FCC SAR Test Report

Report No.	:	**SA170330W002**
Applicant	:	**Lenovo(Shanghai) Electronics Technology Co., Ltd.**
Address	:	**NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA**
Product	:	**Portable Tablet Computer**
FCC ID	:	**O57TB8704V**
Brand	:	**Lenovo**
Model No.	:	**TB-8704V**
Standards	:	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1992 / IEEE 1528:2013** **KDB 865664 D01 v01r04 / KDB 865664 D02 v01r02** **KDB 248227 D01 v02r02 / KDB 447498 D01 v06 / KDB 616217 D04 v01r02** **KDB 941225 D01 v03r01 / KDB 941225 D05 v02r05**
Sample Received Date	:	**Apr. 17, 2017**
Date of Testing	:	**Apr. 18, 2017 ~ May 18, 2017**

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

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Table of Contents

Release Control Record **3**
1. Summary of Maximum SAR Value **4**
2. Description of Equipment Under Test **5**
3. SAR Measurement System **7**
3.1 Definition of Specific Absorption Rate (SAR) 7
3.2 SPEAG DASY System 7
3.2.1 Robot 8
3.2.2 Probes 9
3.2.3 Data Acquisition Electronics (DAE) 9
3.2.4 Phantoms 10
3.2.5 Device Holder 11
3.2.6 System Validation Dipoles 11
3.2.7 Tissue Simulating Liquids 12
3.3 SAR System Verification 15
3.4 SAR Measurement Procedure 16
3.4.1 Area & Zoom Scan Procedure 16
3.4.2 Volume Scan Procedure 16
3.4.3 Power Drift Monitoring 17
3.4.4 Spatial Peak SAR Evaluation 17
3.4.5 SAR Averaged Methods 17
4. SAR Measurement Evaluation **18**
4.1 EUT Configuration and Setting 18
4.2 EUT Testing Position 23
4.2.1 Body Exposure Conditions 23
4.2.2 SAR Test Exclusion Evaluations 24
4.2.3 Simultaneous Transmission Possibilities 25
4.3 Tissue Verification 26
4.4 System Validation 26
4.5 System Verification 27
4.6 Maximum Output Power 28
4.6.1 Maximum Conducted Power 28
4.6.2 Measured Conducted Power Result 30
4.7 SAR Testing Results 45
4.7.1 SAR Test Reduction Considerations 45
4.7.2 SAR Results for Body Exposure Condition 47
4.7.3 SAR Measurement Variability 51
5. Calibration of Test Equipment **66**
6. Measurement Uncertainty **67**
7. Information on the Testing Laboratories **69**

Appendix A. SAR Plots of System Verification
Appendix B. SAR Plots of SAR Measurement
Appendix C. Calibration Certificate for Probe and Dipole
Appendix D. Photographs of EUT and Setup

Release Control Record

Report No.	Reason for Change	Date Issued
SA170330W002	Initial release	May 26, 2017

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported Body SAR_{1g} (W/kg)
PCB	WCDMA II	1.05
	WCDMA V	1.19
	LTE 2	0.59
	LTE 4	1.07
	LTE 5	1.14
	LTE 7	1.35
	LTE 12	1.04
	LTE 13	1.11
DTS	2.4G WLAN	1.17
NII	5.2G WLAN	0.76
	5.8G WLAN	1.05
DSS	Bluetooth	0.16
Highest Simultaneous Transmission SAR		Body (W/kg)
PCB + DTS		1.35
PCB + NII		1.35
PCB + DSS		1.35

Note:

1. The SAR limit **(Head & Body: SAR_{1g} 1.6 W/kg, Extremity: SAR_{10g} 4.0 W/kg)** for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	Portable Tablet Computer
FCC ID	O57TB8704V
Brand Name	Lenovo
Model Name	TB-8704V
HW Version	Lenovo Tablet TB-8704V
SW Version	TB-8704V_RF01_170504
Tx Frequency Bands (Unit: MHz)	WCDMA Band II : 1852.4 ~ 1907.6 WCDMA Band V : 826.4 ~ 846.6 LTE Band 2 : 1850.7 ~ 1909.3 (1.4M), 1851.5 ~ 1908.5 (3M), 1852.5 ~ 1907.5 (5M), 1855 ~ 1905 (10M), 1857.5 ~ 1902.5 (15M), 1860 ~ 1900 (20M) LTE Band 4 : 1710.7 ~ 1754.3 (1.4M), 1711.5 ~ 1753.5 (3M), 1712.5 ~ 1752.5 (5M), 1715 ~ 1750 (10M), 1717.5 ~ 1747.5 (15M), 1720 ~ 1745 (20M) LTE Band 5 : 824.7 ~ 848.3 (1.4M), 825.5 ~ 847.5 (3M), 826.5 ~ 846.5 (5M), 829 ~ 844 (10M) LTE Band 7 : 2502.5 ~ 2567.5 (5M), 2505 ~ 2565 (10M), 2507.5 ~ 2562.5 (15M), 2510 ~ 2560 (20M) LTE Band 12 : 699.7 ~ 715.3 (1.4M), 700.5 ~ 714.5 (3M), 701.5 ~ 713.5 (5M), 704 ~ 711 (10M) LTE Band 13 : 779.5 ~ 784.5 (5M), 782 (10M) WLAN : 2412 ~ 2462, 5180 ~ 5240, 5745 ~ 5805 Bluetooth : 2402 ~ 2480
Uplink Modulations	WCDMA : QPSK LTE : QPSK, 16QAM 802.11b : DSSS 802.11a/g/n/ac : OFDM Bluetooth : GFSK, π/4-DQPSK, 8-DPSK, LE
Maximum Tune-up Conducted Power (Unit: dBm)	WCDMA Band II : 24.5 WCDMA Band V : 24.5 LTE Band 2 : 24.0 LTE Band 4 : 24.0 LTE Band 5 : 24.5 LTE Band 7 : 23.0 LTE Band 12 : 24.5 LTE Band 13 : 24.5 WLAN 2.4G : 15.0 WLAN 5.2G : 14.5 WLAN 5.8G : 14.5 Bluetooth : 8.5
Antenna Type	WLAN: PIFA Antenna WWAN: Fixed Internal Antenna
EUT Stage	Production Unit

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.
2. There were Sample A and B for this project, the difference is as below:

SAMPLE	EUT CONFIGURATION INFORMATION
A	(LCD+TP)1+ Battery1 + eMMC 1(16G+2G)+Front Camera1+Back Camera1+ USB Cable1 + Adapter 1
B	(LCD+TP)2+ Battery2 + eMMC 1 (16G+2G)+Front Camera2+Back Camera2 + USB Cable2+ Adapter 2

List of Accessory:

Battery 1	**Brand Name**	Sunwoda
	Model Name	L16D1P34
	Power Rating	3.85Vdc, 4850mAh
	Type	Li-Polymer
Battery 2	**Brand Name**	SCUD
	Model Name	L16D1P34
	Power Rating	3.85Vdc, 4850mAh
	Type	Li-Polymer

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

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

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

$$\mathbf{SAR} = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\mathbf{dm}}\right) = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\boldsymbol{\rho}\mathbf{dv}}\right)$$

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

SAR measurement can be related to the electrical field in the tissue by

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

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

3.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

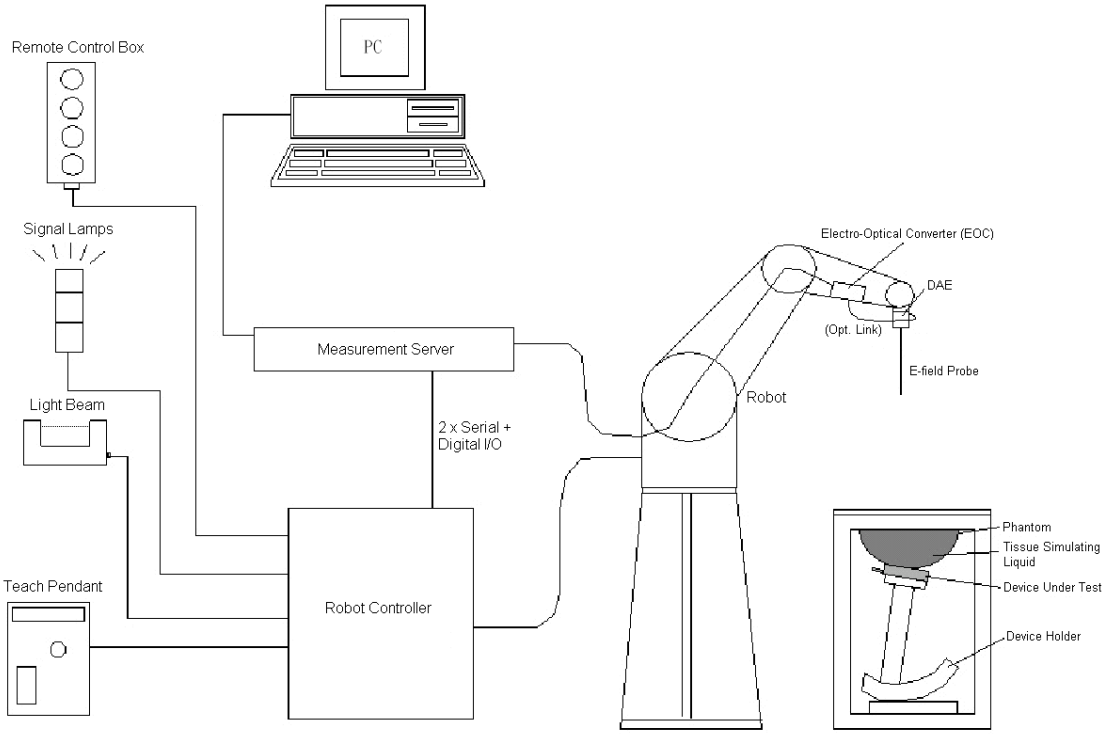


Fig-3.1 DASY System Setup

3.2.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig-3.2 DASY5

3.2.2 Probes

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Model	EX3DV4	
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (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	

Model	ES3DV3	
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	5 µW/g to 100 mW/g Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm	

3.2.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4	
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY 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 fA	
Dimensions	60 x 60 x 68 mm	

3.2.4 Phantoms

Model	Twin SAM	
Construction	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.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	

Model	ELI	
Construction	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.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	

3.2.5 Device Holder

Model	Mounting Device	
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
Material	POM	

Model	Laptop Extensions Kit	
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.	
Material	POM, Acrylic glass, Foam	

3.2.6 System Validation Dipoles

Model	D-Serial	
Construction	Symmetrical dipole with l/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.	
Frequency	750 MHz to 5800 MHz	
Return Loss	> 20 dB	
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)	

3.2.7 Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.

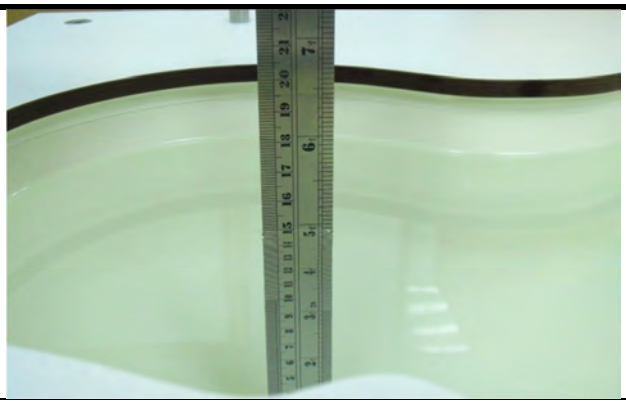
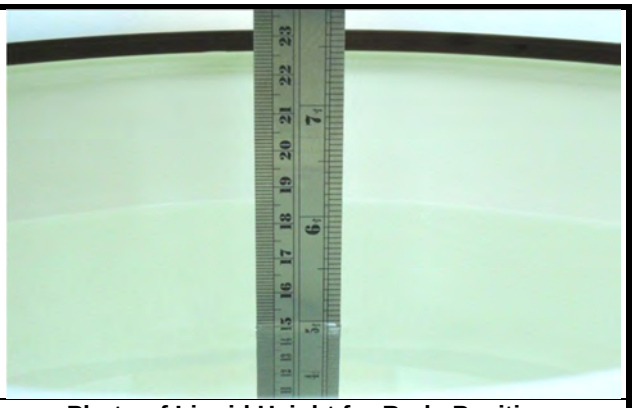
	

Photo of Liquid Height for Head Position	**Photo of Liquid Height for Body Position**

The dielectric properties of the head tissue simulating liquids are defined in IEEE 1528, and KDB 865664 D01 Appendix A. For the body tissue simulating liquids, the dielectric properties are defined in KDB 865664 D01 Appendix A. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using a dielectric assessment kit and a network analyzer.

Table-3.1 Targets of Tissue Simulating Liquid

Frequency (MHz)	Target Permittivity	Range of ±5%	Target Conductivity	Range of ±5%
For Head				
750	41.9	39.8 ~ 44.0	0.89	0.85 ~ 0.93
835	41.5	39.4 ~ 43.6	0.90	0.86 ~ 0.95
900	41.5	39.4 ~ 43.6	0.97	0.92 ~ 1.02
1450	40.5	38.5 ~ 42.5	1.20	1.14 ~ 1.26
1640	40.3	38.3 ~ 42.3	1.29	1.23 ~ 1.35
1750	40.1	38.1 ~ 42.1	1.37	1.30 ~ 1.44
1800	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
1900	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2000	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2300	39.5	37.5 ~ 41.5	1.67	1.59 ~ 1.75
2450	39.2	37.2 ~ 41.2	1.80	1.71 ~ 1.89
2600	39.0	37.1 ~ 41.0	1.96	1.86 ~ 2.06
3500	37.9	36.0 ~ 39.8	2.91	2.76 ~ 3.06
5200	36.0	34.2 ~ 37.8	4.66	4.43 ~ 4.89
5300	35.9	34.1 ~ 37.7	4.76	4.52 ~ 5.00
5500	35.6	33.8 ~ 37.4	4.96	4.71 ~ 5.21
5600	35.5	33.7 ~ 37.3	5.07	4.82 ~ 5.32
5800	35.3	33.5 ~ 37.1	5.27	5.01 ~ 5.53
For Body				
750	55.5	52.7 ~ 58.3	0.96	0.91 ~ 1.01
835	55.2	52.4 ~ 58.0	0.97	0.92 ~ 1.02
900	55.0	52.3 ~ 57.8	1.05	1.00 ~ 1.10
1450	54.0	51.3 ~ 56.7	1.30	1.24 ~ 1.37
1640	53.8	51.1 ~ 56.5	1.40	1.33 ~ 1.47
1750	53.4	50.7 ~ 56.1	1.49	1.42 ~ 1.56
1800	53.3	50.6 ~ 56.0	1.52	1.44 ~ 1.60
1900	53.3	50.6 ~ 56.0	1.52	1.44 ~ 1.60
2000	53.3	50.6 ~ 56.0	1.52	1.44 ~ 1.60
2300	52.9	50.3 ~ 55.5	1.81	1.72 ~ 1.90
2450	52.7	50.1 ~ 55.3	1.95	1.85 ~ 2.05
2600	52.5	49.9 ~ 55.1	2.16	2.05 ~ 2.27
3500	51.3	48.7 ~ 53.9	3.31	3.14 ~ 3.48
5200	49.0	46.6 ~ 51.5	5.30	5.04 ~ 5.57
5300	48.9	46.5 ~ 51.3	5.42	5.15 ~ 5.69
5500	48.6	46.2 ~ 51.0	5.65	5.37 ~ 5.93
5600	48.5	46.1 ~ 50.9	5.77	5.48 ~ 6.06
5800	48.2	45.8 ~ 50.6	6.00	5.70 ~ 6.30

The following table gives the recipes for tissue simulating liquids.

Table-3.2 Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.5	56.0	-	42.1	-
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H900	0.2	-	0.2	1.4	58.0	-	40.2	-
H1450	-	43.3	-	0.6	-	-	56.1	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	47.0	-	0.4	-	-	52.6	-
H1800	-	44.5	-	0.3	-	-	55.2	-
H1900	-	44.5	-	0.2	-	-	55.3	-
H2000	-	44.5	-	0.1	-	-	55.4	-
H2300	-	44.9	-	0.1	-	-	55.0	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H2600	-	45.1	-	0.1	-	-	54.8	-
H3500	-	8.0	-	0.2	-	20.0	71.8	-
H5G	-	-	-	-	-	17.2	65.5	17.3
B750	0.2	-	0.2	0.8	48.8	-	50.0	-
B835	0.2	-	0.2	0.9	48.5	-	50.2	-
B900	0.2	-	0.2	0.9	48.2	-	50.5	-
B1450	-	34.0	-	0.3	-	-	65.7	-
B1640	-	32.5	-	0.3	-	-	67.2	-
B1750	-	31.0	-	0.2	-	-	68.8	-
B1800	-	29.5	-	0.4	-	-	70.1	-
B1900	-	29.5	-	0.3	-	-	70.2	-
B2000	-	30.0	-	0.2	-	-	69.8	-
B2300	-	31.0	-	0.1	-	-	68.9	-
B2450	-	31.4	-	0.1	-	-	68.5	-
B2600	-	31.8	-	0.1	-	-	68.1	-
B3500	-	28.8	-	0.1	-	-	71.1	-
B5G	-	-	-	-	-	10.7	78.6	10.7

3.3 SAR System Verification

The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

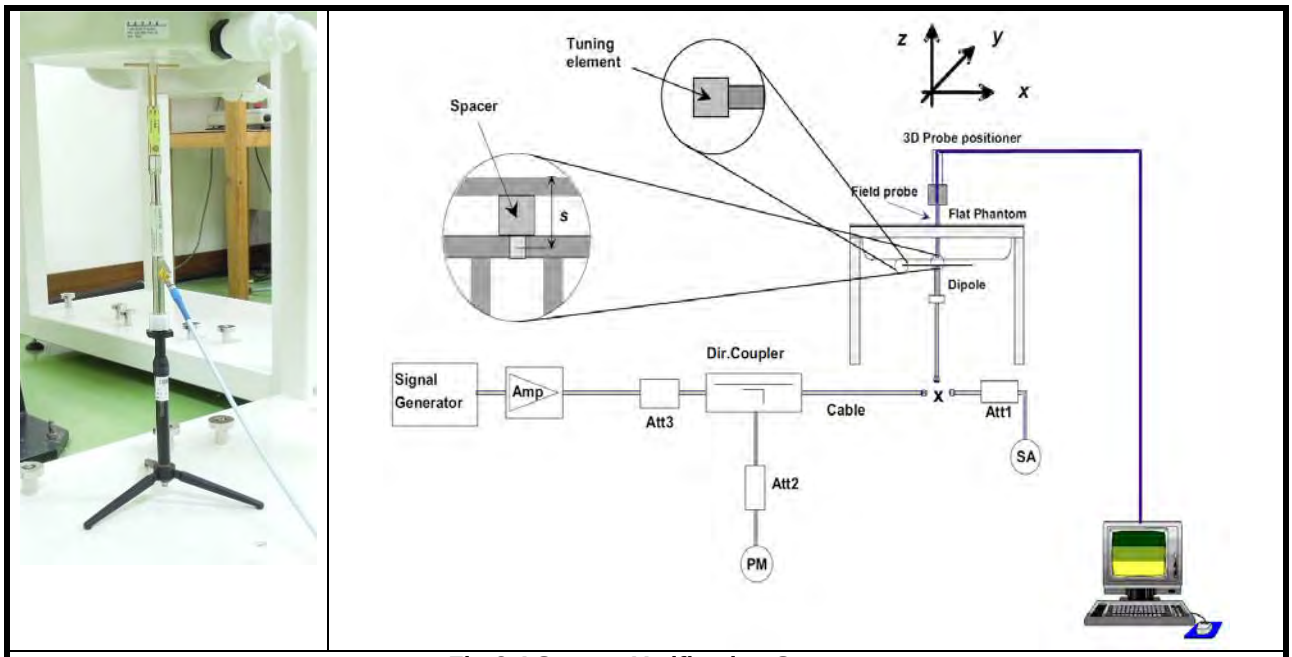


Fig-3.4 System Verification Setup

The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The spectrum analyzer measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) at the dipole connector and the power meter is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter.

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

3.4 SAR Measurement Procedure

According to the SAR test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

The SAR measurement procedures for each of test conditions are as follows:

(a) Make EUT to transmit maximum output power
(b) Measure conducted output power through RF cable
(c) Place the EUT in the specific position of phantom
(d) Perform SAR testing steps on the DASY system
(e) Record the SAR value

3.4.1 Area & Zoom Scan Procedure

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. According to KDB 865664 D01, the resolution for Area and Zoom scan is specified in the table below.

Items	<= 2 GHz	2-3 GHz	3-4 GHz	4-5 GHz	5-6 GHz
Area Scan (Δx, Δy)	<= 15 mm	<= 12 mm	<= 12 mm	<= 10 mm	<= 10 mm
Zoom Scan (Δx, Δy)	<= 8 mm	<= 5 mm	<= 5 mm	<= 4 mm	<= 4 mm
Zoom Scan (Δz)	<= 5 mm	<= 5 mm	<= 4 mm	<= 3 mm	<= 2 mm
Zoom Scan Volume	>= 30 mm	>= 30 mm	>= 28 mm	>= 25 mm	>= 22 mm

Note:

When zoom scan is required and report SAR is <= 1.4 W/kg, the zoom scan resolution of Δx / Δy (2-3GHz: <= 8 mm, 3-4GHz: <= 7 mm, 4-6GHz: <= 5 mm) may be applied.

3.4.2 Volume Scan Procedure

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

3.4.3 Power Drift Monitoring

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

3.4.4 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

3.4.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard’s method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

4. SAR Measurement Evaluation

4.1 EUT Configuration and Setting

<Considerations Related to Proximity Sensor>
FCC KDB 616217 D04 Section 6 was used as guideline for selecting SAR test distance for this device at these additional exposure conditions. Since the proximity sensor activation distance for the Rear face of the device is 16mm, a conservative distance 15mm was tested for SAR on the Rear face at maximum power. Since the proximity sensor activation distance for the Right side of the device is 6mm, a conservative distance 5mm was tested for SAR on the right side at maximum power. Since the proximity sensor activation distance for the Bottom side of the device is 11mm, a conservative distance 10mm was tested for SAR on the Bottom side at maximum power. Sensor triggering distance summary data is included in Document< Technical Description of Power Reduction through Proximity Sensor>.

<Connections between EUT and System Simulator>
For WWAN SAR testing, the EUT was linked and controlled by base station emulator (Agilent E5515C is used for GSM/WCDMA/CDMA, and Anritsu MT8820C is used for LTE). Communication between the EUT and the emulator was established by air link. The distance between the EUT and the communicating antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during SAR testing.

<Considerations Related to WCDMA for Setup and Testing>
WCDMA Handsets Head SAR
SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode.

WCDMA Handsets Body-worn SAR
SAR for body-worn configurations is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode.

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

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

Release 5 HSDPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH / HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c, β_d), and HS-DPCCH power offset parameters (Δ_{ACK}, Δ_{NACK}, Δ_{CQI}) are set according to values indicated in below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs} (1)	CM (dB)(2)	MPR
1	2 / 15	15 / 15	64	2 / 15	4 / 15	0.0	0
2	12 / 15 (3)	15 / 15 (3)	64	12 / 15 (3)	24 / 15	1.0	0
3	15 / 15	8 / 15	64	15 / 8	30 / 15	1.5	0.5
4	15 / 15	4 / 15	64	15 / 4	30 / 15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs} / \beta_c = 30 / 15 \Leftrightarrow \beta_{hs} = 30 / 15 * \beta_c$.
Note 2: CM = 1 for $\beta_c / \beta_d = 12 / 15$, $\beta_{hs} / \beta_c = 24 / 15$.
Note 3: For subtest 2 the β_c / β_d ratio of 12 / 15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11 / 15$ and $\beta_d = 15 / 15$.

Release 6 HSUPA Data Devices

The 3G SAR test reduction procedure is applied to body SAR with 12.2 kbps RMC as the primary mode. Otherwise, body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode. Otherwise, the same HSPA configuration used for body SAR measurements is applied to head exposure testing. Due to inner loop power control requirements in HSPA, a communication test set is required for output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA are configured according to the β values indicated in below.

Sub-test	β_c	β_d	β_d (SF)	β_c / β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11 / 15 (3)	15 / 15 (3)	64	11 / 15 (3)	22 / 15	209 / 225	1039 / 225	4	1	1.0	0.0	20	75
2	6 / 15	15 / 15	64	6 / 15	12 / 15	12 / 15	94 / 75	4	1	3.0	2.0	12	67
3	15 / 15	9 / 15	64	15 / 9	30 / 15	30 / 15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2 / 15	15 / 15	64	2 / 15	4 / 15	2 / 15	56 / 75	4	1	3.0	2.0	17	71
5	15 / 15 (4)	15 / 15 (4)	64	15 / 15 (4)	30 / 15	24 / 15	134 / 15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ A_{hs} = β_{hs} / β_c = 30 / 15 ⇔ β_{hs} = 30 / 15 * β_c.
Note 2: CM = 1 for β_c / β_d = 12 / 15, β_{hs} / β_c = 24 / 15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c / β_d ratio of 11 / 15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10 / 15 and β_d = 15 / 15.
Note 4: For subtest 5 the β_c / β_d ratio of 15 / 15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14 / 15 and β_d = 15 / 15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

<Considerations Related to LTE for Setup and Testing>

This device contains LTE transmitter which follows 3GPP standards, is category 3, supports both QPSK and 16QAM modulations, and supported LTE band and channel bandwidth is listed in below. The output power was tested per 3GPP TS 36.521-1 maximum transmit procedures for both QPSK and 16QAM modulation. The results please refer to section 4.6 of this report.

EUT Supported LTE Band and Channel Bandwidth						
LTE Band	**BW 1.4 MHz**	**BW 3 MHz**	**BW 5 MHz**	**BW 10 MHz**	**BW 15 MHz**	**BW 20 MHz**
2	**V**	**V**	**V**	**V**	**V**	**V**
4	**V**	**V**	**V**	**V**	**V**	**V**
5	**V**	**V**	**V**	**V**		
7			**V**	**V**	**V**	**V**
12	**V**	**V**	**V**	**V**		
13			**V**	**V**		

The LTE maximum power reduction (MPR) in accordance with 3GPP TS 36.101 is active all times during LTE operation. The allowed MPR for the maximum output power is specified in below.

Modulation	**Channel Bandwidth / RB Configurations**						**LTE MPR Setting (dB)**
	BW 1.4 MHz	**BW 3 MHz**	**BW 5 MHz**	**BW 10 MHz**	**BW 15 MHz**	**BW 20 MHz**	
QPSK	**> 5**	**> 4**	**> 8**	**> 12**	**> 16**	**> 18**	**1**
16QAM	**<= 5**	**<= 4**	**<= 8**	**<= 12**	**<= 16**	**<= 18**	**1**
16QAM	**> 5**	**> 4**	**> 8**	**> 12**	**> 16**	**> 18**	**2**

Note: MPR is according to the standard and implemented in the circuit (mandatory).

In addition, the device is compliant with additional maximum power reduction (A-MPR) requirements defined in 3GPP TS 36.101 section 6.2.4 that was disabled for all FCC compliance testing.

During LTE SAR testing, the related parameters of operating band, channel bandwidth, uplink channel number, modulation type, and RB was set in base station simulator. When the EUT has registered and communicated to base station simulator, the simulator set to make EUT transmitting the maximum radiated power.

<Considerations Related to WLAN for Setup and Testing>

In general, various vendor specific external test software and chipset based internal test modes are typically used for SAR measurement. These chipset based test mode utilities are generally hardware and manufacturer dependent, and often include substantial flexibility to reconfigure or reprogram a device. 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. The test frequencies established using test mode must correspond to the actual channel frequencies. When 802.11 frame gaps are accounted for in

the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR correctly. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

According to KDB 248227 D01, this device has installed WLAN engineering testing software which can provide continuous transmitting RF signal. During WLAN SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

Initial Test Configuration

An initial test configuration is determined for OFDM transmission modes in 2.4 GHz and 5 GHz bands 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. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.

Subsequent Test Configuration

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. Additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. When the highest reported SAR for the initial test configuration 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.

SAR Test Configuration and Channel Selection

When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the initial test configuration is using largest channel bandwidth, lowest order modulation, lowest data rate, and lowest order 802.11 mode (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.

