FCC SAR Test Report

APPLICANT	**:**	**Republic Wireless, Inc.**
EQUIPMENT	**:**	**Cellular Voice Device**
BRAND NAME	**:**	**Relay**
MODEL NAME	**:**	**RW2265**
FCC ID	**:**	**2AMBHRW2265**
STANDARD	**:**	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2013**

The product was received on Dec. 24, 2018 and testing was started from Dec. 29, 2018 and completed on Jan. 16, 2019. We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Mark Qu

Approved by: Mark Qu / Manager

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Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone,
Jiangsu Province 215335, China

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA8D2406	Rev. 01	Initial issue of report	Feb. 26, 2019

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Republic Wireless, Inc., Cellular Voice Device, RW2265,** are as follows.

Highest Standalone 1g SAR Summary						
Equipment Class	Frequency Band		Head (Separation 10mm) 1g SAR (W/kg)	Hotspot (Separation 5mm) 1g SAR (W/kg)	Body-worn (Separation 5mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)
Licensed	WCDMA	Band V	0.28	0.51	0.51	1.50
		Band IV	0.83	1.19	1.19	
		Band II	0.54	**1.20**	**1.20**	
	CDMA2000	BC0	0.54	0.76	0.75	
		BC10	0.52	0.78	0.77	
		BC1	0.54	0.94	1.09	
	LTE	Band 12	0.22	0.62	0.62	
		Band 13	0.24	0.67	0.67	
		Band 26/5	0.47	0.78	0.78	
		Band 66/4	**1.17**	**1.20**	**1.20**	
		Band 25/2	0.79	**1.20**	**1.20**	
		Band 41	0.24	0.95	0.92	
DTS	WLAN	2.4GHz WLAN	0.10	0.30	0.30	1.50
Date of Testing:		2018/12/29 ~ 2019/1/16				

Remark: This device supports LTE B4 / B5 / B2 and LTE B66 / B26 / B25. Since the supported frequency span for LTE B4 / B5 / B2 falls completely within the supports frequency span for LTE B66 / B26 / B25, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B66 / B26 / B25.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) 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 (Kunshan) Inc.
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958

Applicant	
Company Name	Republic Wireless, Inc.
Address	940 Main Campus Drive, Ste 300, Raleigh, NC 27606, United States

Manufacturer	
Company Name	Bluebank Communication Technology Co Ltd
Address	No.16 Cuiping Road, Yubei District, Chongqing, P.R.China, 401120

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 616217 D04 SAR for laptop and tablets v01r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Cellular Voice Device
Brand Name	Relay
Model Name	RW2265
FCC ID	2AMBHRW2265
IMEI Code	990007550209800
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 CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz CDMA 2000 BC10: 817.9 MHz ~ 823.1 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 13: 779.5 MHz ~ 784.5 MHz LTE Band 25: 1850.7 MHz ~ 1914.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	AMR/RMC 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) CDMA2000 : 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) LTE: QPSK, 16QAM, 64QAM (uplink is not supported) WLAN 2.4GHz : 802.11b/g/n HT20 Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE NFC:ASK
HW Version	MP
SW Version	msm8909_BLUEBANK-QC26A-000-01-15-01.20.2018_userdebug
EUT Stage	Identical Prototype

Remark:

1. This device has PTT (Push-To-Talk) function, so in-front-of the face SAR (head SAR) has been evaluated with 10mm distance using head liquid under the flat phantom.
2. The device employs proximity sensors and when the sensor detects a user is touching the device on or near to the antenna the device reduces the maximum allowed output power. When detected the presence of the user's body at the front or back faces of the device, WCDMA band IV/II, CDMA 2000 BC1, and LTE band 2/4/25/41/66 reduced power will be active. So for hotspot/body-worn SAR, sensor on reduced power will be active at front/back faces for above WWAN bands, other WWAN bands are all full power mode. For in-front-of the face SAR (head SAR), we always use full power level to perform SAR testing though sensor has been triggered, using full power is a very conservatively evaluation.
3. This is a variant report for RW2265. For model change note, please refer the product equality declaration exhibit submitted. Based on the similarity between current and previous project, only the WWAN SAR full test, and the worst cases of WLAN SAR from original test report (Sporton Report Number FA811212) was verified for the differences.

4.2 General LTE SAR Test and Reporting Considerations

<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>2AMBHRW2265</td></tr>
<tr><td>Equipment Name</td><td>Cellular Voice Device</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>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 13: 779.5 MHz ~ 784.5 MHz
LTE Band 25: 1850.7 MHz ~ 1914.3 MHz
LTE Band 26: 814.7 MHz ~ 848.3 MHz
LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
LTE Band 66: 1710.7 MHz ~ 1779.3 MHz</td></tr>
<tr><td>Channel Bandwidth</td><td>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 13: 5MHz, 10MHz
LTE Band 25:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 66:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz</td></tr>
<tr><td>Uplink Modulations Used</td><td>QPSK / 16QAM / 64QAM (uplink is not supported)</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Data only</td></tr>
<tr><td>LTE Release</td><td>R8, Cat4</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
<tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr>
</table></td></tr>
<tr><td>LTE A-MPR</td><td>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)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>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.</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td>1. Yes, Proximity Sensor.
2. Power reduction will be active at LTE band 2/4/25/41/66.</td></tr>
</table>

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 13				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Freq.(MHz)	Channel #	Freq.(MHz)
L	23205	779.5	23230	782
M	23230	782		
H	23255	784.5		

LTE Band 25												
	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	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905

LTE Band 26										
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5

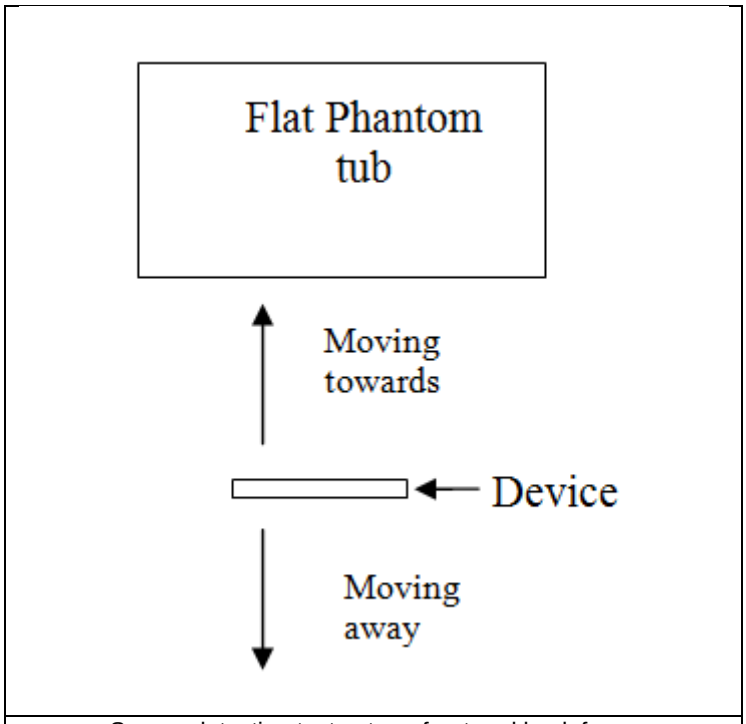
LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

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. Proximity Sensor Triggering Test

<Proximity Sensor Triggering Distance (KDB 616217 D04 section 6.2)>:

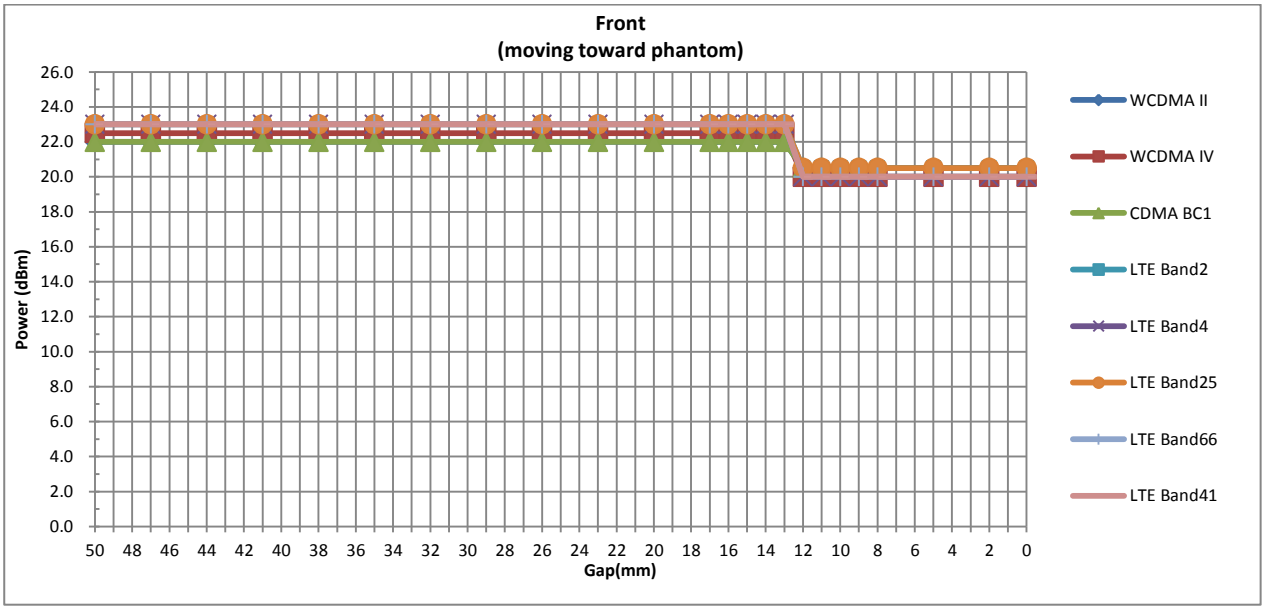
1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency (2600MHz) and lowest (1750MHz) frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensor placed coincident with antenna elements are utilized to determine when the device comes in proximity of the user's body at the front or back surface of the device. There is no need to do sensor coverage testing for the proximity sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the proximity sensor entirely covers the antenna.
3. When the sensor is active, WCDMA band IV/II, CDMA 2000 BC1, and LTE band 2/4/25/41/66 reduced power will be active.
4. The sensors used to detect the proximity of the user's body at the front, back surface of the device use a detection threshold distance. The data shown in the sections below shows the distance(s).

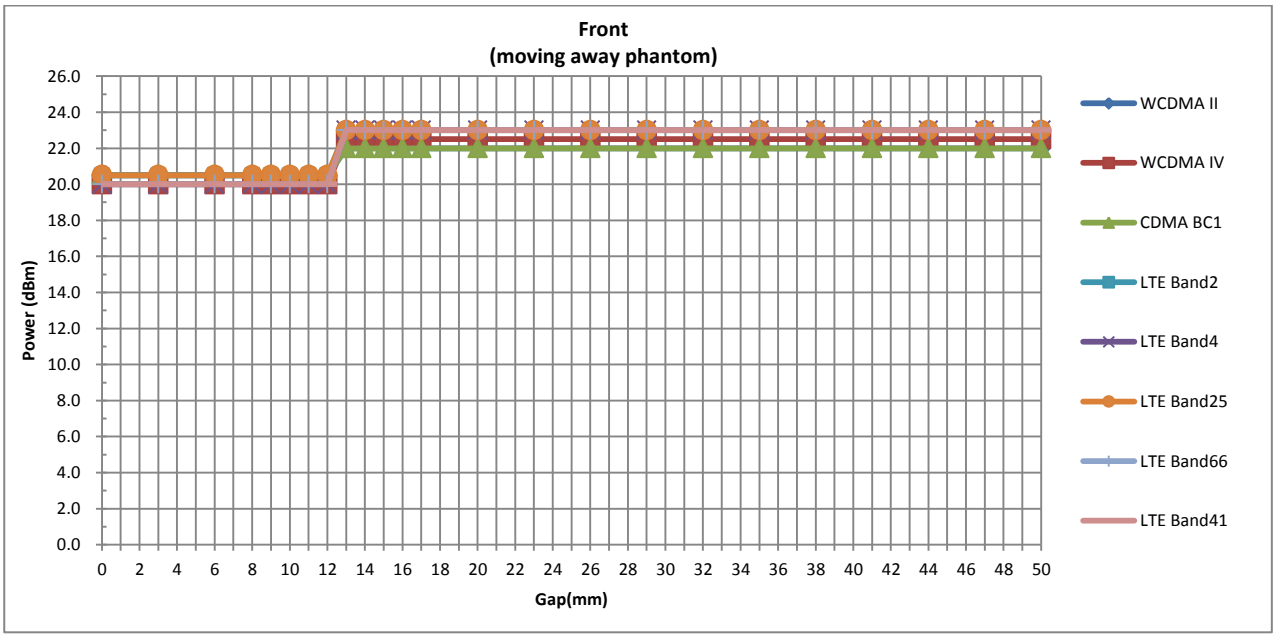


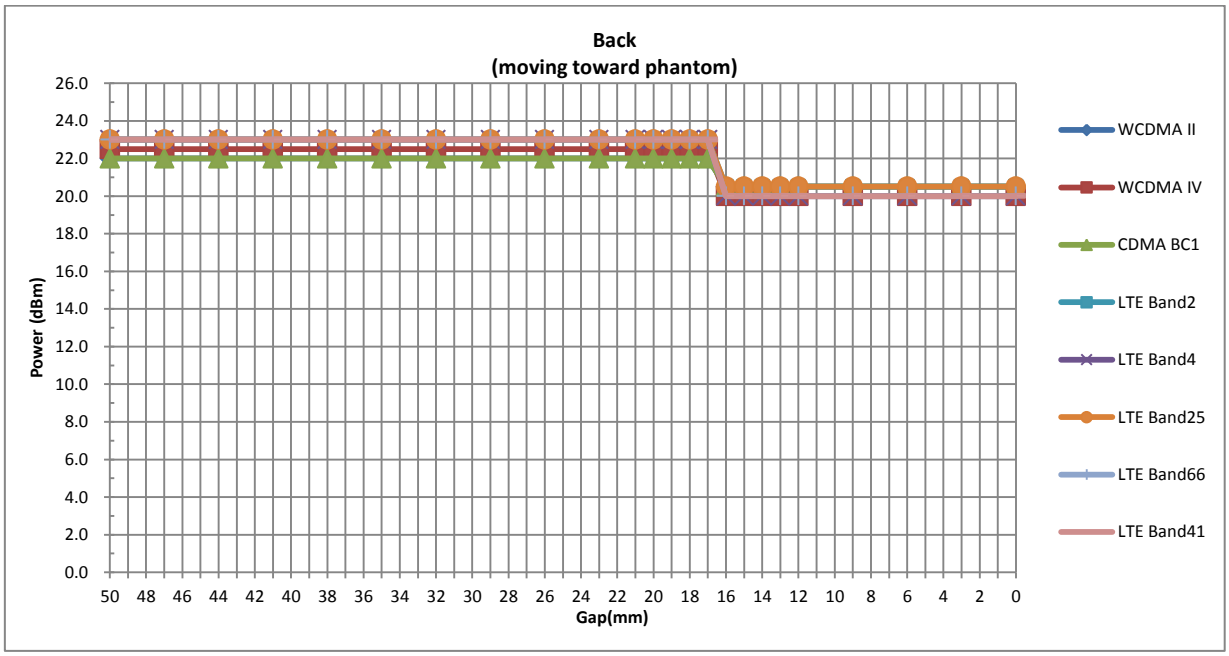
Sensor detection test set-up, front and back faces

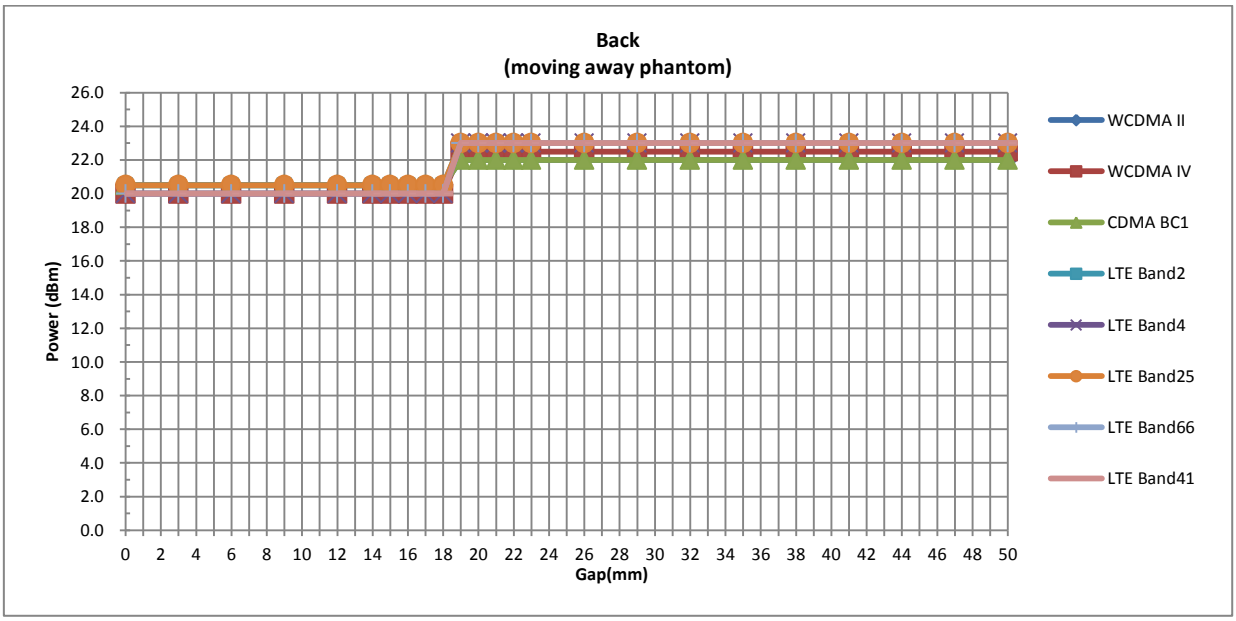
Proximity Sensor Triggering Distance (mm)				
Position	Front		Back	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	12	12	16	18

<Sensor Trigger Distance and Measured Power>






Back
(moving toward phantom)
Power (dBm)
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
50 48 46 44 42 40 38 36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0
Gap(mm)
WCDMA II
WCDMA IV
CDMA BC1
LTE Band2
LTE Band4
LTE Band25
LTE Band66
LTE Band41


Back
(moving away phantom)
Power (dBm)
26.0
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
Gap(mm)
WCDMA II
WCDMA IV
CDMA BC1
LTE Band2
LTE Band4
LTE Band25
LTE Band66
LTE Band41

6. RF Exposure Limits

6.1 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.

6.2 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.

7. Specific Absorption Rate (SAR)

7.1 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.

7.2 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:

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

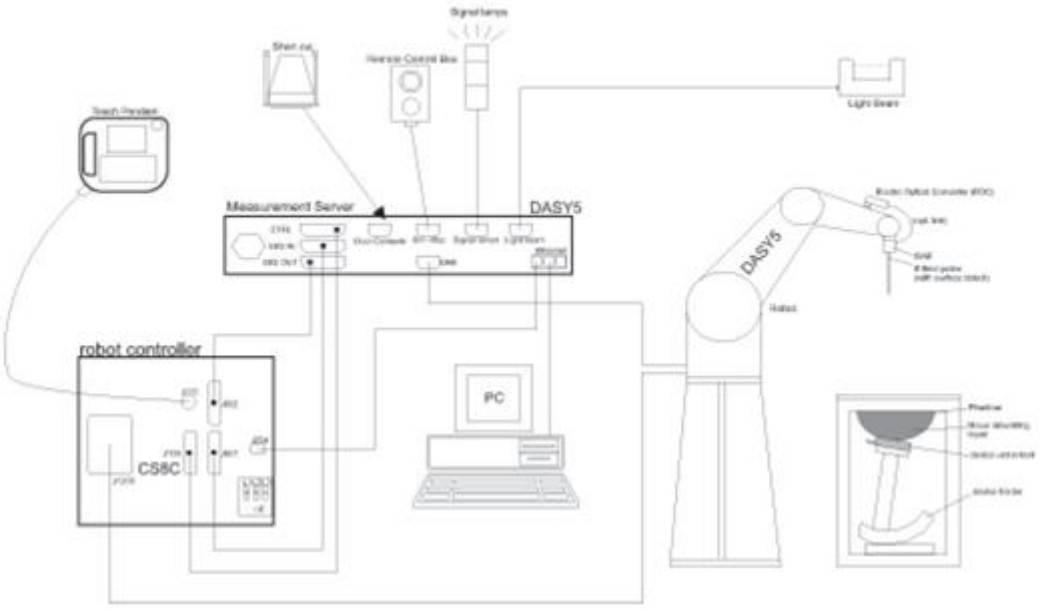
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

8. 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.

8.1 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

8.2 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.

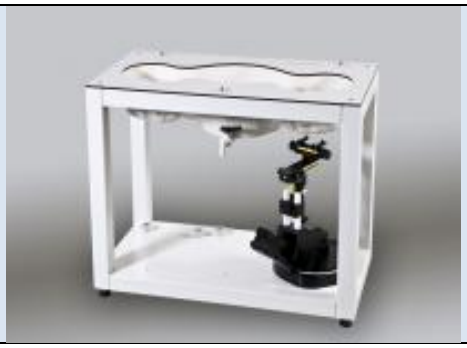
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

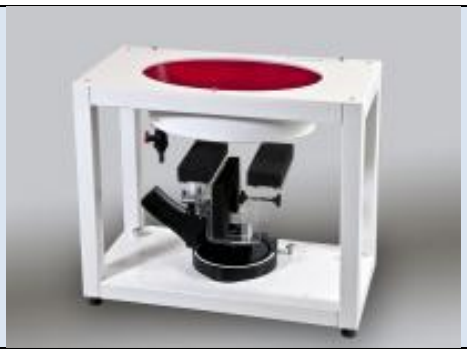
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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.

8.4 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

9. 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

9.1 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

9.2 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.

9.3 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.	

9.4 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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.

9.5 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.

9.6 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.

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1087	2018/3/21	2019/3/20
SPEAG	835MHz System Validation Kit	D835V2	4d151	2018/3/26	2019/3/25
SPEAG	1750MHz System Validation Kit	D1750V2	1090	2018/3/23	2019/3/22
SPEAG	1900MHz System Validation Kit	D1900V2	5d170	2018/3/25	2019/3/24
SPEAG	2450MHz System Validation Kit	D2450V2	908	2018/3/22	2019/3/21
SPEAG	2600MHz System Validation Kit	D2600V2	1061	2018/12/7	2019/12/6
SPEAG	Data Acquisition Electronics	DAE4	1338	2018/12/3	2019/12/2
SPEAG	Data Acquisition Electronics	DAE4	1358	2018/4/19	2019/4/18
SPEAG	Dosimetric E-Field Probe	EX3DV4	3843	2018/9/27	2019/9/26
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	2018/5/31	2019/5/30
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1697	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1754	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201563900	2018/1/26	2019/1/25
Agilent	Wireless Communication Test Set	E5515C	MY52102706	2018/4/17	2019/4/16
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2018/4/17	2019/4/16
SPEAG	Dielectric Probe Kit	DAK-3.5	1138	2018/11/20	2019/11/19
Anritsu	Vector Signal Generator	MG3710A	6201682672	2018/2/6	2019/2/5
R&S	Power Meter	NRVD	102081	2018/8/20	2019/8/19
R&S	Power Sensor	NRV-Z5	100538	2018/8/20	2019/8/19
R&S	Power Sensor	NRV-Z5	100539	2018/8/20	2019/8/19
R&S	CBT BLUETOOTH TESTER	CBT	101246	2018/1/26	2019/1/25
EXA	Spectrum Analyzer	FSV7	101742	2018/1/19	2019/1/18
Testo	Hygrometer	608-H1	1241332126	2018/8/21	2019/8/20
FLUKE	DIGITAC THERMOMETER	51II	97240029	2018/8/8	2019/8/7
ARRA	Power Divider	A3200-2	N/A	Note	
MCL	Attenuation1	BW-S10W5+	N/A	Note	
MCL	Attenuation2	BW-S10W5+	N/A	Note	
MCL	Attenuation3	BW-S10W5+	N/A	Note	
Agilent	Dual Directional Coupler	778D	20500	Note	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note	
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	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 source.

11. System Verification

11.1 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 head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1. 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. 11.2.

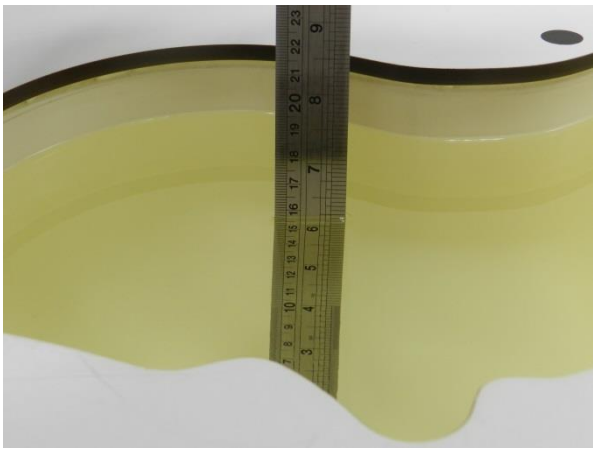


Fig 11.1 Photo of Liquid Height for Head SAR

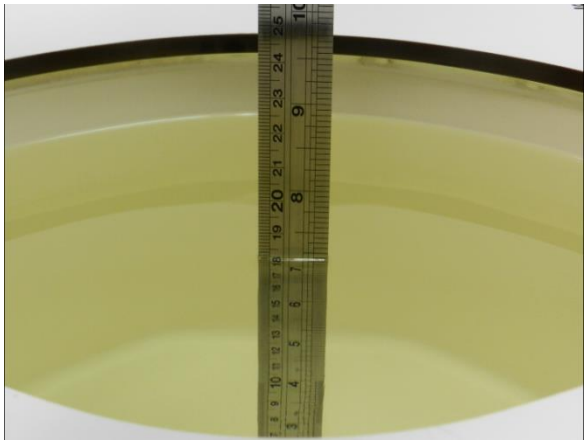


Fig 11.2 Photo of Liquid Height for Body SAR

11.2 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 Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
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
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

<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	Head	22.7	0.903	42.105	0.89	41.90	1.46	0.49	±5	2019/1/12
835	Head	22.8	0.915	41.269	0.90	41.50	1.67	-0.56	±5	2019/1/16
1750	Head	22.8	1.383	41.078	1.37	40.10	0.95	2.44	±5	2019/1/13
1900	Head	22.7	1.373	39.730	1.40	40.00	-1.93	-0.68	±5	2019/1/13
2450	Head	22.8	1.841	38.237	1.80	39.20	2.28	-2.46	±5	2019/1/9
2600	Head	22.8	2.012	37.658	1.96	39.00	2.65	-3.44	±5	2019/1/9
750	Body	22.7	0.967	55.686	0.96	55.50	0.73	0.34	±5	2018/12/29
835	Body	22.8	0.977	55.111	0.97	55.20	0.72	-0.16	±5	2018/12/29
1750	Body	22.6	1.460	53.900	1.49	53.40	-2.01	0.94	±5	2018/12/30
1900	Body	22.7	1.556	53.612	1.52	53.30	2.37	0.59	±5	2018/12/30
2450	Body	22.8	1.961	52.572	1.95	52.70	0.56	-0.24	±5	2019/1/8
2600	Body	22.6	2.166	52.048	2.16	52.50	0.28	-0.86	±5	2019/1/8

11.3 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 (%)
2019/1/12	750	Head	250	1087	3843	1338	1.91	8.25	7.64	-7.39
2019/1/16	835	Head	250	4d151	3843	1338	2.29	9.66	9.16	-5.18
2019/1/13	1750	Head	250	1090	3843	1338	8.82	37.40	35.28	-5.67
2019/1/13	1900	Head	250	5d170	3843	1338	9.65	39.90	38.60	-3.26
2019/1/9	2450	Head	250	908	3843	1338	13.50	51.80	54.00	4.25
2019/1/9	2600	Head	250	1061	3843	1338	14.20	57.70	56.80	-1.56
2018/12/29	750	Body	250	1087	3857	1358	2.21	8.57	8.84	3.15
2018/12/29	835	Body	250	4d151	3857	1358	2.29	9.58	9.16	-4.38
2018/12/30	1750	Body	250	1090	3857	1358	8.95	37.50	35.80	-4.53
2018/12/30	1900	Body	250	5d170	3857	1358	10.00	40.70	40.00	-1.72
2019/1/8	2450	Body	250	908	3843	1338	12.40	50.70	49.60	-2.17
2019/1/8	2600	Body	250	1061	3857	1358	13.50	54.20	54.00	-0.37

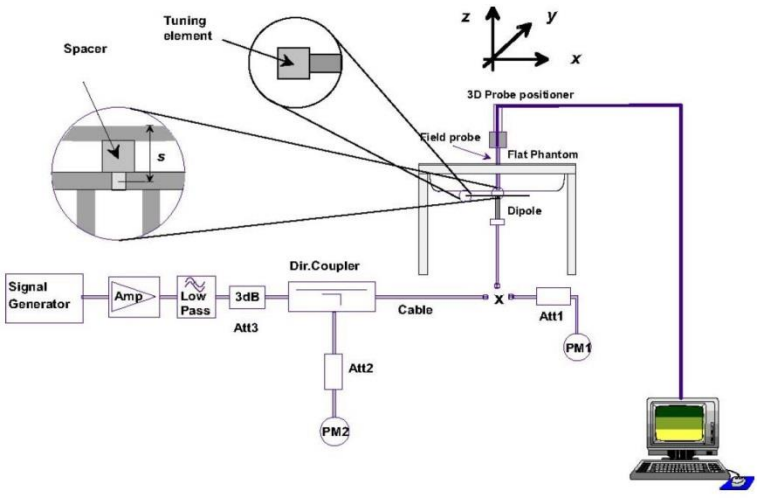


Fig 11.3.1 System Performance Check Setup

Fig 11.3.2 Setup Photo

12. RF Exposure Positions

12.1 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.

<EUT Setup Photos>

Please refer to Appendix D for the test setup photos.

13. 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	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

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

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

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

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

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

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

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.		

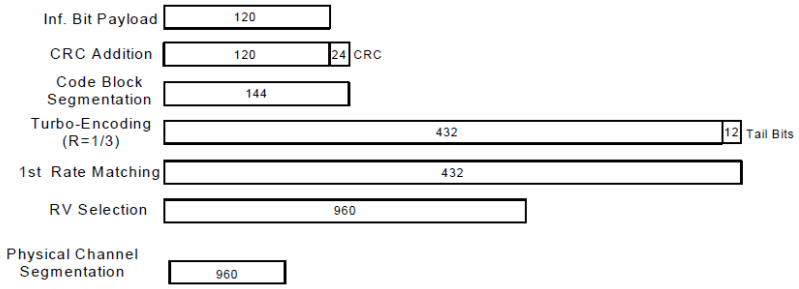


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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.

<Maximum Average RF Power (Proximity Sensor Inactive)>

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	AMR 12.2Kbps	21.50	21.60	21.63	22.00	21.85	21.82	22.00	22.50	22.25	22.35	22.10	22.50
3GPP Rel 99	RMC 12.2Kbps	21.54	21.71	21.74	22.00	21.94	21.97	22.18	22.50	22.31	22.42	22.33	22.50
3GPP Rel 6	HSDPA Subtest-1	20.84	20.94	20.97	21.50	20.95	21.08	20.94	21.50	21.50	21.72	21.57	22.00
3GPP Rel 6	HSDPA Subtest-2	20.84	20.93	21.01	21.50	20.96	21.19	20.99	21.50	21.54	21.69	21.67	22.00
3GPP Rel 6	HSDPA Subtest-3	20.36	20.45	20.55	21.00	20.43	20.67	20.48	21.00	21.10	21.19	21.18	21.50
3GPP Rel 6	HSDPA Subtest-4	20.35	20.45	20.55	21.00	20.42	20.67	20.48	21.00	21.09	21.18	21.17	21.50
3GPP Rel 8	DC-HSDPA Subtest-1	20.23	20.45	20.51	21.50	20.35	20.52	20.50	21.50	20.01	21.22	21.00	22.00
3GPP Rel 8	DC-HSDPA Subtest-2	20.22	20.43	20.53	21.50	20.30	20.50	20.48	21.50	20.98	21.21	20.95	22.00
3GPP Rel 8	DC-HSDPA Subtest-3	19.76	19.95	20.01	21.00	19.86	20.12	19.95	21.00	20.54	20.76	20.45	21.50
3GPP Rel 8	DC-HSDPA Subtest-4	19.79	19.95	19.92	21.00	19.95	20.16	19.92	21.00	20.50	20.79	20.50	21.50
3GPP Rel 6	HSUPA Subtest-1	20.47	20.48	20.73	21.50	20.97	21.16	20.31	21.50	21.63	21.19	21.09	22.00
3GPP Rel 6	HSUPA Subtest-2	19.79	20.00	19.51	20.50	19.62	19.81	19.93	20.50	20.36	20.67	20.57	21.00
3GPP Rel 6	HSUPA Subtest-3	19.39	19.51	19.61	20.50	19.72	19.91	19.62	20.50	20.13	20.27	20.18	21.00
3GPP Rel 6	HSUPA Subtest-4	19.97	20.20	20.17	20.50	20.35	20.22	20.01	20.50	21.14	20.57	20.55	22.00
3GPP Rel 6	HSUPA Subtest-5	20.80	21.00	20.90	21.50	21.10	21.30	21.10	21.50	21.60	21.70	21.60	22.00

<Maximum Average RF Power (Proximity Sensor Active)>

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band IV			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538		1312	1413	1513	
Rx Channel		9662	9800	9938		1537	1638	1738	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6	
3GPP Rel 99	AMR 12.2Kbps	20.08	20.20	20.05	20.50	19.42	19.62	19.66	20.00
3GPP Rel 99	RMC 12.2Kbps	20.10	20.22	20.09	20.50	19.44	19.65	19.67	20.00
3GPP Rel 6	HSDPA Subtest-1	19.24	19.38	19.43	20.00	19.35	19.41	19.42	19.50
3GPP Rel 6	HSDPA Subtest-2	19.18	19.37	19.40	20.00	19.34	19.44	19.45	19.50
3GPP Rel 6	HSDPA Subtest-3	18.77	18.90	19.05	19.50	18.90	18.85	18.87	19.00
3GPP Rel 6	HSDPA Subtest-4	18.76	18.89	19.05	19.50	18.73	18.76	18.93	19.00
3GPP Rel 8	DC-HSDPA Subtest-1	18.73	18.95	19.01	20.00	18.72	18.87	18.79	19.50
3GPP Rel 8	DC-HSDPA Subtest-2	18.72	18.93	19.03	20.00	18.67	18.85	18.77	19.50
3GPP Rel 8	DC-HSDPA Subtest-3	18.26	18.42	18.51	19.50	18.23	18.47	18.29	19.00
3GPP Rel 8	DC-HSDPA Subtest-4	18.29	18.39	18.42	19.50	18.34	18.56	18.24	19.00
3GPP Rel 6	HSUPA Subtest-1	18.97	18.98	19.23	19.50	18.96	18.94	18.46	19.00
3GPP Rel 6	HSUPA Subtest-2	17.56	17.86	17.56	18.50	17.75	17.99	17.94	18.00
3GPP Rel 6	HSUPA Subtest-3	17.82	18.01	18.11	18.50	17.92	17.96	17.73	18.00
3GPP Rel 6	HSUPA Subtest-4	17.92	17.95	17.86	18.50	17.96	17.93	17.94	18.00
3GPP Rel 6	HSUPA Subtest-5	19.30	19.50	19.40	19.50	18.96	18.95	18.97	19.00

<CDMA2000 Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, SAR for peak to face exposure is measured in RC3 with the handset configured to transmit at full rate in SO55.
2. Per KDB 941225 D01v03r01, in Hotspot mode EUT is treated as data device and SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps) as the primary mode.
3. Per KDB 941225 D01v03r01, for Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCH), with FCH only as the primary mode.

