FCC SAR Test Report

Report No.	:	**SA180604C20**
Applicant	:	**DENSO WAVE INCORPORATED**
Address	:	**1, Yoshiike, Kusagi, Agui-cho, Chita-gun, Aichi, 470-2297 Japan**
Product	:	**Barcode Handy Terminal, 2D Code Handy Terminal**
FCC ID	:	**PZWBHT1700QG**
Brand	:	**DENSO**
Model No.	:	**BHT-1700QWBG-2, BHT-1700QWBG-1** (Refer to item 2 for more details)
Standards	:	**FCC 47 CFR Part 2 (2.1093), IEEE C95.1:1992, IEEE Std 1528:2013** **KDB 865664 D01 v01r04, KDB 865664 D02 v01r02, KDB 248227 D01 v02r02** **KDB 447498 D01 v06, KDB 648474 D04 v01r03** **KDB 941225 D01 v03r01, KDB 941225 D05 v02r05, KDB 941225 D06 v02r01**
Sample Received Date	:	**Jun. 04, 2018**
Date of Testing	:	**Jul. 22, 2018 ~ Sep. 06, 2018**
Lab Address	:	**No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.**
Test Location	:	**No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil, Kwei Shan Dist., Taoyuan City 33383, Taiwan (R.O.C)**

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch – Lin Kou Laboratories**, 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 TAF or any government agencies.

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Approved By : Gordon Lin / Assistant Manager

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Release Control Record

Report No.	Reason for Change	Date Issued
SA180604C20	Initial release	Oct. 05, 2018

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest SAR-1g Head (W/kg)	Highest SAR-1g Body-worn Tested at 15 mm (W/kg)	Highest SAR-1g Hotspot Tested at 10 mm (W/kg)	Highest SAR-10g Product Specific Tested at 0 mm (W/kg)
PCE	GSM850	0.77	0.66	0.78	N/A
	GSM1900	0.15	0.95	0.84	N/A
	WCDMA II	0.12	1.17	0.85	N/A
	WCDMA V	0.82	0.74	0.64	N/A
	LTE 2	0.11	1.17	1.09	N/A
	LTE 4	0.11	0.51	1.15	N/A
	LTE 5	0.74	0.69	0.66	N/A
	LTE 12	0.34	0.39	0.43	N/A
	LTE 13	0.65	0.57	0.63	N/A
	LTE 17	0.39	0.43	0.47	N/A
DTS	2.4G WLAN	0.30	0.09	0.50	N/A
NII	5.3G WLAN	0.13	0.68	N/A	1.28
	5.6G WLAN	0.41	0.95	N/A	1.41
	5.8G WLAN	0.44	0.70	N/A	1.21
DSS	Bluetooth	N/A	0.00	N/A	N/A
DXX	NFC	N/A	N/A	N/A	N/A

Equipment Class	Mode	Highest SAR-1g Head (W/kg)	Highest SAR-1g Body-worn Tested at 15 mm (W/kg)	Highest SAR-1g Hotspot Tested at 10 mm (W/kg)	Highest SAR-10g Product Specific Tested at 0 mm (W/kg)
Highest Simultaneous Transmission SAR		Head	Body-worn	Hotspot	Product Specific
		1.26	1.59	1.28	N/A

Note:

1. The SAR criteria **(Head & Body: SAR-1g 1.6 W/kg, and 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	Barcode Handy Terminal, 2D Code Handy Terminal
FCC ID	PZWBHT1700QG
Brand Name	DENSO
Model Name	BHT-1700QWBG-2, BHT-1700QWBG-1 (Refer to item 2 for more details)
Tx Frequency Bands (Unit: MHz)	GSM850 : 824.2 ~ 848.8 GSM1900 : 1850.2 ~ 1909.8 WCDMA Band II : 1852.4 ~ 1907.6 WCDMA Band V : 826.4 ~ 846.6 LTE Band 2 : 1850.7 ~ 1909.3 (BW: 1.4M, 3M, 5M, 10M, 15M, 20M) LTE Band 4 : 1710.7 ~ 1754.3 (BW: 1.4M, 3M, 5M, 10M, 15M, 20M) LTE Band 5 : 824.7 ~ 848.3 (BW: 1.4M, 3M, 5M, 10M) LTE Band 12 : 699.7 ~ 715.3 (BW: 1.4M, 3M, 5M, 10M) LTE Band 13 : 779.5 ~ 784.5 (BW: 5M, 10M) LTE Band 17 : 706.5 ~ 713.5 (BW: 5M, 10M) WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5700, 5745 ~ 5825 Bluetooth : 2402 ~ 2480 NFC : 13.56
Uplink Modulations	GSM & GPRS : GMSK EDGE : 8PSK WCDMA : QPSK LTE : QPSK, 16QAM 802.11b : DSSS 802.11a/g/n/ac : OFDM Bluetooth : GFSK, π/4-DQPSK, 8-DPSK NFC : ASK
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 4.6.1 of this report
Antenna Type	PIFA Antenna
EUT Stage	Engineering sample

Note:

1. The EUT with follow antennas gain is listed as table below.

Antenna Type	For BHT-1700 Series: Gain(dBi)				
	2.4GHz	5.15~5.25GHz	5.25~5.35GHz	5.47~5.725GHz	5.725~5.85GHz
PIFA	2.27	3.59	3.51	4.13	2.91

Antenna Type	For BHT-1700 Series: Gain(dBi)					
	GSM850; WCDMA B5; LTE B5	GSM1900; WCDMA B2; LTE B2	LTE B4	LTE B12	LTE B13	LTE B17
PIFA	0.39	1.11	1.11	-2.42	-0.03	-2.42

2. All models are listed as below.

Model	BHT-1700QWBG-2 (Sample 1)	BHT-1700QWBG-1 (Sample 2)
Base module (WLAN/BT)	4inch	4inch
CPU	APQ8009	
Software	Android	
LCD	4"	4"
WLAN	○	○
GPS	○	○
LTE	○	○
LTE Antenna type	World Wide	World Wide
Docomo IoT	○	○
NFC	○	
Speaker	○	○
Main MIC	○	○
Sub MIC	○	○
Receiver	○	○
IR reader / LED	○	○
2D	○	○
Camera (rear)	○	
10 Key (keyboard)	○	○

3. 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.

List of Accessory:

Battery 1	Brand Name	DENSO.
	Model Name	BT-110LA
	Power Rating	2300mAh, 3.7Vdc, 8.5Wh
	Type	Li-ion
Battery 2	Brand Name	DENSO.
	Model Name	BT-110L
	Power Rating	3450mAh, 3.7Vdc, 12.8Wh
	Type	Li-ion

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 DASY52 System

DASY52 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 DASY52 software defined. The DASY52 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.

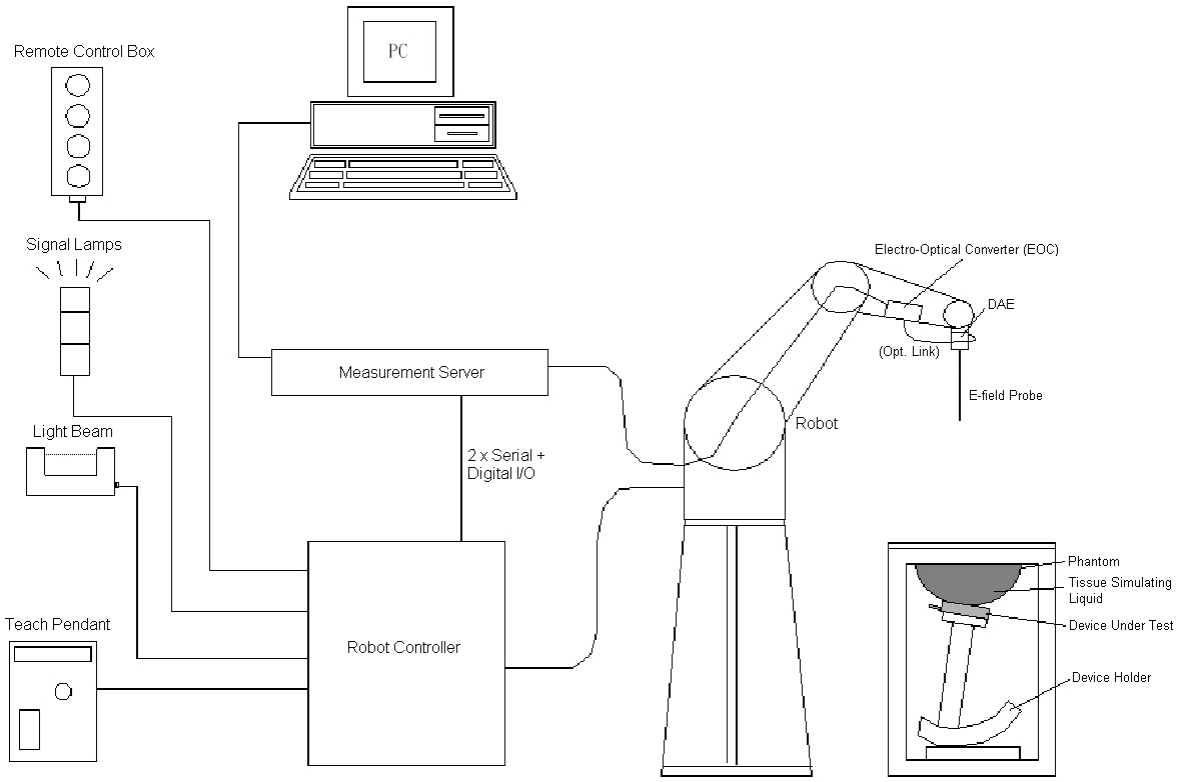


Fig-3.1 SPEAG DASY52 System Setup

3.2.1 Robot

The DASY52 system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version of 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 SPEAG DASY52 System

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	

Model	ET3DV6	
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 2.3 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in TSL (rotation around probe axis) ± 0.4 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 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 I/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 IEC 62209-1. For the body tissue simulating liquids, the dielectric properties are defined in RSS-102 Annex D and IEC 62209-2. 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.

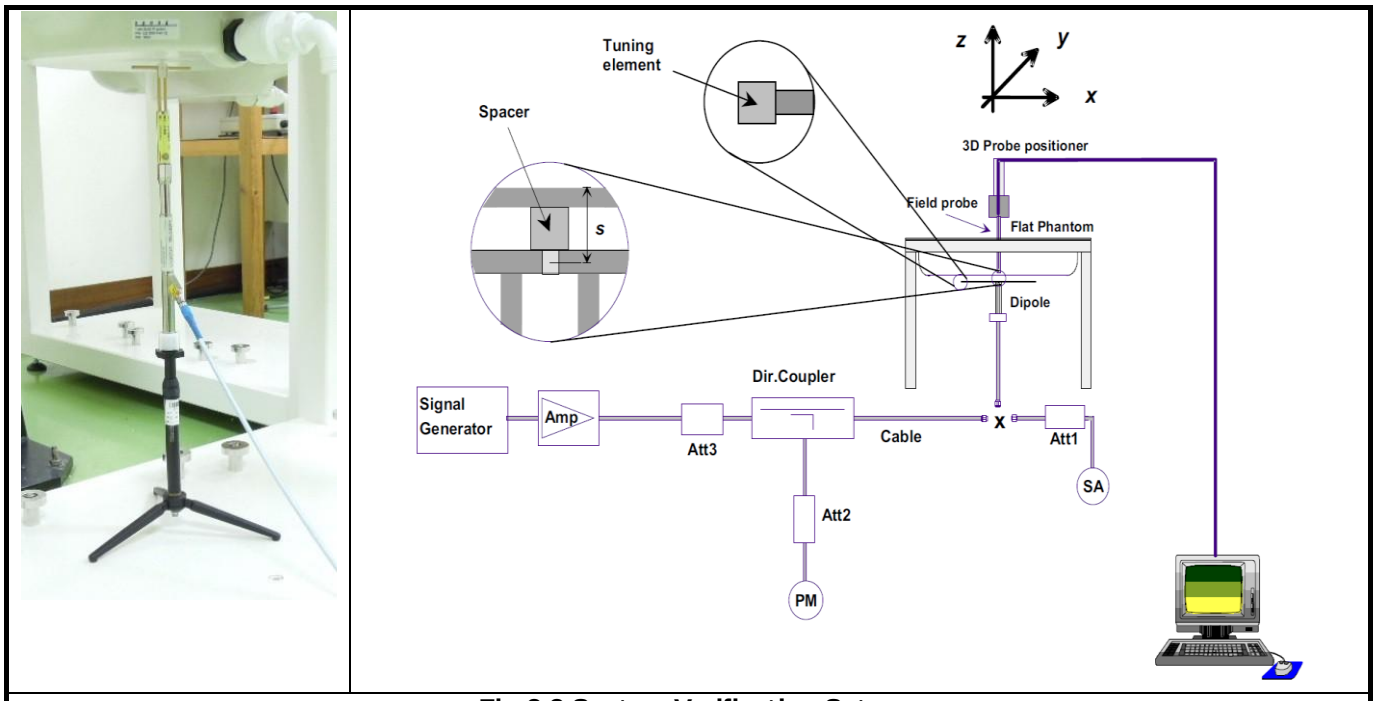


Fig-3.3 System Verification Setup

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

<Connections between EUT and System Simulator>

For WWAN SAR testing, the EUT was linked and controlled by base station emulator. 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 GSM / GPRS / EDGE for Setup and Testing>

The maximum multi-slot capability supported by this device is as below.

1. This EUT is class B device
2. This EUT supports GPRS multi-slot class 12 (max. uplink: 4, max. downlink: 4, total timeslots: 5)
3. This EUT supports EDGE multi-slot class 12 (max. uplink: 4, max. downlink: 4, total timeslots: 5)

For GSM850 frequency band, the power control level is set to 5 for GSM mode and GPRS (GMSK: CS1), and set to 8 for EDGE (GMSK: MCS1, 8PSK: MCS9). For GSM1900 frequency band, the power control level is set to 0 for GSM mode and GPRS (GMSK: CS1), and set to 2 for EDGE (GMSK: MCS1, 8PSK: MCS9).

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

<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)(2)	CM (3) (dB)	MPR (3) (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (4)	15/15 (4)	64	12/15 (4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{HS} = 30/15 * β_c.
Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{HS} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{HS} = 24/15 * β_c.
Note 3: CM = 1 for β_c/β_d = 12/15, β_{HS}/β_c = 24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.
Note 4: 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 signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_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 are 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} (4)(5)	β_{ed} (SF)	β_{ed} (Codes)	CM (2) (dB)	MPR (2)(6) (dB)	AG (5) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1309/225	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_{ed}1: 47/15 β_{ed}2: 47/15	4 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	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{HS} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{HS} = 5/15 * 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 signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

DC-HSDPA SAR Guidance

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

<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		
12	V	V	V	V		
13			V	V		
17			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) and U-NII-2A (5.3 GHz) Bands

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.

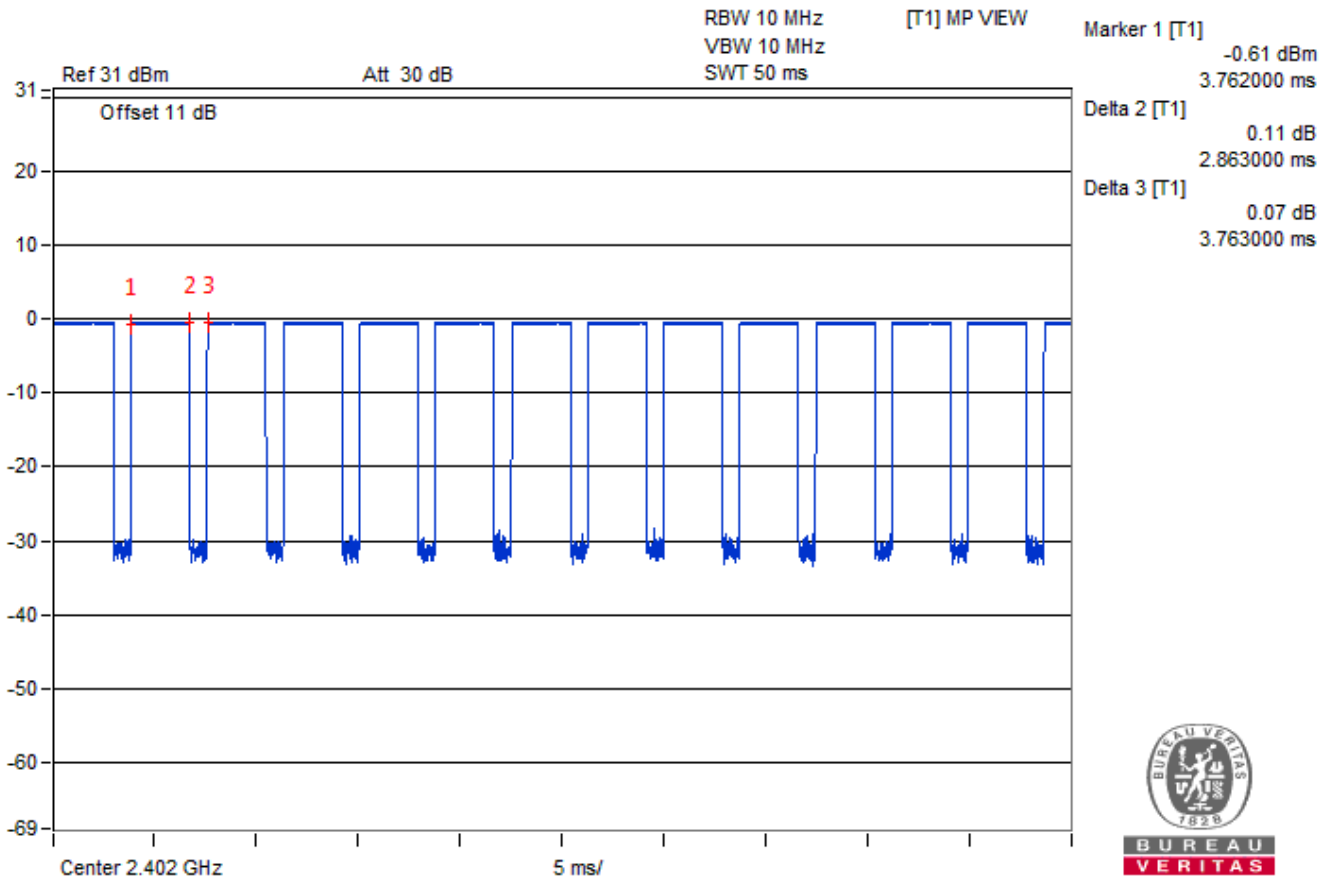
1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition).

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.

The Bluetooth call box has been used during SAR measurement and the EUT was set to DH5 mode at the maximum output power. Its duty factor was calculated as below and the measured SAR for Bluetooth would be scaled to the 100% transmission duty factor to determine compliance.



Time-domain plot for Bluetooth transmission signal

The duty factor of Bluetooth signal has been calculated as following.

Duty Factor = Pulse Width / Total Period =2.863 ms / 3.762 ms = 76.1 %

4.2 EUT Testing Position

According to KDB 648474 D04, handsets are tested for SAR compliance in head, body-worn accessory and other use configurations described in the following subsections.

4.2.1 Head Exposure Conditions

Head exposure is limited to next to the ear voice mode operations. Head SAR compliance is tested according to the test positions defined in IEEE Std 1528-2003 using the SAM phantom illustrated as below.

1. Define two imaginary lines on the handset

(a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

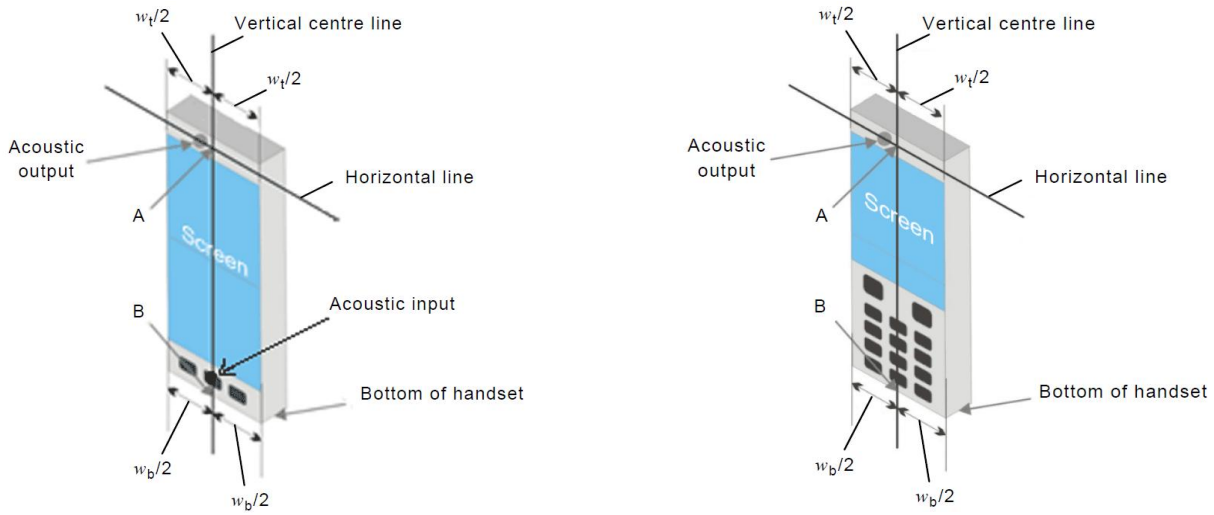


Fig-4.1 Illustration for Handset Vertical and Horizontal Reference Lines

2. Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig-4.2).

