FCC SAR Test Report

APPLICANT	:	Motorola Solutions, Inc.
EQUIPMENT	:	WAVE TWO-WAY RADIO TLK 100
BRAND NAME	:	Motorola
MODEL NAME	:	TLK 100
MODEL NUMBER	:	HK2112A
FCC ID	:	AZ489FT7117
STANDARD	:	FCC 47 CFR PART 2 (2.1093)

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has 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 Inc. (Kunshan), the test report shall not be reproduced except in full.

Si Zhang

Approved by: Si Zhang

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FA850818-02	01	Initial issue of report	Jan. 06, 2023

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Motorola Solutions, Inc., WAVE TWO-WAY RADIO TLK 100, TLK 100**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary		Highest Simultaneous Transmission 1g SAR (W/kg)
			Face (Separation 25mm)	Body-worn (Separation 0mm)	
			1g SAR (W/kg)		
Licensed	LTE	Band 13	**0.62**	**1.01**	1.19
		Band 5	0.50	0.77	
		Band 4	0.29	0.37	
		Band 2	0.42	0.39	
DTS	WLAN	2.4GHz WLAN	<0.10	0.18	1.19
NII		5GHz WLAN	<0.10	<0.10	1.05
DSS	2.4GHz Band	Bluetooth		0.12	1.13
Date of Testing:			2018/7/19 ~ 2018/8/8		

Note: This is a variant report for TLK 100. The difference between current and previous project was only enabled 802.11ac VHT20/VHT40/VHT80 mode by software. According to the difference, only measured 802.11ac VHT20/VHT40/VHT80 mode conducted power, for 802.11ac no need to perform SAR testing base on lower tune up power, and the change has no influence on the test results, all the test results are leveraged from original report FA850818.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR) 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

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-KS	CN1257	314309

Applicant	
Company Name	Motorola Solutions, Inc.
Address	8000 West Sunrise Blvd., Ft Lauderdale, Florida 33322, United States

Manufacturer	
Company Name	Motorola Solutions, Inc.
Address	8000 West Sunrise Blvd., Ft Lauderdale, Florida 33322, United States

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 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D05 SAR for LTE Devices v02r05

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	WAVE TWO-WAY RADIO TLK 100
Brand Name	Motorola
Model Name	TLK 100
Model Number	HK2112A
FCC ID	AZ489FT7117
IMEI Code	355661090007196
Wireless Technology and Frequency Range	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 13: 779.5 MHz ~ 784.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	P3
SW Version	TLK100_BASE_ENG_R03_05_01
EUT Stage	Production Unit

Remark:
1. This device has PTT (push-to-talk) function, so perform 25mm in-front-of the face SAR. For the device can’t support held-to-ear operating mode, so no need to considering head SAR testing.
2. The device can use with assigned accessory manufacturer offered, so perform 0mm body worn accessory SAR.

4.2 Specification of Accessory

Specification of Accessory				
Battery	**Brand Name**	MOTOROLA	**Model Name**	PMNN4468A
	Power Rating	3.7~4.2Vdc, 2300mAh/8.5Wh	**Type**	Li-ion
Earphone 1	**Brand Name**	Motorola	**Model Name**	PMLN7189A
	Signal Line Type	1.28 meter, non-shielded cable, without ferrite core		
Earphone 2	**Brand Name**	Motorola	**Model Name**	PMLN7156A
	Signal Line Type	1.18 meter, non-shielded cable, without ferrite core		
Earphone 3	**Brand Name**	Motorola	**Model Name**	PMLN7158A
	Signal Line Type	2.09meter, non-shielded cable, without ferrite core		
Earphone 4	**Brand Name**	Motorola	**Model Name**	PMLN7157A
	Signal Line Type	1.65 meter, non-shielded cable, without ferrite core		
Earphone 5	**Brand Name**	Motorola	**Model Name**	PMLN7159A
	Signal Line Type	1.67 meter, non-shielded cable, without ferrite core		
Swivel Carry Holster	**Brand Name**	Motorola	**Model Name**	PMLN7932A
Belt Clip (Heavy-Duty)	**Brand Name**	Motorola	**Model Name**	PMLN7128A

Specification of Antenna		
Antenna	**Antenna Type**	**Model Name**
WWAN Main Antenna	External Antenna	SZ08171(Motorola #: HKAN4002A)
	FPC Connector Antenna	SZ0817N
WWAN Diversity Antenna	PCB Antenna	SZ08174
Bluetooth/WLAN Antenna	Internal FPC Antenna	SZ0817B

4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05	
FCC ID	AZ489FT7117
Equipment Name	WAVE TWO-WAY RADIO TLK 100
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 13: 779.5 MHz ~ 784.5 MHz
Channel Bandwidth	LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz
uplink modulations used	QPSK / 16QAM
LTE Voice / Data requirements	Data only
LTE version	R8, Cat 1
LTE MPR permanently built-in by design	(see Table 6.2.3-1 below)
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3

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

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 13

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

5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

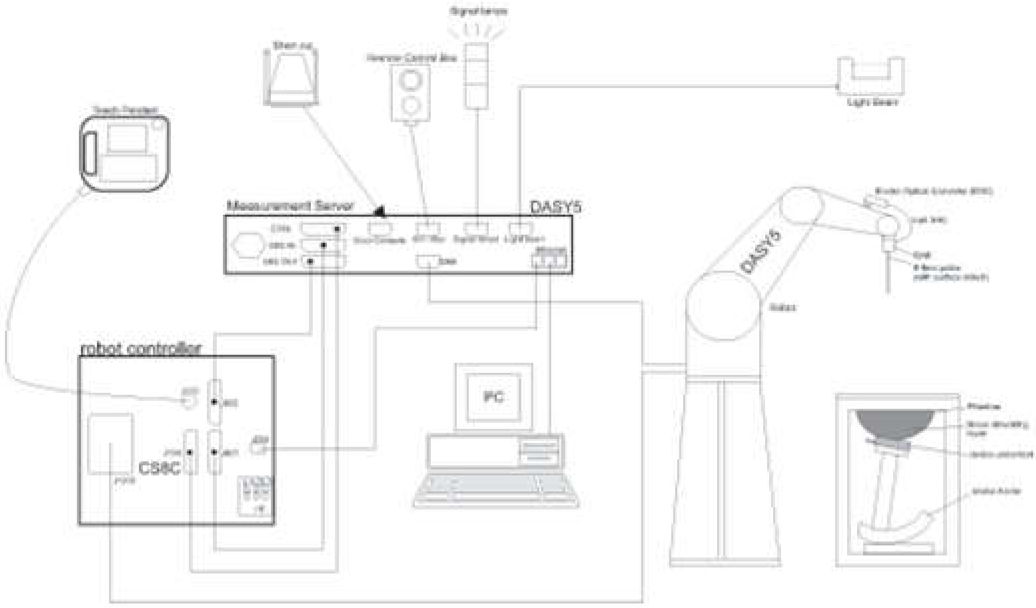
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



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

7.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<EX3DV4 Probe>

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

7.2 Data Acquisition Electronics (DAE)

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

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

Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

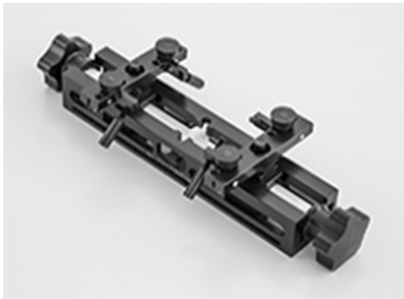
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.

Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

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

8.2 Power Reference Measurement

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

8.3 Area Scan

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

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

<table>
<tr><th></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td>Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td>Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
</table>

8.4 Zoom Scan

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

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

			$\leq$ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			$\leq$ 2 GHz: $\leq$ 8 mm 2 – 3 GHz: $\leq$ 5 mm*	3 – 4 GHz: $\leq$ 5 mm* 4 – 6 GHz: $\leq$ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$\leq$ 5 mm	3 – 4 GHz: $\leq$ 4 mm 4 – 5 GHz: $\leq$ 3 mm 5 – 6 GHz: $\leq$ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	$\leq$ 4 mm	3 – 4 GHz: $\leq$ 3 mm 4 – 5 GHz: $\leq$ 2.5 mm 5 – 6 GHz: $\leq$ 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		$\geq$ 30 mm	3 – 4 GHz: $\geq$ 28 mm 4 – 5 GHz: $\geq$ 25 mm 5 – 6 GHz: $\geq$ 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 $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1065	2017/12/4	2018/12/3
SPEAG	835MHz System Validation Kit	D835V2	4d091	2017/12/5	2018/12/4
SPEAG	1750MHz System Validation Kit	D1750V2	1069	2017/12/5	2018/12/4
SPEAG	1900MHz System Validation Kit	D1900V2	5d118	2017/12/6	2018/12/5
SPEAG	2450MHz System Validation Kit	D2450V2	840	2017/12/7	2018/12/6
SPEAG	5000MHz System Validation Kit	D5GHzV2	1006	2017/9/26	2018/9/25
SPEAG	Data Acquisition Electronics	DAE4	1210	2018/5/28	2019/5/27
SPEAG	Data Acquisition Electronics	DAE4	1338	2017/12/4	2018/12/3
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	2018/5/31	2019/5/30
SPEAG	Dosimetric E-Field Probe	EX3DV4	3954	2018/1/31	2019/1/30
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1542	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1644	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1164	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1842	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201563814	2018/1/18	2019/1/17
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2018/4/17	2019/4/16
SPEAG	Dielectric Probe Kit	DAK-3.5	1138	2017/11/28	2018/11/27
R&S	Signal Generator	SML03	103818	2017/8/17	2018/8/16
Anritsu	Power Meter	ML2495A	1419002	2018/5/14	2019/5/13
Anritsu	Power Sensor	MA2411B	1339124	2018/5/14	2019/5/13
Anritsu	Power Meter	ML2495A	1218006	2017/10/6	2018/10/5
Anritsu	Power Sensor	MA2411B	1207363	2017/10/6	2018/10/5
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	1241332096	2017/8/21	2018/8/20
TES	Liquid thermometer	TES 1310	130023	2018/4/20	2019/4/19
ARRA	Power Divider	A3200-2	N/A	Note	
Agilent	Dual Directional Coupler	778D	50422	Note	
PASTERNACK	Dual Directional Coupler	PE2214-10	N/A	Note	
MCL	Attenuation1	BW-S10W5+	N/A	Note	
MCL	Attenuation2	BW-S10W5+	N/A	Note	
MCL	Attenuation3	BW-S10W5+	N/A	Note	
AR	Amplifier	5S1G4	333096	Note	
mini-circuits	Amplifier	ZVE-3W-83+	162601250	Note	

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

10. System Verification

10.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For 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. 10.1. 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. 10.2.

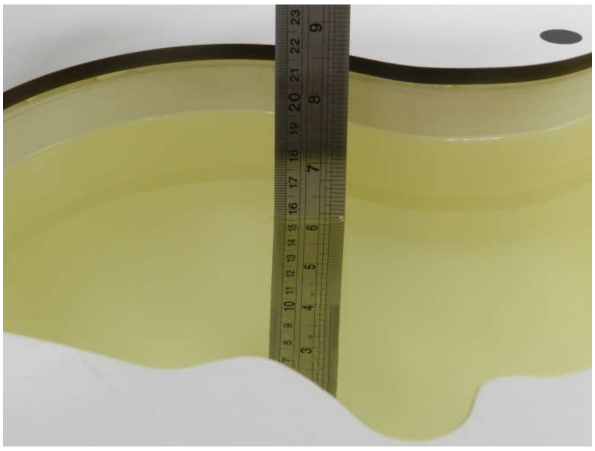


Fig 10.1Photo of Liquid Height for Head SAR

Fig 10.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

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

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

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Head	22.6	0.911	42.828	0.89	41.90	2.36	2.21	±5	2018/8/7
835	Head	22.6	0.912	42.084	0.90	41.50	1.33	1.41	±5	2018/8/7
1750	Head	22.9	1.365	39.524	1.37	40.10	-0.36	-1.44	±5	2018/8/7
1900	Head	22.5	1.403	39.504	1.40	40.00	0.21	-1.24	±5	2018/8/7
2450	Head	22.7	1.837	38.334	1.80	39.20	2.06	-2.21	±5	2018/8/8
5250	Head	22.6	4.565	36.009	4.71	35.90	-3.08	0.30	±5	2018/8/8
5600	Head	22.6	4.968	35.220	5.07	35.50	-2.01	-0.79	±5	2018/8/8
5750	Head	22.6	5.147	34.924	5.22	35.40	-1.40	-1.34	±5	2018/8/8
750	Body	22.5	0.913	57.193	0.96	55.50	-4.90	3.05	±5	2018/7/20
835	Body	22.6	0.984	56.510	0.97	55.20	1.44	2.37	±5	2018/7/19
1750	Body	22.7	1.491	54.729	1.49	53.40	0.07	2.49	±5	2018/7/19
1900	Body	22.8	1.537	53.469	1.52	53.30	1.12	0.32	±5	2018/7/19
2450	Body	22.6	2.017	53.033	1.95	52.70	3.44	0.63	±5	2018/7/21
5250	Body	22.7	5.506	47.956	5.36	48.90	2.72	-1.93	±5	2018/7/22
5600	Body	22.8	5.954	47.367	5.77	48.50	3.19	-2.34	±5	2018/7/22
5750	Body	22.9	6.212	46.182	5.94	48.30	4.58	-4.39	±5	2018/7/22

10.3 System Performance Check Results

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

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2018/8/7	750	Head	250	1065	3857	1210	2.07	8.33	8.28	-0.60
2018/8/7	835	Head	250	4d091	3857	1210	2.46	9.48	9.84	3.80
2018/8/7	1750	Head	250	1069	3857	1210	9.16	37.00	36.64	-0.97
2018/8/7	1900	Head	250	5d118	3857	1210	9.72	39.70	38.88	-2.07
2018/8/8	2450	Head	250	840	3857	1210	12.70	52.60	50.80	-3.42
2018/8/8	5250	Head	100	1006	3857	1210	7.67	78.30	76.7	-2.04
2018/8/8	5600	Head	100	1006	3857	1210	8.05	85.00	80.5	-5.29
2018/8/8	5750	Head	100	1006	3857	1210	7.78	78.50	77.8	-0.89
2018/7/20	750	Body	250	1065	3954	1338	2.15	8.72	8.6	-1.38
2018/7/19	835	Body	250	4d091	3857	1210	2.57	9.72	10.28	5.76
2018/7/19	1750	Body	250	1069	3857	1210	9.34	38.00	37.36	-1.68
2018/7/19	1900	Body	250	5d118	3857	1210	9.83	40.40	39.32	-2.67
2018/7/21	2450	Body	250	840	3857	1210	13.50	51.90	54	4.05
2018/7/22	5250	Body	100	1006	3857	1210	7.72	77.00	77.2	0.26
2018/7/22	5600	Body	100	1006	3857	1210	8.13	80.10	81.3	1.50
2018/7/22	5750	Body	100	1006	3857	1210	7.51	75.10	75.1	0.00

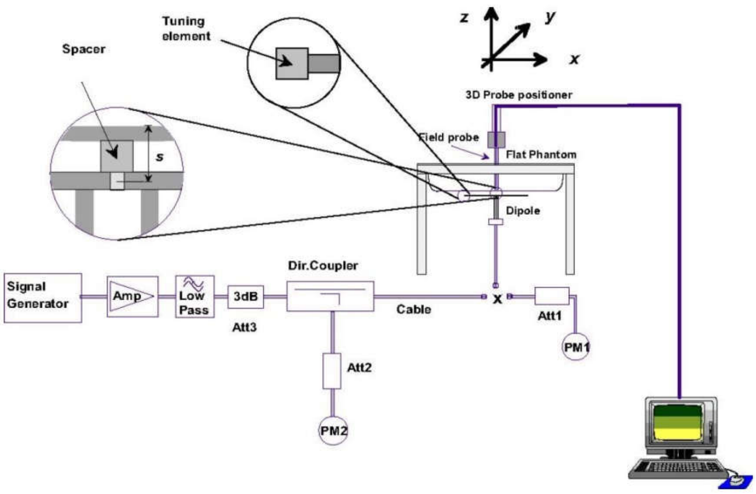


Fig 10.3.1 System Performance Check Setup

Fig 10.3.2 Setup Photo

11. Conducted RF Output Power (Unit: dBm)

<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 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.

