | 1    | 50     | 18700/1860             | 24.00         | 23.50                | 0.142           | 0.279          | 1.12           | 0.313        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 18700/1860             | 23.00         | 22.50                | 0.100           | 0.202          | 1.12           | 0.226        | NO      |
|            | Right Edge    | Hotspot on      | QPSK | 1    | 50     | 18700/1860             | 24.00         | 23.50                | 0.061           | 0.120          | 1.12           | 0.135        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 18700/1860             | 23.00         | 22.50                | 0.041           | 0.079          | 1.12           | 0.089        | NO      |
|            | Bottom Edge   | Hotspot on      | QPSK | 1    | 50     | 18700/1860             | 24.00         | 23.50                | 0.360           | 0.720          | 1.12           | 0.808        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 18700/1860             | 23.00         | 22.50                | 0.325           | 0.669          | 1.12           | 0.750        | NO      |
|            | Back Side     | Hotspot on      | QPSK | 100% | 0      | 18700/1860             | 23.00         | 22.50                | 0.371           | 0.760          | 1.12           | 0.853        | NO      |
| LTE 41 TDD | Back Side     | Hotspot on      | QPSK | 1    | 50     | 39750/2506             | 26.50         | 24.50                | 0.297           | 0.821          | 1.58           | 1.301        | Yes     |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 41490/2680             | 25.50         | 23.50                | 0.155           | 0.459          | 1.58           | 0.728        | NO      |
|            |               | Hotspot on      | QPSK | 1    | 50     | 40620/2593             | 26.50         | 24.50                | 0.329           | 0.916          | 1.58           | 1.451        | Yes     |
|            |               | Hotspot on      | QPSK | 1    | 50     | 41055/2636.5           | 26.50         | 24.50                | 0.278           | 0.783          | 1.58           | 1.241        | Yes     |
|            | Front Side    | Hotspot on      | QPSK | 1    | 50     | 39750/2506             | 26.50         | 24.50                | 0.069           | 0.152          | 1.58           | 0.241        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 41490/2680             | 25.50         | 23.50                | 0.045           | 0.100          | 1.58           | 0.159        | NO      |
|            | Left Edge     | Hotspot on      | QPSK | 1    | 50     | 39750/2506             | 26.50         | 24.50                | 0.166           | 0.470          | 1.58           | 0.745        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 41490/2680             | 25.50         | 23.50                | 0.104           | 0.292          | 1.58           | 0.463        | NO      |
|            | Right Edge    | Hotspot on      | QPSK | 1    | 50     | 39750/2506             | 26.50         | 24.50                | 0.000           | 0.000          | 1.58           | 0.000        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 41490/2680             | 25.50         | 23.50                | 0.000           | 0.000          | 1.58           | 0.000        | NO      |
|            | Top Edge      | Hotspot on      | QPSK | 1    | 50     | 39750/2506             | 26.50         | 24.50                | 0.051           | 0.102          | 1.58           | 0.161        | NO      |
|            |               | Hotspot on      | QPSK | 50%  | 25     | 41490/2680             | 25.50         | 23.50                | 0.021           | 0.045          | 1.58           | 0.071        | NO      |
|            | Back Side     | Hotspot on      | QPSK | 100% | 0      | 41055/2636.5           | 25.50         | 23.50                | 0.207           | 0.620          | 1.58           | 0.982        | NO      |

### 10.3 Simultaneous Transmission Analysis

| Simultaneous Transmission Configurations | Head | Body-worn | Hotspot | Product Specific 10-g SAR |
|------------------------------------------|------|-----------|---------|---------------------------|
| WWAN+ Wi-Fi 2.4GHz                       | Yes  | Yes       | Yes     | Yes                       |
| WWAN + Wi-Fi 5GHz                        | Yes  | Yes       | Yes     | Yes                       |
| WWAN + Bluetooth                         | Yes  | Yes       | Yes     | Yes                       |
| Wi-Fi 2.4GHz+ Wi-Fi 5GHz                 | NA   | NA        | NA      | NA                        |
| Wi-Fi 2.4GHz+ Bluetooth                  | NA   | NA        | NA      | NA                        |
| Wi-Fi 5GHz+ Bluetooth                    | NA   | NA        | NA      | NA                        |

**General Note:**

1. The Scaled SAR summation is calculated based on the same configuration and test position.
2. Per KDB 447498 D01, simultaneous transmission SAR is compliant if,
  - i) Scalar SAR summation  $< 1.6\text{W/kg}$ , simultaneously transmission SAR measurement is not necessary.
  - ii)  $\text{SPLSR} = (\text{SAR1} + \text{SAR2})^{1.5} / (\text{min. separation distance, mm})$ , and the peak separation distance is determined from the square root of  $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$ , where  $(x1, y1, z1)$  and  $(x2, y2, z2)$  are the coordinates of the extrapolated peak SAR locations in the zoom scan.
  - iii) If  $\text{SPLSR} \leq 0.04$ , simultaneously transmission SAR measurement is not necessary.

The maximum SAR<sub>1g</sub> Value for WWAN -Antenna

| SAR <sub>1g/10g</sub> (W/kg)<br>Test Position |             | GSM<br>850 | GSM<br>1900 | WCDMA<br>Band II | WCDMA<br>Band IV | WCDMA<br>Band V | LTE<br>FDD 2 | LTE<br>FDD 4 | LTE<br>FDD 5 | LTE<br>FDD 12 | LTE<br>TDD 41 | LTE<br>FDD 66 | LTE<br>FDD 71 | MAX.<br>SAR <sub>1g/10g</sub> |
|-----------------------------------------------|-------------|------------|-------------|------------------|------------------|-----------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|-------------------------------|
| Head                                          | Left Cheek  | 0.128      | 0.121       | 0.261            | 0.174            | 0.167           | 0.324        | 0.240        | 0.228        | 0.145         | 0.222         | 0.254         | 0.187         | 0.324                         |
|                                               | Left Tilt   | 0.052      | 0.106       | 0.217            | 0.160            | 0.075           | 0.307        | 0.235        | 0.102        | 0.056         | 0.175         | 0.273         | 0.077         | 0.307                         |
|                                               | Right Cheek | 0.127      | 0.115       | 0.245            | 0.188            | 0.187           | 0.294        | 0.266        | 0.243        | 0.201         | 0.686         | 0.286         | 0.198         | 0.686                         |
|                                               | Right Tilt  | 0.052      | 0.070       | 0.160            | 0.149            | 0.068           | 0.191        | 0.218        | 0.101        | 0.062         | 0.330         | 0.194         | 0.077         | 0.330                         |
| Body<br>worn                                  | Back Side   | 0.229      | 0.255       | 0.702            | 0.538            | 0.290           | 0.767        | 0.826        | 0.380        | 0.230         | 0.741         | 0.949         | 0.192         | 0.949                         |
|                                               | Front Side  | 0.144      | 0.157       | 0.504            | 0.299            | 0.171           | 0.442        | 0.475        | 0.261        | 0.165         | 0.274         | 0.450         | 0.092         | 0.504                         |
| Hotspot                                       | Back Side   | 0.623      | 1.038       | 1.157            | 1.071            | 0.462           | 0.988        | 0.905        | 0.631        | 0.389         | 0.916         | 0.955         | 0.271         | 1.157                         |
|                                               | Front Side  | 0.331      | 0.558       | 0.523            | 0.450            | 0.286           | 0.466        | 0.712        | 0.396        | 0.261         | 0.152         | 0.518         | 0.254         | 0.712                         |
|                                               | Left Edge   | 0.000      | 0.363       | 0.361            | 0.340            | 0.063           | 0.279        | 0.467        | 0.000        | 0.000         | 0.470         | 0.341         | 0.163         | 0.470                         |
|                                               | Right Edge  | 0.284      | 0.000       | 0.056            | 0.062            | 0.171           | 0.120        | 0.091        | 0.274        | 0.281         | 0.000         | 0.086         | 0.477         | 0.477                         |
|                                               | Top Edge    | 0.000      | 0.000       | 0.000            | 0.000            | 0.000           | 0.000        | 0.000        | 0.000        | 0.000         | 0.102         | 0.000         | 0.000         | 0.102                         |
|                                               | Bottom Edge | 0.226      | 0.658       | 0.732            | 0.955            | 0.131           | 0.720        | 0.722        | 0.000        | 0.108         | 0.000         | 0.945         | 0.106         | 0.955                         |
| Product<br>Specific<br>10-g<br>SAR            | Back Side   | NA         | NA          | NA               | NA               | NA              | NA           | NA           | NA           | NA            | 2.929         | NA            | NA            | 2.929                         |
|                                               | Front Side  | NA         | NA          | NA               | NA               | NA              | NA           | NA           | NA           | NA            | NA            | NA            | NA            | NA                            |
|                                               | Left Edge   | NA         | NA          | NA               | NA               | NA              | NA           | NA           | NA           | NA            | NA            | NA            | NA            | NA                            |
|                                               | Right Edge  | NA         | NA          | NA               | NA               | NA              | NA           | NA           | NA           | NA            | NA            | NA            | NA            | NA                            |
|                                               | Top Edge    | NA         | NA          | NA               | NA               | NA              | NA           | NA           | NA           | NA            | NA            | NA            | NA            | NA                            |
|                                               | Bottom Edge | NA         | NA          | NA               | NA               | NA              | NA           | NA           | NA           | NA            | NA            | NA            | NA            | NA                            |

# About BT and WWAN -Antenna

| SAR <sub>1g</sub> (W/kg)                                                                      |              | Main-antenna | BT    | MAX. $\Sigma$ SAR <sub>1g</sub> |
|-----------------------------------------------------------------------------------------------|--------------|--------------|-------|---------------------------------|
| Test Position                                                                                 |              |              |       |                                 |
| Head                                                                                          | Left, Cheek  | 0.324        | 0.158 | 0.482                           |
|                                                                                               | Left, Tilt   | 0.307        | 0.168 | 0.475                           |
|                                                                                               | Right, Cheek | 0.686        | 0.093 | 0.779                           |
|                                                                                               | Right, Tilt  | 0.330        | 0.093 | 0.423                           |
| Body worn                                                                                     | Back Side    | 0.949        | 0.058 | 1.007                           |
|                                                                                               | Front Side   | 0.504        | 0.034 | 0.538                           |
| Hotspot                                                                                       | Back Side    | 1.157        | 0.058 | 1.215                           |
|                                                                                               | Front Side   | 0.712        | 0.034 | 0.746                           |
|                                                                                               | Left Edge    | 0.470        | 0.003 | 0.473                           |
|                                                                                               | Right Edge   | 0.477        | 0.012 | 0.489                           |
|                                                                                               | Top Edge     | 0.102        | 0.032 | 0.134                           |
|                                                                                               | Bottom Edge  | 0.955        | 0.000 | 0.955                           |
| Product Specific 10-g SAR                                                                     | Back Side    | 2.929        | NA    | 2.929                           |
|                                                                                               | Front Side   | NA           | NA    | NA                              |
|                                                                                               | Left Edge    | NA           | NA    | NA                              |
|                                                                                               | Right Edge   | NA           | NA    | NA                              |
|                                                                                               | Top Edge     | NA           | NA    | NA                              |
|                                                                                               | Bottom Edge  | NA           | NA    | NA                              |
| Note: 1.The value with blue color is the maximum $\Sigma$ SAR <sub>1g</sub> Value.            |              |              |       |                                 |
| 2.MAX. $\Sigma$ SAR <sub>1g</sub> =Unlicensed SAR <sub>MAX</sub> +Licensed SAR <sub>MAX</sub> |              |              |       |                                 |

MAX.  $\Sigma$ SAR<sub>1g</sub> =1.215W/kg<1.6W/kg and MAX.  $\Sigma$ SAR<sub>10g</sub> =2.929W/kg<4 W/kg, so the Simultaneous transimition SAR with volum scan are not required for BT and Main-Antenna.



## About Wi-Fi and WWAN -Antenna

| SAR <sub>1g</sub> (W/kg)<br>Test Position |              | Main-<br>antenna | Wi-Fi<br>2.4G | Wi-Fi<br>(U-NII-1) | Wi-Fi<br>(U-NII-3) | MAX.<br>ΣSAR <sub>1g</sub> |
|-------------------------------------------|--------------|------------------|---------------|--------------------|--------------------|----------------------------|
| Head                                      | Left, Cheek  | 0.324            | <b>1.244</b>  | 0.897              | 0.768              | 1.568                      |
|                                           | Left, Tilt   | 0.307            | 1.224         | <b>1.260</b>       | 1.056              | 1.567                      |
|                                           | Right, Cheek | 0.686            | 0.639         | <b>0.849</b>       | 0.663              | 1.535                      |
|                                           | Right, Tilt  | 0.330            | 0.608         | <b>1.092</b>       | 0.960              | 1.422                      |
| Body worn                                 | Back Side    | 0.949            | 0.167         | <b>0.600</b>       | 0.184              | 1.549                      |
|                                           | Front Side   | 0.504            | 0.098         | <b>0.300</b>       | 0.118              | 0.804                      |
| Hotspot                                   | Back Side    | 1.157            | 0.360         | <b>0.434</b>       | 0.390              | 1.591                      |
|                                           | Front Side   | 0.712            | 0.222         | <b>0.220</b>       | 0.119              | 0.934                      |
|                                           | Left Edge    | 0.470            | 0.042         | <b>0.092</b>       | 0.021              | 0.562                      |
|                                           | Right Edge   | 0.477            | <b>0.081</b>  | 0.043              | 0.055              | 0.558                      |
|                                           | Top Edge     | 0.102            | 0.272         | <b>1.324</b>       | 0.762              | 1.426                      |
|                                           | Bottom Edge  | 0.955            | 0.000         | 0.000              | 0.000              | 0.955                      |
| Product<br>Specific<br>10-g SAR           | Back Side    | 2.929            | NA            | NA                 | NA                 | 2.929                      |
|                                           | Front Side   | NA               | NA            | NA                 | NA                 | NA                         |
|                                           | Left Edge    | NA               | NA            | NA                 | NA                 | NA                         |
|                                           | Right Edge   | NA               | NA            | NA                 | NA                 | NA                         |
|                                           | Top Edge     | NA               | NA            | NA                 | NA                 | NA                         |
|                                           | Bottom Edge  | NA               | NA            | NA                 | NA                 | NA                         |

Note: 1.The value with blue color is the maximum ΣSAR<sub>1g</sub>Value.  
2.MAX. ΣSAR<sub>1g</sub> =Unlicensed SAR<sub>MAX</sub> +Licensed SAR<sub>MAX</sub>

MAX. ΣSAR<sub>1g</sub> = 1.591W/kg<1.6W/kg and MAX. ΣSAR<sub>10g</sub> = 2.929W/kg<4 W/kg, so the Simultaneous transimition SAR with volum scan are not required for Wi-Fi and Main-Antenna.



## 11 Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is  $< 1.5$  W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528- 2013 is not required in SAR reports submitted for equipment approval. This also applies to the 10-g SAR required for phablets in KDB Publication 648474.

## ANNEX A: Test Layout



### Tissue Simulating Liquids

For the measurement of the field distribution inside the flat phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For Head and Body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Picture 3 and Picture 4.



Picture 3: liquid depth in the head Phantom



Picture 4: Liquid depth in the flat Phantom

## ANNEX B: System Check Results

### Plot 1 System Performance Check at 750 MHz TSL

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3

Date: 9/29/2021

Communication System: CW (0); Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 750 \text{ MHz}$ ;  $\sigma = 0.88 \text{ S/m}$ ;  $\epsilon_r = 42.3$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3^\circ\text{C}$  Liquid Temperature:  $21.5^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=15mm, Pin=250mW/Area Scan (4x12x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.29 W/kg

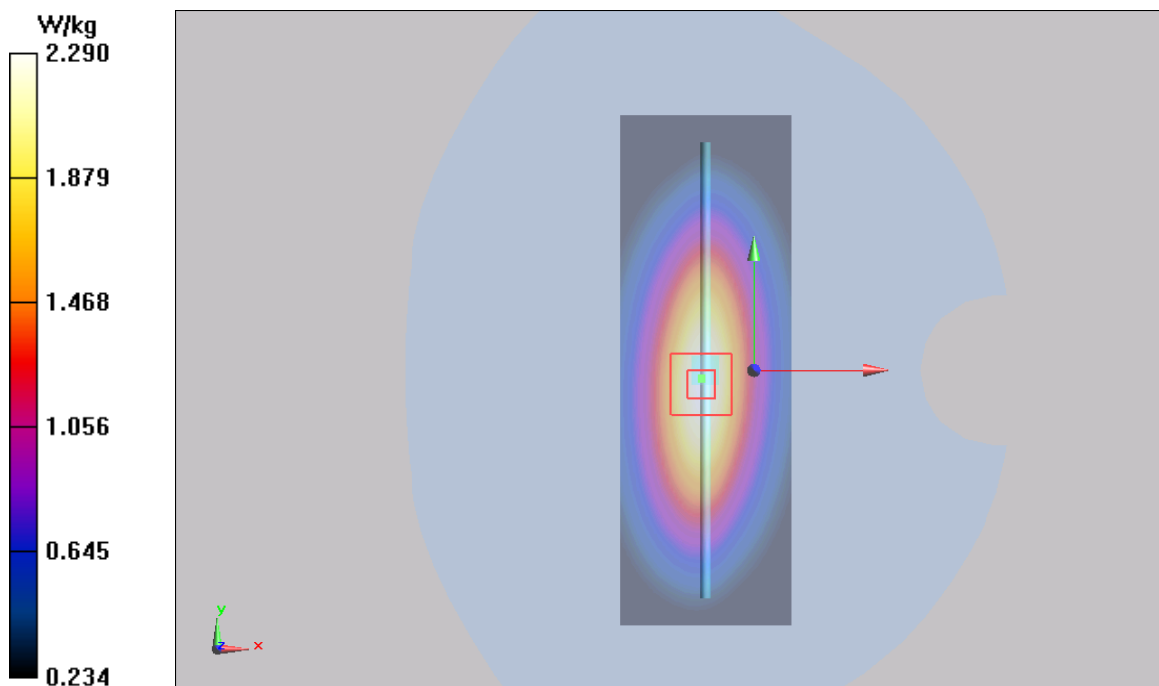
**d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 50.653 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.16 W/kg

**SAR(1 g) = 2.13 W/kg; SAR(10 g) = 1.41 W/kg**

Maximum value of SAR (measured) = 2.29 W/kg



## Plot 2 System Performance Check at 835 MHz TSL

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2**

Date: 9/28/2021

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.88 \text{ S/m}$ ;  $\epsilon_r = 41.4$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3^\circ\text{C}$       Liquid Temperature:  $21.5^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=15mm, Pin=250mW/Area Scan (4x12x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 2.64 mW/g

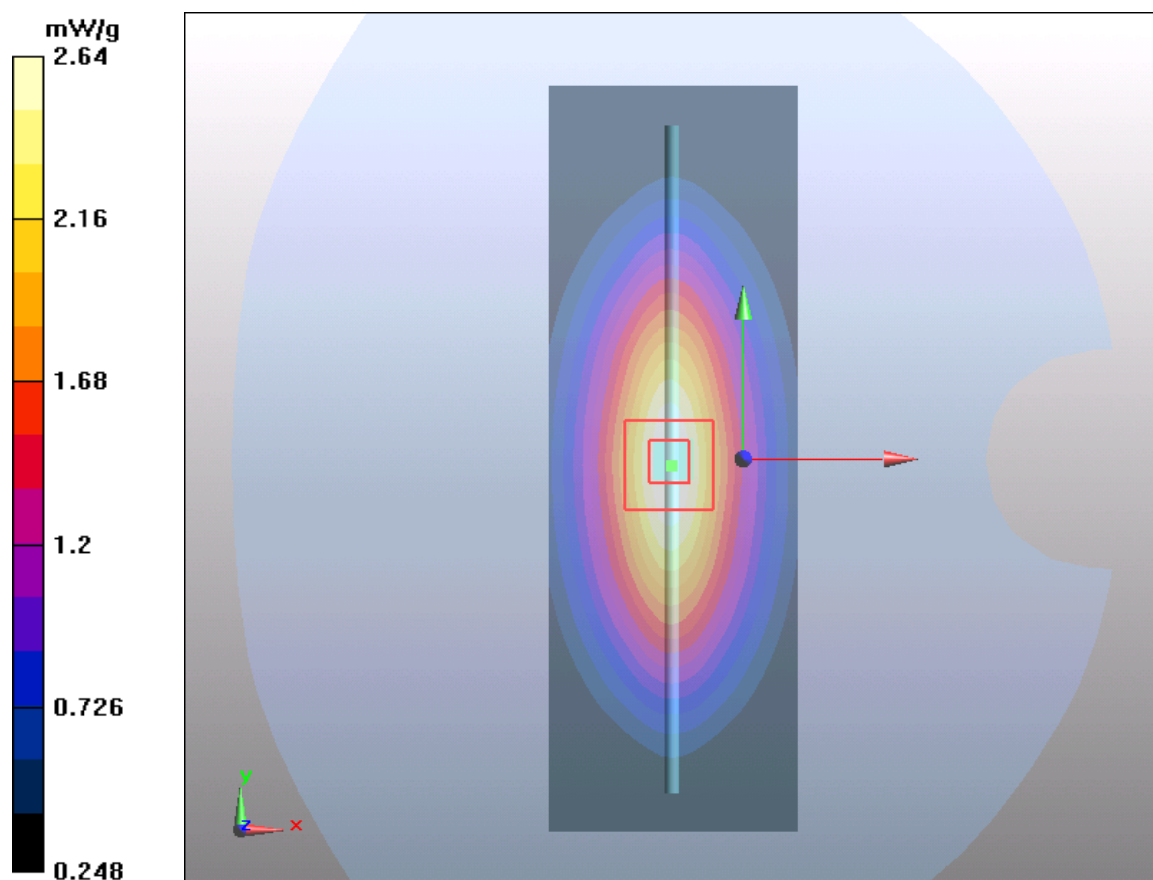
**d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 54.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.67 W/kg

**SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g**

Maximum value of SAR (measured) = 2.64 mW/g



### Plot 3 System Performance Check at 1750 MHz TSL

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2**

Date: 9/30/2021

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1750$  MHz;  $\sigma = 1.34$  S/m;  $\epsilon_r = 40.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=10mm, Pin=250mW/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 9.78 mW/g

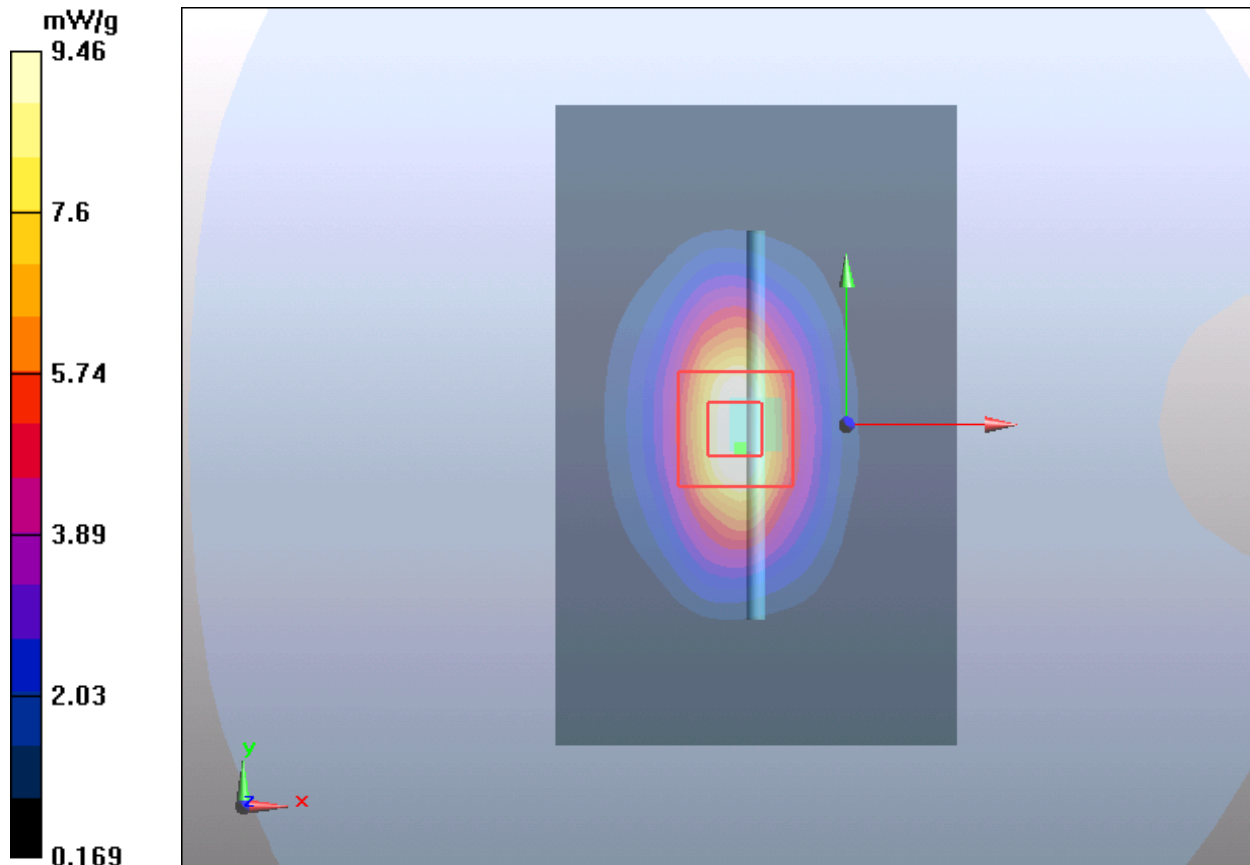
**d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 80 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 15.5 W/kg

**SAR(1 g) = 8.95 mW/g; SAR(10 g) = 4.5 mW/g**

Maximum value of SAR (measured) = 9.46 mW/g



## Plot 4 System Performance Check at 1900 MHz TSL

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2**

Date: 10/1/2021

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.41$  S/m;  $\epsilon_r = 40.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=10mm, Pin=250mW/Area Scan (4x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 11.3 mW/g

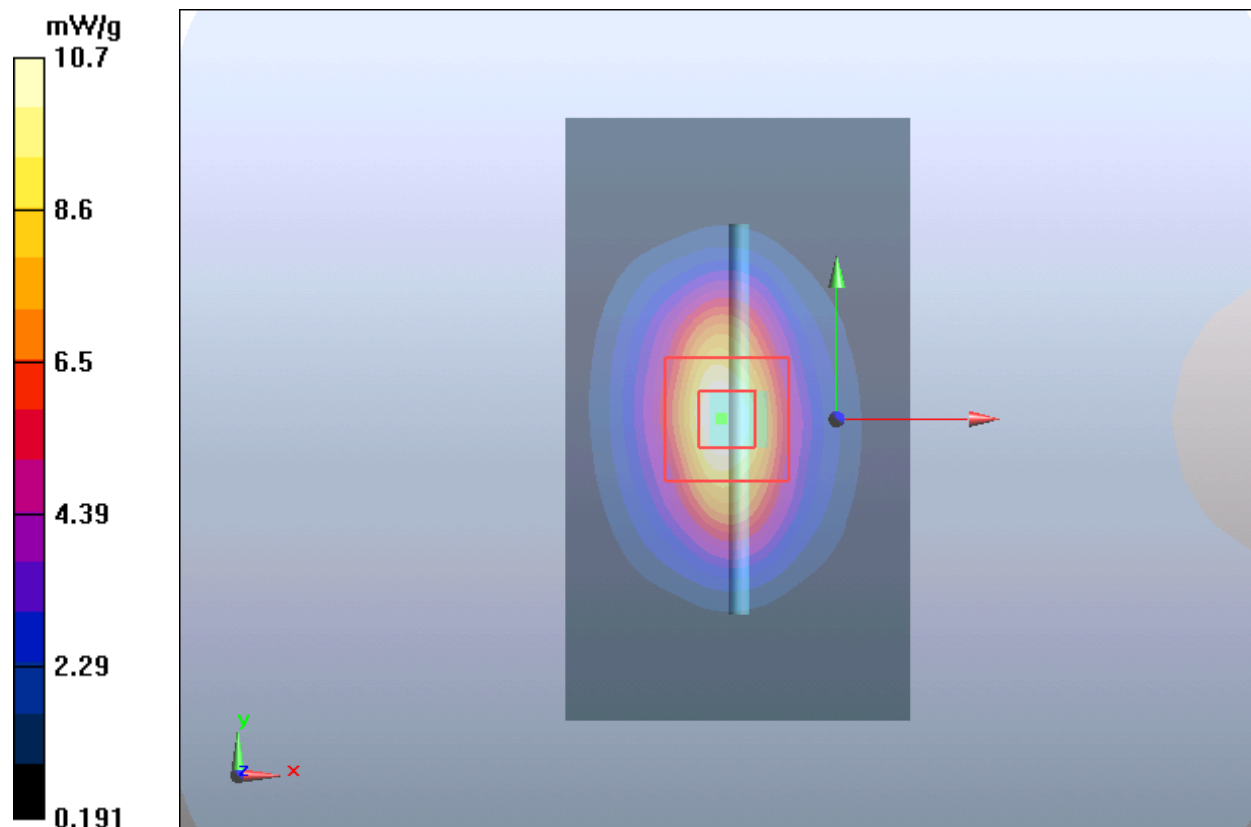
**d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 17.8 W/kg

