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TEST REPORT

Report No. ..... :	**CHTEW19030229** Report verificaiton:
Project No. ..... :	**SHT1902018002EW**
FCC ID ..... :	**Q5ET60**
Applicant's name ..... :	**Kirisun Communication Co.,Ltd.**
Address.....:	3rd Floor, Building A, Tongfang Information Habour, No.11 Langshan Road, Nanshan District, Shenzhen 518057, P.R.China
Manufacturer.....:	Kirisun Communication Co.,Ltd.
Address.....:	3rd Floor, Building A, Tongfang Information Habour, No.11 Langshan Road, Nanshan District, Shenzhen 518057, P.R.China
Test item description ..... :	**PoC Two-way Radio**
Trade Mark .....:	KIRISUN
Model/Type reference.....:	T60
Listed Model(s) .....:	T65,iTALK 220,iTALK 200
Standard ..... :	**FCC 47 CFR Part2.1093** **IEEE Std C95.1, 1999 Edition** **IEEE 1528: 2013**
Date of receipt of test sample…….:	Feb. 25, 2019
Date of testing……...:	Feb. 26, 2019- Mar. 31, 2019
Date of issue……:	Apr. 01, 2019
Result..... ……..:	**PASS**

Compiled by (position+printedname+signature)...:	File administrators:Xiaodong Zhao	Xiaodong Zhao
Supervised by (position+printedname+signature)...:	Test Engineer: Xiaodong Zhao	Xiaodong Zhao
Approved by (position+printedname+signature)...:	Manager: Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Contents

1 . Test Standards and Report version

1.1. Test Standards

The tests were performed according to following standards:

FCC 47 Part 2.1093: Radiofrequency radiation exposure evaluation: portable devices.
IEEE Std C95.1, 1999 Edition: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz
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.

FCC published RF exposure KDB procedures:
865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz
865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations
447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
248227 D01 802 11 Wi-Fi SAR v02r02: SAR Measurement Proceduresfor802.11 a/b/g Transmitters
941225 D01 3G SAR Procedures v03r01: SAR Measurement Procedures for 3G Devices
941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices

1.2. Report version

Revision No.	Date of issue	Description
N/A	2019-04-01	Original

2. Summary

2.1. Client Information

Applicant:	Kirisun Communication Co.,Ltd.
Address:	3rd Floor, Building A, Tongfang Information Habour, No.11 Langshan Road, Nanshan District, Shenzhen 518057, P.R.China
Manufacturer:	Kirisun Communication Co.,Ltd.
Address:	3rd Floor, Building A, Tongfang Information Habour, No.11 Langshan Road, Nanshan District, Shenzhen 518057, P.R.China

2.2. Product Description

Name of EUT:	PoC Two-way Radio				
Trade Mark:	KIRISUN				
Model No.:	T60				
Listed Model(s):	T65,iTALK 220,iTALK 200				
Power supply:	DC 3.7V				
Device Category:	Portable				
Product stage:	Production unit				
RF Exposure Environment:	General Population/Uncontrolled				
IMEI:	860441047600049				
Hardware version:	V1.2				
Software version:	V1.3				
Device Dimension:	Overall (Length x Width x Thickness):118 x 60 x 35mm External Antenna(Length):60mm				
Maximum SAR Value					
Separation Distance:	Front-of-face:	25mm			
	Body:	0mm			
Max Report SAR Value (1g):	Test location:	PCB	DTS	U-NII	Simultaneous TX
	Front-of-face:	0.614W/kg	0.022W/kg	0.017W/kg	0.636W/kg
	Body:	1.280W/kg	0.002W/kg	0.014W/kg	1.294W/kg
GSM					
Support Band:	GSM850				
Modulation Type:	GSM/GPRS:GMSK				
GPRS Multislot Class:	12				
Antenna Type:	PIFA				
WCDMA					
Operation Band:	WCDMA Band V				
Power Class:	Class 3				
Modulation Type:	QPSK				
DC-HSUPA Release Version:	Not Supported				
Antenna Type:	PIFA				

LTE	
Operation Band:	FDD Band 4,FDD Band 5,FDD Band 7,FDD Band 17
Power Class:	Class 3
Modulation Type:	QPSK,16QAM
Antenna Type:	PIFA
WIFI 2.4G	
Supported Type:	802.11b/802.11g/802.11n(HT20)/802.11n(HT40)
Modulation Type:	DSSS for 802.11b OFDM for 802.11g/802.11n(HT20)/802.11n(HT40)
Operation Frequency:	2412MHz~2462MHz for 802.11b/802.11g/802.11n(HT20) 2422MHz~2452MHz for 802.11n(HT40)
Channel Number:	11 for 802.11b/802.11g/802.11n(HT20) 7 for 802.11n(HT40)
Channel Separation:	5MHz
Antenna Type:	Ceramic antenna
WIFI 5G	
Supported Type:	802.11a/802.11n(HT20)/802.11n(HT40)
Modulation Type:	BPSK,QPSK,16QAM,64QAM
Operation Frequency:	U-NII-1:5150MHz~5250MHz U-NII-2A:5250MHz~5350MHz U-NII-2C:5470MHz~5725MHz
Antenna Type:	Ceramic antenna
Bluetooth	
Version:	BT4.1+EDR
Modulation Type:	GFSK,π/4DQPSK,8DPSK
Operation Frequency:	2402MHz~2480MHz
Channel Number:	79
Channel Separation:	1MHz
Antenna Type:	Ceramic antenna
Bluetooth	
Version:	BT4.1+BLE
Modulation:	GFSK
Operation Frequency:	2402MHz~2480MHz
Channel Number:	40
Channel Separation:	2MHz
Antenna Type:	Ceramic antenna

Remark:

1. *The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power.*
2. *Device does not support held-to-ear voice mode.*

3. Test Environment

3.1. Test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.
Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

3.2. Test Facility

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 762235

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 762235.

IC-Registration No.: 5377B-1

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B-1.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Ambient temperature	18 °C to 25 °C
Ambient humidity	30%RH to 70%RH
Air Pressure	950-1050mbar

4. Equipments Used during the Test

Used	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. date (YY-MM-DD)	Due date (YY-MM-DD)
●	Data Acquisition Electronics DAEx	SPEAG	DAE4	1315	2018/04/18	2019/04/17
●	E-field Probe	SPEAG	EX3DV4	7375	2018/12/13	2019/12/12
●	Universal Radio Communication Tester	R&S	CMW500	137681	2018/07/11	2019/07/10
● Tissue-equivalent liquids Validation						
●	Dielectric Assessment Kit	SPEAG	DAK-3.5	1267	N/A	N/A
○	Dielectric Assessment Kit	SPEAG	DAK-12	1130	N/A	N/A
●	Network analyzer	Keysight	E5071C	MY46733048	2018/09/19	2019/09/18
● System Validation						
○	System Validation Antenna	SPEAG	CLA-150	4024	2018/02/21	2021/02/20
○	System Validation Dipole	SPEAG	D450V3	1102	2018/02/23	2021/02/22
●	System Validation Dipole	SPEAG	D750V3	1180	2018/02/07	2021/02/06
●	System Validation Dipole	SPEAG	D835V2	4d238	2018/02/19	2021/02/18
●	System Validation Dipole	SPEAG	D1750V2	1164	2018/02/06	2021/02/05
○	System Validation Dipole	SPEAG	D1900V2	5d226	2018/02/22	2021/02/21
●	System Validation Dipole	SPEAG	D2450V2	1009	2018/02/05	2021/02/04
●	System Validation Dipole	SPEAG	D2600V2	1150	2018/02/05	2021/02/04
●	System Validation Dipole	SPEAG	D5GHzV2	1273	2018/02/21	2021/02/20
●	Signal Generator	R&S	SMB100A	114360	2018/08/21	2019/08/20
●	Power Viewer for Windows	R&S	N/A	N/A	N/A	N/A
●	Power sensor	R&S	NRP18A	101010	2018/08/21	2019/08/20
●	Power sensor	R&S	NRP18A	101011	2018/08/21	2019/08/20
●	Power Amplifier	BONN	BLWA 0160-2M	1811887	2018/11/15	2019/11/14
●	Dual Directional Coupler	Mini-Circuits	ZHDC-10-62-S+	F975001814	2018/11/15	2019/11/14
●	Attenuator	Mini-Circuits	VAT-3W2+	1819	2018/11/15	2019/11/14
●	Attenuator	Mini-Circuits	VAT-10W2+	1741	2018/11/15	2019/11/14

Note:

1. *The Probe,Dipole and DAE calibration reference to the Appendix B and C.*
2. *Referring to KDB865664 D01, the dipole calibration interval can be extended to 3 years with justifcatio. The dipole are also not physically damaged or repaired during the interval.*

5. Measurement Uncertainty

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, 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.

6. SAR Measurements System Configuration

6.1. SAR Measurement Set-up

The DASY5 system for performing compliance tests consists of the following items:

A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).

A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronic (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.

A unit to operate the optical surface detector which is connected to the EOC.

The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.

The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003.

DASY5 software and SEMCAD data evaluation software.

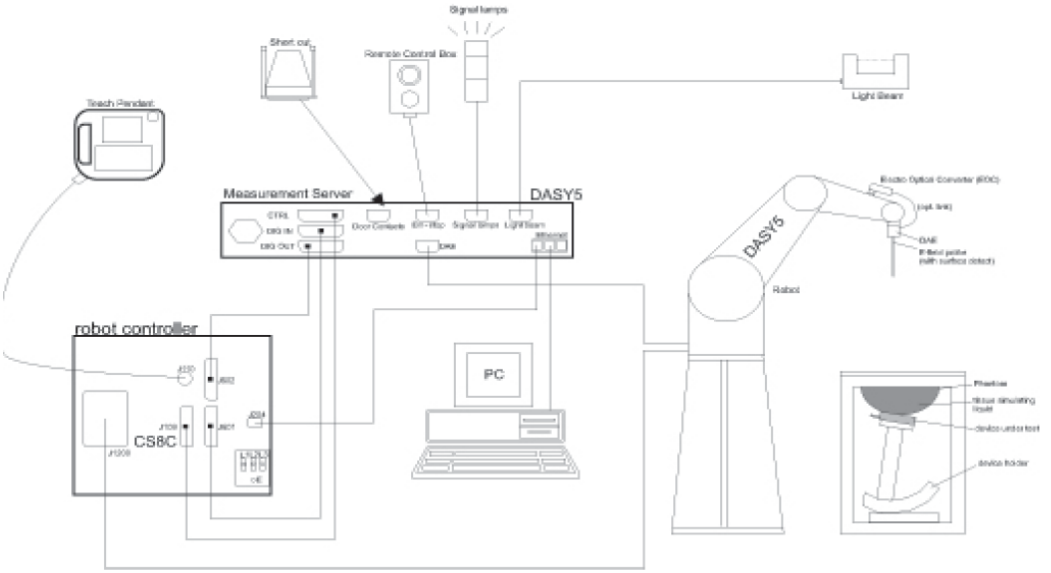
Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

The generic twin phantom enabling the testing of left-hand and right-hand usage.

The device holder for handheld Mobile Phones.

Tissue simulating liquid mixed according to the given recipes.

System validation dipoles allowing to validate the proper functioning of the system.



6.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

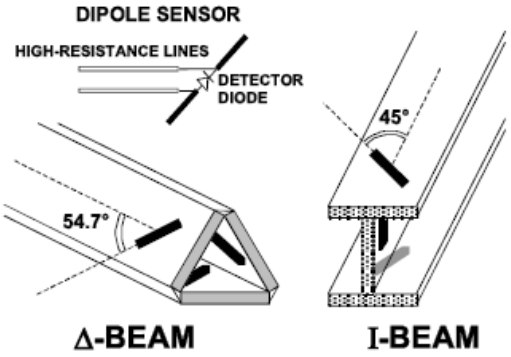
- **Probe Specification**

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	4 MHz to 10 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 W/kg; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz Dosimetry in strong gradient fields Compliance tests of Mobile Phones
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

- **Isotropic E-Field Probe**

The isotropic E-Field probe has been fully calibrated and assessed for isotropicity, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change.

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



6.3. Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6mm).
System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI isfully compatible with standard and all known tissuesimulating liquids. ELI has been optimized regarding its performance and can beintegrated into our standard phantom tables. A cover prevents evaporation ofthe liquid. Reference markings on the phantom allow installation of thecomplete setup, including all predefined phantom positions and measurementgrids, by teaching three points. The phantom is compatible with all SPEAGdosimetric probes and dipoles.

SAM-Twin Phantom

ELI Phantom

6.4. Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the DASY system.
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

Device holder supplied by SPEAG

7. SAR Test Procedure

7.1. Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5%.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

Area Scan
The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot.Before starting the area scan a grid spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged. After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

Zoom Scan
After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

Spatial Peak Detection
The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:
• maximum search
• extrapolation
• boundary correction
• peak search for averaged SAR
During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard’s method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.
They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard’s method for extrapolation.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v04

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm ± 1 mm	½·δ·ln(2) mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.

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

7.2. Data Storage and Evaluation

Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors),s together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [W/kg], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	Sensitivity:	Normi, ai0, ai1, ai2
	Conversion factor:	ConvFi
	Diode compression point:	Dcpi
Device parameters:	Frequency:	f
	Crest factor:	cf
Media parameters:	Conductivity:	σ
	Density:	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

Vi: compensated signal of channel (i = x, y, z)
Ui: input signal of channel (i = x, y, z)
cf: crest factor of exciting field (DASY parameter)
dcpi: diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

$$\mathrm{E-fieldprobes}: \qquad E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

$$\mathrm{H-fieldprobes}: \qquad H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

Vi: compensated signal of channel (i = x, y, z)
Normi: sensor sensitivity of channel (i = x, y, z), [mV/(V/m)2] for E-field Probes
ConvF: sensitivity enhancement in solution
aij: sensor sensitivity factors for H-field probes
f: carrier frequency [GHz]
Ei: electric field strength of channel i in V/m
Hi: magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

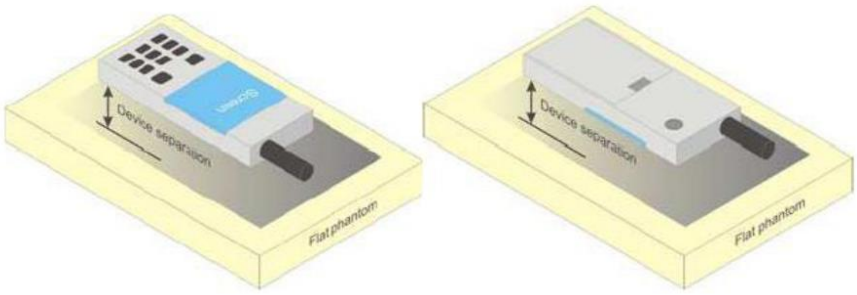
SAR: local specific absorption rate in W/kg
Etot: total field strength in V/m
σ: conductivity in [mho/m] or [Siemens/m]
ρ: equivalent tissue density in g/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

8. Position of the wireless device in relation to the phantom

8.1. Body Position

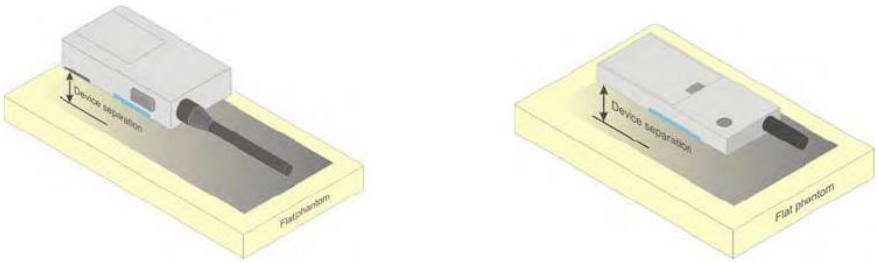
Devices that support transmission while used with body-worn accessories must be tested for body-worn accessory SAR compliance, typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics.
Devices that are designed to operate on the body of users using lanyards and straps or without requiring additional body-worn accessories must be tested for SAR compliance using a conservative minimum test separation distance ≤ 5mm to support compliance.