<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	22.90	22.69	22.68	24.5	0
20	QPSK	1	49	22.91	22.93	22.73		
20	QPSK	1	99	22.61	22.90	22.63		
20	QPSK	50	0	21.98	21.86	21.95	23.5	1
20	QPSK	50	24	22.01	22.07	21.83		
20	QPSK	50	50	21.92	21.94	21.78		
20	QPSK	100	0	21.83	21.79	21.71		
20	16QAM	1	0	21.84	21.85	21.71	23.5	1
20	16QAM	1	49	21.82	21.74	21.88		
20	16QAM	1	99	21.74	21.64	21.63		
20	16QAM	12	0	21.96	22.01	21.96	22.5	2
20	16QAM	12	44	22.00	22.08	21.78		
20	16QAM	12	88	22.00	22.08	21.91		
20	16QAM	27	0	20.57	20.77	20.72		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	22.81	22.90	22.91	24.5	0
15	QPSK	1	37	22.92	22.75	22.70		
15	QPSK	1	74	22.82	22.92	22.77		
15	QPSK	36	0	21.82	21.70	21.76	23.5	1
15	QPSK	36	20	21.85	21.77	21.76		
15	QPSK	36	39	21.85	21.91	21.74		
15	QPSK	75	0	21.66	21.71	21.64		
15	16QAM	1	0	21.64	21.76	21.79	23.5	1
15	16QAM	1	37	21.70	21.75	21.57		
15	16QAM	1	74	21.66	21.56	21.53		
15	16QAM	12	0	21.83	22.00	21.97	22.5	2
15	16QAM	12	31	21.81	21.70	21.56		
15	16QAM	12	63	21.59	21.86	21.91		
15	16QAM	27	0	20.59	20.60	20.57		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.63	22.50	22.58	24.5	0
10	QPSK	1	25	22.78	22.81	22.57		
10	QPSK	1	49	22.76	22.80	22.60		
10	QPSK	25	0	21.75	21.73	21.73	23.5	1
10	QPSK	25	12	21.77	21.72	21.72		
10	QPSK	25	25	21.66	21.78	21.72		
10	QPSK	50	0	21.81	21.73	21.88		
10	16QAM	1	0	21.62	21.59	21.98	23.5	1
10	16QAM	1	25	21.60	21.50	21.54		
10	16QAM	1	49	21.52	21.58	21.52		
10	16QAM	12	0	21.59	21.44	21.79	22.5	2
10	16QAM	12	19	21.90	21.45	21.42		
10	16QAM	12	38	21.72	21.53	21.55		
10	16QAM	27	0	20.52	20.59	20.50		

Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.61	22.59	22.56	24.5	0
5	QPSK	1	12	22.62	22.59	22.77		
5	QPSK	1	24	22.51	22.56	22.51		
5	QPSK	12	0	21.64	21.57	21.57	23.5	1
5	QPSK	12	7	21.74	21.50	21.56		
5	QPSK	12	13	21.69	21.51	21.56		
5	QPSK	25	0	21.71	21.57	21.70		
5	16QAM	1	0	21.51	21.55	21.51	23.5	1
5	16QAM	1	12	21.59	21.53	21.53		
5	16QAM	1	24	21.59	21.60	21.59		
5	16QAM	12	0	20.79	20.57	20.50	22.5	2
5	16QAM	12	7	20.67	20.59	20.59		
5	16QAM	12	13	20.68	20.60	20.50		
5	16QAM	25	0	20.67	20.69	20.71		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.77	22.70	22.58	24.5	0
3	QPSK	1	8	22.72	22.61	22.77		
3	QPSK	1	14	22.65	22.65	22.85		
3	QPSK	8	0	21.82	21.77	21.66	23.5	1
3	QPSK	8	4	21.83	21.76	21.68		
3	QPSK	8	7	21.78	21.83	21.80		
3	QPSK	15	0	21.71	21.73	21.73		
3	16QAM	1	0	21.65	21.53	21.61	23.5	1
3	16QAM	1	8	21.65	21.55	21.62		
3	16QAM	1	14	21.63	21.55	21.61		
3	16QAM	8	0	20.80	20.72	20.80	22.5	2
3	16QAM	8	4	20.75	20.69	20.87		
3	16QAM	8	7	20.74	20.92	20.81		
3	16QAM	15	0	20.76	20.78	20.80		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.74	22.68	22.60	24.5	0
1.4	QPSK	1	3	22.77	22.64	22.65		
1.4	QPSK	1	5	22.67	22.56	22.70		
1.4	QPSK	3	0	22.84	22.66	22.91		
1.4	QPSK	3	1	22.75	22.81	22.83		
1.4	QPSK	3	3	22.77	22.89	22.78		
1.4	QPSK	6	0	21.74	21.62	21.50	23.5	1
1.4	16QAM	1	0	21.62	21.51	21.54	23.5	1
1.4	16QAM	1	3	21.73	21.57	21.51		
1.4	16QAM	1	5	21.65	21.53	21.59		
1.4	16QAM	3	0	21.59	21.59	21.89		
1.4	16QAM	3	1	21.72	21.71	21.52		
1.4	16QAM	3	3	21.75	21.70	21.55		
1.4	16QAM	6	0	20.70	20.67	20.60	22.5	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	23.71	23.69	23.88	25	0
20	QPSK	1	49	24.17	23.67	23.86		
20	QPSK	1	99	23.71	23.72	23.68		
20	QPSK	50	0	22.95	22.69	22.70	24	1
20	QPSK	50	24	22.78	22.68	22.92		
20	QPSK	50	50	22.69	22.58	22.85		
20	QPSK	100	0	22.68	22.46	22.59		
20	16QAM	1	0	22.35	22.45	22.63	24	1
20	16QAM	1	49	22.35	22.24	22.56		
20	16QAM	1	99	22.31	22.26	22.46		
20	16QAM	12	0	22.60	22.62	22.95	23	2
20	16QAM	12	44	22.50	22.60	22.65		
20	16QAM	12	88	22.55	22.59	22.65		
20	16QAM	27	0	21.52	21.39	21.67		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.65	23.62	23.90	25	0
15	QPSK	1	37	23.81	23.61	23.97		
15	QPSK	1	74	23.48	23.47	23.88		
15	QPSK	36	0	22.57	22.64	22.89	24	1
15	QPSK	36	20	22.71	22.58	22.81		
15	QPSK	36	39	22.64	22.55	22.74		
15	QPSK	75	0	22.46	22.59	22.39		
15	16QAM	1	0	22.49	22.45	22.63	24	1
15	16QAM	1	37	22.33	22.45	22.69		
15	16QAM	1	74	22.36	22.22	22.62		
15	16QAM	12	0	22.67	22.67	22.76	23	2
15	16QAM	12	31	22.69	22.58	22.66		
15	16QAM	12	63	22.56	22.68	22.66		
15	16QAM	27	0	21.66	21.70	21.83		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	23.35	23.42	23.54	25	0
10	QPSK	1	25	23.73	23.43	23.85		
10	QPSK	1	49	23.65	23.52	23.81		
10	QPSK	25	0	22.52	22.61	22.70	24	1
10	QPSK	25	12	22.65	22.54	22.84		
10	QPSK	25	25	22.68	22.51	22.75		
10	QPSK	50	0	22.62	22.57	22.72		
10	16QAM	1	0	22.31	22.36	22.62	24	1
10	16QAM	1	25	22.38	22.35	22.62		
10	16QAM	1	49	22.30	22.34	22.68		
10	16QAM	12	0	22.45	22.51	22.64	23	2
10	16QAM	12	19	22.52	22.52	22.67		
10	16QAM	12	38	22.47	22.52	22.81		
10	16QAM	27	0	21.67	21.63	21.73		

Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	23.61	23.51	23.72	25	0
5	QPSK	1	12	23.82	23.50	23.81		
5	QPSK	1	24	23.63	23.66	23.64		
5	QPSK	12	0	22.44	22.60	22.75	24	1
5	QPSK	12	7	22.54	22.57	22.75		
5	QPSK	12	13	22.49	22.55	22.70		
5	QPSK	25	0	22.55	22.52	22.71		
5	16QAM	1	0	22.17	22.39	22.55	24	1
5	16QAM	1	12	22.18	22.35	22.29		
5	16QAM	1	24	22.19	22.26	22.64		
5	16QAM	12	0	21.23	21.40	21.44	23	2
5	16QAM	12	7	21.30	21.50	21.43		
5	16QAM	12	13	21.48	21.48	21.59		
5	16QAM	25	0	21.53	21.53	21.61		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.67	23.56	23.86	25	0
3	QPSK	1	8	23.88	23.39	23.53		
3	QPSK	1	14	23.70	23.74	23.63		
3	QPSK	8	0	22.59	22.59	22.53	24	1
3	QPSK	8	4	22.46	22.66	22.53		
3	QPSK	8	7	22.49	22.57	22.54		
3	QPSK	15	0	22.63	22.64	22.57		
3	16QAM	1	0	22.29	22.43	22.57	24	1
3	16QAM	1	8	22.23	22.37	22.07		
3	16QAM	1	14	22.14	22.43	22.42		
3	16QAM	8	0	21.25	21.58	21.36	23	2
3	16QAM	8	4	21.59	21.56	21.56		
3	16QAM	8	7	21.39	21.64	21.59		
3	16QAM	15	0	21.33	21.58	21.59		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.57	23.78	23.56	25	0
1.4	QPSK	1	3	23.71	23.81	23.76		
1.4	QPSK	1	5	23.54	23.74	23.58		
1.4	QPSK	3	0	23.65	23.86	23.82		
1.4	QPSK	3	1	23.70	23.90	23.84		
1.4	QPSK	3	3	23.70	23.72	23.75		
1.4	QPSK	6	0	22.61	22.59	22.69	24	1
1.4	16QAM	1	0	22.48	22.54	22.47	24	1
1.4	16QAM	1	3	22.48	22.51	22.60		
1.4	16QAM	1	5	22.50	22.52	22.59		
1.4	16QAM	3	0	22.55	22.61	22.64		
1.4	16QAM	3	1	22.67	22.72	22.65		
1.4	16QAM	3	3	22.76	22.73	22.46		
1.4	16QAM	6	0	21.46	21.65	21.63	23	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	22.62	22.82	22.68	24.5	0
10	QPSK	1	25	22.90	22.65	23.10		
10	QPSK	1	49	22.61	22.60	22.63		
10	QPSK	25	0	21.85	21.67	21.74	23.5	1
10	QPSK	25	12	21.76	21.73	21.88		
10	QPSK	25	25	21.72	21.75	21.74		
10	QPSK	50	0	21.79	21.71	21.83		
10	16QAM	1	0	21.50	21.58	21.62	23.5	1
10	16QAM	1	25	21.67	21.54	21.73		
10	16QAM	1	49	21.59	21.61	21.52		
10	16QAM	12	0	21.76	21.87	21.75	22.5	2
10	16QAM	12	19	21.81	21.81	21.88		
10	16QAM	12	38	21.70	21.74	21.55		
10	16QAM	27	0	20.65	20.63	20.73		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.86	22.81	22.88	24.5	0
5	QPSK	1	12	22.80	22.89	23.09		
5	QPSK	1	24	22.76	22.73	22.61		
5	QPSK	12	0	21.83	21.77	21.92	23.5	1
5	QPSK	12	7	21.80	21.76	21.81		
5	QPSK	12	13	21.80	21.75	21.82		
5	QPSK	25	0	21.78	21.79	21.74		
5	16QAM	1	0	21.52	21.57	21.60	23.5	1
5	16QAM	1	12	21.58	21.55	21.55		
5	16QAM	1	24	21.50	21.52	21.56		
5	16QAM	12	0	20.96	20.61	20.84	22.5	2
5	16QAM	12	7	20.99	20.91	20.67		
5	16QAM	12	13	20.93	20.72	20.71		
5	16QAM	25	0	20.91	20.82	20.69		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.78	22.75	22.90	24.5	0
3	QPSK	1	8	22.94	22.68	22.88		
3	QPSK	1	14	22.96	22.81	22.60		
3	QPSK	8	0	21.95	21.91	21.94	23.5	1
3	QPSK	8	4	21.91	21.86	21.80		
3	QPSK	8	7	21.83	21.74	21.78		
3	QPSK	15	0	21.87	21.80	21.76		
3	16QAM	1	0	21.50	21.53	21.85	23.5	1
3	16QAM	1	8	21.51	21.58	21.58		
3	16QAM	1	14	21.52	21.51	21.51		
3	16QAM	8	0	20.86	20.74	20.93	22.5	2
3	16QAM	8	4	20.84	20.80	20.74		
3	16QAM	8	7	20.85	20.77	20.77		
3	16QAM	15	0	20.77	20.68	20.66		

Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.61	22.62	22.57	24.5	0
1.4	QPSK	1	3	22.74	22.63	22.71		
1.4	QPSK	1	5	22.64	22.56	22.50		
1.4	QPSK	3	0	22.79	22.76	22.73		
1.4	QPSK	3	1	22.85	22.94	22.79		
1.4	QPSK	3	3	22.76	22.73	22.66		
1.4	QPSK	6	0	21.65	21.63	21.66	23.5	1
1.4	16QAM	1	0	21.77	21.75	21.54	23.5	1
1.4	16QAM	1	3	21.90	21.58	21.92		
1.4	16QAM	1	5	21.84	21.51	21.53		
1.4	16QAM	3	0	21.56	21.57	21.76		
1.4	16QAM	3	1	21.73	21.52	21.88		
1.4	16QAM	3	3	21.75	21.62	21.85		
1.4	16QAM	6	0	20.62	20.54	20.73	22.5	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	-	23.05	-	25	0
10	QPSK	1	25		23.37			
10	QPSK	1	49		23.10			
10	QPSK	25	0		22.11		24	1
10	QPSK	25	12		22.05			
10	QPSK	25	25		22.15			
10	QPSK	50	0		22.10			
10	16QAM	1	0		22.01		24	1
10	16QAM	1	25		22.22			
10	16QAM	1	49		22.14			
10	16QAM	12	0		22.07		23	2
10	16QAM	12	19		22.12			
10	16QAM	12	38		22.15			
10	16QAM	27	0		21.30			
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	23.09	23.01	23.19	25	0
5	QPSK	1	12	23.36	23.07	23.27		
5	QPSK	1	24	23.27	23.21	23.15		
5	QPSK	12	0	22.07	22.05	22.29	24	1
5	QPSK	12	7	22.21	22.08	22.33		
5	QPSK	12	13	22.03	22.19	22.16		
5	QPSK	25	0	22.04	22.12	22.26		
5	16QAM	1	0	22.12	22.08	22.13	24	1
5	16QAM	1	12	22.26	22.11	22.57		
5	16QAM	1	24	22.19	22.08	22.10		
5	16QAM	12	0	21.12	21.09	21.24	23	2
5	16QAM	12	7	21.23	21.02	21.18		
5	16QAM	12	13	21.06	21.12	21.13		
5	16QAM	25	0	21.18	21.06	21.39		

<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	Duty Cycle %
2.4GHz WLAN	802.11b	CH 1	2412	18.76	20.00	100.00
		CH 6	2437	**19.15**	20.00	
		CH 11	2462	18.61	20.00	
	802.11g	CH 1	2412	14.69	16.00	95.00
		CH 6	2437	15.30	16.00	
		CH 11	2462	14.85	16.00	
	802.11n-HT20	CH 1	2412	13.46	15.00	95.00
		CH 6	2437	14.17	15.00	
		CH 11	2462	13.63	15.00	
	802.11n-HT40	CH 3	2422	11.10	12.00	90.35
		CH 6	2437	10.60	12.00	
		CH 9	2452	10.25	12.00	

<5GHz WLAN >

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	**15.26**	16.00	92.53
		40	5200	15.20	16.00	
		44	5220	15.13	16.00	
		48	5240	15.01	16.00	
	802.11n-HT20 MCS0	36	5180	13.04	14.00	92.36
		40	5200	12.89	14.00	
		44	5220	12.86	14.00	
		48	5240	12.74	14.00	
	802.11n-HT40 MCS0	38	5190	12.30	13.00	89.73
		46	5230	12.11	13.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	**15.14**	16.00	92.53
		56	5280	14.95	16.00	
		60	5300	14.83	16.00	
		64	5320	14.63	16.00	
	802.11n-HT20 MCS0	52	5260	13.30	14.00	92.36
		56	5280	13.16	14.00	
		60	5300	13.08	14.00	
		64	5320	12.91	14.00	
	802.11n-HT40 MCS0	54	5270	12.15	13.00	89.73
		62	5310	11.83	13.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	14.84	16.00	92.53
		116	5580	**14.88**	16.00	
		124	5620	14.87	16.00	
		132	5660	14.73	16.00	
		140	5700	14.69	16.00	
		144	5720	14.82	16.00	
	802.11n-HT20 MCS0	100	5500	13.03	14.00	92.36
		116	5580	13.02	14.00	
		124	5620	12.97	14.00	
		132	5660	13.04	14.00	
		140	5700	13.00	14.00	
		144	5720	13.06	14.00	
	802.11n-HT40 MCS0	102	5510	11.95	13.00	89.73
		110	5550	12.00	13.00	
		126	5630	11.98	13.00	
		134	5670	11.89	13.00	
		142	5710	11.94	13.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a MCS0	149	5745	14.56	16.00	92.53
		157	5785	14.64	16.00	
		165	5825	**15.12**	16.00	
	802.11n-HT20 MCS0	149	5745	12.39	14.00	92.36
		157	5785	12.49	14.00	
		165	5825	13.03	14.00	
	802.11n-HT40 MCS0	151	5755	11.79	13.00	89.73
		159	5795	12.04	13.00	

<Spot Check for WLAN Conducted Power>

<5GHz WLAN >

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11ac-VHT20 MCS0	36	5180	10.92	12.00	94.32
		44	5220	10.96	12.00	
		48	5240	10.92	12.00	
	802.11ac-VHT40 MCS0	38	5190	10.14	11.50	91.03
		46	5230	10.35	11.50	
	802.11ac-VHT80 MCS0	42	5210	9.74	11.00	82.78

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11ac-VHT20 MCS0	52	5260	11.69	12.50	94.32
		60	5300	11.71	12.50	
		64	5320	11.77	12.50	
	802.11ac-VHT40 MCS0	54	5270	10.44	11.50	91.03
		62	5310	10.63	11.50	
	802.11ac-VHT80 MCS0	58	5290	9.87	11.00	82.78

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11ac-VHT20 MCS0	100	5500	12.52	14.00	94.32
		116	5580	12.52	14.00	
		140	5700	12.77	14.00	
		144	5720	12.73	14.00	
	802.11ac-VHT40 MCS0	102	5510	11.11	13.00	91.03
		110	5550	11.22	13.00	
		134	5670	11.53	13.00	
		142	5710	11.42	13.00	
	802.11ac-VHT80 MCS0	106	5530	10.58	11.50	82.78
		122	5610	10.79	11.50	
		138	5690	10.97	12.00	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11ac-VHT20 MCS0	149	5745	12.13	14.00	94.32
		157	5785	12.16	14.00	
		165	5825	12.30	14.00	
	802.11ac-VHT40 MCS0	151	5755	11.49	13.00	91.03
		159	5795	11.56	13.00	
	802.11ac-VHT80 MCS0	155	5775	10.86	12.00	82.78

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 76.79% as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation

Mode	Channel	Frequency (MHz)	Data Rate	Tune-up Limit (dBm)
			1Mbps	
BR/EDR	CH 00	2402	8.63	10.50
	CH 39	2441	**9.78**	11.50
	CH 78	2480	9.27	11.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
LE	CH 00	2402	-0.57
	CH 19	2440	**0.60**
	CH 39	2480	0.40
Tune-up Limit			1.00

12. Bluetooth Exclusions Applied

Mode Band	Max Average power(dBm)	
	BR/EDR	LE
2.4GHz Bluetooth	11.50	1.00

Note:

1. 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
11.50	25	2.48	0.9

Note:

Per KDB 447498 D01v06, when the minimum test separation distance is 25 mm, a distance of 25 mm is applied to determine SAR test exclusion. The test exclusion threshold is 0.9 which is <= 3, SAR testing is not required.

13. Antenna Location

Please refer to appendix D for SAR test setup photo.

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   · ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   · ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   · ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. This device has PTT (push-to-talk) function, so perform 25mm in-front-of the face SAR.
5. The device can use with assigned accessory manufacturer offered, so perform 0mm body worn accessory SAR.
   For Swivel Carry Holster, when using body-worn accessory, the device can enclose the holster with front face or back face, so for body-worn SAR testing, evaluated front/back face when enclose to the holster. There is a swivel belt clip adhere to holster, only rotation for using.
6. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.

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 B5 / B4 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.

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. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
3. 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.
4. 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.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

14.1 Face SAR

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Battery	Antenna	Carry Accessory	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	LTE Band 13	10M	QPSK	1	25	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	23230	782	23.37	25.00	1.455	0.11	0.423	**0.616**
	LTE Band 13	10M	QPSK	25	25	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	23230	782	22.15	24.00	1.531	0.01	0.374	0.573
02	LTE Band 5	10M	QPSK	1	25	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	20525	836.5	22.65	24.50	1.531	0.05	0.325	**0.498**
	LTE Band 5	10M	QPSK	25	12	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	20525	836.5	21.73	23.50	1.503	0.08	0.269	0.404
03	LTE Band 4	20M	QPSK	1	49	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	20175	1732.5	23.67	25.00	1.358	-0.05	0.211	**0.287**
	LTE Band 4	20M	QPSK	50	0	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	20175	1732.5	22.69	24.00	1.352	0.02	0.178	0.241
04	LTE Band 2	20M	QPSK	1	49	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	18900	1880	22.93	24.50	1.435	0.01	0.295	**0.423**
	LTE Band 2	20M	QPSK	50	24	In front of face	PMNN4468A	SZ08171 & SZ0817N	-	25	18900	1880	22.07	23.50	1.390	-0.03	0.223	0.310

<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Battery	Antenna	Carry Accessory	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)
05	WLAN2.4GHz	802.11b 1Mbps	In front of face	PMNN4468A	SZ0817B	-	25	6	2437	19.15	20.00	1.216	100	1.000	0.13	0.041	**0.050**

<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Battery	Antenna	Carry Accessory	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)
06	WLAN5.3GHz	802.11a 6Mbps	In front of face	PMNN4468A	SZ0817B	-	25	52	5260	15.14	16	1.219	92.53	1.081	-0.03	0.00932	**0.012**
07	WLAN5.5GHz	802.11a 6Mbps	In front of face	PMNN4468A	SZ0817B	-	25	116	5580	14.88	16	1.294	92.53	1.081	-0.08	0.039	**0.054**
08	WLAN5.8GHz	802.11a 6Mbps	In front of face	PMNN4468A	SZ0817B	-	25	165	5825	15.12	16	1.225	92.53	1.081	-0.09	0.026	**0.035**

14.2 Body Worn Accessory SAR

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Battery	Antenna	Carry Accessory	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 13	10M	QPSK	1	25	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	23230	782	23.37	25.00	1.455	-0.13	0.546	0.795
	LTE Band 13	10M	QPSK	25	25	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	23230	782	22.15	24.00	1.531	-0.09	0.446	0.683
	LTE Band 13	10M	QPSK	1	25	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	23230	782	23.37	25.00	1.455	-0.1	0.604	0.879
	LTE Band 13	10M	QPSK	25	25	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	23230	782	22.15	24.00	1.531	-0.01	0.483	0.740
	LTE Band 13	10M	QPSK	50	0	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	23230	782	22.10	24.00	1.549	-0.08	0.463	0.717
09	LTE Band 13	10M	QPSK	1	25	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	23230	782	23.37	25.00	1.455	-0.07	0.693	1.009
	LTE Band 13	10M	QPSK	25	25	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	23230	782	22.15	24.00	1.531	0.05	0.517	0.792
	LTE Band 13	10M	QPSK	50	0	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	23230	782	22.10	24.00	1.549	0.03	0.508	0.787
	LTE Band 5	10M	QPSK	1	25	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20525	836.5	22.65	24.50	1.531	-0.01	0.371	0.568
	LTE Band 5	10M	QPSK	25	12	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20525	836.5	21.73	23.50	1.503	-0.05	0.290	0.436
	LTE Band 5	10M	QPSK	1	25	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20525	836.5	22.65	24.50	1.531	0.03	0.427	0.654
	LTE Band 5	10M	QPSK	25	12	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20525	836.5	21.73	23.50	1.503	0.01	0.331	0.498
10	LTE Band 5	10M	QPSK	1	25	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	20525	836.5	22.65	24.50	1.531	-0.03	0.505	0.773
	LTE Band 5	10M	QPSK	25	12	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	20525	836.5	21.73	23.50	1.503	-0.03	0.397	0.597
11	LTE Band 4	20M	QPSK	1	49	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20175	1732.5	23.67	25.00	1.358	-0.02	0.270	0.367
	LTE Band 4	20M	QPSK	50	0	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20175	1732.5	22.69	24.00	1.352	0.01	0.206	0.279
	LTE Band 4	20M	QPSK	1	49	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20175	1732.5	23.67	25.00	1.358	-0.02	0.205	0.278
	LTE Band 4	20M	QPSK	50	0	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	20175	1732.5	22.69	24.00	1.352	-0.08	0.157	0.212
	LTE Band 4	20M	QPSK	1	49	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	20175	1732.5	23.67	25.00	1.358	-0.05	0.257	0.349
	LTE Band 4	20M	QPSK	50	0	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	20175	1732.5	22.69	24.00	1.352	-0.06	0.208	0.281

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Battery	Antenna	Carry Accessory	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	49	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	18900	1880	22.93	24.50	1.435	-0.04	0.238	0.342
	LTE Band 2	20M	QPSK	50	24	Front Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	18900	1880	22.07	23.50	1.390	0.02	0.186	0.259
	LTE Band 2	20M	QPSK	1	49	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	18900	1880	22.93	24.50	1.435	-0.06	0.188	0.270
	LTE Band 2	20M	QPSK	50	24	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7932A	0	18900	1880	22.07	23.50	1.390	-0.17	0.146	0.203
12	LTE Band 2	20M	QPSK	1	49	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	18900	1880	22.93	24.50	1.435	-0.08	0.272	0.390
	LTE Band 2	20M	QPSK	50	24	Back Face	PMNN4468A	SZ08171 & SZ0817N	PMLN7128A	0	18900	1880	22.07	23.50	1.390	-0.07	0.218	0.303

<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Battery	Antenna	Carry Accessory	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)
	WLAN2.4GHz	802.11b 1Mbps	Front Face	PMNN4468A	SZ0817B	PMLN7932A	0	6	2437	19.15	20.00	1.216	100	1.000	-0.01	0.080	0.097
	WLAN2.4GHz	802.11b 1Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7932A	0	6	2437	19.15	20.00	1.216	100	1.000	-0.11	0.043	0.052
13	WLAN2.4GHz	802.11b 1Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7128A	0	6	2437	19.15	20.00	1.216	100	1.000	-0.09	0.145	0.176

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Battery	Antenna	Carry Accessory	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)
	Bluetooth	1Mbps	Front Face	PMNN4468A	SZ0817B	PMLN7932A	0	39	2441	9.78	11.50	1.486	76.79	1.085	-0.08	0.003	0.005
	Bluetooth	1Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7932A	0	39	2441	9.78	11.50	1.486	76.79	1.085	-0.13	0.009	0.014
14	Bluetooth	1Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7128A	0	39	2441	9.78	11.50	1.486	76.79	1.085	-0.19	0.074	0.119

