FCC SAR TEST REPORT

Report No:	ZR/2020/70062
Applicant:	Acer Incorporated
Manufacturer:	SIM Technology Group Shanghai Simcom Limited
Factory:	Shanghai Sunrise SIMCOM LTD
Product Name:	Tablet Computer
Model No.(EUT):	A8202
Trade Mark:	acer
FCC ID:	HLZA8202
Standards:	FCC 47CFR §2.1093
Date of Receipt:	2020-07-27
Date of Test:	2020-08-10
Date of Issue:	2020-08-12
Test conclusion:	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Derek Yang

Derek Yang
Wireless Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

REVISION HISTORY

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-08-12		Original

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TEST SUMMARY

Frequency Band	Test position	Max Report SAR1-g (W/kg)	SAR limit (W/kg)	Verdict
LTE Band 2	Body	1.26	1.6	PASS
LTE Band 4	Body	1.42	1.6	PASS
LTE Band 5	Body	1.32	1.6	PASS
LTE Band 12	Body	0.70	1.6	PASS
LTE Band 13	Body	0.92	1.6	PASS
LTE Band 66	Body	**1.43**	1.6	PASS
LTE Band 71	Body	0.64	1.6	PASS
WI-FI (2.4GHz)	Body	1.30	1.6	PASS
WI-FI (5GHz)	Body	1.19	1.6	PASS
BT	Body	/	1.6	PASS

Approved & Released by

Simon Ling

SAR Manager

Tested by

Jackson Li

SAR Engineer

CONTENTS

1 General Information

1.1 Details of Client

Applicant:	Acer Incorporated
Address:	8F.,NO.88,Sec. 1, Xintai 5 th Rd., Xizhi, New Taipei City 22181, Taiwan (R.O.C)
Manufacturer:	SIM Technology Group Shanghai Simcom Limited
Address:	Building A,SIM Technology Building NO.633, Jinzhong Road.Changning District ,Shanghai P.R. China
Factory:	Shanghai Sunrise SIMCOM LTD
Address:	No.888 Shengli Road,QingPu District Shanghai China

1.2 Test Location

Company: SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Address: No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China

Post code: 518057

Telephone: +86 (0) 755 2601 2053

Fax: +86 (0) 755 2671 0594

E-mail: ee.shenzhen@sgs.com

1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

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1.4 General Description of EUT

Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Product Name:	Tablet Computer		
Model No.(EUT):	A8202		
FCC ID:	HLZA8202		
Trade Mark:	acer		
Product Phase:	production unit		
SN:	02940527164		
Hardware Version:	1.0		
Software Version:	Acer_AV0M0_A8202_1.001.01_PA_VERIZON		
Antenna Type:	Inner Antenna		
Device Operating Configurations :			
Modulation Mode:	**LTE:** QPSK,16QAM; **WIFI:** DSSS, OFDM; **BT:** GFSK, π/4DQPSK,8DPSK		
Power Class	3, tested with power control Max Power(LTE Band 2/4/5/12/13/66/71)		
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	LTE Band 2	1850~1910	1930~1990
	LTE Band 4	1710~1755	2110~2155
	LTE Band 5	824~849	869~894
	LTE Band 12	699~716	729~746
	LTE Band 13	777~787	746~756
	LTE Band 66	1710~1780	2110~2200
	LTE Band 71	663~698	617~652
	Wi-Fi 2.4G	2412~2462	2412~2462
	Wi-Fi 5G	5150-5250 5250-5350 5470-5725 5725-5850	5150-5250 5250-5350 5470-5725 5725-5850
	Bluetooth	2400~2483.5	2400~2483.5
Battery Information:	Model:	NKS(1ICP3/100/107)	
	Normal Voltage:	3.8V	
	Rated capacity:	4550mAh	

Declaration of difference:

We, Acer Incorporated, declare on our sole responsibility for the product of A8202（FCC ID : HLZA8202） as below:

1. Added LTE Band 13 （Update SW: Acer_AV0M0_A8202_1.001.01_PA_VERIZON）
2. 2nd LCD and camera module (front /main) change to 8M from 5M.

Except listings above, the others are all the same as previous version.

According to the difference description above, SAR only will be test for LTE Band 13, and the other same bands will be reused from the Report No.: ZR/2019/4003006

1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
IEEE Std C95.1 – 1991	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 941225 D05	SAR for LTE Devices v02r05
KDB 248227 D01	SAR Guidance for IEEE 802 11 Wi-Fi SAR v02r02
KDB 447498 D01	General RF Exposure Guidance v06
KDB 865664 D01	SAR Measurement 100 MHz to 6 GHz v01r04
KDB 865664 D02	RF Exposure Reporting v01r02
KDB 616217 D04	SAR for laptop and tablets v01r02

1.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	**1.60 mW/g**	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation.)

2 Laboratory Environment

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

Table 1： The Ambient Conditions

3 SAR Measurements System Configuration

3.1 The SAR Measurement System

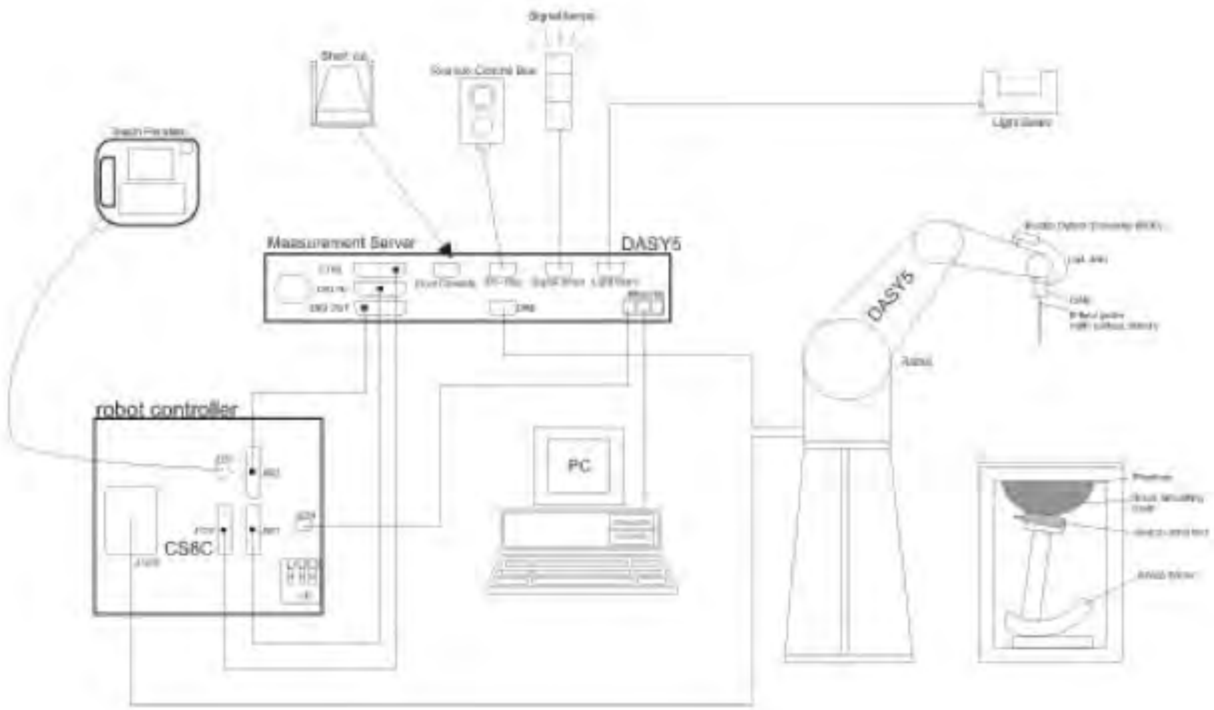
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

The DASY5 system for performing compliance tests consists of the following items:
A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software .An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

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 between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



F-1. SAR Measurement System Configuration

- 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.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

3.2 Isotropic E-field Probe EX3DV4

	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

3.3 Data Acquisition Electronics (DAE)

Model	DAE
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV,400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 f A
Dimensions	60 x 60 x 68 mm

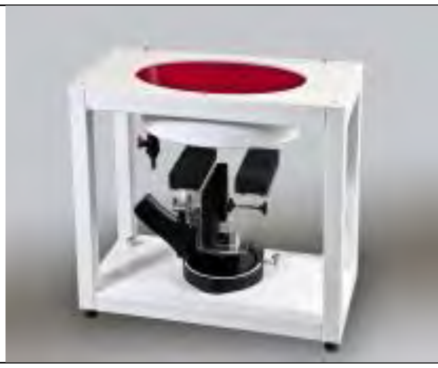
3.4 SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters
Wooden Support	SPEAG standard phantom table

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

3.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

3.6 Device Holder for Transmitters

F-2. **Device Holder for Transmitters**

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

3.7 Measurement procedure

3.7.1 Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: *Area scan*

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm.Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: *Zoom scan*

Around this point, a volume of 32mm*32mm*30mm (f≤2GHz), 30mm*30mm*30mm (f for 2-3GHz) and 24mm*24mm*22mm (f for 5-6GHz) was assessed by measuring 5x5x7 points (f≤2GHz), 7x7x7 points (f for 2-3GHz) and 7x7x12 points (f for 5-6GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification).The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std. 1528-2013.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ $1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
</table>

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %

3.7.2 Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension "DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

3.7.3 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters: - Sensitivity Normi, ai0, ai1, ai2
- Conversion factor ConvFi
- Diode compression point Dcpi
Device parameters: - Frequency f
- Crest factor cf
Media parameters: - Conductivity ε
- Density ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

With Vi = compensated signal of channel i (i = x, y, z)
Ui = input signal of channel i (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcp i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$$

With Vi = compensated signal of channel i (i = x, y, z)
Normi = sensor sensitivity of channel I (i = x, y, z)
[mV/(V/m)2] for E-field Probes
ConvF = sensitivity enhancement in solution
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (Etot^2 \cdot \sigma) / (\varepsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g
Etot = total field strength in V/m
σ= conductivity in [mho/m] or [Siemens/m]
ε= equivalent tissue density in g/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with Ppwe = equivalent power density of a plane wave in mW/cm2
Etot = total electric field strength in V/m
Htot = total magnetic field strength in A/m

4 SAR measurement variability and uncertainty

4.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, 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. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) 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 ⩾ 1.45 W/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.

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

4.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

5 Description of Test Position

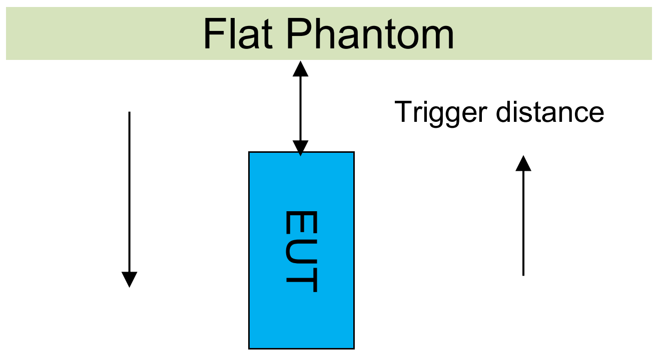
5.1 Body Test Position

The overall diagonal dimension of the display section of a tablet is > 20 cm, Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. SAR evaluation for the front surface of tablet display screens are generally not necessary. The SAR Exclusion Threshold in KDB 447498 D01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

5.1.1 Proximity Sensor Triggering Test for body

1) Proximity sensor triggering distances

The Proximity sensor triggering was applied to WIFI. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed.

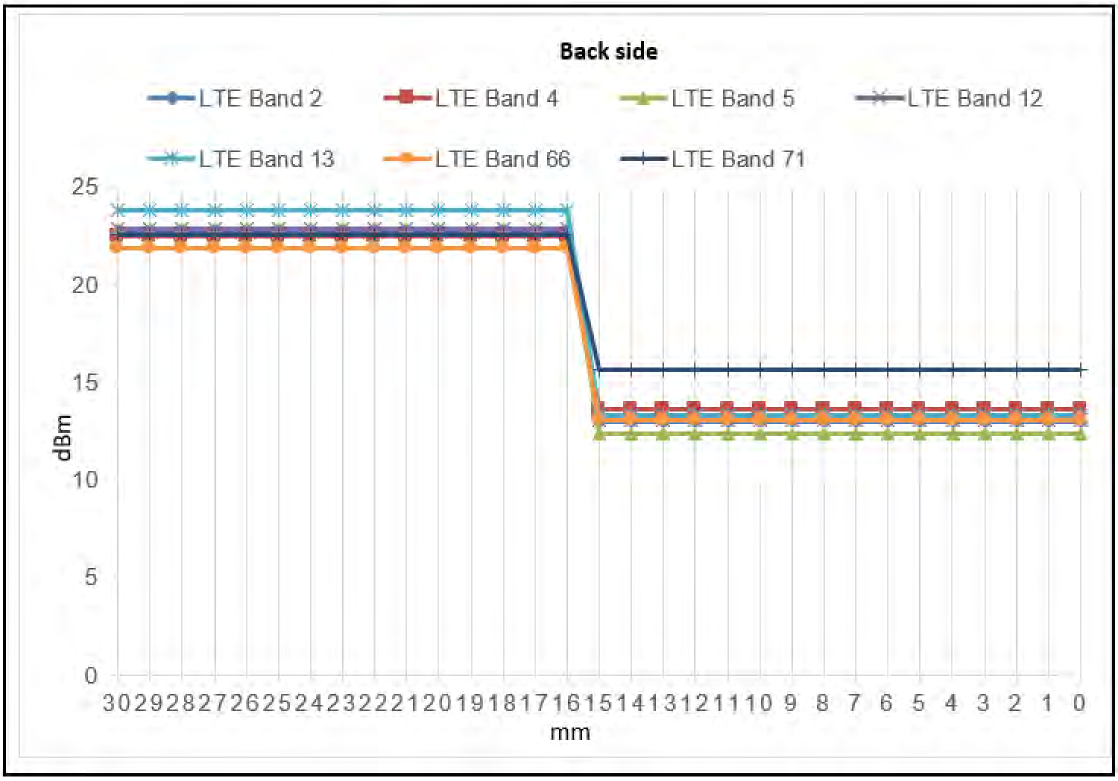


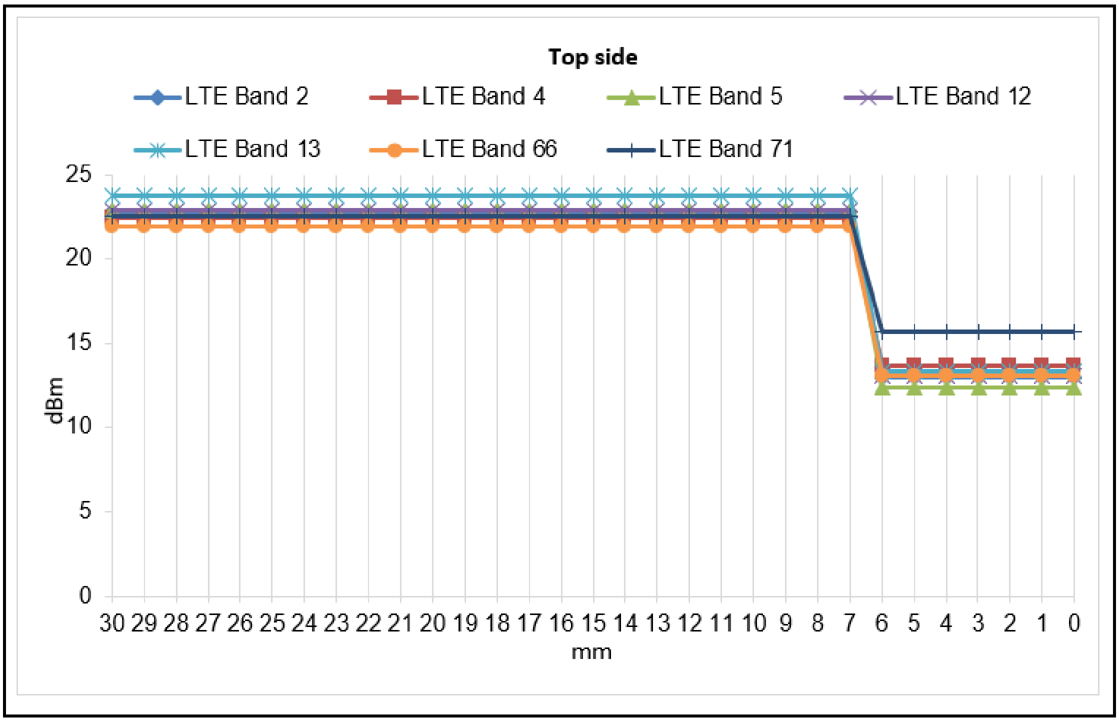
Proximity Sensor Triggering Distance(mm)		
Position	Back	Top
Minimum	15	6
Required SAR Test	14	5

Antenna	Band	Trigger Condition	Body exposure condition Power reduction(dB)
Main Antenna	LTE Band 2	Back side: Close to 15mm Top side: Close to 6mm	9.0
	LTE Band 4		9.0
	LTE Band 5		10.5
	LTE Band 12		10.0
	LTE Band 13		10.0
	LTE Band 66		8.5
	LTE Band 71		7.0

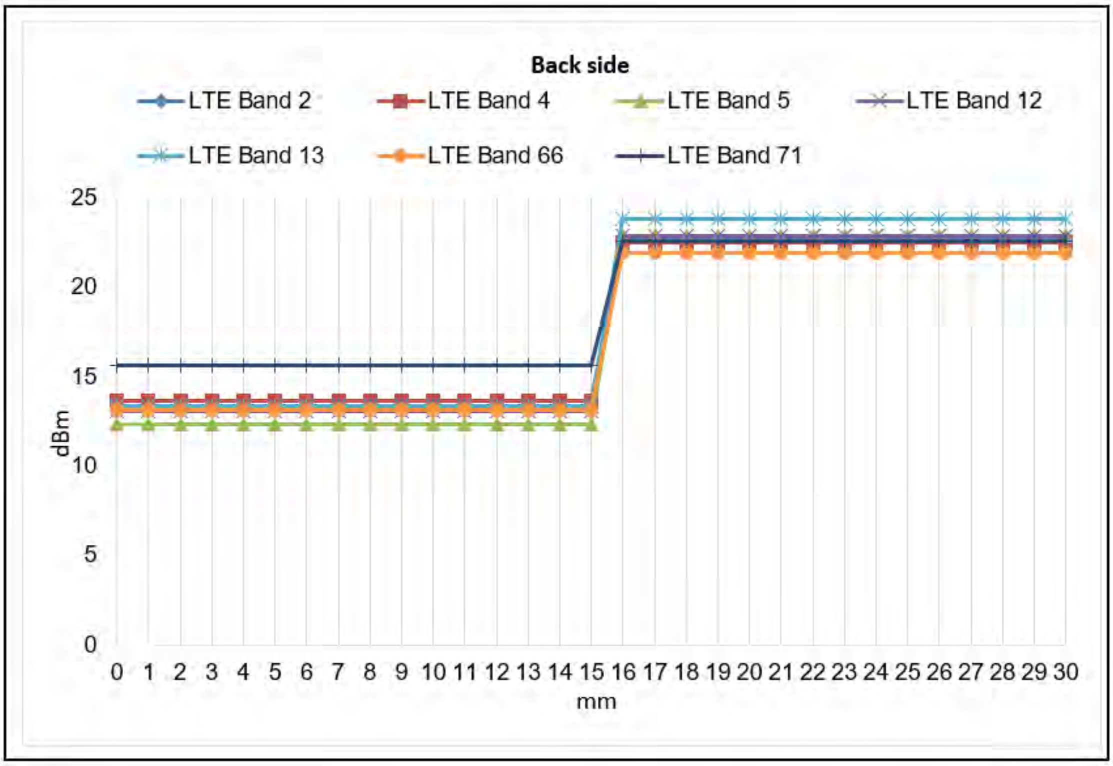
Note: SAR tests with proximity sensor power reduction are only required for the sides of frequency bands in the table above. For the other sides or other frequency bands of the device, SAR is still tested at the maximum power level with sensor off.

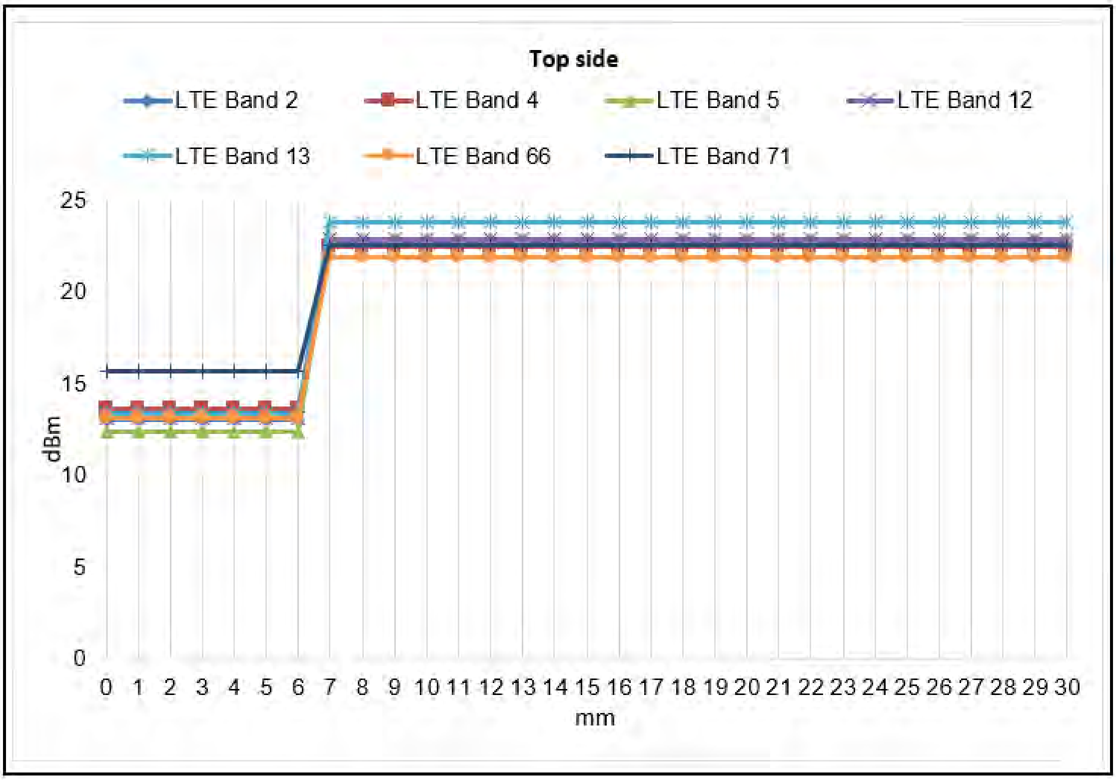
- DUT Moving Toward(Trigger) the Phantom





- DUT Moving Away(Release) from the Phantom





2) Proximity sensor coverage

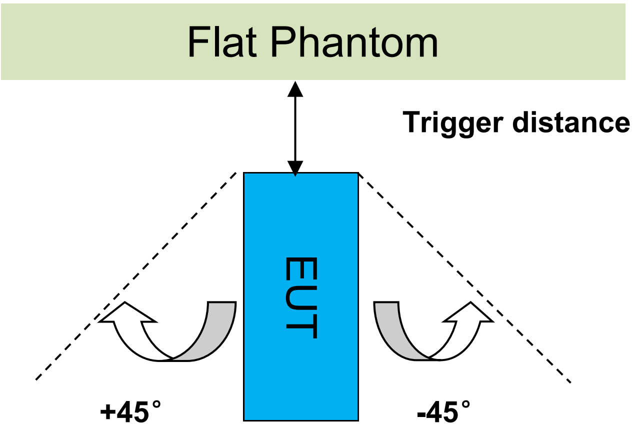
If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing, the device is moved and "along the direction of maximum antenna and sensor offset".

The proximity sensor and main antenna use same metallic electrode, so there is no spatial offset.

3) Device tilt angle influences to proximity sensor triggering

The influence of device tilt angles to proximity sensor triggering was determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom, at 6 mm separation.

Rotating the tablet around the edge next to the phantom in ≤ 10° increments until the tablet is ± 45° from the vertical position at 0°, and the maximum output power remains in the reduced mode.



The Sensor Triggering Distance(mm)	
Position	Top
Minimum	6
Required SAR Test	5

Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering for Top Side													
Band (MHz)	Minimum trigger distance Per KDB616217§6.2	Minimum trigger distance at which power reduction was maintained over ±45°	Power Reduction Status										
			-45°	-35°	-25°	-15°	-5°	0°	5°	15°	25°	35°	45°
LTE Band 2	6mm	6mm	on	on	on	on	on	on	on	on	on	on	on
LTE Band 4	6mm	6mm	on	on	on	on	on	on	on	on	on	on	on
LTE Band 5	6mm	6mm	on	on	on	on	on	on	on	on	on	on	on
LTE Band 12	6mm	6mm	on	on	on	on	on	on	on	on	on	on	on
LTE Band 13	6mm	6mm	on	on	on	on	on	on	on	on	on	on	on
LTE Band 66	6mm	6mm	on	on	on	on	on	on	on	on	on	on	on
LTE Band 71	6mm	6mm	on	on	on	on	on	on	on	on	on	on	on

6 SAR System Verification Procedure

6.1 Tissue Simulate Liquid

6.1.1 Recipes for Tissue Simulate Liquid

The bellowing tables give the recipes for tissue simulating liquids to be used in different frequency bands：

Ingredients (% by weight)	Frequency (MHz)				
	450	700-900	1800-2000	2300-2500	2500-2700
Water	38.56	40.30	55.24	55.00	54.92
Salt (NaCl)	3.95	1.38	0.31	0.2	0.23
Sucrose	56.32	57.90	0	0	0
HEC	0.98	0.24	0	0	0
Bactericide	0.19	0.18	0	0	0
Tween	0	0	44.45	44.80	44.85

Salt: 99^{+}% Pure Sodium Chloride
Sucrose: 98^{+}% Pure Sucrose
Water: De-ionized, 16 $M\Omega^{+}$ resistivity
HEC: Hydroxyethyl Cellulose
Tween: Polyoxyethylene (20) sorbitan monolaurate

HSL5GHz is composed of the following ingredients：
Water：50-65%
Mineral oil：10-30%
Emulsifiers：8-25%
Sodium salt：0-1.5%

Table 2： Recipe of Tissue Simulate Liquid

6.1.2 Measurement for Tissue Simulate Liquid

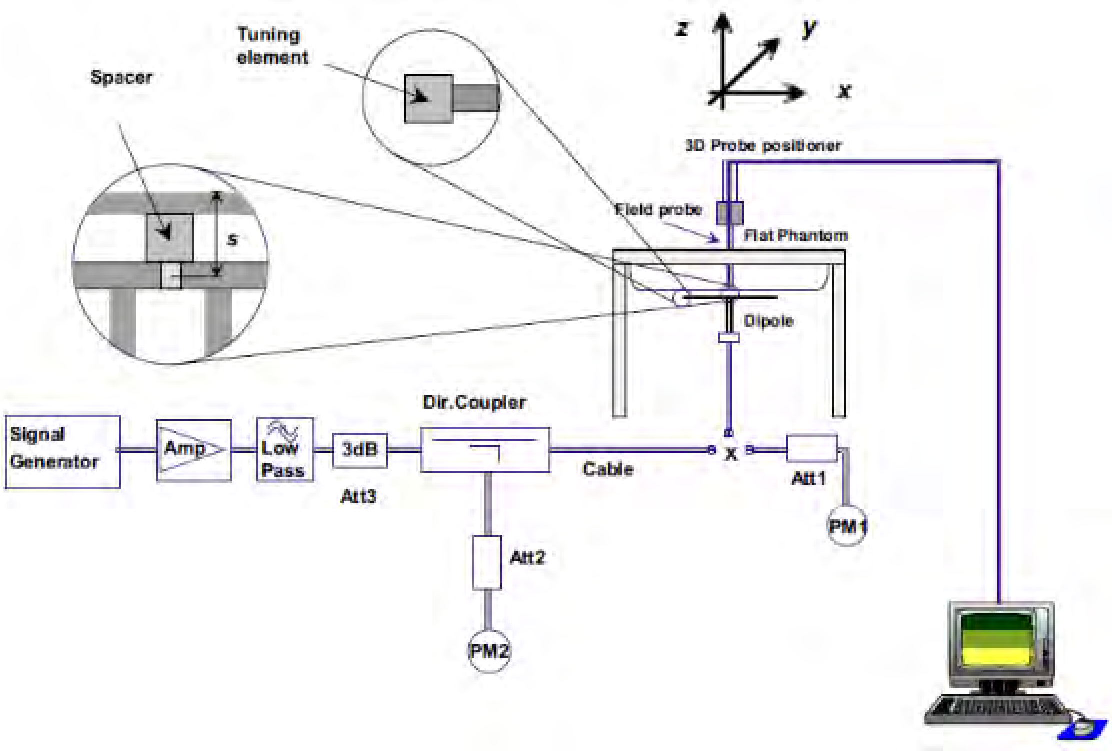
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in bellow table. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2°C.