Test positions for body-worn devices

8.2. Front-of-face

A typical example of a front-of-face device is a two-way radio that is held at a distance from the face of the user when transmitting. In these cases the device under test shall be positioned at the distance to the phantom surface that corresponds to the intended use as specified by the manufacturer in the user instructions. If the intended use is not specified, a separation distance of 25 mm between the phantom surface and the device shall be used.



Test positions for Front-of-face devices

9. Dielectric Property Measurements & System Check

9.1. Tissue Dielectric Parameters

The liquid has previously been proven to be suited for worst-case. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB865664.

Tissue dielectric parameters for Head and Body				
Target Frequency	Head		Body	
(MHz)	εr	σ(s/m)	εr	σ(s/m)
750	41.90	0.89	55.50	0.96
835	41.50	0.90	55.20	0.97
1750	40.10	1.37	53.40	1.49
2450	39.20	1.80	52.70	1.95
2600	39.00	1.96	52.50	2.16
5200	36.00	4.66	49.01	5.30
5300	35.90	4.76	48.90	5.42
5500	35.64	4.96	48.61	5.65
5600	35.50	5.07	48.47	5.77

Check Result:

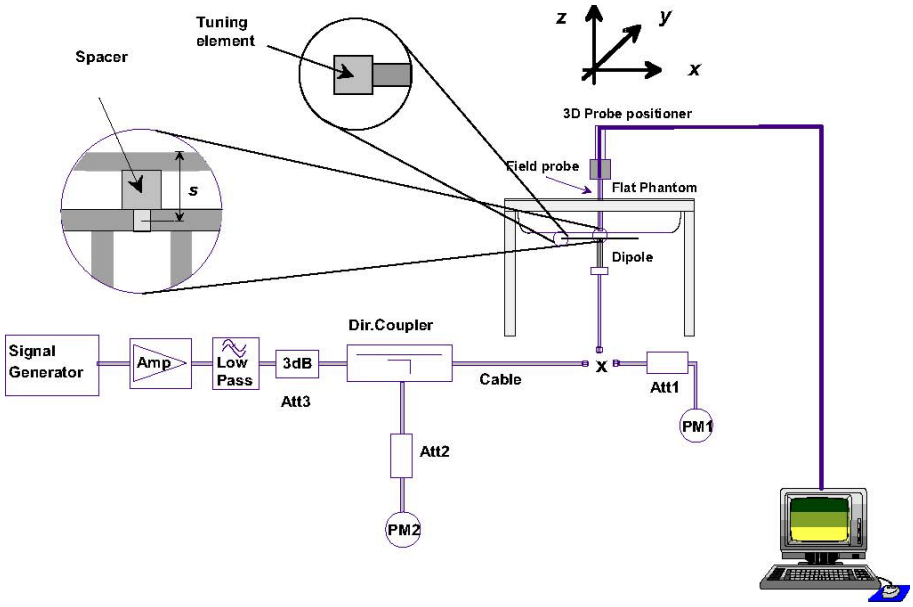
Dielectric performance of Head tissue simulating liquid									
Frequency (MHz)	εr		σ(s/m)		Delta (εr)	Delta (σ)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
750	41.90	42.90	0.89	0.90	2.39%	1.24%	±5%	22	2019-03-11
835	41.50	42.50	0.90	0.93	2.41%	3.56%	±5%	22	2019-03-12
1750	40.10	41.93	1.37	1.38	4.56%	0.36%	±5%	22	2019-03-13
2450	39.20	40.96	1.80	1.84	4.48%	2.11%	±5%	22	2019-03-14
2600	39.00	40.63	1.96	1.97	4.18%	0.51%	±5%	22	2019-03-15
5200	36.00	36.23	4.66	4.52	0.63%	-3.00%	±5%	22	2019-03-18
5300	35.90	36.03	4.76	4.63	0.37%	-2.65%	±5%	22	2019-03-18
5500	35.64	35.69	4.96	4.85	0.13%	-2.26%	±5%	22	2019-03-18
5600	35.50	35.49	5.07	4.96	-0.03%	-2.15%	±5%	22	2019-03-18

Dielectric performance of Body tissue simulating liquid									
Frequency (MHz)	εr		σ(s/m)		Delta (εr)	Delta (σ)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
750	55.50	55.63	0.96	0.94	0.23%	-2.60%	±5%	22	2019-03-11
835	55.20	55.40	0.97	0.97	0.36%	-0.41%	±5%	22	2019-03-12
1750	53.40	53.91	1.49	1.44	0.96%	-3.36%	±5%	22	2019-03-13
2450	52.70	53.03	1.95	2.00	0.63%	2.56%	±5%	22	2019-03-14
2600	52.50	52.78	2.16	2.15	0.53%	-0.46%	±5%	22	2019-03-15
5200	49.01	48.15	5.30	5.38	-1.75%	1.53%	±5%	22	2019-03-18
5300	48.90	47.94	5.42	5.52	-1.97%	1.75%	±5%	22	2019-03-18
5500	48.61	47.52	5.65	5.83	-2.25%	3.10%	±5%	22	2019-03-18
5600	48.47	47.35	5.77	5.96	-2.32%	3.42%	±5%	22	2019-03-18

9.2. SAR System Check

The purpose of the system check is to verify that the system operates within its specifications at the decice test frequency.The system check is simple check of repeatability to make sure that the system works correctly at the time of the compliance test;

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10%).
System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.



System Performance Check Setup

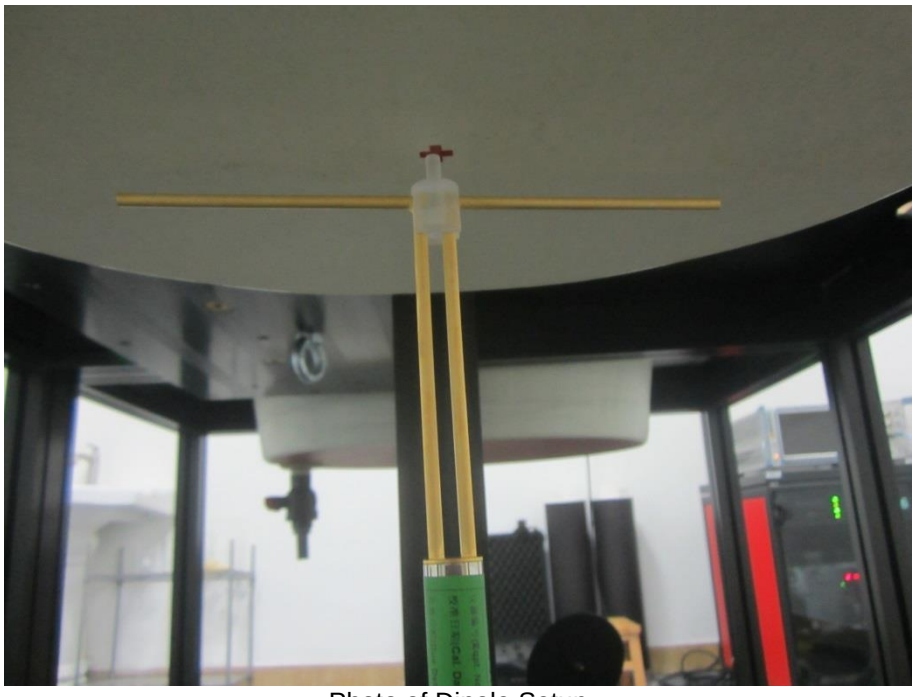


Photo of Dipole Setup

Check Result:

Head											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target 1W	Normalize to 1W	Measured 250mW	Target 1W	Normalize to 1W	Measured 250mW					
750	8.22	8.48	2.12	5.39	5.60	1.40	3.16%	3.90%	±10%	22	2019-03-11
835	9.51	9.92	2.48	6.15	6.52	1.63	4.31%	6.02%	±10%	22	2019-03-12
1750	36.60	36.24	9.06	19.40	19.44	4.86	-0.98%	0.21%	±10%	22	2019-03-13
2450	51.50	50.40	12.60	24.10	23.44	5.86	-2.14%	-2.74%	±10%	22	2019-03-14
2600	55.60	57.60	14.40	25.00	26.04	6.51	3.60%	4.16%	±10%	22	2019-03-15

Head											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target 1W	Normalize to 1W	Measured 100mW	Target 1W	Normalize to 1W	Measured 100mW					
5200	79.90	72.10	7.21	22.80	20.70	2.07	-9.76%	-9.21%	±10%	22	2019-03-18
5300	81.40	76.70	7.67	23.40	21.80	2.18	-5.77%	-6.84%	±10%	22	2019-03-18
5600	83.90	82.30	8.23	24.00	23.20	2.32	-1.91%	-3.33%	±10%	22	2019-03-18

Body											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target 1W	Normalize to 1W	Measured 250mW	Target 1W	Normalize to 1W	Measured 250mW					
750	8.55	8.40	2.10	5.68	5.60	1.40	-1.75%	-1.41%	±10%	22	2019-03-11
835	9.64	10.08	2.52	6.32	6.64	1.66	4.56%	5.06%	±10%	22	2019-03-12
1750	36.70	37.56	9.39	19.50	20.16	5.04	2.34%	3.38%	±10%	22	2019-03-13
2450	49.40	50.00	12.50	23.30	23.32	5.83	1.21%	0.09%	±10%	22	2019-03-14
2600	54.60	58.80	14.70	24.40	26.36	6.59	7.69%	8.03%	±10%	22	2019-03-15

Body											
Frequency (MHz)	1g SAR			10g SAR			Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target 1W	Normalize to 1W	Measured 100mW	Target 1W	Normalize to 1W	Measured 100mW					
5200	73.60	70.70	7.07	20.40	20.00	2.00	-3.94%	-1.96%	±10%	22	2019-03-18
5300	75.60	73.70	7.37	21.10	20.70	2.07	-2.51%	-1.90%	±10%	22	2019-03-18
5600	79.40	78.00	7.80	22.10	21.60	2.16	-1.76%	-2.26%	±10%	22	2019-03-18

Plots of System Performance Check

System Performance Check-Head 750MHz

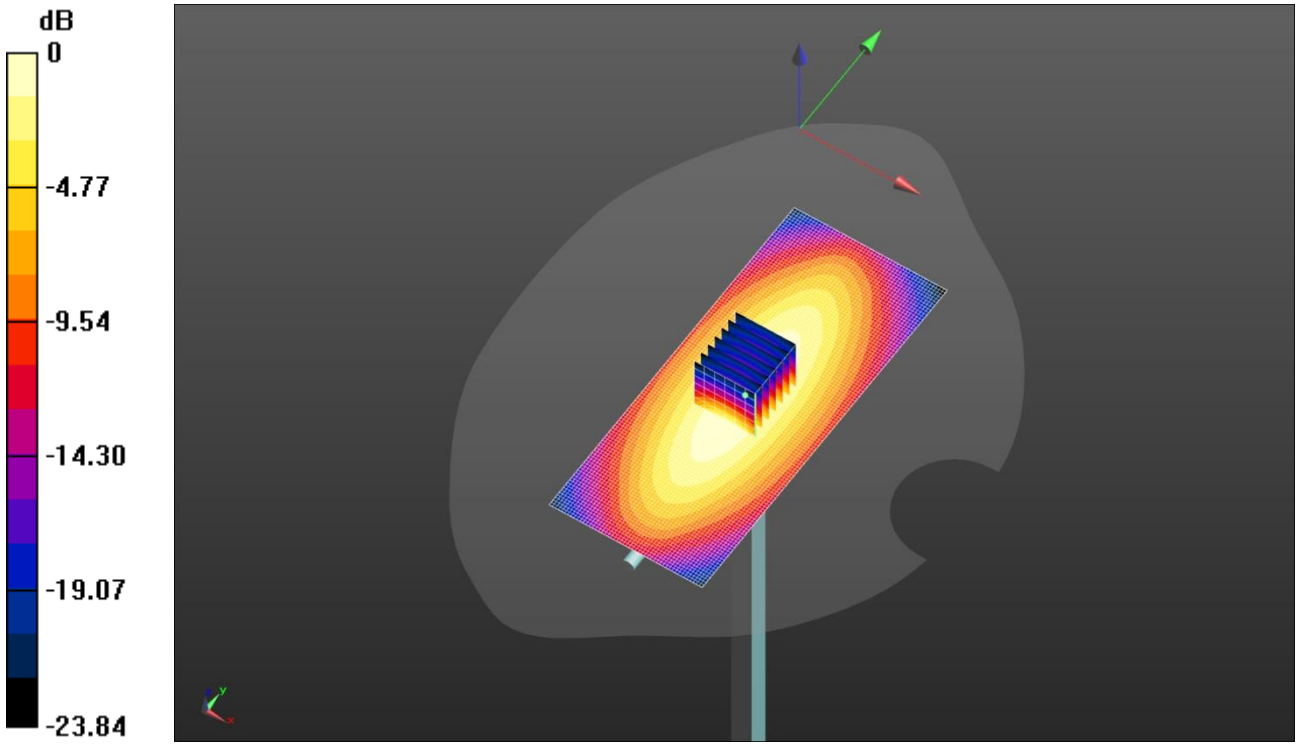
DUT: D750V3; Type: D750V3; Serial: 1180
Date: 2019-03-11
Communication System: UID 0, A-CW (0); Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.901 S/m; ε_r = 42.90; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375;ConvF(10.35, 10.35, 10.35); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7437)

Head/d=15mm, Pin=250mW/Area Scan (41x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.75 W/kg

Head/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.45 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.20 W/kg
SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (measured) = 2.82 W/kg



System Performance Check-Body 750MHz

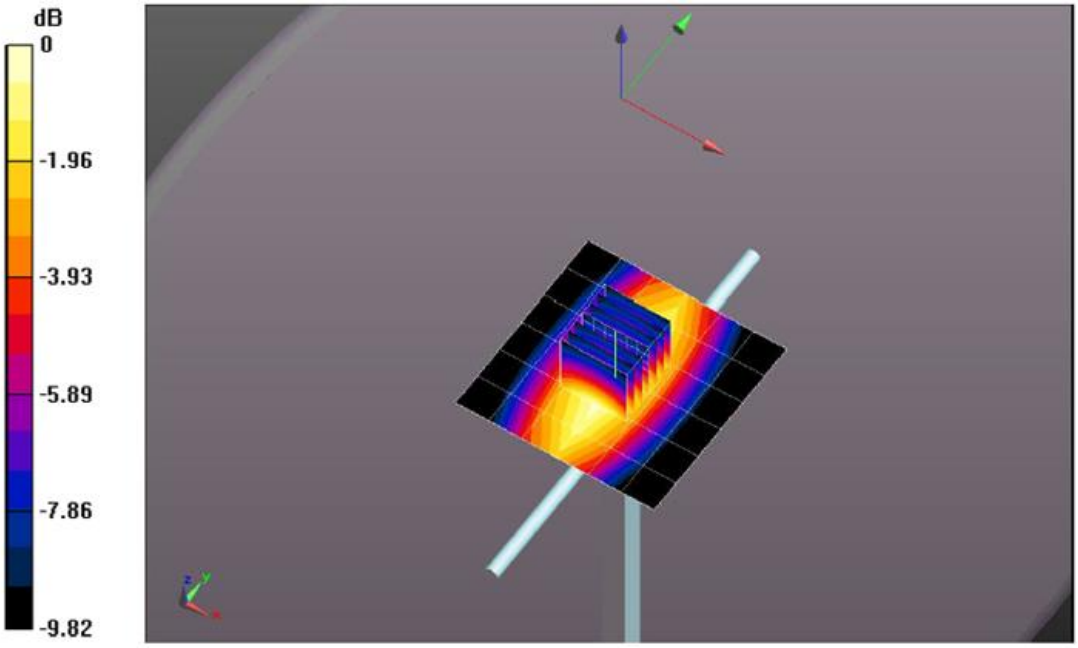
DUT: D750V3; Type: D750V3; Serial: 1180
Date: 2019-03-11
Communication System: UID 0, CW (0); Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.935 S/m; ε_r = 55.625; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375;ConvF(10.52, 10.52, 10.52); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.11(7437)

