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TEST REPORT

Report Reference No. ..... :	**TRE18040118** R/C…….: 74150
FCC ID ..... :	**2AOOFS401**
Applicant's name ..... :	**Shenzhen Two Monkey technology co. Ltd.**
Address.....:	Room 612, Building D, SDG Information Port, No.2 Kefeng Road, Nanshan District, Shenzhen Guangdong, China
Manufacturer.....:	Shenzhen Two Monkey technology co. Ltd.
Address.....:	Room 612, Building D, SDG Information Port, No.2 Kefeng Road, Nanshan District, Shenzhen Guangdong, China
Test item description ..... :	**Translating Machine**
Trade Mark .....:	DOSMONO
Model/Type reference.....:	DOSMONO S401
Listed Model(s) .....:	-
Standard ..... :	**FCC 47 CFR Part2.1093** **IEEE 1528: 2013 ANSI/IEEE C95.1: 1999**
Date of receipt of test sample…….:	Apr.17, 2018
Date of testing……...:	Apr.18, 2018 - May.11, 2018
Date of issue…….:	May.18, 2018
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: 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.
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04: SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting v01r02: RF Exposure Compliance Reporting and Documentation Considerations
KDB 447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
KDB 248227 D01 802 11 Wi-Fi SAR v02r02: SAR Measurement Proceduresfor802.11 a/b/g Transmitters
KDB 941225 D01 3G SAR Procedures v03r01: SAR Measurement Procedures for 3G Devices
KDB 941225 D05 SAR for LTE Devices v02r05: SAR Evaluation Considerations for LTE Devices
941225 D07 UMPC Mini Tablet v01r02: SAR Evaluation Procedures for UMPC Mini-Tablet Devices

1.2. Report version

Revision No.	Date of issue	Description
N/A	May.18,2018	Original

2. Summary

2.1. Client Information

Applicant:	Shenzhen Two Monkey technology co. Ltd.
Address:	Room 612, Building D, SDG Information Port, No.2 Kefeng Road, Nanshan District, Shenzhen Guangdong, China
Manufacturer:	Shenzhen Two Monkey technology co. Ltd.
Address:	Room 612, Building D, SDG Information Port, No.2 Kefeng Road, Nanshan District, Shenzhen Guangdong, China

2.2. Product Description

Name of EUT:	Translating Machine			
Trade Mark:	DOSMONO			
Model No.:	DOSMONO S401			
Listed Model(s):	-			
Power supply:	DC 3.7V			
Device Category:	Portable			
Product stage:	Production unit			
RF Exposure Environment:	General Population / Uncontrolled			
IMEI:	866811030978558			
Hardware version:	YK919_FB_SH_V0.3			
Software version:	V1.0.1			
Maximum SAR Value				
Separation Distance:	Front of face: 10mm			
	Body: 0mm			
Max Report SAR Value (1g):	Test location:	PCB	DTS	Simultaneous TX
	Front of face:	0.100 W/Kg	0.017 W/Kg	0.117 W/Kg
	Body:	0.775 W/Kg	0.188 W/Kg	0.775 W/Kg
GSM				
Support Network:	GSM, GPRS, EGPRS			
Support Band:	GSM850, PCS1900			
Modulation:	GSM/GPRS/EGPRS: GMSK EGPRS: 8PSK			
GPRS Class:	12			
EGPRS Class:	12			
Antenna type:	Integral Antenna			
WCDMA				
Operation Band:	WCDMA Band II, WCDMA Band V			
Power Class:	Power Class 3			
Modilation Type:	QPSK/16QAM/64QAM/HSUPA/HSDPA			
DC-HSUPA Release Version:	Not Supported			
Antenna type:	Integral Antenna			

LTE	
Operation Band:	FDD Band 5, FDD Band 7,TDD Band 41
Modilation Type:	QPSK,16QAM
Antenna type:	Integral Antenna
WIFI 2.4G	
Supported type:	802.11b/802.11g/802.11n(HT20)/802.11n(HT40)
Modulation:	DSSS for 802.11b OFDM for 802.11g/802.11n(HT20)/802.11n(HT40)
Operation frequency:	2412MHz~2462MHz
Channel number:	11
Channel separation:	5MHz
Antenna type:	Integral Antenna
WIFI 5G	
Supported type:	802.11a/802.11n(HT20)/802.11n(HT40)/802.11ac(HT20)/802.11ac(HT40)
Modulation:	BPSK, QPSK, 16QAM, 64QAM
Operation frequency:	U-NII 1:5150MHz~5250MHz U-NII 3: 5725MHz~5850MHz
Supported Bandwidth:	20MHz: 802.11ac, 802.11n, 802.11a 40MHz: 802.11ac, 802.11n
Antenna type:	Integral Antenna
Bluetooth	
Version:	Supported BT4.0+EDR
Modulation:	GFSK, π/4DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Integral Antenna
Bluetooth-BLE	
Version:	Supported BT4.0+BLE
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	Integral Antenna
Remark: *1. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power*	

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.

IC-Registration No.:5377B

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

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.

4. Equipments Used during the Test

Test Equipment	Manufacturer	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
Data Acquisition Electronics DAEx	SPEAG	DAE4	1534	2018/02/23	2019/02/22
E-field Probe	SPEAG	EX3DV4	7494	2018/02/26	2019/02/25
System Validation Dipole	SPEAG	D835V2	4d238	2018/02/19	2021/02/18
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
Dielectric Assessment Kit	SPEAG	DAK-3.5	1267	2018/03/01	2019/02/28
Network analyzer	Agilent	N9923A	MY51491493	2017/09/05	2018/09/04
Universal Radio Communication Tester	ROHDE & SCHWARZ	CMW500	137668	2017/10/26	2018/10/25
Power meter	Agilent	N1914A	MY52090010	2018/03/22	2019/03/21
Power sensor	Agilent	E9304A	MY52140008	2018/03/22	2019/03/21
Power sensor	Agilent	E9301H	MY54470001	2017/06/02	2018/06/01
Power Amplifier	Mini-Circuits	ZVE-8G+	421401127	2018/03/22	2019/03/21
Power Amplifier	Mini-Circuits	ZHL-42W	QA1202003	2017/11/27	2018/11/26
Dual Directional Coupler	Agilent	772D	MY46151257	2018/03/22	2019/03/21
Dual Directional Coupler	Agilent	778D	MY48220612	2018/03/22	2019/03/21

Note:

1. *The Probe,Dipole and DAE calibration reference to the Appendix A and B.*
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

Measurement Uncertainty										
No.	Error Description	Type	Uncertainty Value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement System										
1	Probe calibration	B	6.0%	N	1	1	1	6.0%	6.0%	∞
2	Axial isotropy	B	4.70%	R	$\sqrt{3}$	0.7	0.7	1.90%	1.90%	∞
3	Hemispherical isotropy	B	9.60%	R	$\sqrt{3}$	0.7	0.7	3.90%	3.90%	∞
4	Boundary Effects	B	1.00%	R	$\sqrt{3}$	1	1	0.60%	0.60%	∞
5	Probe Linearity	B	4.70%	R	$\sqrt{3}$	1	1	2.70%	2.70%	∞
6	Detection limit	B	1.00%	R	$\sqrt{3}$	1	1	0.60%	0.60%	∞
7	RF ambient conditions-noise	B	0.00%	R	$\sqrt{3}$	1	1	0.00%	0.00%	∞
8	RF ambient conditions-reflection	B	0.00%	R	$\sqrt{3}$	1	1	0.00%	0.00%	∞
9	Response time	B	0.80%	R	$\sqrt{3}$	1	1	0.50%	0.50%	∞
10	Integration time	B	5.00%	R	$\sqrt{3}$	1	1	2.90%	2.90%	∞
11	RF ambient	B	3.00%	R	$\sqrt{3}$	1	1	1.70%	1.70%	∞
12	Probe positioned mech. restrictions	B	0.40%	R	$\sqrt{3}$	1	1	0.20%	0.20%	∞
13	Probe positioning with respect to phantom shell	B	2.90%	R	$\sqrt{3}$	1	1	1.70%	1.70%	∞
14	Max.SAR evalation	B	3.90%	R	$\sqrt{3}$	1	1	2.30%	2.30%	∞
Test Sample Related										
15	Test sample positioning	A	1.86%	N	1	1	1	1.86%	1.86%	∞
16	Device holder uncertainty	A	1.70%	N	1	1	1	1.70%	1.70%	∞
17	Drift of output power	B	5.00%	R	$\sqrt{3}$	1	1	2.90%	2.90%	∞
Phantom and Set-up										
18	Phantom uncertainty	B	4.00%	R	$\sqrt{3}$	1	1	2.30%	2.30%	∞
19	Liquid conductivity (target)	B	5.00%	R	$\sqrt{3}$	0.64	0.43	1.80%	1.20%	∞
20	Liquid conductivity (meas.)	A	0.50%	N	1	0.64	0.43	0.32%	0.26%	∞
21	Liquid permittivity (target)	B	5.00%	R	$\sqrt{3}$	0.64	0.43	1.80%	1.20%	∞
22	Liquid cpermittivity (meas.)	A	0.16%	N	1	0.64	0.43	0.10%	0.07%	∞
Combined standard uncertainty		$u_c = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$		/	/	/	/	9.79%	9.67%	∞
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		R	K=2	/	/	19.57%	19.34%	∞

System Check Uncertainty										
No.	Error Description	Type	Uncertainty Value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement System										
1	Probe calibration	B	6.0%	N	1	1	1	6.0%	6.0%	∞
2	Axial isotropy	B	4.70%	R	$\sqrt{3}$	0.7	0.7	1.90%	1.90%	∞
3	Hemispherical isotropy	B	9.60%	R	$\sqrt{3}$	0.7	0.7	3.90%	3.90%	∞
4	Boundary Effects	B	1.00%	R	$\sqrt{3}$	1	1	0.60%	0.60%	∞
5	Probe Linearity	B	4.70%	R	$\sqrt{3}$	1	1	2.70%	2.70%	∞
6	Detection limit	B	1.00%	R	$\sqrt{3}$	1	1	0.60%	0.60%	∞
7	RF ambient conditions-noise	B	0.00%	R	$\sqrt{3}$	1	1	0.00%	0.00%	∞
8	RF ambient conditions-reflection	B	0.00%	R	$\sqrt{3}$	1	1	0.00%	0.00%	∞
9	Response time	B	0.80%	R	$\sqrt{3}$	1	1	0.50%	0.50%	∞
10	Integration time	B	5.00%	R	$\sqrt{3}$	1	1	2.90%	2.90%	∞
11	RF ambient	B	3.00%	R	$\sqrt{3}$	1	1	1.70%	1.70%	∞
12	Probe positioned mech. restrictions	B	0.40%	R	$\sqrt{3}$	1	1	0.20%	0.20%	∞
13	Probe positioning with respect to phantom shell	B	2.90%	R	$\sqrt{3}$	1	1	1.70%	1.70%	∞
14	Max.SAR evalation	B	3.90%	R	$\sqrt{3}$	1	1	2.30%	2.30%	∞
System validation source-dipole										
15	Deviation of experimental dipole from numerical dipole	A	1.58%	N	1	1	1	1.58%	1.58%	∞
16	Dipole axis to liquid distance	A	1.35%	N	1	1	1	1.35%	1.35%	∞
17	Input power and SAR drift	B	4.00%	R	$\sqrt{3}$	1	1	2.30%	2.30%	∞
Phantom and Set-up										
18	Phantom uncertainty	B	4.00%	R	$\sqrt{3}$	1	1	2.30%	2.30%	∞
20	Liquid conductivity (meas.)	A	0.50%	N	1	0.64	0.43	0.32%	0.26%	∞
22	Liquid cpermittivity (meas.)	A	0.16%	N	1	0.64	0.43	0.10%	0.07%	∞
Combined standard uncertainty			$u_c = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$	/	/	/	/	8.80%	8.79%	∞
Expanded uncertainty (confidence interval of 95 %)			$u_e = 2u_c$	R	K=2	/	/	17.59%	17.58%	∞

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.

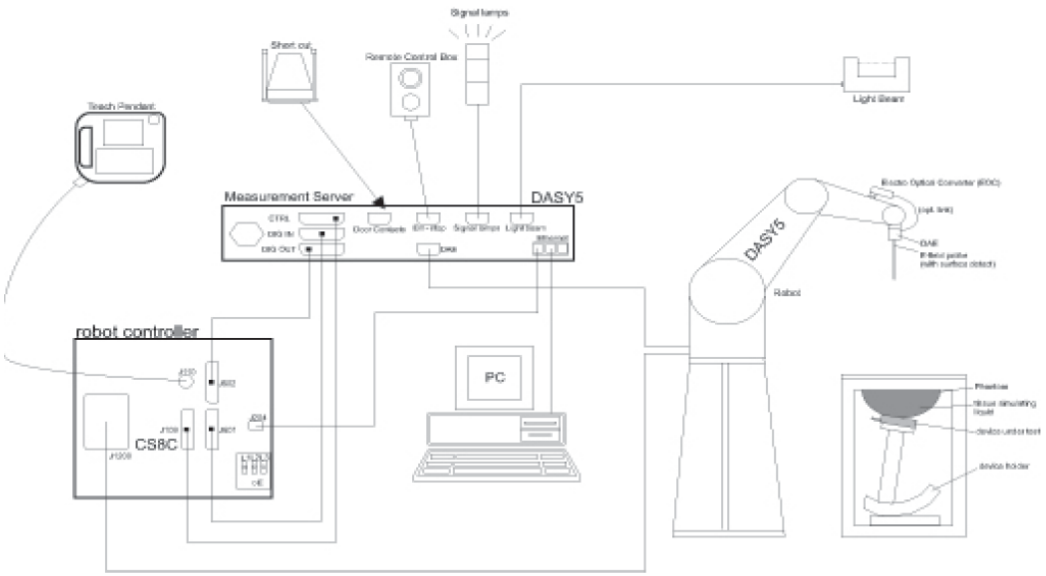
Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

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.

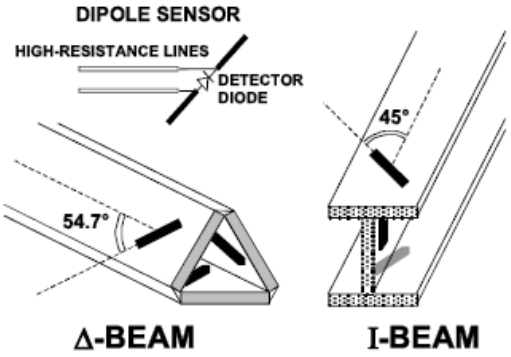
- **Probe Specification**

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	10 MHz to 6 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:



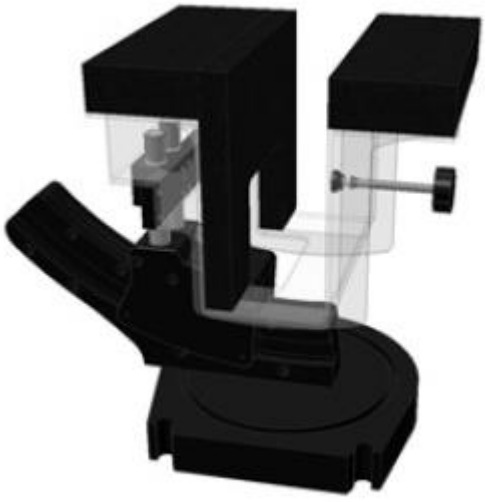
6.3. Phantoms

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.

ELI4 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 extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



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.

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

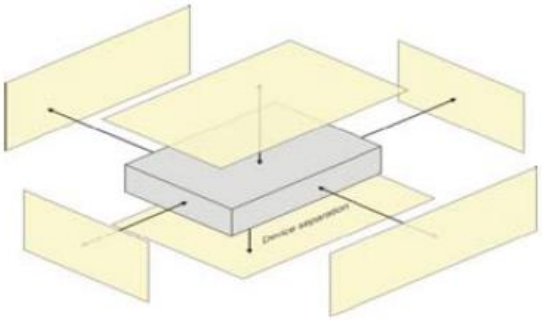
SAR: local specific absorption rate in W/kg
Etot: total field strength in V/m
σ: conductivity in [mho/m] or [Siemens/m]
ρ: equivalent tissue density in g/cm3

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 Mode Exposure conditions

The body accessory SAR test configurations may overlap for handsets. When the same wireless mode transmission configurations for voice and data are required for SAR measurements, the more conservative configuration with a smaller separation distance should be tested for the overlapping SAR configurations.



Picture 5 Test positions for Body Mode

9. System Check

9.1. Tissue Dielectric Parameters

It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB865664.

Tissue dielectric parameters for head and body phantoms				
Target Frequency	Head		Body	
(MHz)	εr	σ(s/m)	εr	σ(s/m)
835	41.5	0.90	55.2	0.97
1750	40.1	1.37	53.4	1.49
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
2600	39.0	1.96	52.5	2.16
5200	36.0	4.66	49.0	5.30
5800	35.3	5.27	48.2	6.00

Check Result:

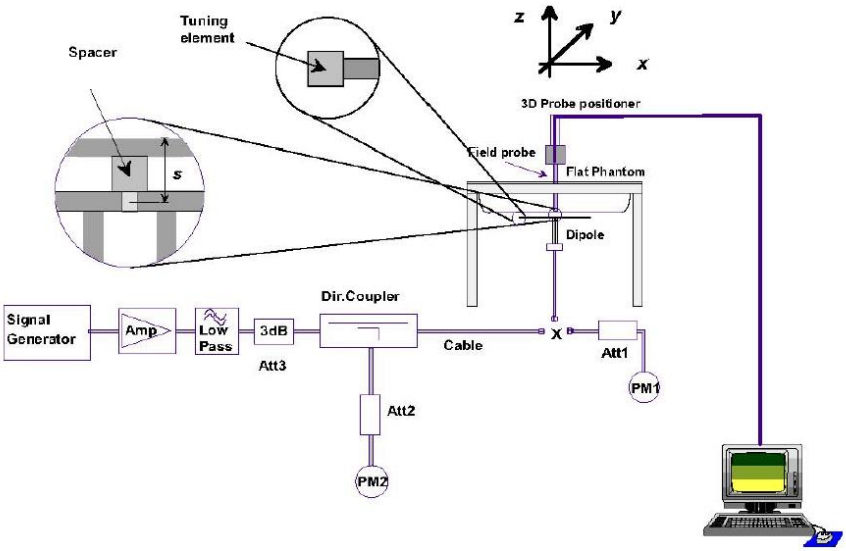
Dielectric performance of Head tissue simulating liquid									
Frequency (MHz)	εr		σ(s/m)		Delta (εr)	Delta (σ)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
835	41.50	43.90	0.90	0.93	5.78%	3.56%	±10%	22	2018-05-02
1900	40.00	41.67	1.40	1.47	4.16%	4.71%	±10%	22	2018-05-04
2450	39.20	40.96	1.80	1.84	4.48%	2.11%	±10%	22	2018-05-07
2600	39.00	40.63	1.96	1.97	4.18%	0.51%	±10%	22	2018-05-08
5200	36.00	36.23	4.66	4.52	0.63%	-3.00%	±10%	22	2018-05-09
5800	35.30	35.17	5.27	5.20	-0.38%	-1.39%	±10%	22	2018-05-09

Dielectric performance of Body tissue simulating liquid									
Frequency (MHz)	εr		σ(s/m)		Delta (εr)	Delta (σ)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
835	55.20	55.40	0.97	0.97	0.36%	-0.41%	±10%	22	2018-05-03
1900	53.30	53.72	1.52	1.55	0.79%	1.97%	±10%	22	2018-05-04
2450	52.70	53.03	1.95	2.00	0.63%	2.56%	±10%	22	2018-05-07
2600	52.50	52.78	2.16	2.15	0.53%	-0.46%	±10%	22	2018-05-08
5200	49.01	48.15	5.30	5.38	-1.75%	1.53%	±10%	22	2018-05-09
5800	48.20	46.94	6.00	6.27	-2.61%	4.50%	±10%	22	2018-05-09

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.



