FCC SAR Test Report

APPLICANT	**:**	**ZTE CORPORATION**
EQUIPMENT	**:**	**LTE uFi**
BRAND NAME	**:**	**ZTE**
MODEL NAME	**:**	**MF985**
FCC ID	**:**	**SRQ-MF985**
STANDARD	**:**	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2013**

We, Sporton International (Xi'an) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Xi'an) Inc., the test report shall not be reproduced except in full.

Mark Qu

Approved by: Mark Qu / Manager

NVLAP TESTING
NVLAP LAB CODE 600154-0

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Table of Contents

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA7N1502	Rev. 01	Initial issue of report	Jan. 10, 2018

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **ZTE CORPORATION, LTE uFi, MF985,** are as follows.

Equipment Class	Frequency Band		Highest SAR Summary Body-Worn (Separation 10mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
Licensed	WCDMA	Band V	0.64	1.41
		Band IV	**1.19**	
		Band II	1.16	
	LTE	Band 12	0.92	
		Band 14	0.54	
		Band 5	0.65	
		Band 66/Band 4	1.09	
		Band 2	1.15	
		Band 30	0.96	
DTS	WLAN	2.4GHz WLAN	0.12	1.41
NII		5GHz WLAN	0.35	1.39
Date of Testing:		2017/11/30 ~ 2017/12/10		

Remark: This device supports LTE B66 and B4. Since the supported frequency span for LTE B4 falls completely within the supports frequency span for B66, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for B66.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/kg as averaged over any 1 gram of tissue) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Testing Laboratory	
Test Site	Sporton International (Xi'an) Inc.
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Applicant	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China

Manufacturer	
Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	LTE uFi
Brand Name	ZTE
Model Name	MF985
FCC ID	SRQ-MF985
IMEI Code	004400152020002
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 30 : 2307.5 MHz ~ 2312.5 MHz LTE Band 66: 1710.7 MHz ~1779.3 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80
HW Version	MF985HW1.0
SW Version	MF985V1.3
EUT Stage	Identical Prototype
Remark: 1. This device does not support voice function. 2. This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO). 3. This device has two WWAN antennas. WWAN antenna 1 is located at the right side of the device and WWAN antenna 2 is located at the top side of the device which can refer to antenna location chapter. WWAN antenna 1 frequency bands include WCDMA B2 / B4 / B5 and LTE B2 / B4 / B5 / B12 / B14 / B66 and WWAN antenna 2 frequency bands only includes LTE B30. And they can't transmit simultaneously.	

4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	SRQ-MF985
Equipment Name	LTE uFi
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 14: 790.5 MHz ~ 795.5 MHz LTE Band 30 : 2307.5 MHz ~ 2312.5 MHz LTE Band 66: 1710.7 MHz ~1779.3 MHz
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 12:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 30: 5MHz, 10MHz LTE Band 66: 1.4MHz, 3MHz,5MHz, 10MHz, 15MHz, 20MHz
Uplink Modulations Used	QPSK, 16QAM and 64QAM
LTE Voice / Data requirements	Data Only
LTE Release Version	R11, Cat8
CA Support	Yes, Downlink Only
LTE MPR permanently built-in by design	**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3**

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

LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.
LTE Carrier Aggregation Combinations	Inter-Band possible combinations as below page and the detail power verification please referred to section 12.
LTE Carrier Aggregation Additional Information	This device supports maximum of 2 and 3 carriers in the downlink only. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. The following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 12								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	23017	699.7	23025	700.5	23035	701.5	23060	704
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5
H	23173	715.3	23165	714.5	23155	713.5	23130	711
LTE Band 14				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq. (MHz)
L	23305	790.5	23330	793
M	23330	793		
H	23355	795.5		
LTE Band 30				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	27685	2307.5	27710	2310
M	27710	2310		
H	27735	2312.5		
LTE Band 66												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	131979	1710.7	131987	1711.5	131997	1712.5	132022	1715	132047	1717.5	132072	1720
M	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745	132322	1745
H	132665	1779.3	132657	1778.5	132647	1777.5	132622	1775	132597	1772.5	132572	1770

5. RF Exposure Limits

5.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

5.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

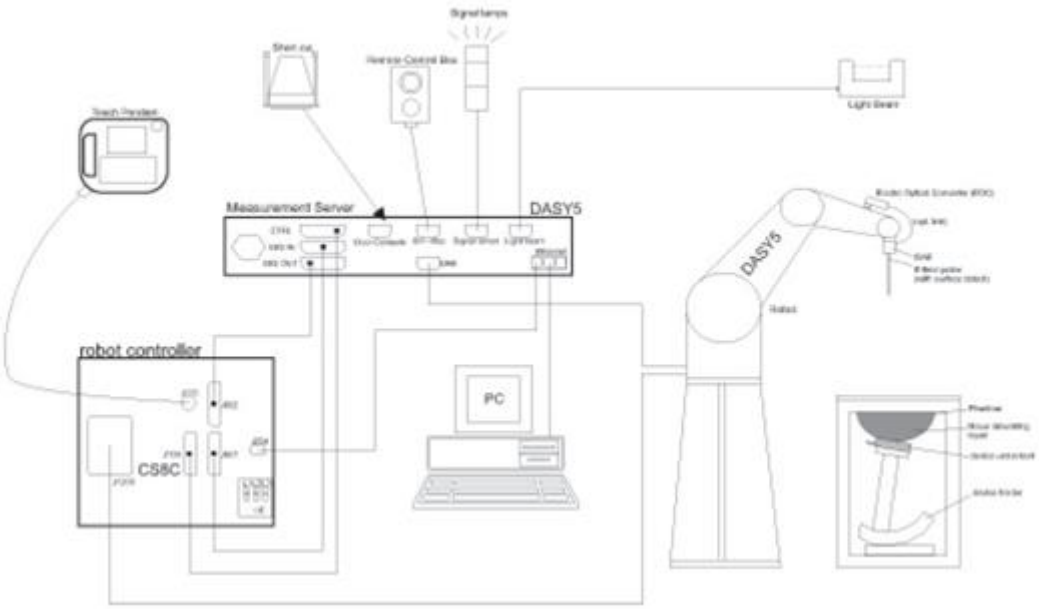
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

The DASY system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

7.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).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. This probe has a built in optical surface detection system to prevent from collision with phantom.

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/g)
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

7.2 Data Acquisition Electronics (DAE)

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

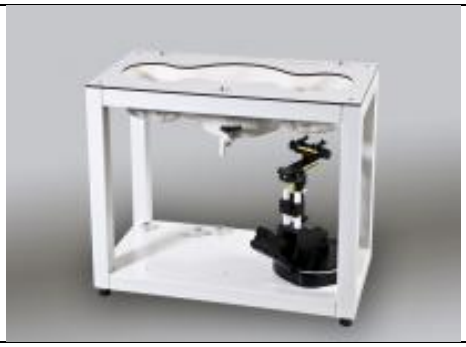
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

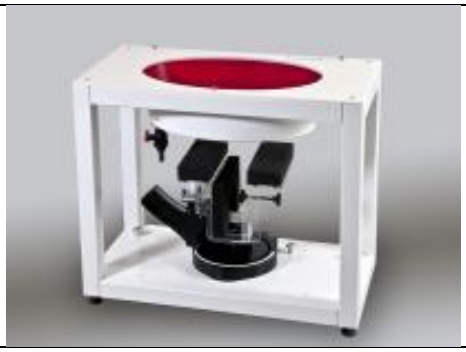
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)
Filling Volume	Approx. 30 liters
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm



The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c 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). And 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.

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

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

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

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

8.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

8.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

8.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ $1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

8.5 Volume Scan Procedures

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.

8.6 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 drifts more than 5%, the SAR will be retested.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1087	2017/3/20	2018/3/19
SPEAG	835MHz System Validation Kit	D835V2	4d151	2017/3/20	2018/3/19
SPEAG	1750MHz System Validation Kit	D1750V2	1090	2017/3/23	2018/3/22
SPEAG	1900MHz System Validation Kit	D1900V2	5d170	2017/3/22	2018/3/21
SPEAG	2300MHz System Validation Kit	D2300V2	1055	2017/8/30	2018/8/29
SPEAG	2450MHz System Validation Kit	D2450V2	908	2017/3/21	2018/3/20
SPEAG	5GHz System Validation Kit	D5GHzV2	1128	2017/9/25	2018/9/24
SPEAG	Data Acquisition Electronics	DAE4	1358	2017/10/24	2018/10/23
SPEAG	Dosimetric E-Field Probe	EX3DV4	3958	2016/12/12	2017/12/11
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1753	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1754	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201563814	2017/1/19	2018/1/18
Anritsu	Radio communication analyzer	MT8821C	6201692204	2017/3/29	2018/3/28
Agilent	Wireless Communication Test Set	E5515C	MY52102706	2017/4/18	2018/4/17
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2017/4/18	2018/4/17
Agilent	Dielectric Probe Kit	85070E	MY44300751	NCR	NCR
R&S	Signal Generator	N5181A	MY50145381	2017/1/3	2018/1/2
Anritsu	Power Senor	MA2411B	1644003	2016/12/23	2017/12/22
Anritsu	Power Meter	ML2495A	1531197	2016/12/23	2017/12/22
Anritsu	Power Senor	MA2411B	1644004	2016/12/23	2017/12/22
Anritsu	Power Meter	ML2495A	1531198	2016/12/23	2017/12/22
EXA	Spectrum Analyzer	N9010A	MY55150244	2017/4/18	2018/4/17
TES	Liquid thermometer	TES 1310	141004807	2017/4/21	2018/4/20
VICTOR	Temperature and humidity meter	VC230	H-3	2017/4/18	2018/4/17
ARRA	Power Divider	A3200-2	NA	Note	
Agilent	Dual Directional Coupler	778D	50422	Note	
PASTERNACK	Dual Directional Coupler	PE2214-10	N/A	Note	
Woken	Attenuation1	WK0602-XX	N/A	Note	
PE	Attenuation2	PE7005-10	N/A	Note	
PE	Attenuation3	PE7005-3	N/A	Note	
AR	Amplifier	5S1G4	333096	Note	
mini-circuits	Amplifier	ZVE-3W-83+	162601250	Note	

Note:
Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check

10. System Verification

10.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1.

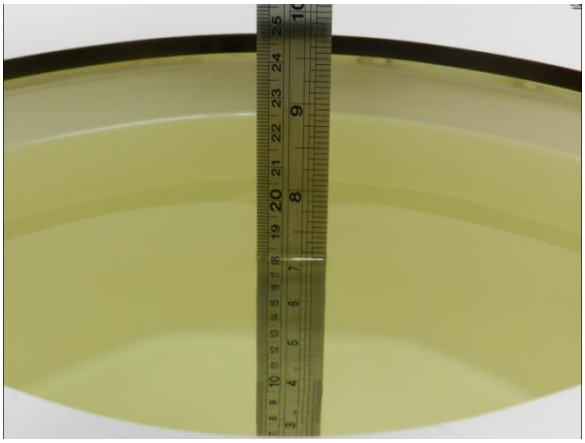


Fig 10.1 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Body	22.5	0.971	57.377	0.96	55.50	1.15	3.38	±5	2017/12/1
835	Body	22.3	1.000	55.844	0.97	55.20	3.09	1.17	±5	2017/12/1
1750	Body	22.0	1.471	54.740	1.49	53.40	-1.28	2.51	±5	2017/12/7
1900	Body	22.5	1.564	51.892	1.52	53.30	2.89	-2.64	±5	2017/11/30
2300	Body	22.4	1.735	54.166	1.81	52.90	-4.14	2.39	±5	2017/11/30
2450	Body	22.4	1.988	54.096	1.95	52.70	1.95	2.65	±5	2017/12/10
5200	Body	22.6	5.432	49.221	5.30	49.00	2.49	0.45	±5	2017/12/10
5800	Body	22.6	5.956	46.473	6.00	48.20	-0.73	-3.58	±5	2017/12/10

10.3 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2017/12/1	750	Body	250	1087	3958	1358	2.28	8.73	9.12	4.47
2017/12/1	835	Body	250	4d151	3958	1358	2.49	9.72	9.96	2.47
2017/12/7	1750	Body	250	1090	3958	1358	9.06	38.10	36.24	-4.88
2017/11/30	1900	Body	250	5d170	3958	1358	10.50	40.70	42.00	3.19
2017/11/30	2300	Body	250	1055	3958	1358	12.30	48.90	49.20	0.61
2017/12/10	2450	Body	250	908	3958	1358	13.10	50.90	52.40	2.95
2017/12/10	5200	Body	100	1128	3958	1358	7.55	74.60	75.50	1.21
2017/12/10	5800	Body	100	1128	3958	1358	7.35	78.20	73.50	-6.01

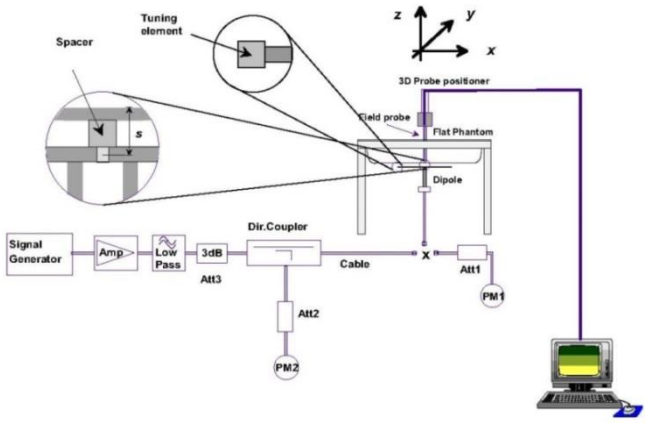


Fig 8.3.1 System Performance Check Setup

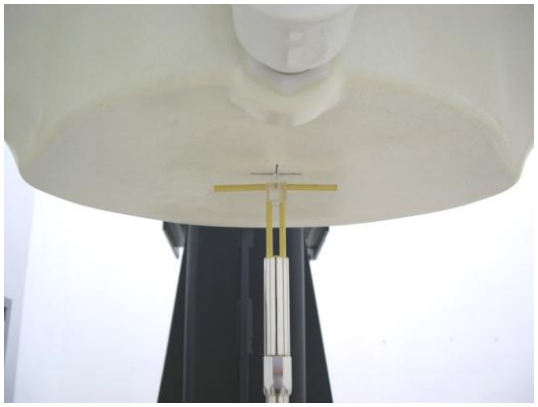


Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 Body Position

(a) To position the device parallel to the phantom surface with all surfaces of the device.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device and the flat phantom to 10 mm.

<EUT Setup Photos>

Please refer to Appendix D for the test setup photos.

11.2 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

12. Conducted RF Output Power (Unit: dBm)

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 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	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
      a). Subtest 1: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

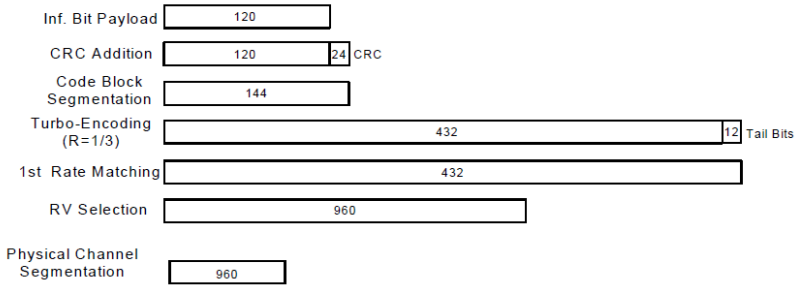


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

General Note:

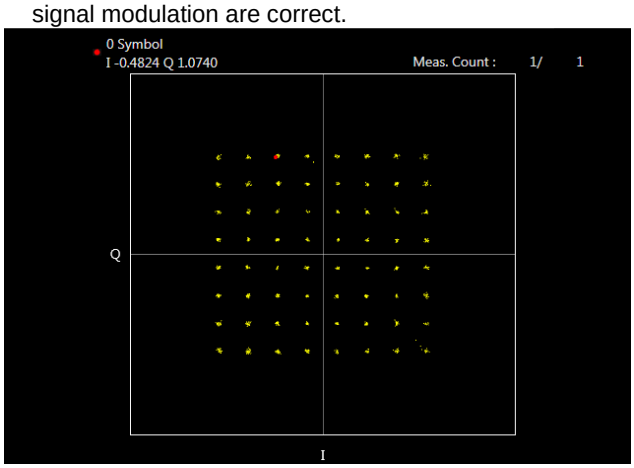
1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band IV			Tune-up Limit (dBm)	WCDMA Band V			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6		826.4	836.4	846.6	
3GPP Rel 99	RMC 12.2Kbps	22.33	**22.39**	22.38	23.00	22.64	**22.65**	22.50	23.50	**22.92**	22.90	22.91	23.50
3GPP Rel 6	HSDPA Subtest-1	21.41	21.48	21.42	22.00	21.26	21.49	21.42	22.00	21.71	21.84	21.94	22.00
3GPP Rel 6	HSDPA Subtest-2	21.45	21.52	21.45	22.00	21.51	21.52	21.46	22.00	21.80	21.83	21.92	22.00
3GPP Rel 6	HSDPA Subtest-3	21.02	21.00	21.01	21.50	20.80	21.02	20.94	21.50	21.30	21.36	21.44	21.50
3GPP Rel 6	HSDPA Subtest-4	20.92	21.00	21.03	21.50	20.87	20.97	20.95	21.50	21.27	21.32	21.40	21.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.38	21.46	21.42	22.00	21.20	21.45	21.42	22.00	21.71	21.82	21.94	22.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.42	21.48	21.41	22.00	21.48	21.48	21.45	22.00	21.58	21.75	21.89	22.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.10	21.00	21.01	21.50	20.76	21.01	20.93	21.50	21.21	21.28	21.38	21.50
3GPP Rel 8	DC-HSDPA Subtest-4	20.89	20.96	20.99	21.50	20.85	20.92	20.91	21.50	21.26	21.32	21.29	21.50
3GPP Rel 6	HSUPA Subtest-1	21.00	21.03	21.00	21.50	21.30	21.34	21.28	21.50	21.40	21.48	21.45	22.00
3GPP Rel 6	HSUPA Subtest-2	19.49	19.54	19.50	20.00	19.50	19.53	19.49	20.00	19.85	19.82	19.80	20.50
3GPP Rel 6	HSUPA Subtest-3	20.10	20.17	20.15	20.50	20.45	20.48	20.40	20.50	20.55	20.52	20.50	21.00
3GPP Rel 6	HSUPA Subtest-4	19.49	19.54	19.50	20.00	19.50	19.55	19.50	20.00	19.75	19.79	19.80	20.50
3GPP Rel 6	HSUPA Subtest-5	20.11	20.19	20.15	20.50	20.38	20.40	20.25	20.50	20.55	20.56	20.50	21.00