Body/d=15mm,Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.80 W/kg

Body/d=15mm,Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.06 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.18 W/kg
SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (measured) = 2.81 W/kg



System Performance Check-Head 835MHz

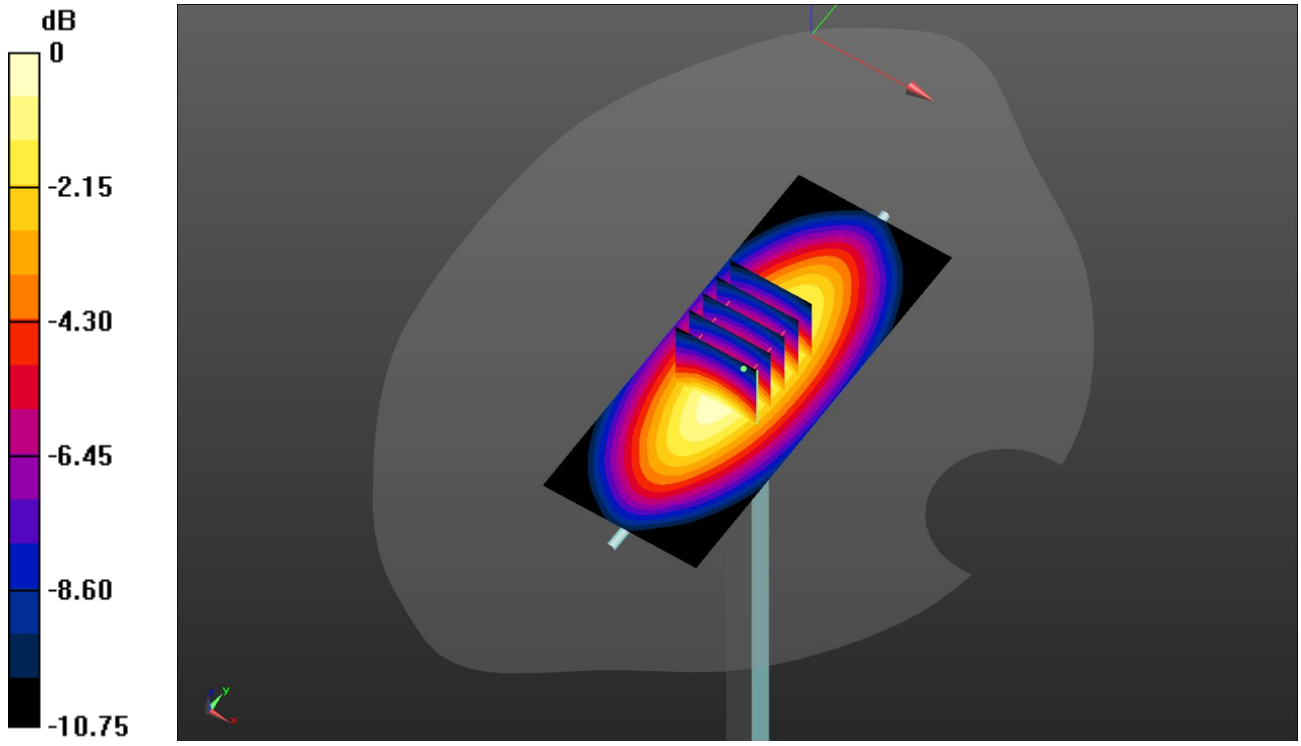
DUT: D835V2; Type: D835V2; Serial: 4d238
Date: 2019-03-12
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.932 S/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(10.13, 10.13, 10.13); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=15mm, Pin=250mW/Area Scan (41x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.51 W/kg

Head/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 66.38 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 3.78 W/kg
SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.63 W/kg
Maximum value of SAR (measured) = 3.34 W/kg



System Performance Check-Body 835MHz

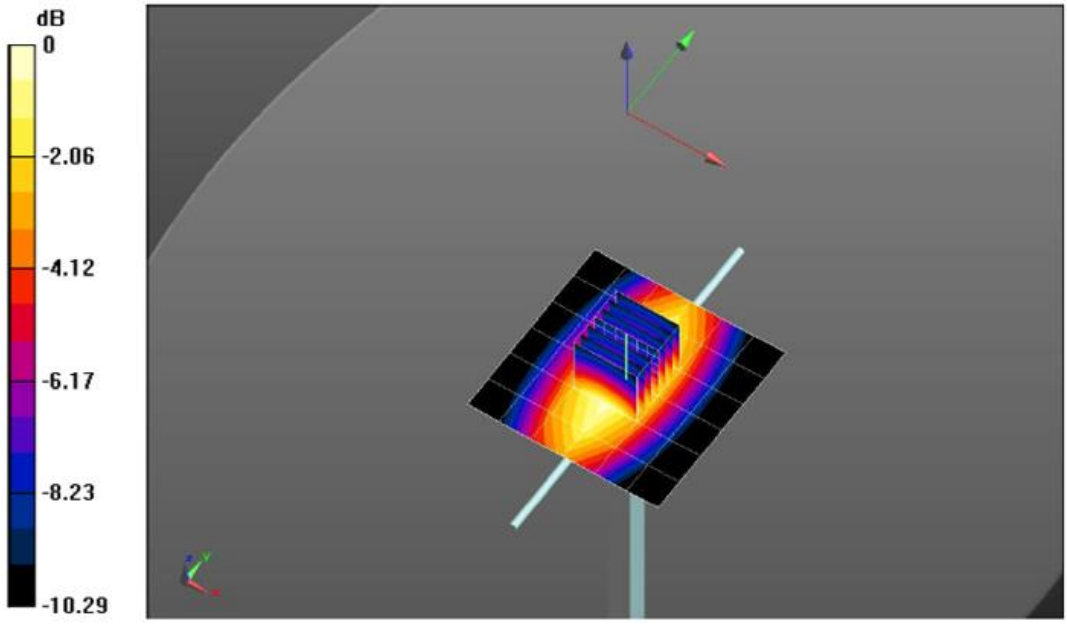
DUT: D835V2; Type: D835V2; Serial: 4d238
Date: 2019-03-12
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.966 S/m; ε_r = 55.403; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(10.18, 10.18, 10.18); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Body/d=15mm,Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 3.40 W/kg

Body/d=15mm,Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.67 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.97 W/kg
SAR(1 g) = 2.52 W/kg; SAR(10 g) = 1.66 W/kg
Maximum value of SAR (measured) = 3.44 W/kg



System Performance Check-Head 1750MHz

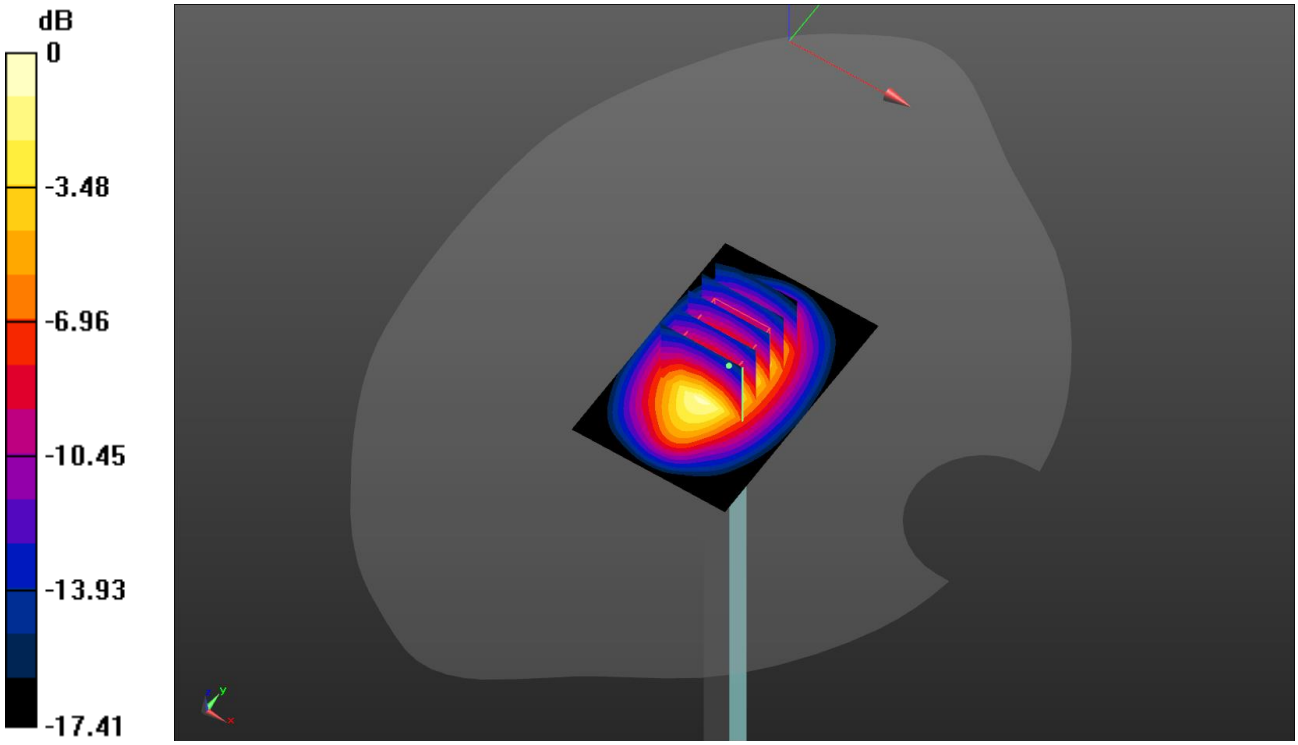
DUT: D1750V2; Type: D1750V2; Serial: 1164
Date: 2019-03-13
Communication System: UID 0, CW (0); Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.375 S/m; ε_r = 41.933; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(8.58, 8.58, 8.58); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=250mW/Area Scan (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.1 W/kg

Head/d=10mm,Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 103.5 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.06 W/kg; SAR(10 g) = 4.86 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



System Performance Check-Body 1750MHz

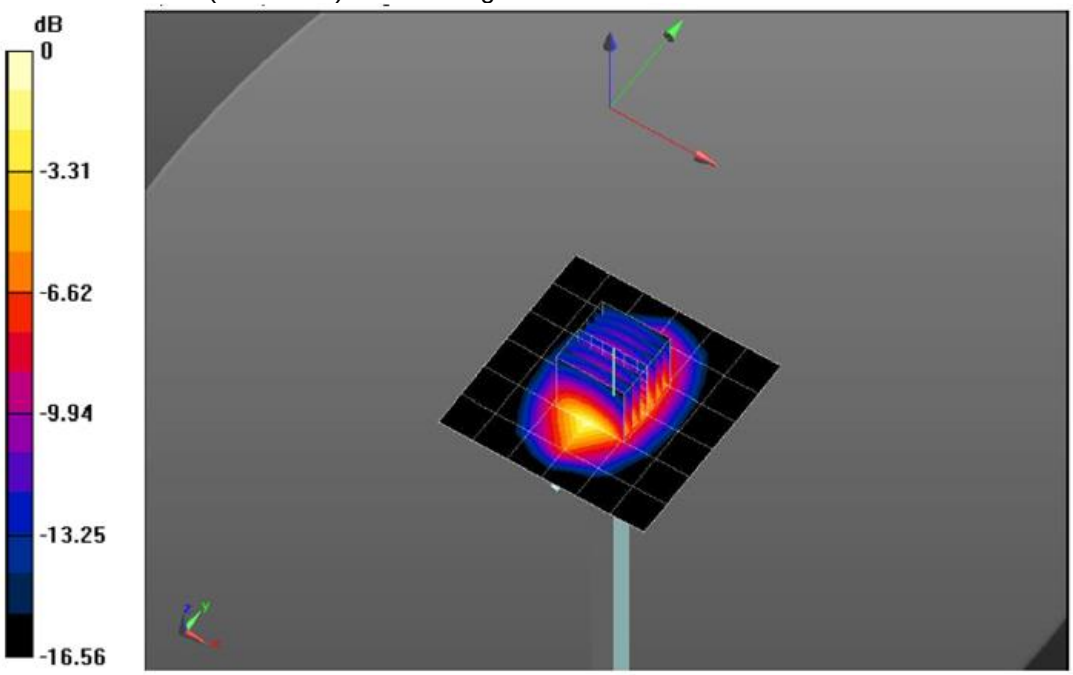
DUT: D1750V2; Type: D1750V2; Serial: 1164
Date: 2019-03-13
Communication System: UID 0, CW (0); Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.441 S/m; ε_r = 53.908; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(8.56, 8.56, 8.56); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Body/d=10mm,Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 14.7 W/kg

Body/d=10mm,Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 102.2 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 16.8 W/kg
SAR(1 g) = 9.39 W/kg; SAR(10 g) = 5.04 W/kg
Maximum value of SAR (measured) = 14.1 W/kg



SystemPerformanceCheck-Head 2450MHz

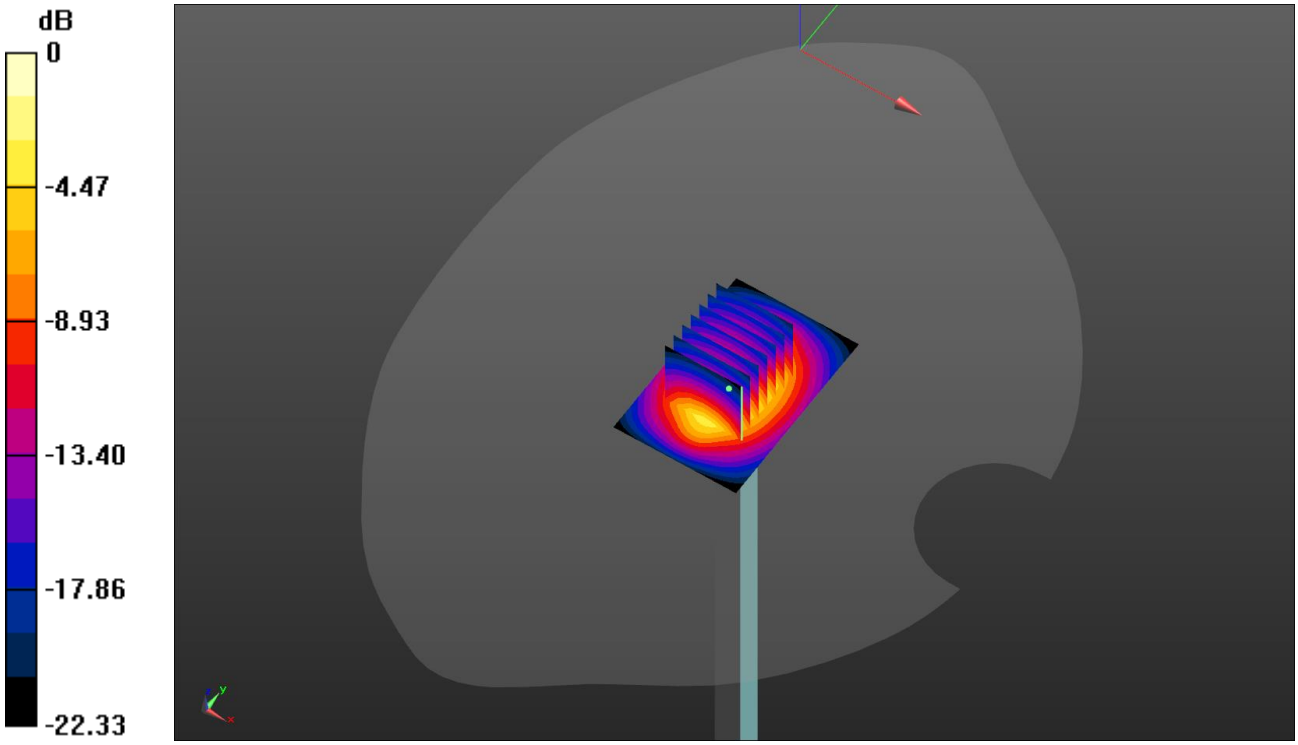
DUT: D2450V2; Type: D2450V2; Serial: 1009
Date:2019-03-14
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.838 S/m; ε_r = 40.956; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(7.64, 7.64, 7.64); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=250mW/Area Scan (41x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.1 W/kg