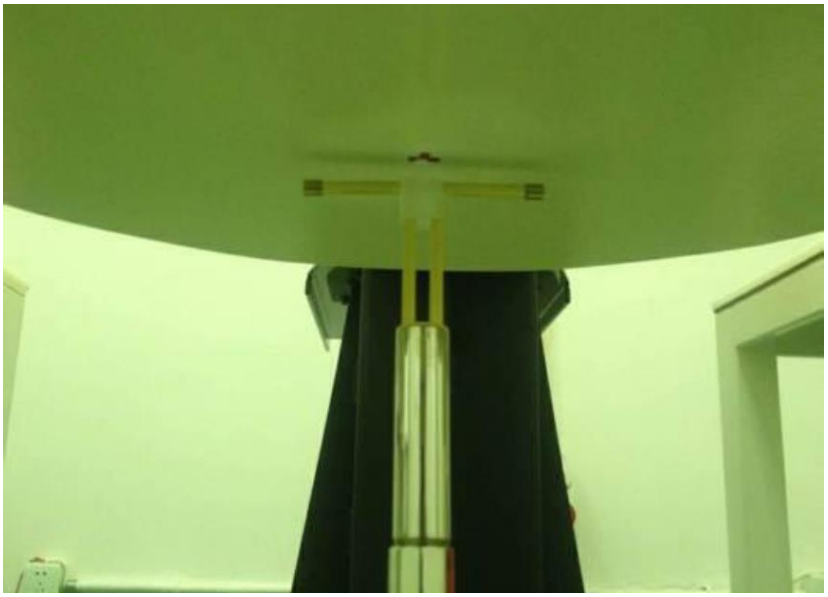


Photo of Dipole Setup

Check Result:

Head									
Frequency (MHz)	1g SAR		10g SAR		Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
835	2.30	2.34	1.50	1.52	1.74%	1.33%	±10%	22	2018-05-02
1900	10.10	9.72	5.34	5.16	-3.76%	-3.37%	±10%	22	2018-05-04
2450	13.10	12.40	6.17	5.80	-5.34%	-6.00%	±10%	22	2018-05-07
2600	13.70	14.20	6.07	6.29	3.65%	3.62%	±10%	22	2018-05-08
5200	79.90	72.10	22.80	20.70	-9.76%	-9.21%	±10%	22	2018-05-09
5800	79.40	77.90	22.50	21.90	-1.89%	-2.67%	±10%	22	2018-05-09

Body									
Frequency (MHz)	1g SAR		10g SAR		Delta (1g)	Delta (10g)	Limit	Temp (℃)	Date
	Target	Measured	Target	Measured					
835	2.43	2.47	1.61	1.59	1.65%	-1.24%	±10%	22	2018-05-03
1900	10.20	10.30	5.47	5.34	0.98%	-2.38%	±10%	22	2018-05-04
2450	13.10	12.50	6.11	5.76	-4.58%	-5.73%	±10%	22	2018-05-07
2600	13.20	13.80	5.87	6.01	4.55%	2.39%	±10%	22	2018-05-08
5200	73.60	70.70	20.40	20.00	-3.94%	-1.96%	±10%	22	2018-05-09
5800	76.50	72.80	21.10	20.20	-4.84%	-4.27%	±10%	22	2018-05-09

Plots of System Performance Check

System Performance Check-Head 835MHz

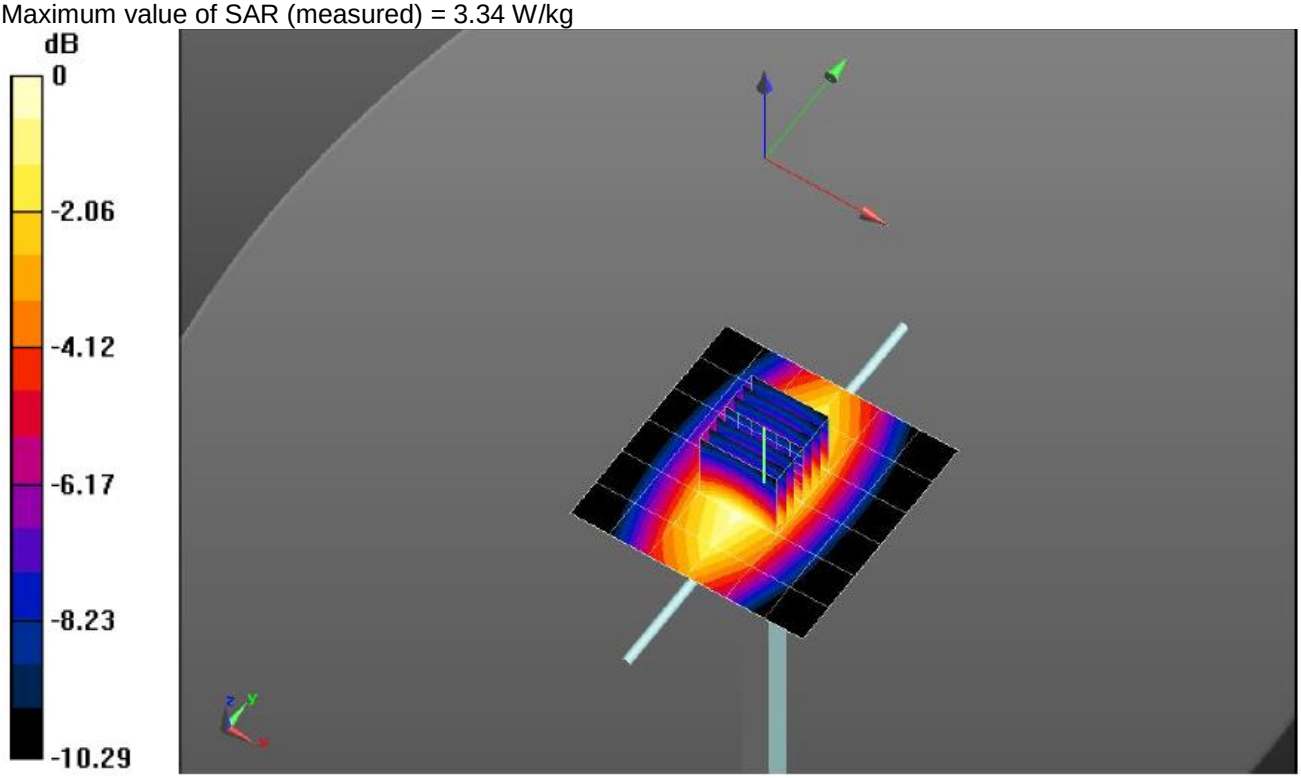
DUT: D835V2; Type: D835V2; Serial: 4d238
Date: 2018-05-02
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.932 S/m; ε_r = 43.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.73, 10.73, 10.73); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- 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

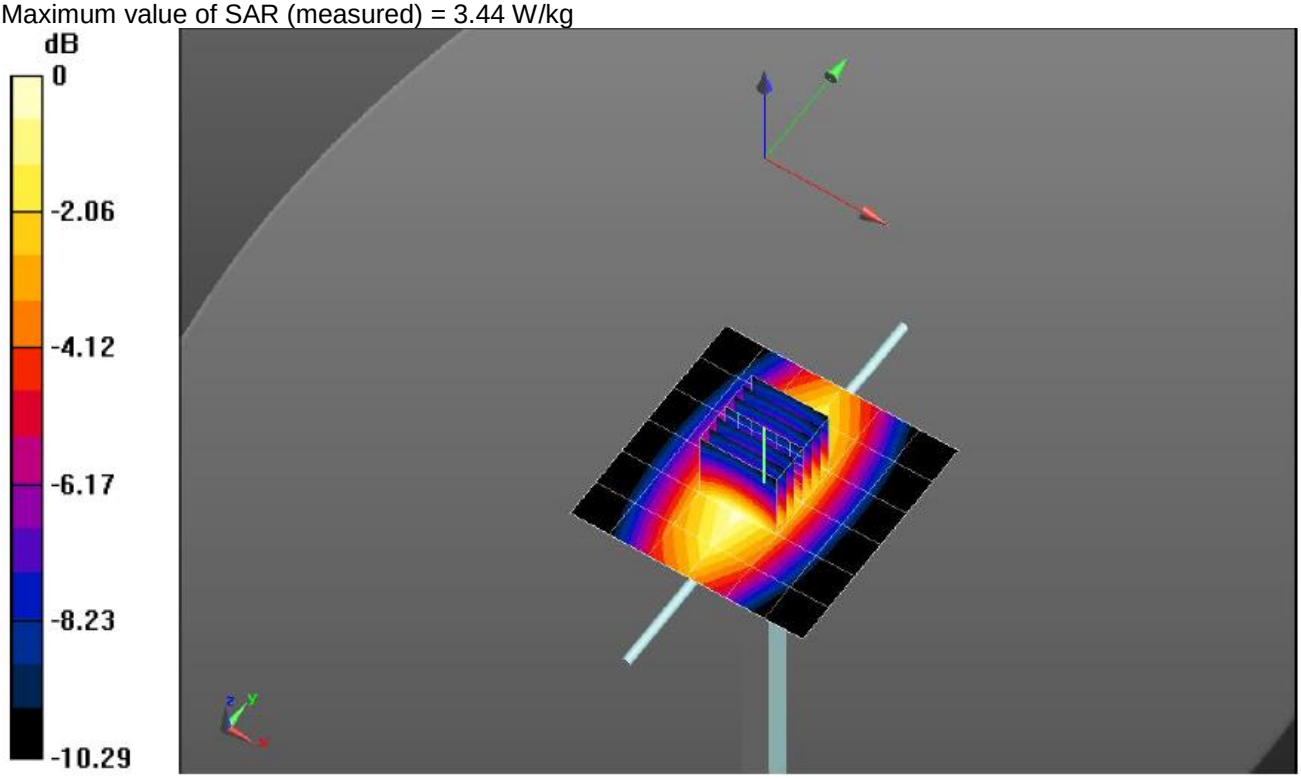
DUT: D835V2; Type: D835V2; Serial: 4d238
Date: 2018-05-03
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.966 S/m; ε_r = 55.403; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.5, 10.5, 10.5); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- 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 (41x101x1): 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 1900MHz

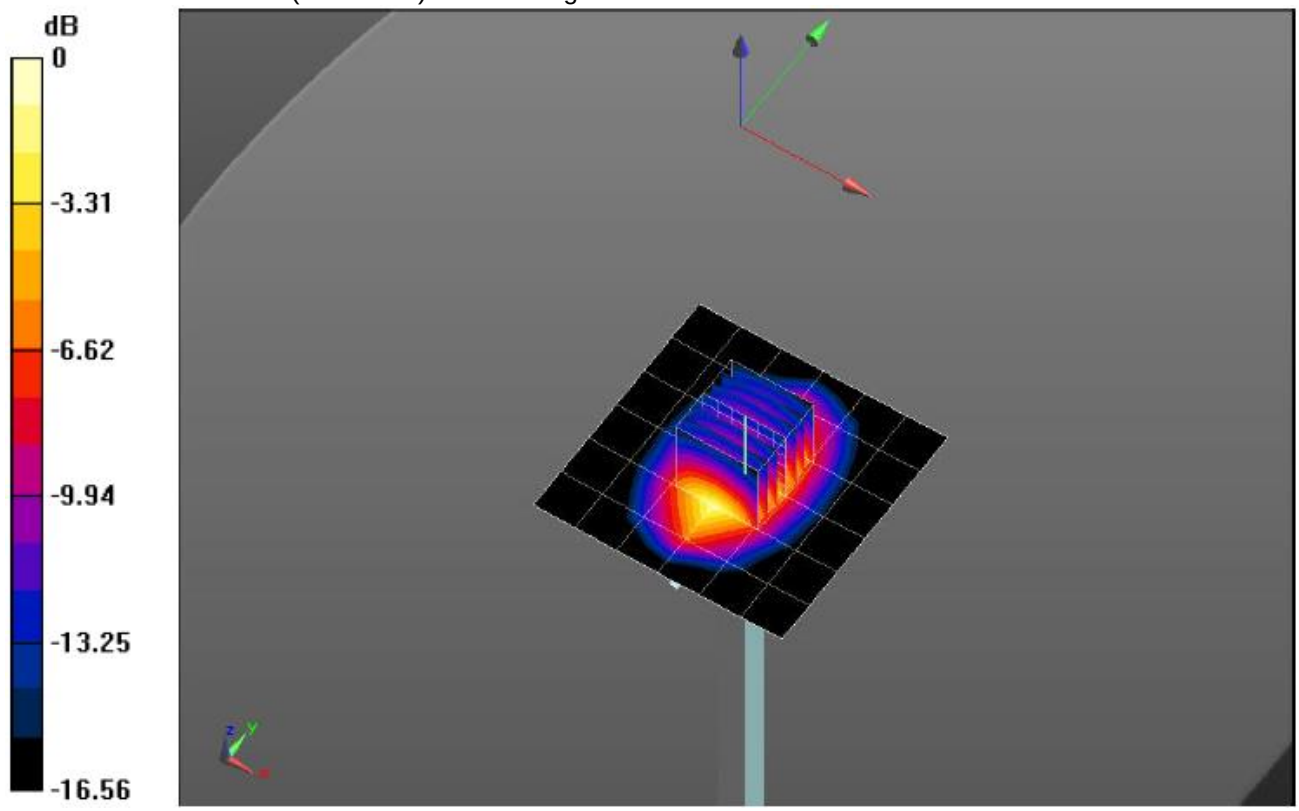
DUT: D1900V2; Type: D1900V2; Serial: 5d226
Date:2018-05-04
Communication System: UID 0, CW (0); Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.466 S/m; ε_r = 41.665; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.83, 8.83, 8.83); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- 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) = 17.1 W/kg

Head/d=10mm,Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 112.4 V/m; Power Drift = -0.27 dB
Peak SAR (extrapolated) = 19.5 W/kg
SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.42 W/kg
Maximum value of SAR (measured) = 16.1 W/kg



System Performance Check-Body 1900MHz

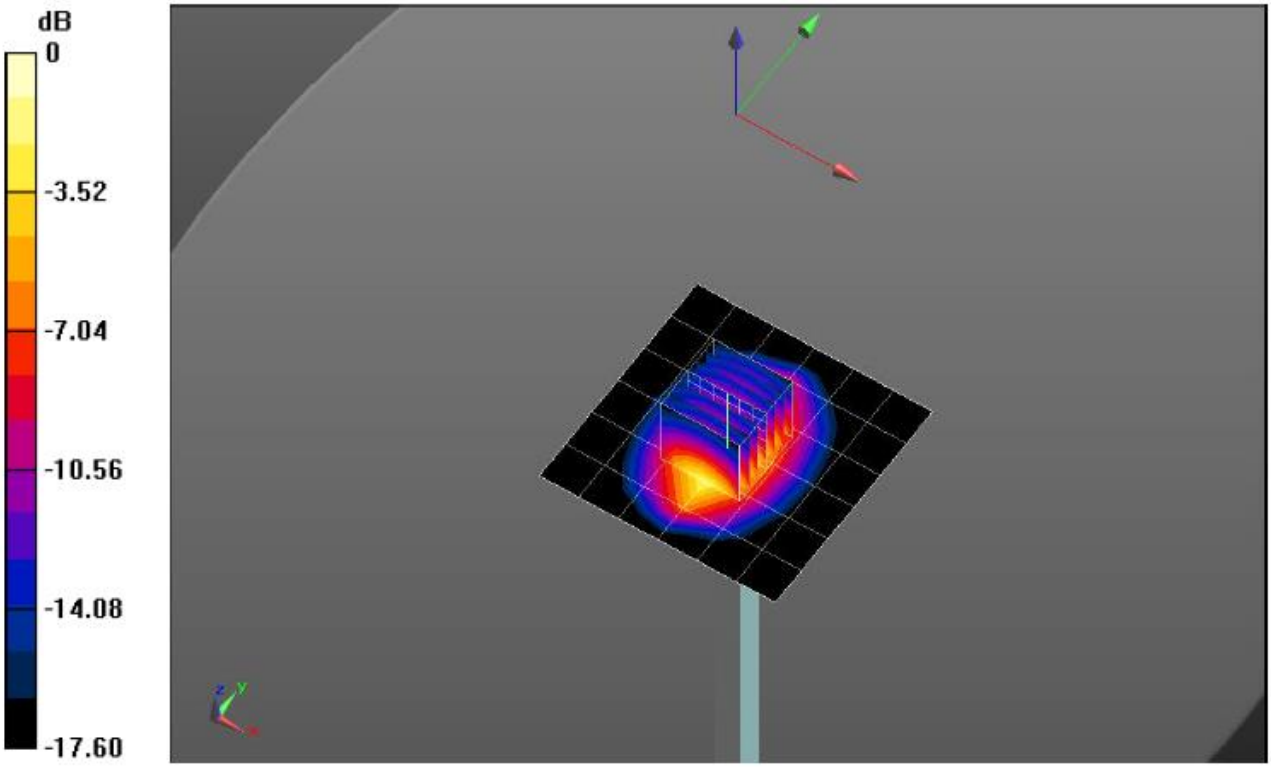
DUT: D1900V2; Type: D1900V2; Serial: 5d226
Date:2018-05-04
Communication System: UID 0, CW (0); Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.553 S/m; ε_r = 53.719; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.42, 8.42, 8.42); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- 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 (41x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 16.4 W/kg

Body/d=10mm,Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 105.9 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.42 W/kg
Maximum value of SAR (measured) = 15.7 W/kg



SystemPerformanceCheck-Head 2450MHz

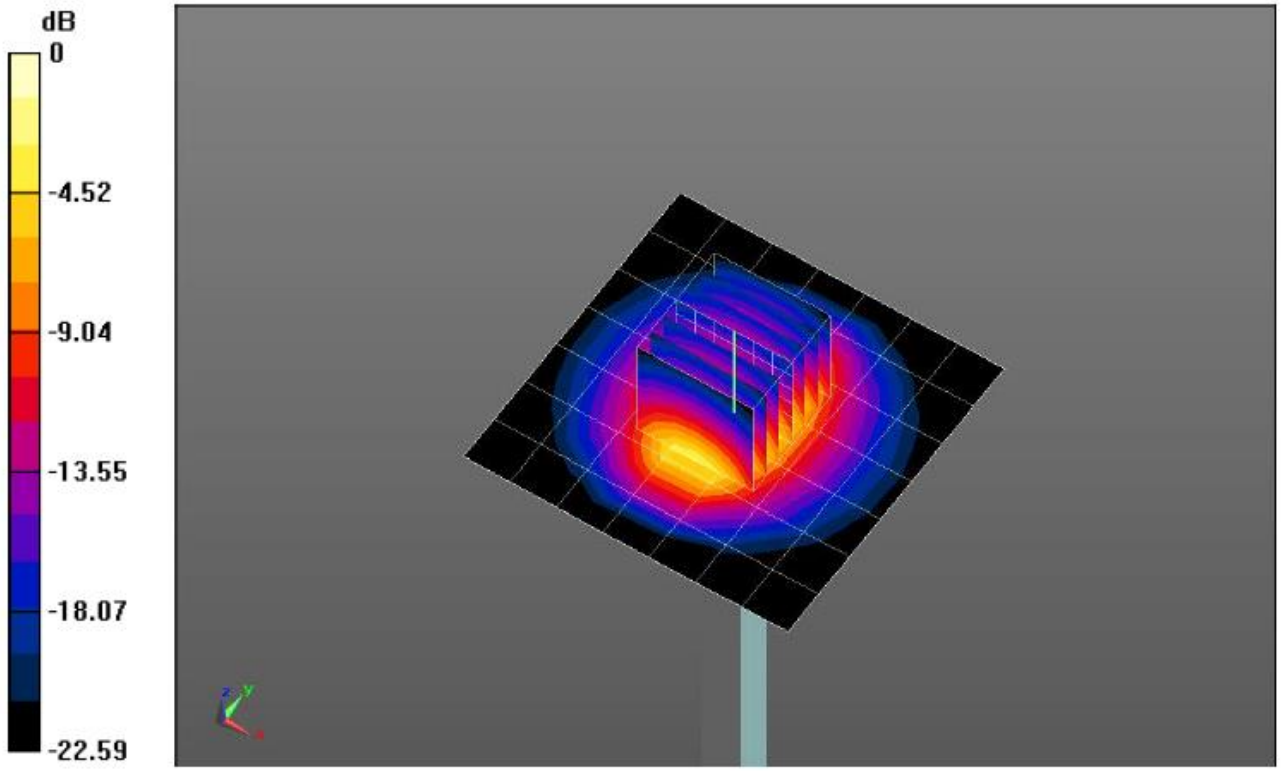
DUT: D2450V2; Type: D2450V2; Serial: 1009
Date:2018-05-07
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.838 S/m; ε_r = 40.956; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.27, 8.27, 8.27); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- 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