<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Battery	Antenna	Carry Accessory	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)
	WLAN5.3GHz	802.11a 6Mbps	Front Face	PMNN4468A	SZ0817B	PMLN7932A	0	52	5260	15.14	16.00	1.219	92.53	1.081	-0.01	0.011	0.014
	WLAN5.3GHz	802.11a 6Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7932A	0	52	5260	15.14	16.00	1.219	92.53	1.081	-0.1	0.006	0.008
15	WLAN5.3GHz	802.11a 6Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7128A	0	52	5260	15.14	16.00	1.219	92.53	1.081	-0.18	0.017	0.022
16	WLAN5.5GHz	802.11a 6Mbps	Front Face	PMNN4468A	SZ0817B	PMLN7932A	0	116	5580	14.88	16.00	1.294	92.53	1.081	-0.01	0.061	0.085
	WLAN5.5GHz	802.11a 6Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7932A	0	116	5580	14.88	16.00	1.294	92.53	1.081	-0.04	0.049	0.069
	WLAN5.5GHz	802.11a 6Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7128A	0	116	5580	14.88	16.00	1.294	92.53	1.081	-0.03	0.027	0.038
17	WLAN5.8GHz	802.11a 6Mbps	Front Face	PMNN4468A	SZ0817B	PMLN7932A	0	165	5825	15.12	16.00	1.225	92.53	1.081	-0.04	0.036	0.048
	WLAN5.8GHz	802.11a 6Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7932A	0	165	5825	15.12	16.00	1.225	92.53	1.081	-0.09	0.027	0.035
	WLAN5.8GHz	802.11a 6Mbps	Back Face	PMNN4468A	SZ0817B	PMLN7128A	0	165	5825	15.12	16.00	1.225	92.53	1.081	-0.05	0.027	0.036

15. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	WAVE TWO-WAY RADIO TLK 100	
		Face	Body-worn
1.	LTE + WLAN2.4GHz	Yes	Yes
2.	LTE + WLAN5GHz	Yes	Yes
3.	LTE + Bluetooth	Yes	Yes

General Note:

1. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. All licensed modes share the same antenna part and cannot transmit simultaneously
3. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
4. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
5. 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.
6. 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	Exposure Position	Face
	Test separation	25 mm
11.50 dBm	Estimated 1g SAR (W/kg)	0.119 W/kg

15.1 Face Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth Estimated			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)			
LTE	Band 13	In the front of face at 25mm	0.616	0.050	0.054	0.119	0.67	0.67	0.74
	Band 5	In the front of face at 25mm	0.498	0.050	0.054	0.119	0.55	0.55	0.62
	Band 4	In the front of face at 25mm	0.287	0.050	0.054	0.119	0.34	0.34	0.41
	Band 2	In the front of face at 25mm	0.423	0.050	0.054	0.119	0.47	0.48	0.54

15.2 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1 WWAN 1g SAR (W/kg)	2 2.4GHz WLAN 1g SAR (W/kg)	3 5GHz WLAN 1g SAR (W/kg)	4 Bluetooth 1g SAR (W/kg)	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
LTE	Band 13	Front Face at 0mm Swivel Carry Holster	0.795	0.097	0.085	0.005	0.89	0.88	0.80
		Back Face at 0mm Swivel Carry Holster	0.879	0.052	0.069	0.014	0.93	0.95	0.89
		Back Face at 0mm Belt Clip	1.009	0.176	0.038	0.119	**1.19**	**1.05**	**1.13**
	Band 5	Front Face at 0mm Swivel Carry Holster	0.568	0.097	0.085	0.005	0.67	0.65	0.57
		Back Face at 0mm Swivel Carry Holster	0.654	0.052	0.069	0.014	0.71	0.72	0.67
		Back Face at 0mm Belt Clip	0.773	0.176	0.038	0.119	0.95	0.81	0.89
	Band 4	Front Face at 0mm Swivel Carry Holster	0.367	0.097	0.085	0.005	0.46	0.45	0.37
		Back Face at 0mm Swivel Carry Holster	0.278	0.052	0.069	0.014	0.33	0.35	0.29
		Back Face at 0mm Belt Clip	0.349	0.176	0.038	0.119	0.53	0.39	0.47
	Band 2	Front Face at 0mm Swivel Carry Holster	0.342	0.097	0.085	0.005	0.44	0.43	0.35
		Back Face at 0mm Swivel Carry Holster	0.270	0.052	0.069	0.014	0.32	0.34	0.28
		Back Face at 0mm Belt Clip	0.390	0.176	0.038	0.119	0.57	0.43	0.51

Test Engineer : Nick Hu

16. 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.

17. References

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

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

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

[4] SPEAG DASY System Handbook

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

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

[7] FCC KDB 447498 D02 v02r01, “SAR Measurement Procedures for USB Dongle Transmitters”, Oct 2015.

[8] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.

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

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

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.7

System Check_Head_750MHz

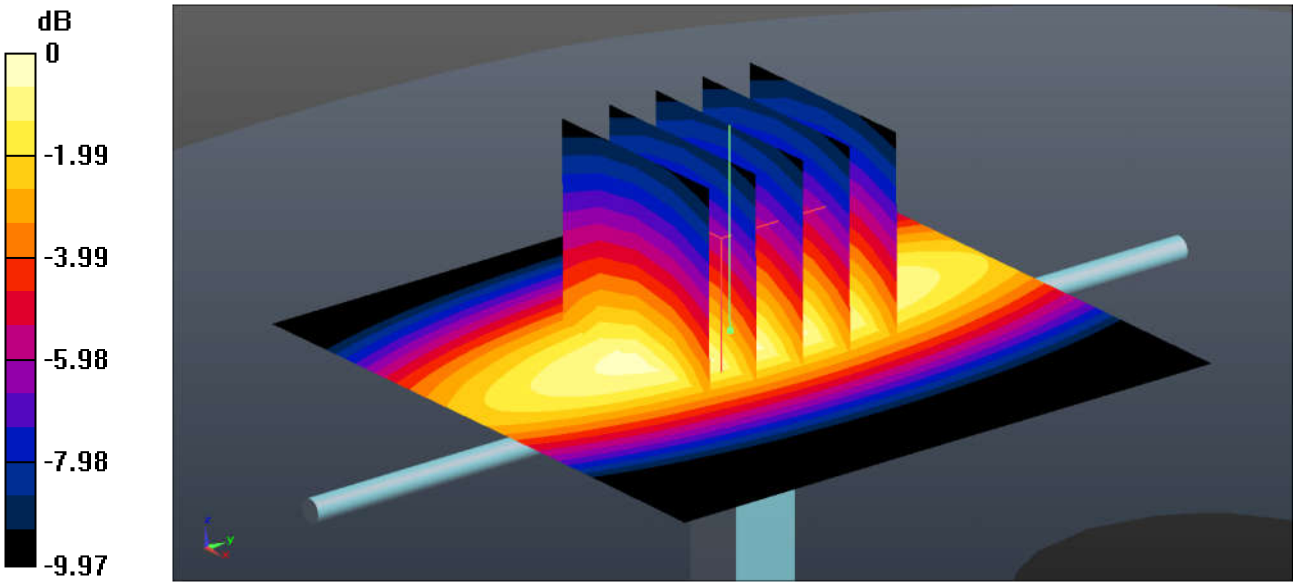
DUT: D750V3 - SN:1065

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium: HSL_750 Medium parameters used: f = 750 MHz; σ = 0.911 S/m; ε_r = 42.828; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.92, 9.92, 9.92); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM3; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.83 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 50.65 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.90 W/kg
SAR(1 g) = 2.07 W/kg; SAR(10 g) = 1.38 W/kg
Maximum value of SAR (measured) = 2.85 W/kg



0 dB = 2.85 W/kg = 4.55 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.7

System Check_Head_835MHz

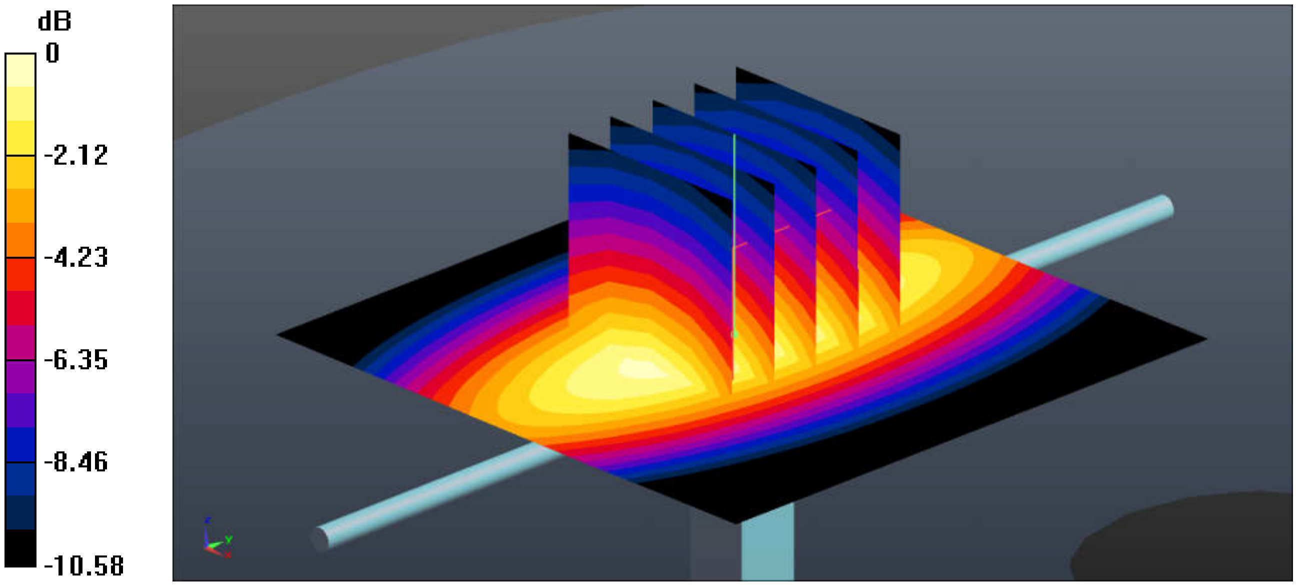
DUT: D835V2 - SN:4d091

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL_835 Medium parameters used: f = 835 MHz; σ = 0.912 S/m; ε_r = 42.084; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.51, 9.51, 9.51); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM3; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.07 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.41 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.62 W/kg
Maximum value of SAR (measured) = 3.10 W/kg



0 dB = 3.10 W/kg = 4.91 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2018.8.7

System Check_Head_1750MHz

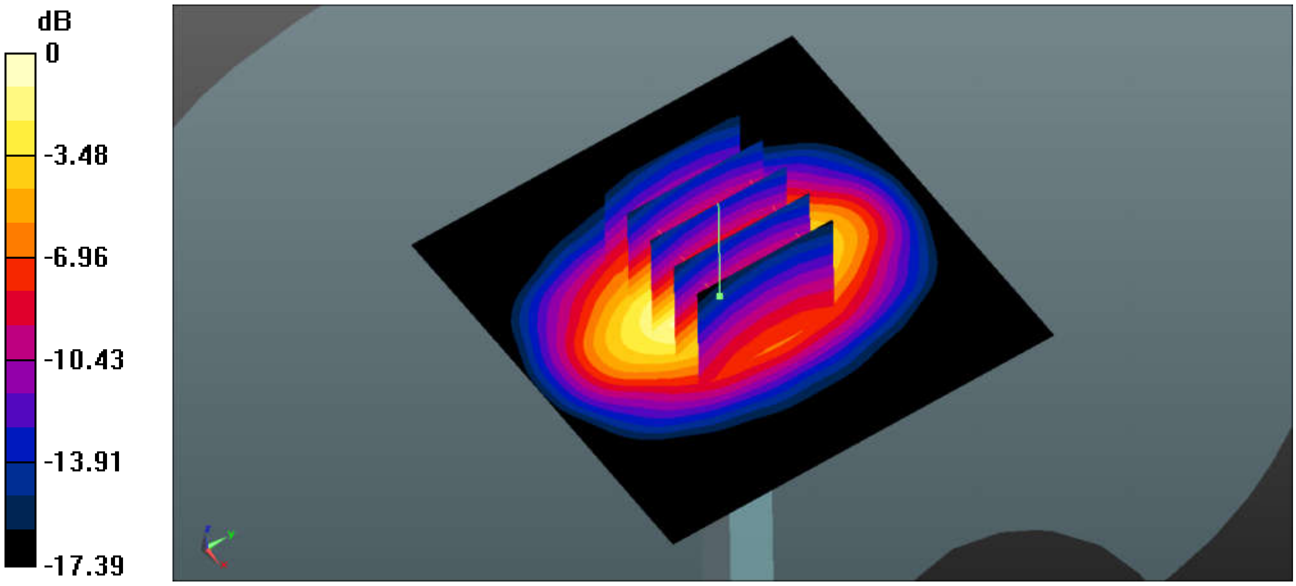
DUT: D1750V2 - SN:1069

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used: f = 1750 MHz; σ = 1.365 S/m; ε_r = 39.524; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.29, 8.29, 8.29); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.1 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 86.45 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 16.7 W/kg
SAR(1 g) = 9.16 W/kg; SAR(10 g) = 4.85 W/kg
Maximum value of SAR (measured) = 13.1 W/kg



0 dB = 13.1 W/kg = 11.17 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.7

System Check_Head_1900MHz

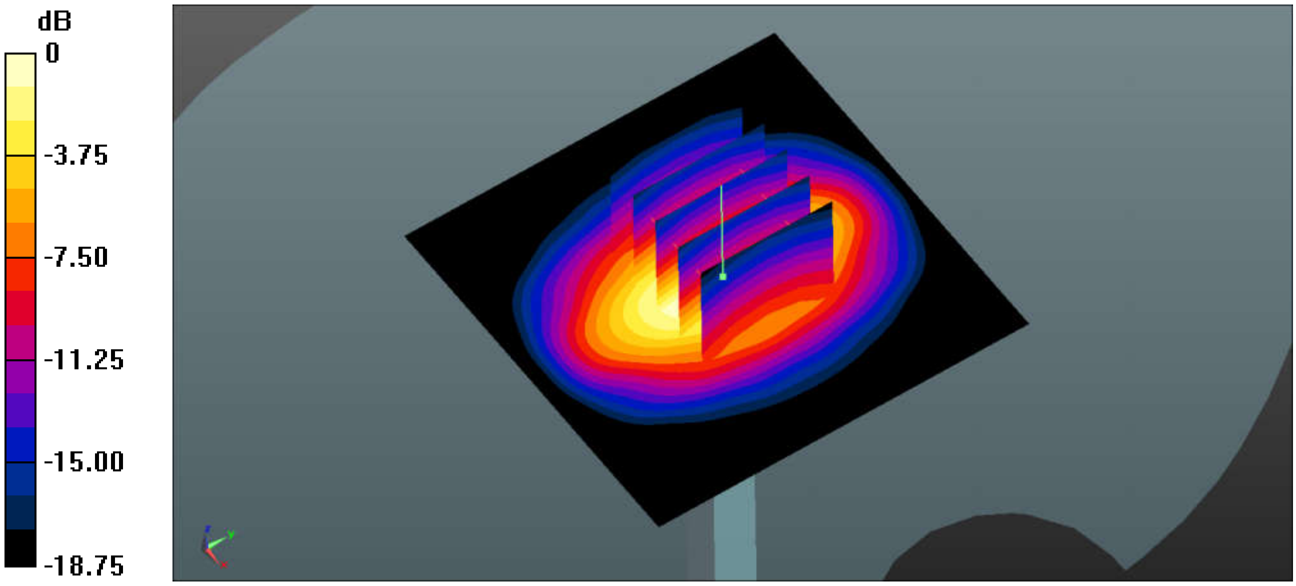
DUT: D1900V2 - SN:5d118

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: f = 1900 MHz; σ = 1.403 S/m; ε_r = 39.504; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.04, 8.04, 8.04); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.2 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 88.65 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.72 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

