TEST REPORT

No. I18D00020-SAR01

For

Client: Hisense International Co., Ltd.

Production: Mobile Phone

Model Name: Hisense F23 PLUS

FCC ID: 2ADOBF23PLUS

Hardware Version: YK736-MB-V0.2

Software Version: Hisense_F17_4G_10_S01_2018

Issued date: 2018-3-22

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

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Revision Version

Report Number	Revision	Date	Memo
I18D00020-SAR01	00	2018-3-16	Initial creation of test report
I18D00020-SAR01	01	2018-3-20	Second creation of test report
I18D00020-SAR01	02	2018-3-22	Third creation of test report

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1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area,No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

1.2. Testing Environment

Normal Temperature:	18-25℃
Relative Humidity:	25-75%
Ambient noise & Reflection:	< 0.012 W/kg

1.3. Project Data

Project Leader:	Xu Yuting
Testing Start Date:	2018-2-2
Testing End Date:	2018-3-4

1.4. Signature

Yan Hang
(Prepared this test report)

Fu Erliang
(Reviewed this test report)

Zheng Zhongbin
(Approved this test report)

2. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Hisense F23 PLUS** are as follows .

Table 2.1: Max. Reported SAR Main Supply (1g)

Band	Position/Distance	SAR 1g (W/Kg)
GSM 850	Head	0.191
	Body worn(10mm)	0.592
	Hotspot(10mm)	0.592
GSM 1900	Head	0.075
	Body worn(10mm)	0.531
	Hotspot(10mm)	0.531
WCDMA Band2	Head	0.112
	Body worn(10mm)	**0.645**
	Hotspot(10mm)	0.645
WCDMA Band4	Head	0.121
	Body worn(10mm)	0.520
	Hotspot(10mm)	0.520
WCDMA Band5	Head	0.242
	Body worn(10mm)	0.408
	Hotspot(10mm)	0.408
LTE Band2	Head	0.132
	Body worn(10mm)	0.574
	Hotspot(10mm)	0.574
LTE Band4	Head	0.114
	Body worn(10mm)	0.488
	Hotspot(10mm)	0.488
LTE Band5	Head	0.224
	Body worn(10mm)	0.374
	Hotspot(10mm)	0.374
LTE Band7	Head	0.061
	Body worn(10mm)	0.644
	Hotspot(10mm)	**1.085**
LTE Band12	Head	0.113
	Body worn(10mm)	0.149
	Hotspot(10mm)	0.149
2.4G Wi-Fi	Head	0.705
	Body worn(10mm)	0.227
	Hotspot(10mm)	0.227
5G Wi-Fi	Head	**1.069**
	Body worn(10mm)	0.181

	Hotspot(10mm)	0.297

Table 2.2: Max. Reported SAR Second Supply (1g)

Band	Position/Distance	SAR 1g (W/Kg)
LTE Band7	Hotspot(10mm)	0.927

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the ANSI C95.1-1999.

For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

The sample has three antennas. One is main antenna for GSM/WCDMA/LTE, and the other is for WiFi/BT/GPS and Diversity Antenna. So simultaneous transmission is GSM/WCDMA/LTE and WiFi/BT.

Table 2.3: Simultaneous SAR (1g)

Transmission SAR(W/Kg)									
Test Position			2G	3G	4G	2.4G WIFI	5GWIFI	BT	SUM
Head	Left	Cheek	0.191	0.242	0.224	0.705	0.615	0.167	0.947
		Tilt 15°	0.107	0.152	0.131	0.626	1.069	0.167	1.221
	Right	Cheek	0.139	0.206	0.174	0.257	0.438	0.167	0.644
		Tilt 15°	0.106	0.145	0.122	0.269	0.666	0.167	0.811
Body worn/ Hotspot10mm	Phantom Side		0.388	0.293	0.427	0.166	0.164	0.084	0.593
	Ground Side		0.592	0.645	0.644	0.227	0.181	0.084	0.872
Hotspot 10mm	Left Side		0.495	0.273	0.248	0.020	<0.01	0.084	0.579
	Right Side		0.402	0.192	0.278	0.150	0.014	0.084	0.552
	Bottom Side		0.490	0.483	1.085	--	--	0.084	1.169
	Top Side		--	--	--	0.103	0.297	0.084	0.297

According to the above table, the maximum sum of reported SAR values for GSM/WCDMA/LTE and WiFi is **1.221 W/kg** (1g). The detail for simultaneous transmission consideration is described in chapter 14.

3. Client Information

3.1. Applicant Information

Company Name:	Hisense International Co., Ltd.
Address:	Floor 22, Hisense Tower, 17 Donghai Xi Road, Qingdao, 266071, China
Email:	zhanghanhan@hisense.com

3.2. Manufacturer Information

Company Name:	Hisense Communications Co., Ltd.
Address:	218 Qianwangang Road, Economic & Technological Development Zone, Qingdao, Shandong Province, P.R. China
Email:	daiqingtao@hisense.com

4. Equipment Under Test (EUT) and Ancillary Equipment (AE)

4.1. About EUT

Description:	Mobile Phone
Model name:	Hisense F23 PLUS
Operation Model(s):	GSM850/900/1800/1900,WCDMA Band II/IV/V LTE Band 2/3/4/5/712,WIFI2.4G/5G,BT
Tx Frequency:	824.2-848.8MHz(GSM850) 1850.2-1909.8MHz（GSM1900） 1852.4-1907.6 MHz (WCDMA Band II) 1712.4-1752.6 MHz (WCDMA Band IV) 826.4-846.6MHz (WCDMA Band V) 1850 -1910 MHz (LTE Band 2) 1710 -1755 MHz (LTE Band 4) 824 -849 MHz (LTE Band 5) 2500 - 2570 MHz (LTE Band 7) 700 -716MHz (LTE Band 12) 2412- 2462 MHz (Wi-Fi) 5260- 5320 MHz (Wi-Fi) 5745- 5825 MHz (Wi-Fi) 2400-2483.5 MHz (BT)
Test device Production information: GPRS/EGPRS Class Mode: GPRS/ EGPRS Multislot Class:	Production unit B 12
Device type:	Portable device
UE category:	3
Antenna type:	Inner antenna
Accessories/Body-worn configurations:	Headset Battery
Dimensions: Hotspot Mode:	14.8cm×7.2 cmx1.0cm Support simultaneous transmission of hotspot and voice (or data)
FCC ID:	2ADOBF23PLUS

4.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Receive Date
N17	861854039066103	YK736-MB-V0.2	Hisense_F17_4G_10_S01_20180118	2018-1-24
N21	861854039067119	YK736-MB-V0.2	Hisense_F17_4G_10_S01_20180118	2018-1-24

*EUT ID: is used to identify the test sample in the lab internally.

N17 is Main Supply ； N21 is Secondary Supply

4.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AA01	Headset	N/A	N/A	N/A
BA35	Battery	N/A	N/A	N/A

*AE ID: is used to identify the test sample in the lab internally.

5. TEST METHODOLOGY

5.1. Applicable Limit Regulations

ANSI C95.1–1999:IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2. Applicable Measurement Standards

IEEE 1528–2013: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices:
Experimental Techniques.
KDB648474 D04 Handset SAR v01r03:SAR Evaluation Considerations for Wireless Handsets.
KDB248227 D01 802 11 Wi-Fi SAR v02r02: SAR measurement procedures for 802.112abg transmitters.
KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.
KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04:SAR Measurement Requirements for 100 MHz to 6 GHz
KDB865664 D02 RF Exposure Reporting v01r02:provides general reporting requirements as well as certain specific information required to support MPE and SAR compliance.
KDB941225 D01 3G SAR Procedures v03r01: 3G SAR Measurement Procedures.
KDB941225 D06 hotspot SAR v02r01:SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities.
NOTE: KDB is not in A2LA Scope List.

6. Specific Absorption Rate (SAR)

6.1. Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2. SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ) . The equation description is as below:

$$SAR = \frac{d}{dt}(\frac{dW}{dm}) = \frac{d}{dt}(\frac{dW}{\rho dv})$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = c(\frac{\delta T}{\delta t})$$

Where: C is the specific head capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7. Tissue Simulating Liquids

7.1. Targets for tissue simulating liquid

Table 7.1: Targets for tissue simulating liquid

Frequency(MHz)	Liquid Type	Conductivity(σ)	± 5% Range	Permittivity(ε)	± 5% Range
835	Head	0.90	0.86～0.95	41.5	39.4～43.6
835	Body	0.97	0.92～1.02	55.2	52.4～58.0
1800	Head	1.40	1.33～1.47	40.0	38.0～42.0
1800	Body	1.52	1.44～1.60	53.3	50.6～56.0
1900	Head	1.40	1.33～1.47	40.0	38.0～42.0
1900	Body	1.52	1.44～1.60	53.3	50.6～56.0
2450	Head	1.80	1.71～1.89	39.2	37.2～41.2
2450	Body	1.95	1.85～2.05	52.7	50.1～55.3
2600	Head	1.96	1.86~2.06	39.0	37.1~40.9
2600	Body	2.16	2.05~2.27	52.5	59.9~55.1
5200	Head	4.66	4.43~4.89	36.0	34.2~37.8
5200	Body	5.30	5.04~5.57	49.0	46.6~51.5
5800	Head	5.27	5.01~5.53	35.3	33.5~37.1
5800	Body	6.00	5.70~6.30	48.2	45.8~50.6

7.2. Dielectric Performance

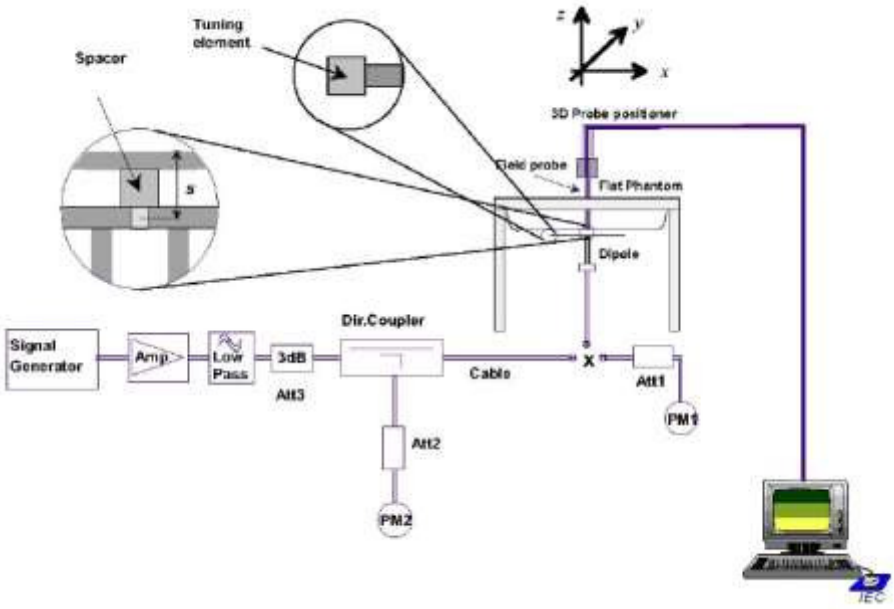
Table 7.2: Dielectric Performance of Tissue Simulating Liquid

Measurement Value						
Liquid Temperature: 22.5 ℃						
Type	**Frequency**	**Permittivity ε**	**Drift (%)**	**Conductivity σ**	**Drift (%)**	Test Date
Head	750 MHz	43.156	3.00%	0.858	-3.60%	2018-2-2
Head	835 MHz	42.971	3.54%	0.939	4.33%	2018-2-3
Head	1800 MHz	40.544	1.36%	1.375	-1.79%	2018-2-4
Head	1900 MHz	38.788	-3.03%	1.349	-3.64%	2018-2-5
Head	2450 MHz	40.902	4.34%	1.821	1.17%	2018-2-11
Head	2600 MHz	38.249	-1.93%	2.035	3.83%	2018-3-4
Head	5300 MHz	36.988	3.12%	4.697	-1.32%	2018-2-6
Head	5800 MHz	36.059	2.15%	5.243	-0.51%	2018-2-6
Body	750 MHz	57.684	3.94%	0.945	-1.56%	2018-2-2
Body	835 MHz	56.695	2.71%	0.998	2.89%	2018-2-3
Body	1800 MHz	55.0	3.19%	1.473	-3.09%	2018-2-4
Body	1900 MHz	54.596	2.43%	1.576	3.68%	2018-2-5
Body	2450 MHz	53.002	0.57%	1.976	1.33%	2018-2-11
Body	2600 MHz	52.858	0.68%	2.083	-3.56%	2018-3-4
Body	5300 MHz	49.847	1.94%	5.333	-2.33%	2018-2-6
Body	5800 MHz	48.828	0.72%	6.051	4.51%	2018-2-6

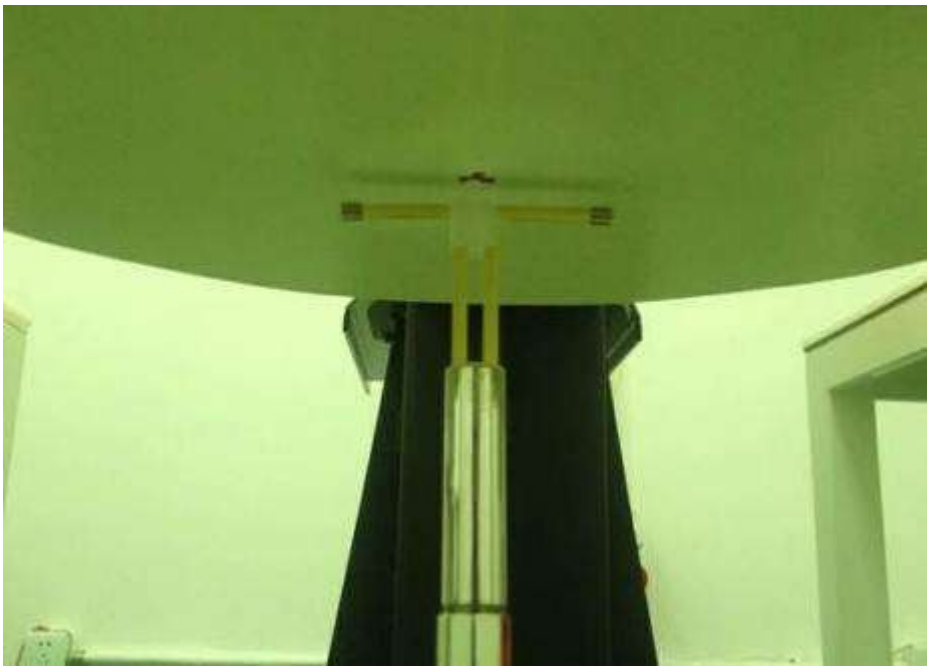
8. System verification

8.1. System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:



Picture 8.1 System Setup for System Evaluation



Picture 8.2 Photo of Dipole Setup

8.2. System Verification

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device.

Table 8.1: System Verification of Head

Verification Results							
Input power level: 1W							
Frequency	**Target value (W/kg)**		**Measured value (W/kg)**		**Deviation**		**Test date**
	10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**	
750 MHz	5.29	8.07	5.6	8.36	5.86%	3.59%	2018-2-2
835 MHz	6.03	9.22	5.8	8.56	-3.81%	-7.16%	2018-2-3
1750 MHz	20.1	37.3	18.52	34.64	-7.86%	-7.13%	2018-2-4
1900 MHz	21	40.8	22.64	44	7.81%	7.84%	2018-2-5
2450 MHz	24.3	52.9	23.32	51.6	-4.03%	-2.46%	2018-2-11
2600 MHz	25.5	58	26.8	62	5.10%	6.90%	2018-3-4
5300 MHz	24.1	84	23.2	83.9	-3.73%	-0.12%	2018-2-6
5800 MHz	23	81	21.5	77.1	-6.52%	-4.81%	2018-2-6

Table 8.2: System Verification of Body

Verification Results							
Input power level: 1W							
Frequency	Target value (W/kg)		Measured value (W/kg)		Deviation		Test date
	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	
750 MHz	5.71	8.6	5.92	8.64	3.68%	0.47%	2018-2-2
835 MHz	6.29	9.57	6.2	9.12	-1.43%	-4.70%	2018-2-3
1750 MHz	20.2	37.6	18.96	35.36	-6.14%	-5.96%	2018-2-4
1900 MHz	21.3	41.1	21.64	42	1.60%	2.19%	2018-2-5
2450 MHz	24.7	53.1	24.88	53.2	0.73%	0.19%	2018-2-11
2600 MHz	25.4	57.1	24.56	54.4	-3.31%	-4.73%	2018-3-4
5300 MHz	21.3	76.4	20.2	73.4	-5.16%	-3.93%	2018-2-6
5800 MHz	21.2	76.4	20.3	74.1	-4.25%	-3.01%	2018-2-6

9. Measurement Procedures

9.1. Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in Picture 11.1.

Step 1: The tests described in 11.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in Chapter 8),

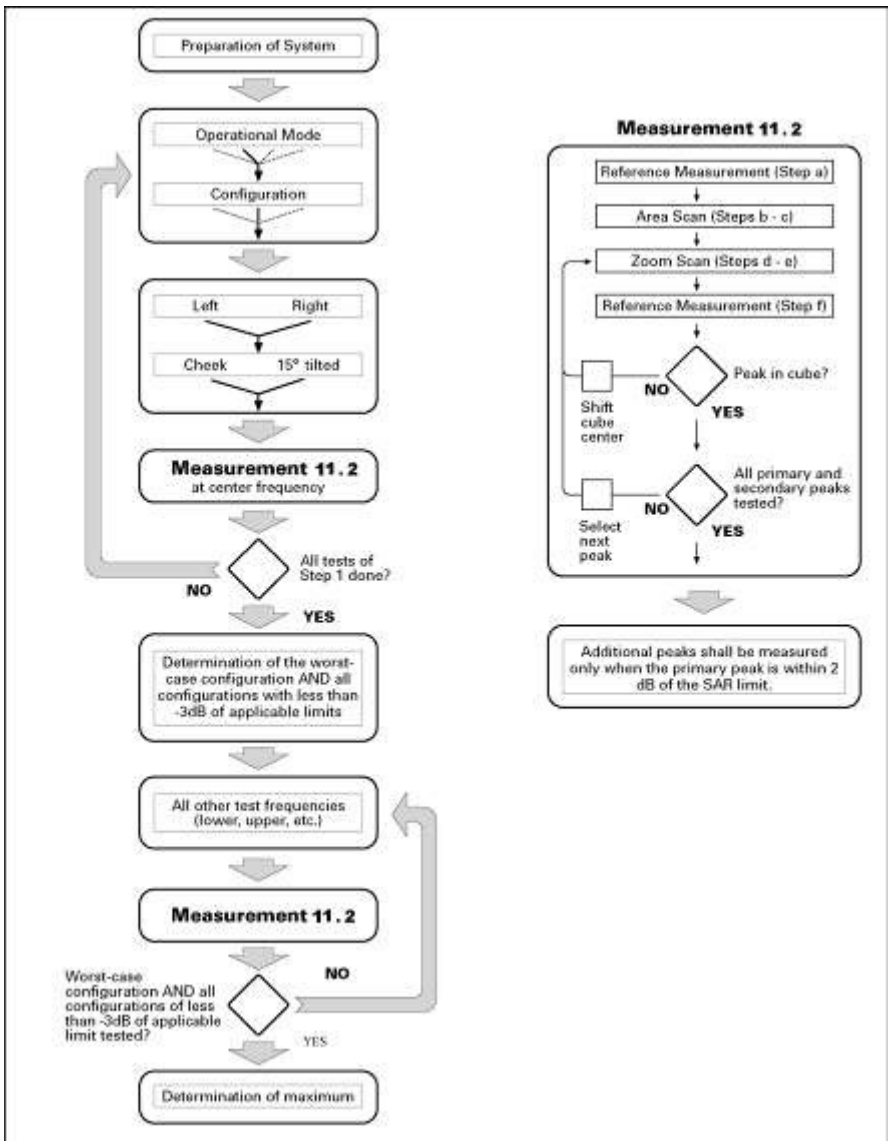
b) all configurations for each device position in a), e.g., antenna extended and retracted, and

c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.

Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 11.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.

Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 9.1Block diagram of the tests to be performed

9.2. General Measurement Procedure

The following procedure shall be performed for each of the test conditions (see Picture 11.1) described in 11.1:

a) Measure the local SAR at a test point within 8 mm or less in the normal direction from the inner surface of the phantom.

b) Measure the two-dimensional SAR distribution within the phantom (area scan procedure). The boundary of the measurement area shall not be closer than 20 mm from the phantom side walls. The distance between the measurement points should enable the detection of the location of local maximum with an accuracy of better than half the linear dimension of the tissue cube after interpolation. A maximum grip spacing of 20 mm

for frequencies below 3 GHz and (60/f [GHz]) mm for frequencies of 3GHz and greater is recommended. The maximum distance between the geometrical centre of the probe detectors and the inner surface of the phantom shall be 5 mm for frequencies below 3 GHz and δ ln(2)/2 mm for frequencies of 3 GHz and greater, where δ is the plane wave skin depth and ln(x) is the natural logarithm. The maximum variation of the sensor-phantom surface shall be ±1 mm for frequencies below 3 GHz and ±0.5 mm for frequencies of 3 GHz and greater. At all measurement points the angle of the probe with respect to the line normal to the surface should be less than 5° . If this cannot be achieved for a measurement distance to the phantom inner surface shorter than the probe diameter, additional uncertainty evaluation is needed.

c) From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that are not within the zoom-scan volume; additional peaks shall be measured only when the primary peak is within 2 dB of the SAR limit. This is consistent with the 2 dB threshold already stated;

d) Measure the three-dimensional SAR distribution at the local maxima locations identified in step c). The horizontal grid step shall be (24/f[GHz]) mm or less but not more than 8 mm. The minimum zoom size of 30 mm by 30 mm and 30 mm for frequencies below 3 GHz. For higher frequencies, the minimum zoom size of 22 mm by 22 mm and 22 mm. The grip step in the vertical direction shall be (8-f[GHz]) mm or less but not more than 5 mm, if uniform spacing is used. If variable spacing is used in the vertical direction, the maximum spacing between the two closest measured points to the phantom shell shall be (12 / f[GHz]) mm or less but not more than 4 mm, and the spacing between father points shall increase by an incremental factor not exceeding 1.5. When variable spacing is used, extrapolation routines shall be tested with the same spacing as used in measurements. The maximum distance between the geometrical centre of the probe detectors and the inner surface of the phantom shall be 5 mm for frequencies below 3 GHz and δ ln(2)/2 mm for frequencies of 3 GHz and greater, where δ is the plane wave skin depth and ln(x) is the natural logarithm. Separate grids shall be centered on each of the local SAR maxima found in step c). Uncertainties due to field distortion between the media boundary and the dielectric enclosure of the probe should also be minimized, which is achieved is the distance between the phantom surface and physical tip of the probe is larger than probe tip diameter. Other methods may utilize correction procedures for these boundary effects that enable high precision measurements closer than half the probe diameter. For all measurement points, the angle of the probe with respect to the

flat phantom surface shall be less than 5°. If this cannot be achieved an additional uncertainty evaluation is needed.

e) Use post processing(e.g. interpolation and extrapolation) procedures to determine the local SAR values at the spatial resolution needed for mass averaging.

9.3. WCDMA Measurement Procedures for SAR

The following procedures are applicable to WCDMA handsets operating under 3GPP Release99, Release 5 and Release 6. The default test configuration is to measure SAR with an established radio link between the DUT and a communication test set using a 12.2kbps RMC (reference measurement channel) configured in Test Loop Mode 1. SAR is selectively confirmed for other physical channel configurations (DPCCH &DPDCH$_n$), HSDPA and HSPA (HSUPA/HSDPA) modes according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. SAR for Release 5 HSDPA and Release 6 HSPA are measured using the applicable FRC (fixed reference channel) and E-DCH reference channel configurations. Maximum output power is verified according to applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. When Maximum Power Reduction (MPR) is not implemented according to Cubic Metric (CM) requirements for Release 6 HSPA, the following procedures do not apply.

For Release 5 HSDPA Data Devices:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}	CM/dB	MPR (dB)
1	2/15	15/15	64	2/15	4/15	1.5	0.5
2	12/15	15/15	64	12/15	24/25	2.0	1
3	15/15	8/15	64	15/8	30/15	2.0	1
4	15/15	4/15	64	15/4	30/15	2.0	1

For Release 6 HSUPA Data Devices

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (dB)	MPR (dB)	AG Index	E-TFCI
1	11/15	15/15	64	11/15	22/15	209/225	1039/225	4	1	2.0	1.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	12/15	4	1	3.0	2.0	12	67

3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	3.0	2.0	15	92
4	2/15	15/15	64	2/15	4/15	4/15	56/75	4	1	2.0	1.0	17	71
5	15/15	15/15	64	15/15	24/15	30/15	134/15	4	1	2.0	1.0	21	81

9.4. Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

9.5. Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Section 13 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

10. Area Scan Based 1-g SAR

10.1 Requirement of KDB

According to the KDB447498 D01 v06, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-g SAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required fo simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements, peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must also demonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR (See Annex B). When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

10.2 Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empirically determined by analyzing a large number of phones. The MOTOROLA FAST SAR was developed and validated by the MOTOROLA Research Group in Ft. Lauderdale.

In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of the algorithm has been demonstrated across a broad frequency range (136-2450 MHz) and for both 1- and 10-g averaged SAR using a sample of 264 SAR measurements from 55 wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm are 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively. The paper describing the algorithm in detail is expected to be published in August 2004 within the Special Issue of Transactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30-6000MHz. Details of this study can be found in the BEMS 2007 Proceedings.

Both algorithms are implemented in DASY software.

11. Conducted Output Power

Manufacturing tolerance

Table 11.1: GSM Speech

GSM 850			
Channel	Channel 128	Channel 190	Channel 251
Maximum Target Value (dBm)	33.0	33.0	33.0
GSM1900			
Channel	Channel 512	Channel 661	Channel 810
Maximum Target Value (dBm)	31.0	31.0	31.0

Table 11.2: GPRS (GMSK Modulation)

GSM 850 GPRS				
Channel		**128**	**190**	**251**
1 Txslots	Maximum Target Value (dBm)	33.0	33.0	33.0
2 Txslots	Maximum Target Value (dBm)	32.5	32.5	32.5
3 Txslots	Maximum Target Value (dBm)	31.0	31.0	31.0
4 Txslots	Maximum Target Value (dBm)	30.0	30.0	30.0
GSM 1900 GPRS				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	31.0	31.0	31.0
2 Txslots	Maximum Target Value (dBm)	30.0	30.0	30.0
3 Txslots	Maximum Target Value (dBm)	29.0	29.0	29.0
4 Txslots	Maximum Target Value (dBm)	28.0	28.0	28.0

Table 11.3: EGPRS (8-PSK Modulation)

GSM 850 EGPRS				
Channel		**975**	**38**	**124**
1 Txslots	Maximum Target Value (dBm)	28.0	28.0	28.0
2 Txslots	Maximum Target Value (dBm)	27.0	27.0	27.0
3 Txslots	Maximum Target Value (dBm)	24.0	24.0	24.0
4 Txslots	Maximum Target Value (dBm)	23.0	23.0	23.0
GSM 1900 EGPRS				
Channel		**512**	**661**	**810**
1 Txslots	Maximum Target Value (dBm)	27.0	27.0	27.0
2 Txslots	Maximum Target Value (dBm)	26.0	26.0	26.0
3 Txslots	Maximum Target Value (dBm)	25.0	25.0	25.0
4 Txslots	Maximum Target Value (dBm)	24.0	24.0	24.0

Table 11.4: WCDMA

WCDMA Band II			
Channel	Channel 9262	Channel 9400	Channel 9538
Maximum Target Value (dBm)	23.5	23.5	23.5

WCDMA Band II **HSDPA**					MPR (dB)
Channel		9262	9400	9538	
1	Maximum Target Value (dBm)	23	23	23	0
2	Maximum Target Value (dBm)	23	23	23	1
3	Maximum Target Value (dBm)	23	23	23	2
4	Maximum Target Value (dBm)	23	23	23	2
WCDMA Band II **HSUPA**					MPR (dB)
Channel		9262	9400	9538	
1	Maximum Target Value (dBm)	22	22	22	1
2	Maximum Target Value (dBm)	22	22	22	0
3	Maximum Target Value (dBm)	22	22	22	1
4	Maximum Target Value (dBm)	22	22	22	1
5	Maximum Target Value (dBm)	22	22	22	1

Table 11.5: WCDMA

WCDMA Band IV			
Channel	1537	1638	1738
Maximum Target Value (dBm)	23.5	23.5	23.5

WCDMA Band IV **HSDPA**					MPR (dB)
Channel		1537	1638	1738	
1	Maximum Target Value (dBm)	22.5	22.5	22.5	1
2	Maximum Target Value (dBm)	22.5	22.5	22.5	1
3	Maximum Target Value (dBm)	22.5	22.5	22.5	1
4	Maximum Target Value (dBm)	22.5	22.5	22.5	1
WCDMA Band IV **HSUPA**					MPR (dB)
Channel		1537	1638	1738	
1	Maximum Target Value (dBm)	21.5	21.5	21.5	1
2	Maximum Target Value (dBm)	21.5	21.5	21.5	1
3	Maximum Target Value (dBm)	21.5	21.5	21.5	1
4	Maximum Target Value (dBm)	21.5	21.5	21.5	1
5	Maximum Target Value (dBm)	21.5	21.5	21.5	1

Table 11.6: WCDMA

WCDMA Band V			
Channel	4233	4182	4132
Maximum Target Value (dBm)	24.0	24.0	24.0

WCDMA Band V **HSDPA**					MPR (dB)
Channel		4233	4182	4132	
1	Maximum Target Value (dBm)	23	23	23	0
2	Maximum Target Value (dBm)	23	23	23	1
3	Maximum Target Value (dBm)	23	23	23	2
4	Maximum Target Value (dBm)	23	23	23	2
WCDMA Band V **HSUPA**					MPR (dB)
Channel		4233	4182	4132	
1	Maximum Target Value (dBm)	22	22	22	1
2	Maximum Target Value (dBm)	22	22	22	1
3	Maximum Target Value (dBm)	22	22	22	1
4	Maximum Target Value (dBm)	22	22	22	1
5	Maximum Target Value (dBm)	22	22	22	1

Table 11.7: LTE

LTE Band2			
RB Size	1	50%	100%
Maximum Target Value (dBm)	23.5	22.5	22.5
LTE Band4			
RB Size	1	50%	100%
Maximum Target Value (dBm)	23.0	22.0	22.0
LTE Band5			
RB Size	1	50%	100%
Maximum Target Value (dBm)	23.5	22.5	22.5
LTE Band7			
RB Size	1	50%	100%
Maximum Target Value (dBm)	20.5	20	20
LTE Band12			
RB Size	1	50%	100%
Maximum Target Value (dBm)	23.5	22.5	22.5

Table 11.8: WiFi

WiFi 802.11b 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	17.0	17.0	17.0
WiFi 802.11g 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	14.0	14.0	14.0
WiFi 802.11n 20M 2.4G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	13.0	13.0	13.0
WiFi 802.11a 5.2G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	13.0	13.0	13.0
WiFi 802.11a 5.8G			
Channel	Channel 1	Channel 6	Channel 11
Maximum Target Value (dBm)	12.5	12.5	12.5

Table 11.9: Bluetooth

Bluetooth			
Channel	Channel 0	Channel 39	Channel 78
Maximum Target Value (dBm)	6.0	6.0	6.0

Table 11.10: Bluetooth 4.0

Bluetooth			
Channel	Channel 0	Channel 19	Channel 39
Maximum Target Value (dBm)	6.0	6.0	6.0

11.1. GSM Measurement result

During the process of testing, the EUT was controlled via Agilent Digital Radio Communication tester (E5515C) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

Table 11.11: The conducted power measurement results for GSM

GSM 850MHZ	**Conducted Power (dBm)**		
	Channel 128(824.2MHz)	**Channel 190(836.6MHz)**	**Channel 251(848.6MHz)**
	32.67	32.65	32.64
GSM 1900MHZ	**Conducted Power (dBm)**		
	Channel 512(1850.2MHz)	**Channel 661(1880MHz)**	**Channel 810(1909.8MHz)**
	29.79	29.95	29.87

Table 11.12: The conducted power measurement results for GPRS

GSM 850 GMSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	128	**190**	**251**		**128**	**190**	**251**
1 Txslot	32.69	32.63	32.64	-9.03dB	23.66	23.60	23.61
2 Txslots	32.05	32.00	32.03	-6.02dB	26.03	25.98	26.01
3 Txslots	30.40	30.35	30.37	-4.26dB	26.14	26.09	26.11
4 Txslots	29.24	29.19	29.23	-3.01dB	26.23	26.18	26.22
GSM 1900 GMSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	512	**661**	**810**		**512**	**661**	**810**
1 Txslot	29.81	29.93	29.89	-9.03dB	20.78	20.90	20.86
2 Txslots	29.08	29.20	29.15	-6.02dB	23.06	23.18	23.13
3 Txslots	27.36	27.51	27.50	-4.26dB	23.10	23.25	23.24
4 Txslots	26.39	26.45	26.43	-3.01dB	23.38	23.44	23.42

Table 11.13: The conducted power measurement results for E-GPRS

GSM 850 8-PSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	128	**190**	**251**		**128**	**190**	**251**
1 Txslot	27.29	27.20	27.13	-9.03dB	18.26	18.17	18.10
2 Txslots	25.88	25.80	25.73	-6.02dB	19.86	19.78	19.71
3 Txslots	23.48	23.44	23.37	-4.26dB	19.22	19.18	19.11
4 Txslots	22.41	22.34	22.29	-3.01dB	19.40	19.33	19.28
GSM 1900 8-PSK	Measured Power (dBm)			calculation	Averaged Power (dBm)		
	512	**661**	**810**		**512**	**661**	**810**
1 Txslot	26.49	26.56	26.48	-9.03dB	17.46	17.53	17.45
2 Txslots	25.54	25.66	25.56	-6.02dB	19.52	19.64	19.54
3 Txslots	23.56	23.74	23.74	-4.26dB	19.30	19.48	19.48
4 Txslots	22.46	22.63	22.55	-3.01dB	19.45	19.62	19.54

NOTES:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 4Txslots for 850MHz ; 4Txslots for1900MHz;

11.2. WCDMA Measurement result

Table 11.14: The conducted Power for WCDMA

Item	band	WCDMA BAND II result(dBm)		
	ARFCN	9662 (1852.4MHz)	9800 (1880.0MHz)	9938 (1907.6MHz)
WCDMA	\	22.68	22.81	22.94
HSDPA	1	21.96	22.08	22.2
	2	21.74	21.88	22.02
	3	21.41	21.58	21.73
	4	21.33	21.48	21.6
HSUPA	1	21.31	21.48	21.59
	2	20.36	20.42	20.63
	3	20.35	20.56	20.56
	4	21.16	21.26	21.47
	5	20.96	21.16	21.36
Item	band	WCDMA BAND IV result(dBm)		
	ARFCN	Channel 1537 (1712.4MHz)	Channel 1638 (1732.6MHz)	Channel 1738 (1752.6MHz)
WCDMA	\	22.6	22.57	22.59
HSDPA	1	21.85	21.83	21.87
	2	21.65	21.65	21.63
	3	21.38	21.34	21.38
	4	21.28	21.27	21.28
HSUPA	1	21.28	21.24	21.21
	2	20.25	20.25	20.22
	3	20.25	20.3	20.26
	4	21.18	21.07	21.14
	5	20.89	20.9	20.97