<Maximum Average RF Power (Proximity Sensor Inactive)>

Band	CDMA2000 BC0			Tune-up Limit (dBm)	CDMA2000 BC1			Tune-up Limit (dBm)	CDMA2000 BC10			Tune-up Limit (dBm)
Tx Channel	1013	384	777		25	600	1175		476	580	684	
Frequency (MHz)	824.7	836.52	848.31		1851.25	1880	1908.75		817.9	820.5	823.1	
RC1 SO55	22.59	22.45	22.49	23.00	21.41	21.68	21.63	22.00	22.61	22.49	22.41	23.00
RC3 SO55	22.66	22.50	22.55	23.00	21.51	21.70	21.70	22.00	22.43	22.22	22.33	23.00
RC3 SO32 (F+SCH)	22.57	22.47	22.55	23.00	21.47	21.63	21.62	22.00	22.36	22.23	22.40	23.00
RC3 SO32 (+SCH)	22.55	22.40	22.52	23.00	21.45	21.60	21.61	22.00	22.35	22.20	22.38	23.00
RTAP 153.6Kbps	22.45	22.40	22.38	23.00	21.42	21.65	21.60	22.00	22.45	22.21	22.31	23.00
RETAP 4096Bits	22.52	22.32	22.40	23.00	21.38	21.60	21.57	22.00	22.28	22.21	22.38	23.00

<Maximum Average RF Power (Proximity Sensor Active)>

Band	CDMA2000 BC1			Tune-up Limit (dBm)
Tx Channel	25	600	1175	
Frequency (MHz)	1851.25	1880	1908.75	
RC1 SO55	20.25	20.42	20.38	20.50
RC3 SO55	20.38	20.46	20.32	20.50
RC3 SO32 (F+SCH)	20.31	20.38	20.25	20.50
RC3 SO32 (+SCH)	20.28	20.41	20.31	20.50
RTAP 153.6Kbps	20.35	20.45	20.38	20.50
RETAP 4096Bits	20.31	20.35	20.28	20.50

<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 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 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 / B26 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 B 4 / B5 / B2 SAR test was covered by LTE B66 / B26 / B25; 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

<Maximum Average RF Power (Proximity Sensor Inactive)>

<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	22.30	22.17	22.17	23	0
20	QPSK	1	49	21.91	22.08	22.28		
20	QPSK	1	99	21.88	21.95	22.04		
20	QPSK	50	0	21.24	21.33	21.23	22	1
20	QPSK	50	24	21.16	21.21	21.25		
20	QPSK	50	50	21.17	21.19	21.23		
20	QPSK	100	0	21.15	21.25	21.19		
20	16QAM	1	0	21.05	20.89	20.79	22	1
20	16QAM	1	49	20.88	20.69	21.42		
20	16QAM	1	99	20.32	20.52	21.24		
20	16QAM	50	0	20.32	20.40	20.21	21	2
20	16QAM	50	24	20.25	20.21	20.17		
20	16QAM	50	50	20.27	20.28	20.2		
20	16QAM	100	0	20.23	20.20	20.20		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.19	22.16	21.85	23	0
15	QPSK	1	37	22.10	22.27	22.25		
15	QPSK	1	74	21.85	22.14	21.94		
15	QPSK	36	0	21.35	21.28	21.14	22	1
15	QPSK	36	20	21.23	21.21	21.17		
15	QPSK	36	39	21.15	21.25	21.25		
15	QPSK	75	0	21.22	21.26	21.22		
15	16QAM	1	0	20.99	20.84	20.87	22	1
15	16QAM	1	37	21.03	20.96	21.38		
15	16QAM	1	74	20.64	20.29	20.65		
15	16QAM	36	0	20.22	20.28	20.14	21	2
15	16QAM	36	20	20.20	20.29	20.22		
15	16QAM	36	39	20.13	20.22	20.24		
15	16QAM	75	0	20.14	20.24	20.10		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	21.86	21.64	21.83	23	0
10	QPSK	1	25	21.73	21.59	21.97		
10	QPSK	1	49	21.42	21.62	21.51		
10	QPSK	25	0	20.78	20.86	20.83	22	1
10	QPSK	25	12	20.74	20.77	20.87		
10	QPSK	25	25	20.66	20.81	20.82		
10	QPSK	50	0	20.76	20.91	20.89		
10	16QAM	1	0	20.99	20.82	20.73	22	1
10	16QAM	1	25	20.89	20.80	21.12		
10	16QAM	1	49	20.44	20.42	20.72		
10	16QAM	25	0	19.83	19.72	20.03	21	2
10	16QAM	25	12	19.70	19.82	19.90		
10	16QAM	25	25	19.73	19.89	19.93		
10	16QAM	50	0	19.83	19.84	19.93		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	21.45	21.68	21.97	23	0
5	QPSK	1	12	21.51	21.64	21.83		
5	QPSK	1	24	21.43	21.49	21.59		
5	QPSK	12	0	20.67	20.76	20.94	22	1
5	QPSK	12	7	20.72	20.93	20.98		
5	QPSK	12	13	20.74	20.86	20.90		
5	QPSK	25	0	20.71	20.78	21.01		
5	16QAM	1	0	20.24	20.19	21.03	22	1
5	16QAM	1	12	20.51	20.60	20.66		
5	16QAM	1	24	20.19	20.39	20.44		
5	16QAM	12	0	19.64	19.67	19.80	21	2
5	16QAM	12	7	19.80	19.65	19.81		
5	16QAM	12	13	19.63	19.65	20.03		
5	16QAM	25	0	19.79	19.79	19.98		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	21.73	21.76	21.85	23	0
3	QPSK	1	8	21.67	21.99	21.81		
3	QPSK	1	14	21.53	21.72	21.57		
3	QPSK	8	0	20.71	20.84	21.07	22	1
3	QPSK	8	4	20.74	20.80	20.92		
3	QPSK	8	7	20.81	20.83	20.98		
3	QPSK	15	0	20.79	20.78	20.97		
3	16QAM	1	0	20.68	20.21	20.99	22	1
3	16QAM	1	8	20.79	20.52	20.76		
3	16QAM	1	14	20.69	20.34	20.51		
3	16QAM	8	0	19.51	19.96	19.85	21	2
3	16QAM	8	4	19.57	20.05	19.99		
3	16QAM	8	7	19.55	19.98	19.95		
3	16QAM	15	0	19.78	19.89	20.02		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	21.70	21.67	21.86	23	0
1.4	QPSK	1	3	21.75	21.83	21.79		
1.4	QPSK	1	5	21.70	21.72	21.80		
1.4	QPSK	3	0	21.68	21.66	21.89		
1.4	QPSK	3	1	21.73	21.68	21.86		
1.4	QPSK	3	3	21.73	21.94	21.80		
1.4	QPSK	6	0	20.73	20.72	20.82	22	1
1.4	16QAM	1	0	20.30	20.18	21.07	22	1
1.4	16QAM	1	3	20.74	20.39	21.09		
1.4	16QAM	1	5	20.30	20.35	20.85		
1.4	16QAM	3	0	20.66	20.61	20.92		
1.4	16QAM	3	1	20.70	20.81	20.90		
1.4	16QAM	3	3	20.62	20.80	20.94		
1.4	16QAM	6	0	19.56	19.61	19.83	21	2

<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	21.96	21.82	22.27	23	0
20	QPSK	1	49	22.06	21.86	22.45		
20	QPSK	1	99	21.98	21.83	22.46		
20	QPSK	50	0	21.15	21.13	21.39	22	1
20	QPSK	50	24	21.12	20.93	21.34		
20	QPSK	50	50	21.03	20.85	21.33		
20	QPSK	100	0	21.11	21.05	21.35		
20	16QAM	1	0	20.78	20.82	20.77	22	1
20	16QAM	1	49	21.29	20.92	20.89		
20	16QAM	1	99	21.24	20.55	20.72		
20	16QAM	50	0	20.02	20.19	20.18	21	2
20	16QAM	50	24	20.07	20.01	20.33		
20	16QAM	50	50	20.00	19.94	20.32		
20	16QAM	100	0	20.03	20.03	20.34		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	22.16	22.07	22.25	23	0
15	QPSK	1	37	22.04	21.92	22.43		
15	QPSK	1	74	21.87	21.96	22.23		
15	QPSK	36	0	20.92	21.13	21.26	22	1
15	QPSK	36	20	21.08	20.96	21.26		
15	QPSK	36	39	21.05	20.92	21.37		
15	QPSK	75	0	21.10	21.12	21.29		
15	16QAM	1	0	20.73	20.71	21.23	22	1
15	16QAM	1	37	20.53	20.86	21.33		
15	16QAM	1	74	20.68	20.63	21.13		
15	16QAM	36	0	20.10	20.07	20.30	21	2
15	16QAM	36	20	19.98	19.84	20.31		
15	16QAM	36	39	19.89	19.92	20.35		
15	16QAM	75	0	20.14	19.93	20.32		

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	21.90	21.79	22.19	23	0
10	QPSK	1	25	21.98	21.83	22.29		
10	QPSK	1	49	21.88	21.66	22.07		
10	QPSK	25	0	21.17	21.08	21.19	22	1
10	QPSK	25	12	21.04	20.93	21.45		
10	QPSK	25	25	21.07	20.93	21.33		
10	QPSK	50	0	21.09	21.03	21.39		
10	16QAM	1	0	20.97	21.11	21.16	22	1
10	16QAM	1	25	21.23	21.10	21.54		
10	16QAM	1	49	21.17	20.57	21.45		
10	16QAM	25	0	20.05	19.99	20.24	21	2
10	16QAM	25	12	20.10	19.81	20.41		
10	16QAM	25	25	20.02	19.91	20.29		
10	16QAM	50	0	20.09	19.81	20.37		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.03	21.93	21.97	23	0
5	QPSK	1	12	22.23	21.71	22.37		
5	QPSK	1	24	21.98	21.60	22.25		
5	QPSK	12	0	21.10	20.98	21.31	22	1
5	QPSK	12	7	21.00	21.03	21.22		
5	QPSK	12	13	21.16	20.88	21.36		
5	QPSK	25	0	21.09	20.99	21.21		
5	16QAM	1	0	20.42	21.25	20.71	22	1
5	16QAM	1	12	20.79	20.76	20.93		
5	16QAM	1	24	20.22	20.34	20.5		
5	16QAM	12	0	19.95	20.07	20.09	21	2
5	16QAM	12	7	19.96	20.11	20.16		
5	16QAM	12	13	20.02	19.77	20.30		
5	16QAM	25	0	19.95	19.88	20.45		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.2	21.94	22.01	23	0
3	QPSK	1	8	22.22	21.77	22.08		
3	QPSK	1	14	22.06	21.71	21.90		
3	QPSK	8	0	21.16	21.06	21.09	22	1
3	QPSK	8	4	21.04	21.00	21.15		
3	QPSK	8	7	20.92	20.83	21.18		
3	QPSK	15	0	21.02	20.91	21.10		
3	16QAM	1	0	20.41	20.53	21.14	22	1
3	16QAM	1	8	20.78	20.8	21.31		
3	16QAM	1	14	20.54	20.51	21.23		
3	16QAM	8	0	20.11	20.09	19.89	21	2
3	16QAM	8	4	20.15	20.04	20.17		
3	16QAM	8	7	20.18	20.06	20.22		
3	16QAM	15	0	20.11	20.10	20.17		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	22.10	21.93	22.13	23	0
1.4	QPSK	1	3	22.12	21.99	22.12		
1.4	QPSK	1	5	22.06	21.79	22.07		
1.4	QPSK	3	0	22.09	22.01	22.15		
1.4	QPSK	3	1	22.12	22.01	22.30		
1.4	QPSK	3	3	22.13	21.97	22.14		
1.4	QPSK	6	0	20.95	20.97	21.04	22	1
1.4	16QAM	1	0	21.38	20.52	20.35	22	1
1.4	16QAM	1	3	21.37	20.68	20.46		
1.4	16QAM	1	5	21.26	20.86	20.68		
1.4	16QAM	3	0	21.37	20.95	21.04		
1.4	16QAM	3	1	21.40	20.94	21.01		
1.4	16QAM	3	3	21.40	20.89	21.03		
1.4	16QAM	6	0	20.10	19.93	20.08	21	2

<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	23.42	23.34	23.32	24	0
10	QPSK	1	25	23.63	23.58	23.52		
10	QPSK	1	49	23.38	23.58	23.39		
10	QPSK	25	0	22.55	22.56	22.62	23	1
10	QPSK	25	12	22.58	22.59	22.54		
10	QPSK	25	25	22.37	22.58	22.51		
10	QPSK	50	0	22.51	22.53	22.49		
10	16QAM	1	0	22.60	21.90	22.30	23	1
10	16QAM	1	25	22.70	21.95	22.65		
10	16QAM	1	49	21.96	22.08	21.99		
10	16QAM	25	0	21.43	21.71	21.68	22	2
10	16QAM	25	12	21.46	21.82	21.6		
10	16QAM	25	25	21.44	21.63	21.49		
10	16QAM	50	0	21.56	21.59	21.48		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.34	23.31	23.44	24	0
5	QPSK	1	12	23.48	23.56	23.32		
5	QPSK	1	24	23.15	23.26	23.36		
5	QPSK	12	0	22.55	22.48	22.48	23	1
5	QPSK	12	7	22.48	22.52	22.56		
5	QPSK	12	13	22.42	22.54	22.51		
5	QPSK	25	0	22.41	22.40	22.51		
5	16QAM	1	0	22.56	22.77	22.73	23	1
5	16QAM	1	12	22.23	22.91	22.74		
5	16QAM	1	24	21.91	22.78	22.15		
5	16QAM	12	0	21.53	21.44	21.42	22	2
5	16QAM	12	7	21.55	21.39	21.42		
5	16QAM	12	13	21.32	21.60	21.40		
5	16QAM	25	0	21.49	21.56	21.58		

Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	23.40	23.42	23.58	24	0
3	QPSK	1	8	23.62	23.47	23.52		
3	QPSK	1	14	23.38	23.53	23.52		
3	QPSK	8	0	22.60	22.62	22.61	23	1
3	QPSK	8	4	22.53	22.66	22.66		
3	QPSK	8	7	22.48	22.67	22.59		
3	QPSK	15	0	22.51	22.50	22.50		
3	16QAM	1	0	22.64	22.47	22.07	23	1
3	16QAM	1	8	22.25	22.77	22.26		
3	16QAM	1	14	22.10	22.57	22.17		
3	16QAM	8	0	21.53	21.53	21.63	22	2
3	16QAM	8	4	21.54	21.48	21.58		
3	16QAM	8	7	21.53	21.58	21.62		
3	16QAM	15	0	21.59	21.57	21.7		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	23.51	23.48	23.41	24	0
1.4	QPSK	1	3	23.50	23.47	23.52		
1.4	QPSK	1	5	23.55	23.46	23.39		
1.4	QPSK	3	0	23.48	23.51	23.53		
1.4	QPSK	3	1	23.49	23.56	23.46		
1.4	QPSK	3	3	23.50	23.48	23.50		
1.4	QPSK	6	0	22.46	22.41	22.47	23	1
1.4	16QAM	1	0	22.05	22.57	21.96	23	1
1.4	16QAM	1	3	21.93	22.66	22.04		
1.4	16QAM	1	5	21.77	22.54	21.91		
1.4	16QAM	3	0	22.16	22.41	22.44		
1.4	16QAM	3	1	22.11	22.47	22.48		
1.4	16QAM	3	3	22.22	22.47	22.44		
1.4	16QAM	6	0	21.30	21.33	21.53	22	2

<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	23.38	23.24	23.12	24	0
10	QPSK	1	25	23.50	23.17	23.80		
10	QPSK	1	49	23.22	23.08	23.05		
10	QPSK	25	0	22.50	22.46	22.43	23	1
10	QPSK	25	12	22.62	22.38	22.49		
10	QPSK	25	25	22.40	22.40	22.36		
10	QPSK	50	0	22.43	22.43	22.44		
10	16QAM	1	0	22.03	22.51	21.90	23	1
10	16QAM	1	25	22.85	22.19	22.18		
10	16QAM	1	49	21.90	22.03	21.92		
10	16QAM	25	0	21.61	21.28	21.45	22	2
10	16QAM	25	12	21.65	21.20	21.70		
10	16QAM	25	25	21.43	21.50	21.45		
10	16QAM	50	0	21.45	21.33	21.55		
Channel				23035	23095	23155	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				701.5	707.5	713.5		
5	QPSK	1	0	23.21	23.17	23.06	24	0
5	QPSK	1	12	23.62	23.41	23.32		
5	QPSK	1	24	23.60	23.20	23.22		
5	QPSK	12	0	22.61	22.37	22.33	23	1
5	QPSK	12	7	22.64	22.36	22.41		
5	QPSK	12	13	22.56	22.34	22.34		
5	QPSK	25	0	22.57	22.35	22.37		
5	16QAM	1	0	21.94	22.34	21.84	23	1
5	16QAM	1	12	22.22	22.13	22.03		
5	16QAM	1	24	21.94	21.72	21.62		
5	16QAM	12	0	21.41	21.29	21.33	22	2
5	16QAM	12	7	21.74	21.27	21.42		
5	16QAM	12	13	21.78	21.37	21.36		
5	16QAM	25	0	21.69	21.53	21.39		

Channel				23025	23095	23165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				700.5	707.5	714.5		
3	QPSK	1	0	23.29	23.32	23.38	24	0
3	QPSK	1	8	23.50	23.33	23.36		
3	QPSK	1	14	23.43	23.27	23.19		
3	QPSK	8	0	22.47	22.54	22.54	23	1
3	QPSK	8	4	22.69	22.56	22.45		
3	QPSK	8	7	22.64	22.55	22.32		
3	QPSK	15	0	22.62	22.46	22.37		
3	16QAM	1	0	22.53	22.38	22.43	23	1
3	16QAM	1	8	22.83	22.25	22.24		
3	16QAM	1	14	22.69	22.54	21.71		
3	16QAM	8	0	21.30	21.53	21.61	22	2
3	16QAM	8	4	21.44	21.39	21.53		
3	16QAM	8	7	21.69	21.54	21.33		
3	16QAM	15	0	21.41	21.52	21.54		
Channel				23017	23095	23173	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				699.7	707.5	715.3		
1.4	QPSK	1	0	23.46	23.45	23.37	24	0
1.4	QPSK	1	3	23.50	23.47	23.36		
1.4	QPSK	1	5	23.56	23.52	23.20		
1.4	QPSK	3	0	23.45	23.43	23.30		
1.4	QPSK	3	1	23.62	23.47	23.39		
1.4	QPSK	3	3	23.61	23.49	23.34		
1.4	QPSK	6	0	22.45	22.44	22.35	23	1
1.4	16QAM	1	0	22.21	22.00	21.90	23	1
1.4	16QAM	1	3	22.18	22.25	22.03		
1.4	16QAM	1	5	22.73	22.10	21.89		
1.4	16QAM	3	0	22.40	22.33	22.24		
1.4	16QAM	3	1	22.48	22.44	22.31		
1.4	16QAM	3	3	22.47	22.45	22.27		
1.4	16QAM	6	0	21.44	21.30	21.27	22	2

<LTE Band 13>

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					23230			
Frequency (MHz)					782			
10	QPSK	1	0		23.18		24	0
10	QPSK	1	25		23.31			
10	QPSK	1	49		23.53			
10	QPSK	25	0		22.32		23	1
10	QPSK	25	12		22.26			
10	QPSK	25	25		22.23			
10	QPSK	50	0		22.32			
10	16QAM	1	0		21.75		23	1
10	16QAM	1	25		21.87			
10	16QAM	1	49		21.88			
10	16QAM	25	0		21.56		22	2
10	16QAM	25	12		21.39			
10	16QAM	25	25		21.39			
10	16QAM	50	0		21.36			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	23.23	23.35	23.25	24	0
5	QPSK	1	12	23.52	23.24	23.44		
5	QPSK	1	24	23.03	23.08	23.33		
5	QPSK	12	0	22.38	22.51	22.23	23	1
5	QPSK	12	7	22.60	22.26	22.39		
5	QPSK	12	13	22.56	22.24	22.35		
5	QPSK	25	0	22.35	22.23	22.23		
5	16QAM	1	0	22.50	21.93	22.62	23	1
5	16QAM	1	12	22.70	22.01	22.26		
5	16QAM	1	24	22.39	21.91	22.18		
5	16QAM	12	0	21.24	21.57	21.08	22	2
5	16QAM	12	7	21.66	21.11	21.32		
5	16QAM	12	13	21.52	21.09	21.53		
5	16QAM	25	0	21.28	21.29	21.48		

<LTE Band 25>

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				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	22.24	22.34	22.18	23	0
20	QPSK	1	49	21.72	22.49	22.03		
20	QPSK	1	99	21.79	22.18	22.10		
20	QPSK	50	0	21.07	21.27	21.03	22	1
20	QPSK	50	24	20.94	21.35	21.11		
20	QPSK	50	50	20.95	21.18	21.11		
20	QPSK	100	0	20.94	21.27	21.23		
20	16QAM	1	0	20.76	21.50	21.43	22	1
20	16QAM	1	49	20.96	21.53	21.03		
20	16QAM	1	99	20.67	21.39	21.44		
20	16QAM	50	0	20.06	20.35	20.01	21	2
20	16QAM	50	24	19.94	20.31	20.08		
20	16QAM	50	50	19.93	20.15	20.05		
20	16QAM	100	0	19.90	20.19	20.04		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	22.00	22.28	22.01	23	0
15	QPSK	1	37	21.83	22.49	21.97		
15	QPSK	1	74	21.96	21.98	22.28		
15	QPSK	36	0	21.17	21.23	21.16	22	1
15	QPSK	36	20	20.95	21.20	21.17		
15	QPSK	36	39	20.91	21.18	21.15		
15	QPSK	75	0	20.99	21.21	21.16		
15	16QAM	1	0	21.66	20.99	20.81	22	1
15	16QAM	1	37	20.79	20.96	20.91		
15	16QAM	1	74	20.70	20.82	20.84		
15	16QAM	36	0	20.21	20.21	20.13	21	2
15	16QAM	36	20	20.01	20.18	20.15		
15	16QAM	36	39	19.98	20.18	20.17		
15	16QAM	75	0	19.99	20.10	20.16		

Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	21.90	22.34	22.23	23	0
10	QPSK	1	25	21.95	22.37	22.04		
10	QPSK	1	49	21.59	22.11	22.13		
10	QPSK	25	0	21.13	21.21	21.12	22	1
10	QPSK	25	12	20.99	21.27	21.20		
10	QPSK	25	25	20.73	21.23	21.18		
10	QPSK	50	0	20.95	21.21	21.11		
10	16QAM	1	0	21.24	20.72	20.76	22	1
10	16QAM	1	25	20.99	20.87	21.30		
10	16QAM	1	49	20.53	20.41	21.49		
10	16QAM	25	0	20.11	20.27	20.06	21	2
10	16QAM	25	12	19.98	20.37	20.24		
10	16QAM	25	25	19.71	20.32	20.33		
10	16QAM	50	0	20.03	20.24	20.25		
Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	21.61	22.11	21.86	23	0
5	QPSK	1	12	21.84	22.22	22.10		
5	QPSK	1	24	21.96	22.06	21.93		
5	QPSK	12	0	21.01	21.12	20.94	22	1
5	QPSK	12	7	20.85	21.26	21.14		
5	QPSK	12	13	20.99	21.30	21.12		
5	QPSK	25	0	21.08	21.24	21.10		
5	16QAM	1	0	20.58	21.30	20.30	22	1
5	16QAM	1	12	20.71	21.37	20.76		
5	16QAM	1	24	20.36	20.69	21.22		
5	16QAM	12	0	20.06	20.05	19.79	21	2
5	16QAM	12	7	19.85	20.16	19.96		
5	16QAM	12	13	19.89	20.30	20.030		
5	16QAM	25	0	20.07	20.35	20.17		

Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	21.77	22.21	22.01	23	0
3	QPSK	1	8	21.76	22.13	22.09		
3	QPSK	1	14	21.85	22.10	21.90		
3	QPSK	8	0	20.98	21.31	21.26	22	1
3	QPSK	8	4	21.02	21.35	21.25		
3	QPSK	8	7	20.92	21.39	21.33		
3	QPSK	15	0	21.00	21.26	21.17		
3	16QAM	1	0	20.64	21.32	20.71	22	1
3	16QAM	1	8	20.77	21.55	20.88		
3	16QAM	1	14	20.71	21.35	20.87		
3	16QAM	8	0	19.94	20.05	20.04	21	2
3	16QAM	8	4	19.90	20.38	20.27		
3	16QAM	8	7	20.07	20.35	20.48		
3	16QAM	15	0	20.03	20.37	20.29		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	21.86	22.02	22.15	23	0
1.4	QPSK	1	3	22.03	22.11	21.94		
1.4	QPSK	1	5	22.06	21.96	21.98		
1.4	QPSK	3	0	21.96	22.19	22.12		
1.4	QPSK	3	1	22.00	22.29	22.08		
1.4	QPSK	3	3	21.90	22.21	22.12		
1.4	QPSK	6	0	20.89	21.27	21.08	22	1
1.4	16QAM	1	0	21.10	20.90	20.48	22	1
1.4	16QAM	1	3	21.12	21.14	20.55		
1.4	16QAM	1	5	21.13	20.90	20.80		
1.4	16QAM	3	0	20.92	21.03	21.01		
1.4	16QAM	3	1	20.88	21.42	21.32		
1.4	16QAM	3	3	20.91	21.58	20.81		
1.4	16QAM	6	0	19.92	20.09	19.89	21	2

<LTE Band 26>

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				26765	26865	26965		
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	23.22	23.42	23.38	24	0
15	QPSK	1	37	23.58	23.56	23.64		
15	QPSK	1	74	23.09	23.32	22.44		
15	QPSK	36	0	22.43	22.26	22.45	23	1
15	QPSK	36	20	22.42	22.27	22.33		
15	QPSK	36	39	22.29	22.42	22.41		
15	QPSK	75	0	22.48	22.4	22.36		
15	16QAM	1	0	22.11	21.64	22.25	23	1
15	16QAM	1	37	22.7	22.05	22.21		
15	16QAM	1	74	21.94	21.93	21.76		
15	16QAM	36	0	21.43	21.32	21.43	22	2
15	16QAM	36	20	21.46	21.33	21.39		
15	16QAM	36	39	21.44	21.47	21.41		
15	16QAM	75	0	21.52	21.47	21.46		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	23.09	23.22	23.26	24	0
10	QPSK	1	25	23.46	23.31	23.26		
10	QPSK	1	49	23.32	23.55	22.39		
10	QPSK	25	0	22.46	22.27	22.49	23	1
10	QPSK	25	12	22.33	22.32	22.47		
10	QPSK	25	25	22.42	22.41	22.39		
10	QPSK	50	0	22.42	22.36	22.42		
10	16QAM	1	0	22.09	21.94	22.61	23	1
10	16QAM	1	25	22.40	21.93	22.55		
10	16QAM	1	49	21.99	22.68	21.69		
10	16QAM	25	0	21.53	21.34	21.56	22	2
10	16QAM	25	12	21.35	21.39	21.52		
10	16QAM	25	25	21.47	21.57	21.46		
10	16QAM	50	0	21.58	21.33	21.49		

Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	23.30	23.23	23.22	24	0
5	QPSK	1	12	23.59	23.54	23.18		
5	QPSK	1	24	23.43	23.41	22.73		
5	QPSK	12	0	22.31	22.31	22.79	23	1
5	QPSK	12	7	22.37	22.33	22.34		
5	QPSK	12	13	22.37	22.36	22.39		
5	QPSK	25	0	22.38	22.48	22.48		
5	16QAM	1	0	22.01	21.83	22.34	23	1
5	16QAM	1	12	22.12	22.19	22.07		
5	16QAM	1	24	22.50	21.90	21.74		
5	16QAM	12	0	21.27	21.20	21.36	22	2
5	16QAM	12	7	21.60	21.32	21.52		
5	16QAM	12	13	21.63	21.34	21.29		
5	16QAM	25	0	21.33	21.38	21.48		
Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	23.38	23.25	23.40	24	0
3	QPSK	1	8	23.35	23.32	23.31		
3	QPSK	1	14	23.33	23.52	22.95		
3	QPSK	8	0	22.42	22.24	22.50	23	1
3	QPSK	8	4	22.49	22.29	22.44		
3	QPSK	8	7	22.42	22.33	22.5		
3	QPSK	15	0	22.43	22.43	22.41		
3	16QAM	1	0	22.32	21.83	22.41	23	1
3	16QAM	1	8	22.66	22.12	22.29		
3	16QAM	1	14	22.42	21.94	21.94		
3	16QAM	8	0	21.15	21.37	21.45	22	2
3	16QAM	8	4	21.51	21.52	21.48		
3	16QAM	8	7	21.73	21.45	21.48		
3	16QAM	15	0	21.50	21.24	21.51		

Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	23.27	23.29	23.37	24	0
1.4	QPSK	1	3	23.42	23.48	23.38		
1.4	QPSK	1	5	23.30	23.38	23.07		
1.4	QPSK	3	0	23.41	23.31	23.36		
1.4	QPSK	3	1	23.46	23.62	23.38		
1.4	QPSK	3	3	23.41	23.56	23.33		
1.4	QPSK	6	0	22.28	22.38	22.41	23	1
1.4	16QAM	1	0	21.98	21.81	21.91	23	1
1.4	16QAM	1	3	22.14	22.00	22.03		
1.4	16QAM	1	5	22.02	21.9	21.91		
1.4	16QAM	3	0	22.29	22.23	22.29		
1.4	16QAM	3	1	22.29	22.3	22.33		
1.4	16QAM	3	3	22.39	22.41	22.36		
1.4	16QAM	6	0	21.20	21.26	21.25	22	2

<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	21.94	22.30	21.88	23	0
20	QPSK	1	49	22.28	22.21	22.48		
20	QPSK	1	99	22.03	22.00	21.72		
20	QPSK	50	0	21.38	21.26	21.48	22	1
20	QPSK	50	24	21.43	21.44	21.13		
20	QPSK	50	50	21.46	21.29	20.90		
20	QPSK	100	0	21.30	21.29	21.37		
20	16QAM	1	0	21.00	21.07	20.90	22	1
20	16QAM	1	49	21.60	20.99	21.38		
20	16QAM	1	99	21.18	20.80	20.50		
20	16QAM	50	0	20.33	20.67	20.23	21	2
20	16QAM	50	24	20.41	20.51	20.31		
20	16QAM	50	50	20.40	20.46	20.03		
20	16QAM	100	0	20.31	20.46	20.05		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	22.14	22.34	22.08	23	0
15	QPSK	1	37	22.40	22.44	22.00		
15	QPSK	1	74	22.39	22.13	21.67		
15	QPSK	36	0	21.09	21.57	21.23	22	1
15	QPSK	36	20	21.30	21.50	21.05		
15	QPSK	36	39	21.28	21.43	21.07		
15	QPSK	75	0	21.10	21.57	21.03		
15	16QAM	1	0	20.76	21.45	21.49	22	1
15	16QAM	1	37	20.95	21.20	21.24		
15	16QAM	1	74	20.81	20.86	20.68		
15	16QAM	36	0	20.16	20.60	20.23	21	2
15	16QAM	36	20	20.29	20.55	20.04		
15	16QAM	36	39	20.37	20.48	20.07		
15	16QAM	75	0	20.23	20.52	20.11		

Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	21.91	22.23	21.70	23	0
10	QPSK	1	25	22.11	22.12	21.70		
10	QPSK	1	49	21.99	22.12	21.67		
10	QPSK	25	0	21.02	21.36	21.07	22	1
10	QPSK	25	12	21.18	21.40	20.95		
10	QPSK	25	25	21.18	21.25	20.82		
10	QPSK	50	0	21.07	21.33	20.91		
10	16QAM	1	0	20.75	20.96	20.40	22	1
10	16QAM	1	25	20.65	20.93	20.52		
10	16QAM	1	49	20.49	20.83	20.55		
10	16QAM	25	0	20.08	20.43	20.12	21	2
10	16QAM	25	12	20.33	20.48	19.91		
10	16QAM	25	25	20.32	20.42	19.76		
10	16QAM	50	0	20.16	20.41	20.03		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	21.70	22.11	21.76	23	0
5	QPSK	1	12	21.80	22.20	21.96		
5	QPSK	1	24	21.81	22.13	21.53		
5	QPSK	12	0	20.94	21.41	20.94	22	1
5	QPSK	12	7	20.93	21.36	21.01		
5	QPSK	12	13	20.89	21.40	20.93		
5	QPSK	25	0	20.93	21.33	20.90		
5	16QAM	1	0	20.65	21.61	20.33	22	1
5	16QAM	1	12	20.88	21.10	20.60		
5	16QAM	1	24	20.59	20.77	20.11		
5	16QAM	12	0	19.96	20.40	19.85	21	2
5	16QAM	12	7	19.99	20.44	19.84		
5	16QAM	12	13	19.85	20.39	19.83		
5	16QAM	25	0	20.00	20.42	19.85		

Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	21.88	22.24	21.61	23	0
3	QPSK	1	8	22.05	22.29	22.12		
3	QPSK	1	14	21.93	22.24	22.03		
3	QPSK	8	0	21.01	21.29	20.96	22	1
3	QPSK	8	4	20.98	21.35	20.82		
3	QPSK	8	7	20.98	21.40	20.90		
3	QPSK	15	0	20.97	21.33	20.94		
3	16QAM	1	0	20.44	20.87	20.94	22	1
3	16QAM	1	8	20.75	21.16	20.86		
3	16QAM	1	14	20.75	21.27	20.88		
3	16QAM	8	0	19.85	20.50	20.11	21	2
3	16QAM	8	4	20.04	20.58	19.78		
3	16QAM	8	7	20.18	20.53	19.73		
3	16QAM	15	0	19.85	20.43	19.84		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	21.97	22.21	21.60	23	0
1.4	QPSK	1	3	21.89	22.26	21.89		
1.4	QPSK	1	5	21.93	22.15	21.64		
1.4	QPSK	3	0	22.00	22.21	21.94		
1.4	QPSK	3	1	22.35	22.23	21.99		
1.4	QPSK	3	3	22.00	22.19	22.06		
1.4	QPSK	6	0	20.98	21.28	20.87	22	1
1.4	16QAM	1	0	20.58	20.82	20.52	22	1
1.4	16QAM	1	3	20.71	20.90	20.20		
1.4	16QAM	1	5	20.77	20.81	20.14		
1.4	16QAM	3	0	20.84	21.26	20.64		
1.4	16QAM	3	1	20.89	21.33	20.94		
1.4	16QAM	3	3	21.01	21.22	20.80		
1.4	16QAM	6	0	20.00	20.15	20.02	21	2

<Maximum Average RF Power (Proximity Sensor Active)>

<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	20.04	20.14	20.09	20.5	0
20	QPSK	1	49	20.33	20.46	20.40		
20	QPSK	1	99	19.93	20.12	20.37		
20	QPSK	50	0	20.31	20.35	20.31	20.5	0
20	QPSK	50	24	20.20	20.29	20.42		
20	QPSK	50	50	20.19	20.35	20.45		
20	QPSK	100	0	20.26	20.32	20.47		
20	16QAM	1	0	20.47	19.96	19.98	20.5	0
20	16QAM	1	49	20.39	20.15	20.16		
20	16QAM	1	99	19.71	19.96	20.03		
20	16QAM	50	0	20.30	20.27	20.31	20.5	0
20	16QAM	50	24	20.33	20.38	20.35		
20	16QAM	50	50	20.30	20.36	20.44		
20	16QAM	100	0	20.28	20.27	20.38		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	20.40	20.17	20.34	20.5	0
15	QPSK	1	37	20.39	20.41	20.36		
15	QPSK	1	74	20.04	20.14	20.44		
15	QPSK	36	0	20.27	20.43	20.45	20.5	0
15	QPSK	36	20	20.26	20.43	20.44		
15	QPSK	36	39	20.23	20.35	20.43		
15	QPSK	75	0	20.33	20.39	20.42		
15	16QAM	1	0	20.22	20.26	19.98	20.5	0
15	16QAM	1	37	20.35	20.00	20.35		
15	16QAM	1	74	19.90	19.96	19.96		
15	16QAM	36	0	20.37	20.4	20.42	20.5	0
15	16QAM	36	20	20.3	20.42	20.42		
15	16QAM	36	39	20.18	20.33	20.49		
15	16QAM	75	0	20.19	20.36	20.50		

Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	20.22	20.19	20.32	20.5	0
10	QPSK	1	25	20.44	20.42	20.41		
10	QPSK	1	49	20.19	20.25	20.39		
10	QPSK	25	0	20.36	20.35	20.45	20.5	0
10	QPSK	25	12	20.24	20.38	20.44		
10	QPSK	25	25	20.25	20.40	20.43		
10	QPSK	50	0	20.27	20.33	20.39		
10	16QAM	1	0	20.16	20.21	20.07	20.5	0
10	16QAM	1	25	19.71	20.42	20.46		
10	16QAM	1	49	19.86	20.11	20.20		
10	16QAM	25	0	20.40	20.41	20.44	20.5	0
10	16QAM	25	12	20.30	20.38	20.39		
10	16QAM	25	25	20.22	20.29	20.48		
10	16QAM	50	0	20.21	20.39	20.45		
Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	20.22	20.10	20.25	20.5	0
5	QPSK	1	12	20.39	20.09	20.31		
5	QPSK	1	24	19.87	19.99	20.05		
5	QPSK	12	0	20.30	20.38	20.38	20.5	0
5	QPSK	12	7	20.30	20.28	20.37		
5	QPSK	12	13	20.29	20.28	20.30		
5	QPSK	25	0	20.25	20.28	20.34		
5	16QAM	1	0	20.38	19.65	20.45	20.5	0
5	16QAM	1	12	20.39	19.99	20.48		
5	16QAM	1	24	20.25	19.86	20.06		
5	16QAM	12	0	20.25	20.25	20.38	20.5	0
5	16QAM	12	7	20.15	20.14	20.31		
5	16QAM	12	13	20.15	20.21	20.23		
5	16QAM	25	0	20.28	20.32	20.42		

Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	20.17	20.25	20.03	20.5	0
3	QPSK	1	8	20.31	20.43	20.45		
3	QPSK	1	14	20.37	20.42	20.29		
3	QPSK	8	0	20.08	20.46	20.45	20.5	0
3	QPSK	8	4	20.09	20.07	19.92		
3	QPSK	8	7	20.23	20.12	19.77		
3	QPSK	15	0	20.40	20.36	20.28		
3	16QAM	1	0	20.44	20.44	20.28	20.5	0
3	16QAM	1	8	20.02	19.98	20.21		
3	16QAM	1	14	19.94	20.17	20.31		
3	16QAM	8	0	20.45	20.30	20.46	20.5	0
3	16QAM	8	4	20.44	20.30	20.45		
3	16QAM	8	7	19.99	19.86	20.02		
3	16QAM	15	0	19.79	19.88	20.02		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	20.18	20.23	20.50	20.5	0
1.4	QPSK	1	3	20.18	20.29	20.50		
1.4	QPSK	1	5	20.35	20.15	20.47		
1.4	QPSK	3	0	20.39	20.48	20.18		
1.4	QPSK	3	1	20.18	20.17	20.37		
1.4	QPSK	3	3	19.98	19.90	20.45		
1.4	QPSK	6	0	20.45	20.44	20.28	20.5	0
1.4	16QAM	1	0	20.02	19.98	20.21	20.5	0
1.4	16QAM	1	3	19.94	20.17	20.31		
1.4	16QAM	1	5	20.29	20.49	20.30		
1.4	16QAM	3	0	20.25	20.38	20.34		
1.4	16QAM	3	1	20.38	19.86	20.18		
1.4	16QAM	3	3	20.35	20.15	20.38		
1.4	16QAM	6	0	20.39	20.45	20.18	20.5	0

<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	19.51	19.29	19.49	20	0
20	QPSK	1	49	19.74	19.87	19.60		
20	QPSK	1	99	19.54	19.27	19.48		
20	QPSK	50	0	19.40	19.43	19.59	20	0
20	QPSK	50	24	19.33	19.27	19.54		
20	QPSK	50	50	19.46	19.14	19.43		
20	QPSK	100	0	19.39	19.28	19.54		
20	16QAM	1	0	18.76	18.88	19.12	20	0
20	16QAM	1	49	18.96	19.51	19.74		
20	16QAM	1	99	18.74	18.77	19.24		
20	16QAM	50	0	19.21	19.36	19.27	20	0
20	16QAM	50	24	19.02	19.19	19.26		
20	16QAM	50	50	19.27	18.97	19.24		
20	16QAM	100	0	19.09	19.10	19.35		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	19.46	19.48	19.64	20	0
15	QPSK	1	37	19.74	19.87	19.85		
15	QPSK	1	74	19.58	19.35	19.72		
15	QPSK	36	0	19.43	19.44	19.52	20	0
15	QPSK	36	20	19.37	19.35	19.60		
15	QPSK	36	39	19.30	19.28	19.58		
15	QPSK	75	0	19.40	19.28	19.56		
15	16QAM	1	0	18.90	18.96	19.38	20	0
15	16QAM	1	37	19.19	19.07	19.61		
15	16QAM	1	74	19.05	18.87	18.86		
15	16QAM	36	0	19.20	19.27	19.24	20	0
15	16QAM	36	20	19.18	19.18	19.40		
15	16QAM	36	39	19.03	19.01	19.35		
15	16QAM	75	0	19.21	19.22	19.37		

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	19.38	19.31	19.62	20	0
10	QPSK	1	25	19.78	19.38	19.73		
10	QPSK	1	49	19.71	19.22	19.71		
10	QPSK	25	0	19.40	19.41	19.59	20	0
10	QPSK	25	12	19.49	19.28	19.62		
10	QPSK	25	25	19.41	19.28	19.63		
10	QPSK	50	0	19.37	19.34	19.66		
10	16QAM	1	0	18.87	18.88	19.17	20	0
10	16QAM	1	25	18.75	18.96	18.81		
10	16QAM	1	49	18.56	18.56	19.00		
10	16QAM	25	0	19.24	19.20	19.41	20	0
10	16QAM	25	12	19.32	19.03	19.44		
10	16QAM	25	25	19.34	19.03	19.56		
10	16QAM	50	0	19.35	19.19	19.59		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	19.41	19.51	19.53	20	0
5	QPSK	1	12	19.39	19.47	19.96		
5	QPSK	1	24	19.21	19.25	19.89		
5	QPSK	12	0	19.31	19.41	19.52	20	0
5	QPSK	12	7	19.34	19.37	19.70		
5	QPSK	12	13	19.42	19.33	19.58		
5	QPSK	25	0	19.34	19.32	19.68		
5	16QAM	1	0	19.47	18.78	19.35	20	0
5	16QAM	1	12	19.25	19.06	19.48		
5	16QAM	1	24	19.01	18.55	18.83		
5	16QAM	12	0	18.90	19.15	19.24	20	0
5	16QAM	12	7	19.01	19.12	19.43		
5	16QAM	12	13	19.08	19.02	19.53		
5	16QAM	25	0	19.01	19.00	19.41		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	19.62	19.61	19.51	20	0
3	QPSK	1	8	19.41	19.33	19.49		
3	QPSK	1	14	19.30	19.21	19.58		
3	QPSK	8	0	19.40	19.42	19.54	20	0
3	QPSK	8	4	19.36	19.29	19.54		
3	QPSK	8	7	19.36	19.33	19.51		
3	QPSK	15	0	19.32	19.28	19.50		
3	16QAM	1	0	19.37	18.80	19.11	20	0
3	16QAM	1	8	19.42	18.81	19.53		
3	16QAM	1	14	19.15	18.95	19.62		
3	16QAM	8	0	19.25	19.25	18.97	20	0
3	16QAM	8	4	19.21	19.11	19.32		
3	16QAM	8	7	19.04	19.08	19.46		
3	16QAM	15	0	19.15	19.14	19.24		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	19.52	19.51	19.58	20	0
1.4	QPSK	1	3	19.55	19.57	19.71		
1.4	QPSK	1	5	19.48	19.41	19.70		
1.4	QPSK	3	0	19.50	19.62	19.72		
1.4	QPSK	3	1	19.54	19.62	19.87		
1.4	QPSK	3	3	19.69	19.66	19.71		
1.4	QPSK	6	0	19.34	19.26	19.41	20	0
1.4	16QAM	1	0	18.88	18.96	19.63	20	0
1.4	16QAM	1	3	19.09	19.06	19.05		
1.4	16QAM	1	5	18.99	18.80	18.94		
1.4	16QAM	3	0	19.19	19.10	19.18		
1.4	16QAM	3	1	19.33	19.66	19.68		
1.4	16QAM	3	3	19.28	19.50	19.47		
1.4	16QAM	6	0	18.98	19.18	19.08	20	0

<LTE Band 25>

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				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	20.37	20.34	20.05	20.5	0
20	QPSK	1	49	20.36	20.40	20.18		
20	QPSK	1	99	19.98	20.38	20.31		
20	QPSK	50	0	20.27	20.31	20.26	20.5	0
20	QPSK	50	24	20.26	20.33	20.27		
20	QPSK	50	50	20.24	20.29	20.28		
20	QPSK	100	0	20.22	20.29	20.2		
20	16QAM	1	0	19.85	19.57	19.75	20.5	0
20	16QAM	1	49	20.01	19.65	19.79		
20	16QAM	1	99	19.89	19.46	19.96		
20	16QAM	50	0	20.10	20.19	20.05	20.5	0
20	16QAM	50	24	20.11	20.24	20.15		
20	16QAM	50	50	20.31	20.33	20.31		
20	16QAM	100	0	20.13	20.25	20.20		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	20.26	20.32	20.13	20.5	0
15	QPSK	1	37	20.08	20.26	20.2		
15	QPSK	1	74	20.22	20.25	20.46		
15	QPSK	36	0	20.32	20.28	20.37	20.5	0
15	QPSK	36	20	20.21	20.28	20.31		
15	QPSK	36	39	20.20	20.33	20.17		
15	QPSK	75	0	20.22	20.24	20.25		
15	16QAM	1	0	20.42	19.94	19.85	20.5	0
15	16QAM	1	37	19.98	20.42	20.03		
15	16QAM	1	74	19.63	20.36	20.08		
15	16QAM	36	0	20.23	20.24	20.40	20.5	0
15	16QAM	36	20	20.26	20.30	20.29		
15	16QAM	36	39	20.23	20.29	20.24		
15	16QAM	75	0	20.23	20.30	20.20		

Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	20.18	20.19	20.16	20.5	0
10	QPSK	1	25	20.17	20.16	20.06		
10	QPSK	1	49	19.94	20.22	20.40		
10	QPSK	25	0	20.19	20.25	20.36	20.5	0
10	QPSK	25	12	20.17	20.29	20.23		
10	QPSK	25	25	20.21	20.30	20.18		
10	QPSK	50	0	20.19	20.22	20.31		
10	16QAM	1	0	20.30	19.90	19.98	20.5	0
10	16QAM	1	25	20.06	19.98	19.83		
10	16QAM	1	49	19.82	19.54	19.99		
10	16QAM	25	0	20.11	20.32	20.32	20.5	0
10	16QAM	25	12	20.11	20.31	20.23		
10	16QAM	25	25	20.02	20.28	20.23		
10	16QAM	50	0	20.20	20.19	20.27		
Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	20.19	20.30	20.13	20.5	0
5	QPSK	1	12	20.02	20.34	20.43		
5	QPSK	1	24	20.01	20.22	20.21		
5	QPSK	12	0	20.15	20.28	20.28	20.5	0
5	QPSK	12	7	20.21	20.24	20.29		
5	QPSK	12	13	20.21	20.19	20.27		
5	QPSK	25	0	20.19	20.27	20.29		
5	16QAM	1	0	19.79	20.46	20.25	20.5	0
5	16QAM	1	12	19.96	19.84	19.98		
5	16QAM	1	24	19.83	19.70	19.61		
5	16QAM	12	0	20.07	20.15	20.15	20.5	0
5	16QAM	12	7	20.15	20.10	20.15		
5	16QAM	12	13	20.15	20.07	20.44		
5	16QAM	25	0	20.32	20.25	20.16		

Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	20.02	20.26	19.81	20.5	0
3	QPSK	1	8	19.48	20.06	19.97		
3	QPSK	1	14	20.31	20.33	20.44		
3	QPSK	8	0	20.44	20.18	20.18	20.5	0
3	QPSK	8	4	20.22	20.07	20.22		
3	QPSK	8	7	20.22	20.08	20.20		
3	QPSK	15	0	20.23	20.27	20.39		
3	16QAM	1	0	20.29	20.26	20.35	20.5	0
3	16QAM	1	8	20.10	20.03	20.21		
3	16QAM	1	14	20.10	20.03	20.17		
3	16QAM	8	0	20.15	20.30	20.46	20.5	0
3	16QAM	8	4	20.16	20.25	20.42		
3	16QAM	8	7	19.80	19.84	19.90		
3	16QAM	15	0	19.81	19.85	19.89		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	20.18	20.06	20.10	20.5	0
1.4	QPSK	1	3	20.32	20.15	20.18		
1.4	QPSK	1	5	20.38	20.37	19.92		
1.4	QPSK	3	0	20.18	20.30	19.86		
1.4	QPSK	3	1	20.13	20.01	20.19		
1.4	QPSK	3	3	20.09	20.37	20.07		
1.4	QPSK	6	0	19.89	20.14	19.76	20.5	0
1.4	16QAM	1	0	20.39	20.43	20.36	20.5	0
1.4	16QAM	1	3	20.19	20.28	20.25		
1.4	16QAM	1	5	20.19	20.14	20.27		
1.4	16QAM	3	0	20.19	20.26	20.26		
1.4	16QAM	3	1	20.39	20.03	20.29		
1.4	16QAM	3	3	20.04	20.04	20.25		
1.4	16QAM	6	0	20.24	20.19	20.29	20.5	0

<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	19.15	19.55	19.58	20	0
20	QPSK	1	49	19.77	19.56	19.78		
20	QPSK	1	99	19.58	19.45	19.33		
20	QPSK	50	0	19.52	19.54	19.65	20	0
20	QPSK	50	24	19.64	19.53	19.51		
20	QPSK	50	50	19.55	19.38	19.35		
20	QPSK	100	0	19.60	19.64	19.56		
20	16QAM	1	0	18.56	19.00	19.17	20	0
20	16QAM	1	49	18.99	19.03	19.46		
20	16QAM	1	99	18.89	18.86	18.91		
20	16QAM	50	0	19.15	19.17	19.35	20	0
20	16QAM	50	24	19.35	19.16	19.31		
20	16QAM	50	50	19.29	19.13	19.13		
20	16QAM	100	0	19.23	19.15	19.24		
Channel				132047	132322	132597	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1745	1772.5		
15	QPSK	1	0	19.43	19.52	19.56	20	0
15	QPSK	1	37	19.68	19.77	18.86		
15	QPSK	1	74	19.64	19.45	19.29		
15	QPSK	36	0	19.41	19.74	19.62	20	0
15	QPSK	36	20	19.57	19.70	19.53		
15	QPSK	36	39	19.60	19.57	19.41		
15	QPSK	75	0	19.39	19.56	19.55		
15	16QAM	1	0	19.05	19.13	19.79	20	0
15	16QAM	1	37	19.16	19.70	19.68		
15	16QAM	1	74	19.02	19.04	19.02		
15	16QAM	36	0	19.00	19.26	19.36	20	0
15	16QAM	36	20	19.18	19.24	19.30		
15	16QAM	36	39	19.19	19.11	19.00		
15	16QAM	75	0	19.02	19.21	19.24		

Channel				132022	132322	132622	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1745	1775		
10	QPSK	1	0	19.21	19.54	19.74	20	0
10	QPSK	1	25	19.38	19.89	19.88		
10	QPSK	1	49	19.22	19.40	19.39		
10	QPSK	25	0	19.37	19.57	19.55	20	0
10	QPSK	25	12	19.37	19.53	19.60		
10	QPSK	25	25	19.34	19.46	19.49		
10	QPSK	50	0	19.35	19.45	19.55		
10	16QAM	1	0	19.08	18.99	19.63	20	0
10	16QAM	1	25	19.50	19.05	19.62		
10	16QAM	1	49	19.57	18.93	18.87		
10	16QAM	25	0	19.07	19.20	19.05	20	0
10	16QAM	25	12	19.09	19.28	19.18		
10	16QAM	25	25	18.88	19.20	19.12		
10	16QAM	50	0	19.05	18.98	19.18		
Channel				131997	132322	132647	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1745	1777.5		
5	QPSK	1	0	19.31	19.36	19.47	20	0
5	QPSK	1	12	19.33	19.61	19.37		
5	QPSK	1	24	19.24	19.42	19.37		
5	QPSK	12	0	19.25	19.50	19.52	20	0
5	QPSK	12	7	19.34	19.57	19.53		
5	QPSK	12	13	19.27	19.51	19.47		
5	QPSK	25	0	19.33	19.54	19.48		
5	16QAM	1	0	19.02	18.97	19.60	20	0
5	16QAM	1	12	19.03	19.20	19.45		
5	16QAM	1	24	18.77	18.94	18.75		
5	16QAM	12	0	18.73	18.96	19.06	20	0
5	16QAM	12	7	18.75	19.01	18.93		
5	16QAM	12	13	18.71	19.05	19.00		
5	16QAM	25	0	18.95	19.19	19.22		

Channel				131987	132322	132657	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1745	1778.5		
3	QPSK	1	0	19.51	19.72	19.69	20	0
3	QPSK	1	8	19.33	19.70	19.65		
3	QPSK	1	14	19.34	19.71	19.50		
3	QPSK	8	0	19.35	19.50	19.55	20	0
3	QPSK	8	4	19.40	19.48	19.61		
3	QPSK	8	7	19.39	19.53	19.54		
3	QPSK	15	0	19.36	19.56	19.59		
3	16QAM	1	0	19.22	19.01	19.49	20	0
3	16QAM	1	8	19.21	18.98	19.17		
3	16QAM	1	14	19.19	18.98	19.21		
3	16QAM	8	0	18.71	19.19	19.20	20	0
3	16QAM	8	4	18.77	19.07	19.14		
3	16QAM	8	7	18.68	19.22	19.21		
3	16QAM	15	0	19.04	19.22	19.01		
Channel				131979	132322	132665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1745	1779.3		
1.4	QPSK	1	0	19.44	19.61	19.58	20	0
1.4	QPSK	1	3	19.47	19.62	19.56		
1.4	QPSK	1	5	19.40	19.65	19.76		
1.4	QPSK	3	0	19.49	19.78	19.64		
1.4	QPSK	3	1	19.72	19.81	19.72		
1.4	QPSK	3	3	19.48	19.67	19.59		
1.4	QPSK	6	0	19.31	19.53	19.43	20	0
1.4	16QAM	1	0	19.54	19.70	19.74	20	0
1.4	16QAM	1	3	19.62	19.83	19.77		
1.4	16QAM	1	5	19.56	19.78	18.87		
1.4	16QAM	3	0	19.54	19.57	19.18		
1.4	16QAM	3	1	19.18	19.60	19.42		
1.4	16QAM	3	3	19.15	19.54	19.34		
1.4	16QAM	6	0	18.80	19.06	19.01	20	0

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations

b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS

c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

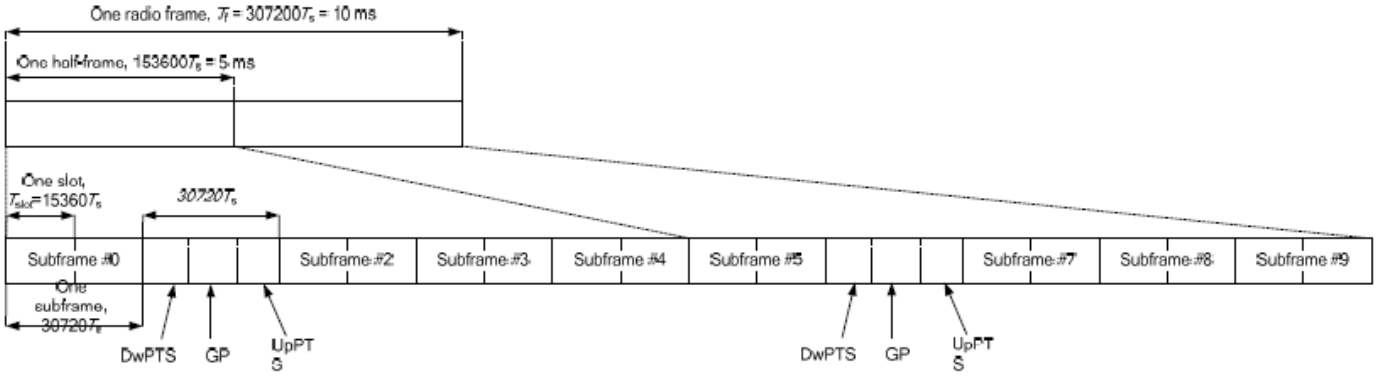


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$		
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Special subframe (30720·T_s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~4**	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~3**	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subfames, uplink operation is in 3 uplink subframes and 1 special subframe.

ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink

iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.167)/5 = 63.3%

iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: (3+0.143)/5 = 62.9%

v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

<Maximum Average RF Power (Proximity Sensor Inactive)>

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	22.00	22.18	22.21	22.32	22.20	23	0
20	QPSK	1	49	22.04	22.98	22.31	22.63	22.16		
20	QPSK	1	99	22.09	22.14	22.32	22.17	22.09		
20	QPSK	50	0	21.15	21.20	21.63	21.37	21.28	22	1
20	QPSK	50	24	21.06	21.71	21.67	21.49	21.15		
20	QPSK	50	50	21.07	21.09	21.59	21.42	21.28		
20	QPSK	100	0	21.08	21.67	21.62	21.45	21.45		
20	16QAM	1	0	20.65	20.95	20.75	21.22	21.13	22	1
20	16QAM	1	49	20.63	20.95	21.17	21.06	21.11		
20	16QAM	1	99	20.45	20.66	20.88	20.92	20.62		
20	16QAM	50	0	20.08	20.07	20.41	20.36	20.23	21	2
20	16QAM	50	24	20.10	20.17	20.52	20.41	20.21		
20	16QAM	50	50	19.92	19.98	20.44	20.33	20.03		
20	16QAM	100	0	20.00	20.04	20.49	20.44	20.08		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	22.09	22.02	22.40	22.42	22.04	23	0
15	QPSK	1	37	22.69	22.57	22.91	22.57	22.00		
15	QPSK	1	74	22.02	22.01	22.58	22.42	22.19		
15	QPSK	36	0	21.27	21.08	21.57	21.35	21.41	22	1
15	QPSK	36	20	21.29	21.21	21.61	21.47	21.28		
15	QPSK	36	39	21.10	21.07	21.35	21.42	21.65		
15	QPSK	75	0	21.07	21.12	21.31	21.38	21.38		
15	16QAM	1	0	20.80	20.73	20.83	21.07	21.17	22	1
15	16QAM	1	37	20.85	20.79	21.24	20.93	21.43		
15	16QAM	1	74	20.79	20.6	20.90	21.02	20.82		
15	16QAM	36	0	19.96	19.98	20.28	20.13	20.15	21	2
15	16QAM	36	20	20.04	20.12	20.52	20.42	20.06		
15	16QAM	36	39	20.06	20.00	20.46	20.28	20.01		
15	16QAM	75	0	19.99	20.03	20.48	20.20	20.03		

Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	22.04	22.19	22.38	22.31	22.38	23	0
10	QPSK	1	25	22.16	22.26	22.48	22.99	22.09		
10	QPSK	1	49	22.19	21.93	22.58	22.51	22.15		
10	QPSK	25	0	21.11	21.07	21.47	21.29	21.37	22	1
10	QPSK	25	12	21.17	21.2	21.59	21.48	21.37		
10	QPSK	25	25	21.18	21.12	21.37	21.21	21.24		
10	QPSK	50	0	21.25	21.09	21.48	21.22	21.16		
10	16QAM	1	0	20.91	20.85	20.94	20.94	20.71	22	1
10	16QAM	1	25	20.96	20.89	21.06	21.03	20.77		
10	16QAM	1	49	20.73	20.64	20.88	21.01	20.64		
10	16QAM	25	0	20.22	20.22	20.47	20.2	20.23	21	2
10	16QAM	25	12	20.38	20.34	20.65	20.48	20.43		
10	16QAM	25	25	20.46	20.37	20.58	20.28	20.56		
10	16QAM	50	0	20.18	19.97	20.41	20.29	20.01		
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.3	2687.5		
5	QPSK	1	0	22.09	22.10	22.09	22.14	22.03	23	0
5	QPSK	1	12	21.92	22.56	22.38	22.54	22.14		
5	QPSK	1	24	21.94	22.10	22.24	22.30	21.86		
5	QPSK	12	0	20.99	21.03	21.5	21.17	21.51	22	1
5	QPSK	12	7	21.03	21.03	21.58	21.17	21.15		
5	QPSK	12	13	21.02	21.09	21.62	21.17	21.33		
5	QPSK	25	0	21.04	21.04	21.61	21.18	21.68		
5	16QAM	1	0	21.40	20.62	20.88	20.80	20.56	22	1
5	16QAM	1	12	20.66	20.83	21.07	20.87	20.92		
5	16QAM	1	24	20.55	20.61	20.99	21.31	20.65		
5	16QAM	12	0	19.92	19.86	20.38	20.10	20.1	21	2
5	16QAM	12	7	19.98	19.94	20.4	20.10	20.17		
5	16QAM	12	13	20.07	20.12	20.34	20.17	20.13		
5	16QAM	25	0	19.96	20.39	20.49	20.35	20.34		

<Maximum Average RF Power (Proximity Sensor Active)>

<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	18.70	18.91	19.04	18.97	19.06	20	0
20	QPSK	1	49	19.28	19.32	19.29	19.11	19.04		
20	QPSK	1	99	18.85	18.96	19.10	19.02	18.96		
20	QPSK	50	0	19.11	19.02	19.30	19.15	19.28	20	0
20	QPSK	50	24	19.13	19.31	19.27	19.07	19.02		
20	QPSK	50	50	19.13	19.14	19.24	19.04	19.14		
20	QPSK	100	0	19.09	19.22	19.21	19.08	19.20		
20	16QAM	1	0	19.18	19.04	19.08	19.12	19.09	20	0
20	16QAM	1	49	19.37	19.42	19.23	19.30	19.20		
20	16QAM	1	99	18.94	19.10	19.12	18.98	18.93		
20	16QAM	50	0	18.80	18.92	19.10	18.94	18.89	20	0
20	16QAM	50	24	19.03	18.98	19.08	19.01	19.07		
20	16QAM	50	50	19.03	18.92	19.17	18.96	18.88		
20	16QAM	100	0	18.90	18.91	19.04	18.91	19.15		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	18.87	18.94	19.17	19.23	19.08	20	0
15	QPSK	1	37	19.27	19.28	19.42	19.39	19.42		
15	QPSK	1	74	18.98	19.09	19.28	19.11	18.88		
15	QPSK	36	0	19.05	19.05	19.34	19.24	19.28	20	0
15	QPSK	36	20	19.10	19.08	19.23	19.24	19.26		
15	QPSK	36	39	19.06	19.03	19.19	18.97	19.21		
15	QPSK	75	0	19.01	19.07	19.24	19.04	19.25		
15	16QAM	1	0	18.61	18.55	19.07	18.67	18.60	20	0
15	16QAM	1	37	19.11	19.13	19.25	19.14	19.01		
15	16QAM	1	74	18.62	18.61	18.70	18.64	18.47		
15	16QAM	36	0	18.88	18.91	19.09	19.02	18.97	20	0
15	16QAM	36	20	19.07	18.95	19.19	19.00	19.06		
15	16QAM	36	39	18.91	19.01	19.16	18.98	18.95		
15	16QAM	75	0	18.91	18.81	19.15	18.96	18.93		

Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	18.90	18.96	19.18	19.16	19.23	20	0
10	QPSK	1	25	19.24	19.26	19.21	19.21	19.13		
10	QPSK	1	49	19.10	19.12	19.23	19.20	19.10		
10	QPSK	25	0	19.23	19.27	19.14	19.23	19.34	20	0
10	QPSK	25	12	19.40	19.07	19.20	19.28	19.38		
10	QPSK	25	25	19.25	19.08	19.30	19.10	19.07		
10	QPSK	50	0	19.08	19.06	19.25	19.15	19.27		
10	16QAM	1	0	18.55	18.59	18.63	18.61	18.71	20	0
10	16QAM	1	25	18.99	18.83	19.07	18.87	18.90		
10	16QAM	1	49	18.72	18.73	18.69	18.74	18.66		
10	16QAM	25	0	18.85	19.11	19.36	19.26	19.31	20	0
10	16QAM	25	12	19.01	19.17	19.39	19.30	19.27		
10	16QAM	25	25	18.86	19.21	19.31	19.12	19.23		
10	16QAM	50	0	18.99	18.80	19.11	19.06	19.26		
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	18.85	18.97	19.05	19.04	18.91	20	0
5	QPSK	1	12	19.14	19.14	19.28	19.24	19.12		
5	QPSK	1	24	18.94	19.02	19.22	19.03	18.94		
5	QPSK	12	0	18.98	19.08	19.44	19.22	19.00	20	0
5	QPSK	12	7	19.17	19.15	19.21	19.36	18.97		
5	QPSK	12	13	19.05	19.10	19.23	19.27	19.02		
5	QPSK	25	0	19.00	19.07	19.45	19.28	18.99		
5	16QAM	1	0	18.87	18.91	18.98	18.89	18.33	20	0
5	16QAM	1	12	19.14	19.02	19.25	19.10	19.12		
5	16QAM	1	24	19.03	18.92	19.03	19.03	18.45		
5	16QAM	12	0	18.85	18.86	18.99	18.85	18.94	20	0
5	16QAM	12	7	18.80	18.89	19.12	18.87	19.00		
5	16QAM	12	13	18.81	18.98	19.12	18.94	18.99		
5	16QAM	25	0	18.92	19.10	19.11	18.99	19.18		

<WLAN Conducted Power>

General Note:

1. 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.
2. 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).
3. 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.
4. 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>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit (dBm)	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	14.68	16.00	97.59
		6	2437	15.78	16.00	
		11	2462	15.62	16.00	
	802.11g 6Mbps	1	2412	8.63	10.00	87.44
		6	2437	9.36	10.00	
		11	2462	8.79	10.00	
	802.11n-HT20 MCS0	1	2412	8.69	10.00	86.70
		6	2437	11.64	12.00	
		11	2462	9.00	10.00	

14. Bluetooth Exclusions Applied

Mode Band	Max Average power(dBm)	
	Bluetooth v3.0 + EDR	Bluetooth v4.0/4.1 LE
2.4GHz Bluetooth	9.00	0.50

Note:
Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

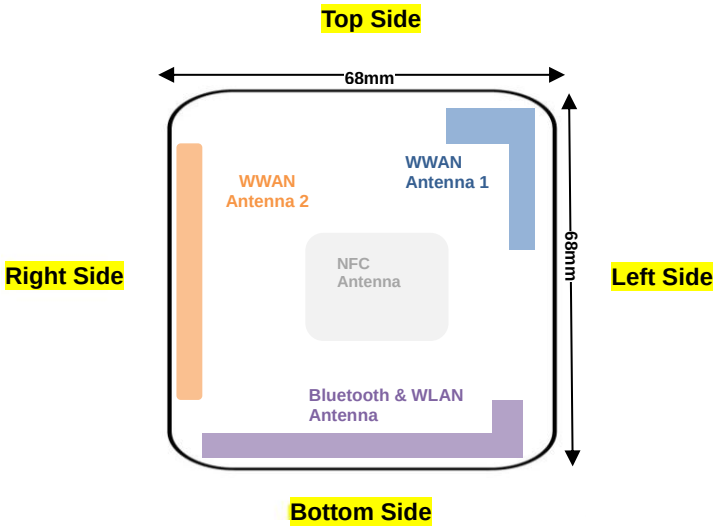
[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	Exclusion Thresholds
9.00	5	2.48	2.5

Note:
Per KDB 447498 D01v06, a distance of 5 mm is applied to determine SAR test exclusion. The test exclusion threshold is 2.5 which is <= 3, SAR testing is not required.

15. Antenna Location



Back View

Antenna	Support Band
WWAN Antenna 1	CDMA: BC0/1/10 WCDMA: B2 / B4 / B5 LTE: B2 / B4 / B5 / B25 / B26 / B41 / B66
WWAN Antenna 2	LTE: B12 / B13
Bluetooth & WLAN Antenna	WLAN 2.4GHz Bluetooth
NFC Antenna	NFC

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Antenna 1	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	≤ 25mm
WWAN Antenna 2	≤ 25mm	≤ 25mm	≤ 25mm	≤ 25mm	≤ 25mm	>25mm
Bluetooth & WLAN	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Antenna 1	Yes	Yes	Yes	No	No	Yes
WWAN Antenna 2	Yes	Yes	Yes	Yes	Yes	No
Bluetooth & WLAN	Yes	Yes	No	Yes	Yes	Yes

General Note: Referring to KDB 941225 D06 v02r01, when the overall device length and width are < 9cm*5cm, the test distance is 5 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

16. 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
   e. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
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. The device employs proximity sensors and when the sensor detects a user is touching the device on or near to the antenna the device reduces the maximum allowed output power. When detected the presence of the user's body at the front or back faces of the device, WCDMA band IV/II, CDMA 2000 BC1, and LTE band 2/4/25/41/66 reduced power will be active. So for speak to face SAR, we always use full power level to perform SAR testing, and for hotspot SAR, sensor on reduced power will be active at front/back/bottom side faces for above WWAN bands, other WWAN bands are all full power mode. Detailed descriptions of the proximity sensor trigger power reduction mechanism are included in the operational description.

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.

CDMA Note:

1. Per KDB 941225 D01v03r01, SAR for peak to face exposure is measured in RC3 with the handset configured to transmit at full rate in SO55.
2. Per KDB 941225 D01v03r01, in Hotspot mode EUT is treated as data device and SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps) as the primary mode.

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 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 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 / B26 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 B 4 / B5 / B2 SAR test was covered by LTE B66 / B26 / B25; 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. During SAR testing the WLAN transmission was verified using a spectrum analyzer.
5. For this application, the worst cases of WLAN SAR from original test report (Sporton Report Number FA811212) was verified for the differences. So always chose the verified worst WLAN SAR to represent the other position to do co-located analysis with WWAN.

16.1 Head SAR

<WCDMA SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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	In front of Face	10	Off	4182	836.4	22.42	22.50	1.019	-0.01	0.271	**0.276**
02	1	WCDMA Band IV	RMC 12.2Kbps	In front of Face	10	Off	1513	1752.6	22.18	22.50	1.076	0.04	0.771	**0.830**
	1	WCDMA Band IV	RMC 12.2Kbps	In front of Face	10	Off	1312	1712.4	21.94	22.50	1.138	0.07	0.521	0.593
	1	WCDMA Band IV	RMC 12.2Kbps	In front of Face	10	Off	1413	1732.6	21.97	22.50	1.130	0.07	0.669	0.756
03	1	WCDMA Band II	RMC 12.2Kbps	In front of Face	10	Off	9538	1907.6	21.74	22.00	1.062	-0.01	0.511	**0.543**

<CDMA2000 SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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	CDMA2000 BC0	RC3 SO55	In front of Face	10	Off	1013	824.7	22.66	23.00	1.081	0.06	0.502	**0.543**
05	1	CDMA2000 BC10	RC3 SO55	In front of Face	10	Off	476	817.9	22.43	23.00	1.140	0.02	0.454	**0.518**
06	1	CDMA2000 BC1	RC3 SO55	In front of Face	10	Off	600	1880	21.7	22.00	1.072	0.06	0.507	**0.543**

<FDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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)
07	2	LTE Band 12	10M	QPSK	1	25	In front of Face	10	Off	23095	707.5	23.17	24.00	1.211	-0.01	0.181	**0.219**
	2	LTE Band 12	10M	QPSK	25	12	In front of Face	10	Off	23095	707.5	22.38	23.00	1.153	0.01	0.149	0.172
08	2	LTE Band 13	10M	QPSK	1	49	In front of Face	10	Off	23230	782	23.53	24.00	1.114	-0.07	0.219	**0.244**
	2	LTE Band 13	10M	QPSK	25	0	In front of Face	10	Off	23230	782	22.32	23.00	1.169	0.02	0.188	0.220
09	1	LTE Band 26	15M	QPSK	1	37	In front of Face	10	Off	26865	831.5	23.56	24.00	1.107	-0.07	0.426	**0.471**
	1	LTE Band 26	15M	QPSK	36	0	In front of Face	10	Off	26865	831.5	22.26	23.00	1.186	0.02	0.389	0.461
10	1	LTE Band 66	20M	QPSK	1	49	In front of Face	10	Off	132572	1770	22.48	23.00	1.127	-0.07	1.040	**1.172**
	1	LTE Band 66	20M	QPSK	1	49	In front of Face	10	Off	132072	1720	22.28	23.00	1.180	0.03	0.896	1.058
	1	LTE Band 66	20M	QPSK	1	49	In front of Face	10	Off	132322	1745	22.21	23.00	1.199	-0.02	0.930	1.116
	1	LTE Band 66	20M	QPSK	50	0	In front of Face	10	Off	132572	1770	21.48	22.00	1.127	-0.01	0.863	0.973
	1	LTE Band 66	20M	QPSK	50	0	In front of Face	10	Off	132072	1720	21.38	22.00	1.153	0.02	0.715	0.825
	1	LTE Band 66	20M	QPSK	50	0	In front of Face	10	Off	132322	1745	21.26	22.00	1.186	0.07	0.801	0.950
	1	LTE Band 66	20M	QPSK	100	0	In front of Face	10	Off	132572	1770	21.37	22.00	1.156	0.09	0.879	1.016
11	1	LTE Band 25	20M	QPSK	1	49	In front of Face	10	Off	26340	1880	22.49	23.00	1.125	0.03	0.701	**0.788**
	1	LTE Band 25	20M	QPSK	50	24	In front of Face	10	Off	26340	1880	21.35	22.00	1.161	-0.04	0.575	0.668

<TDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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)
12	1	LTE Band 41	20M	QPSK	1	49	In front of Face	10	Off	40185	2549.5	22.98	23.00	1.005	62.9	1.006	0.07	0.241	**0.244**
	1	LTE Band 41	20M	QPSK	50	24	In front of Face	10	Off	40185	2549.5	21.71	22.00	1.069	62.9	1.006	-0.11	0.190	0.204

<WLAN2.4G SAR>

Plot No.	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)
13	WLAN2.4GHz	802.11b 1Mbps	In front of Face	10	6	2437	15.78	16.00	1.052	97.59	1.025	-0.01	0.094	**0.101**

16.2 Hotspot SAR

<WCDMA SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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	WCDMA Band V	RMC 12.2Kbps	Front	5	Off	4182	836.4	22.42	22.50	1.019	-0.05	0.502	0.511
14	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Off	4182	836.4	22.42	22.50	1.019	-0.05	0.505	**0.514**
	1	WCDMA Band V	RMC 12.2Kbps	Left side	5	Off	4182	836.4	22.42	22.50	1.019	0.03	0.216	0.220
	1	WCDMA Band V	RMC 12.2Kbps	Top Side	5	Off	4182	836.4	22.42	22.50	1.019	-0.06	<0.001	<0.001
	1	WCDMA Band IV	RMC 12.2Kbps	Front	5	On	1513	1752.6	19.67	20.00	1.079	0.01	0.962	1.038
	1	WCDMA Band IV	RMC 12.2Kbps	Front	5	On	1312	1712.4	19.44	20.00	1.138	0.01	0.752	0.855
15	1	WCDMA Band IV	RMC 12.2Kbps	Front	5	On	1413	1732.6	19.65	20.00	1.084	0.01	1.100	**1.192**
	1	WCDMA Band IV	RMC 12.2Kbps	Back	5	On	1513	1752.6	19.67	20.00	1.079	0.03	0.965	1.041
	1	WCDMA Band IV	RMC 12.2Kbps	Back	5	On	1312	1712.4	19.44	20.00	1.138	0.03	0.731	0.832
	1	WCDMA Band IV	RMC 12.2Kbps	Back	5	On	1413	1732.6	19.65	20.00	1.084	0.03	1.000	1.084
	1	WCDMA Band IV	RMC 12.2Kbps	Left Side	5	Off	1513	1752.6	22.18	22.50	1.076	0.12	0.444	0.478
	1	WCDMA Band IV	RMC 12.2Kbps	Top Side	5	Off	1513	1752.6	22.18	22.50	1.076	0.04	0.510	0.549
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	On	9400	1880	20.22	20.50	1.067	-0.07	0.982	1.047
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	On	9262	1852.4	20.10	20.50	1.096	0.07	1.020	1.118
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	On	9538	1907.6	20.09	20.50	1.099	-0.02	0.894	0.983
	1	WCDMA Band II	RMC 12.2Kbps	Back	5	On	9400	1880	20.22	20.50	1.067	0.02	1.070	1.141
	1	WCDMA Band II	RMC 12.2Kbps	Back	5	On	9262	1852.4	20.10	20.50	1.096	0.01	1.090	1.195
16	1	WCDMA Band II	RMC 12.2Kbps	Back	5	On	9538	1907.6	20.09	20.50	1.099	-0.01	1.090	**1.198**
	1	WCDMA Band II	RMC 12.2Kbps	Left Side	5	Off	9538	1907.6	21.74	22.00	1.062	0.03	0.566	0.601
	1	WCDMA Band II	RMC 12.2Kbps	Top Side	5	Off	9538	1907.6	21.74	22.00	1.062	0.05	0.330	0.350

<CDMA2000 SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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)
17	1	CDMA2000 BC0	RTAP 153.6Kbps	Front	5	Off	1013	824.7	22.45	23.00	1.135	-0.11	0.665	**0.755**
	1	CDMA2000 BC0	RTAP 153.6Kbps	Back	5	Off	1013	824.7	22.45	23.00	1.135	-0.05	0.652	0.740
	1	CDMA2000 BC0	RTAP 153.6Kbps	Left side	5	Off	1013	824.7	22.45	23.00	1.135	0.02	0.187	0.212
	1	CDMA2000 BC0	RTAP 153.6Kbps	Top Side	5	Off	1013	824.7	22.45	23.00	1.135	0.02	0.185	0.210
18	1	CDMA2000 BC10	RTAP 153.6Kbps	Front	5	Off	476	817.9	22.45	23.00	1.135	-0.01	0.688	**0.781**
	1	CDMA2000 BC10	RTAP 153.6Kbps	Back	5	Off	476	817.9	22.45	23.00	1.135	-0.05	0.649	0.737
	1	CDMA2000 BC10	RTAP 153.6Kbps	Left side	5	Off	476	817.9	22.45	23.00	1.135	0.06	0.164	0.186
	1	CDMA2000 BC10	RTAP 153.6Kbps	Top Side	5	Off	476	817.9	22.45	23.00	1.135	0.01	0.179	0.203
19	1	CDMA2000 BC1	RTAP 153.6Kbps	Front	5	On	600	1880	20.45	20.50	1.012	-0.01	0.924	**0.935**
	1	CDMA2000 BC1	RTAP 153.6Kbps	Front	5	On	25	1851.25	20.35	20.50	1.035	-0.01	0.871	0.902
	1	CDMA2000 BC1	RTAP 153.6Kbps	Front	5	On	1175	1908.75	20.38	20.50	1.028	-0.01	0.906	0.931
	1	CDMA2000 BC1	RTAP 153.6Kbps	Back	5	On	600	1880	20.45	20.50	1.012	0.01	0.921	0.932
	1	CDMA2000 BC1	RTAP 153.6Kbps	Back	5	On	25	1851.25	20.35	20.50	1.035	-0.01	0.886	0.917
	1	CDMA2000 BC1	RTAP 153.6Kbps	Back	5	On	1175	1908.75	20.38	20.50	1.028	-0.01	0.906	0.931
	1	CDMA2000 BC1	RTAP 153.6Kbps	Left Side	5	Off	600	1880	21.65	22.00	1.084	0.02	0.441	0.478
	1	CDMA2000 BC1	RTAP 153.6Kbps	Top Side	5	Off	600	1880	21.65	22.00	1.084	0.09	0.291	0.315

<FDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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)
	2	LTE Band 12	10M	QPSK	1	25	Front	5	Off	23095	707.5	23.17	24.00	1.211	0.03	0.407	0.493
	2	LTE Band 12	10M	QPSK	25	12	Front	5	Off	23095	707.5	22.38	23.00	1.153	0.01	0.304	0.351
20	2	LTE Band 12	10M	QPSK	1	25	Back	5	Off	23095	707.5	23.17	24.00	1.211	0.09	0.514	**0.622**
	2	LTE Band 12	10M	QPSK	25	12	Back	5	Off	23095	707.5	22.38	23.00	1.153	-0.02	0.299	0.345
	2	LTE Band 12	10M	QPSK	1	25	Right Side	5	Off	23095	707.5	23.17	24.00	1.211	0.17	0.292	0.353
	2	LTE Band 12	10M	QPSK	25	12	Right Side	5	Off	23095	707.5	22.38	23.00	1.153	0.03	0.227	0.262
	2	LTE Band 12	10M	QPSK	1	25	Top Side	5	Off	23095	707.5	23.17	24.00	1.211	0.06	0.035	0.043
	2	LTE Band 12	10M	QPSK	25	12	Top Side	5	Off	23095	707.5	22.38	23.00	1.153	-0.05	0.025	0.029
	2	LTE Band 12	10M	QPSK	1	25	Bottom Side	5	Off	23095	707.5	23.17	24.00	1.211	0.03	0.152	0.184
	2	LTE Band 12	10M	QPSK	25	12	Bottom Side	5	Off	23095	707.5	22.38	23.00	1.153	0.02	0.116	0.134
	2	LTE Band 13	10M	QPSK	1	49	Front	5	Off	23230	782	23.53	24.00	1.114	0.01	0.378	0.421
	2	LTE Band 13	10M	QPSK	25	0	Front	5	Off	23230	782	22.32	23.00	1.169	0.01	0.337	0.394
21	2	LTE Band 13	10M	QPSK	1	49	Back	5	Off	23230	782	23.53	24.00	1.114	0.07	0.598	**0.666**
	2	LTE Band 13	10M	QPSK	25	0	Back	5	Off	23230	782	22.32	23.00	1.169	0.08	0.498	0.582
	2	LTE Band 13	10M	QPSK	1	49	Right Side	5	Off	23230	782	23.53	24.00	1.114	0.02	0.168	0.187
	2	LTE Band 13	10M	QPSK	25	0	Right Side	5	Off	23230	782	22.32	23.00	1.169	0.04	0.153	0.179
	2	LTE Band 13	10M	QPSK	1	49	Top Side	5	Off	23230	782	23.53	24.00	1.114	0.05	0.037	0.041
	2	LTE Band 13	10M	QPSK	25	0	Top Side	5	Off	23230	782	22.32	23.00	1.169	-0.04	0.034	0.040
	2	LTE Band 13	10M	QPSK	1	49	Bottom Side	5	Off	23230	782	23.53	24.00	1.114	0.01	0.156	0.174
	2	LTE Band 13	10M	QPSK	25	0	Bottom Side	5	Off	23230	782	22.32	23.00	1.169	0.03	0.125	0.146
22	1	LTE Band 26	15M	QPSK	1	37	Front	5	Off	26865	831.5	23.56	24.00	1.107	-0.15	0.706	**0.781**
	1	LTE Band 26	15M	QPSK	36	0	Front	5	Off	26865	831.5	22.26	23.00	1.186	-0.05	0.552	0.655
	1	LTE Band 26	15M	QPSK	1	37	Back	5	Off	26865	831.5	23.56	24.00	1.107	-0.18	0.565	0.625
	1	LTE Band 26	15M	QPSK	36	0	Back	5	Off	26865	831.5	22.26	23.00	1.186	-0.06	0.512	0.607
	1	LTE Band 26	15M	QPSK	1	37	Left side	5	Off	26865	831.5	23.56	24.00	1.107	-0.05	0.288	0.319
	1	LTE Band 26	15M	QPSK	36	0	Left side	5	Off	26865	831.5	22.26	23.00	1.186	-0.02	0.218	0.258
	1	LTE Band 26	15M	QPSK	1	37	Top Side	5	Off	26865	831.5	23.56	24.00	1.107	0.06	0.183	0.203
	1	LTE Band 26	15M	QPSK	36	0	Top Side	5	Off	26865	831.5	22.26	23.00	1.186	0.01	0.136	0.161