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.8

System Check_Head_2450MHz

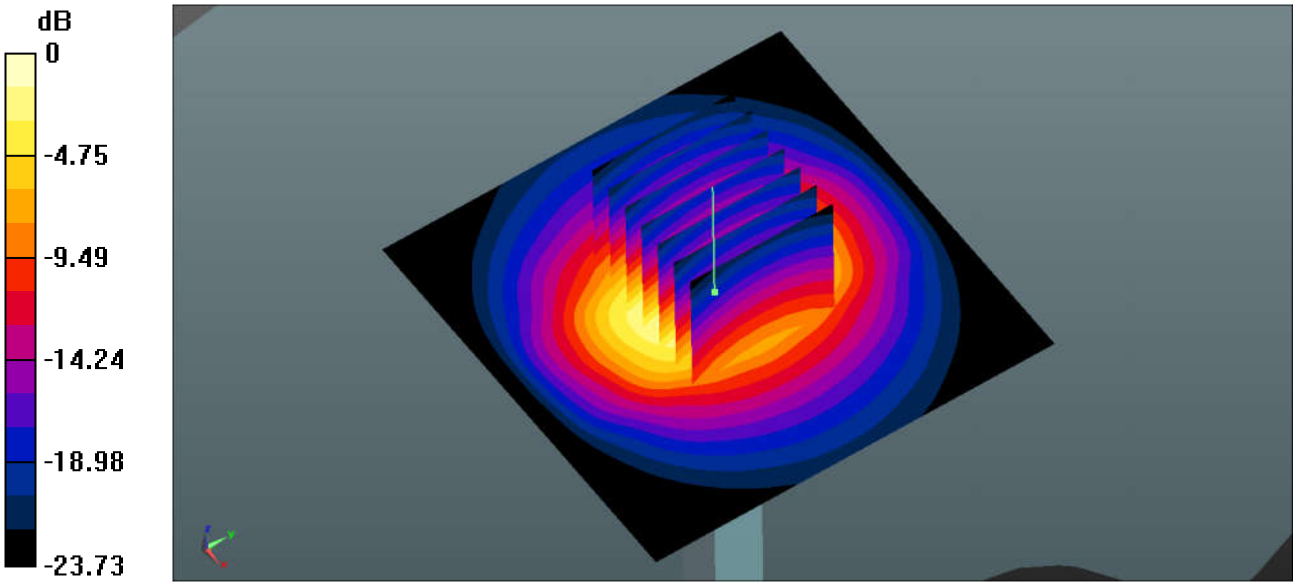
DUT: D2450V2 - SN:840

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: f = 2450 MHz; σ = 1.837 S/m; ε_r = 38.334; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.56, 7.56, 7.56); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM3; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 20.7 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.01 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 12.7 W/kg; SAR(10 g) = 5.74 W/kg
Maximum value of SAR (measured) = 20.0 W/kg



0 dB = 20.0 W/kg = 13.01 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2018.8.8

System Check_Head_5250MHz

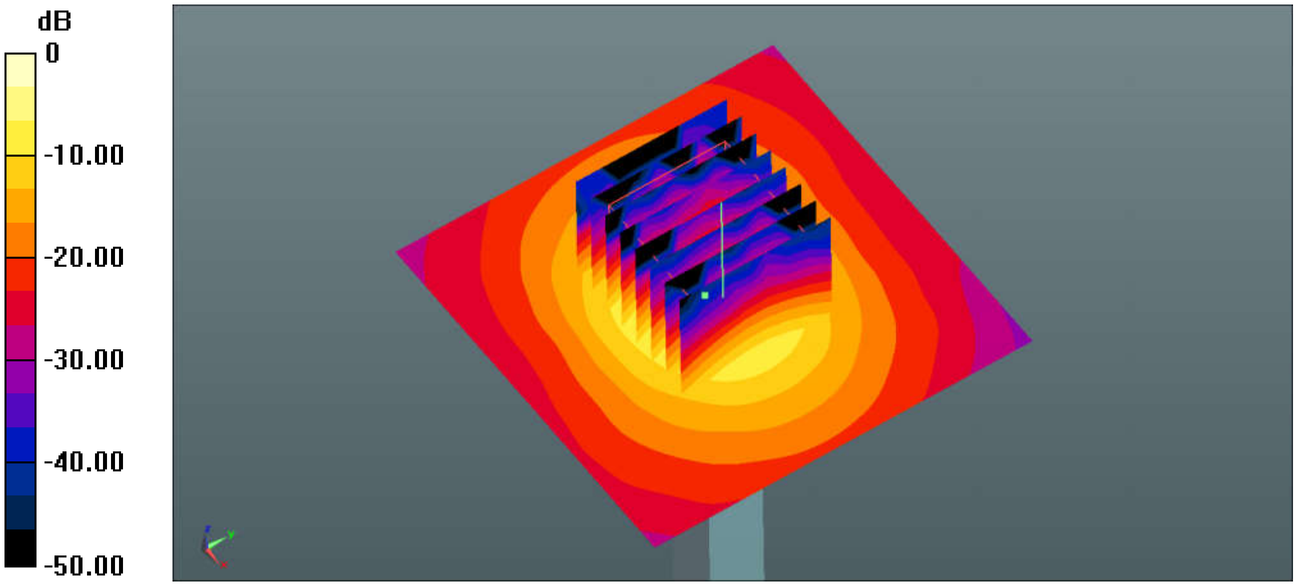
DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: HSL_5000 Medium parameters used: f = 5250 MHz; σ = 4.565 S/m; ε_r = 36.009; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(5.2, 5.2, 5.2); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 43.51 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 29.8 W/kg
SAR(1 g) = 7.67 W/kg; SAR(10 g) = 2.26 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.8

System Check_Head_5600MHz

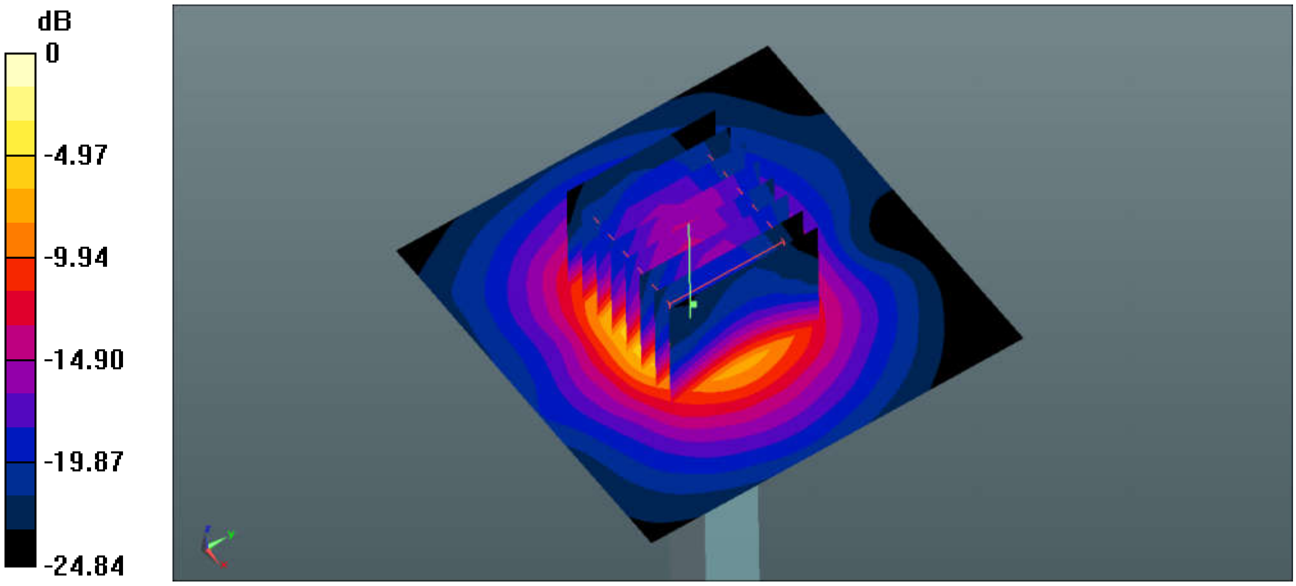
DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: HSL_5000 Medium parameters used: f = 5600 MHz; σ = 4.968 S/m; ε_r = 35.22; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(4.94, 4.94, 4.94); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.7 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 39.38 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 28.2 W/kg
SAR(1 g) = 8.05 W/kg; SAR(10 g) = 2.29 W/kg
Maximum value of SAR (measured) = 17.4 W/kg



0 dB = 17.4 W/kg = 12.41 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.8

System Check_Head_5750MHz

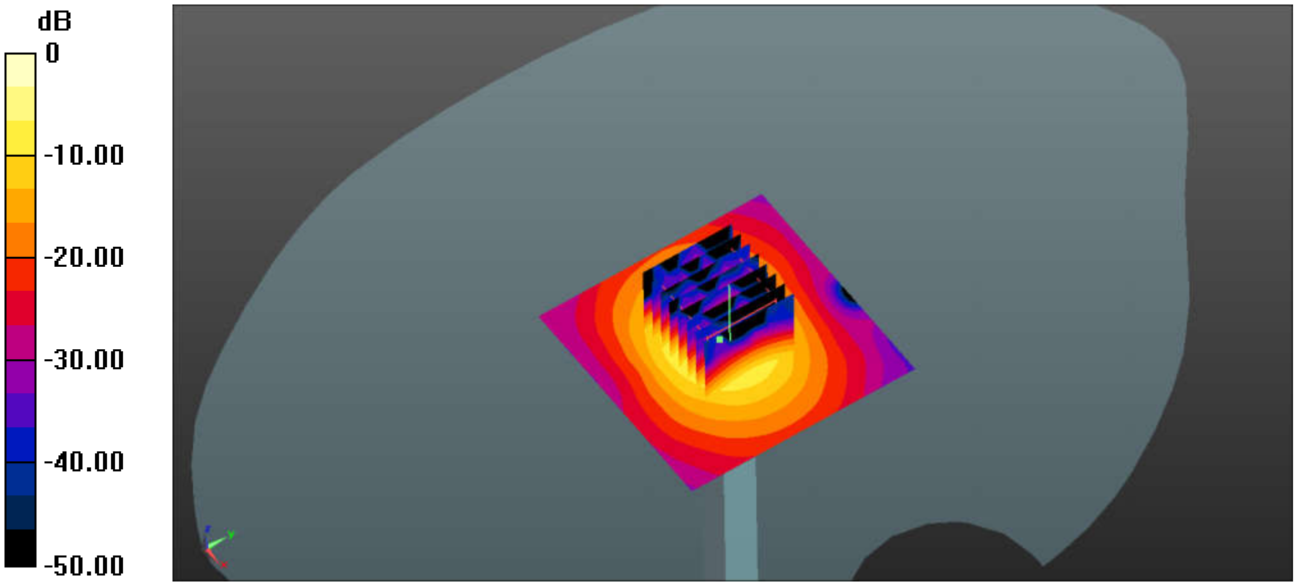
DUT: D5GHzV2-SN:1167

Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: HSL_5000 Medium parameters used: f = 5750 MHz; σ = 5.147 S/m; ε_r = 34.924; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(5.23, 5.23, 5.23); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.9 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 37.84 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 31.4 W/kg
SAR(1 g) = 7.78 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.7.20

System Check_Body_750MHz

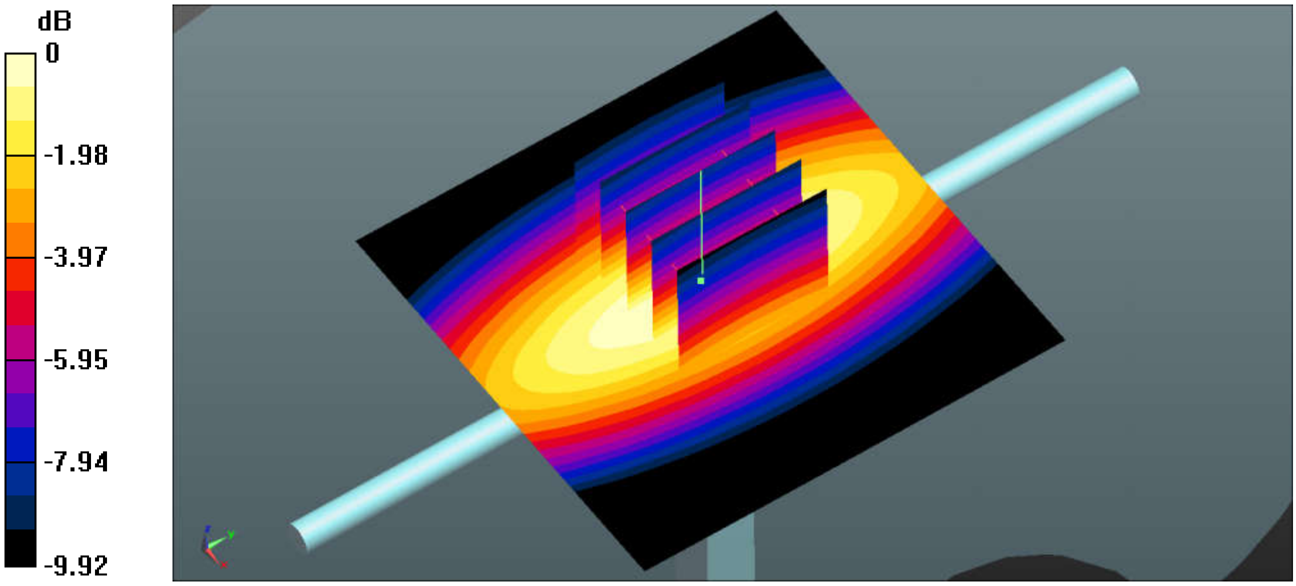
DUT: D750V3-SN:1065

Communication System: UID 0, CW (0); Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL_750 Medium parameters used: f = 750 MHz; σ = 0.913 S/m; ε_r = 57.193; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3954; ConvF(10.21, 10.21, 10.21); Calibrated: 2018.1.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2017.12.4
- Phantom: SAM1; Type: SAM; Serial: TP-1842
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.82 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.97 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.19 W/kg
SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (measured) = 2.82 W/kg