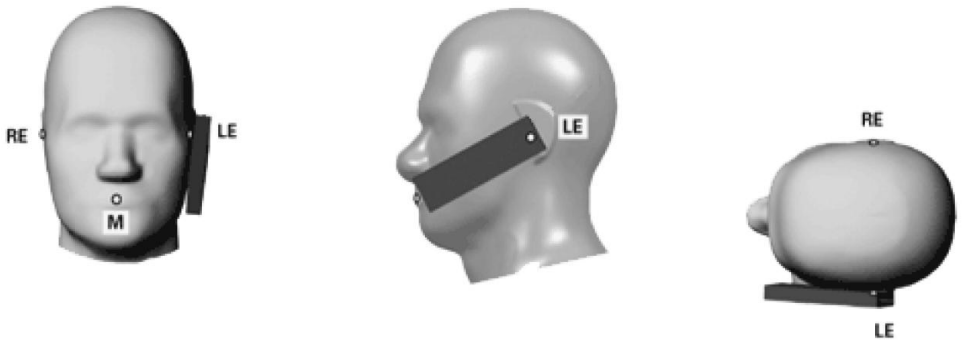


Fig-4.2 Illustration for Cheek Position

3. Tilted Position

(a) To position the device in the “cheek” position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig-4.3).

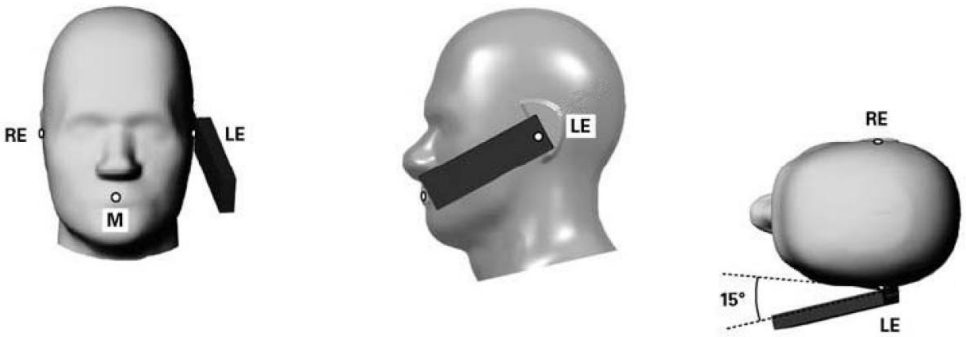


Fig-4.3 Illustration for Tilted Position

4.2.2 Body-worn Accessory Exposure Conditions

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

Body-worn accessories that do not contain metallic or conductive components may be tested according to worst-case exposure configurations, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. All body-worn accessories containing metallic components are tested in conjunction with the host device.

Body-worn accessory SAR compliance is based on a single minimum test separation distance for all wireless and operating modes applicable to each body-worn accessory used by the host, and according to the relevant voice and/or data mode transmissions and operations. If a body-worn accessory supports voice only operations in its normal and expected use conditions, testing of data mode for body-worn compliance is not required.

A conservative minimum test separation distance for supporting off-the-shelf body-worn accessories that may be acquired by users of consumer handsets is used to test for body-worn accessory SAR compliance. This distance is determined by the handset manufacturer, according to the requirements of Supplement C 01-01. Devices that are designed to operate on the body of users using lanyards and straps, or without requiring additional body-worn accessories, will be tested using a conservative minimum test separation distance <= 5 mm to support compliance.

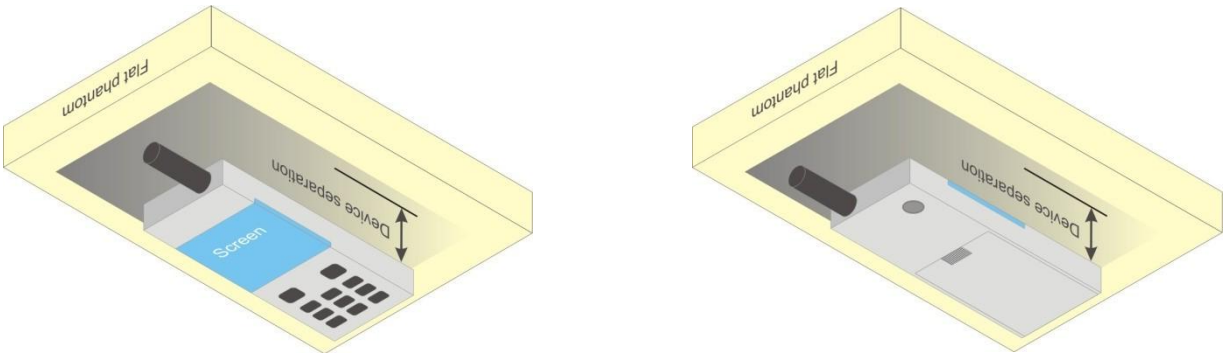
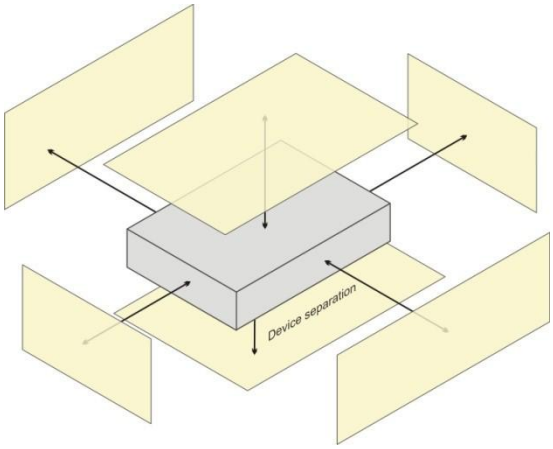


Fig-4.4 Illustration for Body Worn Position

4.2.3 Hotspot Mode Exposure Conditions

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing functions, the relevant hand and body exposure conditions are tested according to the hotspot SAR procedures in KDB 941225 D06. A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge. When the form factor of a handset is smaller than 9 cm x 5 cm, a test separation distance of 5 mm (instead of 10 mm) is required for testing hotspot mode. When the separation distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration (surface).



Based on the antenna location shown on appendix D of this report, the SAR testing required for hotspot mode is listed as below.

Antenna	Front Face	Rear Face	Left Side	Right Side	Top Side	Bottom Side
WWAN	V	V	V	V		V
WLAN / BT	V	V	V			

4.2.4 Product Specific (Phablet) Exposure Conditions

For smart phones with a display diagonal dimension > 15 cm or an overall diagonal dimension > 16 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance.

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at <= 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g SAR > 1.2 W/kg. The normal tablet procedures in KDB 616217 are required when the over diagonal dimension of the device is > 20 cm. Hotspot mode SAR is not required when normal tablet procedures are applied. Extremity 10-g SAR is also not required for the front (top) surface of large form factor full size tablets. The more conservative tablet SAR results can be used to support the 10-g extremity SAR for phablet mode.
3. The simultaneous transmission operating configurations applicable to voice and data transmissions for both phone and mini-tablet modes must be taken into consideration separately for 1-g and 10-g SAR to determine the simultaneous transmission SAR test exclusion and measurement requirements for the relevant wireless modes and exposure conditions.

4.2.5 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.

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

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

Sample1/2

Mode	Max. Tune-up Power (dBm)	Max. Tune-up Power (mW)	Head			Body-Worn			Phablet (10g)		
			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?
BT	3.5	2	5	0.63	No	15	0.21	No	10	0.31	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.

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 (%)
Jul. 25, 2018	Head	750	23.4	0.885	42.46	0.89	41.9	-0.56	1.34
Jul. 25, 2018	Head	835	23.4	0.914	43.02	0.9	41.5	1.56	3.66
Jul. 25, 2018	Head	1750	23.1	1.328	41.493	1.37	40.1	-3.07	3.47
Jul. 25, 2018	Head	1900	23.1	1.459	40.97	1.4	40	4.21	2.43
Jul. 25, 2018	Head	2450	23.2	1.862	37.942	1.8	39.2	3.44	-3.21
Jul. 31, 2018	Head	2450	23.2	1.87	39.144	1.8	39.2	3.89	-0.14
Jul. 25, 2018	Head	5250	23.3	4.706	37.635	4.71	35.9	-0.08	4.83
Jul. 31, 2018	Head	5250	23.2	4.673	35.938	4.71	35.9	-0.79	0.11
Jul. 25, 2018	Head	5600	23.3	5.056	37.14	5.07	35.5	-0.28	4.62
Jul. 31, 2018	Head	5600	23.2	5.08	35.374	5.07	35.5	0.20	-0.35
Jul. 25, 2018	Head	5800	23.3	5.262	36.862	5.27	35.3	-0.15	4.42
Jul. 31, 2018	Head	5800	23.2	5.304	35.044	5.27	35.3	0.65	-0.73
Jul. 25, 2018	Body	750	23.3	0.959	56.425	0.96	55.5	-0.10	1.67
Aug. 19, 2018	Body	750	23.5	0.961	54.281	0.96	55.5	0.10	-2.20
Jul. 25, 2018	Body	835	23.3	1.009	54.937	0.97	55.2	4.02	-0.48
Aug. 19, 2018	Body	835	23.5	0.972	57.709	0.97	55.2	0.21	4.55
Jul. 22, 2018	Body	1750	23.1	1.442	51.72	1.49	53.4	-3.22	-3.15
Aug. 19, 2018	Body	1750	23.5	1.441	52.489	1.49	53.4	-3.29	-1.71
Jul. 22, 2018	Body	1900	23.1	1.56	51.445	1.52	53.3	2.63	-3.48
Jul. 27, 2018	Body	1900	23.3	1.565	51.147	1.52	53.3	2.96	-4.04
Aug. 19, 2018	Body	1900	23.5	1.584	52.168	1.52	53.3	4.21	-2.12
Sep. 06, 2018	Body	1900	23.3	1.586	52.018	1.52	53.3	4.34	-2.41
Jul. 25, 2018	Body	2450	23	1.997	51.375	1.95	52.7	2.41	-2.51
Jul. 31, 2018	Body	2450	23.3	1.987	51.412	1.95	52.7	1.90	-2.44
Aug. 17, 2018	Body	2450	23.3	2.022	51.416	1.95	52.7	3.69	-2.44
Jul. 25, 2018	Body	5250	23.2	5.555	47.077	5.36	48.9	3.64	-3.73
Jul. 31, 2018	Body	5250	23.3	5.267	50.857	5.36	48.9	-1.74	4.00
Jul. 25, 2018	Body	5600	23.2	6.014	46.456	5.77	48.5	4.23	-4.21
Jul. 31, 2018	Body	5600	23.3	5.853	50.213	5.77	48.5	1.44	3.53
Jul. 25, 2018	Body	5800	23.2	6.294	46.095	6	48.2	4.90	-4.37
Jul. 31, 2018	Body	5800	23.3	6.152	49.716	6	48.2	2.53	3.15
Jul. 31, 2018	Extremity	5250	23.3	5.267	50.857	5.36	48.9	-1.74	4.00
Aug. 10, 2018	Extremity	5250	23.4	5.35	47.628	5.36	48.9	-0.19	-2.60
Aug. 10, 2018	Extremity	5250	23.4	5.351	49.105	5.36	48.9	-0.17	0.42
Jul. 31, 2018	Extremity	5600	23.3	5.853	50.213	5.77	48.5	1.44	3.53
Aug. 10, 2018	Extremity	5600	23.4	5.756	46.999	5.77	48.5	-0.24	-3.09
Aug. 10, 2018	Extremity	5600	23.4	5.828	48.581	5.77	48.5	1.01	0.17
Jul. 31, 2018	Extremity	5800	23.3	6.152	49.716	6	48.2	2.53	3.15
Aug. 10, 2018	Extremity	5800	23.4	6.053	46.721	6	48.2	0.88	-3.07
Aug. 10, 2018	Extremity	5800	23.4	6.074	48.636	6	48.2	1.23	0.90

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
Jul. 25, 2018	3898	Head	750	0.885	42.46	Pass	Pass	Pass	N/A	N/A	N/A
Jul. 25, 2018	3898	Head	835	0.914	43.02	Pass	Pass	Pass	GMSK	Pass	N/A
Jul. 25, 2018	3898	Head	1750	1.328	41.493	Pass	Pass	Pass	N/A	N/A	N/A
Jul. 25, 2018	3898	Head	1900	1.459	40.97	Pass	Pass	Pass	GMSK	Pass	N/A
Jul. 25, 2018	3898	Head	2450	1.862	37.942	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Head	2450	1.87	39.144	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 25, 2018	3898	Head	5250	4.706	37.635	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Head	5250	4.673	35.938	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 25, 2018	3898	Head	5600	5.056	37.14	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Head	5600	5.08	35.374	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 25, 2018	3898	Head	5800	5.262	36.862	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Head	5800	5.304	35.044	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 25, 2018	3898	Body	750	0.959	56.425	Pass	Pass	Pass	N/A	N/A	N/A
Aug. 19, 2018	3650	Body	750	0.961	54.281	Pass	Pass	Pass	N/A	N/A	N/A
Jul. 25, 2018	3898	Body	835	1.009	54.937	Pass	Pass	Pass	GMSK	Pass	N/A
Aug. 19, 2018	3650	Body	835	0.972	57.709	Pass	Pass	Pass	GMSK	Pass	N/A
Jul. 22, 2018	3971	Body	1750	1.442	51.72	Pass	Pass	Pass	N/A	N/A	N/A
Aug. 19, 2018	3650	Body	1750	1.441	52.489	Pass	Pass	Pass	N/A	N/A	N/A
Jul. 22, 2018	3971	Body	1900	1.56	51.445	Pass	Pass	Pass	GMSK	Pass	N/A
Jul. 27, 2018	3971	Body	1900	1.565	51.147	Pass	Pass	Pass	N/A	N/A	N/A
Aug. 19, 2018	3650	Body	1900	1.584	52.168	Pass	Pass	Pass	N/A	N/A	N/A
Sep. 06, 2018	7346	Body	1900	1.586	52.018	Pass	Pass	Pass	GMSK	Pass	N/A
Jul. 25, 2018	3898	Body	2450	1.997	51.375	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Body	2450	1.987	51.412	Pass	Pass	Pass	OFDM	N/A	Pass
Aug. 17, 2018	7346	Body	2450	2.022	51.416	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 25, 2018	3898	Body	5250	5.555	47.077	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Body	5250	5.267	50.857	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 25, 2018	3898	Body	5600	6.014	46.456	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Body	5600	5.853	50.213	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 25, 2018	3898	Body	5800	6.294	46.095	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Body	5800	6.152	49.716	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Extremity	5250	5.267	50.857	Pass	Pass	Pass	OFDM	N/A	Pass
Aug. 10, 2018	3650	Extremity	5250	5.35	47.628	Pass	Pass	Pass	OFDM	N/A	Pass
Aug. 10, 2018	7346	Extremity	5250	5.351	49.105	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Extremity	5600	5.853	50.213	Pass	Pass	Pass	OFDM	N/A	Pass
Aug. 10, 2018	3650	Extremity	5600	5.756	46.999	Pass	Pass	Pass	OFDM	N/A	Pass
Aug. 10, 2018	7346	Extremity	5600	5.828	48.581	Pass	Pass	Pass	OFDM	N/A	Pass
Jul. 31, 2018	3971	Extremity	5800	6.152	49.716	Pass	Pass	Pass	OFDM	N/A	Pass
Aug. 10, 2018	3650	Extremity	5800	6.053	46.721	Pass	Pass	Pass	OFDM	N/A	Pass
Aug. 10, 2018	7346	Extremity	5800	6.074	48.636	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
Jul. 25, 2018	Head	750	8.25	2.01	8.04	-2.55	1013	3898	1277
Jul. 25, 2018	Head	835	9.41	2.35	9.40	-0.11	4d121	3898	1277
Jul. 25, 2018	Head	1750	36.20	9.26	37.04	2.32	1055	3898	1277
Jul. 25, 2018	Head	1900	40.70	10.6	42.40	4.18	5d036	3898	1277
Jul. 25, 2018	Head	2450	52.30	12.5	50.00	-4.40	869	3898	1277
Jul. 31, 2018	Head	2450	52.30	13.4	53.60	2.49	869	3971	1431
Jul. 25, 2018	Head	5250	78.60	7.81	78.10	-0.64	1019	3898	1277
Jul. 31, 2018	Head	5250	78.60	7.94	79.40	1.02	1019	3971	1431
Jul. 25, 2018	Head	5600	84.90	8.52	85.20	0.35	1019	3898	1277
Jul. 31, 2018	Head	5600	84.90	8.83	88.30	4.00	1019	3971	1431
Jul. 25, 2018	Head	5800	80.90	7.7	77.00	-4.82	1019	3898	1277
Jul. 31, 2018	Head	5800	80.90	8.17	81.70	0.99	1019	3971	1431
Jul. 25, 2018	Body	750	8.72	2.18	8.72	0.00	1013	3898	1277
Aug. 19, 2018	Body	750	8.72	2.1	8.40	-3.67	1013	3650	1232
Jul. 25, 2018	Body	835	9.61	2.37	9.48	-1.35	4d121	3898	1277
Aug. 19, 2018	Body	835	9.61	2.25	9.00	-6.35	4d121	3650	1232
Jul. 22, 2018	Body	1750	37.10	8.97	35.88	-3.29	1055	3971	1431
Aug. 19, 2018	Body	1750	37.10	9.07	36.28	-2.21	1055	3650	1232
Jul. 22, 2018	Body	1900	40.20	10.3	41.20	2.49	5d036	3971	1431
Jul. 27, 2018	Body	1900	40.20	10.4	41.60	3.48	5d036	3971	1431
Aug. 19, 2018	Body	1900	40.20	10.5	42.00	4.48	5d036	3650	1232
Sep. 06, 2018	Body	1900	40.20	10.2	40.80	1.49	5d036	7346	679
Jul. 25, 2018	Body	2450	50.50	12.6	50.40	-0.20	869	3898	1277
Jul. 31, 2018	Body	2450	50.50	12.3	49.20	-2.57	869	3971	1431
Aug. 17, 2018	Body	2450	49.70	12.7	50.80	2.21	737	7346	679
Jul. 25, 2018	Body	5250	74.90	7.93	79.30	5.87	1019	3898	1277
Jul. 31, 2018	Body	5250	74.90	7.71	77.10	2.94	1019	3971	1431
Jul. 25, 2018	Body	5600	79.30	8.43	84.30	6.31	1019	3898	1277
Jul. 31, 2018	Body	5600	79.30	8.35	83.50	5.30	1019	3971	1431
Jul. 25, 2018	Body	5800	75.20	7.64	76.40	1.60	1019	3898	1277
Jul. 31, 2018	Body	5800	75.20	7.59	75.90	0.93	1019	3971	1431

Test Date	Mode	Frequency (MHz)	1W Target SAR-10g (W/kg)	Measured SAR-10g (W/kg)	Normalized to 1W SAR-10g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Jul. 31, 2018	Extremity	5250	20.80	2.18	21.80	4.81	1019	3971	1431
Aug. 10, 2018	Extremity	5250	20.80	2.16	21.60	3.85	1019	3650	1232
Aug. 10, 2018	Extremity	5250	20.80	2.19	21.90	5.29	1019	7346	679
Jul. 31, 2018	Extremity	5600	22.20	2.34	23.40	5.41	1019	3971	1431
Aug. 10, 2018	Extremity	5600	22.20	2.29	22.90	3.15	1019	3650	1232
Aug. 10, 2018	Extremity	5600	22.20	2.28	22.80	2.70	1019	7346	679
Jul. 31, 2018	Extremity	5800	20.90	2.12	21.20	1.44	1019	3971	1431
Aug. 10, 2018	Extremity	5800	20.90	2.08	20.80	-0.48	1019	3650	1232
Aug. 10, 2018	Extremity	5800	20.90	2.02	20.20	-3.35	1019	7346	679