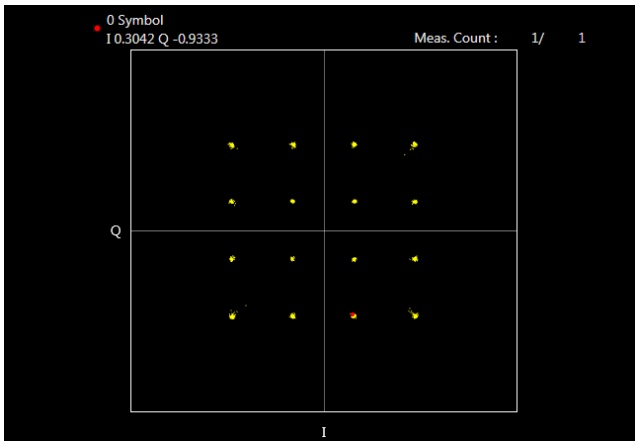
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation 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.
6. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE B4 SAR test was covered by B66; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.46	22.60	22.58	23.5	0
20	QPSK	1	49	22.20	22.37	22.33		
20	QPSK	1	99	22.40	22.52	22.61		
20	QPSK	50	0	21.30	21.35	21.35	22.5	1
20	QPSK	50	24	21.25	21.28	21.41		
20	QPSK	50	50	21.32	21.28	21.42		
20	QPSK	100	0	21.29	21.29	21.44		
20	16QAM	1	0	21.52	21.67	21.77	22.5	1
20	16QAM	1	49	21.39	21.47	21.54		
20	16QAM	1	99	21.65	21.58	21.72		
20	16QAM	50	0	20.29	20.36	20.33	21.5	2
20	16QAM	50	24	20.28	20.31	20.41		
20	16QAM	50	50	20.37	20.32	20.46		
20	16QAM	100	0	20.31	20.28	20.46		
20	64QAM	1	0	20.26	20.33	20.35	21.5	2
20	64QAM	1	49	20.05	20.10	20.15		
20	64QAM	1	99	20.25	20.30	20.42		
20	64QAM	50	0	19.10	19.15	19.23	20.5	3
20	64QAM	50	24	19.10	19.12	19.23		
20	64QAM	50	50	19.20	19.11	19.22		
20	64QAM	100	0	19.00	19.12	19.23		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.23	22.37	22.31	23.5	0
15	QPSK	1	37	22.11	22.19	22.33		
15	QPSK	1	74	22.31	22.31	22.38		
15	QPSK	36	0	21.34	21.34	21.38	22.5	1
15	QPSK	36	20	21.25	21.34	21.36		
15	QPSK	36	39	21.32	21.37	21.43		
15	QPSK	75	0	21.25	21.36	21.42		
15	16QAM	1	0	21.47	21.66	21.67	22.5	1
15	16QAM	1	37	21.38	21.44	21.49		
15	16QAM	1	74	21.57	21.56	21.67		
15	16QAM	36	0	20.31	20.31	20.34	21.5	2
15	16QAM	36	20	20.22	20.34	20.42		
15	16QAM	36	39	20.32	20.32	20.42		
15	16QAM	75	0	20.25	20.30	20.44		
15	64QAM	1	0	20.10	20.17	20.20	21.5	2
15	64QAM	1	37	20.11	20.14	20.15		
15	64QAM	1	74	20.32	20.23	20.22		
15	64QAM	36	0	19.05	19.06	19.12	20.5	3
15	64QAM	36	20	19.01	19.07	19.12		
15	64QAM	36	39	19.01	19.08	19.18		
15	64QAM	75	0	19.00	18.98	19.02		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.41	22.57	22.58	23.5	0
10	QPSK	1	25	22.13	22.11	22.32		
10	QPSK	1	49	22.11	22.09	22.34		
10	QPSK	25	0	21.36	21.45	21.50	22.5	1
10	QPSK	25	12	21.20	21.28	21.45		
10	QPSK	25	25	21.20	21.30	21.38		
10	QPSK	50	0	21.33	21.31	21.46		
10	16QAM	1	0	21.59	21.77	21.88	22.5	1
10	16QAM	1	25	21.38	21.44	21.55		
10	16QAM	1	49	21.44	21.43	21.64		
10	16QAM	25	0	20.37	20.42	20.52	21.5	2
10	16QAM	25	12	20.18	20.26	20.50		
10	16QAM	25	25	20.15	20.26	20.39		
10	16QAM	50	0	20.29	20.32	20.48		
10	64QAM	1	0	20.30	20.37	20.42	21.5	2
10	64QAM	1	25	20.12	20.07	20.15		
10	64QAM	1	49	20.05	20.08	20.10		
10	64QAM	25	0	19.20	19.08	19.15	20.5	3
10	64QAM	25	12	19.05	18.98	19.02		
10	64QAM	25	25	19.01	19.04	19.12		
10	64QAM	50	0	19.20	19.05	19.05		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.22	22.41	22.42	23.5	0
5	QPSK	1	12	22.01	22.15	22.29		
5	QPSK	1	24	22.06	22.20	22.32		
5	QPSK	12	0	21.23	21.29	21.31	22.5	1
5	QPSK	12	7	21.15	21.24	21.34		
5	QPSK	12	13	21.13	21.21	21.35		
5	QPSK	25	0	21.11	21.25	21.32		
5	16QAM	1	0	21.47	21.66	21.65	22.5	1
5	16QAM	1	12	21.38	21.49	21.62		
5	16QAM	1	24	21.40	21.50	21.58		
5	16QAM	12	0	20.23	20.32	20.46	21.5	2
5	16QAM	12	7	20.16	20.23	20.42		
5	16QAM	12	13	20.13	20.21	20.40		
5	16QAM	25	0	20.17	20.24	20.33		
5	64QAM	1	0	20.20	20.22	20.25	21.5	2
5	64QAM	1	12	20.01	20.05	20.12		
5	64QAM	1	24	20.01	20.10	20.15		
5	64QAM	12	0	19.05	19.06	19.16	20.5	3
5	64QAM	12	7	19.00	19.06	19.15		
5	64QAM	12	13	19.00	18.98	19.02		
5	64QAM	25	0	18.99	18.95	19.12		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.09	22.24	22.33	23.5	0
3	QPSK	1	8	22.10	22.24	22.27		
3	QPSK	1	14	22.06	22.11	22.21		
3	QPSK	8	0	21.18	21.27	21.32	22.5	1
3	QPSK	8	4	21.21	21.32	21.31		
3	QPSK	8	7	21.18	21.24	21.28		
3	QPSK	15	0	21.18	21.29	21.30		
3	16QAM	1	0	21.39	21.56	21.57	22.5	1
3	16QAM	1	8	21.45	21.54	21.52		
3	16QAM	1	14	21.40	21.42	21.48		
3	16QAM	8	0	20.35	20.37	20.40	21.5	2
3	16QAM	8	4	20.37	20.40	20.44		
3	16QAM	8	7	20.31	20.36	20.39		
3	16QAM	15	0	20.26	20.33	20.36		
3	64QAM	1	0	20.10	20.16	20.23	21.5	2
3	64QAM	1	8	20.10	20.12	20.16		
3	64QAM	1	14	20.02	20.10	20.22		
3	64QAM	8	0	19.16	19.13	19.25	20.5	3
3	64QAM	8	4	19.30	19.08	19.24		
3	64QAM	8	7	19.02	19.03	19.07		
3	64QAM	15	0	19.06	19.04	19.12		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.08	22.13	22.16	23.5	0
1.4	QPSK	1	3	22.15	22.14	22.29		
1.4	QPSK	1	5	22.08	22.07	22.19		
1.4	QPSK	3	0	22.18	22.17	22.37		
1.4	QPSK	3	1	22.22	22.22	22.39		
1.4	QPSK	3	3	22.21	22.18	22.35		
1.4	QPSK	6	0	21.21	21.15	21.41	22.5	1
1.4	16QAM	1	0	21.37	21.32	21.49	22.5	1
1.4	16QAM	1	3	21.42	21.41	21.63		
1.4	16QAM	1	5	21.32	21.42	21.47		
1.4	16QAM	3	0	21.21	21.20	21.31		
1.4	16QAM	3	1	21.26	21.27	21.38		
1.4	16QAM	3	3	21.17	21.20	21.32		
1.4	16QAM	6	0	20.26	20.25	20.39	21.5	2
1.4	64QAM	1	0	20.15	20.07	20.13	21.5	2
1.4	64QAM	1	3	20.04	20.07	20.00		
1.4	64QAM	1	5	19.82	19.98	19.92		
1.4	64QAM	3	0	20.00	20.04	20.12		
1.4	64QAM	3	1	20.08	20.10	20.16		
1.4	64QAM	3	3	20.00	20.04	20.15		
1.4	64QAM	6	0	19.00	18.90	19.04	20.5	3

<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	22.21	22.24	22.23	23	0
20	QPSK	1	49	22.40	22.50	22.26		
20	QPSK	1	99	22.12	22.16	22.11		
20	QPSK	50	0	21.22	21.22	21.34	22	1
20	QPSK	50	24	21.29	21.29	21.33		
20	QPSK	50	50	21.03	21.16	21.13		
20	QPSK	100	0	21.12	21.13	21.23		
20	16QAM	1	0	21.25	21.20	21.37	22	1
20	16QAM	1	49	21.48	21.51	21.58		
20	16QAM	1	99	21.21	21.31	21.30		
20	16QAM	50	0	20.20	20.21	20.32	21	2
20	16QAM	50	24	20.22	20.28	20.35		
20	16QAM	50	50	20.04	20.17	20.16		
20	16QAM	100	0	20.12	20.13	20.27		
20	64QAM	1	0	20.01	20.10	20.00	21	2
20	64QAM	1	49	20.12	20.26	20.20		
20	64QAM	1	99	20.00	20.09	20.03		
20	64QAM	50	0	19.00	19.05	19.30	20	3
20	64QAM	50	24	19.02	19.14	19.00		
20	64QAM	50	50	19.30	18.98	19.02		
20	64QAM	100	0	19.20	19.02	19.05		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	22.05	21.99	22.15	23	0
15	QPSK	1	37	22.30	22.25	22.28		
15	QPSK	1	74	21.86	21.95	21.97		
15	QPSK	36	0	21.19	21.25	21.32	22	1
15	QPSK	36	20	21.26	21.28	21.36		
15	QPSK	36	39	21.11	21.26	21.31		
15	QPSK	75	0	21.17	21.18	21.30		
15	16QAM	1	0	21.23	21.27	21.32	22	1
15	16QAM	1	37	21.45	21.49	21.54		
15	16QAM	1	74	21.07	21.24	21.17		
15	16QAM	36	0	20.18	20.23	20.30	21	2
15	16QAM	36	20	20.28	20.27	20.37		
15	16QAM	36	39	20.11	20.20	20.22		
15	16QAM	75	0	20.20	20.19	20.27		
15	64QAM	1	0	19.86	19.96	19.80	21	2
15	64QAM	1	37	20.20	20.29	20.25		
15	64QAM	1	74	19.88	20.00	19.85		
15	64QAM	36	0	19.10	19.11	19.00	20	3
15	64QAM	36	20	19.15	19.17	19.01		
15	64QAM	36	39	19.00	19.01	18.98		
15	64QAM	75	0	19.00	19.05	18.86		

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	22.35	22.41	22.43	23	0
10	QPSK	1	25	22.20	22.22	22.33		
10	QPSK	1	49	22.30	22.48	22.49		
10	QPSK	25	0	21.31	21.33	21.45	22	1
10	QPSK	25	12	21.35	21.32	21.41		
10	QPSK	25	25	21.30	21.44	21.43		
10	QPSK	50	0	21.38	21.36	21.41		
10	16QAM	1	0	21.68	21.72	21.82	22	1
10	16QAM	1	25	21.53	21.49	21.60		
10	16QAM	1	49	21.62	21.76	21.78		
10	16QAM	25	0	20.33	20.36	20.46	21	2
10	16QAM	25	12	20.38	20.31	20.43		
10	16QAM	25	25	20.31	20.44	20.43		
10	16QAM	50	0	20.38	20.34	20.41		
10	64QAM	1	0	20.35	20.41	20.40	21	2
10	64QAM	1	25	20.20	20.23	20.15		
10	64QAM	1	49	20.30	20.37	20.24		
10	64QAM	25	0	19.10	19.17	19.05	20	3
10	64QAM	25	12	19.10	19.17	19.25		
10	64QAM	25	25	19.10	19.17	19.25		
10	64QAM	50	0	19.20	19.18	19.20		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.33	22.37	22.44	23	0
5	QPSK	1	12	22.16	22.23	22.31		
5	QPSK	1	24	22.22	22.33	22.31		
5	QPSK	12	0	21.32	21.34	21.41	22	1
5	QPSK	12	7	21.28	21.32	21.42		
5	QPSK	12	13	21.21	21.27	21.37		
5	QPSK	25	0	21.22	21.29	21.36		
5	16QAM	1	0	21.66	21.67	21.73	22	1
5	16QAM	1	12	21.47	21.57	21.62		
5	16QAM	1	24	21.44	21.60	21.59		
5	16QAM	12	0	20.36	20.35	20.44	21	2
5	16QAM	12	7	20.28	20.34	20.44		
5	16QAM	12	13	20.23	20.25	20.38		
5	16QAM	25	0	20.28	20.34	20.39		
5	64QAM	1	0	20.30	20.40	20.35	21	2
5	64QAM	1	12	20.10	20.18	20.25		
5	64QAM	1	24	20.05	20.21	20.30		
5	64QAM	12	0	19.30	19.24	19.35	20	3
5	64QAM	12	7	19.30	19.21	19.35		
5	64QAM	12	13	19.02	19.16	19.20		
5	64QAM	25	0	19.02	19.13	19.20		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.23	22.27	22.33	23	0
3	QPSK	1	8	22.18	22.28	22.31		
3	QPSK	1	14	22.10	22.19	22.26		
3	QPSK	8	0	21.29	21.30	21.39	22	1
3	QPSK	8	4	21.27	21.27	21.41		
3	QPSK	8	7	21.24	21.24	21.36		
3	QPSK	15	0	21.25	21.24	21.37		
3	16QAM	1	0	21.61	21.61	21.66	22	1
3	16QAM	1	8	21.47	21.54	21.62		
3	16QAM	1	14	21.38	21.47	21.60		
3	16QAM	8	0	20.40	20.40	20.50	21	2
3	16QAM	8	4	20.39	20.39	20.51		
3	16QAM	8	7	20.34	20.36	20.45		
3	16QAM	15	0	20.30	20.32	20.41		
3	64QAM	1	0	20.13	20.21	20.05	21	2
3	64QAM	1	8	20.10	20.19	20.23		
3	64QAM	1	14	20.05	20.18	20.20		
3	64QAM	8	0	19.26	19.17	19.30	20	3
3	64QAM	8	4	19.05	19.18	19.10		
3	64QAM	8	7	19.10	19.13	19.25		
3	64QAM	15	0	19.05	19.13	19.20		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	22.15	22.14	22.28	23	0
1.4	QPSK	1	3	22.22	22.18	22.31		
1.4	QPSK	1	5	22.15	22.17	22.26		
1.4	QPSK	3	0	22.25	22.25	22.32		
1.4	QPSK	3	1	22.28	22.28	22.40		
1.4	QPSK	3	3	22.22	22.28	22.36		
1.4	QPSK	6	0	21.20	21.24	21.33	22	1
1.4	16QAM	1	0	21.44	21.40	21.54	22	1
1.4	16QAM	1	3	21.49	21.49	21.63		
1.4	16QAM	1	5	21.36	21.46	21.50		
1.4	16QAM	3	0	21.23	21.28	21.32		
1.4	16QAM	3	1	21.25	21.24	21.34		
1.4	16QAM	3	3	21.20	21.13	21.31		
1.4	16QAM	6	0	20.29	20.27	20.42	21	2
1.4	64QAM	1	0	20.01	20.11	20.20	21	2
1.4	64QAM	1	3	20.13	20.16	20.15		
1.4	64QAM	1	5	20.01	20.13	20.13		
1.4	64QAM	3	0	20.01	20.10	20.06		
1.4	64QAM	3	1	20.01	20.18	20.15		
1.4	64QAM	3	3	20.35	20.14	20.34		
1.4	64QAM	6	0	19.23	19.03	19.10	20	3

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	23.12	23.25	23.12	23.5	0
10	QPSK	1	25	23.18	23.24	23.11		
10	QPSK	1	49	23.14	23.12	23.11		
10	QPSK	25	0	21.93	21.85	21.87	22.5	1
10	QPSK	25	12	22.04	21.88	21.90		
10	QPSK	25	25	21.99	21.89	21.88		
10	QPSK	50	0	22.04	21.88	21.98		
10	16QAM	1	0	22.17	22.10	21.97	22.5	1
10	16QAM	1	25	22.18	22.09	22.02		
10	16QAM	1	49	22.06	22.04	22.04		
10	16QAM	25	0	20.91	20.80	20.83	21.5	2
10	16QAM	25	12	21.04	20.84	20.88		
10	16QAM	25	25	20.92	20.80	20.84		
10	16QAM	50	0	20.99	20.81	20.90		
10	64QAM	1	0	21.20	21.30	21.16	21.5	2
10	64QAM	1	25	21.23	21.33	21.23		
10	64QAM	1	49	21.30	21.26	21.15		
10	64QAM	25	0	20.13	20.24	20.23	20.5	3
10	64QAM	25	12	20.20	20.25	20.13		
10	64QAM	25	25	20.20	20.23	20.30		
10	64QAM	50	0	20.13	20.23	20.21		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.98	22.81	22.78	23.5	0
5	QPSK	1	12	22.89	22.87	22.65		
5	QPSK	1	24	22.93	22.88	22.78		
5	QPSK	12	0	21.95	21.81	21.93	22.5	1
5	QPSK	12	7	22.01	21.85	21.90		
5	QPSK	12	13	21.93	21.83	21.81		
5	QPSK	25	0	21.98	21.82	21.89		
5	16QAM	1	0	22.26	22.06	22.05	22.5	1
5	16QAM	1	12	22.22	22.17	21.96		
5	16QAM	1	24	22.21	22.11	22.04		
5	16QAM	12	0	20.97	20.82	20.89	21.5	2
5	16QAM	12	7	21.02	20.86	20.90		
5	16QAM	12	13	20.94	20.82	20.79		
5	16QAM	25	0	21.00	20.77	20.90		
5	64QAM	1	0	21.40	21.44	21.40	21.5	2
5	64QAM	1	12	21.30	21.31	21.35		
5	64QAM	1	24	21.35	21.41	21.40		
5	64QAM	12	0	20.20	20.25	20.15	20.5	3
5	64QAM	12	7	20.15	20.26	20.20		
5	64QAM	12	13	20.15	20.20	20.10		
5	64QAM	25	0	20.05	20.20	20.13		

Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.94	22.83	22.73	23.5	0
3	QPSK	1	8	22.88	22.86	22.68		
3	QPSK	1	14	22.90	22.87	22.72		
3	QPSK	8	0	22.02	21.78	21.83	22.5	1
3	QPSK	8	4	21.97	21.84	21.83		
3	QPSK	8	7	21.99	21.80	21.85		
3	QPSK	15	0	21.94	21.82	21.79		
3	16QAM	1	0	22.27	22.03	22.03	22.5	1
3	16QAM	1	8	22.21	22.12	22.02		
3	16QAM	1	14	22.22	22.10	22.00		
3	16QAM	8	0	21.07	20.76	20.86	21.5	2
3	16QAM	8	4	20.99	20.85	20.86		
3	16QAM	8	7	20.99	20.77	20.92		
3	16QAM	15	0	20.96	20.81	20.84		
3	64QAM	1	0	21.02	21.26	21.16	21.5	2
3	64QAM	1	8	21.05	21.32	21.25		
3	64QAM	1	14	21.30	21.37	21.25		
3	64QAM	8	0	20.13	20.31	20.24	20.5	3
3	64QAM	8	4	20.16	20.26	20.20		
3	64QAM	8	7	20.24	20.28	20.15		
3	64QAM	15	0	20.20	20.16	20.19		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.89	22.70	22.71	23.5	0
1.4	QPSK	1	3	22.94	22.83	22.72		
1.4	QPSK	1	5	22.93	22.76	22.71		
1.4	QPSK	3	0	22.92	22.77	22.72		
1.4	QPSK	3	1	22.97	22.78	22.78		
1.4	QPSK	3	3	22.93	22.81	22.73		
1.4	QPSK	6	0	21.96	21.75	21.78	22.5	1
1.4	16QAM	1	0	22.20	21.98	21.97	22.5	1
1.4	16QAM	1	3	22.25	22.11	22.03		
1.4	16QAM	1	5	22.25	22.03	21.96		
1.4	16QAM	3	0	21.95	21.77	21.75		
1.4	16QAM	3	1	22.01	21.92	21.81		
1.4	16QAM	3	3	21.93	21.84	21.77		
1.4	16QAM	6	0	21.01	20.82	20.88	21.5	2
1.4	64QAM	1	0	21.20	21.26	21.05	21.5	2
1.4	64QAM	1	3	21.24	21.34	21.30		
1.4	64QAM	1	5	21.30	21.32	21.24		
1.4	64QAM	3	0	21.05	21.21	21.20		
1.4	64QAM	3	1	21.24	21.28	21.16		
1.4	64QAM	3	3	21.20	21.27	21.24		
1.4	64QAM	6	0	20.10	20.15	20.09	20.5	3