**SAR(1 g) = 9.88 mW/g; SAR(10 g) = 4.9 mW/g**

Maximum value of SAR (measured) = 10.7 mW/g



## Plot 5 System Performance Check at 2450 MHz TSL

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2**

Date: 10/2/2021

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.81$  S/m;  $\epsilon_r = 38.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C

Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=10mm, Pin=250mW/Area Scan (4x7x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 18.2 mW/g

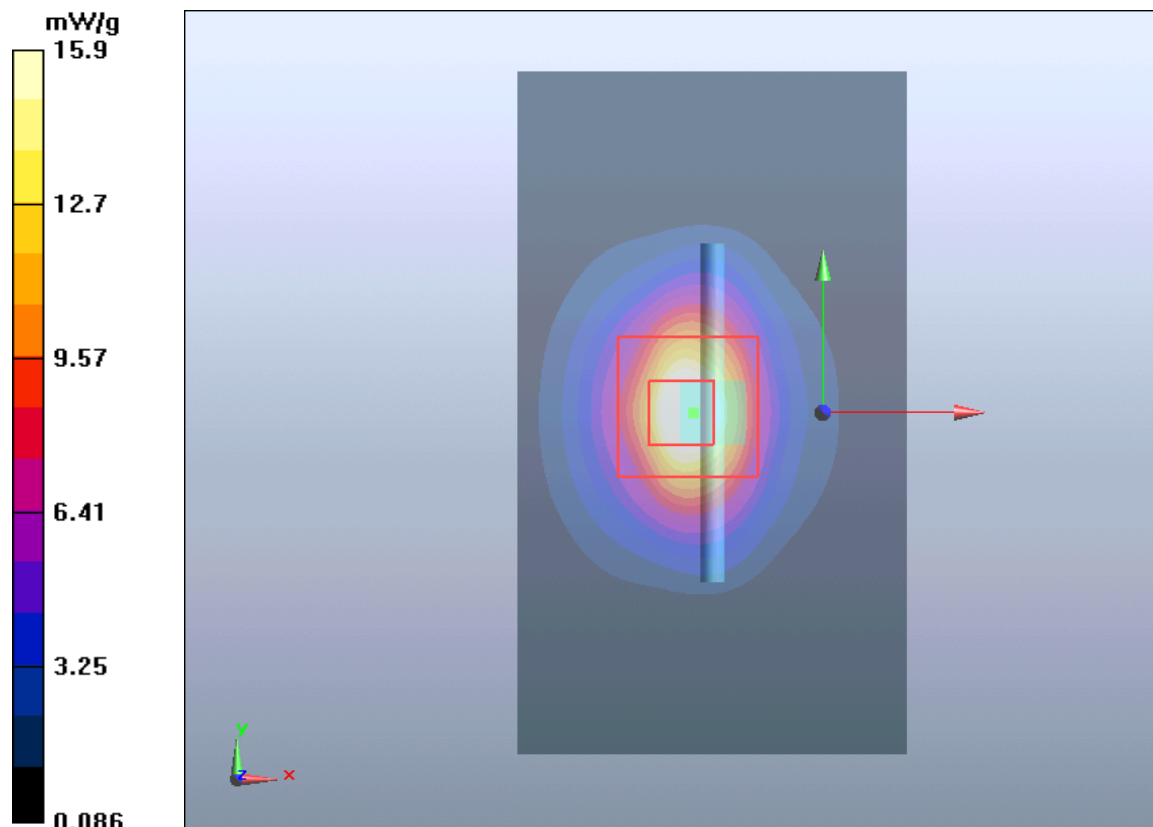
**d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 30 W/kg

**SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g**

Maximum value of SAR (measured) = 15.9 mW/g



## Plot 6 System Performance Check at 2600 MHz TSL

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2**

Date:10/9/2021

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 2600$  MHz;  $\sigma = 1.94$  S/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=10mm, Pin=250mW/Area Scan (4x7x1):** Measurement grid:dx=12mm, dy=12mm

Maximum value of SAR (measured) = 17.59 mW/g

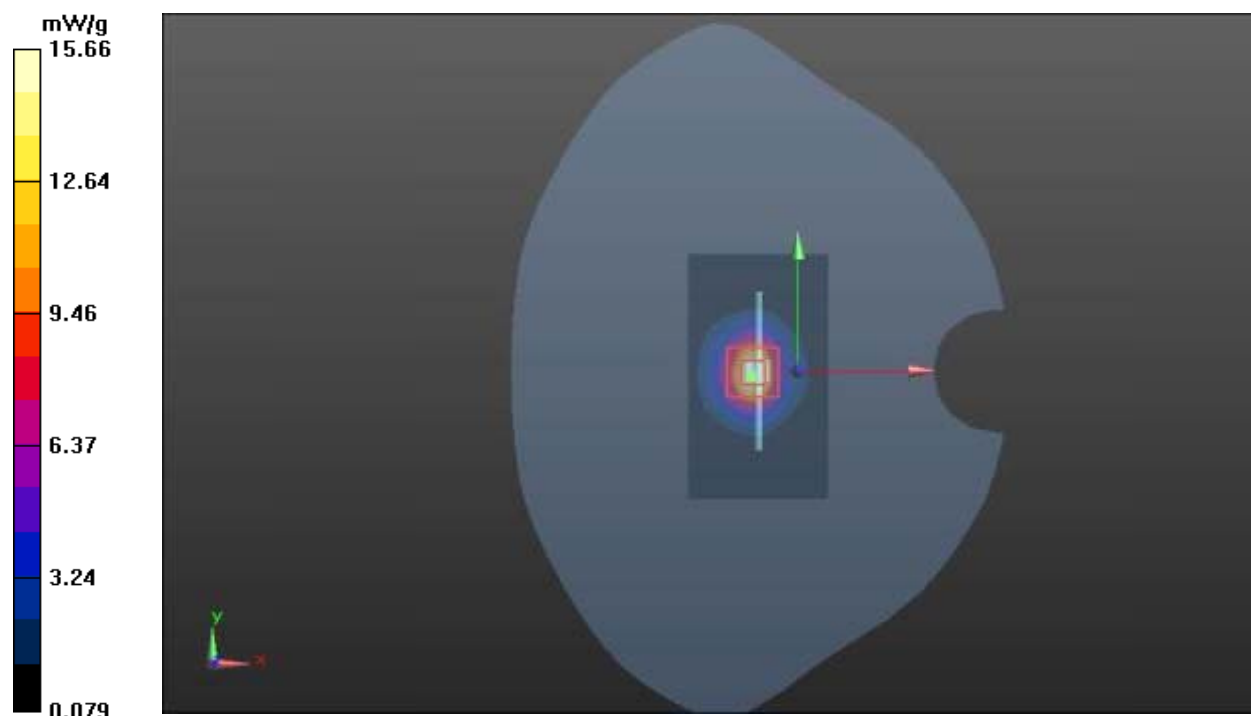
**d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.998 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 31.858 W/kg

**SAR(1 g) = 13.88 mW/g; SAR(10 g) = 6.09 mW/g**

Maximum value of SAR (measured) = 15.66 mW/g



## Plot 7 System Performance Check at 5250 MHz TSL

**DUT: Dipole 5250 MHz; Type: D5GHzV2; Serial: D5GHzV2**

Date: 10/14/2021

Communication System: CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.80$  S/m;  $\epsilon_r = 35.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=10mm, Pin=100mW/Area Scan (6x10x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 9.14 mW/g

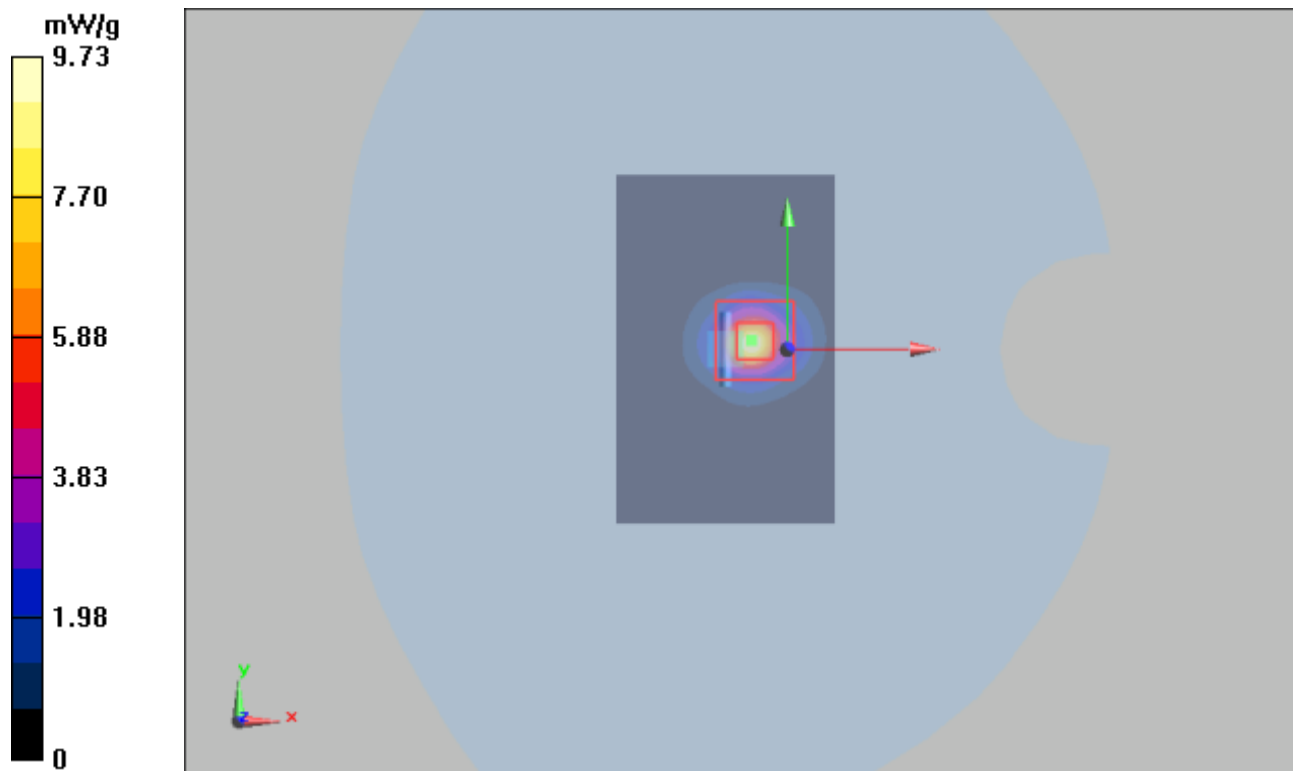
**d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 33.6 V/m; Power Drift = -0.095 dB

Peak SAR (extrapolated) = 52.2 W/kg

**SAR(1 g) = 7.87 mW/g; SAR(10 g) = 2.25 mW/g**

Maximum value of SAR (measured) = 9.73 mW/g



## Plot 8 System Performance Check at 5750 MHz TSL

**DUT: Dipole 5750 MHz; Type: D5GHzV2; Serial: D5GHzV2**

Date: 10/21/2021

Communication System: CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.21$  S/m;  $\epsilon_r = 34.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.04, 5.04, 5.04); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**d=10mm, Pin=100mW/Area Scan (6x10x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 8.31 mW/g

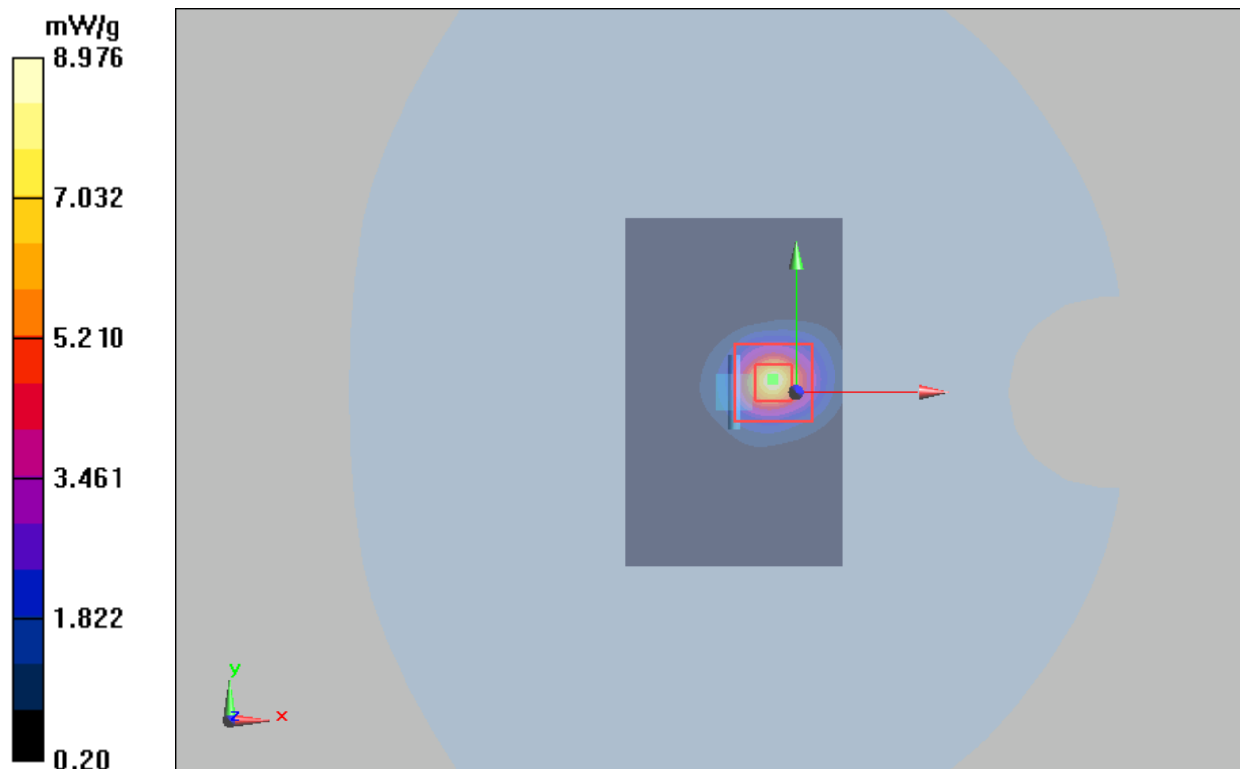
**d=10mm, Pin=100mW/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 23.1 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 23.4 W/kg

**SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.27 mW/g**

Maximum value of SAR (measured) = 8.976 mW/g



## ANNEX C: Highest Graph Results

### Plot 9 GSM 850 Left Cheek Middle

Date: 9/28/2021

Communication System: UID 0, GSM (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 836.6$  MHz;  $\sigma = 0.953$  S/m;  $\epsilon_r = 39.762$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Cheek Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.132 W/kg

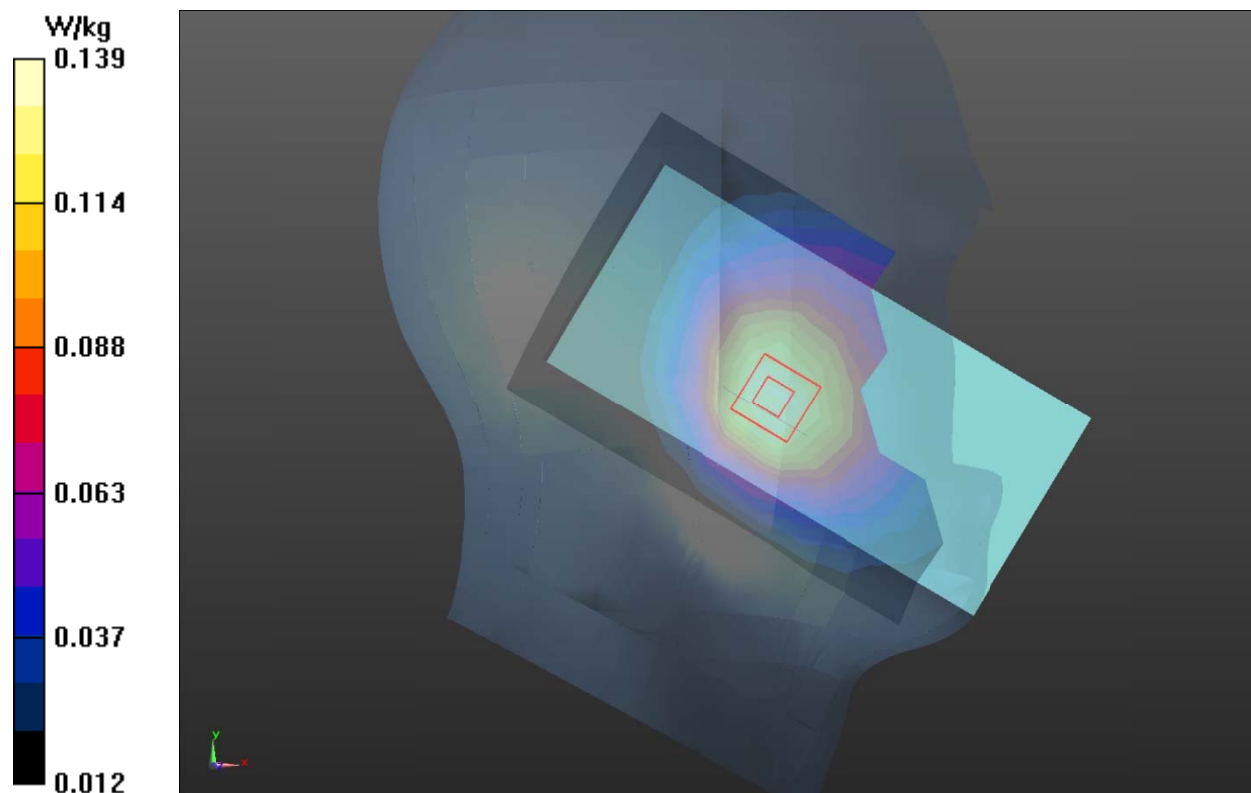
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.894 V/m; Power Drift = 0.069 dB

Peak SAR (extrapolated) = 0.151 W/kg

**SAR(1 g) = 0.118 W/kg; SAR(10 g) = 0.089 W/kg**

Maximum value of SAR (measured) = 0.139 W/kg



## Plot 10 GSM 1900 Left Cheek Middle

Date: 10/1/2021

Communication System: UID 0, GSM (0); Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.42$  S/m;  $\epsilon_r = 38.948$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Cheek Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.143 W/kg

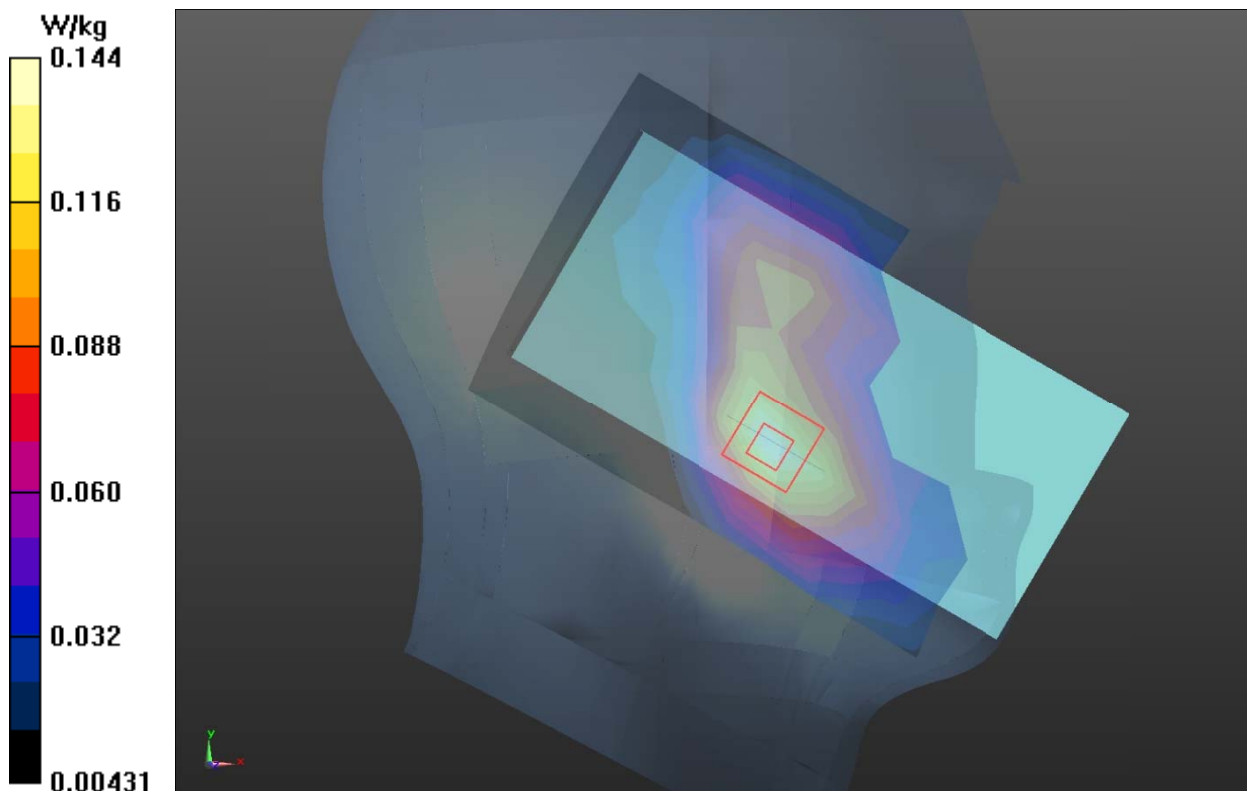
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.419 V/m; Power Drift = 0.026 dB

Peak SAR (extrapolated) = 0.173 W/kg

**SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.067 W/kg**

Maximum value of SAR (measured) = 0.144 W/kg



## Plot 11 UMTS Band II Left Cheek Middle

Date: 10/12021

Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.42$  S/m;  $\epsilon_r = 38.948$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Cheek Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.311 W/kg

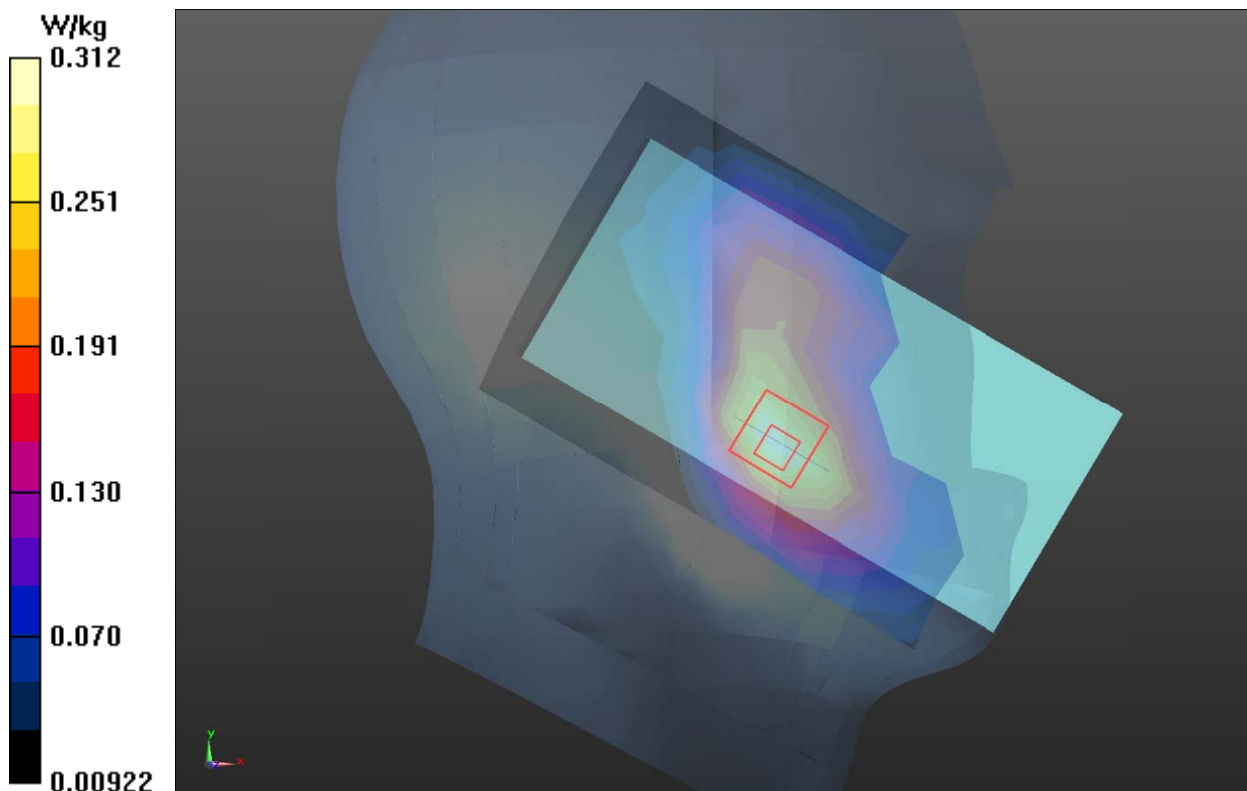
**Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.003 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.373 W/kg

**SAR(1 g) = 0.229 W/kg; SAR(10 g) = 0.143 W/kg**

Maximum value of SAR (measured) = 0.312 W/kg



## Plot 12 UMTS Band IV Right Cheek Middle

Date: 9/30/2021

Communication System: UID 0, WCDMA (0); Frequency: 1732.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1732.6$  MHz;  $\sigma = 1.312$  S/m;  $\epsilon_r = 39.365$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.209 W/kg

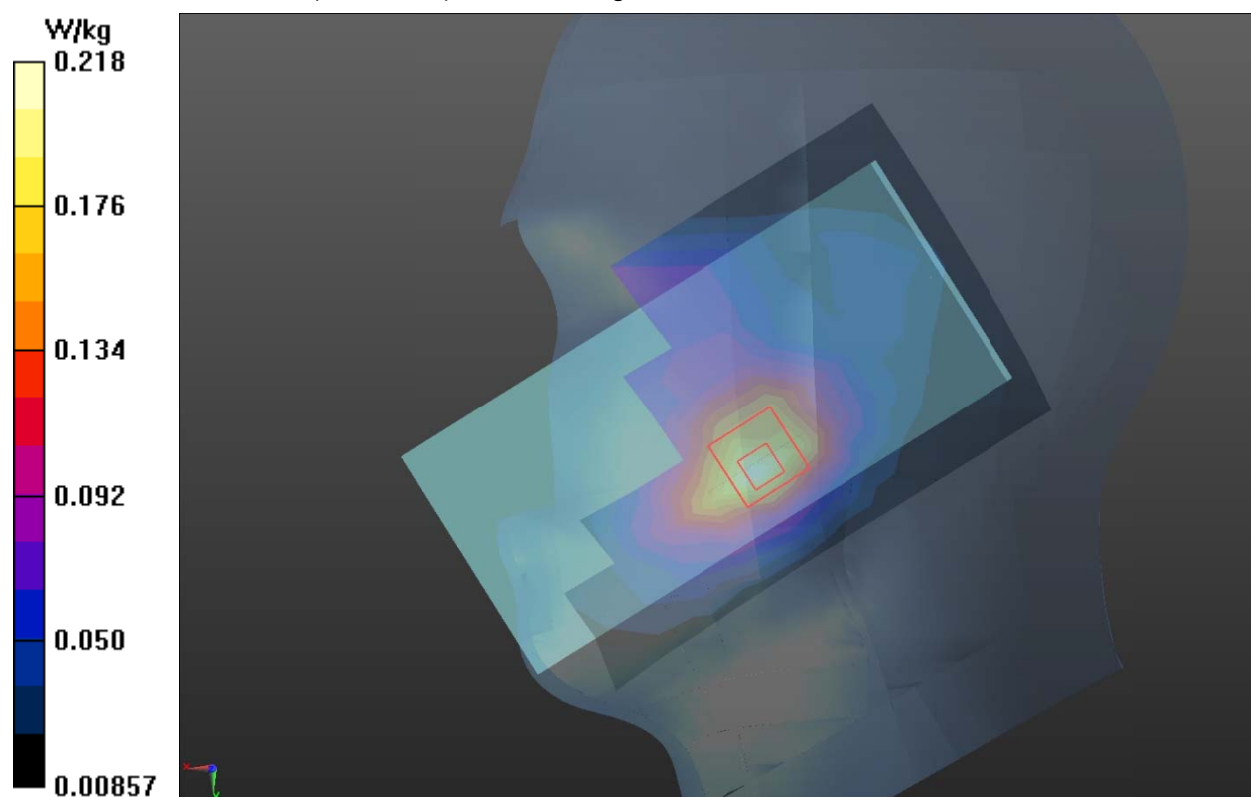
**Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.510 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.258 W/kg

**SAR(1 g) = 0.166 W/kg; SAR(10 g) = 0.106 W/kg**

Maximum value of SAR (measured) = 0.218 W/kg



## Plot 13 UMTS Band V Right Cheek Middle

Date: 9/30/2021

Communication System: UID 0, WCDMA (0); Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 836.6$  MHz;  $\sigma = 0.953$  S/m;  $\epsilon_r = 39.762$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.177 W/kg

