



FCC SAR Test Report

APPLICANT : Lenovo Japan
EQUIPMENT : Smart phone
BRAND NAME : lenovo
MODEL NAME : 503LV
MARKETING NAME : Beam
FCC ID : 2AJAYJP-LEN
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

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Revision History



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Lenovo Japan, Smart phone, 503LV** are as follows.

Equipment Class	Frequency Band	Highest 1g SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)	
		Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)		
		1g SAR (W/kg)				
Licensed	GSM	GSM850	0.18	0.39	0.39	1.26
		GSM1900	<0.10	0.34	0.65	
	WCDMA	WCDMA V	0.11	0.28	0.28	
		WCDMA II	<0.10	0.28	0.51	
	LTE	Band 26	<0.10	0.13	0.13	
		Band 41	<0.10	0.26	0.65	
DTS	WLAN	2.4GHz WLAN	1.07	0.17	0.19	1.26
NII		5GHz WLAN	0.14	0.20	0.17	0.65
Date of Testing:		2016/07/29 ~ 2016/08/04				

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.



2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

Applicant	
Company Name	Lenovo Japan
Address	Akihabara UDX, Sotokanda 4-14-1, Chiyoda-ku, Tokyo 101-0021, Japan

Manufacturer	
Company Name	Shenzhen BVC Technology Co.,Ltd.
Address	Rainbow Bldg., North, Hi-Tech Industrial Park, Nanshan District, Shenzhen, China, P.C.518057

3. Guidance Standard

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01



4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Smart phone
Brand Name	lenovo
Model Name	503LV
Marketing Name	Beam
FCC ID	2AJAYJP-LEN
IMEI Code	004400152020002
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	<ul style="list-style-type: none">· GSM/GPRS/EGPRS· RMC/AMR 12.2Kbps· HSDPA· HSUPA· HSPA+ (16QAM uplink is not supported)· LTE: QPSK, 16QAM· 802.11b/g/n HT20/HT40· 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80· Bluetooth v3.0+EDR, Bluetooth v4.0 LE
HW Version	P2
SW Version	X5_S_WIN10_1028.20_21_testos
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Production Unit

Remark:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP).
2. This device supports GPRS/EGPRS mode up to multi-slot class 33.
3. This device does not support DTM operation.
4. This device 2.4GHz WLAN /5.2GHz WLAN/5.8GHz WLAN support Hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).



4.2 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																
FCC ID	2AJAYJP-LEN																															
Equipment Name	Smart phone																															
Operating Frequency Range of each LTE transmission band	LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz																															
Channel Bandwidth	LTE Band 26: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz																															
uplink modulations used	QPSK, and 16QAM																															
LTE Voice / Data requirements	Data only																															
LTE MPR permanently built-in by design		Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3																														
		Modulation		Channel bandwidth / Transmission bandwidth (RB)			MPR (dB)																									
		1.4 MHz		3.0 MHz		5 MHz																										
		QPSK		> 5		> 4																										
LTE A-MPR		16 QAM		≤ 5		≤ 4		≤ 8		≤ 12		≤ 16		≤ 18		≤ 1																
		16 QAM		> 5		> 4		> 8		> 12		> 16		> 18		≤ 1																
Spectrum plots for RB configuration		A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																														
LTE Release		R10, Cat 4																														
CA Support		NO																														

Transmission (H, M, L) channel numbers and frequencies in each LTE band								
LTE Band 26								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5
H	27033	848.3	27025	847.5	27015	846.5	26990	844
LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506
L	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
H	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680



5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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



6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

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

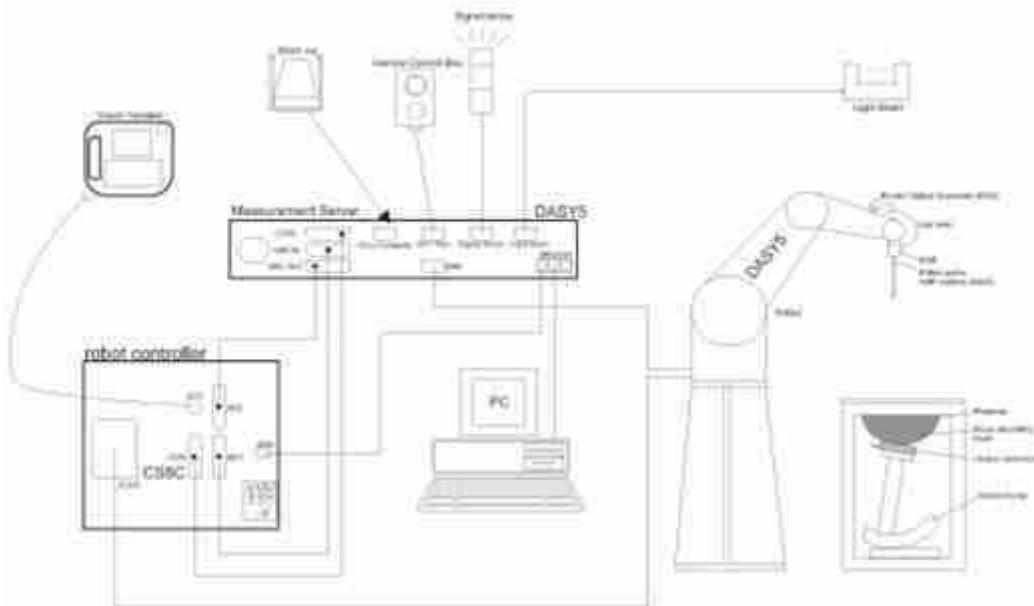
$$\text{SAR} = \frac{\sigma |E|^2}{\rho}$$

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



7. System Description and Setup

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



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

7.1 E-Field Probe

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

<EX3DV4 Probe>

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

7.2 Data Acquisition Electronics (DAE)

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

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



Fig 5.1 Photo of DAE



7.3 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

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



7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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



Mounting Device for Hand-Held
Transmitters



Mounting Device Adaptor for Wide-Phones

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

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



Mounting Device for Laptops



8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

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



8.2 Power Reference Measurement

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

8.3 Area Scan

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

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

	$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	$5 \pm 1 \text{ mm}$	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5 \text{ mm}$
Maximum probe angle from probe axis to phantom surface normal at the measurement location	$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
	$\leq 2 \text{ GHz}: \leq 15 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 12 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 12 \text{ mm}$ $4 - 6 \text{ GHz}: \leq 10 \text{ mm}$
Maximum area scan spatial resolution: $\Delta x_{\text{Area}}, \Delta y_{\text{Area}}$	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.	



8.4 Zoom Scan

Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube 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 gram and 10 gram and displays these values next to the job's label.

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

		≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$		≤ 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: $\Delta z_{\text{Zoom}}(n)$ graded grid	≤ 5 mm	$3 - 4$ GHz: ≤ 4 mm $4 - 5$ GHz: ≤ 3 mm $5 - 6$ GHz: ≤ 2 mm
		$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm
		$\Delta z_{\text{Zoom}}(n > 1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1)$
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.

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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



9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d162	Nov. 24, 2015	Nov. 23, 2016
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Nov. 23, 2015	Nov. 22, 2016
SPEAG	2450MHz System Validation Kit	D2450V2	924	Feb. 24, 2016	Feb. 23, 2017
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Nov. 25, 2015	Nov. 24, 2016
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	Nov. 26, 2015	Nov. 25, 2016
SPEAG	Data Acquisition Electronics	DAE4	914	Jan. 07, 2016	Jan. 06, 2017
SPEAG	Data Acquisition Electronics	DAE4	1338	Nov. 23, 2015	Nov. 22, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Nov. 27, 2015	Nov. 26, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3578	May. 11, 2016	May. 10, 2017
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1670	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1671	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300653	Aug. 25, 2015	Aug. 24, 2016
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Jul. 16, 2016	Jul. 15, 2017
Agilent	Network Analyzer	E5071C	MY46523671	Dec. 31, 2015	Dec. 30, 2016
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Nov. 24, 2015	Nov. 23, 2016
Agilent	Signal Generator	N5181A	MY50145381	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Senor	MA2411B	1306099	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Meter	ML2495A	1349001	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Sensor	MA2411B	1207253	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Meter	ML2495A	1218010	Jan. 12, 2016	Jan. 11, 2017
R&S	Spectrum Analyzer	FSP7	101634	Jul. 16, 2016	Jul. 15, 2017
ARRA	Power Divider	A3200-2	N/A	Note1	
PASTERNACK	Dual Directional Coupler	PE2214-10	N/A	Note1	
Agilent	Dual Directional Coupler	778D	50422	Note1	
AR	Amplifier	5S1G4	333096	Note1	
mini-circuits	Amplifier	ZVE-3W-83+	162601250	Note1	
MCL	Attenuation1	BW-S10W5	N/A	Note1	
Weinschel	Attenuation2	3M-20	N/A	Note1	
Zhongjilianhe	Attenuation3	MVE2214-03	N/A	Note1	

General Note:

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



10. System Verification

10.1 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

< Tissue Dielectric Parameter Check Results >

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
835	Head	22.9	0.897	41.605	0.90	41.50	-0.33	0.25	± 5	2016/7/29
1900	Head	22.5	1.450	40.004	1.40	40.00	3.57	0.01	± 5	2016/8/3
2450	Head	22.6	1.809	38.451	1.80	39.20	0.50	-1.91	± 5	2016/8/3
2600	Head	22.8	2.009	39.626	1.96	39.00	2.50	1.61	± 5	2016/8/3
5250	Head	22.9	4.726	36.478	4.71	35.95	0.34	1.47	± 5	2016/8/4
5600	Head	22.8	5.154	35.866	5.07	35.50	1.66	1.03	± 5	2016/8/4
5750	Head	22.8	5.329	35.584	5.22	35.35	2.09	0.66	± 5	2016/8/4
835	Body	22.5	0.977	54.466	0.97	55.20	0.72	-1.33	± 5	2016/8/1
1900	Body	22.6	1.547	53.803	1.52	53.30	1.78	0.94	± 5	2016/8/3
2450	Body	22.9	1.991	52.320	1.95	52.70	2.10	-0.72	± 5	2016/8/4
2600	Body	22.7	2.209	51.123	2.16	52.50	2.27	-2.62	± 5	2016/8/2
5250	Body	22.5	5.388	49.149	5.36	48.95	0.52	0.41	± 5	2016/8/4
5600	Body	22.6	5.891	48.474	5.77	48.50	2.10	-0.05	± 5	2016/8/4
5750	Body	22.7	6.047	48.317	5.94	48.28	1.80	0.08	± 5	2016/8/4



10.2 System Performance Check Results

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

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2016/7/29	835	Head	250	D835V2-4d162	EX3DV4 - SN3819	DAE4 Sn1338	2.39	9.14	9.56	4.60
2016/8/3	1900	Head	250	D1900V2-5d182	EX3DV4 - SN3819	DAE4 Sn1338	9.91	39.60	39.64	0.10
2016/8/3	2450	Head	250	D2450V2-924	EX3DV4 - SN3819	DAE4 Sn1338	12.60	52.50	50.4	-4.00
2016/8/3	2600	Head	250	D2600V2-1070	EX3DV4 - SN3819	DAE4 Sn1338	14.50	58.10	58	-0.17
2016/8/4	5250	Head	100	D5GHzV2-1113	EX3DV4 - SN3819	DAE4 Sn1338	8.22	80.70	82.2	1.86
2016/8/4	5600	Head	100	D5GHzV2-1113	EX3DV4 - SN3819	DAE4 Sn1338	8.36	83.70	83.6	-0.12
2016/8/4	5750	Head	100	D5GHzV2-1113	EX3DV4 - SN3819	DAE4 Sn1338	8.13	80.80	81.3	0.62
2016/8/1	835	Body	250	D835V2-4d162	EX3DV4 - SN3578	DAE4 Sn914	2.27	9.51	9.08	-4.52
2016/8/3	1900	Body	250	D1900V2-5d182	EX3DV4 - SN3819	DAE4 Sn1338	9.79	40.60	39.16	-3.55
2016/8/4	2450	Body	250	D2450V2-924	EX3DV4 - SN3819	DAE4 Sn1338	13.60	51.40	54.4	5.84
2016/8/2	2600	Body	250	D2600V2-1070	EX3DV4 - SN3819	DAE4 Sn1338	13.80	54.20	55.2	1.85
2016/8/4	5250	Body	100	D5GHzV2-1113	EX3DV4 - SN3819	DAE4 Sn1338	7.74	76.50	77.4	1.18
2016/8/4	5600	Body	100	D5GHzV2-1113	EX3DV4 - SN3819	DAE4 Sn1338	8.64	82.40	86.4	4.85
2016/8/4	5750	Body	100	D5GHzV2-1113	EX3DV4 - SN3819	DAE4 Sn1338	8.22	76.60	82.2	7.31

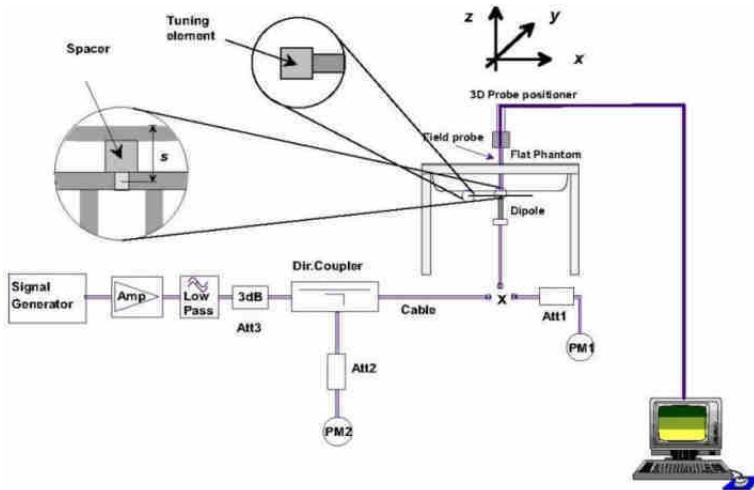


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled "M," the left ear reference point (ERP) is marked "LE," and the right ERP is marked "RE." Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2. The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

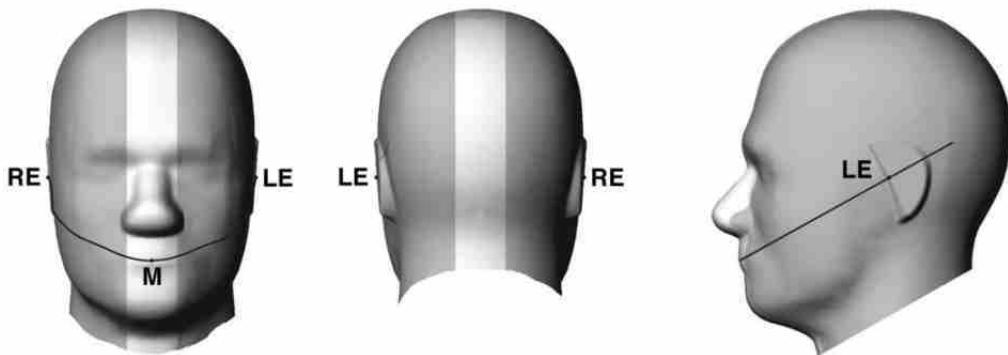


Fig 9.1.1 Front, back, and side views of SAM twin phantom

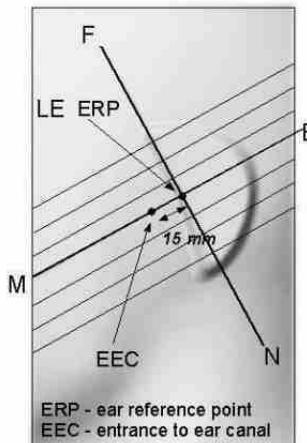


Fig 9.1.2 Close-up side view of phantom showing the ear region.

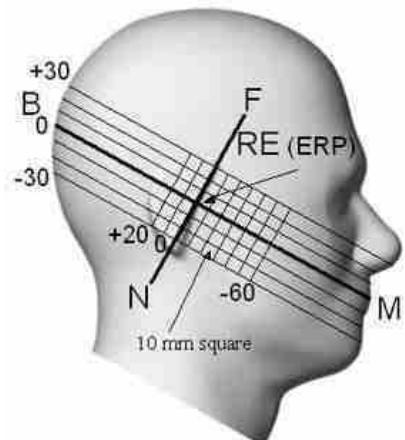


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

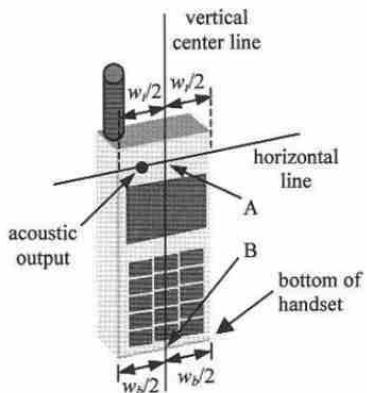


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case"

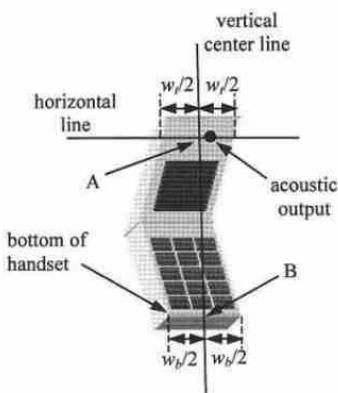


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

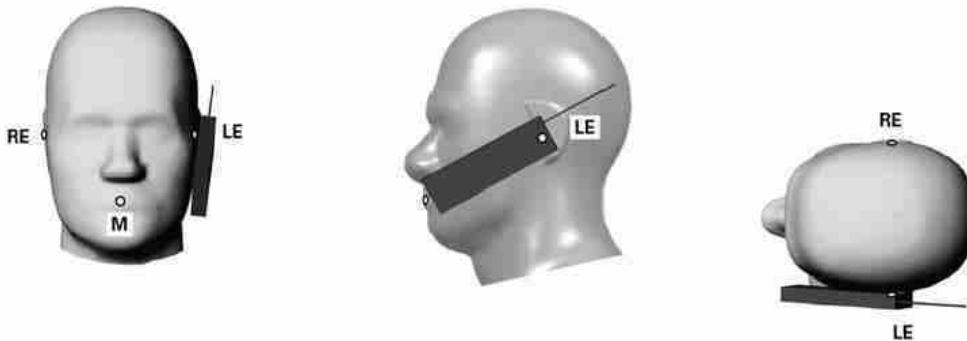


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.



11.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

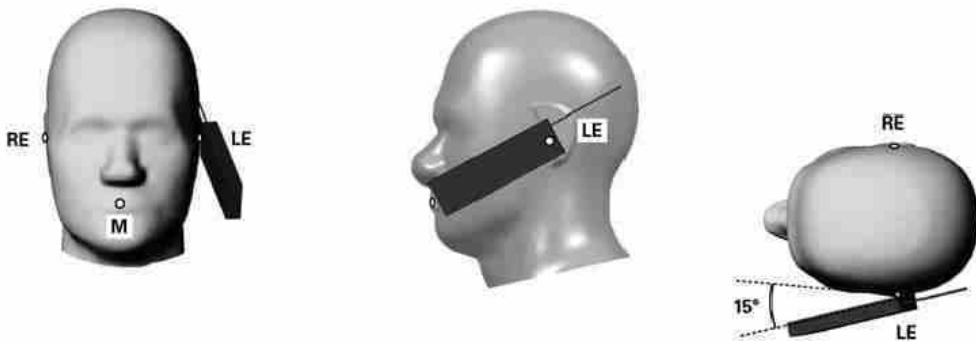


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.



11.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is < 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

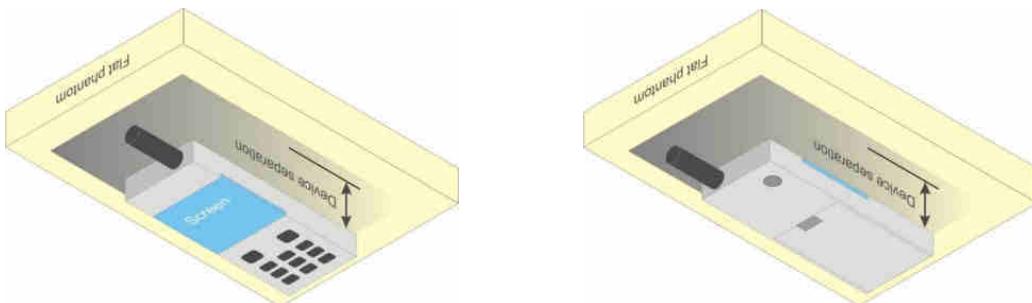


Fig 9.4 Body Worn Position

11.5 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.



12. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

- Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
- Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based 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 GPRS (2Tx slots) for GSM850 and GPRS (4Tx slots) for GSM1900 are considered as the primary mode.
- Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
TX Channel	128	189	251	824.2	836.4	848.8	824.2	836.4
Frequency (MHz)	824.2	836.4	848.8				848.8	
GSM 1 Tx slot	33.82	33.56	33.85	34.00	24.82	24.56	24.85	25.00
GPRS 1 Tx slot	33.81	33.54	33.82	34.00	24.81	24.54	24.82	25.00
GPRS 2 Tx slots	30.79	30.62	30.83	31.00	24.79	24.62	24.83	25.00
GPRS 3 Tx slots	28.33	28.40	28.42	29.00	24.07	24.14	24.16	24.74
GPRS 4 Tx slots	27.16	27.22	27.32	27.50	24.16	24.22	24.32	24.50
EDGE 1 Tx slot	27.06	27.14	27.20	27.50	18.06	18.14	18.20	18.50
EDGE 2 Tx slots	26.43	26.47	26.55	27.00	20.43	20.47	20.55	21.00
EDGE 3 Tx slots	25.38	25.40	25.47	26.00	21.12	21.14	21.21	21.74
EDGE 4 Tx slots	24.30	24.31	24.37	25.00	21.30	21.31	21.37	22.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
TX Channel	512	661	810	1850.2	1880	1909.8	1850.2	1880
Frequency (MHz)	1850.2	1880	1909.8				1909.8	
GSM 1 Tx slot	29.39	29.38	29.35	30.00	20.39	20.38	20.35	21.00
GPRS 1 Tx slot	29.38	29.37	29.33	30.00	20.38	20.37	20.33	21.00
GPRS 2 Tx slots	29.28	29.26	29.25	30.00	23.28	23.26	23.25	24.00
GPRS 3 Tx slots	29.15	29.20	29.15	29.50	24.89	24.94	24.89	25.24
GPRS 4 Tx slots	29.10	29.06	29.03	29.50	26.10	26.06	26.03	26.50
EDGE 1 Tx slot	24.74	24.73	24.73	25.00	15.74	15.73	15.73	16.00
EDGE 2 Tx slots	24.69	24.65	24.63	25.00	18.69	18.65	18.63	19.00
EDGE 3 Tx slots	24.60	24.49	24.50	25.00	20.34	20.23	20.24	20.74
EDGE 4 Tx slots	24.42	24.36	24.33	25.00	21.42	21.36	21.33	22.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

**<WCDMA Conducted Power>**

1. The following tests were conducted according to the test requirements outlined in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set Gain Factors (β_c and β_d) and parameters were set according to each
 - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - iii. Set RMC 12.2Kbps + HSDPA mode.
 - iv. Set Cell Power = -86 dBm
 - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
 - vi. Select HSDPA Uplink Parameters
 - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
 - viii. Set Ack-Nack Repetition Factor to 3
 - ix. Set CQI Feedback Cycle (k) to 4 ms
 - x. Set CQI Repetition Factor to 2
 - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1, 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: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

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

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 $\beta_c = 11/15$ and $\beta_d = 15/15$.

Setup Configuration

**HSUPA Setup Configuration:**

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
 - iii. Set Cell Power = -86 dBm
 - iv. Set Channel Type = 12.2k + HSPA
 - v. Set UE Target Power
 - vi. Power Ctrl Mode= Alternating bits
 - vii. Set and observe the E-TFCI
 - viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (Note 1)	β_c	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	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	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 (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: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

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

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

**<WCDMA Conducted Power>****General Note:**

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA.

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	23.74	23.83	23.85	24.50	23.10	23.19	23.23	24.00
3GPP Rel 99	RMC 12.2Kbps	23.75	23.85	23.86	24.50	23.12	23.20	23.24	24.00
3GPP Rel 6	HSDPA Subtest-1	22.88	22.96	22.93	23.50	22.08	22.19	22.11	22.50
3GPP Rel 6	HSDPA Subtest-2	22.98	23.02	22.88	23.50	22.18	22.24	22.24	22.50
3GPP Rel 6	HSDPA Subtest-3	22.47	22.54	22.51	23.00	21.69	21.76	21.75	22.00
3GPP Rel 6	HSDPA Subtest-4	22.44	22.54	22.50	23.00	21.70	21.76	21.75	22.00
3GPP Rel 6	HSUPA Subtest-1	23.01	22.96	22.95	23.50	22.10	22.19	22.16	22.50
3GPP Rel 6	HSUPA Subtest-2	21.02	20.92	20.94	21.50	20.15	20.15	20.19	20.50
3GPP Rel 6	HSUPA Subtest-3	22.01	21.97	21.90	22.50	21.13	21.21	21.17	21.50
3GPP Rel 6	HSUPA Subtest-4	21.10	21.02	20.96	21.50	20.20	20.21	20.23	20.50
3GPP Rel 6	HSUPA Subtest-5	23.00	23.00	22.90	23.50	22.00	22.00	22.20	22.50

**<LTE Conducted Power>****General Note:**

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.