Item	band	WCDMA BAND V result(dBm)		
	ARFCN	Channel 4132 (826.4MHz)	Channel 4183 (836.6MHz)	Channel 4233 (846.6MHz)
WCDMA	\	23.18	23.14	23.15
HSDPA	1	22.46	22.41	22.41
	2	22.24	22.21	22.23
	3	21.91	21.91	21.94
	4	21.83	21.81	21.81
HSUPA	1	21.81	21.81	21.8
	2	20.86	20.75	20.84
	3	20.85	20.89	20.77
	4	21.66	21.59	21.68
	5	21.46	21.49	21.57

11.3. LTE Measurement result

Table 11.15: The conducted Power for LTE BAND 2/4/5/7/12

Band2						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18625 1852.5MHz	Channel 18900 1880MHz	Channel 19175 1907.5MHz
5MHz	QPSK	1	0	21.72	21.89	22.03
		1	13	21.85	22.03	22.17
		1	24	21.76	21.93	22.07
		12	0	20.79	21.01	21.24
		12	6	20.88	21.07	21.23
		12	13	20.83	21.05	21.17
		25	0	20.85	21.08	21.21
	16QAM	1	0	21.01	21.16	21.30
		1	13	21.18	21.33	21.47
		1	24	21.07	21.26	21.40
		12	0	19.88	20.11	20.26
		12	6	19.99	20.16	20.26
		12	13	19.96	20.10	20.21
		25	0	19.89	20.09	20.20
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18650 1855MHz	Channel 18900 1880MHz	Channel 19150 1905MHz
10MHz	QPSK	1	0	21.85	21.99	22.14
		1	25	22.01	22.16	22.16
		1	49	21.82	22.05	22.19
		25	0	20.91	21.18	21.35
		25	13	20.96	21.13	21.25
		25	25	21.01	21.12	21.18
		50	0	20.98	21.18	21.29
	16QAM	1	0	21.17	21.24	21.36
		1	25	21.30	21.41	21.46
		1	49	21.15	21.36	21.48
		25	0	19.93	20.16	20.29
		25	13	19.97	20.15	20.19
		25	25	20.02	20.10	20.16
		50	0	19.97	20.16	20.22

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18675 1857.5MHz	Channel 18900 1880MHz	Channel 19125 1902.5MHz
15MHz	QPSK	1	0	21.78	21.90	22.05
		1	37	21.89	22.06	22.15
		1	74	21.74	21.99	22.11
		36	0	20.86	21.10	21.21
		36	19	20.93	21.11	21.22
		36	38	20.88	21.10	21.16
		75	0	20.91	21.13	21.22
	16QAM	1	0	21.12	21.17	21.37
		1	37	21.22	21.35	21.37
		1	74	21.01	21.30	21.41
		36	0	19.95	20.15	20.26
		36	19	19.98	20.17	20.25
		36	38	19.99	20.12	20.17
		75	0	19.97	20.17	20.20
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18700 1860MHz	Channel 18900 1880MHz	Channel 19100 1900MHz
20MHz	QPSK	1	0	21.62	21.71	21.91
		1	50	22.03	22.11	22.21
		1	99	21.48	21.77	21.91
		50	0	20.83	21.15	21.17
		50	25	21.05	21.11	21.22
		50	50	20.9	21.07	21.02
		100	0	20.84	21.12	21.09
	16QAM	1	0	20.96	20.96	21.22
		1	50	21.25	21.39	21.42
		1	99	20.75	21.07	21.21
		50	0	19.85	20.15	20.13
		50	25	19.93	20.12	20.20
		50	50	19.89	20.06	20.03
		100	0	19.86	20.13	20.05

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18615 1851.5MHz	Channel 18900 1880MHz	Channel 19185 1908.5MHz
3MHz	QPSK	1	0	21.79	21.99	22.15
		1	7	21.81	22.01	22.18
		1	14	21.81	22.00	22.17
		8	0	20.83	21.03	21.20
		8	4	20.84	21.07	21.24
		8	7	20.86	21.02	21.22
		15	0	20.81	21.06	21.23
	16QAM	1	0	21.07	21.26	21.39
		1	7	21.14	21.28	21.45
		1	14	21.11	21.27	21.47
		8	0	19.93	20.12	20.25
		8	4	19.95	20.18	20.29
		8	7	19.95	20.15	20.26
		15	0	19.86	20.10	20.20
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18607 1850.7MHz	Channel 18900 1880MHz	Channel 19193 1909.3MHz
1.4MHz	QPSK	1	0	21.54	21.67	21.84
		1	3	21.59	21.82	22.00
		1	5	21.56	21.67	21.85
		3	0	21.54	21.76	21.96
		3	1	21.59	21.81	22.00
		3	3	21.56	21.81	22.00
		6	0	20.57	20.82	20.98
	16QAM	1	0	20.80	20.97	21.11
		1	3	20.91	21.14	21.32
		1	5	20.79	20.98	21.16
		3	0	20.61	20.81	20.98
		3	1	20.66	20.88	21.02
		3	3	20.64	20.85	20.99
		6	0	19.71	19.92	20.05

Band4						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19975 1712.5MHz	Channel 20175 1732.5MHz	Channel 20375 1752.5MHz
5MHz	QPSK	1	0	21.80	21.80	21.79
		1	13	21.96	21.91	21.91
		1	24	21.82	21.75	21.77
		12	0	20.91	20.94	20.94
		12	6	20.98	20.96	20.98
		12	13	20.95	20.90	20.88
		25	0	20.95	20.96	20.95
	16QAM	1	0	21.09	20.98	21.06
		1	13	21.23	21.04	21.19
		1	24	21.14	20.88	20.97
		12	0	19.98	19.95	20.03
		12	6	20.06	19.97	20.05
		12	13	20.03	19.91	19.94
		25	0	19.97	19.93	19.96
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20000 1715MHz	Channel 20175 1732.5MHz	Channel 20350 1750MHz
10MHz	QPSK	1	0	21.92	21.93	21.88
		1	25	22.06	22.01	22.01
		1	49	21.88	21.82	21.84
		25	0	21.00	21.04	20.99
		25	13	21.05	21.02	20.99
		25	25	21.04	21.00	21.00
		50	0	21.08	21.05	21.02
	16QAM	1	0	21.17	21.12	21.15
		1	25	21.35	21.13	21.29
		1	49	21.17	20.92	21.05
		25	0	20.00	19.99	20.00
		25	13	20.04	19.96	19.99
		25	25	20.07	19.94	20.00
		50	0	20.06	19.98	20.01

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20025 1717.5MHz	Channel 20175 1732.5MHz	Channel 20325 1747.5MHz
15MHz	QPSK	1	0	21.88	21.91	21.86
		1	38	21.98	21.92	21.89
		1	74	21.81	21.77	21.76
		36	0	21.01	21.01	21.00
		36	18	20.99	20.98	20.92
		36	39	21.03	20.95	20.89
		75	0	21.03	21.01	21.00
	16QAM	1	0	21.12	21.15	21.06
		1	38	21.28	21.04	21.15
		1	74	21.10	20.93	20.99
		36	0	20.09	20.05	20.05
		36	18	20.07	19.97	19.99
		36	39	20.08	19.98	19.99
		75	0	20.06	19.99	20.01
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20050 1720MHz	Channel 20175 1732.5MHz	Channel 20300 1745MHz
20MHz	QPSK	1	0	21.71	21.76	21.65
		1	50	22.08	21.93	21.94
		1	99	21.56	21.51	21.54
		50	0	20.98	21.03	21.02
		50	25	21.05	21.01	21.02
		50	50	21.04	20.96	20.9
		100	0	20.99	20.95	20.93
	16QAM	1	0	20.97	21.06	20.80
		1	50	21.27	21.04	21.20
		1	99	20.76	20.73	20.81
		50	0	20.01	20.00	20.02
		50	25	20.05	19.99	19.95
		50	50	20.05	19.93	19.91
		100	0	20.01	19.92	19.93

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19965 1711.5MHz	Channel 20175 1732.5MHz	Channel 20385 1753.5MHz
3MHz	QPSK	1	0	21.93	21.91	21.90
		1	8	21.95	21.90	21.85
		1	14	21.94	21.89	21.83
		8	0	20.95	20.94	20.95
		8	4	20.99	20.96	20.95
		8	7	20.93	20.90	20.91
		15	0	20.95	20.96	20.94
	16QAM	1	0	21.11	21.02	21.14
		1	8	21.16	20.99	21.11
		1	15	21.19	20.99	21.08
		8	0	20.02	19.96	20.03
		8	4	20.06	19.98	20.05
		8	7	20.02	19.94	20.01
		15	0	19.97	19.94	19.94
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19957 1710.7MHz	Channel 20175 1732.5MHz	Channel 20393 1754.3MHz
1.4MHz	QPSK	1	0	21.74	21.70	21.68
		1	2	21.87	21.84	21.79
		1	5	21.74	21.72	21.68
		3	0	21.86	21.84	21.77
		3	1	21.90	21.89	21.85
		3	2	21.89	21.87	21.82
		6	0	20.85	20.84	20.79
	16QAM	1	0	21.02	20.86	20.92
		1	2	21.13	20.97	21.08
		1	5	21.03	20.87	20.91
		3	0	20.83	20.73	20.76
		3	1	20.90	20.79	20.82
		3	2	20.90	20.75	20.84
		6	0	19.98	19.88	19.92

Band5						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20425 826.5MHz	Channel 20525 836.5MHz	Channel 20625 846.5MHz
5MHz	QPSK	1	0	22.86	22.81	22.76
		1	12	22.99	22.92	22.87
		1	24	22.86	22.76	22.75
		12	0	21.95	21.89	21.86
		12	6	22.02	21.95	21.90
		12	13	21.96	21.89	21.85
		25	0	21.98	21.90	21.87
	16QAM	1	0	22.11	22.06	22.00
		1	12	22.30	22.16	22.11
		1	24	22.16	21.98	22.01
		12	0	20.96	20.89	20.87
		12	6	21.01	20.95	20.93
		12	13	20.96	20.86	20.87
		25	0	20.93	20.87	20.85
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20450 829MHz	Channel 20525 836.5MHz	Channel 20600 844MHz
10MHz	QPSK	1	0	22.95	22.92	22.92
		1	25	23.05	23.03	22.97
		1	49	22.92	22.88	22.87
		25	0	22.06	22.03	22.05
		25	13	22.05	22.00	21.99
		25	25	21.95	21.99	21.93
		50	0	22.05	21.99	21.99
	16QAM	1	0	22.30	22.19	22.16
		1	25	22.42	22.26	22.20
		1	49	22.33	22.14	22.12
		25	0	21.13	20.97	20.93
		25	13	21.15	20.95	20.94
		25	25	21.07	20.96	20.88
		50	0	21.03	20.96	20.92

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20415 825.5MHz	Channel 20525 836.5MHz	Channel 20635 847.5MHz
3MHz	QPSK	1	0	22.96	22.90	22.85
		1	7	23.00	22.89	22.85
		1	14	22.51	22.88	22.89
		8	0	21.83	21.91	21.88
		8	4	21.67	21.95	21.94
		8	7	21.64	21.90	21.90
		15	0	21.68	21.91	21.90
	16QAM	1	0	21.35	22.12	22.10
		1	7	21.42	22.17	22.07
		1	14	21.66	22.13	22.10
		8	0	20.60	20.95	20.92
		8	4	20.62	20.98	20.99
		8	7	20.06	20.93	20.93
		15	0	20.53	20.87	20.87
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20407 824.7MHz	Channel 20525 836.5MHz	Channel 20643 848.3MHz
1.4MHz	QPSK	1	0	22.82	22.74	22.71
		1	2	22.97	22.87	22.86
		1	5	22.81	22.72	22.75
		3	0	22.92	22.83	22.84
		3	2	22.98	22.91	22.87
		3	3	22.93	22.64	22.88
		6	0	21.93	21.90	21.85
	16QAM	1	0	22.08	22.01	21.91
		1	2	22.23	22.12	22.11
		1	5	22.12	22.00	21.95
		3	0	21.97	21.87	21.85
		3	2	21.98	21.92	21.87
		3	3	21.96	21.88	21.90
		6	0	21.01	20.93	20.93

Band7						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20775 2502.5MHz	Channel 21100 2535MHz	Channel 21425 2567.5MHz
5MHz	QPSK	1	0	20.27	20.24	20.31
		1	13	20.41	20.34	20.40
		1	24	20.33	20.26	20.33
		12	0	19.37	19.38	19.43
		12	6	19.32	19.30	19.40
		12	13	19.45	19.35	19.47
		25	0	19.41	19.38	19.48
	16QAM	1	0	19.43	19.43	19.53
		1	13	19.57	19.51	19.57
		1	24	19.49	19.44	19.51
		12	0	18.38	18.39	18.47
		12	6	18.44	18.43	18.54
		12	13	18.46	18.39	18.46
		25	0	18.41	18.39	18.47
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20800 2505MHz	Channel 21100 2535MHz	Channel 21400 2565MHz
10MHz	QPSK	1	0	20.37	20.36	20.41
		1	25	20.43	20.42	20.44
		1	49	20.41	20.42	20.47
		25	0	19.46	19.47	19.38
		25	13	19.42	19.47	19.37
		25	25	19.45	19.41	19.39
		50	0	19.34	19.43	19.43
	16QAM	1	0	19.55	19.55	19.65
		1	25	19.74	19.64	19.75
		1	49	19.60	19.60	19.65
		25	0	18.45	18.47	18.55
		25	13	18.52	18.47	18.54
		25	25	18.53	18.49	18.56
		50	0	18.50	18.51	18.59

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20825 2507.5MHz	Channel 21100 2535MHz	Channel 21375 2562.5MHz
15MHz	QPSK	1	0	20.28	20.25	20.38
		1	37	20.41	20.41	20.45
		1	74	20.36	20.37	20.40
		36	0	19.40	19.42	19.43
		36	19	19.45	19.35	19.47
		36	38	19.44	19.37	19.37
		75	0	19.38	19.36	19.40
	16QAM	1	0	19.51	19.47	19.58
		1	37	19.64	19.60	19.72
		1	74	19.55	19.57	19.63
		36	0	18.45	18.49	18.58
		36	19	18.52	18.52	18.61
		36	38	18.55	18.52	18.62
		75	0	18.50	18.48	18.62
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20850 2510MHz	Channel 21100 2535MHz	Channel 21350 2560MHz
20MHz	QPSK	1	0	20.04	19.99	20.07
		1	50	20.40	20.39	20.47
		1	99	20.10	20.13	20.13
		50	0	19.28	19.31	19.38
		50	25	19.38	19.39	19.47
		50	50	19.45	19.37	19.46
		100	0	19.35	19.35	19.42
	16QAM	1	0	19.30	19.28	19.37
		1	50	19.72	19.70	19.77
		1	99	19.40	19.43	19.47
		50	0	18.27	18.31	18.40
		50	25	18.35	18.42	18.48
		50	50	18.45	18.37	18.48
		100	0	18.36	18.35	18.42

Band12						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23035 826.5MHz	Channel 23095 707.5MHz	Channel 23155 846.5MHz
5MHz	QPSK	1	0	22.72	22.83	22.77
		1	12	22.91	22.92	22.87
		1	24	22.86	22.90	22.79
		12	0	21.92	21.92	21.95
		12	6	21.99	21.98	21.91
		12	13	21.89	21.96	21.84
		25	0	21.94	21.96	21.93
	16QAM	1	0	22.01	22.18	22.12
		1	12	22.22	22.26	22.15
		1	24	22.19	22.19	22.07
		12	0	20.97	20.96	21.03
		12	6	21.02	21.07	21.01
		12	13	20.96	21.07	20.91
		25	0	20.93	21.00	20.98
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23060 829MHz	Channel 23095 707.5MHz	Channel 23130 844MHz
10MHz	QPSK	1	0	22.82	22.90	22.93
		1	25	23.03	23.06	23.01
		1	49	23.01	22.92	22.92
		25	0	22.05	22.12	22.01
		25	13	22.04	22.04	22.00
		25	25	22.08	22.05	21.86
		50	0	22.08	22.06	21.96
	16QAM	1	0	22.10	22.23	22.28
		1	25	22.37	22.40	22.32
		1	49	22.31	22.27	22.21
		25	0	21.07	21.00	21.04
		25	13	21.07	21.10	21.04
		25	25	21.13	21.05	20.89
		50	0	21.12	21.04	20.99

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23025 825.5MHz	Channel 23095 707.5MHz	Channel 23165 847.5MHz
3MHz	QPSK	1	0	22.82	22.92	22.85
		1	7	22.83	22.89	22.84
		1	14	22.89	22.95	22.86
		8	0	21.90	21.95	21.90
		8	4	21.95	22.00	21.91
		8	7	21.90	21.97	21.88
		15	0	21.93	21.94	21.87
	16QAM	1	0	22.11	22.24	22.19
		1	7	22.16	22.25	22.15
		1	14	22.20	22.24	22.15
		8	0	20.96	21.03	21.03
		8	4	21.00	21.11	21.01
		8	7	20.99	21.08	21.00
		15	0	20.94	21.01	20.93
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23017 824.7MHz	Channel 23095 707.5MHz	Channel 23173 848.3MHz
1.4MHz	QPSK	1	0	22.69	21.80	22.71
		1	2	22.80	22.75	22.82
		1	5	22.69	22.87	22.68
		3	0	22.77	22.79	22.78
		3	2	22.81	22.82	22.85
		3	3	22.78	22.89	22.80
		6	0	21.82	21.86	21.78
	16QAM	1	0	21.96	22.08	21.98
		1	2	22.09	22.21	22.10
		1	5	21.99	22.11	21.97
		3	0	21.79	21.93	21.80
		3	2	21.86	21.98	21.85
		3	3	21.83	21.93	21.83
		6	0	20.92	21.02	20.92

11.4. Wi-Fi and BT Measurement result

Table 11.16: The conducted power for Bluetooth

GFSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	4.007	4.511	4.74
π/4 DQPSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	2.718	3.45	3.382
8DPSK			
Channel	Ch0 (2402 MHz)	Ch39 (2441MHz)	CH78 (2480MHz)
Conducted Output Power (dBm)	2.718	3.443	3.405

Table 11.17: The conducted power for Bluetooth4.0

GFSK			
Channel	Ch0 (2402 MHz)	Ch19 (2440MHz)	CH39 (2480MHz)
Conducted Output Power (dBm)	3.959	4.432	4.593

NOTE: According to KDB447498 D01 BT standalone SAR are not required, because maximum average output power is less than 10mW.

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion:

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√f(GHz)/x] W/kg for test separation distances ≤ 50 mm;
where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

SAR head value of BT is 0.167 W/Kg. SAR body value of BT is 0.083 W/Kg.

The default power measurement procedures are:

a) Power must be measured at each transmit antenna port according to the DSSS and OFDM transmission configurations in each standalone and aggregated frequency band.

b) Power measurement is required for the transmission mode configuration with the highest maximum output power specified for production units.

1) When the same highest maximum output power specification applies to multiple transmission modes, the largest channel bandwidth configuration with the lowest order modulation and lowest data rate is measured.

2) When the same highest maximum output power is specified for multiple largest channel bandwidth configurations with the same lowest order modulation or lowest order modulation and lowest data rate, power measurement is required for all equivalent 802.11 configurations with the same maximum output power.

c) For each transmission mode configuration, power must be measured for the highest and lowest channels; and at the mid-band channel(s) when there are at least 3 channels. For configurations with multiple mid-band channels, due to an even number of channels, both channels should be measured.

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting，the duty cycle is 100%.

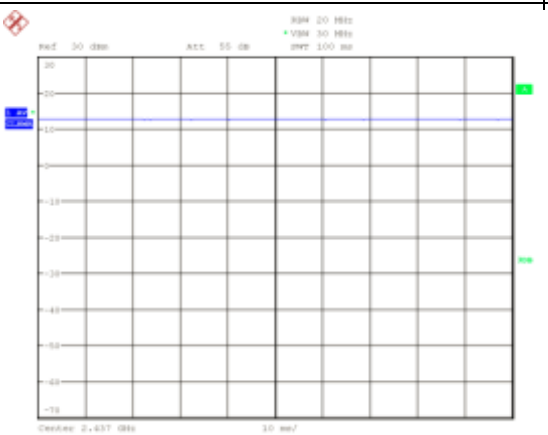
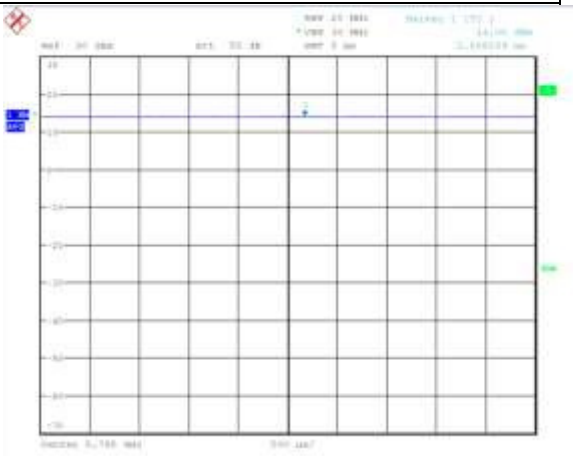
Duty Cycle 802.11b mode	Duty Cycle 802.11a mode
	

Table 11.18: The average conducted power for WiFi

Mode	Channel	Frequence	Average power(dBm)
802.11 a	52	5260 MHZ	12.51
	52	5280 MHZ	12.21
	60	5300 MHZ	12.31
	64	5320 MHZ	12.22
	149	5745 MHZ	12.09
	157	5785 MHZ	12.31
	165	5825 MHZ	12.22
802.11 b	1	2412 MHZ	14.74
	6	2437 MHZ	14.38
	11	2462 MHZ	14.61

802.11 g	1	2412 MHZ	13.42
	6	2437 MHZ	13.34
	11	2462 MHZ	13.11
802.11 n 20M	1	2412 MHZ	12.35
	6	2437 MHZ	12.26
	11	2462 MHZ	12.16
	52	5260 MHZ	11.66
	60	5300 MHZ	11.60
	64	5320 MHZ	11.58
	149	5745 MHZ	11.12
	157	5785 MHZ	10.62
	165	5825 MHZ	10.80

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.

b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

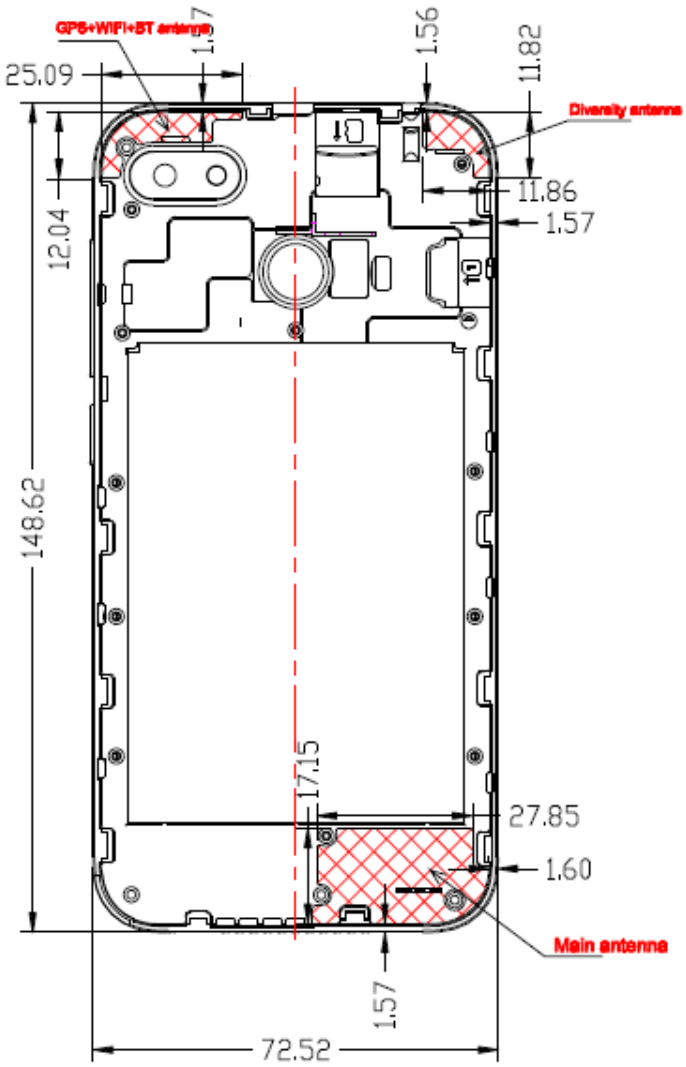
12. Simultaneous TX SAR Considerations

12.1. Introduction

The following procedures adopted from “FCC SAR Considerations for Cell Phones with Multiple Transmitters” are applicable to handsets with built-in unlicensed transmitters such as 802.11 a/b/g and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

For this device, the BT and Wi-Fi can transmit simultaneous with other transmitters.

12.2. Transmit Antenna Separation Distances



Picture 12.1 Antenna Locations

12.3. Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·

[√f(GHz)] ≤ 3.0 for 1-g SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 5mm test separation distances is 10mW.

$$\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} * \sqrt{\text{Frequency (GHz)}} \leqslant 3.0$$

Based on the above equation, Bluetooth SAR was not required:

Evaluation=1.246＜3.0

Based on the above equation, WiFi SAR was required:

Evaluation=15.69>3.0

12.4. SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR Measurement Positions						
Antenna Mode	Phantom	Ground	Left	Right	Top	Bottom
WWAN	Yes	Yes	Yes	Yes	No	Yes
WLAN	Yes	Yes	No	Yes	Yes	No

13. SAR Test Result

13.1. SAR results for Fast SAR

Table 13.1: Duty Cycle

Duty Cycle	
Speech for GSM900/1800	1:8.3
GPRS for GSM900/1800	1:4
WCDMA Band I/ IV/V and WiFi	1:1
LTE Band 2/4/5/7/12	1:1

Table 13.2: SAR Values (GSM 850 MHz Band - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
836.6	190	Left	Touch		32.65	33.0	1.084	0.156	0.169	-0.06
836.6	190	Left	Tilt	/	32.65	33.0	1.084	0.0983	0.107	0.05
836.6	190	Right	Touch	/	32.65	33.0	1.084	0.128	0.139	0.07
836.6	190	Right	Tilt	/	32.65	33.0	1.084	0.0982	0.106	0.09
824.2	128	Left	Touch	Fig.1	32.67	33.0	1.079	0.177	0.191	0.04
848.8	251	Left	Touch	/	32.64	33.0	1.086	0.146	0.159	-0.02

Table 13.3: SAR Values (GSM 850 MHz Band - Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
Body worn & Hotspot										
836.6	190	GPRS (4)	Phantom	/	29.19	30.0	1.205	0.322	0.388	-0.05
836.6	190	GPRS (4)	Ground	/	29.19	30.0	1.205	0.458	0.552	0.07
824.2	128	GPRS (4)	Ground	Fig.2	29.24	30.0	1.191	0.497	0.592	0.12
848.8	251	GPRS (4)	Ground	/	29.23	30.0	1.194	0.414	0.494	0.10
Hotspot										
836.6	190	GPRS (4)	Left	/	29.19	30.0	1.205	0.411	0.495	0.16
836.6	190	GPRS (4)	Right	/	29.19	30.0	1.205	0.334	0.402	-0.03
836.6	190	GPRS (4)	Bottom	/	29.19	30.0	1.205	0.184	0.222	0.06

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.4: SAR Values (GSM 1900 MHz Band - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1880	661	Left	Touch	/	29.95	31.0	1.274	0.056	0.071	-0.16
1880	661	Left	Tilt	/	29.95	31.0	1.274	0.0147	0.019	0.02
1880	661	Right	Touch	/	29.95	31.0	1.274	0.0327	0.042	0.12
1880	661	Right	Tilt	/	29.95	31.0	1.274	0.0176	0.022	0.11
1850.2	512	Left	Touch	/	29.79	31.0	1.321	0.0478	0.063	0.10
1909.8	810	Left	Touch	Fig.3	29.87	31.0	1.297	0.058	0.075	0.05

Table 13.5: SAR Values (GSM 1900 MHz Band- Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
Body worn & Hotspot										
1880	661	GPRS (4)	Phantom	/	26.45	28.0	1.429	0.130	0.186	0.17
1880	661	GPRS (4)	Ground	/	26.45	28.0	1.429	0.351	0.502	0.03
1850.2	512	GPRS (4)	Ground	/	26.39	28.0	1.449	0.361	0.523	0.05
1909.8	810	GPRS (4)	Ground	Fig.4	26.43	28.0	1.435	0.37	0.531	0.07
Hotspot										
1880	661	GPRS (4)	Left	/	26.45	28.0	1.429	0.102	0.146	0.14
1880	661	GPRS (4)	Right	/	26.45	28.0	1.429	0.115	0.164	-0.13
1880	661	GPRS (4)	Bottom	/	26.45	28.0	1.429	0.343	0.490	-0.16

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.6: SAR Values (WCDMA Band II- Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1880	9400	Left	Touch	/	22.81	24.0	1.315	0.0799	0.105	0.16
1880	9400	Left	Tilt	/	22.81	24.0	1.315	0.0194	0.026	0.03
1880	9400	Right	Touch	/	22.81	24.0	1.315	0.0416	0.055	0.06
1880	9400	Right	Tilt	/	22.81	24.0	1.315	0.0248	0.033	0.10
1852.4	9262	Left	Touch	/	22.68	24.0	1.355	0.0734	0.099	-0.09
1907.6	9538	Left	Touch	Fig.5	22.94	24.0	1.276	0.088	0.112	0.10

Table 13.7:SAR Values (WCDMA Band II- Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
Body worn & Hotspot										
1880	9400	12.2K RMC	Phantom	/	22.81	24.0	1.315	0.188	0.247	0.13
1880	9400	12.2K RMC	Ground	/	22.81	24.0	1.315	0.456	0.600	-0.10
1852.4	9262	12.2K RMC	Ground	Fig.6	22.68	24.0	1.355	0.476	0.645	0.04
1907.6	9538	12.2K RMC	Ground	/	22.94	24.0	1.276	0.439	0.560	0.05
Hotspot										
1880	9400	12.2K RMC	Left	/	22.81	24.0	1.315	0.102	0.134	0.07
1880	9400	12.2K RMC	Right	/	22.81	24.0	1.315	0.146	0.192	-0.14
1880	9400	12.2K RMC	Bottom	/	22.81	24.0	1.315	0.367	0.483	-0.16

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.8: SAR Values (WCDMA Band IV- Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1732.6	1638	Left	Touch	Fig.7	22.57	23.5	1.239	0.098	0.121	-0.04
1732.6	1638	Left	Tilt	/	22.57	23.5	1.239	0.0904	0.112	-0.07
1732.6	1638	Right	Touch	/	22.57	23.5	1.239	0.0544	0.067	0.15
1732.6	1638	Right	Tilt	/	22.57	23.5	1.239	0.036	0.045	0.12
1712.4	1537	Left	Touch	/	22.6	23.5	1.23	0.0829	0.102	-0.03
1752.6	1738	Left	Touch	/	22.59	23.5	1.233	0.0671	0.083	0.19

Table 13.9:SAR Values (WCDMA Band IV- Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
Body worn & Hotspot										
1732.6	1638	12.2K RMC	Phantom	/	22.57	23.5	1.239	0.192	0.238	0.12
1732.6	1638	12.2K RMC	Ground	/	22.57	23.5	1.239	0.411	0.509	0.05
1712.4	1537	12.2K RMC	Ground	Fig.8	22.6	23.5	1.23	0.423	0.520	-0.01
1752.6	1738	12.2K RMC	Ground	/	22.59	23.5	1.233	0.412	0.508	-0.06
Hotspot										
1732.6	1638	12.2K RMC	Left	/	22.57	23.5	1.239	0.0895	0.111	0.05
1732.6	1638	12.2K RMC	Right	/	22.57	23.5	1.239	0.0867	0.107	0.06
1732.6	1638	12.2K RMC	Bottom	/	22.57	23.5	1.239	0.279	0.346	0.07

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.10: SAR Values (WCDMA Band V- Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
836.6	4182	Left	Touch	/	23.14	24.0	1.219	0.19	0.232	0.02
836.6	4182	Left	Tilt	/	23.14	24.0	1.219	0.125	0.152	-0.05
836.6	4182	Right	Touch	/	23.14	24.0	1.219	0.169	0.206	0.11
836.6	4182	Right	Tilt	/	23.14	24.0	1.219	0.119	0.145	-0.12
826.4	4132	Left	Touch	/	23.18	24.0	1.208	0.187	0.226	0.01
846.6	4233	Left	Touch	Fig.9	23.15	24.0	1.216	0.199	0.242	0.03

Table 13.11:SAR Values (WCDMA Band V- Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
Body worn & Hotspot										
836.6	4182	12.2K RMC	Phantom	/	23.14	24.0	1.219	0.24	0.293	0.04
836.6	4182	12.2K RMC	Ground	/	23.14	24.0	1.219	0.334	0.407	0.11
826.4	4132	12.2K RMC	Ground	Fig.10	23.18	24.0	1.208	0.338	0.408	0.11
846.6	4233	12.2K RMC	Ground	/	23.15	24.0	1.216	0.305	0.371	0.15
Hotspot										
836.6	4182	12.2K RMC	Left	/	23.14	24.0	1.219	0.224	0.273	0.07
836.6	4182	12.2K RMC	Right	/	23.14	24.0	1.219	0.147	0.179	-0.03
836.6	4182	12.2K RMC	Bottom	/	23.14	24.0	1.219	0.14	0.171	0.07

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.12: SAR Values (LTE Band 2-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
1900	19100	Band 2	QPSK_20MHz 1RB_50 offset	Left	Touch	/	22.21	23.5	1.346	0.0693	0.093	0.09
1900	19100		QPSK_20MHz 50RB_25offset	Left	Touch	/	21.22	22.5	1.343	0.0577	0.077	0.07
1900	19100	Band 2	QPSK_20MHz 1RB_50 offset	Left	Tilt	/	22.21	23.5	1.346	0.0149	0.020	0.17
1900	19100		QPSK_20MHz 50RB_25offset	Left	Tilt	/	21.22	22.5	1.343	0.0115	0.015	0.01
1900	19100	Band 2	QPSK_20MHz 1RB_50 offset	Right	Touch	/	22.21	23.5	1.346	0.0481	0.065	0.03
1900	19100		QPSK_20MHz 50RB_25offset	Right	Touch	/	21.22	22.5	1.343	0.0407	0.055	-0.11
1900	19100	Band 2	QPSK_20MHz 1RB_50 offset	Right	Tilt	/	22.21	23.5	1.346	0.0183	0.025	0.18
1900	19100		QPSK_20MHz 50RB_25offset	Right	Tilt	/	21.22	22.5	1.343	0.0121	0.016	0.02
1860	18700	Band 2	QPSK_20MHz 1RB_50 offset	Left	Touch	Fig.11	22.03	23.5	1.403	0.094	0.132	0.03
1860	18700		QPSK_20MHz 50RB_25offset	Left	Touch	/	21.05	22.5	1.396	0.0579	0.081	0.03
1880	18900	Band 2	QPSK_20MHz 1RB_50 offset	Left	Touch	/	22.11	23.5	1.377	0.0923	0.127	0.11
1880	18900		QPSK_20MHz 50RB_25offset	Left	Touch	Fig.12	21.11	22.5	1.377	0.074	0.102	0.06