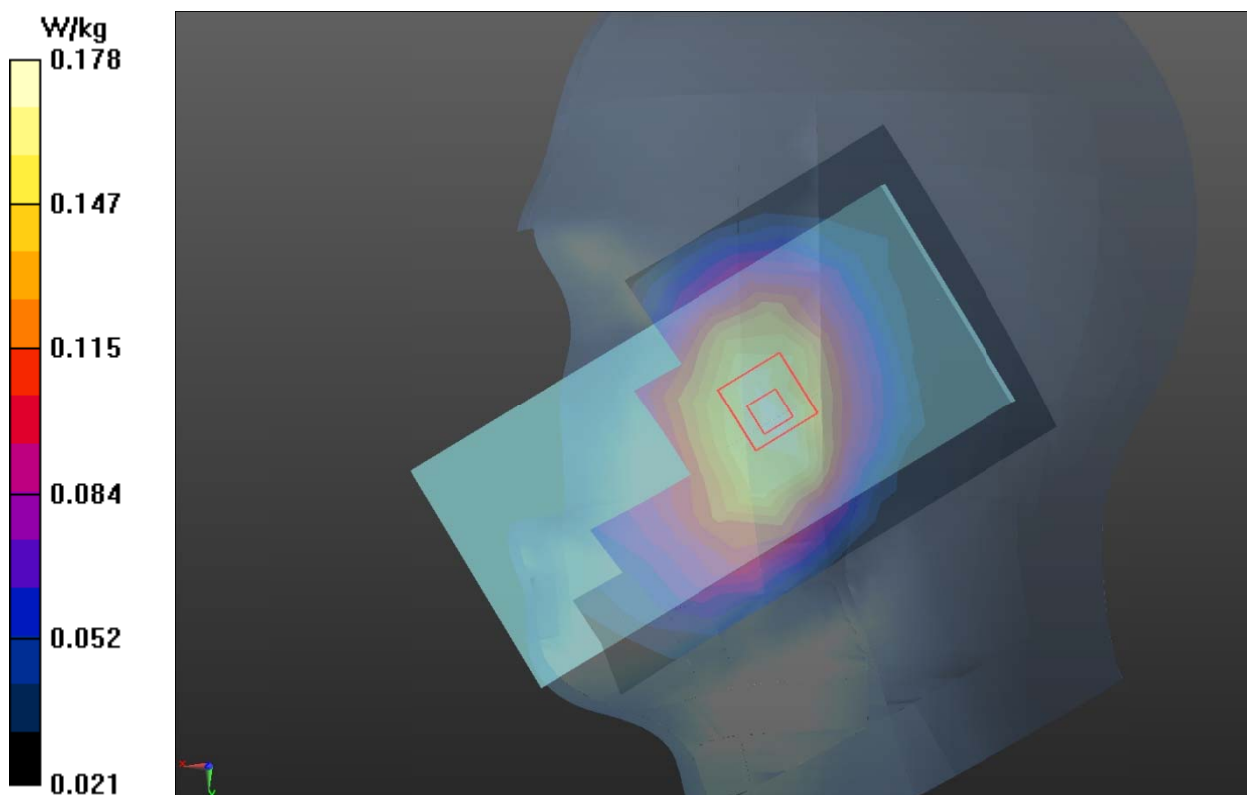
**Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.511 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.191 W/kg

**SAR(1 g) = 0.151 W/kg; SAR(10 g) = 0.116 W/kg**

Maximum value of SAR (measured) = 0.178 W/kg



## Plot 14LTE Band 2 Left Cheek Low

Date: 10/1/2021

Communication System: UID 0, LTE (0); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1860$  MHz;  $\sigma = 1.407$  S/m;  $\epsilon_r = 39.071$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Cheek Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.359 W/kg

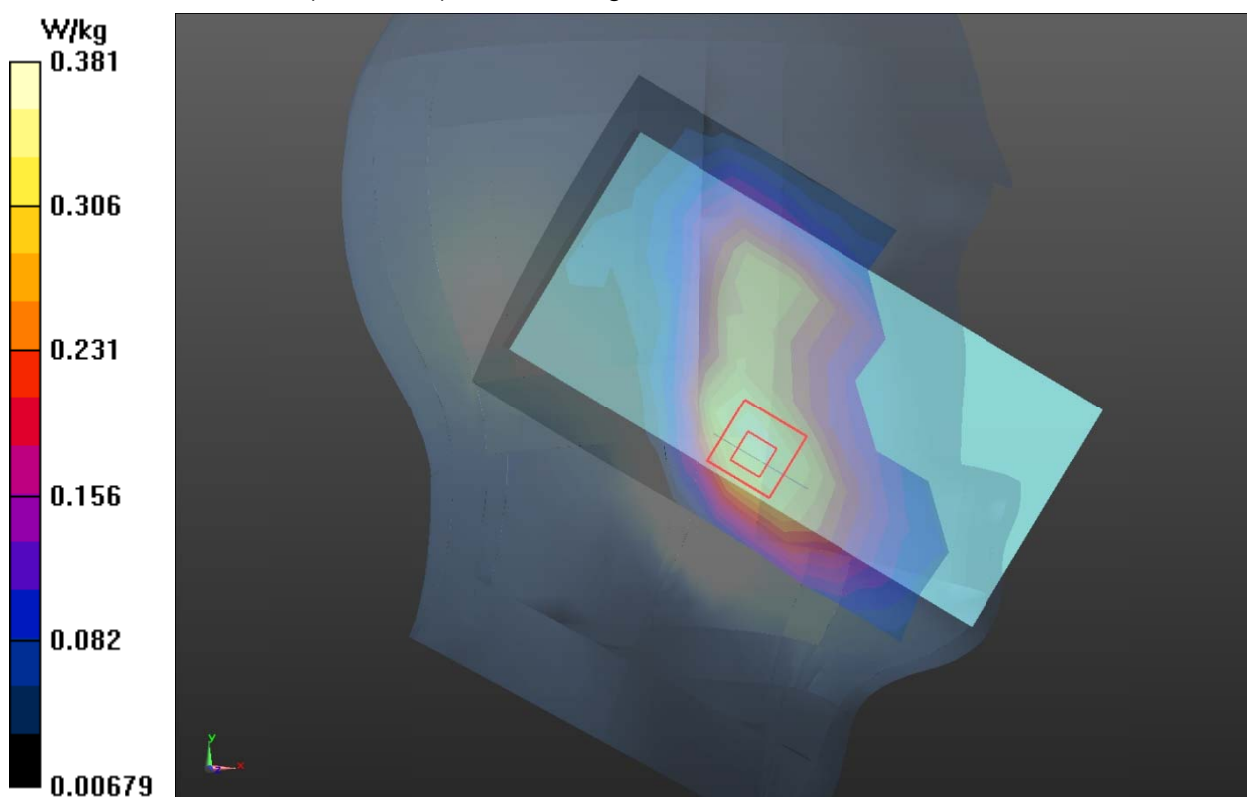
**Left Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.834 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.433 W/kg

**SAR(1 g) = 0.282 W/kg; SAR(10 g) = 0.182 W/kg**

Maximum value of SAR (measured) = 0.381 W/kg



## Plot 15 LTE Band 4 Right Cheek Low

Date: 9/30/2021

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.303$  S/m;  $\epsilon_r = 39.467$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.262 W/kg

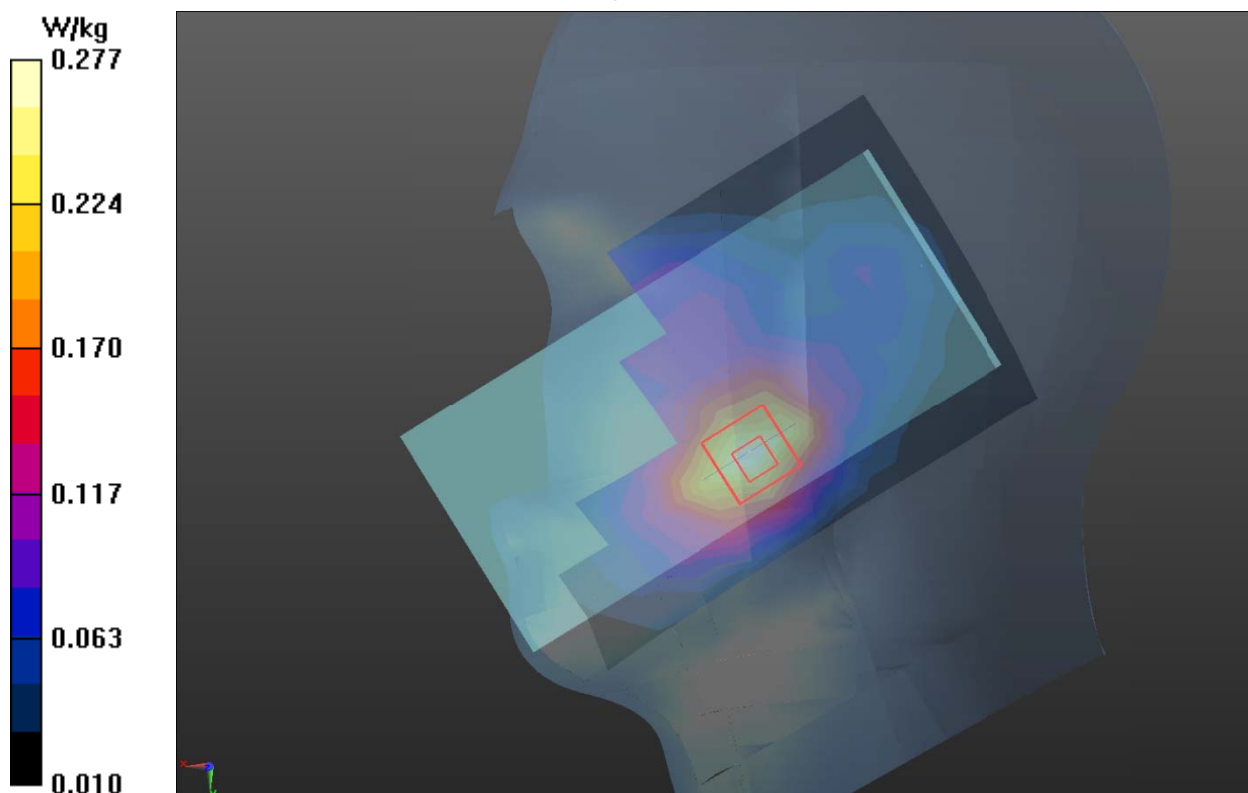
**Right Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.138 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.327 W/kg

**SAR(1 g) = 0.220 W/kg; SAR(10 g) = 0.141 W/kg**

Maximum value of SAR (measured) = 0.277 W/kg



## Plot 16 LTE Band 5 Right Cheek High

Date: 9/30/2021

Communication System: UID 0, LTE (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 844 \text{ MHz}$ ;  $\sigma = 0.958 \text{ S/m}$ ;  $\epsilon_r = 39.728$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3^\circ\text{C}$  Liquid Temperature:  $21.5^\circ\text{C}$

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek High/Area Scan (8x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) =  $0.221 \text{ W/kg}$

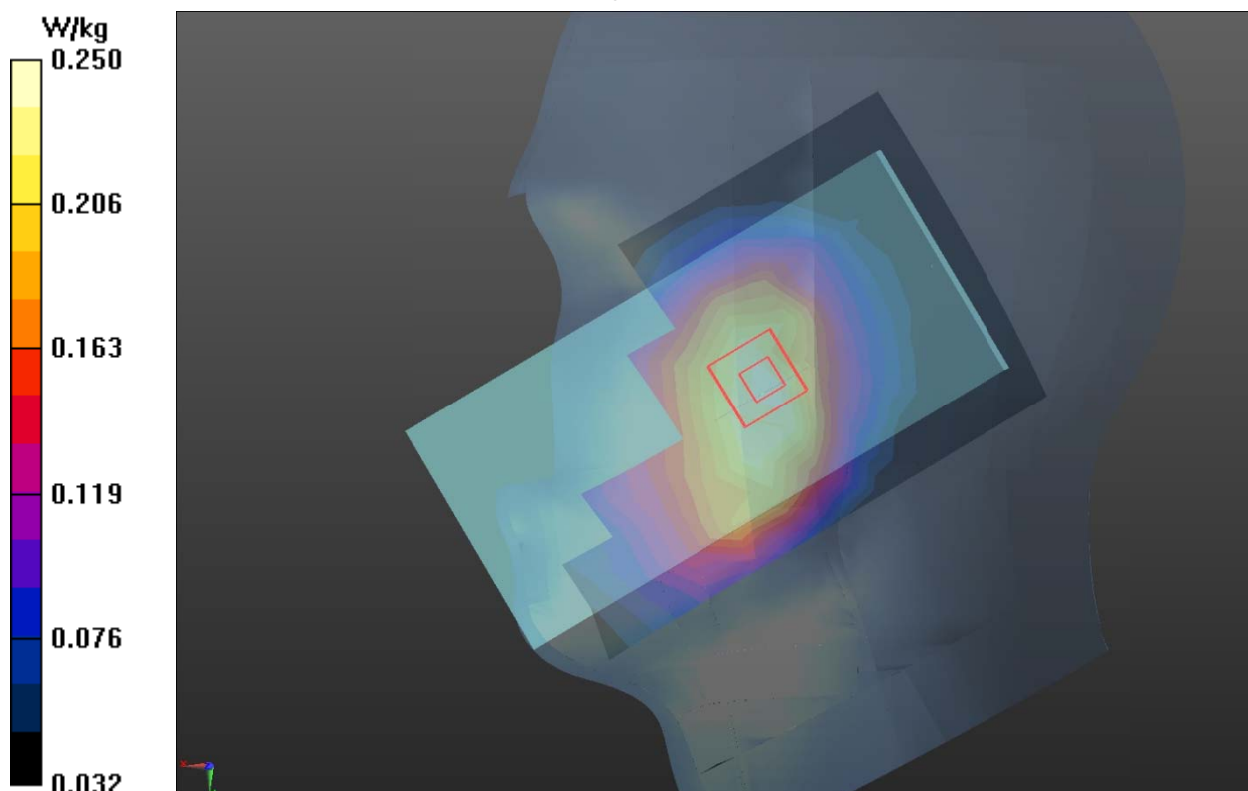
**Right Cheek High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.945 \text{ V/m}$ ; Power Drift =  $-0.11 \text{ dB}$

Peak SAR (extrapolated) =  $0.270 \text{ W/kg}$

**SAR(1 g) =  $0.212 \text{ W/kg}$ ; SAR(10 g) =  $0.162 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.250 \text{ W/kg}$



## Plot 17 LTE Band 12 Right Cheek Low

Date: 9/29/2021

Communication System: UID 0, LTE (0); Frequency: 704 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 704$  MHz;  $\sigma = 0.867$  S/m;  $\epsilon_r = 40.747$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.208 W/kg

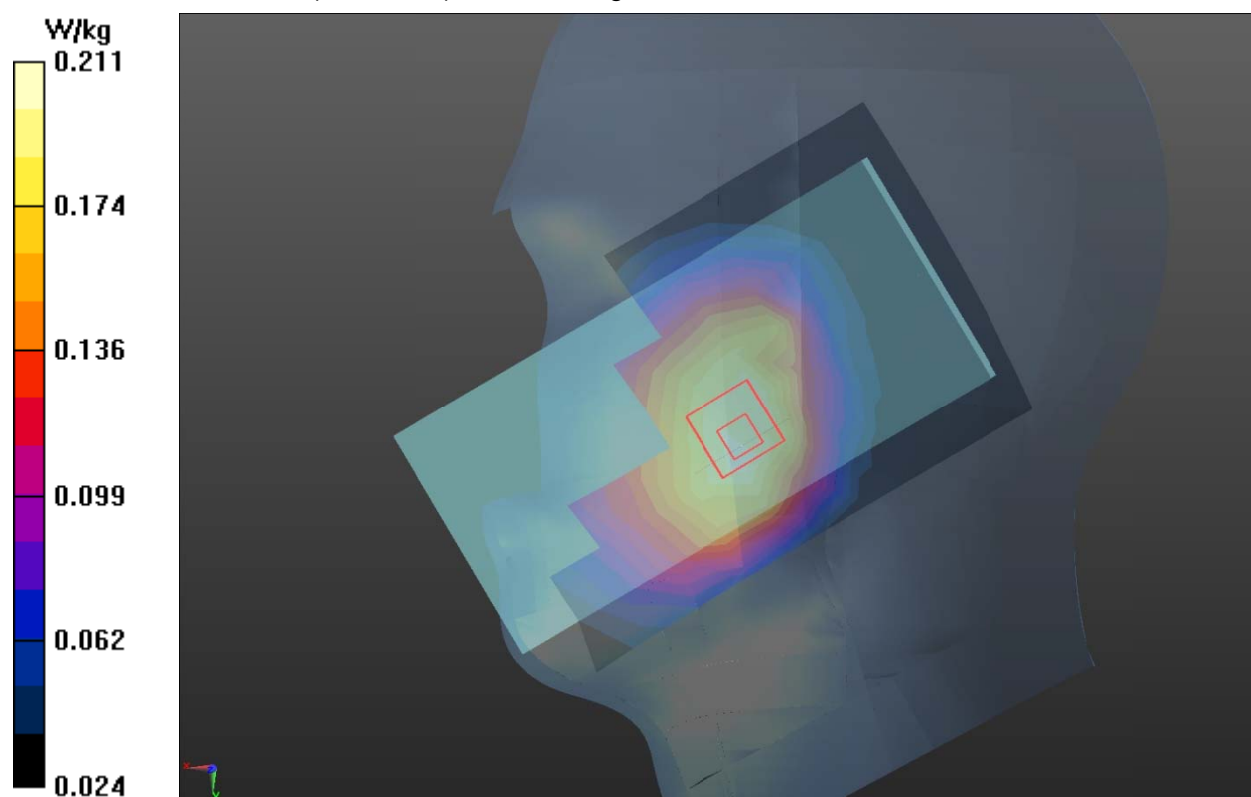
**Right Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.894 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.230 W/kg

**SAR(1 g) = 0.175 W/kg; SAR(10 g) = 0.137 W/kg**

Maximum value of SAR (measured) = 0.211 W/kg



## Plot 18 LTE Band 41 Right Cheek Low

Date:10/9/2021

Communication System: UID 0, LTE (0); Frequency: 2506 MHz;Duty Cycle: 1:1.58

Medium parameters used:  $f = 2506$  MHz;  $\sigma = 1.905$  S/m;  $\epsilon_r = 37.414$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek Low/Area Scan (10x18x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 1.07 W/kg

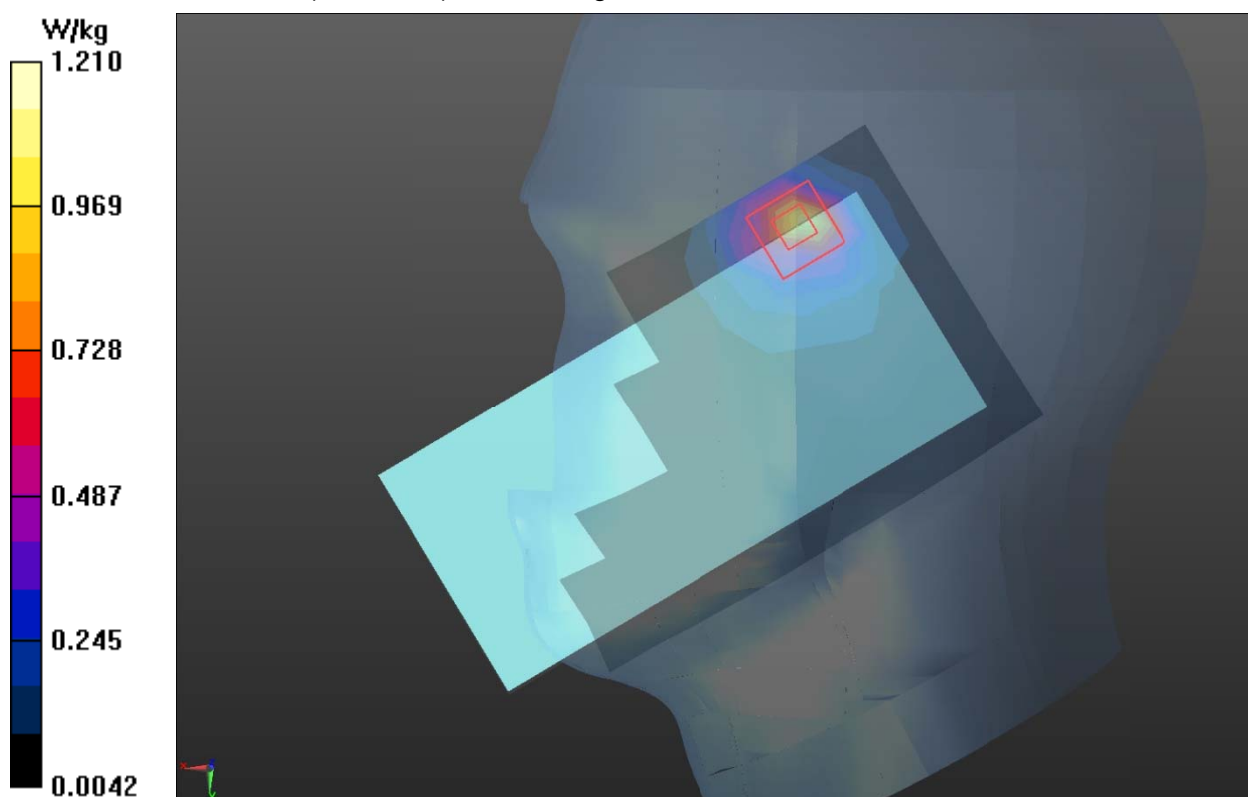
**Right Cheek Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.655 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 1.56 W/kg

**SAR(1 g) = 0.640 W/kg; SAR(10 g) = 0.283 W/kg**

Maximum value of SAR (measured) = 1.21 W/kg



## Plot 19 LTE Band 66 Right Cheek Low

Date: 9/30/2021

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.303$  S/m;  $\epsilon_r = 39.467$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.292 W/kg

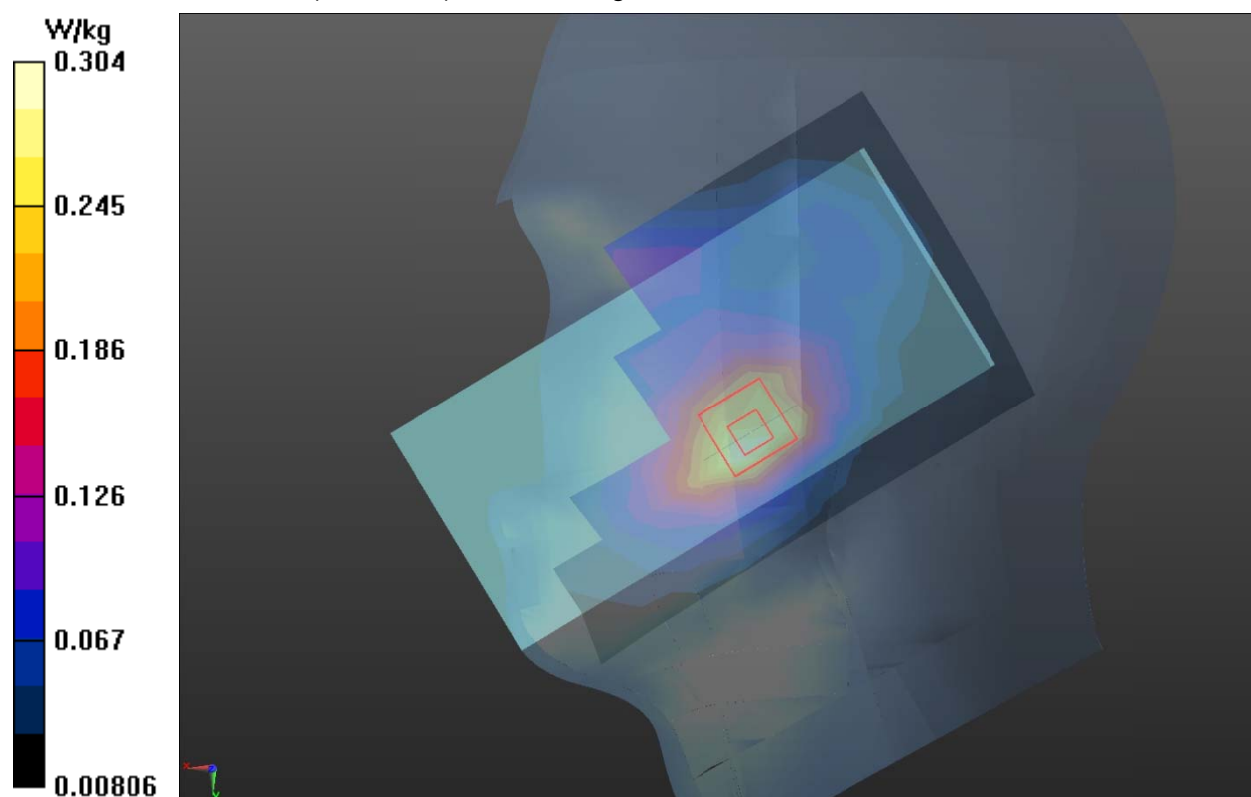
**Right Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.103 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 0.344 W/kg

**SAR(1 g) = 0.229 W/kg; SAR(10 g) = 0.145 W/kg**

Maximum value of SAR (measured) = 0.304 W/kg



## Plot 20 LTE Band 71 Right Cheek Low

Date: 9/29/2021

Communication System: UID 0, LTE (0); Frequency: 673 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 673$  MHz;  $\sigma = 0.847$  S/m;  $\epsilon_r = 40.954$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Cheek Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.197 W/kg

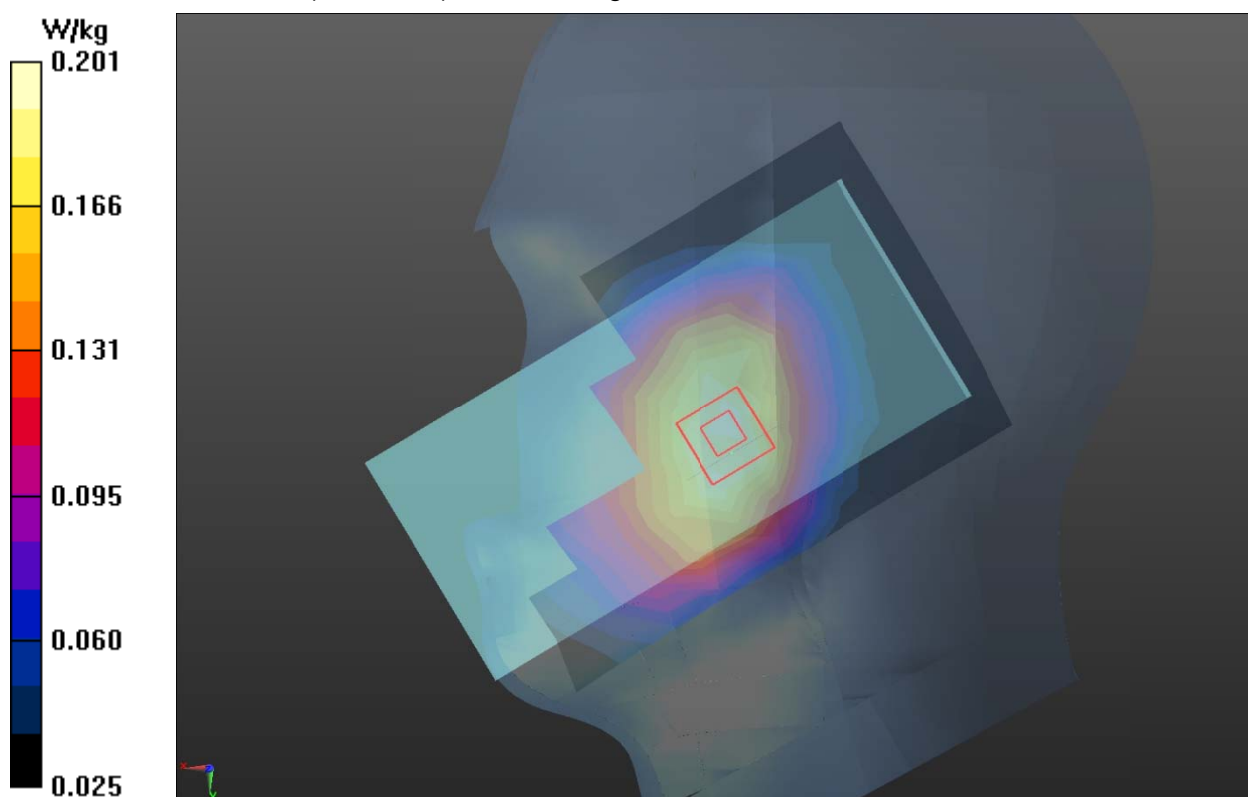
**Right Cheek Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.043 V/m; Power Drift = 0.022 dB

Peak SAR (extrapolated) = 0.220 W/kg

**SAR(1 g) = 0.171 W/kg; SAR(10 g) = 0.135 W/kg**

Maximum value of SAR (measured) = 0.201 W/kg



## Plot 21 802.11b Left Cheek Middle

Date: 10/2/2021

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.856$  S/m;  $\epsilon_r = 40.836$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Cheek Middle/Area Scan (10x18x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 1.19 W/kg

