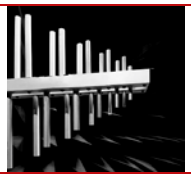
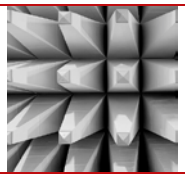




CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test Report No.: 1-6234/13-08-14-A

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing Laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6 – 10
66117 Saarbrücken/Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

Accredited Test Laboratory:
The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS)
The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01

Applicant

BlackBerry Limited
295 Phillip Street
Waterloo, ON N2L 3W8/CANADA

Phone: +1 51 98 88 74 65

Contact: Masud Attayi
e-mail: mattayi@rim.com
Phone: +1 51 98 88 74 65
Fax: +1 51 98 88 69 06

Manufacturer

BlackBerry Limited
295 Phillip Street
Waterloo, ON N2L 3W8/CANADA

Test Standard/s

IEEE 1528-2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR)in the Human Head from Wireless Communications Devices: Measurement Techniques
RSS-102 Issue 4	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

For further applied test standards please refer to section 3 of this test report.

Test Item

Kind of test item:	BlackBerry Smartphone
Device type:	portable device
Model name:	**RGF111LW**
S/N serial number:	N/A
FCC-ID:	L6ARGF110LW
IC:	2503A-RGF110LW
IMEI-Number:	004402242478059 / 004402242478133 / 004402242470056 (conducted)
Hardware status:	CER-57711-001 Rev. 1
Software status:	10.2.0.1155
Frequency:	see technical details
Antenna:	integrated antenna
Battery option:	LS1 3.8V / 1800mAh
Accessories:	---
Test sample status:	identical prototype
Exposure category:	general population / uncontrolled environment

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test Report authorised:

Thomas Vogler

DN: cn=Thomas Vogler, o=CETECOM ICT Services GmbH, ou=VOG-100727, email=thomas.vogler@cetecom.com, c=DE
Datum: 2013.10.15 09:35:18 +02'00'

Thomas Vogler
Senior Testing Manager

Test performed:

cn=Oleksandr Hnatovskiy, o=CETECOM ICT, ou=HNA-100728, email=Oleksandr.Hnatovskiy@cetecom.com, c=DE
2013.10.14 11:40:09 +02'00'

Oleksandr Hnatovskiy
Testing Manager

1 Table of contents

2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM ICT Services GmbH.
This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.
The testing service provided by CETECOM ICT Services GmbH has been rendered under the current "General Terms and Conditions for CETECOM ICT Services GmbH".
CETECOM ICT Services GmbH will not be liable for any loss or damage resulting from false, inaccurate, inappropriate or incomplete product information provided by the customer.
Under no circumstances does the CETECOM ICT Services GmbH test report include any endorsement or warranty regarding the functionality, quality or performance of any other product or service provided.
Under no circumstances does the CETECOM ICT Services GmbH test report include or imply any product or service warranties from CETECOM ICT Services GmbH, including, without limitation, any implied warranties of merchantability, fitness for purpose, or non-infringement, all of which are expressly disclaimed by CETECOM ICT Services GmbH.
All rights and remedies regarding vendor's products and services for which CETECOM ICT Services GmbH has prepared this test report shall be provided by the party offering such products or services and not by CETECOM ICT Services GmbH.
In no case this test report can be considered as a Letter of Approval.

2.2 Application details

Date of receipt of order:	2013-08-19
Date of receipt of test item:	2013-08-27
Start of test:	2013-08-28
End of test:	2013-09-09
Person(s) present during the test:	

2.3 Statement of compliance

The SAR values found for the RGF111LW BlackBerry Smartphone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1 g tissue according to the FCC rule §2.1093, the ANSI/IEEE C 95.1:1992, the NCRP Report Number 86 for uncontrolled environment, according to the Health Canada's Safety Code 6 and the Industry Canada Radio Standards Specification RSS-102 for General Population/Uncontrolled exposure.
For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15 mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.
According to KDB pub 941225 D06 this device has been tested with 10 mm distance to the phantom for operation in WLAN hotspot mode.

2.4 Technical details

Band tested for this test report	Technology	Lowest transmit frequency/MHz	Highest transmit frequency/MHz	Lowest receive Frequency/MHz	Highest receive Frequency/MHz	Kind of modulation	Power Class	Tested power control level	GPRS/EGPRS mobile station class	GPRS/EGPRS multislot class	(E)GPRS voice mode or DTM	Test channel low	Test channel middle	Test channel high	Maximum output power/dBm)*
☐	GSM	880.2	914.8	925.2	959.8	GMSK 8-PSK	4 E2	5	A	12	11	975	37	124	33.0
☐	GSM DCS	1710.2	1784.8	1805.2	1879.8	GMSK 8-PSK	1 E2	0	A	12	11	512	698	885	29.4
☒	GSM cellular	824.2	848.8	869.2	893.8	GMSK 8-PSK	4 E2	5	A	12	11	128	190	251	33.4
☒	GSM PCS	1850.2	1909.8	1930.2	1989.8	GMSK 8-PSK	1 E2	0	A	12	11	512	661	810	28.8
☐	UMTS FDD I	1922.4	1977.6	2112.4	2167.6	QPSK	3	max	--	--	--	9612	9750	9888	23.3
☒	UMTS FDD II	1852.4	1907.6	1982.4	1987.6	QPSK	3	max	--	--	--	9262	9400	9538	24.4
☒	UMTS FDD IV	1712.4	1752.6	1807.4	1877.6	QPSK	3	max	--	--	--	1312	1412	1513	24.1
☒	UMTS FDD V	826.4	846.6	871.4	891.6	QPSK	3	max	--	--	--	4132	4182	4233	24.2
☐	UMTS FDD VI	832.4	837.6	875	885	QPSK	3	max	--	--	--	4162	4175	4188	23.5
☒	LTE FDD 2	1850	1910	1930	1990	OFDM QPSK 16QAM	3	max	--	--	--	18700	18900	19100	23.5
☒	LTE FDD 4	1710	1755	2110	2155		3	max	--	--	--	20050	20175	20300	23.5
☒	LTE FDD 5	824	849	869	894		3	max	--	--	--	20450	20525	20600	23.7
☒	LTE FDD 17	704	716	734	746		3	max	--	--	--	23780	23790	23800	23.3
☐	WLAN	2412	2472	2412	2472	CCK OFDM	--	max	--	--	--	1	7	13	19.3
☒	WLAN US	2412	2462	2412	2462		--	max	--	--	--	1	6	11	19.3
☒	WLAN	5180	5240	5180	5240	OFDM	--	max	--	--	--	--	--	48	14.4
☒	WLAN	5260	5320	5260	5320	OFDM	--	max	--	--	--	--	--	64	15.7
☒	WLAN	5500	5700	5500	5700	OFDM	--	max	--	--	--	100	--	--	16.0
☒	WLAN	5745	5825	5745	5825	OFDM	--	max	--	--	--	149	--	--	15.0
☐	BT	2402	2480	2402	2480	GFSK	3	max	--	--	--	0	39	78	8.75

)*: measured slotted peak power for GSM, averaged max. RMS power for UMTS, LTE, WLAN and BT.

supported UMTS features	category	remarks
Release 5 HSDPA	10	QPSK, 16QAM, 14 Mbit/s
Release 7 HSDPA	14	QPSK, 64QAM, 21.1 Mbit/s
Release 6 HSUPA	6	no 16QAM , no MIMO, 5.76 Mbit/s

LTE: Release 8, Category 3

2.5 Transmitter and Antenna Operating Configurations

Simultaneous transmission conditions		
GSM / GPRS / EDGE / DTM	+	BT/BLE[1]
GSM / GPRS / EDGE / DTM	+	WLAN 2.4GHz
GSM / GPRS / EDGE / DTM	+	WLAN 5GHz
UMTS / HSPA	+	BT/BLE
UMTS / HSPA	+	WLAN 2.4GHz
UMTS / HSPA	+	WLAN 5GHz
CDMA	+	BT/BLE
CDMA	+	WLAN 2.4GHz
CDMA	+	WLAN 5GHz
LTE	+	BT/BLE
LTE	+	WLAN 2.4GHz
LTE	+	WLAN 5GHz

Table 1: Simultaneous transmission conditions

Note: BT and WLAN can be active at the same time, but only with interleaving of packages switched on board level. That means that they don't transmit at the same time.

BLE[1] - Bluetooth low energy

3 Test standards/ procedures references

Test Standard	Version	Test Standard Description
IEEE 1528-2003	2003-04	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
RSS-102 Issue 4	2010-03	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
Canada's Safety Code No. 6	99-EHD-237	Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz
IEEE Std. C95-3	2002	IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave
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.
IEC 62209-2	2010	Human exposure to radio frequency fields from hand-held and bodymounted wireless communication devices. Human models, instrumentation, and procedures. 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)
FCC KDBs:		
KDB 865664D01v01	May 28, 2013	FCC OET SAR measurement requirements 100 MHz to 6 GHz
KDB 865664D02v01	May 28, 2013	RF Exposure Compliance Reporting and Documentation Considerations
KDB 447498D01v05	May 28, 2013	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB 648474D04v01	May 28, 2013	SAR Evaluation Considerations for Wireless Handsets
KDB 941225D01v02	April 10, 2007	SAR Measurements Procedures for 3G Devices
KDB 941225D02v01	December 14, 2009	3GPP R6 HSPA and R7 HSPA+ SAR Guidance
KDB 941225D02v02	May 28, 2013	SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced
KDB 941225D05v02	May 28, 2013	SAR for LTE Devices
KDB 941225D03v01	December, 2008	SAR Test Reduction Procedure for GSM/GPRS/EDGE
KDB 941225D06v01	May 28, 2013	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
KDB 248227D01v01	May, 2007	SAR Measurement Procedures for 802.11 a/b/g Transmitters
KDB 450824D01v01	January, 2007	SAR Probe Calibration and System Verification considerations for measurements from 150 MHz to 3 GHz
KDB 450824D01v01	March 4, 2012	Dipole Requirements for SAR System Validation and Verification

3.1 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain and Trunk)	**1.60 mW/g**	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

Table 2: RF exposure limits

The limit applied in this test report is shown in bold letters

Notes:

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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

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).

4 Summary of Measurement Results

☒	**No deviations from the technical specifications ascertained**
☐	Deviations from the technical specifications ascertained

Maximum SAR value reported for 1g (W/kg)

		PCE	DTS	UNII
head		**1.099**	**0.865**	**0.341**
body worn 15 mm distance		**0.872**	**0.255**	**0.469**
hotspot operation 10 mm distance		**1.358**	**0.643**	not supported
collocated situations	**ΣSAR evaluation**	**1.574**		
	SPLSRi ≤ 0.040	**0.032**		

4.1 SAR measurement variability and measurement uncertainty analysis

This analysis is required for worst case results larger than 0.8 W/kg.

frequency band	highest original measurement result at worst case position (W/kg)	repeated measurement result at worst case	ratio <1.2
GSM 1900	1.210	1.180	1.03
UMTS FDD II	1.030	1.030	1.00
UMTS FDD IV	1.050	1.050	1.00
LTE FDD 2	1.080	1.060	1.02
LTE FDD 4	1.000	0.993	1.01
LTE FDD 5	0.726	0.676	1.07
WLAN 2450	0.826	0.704	1.17

5 Test Environment

Ambient temperature: 20 – 24 °C
Tissue Simulating liquid: 20 – 24 °C

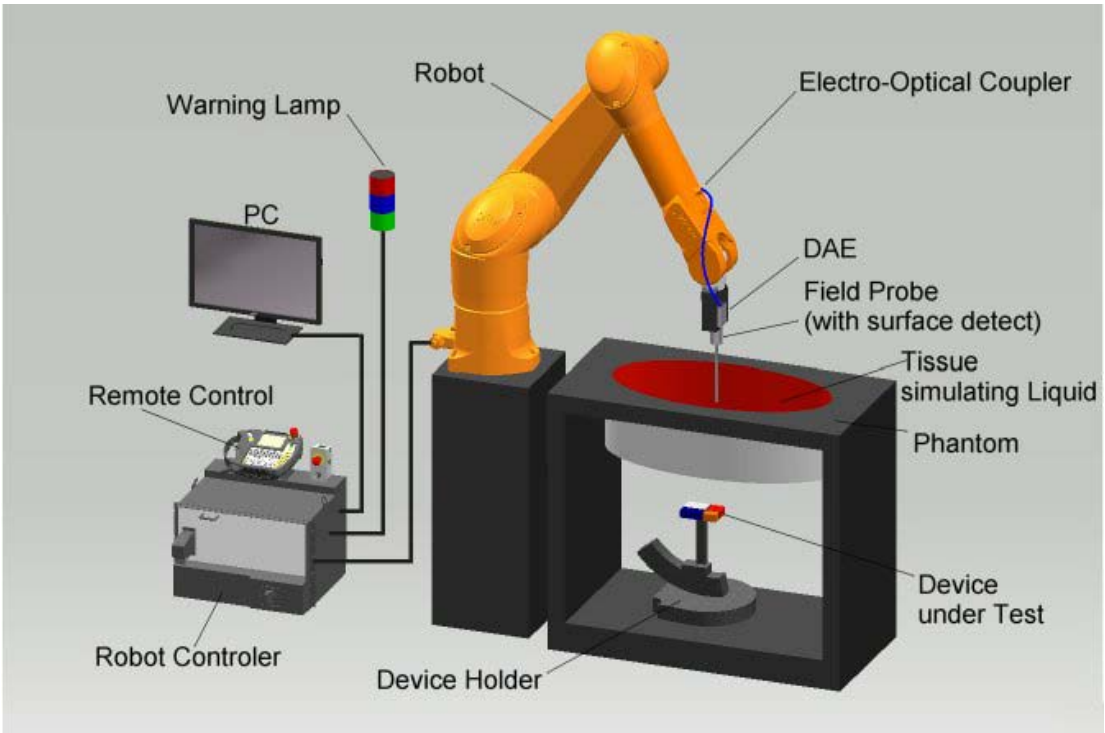
Relative humidity content: 40 – 50 %
Air pressure: not relevant for this kind of testing
Power supply: 230 V / 50 Hz

Exact temperature values for each test are shown in the table(s) under 7.1 and/or on the measurement plots.

6 Test Set-up

6.1 Measurement system

6.1.1 System Description



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

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

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

- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY measurement server.
- The DASY measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 7.
- DASY software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System check dipoles allowing to validate the proper functioning of the system.

6.1.2 Test environment

The DASY measurement system is placed at the head end of a room with dimensions:
5 x 2.5 x 3 m³, the SAM phantom is placed in a distance of 75 cm from the side walls and 1.1m from the rear wall. Above the test system a 1.5 x 1.5 m² array of pyramid absorbers is installed to reduce reflections from the ceiling.
Picture 1 of the photo documentation shows a complete view of the test environment.
The system allows the measurement of SAR values larger than 0.005 mW/g.

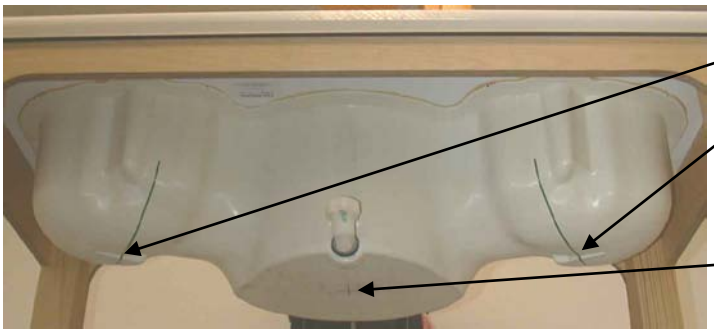
6.1.3 Probe description

Isotropic E-Field Probe ET3DV6 for Dosimetric Measurements

Technical data according to manufacturer information	
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration	In air from 10 MHz to 2.5 GHz In head tissue simulating liquid (HSL) at 900 (800-1000) MHz and 1.8 GHz (1700-1910 MHz) (accuracy ± 9.5%; k=2) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces (ET3DV6 only)
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms (ET3DV6)

6.1.4 Phantom description

The used SAM Phantom meets the requirements specified in Edition 01-01 of Supplement C to OET Bulletin 65 for Specific Absorption Rate (SAR) measurements.
The phantom consists of a fibreglass shell integrated in a wooden table. It allows left-hand and right-hand head as well as body-worn measurements with a maximum liquid depth of 18 cm in head position and 22 cm in planar position (body measurements). The thickness of the Phantom shell is 2 mm +/- 0.1 mm.



6.1.5 Device holder description

The DASY device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. 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. This device holder is used for standard mobile phones or PDA's only. If necessary an additional support of polystyrene material is used.

Larger DUT's (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values.
Therefore those devices are normally only tested at the flat part of the SAM.

6.1.6 Scanning procedure

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

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

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

- The „area scan“ measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strenth is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension. If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation. Results of this coarse scan are shown in Annex B.

- A „7x7x7 zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous „coarse“ scan. This is a fine 7x7 grid where the robot additionally moves the probe in 7 steps along the z-axis away from the bottom of the Phantom. Grid spacing for the cube measurement is 5 mm / 4 mm in x and y-direction and 5 mm / 2 mm in z-direction. DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in annex 2. Test results relevant for the specified standard (see section 3) are shown in table form in section 7.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 2mm steps. This measurement shows the continuity of the liquid and can - depending in the field strength – also show the liquid depth. A z-axis scan of the measurement with maximum SAR value is shown in Annex B.

