



FCC SAR Report

Report No. : SESF1508050
Client : Ocean Coast Resources(HongKong) Limited
Address : Room 1501, 15/F, SPA Centre, 53-55 Lockhart Road, Wanchai, Hong Kong
Manufacturer : ShenZhen Jingwah-Kaoge Communication Technology Co., Ltd.
Address : Floor5th, Bldg 4, Jingwah Square, No.1, Huafa Road, Futian District, Shenzhen, China
Product : Smart Mobilephone
Brand : AUDINAC, I-modo
Model : NOW QS45, A3 REVOLUTION
FCC ID : 2AFJX-M45
Standards : FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:2005 / IEEE 1528-2013 / KDB 865664 D01 v01r04/KDB648474 D04 v01r02/ KDB 447498 D01 v05r02 / KDB 616217 D04 v01r01
Test Date : August 21th, 2015

Statement of Compliance:

The SAR values measured for the test sample are below the maximum recommended level of 1.6W/kg averaged over any 1g tissue according to FCC Knowledge Data Base/FCC 47CFR Part 2 (2.1093)/IEEE Std.1528-2013.

The test result only corresponds to the tested sample. It is not permitted to copy this report, in part or in full, without the permission of the test laboratory.

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to relieve the sellers from their legal and/or contractual obligations.

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Release Version

Report No.	Issue Date	Description
SESF1508050	2015-08-23	Initial release



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1. Summary of Maximum SAR Value

RF Exposure Conditions	Licensed	DTS
Head	0.311	0.185
Body-Worn Accessory	0.61	0.303
Wireless Router (Hotspot)	0.96	0.303
Simultaneous Transmission	1.263	

<Unit: W/kg>



2. Description of Equipment under Test

Product Name	Smart Mobilephone
Model No.	NOW QS45, A3 REVOLUTION
Brand Name	AUDINAC, I-modo
IMEI1	353015060100071
IMEI2	353015060100089
Hardware Version	1480M_MMI_V02
Software Version	Android 4.4.2
Antenna Type	Internal
Device Category	Portable
RF Exposure Environment	Uncontrolled
2G	
Support Band	GSM850/PCS1900
GPRS Type	Class B
GPRS Class	Class 12
Uplink	GSM 850: 824~849MHz PCS 1900: 1850~1910MHz
Downlink	GSM 850: 869~894MHz PCS 1900: 1930~1990MHz
Release Version	R99
Type of modulation	GMSK for GSM/GPRS; 8PSK for EDGE
Antenna Gain	GSM 850: -1.0dBi PCS1900: 0dBi
3G	
Support Band	WCDMA Band II/WCDMA Band V
Uplink	WCDMA Band II: 1850~1910MHz WCDMA Band V: 824~849MHz
Downlink	WCDMA Band II: 1930~1990MHz WCDMA Band V: 869~894MHz
Release Version	R99/R8
Type of modulation	QPSK
Antenna Gain	WCDMA Band II: 0dBi WCDMA Band V: -1.0dBi
Bluetooth	
Bluetooth Frequency	2402~2480MHz
Channel separation	1MHz, 2MHz
Modulation technology	BLE4.0, BT3.0, BT2.1+EDR, BT2.0
Antenna Gain	1.6dBi



<u>Wi-Fi</u>	
Hotspots Function	YES
Tx Rate	802.11b: 1/2/5.5/11 Mbps 802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 150 Mbps
Type of modulation	802.11b: DSSS; 802.11g/n: OFDM
Wi-Fi Frequency	802.11b/g/n(20MHz): 2412 ~ 2462 MHz 802.11n(40MHz):2422~2452 MHz
Antenna Gain	1.6dBi



3. Simultaneous Transmission Condition

RF Exposure Condition	Capable Transmit Configurations
Head	1. GSM 850/1900 (GPRS/EDGE) + WiFi 2.4GHz 2. WCDMA Band II/V (RMC) + WiFi 2.4GHz
Body-worn Accessory	1. GSM 850/1900 Voice +BT 2. GSM 850/1900(GPRS/EDGE) + BT 3. WCDMA Band II/V (Voice)+ BT 4. WCDMA Band II/V (RMC) + BT 5. GSM 850/1900(GPRS/EDGE) + WiFi 2.4GHz 6. WCDMA Band II/V (RMC)+ WiFi 2.4GHz
Wireless Router (Hotspot)	1. GSM 850/1900 (GPRS/EDGE) + WiFi 2.4GHz 2. WCDMA Band II/V + WiFi 2.4GHz

Notes:

1. GPRS/EDGE and WCDMA support hotspot mode.
2. By reason of their independent modules and antennas, when GSM/GPRS or WCDMA is on, BT function can also be at work.
3. WiFi 2.4GHz Radio cannot transmit simultaneously with Bluetooth Radio.
4. According to FCC KDB Publication 447498 D01v05r02 section5.3, transmitter are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneously transmission analysis.



4. Basic restrictions and Standards

4.1. Test Standards

1. IEEE 1528-2013
2. FCC KDB Publication 447498 D01 General RF Exposure Guidance v05r02
3. FCC KDB Publication 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
4. FCC KDB Publication 648474 D04 D04 Handset SAR v01r02
5. FCC KDB Publication 941225 D01 3G SAR Procedures v03

4.2. Environment Condition

Item	Target	Measured
Ambient Temperature(°C)	18~25	21.5±2
Temperature of Simulant(°C)	20~22	21±2
Relative Humidity(%RH)	30~70	52

4.3. RF Exposure Limits

Human Exposure	Basic restrictions for electric, magnetic and electromagnetic fields. (Unit in mW/g or W/kg)
Spatial Peak SAR ¹ (Head and Body)	1.60
Spatial Average SAR ² (Whole Body)	0.08
Spatial Peak SAR ³ (Arms and Legs)	4.00

Notes:

1. The Spatial Peak value of the SAR averaged over any 1gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over appropriate averaging time.



5. General Information

Our Lab,

Test Site	Cerpss Technology (Suzhou) Co.,Ltd
Test Site Location	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China

6. DASY5 Measurement System

DASY5 Measurement System

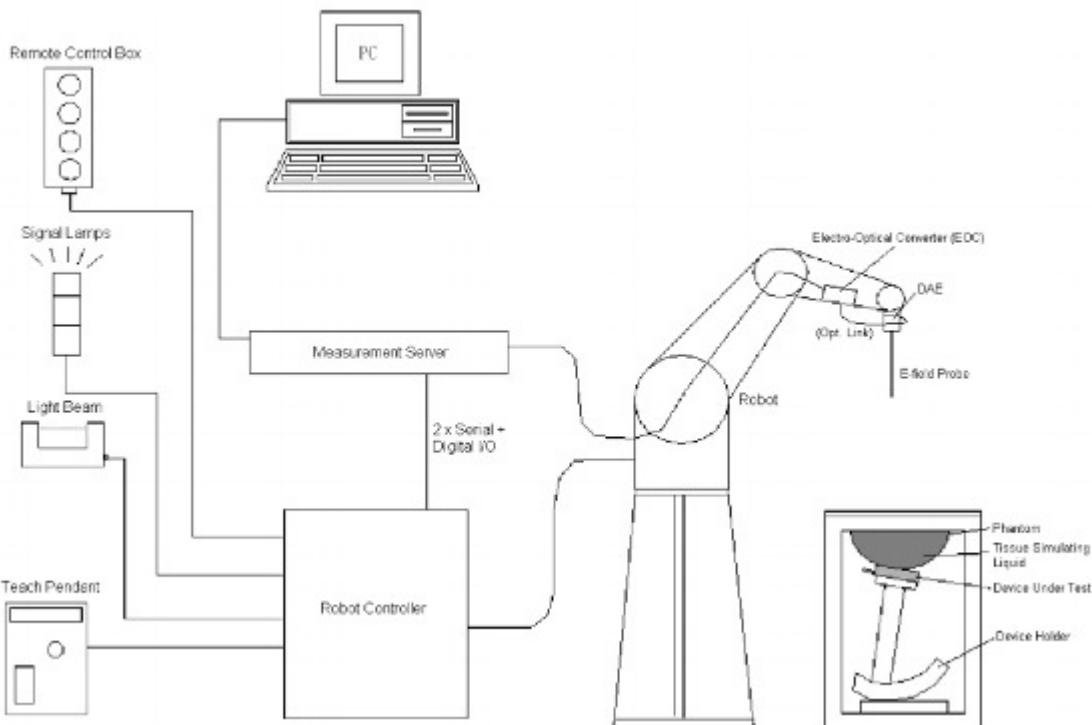


Figure 2.1 SPEAG DASY5 System Configurations

The DASY5 system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic(DAE)attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter(ECO)performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows 7
- DASY5 software
- Remove control with teach pendant additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system



6.1. Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528. The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR distributions for the tested handsets. The field gradients are covered by the spatially flat distribution f_1 , the spatially steep distribution f_3 and f_2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x, y, z) = Ae^{-\frac{z}{2a}} \cos^2\left(\frac{\pi}{2} \frac{\sqrt{x'^2 + y'^2}}{5a}\right)$$
$$f_2(x, y, z) = Ae^{-\frac{z}{a}} \frac{a^2}{a^2 + x'^2} \left(3 - e^{-\frac{2z}{a}}\right) \cos^2\left(\frac{\pi}{2} \frac{y'}{3a}\right)$$
$$f_3(x, y, z) = A \frac{a^2}{\frac{a^2}{4} + x'^2 + y'^2} \left(e^{-\frac{2z}{a}} + \frac{a^2}{2(a + 2z)^2}\right)$$

6.2. DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D.

Model	EX3DV4
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
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 μ W/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

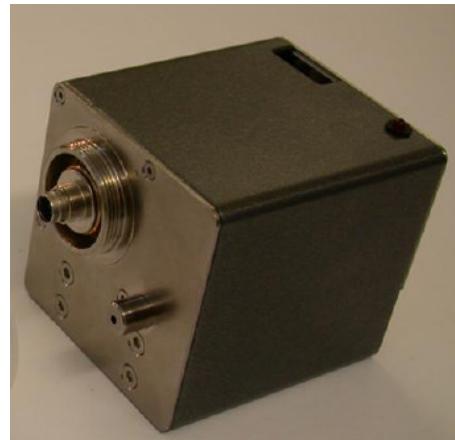


6.3. Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit.

Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.



6.4. Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used.

The XL robot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)
- 6-axis controller



6.5. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip.

The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.





6.6. Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.



6.7. SAM Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

- Left head
- Right head
- Flat phantom



The ELI4 Phantom also is a fiberglass shell phantom with 2mm shell thickness. It has 30 liters filling volume, and with a dimension of 600mm for major ellipse axis, 400mm for minor axis. It is intended for compliance testing of handheld and body-mounted wireless devices in frequency range of 30 MHz to 6GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.