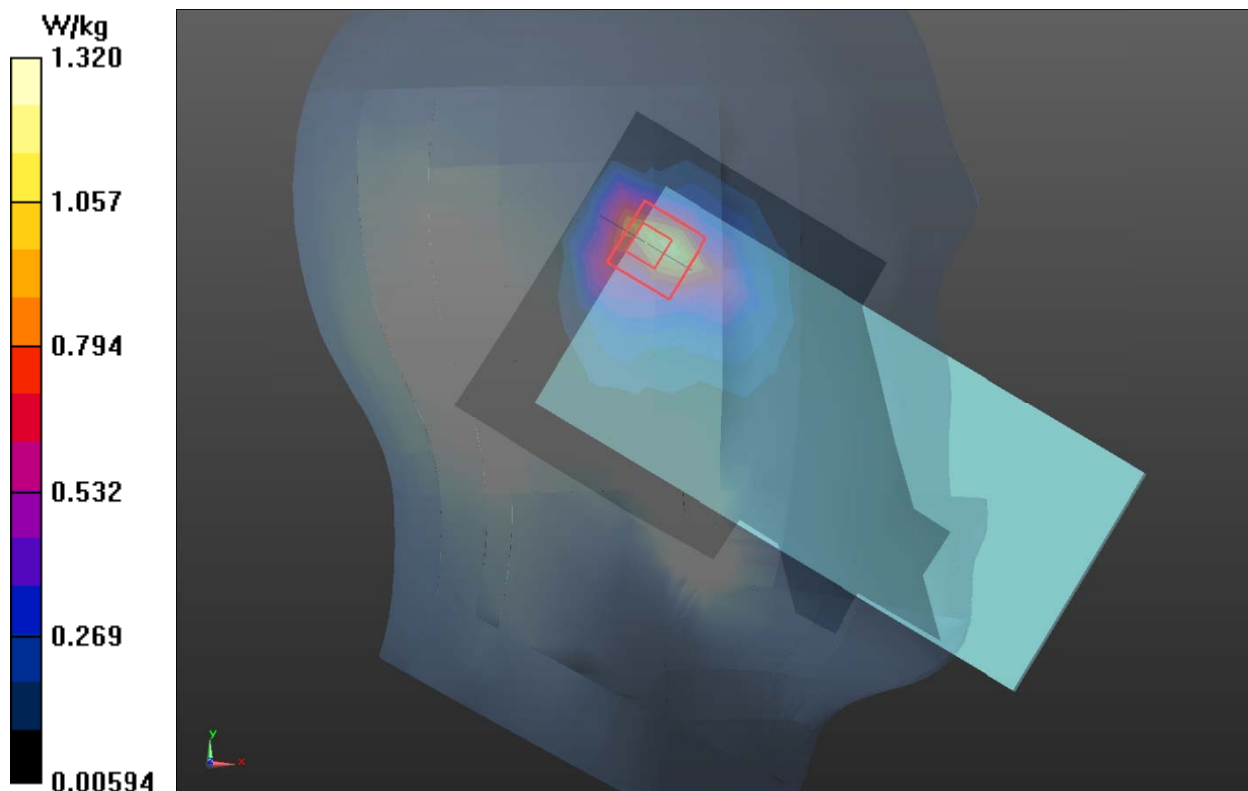
**Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.46 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 2.76 W/kg

**SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.538 W/kg**

Maximum value of SAR (measured) = 1.32 W/kg



## Plot 22 802.11a U-NII-1 Left Tilt Low

Date: 10/14/2021

Communication System: UID 0, 802.11a (0); Frequency: 5180 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 4.75$  S/m;  $\epsilon_r = 36.766$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Tilt Low/Area Scan (12x21x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.62 W/kg

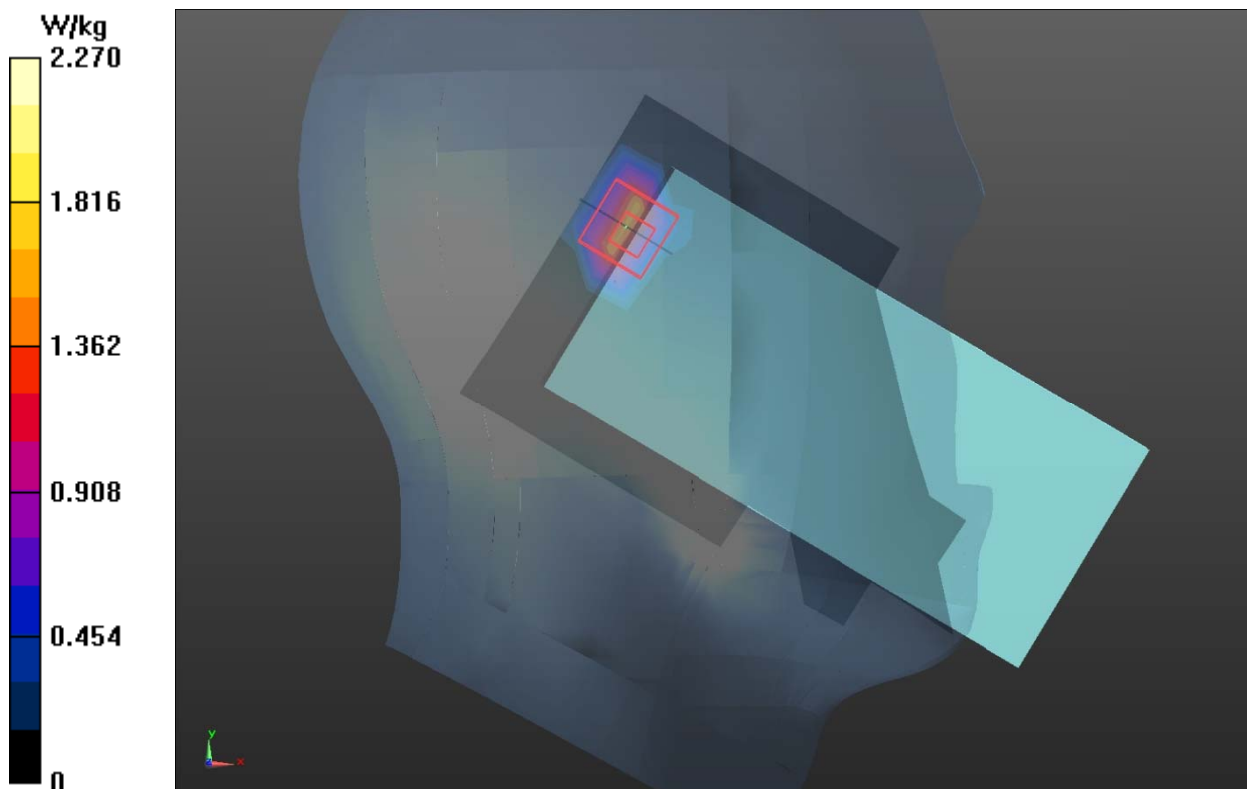
**Left Tilt Low/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 6.904 V/m; Power Drift = 0.038 dB

Peak SAR (extrapolated) = 5.04 W/kg

**SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.317 W/kg**

Maximum value of SAR (measured) = 2.27 W/kg



## Plot 23 802.11a U-NII-3 Left Tilt Low

Date: 10/21/2021

Communication System: UID 0, 802.11a (0); Frequency: 5745 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5745$  MHz;  $\sigma = 5.47$  S/m;  $\epsilon_r = 35.27$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.04, 5.04, 5.04); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Tilt Low/Area Scan (12x21x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 2.00 W/kg

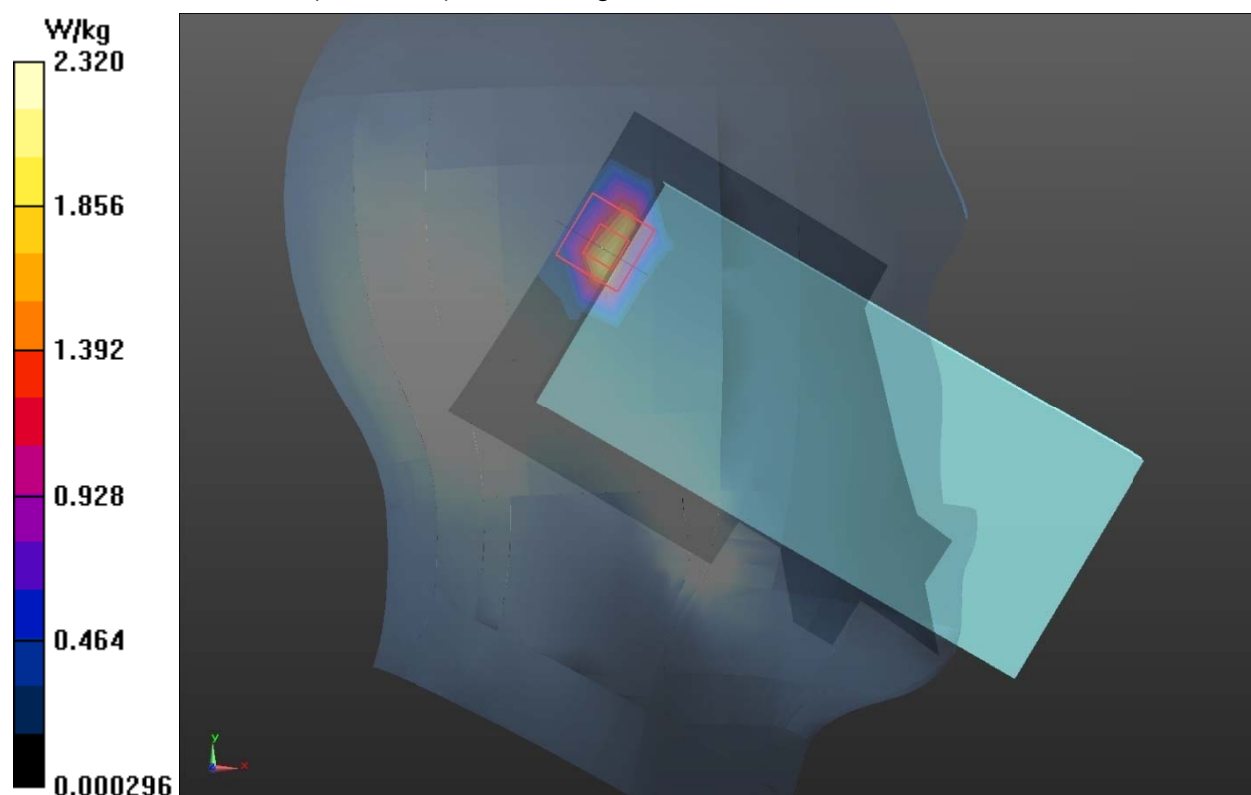
**Left Tilt Low/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 5.953 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 4.47 W/kg

**SAR(1 g) = 0.924 W/kg; SAR(10 g) = 0.276 W/kg**

Maximum value of SAR (measured) = 2.32 W/kg



## Plot 24 BT Left Tilt Low

Date: 10/2/2021

Communication System: UID 0, BT (0); Frequency: 2402 MHz; Duty Cycle: 1:1.3

Medium parameters used:  $f = 2402$  MHz;  $\sigma = 1.789$  S/m;  $\epsilon_r = 37.77$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Left Tilt Low/Area Scan (10x18x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.189 W/kg

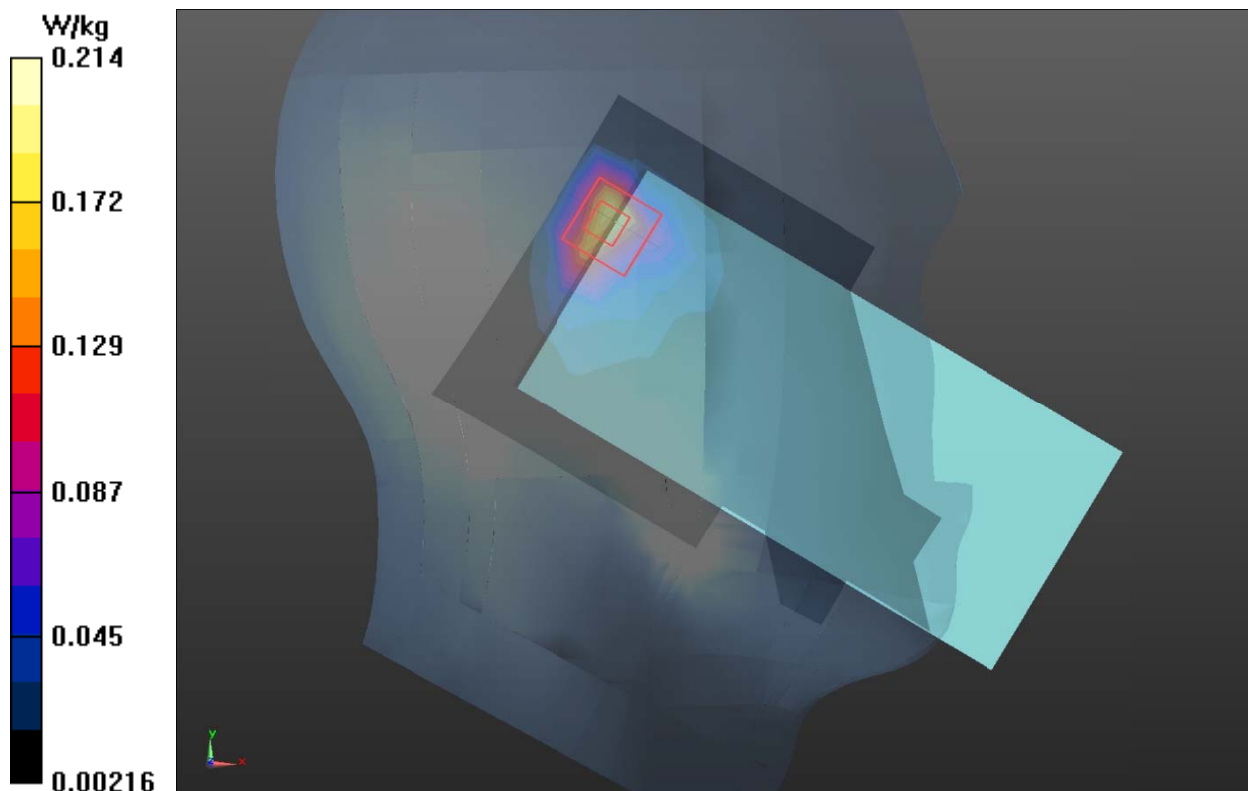
**Left Tilt Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.129 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.291 W/kg

**SAR(1 g) = 0.124 W/kg; SAR(10 g) = 0.053 W/kg**

Maximum value of SAR (measured) = 0.214 W/kg



## Plot 25 GSM 850 Back Side Middle (Distance 15mm)

Date: 9/38/2021

Communication System: UID 0, GSM (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 836.6 \text{ MHz}$ ;  $\sigma = 0.953 \text{ S/m}$ ;  $\epsilon_r = 39.762$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3^\circ\text{C}$  Liquid Temperature:  $21.5^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (8x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) =  $0.223 \text{ W/kg}$

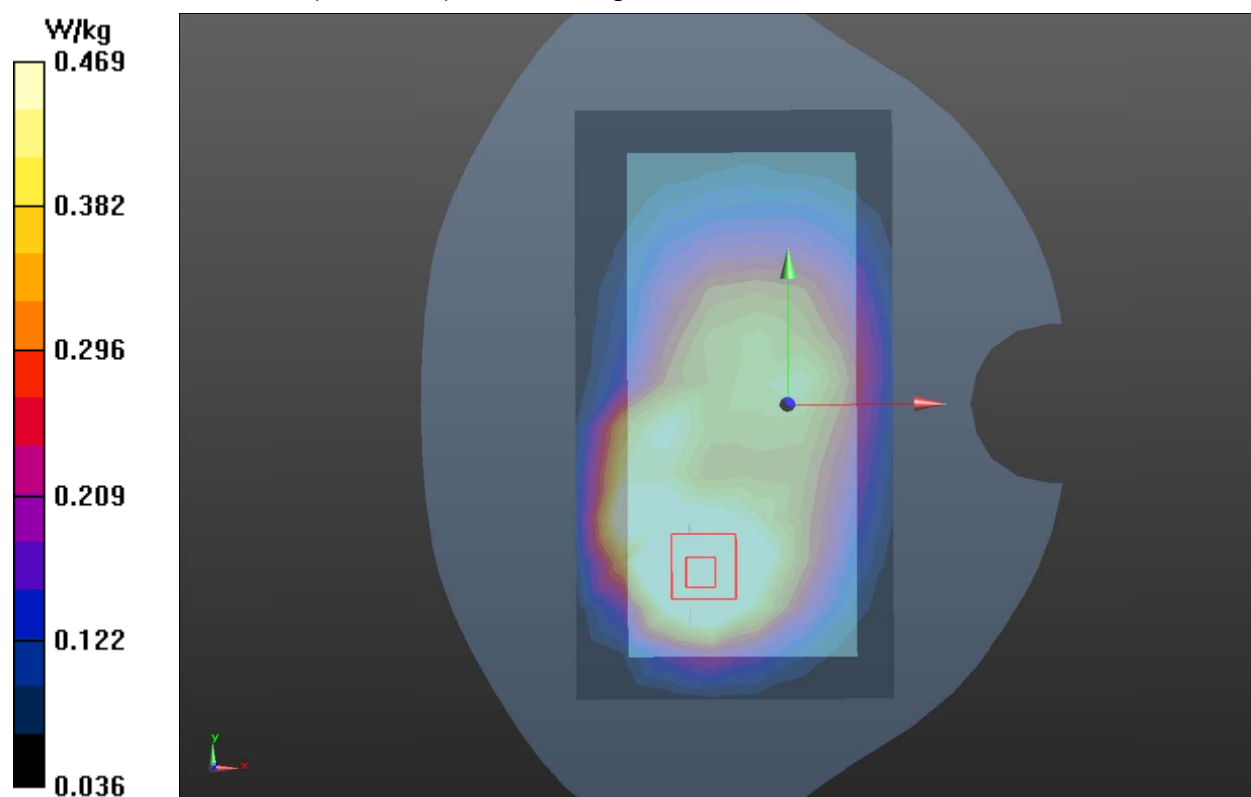
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $21.72 \text{ V/m}$ ; Power Drift =  $-0.01 \text{ dB}$

Peak SAR (extrapolated) =  $0.900 \text{ W/kg}$

**SAR(1 g) =  $0.211 \text{ W/kg}$ ; SAR(10 g) =  $0.141 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.469 \text{ W/kg}$



## Plot 26 GSM 1900 Back Side Middle (Distance 15mm)

Date: 10/1/2021

Communication System: UID 0, GSM (0); Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.42$  S/m;  $\epsilon_r = 38.948$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.299 W/kg

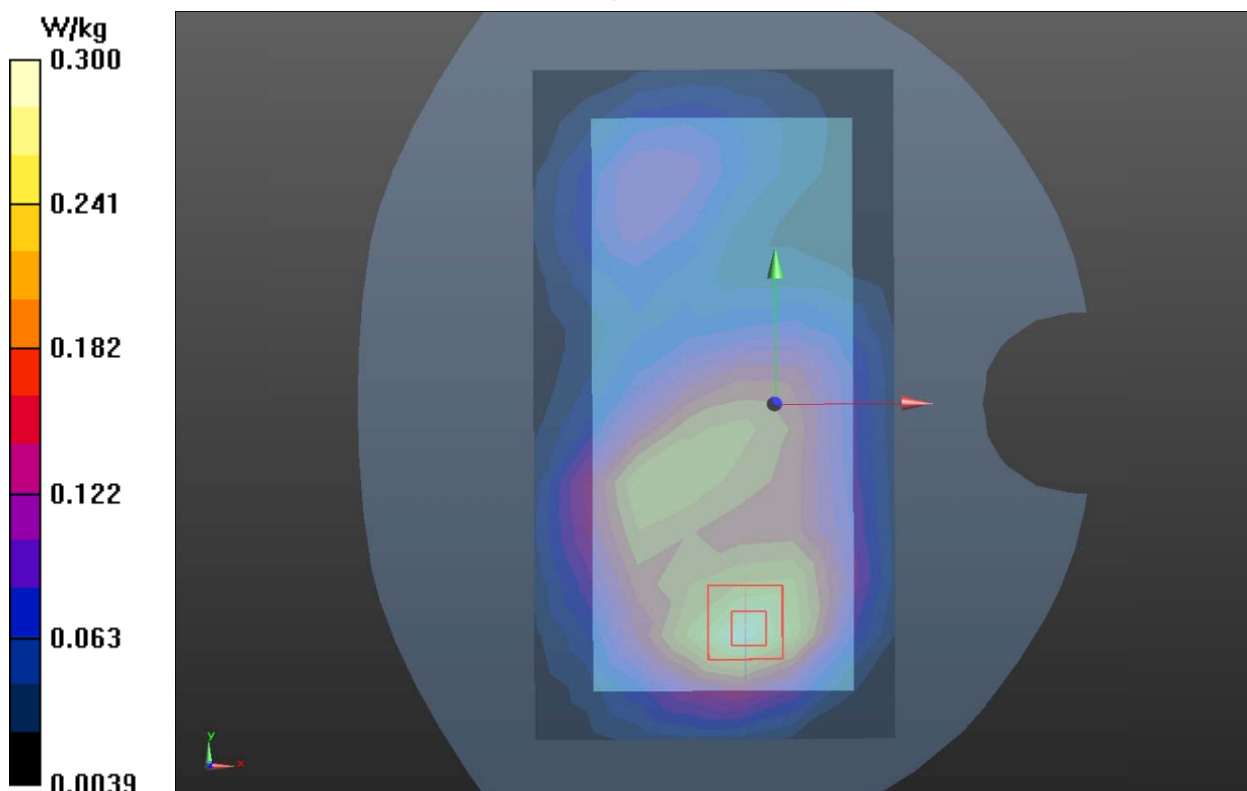
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.74 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.354 W/kg

**SAR(1 g) = 0.226 W/kg; SAR(10 g) = 0.136 W/kg**

Maximum value of SAR (measured) = 0.300 W/kg



## Plot 27 UMTS Band II Back Side Middle (Distance 15mm)

Date: 10/1/2021

Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.42$  S/m;  $\epsilon_r = 38.948$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.845 W/kg

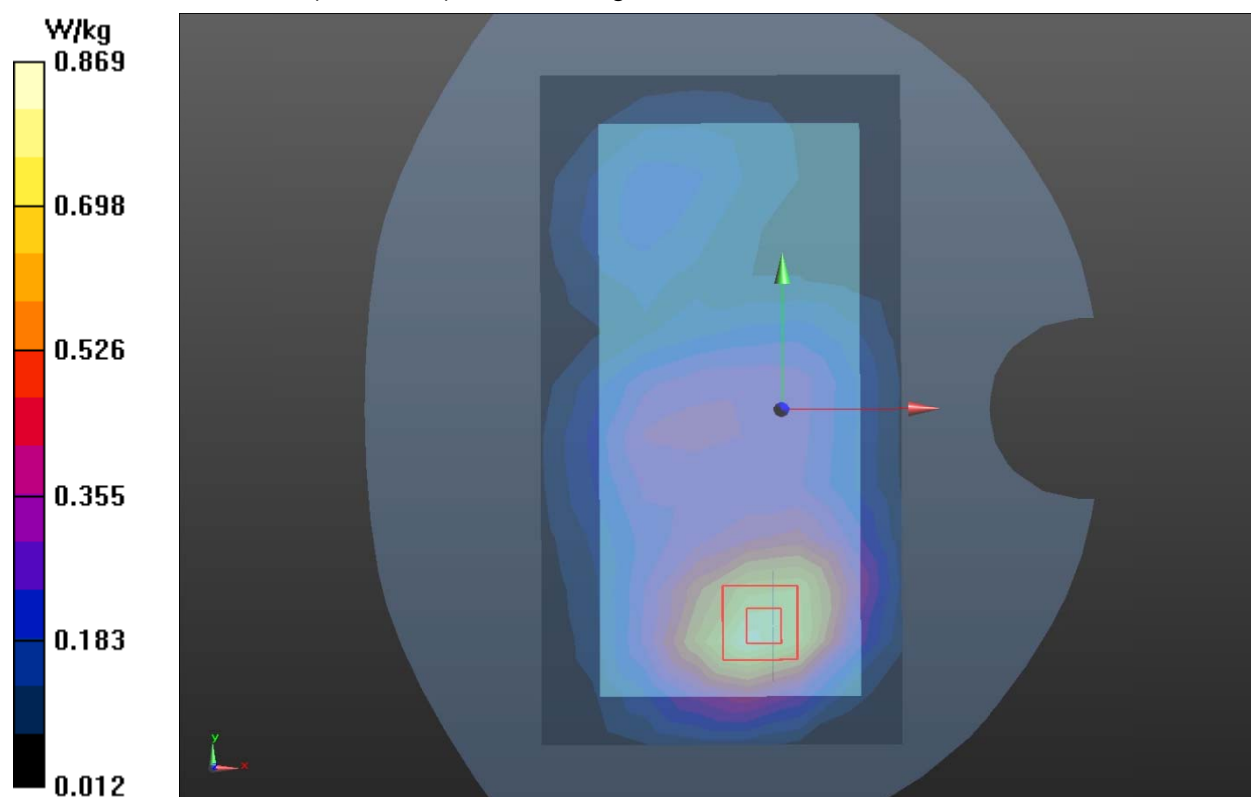
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.85 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.02 W/kg

**SAR(1 g) = 0.616 W/kg; SAR(10 g) = 0.372 W/kg**

Maximum value of SAR (measured) = 0.869 W/kg



## Plot 28 UMTS Band IV Back Side Middle (Distance 15mm)

Date: 9/30/2021

Communication System: UID 0, WCDMA (0); Frequency: 1732.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1732.6$  MHz;  $\sigma = 1.312$  S/m;  $\epsilon_r = 39.365$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.661 W/kg

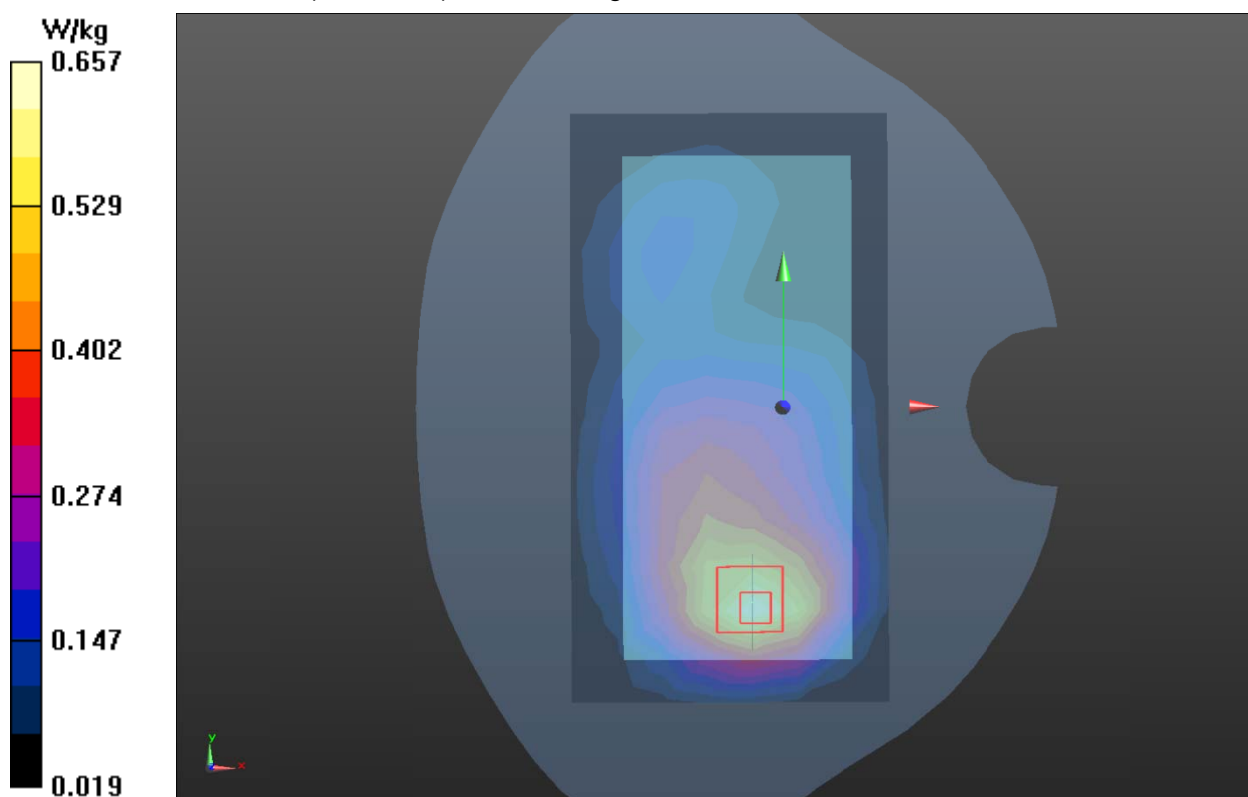
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.51 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.764 W/kg

**SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.295 W/kg**

Maximum value of SAR (measured) = 0.657 W/kg



## Plot 29 UMTS Band V Back Side Middle (Distance 15mm)

Date: 9/28/2021

Communication System: UID 0, WCDMA (0); Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 836.6$  MHz;  $\sigma = 0.953$  S/m;  $\epsilon_r = 39.762$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.290 W/kg