Tissue Type	Measured Frequency （MHz）	Target Tissue (±5%)		Measured Tissue		Liquid Temp.	Measured Date
		ε_r	σ(S/m)	ε_r	σ(S/m)	(℃)	
750 Head	750	41.9 (39.81~44)	0.89 (0.85~0.94)	43.089	0.878	22.1	2020/8/10

Table 3: Measurement result of Tissue electric parameters

6.2 SAR System Check

The microwave circuit arrangement for system Check is sketched in F-12. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the following table (A power level of 250mW (below 3GHz) or 100mW (3-6GHz) was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range 22±2°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15±0.5 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-3. the microwave circuit arrangement used for SAR system check

6.2.1 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.
a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) Return-loss is within 10% of calibrated measurement;
d) Impedance is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

6.2.2 Summary System Check Result(s)

Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1W)	Measured SAR (normalized to 1W)	Target SAR (normalized to 1W) (±10%)	Target SAR (normalized to 1W) (±10%)	Liquid Temp. (℃)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D750V3	Head	2.13	1.37	8.52	5.48	8.39 (7.55~9.23)	5.63 (5.07~6.19)	22.1	2020/8/10

Table 4: SAR System Check Result

6.2.3 Detailed System Check Results

Please see the Appendix A

7 Test Configuration

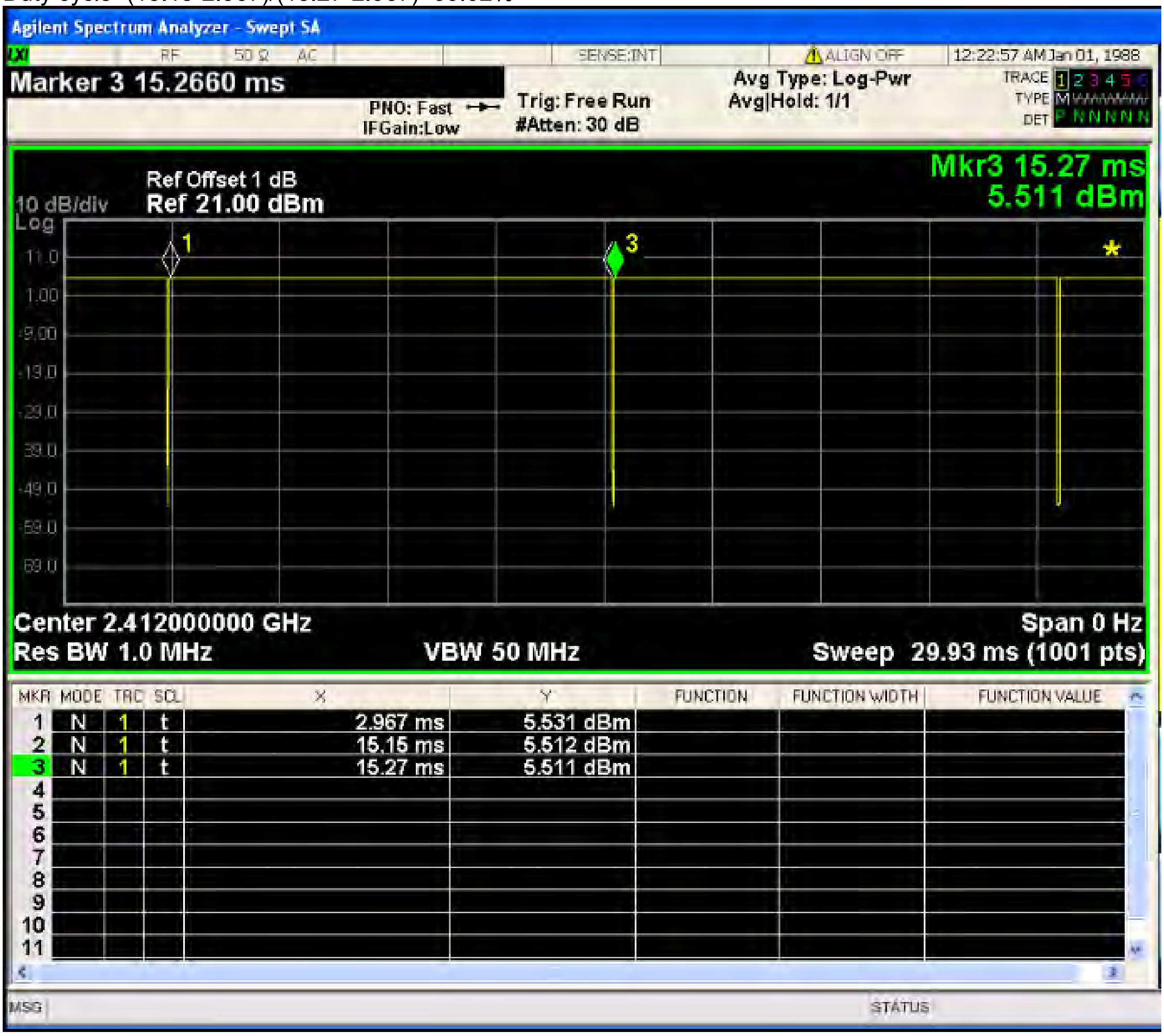
7.1 Operation Configurations

7.1.1 WiFi Test Configuration

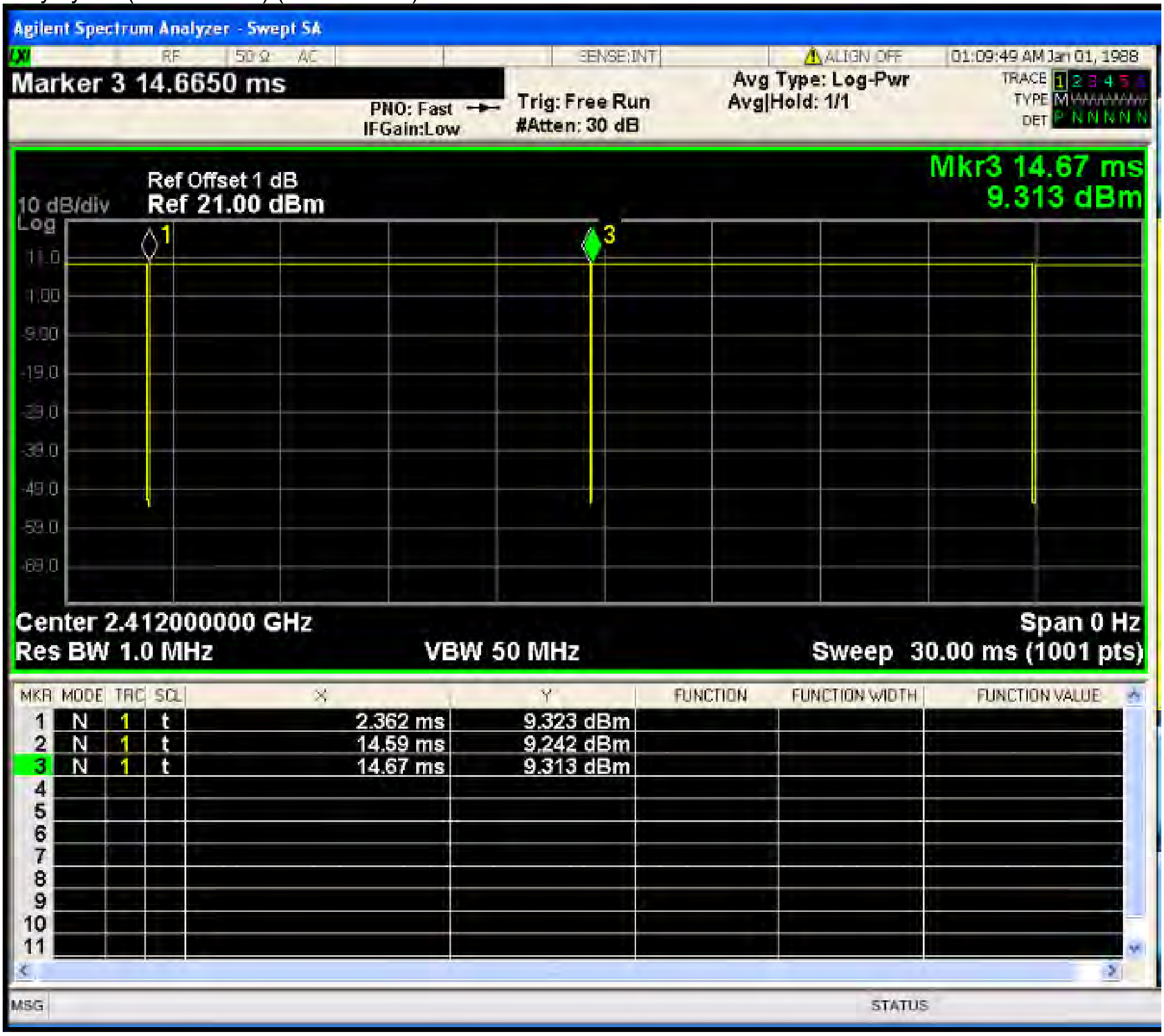
A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

7.1.1.1 Duty cycle

Wi-Fi 2.4G Ant0 802.11b:
Duty cycle=(15.15-2.967)/(15.27-2.967)=99.02%



Wi-Fi 2.4G Ant1 802.11b:
Duty cycle=(14.59-2.362)/(14.67-2.362)=99.35%



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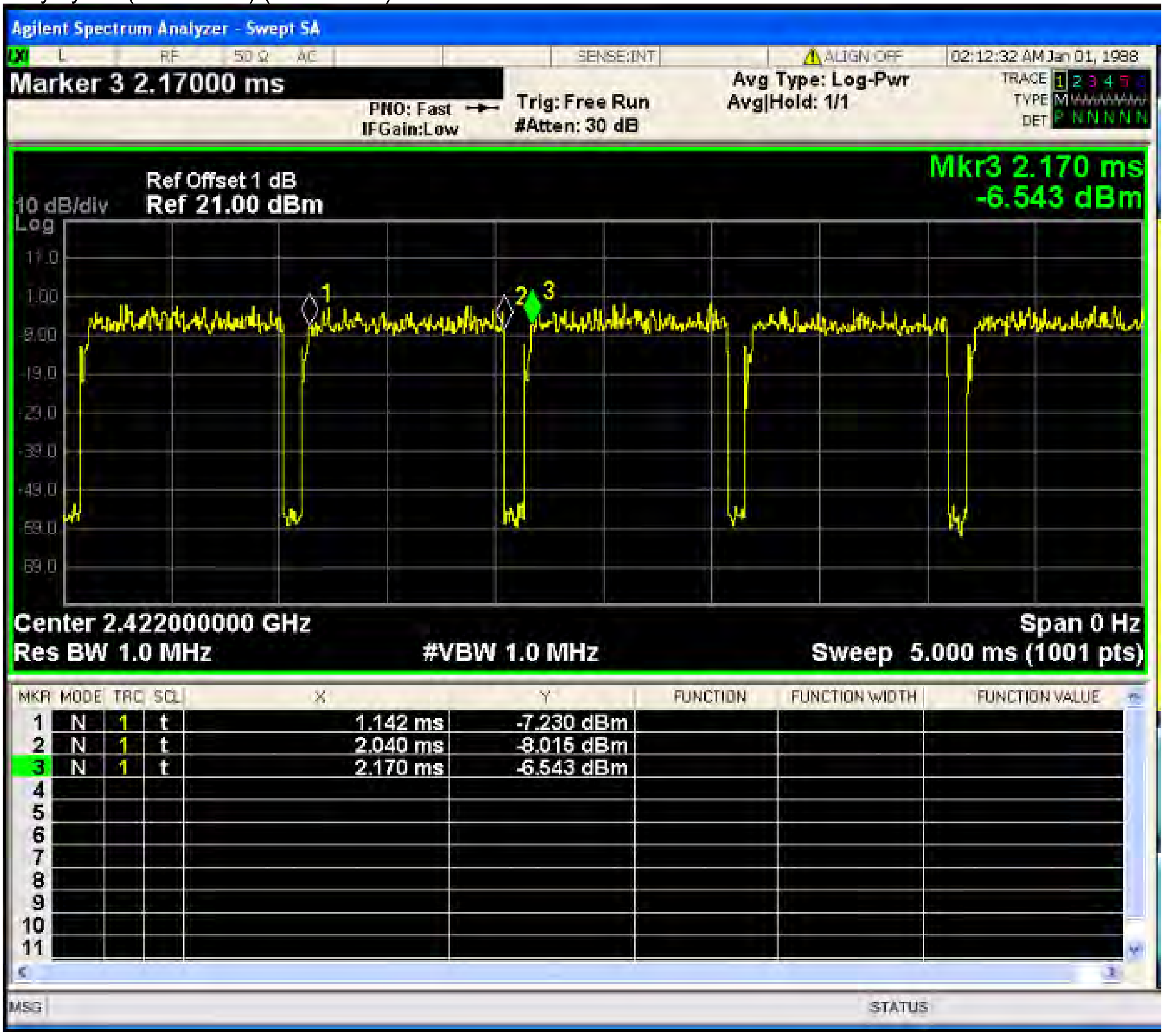
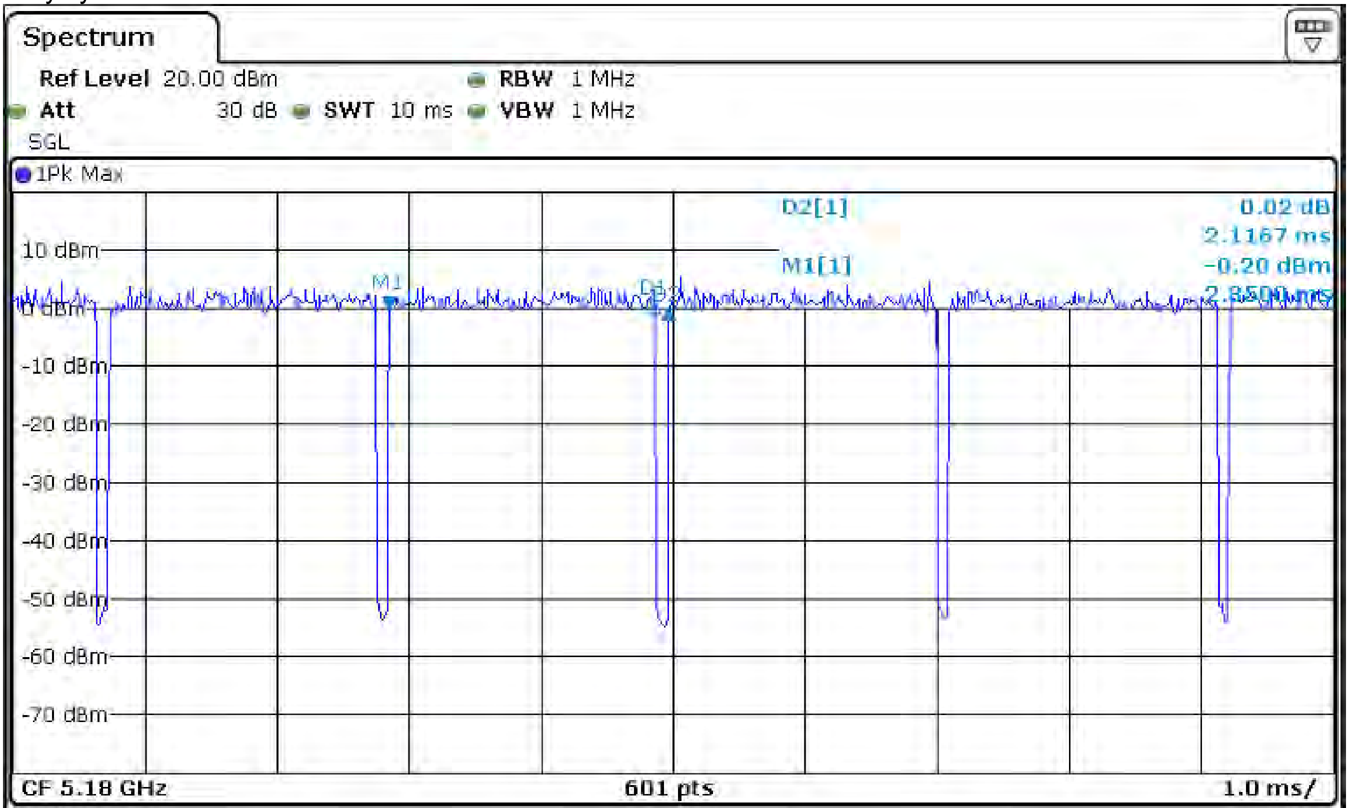
Wi-Fi 2.4G MIMO 802.11n 40M:
Duty cycle=(2.04-1.142)/(2.17-1.142)=87.35%



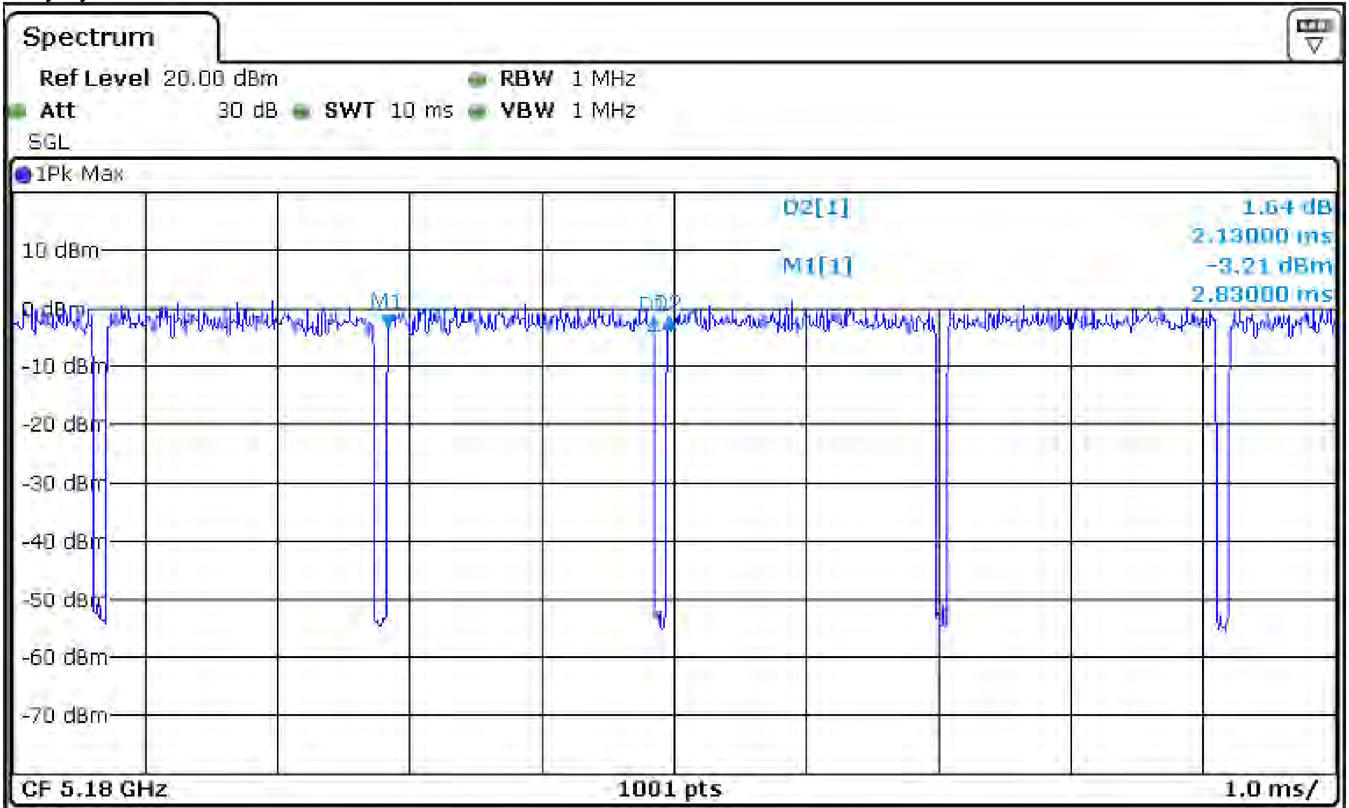
Wi-Fi 5G Ant0 802.11a:
Duty cycle=2.0167/2.1167=95.28%



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.85 ms	-0.20 dBm		
D1	M1	1	2.0167 ms	1.33 dB		
D2	M1	1	2.1167 ms	0.02 dB		

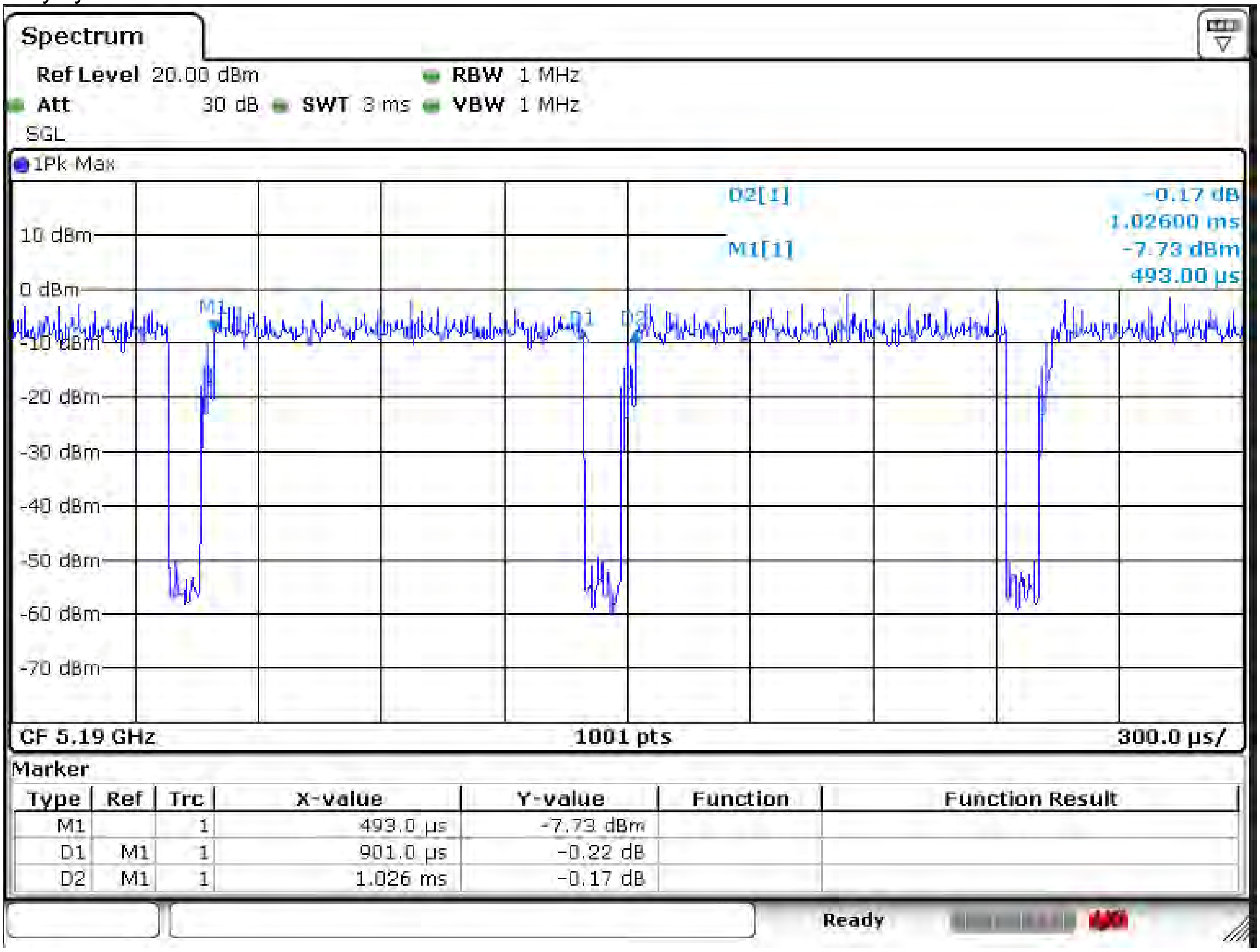
Wi-Fi 5G Ant1 802.11a:
Duty cycle=2.02/2.13=94.84%



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.83 ms	-3.21 dBm		
D1	M1	1	2.02 ms	1.44 dB		
D2	M1	1	2.13 ms	1.64 dB		

Wi-Fi 5G MIMO 802.11n 40M:
Duty cycle=0.901/1.026=87.82%



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	493.0 µs	-7.73 dBm		
D1	M1	1	901.0 µs	-0.22 dB		
D2	M1	1	1.026 ms	-0.17 dB		

7.1.1.2 Initial Test Position SAR Test Reduction Procedure

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures. The initial test position procedure is described in the following:

1）. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
2）. When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
3）. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.