6.1.7 Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of 7 x 7 x 7 points. The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.

- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.

- All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

6.1.8 Data Storage and Evaluation

Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4", ".DA5x". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

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

Data Evaluation by SEMCAD

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

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

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

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf/dcp_i$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	U_i	= input signal of channel i	(i = x, y, z)
	cf	= crest factor of exciting field	(DASY parameter)
	dcp_i	= diode compression point	(DASY parameter)

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

E-field probes: $$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes: $$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2)/f$$

with	V_i	= compensated signal of channel i	(i = x, y, z)
	$Norm_i$	= sensor sensitivity of channel i [mV/(V/m)^2] for E-field Probes	(i = x, y, z)
	ConvF	= sensitivity enhancement in solution	
	a_{ij}	= sensor sensitivity factors for H-field probes	
	f	= carrier frequency [GHz]	
	E_i	= electric field strength of channel i in V/m	
	H_i	= magnetic field strength of channel i in A/m	

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

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

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

$$SAR = (E_{tot}^2 \cdot \sigma) / (\rho \cdot 1000)$$

with	SAR	= local specific absorption rate in mW/g
	E_{tot}	= total field strength in V/m
	σ	= conductivity in [mho/m] or [Siemens/m]
	ρ	= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with	P_{pwe}	= equivalent power density of a plane wave in mW/cm^2
	E_{tot}	= total electric field strength in V/m
	H_{tot}	= total magnetic field strength in A/m

6.1.9 Tissue simulating liquids: dielectric properties

The following materials are used for producing the tissue-equivalent materials.

(Liquids used for tests described in section 7. are marked with ☒) :

Ingredients (% of weight)	**Frequency (MHz)**								
frequency band	☐ 450	☒ 750	☒ 835	☐ 900	☐ 1450	☒ 1800	☒ 1900	☒ 2450	☒ 5000
Tissue Type	Head	Head	Head	Head	Head	Head	Head	Head	Head
Water	38.56	41.1	41.45	40.92	52.64	52.64	54.9	62.7	64 - 78
Salt (NaCl)	3.95	1.4	1.45	1.48	0.61	0.36	0.18	0.5	2 - 3
Sugar	56.32	57.0	56.0	56.5	0.0	0.0	0.0	0.0	0.0
HEC	0.98	0.2	1.0	1.0	0.0	0.0	0.0	0.0	0.0
Bactericide	0.19	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	46.75	47.0	44.92	0.0	0.0
Emulsifiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9 - 15
Mineral Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11 - 18

Table 3: Head tissue dielectric properties

Ingredients (% of weight)	**Frequency (MHz)**								
frequency band	☐ 450	☒ 750	☒ 835	☐ 900	☐ 1450	☒ 1800	☒ 1900	☒ 2450	☒ 5000
Tissue Type	Body	Body	Body	Body	Body	Body	Body	Body	Body
Water	51.16	51.7	52.4	56.0	70.97	69.91	69.91	73.2	64 - 78
Salt (NaCl)	1.49	0.9	1.40	0.76	0.43	0.13	0.13	0.04	2 - 3
Sugar	46.78	47.2	45.0	41.76	0.0	0.0	0.0	0.0	0.0
HEC	0.52	0.0	1.0	1.21	0.0	0.0	0.0	0.0	0.0
Bactericide	0.05	0.1	0.1	0.27	0.0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	0.0	0.0	28.60	29.96	29.96	26.7	0.0
Emulsifiers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9 - 15
Mineral Oil	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11 - 18

Table 4: Body tissue dielectric properties

Salt: 99+% Pure Sodium Chloride
Water: De-ionized, 16MΩ+ resistivity
Sugar: 98+% Pure Sucrose
HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

6.1.10 Tissue simulating liquids: parameters

Liquid **HSL**	Freq. (MHz)	Target head tissue		Measurement head tissue				Measurement date
		Permittivity	Conductivity [S/m]	Permittivity	Dev. %	Conductivity [S/m]	Dev. %	
750	709	41.9	0.89	41.5	-1.0%	0.85	-4.4%	2013-09-02
	710	41.9	0.89	41.5	-1.0%	0.85	-4.2%	2013-09-02
	711	41.9	0.89	41.5	-1.0%	0.85	-4.0%	2013-09-02
	750	41.9	0.89	41.4	-1.1%	0.85	-4.1%	2013-09-02
850/900	824	41.5	0.90	42.1	1.3%	0.87	-3.1%	2013-08-28
	837	41.5	0.90	41.8	0.8%	0.89	-1.7%	2013-08-28
	849	41.5	0.90	41.7	0.4%	0.90	-0.5%	2013-08-28
	900	41.5	0.97	41.1	-1.1%	0.95	-2.6%	2013-08-28
1750	1710	40.0	1.40	39.8	-0.4%	1.35	-3.6%	2013-08-30
	1732	40.0	1.40	39.9	-0.4%	1.37	-2.2%	2013-08-30
	1747	40.0	1.40	39.9	-0.4%	1.38	-1.3%	2013-08-30
	1752	40.0	1.40	39.9	-0.4%	1.39	-1.0%	2013-08-30
1900	1850	40.0	1.40	40.1	0.2%	1.34	-4.6%	2013-09-07
	1880	40.0	1.40	40.0	0.0%	1.36	-3.2%	2013-09-07
	1900	40.0	1.40	40.0	-0.1%	1.36	-2.6%	2013-09-07
	1910	40.0	1.40	39.9	-0.4%	1.38	-1.6%	2013-09-07
2450	2412	39.2	1.80	39.2	0.0%	1.78	-1.1%	2013-09-04
	2437	39.2	1.80	39.1	-0.3%	1.80	0.1%	2013-09-04
	2450	39.2	1.80	39.0	-0.4%	1.82	0.8%	2013-09-04
	2462	39.2	1.80	39.0	-0.5%	1.83	1.7%	2013-09-04
5GHz	5200	36.0	4.66	36.6	1.7%	4.52	-3.0%	2013-10-11
	5240	35.9	4.71	36.5	1.7%	4.56	-3.2%	2013-10-11
	5320	35.9	4.76	36.4	1.5%	4.64	-2.5%	2013-10-11
	5500	35.6	4.96	36.1	1.4%	4.82	-2.8%	2013-10-11
	5745	35.4	5.22	35.7	0.9%	5.07	-3.0%	2013-10-11
	5800	35.3	5.27	35.6	0.8%	5.12	-2.8%	2013-10-11

Table 5: Parameter of the head tissue simulating liquid

Liquid **MSL**	Freq. (MHz)	Target **body** tissue		Measurement **body** tissue				Measurement date
		Permittivity	Conductivity [S/m]	Permittivity	Dev. %	Conductivity [S/m]	Dev. %	
750	709	55.5	0.96	56.5	1.7%	0.93	-3.6%	2013-09-03
	710	55.5	0.96	56.4	1.7%	0.93	-3.5%	2013-09-03
	711	55.5	0.96	56.4	1.7%	0.93	-3.3%	2013-09-03
	750	55.5	0.96	56.2	1.3%	0.97	1.3%	2013-09-03
850/900	824	55.2	0.97	56.0	1.5%	0.95	-1.6%	2013-08-30
	837	55.2	0.97	55.9	1.3%	0.97	-0.2%	2013-08-30
	849	55.2	0.97	55.8	1.1%	0.98	0.9%	2013-08-30
	900	55.0	1.05	55.3	0.6%	1.03	-2.0%	2013-08-30
1750	1710	53.3	1.52	52.7	-1.1%	1.46	-3.9%	2013-09-04
	1732	53.3	1.52	52.6	-1.2%	1.48	-2.4%	2013-09-04
	1747	53.3	1.52	52.6	-1.3%	1.50	-1.1%	2013-09-04
	1752	53.3	1.52	52.6	-1.4%	1.51	-0.9%	2013-09-04
1900	1850	53.3	1.52	53.0	-0.6%	1.45	-4.3%	2013-09-02
	1880	53.3	1.52	52.9	-0.8%	1.49	-2.1%	2013-09-02
	1900	53.3	1.52	52.8	-1.0%	1.51	-0.7%	2013-09-02
	1910	53.3	1.52	52.8	-1.0%	1.52	0.3%	2013-09-02
2450	2412	52.7	1.95	51.5	-2.3%	1.91	-1.9%	2013-09-04
	2437	52.7	1.95	51.4	-2.5%	1.94	-0.3%	2013-09-04
	2450	52.7	1.95	51.4	-2.6%	1.96	0.7%	2013-09-04
	2462	52.7	1.95	51.3	-2.6%	1.98	1.5%	2013-09-04
5GHz	5200	49.0	5.30	48.0	-2.0%	5.34	0.8%	2013-10-10
	5240	49.0	5.30	47.9	-2.2%	5.41	2.1%	2013-10-10
	5320	48.9	5.40	47.8	-2.2%	5.53	2.4%	2013-10-10
	5500	48.6	5.65	47.3	-2.7%	5.71	1.1%	2013-10-10
	5745	48.2	6.00	46.8	-3.0%	6.01	0.2%	2013-10-10
	5800	48.2	6.00	46.7	-3.1%	6.10	1.7%	2013-10-10

Table 6: Parameter of the body tissue simulating liquid
Note: The dielectric properties have been measured using the contact probe method at 22°C.

6.1.11 Measurement uncertainty evaluation for SAR test

Relative DASY5 Uncertainty Budget for SAR Tests								
According to IEEE 1528/2011 and IEC62209-1/2011 (0.3-3GHz range)								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i	c_i	Standard Uncertainty		v_i^2 or v_{eff}
				(1g)	(10g)	± %, (1g)	± %, (10g)	
Measurement System								
Probe calibration	± 6.0 %	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Modulation Response	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√ 3	1	1	± 0.2 %	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Max. SAR evaluation	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 6.1 %	Rectangular	√ 3	1	1	± 3.5 %	± 3.5 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.78	0.71	± 2.3 %	± 2.0 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.26	0.26	± 0.8 %	± 0.8 %	∞
Temp. Unc. - Conductivity	± 3.4 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. Unc. - Permittivity	± 0.4 %	Rectangular	√ 3	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Uncertainty						± 11.3 %	± 11.3 %	330
Expanded Std. Uncertainty						± **22.7** %	± **22.5** %	

Table 7: Measurement uncertainties
Worst-Case uncertainty budget for DASY5 assessed according to IEEE 1528/2011 and IEC 62209-1/2011 draft standards. The budget is valid for the frequency range 300MHz -3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

Relative DASY5 Uncertainty Budget for SAR Tests								
According to IEC62209-2/2010 (30 MHz - 6 GHz range)								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i	c_i	Standard Uncertainty		v_i^2 or v_{eff}
				(1g)	(10g)	± %, (1g)	± %, (10g)	
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Modulation Response	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Post-processing	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 7.9 %	Rectangular	√ 3	1	1	± 4.6 %	± 4.6 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.78	0.71	± 2.3 %	± 2.0 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.26	0.26	± 0.8 %	± 0.8 %	∞
Temp. Unc. - Conductivity	± 3.4 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. Unc. - Permittivity	± 0.4 %	Rectangular	√ 3	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Uncertainty						± 12.7 %	± 12.6 %	330
Expanded Std. Uncertainty						± **25.4** %	± **25.3** %	

Table 8: Measurement uncertainties. Worst-Case uncertainty budget for DASY5 assessed according to according to IEC 62209-2/2010 standard. The budget is valid for the frequency range 30MHz - 6 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

Relative DASY5 Uncertainty Budget for SAR Tests								
According to IEEE 1528-2003, IEC 62209-1 for the 3-6 GHz range								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Max. SAR evaluation	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Liquid conductivity (target)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid permittivity (target)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.6	0.49	± 1.7 %	± 1.4 %	∞
Combined Uncertainty						± 12.1 %	± 11.9 %	330
Expanded Std. Uncertainty						± **24.3** %	± **23.8** %	

Table 9: Measurement uncertainties
Worst-Case uncertainty budget for DASY5 valid for 3G communication signals and frequency range 3 - 6 GHz. Probe calibration error reflects uncertainty of the EX3D probe. For specific tests and configurations, the uncertainty could be considerable smaller.

Relative DASY5 Uncertainty Budget for SAR Tests								
According to IEEE 1528/2011 and IEC62209-1/2011 (3-6GHz range)								
Error Description	Uncertainty Value	Probability Distribution	Divisor	c_i	c_i	Standard Uncertainty		v_i^2 or v_{eff}
				(1g)	(10g)	± %, (1g)	± %, (10g)	
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 9.6 %	Rectangular	√ 3	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary effects	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Modulation Response	± 2.4 %	Rectangular	√ 3	1	1	± 1.4 %	± 1.4 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Integration time	± 2.6 %	Rectangular	√ 3	1	1	± 1.5 %	± 1.5 %	∞
RF ambient noise	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
RF ambient reflections	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Max. SAR evaluation	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device positioning	± 2.9 %	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device holder uncertainty	± 3.6 %	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power drift	± 5.0 %	Rectangular	√ 3	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Set-up								
Phantom uncertainty	± 6.6 %	Rectangular	√ 3	1	1	± 3.8 %	± 3.8 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Rectangular	√ 3	0.78	0.71	± 2.3 %	± 2.0 %	∞
Liquid permittivity (meas.)	± 5.0 %	Rectangular	√ 3	0.26	0.26	± 0.8 %	± 0.8 %	∞
Temp. Unc. - Conductivity	± 3.4 %	Rectangular	√ 3	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. Unc. - Permittivity	± 0.4 %	Rectangular	√ 3	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Uncertainty						± 12.4 %	± 12.4 %	330
Expanded Std. Uncertainty						± **24.9** %	± **24.8** %	

Table 10: Measurement uncertainties
Worst-Case uncertainty budget for DASY5 assessed according to IEEE 1528/2011 and IEC 62209-1/2011 draft standards. The budget is valid for the frequency range 3GHz -6GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

6.1.12 Measurement uncertainty evaluation for System Check

Uncertainty of a System Performance Check with DASY5 System for the 0.3 - 3 GHz range								
Source of uncertainty	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.0 %	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 0.0 %	Rectangular	√ 3	0.7	0.7	± 0.0 %	± 0.0 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Integration time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
RF ambient conditions	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.4 %	Rectangular	√ 3	1	1	± 0.2 %	± 0.2 %	∞
Probe positioning	± 2.9 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Max. SAR evaluation	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Dev. of experimental dipole	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Source to liquid distance	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Power drift	± 3.4 %	Rectangular	√ 3	1	1	± 2.0 %	± 2.0 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Normal	1	0.78	0.71	± 3.9 %	± 3.6 %	∞
Liquid permittivity (meas.)	± 5.0 %	Normal	1	0.26	0.26	± 1.3 %	± 1.3 %	∞
Temp. unc. - Conductivity	± 1.7 %	Rectangular	√ 3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 0.3 %	Rectangular	√ 3	0.23	0.26	± 0.0 %	± 0.0 %	∞
Combined Uncertainty						± 9.1 %	± 8.9 %	330
Expanded Std. Uncertainty						± **18.2** %	± **17.9** %	

Table 11: Measurement uncertainties of the System Check with DASY5 (0.3-3GHz)

Uncertainty of a System Performance Check with DASY5 System for the 3 - 6 GHz range								
Source of uncertainty	Uncertainty Value	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	Standard Uncertainty ± %, (1g)	Standard Uncertainty ± %, (10g)	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 6.6 %	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Axial isotropy	± 4.7 %	Rectangular	√ 3	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical isotropy	± 0.0 %	Rectangular	√ 3	0.7	0.7	± 0.0 %	± 0.0 %	∞
Boundary effects	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Probe linearity	± 4.7 %	Rectangular	√ 3	1	1	± 2.7 %	± 2.7 %	∞
System detection limits	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Readout electronics	± 0.3 %	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Integration time	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
RF ambient conditions	± 3.0 %	Rectangular	√ 3	1	1	± 1.7 %	± 1.7 %	∞
Probe positioner	± 0.8 %	Rectangular	√ 3	1	1	± 0.5 %	± 0.5 %	∞
Probe positioning	± 6.7 %	Rectangular	√ 3	1	1	± 3.9 %	± 3.9 %	∞
Max. SAR evaluation	± 1.0 %	Rectangular	√ 3	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Dev. of experimental dipole	± 0.0 %	Rectangular	√ 3	1	1	± 0.0 %	± 0.0 %	∞
Source to liquid distance	± 2.0 %	Rectangular	√ 3	1	1	± 1.2 %	± 1.2 %	∞
Power drift	± 3.4 %	Rectangular	√ 3	1	1	± 2.0 %	± 2.0 %	∞
Phantom and Set-up								
Phantom uncertainty	± 4.0 %	Rectangular	√ 3	1	1	± 2.3 %	± 2.3 %	∞
SAR correction	± 1.9 %	Rectangular	√ 3	1	0.84	± 1.1 %	± 0.9 %	∞
Liquid conductivity (meas.)	± 5.0 %	Normal	1	0.78	0.71	± 3.9 %	± 3.6 %	∞
Liquid permittivity (meas.)	± 5.0 %	Normal	1	0.26	0.26	± 1.3 %	± 1.3 %	∞
Temp. unc. - Conductivity	± 1.7 %	Rectangular	√ 3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 0.3 %	Rectangular	√ 3	0.23	0.26	± 0.0 %	± 0.0 %	∞
Combined Uncertainty						± 10.1 %	± 10.0 %	330
Expanded Std. Uncertainty						± **20.2** %	± **19.9** %	

Table 12: Measurement uncertainties of the System Check with DASY5 (3-6GHz)

Note: Worst case probe calibration uncertainty has been applied for all probes used during the measurements.