<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				23060	23095	23130		
Frequency (MHz)				704	707.5	711		
10	QPSK	1	0	23.07	23.09	23.20	23.5	0
10	QPSK	1	25	23.21	23.12	23.25		
10	QPSK	1	49	23.33	23.18	23.41		
10	QPSK	25	0	22.31	22.20	22.43	22.5	1
10	QPSK	25	12	22.25	22.27	22.43		
10	QPSK	25	25	22.41	22.32	22.44		
10	QPSK	50	0	22.39	22.28	22.47		
10	16QAM	1	0	22.45	22.40	22.47	22.5	1
10	16QAM	1	25	22.48	22.46	22.40		
10	16QAM	1	49	22.50	22.47	22.47		
10	16QAM	25	0	21.31	21.17	21.42	21.5	2
10	16QAM	25	12	21.25	21.26	21.41		
10	16QAM	25	25	21.40	21.30	21.43		
10	16QAM	50	0	21.37	21.27	21.44		
10	64QAM	1	0	21.00	21.02	21.23	21.5	2
10	64QAM	1	25	21.36	21.50	21.48		
10	64QAM	1	49	21.30	21.35	21.39		
10	64QAM	25	0	20.00	20.00	20.26	20.5	3
10	64QAM	25	12	20.01	20.08	20.13		
10	64QAM	25	25	20.30	20.21	20.35		
10	64QAM	50	0	20.15	20.20	20.36		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	23.17	23.23	23.20	23.5	0
5	QPSK	1	12	23.08	23.11	23.23		
5	QPSK	1	24	23.20	23.22	23.38		
5	QPSK	12	0	22.29	22.15	22.42	22.5	1
5	QPSK	12	7	22.36	22.26	22.40		
5	QPSK	12	13	22.27	22.24	22.40		
5	QPSK	25	0	22.30	22.21	22.44		
5	16QAM	1	0	22.48	22.43	22.40	22.5	1
5	16QAM	1	12	22.45	22.48	22.46		
5	16QAM	1	24	22.42	22.44	22.49		
5	16QAM	12	0	21.31	21.17	21.41	21.5	2
5	16QAM	12	7	21.36	21.28	21.43		
5	16QAM	12	13	21.32	21.29	21.42		
5	16QAM	25	0	21.35	21.24	21.43		
5	64QAM	1	0	21.20	21.23	21.42	21.5	2
5	64QAM	1	12	21.20	21.17	21.35		
5	64QAM	1	24	21.20	21.21	21.36		
5	64QAM	12	0	20.00	19.98	20.13	20.5	3
5	64QAM	12	7	20.15	20.20	20.35		
5	64QAM	12	13	20.30	20.21	20.41		
5	64QAM	25	0	20.26	20.14	20.41		

Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.11	23.19	23.28	23.5	0
3	QPSK	1	8	23.05	23.13	23.25		
3	QPSK	1	14	23.10	23.13	23.38		
3	QPSK	8	0	22.22	22.24	22.31	22.5	1
3	QPSK	8	4	22.19	22.26	22.41		
3	QPSK	8	7	22.17	22.21	22.38		
3	QPSK	15	0	22.16	22.20	22.40		
3	16QAM	1	0	22.34	22.36	22.48	22.5	1
3	16QAM	1	8	22.43	22.45	22.45		
3	16QAM	1	14	22.40	22.38	22.50		
3	16QAM	8	0	21.30	21.26	21.39	21.5	2
3	16QAM	8	4	21.29	21.29	21.50		
3	16QAM	8	7	21.24	21.26	21.45		
3	16QAM	15	0	21.19	21.24	21.44		
3	64QAM	1	0	21.00	21.07	21.26	21.5	2
3	64QAM	1	8	21.20	21.12	21.26		
3	64QAM	1	14	21.05	21.16	21.34		
3	64QAM	8	0	20.21	20.08	20.35	20.5	3
3	64QAM	8	4	20.05	20.11	20.25		
3	64QAM	8	7	20.13	20.07	20.16		
3	64QAM	15	0	20.08	20.02	20.24		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	22.99	23.20	23.25	23.5	0
1.4	QPSK	1	3	23.07	23.11	23.33		
1.4	QPSK	1	5	23.05	23.04	23.29		
1.4	QPSK	3	0	22.98	23.14	23.30		
1.4	QPSK	3	1	23.02	23.16	23.40		
1.4	QPSK	3	3	23.08	23.14	23.33		
1.4	QPSK	6	0	22.03	22.13	22.37	22.5	1
1.4	16QAM	1	0	22.26	22.38	22.49	22.5	1
1.4	16QAM	1	3	22.28	22.45	22.49		
1.4	16QAM	1	5	22.26	22.33	22.50		
1.4	16QAM	3	0	22.01	22.16	22.32		
1.4	16QAM	3	1	22.05	22.21	22.47		
1.4	16QAM	3	3	22.04	22.15	22.32		
1.4	16QAM	6	0	21.10	21.21	21.44	21.5	2
1.4	64QAM	1	0	21.16	21.25	21.40	21.5	2
1.4	64QAM	1	3	21.20	21.19	21.42		
1.4	64QAM	1	5	21.00	21.08	21.34		
1.4	64QAM	3	0	21.06	21.11	21.39		
1.4	64QAM	3	1	21.00	21.08	21.34		
1.4	64QAM	3	3	21.16	21.20	21.39		
1.4	64QAM	6	0	20.19	20.05	20.24	20.5	3

<LTE Band 14>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel					23330			
Frequency (MHz)					793			
10	QPSK	1	0		23.11		23.5	0
10	QPSK	1	25		22.91			
10	QPSK	1	49		22.71			
10	QPSK	25	0		21.93		22.5	1
10	QPSK	25	12		22.15			
10	QPSK	25	25		22.21			
10	QPSK	50	0		22.32			
10	16QAM	1	0		22.48		22.5	1
10	16QAM	1	25		22.33			
10	16QAM	1	49		22.12			
10	16QAM	25	0		21.04		21.5	2
10	16QAM	25	12		21.19			
10	16QAM	25	25		20.99			
10	16QAM	50	0		21.08			
10	64QAM	1	0		20.82		21.5	2
10	64QAM	1	25		20.80			
10	64QAM	1	49		20.53			
10	64QAM	25	0		19.63		20.5	3
10	64QAM	25	12		19.66			
10	64QAM	25	25		19.64			
10	64QAM	50	0		19.69			
Channel				23305	23330	23355	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				790.5	793	795.5		
5	QPSK	1	0	22.81	22.91	22.93	23.5	0
5	QPSK	1	12	22.95	22.97	22.88		
5	QPSK	1	24	22.96	22.91	22.83		
5	QPSK	12	0	22.04	22.11	21.96	22.5	1
5	QPSK	12	7	22.10	22.05	21.97		
5	QPSK	12	13	22.07	22.04	21.92		
5	QPSK	25	0	22.07	22.09	21.94		
5	16QAM	1	0	22.35	22.45	22.23	22.5	1
5	16QAM	1	12	22.35	22.35	22.25		
5	16QAM	1	24	22.34	22.17	22.03		
5	16QAM	12	0	21.11	21.16	21.00	21.5	2
5	16QAM	12	7	21.13	21.08	20.99		
5	16QAM	12	13	21.10	21.05	20.95		
5	16QAM	25	0	21.09	21.14	20.99		
5	64QAM	1	0	20.81	20.83	20.80	21.5	2
5	64QAM	1	12	20.79	20.80	20.85		
5	64QAM	1	24	20.72	20.77	20.80		
5	64QAM	12	0	19.75	19.70	19.80	20.5	3
5	64QAM	12	7	19.65	19.70	19.80		
5	64QAM	12	13	19.62	19.61	19.65		
5	64QAM	25	0	19.60	19.64	19.69		

<LTE Band 30>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel					27710			
Frequency (MHz)					2310			
10	QPSK	1	0		22.42		23.5	0
10	QPSK	1	25		22.17			
10	QPSK	1	49		22.07			
10	QPSK	25	0		21.35		22.5	1
10	QPSK	25	12		21.34			
10	QPSK	25	25		21.28			
10	QPSK	50	0		21.34			
10	16QAM	1	0		21.81		22.5	1
10	16QAM	1	25		21.49			
10	16QAM	1	49		21.48			
10	16QAM	25	0		20.38		21.5	2
10	16QAM	25	12		20.37			
10	16QAM	25	25		20.30			
10	16QAM	50	0		20.36			
10	64QAM	1	0		20.23		21.5	2
10	64QAM	1	25		20.05			
10	64QAM	1	49		19.92			
10	64QAM	25	0		18.97		20.5	3
10	64QAM	25	12		18.95			
10	64QAM	25	25		18.91			
10	64QAM	50	0		19.00			
Channel				27685	27710	27735	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2307.5	2310	2312.5		
5	QPSK	1	0	22.35	22.28	22.21	23.5	0
5	QPSK	1	12	22.20	22.12	22.14		
5	QPSK	1	24	22.17	22.17	22.10		
5	QPSK	12	0	21.39	21.23	21.29	22.5	1
5	QPSK	12	7	21.30	21.35	21.27		
5	QPSK	12	13	21.23	21.30	21.22		
5	QPSK	25	0	21.26	21.23	21.29		
5	16QAM	1	0	21.64	21.57	21.57	22.5	1
5	16QAM	1	12	21.60	21.51	21.50		
5	16QAM	1	24	21.46	21.51	21.44		
5	16QAM	12	0	20.40	20.29	20.35	21.5	2
5	16QAM	12	7	20.34	20.40	20.26		
5	16QAM	12	13	20.26	20.35	20.21		
5	16QAM	25	0	20.31	20.29	20.33		
5	64QAM	1	0	20.05	20.10	20.15	21.5	2
5	64QAM	1	12	20.10	20.07	20.15		
5	64QAM	1	24	20.03	20.10	20.16		
5	64QAM	12	0	19.02	18.96	19.01	20.5	3
5	64QAM	12	7	19.00	19.02	19.05		
5	64QAM	12	13	19.08	19.00	19.02		
5	64QAM	25	0	18.85	18.89	18.92		

<LTE Band 66>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				132072	132322	132572		
Frequency (MHz)				1720	1745	1770		
20	QPSK	1	0	22.28	22.37	22.42	23	0
20	QPSK	1	49	22.12	22.16	22.20		
20	QPSK	1	99	22.03	22.08	21.99		
20	QPSK	50	0	21.34	21.43	21.51	22	1
20	QPSK	50	24	21.30	21.35	21.37		
20	QPSK	50	50	21.18	21.19	21.36		
20	QPSK	100	0	21.28	21.35	21.38		
20	16QAM	1	0	21.62	21.73	21.80	22	1
20	16QAM	1	49	21.45	21.54	21.55		
20	16QAM	1	99	21.35	21.40	21.34		
20	16QAM	50	0	20.35	20.44	20.57	21	2
20	16QAM	50	24	20.37	20.40	20.44		
20	16QAM	50	50	20.24	20.24	20.37		
20	16QAM	100	0	20.33	20.30	20.42		
20	64QAM	1	0	20.45	20.50	20.52	21	2
20	64QAM	1	49	20.20	20.29	20.36		
20	64QAM	1	99	20.20	20.24	20.30		
20	64QAM	50	0	19.25	19.28	19.35	20	3
20	64QAM	50	24	19.20	19.25	19.30		
20	64QAM	50	50	19.18	19.12	19.20		
20	64QAM	100	0	19.15	19.25	19.30		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	22.34	22.45	22.51	23	0
15	QPSK	1	37	22.17	22.24	22.25		
15	QPSK	1	74	22.20	22.24	22.31		
15	QPSK	36	0	21.28	21.47	21.44	22	1
15	QPSK	36	20	21.23	21.40	21.39		
15	QPSK	36	39	21.27	21.31	21.39		
15	QPSK	75	0	21.24	21.28	21.40		
15	16QAM	1	0	21.57	21.75	21.71	22	1
15	16QAM	1	37	21.33	21.52	21.52		
15	16QAM	1	74	21.40	21.48	21.52		
15	16QAM	36	0	20.32	20.42	20.45	21	2
15	16QAM	36	20	20.28	20.40	20.45		
15	16QAM	36	39	20.28	20.32	20.40		
15	16QAM	75	0	20.24	20.29	20.40		
15	64QAM	1	0	20.50	20.51	20.55	21	2
15	64QAM	1	37	20.38	20.41	20.50		
15	64QAM	1	74	20.22	20.32	20.40		
15	64QAM	36	0	19.28	19.30	19.35	20	3
15	64QAM	36	20	19.25	19.30	19.35		
15	64QAM	36	39	19.20	19.22	19.25		
15	64QAM	75	0	19.10	19.16	19.25		

Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	22.18	22.25	22.20	23	0
10	QPSK	1	25	22.13	22.26	22.19		
10	QPSK	1	49	22.11	22.11	22.12		
10	QPSK	25	0	21.33	21.37	21.41	22	1
10	QPSK	25	12	21.31	21.43	21.41		
10	QPSK	25	25	21.24	21.39	21.31		
10	QPSK	50	0	21.30	21.43	21.43		
10	16QAM	1	0	21.54	21.62	21.58	22	1
10	16QAM	1	25	21.46	21.59	21.56		
10	16QAM	1	49	21.44	21.46	21.45		
10	16QAM	25	0	20.36	20.37	20.43	21	2
10	16QAM	25	12	20.35	20.43	20.45		
10	16QAM	25	25	20.29	20.39	20.35		
10	16QAM	50	0	20.32	20.44	20.41		
10	64QAM	1	0	20.25	20.31	20.35	21	2
10	64QAM	1	25	20.30	20.33	20.36		
10	64QAM	1	49	20.16	20.20	20.26		
10	64QAM	25	0	19.20	19.25	19.30	20	3
10	64QAM	25	12	19.20	19.27	19.35		
10	64QAM	25	25	19.24	19.30	19.36		
10	64QAM	50	0	19.20	19.29	19.42		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	22.22	22.38	22.28	23	0
5	QPSK	1	12	22.08	22.23	22.23		
5	QPSK	1	24	22.10	22.26	22.18		
5	QPSK	12	0	21.27	21.37	21.40	22	1
5	QPSK	12	7	21.21	21.39	21.41		
5	QPSK	12	13	21.20	21.24	21.26		
5	QPSK	25	0	21.19	21.33	21.35		
5	16QAM	1	0	21.52	21.76	21.66	22	1
5	16QAM	1	12	21.37	21.59	21.57		
5	16QAM	1	24	21.39	21.56	21.55		
5	16QAM	12	0	20.32	20.41	20.43	21	2
5	16QAM	12	7	20.29	20.37	20.38		
5	16QAM	12	13	20.23	20.33	20.26		
5	16QAM	25	0	20.31	20.38	20.42		
5	64QAM	1	0	20.40	20.46	20.51	21	2
5	64QAM	1	12	20.25	20.30	20.35		
5	64QAM	1	24	20.35	20.41	20.50		
5	64QAM	12	0	19.26	19.30	19.36	20	3
5	64QAM	12	7	19.30	19.32	19.28		
5	64QAM	12	13	19.30	19.27	19.24		
5	64QAM	25	0	19.20	19.22	19.25		

Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	22.10	22.24	22.20	23	0
3	QPSK	1	8	22.15	22.30	22.23		
3	QPSK	1	14	22.07	22.19	22.17		
3	QPSK	8	0	21.25	21.38	21.39	22	1
3	QPSK	8	4	21.25	21.38	21.34		
3	QPSK	8	7	21.22	21.39	21.41		
3	QPSK	15	0	21.23	21.35	21.33		
3	16QAM	1	0	21.46	21.59	21.57	22	1
3	16QAM	1	8	21.46	21.63	21.57		
3	16QAM	1	14	21.39	21.48	21.51		
3	16QAM	8	0	20.39	20.44	20.52	21	2
3	16QAM	8	4	20.41	20.52	20.45		
3	16QAM	8	7	20.38	20.50	20.48		
3	16QAM	15	0	20.31	20.42	20.39		
3	64QAM	1	0	20.16	20.26	20.20	21	2
3	64QAM	1	8	20.13	20.33	20.15		
3	64QAM	1	14	20.18	20.26	20.20		
3	64QAM	8	0	19.20	19.26	19.35	20	3
3	64QAM	8	4	19.20	19.26	19.20		
3	64QAM	8	7	19.20	19.23	19.16		
3	64QAM	15	0	19.30	19.20	19.25		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	22.10	22.24	22.16	23	0
1.4	QPSK	1	3	22.19	22.31	22.29		
1.4	QPSK	1	5	22.09	22.23	22.19		
1.4	QPSK	3	0	22.19	22.30	22.33		
1.4	QPSK	3	1	22.20	22.35	22.37		
1.4	QPSK	3	3	22.19	22.32	22.31		
1.4	QPSK	6	0	21.20	21.33	21.40	22	1
1.4	16QAM	1	0	21.38	21.56	21.47	22	1
1.4	16QAM	1	3	21.42	21.66	21.56		
1.4	16QAM	1	5	21.34	21.52	21.45		
1.4	16QAM	3	0	21.18	21.34	21.35		
1.4	16QAM	3	1	21.21	21.40	21.42		
1.4	16QAM	3	3	21.16	21.37	21.33		
1.4	16QAM	6	0	20.33	20.41	20.43	21	2
1.4	64QAM	1	0	20.16	20.24	20.20	21	2
1.4	64QAM	1	3	20.10	20.34	20.30		
1.4	64QAM	1	5	20.19	20.30	20.16		
1.4	64QAM	3	0	20.16	20.30	20.36		
1.4	64QAM	3	1	20.16	20.36	20.30		
1.4	64QAM	3	3	20.12	20.32	20.35		
1.4	64QAM	6	0	19.30	19.14	19.25	20	3

<LTE Carrier Aggregation>

General Note:

This device supports Carrier Aggregation on downlink for inter band. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.

<Inter-Band for Two Carrier Combination>

E-UTRA CA configuration / Bandwidth combination set										
E-UTRA CA Configuration	Uplink CA Configurations	E- UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth [MHz]	Bandwidth combination set
CA_2A-5A	-	2			Yes	Yes	Yes	Yes	30	0
		5			Yes	Yes				
		2			Yes	Yes			20	1
		5			Yes	Yes				
CA_2A-12A	-	2			Yes	Yes	Yes	Yes	30	0
		12			Yes	Yes				
		2			Yes	Yes	Yes	Yes	30	1
		12		Yes	Yes	Yes				
		2			Yes	Yes			20	2
		12			Yes	Yes				
CA_2A-29A	-	2			Yes	Yes			20	0
		29		Yes	Yes	Yes				
		2			Yes	Yes			20	1
		29			Yes	Yes				
		2			Yes	Yes	Yes	Yes	30	2
		29			Yes	Yes				
CA_2A-30A	-	2			Yes	Yes	Yes	Yes	30	0
		30			Yes	Yes				
CA_4A-5A	-	4			Yes	Yes			20	0
		5			Yes	Yes				
		4			Yes	Yes	Yes	Yes	30	0
		5			Yes	Yes				
CA_4A-12A	-	4	Yes	Yes	Yes	Yes			20	0
		12			Yes	Yes				
		4	Yes	Yes	Yes	Yes	Yes	Yes	30	1
		12			Yes	Yes				
		4			Yes	Yes	Yes	Yes	30	2
		12		Yes	Yes	Yes				
		4			Yes	Yes			20	3
		12			Yes	Yes				
		4			Yes	Yes	Yes	Yes	30	4
		12			Yes	Yes				
		4			Yes	Yes	Yes		20	5
		12			Yes					
CA_4A-29A	-	4			Yes	Yes			20	0
		29		Yes	Yes	Yes				
		4			Yes	Yes			20	1
		29			Yes	Yes				
		4			Yes	Yes	Yes	Yes	30	2
		29			Yes	Yes				
CA_4A-30A	-	4			Yes	Yes	Yes	Yes	30	0
		30			Yes	Yes				
CA_5A-30A	-	5			Yes	Yes			20	0
		30			Yes	Yes				
CA_12A-30A	-	12			Yes	Yes			20	0
		30			Yes	Yes				
CA_29A-30A	-	29			Yes	Yes			20	0
		30			Yes	Yes				

<Inter-Band for Three Carrier Combination>

E-UTRA CA configuration / Bandwidth combination set										
E-UTRA CA Configuration	Uplink CA Configurations	E- UTRA Bands	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	Maximum aggregated bandwidth [MHz]	Bandwidth combination set
CA_2A-5A-30A	-	2			Yes	Yes	Yes	Yes	40	0
		5			Yes	Yes				
		30			Yes	Yes				
CA_2A-12A-30A	-	2			Yes	Yes	Yes	Yes	40	0
		12			Yes	Yes				
		30			Yes	Yes				
CA_2A-29A-30A	-	2			Yes	Yes	Yes	Yes	40	0
		29			Yes	Yes				
		30			Yes	Yes				
CA_4A-5A-30A	-	4			Yes	Yes	Yes	Yes	40	0
		5			Yes	Yes				
		30			Yes	Yes				
CA_4A-12A-30A	-	4			Yes	Yes	Yes	Yes	40	0
		12			Yes	Yes				
		30			Yes	Yes				
CA_4A-29A-30A	-	4			Yes	Yes	Yes	Yes	40	0
		29			Yes	Yes				
		30			Yes	Yes				

<DL CA power measurement test reduction for UL SAR test exclusion>

General Note:

1. This applies to devices using DL CA with multiple CCs in inter-band configurations.
2. For inter-band, it is based on the number of frequency bands and CCs involved. Based on the number of frequency bands and CCs used in each DL CA configurations tabulate these in separate columns according to the number of frequency bands. Align the rows in these columns so that the frequency bands used by the lower number of frequency band and CC combinations are subsets of the larger number of frequency band and CC combinations as show in illustration below.
3. In applying the power measurement procedures of KDB 941225 D05A for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the subset in each row with the largest combination of frequency bands and CCs (far right most configurations).
4. When a power measurement configuration does not qualify for SAR test exclusion, power measurement should be performed for the next lower order combination (column to the left) for the remain lower order subsets to qualify for SAR test exclusion to limit the number of SAR tests needed.