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

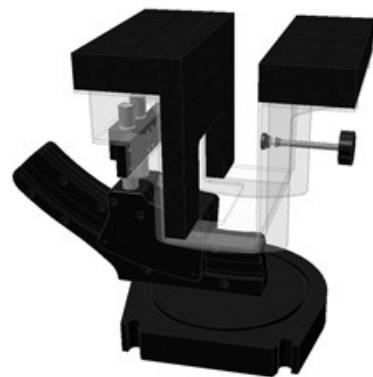


6.8. Device Holder

The DASY5 device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR). Thus the device needs no repositioning when changing the angles. The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon_r = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



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





6.9. Test Equipment List

Instrument	Manufacturer	Model No.	Serial No.	Cali. Due Date
Stäubli Robot TX60L	Stäubli	TX60L	5P6VA1/A/01	only once
Robot Controller	Stäubli	CS8C	5P6VA1/C/01	only once
Dipole Validation Kits	Speag	D850V2		2016.05.15
Dipole Validation Kits	Speag	D1900V2		2016.05.15
Dipole Validation Kits	Speag	D2450V2	914	2016.05.15
SAM ELI Phantom	Speag	SAM	1211	N/A
Laptop Holder	Speag	SM LH1 001CD	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1379	2016.05.15
E-Field Probe	Speag	EX3DV4	3927	2016.05.15
SAR Software	Speag	DASY5	V5.2 Build 162	N/A
Power Amplifier	Mini-Circuit	ZVA-183W-S+	MN136701248	2016.09.05
Directional Coupler	Agilent	772D	MY52180104	2016.09.05
Directional Coupler	Agilent	778D	MY52180185	2016.09.05
Universal Radio Communication Tester	R&S	CMU 200	108823	2016.01.08
Vector Network	Agilent	E5071C	MY4631693	2016.01.15
Signal Generator	R&S	SML	103287	2016.03.09
Power Meter	BONN	BLWA0830-160/100/40D	76659	2015.11.10
AUG Power Sensor	R&S	NRP-Z91	100384	2016.03.09



7. The SAR Measurement Procedure

7.1. System Performance Check

7.1.1 Purpose

1. To verify the simulating liquids are valid for testing.
2. To verify the performance of testing system is valid for testing.

7.1.2 Tissue Dielectric Parameters for Head and Body Phantoms

Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
850	41.5	0.92	55.2	0.99
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5200	36.0	4.66	49.0	5.30
5600	35.5	5.07	48.5	5.77
5800	35.3	5.27	48.2	6.00

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000 \text{ kg/m}^3$)



7.1.3 Tissue Calibration Result

■ The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY5 Dielectric Assessment Kit and Agilent Vector Network Analyzer E5071C.

Head Tissue Simulant Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
850MHz	Reference result ± 5% window	41.50 39.43 to 43.58	0.92 0.87 to 0.97	N/A
	21-08-2015	41.50	0.91	21.0
1900MHz	Reference result ± 5% window	40.0 38.00 to 42.00	1.40 1.33 to 1.47	N/A
	21-08-2015	40.0	1.40	21.0
2450MHz	Reference result ± 5% window	39.2 37.24 to 41.16	1.80 1.71 to 1.89	N/A
	21-08-2015	39.2	1.80	21.0

Body Tissue Simulant Measurement				
Frequency [MHz]	Description	Dielectric Parameters		Tissue Temp. [°C]
		ϵ_r	σ [s/m]	
850MHz	Reference result ± 5% window	55.2 52.44 to 57.96	0.99 0.94 to 1.04	N/A
	21-08-2015	55.15	0.98	21.0
1900MHz	Reference result ± 5% window	53.3 50.64 to 55.97	1.52 1.44 to 1.60	N/A
	21-08-2015	53.20	1.53	21.0
2450MHz	Reference result ± 5% window	52.7 50.065 to 55.335	1.95 1.8525 to 2.0475	N/A
	21-08-2015	52.7	1.95	21.0

■ Refer to KDB 865664 D01 v01r04, The depth of body tissue-equivalent liquid in a phantom must be ≥ 15.0 cm with $\leq \pm 0.5$ cm variation for SAR measurements ≤ 3 GHz and ≥ 10.0 cm with $\leq \pm 0.5$ cm variation for measurements > 3 GHz.



7.1.4 System Performance Check Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and the system performance check. They are read-only document files and destined as fully defined but unmeasured masks, so the finished system performance check must be saved under a different name. The system performance check document requires the SAM Twin Phantom or ELI4 Phantom, so the phantom must be properly installed in your system. (User defined measurement procedures can be created by opening a new document or editing an existing document file). Before you start the system performance check, you need only to tell the system with which components (probe, medium, and device) you are performing the system performance check; the system will take care of all parameters.

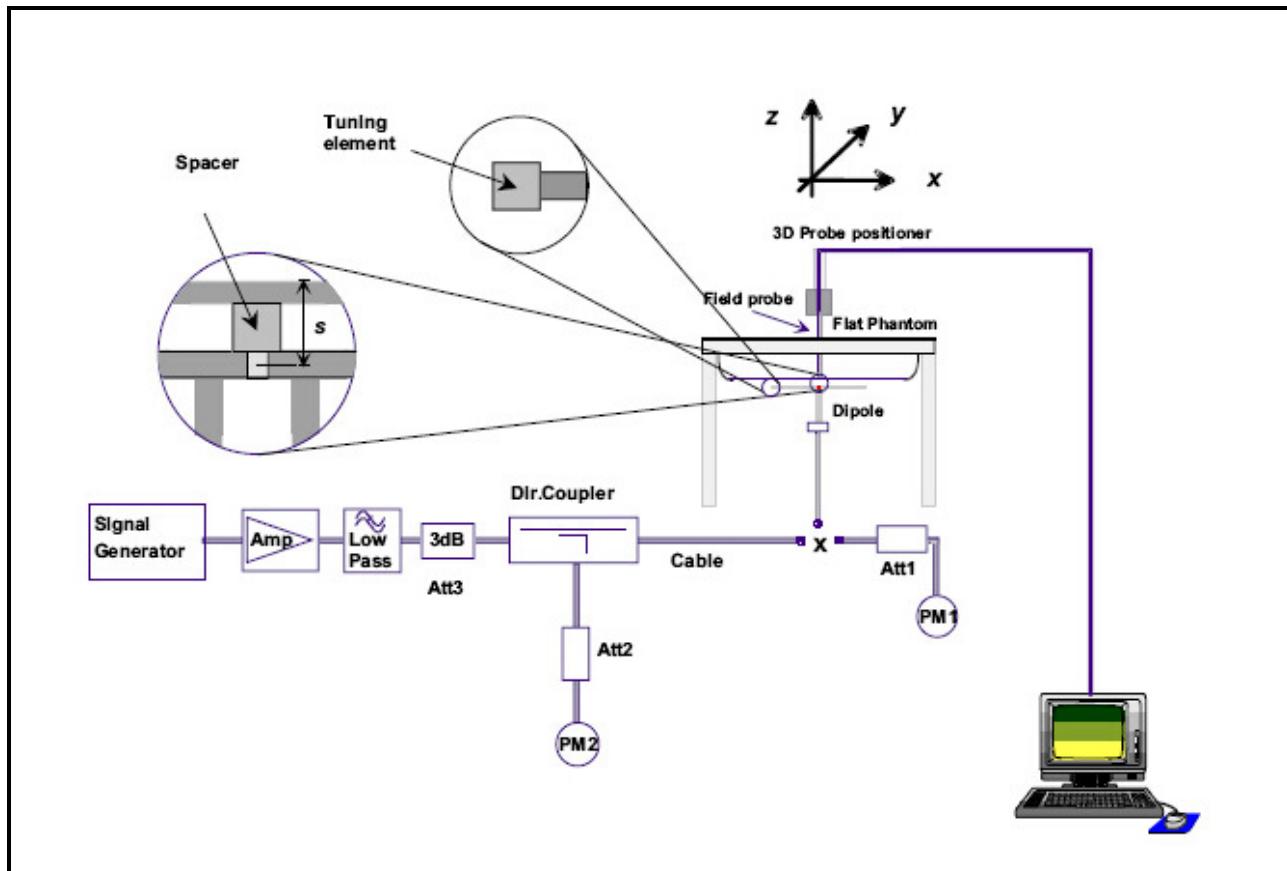
■ **The Power Reference Measurement and Power Drift Measurement** jobs are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the Dipole output power. If it is too high (above ± 0.2 dB), the system performance check should be repeated;

■ **The Surface Check** job 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 ± 0.1 mm). In that case it is better to abort the system performance check and stir the liquid;

■ **The Area Scan** job measures the SAR above the dipole on a plane parallel to the surface. It is used to locate the approximate location of the peak SAR. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field, the peak detection is reliable;

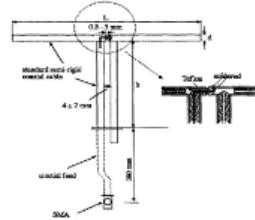
■ **The Zoom Scan** job measures the field in a volume around the peak SAR value assessed in the previous Area Scan job (for more information see the application note on SAR evaluation). If the system performance check gives reasonable results. The dipole input power(forward power) was 250mW, 1 g and 10 g spatial average SAR values normalized to 1W dipole input power give reference data for comparisons and it's equal to 10x(dipole forward power). The next sections analyze the expected uncertainties of these values, as well as additional checks for further information or troubleshooting.

7.1.5 System Performance Check Setup



7.1.6 Validation Dipoles

The dipoles use is based on the IEEE Std.1528-2013 and FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03standard, and is complied with mechanical and electrical specifications in line with the requirements of both EN62209-1 and EN62209-2. The table below provides details for the mechanical and electrical specifications for the dipoles.





7.1.7 Result of System Performance Check: Valid Result

System Performance Check at 850MHz, 1900MHz, 2450MHz for Head.

Validation Dipole: D850V2-SN: 1008

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
850 MHz	Reference result ± 10% window	9.67 8.70 to 10.64	6.29 5.66 to 6.92	21.0
	21-08-2015	9.68	6.32	

Validation Kit: D1900V2-SN: 5d174

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1900MHz	Reference result ± 10% window	41.1 36.99 to 45.21	21.4 19.26 to 23.54	21.0
	21-08-2015	40.4	21.28	

Validation Kit: D2450V2-SN: 914

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450MHz	Reference result ± 10% window	53.8 48.42 to 64.61	25.2 22.68 to 27.72	21.0
	21-08-2015	56	25.24	

Note: All SAR values are normalized to 1W forward power.

**System Performance Check at 850MHz, 1900MHz, 2450MHz for Body.****Validation Dipole: D850V2-SN: 1008**

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
850 MHz	Reference result ± 10% window	9.81 8.83 to 10.79	6.44 5.80 to 7.08	21.0
	21-08-2015	9.48	6.88	

Validation Kit: D1900V2-SN: 5d174

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
1900MHz	Reference result ± 10% window	40.5 36.45 to 44.55	21.7 19.53 to 23.87	21.0
	21-08-2015	40.4	21.32	

Validation Kit: D2450V2-SN: 914

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450MHz	Reference result ± 10% window	52.5 47.25 to 57.75	24.6 22.14 to 27.06	21.0
	21-08-2015	52	23.4	

Note: All SAR values are normalized to 1W forward power.



7.2. Test Requirements

7.2.1 Test Procedures

Step 1 Setup a Connection

First, engineer should record the conducted power before the test. Then establish a call in handset at the maximum power level with a base station simulator via air interface, or make the EUT estimate by itself in testing band. Place the EUT to the specific test location. After the testing, must export SAR test data by SEMCAD. Then writing down the conducted power of the EUT into the report, also the SAR values tested.

Step 2 Power Reference Measurements

To measure the local E-field value at a fixed location which value will be taken as a reference value for calculating a possible power drift.

Step 3 Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01v01r04

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
	≤ 2 GHz: ≤ 15 mm $2 - 3$ GHz: ≤ 12 mm	$3 - 4$ GHz: ≤ 12 mm $4 - 6$ GHz: ≤ 10 mm
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}	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 \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.	