7.1.1.3 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.
For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.
When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

7.1.1.4 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.

1）. When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.

2）. When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

3）. The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.

a) SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.

b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.

4）. SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:

a) replace “subsequent test configuration” with “next subsequent test configuration” (i.e., subsequent next highest specified maximum output power configuration)

b) replace “initial test configuration” with “all tested higher output power configurations”

7.1.1.5 2.4GHz WiFi SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1）. When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2）. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

- **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 (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

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

2）. 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.

- **SAR Test Requirements for OFDM configurations**

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

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7.1.1.6 5GHz WiFi SAR Procedures

7.1.1.6.1 U-NII-1 and U-NII-2A Bands

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following：

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest *reported* SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest *reported* SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.
3) The two U-NII bands may be aggregated to support a 160 MHz channel on channel number 50. Without additional testing, the maximum output power for this is limited to the lower of the maximum output power certified for the two bands. When SAR measurement is required for at least one of the bands and the highest *reported* SAR adjusted by the ratio of specified maximum output power of aggregated to standalone band is > 1.2 W/kg, SAR is required for the 160 MHz channel. This procedure does not apply to an aggregated band with maximum output higher than the standalone band(s); the aggregated band must be tested independently for SAR. SAR is not required when the 160 MHz channel is operating at a reduced maximum power and also qualifies for SAR test exclusion.

7.1.1.6.2 U-NII-2C and U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. when Terminal Doppler Weather Radar (TDWR) restriction applies, all channels that operate at 5.60 – 5.65 GHz must be included to apply the SAR test reduction and measurement procedures.

When the same transmitter and antenna(s) are used for U-NII-2C band and U-NII-3 band or 5.8 GHz band of §15.247, the bands may be aggregated to enable additional channels with 20, 40 or 80 MHz bandwidth to span across the band gap, as illustrated in Appendix B. The maximum output power for the additional band gap channels is limited to the lower of those certified for the bands. Unless band gap channels are permanently disabled, they must be considered for SAR testing. The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels. When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

7.1.1.6.3 OFDM Transmission Mode SAR Test Configuration and Channel Selection Requirements

The initial test configuration for 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple configurations in a frequency band have the same specified maximum output power, the initial test configuration is determined according to the following steps applied sequentially.

1) The largest channel bandwidth configuration is selected among the multiple configurations with the same specified maximum output power.
2) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is selected.
3) If multiple configurations have the same specified maximum output power, largest channel bandwidth and lowest order modulation, the lowest data rate configuration among these configurations is selected.

4) When multiple transmission modes (802.11a/g/n/ac) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n. After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following. These channel selection procedures apply to both the initial test configuration and subsequent test configuration(s), with respect to the default power measurement procedures or additional power measurements required for further SAR test reduction. The same procedures also apply to subsequent highest output power channel(s) selection.
   - The channel closest to mid-band frequency is selected for SAR measurement.
   - For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

7.1.1.6.4 SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 a/n/ac OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies. When band gap channels between U-NII-2C band and 5.8 GHz U-NII-3 or §15.247 band are supported, the highest maximum output power transmission mode configuration and maximum output power channel across the bands must be used to determine SAR test reduction, according to the initial test configuration and subsequent test configuration requirements. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

7.1.2 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The Anritsu MT8821C was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

A) Spectrum Plots for RB Configurations

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

B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2
64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2
64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3

C) A-MPR

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

D) Largest channel bandwidth standalone SAR test requirements

1) QPSK with 1 RB allocation

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

2) QPSK with 50% RB allocation

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

3) QPSK with 100% RB allocation

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

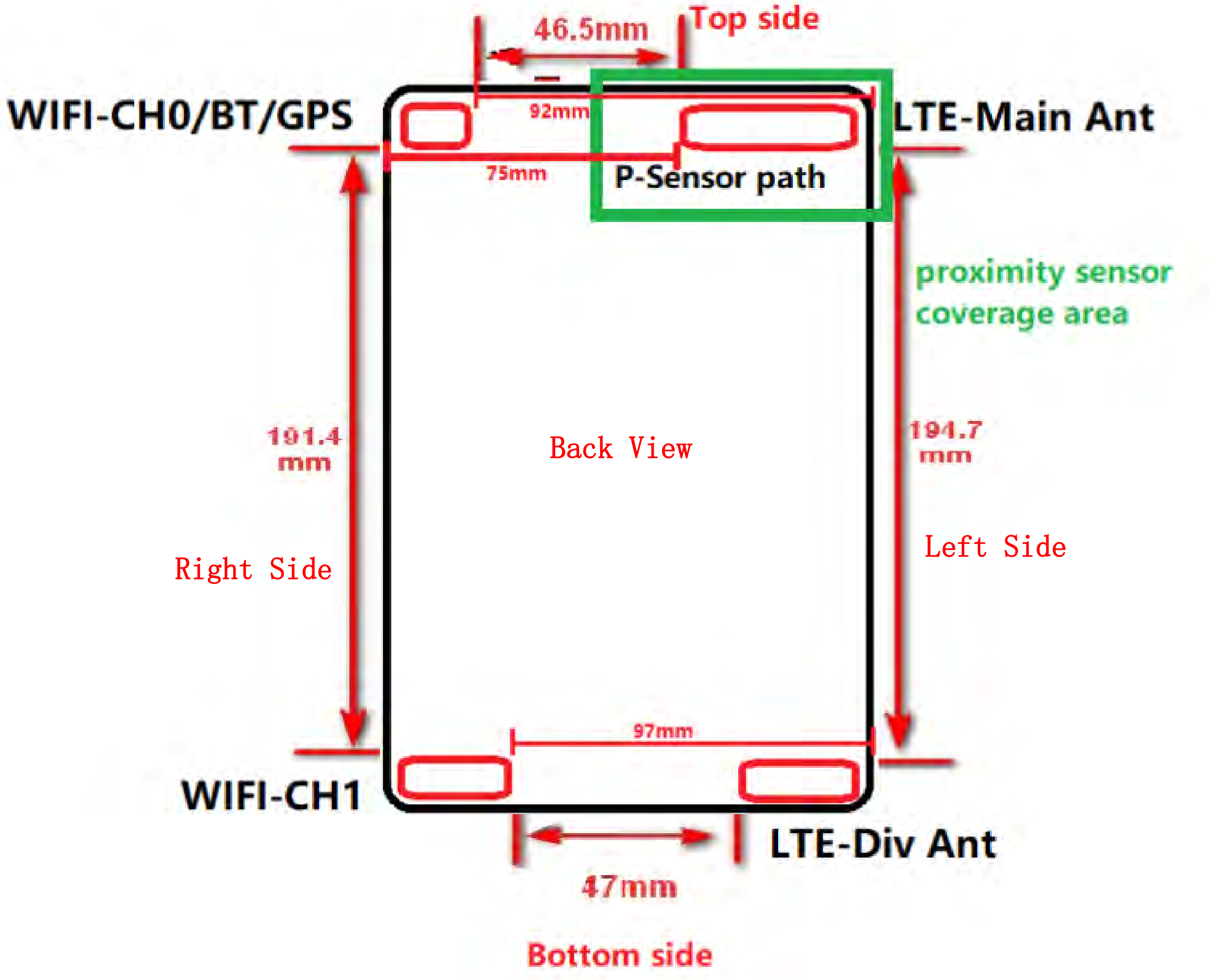
4) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

E) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

7.1.3 DUT Antenna Locations



Note:
1) Per KDB 616217, the diagonal length is > 200mm, the device is considered a “tablet” device and needed to test 0mm 1-g body SAR.
2) The diversity Antenna does not support transmitter function.

7.1.4 EUT side for SAR Testing

- **Stand-alone SAR test evaluation**

1) Per FCC KDB 447498D01, the 1-g and 10-g SAR test exclusion thresholds 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 and ≤ 7.5 for 10-g extremity 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
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.
2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:
a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
1) Standalone SAR exclusion calculation (Antenna to adjacent sides<50mm)

Bnad	Exposure Condition	f（GHz）	Pmax（dBm）	Pmax（mw）	separation distance(mm)					Calculated Value					SAR Test（Yes or No）				
					Back side	Right side	Left side	Top side	Bottom side	Back side	Right side	Left side	Top side	Bottom side	Back side	Right side	Left side	Top side	Bottom side
LTE Band 2	Body 0mm	1.910	23.00	199.53	5	75	5	5	194.7	55.150	>50mm	55.150	55.150	>50mm	Yes	>50mm	Yes	Yes	>50mm
LTE Band 4	Body 0mm	1.755	23.00	199.53	5	75	5	5	194.7	52.865	>50mm	52.865	52.865	>50mm	Yes	>50mm	Yes	Yes	>50mm
LTE Band 5	Body 0mm	0.849	24.00	251.19	5	75	5	5	194.7	46.290	>50mm	46.290	46.290	>50mm	Yes	>50mm	Yes	Yes	>50mm
LTE Band 12	Body 0mm	0.716	24.00	251.19	5	75	5	5	194.7	42.510	>50mm	42.510	42.510	>50mm	Yes	>50mm	Yes	Yes	>50mm
LTE Band 13	Body 0mm	0.787	24.00	251.19	5	75	5	5	194.7	44.567	>50mm	44.567	44.567	>50mm	Yes	>50mm	Yes	Yes	>50mm
LTE Band 66	Body 0mm	1.780	22.50	177.83	5	75	5	5	194.7	47.450	>50mm	47.450	47.450	>50mm	Yes	>50mm	Yes	Yes	>50mm
LTE Band 71	Body 0mm	0.698	23.50	223.87	5	75	5	5	194.7	37.407	>50mm	37.407	37.407	>50mm	Yes	>50mm	Yes	Yes	>50mm
WIFI 2.4G Ant0	Body 0mm	2.462	11.00	12.59	5	5	92	5	191.4	3.951	3.951	>50mm	3.951	>50mm	Yes	Yes	>50mm	Yes	>50mm
WIFI 2.4G Ant1	Body 0mm	2.462	14.00	25.12	5	5	97	191.4	5	7.883	7.883	>50mm	>50mm	7.883	Yes	Yes	>50mm	>50mm	Yes
WIFI 2.4G MIMO	Body 0mm	2.462	12.00	15.85	5	5	92	5	5	4.974	4.974	>50mm	4.974	4.974	Yes	Yes	>50mm	Yes	Yes
WIFI 5.2G Ant0	Body 0mm	5.200	11.00	12.59	5	5	92	5	191.4	5.742	5.742	>50mm	5.742	>50mm	Yes	Yes	>50mm	Yes	>50mm
WIFI 5.3G Ant0	Body 0mm	5.300	11.00	12.59	5	5	92	5	191.4	5.797	5.797	>50mm	5.797	>50mm	Yes	Yes	>50mm	Yes	>50mm
WIFI 5.5G Ant0	Body 0mm	5.500	10.00	10.00	5	5	92	5	191.4	4.690	4.690	>50mm	4.690	>50mm	Yes	Yes	>50mm	Yes	>50mm
WIFI 5.8G Ant0	Body 0mm	5.800	9.50	8.91	5	5	92	5	191.4	4.293	4.293	>50mm	4.293	>50mm	Yes	Yes	>50mm	Yes	>50mm
WIFI 5.2G Ant1	Body 0mm	5.200	12.50	17.78	5	5	97	191.4	5	8.110	8.110	>50mm	>50mm	8.110	Yes	Yes	>50mm	>50mm	Yes
WIFI 5.3G Ant1	Body 0mm	5.300	12.50	17.78	5	5	97	191.4	5	8.188	8.188	>50mm	>50mm	8.188	Yes	Yes	>50mm	>50mm	Yes
WIFI 5.5G Ant1	Body 0mm	5.500	13.50	22.39	5	5	97	191.4	5	10.501	10.501	>50mm	>50mm	10.501	Yes	Yes	>50mm	>50mm	Yes
WIFI 5.8G Ant1	Body 0mm	5.800	11.50	14.13	5	5	97	191.4	5	6.804	6.804	>50mm	>50mm	6.804	Yes	Yes	>50mm	>50mm	Yes
WIFI 5.2G MIMO	Body 0mm	5.200	13.50	22.39	5	5	97	5	5	10.210	10.210	>50mm	10.210	10.210	Yes	Yes	>50mm	Yes	Yes
WIFI 5.3G MIMO	Body 0mm	5.300	13.50	22.39	5	5	97	5	5	10.308	10.308	>50mm	10.308	10.308	Yes	Yes	>50mm	Yes	Yes
WIFI 5.5G MIMO	Body 0mm	5.500	13.50	22.39	5	5	97	5	5	10.501	10.501	>50mm	10.501	10.501	Yes	Yes	>50mm	Yes	Yes
WIFI 5.8G MIMO	Body 0mm	5.800	11.50	14.13	5	5	97	5	5	6.804	6.804	>50mm	6.804	6.804	Yes	Yes	>50mm	Yes	Yes
BT	Body 0mm	2.480	9.50	8.91	5	5	92	5	191.4	2.807	2.807	>50mm	2.807	>50mm	No	No	>50mm	No	>50mm

2) Standalone SAR exclusion calculation (Antenna to adjacent sides>50mm)

Bnad	Exposure Condition	f （GHz）	Pmax	Pmax	separation distance(mm)					Calculated Value					SAR Test（Yes or No）				
			（dBm）	（mw）	Back side	Right side	Left side	Top side	Bottom side	Back side	Right side	Left side	Top side	Bottom side	Back side	Right side	Left side	Top side	Bottom side
LTE Band 2	Body 0mm	1.910	23.00	199.53	5	75	5	5	194.7	<50mm	359.00	<50mm	<50mm	1556.00	<50mm	No	<50mm	<50mm	No
LTE Band 4	Body 0mm	1.755	23.00	199.53	5	75	5	5	194.7	<50mm	363.00	<50mm	<50mm	1560.00	<50mm	No	<50mm	<50mm	No
LTE Band 5	Body 0mm	0.849	24.00	251.19	5	75	5	5	194.7	<50mm	414.00	<50mm	<50mm	1611.00	<50mm	No	<50mm	<50mm	No
LTE Band 12	Body 0mm	0.716	24.00	251.19	5	75	5	5	194.7	<50mm	367.00	<50mm	<50mm	1564.00	<50mm	No	<50mm	<50mm	No
LTE Band 13	Body 0mm	0.787	24.00	251.19	5	75	5	5	194.7	<50mm	367.00	<50mm	<50mm	1564.00	<50mm	No	<50mm	<50mm	No
LTE Band 66	Body 0mm	1.780	22.50	177.83	5	75	5	5	194.7	<50mm	362.00	<50mm	<50mm	1559.00	<50mm	No	<50mm	<50mm	No
LTE Band 71	Body 0mm	0.698	23.50	223.87	5	75	5	5	194.7	<50mm	430.00	<50mm	<50mm	1627.00	<50mm	No	<50mm	<50mm	No
WIFI 2.4G Ant0	Body 0mm	2.462	11.00	12.59	5	5	92	5	191.4	<50mm	<50mm	516.00	<50mm	1510.00	<50mm	<50mm	No	<50mm	No
WIFI 2.4G Ant1	Body 0mm	2.462	14.00	25.12	5	5	97	191.4	5	<50mm	<50mm	566.00	1510.00	<50mm	<50mm	<50mm	No	No	<50mm
WIFI 2.4G MIMO	Body 0mm	2.462	12.00	15.85	5	5	92	5	5	<50mm	<50mm	516.00	<50mm	<50mm	<50mm	<50mm	No	<50mm	<50mm
WIFI 5.2G Ant0	Body 0mm	5.200	11.00	12.59	5	5	92	5	191.4	<50mm	<50mm	486.00	<50mm	1480.00	<50mm	<50mm	No	<50mm	No
WIFI 5.3G Ant0	Body 0mm	5.300	11.00	12.59	5	5	92	5	191.4	<50mm	<50mm	486.00	<50mm	1480.00	<50mm	<50mm	No	<50mm	No
WIFI 5.5G Ant0	Body 0mm	5.500	10.00	10.00	5	5	92	5	191.4	<50mm	<50mm	486.00	<50mm	1480.00	<50mm	<50mm	No	<50mm	No
WIFI 5.8G Ant0	Body 0mm	5.800	9.50	8.91	5	5	92	5	191.4	<50mm	<50mm	486.00	<50mm	1480.00	<50mm	<50mm	No	<50mm	No
WIFI 5.2G Ant1	Body 0mm	5.200	12.50	17.78	5	5	97	191.4	5	<50mm	<50mm	536.00	1480.00	<50mm	<50mm	<50mm	No	No	<50mm
WIFI 5.3G Ant1	Body 0mm	5.300	12.50	17.78	5	5	97	191.4	5	<50mm	<50mm	536.00	1480.00	<50mm	<50mm	<50mm	No	No	<50mm
WIFI 5.5G Ant1	Body 0mm	5.500	13.50	22.39	5	5	97	191.4	5	<50mm	<50mm	536.00	1480.00	<50mm	<50mm	<50mm	No	No	<50mm
WIFI 5.8G Ant1	Body 0mm	5.800	11.50	14.13	5	5	97	191.4	5	<50mm	<50mm	536.00	1480.00	<50mm	<50mm	<50mm	No	No	<50mm
WIFI 5.2G MIMO	Body 0mm	5.200	13.50	22.39	5	5	97	5	5	<50mm	<50mm	536.00	<50mm	<50mm	<50mm	<50mm	No	<50mm	<50mm
WIFI 5.3G MIMO	Body 0mm	5.300	13.50	22.39	5	5	97	5	5	<50mm	<50mm	536.00	<50mm	<50mm	<50mm	<50mm	No	<50mm	<50mm
WIFI 5.5G MIMO	Body 0mm	5.500	13.50	22.39	5	5	97	5	5	<50mm	<50mm	536.00	<50mm	<50mm	<50mm	<50mm	No	<50mm	<50mm
WIFI 5.8G MIMO	Body 0mm	5.800	11.50	14.13	5	5	97	5	5	<50mm	<50mm	536.00	<50mm	<50mm	<50mm	<50mm	No	<50mm	<50mm
BT	Body 0mm	2.480	9.50	8.91	5	5	92	5	191.4	<50mm	<50mm	516.00	<50mm	1510.00	<50mm	<50mm	No	<50mm	No

According to the table above, the standalone test configurations required for this device are as below:

Test configurations	Front side	Back side	Left side	Right side	Top side	Bottom side
LTE	No	Yes	Yes	No	Yes	No
WiFi 2.4G Ant 0	No	Yes	No	Yes	Yes	No
WiFi 2.4G Ant 1	No	Yes	No	Yes	No	Yes
WiFi 2.4G MIMO	No	Yes	No	Yes	Yes	Yes
WiFi 5G Ant 0	No	Yes	No	Yes	Yes	No
WiFi 5G Ant 1	No	Yes	No	Yes	No	Yes
WiFi 5G MIMO	No	Yes	No	Yes	Yes	Yes
BT	No	No	No	No	No	No

8 Test Result
8.1 Measurement of RF Conducted Power
8.1.1 Conducted Power of Main Antenna
8.1.1.1 Conducted Power of LTE

LTE Band 2 sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193	Tune up
1.4MHz	QPSK	1	0	22.46	22.68	22.50	23.00
		1	2	22.64	22.82	22.54	23.00
		1	5	22.48	22.62	22.34	23.00
		3	0	22.60	22.81	22.68	23.00
		3	2	22.65	22.96	22.57	23.00
		3	3	22.73	22.91	22.55	23.00
		6	0	21.66	21.86	21.64	22.00
	16QAM	1	0	21.23	21.43	21.70	22.00
		1	2	20.98	21.61	21.30	22.00
		1	5	21.24	21.84	21.47	22.00
		3	0	21.69	21.77	21.66	22.00
		3	2	21.59	21.99	21.54	22.00
		3	3	21.57	21.96	21.61	22.00
		6	0	20.35	20.73	20.63	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185	Tune up
3MHz	QPSK	1	0	22.48	22.62	22.70	23.00
		1	7	22.61	22.98	22.62	23.00
		1	14	22.78	22.65	22.32	23.00
		8	0	21.69	21.76	21.66	22.00
		8	4	21.75	21.83	21.52	22.00
		8	7	21.72	21.81	21.67	22.00
		15	0	21.71	21.78	21.66	22.00
	16QAM	1	0	20.94	21.40	21.29	22.00
		1	7	21.99	21.45	21.43	22.00
		1	14	21.03	21.38	21.23	22.00
		8	0	20.38	20.98	20.75	21.00
		8	4	20.88	20.74	20.50	21.00
		8	7	20.61	20.78	20.51	21.00
		15	0	20.68	20.56	20.47	21.00

Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175	Tune up
5MHz	QPSK	1	0	22.23	22.54	22.60	23.00
		1	13	22.41	22.47	22.30	23.00
		1	24	22.52	22.33	22.05	23.00
		12	0	21.71	21.72	21.65	22.00
		12	6	21.64	21.72	21.47	22.00
		12	13	21.76	21.73	21.51	22.00
		25	0	21.61	21.67	21.47	22.00
	16QAM	1	0	21.83	21.18	21.37	22.00
		1	13	21.09	21.27	21.68	22.00
		1	24	21.46	21.47	20.96	22.00
		12	0	20.43	20.51	20.70	21.00
		12	6	20.43	20.50	20.19	21.00
		12	13	20.63	20.35	20.36	21.00
		25	0	20.63	20.70	20.39	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 18650	Channel 18900	Channel 19150	Tune up
10MHz	QPSK	1	0	22.36	22.64	22.60	23.00
		1	25	22.90	22.67	22.77	23.00
		1	49	22.55	22.56	22.44	23.00
		25	0	21.55	21.79	21.74	22.00
		25	13	21.82	21.71	21.73	22.00
		25	25	21.74	21.73	21.55	22.00
		50	0	21.64	21.76	21.70	22.00
	16QAM	1	0	21.94	21.86	21.45	22.00
		1	25	21.73	21.98	21.50	22.00
		1	49	21.95	21.41	21.68	22.00
		25	0	20.75	20.85	20.72	21.00
		25	13	20.86	20.95	20.79	21.00
		25	25	20.66	20.83	20.49	21.00
		50	0	20.65	20.89	20.70	21.00

Bandwidth	Modulation	RB size	RB offset	Channel 18675	Channel 18900	Channel 19125	Tune up
15MHz	QPSK	1	0	22.49	22.68	22.33	23.00
		1	38	22.88	22.49	22.65	23.00
		1	74	22.89	22.60	22.57	23.00
		36	0	21.74	21.82	21.76	22.00
		36	18	21.90	21.73	21.70	22.00
		36	39	21.74	21.58	21.56	22.00
		75	0	21.76	21.74	21.63	22.00
	16QAM	1	0	21.13	21.99	21.43	22.00
		1	38	21.97	21.37	21.82	22.00
		1	74	21.29	21.13	21.39	22.00
		36	0	20.54	20.77	20.71	21.00
		36	18	20.74	20.71	20.68	21.00
		36	39	20.59	20.64	20.54	21.00
		75	0	20.69	20.61	20.71	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 18700	Channel 18900	Channel 19100	Tune up
20MHz	QPSK	1	0	22.28	22.76	22.24	23.00
		1	50	**22.86**	**22.91**	**22.90**	23.00
		1	99	22.85	22.29	22.56	23.00
		50	0	21.75	21.62	21.70	22.00
		50	25	21.71	21.61	**21.79**	22.00
		50	50	**21.81**	**21.64**	21.73	22.00
		100	0	21.70	**21.82**	21.81	22.00
	16QAM	1	0	21.34	21.71	21.50	22.00
		1	50	21.68	21.96	21.46	22.00
		1	99	21.40	21.86	21.28	22.00
		50	0	20.89	20.76	20.63	21.00
		50	25	20.72	20.73	20.71	21.00
		50	50	20.82	20.55	20.81	21.00
		100	0	20.67	20.64	20.68	21.00

LTE Band 2 sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 18607	Channel 18900	Channel 19193	Tune up
1.4MHz	QPSK	1	0	12.95	12.90	13.52	14.00
		1	2	12.18	12.89	13.56	14.00
		1	5	12.01	12.80	13.32	14.00
		3	0	12.11	12.99	13.60	14.00
		3	2	12.15	12.98	13.52	14.00
		3	3	12.19	12.90	13.50	14.00
		6	0	12.10	12.94	13.49	14.00
	16QAM	1	0	12.38	12.93	13.85	14.00
		1	2	12.41	13.19	13.72	14.00
		1	5	12.14	12.98	13.51	14.00
		3	0	12.09	12.94	13.84	14.00
		3	2	12.30	12.98	13.72	14.00
		3	3	12.22	12.95	13.72	14.00
		6	0	12.16	12.96	13.83	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 18615	Channel 18900	Channel 19185	Tune up
3MHz	QPSK	1	0	12.28	13.36	13.95	14.00
		1	7	12.29	13.08	13.63	14.00
		1	14	12.00	12.98	13.80	14.00
		8	0	12.15	13.04	13.79	14.00
		8	4	12.26	13.00	13.62	14.00
		8	7	12.24	12.90	13.56	14.00
		15	0	12.24	12.98	13.60	14.00
	16QAM	1	0	12.00	13.67	13.99	14.00
		1	7	12.72	13.09	13.98	14.00
		1	14	12.59	13.21	13.95	14.00
		8	0	12.14	13.12	13.98	14.00
		8	4	12.33	13.01	13.87	14.00
		8	7	12.31	12.93	13.89	14.00
		15	0	12.23	13.03	13.81	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 18625	Channel 18900	Channel 19175	Tune up
5MHz	QPSK	1	0	12.39	13.34	13.97	14.00
		1	13	12.37	13.07	13.72	14.00
		1	24	12.78	12.95	13.81	14.00
		12	0	12.38	13.23	13.94	14.00
		12	6	12.41	13.03	13.70	14.00
		12	13	12.51	12.95	13.96	14.00
		25	0	12.50	13.08	13.83	14.00
	16QAM	1	0	12.38	13.41	13.95	14.00
		1	13	12.64	12.74	13.98	14.00
		1	24	12.74	13.17	13.99	14.00
		12	0	12.39	13.32	13.97	14.00
		12	6	12.47	12.98	13.82	14.00
		12	13	12.48	13.02	13.94	14.00
		25	0	12.45	13.13	13.96	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 18650	Channel 18900	Channel 19150	Tune up
10MHz	QPSK	1	0	12.98	13.05	12.97	14.00
		1	25	12.52	12.88	13.84	14.00
		1	49	12.87	12.23	13.42	14.00
		25	0	12.33	13.10	13.44	14.00
		25	13	12.55	12.89	13.66	14.00
		25	25	12.83	12.61	13.62	14.00
		50	0	12.63	12.87	13.57	14.00
	16QAM	1	0	12.19	13.12	13.19	14.00
		1	25	12.74	13.09	13.90	14.00
		1	49	12.93	12.41	13.98	14.00
		25	0	12.31	13.13	13.64	14.00
		25	13	12.62	12.89	13.76	14.00
		25	25	12.91	12.66	13.75	14.00
		50	0	12.66	12.90	13.73	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 18675	Channel 18900	Channel 19125	Tune up
15MHz	QPSK	1	0	12.02	13.13	12.02	14.00
		1	38	12.84	12.81	13.33	14.00
		1	74	12.46	12.10	13.50	14.00
		36	0	12.50	13.14	12.60	14.00
		36	18	12.83	12.90	13.26	14.00
		36	39	12.26	12.46	13.56	14.00
		75	0	12.70	12.82	13.18	14.00
	16QAM	1	0	12.08	13.27	12.25	14.00
		1	38	12.05	13.15	13.42	14.00
		1	74	12.53	12.22	13.68	14.00
		36	0	12.55	13.17	12.61	14.00
		36	18	12.87	12.95	13.28	14.00
		36	39	12.27	12.47	13.72	14.00
		75	0	12.85	12.86	13.28	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 18700	Channel 18900	Channel 19100	Tune up
20MHz	QPSK	1	0	12.01	13.03	12.04	14.00
		1	50	12.08	12.91	12.94	14.00
		1	99	12.58	12.06	**13.52**	14.00
		50	0	12.03	12.98	12.01	14.00
		50	25	12.15	12.85	12.77	14.00
		50	50	12.44	12.31	**13.43**	14.00
		100	0	12.98	12.62	12.59	14.00
	16QAM	1	0	12.13	13.11	12.99	14.00
		1	50	12.52	13.02	12.84	14.00
		1	99	13.15	12.94	13.67	14.00
		50	0	12.59	12.96	12.05	14.00
		50	25	12.19	12.85	12.78	14.00
		50	50	12.47	12.29	13.50	14.00
		100	0	12.01	12.66	12.77	14.00