Head/d=10mm,Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 26.2 W/kg
SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.86 W/kg
Maximum value of SAR (measured) = 20.8 W/kg



SystemPerformanceCheck-Body 2450MHz

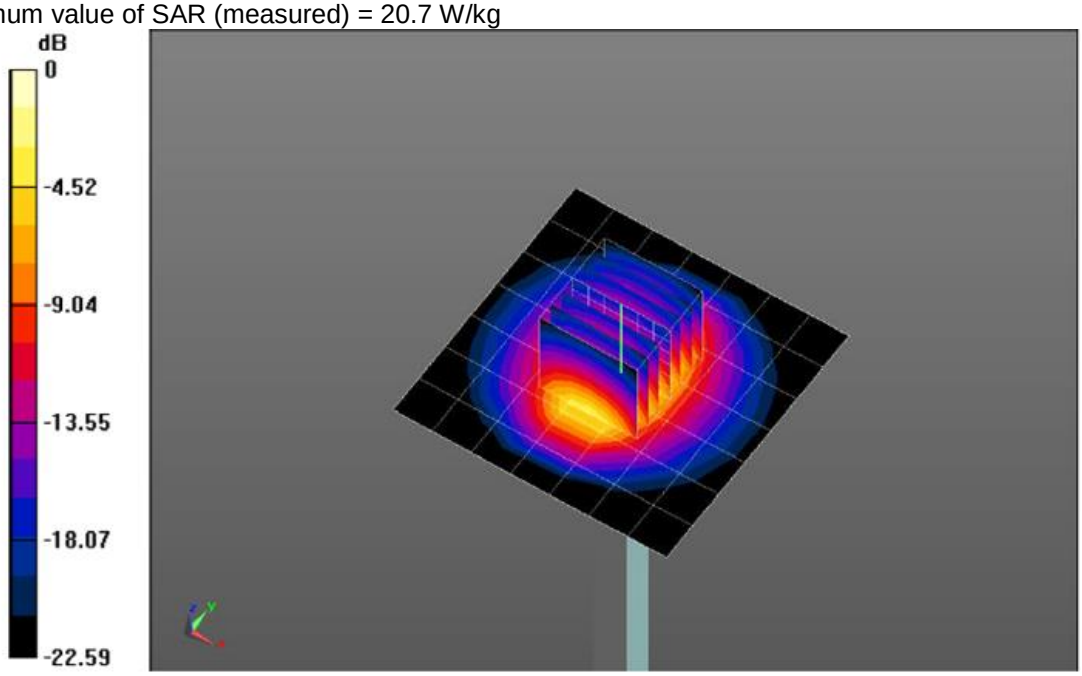
DUT: D2450V2; Type: D2450V2; Serial: 1009
Date:2019-03-14
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.001 S/m; ε_r = 53.03; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(7.81, 7.81, 7.81); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Body/d=10mm,Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 21.1 W/kg

Body/d=10mm,Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.6 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 25.7 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.83 W/kg
Maximum value of SAR (measured) = 20.7 W/kg



SystemPerformanceCheck-Head 2600MHz

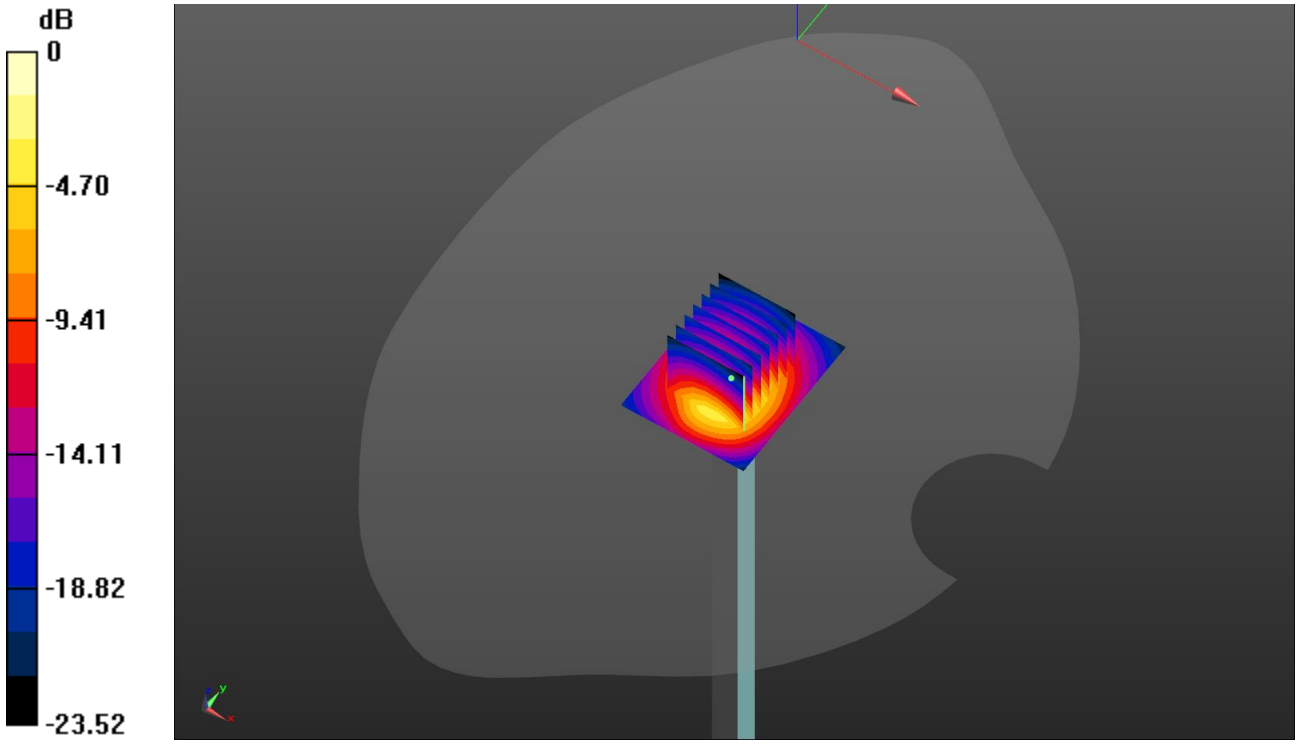
DUT: D2600V2; Type: D2600V2; Serial: 1150
Date:2019-03-15
Communication System: UID 0, CW (0); Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 1.97 S/m; ε_r = 40.632; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(7.42, 7.42, 7.42); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=250mW/Area Scan (41x51x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 25.4 W/kg

Head/d=10mm,Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 115.2 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.51 W/kg
Maximum value of SAR (measured) = 24.9 W/kg



SystemPerformanceCheck-Body 2600MHz

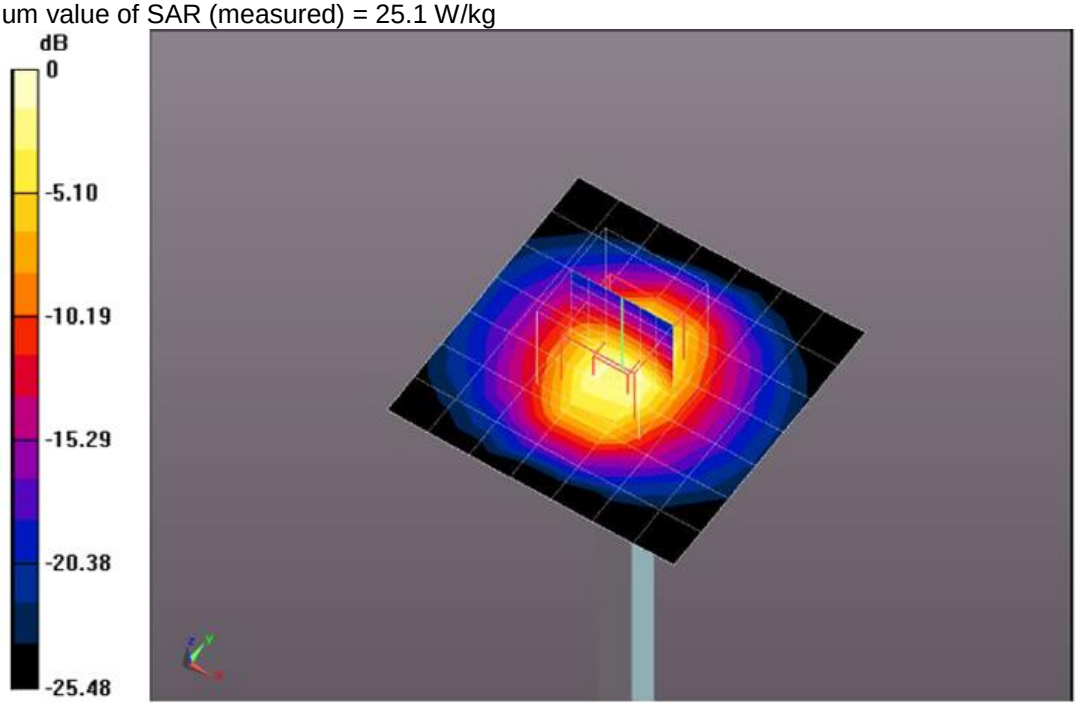
DUT: D2600V2; Type: D2600V2; Serial: 1150
Date:2019-03-15
Communication System: UID 0, CW (0); Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.15 S/m; ε_r = 52.78; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(7.53, 7.53, 7.53); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Body/d=10mm,Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 26.6 W/kg

Body/d=10mm,Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 110.2 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 31.6 W/kg
SAR(1 g) = 14.7 W/kg; SAR(10 g) = 6.59 W/kg
Maximum value of SAR (measured) = 25.1 W/kg



SystemPerformanceCheck-Head 5200MHz

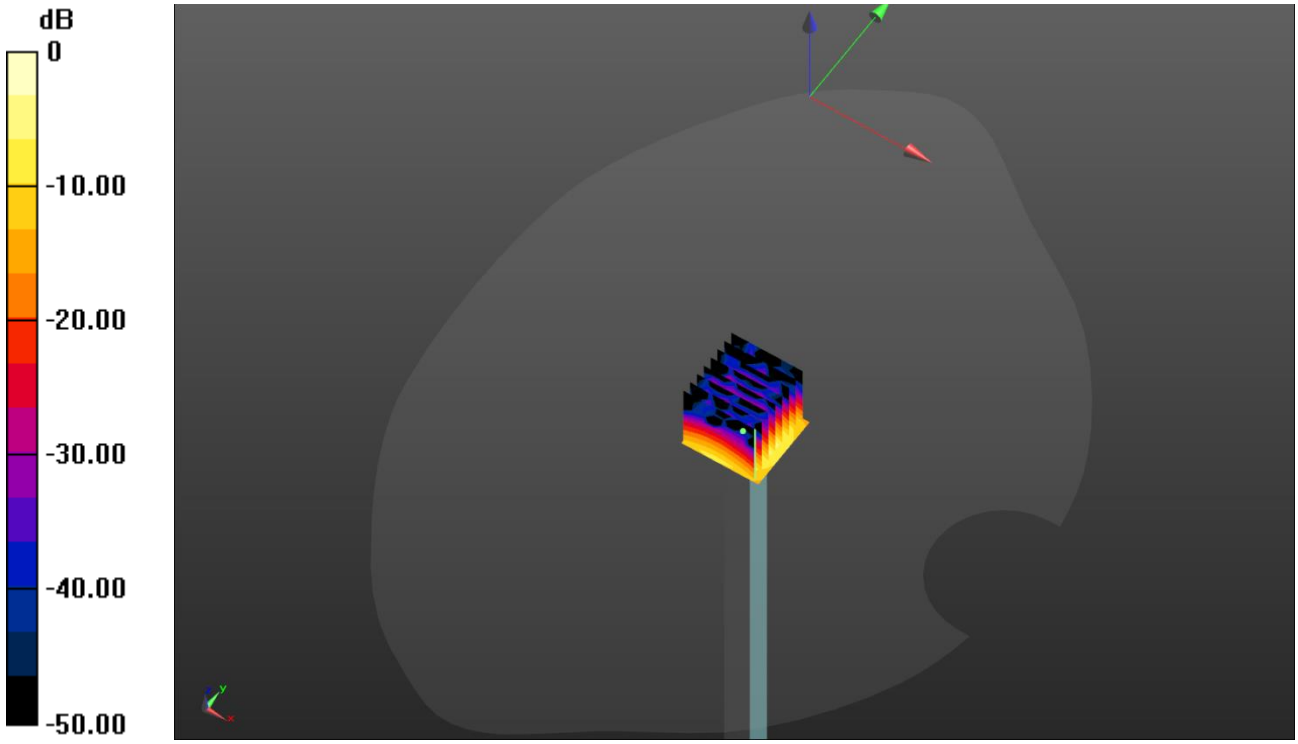
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2019-03-18
Communication System: UID 0, CW (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 36.228; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(5.29, 5.29, 5.29); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 29.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=100mW/Area Scan (31x31x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.8 W/kg

Head/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.28 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 7.21 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



SystemPerformanceCheck-Body 5200MHz

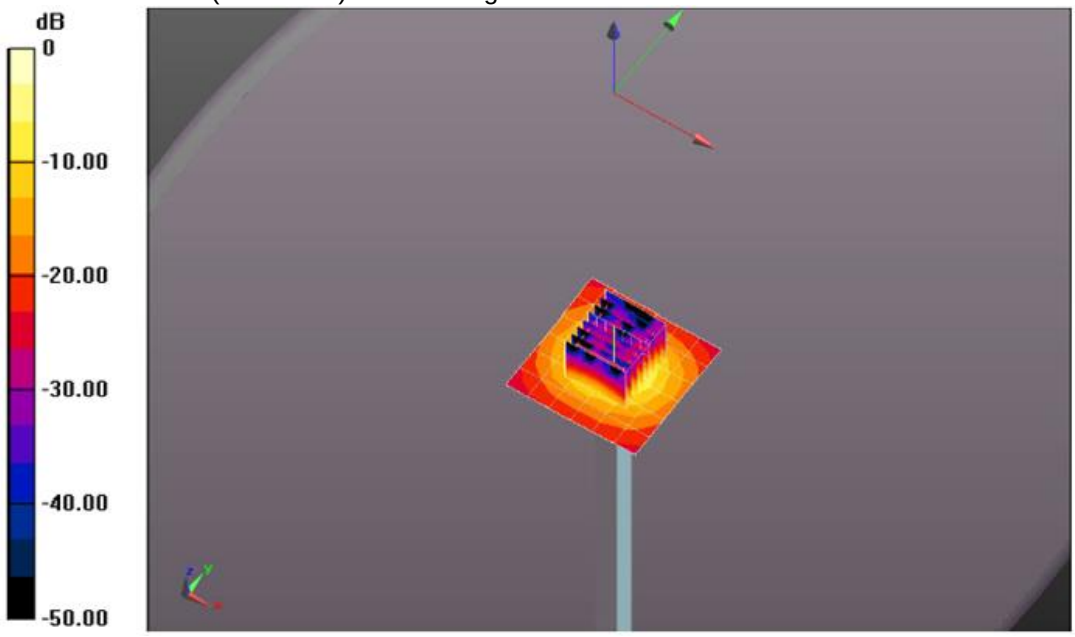
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2019-03-18
Communication System: UID 0, A-CW (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.381 S/m; ε_r = 48.152; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(4.65, 4.65, 4.65); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- DASY52 52.10.0(1446); SEMCAD X 14.6.11(7437)