<LTE Band 26>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				26765	26865	26965		
Frequency (MHz)				821.5	831.5	841.5		
15	QPSK	1	0	21.35	21.43	21.70	22.50	0
15	QPSK	1	37	21.92	21.95	21.81		
15	QPSK	1	74	21.56	21.72	21.56		
15	QPSK	36	0	20.77	20.77	20.90		
15	QPSK	36	20	20.84	20.95	20.91	21.50	1
15	QPSK	36	39	20.67	20.90	20.71		
15	QPSK	75	0	20.84	20.89	20.76		
15	16QAM	1	0	20.12	20.60	20.86		
15	16QAM	1	37	20.89	20.94	20.46	21.50	1
15	16QAM	1	74	20.61	20.81	20.64		
15	16QAM	36	0	19.72	19.73	19.90		
15	16QAM	36	20	19.81	19.92	19.69	20.50	2
15	16QAM	36	39	19.66	20.06	19.66		
15	16QAM	75	0	19.80	19.95	19.75		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	21.36	21.49	21.77	22.50	0
10	QPSK	1	25	21.85	21.88	21.74		
10	QPSK	1	49	21.49	21.67	21.54		
10	QPSK	25	0	20.80	20.74	20.84	21.50	1
10	QPSK	25	12	20.90	20.87	20.87		
10	QPSK	25	25	20.79	20.81	20.77		
10	QPSK	50	0	20.85	20.92	20.87		
10	16QAM	1	0	20.45	20.72	20.72	21.50	1
10	16QAM	1	25	20.73	20.78	20.71		
10	16QAM	1	49	20.72	20.89	20.73		
10	16QAM	25	0	19.99	19.78	19.92		
10	16QAM	25	12	19.97	20.08	19.94	20.50	2
10	16QAM	25	25	19.94	19.88	20.13		
10	16QAM	50	0	19.79	19.90	19.95		



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Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	21.24	21.26	21.28	22.50	0
5	QPSK	1	12	21.89	21.90	21.73		
5	QPSK	1	24	21.68	21.76	21.42	21.50	1
5	QPSK	12	0	20.70	20.77	20.84		
5	QPSK	12	7	20.80	20.83	20.85	21.50	1
5	QPSK	12	13	20.82	20.85	20.79		
5	QPSK	25	0	20.81	20.88	20.82	21.50	1
5	16QAM	1	0	20.27	20.38	20.50		
5	16QAM	1	12	20.75	20.72	20.79	20.50	2
5	16QAM	1	24	20.54	20.50	20.73		
5	16QAM	12	0	19.69	19.65	19.80	20.50	2
5	16QAM	12	7	19.98	20.00	19.87		
5	16QAM	12	13	19.95	20.03	19.77	20.50	2
5	16QAM	25	0	19.90	19.86	19.83		
Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	21.62	21.45	21.59	22.50	0
3	QPSK	1	8	21.61	21.52	21.45		
3	QPSK	1	14	21.67	21.58	21.48	21.50	1
3	QPSK	8	0	20.67	20.72	20.79		
3	QPSK	8	4	20.80	20.90	20.76	21.50	1
3	QPSK	8	7	20.80	20.83	20.77		
3	QPSK	15	0	20.79	20.82	20.71	21.50	1
3	16QAM	1	0	20.55	20.24	20.56		
3	16QAM	1	8	20.45	20.22	20.37	20.50	2
3	16QAM	1	14	20.55	20.20	20.15		
3	16QAM	8	0	19.83	19.90	19.48	20.50	2
3	16QAM	8	4	19.97	19.95	19.55		
3	16QAM	8	7	20.14	20.00	19.75	20.50	2
3	16QAM	15	0	19.89	20.00	19.64		

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Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	21.52	21.55	21.69	22.50	0
1.4	QPSK	1	3	21.51	21.62	21.55		
1.4	QPSK	1	5	21.47	21.50	21.47		
1.4	QPSK	3	0	20.60	20.66	20.89		
1.4	QPSK	3	1	20.81	20.79	20.85		
1.4	QPSK	3	3	20.83	20.89	20.75		
1.4	QPSK	6	0	20.88	20.72	20.65		21.50
1.4	16QAM	1	0	20.51	20.18	20.58		1
1.4	16QAM	1	3	20.55	20.20	20.42		
1.4	16QAM	1	5	20.53	20.32	20.32		
1.4	16QAM	3	0	20.00	19.90	19.55		
1.4	16QAM	3	1	19.99	19.91	19.58		
1.4	16QAM	3	3	20.26	20.07	19.70	20.50	2
1.4	16QAM	6	0	19.98	20.09	19.60		

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<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

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

- 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

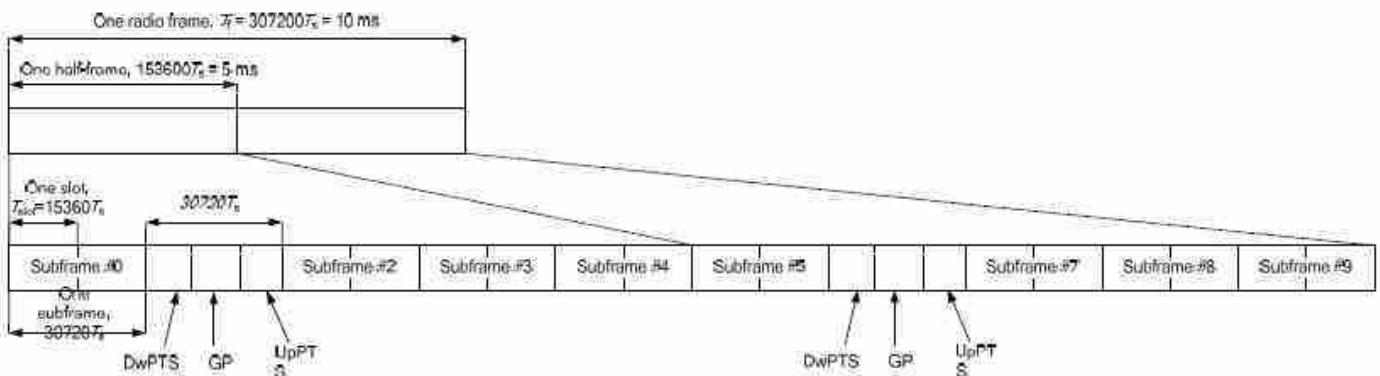


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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



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

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

The highest duty factor is resulted from:

- i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.167)/5 = 63.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.143)/5 = 62.9\%$
- v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.

**<LTE Band 41>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)	
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	20.77	20.95	20.90	21.02	21.27	22.00	0
20	QPSK	1	49	21.28	21.46	21.25	21.38	21.66		
20	QPSK	1	99	20.95	21.28	21.03	20.95	21.28		
20	QPSK	50	0	20.39	20.43	20.35	20.31	20.52	21.00	1
20	QPSK	50	24	20.14	20.31	20.15	20.24	20.47		
20	QPSK	50	50	20.38	20.32	20.04	20.22	20.37		
20	QPSK	100	0	20.16	20.32	20.10	20.18	20.50		
20	16QAM	1	0	19.53	19.64	19.24	19.36	19.91	21.00	1
20	16QAM	1	49	19.78	20.19	20.30	20.06	20.61		
20	16QAM	1	99	19.60	19.62	19.79	19.72	20.04		
20	16QAM	50	0	19.19	19.14	19.11	19.33	19.54	20.00	2
20	16QAM	50	24	19.23	19.42	19.25	19.44	19.48		
20	16QAM	50	50	19.08	19.35	19.14	19.27	19.29		
20	16QAM	100	0	19.06	19.31	19.19	19.13	19.63		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	20.83	21.21	20.80	20.83	21.33	22.00	0
15	QPSK	1	37	21.03	21.37	21.19	21.33	21.50		
15	QPSK	1	74	20.87	21.09	21.00	21.32	21.11		
15	QPSK	36	0	20.08	20.39	20.10	20.16	20.64	21.00	1
15	QPSK	36	20	20.06	20.40	20.16	20.30	20.41		
15	QPSK	36	39	20.05	20.27	20.22	20.29	20.44		
15	QPSK	75	0	20.09	20.33	20.13	20.18	20.56		
15	16QAM	1	0	19.56	19.81	19.56	19.95	19.96	21.00	1
15	16QAM	1	37	20.15	20.43	20.16	20.26	20.51		
15	16QAM	1	74	19.91	19.71	19.90	19.67	19.60		
15	16QAM	36	0	19.10	19.35	19.11	19.12	19.59	20.00	2
15	16QAM	36	20	19.30	19.38	19.27	19.24	19.47		
15	16QAM	36	39	19.00	19.25	19.09	19.27	19.32		
15	16QAM	75	0	18.99	19.43	19.15	19.30	19.60		


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Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	20.92	21.00	20.90	20.97	21.33	22.00	0
10	QPSK	1	25	21.08	21.40	21.06	21.23	21.41		
10	QPSK	1	49	21.01	21.09	20.89	21.08	21.18	21.00	1
10	QPSK	25	0	20.05	20.39	20.09	20.16	20.59		
10	QPSK	25	12	20.06	20.25	20.21	20.34	20.42	21.00	1
10	QPSK	25	25	20.05	20.25	20.19	20.24	20.31		
10	QPSK	50	0	20.08	20.38	20.15	20.24	20.38	21.00	1
10	16QAM	1	0	19.50	19.79	19.48	19.52	19.81		
10	16QAM	1	25	20.14	20.38	19.88	19.99	20.64	21.00	1
10	16QAM	1	49	19.50	19.87	19.76	19.64	19.62		
10	16QAM	25	0	19.25	19.50	19.26	19.36	19.70	20.00	2
10	16QAM	25	12	19.26	19.61	19.41	19.44	19.63		
10	16QAM	25	25	19.26	19.54	19.28	19.43	19.22	20.00	2
10	16QAM	50	0	19.07	19.17	19.14	19.24	19.50		
Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	20.83	20.97	20.77	20.83	21.05	22.00	0
5	QPSK	1	12	20.95	21.49	21.23	21.39	21.34		
5	QPSK	1	24	20.79	20.90	20.78	20.85	21.00	21.00	1
5	QPSK	12	0	20.03	20.34	20.07	20.12	20.60		
5	QPSK	12	7	20.09	20.34	20.24	20.37	20.60	21.00	1
5	QPSK	12	13	20.02	20.23	20.09	20.16	20.33		
5	QPSK	25	0	20.00	20.30	20.06	20.16	20.28	21.00	1
5	16QAM	1	0	19.80	19.88	19.70	19.77	19.71		
5	16QAM	1	12	20.07	20.27	20.02	20.15	20.36	21.00	1
5	16QAM	1	24	19.45	19.92	19.74	19.85	19.52		
5	16QAM	12	0	18.99	19.25	19.05	19.18	19.31	20.00	2
5	16QAM	12	7	19.04	19.39	19.32	19.32	19.37		
5	16QAM	12	13	18.94	19.36	19.12	19.20	19.20	20.00	2
5	16QAM	25	0	19.29	19.50	19.00	19.45	19.62		

**<WLAN Conducted Power>****General Note:**

1. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
2. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
3. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
4. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.¹⁸ The initial test position procedure is described in the following:
 - a. When the reported SAR of the initial test position is $\leq 0.4 \text{ W/kg}$, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
 - b. When the reported SAR of the test position is $> 0.4 \text{ W/kg}$, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closest/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is $\leq 0.8 \text{ W/kg}$ or all required test position are tested.
 - c. For all positions/configurations, when the reported SAR is $> 0.8 \text{ W/kg}$, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is $\leq 1.2 \text{ W/kg}$ or all required channels are tested.



<2.4GHz WLAN>

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11b	CH 1	2412	1Mbps	15.44	16.00	97.59
		CH 6	2437		15.55	16.00	
		CH 11	2462		15.92	16.50	
	802.11g	CH 1	2412	6Mbps	13.00	13.50	87.04
		CH 6	2437		13.16	13.50	
		CH 11	2462		13.55	14.00	
	802.11n-HT20	CH 1	2412	MCS0	11.21	11.50	86.76
		CH 6	2437		11.19	11.50	
		CH 11	2462		11.72	12.00	
	802.11n-HT40	CH 3	2422	MCS0	11.90	12.00	76.25
		CH 6	2437		11.21	11.50	
		CH 9	2452		11.23	11.50	

<5GHz WLAN>

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a	CH 36	5180	6Mbps	15.28	15.50	87.04
		CH 40	5200		14.54	15.00	
		CH 44	5220		15.37	15.50	
		CH 48	5240		15.44	16.00	
	802.11n-HT20	CH 36	5180	MCS0	13.32	14.00	83.07
		CH 40	5200		12.58	13.00	
		CH 44	5220		13.58	14.00	
		CH 48	5240		13.74	14.00	
	802.11n-HT40	CH 38	5190	MCS0	15.00	15.50	71.04
		CH 46	5230		15.35	15.50	
	802.11ac-VHT20	CH 36	5180	MCS0	10.19	10.50	83.31
		CH 40	5200		9.42	10.00	
		CH 44	5220		10.16	10.50	
		CH 48	5240		10.37	10.50	
	802.11ac-VHT40	CH 38	5190	MCS0	10.00	10.50	71.01
		CH 46	5230		10.25	10.50	
802.11ac-VHT80	CH 42	5210	MCS0	10.14	10.50	55.48	



5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a	CH 52	5260	6Mbps	15.66	16.00	87.04
		CH 56	5280		14.93	15.50	
		CH 60	5300		14.63	15.00	
		CH 64	5320		14.69	15.00	
	802.11n-HT20	CH 52	5260	MCS0	13.85	14.00	83.07
		CH 56	5280		13.04	13.50	
		CH 60	5300		14.03	14.50	
		CH 64	5320		14.19	14.50	
	802.11n-HT40	CH 54	5270	MCS0	15.52	15.80	71.04
		CH 62	5310		15.62	15.80	
	802.11ac-VHT20	CH 52	5260	MCS0	10.62	11.00	83.31
		CH 56	5280		9.97	11.00	
		CH 60	5300		10.86	11.00	
		CH 64	5320		10.93	11.00	
	802.11ac-VHT40	CH 54	5270	MCS0	10.32	11.00	71.01
		CH 62	5310		10.39	11.00	
	802.11ac-VHT80	CH 58	5290	MCS0	10.49	11.00	55.48



5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a	CH 100	5500	6Mbps	14.16	14.50	87.04
		CH 116	5580		14.65	15.00	
		CH 124	5620		13.86	14.50	
		CH 132	5660		13.57	14.00	
		CH 140	5700		13.83	14.50	
		CH 144	5720		11.86	12.50	
	802.11n-HT20	CH 100	5500	MCS0	12.49	13.00	83.07
		CH 116	5580		13.06	13.50	
		CH 124	5620		12.11	12.50	
		CH 132	5660		11.38	12.00	
		CH 140	5700		11.94	12.00	
		CH 144	5720		11.48	12.00	
	802.11n-HT40	CH 102	5510	MCS0	14.30	14.70	71.04
		CH 110	5550		14.59	14.70	
		CH 126	5630		12.71	13.00	
		CH 134	5670		13.93	14.00	
		CH 142	5710		11.90	12.00	
	802.11ac-VHT20	CH 100	5500	MCS0	9.37	10.00	83.31
		CH 116	5580		9.77	10.00	
		CH 124	5620		8.90	9.50	
		CH 132	5660		8.52	9.00	
		CH 140	5700		8.90	9.00	
		CH 144	5720		8.26	9.00	
	802.11ac-VHT40	CH 102	5510	MCS0	9.14	9.50	71.01
		CH 110	5550		9.48	9.50	
		CH 126	5630		8.86	9.50	
		CH 134	5670		9.01	9.50	
		CH 142	5710		8.23	9.00	
	802.11ac-VHT80	CH 106	5530	MCS0	9.16	9.50	55.48
		CH 122	5610		9.52	10.00	
		CH 138	5690		9.14	9.50	



5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a	CH 149	5745	6Mbps	15.51	16.00	87.04
		CH 157	5785		15.24	16.00	
		CH 165	5825		15.15	16.00	
	802.11n-HT20	CH 149	5745	MCS0	14.08	14.50	83.07
		CH 157	5785		13.81	14.50	
		CH 165	5825		13.74	14.50	
	802.11n-HT40	CH 151	5755	MCS0	12.98	13.50	71.04
		CH 159	5795		12.66	13.00	
	802.11ac-VHT20	CH 149	5745	MCS0	9.86	10.00	83.31
		CH 157	5785		9.67	10.00	
		CH 165	5825		9.56	10.00	
	802.11ac-VHT40	CH 151	5755	MCS0	9.64	10.00	71.01
		CH 159	5795		9.35	10.00	
	802.11ac-VHT80	CH 155	5775	MCS0	9.55	10.00	55.48



13. Bluetooth Exclusions Applied

Mode Band	Average power(dBm)	
	Bluetooth v3.0+EDR	Bluetooth v4.0 LE
2.4GHz Bluetooth	11.0	2.0

Note:

- Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* \leq 50 mm are determined by:
$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
 for
1-g SAR and ≤ 7.5 for 10-g extremity SAR
 - $f(\text{GHz})$ is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison

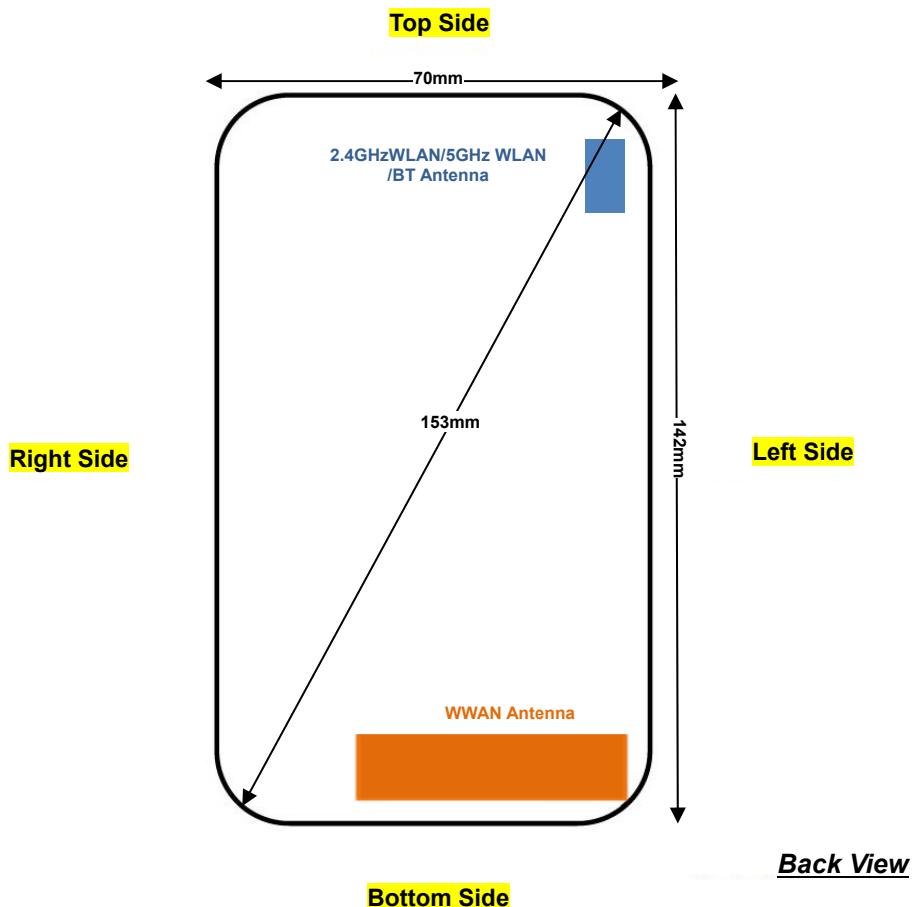
Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
11.0	10	2.48	2.1

Note:

Per KDB 447498 D01v06, the test exclusion threshold is 2.1 which is ≤ 3 , SAR testing is not required.



14. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	>25mm	2mm	24mm	11mm
BT&2.4GHz WLAN	≤ 25mm	≤ 25mm	2mm	>25mm	>25mm	2mm
5GHz WLAN	≤ 25mm	≤ 25mm	2mm	>25mm	>25mm	2mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	Yes	Yes	No	Yes	Yes	Yes
BT&2.4GHz WLAN	Yes	Yes	Yes	No	No	Yes
5GHz WLAN	Yes	Yes	Yes	No	No	Yes

General Note:

Referring to KDB 941225 D06 v02r01, when the overall device length and width are $\geq 9\text{cm} \times 5\text{cm}$, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge



15. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - $\leq 0.8 \text{ W/kg}$ or 2.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\leq 100 \text{ MHz}$
 - $\leq 0.6 \text{ W/kg}$ or 1.5 W/kg , for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - $\leq 0.4 \text{ W/kg}$ or 1.0 W/kg , for 1-g or 10-g respectively, when the transmission band is $\geq 200 \text{ MHz}$
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8 \text{ W/kg}$.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is $\leq 1.2 \text{ W/kg}$, SAR testing with a headset connected to the handset is not required.

GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based 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 GPRS (2Tx slots) for GSM850 and GPRS (4Tx slots) for GSM1900 are considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4} \text{ dB}$ higher than the primary mode, SAR measurement is not required for the secondary mode.

UMTS Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA is $\leq \frac{1}{4} \text{ dB}$ higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA to RMC12.2Kbps and the adjusted SAR is $\leq 1.2 \text{ W/kg}$, SAR measurement is not required for HSDPA / HSUPA.