Step 4 Zoom Scan

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

Zoom Scan Parameters extracted from KDB 865664 D01 v01r04

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

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

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

Step 5 Power Drift Measurements

Repetition of the E-field measurement at the fixed location mentioned in Step 1 to make sure the two results differ by less than ± 0.2 dB.



7.2.2 Test Channel

Per FCC KDB 941225 D01 v03, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq 1/4$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

Here are HSDPA/HSUPA sub-test setups as show blow, per FCC KDB 941225 D01 v03:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	CM (dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.

Note 3: 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 signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ee}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	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 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

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 signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.



8. Conducted Power<Average>

■ Band850

Mode	Frequency <MHz>	Average Burst Power<dBm>	Duty Cycle Factor<dB>	Frame Power<dBm>	Max. Tune-up Power(dBm)	Scaling Factor
GSM850	824.2	31.58	9	22.58	32.0	1.10
	836.6	31.56	9	22.56	32.0	1.11
	848.8	31.6	9	22.60	32.0	1.10
GPRS850(1slot)	824.2	31.33	9	22.33	32.0	1.17
	836.6	31.24	9	22.24	32.0	1.19
	848.8	31.21	9	22.21	32.0	1.20
GPRS850(2slot)	824.2	30.12	6	24.12	30.5	1.09
	836.6	30.08	6	24.08	30.5	1.10
	848.8	30.05	6	24.05	30.5	1.11
GPRS850(3slot)	824.2	28.31	4.25	24.06	29.0	1.17
	836.6	28.26	4.25	24.01	29.0	1.19
	848.8	28.23	4.25	23.98	29.0	1.19
GPRS850(4slot)	824.2	27.26	3	24.26	28.0	1.19
	836.6	27.22	3	24.22	28.0	1.20
	848.8	27.2	3	24.20	28.0	1.20
EDGE850(1slot)	824.2	27.91	9	18.91	28.0	1.02
	836.6	27.86	9	18.86	28.0	1.03
	848.8	27.81	9	18.81	28.0	1.04
EDGE850(2slot)	824.2	27.89	6	21.89	28.0	1.03
	836.6	27.86	6	21.86	28.0	1.03
	848.8	27.77	6	21.77	28.0	1.05
EDGE850(3slot)	824.2	26.12	4.25	21.87	26.5	1.09
	836.6	26.07	4.25	21.82	26.5	1.10
	848.8	26.04	4.25	21.79	26.5	1.11
EDGE850(4slot)	824.2	25.88	3	22.88	26.0	1.03
	836.6	25.83	3	22.83	26.0	1.04
	848.8	25.81	3	22.81	26.0	1.04
SIM2						
GSM850	836.6	31.66	9	22.66	32.0	1.08

Note:

1. Scaling Factor = Max. Power (mW) / AVG Burst Power (mW); Max. Power is the tune-up power.
2. This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.
3. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged powers were calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.

■ Band1900

Mode	Frequency <MHz>	Average Burst Power<dBm>	Duty Cycle Factor<dB>	Frame Power<dBm>	Max. Tune-up Power(dBm)	Scaling Factor
PCS1900	1850.2	28.43	9	19.43	29.0	1.14
	1880	28.38	9	19.38	29.0	1.15
	1909.8	28.35	9	19.35	29.0	1.16
GPRS1900(1slot)	1850.2	28.26	9	19.26	29.0	1.19
	1880	28.23	9	19.23	29.0	1.19
	1909.8	28.21	9	19.21	29.0	1.20
GPRS1900(2slot)	1850.2	27.39	6	21.39	28.0	1.15
	1880	27.34	6	21.34	28.0	1.16
	1909.8	27.31	6	21.31	28.0	1.17
GPRS1900(3slot)	1850.2	25.42	4.25	21.17	26.0	1.14
	1880	25.41	4.25	21.16	26.0	1.15
	1909.8	25.34	4.25	21.09	26.0	1.16
GPRS1900(4slot)	1850.2	24.48	3	21.48	25.0	1.13
	1880	24.45	3	21.45	25.0	1.14
	1909.8	24.36	3	21.36	25.0	1.16
EDGE1900(1slot)	1850.2	26.27	9	17.27	27.0	1.18
	1880	26.29	9	17.29	27.0	1.18
	1909.8	26.23	9	17.23	27.0	1.19
EDGE1900(2slot)	1850.2	25.37	6	19.37	26.0	1.16
	1880	25.34	6	19.34	26.0	1.16
	1909.8	25.42	6	19.42	26.0	1.14
EDGE1900(3slot)	1850.2	24.21	4.25	19.96	25.0	1.20
	1880	24.16	4.25	19.91	25.0	1.21
	1909.8	24.14	4.25	19.89	25.0	1.22
EDGE1900(4slot)	1850.2	23.37	3	20.37	24.0	1.16
	1880	23.35	3	20.35	24.0	1.16
	1909.8	23.32	3	20.32	24.0	1.17
SIM2						
PCS1900	1880	28.44	9	19.44	29.0	1.14

Note:

1. Scaling Factor = Max. Power (mW) / AVG Burst Power (mW); Max. Power is the tune-up power.
2. This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.
3. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged powers were calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.



■ WCDMA

Conducted Power (dBm)						
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4183	4233
Frequency	1852.4	1880.0	1907.6	826.4	836.6	846.6
RMC 12.2Kbps	22.28	22.23	22.16	22.23	22.18	22.13
HSDPA Subtest-1	22.13	22.11	22.07	21.89	21.85	21.81
HSDPA Subtest-2	20.89	20.78	20.67	21.16	21.12	21.08
HSDPA Subtest-3	20.45	20.39	20.35	20.31	20.28	20.23
HSDPA Subtest-4	20.16	20.12	20.05	19.87	19.95	19.91
HSUPA Subtest-1	22.13	22.08	22.05	22.06	22.02	22.13
HSUPA Subtest-2	21.14	21.12	21.05	21.12	21.15	21.02
HSUPA Subtest-3	20.38	20.32	20.26	20.42	20.46	20.37
HSUPA Subtest-4	19.89	19.84	19.75	19.98	19.96	19.89
HSUPA Subtest-5	19.31	19.21	19.05	19.21	19.25	19.12

Mode	Band II <1900MHz> Channel	Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
R99 WCDMA	9262	22.28	23.0	1.18
	9400	22.23	23.0	1.19
	9538	22.16	23.0	1.21
Rel5 HSDPA	9262	22.13	23.0	1.22
	9400	22.11	23.0	1.23
	9538	22.07	23.0	1.24
Rel6 HSUPA	9262	22.13	23.0	1.22
	9400	22.08	23.0	1.24
	9538	22.05	23.0	1.24

Mode	Band V<850MHz> Channel	Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
WCDMA	4132	22.23	23.0	1.19
	4183	22.18	23.0	1.21
	4233	22.13	23.0	1.22
HSDPA	4132	21.89	23.0	1.29
	4183	21.85	23.0	1.30
	4233	21.81	23.0	1.32
HSUPA	4132	22.06	23.0	1.24
	4183	22.02	23.0	1.25
	4233	22.13	23.0	1.22

**■ WIFI**

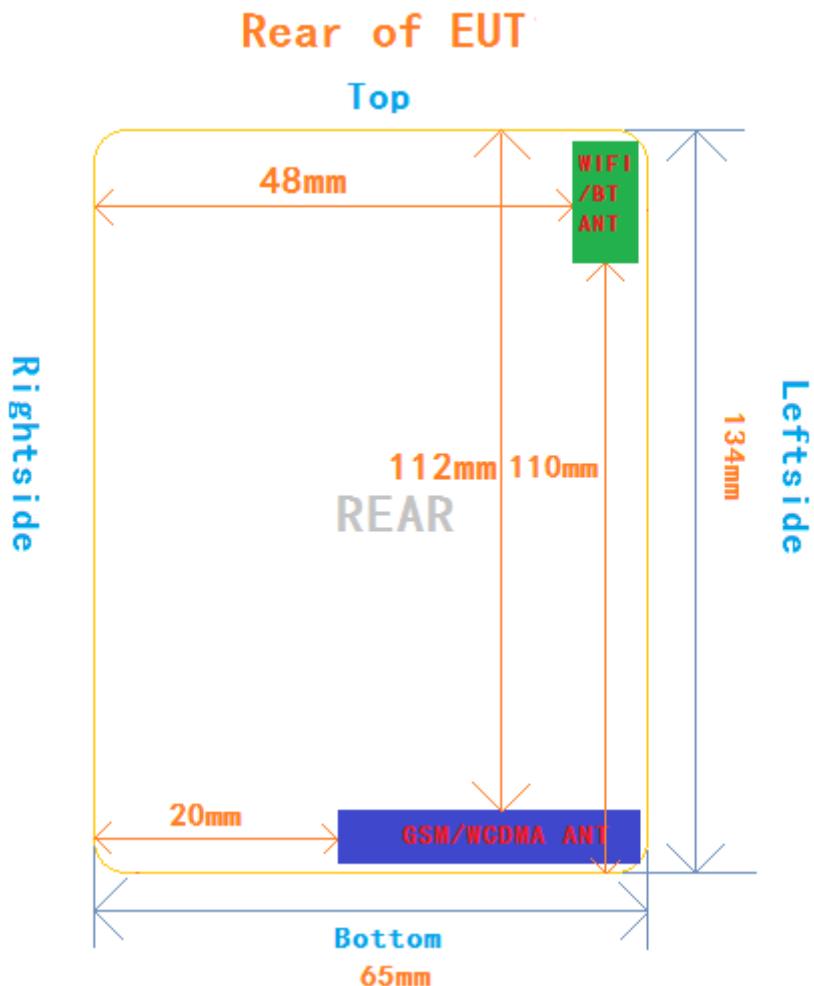
Mode	Channel	Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
802.11b	2412	11.40	11.5	1.02
	2437	11.18	11.5	1.08
	2462	11.19	11.5	1.07
802.11g	2412	10.27	10.5	1.05
	2437	10.15	10.5	1.08
	2462	10.10	10.5	1.10
802.11n(HT20)	2412	10.08	10.5	1.10
	2437	10.06	10.5	1.11
	2462	10.01	10.5	1.12
802.11n(HT40)	2412	8.00	8.0	1.00
	2437	7.96	8.0	1.01
	2462	7.89	8.0	1.03

■ Bluetooth

Mode	Channel	Max. Average Burst Power<dBm>	Max. Tune-up Power<dBm>	Scaling Factor
GFSK	Low	1.45	1.50	1.01
	Mid	1.77	1.80	1.01
	High	1.75	1.80	1.01

9. Analysis and Results

9.1. Antenna Location



Antenna	Antenna Distance to Edges(mm)				
	Back	Top	Left-side	Right-side	Bottom
GSM/WCDMA	<5	112	<5	20	<5
WIFI/BT	<5	<5	<5	48	110



9.2. SAR exclusion

■ Bluetooth

Per FCC KDB 447498 D01v05r02, the SAR exclusion threshold for distances<50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel}(mW)}{\text{Test Separation Distance}(mm)} \times \sqrt{\text{Frequency}(GHz)} \leq 3.0$$

Based on the maximum conducted power and the antenna to use separation distance, Max. Average output power Bluetooth are lower the P_{re} , therefore BT SAR is not required;

$$[(1.51mW/5) * \sqrt{2.441}] = 0.473 < 3.0, \text{ Bluetooth for Head, Body.}$$

Note: 1.51mW comes from 1.80dBm

■ Licensed Transmitter(s)

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.