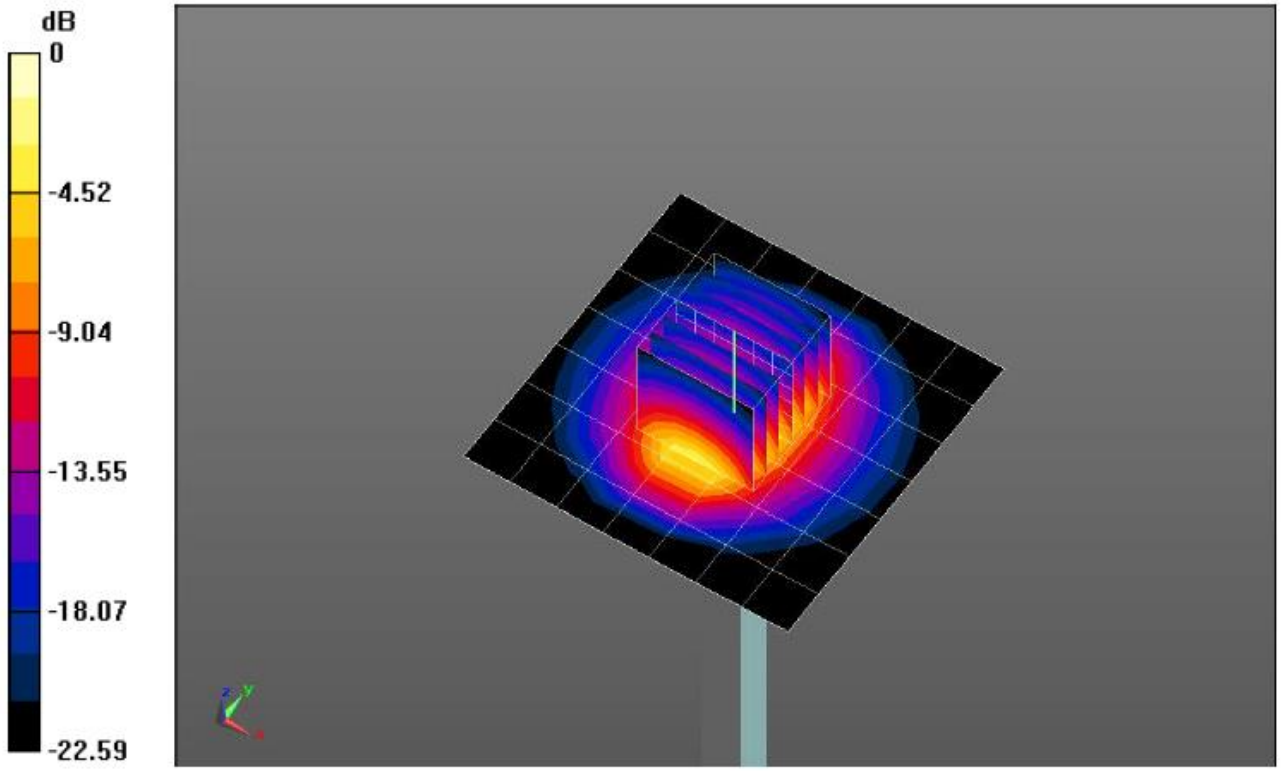
DUT: D2450V2; Type: D2450V2; Serial: 1009
Date:2018-05-07
Communication System: UID 0, CW (0); Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.001 S/m; ε_r = 53.03; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.08, 8.08, 8.08); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- 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 (41x61x1): 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

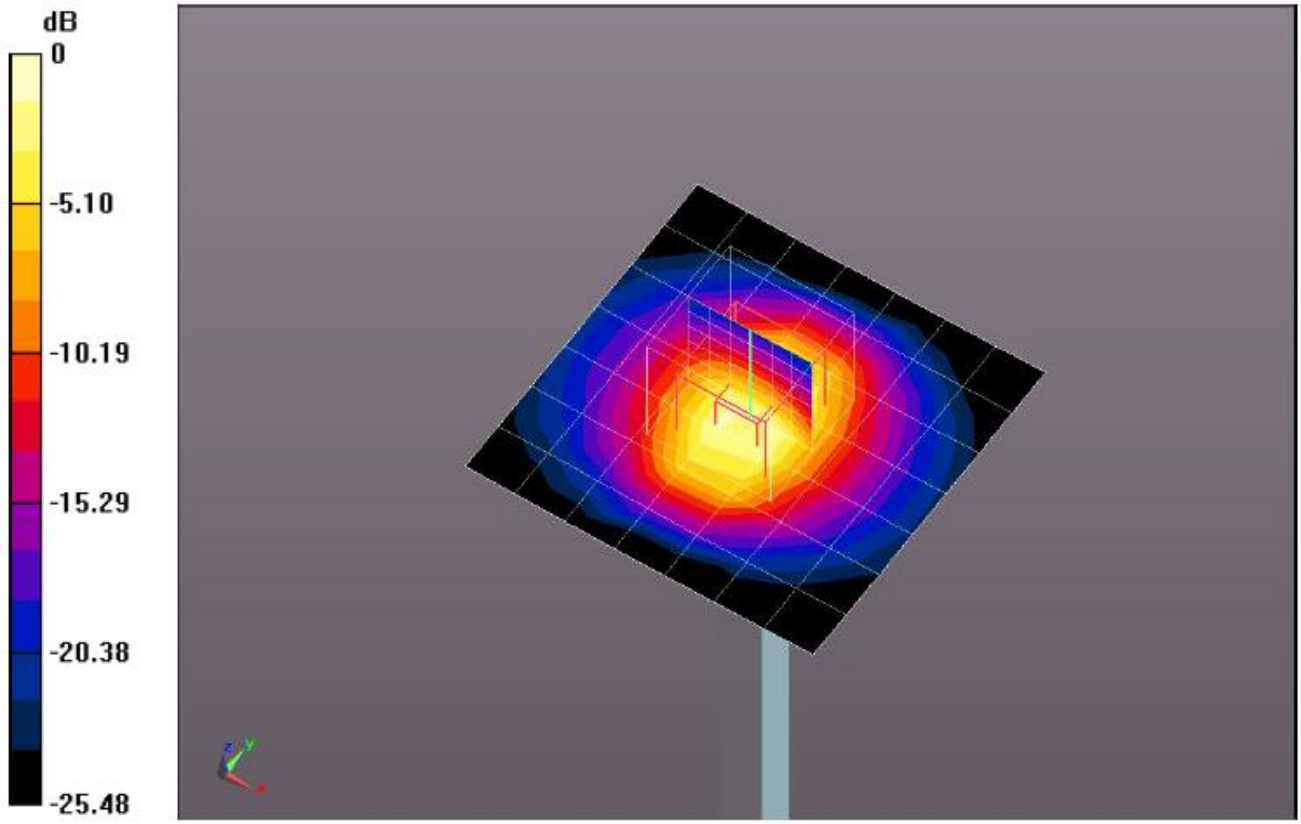
DUT: D2600V2; Type: D2600V2; Serial: 1150
Date:2018-05-08
Communication System: UID 0, CW (0); Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 1.97 S/m; ε_r = 40.632; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(7.92, 7.92, 7.92); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- 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

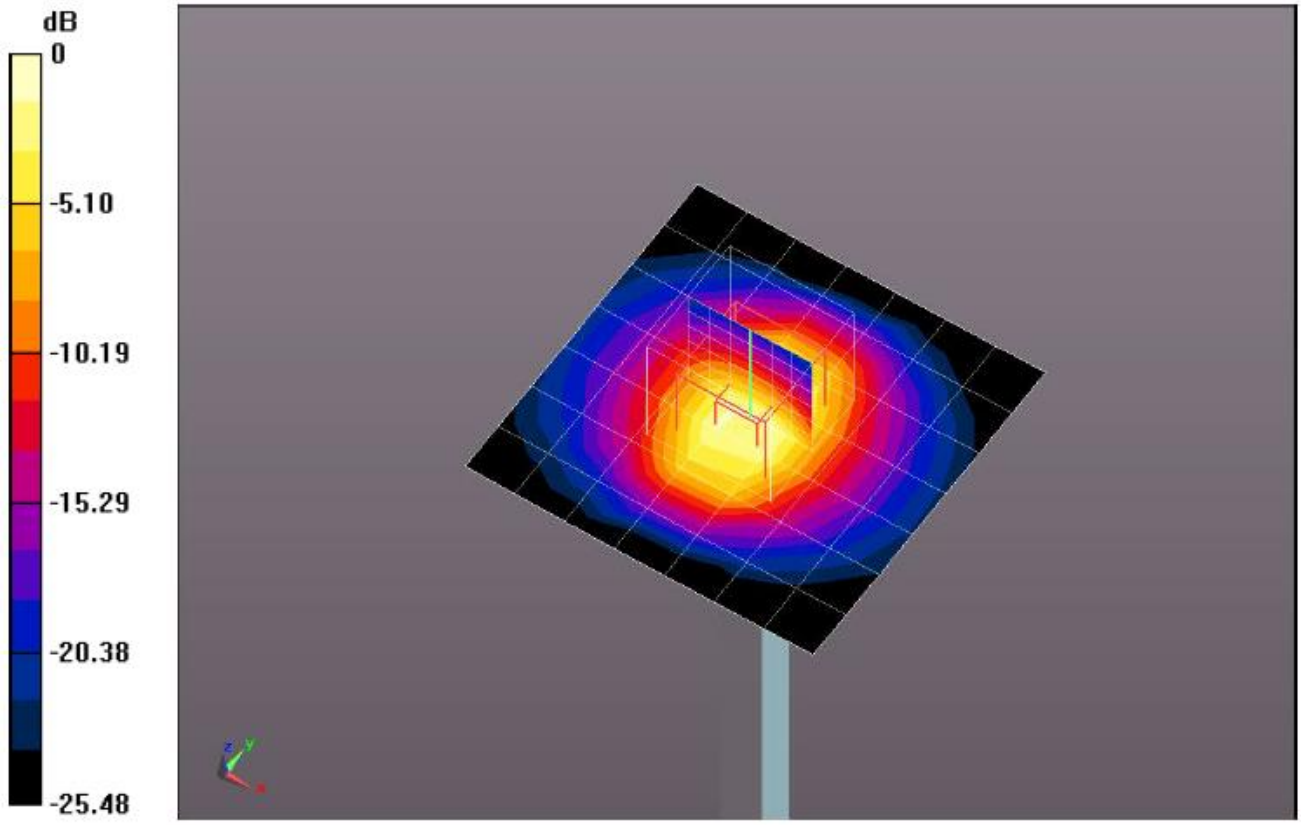
DUT: D2600V2; Type: D2600V2; Serial: 1150
Date:2018-05-08
Communication System: UID 0, CW (0); Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.15 S/m; ε_r = 52.78; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(7.51, 7.51, 7.51); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- 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 (41x51x1): 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

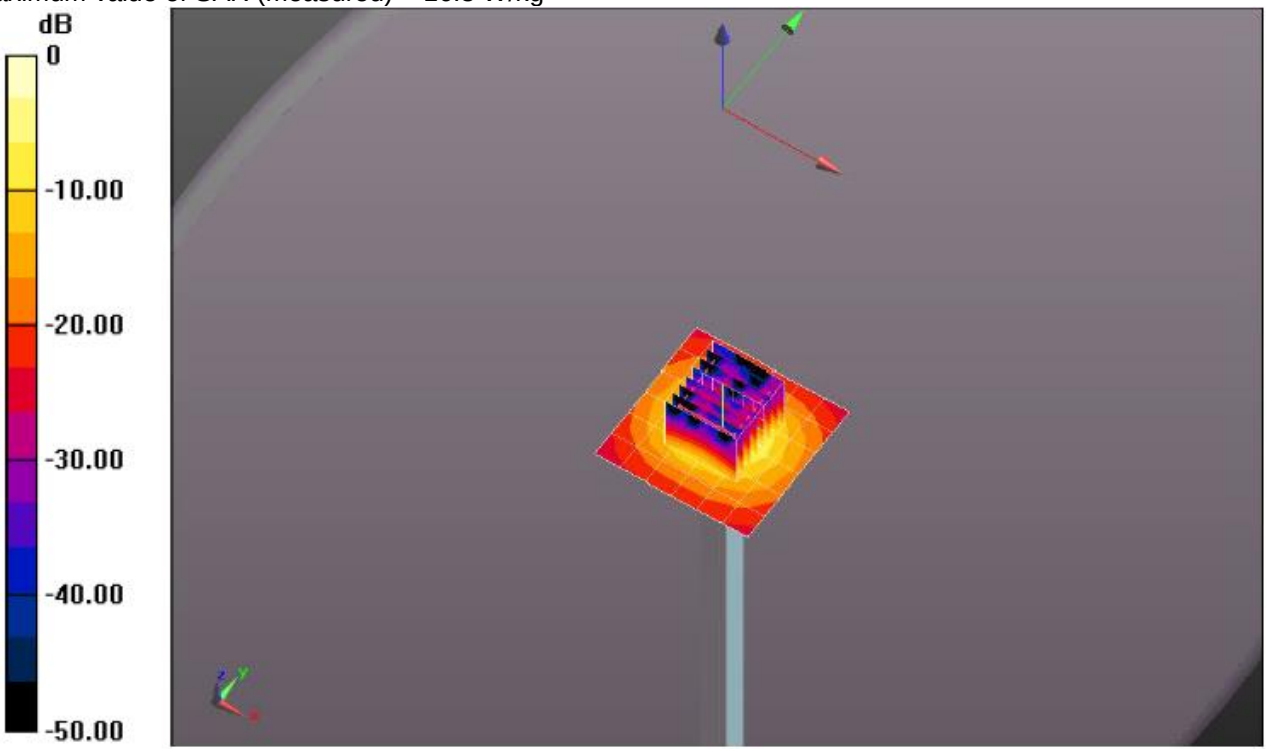
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-05-09
Communication System: UID 0, CW (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 36.228; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.63, 5.63, 5.63); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 29.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- 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

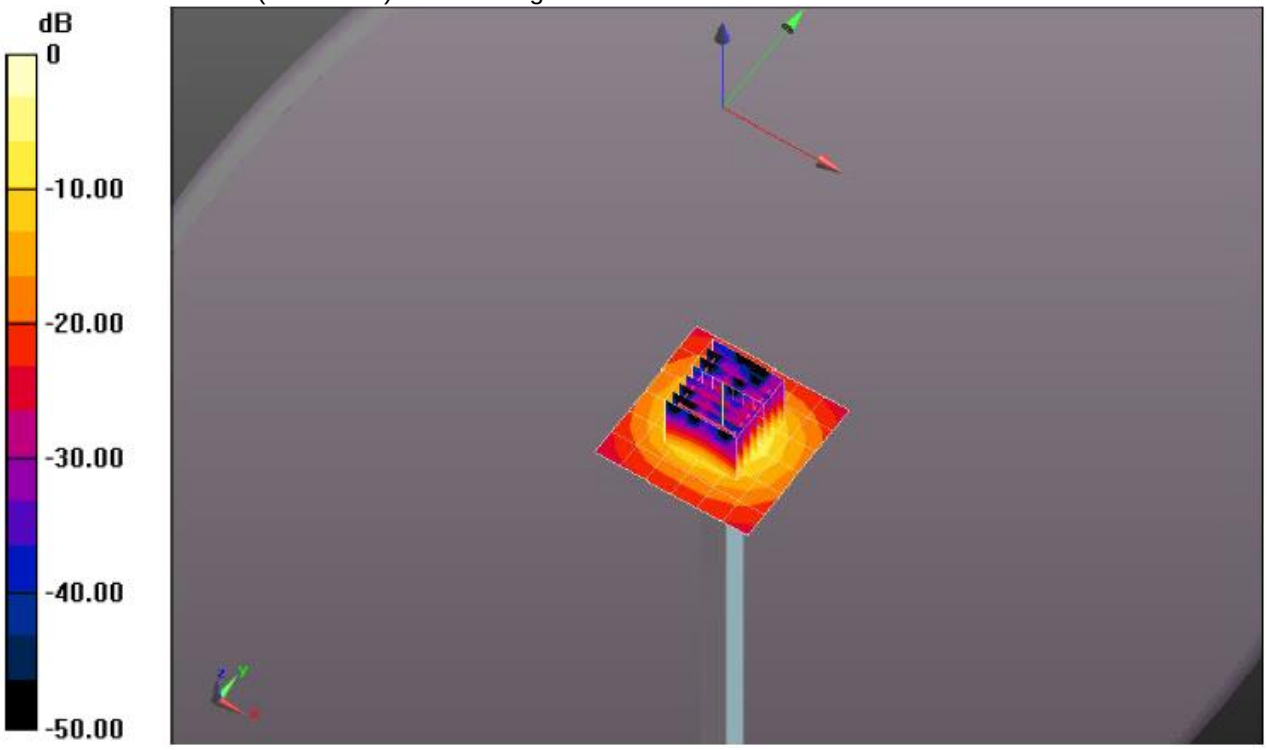
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-05-09
Communication System: UID 0, A-CW (0); Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.381 S/m; ε_r = 48.152; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494;ConvF(5.3, 5.3, 5.3); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- 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 (91x91x1): 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 5800MHz

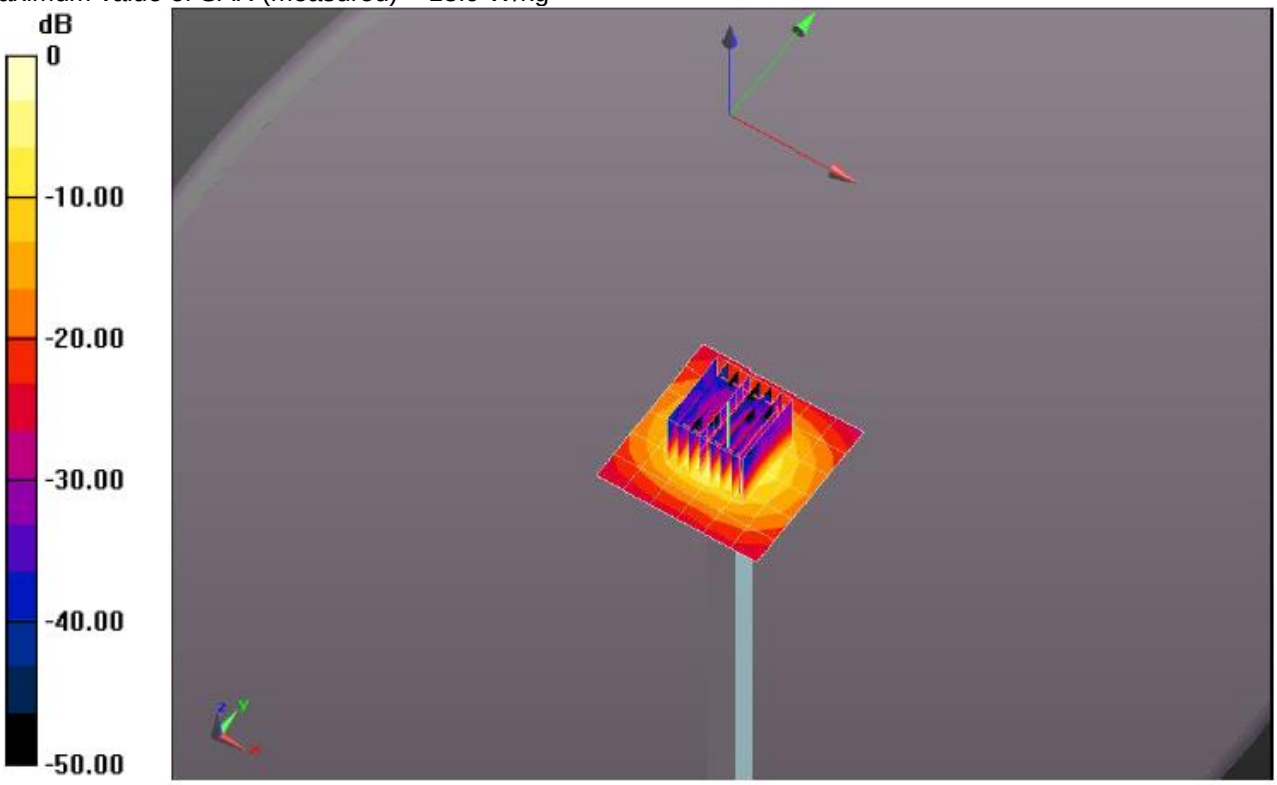
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-05-09
Communication System: UID 0, CW (0); Frequency: 5800 MHz
Medium parameters used: f = 5800 MHz; σ = 5.197 S/m; ε_r = 35.167; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.9, 4.9, 4.9); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 29.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- 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) = 19.2 W/kg