1) The channel closest to mid-band frequency is selected for SAR measurement.

2) 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.

Test Reduction for U-NII-1 (5.2 GHz)

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).

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.

<Considerations Related to Bluetooth for Setup and Testing>

This device has installed Bluetooth engineering testing software which can provide continuous transmitting RF signal. During Bluetooth SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

4.2 EUT Testing Position

4.2.1 Body Exposure Conditions

For full-size tablet, according to KDB 616217 D04, SAR evaluation is required for back surface and edges of the devices. The back surface and edges of the tablet are tested with the tablet touching the phantom. Exposures from antennas through the front surface of the display section of a tablet are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary. When voice mode is supported on a tablet and it is limited to speaker mode or headset operations only, additional SAR testing for this type of voice use is not required.

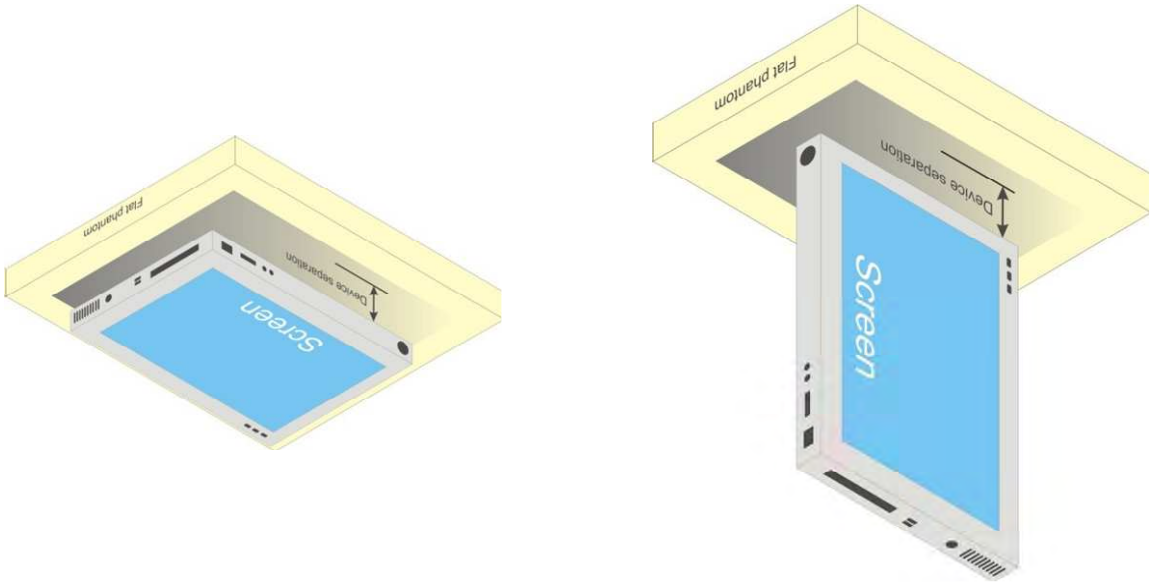


Fig-4.1 Illustration for Tablet Setup

4.2.2 SAR Test Exclusion Evaluations

According to KDB 447498 D01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

1. For the test separation distance <= 50 mm

$$\frac{\textbf{Max. Tune up Power}_{(mW)}}{\textbf{Min. Test Separation Distance}_{(mm)}} \times \sqrt{f_{(GHz)}} \leq 3.0 \text{ for SAR-1g, } \leq 7.5 \text{ for SAR-10g}$$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2. For the test separation distance > 50 mm, and the frequency at 100 MHz to 1500 MHz

$$\left[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\text{ mm}) \times \left(\frac{f_{(MHz)}}{150}\right)\right]_{(mW)}$$

3. For the test separation distance > 50 mm, and the frequency at > 1500 MHz to 6 GHz

$$[(\text{Threshold at 50 mm in Step 1}) + (\text{Test Separation Distance} - 50\text{ mm}) \times 10]_{(mW)}$$

<For WWAN Ant-0>

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Rear Face			Left Side			Right Side			Top Side			Bottom Side		
			Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?
WCDMA II	24.5	281.84	5	77.9	Yes	5	77.9	Yes	80	409 mW	No	200	1609 mW	No	5	77.9	Yes
LTE 2	24.0	251.19	5	69.4	Yes	5	69.4	Yes	80	409 mW	No	200	1609 mW	No	5	69.4	Yes
LTE 4	24.0	251.19	5	66.5	Yes	5	66.5	Yes	80	413 mW	No	200	1613 mW	No	5	66.5	Yes
LTE 7	23.0	199.53	5	63.8	Yes	5	63.8	Yes	80	394 mW	No	200	1594 mW	No	5	63.8	Yes

<For WWAN Ant-1>

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Rear Face			Left Side			Right Side			Top Side			Bottom Side		
			Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?
WCDMA v	24.5	281.84	5	51.9	Yes	82	344 mW	No	5	51.9	Yes	200	1010 mW	No	5	51.9	Yes
LTE 5	24.5	281.84	5	51.9	Yes	82	344 mW	No	5	51.9	Yes	200	1010 mW	No	5	51.9	Yes
LTE 12	24.5	281.84	5	47.6	Yes	82	330 mW	No	5	47.6	Yes	200	892 mW	No	5	47.6	Yes
LTE 13	24.5	281.84	5	49.9	Yes	82	337 mW	No	5	49.9	Yes	200	954 mW	No	5	49.9	Yes

<For WLAN Ant-0 & BT Ant>

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Rear Face			Left Side			Right Side			Top Side			Bottom Side		
			Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?	Ant. to Surface (mm)	Calculated Result	Require SAR Testing?
WLAN 2.4G	15.0	31.62	5	9.9	Yes	5	9.9	Yes	110	696 mW	No	5	9.9	Yes	192	1516 mW	No
WLAN 5.2G	14.5	28.18	5	12.9	Yes	5	12.9	Yes	110	666 mW	No	5	12.9	Yes	192	1486 mW	No
WLAN 5.8G	14.5	28.18	5	13.6	Yes	5	13.6	Yes	110	662 mW	No	5	13.6	Yes	192	1482 mW	No
BT	8.5	7.08	5	2.2	No	5	2.2	No	110	695 mW	No	5	2.2	No	192	1515 mW	No

Note:

1. When separation distance <= 50 mm and the calculated result shown in above table is <= 3.0 for SAR-1g exposure condition, or <= 7.5 for SAR-10g exposure condition, the SAR testing exclusion is applied.
2. When separation distance > 50 mm and the device output power is less than the calculated result (power threshold, mW) shown in above table, the SAR testing exclusion is applied.

4.2.3 Simultaneous Transmission Possibilities

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Body Exposure Condition
1	WCDMA II (Voice / Data) + WLAN (Data)	Yes
2	WCDMA V (Voice / Data) + WLAN (Data)	Yes
3	LTE 2 (Data) + WLAN (Data)	Yes
4	LTE 4 (Data) + WLAN (Data)	Yes
5	LTE 5 (Data) + WLAN (Data)	Yes
6	LTE 7 (Data) + WLAN (Data)	Yes
7	LTE 12 (Data) + WLAN (Data)	Yes
8	LTE 13 (Data) + WLAN (Data)	Yes
9	WCDMA II (Voice / Data) + BT (Data)	Yes
10	WCDMA V (Voice / Data) + BT (Data)	Yes
11	LTE 2 (Data) + BT (Data)	Yes
12	LTE 4 (Data) + BT (Data)	Yes
13	LTE 5 (Data) + BT (Data)	Yes
14	LTE 7 (Data) + BT (Data)	Yes
15	LTE 12 (Data) + BT (Data)	Yes
16	LTE 13 (Data) + BT (Data)	Yes

Note :

1. The 2.4G WLAN and 5G WLAN cannot transmit simultaneously.
2. The WLAN and Bluetooth cannot transmit simultaneously, so there is no co-location test requirement for WLAN and Bluetooth.
3. Only 2.4G WLAN (802.11b/g/n) supports wireless hotspot capability. 5G WLAN (802.11a/n/ac) does not support wireless hotspot mode.
4. Both WCDMA and LTE can transmit through either antenna-0 or antenna-1. However, only one technology (WCDMA or LTE) can transmit from an antenna at a time, and the other technology transmits through the other antenna.
5. This device does not support voice transmission capability.

4.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Test Date	Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Target Conductivity (σ)	Target Permittivity (ε_r)	Conductivity Deviation (%)	Permittivity Deviation (%)
Apr. 20, 2017	B750	750	21.2	0.963	53.779	0.96	55.50	0.31	-3.10
Apr. 22, 2017	B850	835	21.1	0.992	55.615	0.97	55.20	2.27	0.75
Apr. 18, 2017	B1750	1750	21.2	1.496	54.302	1.49	53.40	0.40	1.69
Apr. 19, 2017	B1900	1900	21.3	1.540	52.220	1.52	53.30	1.32	-2.03
May. 18, 2017	B2450	2450	20.9	1.902	51.459	1.95	52.70	-2.46	-2.35
Apr. 21, 2017	B2600	2600	21.3	2.205	52.277	2.16	52.50	2.08	-0.42
May. 18, 2017	B5G	5250	21.6	5.366	49.229	5.36	48.90	0.11	0.67
May. 18, 2017	B5G	5800	21.6	6.128	48.040	6.00	48.20	2.13	-0.33

Note:

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within ±5% of the target values. Liquid temperature during the SAR testing must be within ±2 □.

4.4 System Validation

The SAR measurement system was validated according to procedures in KDB 865664 D01. The validation status in tabulated summary is as below.

Test Date	Probe S/N	Calibration Point		Measured Conductivity (σ)	Measured Permittivity (ε_r)	Validation for CW			Validation for Modulation		
						Sensitivity Range	Probe Linearity	Probe Isotropy	Modulation Type	Duty Factor	PAR
Apr. 20, 2017	3873	Body	750	0.963	53.779	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 22, 2017	3873	Body	835	0.992	55.615	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 18, 2017	3873	Body	1750	1.496	54.302	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 19, 2017	3873	Body	1900	1.540	52.220	Pass	Pass	Pass	N/A	N/A	N/A
May. 18, 2017	3873	Body	2450	1.902	51.459	Pass	Pass	Pass	OFDM	N/A	Pass
Apr. 21, 2017	3873	Body	2600	2.205	52.277	Pass	Pass	Pass	N/A	N/A	N/A
May. 18, 2017	3873	Body	5250	5.366	49.229	Pass	Pass	Pass	OFDM	N/A	Pass
May. 18, 2017	3873	Body	5800	6.128	48.040	Pass	Pass	Pass	OFDM	N/A	Pass

4.5 System Verification

The measuring result for system verification is tabulated as below.

Test Date	Mode	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Apr. 20, 2017	Body	750	8.77	2.12	8.48	-3.31	1067	3873	1341
Apr. 22, 2017	Body	835	9.60	2.31	9.24	-3.75	4d139	3873	1341
Apr. 18, 2017	Body	1750	37.20	8.70	34.80	-6.45	1071	3873	1341
Apr. 19, 2017	Body	1900	39.70	10.40	41.60	4.79	5d159	3873	1341
May. 18, 2017	Body	2450	52.70	12.50	50.00	-5.12	893	3873	1341
Apr. 21, 2017	Body	2600	57.30	13.40	53.60	-6.46	1110	3873	1341
May. 18, 2017	Body	5250	77.70	7.15	71.50	-7.98	1133	3873	1341
May. 18, 2017	Body	5800	77.00	7.51	75.10	-2.47	1133	3873	1341

Note:

Comparing to the reference SAR value provided by SPEAG, the validation data should be within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.

4.6 Maximum Output Power

4.6.1 Maximum Conducted Power

The maximum conducted average power (Unit: dBm) including tune-up tolerance is shown as below.

Mode	WCDMA Band II (without Power Reduction)	WCDMA Band II (with Power Reduction)	Power Reduction (dB)
RMC 12.2K	24.5	15	9.5
HSDPA	23.0	14	9
HSUPA	23.0	14.5	8.5

Mode	WCDMA Band V (without Power Reduction)	WCDMA Band V (with Power Reduction)	Power Reduction (dB)
RMC 12.2K	24.5	22.0	2.5
HSDPA	23.0	21.0	2.0
HSUPA	23.0	21.0	2.0

Mode	LTE 2 (without Power Reduction)	LTE 2 (with Power Reduction)	Power Reduction (dB)
QPSK / 16QAM	24.0	13.5	10.5

Mode	LTE 4 (without Power Reduction)	LTE 4 (with Power Reduction)	Power Reduction (dB)
QPSK / 16QAM	24.0	16.0	8.0

Mode	LTE 5 (without Power Reduction)	LTE 5 (with Power Reduction)	Power Reduction (dB)
QPSK / 16QAM	24.5	22.0	2.5

Mode	LTE 7 (without Power Reduction)	LTE 7 (with Power Reduction)	Power Reduction (dB)
QPSK / 16QAM	23.0	12.0	11.0

Mode	LTE 12 (without Power Reduction)	LTE 12 (with Power Reduction)	Power Reduction (dB)
QPSK / 16QAM	24.5	21.5	3.0

Mode	LTE 13 (without Power Reduction)	LTE 13 (with Power Reduction)	Power Reduction (dB)
QPSK / 16QAM	24.5	22.0	2.5

Mode	2.4G WLAN	5.2G WLAN	5.8G WLAN
802.11b	15.0	N/A	N/A
802.11g	14.6	N/A	N/A
802.11a	N/A	14.0	14.0
802.11n HT20	14.7	14.5	14.0
802.11n HT40	N/A	14.5	14.5
802.11ac VHT80	N/A	13.0	13.0

Mode	2.4G Bluetooth
GFSK	Ch0-Ch77: 8.5 Ch78: 6.5
π/4-DQPSK	Ch0-Ch77: 6.5 Ch78: 4.5
8-DPSK	Ch0-Ch77: 6.5 Ch78: 4.5
LE	Ch0-Ch38: 0 Ch39: -2

4.6.2 Measured Conducted Power Result

The measuring conducted average power (Unit: dBm) is shown as below.

Band	WCDMA Band II			WCDMA Band V			3GPP MPR (dB)
Channel	9262	9400	9538	4132	4182	4233	
Frequency (MHz)	1852.4	1880.0	1907.6	826.4	836.4	846.6	
EUT without Power Reduction (P-Sensor NOT Triggered)							
RMC 12.2K	23.94	**23.99**	23.93	24.11	24.07	**24.18**	-
HSDPA Subtest-1	22.52	22.57	22.51	22.79	22.75	22.86	0
HSDPA Subtest-2	22.48	22.53	22.47	22.75	22.71	22.82	0
HSDPA Subtest-3	21.96	22.01	21.95	22.27	22.23	22.34	0.5
HSDPA Subtest-4	21.92	21.97	21.91	22.23	22.19	22.30	0.5
HSUPA Subtest-1	22.61	22.66	22.60	22.87	22.83	22.94	0
HSUPA Subtest-2	20.66	20.71	20.65	20.85	20.81	20.92	2
HSUPA Subtest-3	21.63	21.68	21.62	21.82	21.78	21.89	1
HSUPA Subtest-4	20.68	20.73	20.67	20.89	20.85	20.96	2
HSUPA Subtest-5	22.70	22.75	22.69	22.95	22.91	22.98	0
EUT with Power Reduction (P-Sensor Triggered)							
RMC 12.2K	14.50	**14.53**	14.49	21.67	21.63	**21.73**	-
HSDPA Subtest-1	13.64	13.67	13.63	20.35	20.31	20.41	-
HSDPA Subtest-2	13.62	13.65	13.61	20.31	20.27	20.37	-
HSDPA Subtest-3	13.30	13.33	13.29	19.83	19.79	19.89	-
HSDPA Subtest-4	13.28	13.31	13.27	19.79	19.75	19.85	-
HSUPA Subtest-1	13.70	13.73	13.69	20.43	20.39	20.49	-
HSUPA Subtest-2	12.34	12.37	12.33	18.41	18.37	18.47	-
HSUPA Subtest-3	12.99	13.02	12.98	19.38	19.34	19.44	-
HSUPA Subtest-4	12.37	12.40	12.36	18.45	18.41	18.51	-
HSUPA Subtest-5	13.76	13.79	13.75	20.51	20.47	20.57	-

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18607 1850.7 MHz	Mid CH 18900 1880.0 MHz	High CH 19193 1909.3 MHz		Low CH 18607 1850.7 MHz	Mid CH 18900 1880.0 MHz	High CH 19193 1909.3 MHz	
EUT without Power Reduction (P-Sensor NOT Triggered)										
2 / 1.4M	1	0	23.65	23.68	23.56	0	22.65	22.68	22.56	1
	1	2	23.60	23.63	23.51	0	22.60	22.63	22.51	1
	1	5	23.53	23.56	23.44	0	22.57	22.60	22.48	1
	3	0	23.64	23.67	23.55	0	22.63	22.66	22.54	1
	3	1	23.59	23.62	23.50	0	22.58	22.61	22.49	1
	3	3	23.52	23.55	23.43	0	22.55	22.58	22.46	1
	6	0	22.65	22.68	22.56	1	21.66	21.69	21.57	2
EUT with Power Reduction (P-Sensor Triggered)										
2 / 1.4M	1	0	13.02	13.11	13.07	0	12.15	12.24	12.20	1
	1	2	12.99	13.08	13.04	0	12.12	12.21	12.17	1
	1	5	12.95	13.04	13.00	0	12.11	12.20	12.16	1
	3	0	13.01	13.10	13.06	0	12.13	12.22	12.18	1
	3	1	12.98	13.07	13.03	0	12.10	12.19	12.15	1
	3	3	12.94	13.03	12.99	0	12.09	12.18	12.14	1
	6	0	12.16	12.25	12.21	1	11.18	11.27	11.23	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 18615 1851.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19185 1908.5 MHz		Low CH 18615 1851.5 MHz	Mid CH 18900 1880.0 MHz	High CH 19185 1908.5 MHz	
EUT without Power Reduction (P-Sensor NOT Triggered)										
2 / 3M	1	0	23.68	23.71	23.59	0	22.68	22.71	22.59	1
	1	7	23.63	23.66	23.54	0	22.63	22.66	22.54	1
	1	14	23.56	23.59	23.47	0	22.60	22.63	22.51	1
	8	0	22.67	22.70	22.58	1	21.68	21.71	21.59	2
	8	3	22.61	22.64	22.52	1	21.65	21.68	21.56	2
	8	7	22.57	22.60	22.48	1	21.60	21.63	21.51	2
	15	0	22.68	22.71	22.59	1	21.69	21.72	21.60	2
EUT with Power Reduction (P-Sensor Triggered)										
2 / 3M	1	0	13.05	13.14	13.10	0	12.18	12.27	12.23	1
	1	7	13.02	13.11	13.07	0	12.15	12.24	12.20	1
	1	14	12.98	13.07	13.03	0	12.14	12.23	12.19	1
	8	0	12.26	12.35	12.31	1	11.24	11.33	11.29	2
	8	3	12.25	12.34	12.30	1	11.20	11.29	11.25	2
	8	7	12.23	12.32	12.28	1	11.18	11.27	11.23	2
	15	0	12.19	12.28	12.24	1	11.21	11.30	11.26	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18625 1852.5 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19175 1907.5 MHz	3GPP MPR (dB)	16QAM Low CH 18625 1852.5 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19175 1907.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
2 / 5M	1	0	23.71	23.74	23.62	0	22.71	22.74	22.62	1
	1	12	23.66	23.69	23.57	0	22.66	22.69	22.57	1
	1	24	23.59	23.62	23.50	0	22.63	22.66	22.54	1
	12	0	22.70	22.73	22.61	1	21.71	21.74	21.62	2
	12	6	22.64	22.67	22.55	1	21.68	21.71	21.59	2
	12	13	22.60	22.63	22.51	1	21.63	21.66	21.54	2
	25	0	22.71	22.74	22.62	1	21.72	21.75	21.63	2
EUT with Power Reduction (P-Sensor Triggered)										
2 / 5M	1	0	13.08	13.17	13.13	0	12.21	12.30	12.26	1
	1	12	13.05	13.14	13.10	0	12.18	12.27	12.23	1
	1	24	13.01	13.10	13.06	0	12.17	12.26	12.22	1
	12	0	12.29	12.38	12.34	1	11.27	11.36	11.32	2
	12	6	12.28	12.37	12.33	1	11.23	11.32	11.28	2
	12	13	12.26	12.35	12.31	1	11.21	11.30	11.26	2
	25	0	12.22	12.31	12.27	1	11.24	11.33	11.29	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18650 1855.0 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19150 1905.0 MHz	3GPP MPR (dB)	16QAM Low CH 18650 1855.0 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19150 1905.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
2 / 10M	1	0	23.73	23.76	23.64	0	22.73	22.76	22.64	1
	1	24	23.68	23.71	23.59	0	22.68	22.71	22.59	1
	1	49	23.61	23.64	23.52	0	22.65	22.68	22.56	1
	25	0	22.72	22.75	22.63	1	21.73	21.76	21.64	2
	25	12	22.66	22.69	22.57	1	21.70	21.73	21.61	2
	25	25	22.62	22.65	22.53	1	21.65	21.68	21.56	2
	50	0	22.73	22.76	22.64	1	21.74	21.77	21.65	2
EUT with Power Reduction (P-Sensor Triggered)										
2 / 10M	1	0	13.10	13.19	13.15	0	12.23	12.32	12.28	1
	1	24	13.07	13.16	13.12	0	12.20	12.29	12.25	1
	1	49	13.03	13.12	13.08	0	12.19	12.28	12.24	1
	25	0	12.31	12.40	12.36	1	11.29	11.38	11.34	2
	25	12	12.30	12.39	12.35	1	11.25	11.34	11.30	2
	25	25	12.28	12.37	12.33	1	11.23	11.32	11.28	2
	50	0	12.24	12.33	12.29	1	11.26	11.35	11.31	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18675 1857.5 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19125 1902.5 MHz	3GPP MPR (dB)	16QAM Low CH 18675 1857.5 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19125 1902.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
2 / 15M	1	0	23.76	23.79	23.67	0	22.76	22.79	22.67	1
	1	37	23.71	23.74	23.62	0	22.71	22.74	22.62	1
	1	74	23.64	23.67	23.55	0	22.68	22.71	22.59	1
	36	0	22.75	22.78	22.66	1	21.76	21.79	21.67	2
	36	19	22.69	22.72	22.60	1	21.73	21.76	21.64	2
	36	39	22.65	22.68	22.56	1	21.68	21.71	21.59	2
	75	0	22.76	22.79	22.67	1	21.77	21.80	21.68	2
EUT with Power Reduction (P-Sensor Triggered)										
2 / 15M	1	0	13.13	13.22	13.18	0	12.26	12.35	12.31	1
	1	37	13.10	13.19	13.15	0	12.23	12.32	12.28	1
	1	74	13.06	13.15	13.11	0	12.22	12.31	12.27	1
	36	0	12.34	12.43	12.39	1	11.32	11.41	11.37	2
	36	19	12.33	12.42	12.38	1	11.28	11.37	11.33	2
	36	39	12.31	12.40	12.36	1	11.26	11.35	11.31	2
	75	0	12.27	12.36	12.32	1	11.29	11.38	11.34	2

Band / BW	RB Size	RB Offset	QPSK Low CH 18700 1860.0 MHz	QPSK Mid CH 18900 1880.0 MHz	QPSK High CH 19100 1900.0 MHz	3GPP MPR (dB)	16QAM Low CH 18700 1860.0 MHz	16QAM Mid CH 18900 1880.0 MHz	16QAM High CH 19100 1900.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
2 / 20M	1	0	23.81	**23.84**	23.72	0	22.81	22.84	22.72	1
	1	50	23.76	23.79	23.67	0	22.76	22.79	22.67	1
	1	99	23.69	23.72	23.60	0	22.73	22.76	22.64	1
	50	0	22.80	22.83	22.71	1	21.81	21.84	21.72	2
	50	25	22.74	22.77	22.65	1	21.78	21.81	21.69	2
	50	50	22.70	22.73	22.61	1	21.73	21.76	21.64	2
	100	0	22.81	22.84	22.72	1	21.82	21.85	21.73	2
EUT with Power Reduction (P-Sensor Triggered)										
2 / 20M	1	0	13.18	**13.27**	13.23	0	12.31	12.40	12.36	1
	1	50	13.15	13.24	13.20	0	12.28	12.37	12.33	1
	1	99	13.11	13.20	13.16	0	12.27	12.36	12.32	1
	50	0	12.39	12.48	12.44	1	11.37	11.46	11.42	2
	50	25	12.38	12.47	12.43	1	11.33	11.42	11.38	2
	50	50	12.36	12.45	12.41	1	11.31	11.40	11.36	2
	100	0	12.32	12.41	12.37	1	11.34	11.43	11.39	2

Band / BW	RB Size	RB Offset	QPSK Low CH 19957 1710.7 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20393 1754.3 MHz	3GPP MPR (dB)	16QAM Low CH 19957 1710.7 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20393 1754.3 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
4 / 1.4M	1	0	23.44	23.70	23.62	0	22.38	22.64	22.56	1
	1	2	23.38	23.64	23.56	0	22.32	22.58	22.50	1
	1	5	23.32	23.58	23.50	0	22.28	22.54	22.46	1
	3	0	23.42	23.68	23.60	0	22.37	22.63	22.55	1
	3	1	23.36	23.62	23.54	0	22.31	22.57	22.49	1
	3	3	23.30	23.56	23.48	0	22.27	22.53	22.45	1
	6	0	22.39	22.65	22.57	1	21.28	21.54	21.46	2
EUT with Power Reduction (P-Sensor Triggered)										
4 / 1.4M	1	0	15.21	15.41	15.32	0	14.49	14.69	14.60	1
	1	2	15.17	15.37	15.28	0	14.45	14.65	14.56	1
	1	5	15.13	15.33	15.24	0	14.42	14.62	14.53	1
	3	0	15.19	15.39	15.30	0	14.48	14.68	14.59	1
	3	1	15.15	15.35	15.26	0	14.44	14.64	14.55	1
	3	3	15.11	15.31	15.22	0	14.41	14.61	14.52	1
	6	0	14.50	14.70	14.61	1	13.40	13.60	13.51	2

Band / BW	RB Size	RB Offset	QPSK Low CH 19965 1711.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20385 1753.5 MHz	3GPP MPR (dB)	16QAM Low CH 19965 1711.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20385 1753.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
4 / 3M	1	0	23.45	23.71	23.63	0	22.39	22.65	22.57	1
	1	7	23.39	23.65	23.57	0	22.33	22.59	22.51	1
	1	14	23.33	23.59	23.51	0	22.29	22.55	22.47	1
	8	0	22.39	22.65	22.57	1	21.42	21.68	21.60	2
	8	3	22.34	22.60	22.52	1	21.39	21.65	21.57	2
	8	7	22.31	22.57	22.49	1	21.34	21.60	21.52	2
	15	0	22.40	22.66	22.58	1	21.29	21.55	21.47	2
EUT with Power Reduction (P-Sensor Triggered)										
4 / 3M	1	0	15.22	15.42	15.33	0	14.50	14.70	14.61	1
	1	7	15.18	15.38	15.29	0	14.46	14.66	14.57	1
	1	14	15.14	15.34	15.25	0	14.43	14.63	14.54	1
	8	0	14.51	14.71	14.62	1	13.42	13.62	13.53	2
	8	3	14.48	14.68	14.59	1	13.36	13.56	13.47	2
	8	7	14.45	14.65	14.56	1	13.31	13.51	13.42	2
	15	0	14.51	14.71	14.62	1	13.41	13.61	13.52	2