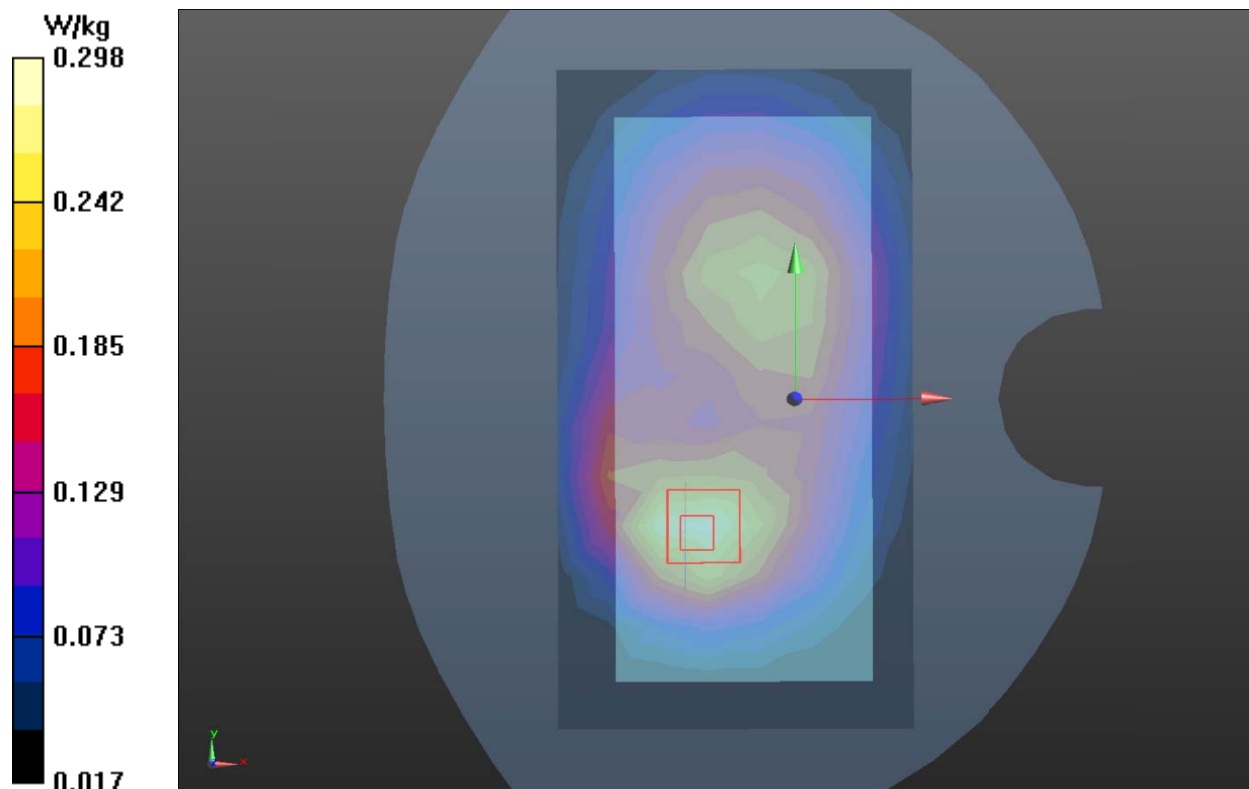
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.28 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 0.338 W/kg

**SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.159 W/kg**

Maximum value of SAR (measured) = 0.298 W/kg



### Plot 30 LTE Band 2 Back Side Low (Distance 15mm)

Date/Time: 2021/9/30 17:38:14

Communication System: UID 0, LTE (0); Frequency: 1860 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1860$  MHz;  $\sigma = 1.42$  S/m;  $\epsilon_r = 38.948$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.691 W/kg

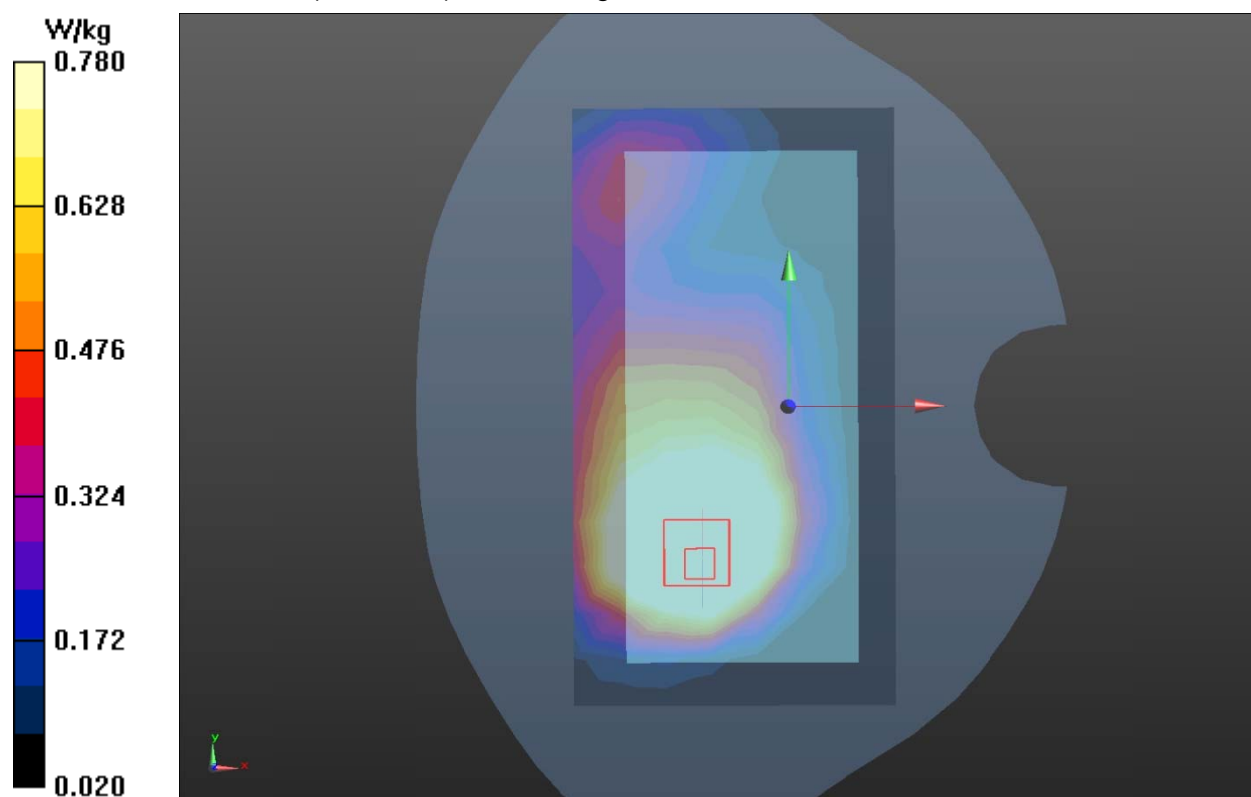
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.66 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 0.95 W/kg

**SAR(1 g) = 0.668 W/kg; SAR(10 g) = 0.412 W/kg**

Maximum value of SAR (measured) = 0.78 W/kg



# Plot 31 LTE Band 4 Back Side Low (Distance 15mm)

Date: 9/30/2021

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.303$  S/m;  $\epsilon_r = 39.467$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (10x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.73 W/kg

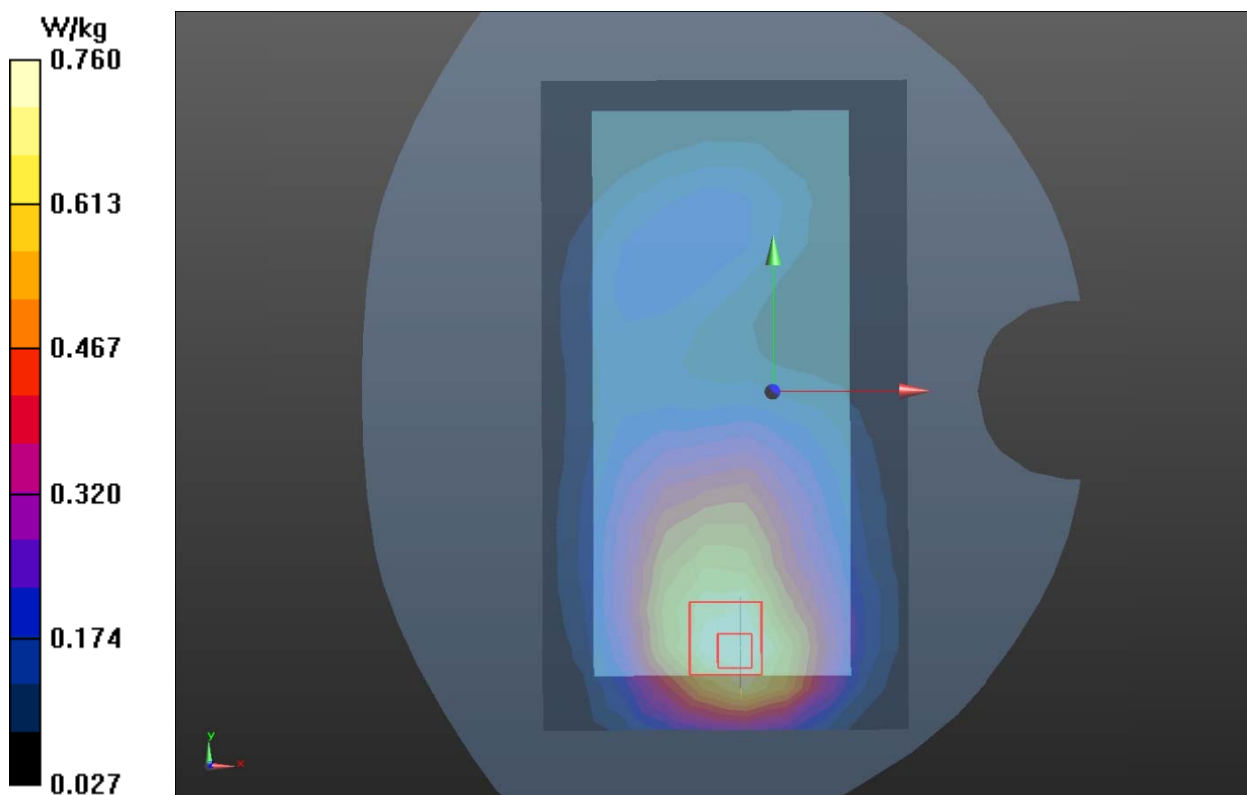
**Back Side Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.89 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 1.08 W/kg

**SAR(1 g) = 0.682 W/kg; SAR(10 g) = 0.431 W/kg**

Maximum value of SAR (measured) = 0.760 W/kg



## Plot 32 LTE Band 5 Back Side High (Distance 15mm)

Date: 9/28/2021

Communication System: UID 0, LTE (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 844$  MHz;  $\sigma = 0.958$  S/m;  $\epsilon_r = 39.728$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side High/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.431 W/kg

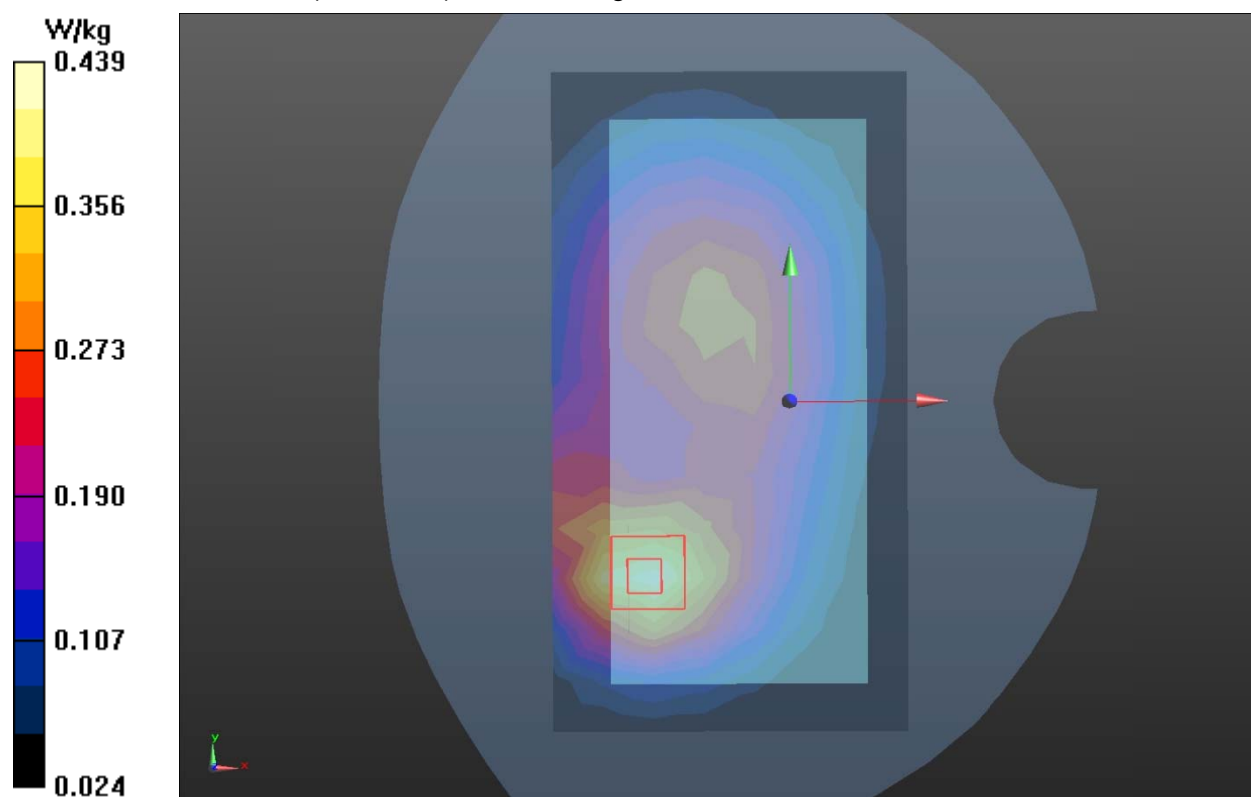
**Back Side High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.47 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.499 W/kg

**SAR(1 g) = 0.332 W/kg; SAR(10 g) = 0.222 W/kg**

Maximum value of SAR (measured) = 0.439 W/kg



### Plot 33 LTE Band 12 Back Side Low (Distance 15mm)

Date: 9/29/2021

Communication System: UID 0, LTE (0); Frequency: 704 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 704$  MHz;  $\sigma = 0.867$  S/m;  $\epsilon_r = 40.747$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.441 W/kg

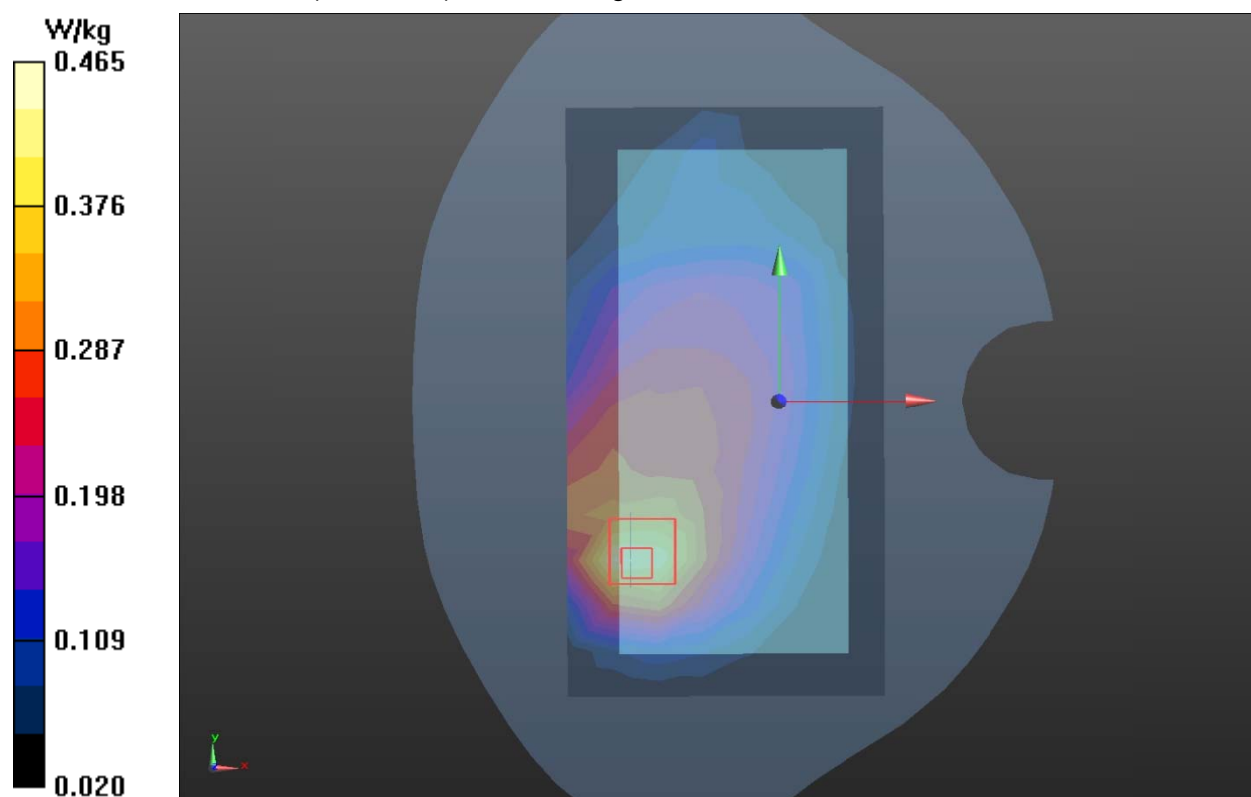
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.56 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.541 W/kg

**SAR(1 g) = 0.2 W/kg; SAR(10 g) = 0.14 W/kg**

Maximum value of SAR (measured) = 0.465 W/kg



# Plot 34 LTE Band 41 Back Side Middle (Distance 15mm)

Date:10/9/2021

Communication System: UID 0, LTE (0); Frequency: 2593 MHz;Duty Cycle: 1:1.58

Medium parameters used:  $f = 2593$  MHz;  $\sigma = 2.009$  S/m;  $\epsilon_r = 37.118$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (10x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.679 W/kg

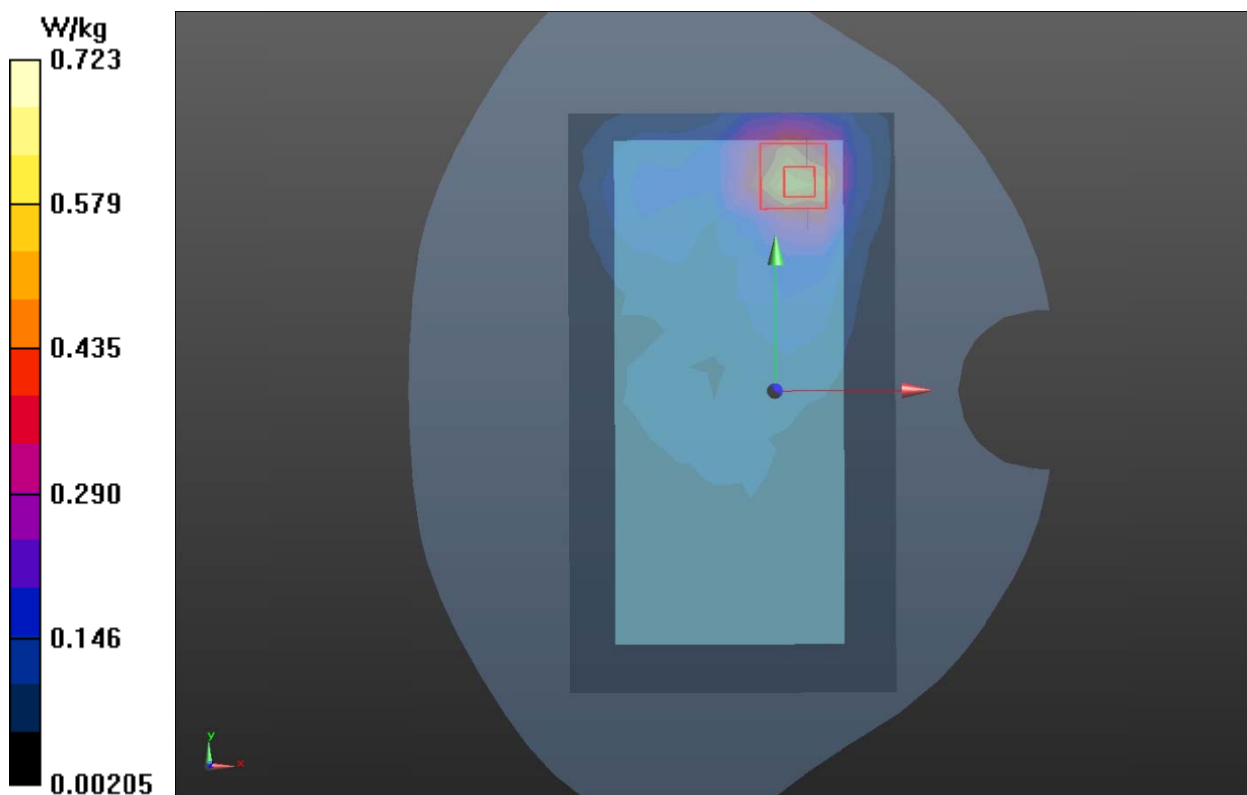
**Back Side Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.858 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.21 W/kg

**SAR(1 g) = 0.635 W/kg; SAR(10 g) = 0.312 W/kg**

Maximum value of SAR (measured) = 0.723 W/kg



# Plot 35 LTE Band 66 Back Side Low (Distance 15mm)

Date: 9/30/2021

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.303$  S/m;  $\epsilon_r = 39.467$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.02 W/kg

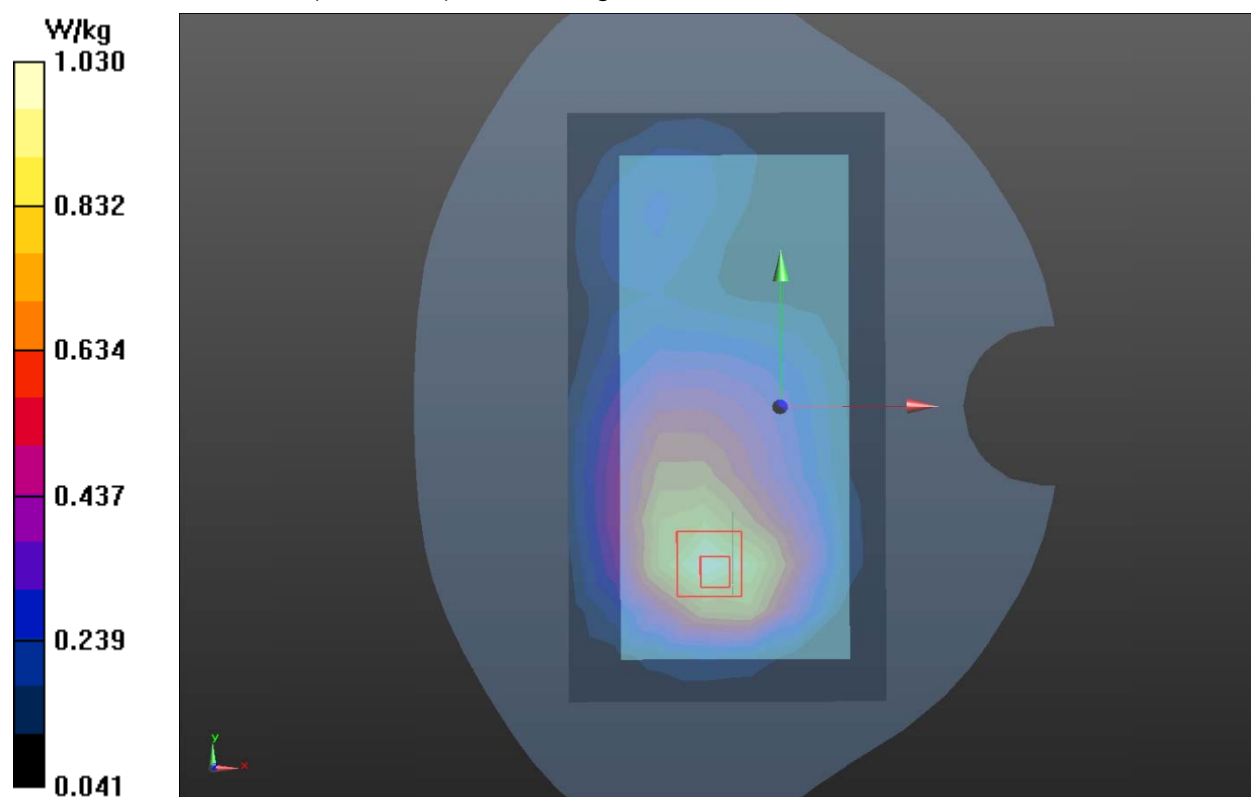
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.42 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.22 W/kg

**SAR(1 g) = 0.759 W/kg; SAR(10 g) = 0.480 W/kg**

Maximum value of SAR (measured) = 1.03 W/kg



# Plot 36 LTE Band 71 Back Side Low (Distance 15mm)

Date: 9/29/2021

Communication System: UID 0, LTE (0); Frequency: 673 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 673 \text{ MHz}$ ;  $\sigma = 0.847 \text{ S/m}$ ;  $\epsilon_r = 40.954$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$  Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (8x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) =  $0.213 \text{ W/kg}$

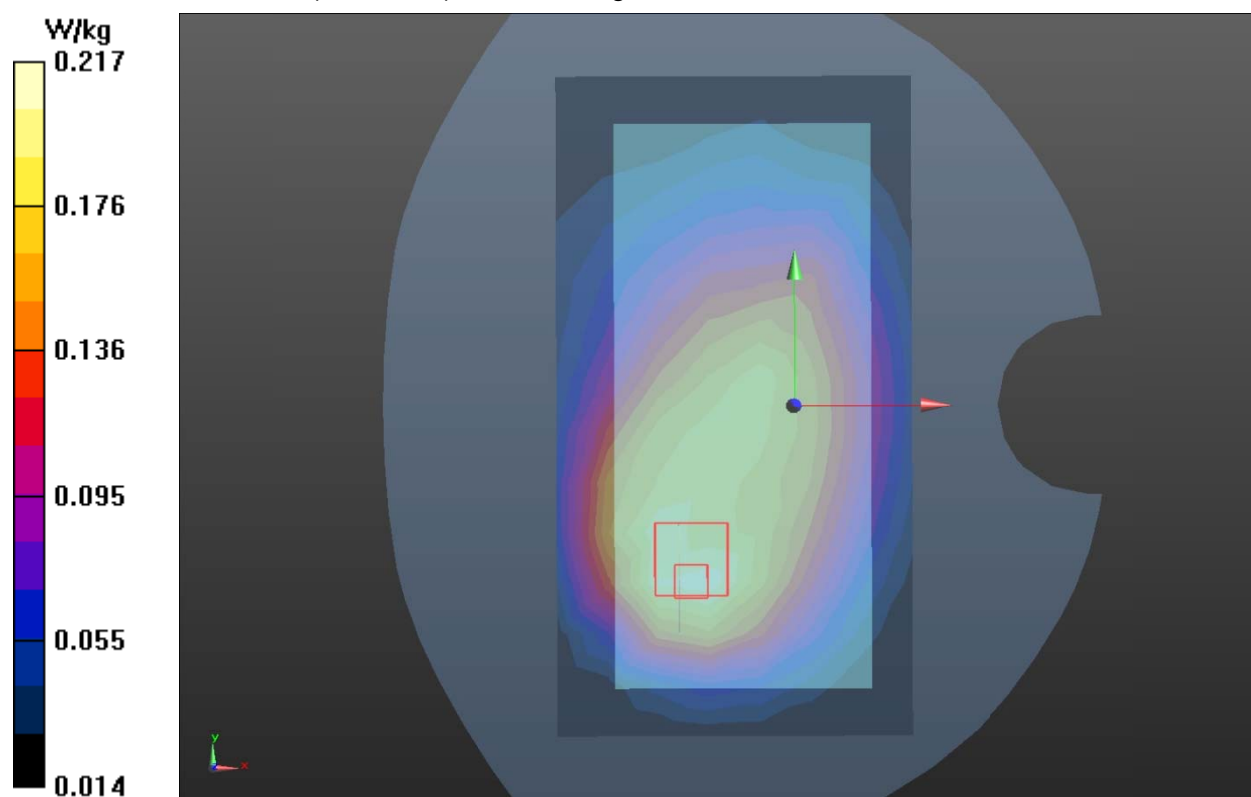
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $15.57 \text{ V/m}$ ; Power Drift =  $-0.02 \text{ dB}$

Peak SAR (extrapolated) =  $0.249 \text{ W/kg}$

**SAR(1 g) =  $0.166 \text{ W/kg}$ ; SAR(10 g) =  $0.118 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.217 \text{ W/kg}$



## Plot 37 802.11b Back Side Middle (Distance 15mm)

Date: 10/2/2021

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz; Duty Cycle: 1:1.02

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.856$  S/m;  $\epsilon_r = 40.836$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan(10x18x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.163 W/kg

