

SAR Test Report

Report No. : SF200306C03-2

Applicant : Fibocom Wireless Inc.

Address : 5/F, Tower A, Technology Building II, 1057 Nanhai Blvd, Nanshan, Shenzhen, China

Product : LTE module

FCC ID : ZMOL850GL

Brand : Fibocom

Model No. : L850-GL

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 616217 D04 v01r02
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Sample Received Date : Mar. 06, 2020

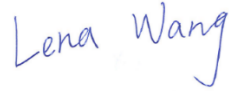
Date of Testing : Mar. 25, 2020 ~ Apr. 10, 2020

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Test Location : No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City, Taiwan

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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Release Control Record

Report No.	Reason for Change	Date Issued
SF200306C03-2	Initial release	Apr. 16, 2020

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1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest SAR-1g Body Tested at 0 mm (W/kg)
PCB	WCDMA II	0.00
	WCDMA IV	0.00
	WCDMA V	0.00
	LTE 2	0.00
	LTE 4	0.00
	LTE 5	0.00
	LTE 7	0.00
	LTE 12	0.00
	LTE 13	0.00
	LTE 17	0.00
	LTE 26	0.00
	LTE 30	0.00
	LTE 38	0.00
	LTE 41	0.00
	LTE 66	0.00
DTS	2.4G WLAN	0.76
NII	5.3G WLAN	0.80
	5.6G WLAN	1.02
	5.8G WLAN	1.03
DSS	Bluetooth	0.08
DXX	NFC	N/A

Highest Simultaneous Transmission SAR	Highest SAR-1g Body Tested at 0 mm (W/kg)
	1.18

Note:

- 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.

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2. Description of Equipment Under Test

EUT Type	LTE module
FCC ID	ZMOL850GL
Brand Name	Fibocom
Model Name	L850-GL
EUT Configurations	Sample 1 : EUT with WNC Antenna Sample 2 : EUT with Hong-Bo Antenna Sample 3 : EUT with AWAN Antenna
Tx Frequency Bands (Unit: MHz)	WCDMA Band II : 1852.4 ~ 1907.6 WCDMA Band IV : 1712.4 ~ 1752.6 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 7 : 2502.5 ~ 2567.5 (BW: 5M, 10M, 15M, 20M) 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) LTE Band 26 : 814.7 ~ 848.3 (BW: 1.4M, 3M, 5M, 10M, 15M) LTE Band 30 : 2307.5 ~ 2312.5 (BW: 5M, 10M) LTE Band 38 : 2572.5 ~ 2617.5 (BW: 5M, 10M, 15M, 20M) LTE Band 41 : 2502.5 ~ 2687.5 (BW: 5M, 10M, 15M, 20M) LTE Band 66 : 1710.7 ~ 1779.3 (BW: 1.4M, 3M, 5M, 10M, 15M, 20M) WLAN : 2412 ~ 2472, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5720, 5745 ~ 5825 Bluetooth : 2402 ~ 2480 NFC : 13.56
Uplink Modulations	WCDMA : QPSK LTE : QPSK, 16QAM 802.11b : DSSS 802.11a/g/n/ac : OFDM 802.11ax : OFDMA Bluetooth : GFSK, $\pi/4$ -DQPSK, 8DPSK NFC : ASK
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 4.6.1 of this report
Antenna Type	Refer note as below
EUT Stage	Identical Prototype

Note:

- The EUT is authorized for use in specific End-product. Please refer to below for more details.

Item	Brand Name	Model Name
Notebook Computer	HP	HSN-I37C

- The information of module collocated in this End-product is listed as below.

Item	Brand Name	Model Name	Specification
BT + WiFi module	Intel	AX200NGW	2T2R 802.11 a/b/g/n/ac/ax WLAN + Bluetooth
WWAN module	Fibocom	L850-GL	WCDMA Band II/IV/V, LTE Band 2/4/5/7/12/13/17/26/30/38/41/66
NFC module	WNC	XRAV-1	NFC

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3. The antenna information is listed as below.

Ant. Type	Manufacturer	Parts Number	WLAN Antenna Gain (dBi)			
			BT/ WLAN 2.4 GHz	WLAN 5.15~5.35 GHz	WLAN 5.47~5.725 GHz	WLAN 5.725~5.85 GHz
PIFA	WNC	WLAN TX1 Antenna: 6036B0253901 (81EABB15.G38) WLAN TX2 Antenna: 6036B0253701 (81EABB15.G37)	TX1: -1.89 TX2: -0.65	TX1: -1.11 TX2: -0.80	TX1: 0.48 TX2: -0.66	TX1: 1.36 TX2: -1.45
	HONG-BO	WLAN TX1 Antenna: 6036B0258301 (260-27370) WLAN TX2 Antenna: 6036B0258401 (260-27369)	TX1: -0.76 TX2: 0.19	TX1: -3.99 TX2: -3.13	TX1: -5.52 TX2: -5.13	TX1: -5.52 TX2: -4.99
	AWAN	WLAN TX1 Antenna: 6036B0257201 (AUP6Y-100030) WLAN TX2 Antenna: 6036B0255401 (AUP6Y-100029)	TX1: -1.18 TX2: -0.30	TX1: -0.69 TX2: 1.85	TX1: -0.69 TX2: -1.11	TX1: -2.44 TX2: -1.78

LTE Band	AWAN		HONG-BO		WNC	
	NB Mode		NB Mode		NB Mode	
	TX1	TX2	TX1	TX2	TX1	TX2
Parts number	6036B0255901 (AUP6Y-100025)	6036B0255301 (AUP6Y-100026)	6036B0257701 (260-27365)	6036B0258501 (260-27366)	6036B0253201 (81EABB15.G35)	6036B0253301 (81EABB15.G36)
FDD B2	1.68	-2.80	-0.81	-1.69	0.22	-0.45
FDD B4	-1.27	-1.93	-2.26	-0.61	-1.11	0.63
FDD B5	-3.75	-4.57	-0.78	-2.70	0.08	-2.65
FDD B7	-	-5.17	0.22	-2.82	-0.19	-1.32
FDD B12	-1.02	-1.97	-1.20	-4.12	-1.73	-3.12
FDD B13	-2.50	-2.00	-2.13	-4.84	-1.47	-3.10
FDD B17	-3.51	-1.97	-1.20	-4.12	-1.73	-3.12
FDD B26	-3.75	-3.95	-0.78	-2.70	0.08	-2.65
FDD B30	-	-1.26	-	-2.21	-	0.55
TDD B38	-0.38	-4.73	0.03	-2.82	-1.30	-2.14
TDD B41	0.74	-1.53	0.22	-2.82	-0.19	-1.32
FDD B66	-1.27	-1.93	-2.26	-0.61	-1.11	0.63
WCDMA B2	1.68	-2.80	-0.81	-1.69	0.22	-0.45
WCDMA B4	-1.27	-1.93	-2.26	-0.61	-1.11	0.63
WCDMA B5	-3.75	-4.57	-0.78	-2.70	0.08	-2.65

4. 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.

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:

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

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

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

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

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 DASY6 System

DASY6 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 DASY6 software defined. The DASY6 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 from the optical into digital electric signal of the DAE and transfers data to the PC.

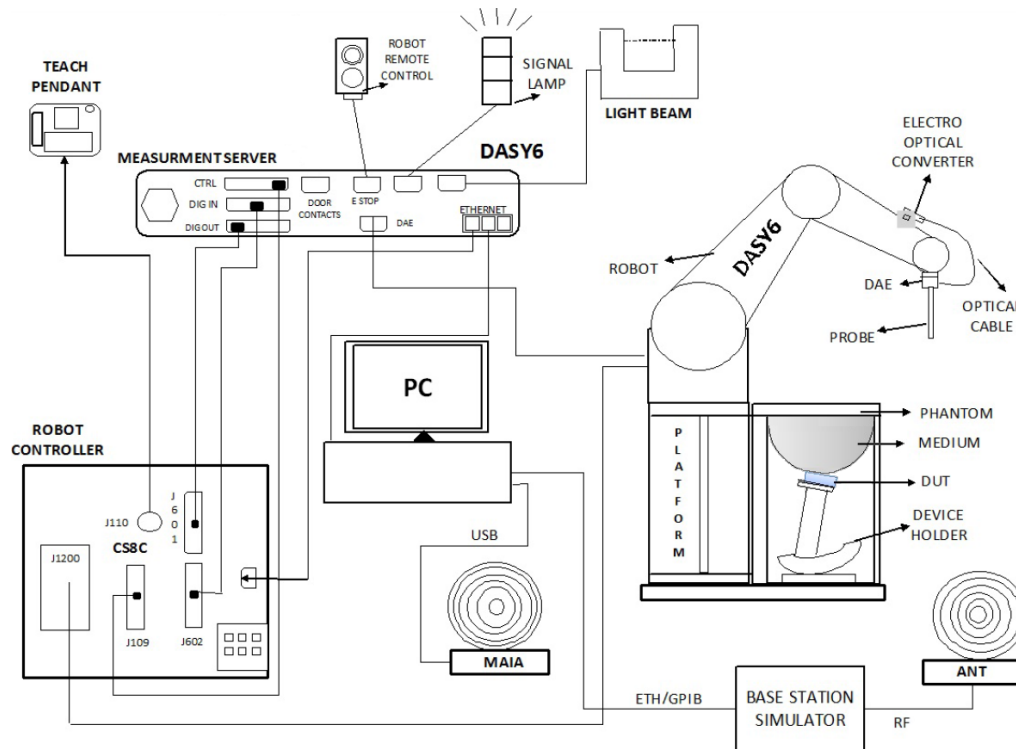


Fig-3.1 SPEAG DASY6 System Setup

3.2.1 Robot

The DASY6 systems use 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 DASY6 System

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3.2.2 Probes

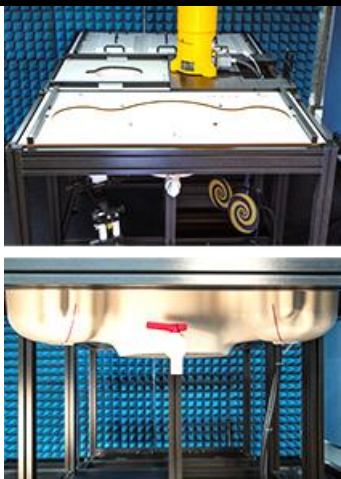
The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

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	4 MHz to 10 GHz Linearity: ± 0.2 dB	
Directivity	± 0.1 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 μ W/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/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	

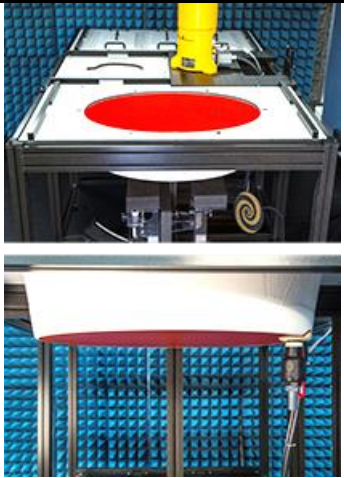
3.2.3 Data Acquisition Electronics (DAE)

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	$< 5\mu$ V (with auto zero)	
Input Bias Current	< 50 fA	
Dimensions	60 x 60 x 68 mm	

3.2.4 Phantoms

Model	SAM-Twin Phantom	
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE Std 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, fiberglass 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	

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Model	ELI	
Construction	The ELI phantom is used for compliance testing of handheld and body-mounted wireless devices. 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, fiberglass 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	MD4HHTV5 - Mounting Device for Hand-Held Transmitters	
Construction	In combination with the Twin SAM or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
Material	Polyoxymethylene (POM)	

Model	MDA4WTV5 - Mounting Device Adaptor for Ultra Wide Transmitters	
Construction	An upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.	
Material	Polyoxymethylene (POM)	

Model	MDA4SPV6 - Mounting Device Adaptor for Smart Phones	
Construction	The solid low-density MDA4SPV6 adaptor assuring no impact on the DUT radiation performance and is conform with any DUT design and shape.	
Material	ROHACELL	

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Model	MD4LAPV5 - Mounting Device for Laptops and other Body-Worn Transmitters	
Construction	In combination with the Twin SAM or ELI phantoms, the Mounting Device (Body-Worn) enables testing of transmitter devices according to IEC 62209-2 specifications. The device holder can be locked for positioning at a flat phantom section.	
Material	Polyoxymethylene (POM), PET-G, Foam	

3.2.6 System Validation Dipoles

Model	D-Serial	
Construction	Symmetrical dipole with 1/4 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 Power Source

Model	Powersource1	
Signal Type	Continuous Wave	
Operating Frequencies	600 MHz to 5850 MHz	
Output Power	-5.0 dBm to +17.0 dBm	
Power Supply	5V DC, via USB jack	
Power Consumption	<3 W	
Applications	System performance check and validation with a CW signal.	

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3.2.8 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 10 % are listed in Table-3.1.

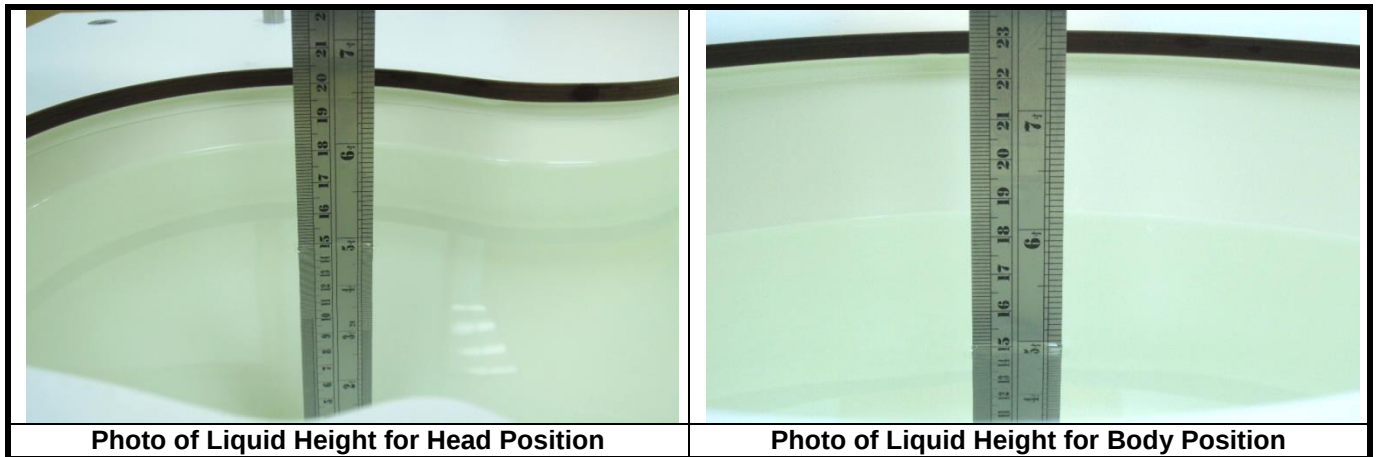


Table-3.1 Targets of Tissue Simulating Liquid

Frequency (MHz)	Target Permittivity	Range of $\pm 10\%$	Target Conductivity	Range of $\pm 10\%$
450	43.5	39.2 ~ 47.9	0.87	0.78 ~ 0.96
750	41.9	37.7 ~ 46.1	0.89	0.80 ~ 0.98
835	41.5	37.4 ~ 45.7	0.90	0.81 ~ 0.99
900	41.5	37.4 ~ 45.7	0.97	0.87 ~ 1.07
1450	40.5	36.5 ~ 44.6	1.20	1.08 ~ 1.32
1500	40.4	36.4 ~ 44.4	1.23	1.11 ~ 1.35
1640	40.2	36.2 ~ 44.2	1.31	1.18 ~ 1.44
1750	40.1	36.1 ~ 44.1	1.37	1.23 ~ 1.51
1800	40.0	36.0 ~ 44.0	1.40	1.26 ~ 1.54
1900	40.0	36.0 ~ 44.0	1.40	1.26 ~ 1.54
2000	40.0	36.0 ~ 44.0	1.40	1.26 ~ 1.54
2100	39.8	35.8 ~ 43.8	1.49	1.34 ~ 1.64
2300	39.5	35.6 ~ 43.5	1.67	1.50 ~ 1.84
2450	39.2	35.3 ~ 43.1	1.80	1.62 ~ 1.98
2600	39.0	35.1 ~ 42.9	1.96	1.76 ~ 2.16
3000	38.5	34.7 ~ 42.4	2.40	2.16 ~ 2.64
3500	37.9	34.1 ~ 41.7	2.91	2.62 ~ 3.20
4000	37.4	33.7 ~ 41.1	3.43	3.09 ~ 3.77
4500	36.8	33.1 ~ 40.5	3.94	3.55 ~ 4.33
5000	36.2	32.6 ~ 39.8	4.45	4.01 ~ 4.90
5200	36.0	32.4 ~ 39.6	4.66	4.19 ~ 5.13
5400	35.8	32.2 ~ 39.4	4.86	4.37 ~ 5.35
5600	35.5	32.0 ~ 39.1	5.07	4.56 ~ 5.58
5800	35.3	31.8 ~ 38.8	5.27	4.74 ~ 5.80
6000	35.1	31.6 ~ 38.6	5.48	4.93 ~ 6.03

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The dielectric properties of the tissue simulating liquids are defined in IEC 62209-1 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.

Since the range of $\pm 10\%$ of the required target values is used to measure relative permittivity and conductivity, the SAR correction procedure is applied to correct measured SAR for the deviations in permittivity and conductivity. Only positive correction has been used to scale up the measured SAR, and SAR result would not be corrected if the correction Δ SAR has a negative sign.

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

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.