LTE Band 4 sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 19957	Channel 20175	Channel 20393	Tune up
1.4MHz	QPSK	1	0	22.17	22.13	22.02	23.00
		1	2	22.36	22.31	22.17	23.00
		1	5	22.12	22.22	22.10	23.00
		3	0	22.30	22.35	22.22	23.00
		3	2	22.50	22.43	22.20	23.00
		3	3	22.46	22.49	22.14	23.00
		6	0	21.30	21.38	21.12	22.00
	16QAM	1	0	21.12	21.13	20.85	22.00
		1	2	21.12	21.25	20.93	22.00
		1	5	21.04	20.93	21.11	22.00
		3	0	21.21	21.27	21.21	22.00
		3	2	21.23	21.31	21.13	22.00
		3	3	21.22	21.55	21.03	22.00
		6	0	20.31	20.46	20.04	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 19965	Channel 20175	Channel 20385	Tune up
3MHz	QPSK	1	0	22.37	22.60	21.73	23.00
		1	7	22.31	22.67	21.81	23.00
		1	14	21.95	22.27	21.80	23.00
		8	0	21.50	21.52	20.94	22.00
		8	4	21.34	21.45	20.97	22.00
		8	7	21.28	21.28	20.86	22.00
		15	0	21.38	21.42	21.02	22.00
	16QAM	1	0	21.16	21.16	20.81	22.00
		1	7	21.13	21.38	20.89	22.00
		1	14	21.06	20.95	21.14	22.00
		8	0	20.46	20.48	20.23	21.00
		8	4	20.36	20.48	20.09	21.00
		8	7	20.48	20.41	19.97	21.00
		15	0	20.56	20.39	20.06	21.00

Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				19975	20175	20375	
5MHz	QPSK	1	0	22.30	22.19	22.01	23.00
		1	13	22.05	22.07	21.79	23.00
		1	24	21.80	22.06	21.83	23.00
		12	0	21.38	21.23	21.21	22.00
		12	6	21.25	21.33	20.99	22.00
		12	13	21.10	21.30	21.09	22.00
		25	0	21.18	21.35	21.05	22.00
	16QAM	1	0	20.88	21.01	20.95	22.00
		1	13	20.91	20.93	20.81	22.00
		1	24	20.93	20.81	20.69	22.00
		12	0	20.26	20.32	20.04	21.00
		12	6	20.02	20.41	20.00	21.00
		12	13	20.06	20.47	20.08	21.00
		25	0	20.17	20.42	20.05	21.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20000	20175	20350	
10MHz	QPSK	1	0	22.23	22.10	22.16	23.00
		1	25	21.92	22.30	21.87	23.00
		1	49	21.84	22.19	21.87	23.00
		25	0	21.23	21.21	21.05	22.00
		25	13	21.10	21.35	21.01	22.00
		25	25	21.07	21.23	20.87	22.00
		50	0	21.12	21.28	20.96	22.00
	16QAM	1	0	21.10	20.88	20.99	22.00
		1	25	21.10	21.11	21.03	22.00
		1	49	20.73	20.92	20.51	22.00
		25	0	20.32	20.50	20.22	21.00
		25	13	20.28	20.44	20.19	21.00
		25	25	20.15	20.22	19.97	21.00
		50	0	20.19	20.43	20.05	21.00

Bandwidth	Modulation	RB size	RB offset	Channel 20025	Channel 20175	Channel 20325	Tune up
15MHz	QPSK	1	0	22.01	21.88	22.14	23.00
		1	38	22.16	22.25	21.92	23.00
		1	74	22.12	22.29	22.07	23.00
		36	0	21.22	21.17	20.98	22.00
		36	18	21.15	21.33	21.00	22.00
		36	39	21.07	21.22	21.06	22.00
		75	0	21.24	21.18	21.10	22.00
	16QAM	1	0	21.09	20.96	20.97	22.00
		1	38	20.91	20.97	20.76	22.00
		1	74	20.90	21.01	20.57	22.00
		36	0	20.10	20.48	20.06	21.00
		36	18	20.02	20.37	19.91	21.00
		36	39	20.12	20.29	20.07	21.00
		75	0	20.13	20.13	20.09	21.00
Bandwidth	Modulation	RB size	RB offset	Channel 20050	Channel 20175	Channel 20300	Tune up
20MHz	QPSK	1	0	22.08	21.84	**22.48**	23.00
		1	50	22.02	**22.49**	22.02	23.00
		1	99	**22.20**	22.15	21.71	23.00
		50	0	21.11	**21.33**	**21.25**	22.00
		50	25	21.18	21.28	21.03	22.00
		50	50	**21.21**	21.13	20.98	22.00
		100	0	21.16	**21.20**	21.12	22.00
	16QAM	1	0	21.37	20.88	21.14	22.00
		1	50	21.11	21.10	21.15	22.00
		1	99	20.90	20.89	20.22	22.00
		50	0	20.09	20.45	20.33	21.00
		50	25	20.18	20.46	20.03	21.00
		50	50	20.29	20.30	20.08	21.00
		100	0	20.21	20.27	20.10	21.00

LTE Band 4 sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 19957	Channel 20175	Channel 20393	Tune up
1.4MHz	QPSK	1	0	12.69	13.13	12.62	14.00
		1	2	12.82	13.24	12.78	14.00
		1	5	12.64	13.30	12.53	14.00
		3	0	12.79	13.25	12.73	14.00
		3	2	12.81	13.39	12.74	14.00
		3	3	12.76	13.46	12.69	14.00
		6	0	12.78	13.31	12.68	14.00
	16QAM	1	0	12.78	13.60	12.45	14.00
		1	2	13.26	13.22	12.50	14.00
		1	5	12.88	13.60	12.76	14.00
		3	0	12.82	13.45	12.92	14.00
		3	2	12.98	13.44	12.93	14.00
		3	3	12.74	13.54	12.77	14.00
		6	0	12.96	13.42	12.98	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 19965	Channel 20175	Channel 20385	Tune up
3MHz	QPSK	1	0	13.22	13.42	12.25	14.00
		1	7	12.62	13.48	12.78	14.00
		1	14	12.53	13.84	12.96	14.00
		8	0	12.70	13.26	12.75	14.00
		8	4	12.53	13.40	12.76	14.00
		8	7	12.47	13.50	12.63	14.00
		15	0	12.59	13.35	12.74	14.00
	16QAM	1	0	13.15	13.38	12.21	14.00
		1	7	12.80	13.56	12.88	14.00
		1	14	12.56	13.86	12.99	14.00
		8	0	12.83	13.46	12.96	14.00
		8	4	12.66	13.59	12.91	14.00
		8	7	12.65	13.60	12.85	14.00
		15	0	12.61	13.42	12.88	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 19975	Channel 20175	Channel 20375	Tune up
5MHz	QPSK	1	0	13.25	13.43	12.56	14.00
		1	13	12.41	13.46	12.89	14.00
		1	24	12.40	13.98	12.95	14.00
		12	0	12.80	13.40	12.20	14.00
		12	6	12.47	13.38	12.88	14.00
		12	13	12.44	13.79	12.93	14.00
		25	0	12.60	13.54	12.02	14.00
	16QAM	1	0	13.26	13.38	12.85	14.00
		1	13	12.59	13.65	12.24	14.00
		1	24	12.70	13.99	12.31	14.00
		12	0	12.81	13.42	12.30	14.00
		12	6	12.52	13.38	12.01	14.00
		12	13	12.45	13.75	12.05	14.00
		25	0	12.66	13.61	12.15	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 20000	Channel 20175	Channel 20350	Tune up
10MHz	QPSK	1	0	12.57	12.54	13.33	14.00
		1	25	12.10	13.43	12.23	14.00
		1	49	12.64	13.75	12.47	14.00
		25	0	12.39	13.07	12.89	14.00
		25	13	12.90	13.33	12.21	14.00
		25	25	12.67	13.68	12.89	14.00
		50	0	12.04	13.42	12.36	14.00
	16QAM	1	0	12.71	12.93	13.98	14.00
		1	25	12.45	13.96	12.37	14.00
		1	49	12.86	13.90	12.26	14.00
		25	0	12.45	12.99	12.93	14.00
		25	13	12.93	13.47	12.36	14.00
		25	25	12.68	13.66	12.89	14.00
		50	0	12.03	13.34	12.47	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 20025	Channel 20175	Channel 20325	Tune up
15MHz	QPSK	1	0	12.63	12.22	13.72	14.00
		1	38	12.60	13.42	12.91	14.00
		1	74	12.86	13.95	12.49	14.00
		36	0	12.13	12.90	13.47	14.00
		36	18	12.70	13.32	12.93	14.00
		36	39	12.69	13.85	12.13	14.00
		75	0	12.96	13.39	12.84	14.00
	16QAM	1	0	13.26	12.62	13.92	14.00
		1	38	12.75	13.84	13.50	14.00
		1	74	12.09	13.83	12.94	14.00
		36	0	12.07	12.84	13.57	14.00
		36	18	12.75	13.42	12.96	14.00
		36	39	12.77	13.78	12.18	14.00
		75	0	12.87	13.37	12.82	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 20050	Channel 20175	Channel 20300	Tune up
20MHz	QPSK	1	0	12.47	**13.69**	13.64	14.00
		1	50	12.02	13.30	13.45	14.00
		1	99	12.44	13.47	12.05	14.00
		50	0	**12.03**	**13.64**	**13.64**	14.00
		50	25	12.02	13.36	13.22	14.00
		50	50	12.01	13.59	12.44	14.00
		100	0	12.01	13.02	**13.03**	14.00
	16QAM	1	0	13.09	12.94	13.73	14.00
		1	50	12.65	13.65	13.62	14.00
		1	99	12.64	13.56	12.92	14.00
		50	0	12.76	12.59	13.73	14.00
		50	25	12.59	13.45	13.30	14.00
		50	50	12.03	13.76	12.39	14.00
		100	0	12.84	13.09	13.08	14.00

LTE Band 5 sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 20407	Channel 20525	Channel 20643	Tune up
1.4MHz	QPSK	1	0	22.91	22.99	22.96	24.00
		1	2	23.12	23.10	23.02	24.00
		1	5	23.03	23.16	23.02	24.00
		3	0	23.18	23.32	23.23	24.00
		3	2	23.16	23.30	23.15	24.00
		3	3	23.25	23.27	23.18	24.00
		6	0	22.15	22.12	22.18	23.00
	16QAM	1	0	22.01	22.00	21.82	23.00
		1	2	22.43	21.97	21.90	23.00
		1	5	22.31	21.92	22.07	23.00
		3	0	22.23	22.06	21.88	23.00
		3	2	22.16	22.29	22.05	23.00
		3	3	22.23	22.28	22.10	23.00
		6	0	21.16	21.20	21.04	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 20415	Channel 20525	Channel 20635	Tune up
3MHz	QPSK	1	0	23.01	22.67	22.68	24.00
		1	7	23.16	23.14	23.06	24.00
		1	14	23.05	23.16	23.18	24.00
		8	0	22.26	22.16	22.11	23.00
		8	4	22.16	22.22	22.09	23.00
		8	7	22.11	22.22	22.10	23.00
		15	0	22.13	22.14	22.06	23.00
	16QAM	1	0	22.13	22.55	21.86	23.00
		1	7	21.70	22.11	21.53	23.00
		1	14	21.98	21.92	21.86	23.00
		8	0	21.15	21.11	21.05	22.00
		8	4	21.21	21.06	20.99	22.00
		8	7	21.06	21.08	21.02	22.00
		15	0	21.07	21.04	21.17	22.00

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Bandwidth	Modulation	RB size	RB offset	Channel 20425	Channel 20525	Channel 20625	Tune up
5MHz	QPSK	1	0	22.69	22.65	22.74	24.00
		1	13	22.86	22.73	23.14	24.00
		1	24	22.95	22.86	23.15	24.00
		12	0	22.10	22.08	22.20	23.00
		12	6	22.06	22.09	22.21	23.00
		12	13	22.12	22.14	22.07	23.00
		25	0	22.16	22.20	22.10	23.00
	16QAM	1	0	21.88	21.69	21.93	23.00
		1	13	21.92	21.87	21.89	23.00
		1	24	21.92	21.77	21.60	23.00
		12	0	21.00	21.02	21.05	22.00
		12	6	20.98	21.07	21.17	22.00
		12	13	21.12	21.05	21.13	22.00
		25	0	21.06	21.11	21.21	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 20450	Channel 20525	Channel 20600	Tune up
10MHz	QPSK	1	0	22.83	22.69	22.88	24.00
		1	25	**23.09**	**23.27**	23.04	24.00
		1	49	22.99	23.01	**23.05**	24.00
		25	0	22.23	**22.26**	**22.20**	23.00
		25	13	**22.27**	22.25	22.17	23.00
		25	25	22.23	22.15	22.15	23.00
		50	0	**22.28**	22.22	22.19	23.00
	16QAM	1	0	22.02	21.87	22.00	23.00
		1	25	22.23	22.00	22.24	23.00
		1	49	21.85	21.86	21.87	23.00
		25	0	21.13	21.32	21.08	22.00
		25	13	21.10	21.33	21.07	22.00
		25	25	21.16	21.22	21.10	22.00
		50	0	21.29	21.20	21.19	22.00

LTE Band 5 sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 20407	Channel 20525	Channel 20643	Tune up
1.4MHz	QPSK	1	0	12.11	12.25	11.98	13.50
		1	2	12.33	12.51	12.14	13.50
		1	5	12.23	12.31	12.03	13.50
		3	0	12.25	12.39	12.08	13.50
		3	2	12.31	12.45	12.14	13.50
		3	3	12.40	12.41	12.13	13.50
		6	0	12.29	12.49	12.10	13.50
	16QAM	1	0	12.22	12.28	11.85	13.50
		1	2	12.44	12.55	12.65	13.50
		1	5	12.43	12.32	12.43	13.50
		3	0	12.26	12.39	12.08	13.50
		3	2	12.34	12.26	12.12	13.50
		3	3	12.35	12.36	12.16	13.50
		6	0	12.30	12.47	12.27	13.50
Bandwidth	Modulation	RB size	RB offset	Channel 20415	Channel 20525	Channel 20635	Tune up
3MHz	QPSK	1	0	12.40	12.44	12.43	13.50
		1	7	12.43	12.59	12.26	13.50
		1	14	12.26	12.57	12.31	13.50
		8	0	12.30	12.43	12.21	13.50
		8	4	12.39	12.44	12.17	13.50
		8	7	12.26	12.50	12.13	13.50
		15	0	12.32	12.36	12.15	13.50
	16QAM	1	0	12.57	12.99	12.83	13.50
		1	7	12.44	12.74	12.45	13.50
		1	14	12.57	13.18	12.42	13.50
		8	0	12.37	12.46	12.31	13.50
		8	4	12.43	12.31	12.27	13.50
		8	7	12.33	12.56	12.27	13.50
		15	0	12.35	12.32	12.21	13.50

Bandwidth	Modulation	RB size	RB offset	Channel 20425	Channel 20525	Channel 20625	Tune up
5MHz	QPSK	1	0	12.45	12.42	12.38	13.50
		1	13	12.29	12.43	12.23	13.50
		1	24	12.33	12.57	12.27	13.50
		12	0	12.34	12.42	12.33	13.50
		12	6	12.34	12.48	12.25	13.50
		12	13	12.21	12.45	12.27	13.50
		25	0	12.25	12.46	12.35	13.50
	16QAM	1	0	12.24	12.79	12.68	13.50
		1	13	12.43	12.33	12.50	13.50
		1	24	13.08	12.85	12.76	13.50
		12	0	12.40	12.54	12.33	13.50
		12	6	12.43	12.44	12.28	13.50
		12	13	12.33	12.50	12.21	13.50
		25	0	12.19	12.55	12.30	13.50
Bandwidth	Modulation	RB size	RB offset	Channel 20450	Channel 20525	Channel 20600	Tune up
10MHz	QPSK	1	0	12.06	11.98	12.37	13.50
		1	25	12.03	**12.37**	12.27	13.50
		1	49	11.99	12.23	11.97	13.50
		25	0	12.16	12.14	12.26	13.50
		25	13	12.12	**12.43**	12.30	13.50
		25	25	12.04	12.34	12.25	13.50
		50	0	12.16	12.26	12.23	13.50
	16QAM	1	0	12.49	12.11	12.81	13.50
		1	25	12.20	12.78	12.28	13.50
		1	49	11.86	12.09	11.82	13.50
		25	0	12.26	12.17	12.20	13.50
		25	13	12.11	12.33	12.19	13.50
		25	25	12.13	12.36	12.26	13.50
		50	0	12.21	12.27	12.26	13.50

LTE FDD Band 12 sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 23017	Channel 23095	Channel 23173	Tune up
1.4MHz	QPSK	1	0	22.91	23.09	23.26	24.00
		1	2	23.13	23.32	23.23	24.00
		1	5	23.14	23.26	22.88	24.00
		3	0	23.13	23.23	23.20	24.00
		3	2	23.15	23.23	23.32	24.00
		3	3	23.13	23.33	23.37	24.00
		6	0	22.21	22.20	22.25	23.00
	16QAM	1	0	21.95	21.93	22.38	23.00
		1	2	22.01	22.23	22.01	23.00
		1	5	21.88	22.12	22.11	23.00
		3	0	21.79	22.17	22.25	23.00
		3	2	21.92	22.35	22.48	23.00
		3	3	22.37	22.36	22.53	23.00
		6	0	21.19	21.11	21.30	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 23025	Channel 23095	Channel 23165	Tune up
3MHz	QPSK	1	0	23.05	22.98	23.20	24.00
		1	7	23.23	23.07	23.25	24.00
		1	14	23.40	23.16	23.20	24.00
		8	0	22.20	22.30	22.50	23.00
		8	4	22.31	22.36	22.32	23.00
		8	7	22.42	22.25	22.22	23.00
		15	0	22.31	22.29	22.37	23.00
	16QAM	1	0	22.03	22.23	22.24	23.00
		1	7	22.04	22.05	22.11	23.00
		1	14	22.23	22.27	22.20	23.00
		8	0	21.24	21.03	21.12	22.00
		8	4	21.37	21.34	21.38	22.00
		8	7	21.56	21.31	21.46	22.00
		15	0	21.38	21.23	21.39	22.00

Bandwidth	Modulation	RB size	RB offset	Channel 23035	Channel 23095	Channel 23155	Tune up
5MHz	QPSK	1	0	22.97	23.10	23.30	24.00
		1	13	23.29	23.13	22.98	24.00
		1	24	22.99	23.37	22.99	24.00
		12	0	22.25	22.09	22.28	23.00
		12	6	22.33	22.24	22.26	23.00
		12	13	22.08	22.19	22.21	23.00
		25	0	22.21	22.15	22.22	23.00
	16QAM	1	0	22.00	22.04	22.07	23.00
		1	13	22.10	21.92	22.01	23.00
		1	24	22.01	21.97	21.71	23.00
		12	0	21.06	21.11	21.10	22.00
		12	6	21.42	20.99	21.08	22.00
		12	13	21.30	21.22	21.03	22.00
		25	0	21.30	21.17	21.12	22.00
Bandwidth	Modulation	RB size	RB offset	Channel 23060	Channel 23095	Channel 23130	Tune up
10MHz	QPSK	1	0	23.19	22.90	22.94	24.00
		1	25	23.11	23.07	**23.43**	24.00
		1	49	22.80	23.41	23.22	24.00
		25	0	22.18	22.27	22.30	23.00
		25	13	22.17	22.12	**22.37**	23.00
		25	25	22.19	22.35	22.36	23.00
		50	0	22.14	22.19	22.30	23.00
	16QAM	1	0	22.17	22.00	22.08	23.00
		1	25	22.47	22.24	22.23	23.00
		1	49	21.96	22.04	21.97	23.00
		25	0	21.26	21.20	21.32	22.00
		25	13	21.27	21.22	21.47	22.00
		25	25	21.21	21.45	21.28	22.00
		50	0	21.15	21.11	21.40	22.00

LTE FDD Band 12 sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 23017	Channel 23095	Channel 23173	Tune up
1.4MHz	QPSK	1	0	12.54	12.51	13.19	14.00
		1	2	13.01	12.79	13.25	14.00
		1	5	13.05	12.66	12.87	14.00
		3	0	12.90	12.65	13.27	14.00
		3	2	13.02	12.84	13.17	14.00
		3	3	13.12	12.75	13.10	14.00
		6	0	12.96	12.75	13.14	14.00
	16QAM	1	0	13.03	12.77	13.31	14.00
		1	2	13.39	12.86	13.65	14.00
		1	5	13.78	13.27	12.96	14.00
		3	0	13.01	12.76	13.26	14.00
		3	2	13.12	12.80	13.17	14.00
		3	3	13.11	12.88	12.98	14.00
		6	0	13.09	12.85	13.09	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 23025	Channel 23095	Channel 23165	Tune up
3MHz	QPSK	1	0	12.85	12.84	13.87	14.00
		1	7	13.24	12.74	13.48	14.00
		1	14	13.53	13.19	13.12	14.00
		8	0	13.06	12.62	13.54	14.00
		8	4	13.30	12.84	13.40	14.00
		8	7	13.35	12.80	13.17	14.00
		15	0	13.19	12.76	13.41	14.00
	16QAM	1	0	13.22	13.03	13.97	14.00
		1	7	13.31	12.71	13.75	14.00
		1	14	13.84	13.49	13.21	14.00
		8	0	13.00	12.66	13.57	14.00
		8	4	13.30	12.90	13.42	14.00
		8	7	13.40	12.95	13.16	14.00
		15	0	13.17	12.73	13.38	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 23035	Channel 23095	Channel 23155	Tune up
5MHz	QPSK	1	0	13.05	12.96	13.98	14.00
		1	13	13.48	12.75	13.71	14.00
		1	24	13.24	13.51	13.09	14.00
		12	0	13.30	12.84	13.99	14.00
		12	6	13.48	12.79	13.73	14.00
		12	13	13.31	13.13	13.41	14.00
		25	0	13.29	12.98	13.71	14.00
	16QAM	1	0	13.22	13.10	13.93	14.00
		1	13	13.92	13.47	13.91	14.00
		1	24	13.59	13.36	13.66	14.00
		12	0	13.32	12.84	13.96	14.00
		12	6	13.48	12.77	13.73	14.00
		12	13	13.28	13.14	13.46	14.00
		25	0	13.32	13.02	13.73	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 23060	Channel 23095	Channel 23130	Tune up
10MHz	QPSK	1	0	12.94	13.09	12.55	14.00
		1	25	12.97	12.82	**13.80**	14.00
		1	49	12.74	13.75	12.90	14.00
		25	0	13.27	12.85	13.14	14.00
		25	13	12.95	12.86	**13.74**	14.00
		25	25	12.76	13.39	13.65	14.00
		50	0	13.04	13.14	13.37	14.00
	16QAM	1	0	13.02	13.12	12.73	14.00
		1	25	13.66	13.43	13.87	14.00
		1	49	12.75	13.75	12.77	14.00
		25	0	13.31	12.87	13.13	14.00
		25	13	12.85	12.92	13.74	14.00
		25	25	12.79	13.53	13.59	14.00
		50	0	12.96	13.09	13.46	14.00

LTE Band 66 sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 131979	Channel 132322	Channel 132665	Tune up
1.4MHz	QPSK	1	0	21.91	21.98	21.80	22.50
		1	2	21.52	21.85	21.82	22.50
		1	5	21.54	21.50	21.64	22.50
		3	0	20.81	20.79	20.72	21.50
		3	2	20.69	20.72	20.72	21.50
		3	3	20.66	20.53	20.73	21.50
		6	0	20.78	20.81	20.82	21.50
	16QAM	1	0	20.48	20.51	20.64	21.50
		1	2	20.62	20.10	20.98	21.50
		1	5	20.50	20.15	20.80	21.50
		3	0	19.75	19.96	19.65	20.50
		3	2	19.64	19.61	19.80	20.50
		3	3	19.65	19.54	19.91	20.50
		6	0	19.70	19.74	19.88	20.50
Bandwidth	Modulation	RB size	RB offset	Channel 131987	Channel 132322	Channel 132657	Tune up
3MHz	QPSK	1	0	21.97	21.94	21.80	22.50
		1	7	21.53	21.81	21.77	22.50
		1	14	21.52	21.56	21.57	22.50
		8	0	20.80	20.82	20.81	21.50
		8	4	20.67	20.66	20.71	21.50
		8	7	20.70	20.57	20.71	21.50
		15	0	20.71	20.81	20.83	21.50
	16QAM	1	0	20.46	20.48	20.68	21.50
		1	7	20.62	20.10	21.02	21.50
		1	14	20.47	20.20	20.78	21.50
		8	0	19.81	19.96	19.71	20.50
		8	4	19.58	19.64	19.77	20.50
		8	7	19.63	19.56	19.93	20.50
		15	0	19.74	19.76	19.92	20.50