Table 13.13: SAR Values (LTE Band2-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
Body worn & Hotspot											
1900	19100	Band2	QPSK_20MHz 1RB_50 offset	Toward Phantom	/	22.21	23.5	1.346	0.161	0.217	-0.16
1900	19100		QPSK_20MHz 50RB_25offset	Toward Phantom	/	21.22	22.5	1.343	0.134	0.180	-0.10
1900	19100	Band2	QPSK_20MHz 1RB_50 offset	Toward Ground	/	22.21	23.5	1.346	0.361	0.486	0.11
1900	19100		QPSK_20MHz 50RB_25offset	Toward Ground	Fig.13	21.22	22.5	1.343	0.29	0.389	-0.08
1860	18700	Band2	QPSK_20MHz 1RB_50 offset	Toward Ground	Fig.14	22.03	23.5	1.403	0.409	0.574	0.02
1860	18700		QPSK_20MHz 50RB_25offset	Toward Ground	/	21.05	22.5	1.396	0.277	0.386	0.05
1880	18900	Band2	QPSK_20MHz 1RB_50 offset	Toward Ground	/	22.11	23.5	1.377	0.395	0.544	0.15
1880	18900		QPSK_20MHz 50RB_25offset	Toward Ground	/	21.11	22.5	1.377	0.269	0.370	0.04
Hotspot											
1900	19100	Band2	QPSK_20MHz 1RB_50 offset	Toward Left	/	22.21	23.5	1.346	0.0727	0.098	0.03
1900	19100		QPSK_20MHz 50RB_25offset	Toward Left	/	21.22	22.5	1.343	0.0575	0.077	-0.09
1900	19100	Band2	QPSK_20MHz 1RB_50 offset	Toward Right	/	22.21	23.5	1.346	0.0556	0.075	0.18
1900	19100		QPSK_20MHz 50RB_25offset	Toward Right	/	21.22	22.5	1.343	0.0439	0.059	-011
1900	19100	Band2	QPSK_20MHz 1RB_50 offset	Toward Bottom	/	22.21	23.5	1.346	0.354	0.476	-0.14
1900	19100		QPSK_20MHz 50RB_25offset	Toward Bottom	/	21.22	22.5	1.343	0.286	0.384	0.11

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.14: SAR Values (LTE Band 4-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Left	Touch	/	22.08	23.0	1.236	0.0845	0.104	0.12
1720	20050		QPSK_20MHz 50RB_25offset	Left	Touch	/	21.05	22.0	1.245	0.0643	0.080	-0.05
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Left	Tilt	/	22.08	23.0	1.236	0.0218	0.027	0.14
1720	20050		QPSK_20MHz 50RB_25offset	Left	Tilt	/	21.05	22.0	1.245	0.0165	0.021	0.12
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Right	Touch	/	22.08	23.0	1.236	0.0699	0.086	-0.06
1720	20050		QPSK_20MHz 50RB_25offset	Right	Touch	Fig.15	21.05	22.0	1.245	0.064	0.080	-0.02
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Right	Tilt	/	22.08	23.0	1.236	0.0311	0.038	0.12
1720	20050		QPSK_20MHz 50RB_25offset	Right	Tilt	/	21.05	22.0	1.245	0.039	0.049	0.03
1732.5	20175	Band 4	QPSK_20MHz 1RB_50 offset	Left	Touch	/	21.93	23.0	1.279	0.0838	0.107	-0.10
1732.5	20175		QPSK_20MHz 50RB_25offset	Right	Touch	/	21.01	22.0	1.256	0.0604	0.076	0.04
1745	20300	Band 4	QPSK_20MHz 1RB_50 offset	Left	Touch	Fig.16	21.94	23.0	1.276	0.089	0.114	0.05
1745	20300		QPSK_20MHz 50RB_25offset	Right	Touch	/	21.02	22.0	1.253	0.0608	0.076	-0.10

Table 13.15: SAR Values (LTE Band4-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
Body worn & Hotspot											
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Toward Phantom	/	22.08	23.0	1.236	0.166	0.205	-0.03
1720	20050		QPSK_20MHz 50RB_25offset	Toward Phantom	/	21.05	22.0	1.245	0.134	0.167	0.14
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Toward Ground	Fig.17	22.08	23.0	1.236	0.395	0.488	0.13
1720	20050		QPSK_20MHz 50RB_25offset	Toward Ground	/	21.05	22.0	1.245	0.267	0.332	-0.01
1732.5	20175	Band 4	QPSK_20MHz 1RB_50 offset	Toward Ground	/	21.93	23.0	1.279	0.331	0.423	0.06
1732.5	20175		QPSK_20MHz 50RB_25offset	Toward Ground	Fig.18	21.01	22.0	1.256	0.27	0.339	-0.07
1745	20300	Band 4	QPSK_20MHz 1RB_50 offset	Toward Ground	/	21.94	23.0	1.276	0.329	0.420	0.11
1745	20300		QPSK_20MHz 50RB_25offset	Toward Ground	/	21.02	22.0	1.253	0.269	0.337	0.05
Hotspot											
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Toward Left	/	22.08	23.0	1.236	0.0766	0.095	0.16
1720	20050		QPSK_20MHz 50RB_25offset	Toward Left	/	21.05	22.0	1.245	0.0614	0.076	0.15
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Toward Right	/	22.08	23.0	1.236	0.0864	0.107	0.01
1720	20050		QPSK_20MHz 50RB_25offset	Toward Right	/	21.05	22.0	1.245	0.0683	0.085	0.16
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Toward Bottom	/	22.08	23.0	1.236	0.262	0.324	0.13
1720	20050		QPSK_20MHz 50RB_25offset	Toward Bottom	/	21.05	22.0	1.245	0.207	0.258	0.02

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.16: SAR Values (LTE Band 5-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Left	Touch	/	23.05	23.5	1.109	0.19	0.211	0.18
829	20450		QPSK_10MHz 25RB_0offset	Left	Touch	/	22.06	22.5	1.107	0.158	0.175	0.03
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Left	Tilt	/	23.05	23.5	1.109	0.118	0.131	0.06
829	20450		QPSK_10MHz 25RB_0offset	Left	Tilt	/	22.06	22.5	1.107	0.0907	0.100	0.14
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Right	Touch	/	23.05	23.5	1.109	0.157	0.174	0.18
829	20450		QPSK_10MHz 25RB_0offset	Right	Touch	/	22.06	22.5	1.107	0.0975	0.108	0.03
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Right	Tilt	/	23.05	23.5	1.109	0.110	0.122	0.01
829	20450		QPSK_10MHz 25RB_0offset	Right	Tilt	/	22.06	22.5	1.107	0.0916	0.101	0.04
836.5	20525	Band 5	QPSK_10MHz 1RB_25 offset	Left	Touch	/	23.03	23.5	1.114	0.192	0.214	-0.01
836.5	20525		QPSK_10MHz 25RB_0offset	Left	Touch	/	22.03	22.5	1.114	0.158	0.176	0.04
844	20600	Band 5	QPSK_10MHz 1RB_25 offset	Left	Touch	Fig.19	22.97	23.5	1.13	0.198	0.224	0.06
844	20600		QPSK_10MHz 25RB_0offset	Left	Touch	Fig.20	22.05	22.5	1.109	0.171	0.190	0.08

Table 13.17: SAR Values (LTE Band5-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
Body worn & Hotspot											
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Toward Phantom	/	23.05	23.5	1.109	0.243	0.269	0.01
829	20450		QPSK_10MHz 25RB_0offset	Toward Phantom	/	22.06	22.5	1.107	0.131	0.145	-0.13
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Toward Ground	Fig.21	23.05	23.5	1.109	0.337	0.374	0.14
829	20450		QPSK_10MHz 25RB_0offset	Toward Ground	Fig.22	22.06	22.5	1.107	0.206	0.228	0.02
836.5	20525	Band 5	QPSK_10MHz 1RB_25 offset	Toward Ground	/	23.03	23.5	1.114	0.334	0.372	0.12
836.5	20525		QPSK_10MHz 25RB_0offset	Toward Ground	/	22.03	22.5	1.114	0.204	0.227	0.10
844	20600	Band 5	QPSK_10MHz 1RB_25 offset	Toward Ground	/	22.97	23.5	1.13	0.308	0.348	-0.06
844	20600		QPSK_10MHz 25RB_0offset	Toward Ground	/	22.05	22.5	1.109	0.205	0.227	0.05
Hotspot											
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Toward Left	/	23.05	23.5	1.109	0.224	0.248	-0.15
829	20450		QPSK_10MHz 25RB_0offset	Toward Left	/	22.06	22.5	1.107	0.183	0.203	-0.07
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Toward Right	/	23.05	23.5	1.109	0.251	0.278	0.14
829	20450		QPSK_10MHz 25RB_0offset	Toward Right	/	22.06	22.5	1.107	0.188	0.208	0.05
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Toward Bottom	/	23.05	23.5	1.109	0.122	0.135	-0.06
829	20450		QPSK_10MHz 25RB_0offset	Toward Bottom	/	22.06	22.5	1.107	0.0905	0.100	-0.07

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.18: SAR Values (LTE Band 7- Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Left	Touch	/	20.47	20.5	1.007	0.0545	0.055	0.13
			QPSK_20MHz 50RB_25offset	Left	Touch	/	19.47	20	1.130	0.0427	0.048	-0.09
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Left	Tilt	/	20.47	20.5	1.007	0.0115	0.012	0.15
			QPSK_20MHz 50RB_25offset	Left	Tilt	/	19.47	20	1.130	0.009	0.010	-0.14
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Right	Touch	/	20.47	20.5	1.007	0.0317	0.032	0.14
			QPSK_20MHz 50RB_25offset	Right	Touch	/	19.47	20	1.130	0.0228	0.026	0.11
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Right	Tilt	/	20.47	20.5	1.007	0.0228	0.023	-0.09
			QPSK_20MHz 50RB_25offset	Right	Tilt	/	19.47	20	1.130	0.02	0.023	0.15
2510	20850	Band 7	QPSK_20MHz 1RB_50 offset	Left	Touch	/	20.40	20.5	1.023	0.0505	0.052	0.12
			QPSK_20MHz 50RB_25offset	Left	Touch	Fig.23	19.38	20	1.153	0.049	0.057	0.04
2535	21100	Band 7	QPSK_20MHz 1RB_50 offset	Left	Touch	Fig.24	20.39	20.5	1.026	0.059	0.061	0.10
			QPSK_20MHz 50RB_25offset	Left	Touch	/	19.39	20	1.151	0.0462	0.053	-0.06

Table 13.19: SAR Values (LTE Band 7-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
Body worn & Hotspot											
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Phantom	/	20.47	20.5	1.007	0.424	0.427	0.11
			QPSK_20MHz 50RB_25offset	Toward Phantom	/	19.47	20	1.130	0.317	0.358	0.15
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Ground	/	20.47	20.5	1.007	0.64	0.644	-0.07
			QPSK_20MHz 50RB_25offset	Toward Ground	/	19.47	20	1.130	0.406	0.459	0.12
Hotspot											
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Left	/	20.47	20.5	1.007	0.169	0.170	0.08
			QPSK_20MHz 50RB_25offset	Toward Left	/	19.47	20	1.130	0.136	0.154	-0.15
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Right	/	20.47	20.5	1.007	0.0343	0.035	0.03
			QPSK_20MHz 50RB_25offset	Toward Right	/	19.47	20	1.130	0.0539	0.061	0.10
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom		20.47	20.5	1.007	1.02	1.027	0.16
			QPSK_20MHz 50RB_25offset	Toward Bottom	Fig.26	19.47	20	1.130	0.87	0.983	0.09
2510	20850	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.25	20.40	20.5	1.023	1.06	1.085	0.03
			QPSK_20MHz 50RB_25offset	Toward Bottom	/	19.38	20	1.153	0.785	0.905	-0.14
2535	21100	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	/	20.39	20.5	1.026	1.04	1.067	0.13
			QPSK_20MHz 50RB_25offset	Toward Bottom	/	19.39	20	1.151	0.841	0.968	-0.09
2535	21100	Band 7	QPSK_20MHz 100RB_0 offset	Toward Bottom	/	19.35	20	1.161	0.78	0.906	0.01
Repeated											
2510	20850	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.27	20.40	20.5	1.023	0.979	1.002	0.12
2560	21350		QPSK_20MHz 50RB_25offset	Toward Bottom	Fig.28	19.47	20	1.007	0.865	0.977	0.08
Second Supply											

2510	20850	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	/	20.40	20.5	1.023	0.904	0.925	0.06
2535	21100		QPSK_20MHz 1RB_50 offset	Toward Bottom	/	20.39	20.5	1.026	0.884	0.907	0.07
2560	21350		QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.29	20.47	20.5	1.007	0.921	0.927	0.08
Second Supply Repeated											
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.30	20.47	20.5	1.007	0.918	0.924	0.03

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.20: SAR Values (LTE Band 12-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Left	Touch	/	23.06	23.5	1.107	0.0784	0.087	0.08
707.5	23095		QPSK_10MHz 25RB_0offset	Left	Touch	/	22.12	22.5	1.091	0.0618	0.067	0.07
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Left	Tilt	/	23.06	23.5	1.107	0.0629	0.070	-0.10
707.5	23095		QPSK_10MHz 25RB_0offset	Left	Tilt	/	22.12	22.5	1.091	0.0507	0.055	-0.15
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Right	Touch	/	23.06	23.5	1.107	0.0618	0.068	0.18
707.5	23095		QPSK_10MHz 25RB_0offset	Right	Touch	/	22.12	22.5	1.091	0.0512	0.056	0.03
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Right	Tilt	/	23.06	23.5	1.107	0.0489	0.054	0.06
707.5	23095		QPSK_10MHz 25RB_0offset	Right	Tilt	/	22.12	22.5	1.091	0.0391	0.043	0.14
704	23060	Band 12	QPSK_10MHz 1RB_25 offset	Left	Touch	/	23.03	23.5	1.114	0.0763	0.085	0.18
704	23060		QPSK_10MHz 25RB_0offset	Left	Touch	/	22.05	22.5	1.109	0.0545	0.060	0.10
711	23130	Band 12	QPSK_10MHz 1RB_25 offset	Left	Touch	Fig.31	23.01	23.5	1.119	0.101	0.113	0.05
711	23130		QPSK_10MHz 25RB_0offset	Left	Touch	Fig.32	22.01	22.5	1.119	0.063	0.071	-0.04

Table 13.21: SAR Values (LTE Band12-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
Body worn & Hotspot											
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Toward Phantom	/	23.06	23.5	1.107	0.104	0.115	0.03
707.5	23095		QPSK_10MHz 25RB_0offset	Toward Phantom	/	22.12	22.5	1.091	0.0833	0.091	0.04
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Toward Ground	/	23.06	23.5	1.107	0.128	0.142	0.01
707.5	23095		QPSK_10MHz 25RB_0offset	Toward Ground	/	22.12	22.5	1.091	0.103	0.112	0.04
704	23060	Band 12	QPSK_10MHz 1RB_25 offset	Toward Ground	/	23.03	23.5	1.114	0.122	0.136	0.15
704	23060		QPSK_10MHz 25RB_0offset	Toward Ground	/	22.05	22.5	1.109	0.089	0.099	-0.02
711	23130	Band 12	QPSK_10MHz 1RB_25 offset	Toward Ground	Fig.33	23.01	23.5	1.119	0.133	0.149	0.12
711	23130		QPSK_10MHz 25RB_0offset	Toward Ground	Fig.34	22.01	22.5	1.119	0.105	0.117	0.14
Hotspot											
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Toward Left	/	23.06	23.5	1.107	0.101	0.112	0.10
707.5	23095		QPSK_10MHz 25RB_0offset	Toward Left	/	22.12	22.5	1.091	0.0798	0.087	0.19
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Toward Right	/	23.06	23.5	1.107	0.0726	0.080	0.04
707.5	23095		QPSK_10MHz 25RB_0offset	Toward Right	/	22.12	22.5	1.091	0.057	0.062	-0.12
707.5	23095	Band 12	QPSK_10MHz 1RB_25 offset	Toward Bottom	/	23.06	23.5	1.107	0.0434	0.048	0.01
707.5	23095		QPSK_10MHz 25RB_0offset	Toward Bottom	/	22.12	22.5	1.091	0.0346	0.038	-0.03

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.22: SAR Values (Wi-Fi 802.11b - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
2412	1	Left	Touch	Fig.35	14.74	17.0	1.683	0.419	0.705	-0.09
2412	1	Left	Tilt	/	14.74	17.0	1.683	0.372	0.626	-0.04
2412	1	Right	Touch	/	14.74	17.0	1.683	0.153	0.257	0.05
2412	1	Right	Tilt	/	14.74	17.0	1.683	0.160	0.269	-0.13
2437	6	Left	Touch	/	14.38	17.0	1.828	0.347	0.634	0.07
2462	11	Left	Touch	/	14.61	17.0	1.734	0.395	0.685	0.14

Table 13.23: SAR Values (Wi-Fi 802.11b - Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
Body worn & Hotspot										
2412	1	Wi-Fi 2450	Phantom	/	14.74	17.0	1.683	0.0988	0.166	0.15
2412	1	Wi-Fi 2450	Ground	/	14.74	17.0	1.683	0.0999	0.168	0.03
2437	6	Wi-Fi 2450	Ground	/	14.38	17.0	1.828	0.115	0.210	0.10
2462	11	Wi-Fi 2450	Ground	Fig.36	14.61	17.0	1.734	0.131	0.227	0.14
Hotspot										
2412	1	Wi-Fi 2450	Left	/	14.74	17.0	1.683	0.0119	0.020	-0.10
2412	1	Wi-Fi 2450	Right	/	14.74	17.0	1.683	0.0893	0.150	0.10
2412	1	Wi-Fi 2450	Top	/	14.74	17.0	1.683	0.0612	0.103	0.03

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.24: SAR Values (Wi-Fi 802.11a - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
5260	52	Left	Touch	/	12.51	13.0	1.119	0.550	0.615	-0.08
5260	52	Left	Tilt	/	12.51	13.0	1.119	0.836	0.935	1.13
5260	52	Right	Touch	/	12.51	13.0	1.119	0.391	0.438	-0.03
5260	52	Right	Tilt	/	12.51	13.0	1.119	0.595	0.666	-0.13
5300	60	Left	Tilt	Fig.37	12.31	13.0	1.172	0.912	1.069	0.05
5320	64	Left	Tilt	/	12.22	13.0	1.197	0.804	0.962	-0.06
5785	157	Left	Touch	/	12.31	12.5	1.045	0.461	0.482	-0.16
5785	157	Left	Tilt	Fig.38	12.31	12.5	1.045	0.51	0.533	0.04
5785	157	Right	Touch	/	12.31	12.5	1.045	0.183	0.191	0.18
5785	157	Right	Tilt	/	12.31	12.5	1.045	0.430	0.449	0.12
5745	149	Left	Tilt	/	12.09	12.5	1.099	0.507	0.557	-0.16
5825	165	Left	Tilt	/	12.22	12.5	1.067	0.497	0.530	0.06
Repeated										
5300	60	Left	Tilt	Fig.39	12.31	13.0	1.172	0.878	1.029	0.08

Table 13.25: SAR Values (Wi-Fi 802.11a - Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
Body worn & Hotspot										
5260	52	Wi-Fi 5G	Phantom	/	12.51	13.0	1.119	0.147	0.164	-0.03
5260	52	Wi-Fi 5G	Ground	/	12.51	13.0	1.119	0.129	0.144	0.19
Hotspot										
5260	52	Wi-Fi 5G	Left	/	12.51	13.0	1.119	<0.01	<0.01	0.08
5260	52	Wi-Fi 5G	Right	/	12.51	13.0	1.119	<0.01	<0.01	0.12
5260	52	Wi-Fi 5G	Top	/	12.51	13.0	1.119	0.18	0.201	0.05
5300	60	Wi-Fi 5G	Top	/	12.31	13.0	1.172	0.189	0.222	0.12
5320	64	Wi-Fi 5G	Top	Fig.40	12.22	13.0	1.197	0.189	0.226	0.08
5785	157	Wi-Fi 5G	Phantom	/	12.31	12.5	1.045	0.112	0.117	0.19
5785	157	Wi-Fi 5G	Ground	/	12.31	12.5	1.045	0.173	0.181	-0.17
5785	157	Wi-Fi 5G	Left	/	12.31	12.5	1.045	<0.01	<0.01	0.13
5785	157	Wi-Fi 5G	Right	/	12.31	12.5	1.045	0.0132	0.014	0.14
5785	157	Wi-Fi 5G	Top	Fig.41	12.31	12.5	1.045	0.284	0.297	0.12
5745	149	Wi-Fi 5G	Top	/	12.09	12.5	1.099	0.164	0.180	0.11
5825	165	Wi-Fi 5G	Top	/	12.22	12.5	1.067	0.18	0.192	0.12

Note: The distance between the EUT and the phantom bottom is 10mm.

13.2. SAR results for Standard procedure

There is zoom scan measurement to be added for the highest measured SAR in each exposure configuration/band.

Table 13.26: SAR Values (GSM 850 MHz Band - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
824.2	128	Left	Touch	Fig.1	32.67	33.0	1.079	0.177	0.191	0.04

Table 13.27: SAR Values (GSM 850 MHz Band- Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
824.2	128	GPRS (4)	Ground	Fig.2	29.24	30.0	1.191	0.497	0.592	0.12

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.28: SAR Values (GSM 1900 MHz Band - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1909.8	810	Left	Touch	Fig.3	29.87	31.0	1.297	0.058	0.075	0.05

Table 13.29: SAR Values (GSM 1900 MHz Band- Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1909.8	810	GPRS (4)	Ground	Fig.4	26.43	28.0	1.435	0.37	0.531	0.07

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.30: SAR Values (WCDMA Band II- Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1907.6	9538	Left	Touch	Fig.5	22.94	24.0	1.276	0.088	0.112	0.10

Table 13.31:SAR Values (WCDMA Band II)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1852.4	9262	12.2K RMC	Ground	Fig.6	22.68	24.0	1.355	0.476	0.645	0.04

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.32: SAR Values (WCDMA Band IV- Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1732.6	1638	Left	Touch	Fig.7	22.57	23.5	1.239	0.098	0.121	-0.04

Table 13.33:SAR Values (WCDMA Band IV)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
1712.4	1537	12.2K RMC	Ground	Fig.8	22.6	23.5	1.23	0.423	0.520	-0.01

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.34: SAR Values (WCDMA Band V- Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
846.6	4233	Left	Touch	Fig.9	23.15	24.0	1.216	0.199	0.242	0.03

Table 13.35:SAR Values (WCDMA Band V)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
826.4	4132	12.2K RMC	Ground	Fig.10	23.18	24.0	1.208	0.338	0.408	0.11

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.36: SAR Values (LTE Band 2-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
1860	18700	Band 2	QPSK_20MHz 1RB_50 offset	Left	Touch	Fig.11	22.03	23.5	1.403	0.094	0.132	0.03
1880	18900		QPSK_20MHz 50RB_25offset	Left	Touch	Fig.12	21.11	22.5	1.377	0.074	0.102	0.06

Table 13.37: SAR Values (LTE Band2-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
1860	18700	Band2	QPSK_20MHz 1RB_50 offset	Toward Ground	Fig.14	22.03	23.5	1.403	0.409	0.574	0.02
1900	19100		QPSK_20MHz 50RB_25offset	Toward Ground	Fig.13	21.22	22.5	1.343	0.29	0.389	-0.08

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.38: SAR Values (LTE Band 4-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
1745	20300	Band 4	QPSK_20MHz 1RB_50 offset	Left	Touch	Fig.16	21.94	23.0	1.276	0.089	0.114	-0.10
1720	20050		QPSK_20MHz 50RB_25offset	Right	Touch	Fig.15	21.05	22.0	1.245	0.064	0.080	-0.02

Table 13.39: SAR Values (LTE Band4-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
1720	20050	Band 4	QPSK_20MHz 1RB_50 offset	Toward Ground	Fig.17	22.08	23.0	1.236	0.395	0.488	0.13
1732.5	20175		QPSK_20MHz 50RB_25offset	Toward Ground	Fig.18	21.01	22.0	1.256	0.27	0.339	-0.07

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.40: SAR Values (LTE Band 5-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
844	20600	Band 5	QPSK_10MHz 1RB_25 offset	Left	Touch	Fig.19	22.97	23.5	1.13	0.198	0.224	0.06
844	20600		QPSK_10MHz 25RB_0offset	Left	Touch	Fig.20	22.05	22.5	1.109	0.171	0.190	0.08

Table 13.41: SAR Values (LTE Band5-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
829	20450	Band 5	QPSK_10MHz 1RB_25 offset	Toward Ground	Fig.21	23.05	23.5	1.109	0.337	0.374	0.14
829	20450		QPSK_10MHz 25RB_0offset	Toward Ground	Fig.22	22.06	22.5	1.107	0.206	0.228	0.02

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.42: SAR Values (LTE Band 7- Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.											
2535	21100	Band 7	QPSK_20MHz 1RB_50 offset	Left	Touch	Fig.24	19.38	20	1.153	0.049	0.057	0.10
2510	20850		QPSK_20MHz 50RB_25offset	Left	Touch	Fig.23	20.39	20.5	1.026	0.059	0.061	0.04

Table 13.43: SAR Values (LTE Band 7-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
2510	20850	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.25	20.40	20.5	1.023	1.06	1.085	0.03
2560	21350		QPSK_20MHz 50RB_25offset	Toward Bottom	Fig.26	19.47	20	1.130	0.87	0.983	0.09
Repeated											
2510	20850	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.27	20.40	20.5	1.023	0.979	1.002	0.12
2560	21350		QPSK_20MHz 50RB_25offset	Toward Bottom	Fig.28	19.47	19.5	1.007	0.865	0.871	0.08
Second Supply											
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.29	20.47	20.5	1.007	0.921	0.927	0.08
Second Supply Repeated											
2560	21350	Band 7	QPSK_20MHz 1RB_50 offset	Toward Bottom	Fig.30	20.47	20.5	1.007	0.918	0.924	0.03

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.44: SAR Values (LTE Band 12-Head)

Frequency		Mode	Configuration	Side	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.											
711	23130	Band 12	QPSK_10MHz 1RB_25 offset	Left	Touch	Fig.31	23.01	23.5	1.119	0.101	0.113	0.05
711	23130		QPSK_10MHz 25RB_0offset	Left	Touch	Fig.32	22.01	22.5	1.119	0.063	0.071	-0.04

Table 13.45: SAR Values (LTE Band12-Body)

Frequency		Mode	Configuration	Test Position	Figure No.	Measured average power (dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift(dB)
MHz	Ch.										
711	23130	Band 12	QPSK_10MHz 1RB_25 offset	Toward Ground	Fig.33	23.01	23.5	1.119	0.133	0.149	0.12
711	23130		QPSK_10MHz 25RB_0offset	Toward Ground	Fig.34	22.01	22.5	1.119	0.105	0.117	0.14

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.46: SAR Values (Wi-Fi 802.11b - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
2412	1	Left	Touch	Fig.35	14.74	17.0	1.683	0.419	0.705	-0.09

Table 13.47: SAR Values (Wi-Fi 802.11b - Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
2462	11	Wi-Fi 2450	Ground	Fig.36	14.61	17.0	1.734	0.131	0.227	0.14

Note: The distance between the EUT and the phantom bottom is 10mm.

Table 13.48: SAR Values (Wi-Fi 802.11a - Head)

Frequency		Side	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
5300	60	Left	Tilt	Fig.37	12.31	13.0	1.172	0.912	1.069	0.05
5785	157	Left	Tilt	Fig.38	12.31	12.5	1.045	0.51	0.533	0.04
Repeated										
5300	60	Left	Tilt	Fig.39	12.31	13.0	1.172	0.878	1.029	0.08

Table 13.49: SAR Values (Wi-Fi 802.11a - Body)

Frequency		Mode (number of timeslots)	Test Position	Figure No.	Measured average power(dBm)	Maximum allowed Power (dBm)	Scaling factor	Measured SAR(1g) (W/kg)	Reported SAR(1g) (W/kg)	Power Drift (dB)
MHz	Ch.									
5320	64	Wi-Fi 5G	Top	Fig.40	12.22	13.0	1.197	0.189	0.226	0.08
5785	157	Wi-Fi 5G	Top	Fig.41	12.31	12.5	1.045	0.284	0.297	0.12

Note: The distance between the EUT and the phantom bottom is 10mm.

14. Evaluation of Simultaneous

Table 14.1: Summary of Transmitters

Band/Mode	Frequency (GHz)	SAR test exclusion threshold(mW)	RF output power (mW)
Bluetooth	2.41	10	3.981
2.4GHz WLAN 802.11 b/g/n	2.45	10	50.12
5.2GHz WLAN 802.11 a/n	5.2	10	19.95
5.8GHz WLAN 802.11 a/n	5.8	10	17.78

Table14.2 Simultaneous transmission SAR

Standalone SAR for 2G(W/Kg)					
Test Position			GSM 850	GSM 1900	Highest SAR
Head	Left	Cheek	0.191	0.075	0.191
		Tilt 15°	0.107	0.019	0.107
	Right	Cheek	0.139	0.042	0.139
		Tilt 15°	0.106	0.022	0.106
Body worn/ Hotspot10mm	Phantom Side		0.388	0.186	0.388
	Ground Side		0.592	0.531	0.592
Hotspot 10mm	Left Side		0.495	0.146	0.495
	Right Side		0.402	0.164	0.402
	Bottom Side		0.222	0.490	0.490
	Top Side		--	--	--

Standalone SAR for 3G (W/Kg)						
Test Position			WCDMA Band II	WCDMA Band IV	WCDMA Band V	Highest SAR
Head	Left	Cheek	0.112	0.121	0.242	0.242
		Tilt 15°	0.026	0.112	0.152	0.152
	Right	Cheek	0.055	0.067	0.206	0.206
		Tilt 15°	0.033	0.045	0.145	0.145
Body worn/ Hotspot10mm	Phantom Side		0.247	0.238	0.293	0.293
	Ground Side		0.645	0.520	0.408	0.645
Hotspot 10mm	Left Side		0.134	0.111	0.273	0.273
	Right Side		0.192	0.107	0.179	0.192
	Bottom Side		0.483	0.346	0.171	0.483
	Top Side		--		--	--

Standalone SAR for 4G (W/Kg)								
Test Position			LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 12	Highest SAR
Head	Left	Cheek	0.132	0.114	0.224	0.061	0.113	0.224
		Tilt 15°	0.020	0.027	0.131	0.012	0.070	0.131
	Right	Cheek	0.065	0.086	0.174	0.032	0.068	0.174
		Tilt 15°	0.025	0.049	0.122	0.023	0.054	0.122
Body worn/ Hotspot10mm	Phantom Side		0.217	0.205	0.269	0.427	0.115	0.427
	Ground Side		0.574	0.488	0.374	0.644	0.149	0.644
Hotspot 10mm	Left Side		0.098	0.095	0.248	0.170	0.112	0.248
	Right Side		0.075	0.107	0.278	0.061	0.080	0.278
	Bottom Side		0.476	0.324	0.135	1.085	0.048	1.085
	Top Side		--			--		--

Transmission SAR(W/Kg)									
Test Position			2G	3G	4G	2.4G WIFI	5GWIFI	BT	SUM
Head	Left	Cheek	0.191	0.242	0.224	0.705	0.615	0.167	0.947
		Tilt 15°	0.107	0.152	0.131	0.626	1.069	0.167	1.221
	Right	Cheek	0.139	0.206	0.174	0.257	0.438	0.167	0.644
		Tilt 15°	0.106	0.145	0.122	0.269	0.666	0.167	0.811
Body worn/ Hotspot10mm	Phantom Side		0.388	0.293	0.427	0.166	0.164	0.084	0.593
	Ground Side		0.592	0.645	0.644	0.227	0.181	0.084	0.872
Hotspot 10mm	Left Side		0.495	0.273	0.248	0.020	<0.01	0.084	0.579
	Right Side		0.402	0.192	0.278	0.150	0.014	0.084	0.552
	Bottom Side		0.490	0.483	1.085	--	--	0.084	1.169
	Top Side		--	--	--	0.103	0.297	0.084	0.297

According to the conducted power measurement result, we can draw the conclusion that: stand-alone SAR for WiFi should be performed. Then, simultaneous transmission SAR for WiFi/BT is considered with measurement results of GSM/WCDMA/LTE and WiFi/BT. According to the above table, the sum of reported SAR values for GSM/WCDMA/LTE and WiFi<1.6W/kg. So the simultaneous transmission SAR is not required for WiFi/BT transmitter.

15. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.
The following procedures are applied to determine if repeated measurements are required.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Table 15.1: SAR Measurement Variability for Head Value (1g)

Frequency		Side	Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio
MHz	Ch.					
5300	60	Left	Tilt	0.878	0.912	1.04

Table 15.2: SAR Measurement Variability for Body Value (1g)

Frequency		Configuration	Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio
MHz	Ch.					
2510	20850	QPSK_20MHz 1RB_50 offset	Bottom	1.06	0.979	1.08
2560	21350	QPSK_20MHz 50RB_25 offset	Bottom	0.87	0.865	1.01
Second Supply						
2560	21350	QPSK_20MHz 1RB_50 offset	Bottom	0.921	0.918	1.01

Note: According to the KDB 865664 D01repeated measurement is not required when the original highest measured SAR is < 0.8 W/kg.