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 Target Conducted Power

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

Mode	Maximum Burst-Averaged Output Power		Maximum Frame-Averaged Output Power	
	GSM850	GSM1900	GSM850	GSM1900
GSM (GMSK, 1Tx-slot)	33.5	30.5	24.5	21.5
GPRS (GMSK, 1Tx-slot)	33.5	30.5	24.5	21.5
GPRS (GMSK, 2Tx-slot)	32.0	30.0	26.0	24.0
GPRS (GMSK, 3Tx-slot)	31.0	29.0	26.7	24.7
GPRS (GMSK, 4Tx-slot)	30.0	28.0	27.0	25.0
EDGE (8PSK, 1Tx-slot)	28.0	27.0	19.0	18.0
EDGE (8PSK, 2Tx-slot)	26.0	27.0	20.0	21.0
EDGE (8PSK, 3Tx-slot)	25.0	27.0	20.7	22.7
EDGE (8PSK, 4Tx-slot)	24.0	27.0	21.0	24.0

Note:

1. SAR testing was performed on the maximum frame-averaged power mode.
2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
   Frame-averaged power = 10 x log (Burst-averaged power mW x Slot used / 8)

Mode	WCDMA Band II	WCDMA Band V
RMC 12.2K	25.0	25.0
HSDPA/ HSUPA/ DC-HSDPA	24.0	24.0

Mode	LTE 2	LTE 4	LTE 5
Maximum Target Power	24.0	24.0	24.0

Mode	LTE 12	LTE 13	LTE 17
Maximum Target Power	24.0	24.0	24.0

<Tune-up for Hotspot>

Mode	Maximum Burst-Averaged Output Power	Maximum Frame-Averaged Output Power
	GSM1900	GSM1900
GSM (GMSK, 1Tx-slot)	27.0	18.0
GPRS (GMSK, 1Tx-slot)	27.0	18.0
GPRS (GMSK, 2Tx-slot)	26.5	20.5
GPRS (GMSK, 3Tx-slot)	25.5	21.2
GPRS (GMSK, 4Tx-slot)	24.5	21.5
EDGE (8PSK, 1Tx-slot)	23.5	14.5
EDGE (8PSK, 2Tx-slot)	23.5	17.5
EDGE (8PSK, 3Tx-slot)	21.5	17.2
EDGE (8PSK, 4Tx-slot)	20.5	17.5

Note:

1. SAR testing was performed on the maximum frame-averaged power mode.
2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
   Frame-averaged power = 10 x log (Burst-averaged power mW x Slot used / 8)

Mode	WCDMA Band II
RMC 12.2K	19.5
HSDPA/ HSUPA/ DC-HSDPA	18.5

Mode	LTE 2
Maximum Target Power	20.5

Mode	2.4G WLAN	5.2G WLAN	5.3G WLAN	5.6G WLAN	5.8G WLAN
802.11b	19.5	N/A	N/A	N/A	N/A
802.11g	17.5	N/A	N/A	N/A	N/A
802.11a	N/A	Ch36-44:17.5 Ch48:17.0	17.5	Ch100-132:17.5 Ch140:16.5	17.5
802.11n HT20	Ch1-6:17.5 Ch11:17.0	16.5	16.5	Ch100-132:16.5 Ch140:15.0	16.5
802.11n HT40	Ch3:17.0 Ch6:17.5 Ch9:17.0	15.5	Ch54:15.5 Ch62:14.0	Ch102:13.0 Ch110:15.5 Ch118-134:16.5	16.5

Mode	2.4G Bluetooth
Bluetooth DH	Ch0-39:3.5 Ch78:3.0
Bluetooth LE	Ch0-19:3.5 Ch39:3.0

4.6.2 Measured Conducted Power Result

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

Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Maximum Burst-Averaged Output Power						
GSM (GMSK, 1Tx-slot)	33.01	**33.19**	32.98	**29.71**	29.62	29.53
GPRS (GMSK, 1Tx-slot)	33.03	33.17	32.92	29.66	29.58	29.48
GPRS (GMSK, 2Tx-slot)	31.33	31.47	31.22	29.55	29.47	29.37
GPRS (GMSK, 3Tx-slot)	29.95	30.09	29.84	28.64	28.56	28.46
GPRS (GMSK, 4Tx-slot)	29.07	28.98	28.82	27.17	27.13	27.19
EDGE (8PSK, 1Tx-slot)	26.97	27.11	26.86	26.24	26.16	26.06
EDGE (8PSK, 2Tx-slot)	25.49	25.63	25.38	26.19	26.11	26.01
EDGE (8PSK, 3Tx-slot)	24.03	24.17	23.92	26.82	26.74	26.64
EDGE (8PSK, 4Tx-slot)	22.49	22.63	22.38	25.34	25.26	25.16

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	
RMC 12.2K	**24.32**	24.29	24.16	**24.35**	24.29	24.31	-
HSDPA Subtest-1	23.41	23.38	23.25	23.38	23.32	23.34	0
HSDPA Subtest-2	23.35	23.32	23.19	23.43	23.37	23.39	0
HSDPA Subtest-3	23.07	23.04	22.91	23.31	23.25	23.27	0.5
HSDPA Subtest-4	22.98	22.95	22.82	23.26	23.20	23.22	0.5
DC-HSDPA Subtest-1	23.39	23.36	23.23	23.41	23.35	23.37	0
DC-HSDPA Subtest-2	23.32	23.29	23.16	23.47	23.41	23.43	0
DC-HSDPA Subtest-3	23.05	23.02	22.89	22.95	22.89	22.91	0.5
DC-HSDPA Subtest-4	23.01	22.98	22.85	22.97	22.91	22.93	0.5
HSUPA Subtest-1	23.44	23.41	23.28	23.37	23.31	23.33	0
HSUPA Subtest-2	22.42	22.39	22.26	22.30	22.24	22.26	2
HSUPA Subtest-3	22.35	22.32	22.19	22.37	22.31	22.33	1
HSUPA Subtest-4	22.47	22.44	22.31	22.75	22.69	22.71	2
HSUPA Subtest-5	23.42	23.39	23.26	23.44	23.38	23.40	0

LTE Band 2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18700	18900	19100				Channel		18675	18900	19125	
		Frequency (MHz)		1860.0	1880.0	1900.0				Frequency (MHz)		1857.5	1880.0	1902.5	
20M	QPSK	1	0	**23.72**	23.66	23.65	0	15M	QPSK	1	0	23.66	23.62	23.65	0
		1	50	23.59	23.53	23.52	0			1	37	23.58	23.44	23.45	0
		1	99	23.52	23.46	23.45	0			1	74	23.51	23.40	23.36	0
		50	0	22.64	22.58	22.57	1			36	0	22.58	22.53	22.50	1
		50	25	22.41	22.35	22.34	1			36	19	22.35	22.30	22.28	1
		50	50	22.37	22.31	22.30	1			36	39	22.33	22.24	22.28	1
		100	0	22.52	22.46	22.45	1			75	0	22.47	22.44	22.39	1
	16QAM	1	0	22.72	22.57	22.64	1		16QAM	1	0	22.55	22.57	22.59	1
		1	50	22.49	22.53	22.45	1			1	37	22.51	22.43	22.41	1
		1	99	22.50	22.37	22.43	1			1	74	22.43	22.42	22.36	1
		50	0	21.64	21.55	21.48	2			36	0	21.52	21.53	21.51	2
		50	25	21.39	21.30	21.34	2			36	19	21.32	21.19	21.14	2
		50	50	21.28	21.28	21.26	2			36	39	21.32	21.27	21.18	2
		100	0	21.45	21.38	21.35	2			75	0	21.43	21.44	21.30	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18650	18900	19150				Channel		18625	18900	19175	
		Frequency (MHz)		1855.0	1880.0	1905.0				Frequency (MHz)		1852.5	1880.0	1907.5	
10M	QPSK	1	0	22.65	22.68	22.61	0	5M	QPSK	1	0	23.52	23.59	22.56	0
		1	24	22.64	22.67	22.60	0			1	12	23.51	23.37	22.51	0
		1	49	22.58	22.61	22.54	0			1	24	23.48	23.28	22.45	0
		25	0	21.70	21.73	21.66	1			12	0	22.57	22.53	21.65	1
		25	12	21.68	21.71	21.64	1			12	6	22.27	22.29	21.54	1
		25	25	21.58	21.61	21.54	1			12	13	22.28	22.25	21.47	1
		50	0	21.60	21.63	21.56	1			25	0	22.39	22.45	21.51	1
	16QAM	1	0	22.54	22.37	22.53	1		16QAM	1	0	22.60	22.54	22.47	1
		1	24	22.49	22.29	22.47	1			1	12	22.52	22.20	22.29	1
		1	49	22.43	22.33	22.33	1			1	24	22.24	22.42	22.26	1
		25	0	21.39	21.31	21.40	2			12	0	21.52	21.31	21.40	2
		25	12	21.31	21.15	21.23	2			12	6	21.17	21.15	21.10	2
		25	25	21.24	21.04	20.99	2			12	13	21.28	21.10	21.05	2
		50	0	21.27	21.20	21.28	2			25	0	21.31	21.28	21.42	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18615	18900	19185				Channel		18607	18900	19193	
		Frequency (MHz)		1851.5	1880.0	1908.5				Frequency (MHz)		1850.7	1880.0	1909.3	
3M	QPSK	1	0	23.66	23.48	23.44	0	1.4M	QPSK	1	0	23.65	23.60	23.61	0
		1	7	23.42	23.40	23.47	0			1	2	23.57	23.41	23.37	0
		1	14	23.41	23.38	23.36	0			1	5	23.38	23.36	23.36	0
		8	0	22.51	22.55	22.38	1			3	0	23.63	23.56	23.41	0
		8	3	22.28	22.22	22.23	1			3	1	23.29	23.11	23.27	0
		8	7	22.31	22.24	22.13	1			3	3	23.20	23.22	23.20	0
		15	0	22.37	22.34	22.31	1			6	0	22.37	22.22	22.38	1
	16QAM	1	0	22.54	22.48	22.47	1		16QAM	1	0	22.45	22.53	22.41	1
		1	7	22.38	22.32	22.44	1			1	2	22.45	22.48	22.37	1
		1	14	22.41	22.24	22.40	1			1	5	22.29	22.40	22.20	1
		8	0	21.38	21.43	21.49	2			3	0	22.52	22.55	22.46	1
		8	3	21.28	21.12	21.13	2			3	1	22.34	22.18	22.15	1
		8	7	21.18	21.18	21.10	2			3	3	22.12	22.25	22.21	1
		15	0	21.38	21.42	21.23	2			6	0	21.36	21.30	21.41	2

LTE Band 4

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20050	20175	20300				Channel		20025	20175	20325	
		Frequency (MHz)		1720.0	1732.5	1745.0				Frequency (MHz)		1717.5	1732.5	1747.5	
20M	QPSK	1	0	23.17	**23.95**	23.44	0	15M	QPSK	1	0	23.08	23.94	23.44	0
		1	50	23.04	23.82	23.31	0			1	37	22.97	23.78	23.31	0
		1	99	23.01	23.79	23.28	0			1	74	22.97	23.74	23.19	0
		50	0	22.14	22.92	22.41	1			36	0	22.08	22.84	22.35	1
		50	25	22.11	22.89	22.38	1			36	19	22.07	22.82	22.37	1
		50	50	22.06	22.84	22.33	1			36	39	22.05	22.78	22.26	1
		100	0	22.10	22.88	22.37	1			75	0	22.08	22.85	22.37	1
	16QAM	1	0	22.12	22.95	22.44	1		16QAM	1	0	22.06	22.82	22.33	1
		1	50	21.96	22.72	22.22	1			1	37	21.92	22.75	22.29	1
		1	99	22.01	22.76	22.25	1			1	74	21.88	22.70	22.26	1
		50	0	21.10	21.84	21.38	2			36	0	21.03	21.87	21.26	2
		50	25	21.09	21.85	21.28	2			36	19	20.94	21.74	21.35	2
		50	50	21.01	21.82	21.31	2			36	39	20.95	21.70	21.22	2
		100	0	21.05	21.79	21.28	2			75	0	21.00	21.74	21.25	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20000	20175	20350				Channel		19975	20175	20375	
		Frequency (MHz)		1715.0	1732.5	1750.0				Frequency (MHz)		1712.5	1732.5	1752.5	
10M	QPSK	1	0	22.65	22.68	22.61	0	5M	QPSK	1	0	23.05	23.76	22.59	0
		1	24	22.64	22.67	22.60	0			1	12	22.90	23.73	22.55	0
		1	49	22.58	22.61	22.54	0			1	24	22.98	23.67	22.48	0
		25	0	21.70	21.73	21.66	1			12	0	22.08	22.76	21.63	1
		25	12	21.68	21.71	21.64	1			12	6	21.94	22.79	21.58	1
		25	25	21.58	21.61	21.54	1			12	13	22.03	22.75	21.45	1
		50	0	21.60	21.63	21.56	1			25	0	21.87	22.71	21.45	1
	16QAM	1	0	21.96	22.78	22.25	1		16QAM	1	0	21.87	22.65	22.30	1
		1	24	21.89	22.58	22.02	1			1	12	21.85	22.60	22.10	1
		1	49	21.85	22.67	22.08	1			1	24	21.79	22.66	22.01	1
		25	0	20.97	21.73	21.31	2			12	0	20.97	21.81	21.19	2
		25	12	20.88	21.80	21.20	2			12	6	20.95	21.70	21.15	2
		25	25	21.02	21.56	21.21	2			12	13	20.84	21.67	21.16	2
		50	0	20.98	21.66	21.31	2			25	0	21.00	21.78	21.25	2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		19965	20175	20385				Channel		19957	20175	20393	
		Frequency (MHz)		1711.5	1732.5	1753.5				Frequency (MHz)		1710.7	1732.5	1754.3	
3M	QPSK	1	0	23.00	23.72	23.27	0	1.4M	QPSK	1	0	22.98	23.83	23.31	0
		1	7	22.91	23.65	23.13	0			1	2	22.81	23.65	23.29	0
		1	14	22.90	23.66	23.19	0			1	5	22.86	23.55	23.13	0
		8	0	21.93	22.82	22.37	1			3	0	23.00	23.79	23.28	0
		8	3	21.97	22.73	22.25	1			3	1	22.95	23.72	23.30	0
		8	7	21.92	22.77	22.24	1			3	3	22.92	23.79	23.19	0
		15	0	22.09	22.69	22.26	1			6	0	22.01	22.67	22.27	1
	16QAM	1	0	21.92	22.77	22.25	1		16QAM	1	0	22.13	22.79	22.25	1
		1	7	21.92	22.60	22.28	1			1	2	21.90	22.55	22.06	1
		1	14	21.88	22.63	22.10	1			1	5	21.89	22.66	22.12	1
		8	0	20.89	21.82	21.18	2			3	0	22.03	22.80	22.21	1
		8	3	20.91	21.82	21.22	2			3	1	21.80	22.77	22.17	1
		8	7	20.94	21.79	21.11	2			3	3	21.96	22.72	22.10	1
		15	0	20.84	21.79	21.28	2			6	0	21.04	21.69	21.15	2

LTE Band 5

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20450	20525	20600				Channel		20425	20525	20625	
		Frequency (MHz)		829.0	836.5	844.0				Frequency (MHz)		826.5	836.5	846.5	
10M	QPSK	1	0	23.44	23.42	23.49	0	5M	QPSK	1	0	23.30	23.33	22.46	0
		1	24	23.47	23.45	**23.52**	0			1	12	23.36	23.37	22.55	0
		1	49	23.33	23.31	23.38	0			1	24	23.25	23.08	22.51	0
		25	0	22.50	22.48	22.55	1			12	0	22.36	22.26	21.66	1
		25	12	22.53	22.51	22.58	1			12	6	22.39	22.32	21.57	1
		25	25	22.45	22.43	22.50	1			12	13	22.40	22.27	21.53	1
		50	0	22.49	22.47	22.54	1			25	0	22.39	22.36	21.41	1
	16QAM	1	0	22.42	22.38	22.49	1		16QAM	1	0	22.28	22.15	22.43	1
		1	24	22.43	22.44	22.46	1			1	12	22.37	22.27	22.26	1
		1	49	22.28	22.24	22.36	1			1	24	22.14	22.15	22.15	1
		25	0	21.47	21.48	21.51	2			12	0	21.40	21.22	21.25	2
		25	12	21.48	21.45	21.52	2			12	6	21.30	21.35	21.43	2
		25	25	21.44	21.43	21.40	2			12	13	21.31	21.26	21.28	2
		50	0	21.45	21.42	21.51	2			25	0	21.42	21.33	21.30	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		20415	20525	20635				Channel		20407	20525	20643	
		Frequency (MHz)		825.5	836.5	847.5				Frequency (MHz)		824.7	836.5	848.3	
3M	QPSK	1	0	23.25	23.36	23.43	0	1.4M	QPSK	1	0	23.33	23.35	23.35	0
		1	7	23.30	23.37	23.45	0			1	2	23.31	23.36	23.38	0
		1	14	23.20	23.20	23.24	0			1	5	23.16	23.17	23.35	0
		8	0	22.40	22.33	22.51	1			3	0	23.43	23.43	23.49	0
		8	3	22.34	22.36	22.37	1			3	1	23.47	23.36	23.44	0
		8	7	22.22	22.36	22.34	1			3	3	23.25	23.24	23.38	0
		15	0	22.45	22.29	22.34	1			6	0	22.38	22.35	22.40	1
	16QAM	1	0	22.24	22.35	22.39	1		16QAM	1	0	22.31	22.30	22.22	1
		1	7	22.30	22.33	22.46	1			1	2	22.24	22.28	22.37	1
		1	14	22.23	22.13	22.17	1			1	5	22.21	22.04	22.24	1
		8	0	21.25	21.38	21.39	2			3	0	22.36	22.32	22.45	1
		8	3	21.39	21.41	21.39	2			3	1	22.46	22.37	22.39	1
		8	7	21.38	21.19	21.34	2			3	3	22.22	22.15	22.37	1
		15	0	21.21	21.27	21.40	2			6	0	21.28	21.40	21.26	2

LTE Band 12

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23060	23095	23130				Channel		23035	23095	23155	
		Frequency (MHz)		704.0	707.5	711.0				Frequency (MHz)		701.5	707.5	713.5	
10M	QPSK	1	0	23.49	23.51	23.63	0	5M	QPSK	1	0	23.37	23.50	22.46	0
		1	24	23.54	23.56	23.68	0			1	12	23.33	23.36	22.59	0
		1	49	23.75	23.77	**23.89**	0			1	24	23.64	23.74	22.41	0
		25	0	22.50	22.52	22.64	1			12	0	22.43	22.39	21.57	1
		25	12	22.54	22.56	22.68	1			12	6	22.35	22.39	21.59	1
		25	25	22.57	22.59	22.71	1			12	13	22.54	22.44	21.52	1
		50	0	22.60	22.62	22.74	1			25	0	22.54	22.55	21.41	1
	16QAM	1	0	22.40	22.48	22.53	1		16QAM	1	0	22.20	22.34	22.51	1
		1	24	22.49	22.53	22.60	1			1	12	22.40	22.36	22.54	1
		1	49	22.73	22.68	22.84	1			1	24	22.59	22.53	22.69	1
		25	0	21.43	21.47	21.58	2			12	0	21.30	21.30	21.42	2
		25	12	21.49	21.48	21.58	2			12	6	21.39	21.37	21.45	2
		25	25	21.57	21.51	21.62	2			12	13	21.31	21.43	21.53	2
		50	0	21.54	21.57	21.67	2			25	0	21.34	21.48	21.70	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23025	23095	23165				Channel		23017	23095	23173	
		Frequency (MHz)		700.5	707.5	714.5				Frequency (MHz)		699.7	707.5	715.3	
3M	QPSK	1	0	23.31	23.45	23.57	0	1.4M	QPSK	1	0	23.35	23.28	23.51	0
		1	7	23.49	23.47	23.60	0			1	2	23.51	23.41	23.55	0
		1	14	23.70	23.72	23.74	0			1	5	23.63	23.67	23.77	0
		8	0	22.44	22.38	22.59	1			3	0	23.44	23.45	23.53	0
		8	3	22.49	22.36	22.63	1			3	1	23.40	23.38	23.50	0
		8	7	22.41	22.38	22.58	1			3	3	23.42	23.46	23.63	0
		15	0	22.45	22.45	22.65	1			6	0	22.59	22.42	22.67	1
	16QAM	1	0	22.38	22.33	22.35	1		16QAM	1	0	22.30	22.42	22.40	1
		1	7	22.34	22.38	22.64	1			1	2	22.30	22.26	22.48	1
		1	14	22.59	22.50	22.72	1			1	5	22.56	22.65	22.69	1
		8	0	21.24	21.23	21.56	2			3	0	22.31	22.43	22.47	1
		8	3	21.41	21.34	21.43	2			3	1	22.35	22.42	22.46	1
		8	7	21.48	21.46	21.51	2			3	3	22.33	22.40	22.44	1
		15	0	21.44	21.38	21.59	2			6	0	21.47	21.47	21.52	2