This device is capable of QPSK HSUPA/HSDPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA/HSDPA in KDB 941225 D01 v03.

When the user utilizes multiple services in UMTS 3G mode, it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.

9.3. Required Edges for SAR Testing

Test Mode	Back	Top	Left side	Right side	Bottom
Band850	Yes	No	Yes	Yes	Yes
Band1900	Yes	No	Yes	Yes	Yes
WCDMA Band II	Yes	No	Yes	Yes	Yes
WCDMA Band V	Yes	No	Yes	Yes	Yes
WIFI	Yes	Yes	Yes	No	No
Bluetooth	N/A	N/A	N/A	N/A	N/A



9.4. Estimated SAR

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific physical test configuration is $\leq 1.6\text{W/kg}$. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r02 4.3.2 2, the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation, mm}}$$

Mode	Frequency	Maximum Power	Separation Distance	Estimated SAR
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2441	1.80	5	0.063



9.5. SAR Test Results Summary

■ Band 850MHz Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
GSM850	Left-Check	128	824.2	Fixed	0	31.58	32.00	1.10	N/A	N/A	N/A	
	Left-Check	190	836.6	Fixed	0	31.56	32.00	1.11	0.14	0.281	0.311	1
	Left-Check	251	848.8	Fixed	0	31.60	32.00	1.10	N/A	N/A	N/A	
	Left-Tilt	190	836.6	Fixed	0	31.56	32.00	1.11	0.02	0.267	0.295	
	Right-Check	128	824.2	Fixed	0	31.58	32.00	1.10	N/A	N/A	N/A	
	Right-Check	190	836.6	Fixed	0	31.56	32.00	1.11	0.16	0.273	0.302	
	Right-Check	251	848.8	Fixed	0	31.60	32.00	1.10	N/A	N/A	N/A	
	Right-Tilt	190	836.6	Fixed	0	31.56	32.00	1.11	0.07	0.278	0.308	
	SIM2											
	Left-Check	190	836.6	Fixed	0	31.66	32.00	1.08	0.17	0.248	0.268	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.

■ Band 850MHz Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Body-Worn Accessory Conditions												
GSM850	Back	128	824.20	Fixed	10	31.58	32.00	1.10	N/A	N/A	N/A	
	Back	190	836.60	Fixed	10	31.56	32.00	1.11	0.03	0.433	0.479	
	Back	251	848.80	Fixed	10	31.60	32.00	1.10	N/A	N/A	N/A	
	Front	190	836.60	Fixed	10	31.56	32.00	1.11	0.14	0.274	0.303	
Hotspot Mode Exposure Conditions												
GPRS-4slot	Back	128	824.20	Fixed	10	27.26	28.00	1.19	0.11	0.794	0.942	
	Back	190	836.60	Fixed	10	27.22	28.00	1.20	-0.02	0.802	0.96	2
	Back*	190	836.60	Fixed	10	27.22	28.00	1.20	-0.02	0.798	0.955	
	Back	251	848.80	Fixed	10	27.20	28.00	1.20	-0.07	0.763	0.917	
	Front	190	836.60	Fixed	10	27.22	28.00	1.20	-0.03	0.532	0.637	
	Left-side	190	836.60	Fixed	10	27.22	28.00	1.20	-0.04	0.498	0.596	
	Right-side	190	836.60	Fixed	10	27.22	28.00	1.20	0.08	0.176	0.211	
	Bottom	190	836.60	Fixed	10	27.22	28.00	1.20	0.15	0.631	0.755	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.
3. “**”, repeated SAR is required, per KDB865664 D01 r01v04.



■ Band 1900MHz Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
PCS 1900	Left-Check	512	1850.2	Fixed	0	28.43	29.00	1.14	N/A	N/A	N/A	
	Left-Check	661	1880	Fixed	0	28.38	29.00	1.15	0.11	0.146	0.168	3
	Left-Check	810	1909.8	Fixed	0	28.35	29.00	1.16	N/A	N/A	N/A	
	Left-Tilt	661	1880	Fixed	0	28.38	29.00	1.15	0.12	0.058	0.067	
	Right-Check	512	1850.2	Fixed	0	28.43	29.00	1.14	N/A	N/A	N/A	
	Right-Check	661	1880	Fixed	0	28.38	29.00	1.15	0.15	0.073	0.084	
	Right-Check	810	1909.8	Fixed	0	28.35	29.00	1.16	N/A	N/A	N/A	
	Right-Tilt	661	1880	Fixed	0	28.38	29.00	1.15	-0.03	0.039	0.045	
	SIM2											
	Left-Check	661	1880	Fixed	0	28.44	29.00	1.14	-0.15	0.139	0.158	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.

■ Band 1900MHz Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Body-Worn Accessory Conditions												
PCS1900	Back	512	1850.2	Fixed	10	28.43	29.00	1.14	N/A	N/A	N/A	
	Back	661	1880	Fixed	10	28.38	29.00	1.15	0.16	0.427	0.493	
	Back	810	1909.8	Fixed	10	28.35	29.00	1.16	N/A	N/A	N/A	
	Front	661	1880	Fixed	10	28.38	29.00	1.15	0.09	0.219	0.253	
Hotspot Mode Exposure Conditions												
GPRS-4slot	Back	512	1850.2	Fixed	10	24.48	25.00	1.13	N/A	N/A	N/A	
	Back	661	1880	Fixed	10	24.45	25.00	1.14	-0.18	0.672	0.763	4
	Back	810	1909.8	Fixed	10	24.36	25.00	1.16	N/A	N/A	N/A	
	Front	661	1880	Fixed	10	24.45	25.00	1.14	-0.02	0.35	0.397	
	Left-side	661	1880	Fixed	10	24.45	25.00	1.14	0.13	0.481	0.546	
	Right-side	661	1880	Fixed	10	24.45	25.00	1.14	0.12	0.117	0.133	
	Bottom	661	1880	Fixed	10	24.45	25.00	1.14	0.10	0.527	0.598	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.



■ WCDMA Band II Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Band II	Left-Check	9262	1852.4	Fixed	0	22.28	22.5	1.05	N/A	N/A	N/A	
	Left-Check	9400	1880	Fixed	0	22.23	22.5	1.06	0.18	0.133	0.142	5
	Left-Check	9538	1907.6	Fixed	0	22.16	22.5	1.08	N/A	N/A	N/A	
	Left-Tilt	9400	1880	Fixed	0	22.23	22.5	1.06	0.17	0.117	0.125	
	Right-Check	9262	1852.4	Fixed	0	22.28	22.5	1.05	N/A	N/A	N/A	
	Right-Check	9400	1880	Fixed	0	22.23	22.5	1.06	0.15	0.094	0.100	
	Right-Check	9538	1907.6	Fixed	0	22.16	22.5	1.08	N/A	N/A	N/A	
	Right-Tilt	9400	1880	Fixed	0	22.23	22.5	1.06	-0.01	0.088	0.094	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.

■ WCDMA Band II Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Body-Worn Accessory & Hotspot Mode Exposure Conditions												
WCDMA Band II	Back	9262	1852.4	Fixed	10	22.28	22.5	1.05	N/A	N/A	N/A	
	Back	9400	1880	Fixed	10	22.23	22.5	1.06	0.19	0.57	0.61	6
	Back	9538	1907.6	Fixed	10	22.16	22.5	1.08	N/A	N/A	N/A	
	Front	9400	1880	Fixed	10	22.23	22.5	1.06	0.03	0.33	0.351	
Hotspot Mode Exposure Conditions												
WCDMA Band II	Left-side	9400	1880	Fixed	10	22.23	22.5	1.06	-0.08	0.41	0.436	
	Right-side	9400	1880	Fixed	10	22.23	22.5	1.06	0.17	0.21	0.223	
	Bottom	9400	1880	Fixed	10	22.23	22.5	1.06	0.11	0.45	0.479	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.



■ WCDMA Band V Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Band V	Left-Check	4132	826.4	Fixed	0	22.23	22.5	1.06	N/A	N/A	N/A	
	Left-Check	4183	836.6	Fixed	0	22.18	22.5	1.08	0.04	0.214	0.230	7
	Left-Check	4233	846.6	Fixed	0	22.13	22.5	1.09	N/A	N/A	N/A	
	Left-Tilt	4183	836.6	Fixed	0	22.18	22.5	1.08	0.01	0.13	0.140	
	Right-Check	4132	826.4	Fixed	0	22.23	22.5	1.06	N/A	N/A	N/A	
	Right-Check	4183	836.6	Fixed	0	22.18	22.5	1.08	0.13	0.195	0.210	
	Right-Check	4233	846.6	Fixed	0	22.13	22.5	1.09	N/A	N/A	N/A	
	Right-Tilt	4183	836.6	Fixed	0	22.18	22.5	1.08	0.01	0.124	0.133	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.

■ WCDMA Band V Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Body-Worn Accessory & Hotspot Mode Exposure Conditions												
WCDMA Band V	Back	4132	826.4	Fixed	10	22.23	22.5	1.06	N/A	N/A	N/A	
	Back	4183	836.6	Fixed	10	22.18	22.5	1.08	0.03	0.441	0.475	8
	Back	4233	846.6	Fixed	10	22.13	22.5	1.09	N/A	N/A	N/A	
	Front	4183	836.6	Fixed	10	22.18	22.5	1.08	-0.17	0.28	0.301	
Hotspot Mode Exposure Conditions												
WCDMA Band V	Left-side	4183	836.6	Fixed	10	22.18	22.5	1.08	0.12	0.228	0.245	
	Right-side	4183	836.6	Fixed	10	22.18	22.5	1.08	0.11	0.086	0.093	
	Bottom	4183	836.6	Fixed	10	22.18	22.5	1.08	0.08	0.114	0.123	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.



■ WIFI Head

Test Mode	Test Position Head	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift (dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
802.11b	Left-Check	1	2412	Fixed	0	11.40	11.5	1.02	N/A	N/A	N/A	
	Left-Check	6	2437	Fixed	0	11.18	11.5	1.08	0.14	0.166	0.179	
	Left-Check	11	2462	Fixed	0	11.19	11.5	1.07	N/A	N/A	N/A	
	Left-Tilt	6	2437	Fixed	0	11.18	11.5	1.08	-0.04	0.149	0.160	
	Right-Check	1	2412	Fixed	0	11.40	11.5	1.02	N/A	N/A	N/A	
	Right-Check	6	2437	Fixed	0	11.18	11.5	1.08	0.13	0.172	0.185	9
	Right-Check	11	2462	Fixed	0	11.19	11.5	1.07	N/A	N/A	N/A	
	Right-Tilt	6	2437	Fixed	0	11.18	11.5	1.08	-0.03	0.134	0.144	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.
3. Due to Wi-Fi duty cycle is 100% declared by applicant, so reported SAR listed above is the final ones.