2 bands / 2 CC	2 bands / 2 CC	3 bands / 3 CC
CA_2A-5A	CA_5A-30A	CA_2A-5A-30A
CA_2A-12A	CA_2A-30A	CA_2A-12A-30A
CA_2A-29A	CA_29A-30A	CA_2A-29A-30A
CA_4A-5A	CA_4A-30A	CA_4A-5A-30A
CA_4A-12A	CA_12A-30A	CA_4A-12A-30A
CA_4A-29A	CA_4A-30A	CA_4A-29A-30A

LTE Carrier Aggregation Conducted Power (Downlink)

i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.

ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.

iii. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.

iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

v. For inter-band CA, the SCC selected highest bandwidth and near the middle of its transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.

Configure		PCC							SCC1				SCC2				Power	
		LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Inter-Band	CA_2A-5A-30A	Band 2	20M	1900	19100	QPSK	1	99	Band 5	10M	881.5	2525	Band 30	10M	2355	9820	22.82	22.61
		Band 5	10M	836.5	20525	QPSK	1	0	Band 2	20M	1960	900	Band 30	10M	2355	9820	23.43	23.25
		Band 30	10M	2310	27710	QPSK	1	0	Band 5	10M	881.5	2525	Band 2	20M	1960	900	22.61	22.42
	CA_2A-12A-30A	Band 2	20M	1900	19100	QPSK	1	99	Band 12	10M	737.5	5095	Band 30	10M	2355	9820	22.79	22.61
		Band 12	10M	711	23130	QPSK	1	49	Band 2	20M	1960	900	Band 30	10M	2355	9820	23.59	23.41
		Band 30	10M	2310	27710	QPSK	1	0	Band 12	10M	737.5	5095	Band 2	20M	1960	900	22.57	22.42
	CA_2A-29A-30A	Band 2	20M	1900	19100	QPSK	1	99	Band 29	10M	722.5	9715	Band 30	10M	2355	9820	22.75	22.61
		Band 30	10M	2310	27710	QPSK	1	0	Band 29	10M	722.5	9715	Band 2	20M	1960	900	22.57	22.42
	CA_4A-5A-30A	Band 4	20M	1732.5	20175	QPSK	1	49	Band 5	10M	881.5	2525	Band 30	10M	2355	9820	22.60	22.50
		Band 5	10M	836.5	20525	QPSK	1	0	Band 4	20M	2132.5	2175	Band 30	10M	2355	9820	23.44	23.25
		Band 30	10M	2310	27710	QPSK	1	0	Band 5	10M	881.5	2525	Band 4	20M	2132.5	2175	22.63	22.42
	CA_4A-12A-30A	Band 4	20M	1732.5	20175	QPSK	1	49	Band 12	10M	737.5	5095	Band 30	10M	2355	9820	22.65	22.50
		Band 30	10M	2310	27710	QPSK	1	0	Band 12	10M	737.5	5095	Band 4	20M	2132.5	2175	22.59	22.42
	CA_4A-29A-30A	Band 4	20M	1732.5	20175	QPSK	1	49	Band 29	10M	722.5	9715	Band 30	10M	2355	9820	22.63	22.50
		Band 30	10M	2310	27710	QPSK	1	0	Band 29	10M	722.5	9715	Band 4	20M	2132.5	2175	22.60	22.42

<WLAN Conducted Power>

General Note:

1. For each antenna, transmit power in SISO operation is larger than (or equal to) the power in MIMO operation, RF exposure compliance of MIMO mode can be deduced from the compliance simultaneous transmission of antennas operating in SISO mode.
2. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
3. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
4. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, 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 for each frequency band.
5. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz WLAN Ant.1>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant.1	802.11b 1Mbps	1	2412	**15.18**	15.50	100.00
		6	2437	15.03	15.50	
		11	2462	14.98	15.50	
	802.11g 6Mbps	1	2412	12.94	13.50	95.28
		6	2437	13.02	13.50	
		11	2462	12.90	13.50	
	802.11n-HT20 MCS0	1	2412	11.93	12.00	94.98
		6	2437	11.97	12.00	
		11	2462	11.83	12.00	
	802.11n-HT40 MCS0	3	2422	12.09	12.50	90.35
		6	2437	11.97	12.50	
		9	2452	11.56	12.50	

<2.4GHz WLAN Ant.2>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant.2	802.11b 1Mbps	1	2412	**15.04**	15.50	100.00
		6	2437	14.82	15.50	
		11	2462	14.99	15.50	
	802.11g 6Mbps	1	2412	13.21	13.50	95.30
		6	2437	13.14	13.50	
		11	2462	13.23	13.50	
	802.11n-HT20 MCS0	1	2412	13.17	13.50	95.00
		6	2437	13.21	13.50	
		11	2462	11.98	12.00	
	802.11n-HT40 MCS0	3	2422	14.11	14.50	90.35
		6	2437	14.19	14.50	
		9	2452	12.55	13.00	

<2.4GHz WLAN Ant.1+2>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant.1+2	802.11n-HT20 MCS0	1	2412	15.61	16.50	95.00
		6	2437	15.65	16.50	
		11	2462	14.92	16.50	
	802.11n-HT40 MCS0	3	2422	**16.23**	16.50	90.35
		6	2437	16.23	16.50	
		9	2452	15.09	15.50	

<5GHz WLAN Ant.1>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant.1	802.11a 6Mbps	36	5180	11.60	12.50	95.98
		40	5200	12.02	12.50	
		44	5220	11.97	12.50	
		48	5240	**12.10**	12.50	
	802.11n-HT20 MCS0	36	5180	10.64	11.00	95.68
		40	5200	10.74	11.00	
		44	5220	10.67	11.00	
		48	5240	10.87	11.00	
	802.11n-HT40 MCS0	38	5190	9.84	11.00	91.61
		46	5230	10.95	11.00	
	802.11ac VHT20 MCS0	36	5180	8.81	9.00	95.71
		40	5200	8.77	9.00	
		44	5220	8.70	9.00	
		48	5240	8.87	9.00	
	802.11ac VHT40 MCS0	38	5190	8.82	9.00	90.97
		46	5230	8.96	9.00	
	802.11ac VHT80 MCS0	42	5210	8.23	9.00	83.07

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant.1	802.11a 6Mbps	149	5745	11.91	12.50	95.98
		157	5785	11.83	12.50	
		165	5825	**12.06**	12.50	
	802.11n-HT20 MCS0	149	5745	10.88	11.50	95.68
		157	5785	10.77	11.50	
		165	5825	11.01	11.50	
	802.11n-HT40 MCS0	151	5755	10.93	11.50	91.61
		159	5795	10.91	11.50	
	802.11ac VHT20 MCS0	149	5745	8.90	10.00	95.71
		157	5785	8.82	10.00	
		165	5825	9.07	10.00	
	802.11ac VHT40 MCS0	151	5755	8.89	10.00	90.97
		159	5795	8.79	10.00	
	802.11ac VHT80 MCS0	155	5775	8.63	10.00	83.07

<5GHz WLAN Ant.2>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant.2	802.11a 6Mbps	36	5180	11.48	12.50	96.29
		40	5200	11.73	12.50	
		44	5220	11.74	12.50	
		48	5240	**11.88**	12.50	
	802.11n-HT20 MCS0	36	5180	10.33	11.00	96.03
		40	5200	10.46	11.00	
		44	5220	10.42	11.00	
		48	5240	10.64	11.00	
	802.11n-HT40 MCS0	38	5190	9.69	10.00	90.97
		46	5230	10.75	11.00	
	802.11ac VHT20 MCS0	36	5180	8.40	9.00	95.00
		40	5200	8.64	9.00	
		44	5220	8.60	9.00	
		48	5240	8.86	9.00	
	802.11ac VHT40 MCS0	38	5190	8.55	9.00	91.02
		46	5230	8.89	9.00	
	802.11ac VHT80 MCS0	42	5210	8.19	9.00	83.07

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant.2	802.11a 6Mbps	149	5745	**11.94**	12.50	96.29
		157	5785	11.61	12.50	
		165	5825	11.91	12.50	
	802.11n-HT20 MCS0	149	5745	11.16	12.00	96.03
		157	5785	10.86	12.00	
		165	5825	11.27	12.00	
	802.11n-HT40 MCS0	151	5755	11.22	12.00	90.97
		159	5795	11.20	12.00	
	802.11ac VHT20 MCS0	149	5745	9.23	10.00	95.00
		157	5785	8.90	10.00	
		165	5825	9.27	10.00	
	802.11ac VHT40 MCS0	151	5755	9.26	10.00	91.02
		159	5795	9.29	10.00	
	802.11ac VHT80 MCS0	155	5775	8.94	10.00	83.07

<5GHz WLAN Ant.1+2>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant.1+2	802.11n-HT20 MCS0	36	5180	13.50	14.00	96.03
		40	5200	13.61	14.00	
		44	5220	13.56	14.00	
		48	5240	13.77	14.00	
	802.11n-HT40 MCS0	38	5190	12.78	13.00	91.61
		46	5230	**13.86**	14.00	
	802.11ac VHT20 MCS0	36	5180	11.62	12.00	95.71
		40	5200	11.72	12.00	
		44	5220	11.66	12.00	
		48	5240	11.88	12.00	
	802.11ac VHT40 MCS0	38	5190	11.70	12.00	91.02
		46	5230	11.94	12.00	
	802.11ac VHT80 MCS0	42	5210	11.22	12.00	83.07

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant.1+2	802.11n-HT20 MCS0	149	5745	14.03	14.50	96.03
		157	5785	13.82	14.50	
		165	5825	**14.15**	14.50	
	802.11n-HT40 MCS0	151	5755	14.09	14.50	91.61
		159	5795	14.07	14.50	
	802.11ac VHT20 MCS0	149	5745	12.08	12.50	95.71
		157	5785	11.87	12.50	
		165	5825	12.18	12.50	
	802.11ac VHT40 MCS0	151	5755	12.09	12.50	91.02
		159	5795	12.06	12.50	
	802.11ac VHT80 MCS0	155	5775	11.79	12.00	83.07

13. Antenna Dimensions and Separation Distances

Please refer to the separate filing document.

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 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
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. This device has two WWAN antennas. WWAN antenna 1 is located at the right side of the device and WWAN antenna 2 is located at the top side of the device which can refer to antenna location chapter. WWAN antenna 1 frequency bands include WCDMA B2 / B4 / B5 and LTE B2 / B4 / B5 / B12 / B14 / B66 and WWAN antenna 2 frequency bands only includes LTE B30. And they can't transmit simultaneously.
5. Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
   a) For WWAN transmitter antenna 1, front/back/top side/bottom side/right side located within 25mm from that surface or edge, therefore these surfaces hotspot SAR is necessary.
   b) For WWAN transmitter antenna 2, front/back/top side located within 25mm from that surface or edge, therefore these surfaces hotspot SAR is necessary.
   c) For WLAN transmitter antenna 1, front/back/bottom side located within 25mm from that surface or edge, therefore these surfaces hotspot SAR is necessary.
   d) For WLAN transmitter antenna 2, front/back/top side/left side located within 25mm from that surface or edge, therefore these surfaces hotspot SAR is necessary.

WCDMA Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”.
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B12 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE B4 SAR test was covered by B66; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
   a. the maximum output power, including tolerance, for the smaller band is ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
3. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
4. For WLAN SAR testing was performed on single antenna RF power in SISO mode is larger or equal to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

14.1 Body SAR

<WCDMA SAR>

Plot No.	Antenna	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	1	WCDMA Band V	RMC 12.2Kbps	Front	10	4132	826.4	22.92	23.50	1.143	0.01	0.562	**0.642**
	1	WCDMA Band V	RMC 12.2Kbps	Back	10	4132	826.4	22.92	23.50	1.143	-0.04	0.483	0.552
	1	WCDMA Band V	RMC 12.2Kbps	Right side	10	4132	826.4	22.92	23.50	1.143	0.04	0.147	0.168
	1	WCDMA Band V	RMC 12.2Kbps	Top side	10	4132	826.4	22.92	23.50	1.143	-0.05	0.289	0.330
	1	WCDMA Band V	RMC 12.2Kbps	Bottom side	10	4132	826.4	22.92	23.50	1.143	0.06	0.220	0.251
02	1	WCDMA Band IV	RMC 12.2Kbps	Front	10	1413	1732.6	22.65	23.50	1.216	-0.01	0.977	**1.188**
	1	WCDMA Band IV	RMC 12.2Kbps	Back	10	1413	1732.6	22.65	23.50	1.216	-0.05	0.754	0.917
	1	WCDMA Band IV	RMC 12.2Kbps	Right side	10	1413	1732.6	22.65	23.50	1.216	-0.13	0.349	0.424
	1	WCDMA Band IV	RMC 12.2Kbps	Top side	10	1413	1732.6	22.65	23.50	1.216	-0.14	0.232	0.282
	1	WCDMA Band IV	RMC 12.2Kbps	Bottom side	10	1413	1732.6	22.65	23.50	1.216	-0.14	0.198	0.241
	1	WCDMA Band IV	RMC 12.2Kbps	Front	10	1312	1712.4	22.64	23.50	1.219	-0.09	0.931	1.135
	1	WCDMA Band IV	RMC 12.2Kbps	Front	10	1513	1752.6	22.50	23.50	1.259	-0.07	0.916	1.153
	1	WCDMA Band IV	RMC 12.2Kbps	Back	10	1312	1712.4	22.64	23.50	1.219	-0.05	0.740	0.902
	1	WCDMA Band IV	RMC 12.2Kbps	Back	10	1513	1752.6	22.50	23.50	1.259	-0.04	0.741	0.933
	1	WCDMA Band II	RMC 12.2Kbps	Front	10	9400	1880	22.39	23.00	1.151	-0.09	0.884	1.017
	1	WCDMA Band II	RMC 12.2Kbps	Back	10	9400	1880	22.39	23.00	1.151	-0.01	0.891	1.025
	1	WCDMA Band II	RMC 12.2Kbps	Right side	10	9400	1880	22.39	23.00	1.151	0.05	0.500	0.575
	1	WCDMA Band II	RMC 12.2Kbps	Top side	10	9400	1880	22.39	23.00	1.151	0.07	0.305	0.351
	1	WCDMA Band II	RMC 12.2Kbps	Bottom side	10	9400	1880	22.39	23.00	1.151	0.12	0.255	0.293
03	1	WCDMA Band II	RMC 12.2Kbps	Front	10	9262	1852.4	22.33	23.00	1.167	0.04	0.993	**1.159**
	1	WCDMA Band II	RMC 12.2Kbps	Front	10	9538	1907.6	22.38	23.00	1.153	-0.09	0.878	1.013
	1	WCDMA Band II	RMC 12.2Kbps	Back	10	9262	1852.4	22.33	23.00	1.167	-0.03	0.928	1.083
	1	WCDMA Band II	RMC 12.2Kbps	Back	10	9538	1907.6	22.38	23.00	1.153	-0.02	0.782	0.902

<FDD LTE SAR>

Plot No.	Antenna	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
04	1	LTE Band 12	10MHz	QPSK	1	49	Front	10	23095	707.5	23.18	23.50	1.076	0.02	0.850	**0.915**
	1	LTE Band 12	10MHz	QPSK	25	25	Front	10	23095	707.5	22.32	22.50	1.042	0.04	0.723	0.754
	1	LTE Band 12	10MHz	QPSK	50	0	Front	10	23095	707.5	22.28	22.50	1.052	0.01	0.717	0.754
	1	LTE Band 12	10MHz	QPSK	1	49	Back	10	23095	707.5	23.18	23.50	1.076	0.07	0.772	0.831
	1	LTE Band 12	10MHz	QPSK	25	25	Back	10	23095	707.5	22.32	22.50	1.042	0.01	0.640	0.667
	1	LTE Band 12	10MHz	QPSK	50	0	Back	10	23095	707.5	22.28	22.50	1.052	-0.01	0.622	0.654
	1	LTE Band 12	10MHz	QPSK	1	49	Right side	10	23095	707.5	23.18	23.50	1.076	-0.05	0.078	0.084
	1	LTE Band 12	10MHz	QPSK	25	25	Right side	10	23095	707.5	22.32	22.50	1.042	-0.14	0.064	0.067
	1	LTE Band 12	10MHz	QPSK	1	49	Top side	10	23095	707.5	23.18	23.50	1.076	-0.01	0.338	0.364
	1	LTE Band 12	10MHz	QPSK	25	25	Top side	10	23095	707.5	22.32	22.50	1.042	-0.02	0.273	0.285
	1	LTE Band 12	10MHz	QPSK	1	49	Bottom side	10	23095	707.5	23.18	23.50	1.076	0.14	0.392	0.422
	1	LTE Band 12	10MHz	QPSK	25	25	Bottom side	10	23095	707.5	22.32	22.50	1.042	0.04	0.321	0.335
	1	LTE Band 14	10MHz	QPSK	1	0	Front	10	23330	793	23.11	23.50	1.094	0.09	0.437	0.478
	1	LTE Band 14	10MHz	QPSK	25	25	Front	10	23330	793	22.21	22.50	1.069	0.08	0.334	0.357
05	1	LTE Band 14	10MHz	QPSK	1	0	Back	10	23330	793	23.11	23.50	1.094	-0.02	0.493	**0.539**
	1	LTE Band 14	10MHz	QPSK	25	25	Back	10	23330	793	22.21	22.50	1.069	0.01	0.351	0.375
	1	LTE Band 14	10MHz	QPSK	1	0	Right side	10	23330	793	23.11	23.50	1.094	-0.06	0.200	0.219
	1	LTE Band 14	10MHz	QPSK	25	25	Right side	10	23330	793	22.21	22.50	1.069	-0.01	0.146	0.156
	1	LTE Band 14	10MHz	QPSK	1	0	Top side	10	23330	793	23.11	23.50	1.094	-0.05	0.229	0.251
	1	LTE Band 14	10MHz	QPSK	25	25	Top side	10	23330	793	22.21	22.50	1.069	0.01	0.174	0.186
	1	LTE Band 14	10MHz	QPSK	1	0	Bottom side	10	23330	793	23.11	23.50	1.094	0.11	0.337	0.369
	1	LTE Band 14	10MHz	QPSK	25	25	Bottom side	10	23330	793	22.21	22.50	1.069	0.07	0.179	0.191
06	1	LTE Band 5	10MHz	QPSK	1	0	Front	10	20525	836.5	23.25	23.50	1.059	-0.01	0.615	**0.651**
	1	LTE Band 5	10MHz	QPSK	25	12	Front	10	20525	836.5	21.88	22.50	1.153	0.01	0.496	0.572
	1	LTE Band 5	10MHz	QPSK	1	0	Back	10	20525	836.5	23.25	23.50	1.059	-0.03	0.597	0.632
	1	LTE Band 5	10MHz	QPSK	25	12	Back	10	20525	836.5	21.88	22.50	1.153	-0.03	0.483	0.557
	1	LTE Band 5	10MHz	QPSK	1	0	Right side	10	20525	836.5	23.25	23.50	1.059	0.06	0.127	0.135
	1	LTE Band 5	10MHz	QPSK	25	12	Right side	10	20525	836.5	21.88	22.50	1.153	0.06	0.100	0.115
	1	LTE Band 5	10MHz	QPSK	1	0	Top side	10	20525	836.5	23.25	23.50	1.059	-0.05	0.377	0.399
	1	LTE Band 5	10MHz	QPSK	25	12	Top side	10	20525	836.5	21.88	22.50	1.153	0.05	0.306	0.353
	1	LTE Band 5	10MHz	QPSK	1	0	Bottom side	10	20525	836.5	23.25	23.50	1.059	0.04	0.293	0.310
	1	LTE Band 5	10MHz	QPSK	25	12	Bottom side	10	20525	836.5	21.88	22.50	1.153	-0.05	0.243	0.280