Body/d=10mm,Pin=100mW/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.4 W/kg

Body/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 64.23 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 7.07 W/kg; SAR(10 g) = 2 W/kg
Maximum value of SAR (measured) = 16.6 W/kg



SystemPerformanceCheck-Head 5300MHz

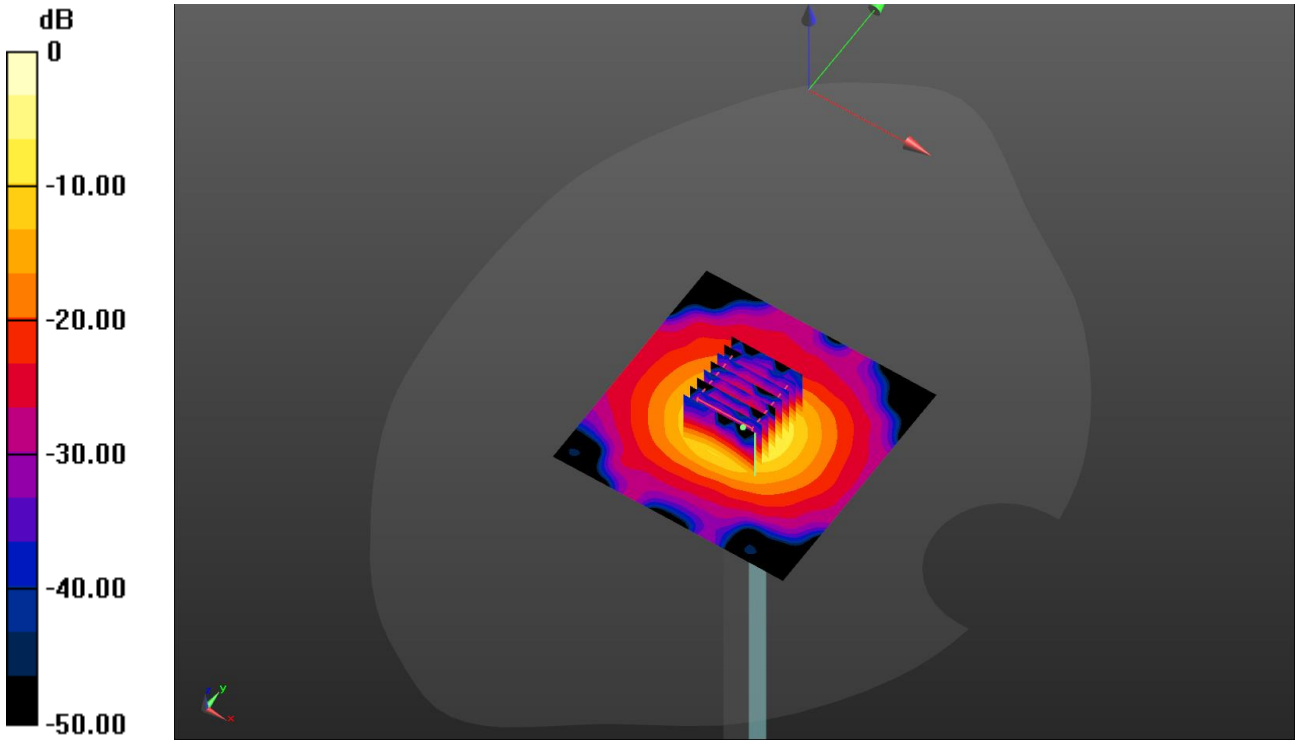
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date: 2019-03-18
Communication System: UID 0, A-CW (0); Frequency: 5300 MHz
Medium parameters used: f = 5300 MHz; σ = 4.634 S/m; ε_r = 36.033; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(5.29, 5.29, 5.29); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0 ; Type: QD 000 P41 AA; Serial: 1974
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm,dy=1.000 mm
Maximum value of SAR (interpolated) = 18.1 W/kg

Head/d=10mm,Pin=100mW/Zoom Scan(8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.24 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 32.1 W/kg
SAR(1 g) = 7.67 W/kg; SAR(10 g) = 2.18 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



SystemPerformanceCheck-Body 5300MHz

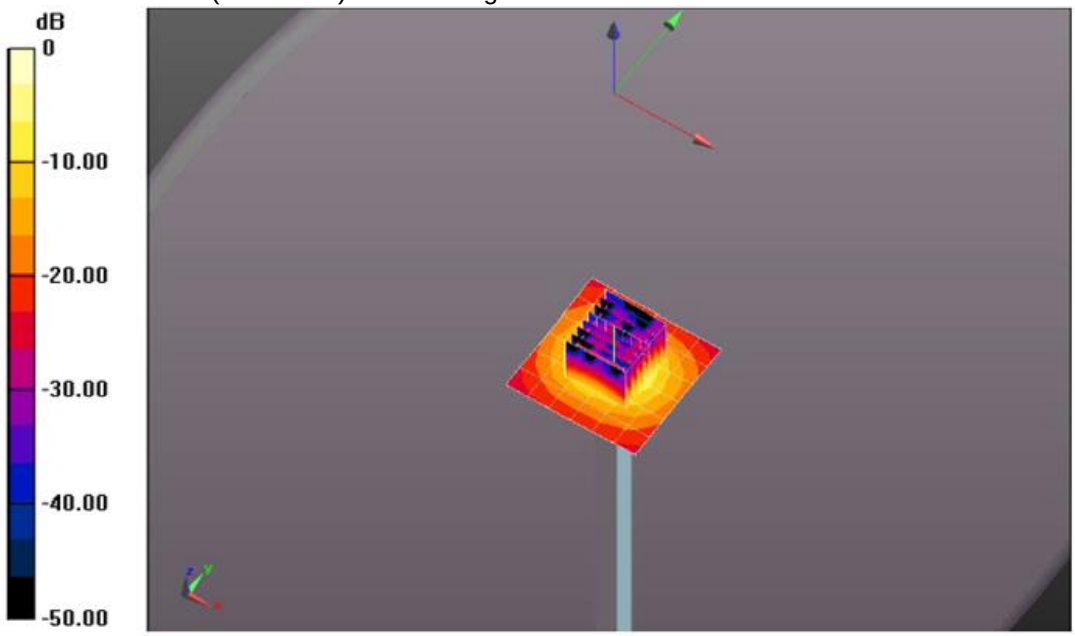
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2019-03-18
Communication System: UID 0, A-CW (0); Frequency: 5300 MHz
Medium parameters used: f = 5300 MHz; σ = 5.515 S/m; ε_r = 47.936; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(4.65, 4.65, 4.65); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.11(7437)

Body/d=10mm,Pin=100mW/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.3 W/kg

Body/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.13 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 31.6 W/kg
SAR(1 g) = 7.37 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 17.8 W/kg

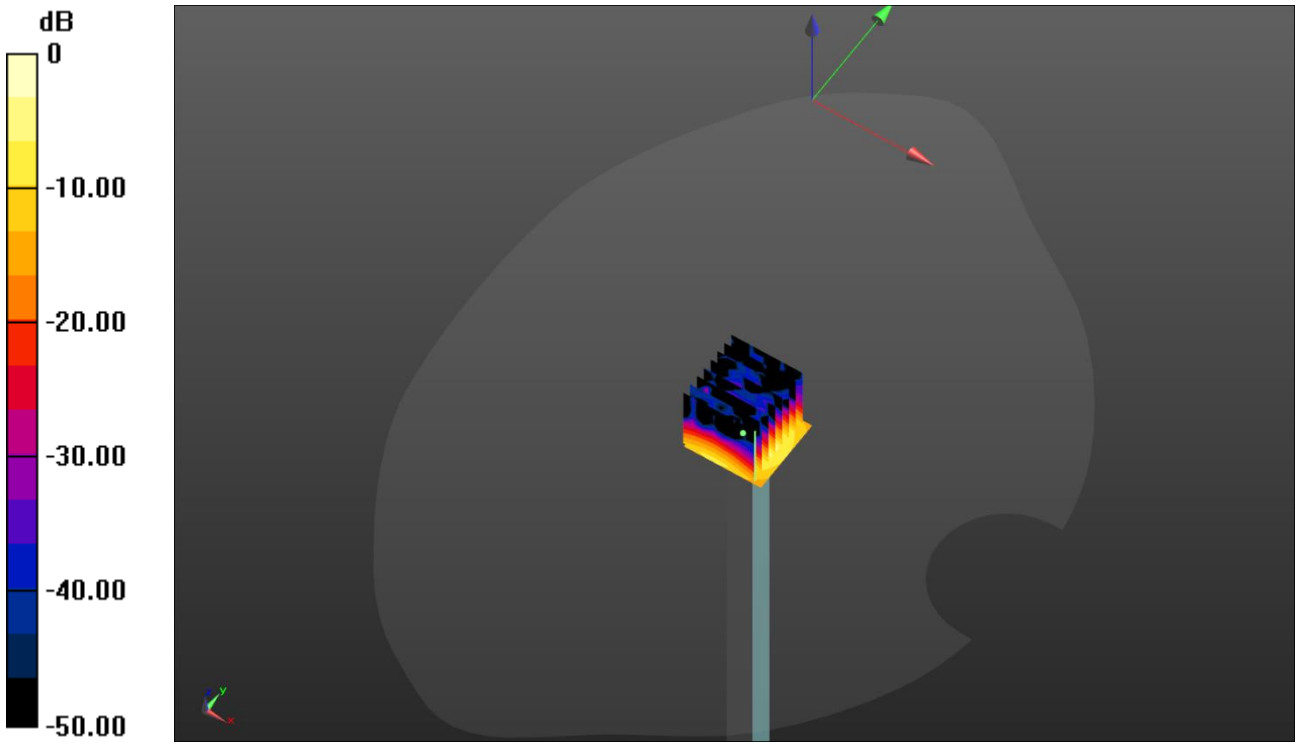


SystemPerformanceCheck-Head 5600MHz

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date: 2019-03-18
Communication System: UID 0, CW (0); Frequency: 5600 MHz
Medium parameters used: f = 5600 MHz; σ = 4.961 S/m; ε_r = 35.488; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(4.69, 4.69, 4.69); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 29.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=100mW/Area Scan (31x31x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 22.1 W/kg
Head/d=10mm,Pin=100mW/Zoom Scan(8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 71.23 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 35.4 W/kg
SAR(1 g) = 8.23 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 20.2 W/kg



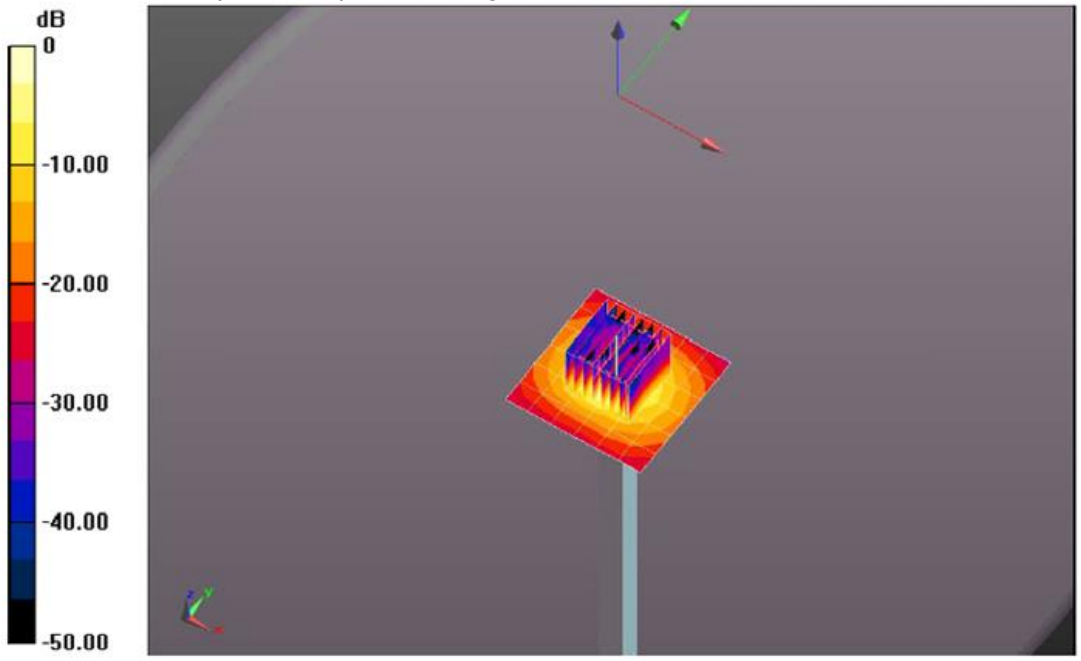
SystemPerformanceCheck-Body 5600MHz

DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2019-03-18
Communication System: UID 0, A-CW (0); Frequency: 5600 MHz
Medium parameters used: f = 5600 MHz; σ = 5.963 S/m; ε_r = 47.347; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:

- Probe: EX3DV4 - SN7375; ConvF(4.00, 4.00, 4.00); Calibrated: 12/13/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 29.0
- Electronics: DAE4 Sn1315; Calibrated: 4/18/2018
- Phantom: Twin-SAM V8.0; Type: QD 000 P41 AA; Serial: 1947
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Head/d=10mm,Pin=100mW/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.4 W/kg

Head/d=10mm,Pin=100mW/Zoom Scan(8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.10 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 36.9 W/kg
SAR(1 g) = 7.8 W/kg; SAR(10 g) = 2.16 W/kg
Maximum value of SAR (measured) = 19.7 W/kg



10. SAR Exposure Limits

SAR assessments have been made in line with the requirements of FCC 47 CFR § 2.1093.

Type Exposure	Limit (W/kg)	
	General Population/ Uncontrolled Exposure Environment	Occupational/ Controlled Exposure Environment
Spatial Average SAR (whole body)	0.08	0.4
Spatial Peak SAR (1g cube tissue for head and trunk)	**1.6**	8.0
Spatial Peak SAR (10g for limb)	4.0	20.0

Population/Uncontrolled Environments: are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

11. Conducted Power Measurement Results

GSM Conducted Power

1. *Per KDB 447498 D01, the maximum output power channel is used for SAR testing and further SAR test reduction.*
2. *Per KDB 941225 D01, considering the possibility of e.g. 3rd party VoIP operation for Head and Body-worn SAR test reduction for GSM and GPRS modes is determined by the source-base time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.*
3. *Per KDB941225 D01, for hotspot SAR test reduction for GPRS modes is determined by the source-based time-averaged output power including tune-up tolerance, For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.*

Mode: GSM850		Burst Average Power (dBm)			Division Factors	Frame-Average Power (dBm)		
		CH128	CH190	CH251		CH128	CH190	CH251
		824.2MHz	836.6MHz	848.8MHz		824.2MHz	836.6MHz	848.8MHz
GSM		33.19	33.41	33.34	-9.03	24.16	24.38	24.31
GPRS (GMSK)	1TXslot	32.60	32.89	32.80	-9.03	23.57	23.86	23.77
	2TXslots	32.73	33.03	32.89	-6.02	26.71	27.01	26.87
	3TXslots	32.55	32.83	32.74	-4.26	28.29	28.57	28.48
	4TXslots	32.38	32.66	32.59	-3.01	29.37	29.65	29.58

Note:

1) Division Factors

To Frame-Average Power, the division factor is as follows:

1Tx-slot = 1 transmit time slot out of 8 time slots=> Burst Average Power divided by (8/1) => -9.03dB

2Tx-slots = 2 transmit time slots out of 8 time slots=> Burst Average Power divided by (8/2) => -6.02dB

3Tx-slots = 3 transmit time slots out of 8 time slots=> Burst Average Power divided by (8/3) => -4.26dB

4Tx-slots = 4 transmit time slots out of 8 time slots=> Burst Average Power divided by (8/4) => -3.01dB

WCDMA Conducted Power

1. *The following tests were conducted according to the test requirements outlines in 3GPP TS34.121 specification.*
2. *The procedures in KDB 941225 D01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode to determine SAR test exclusion*

A summary of thest setting are illustrated belowe:

HSDPA Setup Configureation:

a) The EUT was connected to base station RS CMU200 referred to the setup configuration
b) The RF path losses were compensated into the measurements
c) A call was established between EUT and base station with following setting:
   i. Set Gain Factors (βc and βd) and parameters were set according to each specific sub-test in the following table, C10.1.4, Quoted from the TS 34.121
   ii. Set RMC 12.2Kbps + HSDPA mode
   iii. Set Cell Power=-86dBm
   iv. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   v. Select HSDPA uplink parameters
   vi. Set Delta ACK, Delta NACK and Delta CQI=8
   vii. Set Ack-Nack repetition Factor to 3
   viii. Set CQI Feedback Cycle (K) to 4ms
   ix. Set CQI repetition factor to 2
   x. Power ctrl mode= all up bits
d) The transmitter maximum output power waw recorded.