**LTE Note:**

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are \leq 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is $>$ 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is \leq 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is \leq 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B26 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

WLAN Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is \leq 1.2 W/kg.
2. Per KDB 248227 D01v02r02, for U-NII-1 Head and Body-worn SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is \leq 1.2 W/kg, SAR is not required for U-NII-1 band.
3. When the reported SAR of the test position is $>$ 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closest/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is \leq 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is $>$ 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is \leq 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

**15.1 Head SAR****<GSM SAR>**

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
01	GSM850	GPRS(2 Tx slots)	Right Cheek	251	848.8	30.83	31.00	1.040	0.06	0.177	0.184
	GSM850	GPRS(2 Tx slots)	Right Tilted	251	848.8	30.83	31.00	1.040	-0.02	0.080	0.083
	GSM850	GPRS(2 Tx slots)	Left Cheek	251	848.8	30.83	31.00	1.040	0.05	0.136	0.141
	GSM850	GPRS(2 Tx slots)	Left Tilted	251	848.8	30.83	31.00	1.040	0.09	0.093	0.097
	GSM1900	GPRS(4 Tx slots)	Right Cheek	512	1850.2	29.10	29.50	1.096	0.07	0.041	0.045
	GSM1900	GPRS(4 Tx slots)	Right Tilted	512	1850.2	29.10	29.50	1.096	0.08	0.032	0.035
02	GSM1900	GPRS(4 Tx slots)	Left Cheek	512	1850.2	29.10	29.50	1.096	0.18	0.073	0.080
	GSM1900	GPRS(4 Tx slots)	Left Tilted	512	1850.2	29.10	29.50	1.096	0.04	0.032	0.035

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
03	WCDMA Band V	RMC 12.2Kbps	Right Cheek	4233	846.6	23.24	24.00	1.191	0.02	0.096	0.114
	WCDMA Band V	RMC 12.2Kbps	Right Tilted	4233	846.6	23.24	24.00	1.191	-0.08	0.049	0.058
	WCDMA Band V	RMC 12.2Kbps	Left Cheek	4233	846.6	23.24	24.00	1.191	0.04	0.080	0.095
	WCDMA Band V	RMC 12.2Kbps	Left Tilted	4233	846.6	23.24	24.00	1.191	0.16	0.061	0.073
	WCDMA Band II	RMC 12.2Kbps	Right Cheek	9538	1907.6	23.86	24.50	1.159	0.06	0.041	0.048
	WCDMA Band II	RMC 12.2Kbps	Right Tilted	9538	1907.6	23.86	24.50	1.159	0.04	0.027	0.031
04	WCDMA Band II	RMC 12.2Kbps	Left Cheek	9538	1907.6	23.86	24.50	1.159	-0.01	0.055	0.064
	WCDMA Band II	RMC 12.2Kbps	Left Tilted	9538	1907.6	23.86	24.50	1.159	0.01	0.030	0.035

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
05	LTE Band 26	15M	QPSK	1RB	37Offset	Right Cheek	26865	831.5	21.95	22.5	1.135	0.04	0.042	0.048
	LTE Band 26	15M	QPSK	1RB	37Offset	Right Tilted	26865	831.5	21.95	22.5	1.135	-0.01	0.022	0.025
	LTE Band 26	15M	QPSK	1RB	37Offset	Left Cheek	26865	831.5	21.95	22.5	1.135	-0.03	0.034	0.039
	LTE Band 26	15M	QPSK	1RB	37Offset	Left Tilted	26865	831.5	21.95	22.5	1.135	0.18	0.028	0.032
	LTE Band 26	15M	QPSK	36RB	20Offset	Right Cheek	26865	831.5	20.95	21.5	1.135	0.06	0.034	0.039
	LTE Band 26	15M	QPSK	36RB	20Offset	Right Tilted	26865	831.5	20.95	21.5	1.135	0.05	0.017	0.019
	LTE Band 26	15M	QPSK	36RB	20Offset	Left Cheek	26865	831.5	20.95	21.5	1.135	0.16	0.027	0.031
	LTE Band 26	15M	QPSK	36RB	20Offset	Left Tilted	26865	831.5	20.95	21.5	1.135	0.11	0.022	0.025

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1RB	49Offset	Right Cheek	41490	2680	21.66	22	1.081	62.9	1.006	-0.03	0.017	0.018
	LTE Band 41	20M	QPSK	1RB	49Offset	Right Tilted	41490	2680	21.66	22	1.081	62.9	1.006	0.02	0.022	0.024
	LTE Band 41	20M	QPSK	1RB	49Offset	Left Cheek	41490	2680	21.66	22	1.081	62.9	1.006	0.12	0.017	0.018
	LTE Band 41	20M	QPSK	1RB	49Offset	Left Tilted	41490	2680	21.66	22	1.081	62.9	1.006	-0.11	<0.001	<0.001
06	LTE Band 41	20M	QPSK	50RB	0Offset	Right Cheek	41490	2680	20.52	21	1.117	62.9	1.006	0.07	0.022	0.025
	LTE Band 41	20M	QPSK	50RB	0Offset	Right Tilted	41490	2680	20.52	21	1.117	62.9	1.006	-0.05	0.008	0.009
	LTE Band 41	20M	QPSK	50RB	0Offset	Left Cheek	41490	2680	20.52	21	1.117	62.9	1.006	0.03	0.006	0.007
	LTE Band 41	20M	QPSK	50RB	0Offset	Left Tilted	41490	2680	20.52	21	1.117	62.9	1.006	0.09	0.001	0.001



FCC SAR Test Report

Report No. : FA671404

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
07	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	11	2462	15.92	16.50	1.144	97.59	1.025	-0.02	0.915	1.073
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	11	2462	15.92	16.50	1.144	97.59	1.025	-0.09	0.716	0.840
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	11	2462	15.92	16.50	1.144	97.59	1.025	0.01	0.294	0.345
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	11	2462	15.92	16.50	1.144	97.59	1.025	0.05	0.393	0.461
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	6	2437	15.55	16.00	1.110	97.59	1.025	0.04	0.596	0.678
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	6	2437	15.55	16.00	1.110	97.59	1.025	-0.13	0.497	0.566

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
08	WLAN5.3GHz	802.11a 6Mbps	Right Cheek	52	5260	15.66	16.00	1.081	87.04	1.149	-0.04	0.035	0.043
	WLAN5.3GHz	802.11a 6Mbps	Right Tilted	52	5260	15.66	16.00	1.081	87.04	1.149	0.01	0.034	0.043
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	52	5260	15.66	16.00	1.081	87.04	1.149	0.03	0.012	0.015
	WLAN5.3GHz	802.11a 6Mbps	Left Tilted	52	5260	15.66	16.00	1.081	87.04	1.149	-0.02	0.006	0.008
	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	116	5580	14.65	15.00	1.083	87.04	1.149	0.01	0.051	0.063
	WLAN5.5GHz	802.11a 6Mbps	Right Tilted	116	5580	14.65	15.00	1.083	87.04	1.149	-0.12	0.029	0.036
09	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	116	5580	14.65	15.00	1.083	87.04	1.149	0.16	0.105	0.131
	WLAN5.5GHz	802.11a 6Mbps	Left Tilted	116	5580	14.65	15.00	1.083	87.04	1.149	0.05	0.0445	0.055
	WLAN5.8GHz	802.11a 6Mbps	Right Cheek	149	5745	15.51	16.00	1.119	87.04	1.149	-0.11	0.007	0.009
	WLAN5.8GHz	802.11a 6Mbps	Right Tilted	149	5745	15.51	16.00	1.119	87.04	1.149	0.05	0.010	0.013
10	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	149	5745	15.51	16.00	1.119	87.04	1.149	-0.17	0.107	0.138
	WLAN5.8GHz	802.11a 6Mbps	Left Tilted	149	5745	15.51	16.00	1.119	87.04	1.149	-0.08	0.033	0.042

**15.2 Hotspot SAR****<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS(2 Tx slots)	Front	10	251	848.8	30.83	31	1.040	-0.04	0.353	0.367
11	GSM850	GPRS(2 Tx slots)	Back	10	251	848.8	30.83	31	1.040	0.09	0.371	0.386
	GSM850	GPRS(2 Tx slots)	Left Side	10	251	848.8	30.83	31	1.040	-0.08	0.086	0.089
	GSM850	GPRS(2 Tx slots)	Right Side	10	251	848.8	30.83	31	1.040	0.03	0.248	0.258
	GSM850	GPRS(2 Tx slots)	Bottom Side	10	251	848.8	30.83	31	1.040	0.01	0.245	0.255
	GSM1900	GPRS(4 Tx slots)	Front	10	512	1850.2	29.10	29.5	1.096	0.14	0.266	0.292
	GSM1900	GPRS(4 Tx slots)	Back	10	512	1850.2	29.10	29.5	1.096	-0.09	0.310	0.340
	GSM1900	GPRS(4 Tx slots)	Left Side	10	512	1850.2	29.10	29.5	1.096	-0.08	0.050	0.055
	GSM1900	GPRS(4 Tx slots)	Right Side	10	512	1850.2	29.10	29.5	1.096	-0.08	0.042	0.046
12	GSM1900	GPRS(4 Tx slots)	Bottom Side	10	512	1850.2	29.10	29.5	1.096	0.08	0.589	0.646

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA Band V	RMC 12.2Kbps	Front	10	4233	846.6	23.24	24	1.191	-0.03	0.221	0.263
13	WCDMA Band V	RMC 12.2Kbps	Back	10	4233	846.6	23.24	24	1.191	0.07	0.234	0.279
	WCDMA Band V	RMC 12.2Kbps	Left Side	10	4233	846.6	23.24	24	1.191	0.06	0.073	0.087
	WCDMA Band V	RMC 12.2Kbps	Right Side	10	4233	846.6	23.24	24	1.191	0.1	0.177	0.211
	WCDMA Band V	RMC 12.2Kbps	Bottom Side	10	4233	846.6	23.24	24	1.191	-0.04	0.157	0.187
	WCDMA Band II	RMC 12.2Kbps	Front	10	9538	1907.6	23.86	24.5	1.159	-0.19	0.221	0.256
	WCDMA Band II	RMC 12.2Kbps	Back	10	9538	1907.6	23.86	24.5	1.159	0.07	0.239	0.277
	WCDMA Band II	RMC 12.2Kbps	Left Side	10	9538	1907.6	23.86	24.5	1.159	0.09	0.043	0.050
	WCDMA Band II	RMC 12.2Kbps	Right Side	10	9538	1907.6	23.86	24.5	1.159	-0.19	0.036	0.042
14	WCDMA Band II	RMC 12.2Kbps	Bottom Side	10	9538	1907.6	23.86	24.5	1.159	-0.06	0.441	0.511

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 26	15M	QPSK	1RB	37Offset	Front	10	26865	831.5	21.95	22.5	1.135	-0.09	0.104	0.118
15	LTE Band 26	15M	QPSK	1RB	37Offset	Back	10	26865	831.5	21.95	22.5	1.135	0.03	0.113	0.128
	LTE Band 26	15M	QPSK	1RB	37Offset	Left Side	10	26865	831.5	21.95	22.5	1.135	0.07	0.044	0.050
	LTE Band 26	15M	QPSK	1RB	37Offset	Right Side	10	26865	831.5	21.95	22.5	1.135	0.07	0.086	0.098
	LTE Band 26	15M	QPSK	1RB	37Offset	Bottom Side	10	26865	831.5	21.95	22.5	1.135	-0.04	0.067	0.076
	LTE Band 26	15M	QPSK	36RB	20Offset	Front	10	26865	831.5	20.95	21.5	1.135	0.09	0.082	0.093
	LTE Band 26	15M	QPSK	36RB	20Offset	Back	10	26865	831.5	20.95	21.5	1.135	-0.08	0.080	0.091
	LTE Band 26	15M	QPSK	36RB	20Offset	Left Side	10	26865	831.5	20.95	21.5	1.135	0.1	0.035	0.040
	LTE Band 26	15M	QPSK	36RB	20Offset	Right Side	10	26865	831.5	20.95	21.5	1.135	0.01	0.068	0.077
	LTE Band 26	15M	QPSK	36RB	20Offset	Bottom Side	10	26865	831.5	20.95	21.5	1.135	0.03	0.054	0.061

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1RB	49Offset	Front	10	41490	2680	21.66	22	1.081	62.9	1.006	0.07	0.203	0.221
	LTE Band 41	20M	QPSK	1RB	49Offset	Back	10	41490	2680	21.66	22	1.081	62.9	1.006	-0.07	0.234	0.255
	LTE Band 41	20M	QPSK	1RB	49Offset	Left Side	10	41490	2680	21.66	22	1.081	62.9	1.006	-0.14	0.084	0.091
	LTE Band 41	20M	QPSK	1RB	49Offset	Right Side	10	41490	2680	21.66	22	1.081	62.9	1.006	-0.08	0.054	0.059
16	LTE Band 41	20M	QPSK	1RB	49Offset	Bottom Side	10	41490	2680	21.66	22	1.081	62.9	1.006	-0.05	0.595	0.647
	LTE Band 41	20M	QPSK	1RB	49Offset	Bottom Side	10	39750	2506	21.28	22	1.180	62.9	1.006	-0.18	0.339	0.403
	LTE Band 41	20M	QPSK	1RB	49Offset	Bottom Side	10	40185	2549.5	21.46	22	1.132	62.9	1.006	-0.04	0.347	0.395
	LTE Band 41	20M	QPSK	1RB	49Offset	Bottom Side	10	40620	2593	21.25	22	1.189	62.9	1.006	0.02	0.446	0.533
	LTE Band 41	20M	QPSK	1RB	49Offset	Bottom Side	10	41055	2636.5	21.38	22	1.153	62.9	1.006	-0.09	0.539	0.625
	LTE Band 41	20M	QPSK	50RB	0Offset	Front	10	41490	2680	20.52	21	1.117	62.9	1.006	0.02	0.163	0.183
	LTE Band 41	20M	QPSK	50RB	0Offset	Back	10	41490	2680	20.52	21	1.117	62.9	1.006	-0.03	0.178	0.200
	LTE Band 41	20M	QPSK	50RB	0Offset	Left Side	10	41490	2680	20.52	21	1.117	62.9	1.006	0.05	0.059	0.066
	LTE Band 41	20M	QPSK	50RB	0Offset	Right Side	10	41490	2680	20.52	21	1.117	62.9	1.006	-0.04	0.042	0.047
	LTE Band 41	20M	QPSK	50RB	0Offset	Bottom Side	10	41490	2680	20.52	21	1.117	62.9	1.006	-0.08	0.465	0.522
	LTE Band 41	20M	QPSK	100RB	0Offset	Bottom Side	10	41490	2680	20.50	21	1.122	62.9	1.006	-0.09	0.455	0.514

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	10	11	2462	15.92	16.50	1.144	97.59	1.025	-0.07	0.090	0.105
	WLAN 2.4GHz	802.11b 1Mbps	Back	10	11	2462	15.92	16.50	1.144	97.59	1.025	-0.12	0.143	0.168
	WLAN 2.4GHz	802.11b 1Mbps	Left Side	10	11	2462	15.92	16.50	1.144	97.59	1.025	0.01	0.057	0.067
17	WLAN 2.4GHz	802.11b 1Mbps	Top Side	10	11	2462	15.92	16.50	1.144	97.59	1.025	0.11	0.163	0.191

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 5.2GHz	802.11a 6Mbps	Front	10	48	5240	15.44	16.00	1.137	87.04	1.149	0.03	0.025	0.033
18	WLAN 5.2GHz	802.11a 6Mbps	Back	10	48	5240	15.44	16.00	1.137	87.04	1.149	-0.13	0.130	0.170
	WLAN 5.2GHz	802.11a 6Mbps	Left Side	10	48	5240	15.44	16.00	1.137	87.04	1.149	-0.01	0.084	0.109
	WLAN 5.2GHz	802.11a 6Mbps	Top Side	10	48	5240	15.44	16.00	1.137	87.04	1.149	0.07	0.021	0.027
	WLAN 5.8GHz	802.11a 6Mbps	Front	10	149	5745	15.51	16.00	1.119	87.04	1.149	0.01	<0.001	<0.001
19	WLAN 5.8GHz	802.11a 6Mbps	Back	10	149	5745	15.51	16.00	1.119	87.04	1.149	0.09	0.084	0.108
	WLAN 5.8GHz	802.11a 6Mbps	Left Side	10	149	5745	15.51	16.00	1.119	87.04	1.149	-0.07	0.029	0.037
	WLAN 5.8GHz	802.11a 6Mbps	Top Side	10	149	5745	15.51	16.00	1.119	87.04	1.149	-0.08	0.019	0.024

**15.3 Body Worn Accessory SAR****<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM850	GPRS(2 Tx slots)	Front	10	251	848.8	30.83	31	1.040	-0.04	0.353	0.367
11	GSM850	GPRS(2 Tx slots)	Back	10	251	848.8	30.83	31	1.040	0.09	0.371	0.386
	GSM1900	GPRS(4 Tx slots)	Front	10	512	1850.2	29.1	29.5	1.096	0.14	0.266	0.292
20	GSM1900	GPRS(4 Tx slots)	Back	10	512	1850.2	29.1	29.5	1.096	-0.09	0.310	0.340

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA Band V	RMC 12.2Kbps	Front	10	4233	846.6	23.24	24	1.191	-0.03	0.221	0.263
13	WCDMA Band V	RMC 12.2Kbps	Back	10	4233	846.6	23.24	24	1.191	0.07	0.234	0.279
	WCDMA Band II	RMC 12.2Kbps	Front	10	9538	1907.6	23.86	24.5	1.159	-0.19	0.221	0.256
14	WCDMA Band II	RMC 12.2Kbps	Back	10	9538	1907.6	23.86	24.5	1.159	0.07	0.239	0.277

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 26	15M	QPSK	1RB	37Offset	Front	10	26865	831.5	21.95	22.5	1.135	-0.09	0.104	0.118
15	LTE Band 26	15M	QPSK	1RB	37Offset	Back	10	26865	831.5	21.95	22.5	1.135	0.03	0.113	0.128
	LTE Band 26	15M	QPSK	36RB	20Offset	Front	10	26865	831.5	20.95	21.5	1.135	0.09	0.082	0.093
	LTE Band 26	15M	QPSK	36RB	20Offset	Back	10	26865	831.5	20.95	21.5	1.135	-0.08	0.080	0.091

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 41	20M	QPSK	1RB	49Offset	Front	10	41490	21.66	22	1.081	62.9	1.006	0.07	0.203	0.221
21	LTE Band 41	20M	QPSK	1RB	49Offset	Back	10	41490	21.66	22	1.081	62.9	1.006	-0.07	0.234	0.255
	LTE Band 41	20M	QPSK	50RB	0Offset	Front	10	41490	20.52	21	1.117	62.9	1.006	0.02	0.163	0.183
	LTE Band 41	20M	QPSK	50RB	0Offset	Back	10	41490	20.52	21	1.117	62.9	1.006	-0.03	0.178	0.200

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 2.4GHz	802.11b 1Mbps	Front	10	11	2462	15.92	16.50	1.144	97.59	1.025	-0.09	0.090	0.105
22	WLAN 2.4GHz	802.11b 1Mbps	Back	10	11	2462	15.92	16.50	1.144	97.59	1.025	-0.12	0.143	0.168

Plot No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN 5.3GHz	802.11a 6Mbps	Front	10	52	5260	15.66	16.00	1.081	87.04	1.149	0.04	0.045	0.056
23	WLAN 5.3GHz	802.11a 6Mbps	Back	10	52	5260	15.66	16.00	1.081	87.04	1.149	-0.13	0.160	0.199
	WLAN 5.5GHz	802.11a 6Mbps	Front	10	116	5580	14.65	15.00	1.083	87.04	1.149	-0.01	0.045	0.056
24	WLAN 5.5GHz	802.11a 6Mbps	Back	10	116	5580	14.65	15.00	1.083	87.04	1.149	-0.16	0.086	0.107
	WLAN 5.8GHz	802.11a 6Mbps	Front	10	149	5745	15.51	16.00	1.119	87.04	1.149	0.01	<0.001	<0.001
19	WLAN 5.8GHz	802.11a 6Mbps	Back	10	149	5745	15.51	16.00	1.119	87.04	1.149	0.09	0.084	0.108

**15.4 Repeated SAR Measurement**

No.	Band	Mode	Test Position	Gap (mm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WLAN 2.4GHz	802.11b 1Mbps	Right Cheek	0	11	2462	15.92	16.50	1.144	97.59	1.025	-0.02	0.915	1	1.073
2nd	WLAN 2.4GHz	802.11b 1Mbps	Right Cheek	0	11	2462	15.92	16.50	1.144	97.59	1.025	-0.08	0.898	1.019	1.053

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8\text{W/kg}$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45\text{W/kg}$, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.



16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			Note
		Head	Body-worn	Hotspot	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
5.	GSM Voice + Bluetooth		Yes		
6.	GPRS/EDGE + Bluetooth			Yes	WWAN VoIP
7.	WCDMA+ Bluetooth			Yes	WWAN VoIP
8.	LTE + Bluetooth			Yes	WWAN VoIP
9.	GSM Voice + WLAN5.3/5.5GHz	Yes	Yes		
10.	GPRS/EDGE + WLAN5.3/5.5GHz	Yes	Yes		WWAN VoIP
11.	WCDMA + WLAN5.3/5.5GHz	Yes	Yes		WWAN VoIP
12.	LTE + WLAN5.3/5.5GHz	Yes	Yes		WWAN VoIP
13.	GSM Voice + WLAN5.2/5.8GHz	Yes	Yes		
14.	GPRS/EDGE + WLAN5.2/5.8GHz	Yes	Yes	Yes	Hotspot
15.	WCDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes	Hotspot
16.	LTE + WLAN5.2/5.8GHz	Yes	Yes	Yes	Hotspot

General Note:

1. This device supported VoIP in EGPRS, WCDMA, LTE (e.g. 3rd party VoIP).
2. This device 2.4GHz WLAN /5.2GHz WLAN/5.8GHz WLAN support Hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
3. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
4. WLAN2.4GHz and Bluetooth share the same antenna, and cannot transmit simultaneously.
5. Though EUT has independent antenna for WLAN 2.4GHz and WLAN 5GHz, EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
6. Chose all WLAN 5GHz worse SAR for co-located with WWAN analysis conservatively .
7. The Scaled SAR summation is calculated based on the same configuration and test position.
8. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/kg.
 - ii) SPLSR = $(\text{SAR1} + \text{SAR2})/1.5 / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $\text{SPLSR} \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
9. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
 - i) $(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})}/x] \text{ W/kg}$ for *test separation distances* $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - ii) When the minimum separation distance is $< 5\text{mm}$, the distance is used 5mm to determine SAR test exclusion.
 - iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distances* is $> 50 \text{ mm}$.

Bluetooth Max Power	Exposure Position	Body worn
	Test separation	10 mm
11.0 dBm	Estimated SAR (W/kg)	0.273 W/kg

**16.1 Head Exposure Conditions**

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM	GSM850	Right Cheek	0.184	1.073	0.063	1.26	0.25
		Right Tilted	0.083	0.840	0.043	0.92	0.13
		Left Cheek	0.141	0.345	0.138	0.49	0.28
		Left Tilted	0.097	0.461	0.055	0.56	0.15
	GSM1900	Right Cheek	0.045	1.073	0.063	1.12	0.11
		Right Tilted	0.035	0.840	0.043	0.88	0.08
		Left Cheek	0.080	0.345	0.138	0.43	0.22
		Left Tilted	0.035	0.461	0.055	0.50	0.09
WCDMA	Band V	Right Cheek	0.114	1.073	0.063	1.19	0.18
		Right Tilted	0.058	0.840	0.043	0.90	0.10
		Left Cheek	0.095	0.345	0.138	0.44	0.23
		Left Tilted	0.073	0.461	0.055	0.53	0.13
	Band II	Right Cheek	0.048	1.073	0.063	1.12	0.11
		Right Tilted	0.031	0.840	0.043	0.87	0.07
		Left Cheek	0.064	0.345	0.138	0.41	0.20
		Left Tilted	0.035	0.461	0.055	0.50	0.09
LTE	Band 26	Right Cheek	0.048	1.073	0.063	1.12	0.11
		Right Tilted	0.025	0.840	0.043	0.87	0.07
		Left Cheek	0.039	0.345	0.138	0.38	0.18
		Left Tilted	0.032	0.461	0.055	0.49	0.09
	Band 41	Right Cheek	0.025	1.073	0.063	1.10	0.09
		Right Tilted	0.024	0.840	0.043	0.86	0.07
		Left Cheek	0.018	0.345	0.138	0.36	0.16
		Left Tilted	0.001	0.461	0.055	0.46	0.06

**16.2 Hotspot Exposure Conditions**

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM	GSM850	Front	0.367	0.105	0.033	0.47	0.40
		Back	0.386	0.168	0.170	0.55	0.56
		Left side	0.089	0.067	0.109	0.16	0.20
		Right side	0.258			0.26	0.26
		Top side		0.191	0.027	0.19	0.03
		Bottom side	0.255			0.26	0.26
	GSM1900	Front	0.292	0.105	0.033	0.40	0.33
		Back	0.340	0.168	0.170	0.51	0.51
		Left side	0.055	0.067	0.109	0.12	0.16
		Right side	0.046			0.05	0.05
		Top side		0.191	0.027	0.19	0.03
		Bottom side	0.646			0.65	0.65
WCDMA	Band V	Front	0.263	0.105	0.033	0.37	0.30
		Back	0.279	0.168	0.170	0.45	0.45
		Left side	0.087	0.067	0.109	0.15	0.20
		Right side	0.211			0.21	0.21
		Top side		0.191	0.027	0.19	0.03
		Bottom side	0.187			0.19	0.19
	Band II	Front	0.256	0.105	0.033	0.36	0.29
		Back	0.277	0.168	0.170	0.45	0.45
		Left side	0.050	0.067	0.109	0.12	0.16
		Right side	0.042			0.04	0.04
		Top side		0.191	0.027	0.19	0.03
		Bottom side	0.511			0.51	0.51
LTE	Band 26	Front	0.118	0.105	0.033	0.22	0.15
		Back	0.128	0.168	0.170	0.30	0.30
		Left side	0.050	0.067	0.109	0.12	0.16
		Right side	0.098			0.10	0.10
		Top side		0.191	0.027	0.19	0.03
		Bottom side	0.076			0.08	0.08
	Band 41	Front	0.221	0.105	0.033	0.33	0.25
		Back	0.255	0.168	0.170	0.42	0.43
		Left side	0.091	0.067	0.109	0.16	0.20
		Right side	0.059			0.06	0.06
		Top side		0.191	0.027	0.19	0.03
		Bottom side	0.647			0.65	0.65

**16.3 Body-Worn Accessory Exposure Conditions**

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)			
GSM	GSM850	Front	0.367	0.105	0.056	0.273	0.47	0.42	0.64
		Back	0.386	0.168	0.199	0.273	0.55	0.59	0.66
	GSM1900	Front	0.292	0.105	0.056	0.273	0.40	0.35	0.57
		Back	0.340	0.168	0.199	0.273	0.51	0.54	0.61
WCDMA	Band V	Front	0.263	0.105	0.056	0.273	0.37	0.32	0.54
		Back	0.279	0.168	0.199	0.273	0.45	0.48	0.55
	Band II	Front	0.256	0.105	0.056	0.273	0.36	0.31	0.53
		Back	0.277	0.168	0.199	0.273	0.45	0.48	0.55
LTE	Band 26	Front	0.118	0.105	0.056	0.273	0.22	0.17	0.39
		Back	0.128	0.168	0.199	0.273	0.30	0.33	0.40
	Band 41	Front	0.221	0.105	0.056	0.273	0.33	0.28	0.49
		Back	0.255	0.168	0.199	0.273	0.42	0.45	0.53

Test Engineer : Luke Lu



17. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacturer's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	$1/k^{(b)}$	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

- (a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity
- (b) k is the coverage factor

Table 17.1. Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.4%	11.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						22.9%	22.7%

Table 17.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	7.0	N	1	1	1	7.0	7.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						12.8%	12.7%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.5%	25.4%

Table 17.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz



18. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [6] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [7] FCC KDB 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [8] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [9] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [12] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Head_835MHz_160729**DUT: D835V2-SN:4d162**

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL_835_160729 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.897 \text{ S/m}$; $\epsilon_r = 41.605$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 3.12 W/kg