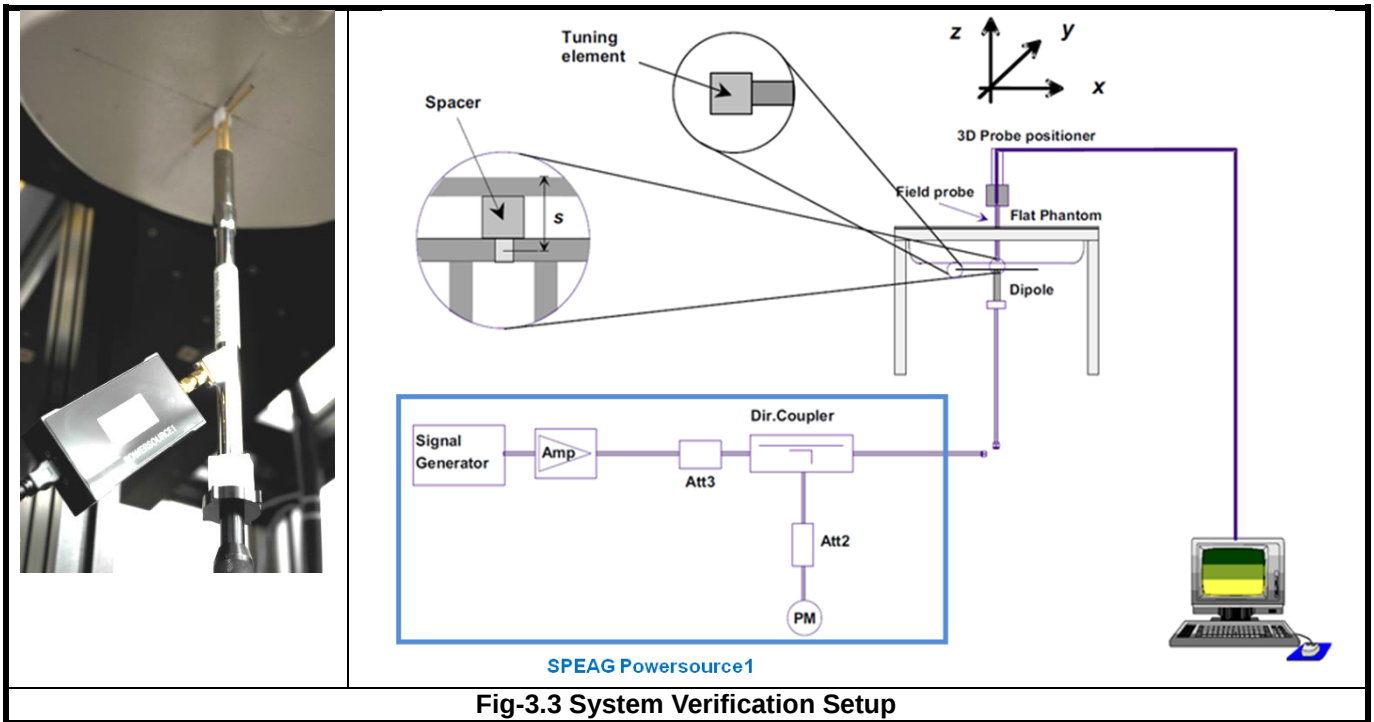


Fig-3.3 System Verification Setup

The SPEAG Powersource1 is a portable and very stable RF source providing a continuous wave (CW) signal. It is designed for conducting SAR system checks and SAR system validation of DASY and is compatible with IEC 62209-1, IEC 62209-2 and IEEE Std 1528 standards. The Powersource1 has been calibrated by SPEAG's ISO/IEC 17025-accredited calibration center. When using Powersource1, the setup can be simplified, as shown in Fig-3.3. The signal purity is warranted by design. Since the Powersource1 is calibrated, no additional equipment is needed and the Powersource1 can directly be connected to the SMA connector of the dipole without a cable as all separate components (signal generator, amplifier, coupler and power meter) are built into the unit.

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 Powersource1 is adjusted for the desired forward power of 17 dBm at the dipole connector and the RF output power would be turned on. 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:

- Power reference measurement
- Area scan
- Zoom scan
- Power drift measurement

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

- Make EUT to transmit maximum output power
- Measure conducted output power through RF cable
- Place the EUT in the specific position of phantom
- Perform SAR testing steps on the DASY system
- Record the SAR value

3.4.1 Area Scan and 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.

Measure the local SAR at a test point at 1.4 mm of the inner surface of the phantom recommended by SEPAG. The area scan (two-dimensional SAR distribution) is performed cover at least an area larger than the projection of the EUT or antenna. The measurement resolution and spatial resolution for interpolation shall be chosen to allow identification of the local peak locations to within one-half of the linear dimension of the corresponding side of the zoom scan volume. Following table provides the measurement parameters required for the area scan.

Parameter	$f \leq 3 \text{ GHz}$	$3 \text{ GHz} < f \leq 6 \text{ GHz}$
Maximum distance from closest measurement point to phantom surface	5 ± 1	$\delta \ln(2)/2 \pm 0.5$
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	$\leq 2 \text{ GHz: } \leq 15 \text{ mm}$ $2 - 3 \text{ GHz: } \leq 12 \text{ mm}$	$3 - 4 \text{ GHz: } \leq 12 \text{ mm}$ $4 - 6 \text{ GHz: } \leq 10 \text{ mm}$

From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that will not be within the zoom scan of other peaks. Additional peaks shall be measured only when the primary peak is within 2 dB of the SAR compliance limit (e.g. 1 W/kg for 1.6 W/kg, 1 g limit; or 1.26 W/kg for 2 W/kg, 10 g limit).

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The zoom scan (three-dimensional SAR distribution) is performed at the local maxima locations identified in previous area scan procedure. The zoom scan volume must be larger than the required minimum dimensions. When graded grids are used, which only applies in the direction normal to the phantom surface, the initial grid separation closest to the phantom surface and subsequent graded grid increment ratios must satisfy the required protocols. The 1-g SAR averaging volume must be fully contained within the zoom scan measurement volume boundaries; otherwise, the measurement must be repeated by shifting or expanding the zoom scan volume. The similar requirements also apply to 10-g SAR measurements. Following table provides the measurement parameters required for the zoom scan.

Parameter		$f \leq 3 \text{ GHz}$	$3 \text{ GHz} < f \leq 6 \text{ GHz}$
Maximum zoom scan spatial resolution: $\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}}$		$\leq 2 \text{ GHz: } \leq 8 \text{ mm}$ $2 - 3 \text{ GHz: } \leq 5 \text{ mm}$	$3 - 4 \text{ GHz: } \leq 5 \text{ mm}$ $4 - 6 \text{ GHz: } \leq 4 \text{ mm}$
Maximum zoom scan spatial resolution, normal to phantom surface	<i>uniform grid:</i> $\Delta z_{\text{zoom}}(n)$	$\leq 5 \text{ mm}$	$3 - 4 \text{ GHz: } \leq 4 \text{ mm}$ $4 - 5 \text{ GHz: } \leq 3 \text{ mm}$ $5 - 6 \text{ GHz: } \leq 2 \text{ mm}$
	<i>graded grids:</i> $\Delta z_{\text{zoom}}(1)$	$\leq 4 \text{ mm}$	$3 - 4 \text{ GHz: } \leq 3.0 \text{ mm}$ $4 - 5 \text{ GHz: } \leq 2.5 \text{ mm}$ $5 - 6 \text{ GHz: } \leq 2.0 \text{ mm}$
	$\Delta z_{\text{zoom}}(n>1)$	$\leq 1.5 \cdot \Delta z_{\text{zoom}}(n-1) \text{ mm}$	
Minimum zoom scan volume (x, y, z)		$\geq 30 \text{ mm}$	$3 - 4 \text{ GHz: } \geq 28 \text{ mm}$ $4 - 5 \text{ GHz: } \geq 25 \text{ mm}$ $5 - 6 \text{ GHz: } \geq 22 \text{ mm}$

Per IEC 62209-2 AMD1, the successively higher resolution zoom scan is required if the zoom scan measured as defined above complies with both of the following criteria, or if the peak spatial-average SAR is below 0.1 W/kg, no additional measurements are needed:

- (1) The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x and y directions ($\Delta x, \Delta y$). This shall be checked for the measured zoom scan plane conformal to the phantom at the distance z_{M1} .
- (2) The ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (M1) at the x-y location of the measured maximum SAR value shall be at least 30 %.

If one or both of the above criteria are not met, the zoom scan measurement shall be repeated using a finer resolution. New horizontal and vertical grid steps shall be determined from the measured SAR distribution so that the above criteria are met. Compliance with the above two criteria shall be demonstrated for the new measured zoom scan.

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 from 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 WCDMA for Setup and Testing>

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.

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Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{HS}^{(1)(2)}$	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 $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$.

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 $\Delta_{NACK} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{HS} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. 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 $\beta_c = 11/15$ and $\beta_d = 15/15$.

Release 6 HSPA 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	$\beta_{HS}^{(1)}$	β_{ec}	$\beta_{ed}^{(4)(5)}$	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	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	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 $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{HS} = 5/15 * \beta_c$.

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

Note 3: For subtest 1 the 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 $\beta_c = 10/15$ and $\beta_d = 15/15$.

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.

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<Considerations Related to LTE for Setup and Testing>

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

EUT Supported LTE Band and Channel Bandwidth						
LTE Band	BW 1.4 MHz	BW 3 MHz	BW 5 MHz	BW 10 MHz	BW 15 MHz	BW 20 MHz
2	V	V	V	V	V	V
4	V	V	V	V	V	V
5	V	V	V	V		
7			V	V	V	V
12	V	V	V	V		
13			V	V		
17			V	V		
26	V	V	V	V	V	
30			V	V		
38			V	V	V	V
41			V	V	V	V
66	V	V	V	V	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).

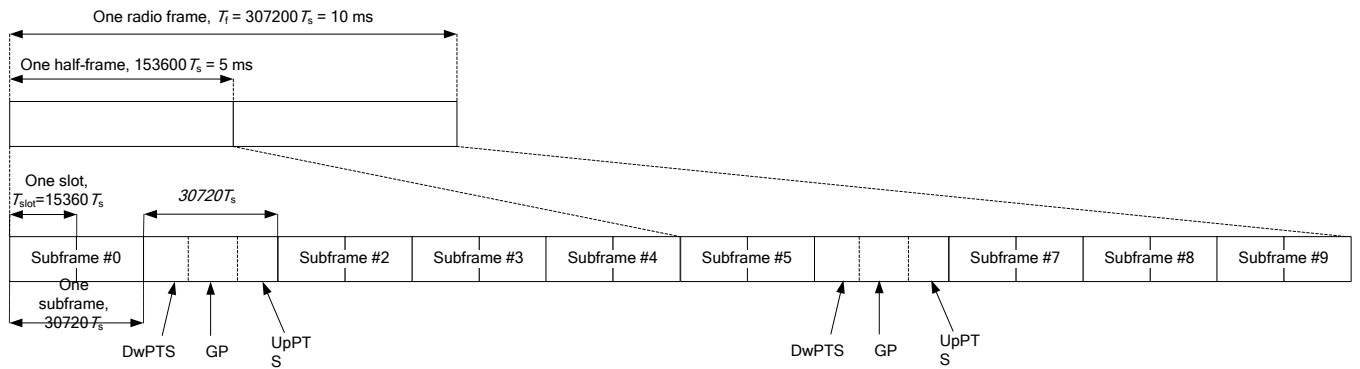
In addition, the device is compliant with additional maximum power reduction (A-MPR) requirements defined in 3GPP TS 36.101 section 6.2.4 that was disabled for all FCC compliance testing.

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.

TDD-LTE Setup Configurations

According to KDB 941225 D05, SAR testing for TDD-LTE device must be tested using a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by the defined 3GPP TDD-LTE configurations. The TDD-LTE of this device supports frame structure type 2 defined in 3GPP TS 36.211 section 4.2, and the frame structure configuration can be referred to below.

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3GPP TS 36.211 Figure 4.2-1: Frame Structure Type 2

Special Subframe Configuration	Normal Cyclic Prefix in Downlink			Extended Cyclic Prefix in Downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal Cyclic Prefix in Uplink	Extended Cyclic Prefix in Uplink		Normal Cyclic Prefix in Uplink	Extended Cyclic Prefix in Uplink
0	6592 • T _s	2192 • T _s	2560 • T _s	7680 • T _s	2192 • T _s	2560 • T _s
1	19760 • T _s			20480 • T _s		
2	21952 • T _s			23040 • T _s		
3	24144 • T _s			25600 • T _s		
4	26336 • T _s	4384 • T _s	5120 • T _s	7680 • T _s	4384 • T _s	5120 • T _s
5	6592 • T _s			20480 • T _s		
6	19760 • T _s			23040 • T _s		
7	21952 • T _s			12800 • T _s		
8	24144 • T _s	-	-	-	-	-
9	13168 • T _s			-	-	-

3GPP TS 36.211 Table 4.2-1: Configuration of Special Subframe

Uplink-Downlink Configuration	Downlink-to-Uplink Switch-Point Periodicity	Subframe Number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

3GPP TS 36.211 Table 4.2-2: Uplink-Downlink Configurations

The variety of different TD-LTE uplink-downlink configurations allows a network operator to allocate the network's capacity between uplink and downlink traffic to meet the needs of the network. The uplink duty cycle of these seven configurations can readily be computed and shown in below.

UL-DL Configuration	0	1	2	3	4	5	6
Highest Duty-Cycle	63.33%	43.33%	23.33%	31.67%	21.67%	11.67%	53.33%

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<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.

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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.

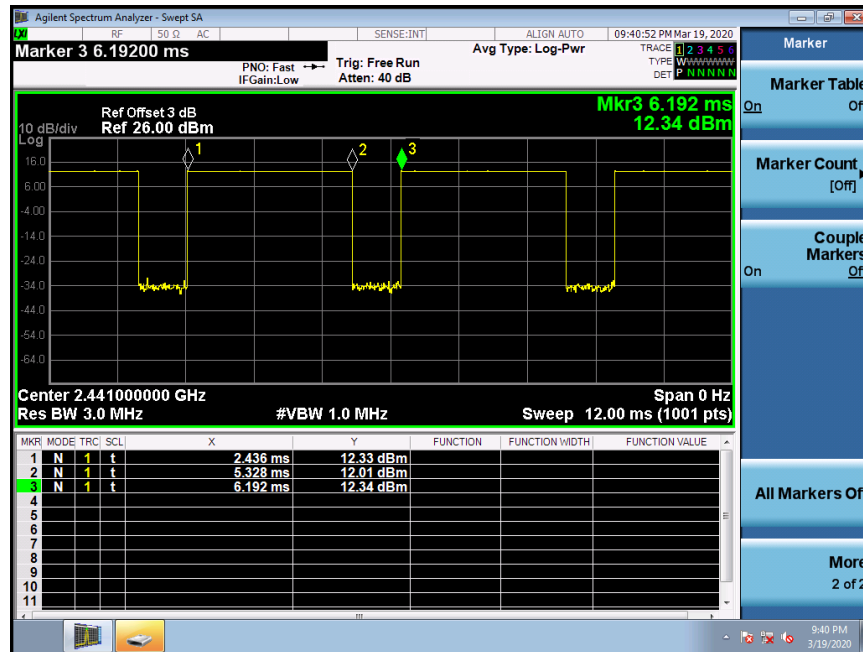
- 1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure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

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Time-domain plot for Bluetooth transmission signal

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

$$\text{Duty Factor} = \text{Pulse Width} / \text{Total Period} = (5.328 - 2.436) / (6.192 - 2.436) = 77.0 \%$$

4.2 EUT Testing Position

4.2.1 Body Exposure Conditions

For laptop PC, according to KDB 616217 D04, SAR evaluation is required for the bottom surface of the keyboard. This EUT was tested in the base of EUT directly against the flat phantom. The required minimum test separation distance for incorporating transmitters and antennas into laptop computer display is determined with the display screen opened at an angle of 90° to the keyboard compartment.

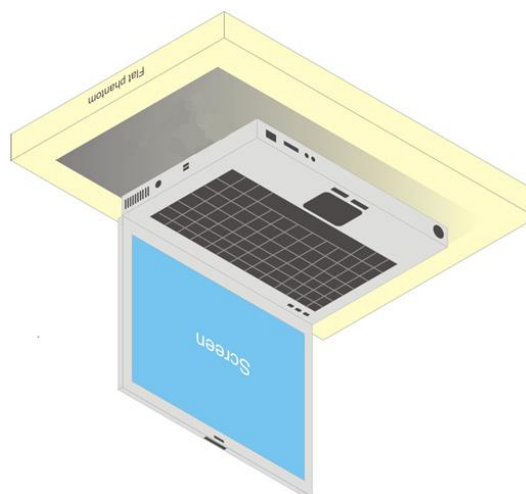


Fig-4.1 Illustration for Laptop Setup

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4.3 Tissue Verification

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

Frequency (MHz)	Liquid Temp. (°C)	Measured Conductivity (σ)	Measured Permittivity (ϵ_r)	Target Conductivity (σ)	Target Permittivity (ϵ_r)	Conductivity Deviation (%)	Permittivity Deviation (%)	Test Date
750	23.6	0.901	42.202	0.89	41.9	1.24	0.72	Mar. 26, 2020
750	23.3	0.894	43.427	0.89	41.9	0.45	3.64	Mar. 27, 2020
750	23.3	0.886	43.438	0.89	41.9	-0.45	3.67	Mar. 31, 2020
835	23.6	0.907	43.13	0.9	41.5	0.78	3.93	Mar. 26, 2020
835	23.3	0.915	42.964	0.9	41.5	1.67	3.53	Mar. 27, 2020
835	23.3	0.906	41.961	0.9	41.5	0.67	1.11	Mar. 30, 2020
1750	23.3	1.332	39.648	1.37	40.1	-2.77	-1.13	Mar. 25, 2020
1750	23.3	1.323	41.033	1.37	40.1	-3.43	2.33	Mar. 27, 2020
1750	23.3	1.323	40.829	1.37	40.1	-3.43	1.82	Apr. 10, 2020
1900	23.3	1.461	39.14	1.4	40	4.36	-2.15	Mar. 25, 2020
1900	23.3	1.454	40.489	1.4	40	3.86	1.22	Mar. 27, 2020
1900	23.3	1.454	40.489	1.4	40	3.86	1.22	Mar. 30, 2020
1900	23.3	1.461	40.304	1.4	40	4.36	0.76	Apr. 10, 2020
2300	23.3	1.684	39.442	1.67	39.5	0.84	-0.15	Mar. 26, 2020
2300	23.3	1.713	39.078	1.67	39.5	2.57	-1.07	Mar. 27, 2020
2300	23.3	1.713	39.321	1.67	39.5	2.57	-0.45	Apr. 01, 2020
2450	23.1	1.885	38.339	1.8	39.2	4.72	-2.20	Mar. 25, 2020
2450	23.3	1.88	38.414	1.8	39.2	4.44	-2.01	Mar. 30, 2020
2600	23.3	1.975	38.417	1.96	39	0.77	-1.49	Mar. 26, 2020
2600	23.3	2.012	38.051	1.96	39	2.65	-2.43	Mar. 27, 2020
2600	23.3	2.012	38.257	1.96	39	2.65	-1.91	Apr. 01, 2020
2600	23.3	2.037	39.407	1.96	39	3.93	1.04	Apr. 08, 2020
2600	23.3	2.027	39.482	1.96	39	3.42	1.24	Apr. 10, 2020
5250	23.1	4.658	37.1	4.71	35.9	-1.10	3.34	Mar. 25, 2020
5250	23.3	4.831	35.046	4.71	35.9	2.57	-2.38	Mar. 30, 2020
5250	23.3	4.835	36.46	4.71	35.9	2.65	1.56	Mar. 31, 2020
5600	23.1	4.992	36.659	5.07	35.5	-1.54	3.26	Mar. 25, 2020
5600	23.3	5.176	34.57	5.07	35.5	2.09	-2.62	Mar. 30, 2020
5750	23.1	5.138	36.444	5.22	35.4	-1.57	2.95	Mar. 25, 2020
5750	23.3	5.303	34.304	5.22	35.4	1.59	-3.10	Mar. 30, 2020

Note:

The dielectric properties of the tissue simulating liquid have been measured within 24 hours before the SAR testing and within ± 10 % of the target values. Liquid temperature during the SAR testing has kept within ± 2 °C.