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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	20M	QPSK	1	49	Front	5	On	132572	1770	19.78	20.00	1.052	-0.18	0.805	0.847
	1	LTE Band 66	20M	QPSK	1	49	Front	5	On	132072	1720	19.77	20.00	1.054	0.02	0.703	0.741
	1	LTE Band 66	20M	QPSK	1	49	Front	5	On	132322	1745	19.56	20.00	1.107	0.03	0.929	1.028
	1	LTE Band 66	20M	QPSK	50	0	Front	5	On	132572	1770	19.65	20.00	1.084	-0.05	0.714	0.774
	1	LTE Band 66	20M	QPSK	100	0	Front	5	On	132322	1745	19.64	20.00	1.086	-0.14	1.060	1.152
	1	LTE Band 66	20M	QPSK	1	49	Back	5	On	132572	1770	19.78	20.00	1.052	-0.04	0.811	0.853
	1	LTE Band 66	20M	QPSK	1	49	Back	5	On	132072	1720	19.77	20.00	1.054	-0.06	0.716	0.755
	1	LTE Band 66	20M	QPSK	1	49	Back	5	On	132322	1745	19.56	20.00	1.107	-0.09	0.951	1.052
	1	LTE Band 66	20M	QPSK	50	0	Back	5	On	132572	1770	19.65	20.00	1.084	-0.04	0.797	0.864
	1	LTE Band 66	20M	QPSK	50	0	Back	5	On	132072	1720	19.52	20.00	1.117	0.01	0.841	0.939
	1	LTE Band 66	20M	QPSK	50	0	Back	5	On	132322	1745	19.54	20.00	1.112	-0.11	1.040	1.156
23	1	LTE Band 66	20M	QPSK	100	0	Back	5	On	132322	1745	19.64	20.00	1.086	-0.12	1.100	**1.195**
	1	LTE Band 66	20M	QPSK	1	49	Left Side	5	Off	132572	1770	22.48	23.00	1.127	0.03	0.703	0.792
	1	LTE Band 66	20M	QPSK	50	0	Left Side	5	Off	132572	1770	21.48	22.00	1.127	-0.03	0.574	0.647
	1	LTE Band 66	20M	QPSK	1	49	Top Side	5	Off	132572	1770	22.48	23.00	1.127	-0.02	0.479	0.540
	1	LTE Band 66	20M	QPSK	50	0	Top Side	5	Off	132572	1770	21.48	22.00	1.127	-0.03	0.413	0.466
	1	LTE Band 25	20M	QPSK	1	49	Front	5	On	26340	1880	20.40	20.50	1.023	-0.01	0.888	0.909
	1	LTE Band 25	20M	QPSK	1	49	Front	5	On	26140	1860	20.36	20.50	1.033	-0.04	0.894	0.923
	1	LTE Band 25	20M	QPSK	1	49	Front	5	On	26590	1905	20.18	20.50	1.076	0.02	0.893	0.961
	1	LTE Band 25	20M	QPSK	50	24	Front	5	On	26340	1880	20.33	20.50	1.040	0.02	0.860	0.894
	1	LTE Band 25	20M	QPSK	50	24	Front	5	On	26140	1860	20.26	20.50	1.057	-0.09	0.946	1.000
	1	LTE Band 25	20M	QPSK	50	24	Front	5	On	26590	1905	20.27	20.50	1.054	-0.02	1.040	1.097
24	1	LTE Band 25	20M	QPSK	100	0	Front	5	On	26340	1880	20.29	20.50	1.050	-0.09	1.140	**1.196**
	1	LTE Band 25	20M	QPSK	1	49	Back	5	On	26340	1880	20.40	20.50	1.023	-0.07	0.905	0.926
	1	LTE Band 25	20M	QPSK	1	49	Back	5	On	26140	1860	20.36	20.50	1.033	-0.09	0.870	0.899
	1	LTE Band 25	20M	QPSK	1	49	Back	5	On	26590	1905	20.18	20.50	1.076	-0.06	0.874	0.941
	1	LTE Band 25	20M	QPSK	50	24	Back	5	On	26340	1880	20.33	20.50	1.040	-0.13	0.919	0.956
	1	LTE Band 25	20M	QPSK	50	24	Back	5	On	26140	1860	20.26	20.50	1.057	-0.07	0.882	0.932
	1	LTE Band 25	20M	QPSK	50	24	Back	5	On	26590	1905	20.27	20.50	1.054	0.04	0.878	0.926
	1	LTE Band 25	20M	QPSK	100	0	Back	5	On	26340	1880	20.29	20.50	1.050	0.05	0.948	0.995
	1	LTE Band 25	20M	QPSK	1	49	Left Side	5	Off	26340	1880	22.49	23.00	1.125	-0.11	0.893	1.004
	1	LTE Band 25	20M	QPSK	1	49	Left Side	5	Off	26140	1860	21.72	23.00	1.343	0.02	0.851	1.143
	1	LTE Band 25	20M	QPSK	1	49	Left Side	5	Off	26590	1905	22.03	23.00	1.250	-0.03	0.809	1.011
	1	LTE Band 25	20M	QPSK	50	24	Left Side	5	Off	26340	1880	21.35	22.00	1.161	-0.03	0.707	0.821
	1	LTE Band 25	20M	QPSK	50	24	Left Side	5	Off	26140	1860	20.94	22.00	1.276	-0.05	0.690	0.881
	1	LTE Band 25	20M	QPSK	50	24	Left Side	5	Off	26590	1905	21.11	22.00	1.227	0.13	0.626	0.768
	1	LTE Band 25	20M	QPSK	100	0	Left Side	5	Off	26340	1880	21.27	22.00	1.183	-0.07	0.724	0.857
	1	LTE Band 25	20M	QPSK	1	49	Top Side	5	Off	26340	1880	22.49	23.00	1.125	0.09	0.531	0.597
	1	LTE Band 25	20M	QPSK	50	24	Top Side	5	Off	26340	1880	21.35	22.00	1.161	-0.02	0.427	0.496

<TDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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	LTE Band 41	20M	QPSK	1	49	Front	5	On	40185	2549.5	19.32	20.00	1.169	62.9	1.006	-0.06	0.326	0.384
	1	LTE Band 41	20M	QPSK	50	24	Front	5	On	40185	2549.5	19.31	20.00	1.172	62.9	1.006	-0.11	0.313	0.369
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	40185	2549.5	19.32	20.00	1.169	62.9	1.006	-0.01	0.719	0.846
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	39750	2506	19.28	20.00	1.180	62.9	1.006	0.06	0.777	0.923
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	40620	2593	19.29	20.00	1.178	62.9	1.006	0.02	0.531	0.629
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	41055	2636.5	19.11	20.00	1.227	62.9	1.006	0.05	0.604	0.746
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	41490	2680	19.04	20.00	1.247	62.9	1.006	0.02	0.604	0.758
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	40185	2549.5	19.31	20.00	1.172	62.9	1.006	-0.09	0.756	0.891
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	39750	2506	19.13	20.00	1.222	62.9	1.006	0.02	0.734	0.902
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	40620	2593	19.27	20.00	1.183	62.9	1.006	0.03	0.499	0.594
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	41055	2636.5	19.07	20.00	1.239	62.9	1.006	0.03	0.584	0.728
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	41490	2680	19.02	20.00	1.253	62.9	1.006	0.06	0.558	0.703
	1	LTE Band 41	20M	QPSK	100	0	Back	5	On	40185	2549.5	19.22	20.00	1.197	62.9	1.006	0.02	0.658	0.792
	1	LTE Band 41	20M	QPSK	1	49	Left Side	5	Off	40185	2549.5	22.98	23.00	1.005	62.9	1.006	0.06	0.754	0.762
25	1	LTE Band 41	20M	QPSK	1	49	Left Side	5	Off	39750	2506	22.04	23.00	1.247	62.9	1.006	-0.08	0.757	**0.950**
	1	LTE Band 41	20M	QPSK	1	49	Left Side	5	Off	40620	2593	22.31	23.00	1.172	62.9	1.006	0.02	0.641	0.756
	1	LTE Band 41	20M	QPSK	1	49	Left Side	5	Off	41055	2636.5	22.63	23.00	1.089	62.9	1.006	0.07	0.554	0.607
	1	LTE Band 41	20M	QPSK	1	49	Left Side	5	Off	41490	2680	22.16	23.00	1.213	62.9	1.006	0.03	0.516	0.630
	1	LTE Band 41	20M	QPSK	50	24	Left Side	5	Off	40185	2549.5	21.71	22.00	1.069	62.9	1.006	-0.03	0.594	0.639
	1	LTE Band 41	20M	QPSK	50	24	Left Side	5	Off	39750	2506	21.06	22.00	1.242	62.9	1.006	0.05	0.722	0.902
	1	LTE Band 41	20M	QPSK	50	24	Left Side	5	Off	40620	2593	21.67	22.00	1.079	62.9	1.006	0.09	0.442	0.480
	1	LTE Band 41	20M	QPSK	50	24	Left Side	5	Off	41055	2636.5	21.49	22.00	1.125	62.9	1.006	0.06	0.473	0.535
	1	LTE Band 41	20M	QPSK	50	24	Left Side	5	Off	41490	2680	21.15	22.00	1.216	62.9	1.006	-0.04	0.376	0.460
	1	LTE Band 41	20M	QPSK	100	0	Left Side	5	Off	40185	2549.5	21.67	22.00	1.079	62.9	1.006	0.02	0.638	0.692
	1	LTE Band 41	20M	QPSK	1	49	Top Side	5	Off	40185	2549.5	22.98	23.00	1.005	62.9	1.006	0.03	0.240	0.243
	1	LTE Band 41	20M	QPSK	50	24	Top Side	5	Off	40185	2549.5	21.71	22.00	1.069	62.9	1.006	-0.05	0.192	0.206

<WLAN2.4G SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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)
26	WLAN2.4GHz	802.11b 1Mbps	Back	5	Off	6	2437	15.78	16.00	1.052	97.59	1.025	-0.09	0.275	**0.297**

16.3 Body Worn Accessory SAR

<WCDMA SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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	WCDMA Band V	RMC 12.2Kbps	Front	5	Off	4182	836.4	22.42	22.50	1.019	-0.05	0.502	0.511
14	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Off	4182	836.4	22.42	22.50	1.019	-0.05	0.505	**0.514**
	1	WCDMA Band IV	RMC 12.2Kbps	Front	5	On	1513	1752.6	19.67	20.00	1.079	0.01	0.962	1.038
	1	WCDMA Band IV	RMC 12.2Kbps	Front	5	On	1312	1712.4	19.44	20.00	1.138	0.01	0.752	0.855
15	1	WCDMA Band IV	RMC 12.2Kbps	Front	5	On	1413	1732.6	19.65	20.00	1.084	0.01	1.100	**1.192**
	1	WCDMA Band IV	RMC 12.2Kbps	Back	5	On	1513	1752.6	19.67	20.00	1.079	0.03	0.965	1.041
	1	WCDMA Band IV	RMC 12.2Kbps	Back	5	On	1312	1712.4	19.44	20.00	1.138	0.03	0.731	0.832
	1	WCDMA Band IV	RMC 12.2Kbps	Back	5	On	1413	1732.6	19.65	20.00	1.084	0.03	1.000	1.084
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	On	9400	1880	20.22	20.50	1.067	-0.07	0.982	1.047
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	On	9262	1852.4	20.10	20.50	1.096	0.07	1.020	1.118
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	On	9538	1907.6	20.09	20.50	1.099	-0.02	0.894	0.983
	1	WCDMA Band II	RMC 12.2Kbps	Back	5	On	9400	1880	20.22	20.50	1.067	0.02	1.070	1.141
	1	WCDMA Band II	RMC 12.2Kbps	Back	5	On	9262	1852.4	20.10	20.50	1.096	0.01	1.090	1.195
16	1	WCDMA Band II	RMC 12.2Kbps	Back	5	On	9538	1907.6	20.09	20.50	1.099	-0.01	1.090	**1.198**

<CDMA2000 SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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)
27	1	CDMA2000 BC0	RC3 SO32 (F+SCH)	Front	5	Off	1013	824.7	22.57	23.00	1.104	-0.05	0.682	**0.753**
	1	CDMA2000 BC0	RC3 SO32 (F+SCH)	Back	5	Off	1013	824.7	22.57	23.00	1.104	0.03	0.579	0.639
	1	CDMA2000 BC10	RC3 SO32 (F+SCH)	Front	5	Off	684	823.1	22.4	23.00	1.148	-0.18	0.658	0.755
28	1	CDMA2000 BC10	RC3 SO32 (F+SCH)	Back	5	Off	684	823.1	22.4	23.00	1.148	0.01	0.674	**0.774**
	1	CDMA2000 BC1	RC3 SO32 (F+SCH)	Front	5	On	600	1880	20.38	20.50	1.028	-0.09	1.020	1.049
	1	CDMA2000 BC1	RC3 SO32 (F+SCH)	Front	5	On	25	1851.25	20.31	20.50	1.045	-0.09	1.040	1.087
	1	CDMA2000 BC1	RC3 SO32 (F+SCH)	Front	5	On	1175	1908.75	20.25	20.50	1.059	-0.09	0.951	1.007
29	1	CDMA2000 BC1	RC3 SO32 (F+SCH)	Back	5	On	600	1880	20.38	20.50	1.028	-0.09	1.060	**1.090**
	1	CDMA2000 BC1	RC3 SO32 (F+SCH)	Back	5	On	25	1851.25	20.31	20.50	1.045	0.01	0.930	0.972
	1	CDMA2000 BC1	RC3 SO32 (F+SCH)	Back	5	On	1175	1908.75	20.25	20.50	1.059	-0.09	0.928	0.983

<FDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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)
	2	LTE Band 12	10M	QPSK	1	25	Front	5	Off	23095	707.5	23.17	24.00	1.211	0.03	0.407	0.493
	2	LTE Band 12	10M	QPSK	25	12	Front	5	Off	23095	707.5	22.38	23.00	1.153	0.01	0.304	0.351
20	2	LTE Band 12	10M	QPSK	1	25	Back	5	Off	23095	707.5	23.17	24.00	1.211	0.09	0.514	**0.622**
	2	LTE Band 12	10M	QPSK	25	12	Back	5	Off	23095	707.5	22.38	23.00	1.153	-0.02	0.299	0.345
	2	LTE Band 13	10M	QPSK	1	49	Front	5	Off	23230	782	23.53	24.00	1.114	0.01	0.378	0.421
	2	LTE Band 13	10M	QPSK	25	0	Front	5	Off	23230	782	22.32	23.00	1.169	0.01	0.337	0.394
21	2	LTE Band 13	10M	QPSK	1	49	Back	5	Off	23230	782	23.53	24.00	1.114	0.07	0.598	**0.666**
	2	LTE Band 13	10M	QPSK	25	0	Back	5	Off	23230	782	22.32	23.00	1.169	0.08	0.498	0.582
22	1	LTE Band 26	15M	QPSK	1	37	Front	5	Off	26865	831.5	23.56	24.00	1.107	-0.15	0.706	**0.781**
	1	LTE Band 26	15M	QPSK	36	0	Front	5	Off	26865	831.5	22.26	23.00	1.186	-0.05	0.552	0.655
	1	LTE Band 26	15M	QPSK	1	37	Back	5	Off	26865	831.5	23.56	24.00	1.107	-0.18	0.565	0.625
	1	LTE Band 26	15M	QPSK	36	0	Back	5	Off	26865	831.5	22.26	23.00	1.186	-0.06	0.512	0.607

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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	20M	QPSK	1	49	Front	5	On	132572	1770	19.78	20.00	1.052	-0.18	0.805	0.847
	1	LTE Band 66	20M	QPSK	1	49	Front	5	On	132072	1720	19.77	20.00	1.054	0.02	0.703	0.741
	1	LTE Band 66	20M	QPSK	1	49	Front	5	On	132322	1745	19.56	20.00	1.107	0.03	0.929	1.028
	1	LTE Band 66	20M	QPSK	50	0	Front	5	On	132572	1770	19.65	20.00	1.084	-0.05	0.714	0.774
	1	LTE Band 66	20M	QPSK	100	0	Front	5	On	132322	1745	19.64	20.00	1.086	-0.14	1.060	1.152
	1	LTE Band 66	20M	QPSK	1	49	Back	5	On	132572	1770	19.78	20.00	1.052	-0.04	0.811	0.853
	1	LTE Band 66	20M	QPSK	1	49	Back	5	On	132072	1720	19.77	20.00	1.054	-0.06	0.716	0.755
	1	LTE Band 66	20M	QPSK	1	49	Back	5	On	132322	1745	19.56	20.00	1.107	-0.09	0.951	1.052
	1	LTE Band 66	20M	QPSK	50	0	Back	5	On	132572	1770	19.65	20.00	1.084	-0.04	0.797	0.864
	1	LTE Band 66	20M	QPSK	50	0	Back	5	On	132072	1720	19.52	20.00	1.117	0.01	0.841	0.939
	1	LTE Band 66	20M	QPSK	50	0	Back	5	On	132322	1745	19.54	20.00	1.112	-0.11	1.040	1.156
23	1	LTE Band 66	20M	QPSK	100	0	Back	5	On	132322	1745	19.64	20.00	1.086	-0.12	1.100	**1.195**
	1	LTE Band 25	20M	QPSK	1	49	Front	5	On	26340	1880	20.40	20.50	1.023	-0.01	0.888	0.909
	1	LTE Band 25	20M	QPSK	1	49	Front	5	On	26140	1860	20.36	20.50	1.033	-0.04	0.894	0.923
	1	LTE Band 25	20M	QPSK	1	49	Front	5	On	26590	1905	20.18	20.50	1.076	0.02	0.893	0.961
	1	LTE Band 25	20M	QPSK	50	24	Front	5	On	26340	1880	20.33	20.50	1.040	0.02	0.860	0.894
	1	LTE Band 25	20M	QPSK	50	24	Front	5	On	26140	1860	20.26	20.50	1.057	-0.09	0.946	1.000
	1	LTE Band 25	20M	QPSK	50	24	Front	5	On	26590	1905	20.27	20.50	1.054	-0.02	1.040	1.097
24	1	LTE Band 25	20M	QPSK	100	0	Front	5	On	26340	1880	20.29	20.50	1.050	-0.09	1.140	**1.196**
	1	LTE Band 25	20M	QPSK	1	49	Back	5	On	26340	1880	20.40	20.50	1.023	-0.07	0.905	0.926
	1	LTE Band 25	20M	QPSK	1	49	Back	5	On	26140	1860	20.36	20.50	1.033	-0.09	0.870	0.899
	1	LTE Band 25	20M	QPSK	1	49	Back	5	On	26590	1905	20.18	20.50	1.076	-0.06	0.874	0.941
	1	LTE Band 25	20M	QPSK	50	24	Back	5	On	26340	1880	20.40	20.50	1.023	-0.13	0.919	0.940
	1	LTE Band 25	20M	QPSK	50	24	Back	5	On	26140	1860	20.36	20.50	1.033	-0.07	0.882	0.911
	1	LTE Band 25	20M	QPSK	50	24	Back	5	On	26590	1905	20.18	20.50	1.076	0.04	0.878	0.945
	1	LTE Band 25	20M	QPSK	100	0	Back	5	On	26340	1880	20.29	20.50	1.050	0.05	0.948	0.995

<TDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Reduction	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	LTE Band 41	20M	QPSK	1	49	Front	5	On	40185	2549.5	19.32	20.00	1.169	62.9	1.006	-0.06	0.326	0.384
	1	LTE Band 41	20M	QPSK	50	24	Front	5	On	40185	2549.5	19.31	20.00	1.172	62.9	1.006	-0.11	0.313	0.369
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	40185	2549.5	19.32	20.00	1.169	62.9	1.006	-0.01	0.719	0.846
30	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	39750	2506	19.28	20.00	1.180	62.9	1.006	0.06	0.777	**0.923**
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	40620	2593	19.29	20.00	1.178	62.9	1.006	0.02	0.531	0.629
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	41055	2636.5	19.11	20.00	1.227	62.9	1.006	0.05	0.604	0.746
	1	LTE Band 41	20M	QPSK	1	49	Back	5	On	41490	2680	19.04	20.00	1.247	62.9	1.006	0.02	0.604	0.758
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	40185	2549.5	19.31	20.00	1.172	62.9	1.006	-0.09	0.756	0.891
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	39750	2506	19.13	20.00	1.222	62.9	1.006	0.02	0.734	0.902
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	40620	2593	19.27	20.00	1.183	62.9	1.006	0.03	0.499	0.594
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	41055	2636.5	19.07	20.00	1.239	62.9	1.006	0.03	0.584	0.728
	1	LTE Band 41	20M	QPSK	50	24	Back	5	On	41490	2680	19.02	20.00	1.253	62.9	1.006	0.06	0.558	0.703
	1	LTE Band 41	20M	QPSK	100	0	Back	5	On	40185	2549.5	19.22	20.00	1.197	62.9	1.006	0.02	0.658	0.792

<WLAN2.4G SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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)
26	WLAN2.4GHz	802.11b 1Mbps	Back	5	Off	6	2437	15.78	16.00	1.052	97.59	1.025	-0.09	0.275	**0.297**

16.4 Repeated SAR Measurement

No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Power Reduction	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)	Ratio	Reported 1g SAR (W/kg)
1st	1	WCDMA Band IV	-	-	-	-	RMC 12.2Kbps	Front	5	On	1413	1732.6	19.65	20.00	1.084	-	-	0.01	1.100	1	1.192
2nd	1	WCDMA Band IV	-	-	-	-	RMC 12.2Kbps	Front	5	On	1413	1732.6	19.65	20.00	1.084	-	-	0.03	1.060	1.038	1.149
1st	1	LTE Band 25	20M	QPSK	100	0	-	Front	5	On	26340	1880	20.29	20.50	1.050	-	-	-0.09	1.140	1	1.196
2nd	1	LTE Band 25	20M	QPSK	100	0	-	Front	5	On	26340	1880	20.29	20.50	1.050	-	-	0.02	1.090	1.046	1.144

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.

17. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Face	Hotspot	Body-worn
1.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes
2.	WCDMA + Bluetooth	Yes	Yes	Yes
3.	CDMA + WLAN2.4GHz	Yes	Yes	Yes
4.	CDMA + Bluetooth	Yes	Yes	Yes
5.	LTE + WLAN2.4GHz	Yes	Yes	Yes
6.	LTE + Bluetooth	Yes	Yes	Yes

General Note:

1. EUT will choose each CDMA, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. The reported SAR summation is calculated based on the same configuration and test position.
4. 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.
5. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
   i) (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm; where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
   ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
   iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distances* is > 50 mm.

Bluetooth Max Power (dBm)	Exposure Position	In front of Face	Hotspot/Body-worn
	Test separation	10 mm	5 mm
9.00	Estimated SAR (W/kg)	0.167	0.333

17.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	Bluetooth		
			1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)		
WCDMA	Band V	In front of Face	0.276	0.101	0.167	0.38	0.44
	Band IV	In front of Face	0.830	0.101	0.167	0.93	1.00
	Band II	In front of Face	0.543	0.101	0.167	0.64	0.71
CDMA2000	BC0	In front of Face	0.543	0.101	0.167	0.64	0.71
	BC10	In front of Face	0.518	0.101	0.167	0.62	0.69
	BC1	In front of Face	0.543	0.101	0.167	0.64	0.71
LTE	Band 12	In front of Face	0.219	0.101	0.167	0.32	0.39
	Band 13	In front of Face	0.244	0.101	0.167	0.35	0.41
	Band 26	In front of Face	0.471	0.101	0.167	0.57	0.64
	Band 66	In front of Face	1.172	0.101	0.167	1.27	1.34
	Band 25	In front of Face	0.788	0.101	0.167	0.89	0.96
	Band 41	In front of Face	0.244	0.101	0.167	0.35	0.41

17.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	Bluetooth		
			1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)		
WCDMA	Band V	Front	0.511	0.297	0.333	0.81	0.84
		Back	0.514	0.297	0.333	0.81	0.85
		Left side	0.220	0.297	0.333	0.52	0.55
		Right side		0.297	0.333	0.30	0.33
		Top side	<0.001			<0.01	<0.01
		Bottom side		0.297	0.333	0.30	0.33
	Band IV	Front	1.192	0.297	0.333	1.49	1.53
		Back	1.084	0.297	0.333	1.38	1.42
		Left side	0.478	0.297	0.333	0.78	0.81
		Right side		0.297	0.333	0.30	0.33
		Top side	0.549			0.55	0.55
		Bottom side		0.297	0.333	0.30	0.33
	Band II	Front	1.118	0.297	0.333	1.42	1.45
		Back	1.198	0.297	0.333	**1.50**	1.53
		Left side	0.601	0.297	0.333	0.90	0.93
		Right side		0.297	0.333	0.30	0.33
		Top side	0.350			0.35	0.35
		Bottom side		0.297	0.333	0.30	0.33
CDMA2000	BC0	Front	0.755	0.297	0.333	1.05	1.09
		Back	0.740	0.297	0.333	1.04	1.07
		Left side	0.212	0.297	0.333	0.51	0.55
		Right side		0.297	0.333	0.30	0.33
		Top side	0.210			0.21	0.21
		Bottom side		0.297	0.333	0.30	0.33
	BC10	Front	0.781	0.297	0.333	1.08	1.11
		Back	0.737	0.297	0.333	1.03	1.07
		Left side	0.186	0.297	0.333	0.48	0.52
		Right side		0.297	0.333	0.30	0.33
		Top side	0.203			0.20	0.20
		Bottom side		0.297	0.333	0.30	0.33
	BC1	Front	0.935	0.297	0.333	1.23	1.27
		Back	0.932	0.297	0.333	1.23	1.27
		Left side	0.478	0.297	0.333	0.78	0.81
		Right side		0.297	0.333	0.30	0.33
		Top side	0.315			0.32	0.32
		Bottom side		0.297	0.333	0.30	0.33

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 Bluetooth Estimated 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
LTE	Band 12	Front	0.493	0.297	0.333	0.79	0.83
		Back	0.622	0.297	0.333	0.92	0.96
		Left side		0.297	0.333	0.30	0.33
		Right side	0.353	0.297	0.333	0.65	0.69
		Top side	0.043			0.04	0.04
		Bottom side	0.184	0.297	0.333	0.48	0.52
	Band 13	Front	0.421	0.297	0.333	0.72	0.75
		Back	0.666	0.297	0.333	0.96	1.00
		Left side		0.297	0.333	0.30	0.33
		Right side	0.187	0.297	0.333	0.48	0.52
		Top side	0.041			0.04	0.04
		Bottom side	0.174	0.297	0.333	0.47	0.51
	Band 26	Front	0.781	0.297	0.333	1.08	1.11
		Back	0.625	0.297	0.333	0.92	0.96
		Left side	0.319	0.297	0.333	0.62	0.65
		Right side		0.297	0.333	0.30	0.33
		Top side	0.203			0.20	0.20
		Bottom side		0.297	0.333	0.30	0.33
	Band 66	Front	1.152	0.297	0.333	1.45	1.49
		Back	1.195	0.297	0.333	1.49	1.53
		Left side	0.792	0.297	0.333	1.09	1.13
		Right side		0.297	0.333	0.30	0.33
		Top side	0.540			0.54	0.54
		Bottom side		0.297	0.333	0.30	0.33
	Band 25	Front	1.196	0.297	0.333	1.49	1.53
		Back	0.995	0.297	0.333	1.29	1.33
		Left side	1.143	0.297	0.333	1.44	1.48
		Right side		0.297	0.333	0.30	0.33
		Top side	0.597			0.60	0.60
		Bottom side		0.297	0.333	0.30	0.33
	Band 41	Front	0.384	0.297	0.333	0.68	0.72
		Back	0.923	0.297	0.333	1.22	1.26
		Left side	0.950	0.297	0.333	1.25	1.28
		Right side		0.297	0.333	0.30	0.33
		Top side	0.243			0.24	0.24
		Bottom side		0.297	0.333	0.30	0.33

17.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 Bluetooth Estimated 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
WCDMA	Band V	Front	0.511	0.297	0.333	0.81	0.84
		Back	0.514	0.297	0.333	0.81	0.85
	Band IV	Front	1.192	0.297	0.333	1.49	1.53
		Back	1.084	0.297	0.333	1.38	1.42
	Band II	Front	1.118	0.297	0.333	1.42	1.45
		Back	1.198	0.297	0.333	1.50	1.53
CDMA2000	BC0	Front	0.753	0.297	0.333	1.05	1.09
		Back	0.639	0.297	0.333	0.94	0.97
	BC10	Front	0.755	0.297	0.333	1.05	1.09
		Back	0.774	0.297	0.333	1.07	1.11
	BC1	Front	1.087	0.297	0.333	1.38	1.42
		Back	1.090	0.297	0.333	1.39	1.42
LTE	Band 12	Front	0.493	0.297	0.333	0.79	0.83
		Back	0.622	0.297	0.333	0.92	0.96
	Band 13	Front	0.421	0.297	0.333	0.72	0.75
		Back	0.666	0.297	0.333	0.96	1.00
	Band 26	Front	0.781	0.297	0.333	1.08	1.11
		Back	0.625	0.297	0.333	0.92	0.96
	Band 66	Front	1.152	0.297	0.333	1.45	1.49
		Back	1.195	0.297	0.333	1.49	1.53
	Band 25	Front	1.196	0.297	0.333	1.49	1.53
		Back	0.995	0.297	0.333	1.29	1.33
	Band 41	Front	0.384	0.297	0.333	0.68	0.72
		Back	0.923	0.297	0.333	1.22	1.26

Test Engineer： Nick Hu

18. Uncertainty Assessment

Per 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.

19. 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 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

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

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

[12] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", 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: 2019.1.12

System Check_Head_750MHz

DUT: D750V3 - SN:1087

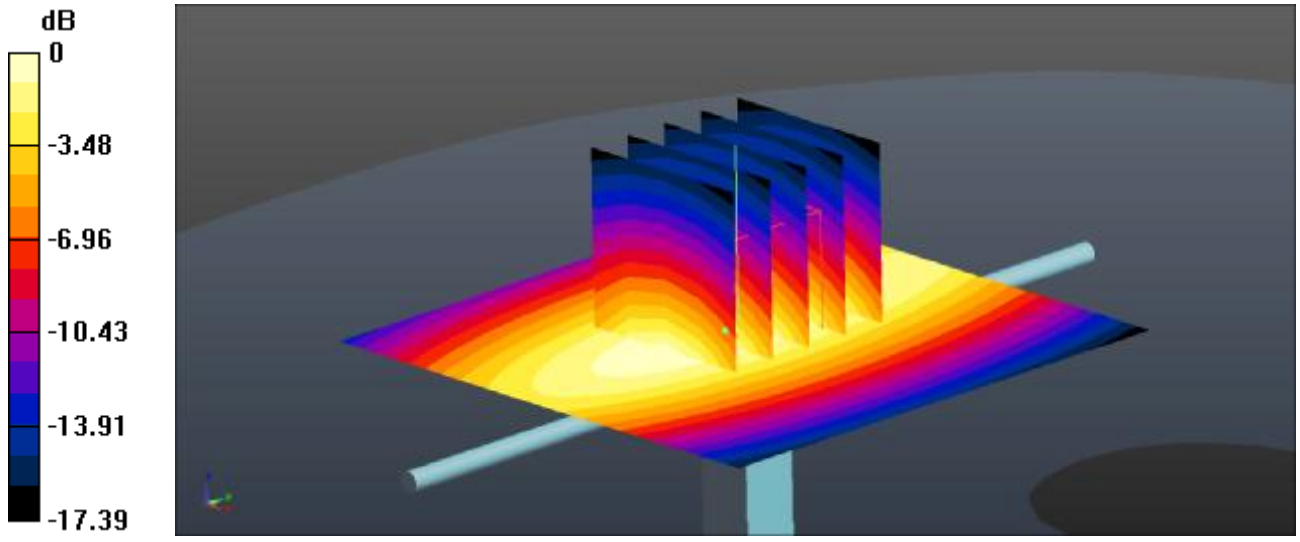
Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium: HSL_750 Medium parameters used: f = 750 MHz; σ = 0.903 S/m; ε_r = 42.105; ρ = 1000 kg/m^3

Ambient Temperature：23.2 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.27, 9.27, 9.27); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.42 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 46.15 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 2.93 W/kg
SAR(1 g) = 1.91 W/kg; SAR(10 g) = 1.35 W/kg
Maximum value of SAR (measured) = 2.44 W/kg



0 dB = 2.42 W/kg = 3.84 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.16

System Check_Head_835MHz

DUT: D835V2 - SN:4d151

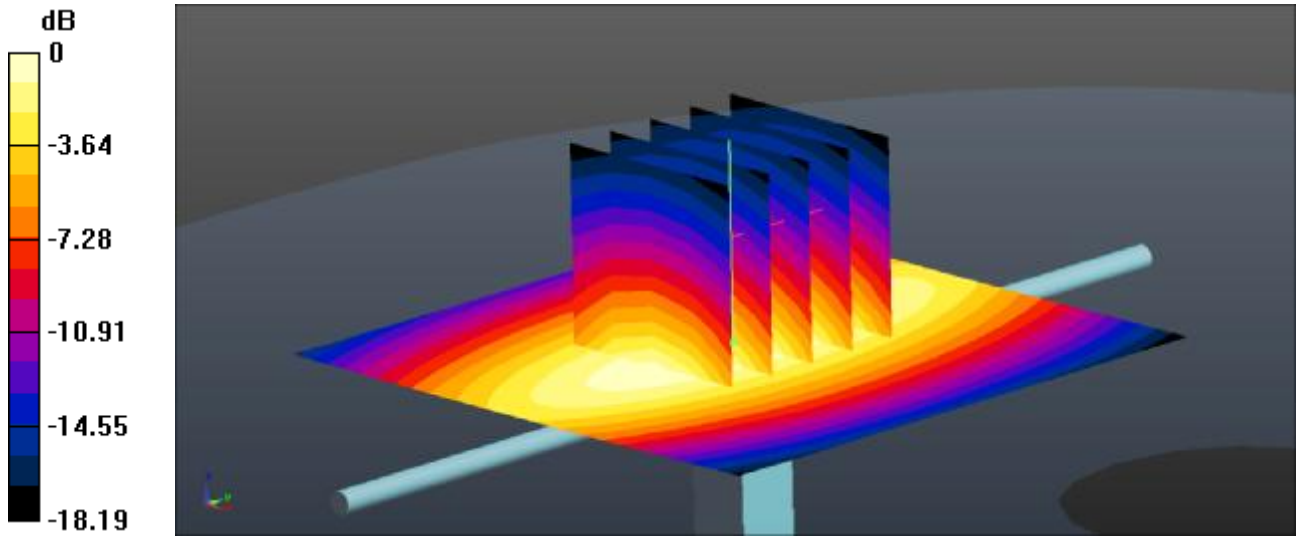
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: f = 835 MHz; σ = 0.915 S/m; ε_r = 41.269; ρ = 1000 kg/m^3

Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.01, 9.01, 9.01); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.89 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.93 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 2.95 W/kg
SAR(1 g) = 2.29 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 2.70 W/kg



0 dB = 2.70 W/kg = 4.13 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.13

System Check_Head_1750MHz

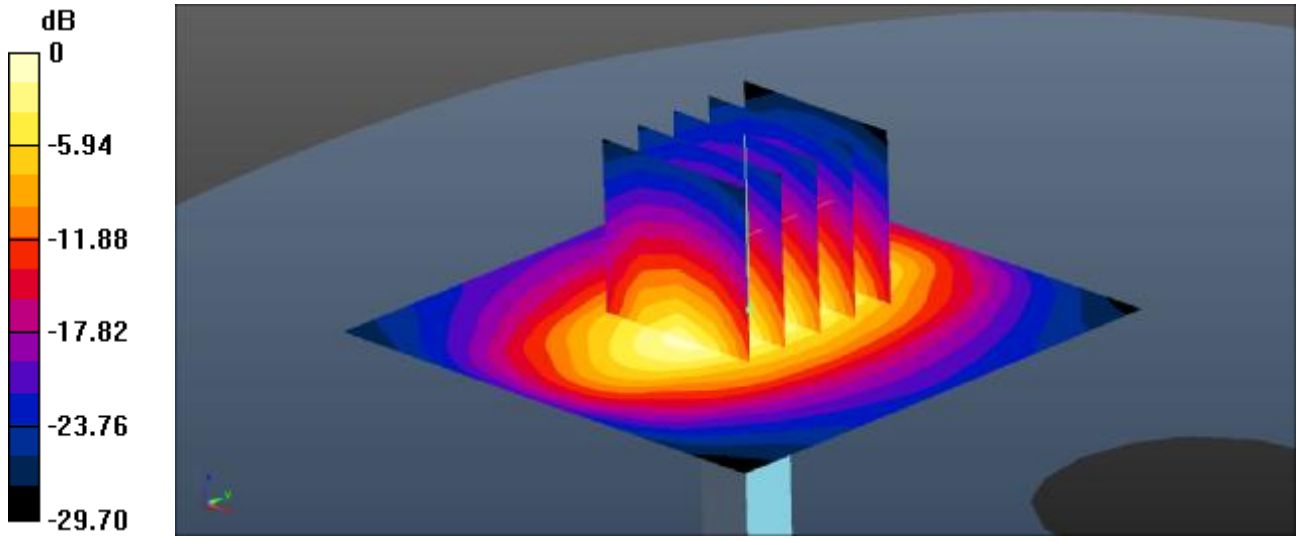
DUT: D1750V2 - SN:1090

Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used: f = 1750 MHz; σ = 1.383 S/m; ε_r = 41.078; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.79, 7.79, 7.79); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

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 = 84.1 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 8.82 W/kg; SAR(10 g) = 5.03 W/kg
Maximum value of SAR (measured) = 12.1 W/kg



0 dB = 12.1 W/kg = 10.83 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.13

System Check_Head_1900MHz

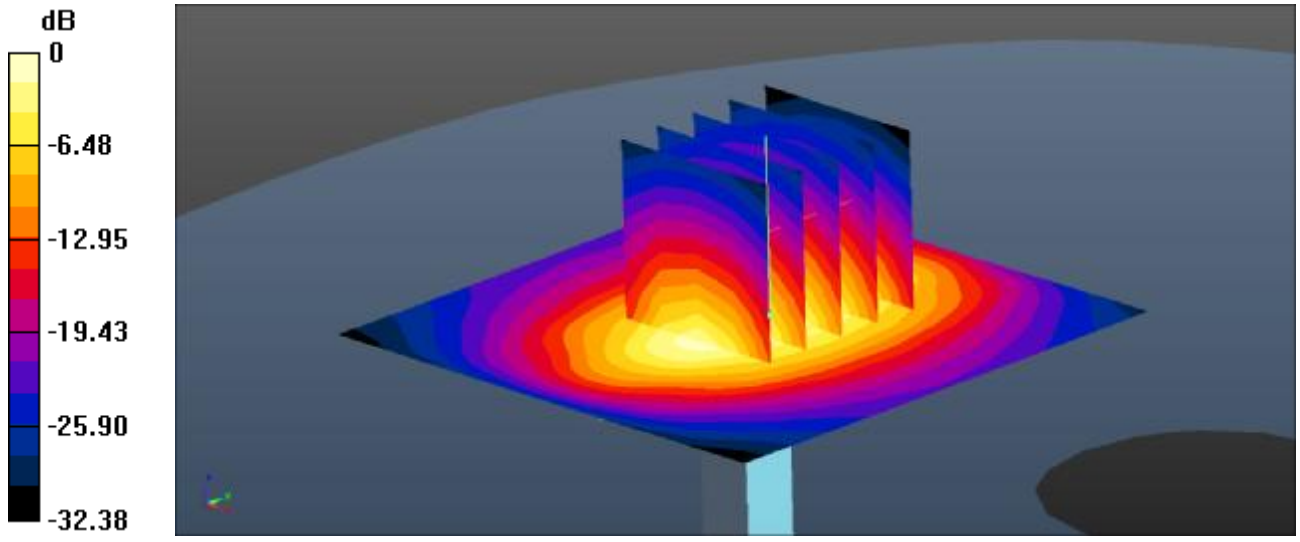
DUT: D1900V2 - SN:5d170

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: f = 1900 MHz; σ = 1.373 S/m; ε_r = 39.73; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.4, 7.4, 7.4); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.2 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 90.7 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.0 W/kg
SAR(1 g) = 9.65 W/kg; SAR(10 g) = 5.14 W/kg
Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg = 10.97 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.9

System Check_Head_2450MHz

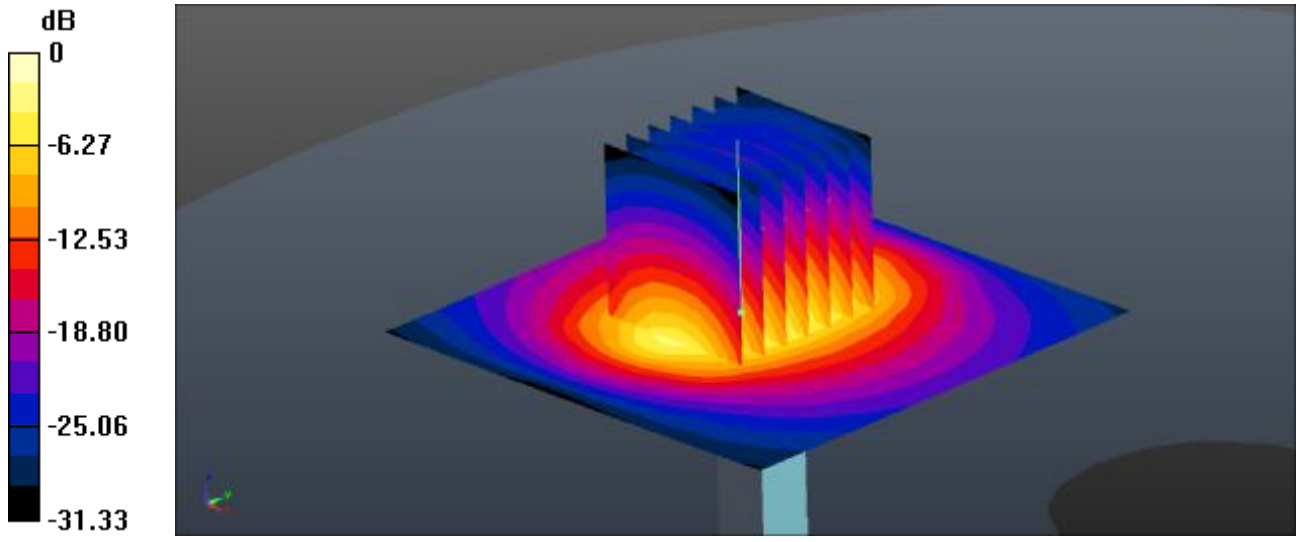
DUT: D2450V2 - SN:908

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: f = 2450 MHz; σ = 1.841 S/m; ε_r = 38.237; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.08, 7.08, 7.08); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.7 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.9 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 24.3 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 5.79 W/kg
Maximum value of SAR (measured) = 20.6 W/kg