Plot No.	Antenna	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	LTE Band 66	20MHz	QPSK	1	0	Front	10	132572	1770	22.42	23.00	1.143	-0.01	0.946	1.081
07	1	LTE Band 66	20MHz	QPSK	1	0	Front	10	132072	1720	22.28	23.00	1.180	-0.05	0.926	**1.093**
	1	LTE Band 66	20MHz	QPSK	1	0	Front	10	132322	1745	22.37	23.00	1.156	-0.07	0.929	1.074
	1	LTE Band 66	20MHz	QPSK	50	0	Front	10	132572	1770	21.51	22.00	1.119	-0.03	0.749	0.838
	1	LTE Band 66	20MHz	QPSK	50	0	Front	10	132072	1720	21.34	22.00	1.164	-0.03	0.722	0.840
	1	LTE Band 66	20MHz	QPSK	50	0	Front	10	132322	1745	21.43	22.00	1.140	0.05	0.733	0.836
	1	LTE Band 66	20MHz	QPSK	100	0	Front	10	132572	1770	21.38	22.00	1.153	-0.05	0.748	0.863
	1	LTE Band 66	20MHz	QPSK	1	0	Back	10	132572	1770	22.42	23.00	1.143	0.01	0.783	0.895
	1	LTE Band 66	20MHz	QPSK	1	0	Back	10	132072	1720	22.28	23.00	1.180	-0.02	0.758	0.895
	1	LTE Band 66	20MHz	QPSK	1	0	Back	10	132322	1745	22.37	23.00	1.156	-0.02	0.773	0.894
	1	LTE Band 66	20MHz	QPSK	50	0	Back	10	132572	1770	21.51	22.00	1.119	-0.02	0.649	0.727
	1	LTE Band 66	20MHz	QPSK	100	0	Back	10	132572	1770	21.38	22.00	1.153	0.01	0.643	0.742
	1	LTE Band 66	20MHz	QPSK	1	0	Right side	10	132572	1770	22.42	23.00	1.143	-0.01	0.365	0.417
	1	LTE Band 66	20MHz	QPSK	50	0	Right side	10	132572	1770	21.51	22.00	1.119	0.02	0.295	0.330
	1	LTE Band 66	20MHz	QPSK	1	0	Top side	10	132572	1770	22.42	23.00	1.143	-0.01	0.226	0.258
	1	LTE Band 66	20MHz	QPSK	50	0	Top side	10	132572	1770	21.51	22.00	1.119	-0.05	0.182	0.204
	1	LTE Band 66	20MHz	QPSK	1	0	Bottom side	10	132572	1770	22.42	23.00	1.143	-0.01	0.192	0.219
	1	LTE Band 66	20MHz	QPSK	50	0	Bottom side	10	132572	1770	21.51	22.00	1.119	-0.02	0.153	0.171
	1	LTE Band 2	20MHz	QPSK	1	99	Front	10	19100	1900	22.61	23.50	1.227	-0.01	0.894	1.097
	1	LTE Band 2	20MHz	QPSK	1	99	Front	10	18700	1860	22.40	23.50	1.288	0.09	0.889	1.145
	1	LTE Band 2	20MHz	QPSK	1	99	Front	10	18900	1880	22.52	23.50	1.253	-0.12	0.843	1.056
	1	LTE Band 2	20MHz	QPSK	50	50	Front	10	19100	1900	21.42	22.50	1.282	0.01	0.656	0.841
	1	LTE Band 2	20MHz	QPSK	50	50	Front	10	18700	1860	21.32	22.50	1.312	0.12	0.710	0.932
	1	LTE Band 2	20MHz	QPSK	50	50	Front	10	18900	1880	21.28	22.50	1.324	0.02	0.674	0.893
	1	LTE Band 2	20MHz	QPSK	100	0	Front	10	19100	1900	21.44	22.50	1.276	0.07	0.672	0.858
	1	LTE Band 2	20MHz	QPSK	1	99	Back	10	19100	1900	22.61	23.50	1.227	0.02	0.784	0.962
08	1	LTE Band 2	20MHz	QPSK	1	99	Back	10	18700	1860	22.40	23.50	1.288	-0.08	0.896	**1.154**
	1	LTE Band 2	20MHz	QPSK	1	99	Back	10	18900	1880	22.52	23.50	1.253	-0.07	0.796	0.998
	1	LTE Band 2	20MHz	QPSK	50	50	Back	10	19100	1900	21.42	22.50	1.282	-0.06	0.636	0.816
	1	LTE Band 2	20MHz	QPSK	50	50	Back	10	18700	1860	21.32	22.50	1.312	0.04	0.677	0.888
	1	LTE Band 2	20MHz	QPSK	50	50	Back	10	18900	1880	21.28	22.50	1.324	-0.01	0.605	0.801
	1	LTE Band 2	20MHz	QPSK	100	0	Back	10	19100	1900	21.44	22.50	1.276	0.07	0.618	0.789
	1	LTE Band 2	20MHz	QPSK	1	99	Right side	10	19100	1900	22.61	23.50	1.227	-0.08	0.509	0.625
	1	LTE Band 2	20MHz	QPSK	50	50	Right side	10	19100	1900	21.42	22.50	1.282	-0.06	0.403	0.517
	1	LTE Band 2	20MHz	QPSK	1	99	Top side	10	19100	1900	22.61	23.50	1.227	0.06	0.336	0.412
	1	LTE Band 2	20MHz	QPSK	50	50	Top side	10	19100	1900	21.42	22.50	1.282	0.1	0.260	0.333
	1	LTE Band 2	20MHz	QPSK	1	99	Bottom side	10	19100	1900	22.61	23.50	1.227	0.03	0.250	0.307
	1	LTE Band 2	20MHz	QPSK	50	50	Bottom side	10	19100	1900	21.42	22.50	1.282	0.14	0.196	0.251
	2	LTE Band 30	10MHz	QPSK	1	0	Front	10	27710	2310	22.42	23.50	1.282	0.06	0.642	0.823
	2	LTE Band 30	10MHz	QPSK	25	0	Front	10	27710	2310	21.35	22.50	1.303	0.01	0.492	0.641
	2	LTE Band 30	10MHz	QPSK	50	0	Front	10	27710	2310	21.34	22.50	1.306	-0.01	0.487	0.636
	2	LTE Band 30	10MHz	QPSK	1	0	Back	10	27710	2310	22.42	23.50	1.282	0.01	0.529	0.678
	2	LTE Band 30	10MHz	QPSK	25	0	Back	10	27710	2310	21.35	22.50	1.303	0.03	0.427	0.556
09	2	LTE Band 30	10MHz	QPSK	1	0	Top side	10	27710	2310	22.42	23.50	1.282	-0.15	0.746	**0.957**
	2	LTE Band 30	10MHz	QPSK	25	0	Top side	10	27710	2310	21.35	22.50	1.303	-0.06	0.631	0.822
	2	LTE Band 30	10MHz	QPSK	50	0	Top side	10	27710	2310	21.34	22.50	1.306	-0.09	0.626	0.818

<WLAN 2.4GHz SAR>

Plot No.	Antenna	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Max Area Scan SAR	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	WLAN2.4GHz	802.11b 1Mbps	Front	10	1	2412	15.18	15.50	1.076	100	1.000		0.135		
	1	WLAN2.4GHz	802.11b 1Mbps	Back	10	1	2412	15.18	15.50	1.076	100	1.000		0.134		
10	1	WLAN2.4GHz	802.11b 1Mbps	Bottom side	10	1	2412	15.18	15.50	1.076	100	1.000	0.18	0.174	0.115	**0.124**
11	2	WLAN2.4GHz	802.11b 1Mbps	Front	10	1	2412	15.04	15.50	1.112	100	1.000	0.01	0.14	0.092	**0.102**
	2	WLAN2.4GHz	802.11b 1Mbps	Back	10	1	2412	15.04	15.50	1.112	100	1.000		0.115		
	2	WLAN2.4GHz	802.11b 1Mbps	Left side	10	1	2412	15.04	15.50	1.112	100	1.000		0.029		
	2	WLAN2.4GHz	802.11b 1Mbps	Top side	10	1	2412	15.04	15.50	1.112	100	1.000		0.0796		

<WLAN 5GHz SAR>

Plot No.	Antenna	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	WLAN5.2GHz	802.11a 6Mbps	Front	10	48	5240	12.10	12.50	1.096	95.98	1.042	-0.14	0.071	0.081
	1	WLAN5.2GHz	802.11a 6Mbps	Back	10	48	5240	12.10	12.50	1.096	95.98	1.042	-0.07	0.073	0.083
12	1	WLAN5.2GHz	802.11a 6Mbps	Bottom side	10	48	5240	12.10	12.50	1.096	95.98	1.042	-0.17	0.221	**0.252**
	2	WLAN5.2GHz	802.11a 6Mbps	Front	10	48	5240	11.88	12.50	1.153	96.29	1.039	0.02	0.047	0.056
13	2	WLAN5.2GHz	802.11a 6Mbps	Back	10	48	5240	11.88	12.50	1.153	96.29	1.039	-0.19	0.083	**0.099**
	2	WLAN5.2GHz	802.11a 6Mbps	Left side	10	48	5240	11.88	12.50	1.153	96.29	1.039	-0.04	0.074	0.089
	2	WLAN5.2GHz	802.11a 6Mbps	Top side	10	48	5240	11.88	12.50	1.153	96.29	1.039	0.17	0.019	0.023
	1	WLAN5.8GHz	802.11a 6Mbps	Front	10	165	5825	12.06	12.50	1.107	95.98	1.042	0.01	0.112	0.129
	1	WLAN5.8GHz	802.11a 6Mbps	Back	10	165	5825	12.06	12.50	1.107	95.98	1.042	0.01	0.081	0.093
14	1	WLAN5.8GHz	802.11a 6Mbps	Bottom side	10	165	5825	12.06	12.50	1.107	95.98	1.042	-0.01	0.307	**0.354**
	2	WLAN5.8GHz	802.11a 6Mbps	Front	10	149	5745	11.94	12.50	1.138	96.29	1.039	-0.09	0.059	0.070
15	2	WLAN5.8GHz	802.11a 6Mbps	Back	10	149	5745	11.94	12.50	1.138	96.29	1.039	-0.03	0.120	**0.142**
	2	WLAN5.8GHz	802.11a 6Mbps	Left side	10	149	5745	11.94	12.50	1.138	96.29	1.039	0.07	0.054	0.064
	2	WLAN5.8GHz	802.11a 6Mbps	Top side	10	149	5745	11.94	12.50	1.138	96.29	1.039	-0.05	0.051	0.060

14.2 Repeated SAR Measurement

No.	Band	Mode	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WCDMA Band IV	RMC 12.2Kbps	-	-	-	-	Front	10	1413	1732.6	22.65	23.50	1.216	-0.01	0.977	1	1.188
2nd	WCDMA Band IV	RMC 12.2Kbps	-	-	-	-	Front	10	1413	1732.6	22.65	23.50	1.216	-0.02	0.967	1.010	1.176
1st	WCDMA Band II	RMC 12.2Kbps	-	-	-	-	Front	10	9262	1852.4	22.33	23.00	1.167	0.04	0.993	1	1.159
2nd	WCDMA Band II	RMC 12.2Kbps	-	-	-	-	Front	10	9262	1852.4	22.33	23.00	1.167	-0.06	0.981	1.012	1.145
1st	LTE Band 12	-	10MHz	QPSK	1	49	Front	10	23095	707.5	23.18	23.50	1.076	0.02	0.850	1	0.915
2nd	LTE Band 12	-	10MHz	QPSK	1	49	Front	10	23095	707.5	23.18	23.50	1.076	0.01	0.827	1.028	0.890

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

15. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Body
1.	WCDMA(Data) + WLAN2.4GHz SISO(data)	Yes
2.	WCDMA(Data) + WLAN2.4GHz MIMO(data)	Yes
3.	WCDMA(Data) + WLAN5 GHz SISO(data)	Yes
4.	WCDMA(Data) + WLAN5 GHz MIMO(data)	Yes
5.	LTE (Data) + WLAN2.4GHz SISO(data)	Yes
6.	LTE (Data) + WLAN2.4GHz MIMO(data)	Yes
7.	LTE (Data) + WLAN5 GHz SISO(data)	Yes
8.	LTE (Data) + WLAN5 GHz MIMO(data)	Yes
9.	WLAN Antenna 1 + WLAN Antenna 2	Yes

General Note:

1. EUT will choose either WCDMA or LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
2. This device 2.4GHz WLAN/ 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO).
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment though they have independent antenna.
4. This device has two WWAN antennas. WWAN antenna 1 is located at the right side of the device and WWAN antenna 2 is located at the top side of the device which can refer to antenna location chapter. WWAN antenna 1 frequency bands include WCDMA B2 / B4 / B5 and LTE B2 / B4 / B5 / B12 / B14 / B66 and WWAN antenna 2 frequency bands only includes LTE B30. And they can't transmit simultaneously.
5. Chose the worst zoom scan SAR of WLAN 2.4GHz correspondingly for co-located with WWAN analysis.
6. For simultaneously analysis, since the SAR summation of 3 transmitters can cover others combination of 2 transmitters, therefore in this section did not additional to evaluate 2TX combination of simultaneously transmission.
7. The reported SAR summation is calculated based on the same configuration and test position.
8. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

15.1 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	5	1+2+3	1+4+5
			WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
WCDMA	Band V	Front	0.642	0.124	0.102	0.129	0.070	0.87	0.84
		Back	0.552	0.124	0.102	0.093	0.142	0.78	0.79
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.168					0.17	0.17
		Top Side	0.330		0.102		0.060	0.43	0.39
		Bottom Side	0.251	0.124		0.354		0.38	0.61
	Band IV	Front	1.188	0.124	0.102	0.129	0.070	**1.41**	**1.39**
		Back	0.933	0.124	0.102	0.093	0.142	1.16	1.17
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.424					0.42	0.42
		Top Side	0.282		0.102		0.060	0.38	0.34
		Bottom Side	0.241	0.124		0.354		0.37	0.60
	Band II	Front	1.159	0.124	0.102	0.129	0.070	1.39	1.36
		Back	1.083	0.124	0.102	0.093	0.142	1.31	1.32
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.575					0.58	0.58
		Top Side	0.351		0.102		0.060	0.45	0.41
		Bottom Side	0.293	0.124		0.354		0.42	0.65

WWAN Band		Exposure Position	1	2	3	4	5	1+2+3	1+4+5
			WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Summed 1g SAR (W/kg)	Summed 1g SAR (W/kg)
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
LTE	Band 12	Front	0.915	0.124	0.102	0.129	0.070	1.14	1.11
		Back	0.831	0.124	0.102	0.093	0.142	1.06	1.07
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.084					0.08	0.08
		Top Side	0.364		0.102		0.060	0.47	0.42
		Bottom Side	0.422	0.124		0.354		0.55	0.78
	Band 14	Front	0.478	0.124	0.102	0.129	0.070	0.70	0.68
		Back	0.539	0.124	0.102	0.093	0.142	0.77	0.77
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.219					0.22	0.22
		Top Side	0.251		0.102		0.060	0.35	0.31
		Bottom Side	0.369	0.124		0.354		0.49	0.72
	Band 5	Front	0.651	0.124	0.102	0.129	0.070	0.88	0.85
		Back	0.632	0.124	0.102	0.093	0.142	0.86	0.87
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.135					0.14	0.14
		Top Side	0.399		0.102		0.060	0.50	0.46
		Bottom Side	0.310	0.124		0.354		0.43	0.66
	Band 66	Front	1.093	0.124	0.102	0.129	0.070	1.32	1.29
		Back	0.895	0.124	0.102	0.093	0.142	1.12	1.13
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.417					0.42	0.42
		Top Side	0.258		0.102		0.060	0.36	0.32
		Bottom Side	0.219	0.124		0.354		0.34	0.57
	Band 2	Front	1.145	0.124	0.102	0.129	0.070	1.37	1.34
		Back	1.154	0.124	0.102	0.093	0.142	1.38	1.39
		Left Side			0.102		0.089	0.10	0.09
		Right Side	0.625					0.63	0.63
		Top Side	0.412		0.102		0.060	0.51	0.47
		Bottom Side	0.307	0.124		0.354		0.43	0.66
	Band 30	Front	0.823	0.124	0.102	0.129	0.070	1.05	1.02
		Back	0.678	0.124	0.102	0.093	0.142	0.90	0.91
		Top Side	0.957		0.102		0.060	1.06	1.02
		Bottom Side		0.124		0.354		0.12	0.35

Test Engineer: Kat Yin

16. Uncertainty Assessment

Pre KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg. Therefore, the measurement uncertainty table is not required in this report.

17. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[6] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

[7] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[8] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[9] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[10] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[11] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/1

System Check_Body_750MHz_20171201

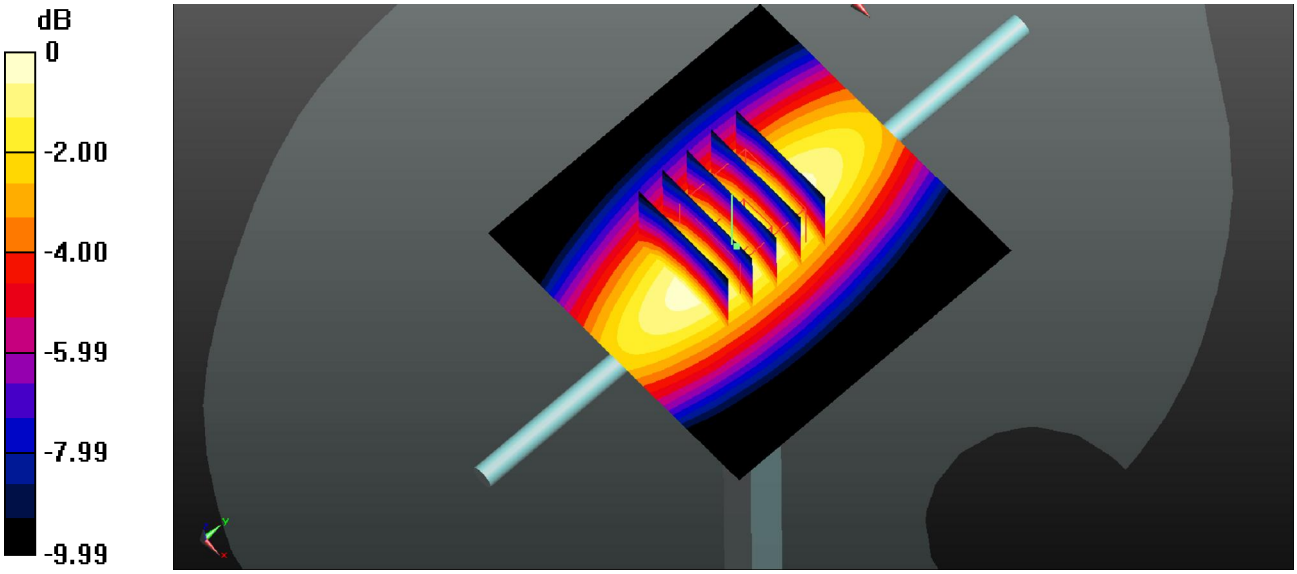
DUT: D750V3-SN1087

Communication System: UID 0, CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL_750_Medium parameters used: f = 750 MHz; σ = 0.971 S/m; ε_r = 57.377; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(10.29, 10.29, 10.29); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.00 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.72 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.37 W/kg
SAR(1 g) = 2.28 W/kg; SAR(10 g) = 1.53 W/kg
Maximum value of SAR (measured) = 2.99 W/kg