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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
Mar. 26, 2020	7537	750	0.901	42.202	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 27, 2020	3898	750	0.894	43.427	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 31, 2020	3898	750	0.886	43.438	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 26, 2020	7537	835	0.907	43.13	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 27, 2020	3898	835	0.915	42.964	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 30, 2020	3898	835	0.906	41.961	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 25, 2020	7472	1750	1.332	39.648	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 27, 2020	3898	1750	1.323	41.033	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 10, 2020	3820	1750	1.323	40.829	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 25, 2020	7472	1900	1.461	39.14	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 27, 2020	3898	1900	1.454	40.489	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 30, 2020	3898	1900	1.454	40.489	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 10, 2020	3820	1900	1.461	40.304	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 26, 2020	7537	2300	1.684	39.442	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 27, 2020	3898	2300	1.713	39.078	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 01, 2020	3898	2300	1.713	39.321	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 25, 2020	7472	2450	1.885	38.339	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 30, 2020	3898	2450	1.88	38.414	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 26, 2020	7537	2600	1.975	38.417	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 27, 2020	3898	2600	2.012	38.051	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 01, 2020	3898	2600	2.012	38.257	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 08, 2020	3898	2600	2.037	39.407	Pass	Pass	Pass	N/A	N/A	N/A
Apr. 10, 2020	3820	2600	2.027	39.482	Pass	Pass	Pass	N/A	N/A	N/A
Mar. 25, 2020	7472	5250	4.658	37.1	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 30, 2020	3898	5250	4.831	35.046	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 31, 2020	3898	5250	4.835	36.46	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 25, 2020	7472	5600	4.992	36.659	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 30, 2020	3898	5600	5.176	34.57	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 25, 2020	7472	5750	5.138	36.444	Pass	Pass	Pass	OFDM	N/A	Pass
Mar. 30, 2020	3898	5750	5.303	34.304	Pass	Pass	Pass	OFDM	N/A	Pass

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4.5 System Verification

The measuring result for system verification is tabulated as below.

Test Date	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
Mar. 26, 2020	750	8.56	0.388	7.76	-9.35	1013	7537	1585
Mar. 27, 2020	750	8.56	0.391	7.82	-8.64	1013	3898	914
Mar. 31, 2020	750	8.56	0.396	7.92	-7.48	1013	3898	914
Mar. 26, 2020	835	9.61	0.457	9.14	-4.89	4d121	7537	1585
Mar. 27, 2020	835	9.61	0.452	9.04	-5.93	4d121	3898	914
Mar. 30, 2020	835	9.61	0.454	9.08	-5.52	4d121	3898	914
Mar. 25, 2020	1750	37.00	1.73	34.60	-6.49	1055	7472	861
Mar. 27, 2020	1750	37.00	1.73	34.60	-6.49	1055	3898	914
Apr. 10, 2020	1750	37.00	1.81	36.20	-2.16	1055	3820	916
Mar. 25, 2020	1900	40.30	1.87	37.40	-7.20	5d036	7472	861
Mar. 27, 2020	1900	40.30	1.84	36.80	-8.68	5d036	3898	914
Mar. 30, 2020	1900	40.30	1.84	36.80	-8.68	5d036	3898	914
Apr. 10, 2020	1900	40.30	1.93	38.60	-4.22	5d036	3820	916
Mar. 26, 2020	2300	48.80	2.39	47.80	-2.05	1004	7537	1585
Mar. 27, 2020	2300	48.80	2.3	46.00	-5.74	1004	3898	914
Apr. 01, 2020	2300	48.80	2.39	47.80	-2.05	1004	3898	914
Mar. 25, 2020	2450	52.70	2.38	47.60	-9.68	737	7472	861
Mar. 30, 2020	2450	52.70	2.46	49.20	-6.64	737	3898	914
Mar. 26, 2020	2600	57.30	2.76	55.20	-3.66	1020	7537	1585
Mar. 27, 2020	2600	57.30	2.73	54.60	-4.71	1020	3898	914
Apr. 01, 2020	2600	57.30	2.59	51.80	-9.60	1020	3898	914
Apr. 08, 2020	2600	57.30	2.63	52.60	-8.20	1020	3898	914
Apr. 10, 2020	2600	57.30	2.83	56.60	-1.22	1020	3820	916
Mar. 25, 2020	5250	75.50	3.65	73.00	-3.31	1203	7472	861
Mar. 30, 2020	5250	75.50	3.82	76.40	1.19	1203	3898	914
Mar. 31, 2020	5250	75.50	3.85	77.00	1.99	1203	3898	914
Mar. 25, 2020	5600	80.00	3.83	76.60	-4.25	1203	7472	861
Mar. 30, 2020	5600	80.00	3.98	79.60	-0.50	1203	3898	914
Mar. 25, 2020	5750	77.80	3.52	70.40	-9.51	1203	7472	861
Mar. 30, 2020	5750	77.80	3.69	73.80	-5.14	1203	3898	914

Note:

Comparing to the reference SAR value provided by SPEAG in dipole calibration certificate, the deviation of system check results is within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots please refer to Appendix A of this report.

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

Mode	LTE 2	LTE 4	LTE 5	LTE 7
Maximum Target Power	23.5	23.5	23.5	23.5

Mode	LTE 12	LTE 13	LTE 17	LTE 26
Maximum Target Power	23.5	23.5	23.5	23.5

Mode	LTE 30	LTE 38	LTE 41	LTE 66
Maximum Target Power	23.5	23.5	23.5	23.5

<WLAN 2.4G>

Mode	Channel	Frequency (MHz)	Tune-up Power (TX1)	Tune-up Power (TX2)	Tune-up Power (TX1+TX2)
802.11b	1	2412	19.50	19.25	-
	6	2437	20.00	20.00	-
	11	2462	19.25	19.25	-
	12	2467	17.50	17.00	-
	13	2472	15.25	14.50	-
802.11g	1	2412	17.00	17.00	-
	6	2437	19.75	20.00	-
	11	2462	16.00	16.00	-
	12	2467	13.50	13.50	-
	13	2472	11.50	11.50	-
802.11n (HT20)	1	2412	17.00	17.00	15.50
	6	2437	19.75	20.00	16.75
	11	2462	16.00	16.00	14.50
	12	2467	13.50	13.50	11.50
	13	2472	11.50	11.50	8.50
802.11n (HT40)	3	2422	16.50	16.50	14.00
	6	2437	16.75	16.75	14.50
	9	2452	15.50	15.25	14.50
	10	2457	12.50	12.50	10.00
	11	2462	12.00	11.50	10.00
802.11ax (HE20)	1	2412	17.00	17.00	15.50
	6	2437	19.75	20.00	16.75
	11	2462	16.00	16.00	14.50
	12	2467	13.50	13.50	11.50
	13	2472	11.50	11.50	8.50
802.11ax (HE40)	3	2422	16.50	16.50	14.00
	6	2437	16.75	16.75	14.50
	9	2452	15.50	15.25	14.50
	10	2457	12.50	12.50	10.00
	11	2462	12.00	11.50	10.00

SAR Test Report

<WLAN 5.2G >

Mode	Channel	Frequency (MHz)	Tune-up Power (TX1)	Tune-up Power (TX2)	Tune-up Power (TX1+TX2)
802.11a	36	5180	18.00	18.00	17.50
	40	5200	18.00	18.00	18.00
	44	5220	18.00	18.00	18.00
	48	5240	18.00	18.00	18.00
802.11n (HT20)	36	5180	18.00	18.00	17.50
	40	5200	18.00	18.00	18.00
	44	5220	18.00	18.00	18.00
	48	5240	18.00	18.00	18.00
802.11n (HT40)	38	5190	18.00	18.00	17.25
	46	5230	18.00	18.00	18.00
802.11ac (VHT20)	36	5180	18.00	18.00	17.50
	40	5200	18.00	18.00	18.00
	44	5220	18.00	18.00	18.00
	48	5240	18.00	18.00	18.00
802.11ac (VHT40)	38	5190	18.00	18.00	17.25
	46	5230	18.00	18.00	18.00
802.11ac (VHT80)	42	5210	18.00	18.00	17.00
802.11ax (HE20)	36	5180	18.00	18.00	17.50
	40	5200	18.00	18.00	18.00
	44	5220	18.00	18.00	18.00
	48	5240	18.00	18.00	18.00
802.11ax (HE40)	38	5190	18.00	18.00	17.25
	46	5230	18.00	18.00	18.00
802.11ax (HE80)	42	5210	18.00	18.00	17.00

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< WLAN 5.3G >

Mode	Channel	Frequency (MHz)	Tune-up Power (TX1)	Tune-up Power (TX2)	Tune-up Power (TX1+TX2)
802.11a	52	5260	18.00	18.00	18.00
	56	5280	18.00	18.00	18.00
	60	5300	18.00	18.00	18.00
	64	5320	17.75	17.75	16.50
802.11n (HT20)	52	5260	18.00	18.00	18.00
	56	5280	18.00	18.00	18.00
	60	5300	18.00	18.00	18.00
	64	5320	17.75	17.75	16.50
802.11n (HT40)	54	5270	18.00	18.00	18.00
	62	5310	17.00	17.00	15.00
802.11ac (VHT20)	52	5260	18.00	18.00	18.00
	56	5280	18.00	18.00	18.00
	60	5300	18.00	18.00	18.00
	64	5320	17.75	17.75	16.50
802.11ac (VHT40)	54	5270	18.00	18.00	18.00
	62	5310	17.00	17.00	15.00
802.11ac (VHT80)	58	5290	18.00	18.00	15.75
802.11ac (VHT160)	50	5250	14.50	14.50	13.00
802.11ax (HE20)	52	5260	18.00	18.00	18.00
	56	5280	18.00	18.00	18.00
	60	5300	18.00	18.00	18.00
	64	5320	17.75	17.75	16.50
802.11ax (HE40)	54	5270	18.00	18.00	18.00
	62	5310	17.00	17.00	15.00
802.11ax (HE80)	58	5290	18.00	18.00	15.75
802.11ax (HE160)	50	5250	14.50	14.50	13.00

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<WLAN 5.6G>

Mode	Channel	Frequency (MHz)	Tune-up Power (TX1)	Tune-up Power (TX2)	Tune-up Power (TX1+TX2)
802.11a	100	5500	18.00	18.00	18.00
	116	5580	18.00	18.00	18.00
	120	5600	18.00	18.00	18.00
	124	5620	18.00	18.00	18.00
	132	5660	18.00	18.00	18.00
	140	5700	18.00	18.00	16.50
	144	5720	18.00	18.00	18.00
802.11n (HT20)	100	5500	18.00	18.00	18.00
	116	5580	18.00	18.00	18.00
	120	5600	18.00	18.00	18.00
	124	5620	18.00	18.00	18.00
	132	5660	18.00	18.00	18.00
	140	5700	18.00	18.00	16.50
	144	5720	18.00	18.00	18.00
802.11n (HT40)	102	5510	18.00	18.00	17.25
	110	5550	18.00	18.00	18.00
	118	5590	18.00	18.00	18.00
	126	5630	18.00	18.00	18.00
	134	5670	18.00	18.00	17.50
	142	5710	18.00	18.00	18.00
802.11ac (VHT20)	100	5500	18.00	18.00	18.00
	116	5580	18.00	18.00	18.00
	120	5600	18.00	18.00	18.00
	124	5620	18.00	18.00	18.00
	132	5660	18.00	18.00	18.00
	140	5700	18.00	18.00	16.50
	144	5720	18.00	18.00	18.00
802.11ac (VHT40)	102	5510	18.00	18.00	17.25
	110	5550	18.00	18.00	18.00
	118	5590	18.00	18.00	18.00
	126	5630	18.00	18.00	18.00
	134	5670	18.00	18.00	17.50
	142	5710	18.00	18.00	18.00
802.11ac (VHT80)	106	5530	18.00	18.00	16.50
	122	5610	18.00	18.00	18.00
	138	5690	18.00	18.00	18.00
802.11ac (VHT160)	114	5570	15.00	15.50	13.50
802.11ax (HE20)	100	5500	18.00	18.00	18.00
	116	5580	18.00	18.00	18.00
	120	5600	18.00	18.00	18.00
	124	5620	18.00	18.00	18.00
	132	5660	18.00	18.00	18.00
	140	5700	18.00	18.00	16.50
	144	5720	18.00	18.00	18.00
802.11ax (HE40)	102	5510	18.00	18.00	17.25
	110	5550	18.00	18.00	18.00
	118	5590	18.00	18.00	18.00
	126	5630	18.00	18.00	18.00
	134	5670	18.00	18.00	17.50
	142	5710	18.00	18.00	18.00
802.11ax (HE80)	106	5530	18.00	18.00	16.50
	122	5610	18.00	18.00	18.00
	138	5690	18.00	18.00	18.00
802.11ax (HE160)	114	5570	15.00	15.50	13.50

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<WLAN 5.8G>

Mode	Channel	Frequency (MHz)	Tune-up Power (TX1)	Tune-up Power (TX2)	Tune-up Power (TX1+TX2)
802.11a	149	5745	18.0	18.0	18.0
	153	5765	18.0	18.0	18.0
	157	5785	18.0	18.0	18.0
	161	5805	18.0	18.0	18.0
	165	5825	18.0	18.0	18.0
802.11n (HT20)	149	5745	18.0	18.0	18.0
	153	5765	18.0	18.0	18.0
	157	5785	18.0	18.0	18.0
	161	5805	18.0	18.0	18.0
	165	5825	18.0	18.0	18.0
802.11n (HT40)	151	5755	18.0	18.0	18.0
	159	5795	18.0	18.0	18.0
802.11ac (VHT20)	149	5745	18.0	18.0	18.0
	153	5765	18.0	18.0	18.0
	157	5785	18.0	18.0	18.0
	161	5805	18.0	18.0	18.0
	165	5825	18.0	18.0	18.0
802.11ac (VHT40)	151	5755	18.0	18.0	18.0
	159	5795	18.0	18.0	18.0
802.11ac (VHT80)	155	5775	18.0	18.0	17.5
802.11ax (HE20)	149	5745	18.0	18.0	18.0
	153	5765	18.0	18.0	18.0
	157	5785	18.0	18.0	18.0
	161	5805	18.0	18.0	18.0
	165	5825	18.0	18.0	18.0
802.11ax (HE40)	151	5755	18.0	18.0	18.0
	159	5795	18.0	18.0	18.0
802.11ax (HE80)	155	5775	18.0	18.0	17.5

<Bluetooth>

Mode	Channel	Frequency (MHz)	Tune-up Power
Bluetooth EDR	0	2402	11.0
	39	2441	11.0
	78	2480	11.0
Bluetooth LE	0	2402	7.0
	19	2440	7.0
	39	2480	7.0

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4.6.2 Measured Conducted Power Result

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

Band	WCDMA Band II			WCDMA Band IV			WCDMA Band V			3GPP MPR (dB)
Channel	9262	9400	9538	1312	1413	1513	4132	4182	4233	
Frequency (MHz)	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6	826.4	836.4	846.6	
RMC 12.2K	23.80	23.88	23.76	23.50	23.54	23.81	23.46	23.95	23.80	-
HSDPA Subtest-1	23.73	23.75	23.66	23.41	23.42	23.80	23.39	23.91	23.79	0
HSDPA Subtest-2	22.75	23.66	23.60	22.45	23.41	22.81	22.50	23.85	22.78	0
HSDPA Subtest-3	22.23	23.14	23.24	22.17	22.19	22.35	22.00	23.40	22.28	0.5
HSDPA Subtest-4	22.15	22.81	22.88	21.80	22.00	22.05	21.75	23.17	22.03	0.5
DC-HSDPA Subtest-1	23.62	23.65	23.52	23.30	23.33	23.69	23.28	23.80	23.77	0
DC-HSDPA Subtest-2	22.63	23.53	23.51	22.33	23.30	22.70	22.32	23.73	22.69	0
DC-HSDPA Subtest-3	22.12	23.04	23.12	22.08	22.90	22.25	21.88	23.31	22.19	0.5
DC-HSDPA Subtest-4	22.02	22.70	22.77	21.71	21.84	22.04	21.66	23.10	21.94	0.5
HSUPA Subtest-1	22.45	22.81	22.64	22.10	22.17	22.47	22.07	23.79	22.45	0
HSUPA Subtest-2	20.81	21.43	20.71	20.43	20.56	20.74	20.31	21.68	20.60	2
HSUPA Subtest-3	21.32	21.25	21.45	21.15	21.21	21.35	21.05	22.43	21.28	1
HSUPA Subtest-4	21.12	20.91	20.63	20.70	20.84	20.90	20.60	21.97	20.86	2
HSUPA Subtest-5	23.18	23.23	22.86	22.61	22.70	23.00	22.50	23.80	22.80	0