16. Measurement Uncertainty

Measurement uncertainty for 750 MHz to 3 GHz averaged over 1 gram						
Uncertainty Component	Uncertainty	Prob.	Div.	$c_{i\ (1g)}$	Std. Unc. (1-g)	v_i or Veff
Measurement System						
Probe Calibration (k=1)	5.4	Normal	2	1	5.40	∞
Probe Isotropy	4.70	Rectangular	√3	0.7	1.90	∞
Modulation Response	2.40	Rectangular	√3	1	1.39	∞
Hemispherical Isotropy	2.60	Rectangular	√3	0.7	1.05	∞
Boundary Effect	1.00	Rectangular	√3	1	0.58	∞
Linearity	4.70	Rectangular	√3	1	2.71	∞
System Detection Limit	1.00	Rectangular	√3	1	0.58	∞
Readout Electronics	0.30	Normal	1	1	0.30	∞
Response Time	0.80	Rectangular	√3	1	0.46	∞
Integration Time	2.60	Rectangular	√3	1	1.50	∞
RF Ambient Noise	0.00	Rectangular	√3	1	0.00	∞
RF Ambient Reflections	0.00	Rectangular	√3	1	0.00	∞
Probe Positioner	0.40	Rectangular	√3	1	0.23	∞
Probe Positioning	2.90	Rectangular	√3	1	1.67	∞
Post-processing	1.00	Rectangular	√3	1	0.58	∞
Test sample Related						
Test sample Positioning	1.2	Normal	1	1	1.2	5
Device Holder Uncertainty	3.2	Normal	1	1	3.2	71
Power drift	5	Rectangular	√3	1	2.89	∞
Power Scaling	0	Rectangular	√3	1	0.00	∞
Phantom and Tissue Parameters						
Phantom Uncertainty	4	Rectangular	√3	1	2.31	∞
SAR correction	1.9	Rectangular	√3	1	1.10	∞
Liquid Conductivity (meas)	4.19	Rectangular	1	0.78	3.27	∞
Liquid Permittivity (meas)	4.4	Rectangular	1	0.26	1.14	∞
Temp. unc. - Conductivity	0.18	Rectangular	√3	0.78	0.08	∞
Temp. unc. - Permittivity	0.54	Rectangular	√3	0.23	0.07	∞
Combined Std. Uncertainty		RSS			9.39	
Expanded STD Uncertainty		k=2			18.77%	

System check uncertainty for 750 MHz to 3 GHz averaged over 1 gram						
Uncertainty Component	Uncertainty	Prob.	Div.	$c_{i\,(1g)}$	Std. Unc. (1-g)	v_i or Veff
Measurement System						
Probe Calibration (k=1)	5.40	Normal	1	1	5.40	∞
Probe Isotropy	4.70	Rectangular	√3	0.7	1.90	∞
Modulation Response	2.40	Rectangular	√3	1	1.39	∞
Hemispherical Isotropy	2.60	Rectangular	√3	0.7	1.05	∞
Boundary Effect	1.00	Rectangular	√3	1	0.58	∞
Linearity	4.70	Rectangular	√3	1	2.71	∞
System Detection Limit	1.00	Rectangular	√3	1	0.58	∞
Readout Electronics	0.30	Normal	1	1	0.30	∞
Response Time	0.80	Rectangular	√3	1	0.46	∞
Integration Time	2.60	Rectangular	√3	1	1.50	∞
RF Ambient Noise	0.00	Rectangular	√3	1	0.00	∞
RF Ambient Reflections	0.00	Rectangular	√3	1	0.00	∞
Probe Positioner	0.40	Rectangular	√3	1	0.23	∞
Probe Positioning	2.90	Rectangular	√3	1	1.67	∞
Post-processing	1.00	Rectangular	√3	1	0.58	∞
Field source						
Deviation of the experimental source from numerical source	5.5	Normal	1	1	5.5	∞
Source to liquid distance	2	Rectangular	√3	1	1.15	∞
Power drift	5	Rectangular	√3	1	2.89	∞
Phantom and Tissue Parameters						
Phantom Uncertainty	4	Rectangular	√3	1	2.31	∞
SAR correction	1.9	Rectangular	√3	1	1.10	∞
Liquid Conductivity (meas)	4.19	Normal	1	0.78	3.27	∞
Liquid Permittivity (meas)	4.4	Normal	1	0.26	1.14	∞
Temp. unc. - Conductivity	0.18	Rectangular	√3	0.78	0.08	∞
Temp. unc. - Permittivity	0.54	Rectangular	√3	0.23	0.07	∞
Combined Std. Uncertainty		RSS			10.39	
Expanded STD Uncertainty		k=2			20.79%	

17. Main Test Instrument

Table 17.1: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	N5242A	MY51221755	Dec 25, 2017	1 year
02	Power meter	NRVD	102257	May 11, 2017	1 year
03	Power sensor	NRV-Z5	100241		
			100644		
04	Signal Generator	E4438C	MY49072044	May 11, 2017	1 Year
05	Amplifier	NTWPA-0086010F	12023024	No Calibration Requested	
06	Coupler	778D	MY4825551	May 11, 2017	1 year
07	BTS	E5515C	MY50266468	Dec 25, 2017	1 year
08	BTS	MT8820C	6201240338	May 11, 2017	1 year
09	E-field Probe	ES3DV3	3252	Aug 31, 2017	1 year
		EX3DV4	7350	Dec 2, 2017	1 year
10	DAE	SPEAG DAE4	1244	Dec 4,2017	1 year
11	Dipole Validation Kit	SPEAG D750V3	1144	Aug 03,2015	3 year
		SPEAG D835V2	4d112	Oct 22, 2015	3 year
		SPEAG D1750V2	1044	Nov. 3,2015	3 year
		SPEAG D1900V2	5d134	Nov 4,2015	3 year
		SPEAG D2450V2	858	Oct 30,2015	3 year
		SPEAG D2600V2	1031	Oct 30,2015	3 year
		SPEAG D5GHzV2	1121	Mar 24,2017	1 year

ANNEX A. GRAPH RESULTS

GSM850 Left Cheek Low

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.93 S/m; ε_r = 43.088; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GSM Professional ; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3252ConvF(6.19, 6.19, 6.19); Calibrated: 8/31/2017
GSM850 Left Cheek Low/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.185 W/kg
GSM850 Left Cheek Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.807 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.218 W/kg
SAR(1 g) = 0.177 W/kg; SAR(10 g) = 0.143 W/kg
Maximum value of SAR (measured) = 0.184 W/kg

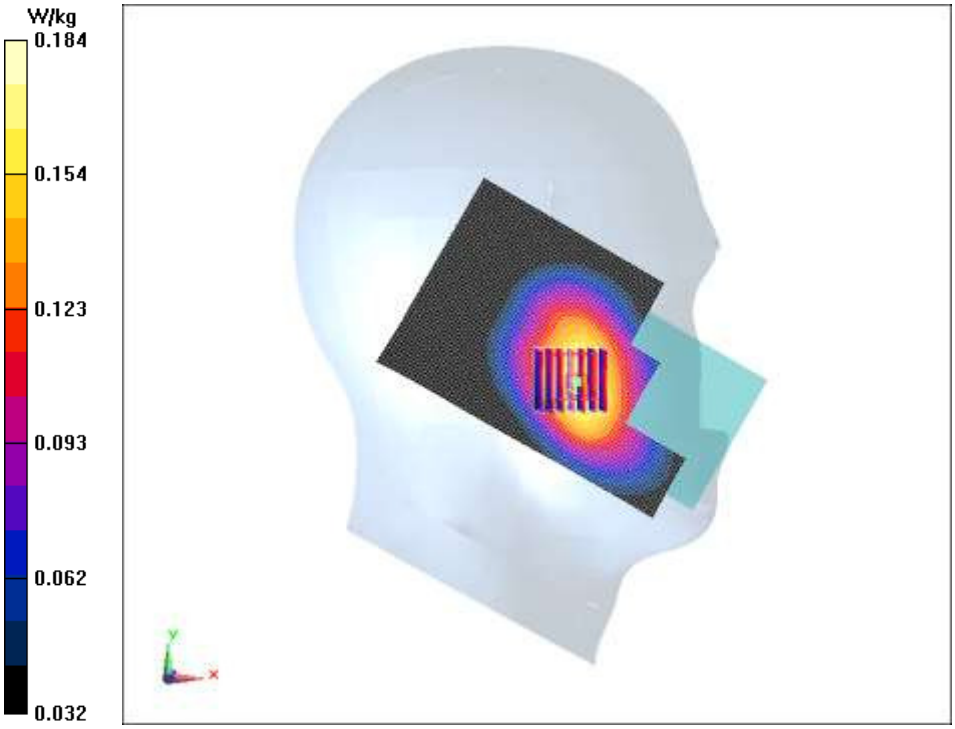


Fig.1 GSM850 Left Cheek Low

GPRS850 4TX Ground Mode Low

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.988 S/m; ε_r = 56.815; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GSM GPRS 4TS (0); Frequency: 824.2 MHz; Duty Cycle: 1:2
Probe: ES3DV3 - SN3252ConvF(6.14, 6.14, 6.14); Calibrated: 8/31/2017
GPRS850 4TX Ground Mode Low/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.515 W/kg
GPRS850 4TX Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.87 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.585 W/kg
SAR(1 g) = 0.497 W/kg; SAR(10 g) = 0.405 W/kg
Maximum value of SAR (measured) = 0.516 W/kg

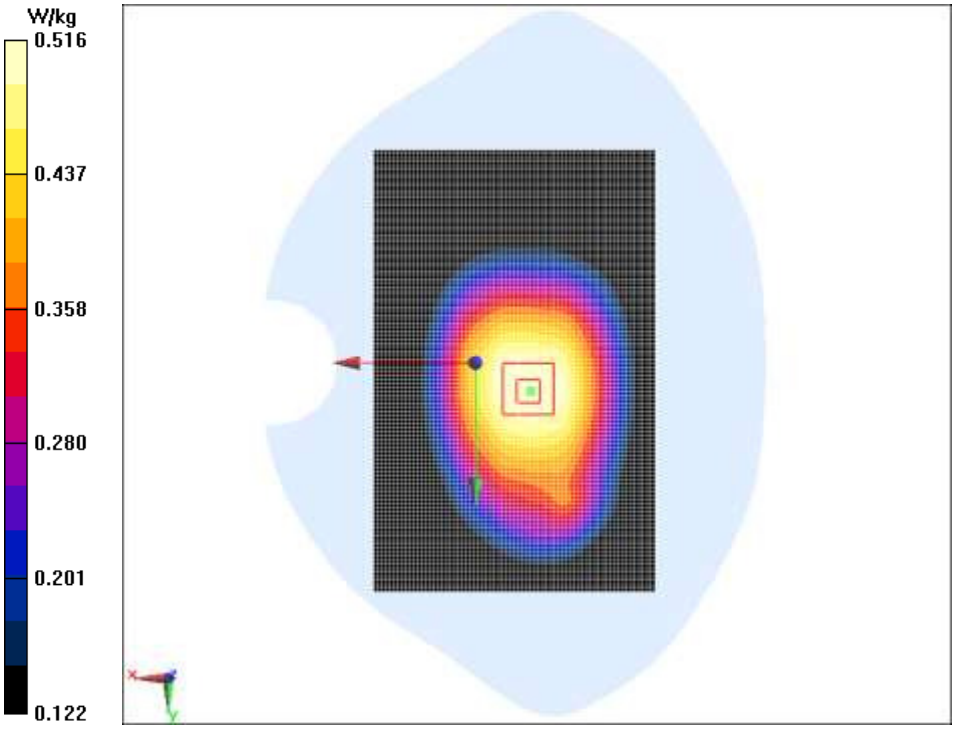


Fig.2 GPRS850 4TX Ground Mode Low

GSM1900 Left Cheek Mode Middle

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1910 MHz; σ = 1.358 S/m; ε_r = 38.751; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GSM Professional ; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3252ConvF(5.11, 5.11, 5.11); Calibrated: 8/31/2017
GSM1900 Left Cheek Mode Middle/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.0626 W/kg
GSM1900 Left Cheek Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.077 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.0980 W/kg
SAR(1 g) = 0.058 W/kg; SAR(10 g) = 0.034 W/kg
Maximum value of SAR (measured) = 0.0630 W/kg

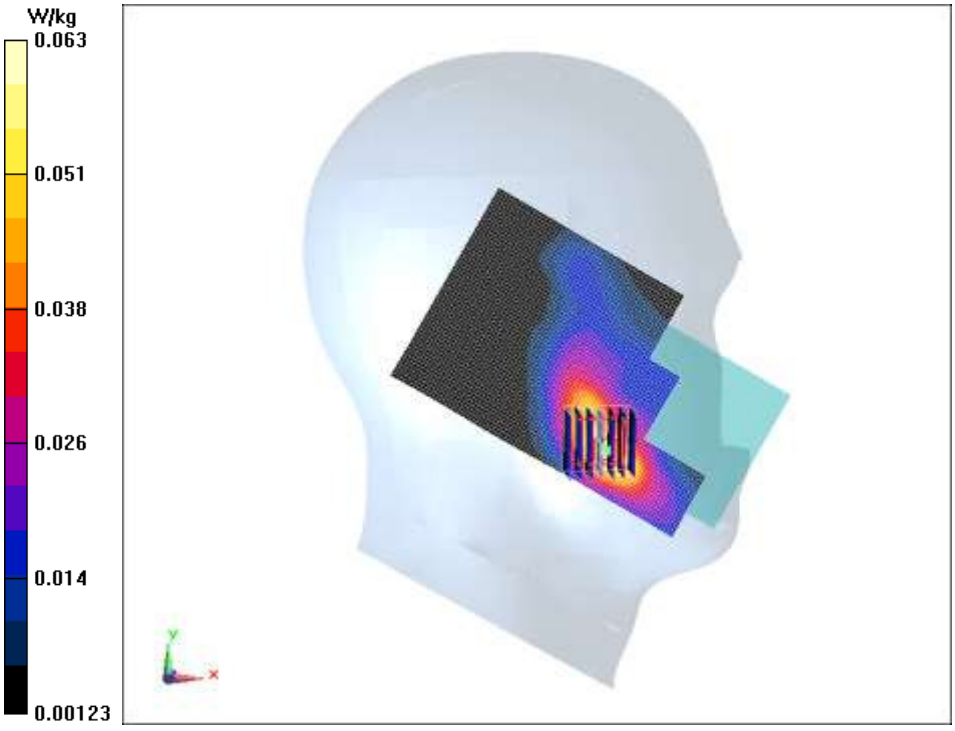


Fig.3 GSM1900 Left Cheek Mode Middle

GSM1900 Ground Mode High

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1910 MHz; σ = 1.586 S/m; ε_r = 54.571; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: GSM Professional ; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3252ConvF(4.69, 4.69, 4.69); Calibrated: 8/31/2017
GSM1900 Ground Mode High/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.401 W/kg
GSM1900 Ground Mode High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.09 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.654 W/kg
SAR(1 g) = 0.370 W/kg; SAR(10 g) = 0.200 W/kg
Maximum of SAR (measured) = 0.417 W/kg

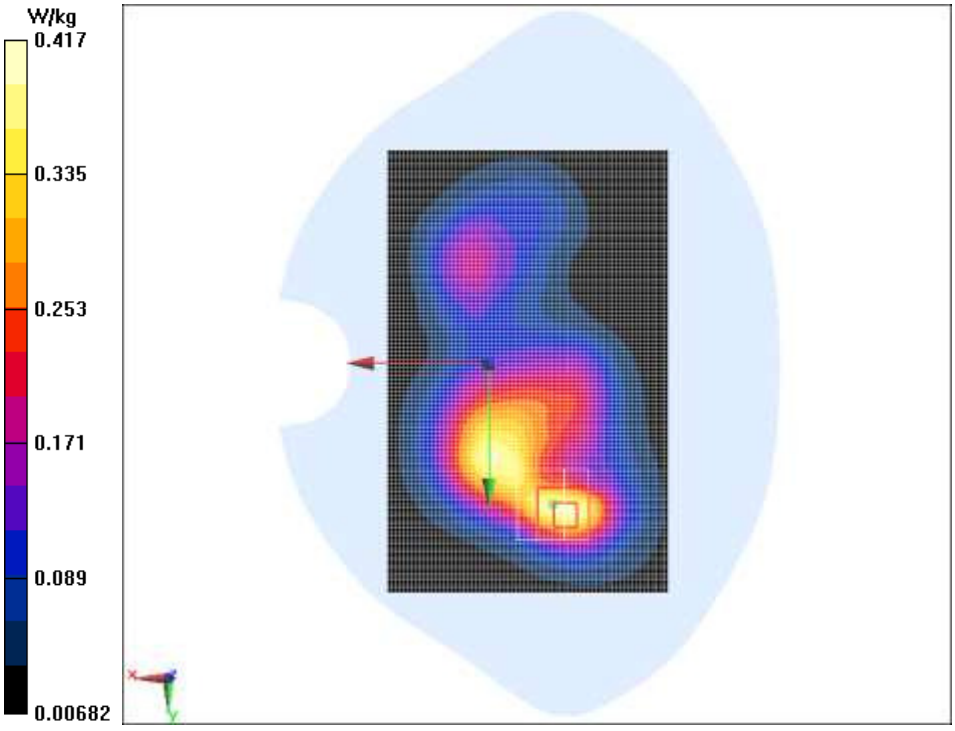


Fig.4 GSM1900 Ground Mode High

WCDMA Band 2 Left Cheek Mode High

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1908 MHz; σ = 1.356 S/m; ε_r = 38.756; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: UID 0, WCDMA Professional (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.11, 5.11, 5.11); Calibrated: 8/31/2017
WCDMA Band 2 Left Cheek Mode High/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.0810 W/kg
WCDMA Band 2 Left Cheek Mode High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.534 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.333 W/kg
SAR(1 g) = 0.088 W/kg; SAR(10 g) = 0.033 W/kg
Maximum value of SAR (measured) = 0.0778 W/kg

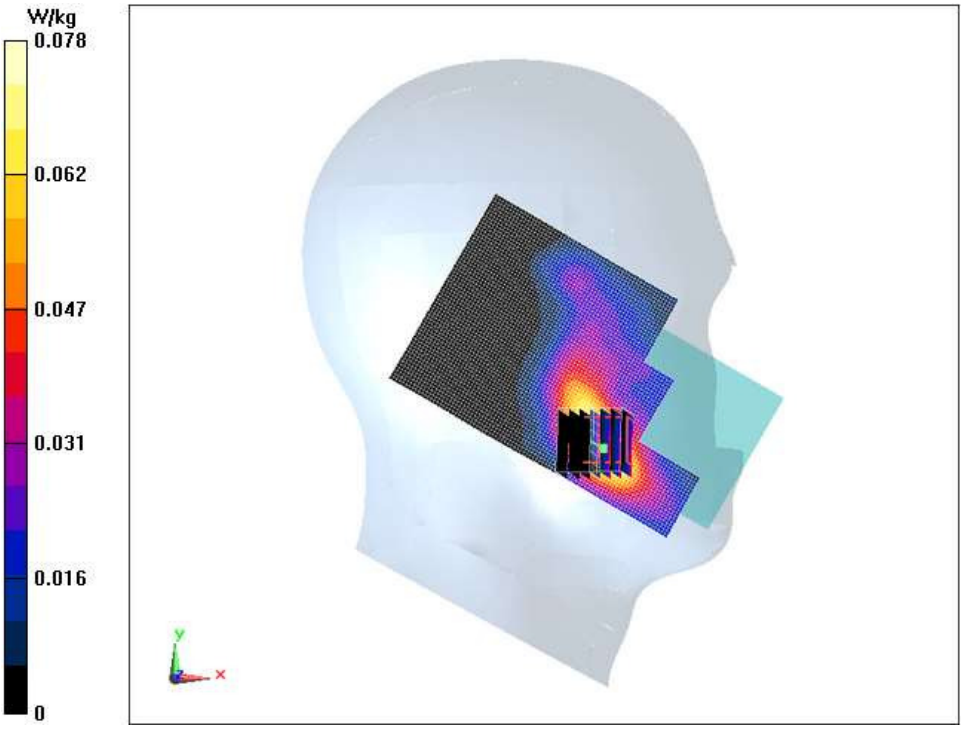


Fig.5 WCDMA Band 2 Left Cheek Mode High

WCDMA Band 2 Ground Mode Low

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.528 S/m; εr = 54.792; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: UID 0, WCDMA Professional (0); Frequency: 1852.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.69, 4.69, 4.69); Calibrated: 8/31/2017
WCDMA Band 2 Ground Mode Low/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.516 W/kg
WCDMA Band 2 Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.73 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.764 W/kg
SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.298 W/kg
Maximum value of SAR (measured) = 0.510 W/kg

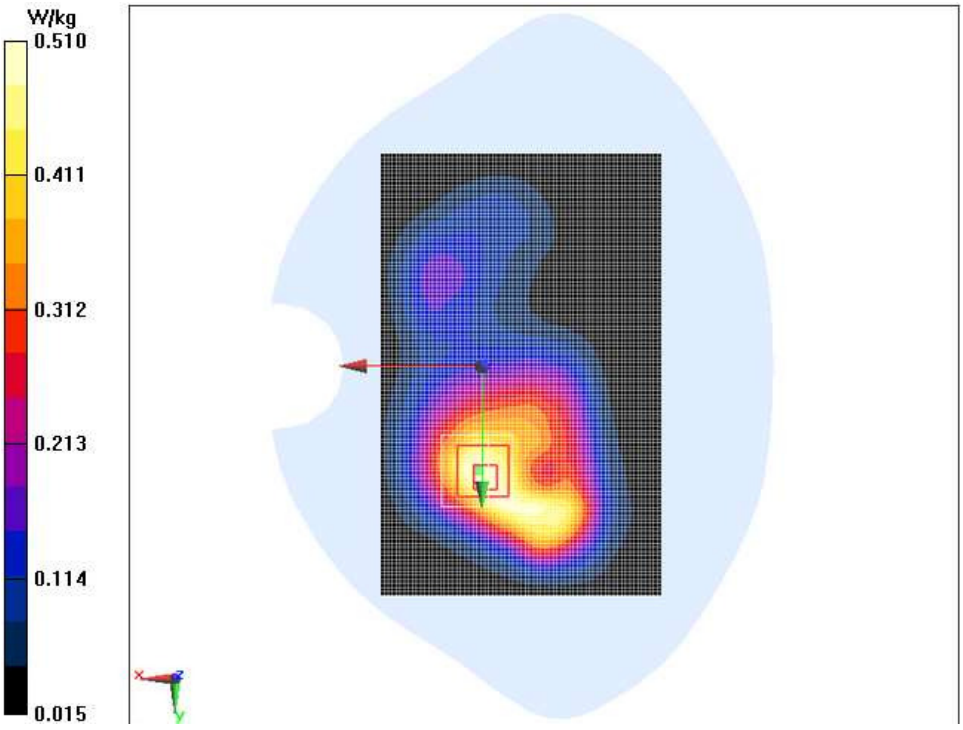


Fig.6 WCDMA Band 2 Ground Mode Low

WCDMA Band 4 Left Cheek Middle

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1733 MHz; σ = 1.31 S/m; εr = 40.772; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: UID 0, WCDMA Professional (0); Frequency: 1732.6 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.3, 5.3, 5.3); Calibrated: 8/31/2017
WCDMA Band 4 Left Cheek Middle/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.113 W/kg
WCDMA Band 4 Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.718 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.158 W/kg
SAR(1 g) = 0.098 W/kg; SAR(10 g) = 0.060 W/kg
Maximum value of SAR (measured) = 0.106 W/kg

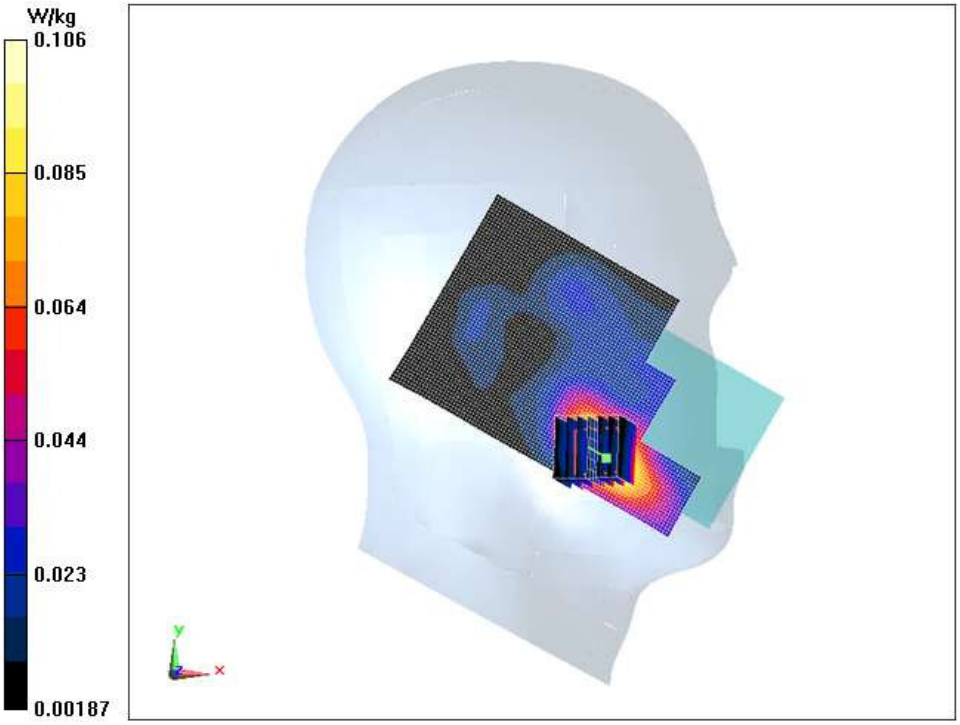


Fig.7 WCDMA Band 4 Left Cheek Middle

WCDMA Band 4 Ground Mode low

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 1712.4 MHz; σ = 1.381 S/m; εr = 55.271; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: UID 0, WCDMA Professional (0); Frequency: 1712.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.95, 4.95, 4.95); Calibrated: 8/31/2017
WCDMA Band 4 Ground Mode low/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.460 W/kg
WCDMA Band 4 Ground Mode low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.502 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.677 W/kg
SAR(1 g) = 0.423 W/kg; SAR(10 g) = 0.268 W/kg
Maximum value of SAR (measured) = 0.452 W/kg

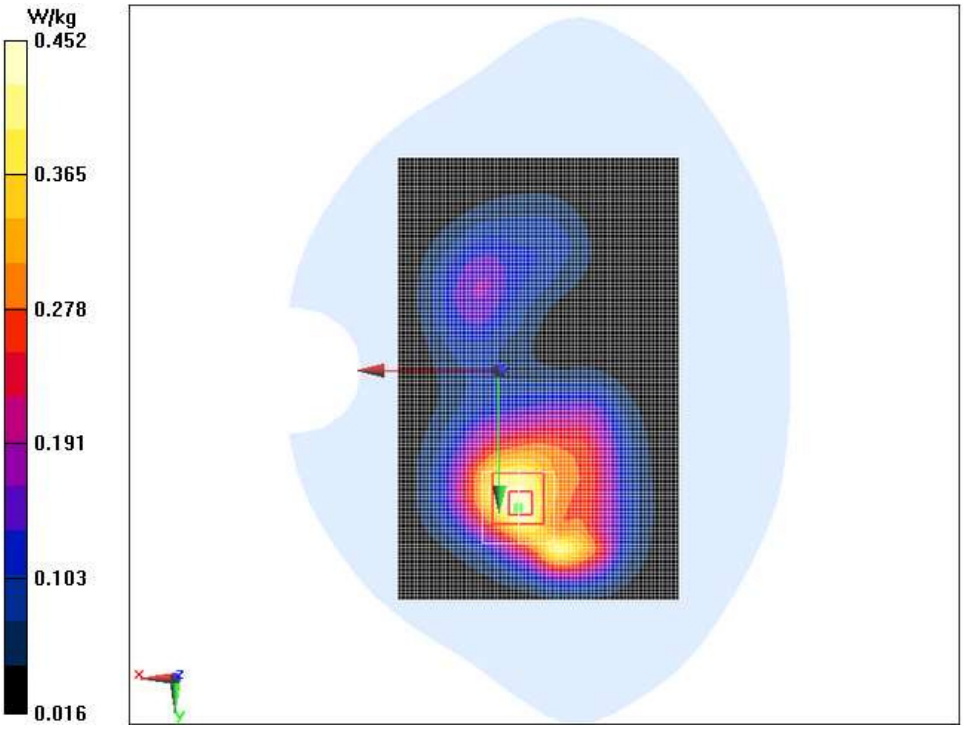


Fig.8 WCDMA Band 4 Ground Mode low

WCDMA Band 5 Left Cheek High

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 847 MHz; σ = 0.948 S/m; εr = 42.835; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: UID 0, WCDMA Professional (0); Frequency: 846.6 MHz;
Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.19, 6.19, 6.19); Calibrated: 8/31/2017
WCDMA Band 5 Left Cheek High/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.208 W/kg
WCDMA Band 5 Left Cheek High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.429 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.239 W/kg
SAR(1 g) = 0.199 W/kg; SAR(10 g) = 0.160 W/kg
Maximum value of SAR (measured) = 0.208 W/kg

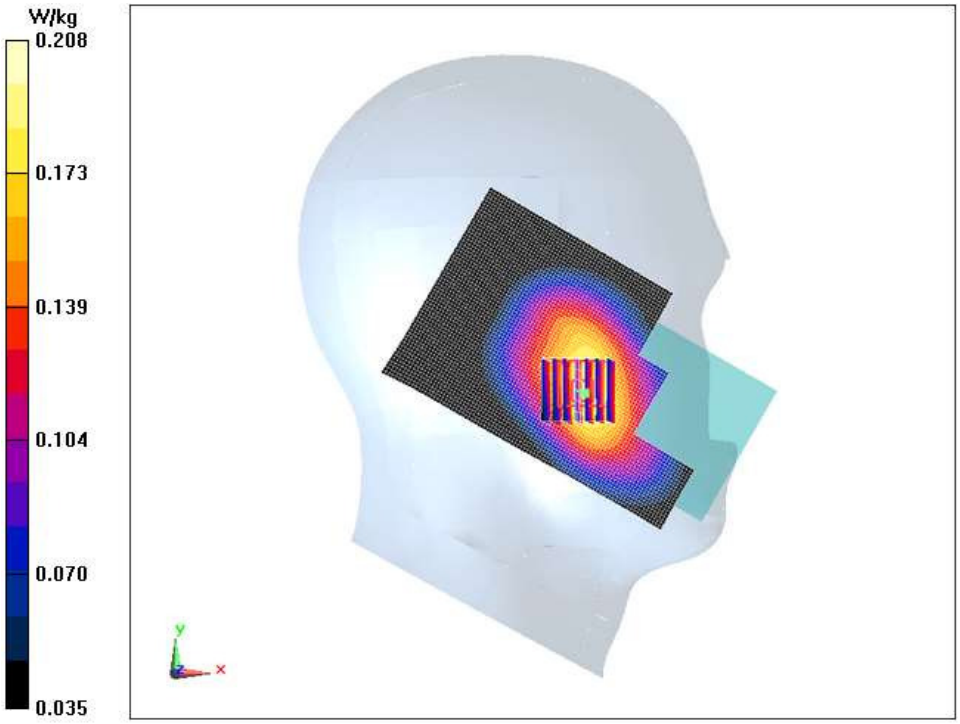


Fig.9 WCDMA Band 5 Left Cheek High

WCDMA Band 5 Ground Mode Low

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.991 S/m; εr = 56.788; ρ = 1000 kg/m3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: UID 0, WCDMA Professional (0); Frequency: 826.4 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.14, 6.14, 6.14); Calibrated: 8/31/2017
WCDMA Band 5 Ground Mode Low/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.348 W/kg
WCDMA Band 5 Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.92 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.394 W/kg
SAR(1 g) = 0.338 W/kg; SAR(10 g) = 0.275 W/kg
Maximum value of SAR (measured) = 0.359 W/kg

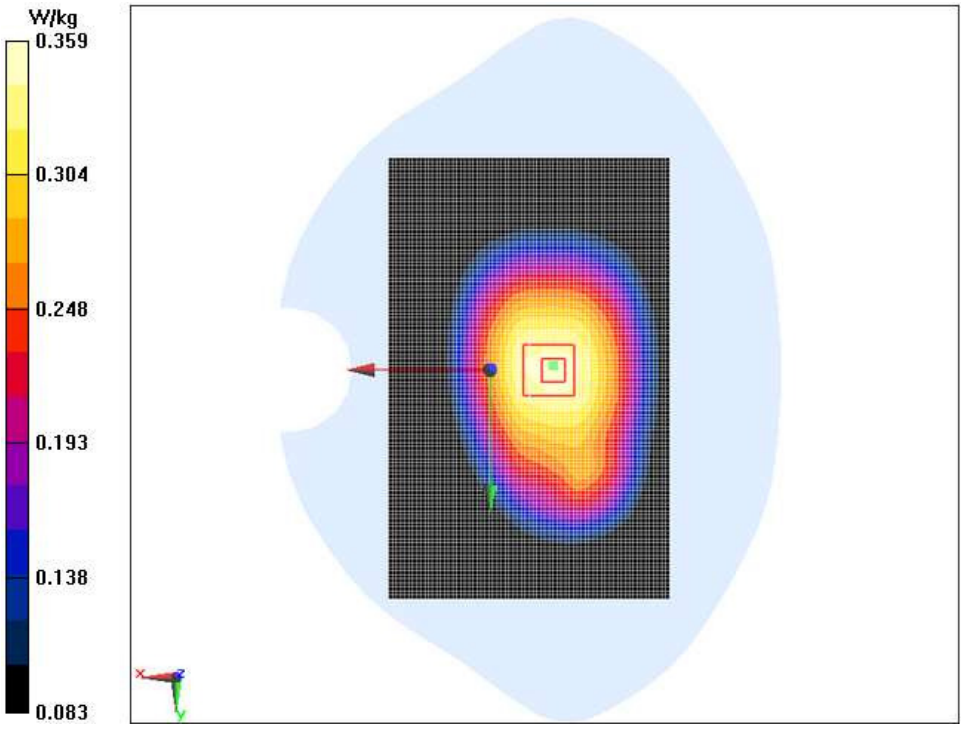


Fig.10 WCDMA Band 5 Ground Mode Low

LTE Band 2 20M 1RB 50offset Left Cheek Low

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1860 MHz; σ = 1.31 S/m; ε_r = 38.943; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 2 Professional ; Frequency: 1860 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.11, 5.11, 5.11); Calibrated: 8/31/2017
LTE Band 2 20M 1RB 50offset Left Cheek Low/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.103 W/kg
LTE Band 2 20M 1RB 50offset Left Cheek Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.959 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.156 W/kg
SAR(1 g) = 0.094 W/kg; SAR(10 g) = 0.056 W/kg
Maximum value of SAR (measured) = 0.102 W/kg

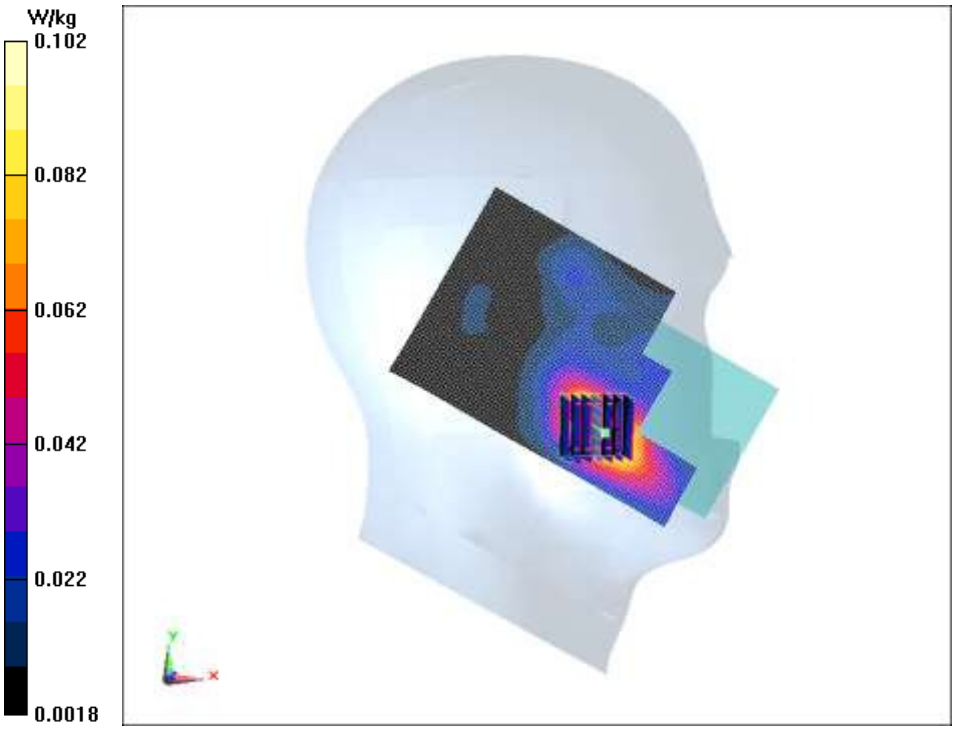


Fig.11 LTE Band 2 20M 1RB 50offset Left Cheek Low

LTE Band 2 20M 50RB 25offset Left Cheek Middle

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1880 MHz; σ = 1.329 S/m; ε_r = 38.859; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 2 Professional ; Frequency: 1880 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.11, 5.11, 5.11); Calibrated: 8/31/2017
LTE Band 2 20M 50RB 25offset Left Cheek Middle/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.0825 W/kg
LTE Band 2 20M 50RB 25offset Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.008 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.123 W/kg
SAR(1 g) = 0.074 W/kg; SAR(10 g) = 0.044 W/kg
Maximum value of SAR (measured) = 0.0807 W/kg