0 dB = 2.99 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/1

System Check_Body_835MHz_20171201

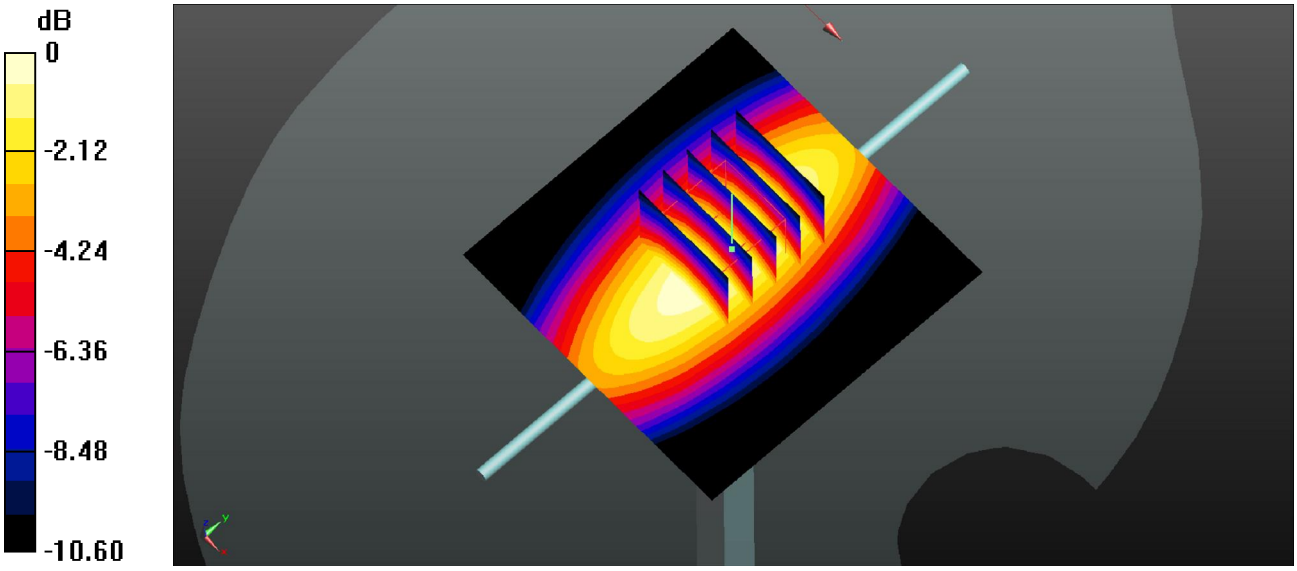
DUT: D835V2-SN4d151

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835_Medium parameters used: f = 835 MHz; σ = 1 S/m; ε_r = 55.844; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(10.34, 10.34, 10.34); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.37 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.27 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.79 W/kg
SAR(1 g) = 2.49 W/kg; SAR(10 g) = 1.64 W/kg
Maximum value of SAR (measured) = 3.33 W/kg



0 dB = 3.33 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/7

System Check_Body_1750MHz_20171207

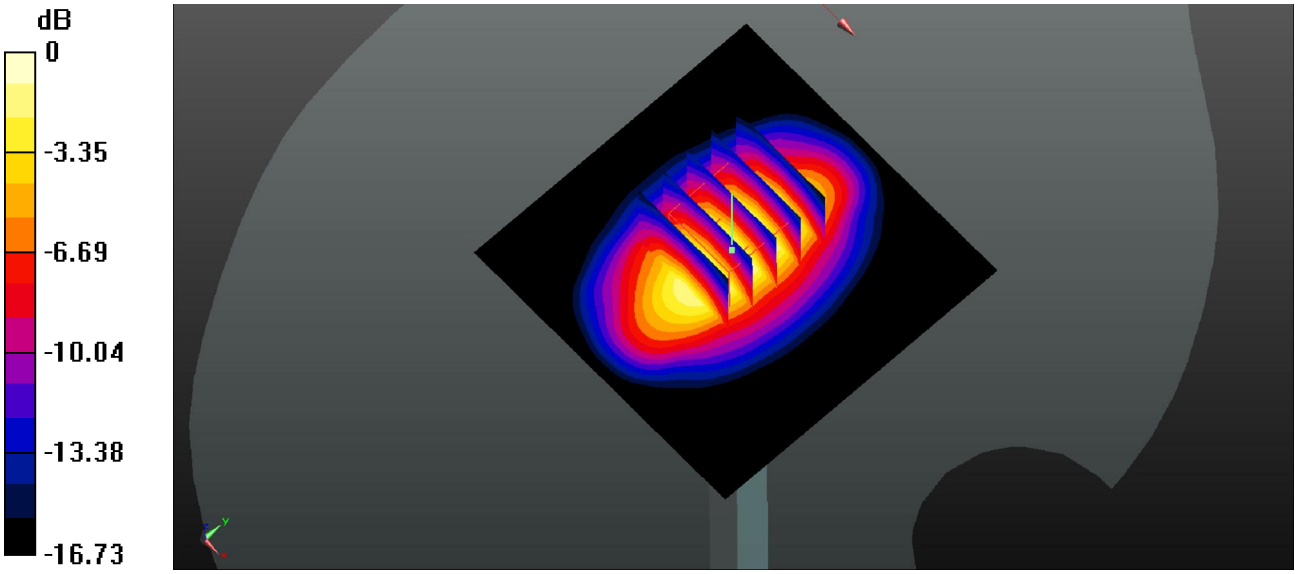
DUT: D1750V2-SN1090

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1750_Medium parameters used: f = 1750 MHz; σ = 1.471 S/m; ε_r = 54.74; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.7 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 90.90 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.06 W/kg; SAR(10 g) = 4.85 W/kg
Maximum value of SAR (measured) = 13.5 W/kg



0 dB = 13.5 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/11/30

System Check_Body_1900MHz_20171130

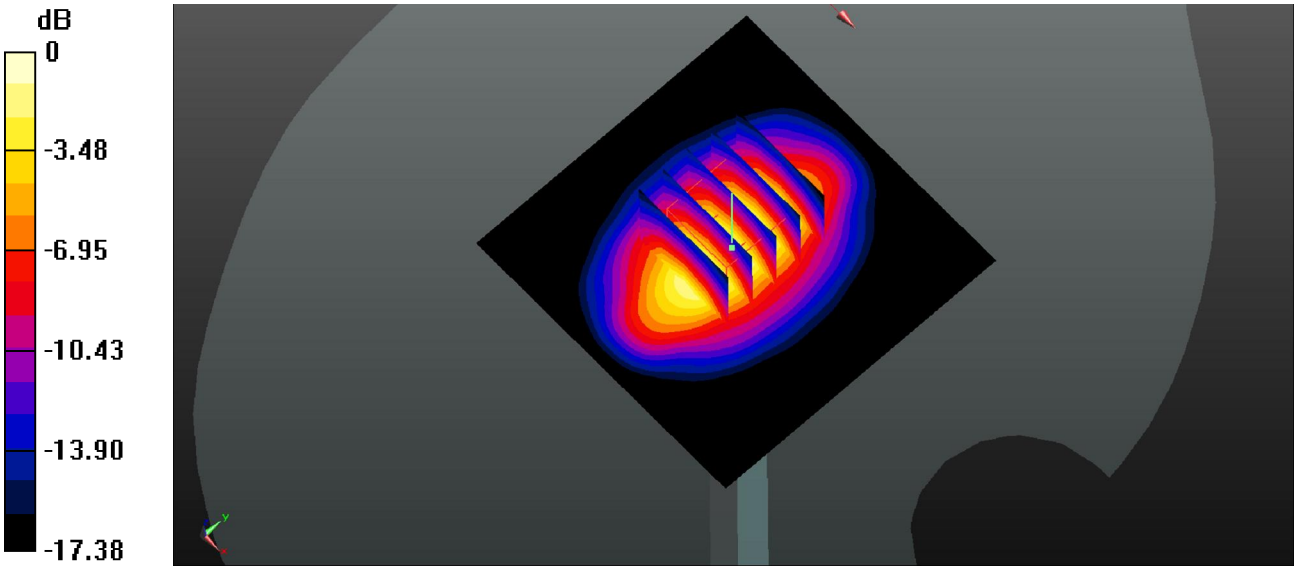
DUT: D1900V2-SN5d170

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900_Medium parameters used: f = 1900 MHz; σ = 1.564 S/m; ε_r = 51.892; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 15.9 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 85.07 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 19.1 W/kg
SAR(1 g) = 10.5 W/kg; SAR(10 g) = 5.5 W/kg
Maximum value of SAR (measured) = 16.2 W/kg



0 dB = 16.2 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/11/30

System Check_Body_2300MHz_20171130

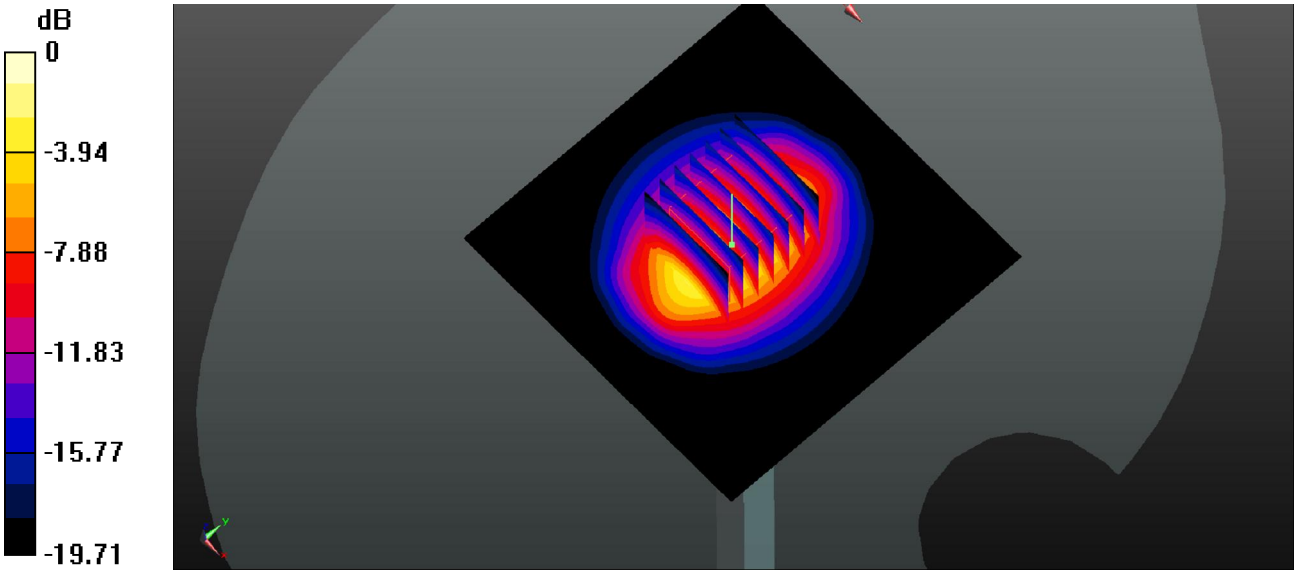
DUT: D2300V2-SN1055

Communication System: UID 0, CW (0); Frequency: 2300 MHz;Duty Cycle: 1:1
Medium: MSL_2300_Medium parameters used: f = 2300 MHz; σ = 1.735 S/m; ε_r = 54.166; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.02, 8.02, 8.02); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 19.8 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.36 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 24.1 W/kg
SAR(1 g) = 12.3 W/kg; SAR(10 g) = 5.91 W/kg
Maximum value of SAR (measured) = 19.9 W/kg



0 dB = 19.9 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

System Check_Body_2450MHz_20171210

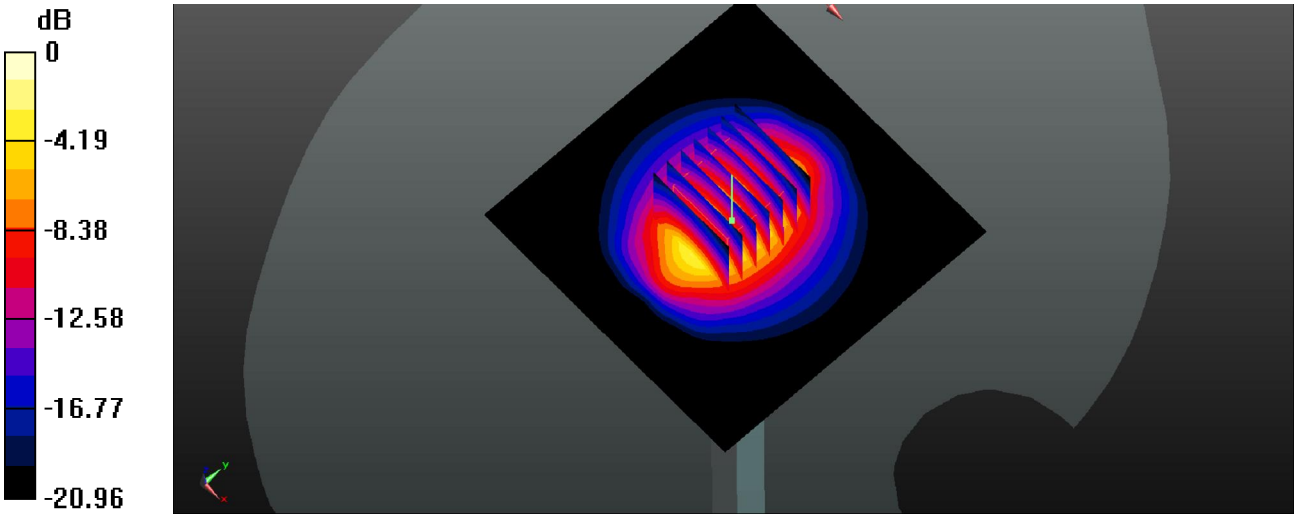
DUT: D2450V2-SN908

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_Medium parameters used: f = 2450 MHz; σ = 1.988 S/m; ε_r = 54.096; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(7.72, 7.72, 7.72); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.4 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.51 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.16 W/kg
Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

System Check_Body_5200MHz_20171210

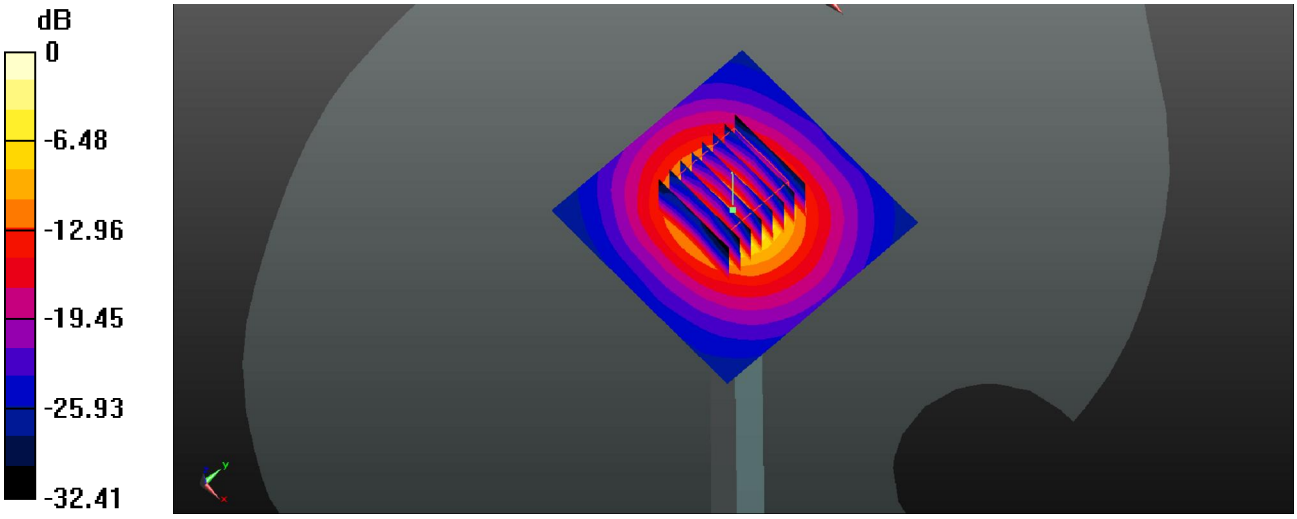
DUT: D5GHzV2-SN1128

Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: MSL_5G_Medium parameters used: f = 5200 MHz; σ = 5.432 S/m; ε_r = 49.221; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(4.79, 4.79, 4.79); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=100mw/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.1 W/kg

Pin=100mw/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 40.06 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 29.9 W/kg
SAR(1 g) = 7.55 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



0 dB = 18.2 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

System Check_Body_5800MHz_20171210

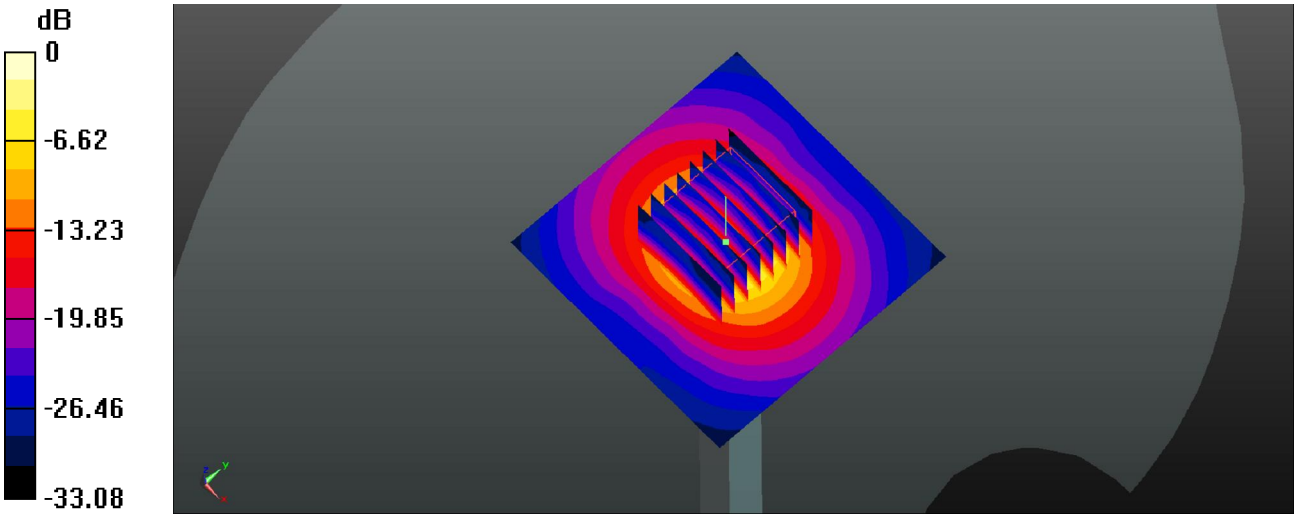
DUT: D5GHzV2-SN1128

Communication System: UID 0, CW (0); Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: MSL_5G_Medium parameters used: f = 5800 MHz; σ = 5.956 S/m; ε_r = 46.473; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(4.16, 4.16, 4.16); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=100mw/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.5 W/kg

Pin=100mw/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 36.75 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 31.8 W/kg
SAR(1 g) = 7.35 W/kg; SAR(10 g) = 1.96 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/1

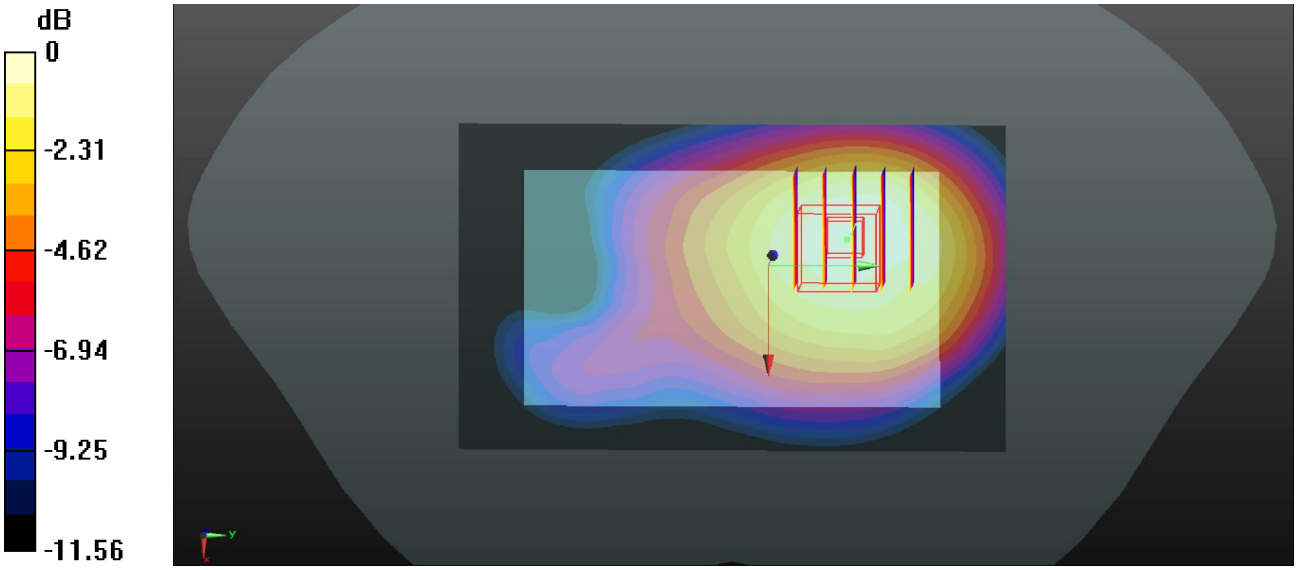
01_WCDMA Band V_RMC 12.2Kbps_Front_10mm_Ch4132