6.1.13 System check

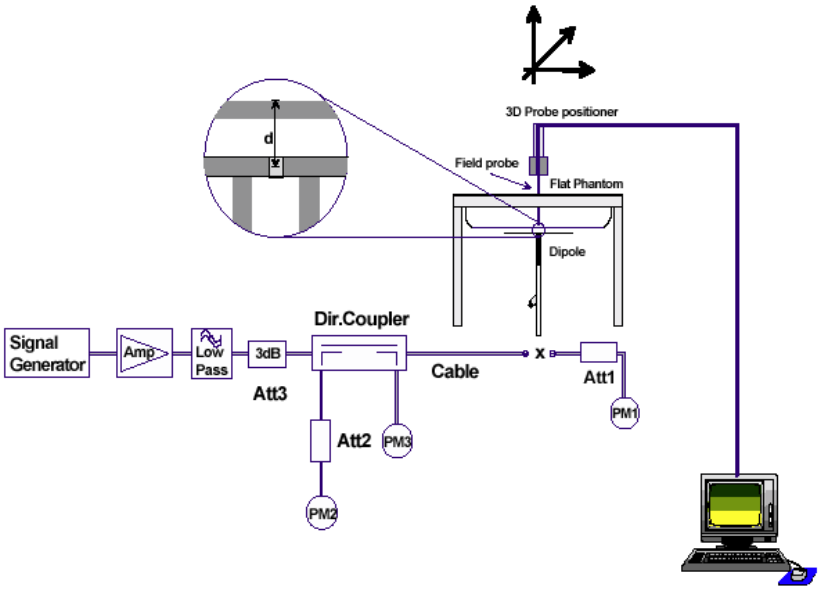
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE 1528. The following table shows system check results for all frequency bands and tissue liquids used during the tests (plot(s) see annex A).

System performence check (1000 mW)								
System validation Kit	Frequency	Target SAR_{1g} (+/- 10%)	Target SAR_{10g} (+/- 10%)	Measured SAR_{1g} mW/g	SAR_{1g} dev. %	Measured SAR_{10g} mW/g	SAR_{10g} dev. %	Measured date
D750V3 S/N: 1041	750 MHz head	8.52	5.56	8.26	-3.1%	5.36	-3.6%	2013-09-02
D750V3 S/N: 1041	750 MHz body	8.78	5.79	8.76	-0.2%	5.77	-0.3%	2013-09-03
D900V2 S/N: 102	900 MHz head	10.70	6.89	10.50	-1.9%	6.68	-3.0%	2013-08-28
D900V2 S/N: 102	900 MHz head	10.70	6.89	10.50	-1.9%	6.74	-2.2%	2013-08-29
D900V2 S/N: 102	900 MHz body	10.90	7.03	10.80	-0.9%	6.95	-1.1%	2013-08-30
D900V2 S/N: 102	900 MHz body	10.90	7.03	10.80	-0.9%	6.96	-1.0%	2013-08-31
D1750V2 S/N: 1093	1750 MHz head	36.60	19.30	38.80	6.0%	20.90	8.3%	2013-08-30
D1750V2 S/N: 1093	1750 MHz body	37.90	20.30	37.90	0.0%	20.90	3.0%	2013-09-04
D1750V2 S/N: 1093	1750 MHz body	37.90	20.30	35.60	-6.1%	19.70	-3.0%	2013-09-05
D1750V2 S/N: 1093	1750 MHz body	37.90	20.30	36.50	-3.7%	20.20	-0.5%	2013-09-06
D1900V2 S/N: 5d009	1900 MHz head	40.10	21.00	38.60	-3.7%	20.10	-4.3%	2013-09-07
D1900V2 S/N: 5d009	1900 MHz head	40.10	21.00	38.90	-3.0%	20.50	-2.4%	2013-09-09
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	39.00	-4.6%	21.00	-3.2%	2013-09-02
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	39.10	-4.4%	21.00	-3.2%	2013-09-03
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	39.30	-3.9%	21.30	-1.8%	2013-09-06
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	39.20	-4.2%	21.20	-2.3%	2013-09-07
D2450V2 S/N: 710	2450 MHz head	51.50	24.00	54.00	4.9%	25.00	4.2%	2013-09-04
D2450V2 S/N: 710	2450 MHz body	51.20	23.90	54.30	6.1%	25.30	5.9%	2013-09-04
D5GHzV2 S/N: 1055	5200 MHz head	80.40	23.00	79.40	-1.2%	22.40	-2.6%	2013-10-11
D5GHzV2 S/N: 1055	5500 MHz head	84.90	24.30	80.00	-5.8%	22.20	-8.6%	2013-10-11
D5GHzV2 S/N: 1055	5800 MHz head	80.10	22.70	75.60	-5.6%	20.90	-7.9%	2013-10-11
D5GHzV2 S/N: 1055	5200 MHz body	74.20	20.80	78.00	5.1%	22.10	6.3%	2013-10-10
D5GHzV2 S/N: 1055	5500 MHz body	77.90	21.70	83.10	6.7%	23.00	6.0%	2013-10-10
D5GHzV2 S/N: 1055	5800 MHz body	73.30	20.20	68.80	-6.1%	18.90	-6.4%	2013-10-10

Table 13: Results system check

6.1.14 System check procedure

The system check is performed by using a validation dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 1000 mW for frequencies below 2 GHz or 100 mW for frequencies above 2 GHz. To adjust this power a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the validation to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).
System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



6.1.15 System validation

The system validation is performed in a similar way as a system check. It needs to be performed once a SAR measurement system has been established and allows an evaluation of the system accuracy with all components used together with the specified system. It has to be repeated at least once a year or when new system components are used (DAE, probe, phantom, dipole, liquid type).
In addition to the procedure used during system check a system validation also includes checks of probe isotropy, probe modulation factor and RF signal.

The following table lists the system validations relevant for this test report:

DASY System	Frequency/ MHz	Liquid type	Probe / SN	DAE3 / SN	Dipole type / SN	DASY software	Date
ICT #2	750	Head	ES3DV4 / 3320	477	D750V3 / 1041	V52.8	2013-07
ICT #2	750	Body	ES3DV4 / 3320	477	D750V3 / 1041	V52.8	2013-07
ICT #1	835	Head	ES3DV4 / 3320	413	D835V2 / 4d153	V52.8	2013-06
ICT #1	835	Body	ES3DV4 / 3320	413	D835V2 / 4d153	V52.8	2013-06
ICT #2	1750	Head	ET3DV6 / 1558	477	D1750V2 / 1093	V52.8	2013-08
ICT #2	1750	Body	ET3DV6 / 1558	477	D1750V2 / 1093	V52.8	2013-08
ICT #1	1900	Head	ES3DV4 / 3320	413	D1900V2 / 5d009	V52.8	2013-06
ICT #2	1900	Body	ET3DV6 / 1558	477	D1900V2 / 5d009	V52.8	2013-08
ICT #1	2450	Head	ES3DV4 / 3320	413	D2450V2 / 710	V52.8	2013-07
ICT #1	2450	Body	ES3DV4 / 3320	413	D2450V2 / 710	V52.8	2013-07
ICT #1	5200	Head	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08
ICT #1	5500	Head	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08
ICT #1	5800	Head	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08
ICT #1	5200	Body	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08
ICT #1	5300	Body	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08
ICT #1	5500	Body	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08
ICT #1	5600	Body	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08
ICT #1	5800	Body	EX3DV4 / SN3944	413	D5GHzV2 / 1055	V52.8	2013-08

Table 14: System validation

7 Detailed Test Results

7.1 Conducted power measurements

For the measurements a Rohde & Schwarz Radio Communication Tester CMU 200 and CMW 500 were used.
The output power was measured using an integrated RF connector and attached RF cable.
The conducted output power was also checked before and after each SAR measurement. The resulting power values were within a 0.2 dB tolerance of the values shown below.

Note: CMU200 measures GSM peak and average output power for active timeslots.
For SAR the time based average power is relevant. The difference in-between depends on the duty cycle of the TDMA signal:

No. of timeslots	***1***	***2***	***3***	***4***
Duty Cycle	1 : 8	1: 4	1 : 2.66	1 : 2
time based avg. power compared to slotted avg. power	- 9 dB	- 6 dB	- 4.25 dB	- 3 dB

The signalling modes differ as follows :

mode	***coding scheme***	***modulation***
GPRS	CS1 to CS4	GMSK
EGPRS (EDGE)	MCS1 to MCS4	GMSK
EGPRS (EDGE)	MCS5 to MCS9	8PSK

Apart from modulation change (GMSK/8PSK) coding schemes differ in code rate without influence on the RF signal. Therefore one coding scheme per mode was selected for conducted power measurements.

7.1.1 Conducted power measurements GSM 850 MHz

Channel / frequency	modulation	timeslots	slotted avg. power	time based avg. Power (calculated)
128 / 824.2 MHz	GMSK	1	33.4 dBm	24.4 dBm
190 / 836.6 MHz	GMSK	1	33.0 dBm	24.0 dBm
251 / 848.8 MHz	GMSK	1	32.6 dBm	23.6 dBm
128 / 824.2 MHz	GMSK	2	30.3 dBm	24.3 dBm
190 / 836.6 MHz	GMSK	2	29.9 dBm	23.9 dBm
251 / 848.8 MHz	GMSK	2	29.6 dBm	23.6 dBm
128 / 824.2 MHz	GMSK	3	29.5 dBm	**25.25 dBm**
190 / 836.6 MHz	GMSK	3	29.3 dBm	**25.05 dBm**
251 / 848.8 MHz	GMSK	3	28.8 dBm	**24.55 dBm**
128 / 824.2 MHz	GMSK	4	27.4 dBm	24.4 dBm
190 / 836.6 MHz	GMSK	4	27.1 dBm	24.1 dBm
251 / 848.8 MHz	GMSK	4	26.6 dBm	23.6 dBm
128 / 824.2 MHz	8PSK	1	27.0 dBm	18.0 dBm
190 / 836.6 MHz	8PSK	1	26.6 dBm	17.6 dBm
251 / 848.8 MHz	8PSK	1	26.2 dBm	17.2 dBm
128 / 824.2 MHz	8PSK	2	26.9 dBm	20.9 dBm
190 / 836.6 MHz	8PSK	2	26.5 dBm	20.5 dBm
251 / 848.8 MHz	8PSK	2	26.3 dBm	20.3 dBm
128 / 824.2 MHz	8PSK	3	25.4 dBm	21.15 dBm
190 / 836.6 MHz	8PSK	3	25.1 dBm	20.85 dBm
251 / 848.8 MHz	8PSK	3	24.7 dBm	20.45 dBm
128 / 824.2 MHz	8PSK	4	24.4 dBm	21.4 dBm
190 / 836.6 MHz	8PSK	4	24.0 dBm	21.0 dBm
251 / 848.8 MHz	8PSK	4	23.6 dBm	20.6 dBm

Table 15: Test results conducted power measurement GSM 850 MHz

7.1.2 Conducted power measurements GSM 1900 MHz

Channel / frequency	device	timeslots	slotted avg. power	time based avg. Power (calculated)
512 / 1850.2 MHz	GMSK	1	28.8 dBm	19.8 dBm
661 / 1880.0 MHz	GMSK	1	28.8 dBm	19.8 dBm
810 / 1909.8 MHz	GMSK	1	28.8 dBm	19.8 dBm
512 / 1850.2 MHz	GMSK	2	28.3 dBm	**22.3 dBm**
661 / 1880.0 MHz	GMSK	2	28.3 dBm	**22.3 dBm**
810 / 1909.8 MHz	GMSK	2	28.1 dBm	**22.1 dBm**
512 / 1850.2 MHz	GMSK	3	26.4 dBm	22.15 dBm
661 / 1880.0 MHz	GMSK	3	26.4 dBm	22.15 dBm
810 / 1909.8 MHz	GMSK	3	26.2 dBm	21.95 dBm
512 / 1850.2 MHz	GMSK	4	26.0 dBm	**23.0 dBm**
661 / 1880.0 MHz	GMSK	4	26.2 dBm	**23.2 dBm**
810 / 1909.8 MHz	GMSK	4	25.7 dBm	**22.7 dBm**
512 / 1850.2 MHz	8PSK	1	25.8 dBm	16.8 dBm
661 / 1880.0 MHz	8PSK	1	25.7 dBm	16.7 dBm
810 / 1909.8 MHz	8PSK	1	25.5 dBm	16.5 dBm
512 / 1850.2 MHz	8PSK	2	25.2 dBm	19.2 dBm
661 / 1880.0 MHz	8PSK	2	25.2 dBm	19.2 dBm
810 / 1909.8 MHz	8PSK	2	25.0 dBm	19.0 dBm
512 / 1850.2 MHz	8PSK	3	24.1 dBm	19.85 dBm
661 / 1880.0 MHz	8PSK	3	24.2 dBm	19.95 dBm
810 / 1909.8 MHz	8PSK	3	23.9 dBm	19.65 dBm
512 / 1850.2 MHz	8PSK	4	23.1 dBm	20.1 dBm
661 / 1880.0 MHz	8PSK	4	23.2 dBm	20.2 dBm
810 / 1909.8 MHz	8PSK	4	22.9 dBm	19.9 dBm

Table 16: Test results conducted power measurement GSM 1900 MHz

7.1.3 Justification of SAR measurements in GSM mode

SAR measurements were performed in the configuration with highest calculated time based averaged output power. The device supports DTM class 11 with max. 3 timeslots in uplink, therefore 2 timeslots in uplink were used for GSM 1900 head and 3 timeslots for GSM 850 head tests.
In EDGE mode no delta measurement was performed.

7.1.4 Conducted power measurements UMTS FDD II (1900 MHz)

Max. RMS output power 1900 MHz (FDD II) / dBm						
mode	Channel / frequency 9262 / 1852.4 MHz		9400 / 1880.0 MHz		9538 / 1907.6 MHz	
	full	**backoff**	**full**	**backoff**	**full**	**backoff**
RMC 12.2 kbit/s	**24.4**	**23.4**	**24.4**	**23.4**	**24.2**	**23.3**
RMC 64 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
RMC 144 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
RMC 384 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
AMR 4.75 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
AMR 5.15 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
AMR 5.9 kbit/s	24.4	23.4	24.4	23.4	24.2	23.3
AMR 6.7 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
AMR 7.4 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
AMR 7.95 kbit/s	24.4	23.4	24.4	23.4	24.2	23.3
AMR 10.2 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
AMR 12.2 kbit/s	24.4	23.4	24.4	23.4	24.2	23.2
HSDPA Sub test 1	**23.5**	**22.8**	**23.5**	**22.8**	**23.3**	**22.8**
HSDPA Sub test 2	22.0	21.5	21.9	22.6	21.9	21.5
HSDPA Sub test 3	20.3	19.9	20.3	21.1	20.1	19.7
HSDPA Sub test 4	20.2	19.8	20.2	21.2	20.0	19.5
HSUPA Sub test 1	**23.2**	**22.6**	**22.9**	**22.1**	**22.5**	**22.3**
HSUPA Sub test 2	21.3	20.5	21.1	20.9	21.0	20.1
HSUPA Sub test 3	22.3	21.7	22.2	21.7	22.3	21.8
HSUPA Sub test 4	21.6	20.8	21.5	20.6	21.6	20.5
HSUPA Sub test 5	**23.3**	**22.6**	**23.2**	**22.1**	**22.9**	**22.2**

Table 17: Test results conducted power measurement UMTS FDD II 1900MHz

Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.

7.1.5 Conducted power measurements UMTS FDD IV (1700 MHz)

Max. RMS output power FDD IV (1700MHz) / dBm						
	Channel / frequency					
mode	1312 / 1712.4 MHz		1412 / 1732.4 MHz		1513 / 1752.6 MHz	
	full	**backoff**	**full**	**backoff**	**full**	**backoff**
RMC 12.2 kbit/s	**24.0**	**22.9**	**24.1**	**23.0**	**24.1**	**23.0**
RMC 64 kbit/s	24.0	22.8	24.0	23.0	24.0	23.0
RMC 144 kbit/s	24.1	22.9	24.0	23.0	24.1	23.0
RMC 384 kbit/s	24.0	22.9	24.1	23.0	24.0	22.9
AMR 4.75 kbit/s	23.9	22.8	24.0	23.0	24.0	23.0
AMR 5.15 kbit/s	23.9	22.8	24.0	22.9	24.0	23.0
AMR 5.9 kbit/s	24.0	22.8	23.9	22.9	24.0	22.9
AMR 6.7 kbit/s	23.9	22.6	23.9	23.0	24.0	22.9
AMR 7.4 kbit/s	23.9	22.7	23.9	23.0	24.0	22.9
AMR 7.95 kbit/s	23.9	22.7	23.9	23.0	24.0	23.0
AMR 10.2 kbit/s	23.9	22.7	23.8	22.9	24.0	23.0
AMR 12.2 kbit/s	23.8	22.7	23.8	22.9	24.0	23.0
HSDPA Sub test 1	**22.9**	**22.0**	**23.0**	**22.0**	**23.1**	**22.0**
HSDPA Sub test 2	21.8	20.5	23.2	20.6	22.9	21.8
HSDPA Sub test 3	20.0	19.3	21.8	19.2	21.4	20.3
HSDPA Sub test 4	19.9	19.2	20.4	19.3	20.4	19.4
HSUPA Sub test 1	**23.2**	**22.0**	**23.1**	**22.2**	**22.9**	**21.9**
HSUPA Sub test 2	21.1	20.1	21.3	20.3	21.1	20.2
HSUPA Sub test 3	22.1	21.2	22.3	21.6	22.5	21.4
HSUPA Sub test 4	21.2	20.0	21.2	20.2	21.6	20.4
HSUPA Sub test 5	**23.2**	**21.9**	**23.0**	**22.1**	**22.8**	**21.8**

Table 18: Test results conducted power measurement UMTS FDD IV 1700MHz

Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.