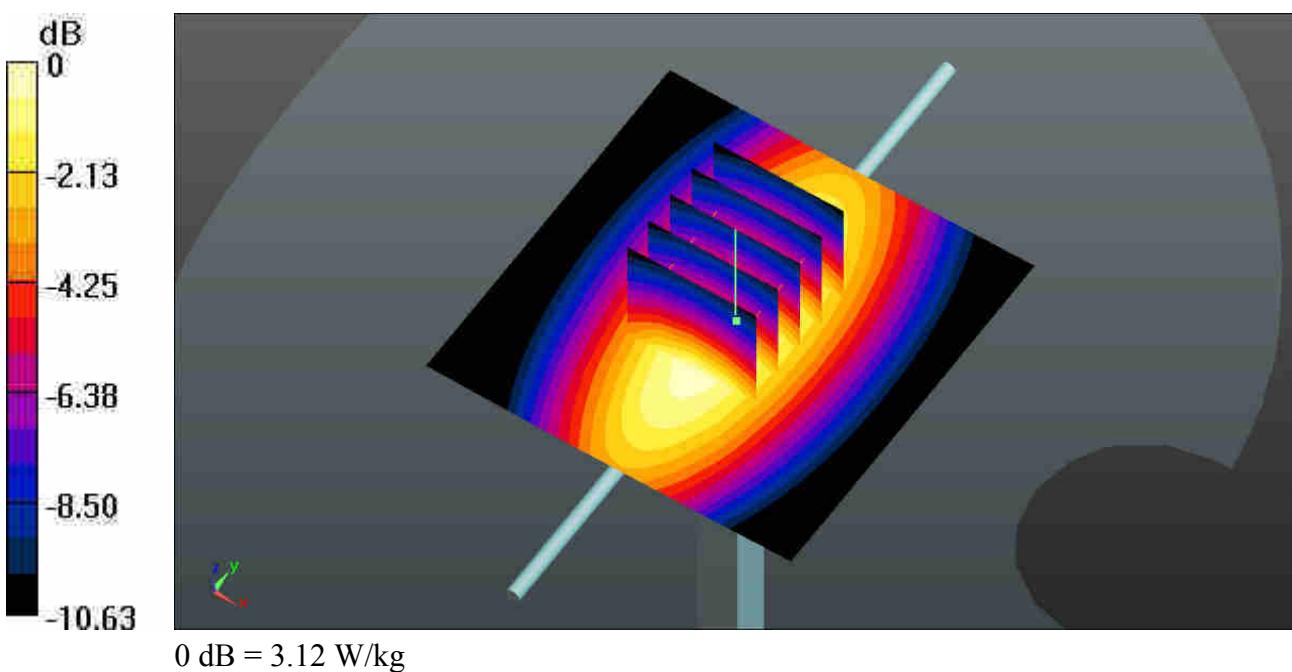
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 61.14 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.48 W/kg

SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.58 W/kg

Maximum value of SAR (measured) = 3.00 W/kg



System Check_Head_1900MHz_160803

DUT: D1900V2-SN:5d182

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

Medium: HSL_1900_160803 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.45 \text{ S/m}$; $\epsilon_r = 40.004$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.79, 7.79, 7.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 14.6 W/kg

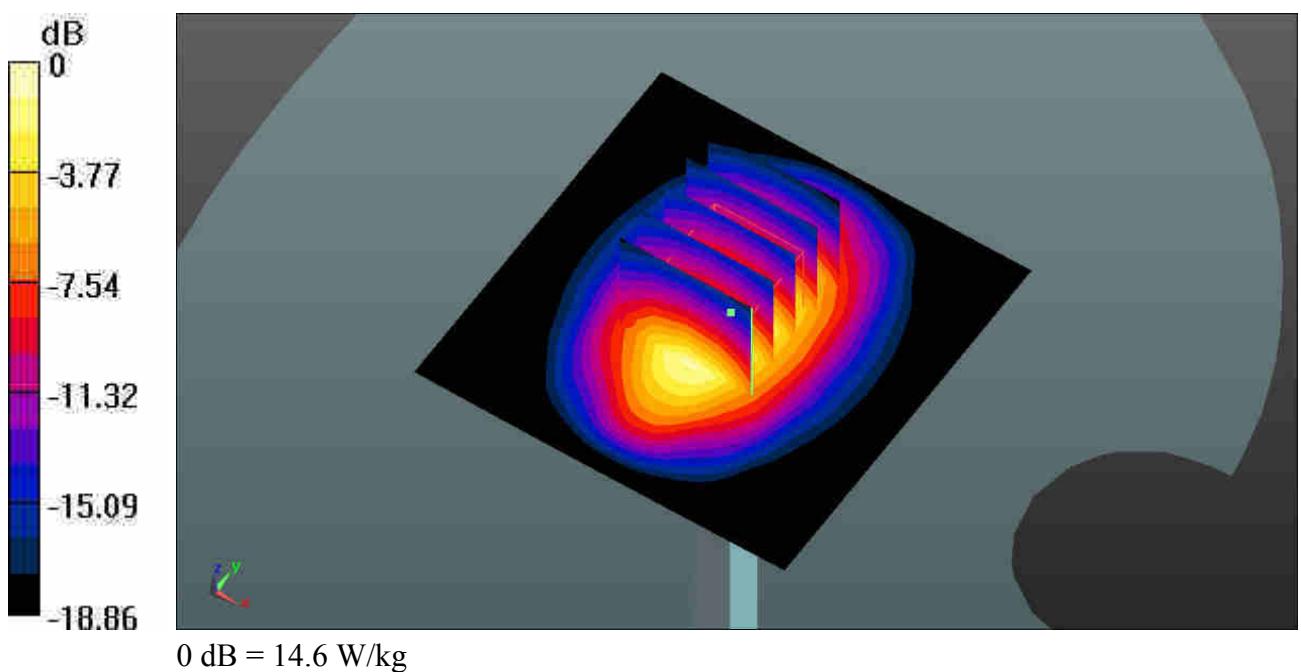
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 102.8 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 9.91 W/kg; SAR(10 g) = 5.12 W/kg

Maximum value of SAR (measured) = 13.9 W/kg



System Check_Head_2450MHz_160803**DUT: D2450V2-SN:924**

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

Medium: HSL_2450_160803 Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.809 \text{ S/m}$; $\epsilon_r = 38.451$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(6.93, 6.93, 6.93); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 19.6 W/kg

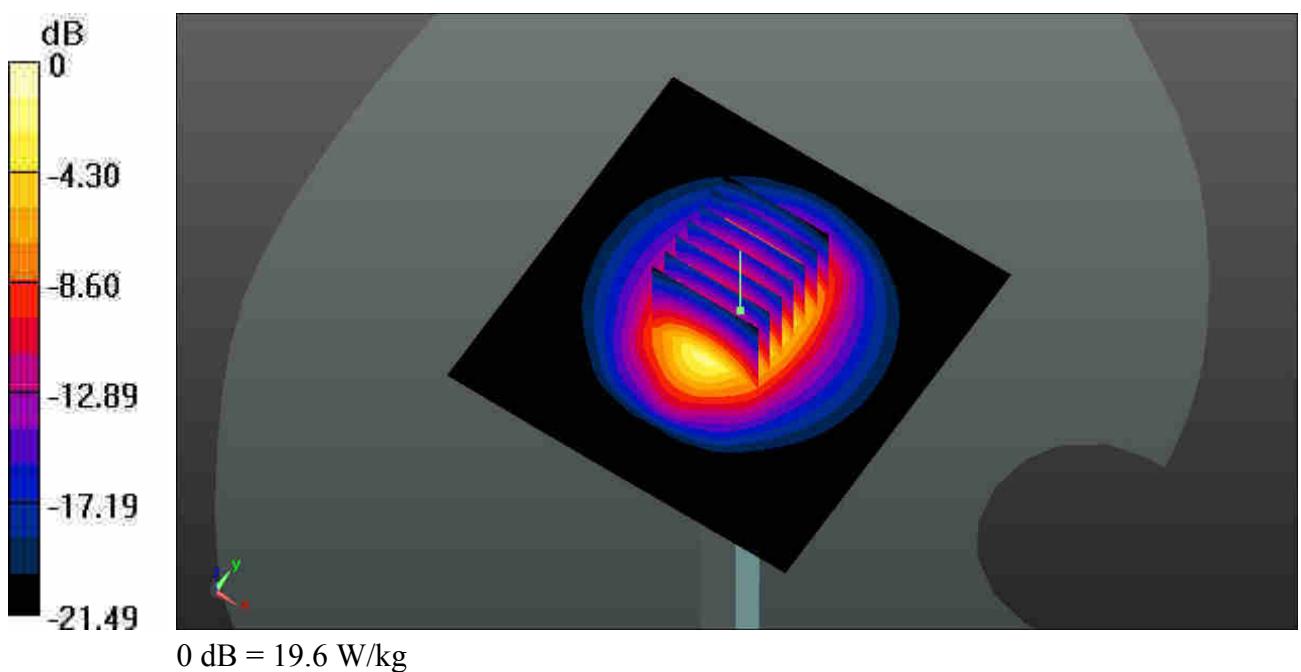
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.22 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 12.6 W/kg; SAR(10 g) = 5.91 W/kg

Maximum value of SAR (measured) = 19.1 W/kg



System Check_Head_2600MHz_160803

DUT: D2600V2-SN:1070

Communication System: UID 0, CW (0); Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: HSL_2600_160803 Medium parameters used: $f = 2600 \text{ MHz}$; $\sigma = 2.009 \text{ S/m}$; $\epsilon_r = 39.626$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(6.82, 6.82, 6.82); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 22.7 W/kg

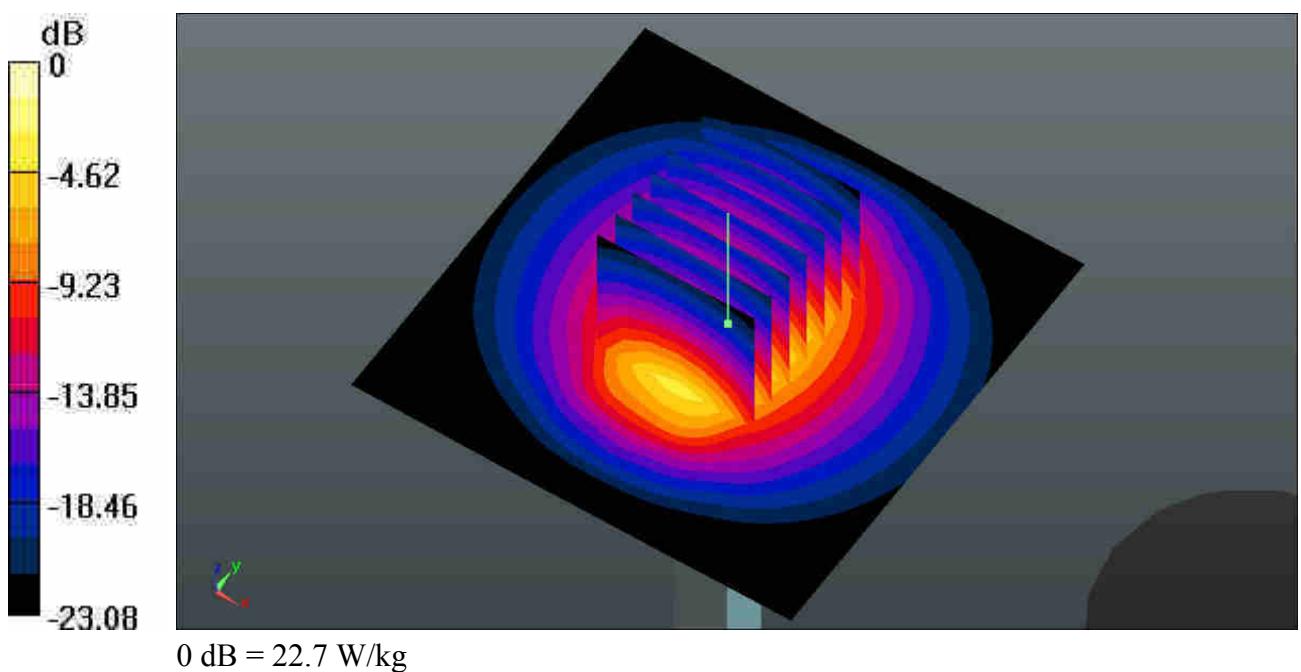
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.5 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 30.3 W/kg

SAR(1 g) = 14.5 W/kg; SAR(10 g) = 6.48 W/kg

Maximum value of SAR (measured) = 22.4 W/kg



System Check_Head_5250MHz_160804

DUT: D5GHzV2-SN:1113

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: HSL_5250_160804 Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 4.726 \text{ S/m}$; $\epsilon_r = 36.478$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.6 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.99, 4.99, 4.99); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

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

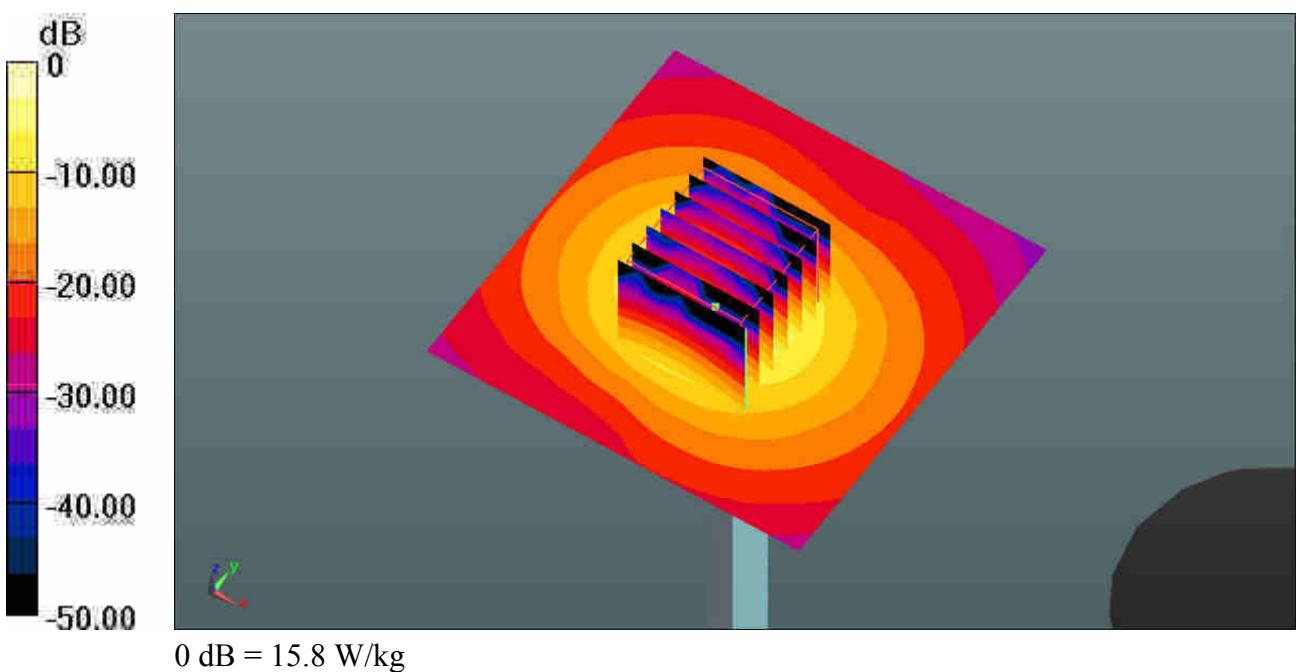
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 54.92 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 33.3 W/kg

SAR(1 g) = 8.22 W/kg; SAR(10 g) = 2.31 W/kg

Maximum value of SAR (measured) = 16.2 W/kg



System Check_Head_5600MHz_160804

DUT: D5GHzV2-SN:1113

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: HSL_5600_160804 Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.154 \text{ S/m}$; $\epsilon_r = 35.866$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.28, 4.28, 4.28); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 16.5 W/kg

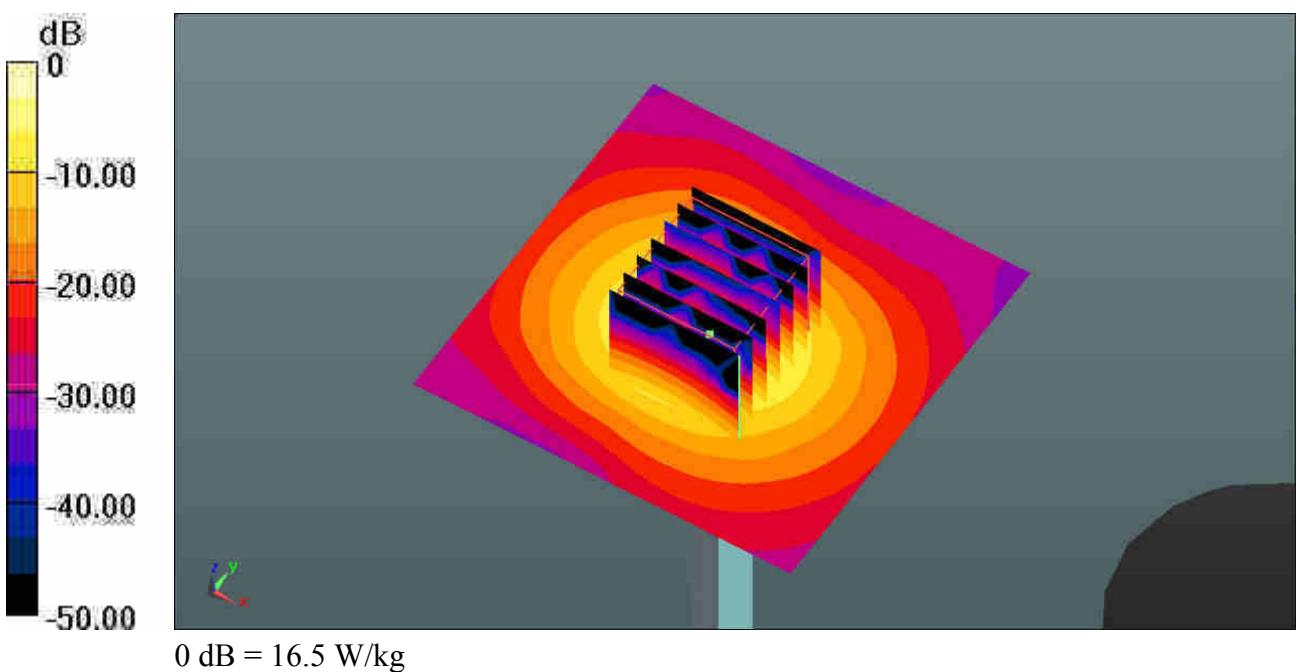
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 54.30 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 35.5 W/kg

SAR(1 g) = 8.36 W/kg; SAR(10 g) = 2.3 W/kg

Maximum value of SAR (measured) = 17.2 W/kg



System Check_Head_5750MHz_160804

DUT: D5GHzV2-SN:1113

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: HSL_5750_160804 Medium parameters used: $f = 5750 \text{ MHz}$; $\sigma = 5.329 \text{ S/m}$; $\epsilon_r = 35.584$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.4, 4.4, 4.4); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 16.5 W/kg

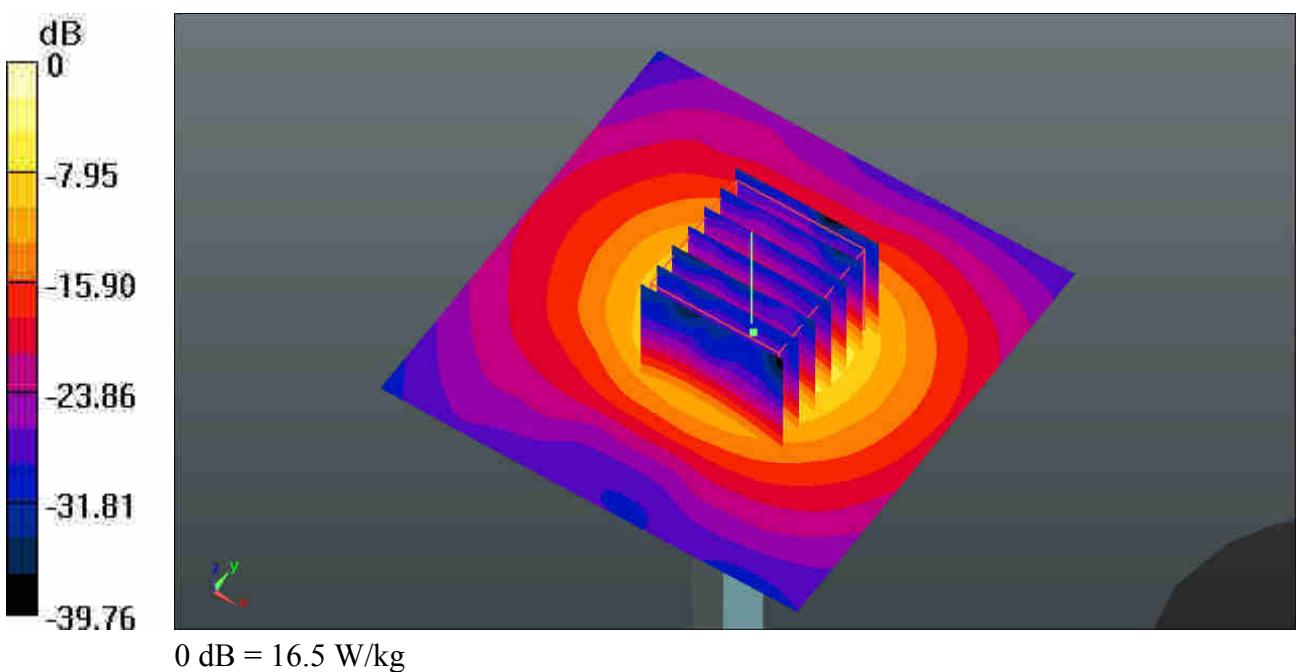
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 52.38 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 33.8 W/kg

SAR(1 g) = 8.13 W/kg; SAR(10 g) = 2.21 W/kg

Maximum value of SAR (measured) = 17.1 W/kg



System Check_Body_835MHz_160801

DUT: D835V2-SN:4d162

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL_835_160801 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.977 \text{ S/m}$; $\epsilon_r = 54.466$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(9.53, 9.53, 9.53); Calibrated: 2016.05.11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2016.01.07
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 3.10 W/kg

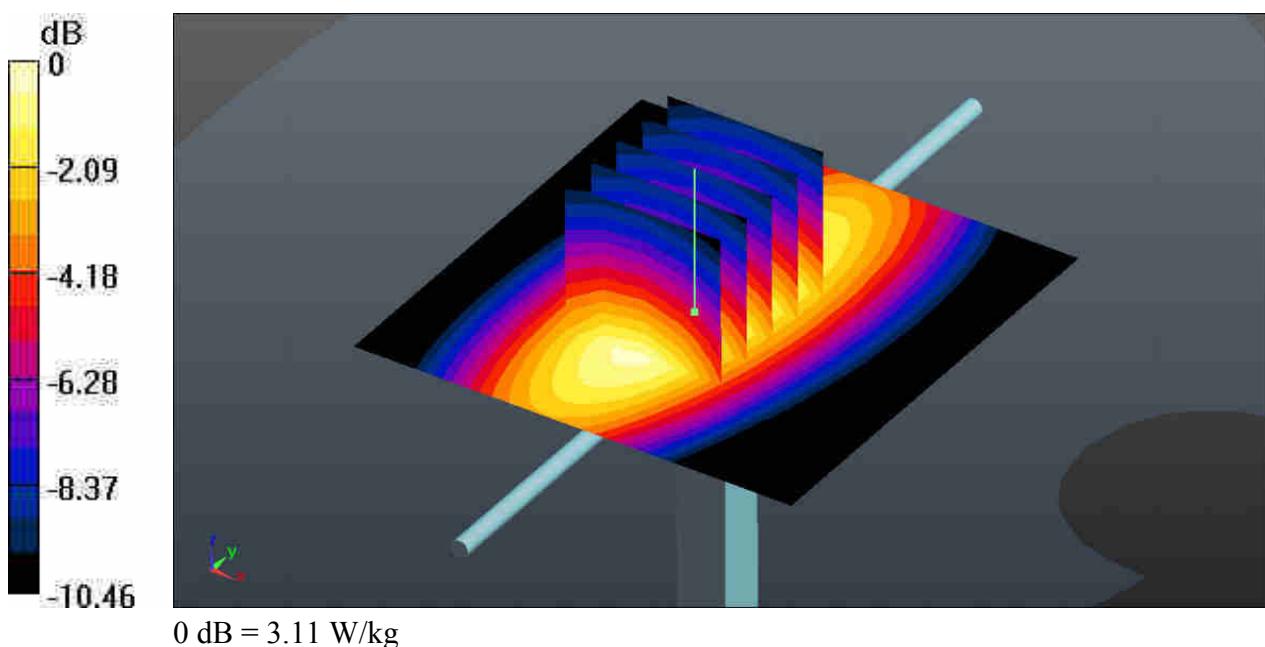
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 65.99 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.79 W/kg

SAR(1 g) = 2.27 W/kg; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (measured) = 3.11 W/kg