LTE Band 13

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel			23230					Channel		23205	23230	23255	
		Frequency (MHz)			782.0					Frequency (MHz)		779.5	782.0	784.5	
10M	QPSK	1	0		23.73		0	5M	QPSK	1	0	23.45	23.59	23.43	0
		1	24		**23.75**		0			1	12	23.56	23.64	23.46	0
		1	49		23.55		0			1	24	23.29	23.41	23.17	0
		25	0		22.63		1			12	0	22.28	22.39	22.23	1
		25	12		22.56		1			12	6	22.43	22.52	22.35	1
		25	25		22.52		1			12	13	22.27	22.41	22.25	1
		50	0		22.57		1			25	0	22.39	22.47	22.30	1
	16QAM	1	0		22.73		1		16QAM	1	0	22.48	22.63	22.45	1
		1	24		22.65		1			1	12	22.57	22.53	22.49	1
		1	49		22.52		1			1	24	22.36	22.39	22.21	1
		25	0		21.61		2			12	0	21.22	21.49	21.18	2
		25	12		21.51		2			12	6	21.36	21.36	21.30	2
		25	25		21.48		2			12	13	21.25	21.37	21.20	2
		50	0		21.52		2			25	0	21.35	21.41	21.27	2

LTE Band 17

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		23780	23790	23800				Channel		23755	23790	23825	
		Frequency (MHz)		709.0	710.0	711.0				Frequency (MHz)		706.5	710.0	713.5	
10M	QPSK	1	0	23.44	23.52	23.49	0	5M	QPSK	1	0	23.34	23.33	22.49	0
		1	24	23.50	**23.58**	23.55	0			1	12	23.36	23.54	22.50	0
		1	49	23.48	23.56	23.53	0			1	24	23.40	23.48	22.45	0
		25	0	22.56	22.64	22.61	1			12	0	22.43	22.53	21.59	1
		25	12	22.54	22.62	22.59	1			12	6	22.33	22.51	21.53	1
		25	25	22.60	22.68	22.65	1			12	13	22.46	22.57	21.52	1
		50	0	22.49	22.57	22.54	1			25	0	22.37	22.49	21.49	1
	16QAM	1	0	22.40	22.52	22.49	1		16QAM	1	0	22.25	22.40	22.33	1
		1	24	22.44	22.52	22.47	1			1	12	22.30	22.41	22.36	1
		1	49	22.45	22.55	22.48	1			1	24	22.30	22.50	22.41	1
		25	0	21.51	21.56	21.53	2			12	0	21.45	21.51	21.53	2
		25	12	21.44	21.62	21.55	2			12	6	21.33	21.44	21.52	2
		25	25	21.50	21.66	21.63	2			12	13	21.45	21.43	21.40	2
		50	0	21.48	21.48	21.52	2			25	0	21.37	21.35	21.35	2

<Power for Hotspot>

Band	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8
Maximum Burst-Averaged Output Power			
GSM (GMSK, 1Tx-slot)	26.74	26.88	**26.98**
GPRS (GMSK, 1Tx-slot)	26.68	26.74	26.90
GPRS (GMSK, 2Tx-slot)	25.97	26.03	26.19
GPRS (GMSK, 3Tx-slot)	25.06	25.12	25.28
GPRS (GMSK, 4Tx-slot)	23.85	23.91	24.07
EDGE (8PSK, 1Tx-slot)	23.22	23.28	23.44
EDGE (8PSK, 2Tx-slot)	23.00	23.06	23.22
EDGE (8PSK, 3Tx-slot)	21.00	21.06	21.22
EDGE (8PSK, 4Tx-slot)	20.13	20.19	20.35

Band	WCDMA Band II			3GPP MPR (dB)
Channel	9262	9400	9538	
Frequency (MHz)	1852.4	1880.0	1907.6	
RMC 12.2K	**19.47**	19.44	19.32	-
HSDPA Subtest-1	18.47	18.44	18.32	0
HSDPA Subtest-2	18.36	18.33	18.21	0
HSDPA Subtest-3	17.38	17.35	17.23	0.5
HSDPA Subtest-4	17.33	17.30	17.18	0.5
DC-HSDPA Subtest-1	17.28	17.25	17.13	0
DC-HSDPA Subtest-2	17.25	17.22	17.10	0
DC-HSDPA Subtest-3	17.14	17.11	16.99	0.5
DC-HSDPA Subtest-4	17.11	17.08	16.96	0.5
HSUPA Subtest-1	18.47	18.44	18.32	0
HSUPA Subtest-2	17.47	17.44	17.32	2
HSUPA Subtest-3	17.36	17.33	17.21	1
HSUPA Subtest-4	17.35	17.32	17.20	2
HSUPA Subtest-5	18.41	18.47	18.33	0

LTE Band 2

BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18700	18900	19100				Channel		18675	18900	19125	
		Frequency (MHz)		1860.0	1880.0	1900.0				Frequency (MHz)		1857.5	1880.0	1902.5	
20M	QPSK	1	0	20.48	20.40	20.35	0	15M	QPSK	1	0	20.46	20.38	**20.33**	0
		1	50	20.41	20.33	20.28	0			1	37	20.39	20.31	20.26	0
		1	99	20.26	20.18	20.13	0			1	74	20.24	20.16	20.11	0
		50	0	20.40	20.32	20.27	0			36	0	20.38	20.30	20.25	0
		50	25	20.23	20.15	20.10	0			36	19	20.21	20.13	20.08	0
		50	50	20.22	20.14	20.09	0			36	39	20.20	20.12	20.07	0
		100	0	20.30	20.22	20.17	0			75	0	20.28	20.20	20.15	0
	16QAM	1	0	20.46	20.38	20.33	0		16QAM	1	0	20.44	20.36	20.31	0
		1	50	20.39	20.31	20.26	0			1	37	20.37	20.29	20.24	0
		1	99	20.24	20.16	20.11	0			1	74	20.22	20.14	20.09	0
		50	0	20.38	20.30	20.25	0			36	0	20.36	20.28	20.23	0
		50	25	20.21	20.13	20.08	0			36	19	20.19	20.11	20.06	0
		50	50	20.20	20.12	20.07	0			36	39	20.18	20.10	20.05	0
		100	0	20.28	20.20	20.15	0			75	0	20.26	20.18	20.13	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18650	18900	19150				Channel		18625	18900	19175	
		Frequency (MHz)		1855.0	1880.0	1905.0				Frequency (MHz)		1852.5	1880.0	1907.5	
10M	QPSK	1	0	20.43	20.35	20.30	0	5M	QPSK	1	0	20.41	20.33	20.28	0
		1	24	20.36	20.28	20.23	0			1	12	20.34	20.26	20.21	0
		1	49	20.21	20.13	20.08	0			1	24	20.19	20.11	20.06	0
		25	0	20.35	20.27	20.22	0			12	0	20.33	20.25	20.20	0
		25	12	20.18	20.10	20.05	0			12	6	20.16	20.08	20.03	0
		25	25	20.17	20.09	20.04	0			12	13	20.15	20.07	20.02	0
		50	0	20.25	20.17	20.12	0			25	0	20.23	20.15	20.10	0
	16QAM	1	0	20.41	20.33	20.28	0		16QAM	1	0	20.39	20.31	20.26	0
		1	24	20.34	20.26	20.21	0			1	12	20.32	20.24	20.19	0
		1	49	20.19	20.11	20.06	0			1	24	20.17	20.09	20.04	0
		25	0	20.33	20.25	20.20	0			12	0	20.31	20.23	20.18	0
		25	12	20.16	20.08	20.03	0			12	6	20.14	20.06	20.01	0
		25	25	20.15	20.07	20.02	0			12	13	20.13	20.05	20.00	0
		50	0	20.23	20.15	20.10	0			25	0	20.21	20.13	20.08	0
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel		18615	18900	19185				Channel		18607	18900	19193	
		Frequency (MHz)		1851.5	1880.0	1908.5				Frequency (MHz)		1850.7	1880.0	1909.3	
3M	QPSK	1	0	20.37	20.29	20.24	0	1.4M	QPSK	1	0	20.33	20.25	20.20	0
		1	7	20.30	20.22	20.17	0			1	2	20.26	20.18	20.13	0
		1	14	20.15	20.07	20.02	0			1	5	20.11	20.03	19.98	0
		8	0	20.29	20.21	20.16	0			3	0	20.25	20.17	20.12	0
		8	3	20.12	20.04	19.99	0			3	1	20.08	20.00	19.95	0
		8	7	20.11	20.03	19.98	0			3	3	20.07	19.99	19.94	0
		15	0	20.19	20.11	20.06	0			6	0	20.15	20.07	20.02	0
	16QAM	1	0	20.35	20.27	20.22	0		16QAM	1	0	20.31	20.23	20.18	0
		1	7	20.28	20.20	20.15	0			1	2	20.24	20.16	20.11	0
		1	14	20.13	20.05	20.00	0			1	5	20.09	20.01	19.96	0
		8	0	20.27	20.19	20.14	0			3	0	20.23	20.15	20.10	0
		8	3	20.10	20.02	19.97	0			3	1	20.06	19.98	19.93	0
		8	7	20.09	20.01	19.96	0			3	3	20.05	19.97	19.92	0
		15	0	20.17	20.09	20.04	0			6	0	20.13	20.05	20.00	0

<WLAN 2.4G>

Mode	Channel	Frequency (MHz)	Average Power
802.11b	1	2412	18.81
	6	2437	18.25
	11	2462	18.13

<WLAN 5.3G>

Mode	Channel	Frequency (MHz)	Average Power
802.11a	52	5260	16.04
	56	5280	16.14
	60	5300	16.01
	64	5320	16.03

<WLAN 5.6G>

Mode	Channel	Frequency (MHz)	Average Power
802.11a	100	5500	16.25
	116	5580	16.32
	120	5600	16.34
	124	5620	16.46
	132	5660	16.31
	140	5700	15.27

<WLAN 5.8G>

Mode	Channel	Frequency (MHz)	Average Power
802.11a	149	5745	16.59
	153	5765	16.61
	157	5785	16.41
	161	5805	16.36
	165	5825	16.25

<Bluetooth>

Mode	Channel	Frequency (MHz)	Average Power
Bluetooth EDR	0	2402	1.94
	39	2441	3.39
	78	2480	1.16
Bluetooth LE	0	2402	1.91
	19	2440	3.27
	39	2480	1.12

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

When SAR is not measured at the maximum power level allowed for production units, the measured SAR will be scaled to the maximum tune-up tolerance limit to determine compliance. The scaling factor for the tune-up power is defined as maximum tune-up limit (mW) / measured conducted power (mW). The reported SAR would be calculated by measured SAR x tune-up power scaling factor.

The SAR has been measured with highest transmission duty factor supported by the test mode tools for WLAN and/or Bluetooth. When the transmission duty factor could not achieve 100%, the reported SAR will be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up power. The scaling factor for the duty factor is defined as 100% / transmission duty cycle (%). The reported SAR would be calculated by measured SAR x tune-up power scaling factor x duty cycle scaling factor.

<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 Head Exposure Condition

Plot No.	Band	Mode	Test Position	Ch.	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	GSM850	GPRS12	Right Cheek	128	1	1	30.0	29.07	1.24	0.08	0.502	0.62
	GSM850	GPRS12	Right Tilted	128	1	1	30.0	29.07	1.24	-0.12	0.344	0.43
	GSM850	GPRS12	Left Cheek	128	1	1	30.0	29.07	1.24	-0.14	0.58	0.72
	GSM850	GPRS12	Left Tilted	128	1	1	30.0	29.07	1.24	0.05	0.379	0.47
01	GSM850	GPRS12	Left Cheek	189	1	1	30.0	28.98	1.26	-0.09	0.608	**0.77**
	GSM850	GPRS12	Left Cheek	251	1	1	30.0	28.82	1.31	0.01	0.583	0.76
	GSM850	GPRS12	Left Cheek	189	1	2	30.0	28.98	1.26	0.11	0.494	0.62
	GSM850	GPRS12	Left Cheek	189	2	1	30.0	28.98	1.26	-0.11	0.451	0.57
	GSM1900	GPRS12	Right Cheek	810	1	1	28.0	27.19	1.21	0.15	0.077	0.09
	GSM1900	GPRS12	Right Tilted	810	1	1	28.0	27.19	1.21	-0.14	0.068	0.08
02	GSM1900	GPRS12	Left Cheek	810	1	1	28.0	27.19	1.21	-0.04	0.124	**0.15**
	GSM1900	GPRS12	Left Tilted	810	1	1	28.0	27.19	1.21	-0.09	0.048	0.06
	GSM1900	GPRS12	Left Cheek	512	1	1	28.0	27.17	1.21	0.07	0.074	0.09
	GSM1900	GPRS12	Left Cheek	661	1	1	28.0	27.13	1.22	0.09	0.101	0.12
	GSM1900	GPRS12	Left Cheek	810	1	2	28.0	27.19	1.21	-0.04	0.086	0.10
	GSM1900	GPRS12	Left Cheek	810	2	1	28.0	27.19	1.21	-0.11	0.098	0.12
03	WCDMA II	RMC 12.2K	Right Cheek	9262	1	1	25.0	24.32	1.17	0.03	0.100	**0.12**
	WCDMA II	RMC 12.2K	Right Tilted	9262	1	1	25.0	24.32	1.17	0.08	0.078	0.09
	WCDMA II	RMC 12.2K	Left Cheek	9262	1	1	25.0	24.32	1.17	0.12	0.063	0.07
	WCDMA II	RMC 12.2K	Left Tilted	9262	1	1	25.0	24.32	1.17	0.09	0.065	0.08
	WCDMA II	RMC 12.2K	Right Cheek	9400	1	1	25.0	24.29	1.18	-0.13	0.083	0.10
	WCDMA II	RMC 12.2K	Right Cheek	9538	1	1	25.0	24.16	1.21	-0.17	0.070	0.08
	WCDMA II	RMC 12.2K	Right Cheek	9262	1	2	25.0	24.32	1.17	-0.15	0.071	0.08
	WCDMA II	RMC 12.2K	Right Cheek	9262	2	1	25.0	24.32	1.17	-0.11	0.073	0.09
	WCDMA V	RMC 12.2K	Right Cheek	4132	1	1	25.0	24.35	1.16	0.05	0.412	0.48
	WCDMA V	RMC 12.2K	Right Tilted	4132	1	1	25.0	24.35	1.16	0.01	0.306	0.35
	WCDMA V	RMC 12.2K	Left Cheek	4132	1	1	25.0	24.35	1.16	0.01	0.497	0.58
	WCDMA V	RMC 12.2K	Left Tilted	4132	1	1	25.0	24.35	1.16	-0.13	0.337	0.39
04	WCDMA V	RMC 12.2K	Left Cheek	4182	1	1	25.0	24.29	1.18	-0.12	0.692	**0.82**
	WCDMA V	RMC 12.2K	Left Cheek	4233	1	1	25.0	24.31	1.17	-0.05	0.679	0.79
	WCDMA V	RMC 12.2K	Left Cheek	4182	1	2	25.0	24.29	1.18	0.11	0.574	0.68
	WCDMA V	RMC 12.2K	Left Cheek	4182	2	1	25.0	24.29	1.18	-0.07	0.348	0.41

Plot No.	Band	Mode	Test Position	Ch.	RB#	RB Offset	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 2	QPSK20M	Right Cheek	18700	1	0	1	1	24.0	23.72	1.07	0.01	0.086	0.09
	LTE 2	QPSK20M	Right Tilted	18700	1	0	1	1	24.0	23.72	1.07	-0.03	0.046	0.05
	LTE 2	QPSK20M	Left Cheek	18700	1	0	1	1	24.0	23.72	1.07	0.19	0.063	0.07
	LTE 2	QPSK20M	Left Tilted	18700	1	0	1	1	24.0	23.72	1.07	0.17	0.056	0.06
	LTE 2	QPSK20M	Right Cheek	18700	50	0	1	1	23.0	22.64	1.09	0.06	0.069	0.08
	LTE 2	QPSK20M	Right Tilted	18700	50	0	1	1	23.0	22.64	1.09	0.12	0.048	0.05
	LTE 2	QPSK20M	Left Cheek	18700	50	0	1	1	23.0	22.64	1.09	-0.08	0.056	0.06
	LTE 2	QPSK20M	Left Tilted	18700	50	0	1	1	23.0	22.64	1.09	0.09	0.035	0.04
05	LTE 2	QPSK20M	Right Cheek	18900	1	0	1	1	24.0	23.66	1.08	-0.03	0.1	**0.11**
	LTE 2	QPSK20M	Right Cheek	19100	1	0	1	1	24.0	23.65	1.08	0.14	0.076	0.08
	LTE 2	QPSK20M	Right Cheek	18900	1	0	1	2	24.0	23.66	1.08	0.11	0.093	0.10
	LTE 2	QPSK20M	Right Cheek	18900	1	0	2	1	24.0	23.66	1.08	0.17	0.033	0.04