0 dB = 20.6 W/kg = 13.14 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.9

System Check_Head_2600MHz

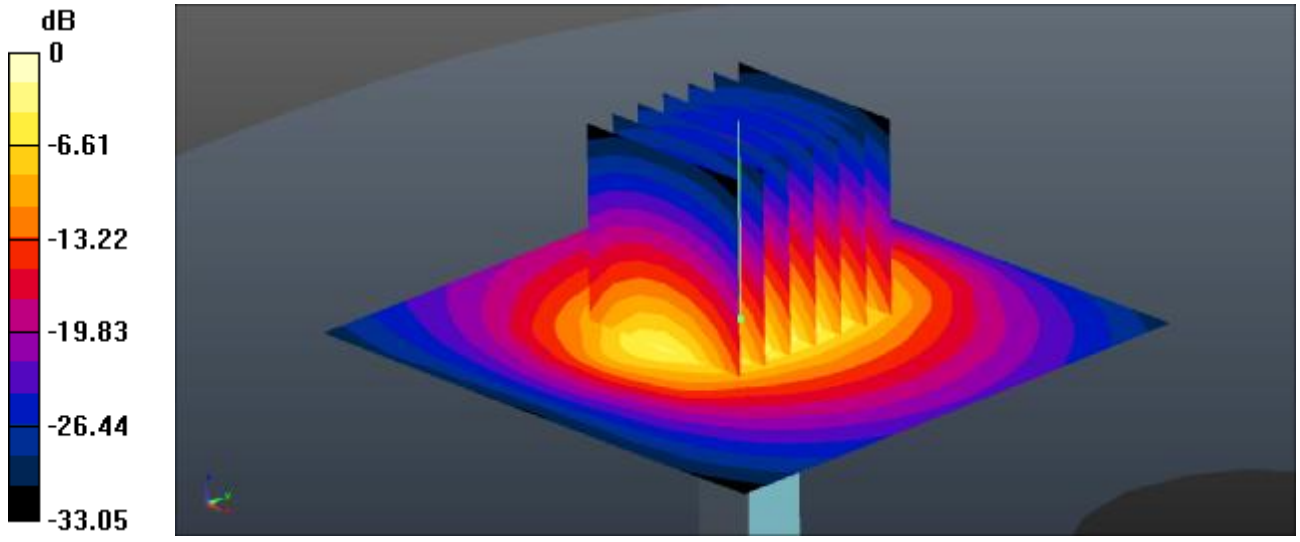
DUT: D2600V2 - SN:1061

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: HSL_2600 Medium parameters used: f = 2600 MHz; σ = 2.012 S/m; ε_r = 37.658; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(6.86, 6.86, 6.86); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 23.1 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.4 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 31.5 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.23 W/kg
Maximum value of SAR (measured) = 22.6 W/kg



0 dB = 22.6 W/kg = 13.54 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

System Check_Body_750MHz

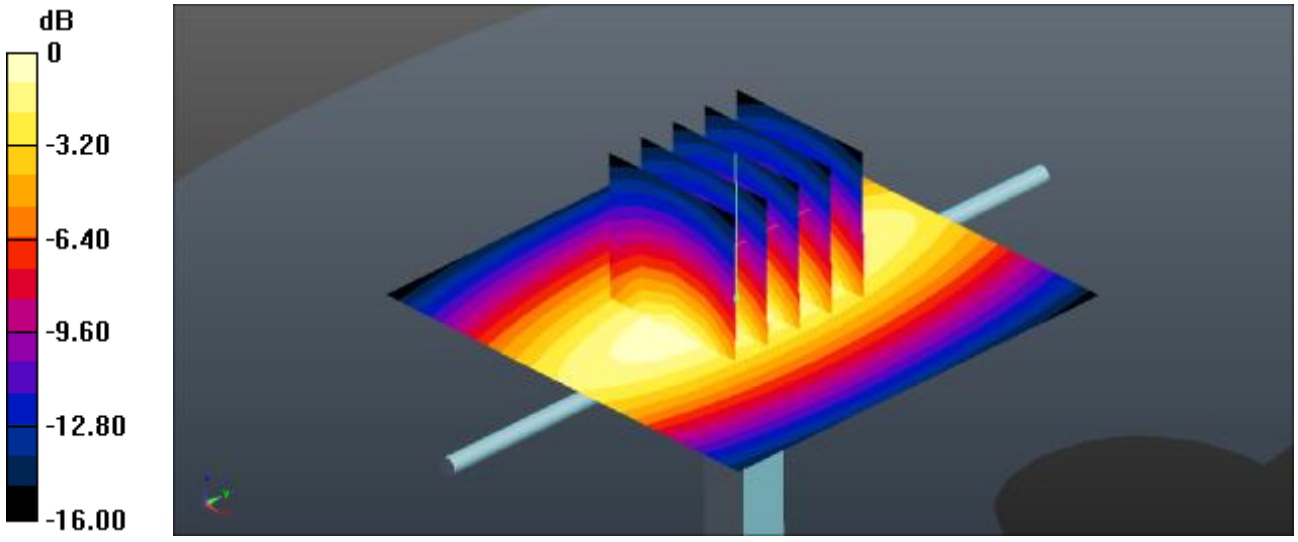
DUT: D750V3 - SN:1087

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL_750 Medium parameters used: f = 750 MHz; σ = 0.967 S/m; ε_r = 55.686; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.7, 9.7, 9.7); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.31 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.24 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 3.82 W/kg
SAR(1 g) = 2.21 W/kg; SAR(10 g) = 1.45 W/kg
Maximum value of SAR (measured) = 3.28 W/kg



0 dB = 3.31 W/kg = 5.20 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

System Check_Body_835MHz

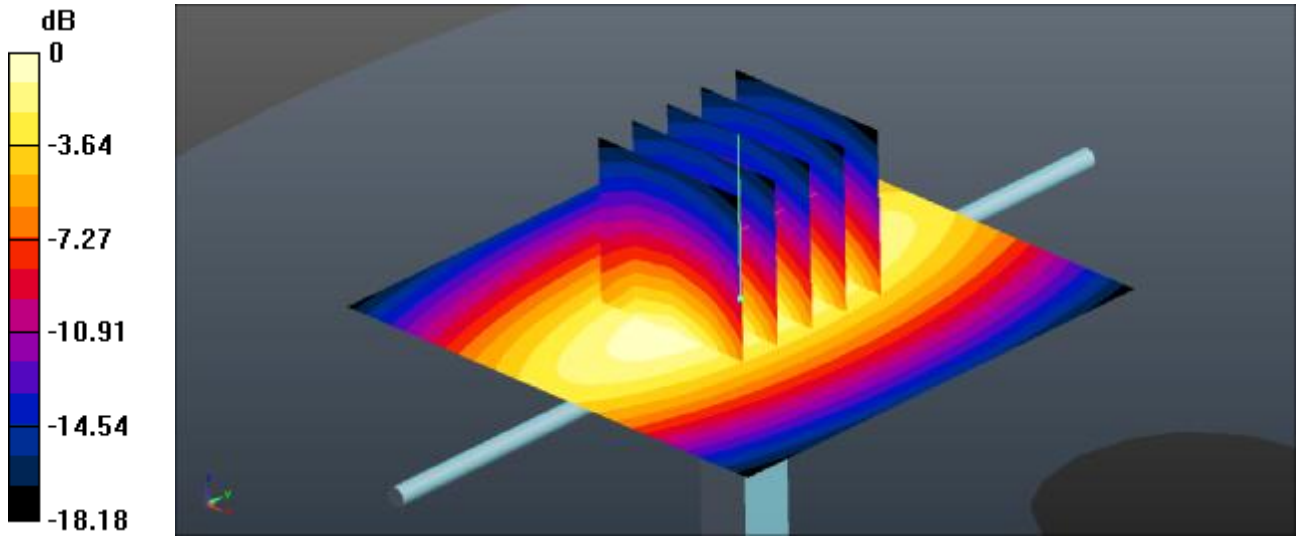
DUT: D835V2 - SN:4d151

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: f = 835 MHz; σ = 0.977 S/m; ε_r = 55.111; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.49, 9.49, 9.49); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.91 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.29 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 2.29 W/kg; SAR(10 g) = 1.51 W/kg
Maximum value of SAR (measured) = 2.91 W/kg



0 dB = 2.91 W/kg = 4.64 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.30

System Check_Body_1750MHz

DUT: D1750V2 - SN:1090

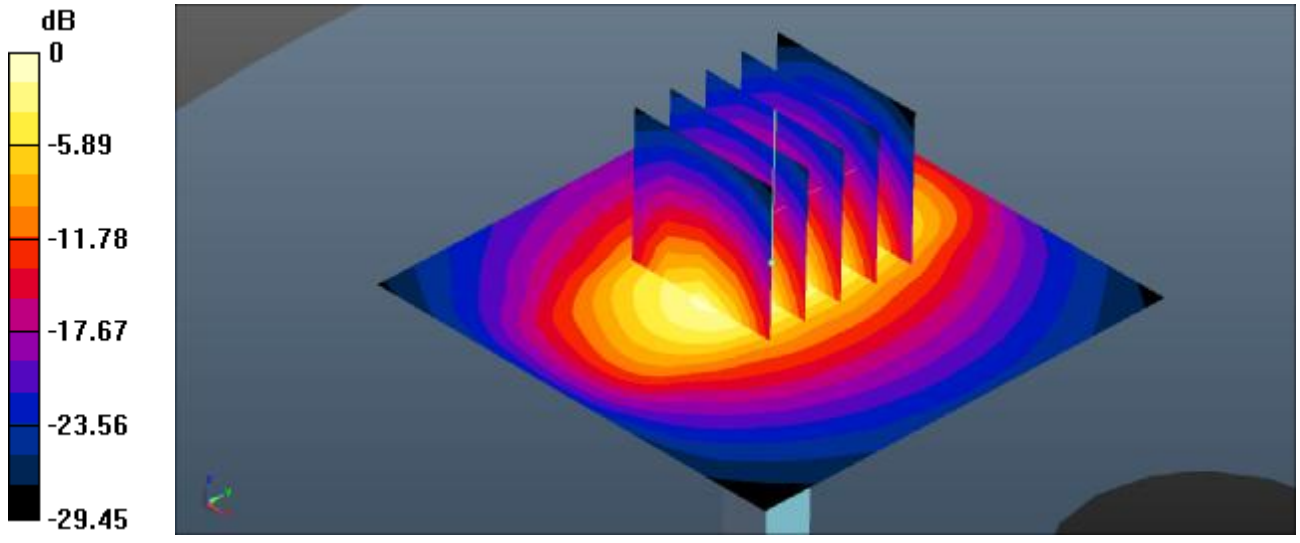
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1750 Medium parameters used: f = 1750 MHz; σ = 1.46 S/m; ε_r = 53.9; ρ = 1000 kg/m^3

Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.15, 8.15, 8.15); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.3 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.43 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 16.2 W/kg
SAR(1 g) = 8.95 W/kg; SAR(10 g) = 4.74 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.3 W/kg = 11.24 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.30

System Check_Body_1900MHz

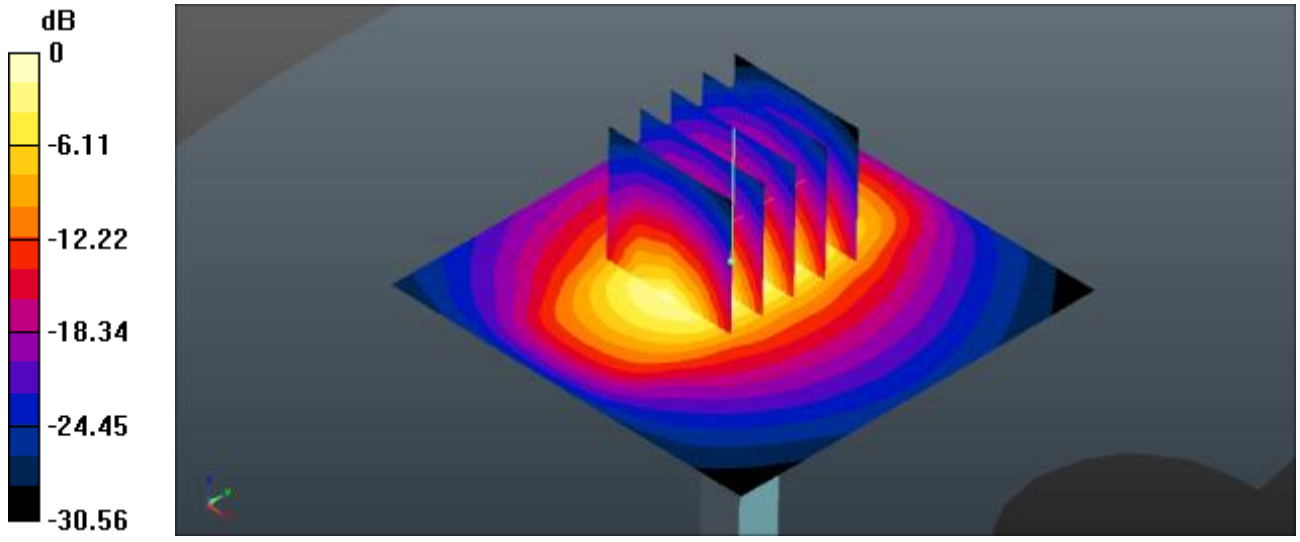
DUT: D1900V2 - SN:5d170

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: f = 1900 MHz; σ = 1.556 S/m; ε_r = 53.612; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.82, 7.82, 7.82); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 15.2 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 80.23 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 10 W/kg; SAR(10 g) = 5.17 W/kg
Maximum value of SAR (measured) = 15.7 W/kg



0 dB = 15.2 W/kg = 11.82 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.8

System Check_Body_2450MHz

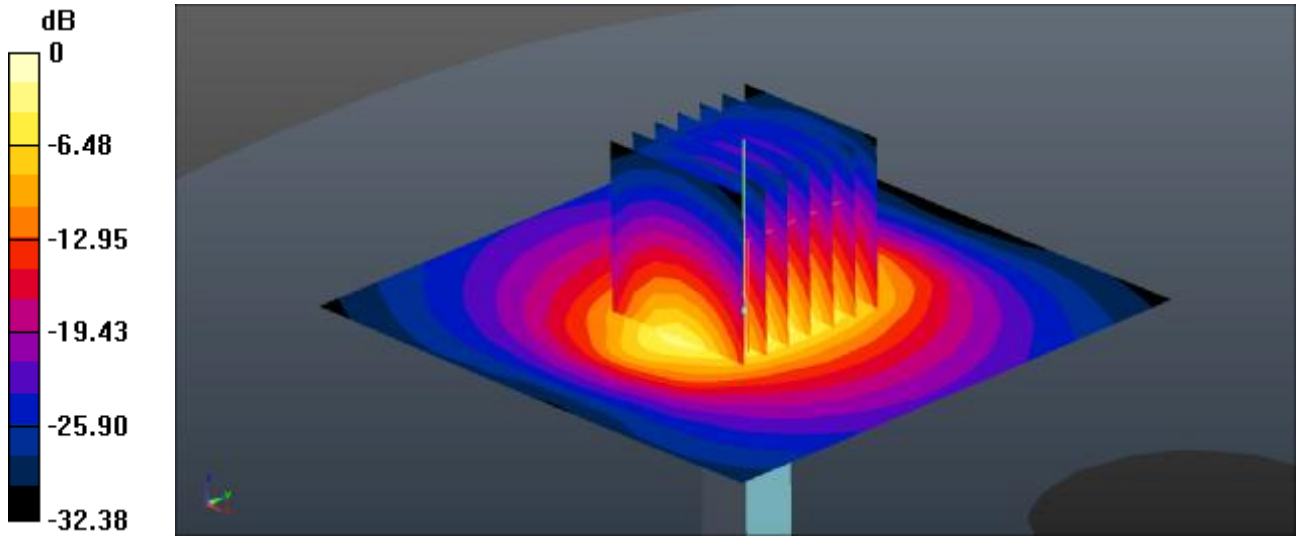
DUT: D2450V2 - SN:908

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2450 MHz; σ = 1.961 S/m; ε_r = 52.572; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.02, 7.02, 7.02); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 19.9 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.2 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 24.5 W/kg
SAR(1 g) = 12.4 W/kg; SAR(10 g) = 5.83 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



0 dB = 19.6 W/kg = 12.92 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.8

System Check_Body_2600MHz

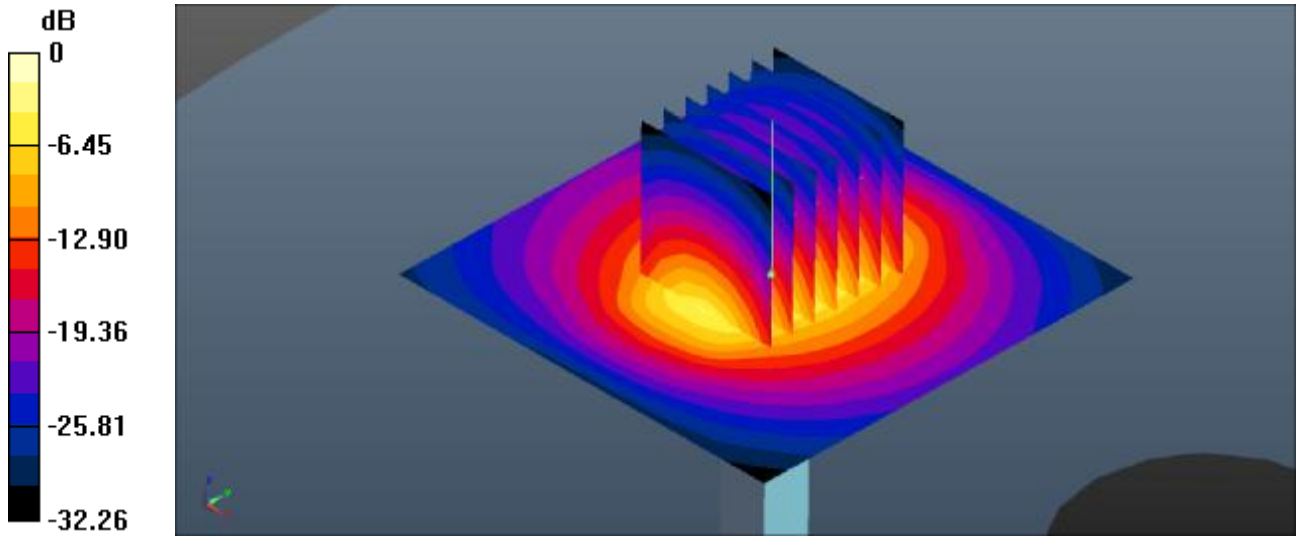
DUT: D2600V2 - SN:1061

Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium: MSL_2600 Medium parameters used: f = 2600 MHz; σ = 2.166 S/m; ε_r = 52.048; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.38, 7.38, 7.38) ; Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Pin=250mW/Area Scan (71x71x1): 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 = 85.04 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 5.96 W/kg
Maximum value of SAR (measured) = 21.1 W/kg



0 dB = 21.4 W/kg = 13.30 dBW/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

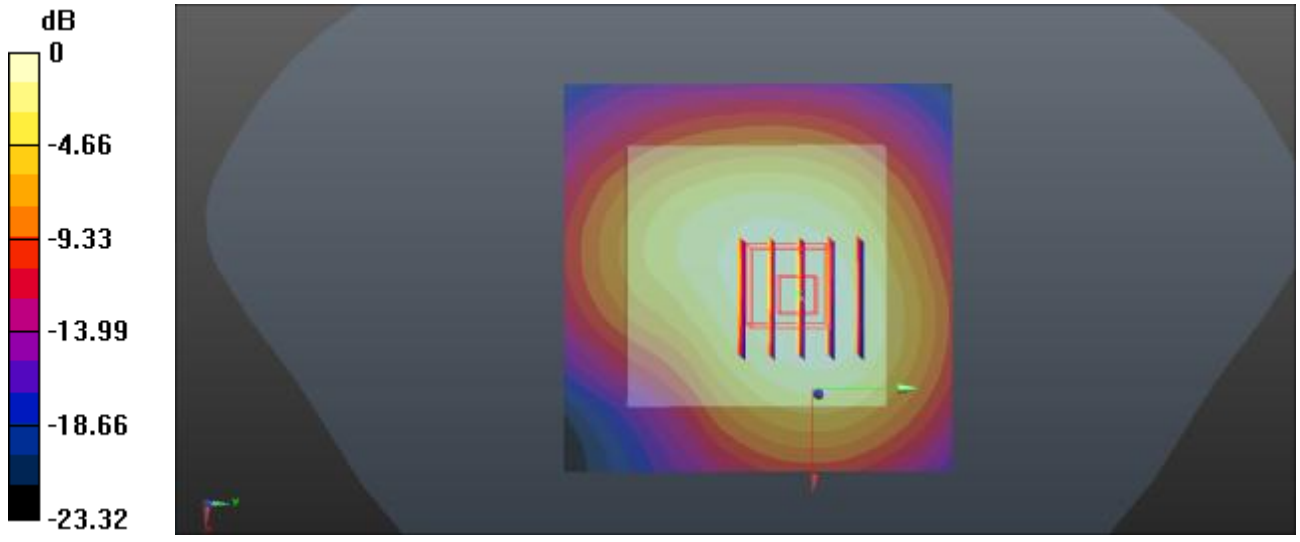
01_WCDMA Band V_RMC 12.2Kbps_In front of face_10mm_Ch4182

Communication System: UID 0, WCDMA (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: f = 836.4 MHz; σ = 0.916 S/m; ε_r = 41.25; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.01, 9.01, 9.01); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch4182/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.372 W/kg

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.56 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.428 W/kg
SAR(1 g) = 0.271 W/kg; SAR(10 g) = 0.183 W/kg
Maximum value of SAR (measured) = 0.368 W/kg



0 dB = 0.372 W/kg = -4.29 dBW/kg

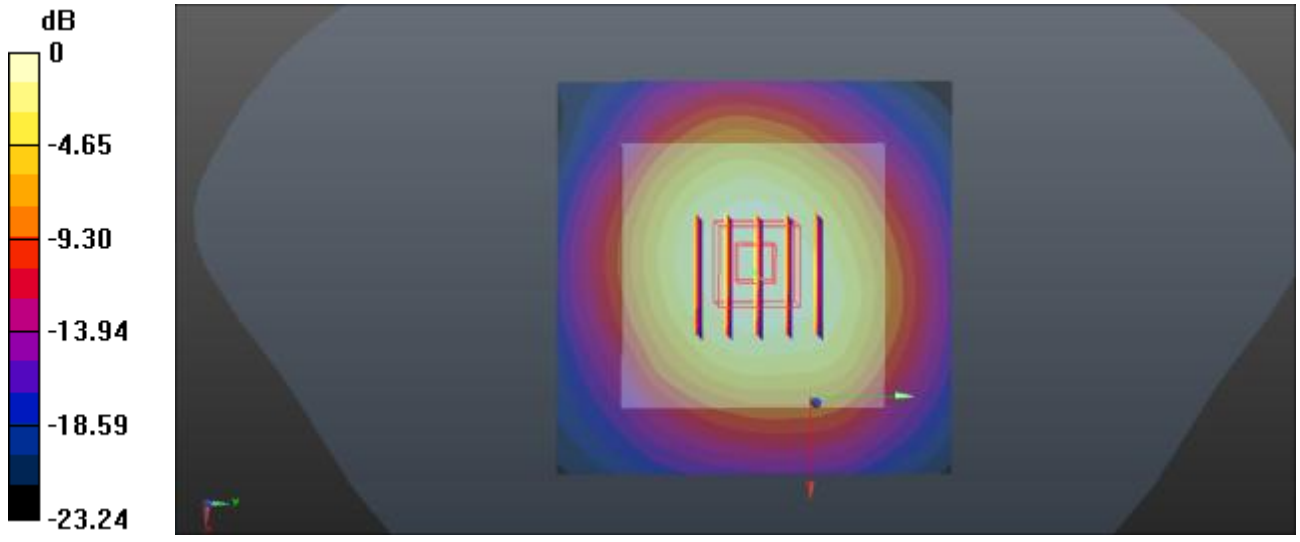
02_WCDMA Band IV_RMC 12.2Kbps_In front of face_10mm_Ch1513

Communication System: UID 0, WCDMA (0); Frequency: 1752.6 MHz;Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used: f = 1752.6 MHz; σ = 1.387 S/m; ε_r = 41.067; ρ = $1000_{kg/m^3}$
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.79, 7.79, 7.79); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch1513/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.05 W/kg

Ch1513/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.793 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.771 W/kg; SAR(10 g) = 0.495 W/kg
Maximum value of SAR (measured) = 1.03 W/kg



0 dB = 1.05 W/kg = 0.21 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.13

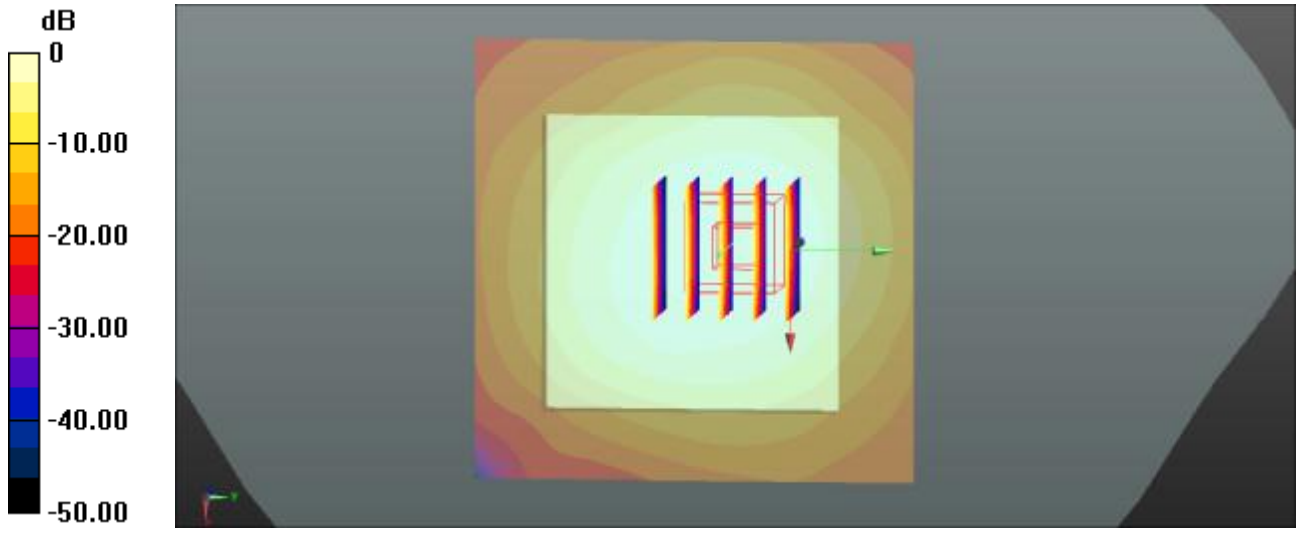
03_WCDMA Band II_RMC 12.2Kbps_In front of face_10mm_Ch9538

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: f = 1907.6 MHz; σ = 1.381 S/m; ε_r = 39.699; ρ = $1000_{kg/m^3}$
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.4, 7.4, 7.4); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch9538/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.843 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.199 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.922 W/kg
SAR(1 g) = 0.511 W/kg; SAR(10 g) = 0.305 W/kg
Maximum value of SAR (measured) = 0.805 W/kg



0 dB = 0.843 W/kg = -0.74 dBW/kg

04_CDMA2000 BC0_RC3 SO55_In front of face_10mm_Ch1013

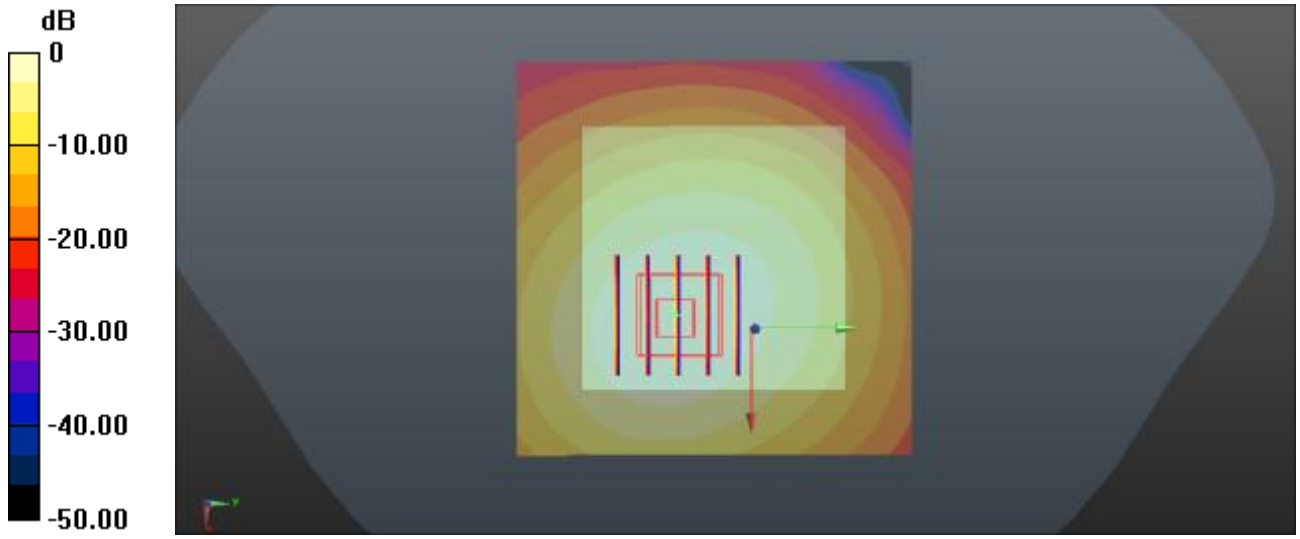
Communication System: UID 0, CDMA (0); Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: f = 824.7 MHz; σ = 0.906 S/m; ε_r = 41.405; ρ = 1000 kg/m^3

Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.01, 9.01, 9.01); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch1013/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.693 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.2380 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.786 W/kg
SAR(1 g) = 0.502 W/kg; SAR(10 g) = 0.328 W/kg
Maximum value of SAR (measured) = 0.682 W/kg



0 dB = 0.693 W/kg = -1.59 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.16

05_CDMA2000 BC10_RC3 SO55_In front of face_10mm_Ch476

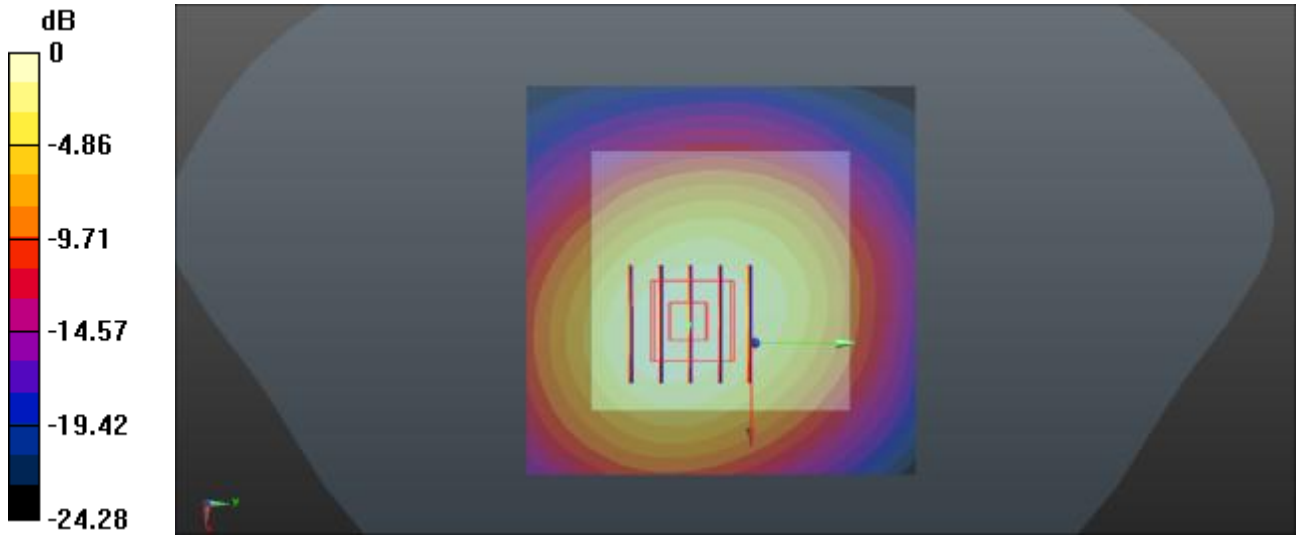
Communication System: UID 0, CDMA (0); Frequency: 817.9 MHz;Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: f = 817.9 MHz; σ = 0.899 S/m; ε_r = 41.499; ρ = 1000 kg/m^3

Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.01, 9.01, 9.01); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch476/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.622 W/kg

Ch476/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.5380 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.712 W/kg
SAR(1 g) = 0.454 W/kg; SAR(10 g) = 0.295 W/kg
Maximum value of SAR (measured) = 0.618 W/kg



0 dB = 0.622 W/kg = -2.06 dBW/kg

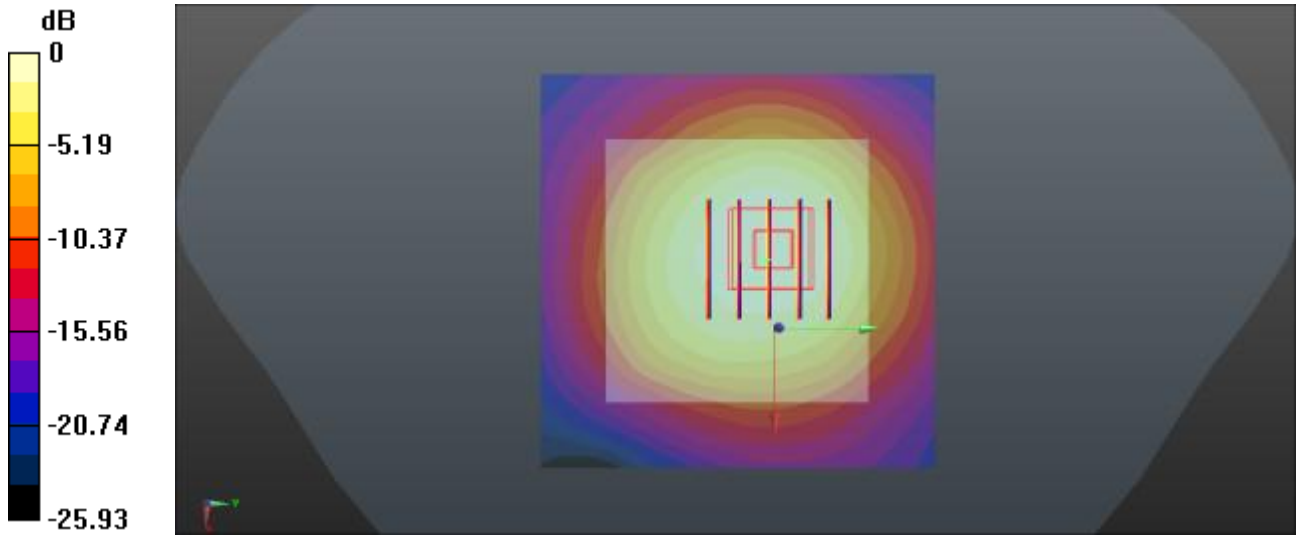
06_ CDMA2000 BC1_RC3 SO55_In front of face_10mm_Ch600

Communication System: UID 0, CDMA (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.352 S/m; ε_r = 39.804; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.4, 7.4, 7.4); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch600/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.704 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.565 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.794 W/kg
SAR(1 g) = 0.507 W/kg; SAR(10 g) = 0.315 W/kg
Maximum value of SAR (measured) = 0.685 W/kg



0 dB = 0.704 W/kg = -1.52 dBW/kg

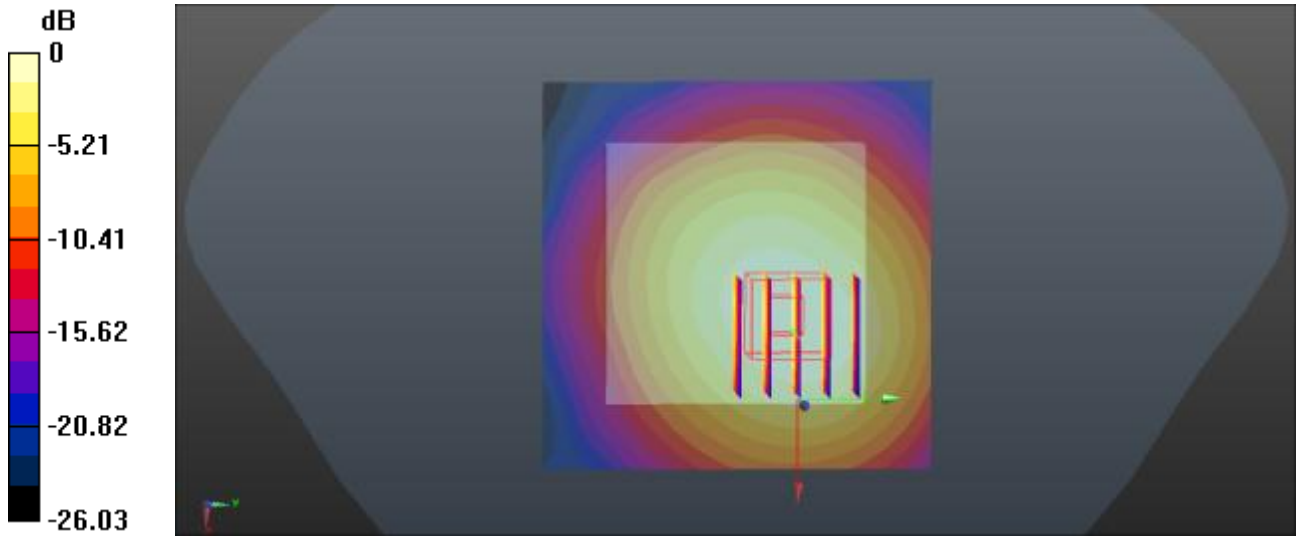
07_ LTE Band 12_QPSK_10M_1RB_25Offset_In front of face_10mm_Ch23095

Communication System: UID 0, LTE-FDD (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: HSL_750 Medium parameters used: f = 707.5 MHz; σ = 0.864 S/m; ε_r = 42.662; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.27, 9.27, 9.27); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch23095/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.242 W/kg

Ch23095/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.92 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.269 W/kg
SAR(1 g) = 0.181 W/kg; SAR(10 g) = 0.123 W/kg
Maximum value of SAR (measured) = 0.234 W/kg



0 dB = 0.242 W/kg = -6.16 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2019.1.12

08_LTE Band 13_QPSK_10M_1RB_49Offset_In front of face_10mm_Ch23230

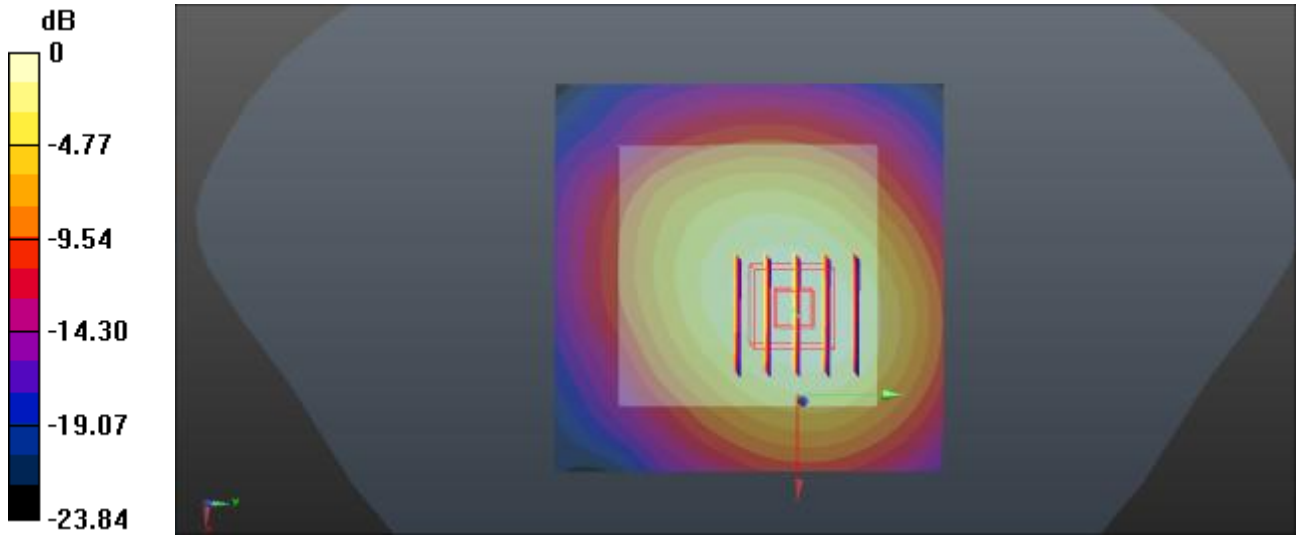
Communication System: UID 0, LTE-FDD (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: HSL_750 Medium parameters used: f = 782 MHz; σ = 0.935 S/m; ε_r = 41.682; ρ = 1000 kg/m^3