Band / BW	RB Size	RB Offset	QPSK Low CH 19975 1712.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20375 1752.5 MHz	3GPP MPR (dB)	16QAM Low CH 19975 1712.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20375 1752.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
4 / 5M	1	0	23.48	23.74	23.66	0	22.42	22.68	22.60	1
	1	12	23.42	23.68	23.60	0	22.36	22.62	22.54	1
	1	24	23.36	23.62	23.54	0	22.32	22.58	22.50	1
	12	0	22.42	22.68	22.60	1	21.45	21.71	21.63	2
	12	6	22.37	22.63	22.55	1	21.42	21.68	21.60	2
	12	13	22.34	22.60	22.52	1	21.37	21.63	21.55	2
	25	0	22.43	22.69	22.61	1	21.32	21.58	21.50	2
EUT with Power Reduction (P-Sensor Triggered)										
4 / 5M	1	0	15.25	15.45	15.36	0	14.53	14.73	14.64	1
	1	12	15.21	15.41	15.32	0	14.49	14.69	14.60	1
	1	24	15.17	15.37	15.28	0	14.46	14.66	14.57	1
	12	0	14.54	14.74	14.65	1	13.45	13.65	13.56	2
	12	6	14.51	14.71	14.62	1	13.39	13.59	13.50	2
	12	13	14.48	14.68	14.59	1	13.34	13.54	13.45	2
	25	0	14.54	14.74	14.65	1	13.44	13.64	13.55	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20000 1715.0 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20350 1750.0 MHz	3GPP MPR (dB)	16QAM Low CH 20000 1715.0 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20350 1750.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
4 / 10M	1	0	23.52	23.78	23.70	0	22.46	22.72	22.64	1
	1	24	23.46	23.72	23.64	0	22.40	22.66	22.58	1
	1	49	23.40	23.66	23.58	0	22.36	22.62	22.54	1
	25	0	22.46	22.72	22.64	1	21.49	21.75	21.67	2
	25	12	22.41	22.67	22.59	1	21.46	21.72	21.64	2
	25	25	22.38	22.64	22.56	1	21.41	21.67	21.59	2
	50	0	22.47	22.73	22.65	1	21.36	21.62	21.54	2
EUT with Power Reduction (P-Sensor Triggered)										
4 / 10M	1	0	15.29	15.49	15.40	0	14.57	14.77	14.68	1
	1	24	15.25	15.45	15.36	0	14.53	14.73	14.64	1
	1	49	15.21	15.41	15.32	0	14.50	14.70	14.61	1
	25	0	14.58	14.78	14.69	1	13.49	13.69	13.60	2
	25	12	14.55	14.75	14.66	1	13.43	13.63	13.54	2
	25	25	14.52	14.72	14.63	1	13.38	13.58	13.49	2
	50	0	14.58	14.78	14.69	1	13.48	13.68	13.59	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20025 1717.5 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20325 1747.5 MHz	3GPP MPR (dB)	16QAM Low CH 20025 1717.5 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20325 1747.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
4 / 15M	1	0	23.58	23.84	23.76	0	22.52	22.78	22.70	1
	1	37	23.52	23.78	23.70	0	22.46	22.72	22.64	1
	1	74	23.46	23.72	23.64	0	22.42	22.68	22.60	1
	36	0	22.52	22.78	22.70	1	21.55	21.81	21.73	2
	36	19	22.47	22.73	22.65	1	21.52	21.78	21.70	2
	36	39	22.44	22.70	22.62	1	21.47	21.73	21.65	2
	75	0	22.53	22.79	22.71	1	21.42	21.68	21.60	2
EUT with Power Reduction (P-Sensor Triggered)										
4 / 15M	1	0	15.35	15.55	15.46	0	14.63	14.83	14.74	1
	1	37	15.31	15.51	15.42	0	14.59	14.79	14.70	1
	1	74	15.27	15.47	15.38	0	14.56	14.76	14.67	1
	36	0	14.64	14.84	14.75	1	13.55	13.75	13.66	2
	36	19	14.61	14.81	14.72	1	13.49	13.69	13.60	2
	36	39	14.58	14.78	14.69	1	13.44	13.64	13.55	2
	75	0	14.64	14.84	14.75	1	13.54	13.74	13.65	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20050 1720.0 MHz	QPSK Mid CH 20175 1732.5 MHz	QPSK High CH 20300 1745.0 MHz	3GPP MPR (dB)	16QAM Low CH 20050 1720.0 MHz	16QAM Mid CH 20175 1732.5 MHz	16QAM High CH 20300 1745.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
4 / 20M	1	0	23.61	**23.87**	23.79	0	22.55	22.81	22.73	1
	1	50	23.55	23.81	23.73	0	22.49	22.75	22.67	1
	1	99	23.49	23.75	23.67	0	22.45	22.71	22.63	1
	50	0	22.55	22.81	22.73	1	21.58	21.84	21.76	2
	50	25	22.50	22.76	22.68	1	21.55	21.81	21.73	2
	50	50	22.47	22.73	22.65	1	21.50	21.76	21.68	2
	100	0	22.56	22.82	22.74	1	21.45	21.71	21.63	2
EUT with Power Reduction (P-Sensor Triggered)										
4 / 20M	1	0	15.38	**15.58**	15.49	0	14.66	14.86	14.77	1
	1	50	15.34	15.54	15.45	0	14.62	14.82	14.73	1
	1	99	15.30	15.50	15.41	0	14.59	14.79	14.70	1
	50	0	14.67	14.87	14.78	1	13.58	13.78	13.69	2
	50	25	14.64	14.84	14.75	1	13.52	13.72	13.63	2
	50	50	14.61	14.81	14.72	1	13.47	13.67	13.58	2
	100	0	14.67	14.87	14.78	1	13.57	13.77	13.68	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 20407 824.7 MHz	Mid CH 20525 836.5 MHz	High CH 20643 848.3 MHz		Low CH 20407 824.7 MHz	Mid CH 20525 836.5 MHz	High CH 20643 848.3 MHz	
EUT without Power Reduction (P-Sensor NOT Triggered)										
5 / 1.4M	1	0	23.89	23.95	23.81	0	22.67	22.73	22.59	1
	1	2	23.83	23.89	23.75	0	22.64	22.70	22.56	1
	1	5	23.78	23.84	23.70	0	22.60	22.66	22.52	1
	3	0	23.87	23.93	23.79	0	22.66	22.72	22.58	1
	3	1	23.81	23.87	23.73	0	22.63	22.69	22.55	1
	3	3	23.76	23.82	23.68	0	22.59	22.65	22.51	1
	6	0	22.81	22.87	22.73	1	21.99	22.05	21.91	2
EUT with Power Reduction (P-Sensor Triggered)										
5 / 1.4M	1	0	21.54	21.59	21.49	0	20.41	20.46	20.36	1
	1	2	21.49	21.54	21.44	0	20.38	20.43	20.33	1
	1	5	21.44	21.49	21.39	0	20.34	20.39	20.29	1
	3	0	21.52	21.57	21.47	0	20.40	20.45	20.35	1
	3	1	21.47	21.52	21.42	0	20.37	20.42	20.32	1
	3	3	21.42	21.47	21.37	0	20.33	20.38	20.28	1
	6	0	20.54	20.59	20.49	1	19.78	19.83	19.73	2

Band / BW	RB Size	RB Offset	QPSK			3GPP MPR (dB)	16QAM			3GPP MPR (dB)
			Low CH 20415 825.5 MHz	Mid CH 20525 836.5 MHz	High CH 20635 847.5 MHz		Low CH 20415 825.5 MHz	Mid CH 20525 836.5 MHz	High CH 20635 847.5 MHz	
EUT without Power Reduction (P-Sensor NOT Triggered)										
5 / 3M	1	0	23.93	23.99	23.85	0	22.71	22.77	22.63	1
	1	7	23.87	23.93	23.79	0	22.68	22.74	22.60	1
	1	14	23.82	23.88	23.74	0	22.64	22.70	22.56	1
	8	0	22.86	22.92	22.78	1	21.99	22.05	21.91	2
	8	3	22.83	22.89	22.75	1	21.96	22.02	21.88	2
	8	7	22.79	22.85	22.71	1	21.92	21.98	21.84	2
	15	0	22.85	22.91	22.77	1	22.03	22.09	21.95	2
EUT with Power Reduction (P-Sensor Triggered)										
5 / 3M	1	0	21.58	21.63	21.53	0	20.45	20.50	20.40	1
	1	7	21.53	21.58	21.48	0	20.42	20.47	20.37	1
	1	14	21.48	21.53	21.43	0	20.38	20.43	20.33	1
	8	0	20.61	20.66	20.56	1	19.79	19.84	19.74	2
	8	3	20.57	20.62	20.52	1	19.76	19.81	19.71	2
	8	7	20.53	20.58	20.48	1	19.72	19.77	19.67	2
	15	0	20.58	20.63	20.53	1	19.82	19.87	19.77	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20425 826.5 MHz	QPSK Mid CH 20525 836.5 MHz	QPSK High CH 20625 846.5 MHz	3GPP MPR (dB)	16QAM Low CH 20425 826.5 MHz	16QAM Mid CH 20525 836.5 MHz	16QAM High CH 20625 846.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
5 / 5M	1	0	23.99	24.05	23.91	0	22.77	22.83	22.69	1
	1	12	23.93	23.99	23.85	0	22.74	22.80	22.66	1
	1	24	23.88	23.94	23.80	0	22.70	22.76	22.62	1
	12	0	22.92	22.98	22.84	1	22.05	22.11	21.97	2
	12	6	22.89	22.95	22.81	1	22.02	22.08	21.94	2
	12	13	22.85	22.91	22.77	1	21.98	22.04	21.90	2
	25	0	22.91	22.97	22.83	1	22.09	22.15	22.01	2
EUT with Power Reduction (P-Sensor Triggered)										
5 / 5M	1	0	21.64	21.69	21.59	0	20.51	20.56	20.46	1
	1	12	21.59	21.64	21.54	0	20.48	20.53	20.43	1
	1	24	21.54	21.59	21.49	0	20.44	20.49	20.39	1
	12	0	20.67	20.72	20.62	1	19.85	19.90	19.80	2
	12	6	20.63	20.68	20.58	1	19.82	19.87	19.77	2
	12	13	20.59	20.64	20.54	1	19.78	19.83	19.73	2
	25	0	20.64	20.69	20.59	1	19.88	19.93	19.83	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20450 829.0 MHz	QPSK Mid CH 20525 836.5 MHz	QPSK High CH 20600 844.0 MHz	3GPP MPR (dB)	16QAM Low CH 20450 829.0 MHz	16QAM Mid CH 20525 836.5 MHz	16QAM High CH 20600 844.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
5 / 10M	1	0	24.02	**24.08**	23.94	0	22.80	22.86	22.72	1
	1	24	23.96	24.02	23.88	0	22.77	22.83	22.69	1
	1	49	23.91	23.97	23.83	0	22.73	22.79	22.65	1
	25	0	22.95	23.01	22.87	1	22.08	22.14	22.00	2
	25	12	22.92	22.98	22.84	1	22.05	22.11	21.97	2
	25	25	22.88	22.94	22.80	1	22.01	22.07	21.93	2
	50	0	22.94	23.00	22.86	1	22.12	22.18	22.04	2
EUT with Power Reduction (P-Sensor Triggered)										
5 / 10M	1	0	21.67	**21.72**	21.62	0	20.54	20.59	20.49	1
	1	24	21.62	21.67	21.57	0	20.51	20.56	20.46	1
	1	49	21.57	21.62	21.52	0	20.47	20.52	20.42	1
	25	0	20.70	20.75	20.65	1	19.88	19.93	19.83	2
	25	12	20.66	20.71	20.61	1	19.85	19.90	19.80	2
	25	25	20.62	20.67	20.57	1	19.81	19.86	19.76	2
	50	0	20.67	20.72	20.62	1	19.91	19.96	19.86	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20775 2502.5 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21425 2567.5 MHz	3GPP MPR (dB)	16QAM Low CH 20775 2502.5 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21425 2567.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
7 / 5M	1	0	22.38	22.60	22.35	0	21.36	21.58	21.33	1
	1	12	22.33	22.55	22.30	0	21.32	21.54	21.29	1
	1	24	22.26	22.48	22.23	0	21.28	21.50	21.25	1
	12	0	21.52	21.74	21.49	1	20.64	20.86	20.61	2
	12	6	21.49	21.71	21.46	1	20.59	20.81	20.56	2
	12	13	21.46	21.68	21.43	1	20.54	20.76	20.51	2
	25	0	21.50	21.72	21.47	1	20.66	20.88	20.63	2
EUT with Power Reduction (P-Sensor Triggered)										
7 / 5M	1	0	11.34	11.43	11.26	0	10.44	10.53	10.36	1
	1	12	11.31	11.40	11.23	0	10.40	10.49	10.32	1
	1	24	11.27	11.36	11.19	0	10.37	10.46	10.29	1
	12	0	10.57	10.66	10.49	1	9.44	9.53	9.36	2
	12	6	10.53	10.62	10.45	1	9.41	9.50	9.33	2
	12	13	10.50	10.59	10.42	1	9.38	9.47	9.30	2
	25	0	10.53	10.62	10.45	1	9.45	9.54	9.37	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20800 2505.0 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21400 2565.0 MHz	3GPP MPR (dB)	16QAM Low CH 20800 2505.0 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21400 2565.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
7 / 10M	1	0	22.42	22.64	22.39	0	21.40	21.62	21.37	1
	1	24	22.37	22.59	22.34	0	21.36	21.58	21.33	1
	1	49	22.30	22.52	22.27	0	21.32	21.54	21.29	1
	25	0	21.56	21.78	21.53	1	20.68	20.90	20.65	2
	25	12	21.53	21.75	21.50	1	20.63	20.85	20.60	2
	25	25	21.50	21.72	21.47	1	20.58	20.80	20.55	2
	50	0	21.54	21.76	21.51	1	20.70	20.92	20.67	2
EUT with Power Reduction (P-Sensor Triggered)										
7 / 10M	1	0	11.38	11.47	11.30	0	10.48	10.57	10.40	1
	1	24	11.35	11.44	11.27	0	10.44	10.53	10.36	1
	1	49	11.31	11.40	11.23	0	10.41	10.50	10.33	1
	25	0	10.61	10.70	10.53	1	9.48	9.57	9.40	2
	25	12	10.57	10.66	10.49	1	9.45	9.54	9.37	2
	25	25	10.54	10.63	10.46	1	9.42	9.51	9.34	2
	50	0	10.57	10.66	10.49	1	9.49	9.58	9.41	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20825 2507.5 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21375 2562.5 MHz	3GPP MPR (dB)	16QAM Low CH 20825 2507.5 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21375 2562.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
7 / 15M	1	0	22.48	22.70	22.45	0	21.46	21.68	21.43	1
	1	37	22.43	22.65	22.40	0	21.42	21.64	21.39	1
	1	74	22.36	22.58	22.33	0	21.38	21.60	21.35	1
	36	0	21.62	21.84	21.59	1	20.74	20.96	20.71	2
	36	19	21.59	21.81	21.56	1	20.69	20.91	20.66	2
	36	39	21.56	21.78	21.53	1	20.64	20.86	20.61	2
	75	0	21.60	21.82	21.57	1	20.76	20.98	20.73	2
EUT with Power Reduction (P-Sensor Triggered)										
7 / 15M	1	0	11.44	11.53	11.36	0	10.54	10.63	10.46	1
	1	37	11.41	11.50	11.33	0	10.50	10.59	10.42	1
	1	74	11.37	11.46	11.29	0	10.47	10.56	10.39	1
	36	0	10.67	10.76	10.59	1	9.54	9.63	9.46	2
	36	19	10.63	10.72	10.55	1	9.51	9.60	9.43	2
	36	39	10.60	10.69	10.52	1	9.48	9.57	9.40	2
	75	0	10.63	10.72	10.55	1	9.55	9.64	9.47	2

Band / BW	RB Size	RB Offset	QPSK Low CH 20850 2510.0 MHz	QPSK Mid CH 21100 2535.0 MHz	QPSK High CH 21350 2560.0 MHz	3GPP MPR (dB)	16QAM Low CH 20850 2510.0 MHz	16QAM Mid CH 21100 2535.0 MHz	16QAM High CH 21350 2560.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
7 / 20M	1	0	22.51	**22.73**	22.48	0	21.49	21.71	21.46	1
	1	50	22.46	22.68	22.43	0	21.45	21.67	21.42	1
	1	99	22.39	22.61	22.36	0	21.41	21.63	21.38	1
	50	0	21.65	21.87	21.62	1	20.77	20.99	20.74	2
	50	25	21.62	21.84	21.59	1	20.72	20.94	20.69	2
	50	50	21.59	21.81	21.56	1	20.67	20.89	20.64	2
	100	0	21.63	21.85	21.60	1	20.79	21.01	20.76	2
EUT with Power Reduction (P-Sensor Triggered)										
7 / 20M	1	0	11.47	**11.56**	11.39	0	10.57	10.66	10.49	1
	1	50	11.44	11.53	11.36	0	10.53	10.62	10.45	1
	1	99	11.40	11.49	11.32	0	10.50	10.59	10.42	1
	50	0	10.70	10.79	10.62	1	9.57	9.66	9.49	2
	50	25	10.66	10.75	10.58	1	9.54	9.63	9.46	2
	50	50	10.63	10.72	10.55	1	9.51	9.60	9.43	2
	100	0	10.66	10.75	10.58	1	9.58	9.67	9.50	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23017 699.7 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23173 715.3 MHz	3GPP MPR (dB)	16QAM Low CH 23017 699.7 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23173 715.3 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
12 / 1.4M	1	0	23.72	24.02	23.99	0	22.56	22.86	22.83	1
	1	2	23.68	23.98	23.95	0	22.48	22.78	22.75	1
	1	5	23.65	23.95	23.92	0	22.44	22.74	22.71	1
	3	0	23.70	24.00	23.97	0	22.55	22.85	22.82	1
	3	1	23.66	23.96	23.93	0	22.47	22.77	22.74	1
	3	3	23.63	23.93	23.90	0	22.43	22.73	22.70	1
	6	0	22.68	22.98	22.95	1	21.69	21.99	21.96	2
EUT with Power Reduction (P-Sensor Triggered)										
12 / 1.4M	1	0	20.63	20.78	20.72	0	19.62	19.77	19.71	1
	1	2	20.60	20.75	20.69	0	19.55	19.70	19.64	1
	1	5	20.57	20.72	20.66	0	19.52	19.67	19.61	1
	3	0	20.61	20.76	20.70	0	19.61	19.76	19.70	1
	3	1	20.58	20.73	20.67	0	19.54	19.69	19.63	1
	3	3	20.55	20.70	20.64	0	19.51	19.66	19.60	1
	6	0	19.72	19.87	19.81	1	18.87	19.02	18.96	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23025 700.5 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23165 714.5 MHz	3GPP MPR (dB)	16QAM Low CH 23025 700.5 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23165 714.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
12 / 3M	1	0	23.76	24.06	24.03	0	22.60	22.90	22.87	1
	1	7	23.72	24.02	23.99	0	22.52	22.82	22.79	1
	1	14	23.69	23.99	23.96	0	22.48	22.78	22.75	1
	8	0	22.72	23.02	22.99	1	21.77	22.07	22.04	2
	8	3	22.69	22.99	22.96	1	21.74	22.04	22.01	2
	8	7	22.66	22.96	22.93	1	21.68	21.98	21.95	2
	15	0	22.72	23.02	22.99	1	21.73	22.03	22.00	2
EUT with Power Reduction (P-Sensor Triggered)										
12 / 3M	1	0	20.67	20.82	20.76	0	19.66	19.81	19.75	1
	1	7	20.64	20.79	20.73	0	19.59	19.74	19.68	1
	1	14	20.61	20.76	20.70	0	19.56	19.71	19.65	1
	8	0	19.77	19.92	19.86	1	18.95	19.10	19.04	2
	8	3	19.74	19.89	19.83	1	18.92	19.07	19.01	2
	8	7	19.71	19.86	19.80	1	18.87	19.02	18.96	2
	15	0	19.76	19.91	19.85	1	18.91	19.06	19.00	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23035 701.5 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23155 713.5 MHz	3GPP MPR (dB)	16QAM Low CH 23035 701.5 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23155 713.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
12 / 5M	1	0	23.82	24.12	24.09	0	22.66	22.96	22.93	1
	1	12	23.78	24.08	24.05	0	22.58	22.88	22.85	1
	1	24	23.75	24.05	24.02	0	22.54	22.84	22.81	1
	12	0	22.78	23.08	23.05	1	21.83	22.13	22.10	2
	12	6	22.75	23.05	23.02	1	21.80	22.10	22.07	2
	12	13	22.72	23.02	22.99	1	21.74	22.04	22.01	2
	25	0	22.78	23.08	23.05	1	21.79	22.09	22.06	2
EUT with Power Reduction (P-Sensor Triggered)										
12 / 5M	1	0	20.73	20.88	20.82	0	19.72	19.87	19.81	1
	1	12	20.70	20.85	20.79	0	19.65	19.80	19.74	1
	1	24	20.67	20.82	20.76	0	19.62	19.77	19.71	1
	12	0	19.83	19.98	19.92	1	19.01	19.16	19.10	2
	12	6	19.80	19.95	19.89	1	18.98	19.13	19.07	2
	12	13	19.77	19.92	19.86	1	18.93	19.08	19.02	2
	25	0	19.82	19.97	19.91	1	18.97	19.12	19.06	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23060 704.0 MHz	QPSK Mid CH 23095 707.5 MHz	QPSK High CH 23130 711.0 MHz	3GPP MPR (dB)	16QAM Low CH 23060 704.0 MHz	16QAM Mid CH 23095 707.5 MHz	16QAM High CH 23130 711.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
12 / 10M	1	0	23.85	**24.15**	24.12	0	22.69	22.99	22.96	1
	1	24	23.81	24.11	24.08	0	22.61	22.91	22.88	1
	1	49	23.78	24.08	24.05	0	22.57	22.87	22.84	1
	25	0	22.81	23.11	23.08	1	21.86	22.16	22.13	2
	25	12	22.78	23.08	23.05	1	21.83	22.13	22.10	2
	25	25	22.75	23.05	23.02	1	21.77	22.07	22.04	2
	50	0	22.81	23.11	23.08	1	21.82	22.12	22.09	2
EUT with Power Reduction (P-Sensor Triggered)										
12 / 10M	1	0	20.76	**20.91**	20.85	0	19.75	19.90	19.84	1
	1	24	20.73	20.88	20.82	0	19.68	19.83	19.77	1
	1	49	20.70	20.85	20.79	0	19.65	19.80	19.74	1
	25	0	19.86	20.01	19.95	1	19.04	19.19	19.13	2
	25	12	19.83	19.98	19.92	1	19.01	19.16	19.10	2
	25	25	19.80	19.95	19.89	1	18.96	19.11	19.05	2
	50	0	19.85	20.00	19.94	1	19.00	19.15	19.09	2

Band / BW	RB Size	RB Offset	QPSK Low CH 23205 779.5 MHz	QPSK Mid CH 23230 782.0 MHz	QPSK High CH 23255 784.5 MHz	3GPP MPR (dB)	16QAM Low CH 23205 779.5 MHz	16QAM Mid CH 23230 782.0 MHz	16QAM High CH 23255 784.5 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)										
13 / 5M	1	0	24.06	24.08	24.02	0	23.02	23.04	22.98	1
	1	12	24.03	24.05	23.99	0	22.99	23.01	22.95	1
	1	24	23.99	24.01	23.95	0	22.94	22.96	22.90	1
	12	0	23.04	23.06	23.00	1	22.12	22.14	22.08	2
	12	6	23.00	23.02	22.96	1	22.07	22.09	22.03	2
	12	13	22.96	22.98	22.92	1	22.02	22.04	21.98	2
	25	0	23.03	23.05	22.99	1	22.06	22.08	22.02	2
EUT with Power Reduction (P-Sensor Triggered)										
13 / 5M	1	0	24.06	24.08	24.02	0	23.02	23.04	22.98	1
	1	12	24.03	24.05	23.99	0	22.99	23.01	22.95	1
	1	24	23.99	24.01	23.95	0	22.94	22.96	22.90	1
	12	0	23.04	23.06	23.00	1	22.12	22.14	22.08	2
	12	6	23.00	23.02	22.96	1	22.07	22.09	22.03	2
	12	13	22.96	22.98	22.92	1	22.02	22.04	21.98	2
	25	0	23.03	23.05	22.99	1	22.06	22.08	22.02	2

Band / BW	RB Size	RB Offset	QPSK Mid CH 23230 782.0 MHz	3GPP MPR (dB)	16QAM Mid CH 23230 782.0 MHz	3GPP MPR (dB)
EUT without Power Reduction (P-Sensor NOT Triggered)						
13 / 10M	1	0	**24.15**	0	23.12	1
	1	24	24.12	0	23.09	1
	1	49	24.00	0	23.04	1
	25	0	23.14	1	22.21	2
	25	12	23.11	1	22.17	2
	25	25	23.08	1	22.14	2
	50	0	23.12	1	22.19	2
EUT with Power Reduction (P-Sensor Triggered)						
13 / 10M	1	0	**21.73**	0	20.81	1
	1	24	21.70	0	20.78	1
	1	49	21.59	0	20.74	1
	25	0	20.82	1	19.99	2
	25	12	20.79	1	19.95	2
	25	25	20.76	1	19.90	2
	50	0	20.80	1	19.94	2

<WLAN 2.4G>

Mode	802.11b		
Channel / Frequency (MHz)	1 (2412)	6 (2437)	11 (2462)
Average Power	14.61	**14.76**	14.25
Mode	802.11g		
Channel / Frequency (MHz)	1 (2412)	6 (2437)	11 (2462)
Average Power	14.49	**14.58**	14.17
Mode	802.11n (HT20)		
Channel / Frequency (MHz)	1 (2412)	6 (2437)	11 (2462)
Average Power	14.47	**14.68**	14.32

<WLAN 5.2G>

Mode	802.11a			
Channel / Frequency (MHz)	36 (5180)	40 (5200)	44 (5220)	48 (5240)
Average Power	13.70	13.80	**13.89**	13.82
Mode	802.11n (HT20)			
Channel / Frequency (MHz)	36 (5180)	40 (5200)	44 (5220)	48 (5240)
Average Power	13.79	13.87	**14.01**	13.60
Mode	802.11n (HT40)			
Channel / Frequency (MHz)	38 (5190)		46 (5230)	
Average Power	**14.09**		13.97	
Mode	802.11ac (VHT80)			
Channel / Frequency (MHz)	42 (5210)			
Average Power	12.60			

<WLAN 5.8G>

Mode	802.11a			
Channel / Frequency (MHz)	149 (5745)	153 (5765)	157 (5785)	161 (5805)
Average Power	13.67	13.60	**13.71**	13.43
Mode	802.11n (HT20)			
Channel / Frequency (MHz)	149 (5745)	153 (5765)	157 (5785)	161 (5805)
Average Power	13.68	**13.79**	13.43	13.38
Mode	802.11n (HT40)			
Channel / Frequency (MHz)	151 (5755)		159 (5795)	
Average Power	**14.13**		13.89	
Mode	802.11ac (VHT80)			
Channel / Frequency (MHz)	155 (5775)			
Average Power	12.89			

<Bluetooth>

Mode	Bluetooth GFSK		
Channel / Frequency (MHz)	0 (2402)	39 (2441)	78 (2480)
Average Power	6.53	**8.18**	4.64
Mode	Bluetooth π/4-DQPSK		
Channel / Frequency (MHz)	0 (2402)	39 (2441)	78 (2480)
Average Power	4.63	**6.12**	2.77
Mode	Bluetooth 8-DPSK		
Channel / Frequency (MHz)	0 (2402)	39 (2441)	78 (2480)
Average Power	4.71	**6.13**	2.78
Mode	Bluetooth LE		
Channel / Frequency (MHz)	0 (2402)	19 (2440)	39 (2480)
Average Power	-1.40	**-0.02**	-3.81

4.7 SAR Testing Results

4.7.1 SAR Test Reduction Considerations

<KDB 447498 D01, General RF Exposure Guidance>

Testing of other required channels within the operating mode of a frequency band is not required when the reported SAR for the mid-band or highest output power channel is:

(1) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz

(2) ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz

(3) ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

<KDB 941225 D01, 3G SAR Measurement Procedures>

The mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ 1/4 dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

<KDB 941225 D05, SAR Evaluation Considerations for LTE Devices>

(1) QPSK with 1 RB and 50% RB allocation

Start with the largest channel bandwidth and measure SAR, using the RB offset and required test channel combination with the highest maximum output power among 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; 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 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 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.

(3) Higher order modulations

SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > 1/2 dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

(4) Other channel bandwidth

SAR is required when the highest maximum output power of the smaller channel bandwidth is > 1/2 dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

<KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters>

(1) For handsets operating next to ear, hotspot mode or mini-tablet configurations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When the reported SAR of initial test position is <= 0.4 W/kg, SAR testing for remaining test positions is not required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is <= 0.8 W/kg or all test positions are measured.

(2) For WLAN 2.4 GHz, the highest measured maximum output power channel for DSSS was selected for SAR measurement. When the reported SAR is <= 0.8 W/kg, no further SAR testing is required. Otherwise, SAR is evaluated at the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is <= 1.2 W/kg.