Plot No.	Band	Mode	Test Position	Ch.	RB#	RB Offset	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 4	QPSK20M	Right Cheek	20175	1	0	1	1	24.0	23.95	1.01	-0.07	0.045	0.05
	LTE 4	QPSK20M	Right Tilted	20175	1	0	1	1	24.0	23.95	1.01	0.00	<0.001	0.00
	LTE 4	QPSK20M	Left Cheek	20175	1	0	1	1	24.0	23.95	1.01	-0.16	0.066	0.07
	LTE 4	QPSK20M	Left Tilted	20175	1	0	1	1	24.0	23.95	1.01	0.00	<0.001	0.00
	LTE 4	QPSK20M	Right Cheek	20175	50	0	1	1	23.0	22.92	1.02	-0.14	0.047	0.05
	LTE 4	QPSK20M	Right Tilted	20175	50	0	1	1	23.0	22.92	1.02	0.00	<0.001	0.00
	LTE 4	QPSK20M	Left Cheek	20175	50	0	1	1	23.0	22.92	1.02	-0.11	0.065	0.07
	LTE 4	QPSK20M	Left Tilted	20175	50	0	1	1	23.0	22.92	1.02	0.00	<0.001	0.00
06	LTE 4	QPSK20M	Left Cheek	20050	1	0	1	1	24.0	23.17	1.21	-0.14	0.09	**0.11**
	LTE 4	QPSK20M	Left Cheek	20300	1	0	1	1	24.0	23.44	1.14	-0.18	0.047	0.05
	LTE 4	QPSK20M	Left Cheek	20050	1	0	1	2	24.0	23.17	1.21	-0.10	0.081	0.10
	LTE 4	QPSK20M	Left Cheek	20050	1	0	2	1	24.0	23.17	1.21	0.16	0.067	0.08
	LTE 5	QPSK10M	Right Cheek	20600	1	24	1	1	24.0	23.52	1.12	0.06	0.529	0.59
	LTE 5	QPSK10M	Right Tilted	20600	1	24	1	1	24.0	23.52	1.12	0.12	0.342	0.38
	LTE 5	QPSK10M	Left Cheek	20600	1	24	1	1	24.0	23.52	1.12	0.05	0.576	0.65
	LTE 5	QPSK10M	Left Tilted	20600	1	24	1	1	24.0	23.52	1.12	-0.13	0.421	0.47
	LTE 5	QPSK10M	Right Cheek	20600	25	12	1	1	23.0	22.58	1.10	-0.01	0.384	0.42
	LTE 5	QPSK10M	Right Tilted	20600	25	12	1	1	23.0	22.58	1.10	0.14	0.282	0.31
	LTE 5	QPSK10M	Left Cheek	20600	25	12	1	1	23.0	22.58	1.10	-0.05	0.488	0.54
	LTE 5	QPSK10M	Left Tilted	20600	25	12	1	1	23.0	22.58	1.10	-0.11	0.312	0.34
	LTE 5	QPSK10M	Left Cheek	20450	1	24	1	1	24.0	23.47	1.13	0.10	0.549	0.62
07	LTE 5	QPSK10M	Left Cheek	20525	1	24	1	1	24.0	23.45	1.14	0.02	0.648	**0.74**
	LTE 5	QPSK10M	Left Cheek	20525	1	24	1	2	24.0	23.45	1.14	-0.12	0.568	0.65
	LTE 5	QPSK10M	Left Cheek	20525	1	24	2	1	24.0	23.45	1.14	0.02	0.345	0.39
	LTE 12	QPSK10M	Right Cheek	23130	1	49	1	1	24.0	23.89	1.03	0.02	0.182	0.19
	LTE 12	QPSK10M	Right Tilted	23130	1	49	1	1	24.0	23.89	1.03	0.01	0.093	0.10
	LTE 12	QPSK10M	Left Cheek	23130	1	49	1	1	24.0	23.89	1.03	0.11	0.229	0.24
	LTE 12	QPSK10M	Left Tilted	23130	1	49	1	1	24.0	23.89	1.03	0.13	0.126	0.13
	LTE 12	QPSK10M	Right Cheek	23130	25	25	1	1	23.0	22.71	1.07	-0.12	0.153	0.16
	LTE 12	QPSK10M	Right Tilted	23130	25	25	1	1	23.0	22.71	1.07	0.06	0.093	0.10
	LTE 12	QPSK10M	Left Cheek	23130	25	25	1	1	23.0	22.71	1.07	-0.07	0.197	0.21
	LTE 12	QPSK10M	Left Tilted	23130	25	25	1	1	23.0	22.71	1.07	-0.11	0.113	0.12
	LTE 12	QPSK10M	Left Cheek	23060	1	49	1	1	24.0	23.75	1.06	-0.10	0.241	0.26
	LTE 12	QPSK10M	Left Cheek	23095	1	49	1	1	24.0	23.77	1.05	0.04	0.175	0.18
08	LTE 12	QPSK10M	Left Cheek	23060	1	49	1	2	24.0	23.75	1.06	-0.01	0.324	**0.34**
	LTE 12	QPSK10M	Left Cheek	23060	1	49	2	2	24.0	23.75	1.06	0.03	0.289	0.31
	LTE 13	QPSK10M	Right Cheek	23230	1	24	1	1	24.0	23.75	1.06	0.04	0.391	0.41
	LTE 13	QPSK10M	Right Tilted	23230	1	24	1	1	24.0	23.75	1.06	-0.13	0.278	0.29
	LTE 13	QPSK10M	Left Cheek	23230	1	24	1	1	24.0	23.75	1.06	0.02	0.447	0.47
	LTE 13	QPSK10M	Left Tilted	23230	1	24	1	1	24.0	23.75	1.06	0.10	0.315	0.33
	LTE 13	QPSK10M	Right Cheek	23230	25	0	1	1	23.0	22.63	1.09	-0.03	0.31	0.34
	LTE 13	QPSK10M	Right Tilted	23230	25	0	1	1	23.0	22.63	1.09	0.11	0.203	0.22
	LTE 13	QPSK10M	Left Cheek	23230	25	0	1	1	23.0	22.63	1.09	0.14	0.35	0.38
	LTE 13	QPSK10M	Left Tilted	23230	25	0	1	1	23.0	22.63	1.09	-0.01	0.235	0.26
09	LTE 13	QPSK10M	Left Cheek	23230	1	24	1	2	24.0	23.75	1.06	-0.12	0.609	**0.65**
	LTE 13	QPSK10M	Left Cheek	23230	1	24	2	2	24.0	23.75	1.06	-0.11	0.296	0.31
	LTE 17	QPSK10M	Right Cheek	23790	1	24	1	1	24.0	23.58	1.10	0.12	0.245	0.27
	LTE 17	QPSK10M	Right Tilted	23790	1	24	1	1	24.0	23.58	1.10	0.03	0.125	0.14
	LTE 17	QPSK10M	Left Cheek	23790	1	24	1	1	24.0	23.58	1.10	-0.12	0.26	0.29
	LTE 17	QPSK10M	Left Tilted	23790	1	24	1	1	24.0	23.58	1.10	0.05	0.155	0.17
	LTE 17	QPSK10M	Right Cheek	23790	25	25	1	1	23.0	22.68	1.08	0.11	0.173	0.19
	LTE 17	QPSK10M	Right Tilted	23790	25	25	1	1	23.0	22.68	1.08	-0.13	0.1	0.11
	LTE 17	QPSK10M	Left Cheek	23790	25	25	1	1	23.0	22.68	1.08	-0.05	0.192	0.21
	LTE 17	QPSK10M	Left Tilted	23790	25	25	1	1	23.0	22.68	1.08	0.07	0.119	0.13
	LTE 17	QPSK10M	Left Cheek	23780	1	24	1	1	24.0	23.50	1.12	0.12	0.279	0.31
	LTE 17	QPSK10M	Left Cheek	23800	1	24	1	1	24.0	23.55	1.11	-0.03	0.226	0.25
10	LTE 17	QPSK10M	Left Cheek	23780	1	24	1	2	24.0	23.50	1.12	0.00	0.35	**0.39**
	LTE 17	QPSK10M	Left Cheek	23780	1	24	2	2	24.0	23.50	1.12	0.11	0.27	0.30

Note: The "< 0.001" means there is no SAR value or the SAR is too low to be measured.

Plot No.	Band	Mode	Test Position	Ch.	Sample	Battery	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
11	WLAN2.4G	802.11b	Right Cheek	1	1	1	98.70	1.01	19.5	18.81	1.17	-0.02	0.253	**0.30**
	WLAN2.4G	802.11b	Right Tilted	1	1	1	98.70	1.01	19.5	18.81	1.17	0.15	0.114	0.13
	WLAN2.4G	802.11b	Left Cheek	1	1	1	98.70	1.01	19.5	18.81	1.17	-0.05	0.164	0.19
	WLAN2.4G	802.11b	Left Tilted	1	1	1	98.70	1.01	19.5	18.81	1.17	-0.15	0.124	0.15
	WLAN2.4G	802.11b	Right Cheek	6	1	1	98.70	1.01	19.5	18.25	1.33	0.18	0.167	0.22
	WLAN2.4G	802.11b	Right Cheek	11	1	1	98.70	1.01	19.5	18.13	1.37	-0.02	0.146	0.20
	WLAN2.4G	802.11b	Right Cheek	1	1	2	98.70	1.01	19.5	18.81	1.17	-0.15	0.165	0.19
	WLAN2.4G	802.11b	Right Cheek	1	2	1	98.70	1.01	19.5	18.81	1.17	0.00	0.131	0.15
	WLAN5G	802.11a	Right Cheek	56	1	1	88.70	1.13	17.5	16.14	1.37	0.00	<0.001	0.00
	WLAN5G	802.11a	Right Tilted	56	1	1	88.70	1.13	17.5	16.14	1.37	0.00	<0.001	0.00
	WLAN5G	802.11a	Left Cheek	56	1	1	88.70	1.13	17.5	16.14	1.37	0.07	0.072	0.11
	WLAN5G	802.11a	Left Tilted	56	1	1	88.70	1.13	17.5	16.14	1.37	0.00	<0.001	0.00
12	WLAN5G	802.11a	Left Cheek	52	1	1	88.70	1.13	17.5	16.04	1.40	-0.06	0.083	**0.13**
	WLAN5G	802.11a	Left Cheek	60	1	1	88.70	1.13	17.5	16.01	1.41	-0.05	0.061	0.10
	WLAN5G	802.11a	Left Cheek	64	1	1	88.70	1.13	17.5	16.03	1.40	0.12	0.062	0.10
	WLAN5G	802.11a	Left Cheek	52	1	2	88.70	1.13	17.5	16.04	1.40	-0.01	0.068	0.11
	WLAN5G	802.11a	Left Cheek	52	2	1	88.70	1.13	17.5	16.04	1.40	0.01	0.074	0.12
	WLAN5G	802.11a	Right Cheek	124	1	1	89.10	1.12	17.5	16.46	1.27	-0.15	0.136	0.19
	WLAN5G	802.11a	Right Tilted	124	1	1	89.10	1.12	17.5	16.46	1.27	0.00	<0.001	0.00
	WLAN5G	802.11a	Left Cheek	124	1	1	89.10	1.12	17.5	16.46	1.27	-0.06	0.283	0.40
	WLAN5G	802.11a	Left Tilted	124	1	1	89.10	1.12	17.5	16.46	1.27	0.00	<0.001	0.00
	WLAN5G	802.11a	Left Cheek	100	1	1	89.10	1.12	17.5	16.25	1.33	0.05	0.176	0.26
13	WLAN5G	802.11a	Left Cheek	116	1	1	89.10	1.12	17.5	16.32	1.31	-0.06	0.277	**0.41**
	WLAN5G	802.11a	Left Cheek	120	1	1	89.10	1.12	17.5	16.34	1.31	0.19	0.208	0.31
	WLAN5G	802.11a	Left Cheek	132	1	1	89.10	1.12	17.5	16.31	1.32	0.15	0.265	0.39
	WLAN5G	802.11a	Left Cheek	140	1	1	89.10	1.12	16.5	15.27	1.33	-0.04	0.225	0.34
	WLAN5G	802.11a	Left Cheek	116	1	2	89.10	1.12	17.5	16.32	1.31	0.10	0.276	0.40
	WLAN5G	802.11a	Left Cheek	116	2	1	89.10	1.12	17.5	16.32	1.31	-0.13	0.181	0.27
	WLAN5G	802.11a	Right Cheek	153	1	1	88.10	1.14	17.5	16.61	1.23	-0.19	0.126	0.18
	WLAN5G	802.11a	Right Tilted	153	1	1	88.10	1.14	17.5	16.61	1.23	0.00	<0.001	0.00
	WLAN5G	802.11a	Left Cheek	153	1	1	88.10	1.14	17.5	16.61	1.23	-0.13	0.254	0.36
	WLAN5G	802.11a	Left Tilted	153	1	1	88.10	1.14	17.5	16.61	1.23	0.00	<0.001	0.00
	WLAN5G	802.11a	Left Cheek	149	1	1	88.10	1.14	17.5	16.59	1.23	-0.18	0.248	0.35
	WLAN5G	802.11a	Left Cheek	157	1	1	88.10	1.14	17.5	16.41	1.29	0.01	0.26	0.38
14	WLAN5G	802.11a	Left Cheek	161	1	1	88.10	1.14	17.5	16.36	1.30	-0.05	0.298	**0.44**
	WLAN5G	802.11a	Left Cheek	165	1	1	88.10	1.14	17.5	16.25	1.33	-0.07	0.248	0.38
	WLAN5G	802.11a	Left Cheek	161	1	2	88.10	1.14	17.5	16.36	1.30	-0.16	0.291	0.43
	WLAN5G	802.11a	Left Cheek	161	2	1	88.10	1.14	17.5	16.36	1.30	-0.03	0.229	0.34

Note: The "< 0.001" means there is no SAR value or the SAR is too low to be measured.

4.7.3 SAR Results for Body-worn Exposure Condition (Test Separation Distance is 15 mm)

Plot No.	Band	Mode	Test Position	Ch.	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	GSM850	GPRS12	Front Face	128	1	1	30.0	29.07	1.24	0.05	0.486	0.60
	GSM850	GPRS12	Rear Face	128	1	1	30.0	29.07	1.24	0.12	0.379	0.47
15	GSM850	GPRS12	Front Face	189	1	1	30.0	28.98	1.26	-0.14	0.521	**0.66**
	GSM850	GPRS12	Front Face	251	1	1	30.0	28.82	1.31	-0.05	0.498	0.65
	GSM850	GPRS12	Front Face	189	1	2	30.0	28.98	1.26	-0.13	0.505	0.64
	GSM850	GPRS12	Front Face	189	2	1	30.0	28.98	1.26	-0.01	0.458	0.58
	GSM1900	GPRS12	Front Face	810	1	1	28.0	27.19	1.21	0.09	0.689	0.83
	GSM1900	GPRS12	Rear Face	810	1	1	28.0	27.19	1.21	-0.02	0.526	0.64
16	GSM1900	GPRS12	Front Face	512	1	1	28.0	27.17	1.21	-0.07	0.781	**0.95**
	GSM1900	GPRS12	Front Face	661	1	1	28.0	27.13	1.22	0.03	0.709	0.86
	GSM1900	GPRS12	Front Face	512	1	2	28.0	27.17	1.21	-0.06	0.753	0.91
	GSM1900	GPRS12	Front Face	661	1	2	28.0	27.13	1.22	0.02	0.664	0.81
	GSM1900	GPRS12	Front Face	810	1	2	28.0	27.19	1.21	-0.03	0.683	0.83
	GSM1900	GPRS12	Front Face	512	2	1	28.0	27.17	1.21	0.01	0.750	0.91
	GSM1900	GPRS12	Front Face	661	2	1	28.0	27.13	1.22	0.13	0.661	0.81
	GSM1900	GPRS12	Front Face	810	2	1	28.0	27.19	1.21	0.05	0.681	0.82
	WCDMA II	RMC 12.2K	Front Face	9262	1	1	25.0	24.32	1.17	-0.06	0.991	1.16
	WCDMA II	RMC 12.2K	Rear Face	9262	1	1	25.0	24.32	1.17	-0.06	0.842	0.99
17	WCDMA II	RMC 12.2K	Front Face	9400	1	1	25.0	24.29	1.18	0.1	0.991	**1.17**
	WCDMA II	RMC 12.2K	Front Face	9538	1	1	25.0	24.16	1.21	-0.13	0.857	1.04
	WCDMA II	RMC 12.2K	Rear Face	9400	1	1	25.0	24.29	1.18	0.03	0.781	0.92
	WCDMA II	RMC 12.2K	Rear Face	9538	1	1	25.0	24.16	1.21	-0.02	0.675	0.82
	WCDMA II	RMC 12.2K	Front Face	9400	1	2	25.0	24.29	1.18	0.01	0.981	1.16
	WCDMA II	RMC 12.2K	Front Face	9262	1	2	25.0	24.32	1.17	0.12	0.962	1.13
	WCDMA II	RMC 12.2K	Front Face	9538	1	2	25.0	24.16	1.21	0.07	0.832	1.01
	WCDMA II	RMC 12.2K	Front Face	9400	2	1	25.0	24.29	1.18	-0.05	0.897	1.06
	WCDMA II	RMC 12.2K	Front Face	9262	2	1	25.0	24.32	1.17	0.02	0.882	1.03
	WCDMA II	RMC 12.2K	Front Face	9538	2	1	25.0	24.16	1.21	-0.03	0.761	0.92
	WCDMA II	RMC 12.2K	Front Face	9400	1	1	25.0	24.29	1.18	0.05	0.982	1.16
	WCDMA V	RMC 12.2K	Front Face	4132	1	1	25.0	24.35	1.16	0.03	0.415	0.48
	WCDMA V	RMC 12.2K	Rear Face	4132	1	1	25.0	24.35	1.16	0.14	0.293	0.34
18	WCDMA V	RMC 12.2K	Front Face	4182	1	1	25.0	24.29	1.18	-0.1	0.623	**0.74**
	WCDMA V	RMC 12.2K	Front Face	4233	1	1	25.0	24.31	1.17	-0.05	0.433	0.51
	WCDMA V	RMC 12.2K	Front Face	4182	1	2	25.0	24.29	1.18	0.16	0.598	0.71
	WCDMA V	RMC 12.2K	Front Face	4182	2	1	25.0	24.29	1.18	-0.07	0.556	0.66

Plot No.	Band	Mode	Test Position	Ch.	RB#	RB Offset	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 2	QPSK20M	Front Face	18700	1	0	1	1	24.0	23.72	1.07	0.13	0.889	0.95
	LTE 2	QPSK20M	Rear Face	18700	1	0	1	1	24.0	23.72	1.07	0.05	0.591	0.63
	LTE 2	QPSK20M	Front Face	18700	50	0	1	1	23.0	22.64	1.09	-0.02	0.862	0.94
	LTE 2	QPSK20M	Rear Face	18700	50	0	1	1	23.0	22.64	1.09	-0.07	0.581	0.63
19	LTE 2	QPSK20M	Front Face	18900	1	0	1	1	24.0	23.66	1.08	-0.09	1.08	**1.17**
	LTE 2	QPSK20M	Front Face	19100	1	0	1	1	24.0	23.65	1.08	0.01	0.774	0.84
	LTE 2	QPSK20M	Front Face	18900	50	0	1	1	23.0	22.58	1.10	-0.09	0.852	0.94
	LTE 2	QPSK20M	Front Face	19100	50	0	1	1	23.0	22.57	1.10	0.01	0.850	0.94
	LTE 2	QPSK20M	Front Face	18700	100	0	1	1	23.0	22.52	1.12	-0.03	0.843	0.94
	LTE 2	QPSK20M	Front Face	18900	1	0	1	2	24.0	23.66	1.08	0.09	1.008	1.09
	LTE 2	QPSK20M	Front Face	18700	1	0	1	2	24.0	23.72	1.07	0.03	0.879	0.94
	LTE 2	QPSK20M	Front Face	19100	1	0	1	2	24.0	23.65	1.08	-0.02	0.714	0.77
	LTE 2	QPSK20M	Front Face	18900	1	0	2	1	24.0	23.66	1.08	0.11	0.948	1.02
	LTE 2	QPSK20M	Front Face	18700	1	0	2	1	24.0	23.72	1.07	0.05	0.936	1.00
	LTE 2	QPSK20M	Front Face	19100	1	0	2	1	24.0	23.65	1.08	-0.09	0.936	1.01
	LTE 2	QPSK20M	Front Face	18900	1	0	1	1	24.0	23.66	1.08	0.03	1.03	1.11
20	LTE 4	QPSK20M	Front Face	20175	1	0	1	1	24.0	23.95	1.01	-0.02	0.508	**0.51**
	LTE 4	QPSK20M	Rear Face	20175	1	0	1	1	24.0	23.95	1.01	0.05	0.197	0.20
	LTE 4	QPSK20M	Front Face	20175	50	0	1	1	23.0	22.92	1.02	-0.03	0.495	0.50
	LTE 4	QPSK20M	Rear Face	20175	50	0	1	1	23.0	22.92	1.02	0.01	0.186	0.19
	LTE 4	QPSK20M	Front Face	20050	1	0	1	1	24.0	23.17	1.21	-0.12	0.415	0.50
	LTE 4	QPSK20M	Front Face	20300	1	0	1	1	24.0	23.44	1.14	0.05	0.436	0.50
	LTE 4	QPSK20M	Front Face	20175	1	0	1	2	24.0	23.95	1.01	-0.09	0.448	0.45
	LTE 4	QPSK20M	Front Face	20175	1	0	2	1	24.0	23.95	1.01	0.03	0.433	0.44
	LTE 5	QPSK10M	Front Face	20600	1	24	1	1	24.0	23.52	1.12	-0.01	0.551	0.62
	LTE 5	QPSK10M	Rear Face	20600	1	24	1	1	24.0	23.52	1.12	0.11	0.411	0.46
	LTE 5	QPSK10M	Front Face	20600	25	12	1	1	23.0	22.58	1.10	0.05	0.451	0.50
	LTE 5	QPSK10M	Rear Face	20600	25	12	1	1	23.0	22.58	1.10	-0.03	0.334	0.37
	LTE 5	QPSK10M	Front Face	20450	1	24	1	1	24.0	23.47	1.13	-0.12	0.578	0.65
21	LTE 5	QPSK10M	Front Face	20525	1	24	1	1	24.0	23.45	1.14	-0.06	0.602	**0.69**
	LTE 5	QPSK10M	Front Face	20525	1	24	1	2	24.0	23.45	1.14	0.05	0.545	0.62
	LTE 5	QPSK10M	Front Face	20525	1	24	2	1	24.0	23.45	1.14	0.01	0.486	0.55
	LTE 12	QPSK10M	Front Face	23130	1	49	1	1	24.0	23.89	1.03	0.05	0.277	0.29
	LTE 12	QPSK10M	Rear Face	23130	1	49	1	1	24.0	23.89	1.03	-0.01	0.173	0.18
	LTE 12	QPSK10M	Front Face	23130	25	25	1	1	23.0	22.71	1.07	0.05	0.260	0.28
	LTE 12	QPSK10M	Rear Face	23130	25	25	1	1	23.0	22.71	1.07	-0.11	0.135	0.14
22	LTE 12	QPSK10M	Front Face	23060	1	49	1	1	24.0	23.75	1.06	-0.08	0.367	**0.39**
	LTE 12	QPSK10M	Front Face	23095	1	49	1	1	24.0	23.77	1.05	0.06	0.218	0.23
	LTE 12	QPSK10M	Front Face	23060	1	49	1	2	24.0	23.75	1.06	0.04	0.267	0.28
	LTE 12	QPSK10M	Front Face	23060	1	49	2	1	24.0	23.75	1.06	0.01	0.327	0.35
23	LTE 13	QPSK10M	Front Face	23230	1	24	1	1	24.0	23.75	1.06	0.06	0.539	**0.57**
	LTE 13	QPSK10M	Rear Face	23230	1	24	1	1	24.0	23.75	1.06	0.02	0.347	0.37
	LTE 13	QPSK10M	Front Face	23230	25	0	1	1	23.0	22.63	1.09	-0.13	0.415	0.45
	LTE 13	QPSK10M	Rear Face	23230	25	0	1	1	23.0	22.63	1.09	0.12	0.277	0.30
	LTE 13	QPSK10M	Front Face	23230	1	24	1	2	24.0	23.75	1.06	0.01	0.517	0.55
	LTE 13	QPSK10M	Front Face	23230	1	24	2	1	24.0	23.75	1.06	-0.11	0.479	0.51
	LTE 17	QPSK10M	Front Face	23790	1	24	1	1	24.0	23.58	1.10	0.12	0.354	0.39
	LTE 17	QPSK10M	Rear Face	23790	1	24	1	1	24.0	23.58	1.10	-0.13	0.195	0.21
	LTE 17	QPSK10M	Front Face	23790	25	25	1	1	23.0	22.68	1.08	0.04	0.266	0.29
	LTE 17	QPSK10M	Rear Face	23790	25	25	1	1	23.0	22.68	1.08	-0.11	0.151	0.16
24	LTE 17	QPSK10M	Front Face	23780	1	24	1	1	24.0	23.50	1.12	0.06	0.387	**0.43**
	LTE 17	QPSK10M	Front Face	23800	1	24	1	1	24.0	23.55	1.11	0.01	0.317	0.35
	LTE 17	QPSK10M	Front Face	23780	1	24	1	2	24.0	23.50	1.12	-0.01	0.379	0.42
	LTE 17	QPSK10M	Front Face	23780	1	24	2	1	24.0	23.50	1.12	0.07	0.310	0.35