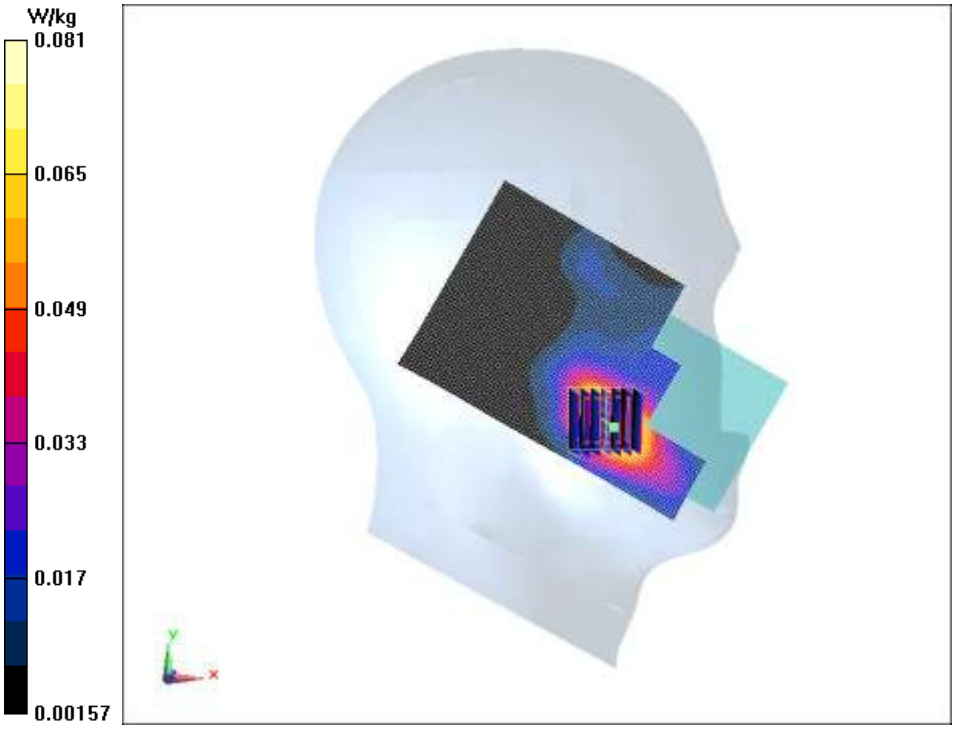


Fig.12 LTE Band 2 20M 50RB 25offset Left Cheek Middle

LTE Band 2 20M 50RB 25offset Ground Mode High

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1900 MHz; σ = 1.576 S/m; ε_r = 54.596; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 2 Professional ; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.69, 4.69, 4.69); Calibrated: 8/31/2017

LTE Band 2 20M 50RB 25offset Ground Mode High/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.322 W/kg

LTE Band 2 20M 50RB 25offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.284 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.502 W/kg
SAR(1 g) = 0.290 W/kg; SAR(10 g) = 0.158 W/kg
Maximum value of SAR (measured) = 0.322 W/kg

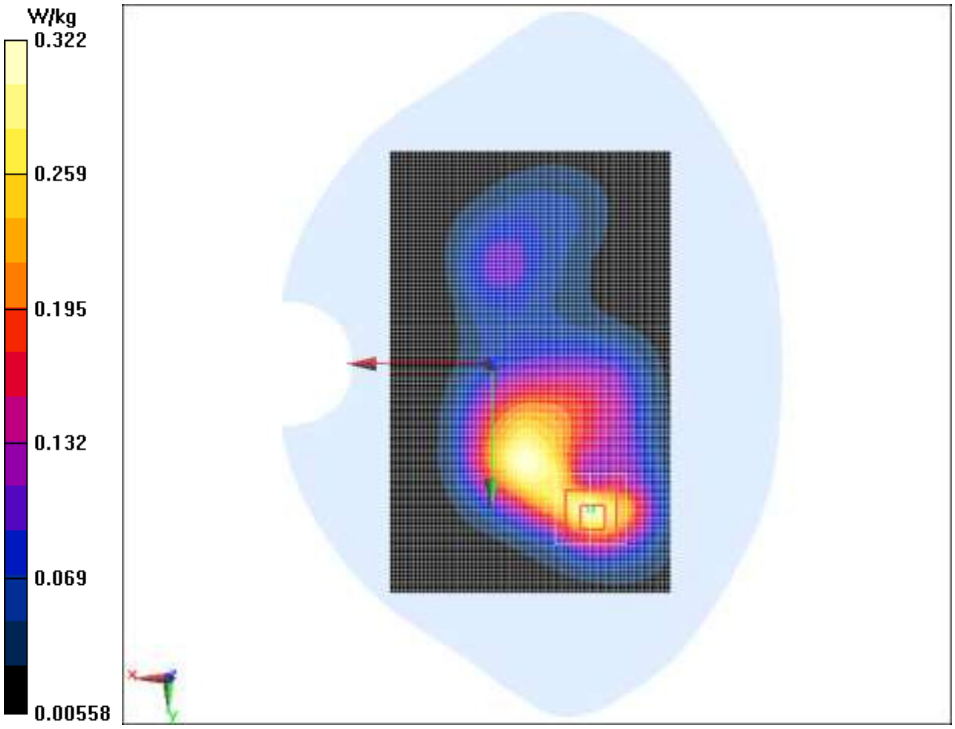


Fig.13 LTE Band 2 20M 50RB 25offset Ground Mode High

LTE Band 2 20M 1RB 50offset Ground Mode Low

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1860 MHz; σ = 1.536 S/m; ε_r = 54.761; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 2 Professional ; Frequency: 1860 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.69, 4.69, 4.69); Calibrated: 8/31/2017
LTE Band 2 20M 1RB 50offset Ground Mode Low/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.455 W/kg
LTE Band 2 20M 1RB 50offset Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.462 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.635 W/kg
SAR(1 g) = 0.409 W/kg; SAR(10 g) = 0.257 W/kg
Maximum value of SAR (measured) = 0.437 W/kg

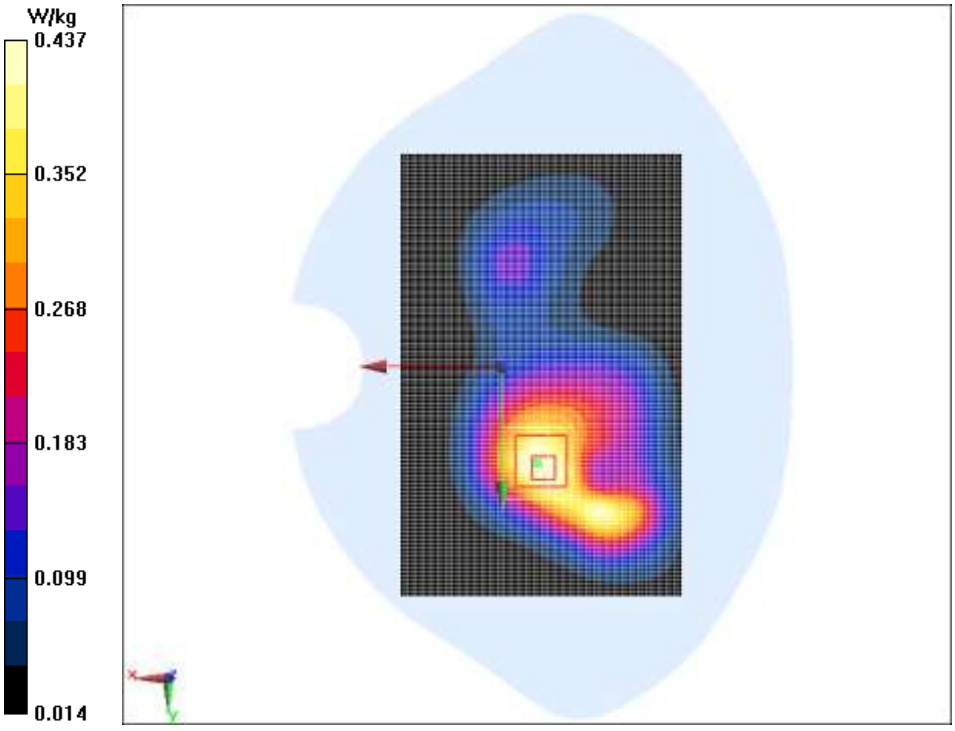


Fig.14 LTE Band 2 20M 1RB 50offset Ground Mode Low

LTE Band 4 20M 50RB 25offset Right Cheek Low

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1720 MHz; σ = 1.297 S/m; ε_r = 40.821; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 4 Professional ; Frequency: 1720 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.3, 5.3, 5.3); Calibrated: 8/31/2017
LTE Band 4 20M 50RB 25offset Right Cheek Low/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.0687 W/kg
LTE Band 4 20M 50RB 25offset Right Cheek Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.095 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.0960 W/kg
SAR(1 g) = 0.064 W/kg; SAR(10 g) = 0.041 W/kg
Maximum value of SAR (measured) = 0.0696 W/kg

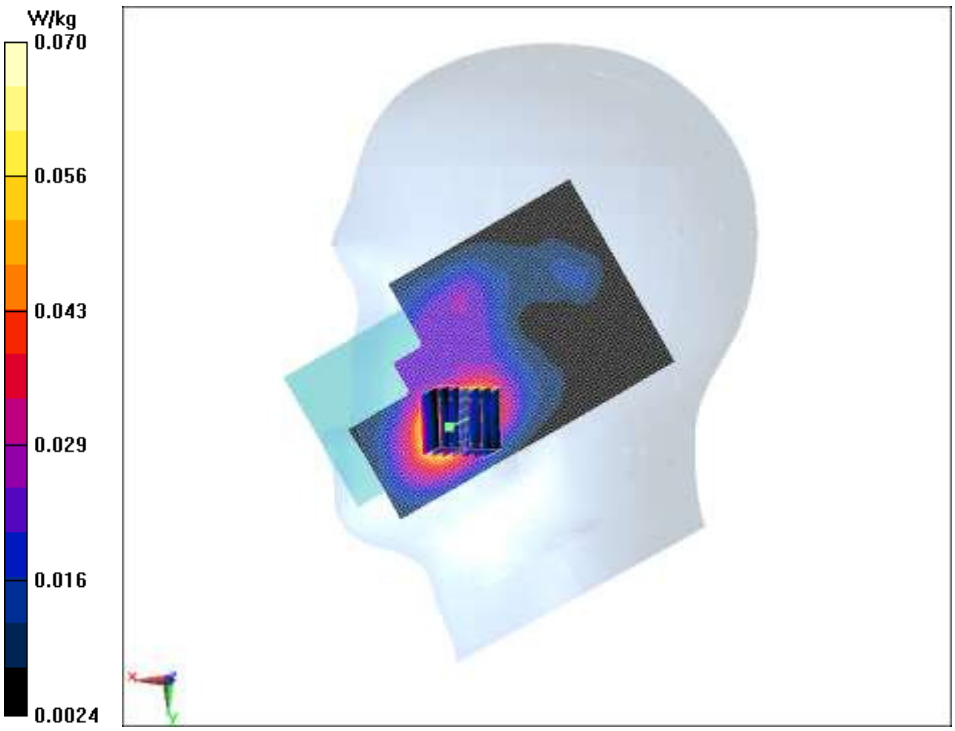


Fig.15 LTE Band 4 20M 50RB 25offset Right Cheek Low

LTE Band 4 20M 1RB 50offset Left Cheek High

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1745 MHz; σ = 1.32 S/m; ε_r = 40.73; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 4 Professional ; Frequency: 1745 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.3, 5.3, 5.3); Calibrated: 8/31/2017
LTE Band 4 20M 1RB 50offset Left Cheek High/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.100 W/kg
LTE Band 4 20M 1RB 50offset Left Cheek High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.669 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.089 W/kg; SAR(10 g) = 0.056 W/kg
Maximum value of SAR (measured) = 0.0976 W/kg

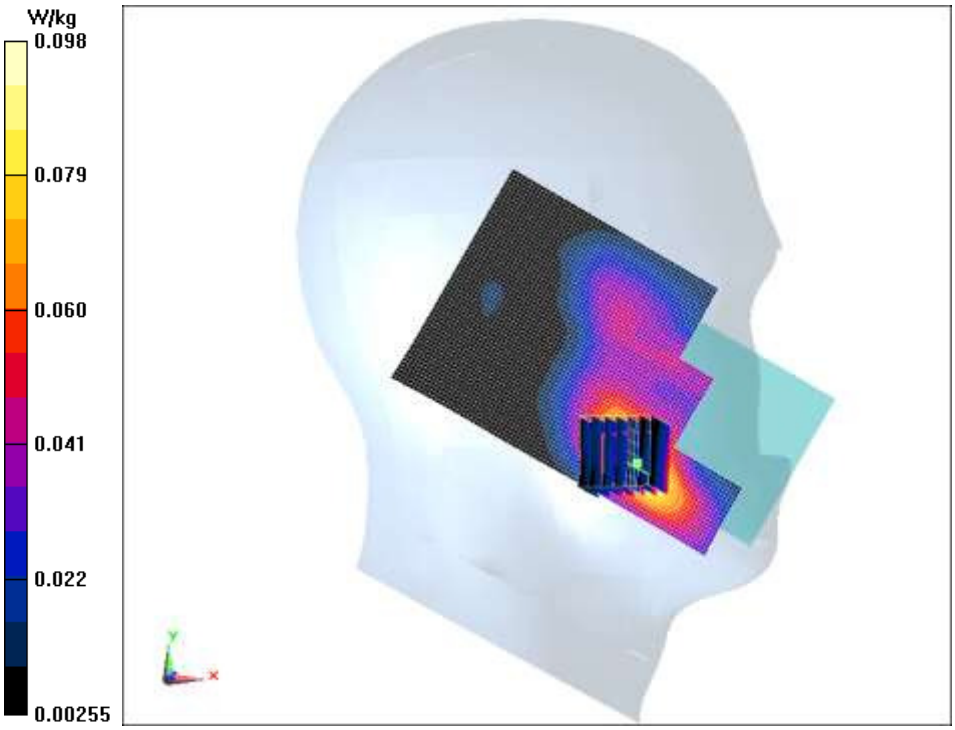


Fig.16 LTE Band 4 20M 1RB 50offset Left Cheek High

LTE Band 4 20M 1RB 50offset Ground Mode Low

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1720 MHz; σ = 1.389 S/m; ε_r = 55.251; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 4 Professional ; Frequency: 1720 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.95, 4.95, 4.95); Calibrated: 8/31/2017
LTE Band 4 20M 1RB 50offset Ground Mode Low/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.429 W/kg
LTE Band 4 20M 1RB 50offset Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.218 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.617 W/kg
SAR(1 g) = 0.395 W/kg; SAR(10 g) = 0.251 W/kg
Maximum value of SAR (measured) = 0.426 W/kg

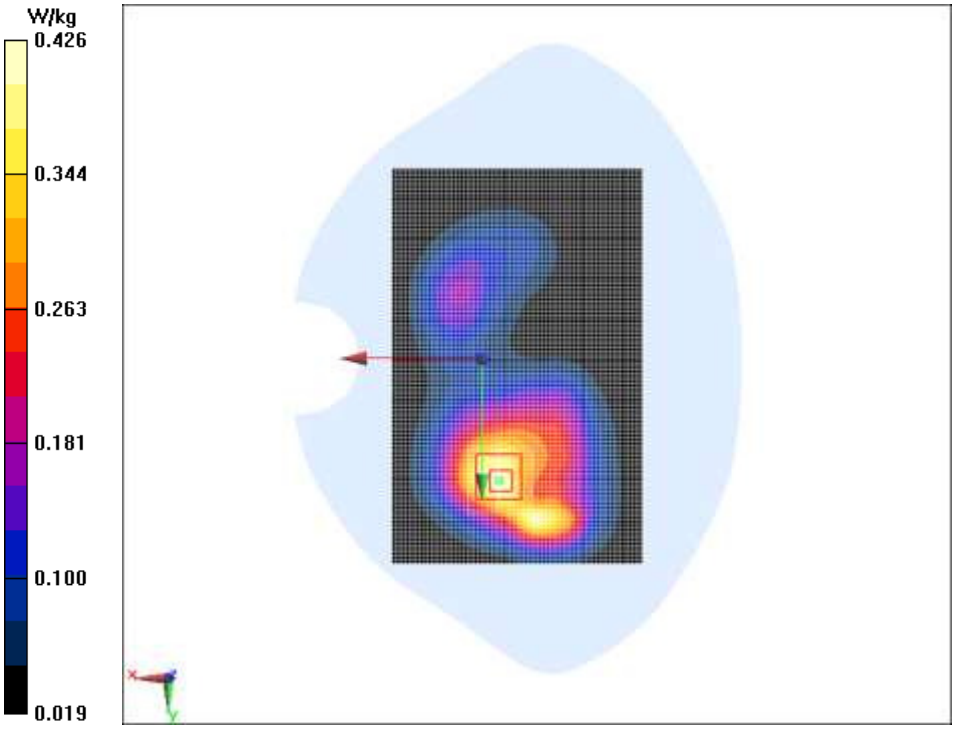


Fig.17 LTE Band 4 20M 1RB 50offset Ground Mode Low

LTE Band 4 20M 50RB 25offset Ground Mode Middle

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.402 S/m; ε_r = 55.22; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 4 Professional ; Frequency: 1732.5 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.95, 4.95, 4.95); Calibrated: 8/31/2017

LTE Band 4 20M 50RB 25offset Ground Mode Middle/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.295 W/kg

LTE Band 4 20M 50RB 25offset Ground Mode Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.037 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.420 W/kg
SAR(1 g) = 0.270 W/kg; SAR(10 g) = 0.173 W/kg
Maximum value of SAR (measured) = 0.291 W/kg

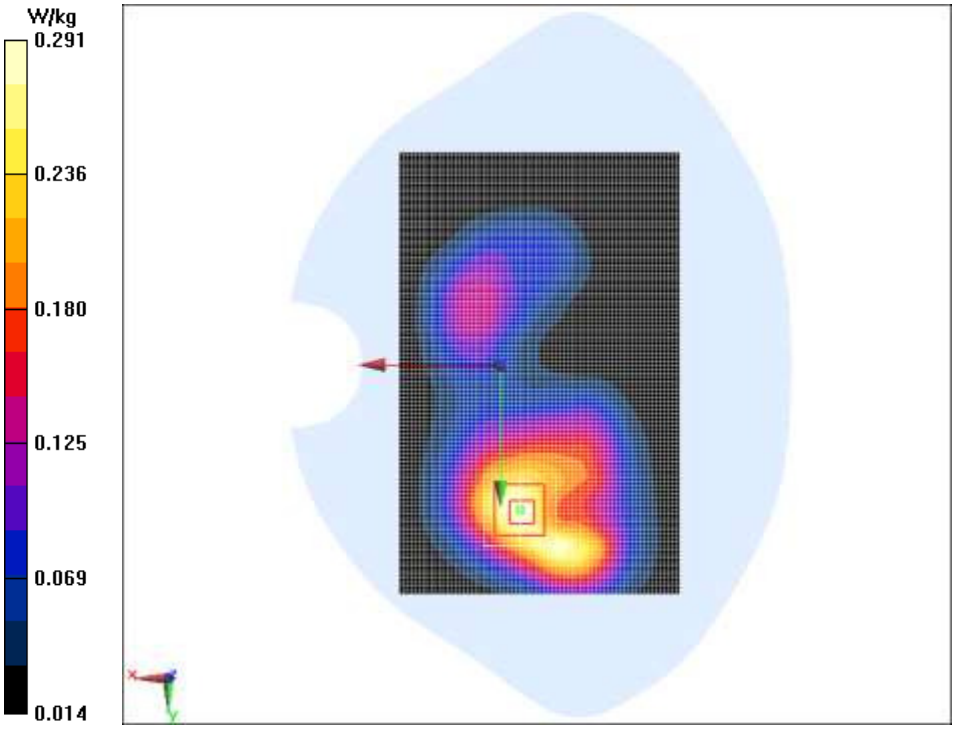


Fig.18 LTE Band 4 20M 50RB 25offset Ground Mode Middle

LTE Band 5 10M 1RB 25offset Left Cheek High

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 844 MHz; σ = 0.946 S/m; ε_r = 42.869; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 5 Professional ; Frequency: 844 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.19, 6.19, 6.19); Calibrated: 8/31/2017
LTE Band 5 10M 1RB 25offset Left Cheek High/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.207 W/kg
LTE Band 5 10M 1RB 25offset Left Cheek High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.649 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.233 W/kg
SAR(1 g) = 0.198 W/kg; SAR(10 g) = 0.162 W/kg
Maximum value of SAR (measured) = 0.205 W/kg

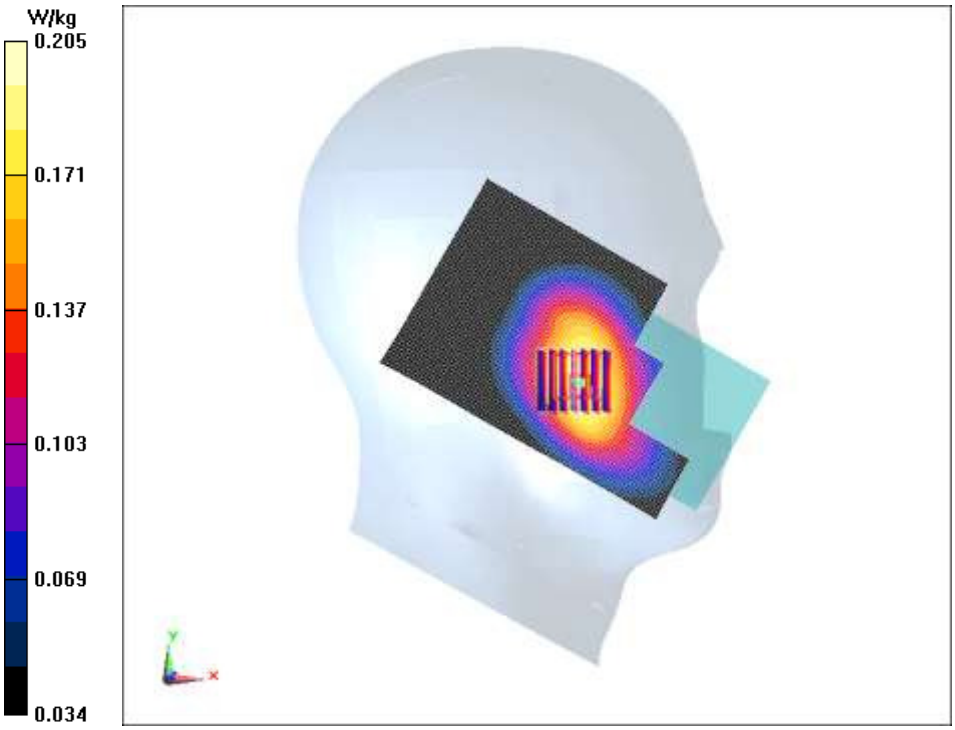


Fig.19 LTE Band 5 10M 1RB 25offset Left Cheek High

LTE Band 5 10M 25RB 0offset Left Cheek High

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 844 MHz; σ = 0.946 S/m; ε_r = 42.869; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 5 Professional ; Frequency: 844 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.19, 6.19, 6.19); Calibrated: 8/31/2017
LTE Band 5 10M 25RB 0offset Left Cheek High/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.179 W/kg
LTE Band 5 10M 25RB 0offset Left Cheek High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.600 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.205 W/kg
SAR(1 g) = 0.171 W/kg; SAR(10 g) = 0.138 W/kg
Maximum value of SAR (measured) = 0.178 W/kg

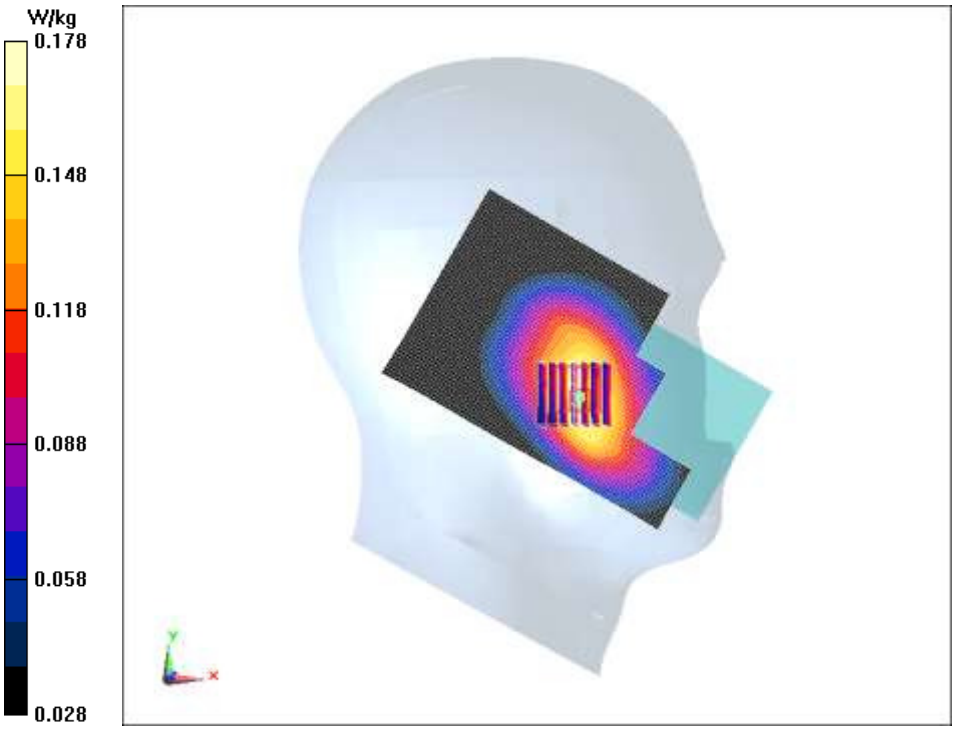


Fig.20 LTE Band 5 10M 25RB 0offset Left Cheek High

LTE Band 5 10M 1RB 25offset Ground Mode Low

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 829 MHz; σ = 0.993 S/m; ε_r = 56.761; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 5 Professional ; Frequency: 829 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.14, 6.14, 6.14); Calibrated: 8/31/2017
LTE Band 5 10M 1RB 25offset Ground Mode Low/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.354 W/kg
LTE Band 5 10M 1RB 25offset Ground Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.93 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.397 W/kg
SAR(1 g) = 0.337 W/kg; SAR(10 g) = 0.273 W/kg
Maximum of SAR (measured) = 0.350 W/kg

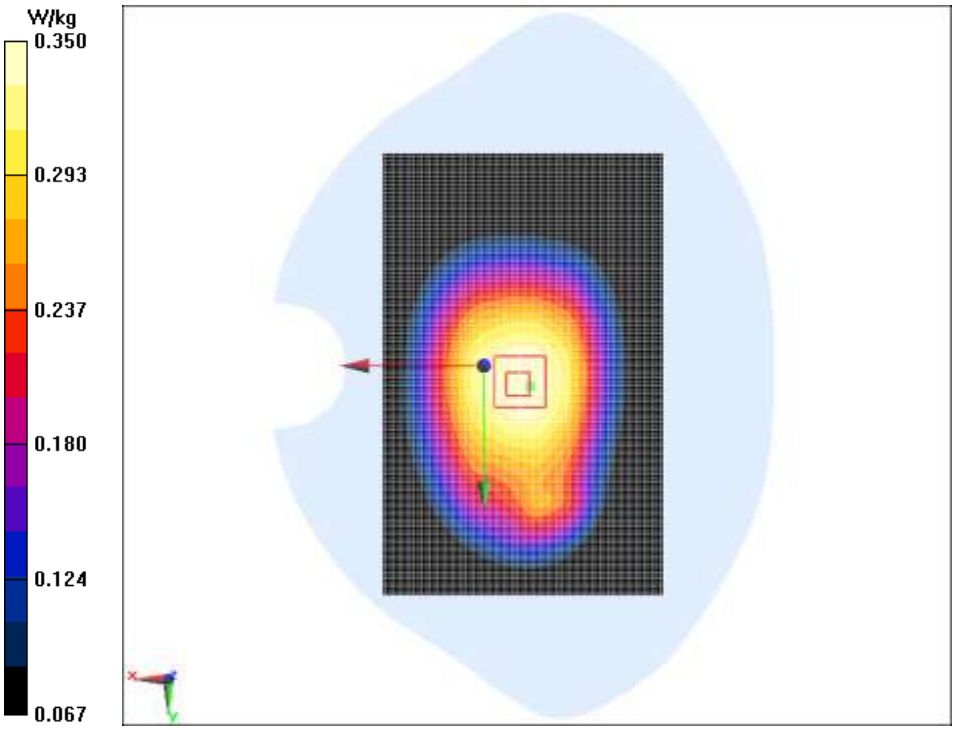


Fig.21 LTE Band 5 10M 1RB 25offset Ground Mode Low

LTE Band 5 10M 25RB 0offset Ground Mode Low

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 829 MHz; σ = 0.993 S/m; ε_r = 56.761; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 5 Professional ; Frequency: 829 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.14, 6.14, 6.14); Calibrated: 8/31/2017

LTE Band 5 10M 25RB 0offset Ground Mode Low /Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.214 W/kg

LTE Band 5 10M 25RB 0offset Ground Mode Low /Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.62 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.271 W/kg
SAR(1 g) = 0.206 W/kg; SAR(10 g) = 0.158 W/kg
Maximum of SAR (measured) = 0.217 W/kg

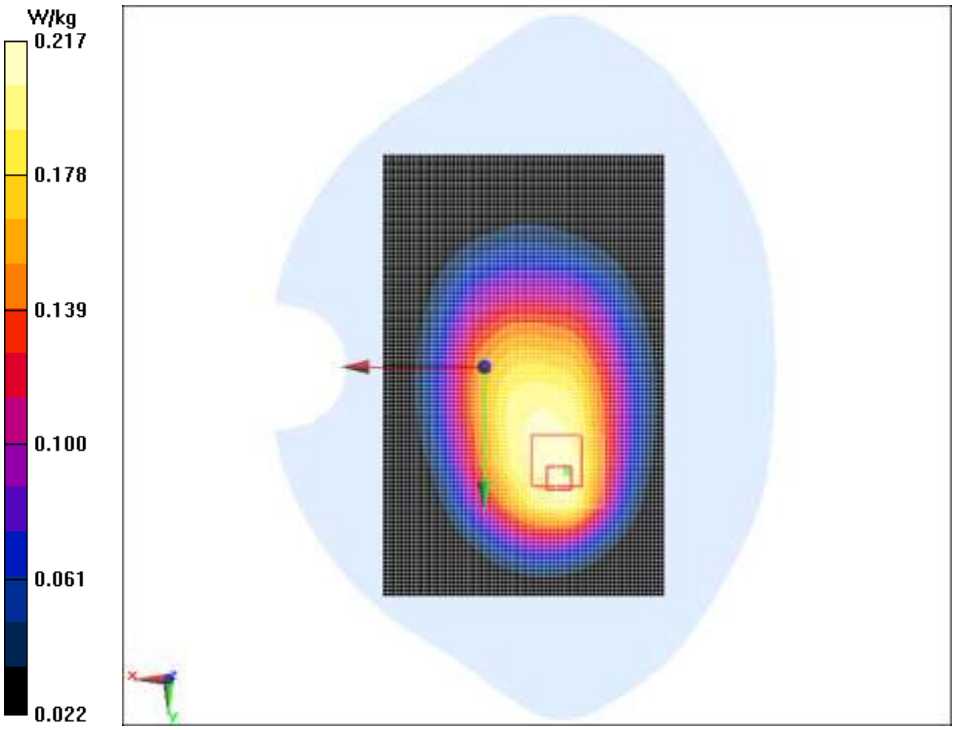


Fig.22 LTE Band 5 10M 25RB 0offset Ground Mode Low

LTE Band 7 20M 50RB 25offset Left Cheek Low

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2510 MHz; σ = 1.945 S/m; ε_r = 38.603; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2510 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.75, 4.75, 4.75); Calibrated: 8/31/2017
LTE Band 7 20M 50RB 25offset Left Cheek Low/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.0578 W/kg
LTE Band 7 20M 50RB 25offset Left Cheek Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.7810 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.0870 W/kg
SAR(1 g) = 0.049 W/kg; SAR(10 g) = 0.025 W/kg
Maximum value of SAR (measured) = 0.0546 W/kg

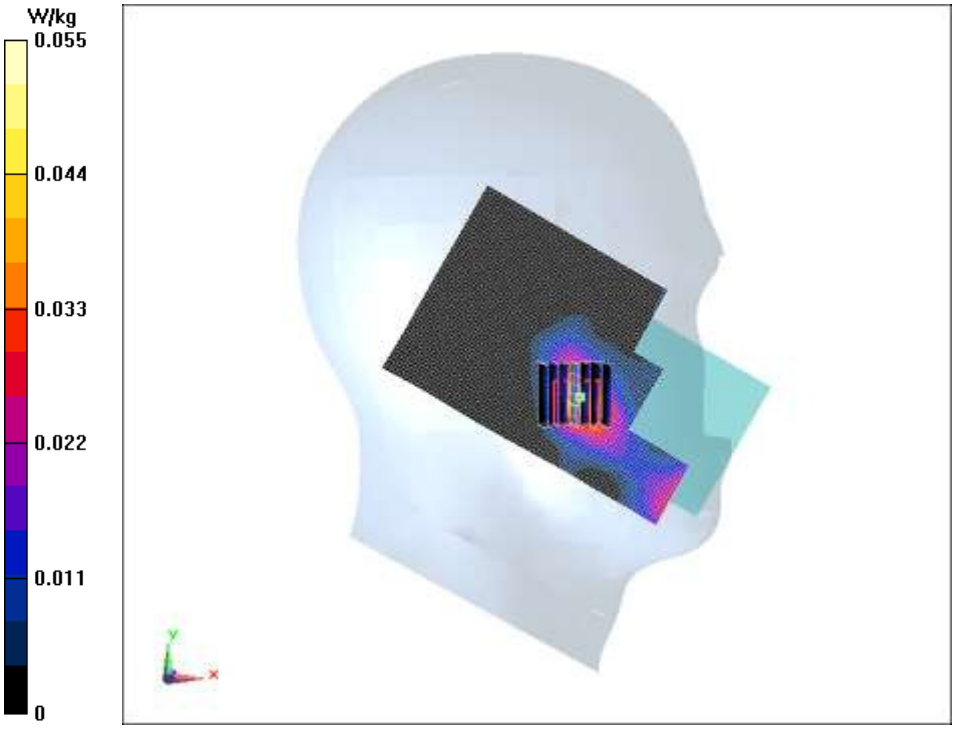


Fig.23 LTE Band 7 20M 50RB 25offset Left Cheek Low

LTE Band 7 20M 1RB 50offset Left Cheek Middle

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2535 MHz; σ = 1.969 S/m; ε_r = 38.506; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2535 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.75, 4.75, 4.75); Calibrated: 8/31/2017