0 dB = 2.82 W/kg = 4.50 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.7.19

System Check_Body_835MHz

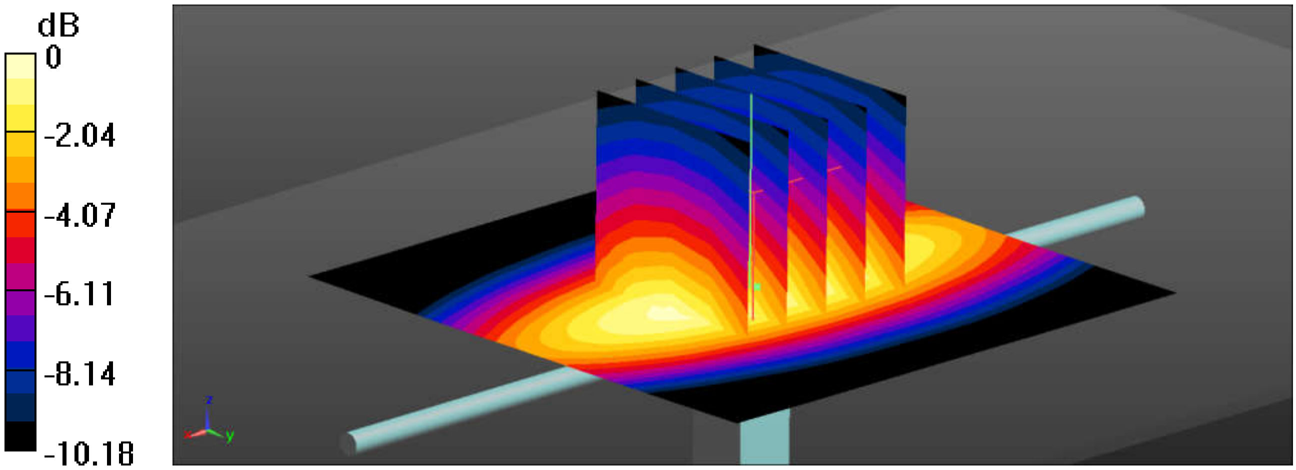
DUT: D835V2 - SN:4d091

Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL_835 Medium parameters used: f = 835 MHz; σ = 0.984 S/m; ε_r = 56.51; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

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 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM1; Type: SAM; Serial: TP-1164
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.36 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.11 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 3.95 W/kg
SAR(1 g) = 2.57 W/kg; SAR(10 g) = 1.69 W/kg
Maximum value of SAR (measured) = 3.30 W/kg



0 dB = 3.30 W/kg = 5.19 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.7.19

System Check_Body_1750MHz

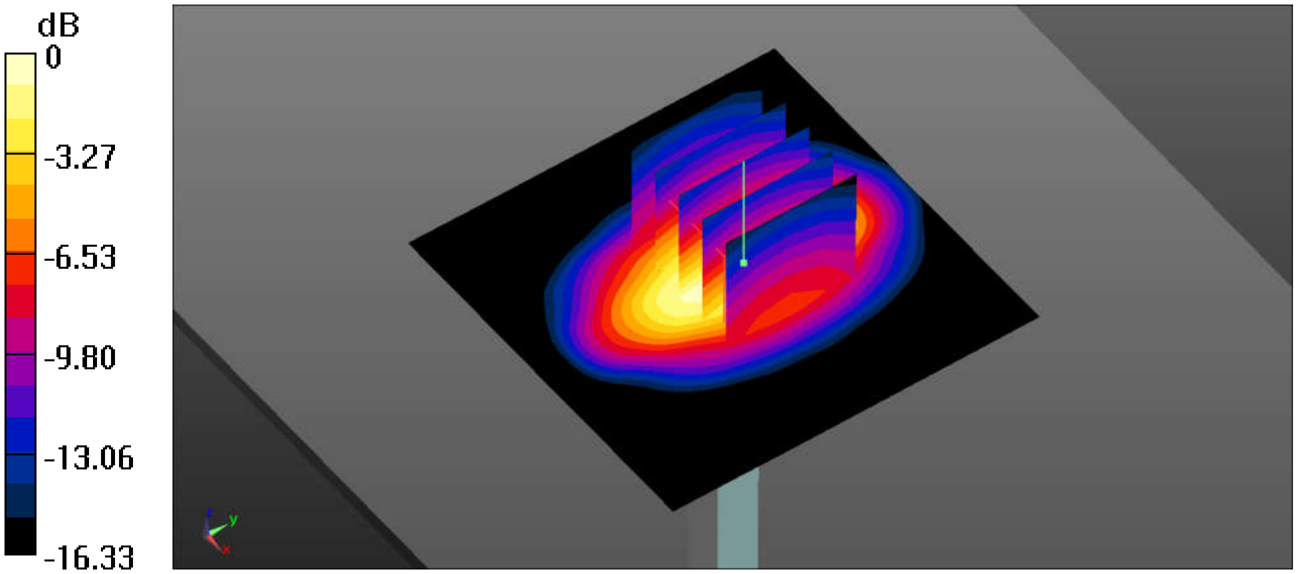
DUT: D1750V2 - SN:1069

Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1750 Medium parameters used: f = 1750 MHz; σ = 1.491 S/m; ε_r = 54.729; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.7 ℃

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 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM1; Type: SAM; Serial: TP-1164
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 82.54 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 16.0 W/kg
SAR(1 g) = 9.34 W/kg; SAR(10 g) = 5.06 W/kg
Maximum value of SAR (measured) = 13.0 W/kg



0 dB = 13.0 W/kg = 11.14 dBW/kg

System Check_Body_1900MHz

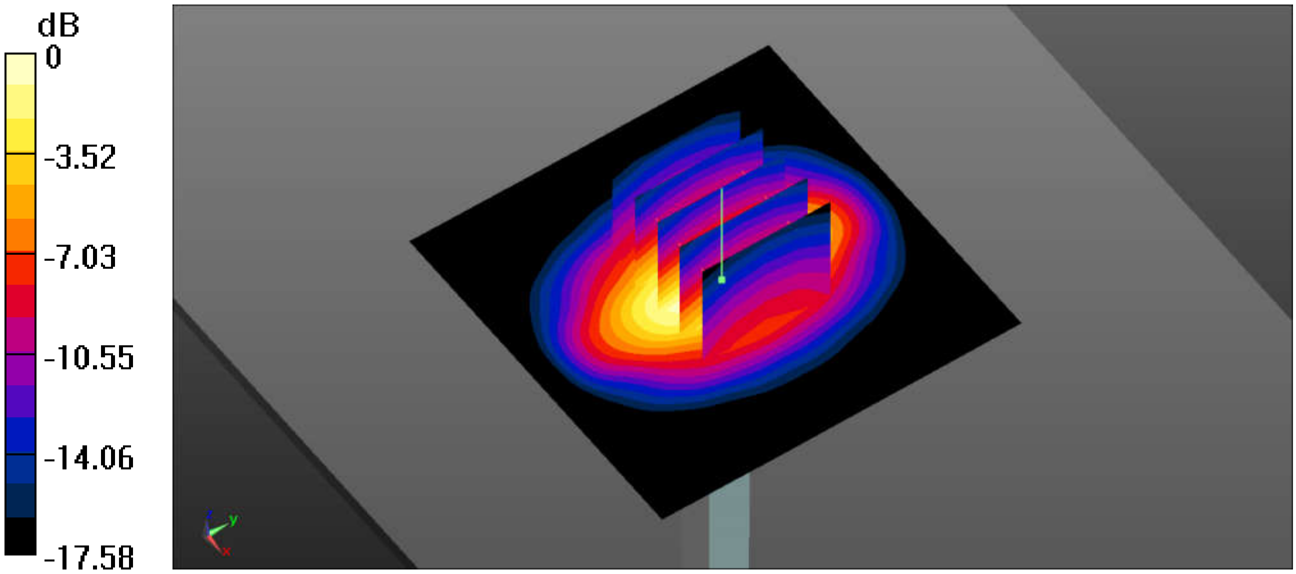
DUT: D1900V2 - SN:5d118

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL_1900 Medium parameters used: f = 1900 MHz; σ = 1.537 S/m; ε_r = 53.469; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.8 ℃

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 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM1; Type: SAM; Serial: TP-1164
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 13.9 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.90 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 9.83 W/kg; SAR(10 g) = 5.13 W/kg
Maximum value of SAR (measured) = 14.0 W/kg



0 dB = 14.0 W/kg = 11.46 dBW/kg

System Check_Body_2450MHz

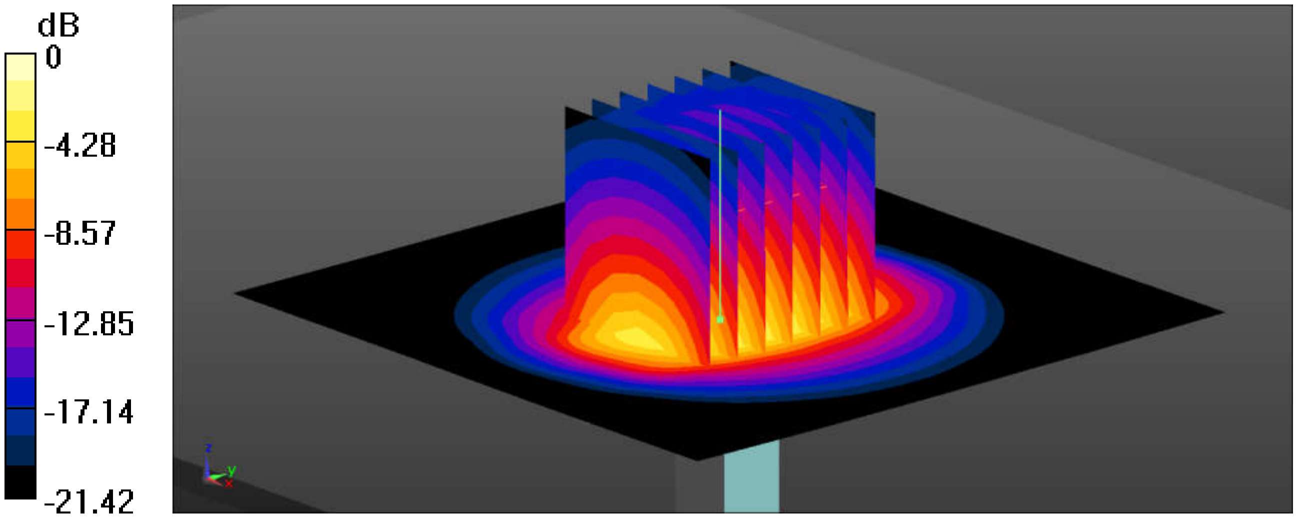
DUT: D2450V2 - SN:840

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450 Medium parameters used: f = 2450 MHz; σ = 2.017 S/m; ε_r = 53.033; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.42, 7.42, 7.42); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM1; Type: SAM; Serial: TP-1164
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 20.3 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.32 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 26.7 W/kg
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.38 W/kg
Maximum value of SAR (measured) = 20.2 W/kg



0 dB = 20.2 W/kg = 13.05 dBW/kg

System Check_Body_5250MHz

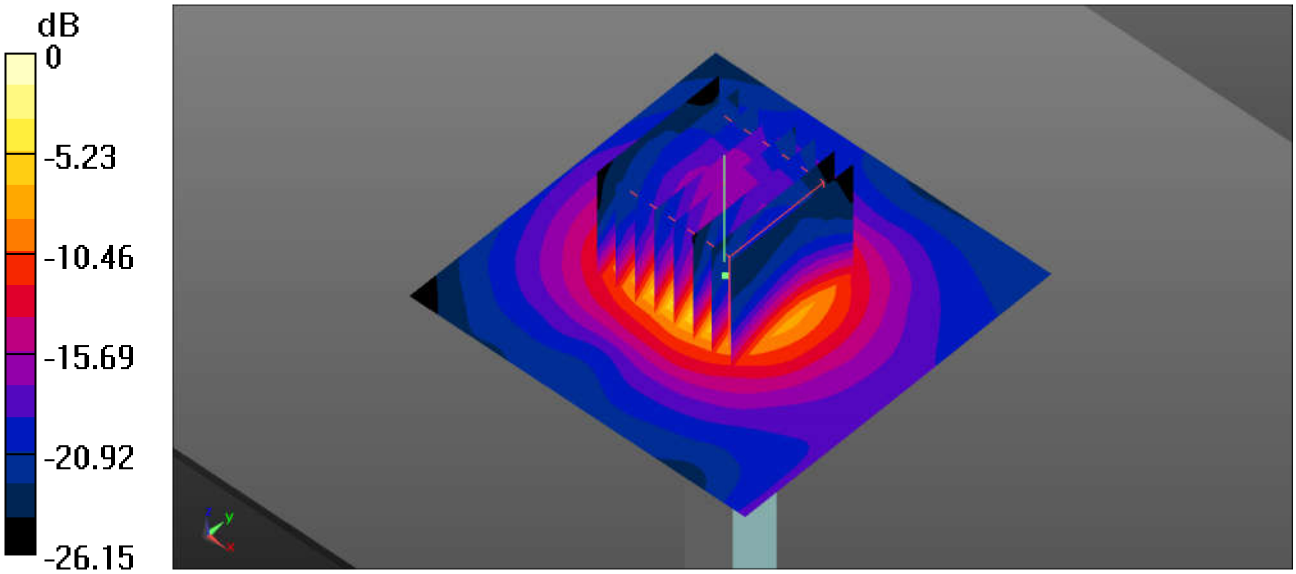
DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: MSL_5000 3 Medium parameters used: f = 5250 MHz; σ = 5.506 S/m; ε_r = 47.956; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(4.4, 4.4, 4.4); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM1; Type: SAM; Serial: TP-1164
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.3 W/kg

CW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 39.99 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 26.6 W/kg
SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.34 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg = 12.25 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.7.22