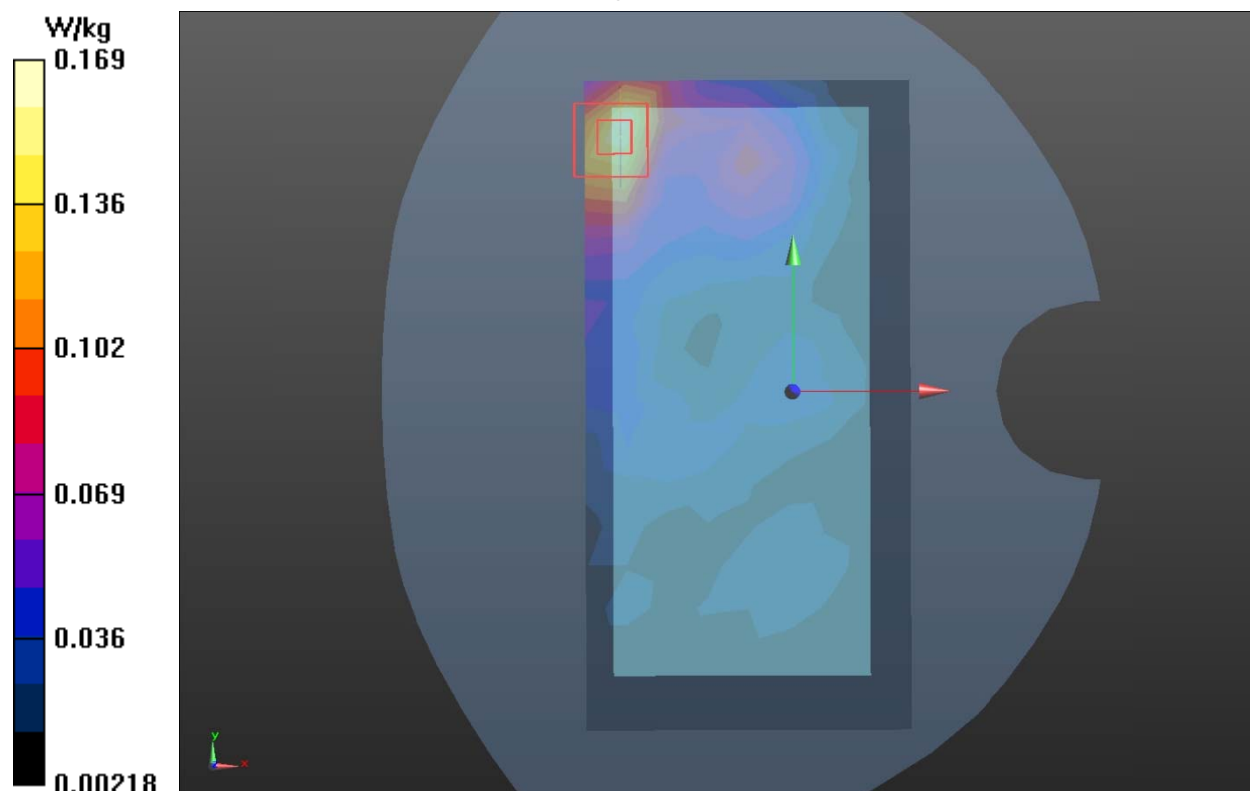
**Back Side Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.402 V/m; Power Drift = 0.184 dB

Peak SAR (extrapolated) = 0.311 W/kg

**SAR(1 g) = 0.155 W/kg; SAR(10 g) = 0.080 W/kg**

Maximum value of SAR (measured) = 0.169 W/kg



# Plot 38 802.11a U-NII-1 Back Side Low (Distance 15mm)

Date: 10/14/2021

Communication System: UID 0, 802.11a (0); Frequency: 5180 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 4.75$  S/m;  $\epsilon_r = 36.766$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (10x21x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.693 W/kg

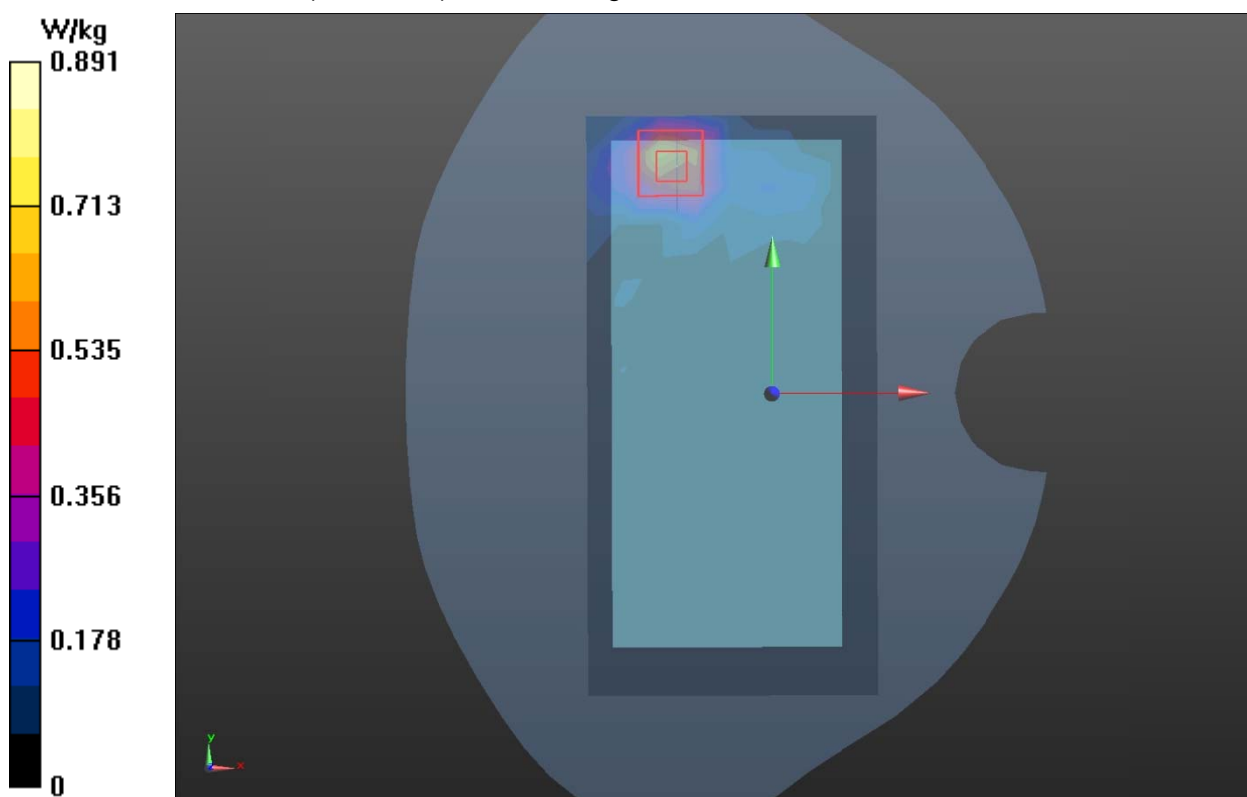
**Back Side Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.335 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.36 W/kg

**SAR(1 g) = 0.524 W/kg; SAR(10 g) = 0.209 W/kg**

Maximum value of SAR (measured) = 0.891 W/kg



# Plot 39 802.11a U-NII-3 Back Side Middle (Distance 15mm)

Date: 10/21/2021

Communication System: UID 0, 802.11a (0); Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5785$  MHz;  $\sigma = 5.48$  S/m;  $\epsilon_r = 35.343$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.04, 5.04, 5.04); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (10x21x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.258 W/kg

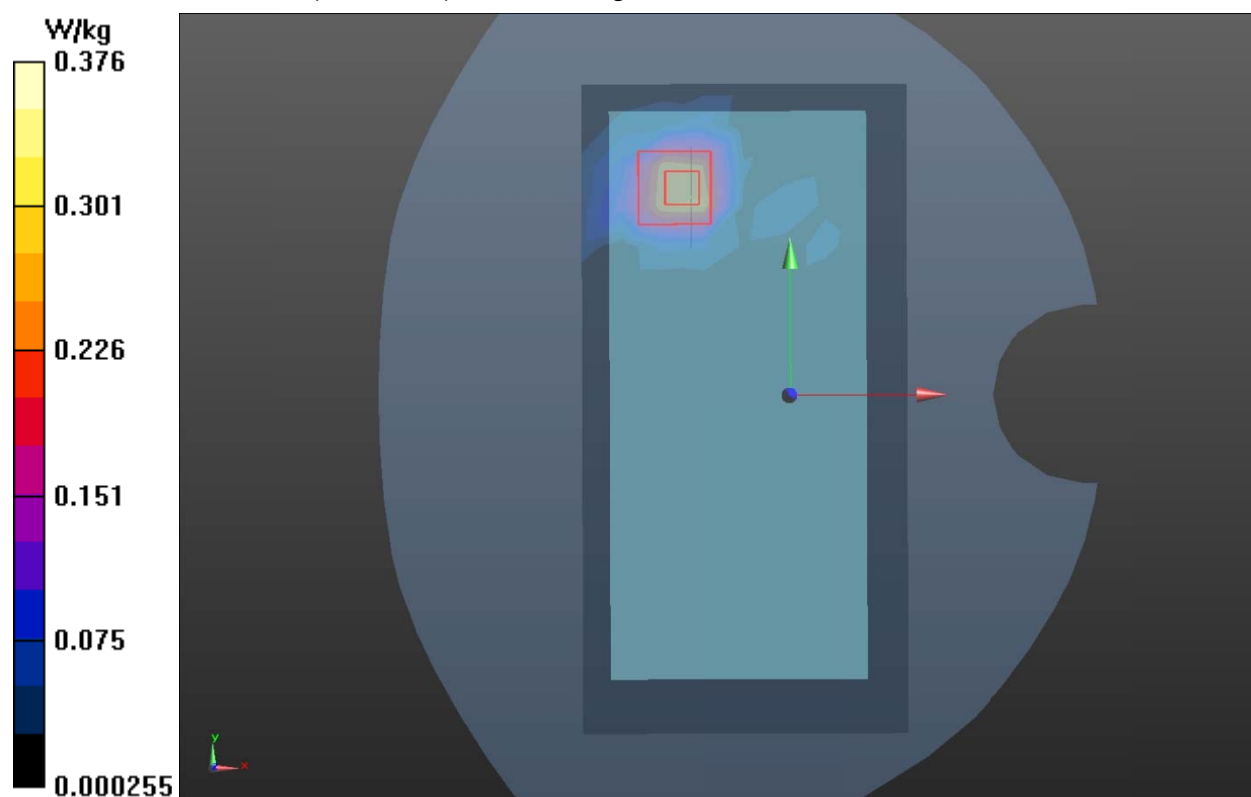
**Back Side Middle/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.7500 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.07 W/kg

**SAR(1 g) = 0.164 W/kg; SAR(10 g) = 0.068 W/kg**

Maximum value of SAR (measured) = 0.376 W/kg



# Plot 40 GSM 850 GPRS (4Txslots) Back Side Middle (Distance 10mm)

Date: 9/30/2021

Communication System: UID 0, GPRS 4TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:2.07

Medium parameters used:  $f = 836.6 \text{ MHz}$ ;  $\sigma = 0.953 \text{ S/m}$ ;  $\epsilon_r = 39.762$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3 \text{ }^\circ\text{C}$  Liquid Temperature:  $21.5 \text{ }^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (8x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) =  $0.636 \text{ W/kg}$

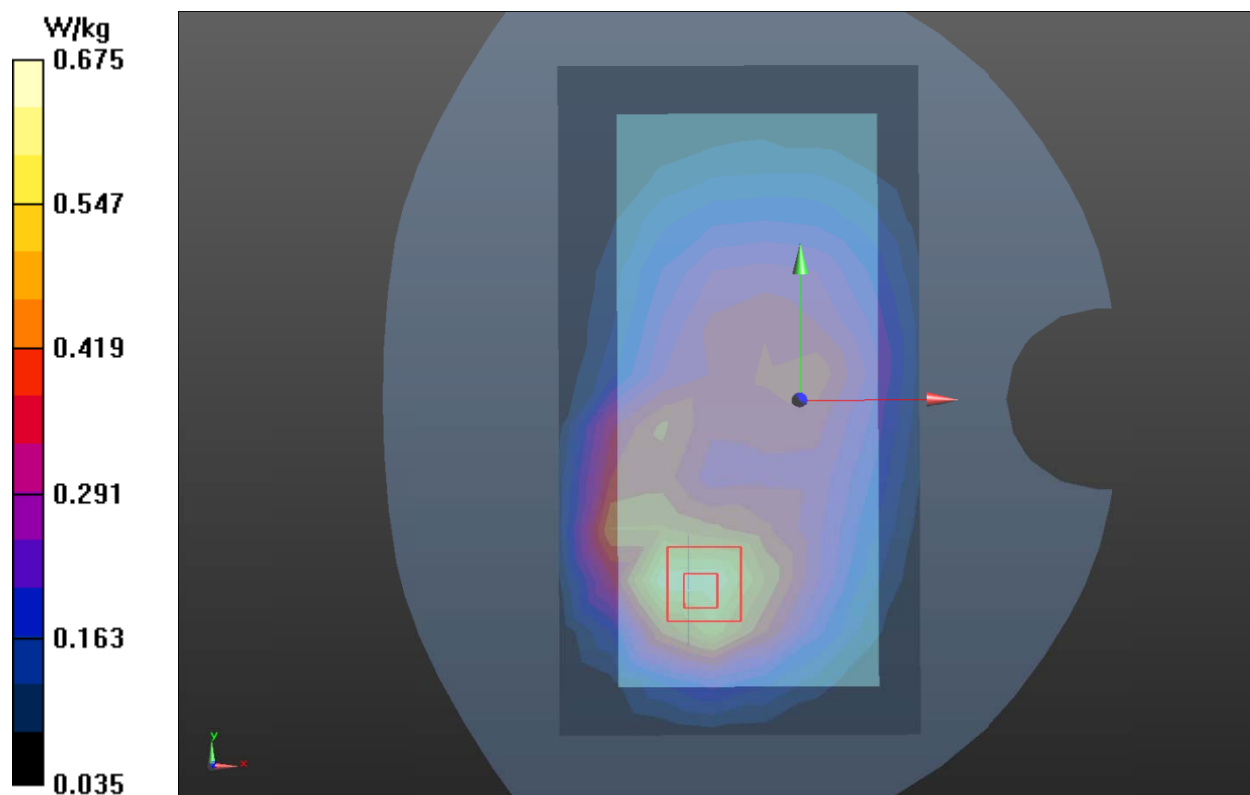
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $21.10 \text{ V/m}$ ; Power Drift =  $-0.15 \text{ dB}$

Peak SAR (extrapolated) =  $0.774 \text{ W/kg}$

**SAR(1 g) =  $0.538 \text{ W/kg}$ ; SAR(10 g) =  $0.346 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.675 \text{ W/kg}$



# Plot 41 GSM 1900 GPRS (4Txslots) Back Side High (Distance 10mm)

Date/Time: 2021/9/29 20:39:23

Communication System: UID 0, GPRS 4TX (0); Frequency: 1909.8 MHz; Duty Cycle: 1:2.07491

Medium parameters used (interpolated):  $f = 1909.8$  MHz;  $\sigma = 1.398$  S/m;  $\epsilon_r = 39.043$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side High/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.2 W/kg

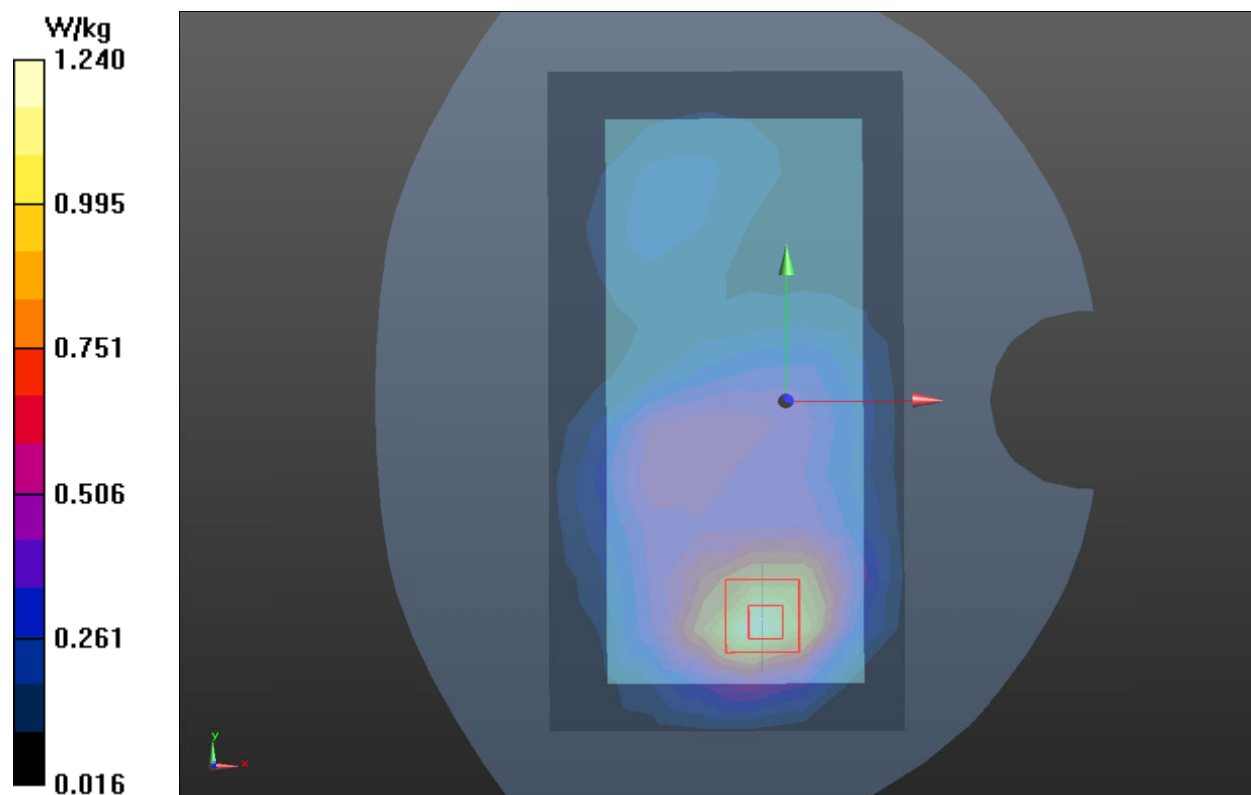
**Back Side High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.49 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.48 W/kg

**SAR(1 g) = 0.879 W/kg; SAR(10 g) = 0.502 W/kg**

Maximum value of SAR (measured) = 1.24 W/kg



## Plot 42 UMTS Band II Back Side High (Distance 10mm)

Date/Time: 2021/9/29 21:08:54

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1907.6 \text{ MHz}$ ;  $\sigma = 1.44 \text{ S/m}$ ;  $\epsilon_r = 38.828$ ;  $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature:  $22.3^\circ\text{C}$  Liquid Temperature:  $21.5^\circ\text{C}$

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side High/Area Scan (8x14x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

Maximum value of SAR (measured) =  $1.4 \text{ W/kg}$

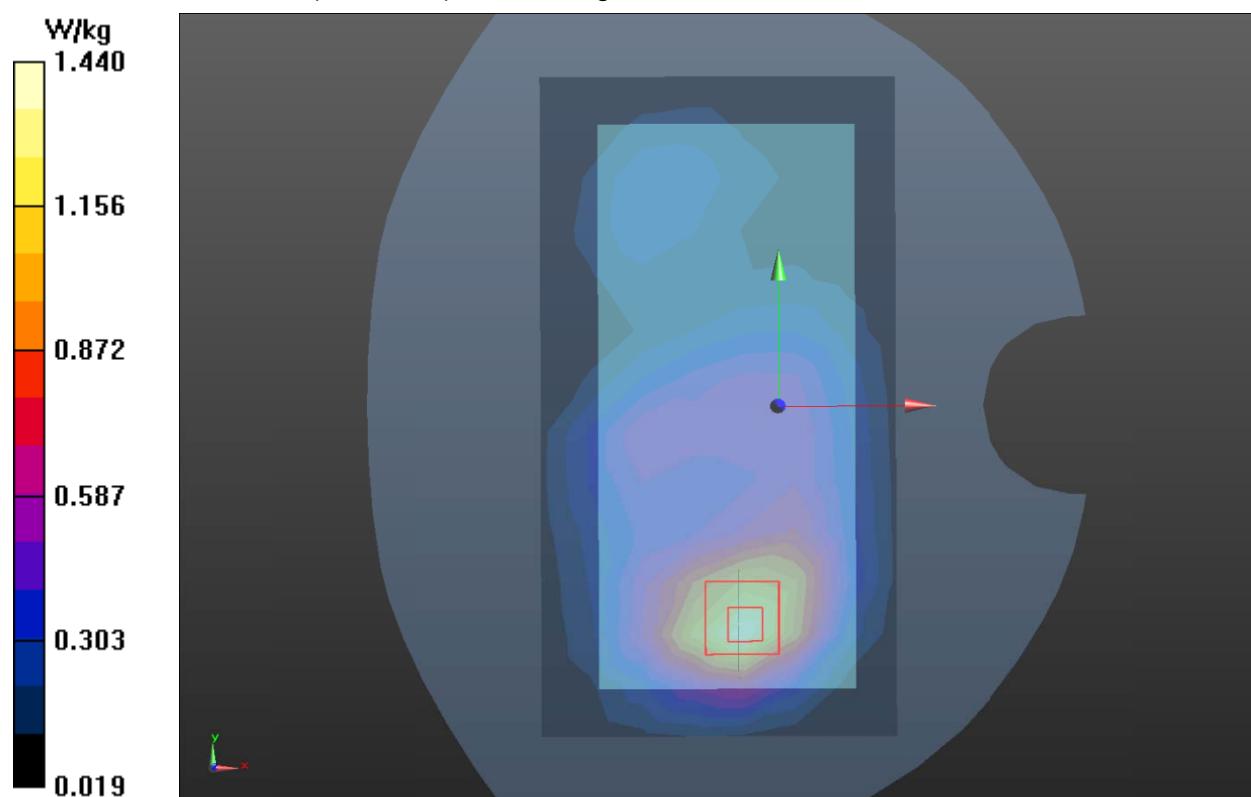
**Back Side High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $20.95 \text{ V/m}$ ; Power Drift =  $-0.04 \text{ dB}$

Peak SAR (extrapolated) =  $1.70 \text{ W/kg}$

**SAR(1 g) =  $1.01 \text{ W/kg}$ ; SAR(10 g) =  $0.595 \text{ W/kg}$**

Maximum value of SAR (measured) =  $1.44 \text{ W/kg}$



## Plot 43 UMTS Band IV Back Side Low (Distance 10mm)

Date: 9/30/2021

Communication System: UID 0, WCDMA (0); Frequency: 1712.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1712.4$  MHz;  $\sigma = 1.298$  S/m;  $\epsilon_r = 39.443$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.21 W/kg

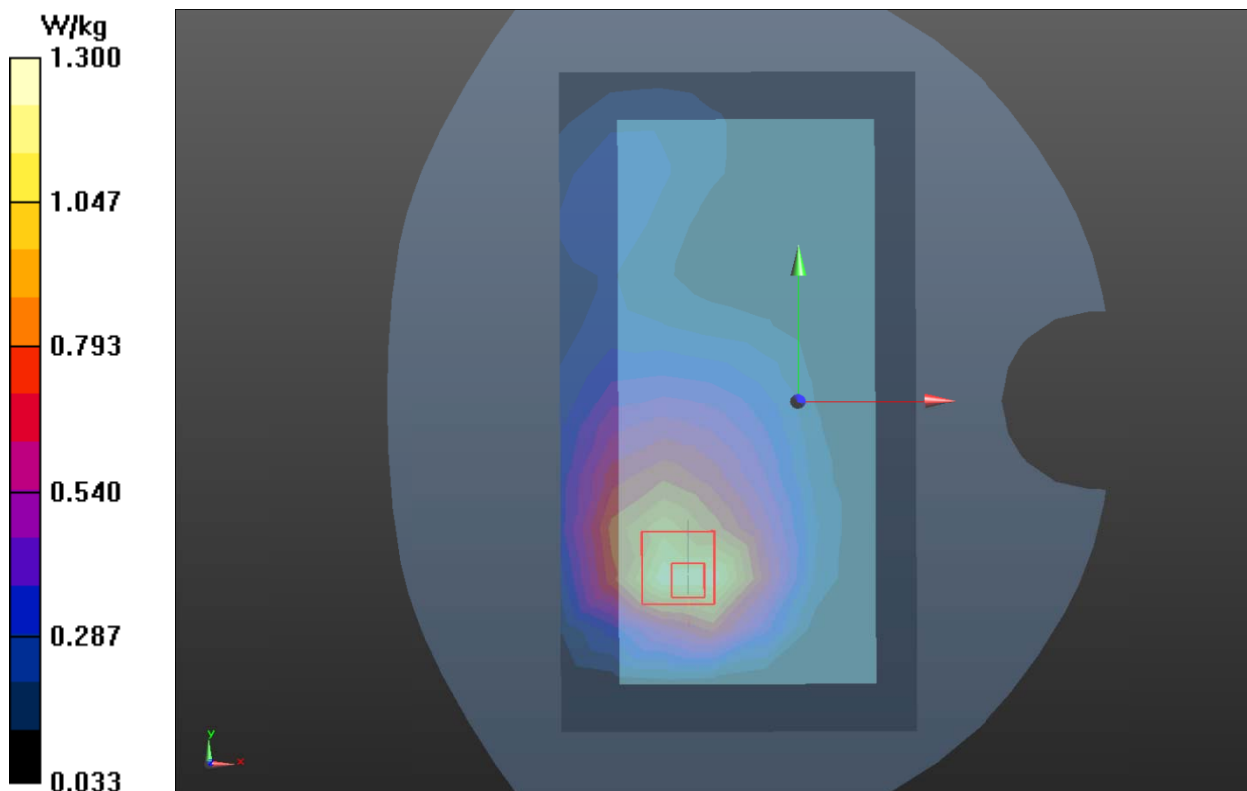
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.97 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.54 W/kg

**SAR(1 g) = 0.937 W/kg; SAR(10 g) = 0.579 W/kg**

Maximum value of SAR (measured) = 1.30 W/kg



## Plot 44 UMTS Band V Back Side Middle (Distance 10mm)

Date: 9/30/2021

Communication System: UID 0, WCDMA (0); Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 836.6$  MHz;  $\sigma = 0.953$  S/m;  $\epsilon_r = 39.762$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.440 W/kg

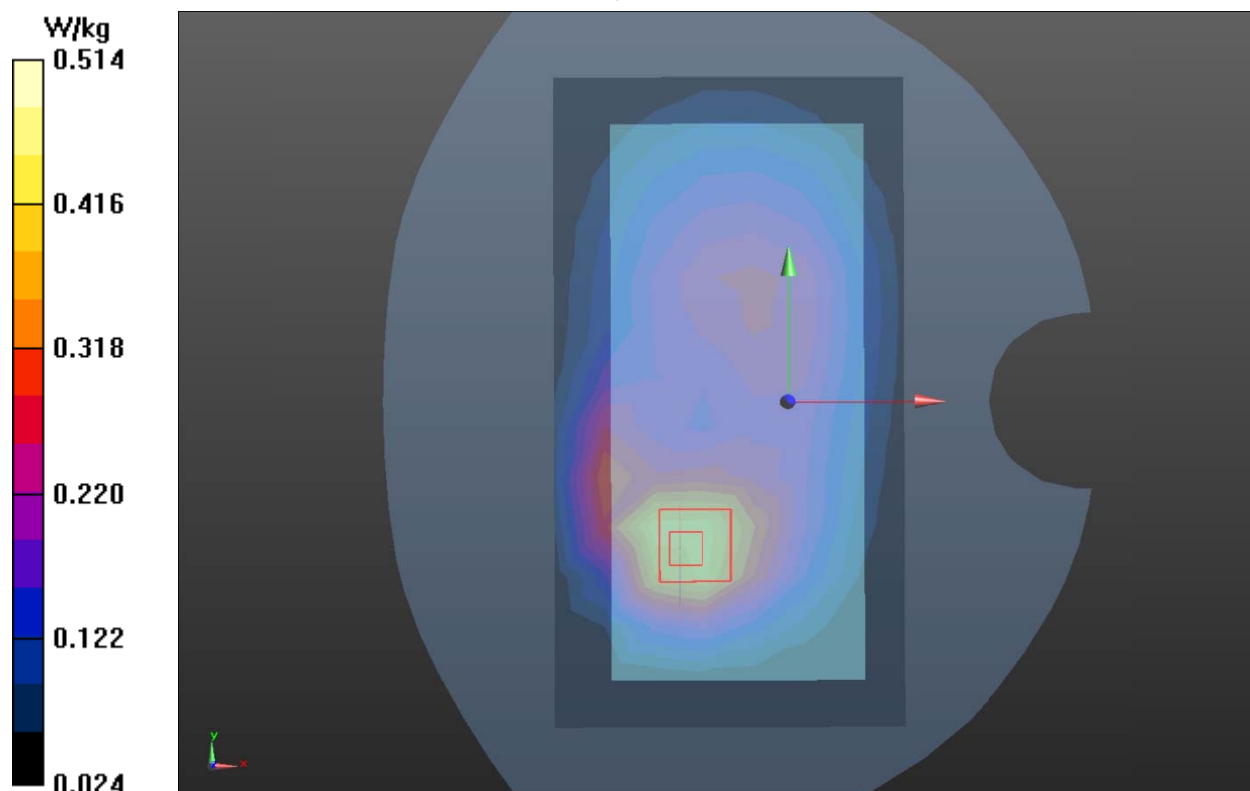
**Back Side Middle/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.30 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.591 W/kg