Bandwidth	Modulation	RB size	RB offset	Channel 131997	Channel 132322	Channel 132647	Tune up
5MHz	QPSK	1	0	21.53	21.43	21.86	22.50
		1	13	21.50	21.22	21.36	22.50
		1	24	21.41	21.19	21.23	22.50
		12	0	20.80	20.59	20.81	21.50
		12	6	20.80	20.51	20.74	21.50
		12	13	20.71	20.43	20.63	21.50
		25	0	20.74	20.47	20.81	21.50
	16QAM	1	0	20.44	20.36	20.03	21.50
		1	13	20.38	20.03	20.30	21.50
		1	24	20.62	20.65	19.79	21.50
		12	0	19.72	19.40	19.68	20.50
		12	6	19.79	19.35	19.58	20.50
		12	13	19.82	19.48	19.36	20.50
		25	0	19.72	19.60	19.62	20.50
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Channel 132022**	**Channel 132322**	**Channel 132622**	**Tune up**
10MHz	QPSK	1	0	21.50	21.69	21.80	22.50
		1	25	21.49	21.68	22.10	22.50
		1	49	21.41	21.46	21.49	22.50
		25	0	20.84	20.88	20.84	21.50
		25	13	20.69	20.61	20.82	21.50
		25	25	20.78	20.42	20.75	21.50
		50	0	20.72	20.61	20.84	21.50
	16QAM	1	0	20.98	21.30	20.44	21.50
		1	25	20.44	20.24	20.87	21.50
		1	49	19.68	20.29	20.18	21.50
		25	0	19.88	20.01	19.93	20.50
		25	13	19.78	19.76	19.92	20.50
		25	25	19.63	19.50	19.66	20.50
		50	0	19.61	19.52	19.71	20.50

Bandwidth	Modulation	RB size	RB offset	Channel 132047	Channel 132322	Channel 132597	Tune up
15MHz	QPSK	1	0	21.62	21.62	21.57	22.50
		1	38	21.49	21.59	21.61	22.50
		1	74	21.64	21.63	21.57	22.50
		36	0	20.79	20.75	20.71	21.50
		36	18	20.78	20.56	20.74	21.50
		36	39	20.66	20.60	20.73	21.50
		75	0	20.79	20.74	20.68	21.50
	16QAM	1	0	20.56	20.84	20.50	21.50
		1	38	20.33	20.16	20.20	21.50
		1	74	20.38	20.18	20.04	21.50
		36	0	19.77	19.72	19.63	20.50
		36	18	19.73	19.32	19.73	20.50
		36	39	19.58	19.42	19.70	20.50
		75	0	19.66	19.56	19.83	20.50
Bandwidth	Modulation	RB size	RB offset	Channel 132072	Channel 132322	Channel 132572	Tune up
20MHz	QPSK	1	0	**21.89**	**21.90**	**21.76**	22.50
		1	50	21.47	21.79	21.74	22.50
		1	99	21.46	21.46	21.55	22.50
		50	0	**20.73**	**20.77**	**20.71**	21.50
		50	25	20.61	20.62	20.70	21.50
		50	50	20.63	20.50	20.68	21.50
		100	0	20.69	**20.77**	20.76	21.50
	16QAM	1	0	20.39	20.43	20.60	21.50
		1	50	20.59	20.06	20.96	21.50
		1	99	20.45	20.12	20.77	21.50
		50	0	19.71	19.94	19.62	20.50
		50	25	19.57	19.56	19.72	20.50
		50	50	19.60	19.51	19.86	20.50
		100	0	19.68	19.67	19.84	20.50

LTE Band 66 sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 131979	Channel 132322	Channel 132665	Tune up
1.4MHz	QPSK	1	0	13.54	13.13	12.02	14.00
		1	2	12.06	13.12	13.58	14.00
		1	5	12.03	12.05	13.18	14.00
		3	0	12.06	13.67	12.39	14.00
		3	2	12.10	13.31	13.34	14.00
		3	3	12.67	12.39	13.65	14.00
		6	0	12.08	13.14	13.11	14.00
	16QAM	1	0	12.98	12.95	12.15	14.00
		1	2	12.91	13.79	13.99	14.00
		1	5	12.97	12.45	13.38	14.00
		3	0	12.98	13.69	12.56	14.00
		3	2	12.80	13.37	13.58	14.00
		3	3	12.87	12.46	13.84	14.00
		6	0	12.82	12.97	13.22	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 131987	Channel 132322	Channel 132657	Tune up
3MHz	QPSK	1	0	13.56	13.12	12.08	14.00
		1	7	12.09	13.07	13.54	14.00
		1	14	12.05	12.07	13.09	14.00
		8	0	12.12	13.63	12.38	14.00
		8	4	12.14	13.32	13.34	14.00
		8	7	12.66	12.40	13.67	14.00
		15	0	12.09	13.13	13.06	14.00
	16QAM	1	0	12.99	12.97	12.12	14.00
		1	7	12.87	13.78	13.95	14.00
		1	14	12.98	12.41	13.36	14.00
		8	0	12.91	13.76	12.52	14.00
		8	4	12.77	13.38	13.53	14.00
		8	7	12.92	12.42	13.84	14.00
		15	0	12.75	13.02	13.24	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 131997	Channel 132322	Channel 132647	Tune up
5MHz	QPSK	1	0	12.99	13.92	13.97	14.00
		1	13	12.53	13.39	13.90	14.00
		1	24	12.37	13.53	13.55	14.00
		12	0	12.84	13.76	13.92	14.00
		12	6	12.58	13.51	13.91	14.00
		12	13	12.49	13.46	13.70	14.00
		25	0	12.61	13.57	13.88	14.00
	16QAM	1	0	13.23	13.99	13.98	14.00
		1	13	13.19	13.98	13.95	14.00
		1	24	12.48	13.69	13.96	14.00
		12	0	12.77	13.93	13.96	14.00
		12	6	12.66	13.58	13.78	14.00
		12	13	12.45	13.44	13.90	14.00
		25	0	12.55	13.50	13.94	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 132022	Channel 132322	Channel 132622	Tune up
10MHz	QPSK	1	0	12.54	13.59	13.58	14.00
		1	25	12.03	13.49	13.95	14.00
		1	49	12.58	12.64	13.19	14.00
		25	0	12.43	13.67	13.99	14.00
		25	13	12.98	13.32	13.91	14.00
		25	25	12.95	13.07	13.71	14.00
		50	0	12.11	13.42	13.75	14.00
	16QAM	1	0	12.77	13.93	13.61	14.00
		1	25	12.38	13.98	13.99	14.00
		1	49	12.72	12.81	13.27	14.00
		25	0	12.43	13.88	13.93	14.00
		25	13	12.10	13.47	13.96	14.00
		25	25	12.91	12.99	13.93	14.00
		50	0	12.09	13.31	13.96	14.00

Bandwidth	Modulation	RB size	RB offset	Channel 132047	Channel 132322	Channel 132597	Tune up
15MHz	QPSK	1	0	12.59	13.33	12.40	14.00
		1	38	12.73	13.33	13.64	14.00
		1	74	12.72	12.99	13.13	14.00
		36	0	12.19	13.67	13.38	14.00
		36	18	12.85	13.27	13.72	14.00
		36	39	12.78	12.88	13.81	14.00
		75	0	12.98	13.29	13.53	14.00
	16QAM	1	0	12.76	13.54	12.72	14.00
		1	38	12.57	13.60	13.96	14.00
		1	74	12.47	12.37	13.31	14.00
		36	0	12.11	13.81	13.35	14.00
		36	18	12.94	13.33	13.90	14.00
		36	39	12.69	12.83	13.95	14.00
		75	0	12.87	13.19	13.77	14.00
Bandwidth	Modulation	RB size	RB offset	Channel 132072	Channel 132322	Channel 132572	Tune up
20MHz	QPSK	1	0	**13.49**	**13.11**	12.01	14.00
		1	50	12.03	13.06	**13.49**	14.00
		1	99	12.02	12.01	13.08	14.00
		50	0	12.04	**13.59**	12.30	14.00
		50	25	12.06	13.29	13.30	14.00
		50	50	**12.61**	12.36	**13.58**	14.00
		100	0	12.01	**13.05**	13.03	14.00
	16QAM	1	0	12.94	12.88	12.10	14.00
		1	50	12.84	13.72	13.92	14.00
		1	99	12.92	12.39	13.34	14.00
		50	0	12.88	13.68	12.51	14.00
		50	25	12.76	13.34	13.51	14.00
		50	50	12.85	12.41	13.80	14.00
		100	0	12.74	12.94	13.20	14.00

LTE Band 71 sensor off				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 133147	Channel 133297	Channel 133447	Tune up
5MHz	QPSK	1	0	22.76	22.62	22.59	23.50
		1	13	22.83	22.75	22.76	23.50
		1	24	22.74	22.65	22.56	23.50
		12	0	21.81	21.64	21.60	22.50
		12	6	21.87	21.71	21.62	22.50
		12	13	21.72	21.60	21.63	22.50
		25	0	21.71	21.60	21.53	22.50
	16QAM	1	0	21.77	21.73	22.44	22.50
		1	13	21.70	21.41	21.42	22.50
		1	24	21.85	21.33	21.48	22.50
		12	0	20.57	20.80	20.54	21.50
		12	6	20.92	20.66	20.69	21.50
		12	13	20.69	20.71	20.57	21.50
		25	0	20.85	20.70	20.77	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 133172	Channel 133297	Channel 133422	Tune up
10MHz	QPSK	1	0	22.95	22.70	22.88	23.50
		1	25	23.14	22.84	23.10	23.50
		1	49	22.91	22.72	22.52	23.50
		25	0	21.71	21.76	21.62	22.50
		25	13	21.83	21.66	21.72	22.50
		25	25	21.72	21.63	21.57	22.50
		50	0	21.79	21.53	21.65	22.50
	16QAM	1	0	21.75	21.39	21.58	22.50
		1	25	21.47	21.55	21.12	22.50
		1	49	21.32	21.21	21.46	22.50
		25	0	20.84	20.77	20.58	21.50
		25	13	20.73	20.87	20.72	21.50
		25	25	20.84	20.67	20.58	21.50
		50	0	20.93	20.61	20.57	21.50

Bandwidth	Modulation	RB size	RB offset	Channel 133197	Channel 133297	Channel 133397	Tune up
15MHz	QPSK	1	0	22.91	22.82	22.76	23.50
		1	38	22.88	22.72	22.69	23.50
		1	74	22.80	22.63	22.65	23.50
		36	0	21.80	21.63	21.83	22.50
		36	18	21.67	21.66	21.68	22.50
		36	39	21.65	21.60	21.63	22.50
		75	0	21.60	21.69	21.61	22.50
	16QAM	1	0	21.26	21.46	21.07	22.50
		1	38	21.57	21.30	21.40	22.50
		1	74	21.17	21.54	21.75	22.50
		36	0	20.66	20.76	20.61	21.50
		36	18	20.77	20.74	20.76	21.50
		36	39	20.69	20.52	20.82	21.50
		75	0	20.77	20.70	20.71	21.50
Bandwidth	Modulation	RB size	RB offset	Channel 133222	Channel 133322	Channel 133372	Tune up
20MHz	QPSK	1	0	22.57	22.35	22.38	23.50
		1	50	**22.58**	22.55	22.32	23.50
		1	99	22.30	22.20	22.31	23.50
		50	0	21.53	21.56	21.43	22.50
		50	25	**21.66**	21.52	21.45	22.50
		50	50	21.54	21.45	21.40	22.50
		100	0	21.49	21.37	21.42	22.50
	16QAM	1	0	21.84	21.23	21.44	22.50
		1	50	21.64	21.37	21.64	22.50
		1	99	21.45	21.76	21.22	22.50
		50	0	20.83	20.64	20.69	21.50
		50	25	20.71	20.70	20.77	21.50
		50	50	20.71	20.80	20.58	21.50
		100	0	20.63	20.68	20.68	21.50

LTE Band 71 sensor on				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel 133147	Channel 133297	Channel 133447	Tune up
5MHz	QPSK	1	0	15.77	15.77	15.65	16.50
		1	13	15.84	15.75	15.94	16.50
		1	24	15.82	15.71	15.78	16.50
		12	0	15.85	15.80	15.72	16.50
		12	6	15.91	15.76	15.66	16.50
		12	13	15.85	15.82	15.70	16.50
		25	0	15.84	15.71	15.67	16.50
	16QAM	1	0	15.31	15.38	15.12	16.50
		1	13	15.86	15.34	15.36	16.50
		1	24	15.46	15.51	15.81	16.50
		12	0	15.95	15.72	15.45	16.50
		12	6	15.98	15.64	15.48	16.50
		12	13	15.89	15.65	15.58	16.50
		25	0	15.83	15.72	15.72	16.50
Bandwidth	Modulation	RB size	RB offset	Channel 133172	Channel 133297	Channel 133422	Tune up
10MHz	QPSK	1	0	15.99	15.83	15.84	16.50
		1	25	15.81	15.98	15.88	16.50
		1	49	15.76	15.74	15.76	16.50
		25	0	15.88	15.88	15.70	16.50
		25	13	15.82	15.80	15.77	16.50
		25	25	15.78	15.87	15.70	16.50
		50	0	15.74	15.84	15.81	16.50
	16QAM	1	0	15.45	15.76	15.59	16.50
		1	25	15.38	15.58	15.78	16.50
		1	49	15.60	15.73	15.43	16.50
		25	0	16.06	15.87	15.83	16.50
		25	13	15.82	16.04	15.77	16.50
		25	25	15.95	16.00	15.81	16.50
		50	0	15.85	16.05	15.63	16.50

Bandwidth	Modulation	RB size	RB offset	Channel 133197	Channel 133297	Channel 133397	Tune up
15MHz	QPSK	1	0	15.92	16.10	15.92	16.50
		1	38	15.91	16.00	15.75	16.50
		1	74	16.17	15.85	15.82	16.50
		36	0	15.80	15.86	15.85	16.50
		36	18	15.76	15.72	15.69	16.50
		36	39	15.91	15.63	15.68	16.50
		75	0	15.80	15.87	15.78	16.50
	16QAM	1	0	15.51	15.67	15.58	16.50
		1	38	15.57	15.44	15.46	16.50
		1	74	15.33	15.39	15.42	16.50
		36	0	15.72	15.90	15.75	16.50
		36	18	15.74	15.79	15.74	16.50
		36	39	15.92	15.76	15.72	16.50
		75	0	15.83	15.83	15.75	16.50
Bandwidth	Modulation	RB size	RB offset	Channel 133222	Channel 133322	Channel 133372	Tune up
20MHz	QPSK	1	0	15.61	15.70	15.62	16.50
		1	50	15.86	15.66	**15.90**	16.50
		1	99	15.46	15.43	15.56	16.50
		50	0	15.76	**15.84**	15.72	16.50
		50	25	15.78	15.77	15.71	16.50
		50	50	15.73	15.59	15.53	16.50
		100	0	15.67	15.73	15.60	16.50
	16QAM	1	0	15.52	15.56	15.53	16.50
		1	50	15.60	15.63	15.84	16.50
		1	99	15.38	15.12	15.42	16.50
		50	0	15.73	15.74	15.78	16.50
		50	25	15.83	15.75	15.77	16.50
		50	50	15.64	15.50	15.56	16.50
		100	0	15.71	15.71	15.73	16.50

LTE FDD Band 13 Sensor off				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel 23205	Channel 23230	Channel 23255	Tune up
5MHz	QPSK	1	0	23.54	**23.79**	23.62	24.00
		1	13	23.64	23.64	23.71	24.00
		1	24	23.61	23.78	23.65	24.00
		12	0	22.89	22.87	22.85	23.00
		12	6	22.89	22.95	22.88	23.00

		12	13	22.88	22.88	22.91	23.00
		25	0	22.92	22.90	22.89	23.00
	16QAM	1	0	22.68	22.57	22.40	23.00
		1	13	22.18	22.52	22.82	23.00
		1	24	22.33	22.53	22.19	23.00
		12	0	21.75	21.71	21.95	22.00
		12	6	21.76	21.83	21.72	22.00
		12	13	21.75	21.77	21.73	22.00
		25	0	21.89	21.89	21.87	22.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				NA	23230	NA	
10MHz	QPSK	1	0	NA	**23.71**	NA	24.00
		1	25	NA	23.68	NA	24.00
		1	49	NA	23.67	NA	24.00
		25	0	NA	22.87	NA	23.00
		25	13	NA	22.88	NA	23.00
		25	25	NA	22.85	NA	23.00
		50	0	NA	22.83	NA	23.00
	16QAM	1	0	NA	22.64	NA	23.00
		1	25	NA	22.68	NA	23.00
		1	49	NA	22.50	NA	23.00
		25	0	NA	21.93	NA	22.00
		25	13	NA	21.81	NA	22.00
		25	25	NA	21.83	NA	22.00
		50	0	NA	21.79	NA	22.00

LTE FDD Band 13 Sensor on				**Conducted Power(dBm)**			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				23205	23230	23255	
5MHz	QPSK	1	0	**13.34**	13.25	13.05	14.00
		1	13	13.21	13.27	13.32	14.00
		1	24	13.05	13.02	13.21	14.00
		12	0	13.11	13.03	13.03	14.00
		12	6	12.92	13.08	13.04	14.00
		12	13	12.84	13.03	13.11	14.00
		25	0	12.91	12.98	13.09	14.00
	16QAM	1	0	12.94	12.93	12.88	14.00
		1	13	13.00	13.05	13.08	14.00
		1	24	12.69	12.79	12.87	14.00
		12	0	12.97	12.99	13.04	14.00
		12	6	13.04	13.08	13.05	14.00
		12	13	12.97	13.03	13.09	14.00

		25	0	12.96	12.96	13.05	14.00
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				NA	23230	NA	
10MHz	QPSK	1	0	NA	13.12	NA	14.00
		1	25	NA	**13.57**	NA	14.00
		1	49	NA	13.05	NA	14.00
		25	0	NA	13.01	NA	14.00
		25	13	NA	13.00	NA	14.00
		25	25	NA	12.80	NA	14.00
		50	0	NA	12.93	NA	14.00
	16QAM	1	0	NA	12.49	NA	14.00
		1	25	NA	13.09	NA	14.00
		1	49	NA	12.45	NA	14.00
		25	0	NA	12.87	NA	14.00
		25	13	NA	13.02	NA	14.00
		25	25	NA	12.84	NA	14.00
		50	0	NA	12.86	NA	14.00

Table 5： Conducted Power of LTE

8.1.2 Conducted Power of WIFI and BT

Mode	Antenna	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11b	Ant0	1	2412	1	11.00	**10.01**	Yes
		6	2437		11.00	**9.65**	Yes
		11	2462		11.00	**9.88**	Yes
	Ant1	1	2412		14.00	**13.11**	Yes
		6	2437		14.00	**12.96**	Yes
		11	2462		14.00	**13.01**	Yes
802.11g	Ant0	1	2412	6	10.00	**9.28**	NO
		6	2437		10.00	8.88	NO
		11	2462		10.00	9.21	NO
	Ant1	1	2412		11.00	10.42	NO
		6	2437		11.00	10.21	NO
		11	2462		11.00	10.51	NO
802.11n 20M SISO	Ant0	1	2412	6.5	10.00	9.25	NO
		6	2437		10.00	8.75	NO
		11	2462		10.00	9.08	NO
	Ant1	1	2412		10.00	8.36	NO
		6	2437		10.00	8.08	NO
		11	2462		10.00	8.38	NO
802.11n 40M SISO	Ant0	3	2422	13.5	10.00	9.44	NO
		6	2437		10.00	9.06	NO
		9	2452		10.00	9.36	NO
	Ant1	3	2422		10.00	8.72	NO
		6	2437		10.00	8.57	NO
		9	2452		10.00	8.64	NO
802.11n 20M MIMO	Sum	1	2412	13	12.00	11.47	NO
		6	2437		12.00	11.04	NO
		11	2462		12.00	11.47	NO
802.11n 40M MIMO	Sum	3	2422	27	12.00	**11.67**	Yes
		6	2437		12.00	**11.41**	Yes
		9	2452		12.00	**11.40**	Yes

WiFi 5G Ant0							
5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11a	U-NII-1	36	5180	6	11.00	10.77	NO
		40	5200		11.00	10.86	NO
		44	5220		11.00	10.74	NO
		48	5240		11.00	10.68	NO
	U-NII-2A	52	5260		11.00	**10.63**	Yes
		56	5280		11.00	**10.61**	Yes
		60	5300		11.00	10.07	NO
		64	5320		11.00	9.55	NO
	U-NII-2C	100	5500		10.00	**9.01**	Yes
		104	5520		10.00	**9.14**	Yes
		108	5540		10.00	8.87	NO
		112	5560		10.00	8.61	NO
		116	5580		10.00	8.53	NO
		120	5600		10.00	8.44	NO
		124	5620		10.00	8.25	NO
		128	5640		10.00	8.17	NO
		132	5660		10.00	8.01	NO
		136	5680		10.00	7.81	NO
		140	5700		10.00	7.77	NO
		144	5720		10.00	8.01	NO
	U-NII-3	149	5745		9.50	7.82	NO
		153	5765		9.50	**7.99**	Yes
		157	5785		9.50	7.65	NO
		161	5805		9.50	7.81	NO
		165	5825		9.50	7.88	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11n-20M	U-NII-1	36	5180	MCS0	11.00	10.69	NO
		40	5200		11.00	10.77	NO
		44	5220		11.00	10.63	NO
		48	5240		11.00	10.53	NO
	U-NII-2A	52	5260		11.00	10.38	NO
		56	5280		11.00	10.33	NO
		60	5300		11.00	9.98	NO
		64	5320		11.00	9.43	NO
	U-NII-2C	100	5500		10.00	8.58	NO
		104	5520		10.00	8.56	NO
		108	5540		10.00	8.46	NO
		112	5560		10.00	8.44	NO
		116	5580		10.00	8.41	NO
		120	5600		10.00	8.32	NO
		124	5620		10.00	8.15	NO
		128	5640		10.00	8.05	NO
		132	5660		10.00	7.86	NO
		136	5680		10.00	7.72	NO
		140	5700		10.00	7.69	NO
		144	5720		10.00	7.92	NO
	U-NII-3	149	5745		9.00	7.68	NO
		153	5765		9.00	7.96	NO

		157	5785		9.00	7.57	NO
		161	5805		9.00	7.73	NO
		165	5825		9.00	7.81	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11n-40M	U-NII-1	38	5190	MCS0	10.90	10.85	NO
		46	5230		10.90	10.80	NO
	U-NII-2A	54	5270		10.90	10.66	NO
		62	5310		10.90	10.08	NO
	U-NII-2C	102	5510		9.50	8.86	NO
		110	5550		9.50	8.74	NO
		118	5590		9.50	8.67	NO
		126	5630		9.50	8.31	NO
		134	5670		9.50	8.03	NO
		142	5710		9.50	8.01	NO
	U-NII-3	151	5755		9.00	8.06	NO
		159	5795		9.00	7.83	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 20M	U-NII-1	36	5180	MCS0	11.00	10.71	NO
		40	5200		11.00	10.81	NO
		44	5220		11.00	10.67	NO
		48	5240		11.00	10.64	NO
	U-NII-2A	52	5260		11.00	10.41	NO
		56	5280		11.00	10.31	NO
		60	5300		11.00	10.02	NO
		64	5320		11.00	9.46	NO
	U-NII-2C	100	5500		10.00	8.59	NO
		104	5520		10.00	8.66	NO
		108	5540		10.00	8.47	NO
		112	5560		10.00	8.44	NO
		116	5580		10.00	8.41	NO
		120	5600		10.00	8.38	NO
		124	5620		10.00	8.13	NO
		128	5640		10.00	8.01	NO
		132	5660		10.00	7.83	NO
		136	5680		10.00	7.69	NO
		140	5700		10.00	7.66	NO
		144	5720		10.00	7.88	NO
	U-NII-3	149	5745		9.00	7.74	NO
		153	5765		9.00	7.95	NO
		157	5785		9.00	7.61	NO
		161	5805		9.00	7.72	NO
		165	5825		9.00	7.83	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 40M	U-NII-1	38	5190	MCS0	10.90	10.83	NO
		46	5230		10.90	10.86	NO
	U-NII-2A	54	5270		10.90	10.66	NO
		62	5310		10.90	10.09	NO
	U-NII-2C	102	5510		9.50	8.85	NO
		110	5550		9.50	8.76	NO

		118	5590		9.50	8.69	NO
		126	5630		9.50	8.32	NO
		134	5670		9.50	8.04	NO
		142	5710		9.50	8.01	NO
	U-NII-3	151	5755		9.00	8.05	NO
		159	5795		9.00	7.82	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 80M	U-NII-1	42	5210	MCS0	10.00	9.39	NO
	U-NII-2A	58	5290		10.00	8.78	NO
	U-NII-2C	106	5530		8.00	7.16	NO
		122	5610		8.00	6.65	NO
		138	5690		8.00	6.01	NO
	U-NII-3	155	5775		8.00	6.24	NO

WiFi 5G Ant1							
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11a	U-NII-1	36	5180	6	12.50	11.19	NO
		40	5200		12.50	11.28	NO
		44	5220		12.50	11.24	NO
		48	5240		12.50	11.32	NO
	U-NII-2A	52	5260		12.50	11.55	NO
		56	5280		12.50	**11.56**	Yes
		60	5300		12.50	**11.78**	Yes
		64	5320		12.50	11.52	NO
	U-NII-2C	100	5500		13.50	**12.98**	Yes
		104	5520		13.50	**12.85**	Yes
		108	5540		13.50	12.51	NO
		112	5560		13.50	12.15	NO
		116	5580		13.50	11.88	NO
		120	5600		13.50	11.43	NO
		124	5620		13.50	10.99	NO
		128	5640		13.50	10.82	NO
		132	5660		13.50	10.75	NO
		136	5680		13.50	10.35	NO
		140	5700		13.50	10.46	NO
		144	5720		13.50	10.42	NO
	U-NII-3	149	5745		11.50	**10.58**	Yes
		153	5765		11.50	10.37	NO
		157	5785		11.50	10.26	NO
		161	5805		11.50	10.01	NO
		165	5825		11.50	9.76	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11n-20M	U-NII-1	36	5180	MCS0	11.00	8.93	NO
		40	5200		11.00	9.23	NO
		44	5220		11.00	9.27	NO
		48	5240		11.00	9.18	NO
	U-NII-2A	52	5260		11.00	9.34	NO
		56	5280		11.00	9.51	NO