Ambient Temperature：23.2 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.27, 9.27, 9.27); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch23230/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.298 W/kg

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.72 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.323 W/kg
SAR(1 g) = 0.219 W/kg; SAR(10 g) = 0.148 W/kg
Maximum value of SAR (measured) = 0.287 W/kg



0 dB = 0.298 W/kg = -5.26 dBW/kg

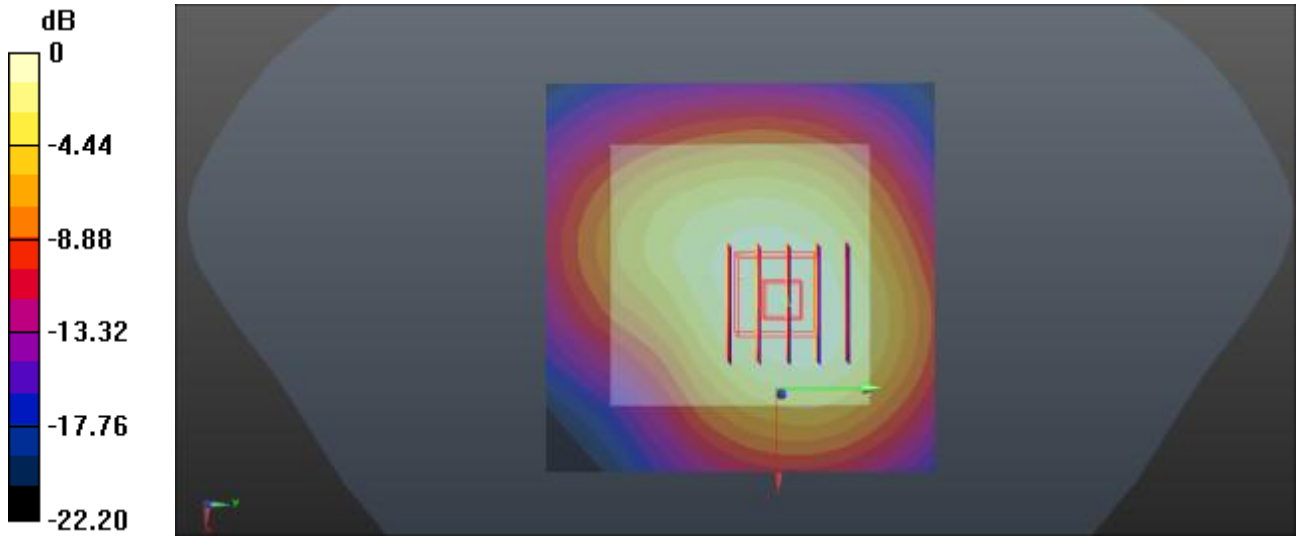
09_LTE Band 26_15M_QPSK_1RB_37Offset_In front of face_10mm_Ch26865

Communication System: UID 0, LTE-FDD (0); Frequency: 831.5 MHz;Duty Cycle: 1:1
Medium: HSL_850 Medium parameters used: f = 831.5 MHz; σ = 0.912 S/m; ε_r = 41.318; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(9.01, 9.01, 9.01); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch26865/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.604 W/kg

Ch26865/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.41 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.673 W/kg
SAR(1 g) = 0.426 W/kg; SAR(10 g) = 0.283 W/kg
Maximum value of SAR (measured) = 0.581 W/kg



0 dB = 0.604 W/kg = -2.19 dBW/kg

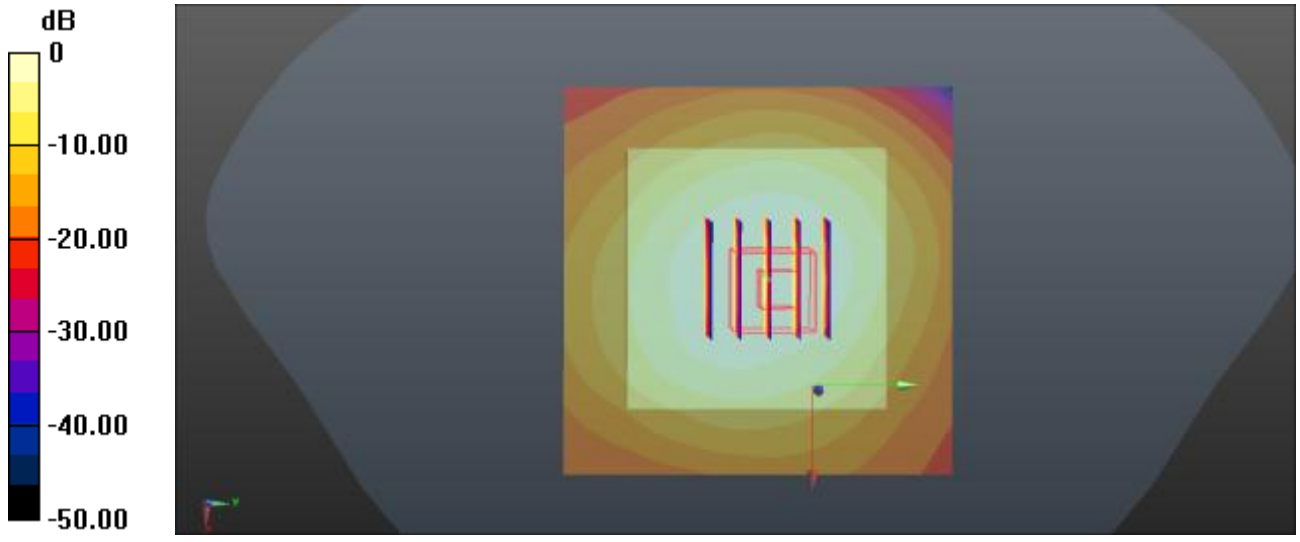
10_ LTE Band 66_QPSK_20M_1RB_49Offset_In front of face_10mm_Ch132572

Communication System: UID 0, LTE-FDD (0); Frequency: 1770 MHz;Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used: f = 1770 MHz; σ = 1.404 S/m; ε_r = 41.008; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.79, 7.79, 7.79); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch132572/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.53 W/kg

Ch132572/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.22 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.667 W/kg
Maximum value of SAR (measured) = 1.37 W/kg



0 dB = 1.53 W/kg = 1.85 dBW/kg

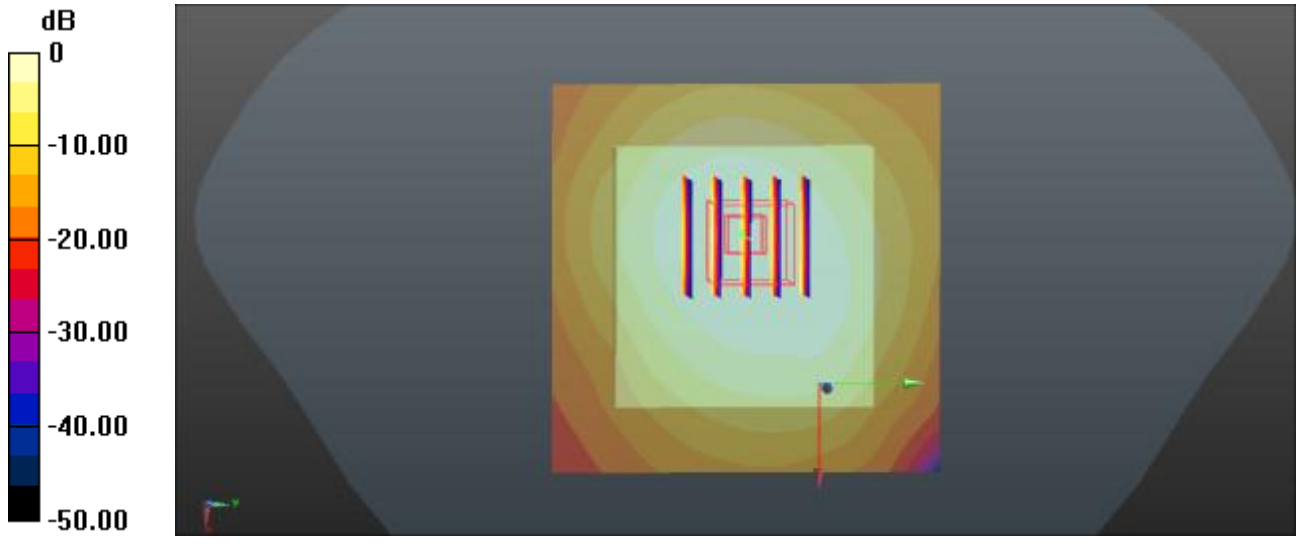
11_ LTE Band 25_QPSK_20M_1RB_49Offset_In front of face_10mm_Ch26340

Communication System: UID 0, LTE-FDD (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.352 S/m; ε_r = 39.804; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.4, 7.4, 7.4); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch26340/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.986 W/kg

Ch26340/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.97 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.701 W/kg; SAR(10 g) = 0.446 W/kg
Maximum value of SAR (measured) = 0.950 W/kg



0 dB = 0.986 W/kg = -0.06 dBW/kg

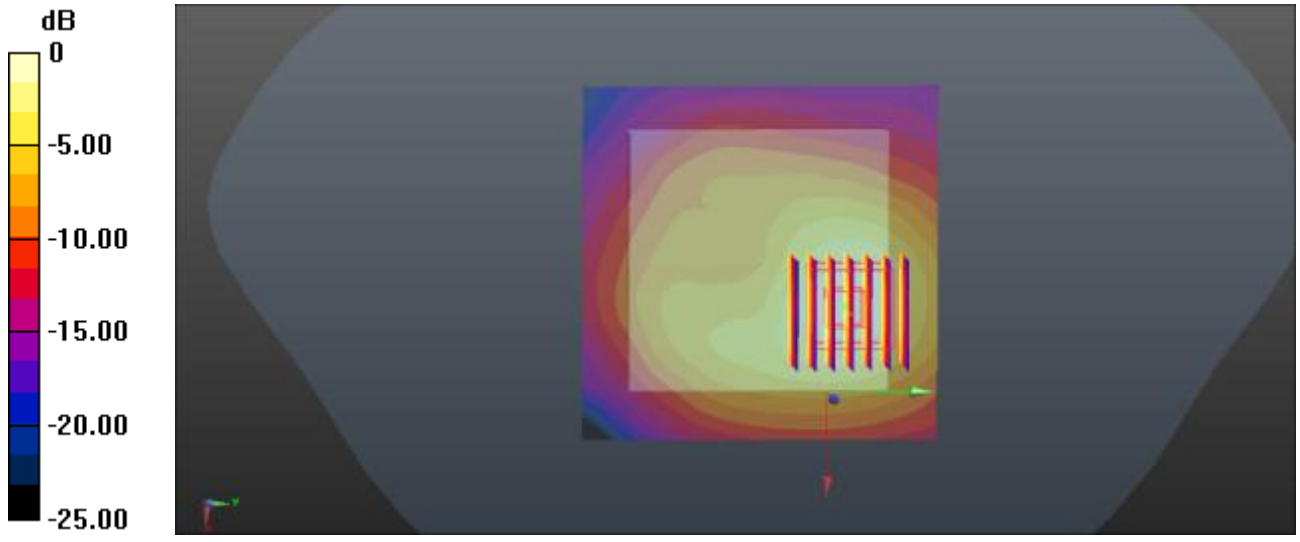
12_LTE Band 41_20M_QPSK_1RB_49Offset_In front of face_10mm_Ch40185

Communication System: UID 0, LTE-TDD (0); Frequency: 2549.5 MHz;Duty Cycle: 1:1.59
Medium: HSL_2600 Medium parameters used: f = 2549.5 MHz; σ = 1.954 S/m; ε_r = 37.845; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(6.86, 6.86, 6.86); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch40185/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.393 W/kg

Ch40185/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.396 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.473 W/kg
SAR(1 g) = 0.241 W/kg; SAR(10 g) = 0.123 W/kg
Maximum value of SAR (measured) = 0.383 W/kg



0 dB = 0.393 W/kg = -4.06 dBW/kg

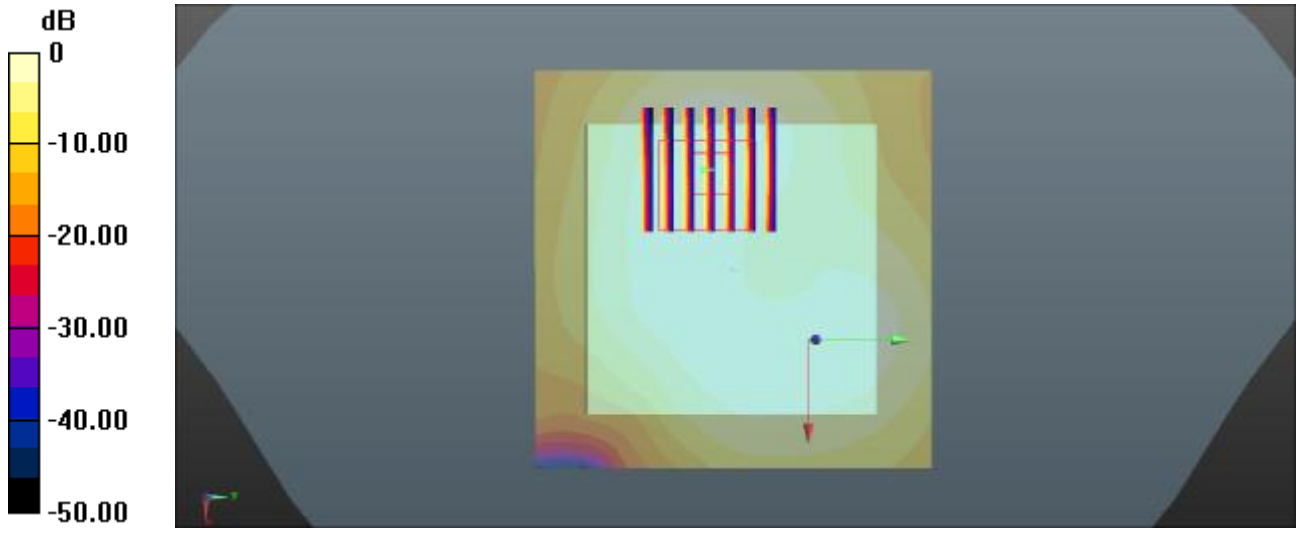
13_WLAN2.4GHz_802.11b 1Mbps_In front of face_10mm_Ch6

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1.025
Medium: HSL_2450 Medium parameters used: f = 2437 MHz; σ = 1.825 S/m; ε_r = 38.288; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.08, 7.08, 7.08); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch6/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.148 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.440 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.183 W/kg
SAR(1 g) = 0.094 W/kg; SAR(10 g) = 0.052 W/kg
Maximum value of SAR (measured) = 0.148 W/kg



0 dB = 0.148 W/kg = -8.30 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

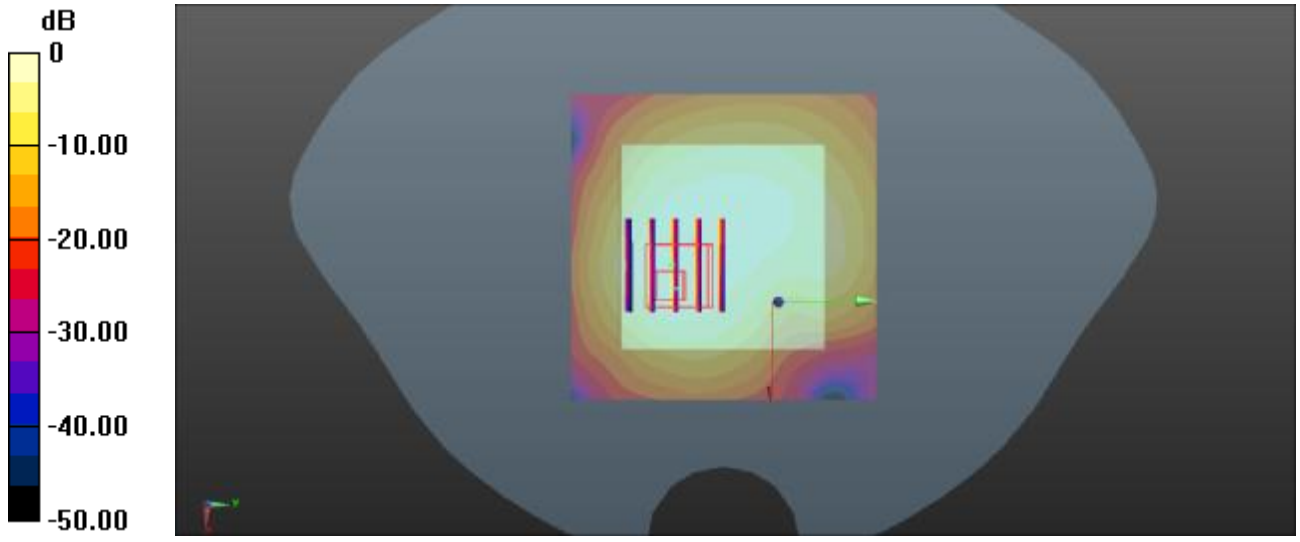
14_WCDMA Band V_RMC 12.2Kbps_Back_5mm_Ch4182

Communication System: UID 0, WCDMA (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: f = 836.4 MHz; σ = 0.978 S/m; ε_r = 55.102; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.49, 9.49, 9.49); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch4182/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.831 W/kg

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.228 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.505 W/kg; SAR(10 g) = 0.285 W/kg
Maximum value of SAR (measured) = 0.828 W/kg



0 dB = 0.831 W/kg = -0.80 dBW/kg

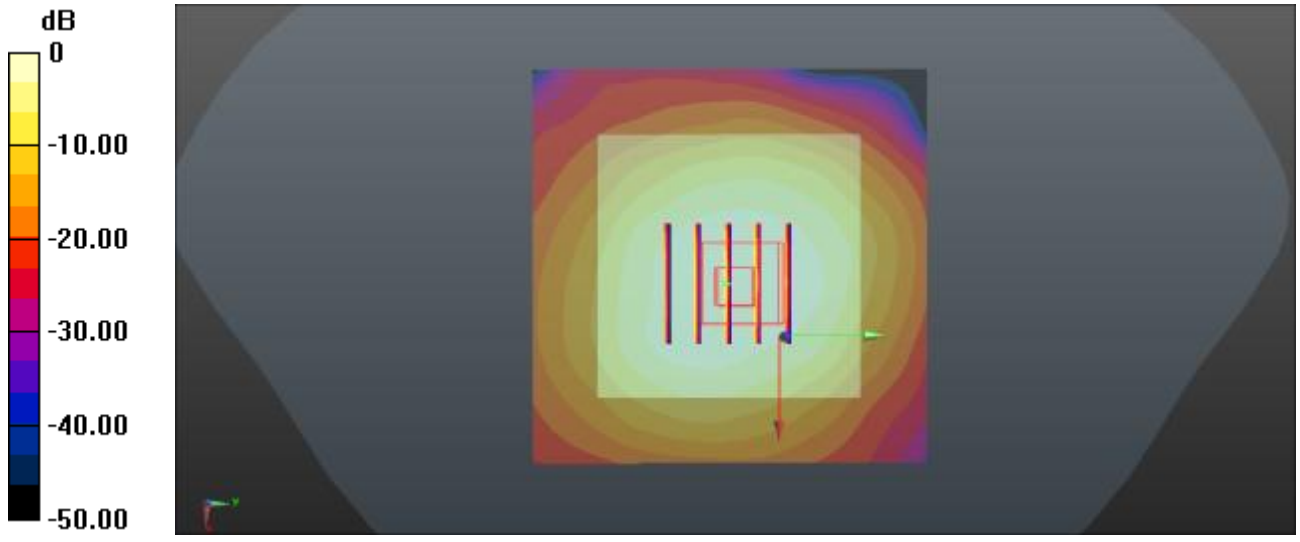
15_WCDMA Band IV_RMC 12.2Kbps_Front_5mm_Ch1413

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 = 1.441 S/m; ε_r = 53.946; ρ = $1000_{kg/m^3}$
Ambient Temperature：23.2 ℃； Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.15, 8.15, 8.15); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch1413/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.52 W/kg

Ch1413/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.498 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.715 W/kg
Maximum value of SAR (measured) = 1.48 W/kg



0 dB = 1.52 W/kg = 1.82 dBW/kg

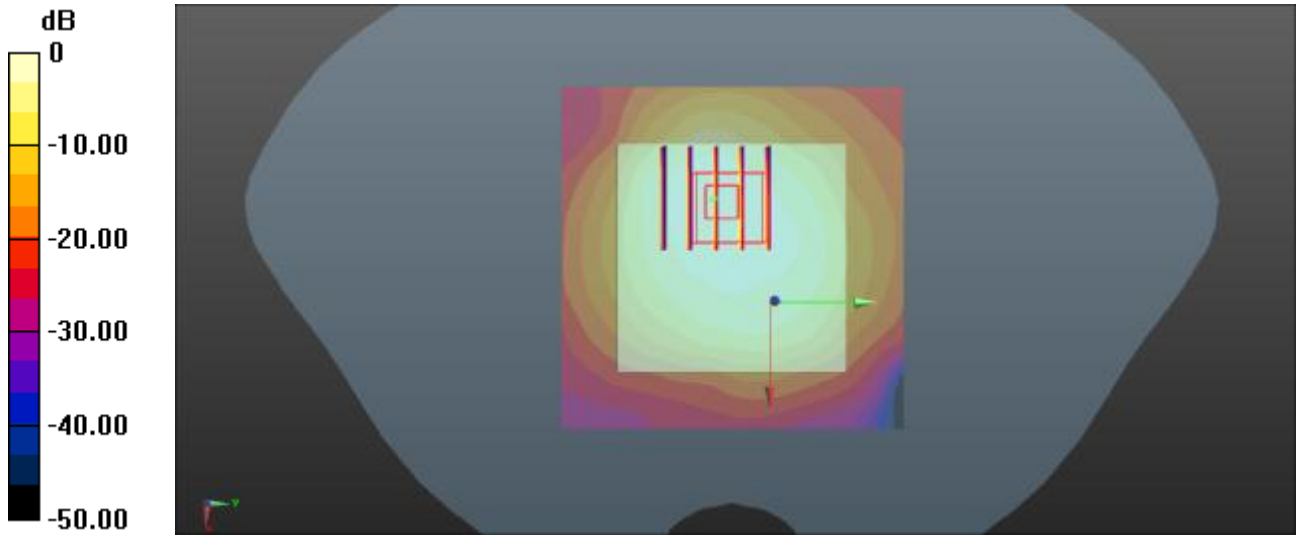
16_WCDMA Band II_RMC 12.2Kbps_Back_5mm_Ch9538

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: f =1907.6 MHz; σ = 1.565 S/m; ε_r = 53.573; ρ = $1000_{kg/m^3}$
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.82, 7.82, 7.82); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch9538/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.87 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.15 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.650 W/kg
Maximum value of SAR (measured) = 1.56 W/kg



0 dB = 1.87 W/kg = 2.72 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

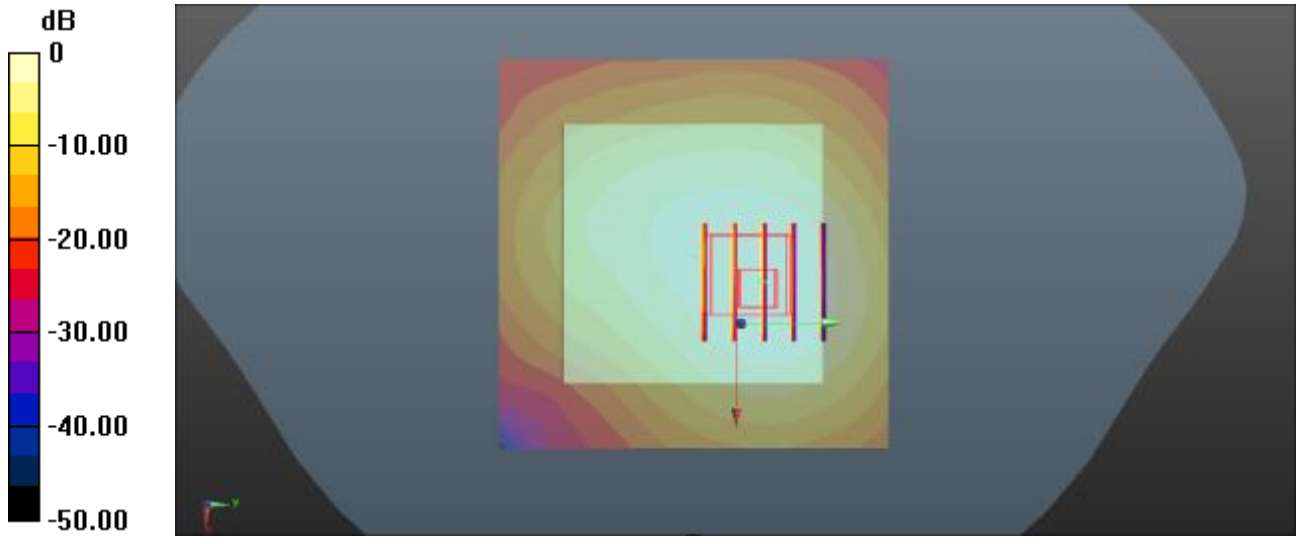
17_CDMA2000 BC0_RTAP 153.6Kbps_Front_5mm_Ch1013

Communication System: UID 0, CDMA (0); Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: f = 824.7 MHz; σ = 0.967 S/m; ε_r = 55.221; ρ = $1000_{kg/m^3}$
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.49, 9.49, 9.49); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch1013/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.912 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.679 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.665 W/kg; SAR(10 g) = 0.429 W/kg
Maximum value of SAR (measured) = 0.923 W/kg



0 dB = 0.912 W/kg = -0.40 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

18_CDMA2000 BC10_RTAP 153.6Kbps_Front_5mm_Ch476

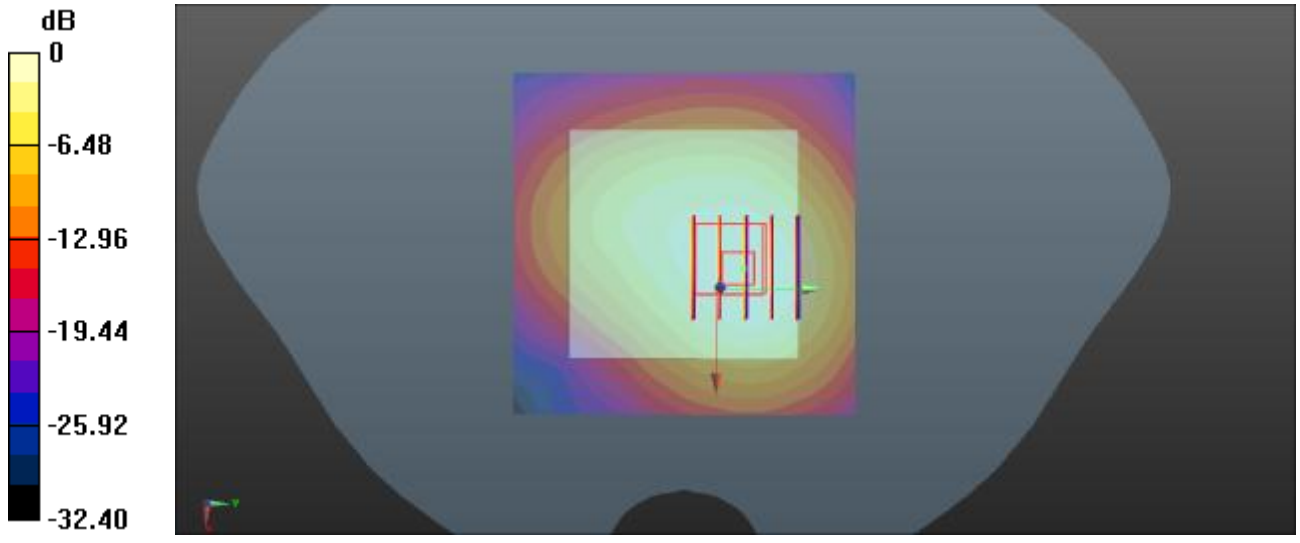
Communication System: UID 0, CDMA (0); Frequency: 817.9 MHz;Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: f =817.9 MHz; σ = 0.96 S/m; ε_r = 55.294; ρ = 1000 kg/m^3

Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.49, 9.49, 9.49); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch476/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.948 W/kg

Ch476/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.507 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.688 W/kg; SAR(10 g) = 0.449 W/kg
Maximum value of SAR (measured) = 0.951 W/kg



0 dB = 0.948 W/kg = -0.23 dBW/kg

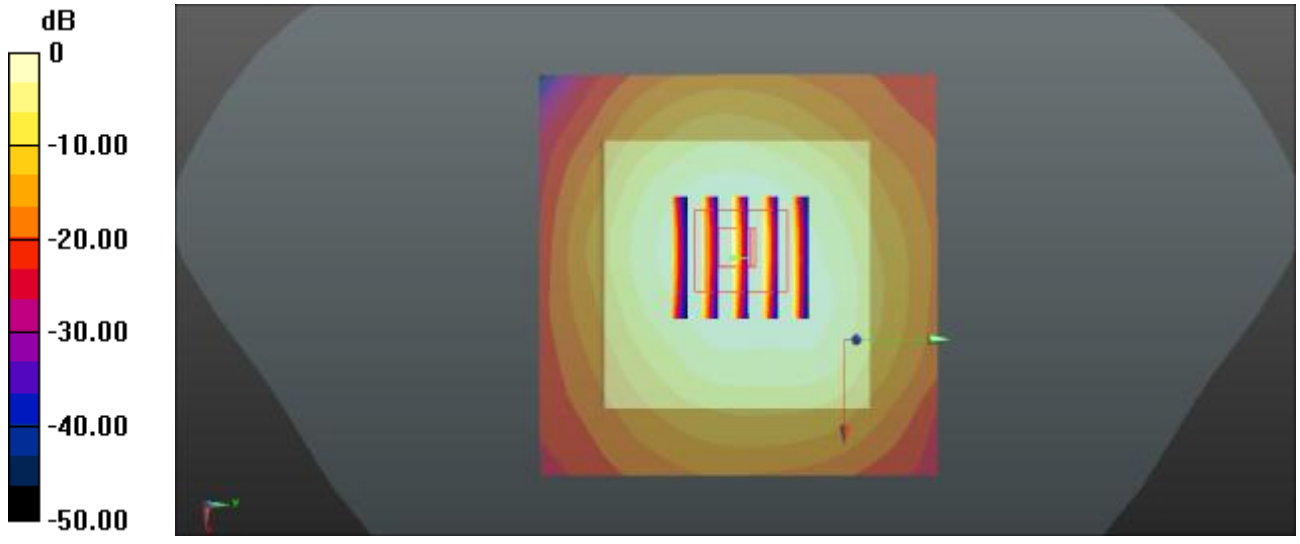
19_ CDMA2000 BC1_RTAP 153.6Kbps _Front_5mm_Ch600

Communication System: UID 0, CDMA (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.532 S/m; ε_r = 53.71; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.82, 7.82, 7.82); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch600/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.8460 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.924 W/kg; SAR(10 g) = 0.589 W/kg
Maximum value of SAR (measured) = 1.21 W/kg



0 dB = 1.27 W/kg = 1.04 dBW/kg

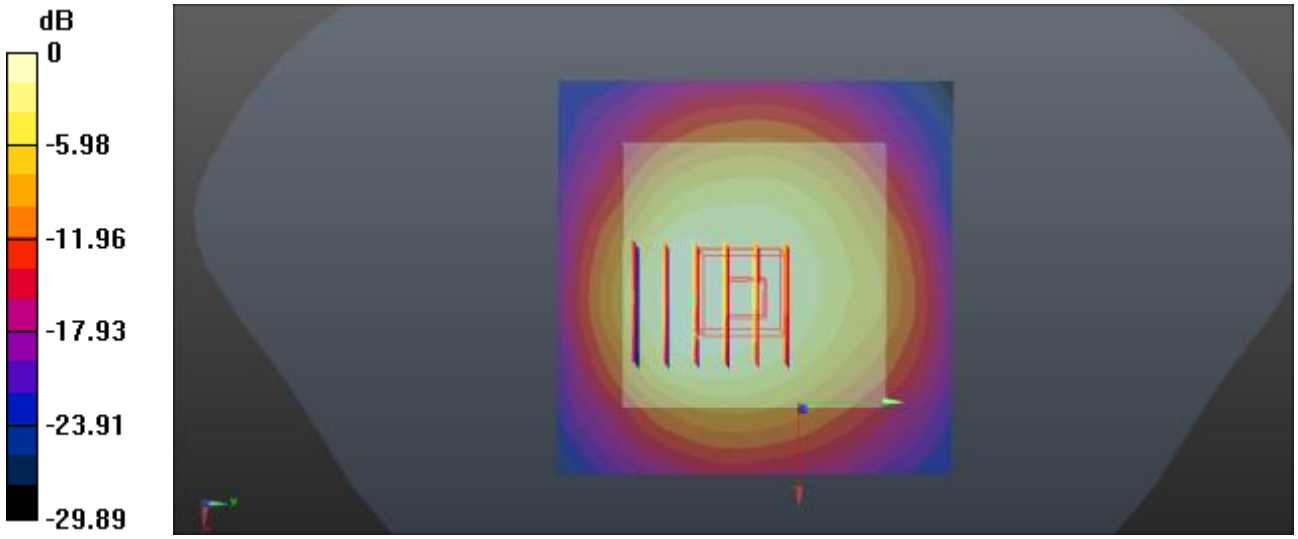
20_LTE Band 12_QPSK_10M_1RB_25Offset_Back_5mm_Ch23095

Communication System: UID 0, LTE-FDD (0); Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: MSL_750 Medium parameters used: f = 707.5 MHz; σ = 0.926 S/m; ε_r = 56.19; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.7, 9.7, 9.7); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch23095/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.796 W/kg

Ch23095/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.6230 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.862 W/kg
SAR(1 g) = 0.514 W/kg; SAR(10 g) = 0.351 W/kg
Maximum value of SAR (measured) = 0.710 W/kg



0 dB = 0.796 W/kg = -0.99 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

21_LTE Band 13_QPSK_10M_1RB_49Offset_Back_5mm_Ch23230

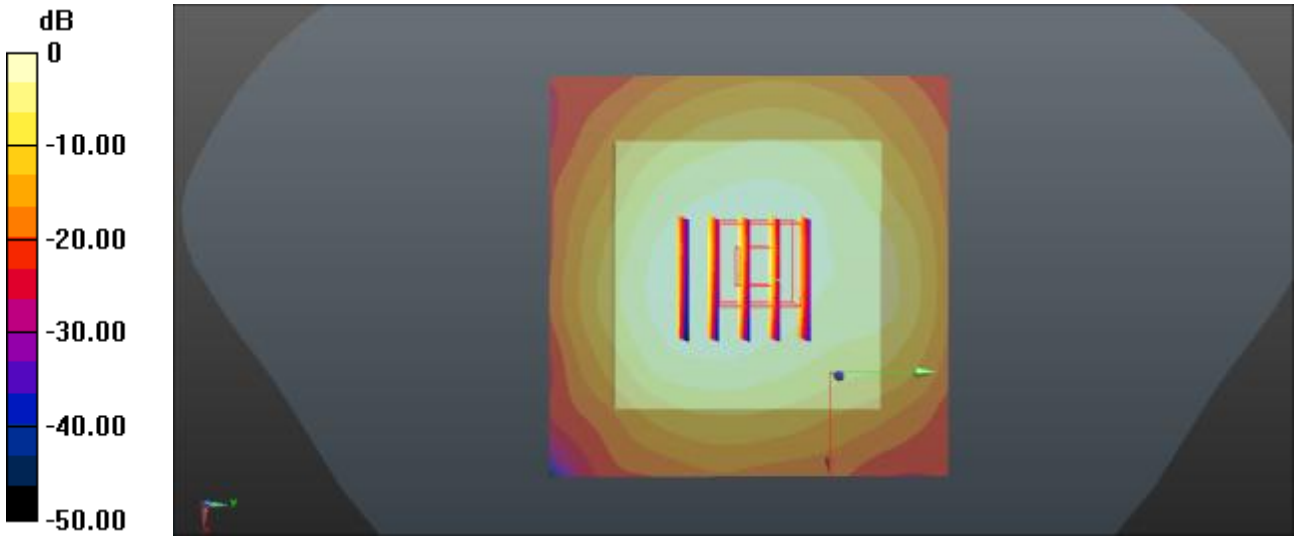
Communication System: UID 0, LTE-FDD (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL_750 Medium parameters used: f = 782 MHz; σ = 1 S/m; ε_r = 55.386; ρ = 1000 kg/m^3

Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.7, 9.7, 9.7); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch23230/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.780 W/kg

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.94 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.842 W/kg
SAR(1 g) = 0.598 W/kg; SAR(10 g) = 0.408 W/kg
Maximum value of SAR (measured) = 0.743 W/kg



0 dB = 0.780 W/kg = -1.08 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

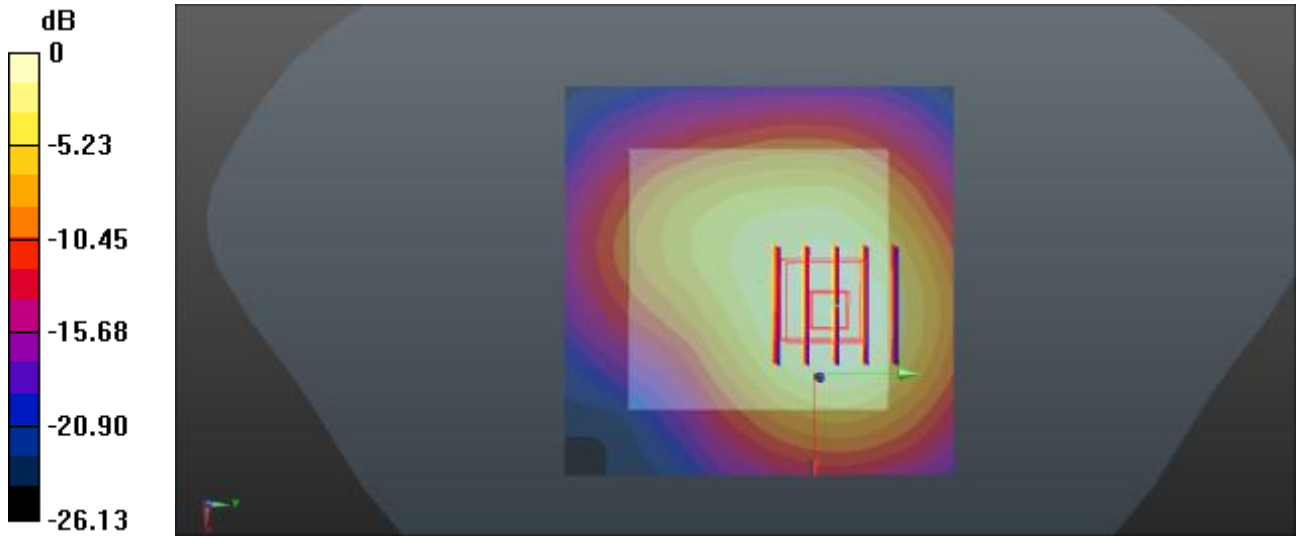
22_LTE Band 26_15M_QPSK_1RB_37Offset_Front_5mm_Ch26865

Communication System: UID 0, LTE-FDD (0); Frequency: 831.5 MHz;Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: f = 831.5 MHz; σ = 0.973 S/m; ε_r = 55.158; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.49, 9.49, 9.49); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch26865/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.03 W/kg

Ch26865/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.229 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.706 W/kg; SAR(10 g) = 0.442 W/kg
Maximum value of SAR (measured) = 0.996 W/kg