System Check_Body_5600MHz

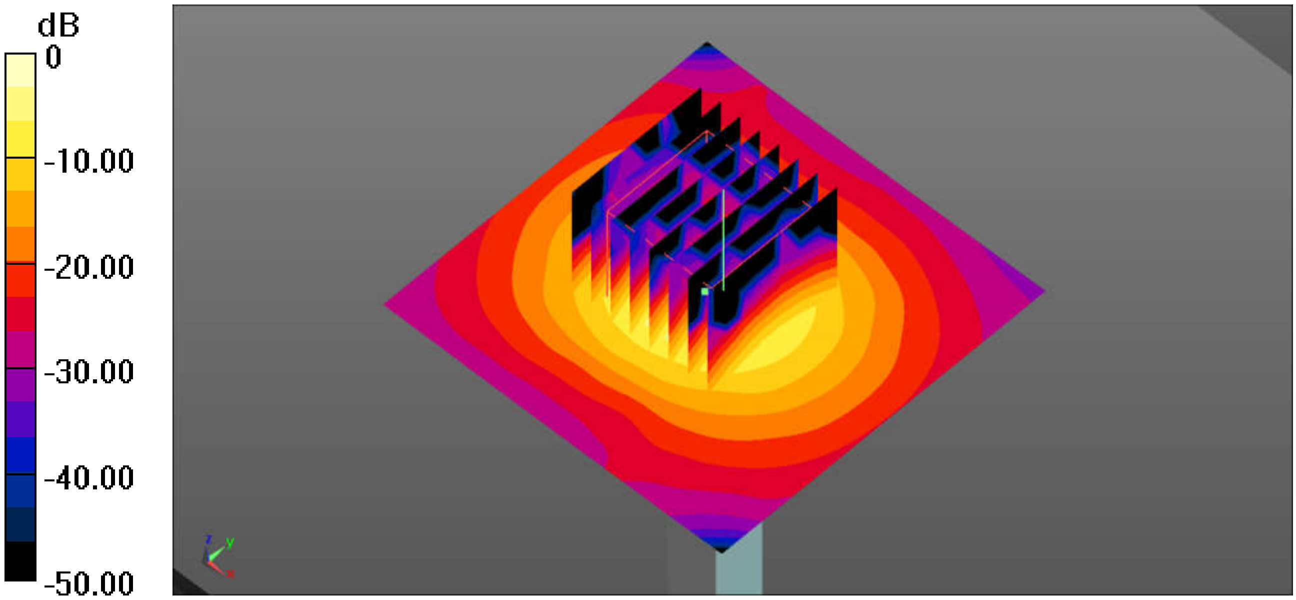
DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: MSL_5000 3 Medium parameters used: f = 5600 MHz; σ = 5.954 S/m; ε_r = 47.367; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(3.98, 3.98, 3.98); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM1; Type: SAM; Serial: TP-1164
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

CW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.9 W/kg

CW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 40.11 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 35.2 W/kg
SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 20.1 W/kg



0 dB = 20.1 W/kg = 13.03 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.7.22

System Check_Body_5750MHz

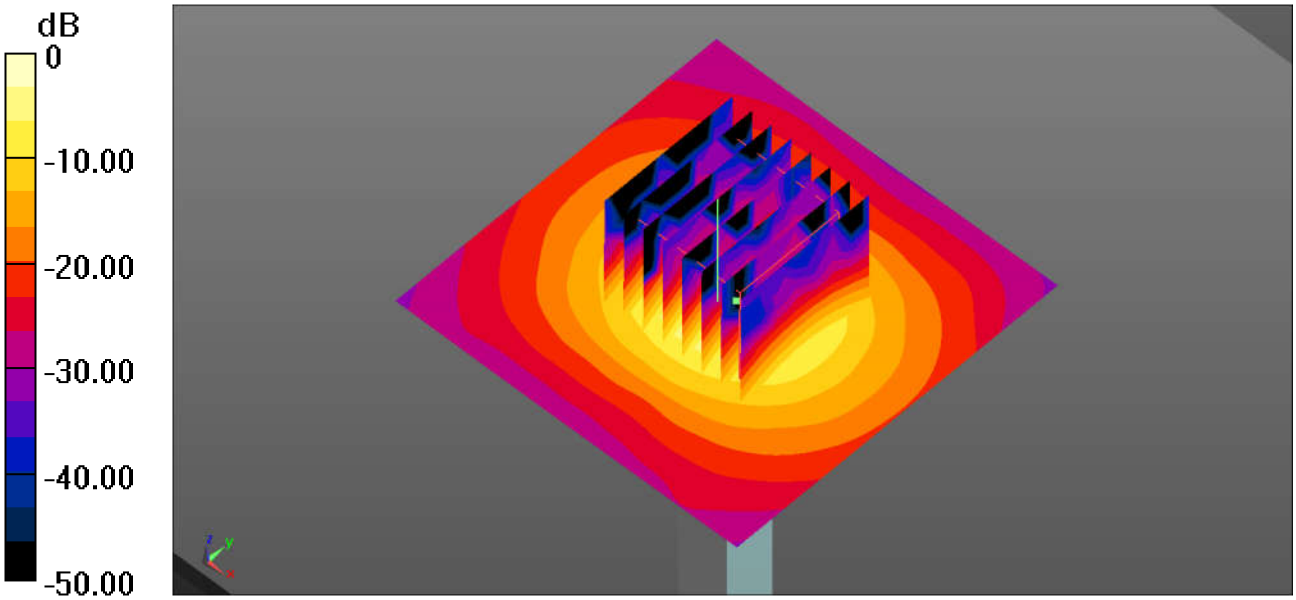
DUT: D5GHzV2-SN:1006

Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: MSL_5000 Medium parameters used: f = 5750 MHz; σ = 6.212 S/m; ε_r = 46.182; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(4.31, 4.31, 4.31); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM1; Type: SAM; Serial: TP-1164
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.1 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 36.85 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 33.9 W/kg
SAR(1 g) = 7.51 W/kg; SAR(10 g) = 2.11 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.7

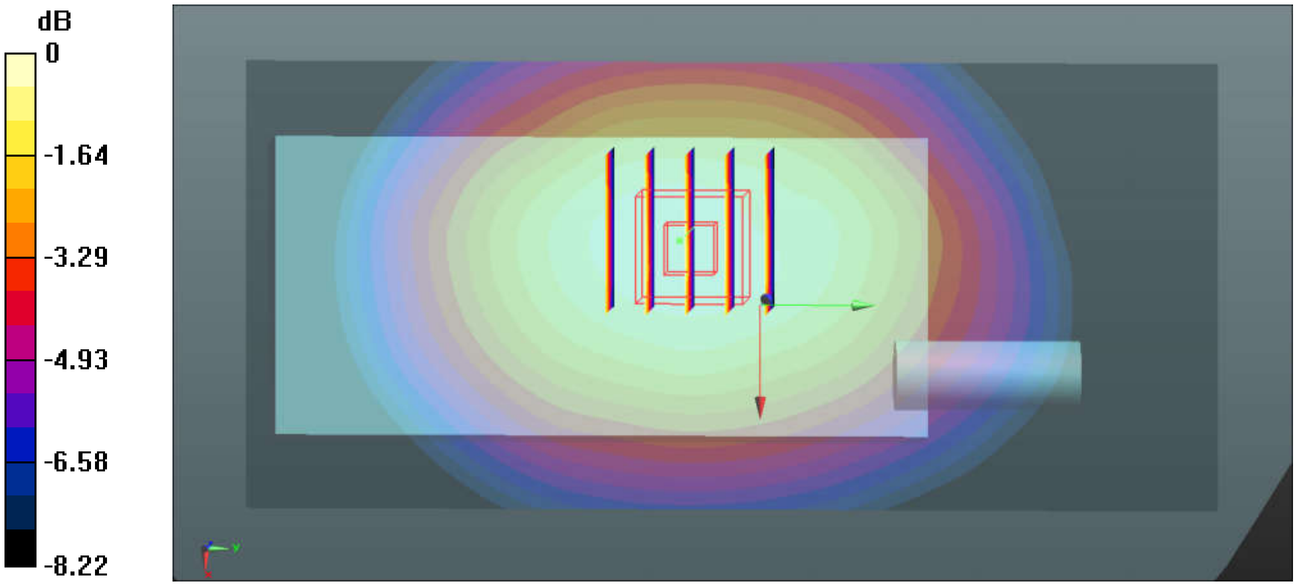
01_LTE Band 13_10M_QPSK_1RB_25Offset_Face_25mm_Ch23230

Communication System: UID 0, FDD_LTE (0); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: HSL_750 Medium parameters used: f = 782 MHz; σ = 0.863 S/m; ε_r = 42.727; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.92, 9.92, 9.92); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM3; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch23230/Area Scan (61x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.519 W/kg

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.99 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.572 W/kg
SAR(1 g) = 0.423 W/kg; SAR(10 g) = 0.315 W/kg
Maximum value of SAR (measured) = 0.521 W/kg



0 dB = 0.521 W/kg = -2.83 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2018.8.7

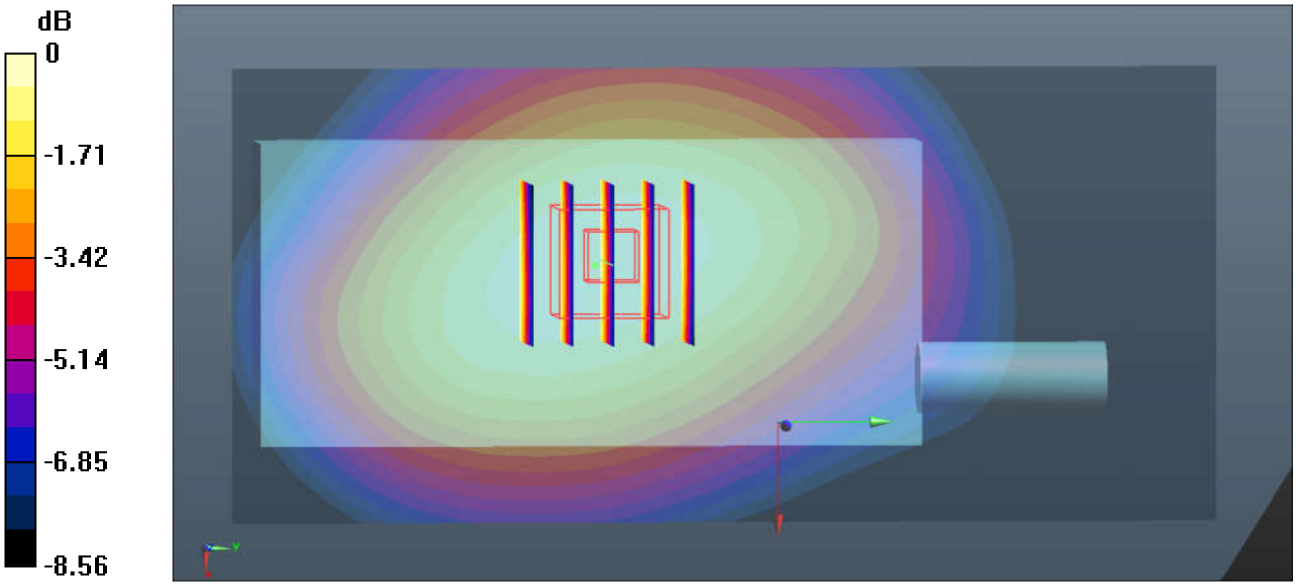
02_LTE Band 5_10M_QPSK_1RB_25Offset_face_25mm_Ch20525

Communication System: UID 0, FDD_LTE (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: HSL_835 Medium parameters used: f = 836.5 MHz; σ = 0.914 S/m; ε_r =42.066; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(9.51, 9.51, 9.51); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM3; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20525/Area Scan (61x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.396 W/kg

Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.82 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.325 W/kg; SAR(10 g) = 0.239 W/kg
Maximum value of SAR (measured) = 0.399 W/kg



0 dB = 0.399 W/kg = -3.99 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.7

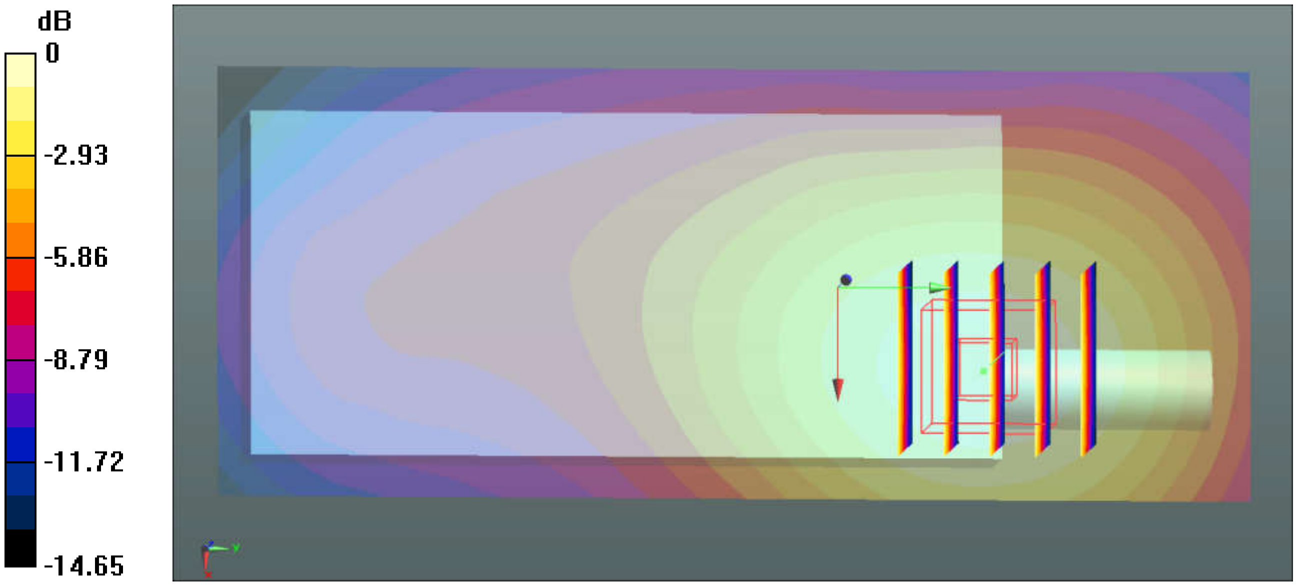
03_LTE Band 4_20M_QPSK_1RB_49Offset_face_25mm_Ch20175

Communication System: UID 0, FDD_LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: HSL_1750 Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.347 S/m; ε_r = 39.604; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.29, 8.29, 8.29); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20175/Area Scan (51x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.290 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.24 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.351 W/kg
SAR(1 g) = 0.211 W/kg; SAR(10 g) = 0.132 W/kg
Maximum value of SAR (measured) = 0.298 W/kg