(3) For WLAN 5 GHz, the initial test configuration was selected according to the transmission mode with the highest maximum output power. When the reported SAR of initial test configuration is > 0.8 W/kg, SAR is required for the subsequent highest measured output power channel until the reported SAR result is <= 1.2 W/kg or all required channels are measured. For other transmission modes, SAR is not required when the highest reported SAR for initial test configuration is adjusted by the ratio of subsequent test configuration to initial test configuration specified maximum output power and it is <= 1.2 W/kg.

4.7.2 SAR Results for Body Exposure Condition

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	Power Reduction	Sample	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
1	WCDMA II	RMC12.2K	Rear Face	0	9400	on	1	15.0	14.53	-0.04	0.941	1.11	**1.05**
	WCDMA II	RMC12.2K	Rear Face	1.5	9400	off	1	24.5	23.99	-0.11	0.569	1.12	0.64
	WCDMA II	RMC12.2K	Left Side	0	9400	off	1	24.5	23.99	0.00	0.345	1.12	0.39
	WCDMA II	RMC12.2K	Bottom Side	0	9400	on	1	15.0	14.53	0.00	0.48	1.11	0.53
	WCDMA II	RMC12.2K	Bottom Side	1	9400	off	1	24.5	23.99	-0.11	0.293	1.12	0.33
	WCDMA II	RMC12.2K	Rear Face	0	9262	on	1	15.0	14.50	-0.08	0.692	1.12	0.78
	WCDMA II	RMC12.2K	Rear Face	0	9538	on	1	15.0	14.49	0.00	0.908	1.12	1.02
	WCDMA II	RMC12.2K	Rear Face	0	9400	on	2	15.0	14.53	0.07	0.924	1.11	1.03
	WCDMA II	RMC12.2K	Rear Face	0	9400	on	1	15.0	14.53	0.04	0.922	1.11	1.03
	WCDMA V	RMC12.2K	Rear Face	0	4233	on	1	22.0	21.73	0.03	1.09	1.06	1.16
	WCDMA V	RMC12.2K	Rear Face	1.5	4233	off	1	24.5	24.18	-0.03	0.351	1.08	0.38
	WCDMA V	RMC12.2K	Left Side	0	4233	off	1	24.5	24.18	0.06	0.018	1.08	0.02
	WCDMA V	RMC12.2K	Right Side	0	4233	on	1	22.0	21.73	0.06	0.357	1.06	0.38
	WCDMA V	RMC12.2K	Right Side	0.5	4233	off	1	24.5	24.18	-0.02	0.114	1.08	0.12
	WCDMA V	RMC12.2K	Bottom Side	0	4233	on	1	22.0	21.73	0.05	0.276	1.06	0.29
	WCDMA V	RMC12.2K	Bottom Side	1	4233	off	1	24.5	24.18	0.10	0.254	1.08	0.27
2	WCDMA V	RMC12.2K	Rear Face	0	4132	on	1	22.0	21.67	0.07	1.1	1.08	**1.19**
	WCDMA V	RMC12.2K	Rear Face	0	4182	on	1	22.0	21.63	0.15	1.09	1.09	1.19
	WCDMA V	RMC12.2K	Rear Face	0	4132	on	2	22.0	21.67	0.01	1.03	1.08	1.11
	WCDMA V	RMC12.2K	Rear Face	0	4132	on	1	22.0	21.67	0.07	1.03	1.08	1.11

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	Power Reduction	RB#	RB Offset	Sample	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 2	QPSK20M	Rear Face	0	18900	on	1	0	1	13.5	13.27	0.04	0.544	1.05	0.57
3	LTE 2	QPSK20M	Rear Face	1.5	18900	off	1	0	1	24.0	23.84	-0.01	0.564	1.04	**0.59**
	LTE 2	QPSK20M	Left Side	0	18900	off	1	0	1	24.0	23.84	0.01	0.342	1.04	0.35
	LTE 2	QPSK20M	Bottom Side	0	18900	on	1	0	1	13.5	13.27	0.00	0.141	1.05	0.15
	LTE 2	QPSK20M	Bottom Side	1	18900	off	1	0	1	24.0	23.84	0.00	0.281	1.04	0.29
	LTE 2	QPSK20M	Rear Face	0	18900	on	50	0	1	12.5	12.48	0.02	0.496	1.00	0.50
	LTE 2	QPSK20M	Rear Face	0	18900	off	50	0	1	23.0	22.83	0.12	0.259	1.04	0.27
	LTE 2	QPSK20M	Left Side	0	18900	off	50	0	1	23.0	22.83	0.00	0.157	1.04	0.16
	LTE 2	QPSK20M	Bottom Side	0	18900	on	50	0	1	12.5	12.48	-0.01	0.128	1.00	0.13
	LTE 2	QPSK20M	Bottom Side	0	18900	off	50	0	1	23.0	22.83	-0.03	0.129	1.04	0.13
	LTE 2	QPSK20M	Rear Face	1.5	18900	off	1	0	2	24.0	23.84	-0.04	0.524	1.04	0.54
4	LTE 4	QPSK20M	Rear Face	0	20175	on	1	0	1	16.0	15.58	0.01	0.967	1.10	**1.07**
	LTE 4	QPSK20M	Rear Face	1.5	20175	off	1	0	1	24.0	23.87	-0.05	0.74	1.03	0.76
	LTE 4	QPSK20M	Left Side	0	20175	off	1	0	1	24.0	23.87	0.01	0.449	1.03	0.46
	LTE 4	QPSK20M	Bottom Side	0	20175	on	1	0	1	16.0	15.58	-0.06	0.173	1.10	0.19
	LTE 4	QPSK20M	Bottom Side	1	20175	off	1	0	1	24.0	23.87	0.18	0.263	1.03	0.27
	LTE 4	QPSK20M	Rear Face	0	20175	on	50	0	1	15.0	14.87	-0.04	0.882	1.03	0.91
	LTE 4	QPSK20M	Rear Face	1.5	20175	off	50	0	1	23.0	22.81	-0.15	0.601	1.04	0.63
	LTE 4	QPSK20M	Left Side	0	20175	off	50	0	1	23.0	22.81	0.08	0.365	1.04	0.38
	LTE 4	QPSK20M	Bottom Side	0	20175	on	50	0	1	15.0	14.87	0.05	0.158	1.03	0.16
	LTE 4	QPSK20M	Bottom Side	1	20175	off	50	0	1	23.0	22.81	0.01	0.188	1.04	0.20
	LTE 4	QPSK20M	Rear Face	0	20050	on	1	0	1	16.0	15.38	0.06	0.854	1.15	0.99
	LTE 4	QPSK20M	Rear Face	0	20300	on	1	0	1	16.0	15.49	0.07	0.927	1.12	1.04
	LTE 4	QPSK20M	Rear Face	0	20050	on	50	0	1	15.0	14.67	0.12	0.779	1.08	0.84
	LTE 4	QPSK20M	Rear Face	0	20300	on	50	0	1	15.0	14.78	0.01	0.946	1.05	1.00
	LTE 4	QPSK20M	Rear Face	0	20175	on	100	0	1	15.0	14.87	0.04	0.921	1.03	0.95
	LTE 4	QPSK20M	Rear Face	0	20175	on	1	0	2	16.0	15.58	-0.09	0.931	1.10	1.03
	LTE 4	QPSK20M	Rear Face	0	20175	on	1	0	1	16.0	15.58	0.09	0.955	1.10	1.05

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	Power Reduction	RB#	RB Offset	Sample	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 5	QPSK10M	Rear Face	0	20525	on	1	0	1	22.0	21.72	0.06	1.04	1.07	1.11
	LTE 5	QPSK10M	Rear Face	1.5	20525	off	1	0	1	24.5	24.08	-0.13	0.332	1.10	0.37
	LTE 5	QPSK10M	Left Side	0	20525	off	1	0	1	24.5	24.08	0.02	0.018	1.10	0.02
	LTE 5	QPSK10M	Right Side	0	20525	on	1	0	1	22.0	21.72	0.01	0.34	1.07	0.36
	LTE 5	QPSK10M	Right Side	0.5	20525	off	1	0	1	24.5	24.08	0.10	0.108	1.10	0.12
	LTE 5	QPSK10M	Bottom Side	0	20525	on	1	0	1	22.0	21.72	0.02	0.263	1.07	0.28
	LTE 5	QPSK10M	Bottom Side	1	20525	off	1	0	1	24.5	24.08	-0.04	0.231	1.10	0.25
	LTE 5	QPSK10M	Rear Face	0	20525	on	25	0	1	21.0	20.75	0.12	1.01	1.06	1.07
	LTE 5	QPSK10M	Rear Face	1.5	20525	off	25	0	1	23.5	23.01	0.02	0.257	1.12	0.29
	LTE 5	QPSK10M	Left Side	0	20525	off	25	0	1	23.5	23.01	0.01	0.014	1.12	0.02
	LTE 5	QPSK10M	Right Side	0	20525	on	25	0	1	21.0	20.75	0.00	0.338	1.06	0.36
	LTE 5	QPSK10M	Right Side	0.5	20525	off	25	0	1	23.5	23.01	0.05	0.084	1.12	0.09
	LTE 5	QPSK10M	Bottom Side	0	20525	on	25	0	1	21.0	20.75	0.05	0.261	1.06	0.28
	LTE 5	QPSK10M	Bottom Side	1	20525	off	25	0	1	23.5	23.01	0.07	0.179	1.12	0.20
	LTE 5	QPSK10M	Rear Face	0	20450	on	1	0	1	22.0	21.67	0.07	1	1.08	1.08
5	LTE 5	QPSK10M	Rear Face	0	20600	on	1	0	1	22.0	21.62	0.03	1.04	1.09	**1.14**
	LTE 5	QPSK10M	Rear Face	0	20450	on	25	0	1	21.0	20.70	0.12	0.971	1.07	1.04
	LTE 5	QPSK10M	Rear Face	0	20600	on	25	0	1	21.0	20.65	0.12	0.989	1.08	1.07
	LTE 5	QPSK10M	Rear Face	0	20525	on	50	0	1	21.0	20.72	-0.12	0.726	1.07	0.77
	LTE 5	QPSK10M	Rear Face	0	20600	on	1	0	2	22.0	21.62	0.07	0.989	1.09	1.08
	LTE 5	QPSK10M	Rear Face	0	20600	on	1	0	1	22.0	21.62	0.03	0.992	1.09	1.08
	LTE 7	QPSK20M	Rear Face	0	21100	on	1	0	1	12.0	11.56	0.07	0.533	1.11	0.59
	LTE 7	QPSK20M	Rear Face	1.5	21100	off	1	0	1	23.0	22.73	-0.07	0.579	1.06	0.62
	LTE 7	QPSK20M	Left Side	0	21100	off	1	0	1	23.0	22.73	0.05	0.28	1.06	0.30
	LTE 7	QPSK20M	Bottom Side	0	21100	on	1	0	1	12.0	11.56	0.03	0.259	1.11	0.29
	LTE 7	QPSK20M	Bottom Side	1	21100	off	1	0	1	23.0	22.73	0.12	1.19	1.06	1.27
	LTE 7	QPSK20M	Rear Face	0	21100	on	50	0	1	11.0	10.79	0.02	0.653	1.05	0.69
	LTE 7	QPSK20M	Rear Face	1.5	21100	off	50	0	1	22.0	21.87	0.09	0.311	1.03	0.32
	LTE 7	QPSK20M	Left Side	0	21100	off	50	0	1	22.0	21.87	0.01	0.15	1.03	0.15
	LTE 7	QPSK20M	Bottom Side	0	21100	on	50	0	1	11.0	10.79	-0.03	0.353	1.05	0.37
	LTE 7	QPSK20M	Bottom Side	1	21100	off	50	0	1	22.0	21.87	0.05	0.798	1.03	0.82
6	LTE 7	QPSK20M	Bottom Side	1	20850	off	1	0	1	23.0	22.51	0.05	1.21	1.12	**1.35**
	LTE 7	QPSK20M	Bottom Side	1	21350	off	1	0	1	23.0	22.48	-0.06	0.765	1.13	0.86
	LTE 7	QPSK20M	Bottom Side	1	20850	off	50	0	1	23.0	21.65	0.09	0.762	1.36	1.04
	LTE 7	QPSK20M	Bottom Side	1	21350	off	50	0	1	23.0	21.61	0.07	0.755	1.38	1.04
	LTE 7	QPSK20M	Bottom Side	1	21100	off	100	0	1	23.0	21.85	0.08	0.764	1.30	1.00
	LTE 7	QPSK20M	Bottom Side	1	20850	off	1	0	2	23.0	22.51	0.09	1.09	1.12	1.22
	LTE 7	QPSK20M	Bottom Side	1	20850	off	1	0	1	23.0	22.51	0.05	1.2	1.12	1.34

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	Power Reduction	RB#	RB Offset	Sample	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	LTE 12	QPSK10M	Rear Face	0	23095	on	1	0	1	21.5	20.91	0.03	0.888	1.15	1.02
	LTE 12	QPSK10M	Rear Face	1.5	23095	off	1	0	1	24.5	24.15	0.04	0.311	1.08	0.34
	LTE 12	QPSK10M	Left Side	0	23095	off	1	0	1	24.5	24.15	0.05	0.017	1.08	0.02
	LTE 12	QPSK10M	Right Side	0	23095	on	1	0	1	21.5	20.91	0.06	0.473	1.15	0.54
	LTE 12	QPSK10M	Right Side	0.5	23095	off	1	0	1	24.5	24.15	0.10	0.102	1.08	0.11
	LTE 12	QPSK10M	Bottom Side	0	23095	on	1	0	1	21.5	20.91	0.01	0.344	1.15	0.39
	LTE 12	QPSK10M	Bottom Side	1	23095	off	1	0	1	24.5	24.15	0.04	0.186	1.08	0.20
	LTE 12	QPSK10M	Rear Face	0	23095	on	25	0	1	20.5	20.01	-0.04	0.912	1.12	1.02
	LTE 12	QPSK10M	Rear Face	1.5	23095	off	25	0	1	23.5	23.11	-0.01	0.239	1.09	0.26
	LTE 12	QPSK10M	Left Side	0	23095	off	25	0	1	23.5	23.11	0.00	0.013	1.09	0.01
	LTE 12	QPSK10M	Right Side	0	23095	on	25	0	1	20.5	20.01	0.05	0.477	1.12	0.53
	LTE 12	QPSK10M	Right Side	0.5	23095	off	25	0	1	23.5	23.11	0.06	0.081	1.09	0.09
	LTE 12	QPSK10M	Bottom Side	0	23095	on	25	0	1	20.5	20.01	0.01	0.346	1.12	0.39
	LTE 12	QPSK10M	Bottom Side	1	23095	off	25	0	1	23.5	23.11	0.01	0.147	1.09	0.16
7	LTE 12	QPSK10M	Rear Face	0	23060	on	1	0	1	21.5	20.76	0.01	0.874	1.19	**1.04**
	LTE 12	QPSK10M	Rear Face	0	23130	on	1	0	1	21.5	20.85	0.01	0.867	1.16	1.01
	LTE 12	QPSK10M	Rear Face	0	23060	on	25	0	1	20.5	19.86	0.01	0.898	1.16	1.04
	LTE 12	QPSK10M	Rear Face	0	23130	on	25	0	1	20.5	19.95	0.05	0.873	1.14	0.99
	LTE 12	QPSK10M	Rear Face	0	23095	on	50	0	1	20.5	20.00	0.13	0.909	1.12	1.02
	LTE 12	QPSK10M	Rear Face	0	23060	on	1	0	2	21.5	20.76	0.12	0.827	1.19	0.98
	LTE 12	QPSK10M	Rear Face	0	23095	on	25	0	1	20.5	20.01	0.08	0.903	1.12	1.01
	LTE 13	QPSK10M	Rear Face	0	23230	on	1	0	1	22.0	21.73	0.00	0.88	1.06	0.94
	LTE 13	QPSK10M	Rear Face	1.5	23230	off	1	0	1	24.5	24.15	0.07	0.323	1.08	0.35
	LTE 13	QPSK10M	Left Side	0	23230	off	1	0	1	24.5	24.15	-0.08	0.018	1.08	0.02
	LTE 13	QPSK10M	Right Side	0	23230	on	1	0	1	22.0	21.73	-0.12	0.461	1.06	0.49
	LTE 13	QPSK10M	Right Side	0.5	23230	off	1	0	1	24.5	24.15	0.00	0.105	1.08	0.11
	LTE 13	QPSK10M	Bottom Side	0	23230	on	1	0	1	22.0	21.73	0.05	0.335	1.06	0.36
	LTE 13	QPSK10M	Bottom Side	1	23230	off	1	0	1	24.5	24.15	0.04	0.234	1.08	0.25
	LTE 13	QPSK10M	Rear Face	0	23230	on	25	0	1	21.0	20.82	0.05	1.02	1.04	1.06
	LTE 13	QPSK10M	Rear Face	1.5	23230	off	25	0	1	23.5	23.14	0.07	0.248	1.09	0.27
	LTE 13	QPSK10M	Left Side	0	23230	off	25	0	1	23.5	23.14	0.01	0.014	1.09	0.02
	LTE 13	QPSK10M	Right Side	0	23230	on	25	0	1	21.0	20.82	0.06	0.533	1.04	0.56
	LTE 13	QPSK10M	Right Side	0.5	23230	off	25	0	1	23.5	23.14	0.10	0.08	1.09	0.09
	LTE 13	QPSK10M	Bottom Side	0	23230	on	25	0	1	21.0	20.82	0.01	0.387	1.04	0.40
	LTE 13	QPSK10M	Bottom Side	1	23230	off	25	0	1	23.5	23.14	0.06	0.18	1.09	0.20
8	LTE 13	QPSK10M	Rear Face	0	23230	on	50	0	1	21.0	20.80	0.03	1.06	1.05	**1.11**
	LTE 13	QPSK10M	Rear Face	0	23230	on	50	0	2	21.0	20.80	0.09	0.992	1.05	1.04
	LTE 13	QPSK10M	Rear Face	0	23230	on	50	0	1	21.0	20.80	0.03	1.01	1.05	1.06

Plot No.	Band	Mode	Test Position	Separation Distance (mm)	Ch.	Power Reduction	Sample	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaling Factor	Scaled SAR-1g (W/kg)
	802.11b	-	Rear Face	0	6	-	1	15.0	14.76	-0.05	1.06	1.06	1.12
	802.11b	-	Left Side	0	6	-	1	15.0	14.76	0.00	0.596	1.06	0.63
	802.11b	-	Top Side	0	6	-	1	15.0	14.76	0.01	0.137	1.06	0.14
	802.11b	-	Bottom Side	0	6	-	1	15.0	14.76	0.09	N/A	1.06	0.00
9	802.11b	-	Rear Face	0	1	-	1	15.0	14.61	0.02	1.07	1.09	**1.17**
	802.11b	-	Rear Face	0	1	-	2	15.0	14.61	0.08	0.991	1.09	1.08
	802.11b	-	Rear Face	0	1	-	1	15.0	14.61	0.02	1.01	1.09	1.10
10	802.11n	HT40	Rear Face	0	38	-	1	14.5	14.09	0.09	0.695	1.10	**0.76**
	802.11n	HT40	Left Side	0	38	-	1	14.5	14.09	0.06	0.019	1.10	0.02
	802.11n	HT40	Top Side	0	38	-	1	14.5	14.09	0.08	0.246	1.10	0.27
	802.11n	HT40	Bottom Side	0	38	-	1	14.5	14.09	-0.06	N/A	1.10	0.00
	802.11n	HT40	Rear Face	0	38	-	2	14.5	14.09	0.01	0.677	1.10	0.74
11	802.11n	HT40	Rear Face	0	151	-	1	14.5	14.13	0.04	0.962	1.09	**1.05**
	802.11n	HT40	Left Side	0	151	-	1	14.5	14.13	-0.01	0.021	1.09	0.02
	802.11n	HT40	Top Side	0	151	-	1	14.5	14.13	0.09	0.39	1.09	0.42
	802.11n	HT40	Bottom Side	0	151	-	1	14.5	14.13	-0.02	N/A	1.09	0.00
	802.11n	HT40	Rear Face	0	159	-	1	14.5	13.89	0.01	0.87	1.15	1.00
	802.11n	HT40	Rear Face	0	151	-	2	14.5	14.13	0.04	0.922	1.09	1.00
	802.11n	HT40	Rear Face	0	151	-	1	14.5	14.13	0.01	0.951	1.09	1.04
12	BT	GFSK	Rear Face	0	39	-	1	8.5	8.18	0.06	0.145	1.08	**0.16**
	BT	GFSK	Left Side	0	39	-	1	8.5	8.18	0.01	0.081	1.08	0.09
	BT	GFSK	Top Side	0	39	-	1	8.5	8.18	-0.01	0.019	1.08	0.02
	BT	GFSK	Bottom Side	0	39	-	1	8.5	8.18	0.05	N/A	1.08	0.00
	BT	GFSK	Rear Face	0	39	-	2	8.5	8.18	0.01	0.142	1.08	0.15

4.7.3 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These 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.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. 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, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

Band	Mode	Test Position	Separation Distance (cm)	Ch.	Original Measured SAR-1g (W/kg)	1st Repeated SAR-1g (W/kg)	L/S Ratio	2nd Repeated SAR-1g (W/kg)	L/S Ratio	3rd Repeated SAR-1g (W/kg)	L/S Ratio
WCDMA II	RMC12.2K	Rear Face	0	9400	0.941	0.922	1.02	N/A	N/A	N/A	N/A
WCDMA V	RMC12.2K	Rear Face	0	4132	1.0	1.03	1.07	N/A	N/A	N/A	N/A
LTE 4	QPSK20M	Rear Face	0	20175	0.967	0.955	1.01	N/A	N/A	N/A	N/A
LTE 5	QPSK10M	Rear Face	0	20600	1.04	0.992	1.05	N/A	N/A	N/A	N/A
LTE 7	QPSK20M	Bottom Side	1	20850	1.21	1.2	1.01	N/A	N/A	N/A	N/A
LTE 12	QPSK10M	Rear Face	0	23095	0.874	0.903	1.01	N/A	N/A	N/A	N/A
LTE 13	QPSK10M	Rear Face	0	23230	1.06	1.01	1.05	N/A	N/A	N/A	N/A
802.11b	-	Rear Face	0	1	1.07	1.01	1.06	N/A	N/A	N/A	N/A
802.11n	HT40	Rear Face	0	151	0.962	0.951	1.01	N/A	N/A	N/A	N/A

<SAR Summation Analysis>

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR_{1g} of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR_{1g} 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR_{1g} is greater than the SAR limit (SAR_{1g} 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
1	WCDMA II + WLAN (DTS)	Body	Rear Face	1.05	1.17	2.22	**Analyzed as below**
			Left Side	0.39	0.63	1.02	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	0.53	0.00	0.53	∑SAR < 1.6, Not required
2	WCDMA II + WLAN (NII)	Body	Rear Face	1.05	1.05	2.10	**Analyzed as below**
			Left Side	0.39	0.02	0.41	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	0.53	0.00	0.53	∑SAR < 1.6, Not required
3	WCDMA II + BT (DSS)	Body	Rear Face	1.05	0.16	1.21	∑SAR < 1.6, Not required
			Left Side	0.39	0.09	0.48	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	0.53	0.00	0.53	∑SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
4	WCDMA V + WLAN (DTS)	Body	Rear Face	1.19	1.17	2.36	**Analyzed as below**
			Left Side	0.02	0.63	0.65	∑SAR < 1.6, Not required
			Right Side	0.38	0.40	0.78	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	0.29	0.00	0.29	∑SAR < 1.6, Not required
5	WCDMA V + WLAN (NII)	Body	Rear Face	1.19	1.05	2.24	**Analyzed as below**
			Left Side	0.02	0.02	0.04	∑SAR < 1.6, Not required
			Right Side	0.38	0.40	0.78	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	0.29	0.00	0.29	∑SAR < 1.6, Not required
6	WCDMA V + BT (DSS)	Body	Rear Face	1.19	0.16	1.35	∑SAR < 1.6, Not required
			Left Side	0.02	0.09	0.11	∑SAR < 1.6, Not required
			Right Side	0.38	0.40	0.78	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	0.29	0.00	0.29	∑SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
7	LTE 2 + WLAN (DTS)	Body	Rear Face	0.59	1.17	1.76	**Analyzed as below**
			Left Side	0.35	0.63	0.98	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	0.29	0.00	0.29	∑SAR < 1.6, Not required
8	LTE 2 + WLAN (NII)	Body	Rear Face	0.59	1.05	1.64	**Analyzed as below**
			Left Side	0.35	0.02	0.37	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	0.29	0.00	0.29	∑SAR < 1.6, Not required
9	LTE 2 + BT (DSS)	Body	Rear Face	0.59	0.16	0.75	∑SAR < 1.6, Not required
			Left Side	0.35	0.09	0.44	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	0.29	0.00	0.29	∑SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
10	LTE 4 + WLAN (DTS)	Body	Rear Face	1.07	1.17	2.24	**Analyzed as below**
			Left Side	0.46	0.63	1.09	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	0.27	0.00	0.27	∑SAR < 1.6, Not required
11	LTE 4 + WLAN (NII)	Body	Rear Face	1.07	1.05	2.12	**Analyzed as below**
			Left Side	0.46	0.02	0.48	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	0.27	0.00	0.27	∑SAR < 1.6, Not required
12	LTE 4 + BT (DSS)	Body	Rear Face	1.07	0.16	1.23	∑SAR < 1.6, Not required
			Left Side	0.46	0.09	0.55	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	0.27	0.00	0.27	∑SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
13	LTE 5 + WLAN (DTS)	Body	Rear Face	1.14	1.17	2.31	**Analyzed as below**
			Left Side	0.02	0.63	0.65	∑SAR < 1.6, Not required
			Right Side	0.36	0.40	0.76	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	0.28	0.00	0.28	∑SAR < 1.6, Not required
14	LTE 5 + WLAN (NII)	Body	Rear Face	1.14	1.05	2.19	**Analyzed as below**
			Left Side	0.02	0.02	0.04	∑SAR < 1.6, Not required
			Right Side	0.36	0.40	0.76	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	0.28	0.00	0.28	∑SAR < 1.6, Not required
15	LTE 5 + BT (DSS)	Body	Rear Face	1.14	0.16	1.30	∑SAR < 1.6, Not required
			Left Side	0.02	0.09	0.11	∑SAR < 1.6, Not required
			Right Side	0.36	0.40	0.76	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	0.28	0.00	0.28	∑SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
16	LTE 7 + WLAN (DTS)	Body	Rear Face	0.78	1.17	1.95	**Analyzed as below**
			Left Side	0.38	0.63	1.01	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	1.35	0.00	1.35	∑SAR < 1.6, Not required
17	LTE 7 + WLAN (NII)	Body	Rear Face	0.78	1.05	1.83	**Analyzed as below**
			Left Side	0.38	0.02	0.40	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	1.35	0.00	1.35	∑SAR < 1.6, Not required
18	LTE 7 + BT (DSS)	Body	Rear Face	0.78	0.16	0.94	∑SAR < 1.6, Not required
			Left Side	0.38	0.09	0.47	∑SAR < 1.6, Not required
			Right Side	0.40	0.40	0.80	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	1.35	0.00	1.35	∑SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
19	LTE 12 + WLAN (DTS)	Body	Rear Face	1.06	1.17	2.23	**Analyzed as below**
			Left Side	0.02	0.63	0.65	∑SAR < 1.6, Not required
			Right Side	0.54	0.40	0.94	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	0.39	0.00	0.39	∑SAR < 1.6, Not required
20	LTE 12 + WLAN (NII)	Body	Rear Face	1.06	1.05	2.11	**Analyzed as below**
			Left Side	0.02	0.02	0.04	∑SAR < 1.6, Not required
			Right Side	0.54	0.40	0.94	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	0.39	0.00	0.39	∑SAR < 1.6, Not required
21	LTE 12 + BT (DSS)	Body	Rear Face	1.06	0.16	1.22	∑SAR < 1.6, Not required
			Left Side	0.02	0.09	0.11	∑SAR < 1.6, Not required
			Right Side	0.54	0.40	0.94	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	0.39	0.00	0.39	∑SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
22	LTE 13 + WLAN (DTS)	Body	Rear Face	1.12	1.17	2.29	**Analyzed as below**
			Left Side	0.02	0.63	0.65	∑SAR < 1.6, Not required
			Right Side	0.56	0.40	0.96	∑SAR < 1.6, Not required
			Top Side	0.40	0.14	0.54	∑SAR < 1.6, Not required
			Bottom Side	0.40	0.00	0.40	∑SAR < 1.6, Not required
23	LTE 13 + WLAN (NII)	Body	Rear Face	1.12	1.05	2.17	**Analyzed as below**
			Left Side	0.02	0.02	0.04	∑SAR < 1.6, Not required
			Right Side	0.56	0.40	0.96	∑SAR < 1.6, Not required
			Top Side	0.40	0.42	0.82	∑SAR < 1.6, Not required
			Bottom Side	0.40	0.00	0.40	∑SAR < 1.6, Not required
24	LTE 13 + BT (DSS)	Body	Rear Face	1.12	0.16	1.28	∑SAR < 1.6, Not required
			Left Side	0.02	0.09	0.11	∑SAR < 1.6, Not required
			Right Side	0.56	0.40	0.96	∑SAR < 1.6, Not required
			Top Side	0.40	0.30	0.70	∑SAR < 1.6, Not required
			Bottom Side	0.40	0.00	0.40	∑SAR < 1.6, Not required

<SAR to Peak Location Separation Ratio Analysis>

The simultaneous transmitting antennas in each operating mode and exposure condition combination are considered one pair at a time to determine the SPLSR. When SAR is measured for both antennas in the pair, the peak location separation distance is computed by the following formula.

$$\text{Peak Location Separation Distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

Where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the area or zoom scans.