System Check_Body_1900MHz_160803

DUT: D1900V2-SN:5d182

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

Medium: MSL_1900_160803 Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.547 \text{ S/m}$; $\epsilon_r = 53.803$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.39, 7.39, 7.39); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 13.9 W/kg

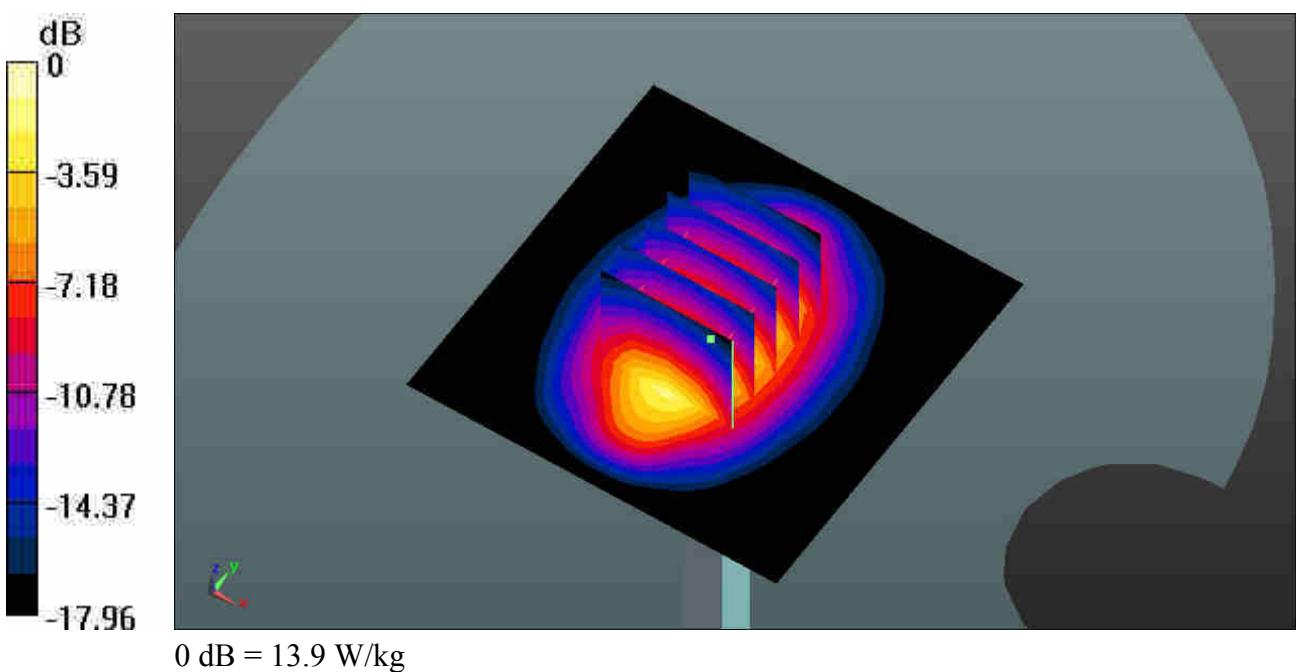
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.08 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 17.7 W/kg

SAR(1 g) = 9.79 W/kg; SAR(10 g) = 5.04 W/kg

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



System Check_Body_2450MHz_160804

DUT: D2450V2-SN:924

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

Medium: MSL_2450_160804 Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.991 \text{ S/m}$; $\epsilon_r = 52.32$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.08, 7.08, 7.08); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 19.9 W/kg

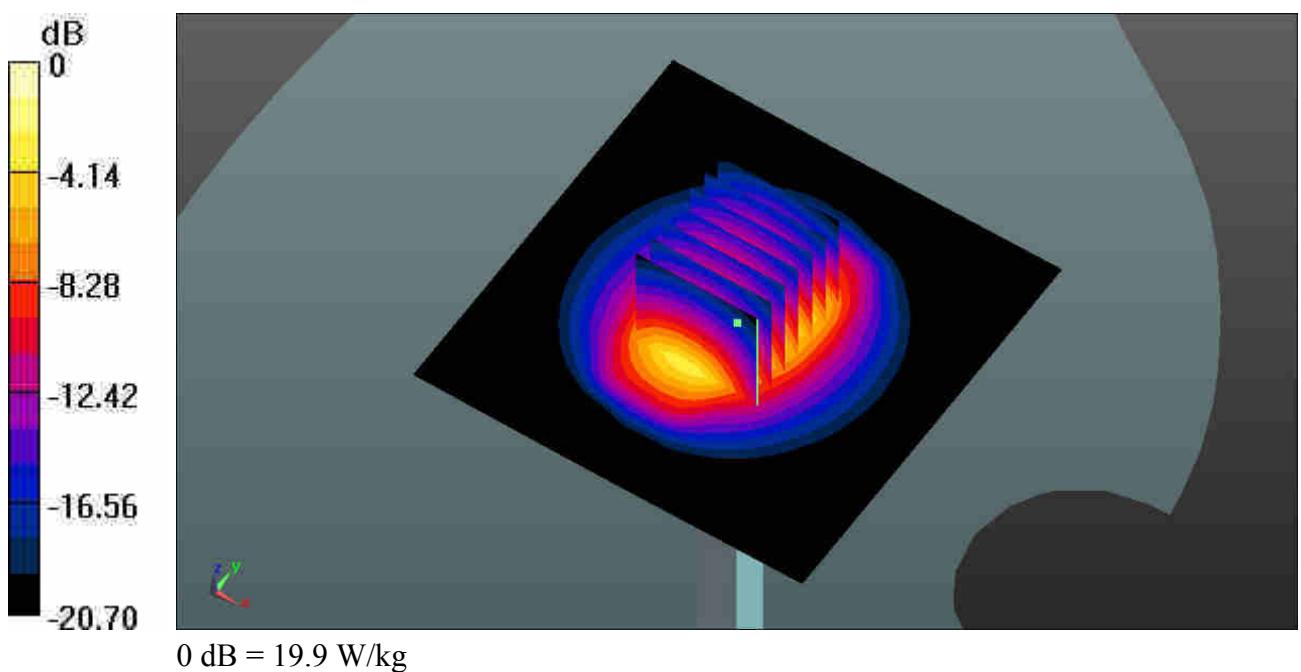
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.35 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 26.8 W/kg

SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.48 W/kg

Maximum value of SAR (measured) = 20.4 W/kg



System Check_Body_2600MHz_160802

DUT: D2600V2-SN:1070

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: MSL_2600_160802 Medium parameters used: $f = 2600 \text{ MHz}$; $\sigma = 2.209 \text{ S/m}$; $\epsilon_r = 51.123$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(6.79, 6.79, 6.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (71x71x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 21.7 W/kg

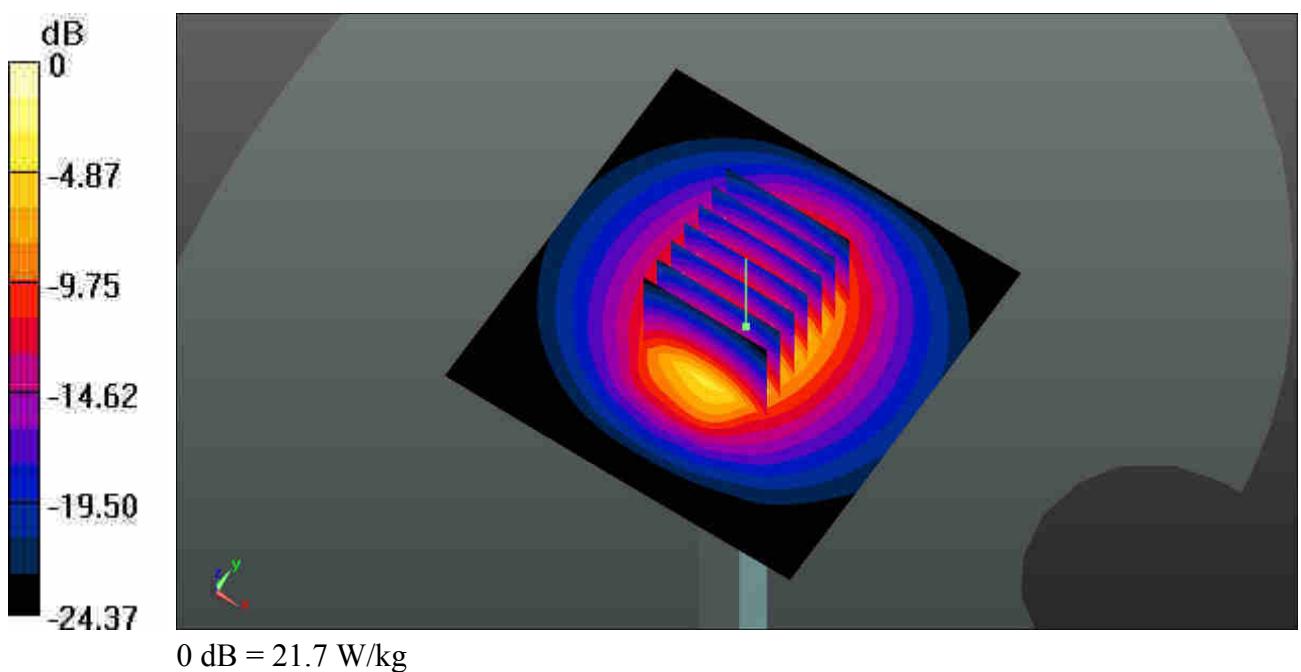
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.61 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 29.8 W/kg

SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.03 W/kg

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



System Check_Body_5250MHz_160804

DUT: D5GHzV2-SN:1113

Communication System: UID 0, CW (0); Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: MSL_5250_160804 Medium parameters used: $f = 5250 \text{ MHz}$; $\sigma = 5.388 \text{ S/m}$; $\epsilon_r = 49.149$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.2, 4.2, 4.2); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 18.0 W/kg

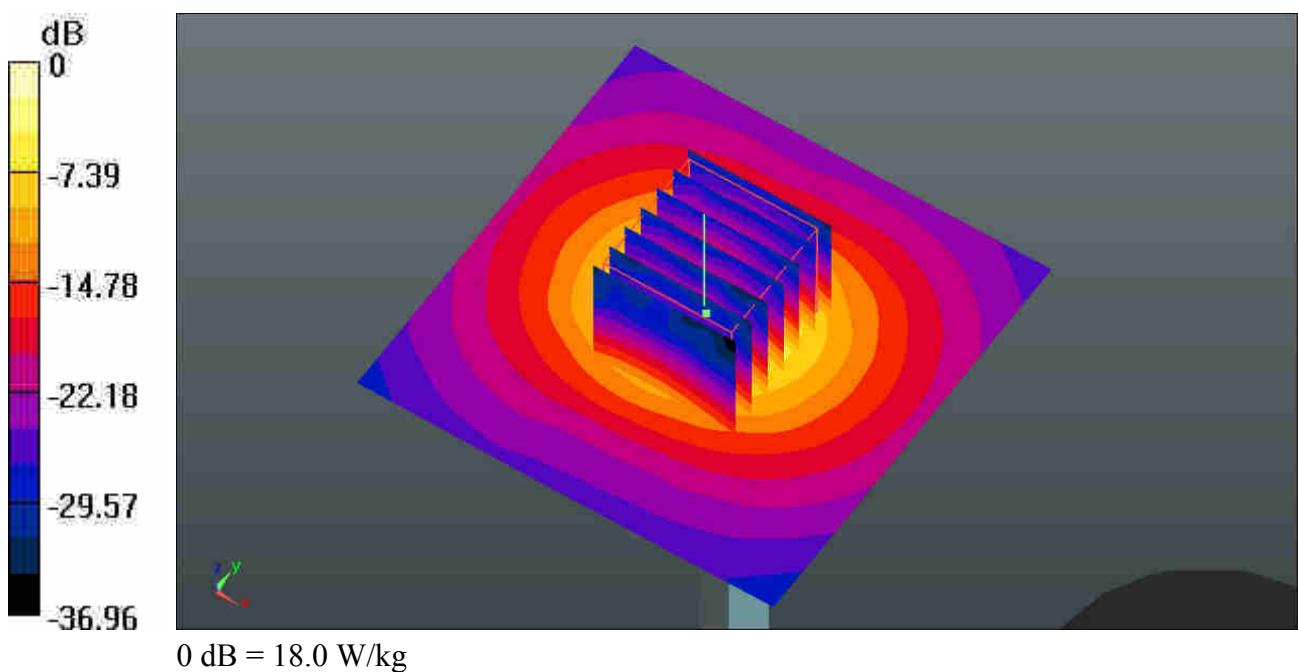
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 48.75 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 30.5 W/kg

SAR(1 g) = 7.74 W/kg; SAR(10 g) = 2.11 W/kg

Maximum value of SAR (measured) = 18.8 W/kg



System Check_Body_5600MHz_160804

DUT: D5GHzV2-SN:1113

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: MSL_5600_160804 Medium parameters used: $f = 5600 \text{ MHz}$; $\sigma = 5.891 \text{ S/m}$; $\epsilon_r = 48.474$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(3.67, 3.67, 3.67); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 20.4 W/kg

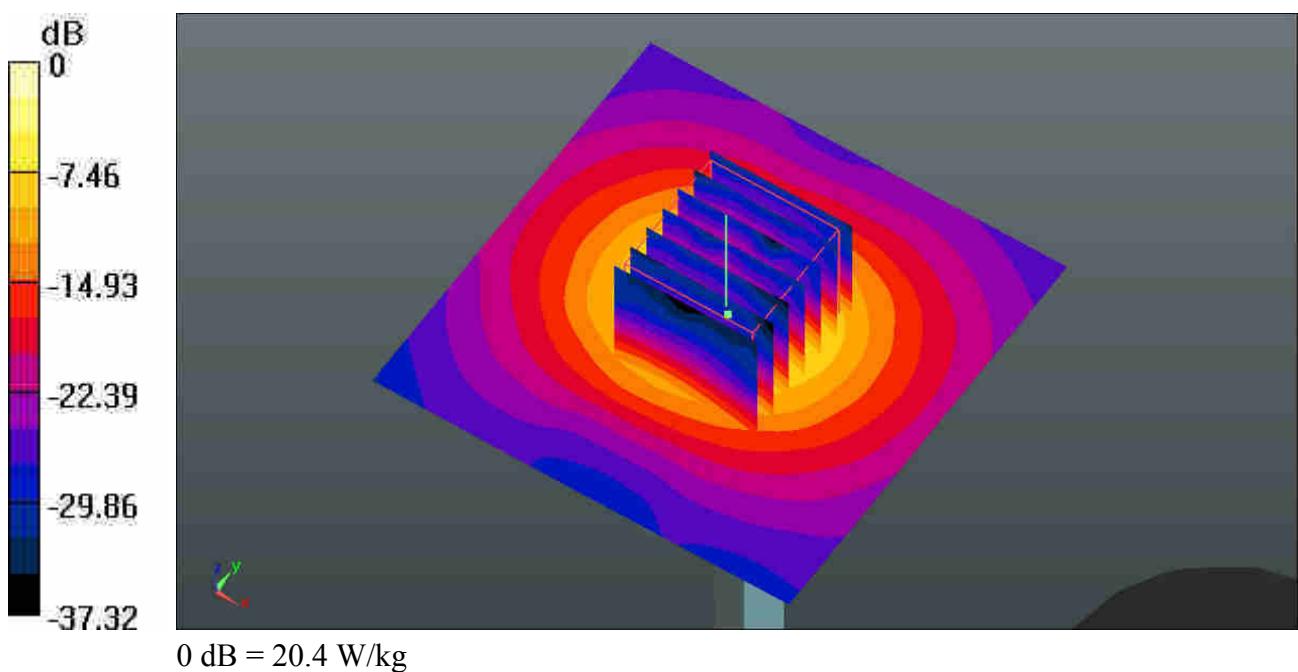
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 48.92 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 34.7 W/kg

SAR(1 g) = 8.64 W/kg; SAR(10 g) = 2.31 W/kg

Maximum value of SAR (measured) = 22.2 W/kg



System Check_Body_5750MHz_160804

DUT: D5GHzV2-SN:1113

Communication System: UID 0, CW (0); Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: MSL_5750_160804 Medium parameters used: $f = 5750 \text{ MHz}$; $\sigma = 6.047 \text{ S/m}$; $\epsilon_r = 48.317$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.6 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(3.73, 3.73, 3.73); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 19.9 W/kg

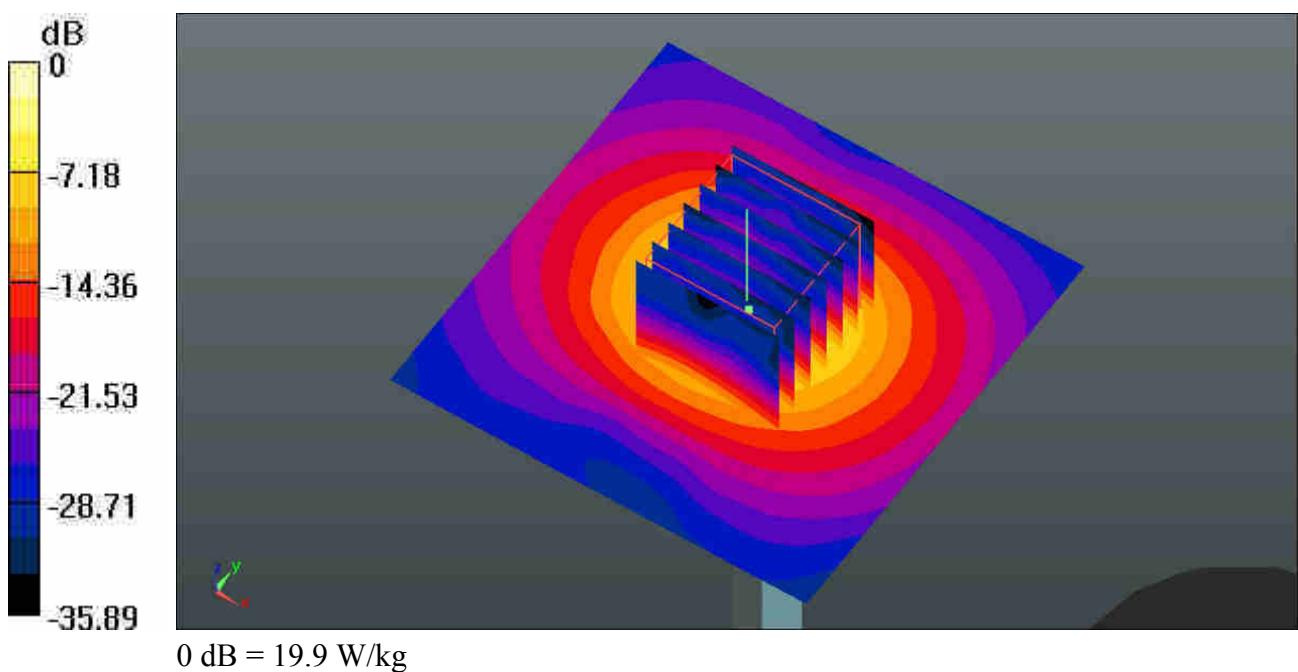
Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 46.33 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 35.0 W/kg

SAR(1 g) = 8.22 W/kg; SAR(10 g) = 2.24 W/kg

Maximum value of SAR (measured) = 21.0 W/kg





Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

01_GSM850_GPRS(2 Tx slots)_Right Cheek_Ch251

Communication System: UID 0, GPRS/EDGE10 (0); Frequency: 848.8 MHz; Duty Cycle: 1:4.15
Medium: HSL_835_160729 Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.905$ S/m; $\epsilon_r = 41.32$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch251/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.207 W/kg

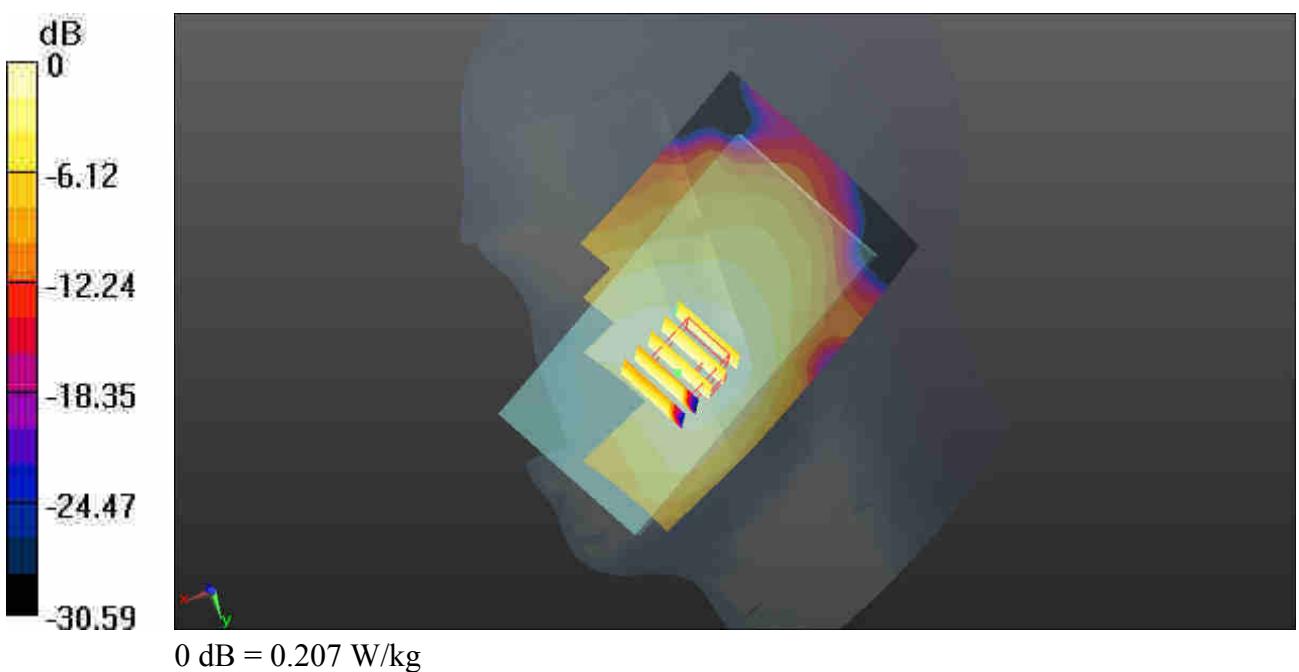
Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.437 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.269 W/kg

SAR(1 g) = 0.177 W/kg; SAR(10 g) = 0.132 W/kg

Maximum value of SAR (measured) = 0.187 W/kg



02_GSM1900_GPRS(4 Tx slots)_Left Cheek_Ch512

Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.08
Medium: HSL_1900_160803 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.398$ S/m; $\epsilon_r = 40.229$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.79, 7.79, 7.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.0915 W/kg

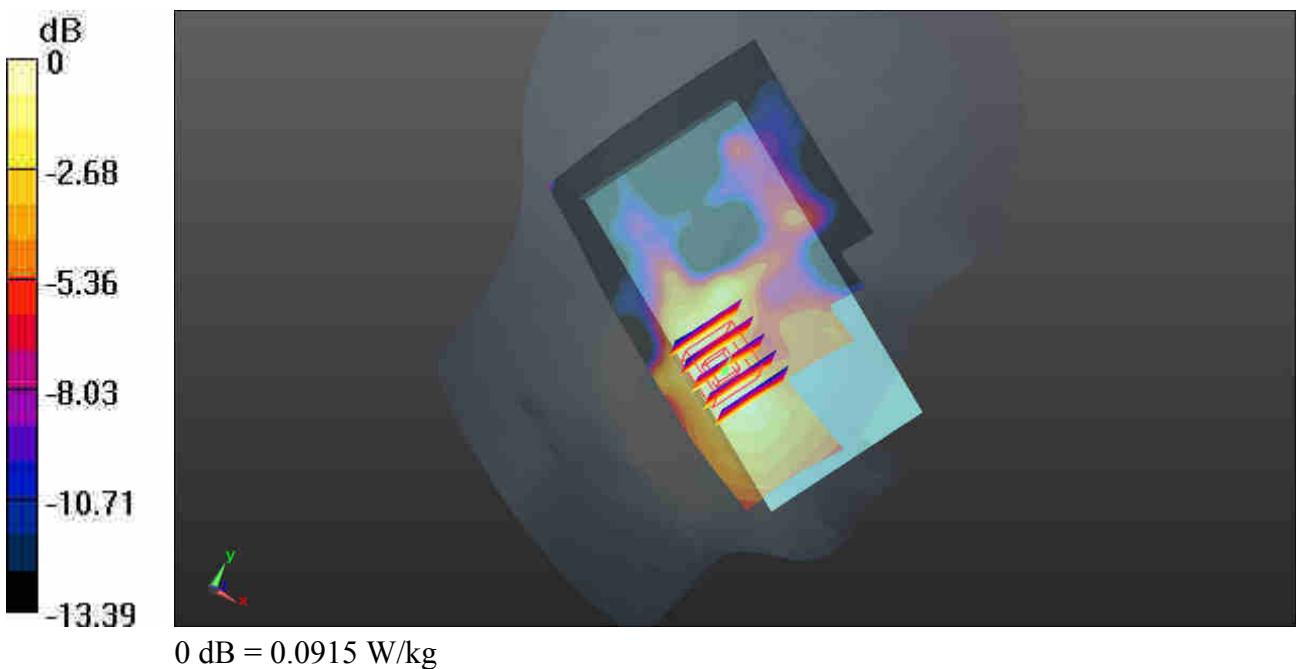
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.392 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.111 W/kg