Communication System: UID 0, WCDMA (0); Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: MSL_835_Medium parameters used: f = 826.4 MHz; σ = 0.991 S/m; ε_r = 55.927; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(10.34, 10.34, 10.34); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch4132/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.760 W/kg

Ch4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.71 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.827 W/kg
SAR(1 g) = 0.562 W/kg; SAR(10 g) = 0.394 W/kg
Maximum value of SAR (measured) = 0.730 W/kg



0 dB = 0.730 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/7

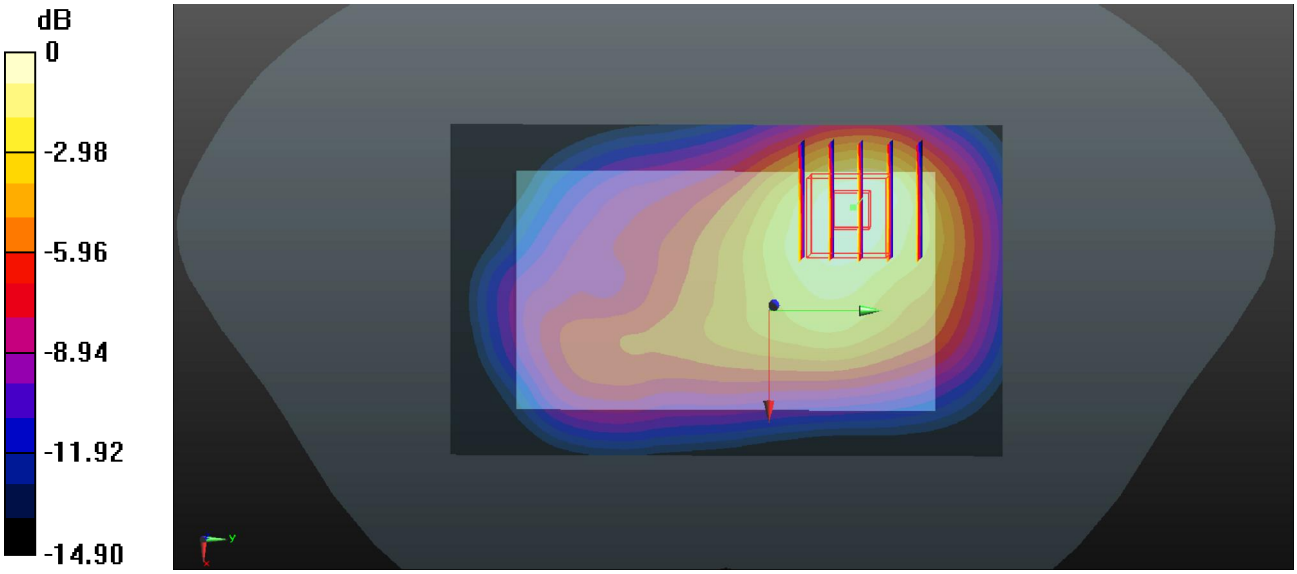
02_WCDMA Band IV_RMC 12.2Kbps_Front_10mm_Ch1413

Communication System: UID 0, WCDMA (0); Frequency: 1732.6 MHz;Duty Cycle: 1:1
Medium: MSL_1750_Medium parameters used: f = 1732.6 MHz; σ = 1.453 S/m; ε_r = 54.792; ρ = 1000kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch1413/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.38 W/kg

Ch1413/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.04 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 0.977 W/kg; SAR(10 g) = 0.601 W/kg
Maximum value of SAR (measured) = 1.37 W/kg



0 dB = 1.37 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/11/30

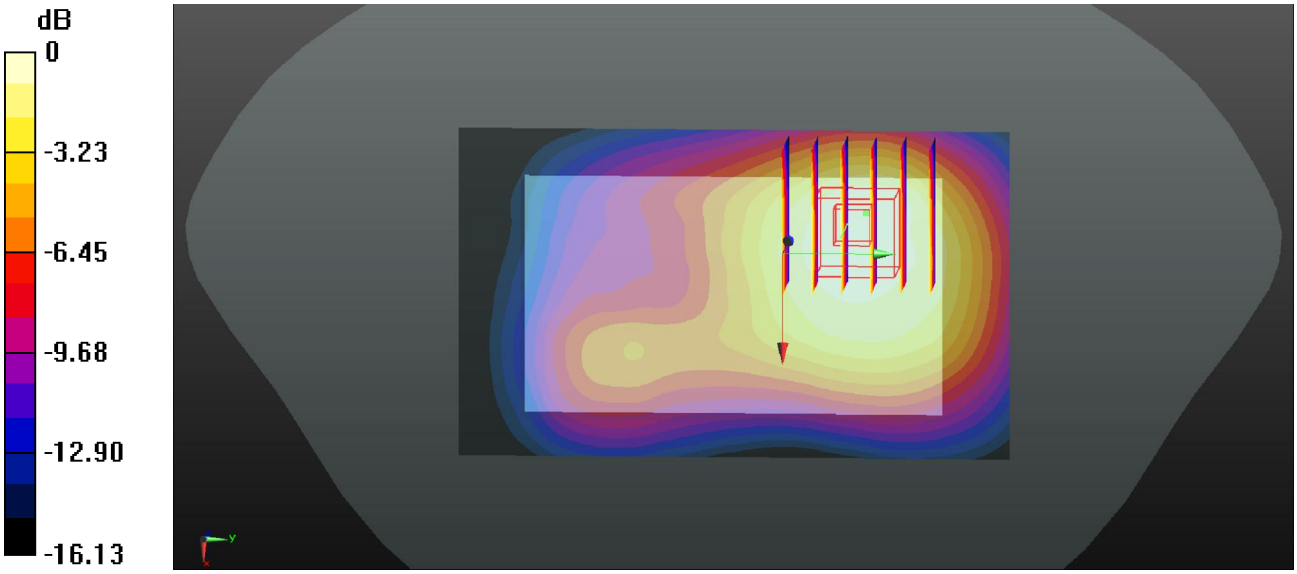
03_WCDMA Band II_RMC 12.2Kbps_Front_10mm_Ch9262

Communication System: UID 0, WCDMA (0); Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_Medium parameters used: f = 1852.4 MHz; σ = 1.511 S/m; ε_r = 52.083; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch9262/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.41 W/kg

Ch9262/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.65 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 0.993 W/kg; SAR(10 g) = 0.616 W/kg
Maximum value of SAR (measured) = 1.37 W/kg



0 dB = 1.37 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/1

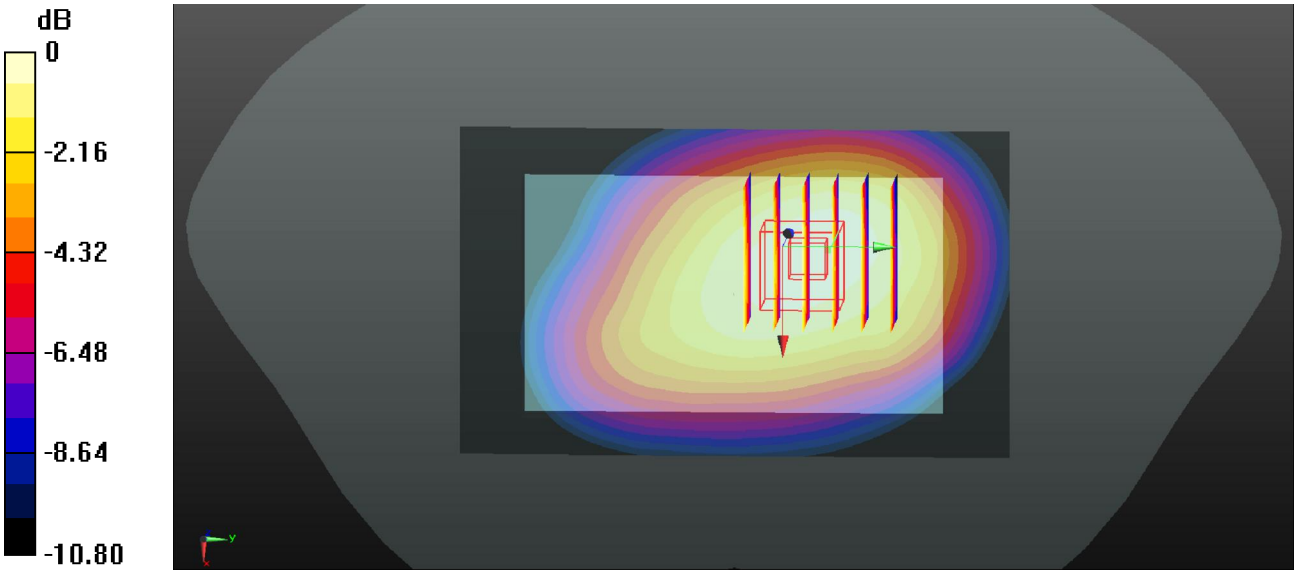
04_LTE Band 12_10M_QPSK_1RB_49offset_Front_10mm_Ch23095

Communication System: UID 0, FDD-LTE (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: MSL_750_Medium parameters used: f = 707.5 MHz; σ = 0.933 S/m; ε_r = 57.753; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(10.29, 10.29, 10.29); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch23095/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.03 W/kg

Ch23095/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.16 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.850 W/kg; SAR(10 g) = 0.636 W/kg
Maximum value of SAR (measured) = 1.04 W/kg



0 dB = 1.04 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/1

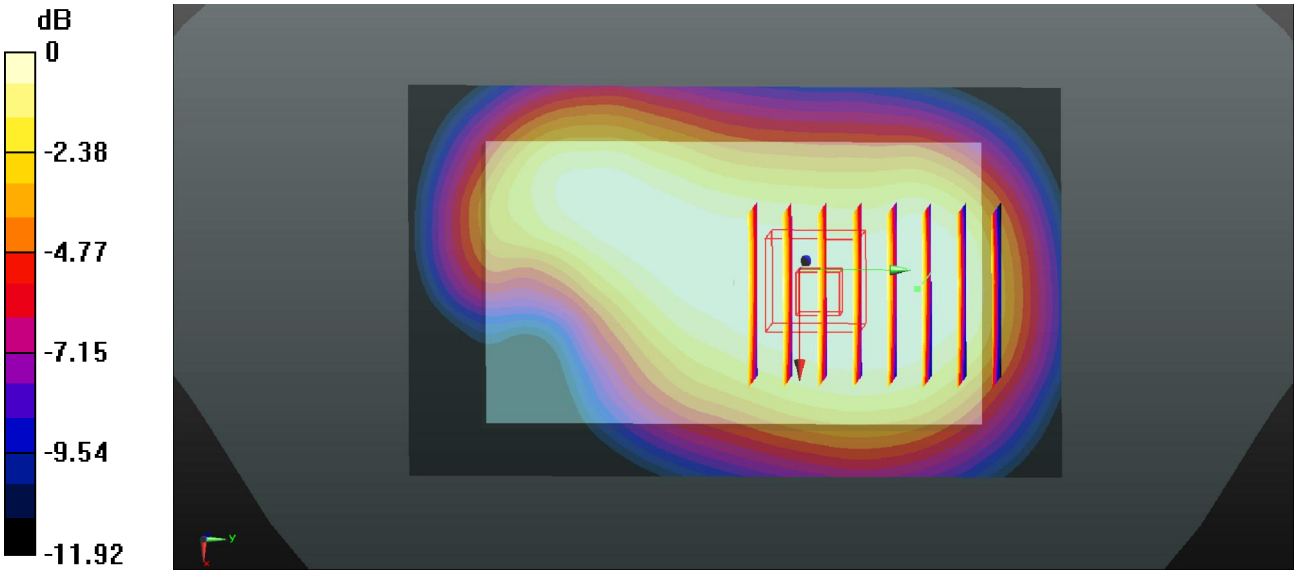
05_LTE Band 14_10M_QPSK_1RB_0offset_Back_10mm_Ch23330

Communication System: UID 0, FDD-LTE (0); Frequency: 793 MHz;Duty Cycle: 1:1
Medium: MSL_750_Medium parameters used: f = 793 MHz; σ = 1.013 S/m; ε_r = 56.968; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(10.29, 10.29, 10.29); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch23330/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.646 W/kg

Ch23330/Zoom Scan (6x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.61 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.708 W/kg
SAR(1 g) = 0.493 W/kg; SAR(10 g) = 0.370 W/kg
Maximum value of SAR (measured) = 0.599 W/kg



0 dB = 0.599 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/1

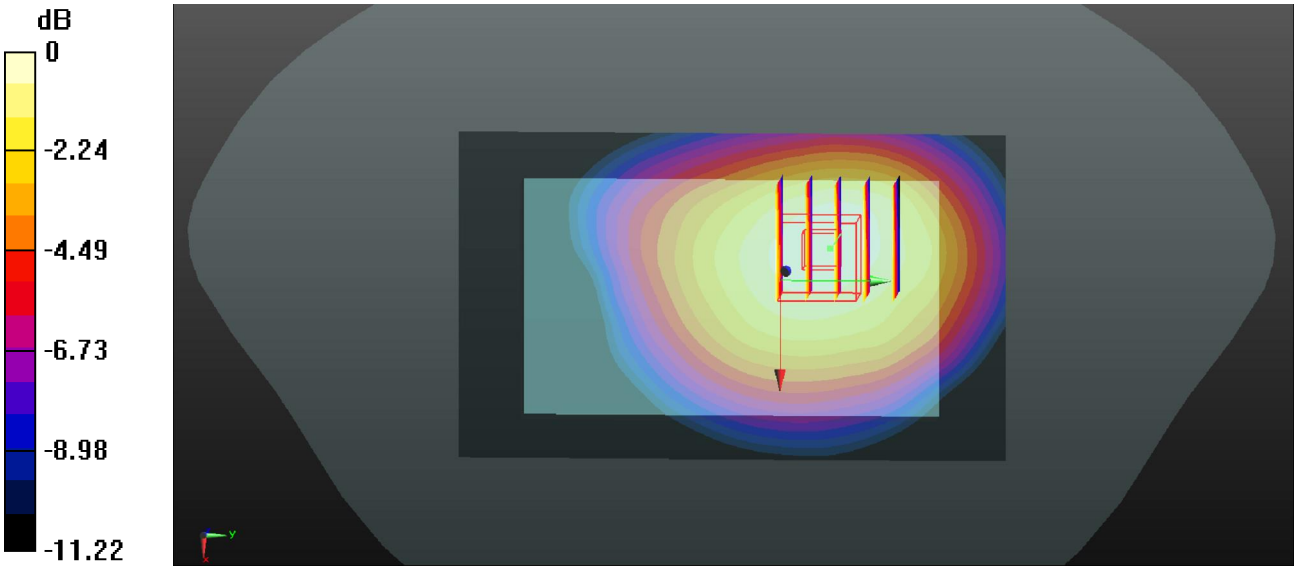
06_LTE Band 5_10M_QPSK_1RB_0offset_Front_10mm_Ch20525

Communication System: UID 0, FDD-LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_835_Medium parameters used: f = 836.5 MHz; σ = 1.001 S/m; ε_r = 55.829; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(10.34, 10.34, 10.34); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch20525/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.791 W/kg

Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.08 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.862 W/kg
SAR(1 g) = 0.615 W/kg; SAR(10 g) = 0.444 W/kg
Maximum value of SAR (measured) = 0.777 W/kg



0 dB = 0.777 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/7

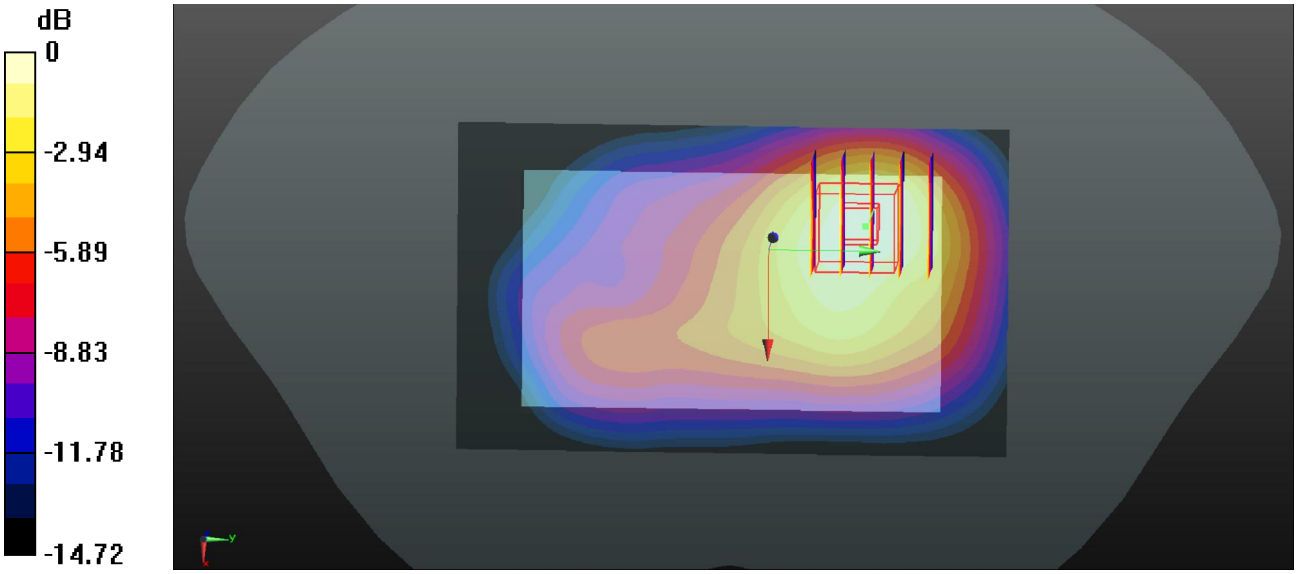
07_LTE Band 66_20M_QPSK_1RB_0offset_Front_10mm_Ch132072

Communication System: UID 0, FDD-LTE (0); Frequency: 1720 MHz;Duty Cycle: 1:1
Medium: MSL_1750_Medium parameters used: f = 1720 MHz; σ = 1.44 S/m; ε_r = 54.836; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.58, 8.58, 8.58); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch132072/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Ch132072/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.93 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.926 W/kg; SAR(10 g) = 0.568 W/kg
Maximum value of SAR (measured) = 1.30 W/kg



0 dB = 1.30 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/11/30

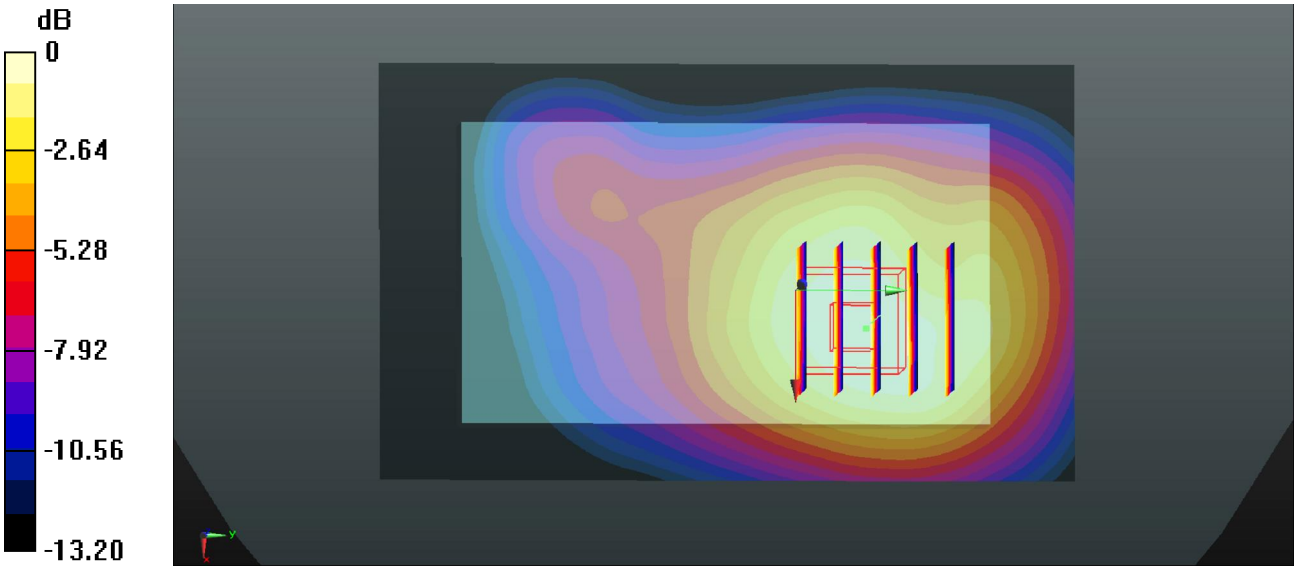
08_LTE Band 2_20M_QPSK_1RB_99offset_Back_10mm_Ch18700