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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	23.44	23.48	23.35	0	15M	QPSK	1	0	23.36	23.41	23.28	0
		1	50	23.39	23.44	23.30	0			1	37	23.36	23.44	23.22	0
		1	99	23.26	23.31	23.18	0			1	74	23.21	23.24	23.09	0
		50	0	22.43	22.47	22.33	1			36	0	22.43	22.46	22.24	1
		50	25	22.40	22.45	22.32	1			36	19	22.34	22.43	22.27	1
		50	50	22.36	22.40	22.25	1			36	39	22.35	22.37	22.15	1
	16QAM	100	0	22.42	22.49	22.35	1			75	0	22.35	22.41	22.32	1
		1	0	22.38	22.42	22.29	1		16QAM	1	0	22.28	22.32	22.23	1
		1	50	22.43	22.49	22.37	1			1	37	22.35	22.44	22.28	1
		1	99	22.37	22.39	22.26	1			1	74	22.34	22.33	22.26	1
		50	0	21.36	21.40	21.28	2			36	0	21.32	21.40	21.28	2
		50	25	21.32	21.39	21.22	2			36	19	21.25	21.36	21.20	2
10M	QPSK	50	50	21.30	21.33	21.21	2	5M	QPSK	36	39	21.27	21.30	21.11	2
		100	0	21.44	21.48	21.35	2			75	0	21.40	21.47	21.32	2
	16QAM	1	0	23.28	23.38	23.21	0		16QAM	1	0	23.30	23.38	23.14	0
		1	24	23.17	23.34	23.08	0			1	12	23.18	23.26	23.03	0
		1	49	23.19	23.13	23.09	0			1	24	23.18	23.20	23.04	0
		25	0	22.40	22.35	22.20	1			12	0	22.36	22.28	22.03	1
	16QAM	25	12	22.33	22.29	22.19	1			12	6	22.20	22.35	22.26	1
		25	25	22.17	22.32	22.08	1			12	13	22.29	22.39	21.98	1
3M	QPSK	50	0	22.37	22.34	22.12	1		16QAM	25	0	22.36	22.25	22.17	1
		1	0	22.30	22.27	22.28	1			1	0	22.37	22.34	22.06	1
		1	24	22.33	22.41	22.28	1			1	12	22.39	22.28	22.31	1
		1	49	22.21	22.15	22.10	1			1	24	22.18	22.29	22.17	1
		25	0	21.25	21.28	21.21	2			12	0	21.22	21.36	21.16	2
		25	12	21.25	21.29	21.09	2			12	6	21.31	21.36	21.15	2
1.4M	QPSK	25	25	21.16	21.30	21.05	2		16QAM	12	13	21.12	21.18	21.13	2
		50	0	21.36	21.37	21.31	2			25	0	21.28	21.25	21.26	2
	16QAM	1	0	23.36	23.44	23.22	0		QPSK	1	0	23.40	23.36	23.17	0
		1	7	23.29	23.28	23.21	0			1	2	23.34	23.28	23.21	0
		1	14	23.03	23.21	23.03	0			1	5	23.11	23.18	23.06	0
		8	0	22.24	22.38	22.23	1			3	0	23.27	23.28	23.22	0
3M	QPSK	8	3	22.28	22.37	22.16	1		16QAM	3	1	23.29	23.25	23.10	0
		8	7	22.26	22.18	22.11	1			3	3	23.25	23.24	23.13	0
		15	0	22.23	22.26	22.18	1			6	0	22.29	22.42	22.20	1
	16QAM	1	0	22.29	22.28	22.19	1		QPSK	1	0	22.27	22.36	22.25	1
		1	7	22.33	22.36	22.29	1			1	2	22.31	22.44	22.22	1
		1	14	22.32	22.34	22.22	1			1	5	22.30	22.30	22.22	1
1.4M	QPSK	8	0	21.21	21.25	21.19	2		16QAM	3	0	22.29	22.33	22.22	1
		8	3	21.11	21.26	21.06	2			3	1	22.17	22.33	22.13	1
		8	7	21.23	21.21	21.17	2			3	3	22.25	22.25	22.13	1
		15	0	21.36	21.36	21.31	2			6	0	21.34	21.45	21.29	2

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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	23.25	23.38	23.11	0	15M	QPSK	1	0	23.22	23.34	23.05	0
		1	50	22.90	23.04	22.77	0			1	37	22.83	23.00	22.74	0
		1	99	22.89	23.03	22.76	0			1	74	22.83	22.95	22.75	0
		50	0	22.01	22.14	21.87	1			36	0	21.94	22.09	21.83	1
		50	25	21.91	22.06	21.80	1			36	19	21.83	22.05	21.76	1
		50	50	21.86	21.99	21.74	1			36	39	21.76	21.90	21.69	1
	16QAM	100	0	22.03	22.17	21.90	1		16QAM	75	0	21.99	22.16	21.81	1
		1	0	22.35	22.48	22.21	1			1	0	22.32	22.48	22.17	1
		1	50	22.14	22.29	22.01	1			1	37	22.12	22.27	21.99	1
		1	99	22.12	22.25	22.00	1			1	74	22.08	22.21	21.97	1
		50	0	21.13	21.23	20.96	2			36	0	21.10	21.14	20.88	2
		50	25	21.07	21.20	20.94	2			36	19	21.07	21.19	20.89	2
10M	QPSK	50	50	21.05	21.13	20.88	2	5M	QPSK	36	39	21.05	21.09	20.88	2
		100	0	21.11	21.25	20.98	2			75	0	21.04	21.20	20.90	2
	16QAM	1	0	23.10	23.26	22.94	0		16QAM	1	0	23.20	23.30	22.84	0
		1	24	22.75	22.89	22.73	0			1	12	22.76	22.86	22.60	0
		1	49	22.74	22.87	22.63	0			1	24	22.68	22.91	22.44	0
		25	0	21.89	22.06	21.72	1			12	0	21.78	22.07	21.74	1
		25	12	21.82	21.86	21.70	1			12	6	21.84	21.83	21.55	1
		25	25	21.77	21.80	21.57	1			12	13	21.82	21.89	21.54	1
3M	QPSK	50	0	21.87	22.02	21.82	1		16QAM	25	0	21.89	22.01	21.65	1
		1	0	22.23	22.36	22.11	1			1	0	22.20	22.25	22.14	1
		1	24	22.05	22.07	21.83	1			1	12	22.08	22.23	21.78	1
		1	49	22.01	22.04	21.91	1			1	24	21.88	22.06	21.91	1
		25	0	21.03	21.01	20.92	2			12	0	21.05	21.10	20.80	2
		25	12	20.92	21.14	20.81	2			12	6	20.84	21.14	20.81	2
1.4M	QPSK	25	25	20.97	20.95	20.65	2	1.4M	QPSK	12	13	20.87	21.03	20.78	2
		50	0	21.08	21.04	20.88	2			25	0	20.93	21.16	20.85	2
	16QAM	1	0	23.23	23.25	23.01	0		16QAM	1	0	23.05	23.34	22.94	0
		1	7	22.75	22.98	22.65	0			1	2	22.86	22.89	22.71	0
		1	14	22.80	22.80	22.75	0			1	5	22.80	23.02	22.60	0
		8	0	21.92	22.01	21.80	1			3	0	22.81	23.01	22.74	0
		8	3	21.91	21.97	21.66	1			3	1	22.90	22.89	22.60	0
		8	7	21.74	21.84	21.74	1			3	3	22.80	22.91	22.64	0
3M	QPSK	15	0	22.02	22.07	21.72	1		16QAM	6	0	22.01	22.06	21.77	1
		1	0	22.28	22.29	22.02	1			1	0	22.18	22.40	22.08	1
		1	7	22.01	22.21	21.94	1			1	2	21.97	22.10	21.90	1
		1	14	21.91	22.12	21.91	1			1	5	22.04	22.15	21.87	1
		8	0	20.97	21.11	20.82	2			3	0	21.96	22.19	21.79	1
		8	3	20.88	21.03	20.89	2			3	1	21.87	22.09	21.77	1
3M	16QAM	8	7	20.90	21.00	20.81	2		16QAM	3	3	21.87	22.06	21.71	1
		15	0	21.07	21.12	20.88	2			6	0	20.96	21.16	20.85	2
	QPSK	1	0	19.965	20.175	20.385			QPSK	1	0	19.957	20.175	20.393	
		1	7	1711.5	1732.5	1753.5				1	2	1710.7	1732.5	1754.3	
		1	14							1	5				
		8	0							3	0				
		8	3							3	1				
		8	7							3	3				

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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	22.91	23.17	23.27	0	5M	QPSK	1	0	22.89	23.11	23.26	0
		1	24	22.88	23.16	23.25	0			1	12	22.83	23.10	23.18	0
		1	49	22.85	23.12	23.21	0			1	24	22.79	23.03	23.20	0
		25	0	22.07	22.26	22.36	1			12	0	22.03	22.20	22.30	1
		25	12	21.99	22.23	22.33	1			12	6	21.96	22.22	22.26	1
		25	25	21.93	22.21	22.32	1			12	13	21.88	22.19	22.32	1
	16QAM	50	0	22.08	22.33	22.43	1			25	0	22.04	22.24	22.40	1
		1	0	22.11	22.37	22.45	1		16QAM	1	0	22.01	22.31	22.37	1
		1	24	22.06	22.30	22.42	1			1	12	22.00	22.28	22.40	1
		1	49	22.04	22.31	22.41	1			1	24	21.99	22.26	22.37	1
		25	0	20.92	21.19	21.28	2			12	0	20.84	21.13	21.28	2
		25	12	20.90	21.17	21.27	2			12	6	20.80	21.10	21.20	2
3M	QPSK	25	25	20.91	21.20	21.29	2	1.4M	QPSK	12	13	20.86	21.13	21.27	2
		50	0	20.95	21.23	21.34	2			25	0	20.86	21.19	21.30	2
	16QAM	1	0	22.79	23.13	23.19	0		16QAM	1	0	22.81	23.01	23.25	0
		1	7	22.83	23.11	23.04	0			1	2	22.70	23.03	23.15	0
		1	14	22.64	22.95	23.07	0			1	5	22.69	23.03	23.10	0
		8	0	21.87	22.18	22.23	1			3	0	22.97	23.09	23.11	0
	16QAM	8	3	21.78	22.20	22.26	1			3	1	22.82	23.07	23.14	0
		8	7	21.86	22.00	22.19	1			3	3	22.76	23.08	23.25	0
3M	QPSK	15	0	22.00	22.24	22.29	1		16QAM	6	0	21.91	22.15	22.36	1
		1	0	21.99	22.26	22.32	1			1	0	22.02	22.28	22.40	1
		1	7	21.96	22.22	22.36	1			1	2	21.88	22.06	22.33	1
		1	14	21.83	22.19	22.29	1			1	5	21.82	22.14	22.30	1
		8	0	20.78	21.00	21.14	2			3	0	21.72	22.07	22.17	1
		8	3	20.73	21.06	21.16	2			3	1	21.76	21.97	22.18	1
	16QAM	8	7	20.78	21.09	21.14	2			3	3	21.84	22.07	22.26	1
		15	0	20.88	21.13	21.12	2			6	0	20.73	21.10	21.24	2

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LTE Band 7															
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		20850	21100	21350				Channel		20825	21100	21375	
		Frequency (MHz)		2510.0	2535.0	2560.0				Frequency (MHz)		2507.5	2535.0	2562.5	
20M	QPSK	1	0	23.16	23.20	23.26	0	15M	QPSK	1	0	23.10	23.15	23.24	0
		1	50	23.02	23.08	23.13	0			1	37	22.99	22.99	23.09	0
		1	99	22.93	23.00	23.03	0			1	74	22.85	22.90	23.03	0
		50	0	22.15	22.19	22.25	1			36	0	22.05	22.14	22.24	1
		50	25	22.13	22.16	22.23	1			36	19	22.04	22.09	22.23	1
		50	50	22.10	22.12	22.19	1			36	39	22.02	22.11	22.19	1
	16QAM	100	0	22.27	22.31	22.37	1			75	0	22.20	22.29	22.37	1
		1	0	22.30	22.34	22.40	1		16QAM	1	0	22.28	22.27	22.40	1
		1	50	22.24	22.28	22.34	1			1	37	22.15	22.23	22.27	1
		1	99	22.09	22.14	22.21	1			1	74	22.04	22.07	22.13	1
		50	0	21.25	21.29	21.35	2			36	0	21.21	21.26	21.25	2
		50	25	21.20	21.23	21.32	2			36	19	21.10	21.15	21.30	2
10M	QPSK	50	50	21.17	21.24	21.30	2			36	39	21.17	21.14	21.22	2
		100	0	21.35	21.40	21.47	2			75	0	21.27	21.35	21.44	2
	16QAM	1	0	23.05	23.06	23.15	0		QPSK	1	0	23.07	23.09	23.00	0
		1	24	22.89	22.95	23.02	0			1	12	22.94	22.86	22.98	0
		1	49	22.77	22.84	22.89	0			1	24	22.88	22.89	22.90	0
		25	0	22.12	22.04	22.13	1			12	0	22.05	22.10	22.08	1
		25	12	22.01	21.96	22.14	1			12	6	21.94	22.07	22.13	1
		25	25	21.91	21.99	22.05	1			12	13	21.86	21.97	22.00	1
	16QAM	50	0	22.13	22.19	22.14	1			25	0	22.11	22.20	22.11	1
		1	0	22.18	22.22	22.34	1		16QAM	1	0	22.20	22.19	22.29	1
		1	24	22.16	22.05	22.24	1			1	12	22.02	22.19	22.31	1
		1	49	21.98	22.04	22.07	1			1	24	21.98	22.06	22.15	1
		25	0	21.18	21.11	21.18	2			12	0	21.15	21.12	21.20	2
		25	12	21.05	21.10	21.10	2			12	6	21.07	21.13	21.24	2
5M	QPSK	25	25	20.99	21.03	21.11	2			12	13	20.98	21.11	21.11	2
		50	0	21.24	21.32	21.40	2			25	0	21.27	21.34	21.31	2
	16QAM	1	0	23.05	23.06	23.15	0		QPSK	1	0	23.07	23.09	23.00	0
		1	24	22.89	22.95	23.02	0			1	12	22.94	22.86	22.98	0
		1	49	22.77	22.84	22.89	0			1	24	22.88	22.89	22.90	0
		25	0	22.12	22.04	22.13	1			12	0	22.05	22.10	22.08	1
		25	12	22.01	21.96	22.14	1			12	6	21.94	22.07	22.13	1
		25	25	21.91	21.99	22.05	1			12	13	21.86	21.97	22.00	1
3M	QPSK	50	0	22.13	22.19	22.14	1			25	0	22.11	22.20	22.11	1
		1	0	22.18	22.22	22.34	1		16QAM	1	0	22.20	22.19	22.29	1
		1	24	22.16	22.05	22.24	1			1	12	22.02	22.19	22.31	1
		1	49	21.98	22.04	22.07	1			1	24	21.98	22.06	22.15	1
		25	0	21.18	21.11	21.18	2			12	0	21.15	21.12	21.20	2
		25	12	21.05	21.10	21.10	2			12	6	21.07	21.13	21.24	2
	16QAM	25	25	20.99	21.03	21.11	2			12	13	20.98	21.11	21.11	2
		50	0	21.24	21.32	21.40	2			25	0	21.27	21.34	21.31	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	22.81	22.89	22.76	0	5M	QPSK	1	0	22.73	22.84	22.71	0
		1	24	22.74	22.78	22.66	0			1	12	22.72	22.69	22.61	0
		1	49	22.67	22.75	22.64	0			1	24	22.67	22.66	22.62	0
		25	0	21.72	21.80	21.67	1			12	0	21.69	21.76	21.61	1
		25	12	21.66	21.75	21.63	1			12	6	21.61	21.70	21.62	1
		25	25	21.64	21.74	21.61	1			12	13	21.60	21.68	21.55	1
	16QAM	50	0	21.71	21.85	21.72	1			25	0	21.69	21.84	21.63	1
		1	0	22.07	22.15	22.02	1		16QAM	1	0	21.99	22.05	21.98	1
		1	24	22.00	22.09	21.97	1			1	12	21.93	21.99	21.89	1
		1	49	22.12	22.21	22.09	1			1	24	22.08	22.20	22.08	1
		25	0	20.84	20.92	20.75	2			12	0	20.75	20.91	20.71	2
		25	12	20.90	20.96	20.83	2			12	6	20.89	20.92	20.77	2
3M	QPSK	25	25	20.93	21.02	20.88	2			12	13	20.91	20.92	20.88	2
		50	0	20.90	20.98	20.85	2			25	0	20.86	20.94	20.82	2
	16QAM	1	0	23.05	23.06	23.15	0		QPSK	1	0	22.76	22.84	22.56	0
		1	7	22.55	22.60	22.62	0			1	2	22.55	22.59	22.58	0
		1	14	22.56	22.54	22.44	0			1	5	22.50	22.61	22.48	0
		8	0	21.56	21.70	21.50	1			3	0	22.69	22.65	22.50	0
		8	3	21.48	21.63	21.57	1			3	1	22.62	22.67	22.46	0
		8	7	21.63	21.58	21.61	1			3	3	22.51	22.63	22.53	0
	16QAM	15	0	21.64	21.73	21.49	1			6	0	21.56	21.78	21.64	1
		1	0	21.92	22.05	21.89	1		16QAM	1	0	21.98	22.09	22.00	1
		1	7	21.91	22.00	21.86	1			1	2	21.83	21.91	21.94	1
		1	14	21.93	22.17	21.88	1			1	5	21.95	22.04	21.98	1
		8	0	20.76	20.76	20.63	2			3	0	21.74	21.88	21.61	1
		8	3	20.70	20.92	20.76	2			3	1	21.77	21.91	21.77	1
1.4M	QPSK	8	7	20.82	20.81	20.68	2			3	3	21.80	21.89	21.74	1
		15	0	20.76	20.91	20.76	2			6	0	20.74	20.79	20.69	2
	16QAM	1	0	23.05	23.06	23.15	0		QPSK	1	0	22.76	22.84	22.56	0
		1	7	22.55	22.60	22.62	0			1	2	22.55	22.59	22.58	0
		1	14	22.56	22.54	22.44	0			1	5	22.50	22.61	22.48	0
		8	0	21.56	21.70	21.50	1			3	0	22.69	22.65	22.50	0
		8	3	21.48	21.63	21.57	1			3	1	22.62	22.67	22.46	0
		8	7	21.63	21.58	21.61	1			3	3	22.51	22.63	22.53	0
1.4M	QPSK	15	0	21.64	21.73	21.49	1			6	0	21.56	21.78	21.64	1
		1	0	21.9											