SAR(1 g) = 0.073 W/kg; SAR(10 g) = 0.046 W/kg

Maximum value of SAR (measured) = 0.0936 W/kg



03_WCDMA Band V_RMC 12.2Kbps_Right Cheek_Ch4233

Communication System: UID 0, UMTS (0); Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: HSL_835_160729 Medium parameters used: $f = 846.6$ MHz; $\sigma = 0.904$ S/m; $\epsilon_r = 41.367$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4233/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.110 W/kg

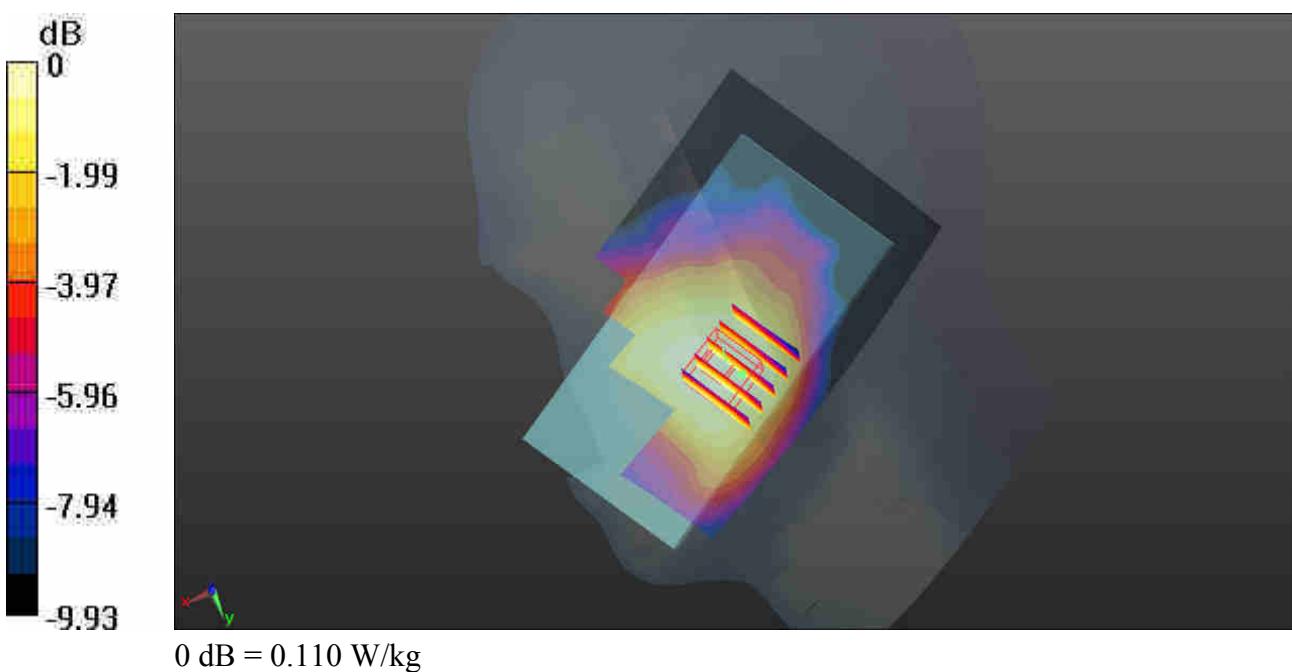
Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.999 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.119 W/kg

SAR(1 g) = 0.096 W/kg; SAR(10 g) = 0.076 W/kg

Maximum value of SAR (measured) = 0.109 W/kg



04_WCDMA Band II_RMC 12.2Kbps_Left Cheek_Ch9538

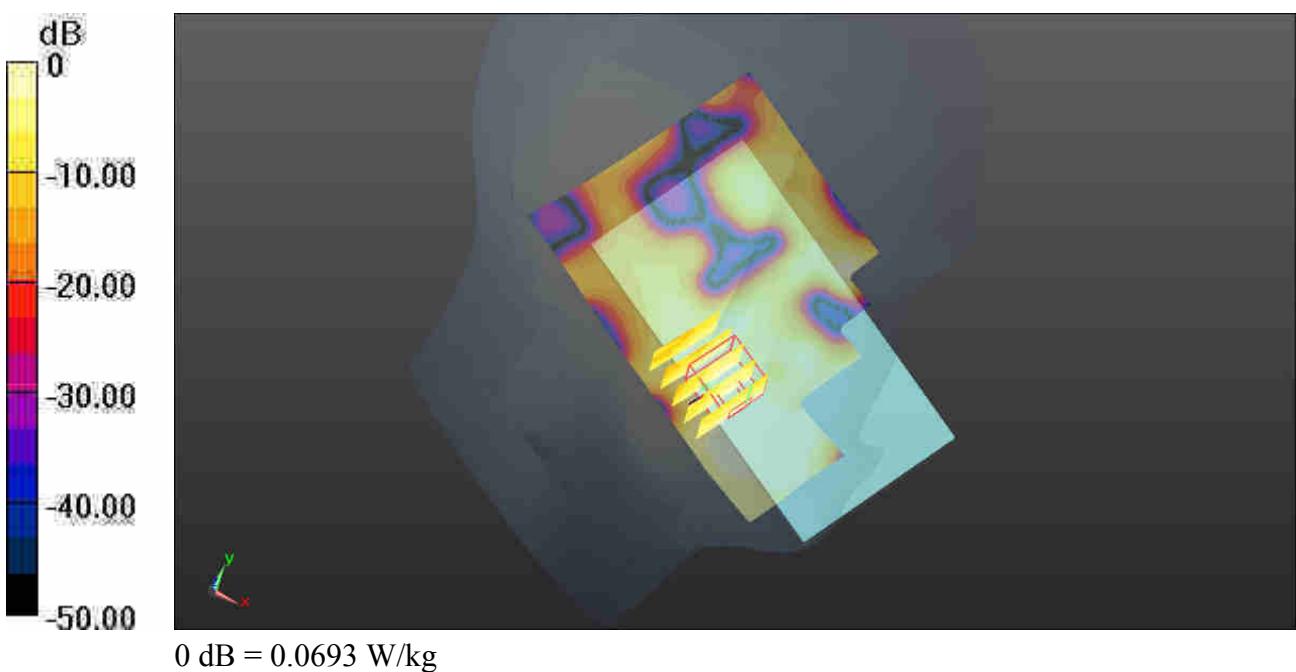
Communication System: UID 0, UMTS (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: HSL_1900_160803 Medium parameters used: $f = 1907.6$ MHz; $\sigma = 1.458$ S/m; $\epsilon_r = 39.969$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.5 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.79, 7.79, 7.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch9538/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.0693 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.519 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.109 W/kg
SAR(1 g) = 0.055 W/kg; SAR(10 g) = 0.036 W/kg
Maximum value of SAR (measured) = 0.0709 W/kg



05_LTE Band 26_15M_QPSK_1RB_37Offset_Right Cheek_Ch26865

Communication System: UID 0, LTE (0); Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: HSL_835_160729 Medium parameters used: $f = 831.5 \text{ MHz}$; $\sigma = 0.895 \text{ S/m}$; $\epsilon_r = 41.645$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(9.41, 9.41, 9.41); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

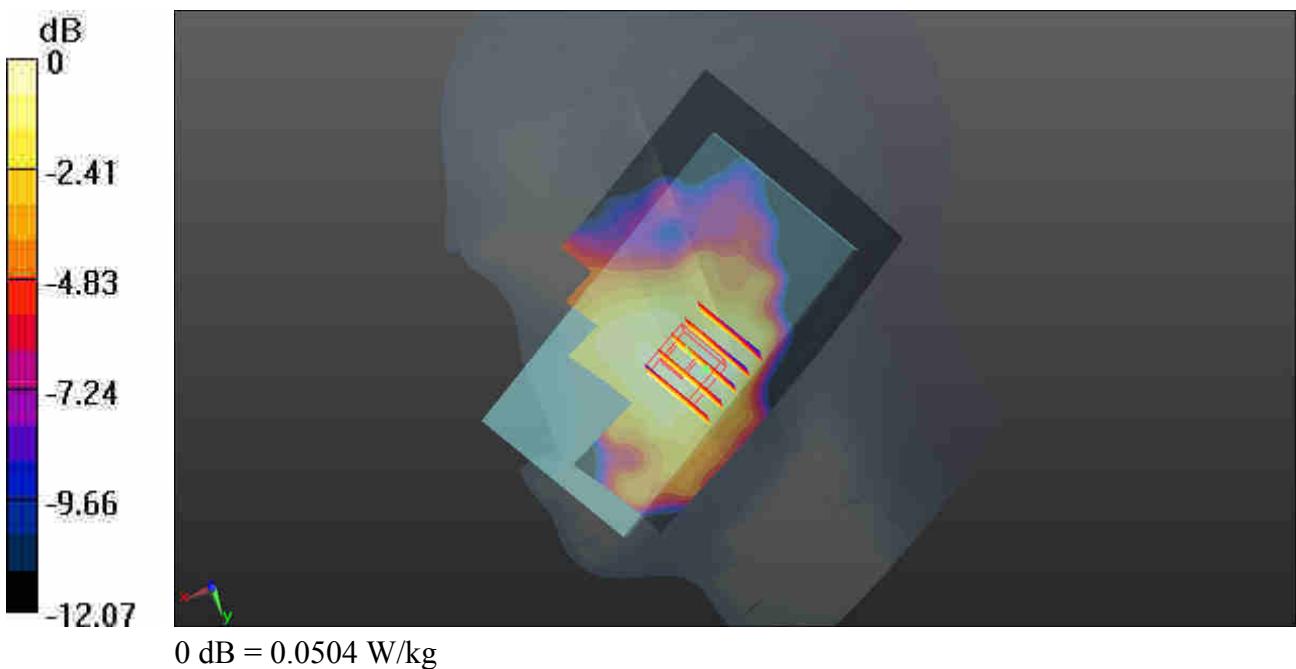
Ch26865/Area Scan (71x121x1): Interpolated grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 0.0504 W/kg

Ch26865/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 3.281 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.0640 W/kg

SAR(1 g) = 0.042 W/kg; SAR(10 g) = 0.033 W/kg

Maximum value of SAR (measured) = 0.0513 W/kg



06_LTE Band 41_20M_QPSK_50RB_0Offsets_Right Cheek_Ch41490

Communication System: UID 0, LTE (0); Frequency: 2680 MHz; Duty Cycle: 1:1.59
Medium: HSL_2600_160803 Medium parameters used: $f = 2680 \text{ MHz}$; $\sigma = 2.101 \text{ S/m}$; $\epsilon_r = 39.289$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(6.82, 6.82, 6.82); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

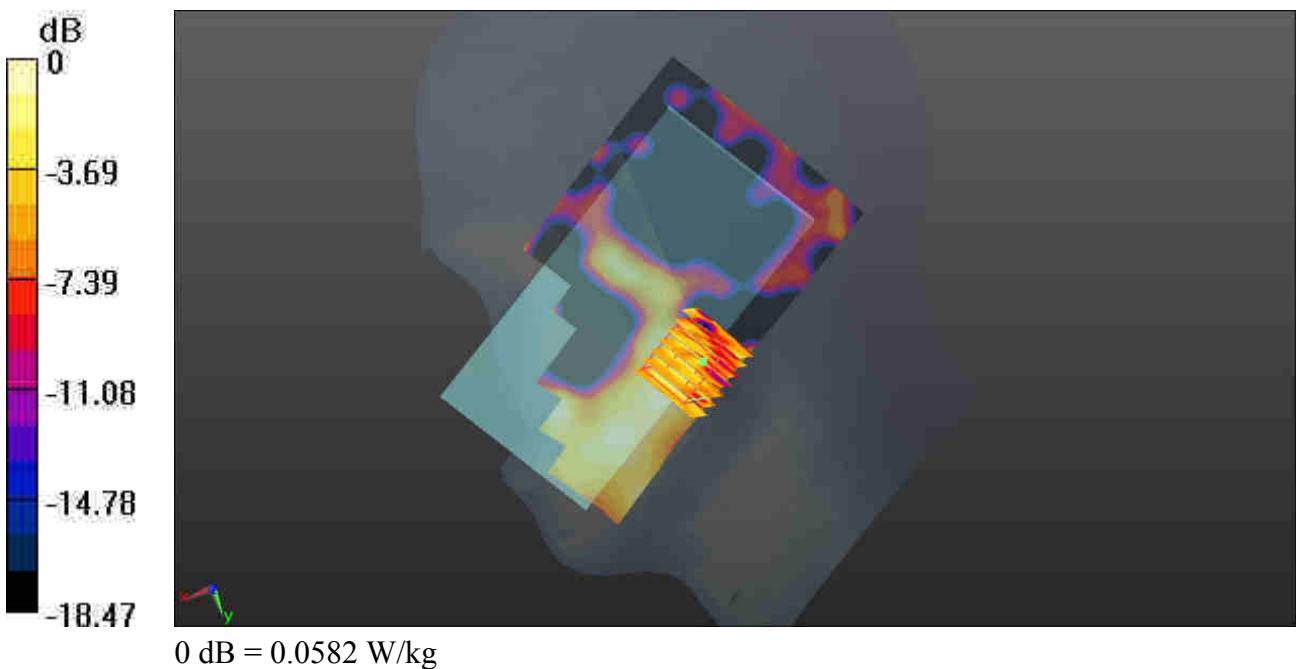
Ch41490/Area Scan (81x151x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.0582 W/kg

Ch41490/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.985 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.151 W/kg

SAR(1 g) = 0.022 W/kg; SAR(10 g) = 0.012 W/kg

Maximum value of SAR (measured) = 0.0553 W/kg



07_WLAN2.4GHz_802.11b 1Mbps_Right Cheek_Ch11

Communication System: UID 0, WIFI (0); Frequency: 2462 MHz; Duty Cycle: 1:1.025
Medium: HSL_2450_160803 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 1.824 \text{ S/m}$; $\epsilon_r = 38.384$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(6.93, 6.93, 6.93); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch11/Area Scan (81x151x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.66 W/kg

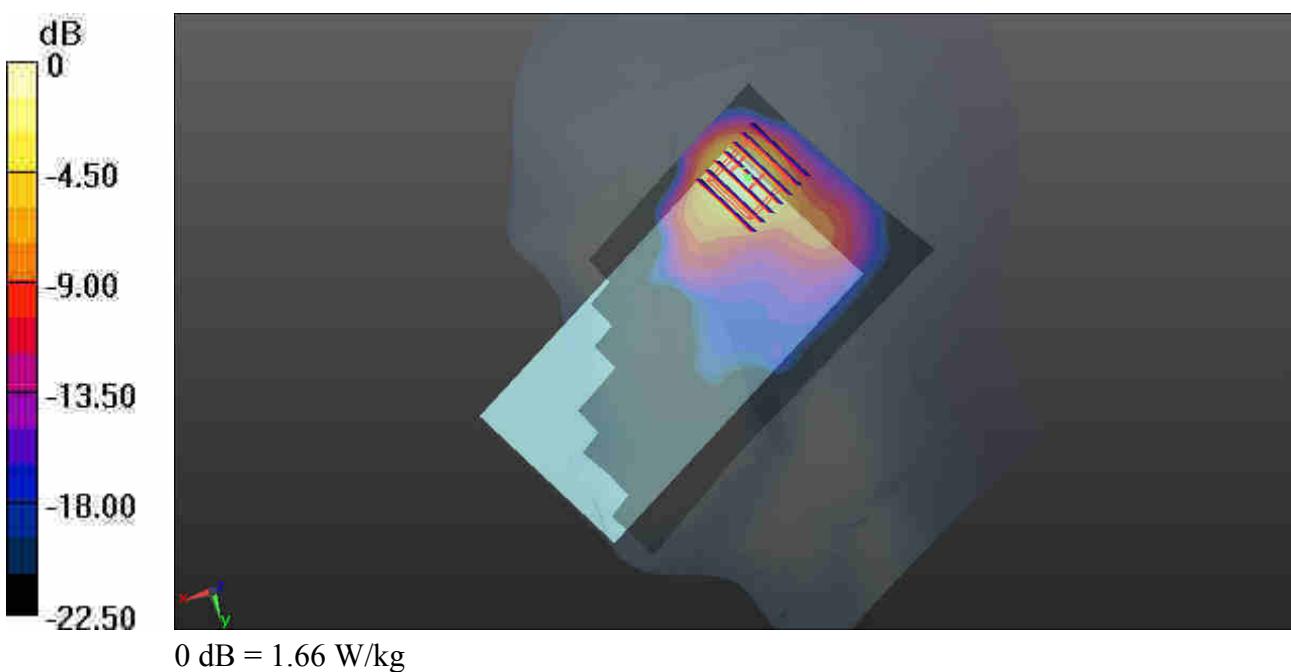
Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.573 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 2.34 W/kg

SAR(1 g) = 0.915 W/kg; SAR(10 g) = 0.384 W/kg

Maximum value of SAR (measured) = 1.45 W/kg



08_WLAN5.3GHz_ 802.11a 6Mbps_Right Cheek_Ch52

Communication System: UID 0, WIFI (0); Frequency: 5260 MHz; Duty Cycle: 1:1.149
Medium: HSL_5250_160804 Medium parameters used: $f = 5260 \text{ MHz}$; $\sigma = 4.741 \text{ S/m}$; $\epsilon_r = 36.465$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.6 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.99, 4.99, 4.99); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch52/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.105 W/kg

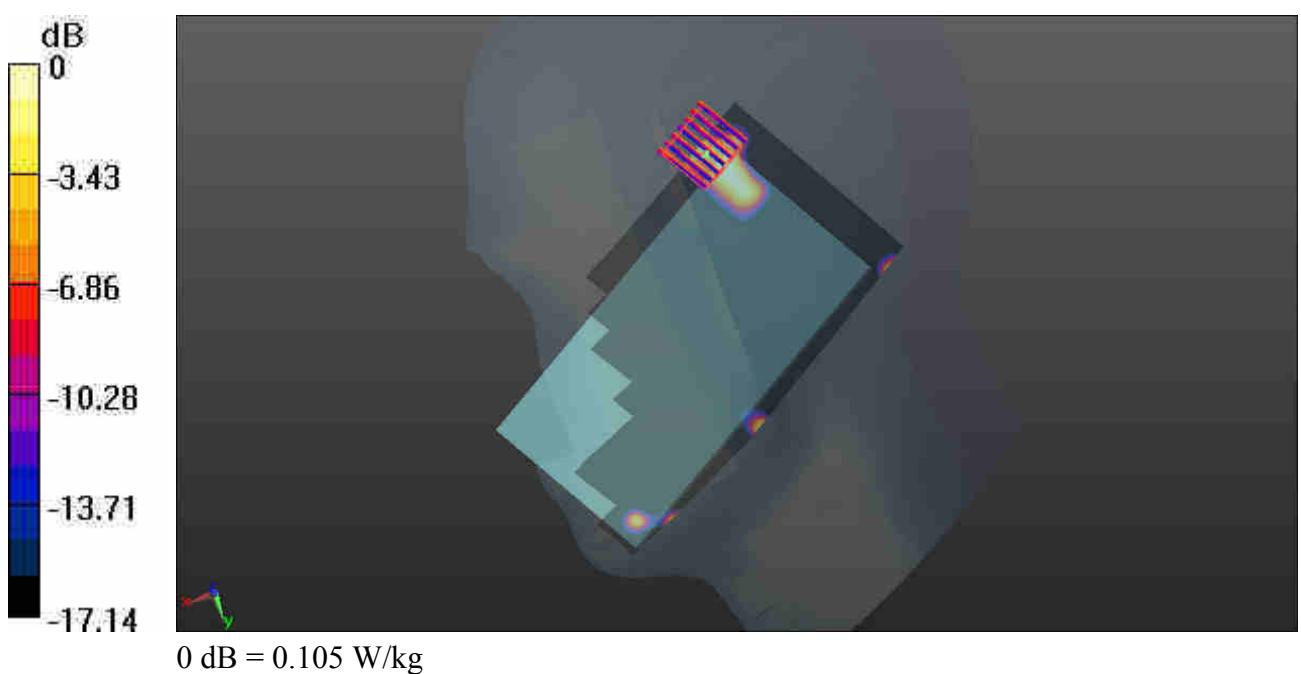
Ch52/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 3.230 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.242 W/kg

SAR(1 g) = 0.035 W/kg; SAR(10 g) = 0.014 W/kg

Maximum value of SAR (measured) = 0.0873 W/kg



09_WLAN5.5GHz_ 802.11a 6Mbps_Left Cheek_Ch116

Communication System: UID 0, WIFI (0); Frequency: 5580 MHz; Duty Cycle: 1:1.149
Medium: HSL_5600_160804 Medium parameters used: $f = 5580 \text{ MHz}$; $\sigma = 5.126 \text{ S/m}$; $\epsilon_r = 35.906$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.28, 4.28, 4.28); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

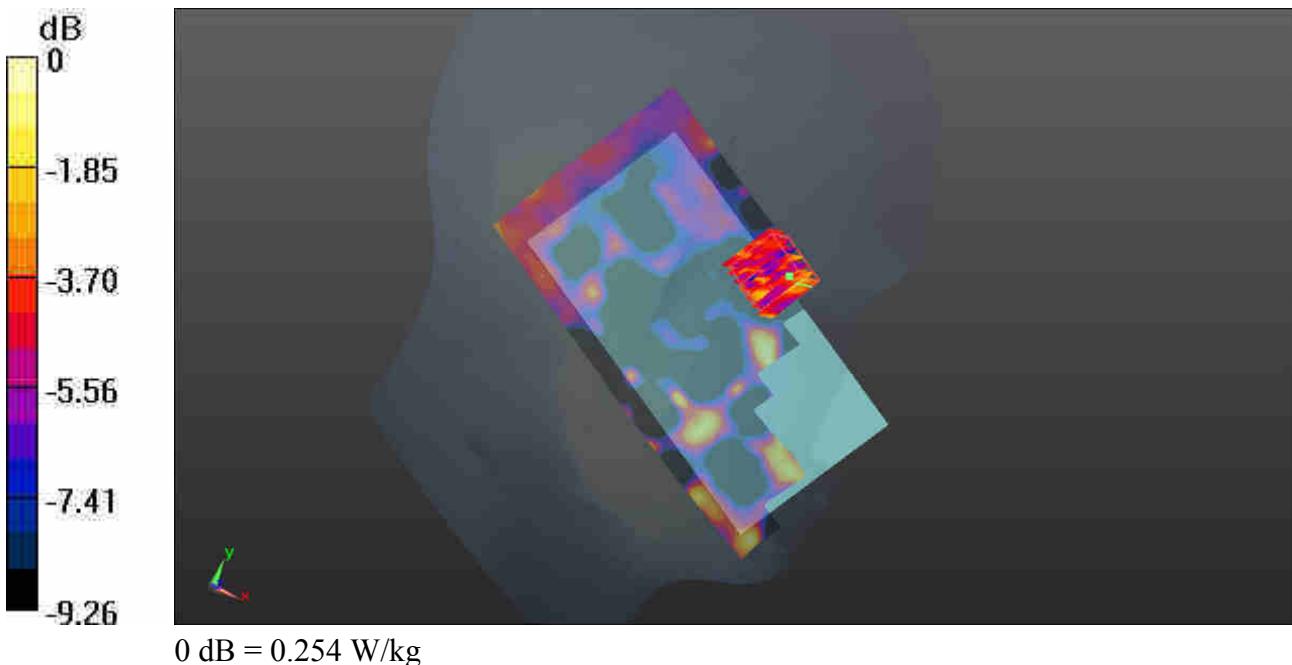
Ch116/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.254 W/kg

Ch116/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.636 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.354 W/kg

SAR(1 g) = 0.105 W/kg; SAR(10 g) = 0.086 W/kg

Maximum value of SAR (measured) = 0.176 W/kg



10_WLAN5.8GHz_ 802.11a 6Mbps_Left Cheek_Ch149

Communication System: UID 0, WIFI (0); Frequency: 5745 MHz; Duty Cycle: 1:1.149
Medium: HSL_5750_160804 Medium parameters used: $f = 5745 \text{ MHz}$; $\sigma = 5.321 \text{ S/m}$; $\epsilon_r = 35.594$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.4, 4.4, 4.4); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.223 W/kg