Communication System: UID 0, FDD-LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: MSL_1900_Medium parameters used: f = 1860 MHz; σ = 1.52 S/m; ε_r = 52.05; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.18, 8.18, 8.18); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch18700/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.26 W/kg

Ch18700/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.99 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.896 W/kg; SAR(10 g) = 0.562 W/kg
Maximum value of SAR (measured) = 1.21 W/kg



0 dB = 1.21 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/11/30

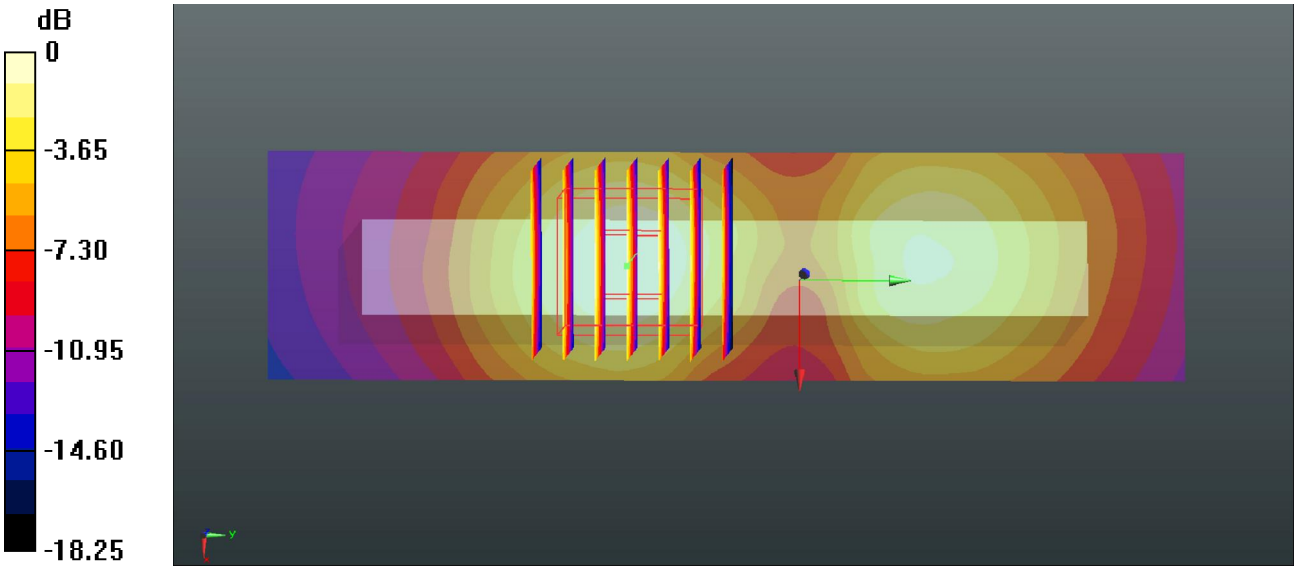
09_LTE Band 30_10M_QPSK_1RB_0offset_Top side_10mm_Ch27710

Communication System: UID 0, FDD-LTE (0); Frequency: 2310 MHz;Duty Cycle: 1:1
Medium: MSL_2300_Medium parameters used: f = 2310 MHz; σ = 1.749 S/m; ε_r = 54.137; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(8.02, 8.02, 8.02); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch27710/Area Scan (31x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.19 W/kg

Ch27710/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.64 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 0.746 W/kg; SAR(10 g) = 0.415 W/kg
Maximum value of SAR (measured) = 1.09 W/kg



0 dB = 1.09 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

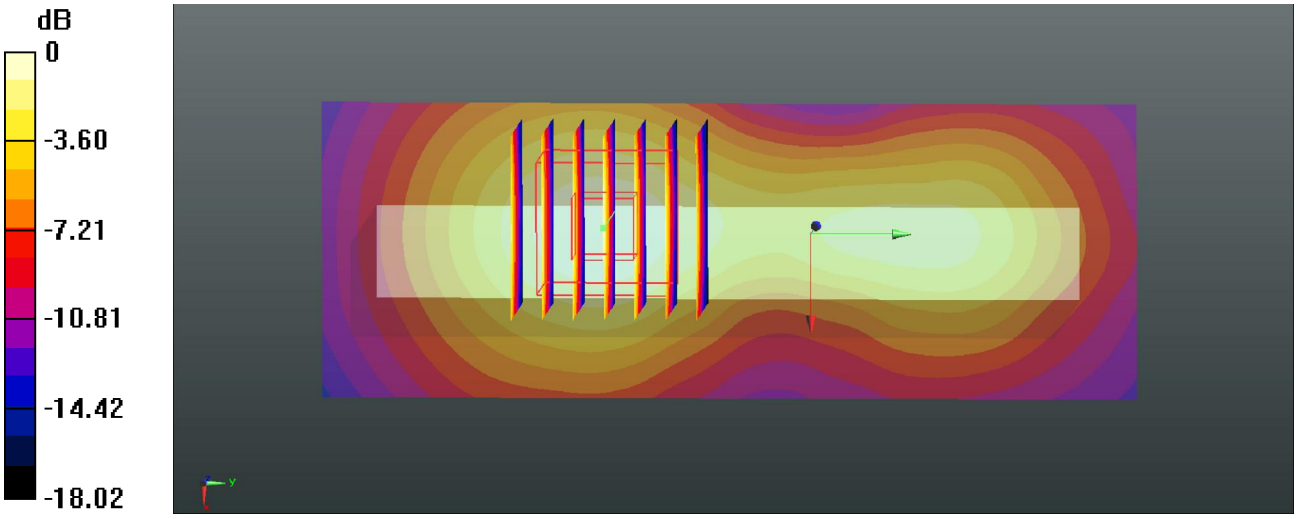
10_WLAN2.4GHz_802.11b 1Mbps_Bottom side_10mm_Ch1_Ant 1

Communication System: UID 0, 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450_Medium parameters used: f = 2412 MHz; σ = 1.933 S/m; ε_r = 54.248; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(7.72, 7.72, 7.72); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch1/Area Scan (41x111x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.174 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.543 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.211 W/kg
SAR(1 g) = 0.115 W/kg; SAR(10 g) = 0.063 W/kg
Maximum value of SAR (measured) = 0.175 W/kg



0 dB = 0.175 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

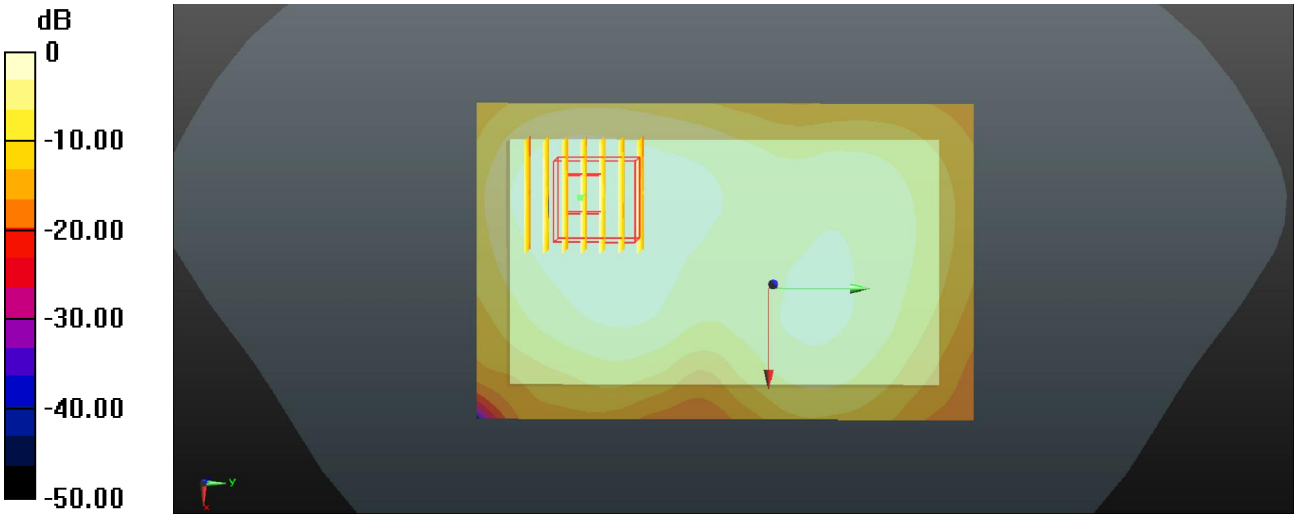
11_WLAN2.4GHz_802.11b 1Mbps_Front_10mm_Ch1_Ant 2

Communication System: UID 0, 802.11b (0); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: MSL_2450_Medium parameters used: f = 2412 MHz; σ = 1.933 S/m; ε_r = 54.248; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(7.72, 7.72, 7.72); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch1/Area Scan (71x111x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.140 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.271 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.171 W/kg
SAR(1 g) = 0.092 W/kg; SAR(10 g) = 0.052 W/kg
Maximum value of SAR (measured) = 0.140 W/kg



0 dB = 0.140 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

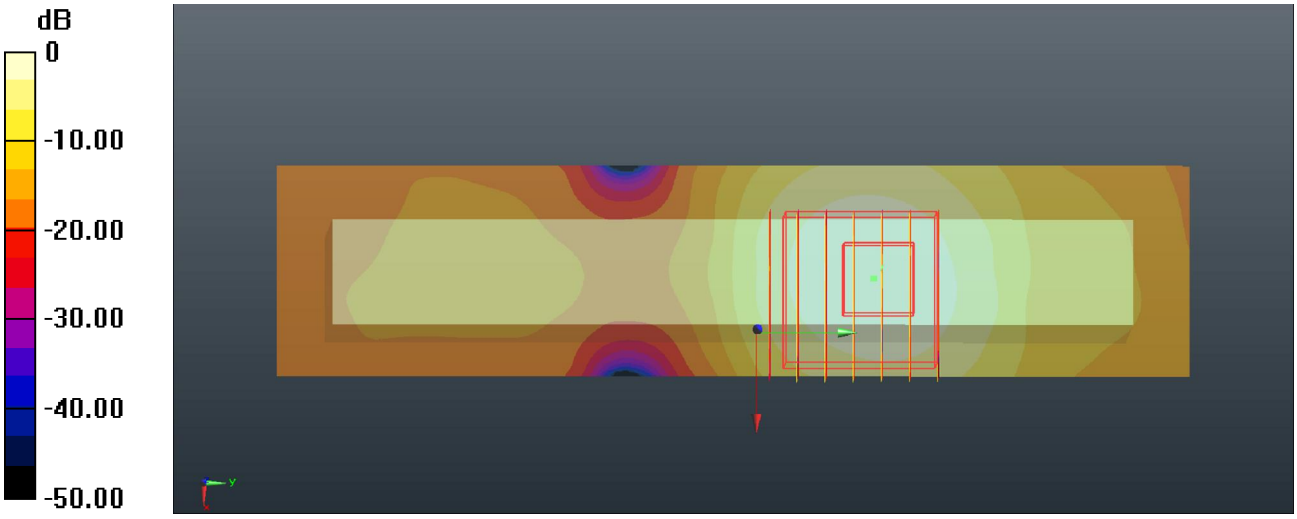
12_WLAN5.2GHz_802.11a 6Mbps_Bottom side_10mm_Ch48_Ant 1

Communication System: UID 0, 802.11a (0); Frequency: 5240 MHz;Duty Cycle: 1:1.042
Medium: MSL_5G_Medium parameters used: f = 5240 MHz; σ = 5.485 S/m; ε_r = 49.146; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(4.79, 4.79, 4.79); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch48/Area Scan (31x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.505 W/kg

Ch48/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 3.850 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.797 W/kg
SAR(1 g) = 0.221 W/kg; SAR(10 g) = 0.076 W/kg
Maximum value of SAR (measured) = 0.493 W/kg



0 dB = 0.493 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

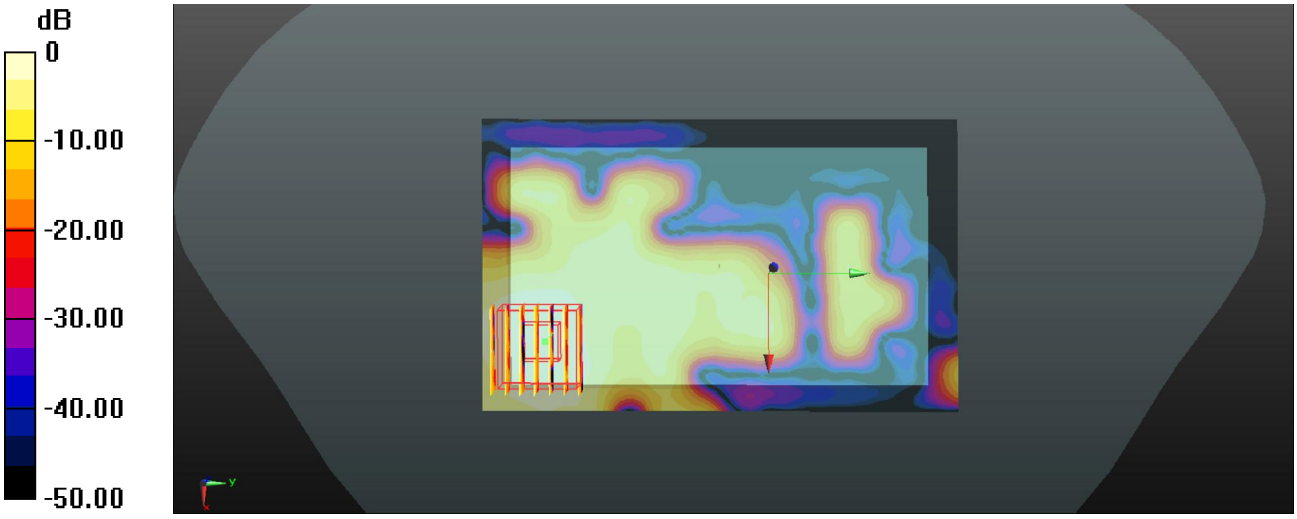
13_WLAN5.2GHz_802.11a 6Mbps_Back_10mm_Ch48_Ant 2

Communication System: UID 0, 802.11a (0); Frequency: 5240 MHz;Duty Cycle: 1:1.039
Medium: MSL_5G_Medium parameters used: f = 5240 MHz; σ = 5.485 S/m; ε_r = 49.146; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(4.79, 4.79, 4.79); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch48/Area Scan (81x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.191 W/kg

Ch48/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.566 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.292 W/kg
SAR(1 g) = 0.083 W/kg; SAR(10 g) = 0.032 W/kg
Maximum value of SAR (measured) = 0.181 W/kg



0 dB = 0.181 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

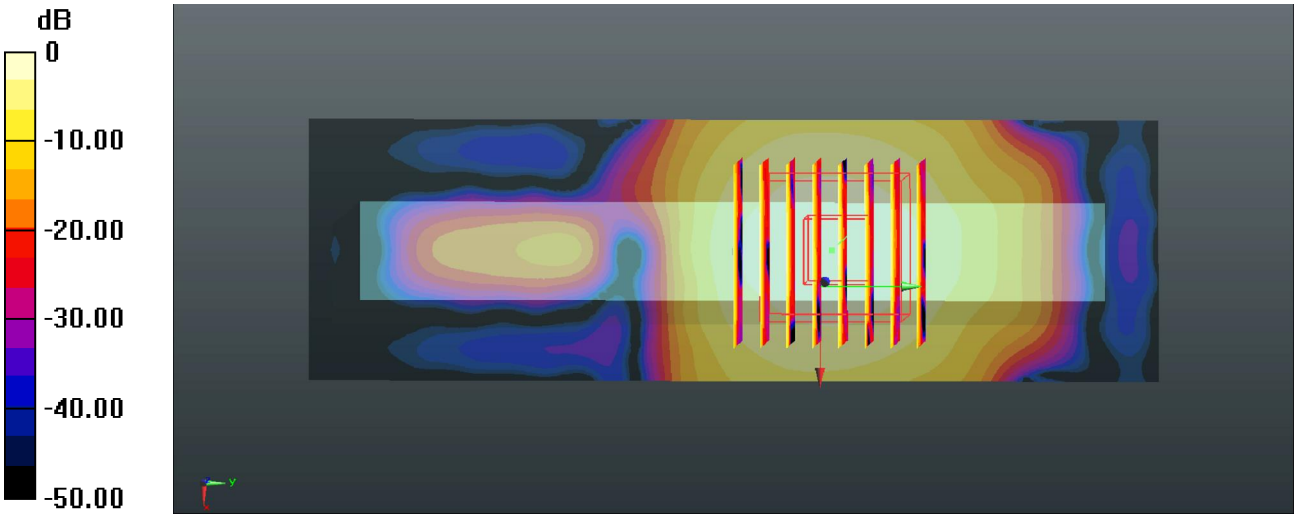
14_WLAN5.8GHz_802.11a 6Mbps_Bottom side_10mm_Ch165_Ant 1

Communication System: UID 0, 802.11a (0); Frequency: 5825 MHz;Duty Cycle: 1:1.042
Medium: MSL_5G_Medium parameters used: f = 5825 MHz; σ = 6.018 S/m; ε_r = 46.416; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(4.16, 4.16, 4.16); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch165/Area Scan (41x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.707 W/kg

Ch165/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 7.908 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.307 W/kg; SAR(10 g) = 0.110 W/kg
Maximum value of SAR (measured) = 0.718 W/kg



0 dB = 0.718 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/12/10

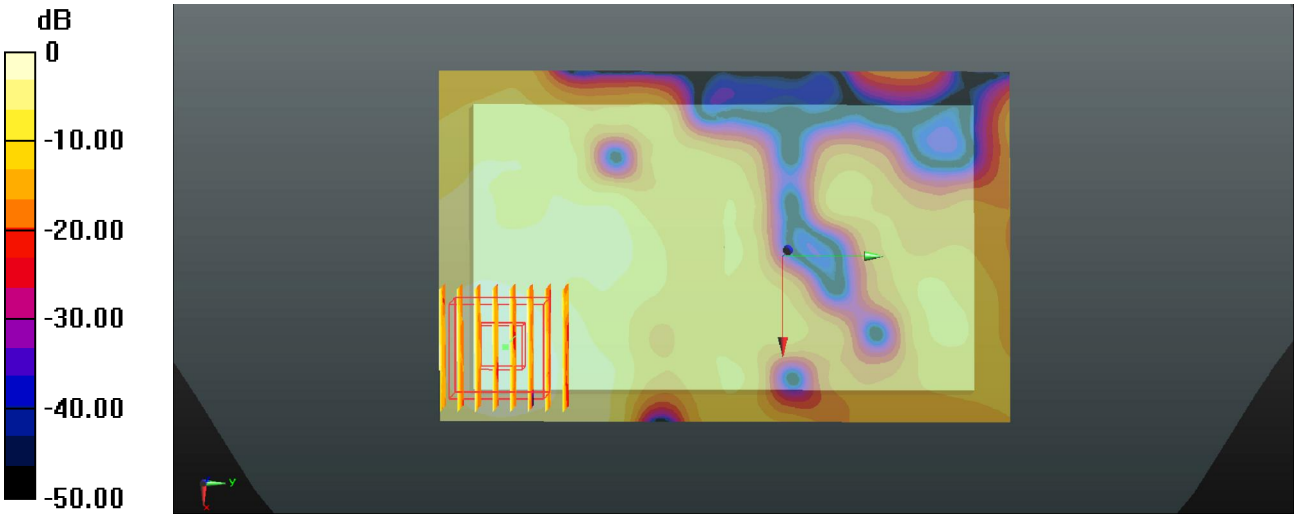
15_WLAN5.8GHz_802.11a 6Mbps_Back_10mm_Ch149_Ant 2

Communication System: UID 0, 802.11a (0); Frequency: 5745 MHz;Duty Cycle: 1:1.039
Medium: MSL_5G_Medium parameters used: f = 5745 MHz; σ = 5.901 S/m; ε_r = 46.679; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3958; ConvF(4.16, 4.16, 4.16); Calibrated: 2016/12/12;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch149/Area Scan (81x131x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.268 W/kg

Ch149/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.404 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.468 W/kg
SAR(1 g) = 0.120 W/kg; SAR(10 g) = 0.047 W/kg
Maximum value of SAR (measured) = 0.274 W/kg



0 dB = 0.274 W/kg

Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.