■ WIFI Body

Test Mode	Test Position Body	CH.	Fre. <MHz>	Ant.	Dist. mm	Measured Conducted Power (dBm)	Max.Tune-up Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)	Max. Value Slot
Body-Worn Accessory & Hotspot Mode Exposure Conditions												
802.11b	Back	1	2412	Fixed	10	11.40	11.5	1.02	-0.08	0.246	0.252	
	Back	6	2437	Fixed	10	11.18	11.5	1.08	0.14	0.129	0.139	
	Back	11	2462	Fixed	10	11.19	11.5	1.07	-0.03	0.282	0.303	10
	Front	6	2437	Fixed	10	11.18	11.5	1.08	0.06	0.105	0.113	
802.11g	Back	6	2437	Fixed	10	10.15	10.5	1.08	0.11	0.115	0.125	
802.11n(20)	Back	6	2437	Fixed	10	10.06	10.5	1.11	-0.19	0.096	0.106	
802.11n(40)	Back	6	2437	Fixed	10	7.96	8.0	1.01	0.15	0.073	0.074	
Hotspot Mode Exposure Conditions												
802.11b	Left-side	6	2437	Fixed	10	11.19	11.5	1.07	0.11	0.032	0.034	
	Right-side	6	2437	Fixed	10	11.19	11.5	1.07	0.09	0.126	0.135	
	Top	6	2437	Fixed	10	11.19	11.5	1.07	0.15	0.117	0.126	

Note:

1. When the 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional, refer to KDB 447498;
2. Two SIM cards cannot work simultaneously.
3. Due to Wi-Fi duty cycle is 100% declared by applicant, so reported SAR listed above is the final ones.



10. Simultaneous Transmission Analysis

10.1. Simultaneous Transmission Scenario with Wi-Fi

Configuration	Mode	Max. Scaled SAR(W/kg)	Wi-Fi SAR(W/kg)	Σ SAR(W/kg)
Head	GSM850	0.311	0.185	0.496
Head	PCS1900	0.168	0.185	0.353
Head	WCDMA Band II	0.142	0.185	0.327
Head	WCDMA Band V	0.23	0.185	0.415
Body	GSM850	0.96	0.303	1.263
Body	PCS1900	0.763	0.303	1.066
Body	WCDMA Band II	0.61	0.303	0.913
Body	WCDMA Band V	0.475	0.303	0.778

Note: WIFI SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

10.2. Simultaneous Transmission Scenario with Bluetooth

Configuration	Mode	Max. Scaled SAR(W/kg)	Bluetooth SAR(W/kg)	Σ SAR(W/kg)
Head	GSM850	0.311	0.063	0.374
Head	PCS1900	0.168	0.063	0.231
Head	WCDMA Band II	0.142	0.063	0.205
Head	WCDMA Band V	0.23	0.063	0.293
Body	GSM850	0.96	0.063	1.023
Body	PCS1900	0.763	0.063	0.826
Body	WCDMA Band II	0.61	0.063	0.673
Body	WCDMA Band V	0.475	0.063	0.538

Note: Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

10.3. Simultaneous Transmission Scenario with Wi-Fi & Bluetooth

Bluetooth and WIFI cannot be transmit at same time, due to they share the same antenna.



10.4. Simultaneous Transmission Scenario (Hotspot)

Simult Tx	Configuration	GPRS850 SAR(W/kg)	Wi-Fi SAR(W/kg)	Σ SAR(W/kg)
Body	Back	0.96	0.303	1.263
	Front	0.637	0.113	0.75
	Left side	0.596	0.034	0.63
	Right side	0.211	0.135	0.346
	Top	0.4	0.26	0.66
	Bottom	0.755	0.4	1.155
Simult Tx	Configuration	GPRS1900 SAR(W/kg)	Wi-Fi SAR(W/kg)	Σ AR(W/kg)
Body	Back	0.763	0.303	1.066
	Front	0.387	0.113	0.5
	Left side	0.546	0.034	0.58
	Right side	0.133	0.135	0.268
	Top	0.4	0.26	0.66
	Bottom	0.598	0.4	0.998
Simult Tx	Configuration	WCDMA Band II SAR(W/kg)	Wi-Fi SAR(W/kg)	Σ SAR(W/kg)
Body	Back	0.61	0.303	0.913
	Front	0.351	0.113	0.464
	Left side	0.436	0.034	0.47
	Right side	0.223	0.135	0.358
	Top	0.4	0.26	0.66
	Bottom	0.479	0.4	0.879
Simult Tx	Configuration	WCDMA Band V SAR(W/kg)	Wi-Fi SAR (W/kg)	Σ SAR(W/kg)
Body	Back	0.475	0.303	0.778
	Front	0.301	0.113	0.414
	Left side	0.245	0.034	0.279
	Right side	0.093	0.135	0.228
	Top	0.4	0.26	0.66
	Bottom	0.123	0.4	0.523

Note: An estimated SAR of 0.4 W/kg was used to determine simultaneous transmission SAR for test separation distances >50mm per 447498 D01v05r02.



10.5. Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r02.



11. Measurement Uncertainty

Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std.Unc. (1g)	Std. nc. (10g)	(vi) v _{eff}
Measurement System								
Probe Calibration	±6.0%	N	1	1	1	±6.0%	±6.0%	∞
Axial Isotropy	±4.7%	R	$\sqrt{3}$	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	$\sqrt{3}$	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Modulation Response	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.4%	R	$\sqrt{3}$	1	1	±0.2%	±0.2%	∞
Probe Positioning	±2.9%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Max.SAR Eval.	±2.0%	R	$\sqrt{3}$	1	1	±1.2%	±1.2%	∞
Test Sample Related								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power Drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Power Scalingp	±0%	R	$\sqrt{3}$	0	0	±0%	±0%	∞
Phantom and Setup								
Phantom Uncertainty	±6.1%	R	$\sqrt{3}$	1	1	±3.5%	±3.5%	∞
SAR correction	±1.9%	R	$\sqrt{3}$	1	0.84	±1.1%	±0.9%	∞
Liquid Conductivity (mea.)DAK	±2.5%	R	$\sqrt{3}$	0.78	0.71	±1.1%	±1.0%	∞
Liquid Permittivity (mea.)DAK	±2.5%	R	$\sqrt{3}$	0.26	0.26	±0.3%	±0.4%	∞
Temp. unc. –ConductivityBB	±3.4%	R	$\sqrt{3}$	0.78	0.71	±1.5%	±1.4%	∞
Temp. unc. – PermittivityBB	±0.4%	R	$\sqrt{3}$	0.23	0.26	±0.1%	±0.1%	∞
Combined Std. Uncertainty						±11.2%	±11.1%	361
Expanded STD Uncertainty(k=2)						±22.3%	±22.2%	

DASY5 Uncertainty Budget, according to IEEE 1528/2011 and IEC 62209-1/2011(0.3-3GHz)

--END--

APPENDIX A. SAR System Verification Data

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Date/Time: 21/08/2015

Test Laboratory: Cerpass Lab

SystemPerformanceCheck-D850 Head

DUT: Dipole 850 MHz D850V2; Type: D850V2; Serial: D850V2

Communication System: CW; Frequency: 850 MHz

Medium parameters used: $f = 850$ MHz; $\sigma = 0.91$ S/m; $\epsilon_r = 41.50$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22°C; Input power-250mW

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(9.78, 9.78, 9.78); Calibrated: 2015/5/27;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

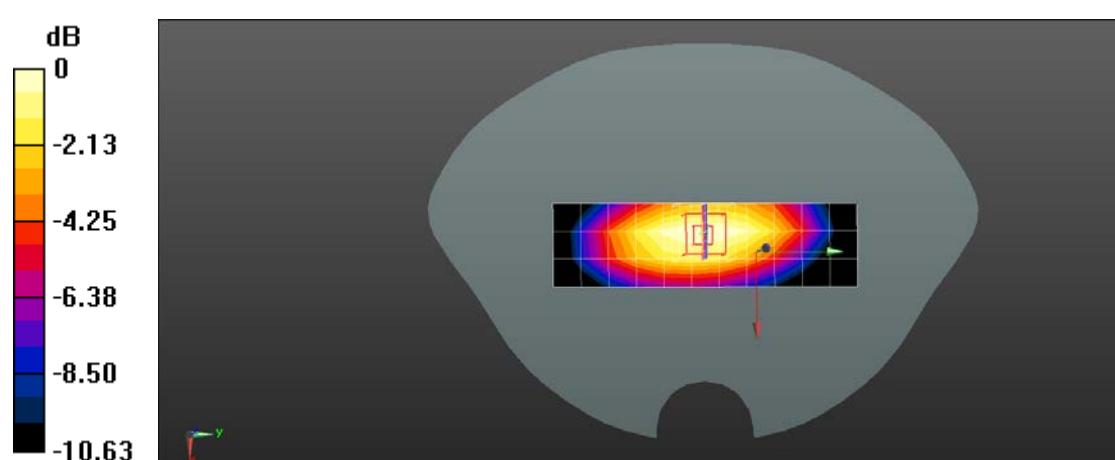
Configuration/SystemPerformanceCheck-D850 Head/Area Scan (4x12x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 2.74 W/kg

Configuration/SystemPerformanceCheck-D850 Head/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm, Reference Value = 53.39 V/m; Power Drift = 0.01 dB, Peak SAR (extrapolated) = 3.64 W/kg

SAR(1 g) = 2.42 W/kg; SAR(10 g) = 1.58 W/kg Maximum value of SAR (measured) = 2.62 W/kg



0 dB = 2.62 W/kg = 4.18 dBW/kg

Date/Time: 21/08/2015

Test Laboratory: Cerpass Lab

SystemPerformanceCheck-D1900 Head

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ S/m; $\epsilon_r = 40$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22°C; Input power-250mW

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(8.24, 8.24, 8.24); Calibrated: 2015/5/27;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

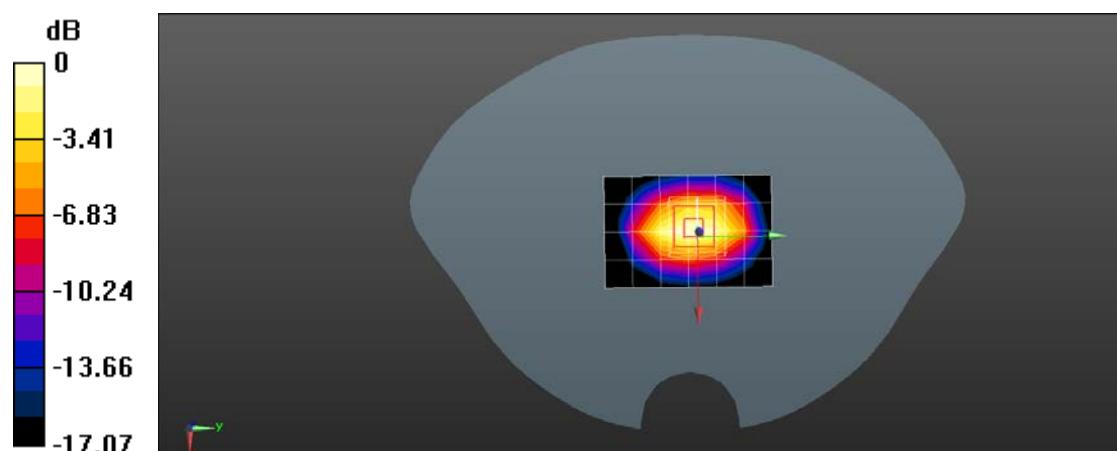
Configuration/SystemPerformanceCheck D1900 Head/Area Scan (5x7x1):

Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 12.5 W/kg

Configuration/SystemPerformanceCheck D1900 Head/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm, Reference Value = 85.35 V/m; Power Drift = 0.04 dB, Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.32 W/kg Maximum value of SAR (measured) = 11.4 W/kg



Date/Time: 21/08/2015

Test Laboratory: Cerpass Lab

SystemPerformanceCheck-D2450 Head

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.80$ S/m; $\epsilon_r = 39.20$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22°C; Input power-250mW

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(7.51, 7.51, 7.51); Calibrated: 2015/5/27;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