Head/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 63.74 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 35.4 W/kg
SAR(1 g) = 7.79 W/kg; SAR(10 g) = 2.19 W/kg
Maximum value of SAR (measured) = 18.9 W/kg



SystemPerformanceCheck-Body 5800MHz

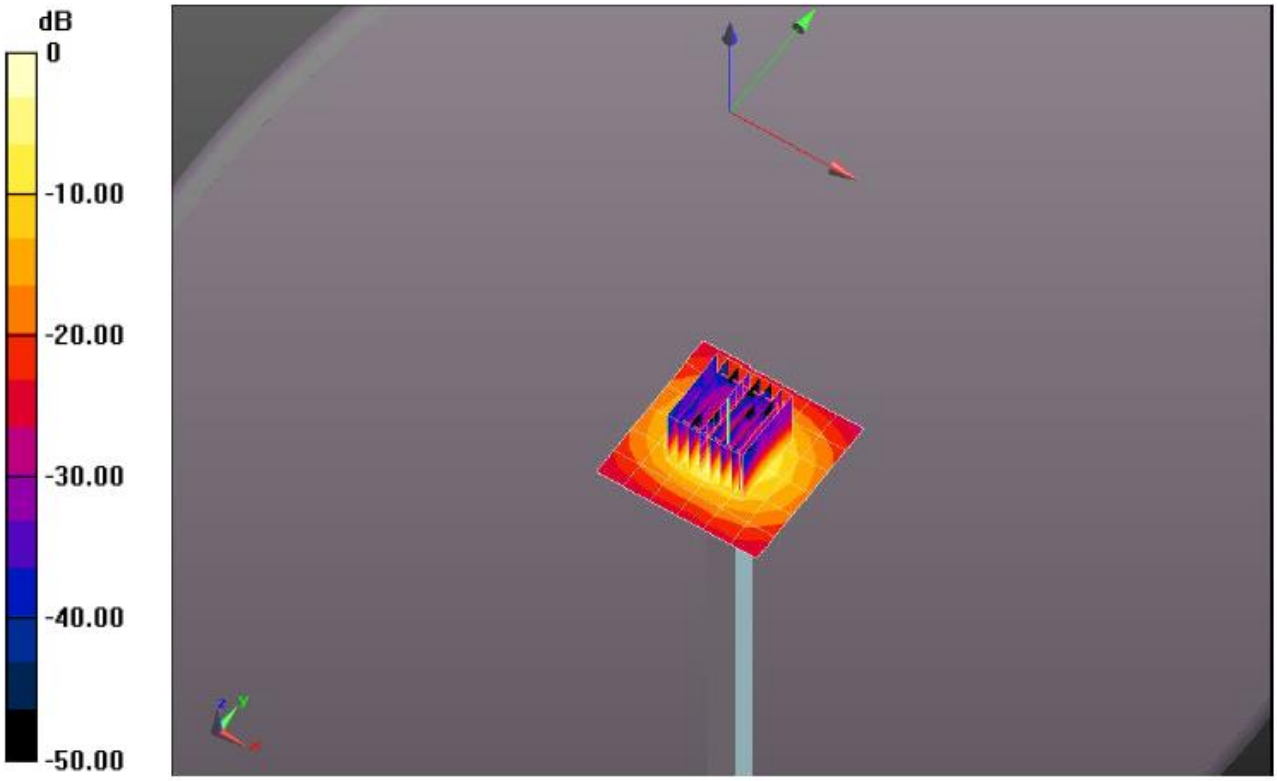
DUT: D5GHzV2; Type: D5GHzV2; Serial: 1273
Date:2018-05-09
Communication System: UID 0, A-CW (0); Frequency: 5800 MHz
Medium parameters used: f = 5800 MHz; σ = 6.27 S/m; ε_r = 46.943; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(4.61, 4.61, 4.61); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection), z = 1.0, 25.0
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- 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 (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.9 W/kg

Body/d=10mm,Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 62.07 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 36.2 W/kg
SAR(1 g) = 7.28 W/kg; SAR(10 g) = 2.02 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



10. SAR Exposure Limits

SAR assessments have been made in line with the requirements of ANSI/IEEE C95.1-1992

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)	1.60	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. Therefore, the EUT was set in GPRS (4Tx slots) for GSM850 and GPRS (4Tx slots) for PCS1900.*
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. Therefore, the EUT was set in GPRS (4Tx slots) for GSM850 and GPRS (4Tx slots) for PCS1900.*

Mode: GSM850		Conducted Power (dBm)			Division Factors	Averager Power (dBm)		
		CH128	CH190	CH251		CH128	CH190	CH251
		824.2MHz	836.6MHz	848.8MHz		824.2MHz	836.6MHz	848.8MHz
GSM		34.87	34.91	34.87	-9.03	25.84	25.88	25.84
GPRS (GMSK)	1TXslot	34.66	34.68	34.61	-9.03	25.63	25.65	25.58
	2TXslots	34.42	34.41	34.47	-6.02	28.40	28.39	28.45
	3TXslots	33.27	33.00	32.98	-4.26	29.01	28.74	28.72
	4TXslots	31.63	31.75	31.76	-3.01	28.62	28.74	28.75
EGPRS (8PSK)	1TXslot	28.92	28.68	28.64	-9.03	19.89	19.65	19.61
	2TXslots	28.16	28.15	28.12	-6.02	22.14	22.13	22.10
	3TXslots	26.30	25.95	26.42	-4.26	22.04	21.69	22.16
	4TXslots	24.53	24.42	24.48	-3.01	21.52	21.41	21.47
Mode: PCS1900		**Conducted Power (dBm)**			Division Factors	**Averager Power (dBm)**		
		CH512	CH661	CH810		CH512	CH661	CH810
		1850.2MHz	1880.0MHz	1909.8MHz		1850.2MHz	1880.0MHz	1909.8MHz
GSM		29.12	29.52	29.13	-9.03	20.09	20.49	20.10
GPRS (GMSK)	1TXslot	29.10	29.50	29.11	-9.03	20.07	20.47	20.08
	2TXslots	28.71	29.04	28.64	-6.02	22.69	23.02	22.62
	3TXslots	27.48	27.72	27.31	-4.26	23.22	23.46	23.05
	4TXslots	25.90	26.27	25.89	-3.01	22.89	23.26	22.88
EGPRS (8PSK)	1TXslot	27.31	26.99	26.65	-9.03	18.28	17.96	17.62
	2TXslots	26.90	26.63	26.34	-6.02	20.88	20.61	20.32
	3TXslots	25.42	25.25	24.72	-4.26	21.16	20.99	20.46
	4TXslots	23.62	23.37	22.88	-3.01	20.61	20.36	19.87

Note:

1) Division Factors

To average the power, the division factor is as follows:

1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots = 4 transmit time slots out of 8 time slots=> conducted 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 β_{hs} = 30/15 * β_c.

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

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

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

Setup Configuration

HSUPA Setup 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	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (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 II			WCDMA Band V		
		Conducted Power (dBm)			Conducted Power (dBm)		
		CH9262	CH9400	CH9538	CH4132	CH4183	CH4233
		1852.4	1880.0	1907.6	826.4	836.6	846.6
AMR 12.2K		22.70	22.76	22.57	23.74	23.77	23.73
RMC 12.2K		22.72	22.79	22.58	23.77	23.80	23.74
HSDPA	Subtest-1	21.39	21.45	21.36	22.58	22.57	22.62
	Subtest-2	20.88	20.96	20.92	22.11	22.12	22.10
	Subtest-3	20.90	20.97	20.96	22.14	22.18	22.17
	Subtest-4	20.92	20.95	20.92	22.12	22.16	22.13
HSUPA	Subtest-1	19.00	19.09	19.08	19.97	20.02	19.98
	Subtest-2	20.03	20.10	20.04	21.01	20.71	20.97
	Subtest-3	19.99	20.10	19.83	21.05	21.03	20.86
	Subtest-4	19.06	19.13	19.08	20.03	20.04	20.04
	Subtest-5	19.91	20.02	20.02	20.95	20.95	20.96

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 5				Actual output Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
1.4	QPSK	1	Low	23.55	23.69	23.49
			Middle	23.54	23.67	23.47
			High	23.46	23.59	23.39
		3	Low	23.31	23.44	23.24
			Middle	23.23	23.36	23.16
			High	23.13	23.26	23.06
		6	/	22.90	23.03	22.84
	16QAM	1	Low	23.19	23.32	23.12
			Middle	23.29	23.42	23.22
			High	23.20	23.33	23.13
		3	Low	22.93	23.06	22.87
			Middle	22.86	22.99	22.80
			High	22.91	23.04	22.85
		6	/	21.85	21.98	21.80
3	QPSK	1	Low	23.64	23.78	23.58
			Middle	23.48	23.61	23.41
			High	23.48	23.61	23.41
		8	Low	22.81	22.94	22.75
			Middle	22.74	22.87	22.68
			High	22.70	22.83	22.64
		15	/	22.71	22.84	22.65
	16QAM	1	Low	23.14	23.27	23.07
			Middle	23.01	23.14	22.95
			High	22.90	23.03	22.84
		8	Low	21.89	22.02	21.84
			Middle	21.80	21.92	21.74
			High	21.76	21.88	21.70
		15	/	21.80	21.92	21.74

5	QPSK	1	Low	23.57	23.71	23.51
			Middle	23.40	23.53	23.33
			High	23.55	23.69	23.49
		12	Low	22.58	22.71	22.52
			Middle	22.46	22.59	22.40
			High	22.47	22.60	22.41
		25	/	22.50	22.63	22.44
	16QAM	1	Low	23.15	23.28	23.08
			Middle	22.71	22.84	22.65
			High	22.85	22.98	22.79
		12	Low	21.75	21.87	21.69
			Middle	21.61	21.73	21.55
			High	21.62	21.74	21.56
		25	/	21.55	21.67	21.49
10	QPSK	1	Low	23.70	23.84	23.64
			Middle	23.56	23.70	23.50
			High	23.54	23.67	23.47
		25	Low	22.48	22.61	22.42
			Middle	22.33	22.46	22.27
			High	22.23	22.36	22.17
		50	/	22.33	22.46	22.27
	16QAM	1	Low	22.78	22.91	22.72
			Middle	22.75	22.88	22.69
			High	22.43	22.56	22.37
		25	Low	21.56	21.68	21.50
			Middle	21.40	21.52	21.34
			High	21.31	21.43	21.25
		50	/	21.42	21.54	21.36

LTE-FDD Band 7				Actual output Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
5	QPSK	1	Low	23.65	23.74	23.59
			Middle	23.59	23.68	23.53
			High	23.66	23.75	23.60
		12	Low	22.14	22.23	22.09
			Middle	22.14	22.23	22.09
			High	22.30	22.39	22.25
		25	/	22.21	22.30	22.16
	16QAM	1	Low	22.71	22.80	22.65
			Middle	22.40	22.49	22.35
			High	22.89	22.98	22.83
		12	Low	21.35	21.44	21.30
			Middle	21.32	21.41	21.27
			High	21.47	21.56	21.42
		25	/	21.30	21.39	21.25
10	QPSK	1	Low	23.05	23.14	22.99
			Middle	23.14	23.23	23.08
			High	23.06	23.15	23.00
		25	Low	22.08	22.17	22.03
			Middle	22.20	22.29	22.15
			High	22.26	22.35	22.21
		50	/	22.16	22.25	22.11
	16QAM	1	Low	22.30	22.39	22.25
			Middle	22.60	22.69	22.54
			High	22.50	22.59	22.44
		25	Low	21.18	21.27	21.13
			Middle	21.28	21.37	21.23
			High	21.33	21.42	21.28
		50	/	21.27	21.36	21.22

15	QPSK	1	Low	23.16	23.25	23.10
			Middle	23.12	23.21	23.06
			High	23.37	23.46	23.31
		38	Low	22.07	22.16	22.02
			Middle	22.16	22.25	22.11
			High	22.32	22.41	22.27
		75	/	22.18	22.27	22.13
	16QAM	1	Low	22.42	22.51	22.37
			Middle	22.53	22.62	22.47
			High	22.73	22.82	22.67
		38	Low	21.17	21.26	21.12
			Middle	21.28	21.37	21.23
			High	21.44	21.53	21.39
		75	/	21.27	21.36	21.22
20	QPSK	1	Low	23.67	23.77	23.62
			Middle	23.39	23.48	23.33
			High	23.60	23.69	23.54
		50	Low	22.04	22.13	21.99
			Middle	22.10	22.19	22.05
			High	22.19	22.28	22.14
		100	/	22.10	22.19	22.05
	16QAM	1	Low	22.36	22.45	22.31
			Middle	22.53	22.62	22.47
			High	22.57	22.66	22.51
		50	Low	21.10	21.18	21.04
			Middle	21.23	21.32	21.18
			High	21.32	21.41	21.27
		100	/	21.18	21.27	21.13

LTE-TDD Band 41				Actual output Power (dBm)		
Band-width	Modulation	RB allocation	RB offset	Low	Middle	High
5	QPSK	1	Low	24.75	24.58	24.93
			Middle	24.76	24.36	24.20
			High	24.72	24.34	24.48
		12	Low	23.66	23.19	23.48
			Middle	23.62	23.06	23.35
			High	23.63	23.18	23.34
		25	/	23.60	23.17	23.41
	16QAM	1	Low	23.84	23.87	24.15
			Middle	23.87	23.35	23.42
			High	23.87	23.74	23.77
		12	Low	22.68	22.25	22.46
			Middle	22.70	22.14	22.27
			High	22.68	22.21	22.30
		25	/	22.57	22.12	22.37
10	QPSK	1	Low	24.74	24.70	25.39
			Middle	24.69	24.50	24.96
			High	24.75	24.26	24.42
		25	Low	23.54	23.64	24.28
			Middle	23.57	23.60	24.12
			High	23.58	23.49	23.90
		50	/	23.52	23.62	24.13
	16QAM	1	Low	23.94	24.04	24.58
			Middle	23.90	23.89	24.17
			High	23.94	23.70	23.74
		25	Low	22.55	22.60	23.26
			Middle	22.54	22.55	23.07
			High	22.58	22.48	22.85
		50	/	22.57	22.60	23.07

15	QPSK	1	Low	24.63	24.82	25.59
			Middle	24.66	24.67	25.39
			High	24.73	24.65	24.81
		38	Low	23.55	23.89	24.66
			Middle	23.58	23.74	24.52
			High	23.59	23.69	24.27
		75	/	23.57	23.76	24.51
	16QAM	1	Low	23.82	24.34	24.77
			Middle	23.86	24.04	24.61
			High	23.88	24.09	24.13
		38	Low	22.56	22.89	23.50
			Middle	22.59	22.73	23.52
			High	22.59	22.67	23.21
		75	/	22.55	22.77	23.54
20	QPSK	1	Low	24.73	25.00	24.91
			Middle	24.75	24.76	24.88
			High	24.87	24.66	24.89
		50	Low	23.53	23.91	24.55
			Middle	23.57	23.91	24.58
			High	23.60	23.81	24.48
		100	/	23.53	23.95	24.59
	16QAM	1	Low	23.93	24.02	24.80
			Middle	24.04	23.95	24.81
			High	24.05	23.91	24.21
		50	Low	22.56	22.85	23.40
			Middle	22.63	22.87	23.45
			High	22.62	22.77	23.43
		100	/	22.53	22.92	23.45

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 Average Power (dBm)
802.11b	01	2412	15.70
	06	2437	16.00
	11	2462	15.70
802.11g	01	2412	12.04
	06	2437	12.22
	11	2462	11.73
802.11n(HT20)	01	2412	10.93
	06	2437	11.18
	11	2462	10.68
802.11n(HT40)	03	2422	10.35
	06	2437	10.50
	09	2452	9.99

WIFI 5G U-NII-1				
Bandwidth	Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
20M	802.11ac	36	5180	12.33
		40	5200	12.37
		48	5240	12.17
	802.11n	36	5180	12.82
		40	5200	12.82
		48	5240	12.34
	802.11a	36	5180	13.84
		40	5200	13.93
		48	5240	13.73
40M	802.11ac	38	5190	11.52
		46	5230	11.49
	802.11n	38	5190	11.83
		46	5230	11.71

WIFI 5G U-NII-3				
Bandwidth	Mode	Channel	Frequency (MHz)	Conducted Average Power (dBm)
20	802.11ac	149	5745	10.36
		157	5785	10.29
		165	5825	10.77
	802.11n	149	5745	10.33
		157	5785	10.46
		165	5825	10.81
	802.11a	149	5745	11.78
		157	5785	11.85
		165	5825	12.30
40	802.11ac	151	5755	9.49
		159	5795	9.49
	802.11n	151	5755	10.69
		159	5795	9.89

Bluetooth Conducted Power

Bluetooth			
Mode	Channel	Frequency (MHz)	Conducted power (dBm)
GFSK	0	2402	2.80
	39	2441	4.58
	78	2480	3.87
π/4QPSK	0	2402	2.29
	39	2441	4.12
	78	2480	2.96
8DPSK	0	2402	2.22
	39	2441	3.84
	78	2480	2.74
BLE	0	2402	-3.93
	19	2440	-2.02
	39	2480	-3.78

12. Maximum Tune-up Limit

GSM		
Mode	Maximum Tune-up (dBm)	
	GSM850	PCS1900
GSM (GMSK, 1Tx Slot)	35.00	29.70
GPRS (GMSK, 1Tx Slot)	35.00	29.70
GPRS (GMSK, 2Tx Slot)	34.50	29.20
GPRS (GMSK, 3Tx Slot)	33.00	28.00
GPRS (GMSK, 4Tx Slot)	32.00	26.50
EGPRS (GMSK, 1Tx Slot)	29.00	27.50
EGPRS (GMSK, 2Tx Slot)	28.50	27.00
EGPRS (GMSK, 3Tx Slot)	26.50	25.50
EGPRS (GMSK, 4Tx Slot)	25.00	23.70

WCDMA		
Mode	Maximum Tune-up (dBm)	
	WCDMA Band II	WCDMA Band V
AMR 12.2Kbps	23.00	24.00
RMC 12.2Kbps	23.00	24.00
HSDPA Subtest-1	21.50	23.00
HSDPA Subtest-2	21.00	22.50
HSDPA Subtest-3	21.00	22.50
HSDPA Subtest-4	21.00	22.50
HSUPA Subtest-1	20.00	20.50
HSUPA Subtest-2	20.50	21.50
HSUPA Subtest-3	20.50	21.50
HSUPA Subtest-4	19.50	20.50
HSUPA Subtest-5	20.50	21.00

LTE				
Fequency Band	Band-width(MHz)	Modulation	RB allocation	Maximum Tune-up (dBm)
LTE Band 5	1.4	QPSK	1	24.00
			3	23.50
			6	23.20
		16QAM	1	23.50
			3	23.20
			6	22.00
	3	QPSK	1	24.00
			8	23.00
			15	23.00
		16QAM	1	23.50
			8	22.20
			15	22.00
	5	QPSK	1	24.00
			12	23.00
			25	23.00
		16QAM	1	23.50
			12	22.00
			25	22.00
	10	QPSK	1	24.00
			25	23.00
			50	23.00
		16QAM	1	23.00
			25	22.00
			50	22.00

LTE				
Fequency Band	Band-width(MHz)	Modulation	RB allocation	Maximum Tune-up (dBm)
LTE Band 7	5	QPSK	1	24.00
			12	23.00
			25	23.00
		16QAM	1	23.00
			12	22.00
			25	22.00
	10	QPSK	1	24.00
			25	23.00
			50	23.00
		16QAM	1	23.00
			25	22.00
			50	22.00
	15	QPSK	1	24.00
			38	23.00
			75	23.00
		16QAM	1	23.00
			38	22.00
			75	22.00
	20	QPSK	1	24.00
			50	23.00
			100	23.00
		16QAM	1	23.00
			50	22.00
			100	22.00

LTE				
Fequency Band	Band-width(MHz)	Modulation	RB allocation	Maximum Tune-up (dBm)
LTE Band 41	5	QPSK	1	24.70
			12	23.50
			25	23.50
		16QAM	1	24.00
			12	22.50
			25	22.50
	10	QPSK	1	24.70
			25	24.00
			50	24.00
		16QAM	1	24.10
			25	23.00
			50	23.00
	15	QPSK	1	25.00
			38	24.00
			75	24.00
		16QAM	1	24.50
			38	23.00
			75	23.00
	20	QPSK	1	25.00
			50	24.00
			100	24.00
		16QAM	1	24.10
			50	23.00
			100	23.00

LTE MPR will followup 3GPP setting as below:

Modulation	Channel bandwidth / Transmission bandwidth (NRB)						MPR (dB)
	1.4MHz	3.0MHz	5MHz	10MHz	15MHz	20MHz	
QPSK	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	0
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

WLAN	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11b	16.00
802.11g	12.50
802.11n(HT20)	11.50
802.11n(HT40)	10.50

WLAN 5G U-NII-1	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11ac(HT20)	12.50
802.11n(HT20)	13.00
802.11a	14.00
802.11ac(HT40)	12.00
802.11n(HT40)	12.00

WLAN 5G U-NII-3	
Mode	Maximum Tune-up (dBm) Burst Average Power
802.11ac(HT20)	11.00
802.11n(HT20)	11.00
802.11a	12.50
802.11ac(HT40)	10.00
802.11n(HT40)	11.00

Note:
When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.