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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								23205	23230					23225
		Frequency (MHz)								779.5	782.0					784.5
10M	QPSK	1	0		23.24		0	5M	QPSK	1	0	23.15	23.22	23.21	0	
		1	24		23.21		0			1	12	23.06	23.17	23.13	0	
		1	49		23.17		0			1	24	23.10	23.20	23.16	0	
		25	0		22.35		1			12	0	22.11	22.18	22.17	1	
		25	12		22.27		1			12	6	22.03	22.13	22.12	1	
		25	25		22.26		1			12	13	22.08	22.17	22.16	1	
		50	0		22.37		1			25	0	22.12	22.21	22.19	1	
	16QAM	1	0		22.46		1		16QAM	1	0	22.35	22.45	22.44	1	
		1	24		22.47		1			1	12	22.31	22.38	22.37	1	
		1	49		22.44		1			1	24	22.34	22.44	22.43	1	
		25	0		21.42		2			12	0	21.17	21.24	21.21	2	
		25	12		21.38		2			12	6	21.12	21.20	21.19	2	
		25	25		21.40		2			12	13	21.15	21.23	21.20	2	
		50	0		21.41		2			25	0	21.17	21.24	21.23	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	22.84	22.83	22.78	0	5M	QPSK	1	0	22.74	22.76	22.77	0						
		1	24	22.82	22.80	22.72	0			1	12	22.80	22.77	22.63	0						
		1	49	22.79	22.77	22.76	0			1	24	22.72	22.72	22.67	0						
		25	0	21.91	21.90	21.85	1			12	0	21.91	21.88	21.75	1						
		25	12	21.89	21.83	21.83	1			12	6	21.86	21.79	21.73	1						
		25	25	21.90	21.87	21.82	1			12	13	21.84	21.78	21.81	1						
	16QAM	50	0	22.00	21.99	21.90	1		16QAM	25	0	21.94	21.96	21.84	1						
		1	0	22.16	22.15	22.10	1			1	0	22.11	22.07	22.07	1						
		1	24	22.14	22.11	22.09	1			1	12	22.08	22.11	22.04	1						
		1	49	22.12	22.10	22.03	1			1	24	22.05	22.08	22.02	1						
		25	0	21.04	21.03	20.98	2			12	0	21.01	21.02	20.91	2						
		25	12	20.93	20.90	20.87	2			12	6	20.91	20.88	20.78	2						
16QAM	25	25	21.00	20.99	20.92	2	16QAM	12	13	20.99	20.93	20.90	2								
	50	0	21.09	21.04	21.01	2		25	0	21.00	20.99	20.97	2								

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LTE Band 26															
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		26765	26865	26965				Channel		26740	26865	26990	
		Frequency (MHz)		821.5	831.5	841.5				Frequency (MHz)		819.0	831.5	844.0	
15M	QPSK	1	0	22.70	22.86	23.19	0	10M	QPSK	1	0	22.68	22.84	23.10	0
		1	37	22.69	22.84	23.18	0			1	24	22.61	22.80	23.08	0
		1	74	22.66	22.82	23.16	0			1	49	22.59	22.73	23.11	0
		36	0	21.78	21.95	22.27	1			25	0	21.78	21.94	22.23	1
		36	19	21.73	21.93	22.25	1			25	12	21.71	21.84	22.22	1
		36	39	21.75	21.90	22.24	1			25	25	21.71	21.82	22.21	1
		75	0	21.94	22.07	22.40	1			50	0	21.87	21.99	22.34	1
	16QAM	1	0	21.99	22.17	22.48	1		16QAM	1	0	21.89	22.12	22.39	1
		1	37	21.99	22.14	22.47	1			1	24	21.92	22.07	22.46	1
		1	74	21.95	22.13	22.44	1			1	49	21.90	22.04	22.41	1
		36	0	20.92	21.10	21.40	2			25	0	20.85	21.10	21.37	2
		36	19	20.91	21.12	21.45	2			25	12	20.81	21.09	21.40	2
		36	39	20.93	21.14	21.48	2			25	25	20.93	21.06	21.40	2
		75	0	20.95	21.16	21.47	2			50	0	20.85	21.10	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		26715	26865	27015				Channel		26705	26865	27025	
		Frequency (MHz)		816.5	831.5	846.5				Frequency (MHz)		815.5	831.5	847.5	
5M	QPSK	1	0	22.61	22.70	23.08	0	3M	QPSK	1	0	22.56	22.81	22.95	0
		1	12	22.60	22.59	23.08	0			1	7	22.63	22.80	23.00	0
		1	24	22.45	22.69	23.10	0			1	14	22.62	22.63	23.05	0
		12	0	21.59	21.90	22.19	1			8	0	21.70	21.83	21.93	1
		12	6	21.56	21.85	22.06	1			8	3	21.68	21.89	21.94	1
		12	13	21.54	21.82	22.18	1			8	7	21.56	21.80	22.08	1
		25	0	21.92	21.98	22.24	1			15	0	21.75	22.04	22.14	1
	16QAM	1	0	21.95	22.15	22.32	1		16QAM	1	0	21.83	22.07	22.33	1
		1	12	21.75	22.02	22.38	1			1	7	21.90	22.02	22.27	1
		1	24	21.87	22.01	22.37	1			1	14	21.91	21.95	22.29	1
		12	0	20.73	20.99	21.33	2			8	0	20.77	20.97	21.16	2
		12	6	20.77	21.05	21.30	2			8	3	20.75	20.92	21.30	2
		12	13	20.77	21.05	21.42	2			8	7	20.91	21.01	21.37	2
		25	0	20.78	20.98	21.37	2			15	0	20.73	21.02	21.33	2
BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)								
		Channel		26697	26865	27033									
		Frequency (MHz)		814.7	831.5	848.3									
1.4M	QPSK	1	0	22.59	22.76	23.01	0								
		1	2	22.60	22.73	23.10	0								
		1	5	22.58	22.80	23.09	0								
		3	0	22.66	22.89	23.10	0								
		3	1	22.63	22.75	23.02	0								
		3	3	22.54	22.81	23.13	0								
		6	0	21.76	21.91	22.21	1								
	16QAM	1	0	21.92	22.05	22.40	1								
		1	2	21.87	22.06	22.40	1								
		1	5	21.78	22.02	22.33	1								
		3	0	21.71	22.06	22.30	1								
		3	1	21.72	22.01	22.26	1								
		3	3	21.86	21.99	22.38	1								
		6	0	20.84	21.01	21.37	2								

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LTE Band 30															
BW	MCS Index	RB Size	RB Offset		Mid		3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	High	3GPP MPR (dB)
		Channel			27710					Channel		27685	27710	27735	
		Frequency (MHz)			2310.0					Frequency (MHz)		2307.5	2310.0	2312.5	
10M	QPSK	1	0		23.44		0	5M	QPSK	1	0	23.22	23.18	23.06	0
		1	24		23.12		0			1	12	23.16	23.11	23.04	0
		1	49		23.03		0			1	24	23.04	23.02	22.87	0
		25	0		22.34		1			12	0	22.35	22.31	22.19	1
		25	12		22.30		1			12	6	22.31	22.25	22.13	1
		25	25		22.16		1			12	13	22.30	22.29	22.11	1
		50	0		22.35		1			25	0	22.33	22.30	22.18	1
	16QAM	1	0		22.44		1		16QAM	1	0	22.46	22.42	22.30	1
		1	24		22.20		1			1	12	22.30	22.26	22.14	1
		1	49		22.23		1			1	24	22.29	22.24	22.12	1
		25	0		21.43		2			12	0	21.36	21.32	21.20	2
		25	12		21.40		2			12	6	21.35	21.30	21.20	2
		25	25		21.27		2			12	13	21.29	21.28	21.13	2
		50	0		21.42		2			25	0	21.34	21.30	21.17	2

LTE Band 38																
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		37850	38000	38150				Channel		37825	38000	38175		
		Frequency (MHz)		2580	2595	2610				Frequency (MHz)		2577.5	2595	2612.5		
20M	QPSK	1	0	23.09	23.05	23.13	0	15M	QPSK	1	0	23.01	22.97	23.06	0	
		1	50	23.06	23.02	23.07	0			1	37	23.01	22.95	23.03	0	
		1	99	23.05	23.03	23.11	0			1	74	22.96	22.94	23.02	0	
		50	0	22.09	22.05	22.13	1			36	0	22.03	21.99	22.11	1	
		50	25	22.02	22.04	22.08	1			36	19	21.92	22.04	22.07	1	
		50	50	22.01	22.02	22.10	1			36	39	21.95	22.02	22.09	1	
		100	0	22.07	22.03	22.12	1			75	0	22.05	21.98	22.08	1	
	16QAM	1	0	22.10	22.06	22.14	1		16QAM	1	0	22.02	22.05	22.10	1	
		1	50	22.03	21.96	22.07	1			1	37	22.02	21.94	21.99	1	
		1	99	22.07	22.01	22.09	1			1	74	22.03	21.91	22.04	1	
		50	0	21.18	21.12	21.22	2			36	0	21.18	21.05	21.15	2	
		50	25	21.15	21.11	21.20	2			36	19	21.11	21.01	21.14	2	
10M	QPSK	50	50	21.18	21.15	21.21	2	5M	QPSK	36	39	21.10	21.10	21.11	2	
		100	0	21.17	21.16	21.23	2			75	0	21.09	21.10	21.21	2	
		1	0	23.02	22.83	23.07	0			16QAM	1	0	22.85	22.97	23.01	0
		1	24	22.97	22.82	23.07	0				1	12	22.87	22.90	22.92	0
		1	49	22.81	22.90	22.96	0				1	24	23.03	22.82	22.81	0
		25	0	21.95	21.91	22.03	1				12	0	22.02	21.99	21.98	1
		25	12	21.92	21.93	21.97	1				12	6	21.89	21.85	21.95	1
	25	25	21.77	21.89	21.91	1	12		13		21.90	21.84	21.93	1		
	50	0	22.04	21.83	22.05	1	25		0		21.89	21.90	21.94	1		
	16QAM	1	0	21.96	21.95	21.95	1		16QAM	1	0	22.09	21.99	22.13	1	
		1	24	21.88	21.89	22.01	1			1	12	21.92	21.79	21.95	1	
		1	49	21.95	21.91	21.94	1			1	24	21.89	21.88	21.91	1	
		25	0	21.03	21.02	21.05	2			12	0	21.00	20.98	21.05	2	
		25	12	21.06	20.92	21.07	2			12	6	20.97	20.96	21.02	2	
25		25	21.11	20.94	20.99	2	12	13		21.06	21.04	21.12	2			
50		0	21.06	21.12	21.06	2	25	0		21.07	20.97	21.06	2			

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LTE Band 41																				
BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)	BW	MCS Index	RB Size	RB Offset	Low	Mid	Mid	Mid	High	3GPP MPR (dB)	
		Channel		39750	40185	40620	41055	41490				Channel		39725	40173	40620	41068	41515		
		Frequency (MHz)		2506.0	2549.5	2593.0	2636.5	2680.0				Frequency (MHz)		2503.5	2548.3	2593.0	2637.8	2682.5		
20M	QPSK	1	0	22.87	23.22	22.91	22.98	22.72	0	15M	QPSK	1	0	22.86	23.17	22.86	22.92	22.70	0	
		1	50	22.77	23.08	22.79	22.85	22.60	0			1	37	22.77	23.01	22.69	22.80	22.56	0	
		1	99	22.61	22.97	22.66	22.76	22.50	0			1	74	22.51	22.88	22.58	22.75	22.50	0	
		50	0	21.79	22.14	21.83	21.90	21.64	1			36	0	21.73	22.04	21.80	21.86	21.57	1	
		50	25	21.73	22.06	21.74	21.82	21.59	1			36	19	21.63	22.06	21.74	21.72	21.55	1	
		50	50	21.62	22.00	21.67	21.77	21.52	1			36	39	21.52	21.93	21.65	21.77	21.49	1	
	16QAM	100	0	21.70	22.09	21.78	21.84	21.60	1		75	0	21.67	22.08	21.75	21.76	21.53	1		
		1	0	21.86	22.21	21.92	21.96	21.71	1		16QAM	1	0	21.87	22.18	21.90	21.95	21.68	1	
		1	50	21.71	22.08	21.75	21.83	21.59	1			1	37	21.70	22.02	21.75	21.76	21.50	1	
		1	99	21.58	21.93	21.62	21.70	21.42	1			1	74	21.61	21.90	21.65	21.70	21.49	1	
		50	0	20.92	21.29	20.99	21.05	20.79	2			36	0	20.70	21.13	20.83	20.90	20.54	2	
		50	25	20.87	21.22	20.91	20.99	20.73	2			36	19	20.65	21.04	20.69	20.79	20.51	2	
50	50	20.80	21.16	20.83	20.92	20.70	2	36	39	20.54		20.99	20.59	20.75	20.51	2				
10M	QPSK	100	0	20.85	21.19	20.87	20.94	20.72	2	75	0	20.61	21.06	20.78	20.75	20.53	2			
		16QAM	1	0	21.82	22.13	21.84	21.82	21.67	1	5M	QPSK	1	0	22.82	23.05	22.81	22.90	22.63	0
			1	24	22.63	23.01	22.76	22.72	22.47	0			1	12	22.69	23.07	22.70	22.72	22.54	0
			1	49	22.49	22.79	22.65	22.56	22.45	0			1	24	22.50	22.83	22.59	22.73	22.38	0
			25	0	21.76	21.96	21.66	21.71	21.59	1			12	0	21.73	22.06	21.68	21.76	21.54	1
			25	12	21.68	22.06	21.57	21.64	21.47	1			12	6	21.69	22.00	21.63	21.71	21.57	1
	25		25	21.51	21.90	21.54	21.64	21.32	1	12			13	21.55	21.93	21.62	21.60	21.43	1	
	16QAM	50	0	21.56	22.03	21.62	21.77	21.48	1	25		0	21.58	22.03	21.61	21.75	21.47	1		
		1	0	21.82	22.13	21.84	21.82	21.67	1	16QAM		1	0	21.78	22.09	21.82	21.87	21.60	1	
		1	24	21.66	21.99	21.75	21.82	21.47	1			1	12	21.68	22.03	21.68	21.78	21.49	1	
		1	49	21.57	21.86	21.62	21.62	21.40	1			1	24	21.46	21.89	21.57	21.73	21.35	1	
		25	0	20.78	21.02	20.67	20.72	20.56	2			12	0	20.65	21.07	20.73	20.82	20.54	2	
		25	12	20.72	21.04	20.66	20.71	20.50	2			12	6	20.71	21.05	20.63	20.78	20.51	2	
		25	25	20.48	20.90	20.63	20.64	20.32	2		12	13	20.53	20.86	20.61	20.63	20.40	2		
50		0	20.56	21.02	20.61	20.67	20.53	2	25		0	20.54	20.94	20.63	20.73	20.51	2			

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LTE Band 66															
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		132072	132322	132572				Channel		132047	132322	132597	
		Frequency (MHz)		1720.0	1745.0	1770.0				Frequency (MHz)		1717.5	1745.0	1772.5	
20M	QPSK	1	0	23.15	23.11	23.43	0	15M	QPSK	1	0	23.13	23.06	23.38	0
		1	50	22.80	22.76	23.09	0			1	37	22.76	22.71	23.08	0
		1	99	23.11	23.03	23.40	0			1	74	23.09	22.94	23.31	0
		50	0	21.97	21.93	22.25	1			36	0	21.96	21.88	22.18	1
		50	25	21.90	21.82	22.15	1			36	19	21.80	21.79	22.11	1
		50	50	21.88	21.87	22.17	1			36	39	21.81	21.79	22.08	1
		100	0	22.11	22.07	22.39	1			75	0	22.08	22.03	22.32	1
	16QAM	1	0	22.18	22.15	22.46	1		16QAM	1	0	22.08	22.10	22.45	1
		1	50	21.82	21.77	22.09	1			1	37	21.77	21.72	22.03	1
		1	99	22.10	22.06	22.39	1			1	74	22.01	21.97	22.38	1
		50	0	20.97	20.93	21.25	2			36	0	20.97	20.88	21.17	2
		50	25	20.88	20.81	21.16	2			36	19	20.86	20.78	21.06	2
		50	50	20.94	20.86	21.18	2			36	39	20.86	20.81	21.12	2
		100	0	21.17	21.07	21.41	2			75	0	21.15	21.05	21.39	2
10M	QPSK	1	0	23.03	23.03	23.38	0	5M	QPSK	1	0	23.13	22.94	23.12	0
		1	24	22.60	22.71	22.92	0			1	12	22.72	22.60	22.99	0
		1	49	23.11	22.91	23.26	0			1	24	22.93	22.91	23.23	0
		25	0	21.86	21.75	22.09	1			12	0	21.75	21.82	22.20	1
		25	12	21.76	21.77	21.99	1			12	6	21.85	21.61	21.90	1
		25	25	21.72	21.71	22.07	1			12	13	21.73	21.80	21.91	1
		50	0	22.02	21.94	22.36	1			25	0	21.91	21.92	22.08	1
	16QAM	1	0	22.07	22.06	22.33	1		16QAM	1	0	22.03	22.02	22.38	1
		1	24	21.71	21.65	22.04	1			1	12	21.75	21.68	21.98	1
		1	49	22.03	21.94	22.27	1			1	24	22.06	22.03	22.24	1
		25	0	20.93	20.81	21.12	2			12	0	20.87	20.70	21.03	2
		25	12	20.75	20.72	21.03	2			12	6	20.73	20.59	21.13	2
		25	25	20.77	20.68	21.12	2			12	13	20.73	20.70	20.94	2
		50	0	21.15	20.94	21.28	2			25	0	21.11	20.97	21.38	2
3M	QPSK	1	0	23.05	22.99	23.35	0	1.4M	QPSK	1	0	23.05	23.05	23.28	0
		1	7	22.67	22.53	22.90	0			1	2	22.78	22.66	22.98	0
		1	14	22.99	22.93	23.29	0			1	5	23.06	22.88	23.29	0
		8	0	21.93	21.78	22.14	1			3	0	22.83	22.86	23.15	0
		8	3	21.73	21.74	21.97	1			3	1	22.83	22.70	23.00	0
		8	7	21.77	21.74	22.03	1			3	3	22.72	22.69	22.93	0
		15	0	21.88	21.95	22.23	1			6	0	22.00	21.97	22.27	1
	16QAM	1	0	22.00	22.04	22.34	1		16QAM	1	0	22.00	21.92	22.40	1
		1	7	21.65	21.57	21.91	1			1	2	21.62	21.69	21.92	1
		1	14	22.01	22.04	22.16	1			1	5	22.02	21.90	22.16	1
		8	0	20.75	20.71	21.11	2			3	0	21.75	21.88	22.11	1
		8	3	20.72	20.65	21.03	2			3	1	21.63	21.71	21.91	1
		8	7	20.80	20.72	21.07	2			3	3	21.84	21.83	22.00	1
		15	0	21.15	20.92	21.32	2			6	0	20.96	20.94	21.24	2

SAR Test Report

<WLAN 2.4G>

Mode	Channel	Frequency (MHz)	Average Power (TX1)	Average Power (TX2)
802.11b	1	2412	19.47	19.11
	6	2437	19.96	19.95
	11	2462	19.12	19.22
	12	2467	17.47	16.93
	13	2472	15.15	14.39

<WLAN 5.3G>

Mode	Channel	Frequency (MHz)	Average Power (TX1)	Average Power (TX2)
802.11ac (VHT80)	58	5290	17.99	17.96

<WLAN 5.6G>

Mode	Channel	Frequency (MHz)	Average Power (TX1)	Average Power (TX2)
802.11ac (VHT80)	106	5530	17.97	17.98
	122	5610	17.94	17.95
	138	5690	17.95	17.93

<WLAN 5.8G>

Mode	Channel	Frequency (MHz)	Average Power (TX1)	Average Power (TX2)
802.11ac (VHT80)	155	5775	17.96	17.98

<Bluetooth>

Mode	Channel	Frequency (MHz)	Average Power
Bluetooth EDR	0	2402	10.53
	39	2441	10.95
	78	2480	10.98
Bluetooth LE	0	2402	6.79
	19	2440	6.84
	39	2480	6.93

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 $\leq 1/4$ 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 5GHz, 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.