**SAR(1 g) = 0.373 W/kg; SAR(10 g) = 0.240 W/kg**

Maximum value of SAR (measured) = 0.514 W/kg



## Plot 45 LTE Band 2 Back Side High (Distance 10mm)

Date/Time: 2021/9/30 19:14:21

Communication System: UID 0, LTE (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.434$  S/m;  $\epsilon_r = 38.861$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side High/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.97 W/kg

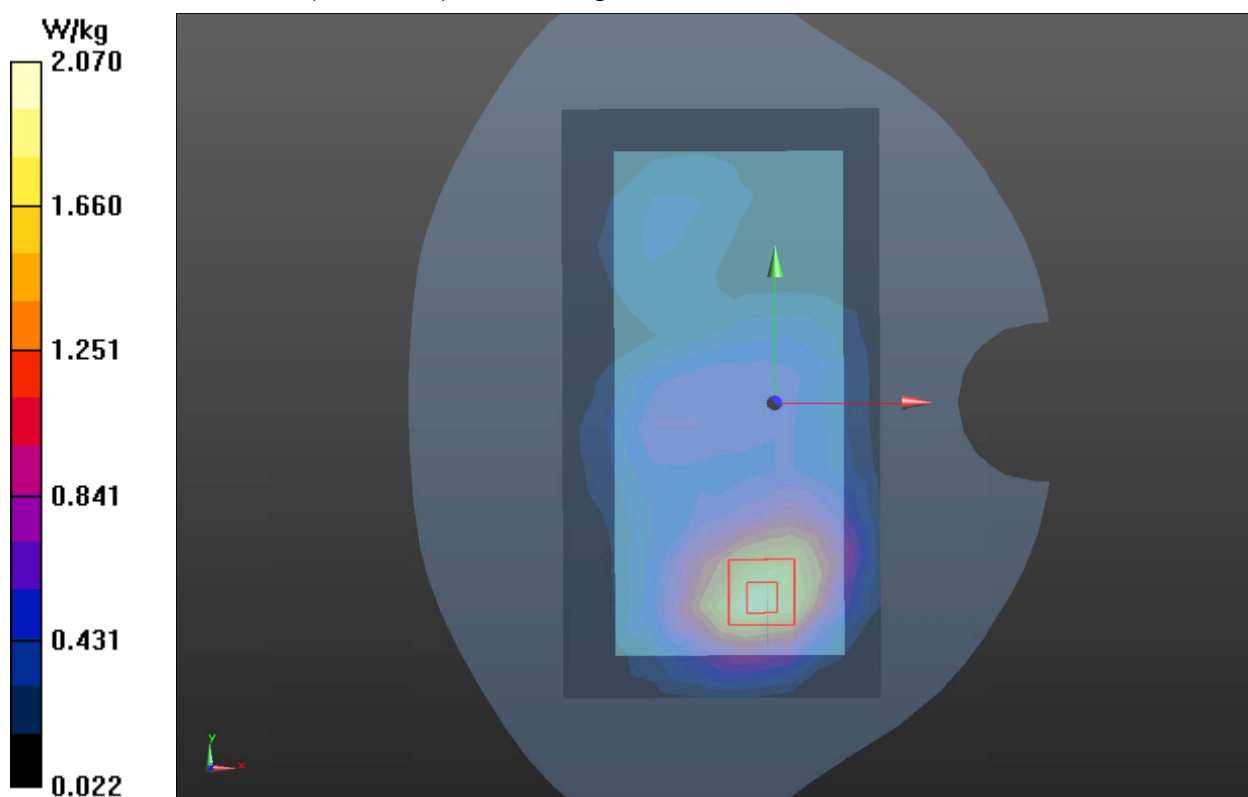
**Back Side High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.92 V/m; Power Drift = 0 dB

Peak SAR (extrapolated) = 2.46 W/kg

**SAR(1 g) = 0.845 W/kg; SAR(10 g) = 0.493 W/kg**

Maximum value of SAR (measured) = 2.07 W/kg



# Plot 46 LTE Band 4 Back Side Middle (Distance 10mm)

Date: 9/30/2021

Communication System: UID 0, LTE (0); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1732.5$  MHz;  $\sigma = 1.313$  S/m;  $\epsilon_r = 39.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (10x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.787 W/kg

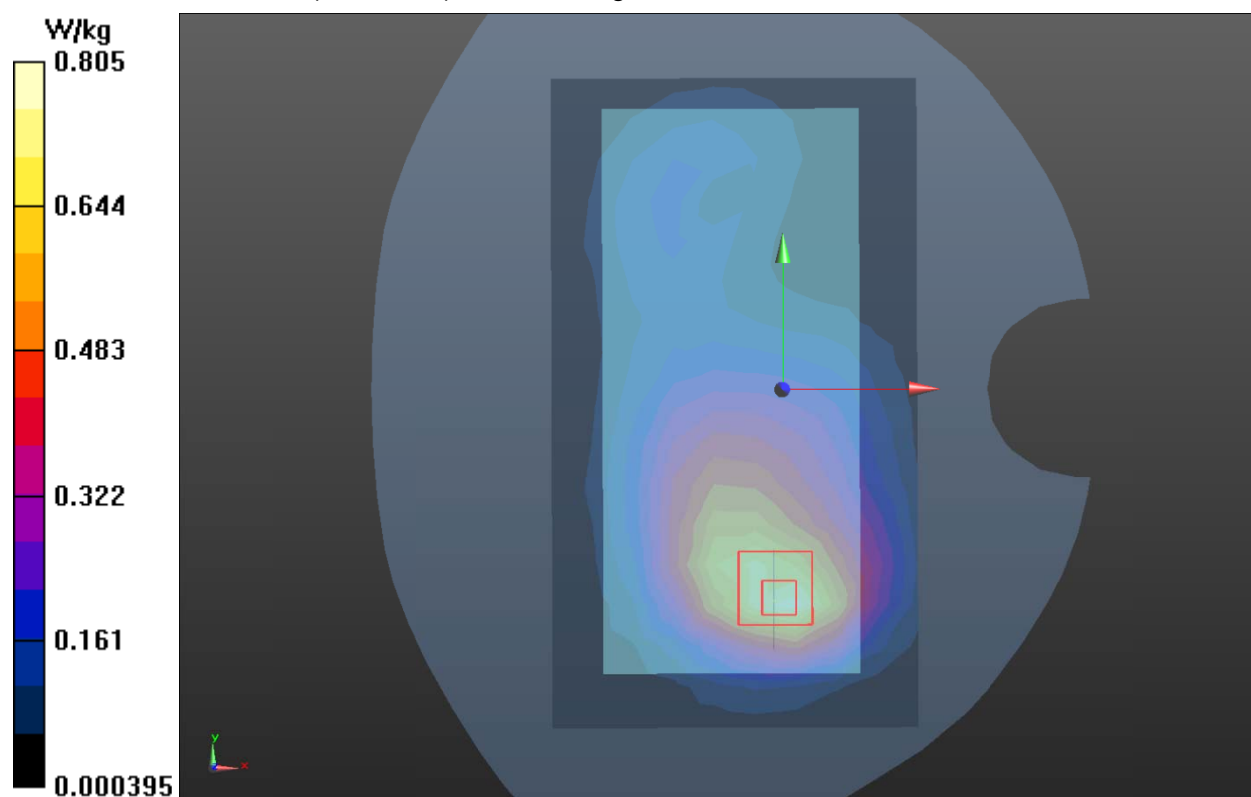
**Back Side Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.30 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.22 W/kg

**SAR(1 g) = 0.744 W/kg; SAR(10 g) = 0.455 W/kg**

Maximum value of SAR (measured) = 0.805 W/kg



## Plot 47 LTE Band 5 Back Side High (Distance 10mm)

Date: 9/28/2021

Communication System: UID 0, LTE (0); Frequency: 844 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 844$  MHz;  $\sigma = 0.958$  S/m;  $\epsilon_r = 39.728$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.30, 9.30, 9.30); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side High/Area Scan (8x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.709 W/kg

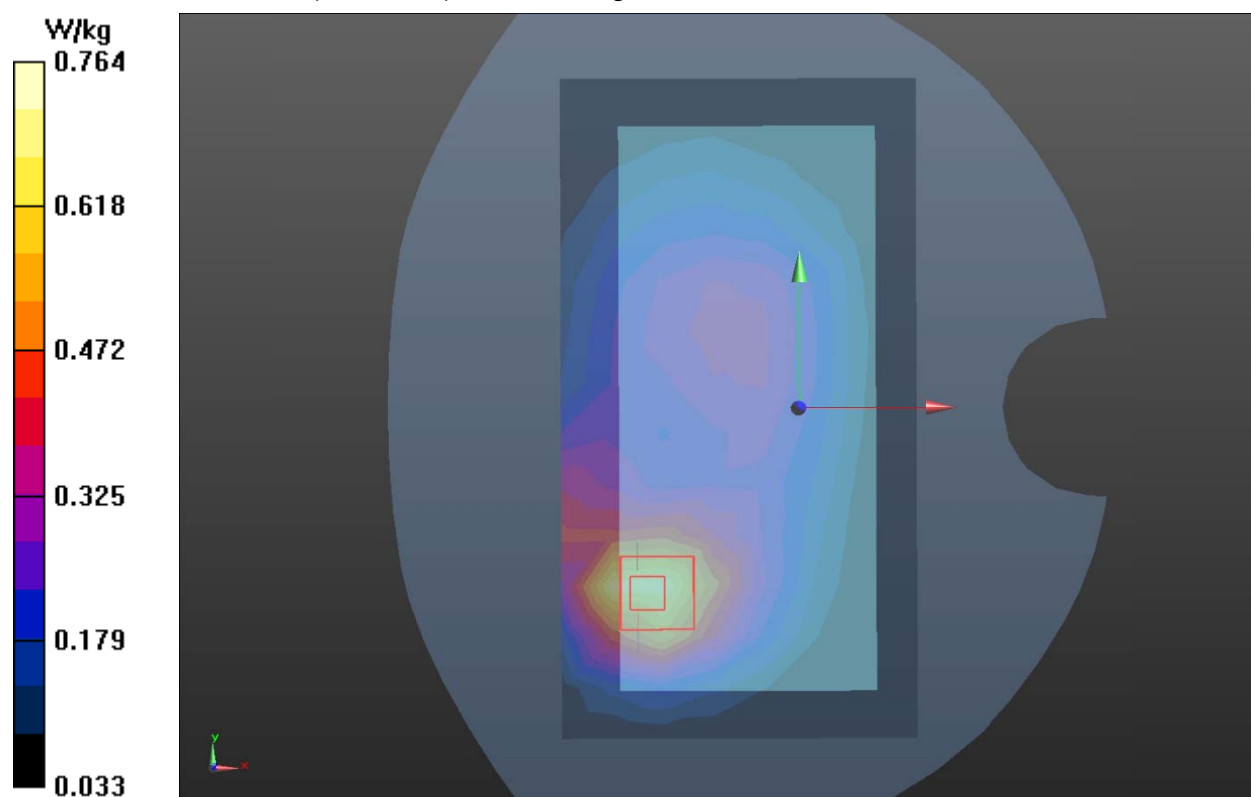
**Back Side High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.34 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.881 W/kg

**SAR(1 g) = 0.551 W/kg; SAR(10 g) = 0.354 W/kg**

Maximum value of SAR (measured) = 0.764 W/kg



## Plot 48 LTE Band 12 Back Side Low (Distance 10mm)

Date: 9/29/2021

Communication System: UID 0, LTE (0); Frequency: 704 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 704$  MHz;  $\sigma = 0.867$  S/m;  $\epsilon_r = 40.747$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (9x17x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.441 W/kg

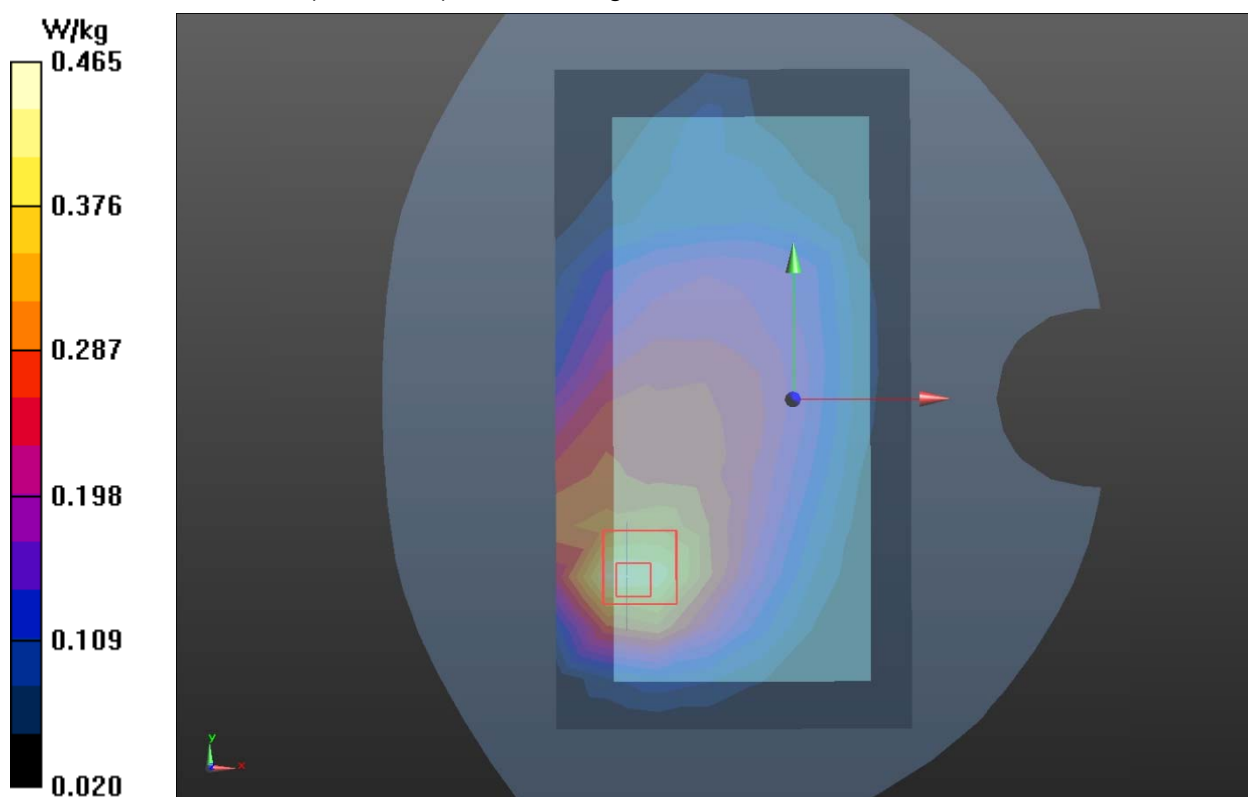
**Back Side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.56 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.541 W/kg

**SAR(1 g) = 0.338 W/kg; SAR(10 g) = 0.224 W/kg**

Maximum value of SAR (measured) = 0.465 W/kg



## Plot 49 LTE Band 41 Back Side Middle (Distance 10mm)

Date:10/9/2021

Communication System: UID 0, LTE (0); Frequency: 2593 MHz;Duty Cycle: 1:1.58

Medium parameters used:  $f = 2593$  MHz;  $\sigma = 2.009$  S/m;  $\epsilon_r = 37.118$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (10x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.831 W/kg

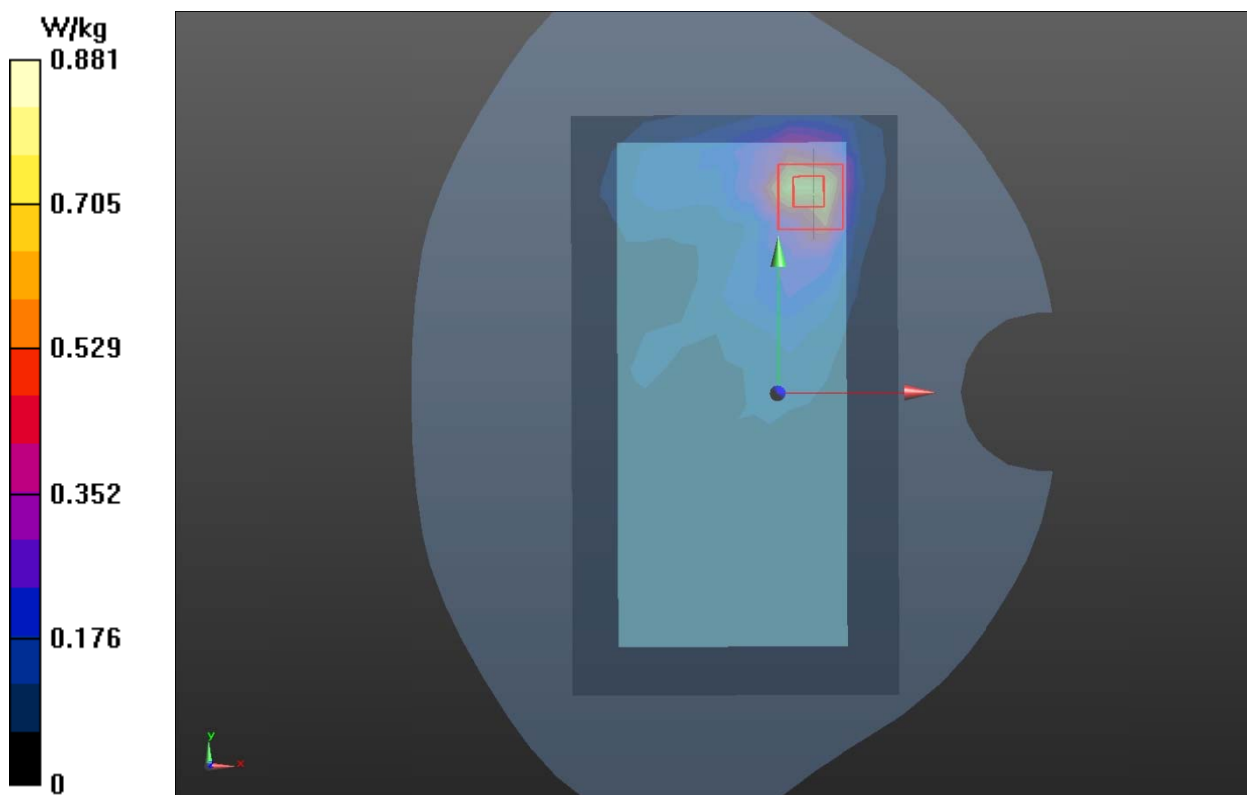
**Back Side Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.492 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 2.20 W/kg

**SAR(1 g) = 0.816 W/kg; SAR(10 g) = 0.329 W/kg**

Maximum value of SAR (measured) = 0.881 W/kg



## Plot 50 LTE Band 66 Back Side Low (Distance 10mm)

Date: 9/30/2021

Communication System: UID 0, LTE (0); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 1720$  MHz;  $\sigma = 1.303$  S/m;  $\epsilon_r = 39.467$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (10x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.847 W/kg

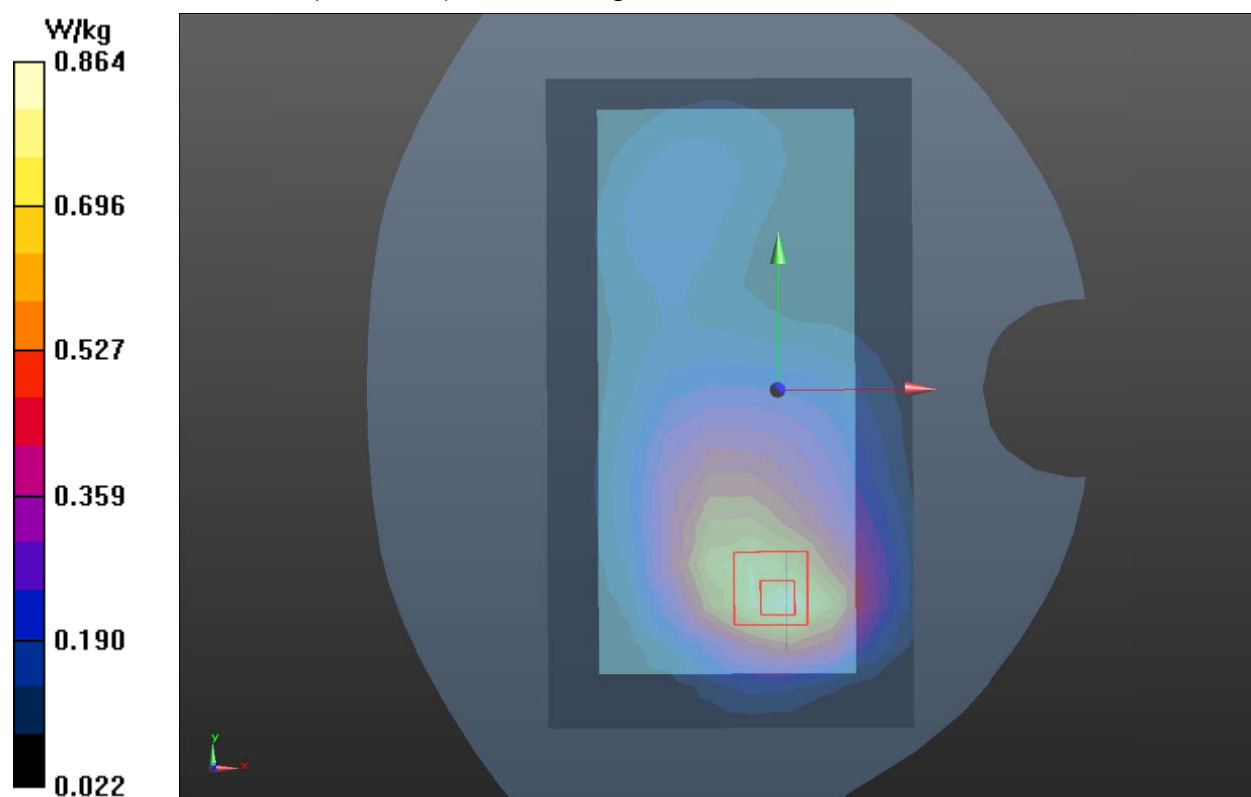
**Back Side Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.41 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.29 W/kg

**SAR(1 g) = 0.796 W/kg; SAR(10 g) = 0.490 W/kg**

Maximum value of SAR (measured) = 0.864 W/kg



## Plot 51 LTE Band 71 Right Edge Low (Distance 10mm)

Date: 9/29/2021

Communication System: UID 0, LTE (0); Frequency: 673 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 673$  MHz;  $\sigma = 0.847$  S/m;  $\epsilon_r = 40.954$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.64, 9.64, 9.64); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Right Edge Low/Area Scan (4x14x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.501 W/kg

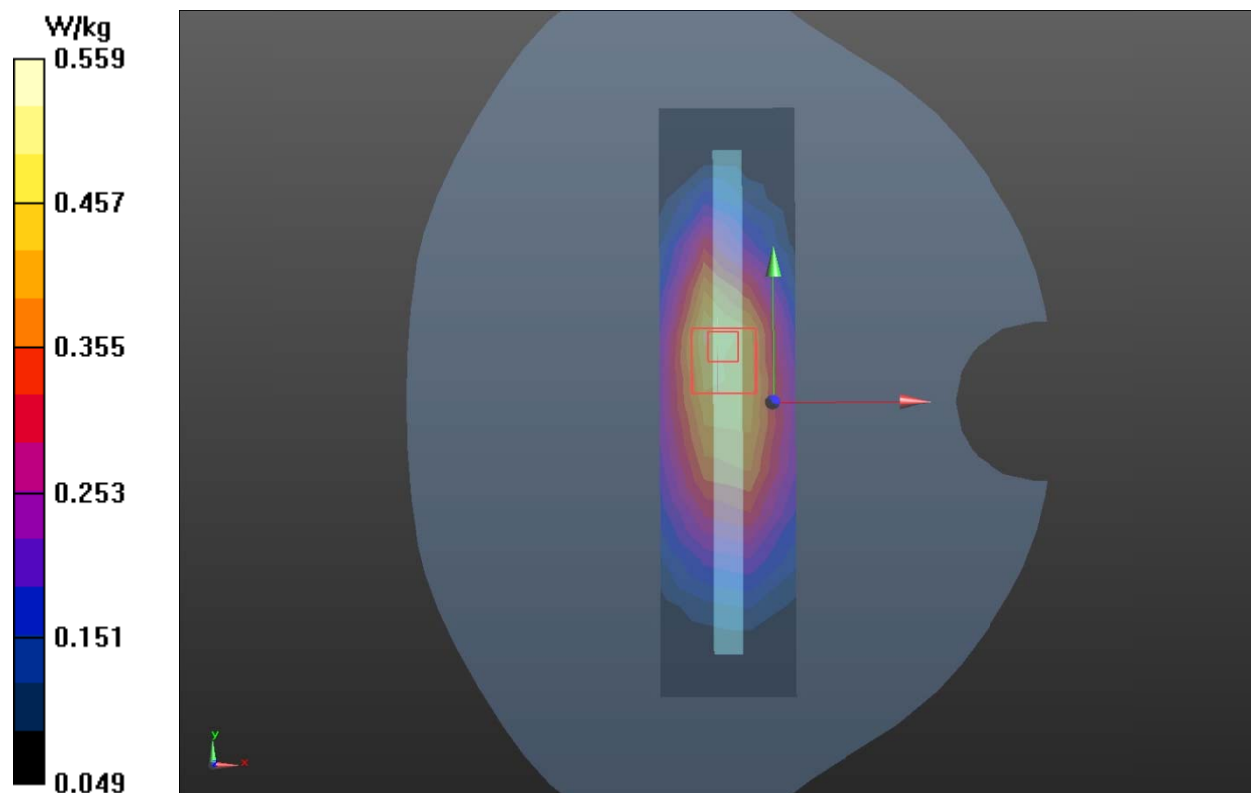
**Right Edge Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.81 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.654 W/kg

**SAR(1 g) = 0.412 W/kg; SAR(10 g) = 0.278 W/kg**

Maximum value of SAR (measured) = 0.559 W/kg



## Plot 52 802.11b Back Side Middle (Distance 10mm)

Date: 10/2/2021

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz; Duty Cycle: 1:1.02

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.856$  S/m;  $\epsilon_r = 40.836$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (9x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.341 W/kg

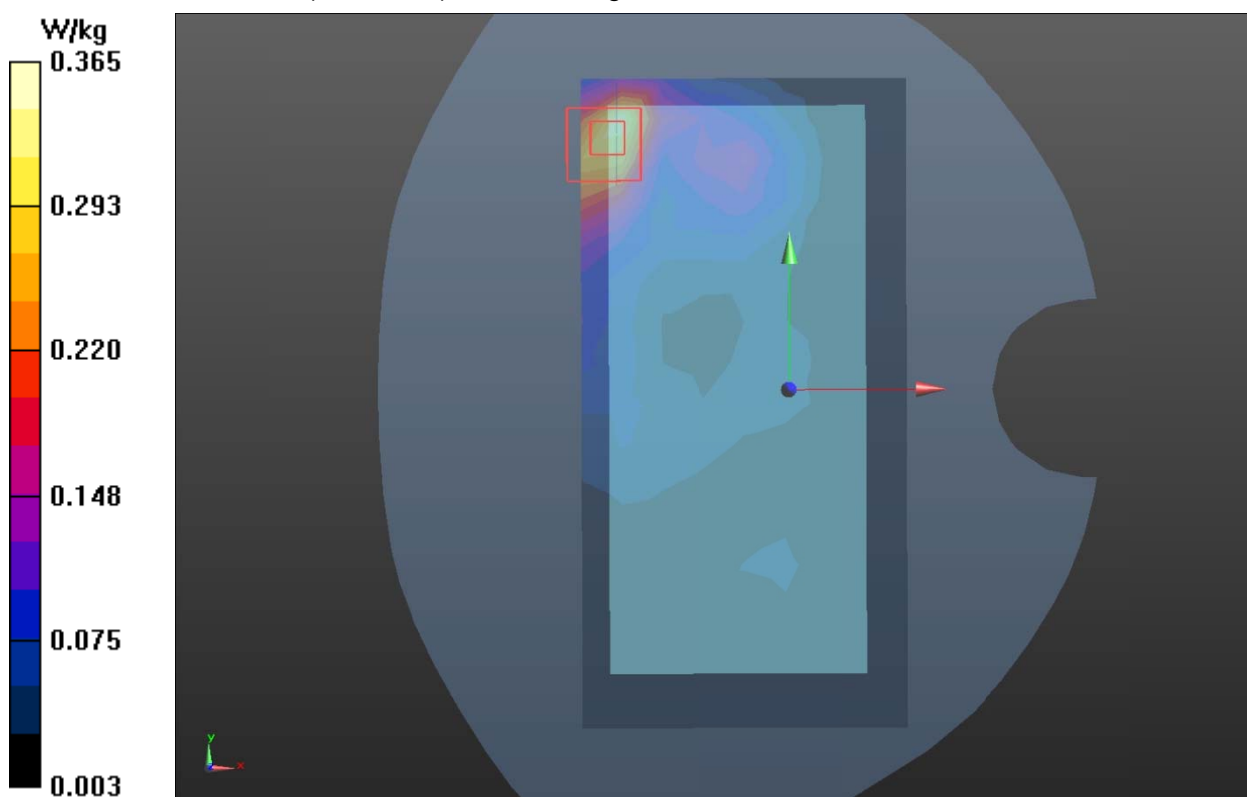
**Back Side Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.657 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.719 W/kg