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

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

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.

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

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

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

Setup Configuration

HSUPA Setup Configureation:

a) The EUT was connected to base station RS CMU200 referred to the setup configuration
b) The RF path losses were compensated into the measurements
c) A call was established between EUT and base station with following setting:
   i. Call configs = 5.2b, 5.9b, 5.10b, and 5.13.2B with QPSK
   ii. Set Gain Factors (βc and βd) and parameters (AG index) were set according to each specific sub-test in the following table, C11.1.3, Quoted from the TS 34.121
   iii. Set Cell Power=-86dBm
   iv. Set channel type= 12.2Kbps + HSPA mode
   v. Set UE Target power
   vi. Set Ctrl mode=Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal the target E-TFCI of 75 for Sub-test 1, and other subtest's E-TFCI
d) The transmitter maximum output power waw recorded.

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with $\beta_{hs} = 30/15 * \beta_c$.

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

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

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

General Note:

1. Per KDB 941225 D01, SAR for Head / Hotsport / Body-worn Exposure is measured using a 12.2Kbps RMC with TPC bit ocnfigured to all 1s
2. Per KDB 941225 D01 RMC12.2Kbps setting is used to evaluate SAR. If the maximum output power and Tune-up tolerance specified for production units in HSDPA/HSUPA is ≦1/4dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio fo specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC 12.2Kbps and the adjusted SAR is ≦1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA.

Mode		WCDMA Band V		
		Conducted Power (dBm)		
		CH4132	CH4183	CH4233
		826.4MHz	836.6MHz	846.6MHz
AMR 12.2K		23.48	23.23	23.20
RMC 12.2K		23.52	23.26	23.23
HSDPA	Subtest-1	23.51	23.29	23.28
	Subtest-2	23.05	22.66	22.79
	Subtest-3	23.05	22.85	22.81
	Subtest-4	23.07	22.85	22.82
HSUPA	Subtest-1	23.42	22.40	22.53
	Subtest-2	21.89	21.85	21.99
	Subtest-3	21.62	21.78	21.90
	Subtest-4	22.41	22.35	21.74
	Subtest-5	23.25	23.07	22.99

LTE Conducted Power

General Note:

1. CMW500 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 EUTtransmitting at maximum power and at different configurations which are requested to be reported to FCC, forconducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r03, when a properly configured base station simulator is used for the SAR and powermeasurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r03, start with the largest channel bandwidth and measure SAR for QPSK with 1 RBallocation, using the RB offset and required test channel combination with the highest maximum output power for RBoffsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r03, for QPSK with 100% RB allocation, SAR is not required when the highest maximumoutput power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations andthe highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highestoutput power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also betested.
6. Per KDB 941225 D05v02r03, 16QAM output power for each RB allocation configuration is > not ½ dB higher than thesame configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225D05v02r03, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r03, smaller bandwidth output power for each RB allocation configuration is > not ½ dBhigher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supportedbandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r03, smaller bandwidth SAR testing is not required.

LTE-FDD Band 4				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
1.4MHz	QPSK	1	0	22.14	22.57	22.09
			2	22.00	22.57	22.20
			5	22.52	22.39	22.18
		3	0	21.91	21.70	22.10
			1	21.89	21.65	22.07
			3	21.77	21.63	22.07
		6	0	20.84	20.57	20.99
	16QAM	1	0	21.00	20.73	21.30
			2	21.22	20.76	21.49
			5	21.02	20.56	21.27
		3	0	22.39	21.65	22.07
			1	22.38	21.64	22.06
			3	22.28	21.58	22.06
		6	0	21.10	20.60	20.33
3MHz	QPSK	1	0	22.23	21.91	21.57
			8	21.89	21.64	21.69
			14	22.22	21.63	22.09
		8	0	21.50	20.96	20.74
			4	21.05	20.83	20.59
			7	20.94	20.82	20.98
		15	0	21.21	20.72	20.86
	16QAM	1	0	20.41	20.81	20.82
			8	20.14	20.46	20.92
			14	20.13	20.77	21.02
		8	0	21.22	21.10	20.76
			4	21.51	20.86	20.66
			7	21.44	20.80	20.73
		15	0	21.02	20.48	20.89

LTE-FDD Band 4				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
5MHz	QPSK	1	0	22.35	21.87	21.43
			12	22.30	21.57	21.68
			24	22.41	21.50	21.96
		12	0	21.49	20.96	20.70
			7	21.36	21.04	20.61
			13	21.20	20.74	20.77
		25	0	21.33	20.86	20.76
	16QAM	1	0	20.37	20.87	20.65
			12	20.07	20.46	20.86
			24	20.00	20.33	21.00
		12	0	20.86	21.05	20.72
			7	20.85	21.03	20.62
			13	20.81	20.74	20.83
		25	0	20.87	20.73	20.77
10MHz	QPSK	1	0	21.32	21.38	21.22
			24	21.68	22.10	21.46
			49	21.77	21.51	22.07
		25	0	21.29	21.31	20.45
			24	21.30	21.31	20.39
			49	21.04	20.69	20.72
		50	0	21.20	20.93	20.69
	16QAM	1	0	21.23	21.27	20.43
			24	21.03	21.01	20.85
			49	21.27	20.70	21.21
		25	0	21.34	21.30	20.46
			24	21.33	21.30	20.39
			49	21.17	20.68	20.74
		50	0	20.74	20.33	20.66

LTE-FDD Band 4				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
15MHz	QPSK	1	0	21.79	21.08	21.15
			38	21.61	21.37	21.02
			74	21.48	21.37	21.92
		38	0	21.28	21.06	20.93
			18	21.29	20.81	20.38
			37	21.23	21.05	20.94
		75	0	21.11	21.03	20.34
	16QAM	1	0	21.23	20.98	20.56
			38	21.06	21.00	20.50
			74	21.35	20.43	21.14
		38	0	21.11	21.06	20.96
			18	20.85	20.80	20.70
			37	21.13	21.08	20.98
		75	0	21.03	20.98	20.88
20MHz	QPSK	1	0	22.32	22.27	22.16
			49	22.28	22.23	22.12
			99	21.49	21.44	21.34
		50	0	21.75	21.70	21.60
			25	21.87	21.82	21.72
			50	21.78	21.73	21.63
		100	0	21.20	21.15	21.05
	16QAM	1	0	21.78	21.73	21.63
			49	21.58	21.53	21.43
			99	21.58	21.53	21.43
		50	0	21.88	21.83	21.73
			25	21.87	21.82	21.72
			50	21.83	21.78	21.68
		100	0	20.38	20.33	20.23

LTE-FDD Band 5				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
1.4MHz	QPSK	1	0	23.23	22.77	22.69
			2	23.44	22.87	22.94
			5	23.25	22.78	22.69
		3	0	23.29	22.81	23.07
			1	23.25	22.87	23.06
			3	23.18	22.79	22.98
		6	0	22.28	21.89	21.93
	16QAM	1	0	22.48	22.01	21.86
			2	22.65	22.08	21.91
			5	22.58	21.93	21.72
		3	0	23.25	22.87	23.06
			1	23.24	22.87	23.06
			3	23.19	22.79	22.97
		6	0	21.37	20.95	21.01
3MHz	QPSK	1	0	23.09	22.86	22.49
			8	22.84	22.29	22.54
			14	23.08	22.98	22.35
		8	0	22.25	22.23	21.57
			4	21.45	21.66	21.31
			7	21.66	22.02	21.38
		15	0	21.83	21.75	21.66
	16QAM	1	0	22.18	21.37	21.58
			8	21.99	21.71	21.63
			14	22.11	21.77	21.68
		8	0	21.91	22.20	21.55
			4	21.43	21.76	21.32
			7	21.56	22.02	21.35
		15	0	20.61	20.59	20.67

LTE-FDD Band 5				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
5MHz	QPSK	1	0	23.06	22.70	22.75
			12	22.98	22.45	22.77
			24	23.11	22.60	22.94
		12	0	22.09	21.83	21.87
			7	22.07	21.82	21.77
			13	22.00	21.66	21.76
		25	0	22.04	21.85	21.82
	16QAM	1	0	21.86	21.79	21.67
			12	22.05	21.12	21.68
			24	21.90	21.63	21.60
		12	0	22.07	21.83	21.76
			7	22.07	21.79	21.75
			13	22.03	21.78	21.89
		25	0	21.04	20.71	20.80
10MHz	QPSK	1	0	22.96	22.94	22.60
			24	22.68	22.58	22.66
			49	22.68	22.60	22.64
		25	0	21.99	21.77	21.78
			24	21.96	21.70	21.80
			49	21.97	21.78	21.64
		50	0	21.89	21.75	21.65
	16QAM	1	0	21.92	21.88	22.01
			24	22.00	22.12	21.82
			49	21.81	21.95	21.72
		25	0	22.02	21.76	21.79
			24	21.93	21.74	21.79
			49	21.96	21.67	21.72
		50	0	21.05	20.69	20.49

LTE-FDD Band 7				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
5MHz	QPSK	1	0	23.46	23.17	22.88
			12	23.57	23.28	22.99
			24	23.80	23.51	23.22
		12	0	23.09	22.81	22.53
			7	23.17	22.89	22.61
			13	22.93	22.65	22.37
		25	0	23.14	22.86	22.58
	16QAM	1	0	22.98	22.70	22.42
			12	23.08	22.80	22.52
			24	22.69	22.41	22.13
		12	0	23.09	22.81	22.53
			7	23.14	22.86	22.58
			13	22.97	22.69	22.41
		25	0	22.08	21.81	21.54
10MHz	QPSK	1	0	24.17	23.88	23.58
			24	24.12	23.83	23.53
			49	23.98	23.69	23.40
		25	0	23.52	23.23	22.94
			24	23.72	23.43	23.14
			49	23.62	23.33	23.04
		50	0	23.34	23.06	22.77
	16QAM	1	0	23.27	22.99	22.70
			24	23.16	22.88	22.60
			49	23.22	22.94	22.65
		25	0	23.70	23.41	23.12
			24	23.94	23.65	23.36
			49	24.09	23.80	23.50
		50	0	22.98	22.70	22.42

LTE-FDD Band 7				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
15MHz	QPSK	1	0	24.38	24.38	24.08
			38	24.40	24.10	23.80
			74	24.43	24.13	23.83
		38	0	23.41	23.12	22.83
			18	23.28	23.00	22.71
			37	23.57	23.28	22.99
		75	0	23.83	23.54	23.25
	16QAM	1	0	23.81	23.52	23.23
			38	23.56	23.27	22.98
			74	23.76	23.47	23.18
		38	0	23.86	23.57	23.28
			18	23.71	23.42	23.13
			37	23.54	23.25	22.96
		75	0	22.35	22.08	21.81
20MHz	QPSK	1	0	24.18	23.89	23.59
			49	23.88	23.59	23.30
			99	23.81	23.52	23.23
		50	0	23.97	23.68	23.39
			25	23.81	23.52	23.23
			50	23.71	23.42	23.13
		100	0	22.90	22.62	22.34
	16QAM	1	0	23.47	23.18	22.89
			49	23.65	23.36	23.07
			99	23.56	23.27	22.98
		50	0	23.48	23.19	22.90
			25	23.29	23.01	22.72
			50	23.22	22.94	22.65
		100	0	22.40	22.13	21.85

LTE-FDD Band 17				Conducted Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
5MHz	QPSK	1	0	22.83	23.15	22.69
			12	22.91	23.00	22.70
			24	23.03	23.19	22.88
		12	0	22.03	21.94	22.04
			7	22.08	21.96	22.02
			13	22.06	21.87	21.96
		25	0	22.03	21.94	22.05
	16QAM	1	0	21.85	21.88	21.66
			12	22.08	22.01	21.67
			24	22.00	21.84	21.71
		12	0	22.10	21.95	22.03
			7	22.08	21.96	22.01
			13	21.97	21.94	21.94
		25	0	20.88	21.01	21.12
10MHz	QPSK	1	0	23.11	23.14	23.25
			24	22.98	23.04	23.26
			49	22.96	22.99	23.10
		25	0	22.13	22.21	22.07
			24	22.14	22.23	22.06
			49	21.99	22.01	22.02
		50	0	22.10	22.08	22.02
	16QAM	1	0	22.05	22.43	22.51
			24	21.94	22.34	21.88
			49	21.93	22.14	22.25
		25	0	22.14	22.23	22.06
			24	22.14	22.23	22.07
			49	21.98	21.97	21.98
		50	0	21.20	21.13	21.18

WLAN Conducted Power

For 2.4GHz WLAN SAR testing, highest average RF output power channel for the lowest data rate for 802.11b were for SAR evaluation. 802.11g/n were not investigated since the average putput powers over all channels and data rates were not more than 0.25dB higher than the tested channel in the lowest data rate of 802.11b mode.

The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures.