0 dB = 1.03 W/kg = 0.13 dBW/kg

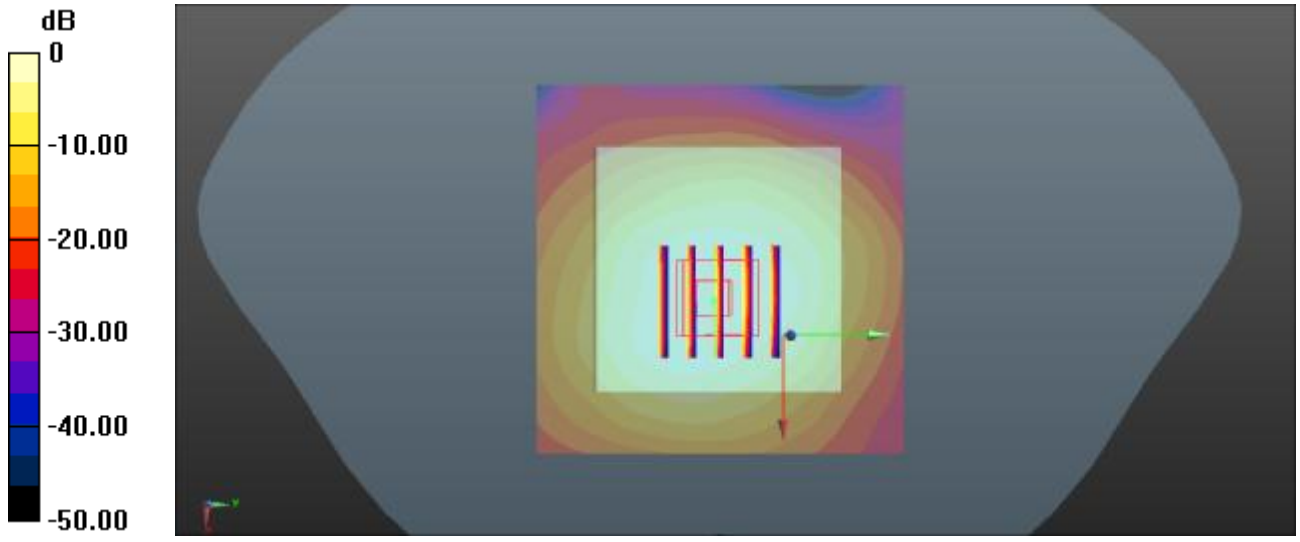
23_ LTE Band 66_QPSK_20M_100RB_0Offset_Back_5mm_Ch132322

Communication System: UID 0, LTE-FDD (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium: MSL_1750 Medium parameters used: f = 1745 MHz; σ = 1.454 S/m; ε_r = 53.907; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.15, 8.15, 8.15); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP:1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch132322/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.56 W/kg

Ch132322/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.911 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.70 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.705 W/kg
Maximum value of SAR (measured) = 1.46 W/kg



0 dB = 1.56 W/kg = 1.93 dBW/kg

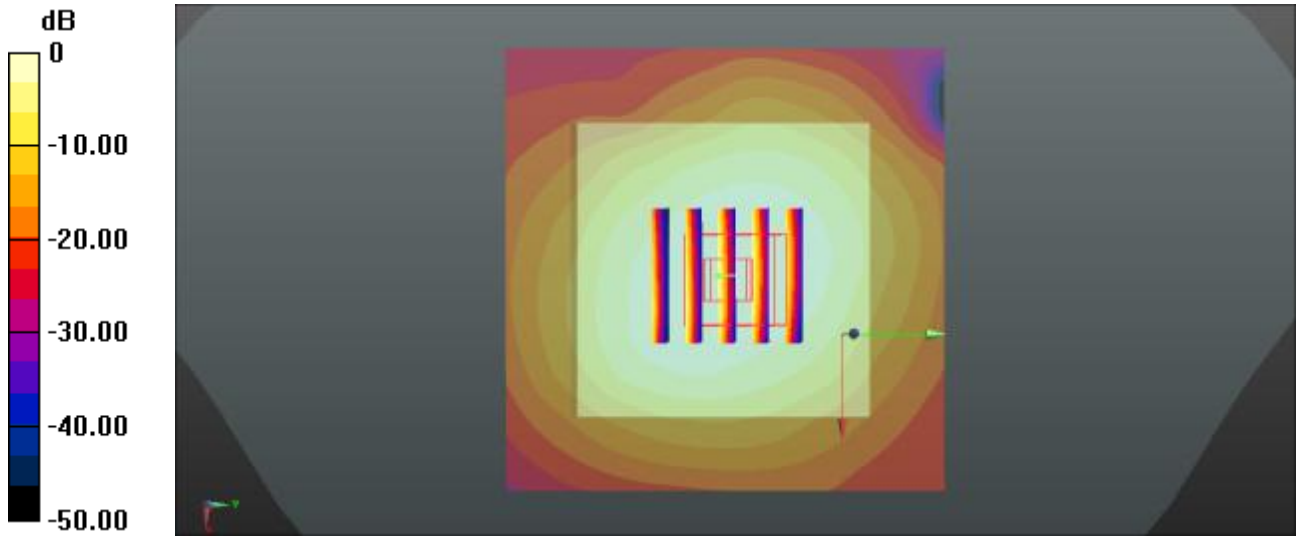
24_ LTE Band 25_QPSK_20M_100RB_0Offset_Front_5mm_Ch26340

Communication System: UID 0, LTE-FDD (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.532 S/m; ε_r = 53.71; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.82, 7.82, 7.82); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch26340/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.70 W/kg

Ch26340/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.65 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.722 W/kg
Maximum value of SAR (measured) = 1.54 W/kg



0 dB = 1.70 W/kg = 2.30 dBW/kg

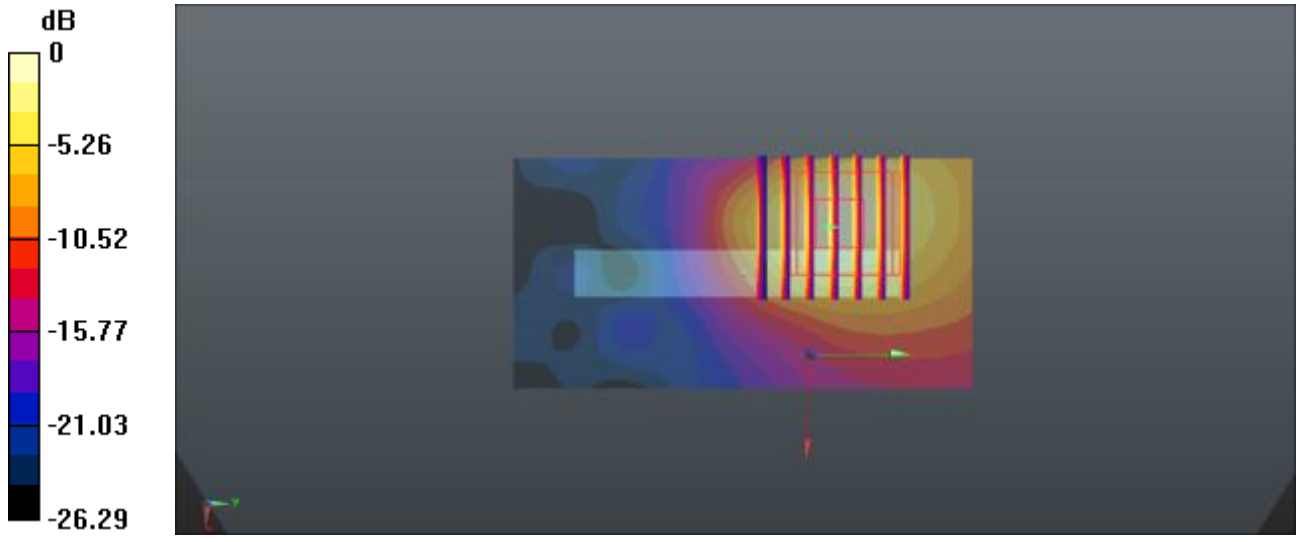
25_LTE Band 41_20M_QPSK_1RB_49Offset_Left Side_5mm_Ch39750

Communication System: UID 0, LTE-TDD (0); Frequency: 2506 MHz;Duty Cycle: 1:1.59
Medium: MSL_2600 Medium parameters used: f = 2506 MHz; σ = 2.036 S/m; ε_r = 52.399; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.38, 7.38, 7.38) ; Calibrated: 2018.5.31
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch39750/Area Scan (41x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Ch39750/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.173 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 0.757 W/kg; SAR(10 g) = 0.336 W/kg
Maximum value of SAR (measured) = 1.33 W/kg



0 dB = 1.33 W/kg = 1.24 dBW/kg

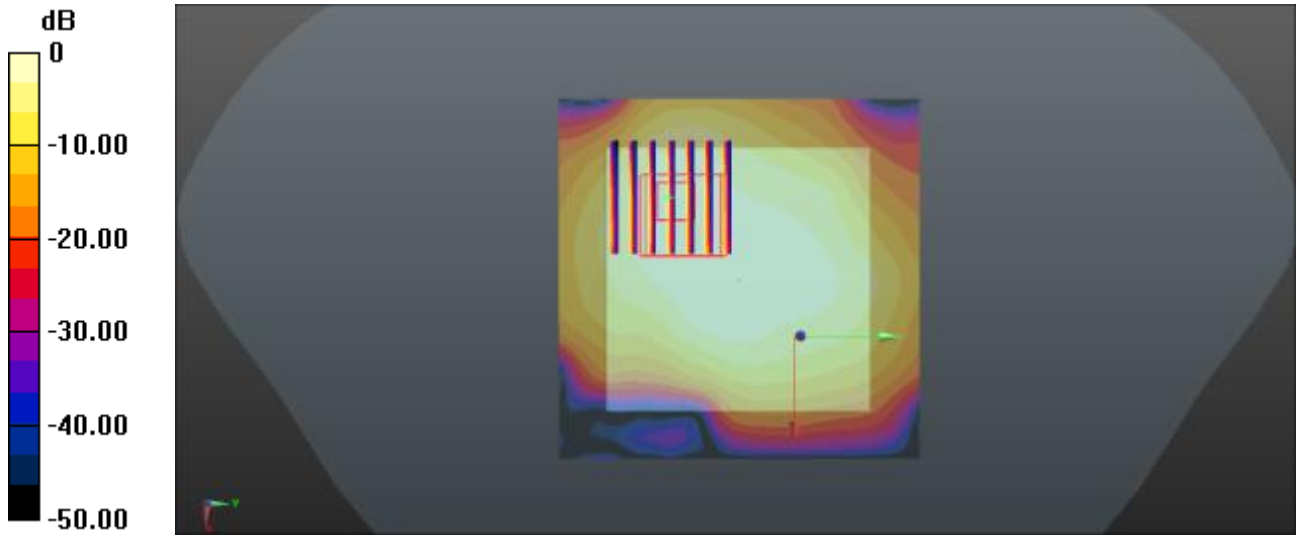
26_WLAN2.4GHz_802.11b 1Mbps_Back_5mm_Ch6

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1.025
Medium: MSL_2450 Medium parameters used: f = 2437 MHz; σ = 1.943 S/m; ε_r = 52.621; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3843; ConvF(7.02, 7.02, 7.02); Calibrated: 2018.9.27
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2018.12.3
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch6/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.540 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.02 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.631 W/kg
SAR(1 g) = 0.275 W/kg; SAR(10 g) = 0.144 W/kg
Maximum value of SAR (measured) = 0.501 W/kg



0 dB = 0.540 W/kg = -2.68 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

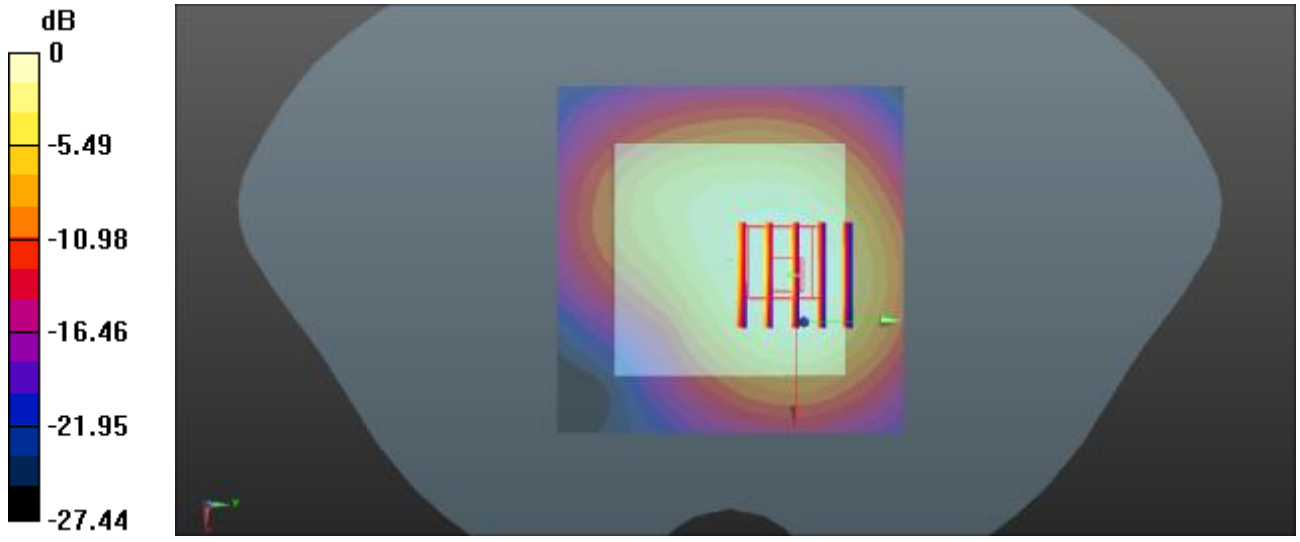
27_CDMA2000 BC0_RC3 SO32 (F+SCH) _Front_5mm_Ch1013

Communication System: UID 0, CDMA (0); Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: f =824.7 MHz; σ = 0.967 S/m; ε_r = 55.221; ρ = $1000_{kg/m^3}$
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.49, 9.49, 9.49); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch1013/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.939 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.92 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.682 W/kg; SAR(10 g) = 0.436 W/kg
Maximum value of SAR (measured) = 0.956 W/kg



0 dB = 0.939 W/kg = -0.27 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

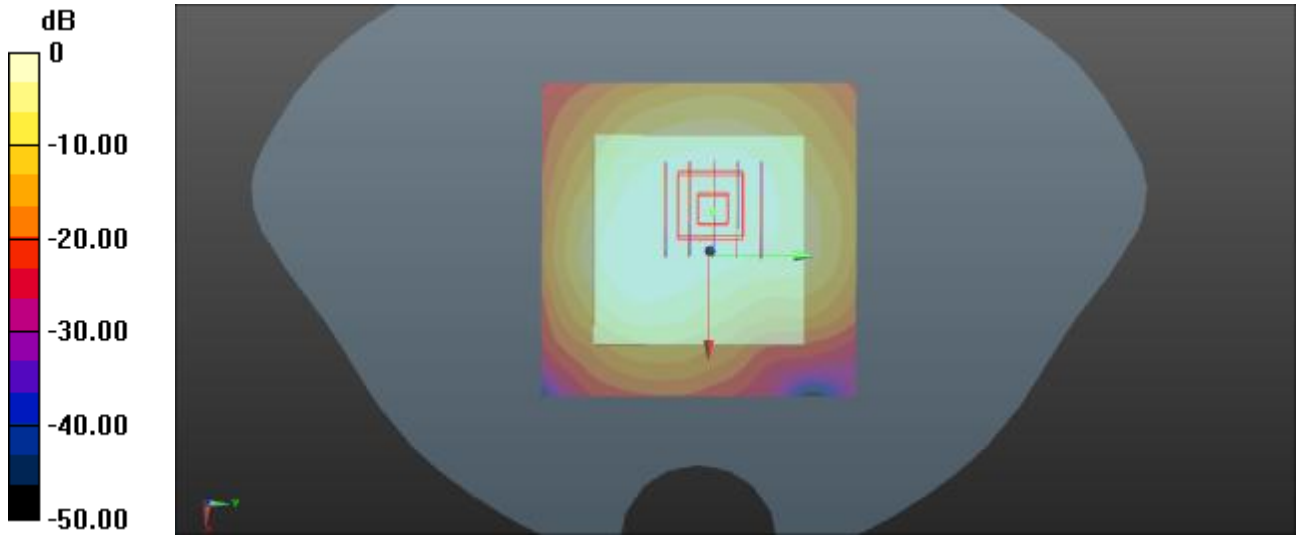
28_CDMA2000 BC0_RC3 SO32 (F+SCH) _Back_5mm_Ch684

Communication System: UID 0, CDMA (0); Frequency: 823.1 MHz;Duty Cycle: 1:1
Medium: MSL_850 Medium parameters used: f = 823.1 MHz; σ = 0.965 S/m; ε_r = 55.242; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.49, 9.49, 9.49); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch684/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.855 W/kg

Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.62 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.907 W/kg
SAR(1 g) = 0.674 W/kg; SAR(10 g) = 0.462 W/kg
Maximum value of SAR (measured) = 0.835 W/kg



0 dB = 0.855 W/kg = -0.68 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.12.29

29_ CDMA2000 BC1_RC3 SO32 (F+SCH) _Back_5mm_Ch600

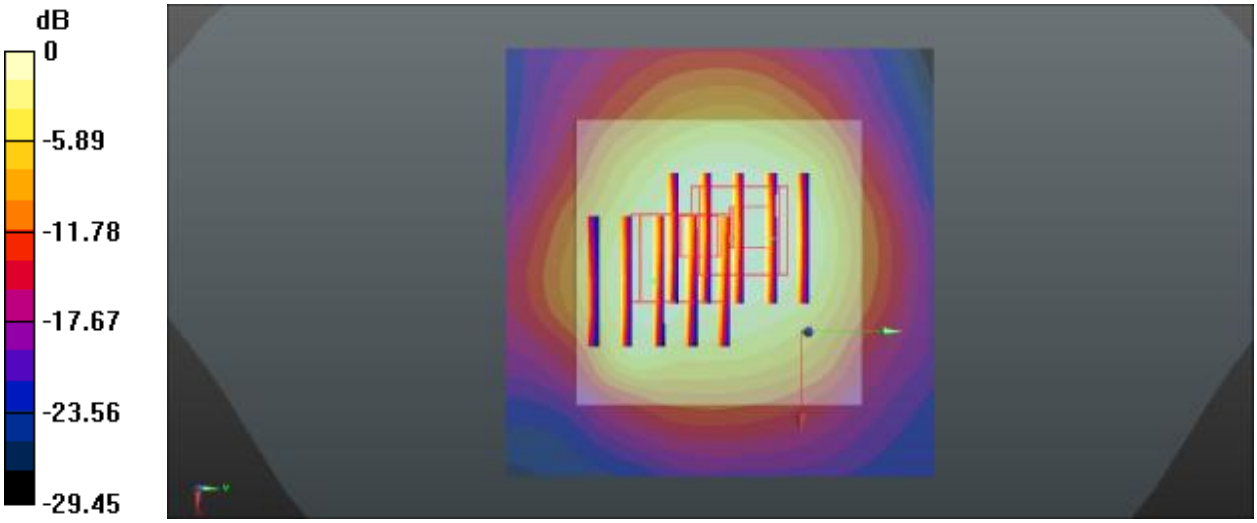
Communication System: UID 0, CDMA (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.532 S/m; ε_r = 53.71; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃； Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.82, 7.82, 7.82); Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM2; Type: SAM; Serial: TP-1754
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch600/Area Scan (71x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.52 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.280 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.60 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.687 W/kg
Maximum value of SAR (measured) = 1.39 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.280 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.962 W/kg; SAR(10 g) = 0.576 W/kg
Maximum value of SAR (measured) = 1.35 W/kg



0 dB = 1.52 W/kg = 1.82 dBW/kg

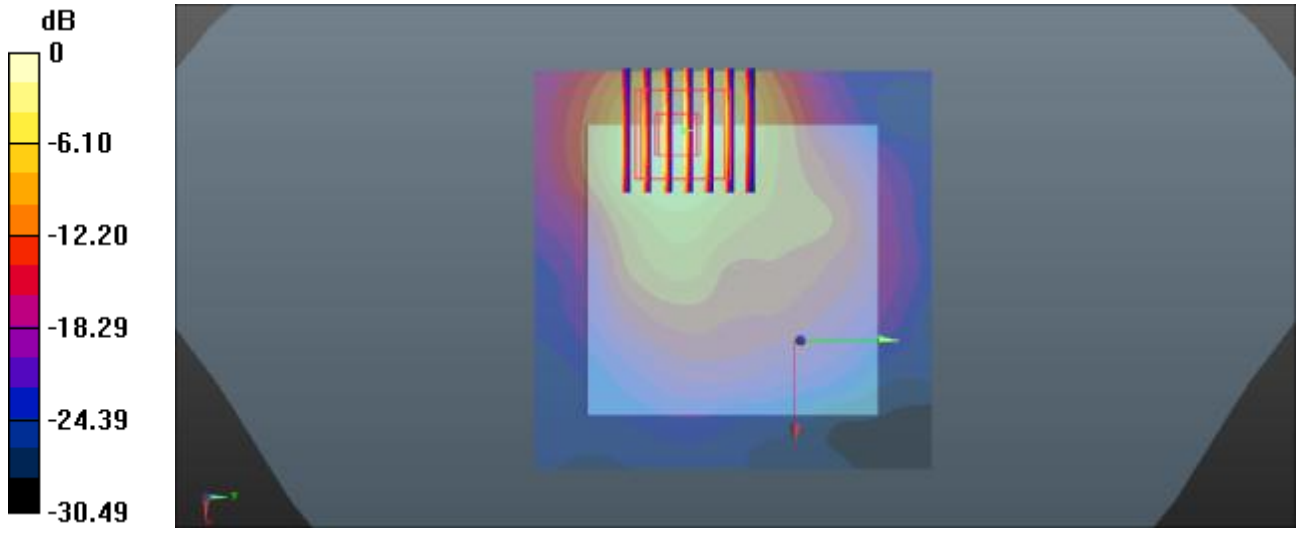
30_LTE Band 41_20M_QPSK_1RB_49Offset_Back_5mm_Ch39750

Communication System: UID 0, LTE-TDD (0); Frequency: 2506 MHz;Duty Cycle: 1:1.59
Medium: MSL_2600 Medium parameters used: f = 2506 MHz; σ = 2.036 S/m; ε_r = 52.399; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.38, 7.38, 7.38) ; Calibrated: 2018.5.31
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2018.4.19
- Phantom: SAM1; Type: SAM; Serial: TP-1697
- Measurement SW: DASY52, Version 52.10 (1); SEMCAD X Version 14.6.11 (7439)

Ch39750/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.30 W/kg

Ch39750/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.342 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.56 W/kg
SAR(1 g) = 0.777 W/kg; SAR(10 g) = 0.349 W/kg
Maximum value of SAR (measured) = 1.22 W/kg



0 dB = 1.30 W/kg = 1.14 dBW/kg

Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.

In Collaboration with
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CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client **Sporton** **Certificate No: Z18-60046**

CALIBRATION CERTIFICATE

Object D750V3 - SN: 1087

Calibration Procedure(s) FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: March 21, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Power sensor NRV-Z5	100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Reference Probe EX3DV4	SN 7464	12-Sep-17(SPEAG,No.EX3-7464_Sep17)	Sep-18
DAE4	SN 1525	02-Oct-17(SPEAG,No.DAE4-1525_Oct17)	Oct-18
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzer E5239A	MY55491241	29-Jun-17 (CTTL, No.J18X00561)	Jun-18

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

Issued: March 24, 2018

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.08 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**8.25 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.40 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.56 mW /g ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.8 ± 6 %	0.97 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.16 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**8.57 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.45 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**5.77 mW /g ±18.7 % (k=2)**

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.4Ω- 3.42jΩ
Return Loss	- 27.8dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2Ω- 3.21jΩ
Return Loss	- 29.5dB

General Antenna Parameters and Design

Electrical Delay (one direction)	0.943 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

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Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
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E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 03.21.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1087

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

Medium parameters used: f = 750 MHz; σ = 0.902 S/m; ε_r = 42.33; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(10.57, 10.57, 10.57); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

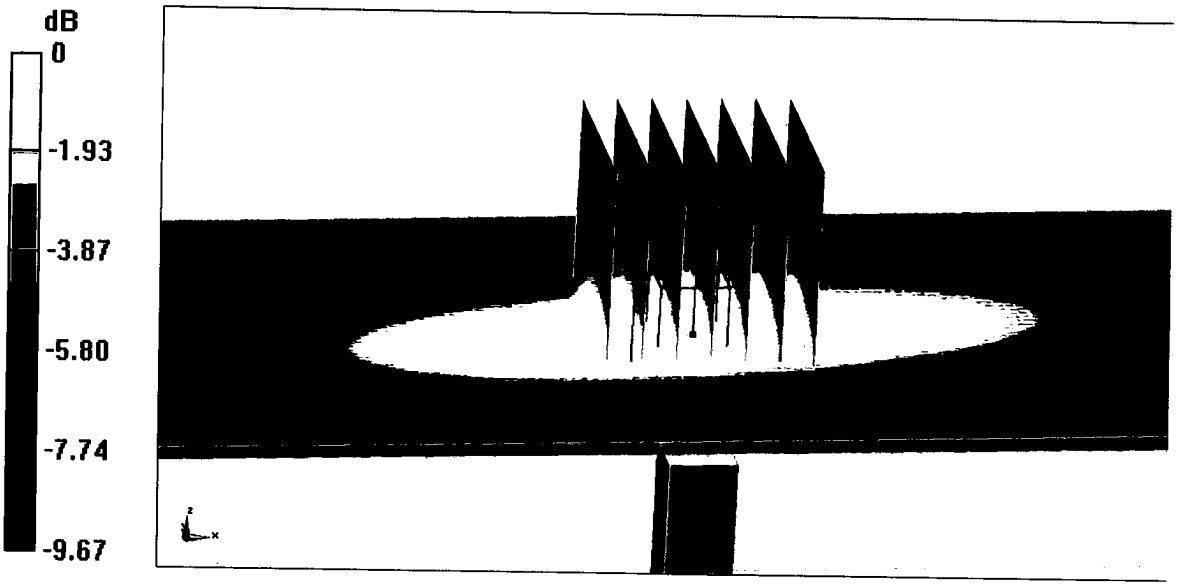
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.28 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.06 W/kg

SAR(1 g) = 2.08 W/kg; SAR(10 g) = 1.4 W/kg

Maximum value of SAR (measured) = 2.74 W/kg



0 dB = 2.74 W/kg = 4.38 dBW/kg

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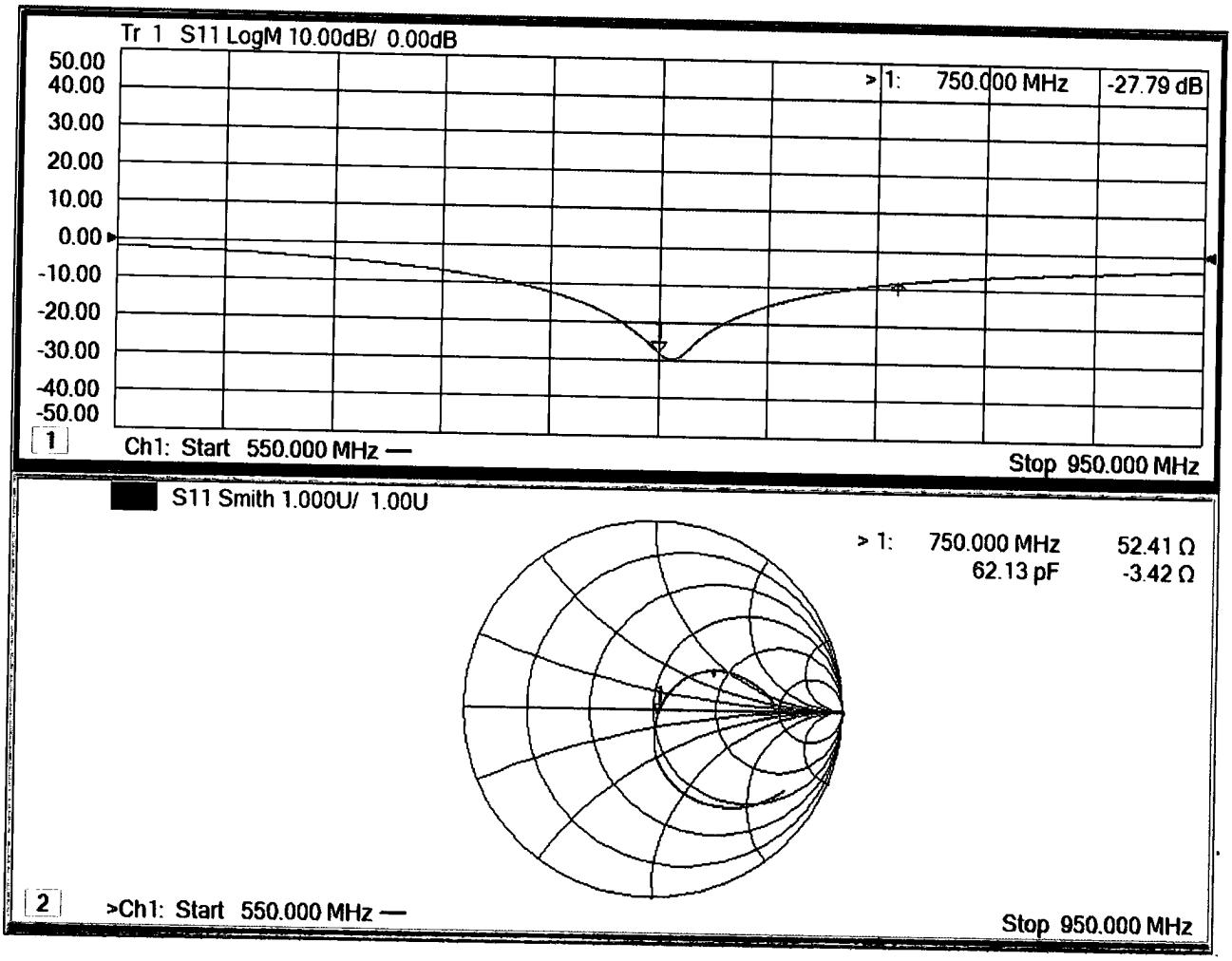
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 03.21.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1087

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

Medium parameters used: f = 750 MHz; σ = 0.966 S/m; ε_r = 54.78; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(10.63, 10.63, 10.63); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

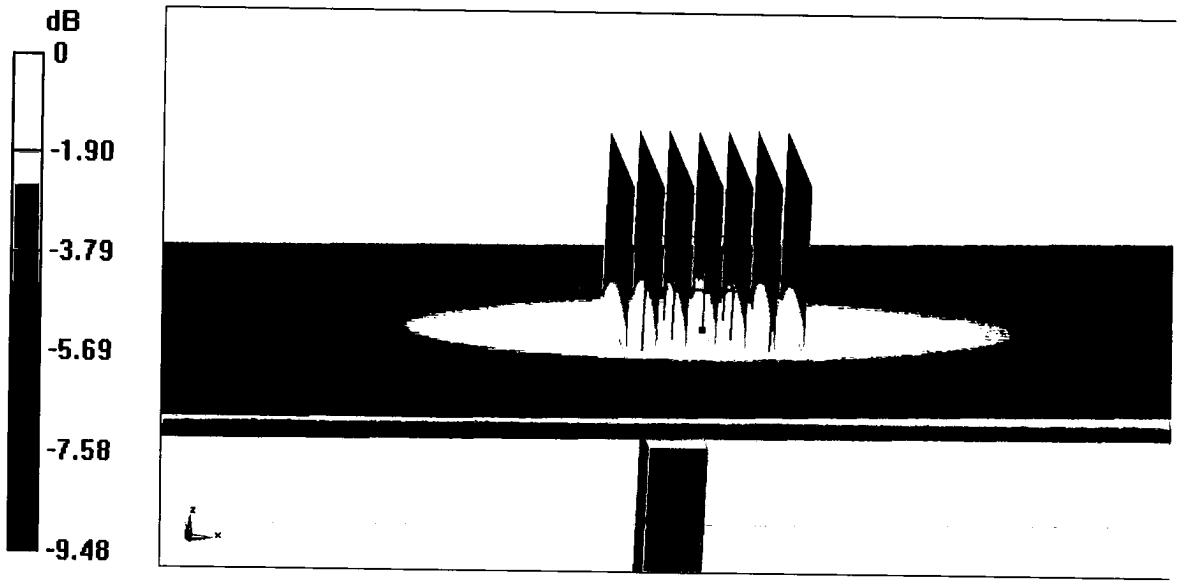
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.31 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.15 W/kg

SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.45 W/kg

Maximum value of SAR (measured) = 2.83 W/kg



0 dB = 2.83 W/kg = 4.52 dBW/kg

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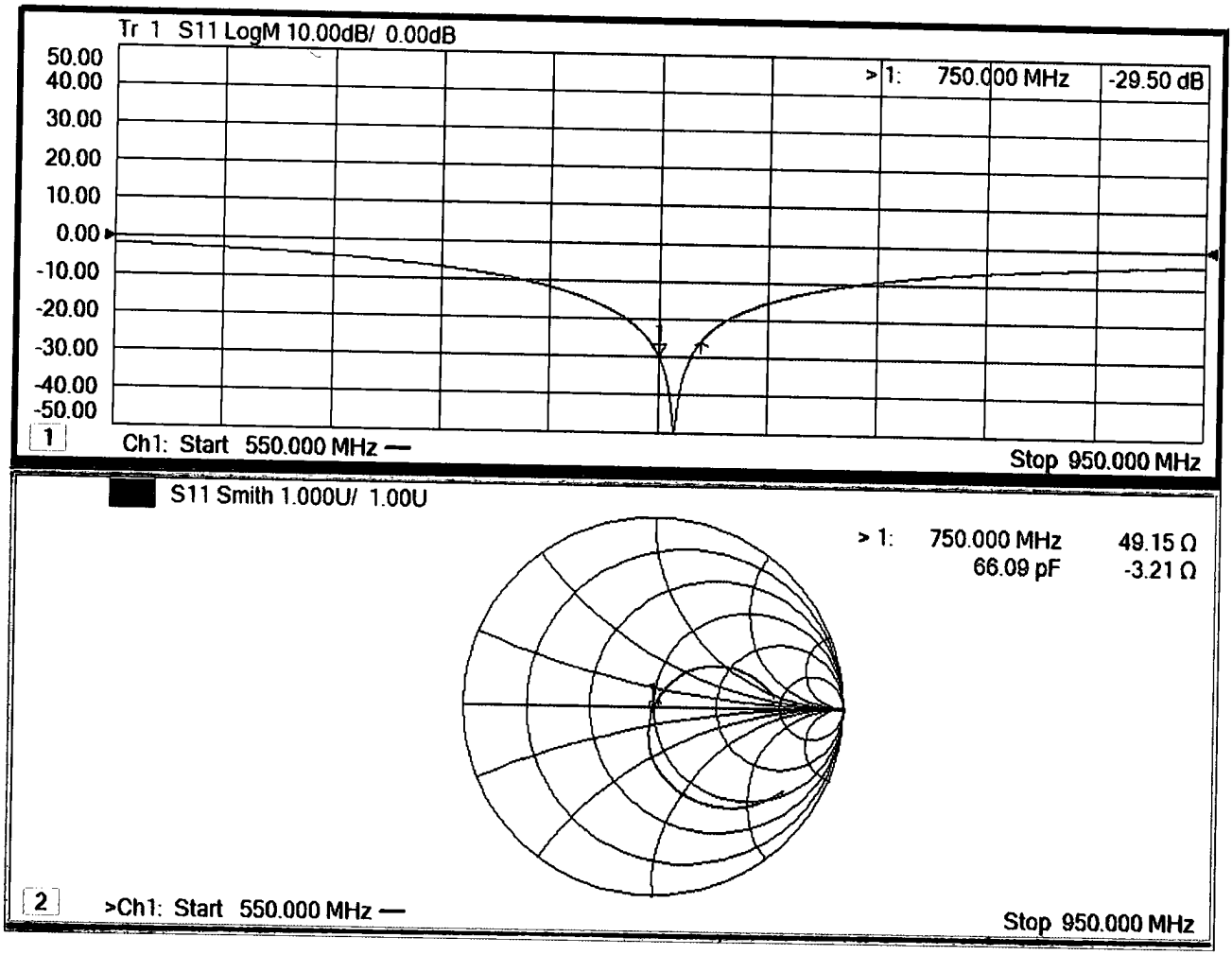
Impedance Measurement Plot for Body TSL



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

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

Accreditation No.: SCS 0108

Client Sporton (Auden)

Certificate No: D835V2-4d151_Mar18

CALIBRATION CERTIFICATE

Object: D835V2 - SN:4d151

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: March 26, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

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

Issued: March 26, 2018

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.1 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.66 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.23 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.58 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.31 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.3 Ω - 2.3 jΩ
Return Loss	- 31.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.4 Ω - 4.8 jΩ
Return Loss	- 25.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.392 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 27, 2012

DASY5 Validation Report for Head TSL

Date: 26.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d151

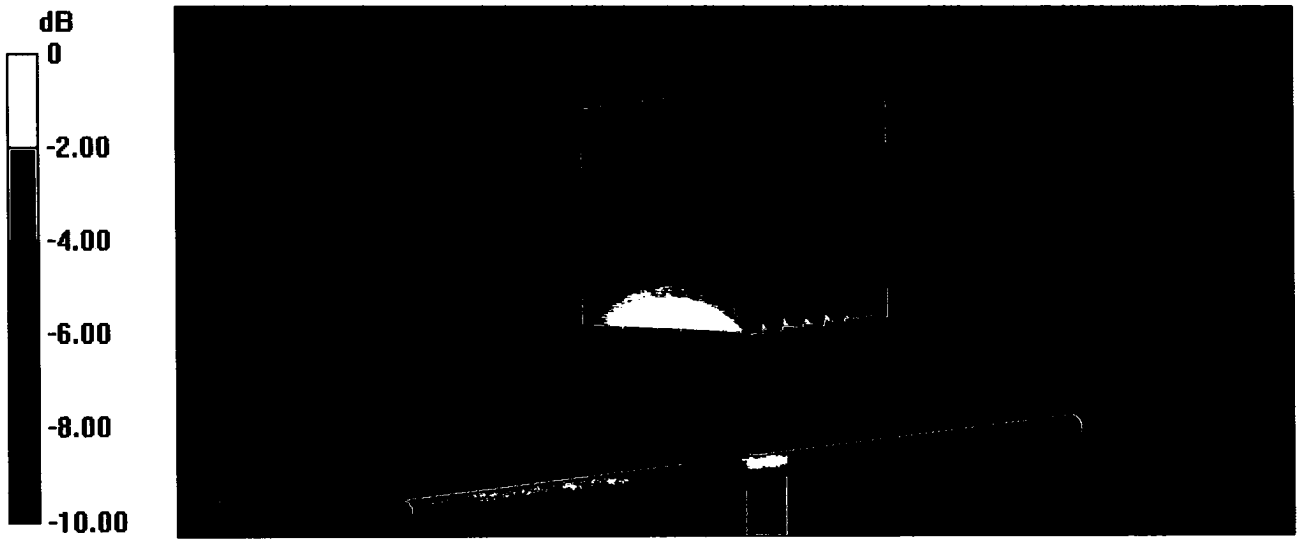
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.91 S/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

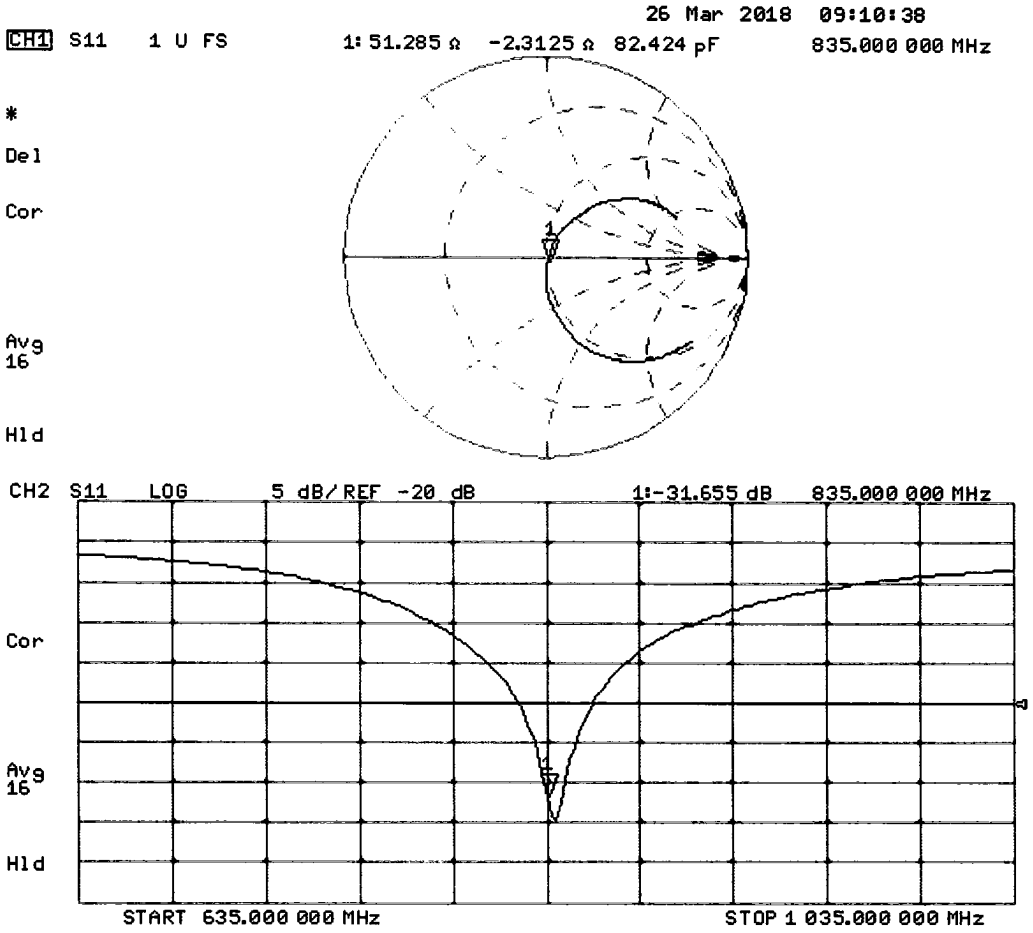
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 63.64 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.78 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.32 W/kg