LTE Band 7 20M 1RB 50offset Left Cheek Middle/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.0760 W/kg

LTE Band 7 20M 1RB 50offset Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.112 W/kg
SAR(1 g) = 0.059 W/kg; SAR(10 g) = 0.029 W/kg
Maximum value of SAR (measured) = 0.0656 W/kg

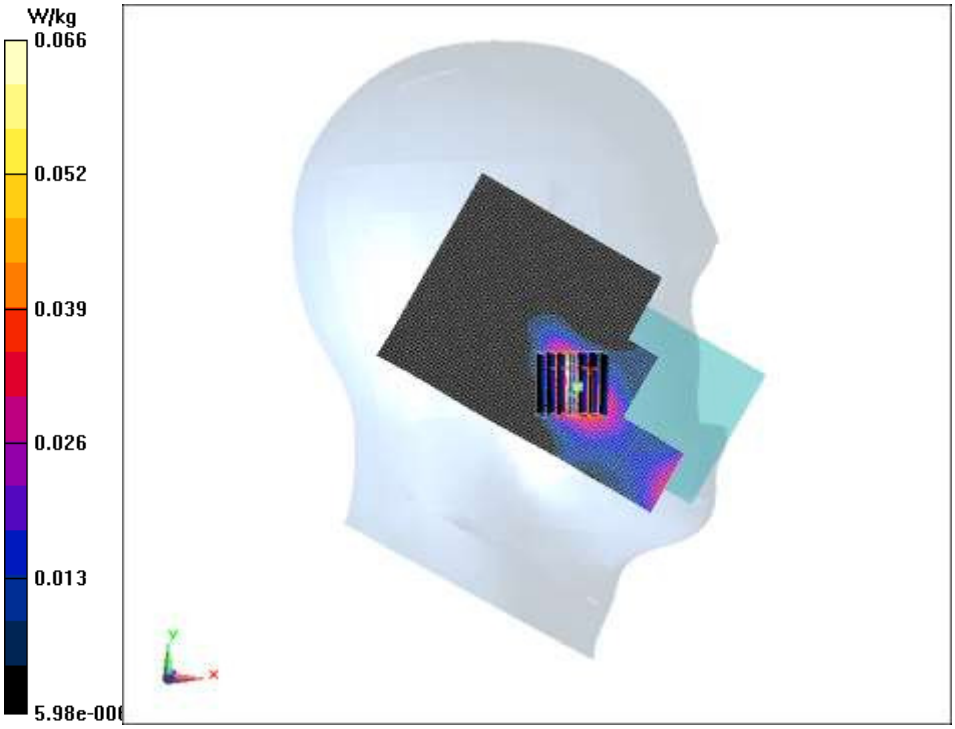


Fig.24 LTE Band 7 20M 1RB 50offset Left Cheek Middle

LTE Band 7 20M 1RB 50offset Bottom Mode Low

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2510 MHz; σ = 1.976 S/m; ε_r = 53.182; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2510 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.42, 4.42, 4.42); Calibrated: 8/31/2017

LTE Band 7 20M 1RB 50offset Bottom Mode Low/Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.14 W/kg

LTE Band 7 20M 1RB 50offset Bottom Mode Low/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.34 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.18 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.466 W/kg
Maximum value of SAR (measured) = 1.22 W/kg

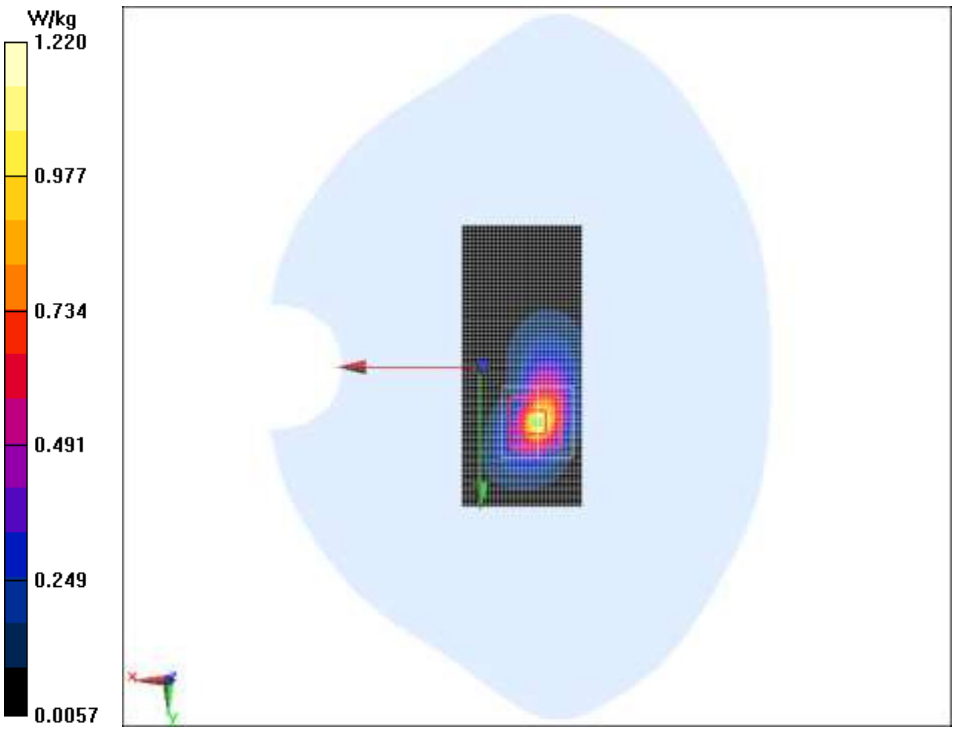


Fig.25 LTE Band 7 20M 1RB 50offset Bottom Mode Low

LTE Band 7 20M 50RB 25offset Bottom Mode High

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2560 MHz; σ = 2.04 S/m; ε_r = 52.994; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2560 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.22, 4.22, 4.22); Calibrated: 8/31/2017
LTE Band 7 20M 50RB 25offset Bottom Mode High/Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.877 W/kg
LTE Band 7 20M 50RB 25offset Bottom Mode High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.470 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 0.870 W/kg; SAR(10 g) = 0.364 W/kg
Maximum value of SAR (measured) = 0.907 W/kg

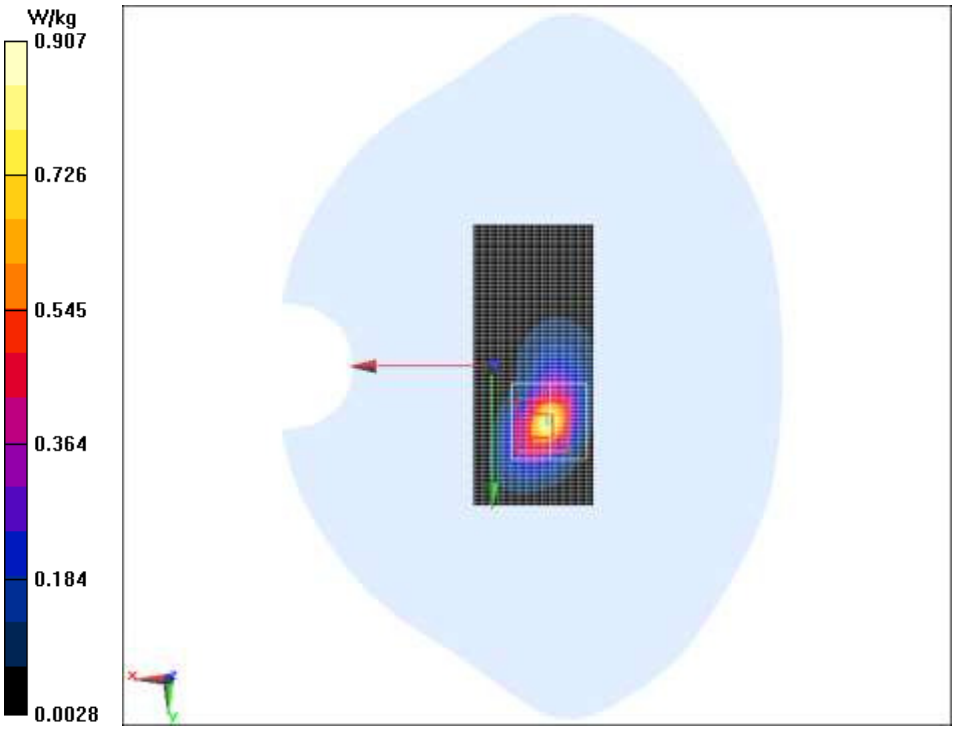


Fig.26 LTE Band 7 20M 50RB 25offset Bottom Mode High

LTE Band 7 20M 1RB 50offset Bottom Mode Low Repeated

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2510 MHz; σ = 1.976 S/m; ε_r = 53.182; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2510 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.42, 4.42, 4.42); Calibrated: 8/31/2017

LTE Band 7 20M 1RB 50offset Bottom Mode Low Repeated/Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.03 W/kg

LTE Band 7 20M 1RB 50offset Bottom Mode Low Repeated/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.973 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 2.00 W/kg
SAR(1 g) = 0.979 W/kg; SAR(10 g) = 0.431 W/kg
Maximum value of SAR (measured) = 1.13 W/kg

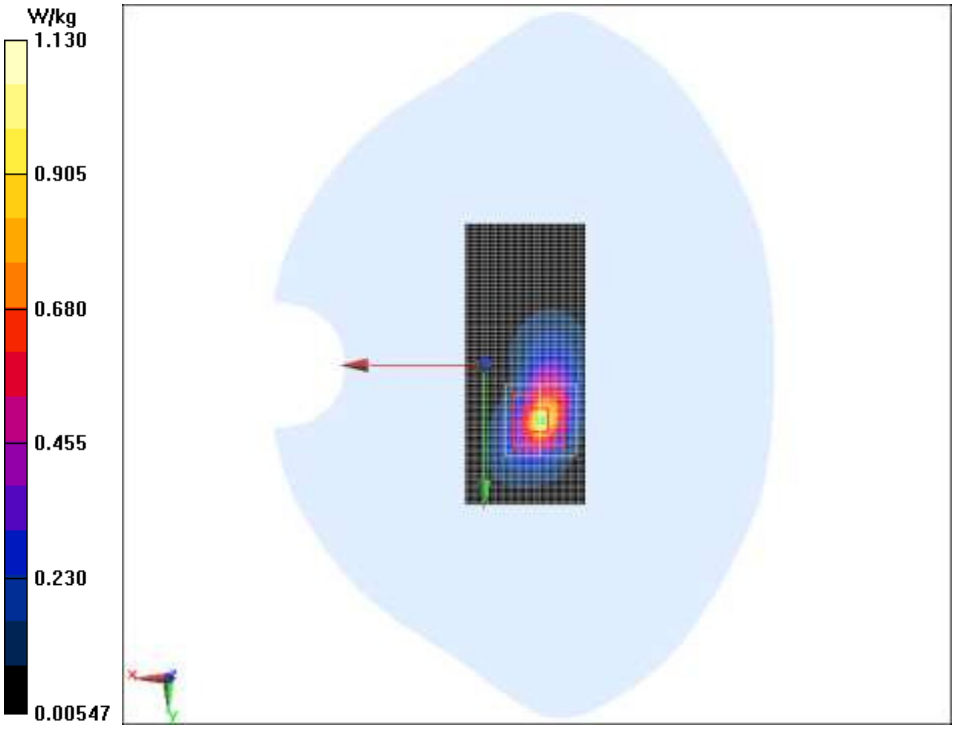


Fig.27 LTE Band 7 20M 1RB 50offset Bottom Mode Low Repeated

LTE Band 7 20M 50RB 25offset Bottom Mode High reported

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2560 MHz; σ = 2.04 S/m; ε_r = 52.994; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2560 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.22, 4.22, 4.22); Calibrated: 8/31/2017

LTE Band 7 20M 50RB 25offset Bottom Mode High reported/Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.910 W/kg

LTE Band 7 20M 50RB 25offset Bottom Mode High reported/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.811 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.865 W/kg; SAR(10 g) = 0.379 W/kg
Maximum value of SAR (measured) = 0.994 W/kg

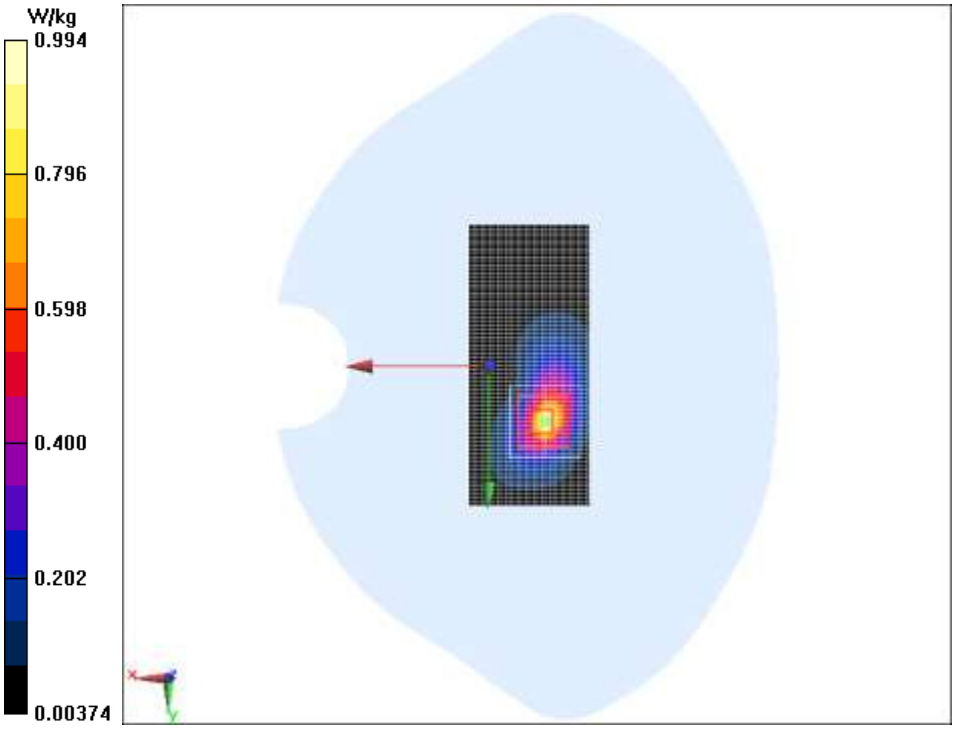


Fig.28 LTE Band 7 20M 50RB 25offset Bottom Mode High reported

LTE Band 7 20M 1RB 50offset Bottom Mode High Second Supply

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2560 MHz; σ = 2.04 S/m; ε_r = 52.994; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2560 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.22, 4.22, 4.22); Calibrated: 8/31/2017

LTE Band 7 20M 1RB 50offset Bottom Mode High /Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.01 W/kg

LTE Band 7 20M 1RB 50offset Bottom Mode High /Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.28 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 2.00 W/kg
SAR(1 g) = 0.921 W/kg; SAR(10 g) = 0.402 W/kg
Maximum value of SAR (measured) = 1.06 W/kg

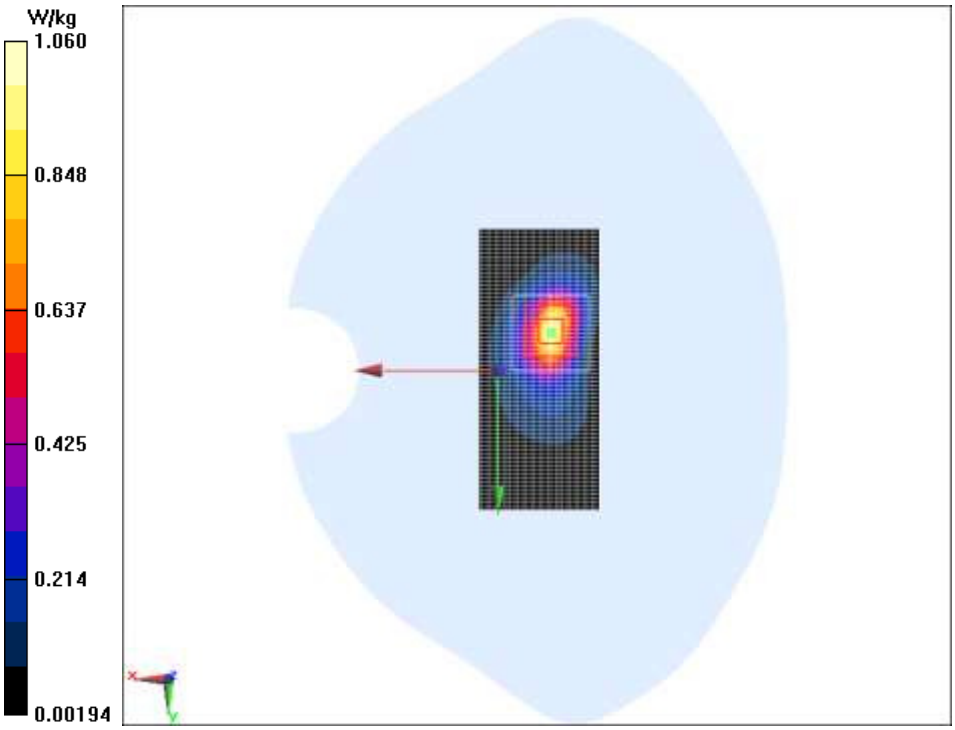


Fig.29 LTE Band 7 20M 1RB 50offset Bottom Mode High

LTE Band 7 20M 1RB 50offset Bottom Mode High Second Supply Repeated

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2560 MHz; σ = 2.04 S/m; ε_r = 52.994; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 7 Professional ; Frequency: 2560 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.22, 4.22, 4.22); Calibrated: 8/31/2017
LTE Band 7 20M 1RB 50offset Bottom Mode High /Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.01 W/kg
LTE Band 7 20M 1RB 50offset Bottom Mode High /Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.29 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.99 W/kg
SAR(1 g) = 0.918 W/kg; SAR(10 g) = 0.401 W/kg
Maximum value of SAR (measured) = 1.06 W/kg

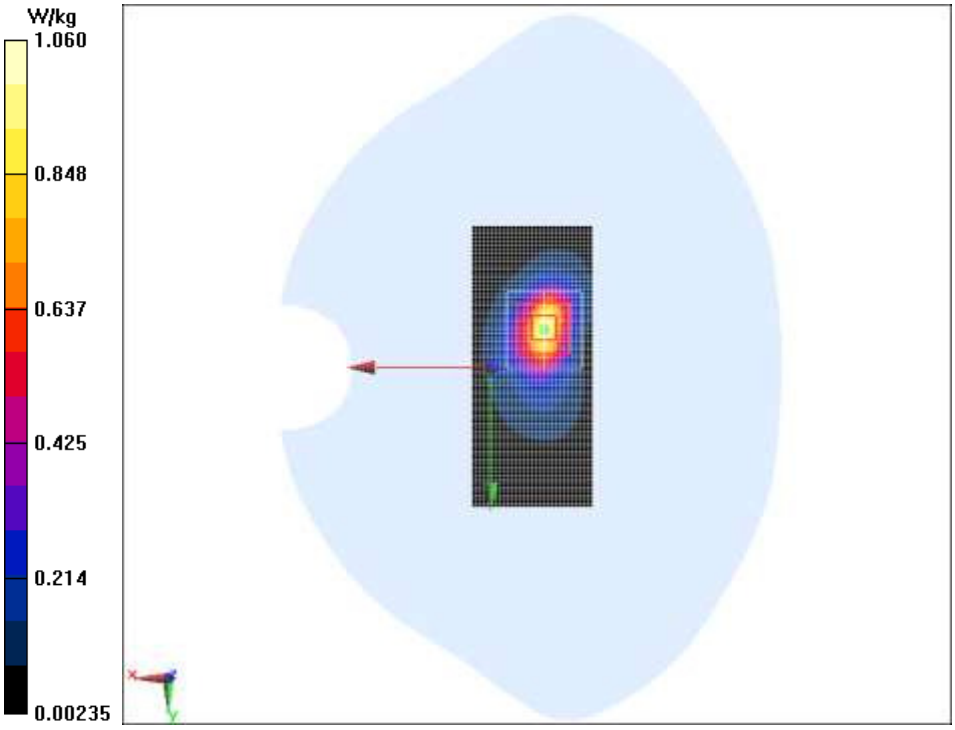


Fig.30 LTE Band 7 20M 1RB 50offset Bottom Mode High

LTE Band 12 10M 1RB 25offset Left Cheek High

Date/Time: 2018/2/2
Electronics: DAE4 Sn1244
Medium parameters used: f = 711 MHz; σ = 0.825 S/m; ε_r = 43.598; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 12 Professional ; Frequency: 711 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.25, 6.25, 6.25); Calibrated: 8/31/2017
LTE Band 12 10M 1RB 25offset Left Cheek High/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.0839 W/kg
LTE Band 12 10M 1RB 25offset Left Cheek High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.024 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.226 W/kg
SAR(1 g) = 0.101 W/kg; SAR(10 g) = 0.041 W/kg
Maximum of SAR (measured) = 0.0832 W/kg

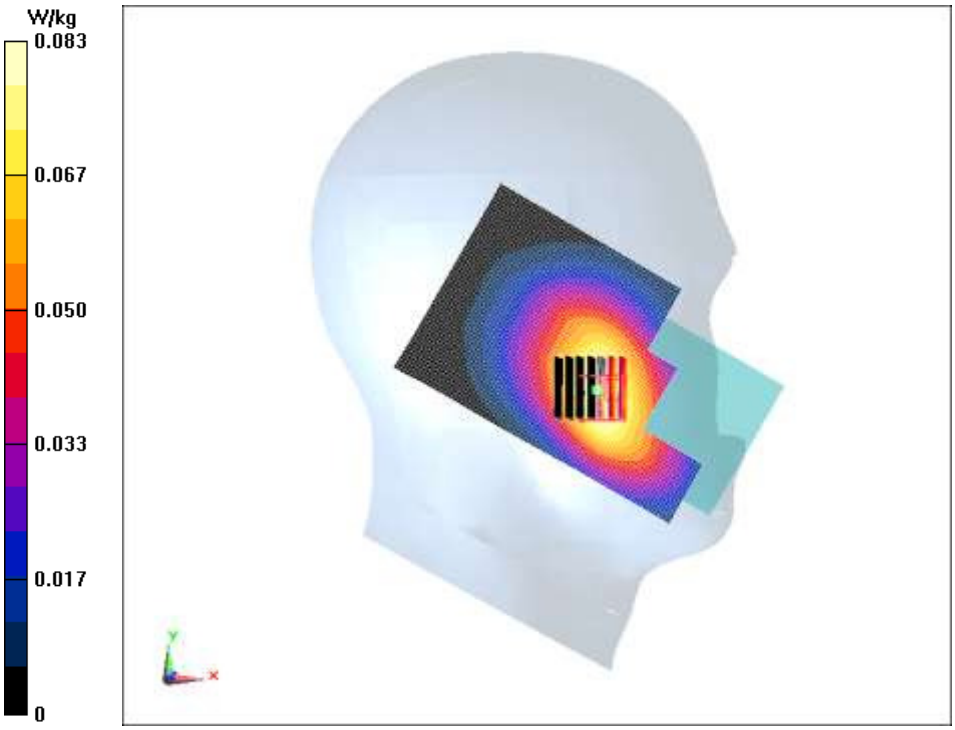


Fig.31 LTE Band 12 10M 1RB 25offset Left Cheek High

LTE Band 12 10M 25RB 0offset Left Cheek High

Date/Time: 2018/2/2
Electronics: DAE4 Sn1244
Medium parameters used: f = 711 MHz; σ = 0.825 S/m; ε_r = 43.598; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 12 Professional ; Frequency: 711 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.25, 6.25, 6.25); Calibrated: 8/31/2017

LTE Band 12 10M 25RB 0offset Left Cheek High/Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.0646 W/kg

LTE Band 12 10M 25RB 0offset Left Cheek High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.670 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.0750 W/kg
SAR(1 g) = 0.063 W/kg; SAR(10 g) = 0.052 W/kg
Maximum value of SAR (measured) = 0.0650 W/kg

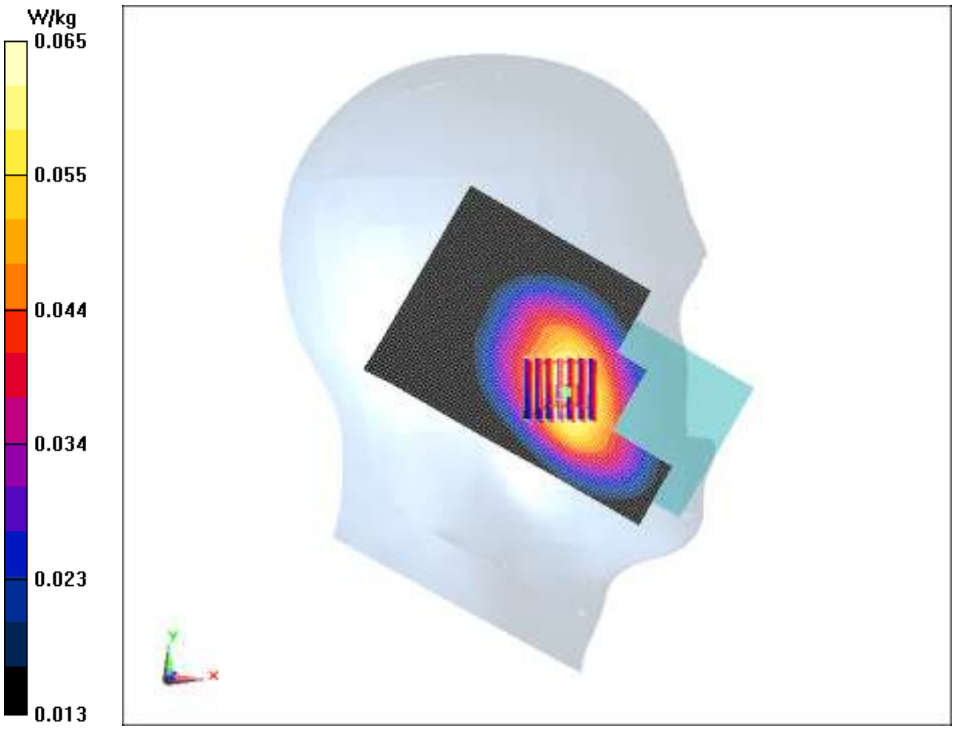


Fig.32 LTE Band 12 10M 25RB 0offset Left Cheek High

LTE Band 12 10M 1RB 25offset Ground Mode High

Date/Time: 2018/2/2
Electronics: DAE4 Sn1244
Medium parameters used: f = 711 MHz; σ = 0.917 S/m; ε_r = 58.129; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 12 Professional ; Frequency: 711 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 8/31/2017

LTE Band 12 10M 1RB 25offset Ground Mode High/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.137 W/kg

LTE Band 12 10M 1RB 25offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.87 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.157 W/kg
SAR(1 g) = 0.133 W/kg; SAR(10 g) = 0.109 W/kg
Maximum value of SAR (measured) = 0.138 W/kg

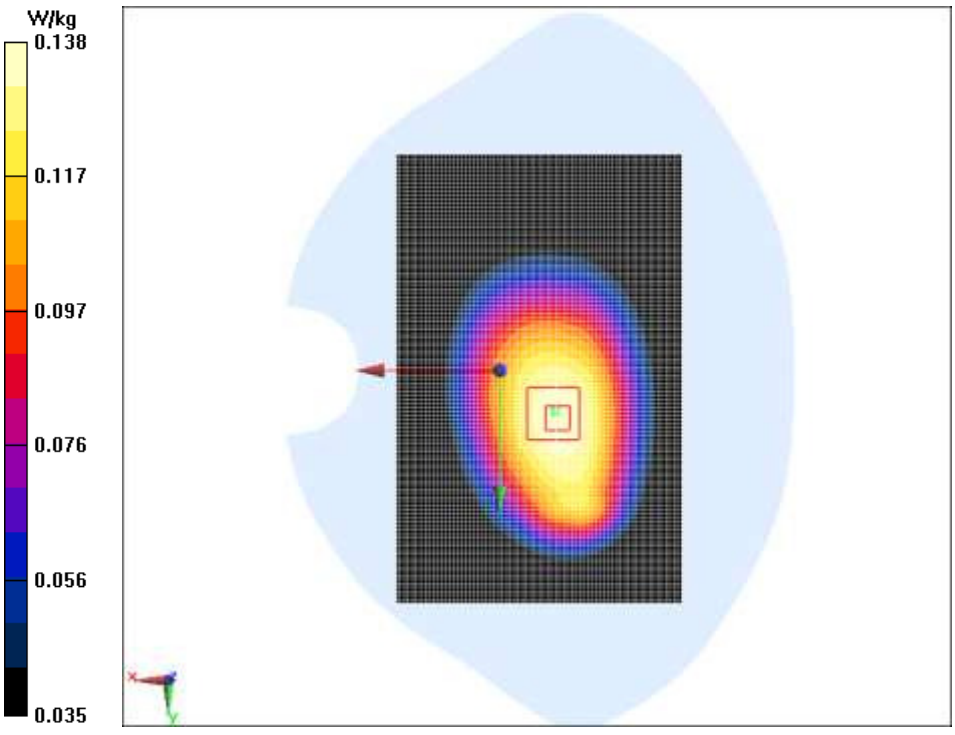


Fig.33 LTE Band 12 10M 1RB 25offset Ground Mode High

LTE Band 12 10M 25RB 0offset Ground Mode High

Date/Time: 2018/2/2
Electronics: DAE4 Sn1244
Medium parameters used: f = 711 MHz; σ = 0.917 S/m; ε_r = 58.129; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: LTE Band 12 Professional ; Frequency: 711 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 8/31/2017

LTE Band 12 10M 25RB 0offset Ground Mode High/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.109 W/kg

LTE Band 12 10M 25RB 0offset Ground Mode High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.79 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.105 W/kg; SAR(10 g) = 0.086 W/kg
Maximum value of SAR (measured) = 0.109 W/kg

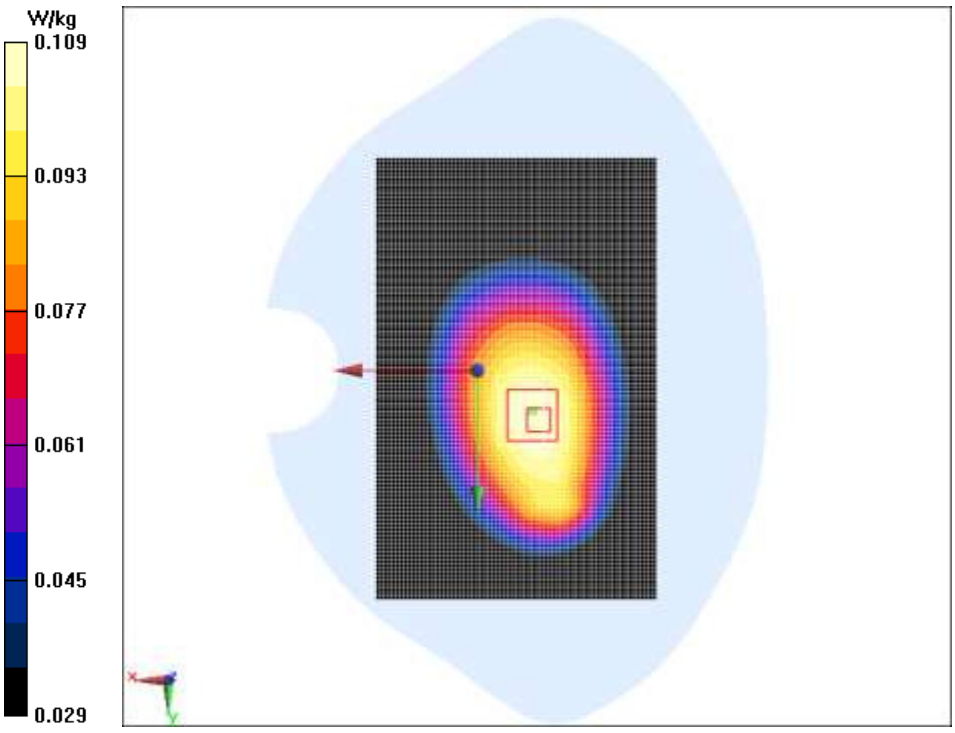


Fig.34 LTE Band 12 10M 25RB 0offset Ground Mode High

Wifi2450 Left Tilt Low

Date/Time: 2018/2/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 2412 MHz; σ = 1.796 S/m; ε_r = 40.973; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: Wifi 2450 ; Frequency: 2412 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.75, 4.75, 4.75); Calibrated: 8/31/2017
Wifi2450 Left Tilt Low /Area Scan (111x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.508 W/kg
Wifi2450 Left Tilt Low /Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.907 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.177 W/kg
Maximum value of SAR (measured) = 0.481 W/kg

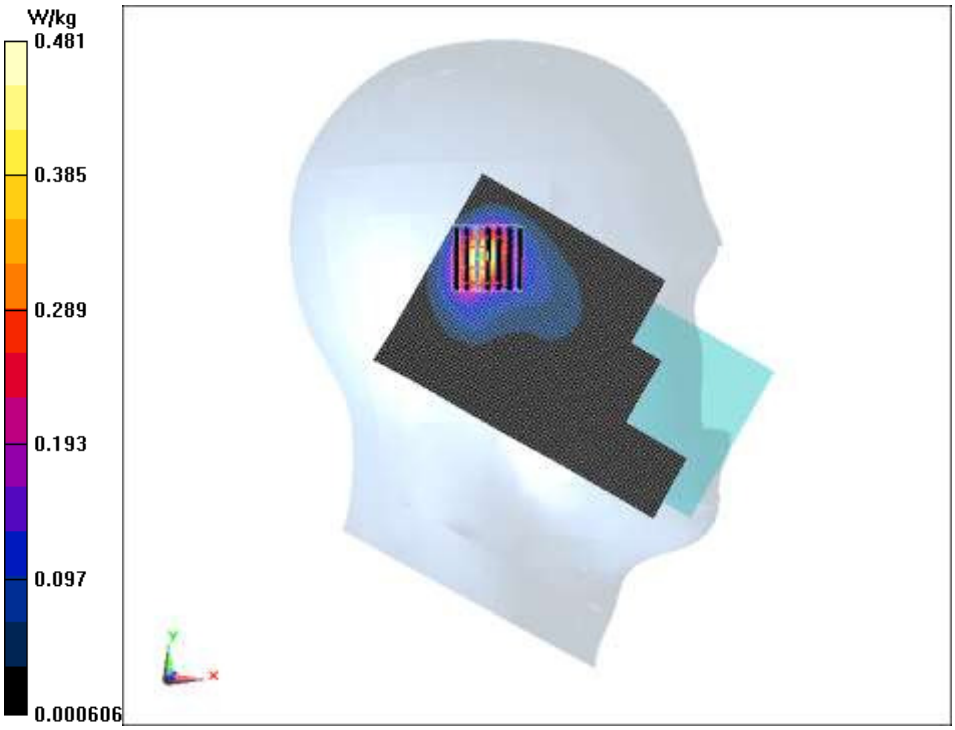


Fig.35 Wifi2450 Left Tilt Low

Wifi2450 Ground Mode High

Date/Time: 2018/2/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 2462 MHz; σ = 1.99 S/m; ε_r = 52.959; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: Wifi 2450 ; Frequency: 2462 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.42, 4.42, 4.42); Calibrated: 8/31/2017
Wifi2450 Ground Mode High/Area Scan (71x111x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.154 W/kg
Wifi2450 Ground Mode High/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.586 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.305 W/kg
SAR(1 g) = 0.131 W/kg; SAR(10 g) = 0.068 W/kg
Maximum value of SAR (measured) = 0.139 W/kg