WIFI 2.4G				
Mode	Channel	Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)
802.11b	1	2412	15.96	13.46
	6	2437	15.67	13.10
	11	2462	16.18	14.38
802.11g	1	2412	15.92	11.73
	6	2437	15.71	11.31
	11	2462	15.99	11.92
802.11n (HT20)	1	2412	15.70	12.08
	6	2437	15.49	11.48
	11	2462	15.54	12.03
802.11n (HT40)	3	2422	14.50	11.57
	6	2437	14.76	12.01
	9	2452	15.03	12.23

WIFI 5G U-NII-1			
Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
802.11n (HT20)	36	5180	14.46
	40	5200	14.92
	48	5240	14.32
802.11a	36	5180	14.48
	40	5200	14.69
	48	5240	14.05
802.11n (HT40)	38	5190	12.94
	46	5230	13.22

WIFI 5G U-NII-2A			
Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
802.11n (HT20)	52	5260	13.50
	56	5280	13.55
	64	5320	14.23
802.11a	52	5260	13.46
	56	5280	13.59
	64	5320	14.29
802.11n (HT40)	54	5270	13.00
	62	5310	13.82

WIFI 5G U-NII-2C			
Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
802.11n (HT20)	100	5500	15.53
	120	5600	15.86
	140	5700	16.29
802.11a	100	5500	14.71
	120	5600	14.31
	140	5700	15.96
802.11n (HT40)	102	5510	13.39
	118	5590	14.29
	134	5670	15.11

Bluetooth Conducted Power

Bluetooth			
Mode	Channel	Frequency (MHz)	Conducted Power(dBm)
GFSK	0	2402	1.08
	39	2441	1.69
	78	2480	2.44
π/4QPSK	0	2402	0.91
	39	2441	1.78
	78	2480	2.42
8DPSK	0	2402	0.78
	39	2441	1.37
	78	2480	2.43
GFSK(BLE)	0	2402	0.99
	19	2440	1.24
	39	2480	-0.53

12. Maximum Tune-up Limit

GSM	
Mode	Maximum Tune-up (dBm)
	GSM850
GSM (GMSK, 1Tx Slot)	33.50
GPRS (GMSK, 1Tx Slot)	33.00
GPRS (GMSK, 2Tx Slots)	33.50
GPRS (GMSK, 3Tx Slots)	33.00
GPRS (GMSK, 4Tx Slots)	33.00

WCDMA	
Mode	Maximum Tune-up (dBm)
	WCDMA Band V
AMR 12.2Kbps	24.00
RMC 12.2Kbps	24.00
HSDPA Subtest-1	24.00
HSDPA Subtest-2	23.50
HSDPA Subtest-3	23.50
HSDPA Subtest-4	23.50
HSUPA Subtest-1	23.50
HSUPA Subtest-2	22.00
HSUPA Subtest-3	22.00
HSUPA Subtest-4	22.50
HSUPA Subtest-5	23.50

LTE				
Fequency Band	Band-width(MHz)	Modulation	RB allocation	Maximum Tune-up (dBm)
LTE Band 4	1.4	QPSK	1	23.00
			3	22.50
			6	21.00
		16QAM	1	21.50
			3	22.50
			6	21.50
	3	QPSK	1	22.50
			8	22.00
			15	21.50
		16QAM	1	21.50
			8	22.00
			15	21.50
	5	QPSK	1	22.50
			12	21.50
			25	21.50
		16QAM	1	21.50
			12	21.50
			25	21.00
	10	QPSK	1	22.50
			25	21.50
			50	21.50
		16QAM	1	21.50
			25	21.50
			50	21.00
	15	QPSK	1	22.00
			38	21.50
			75	21.50
		16QAM	1	21.50
			38	21.50
			75	21.50
	20	QPSK	1	23.00
			50	22.50
			100	21.50
		16QAM	1	22.00
			50	22.00
			100	20.50

LTE				
Fequency Band	Band-width(MHz)	Modulation	RB allocation	Maximum Tune-up (dBm)
LTE Band 5	1.4	QPSK	1	23.50
			3	23.50
			6	22.50
		16QAM	1	23.00
			3	23.50
			6	21.50
	3	QPSK	1	23.50
			8	22.50
			15	22.00
		16QAM	1	22.50
			8	22.50
			15	21.00
	5	QPSK	1	23.50
			12	22.50
			25	22.50
		16QAM	1	22.50
			12	22.50
			25	21.50
	10	QPSK	1	23.50
			25	23.50
			50	22.00
		16QAM	1	22.50
			25	22.50
			50	21.50

LTE				
Fequency Band	Band-width(MHz)	Modulation	RB allocation	Maximum Tune-up (dBm)
LTE Band 7	5	QPSK	1	24.00
			12	23.50
			25	23.50
		16QAM	1	23.50
			12	23.50
			25	22.50
	10	QPSK	1	24.50
			25	24.00
			50	23.50
		16QAM	1	23.50
			25	24.50
			50	23.00
	15	QPSK	1	24.50
			38	24.00
			75	24.00
		16QAM	1	24.00
			38	24.00
			75	22.50
	20	QPSK	1	24.50
			50	24.00
			100	23.00
		16QAM	1	24.00
			50	23.50
			100	22.50

LTE				
Fequency Band	Band-width(MHz)	Modulation	RB allocation	Maximum Tune-up (dBm)
LTE Band 17	5	QPSK	1	23.50
			12	22.50
			25	22.50
		16QAM	1	22.50
			12	22.50
			25	22.50
	10	QPSK	1	23.50
			25	22.50
			50	22.50
		16QAM	1	23.00
			25	22.50
			50	22.50

The allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2-1due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1.

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

WIFI 2.4G	
Mode	Maximum Tune-up (dBm) Conducted Average Power
802.11b	14.50
802.11g	12.00
802.11n(HT20)	12.50
802.11n(HT40)	12.50

WIFI 5G U-NII-1	
Mode	Maximum Tune-up (dBm) Conducted Average Power
802.11n(HT20)	15.00
802.11a	15.00
802.11n(HT40)	13.50

WIFI 5G U-NII-2A	
Mode	Maximum Tune-up (dBm) Conducted Average Power
802.11n(HT20)	14.50
802.11a	14.50
802.11n(HT40)	14.00

WIFI 5G U-NII-2C	
Mode	Maximum Tune-up (dBm) Conducted Average Power
802.11n(HT20)	16.50
802.11a	16.00
802.11n(HT40)	15.50

Bluetooth	
Mode	Maximum Tune-up (dBm)
GFSK	2.50
π/4QPSK	2.50
8DPSK	2.50
GFSK(BLE)	1.30

Per KDB 447498 D01, the 1-g and 10-g SAR test exclusion thresholds for 100MHz to 6GHz at test separation distances ≤50mm are determined by:

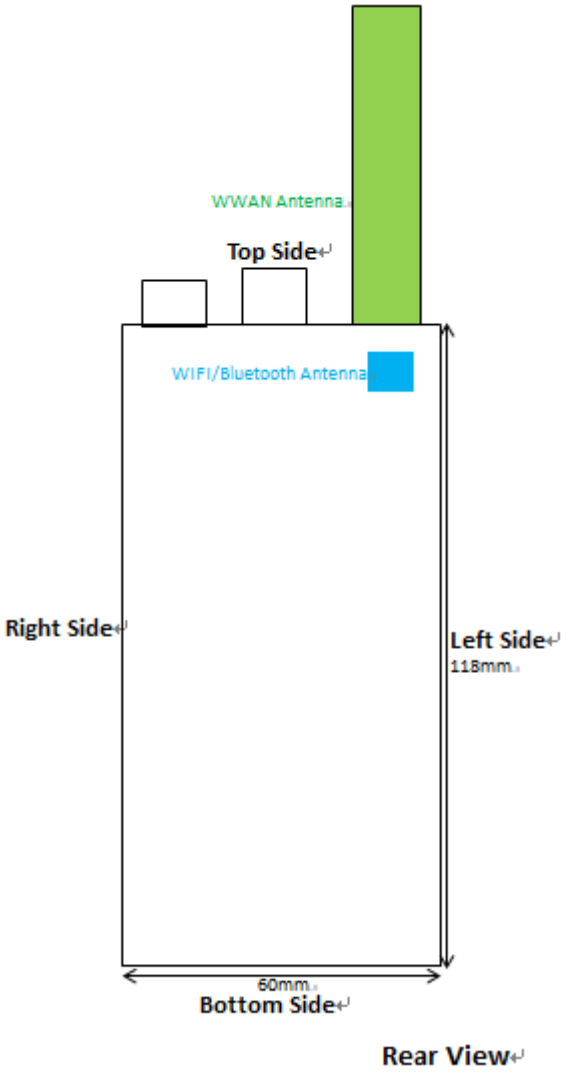
[(max. Power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [√f(GHz)] ≤3.0 for 1-g SAR

Band/Mode	Frequency (GHz)	Position	Tune-up Power		Separation Distance (mm)	Exclusion Thresholds
			dBm	mW		
Bluetooth	2.45	Front-of-face	2.50	1.78	25	0.1
		Body			0	0.6

Per KDB 447498 D01, when the minimum test separation distance is <5mm, a distance of 5mm is applied to determine SAR test exclusion.

The test exclusion thereshold is ≤3, SAR testing is not required.

13. Antenna Location



14. SAR Measurement Results

GENERAL:

1. Reference from KDB 447498 D01 General RF Exposure Guidance:

Testing of other required channels within the operating mode of a frequency band is not required when the reported 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

WIRELESS TECHNOLOGY:

2. Reference KDB 941225 D01 SAR test for 3G devices:

When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ Db higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode

3. Reference from KDB 941225 D05 SAR for LTE Devices:

SAR test reduction is applied using the following criteria:

a) Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.

b) When the reported SAR is > 0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.

c) Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg. Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg.

d) Testing for 16-QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of QPSK.

e) Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/Kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

f) For LTE bands that do not support at least three non-overlapping channels in certain channel bandwidths, test the available non-overlapping channels instead. 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; therefore, the requirement for H, M and L channels may not fully apply.

4. Reference from KDB 248227 D01 SAR meas for 802.11:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the initial test position(s) by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The initial test position(s) is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the reported SAR for 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 wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- > 0.4 W/kg, SAR is repeated using the same wireless mode test 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 reported SAR is ≤ 0.8 W/kg or all required test positions are tested.

➢ For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
➢ When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the initial test position and subsequent test positions,when the reported SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required test channels are considered.

➢ The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the initial test position, Area Scans were performed to determine the position with the Maximum Value of SAR (measured). The position that produced the highest Maximum Value of SAR is considered the worst case position; thus used as the initial test position.

Front-of-face SAR

GSM850										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
GPRS (4Tx slots)	Front (T60)	128	824.2	32.38	33.00	1.15	-	-	-	-
		190	836.6	32.66	33.00	1.08	-0.12	0.568	0.614	1
		251	848.8	32.59	33.00	1.10	-	-	-	-
	Front (T65)	128	824.2	32.38	33.00	1.15	-	-	-	-
		190	836.6	32.66	33.00	1.08	0.09	0.545	0.589	-
		251	848.8	32.59	33.00	1.10	-	-	-	-

WCDMA Band V										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
RMC 12.2K bps	Front (T60)	4132	826.4	23.52	24.00	1.12	-	-	-	-
		4183	836.6	23.26	24.00	1.19	0.14	0.107	0.127	3
		4233	846.6	23.23	24.00	1.19	-	-	-	-
	Front (T65)	4132	826.4	23.52	24.00	1.12	-	-	-	-
		4183	836.6	23.26	24.00	1.19	-0.05	0.095	0.113	-
		4233	846.6	23.23	24.00	1.19	-	-	-	-

LTE Band 4										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
20M QPSK _1RB	Front (T60)	20050	1720.0	22.32	23.00	1.17	-	-	-	-
		20175	1732.5	22.27	23.00	1.18	0.16	0.138	0.163	5
		20300	1745.0	22.16	23.00	1.21	-	-	-	-
	Front (T65)	20050	1720.0	22.32	23.00	1.17	-	-	-	-
		20175	1732.5	22.27	23.00	1.18	0.14	0.121	0.143	-
		20300	1745.0	22.16	23.00	1.21	-	-	-	-
20M QPSK _50RB	Front (T60)	20050	1720.0	21.75	22.50	1.19	-	-	-	-
		20175	1732.5	21.70	22.50	1.20	-0.12	0.119	0.143	-
		20300	1745.0	21.60	22.50	1.23	-	-	-	-

LTE Band 5										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
10M QPSK _1RB	Front (T60)	20450	829.0	22.96	23.50	1.13	-	-	-	-
		20525	836.5	22.94	23.50	1.14	-0.03	0.076	0.087	7
		20600	844.0	22.60	23.50	1.23	-	-	-	-
	Front (T65)	20450	829.0	22.96	23.50	1.13	-	-	-	-
		20525	836.5	22.94	23.50	1.14	0.15	0.069	0.078	-
		20600	844.0	22.60	23.50	1.23	-	-	-	-
10M QPSK _25RB	Front (T60)	20450	829.0	21.20	22.00	1.20	-	-	-	-
		20525	836.5	21.15	22.00	1.22	0.02	0.066	0.080	-
		20600	844.0	21.05	22.00	1.24	-	-	-	-

LTE Band 7										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
20M QPSK _1RB	Front (T60)	20850	2510	24.18	24.50	1.08	-	-	-	-
		21100	2535	23.89	24.50	1.15	-0.02	0.131	0.151	9
		21350	2560	23.59	24.50	1.23	-	-	-	-
	Front (T65)	20850	2510	24.18	24.50	1.08	-	-	-	-
		21100	2535	23.89	24.50	1.15	0.13	0.122	0.140	-
		21350	2560	23.59	24.50	1.23	-	-	-	-
20M QPSK _50RB	Front (T60)	20850	2510	23.97	24.00	1.01	-	-	-	-
		21100	2535	23.68	24.00	1.08	0.02	0.113	0.122	-
		21350	2560	23.39	24.00	1.15	-	-	-	-

LTE Band 17										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
10M QPSK _1RB	Front (T60)	23780	709	23.11	23.50	1.09	-	-	-	-
		23790	710	23.14	23.50	1.09	0.16	0.019	0.020	11
		23800	711	23.25	23.50	1.06	-	-	-	-
	Front (T65)	23780	709	23.11	23.50	1.09	-	-	-	-
		23790	710	23.14	23.50	1.09	-0.06	0.017	0.018	-
		23800	711	23.25	23.50	1.06	-	-	-	-
10M QPSK _25RB	Front (T60)	23780	709	22.13	22.50	1.09	-	-	-	-
		23790	710	22.21	22.50	1.07	-0.12	0.016	0.017	-
		23800	711	22.07	22.50	1.10	-	-	-	-

WIFI 2.4G												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11b	Front (T60)	1	2412	13.46	14.50	1.27	100.00%	1.00	-	-	-	-
		6	2437	13.10	14.50	1.38	100.00%	1.00	-	-	-	-
		11	2462	14.38	14.50	1.03	100.00%	1.00	0.18	0.022	0.022	13
	Front (T65)	1	2412	13.46	14.50	1.27	100.00%	1.00	-	-	-	-
		6	2437	13.10	14.50	1.38	100.00%	1.00	-	-	-	-
		11	2462	14.38	14.50	1.03	100.00%	1.00	0.03	0.020	0.021	-

WIFI 5G U-NII-1												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11a	Front (T60)	36	5180	14.48	15.00	1.13	100.00%	1.00	-	-	-	-
		40	5200	14.69	15.00	1.07	100.00%	1.00	0.17	0.008	0.009	15
		48	5240	14.05	15.00	1.24	100.00%	1.00	-	-	-	-
	Front (T65)	36	5180	14.48	15.00	1.13	100.00%	1.00	-	-	-	-
		40	5200	14.69	15.00	1.07	100.00%	1.00	-0.06	0.007	0.008	-
		48	5240	14.05	15.00	1.24	100.00%	1.00	-	-	-	-

WIFI 5G U-NII-2A												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11a	Front (T60)	52	5260	13.46	14.50	1.27	100.00%	1.00	-	-	-	-
		56	5280	13.59	14.50	1.23	100.00%	1.00	-	-	-	-
		64	5320	14.29	14.50	1.05	100.00%	1.00	-0.17	0.010	0.010	17
	Front (T65)	52	5260	13.46	14.50	1.27	100.00%	1.00	-	-	-	-
		56	5280	13.59	14.50	1.23	100.00%	1.00	-	-	-	-
		64	5320	14.29	14.50	1.05	100.00%	1.00	0.20	0.008	0.008	-

WIFI 5G U-NII-2C												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11n (HT20)	Front (T60)	100	5500	15.53	16.50	1.25	100.00%	1.00	-	-	-	-
		120	5600	15.86	16.50	1.16	100.00%	1.00	-	-	-	-
		140	5700	16.29	16.50	1.05	100.00%	1.00	0.17	0.016	0.017	19
	Front (T65)	100	5500	15.53	16.50	1.25	100.00%	1.00	-	-	-	-
		120	5600	15.86	16.50	1.16	100.00%	1.00	-	-	-	-
		140	5700	16.29	16.50	1.05	100.00%	1.00	-0.09	0.014	0.015	-

Body SAR

GSM850										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
GPRS (4Tx slots)	Rear (T60)	128	824.2	32.38	33.00	1.15	-0.15	1.110	1.280	2
		190	836.6	32.66	33.00	1.08	-0.18	1.030	1.114	-
		251	848.8	32.59	33.00	1.10	-0.03	1.050	1.154	-

WCDMA Band V										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
RMC 12.2K bps	Rear (T60)	4132	826.4	23.52	24.00	1.12	-	-	-	-
		4183	836.6	23.26	24.00	1.19	-0.02	0.240	0.285	4
		4233	846.6	23.23	24.00	1.19	-	-	-	-