0 dB = 3.32 W/kg = 5.21 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 26.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d151

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 S/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

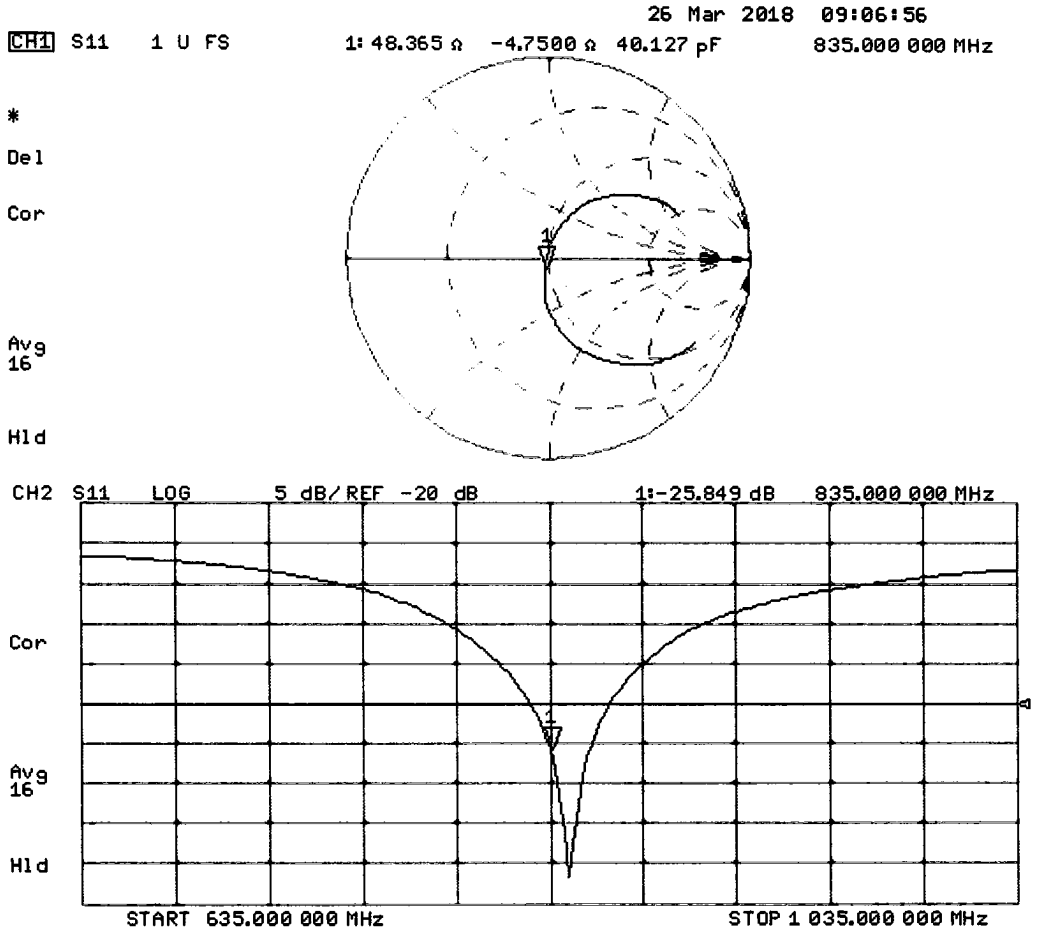
- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.45 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.21 W/kg

0 dB = 3.21 W/kg = 5.07 dBW/kg

Impedance Measurement Plot for Body TSL



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CNAS L0570

Client **Sporton** **Certificate No: Z18-60048**

CALIBRATION CERTIFICATE

Object D1750V2 - SN: 1090

Calibration Procedure(s) FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: March 23, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Power sensor NRV-Z5	100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Reference Probe EX3DV4	SN 7464	12-Sep-17(SPEAG,No.EX3-7464_Sep17)	Sep-18
DAE4	SN 1525	02-Oct-17(SPEAG,No.DAE4-1525_Oct17)	Oct-18
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzer E5239A	MY55491241	29-Jun-17 (CTTL, No.J18X00561)	Jun-18

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

Issued: March 27, 2018

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Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.33 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**37.4 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	4.97 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.0 mW /g ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.0 ± 6 %	1.45 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.27 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**37.5 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	4.94 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**19.9 mW /g ± 18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.5Ω- 1.57 jΩ
Return Loss	- 30.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.9Ω- 2.10 jΩ
Return Loss	- 23.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.126 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 03.23.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1090

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

Medium parameters used: f = 1750 MHz; σ = 1.332 S/m; εr = 38.93; ρ = 1000 kg/m3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.7, 8.7, 8.7); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

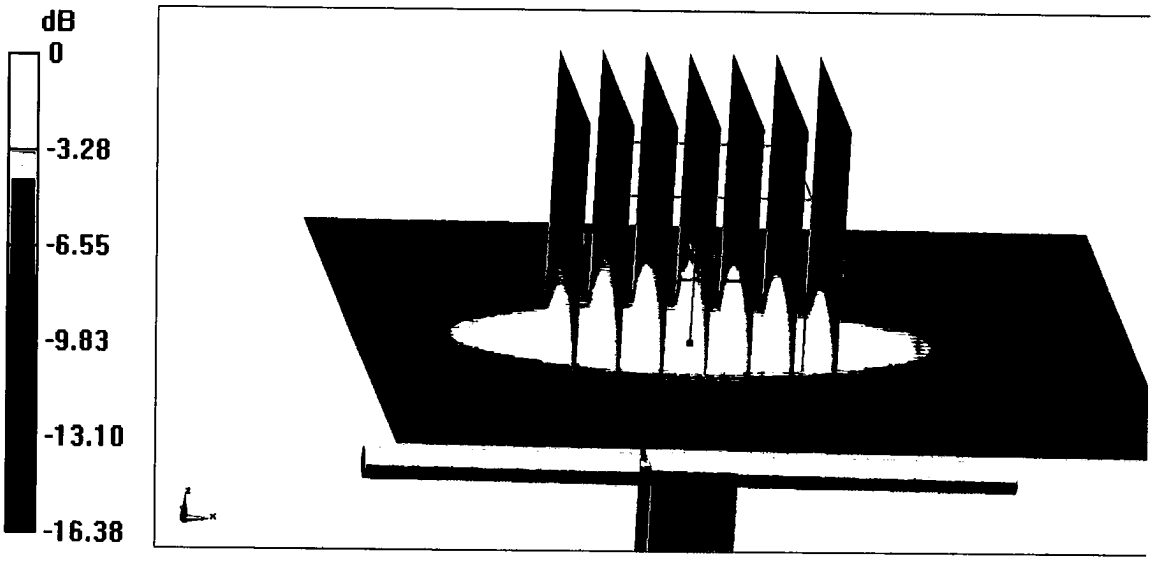
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.7 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.9 W/kg

SAR(1 g) = 9.26 W/kg; SAR(10 g) = 4.97 W/kg

Maximum value of SAR (measured) = 14.2 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

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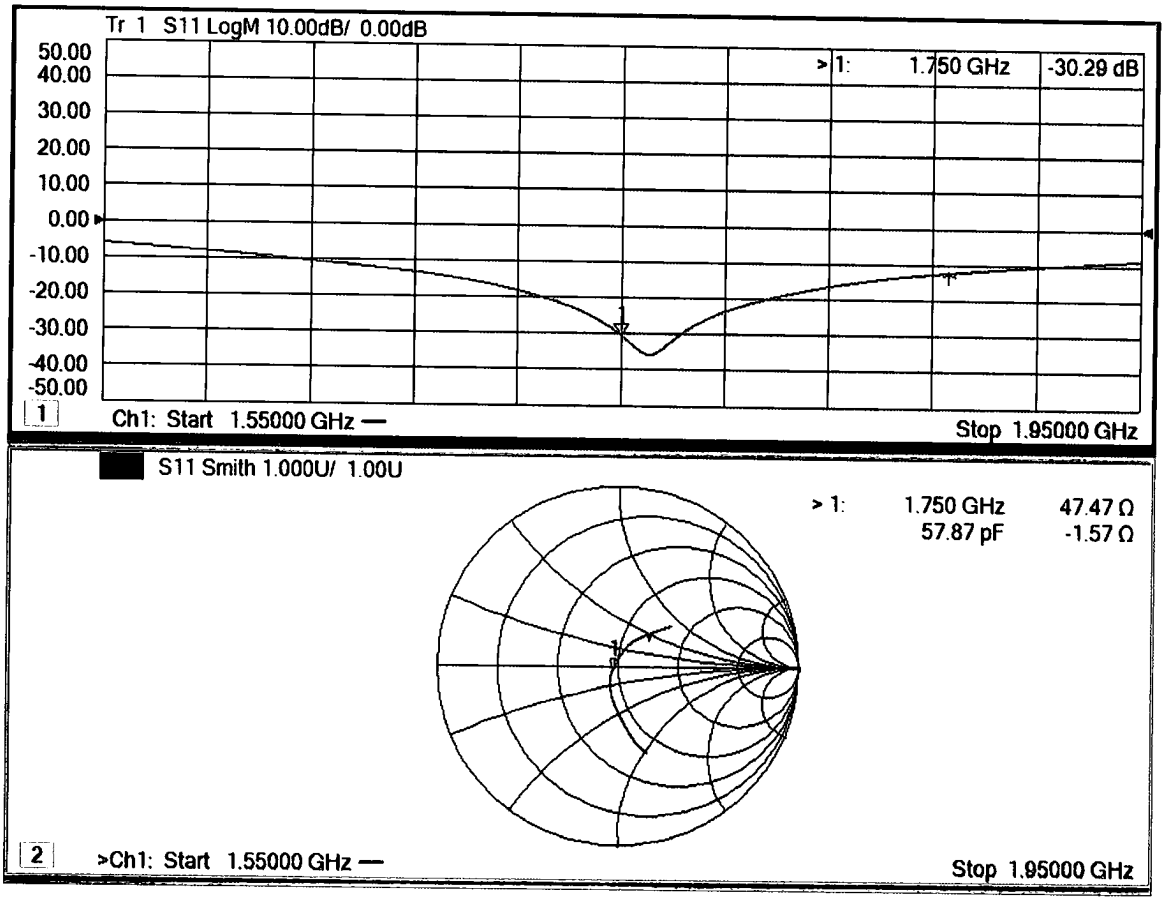
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 03.23.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1090

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

Medium parameters used: f = 1750 MHz; σ = 1.447 S/m; ε_r = 51.98; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.6, 8.6, 8.6); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

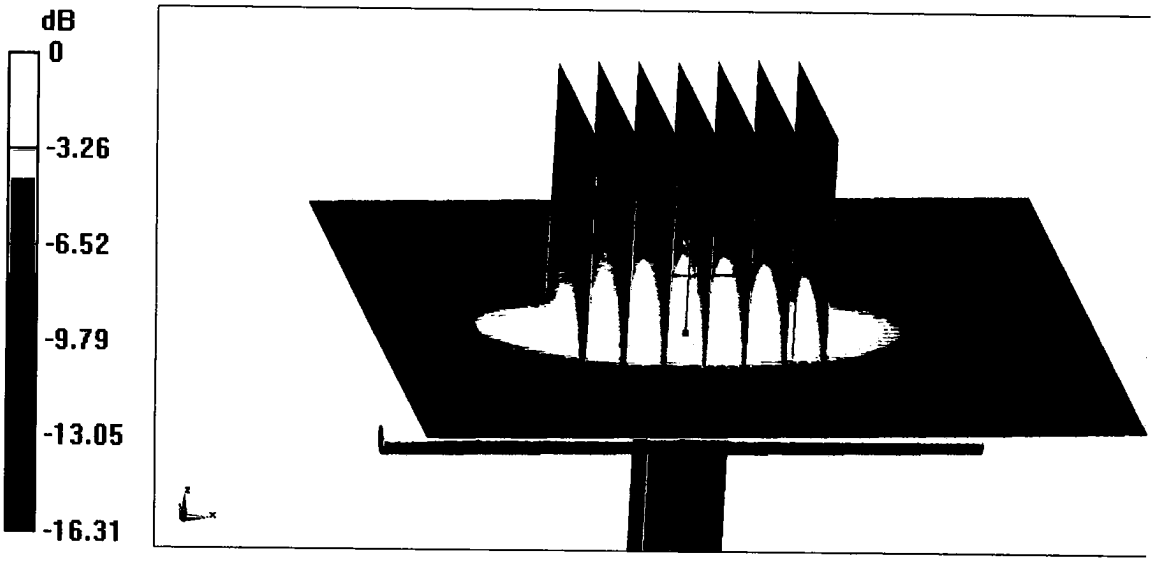
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 90.23 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.27 W/kg; SAR(10 g) = 4.94 W/kg

Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

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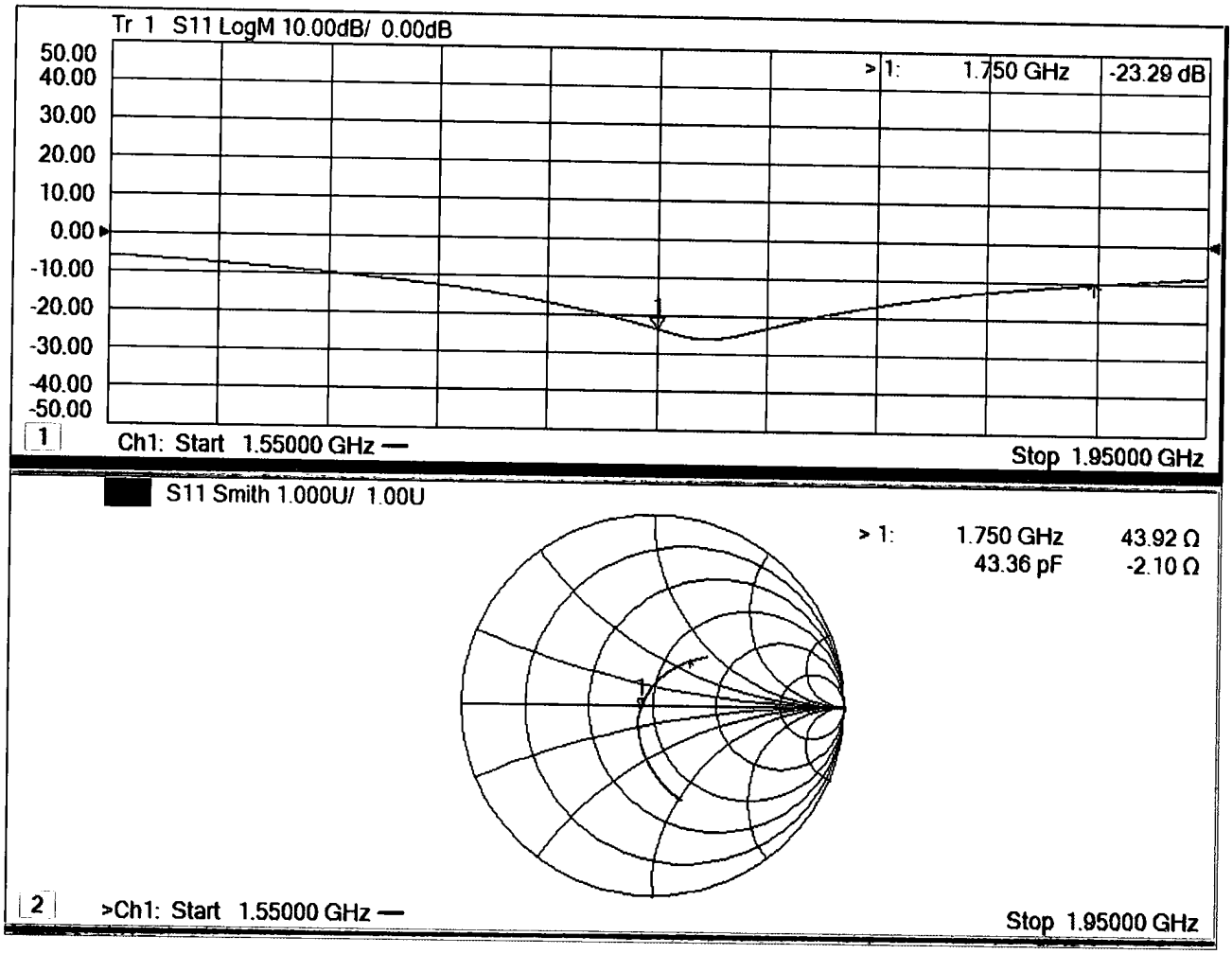
Impedance Measurement Plot for Body TSL



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Client **Sporton** **Certificate No: Z18-60049**

CALIBRATION CERTIFICATE

Object D1900V2 - SN: 5d170

Calibration Procedure(s) FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: March 25, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Power sensor NRV-Z5	100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Reference Probe EX3DV4	SN 7464	12-Sep-17(SPEAG,No.EX3-7464_Sep17)	Sep-18
DAE4	SN 1525	02-Oct-17(SPEAG,No.DAE4-1525_Oct17)	Oct-18
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzer E5239A	MY55491241	29-Jun-17 (CTTL, No.J18X00561)	Jun-18

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

Issued: March 27, 2018

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lossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.39 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.97 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.9 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.14 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.6 mW /g ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.98 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.7 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.17 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 mW /g ± 18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.6Ω+ 4.18jΩ
Return Loss	- 26.4dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.1Ω+ 4.53jΩ
Return Loss	- 26.0dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.107 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 03.23.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d170

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

Medium parameters used: f = 1900 MHz; σ = 1.386 S/m; εr = 38.9; ρ = 1000 kg/m3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.39, 8.39, 8.39); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

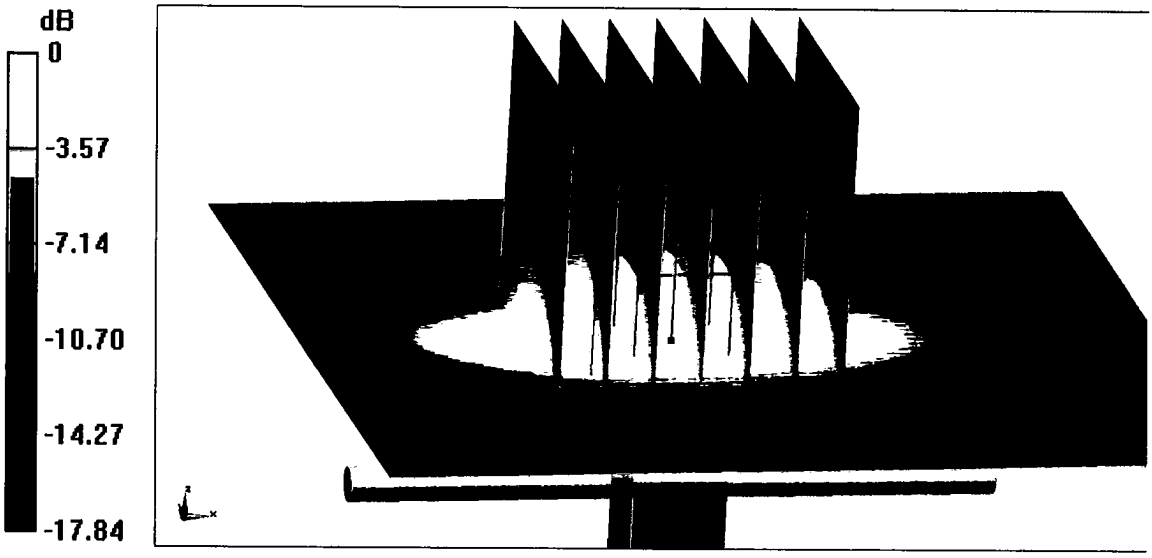
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.9 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 19.1 W/kg

SAR(1 g) = 9.97 W/kg; SAR(10 g) = 5.14 W/kg

Maximum value of SAR (measured) = 15.8 W/kg



0 dB = 15.8 W/kg = 11.99 dBW/kg

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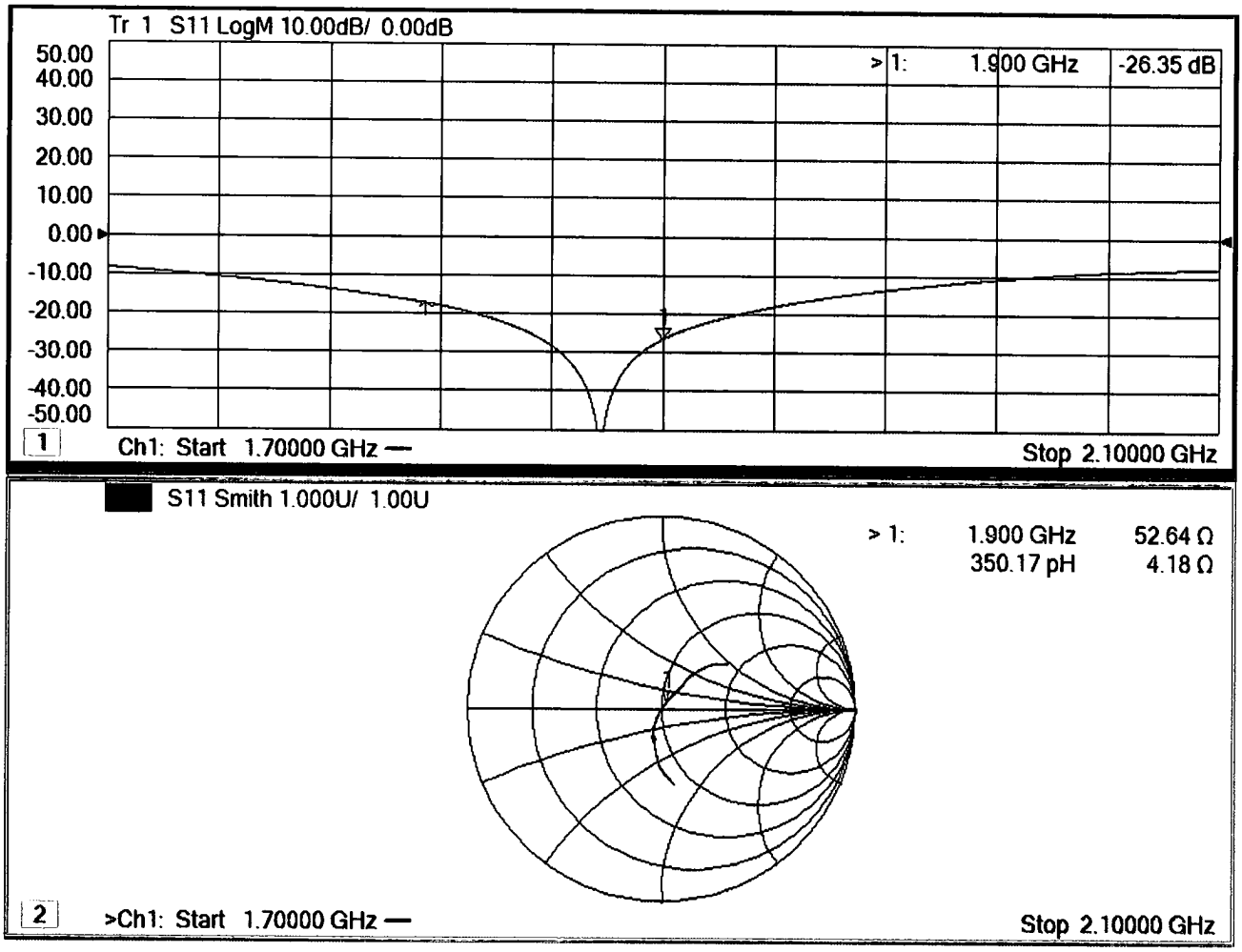
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 03.25.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d170

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

Medium parameters used: f = 1900 MHz; σ = 1.488 S/m; ε_r = 54.73; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.32, 8.32, 8.32); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

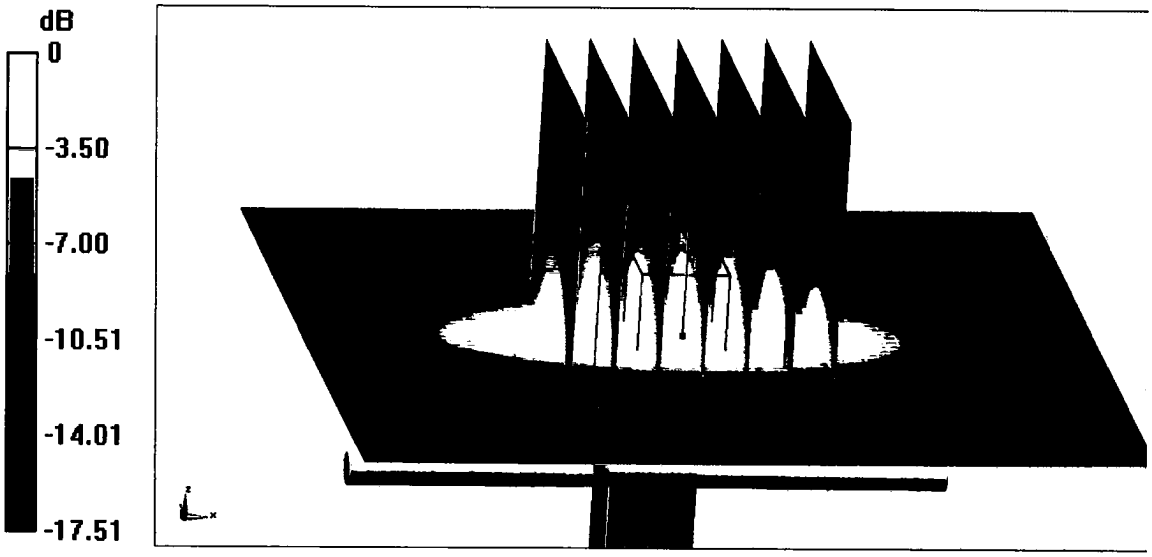
System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.38 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 9.98 W/kg; SAR(10 g) = 5.17 W/kg

Maximum value of SAR (measured) = 15.5 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg

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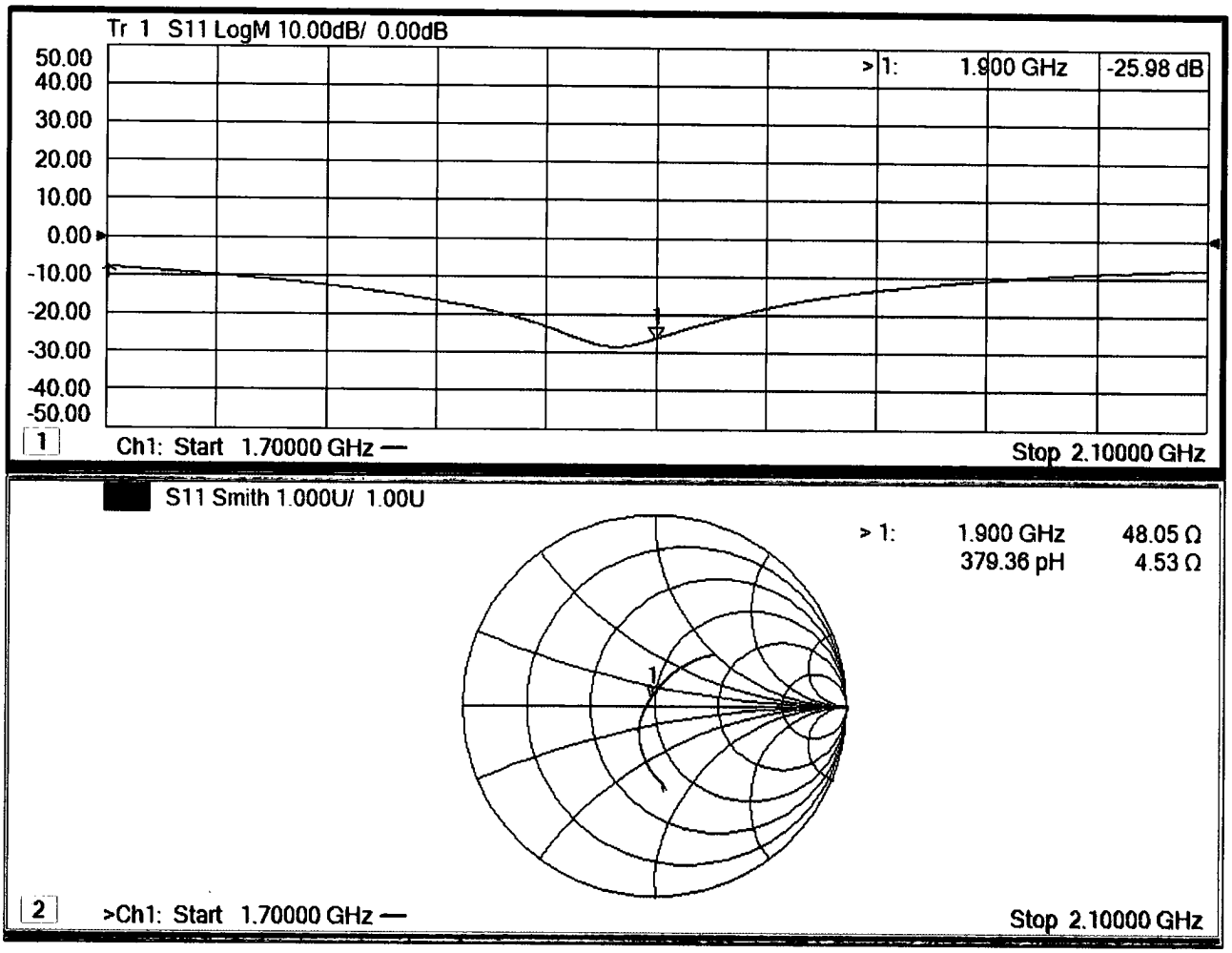
Impedance Measurement Plot for Body TSL



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Client **Sporton** **Certificate No: Z18-60045**

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 908

Calibration Procedure(s) FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: March 22, 2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102083	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Power sensor NRV-Z5	100542	01-Nov-17 (CTTL, No.J17X08756)	Oct-18
Reference Probe EX3DV4	SN 7464	12-Sep-17(SPEAG,No.EX3-7464_Sep17)	Sep-18
DAE4	SN 1525	02-Oct-17(SPEAG,No.DAE4-1525_Oct17)	Oct-18
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	23-Jan-18 (CTTL, No.J18X00560)	Jan-19
NetworkAnalyzer E5239A	MY55491241	29-Jun-17 (CTTL, No.J18X00561)	Jun-18

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

Issued: March 25, 2018

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Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY52	52.10.0.1446
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**51.8 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.04 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.1 mW /g ± 18.7 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.3 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	<1.0 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.9 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**50.7 mW /g ± 18.8 % (k=2)**
SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	5.92 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.4 mW /g ± 18.7 % (k=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.6Ω+ 3.68jΩ
Return Loss	- 24.0dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	53.8Ω+ 3.05jΩ
Return Loss	- 26.6dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.062 ns

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

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

Additional EUT Data

Manufactured by	SPEAG

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E-mail: cttl@chinattl.com http://www.chinattl.cn

DASY5 Validation Report for Head TSL Date: 03.22.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 908

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

Medium parameters used: f = 2450 MHz; σ = 1.841 S/m; εr = 40.32; ρ = 1000 kg/m3

Phantom section: Center Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(7.89, 7.89, 7.89); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

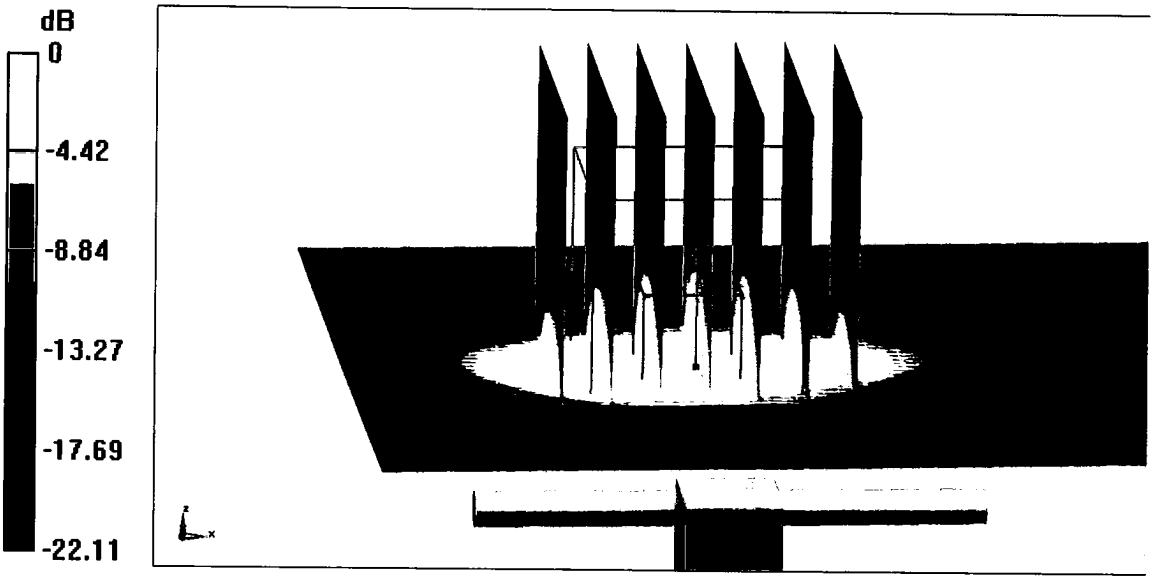
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.0 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 26.9W/kg

SAR(1 g) = 13 W/kg; SAR(10 g) = 6.04 W/kg

Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

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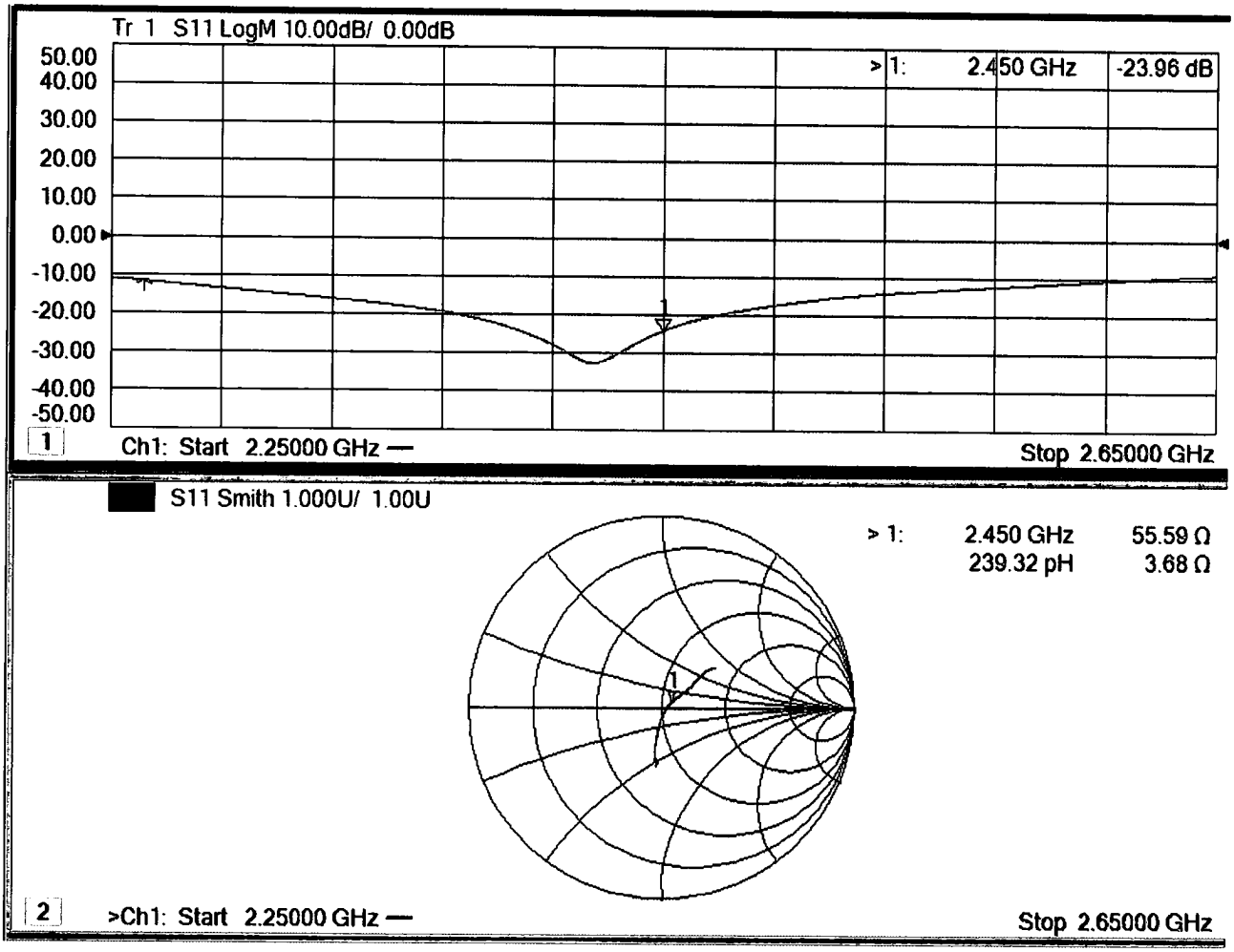
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL Date: 03.22.2018

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 908

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

Medium parameters used: f = 2450 MHz; σ = 1.998 S/m; ε_r = 51.28; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN7464; ConvF(8.09, 8.09, 8.09); Calibrated: 9/12/2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1525; Calibrated: 10/2/2017
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1161/1
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

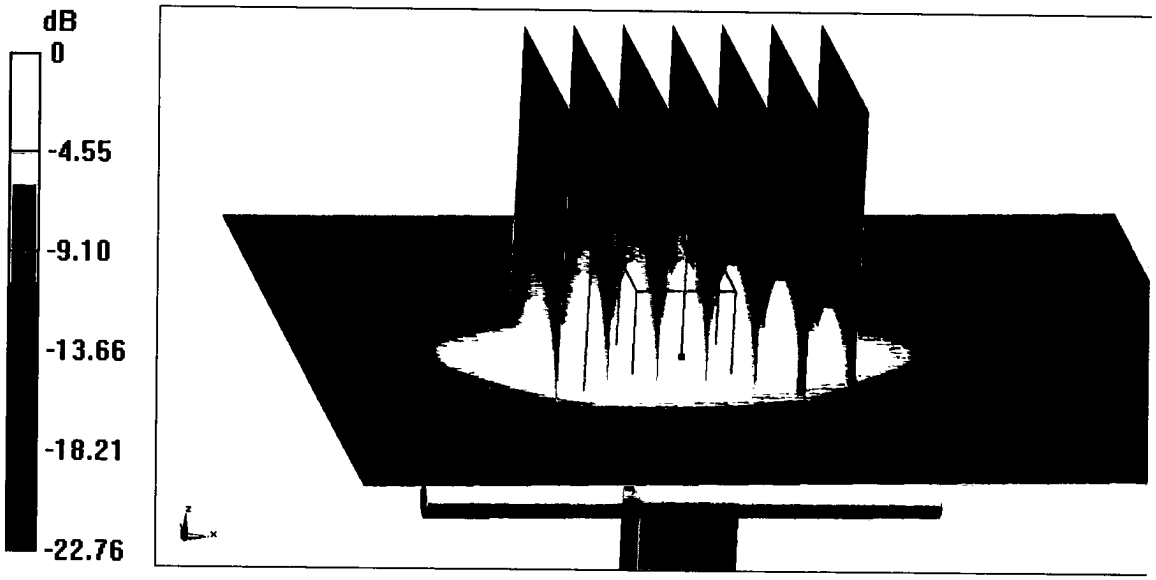
Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.11 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 27.2 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 5.92 W/kg

Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg = 13.34 dBW/kg

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Impedance Measurement Plot for Body TSL