Bluetooth	
Mode	Maximum Tune-up (dBm)
GFSK	4.80
π/4QPSK	4.20
8DPSK	3.90
BLE	-2.00

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:

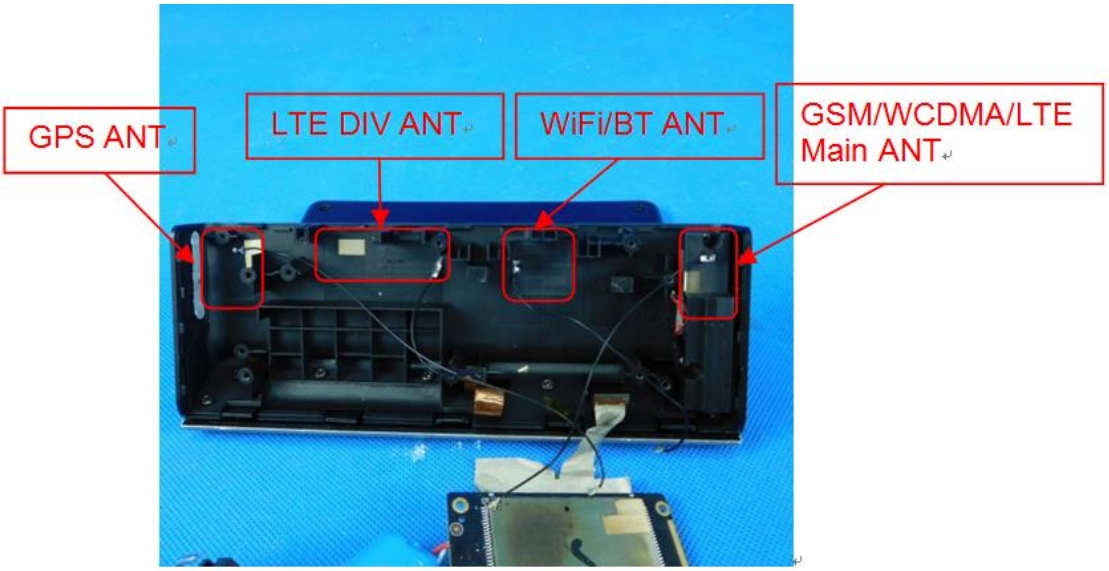
[(max. Power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] * [√f(GHz)] ≤3.0 for 1-g SAR

Band/Mode	F(GHz)	Position	SAR test exclusion threshold (mW)	RF output power		SAR test exclusion
				dBm	mW	
Bluetooth	2.45	Head	10	4.80	3.02	Yes
		Body	19	4.80	3.02	Yes

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



Distance of the Antenna to the EUT surface/edge(mm)					
Antenna	Bottom	Front	Rear	Left side	Right side
WWAN	3	46	2	5	200
WIFI/BT	26	35	5	70	122

Positions for SAR tests					
Antenna	Bottom	Front	Rear	Left side	Right side
WWAN	Yes	No	Yes	Yes	No
WIFI/BT	No	No	Yes	No	No

General note:
Referring to KDB941225 D07,SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

14. SAR Measurement Results

Head 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)	Test Plot
		CH	MHz							
GPRS 4Tx slot	Front	128	824.2	31.63	32.00	1.09	-	-	-	-
		190	836.6	31.75	32.00	1.06	-0.10	0.094	0.100	F1
		251	848.8	31.76	32.00	1.06	-	-	-	-

GSM1900										
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)	Test Plot
		CH	MHz							
GPRS 3Tx slot	Front	512	1850.2	27.48	28.00	1.13	-	-	-	-
		661	1880.0	27.72	28.00	1.07	-0.02	0.043	0.046	F2
		810	1909.8	27.31	28.00	1.17	-	-	-	-

WCDMA Band II										
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)	Test Plot
		CH	MHz							
RMC 12.2Kbps	Front	9262	1852.4	22.72	23.00	1.07	-	-	-	-
		9400	1880.0	22.79	23.00	1.05	-0.05	0.043	0.045	F3
		9538	1907.6	22.58	23.00	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)	Test Plot
		CH	MHz							
RMC 12.2Kbps	Front	4132	826.4	23.77	24.00	1.06	-	-	-	-
		4183	836.6	23.80	24.00	1.05	-0.01	0.058	0.061	F4
		4233	846.6	23.74	24.00	1.06	-	-	-	-

Note:
Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

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)	Test Plot
		CH	MHz							
1RB	Front	20450	829.0	23.70	24.00	1.07	-	-	-	-
		20525	836.5	23.84	24.00	1.04	-0.20	0.048	0.050	F5
		20600	844.0	23.64	24.00	1.09	-	-	-	-
25RB	Front	20450	829.0	22.48	23.00	1.13	-	-	-	-
		20525	836.5	22.61	23.00	1.09	-0.09	0.039	0.043	-
		20600	844.0	22.42	23.00	1.14	-	-	-	-

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)	Test Plot
		CH	MHz							
1RB	Front	20850	2510	23.67	24.00	1.08	-	-	-	-
		21100	2535	23.77	24.00	1.05	-0.10	0.025	0.026	F6
		21350	2560	23.62	24.00	1.09	-	-	-	-
50RB	Front	20850	2510	22.19	23.00	1.20	-	-	-	-
		21100	2535	22.28	23.00	1.18	0.07	0.018	0.021	-
		21350	2560	22.14	23.00	1.22	-	-	-	-

LTE Band 41										
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)	Test Plot
		CH	MHz							
1RB	Front	40340	2565	24.93	25.00	1.02	-	-	-	-
		40740	2605	25.00	25.00	1.00	-0.11	0.045	0.045	F7
		41140	2645	24.79	25.00	1.05	-	-	-	-
50RB	Front	40340	2565	23.84	24.00	1.04	-	-	-	-
		40740	2605	23.91	24.00	1.02	0.09	0.037	0.038	-
		41140	2645	23.71	24.00	1.07	-	-	-	-

Note:
Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

WIFI 2.4G										
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)	Test Plot
		CH	MHz							
802.11b 1Mbps	Front	1	2412	15.70	16.00	1.07	-	-	-	-
		6	2437	16.00	16.00	1.00	-0.10	0.014	0.014	F8
		11	2462	15.70	16.00	1.07	-	-	-	-

Note:

1. According to the above table, the initial test position for body is “Back”, and its reported SAR is≤ 0.4W/kg. Thus further SAR measurement is not required for the other (remaining) test positions. Because the reported SAR of the highest measured maximum output power channel for the exposureconfiguration is ≤ 0.8W/kg, no further SAR testing is required for 802.11b DSSS in that exposureconfiguration.
2. When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.
   a) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
   b) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. the 802.11g/n is not required

WIFI 2.4G- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
802.11b 1Mbps	Front	6	2437	98.71%	100%	0.014	0.014

Note:

1. According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 98.71% is achievable for WLAN in this project.

WIFI 5G										
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)	Test Plot
		CH	MHz							
802.11a U-NII-1	Front	36	5180	13.84	14.00	1.04	-	-	-	-
		40	5200	13.93	14.00	1.02	0.02	0.017	0.017	F9
		48	5240	13.73	14.00	1.06	-	-	-	-
802.11a U-NII-3	Front	149	5745	11.78	12.50	1.18	-	-	-	-
		157	5785	11.85	12.50	1.16	0.14	0.013	0.015	-
		165	5825	12.30	12.50	1.05	-	-	-	-

Note:
When SAR measurement is required for 802.11 a/g/n/ac OFDM configurations, each standalone and aggregated frequency band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies.

a) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements.19 If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

b) b) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

WIFI 5G- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
802.11a U-NII-1	Front	40	5200	98.89%	100%	0.017	0.017

Note:
1. According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 98.89% is achievable for WLAN in this project.

Body SAR

Positions for SAR tests					
Antenna	Bottom	Front	Rear	Left side	Right side
WWAN	Yes	No	Yes	Yes	No
WIFI/BT	No	No	Yes	No	No

General note:
Referring to KDB941225 D07,SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

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)	Test Plot
		CH	MHz							
GPRS (4Tx slot)	Left	128	824.2	31.63	32.00	1.09	-	-	-	-
		190	836.6	31.75	32.00	1.06	0.06	0.474	0.502	-
		251	848.8	31.76	32.00	1.06	-	-	-	-
	Bottom	128	824.2	31.63	32.00	1.09	-	-	-	-
		190	836.6	31.75	32.00	1.06	-0.13	0.718	0.761	B1
		251	848.8	31.76	32.00	1.06	-	-	-	-
	Rear	128	824.2	31.63	32.00	1.09	-	-	-	-
		190	836.6	31.75	32.00	1.06	0.07	0.514	0.544	-
		251	848.8	31.76	32.00	1.06	-	-	-	-

PCS1900										
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)	Test Plot
		CH	MHz							
GPRS (3Tx slot)	Left	512	1850.2	27.48	28.00	1.13	-	-	-	-
		661	1880.0	27.72	28.00	1.07	0.12	0.460	0.491	-
		810	1909.8	27.31	28.00	1.17	-	-	-	-
	Bottom	512	1850.2	27.48	28.00	1.13	-	-	-	-
		661	1880.0	27.72	28.00	1.07	-0.16	0.727	0.775	B2
		810	1909.8	27.31	28.00	1.17	-	-	-	-
	Rear	512	1850.2	27.48	28.00	1.13	-	-	-	-
		661	1880.0	27.72	28.00	1.07	-0.17	0.457	0.487	-
		810	1909.8	27.31	28.00	1.17	-	-	-	-

Note:
Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

WCDMA Band II										
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)	Test Plot
		CH	MHz							
RMC 12.2Kbps	Left	9262	1852.4	22.72	23.00	1.07	-	-	-	-
		9400	1880.0	22.79	23.00	1.05	-0.05	0.518	0.544	-
		9538	1907.6	22.58	23.00	1.10	-	-	-	-
	Bottom	9262	1852.4	22.72	23.00	1.07	-	-	-	-
		9400	1880.0	22.79	23.00	1.05	0.12	0.728	0.764	B3
		9538	1907.6	22.58	23.00	1.10	-	-	-	-
	Rear	9262	1852.4	22.72	23.00	1.07	-	-	-	-
		9400	1880.0	22.79	23.00	1.05	0.06	0.495	0.520	-
		9538	1907.6	22.58	23.00	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)	Test Plot
		CH	MHz							
RMC 12.2Kbps	Left	4132	826.4	23.77	24.00	1.06	-	-	-	-
		4183	836.6	23.80	24.00	1.05	0.00	0.388	0.406	-
		4233	846.6	23.74	24.00	1.06	-	-	-	-
	Bottom	4132	826.4	23.77	24.00	1.06	-	-	-	-
		4183	836.6	23.80	24.00	1.05	-0.01	0.630	0.659	B4
		4233	846.6	23.74	24.00	1.06	-	-	-	-
	Rear	4132	826.4	23.77	24.00	1.06	-	-	-	-
		4183	836.6	23.80	24.00	1.05	0.01	0.383	0.401	-
		4233	846.6	23.74	24.00	1.06	-	-	-	-

Note:
Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg

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)	Test Plot
		CH	MHz							
10M_1RB	Left	20450	829.0	23.70	24.00	1.07	-	-	-	-
		20525	836.5	23.84	24.00	1.04	0.02	0.382	0.397	-
		20600	844.0	23.64	24.00	1.09	-	-	-	-
	Bottom	20450	829.0	23.70	24.00	1.07	-	-	-	-
		20525	836.5	23.84	24.00	1.04	-0.03	0.567	0.588	B5
		20600	844.0	23.64	24.00	1.09	-	-	-	-
	Rear	20450	829.0	23.70	24.00	1.07	-	-	-	-
		20525	836.5	23.84	24.00	1.04	0.01	0.401	0.416	-
		20600	844.0	23.64	24.00	1.09	-	-	-	-
10M_25RB	Left	20450	829.0	22.48	23.00	1.13	-	-	-	-
		20525	836.5	22.61	23.00	1.09	-0.08	0.270	0.295	-
		20600	844.0	22.42	23.00	1.14	-	-	-	-
	Bottom	20450	829.0	22.48	23.00	1.13	-	-	-	-
		20525	836.5	22.61	23.00	1.09	0.12	0.494	0.540	-
		20600	844.0	22.42	23.00	1.14	-	-	-	-
	Rear	20450	829.0	22.48	23.00	1.13	-	-	-	-
		20525	836.5	22.61	23.00	1.09	-0.09	0.326	0.357	-
		20600	844.0	22.42	23.00	1.14	-	-	-	-

Note:

1. Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg
2. 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.

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)	Test Plot
		CH	MHz							
20M_1RB	Left	20850	2510	23.67	24.00	1.08	-	-	-	-
		21100	2535	23.77	24.00	1.05	0.03	0.434	0.457	-
		21350	2560	23.62	24.00	1.09	-	-	-	-
	Bottom	20850	2510	23.67	24.00	1.08	-	-	-	-
		21100	2535	23.77	24.00	1.05	-0.12	0.614	0.647	B6
		21350	2560	23.62	24.00	1.09	-	-	-	-
	Rear	20850	2510	23.67	24.00	1.08	-	-	-	-
		21100	2535	23.77	24.00	1.05	0.04	0.383	0.404	-
		21350	2560	23.62	24.00	1.09	-	-	-	-
20M_50RB	Left	20850	2510	22.19	23.00	1.20	-	-	-	-
		21100	2535	22.28	23.00	1.18	-0.02	0.342	0.404	-
		21350	2560	22.14	23.00	1.22	-	-	-	-
	Bottom	20850	2510	22.19	23.00	1.20	-	-	-	-
		21100	2535	22.28	23.00	1.18	0.08	0.503	0.594	-
		21350	2560	22.14	23.00	1.22	-	-	-	-
	Rear	20850	2510	22.19	23.00	1.20	-	-	-	-
		21100	2535	22.28	23.00	1.18	-0.02	0.289	0.341	-
		21350	2560	22.14	23.00	1.22	-	-	-	-

Note:

1. Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg
2. 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.

LTE Band 41										
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)	Test Plot
		CH	MHz							
20M_1RB	Left	40340	2565	24.93	25.00	1.02	-	-	-	-
		40740	2605	25.00	25.00	1.00	-0.02	0.482	0.482	-
		41140	2645	24.79	25.00	1.05	-	-	-	-
	Bottom	40340	2565	24.93	25.00	1.02	-	-	-	-
		40740	2605	25.00	25.00	1.00	0.07	0.682	0.682	B7
		41140	2645	24.79	25.00	1.05	-	-	-	-
	Rear	40340	2565	24.93	25.00	1.02	-	-	-	-
		40740	2605	25.00	25.00	1.00	-0.02	0.426	0.426	-
		41140	2645	24.79	25.00	1.05	-	-	-	-
20M_50RB	Left	40340	2565	23.84	24.00	1.04	-	-	-	-
		40740	2605	23.91	24.00	1.02	-0.03	0.408	0.416	-
		41140	2645	23.71	24.00	1.07	-	-	-	-
	Bottom	40340	2565	23.84	24.00	1.04	-	-	-	-
		40740	2605	23.91	24.00	1.02	0.11	0.599	0.612	-
		41140	2645	23.71	24.00	1.07	-	-	-	-
	Rear	40340	2565	23.84	24.00	1.04	-	-	-	-
		40740	2605	23.91	24.00	1.02	-0.03	0.344	0.351	-
		41140	2645	23.71	24.00	1.07	-	-	-	-

Note:

1. Per KDB865664 D01v01r04, Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg
2. 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.

WLAN 2.4G										
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)	Test Plot
		CH	MHz							
802.11b 1Mbps	Rear	1	2412	15.70	16.00	1.07	-	-	-	-
		6	2437	16.00	16.00	1.00	-0.07	0.186	0.186	B8
		11	2462	15.70	16.00	1.07	-	-	-	-

Note:

1. According to the above table, the initial test position for body is “Back”, and its reported SAR is≤ 0.4W/kg. Thus further SAR measurement is not required for the other (remaining) test positions. Because the reported SAR of the highest measured maximum output power channel for the exposureconfiguration is ≤ 0.8W/kg, no further SAR testing is required for 802.11b DSSS in that exposureconfiguration.
2. When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.
   c) When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
   d) When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg. the 802.11g/n is not required

WLAN 2.4G- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
802.11b 1Mbps	Rear	6	2437	98.71%	100%	0.186	0.188

Note:

1. According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 98.71% is achievable for WLAN in this project.

WLAN 5G										
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)	Test Plot
		CH	MHz							
U-NII-1 802.11a	Rear	36	5180	13.84	14.00	1.04	-	-	-	-
		40	5200	13.93	14.00	1.02	-0.11	0.053	0.054	B9
		48	5240	13.73	14.00	1.06	-	-	-	-
U-NII-3 802.11a	Rear	149	5745	11.78	12.50	1.18	-	-	-	-
		157	5785	11.85	12.50	1.16	0.14	0.044	0.051	-
		165	5825	12.30	12.50	1.05	-	-	-	-

Note:
When SAR measurement is required for 802.11 a/g/n/ac OFDM configurations, each standalone and aggregated frequency band is considered separately for SAR test reduction. When the same transmitter and antenna(s) are used for U-NII-1 and U-NII-2A bands, additional SAR test reduction applies.

a) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements.19 If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.

b) b) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

WLAN 5G- Scaled Reported SAR							
Mode	Test Position	Frequency		Actual duty factor	maximum duty factor	Reported SAR (1g)(W/kg)	Scaled reported SAR (1g)(W/kg)
		CH	MHz				
U-NII-1 802.11a	Rear	40	5200	98.89%	100%	0.054	0.054

Note:
1. According to the KDB248227 D01, The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit. A maximum transmission duty factor of 98.89% is achievable for WLAN in this project.