Plot No.	Band	Mode	Test Position	Ch.	Sample	Battery	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
25	WLAN2.4G	802.11b	Front Face	1	1	1	98.70	1.01	19.5	18.81	1.17	0.02	0.076	**0.09**
	WLAN2.4G	802.11b	Rear Face	1	1	1	98.70	1.01	19.5	18.81	1.17	0.06	0.062	0.07
	WLAN2.4G	802.11b	Front Face	6	1	1	98.70	1.01	19.5	18.25	1.33	0.17	0.060	0.08
	WLAN2.4G	802.11b	Front Face	11	1	1	98.70	1.01	19.5	18.13	1.37	0.13	0.059	0.08
	WLAN2.4G	802.11b	Front Face	1	1	2	98.70	1.01	19.5	18.81	1.17	0.05	0.063	0.07
	WLAN2.4G	802.11b	Front Face	1	2	1	98.70	1.01	19.5	18.81	1.17	-0.1	0.069	0.08
	WLAN5G	802.11a	Front Face	56	1	1	88.70	1.13	17.5	16.14	1.37	-0.07	0.073	0.11
	WLAN5G	802.11a	Rear Face	56	1	1	88.70	1.13	17.5	16.14	1.37	0.16	0.413	0.64
	WLAN5G	802.11a	Rear Face	52	1	1	88.70	1.13	17.5	16.04	1.40	-0.01	0.421	0.67
26	WLAN5G	802.11a	Rear Face	60	1	1	88.70	1.13	17.5	16.01	1.41	0.07	0.425	**0.68**
	WLAN5G	802.11a	Rear Face	64	1	1	88.70	1.13	17.5	16.03	1.40	-0.18	0.398	0.63
	WLAN5G	802.11a	Rear Face	60	1	2	88.70	1.13	17.5	16.01	1.41	0.01	0.412	0.66
	WLAN5G	802.11a	Rear Face	60	2	1	88.70	1.13	17.5	16.01	1.41	-0.03	0.213	0.34
	WLAN5G	802.11a	Front Face	124	1	1	89.10	1.12	17.5	16.46	1.27	-0.18	0.205	0.29
	WLAN5G	802.11a	Rear Face	124	1	1	89.10	1.12	17.5	16.46	1.27	-0.03	0.525	0.75
27	WLAN5G	802.11a	Rear Face	100	1	1	89.10	1.12	17.5	16.25	1.33	-0.05	0.639	**0.95**
	WLAN5G	802.11a	Rear Face	116	1	1	89.10	1.12	17.5	16.32	1.31	0.06	0.552	0.81
	WLAN5G	802.11a	Rear Face	120	1	1	89.10	1.12	17.5	16.34	1.31	0.03	0.551	0.81
	WLAN5G	802.11a	Rear Face	132	1	1	89.10	1.12	17.5	16.31	1.32	0.11	0.492	0.73
	WLAN5G	802.11a	Rear Face	140	1	1	89.10	1.12	16.5	15.27	1.33	0.03	0.365	0.54
	WLAN5G	802.11a	Rear Face	100	1	2	89.10	1.12	17.5	16.25	1.33	0.01	0.621	0.93
	WLAN5G	802.11a	Rear Face	124	1	2	89.10	1.12	17.5	16.46	1.27	-0.06	0.507	0.72
	WLAN5G	802.11a	Rear Face	100	2	1	89.10	1.12	17.5	16.25	1.33	-0.1	0.310	0.46
	WLAN5G	802.11a	Front Face	153	1	1	88.10	1.14	17.5	16.61	1.23	0.15	0.299	0.42
28	WLAN5G	802.11a	Rear Face	153	1	1	88.10	1.14	17.5	16.61	1.23	-0.07	0.502	**0.70**
	WLAN5G	802.11a	Rear Face	149	1	1	88.10	1.14	17.5	16.59	1.23	0.11	0.493	0.69
	WLAN5G	802.11a	Rear Face	157	1	1	88.10	1.14	17.5	16.41	1.29	-0.14	0.470	0.69
	WLAN5G	802.11a	Rear Face	161	1	1	88.10	1.14	17.5	16.36	1.30	0.08	0.443	0.66
	WLAN5G	802.11a	Rear Face	165	1	1	88.10	1.14	17.5	16.25	1.33	-0.18	0.434	0.66
	WLAN5G	802.11a	Rear Face	153	1	2	88.10	1.14	17.5	16.61	1.23	0.06	0.493	0.69
	WLAN5G	802.11a	Rear Face	153	2	1	88.10	1.14	17.5	16.61	1.23	-0.01	0.277	0.39
29	BT	BR/EDR	Front Face	39	1	1	76.10	1.31	3.5	3.39	1.03	0.08	0.000838	**0.00**
	BT	BR/EDR	Rear Face	39	1	1	76.10	1.31	3.5	3.39	1.03	-0.02	0.000811	0.00
	BT	BR/EDR	Front Face	0	1	1	76.10	1.31	3.5	1.94	1.43	0.08	0.000808	0.00
	BT	BR/EDR	Front Face	78	1	1	76.10	1.31	3.0	1.16	1.53	-0.02	0.000798	0.00
	BT	BR/EDR	Front Face	39	1	2	76.10	1.31	3.5	3.39	1.03	0.04	0.000804	0.00
	BT	BR/EDR	Front Face	39	2	1	76.10	1.31	3.5	3.39	1.03	-0.13	0.000798	0.00

4.7.4 SAR Results for Hotspot Exposure Condition (Test Separation Distance is 10 mm)

Plot No.	Band	Mode	Test Position	Ch.	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	GSM850	GPRS12	Front Face	128	1	1	30.0	29.07	1.24	-0.04	0.619	0.77
	GSM850	GPRS12	Rear Face	128	1	1	30.0	29.07	1.24	0.03	0.541	0.67
30	GSM850	GPRS12	Left Side	128	1	1	30.0	29.07	1.24	-0.03	0.633	**0.78**
	GSM850	GPRS12	Right Side	128	1	1	30.0	29.07	1.24	-0.12	0.369	0.46
	GSM850	GPRS12	Bottom Side	128	1	1	30.0	29.07	1.24	0.05	0.290	0.36
	GSM850	GPRS12	Left Side	189	1	1	30.0	28.98	1.26	0.09	0.525	0.66
	GSM850	GPRS12	Left Side	251	1	1	30.0	28.82	1.31	0.01	0.452	0.59
	GSM850	GPRS12	Left Side	128	1	2	30.0	29.07	1.24	-0.05	0.611	0.76
	GSM850	GPRS12	Left Side	128	2	1	30.0	29.07	1.24	0.06	0.624	0.77
	GSM1900	GPRS12	Front Face	810	1	1	24.5	24.07	1.10	0.05	0.403	0.44
	GSM1900	GPRS12	Rear Face	810	1	1	24.5	24.07	1.10	0.06	0.233	0.26
	GSM1900	GPRS12	Left Side	810	1	1	24.5	24.07	1.10	-0.08	0.055	0.06
	GSM1900	GPRS12	Right Side	810	1	1	24.5	24.07	1.10	0.15	0.123	0.14
	GSM1900	GPRS12	Bottom Side	810	1	1	24.5	24.07	1.10	-0.07	0.629	0.69
31	GSM1900	GPRS12	Bottom Side	512	1	1	24.5	23.85	1.16	-0.12	0.723	**0.84**
	GSM1900	GPRS12	Bottom Side	661	1	1	24.5	23.91	1.15	-0.02	0.636	0.73
	GSM1900	GPRS12	Bottom Side	512	1	2	24.5	23.85	1.16	0.13	0.713	0.83
	GSM1900	GPRS12	Bottom Side	661	1	2	24.5	23.91	1.15	0.07	0.629	0.72
	GSM1900	GPRS12	Bottom Side	810	1	2	24.5	24.07	1.10	-0.06	0.616	0.68
	GSM1900	GPRS12	Bottom Side	512	2	1	24.5	23.85	1.16	0.01	0.701	0.81
	GSM1900	GPRS12	Bottom Side	661	2	1	24.5	23.91	1.15	0.08	0.633	0.73
	GSM1900	GPRS12	Bottom Side	810	2	1	24.5	24.07	1.10	0.15	0.616	0.68
	WCDMA II	RMC12.2K	Front Face	9262	1	1	19.5	19.47	1.01	-0.05	0.631	0.64
	WCDMA II	RMC12.2K	Rear Face	9262	1	1	19.5	19.47	1.01	0.01	0.376	0.38
	WCDMA II	RMC12.2K	Left Side	9262	1	1	19.5	19.47	1.01	0.06	0.071	0.07
	WCDMA II	RMC12.2K	Right Side	9262	1	1	19.5	19.47	1.01	-0.13	0.143	0.14
32	WCDMA II	RMC12.2K	Bottom Side	9262	1	1	19.5	19.47	1.01	-0.11	0.842	**0.85**
	WCDMA II	RMC12.2K	Bottom Side	9400	1	1	19.5	19.44	1.01	0.13	0.772	0.78
	WCDMA II	RMC12.2K	Bottom Side	9538	1	1	19.5	19.32	1.04	0.07	0.666	0.69
	WCDMA II	RMC12.2K	Bottom Side	9262	1	2	19.5	19.47	1.01	-0.06	0.836	0.84
	WCDMA II	RMC12.2K	Bottom Side	9400	1	2	19.5	19.44	1.01	0.01	0.736	0.74
	WCDMA II	RMC12.2K	Bottom Side	9538	1	2	19.5	19.32	1.04	0.05	0.643	0.67
	WCDMA II	RMC12.2K	Bottom Side	9262	2	1	19.5	19.47	1.01	-0.08	0.831	0.84
	WCDMA II	RMC12.2K	Bottom Side	9400	2	1	19.5	19.44	1.01	0.15	0.739	0.75
	WCDMA II	RMC12.2K	Bottom Side	9538	2	1	19.5	19.32	1.04	-0.17	0.648	0.67
	WCDMA II	RMC12.2K	Bottom Side	9262	1	1	19.5	19.47	1.01	0.05	0.835	0.84
	WCDMA V	RMC12.2K	Front Face	4132	1	1	25.0	24.35	1.16	-0.06	0.412	0.48
	WCDMA V	RMC12.2K	Rear Face	4132	1	1	25.0	24.35	1.16	0.02	0.329	0.38
	WCDMA V	RMC12.2K	Left Side	4132	1	1	25.0	24.35	1.16	-0.03	0.367	0.43
	WCDMA V	RMC12.2K	Right Side	4132	1	1	25.0	24.35	1.16	0.13	0.286	0.33
	WCDMA V	RMC12.2K	Bottom Side	4132	1	1	25.0	24.35	1.16	0.05	0.206	0.24
33	WCDMA V	RMC12.2K	Front Face	4182	1	1	25.0	24.29	1.18	0.06	0.542	**0.64**
	WCDMA V	RMC12.2K	Front Face	4233	1	1	25.0	24.31	1.17	-0.08	0.381	0.45
	WCDMA V	RMC12.2K	Front Face	4182	1	2	25.0	24.29	1.18	0.15	0.522	0.62
	WCDMA V	RMC12.2K	Front Face	4182	2	1	25.0	24.29	1.18	0.07	0.538	0.63

Plot No.	Band	Mode	Test Position	Ch.	RB#	RB Offset	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 2	QPSK20M	Front Face	18700	1	0	1	1	20.5	20.48	1.00	-0.03	0.762	0.76
	LTE 2	QPSK20M	Rear Face	18700	1	0	1	1	20.5	20.48	1.00	-0.07	0.421	0.42
	LTE 2	QPSK20M	Left Side	18700	1	0	1	1	20.5	20.48	1.00	0.02	0.053	0.05
	LTE 2	QPSK20M	Right Side	18700	1	0	1	1	20.5	20.48	1.00	0.08	0.138	0.14
	LTE 2	QPSK20M	Bottom Side	18700	1	0	1	1	20.5	20.48	1.00	-0.13	0.963	0.96
	LTE 2	QPSK20M	Front Face	18700	50	0	1	1	20.5	20.40	1.02	0.03	0.661	0.67
	LTE 2	QPSK20M	Rear Face	18700	50	0	1	1	20.5	20.40	1.02	0.05	0.395	0.40
	LTE 2	QPSK20M	Left Side	18700	50	0	1	1	20.5	20.40	1.02	0.05	0.055	0.06
	LTE 2	QPSK20M	Right Side	18700	50	0	1	1	20.5	20.40	1.02	-0.07	0.132	0.13
	LTE 2	QPSK20M	Bottom Side	18700	50	0	1	1	20.5	20.40	1.02	0.01	0.901	0.92
34	LTE 2	QPSK20M	Bottom Side	18900	1	0	1	1	20.5	20.40	1.02	0.05	1.07	**1.09**
	LTE 2	QPSK20M	Bottom Side	19100	1	0	1	1	20.5	20.35	1.04	0.02	0.869	0.90
	LTE 2	QPSK20M	Bottom Side	18900	50	0	1	1	20.5	20.32	1.04	0.01	0.878	0.91
	LTE 2	QPSK20M	Bottom Side	19100	50	0	1	1	20.5	20.27	1.05	0.06	0.913	0.96
	LTE 2	QPSK20M	Bottom Side	18700	100	0	1	1	20.5	20.30	1.05	-0.02	0.869	0.91
	LTE 2	QPSK20M	Bottom Side	18900	1	0	1	2	20.5	20.40	1.02	0.13	1.06	1.08
	LTE 2	QPSK20M	Bottom Side	18700	1	0	1	2	20.5	20.48	1.00	0.11	0.913	0.91
	LTE 2	QPSK20M	Bottom Side	19100	1	0	1	2	20.5	20.35	1.04	0.07	0.852	0.89
	LTE 2	QPSK20M	Bottom Side	18900	1	0	2	1	20.5	20.40	1.02	0.01	1.05	1.07
	LTE 2	QPSK20M	Bottom Side	18700	1	0	2	1	20.5	20.48	1.00	-0.06	0.918	0.92
	LTE 2	QPSK20M	Bottom Side	19100	1	0	2	1	20.5	20.35	1.04	0.03	0.856	0.89
	LTE 2	QPSK20M	Bottom Side	18900	1	0	1	1	20.5	20.40	1.02	0.05	1.05	1.07
	LTE 4	QPSK20M	Front Face	20175	1	0	1	1	24.0	23.95	1.01	0.06	0.611	0.62
	LTE 4	QPSK20M	Rear Face	20175	1	0	1	1	24.0	23.95	1.01	-0.02	0.294	0.30
	LTE 4	QPSK20M	Left Side	20175	1	0	1	1	24.0	23.95	1.01	0.13	0.034	0.03
	LTE 4	QPSK20M	Right Side	20175	1	0	1	1	24.0	23.95	1.01	0.07	0.057	0.06
	LTE 4	QPSK20M	Bottom Side	20175	1	0	1	1	24.0	23.95	1.01	-0.06	0.802	0.81
	LTE 4	QPSK20M	Front Face	20175	50	0	1	1	23.0	22.92	1.02	0.01	0.591	0.60
	LTE 4	QPSK20M	Rear Face	20175	50	0	1	1	23.0	22.92	1.02	0.05	0.271	0.28
	LTE 4	QPSK20M	Left Side	20175	50	0	1	1	23.0	22.92	1.02	-0.08	0.034	0.03
	LTE 4	QPSK20M	Right Side	20175	50	0	1	1	23.0	22.92	1.02	0.03	0.056	0.06
	LTE 4	QPSK20M	Bottom Side	20175	50	0	1	1	23.0	22.92	1.02	0.01	0.693	0.71
	LTE 4	QPSK20M	Bottom Side	20050	1	0	1	1	24.0	23.17	1.21	0.05	0.835	1.01
35	LTE 4	QPSK20M	Bottom Side	20300	1	0	1	1	24.0	23.44	1.14	-0.09	1.01	**1.15**
	LTE 4	QPSK20M	Bottom Side	20175	100	0	1	1	23.0	22.88	1.03	-0.03	0.706	0.73
	LTE 4	QPSK20M	Bottom Side	20300	1	0	1	2	24.0	23.44	1.14	0.11	0.997	1.14
	LTE 4	QPSK20M	Bottom Side	20050	1	0	1	2	24.0	23.17	1.21	0.07	0.739	0.89
	LTE 4	QPSK20M	Bottom Side	20175	1	0	1	2	24.0	23.95	1.01	0.01	0.713	0.72
	LTE 4	QPSK20M	Bottom Side	20300	1	0	2	1	24.0	23.44	1.14	-0.06	0.997	1.14
	LTE 4	QPSK20M	Bottom Side	20050	1	0	2	1	24.0	23.17	1.21	0.03	0.733	0.89
	LTE 4	QPSK20M	Bottom Side	20175	1	0	2	1	24.0	23.95	1.01	0.02	0.673	0.68
	LTE 4	QPSK20M	Bottom Side	20300	1	0	1	1	24.0	23.44	1.14	0.05	0.989	1.13