7.1.6 Conducted power measurements WCDMA FDD V (850 MHz)

Max. RMS output power 850 MHz (FDD V) / dBm			
	Channel / frequency		
mode	4132 / 826.4 MHz	4182 / 836.6 MHz	4233 / 846.6 MHz
RMC 12.2 kbit/s	**24.2**	**24.0**	**23.9**
RMC 64 kbit/s	24.1	24.0	23.9
RMC 144 kbit/s	24.2	23.9	23.9
RMC 384 kbit/s	24.1	23.9	23.8
AMR 4.75 kbit/s	24.1	23.9	23.8
AMR 5.15 kbit/s	24.1	23.9	23.8
AMR 5.9 kbit/s	24.0	23.8	23.7
AMR 6.7 kbit/s	24.0	23.9	23.8
AMR 7.4 kbit/s	23.9	23.9	23.7
AMR 7.95 kbit/s	24.0	23.9	23.7
AMR 10.2 kbit/s	23.9	23.8	23.6
AMR 12.2 kbit/s	23.9	23.7	23.6
HSDPA Sub test 1	**23.2**	**22.9**	**22.8**
HSDPA Sub test 2	22.0	21.7	21.5
HSDPA Sub test 3	20.8	20.6	20.2
HSDPA Sub test 4	20.5	20.4	20.2
HSUPA Sub test 1	**23.1**	**22.4**	**22.1**
HSUPA Sub test 2	21.1	21.0	20.9
HSUPA Sub test 3	22.2	22.2	21.9
HSUPA Sub test 4	21.0	20.9	20.8
HSUPA Sub test 5	**22.5**	**22.4**	**22.0**

Table 19: Test results conducted power measurement UMTS FDD V 850MHz

Remark: None of the HSDPA/HSUPA settings leads to conducted power values exceeding the conducted power in RMC mode by more than 0.25 dB.
Therefore no additional SAR measurements were performed in HSDPA/HSUPA mode.

7.1.7 Test-set-up information for WCDMA / HSPDA / HSUPA

a) WCDMA RMC

In RMC (reference measurement channel) mode the conducted power at 4 different bit rates was measured. They correspond with the used spreading factors as follows:

Bit rate	***12.2 kbit/s***	***64 kbit/s***	***144 kbit/s***	***384 kbit/s***
Spreading factor (SF)	64	16	8	4

In RMC mode only DPCCH and DPDCH are active. As bit rate changes do not influence the relative power of any code channel the measured RMS output power remains on the same level which is set to maximum by TPC (Transmit power control) pattern type 'All 1'.

b) HSDPA

HSDPA adds the HS-DPCCH in uplink as a control channel for high speed data transfer in downlink.
In HSDPA mode 4 sub-tests are defined by 3GPP 34.121 according to the following table:

Sub-test	**β_c**	**β_d**	**β_d (SF)**	**β_c/β_d**	**β_{hs} (1)**	**CM(dB) (2)**
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5
Note 1: Δ_{ACK}, Δ_{NACK}, Δ_{CQI} = 8 $\Longleftrightarrow$ $A_{hs} = \beta_{hs}/\beta_c$ = 30/15 $\Longleftrightarrow$ β_{hs} = 30/15 * β_c Note 2 : CM = 1 for β_c/β_d = 12/15, β_{hs}/β_c = 24/15 Note 3 : For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to β_c = 11/15 and β_d = 15/15						

Table 20: Sub-tests for UMTS Release 5 HSDPA

The β_c and β_d gain factors for DPCCH and DPDCH were set according to the values in the above table, β_{hs} for HS-DPCCH is set automatically to the correct value when Δ_{ACK}, Δ_{NACK}, Δ_{CQI} = 8. The variation of the β_c/β_d ratio causes a power reduction at sub-tests 2 - 4.
The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	***Value***
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI's
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 21: settings of required H-Set 1 QPSK acc. to 3GPP 34.121

c) HSUPA

In HSUPA mode additional code channels (E-DPCCH, E-DPDCHn) are added for data transfer in uplink at higher bit rates.

5 sub-tests are defined by 3GPP 34.121 according to the following table :

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK}, Δ_{CQI} = 8 $\Leftarrow\Rightarrow$ A_{hs} = β_{hs}/β_c = 30/15 $\Leftarrow\Rightarrow$ β_{hs} = 30/15 * β_c
Note 2 : CM = 1 for β_c/β_d = 12/15, β_{hs}/β_c = 24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference
Note 3 : For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to β_c = 10/15 and β_d = 15/15
Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to β_c = 14/15 and β_d = 15/15
Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g
Note 6 : β_{ed} can not be set directly; it is set by Absolute Grant Value

Table 22: Subtests for UMTS Release 6 HSUPA

To achieve the settings above some additional procedures were defined by 3GPP 34.121. Those have been included in an application note for the CMU200 and were exactly followed :

- Test mode connection (BS signal tab) :
RMC 12.2 kbit/s + HSPA 34.108 with loop mode 1
- HS-DSCH settings (BS signal tab):
- FRC with H-set 1 QPSK
- ACK-NACK repetition factor = 3
- CQI feedback cycle = 4ms
- CQI repetition factor = 2
- HSUPA-specific signalling settings (UE signal tab) :
- E-TFCI table index = 0
- E-DCH minimum set E-TFCI = 9
- Puncturing limit non-max = 0.84
- max. number of channelisation codes = 2x SF4
- Initial Serving Grant Value = Off
- HSDPA and HSUPA Gain factors (UE signal tab)

Sub-test	β_c	β_d	Δ_{ACK}, Δ_{NACK}, Δ_{CQI}	ΔE–DPCCH)*
1	10	15	8	6
2	6	15	8	8
3	15	9	8	8
4	2	15	8	5
5	14	15	8	7

)* : β_{ec} and β_{ed} ratios (relative to β_c and β_d) are set by ΔE–DPCCH

- HSUPA Reference E-TFCIs (UE signal tab > HSUPA gain factors) :

Sub-test	**1, 2, 4, 5**				
Number of E-TFCIs	5				
Reference E-TFCI	11	67	71	75	81
Reference E-TFCI power offset	4	18	23	26	27

Sub-test	**3**	
Number of E-TFCIs	2	
Reference E-TFCI	11	92
Reference E-TFCI power offset	4	18

- HSUPA-specific generator parameters (BS Signal tab > HSUPA > E-AGCH > AG Pattern)

Sub-test	***Absolute Grant Value (AG Index)***
1	20
2	12
3	15
4	17
5	21

- Power Level settings (BS Signal tab > Node B-settings):
- Level reference : Output Channel Power (lor)
- Output Channel Power (lor) : -86 dBm

- Downlink Physical Channel Settings (BS signal tab)
- P-CPICH : -10 dB
- S-CPICH : Off
- P-SCH : -15 dB
- S-SCH : -15 dB
- P-CCPCH : -12 dB
- S-CCPCH : -12 dB
- PICH : -15 dB
- AICH : -12 dB
- DPDCH : -10 dB
- HS-SCCH : -8 dB
- HS-PDSCH : -3 dB
- E-AGCH : -20 dB
- E-RGCH/E-HICH - 20 dB
- E-RGCH Active : Off

The settings above were stored once for each sub-test and recalled before the measurement.

HSUPA test procedure :

To reach maximum output power in HSUPA mode the following procedures were followed:

3 different TPC patterns were defined :
Set 1 : Closed loop with target power 10 dBm
Set 2 : Single Pattern+Alternating with binary pattern '11111' for 1 dB steps 'up'
Set 3 : Single Pattern+Alternating with binary pattern '00000' for 1 dB steps 'down'

After recalling a certain HSUPA sub-test the HSUPA E-AGCH graph with E-TFCI event counter is displayed.
After starting with the closed loop command the power is increased in 1 dB steps by activating pattern set 2 until the UE decreases the transmitted E-TFCI.
At this point set 3 is activated once to reduce the output power to the value at which the original E-TFCI, which is required for the sub-test, appears again.

For conducted power measurements the same steps are repeated in the power menu to read out the corresponding maximum RMS output power with the target E-TFCI.
For SAR measurements it is useful to switch to Code Domain Power vs. Time display.
Here the CMU200 shows relative power values (max. and min.) of each code channel which should roughly correspond to the numerators of the gain factors e.g. :

Sub-test	β_c	β_d	β_{hs}	β_{ec}	β_{ed}
5	15	15	30	24	134

By this way a surveillance of signalling conditions is possible to make sure that HSUPA code channels are active during the complete SAR measurement.

7.1.8 Conducted power measurements LTE FDD 2 1900 MHz

Output Power (conducted)								
Bandwidth (MHz)	Frequency (MHz)	Resource block allocation	P_{avg} (dBm) QPSK	P_{avg} (dBm) in hotspot mode QPSK	dev. dB	P_{avg} (dBm) 16-QAM	P_{avg} (dBm) in hotspot mode 16-QAM	dev. dB
1.4	1850.7	1 RB low	23.4	22.3	1.1	22.7	22.5	0.2
		1 RB mid	23.3	22.4	0.9	22.7	22.5	0.2
		1 RB high	23.4	22.4	1.0	22.8	22.5	0.3
		50% RB low	23.1	22.3	0.8	22.3	22.4	-0.1
		50% RB mid	23.0	22.2	0.8	22.4	22.4	0.0
		50% RB high	23.1	22.2	0.9	22.3	22.4	-0.1
		100% RB	22.2	22.3	-0.1	21.0	21.2	-0.2
	1880.0	1 RB low	23.1	22.2	0.9	22.1	21.9	0.2
		1 RB mid	23.1	22.3	0.8	22.1	22.1	0.0
		1 RB high	23.3	22.3	1.0	22.2	22.1	0.1
		50% RB low	23.1	22.2	0.9	22.3	22.4	-0.1
		50% RB mid	23.1	22.3	0.8	22.3	22.2	0.1
		50% RB high	23.2	22.3	0.9	22.4	22.2	0.2
		100% RB	22.2	22.3	-0.1	21.4	21.5	-0.1
	1909.3	1 RB low	22.9	21.9	1.0	21.4	21.8	-0.4
		1 RB mid	22.7	21.8	0.9	21.6	21.6	0.0
		1 RB high	22.5	21.8	0.7	21.6	21.9	-0.3
		50% RB low	22.6	21.8	0.8	21.8	22.2	-0.4
		50% RB mid	22.5	21.8	0.7	21.8	22.1	-0.3
		50% RB high	22.5	21.8	0.7	21.8	22.1	-0.3
		100% RB	21.7	21.9	-0.2	21.0	21.3	-0.3
3	1851.5	1 RB low	23.1	22.3	0.8	22.5	22.6	-0.1
		1 RB mid	23.2	22.3	0.9	22.7	22.6	0.1
		1 RB high	23.3	22.4	0.9	22.7	22.8	-0.1
		50% RB low	22.2	22.2	0.0	20.9	21.1	-0.2
		50% RB mid	22.2	22.1	0.1	20.9	21.1	-0.2
		50% RB high	22.2	22.3	-0.1	21.0	21.1	-0.1
		100% RB	22.2	22.3	-0.1	21.3	21.4	-0.1
	1880.0	1 RB low	23.0	22.2	0.8	21.9	22.1	-0.2
		1 RB mid	23.2	22.3	0.9	22.1	22.0	0.1
		1 RB high	23.2	22.3	0.9	22.2	22.1	0.1
		50% RB low	22.1	22.2	-0.1	21.2	21.3	-0.1
		50% RB mid	22.2	22.2	0.0	21.2	21.4	-0.2
		50% RB high	22.2	22.2	0.0	21.4	21.4	0.0
		100% RB	22.3	22.3	0.0	21.4	21.4	0.0
	1908.5	1 RB low	22.8	21.9	0.9	21.6	21.8	-0.2
		1 RB mid	22.6	21.8	0.8	21.8	21.6	0.2
		1 RB high	22.3	21.5	0.8	21.3	21.5	-0.2
		50% RB low	21.8	21.9	-0.1	20.8	20.9	-0.1
		50% RB mid	21.8	21.8	0.0	20.8	20.9	-0.1
		50% RB high	21.7	21.7	0.0	20.7	20.8	-0.1
		100% RB	21.9	21.9	0.0	21.0	21.1	-0.1

5	1852.5	1 RB low	23.3	22.3	1.0	23.1	22.5	0.6
		1 RB mid	23.2	22.3	0.9	22.8	22.5	0.3
		1 RB high	23.4	22.4	1.0	23.0	23.0	0.0
		50% RB low	22.3	22.3	0.0	21.6	21.6	0.0
		50% RB mid	22.4	22.4	0.0	21.6	21.6	0.0
		50% RB high	22.3	22.4	-0.1	21.6	21.8	-0.2
		100% RB	22.4	22.4	0.0	21.4	21.4	0.0
	1880.0	1 RB low	23.1	22.4	0.7	22.8	22.9	-0.1
		1 RB mid	23.2	22.4	0.8	22.9	23.1	-0.2
		1 RB high	23.3	22.4	0.9	23.0	22.9	0.1
		50% RB low	22.2	22.4	-0.2	21.2	21.4	-0.2
		50% RB mid	22.3	22.4	-0.1	21.3	21.6	-0.3
		50% RB high	22.4	22.5	-0.1	21.4	21.6	-0.2
		100% RB	22.4	22.4	0.0	21.5	21.6	-0.1
	1907.5	1 RB low	22.9	22.0	0.9	21.7	21.9	-0.2
		1 RB mid	22.8	22.1	0.7	21.5	21.9	-0.4
		1 RB high	22.5	21.7	0.8	21.4	21.6	-0.2
		50% RB low	22.2	22.2	0.0	21.3	21.3	0.0
		50% RB mid	22.0	22.2	-0.2	21.2	21.2	0.0
		50% RB high	21.8	22.1	-0.3	21.1	21.1	0.0
		100% RB	21.9	22.1	-0.2	21.2	21.3	-0.1
10	1855	1 RB low	23.2	22.3	0.9	23.0	22.4	0.6
		1 RB mid	23.3	22.2	1.1	22.8	22.5	0.3
		1 RB high	23.6	22.3	1.3	23.0	22.5	0.5
		50% RB low	22.4	22.5	-0.1	21.5	21.4	0.1
		50% RB mid	22.4	22.4	0.0	21.5	21.5	0.0
		50% RB high	22.3	22.3	0.0	21.4	21.4	0.0
		100% RB	22.3	22.2	0.1	21.4	21.3	0.1
	1880	1 RB low	23.0	22.1	0.9	22.0	22.0	0.0
		1 RB mid	23.1	22.2	0.9	22.1	22.0	0.1
		1 RB high	23.0	22.0	1.0	21.9	22.0	-0.1
		50% RB low	22.2	22.3	-0.1	21.4	21.5	-0.1
		50% RB mid	22.3	22.4	-0.1	21.5	21.5	0.0
		50% RB high	22.3	22.3	0.0	21.4	21.5	-0.1
		100% RB	22.4	22.5	-0.1	21.5	21.5	0.0
	1905	1 RB low	22.8	21.9	0.9	22.0	21.6	0.4
		1 RB mid	22.8	22.0	0.8	21.8	21.9	-0.1
		1 RB high	22.4	21.5	0.9	21.6	21.5	0.1
		50% RB low	22.2	22.2	0.0	21.3	21.4	-0.1
		50% RB mid	22.2	22.2	0.0	21.3	21.4	-0.1
		50% RB high	22.0	22.1	-0.1	21.2	21.2	0.0
		100% RB	22.1	22.2	-0.1	21.3	21.3	0.0

15	1857.5	1 RB low	23.3	22.2	1.1	22.8	22.5	0.3
		1 RB mid	23.2	22.2	1.0	22.5	22.5	0.0
		1 RB high	23.1	22.2	0.9	22.8	22.5	0.3
		50% RB low	22.4	22.4	0.0	21.5	21.5	0.0
		50% RB mid	22.4	22.3	0.1	21.4	21.3	0.1
		50% RB high	22.4	22.3	0.1	21.4	21.5	-0.1
		100% RB	22.3	22.3	0.0	21.4	21.3	0.1
	1880.0	1 RB low	22.8	21.8	1.0	21.8	21.8	0.0
		1 RB mid	23.2	22.2	1.0	22.3	22.3	0.0
		1 RB high	23.0	22.0	1.0	22.2	22.2	0.0
		50% RB low	22.2	22.2	0.0	21.2	21.1	0.1
		50% RB mid	22.4	22.3	0.1	21.4	21.3	0.1
		50% RB high	22.3	22.2	0.1	21.3	21.2	0.1
		100% RB	22.5	22.4	0.1	21.5	21.4	0.1
	1902.5	1 RB low	22.5	21.6	0.9	21.7	21.3	0.4
		1 RB mid	22.9	21.8	1.1	21.9	21.6	0.3
		1 RB high	22.3	21.4	0.9	21.5	21.6	-0.1
		50% RB low	22.0	22.0	0.0	21.0	21.0	0.0
		50% RB mid	22.1	22.1	0.0	21.1	21.0	0.1
		50% RB high	22.0	21.9	0.1	21.0	21.0	0.0
		100% RB	22.1	22.1	0.0	21.2	21.2	0.0
20	1860	1 RB low	**23.3**	22.3	1.0	22.8	22.5	0.3
		1 RB mid	23.2	22.3	0.9	22.7	22.5	0.2
		1 RB high	23.1	22.0	1.1	22.6	22.5	0.1
		50% RB low	22.4	22.3	0.1	21.4	21.4	0.0
		50% RB mid	22.4	22.3	0.1	21.4	21.4	0.0
		50% RB high	22.3	22.3	0.0	21.4	21.4	0.0
		100% RB	22.2	22.1	0.1	21.3	21.2	0.1
	1880	1 RB low	23.0	21.9	1.1	22.2	22.3	-0.1
		1 RB mid	**23.5**	**22.4**	1.1	22.7	22.7	0.0
		1 RB high	23.0	22.0	1.0	22.4	22.4	0.0
		50% RB low	22.1	22.1	0.0	21.2	21.1	0.1
		50% RB mid	**22.4**	**22.4**	0.0	21.5	21.3	0.2
		50% RB high	22.4	22.0	0.4	21.1	21.0	0.1
		100% RB	**22.5**	**22.4**	0.1	21.5	21.5	0.0
	1900	1 RB low	22.8	21.9	0.9	22.5	22.4	0.1
		1 RB mid	**22.9**	22.1	0.8	22.4	22.4	0.0
		1 RB high	22.7	21.6	1.1	22.3	22.1	0.2
		50% RB low	22.1	22.0	0.1	21.1	21.1	0.0
		50% RB mid	22.2	22.2	0.0	21.4	21.3	0.1
		50% RB high	22.1	22.0	0.1	21.2	21.2	0.0
		100% RB	22.3	22.3	0.0	21.5	21.4	0.1

Table 23: Test results conducted power measurement LTE FDD 2 1900 MHz.

Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.

7.1.9 Conducted power measurements LTE FDD 4 1700 MHz

Output Power (conducted)								
Bandwidth (MHz)	Frequency (MHz)	Resource block allocation	P_{avg} (dBm) QPSK	P_{avg} (dBm) in hotspot mode QPSK	dev. dB	P_{avg} (dBm) 16-QAM	P_{avg} (dBm) in hotspot mode 16-QAM	dev. dB
1.4	1710.7	1 RB low	23.2	21.9	1.3	22.6	22.3	0.3
		1 RB mid	23.1	21.9	1.2	22.6	22.3	0.3
		1 RB high	23.3	21.9	1.4	22.6	22.2	0.4
		50% RB low	23.2	21.9	1.3	22.4	22.1	0.3
		50% RB mid	23.1	21.8	1.3	22.4	22.1	0.3
		50% RB high	23.1	21.8	1.3	22.3	22.0	0.3
		100% RB	22.2	21.8	0.4	21.0	20.7	0.3
	1732.5	1 RB low	23.3	22.1	1.2	22.3	22.0	0.3
		1 RB mid	23.4	22.1	1.3	22.3	21.8	0.5
		1 RB high	23.3	21.9	1.4	22.2	22.0	0.2
		50% RB low	23.3	22.0	1.3	22.3	22.1	0.2
		50% RB mid	23.3	22.0	1.3	22.4	22.0	0.4
		50% RB high	23.5	22.0	1.5	22.3	21.9	0.4
		100% RB	22.3	22.0	0.3	21.5	21.0	0.5
	1754.3	1 RB low	23.3	21.9	1.4	22.1	22.3	-0.2
		1 RB mid	23.3	21.9	1.4	22.2	22.1	0.1
		1 RB high	23.2	21.8	1.4	21.9	22.1	-0.2
		50% RB low	23.0	21.8	1.2	22.5	21.9	0.6
		50% RB mid	23.2	21.7	1.5	22.4	21.9	0.5
		50% RB high	23.0	21.7	1.3	22.5	21.8	0.7
		100% RB	22.2	21.7	0.5	21.4	20.6	0.8
3	1711.5	1 RB low	23.2	21.9	1.3	22.6	22.2	0.4
		1 RB mid	23.2	22.0	1.2	22.6	22.5	0.1
		1 RB high	23.2	21.9	1.3	22.7	22.5	0.2
		50% RB low	22.1	21.8	0.3	21.0	20.7	0.3
		50% RB mid	22.2	21.8	0.4	21.0	20.6	0.4
		50% RB high	22.1	21.9	0.2	21.0	20.9	0.1
		100% RB	22.4	22.0	0.4	21.4	21.1	0.3
	1732.5	1 RB low	23.3	22.0	1.3	22.4	21.8	0.6
		1 RB mid	23.3	22.0	1.3	22.2	21.7	0.5
		1 RB high	23.4	21.9	1.5	22.1	21.7	0.4
		50% RB low	22.3	22.0	0.3	21.5	21.1	0.4
		50% RB mid	22.3	22.0	0.3	21.5	21.3	0.2
		50% RB high	22.3	22.0	0.3	21.5	21.0	0.5
		100% RB	22.5	22.2	0.3	21.6	21.4	0.2
	1753.5	1 RB low	23.2	21.6	1.6	22.0	21.6	0.4
		1 RB mid	23.2	21.7	1.5	22.2	21.8	0.4
		1 RB high	23.0	21.5	1.5	22.0	21.5	0.5
		50% RB low	22.3	21.8	0.5	21.4	21.0	0.4
		50% RB mid	22.2	21.8	0.4	21.4	20.9	0.5
		50% RB high	22.1	21.8	0.3	21.3	20.8	0.5
		100% RB	22.4	22.0	0.4	21.4	20.9	0.5

5	1712.5	1 RB low	23.2	21.9	1.3	23.0	22.5	0.5
		1 RB mid	23.3	22.0	1.3	22.7	22.5	0.2
		1 RB high	23.2	21.8	1.4	22.6	22.4	0.2
		50% RB low	22.3	22.0	0.3	21.5	21.3	0.2
		50% RB mid	22.3	22.0	0.3	21.6	21.3	0.3
		50% RB high	22.4	22.1	0.3	21.5	21.3	0.2
		100% RB	22.4	22.1	0.3	21.4	21.1	0.3
	1732.5	1 RB low	23.5	22.2	1.3	23.1	22.7	0.4
		1 RB mid	23.4	22.2	1.2	23.0	22.8	0.2
		1 RB high	23.4	22.1	1.3	22.8	22.7	0.1
		50% RB low	22.5	22.3	0.2	21.5	21.1	0.4
		50% RB mid	22.5	22.2	0.3	21.6	21.2	0.4
		50% RB high	22.5	22.1	0.4	21.5	21.2	0.3
		100% RB	22.5	22.3	0.2	21.6	21.0	0.6
	1752.5	1 RB low	23.2	21.7	1.5	22.0	21.7	0.3
		1 RB mid	23.1	21.7	1.4	22.0	21.7	0.3
		1 RB high	23.1	22.0	1.1	22.1	21.6	0.5
		50% RB low	22.3	21.9	0.4	21.5	21.0	0.5
		50% RB mid	22.3	21.9	0.4	21.4	21.0	0.4
		50% RB high	22.4	22.0	0.4	21.5	21.0	0.5
		100% RB	22.3	21.9	0.4	21.4	21.1	0.3
10	1715.0	1 RB low	23.3	22.1	1.2	22.6	22.4	0.2
		1 RB mid	23.2	22.0	1.2	22.6	22.5	0.1
		1 RB high	23.5	22.1	1.4	23.2	22.5	0.7
		50% RB low	22.4	22.0	0.4	21.3	21.1	0.2
		50% RB mid	22.4	22.0	0.4	21.3	21.1	0.2
		50% RB high	22.5	22.2	0.3	21.4	21.2	0.2
		100% RB	22.3	22.0	0.3	21.4	21.1	0.3
	1732.5	1 RB low	23.2	22.0	1.2	22.2	21.7	0.5
		1 RB mid	23.4	22.1	1.3	22.2	21.9	0.3
		1 RB high	23.3	22.1	1.2	22.1	21.9	0.2
		50% RB low	22.5	22.3	0.2	21.8	21.5	0.3
		50% RB mid	22.5	22.3	0.2	21.7	21.6	0.1
		50% RB high	22.5	22.2	0.3	21.6	21.3	0.3
		100% RB	22.5	22.1	0.4	21.7	21.1	0.6
	1750.0	1 RB low	23.1	21.7	1.4	22.1	22.0	0.1
		1 RB mid	23.1	21.7	1.4	22.0	21.8	0.2
		1 RB high	23.0	21.8	1.2	21.9	21.5	0.4
		50% RB low	22.4	22.0	0.4	21.5	21.1	0.4
		50% RB mid	22.4	22.0	0.4	21.4	21.1	0.3
		50% RB high	22.4	21.9	0.5	21.4	21.0	0.4
		100% RB	22.4	22.0	0.4	21.3	21.2	0.1

15	1717.5	1 RB low	23.2	21.9	1.3	22.7	22.4	0.3
		1 RB mid	23.3	22.2	1.1	22.7	22.5	0.2
		1 RB high	23.4	22.1	1.3	22.8	22.7	0.1
		50% RB low	22.3	22.1	0.2	21.4	21.1	0.3
		50% RB mid	22.4	22.2	0.2	21.5	21.2	0.3
		50% RB high	22.5	22.3	0.2	21.5	21.3	0.2
		100% RB	22.4	22.1	0.3	21.4	21.1	0.3
	1732.5	1 RB low	23.3	22.1	1.2	22.4	22.4	0.0
		1 RB mid	23.3	22.0	1.3	22.5	22.2	0.3
		1 RB high	23.3	21.9	1.4	22.4	22.2	0.2
		50% RB low	22.6	22.2	0.4	21.5	21.2	0.3
		50% RB mid	22.5	22.1	0.4	21.6	21.2	0.4
		50% RB high	22.5	22.2	0.3	21.5	21.2	0.3
		100% RB	22.5	22.1	0.4	21.6	21.1	0.5
	1747.5	1 RB low	23.2	21.8	1.4	22.2	21.9	0.3
		1 RB mid	23.1	21.8	1.3	22.0	21.7	0.3
		1 RB high	23.0	21.7	1.3	22.0	21.4	0.6
		50% RB low	22.4	22.1	0.3	21.4	20.9	0.5
		50% RB mid	22.4	22.1	0.3	21.4	21.1	0.3
		50% RB high	22.4	21.9	0.5	21.3	20.9	0.4
		100% RB	22.3	22.0	0.3	21.5	21.1	0.4
20	1720.0	1 RB low	**23.5**	**22.3**	1.2	22.8	22.5	0.3
		1 RB mid	23.4	22.2	1.2	22.8	22.5	0.3
		1 RB high	23.4	22.2	1.2	22.8	22.2	0.6
		50% RB low	**22.5**	**22.3**	0.2	21.5	21.2	0.3
		50% RB mid	22.4	22.2	0.2	21.4	21.3	0.1
		50% RB high	22.4	22.3	0.1	21.6	21.3	0.3
		100% RB	22.5	22.2	0.3	21.5	21.3	0.2
	1732.5	1 RB low	**23.4**	**22.2**	1.2	22.7	22.5	0.2
		1 RB mid	23.4	22.2	1.2	23.0	22.4	0.6
		1 RB high	23.4	21.9	1.5	22.7	22.3	0.4
		50% RB low	**22.5**	**22.2**	0.3	21.4	21.1	0.3
		50% RB mid	22.4	22.1	0.3	21.5	21.2	0.3
		50% RB high	22.4	22.1	0.3	21.5	21.0	0.5
		100% RB	22.4	22.2	0.2	21.5	21.2	0.3
	1745.0	1 RB low	23.3	22.1	1.2	22.9	22.4	0.5
		1 RB mid	23.3	21.9	1.4	23.2	22.5	0.7
		1 RB high	**23.3**	**22.2**	1.1	22.7	22.4	0.3
		50% RB low	**22.5**	22.0	0.5	21.6	21.1	0.5
		50% RB mid	22.4	22.1	0.3	21.5	21.1	0.4
		50% RB high	22.3	**22.2**	0.1	21.4	21.1	0.3
		100% RB	22.3	22.1	0.2	21.5	21.1	0.4

Table 24: Test results conducted power measurement LTE FDD 4 1700 MHz.

Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.

7.1.10 Conducted power measurements LTE FDD 5 850 MHz

Output Power (conducted)				
Bandwidth (MHz)	Frequency (MHz)	Resource block allocation	Average Output Power (dBm) QPSK	Average Output Power (dBm) 16-QAM
1.4	824.7	1 RB low	23.8	23.2
		1 RB mid	23.7	23.0
		1 RB high	23.6	23.1
		50% RB low	23.6	22.8
		50% RB mid	23.5	22.7
		50% RB high	23.5	22.6
		100% RB	22.6	21.3
	836.5	1 RB low	23.5	22.3
		1 RB mid	23.4	22.3
		1 RB high	23.4	22.3
		50% RB low	23.4	22.5
		50% RB mid	23.4	22.5
		50% RB high	23.3	22.7
		100% RB	22.4	21.5
	848.3	1 RB low	23.1	21.8
		1 RB mid	23.0	21.7
		1 RB high	22.9	21.9
		50% RB low	22.9	22.4
		50% RB mid	22.9	22.3
		50% RB high	22.8	22.1
		100% RB	22.1	21.4
3	825.5	1 RB low	23.7	23.1
		1 RB mid	23.5	22.9
		1 RB high	23.5	23.0
		50% RB low	22.6	21.3
		50% RB mid	22.4	21.1
		50% RB high	22.4	21.4
		100% RB	22.6	21.6
	836.5	1 RB low	23.4	22.2
		1 RB mid	23.8	22.3
		1 RB high	23.3	22.1
		50% RB low	22.3	21.4
		50% RB mid	22.3	21.5
		50% RB high	22.3	21.5
		100% RB	22.7	21.7
	847.5	1 RB low	22.7	21.8
		1 RB mid	22.9	22.0
		1 RB high	22.7	21.7
		50% RB low	22.0	21.1
		50% RB mid	22.1	21.1
		50% RB high	22.1	21.2
		100% RB	22.3	21.3

5	826.5	1 RB low	23.7	23.1
		1 RB mid	23.4	23.0
		1 RB high	23.3	23.0
		50% RB low	22.6	21.8
		50% RB mid	22.6	21.8
		50% RB high	22.4	21.8
		100% RB	22.5	21.6
	836.5	1 RB low	23.3	23.1
		1 RB mid	23.6	23.2
		1 RB high	23.4	23.1
		50% RB low	22.5	21.5
		50% RB mid	22.6	21.5
		50% RB high	22.6	21.6
		100% RB	22.6	21.7
	846.5	1 RB low	23.3	22.0
		1 RB mid	23.1	21.8
		1 RB high	23.1	22.0
		50% RB low	22.3	21.3
		50% RB mid	22.1	21.4
		50% RB high	22.2	21.5
		100% RB	22.1	21.3
10	829	1 RB low	**23.7**	23.0
		1 RB mid	23.2	22.6
		1 RB high	23.4	22.8
		50% RB low	22.5	21.6
		50% RB mid	22.3	21.4
		50% RB high	22.5	21.5
		100% RB	22.2	21.2
	836.5	1 RB low	23.4	22.2
		1 RB mid	**23.6**	22.3
		1 RB high	23.5	22.3
		50% RB low	22.5	21.6
		50% RB mid	**22.6**	21.7
		50% RB high	22.2	21.5
		100% RB	22.5	21.5
	844	1 RB low	**23.1**	22.0
		1 RB mid	23.0	22.0
		1 RB high	22.7	21.9
		50% RB low	22.5	21.5
		50% RB mid	22.3	21.4
		50% RB high	21.9	21.1
		100% RB	22.0	21.1

Table 25: Test results conducted power measurement LTE FDD 5 850 MHz.

7.1.11 Conducted power measurements LTE FDD 17 700 MHz

Output Power (conducted)				
Bandwidth (MHz)	Frequency (MHz)	Resource block allocation	Average Output Power (dBm) QPSK	Average Output Power (dBm) 16-QAM
5	706.5	1 RB low	22.8	22.2
		1 RB mid	23.0	22.5
		1 RB high	23.2	22.6
		50% RB low	22.0	21.3
		50% RB mid	22.1	21.4
		50% RB high	22.2	21.3
		100% RB	22.2	21.3
	710.0	1 RB low	23.1	22.8
		1 RB mid	23.3	23.0
		1 RB high	23.3	22.9
		50% RB low	22.2	21.3
		50% RB mid	22.4	21.3
		50% RB high	22.4	21.5
		100% RB	22.4	21.5
	713.5	1 RB low	23.3	22.2
		1 RB mid	23.2	21.9
		1 RB high	23.0	21.8
		50% RB low	22.2	21.4
		50% RB mid	22.2	21.3
		50% RB high	22.1	21.3
		100% RB	22.2	21.4
10	709.0	1 RB low	22.9	22.2
		1 RB mid	23.2	22.5
		1 RB high	**23.3**	22.6
		50% RB low	22.1	21.2
		50% RB mid	22.3	21.3
		50% RB high	22.4	21.5
		100% RB	22.3	21.3
	710.0	1 RB low	22.8	21.8
		1 RB mid	23.2	22.0
		1 RB high	23.0	21.8
		50% RB low	22.0	21.2
		50% RB mid	22.4	21.6
		50% RB high	22.2	21.4
		100% RB	22.4	21.3
	711.0	1 RB low	22.6	21.6
		1 RB mid	23.2	22.1
		1 RB high	22.8	21.7
		50% RB low	22.3	21.3
		50% RB mid	**22.5**	21.5
		50% RB high	22.2	21.3
		100% RB	22.3	21.3

Table 26: Test results conducted power measurement LTE FDD 17 700 MHz.