		60	5300		11.00	9.25	NO
		64	5320		11.00	9.35	NO
	U-NII-2C	100	5500		11.00	10.81	NO
		104	5520		11.00	10.78	NO
		108	5540		11.00	10.25	NO
		112	5560		11.00	9.98	NO
		116	5580		11.00	10.03	NO
		120	5600		11.00	9.24	NO
		124	5620		11.00	8.92	NO
		128	5640		11.00	8.67	NO
		132	5660		11.00	8.39	NO
		136	5680		11.00	8.01	NO
		140	5700		11.00	8.14	NO
		144	5720		11.00	7.98	NO
	U-NII-3	149	5745		9.50	8.40	NO
		153	5765		9.50	7.92	NO
		157	5785		9.50	7.91	NO
		161	5805		9.50	7.87	NO
		165	5825		9.50	7.28	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11n-40M	U-NII-1	38	5190	MCS0	11.00	9.18	NO
		46	5230		11.00	9.28	NO
	U-NII-2A	54	5270		11.00	9.66	NO
		62	5310		11.00	9.68	NO
	U-NII-2C	102	5510		11.50	11.26	NO
		110	5550		11.50	10.38	NO
		118	5590		11.50	9.81	NO
		126	5630		11.50	8.95	NO
		134	5670		11.50	8.56	NO
		142	5710		11.50	8.28	NO
	U-NII-3	151	5755		11.00	8.43	NO
		159	5795		11.00	7.91	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 20M	U-NII-1	36	5180	MCS0	11.00	9.02	NO
		40	5200		11.00	9.19	NO
		44	5220		11.00	9.24	NO
		48	5240		11.00	9.22	NO
	U-NII-2A	52	5260		11.00	9.42	NO
		56	5280		11.00	9.58	NO
		60	5300		11.00	9.31	NO
		64	5320		11.00	9.46	NO
	U-NII-2C	100	5500		11.00	10.91	NO
		104	5520		11.00	10.84	NO
		108	5540		11.00	10.29	NO
		112	5560		11.00	10.08	NO
		116	5580		11.00	9.71	NO
		120	5600		11.00	9.25	NO
		124	5620		11.00	8.98	NO
		128	5640		11.00	8.78	NO
		132	5660		11.00	8.48	NO

		136	5680		11.00	8.08	NO
		140	5700		11.00	8.24	NO
		144	5720		11.00	8.19	NO
	U-NII-3	149	5745		10.00	8.52	NO
		153	5765		10.00	8.08	NO
		157	5785		10.00	8.06	NO
		161	5805		10.00	8.02	NO
		165	5825		10.00	7.48	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 40M	U-NII-1	38	5190	MCS0	11.00	9.26	NO
		46	5230		11.00	9.41	NO
	U-NII-2A	54	5270		11.00	9.67	NO
		62	5310		11.00	9.81	NO
	U-NII-2C	102	5510		11.50	11.35	NO
		110	5550		11.50	10.48	NO
		118	5590		11.50	9.89	NO
		126	5630		11.50	8.92	NO
		134	5670		11.50	8.48	NO
		142	5710		11.50	8.28	NO
	U-NII-3	151	5755		11.00	8.41	NO
		159	5795		11.00	7.91	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 80M	U-NII-1	42	5210	MCS0	8.00	6.64	NO
	U-NII-2A	58	5290		8.00	6.82	NO
	U-NII-2C	106	5530		8.00	7.91	NO
		122	5610		8.00	6.51	NO
		138	5690		8.00	5.48	NO
	U-NII-3	155	5775		8.00	5.38	NO

WiFi 5G MIMO							
5GHz	mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11n-20M	U-NII-1	36	5180	MCS0	13.50	12.64	NO
		40	5200		13.50	12.76	NO
		44	5220		13.50	12.71	NO
		48	5240		13.50	12.65	NO
	U-NII-2A	52	5260		13.50	12.66	NO
		56	5280		13.50	12.64	NO
		60	5300		13.50	12.31	NO
		64	5320		13.50	12.06	NO
	U-NII-2C	100	5500		13.50	12.41	NO
		104	5520		13.50	12.30	NO
		108	5540		13.50	11.89	NO
		112	5560		13.50	11.92	NO
		116	5580		13.50	11.53	NO
		120	5600		13.50	11.30	NO
		124	5620		13.50	11.14	NO
		128	5640		13.50	10.98	NO
		132	5660		13.50	10.84	NO

		136	5680		13.50	10.63	NO
		140	5700		13.50	10.56	NO
		144	5720		13.50	10.65	NO
	U-NII-3	149	5745		11.50	10.58	NO
		153	5765		11.50	10.61	NO
		157	5785		11.50	10.40	NO
		161	5805		11.50	10.39	NO
		165	5825		11.50	10.30	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11n-40M	U-NII-1	38	5190	MCS0	13.50	12.95	NO
		46	5230		13.50	12.96	NO
	U-NII-2A	54	5270		13.50	**12.89**	Yes
		62	5310		13.50	**12.58**	Yes
	U-NII-2C	102	5510		13.50	**12.74**	Yes
		110	5550		13.50	**12.63**	Yes
		118	5590		13.50	11.77	NO
		126	5630		13.50	11.21	NO
		134	5670		13.50	10.99	NO
		142	5710		13.50	10.85	NO
	U-NII-3	151	5755		11.50	**10.80**	Yes
		159	5795		11.50	10.52	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 20M	U-NII-1	36	5180	MCS0	13.50	12.76	NO
		40	5200		13.50	12.76	NO
		44	5220		13.50	12.69	NO
		48	5240		13.50	12.72	NO
	U-NII-2A	52	5260		13.50	12.68	NO
		56	5280		13.50	12.69	NO
		60	5300		13.50	12.32	NO
		64	5320		13.50	12.10	NO
	U-NII-2C	100	5500		13.50	12.45	NO
		104	5520		13.50	12.31	NO
		108	5540		13.50	11.87	NO
		112	5560		13.50	11.94	NO
		116	5580		13.50	11.56	NO
		120	5600		13.50	11.36	NO
		124	5620		13.50	11.14	NO
		128	5640		13.50	11.00	NO
		132	5660		13.50	10.88	NO
		136	5680		13.50	10.60	NO
		140	5700		13.50	10.52	NO
		144	5720		13.50	10.62	NO
	U-NII-3	149	5745		11.50	10.55	NO
		153	5765		11.50	10.60	NO
		157	5785		11.50	10.41	NO
		161	5805		11.50	10.42	NO
		165	5825		11.50	10.32	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac	U-NII-1	38	5190	MCS0	13.50	12.87	NO

40M		46	5230		13.50	12.98	NO
	U-NII-2A	54	5270		13.50	12.87	NO
		62	5310		13.50	12.51	NO
	U-NII-2C	102	5510		13.50	12.73	NO
		110	5550		13.50	12.05	NO
		118	5590		13.50	11.70	NO
		126	5630		13.50	11.17	NO
		134	5670		13.50	10.91	NO
		142	5710		13.50	10.82	NO
	U-NII-3	151	5755		11.50	10.67	NO
		159	5795		11.50	10.53	NO
5GHz	mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up (dBm)	Average Power (dBm)	SAR Test
802.11ac 80M	U-NII-1	42	5210	MCS0	11.50	11.36	NO
	U-NII-2A	58	5290		11.50	11.03	NO
	U-NII-2C	106	5530		11.50	10.68	NO
		122	5610		11.50	9.76	NO
		138	5690		11.50	8.94	NO
	U-NII-3	155	5775		10.00	8.94	NO

Table 6: Conducted Power of WiFi

BT			Tune up (dBm)	Average Conducted Power(dBm)	SAR Test
Modulation	Channel	Frequency (MHz)			
GFSK	0	2402	9.50	9.38	No
	39	2441	9.50	9.34	No
	78	2480	9.50	8.17	Yes
π/4DQPSK	0	2402	8.50	7.97	No
	39	2441	8.50	7.71	No
	78	2480	8.50	6.41	No
8DPSK	0	2402	8.50	8.01	No
	39	2441	8.50	7.78	No
	78	2480	8.50	6.48	No

BLE			Tune up (dBm)	Average Conducted Power(dBm)	SAR Test
Modulation	Channel	Frequency (MHz)			
GFSK	0	2402	1.00	-1.89	No
	19	2440	1.00	-2.11	No
	39	2480	1.00	-3.09	No

Table 7: Conducted Power of BT

8.2 Measurement of SAR Data

8.2.1 SAR Result of LTE Band 2

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data(Separate 0mm1RB)(Sensor on)											
Back side	20	QPSK 1RB_99	19100/1900	1:1	0.706	0.03	13.52	14.00	1.117	0.789	22.3
Top side	20	QPSK 1RB_99	19100/1900	1:1	0.352	-0.09	13.52	14.00	1.117	0.393	22.3
Body Test data (Separate 0mm 50%RB)(Sensor on)											
Back side	20	QPSK 50RB_50	19100/1900	1:1	0.690	0.03	13.43	14.00	1.140	0.787	22.3
Top side	20	QPSK 50RB_50	19100/1900	1:1	0.356	0.04	13.43	14.00	1.140	0.406	22.3
Body Test data(1RB)(Sensor off)											
Back side-14mm	20	QPSK 1RB_50	19100/1900	1:1	0.766	0.18	22.91	23.00	1.021	0.782	22.3
Back side-14mm	20	QPSK 1RB_50	18700/1860	1:1	0.842	0.02	22.86	23.00	1.033	0.870	22.3
Back side-14mm	20	QPSK 1RB_50	18900/1880	1:1	0.815	-0.19	22.90	23.00	1.023	0.834	22.3
Left side-0mm	20	QPSK 1RB_50	19100/1900	1:1	0.812	0.15	22.91	23.00	1.021	0.829	22.3
Left side-0mm	20	QPSK 1RB_50	18700/1860	1:1	1.220	-0.19	22.86	23.00	1.033	**1.260**	22.3
Left side-0mm repeat	20	QPSK 1RB_50	18700/1860	1:1	1.200	0.09	22.86	23.00	1.033	1.239	22.3
Left side-0mm	20	QPSK 1RB_50	18900/1880	1:1	0.961	0.02	22.90	23.00	1.023	0.983	22.3
Top side-5mm	20	QPSK 1RB_50	19100/1900	1:1	0.333	0.17	22.91	23.00	1.021	0.340	22.3
Body Test data(50%RB)(Sensor off)											
Back side-14mm	20	QPSK 50RB_50	18700/1860	1:1	0.686	-0.06	21.81	22.00	1.045	0.717	22.3
Left side-0mm	20	QPSK 50RB_50	18700/1860	1:1	0.933	0.07	21.81	22.00	1.045	0.975	22.3
Left side-0mm	20	QPSK 50RB_50	18900/1880	1:1	0.736	0.03	21.64	22.00	1.086	0.800	22.3
Left side-0mm	20	QPSK 50RB_25	19100/1900	1:1	0.661	0.19	21.79	22.00	1.050	0.694	22.3
Top side-5mm	20	QPSK 50RB_50	18700/1860	1:1	0.369	0.04	21.81	22.00	1.045	0.386	22.3
Body Test data(100%RB)(Sensor off)											
Left side-0mm	20	QPSK 100RB_0	18900/1880	1:1	0.777	0.04	21.82	22.00	1.042	0.810	22.3
Back side-14mm	20	QPSK 100RB_0	18900/1880	1:1	0.589	0.06	21.82	22.00	1.042	0.614	22.3

Table 8： SAR of LTE Band 2 for Body (original report:ZR/2019/4003006)

Note:

1) The maximum Scaled SAR value is marked in bold.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Left side 0mm	18700/1860	1.220	1.200	1.019	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

8.2.2 SAR Result of LTE Band 4

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data(Separate 0mm1RB)(Sensor on)											
Top side	20	QPSK 1RB_0	20175/1732.5	1:1	0.182	0.12	13.69	14.00	1.074	0.195	22.2
Back side	20	QPSK 1RB_0	20175/1732.5	1:1	0.629	0.07	13.69	14.00	1.074	0.676	22.2
Body Test data (Separate 0mm 50%RB)(Sensor on)											
Back side	20	QPSK 50RB_0	20175/1732.5	1:1	0.757	0.10	13.64	14.00	1.086	0.822	22.2
Back side	20	QPSK 50RB_0	20050/1720	1:1	0.497	0.04	12.03	14.00	1.574	0.782	22.2
Back side	20	QPSK 50RB_0	20300/1745	1:1	0.884	0.04	13.64	14.00	1.086	0.960	22.2
Back side-repeat	20	QPSK 50RB_0	20300/1745	1:1	0.878	0.05	13.64	14.00	1.086	0.954	22.2
Top side	20	QPSK 50RB_0	20175/1732.5	1:1	0.228	0.16	13.64	14.00	1.086	0.248	22.2
Body Test data (Separate 0mm 100%RB)(Sensor on)											
Back side	20	QPSK 100RB_0	20300/1745	1:1	0.719	0.09	13.03	14.00	1.250	0.899	22.2
Body Test data(1RB)(Sensor off)											
Back side-14mm	20	QPSK 1RB_50	20175/1732.5	1:1	0.600	-0.10	22.49	23.00	1.125	0.675	22.2
Left side-0mm	20	QPSK 1RB_50	20175/1732.5	1:1	1.210	-0.13	22.49	23.00	1.125	1.361	22.2
Left side-0mm	20	QPSK 1RB_99	20050/1720	1:1	1.160	0.06	22.20	23.00	1.202	1.395	22.2
Left side-0mm	20	QPSK 1RB_0	20300/1745	1:1	1.260	-0.04	22.48	23.00	1.127	**1.420**	22.2
Left side-0mm repeat	20	QPSK 1RB_0	20300/1745	1:1	1.220	-0.05	22.48	23.00	1.127	1.375	22.2
Top side-5mm	20	QPSK 1RB_50	20175/1732.5	1:1	0.484	-0.09	22.49	23.00	1.125	0.544	22.2
Body Test data(50%RB)(Sensor off)											
Back side-14mm	20	QPSK 50RB_0	20175/1732.5	1:1	0.450	0.02	21.33	22.00	1.167	0.525	22.2
Left side-0mm	20	QPSK 50RB_0	20175/1732.5	1:1	0.946	0.17	21.33	22.00	1.167	1.104	22.2
Left side-0mm	20	QPSK 50RB_0	20300/1745	1:1	1.060	-0.02	21.25	22.00	1.189	1.260	22.2
Left side-0mm	20	QPSK 50RB_50	20050/1720	1:1	0.936	-0.02	21.21	22.00	1.199	1.123	22.2
Top side-5mm	20	QPSK 50RB_0	20175/1732.5	1:1	0.392	-0.05	21.33	22.00	1.167	0.457	22.2
Body Test data(100%RB)(Sensor off)											
Left side-0mm	20	QPSK 100RB_0	20175/1732.5	1:1	0.882	-0.03	21.20	22.00	1.202	1.060	22.2

Table 9： SAR of LTE Band 4 for Body (original report:ZR/2019/4003006).

Note:

1)The maximum Scaled SAR value is marked in bold.

2)Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Left side 0mm	20300/1745	1.260	1.220	1.033	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

8.2.3 SAR Result of LTE Band 5

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data(Separate 0mm1RB)(Sensor on)											
Back side	10	QPSK 1RB_25	20525/836.5	1:1	0.168	0.13	12.37	13.50	1.297	0.218	22.1
Top side	10	QPSK 1RB_25	20525/836.5	1:1	0.042	-0.03	12.37	13.50	1.297	0.054	22.1
Body Test data (Separate 0mm 50%RB)(Sensor on)											
Back side	10	QPSK 25RB_13	20525/836.5	1:1	0.170	0.07	12.43	13.50	1.279	0.217	22.1
Top side	10	QPSK 25RB_13	20525/836.5	1:1	0.049	-0.06	12.43	13.50	1.279	0.062	22.1
Body Test data(1RB)(Sensor off)											
Back side-14mm	10	QPSK 1RB_25	20525/836.5	1:1	0.623	-0.10	23.27	24.00	1.183	0.737	22.1
Left side-0mm	10	QPSK 1RB_25	20525/836.5	1:1	1.110	0.03	23.27	24.00	1.183	1.313	22.1
Left side-0mm repeat	10	QPSK 1RB_25	20525/836.5	1:1	1.080	-0.04	23.27	24.00	1.183	1.278	22.1
Left side-0mm	10	QPSK 1RB_25	20450/829	1:1	0.909	-0.09	23.09	24.00	1.233	1.121	22.1
Left side-0mm	10	QPSK 1RB_49	20600/844	1:1	1.060	0.04	23.05	24.00	1.245	**1.319**	22.1
Top side-5mm	10	QPSK 1RB_25	20525/836.5	1:1	0.480	0.01	23.27	24.00	1.183	0.568	22.1
Body Test data(50%RB)(Sensor off)											
Back side-14mm	10	QPSK 25RB_13	20450/829	1:1	0.471	0.02	22.27	23.00	1.183	0.557	22.1
Left side-0mm	10	QPSK 25RB_13	20450/829	1:1	0.803	-0.03	22.27	23.00	1.183	0.950	22.1
Left side-0mm	10	QPSK 25RB_0	20525/836.5	1:1	0.881	0.06	22.26	23.00	1.186	1.045	22.1
Left side-0mm	10	QPSK 25RB_0	20600/844	1:1	0.841	0.07	22.20	23.00	1.202	1.011	22.1
Top side-5mm	10	QPSK 25RB_13	20450/829	1:1	0.398	-0.03	22.27	23.00	1.183	0.471	22.1
Body Test data(100%RB)(Sensor off)											
Left side-0mm	10	QPSK 50RB_0	20450/829	1:1	0.727	-0.02	22.28	23.00	1.180	0.858	22.1

Table 10：SAR of LTE Band 5 for Body (original report:ZR/2019/4003006).

Note:

1)The maximum Scaled SAR value is marked in bold.

2)Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Left side-0mm	20525/836.5	1.110	1.080	1.028	N/A	N/A
Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.						
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).						
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.						
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg						

8.2.4 SAR Result of LTE Band 12

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data(Separate 0mm1RB)(Sensor on)											
Back side	10	QPSK 1RB_25	23130/711	1:1	0.207	0.05	13.80	14.00	1.047	0.217	22.1
Top side	10	QPSK 1RB_25	23130/711	1:1	0.089	0.04	13.80	14.00	1.047	0.093	22.1
Body Test data (Separate 0mm 50%RB)(Sensor on)											
Back side	10	QPSK 25RB_13	23130/711	1:1	0.173	0.02	13.74	14.00	1.062	0.184	22.1
Top side	10	QPSK 25RB_13	23130/711	1:1	0.075	0.09	13.74	14.00	1.062	0.080	22.1
Body Test data(1RB)(Sensor off)											
Back side-14mm	10	QPSK 1RB_25	23130/711	1:1	0.324	-0.10	23.43	24.00	1.140	0.369	22.1
Left side-0mm	10	QPSK 1RB_25	23130/711	1:1	0.614	-0.14	23.43	24.00	1.140	**0.700**	22.1
Top side-5mm	10	QPSK 1RB_25	23130/711	1:1	0.297	0.04	23.43	24.00	1.140	0.339	22.1
Body Test data(50%RB)(Sensor off)											
Back side-14mm	10	QPSK 25RB_13	23130/711	1:1	0.262	0.09	22.37	23.00	1.156	0.303	22.1
Left side-0mm	10	QPSK 25RB_13	23130/711	1:1	0.516	0.04	22.37	23.00	1.156	0.597	22.1
Top side-5mm	10	QPSK 25RB_13	23130/711	1:1	0.243	0.00	22.37	23.00	1.156	0.281	22.1

Table 11：SAR of LTE Band 12 for Body (original report:ZR/2019/4003006).

Note:

1) The maximum Scaled SAR value is marked in bold.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg(1g SAR) or ≤ 2.0 W/kg(10g SAR) then testing at the other channels is not required for such test configuration(s).

8.2.5 SAR Result of LTE Band 13

Test position	BW.	Test mode	Test ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted Power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR 1-g (W/kg)	Liquid Temp. (℃)
Body Test data(Separate 0mm 1RB)Sensor on											
Back side	20	QPSK 1_25	23230/782	1:1	0.297	-0.03	13.57	14.00	1.104	0.328	22.1
Top side	20	QPSK 1_25	23230/782	1:1	0.098	0.01	13.57	14.00	1.104	0.108	22.1
Body Test data(Separate 0mm 50%RB)Sensor on											
Back side	20	QPSK 25_0	23230/782	1:1	0.304	-0.02	13.01	14.00	1.256	0.382	22.1
Top side	20	QPSK 25_0	23230/782	1:1	0.093	0.08	13.01	14.00	1.256	0.117	22.1
Body Test data(1RB)Sensor off											
Back side-14mm	20	QPSK 1_0	23230/782	1:1	0.028	-0.09	23.71	24.00	1.069	0.030	22.1
Left side-0mm	20	QPSK 1_0	23230/782	1:1	0.857	-0.05	23.71	24.00	1.069	**0.916**	22.1
Top side-5mm	20	QPSK 1_0	23230/782	1:1	0.571	0.01	23.71	24.00	1.069	0.610	22.1
Body Test data(50%RB)Sensor off											
Back side-14mm	20	QPSK 25_13	23230/782	1:1	0.034	0.03	22.88	23.00	1.028	0.035	22.1
Left side-0mm	20	QPSK 25_13	23230/782	1:1	0.751	-0.07	22.88	23.00	1.028	0.772	22.1
Top side-5mm	20	QPSK 25_13	23230/782	1:1	0.431	0.03	22.88	23.00	1.028	0.443	22.1

Table 12：SAR of LTE Band 13 for Body (Variant).
Note:

1) The maximum Scaled SAR value is marked in bold.
2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg(1g SAR) or ≤ 2.0 W/kg(10g SAR) then testing at the other channels is not required for such test configuration(s).

8.2.6 SAR Result of LTE Band 66

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data(Separate 0mm1RB)(Sensor on)											
Back side	20	QPSK 1RB_0	132072/1720	1:1	0.757	0.11	13.49	14.00	1.125	0.851	22.2
Back side	20	QPSK 1RB_0	132322/1745	1:1	0.888	0.09	13.11	14.00	1.227	1.090	22.2
Back side	20	QPSK 1RB_50	132572/1770	1:1	1.100	0.05	13.49	14.00	1.125	1.237	22.2
Top side	20	QPSK 1RB_0	132072/1720	1:1	0.186	0.08	13.49	14.00	1.125	0.209	22.2
Body Test data(Separate 0mm50%RB)(Sensor on)											
Back side	20	QPSK 50RB_0	132322/1745	1:1	0.989	0.05	13.59	14.00	1.099	1.087	22.2
Back side	20	QPSK 50RB_50	132072/1720	1:1	0.600	0.09	12.61	14.00	1.377	0.826	22.2
Back side	20	QPSK 50RB_50	132572/1770	1:1	1.040	0.09	13.58	14.00	1.102	1.146	22.2
Top side	20	QPSK 50RB_0	132322/1745	1:1	0.264	0.17	13.59	14.00	1.099	0.290	22.2
Body Test data (Separate 0mm 100%RB)(Sensor on)											
Back side	20	QPSK 100RB_0	132322/1745	1:1	0.816	0.02	13.05	14.00	1.245	1.016	22.2
Body Test data(1RB)(Sensor off)											
Back side-14mm	20	QPSK 1RB_0	132322/1745	1:1	0.401	0.08	21.90	22.50	1.148	0.460	22.2
Left side-0mm	20	QPSK 1RB_0	132322/1745	1:1	1.070	-0.02	21.90	22.50	1.148	1.229	22.2
Left side-0mm	20	QPSK 1RB_0	132072/1720	1:1	1.240	-0.05	21.89	22.50	1.151	**1.427**	22.2
Left side 0mm -repeat	20	QPSK 1RB_0	132072/1720	1:1	1.210	0.02	21.89	22.50	1.151	1.392	22.2
Left side-0mm	20	QPSK 1RB_0	132572/1770	1:1	1.200	-0.09	21.76	22.50	1.186	1.423	22.2
Top side-5mm	20	QPSK 1RB_0	132322/1745	1:1	0.288	0.09	21.90	22.50	1.148	0.331	22.2
Body Test data(50%RB)(Sensor off)											
Back side-14mm	20	QPSK 50RB_0	132322/1745	1:1	0.334	0.05	20.77	21.50	1.183	0.395	22.2
Left side-0mm	20	QPSK 50RB_0	132322/1745	1:1	0.874	-0.03	20.77	21.50	1.183	1.034	22.2
Left side-0mm	20	QPSK 50RB_0	132072/1720	1:1	0.744	-0.03	20.73	21.50	1.194	0.888	22.2
Left side-0mm	20	QPSK 50RB_0	132572/1770	1:1	0.987	-0.06	20.71	21.50	1.199	1.184	22.2
Top side-5mm	20	QPSK 50RB_0	132322/1745	1:1	0.260	-0.04	20.77	21.50	1.183	0.308	22.2
Body Test data(100%RB)(Sensor off)											
Left side-0mm	20	QPSK 100RB_0	132322/1745	1:1	0.871	-0.03	20.77	21.50	1.183	1.030	22.2

Table 13： SAR of LTE Band 66 for Body (original report:ZR/2019/4003006).

Note:

1) The maximum Scaled SAR value is marked in bold.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Left side-0mm	132072/1720	1.240	1.210	1.025	N/A	N/A
Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.						
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).						
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.						
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg						

8.2.7 SAR Result of LTE Band 71

Test position	BW.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Body Test data(Separate 0mm1RB)(Sensor on)											
Back side	20	QPSK 1RB_50	133372/688	1:1	0.142	-0.06	15.90	16.50	1.148	0.163	22.1
Top side	20	QPSK 1RB_50	133372/688	1:1	0.062	-0.04	15.90	16.50	1.148	0.071	22.1
Body Test data (Separate 0mm 50%RB)(Sensor on)											
Back side	20	QPSK 50RB_0	133322/683	1:1	0.169	0.02	15.84	16.50	1.164	0.197	22.1
Top side	20	QPSK 50RB_0	133322/683	1:1	0.075	0.03	15.84	16.50	1.164	0.087	22.1
Body Test data(1RB)(Sensor off)											
Back side-14mm	20	QPSK 1RB_50	133222/673	1:1	0.246	-0.09	22.58	23.50	1.236	0.304	22.1
Left side-0mm	20	QPSK 1RB_50	133222/673	1:1	0.517	0.13	22.58	23.50	1.236	**0.639**	22.1
Top side-5mm	20	QPSK 1RB_50	133222/673	1:1	0.249	-0.07	22.58	23.50	1.236	0.308	22.1
Body Test data(50%RB)(Sensor off)											
Back side-14mm	20	QPSK 50RB_25	133222/673	1:1	0.195	0.01	21.66	22.50	1.213	0.237	22.1
Left side-0mm	20	QPSK 50RB_25	133222/673	1:1	0.380	0.04	21.66	22.50	1.213	0.461	22.1
Top side-5mm	20	QPSK 50RB_25	133222/673	1:1	0.192	-0.02	21.66	22.50	1.213	0.233	22.1

Table 14：SAR of LTE Band 71 for Body (original report:ZR/2019/4003006).