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

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2018.8.7

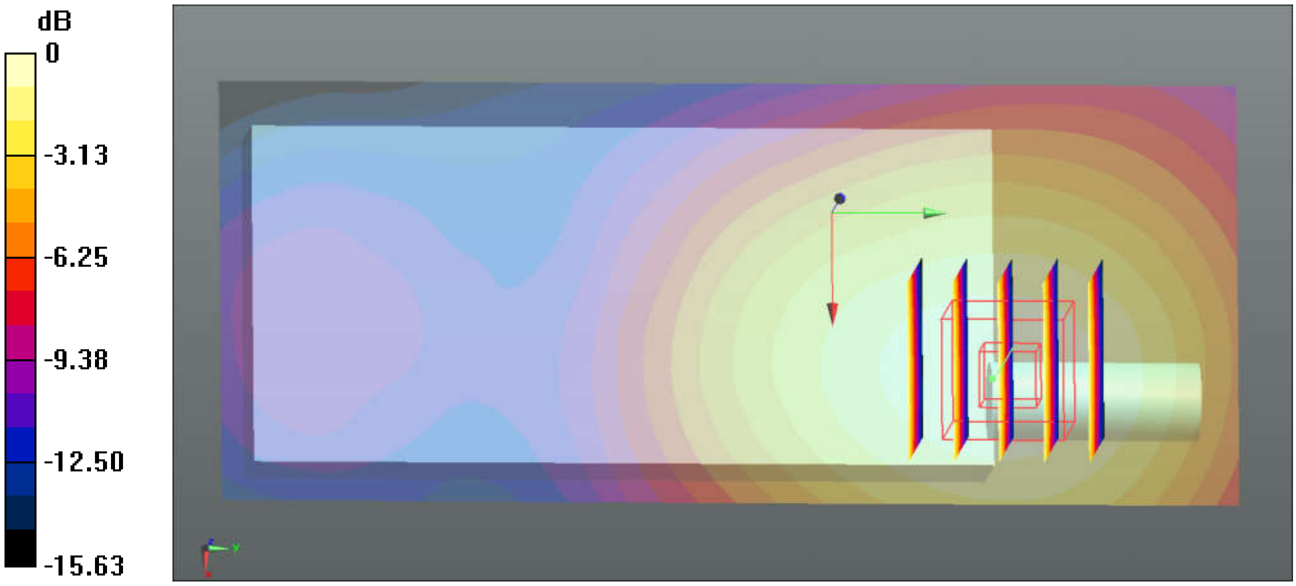
04_LTE Band 2_20M_QPSK_1RB_49Offset_face_25mm_Ch18900

Communication System: UID 0, FDD_LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL_1900 Medium parameters used: f = 1880 MHz; σ = 1.381 S/m; ε_r = 39.62; ρ = 1000 kg/m^3
Ambient Temperature：23.7 ℃; Liquid Temperature：22.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(8.04, 8.04, 8.04); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch18900/Area Scan (51x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.410 W/kg

Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.95 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.494 W/kg
SAR(1 g) = 0.295 W/kg; SAR(10 g) = 0.181 W/kg
Maximum value of SAR (measured) = 0.418 W/kg



0 dB = 0.418 W/kg = -3.79 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2018.8.8

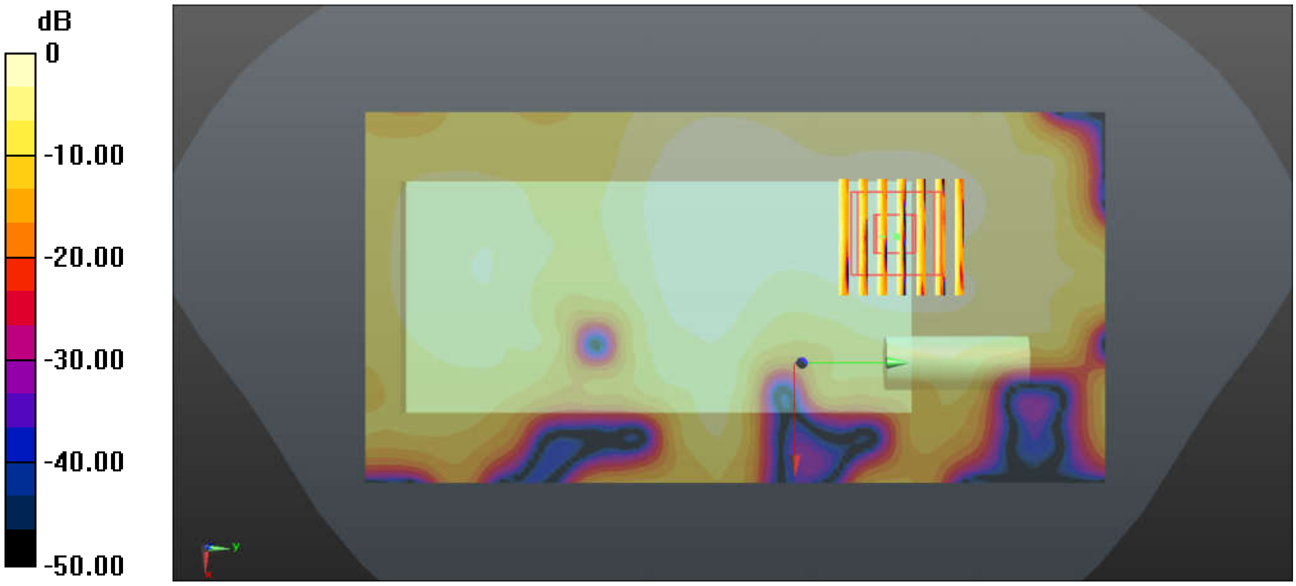
05_WLAN2.4GHz_802.11b 1Mbps_face_25mm_Ch6

Communication System: UID 0, WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: HSL_2450 Medium parameters used: f = 2437 MHz; σ = 1.822 S/m; ε_r = 38.384; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.56, 7.56, 7.56); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM3; Type: SAM; Serial: TP-1542
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch6/Area Scan (81x161x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0655 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.674 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.0810 W/kg
SAR(1 g) = 0.041 W/kg; SAR(10 g) = 0.019 W/kg
Maximum value of SAR (measured) = 0.0643 W/kg



0 dB = 0.0643 W/kg = -11.92 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.8

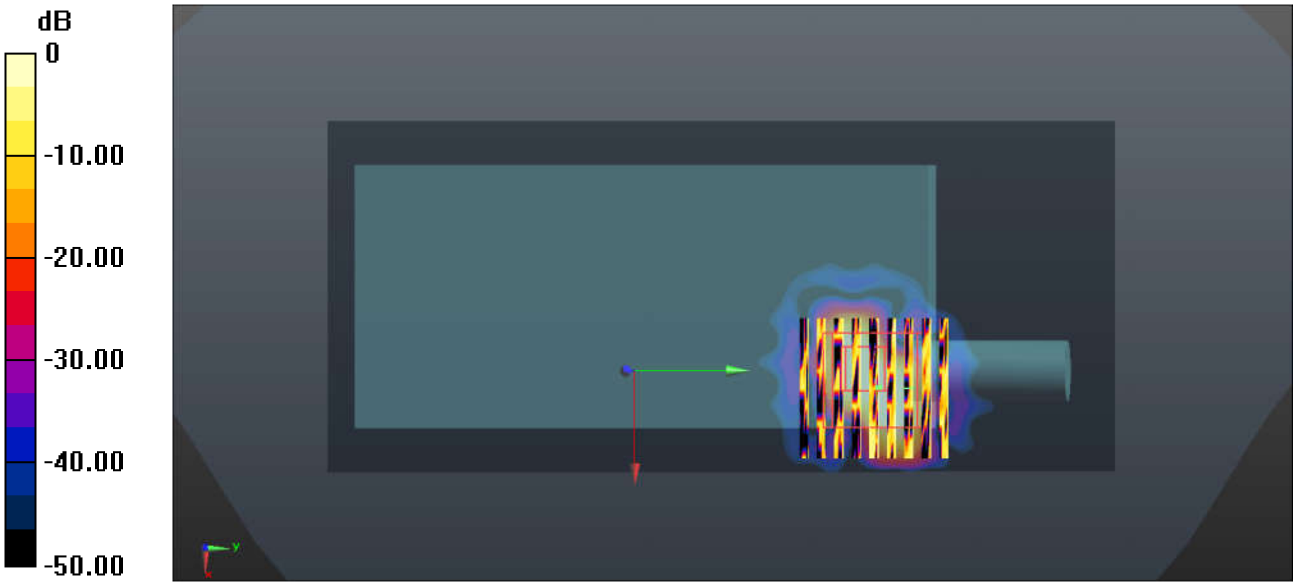
06_WLAN5GHz_802.11a 6Mbps_face_25mm_Ch52

Communication System: UID 0, WIFI (0); Frequency: 5260 MHz;Duty Cycle: 1:1.081
Medium: HSL_5000 Medium parameters used: f = 5260 MHz; σ = 4.579 S/m; ε_r = 35.987; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(5.2, 5.2, 5.2); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch52/Area Scan (81x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.0544 W/kg

Ch52/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.170 W/kg
SAR(1 g) = 0.00932 W/kg; SAR(10 g) = 0.00188 W/kg
Maximum value of SAR (measured) = 0.0277 W/kg



0 dB = 0.0277 W/kg = -15.58 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2018.8.8

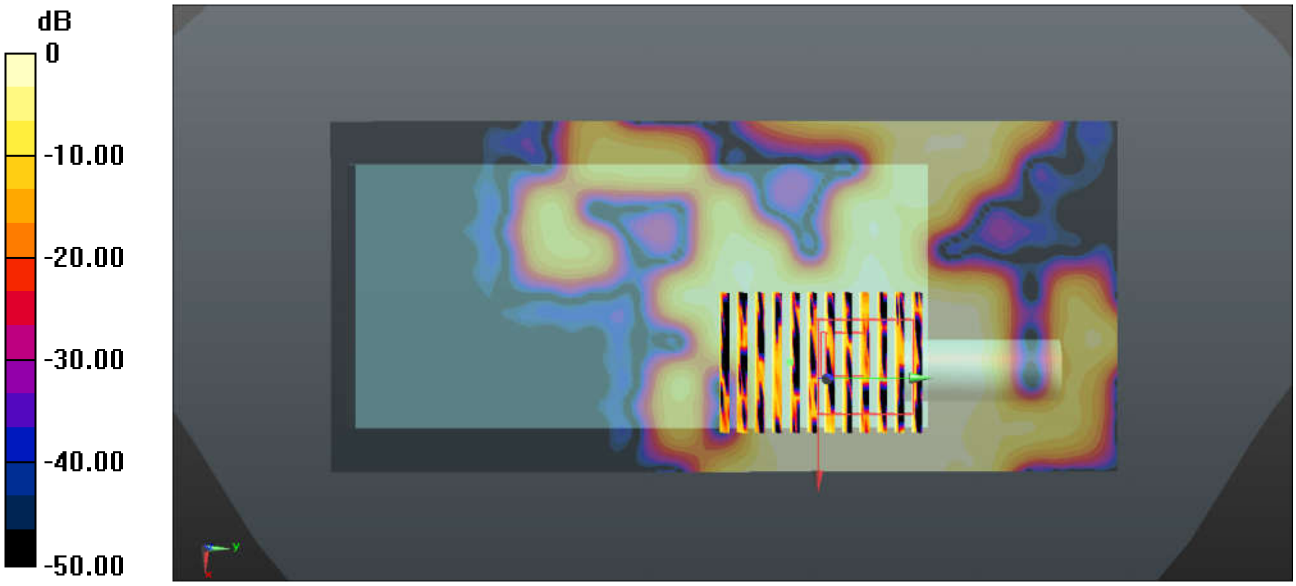
07_WLAN5GHz_802.11a 6Mbps_face_25mm_Ch116

Communication System: UID 0, WIFI (0); Frequency: 5580 MHz;Duty Cycle: 1:1.081
Medium: HSL_5000 Medium parameters used: f = 5580 MHz; σ = 4.94 S/m; ε_r = 35.266; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(4.94, 4.94, 4.94); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch116/Area Scan (81x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.109 W/kg

Ch116/Zoom Scan (9x12x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 3.657 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.377 W/kg
SAR(1 g) = 0.039 W/kg; SAR(10 g) = 0.016 W/kg
Maximum value of SAR (measured) = 0.109 W/kg



0 dB = 0.109 W/kg = -9.63 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2018.8.8

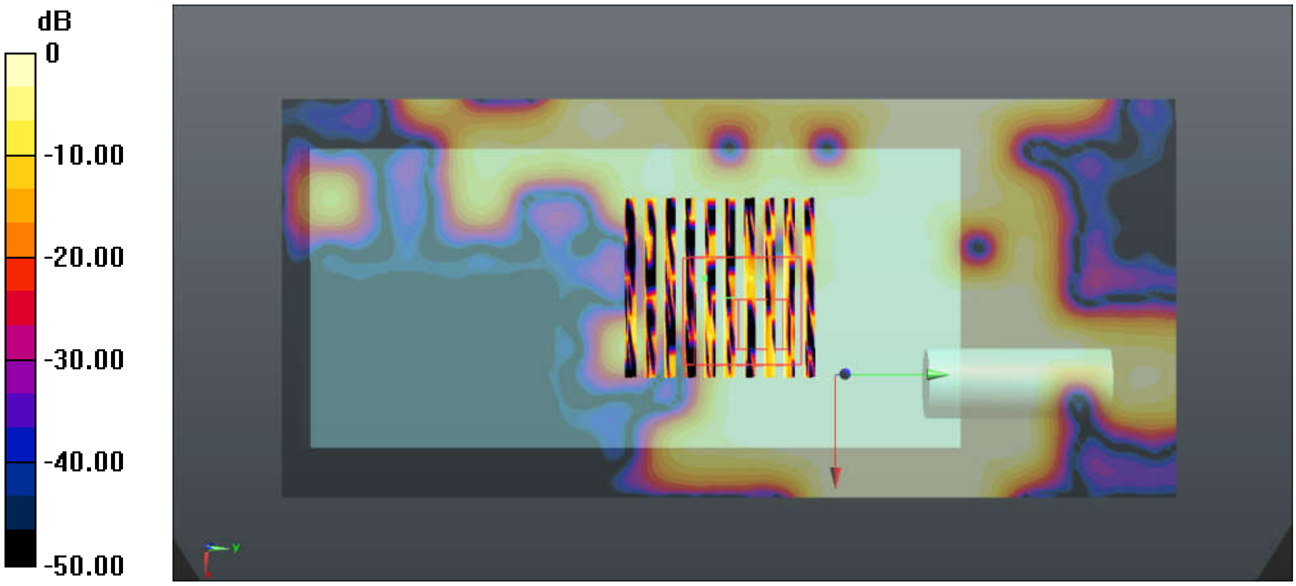
08_WLAN5GHz_802.11a 6Mbps_face_25mm_Ch165

Communication System: UID 0, WIFI (0); Frequency: 5825 MHz;Duty Cycle: 1:1.081
Medium: HSL_5000 Medium parameters used: f = 5825 MHz; σ = 5.235 S/m; ε_r = 34.737; ρ = 1000 kg/m^3
Ambient Temperature：23.5 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(5.23, 5.23, 5.23); Calibrated: 2018.5.31;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2018.5.28
- Phantom: SAM2; Type: SAM; Serial: TP-1644
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch165/Area Scan (81x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.138 W/kg

Ch165/Zoom Scan (10x10x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.099 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.409 W/kg
SAR(1 g) = 0.026 W/kg; SAR(10 g) = 0.010 W/kg
Maximum value of SAR (measured) = 0.0734 W/kg



0 dB = 0.0734 W/kg = -11.34 dBW/kg