7.1.12 Justification of SAR measurements in LTE mode

According to Chapter 5 'SAR test procedures for LTE devices of FCC KDB Publication 941225 D05 the following test configurations for standalone measurements of the largest channel bandwidth (chapter 5.2) had to be taken into consideration:

5.2.1. QPSK with 1 RB allocation
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*. When the *reported* SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and *required test channels* is not required for 1 RB allocation; otherwise, SAR is required for the remaining *required test channels* and only for the RB offset configuration with the highest output power for that channel.6 When the *reported* SAR of a *required test channel* is > 1.45 W/kg, SAR is required for all three RB offset configurations for that *required test channel*.

5.2.2. QPSK with 50% RB allocation
The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.

5.2.3. QPSK with 100% RB allocation
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 in 5.2.1 and 5.2.2 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.

5.2.4. Higher order modulations
For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 5.2.1, 5.2.2 and 5.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the *reported* SAR for the QPSK configuration is > 1.45 W/kg.

Testing of other channel bandwidths was not necessary because the output power of equivalent channel configurations was less than ½ dB larger compared to the largest channel bandwidth and reported SAR was < 1.45 W/kg

7.1.13 MPR information in LTE mode

There is a permanently applied MPR implemented by the manufacturer.
MPR is enabled for this device according to 3GPP TS36.101.

Modulation	Channel bandwidth / resource block configuration						Target MPR	3 GPP MPR
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz		
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	1	≤ 1
16QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	1	≤ 1
16QAM	> 5	> 4	> 8	> 12	> 16	> 18	2	≤ 2

Therefore there is no power reduction at 1.4 MHz bandwidth with 50% RB allocation (3 RBs).

Additional differences in conducted power are not caused by implemented MPR but depend on measurement uncertainty and allowable tolerances per 3GPP or tune-up.
A-MPR was disabled for all SAR tests.

7.1.14 Conducted power measurements WLAN 2.4 GHz

Channel / frequency	modulation	bit rate	maximum avg. power
1 / 2412 MHz	CCK	1 MBit/s	**19.3dBm**
6 / 2437 MHz	CCK	1 MBit/s	**19.1dBm**
11 / 2462 MHz	CCK	1 MBit/s	**19.1dBm**
1 / 2412 MHz	OFDM	6 MBit/s	10.2dBm
6 / 2437 MHz	OFDM	6 MBit/s	14.3dBm
11 / 2462 MHz	OFDM	6 MBit/s	10.9dBm
1 / 2412 MHz	OFDM	6.5 MBit/s	10.0dBm
6 / 2437 MHz	OFDM	6.5 MBit/s	14.0dBm
11 / 2462 MHz	OFDM	6.5 MBit/s	10.5dBm

Table 27: Test results conducted power measurement WLAN 2.4 GHz

7.1.15 Conducted power measurements WLAN 5 GHz

Conducted maximum avg. power measurement WLAN 5 GHz (dBm)					
Channel	Frequency (MHz)	modulation	6 MBit/s	6.5 MBit/s	13.5 MBit/s
36	5180	OFDM	14.4	14.2	14.2
40	5200	OFDM	14.4	14.1	14.1
44	5220	OFDM	14.4	14.2	14.2
48	5240	OFDM	**14.4**	14.2	14.2
52	5260	OFDM	15.5	15.4	14.3
56	5280	OFDM	15.5	15.4	14.3
60	5300	OFDM	15.5	15.4	14.2
64	5320	OFDM	**15.7**	15.5	14.2
100	5500	OFDM	**16.0**	15.9	15.6
104	5520	OFDM	16.0	15.8	15.6
108	5540	OFDM	15.9	15.8	15.5
112	5560	OFDM	15.9	15.4	15.5
116	5580	OFDM	15.7	15.6	15.5
120	5600	OFDM	15.7	15.5	15.5
124	5620	OFDM	15.5	15.4	15.5
128	5640	OFDM	15.4	15.3	15.5
132	5660	OFDM	15.5	15.3	15.3
136	5680	OFDM	15.4	15.2	15.3
140	5700	OFDM	15.3	15.0	---
149	5745	OFDM	**15.0**	14.8	15.2
153	5765	OFDM	15.0	14.8	15.2
157	5785	OFDM	15.0	14.8	15.2
161	5805	OFDM	14.9	14.8	15.2
165	5825	OFDM	12.3	12.1	---

Table 28: Test results conducted power measurement WLAN 5 GHz

7.1.16 Standalone SAR Test Exclusion

Standalone SAR test exclusion considerations for **Head** position					
Communication system	freq. (MHz)	P_{avg}* (dBm)	P_{avg}* (mW)	**threshold$_{1\text{-}g}$ comparison value**	SAR test exclusion
GSM 850	835	25.3	335.0	61.2	no
GSM 1900	1900	23.0	199.5	55.0	no
UMTS FDD II	1900	24.4	275.4	75.9	no
UMTS FDD IV	1750	24.3	269.2	71.2	no
UMTS FDD V	835	24.5	281.8	51.5	no
LTE FDD 2	1880	24.0	251.2	68.9	no
LTE FDD 4	1750	23.8	239.9	63.5	no
LTE FDD 5	835	24.0	251.2	45.9	no
LTE FDD 17	710	23.5	223.9	37.7	no
WLAN 2450	2450	19.5	89.1	27.9	no
WLAN 5.2 GHz	5200	15.0	31.6	14.4	no
WLAN 5.3 GHz	5300	16.0	39.8	18.3	no
WLAN 5.6 GHz	5600	16.5	44.7	21.1	no
WLAN 5.8 GHz	5800	15.5	35.5	17.1	no
Bluetooth 2450	2450	8.75	7.5	2.3	yes

Table 29: Standalone SAR test exclusion considerations in **head position**

P_{avg}* - maximum possible output power declared by manufacturer

The **1-g SAR test exclusion thresholds** for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [√f(GHz)] ≤ **3.0** for 1-g SAR, where:

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

Standalone SAR test exclusion considerations for **hotspot mode**						
Communication system	freq. (MHz)	distance (mm)	P_{avg}* (dBm)	P_{avg}* (mW)	**threshold$_{1\text{-}g}$ comparison value**	SAR test exclusion
GSM 850	835	10	25.3	335.0	30.6	no
GSM 1900	1900	10	23.5	223.9	30.9	no
UMTS FDD II	1900	10	23.4	218.8	30.2	no
UMTS FDD IV	1750	10	23.3	213.8	28.3	no
UMTS FDD V	835	10	24.5	281.8	25.8	no
LTE FDD 2	1880	10	23.0	199.5	27.4	no
LTE FDD 4	1750	10	22.8	190.5	25.2	no
LTE FDD 5	835	10	24.0	251.2	23.0	no
LTE FDD 17	710	10	23.5	223.9	18.9	no
WLAN 2450	2450	10	19.5	89.1	14.0	no
Bluetooth 2450	2450	10	8.75	7.5	1.2	yes

Table 30: Standalone SAR test exclusion considerations in **hotspot mode**

WLAN 5GHz is **not supported** in **hotspot** mode.

Standalone SAR test exclusion considerations for **Body** position						
Communication system	freq. (MHz)	distance (mm)	P_{avg}* (dBm)	P_{avg}* (mW)	**threshold$_{1\text{-}g}$ comparison value**	SAR test exclusion
GSM 850	835	15	25.3	335.0	20.4	no
GSM 1900	1900	15	23.5	223.9	20.6	no
UMTS FDD II	1900	15	24.4	275.4	25.3	no
UMTS FDD IV	1750	15	24.3	269.2	23.7	no
UMTS FDD V	835	15	24.5	281.8	17.2	no
LTE FDD 2	1880	15	24.0	251.2	23.0	no
LTE FDD 4	1750	15	23.8	239.9	21.2	no
LTE FDD 5	835	15	24.0	251.2	15.3	no
LTE FDD 17	710	15	23.5	223.9	12.6	no
WLAN 2450	2450	15	19.5	89.1	9.3	no
WLAN 5.2 GHz	5200	15	15.0	31.6	4.8	no
WLAN 5.3 GHz	5300	15	16.0	39.8	6.1	no
WLAN 5.6 GHz	5600	15	16.5	44.7	7.0	no
WLAN 5.8 GHz	5800	15	15.5	35.5	5.7	no
Bluetooth 2450	2450	15	8.75	7.5	0.8	yes

Table 31: Standalone SAR test exclusion considerations in **body position**

P_{avg}* - maximum possible output power declared by manufacturer

The **1-g SAR test exclusion thresholds** for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [√f(GHz)] ≤ **3.0** for 1-g SAR, where:

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

7.1.17 Estimated SAR for Bluetooth

Estimated SAR for Bluetooth					
Communication system	freq. (GHz)	distance (mm)	P_{avg}* (dBm)	P_{avg}* (mW)	estimated$_{1-g}$ (W/kg)
Bluetooth 2450 head	2.45	5	8.75	7.5	0.313
Bluetooth 2450 MHS	2.45	10	8.75	7.5	0.157
Bluetooth 2450 body worn	2.45	15	8.75	7.5	0.104

Table 32: Estimated stand alone SAR for **Bluetooth 2450MHz**

P_{avg}* - maximum possible output power declared by manufacturer

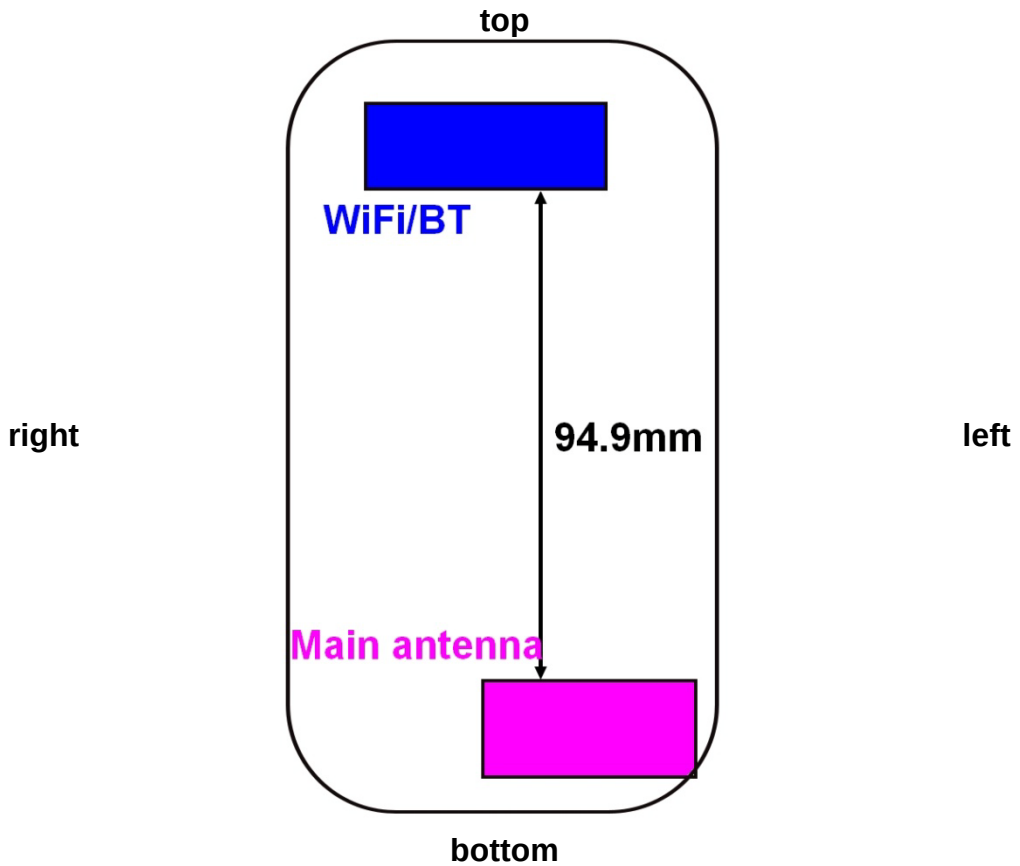
When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
(*max. power of channel, including* ***tune-up tolerance****, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm;
where *x* = 7.5 for 1-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Note: Test separation distance is the distance between phantom and DUT.

7.1.18 Hotspot mode SAR measurement positions

Hotspot mode SAR measurement positions						
mode	front	rear	left edge	right edge	top edge	bottom edge
GSM 850	yes	yes	yes	yes	no	yes
GSM 1900	yes	yes	yes	yes	no	yes
WCDMA FDD II	yes	yes	yes	yes	no	yes
WCDMA FDD IV	yes	yes	yes	yes	no	yes
WCDMA FDD V	yes	yes	yes	yes	no	yes
LTE FDD 2	yes	yes	yes	yes	no	yes
LTE FDD 4	yes	yes	yes	yes	no	yes
LTE FDD 5	yes	yes	yes	yes	no	yes
LTE FDD 17	yes	yes	yes	yes	no	yes
WLAN 2450	yes	yes	yes	yes	yes	no

The edges with less than 2.5 cm distance to the TX antennas need to be tested for hotspot mode SAR.



Antenna dimensions and separation distances

7.2 SAR test results

7.2.1 Results overview

measured / extrapolated SAR numbers - Head - GSM 850 MHz							
Channel	Frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} max. results(W/kg)		liquid temp. (°C)
			declared**	measured	Measured	Extrapolated	
190	836.6	left cheek	29.5	29.3	0.338	0.354	22.5
190	836.6	left tilted 15°	29.5	29.3	0.195	0.204	22.5
128	824.2	right cheek	29.5	29.5	0.367	0.367	22.5
190	836.6	right cheek	29.5	29.3	0.359	0.376	22.5
251	848.8	right cheek	29.5	28.8	**0.407**	**0.478**	22.5
190	836.6	right tilted 15°	29.5	29.3	0.227	0.238	22.5

Table 33: Test results head SAR GSM 850MHz GMSK **3TS** in uplink (see max. SAR plot in Annex B.1:GSM 850MHz)

Note: The device supports DTM class 11 with max. 3 timeslots in uplink. SAR measurements were performed in the configuration with highest calculated time based averaged output power (see section 7.1.1). Therefore 3 timeslots in uplink were used for test.

measured / extrapolated SAR numbers - hotspot mode - GSM 850 MHz									
Ch.	freq. (MHz)	time slots	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
128	824.2	3	10	front	29.5	29.5	0.628	0.628	22.5
190	836.6	3	10	front	29.5	29.3	0.579	0.606	22.5
251	848.8	3	10	front	29.5	28.8	**0.656**	**0.771**	22.5
190	836.6	3	10	rear	29.5	29.3	0.512	0.536	22.5
190	836.6	3	10	left edge	29.5	29.3	0.289	0.303	22.5
190	836.6	3	10	right edge	29.5	29.3	0.374	0.392	22.5
190	836.6	3	10	bottom edge	29.5	29.3	0.114	0.119	22.5
measured / extrapolated SAR numbers - Body worn - GSM 850 MHz									
Ch.	freq. (MHz)	time slots	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
128	824.2	3	15	front	29.5	29.5	0.457	0.457	22.5
190	836.6	3	15	front	29.5	29.3	0.446	0.467	22.5
251	848.8	3	15	front	29.5	28.8	**0.478**	**0.562**	22.5
190	836.6	3	15	rear	29.5	29.3	0.404	0.423	22.5

Table 34: Test results hotspot mode and body worn SAR GSM 850 MHz (see max. SAR plot in Annex B.1:GSM 850MHz)

Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - GSM 1900 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
512	1850.2	left cheek	29.0	28.3	**0.633**	0.744	22.0
661	1880.0	left cheek	29.0	28.3	0.597	0.701	22.0
810	1909.8	left cheek	29.0	28.1	0.626	**0.770**	22.0
661	1880.0	left tilted 15°	29.0	28.3	0.325	0.382	22.0
661	1880.0	right cheek	29.0	28.3	0.551	0.647	22.0
661	1880.0	right tilted 15°	29.0	28.3	0.174	0.204	22.0

Table 35: Test results head SAR GSM 1900MHz GMSK **2TS** in uplink (see max. SAR plot Annex B.2: GSM 1900MHz)

Note: The device supports DTM class 11 with max. 3 timeslots in uplink. SAR measurements were performed in the configuration with highest calculated time based averaged output power (see section 7.1.2). Therefore 2 timeslots in uplink were used for test.