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- (4) For WLAN MIMO mode, the power-based standalone SAR test exclusion or the sum of SAR provision in KDB 447498 to determine simultaneous transmission SAR test exclusion should be applied. Otherwise, SAR for MIMO mode will be measured with all applicable antennas transmitting simultaneously at the specified maximum output power of MIMO operation.

4.7.2 SAR Results for Body Exposure Condition (Test Separation Distance is 0 mm)

Plot No.	Band	Mode	Test Position	Ch.	EUT Config.	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
	WCDMA II	RMC12.2K	Bottom	9400	1	24.00	23.88	1.03	0	<0.001	0.00
	WCDMA II	RMC12.2K	Bottom	9262	1	24.00	23.80	1.05	0	<0.001	0.00
	WCDMA II	RMC12.2K	Bottom	9538	1	24.00	23.76	1.06	0	<0.001	0.00
	WCDMA II	RMC12.2K	Bottom	9400	1	24.00	23.88	1.03	0	<0.001	0.00
	WCDMA II	RMC12.2K	Bottom	9400	1	24.00	23.88	1.03	0	<0.001	0.00
	WCDMA IV	RMC12.2K	Bottom	1513	1	24.00	23.81	1.04	0	<0.001	0.00
	WCDMA IV	RMC12.2K	Bottom	1312	1	24.00	23.50	1.12	0	<0.001	0.00
	WCDMA IV	RMC12.2K	Bottom	1413	1	24.00	23.54	1.11	0	<0.001	0.00
	WCDMA IV	RMC12.2K	Bottom	1513	2	24.00	23.81	1.04	0	<0.001	0.00
	WCDMA IV	RMC12.2K	Bottom	1513	3	24.00	23.81	1.04	0	<0.001	0.00
	WCDMA V	RMC12.2K	Bottom	4182	1	24.00	23.95	1.01	0	<0.001	0.00
	WCDMA V	RMC12.2K	Bottom	4132	1	24.00	23.46	1.13	0	<0.001	0.00
	WCDMA V	RMC12.2K	Bottom	4233	1	24.00	23.80	1.05	0	<0.001	0.00
	WCDMA V	RMC12.2K	Bottom	4182	2	24.00	23.95	1.01	0	<0.001	0.00
	WCDMA V	RMC12.2K	Bottom	4182	3	24.00	23.95	1.01	0	<0.001	0.00

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

Plot No.	Band	Mode	Test Position	Ch.	RB#	RB Offset	EUT Config.	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	Bottom	18900	1	0	1	23.50	23.48	1.00	0	<0.001	0.00
	LTE 2	QPSK20M	Bottom	18900	50	0	1	22.50	22.47	1.01	0	<0.001	0.00
	LTE 2	QPSK20M	Bottom	18700	1	0	1	23.50	23.44	1.01	0	<0.001	0.00
	LTE 2	QPSK20M	Bottom	19100	1	0	1	23.50	23.35	1.04	0	<0.001	0.00
	LTE 2	QPSK20M	Bottom	18900	1	0	2	23.50	23.48	1.00	0	<0.001	0.00
	LTE 2	QPSK20M	Bottom	18900	1	0	3	23.50	23.48	1.00	0	<0.001	0.00
	LTE 4	QPSK20M	Bottom	20175	1	0	1	23.50	23.38	1.03	0	<0.001	0.00
	LTE 4	QPSK20M	Bottom	20175	50	0	1	22.50	22.14	1.09	0	<0.001	0.00
	LTE 4	QPSK20M	Bottom	20050	1	0	1	23.50	23.25	1.06	0	<0.001	0.00
	LTE 4	QPSK20M	Bottom	20300	1	0	1	23.50	23.11	1.09	0	<0.001	0.00
	LTE 4	QPSK20M	Bottom	20175	1	0	2	23.50	23.38	1.03	0	<0.001	0.00
	LTE 4	QPSK20M	Bottom	20175	1	0	3	23.50	23.38	1.03	0	<0.001	0.00
	LTE 5	QPSK10M	Bottom	20600	1	0	1	23.50	23.27	1.05	0	<0.001	0.00
	LTE 5	QPSK10M	Bottom	20600	25	0	1	22.50	22.36	1.03	0	<0.001	0.00
	LTE 5	QPSK10M	Bottom	20450	1	0	1	23.50	22.91	1.15	0	<0.001	0.00
	LTE 5	QPSK10M	Bottom	20525	1	0	1	23.50	23.17	1.08	0	<0.001	0.00
	LTE 5	QPSK10M	Bottom	20600	1	0	2	23.50	23.27	1.05	0	<0.001	0.00
	LTE 5	QPSK10M	Bottom	20600	1	0	3	23.50	23.27	1.05	0	<0.001	0.00
	LTE 7	QPSK20M	Bottom	21350	1	0	1	23.50	23.26	1.06	0	<0.001	0.00
	LTE 7	QPSK20M	Bottom	21350	50	0	1	22.50	22.25	1.06	0	<0.001	0.00
	LTE 7	QPSK20M	Bottom	20850	1	0	1	23.50	23.16	1.08	0	<0.001	0.00
	LTE 7	QPSK20M	Bottom	21100	1	0	1	23.50	23.20	1.07	0	<0.001	0.00
	LTE 7	QPSK20M	Bottom	21350	1	0	2	23.50	23.26	1.06	0	<0.001	0.00
	LTE 7	QPSK20M	Bottom	21350	1	0	3	23.50	23.26	1.06	0	<0.001	0.00
	LTE 12	QPSK10M	Bottom	23095	1	0	1	23.50	22.89	1.15	0	<0.001	0.00
	LTE 12	QPSK10M	Bottom	23095	25	0	1	22.50	21.80	1.17	0	<0.001	0.00
	LTE 12	QPSK10M	Bottom	23060	1	0	1	23.50	22.81	1.17	0	<0.001	0.00
	LTE 12	QPSK10M	Bottom	23130	1	0	1	23.50	22.76	1.19	0	<0.001	0.00
	LTE 12	QPSK10M	Bottom	23095	1	0	2	23.50	22.89	1.15	0	<0.001	0.00
	LTE 12	QPSK10M	Bottom	23095	1	0	3	23.50	22.89	1.15	0	<0.001	0.00

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

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Plot No.	Band	Mode	Test Position	Ch.	RB#	RB Offset	EUT Config.	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 13	QPSK10M	Bottom	23230	1	0	1	23.50	23.24	1.06	0	<0.001	0.00
	LTE 13	QPSK10M	Bottom	23230	25	0	1	22.50	22.35	1.04	0	<0.001	0.00
	LTE 13	QPSK10M	Bottom	23230	1	0	2	23.50	23.24	1.06	0	<0.001	0.00
	LTE 13	QPSK10M	Bottom	23230	1	0	3	23.50	23.24	1.06	0	<0.001	0.00
	LTE 17	QPSK10M	Bottom	23780	1	0	1	23.50	22.84	1.16	0	<0.001	0.00
	LTE 17	QPSK10M	Bottom	23780	25	0	1	22.50	21.91	1.15	0	<0.001	0.00
	LTE 17	QPSK10M	Bottom	23790	1	0	1	23.50	22.83	1.17	0	<0.001	0.00
	LTE 17	QPSK10M	Bottom	23800	1	0	1	23.50	22.78	1.18	0	<0.001	0.00
	LTE 17	QPSK10M	Bottom	23780	1	0	2	23.50	22.84	1.16	0	<0.001	0.00
	LTE 17	QPSK10M	Bottom	23780	1	0	3	23.50	22.84	1.16	0	<0.001	0.00
	LTE 26	QPSK15M	Bottom	26965	1	0	1	23.50	23.19	1.07	0	<0.001	0.00
	LTE 26	QPSK15M	Bottom	26965	36	0	1	22.50	22.27	1.05	0	<0.001	0.00
	LTE 26	QPSK15M	Bottom	26765	1	0	1	23.50	22.70	1.20	0	<0.001	0.00
	LTE 26	QPSK15M	Bottom	26865	1	0	1	23.50	22.86	1.16	0	<0.001	0.00
	LTE 26	QPSK15M	Bottom	26965	1	0	2	23.50	23.19	1.07	0	<0.001	0.00
	LTE 26	QPSK15M	Bottom	26965	1	0	3	23.50	23.19	1.07	0	<0.001	0.00
	LTE 30	QPSK10M	Bottom	27710	1	0	1	23.50	23.44	1.01	0	<0.001	0.00
	LTE 30	QPSK10M	Bottom	27710	25	0	1	22.50	22.34	1.04	0	<0.001	0.00
	LTE 30	QPSK10M	Bottom	27710	1	0	2	23.50	23.44	1.01	0	<0.001	0.00
	LTE 30	QPSK10M	Bottom	27710	1	0	3	23.50	23.44	1.01	0	<0.001	0.00
	LTE 38	QPSK20M	Bottom	38150	1	0	1	23.50	23.13	1.09	0	<0.001	0.00
	LTE 38	QPSK20M	Bottom	38150	50	0	1	22.50	22.13	1.09	0	<0.001	0.00
	LTE 38	QPSK20M	Bottom	37850	1	0	1	23.50	23.09	1.10	0	<0.001	0.00
	LTE 38	QPSK20M	Bottom	38000	1	0	1	23.50	23.05	1.11	0	<0.001	0.00
	LTE 38	QPSK20M	Bottom	38150	1	0	2	23.50	23.13	1.09	0	<0.001	0.00
	LTE 38	QPSK20M	Bottom	38150	1	0	3	23.50	23.13	1.09	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	40185	1	0	1	23.50	23.22	1.07	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	40185	50	0	1	22.50	22.14	1.09	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	39750	1	0	1	23.50	22.87	1.16	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	40620	1	0	1	23.50	22.91	1.15	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	41055	1	0	1	23.50	22.98	1.13	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	41490	1	0	1	23.50	22.72	1.20	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	40185	1	0	2	23.50	23.22	1.07	0	<0.001	0.00
	LTE 41	QPSK20M	Bottom	40185	1	0	3	23.50	23.22	1.07	0	<0.001	0.00
	LTE 66	QPSK20M	Bottom	132572	1	0	1	23.50	23.43	1.02	0	<0.001	0.00
	LTE 66	QPSK20M	Bottom	132572	50	0	1	22.50	22.25	1.06	0	<0.001	0.00
	LTE 66	QPSK20M	Bottom	132072	1	0	1	23.50	23.15	1.08	0	<0.001	0.00
	LTE 66	QPSK20M	Bottom	132322	1	0	1	23.50	23.11	1.09	0	<0.001	0.00
	LTE 66	QPSK20M	Bottom	132572	1	0	2	23.50	23.43	1.02	0	<0.001	0.00
	LTE 66	QPSK20M	Bottom	132572	1	0	3	23.50	23.43	1.02	0	<0.001	0.00

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

SAR Test Report

Plot No.	Band	Mode	Test Position	Ch.	EUT Config.	Tx Antenna	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)
01	WLAN2.4G	802.11b	Bottom	6	1	Tx1	99.00	1.01	20.00	19.96	1.01	-0.04	0.742	0.76
	WLAN2.4G	802.11b	Bottom	6	1	Tx2	99.00	1.01	20.00	19.95	1.01	-0.09	0.408	0.42
	WLAN2.4G	802.11b	Bottom	1	1	Tx1	99.00	1.01	19.50	19.47	1.01	0.05	0.632	0.64
	WLAN2.4G	802.11b	Bottom	11	1	Tx1	99.00	1.01	19.25	19.12	1.03	0.02	0.56	0.58
	WLAN2.4G	802.11b	Bottom	12	1	Tx1	99.00	1.01	17.50	17.47	1.01	0.1	0.379	0.39
	WLAN2.4G	802.11b	Bottom	13	1	Tx1	99.00	1.01	15.25	15.15	1.02	0.14	0.222	0.23
	WLAN2.4G	802.11b	Bottom	6	2	Tx1	99.00	1.01	20.00	19.96	1.01	0.05	0.68	0.69
	WLAN2.4G	802.11b	Bottom	6	3	Tx1	99.00	1.01	20.00	19.96	1.01	0.13	0.586	0.60
02	WLAN5.3G	802.11ac VHT80	Bottom	58	1	Tx1	97.50	1.03	18.00	17.99	1.00	-0.02	0.741	0.76
	WLAN5.3G	802.11ac VHT80	Bottom	58	1	Tx2	97.90	1.02	18.00	17.96	1.01	-0.06	0.726	0.75
	WLAN5.3G	802.11ac VHT80	Bottom	58	2	Tx1	97.50	1.03	18.00	17.99	1.00	-0.02	0.645	0.66
	WLAN5.3G	802.11ac VHT80	Bottom	58	3	Tx1	97.50	1.03	18.00	17.99	1.00	-0.18	0.78	0.80
	WLAN5.6G	802.11ac VHT80	Bottom	106	1	Tx1	97.50	1.03	18.00	17.97	1.01	0.11	0.88	0.92
	WLAN5.6G	802.11ac VHT80	Bottom	106	1	Tx2	97.90	1.02	18.00	17.98	1.00	-0.04	0.557	0.57
	WLAN5.6G	802.11ac VHT80	Bottom	122	1	Tx1	97.50	1.03	18.00	17.94	1.01	0.12	0.87	0.91
	WLAN5.6G	802.11ac VHT80	Bottom	138	1	Tx1	97.50	1.03	18.00	17.95	1.01	-0.10	0.976	1.02
03	WLAN5.6G	802.11ac VHT80	Bottom	138	2	Tx1	97.50	1.03	18.00	17.95	1.01	0.11	0.392	0.41
	WLAN5.6G	802.11ac VHT80	Bottom	138	3	Tx1	97.50	1.03	18.00	17.95	1.01	0.05	0.839	0.87
	WLAN5.6G	802.11ac VHT80	Bottom	106	3	Tx1	97.50	1.03	18.00	17.97	1.01	0.04	0.68	0.71
	WLAN5.6G	802.11ac VHT80	Bottom	122	3	Tx1	97.50	1.03	18.00	17.94	1.01	0.02	0.714	0.74
	WLAN5.6G	802.11ac VHT80	Bottom	138	1	Tx1	97.50	1.03	18.00	17.95	1.01	-0.2	0.967	1.01
	WLAN5.8G	802.11ac VHT80	Bottom	155	1	Tx1	97.50	1.03	18.00	17.96	1.01	-0.13	0.987	1.03
	WLAN5.8G	802.11ac VHT80	Bottom	155	1	Tx2	97.90	1.02	18.00	17.98	1.00	-0.08	0.307	0.31
	WLAN5.8G	802.11ac VHT80	Bottom	155	2	Tx1	97.50	1.03	18.00	17.96	1.01	0.02	0.374	0.39
04	WLAN5.8G	802.11ac VHT80	Bottom	155	3	Tx1	97.50	1.03	18.00	17.96	1.01	0.03	0.859	0.89
	WLAN5.8G	802.11ac VHT80	Bottom	155	1	Tx1	97.50	1.03	18.00	17.96	1.01	-0.09	0.979	1.02
	BT	BDR	Bottom	78	1	Tx1	77.00	1.30	11.00	10.98	1.00	0.03	0.055	0.07
	BT	BDR	Bottom	0	1	Tx1	77.00	1.30	11.00	10.53	1.11	0.04	0.052	0.08
	BT	BDR	Bottom	39	1	Tx1	77.00	1.30	11.00	10.95	1.01	-0.02	0.059	0.08
	BT	BDR	Bottom	39	2	Tx1	77.00	1.30	11.00	10.95	1.01	0.11	0.053	0.07
	BT	BDR	Bottom	39	3	Tx1	77.00	1.30	11.00	10.95	1.01	0.02	0.054	0.07
	BT	BDR	Bottom	39	3	Tx1	77.00	1.30	11.00	10.95	1.01	0.02	0.054	0.07

Note: The MIMO mode test can be exempted due to the MIMO mode power <= SISO mode power.

SAR Test Report

4.7.3 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10 , the highest SAR configuration for either head or body tissue-equivalent medium maybe 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
WLAN5.6G	802.11ac VHT80	Bottom	138	0.976	0.967	1.01	N/A	N/A	N/A	N/A
WLAN5.8G	802.11ac VHT80	Bottom	155	0.987	0.979	1.01	N/A	N/A	N/A	N/A

SAR Test Report

4.7.2 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	Body Exposure Condition
1	WWAN + WLAN 2.4G_Tx2 + BT_Tx1	Yes
2	WWAN + WLAN 2.4G_Tx1 + WWAN 2.4G_Tx2	Yes
3	WWAN + WLAN 5G_Tx2 + BT_Tx1	Yes
4	WWAN + WLAN 5G_Tx1 + WWAN 5G_Tx2	Yes
5	WWAN + WLAN 5G_Tx1 + WWAN 5G_Tx2 + BT_Tx1	Yes

Note :

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

<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.