SAR Test Data Plots

Test mode:	GPRS850 4Tx slot	Test Position:	Front of Face	Test Plot:	F1

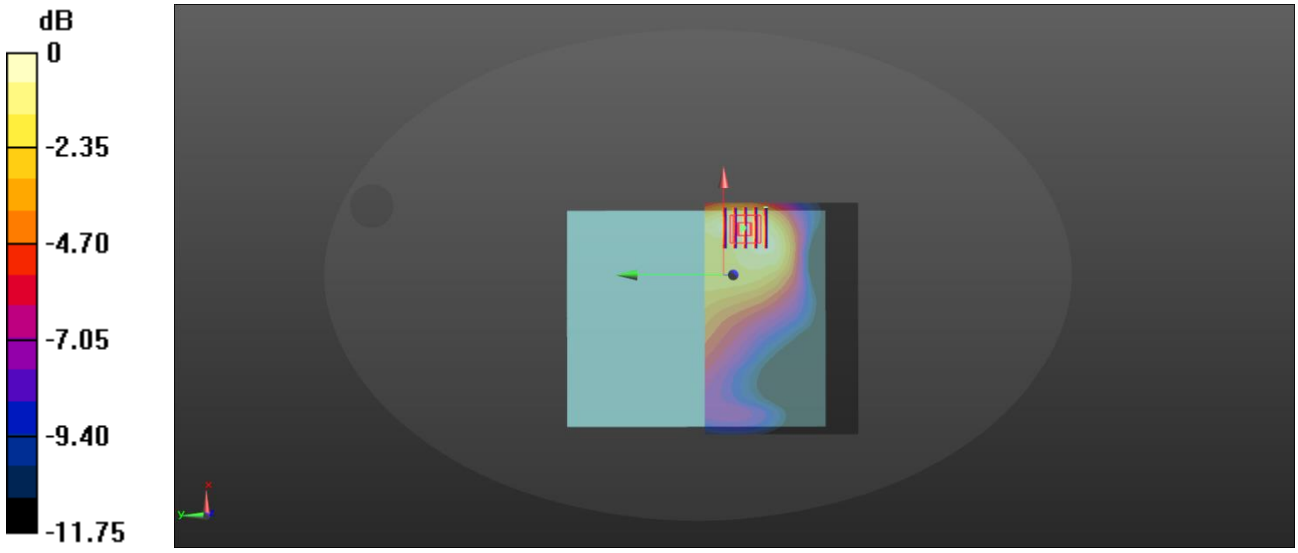
Date:2018-05-02
Communication System: UID 0, Generic GPRS(TDMA, GMSK, TN 0-1-2-3) (0); Frequency: 836.6 MHz;Duty Cycle: 1:2.00447
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.933 S/m; ε_r = 43.899; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.73, 10.73, 10.73); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.124 W/kg

Front of Face/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.986 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.140 W/kg
SAR(1 g) = 0.094 W/kg; SAR(10 g) = 0.062 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.123 W/kg



0 dB = 0.123 W/kg = -9.10 dBW/kg

Test mode: GPRS1900 3Tx slot Test Position: Front of Face Test Plot: F2

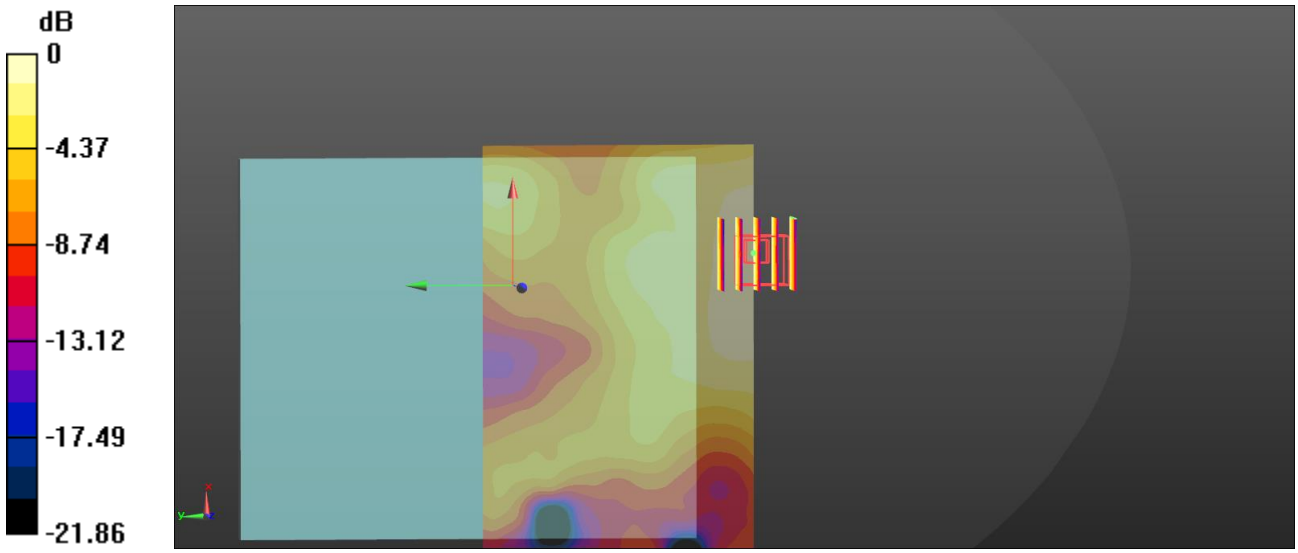
Date:2018-05-04
Communication System: UID 0, Generic GPRS(TDMA, GMSK, TN 0-1-2) (0); Frequency: 1880 MHz;Duty Cycle: 1:2.67
Medium parameters used: f = 1880 MHz; σ = 1.455 S/m; ε_r = 41.738; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.83, 8.83, 8.83); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (121x81x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0601 W/kg

Front of Face/Procedure/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.393 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.0680 W/kg
SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.027 W/kg
Maximum value of SAR (measured) = 0.0594 W/kg



0 dB = 0.0594 W/kg = -12.26 dBW/kg

Test mode:	WCDMA Band II	Test Position:	Front of Face	Test Plot:	F3

Date:2018-05-04
Communication System: UID 0, Generic UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.455 S/m; ε_r = 41.738; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

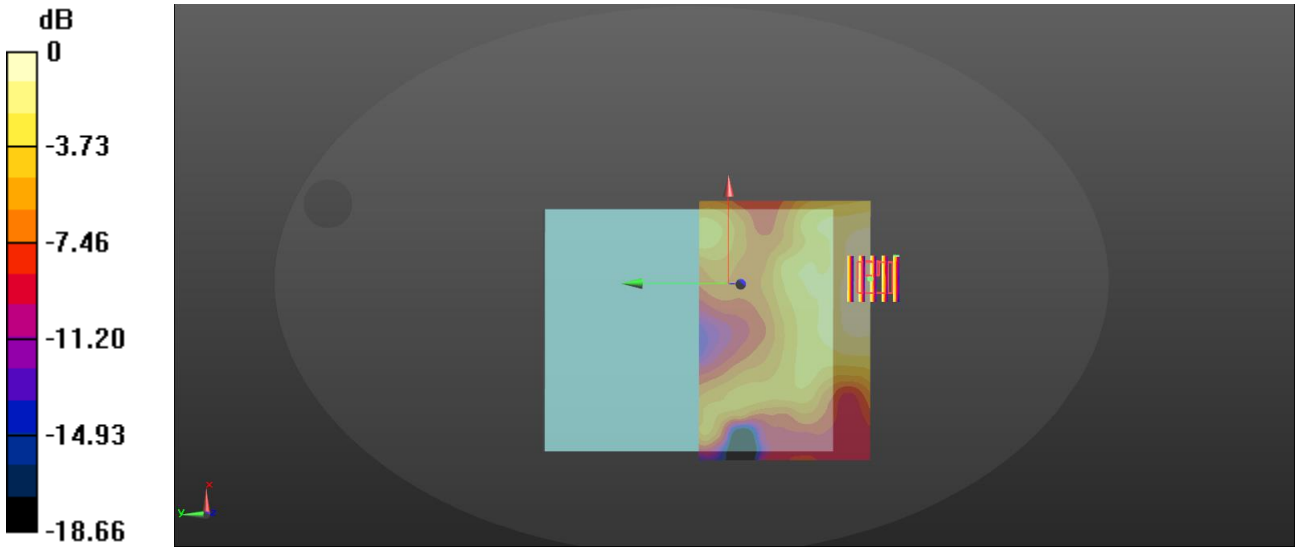
- Probe: EX3DV4 - SN7494; ConvF(8.83, 8.83, 8.83); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0602 W/kg

Front of Face/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.522 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.0690 W/kg
SAR(1 g) = 0.043 W/kg; SAR(10 g) = 0.028 W/kg
Maximum value of SAR (measured) = 0.0596 W/kg



0 dB = 0.0596 W/kg = -12.25 dBW/kg

Test mode:	WCDMA Band V	Test Position:	Front of Face	Test Plot:	F4

Date:2018-05-02
Communication System: UID 0, Generic UMTS (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.933 S/m; ε_r = 43.899; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

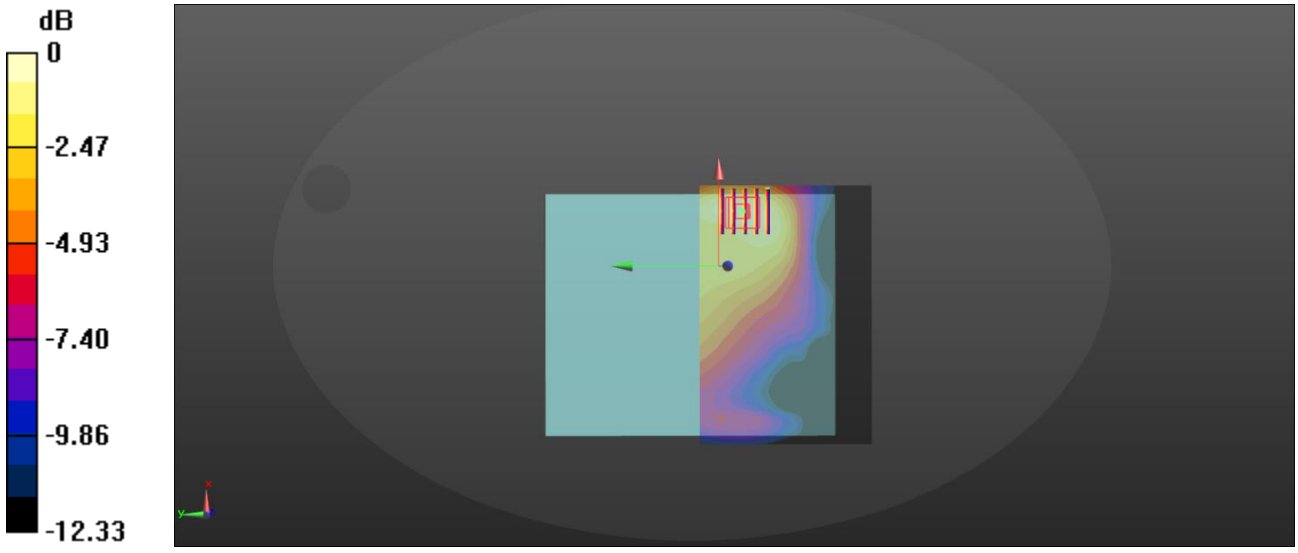
- Probe: EX3DV4 - SN7494; ConvF(10.73, 10.73, 10.73); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0778 W/kg

Front of Face/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.981 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.0870 W/kg
SAR(1 g) = 0.058 W/kg; SAR(10 g) = 0.038 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0765 W/kg



0 dB = 0.0765 W/kg = -11.16 dBW/kg

Test mode:	LTE Band 5	Test Position:	Front of Face	Test Plot:	F5

Date:2018-05-02
Communication System: UID 0, Generic LTE-FDD (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.933 S/m; ε_r = 43.899; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

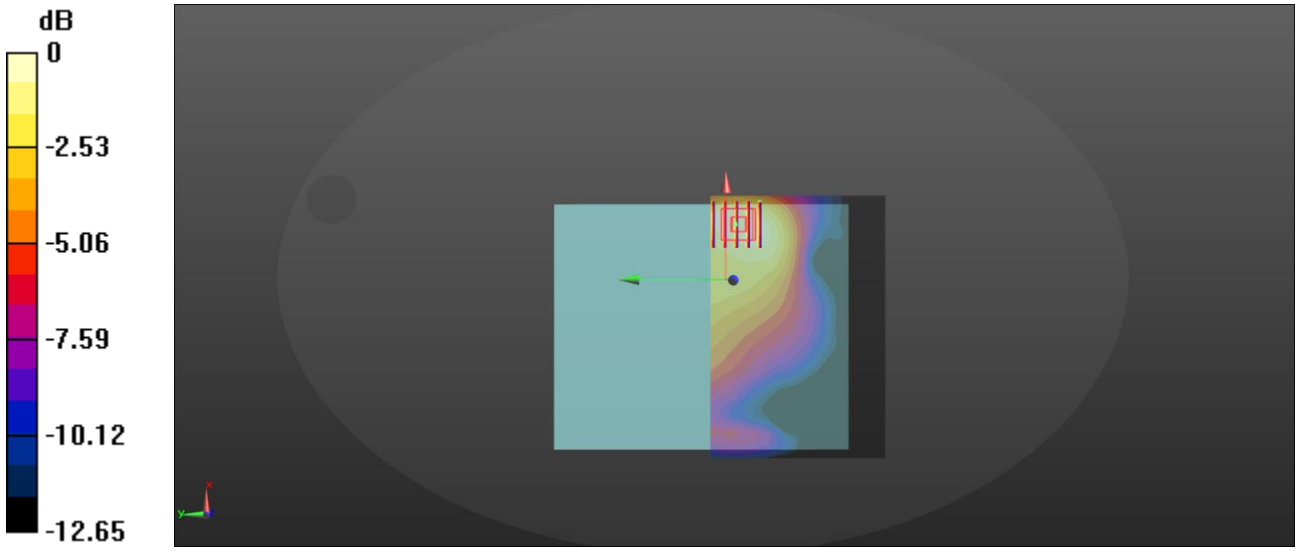
- Probe: EX3DV4 - SN7494; ConvF(10.73, 10.73, 10.73); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0666 W/kg

Front of Face/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.243 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 0.0710 W/kg
SAR(1 g) = 0.048 W/kg; SAR(10 g) = 0.031 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0630 W/kg



0 dB = 0.0630 W/kg = -12.01 dBW/kg

Test mode: LTE Band 7 Test Position: Front of Face Test Plot: F6

Date:2018-05-08
Communication System: UID 0, Generic LTE-FDD (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.933 S/m; ε_r = 43.899; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

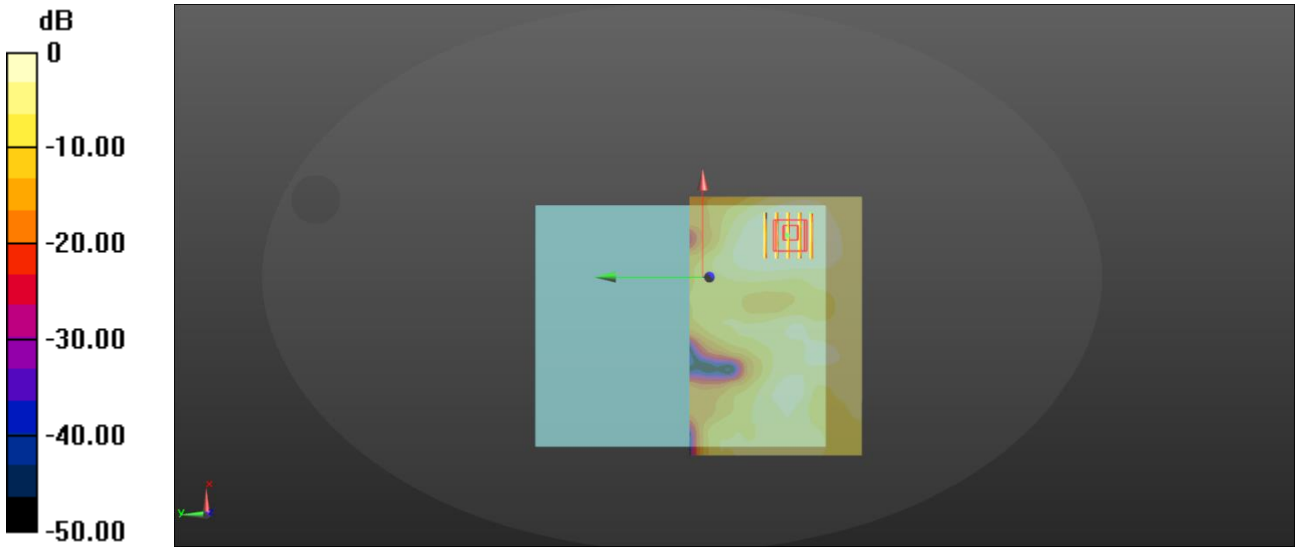
- Probe: EX3DV4 - SN7494; ConvF(10.73, 10.73, 10.73); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0440 W/kg

Front of Face/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.974 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.0460 W/kg
SAR(1 g) = 0.025 W/kg; SAR(10 g) = 0.014 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0381 W/kg



0 dB = 0.0381 W/kg = -14.19 dBW/kg

Test mode:	LTE Band 41	Test Position:	Front of Face	Test Plot:	F7

Date:2018-05-08
Communication System: UID 0, Generic LTE-TDD (0); Frequency: 2605 MHz;Duty Cycle: 1:1.59882
Medium parameters used (interpolated): f = 2605 MHz; σ = 1.964 S/m; ε_r = 40.64; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

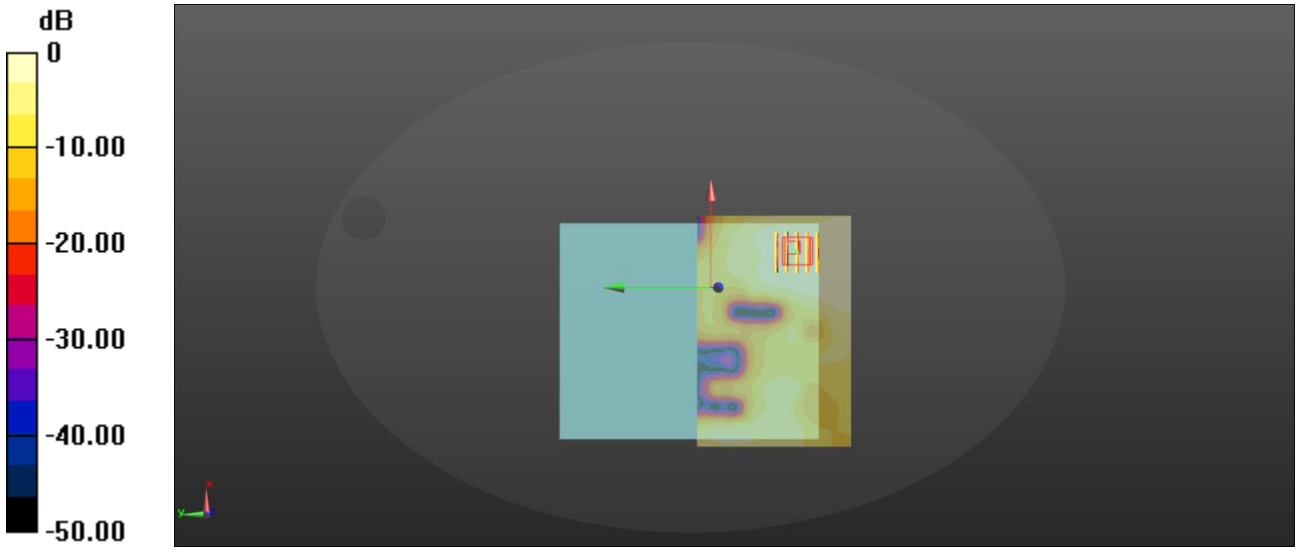
- Probe: EX3DV4 - SN7494; ConvF(7.92, 7.92, 7.92); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (121x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0676 W/kg

Front of Face/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.945 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.0860 W/kg
SAR(1 g) = 0.045 W/kg; SAR(10 g) = 0.023 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0692 W/kg



0 dB = 0.0692 W/kg = -11.60 dBW/kg

Test mode: WLAN 2.4G 802.11b Test Position: Front of Face Test Plot: F8

Date:2018-05-07
Communication System: UID 0, Generic WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.829 S/m; ε_r = 41.002; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