measured / extrapolated SAR numbers - hotspot mode - GSM 1900 MHz										
Ch.	freq. (MHz)	time slots	distance (mm)	modulation	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
						declared**	measured	measured	extrapolated	
661	1880.0	4	10	GMSK	front	26.5	26.2	0.639	0.685	22.8
512	1850.2	4	10	GMSK	rear	26.5	26.0	**1.210**	**1.358**	22.8
661	1880.0	4	10	GMSK	rear	26.5	26.2	1.140	1.222	22.8
810	1909.8	4	10	GMSK	rear	26.5	25.7	1.090	1.310	22.8
661	1880.0	4	10	GMSK	left edge	26.5	26.2	0.306	0.328	22.8
661	1880.0	4	10	GMSK	right edge	26.5	26.2	0.264	0.283	22.8
661	1880.0	4	10	GMSK	bottom edge	26.5	26.2	0.066	0.071	22.8
512	1850.2	4	10	GMSK	rear*	26.5	26.0	1.180	1.324	22.8
measured / extrapolated SAR numbers - Body worn - GSM 1900 MHz										
Ch.	freq. (MHz)	time slots	distance (mm)	modulation	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
						declared**	measured	measured	extrapolated	
661	1880.0	4	15	GMSK	front	26.5	26.2	0.355	0.380	22.8
512	1850.2	4	15	GMSK	rear	26.5	26.0	**0.622**	**0.698**	22.8
661	1880.0	4	15	GMSK	rear	26.5	26.2	0.590	0.632	22.8
810	1909.8	4	15	GMSK	rear	26.5	25.7	0.577	0.694	22.8

Table 36: Test results hotspot mode and body worn SAR GSM 1900 MHz (see max. SAR plot Annex B.2: GSM 1900MHz)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - UMTS FDD II 1880 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
9262	1852.4	left cheek	24.4	24.4	**0.903**	**0.903**	22.6
9400	1880	left cheek	24.4	24.4	0.884	0.884	22.6
9538	1907.6	left cheek	24.4	24.2	0.797	0.835	22.6
9400	1880	left tilted 15°	24.4	24.4	0.420	0.420	22.6
9262	1852.4	right cheek	24.4	24.4	0.850	0.850	22.6
9400	1880	right cheek	24.4	24.4	0.849	0.849	22.6
9538	1907.6	right cheek	24.4	24.2	0.757	0.793	22.6
9400	1880	right tilted 15°	24.4	24.4	0.285	0.285	22.6

Table 37: Test results head SAR UMTS FDD II 1880 MHz (see max. SAR plot Annex B.3: UMTS FDD II)

measured / extrapolated SAR numbers - hotspot mode - UMTS FDD II 1880 MHz Power back off									
Ch.	freq. (MHz)	test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
9400	1880	RMC	10	front	23.4	23.4	0.697	0.697	23.2
9262	1852.4	RMC	10	rear	23.4	23.4	1.030	1.030	23.2
9400	1880	RMC	10	rear	23.4	23.4	**1.030**	**1.030**	23.2
9538	1907.6	RMC	10	rear	23.4	23.4	0.980	0.980	23.2
9400	1880	RMC	10	left edge	23.4	23.4	0.352	0.352	23.2
9400	1880	RMC	10	right edege	23.4	23.4	0.286	0.286	23.2
9400	1880	RMC	10	bottom edge	23.4	23.4	0.583	0.583	23.2
9262	1852.4	RMC	10	rear*	23.4	23.4	1.030	1.030	23.2

Test results hotspot mode SAR UMTS FDD II 1880 MHz power back off (see max. SAR plot Annex B.3: UMTS FDD II)
Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

measured / extrapolated SAR numbers - Body worn - UMTS FDD II 1880 MHz									
Ch.	freq. (MHz)	test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
9400	1880	RMC	15	front	24.4	24.4	0.518	0.518	22.8
9262	1852.4	RMC	15	rear	24.4	24.4	**0.780**	**0.780**	22.8
9400	1880	RMC	15	rear	24.4	24.2	0.743	0.778	22.8
9538	1907.6	RMC	15	rear	24.4	24.4	0.668	0.668	22.8

Table 38: Test results body worn SAR UMTS FDD II 1880 MHz (see max. SAR plot Annex B.3: UMTS FDD II)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - UMTS FDD IV 1700 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
1312	1712.4	left cheek	24.3	24.0	0.973	1.043	23.1
1413	1732.4	left cheek	24.3	24.1	0.903	0.946	23.1
1513	1752.6	left cheek	24.3	24.1	0.943	0.987	23.1
1413	1732.4	left tilted 15°	24.3	24.1	0.623	0.652	23.1
1312	1712.4	right cheek	24.3	24.0	1.010	1.082	23.1
1413	1732.4	right cheek	24.3	24.1	1.040	1.089	23.1
1513	1752.6	right cheek	24.3	24.1	**1.050**	**1.099**	23.1
1413	1732.4	right tilted 15°	24.3	24.1	0.404	0.423	23.1
1513	1752.6	right cheek	24.3	24.1	1.050	1.099	23.1

Table 39: Test results head SAR UMTS FDD IV 1700 MHz (see max. SAR plot Annex B.4: UMTS FDD IV)

measured / extrapolated SAR numbers hotspot mode UMTS FDD IV 1700 MHz with power backoff									
Ch.	freq. (MHz)	test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
1312	1712.4	RMC	10	front	23.3	22.9	1.080	1.184	23.6
1412	1732.4	RMC	10	front	23.3	23.0	1.070	1.147	23.6
1513	1752.6	RMC	10	front	23.3	23.0	0.970	1.039	23.6
1312	1712.4	RMC	10	rear	23.3	22.9	1.130	1.239	23.6
1412	1732.4	RMC	10	rear	23.3	23.0	**1.180**	**1.264**	23.6
1513	1752.6	RMC	10	rear	23.3	23.0	1.110	1.189	23.6
1412	1732.4	RMC	10	left edge	23.3	23.0	0.475	0.509	23.6
1412	1732.4	RMC	10	right edge	23.3	23.0	0.286	0.306	23.6
1412	1732.4	RMC	10	bottom edge	23.3	23.0	0.389	0.417	23.6
1412	1732.4	HSDPA	10	rear	23.3	22.0	0.887	1.197	23.6
1412	1732.4	HSUPA	10	rear	23.3	22.2	0.699	0.900	23.6
measured / extrapolated SAR numbers - Body worn - UMTS FDD IV 1700 MHz									
Ch.	freq. (MHz)	test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
1413	1732.4	RMC	15	front	24.3	24.1	0.759	0.795	23.6
1312	1712.4	RMC	15	rear	24.3	24.0	0.778	0.834	23.6
1413	1732.4	RMC	15	rear	24.3	24.1	**0.833**	**0.872**	23.6
1513	1752.6	RMC	15	rear	24.3	24.1	0.782	0.819	23.6

Table 40: Test results hotspot mode and body worn SAR UMTS FDD IV 1700 MHz (see max. SAR plot Annex B.4: UMTS FDD IV)

Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.
* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - UMTS FDD V 850 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
4132	826.4	left cheek	24.5	24.2	**0.492**	0.527	22.5
4182	836.4	left cheek	24.5	24.0	0.347	0.389	22.5
4233	846.6	left cheek	24.5	23.9	0.460	**0.528**	22.5
4182	836.4	left tilted 15°	24.5	24.0	0.195	0.219	22.5
4182	836.4	right cheek	24.5	24.0	0.339	0.380	22.5
4182	836.4	right tilted 15°	24.5	24.0	0.207	0.232	22.5

Table 41: Test results head SAR UMTS FDD V 850 MHz (see max. SAR plot Annex B.5: UMTS FDD V)

measured / extrapolated SAR numbers - hotspot mode - UMTS FDD V 850 MHz									
Ch.	freq. (MHz)	test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
4132	826.4	RMC	10	front	24.5	24.2	**0.702**	**0.752**	22.8
4182	836.4	RMC	10	front	24.5	24.0	0.640	0.718	22.8
4233	846.6	RMC	10	front	24.5	23.9	0.644	0.739	22.8
4182	836.4	RMC	10	rear	24.5	24.0	0.506	0.568	22.8
4182	836.4	RMC	10	left edge	24.5	24.0	0.242	0.272	22.8
4182	836.4	RMC	10	right edge	24.5	24.0	0.349	0.392	22.8
4182	836.4	RMC	10	bottom edge	24.5	24.0	0.121	0.136	22.8
measured / extrapolated SAR numbers - Body worn - UMTS FDD V 850 MHz									
Ch.	freq. (MHz)	test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
					declared**	measured	measured	extrapolated	
4132	826.4	RMC	15	front	24.5	24.2	**0.580**	**0.621**	22.8
4182	836.4	RMC	15	front	24.5	24.0	0.474	0.532	22.8
4233	846.6	RMC	15	front	24.5	23.9	0.540	0.620	22.8
4182	836.4	RMC	15	rear	24.5	24.0	0.455	0.511	22.8

Table 42: Test results hotspot mode and body worn SAR UMTS FDD V 850 MHz (see max. SAR plot Annex B.5: UMTS FDD V)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

** - maximum possible output power declared by manufacturer
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

measured / extrapolated SAR numbers - Head - LTE FDD 2 1900 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
20MHz BW/1RB/QPSK							
18700	1860	left cheek	24.0	23.3	0.712	0.837	22.7
18900	1880	left cheek	24.0	23.5	**0.742**	0.833	22.7
19100	1900	left cheek	24.0	22.9	0.711	**0.916**	22.7
18900	1880	left tilted 15°	24.0	23.5	0.376	0.422	22.7
18900	1880	right cheek	24.0	23.5	0.674	0.756	22.7
18900	1880	right tilted 15°	24.0	23.5	0.267	0.300	22.7
20MHz BW/50RB/50RB offset/QPSK							
18900	1880	left cheek	23.0	22.4	0.559	0.642	22.7
18900	1880	left tilted 15°	23.0	22.4	0.296	0.340	22.7
18900	1880	right cheek	23.0	22.4	0.505	0.580	22.7
18900	1880	right tilted 15°	23.0	22.4	0.205	0.235	22.7
20MHz BW/100RB/0RB offset/QPSK							
18900	1880	left cheek	23.0	22.5	0.617	0.692	22.7
18900	1880	left tilted 15°	23.0	22.5	0.326	0.366	22.7
18900	1880	right cheek	23.0	22.5	0.560	0.628	22.7
18900	1880	right tilted 15°	23.0	22.5	0.221	0.248	22.7

Table 43: Test results head SAR LTE FDD 2 1900 MHz (see max. SAR plot Annex B.6: LTE FDD 2)

measured / extrapolated SAR numbers hotspot mode LTE FDD 2 1900 MHz with power backoff									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
20MHz BW/1RB/QPSK									
18900	1880	50	10	front	23.0	22.4	0.609	0.699	21.7
18700	1860	0	10	rear	23.0	22.3	1.010	1.187	21.7
18900	1880	50	10	rear	23.0	22.4	1.050	1.206	21.7
19100	1900	50	10	rear	23.0	22.1	1.030	1.267	21.7
18900	1880	50	10	left edge	23.0	22.4	0.302	0.347	21.7
18900	1880	50	10	right edge	23.0	22.4	0.224	0.257	21.7
18900	1880	50	10	bottom edge	23.0	22.4	0.502	0.576	21.7
20MHz BW/50RB/QPSK									
18900	1880	50	10	front	23.0	22.4	0.596	0.684	21.7
18700	1860	50	10	rear	23.0	22.3	**1.080**	**1.269**	21.7
18900	1880	50	10	rear	23.0	22.4	0.930	1.068	21.7
19100	1900	50	10	rear	23.0	22.2	1.030	1.238	21.7
18900	1880	50	10	left edge	23.0	22.4	0.274	0.315	21.7
18900	1880	50	10	right edge	23.0	22.4	0.213	0.245	21.7
18900	1880	50	10	bottom edge	23.0	22.4	0.486	0.558	21.7
18700	1860	50	10	rear*	23.0	22.4	1.060	1.217	21.7
20MHz BW/100RB/0RB offset/QPSK									
18900	1880	0	10	front	23.0	22.4	0.617	0.708	21.7
18700	1860	0	10	rear	23.0	22.1	0.948	1.166	21.7
18900	1880	0	10	rear	23.0	22.4	0.984	1.130	21.7
19100	1900	0	10	rear	23.0	22.3	0.960	1.128	21.7
18900	1880	0	10	left edge	23.0	22.4	0.294	0.338	21.7
18900	1880	0	10	right edge	23.0	22.4	0.223	0.256	21.7
18900	1880	0	10	bottom edge	23.0	22.4	0.503	0.578	21.7

Table 44: Test results **hotspot mode** SAR LTE FDD 2 1900 MHz with **power back off** (see max. SAR plot Annex B.6: LTE FDD 2)

Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Body worn - LTE FDD 2 1900 MHz									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
20MHz BW/1RB/QPSK									
18900	1880	50	15	front	24.0	23.5	0.395	0.443	22.8
18700	1860	50	15	rear	24.0	23.3	**0.611**	**0.718**	22.8
18900	1880	50	15	rear	24.0	23.5	0.595	0.668	22.8
19100	1900	50	15	rear	24.0	22.9	0.557	0.718	22.8
20MHz BW/50RB/QPSK									
18900	1880	50	15	front	23.0	22.4	0.543	0.623	22.8
18900	1880	50	15	rear	23.0	22.4	0.514	0.590	22.8

Table 45: Test results body worn SAR LTE FDD 2 1900 MHz (see max. SAR plot Annex B.6: LTE FDD 2)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

measured / extrapolated SAR numbers - Head - LTE FDD 4 1750 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
20MHz BW/1RB/0RB offset/QPSK							
20050	1720	left cheek	23.8	23.5	0.749	0.803	23.1
20175	1732.5	left cheek	23.8	23.4	0.761	0.834	23.1
20300	1745	left cheek	23.8	23.3	0.730	0.819	23.1
20050	1720	left tilted 15°	23.8	23.5	0.467	0.500	23.1
20050	1720	right cheek	23.8	23.5	0.760	0.814	23.1
20175	1732.5	right cheek	23.8	23.4	**0.784**	**0.860**	23.1
20300	1745	right cheek	23.8	23.3	0.759	0.852	23.1
20050	1720	right tilted 15°	23.8	23.5	0.291	0.312	23.1
20MHz BW/50RB/0RB offset/QPSK							
20050	1720	left cheek	22.8	22.5	0.660	0.707	23.1
20050	1720	left tilted 15°	22.8	22.5	0.386	0.414	23.1
20050	1720	right cheek	22.8	22.5	0.647	0.693	23.1
20050	1720	right tilted 15°	22.8	22.5	0.247	0.265	23.1
20MHz BW/100RB/0RB offset/QPSK							
20050	1720	left cheek	22.8	22.5	0.646	0.692	23.1
20050	1720	left tilted 15°	22.8	22.5	0.387	0.415	23.1
20050	1720	right cheek	22.8	22.5	0.596	0.639	23.1
20050	1720	right tilted 15°	22.8	22.5	0.240	0.257	23.1

Table 46: Test results head SAR LTE FDD 4 1750 MHz (see max. SAR plot Annex B.7: LTE FDD 4)

measured / extrapolated SAR numbers hotspot mode LTE FDD 4 1750 MHz with power backoff									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
20MHz BW/1RB/QPSK									
20050	1720	0	10	front	22.8	22.3	0.950	1.066	22.9
20175	1732.5	0	10	front	22.8	22.2	0.970	1.114	22.9
20300	1745	99	10	front	22.8	22.2	0.837	0.961	22.9
20050	1720	0	10	rear	22.8	22.3	0.979	1.098	22.9
20175	1732.5	0	10	rear	22.8	22.2	0.805	0.924	22.9
20300	1745	99	10	rear	22.8	22.2	0.785	0.901	22.9
20050	1720	0	10	left edge	22.8	22.3	0.420	0.471	22.9
20050	1720	0	10	right edge	22.8	22.3	0.222	0.249	22.9
20050	1720	0	10	bottom edge	22.8	22.3	0.291	0.327	22.9
20MHz BW/50RB/0RB offset/QPSK									
20050	1720	0	10	front	22.8	22.3	0.967	1.085	22.9
20175	1732.5	0	10	front	22.8	22.2	0.947	1.087	22.9
20300	1745	50	10	front	22.8	22.2	0.844	0.969	22.9
20050	1720	0	10	rear	22.8	22.3	0.964	1.082	22.9
20175	1732.5	0	10	rear	22.8	22.2	**1.000**	**1.148**	22.9
20300	1745	50	10	rear	22.8	22.2	0.940	1.079	22.9
20050	1720	0	10	left edge	22.8	22.3	0.429	0.481	22.9
20050	1720	0	10	right edge	22.8	22.3	0.234	0.263	22.9
20050	1720	0	10	bottom edge	22.8	22.3	0.302	0.339	22.9
20175	1732.5	0	10	rear*	22.8	22.2	0.993	1.140	22.9
20MHz BW/100RB/0RB offset/QPSK									
20050	1720	0	10	front	22.8	22.2	0.825	0.947	22.9
20175	1732.5	0	10	front	22.8	22.2	0.888	1.020	22.9
20300	1745	0	10	front	22.8	22.1	0.872	1.025	22.9
20050	1720	0	10	rear	22.8	22.2	0.970	1.114	22.9
20175	1732.5	0	10	rear	22.8	22.2	0.954	1.095	22.9
20300	1745	0	10	rear	22.8	22.1	0.962	1.130	22.9
20050	1720	0	10	left edge	22.8	22.2	0.422	0.485	22.9
20050	1720	0	10	right edge	22.8	22.2	0.242	0.278	22.9
20050	1720	0	10	bottom edge	22.8	22.2	0.300	0.344	22.9

Table 47: Test results **hotspot** mode SAR LTE FDD 4 1750 MHz with **power backoff** (see max. SAR plot Annex B.7: LTE FDD 4)