LTE Band 4										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
20M QPSK _1RB	Rear (T60)	20050	1720.0	22.32	23.00	1.17	-	-	-	-
		20175	1732.5	22.27	23.00	1.18	-0.11	0.610	0.722	6
		20300	1745.0	22.16	23.00	1.21	-	-	-	-
20M QPSK _50RB	Rear (T60)	20050	1720.0	21.75	22.50	1.19	-	-	-	-
		20175	1732.5	21.70	22.50	1.20	0.08	0.484	0.582	-
		20300	1745.0	21.60	22.50	1.23	-	-	-	-

LTE Band 5										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
10M QPSK _1RB	Rear (T60)	20450	829.0	22.96	23.50	1.13	-	-	-	-
		20525	836.5	22.94	23.50	1.14	-0.02	0.187	0.213	8
		20600	844.0	22.60	23.50	1.23	-	-	-	-
10M QPSK _25RB	Rear (T60)	20450	829.0	21.20	22.00	1.20	-	-	-	-
		20525	836.5	21.15	22.00	1.22	0.01	0.148	0.180	-
		20600	844.0	21.05	22.00	1.24	-	-	-	-

LTE Band 7										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
20M QPSK _1RB	Rear (T60)	20850	2510	24.18	24.50	1.08	-0.16	0.681	0.732	-
		21100	2535	23.89	24.50	1.15	0.18	0.908	1.045	-
		21350	2560	23.59	24.50	1.23	-0.11	0.944	1.163	10
20M QPSK _50RB	Rear (T60)	20850	2510	23.97	24.00	1.01	-	-	-	-
		21100	2535	23.68	24.00	1.08	-0.13	0.720	0.776	-
		21350	2560	23.39	24.00	1.15	-	-	-	-
20M QPSK _100RB	Rear (T60)	20850	2510	22.90	23.00	1.02	-	-	-	-
		21100	2535	22.62	23.00	1.09	-0.13	0.589	0.643	-
		21350	2560	22.34	23.00	1.16	-	-	-	-

LTE Band 17										
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune up limit (dBm)	Tune up scaling factor	Power Drift(dB)	Measured SAR(1g) (W/kg)	Report SAR(1g) (W/kg)	Plot No.
		CH	MHz							
10M QPSK _1RB	Rear (T60)	23780	709	23.11	23.50	1.09	-	-	-	-
		23790	710	23.14	23.50	1.09	0.10	0.063	0.068	12
		23800	711	23.25	23.50	1.06	-	-	-	-
10M QPSK _25RB	Rear (T60)	23780	709	22.13	22.50	1.09	-	-	-	-
		23790	710	22.21	22.50	1.07	-0.07	0.050	0.053	-
		23800	711	22.07	22.50	1.10	-	-	-	-

WIFI 2.4G												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11b	Rear (T60)	1	2412	13.46	14.50	1.27	100.00%	1.00	-	-	-	-
		6	2437	13.10	14.50	1.38	100.00%	1.00	-	-	-	-
		11	2462	14.38	14.50	1.03	100.00%	1.00	0.17	0.002	0.002	14

WIFI 5G U-NII-1												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11a	Rear (T60)	36	5180	14.48	15.00	1.13	100.00%	1.00	-	-	-	-
		40	5200	14.69	15.00	1.07	100.00%	1.00	0.11	0.009	0.010	16
		48	5240	14.05	15.00	1.24	100.00%	1.00	-	-	-	-

WIFI 5G U-NII-2A												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11a	Rear (T60)	52	5260	13.46	14.50	1.27	100.00%	1.00	-	-	-	-
		56	5280	13.59	14.50	1.23	100.00%	1.00	-	-	-	-
		64	5320	14.29	14.50	1.05	100.00%	1.00	0.14	0.011	0.011	18

WIFI 5G U-NII-2C												
Mode	Test Position	Frequency		Conducted Power (dBm)	Tune-up limit (dBm)	Tune-up scaling factor	Duty Cycle	Duty Cycle Scaling Factor	Power Drift(dB)	Measured SAR(10g) (W/kg)	Report SAR(10g) (W/kg)	Plot No.
		CH	MHz									
802.11n (HT20)	Rear (T60)	100	5500	15.53	16.50	1.25	100.00%	1.00	-	-	-	-
		120	5600	15.86	16.50	1.16	100.00%	1.00	-	-	-	-
		140	5700	16.29	16.50	1.05	100.00%	1.00	-0.11	0.014	0.014	20

SAR Test Data Plots to the Appendix A.

15. Simultaneous Transmission analysis

No.	Simultaneous Transmission Configurations	Front-of-face	Body-worn	Note
1	GSM(voice) + Bluetooth (data)	Yes	Yes	
2	GSM(voice) + WIFI (data)	Yes	Yes	
3	WCDMA(voice) + Bluetooth (data)	Yes	Yes	
4	WCDMA(voice) + WIFI (data)	Yes	Yes	
5	GPRS (data) + Bluetooth (data)	Yes	Yes	
6	GPRS (data) + WIFI (data)	Yes	Yes	
7	WCDMA (data) + Bluetooth (data)	Yes	Yes	
8	WCDMA (data) + WIFI (data)	Yes	Yes	
9	LTE + Bluetooth (data)	Yes	Yes	
10	LTE + WIFI (data)	Yes	Yes	

General note:

1. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. EUT will choose either GSM or WCDMA LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. The reported SAR summation is calculated based on the same configuration and test position.
4. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01 based on the formula below
   a) [(max. Power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [√f(GHz)/x]W/kg for test separation distances ≦50mm; whetn x=7.5 for 1-g SAR, and x=18.75 for 10-g SAR.
   b) When the minimum separation distance is <5mm, the distance is used 5mm to determine SAR test exclusion
   c) 0.4 W/kg for 1-g SAR and 1.0W/kg for 10-g SAR, when the test separation distances is >50mm.

Bluetooth Max power	Exposure position	Front-of-face	Body-worn
	Test separation	25mm	0mm
2.50 dBm	Estimated SAR(W/kg)	0.015	0.074

Maximum reported SAR value for Front-of-face

WWAN PCB + WLAN DTS					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	WLAN DTS	(W/kg)
GSM	GSM 850	Front	0.614	0.022	**0.636**
WCDMA	Band V	Front	0.127	0.022	0.149
LTE	Band 4 20M_QPSK_1RB	Front	0.163	0.022	0.185
	Band 4 20M_QPSK_50RB	Front	0.143	0.022	0.165
	Band 5 10M_QPSK_1RB	Front	0.087	0.022	0.109
	Band 5 10M_QPSK_25RB	Front	0.080	0.022	0.102
	Band 7 20M_QPSK_1RB	Front	0.151	0.022	0.173
	Band 7 20M_QPSK_50RB	Front	0.151	0.022	0.173
	Band 14 10M_QPSK_1RB	Front	0.020	0.022	0.042
	Band 17 10M_QPSK_25RB	Front	0.017	0.022	0.039

WWAN PCB + WLAN U-NII					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	WLAN U-NII	(W/kg)
GSM	GSM 850	Front	0.614	0.017	**0.631**
WCDMA	Band V	Front	0.127	0.017	0.144
LTE	Band 4 20M_QPSK_1RB	Front	0.163	0.017	0.180
	Band 4 20M_QPSK_50RB	Front	0.143	0.017	0.160
	Band 5 10M_QPSK_1RB	Front	0.087	0.017	0.104
	Band 5 10M_QPSK_25RB	Front	0.080	0.017	0.097
	Band 7 20M_QPSK_1RB	Front	0.151	0.017	0.168
	Band 7 20M_QPSK_50RB	Front	0.151	0.017	0.168
	Band 14 10M_QPSK_1RB	Front	0.020	0.017	0.037
	Band 17 10M_QPSK_25RB	Front	0.017	0.017	0.034

WWAN PCB + Bluetooth					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	Bluetooth	(W/kg)
GSM	GSM 850	Front	0.614	0.015	0.629
WCDMA	Band V	Front	0.127	0.015	0.142
LTE	Band 4 20M_QPSK_1RB	Front	0.163	0.015	0.178
	Band 4 20M_QPSK_50RB	Front	0.143	0.015	0.158
	Band 5 10M_QPSK_1RB	Front	0.087	0.015	0.102
	Band 5 10M_QPSK_25RB	Front	0.080	0.015	0.095
	Band 7 20M_QPSK_1RB	Front	0.151	0.015	0.166
	Band 7 20M_QPSK_50RB	Front	0.151	0.015	0.166
	Band 14 10M_QPSK_1RB	Front	0.020	0.015	0.035
	Band 17 10M_QPSK_25RB	Front	0.017	0.015	0.032

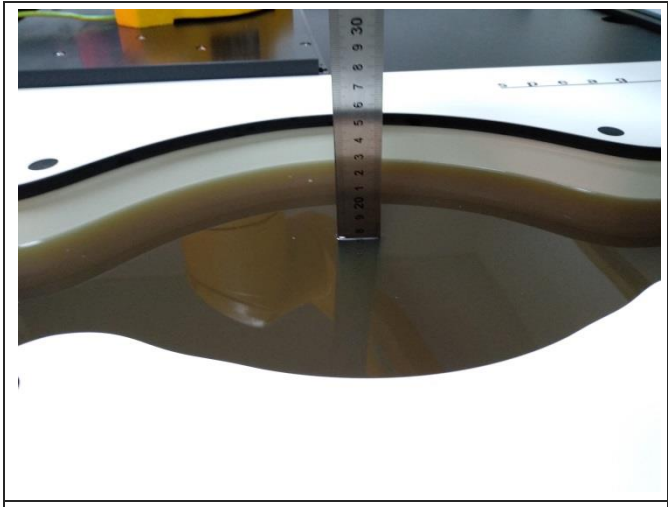
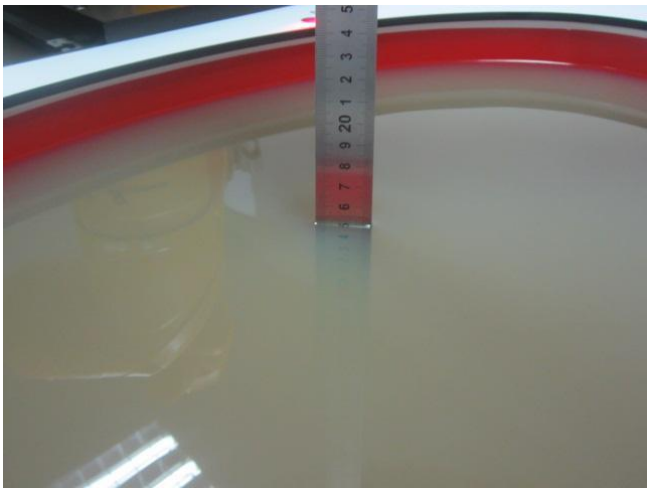
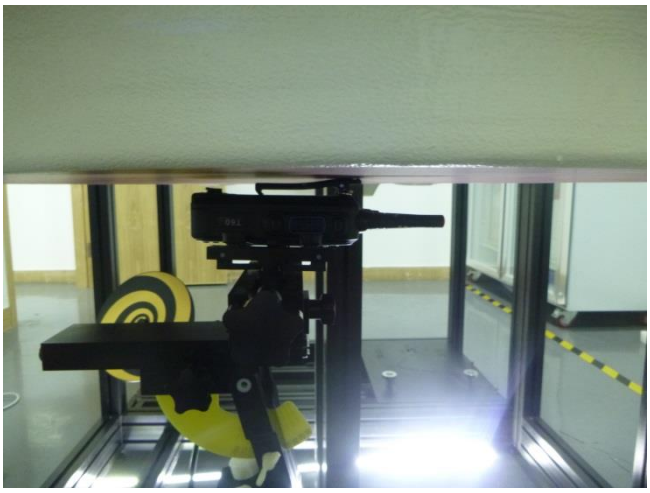
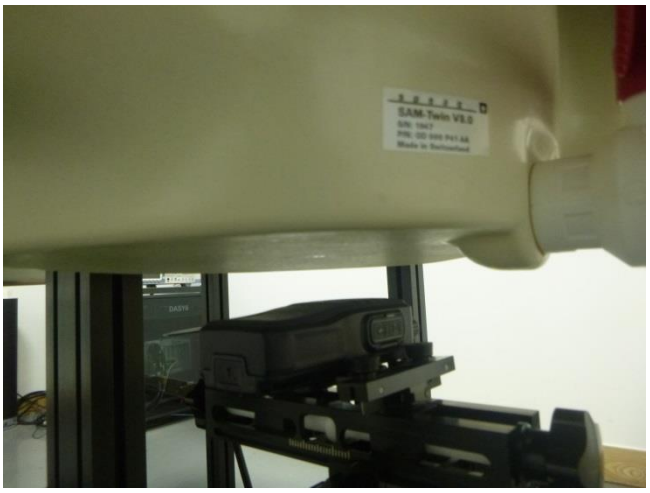
Maximum reported SAR value for Body

WWAN PCB + WLAN DTS					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	WLAN DTS	(W/kg)
GSM	GSM 850	Rear	1.280	0.002	**1.282**
WCDMA	Band V	Rear	0.285	0.002	0.287
LTE	Band 4 20M_QPSK_1RB	Rear	0.722	0.002	0.724
	Band 4 20M_QPSK_50RB	Rear	0.582	0.002	0.584
	Band 5 10M_QPSK_1RB	Rear	0.213	0.002	0.215
	Band 5 10M_QPSK_25RB	Rear	0.180	0.002	0.182
	Band 7 20M_QPSK_1RB	Rear	1.163	0.002	1.165
	Band 7 20M_QPSK_50RB	Rear	0.776	0.002	0.778
	Band 14 10M_QPSK_1RB	Rear	0.068	0.002	0.070
	Band 17 10M_QPSK_25RB	Rear	0.053	0.002	0.055

WWAN PCB + WLAN U-NII					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	WLAN U-NII	(W/kg)
GSM	GSM 850	Rear	1.280	0.014	**1.294**
WCDMA	Band V	Rear	0.285	0.014	0.299
LTE	Band 4 20M_QPSK_1RB	Rear	0.722	0.014	0.736
	Band 4 20M_QPSK_50RB	Rear	0.582	0.014	0.596
	Band 5 10M_QPSK_1RB	Rear	0.213	0.014	0.227
	Band 5 10M_QPSK_25RB	Rear	0.180	0.014	0.194
	Band 7 20M_QPSK_1RB	Rear	1.163	0.014	1.177
	Band 7 20M_QPSK_50RB	Rear	0.776	0.014	0.790
	Band 14 10M_QPSK_1RB	Rear	0.068	0.014	0.082
	Band 17 10M_QPSK_25RB	Rear	0.053	0.014	0.067

WWAN PCB + Bluetooth					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	Bluetooth	(W/kg)
GSM	GSM 850	Rear	1.280	0.074	1.354
WCDMA	Band V	Rear	0.285	0.074	0.359
LTE	Band 4 20M_QPSK_1RB	Rear	0.722	0.074	0.796
	Band 4 20M_QPSK_50RB	Rear	0.582	0.074	0.656
	Band 5 10M_QPSK_1RB	Rear	0.213	0.074	0.287
	Band 5 10M_QPSK_25RB	Rear	0.180	0.074	0.254
	Band 7 20M_QPSK_1RB	Rear	1.163	0.074	1.237
	Band 7 20M_QPSK_50RB	Rear	0.776	0.074	0.850
	Band 14 10M_QPSK_1RB	Rear	0.068	0.074	0.142
	Band 17 10M_QPSK_25RB	Rear	0.053	0.074	0.127

16. TestSetup Photos

	
Liquid depth in the SAM phantom	Liquid depth in the ELI phantom
	
Front (25mm)- with screen	Body-worn Rear(0mm)- with screen
	
Front (25mm)- without screen	

17. External and Internal Photos of the EUT

Please reference to the report No.: CHTEW19030209

---------End of Report----------