Note:

1) The maximum Scaled SAR value is marked in bold.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

8.2.8 SAR Result of WiFi 2.4G

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg)1-g	Power drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Ant 0 Test Record											
Body Test data (Separate 0mm)											
Back side	802.11b	1/2412	99.02%	1.010	0.949	0.04	10.01	11.00	1.256	1.204	22
Back side -repeat	802.11b	1/2412	99.02%	1.010	0.928	0.00	10.01	11.00	1.256	1.177	22
Back side	802.11b	11/2462	99.02%	1.010	0.853	0.03	9.88	11.00	1.294	1.115	22
Back side	802.11b	6/2437	99.02%	1.010	0.866	-0.04	9.65	11.00	1.365	1.193	22
Right side	802.11b	1/2412	99.02%	1.010	0.054	0.04	10.01	11.00	1.256	0.068	22
Top side	802.11b	1/2412	99.02%	1.010	0.522	-0.10	10.01	11.00	1.256	0.662	22
Ant 1 Test Record											
Body Test data (Separate 0mm)											
Back side	802.11b	1/2412	99.35%	1.007	1.050	0.09	13.11	14.00	1.227	**1.297**	22
Back side -repeat	802.11b	1/2412	99.35%	1.007	1.040	0.03	13.11	14.00	1.227	1.285	22
Back side	802.11b	6/2437	99.35%	1.007	1.000	0.00	12.96	14.00	1.271	1.279	22
Back side	802.11b	11/2462	99.35%	1.007	1.020	0.05	13.01	14.00	1.256	1.290	22
Right side	802.11b	1/2412	99.35%	1.007	0.106	-0.07	13.11	14.00	1.227	0.131	22
Bottom side	802.11b	1/2412	99.35%	1.007	0.467	0.08	13.11	14.00	1.227	0.577	22
MIMO Test Record											
Body Test data (Separate 0mm)											
Back side	802.11n 40M	3/2422	87.35%	1.145	0.913	0.05	11.67	12.00	1.079	1.128	22
Back side -repeat	802.11n 40M	3/2422	87.35%	1.145	0.893	0.01	11.67	12.00	1.079	1.103	22
Back side	802.11n 40M	6/2437	87.35%	1.145	0.905	0.07	11.41	12.00	1.146	1.187	22
Back side	802.11n 40M	9/2452	87.35%	1.145	0.766	0.06	11.40	12.00	1.148	1.007	22
Right side	802.11n 40M	3/2422	87.35%	1.145	0.046	0.06	11.67	12.00	1.079	0.057	22
Top side	802.11n 40M	3/2422	87.35%	1.145	0.457	0.06	11.67	12.00	1.079	0.564	22
Bottom side	802.11n 40M	3/2422	87.35%	1.145	0.147	-0.02	11.67	12.00	1.079	0.182	22

Table 15：SAR of WiFi 2.4G for Body (original report:ZR/2019/4003006).

Note:

1) The maximum Scaled SAR value is marked in bold.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3) Each channel was tested at the lowest data rate.

Mode	Tune-up (dBm)	Tune-up (mw)	Hightest Reported SAR1-g(W/kg)	Adjusted SAR1-g(W/kg)	SAR test
WiFi 2.4G Ant 0					
802.11b	11.00	12.59	1.204	/	Yes
802.11g	10.00	10.00	/	0.956	No
802.1n 20M	10.00	10.00	/	0.956	No
802.11n 40M	10.00	10.00	/	0.956	No
WiFi 2.4G Ant 1					
802.11b	14.00	25.12	1.297	/	Yes
802.11g	11.00	12.59	/	0.650	No
802.1n 20M	10.00	10.00	/	0.516	No
802.11n 40M	10.00	10.00	/	0.516	No
WiFi 2.4G MIMO					
802.11n 40M	12.00	15.85	1.187	/	Yes
802.11n 20M	12.00	15.85	/	1.187	No

Note: Per KDB248227D01, for SAR test of WiFi 2.4G:
1) SAR is measured for 2.4 GHz 802.11b DSSS using the initial test position procedure.
2) As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required..

8.2.9 SAR Result of WIFI 5G

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg)1-g	Power drift(dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR(W/kg)	Liquid Temp.
Ant 0 Test Record											
Body Test data of U-NII-2A (Separate 0mm)											
Back side	802.11a	52/5260	95.28%	1.050	0.777	-0.19	10.63	11.00	1.089	0.888	22.2
Back side	802.11a	56/5280	95.28%	1.050	1.040	-0.18	10.61	11.00	1.094	**1.194**	22.2
Back side-Repeat	802.11a	56/5280	95.28%	1.050	0.968	-0.08	10.61	11.00	1.094	1.111	22.2
Right side	802.11a	52/5260	95.28%	1.050	0.076	0.05	10.47	11.00	1.130	0.090	22.2
Top side	802.11a	52/5260	95.28%	1.050	0.445	0.15	10.47	11.00	1.130	0.528	22.2
Body worn Test data of U-NII-2C(Separate 0mm)											
Back side	802.11a	104/5520	95.28%	1.050	0.929	-0.09	9.14	10.00	1.219	1.189	22.2
Back side	802.11a	100/5500	95.28%	1.050	0.903	0.04	9.01	10.00	1.256	1.190	22.2
Right side	802.11a	104/5520	95.28%	1.050	0.124	0.09	9.14	10.00	1.219	0.159	22.2
Top side	802.11a	104/5520	95.28%	1.050	0.565	-0.02	9.14	10.00	1.219	0.723	22.2
Body worn Test data of U-NII-3(Separate 0mm)											
Back side	802.11a	153/5765	95.28%	1.050	0.522	0.04	7.99	9.00	1.262	0.691	22.2
Right side	802.11a	153/5765	95.28%	1.050	0.053	0.05	7.99	9.00	1.262	0.071	22.2
Top side	802.11a	153/5765	95.28%	1.050	0.264	-0.06	7.99	9.00	1.262	0.350	22.2
Ant 1 Test Record											
Body Test data of U-NII-2A (Separate 0mm)											
Back side	802.11a	60/5300	94.84%	1.054	0.945	0.14	11.78	12.50	1.180	1.176	22.2
Back side-Repeat	802.11a	60/5300	94.84%	1.054	0.821	0.03	11.78	12.50	1.180	1.022	22.2
Back side	802.11a	56/5280	94.84%	1.054	0.860	0.15	11.56	12.50	1.242	1.126	22.2
Right side	802.11a	60/5300	94.84%	1.054	0.077	0.06	11.78	12.50	1.180	0.096	22.2
Bottom side	802.11a	60/5300	94.84%	1.054	0.869	0.06	11.78	12.50	1.180	1.082	22.2
Bottom side	802.11a	56/5280	94.84%	1.054	0.683	-0.01	11.56	12.50	1.242	0.894	22.2
Body worn Test data of U-NII-2C(Separate 0mm)											
Back side	802.11a	100/5500	94.84%	1.054	0.748	0.01	12.98	13.50	1.127	0.889	22.2
Back side	802.11a	104/5520	94.84%	1.054	0.741	0.07	12.85	13.50	1.161	0.907	22.2
Right side	802.11a	100/5500	94.84%	1.054	0.117	0.04	12.98	13.50	1.127	0.139	22.2
Bottom side	802.11a	100/5500	94.84%	1.054	0.822	0.03	12.98	13.50	1.127	0.977	22.2
Bottom side	802.11a	104/5520	94.84%	1.054	0.819	-0.06	12.85	13.50	1.161	1.003	22.2
Body worn Test data of U-NII-3(Separate 0mm)											
Back side	802.11a	149/5745	94.84%	1.054	0.293	0.04	10.58	11.50	1.236	0.382	22.2
Right side	802.11a	149/5745	94.84%	1.054	0.000	0.00	10.58	11.50	1.236	0.000	22.2
Bottom side	802.11a	149/5745	94.84%	1.054	0.247	-0.01	10.58	11.50	1.236	0.322	22.2
MIMO Test Record											
Body Test data of U-NII-2A (Separate 0mm)											
Back side	802.11n 40M	54/5270	87.82%	1.139	0.784	0.00	12.89	13.50	1.151	1.027	22.2

Back side	802.11n 40M	62/5310	87.82%	1.139	0.846	0.00	12.58	13.50	1.236	1.191	22.2
Right side	802.11n 40M	54/5270	87.82%	1.139	0.076	0.05	12.89	13.50	1.151	0.100	22.2
Top side	802.11n 40M	54/5270	87.82%	1.139	0.393	0.02	12.89	13.50	1.151	0.515	22.2
Bottom side	802.11n 40M	54/5270	87.82%	1.139	0.332	0.03	12.89	13.50	1.151	0.435	22.2
Body worn Test data of U-NII-2C(Separate 0mm)											
Back side	802.11n 40M	102/5510	87.82%	1.139	0.879	0.00	12.74	13.50	1.191	1.192	22.2
Back side-Repeat	802.11n 40M	102/5510	87.82%	1.139	0.840	0.00	12.74	13.50	1.191	1.139	22.2
Back side	802.11n 40M	110/5550	87.82%	1.139	0.856	0.00	12.63	13.50	1.222	1.191	22.2
Right side	802.11n 40M	102/5510	87.82%	1.139	0.122	0.08	12.74	13.50	1.191	0.165	22.2
Top side	802.11n 40M	102/5510	87.82%	1.139	0.462	0.07	12.74	13.50	1.191	0.627	22.2
Bottom side	802.11n 40M	102/5510	87.82%	1.139	0.432	0.03	12.74	13.50	1.191	0.586	22.2
Body worn Test data of U-NII-3(Separate 0mm)											
Back side	802.11n 40M	151/5755	87.82%	1.139	0.446	0.09	10.80	11.50	1.175	0.597	22.2
Right side	802.11n 40M	151/5755	87.82%	1.139	0.063	0.00	10.80	11.50	1.175	0.084	22.2
Top side	802.11n 40M	151/5755	87.82%	1.139	0.225	0.09	10.80	11.50	1.175	0.301	22.2
Bottom side	802.11n 40M	151/5755	87.82%	1.139	0.118	0.04	10.80	11.50	1.175	0.158	22.2

Table 16：SAR of WIFI 5G for Body (original report:ZR/2019/4003006).

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B.

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3) Each channel was tested at the lowest data rate.

Mode	Tune-up (dBm)	Tune-up (mw)	Hightest Reported SAR1-g(W/kg)	Adjusted SAR1-g(W/kg)	SAR test
WiFi 5G Ant 0					
802.11a (U-NII-2A)	11.00	12.59	1.194	/	Yes
802.11a (U-NII-1)	11.00	12.59	/	1.194	No
802.11n 20M	11.00	12.59	/	1.194	No
802.11n 40M	10.90	12.30	/	1.167	No
802.11ac 20M	11.00	12.59	/	1.194	No
802.11ac 40M	10.90	12.30	/	1.167	No
802.11ac 80M	10.00	10.00	/	0.948	No
WiFi 5G Ant 1					
802.11a (U-NII-2A)	12.50	17.78	1.176	/	Yes
802.11a (U-NII-1)	12.50	17.78	/	1.176	No
802.11n 20M	11.00	12.59	/	0.833	No
802.11n 40M	11.50	14.13	/	0.934	No
802.11ac 20M	11.00	12.59	/	0.833	No
802.11ac 40M	11.50	14.13	/	0.934	No
802.11ac 80M	8.00	6.31	/	0.417	No
WiFi 5G MIMO					
802.11n 40M (U-NII-2A)	13.50	22.39	1.191	/	Yes
802.11n 40M (U-NII-1)	13.50	22.39	/	1.191	No
802.11n 40M	13.50	22.39	1.192	/	Yes
802.11n 20M	13.50	22.39	/	1.192	No
802.11ac 20M	13.50	22.39	/	1.192	No
802.11ac 40M	13.50	22.39	/	1.192	No
802.11ac 80M	11.50	14.13	/	0.752	No

Note: Per KDB248227D01, for SAR test of WiFi 2.4G:

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. As the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration

2) As the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR test for the other 802.11 modes are not required..

8.3 Multiple Transmitter Evaluation

8.3.1 Simultaneous SAR SAR test evaluation

Simultaneous Transmission

NO.	Simultaneous Transmission Configuration	Body
1	LTE + WiFi 2.4G SISO/MIMO	NO
2	LTE + WiFi 5G SISO/MIMO	NO
3	LTE + BT	NO
4	WiFi 2.4G SISO/MIMO + BT	NO
5	WiFi 5G SISO/MIMO + BT	NO
6	WiFi 2.4G SISO/MIMO + WiFi 5G SISO/MIMO	NO

9 Equipment list

Test Platform	SPEAG DASY5 Professional
Description	SAR Test System (Frequency range 300MHz-6GHz)
Software Reference	DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Hardware Reference

	Equipment	Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
☒	Twin Phantom	SPEAG	SAM 3	1912	NCR	NCR
☒	DAE	SPEAG	DAE4	896	2020-06-11	2021-06-10
☒	E-Field Probe	SPEAG	EX3DV4	3982	2019-09-11	2020-09-10
☒	Validation Kits	SPEAG	D750V3	1160	2019-05-22	2022-05-21
☒	Agilent Network Analyzer	Agilent	E5071C	MY46523590	2020-04-16	2021-04-15
☒	Dielectric Probe Kit	Agilent	85070E	US01440210	NCR	NCR
☒	Radio Communication Analyzer	Anritsu	MT8821C	6201502984	2020-06-11	2021-06-10
☒	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
☒	Signal Generator	Agilent	N5171B	MY53050736	2020-04-15	2021-04-14
☒	Preamplifier	Mini-Circuits	ZHL-42W	15542	NCR	NCR
☒	Preamplifier	Compliance Directions Systems Inc.	AMP28-3W	073501433	NCR	NCR
☒	Power Meter	Agilent	E4416A	GB41292095	2020-04-15	2021-04-14
☒	Power Sensor	Agilent	8481H	MY41091234	2020-04-15	2021-04-14
☒	Power Sensor	R&S	NRP-Z92	100025	2020-04-16	2021-04-15
☒	Attenuator	SHX	TS2-3dB	30704	NCR	NCR
☒	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	NA	NCR	NCR
☒	Coaxial low pass filter	Microlab Fxr	LA-F13	NA	NCR	NCR
☒	DC POWER SUPPLY	SAKO	SK1730SL5A	NA	NCR	NCR
☒	Speed reading thermometer	MingGao	T809	NA	2020-04-21	2021-04-20
☒	Humidity and Temperature Indicator	KIMTOKA	KIMTOKA	NA	2020-04-21	2021-04-20

Note: All the equipments are within the valid period when the tests are performed.

10 Calibration certificate

Please see the Appendix C

11 Photographs

Please see the Appendix D

Appendix A: Detailed System Check Results

Appendix B: Detailed Test Results

Appendix C: Calibration certificate

Appendix D: Photographs

---END---

Appendix A

Detailed System Check Results

1. System Performance Check
System Performance Check 750 MHz Head

Date: 2020-08-10

Test Laboratory: SGS-SAR Lab

System Performance Check 750 MHz Head

DUT: D750V3; Type: D750V3; Serial: 1160

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

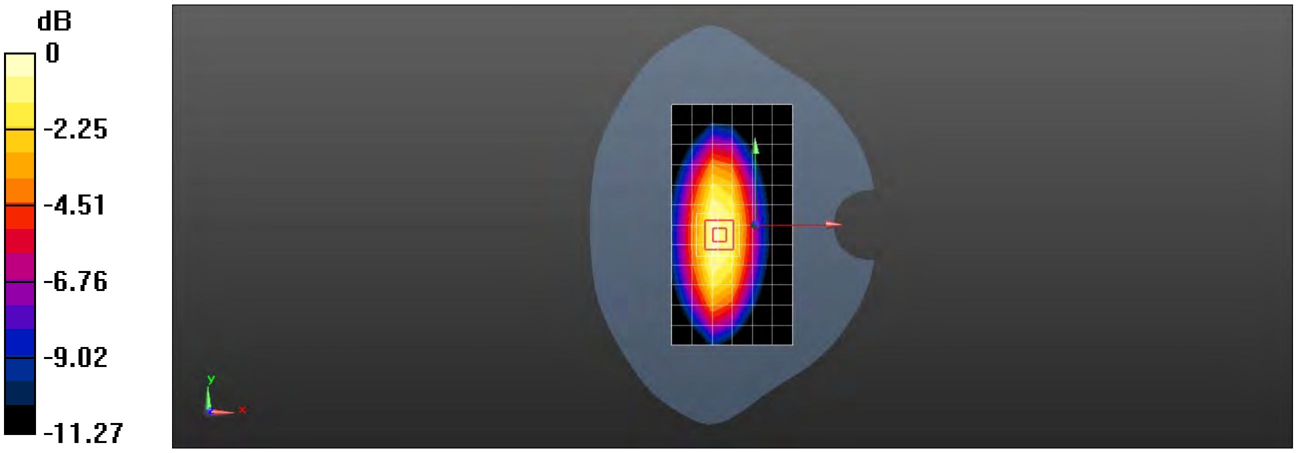
Medium: HSL750;Medium parameters used: f = 750 MHz; σ = 0.878 S/m; ε_r = 43.089; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3982; ConvF(10.68, 10.68, 10.68); Calibrated: 2019-09-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2020-06-11
- Phantom: SAM 3; Type: SAM; Serial: 1912
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Body/d=15mm, Pin=250mW/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.65 W/kg

Body/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.82 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 3.38 W/kg
SAR(1 g) = 2.13 W/kg; SAR(10 g) = 1.37 W/kg
Maximum value of SAR (measured) = 2.94 W/kg



0 dB = 2.94 W/kg = 4.68 dBW/kg

Appendix B

Detailed Test Results

1.LTE
LTE Band 13 for Body

Date: 2020-08-10

Test Laboratory: SGS-SAR Lab

A8202 LTE Band 13 10M QPSK 1RB0 23230CH Left side 0mm

DUT: A8202; Type: Tablet; Serial: 02940527164

Communication System: UID 0, LTE-FDD BW 10MHZ (0); Frequency: 782 MHz;Duty Cycle: 1:1

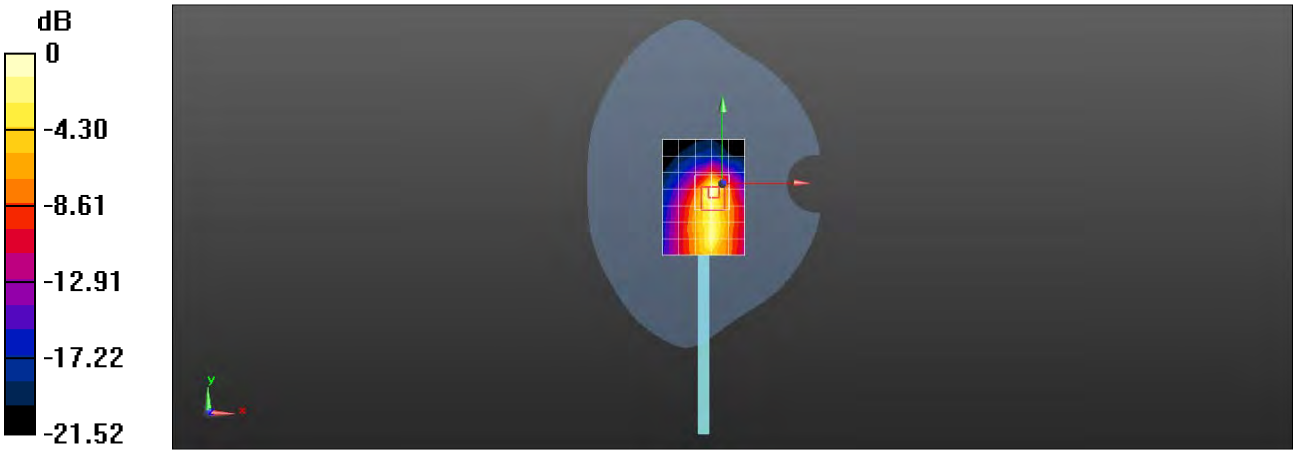
Medium: HSL750;Medium parameters used: f = 782 MHz; σ = 0.9 S/m; ε_r = 42.907; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3982; ConvF(10.68, 10.68, 10.68); Calibrated: 2019-09-11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn896; Calibrated: 2020-06-11
- Phantom: SAM 3; Type: SAM; Serial: 1912
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (6x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.83 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.97 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.44 W/kg
SAR(1 g) = 0.857 W/kg; SAR(10 g) = 0.417 W/kg
Maximum value of SAR (measured) = 1.76 W/kg



0 dB = 1.76 W/kg = 2.46 dBW/kg

Appendix C

Calibration certificate

1. Dipole
D750V3-SN 1160(2019-05-22)
2. DAE
DAE4-SN 896(2020-06-11)
3. Probe
EX3DV4-SN 3982(2019-09-11)

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CALIBRATION
CNAS L0570

Client **SGS** **Certificate No: Z19-60152**

CALIBRATION CERTIFICATE

Object	D750V3 - SN: 1160
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	May 22, 2019

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Power sensor NRP8S	104291	20-Aug-18 (CTTL, No.J18X06862)	Aug-19
Reference Probe EX3DV4	SN 3617	31-Jan-19(SPEAG,No.EX3-3617_Jan19)	Jan-20
DAE4	SN 1331	06-Feb-19(SPEAG,No.DAE4-1331_Feb19)	Feb-20
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-19 (CTTL, No.J19X00336)	Jan-20
NetworkAnalyzer E5071C	MY46116073	24-Jan-19 (CTTL, No.J19X00547)	Jan-20

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: May 25, 2019

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	52.10.2.1495
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.39 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.63 W/kg ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	56.9 ± 6 %	0.95 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.62 W/kg ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.63 W/kg ±18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8Ω- 3.06jΩ
Return Loss	- 29.1dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.1Ω- 3.83jΩ
Return Loss	- 27.2dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.897 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

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DASY5 Validation Report for Head TSL Date: 05.22.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1160

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.905 S/m; ε_r = 42.28; ρ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(10.03, 10.03, 10.03) @ 750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

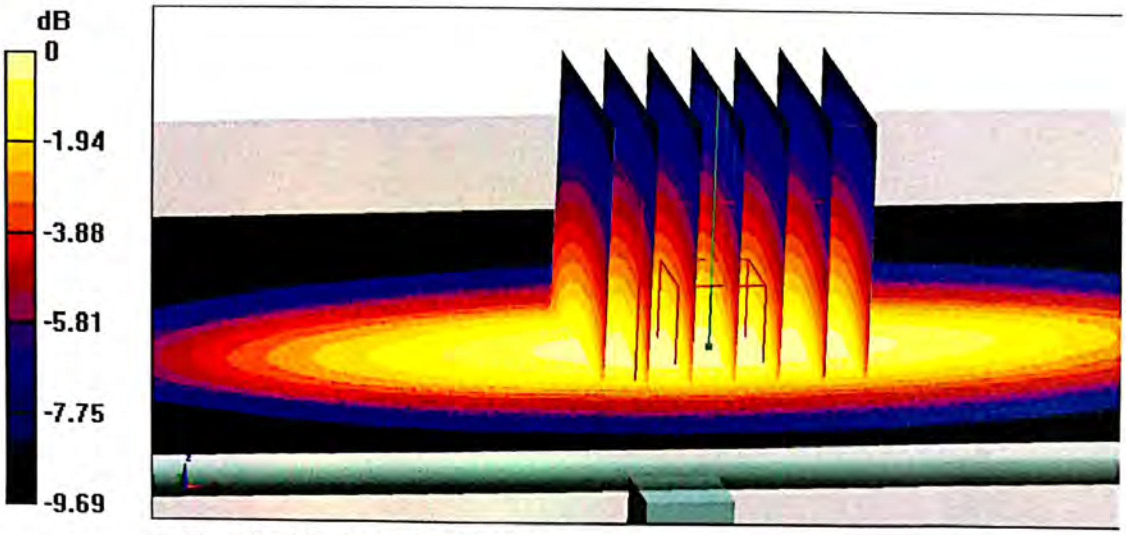
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 51.91 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 3.06 W/kg

SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.42 W/kg

Maximum value of SAR (measured) = 2.76 W/kg



0 dB = 2.76 W/kg = 4.41 dBW/kg

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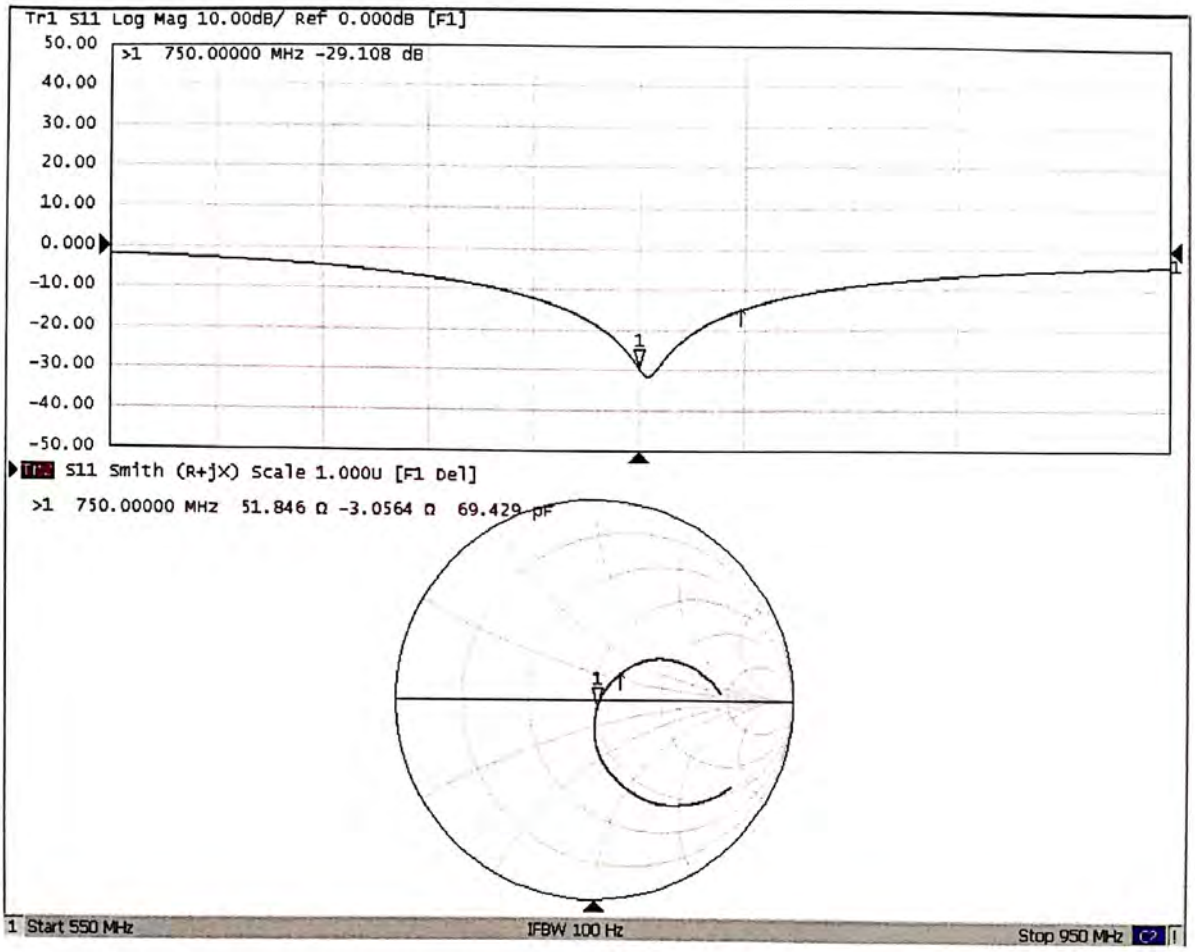
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 05.22.2019