Plot No.	Band	Mode	Test Position	Ch.	RB#	RB Offset	Sample	Battery	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	LTE 5	QPSK10M	Front Face	20600	1	24	1	1	24.0	23.52	1.12	-0.08	0.559	0.63
	LTE 5	QPSK10M	Rear Face	20600	1	24	1	1	24.0	23.52	1.12	0.13	0.479	0.54
	LTE 5	QPSK10M	Left Side	20600	1	24	1	1	24.0	23.52	1.12	0.05	0.518	0.58
	LTE 5	QPSK10M	Right Side	20600	1	24	1	1	24.0	23.52	1.12	-0.07	0.419	0.47
	LTE 5	QPSK10M	Bottom Side	20600	1	24	1	1	24.0	23.52	1.12	0.01	0.320	0.36
	LTE 5	QPSK10M	Front Face	20600	25	12	1	1	23.0	22.58	1.10	0.13	0.421	0.46
	LTE 5	QPSK10M	Rear Face	20600	25	12	1	1	23.0	22.58	1.10	0.05	0.366	0.40
	LTE 5	QPSK10M	Left Side	20600	25	12	1	1	23.0	22.58	1.10	-0.09	0.395	0.43
	LTE 5	QPSK10M	Right Side	20600	25	12	1	1	23.0	22.58	1.10	0.02	0.305	0.34
	LTE 5	QPSK10M	Bottom Side	20600	25	12	1	1	23.0	22.58	1.10	-0.06	0.255	0.28
36	LTE 5	QPSK10M	Front Face	20450	1	24	1	1	24.0	23.47	1.13	-0.11	0.580	**0.66**
	LTE 5	QPSK10M	Front Face	20525	1	24	1	1	24.0	23.45	1.14	0.13	0.573	0.65
	LTE 5	QPSK10M	Front Face	20450	1	24	1	2	24.0	23.47	1.13	0.07	0.566	0.64
	LTE 5	QPSK10M	Front Face	20450	1	24	2	1	24.0	23.47	1.13	0.02	0.571	0.65
	LTE 12	QPSK10M	Front Face	23130	1	49	1	1	24.0	23.89	1.03	0.11	0.289	0.30
	LTE 12	QPSK10M	Rear Face	23130	1	49	1	1	24.0	23.89	1.03	0.06	0.222	0.23
	LTE 12	QPSK10M	Left Side	23130	1	49	1	1	24.0	23.89	1.03	-0.03	0.210	0.22
	LTE 12	QPSK10M	Right Side	23130	1	49	1	1	24.0	23.89	1.03	-0.07	0.220	0.23
	LTE 12	QPSK10M	Bottom Side	23130	1	49	1	1	24.0	23.89	1.03	0.02	0.042	0.04
	LTE 12	QPSK10M	Front Face	23130	25	25	1	1	23.0	22.71	1.07	-0.08	0.283	0.30
	LTE 12	QPSK10M	Rear Face	23130	25	25	1	1	23.0	22.71	1.07	-0.13	0.192	0.21
	LTE 12	QPSK10M	Left Side	23130	25	25	1	1	23.0	22.71	1.07	0.05	0.201	0.22
	LTE 12	QPSK10M	Right Side	23130	25	25	1	1	23.0	22.71	1.07	0.01	0.204	0.22
	LTE 12	QPSK10M	Bottom Side	23130	25	25	1	1	23.0	22.71	1.07	-0.03	0.022	0.02
37	LTE 12	QPSK10M	Front Face	23060	1	49	1	1	24.0	23.75	1.06	0.01	0.410	**0.43**
	LTE 12	QPSK10M	Front Face	23095	1	49	1	1	24.0	23.77	1.05	0.12	0.277	0.29
	LTE 12	QPSK10M	Front Face	23060	1	49	1	2	24.0	23.75	1.06	0.07	0.392	0.42
	LTE 12	QPSK10M	Front Face	23060	1	49	2	1	24.0	23.75	1.06	0.02	0.398	0.42
38	LTE 13	QPSK10M	Front Face	23230	1	24	1	1	24.0	23.75	1.06	-0.04	0.591	**0.63**
	LTE 13	QPSK10M	Rear Face	23230	1	24	1	1	24.0	23.75	1.06	0.03	0.432	0.46
	LTE 13	QPSK10M	Left Side	23230	1	24	1	1	24.0	23.75	1.06	0.09	0.467	0.50
	LTE 13	QPSK10M	Right Side	23230	1	24	1	1	24.0	23.75	1.06	-0.06	0.425	0.45
	LTE 13	QPSK10M	Bottom Side	23230	1	24	1	1	24.0	23.75	1.06	0.05	0.177	0.19
	LTE 13	QPSK10M	Front Face	23230	25	0	1	1	23.0	22.63	1.09	0.01	0.461	0.50
	LTE 13	QPSK10M	Rear Face	23230	25	0	1	1	23.0	22.63	1.09	-0.03	0.342	0.37
	LTE 13	QPSK10M	Left Side	23230	25	0	1	1	23.0	22.63	1.09	0.02	0.374	0.41
	LTE 13	QPSK10M	Right Side	23230	25	0	1	1	23.0	22.63	1.09	-0.07	0.288	0.31
	LTE 13	QPSK10M	Bottom Side	23230	25	0	1	1	23.0	22.63	1.09	0.01	0.139	0.15
	LTE 13	QPSK10M	Front Face	23230	1	24	1	2	24.0	23.75	1.06	0.13	0.584	0.62
	LTE 13	QPSK10M	Front Face	23230	1	24	2	1	24.0	23.75	1.06	0.05	0.583	0.62
	LTE 17	QPSK10M	Front Face	23790	1	24	1	1	24.0	23.58	1.10	-0.02	0.377	0.41
	LTE 17	QPSK10M	Rear Face	23790	1	24	1	1	24.0	23.58	1.10	-0.05	0.257	0.28
	LTE 17	QPSK10M	Left Side	23790	1	24	1	1	24.0	23.58	1.10	0.01	0.308	0.34
	LTE 17	QPSK10M	Right Side	23790	1	24	1	1	24.0	23.58	1.10	0.06	0.270	0.30
	LTE 17	QPSK10M	Bottom Side	23790	1	24	1	1	24.0	23.58	1.10	-0.13	0.054	0.06
	LTE 17	QPSK10M	Front Face	23790	25	25	1	1	23.0	22.68	1.08	0.07	0.299	0.32
	LTE 17	QPSK10M	Rear Face	23790	25	25	1	1	23.0	22.68	1.08	0.09	0.199	0.21
	LTE 17	QPSK10M	Left Side	23790	25	25	1	1	23.0	22.68	1.08	-0.02	0.233	0.25
	LTE 17	QPSK10M	Right Side	23790	25	25	1	1	23.0	22.68	1.08	0.08	0.230	0.25
	LTE 17	QPSK10M	Bottom Side	23790	25	25	1	1	23.0	22.68	1.08	-0.03	0.041	0.04
39	LTE 17	QPSK10M	Front Face	23780	1	24	1	1	24.0	23.50	1.12	0.04	0.424	**0.47**
	LTE 17	QPSK10M	Front Face	23800	1	24	1	1	24.0	23.55	1.11	0.13	0.294	0.33
	LTE 17	QPSK10M	Front Face	23780	1	24	1	2	24.0	23.50	1.12	0.07	0.403	0.45
	LTE 17	QPSK10M	Front Face	23780	1	24	2	1	24.0	23.50	1.12	-0.02	0.415	0.46

Plot No.	Band	Mode	Test Position	Ch.	Sample	Battery	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WLAN2.4G	802.11b	Front Face	1	1	1	98.70	1.01	19.5	18.81	1.17	-0.02	0.112	0.13
	WLAN2.4G	802.11b	Rear Face	1	1	1	98.70	1.01	19.5	18.81	1.17	-0.13	0.144	0.17
	WLAN2.4G	802.11b	Left Side	1	1	1	98.70	1.01	19.5	18.81	1.17	0.08	0.311	0.37
	WLAN2.4G	802.11b	Left Side	6	1	1	98.70	1.01	19.5	18.25	1.33	-0.13	0.324	0.44
40	WLAN2.4G	802.11b	Left Side	11	1	1	98.70	1.01	19.5	18.13	1.37	0.03	0.363	**0.50**
	WLAN2.4G	802.11b	Left Side	11	1	2	98.70	1.01	19.5	18.13	1.37	0.05	0.357	0.49
	WLAN2.4G	802.11b	Left Side	11	2	1	98.70	1.01	19.5	18.13	1.37	0.07	0.352	0.49

4.7.5 SAR Results for Product Specific (Phablet) Exposure Condition (Test Separation Distance is 0 mm)

Plot No.	Band	Mode	Test Position	Ch.	Sample	Battery	Duty Cycle	Crest Factor	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-10g (W/kg)	Scaled SAR-10g (W/kg)
	WLAN5G	802.11a	Front Face	56	1	1	88.70	1.13	17.5	16.14	1.37	0.02	0.083	0.13
	WLAN5G	802.11a	Rear Face	56	1	1	88.70	1.13	17.5	16.14	1.37	0.07	0.419	0.65
	WLAN5G	802.11a	Left Side	56	1	1	88.70	1.13	17.5	16.14	1.37	-0.12	0.784	1.21
	WLAN5G	802.11a	Left Side	52	1	1	88.70	1.13	17.5	16.04	1.40	0.05	0.771	1.22
	WLAN5G	802.11a	Left Side	60	1	1	88.70	1.13	17.5	16.01	1.41	0.08	0.708	1.13
41	WLAN5G	802.11a	Left Side	64	1	1	88.70	1.13	17.5	16.03	1.40	0.15	0.806	**1.28**
	WLAN5G	802.11a	Left Side	64	1	2	88.70	1.13	17.5	16.03	1.40	-0.11	0.785	1.24
	WLAN5G	802.11a	Left Side	64	2	1	88.70	1.13	17.5	16.03	1.40	0.09	0.779	1.23
	WLAN5G	802.11a	Front Face	124	1	1	89.10	1.12	17.5	16.46	1.27	0.03	0.123	0.17
	WLAN5G	802.11a	Rear Face	124	1	1	89.10	1.12	17.5	16.46	1.27	0.07	0.371	0.53
	WLAN5G	802.11a	Left Side	124	1	1	89.10	1.12	17.5	16.46	1.27	-0.1	0.865	1.23
42	WLAN5G	802.11a	Left Side	100	1	1	89.10	1.12	17.5	16.25	1.33	0.09	0.948	**1.41**
	WLAN5G	802.11a	Left Side	116	1	1	89.10	1.12	17.5	16.32	1.31	0.05	0.907	1.33
	WLAN5G	802.11a	Left Side	120	1	1	89.10	1.12	17.5	16.34	1.31	0.07	0.871	1.28
	WLAN5G	802.11a	Left Side	132	1	1	89.10	1.12	17.5	16.31	1.32	-0.12	0.831	1.23
	WLAN5G	802.11a	Left Side	140	1	1	89.10	1.12	16.5	15.27	1.33	0.08	0.641	0.95
	WLAN5G	802.11a	Left Side	100	1	2	89.10	1.12	17.5	16.25	1.33	0.06	0.941	1.40
	WLAN5G	802.11a	Left Side	100	2	1	89.10	1.12	17.5	16.25	1.33	0.04	0.909	1.35
	WLAN5G	802.11a	Front Face	153	1	1	88.10	1.14	17.5	16.61	1.23	0.03	0.155	0.22
	WLAN5G	802.11a	Rear Face	153	1	1	88.10	1.14	17.5	16.61	1.23	-0.11	0.335	0.47
	WLAN5G	802.11a	Left Side	153	1	1	88.10	1.14	17.5	16.61	1.23	0.08	0.858	1.20
43	WLAN5G	802.11a	Left Side	149	1	1	88.10	1.14	17.5	16.59	1.23	0.09	0.865	**1.21**
	WLAN5G	802.11a	Left Side	157	1	1	88.10	1.14	17.5	16.41	1.29	-0.12	0.824	1.21
	WLAN5G	802.11a	Left Side	161	1	1	88.10	1.14	17.5	16.36	1.30	0.05	0.816	1.21
	WLAN5G	802.11a	Left Side	165	1	1	88.10	1.14	17.5	16.25	1.33	0.07	0.791	1.20
	WLAN5G	802.11a	Left Side	149	1	2	88.10	1.14	17.5	16.59	1.23	0.1	0.826	1.16
	WLAN5G	802.11a	Left Side	149	2	1	88.10	1.14	17.5	16.59	1.23	-0.05	0.858	1.20

4.7.6 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	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	Front Face	9400	0.991	0.982	1.01	N/A	N/A	N/A	N/A
LTE 2	QPSK20M	Front Face	18900	1.08	1.03	1.05	N/A	N/A	N/A	N/A
WCDMA II	RMC12.2K	Bottom Side	9262	0.842	0.835	1.01	N/A	N/A	N/A	N/A
LTE 2	QPSK20M	Bottom Side	18900	1.07	1.05	1.02	N/A	N/A	N/A	N/A
LTE 4	QPSK20M	Bottom Side	20300	1.01	0.989	1.02	N/A	N/A	N/A	N/A

4.7.7 Simultaneous Multi-band Transmission Evaluation

<Possibilities of Simultaneous Transmission>

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

Simultaneous TX Combination	Capable Transmit Configurations	Head Exposure Condition	Body-worn Exposure Condition	Hotspot Exposure Condition
1	GSM + WLAN 2.4G	Yes	Yes	Yes
2	GSM + WLAN 5G	Yes	Yes	No
3	GSM + BT	Yes	Yes	No
4	WCDMA + WLAN 2.4G	Yes	Yes	Yes
5	WCDMA + WLAN 5G	Yes	Yes	No
6	WCDMA + BT	Yes	Yes	No
7	LTE + WLAN 2.4G	Yes	Yes	Yes
8	LTE + WLAN 5G	Yes	Yes	No
9	LTE + BT	Yes	Yes	No

Note :

1. The WLAN 2.4G and WLAN 5G cannot transmit simultaneously.
2. The WLAN and Bluetooth cannot transmit simultaneously.

<Estimated SAR Calculation>

According to KDB 447498 D01, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR was estimated according to following formula to result in substantially conservative SAR values of <= 0.4 W/kg to determine simultaneous transmission SAR test exclusion.

$$\text{Estimated SAR} = \frac{\text{Max. Tune up Power}_{(\text{mW})}}{\text{Min. Test Separation Distance}_{(\text{mm})}} \times \frac{\sqrt{f_{(\text{GHz})}}}{7.5}$$

If the minimum test separation distance is < 5 mm, a distance of 5 mm is used for estimated SAR calculation. When the test separation distance is > 50 mm, the 0.4 W/kg is used for SAR-1g.

Mode / Band	Frequency (GHz)	Max. Tune-up Power (dBm)	Test Position	Separation Distance (mm)	Estimated SAR (W/kg)
BT (DSS)	2.48	3.5	Head	5	0.09

Note:

1. The separation distance is determined from the outer housing of the EUT to the user.
2. When standalone SAR testing is not required, an estimated SAR can be applied to determine simultaneous transmission SAR test exclusion.