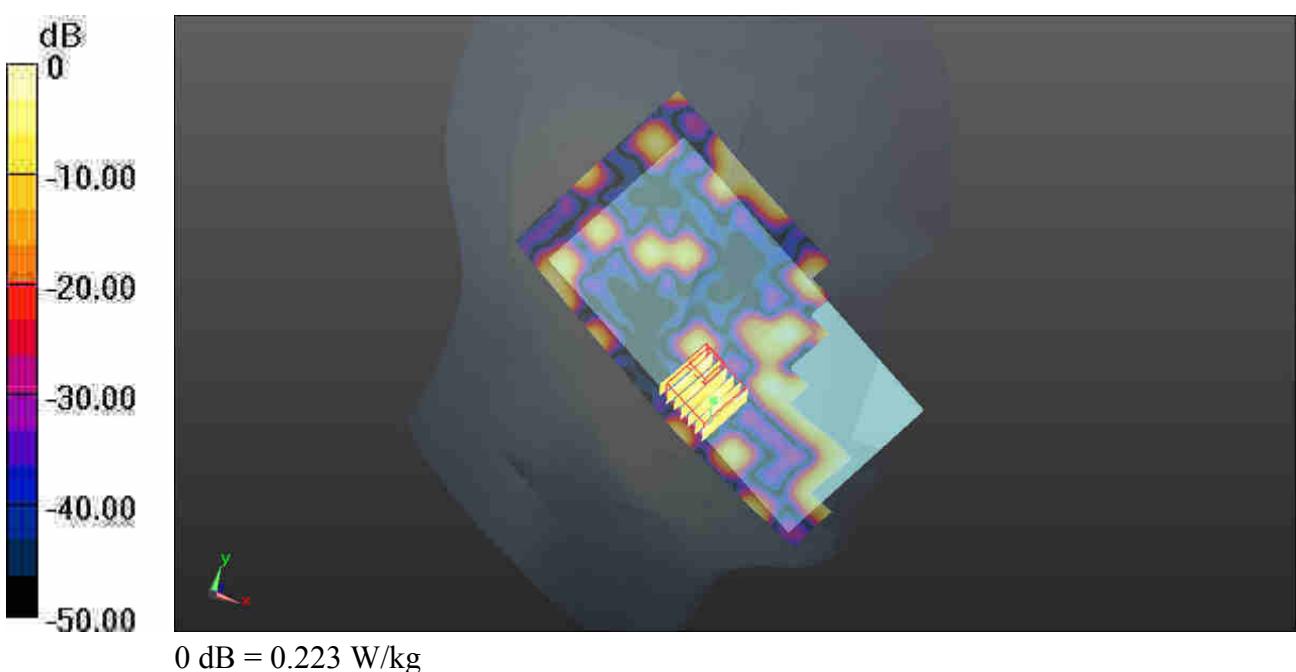
Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 4.700 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.085 W/kg

Maximum value of SAR (measured) = 0.197 W/kg



11_GSM850_GPRS(2 Tx slots)_Back_10mm_Ch251

Communication System: UID 0, GPRS/EDGE10 (0); Frequency: 848.8 MHz; Duty Cycle: 1:4.15
Medium: MSL_835_160801 Medium parameters used: $f = 848.8 \text{ MHz}$; $\sigma = 0.994 \text{ S/m}$; $\epsilon_r = 54.359$;
 $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(9.53, 9.53, 9.53); Calibrated: 2016.05.11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2016.01.07
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

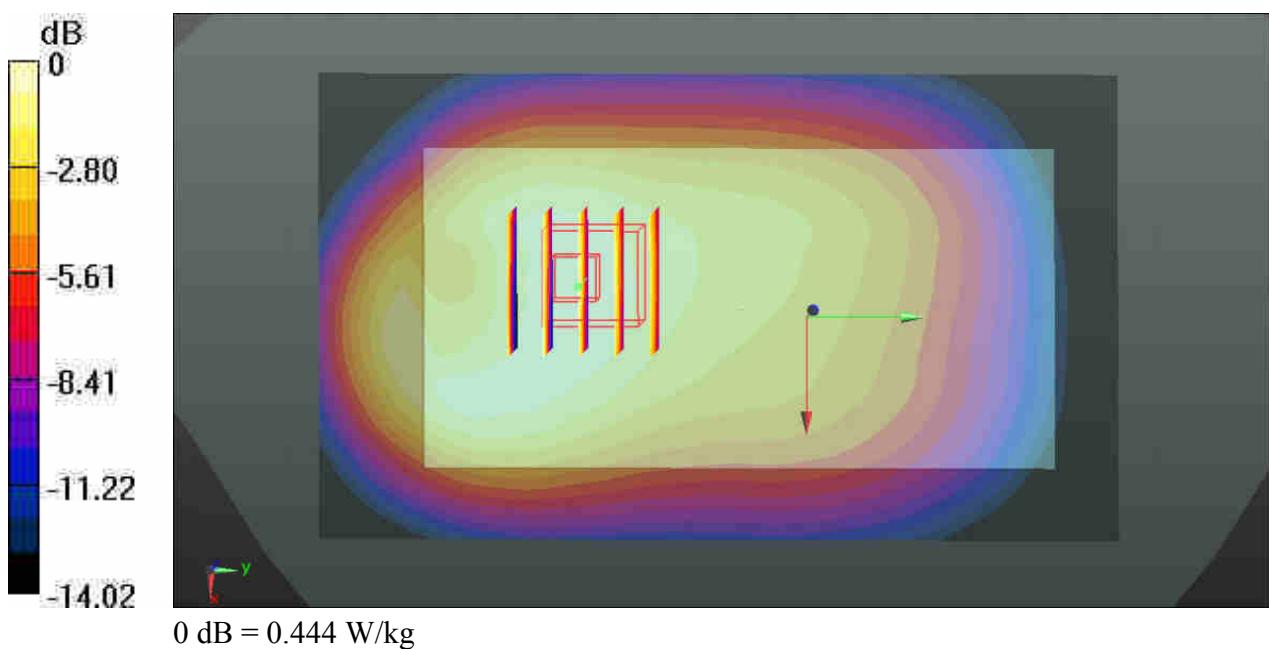
Ch251/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.442 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.217 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.539 W/kg

SAR(1 g) = 0.371 W/kg; SAR(10 g) = 0.256 W/kg

Maximum value of SAR (measured) = 0.444 W/kg



12_GSM1900_GPRS(4 Tx slots)_Bottom Side_10mm_Ch512

Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.08
Medium: MSL_1900_160803 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.489$ S/m; $\epsilon_r = 53.881$;

$$\rho = 1000 \text{ kg/m}^3$$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.39, 7.39, 7.39); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (41x71x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.861 W/kg

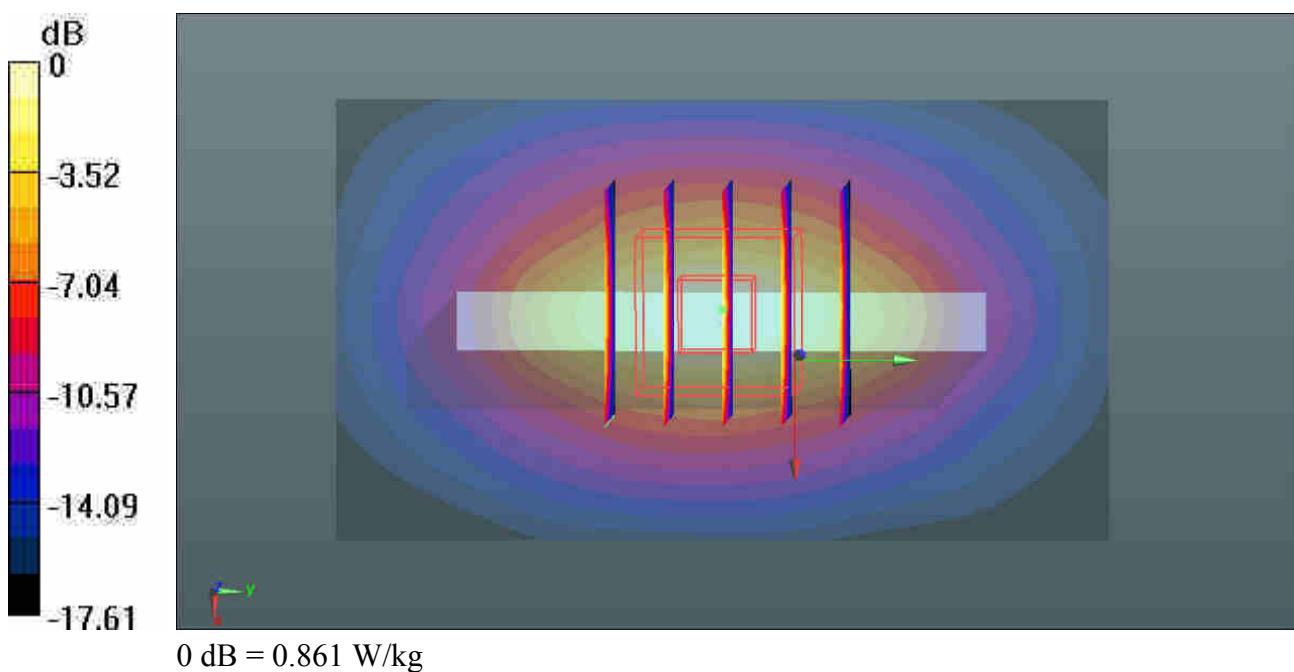
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.082 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.589 W/kg; SAR(10 g) = 0.299 W/kg

Maximum value of SAR (measured) = 0.833 W/kg



13_WCDMA Band V_RMC 12.2Kbps_Back_10mm_Ch4233

Communication System: UID 0, UMTS (0); Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: MSL_835_160801 Medium parameters used: $f = 846.6$ MHz; $\sigma = 0.992$ S/m; $\epsilon_r = 54.371$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(9.53, 9.53, 9.53); Calibrated: 2016.05.11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2016.01.07
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch4233/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.273 W/kg

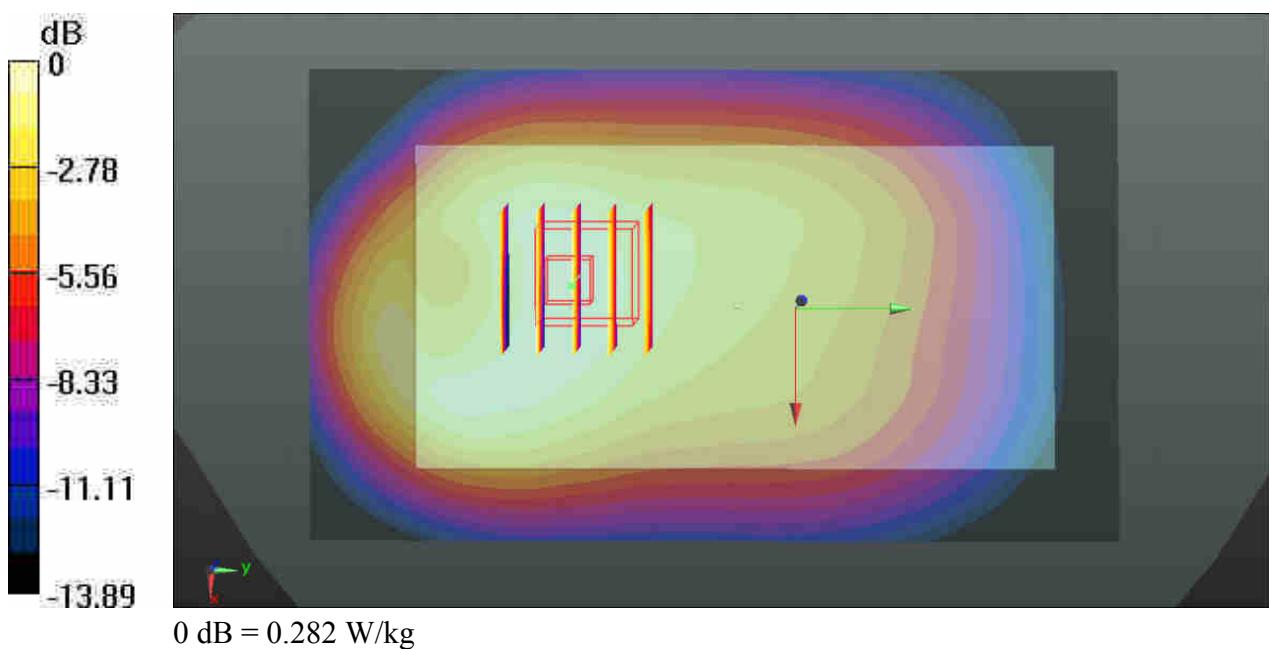
Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.009 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.338 W/kg

SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.162 W/kg

Maximum value of SAR (measured) = 0.282 W/kg



14_WCDMA Band II_RMC 12.2Kbps_Bottom Side_10mm_Ch9538

Communication System: UID 0, UMTS (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: MSL_1900_160803 Medium parameters used: $f = 1907.6$ MHz; $\sigma = 1.555$ S/m; $\epsilon_r = 53.787$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.39, 7.39, 7.39); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

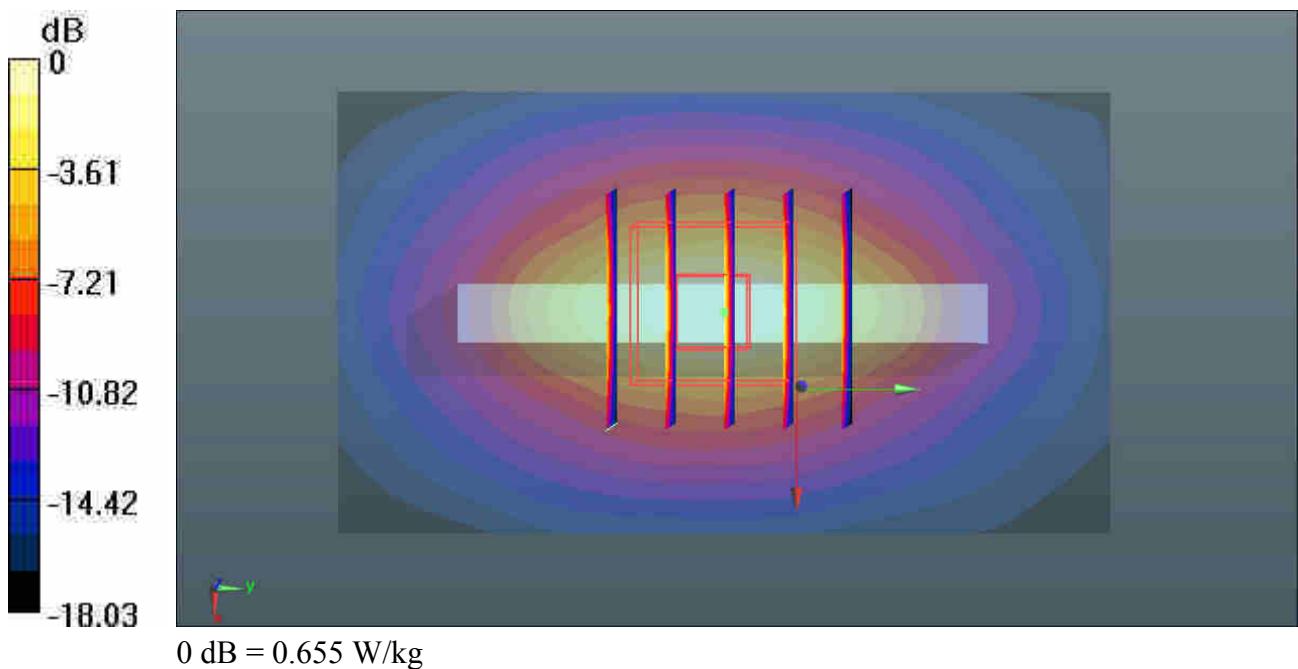
Ch9538/Area Scan (41x71x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.655 W/kg

Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.528 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.798 W/kg

SAR(1 g) = 0.441 W/kg; SAR(10 g) = 0.220 W/kg

Maximum value of SAR (measured) = 0.632 W/kg



15_LTE Band 26_15M_QPSK_1RB_37Offset_Back_10mm_Ch26865

Communication System: UID 0, LTE (0); Frequency: 831.5 MHz; Duty Cycle: 1:1
Medium: MSL_835_160801 Medium parameters used: $f = 831.5$ MHz; $\sigma = 0.973$ S/m; $\epsilon_r = 54.503$; $\rho = 1000$ kg/m³
Ambient Temperature : 23.4 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(9.53, 9.53, 9.53); Calibrated: 2016.05.11;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn914; Calibrated: 2016.01.07
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1670
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch26865/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.139 W/kg

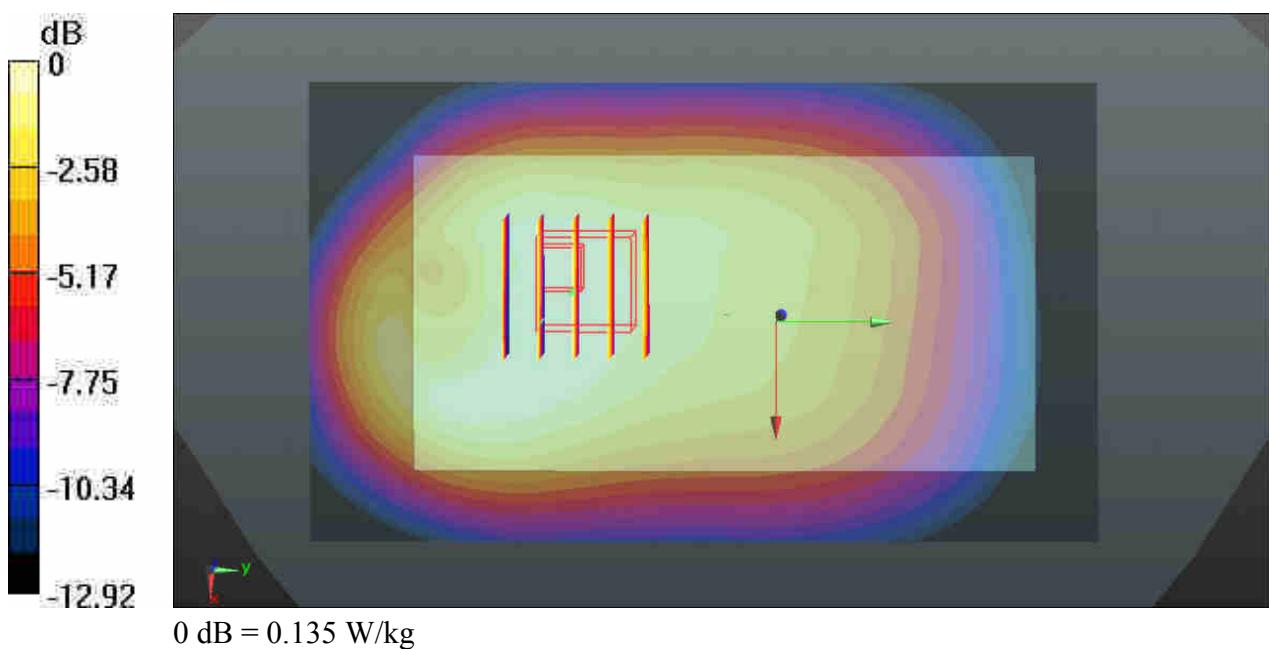
Ch26865/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.9200 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.159 W/kg

SAR(1 g) = 0.113 W/kg; SAR(10 g) = 0.081 W/kg

Maximum value of SAR (measured) = 0.135 W/kg



16_LTE Band 41_20M_QPSK_1RB_49Offset_Bottom Side_10mm_Ch41490

Communication System: UID 0, LTE (0); Frequency: 2680 MHz; Duty Cycle: 1:1.59
Medium: MSL_2600_160802 Medium parameters used: $f = 2680 \text{ MHz}$; $\sigma = 2.246 \text{ S/m}$; $\epsilon_r = 50.872$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(6.79, 6.79, 6.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

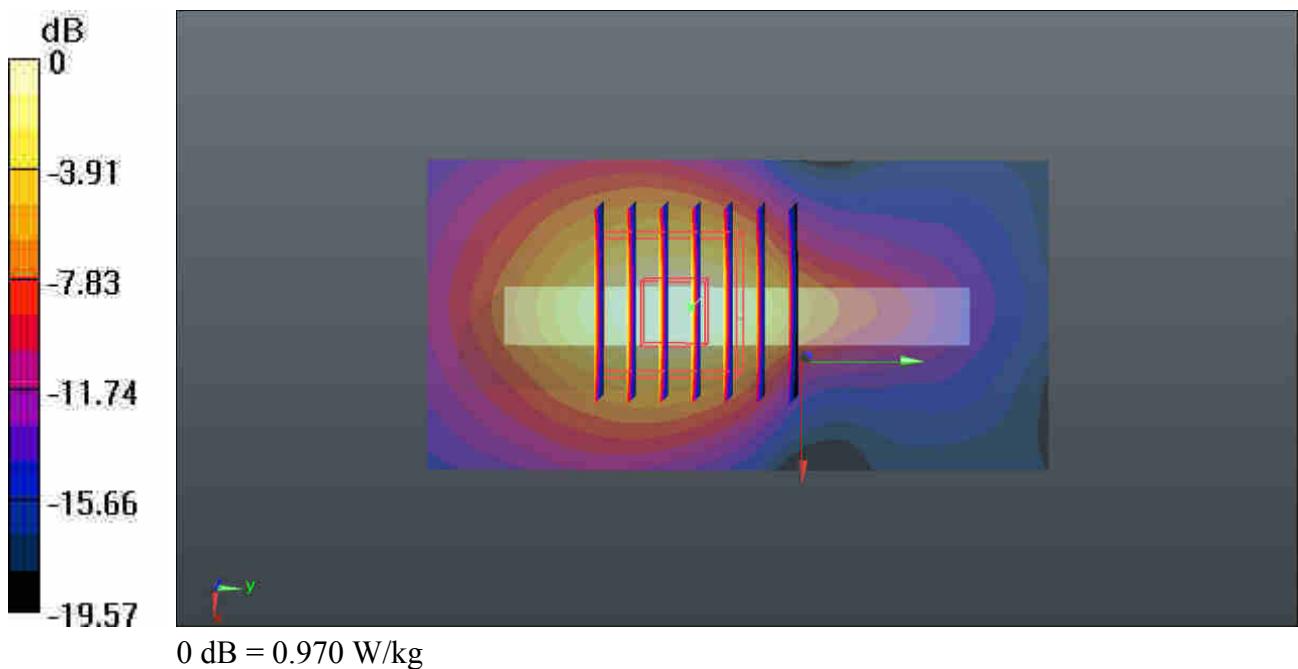
Ch41490/Area Scan (41x81x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.970 W/kg

Ch41490/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.888 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = 0.595 W/kg; SAR(10 g) = 0.267 W/kg

Maximum value of SAR (measured) = 0.910 W/kg



17_WLAN2.4GHz_802.11b 1Mbps_Top Side_10mm_Ch11

Communication System: UID 0, WIFI (0); Frequency: 2462 MHz; Duty Cycle: 1:1.025
Medium: MSL_2450_160804 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 2.011 \text{ S/m}$; $\epsilon_r = 52.249$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.08, 7.08, 7.08); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch11/Area Scan (41x81x1): Interpolated grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.242 W/kg

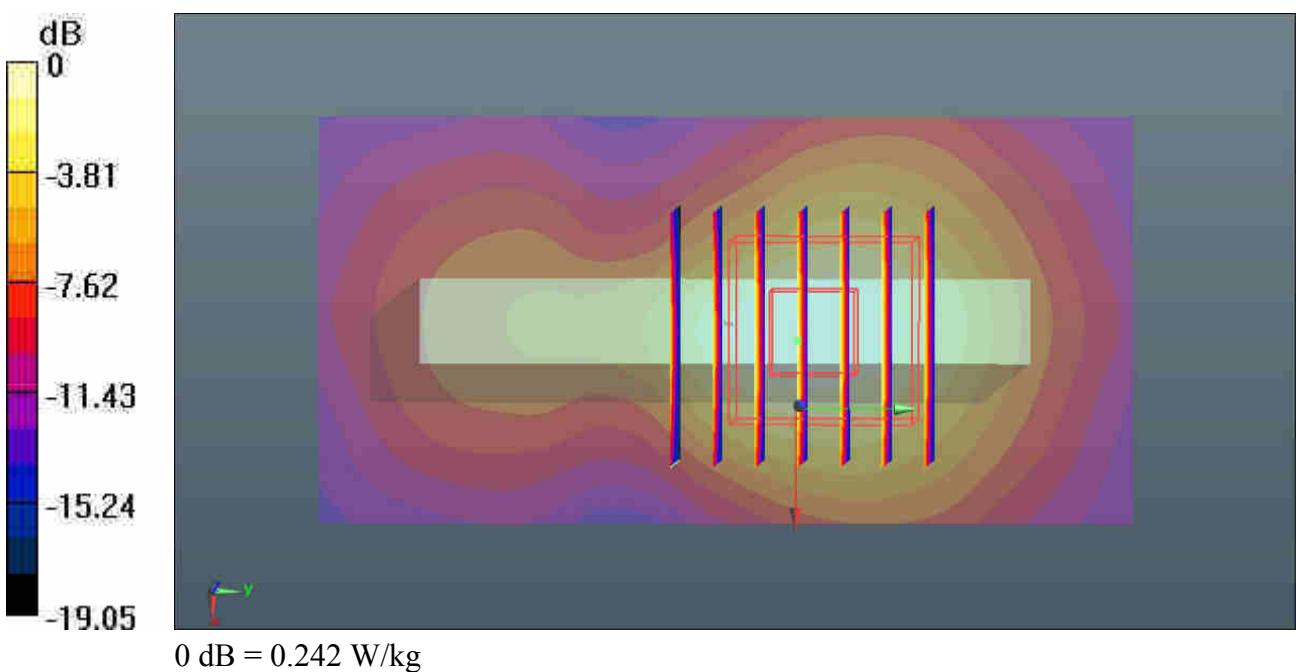
Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.555 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.310 W/kg