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna. Due to curvatures on the SAM phantom, when SAR is estimated for one of the antennas in an antenna pair, the measured peak SAR location will be translated onto the test device to determine the peak location separation for the antenna pair.

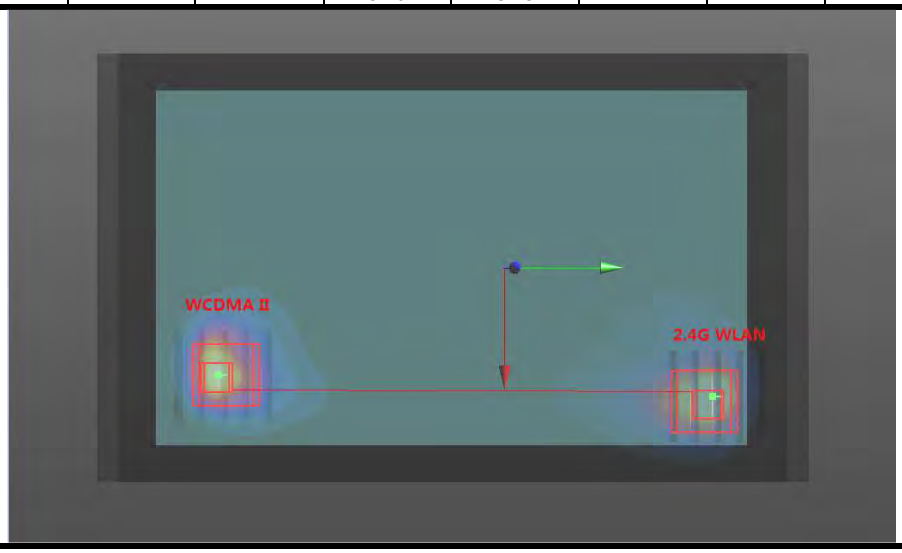
The SPLSR is determined by the following formula.

$$\text{SPLSR} = \frac{(\text{SAR}_1 + \text{SAR}_2)^{1.5}}{R_i}$$

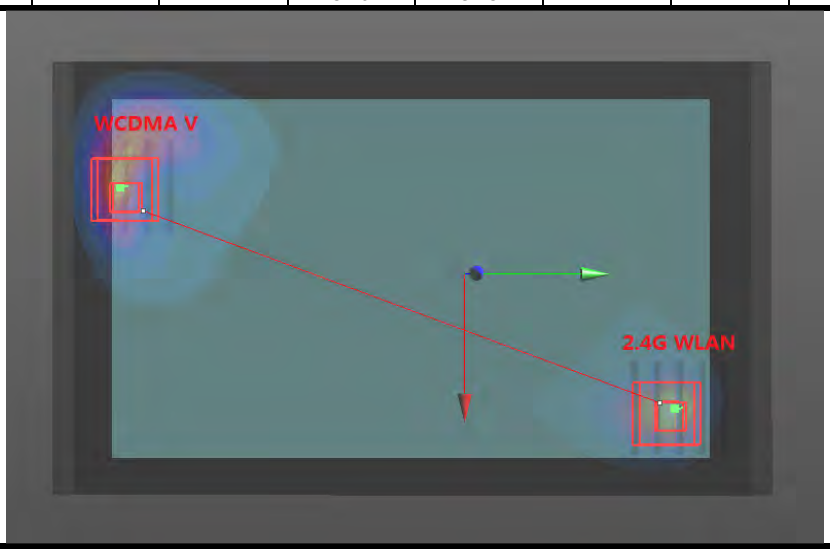
Where SAR_1 and SAR_2 are the highest reported or estimated SAR for each antenna in the pair, and R_i is the separation distance between the peak SAR locations for the antenna pair in mm.

When the SPLSR is <= 0.04, the simultaneous transmission SAR is not required. Otherwise, the enlarged zoom scan and volume scan post-processing procedures will be performed.

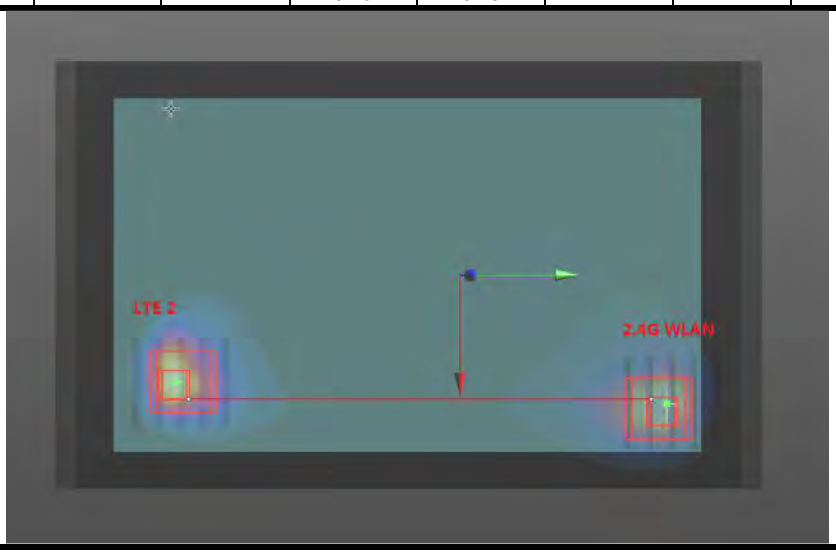
1									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
WCDMA II	Body	Rear Face	1.05	37.5	-84.0	-2.4	172.0	0.019	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



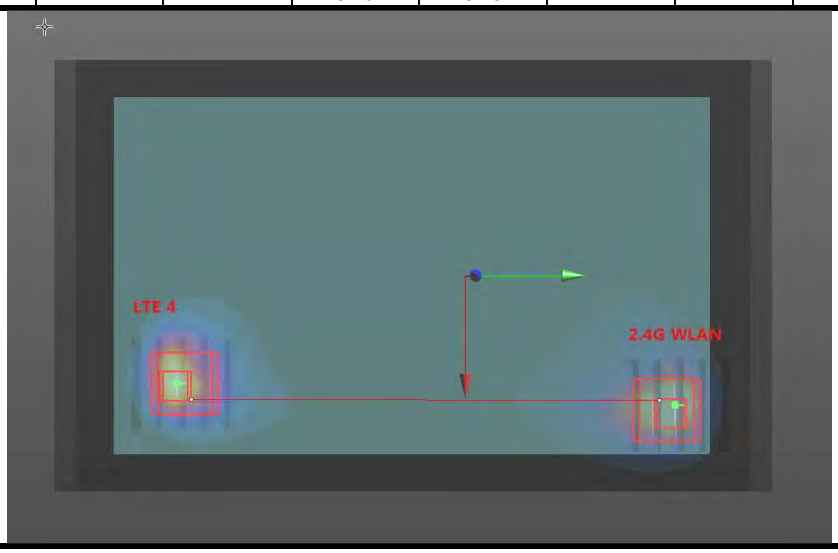
2									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
WCDMA V	Body	Rear Face	1.19	-23.6	-96.6	-3.2	198.6	0.018	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



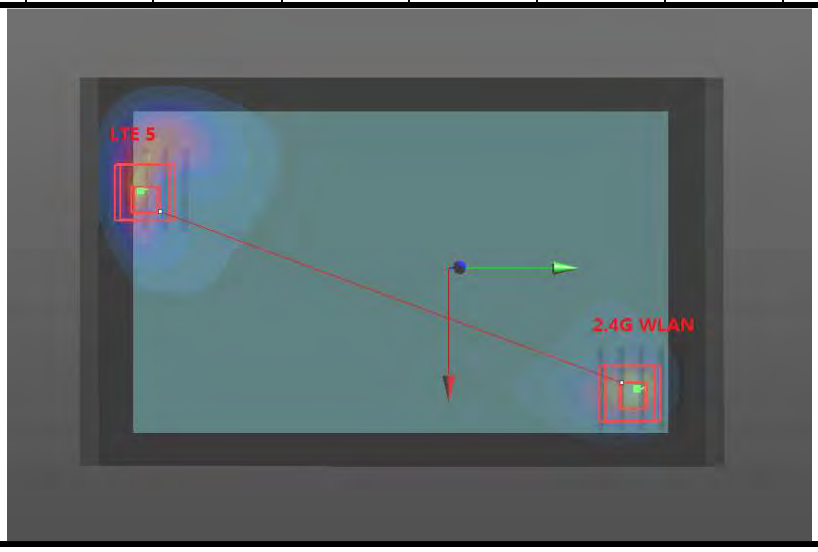
3									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 2	Body	Rear Face	0.59	39.0	-73.5	-3.1	161.4	0.014	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



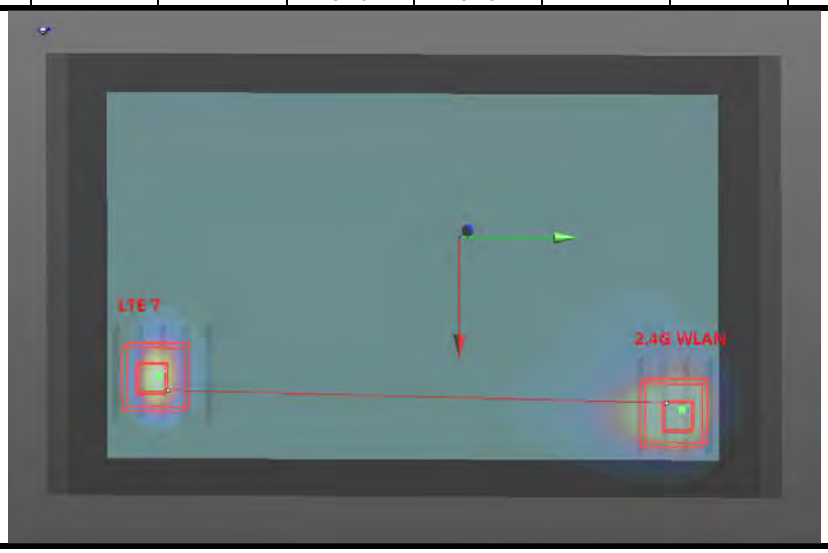
4									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 4	Body	Rear Face	1.07	36.0	-81.0	-2.4	169.2	0.020	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



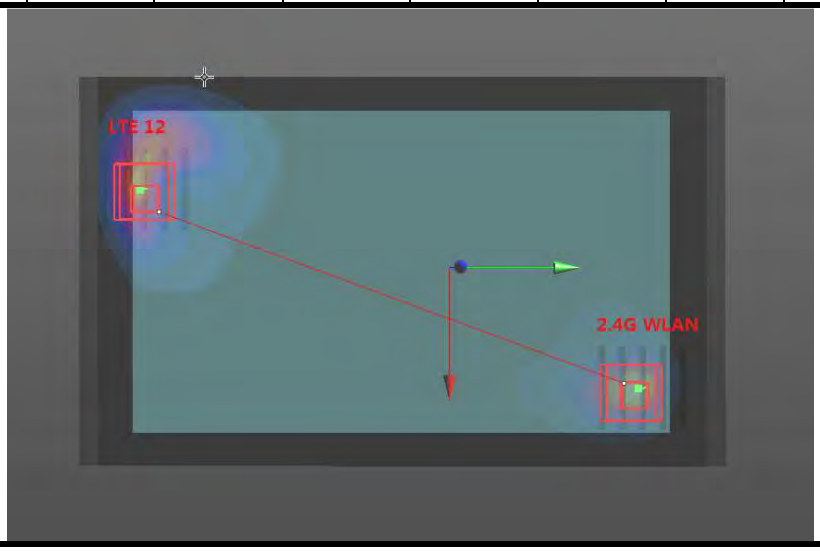
5									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 5	Body	Rear Face	1.14	-31.8	-101.9	-3.1	206.7	0.017	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



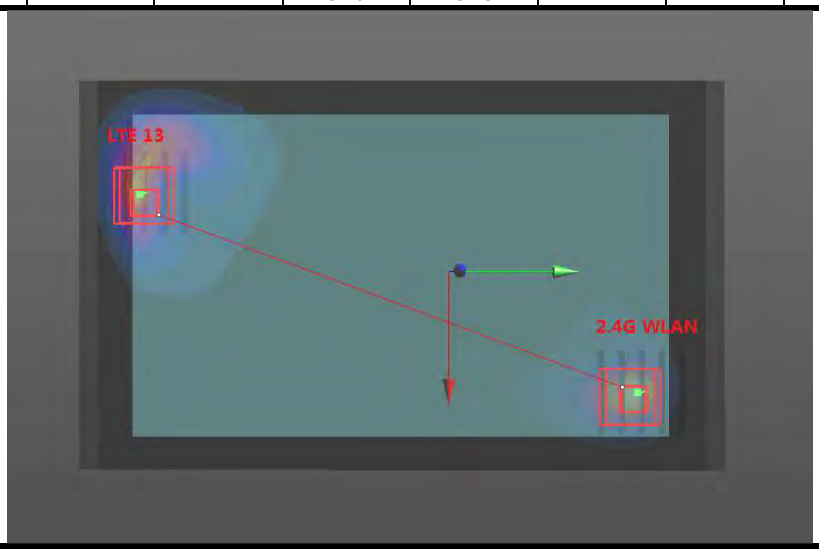
6									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 7	Body	Rear Face	0.78	-1.50	34.5	-3.5	74.6	0.036	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



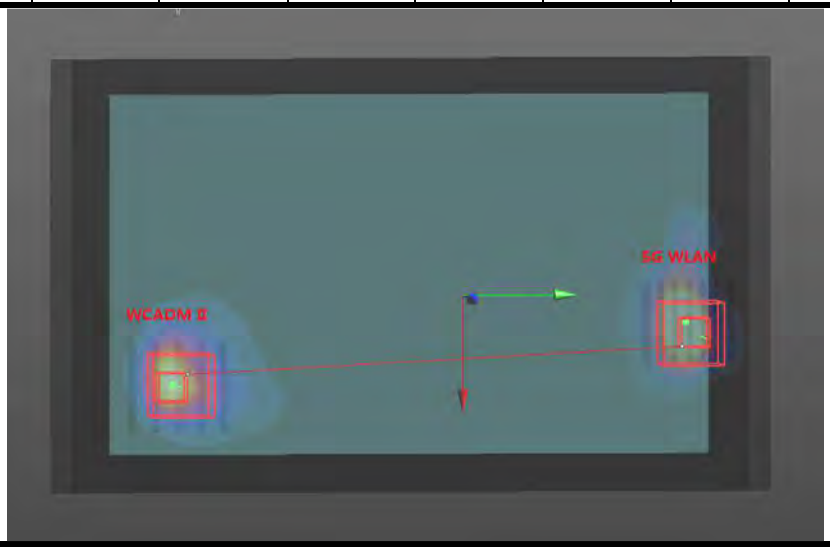
7									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 12	Body	Rear Face	1.06	-28.5	-100.4	-3.1	204.0	0.016	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



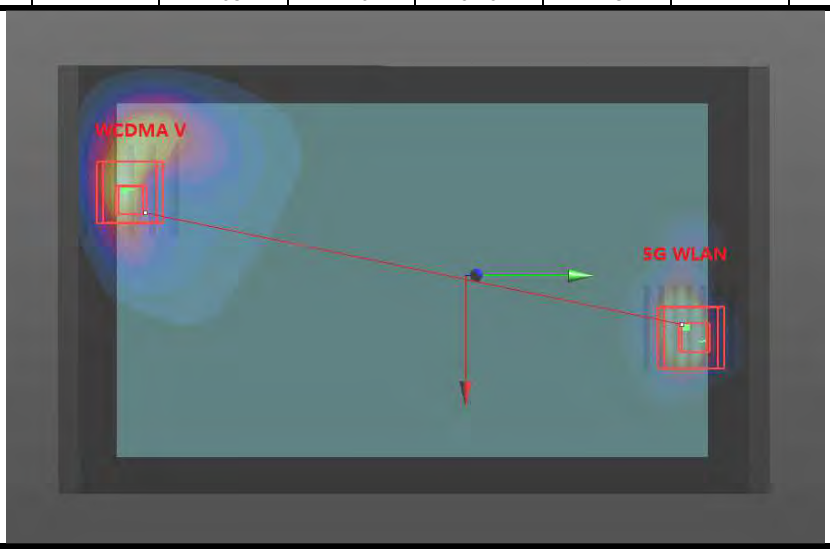
8									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 13	Body	Rear Face	1.12	-20.5	-97.1	-3.2	198.0	0.018	SPLSR < 0.04, Not required
802.11b			1.17	51.0	87.5	-2.2			



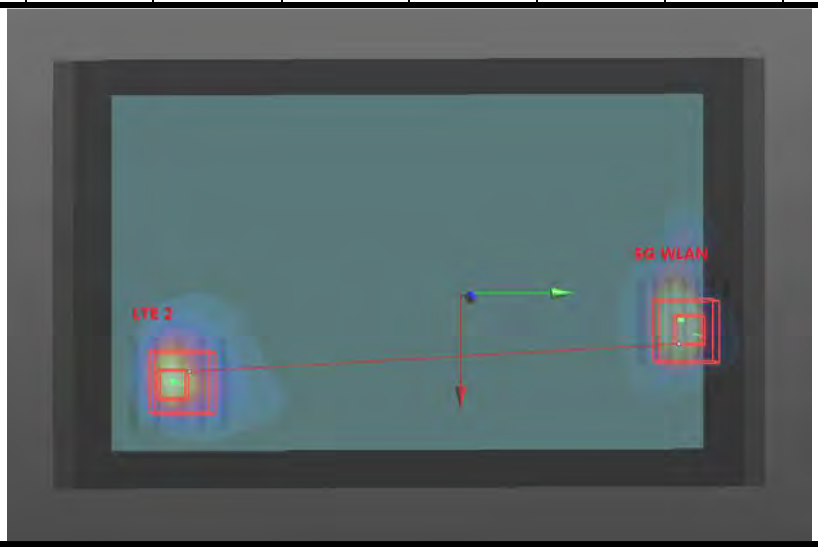
9									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
WCDMA II	Body	Rear Face	1.05	37.5	-84.0	-2.4	181.8	0.017	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



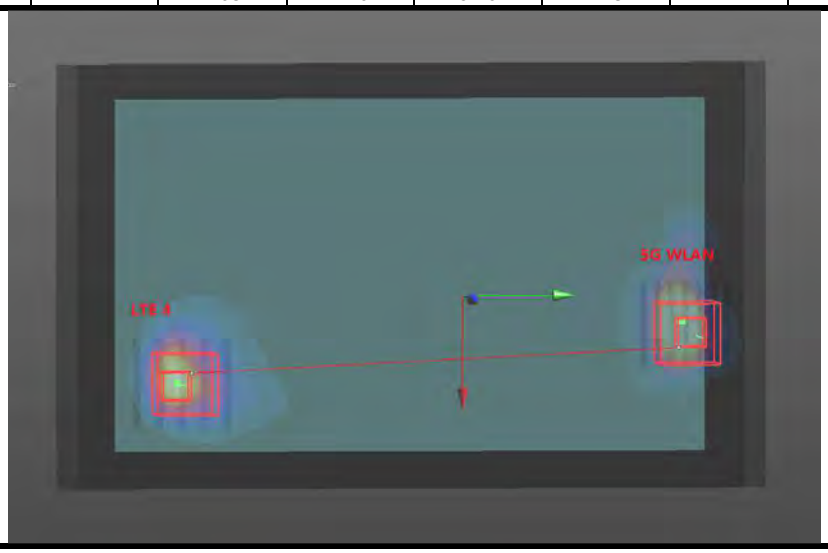
10									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
WCDMA V	Body	Rear Face	1.19	-23.6	-96.6	-3.2	198.7	0.017	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



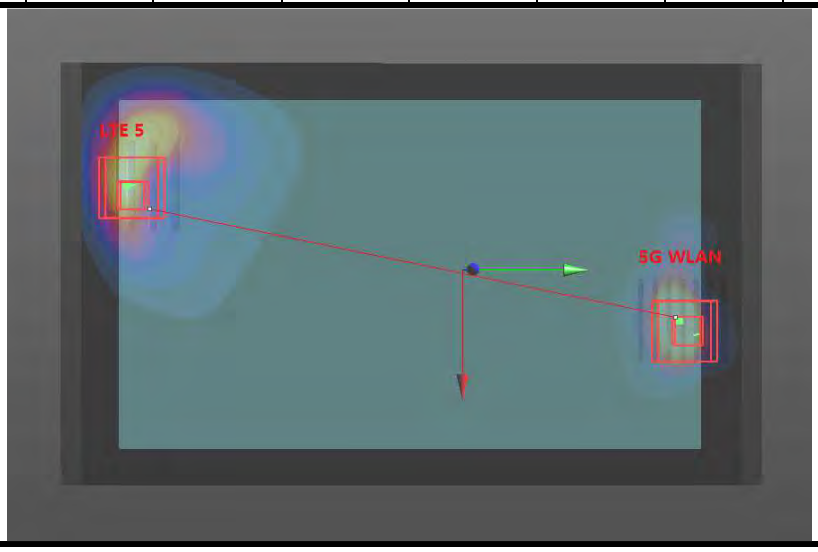
11									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 2	Body	Rear Face	0.59	39.0	-73.5	-3.1	171.4	0.012	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



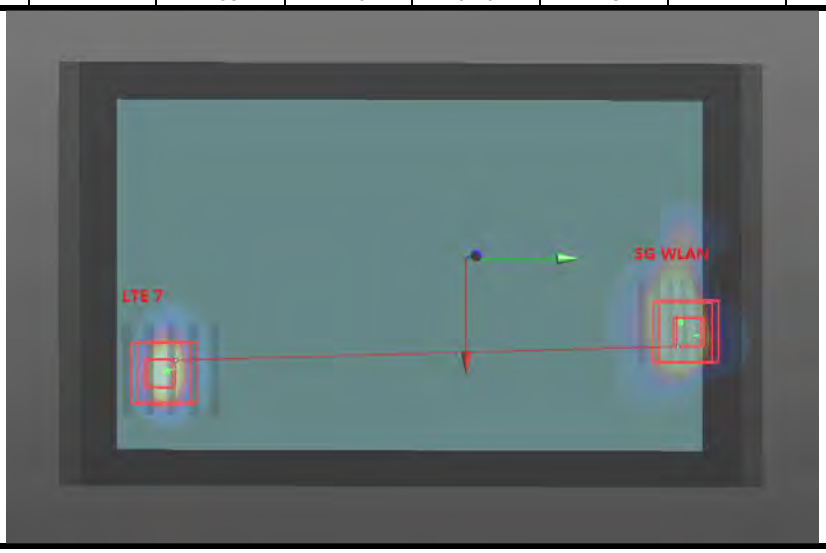
12									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 4	Body	Rear Face	1.07	36.0	-81.0	-2.4	178.6	0.017	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



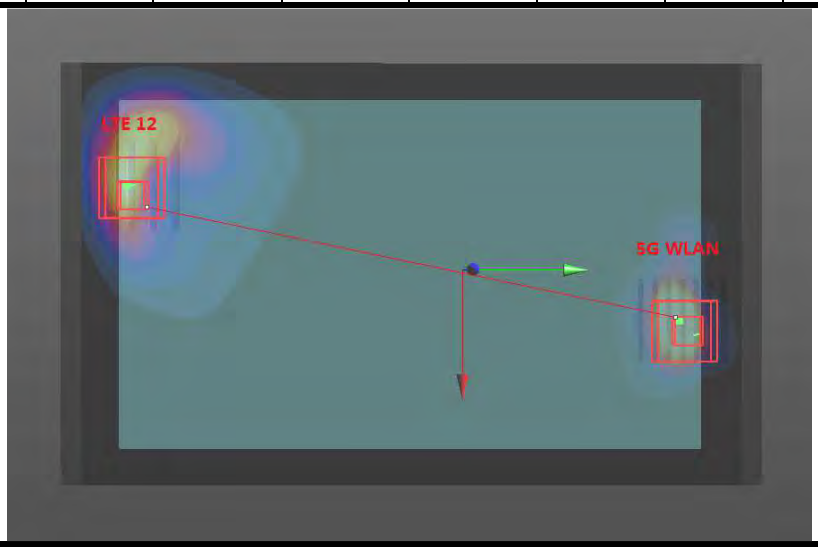
13									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 5	Body	Rear Face	1.14	-31.8	-101.9	-3.1	205.8	0.016	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



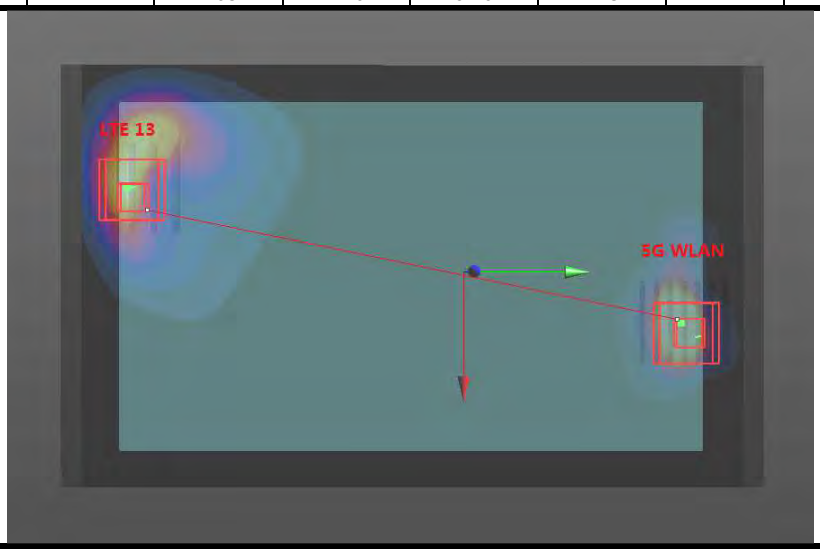
14									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 7	Body	Rear Face	0.78	-1.50	34.5	-3.5	66.4	0.037	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



15									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 12	Body	Rear Face	1.06	-28.5	-100.4	-3.1	203.5	0.015	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



16									
Conditions	Exposure Condition	Test Position	SAR Value (W/kg)	Coordinates			Peak Location Separation Distance (R_i, mm)	SPLSR	Simultaneous Transmission SAR Test
				x	y	z			
LTE 13	Body	Rear Face	1.12	-20.5	-97.1	-3.2	198.5	0.016	SPLSR < 0.04, Not required
5G WLAN			1.05	21.0	97.0	-2.8			