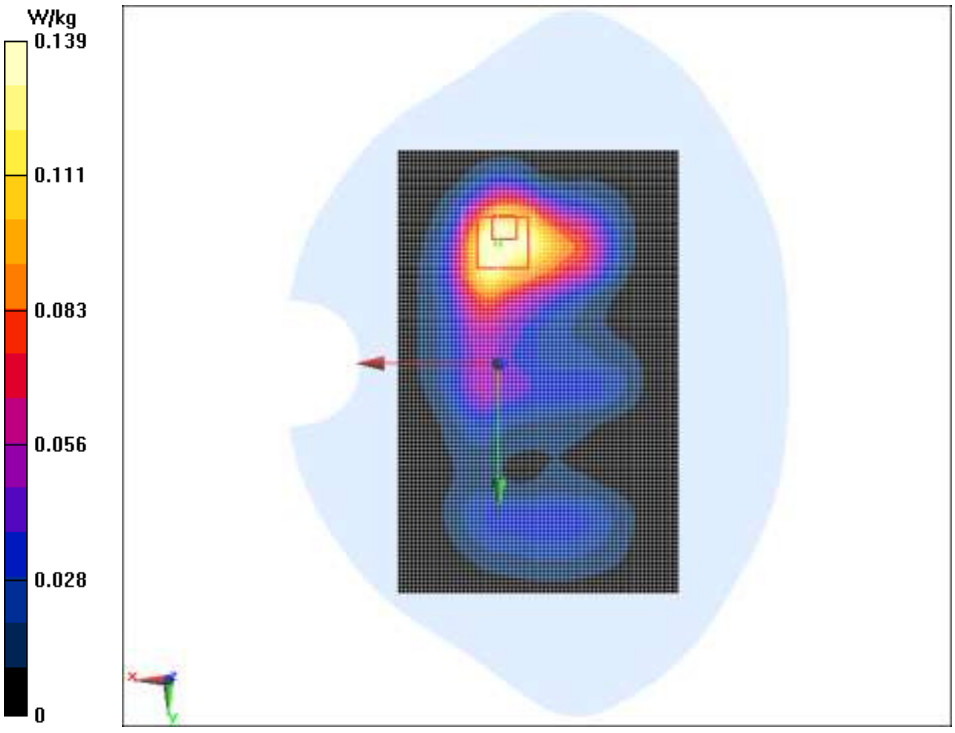


Fig.36 Wifi2450 Ground Mode High

Wifi5G Left Tilt Channel 60

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5300 MHz; σ = 4.697 S/m; ε_r = 36.988; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: 5GHz U-NII-2A ; Frequency: 5300 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(5.15, 5.15, 5.15); Calibrated: 12/21/2017
Wifi5G Left Tilt Channel 60/Area Scan (71x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.37 W/kg
Wifi5G Left Tilt Channel 60/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 3.706 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 4.25 W/kg
SAR(1 g) = 0.912 W/kg; SAR(10 g) = 0.279 W/kg
Maximum of SAR (measured) = 2.41 W/kg

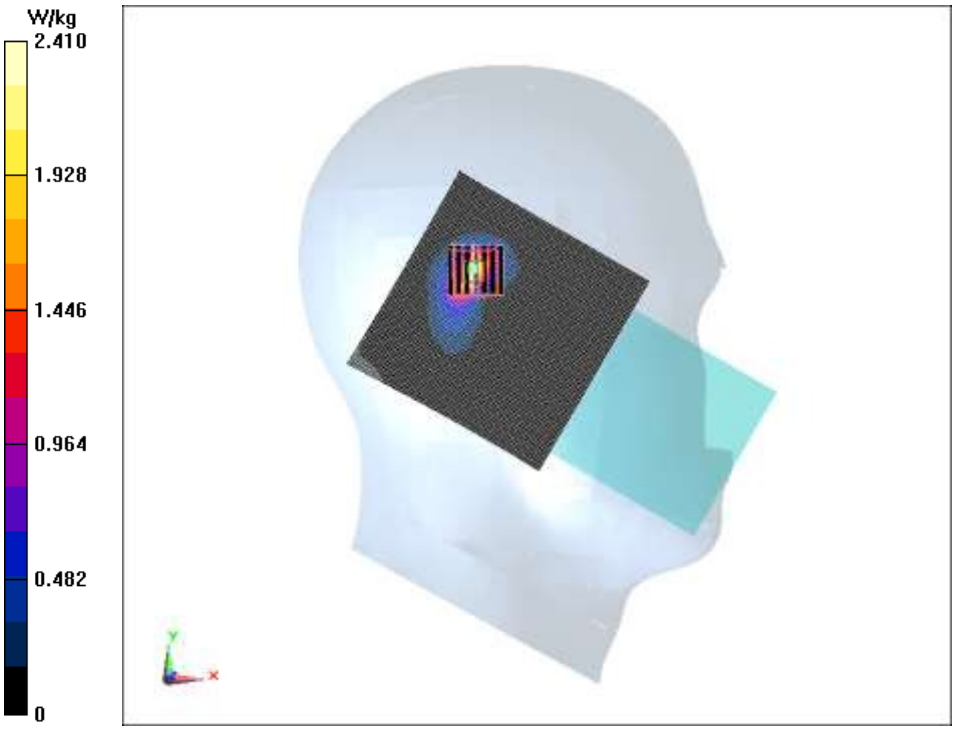


Fig.37 Wifi5G Left Tilt Channel 60

Wifi5G Left Tilt Channel 157

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5785 MHz; σ = 5.226 S/m; ε_r = 36.086; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: 5GHz U-NII-3 ; Frequency: 5785 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(4.8, 4.8, 4.8); Calibrated: 12/21/2017
Wifi5G Left Tilt Channel 157/Area Scan (71x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 1.50 W/kg
Wifi5G Left Tilt Channel 157/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.567 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 0.510 W/kg; SAR(10 g) = 0.166 W/kg
Maximum value of SAR (measured) = 0.616 W/kg

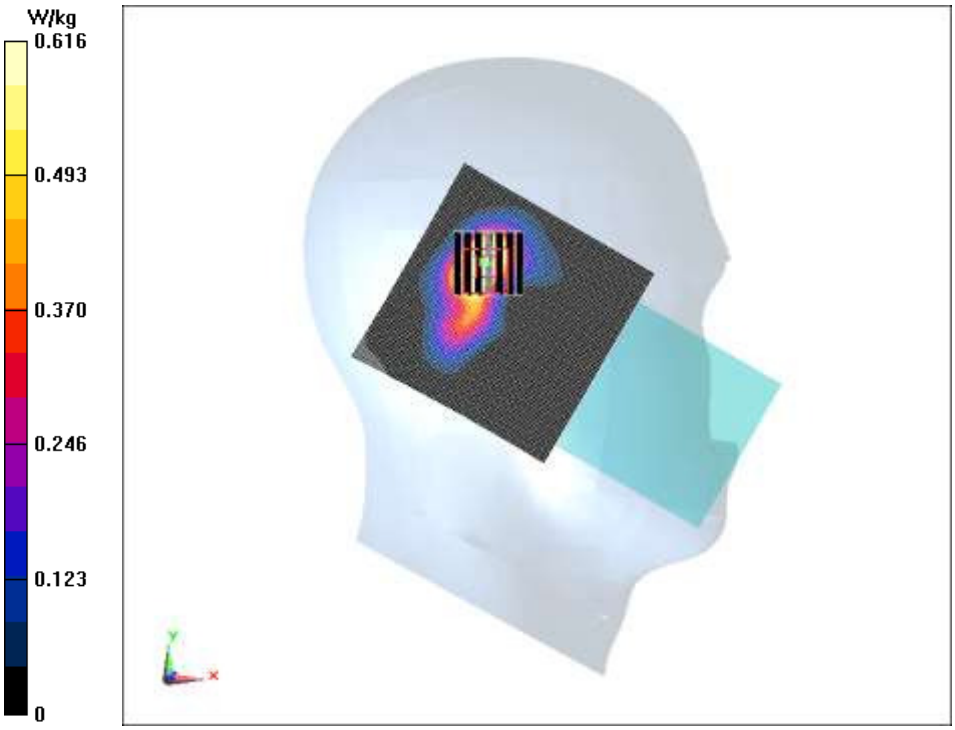


Fig.38 Wifi5G Left Tilt Channel 157

Wifi5G Left Tilt Channel 60 Repeated

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5300 MHz; σ = 4.697 S/m; ε_r = 36.988; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: 5GHz U-NII-2A ; Frequency: 5300 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(5.15, 5.15, 5.15); Calibrated: 12/21/2017
Wifi5G Left Tilt Channel 60 Repeated/Area Scan (71x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.38 W/kg
Wifi5G Left Tilt Channel 60 Repeated/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.223 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 3.96 W/kg
SAR(1 g) = 0.878 W/kg; SAR(10 g) = 0.269 W/kg
Maximum of SAR (measured) = 2.29 W/kg

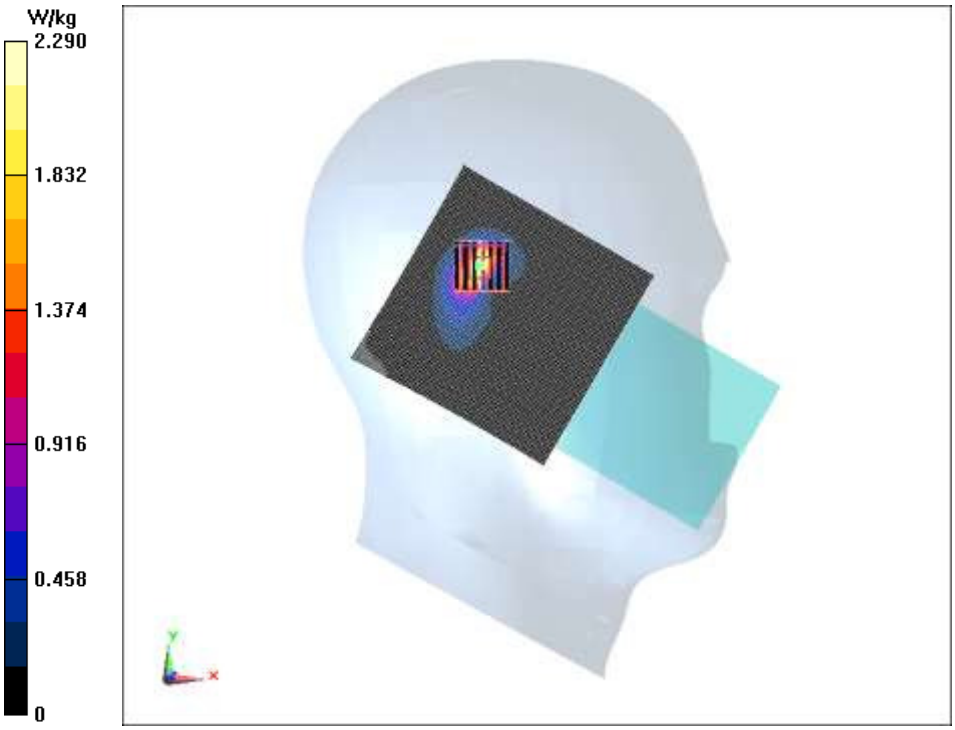


Fig.39 Wifi5G Left Tilt Channel 60 Repeated

Wifi5G Top Mode Middle CH64

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5320 MHz; σ = 5.358 S/m; ε_r = 49.817; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: 5GHz U-NII-2A ; Frequency: 5320 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(4.78, 4.78, 4.78); Calibrated: 12/21/2017
Wifi5G Top Mode Middle CH64/Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.281 W/kg
Wifi5G Top Mode Middle CH64/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.261 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.551 W/kg
SAR(1 g) = 0.189 W/kg; SAR(10 g) = 0.071 W/kg
Maximum value of SAR (measured) = 0.216 W/kg

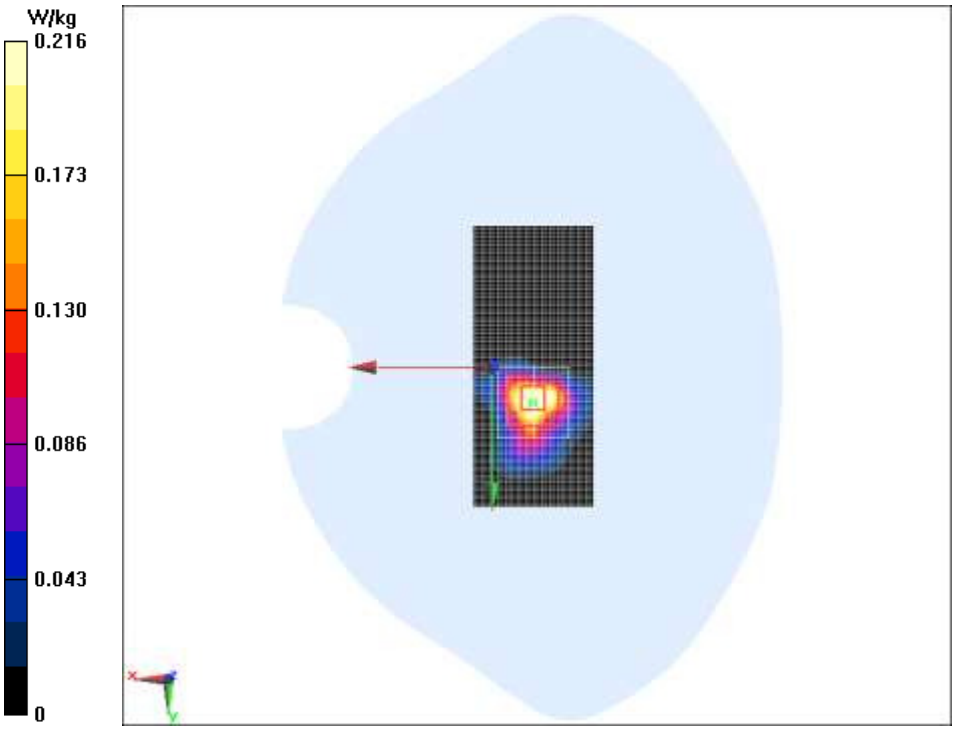


Fig.40 Wifi5G Top Mode Middle CH64

Wifi5G Top Mode Middle CH157

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5785 MHz; σ = 6.031 S/m; ε_r = 48.863; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: 5GHz U-NII-3 ; Frequency: 5785 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(4.32, 4.32, 4.32); Calibrated: 12/21/2017
Wifi5G Top Mode Middle CH157/Area Scan (31x71x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 0.347 W/kg
Wifi5G Top Mode Middle CH157/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.659 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.284 W/kg; SAR(10 g) = 0.100 W/kg
Maximum of SAR (measured) = 0.231 W/kg

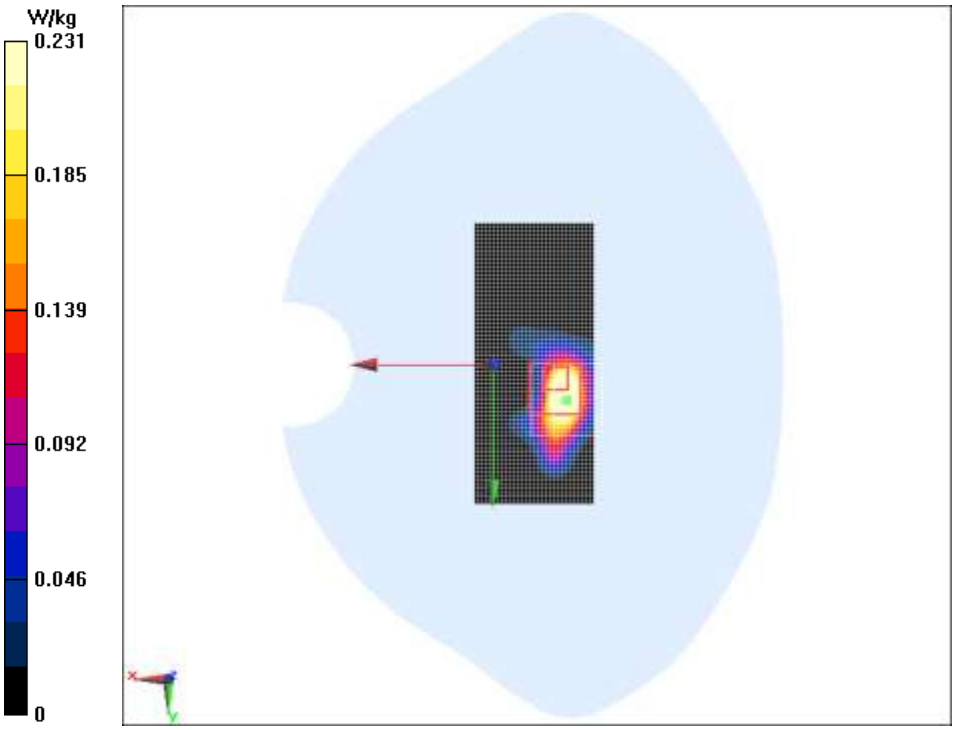
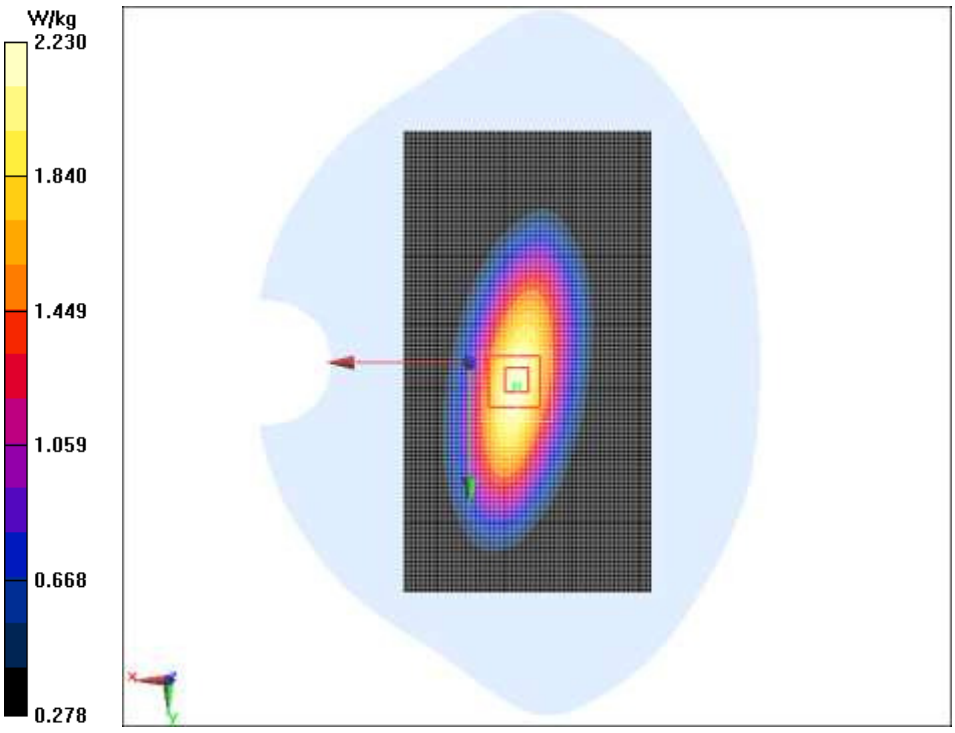


Fig.41 Wifi5G Top Mode Middle CH157

ANNEX B. SYSTEM VALIDATION RESULTS

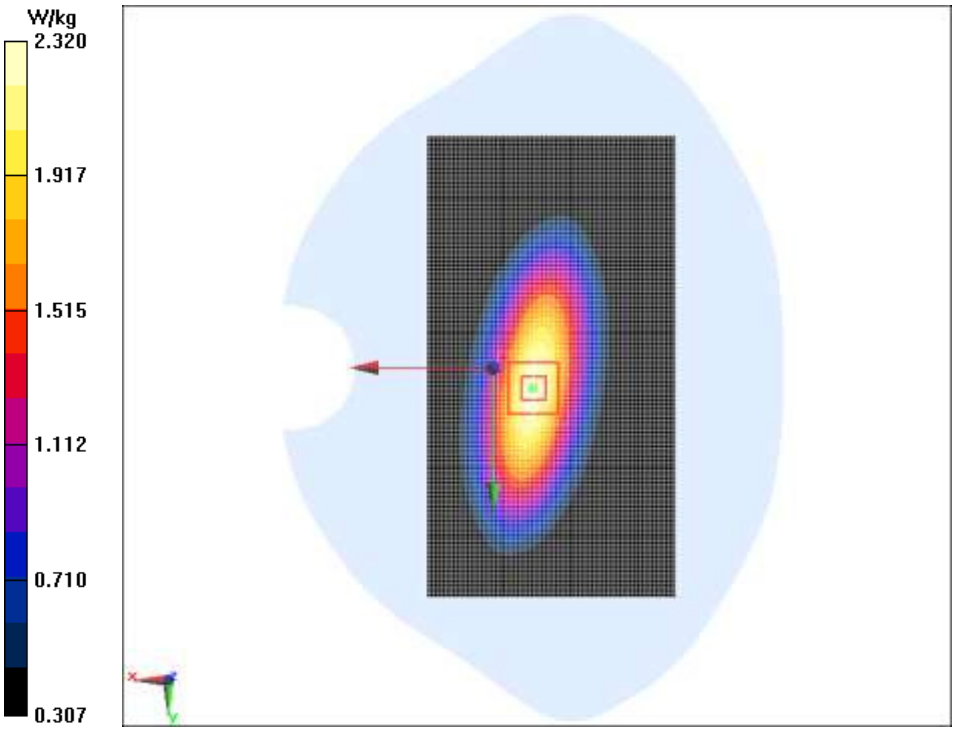
Head 750 MHz

Date/Time: 2018/2/2
Electronics: DAE4 Sn1244
Medium parameters used: f = 750 MHz; σ = 0.858 S/m; ε_r = 43.156; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 750 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.25, 6.25, 6.25); Calibrated: 8/31/2017
System validation /Area Scan (71x131x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.22 W/kg
System validation /Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.84 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 3.02 W/kg
SAR(1 g) = 2.09 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (measured) = 2.23 W/kg



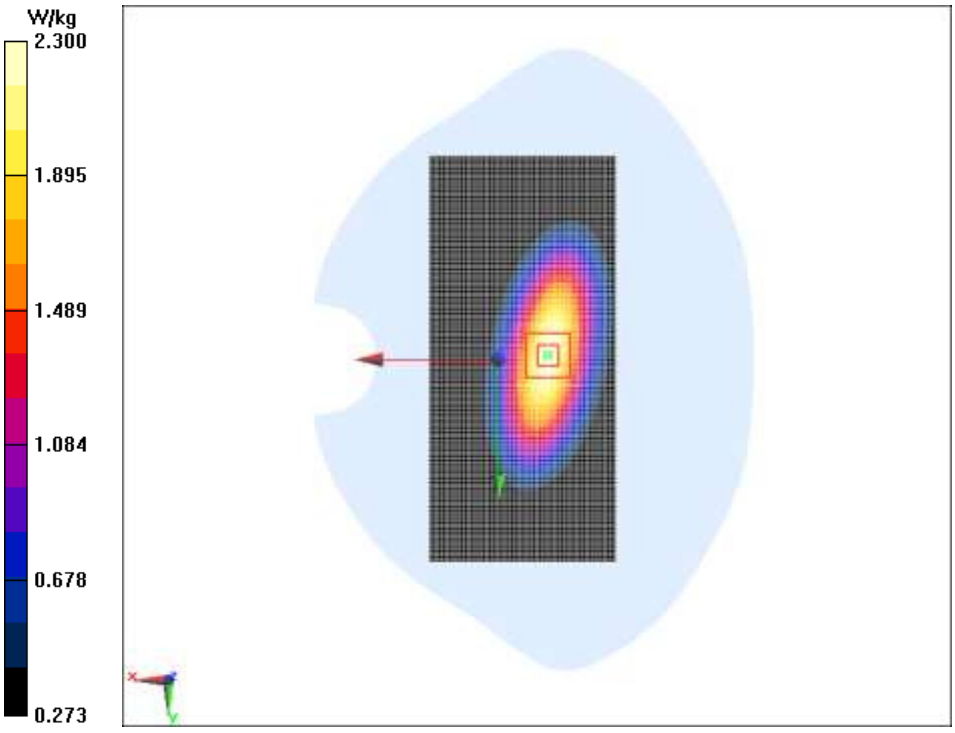
Body 750 MHz

Date/Time: 2018/2/2
Electronics: DAE4 Sn1244
Medium parameters used: f = 750 MHz; σ = 0.945 S/m; ε_r = 57.684; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 750 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.34, 6.34, 6.34); Calibrated: 8/31/2017
System validation /Area Scan (71x131x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.32 W/kg
System validation /Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.15 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.07 W/kg
SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.48 W/kg
Maximum value of SAR (measured) = 2.32 W/kg



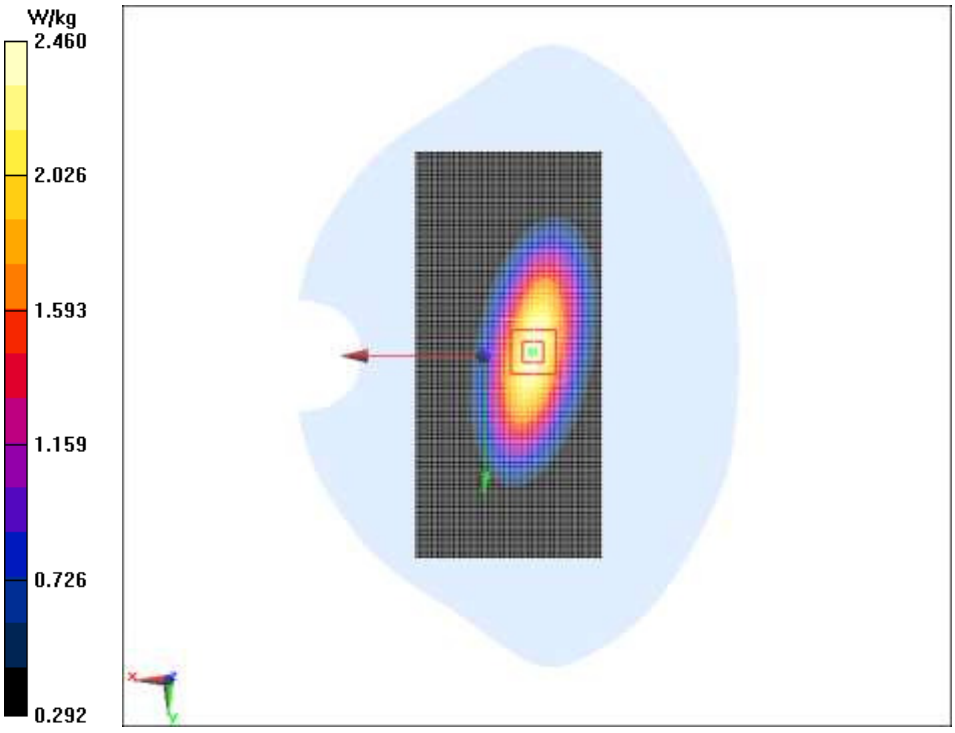
Head 835 MHz

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 835 MHz; σ = 0.939 S/m; ε_r = 42.971; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW 900MHz; Frequency: 835 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.19, 6.19, 6.19); Calibrated: 8/31/2017
System Validation/Area Scan (61x131x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.30 W/kg
System Validation/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 47.09 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 3.03 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 2.30 W/kg



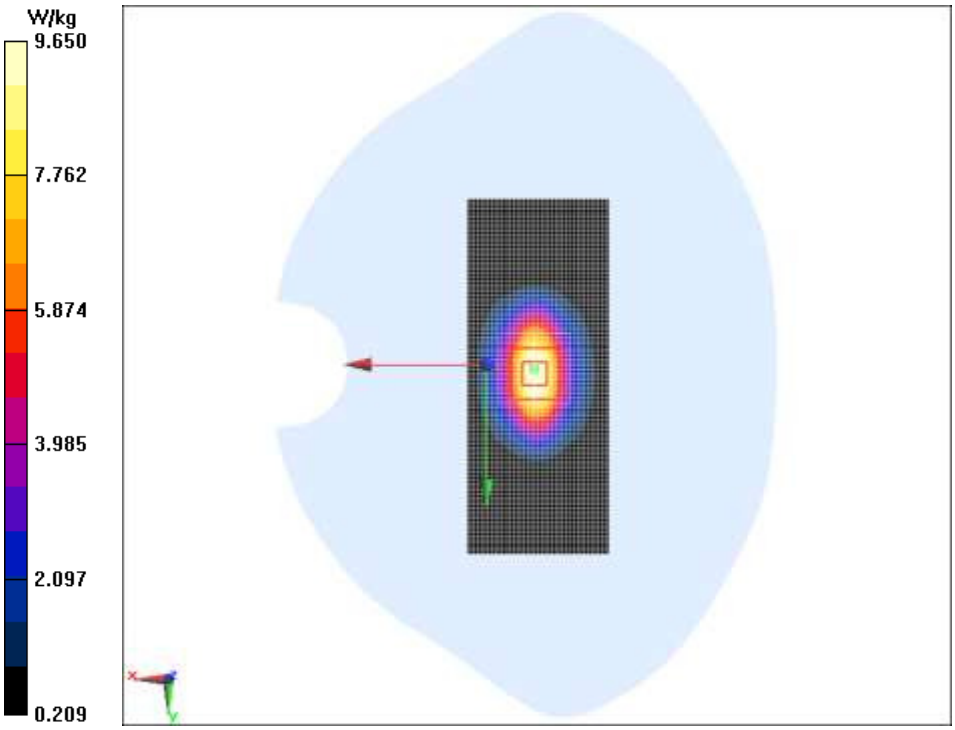
Body 835MHz

Date/Time: 2018/2/3
Electronics: DAE4 Sn1244
Medium parameters used: f = 835 MHz; σ = 0.998 S/m; ε_r = 56.695; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW 835MHz; Frequency: 835 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(6.14, 6.14, 6.14); Calibrated: 8/31/2017
System Validation/Area Scan (61x131x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 2.44 W/kg
System Validation/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 47.20 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 3.21 W/kg
SAR(1 g) = 2.28 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 2.46 W/kg



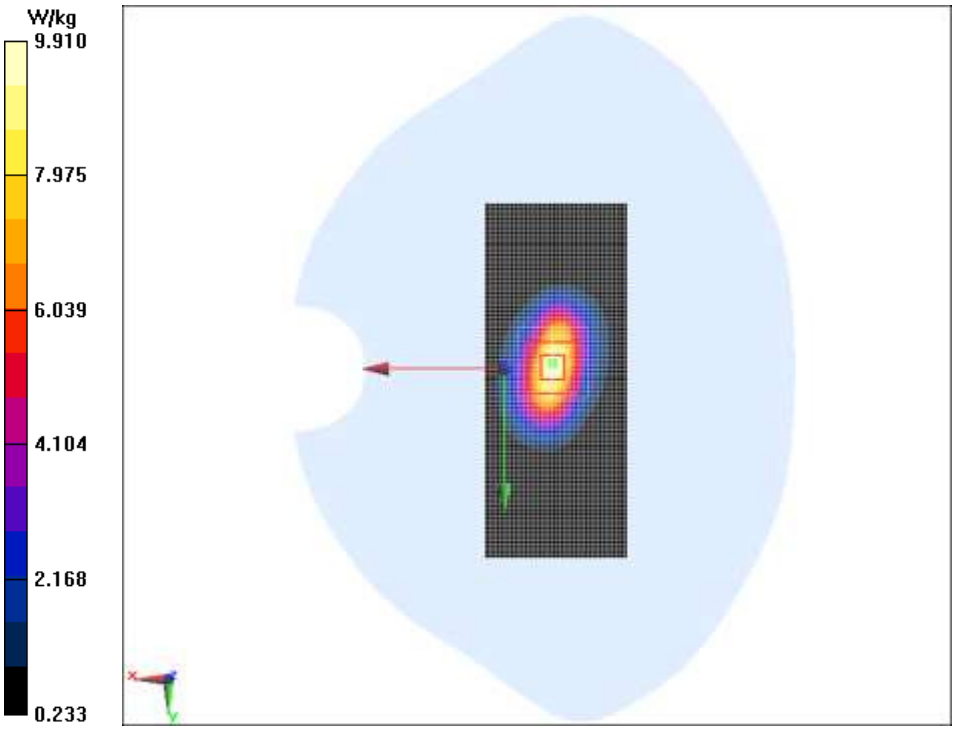
Head 1750 MHz

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1750 MHz; σ = 1.325 S/m; ε_r = 40.716; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 1750 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.3, 5.3, 5.3); Calibrated: 8/31/2017
System validation/Area Scan (41x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 9.98 W/kg
System validation/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 83.95 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 15.5 W/kg
SAR(1 g) = 8.66 W/kg; SAR(10 g) = 4.63 W/kg
Maximum value of SAR (measured) = 9.65 W/kg