SAR Test Report

Band	Position	1g SAR W/kg						Summing result 1g SAR W/kg				
		A	1	2	3	4	5	A+2+5	A+1+2	A+4+5	A+3+4	A+3+4+5
		MAX WWAN	WLAN 2.4GHz Tx1	WLAN 2.4GHz Tx2	WLAN 5GHz Tx1	WLAN 5GHz Tx2	BT Tx1					
WCDMA II	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
WCDMA IV	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
WCDMA V	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 2	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 4	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 5	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 7	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 12	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 13	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 17	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 26	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 30	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 38	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 41	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86
LTE 66	Bottom	0.00	0.76	0.42	1.03	0.75	0.08	0.50	1.18	0.83	1.78	1.86

SAR Test Report

<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.

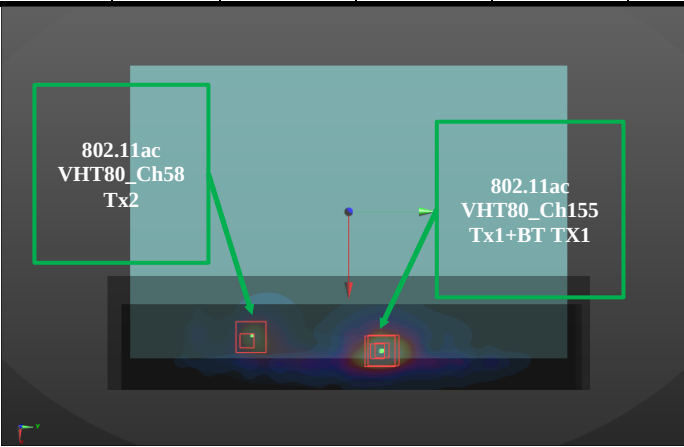
The SPLSR is determined by the following formula.

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

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			
802.11ac VHT80_Ch155 Tx1+BT TX1	Body	Bottom	1.11	98	15	1.73	88.8	0.03	SPLSR ≤ 0.04 , Not required
802.11ac VHT80_Ch58 Tx2			0.75	91.8	-73.6	2.59			



Test Engineer : Zeke Wang, and Tim Cheng

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D750V3	1013	Aug. 23, 2019	1 Year
System Validation Dipole	SPEAG	D835V2	4d121	Aug. 23, 2019	1 Year
System Validation Dipole	SPEAG	D1750V2	1055	Aug. 23, 2019	1 Year
System Validation Dipole	SPEAG	D1900V2	5d036	Jan. 21, 2020	1 Year
System Validation Dipole	SPEAG	D2300V2	1004	Jan. 21, 2020	1 Year
System Validation Dipole	SPEAG	D2450V2	737	Aug. 26, 2019	1 Year
System Validation Dipole	SPEAG	D2600V2	1020	Aug. 26, 2019	1 Year
System Validation Dipole	SPEAG	D5GHzV2	1203	Dec. 20, 2019	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3820	Jun. 25, 2019	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3898	Jun. 27, 2019	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7472	Aug. 30, 2019	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	7537	Jun. 18, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE4	914	Jun. 20, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE4	916	Dec. 17, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE4	861	May. 08, 2019	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1585	Jun. 07, 2019	1 Year
Spectrum Analyzer	Anritsu	MS2720T	1513085	May. 30, 2019	1 Year
Universal Wireless Test Set	Anritsu	MT8870A/MU8 87000A	6201699387	Oct. 07, 2019	1 Year
Thermometer	YFE	YF-160A	120702365	Aug. 06, 2019	1 Year
Dielectric Assessment Kit	SPEAG	DAKS-3.5	1092	May. 07, 2019	1 Year
Dielectric Assessment Kit	SPEAG	DAKS_VNA R140	0010917	May. 08, 2019	1 Year
Powersource1	SPEAG	SE_UMS_160 BA	4010	Aug. 21, 2019	1 Year

6. Measurement Uncertainty

According to KDB 865664 D01, SAR measurement uncertainty analysis is required in SAR reports only when the highest measured SAR in a frequency band is ≥ 1.5 W/kg for 1-g SAR, and ≥ 3.75 W/kg for 10-g SAR. The procedures described in IEEE Std 1528-2013 should be applied. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. When the highest measured SAR within a frequency band is < 1.5 W/kg for 1-g and < 3.75 W/kg for 10-g, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. Hence, the measurement uncertainty analysis is not required in this SAR report because the test result met the condition.

7. Information of 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.

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

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Appendix A. SAR Plots of System Verification

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

System Check_H750_200326

DUT: Dipole 750 MHz; Type: D750V3; SN: 1013

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

Medium: H06T09N3_0326 Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.901 \text{ S/m}$; $\epsilon_r = 42.202$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.8°C ; Liquid Temperature : 23.6°C

DASY5 Configuration:

- Probe: EX3DV4 - SN7537; ConvF(10.77, 10.77, 10.77) @ 750 MHz; Calibrated: 2019/06/18
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1585; Calibrated: 2019/06/07
- Phantom: ELI Phantom_1043; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (61x81x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.486 W/kg

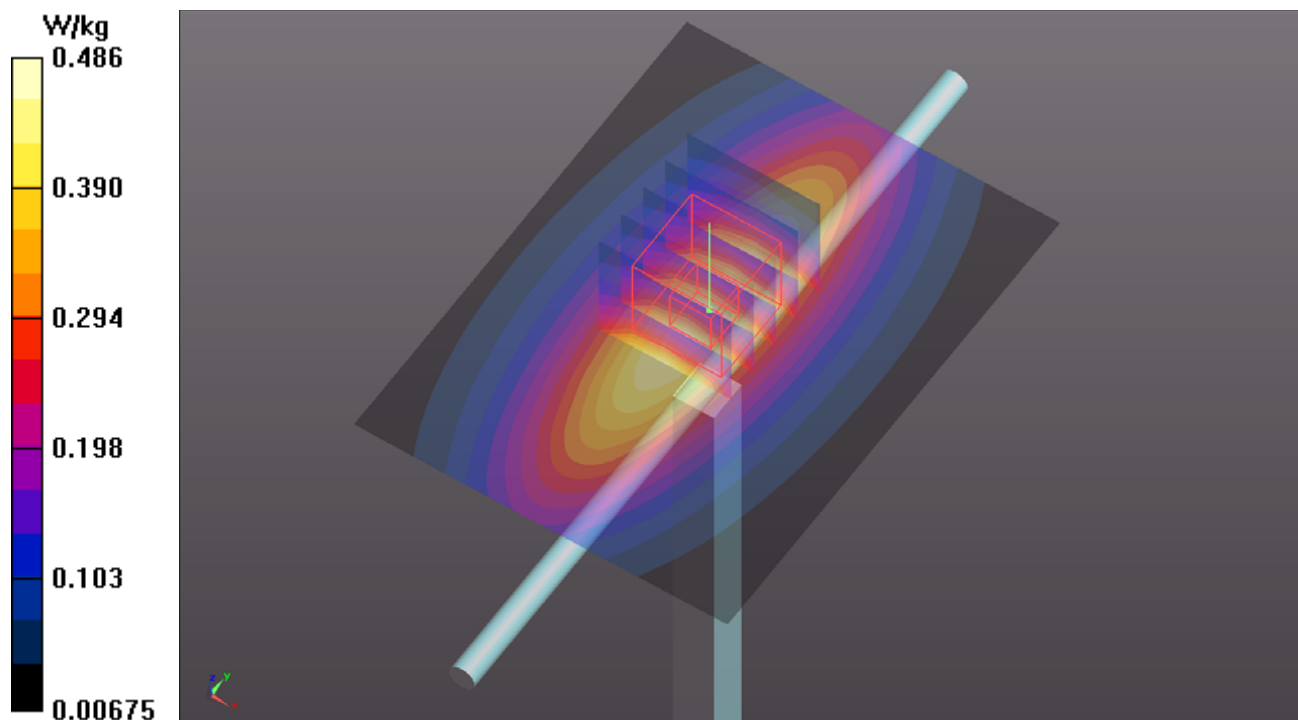
Pin=50mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 24.42 V/m ; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.545 W/kg

SAR(1 g) = 0.388 W/kg ; SAR(10 g) = 0.241 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.488 W/kg



System Check_H835_200327

DUT: Dipole 835 MHz; Type: D835V2; SN: 4d121

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: H07T10N3_0327 Medium parameters used: $f = 835$ MHz; $\sigma = 0.915$ S/m; $\epsilon_r = 42.964$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.7 °C ; Liquid Temperature : 23.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3898; ConvF(9.83, 9.83, 9.83) @ 835 MHz; Calibrated: 2019/06/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2019/06/20
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.603 W/kg

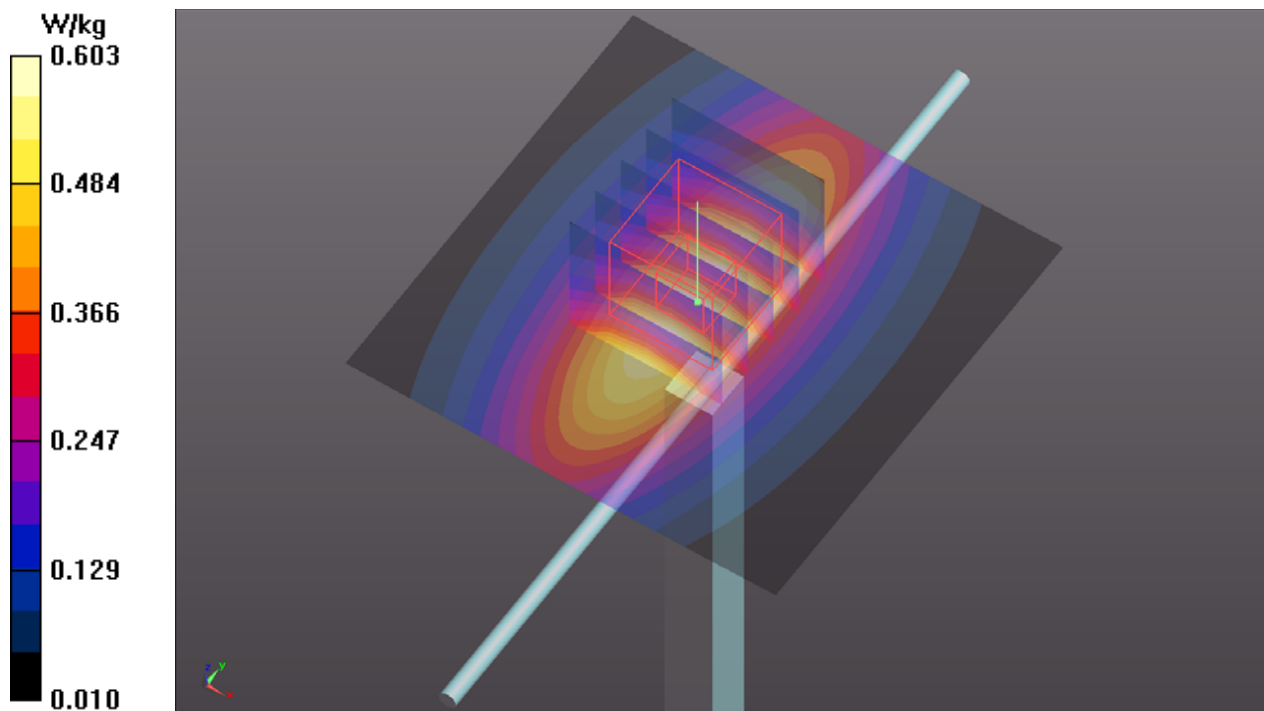
Pin=50mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.72 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.687 W/kg

SAR(1 g) = 0.452 W/kg; SAR(10 g) = 0.293 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.609 W/kg



System Check_H1750_200325

DUT: Dipole 1750 MHz; Type: D1750V2; SN: 1055

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: H16T20N2_0325 Medium parameters used: $f = 1750$ MHz; $\sigma = 1.332$ S/m; $\epsilon_r = 39.648$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.8 °C ; Liquid Temperature : 23.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7472; ConvF(8.68, 8.68, 8.68) @ 1750 MHz; Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2019/05/08
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.62 W/kg

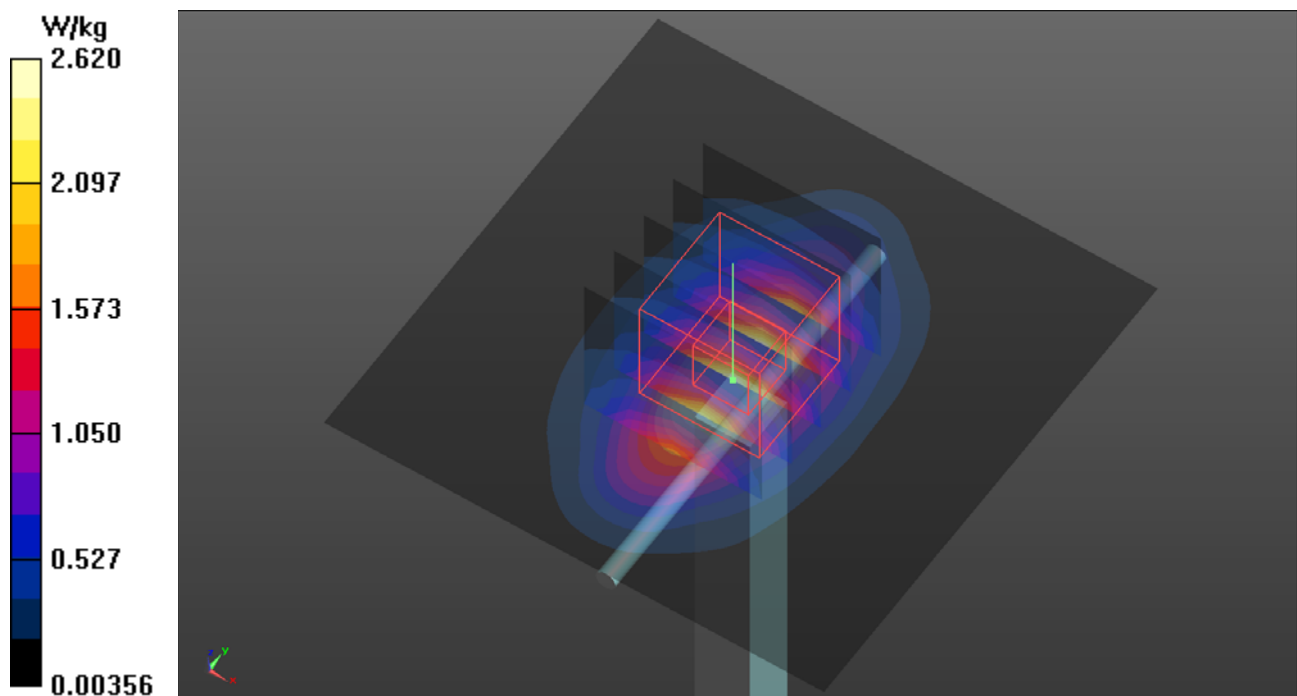
Pin=50mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 45.00 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.07 W/kg

SAR(1 g) = 1.73 W/kg; SAR(10 g) = 0.922 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 2.59 W/kg



System Check_H1900_200327

DUT: Dipole 1900 MHz; Type: D1900V2; SN: 5d036

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: H16T20N1_0327 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.454$ S/m; $\epsilon_r = 40.489$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.7 °C ; Liquid Temperature : 23.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3898; ConvF(8.35, 8.35, 8.35) @ 1900 MHz; Calibrated: 2019/06/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2019/06/20
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.86 W/kg

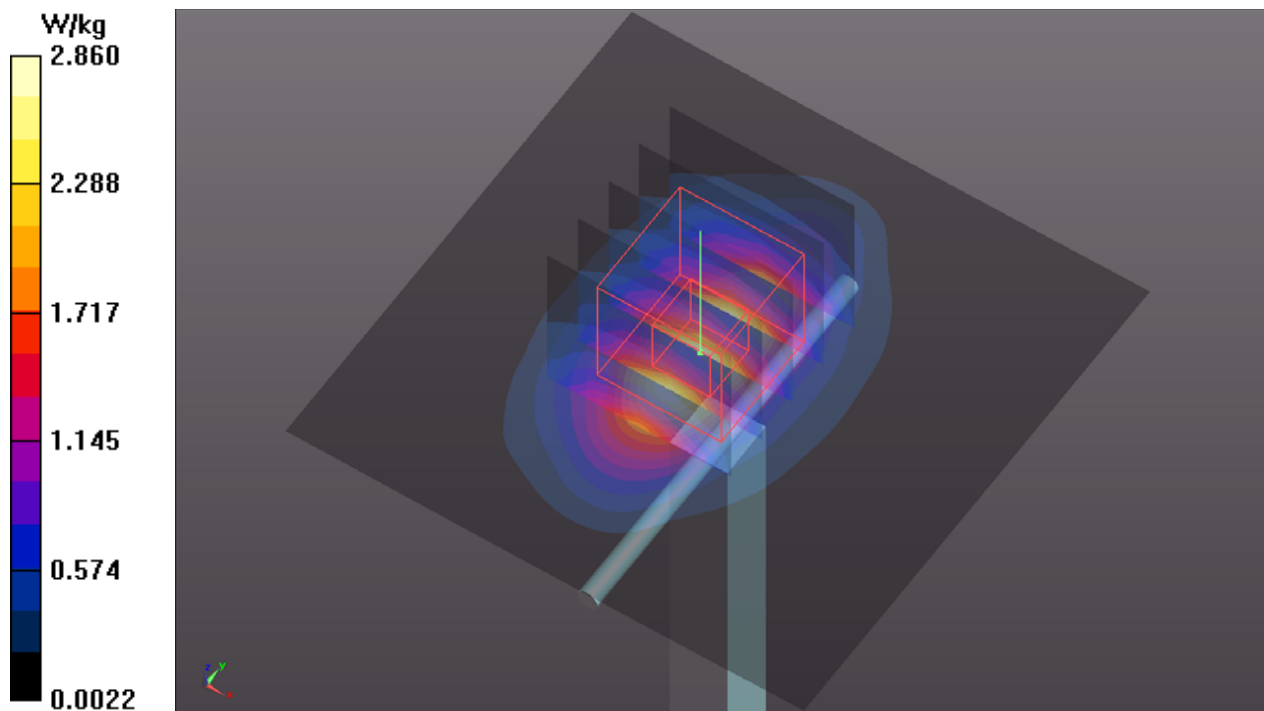
Pin=50mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 44.58 V/m; Power Drift = 0.25 dB

Peak SAR (extrapolated) = 3.53 W/kg

SAR(1 g) = 1.84 W/kg; SAR(10 g) = 0.959 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 2.96 W/kg