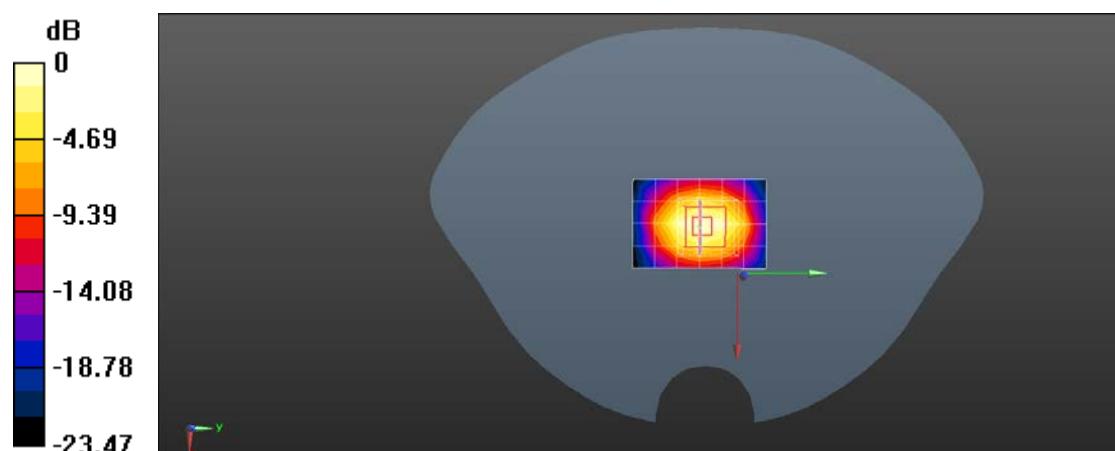
Configuration/SystemPerformanceCheck-D2450 Head/Area Scan (5x7x1):

Measurement grid: $dx=12$ mm, $dy=12$ mm, Maximum value of SAR (measured) = 18.4 W/kg

Configuration/SystemPerformanceCheck-D2450 Head/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm, Reference Value = 90.98 V/m; Power Drift = -0.01 dB, Peak SAR (extrapolated) = 30.4 W/kg

SAR(1 g) = 14 W/kg; SAR(10 g) = 6.31 W/kg Maximum value of SAR (measured) = 15.7 W/kg



Date/Time: 21/08/2015

Test Laboratory: Cerpass Lab

SystemPerformanceCheck-D850 Body

DUT: Dipole 850 MHz D850V2; Type: D850V2; Serial: D850V2

Communication System: CW; Frequency: 850 MHz

Medium parameters used: $f = 850$ MHz; $\sigma = 0.98$ S/m; $\epsilon_r = 55.15$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22°C; Input power-250mW

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

DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(9.74, 9.74, 9.74); Calibrated: 2015/5/27;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

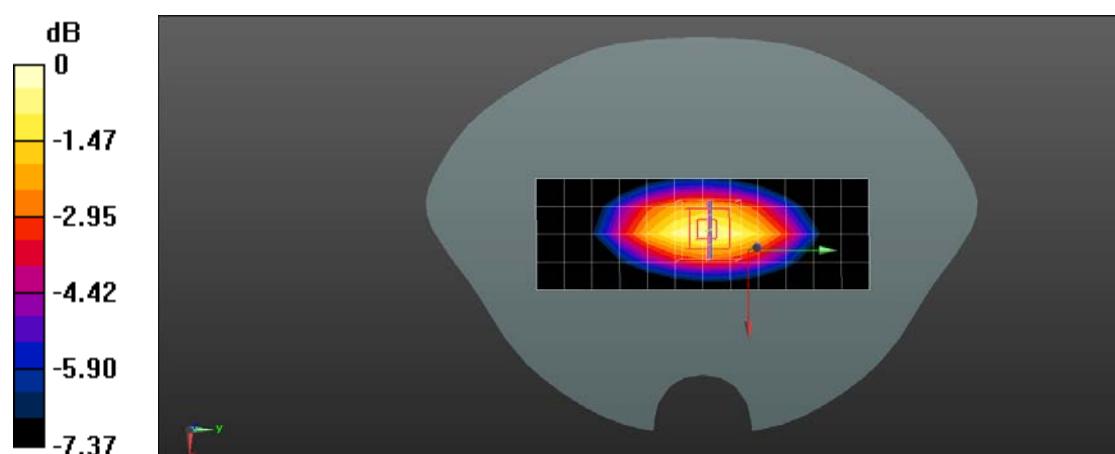
System Performance Check at Frequencies above 1 GHz/Systemcheck-D850

Body/Area Scan (5x13x1): Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 2.60 W/kg

System Performance Check at Frequencies above 1 GHz/Systemcheck-D850

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm, Reference Value = 54.50 V/m; Power Drift = 0.03 dB, Peak SAR (extrapolated) = 3.11 W/kg

SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.72 W/kg Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Date/Time: 21/08/2015

Test Laboratory: Cerpass Lab

SystemPerformanceCheck-D1900 Body

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.53$ S/m; $\epsilon_r = 53.20$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22°C; Input power-250mW

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

DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(7.93, 7.93, 7.93); Calibrated: 2015/5/27;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

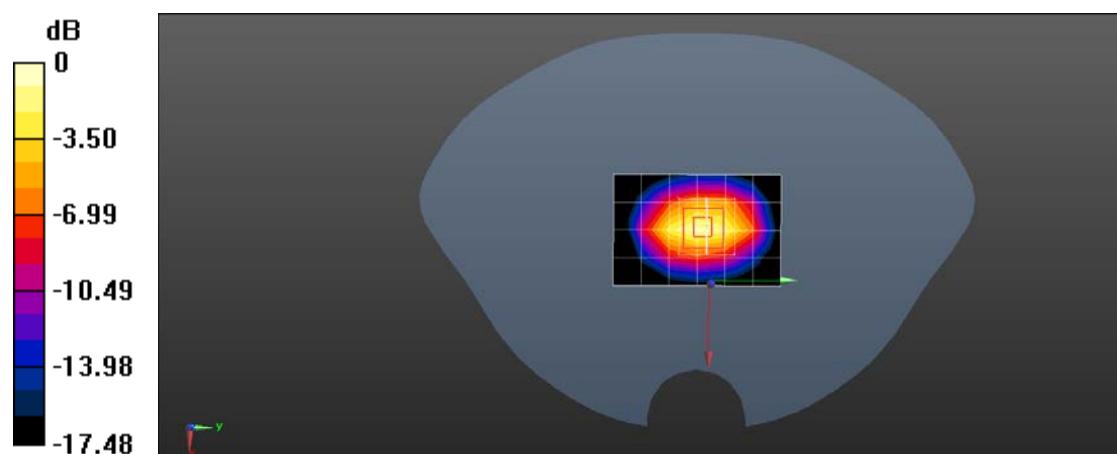
System Performance Check at Frequencies above 1 GHz/Systemcheck-D1900

Body/Area Scan (5x7x1): Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 12.4 W/kg

System Performance Check at Frequencies above 1 GHz/Systemcheck-D1900

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm, Reference Value = 95.07 V/m; Power Drift = 0.04 dB, Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.33 W/kg Maximum value of SAR (measured) = 14.3 W/kg



Date/Time: 21/08/2015

Test Laboratory: Cerpass Lab

SystemPerformanceCheck-D2450 Body

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.95$ S/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22°C; Input power-250mW

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(7.54, 7.54, 7.54); Calibrated: 2015/5/27;
- Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection), $z = 1.0, 31.0$
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

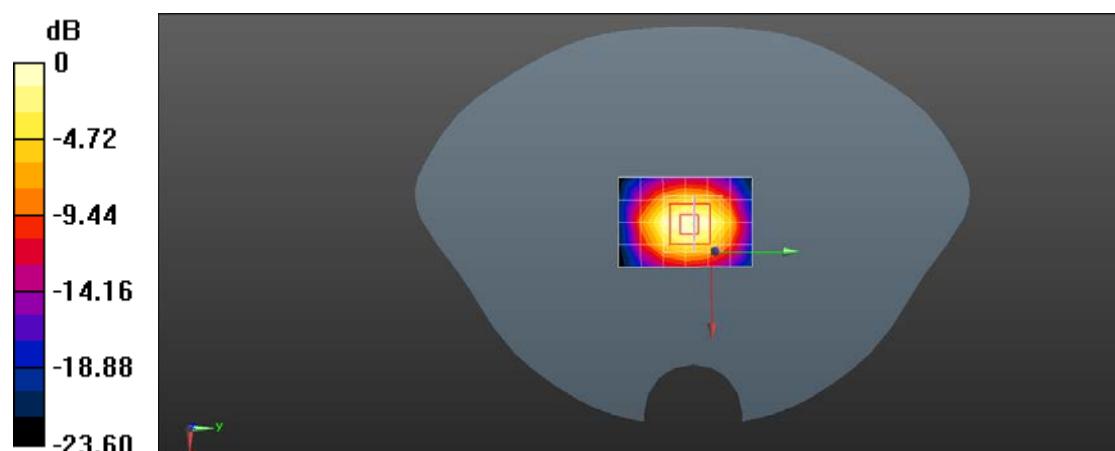
Configuration/SystemPerformanceCheck-D2450 Body/Area Scan (5x7x1):

Measurement grid: $dx=12$ mm, $dy=12$ mm, Maximum value of SAR (measured) = 17.0 W/kg

Configuration/SystemPerformanceCheck-D2450 Body/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm, Reference Value = 89.74 V/m; Power Drift = -0.02 dB, Peak SAR (extrapolated) = 28.3 W/kg

SAR(1 g) = 13 W/kg; SAR(10 g) = 5.85 W/kg Maximum value of SAR (measured) = 14.7 W/kg



0 dB = 14.7 W/kg = 11.67 dBW/kg

APPENDIX B. SAR measurement Data

The SAR plots are shown as follows.

Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: GSM850 Mid Touch-Left

Communication System Band: GSM850MHz; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 41.48$; $\rho = 1000$ kg/m³

Phantom section: Left Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

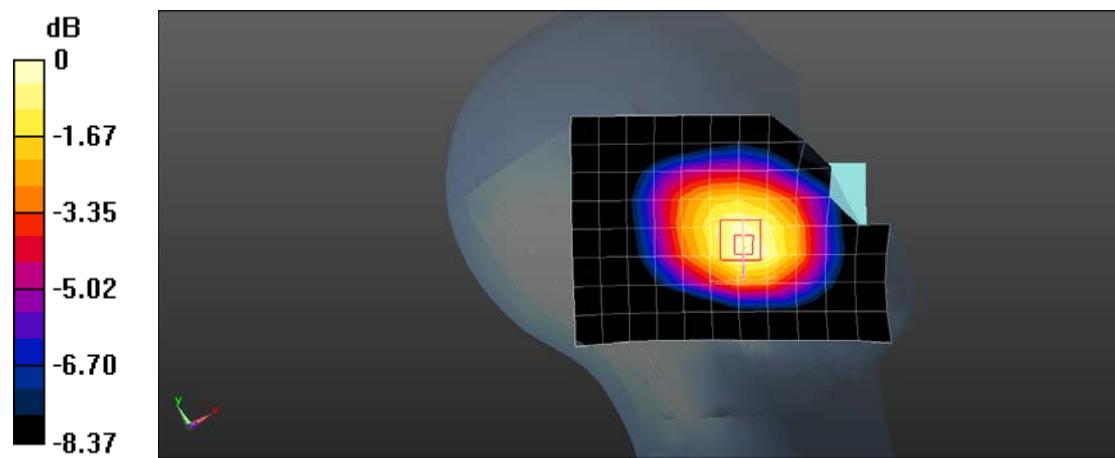
- Probe: EX3DV4 - SN3927; ConvF(9.78, 9.78, 9.78); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/GSM850 Mid Touch-Left/Area Scan (9x14x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 0.277 W/kg

Configuration/GSM850 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm, Reference Value = 6.637 V/m; Power Drift = 0.14 dB, Peak SAR (extrapolated) = 0.328 W/kg

SAR(1 g) = 0.281 W/kg; SAR(10 g) = 0.234 W/kg Maximum value of SAR (measured) = 0.291 W/kg



0 dB = 0.291 W/kg = -5.36 dBW/kg

Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: GPRS850(4up) Mid Body-Back

Communication System Band: GPRS850MHz(4up); Frequency: 836.6 MHz; Duty Cycle: 1:2.1

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 55.19$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

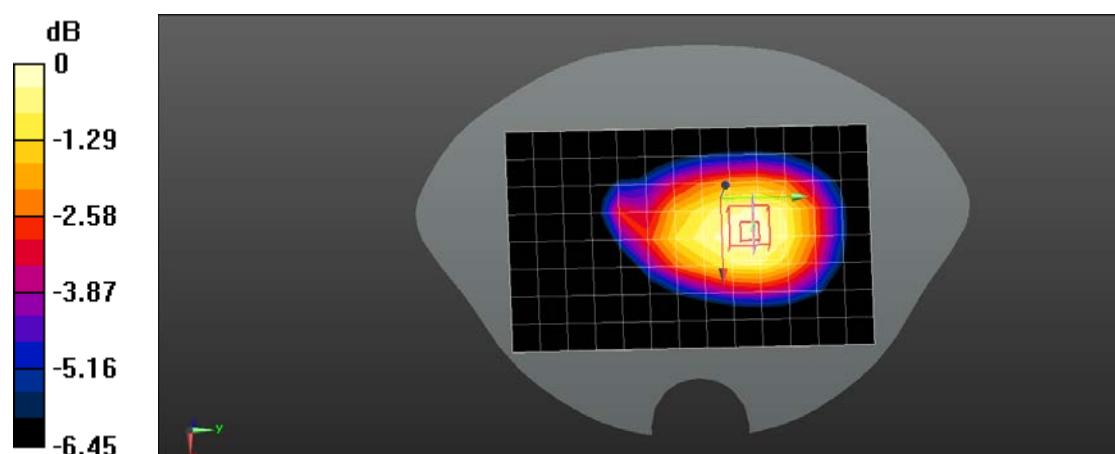
- Probe: EX3DV4 - SN3927; ConvF(9.74, 9.74, 9.74); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/GPRS850(4up) Mid Body-Back/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm, Maximum value of SAR (measured) = 0.816 W/kg

Configuration/GPRS850(4up) Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 28.15 V/m; Power Drift = -0.02 dB, Peak SAR (extrapolated) = 0.944 W/kg

SAR(1 g) = 0.802 W/kg; SAR(10 g) = 0.646 W/kg Maximum value of SAR (measured) = 0.837 W/kg



0 dB = 0.837 W/kg = -0.77 dBW/kg

Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: PCS1900 Mid Touch-Left

Communication System Band: PCS1900MHz; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ S/m; $\epsilon_r = 39.74$; $\rho = 1000$ kg/m³

Phantom section: Left Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

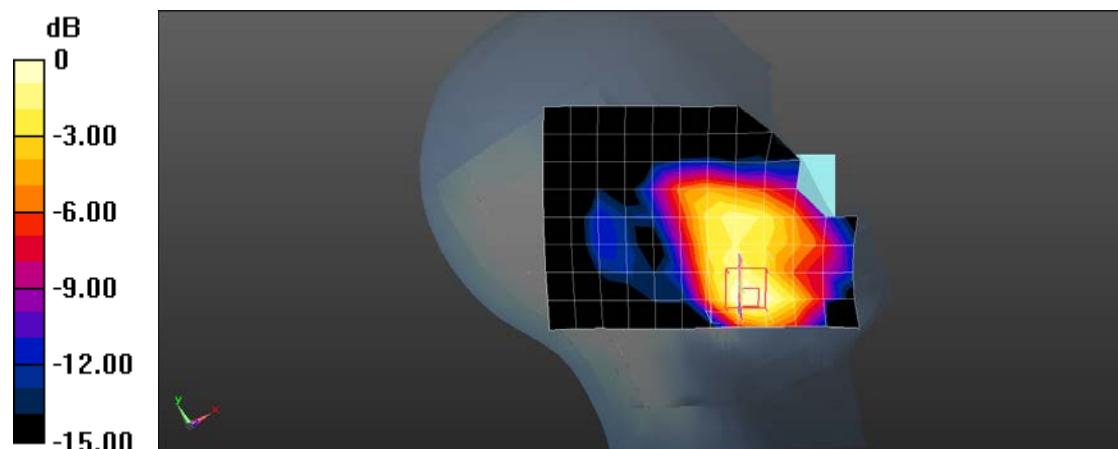
- Probe: EX3DV4 - SN3927; ConvF(8.24, 8.24, 8.24); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/PCS1900 Mid Touch-Left/Area Scan (9x14x1): Measurement grid:

$dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 0.145 W/kg

Configuration/PCS1900 Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm, Reference Value = 2.861 V/m; Power Drift = 0.11 dB, Peak SAR (extrapolated) = 0.197 W/kg

SAR(1 g) = 0.146 W/kg; SAR(10 g) = 0.091 W/kg Maximum value of SAR (measured) = 0.151 W/kg



0 dB = 0.151 W/kg = -8.21 dBW/kg

Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: GPRS1900(4up) Mid Body-Back

Communication System Band: GPRS1900MHz(4up); Frequency: 1880 MHz; Duty Cycle: 1:2.1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ S/m; $\epsilon_r = 53.30$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

- Probe: EX3DV4 - SN3927; ConvF(7.93, 7.93, 7.93); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

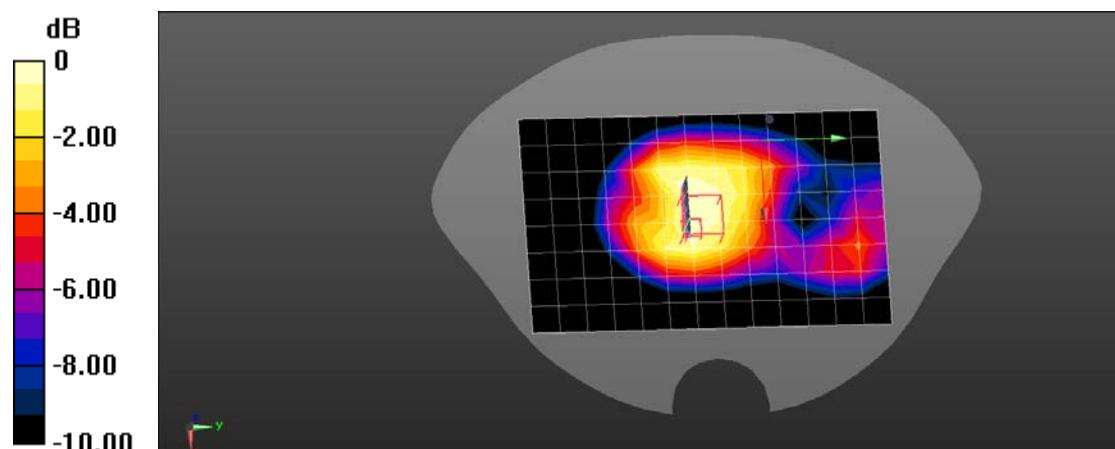
Configuration/GPRS1900(4up) Mid Body-Back/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm, Maximum value of SAR (measured) = 0.718 W/kg

Configuration/GPRS1900(4up) Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 11.06 V/m; Power

Drift = -0.18 dB, Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.672 W/kg; SAR(10 g) = 0.422 W/kg Maximum value of SAR (measured) = 0.713 W/kg



Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: WCDMA Band II Mid Touch-Left

Communication System Band: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.42$ S/m; $\epsilon_r = 39.74$; $\rho = 1000$ kg/m³

Phantom section: Left Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

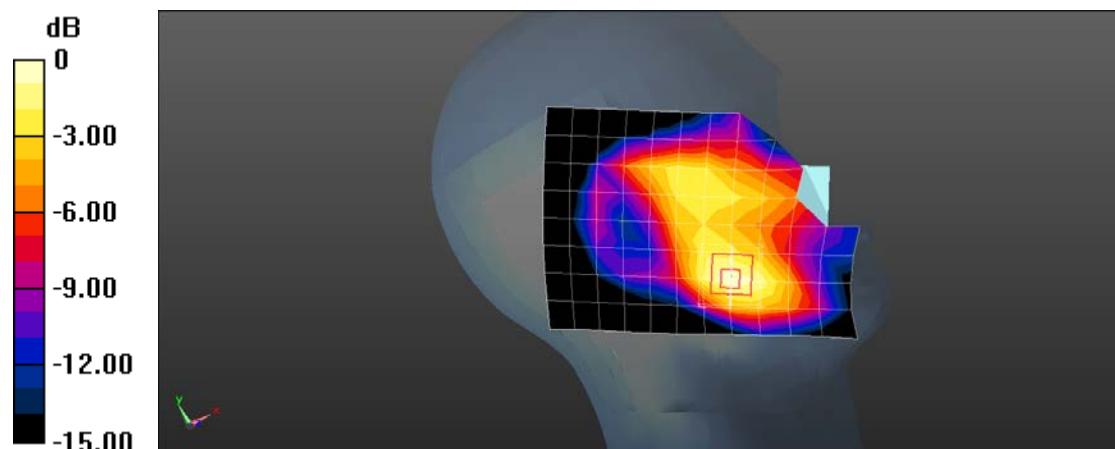
- Probe: EX3DV4 - SN3927; ConvF(8.24, 8.24, 8.24); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/WCDMA Band II Mid Touch-Left/Area Scan (9x14x1): Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 0.148 W/kg

Configuration/WCDMA Band II Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm, Reference Value = 3.886 V/m; Power Drift = 0.18 dB, Peak SAR (extrapolated) = 0.213 W/kg

SAR(1 g) = 0.133 W/kg; SAR(10 g) = 0.079 W/kg Maximum value of SAR (measured) = 0.147 W/kg



0 dB = 0.147 W/kg = -8.33 dBW/kg

Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: WCDMA Band II Mid Body-Back

Communication System Band: WCDMA Band II; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ S/m; $\epsilon_r = 53.30$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