**SAR(1 g) = 0.335 W/kg; SAR(10 g) = 0.160 W/kg**

Maximum value of SAR (measured) = 0.365 W/kg



# Plot 53 802.11a U-NII-1 Top Edge Middle (Distance 10mm)

Date: 10/14/2021

Communication System: UID 0, 802.11a (0); Frequency: 5220 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5220$  MHz;  $\sigma = 4.86$  S/m;  $\epsilon_r = 36.763$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.45, 5.45, 5.45); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Top Edge Middle /Area Scan (5x11x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.22 W/kg

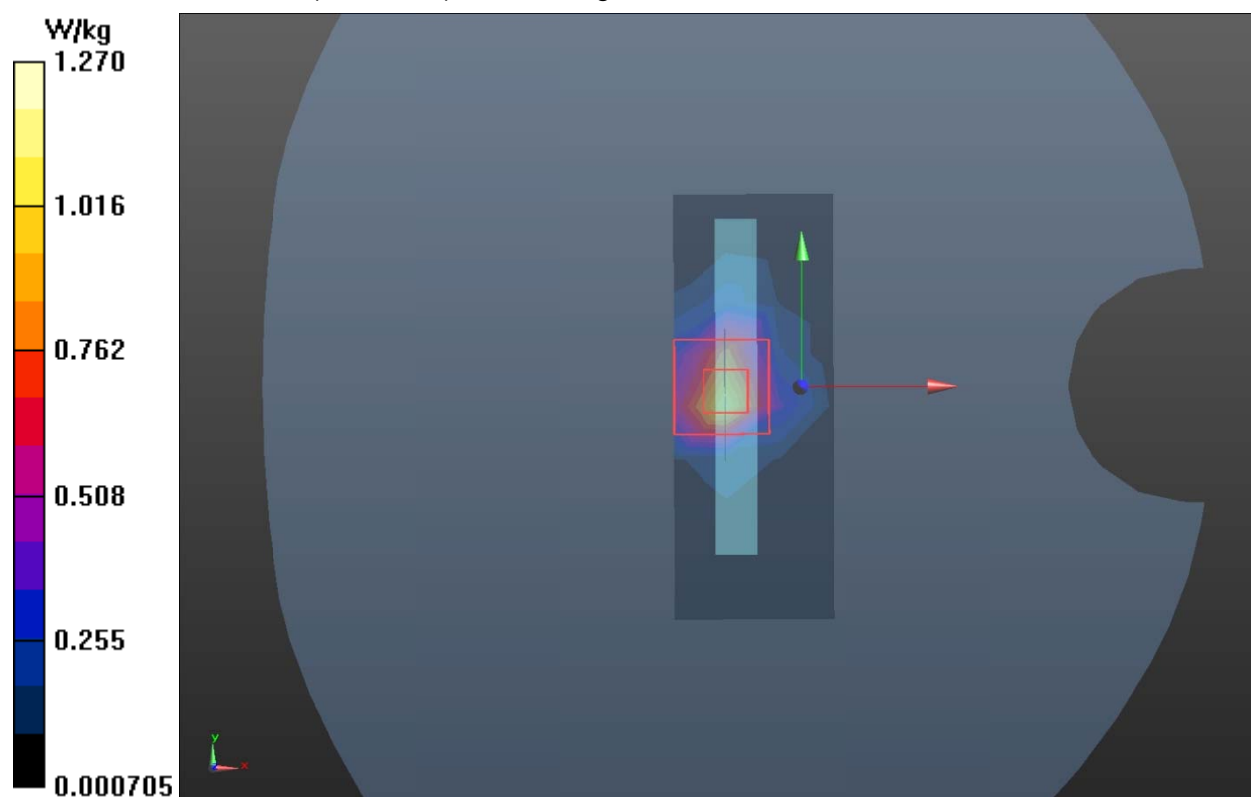
**Top Edge Middle /Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 15.83 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 5.24 W/kg

**SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.376 W/kg**

Maximum value of SAR (measured) = 1.27 W/kg



# Plot 54 802.11a U-NII-3 Top Edge Middle (Distance 10mm)

Date: 10/21/2021

Communication System: UID 0, 802.11a (0); Frequency: 5785 MHz; Duty Cycle: 1:1

Medium parameters used:  $f = 5785$  MHz;  $\sigma = 5.48$  S/m;  $\epsilon_r = 35.343$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(5.04, 5.04, 5.04); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Top Edge Middle/Area Scan (5x11x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.714 W/kg

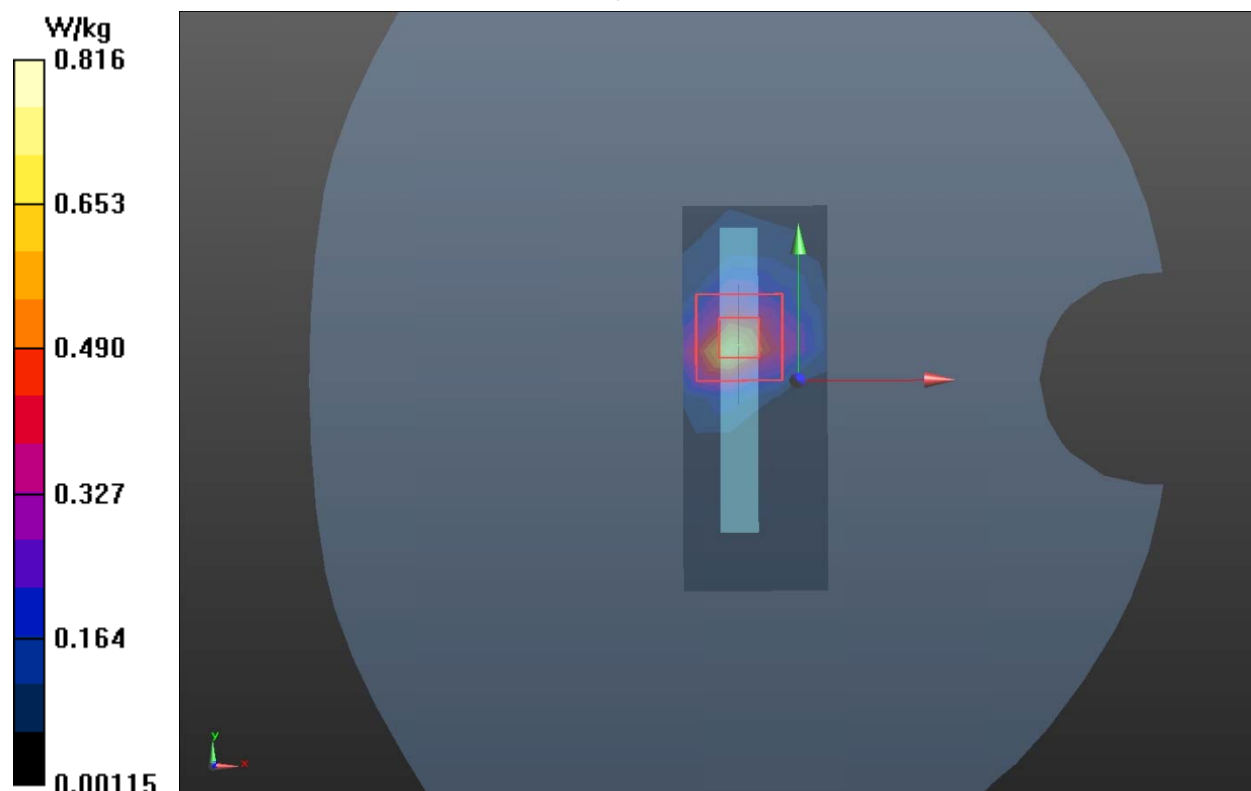
**Top Edge Middle/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 7.314 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 2.22 W/kg

**SAR(1 g) = 0.679 W/kg; SAR(10 g) = 0.215 W/kg**

Maximum value of SAR (measured) = 0.816 W/kg



## Plot 55 BT Back Side Low (Distance 10mm)

Date: 10/2/2021

Communication System: UID 0, BT (0); Frequency: 2402 MHz; Duty Cycle: 1:1.3

Medium parameters used:  $f = 2402$  MHz;  $\sigma = 1.789$  S/m;  $\epsilon_r = 37.77$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.50, 7.50, 7.50); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Low/Area Scan (9x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 0.044 W/kg

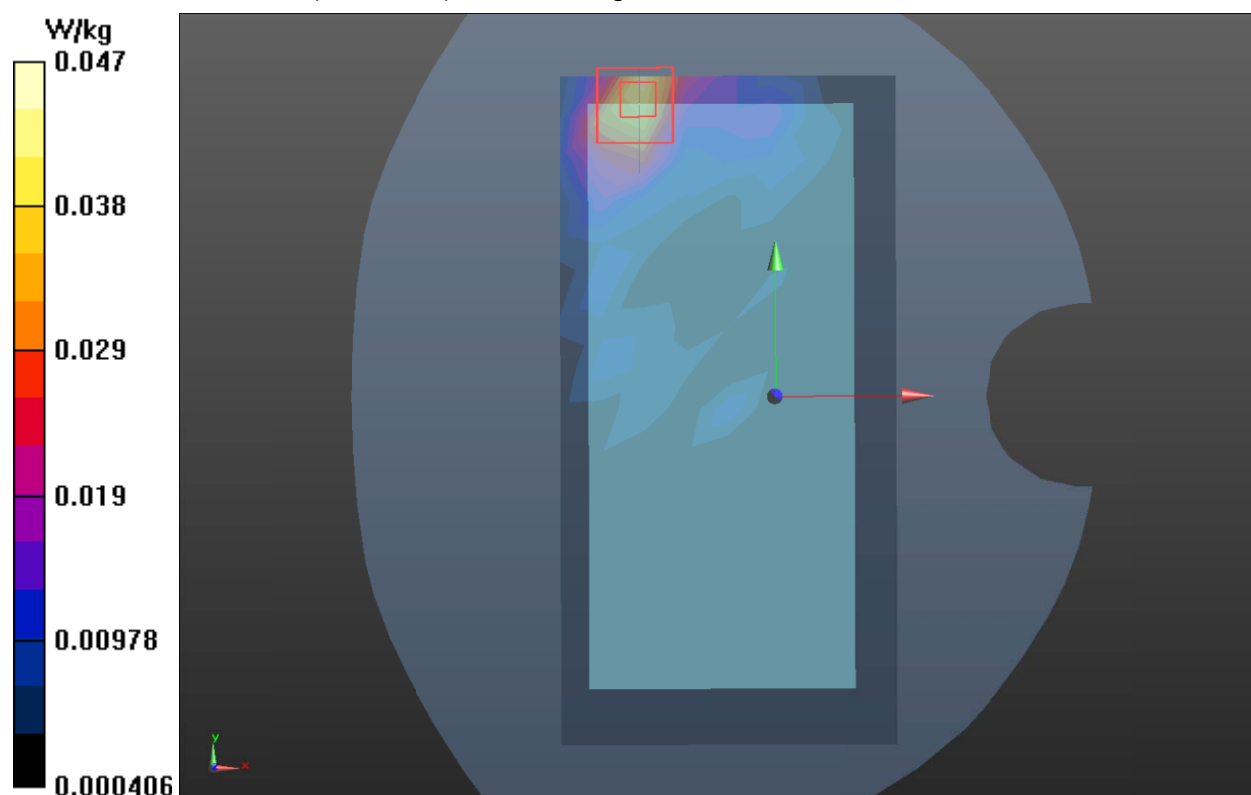
**Back Side Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.6240 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 0.095 W/kg

**SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.021 W/kg**

Maximum value of SAR (measured) = 0.047 W/kg



## Plot 56 LTE Band 41 Back Side Middle (Distance 0mm)

Date:10/9/2021

Communication System: UID 0, LTE (0); Frequency: 2593 MHz;Duty Cycle: 1:1.58

Medium parameters used:  $f = 2593$  MHz;  $\sigma = 2.009$  S/m;  $\epsilon_r = 37.118$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature:22.3 °C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.25, 7.25, 7.25); Calibrated: 2021/8/12

Electronics: DAE4 SN1317; Calibrated: 2021/2/23

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

**Back Side Middle/Area Scan (10x17x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 6.20 W/kg

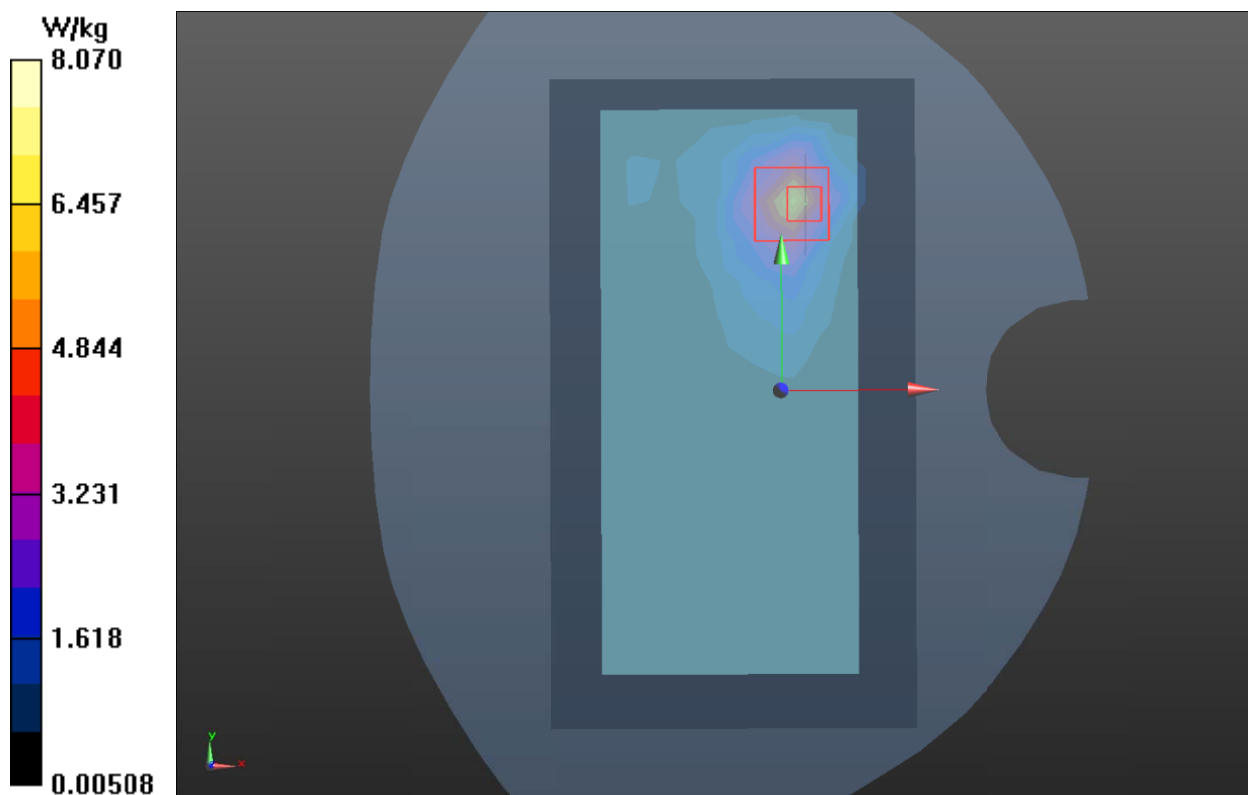
**Back Side Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.88 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 21.3 W/kg

**SAR(1 g) = 5.83 W/kg; SAR(10 g) = 2.51 W/kg**

Maximum value of SAR (measured) = 8.07 W/kg





## ANNEX D: Probe Calibration Certificate



In Collaboration with  
**s p e a g**  
CALIBRATION LABORATORY



中国认可  
国际互认  
校准  
CALIBRATION  
CNAS L0570

Add: No.52 HuaYuanBei Road, Haidian District, Beijing, 100191, China  
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504  
E-mail: cttl@chinattl.com Http://www.chinattl.cn

Client **TA(Shanghai)**Certificate No: **Z21-60285****CALIBRATION CERTIFICATE**Object **EX3DV4 - SN : 3677**

Calibration Procedure(s) **FF-Z11-004-02**  
**Calibration Procedures for Dosimetric E-field Probes**

Calibration date: **August 12, 2021**

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)°C and humidity<70%.

Calibration Equipment used (M&amp;TE critical for calibration)

| Primary Standards        | ID #        | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|--------------------------|-------------|------------------------------------------|-----------------------|
| Power Meter NRP2         | 101919      | 15-Jun-21(CTTL, No.J21X04466)            | Jun-22                |
| Power sensor NRP-Z91     | 101547      | 15-Jun-21(CTTL, No.J21X04466)            | Jun-22                |
| Power sensor NRP-Z91     | 101548      | 15-Jun-21(CTTL, No.J21X04466)            | Jun-22                |
| Reference 10dBAttenuator | 18N50W-10dB | 10-Feb-20(CTTL, No.J20X00525)            | Feb-22                |
| Reference 20dBAttenuator | 18N50W-20dB | 10-Feb-20(CTTL, No.J20X00526)            | Feb-22                |
| Reference Probe EX3DV4   | SN 3617     | 27-Jan-21(SPEAG, No.EX3-3617_Jan21)      | Jan-22                |
| DAE4                     | SN 1556     | 15-Jan-21(SPEAG, No.DAE4-1556_Jan21)     | Jan-22                |
| Secondary Standards      | ID #        | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
| SignalGenerator MG3700A  | 6201052605  | 16-Jun-21(CTTL, No.J21X04467)            | Jun-22                |
| Network Analyzer E5071C  | MY46110673  | 21-Jan-21(CTTL, No.J20X00515)            | Jan-22                |

|                | Name        | Function           | Signature |
|----------------|-------------|--------------------|-----------|
| Calibrated by: | Yu Zongying | SAR Test Engineer  |           |
| Reviewed by:   | Lin Hao     | SAR Test Engineer  |           |
| Approved by:   | Qi Dianyuan | SAR Project Leader |           |

Issued: August 14, 2021

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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## Glossary:

|                       |                                                                                                                                             |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                   | tissue simulating liquid                                                                                                                    |
| NORM <sub>x,y,z</sub> | sensitivity in free space                                                                                                                   |
| ConvF                 | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                  |
| DCP                   | diode compression point                                                                                                                     |
| CF                    | crest factor (1/duty_cycle) of the RF signal                                                                                                |
| A,B,C,D               | modulation dependent linearization parameters                                                                                               |
| Polarization $\Phi$   | $\Phi$ rotation around probe axis                                                                                                           |
| Polarization $\theta$ | $\theta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i<br>$\theta=0$ is normal to probe axis |

Connector Angle information used in DASY system to align probe sensor X to the robot coordinate system

## Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

## Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\theta=0$  ( $f \leq 900\text{MHz}$  in TEM-cell;  $f > 1800\text{MHz}$ : waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the  $E^2$ -field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800\text{MHz}$ ) and inside waveguide using analytical field distributions based on power measurements for  $f > 800\text{MHz}$ . The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50\text{MHz}$  to  $\pm 100\text{MHz}$ .
- Spherical isotropy (3D deviation from isotropy)**: In a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM<sub>x</sub> (no uncertainty required).

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## DASY/EASY – Parameters of Probe: EX3DV4 – SN:3677

### Basic Calibration Parameters

|                                      | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|--------------------------------------|----------|----------|----------|-----------|
| Norm( $\mu V/(V/m)^2$ ) <sup>A</sup> | 0.41     | 0.46     | 0.40     | ±10.0%    |
| DCP(mV) <sup>B</sup>                 | 99.3     | 101.9    | 101.5    |           |

### Modulation Calibration Parameters

| UID | Communication System Name |   | A dB | B dB $\sqrt{\mu V}$ | C   | D dB | VR mV | Unc <sup>E</sup> (k=2) |
|-----|---------------------------|---|------|---------------------|-----|------|-------|------------------------|
| 0   | CW                        | X | 0.0  | 0.0                 | 1.0 | 0.00 | 158.2 | ±2.0%                  |
|     |                           | Y | 0.0  | 0.0                 | 1.0 |      | 170.4 |                        |
|     |                           | Z | 0.0  | 0.0                 | 1.0 |      | 156.9 |                        |

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution Corresponds to a coverage probability of approximately 95%.

<sup>A</sup> The uncertainties of Norm X, Y, Z do not affect the  $E^2$ -field uncertainty inside TSL (see Page 4).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



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## DASY/EASY – Parameters of Probe: EX3DV4 – SN:3677

### Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unct. (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-------------|
| 750                  | 41.9                               | 0.89                            | 9.64    | 9.64    | 9.64    | 0.40               | 0.80                    | ±12.1%      |
| 835                  | 41.5                               | 0.90                            | 9.30    | 9.30    | 9.30    | 0.16               | 1.29                    | ±12.1%      |
| 1750                 | 40.1                               | 1.37                            | 8.22    | 8.22    | 8.22    | 0.24               | 1.00                    | ±12.1%      |
| 1900                 | 40.0                               | 1.40                            | 7.88    | 7.88    | 7.88    | 0.24               | 1.10                    | ±12.1%      |
| 2000                 | 40.0                               | 1.40                            | 7.96    | 7.96    | 7.96    | 0.21               | 1.17                    | ±12.1%      |
| 2300                 | 39.5                               | 1.67                            | 7.67    | 7.67    | 7.67    | 0.66               | 0.68                    | ±12.1%      |
| 2450                 | 39.2                               | 1.80                            | 7.50    | 7.50    | 7.50    | 0.66               | 0.70                    | ±12.1%      |
| 2600                 | 39.0                               | 1.96                            | 7.25    | 7.25    | 7.25    | 0.62               | 0.73                    | ±12.1%      |
| 3300                 | 38.2                               | 2.71                            | 7.00    | 7.00    | 7.00    | 0.45               | 0.94                    | ±13.3%      |
| 3500                 | 37.9                               | 2.91                            | 6.92    | 6.92    | 6.92    | 0.45               | 0.98                    | ±13.3%      |
| 3700                 | 37.7                               | 3.12                            | 6.71    | 6.71    | 6.71    | 0.45               | 1.04                    | ±13.3%      |
| 3900                 | 37.5                               | 3.32                            | 6.62    | 6.62    | 6.62    | 0.40               | 1.25                    | ±13.3%      |
| 4100                 | 37.2                               | 3.53                            | 6.66    | 6.66    | 6.66    | 0.30               | 1.38                    | ±13.3%      |
| 4400                 | 36.9                               | 3.84                            | 6.43    | 6.43    | 6.43    | 0.35               | 1.35                    | ±13.3%      |
| 4600                 | 36.7                               | 4.04                            | 6.35    | 6.35    | 6.35    | 0.50               | 1.13                    | ±13.3%      |
| 4800                 | 36.4                               | 4.25                            | 6.30    | 6.30    | 6.30    | 0.45               | 1.25                    | ±13.3%      |
| 4950                 | 36.3                               | 4.40                            | 6.13    | 6.13    | 6.13    | 0.45               | 1.25                    | ±13.3%      |
| 5250                 | 35.9                               | 4.71                            | 5.45    | 5.45    | 5.45    | 0.50               | 1.30                    | ±13.3%      |
| 5600                 | 35.5                               | 5.07                            | 5.00    | 5.00    | 5.00    | 0.60               | 1.15                    | ±13.3%      |
| 5750                 | 35.4                               | 5.22                            | 5.04    | 5.04    | 5.04    | 0.55               | 1.26                    | ±13.3%      |

<sup>C</sup> Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<sup>F</sup> At frequency below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

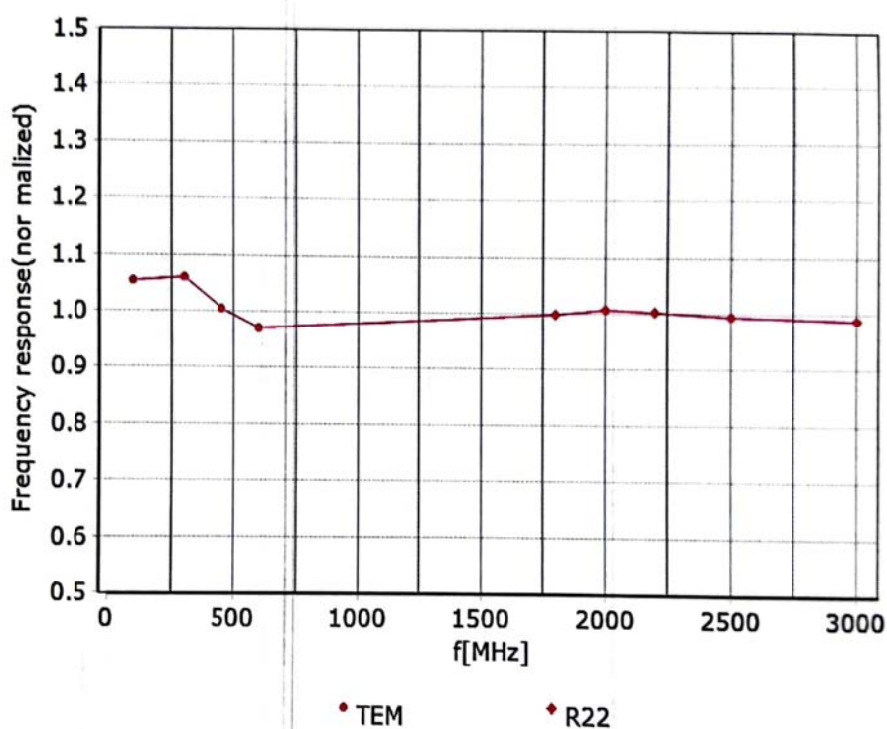
<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.



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## Frequency Response of E-Field (TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field:  $\pm 7.4\%$  ( $k=2$ )

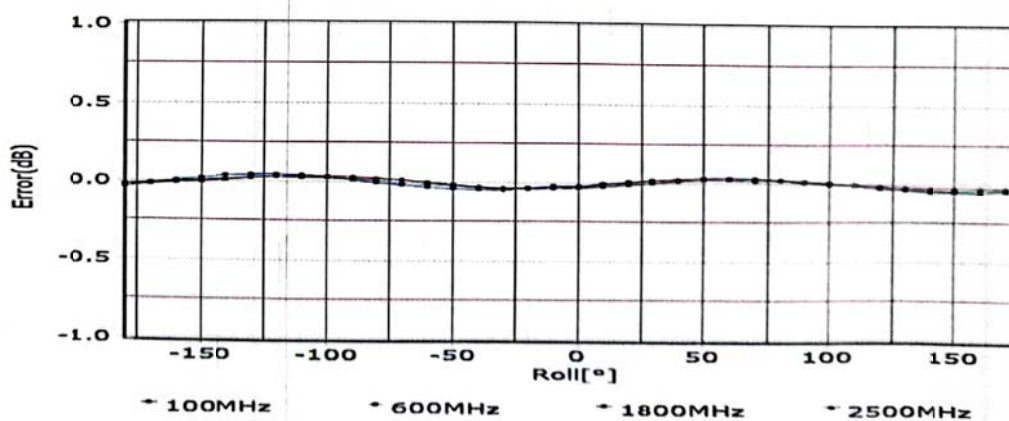
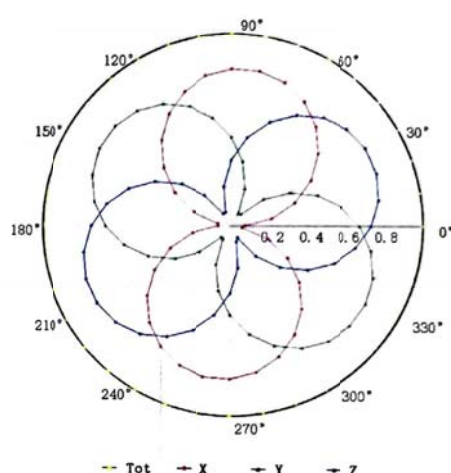
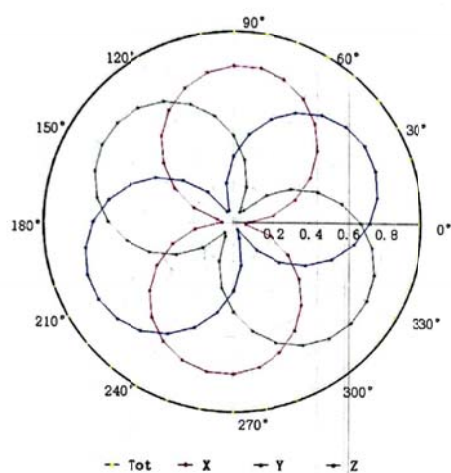


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## Receiving Pattern ( $\Phi$ ), $\theta=0^\circ$

**f=600 MHz, TEM**

**f=1800 MHz, R22**



Uncertainty of Axial Isotropy Assessment:  $\pm 1.2\%$  ( $k=2$ )

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