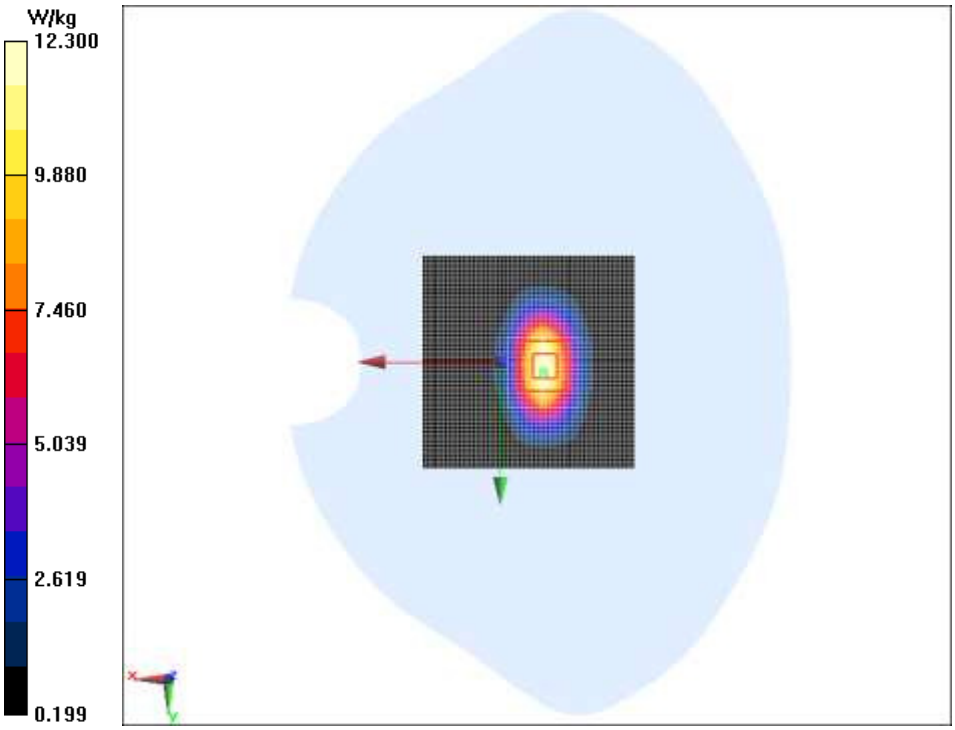
Body 1750MHz

Date/Time: 2018/2/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 1750 MHz; σ = 1.421 S/m; ε_r = 55.158; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 1750 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.95, 4.95, 4.95); Calibrated: 8/31/2017
System validation/Area Scan (41x101x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 9.91 W/kg
System validation/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 80.11 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 15.8 W/kg
SAR(1 g) = 8.84 W/kg; SAR(10 g) = 4.74 W/kg
Maximum value of SAR (measured) = 9.91 W/kg



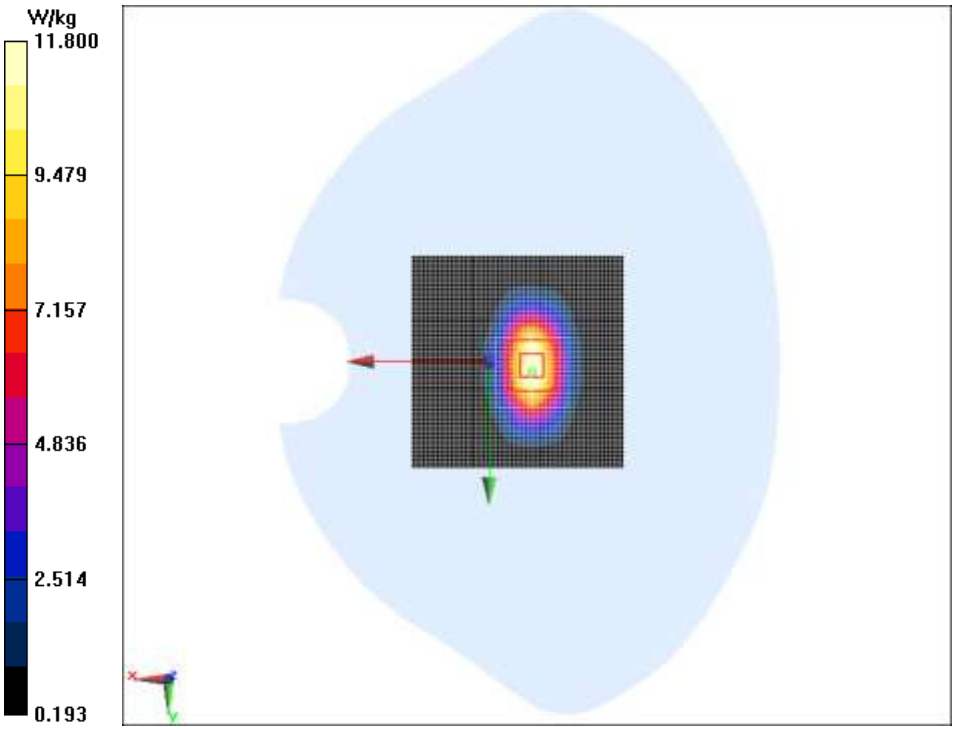
Head 1900 MHz

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1900 MHz; σ = 1.349 S/m; ε_r = 38.788; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(5.11, 5.11, 5.11); Calibrated: 8/31/2017
System validation /Area Scan (61x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 12.7 W/kg
System validation /Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.38 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 20.8 W/kg
SAR(1 g) = 11 W/kg; SAR(10 g) = 5.66 W/kg
Maximum value of SAR (measured) = 12.3 W/kg



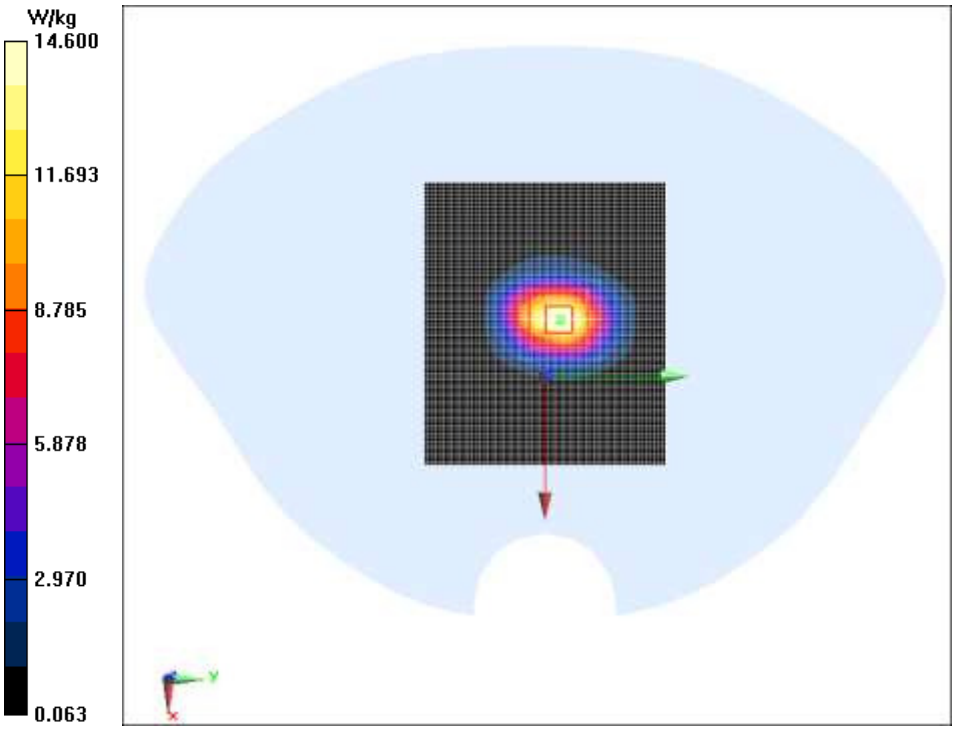
Body 1900MHz

Date/Time: 2018/2/5
Electronics: DAE4 Sn1244
Medium parameters used: f = 1900 MHz; σ = 1.576 S/m; ε_r = 54.596; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.69, 4.69, 4.69); Calibrated: 8/31/2017
System validation /Area Scan (61x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 12.5 W/kg
System validation /Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.74 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 19.6 W/kg
SAR(1 g) = 10.5 W/kg; SAR(10 g) = 5.41 W/kg
Maximum value of SAR (measured) = 11.8 W/kg



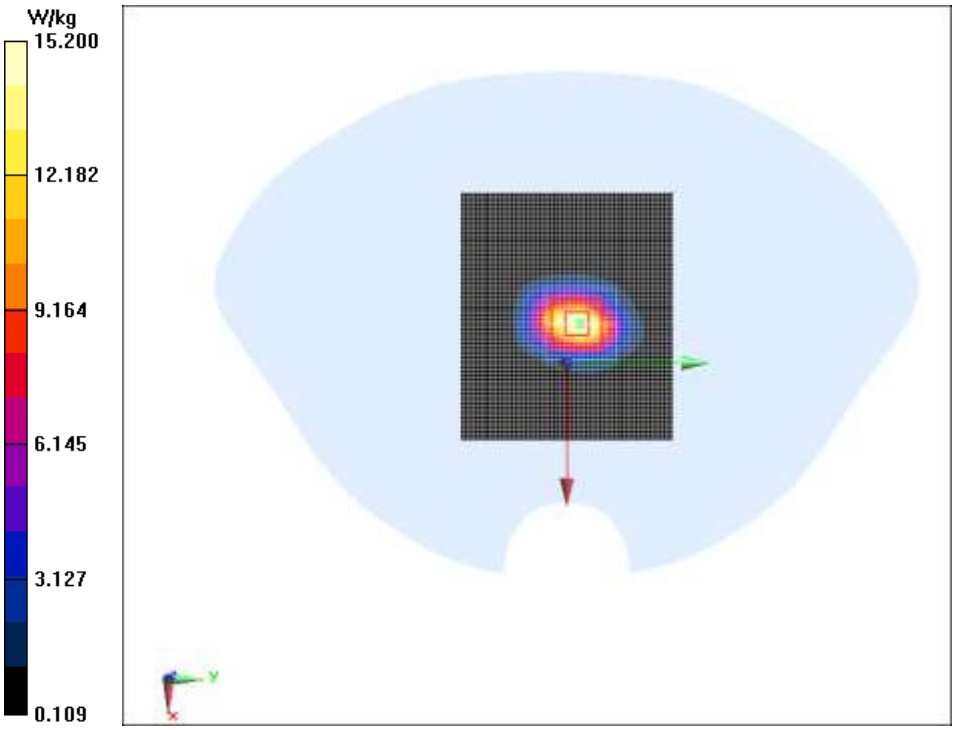
Head 2450 MHz

Date/Time: 2018/2/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 2450 MHz; σ = 1.821 S/m; ε_r = 40.902; ρ = 1000 kg/m^3
Ambient Temperature:22°C Liquid Temperature:22°C
Communication System: CW ; Frequency: 2450 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.75, 4.75, 4.75); Calibrated: 8/31/2017
System validation /Area Scan (71x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 16.3 W/kg
System validation /Zoom Scan (7x7x7) /Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 81.16 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 29.3 W/kg
SAR(1 g) = 12.9 W/kg; SAR(10 g) = 5.83 W/kg
Maximum value of SAR (measured) = 14.6 W/kg



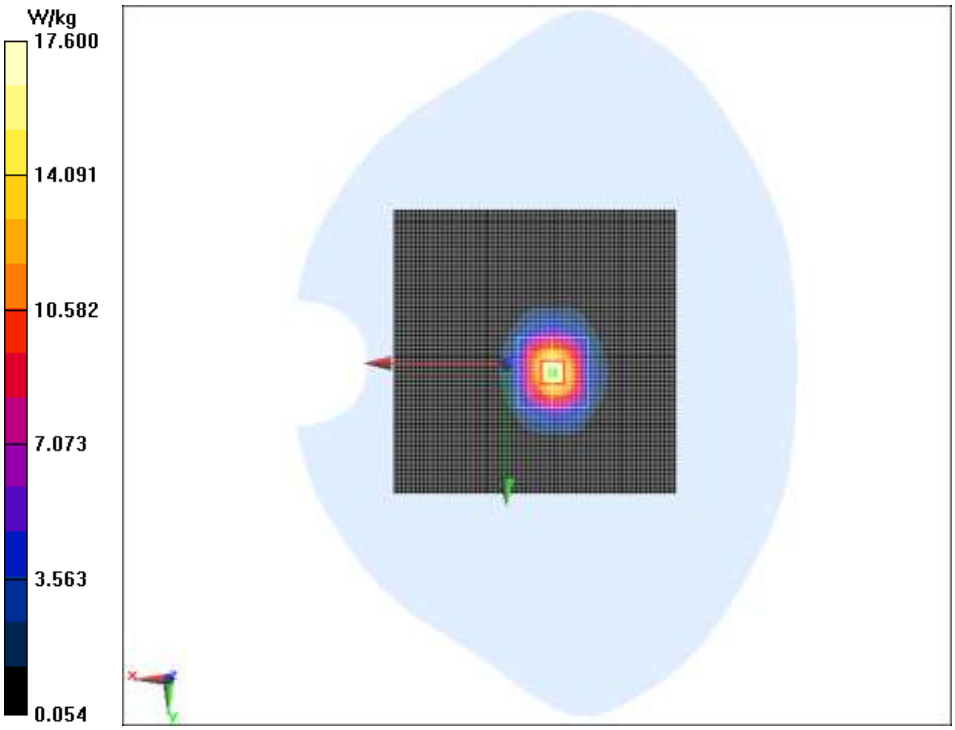
Body 2450 MHz

Date/Time: 2018/2/11
Electronics: DAE4 Sn1244
Medium parameters used: f = 2450 MHz; σ = 1.976 S/m; ε_r = 53.002; ρ = 1000 kg/m^3
Ambient Temperature:22°C Liquid Temperature:22°C
Communication System: CW ; Frequency: 2450 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.42, 4.42, 4.42); Calibrated: 8/31/2017
System validation /Area Scan (71x61x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 16.6 W/kg
System validation /Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.20 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 26.8 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.22 W/kg
Maximum value of SAR (measured) = 15.2 W/kg



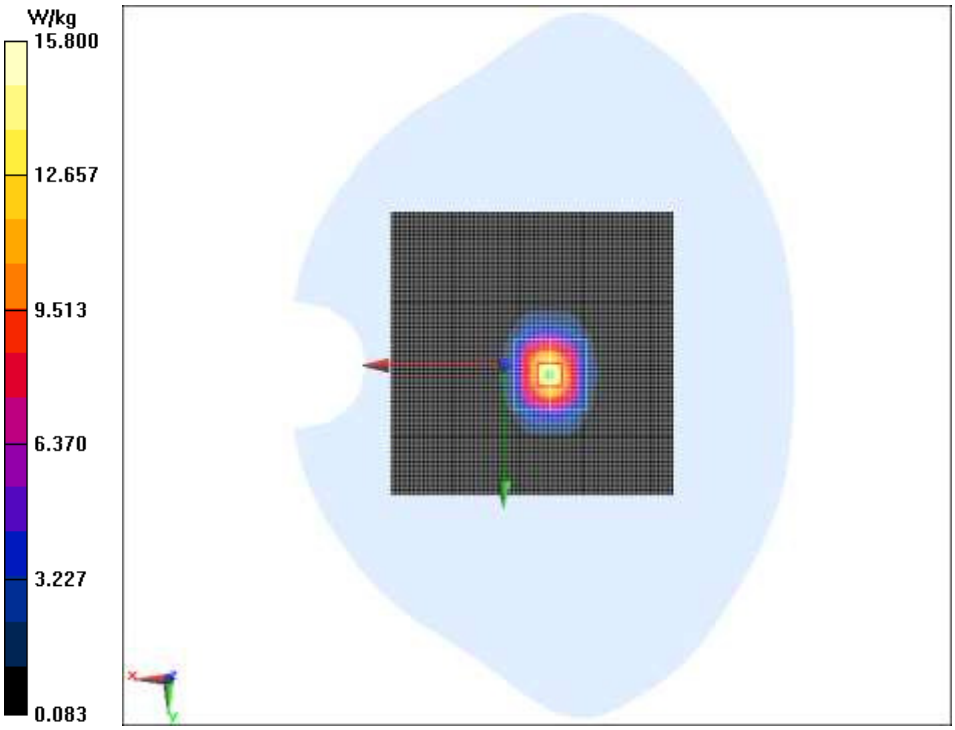
Head 2600 MHz

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2600 MHz; σ = 2.035 S/m; ε_r = 38.249; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 2600 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.44, 4.44, 4.44); Calibrated: 8/31/2017
System validation /Area Scan (81x81x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 17.7 W/kg
System validation /Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.36 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 36.4 W/kg
SAR(1 g) = 15.5 W/kg; SAR(10 g) = 6.7 W/kg
Maximum value of SAR (measured) = 17.6 W/kg



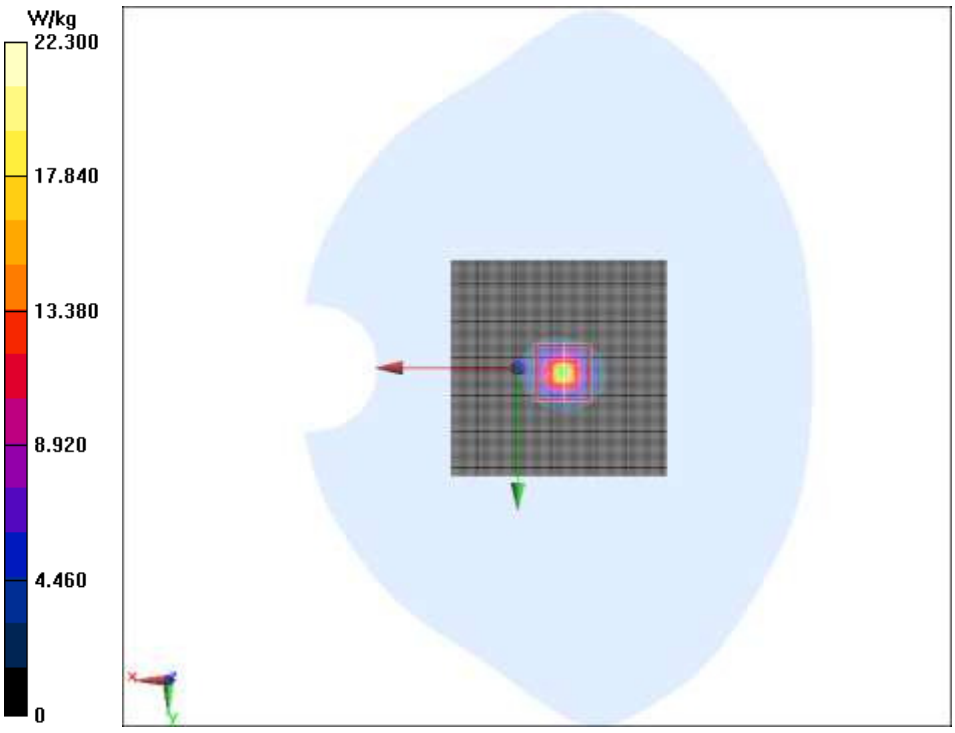
Body 2600 MHz

Date/Time: 2018/3/4
Electronics: DAE4 Sn1244
Medium parameters used: f = 2600 MHz; σ = 2.083 S/m; ε_r = 52.858; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 2600 MHz; Duty Cycle: 1:1
Probe: ES3DV3 - SN3252ConvF(4.22, 4.22, 4.22); Calibrated: 8/31/2017
System validation /Area Scan (81x81x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 15.7 W/kg
System validation /Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.53 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.14 W/kg
Maximum value of SAR (measured) = 15.8 W/kg



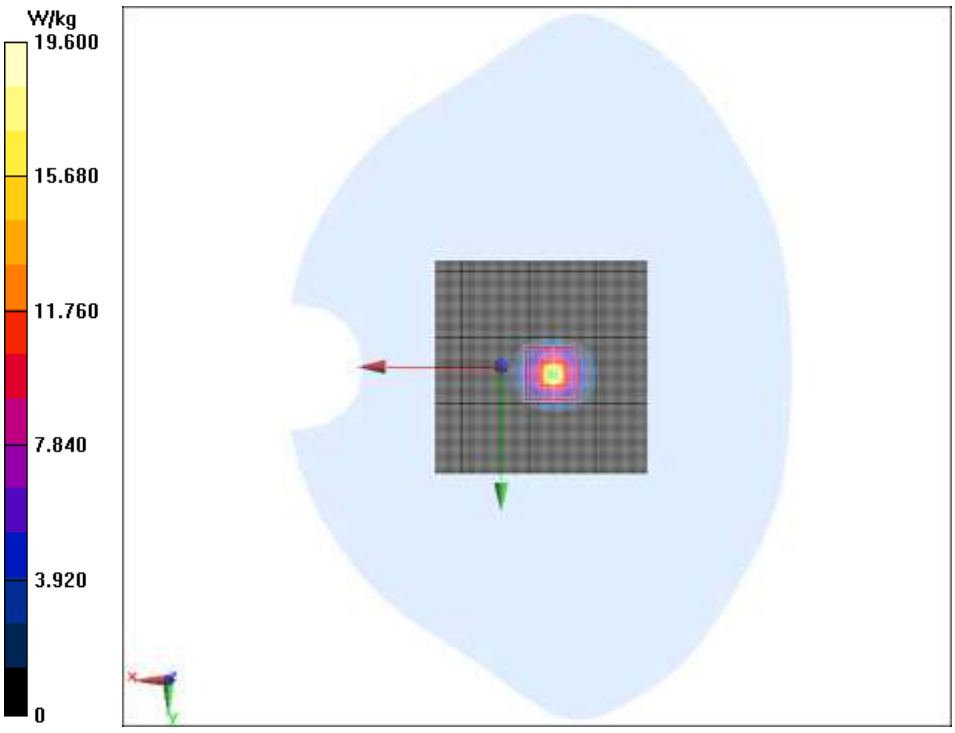
Head 5300 MHz

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5300 MHz; σ = 4.697 S/m; ε_r = 36.988; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 5300 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(5.15, 5.15, 5.15); Calibrated: 12/21/2017
System validation /Area Scan (91x91x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 18.6 W/kg
System validation/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.03 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 38.3 W/kg
SAR(1 g) = 8.39 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 22.3 W/kg



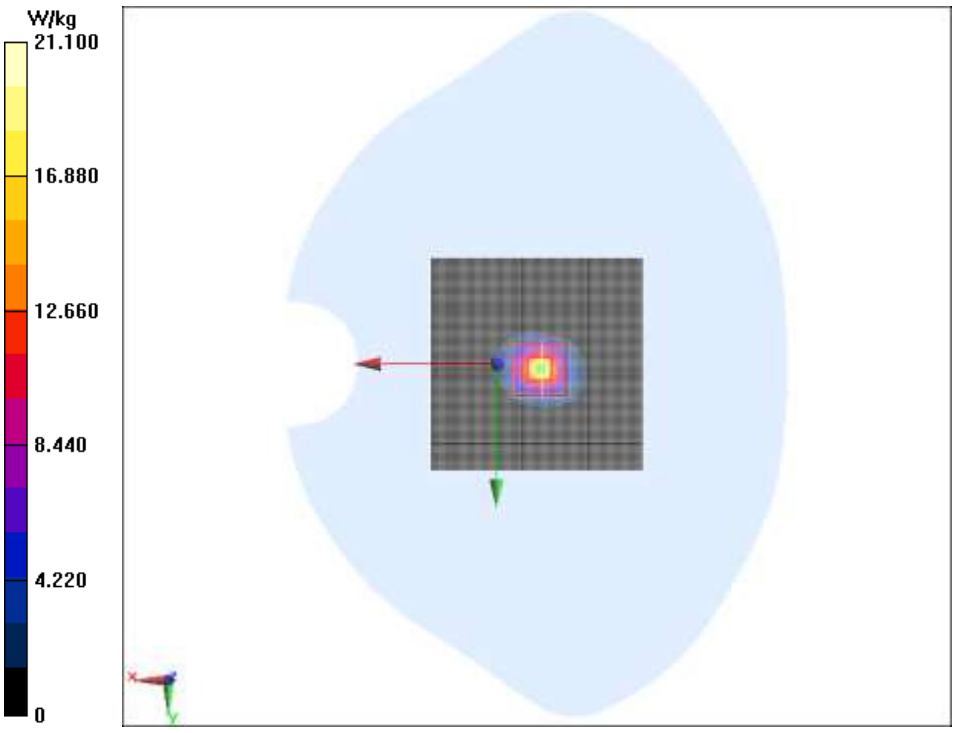
Body 5300MHz

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5300 MHz; σ = 5.333 S/m; ε_r = 49.847; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 5300 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(4.78, 4.78, 4.78); Calibrated: 12/21/2017
System validation /Area Scan (91x91x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 19.1 W/kg
System validation/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 52.91 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 7.34 W/kg; SAR(10 g) = 2.02 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



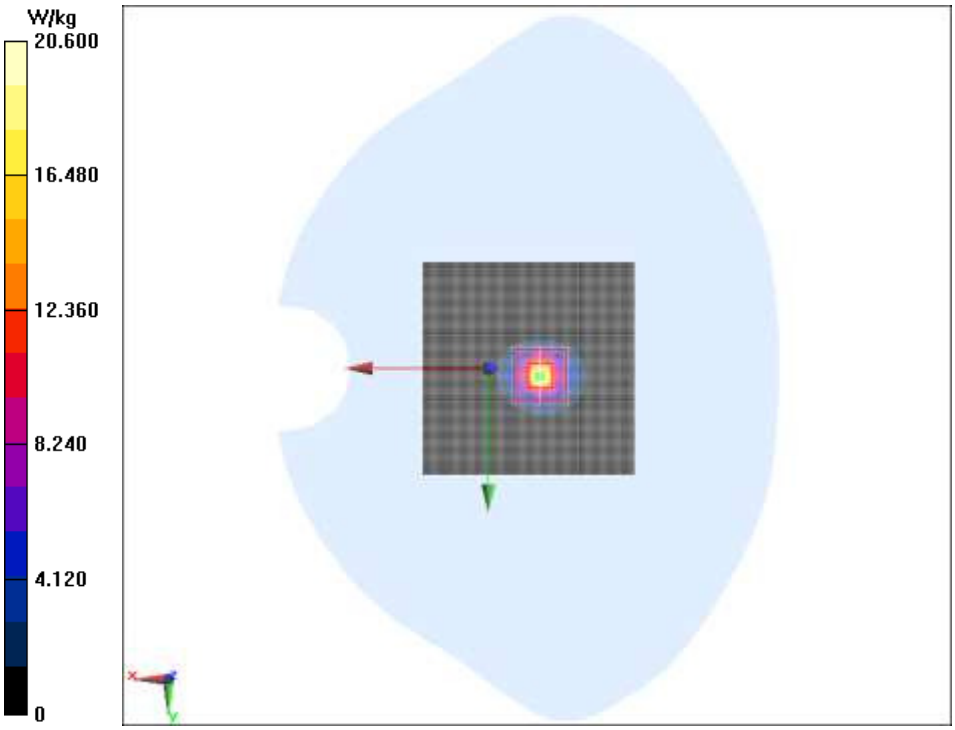
Head 5800 MHz

Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5800 MHz; σ = 5.243 S/m; ε_r = 36.059; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 5800 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(4.8, 4.8, 4.8); Calibrated: 12/21/2017
System validation /Area Scan (91x91x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 19.7 W/kg
System validation/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.37 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 39.3 W/kg
SAR(1 g) = 7.71 W/kg; SAR(10 g) = 2.15 W/kg
Maximum of SAR (measured) = 21.1 W/kg



Body 5800 MHz

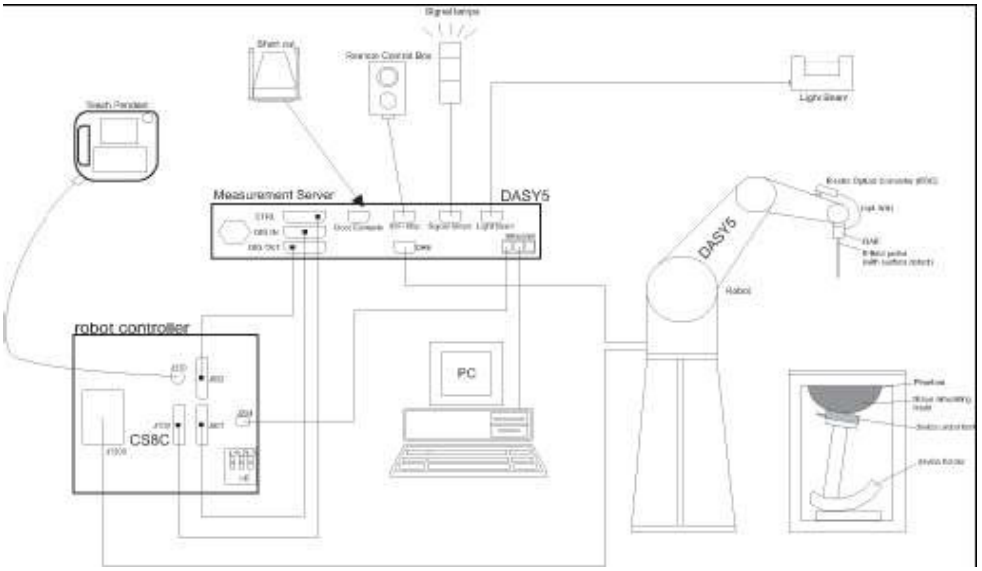
Date/Time: 2018/2/6
Electronics: DAE4 Sn1244
Medium parameters used: f = 5800 MHz; σ = 6.051 S/m; ε_r = 48.828; ρ = 1000 kg/m^3
Ambient Temperature:22.5°C Liquid Temperature:22.5°C
Communication System: CW ; Frequency: 5800 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN7350ConvF(4.32, 4.32, 4.32); Calibrated: 12/21/2017
Body 5800 MHz/Area Scan (91x91x1):
Measurement grid: dx=10 mm, dy=10 mm
Maximum value of SAR (Measurement) = 20.3 W/kg
Body 5800 MHz/Zoom Scan (4x4x1.4mm, graded), dist=1.4mm (7x7x7)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 52.59 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 38.1 W/kg
SAR(1 g) = 7.41 W/kg; SAR(10 g) = 2.03 W/kg
Maximum value of SAR (measured) = 20.6 W/kg



ANNEX C. SAR Measurement Setup

C.1. Measurement Set-up

The DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:



Picture C.1 SAR Lab Test Measurement Set-up

- A standard high precision 6-axis robot (Stäubli TX=RX family) 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 and the DASY5 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.

C.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection durning a software approach and looks for the maximum using 2ndord curve fitting. The approach is stopped at reaching the maximum.

Probe Specifications:

Model: ES3DV3,EX3DV4
Frequency 10MHz — 6GHz(EX3DV4)
Range: 10MHz — 4GHz(ES3DV3)
Calibration: In head and body simulating tissue at Frequencies from 835 up to 5800MHz
Linearity: ± 0.2 dB(30 MHz to 4 GHz) for ES3DV3
± 0.2 dB(30 MHz to 6 GHz) for EX3DV4
Dynamic Range: 10 mW/kg — 100W/kg
Probe Length: 330 mm
Probe Tip
Length: 20 mm
Body Diameter: 12 mm
Tip Diameter: 2.5 mm (3.9 mm for ES3DV3)
Tip-Center: 1 mm (2.0mm for ES3DV3)
Application: SAR Dosimetry Testing
Compliance tests of mobile phones
Dosimetry in strong gradient fields

Picture7-2 Near-field Probe

Picture 7-3 E-field Probe

C.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by

subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and inn a waveguide or other methodologies 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 until the three channels show the maximum reading. The power density readings equates to 1 mW/ cm^2.

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

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where:

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

C.4. Other Test Equipment

C.4.1. Data Acquisition Electronics(DAE)

The data acquisition electronics consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe

collision detection.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating.

Common mode rejection is above 80 dB.

PictureC.4: DAE

C.4.2. Robot

The SPEAG DASY system uses the high precision robots (DASY5: RX90L) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

Picture C.5 DASY 5

C.4.3. Measurement Server

The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O broad, which

is directly connected to the PC/104 bus of the CPU broad.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Picture C.6 Server for DASY 5

C.4.4. Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

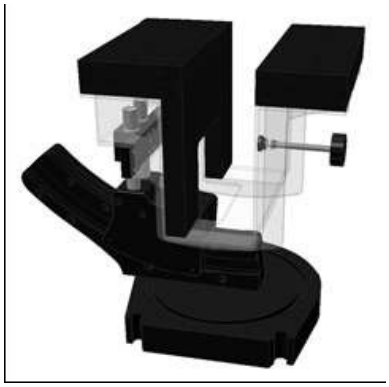
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point
(ERP). Thus the device needs no repositioning when
changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

Picture C.7: Device Holder



Picture C.8: Laptop Extension Kit

C.4.5. Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness: 2 ± 0. 2 mm

Filling Volume: Approx. 25 liters

Dimensions: 810 x l000 x 500 mm (H x L x W)

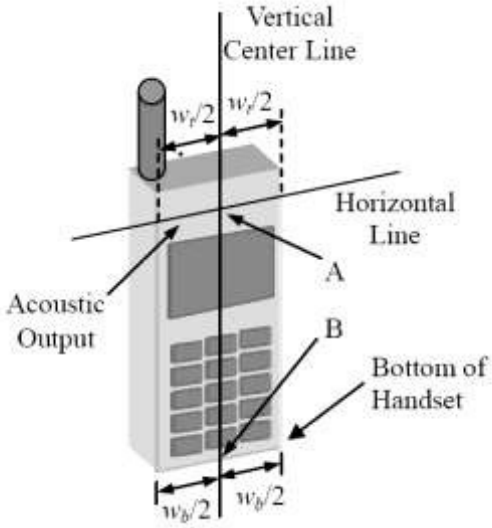
Available: Special

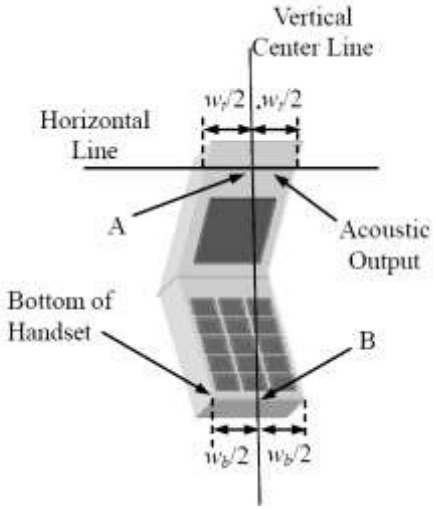
Picture C.9: SAM Twin Phantom

ANNEX D. Position of the wireless device in relation to the phantom

D.1. General considerations

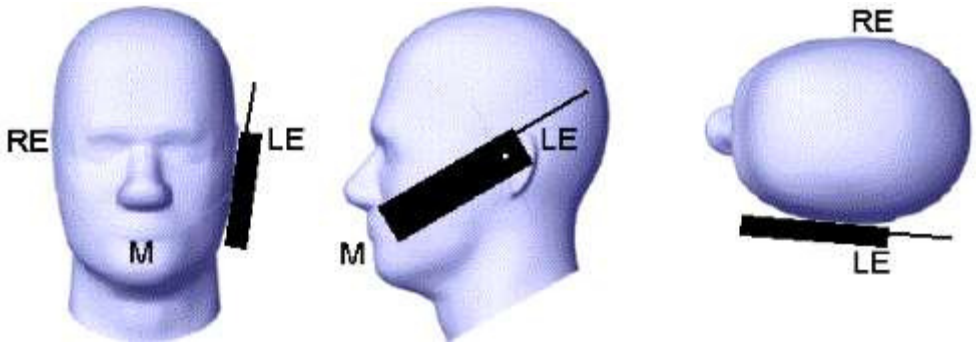
This standard specifies two handset test positions against the head phantom – the "cheek" position and the "tilt" position.





w_t	Width of the handset at the level of the acoustic
w_b	Width of the bottom of the handset
A	Midpoint of the width w_t of the handset at the level of the acoustic output
B	Midpoint of the width w_b of the bottom of the handset

Picture D.1-a Typical "fixed" case handset Picture D.1-b Typical "clam-shell" case handset



Picture D.2 Cheek position of the wireless device on the left side of SAM