Test Engineer：Yihu Xiong

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D750V3	1067	Aug. 30, 2016	1 Year
System Validation Dipole	SPEAG	D835V2	4d139	Aug. 25, 2016	1 Year
System Validation Dipole	SPEAG	D1750V2	1071	Aug. 31, 2016	1 Year
System Validation Dipole	SPEAG	D1900V2	5d159	Aug. 31, 2016	1 Year
System Validation Dipole	SPEAG	D2450V2	893	Aug. 26, 2016	1 Year
System Validation Dipole	SPEAG	D2600V2	1110	Aug. 26, 2016	1 Year
System Validation Dipole	SPEAG	D5GHzV2	1133	Sep. 01, 2016	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3873	Sep. 01, 2016	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1341	Aug. 29, 2016	1 Year
Radio Communication Analyzer	ANRITSU	MT8820C	6201300717	Jul. 27, 2016	1 Year
Wireless Communication Test Set	Agilent	E5515C	MY50260600	Jun. 29, 2016	1 Year
ENA Series Network Analyzer	Agilent	E5071C	MY46214638	Jul. 27, 2016	1 Year
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510355	Jun. 29, 2016	1Year
MXG Analog Signal Generator	KEYSIGHT	N5183A	MY50143024	Mar. 01, 2017	1 Year
Power Meter	Agilent	ML2495A	1506002	Mar. 01, 2017	1Year
Power Sensor	Agilent	MA2411B	1339353	Mar. 01, 2017	1 Year
Temp. & Humi. Recorder	CLOCK	HTC-1	157248	Jul. 29, 2016	1 Year
Electronic Thermometer	YONGFA	YF-160A	120100323	Sep. 28, 2016	1 Year
Coupler	Woken	0110A056020-10	COM27RW1A3	Sep. 28, 2016	1 Year

6. Measurement Uncertainty

Source of Uncertainty	Tolerance (± %)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (± %, 1g)	Standard Uncertainty (± %, 10g)	Vi
Measurement System								
Probe Calibration	6.0	Normal	1	1	1	6.0	6.0	∞
Axial Isotropy	4.7	Rectangular	√3	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.707	0.707	3.9	3.9	∞
Boundary Effect	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Linearity	4.7	Rectangular	√3	1	1	2.7	2.7	∞
System Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Readout Electronics	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	0.0	Rectangular	√3	1	1	0.0	0.0	∞
Integration Time	1.7	Rectangular	√3	1	1	1.0	1.0	∞
RF Ambient Conditions - Noise	3.0	Rectangular	√3	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	Rectangular	√3	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	Rectangular	√3	1	1	0.2	0.2	∞
Probe Positioning with Respect to Phantom Shell	2.9	Rectangular	√3	1	1	1.7	1.7	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	2.0	Rectangular	√3	1	1	1.2	1.2	∞
Test Sample Related								
Test Sample Positioning	1.5 / 0.7	Normal	1	1	1	1.5	0.7	32
Device Holder Uncertainty	4.2 / 1.8	Normal	1	1	1	4.2	1.8	32
Output Power Variation - SAR Drift Measurement	5.0	Rectangular	√3	1	1	2.9	2.9	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and Thickness Tolerances)	7.2	Rectangular	√3	1	1	4.2	4.2	∞
Liquid Conductivity - Deviation from Target Values	5.0	Rectangular	√3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - Measurement Uncertainty	1.0	Normal	1	0.64	0.43	0.6	0.4	25
Liquid Permittivity - Deviation from Target Values	5.0	Rectangular	√3	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - Measurement Uncertainty	0.5	Normal	1	0.60	0.49	0.3	0.2	25
Combined Standard Uncertainty						± 11.2 %	± 10.4 %	
Expanded Uncertainty (K=2)						**± 22.4 %**	**± 20.8 %**	

Uncertainty budget for frequency range 300 MHz to 3 GHz

Source of Uncertainty	Tolerance (± %)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (± %, 1g)	Standard Uncertainty (± %, 10g)	Vi
Measurement System								
Probe Calibration	6.55	Normal	1	1	1	6.55	6.55	∞
Axial Isotropy	4.7	Rectangular	√3	0.707	0.707	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.707	0.707	3.9	3.9	∞
Boundary Effect	2.0	Rectangular	√3	1	1	1.2	1.2	∞
Linearity	4.7	Rectangular	√3	1	1	2.7	2.7	∞
System Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Readout Electronics	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	0.0	Rectangular	√3	1	1	0.0	0.0	∞
Integration Time	1.7	Rectangular	√3	1	1	1.0	1.0	∞
RF Ambient Conditions - Noise	3.0	Rectangular	√3	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	Rectangular	√3	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	Rectangular	√3	1	1	0.2	0.2	∞
Probe Positioning with Respect to Phantom Shell	6.7	Rectangular	√3	1	1	3.9	3.9	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	4.0	Rectangular	√3	1	1	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	1.5 / 0.7	Normal	1	1	1	1.5	0.7	32
Device Holder Uncertainty	4.2 / 1.8	Normal	1	1	1	4.2	1.8	32
Output Power Variation - SAR Drift Measurement	5.0	Rectangular	√3	1	1	2.9	2.9	∞
Phantom and Tissue Parameters								
Phantom Uncertainty (Shape and Thickness Tolerances)	7.6	Rectangular	√3	1	1	4.4	4.4	∞
Liquid Conductivity - Deviation from Target Values	5.0	Rectangular	√3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - Measurement Uncertainty	1.0	Normal	1	0.64	0.43	0.6	0.4	25
Liquid Permittivity - Deviation from Target Values	5.0	Rectangular	√3	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - Measurement Uncertainty	0.5	Normal	1	0.60	0.49	0.3	0.2	25
Combined Standard Uncertainty						± 12.3 %	± 11.5 %	
Expanded Uncertainty (K=2)						**± 24.6 %**	**± 23.0 %**	

Uncertainty budget for frequency range 3 GHz to 6 GHz

7. Information on the Testing Laboratories

We, Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch, were founded in 2002 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

China Dongguan Lab:
No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China
Tel: 86-769-8593-5656
Fax: 86-769-8599-1080

Email: service.dg@cn.bureauveritas.com
Web Site: www.adt.com.tw

The road map of all our labs can be found in our web site also.

---END---

Appendix A. SAR Plots of System Verification

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

System Check_B750_170420

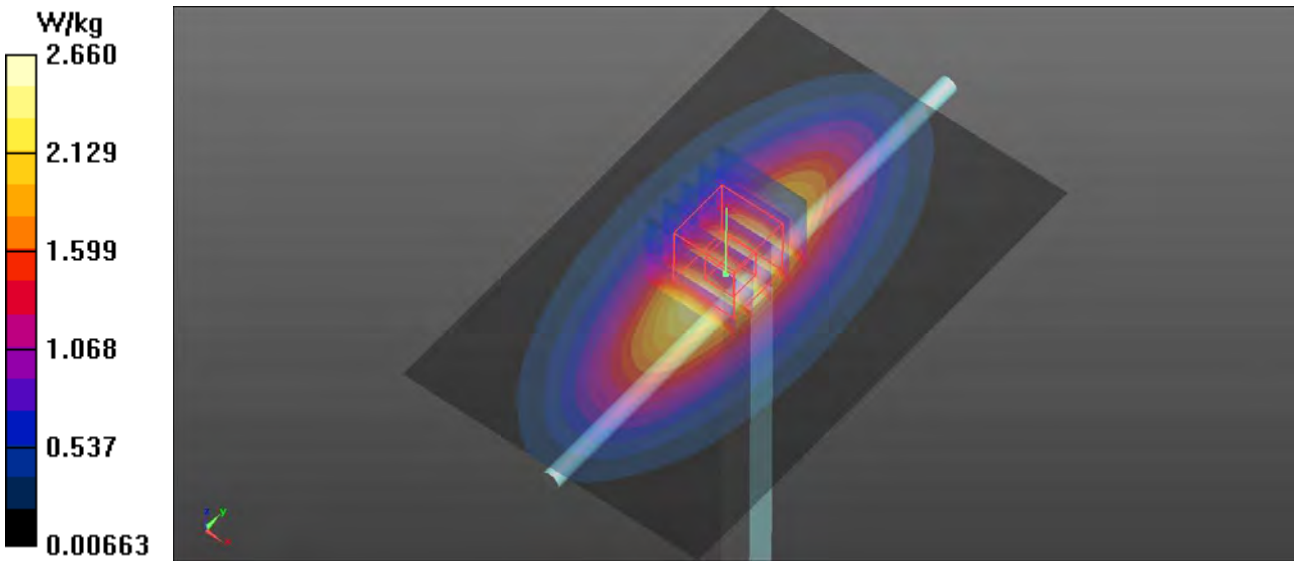
DUT: Dipole 750 MHz;Type:D750V3;SN:1067

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: B750_0420 Medium parameters used: f = 750 MHz; σ = 0.963 S/m; ε_r = 53.779; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃； Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(9.73, 9.73, 9.73); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.66 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.03 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 3.02 W/kg
SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 2.63 W/kg



System Check_B835_170422

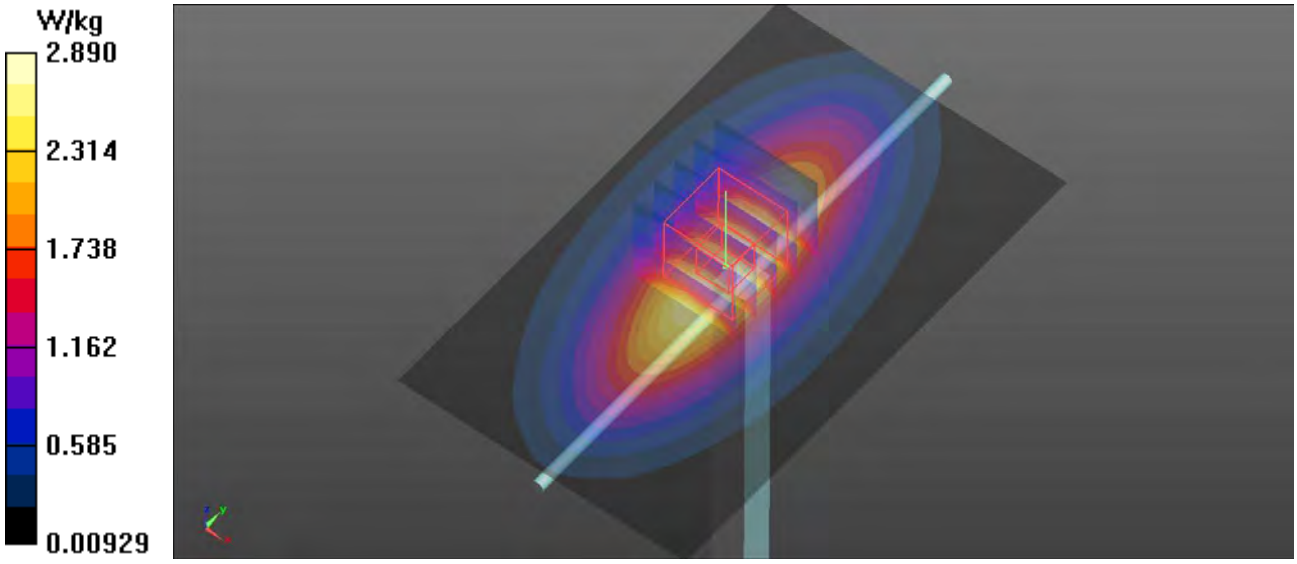
DUT: Dipole 835 MHz;Type:D835V2; SN:4d139

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: B835_0422 Medium parameters used: f = 835 MHz; σ = 0.992 S/m; ε_r = 55.615; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(9.9, 9.9, 9.9); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.89 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.96 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 3.36 W/kg
SAR(1 g) = 2.31 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 2.90 W/kg



System Check_B1750_170418

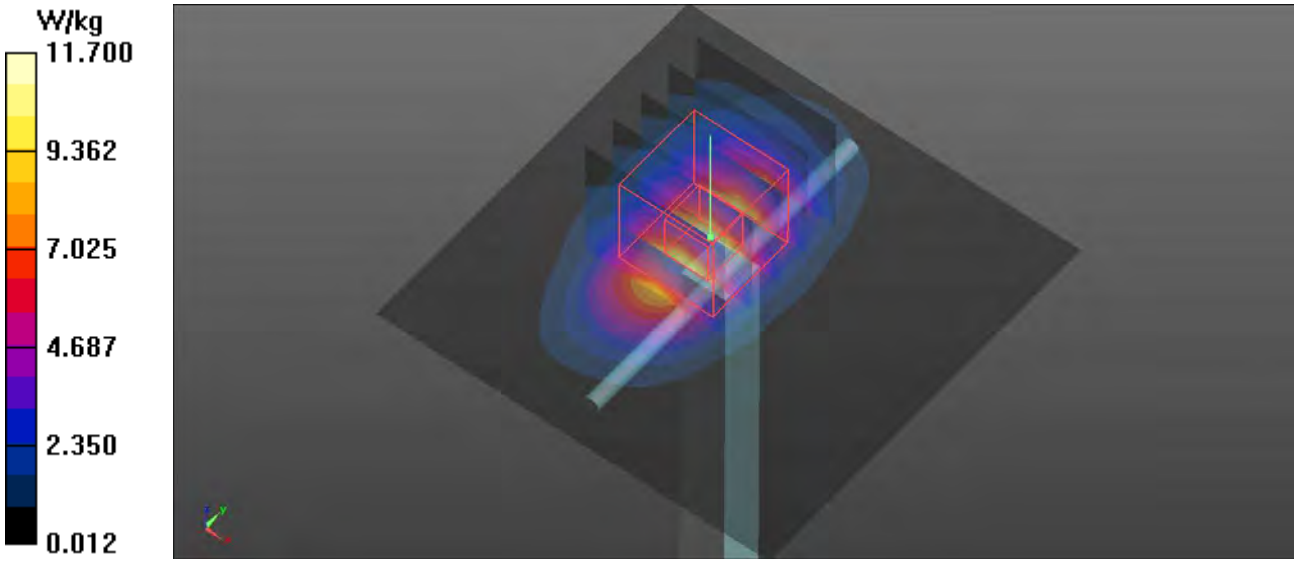
DUT: Dipole 1750 MHz;Type:D1750V2; SN:1071

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: B1750_0418 Medium parameters used: f = 1750 MHz; σ = 1.496 S/m; ε_r = 54.302; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃； Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(8.13, 8.13, 8.13); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 11.7 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 82.89 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 14.5 W/kg
SAR(1 g) = 8.7 W/kg; SAR(10 g) = 4.74 W/kg
Maximum value of SAR (measured) = 11.8 W/kg



System Check_B1900_170419

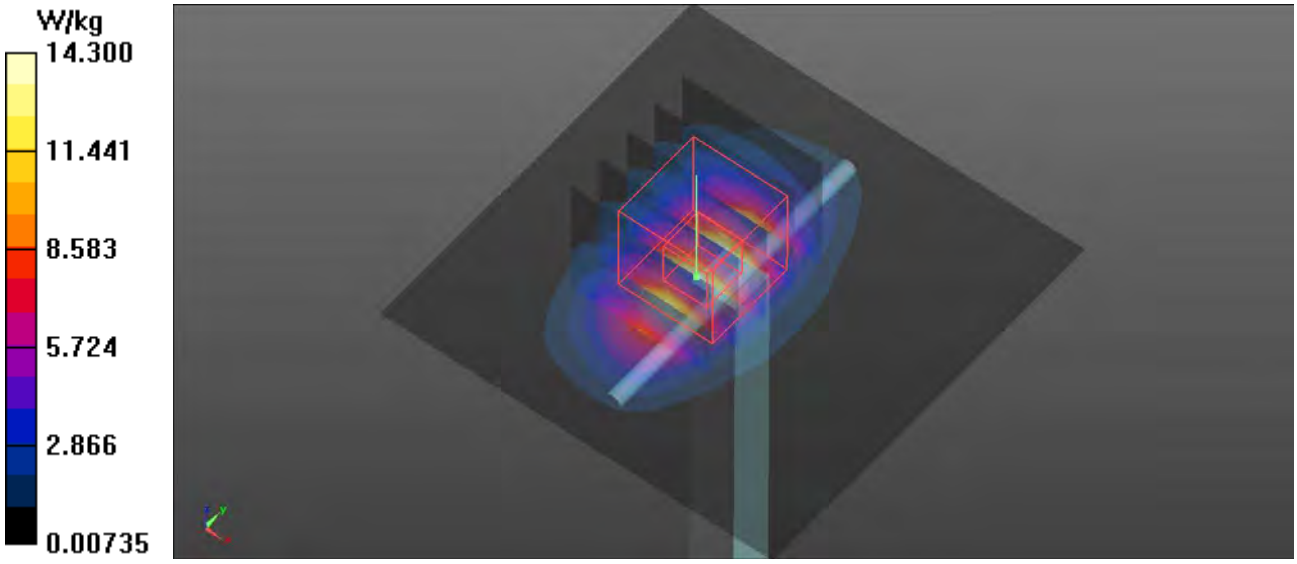
DUT: Dipole 1900MHz;Type:D1900V2; SN:5d159

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: B1900_0419 Medium parameters used: f = 1900 MHz; σ = 1.54 S/m; ε_r = 52.22; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃； Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.85, 7.85, 7.85); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.3 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 98.63 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.44 W/kg
Maximum value of SAR (measured) = 14.7 W/kg



System Check_B2450_170518

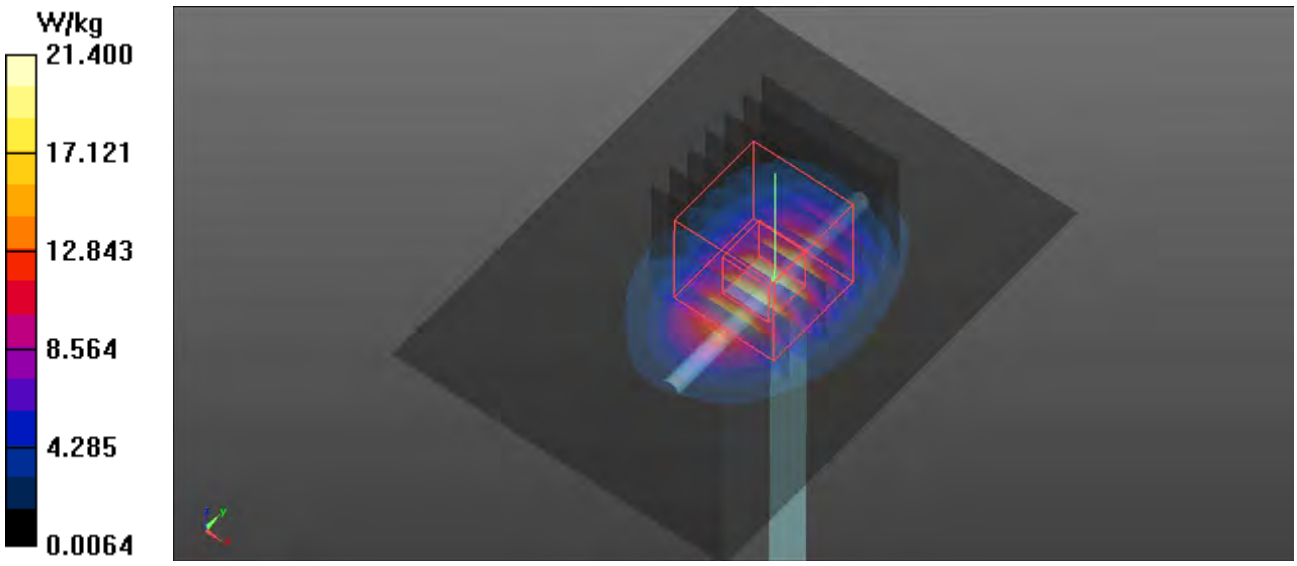
DUT: Dipole 2450 MHz;Type:D2450V2; SN:893

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: B2450_0518 Medium parameters used: f = 2450 MHz; σ = 1.902 S/m; ε_r = 51.459; ρ = 1000 kg/m^3
Ambient Temperature：21.9 ℃； Liquid Temperature：20.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.46, 7.46, 7.46); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.4 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.89 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 26.0 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.83 W/kg
Maximum value of SAR (measured) = 20.8 W/kg



System Check_B2600_170421

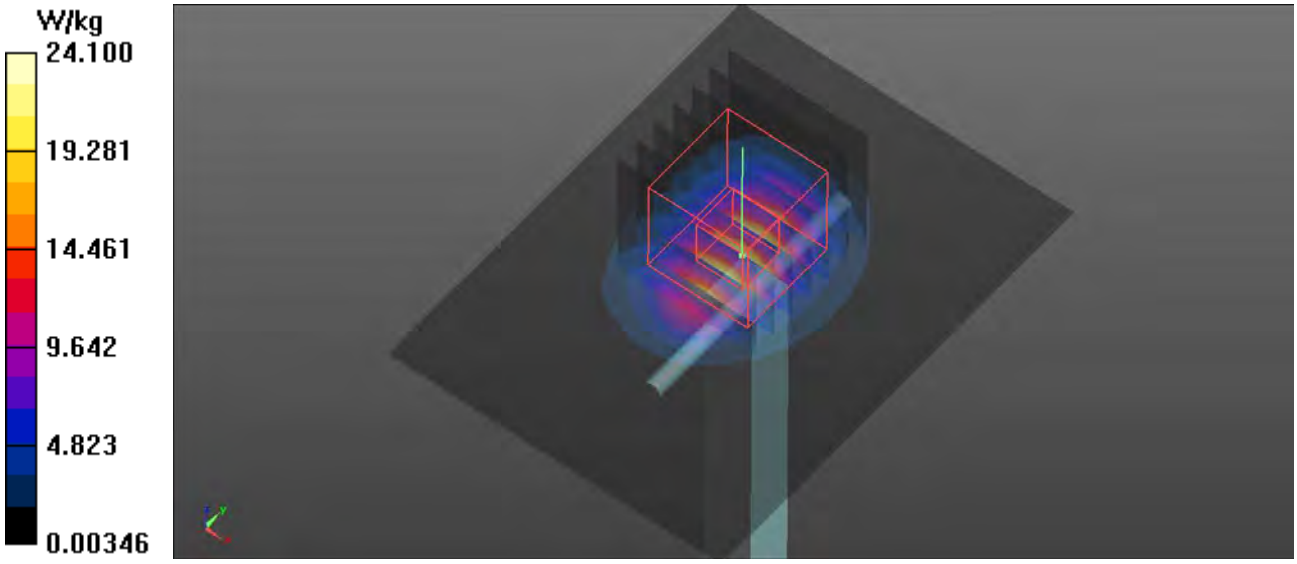
DUT: Dipole 2600 MHz;Type:D2600V2; SN:1110

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: B2600_0421 Medium parameters used: f = 2600 MHz; σ = 2.205 S/m; ε_r = 52.277; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃； Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.32, 7.32, 7.32); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 24.1 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.15 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 5.94 W/kg
Maximum value of SAR (measured) = 23.2 W/kg



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2017/05/18

System Check_B5250_170518

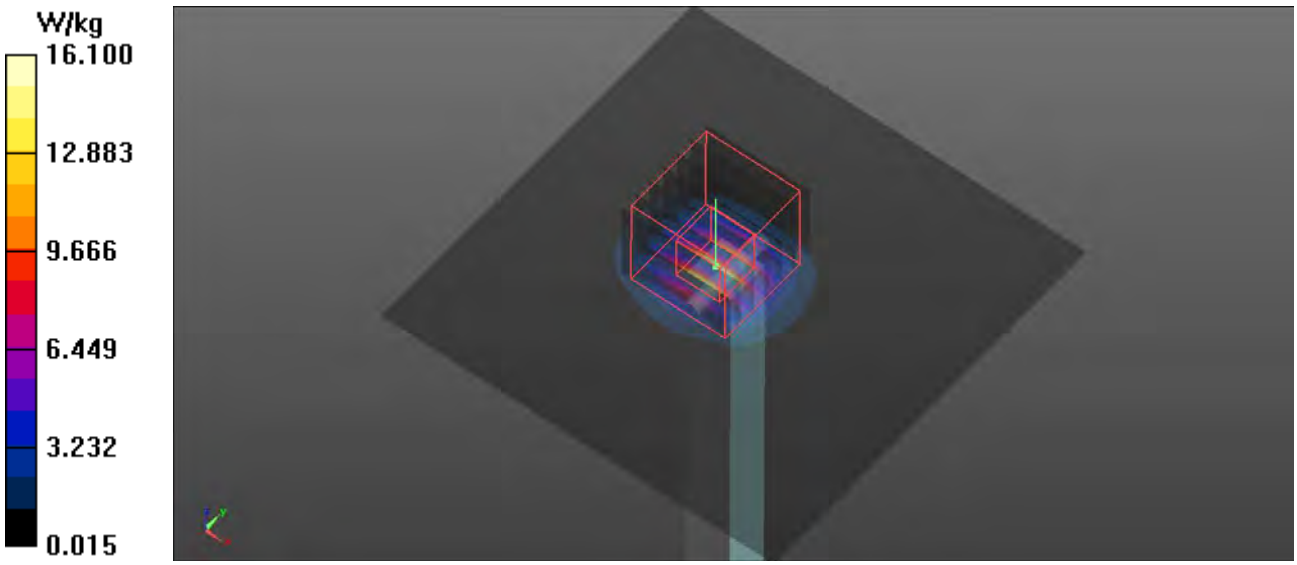
DUT: Dipole 5GHzV2;Type:D5GHzV2; SN:1133

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: B5G_0518 Medium parameters used: f = 5250 MHz; σ = 5.366 S/m; ε_r = 49.229; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃； Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.39, 4.39, 4.39); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.1 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 46.25 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 7.15 W/kg; SAR(10 g) = 1.93 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



System Check_B5800_170518

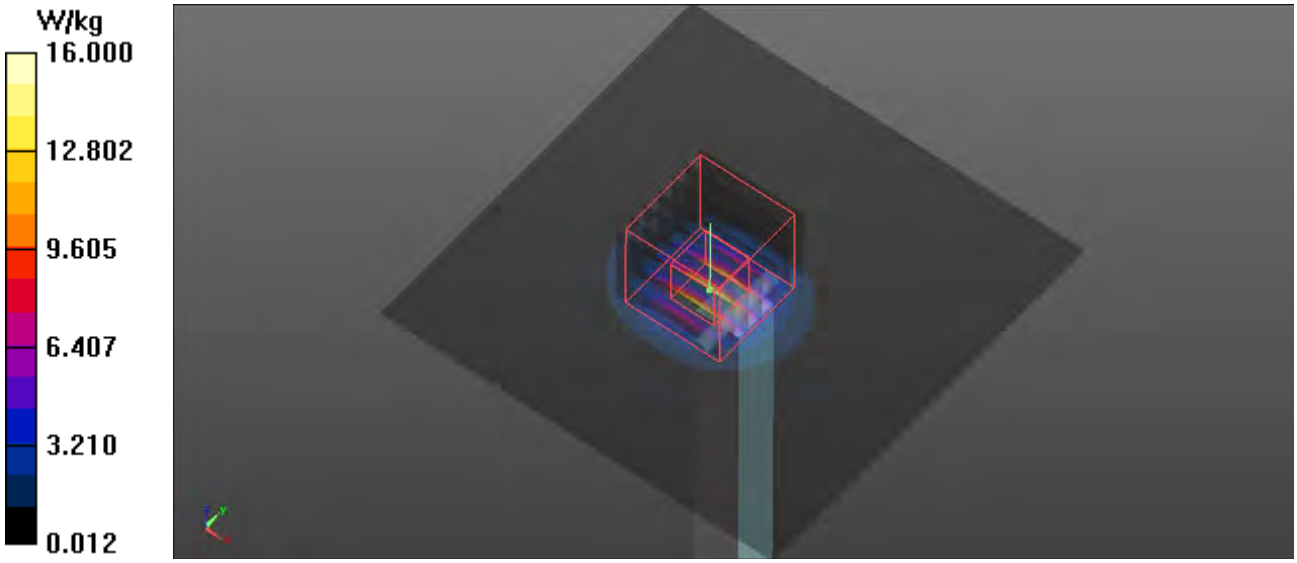
DUT: Dipole 5GHzV2;Type:D5GHzV2; SN:1133

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: B5G_0518 Medium parameters used: f = 5800 MHz; σ = 6.128 S/m; ε_r = 48.04; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃； Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(3.97, 3.97, 3.97); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.0 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 48.11 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 7.51 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



Appendix B. SAR Plots of SAR Measurement

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination, and measured SAR > 1.5 W/kg are shown as follows.