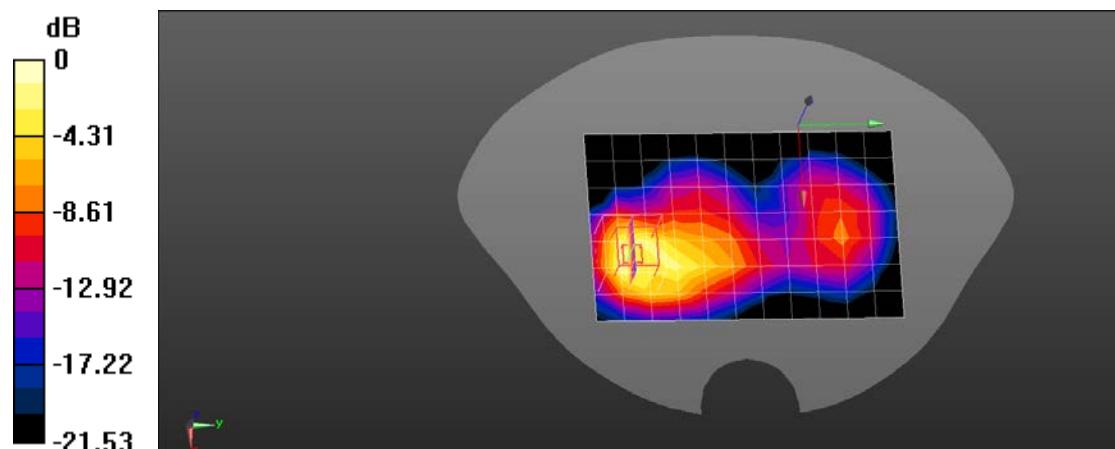
- Probe: EX3DV4 - SN3927; ConvF(7.93, 7.93, 7.93); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/WCDMA Band II Mid Body-Back/Area Scan (8x12x1): Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 0.458 W/kg

Configuration/WCDMA Band II Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm, Reference Value = 5.454 V/m; Power Drift = 0.19 dB, Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.570 W/kg; SAR(10 g) = 0.275 W/kg Maximum value of SAR (measured) = 0.619 W/kg



0 dB = 0.619 W/kg = -2.08 dBW/kg

Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: WCDMA Band V Mid Touch-Left

Communication System Band: WCDMA Band V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.89$ S/m; $\epsilon_r = 41.48$; $\rho = 1000$ kg/m³

Phantom section: Left Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

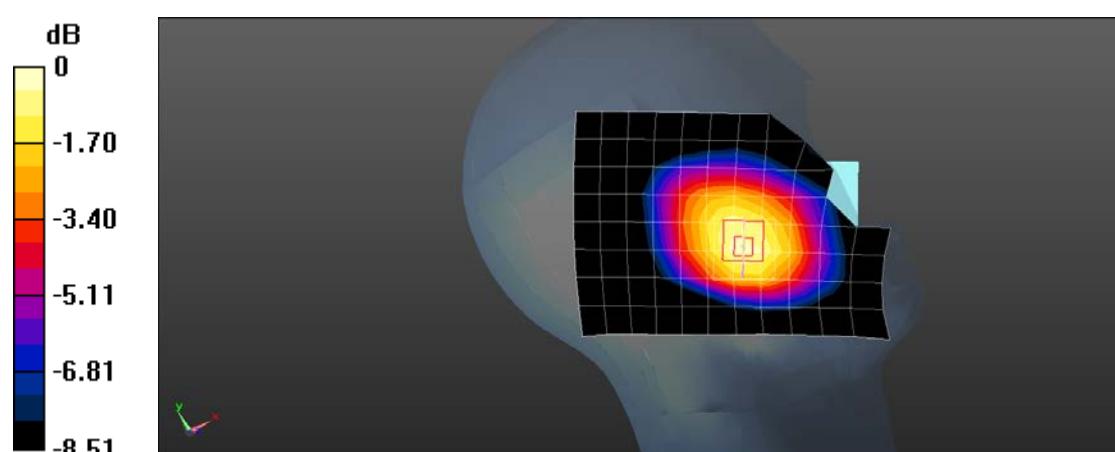
- Probe: EX3DV4 - SN3927; ConvF(9.78, 9.78, 9.78); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/WCDMA Band V Mid Touch-Left/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm, Maximum value of SAR (measured) = 0.205 W/kg

Configuration/WCDMA Band V Mid Touch-Left/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 5.039 V/m; Power Drift = 0.04 dB, Peak SAR (extrapolated) = 0.253 W/kg

SAR(1 g) = 0.214 W/kg; SAR(10 g) = 0.178 W/kg Maximum value of SAR (measured) = 0.223 W/kg



Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: WCDMA Band V Mid Body-Back

Communication System Band: WCDMA Band V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.97$ S/m; $\epsilon_r = 55.19$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

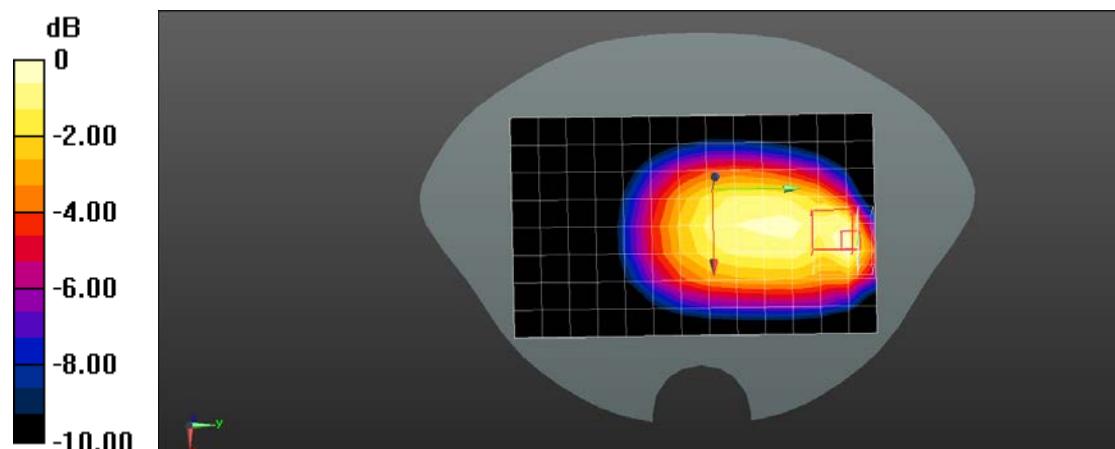
- Probe: EX3DV4 - SN3927; ConvF(9.74, 9.74, 9.74); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/WCDMA Band V Mid Body-Back/Area Scan (9x14x1): Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 0.469 W/kg

Configuration/WCDMA Band V Mid Body-Back/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm, Reference Value = 18.99 V/m; Power Drift = 0.03 dB, Peak SAR (extrapolated) = 0.766 W/kg

SAR(1 g) = 0.441 W/kg; SAR(10 g) = 0.258 W/kg Maximum value of SAR (measured) = 0.480 W/kg



Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: 802.11b 2437MHz Mid Touch-Right

Communication System Band: 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.78$ S/m; $\epsilon_r = 39.23$; $\rho = 1000$ kg/m³

Phantom section: Right Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

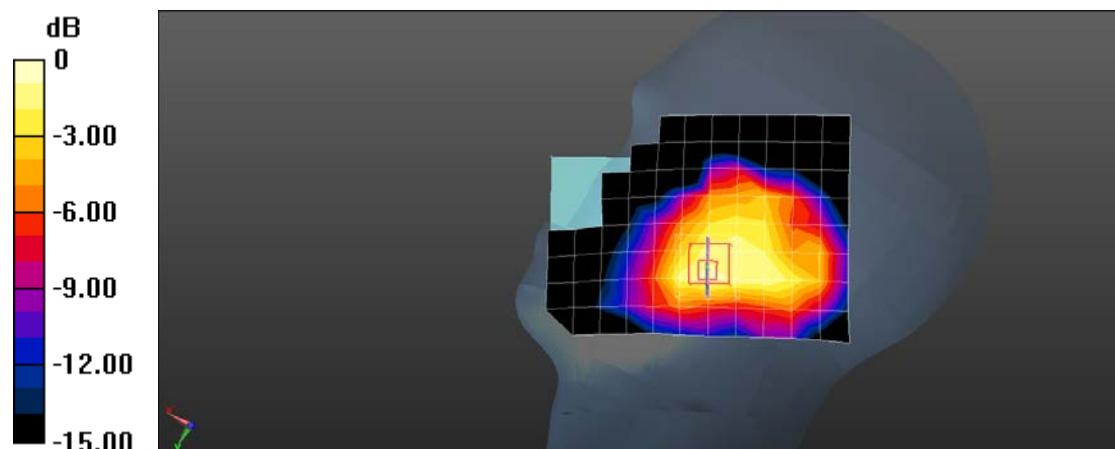
- Probe: EX3DV4 - SN3927; ConvF(7.51, 7.51, 7.51); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/802.11b 2437MHz Mid Touch-Right/Area Scan (9x14x1): Measurement grid: $dx=15$ mm, $dy=15$ mm, Maximum value of SAR (measured) = 0.177 W/kg

Configuration/802.11b 2437MHz Mid Touch-Right/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm, Reference Value = 5.056 V/m; Power Drift = 0.13 dB, Peak SAR (extrapolated) = 0.310 W/kg

SAR(1 g) = 0.172 W/kg; SAR(10 g) = 0.094 W/kg Maximum value of SAR (measured) = 0.191 W/kg



0 dB = 0.191 W/kg = -7.19 dBW/kg

Test Laboratory: Cerpass Lab

DUT: Mobile Phone; Type: QS45

Procedure Name: 802.11b 2462MHz High Body-Back

Communication System Band: 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2462$ MHz; $\sigma = 1.96$ S/m; $\epsilon_r = 52.69$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Tissue Temp(celsius)- 21 °C

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

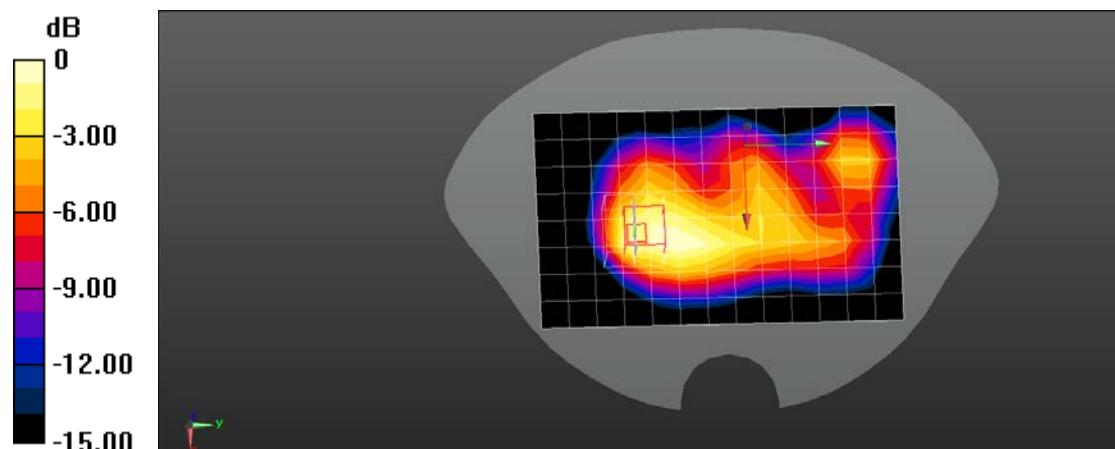
- Probe: EX3DV4 - SN3927; ConvF(7.54, 7.54, 7.54); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/802.11b 2462MHz High Body-Back/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm, Maximum value of SAR (measured) = 0.322 W/kg

Configuration/802.11b 2462MHz High Body-Back/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 6.430 V/m; Power Drift = -0.03 dB, Peak SAR (extrapolated) = 0.590 W/kg

SAR(1 g) = 0.282 W/kg; SAR(10 g) = 0.146 W/kg Maximum value of SAR (measured) = 0.321 W/kg



APPENDIX C. Calibration Data for Probe, Dipole and DAE

Please refer to attached files.

APPENDIX D. Photographs of EUT and Setup

Please refer to attached files.