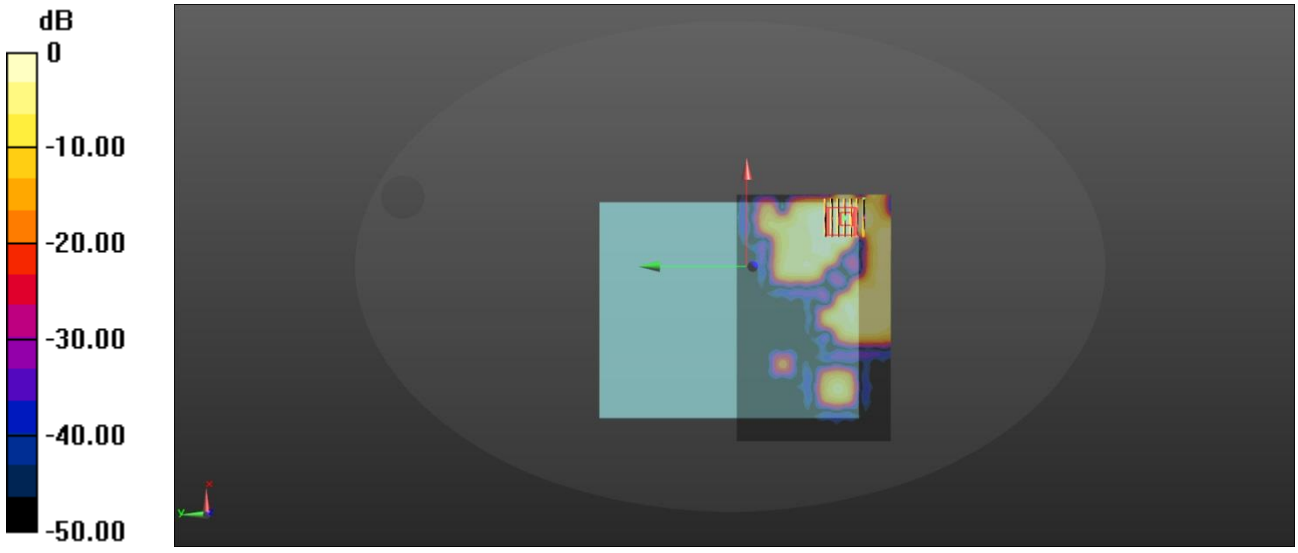
- Probe: EX3DV4 - SN7494; ConvF(8.27, 8.27, 8.27); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (161x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.0337 W/kg

Front of Face/Procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.3870 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.0260 W/kg
SAR(1 g) = 0.014 W/kg; SAR(10 g) = 0.00561 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.0233 W/kg



0 dB = 0.0233 W/kg = -16.33 dBW/kg

Test mode: WLAN 5G 802.11a Test Position: Front of Face Test Plot: F9

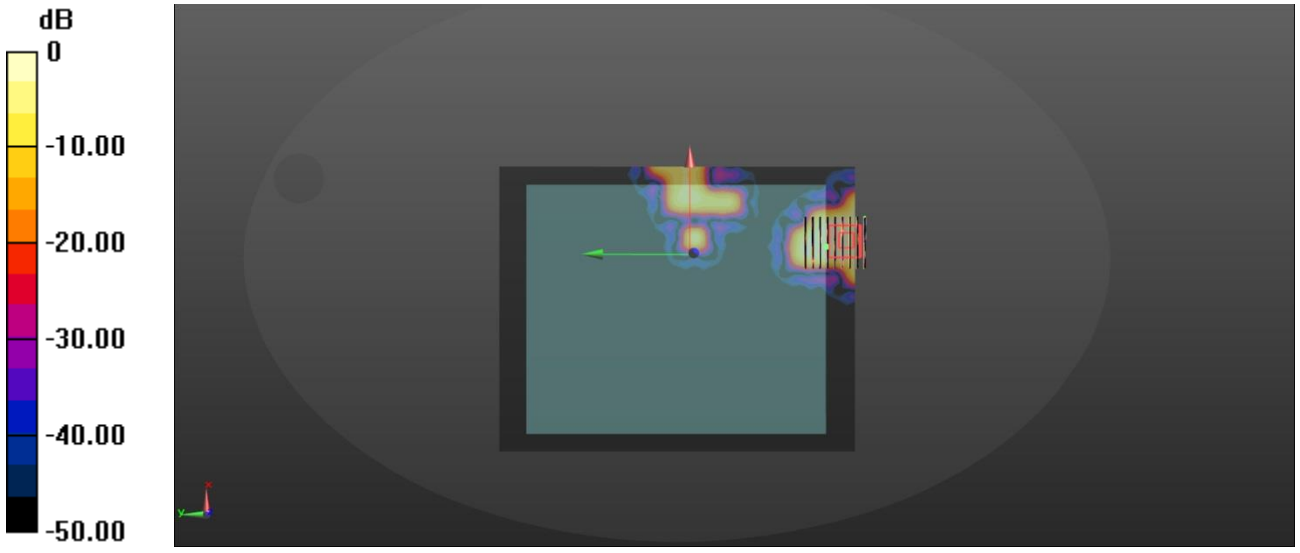
Date:2018-05-09
Communication System: UID 0, Generic WIFI (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 36.228; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.63, 5.63, 5.63); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Front of Face/Procedure/Area Scan (161x201x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0855 W/kg

Front of Face/Procedure/Zoom Scan (8x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.067 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.0990 W/kg
SAR(1 g) = 0.017 W/kg; SAR(10 g) = 0.00661 W/kg
Maximum value of SAR (measured) = 0.0503 W/kg



0 dB = 0.0503 W/kg = -12.98 dBW/kg

Test mode:	GPRS850 4Tx slot	Test Position:	Bottom Side	Test Plot:	B1

Date:2018-05-03
Communication System: UID 0, Generic GPRS(TDMA, GMSK, TN 0-1-2-3) (0); Frequency: 836.6 MHz;Duty Cycle: 1:2.00447
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.967 S/m; ε_r = 55.399; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY 5 Configuration:

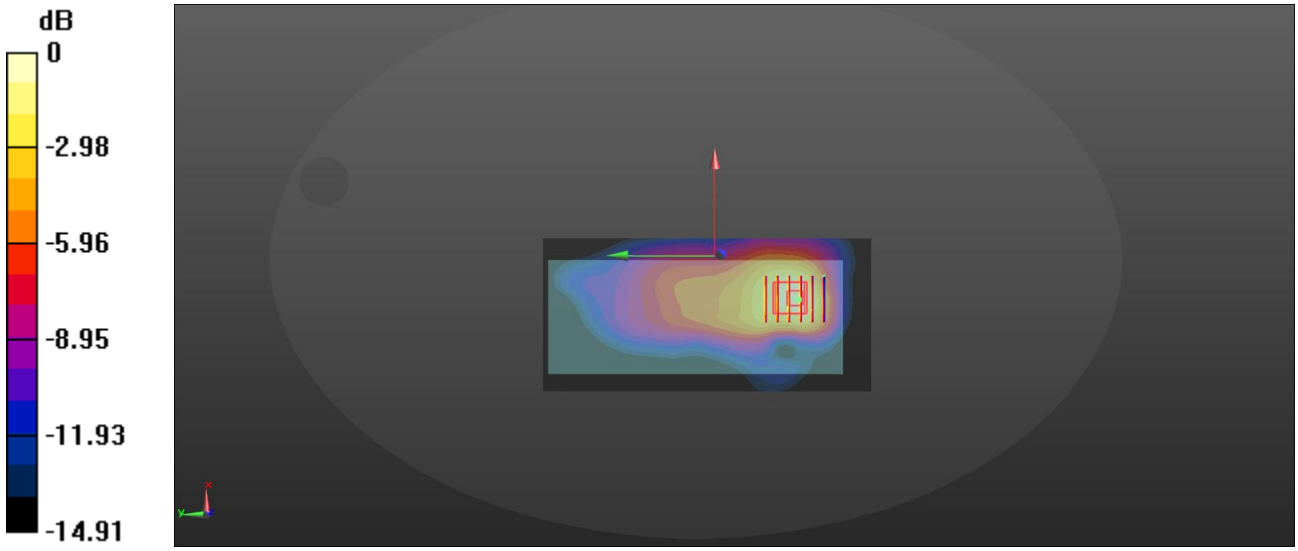
- Probe: EX3DV4 - SN7494; ConvF(10.5, 10.5, 10.5); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Bottom/Procedure/Area Scan (71x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.06 W/kg

Bottom/Procedure/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.90 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.718 W/kg; SAR(10 g) = 0.469 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.58 W/kg = 1.99 dBW/kg

Test mode:	GPRS1900 3Tx slot	Test Position:	Bottom Side	Test Plot:	B2

Date:2018-05-04
Communication System: UID 0, Generic GPRS(TDMA, GMSK, TN 0-1-2) (0); Frequency: 1880 MHz;Duty Cycle: 1:2.67
Medium parameters used: f = 1880 MHz; σ = 1.539 S/m; ε_r = 53.741; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

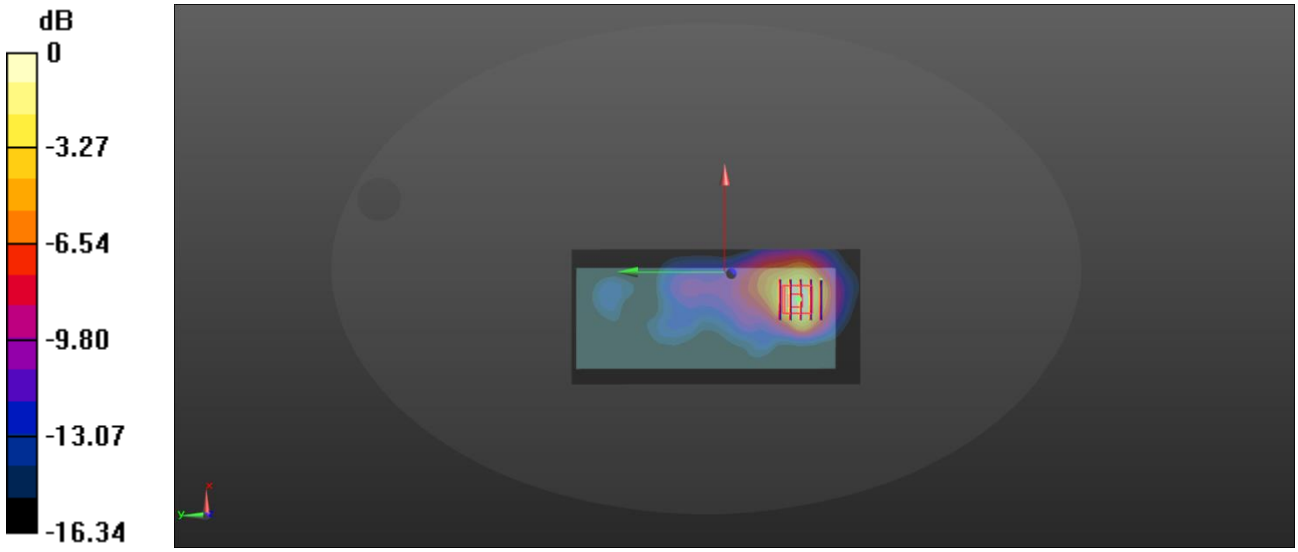
- Probe: EX3DV4 - SN7494; ConvF(8.42, 8.42, 8.42); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Bottom/Procedure/Area Scan (71x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.02 W/kg

Bottom/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.649 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.727 W/kg; SAR(10 g) = 0.407 W/kg
Maximum value of SAR (measured) = 1.03 W/kg



0 dB = 1.73 W/kg = 2.38 dBW/kg

Test mode:	WCDMA Band II	Test Position:	Bottom Side	Test Plot:	B3

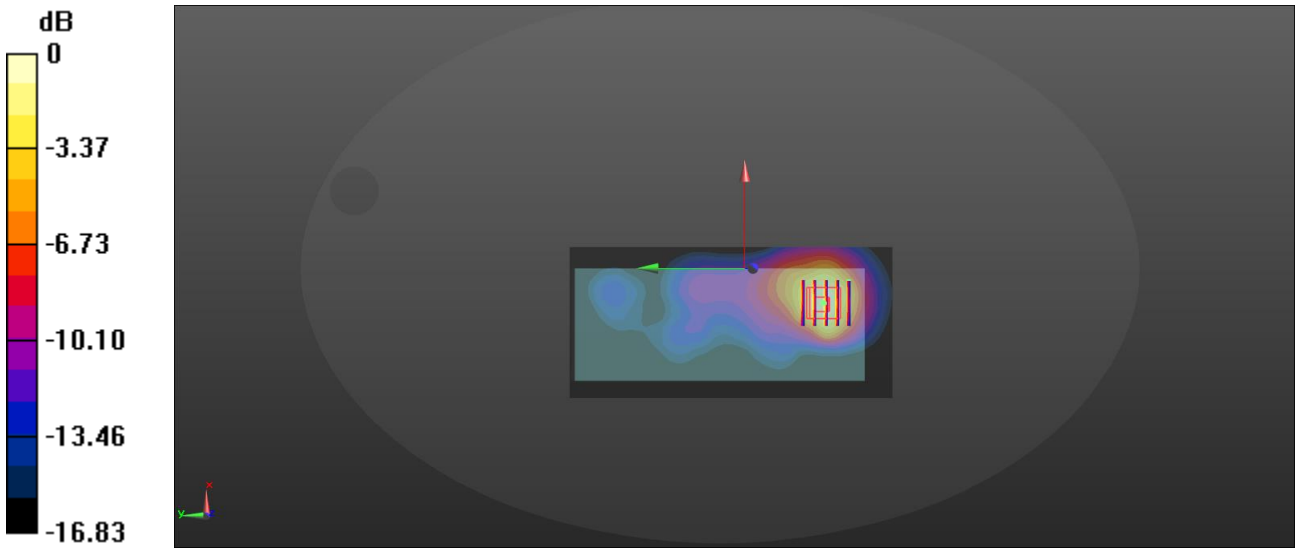
Date:2018-05-04
Communication System: UID 0, Generic UMTS (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.539 S/m; ε_r = 53.741; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.42, 8.42, 8.42); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Bottom/Procedure/Area Scan (71x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.12 W/kg

Bottom/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.975 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.728 W/kg; SAR(10 g) = 0.422 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



0 dB = 1.78 W/kg = 2.50 dBW/kg

Test mode:	WCDMA Band V	Test Position:	Bottom Side	Test Plot:	B4

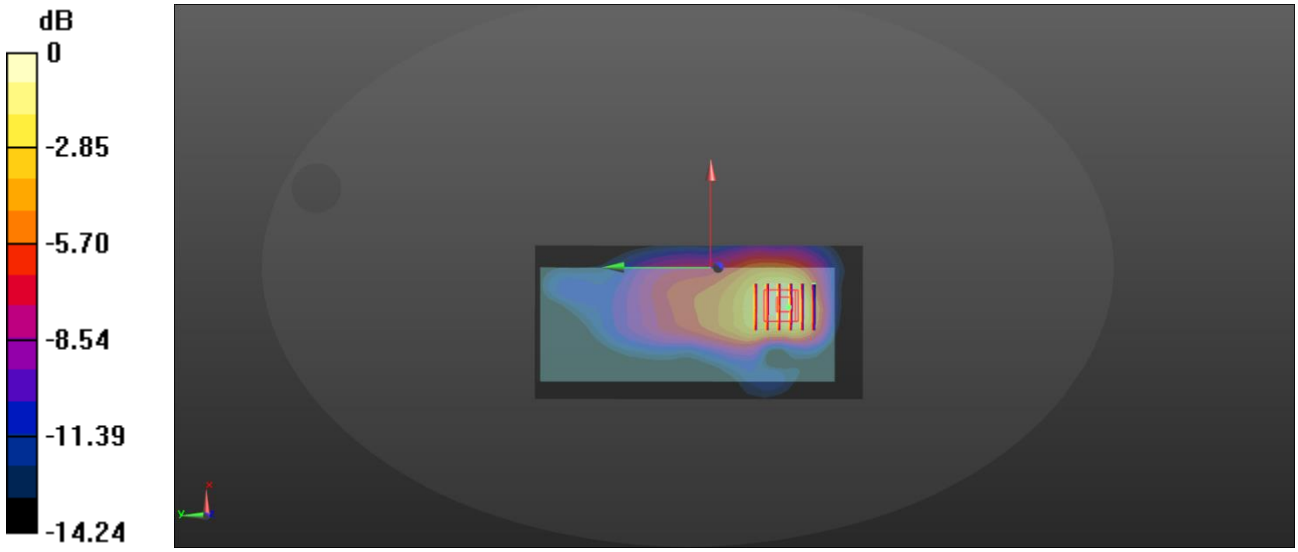
Date:2018-05-03
Communication System: UID 0, Generic UMTS (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.967 S/m; ε_r = 55.399; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(10.5, 10.5, 10.5); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Bottom/Procedure/Area Scan (71x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.903 W/kg

Bottom/Procedure/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.44 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.983 W/kg
SAR(1 g) = 0.630 W/kg; SAR(10 g) = 0.412 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.845 W/kg



0 dB = 0.845 W/kg = -0.73 dBW/kg

Test mode:	LTE Band 5	Test Position:	Bottom Side	Test Plot:	B5

Date:2018-05-03
Communication System: UID 0, Generic LTE-FDD (0); Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.5 MHz; σ = 0.967 S/m; ε_r = 55.399; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

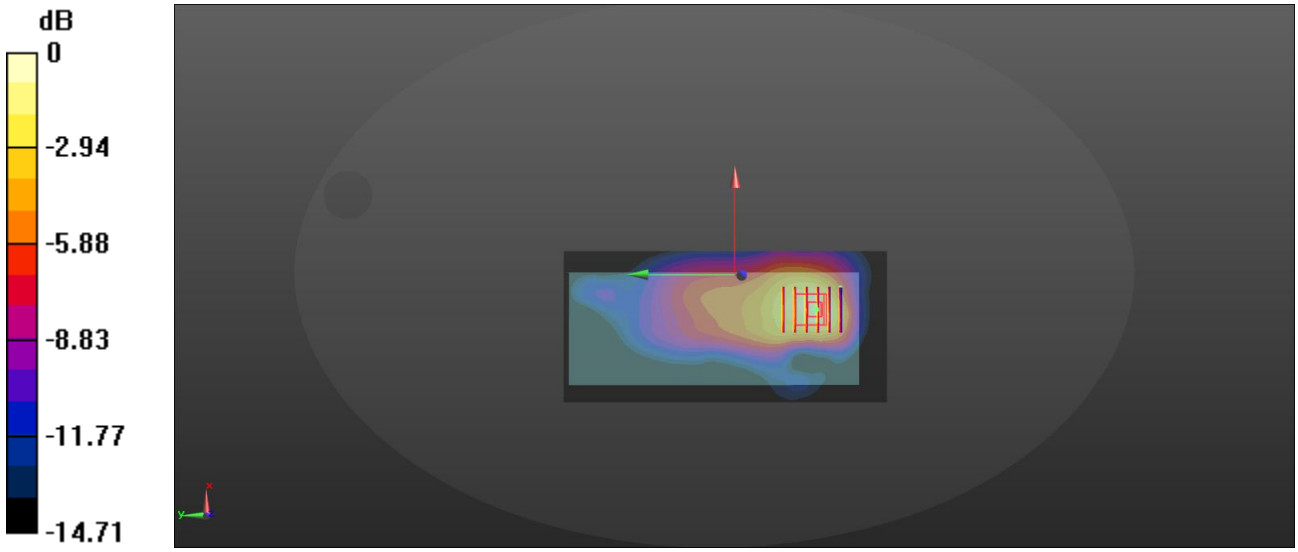
- Probe: EX3DV4 - SN7494; ConvF(10.5, 10.5, 10.5); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Bottom/Procedure/Area Scan (71x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.763 W/kg

Bottom/Procedure/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.65 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.893 W/kg
SAR(1 g) = 0.567 W/kg; SAR(10 g) = 0.369 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.776 W/kg



0 dB = 0.776 W/kg = -1.10 dBW/kg

Test mode:	LTE Band 7	Test Position:	Bottom Side	Test Plot:	B6

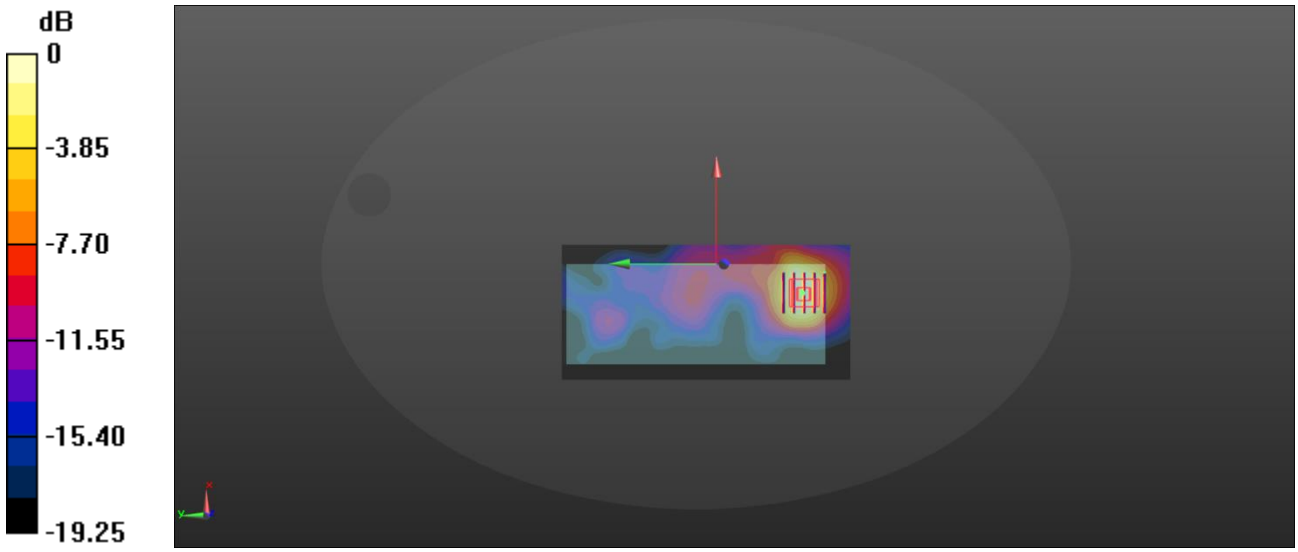
Date:2018-05-08
Communication System: UID 0, Generic LTE-FDD (0); Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2535 MHz; σ = 2.082 S/m; ε_r = 52.884; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(7.51, 7.51, 7.51); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Bottom/Procedure/Area Scan (71x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.936 W/kg