P01 WCDMA II_RMC12.2K_Rear Face_0cm_Ch9400

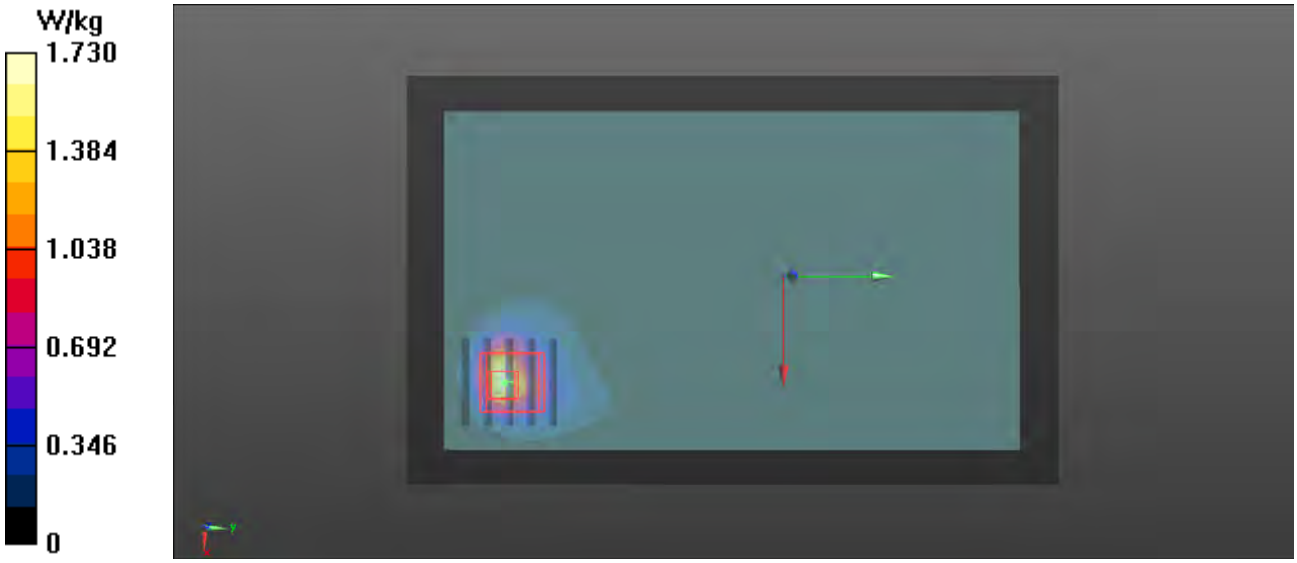
DUT: 170330W002

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: B1900_0419 Medium parameters used: f = 1880.1 MHz; σ = 1.516 S/m; ε_r = 52.281; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃； Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.85, 7.85, 7.85); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.73 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.221 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.23 W/kg
SAR(1 g) = 0.941 W/kg; SAR(10 g) = 0.418 W/kg
Maximum value of SAR (measured) = 1.80 W/kg



P02 WCDMA V_RMC12.2K_Rear Face_0cm_Ch4132

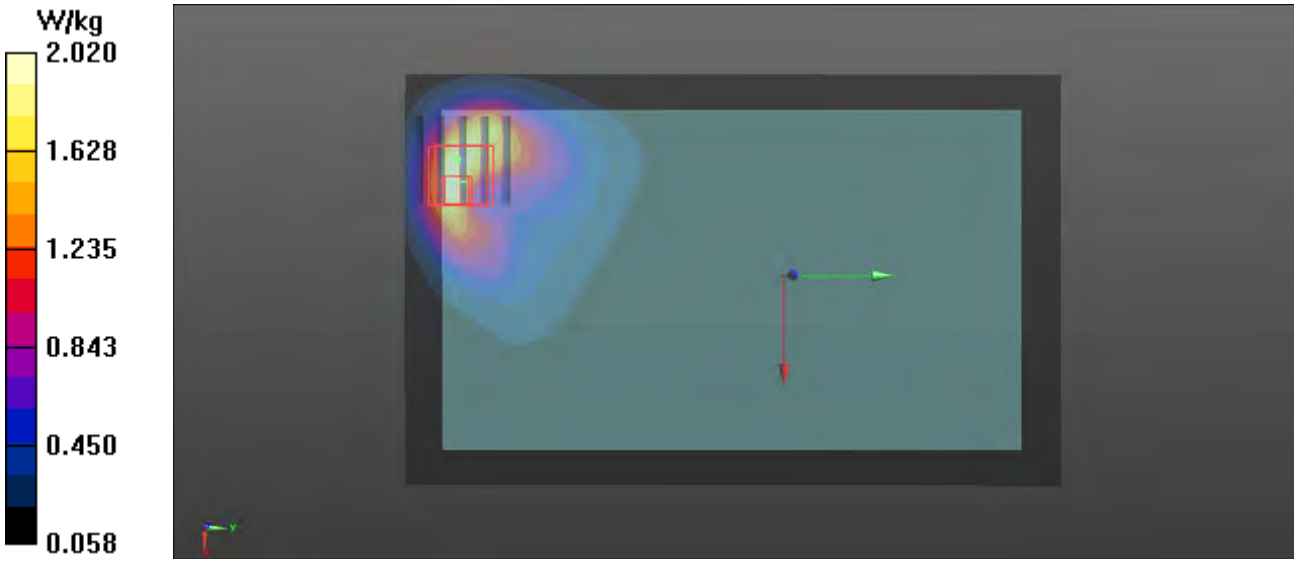
DUT: 170330W002

Communication System: WCDMA; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: B835_0422 Medium parameters used: f = 826.4 MHz; σ = 0.984 S/m; ε_r = 55.703; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(9.9, 9.9, 9.9); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.70 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.466 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 2.73 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.541 W/kg
Maximum value of SAR (measured) = 2.02 W/kg



P03 LTE 2_QPSK20M_Rear Face_1.5cm_Ch18900_1RB_OS0

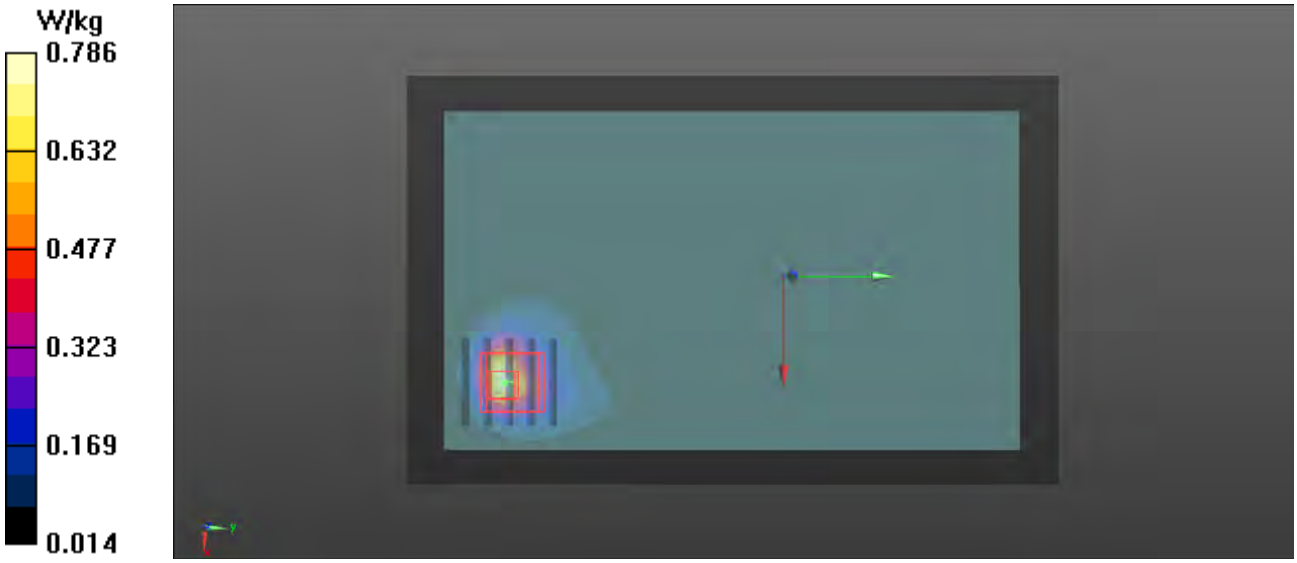
DUT: 170330W002

Communication System: LTE; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: B1900_0419 Medium parameters used: f = 1880.1 MHz; σ = 1.516 S/m; ε_r = 52.281; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.85, 7.85, 7.85); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.816 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.170 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.906 W/kg
SAR(1 g) = 0.564 W/kg; SAR(10 g) = 0.339 W/kg
Maximum value of SAR (measured) = 0.786 W/kg



P04 LTE 4_QPSK20M_Rear Face_0cm_Ch20175_1RB_OS0

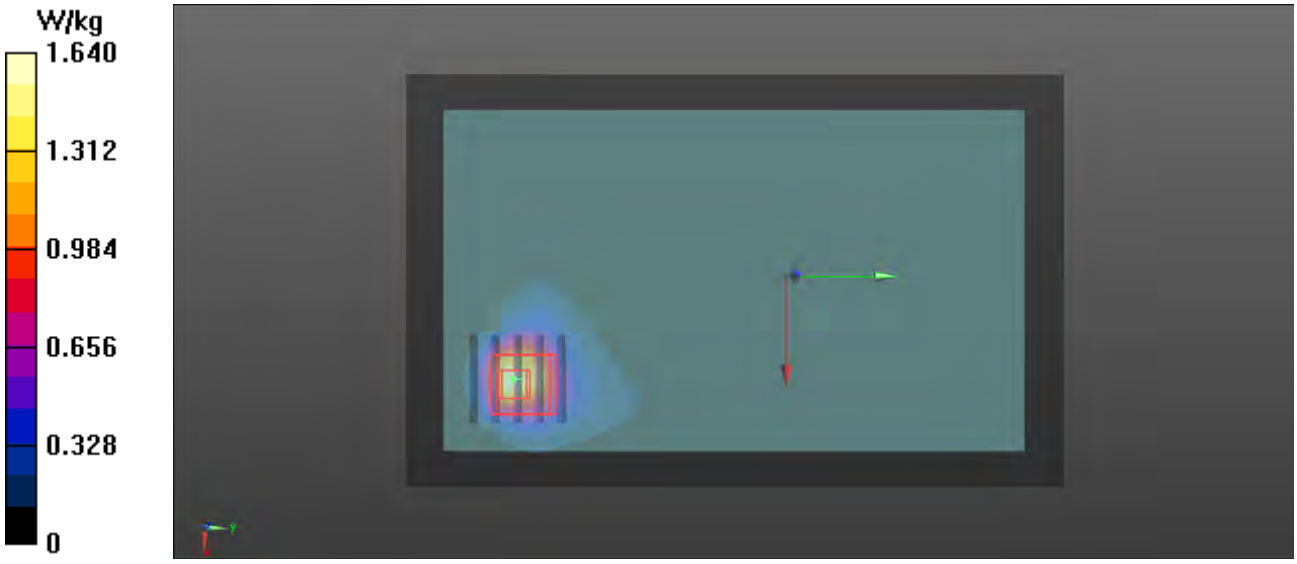
DUT: 170330W002

Communication System: LTE; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: B1750_0418 Medium parameters used: f = 1732.5 MHz; σ = 1.509 S/m; ε_r = 54.191; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃； Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(8.13, 8.13, 8.13); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.64 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.295 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 0.967 W/kg; SAR(10 g) = 0.481 W/kg
Maximum value of SAR (measured) = 1.61 W/kg



P05 LTE 5_QPSK10M_Rear Face_0cm_Ch20600_1RB_OS0

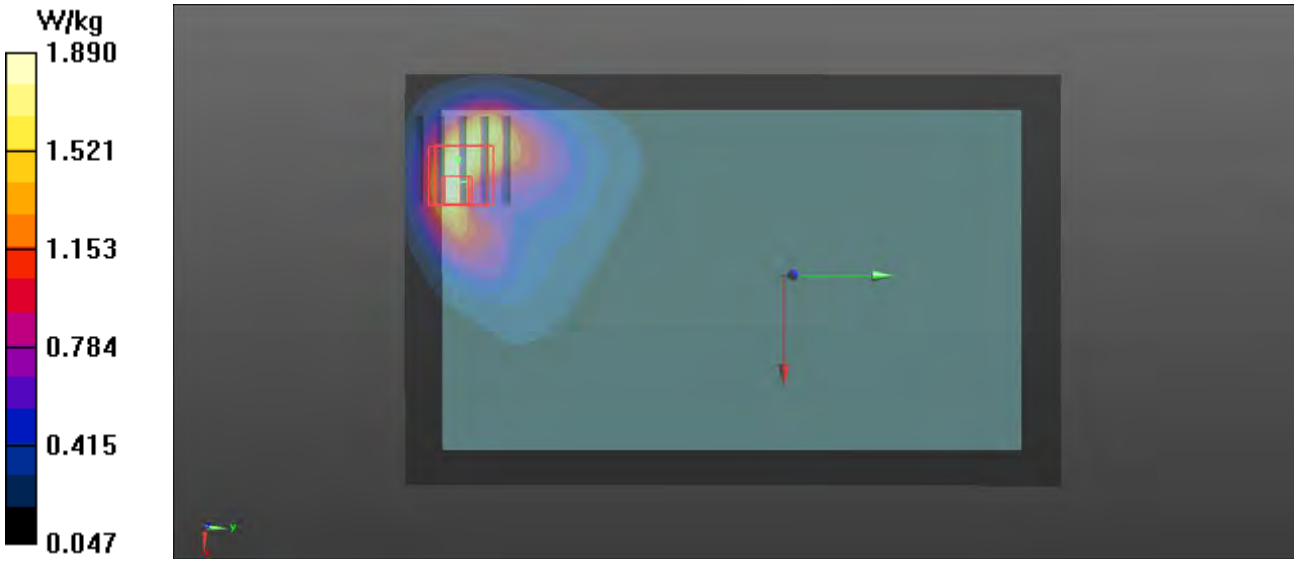
DUT: 170330W002

Communication System: LTE; Frequency: 844 MHz;Duty Cycle: 1:1
Medium: B835_0422 Medium parameters used: f = 844 MHz; σ = 1.001 S/m; ε_r = 55.521; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.1 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(9.9, 9.9, 9.9); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.71 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.803 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.35 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.508 W/kg
Maximum value of SAR (measured) = 1.89 W/kg



P06 LTE 7_QPSK20M_Bottom Side_1cm_Ch20850_1RB_OS0

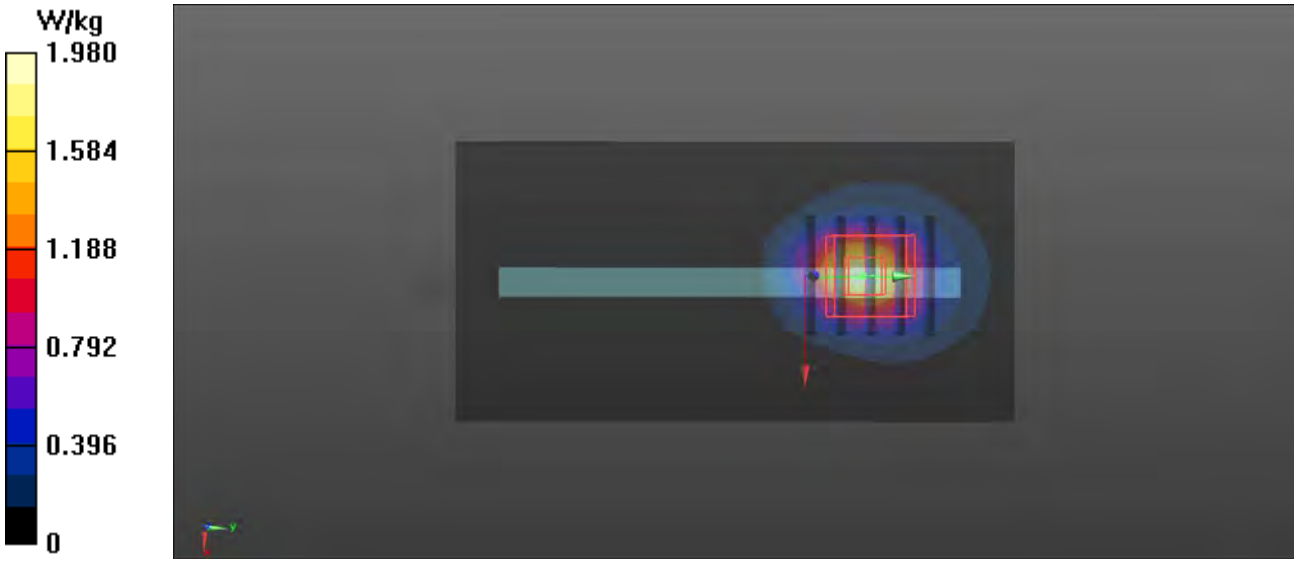
DUT: 170330W002

Communication System: LTE; Frequency: 2510 MHz;Duty Cycle: 1:1
Medium: B2600_0421 Medium parameters used: f = 2510 MHz; σ = 2.085 S/m; ε_r = 52.581; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃； Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.32, 7.32, 7.32); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (61x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.98 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.253 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.54 W/kg
SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.559 W/kg
Maximum value of SAR (measured) = 2.03 W/kg



P07 LTE 12_QPSK10M_Rear Face_0cm_Ch23060_1RB_OS0

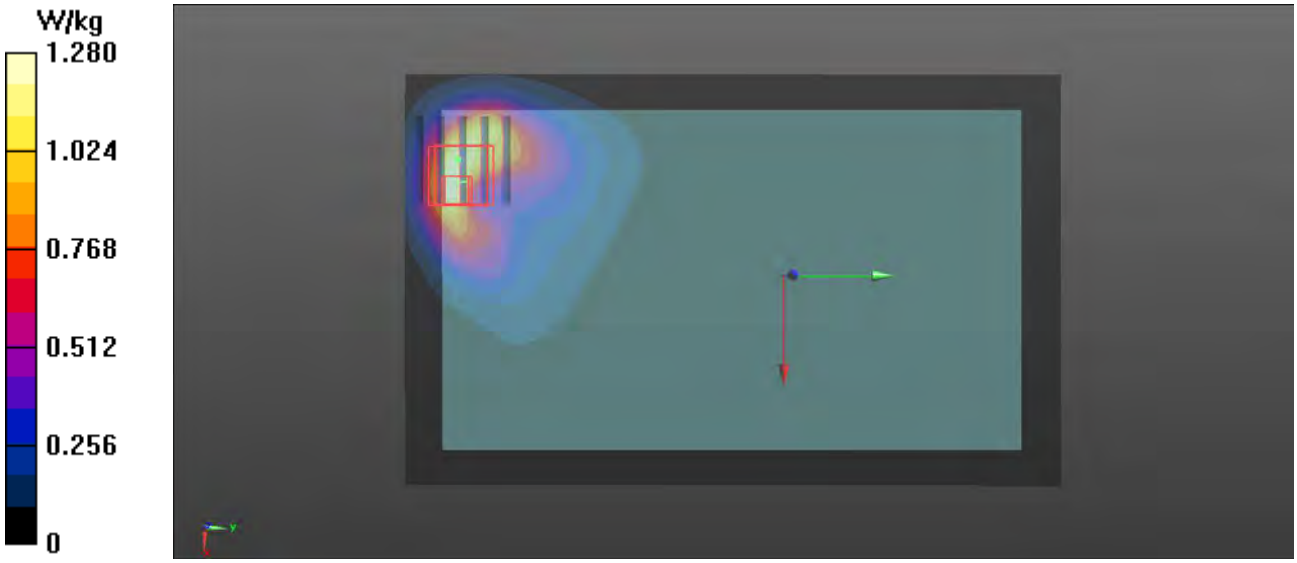
DUT: 170330W002

Communication System: LTE; Frequency: 704 MHz;Duty Cycle: 1:1
Medium: B750_0420 Medium parameters used: f = 704 MHz; σ = 0.915 S/m; ε_r = 54.32; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃； Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(9.73, 9.73, 9.73); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.28 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.646 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.15 W/kg
SAR(1 g) = 0.874 W/kg; SAR(10 g) = 0.435 W/kg
Maximum value of SAR (measured) = 1.65 W/kg



P08 LTE 13_QPSK10M_Rear Face_0cm_Ch23230_50RB_OS0

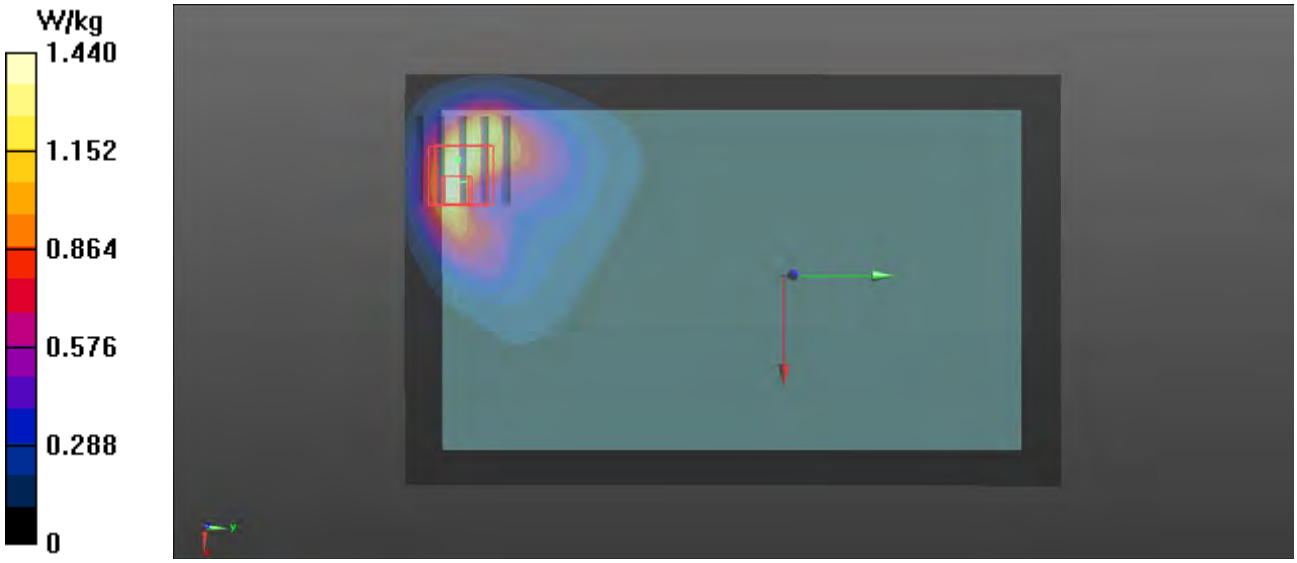
DUT: 170330W002

Communication System: LTE; Frequency: 782 MHz;Duty Cycle: 1:1
Medium: B750_0420 Medium parameters used: f = 782 MHz; σ = 0.995 S/m; ε_r = 53.489; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃； Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(9.73, 9.73, 9.73); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (101x161x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.44 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.023 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.83 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.514 W/kg
Maximum value of SAR (measured) = 1.94 W/kg



P09 802.11b_Rear Face_0cm_Ch1

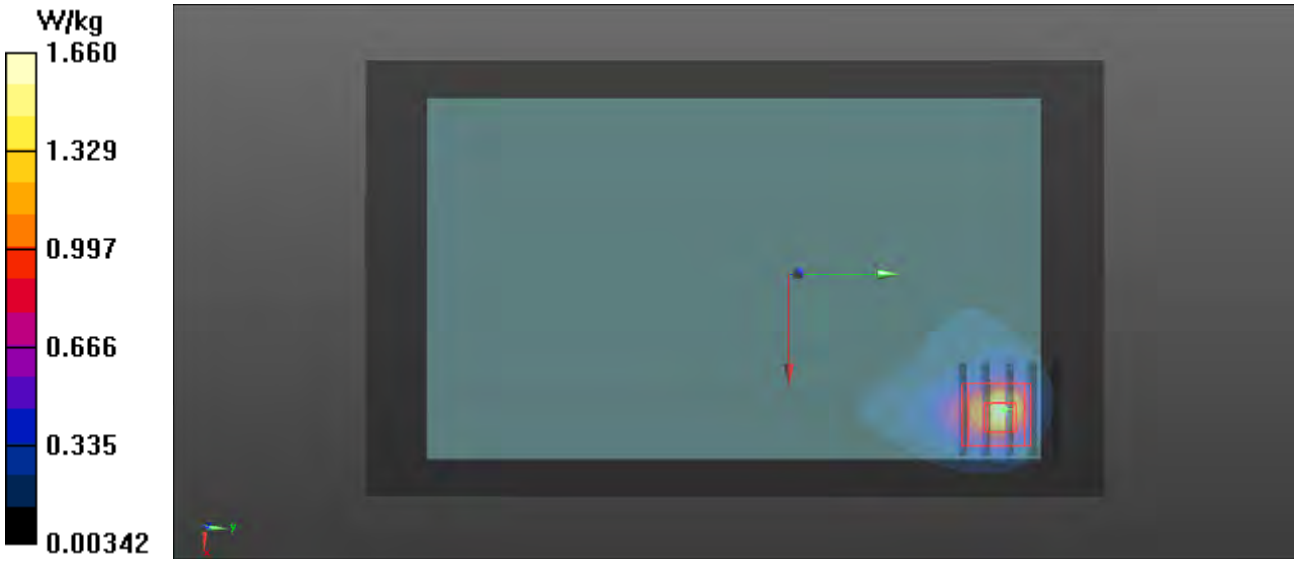
DUT: 170330W002

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: B2450_0518 Medium parameters used: f = 2412 MHz; σ = 1.849 S/m; ε_r = 51.577; ρ = 1000 kg/m^3
Ambient Temperature：21.9 ℃; Liquid Temperature：20.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.46, 7.46, 7.46); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (131x211x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.53 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.3990 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 2.55 W/kg
SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.445 W/kg
Maximum value of SAR (measured) = 1.66 W/kg



P10 802.11n_HT40_Rear Face_0cm_Ch38

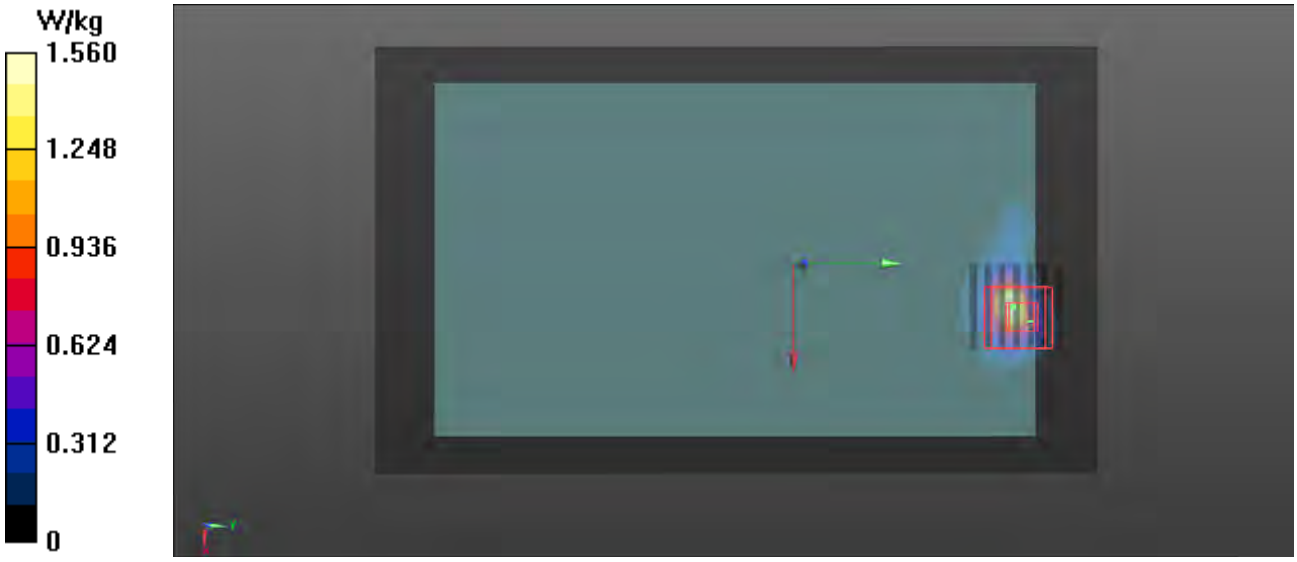
DUT: 170330W002

Communication System: 802.11n; Frequency: 5190 MHz;Duty Cycle: 1:1
Medium: B5G_0518 Medium parameters used: f = 5190 MHz; σ = 5.251 S/m; ε_r = 49.353; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃； Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.39, 4.39, 4.39); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (151x261x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.56 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 0.4910 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 5.90 W/kg
SAR(1 g) = 0.695 W/kg; SAR(10 g) = 0.138 W/kg
Maximum value of SAR (measured) = 3.02 W/kg