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1160

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.946 S/m; ε_r = 56.92; ρ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3617; ConvF(9.85, 9.85, 9.85) @ 750 MHz; Calibrated: 1/31/2019
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1331; Calibrated: 2/6/2019
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

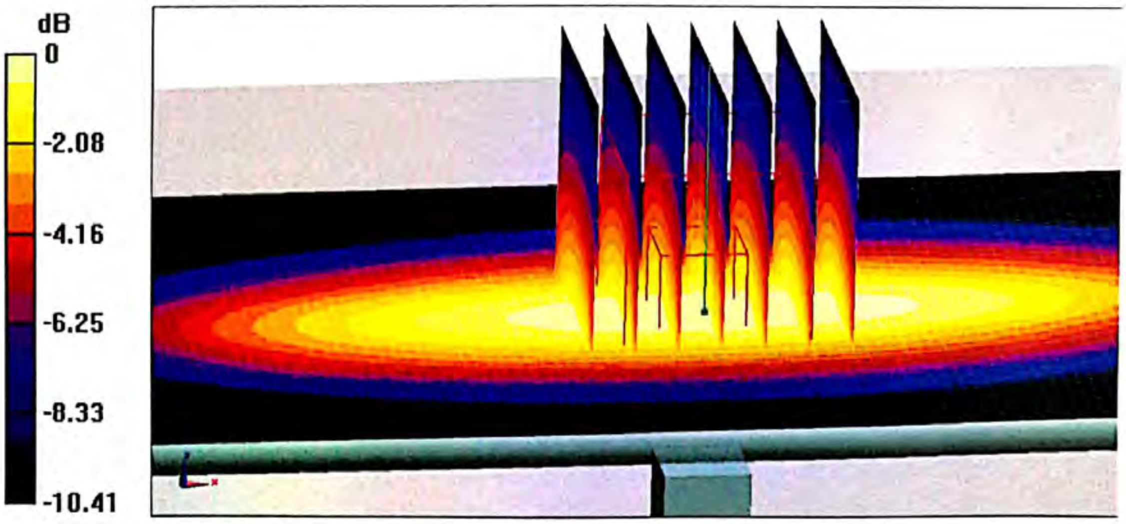
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.99 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.22 W/kg

SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.39 W/kg

Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.55 dBW/kg

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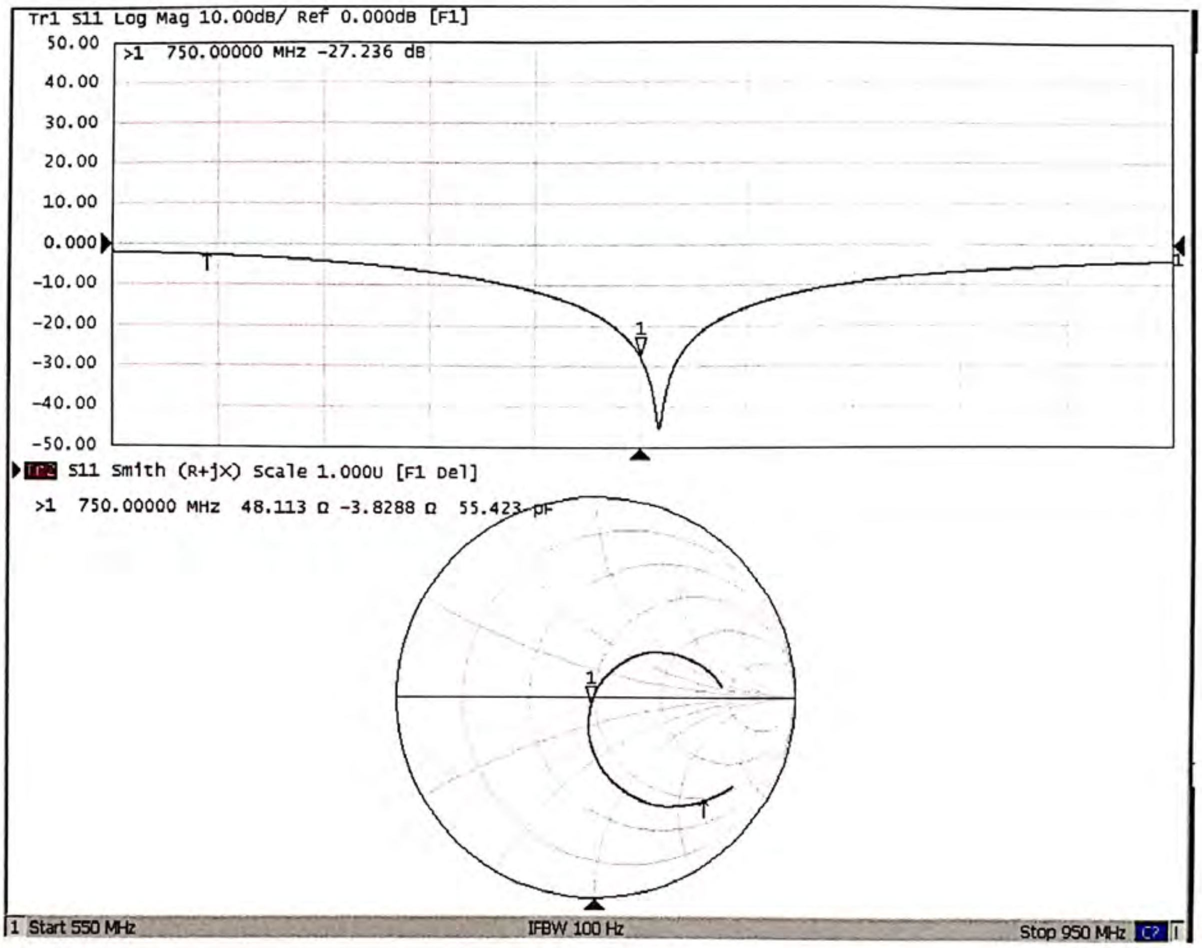
Impedance Measurement Plot for Body TSL



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IMPORTANT NOTICE

USAGE OF THE DAE4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is fixed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:
Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:
Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:
To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **SGS-CN (Auden)**

Certificate No: DAE4-896_Jun20

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 896
Calibration procedure(s)	QA CAL-06.v30 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	June 11, 2020

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	03-Sep-19 (No:25949)	Sep-20
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	09-Jan-20 (in house check)	In house check: Jan-21
Calibrator Box V2.1	SE UMS 006 AA 1002	09-Jan-20 (in house check)	In house check: Jan-21

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Laboratory Technician	
Approved by:	Sven Kühn	Deputy Manager	i.V.

Issued: June 11, 2020

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.020 ± 0.02% (k=2)	404.270 ± 0.02% (k=2)	404.201 ± 0.02% (k=2)
Low Range	3.98028 ± 1.50% (k=2)	3.99643 ± 1.50% (k=2)	3.97192 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	37.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200031.72	-0.85	-0.00
Channel X	+ Input	20003.84	-1.17	-0.01
Channel X	- Input	-20002.90	3.17	-0.02
Channel Y	+ Input	200032.22	-0.65	-0.00
Channel Y	+ Input	20002.66	-2.27	-0.01
Channel Y	- Input	-20005.59	0.56	-0.00
Channel Z	+ Input	200031.62	-1.12	-0.00
Channel Z	+ Input	20001.63	-3.29	-0.02
Channel Z	- Input	-20006.11	0.11	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.46	-0.47	-0.02
Channel X	+ Input	201.01	0.15	0.07
Channel X	- Input	-198.83	0.16	-0.08
Channel Y	+ Input	2000.11	-0.61	-0.03
Channel Y	+ Input	199.03	-1.65	-0.82
Channel Y	- Input	-200.32	-1.15	0.57
Channel Z	+ Input	2000.58	-0.14	-0.01
Channel Z	+ Input	199.41	-1.29	-0.64
Channel Z	- Input	-200.10	-0.86	0.43

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	12.27	10.72
	- 200	-9.94	-11.49
Channel Y	200	16.61	16.02
	- 200	-17.95	-18.85
Channel Z	200	5.05	5.08
	- 200	-6.58	-6.77

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-1.55	-4.57
Channel Y	200	6.73	-	0.61
Channel Z	200	9.49	4.63	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15563	17646
Channel Y	15995	17799
Channel Z	15649	15511

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.76	-0.05	2.07	0.40
Channel Y	-0.98	-2.24	0.08	0.48
Channel Z	-0.72	-1.67	0.77	0.37

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

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S **Schweizerischer Kalibrierdienst**
C **Service suisse d'étalonnage**
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Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **SGS-CN (Auden)**

Certificate No: EX3-3982_Sep19

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3982
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7 Calibration procedure for dosimetric E-field probes
Calibration date:	September 11, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Leif Klysner
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 11, 2019

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3982

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.53	0.57	0.50	± 10.1 %
DCP (mV)[B]	98.9	97.0	100.0	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	131.5	±3.0 %	± 4.7 %
		Y	0.0	0.0	1.0		130.2		
		Y	0.0	0.0	1.0		142.6		

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 5).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3982

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-10.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

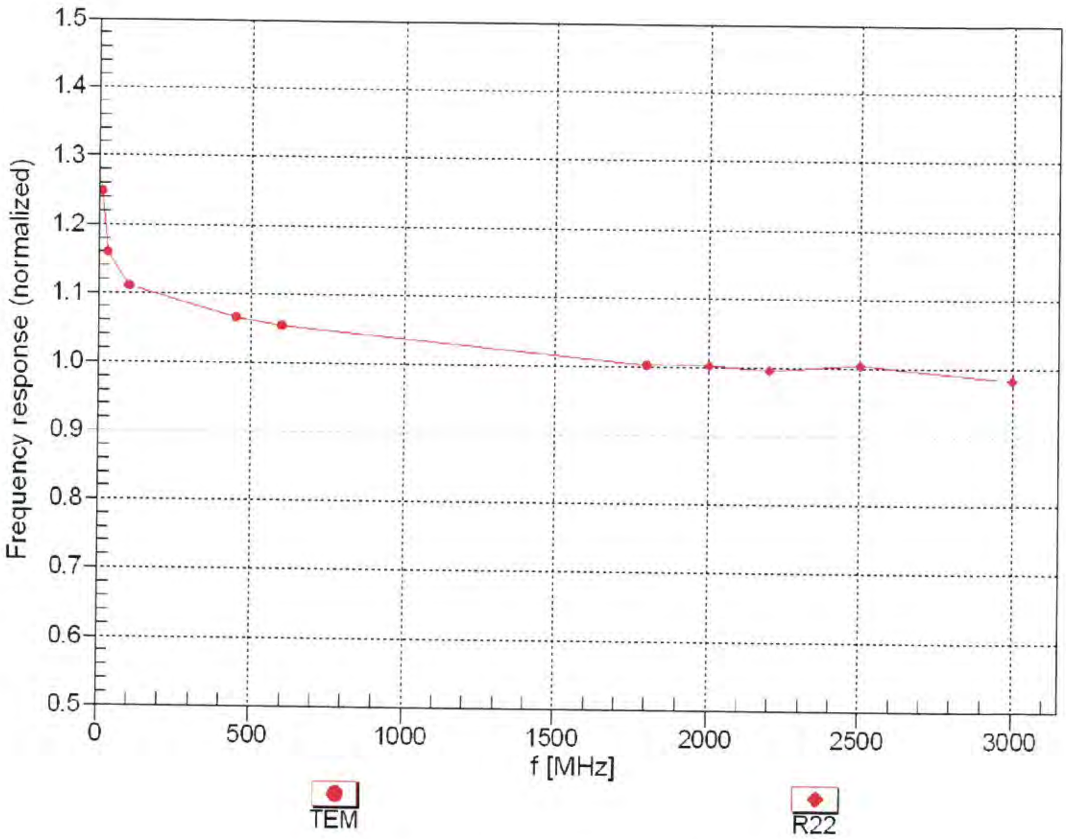
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3982

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	10.68	10.68	10.68	0.50	0.80	± 12.0 %
835	41.5	0.90	10.39	10.39	10.39	0.53	0.80	± 12.0 %
1750	40.1	1.37	8.80	8.80	8.80	0.36	0.86	± 12.0 %
1900	40.0	1.40	8.48	8.48	8.48	0.39	0.86	± 12.0 %
3300	38.2	2.71	7.19	7.19	7.19	0.30	1.35	± 13.1 %
3500	37.9	2.91	7.07	7.07	7.07	0.30	1.35	± 13.1 %
3700	37.7	3.12	7.04	7.04	7.04	0.35	1.35	± 13.1 %
3900	37.5	3.32	6.93	6.93	6.93	0.40	1.60	± 13.1 %
4100	37.2	3.53	6.63	6.63	6.63	0.40	1.60	± 13.1 %
4400	36.9	3.84	6.62	6.62	6.62	0.40	1.70	± 13.1 %
4600	36.7	4.04	6.37	6.37	6.37	0.40	1.70	± 13.1 %
4800	36.4	4.25	6.22	6.22	6.22	0.40	1.80	± 13.1 %
4950	36.3	4.40	5.83	5.83	5.83	0.40	1.80	± 13.1 %

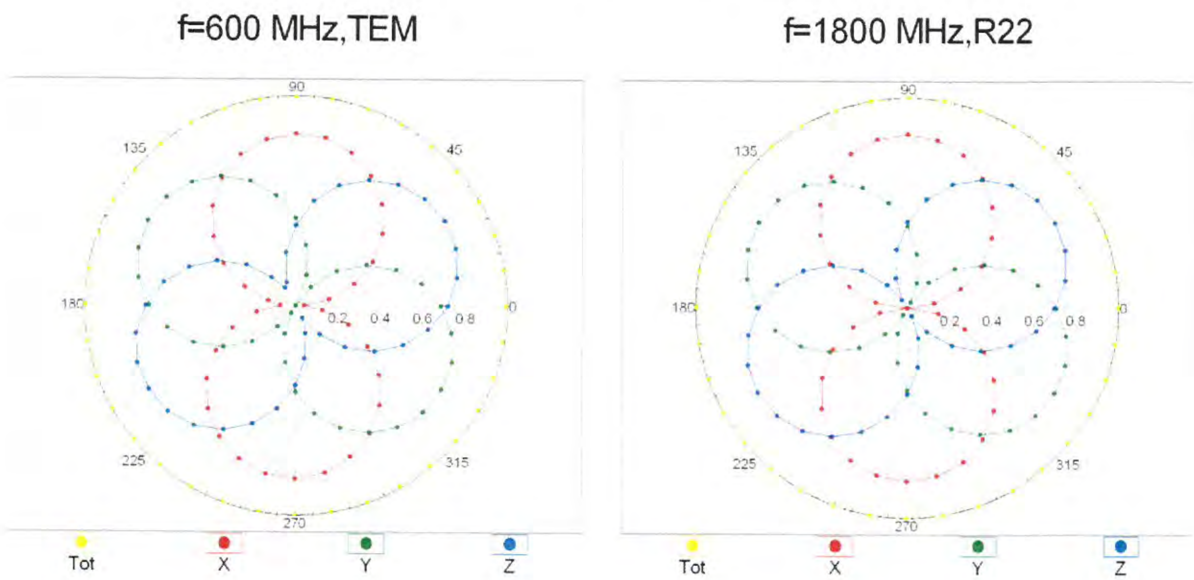
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

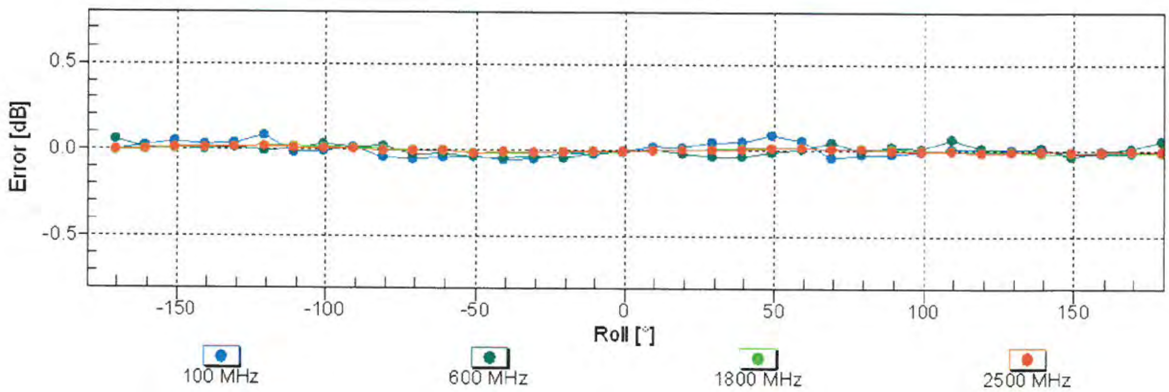
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

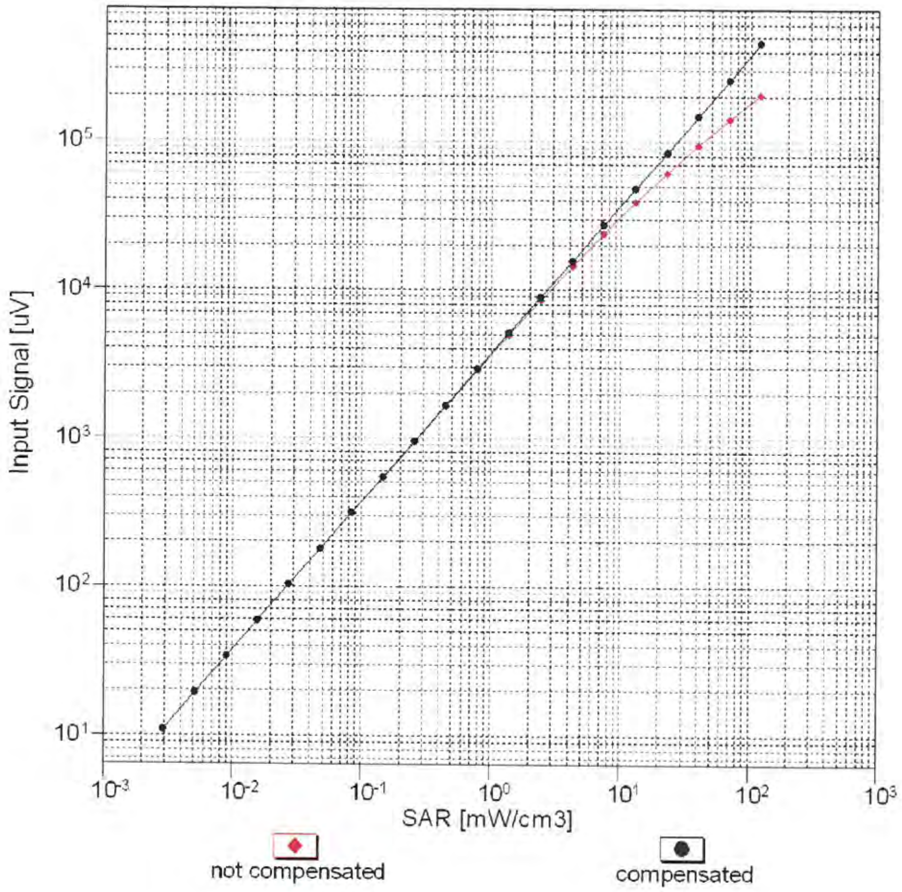
Receiving Pattern (ϕ), $\vartheta = 0°$

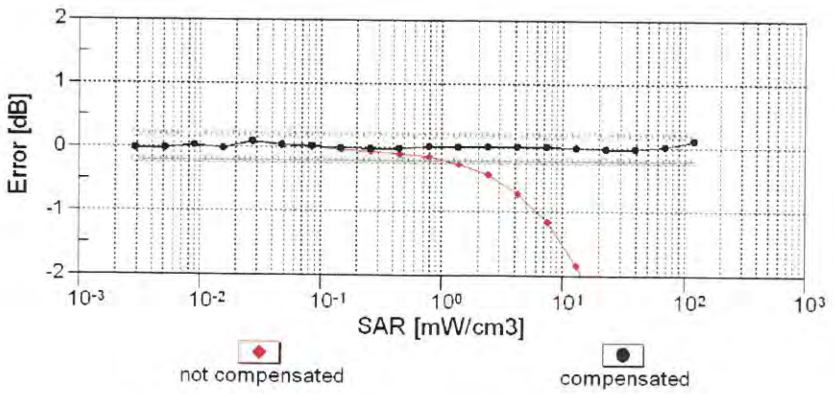




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

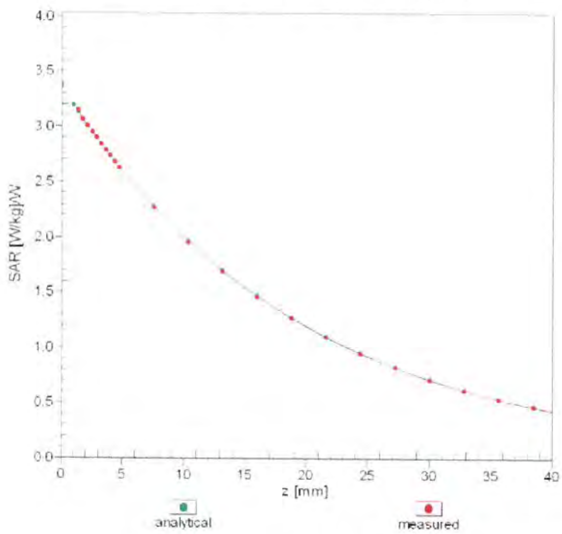




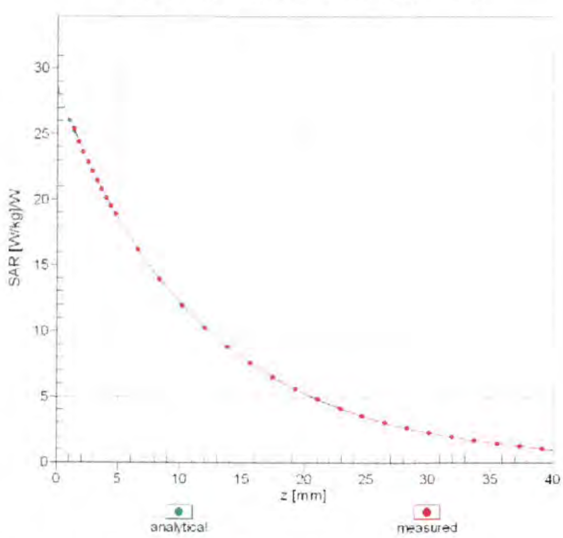
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

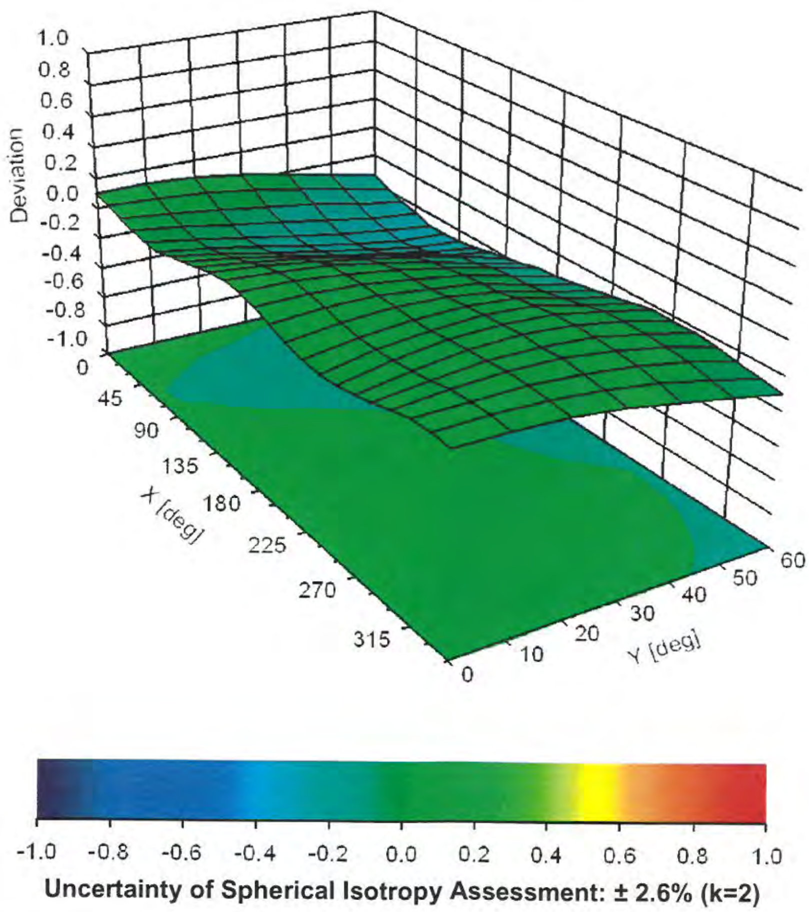


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Dipole D750V3 SN 1160				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
2019-05-22	-29.1	/	51.8	/
2020-05-21	-29.4	1.03%	52.2	0.4Ω