SAR(1 g) = 0.163 W/kg; SAR(10 g) = 0.082 W/kg

Maximum value of SAR (measured) = 0.237 W/kg



18_WLAN5.2GHz_ 802.11a 6Mbps_Back_10mm_Ch48

Communication System: UID 0, WIFI (0); Frequency: 5240 MHz; Duty Cycle: 1:1.149
Medium: MSL_5250_160804 Medium parameters used: $f = 5240 \text{ MHz}$; $\sigma = 5.455 \text{ S/m}$; $\epsilon_r = 49.876$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.2, 4.2, 4.2); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

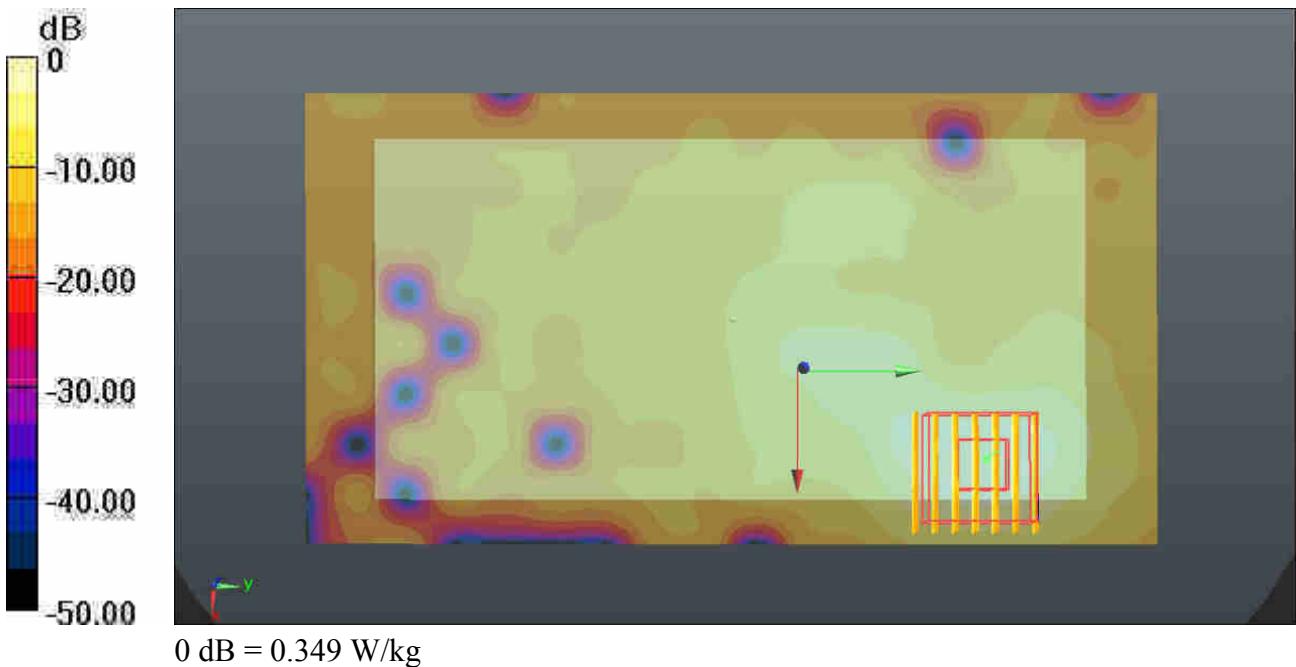
Ch48/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.349 W/kg

Ch48/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.359 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.575 W/kg

SAR(1 g) = 0.130 W/kg; SAR(10 g) = 0.033 W/kg

Maximum value of SAR (measured) = 0.365 W/kg



19_WLAN5.8GHz_802.11a 6Mbps_Back_10mm_Ch149

Communication System: UID 0, WIFI (0); Frequency: 5745 MHz; Duty Cycle: 1:1.149
Medium: MSL_5750_160804 Medium parameters used: $f = 5745 \text{ MHz}$; $\sigma = 6.048 \text{ S/m}$; $\epsilon_r = 48.335$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.6 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(3.73, 3.73, 3.73); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

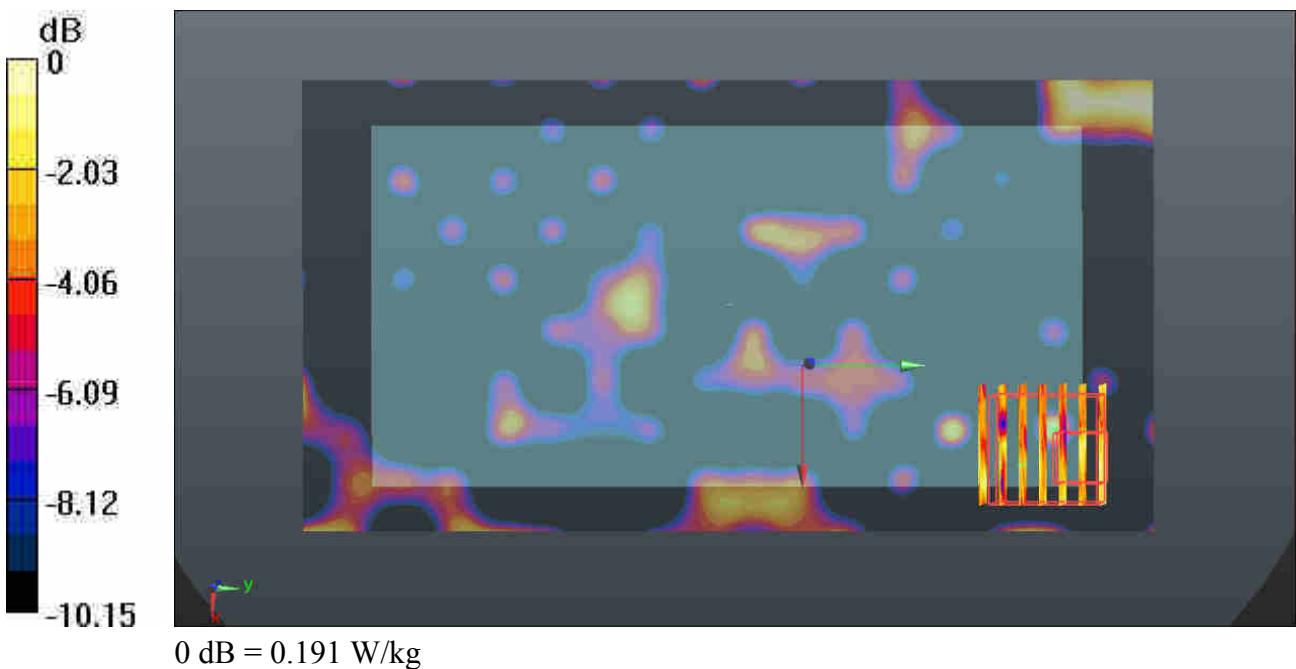
Ch149/Area Scan (91x171x1): Interpolated grid: $dx=10\text{mm}$, $dy=10\text{mm}$
Maximum value of SAR (interpolated) = 0.191 W/kg

Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$
Reference Value = 3.972 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.965 W/kg

SAR(1 g) = 0.084 W/kg; SAR(10 g) = 0.042 W/kg

Maximum value of SAR (measured) = 0.220 W/kg



20_GSM1900_GPRS(4 Tx slots)_Back_10mm_Ch512

Communication System: UID 0, GPRS/EDGE12 (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.08
Medium: MSL_1900_160803 Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.489$ S/m; $\epsilon_r = 53.881$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.39, 7.39, 7.39); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch512/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.394 W/kg

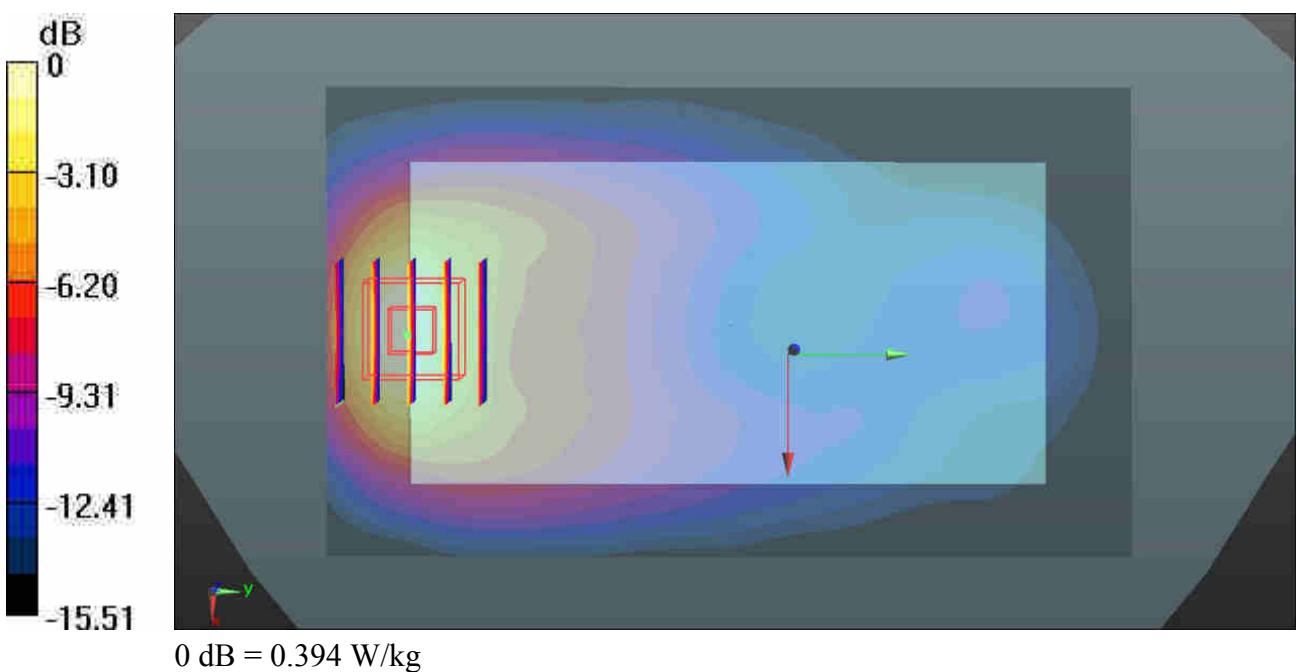
Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.464 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.517 W/kg

SAR(1 g) = 0.310 W/kg; SAR(10 g) = 0.168 W/kg

Maximum value of SAR (measured) = 0.421 W/kg



21_LTE Band 41_20M_QPSK_1RB_49Offset_Back_10mm_Ch41490

Communication System: UID 0, LTE (0); Frequency: 2680 MHz; Duty Cycle: 1:1.59
Medium: MSL_2600_160802 Medium parameters used: $f = 2680 \text{ MHz}$; $\sigma = 2.246 \text{ S/m}$; $\epsilon_r = 50.872$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.4 °C; Liquid Temperature : 22.7 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(6.79, 6.79, 6.79); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

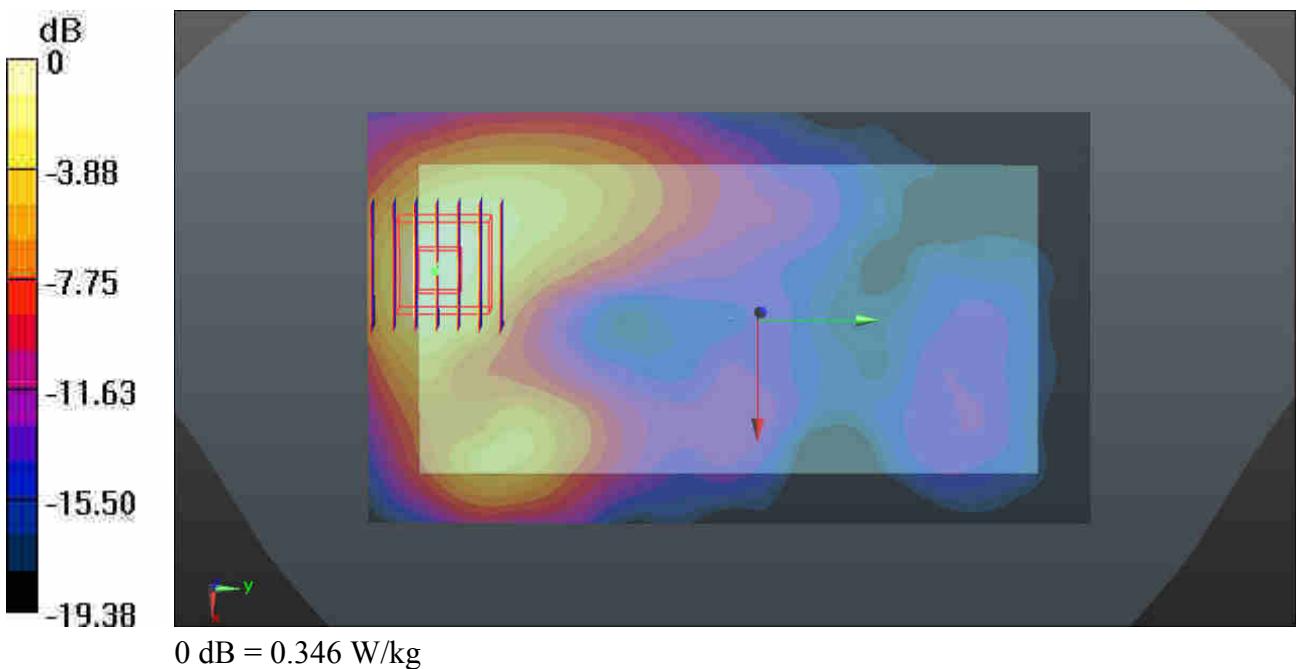
Ch41490/Area Scan (81x141x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.346 W/kg

Ch41490/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.171 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.480 W/kg

SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.113 W/kg

Maximum value of SAR (measured) = 0.352 W/kg



22_WLAN2.4GHz_802.11b 1Mbps_Back_10mm_Ch11

Communication System: UID 0, WIFI (0); Frequency: 2462 MHz; Duty Cycle: 1:1.025
Medium: MSL_2450_160804 Medium parameters used: $f = 2462 \text{ MHz}$; $\sigma = 2.011 \text{ S/m}$; $\epsilon_r = 52.249$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.5 °C; Liquid Temperature : 22.9 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(7.08, 7.08, 7.08); Calibrated: 2015.11.27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

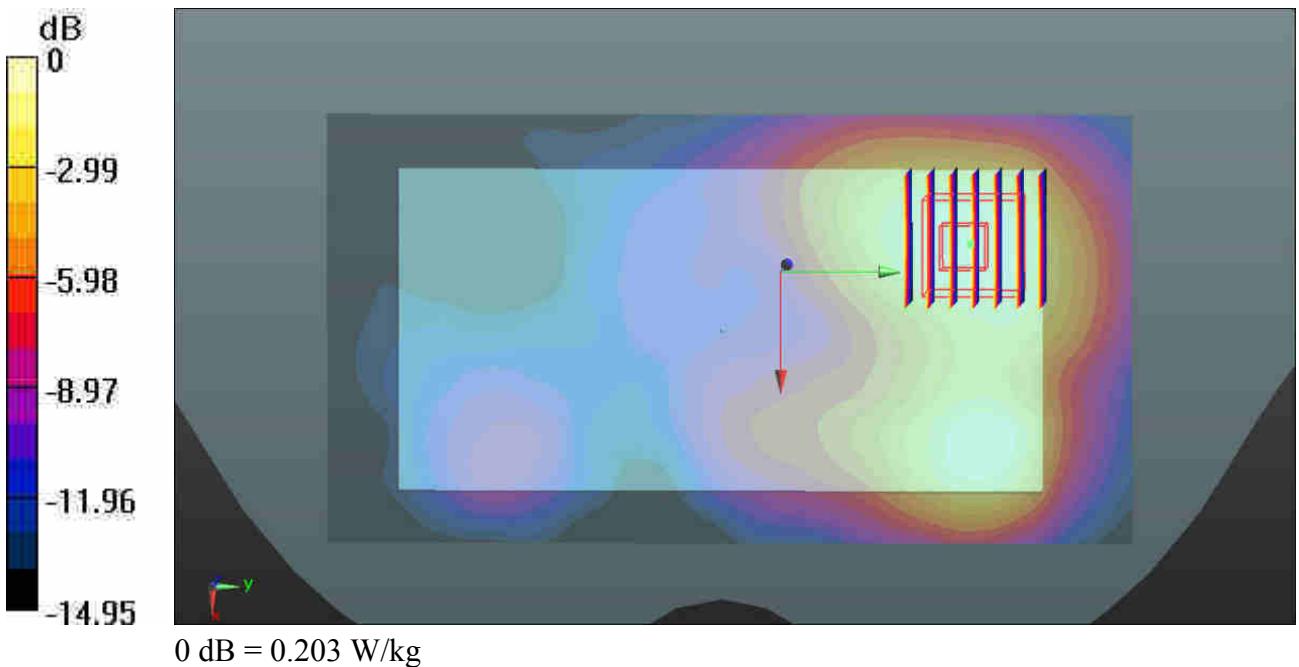
Ch11/Area Scan (81x151x1): Interpolated grid: $dx=12\text{mm}$, $dy=12\text{mm}$
Maximum value of SAR (interpolated) = 0.203 W/kg

Ch11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$
Reference Value = 2.316 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.256 W/kg

SAR(1 g) = 0.143 W/kg; SAR(10 g) = 0.084 W/kg

Maximum value of SAR (measured) = 0.196 W/kg



23_WLAN5.3GHz_ 802.11a 6Mbps_Back_10mm_Ch52

Communication System: UID 0, WIFI (0); Frequency: 5260 MHz; Duty Cycle: 1:1.149
Medium: MSL_5250_160804 Medium parameters used: $f = 5260 \text{ MHz}$; $\sigma = 5.405 \text{ S/m}$; $\epsilon_r = 49.156$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.5 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(4.2, 4.2, 4.2); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

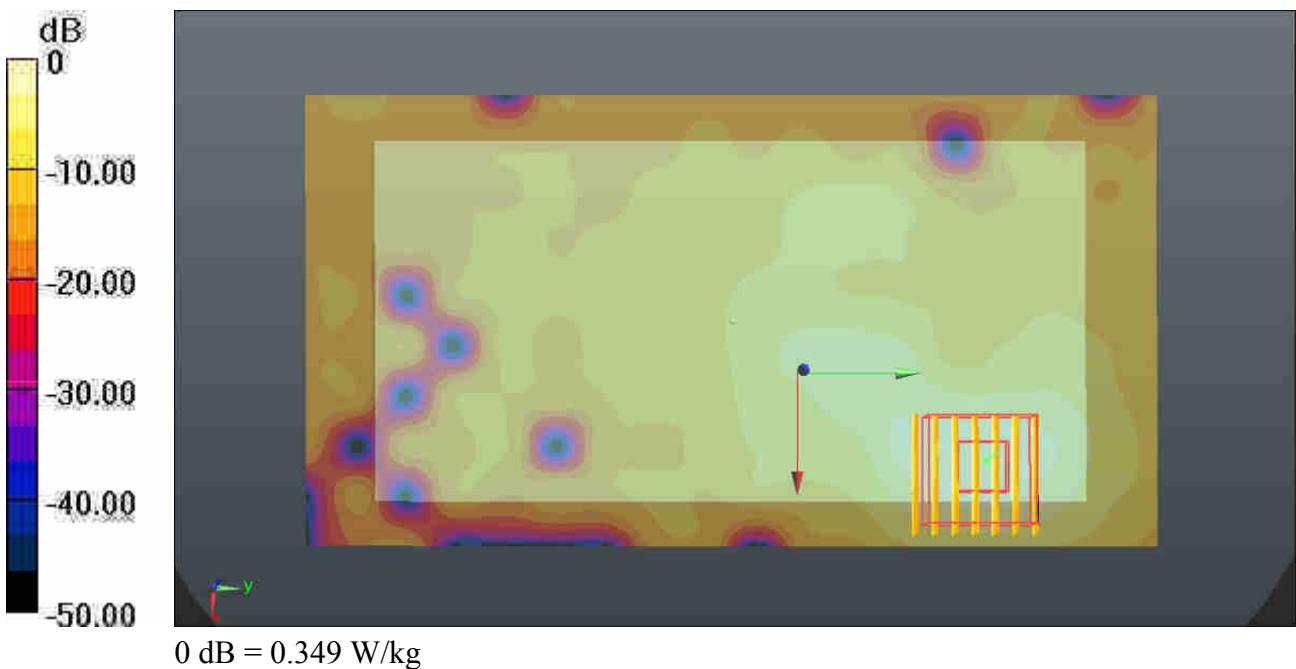
Ch52/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.349 W/kg

Ch52/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.401 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.583 W/kg

SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.053 W/kg

Maximum value of SAR (measured) = 0.360 W/kg



24_WLAN5.5GHz_ 802.11a 6Mbps_Back_10mm_Ch116

Communication System: UID 0, WIFI (0); Frequency: 5580 MHz; Duty Cycle: 1:1.149
Medium: MSL_5600_160804 Medium parameters used: $f = 5580 \text{ MHz}$; $\sigma = 5.846 \text{ S/m}$; $\epsilon_r = 48.413$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 23.2 °C; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3819; ConvF(3.67, 3.67, 3.67); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1671
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

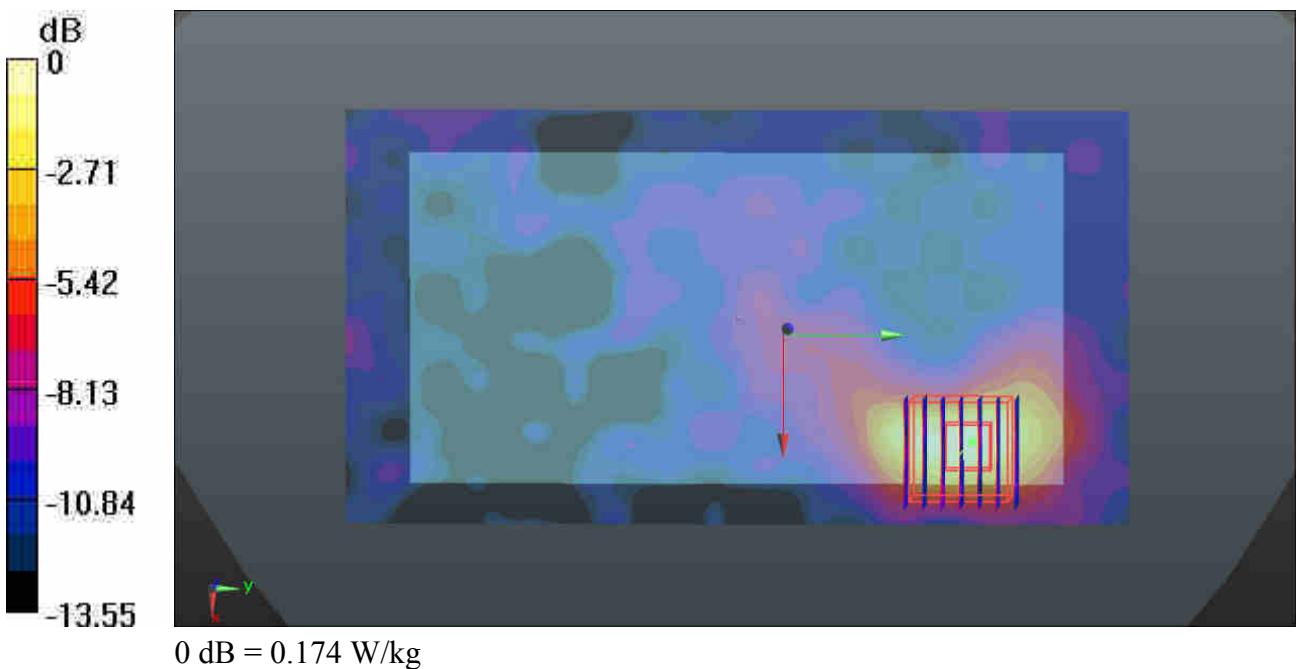
Ch116/Area Scan (91x171x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.174 W/kg

Ch116/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.893 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.324 W/kg

SAR(1 g) = 0.086 W/kg; SAR(10 g) = 0.037 W/kg

Maximum value of SAR (measured) = 0.185 W/kg





Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.



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

Accreditation No.: SCS 0108

Client Sporton-SZ (Auden)

Certificate No: D835V2-4d162_Nov15

CALIBRATION CERTIFICATE

Object D835V2 - SN: 4d162

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: November 24, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 7349	30-Dec-14 (No. EX3-7349_Dec14)	Dec-15
DAE4	SN: 601	17-Aug-15 (No. DAE4-601_Aug15)	Aug-16
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

Calibrated by: Name Claudio Leubler Function Laboratory Technician

Signature

Approved by: Kalja Pokovic Technical Manager

Issued: November 24, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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