P11 802.11n_HT40_Rear Face_0cm_Ch151

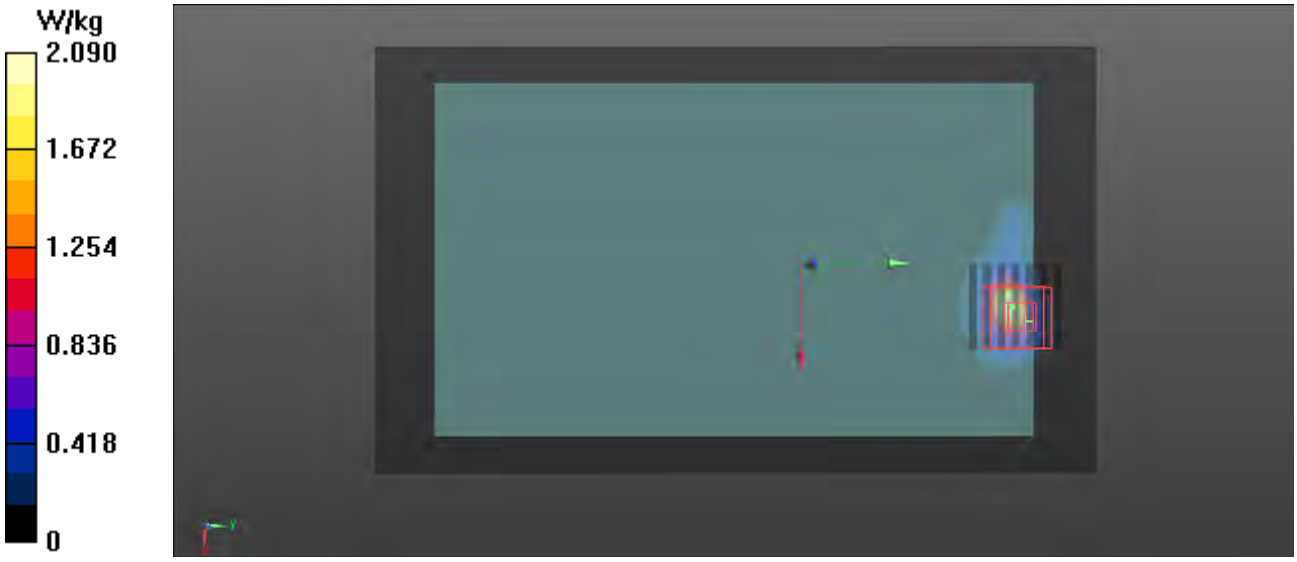
DUT: 170330W002

Communication System: 802.11n; Frequency: 5755 MHz;Duty Cycle: 1:1
Medium: B5G_0518 Medium parameters used: f = 5755 MHz; σ = 6.027 S/m; ε_r = 48.355; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃； Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(3.97, 3.97, 3.97); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (151x261x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.09 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=2mm
Reference Value = 0.5460 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 5.31 W/kg
SAR(1 g) = 0.962 W/kg; SAR(10 g) = 0.233 W/kg
Maximum value of SAR (measured) = 3.24 W/kg



P12 BT_GFSK_Rear Face_0cm_Ch39

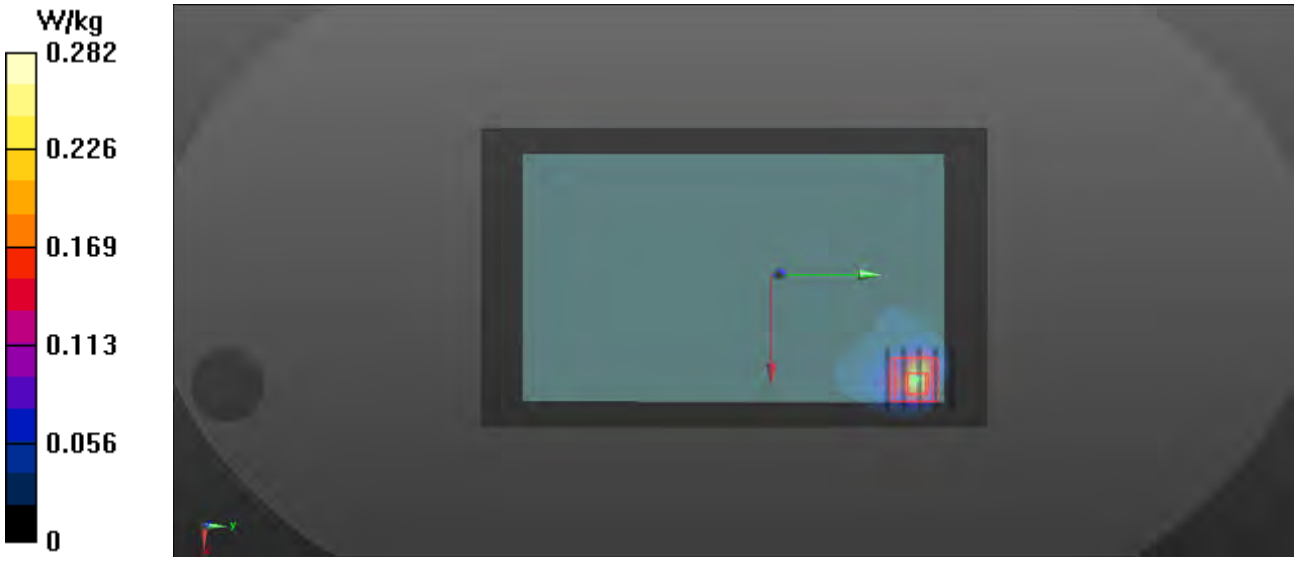
DUT: 170330W002

Communication System: BT; Frequency: 2441 MHz;Duty Cycle: 1:2.14
Medium: B2450_0518 Medium parameters used: f = 2441 MHz; σ = 1.89 S/m; ε_r = 51.484; ρ = 1000 kg/m^3
Ambient Temperature：21.9 ℃； Liquid Temperature：20.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.46, 7.46, 7.46); Calibrated: 2016/09/01;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2016/08/29
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1205
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

- Area Scan (131x211x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.282 W/kg

- Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.3240 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.349 W/kg
SAR(1 g) = 0.145 W/kg; SAR(10 g) = 0.059 W/kg
Maximum value of SAR (measured) = 0.269 W/kg



Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

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 **BV ADT CN (Auden)**

Certificate No: D750V3-1067_Aug16

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1067
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 30, 2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M. Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 30, 2016

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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"

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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
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	42.4 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.09 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.24 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.37 W/kg ± 16.5 % (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	54.9 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.77 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.76 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.8 Ω - 0.3 jΩ
Return Loss	- 26.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.0 Ω - 2.8 jΩ
Return Loss	- 31.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.033 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

Manufactured by	SPEAG
Manufactured on	May 10, 2012

DASY5 Validation Report for Head TSL

Date: 30.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1067

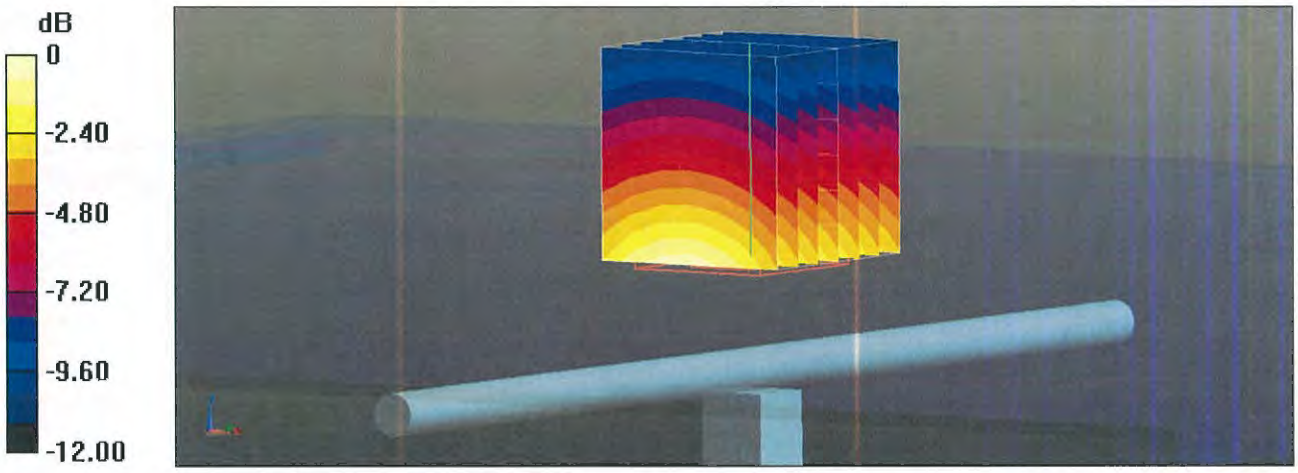
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.91 S/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

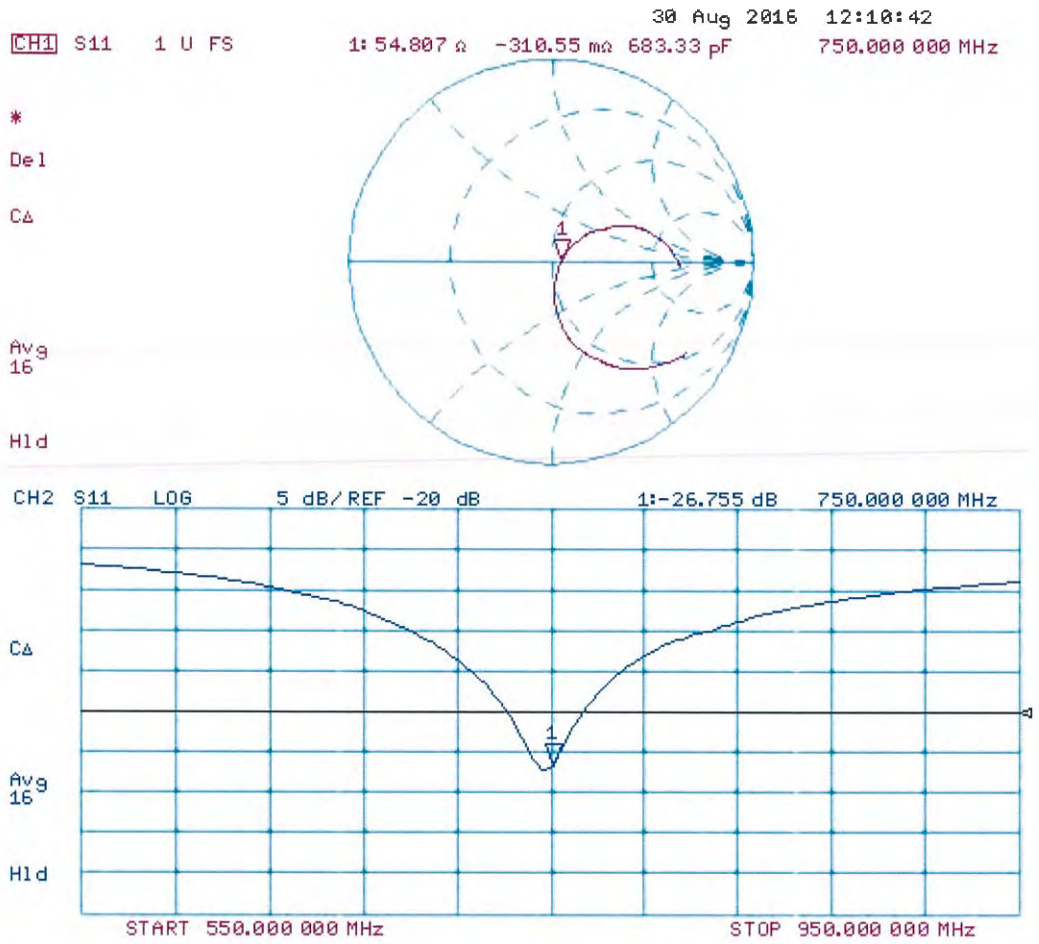
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.93 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.12 W/kg
SAR(1 g) = 2.09 W/kg; SAR(10 g) = 1.36 W/kg
Maximum value of SAR (measured) = 2.77 W/kg



0 dB = 2.77 W/kg = 4.42 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 30.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1067

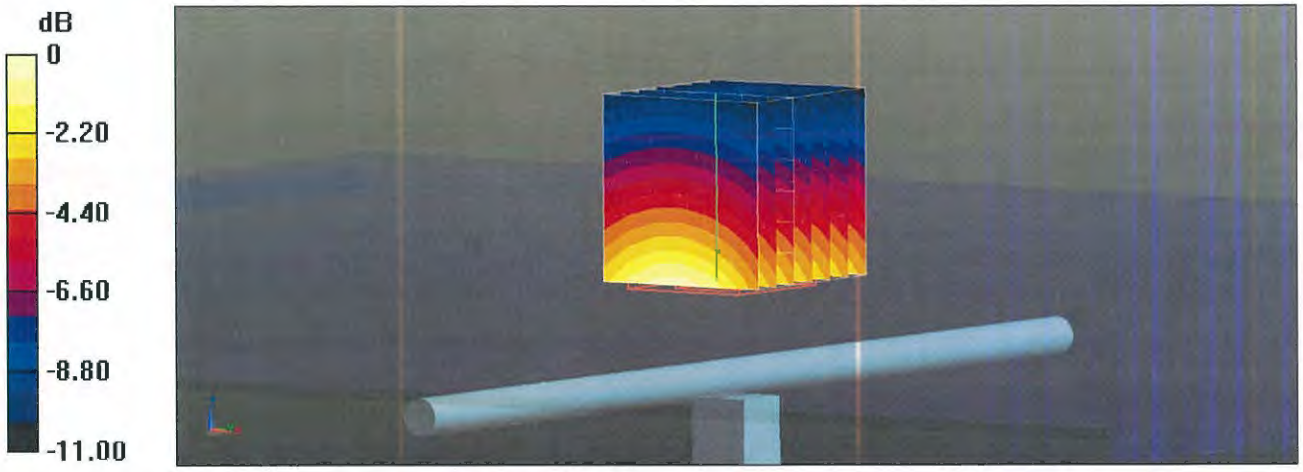
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.99 S/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.99, 9.99, 9.99); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

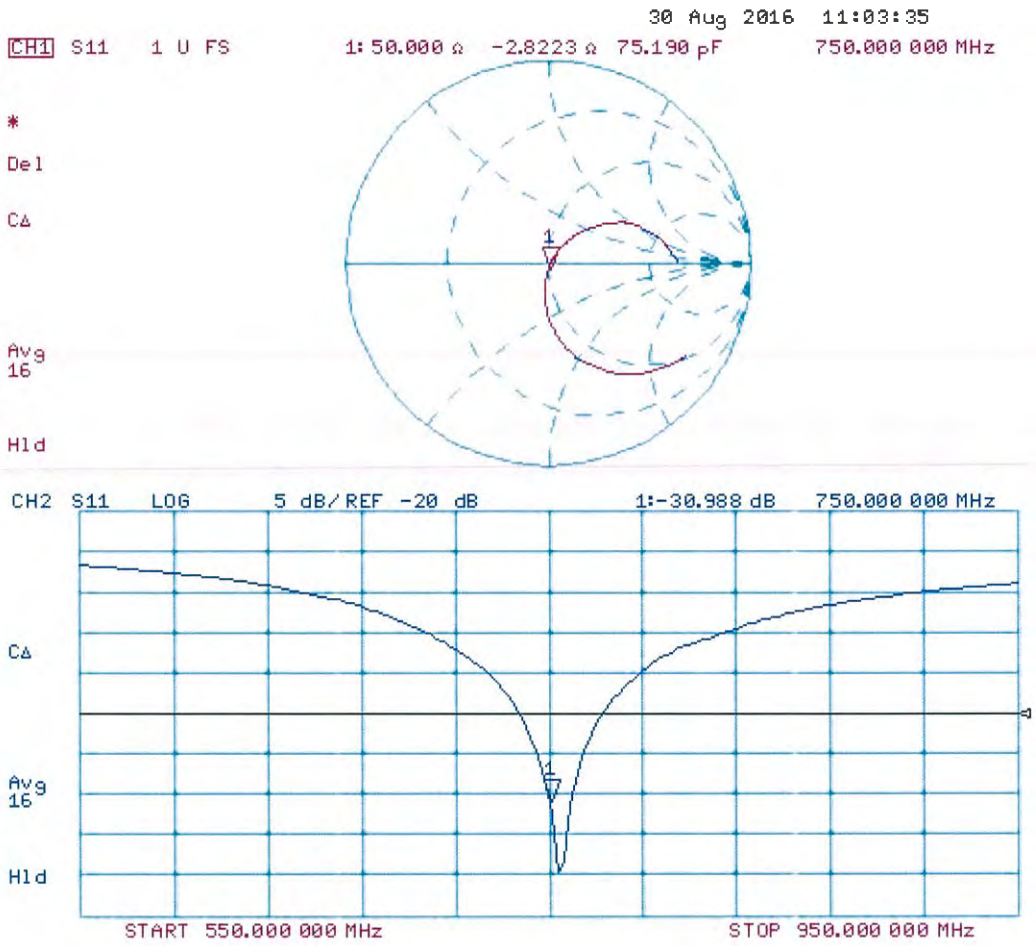
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.54 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.38 W/kg
SAR(1 g) = 2.25 W/kg; SAR(10 g) = 1.47 W/kg
Maximum value of SAR (measured) = 2.97 W/kg



0 dB = 2.97 W/kg = 4.73 dBW/kg

Impedance Measurement Plot for Body TSL



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 **BV ADT CN (Auden)**

Certificate No: D835V2-4d139_Aug16

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d139
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 25, 2016

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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M. Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 30, 2016

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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"

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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.1 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.40 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.09 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.48 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.60 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.28 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω - 3.2 jΩ
Return Loss	- 29.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.8 Ω - 5.4 jΩ
Return Loss	- 24.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391 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

Manufactured by	SPEAG
Manufactured on	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 25.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d139

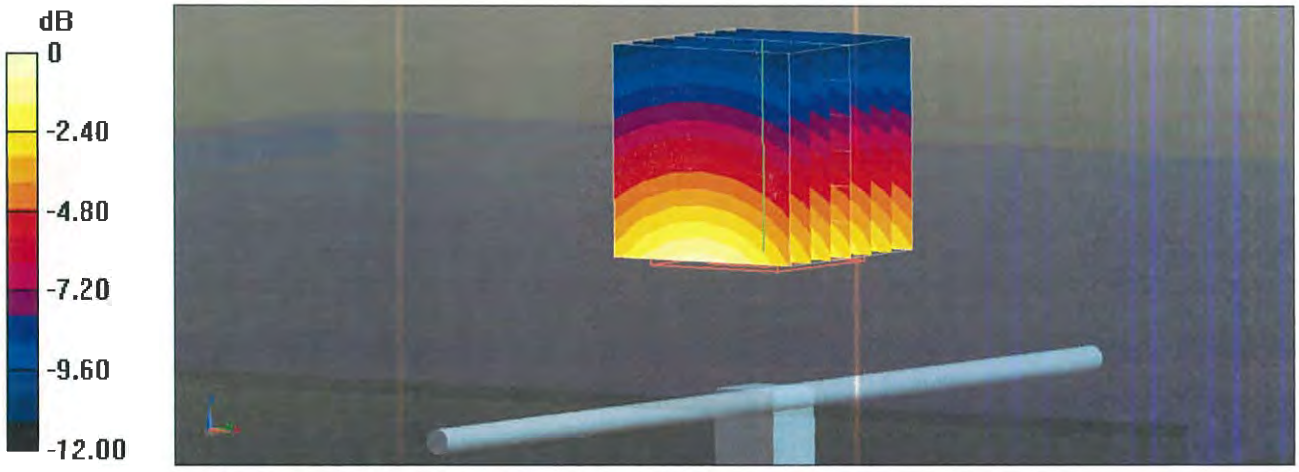
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε_r = 42.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

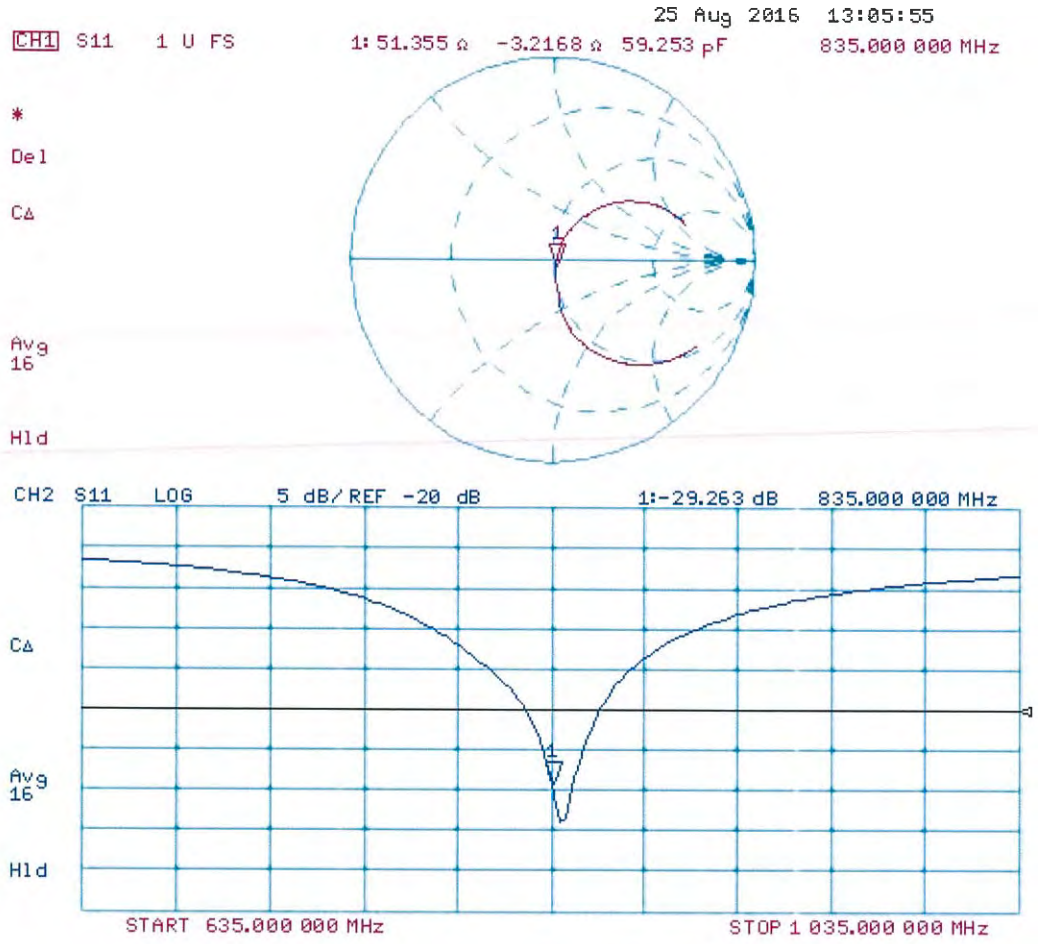
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.09 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.08.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d139

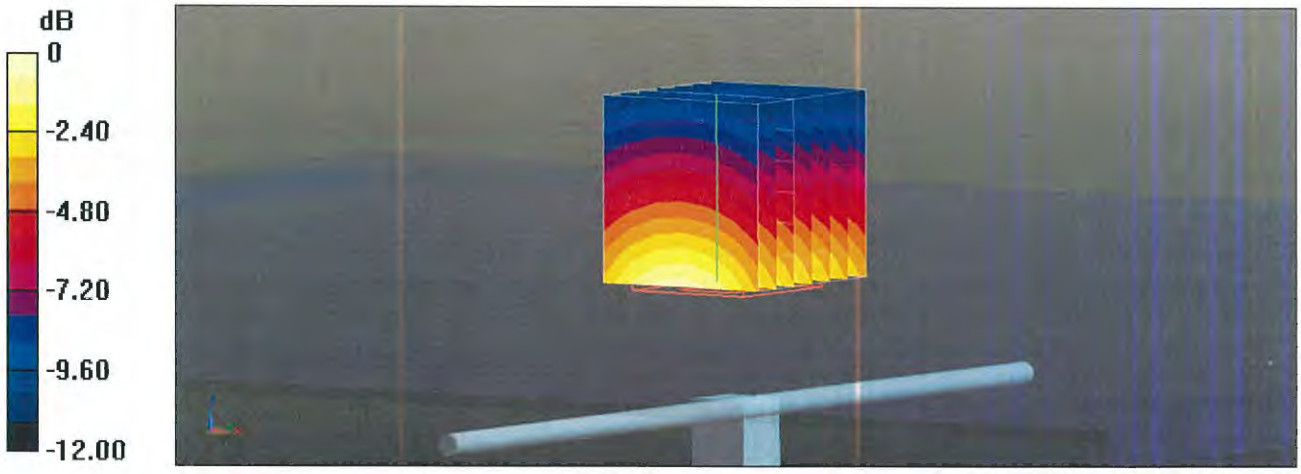
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

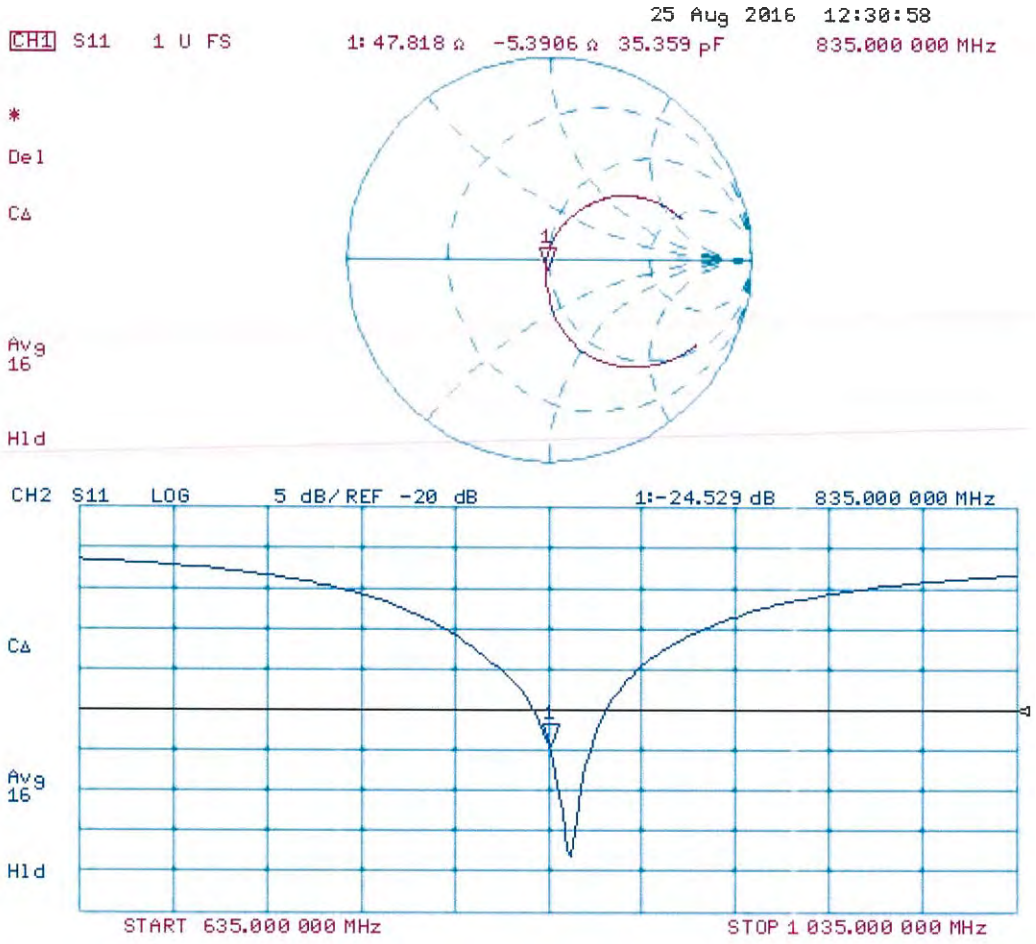
DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.11 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 3.27 W/kg



0 dB = 3.27 W/kg = 5.15 dBW/kg

Impedance Measurement Plot for Body TSL