Bottom/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.553 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.614 W/kg; SAR(10 g) = 0.342 W/kg
Maximum value of SAR (measured) = 0.932 W/kg



0 dB = 1.21 W/kg = 0.83 dBW/kg

Test mode:	LTE Band 41	Test Position:	Bottom Side	Test Plot:	B7

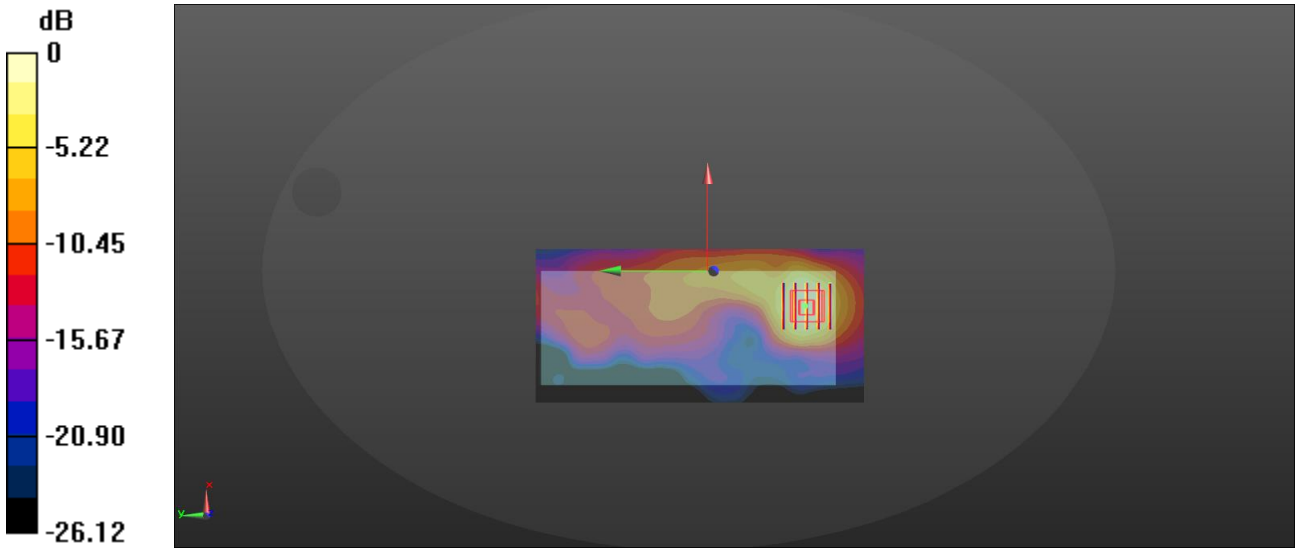
Date:2018-05-08
Communication System: UID 0, Generic LTE-TDD (0); Frequency: 2593 MHz;Duty Cycle: 1:1.59882
Medium parameters used (interpolated): f = 2593 MHz; σ = 2.143 S/m; ε_r = 52.791; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(7.51, 7.51, 7.51); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Bottom/Procedure/Area Scan (71x151x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.30 W/kg

Bottom/Procedure/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.725 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 0.682 W/kg; SAR(10 g) = 0.406 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.21 W/kg



0 dB = 1.21 W/kg = 0.83 dBW/kg

Test mode: WIFI 2.4G 802.11b Test Position: Rear Side Test Plot: B8

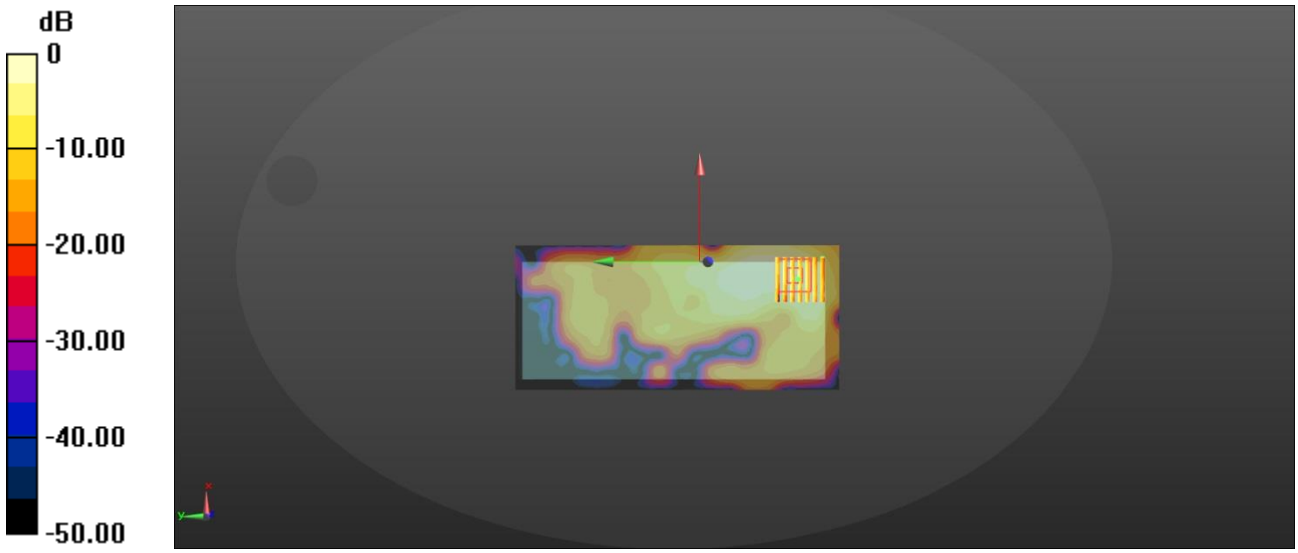
Date:2018-05-07
Communication System: UID 0, Generic WIFI (0); Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.991 S/m; ε_r = 53.023; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(8.08, 8.08, 8.08); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Rear/Procedure/Area Scan (81x181x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.270 W/kg

Rear/Procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.697 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.377 W/kg
SAR(1 g) = 0.186 W/kg; SAR(10 g) = 0.091 W/kg
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.305 W/kg



0 dB = 0.305 W/kg = -5.16 dBW/kg

Test mode:	WiFi 5G 802.11a	Test Position:	Rear Side	Test Plot:	B9

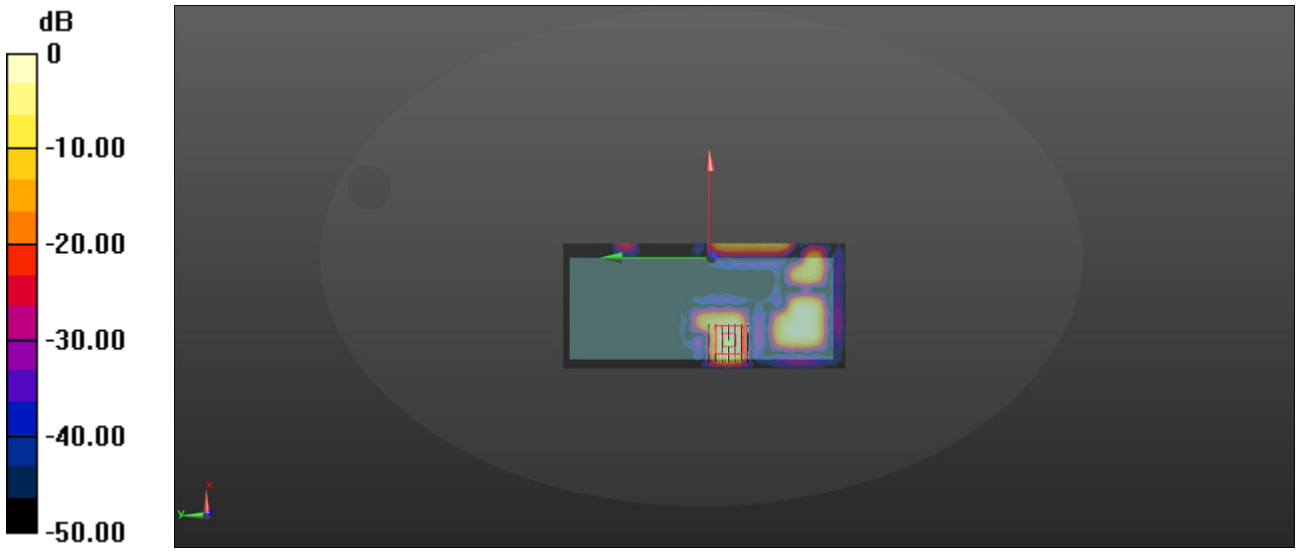
Date:2018-05-09
Communication System: UID 0, Generic WIFI (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.381 S/m; ε_r = 48.152; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7494; ConvF(5.3, 5.3, 5.3); Calibrated: 2/26/2018;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1534; Calibrated: 2/23/2018
- Phantom: ELI V8.0 ; Type: QD OVA 004 AA ; Serial: 2078
- Measurement SW: DASY52, Version 52.10 (0); SEMCAD X Version 14.6.10 (7417)

Rear/Procedure/Area Scan (81x181x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.487 W/kg

Rear/Procedure/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.2490 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.350 W/kg
SAR(1 g) = 0.053 W/kg; SAR(10 g) = 0.017 W/kg
Maximum value of SAR (measured) = 0.171 W/kg



0 dB = 0.171 W/kg = -7.67 dBW/kg

15. Simultaneous Transmission analysis

No.	Simultaneous Transmission Configurations	Body	Front of face	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	Body	Front of Face
	Test separation	0mm	10mm
4.80 dBm	Estimated SAR (W/kg)	0.126	0.063

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	GSM850	Front	0.100	0.014	0.114
	PCS1900	Front	0.046	0.014	0.060
WCDMA	Band II	Front	0.045	0.014	0.059
	Band V	Front	0.061	0.014	0.075
LTE	B5 1RB	Front	0.050	0.014	0.064
	B5 25RB	Front	0.043	0.014	0.057
	B7 1RB	Front	0.026	0.014	0.040
	B7 50RB	Front	0.021	0.014	0.035
	B41 1RB	Front	0.045	0.014	0.059
	B41 50RB	Front	0.038	0.014	0.052

WWAN PCB + WLAN U-NII					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	WLAN U-NII	(W/kg)
GSM	GSM850	Front	0.100	0.017	**0.117**
	PCS1900	Front	0.046	0.017	0.063
WCDMA	Band II	Front	0.045	0.017	0.062
	Band V	Front	0.061	0.017	0.078
LTE	B5 1RB	Front	0.050	0.017	0.067
	B5 25RB	Front	0.043	0.017	0.060
	B7 1RB	Front	0.026	0.017	0.043
	B7 50RB	Front	0.021	0.017	0.038
	B41 1RB	Front	0.045	0.017	0.062
	B41 50RB	Front	0.038	0.017	0.055

WWAN PCB + Bluetooth					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	Bluetooth	(W/kg)
GSM	GSM850	Front	0.100	0.063	0.163
	PCS1900	Front	0.046	0.063	0.109
WCDMA	Band II	Front	0.045	0.063	0.108
	Band V	Front	0.061	0.063	0.124
LTE	B5 1RB	Front	0.050	0.063	0.113
	B5 25RB	Front	0.043	0.063	0.106
	B7 1RB	Front	0.026	0.063	0.089
	B7 50RB	Front	0.021	0.063	0.084
	B41 1RB	Front	0.045	0.063	0.108
	B41 50RB	Front	0.038	0.063	0.101

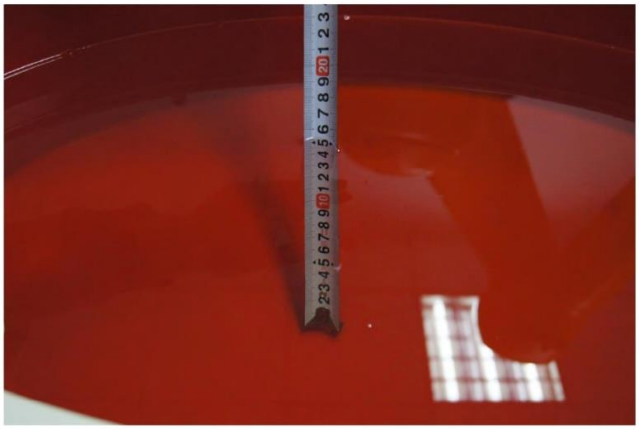
Maximum reported SAR value for Body

WWAN PCB + WLAN DTS					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	WLAN DTS	(W/kg)
GSM	GSM850	Left	0.502	-	0.502
		Bottom	0.761	-	0.761
		Rear	0.544	0.188	0.732
	PCS1900	Left	0.491	-	0.491
		Bottom	0.775	-	**0.775**
		Rear	0.487	0.188	0.675
WCDMA	Band II	Left	0.544	-	0.544
		Bottom	0.764	-	0.764
		Rear	0.520	0.188	0.708
	Band V	Left	0.406	-	0.406
		Bottom	0.659	-	0.659
		Rear	0.401	0.188	0.589
LTE	B5 1RB	Left	0.397	-	0.397
		Bottom	0.588	-	0.588
		Rear	0.416	0.188	0.604
	B5 25RB	Left	0.295	-	0.295
		Bottom	0.540	-	0.540
		Rear	0.357	0.188	0.545
	B7 1RB	Left	0.457	-	0.457
		Bottom	0.647	-	0.647
		Rear	0.404	0.188	0.592
	B7 50RB	Left	0.404	-	0.404
		Bottom	0.594	-	0.594
		Rear	0.341	0.188	0.529
	B41 1RB	Left	0.482	-	0.482
		Bottom	0.682	-	0.682
		Rear	0.426	0.188	0.614
	B41 50RB	Left	0.416	-	0.416
		Bottom	0.612	-	0.612
		Rear	0.351	0.188	0.539

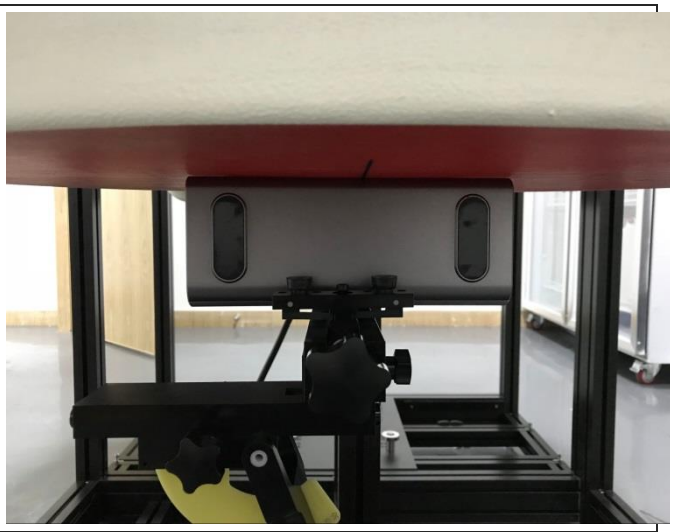
WWAN PCB + WLAN U-NII					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	WLAN U-NII	(W/kg)
GSM	GSM850	Left	0.502	-	0.502
		Bottom	0.761	-	0.761
		Rear	0.544	0.053	0.597
	PCS1900	Left	0.491	-	0.491
		Bottom	0.775	-	**0.775**
		Rear	0.487	0.053	0.675
WCDMA	Band II	Left	0.544	-	0.544
		Bottom	0.764	-	0.764
		Rear	0.520	0.053	0.573
	Band V	Left	0.406	-	0.406
		Bottom	0.659	-	0.659
		Rear	0.401	0.053	0.454
LTE	B5 1RB	Left	0.397	-	0.397
		Bottom	0.588	-	0.588
		Rear	0.416	0.053	0.469
	B5 25RB	Left	0.295	-	0.295
		Bottom	0.540	-	0.540
		Rear	0.357	0.053	0.410
	B7 1RB	Left	0.457	-	0.457
		Bottom	0.647	-	0.647
		Rear	0.404	0.053	0.457
	B7 50RB	Left	0.404	-	0.404
		Bottom	0.594	-	0.594
		Rear	0.341	0.053	0.394
	B41 1RB	Left	0.482	-	0.482
		Bottom	0.682	-	0.682
		Rear	0.426	0.053	0.479
	B41 50RB	Left	0.416	-	0.416
		Bottom	0.612	-	0.612
		Rear	0.351	0.053	0.404

WWAN PCB + Bluetooth					
WWAN Band		Exposure Position	Max SAR (W/kg)		Summed SAR
			WWAN PCB	Bluetooth	(W/kg)
GSM	GSM850	Left	0.502	-	0.502
		Bottom	0.761	-	0.761
		Rear	0.544	0.126	0.670
	PCS1900	Left	0.491	-	0.491
		Bottom	0.775	-	0.775
		Rear	0.487	0.126	0.675
WCDMA	Band II	Left	0.544	-	0.544
		Bottom	0.764	-	0.764
		Rear	0.520	0.126	0.646
	Band V	Left	0.406	-	0.406
		Bottom	0.659	-	0.659
		Rear	0.401	0.126	0.527
LTE	B5 1RB	Left	0.397	-	0.397
		Bottom	0.588	-	0.588
		Rear	0.416	0.126	0.542
	B5 25RB	Left	0.295	-	0.295
		Bottom	0.540	-	0.540
		Rear	0.357	0.126	0.483
	B7 1RB	Left	0.457	-	0.457
		Bottom	0.647	-	0.647
		Rear	0.404	0.126	0.530
	B7 50RB	Left	0.404	-	0.404
		Bottom	0.594	-	0.594
		Rear	0.341	0.126	0.467
	B41 1RB	Left	0.482	-	0.482
		Bottom	0.682	-	0.682
		Rear	0.426	0.126	0.552
	B41 50RB	Left	0.416	-	0.416
		Bottom	0.612	-	0.612
		Rear	0.351	0.126	0.477

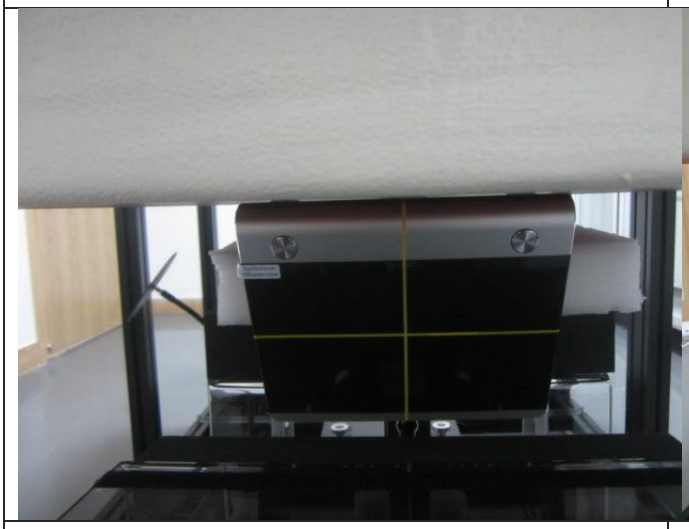
16. TestSetup Photos



Liquid depth in the phantom



Rear Side (0mm)



Bottom Side (0mm)

Left Side (0mm)

Front Side (10mm)

17. External and Internal Photos of the EUT

Please reference to the report No.: TRE1804011701

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