System Check_H2300_200327

DUT: Dipole 2300 MHz; Type: D2300V2; SN:1004

Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: H19T27N3_0327 Medium parameters used: $f = 2300$ MHz; $\sigma = 1.713$ S/m; $\epsilon_r = 39.078$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.7 °C ; Liquid Temperature : 23.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3898; ConvF(8.03, 8.03, 8.03) @ 2300 MHz; Calibrated: 2019/06/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2019/06/20
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (81x81x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 3.79 W/kg

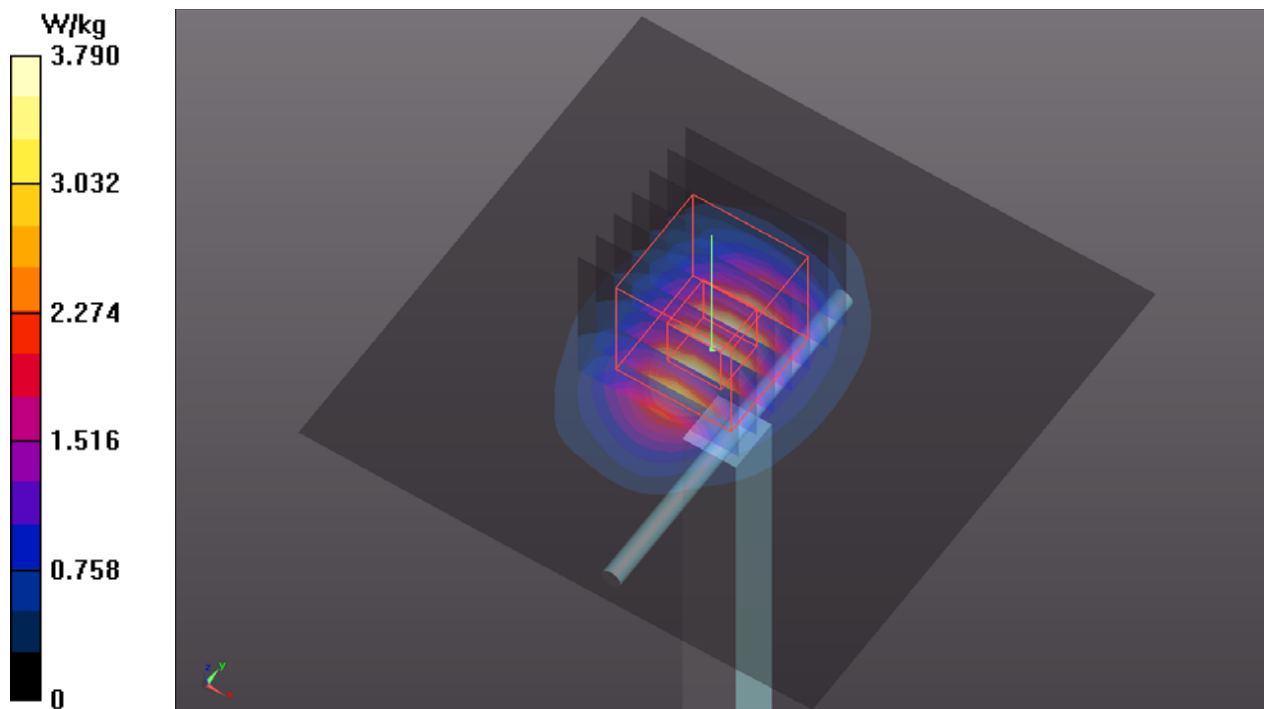
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 46.44 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 4.78 W/kg

SAR(1 g) = 2.3 W/kg; SAR(10 g) = 1.1 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 3.87 W/kg



System Check_H2450_200325

DUT: Dipole 2450 MHz; Type: D2450V2; SN: 737

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: H19T27N1_0325 Medium parameters used (interpolated): $f = 2450$ MHz; $\sigma = 1.885$ S/m; $\epsilon_r = 38.339$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.9 °C ; Liquid Temperature : 23.1 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7472; ConvF(7.7, 7.7, 7.7) @ 2450 MHz; Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2019/05/08
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 3.91 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 45.79 V/m; Power Drift = -0.06 dB

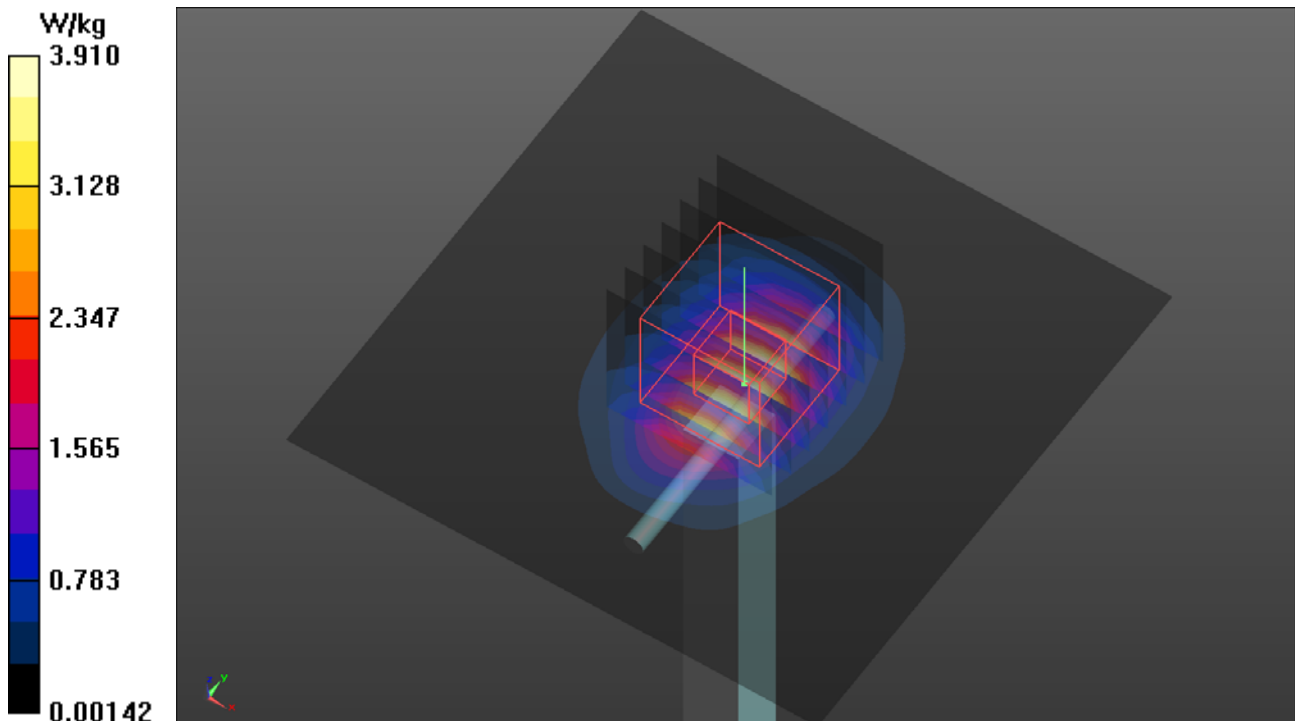
Peak SAR (extrapolated) = 4.90 W/kg

SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.14 W/kg (SAR corrected for target medium)

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 50.5%

Maximum value of SAR (measured) = 4.02 W/kg



System Check_H2600_200401

DUT: Dipole 2600 MHz; Type: D2600V2; SN: 1020

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: H19T27N1_0401 Medium parameters used: $f = 2600$ MHz; $\sigma = 2.012$ S/m; $\epsilon_r = 38.257$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.7 °C ; Liquid Temperature : 23.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3898; ConvF(7.41, 7.41, 7.41) @ 2600 MHz; Calibrated: 2019/06/27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2019/06/20
- Phantom: ELI Phantom_1204; Type: QDOVA;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 4.48 W/kg

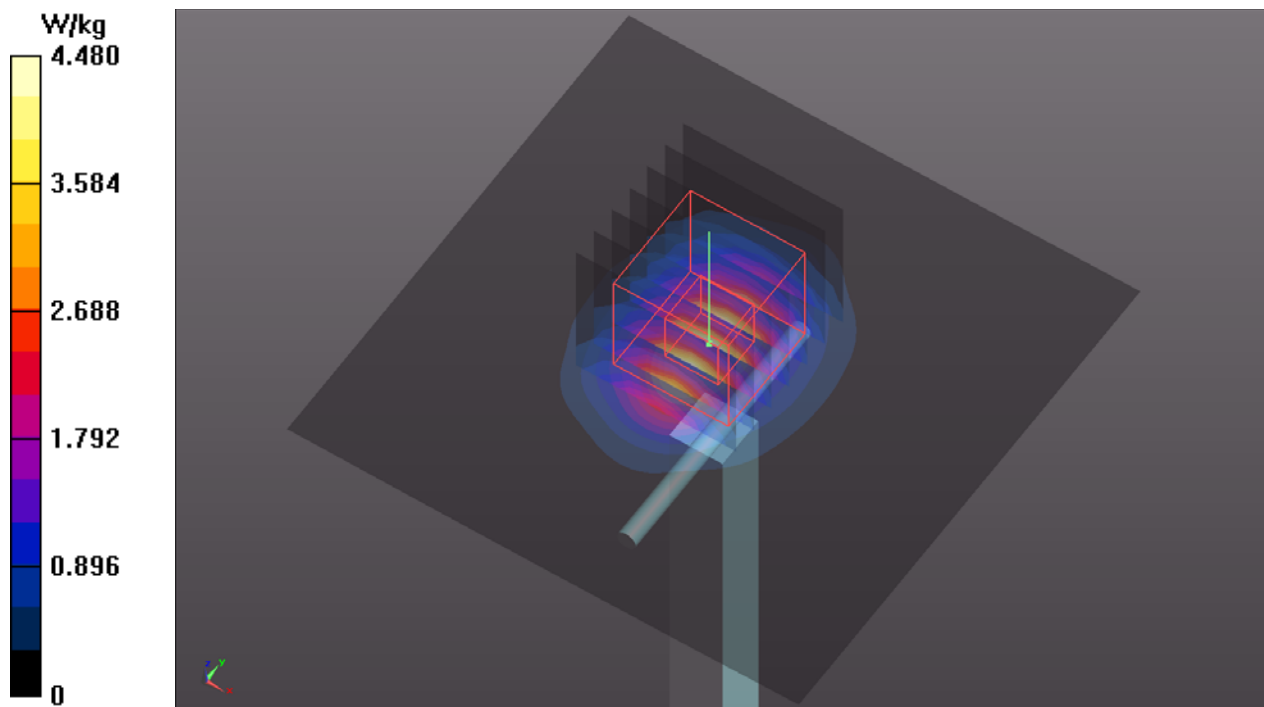
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 46.96 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 5.68 W/kg

SAR(1 g) = 2.59 W/kg; SAR(10 g) = 1.17 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 4.55 W/kg



System Check_H5250_200325

DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1203

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: H34T60N1_0325 Medium parameters used (interpolated): $f = 5250$ MHz; $\sigma = 4.658$ S/m; $\epsilon_r = 37.1$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.9 °C ; Liquid Temperature : 23.1 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7472; ConvF(5.67, 5.67, 5.67) @ 5250 MHz; Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2019/05/08
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 8.46 W/kg

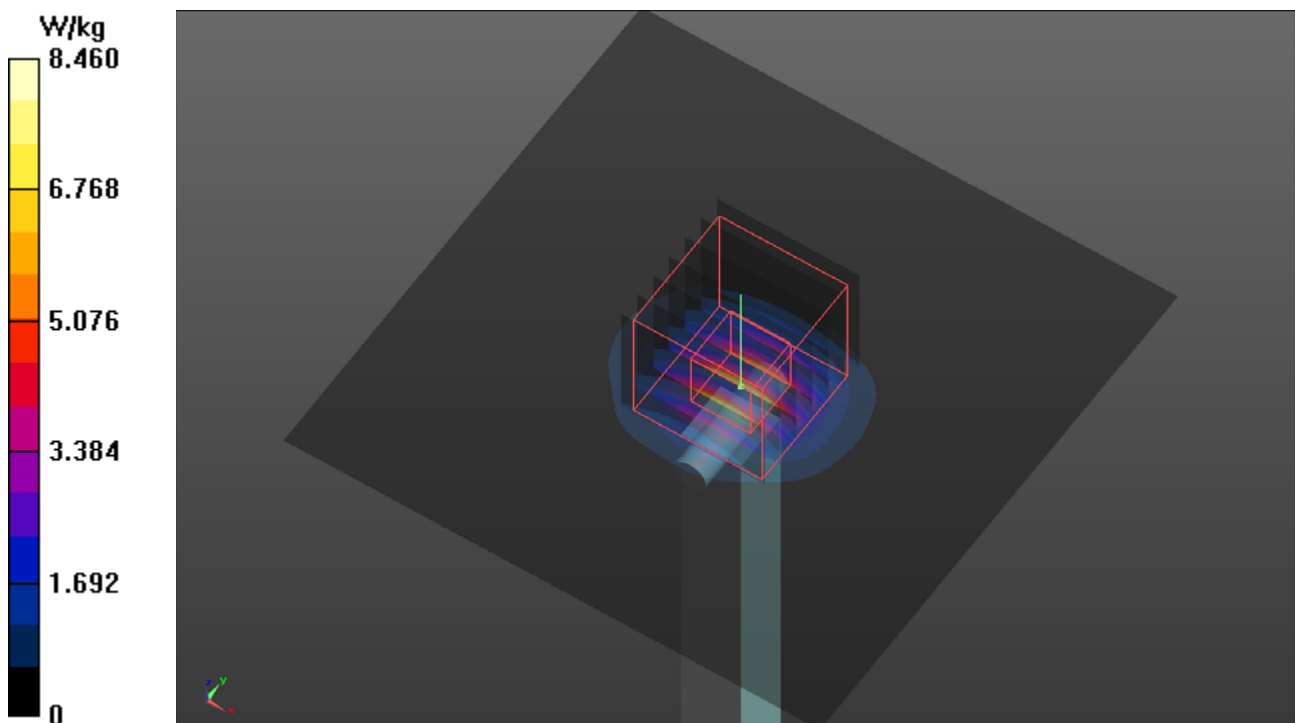
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 44.53 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 14.0 W/kg

SAR(1 g) = 3.65 W/kg; SAR(10 g) = 1.05 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 9.01 W/kg



System Check_H5600_200325

DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1203

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: H34T60N1_0325 Medium parameters used: $f = 5600$ MHz; $\sigma = 4.992$ S/m; $\epsilon_r = 36.659$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.9 °C ; Liquid Temperature : 23.1 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7472; ConvF(5.1, 5.1, 5.1) @ 5600 MHz; Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2019/05/08
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 9.42 W/kg

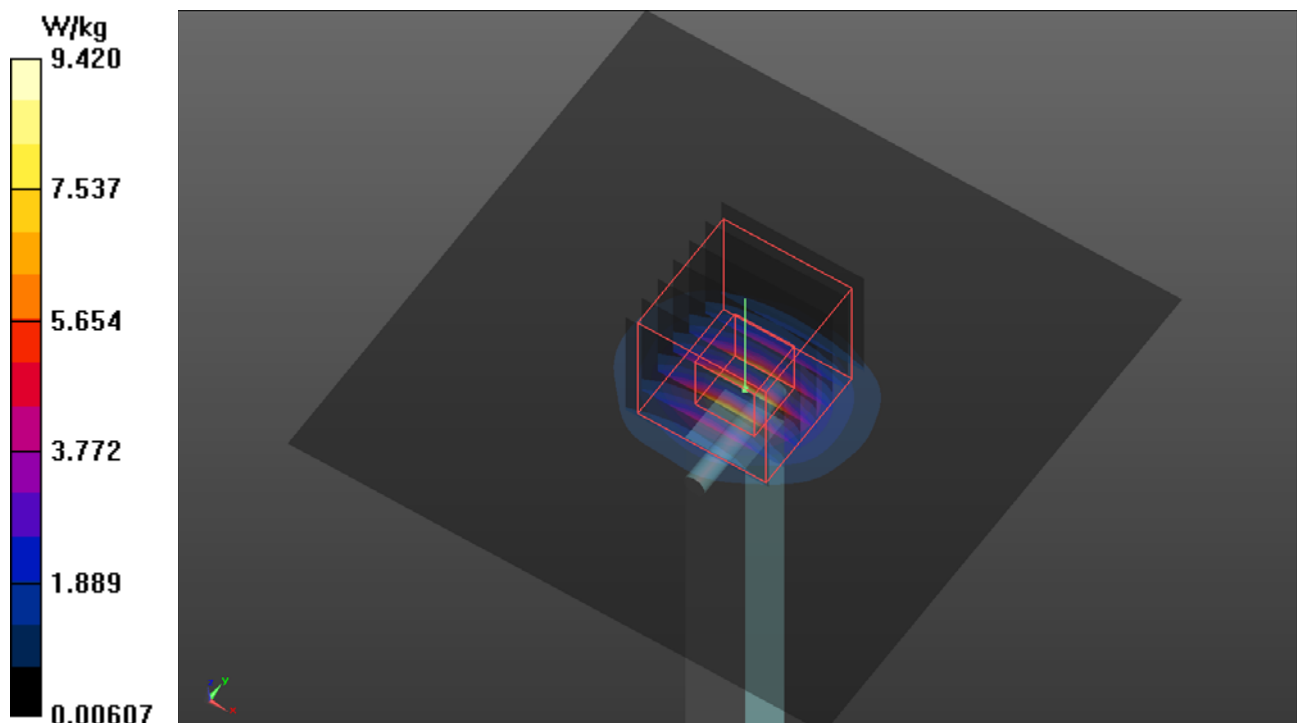
Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 45.17 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 16.1 W/kg

SAR(1 g) = 3.83 W/kg; SAR(10 g) = 1.1 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 9.79 W/kg



System Check_H5750_200325

DUT: Dipole 5 GHz; Type: D5GHzV2; SN: 1203

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: H34T60N1_0325 Medium parameters used: $f = 5750$ MHz; $\sigma = 5.138$ S/m; $\epsilon_r = 36.444$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.9 °C ; Liquid Temperature : 23.1 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN7472; ConvF(5.23, 5.23, 5.23) @ 5750 MHz; Calibrated: 2019/08/30
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2019/05/08
- Phantom: ELI Phantom_2105; Type: QD OVA 004 Ax;
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Pin=50mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 8.61 W/kg

Pin=50mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 42.81 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 15.1 W/kg

SAR(1 g) = 3.52 W/kg; SAR(10 g) = 0.997 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 8.98 W/kg