<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	GSM850 + WLAN (DTS)	Head	Right Cheek	0.62	0.30	0.92	Σ SAR < 1.6, Not required
			Right Tilted	0.43	0.13	0.56	Σ SAR < 1.6, Not required
			Left Cheek	0.77	0.19	0.96	Σ SAR < 1.6, Not required
			Left Tilted	0.47	0.15	0.62	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.66	0.09	0.75	Σ SAR < 1.6, Not required
			Rear Face	0.47	0.07	0.54	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.77	0.13	0.90	Σ SAR < 1.6, Not required
			Rear Face	0.67	0.17	0.84	Σ SAR < 1.6, Not required
			Left Side	0.78	0.50	1.28	Σ SAR < 1.6, Not required
			Right Side	0.46	0.00	0.46	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.36	0.00	0.36	Σ SAR < 1.6, Not required
2	GSM850 + WLAN (NII)	Head	Right Cheek	0.62	0.19	0.81	Σ SAR < 1.6, Not required
			Right Tilted	0.43	0.00	0.43	Σ SAR < 1.6, Not required
			Left Cheek	0.77	0.44	1.21	Σ SAR < 1.6, Not required
			Left Tilted	0.47	0.00	0.47	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.66	0.42	1.08	Σ SAR < 1.6, Not required
			Rear Face	0.47	0.95	1.42	Σ SAR < 1.6, Not required
3	GSM850 + BT (DSS)	Head	Right Cheek	0.62	0.09	0.71	Σ SAR < 1.6, Not required
			Right Tilted	0.43	0.09	0.52	Σ SAR < 1.6, Not required
			Left Cheek	0.77	0.09	0.86	Σ SAR < 1.6, Not required
			Left Tilted	0.47	0.09	0.56	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.66	0.00	0.66	Σ SAR < 1.6, Not required
			Rear Face	0.47	0.00	0.47	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
4	GSM1900 + WLAN (DTS)	Head	Right Cheek	0.09	0.30	0.39	Σ SAR < 1.6, Not required
			Right Tilted	0.08	0.13	0.21	Σ SAR < 1.6, Not required
			Left Cheek	0.15	0.19	0.34	Σ SAR < 1.6, Not required
			Left Tilted	0.06	0.15	0.21	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.95	0.09	1.04	Σ SAR < 1.6, Not required
			Rear Face	0.64	0.07	0.71	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.44	0.13	0.57	Σ SAR < 1.6, Not required
			Rear Face	0.26	0.17	0.43	Σ SAR < 1.6, Not required
			Left Side	0.06	0.50	0.56	Σ SAR < 1.6, Not required
			Right Side	0.14	0.00	0.14	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.84	0.00	0.84	Σ SAR < 1.6, Not required
5	GSM1900 + WLAN (NII)	Head	Right Cheek	0.09	0.19	0.28	Σ SAR < 1.6, Not required
			Right Tilted	0.08	0.00	0.08	Σ SAR < 1.6, Not required
			Left Cheek	0.15	0.44	0.59	Σ SAR < 1.6, Not required
			Left Tilted	0.06	0.00	0.06	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.95	0.42	1.37	Σ SAR < 1.6, Not required
			Rear Face	0.64	0.95	1.59	Σ SAR < 1.6, Not required
6	GSM1900 + BT (DSS)	Head	Right Cheek	0.09	0.09	0.18	Σ SAR < 1.6, Not required
			Right Tilted	0.08	0.09	0.17	Σ SAR < 1.6, Not required
			Left Cheek	0.15	0.09	0.24	Σ SAR < 1.6, Not required
			Left Tilted	0.06	0.09	0.15	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.95	0.00	0.95	Σ SAR < 1.6, Not required
			Rear Face	0.64	0.00	0.64	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
7	WCDMA II + WLAN (DTS)	Head	Right Cheek	0.12	0.30	0.42	Σ SAR < 1.6, Not required
			Right Tilted	0.09	0.13	0.22	Σ SAR < 1.6, Not required
			Left Cheek	0.07	0.19	0.26	Σ SAR < 1.6, Not required
			Left Tilted	0.08	0.15	0.23	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	1.17	0.09	1.26	Σ SAR < 1.6, Not required
			Rear Face	0.99	0.07	1.06	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.64	0.13	0.77	Σ SAR < 1.6, Not required
			Rear Face	0.38	0.17	0.55	Σ SAR < 1.6, Not required
			Left Side	0.07	0.50	0.57	Σ SAR < 1.6, Not required
			Right Side	0.14	0.00	0.14	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.85	0.00	0.85	Σ SAR < 1.6, Not required
8	WCDMA II + WLAN (NII)	Head	Right Cheek	0.12	0.19	0.31	Σ SAR < 1.6, Not required
			Right Tilted	0.09	0.00	0.09	Σ SAR < 1.6, Not required
			Left Cheek	0.07	0.44	0.51	Σ SAR < 1.6, Not required
			Left Tilted	0.08	0.00	0.08	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	1.17	0.42	1.59	Σ SAR < 1.6, Not required
			Rear Face	0.99	0.95	1.94	**Analyzed as below**
9	WCDMA II + BT (DSS)	Head	Right Cheek	0.12	0.09	0.21	Σ SAR < 1.6, Not required
			Right Tilted	0.09	0.09	0.18	Σ SAR < 1.6, Not required
			Left Cheek	0.07	0.09	0.16	Σ SAR < 1.6, Not required
			Left Tilted	0.08	0.09	0.17	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	1.17	0.00	1.17	Σ SAR < 1.6, Not required
			Rear Face	0.99	0.00	0.99	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
10	WCDMA V + WLAN (DTS)	Head	Right Cheek	0.48	0.30	0.78	Σ SAR < 1.6, Not required
			Right Tilted	0.35	0.13	0.48	Σ SAR < 1.6, Not required
			Left Cheek	0.82	0.19	1.01	Σ SAR < 1.6, Not required
			Left Tilted	0.39	0.15	0.54	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.74	0.09	0.83	Σ SAR < 1.6, Not required
			Rear Face	0.34	0.07	0.41	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.64	0.13	0.77	Σ SAR < 1.6, Not required
			Rear Face	0.38	0.17	0.55	Σ SAR < 1.6, Not required
			Left Side	0.43	0.50	0.93	Σ SAR < 1.6, Not required
			Right Side	0.33	0.00	0.33	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.24	0.00	0.24	Σ SAR < 1.6, Not required
11	WCDMA V + WLAN (NII)	Head	Right Cheek	0.48	0.19	0.67	Σ SAR < 1.6, Not required
			Right Tilted	0.35	0.00	0.35	Σ SAR < 1.6, Not required
			Left Cheek	0.82	0.44	1.26	Σ SAR < 1.6, Not required
			Left Tilted	0.39	0.00	0.39	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.74	0.42	1.16	Σ SAR < 1.6, Not required
			Rear Face	0.34	0.95	1.29	Σ SAR < 1.6, Not required
12	WCDMA V + BT (DSS)	Head	Right Cheek	0.48	0.09	0.57	Σ SAR < 1.6, Not required
			Right Tilted	0.35	0.09	0.44	Σ SAR < 1.6, Not required
			Left Cheek	0.82	0.09	0.91	Σ SAR < 1.6, Not required
			Left Tilted	0.39	0.09	0.48	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.74	0.00	0.74	Σ SAR < 1.6, Not required
			Rear Face	0.34	0.00	0.34	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
13	LTE 2 + WLAN (DTS)	Head	Right Cheek	0.11	0.30	0.41	Σ SAR < 1.6, Not required
			Right Tilted	0.05	0.13	0.18	Σ SAR < 1.6, Not required
			Left Cheek	0.07	0.19	0.26	Σ SAR < 1.6, Not required
			Left Tilted	0.06	0.15	0.21	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	1.17	0.09	1.26	Σ SAR < 1.6, Not required
			Rear Face	0.63	0.07	0.70	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.76	0.13	0.89	Σ SAR < 1.6, Not required
			Rear Face	0.42	0.17	0.59	Σ SAR < 1.6, Not required
			Left Side	0.06	0.50	0.56	Σ SAR < 1.6, Not required
			Right Side	0.14	0.00	0.14	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	1.09	0.00	1.09	Σ SAR < 1.6, Not required
14	LTE 2 + WLAN (NII)	Head	Right Cheek	0.11	0.19	0.30	Σ SAR < 1.6, Not required
			Right Tilted	0.05	0.00	0.05	Σ SAR < 1.6, Not required
			Left Cheek	0.07	0.44	0.51	Σ SAR < 1.6, Not required
			Left Tilted	0.06	0.00	0.06	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	1.17	0.42	1.59	Σ SAR < 1.6, Not required
			Rear Face	0.63	0.95	1.58	Σ SAR < 1.6, Not required
15	LTE 2 + BT (DSS)	Head	Right Cheek	0.11	0.09	0.20	Σ SAR < 1.6, Not required
			Right Tilted	0.05	0.09	0.14	Σ SAR < 1.6, Not required
			Left Cheek	0.07	0.09	0.16	Σ SAR < 1.6, Not required
			Left Tilted	0.06	0.09	0.15	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	1.17	0.00	1.17	Σ SAR < 1.6, Not required
			Rear Face	0.63	0.00	0.63	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
16	LTE 4 + WLAN (DTS)	Head	Right Cheek	0.05	0.30	0.35	Σ SAR < 1.6, Not required
			Right Tilted	0.00	0.13	0.13	Σ SAR < 1.6, Not required
			Left Cheek	0.11	0.19	0.30	Σ SAR < 1.6, Not required
			Left Tilted	0.00	0.15	0.15	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.51	0.09	0.60	Σ SAR < 1.6, Not required
			Rear Face	0.20	0.07	0.27	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.62	0.13	0.75	Σ SAR < 1.6, Not required
			Rear Face	0.30	0.17	0.47	Σ SAR < 1.6, Not required
			Left Side	0.03	0.50	0.53	Σ SAR < 1.6, Not required
			Right Side	0.06	0.00	0.06	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	1.15	0.00	1.15	Σ SAR < 1.6, Not required
17	LTE 4 + WLAN (NII)	Head	Right Cheek	0.05	0.19	0.24	Σ SAR < 1.6, Not required
			Right Tilted	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Left Cheek	0.11	0.44	0.55	Σ SAR < 1.6, Not required
			Left Tilted	0.00	0.00	0.00	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.51	0.42	0.93	Σ SAR < 1.6, Not required
			Rear Face	0.20	0.95	1.15	Σ SAR < 1.6, Not required
18	LTE 4 + BT (DSS)	Head	Right Cheek	0.05	0.09	0.14	Σ SAR < 1.6, Not required
			Right Tilted	0.00	0.09	0.09	Σ SAR < 1.6, Not required
			Left Cheek	0.11	0.09	0.20	Σ SAR < 1.6, Not required
			Left Tilted	0.00	0.09	0.09	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.51	0.00	0.51	Σ SAR < 1.6, Not required
			Rear Face	0.20	0.00	0.20	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
19	LTE 5 + WLAN (DTS)	Head	Right Cheek	0.59	0.30	0.89	Σ SAR < 1.6, Not required
			Right Tilted	0.38	0.13	0.51	Σ SAR < 1.6, Not required
			Left Cheek	0.74	0.19	0.93	Σ SAR < 1.6, Not required
			Left Tilted	0.47	0.15	0.62	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.69	0.09	0.78	Σ SAR < 1.6, Not required
			Rear Face	0.46	0.07	0.53	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.66	0.13	0.79	Σ SAR < 1.6, Not required
			Rear Face	0.54	0.17	0.71	Σ SAR < 1.6, Not required
			Left Side	0.58	0.50	1.08	Σ SAR < 1.6, Not required
			Right Side	0.47	0.00	0.47	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.36	0.00	0.36	Σ SAR < 1.6, Not required
20	LTE 5 + WLAN (NII)	Head	Right Cheek	0.59	0.19	0.78	Σ SAR < 1.6, Not required
			Right Tilted	0.38	0.00	0.38	Σ SAR < 1.6, Not required
			Left Cheek	0.74	0.44	1.18	Σ SAR < 1.6, Not required
			Left Tilted	0.47	0.00	0.47	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.69	0.42	1.11	Σ SAR < 1.6, Not required
			Rear Face	0.46	0.95	1.41	Σ SAR < 1.6, Not required
21	LTE 5 + BT (DSS)	Head	Right Cheek	0.59	0.09	0.68	Σ SAR < 1.6, Not required
			Right Tilted	0.38	0.09	0.47	Σ SAR < 1.6, Not required
			Left Cheek	0.74	0.09	0.83	Σ SAR < 1.6, Not required
			Left Tilted	0.47	0.09	0.56	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.69	0.00	0.69	Σ SAR < 1.6, Not required
			Rear Face	0.46	0.00	0.46	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
22	LTE 12 + WLAN (DTS)	Head	Right Cheek	0.19	0.30	0.49	Σ SAR < 1.6, Not required
			Right Tilted	0.10	0.13	0.23	Σ SAR < 1.6, Not required
			Left Cheek	0.34	0.19	0.53	Σ SAR < 1.6, Not required
			Left Tilted	0.13	0.15	0.28	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.39	0.09	0.48	Σ SAR < 1.6, Not required
			Rear Face	0.18	0.07	0.25	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.43	0.13	0.56	Σ SAR < 1.6, Not required
			Rear Face	0.23	0.17	0.40	Σ SAR < 1.6, Not required
			Left Side	0.22	0.50	0.72	Σ SAR < 1.6, Not required
			Right Side	0.23	0.00	0.23	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.04	0.00	0.04	Σ SAR < 1.6, Not required
23	LTE 12 + WLAN (NII)	Head	Right Cheek	0.19	0.19	0.38	Σ SAR < 1.6, Not required
			Right Tilted	0.10	0.00	0.10	Σ SAR < 1.6, Not required
			Left Cheek	0.34	0.44	0.78	Σ SAR < 1.6, Not required
			Left Tilted	0.13	0.00	0.13	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.39	0.42	0.81	Σ SAR < 1.6, Not required
			Rear Face	0.18	0.95	1.13	Σ SAR < 1.6, Not required
24	LTE 12 + BT (DSS)	Head	Right Cheek	0.19	0.09	0.28	Σ SAR < 1.6, Not required
			Right Tilted	0.10	0.09	0.19	Σ SAR < 1.6, Not required
			Left Cheek	0.34	0.09	0.43	Σ SAR < 1.6, Not required
			Left Tilted	0.13	0.09	0.22	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.39	0.00	0.39	Σ SAR < 1.6, Not required
			Rear Face	0.18	0.00	0.18	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
25	LTE 13 + WLAN (DTS)	Head	Right Cheek	0.41	0.30	0.71	Σ SAR < 1.6, Not required
			Right Tilted	0.29	0.13	0.42	Σ SAR < 1.6, Not required
			Left Cheek	0.65	0.19	0.84	Σ SAR < 1.6, Not required
			Left Tilted	0.33	0.15	0.48	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.57	0.09	0.66	Σ SAR < 1.6, Not required
			Rear Face	0.37	0.07	0.44	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.63	0.13	0.76	Σ SAR < 1.6, Not required
			Rear Face	0.46	0.17	0.63	Σ SAR < 1.6, Not required
			Left Side	0.50	0.50	1.00	Σ SAR < 1.6, Not required
			Right Side	0.45	0.00	0.45	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.19	0.00	0.19	Σ SAR < 1.6, Not required
26	LTE 13 + WLAN (NII)	Head	Right Cheek	0.41	0.19	0.60	Σ SAR < 1.6, Not required
			Right Tilted	0.29	0.00	0.29	Σ SAR < 1.6, Not required
			Left Cheek	0.65	0.44	1.09	Σ SAR < 1.6, Not required
			Left Tilted	0.33	0.00	0.33	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.57	0.42	0.99	Σ SAR < 1.6, Not required
			Rear Face	0.37	0.95	1.32	Σ SAR < 1.6, Not required
27	LTE 13 + BT (DSS)	Head	Right Cheek	0.41	0.09	0.50	Σ SAR < 1.6, Not required
			Right Tilted	0.29	0.09	0.38	Σ SAR < 1.6, Not required
			Left Cheek	0.65	0.09	0.74	Σ SAR < 1.6, Not required
			Left Tilted	0.33	0.09	0.42	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.57	0.00	0.57	Σ SAR < 1.6, Not required
			Rear Face	0.37	0.00	0.37	Σ SAR < 1.6, Not required

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
28	LTE 17 + WLAN (DTS)	Head	Right Cheek	0.27	0.30	0.57	Σ SAR < 1.6, Not required
			Right Tilted	0.14	0.13	0.27	Σ SAR < 1.6, Not required
			Left Cheek	0.39	0.19	0.58	Σ SAR < 1.6, Not required
			Left Tilted	0.17	0.15	0.32	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.43	0.09	0.52	Σ SAR < 1.6, Not required
			Rear Face	0.21	0.07	0.28	Σ SAR < 1.6, Not required
		Hotspot	Front Face	0.47	0.13	0.60	Σ SAR < 1.6, Not required
			Rear Face	0.28	0.17	0.45	Σ SAR < 1.6, Not required
			Left Side	0.34	0.50	0.84	Σ SAR < 1.6, Not required
			Right Side	0.30	0.00	0.30	Σ SAR < 1.6, Not required
			Top Side	0.00	0.00	0.00	Σ SAR < 1.6, Not required
			Bottom Side	0.06	0.00	0.06	Σ SAR < 1.6, Not required
29	LTE 17 + WLAN (NII)	Head	Right Cheek	0.27	0.19	0.46	Σ SAR < 1.6, Not required
			Right Tilted	0.14	0.00	0.14	Σ SAR < 1.6, Not required
			Left Cheek	0.39	0.44	0.83	Σ SAR < 1.6, Not required
			Left Tilted	0.17	0.00	0.17	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.43	0.42	0.85	Σ SAR < 1.6, Not required
			Rear Face	0.21	0.95	1.16	Σ SAR < 1.6, Not required
30	LTE 17 + BT (DSS)	Head	Right Cheek	0.27	0.09	0.36	Σ SAR < 1.6, Not required
			Right Tilted	0.14	0.09	0.23	Σ SAR < 1.6, Not required
			Left Cheek	0.39	0.09	0.48	Σ SAR < 1.6, Not required
			Left Tilted	0.17	0.09	0.26	Σ SAR < 1.6, Not required
		Body-Worn	Front Face	0.43	0.00	0.43	Σ SAR < 1.6, Not required
			Rear Face	0.21	0.00	0.21	Σ 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.

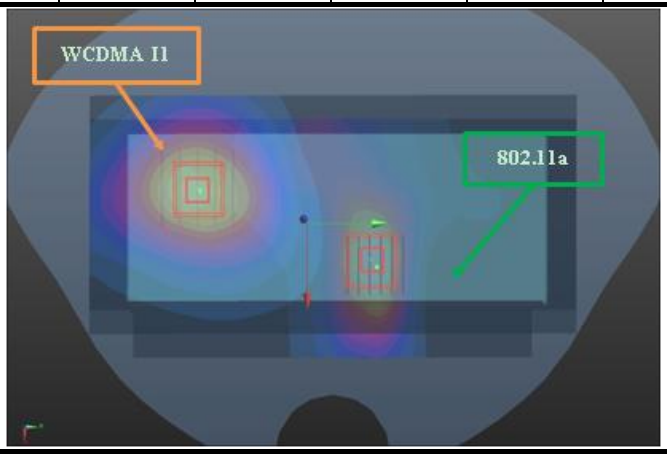
The SPLSR is determined by the following formula.

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

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.

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 Ch9262	Body	Rear Face	0.99	-10	-60	-0.83	83.9	0.03	SPLSR ≤ 0.04, Not required
802.11a Ch100			0.95	19.5	18.5	-0.48			



Test Engineer： Isaac Liao, and Sam Onn

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D750V3	1013	Aug. 21, 2017	1 Year
System Validation Dipole	SPEAG	D835V2	4d121	Aug. 21, 2017	1 Year
System Validation Dipole	SPEAG	D1750V2	1055	Aug. 21, 2017	1 Year
System Validation Dipole	SPEAG	D1900V2	5d036	Jan. 18, 2018	1 Year
System Validation Dipole	SPEAG	D2450V2	869	Jun. 19, 2018	1 Year
System Validation Dipole	SPEAG	D2450V2	737	Aug. 24, 2018	1 Year
System Validation Dipole	SPEAG	D5GHzV2	1019	Mar. 22, 2018	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3898	Jun. 26, 2018	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3971	Mar. 26, 2018	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3650	Jul. 27, 2018	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7346	Feb. 28, 2018	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7472	Aug. 29, 2018	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1431	Mar. 16, 2018	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1277	Jan. 18, 2018	1 Year
Data Acquisition Electronics	SPEAG	DAE4	679	Mar. 05, 2018	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1232	May. 22, 2018	1 Year
Wireless Communication Test Set	Agilent	E5515C	MY50266628	Dec. 06, 2017	1 Year
Universal Radio Communication Tester	Anritsu	MT8821C	6261786083	Dec. 21, 2017	1 Year
Spectrum Analyzer	R&S	FSL6	102006	Mar. 23, 2018	1 Year
ENA Series Network Analyzer	Agilent	E5071C	MY46214281	Jun. 08, 2018	1 Year
MXG Analong Signal Generator	Agilent	N5181A	MY50143868	Jul. 03, 2018	1 Year
Vector Signal Generator	Anritsu	MG3710A	6201599977	Mar. 16, 2018	1 Year
Power Meter	Anritsu	ML2495A	1218009	Jul. 03, 2018	1 Year
Power Sensor	Anritsu	MA2411B	1207252	Jul. 03, 2018	1 Year
Thermometer	YFE	YF-160A	130504591	Mar. 23, 2018	1 Year

6. Measurement Uncertainty

Source of Uncertainty	Uncertainty (± %)	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	√0.5	√0.5	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	√0.5	√0.5	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	∞
Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Probe Modulation Response	3.5	Rectangular	√3	1	1	2.0	2.0	∞
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	2.9	Rectangular	√3	1	1	1.7	1.7	∞
Post-processing	2.0	Rectangular	√3	1	1	1.2	1.2	∞
Test Sample Related								
Test Sample Positioning	3.9 / 2.06	Normal	1	1	1	3.9	2.1	35
Device Holder Uncertainty	2.9 / 4.1	Normal	1	1	1	2.9	4.1	11
Power Drift of Measurement	5.0	Rectangular	√3	1	1	2.9	2.9	∞
Power Scaling	0.0	Rectangular	√3	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty (Shape and Thickness Tolerances)	6.1	Rectangular	√3	1	1	3.5	3.5	∞
Liquid Conductivity (Temperature Uncertainty)	3.24	Rectangular	√3	0.78	0.71	1.5	1.3	∞
Liquid Conductivity (Measured)	2.88	Normal	1	0.78	0.71	2.2	2.0	43
Liquid Permittivity (Temperature Uncertainty)	1.13	Rectangular	√3	0.23	0.26	0.2	0.2	∞
Liquid Permittivity (Measured)	2.50	Normal	1	0.23	0.26	0.6	0.7	54
Combined Standard Uncertainty						± 11.4 %	± 11.2 %	
Expanded Uncertainty (K=2)						**± 22.8 %**	**± 22.4 %**	

Head SAR Uncertainty Budget for Frequency Range of 300 MHz to 3 GHz

Source of Uncertainty	Uncertainty (± %)	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	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	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	∞
Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Probe Modulation Response	3.5	Rectangular	√3	1	1	2.0	2.0	∞
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	6.7	Rectangular	√3	1	1	3.9	3.9	∞
Post-processing	4.0	Rectangular	√3	1	1	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	3.9 / 2.06	Normal	1	1	1	3.9	2.1	35
Device Holder Uncertainty	2.9 / 4.1	Normal	1	1	1	2.9	4.1	11
Power Drift of Measurement	5.0	Rectangular	√3	1	1	2.9	2.9	∞
Power Scaling	0.0	Rectangular	√3	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty (Shape and Thickness Tolerances)	6.6	Rectangular	√3	1	1	3.8	3.8	∞
Liquid Conductivity (Temperature Uncertainty)	3.24	Rectangular	√3	0.78	0.71	1.5	1.3	∞
Liquid Conductivity (Measured)	2.88	Normal	1	0.78	0.71	2.2	2.0	43
Liquid Permittivity (Temperature Uncertainty)	1.13	Rectangular	√3	0.23	0.26	0.2	0.2	∞
Liquid Permittivity (Measured)	2.50	Normal	1	0.23	0.26	0.6	0.7	54
Combined Standard Uncertainty						± 12.5 %	± 12.3 %	
Expanded Uncertainty (K=2)						**± 25.0 %**	**± 24.6 %**	

Head SAR Uncertainty Budget for Frequency Range of 3 GHz to 6 GHz

Source of Uncertainty	Uncertainty (± %)	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	√0.5	√0.5	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	√0.5	√0.5	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	∞
Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Probe Modulation Response	3.5	Rectangular	√3	1	1	2.0	2.0	∞
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	2.9	Rectangular	√3	1	1	1.7	1.7	∞
Post-processing	2.0	Rectangular	√3	1	1	1.2	1.2	∞
Test Sample Related								
Test Sample Positioning	4.38 / 1.35	Normal	1	1	1	4.4	1.4	29
Device Holder Uncertainty	2.9 / 4.1	Normal	1	1	1	2.9	4.1	11
Power Drift of Measurement	5.0	Rectangular	√3	1	1	2.9	2.9	∞
Power Scaling	0.0	Rectangular	√3	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty (Shape and Thickness Tolerances)	7.2	Rectangular	√3	1	1	4.2	4.2	∞
Liquid Conductivity (Temperature Uncertainty)	3.24	Rectangular	√3	0.78	0.71	1.5	1.3	∞
Liquid Conductivity (Measured)	2.88	Normal	1	0.78	0.71	2.2	2.0	43
Liquid Permittivity (Temperature Uncertainty)	1.13	Rectangular	√3	0.23	0.26	0.2	0.2	∞
Liquid Permittivity (Measured)	2.50	Normal	1	0.23	0.26	0.6	0.7	54
Combined Standard Uncertainty						± 11.8 %	± 11.3 %	
Expanded Uncertainty (K=2)						**± 23.6 %**	**± 22.6 %**	

Body SAR Uncertainty Budget for Frequency Range of 300 MHz to 3 GHz

Source of Uncertainty	Uncertainty (± %)	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	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	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	∞
Detection Limits	0.25	Rectangular	√3	1	1	0.14	0.14	∞
Probe Modulation Response	3.5	Rectangular	√3	1	1	2.0	2.0	∞
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	6.7	Rectangular	√3	1	1	3.9	3.9	∞
Post-processing	4.0	Rectangular	√3	1	1	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	4.38 / 1.35	Normal	1	1	1	4.4	1.4	29
Device Holder Uncertainty	2.9 / 4.1	Normal	1	1	1	2.9	4.1	11
Power Drift of Measurement	5.0	Rectangular	√3	1	1	2.9	2.9	∞
Power Scaling	0.0	Rectangular	√3	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty (Shape and Thickness Tolerances)	7.6	Rectangular	√3	1	1	4.4	4.4	∞
Liquid Conductivity (Temperature Uncertainty)	3.24	Rectangular	√3	0.78	0.71	1.5	1.3	∞
Liquid Conductivity (Measured)	2.88	Normal	1	0.78	0.71	2.2	2.0	43
Liquid Permittivity (Temperature Uncertainty)	1.13	Rectangular	√3	0.23	0.26	0.2	0.2	∞
Liquid Permittivity (Measured)	2.50	Normal	1	0.23	0.26	0.6	0.7	54
Combined Standard Uncertainty						± 12.8 %	± 12.4 %	
Expanded Uncertainty (K=2)						**± 25.6 %**	**± 24.8 %**	

Body SAR Uncertainty Budget for Frequency Range of 3 GHz to 6 GHz

7. Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 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:

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

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