Hotspot fixed lower power level is triggered when device is placed in the hotspot mode.
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Body - LTE FDD 4 1750 MHz									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
20MHz BW/1RB/QPSK									
20050	1720	0	15	front	23.8	23.5	**0.772**	0.827	22.9
20175	1732.5	0	15	front	23.8	23.4	0.761	**0.834**	22.9
20300	1745	99	15	front	23.8	23.3	0.682	0.765	22.9
20050	1720	0	15	rear	23.8	23.5	0.749	0.803	22.9
20175	1732.5	0	15	rear	23.8	23.4	0.755	0.828	22.9
20300	1745	99	15	rear	23.8	23.3	0.712	0.799	22.9
20MHz BW/50RB/QPSK									
20050	1720	0	15	front	23.8	22.5	0.609	0.822	22.9
20050	1720	0	15	rear	23.8	22.5	0.608	0.820	22.9

Table 48: Test results body worn SAR LTE FDD 4 1750 MHz (see max. SAR plot Annex B.7: LTE FDD 4)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

measured / extrapolated SAR numbers - Head - LTE FDD 5 850 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
10MHz BW/1RB/0RB offset/QPSK							
20450	829.0	left cheek	24.0	23.7	0.466	0.499	22.3
20450	829.0	left tilted 15°	24.0	23.7	0.297	0.318	22.3
20450	829.0	right cheek	24.0	23.7	**0.534**	**0.572**	22.3
20525	836.5	right cheek	24.0	23.6	0.326	0.357	22.3
20600	844.0	right cheek	24.0	23.1	0.432	0.531	22.3
20450	829.0	right tilted 15°	24.0	23.7	0.330	0.354	22.3
10MHz BW/25RB/12RB offset/QPSK							
20525	836.5	left cheek	23.0	22.6	0.233	0.255	22.3
20525	836.5	left tilted 15°	23.0	22.6	0.154	0.169	22.3
20525	836.5	right cheek	23.0	22.6	0.270	0.296	22.3
20525	836.5	right tilted 15°	23.0	22.6	0.174	0.191	22.3

Table 49: Test results head SAR LTE FDD 5 850 MHz (see max. SAR plot Annex B.8: LTE FDD 5)

measured / extrapolated SAR numbers - hotspot mode - LTE FDD 5 850 MHz									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
10MHz BW/1RB/QPSK									
20450	829.0	0	10	front	24.0	23.7	0.706	0.756	23.0
20525	836.5	25	10	front	24.0	23.6	0.519	0.569	23.0
20600	844.0	0	10	front	24.0	23.1	0.574	0.706	23.0
20450	829.0	0	10	rear	24.0	23.7	**0.726**	**0.778**	23.0
20525	836.5	25	10	rear	24.0	23.6	0.503	0.552	23.0
20600	844.0	0	10	rear	24.0	23.1	0.543	0.668	23.0
20450	829.0	0	10	left edge	24.0	23.7	0.388	0.416	23.0
20450	829.0	0	10	right edge	24.0	23.7	0.420	0.450	23.0
20450	829.0	0	10	bottom edge	24.0	23.7	0.143	0.153	23.0
20450	829.0	0	10	rear*	24.0	23.7	0.676	0.724	23.0
10MHz BW/25RB/QPSK									
20450	829.0	0	10	front	23.0	22.5	0.520	0.583	23.0
20525	836.5	12	10	front	23.0	22.6	0.395	0.433	23.0
20600	844.0	0	10	front	23.0	22.5	0.578	0.649	23.0
20525	836.5	12	10	rear	23.0	22.6	0.384	0.421	23.0
10MHz BW/50RB/0RB offset/QPSK									
20450	829.0	0	10	front	23.0	22.2	0.430	0.517	23.0
20525	836.5	0	10	front	23.0	22.5	0.457	0.513	23.0
20600	844.0	0	10	front	23.0	22.0	0.492	0.619	23.0
20525	836.5	0	10	rear	23.0	22.5	0.413	0.463	23.0

Table 50: Test results hotspot mode SAR LTE FDD 5 850 MHz (see max. SAR plot Annex B.8: LTE FDD 5)
* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer

Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

measured / extrapolated SAR numbers - Body worn - LTE FDD 5 850 MHz									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
10MHz BW/1RB/QPSK									
20450	829.0	0	15	front	24.0	23.7	**0.626**	**0.671**	22.5
20525	836.5	25	15	front	24.0	23.6	0.416	0.456	22.5
20600	844.0	0	15	front	24.0	23.1	0.511	0.629	22.5
20450	829.0	0	15	rear	24.0	23.7	0.550	0.589	22.5
10MHz BW/25RB/QPSK									
20525	836.5	12	15	front	23.0	22.5	0.336	0.377	22.5
20525	836.5	12	15	rear	23.0	22.5	0.314	0.352	22.5

Table 51: Test results body worn SAR LTE FDD 5 850 MHz (see max. SAR plot Annex B.8: LTE FDD 5)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

measured / extrapolated SAR numbers - Head - LTE FDD 17 700 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
10MHz BW/1RB/49RB offset/QPSK							
709	23780	left cheek	23.5	23.3	**0.350**	0.366	22.4
710	23790	left cheek	23.5	23.2	0.343	**0.368**	22.4
711	23800	left cheek	23.5	23.2	0.271	0.290	22.4
709	23800	left tilted 15°	23.5	23.3	0.167	0.175	22.4
709	23800	right cheek	23.5	23.3	0.234	0.245	22.4
709	23800	right tilted 15°	23.5	23.3	0.165	0.173	22.4
10MHz BW/25RB/25RB offset/QPSK							
711	23780	left cheek	22.5	22.5	0.257	0.257	22.4
711	23780	left tilted 15°	22.5	22.5	0.129	0.129	22.4
711	23780	right cheek	22.5	22.5	0.228	0.228	22.4
711	23780	right tilted 15°	22.5	22.5	0.128	0.128	22.4

Table 52: Test results head SAR LTE FDD 17 700 MHz (see max. SAR plot Annex B.9: LTE FDD 17)

measured / extrapolated SAR numbers - hotspot mode - LTE FDD 17 700 MHz									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
10MHz BW/1RB/QPSK									
23780	709	49	10	front	23.5	23.3	0.453	0.474	23.0
23780	709	49	10	rear	23.5	23.3	0.511	0.535	23.0
23790	710	49	10	rear	23.5	23.2	**0.541**	**0.580**	23.0
23800	711	25	10	rear	23.5	23.2	0.448	0.480	23.0
23780	709	49	10	left edge	23.5	23.3	0.305	0.319	23.0
23780	709	49	10	right edge	23.5	23.3	0.213	0.223	23.0
23780	709	49	10	bottom edge	23.5	23.3	0.091	0.095	23.0
10MHz BW/25RB/12RB offset/QPSK									
23800	711	12	10	front	22.5	22.5	0.380	0.380	23.0
23800	711	12	10	rear	22.5	22.5	0.398	0.398	23.0
23800	711	12	10	left edge	22.5	22.5	0.246	0.246	23.0
23800	711	12	10	right edge	22.5	22.5	0.177	0.177	23.0
23800	711	12	10	bottom edge	22.5	22.5	0.073	0.073	23.0

Table 53: Test results hotspot mode SAR LTE FDD 17 700 MHz (see max. SAR plot Annex B.9: LTE FDD 17)

Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Body worn - LTE FDD 17 700 MHz									
Ch.	freq. (MHz)	RB offset	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	extrapolated	
10MHz BW/1RB/QPSK									
23780	709	49	15	front	23.5	23.3	0.323	0.338	23.0
23780	709	49	15	rear	23.5	23.3	0.338	0.354	23.0
23790	710	49	15	rear	23.5	23.2	**0.343**	**0.368**	23.0
23800	711	25	15	rear	23.5	23.2	0.289	0.310	23.0
10MHz BW/25RB/12RB offset/QPSK									
23800	711	12	15	front	22.5	22.5	0.263	0.263	23.0
23800	711	12	15	rear	22.5	22.5	0.267	0.267	23.0

Table 54: Test results body worn SAR LTE FDD 17 700 MHz (see max. SAR plot Annex B.9: LTE FDD 17) Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

measured / extrapolated SAR numbers - Head - WLAN 2450 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	**extrapolated**	
1	2412	left cheek	19.5	19.3	**0.826**	**0.865**	22.7
6	2437	left cheek	19.5	19.1	0.738	0.809	22.7
11	2462	left cheek	19.5	19.1	0.633	0.694	22.7
1	2412	left tilted 15°	19.5	19.3	0.654	0.685	22.7
1	2412	right cheek	19.5	19.3	0.453	0.474	22.7
1	2412	right tilted 15°	19.5	19.3	0.807	0.845	22.7
6	2437	right tilted 15°	19.5	19.1	0.521	0.571	22.7
11	2462	right tilted 15°	19.5	19.1	0.526	0.577	22.7
1	2412	left cheek*	19.5	19.3	0.704	0.737	22.7

Table 55: Test results head SAR WLAN 2450 MHz (see max. SAR plot Annex B.10: WLAN 2450MHz)

* - repeated at the highest SAR measurement according to the FCC KDB 865664

** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - hotspot mode - WLAN 2450 MHz									
Ch.	freq. (MHz)	Test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	**extrapolated**	
1	2412	1Mbit/s	10	front	19.5	19.3	0.150	0.157	22.7
1	2412	1Mbit/s	10	rear	19.5	19.3	0.452	0.473	22.7
6	2437	1Mbit/s	10	rear	19.5	19.1	**0.586**	**0.643**	22.7
11	2462	1Mbit/s	10	rear	19.5	19.1	0.551	0.604	22.7
1	2412	1Mbit/s	10	left edge	19.5	19.3	0.051	0.053	22.7
1	2412	1Mbit/s	10	right edge	19.5	19.3	0.025	0.026	22.7
1	2412	1Mbit/s	10	top	19.5	19.3	0.133	0.139	22.7

Table 56: Test results hotspot mode SAR WLAN 2450 MHz (see max. SAR plot Annex B.10: WLAN 2450MHz)
Bottom side edge positions for hotspot mode are not required since the distance from the WLAN antenna to the edge is greater than 2.5cm.

measured / extrapolated SAR numbers - Body worn - WLAN 2450 MHz									
Ch.	freq. (MHz)	Test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	**extrapolated**	
1	2412	1Mbit/s	15	front	19.5	19.3	0.062	0.065	22.7
1	2412	1Mbit/s	15	rear	19.5	19.3	0.183	0.192	22.7
6	2437	1Mbit/s	15	rear	19.5	19.1	0.206	0.226	22.7
11	2462	1Mbit/s	15	rear	19.5	19.1	**0.233**	**0.255**	22.7

Table 57: Test results body worn SAR WLAN 2450 MHz (see max. SAR plot Annex B.10: WLAN 2450MHz)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.

measured / extrapolated SAR numbers - Head - WLAN 5 GHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	**extrapolated**	
48	5240	left cheek	15.0	14.4	0.172	0.196	22.5
64	5320	left cheek	16.0	15.7	0.295	0.313	22.5
100	5500	left cheek	16.5	16.0	0.248	0.281	22.5
149	5745	left cheek	15.5	15.0	0.219	0.246	22.5
48	5240	left tilted 15°	15.0	14.4	0.131	0.149	22.5
64	5320	left tilted 15°	16.0	15.7	0.232	0.246	22.5
100	5500	left tilted 15°	16.5	16.7	0.197	0.188	22.5
149	5745	left tilted 15°	15.5	15.0	0.250	0.281	22.5
48	5240	right cheek	15.0	14.4	0.189	0.215	22.5
64	5320	right cheek	16.0	15.7	**0.321**	**0.341**	22.5
100	5500	right cheek	16.5	16.0	0.266	0.301	22.5
149	5745	right cheek	15.5	15.0	0.189	0.212	22.5
48	5240	right tilted 15°	15.0	14.4	0.139	0.158	22.5
64	5320	right tilted 15°	16.0	15.7	0.220	0.234	22.5
100	5500	right tilted 15°	16.5	16.0	0.209	0.237	22.5
149	5745	right tilted 15°	15.5	15.0	0.242	0.272	22.5

Table 58: Test results head SAR WLAN 5 GHz (see max. SAR plot Annex B.11: WLAN 5GHz)

measured / extrapolated SAR numbers - Body worn - WLAN 5 GHz									
Ch.	freq. (MHz)	Test condition	distance (mm)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp.(°C)
					declared**	measured	measured	**extrapolated**	
48	5240	6Mbit/s	15	front	15.0	14.4	0.028	0.032	22.2
64	5320	6Mbit/s	15	front	16.0	15.7	0.040	0.042	22.2
100	5500	6Mbit/s	15	front	16.5	16.0	0.037	0.042	22.2
149	5745	6Mbit/s	15	front	15.5	15.0	0.052	0.058	22.2
48	5240	6Mbit/s	15	rear	15.0	14.4	0.173	0.197	22.2
64	5320	6Mbit/s	15	rear	16.0	15.7	0.318	0.338	22.2
100	5500	6Mbit/s	15	rear	16.5	16.0	**0.414**	**0.469**	22.2
149	5745	6Mbit/s	15	rear	15.5	15.0	0.400	0.449	22.2

Table 59: Test results body worn SAR WLAN 5 GHz(see max. SAR plot Annex B.11: WLAN 5GHz)
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.
** - maximum possible output power declared by manufacturer

7.2.2 General description of test procedures

- The DUT is tested using CMU 200 and CMW 500 communications testers as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted peak power.
- Test positions as described in the tables above are in accordance with the specified test standard.
- Tests in body position were performed in that configuration, which generates the highest time based averaged output power (see conducted power results).
- Tests in head position with GSM were performed in voice mode with 1 timeslot unless GPRS/EGPRS/DTM function allows parallel voice and data traffic on 2 or more timeslots (see section 2.4 for details).
- UMTS was tested in RMC mode with 12.2 kbit/s and TPC bits set to 'all 1'.
- WLAN was tested in 802.11a/b mode with 1 MBit/s and 6 MBit/s. According to KDB 248227 the SAR testing for 802.11g/n is not required since the maximum power of 802.11g/n is less ¼ dB higher than maximum power of 802.11a/b.
- Required WLAN test channels were selected according to KDB 248227
- For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15 mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.
- Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used.
- According to FCC KDB pub 941225 D06 this device has been tested with 10 mm distance to the phantom for operation in WLAN hot spot mode.
- Per FCC KDB pub 941225 D06 the edges with antennas within 2.5 cm are required to be evaluated for SAR to cover WLAN hot spot function.
- For SAR measurements test samples with fixed **power back off** have been used in **LTE FDD 2/4** and **UMTS FDD II/IV** mode for all configurations that require power back off during normal operation **hotspot mode**.
- According to IEEE 1528 the SAR test shall be performed at middle channel. Testing of top and bottom channel is optional.
- According to KDB 447498 D01 testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:
  - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
  - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
  - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

7.2.3 Multiple Transmitter Information

The following tables list information which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498D01 General RF Exposure Guidance v05.

reported SAR **WWAN** and **WLAN 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR** <1.6W/kg	distance **Ri**, mm	**ratio** ≤ 0.040
		WWAN	WLAN			
GSM 850	left cheek	0.354	0.865	1.219		
GSM 850	left tilted 15°	0.204	0.685	0.889		
GSM 850	right cheek	0.478	0.474	0.952		
GSM 850	right tilted 15°	0.238	0.845	1.083		
GSM 850	front 10mm	0.771	0.157	0.928		
GSM 850	rear 10mm	0.536	0.643	1.179		
GSM 850	front 15mm	0.501	0.065	0.566		
GSM 850	rear 15mm	0.423	0.255	0.678		
GSM 1900	left cheek	0.770	0.865	**1.635**	81.7	0.026
GSM 1900	left tilted 15°	0.382	0.685	1.067		
GSM 1900	right cheek	0.647	0.474	1.121		
GSM 1900	right tilted 15°	0.204	0.845	1.049		
GSM 1900	front 10mm	0.685	0.157	0.842		
GSM 1900	rear 10mm	1.358	0.643	**2.001**	105.2	0.027
GSM 1900	front 15mm	0.380	0.065	0.445		
GSM 1900	rear 15mm	0.748	0.255	1.003		
UMTS FDD II	left cheek	0.903	0.865	**1.768**	85.2	0.028
UMTS FDD II	left tilted 15°	0.420	0.685	1.105		
UMTS FDD II	right cheek	0.850	0.474	1.324		
UMTS FDD II	right tilted 15°	0.285	0.845	1.130		
UMTS FDD II	front 10mm	0.697	0.157	0.854		
UMTS FDD II	rear 10mm	1.030	0.643	**1.673**	106.8	0.020
UMTS FDD II	front 15mm	0.518	0.065	0.583		
UMTS FDD II	rear 15mm	0.780	0.255	1.035		
UMTS FDD IV	left cheek	1.043	0.865	**1.908**	82.6	0.032
UMTS FDD IV	left tilted 15°	0.652	0.685	1.337		
UMTS FDD IV	right cheek	1.099	0.474	1.573	74.6	0.026
UMTS FDD IV	right tilted 15°	0.423	0.845	1.268		
UMTS FDD IV	front 10mm	1.184	0.157	1.341		
UMTS FDD IV	rear 10mm	1.264	0.643	**1.907**	106.3	0.025
UMTS FDD IV	front 15mm	0.795	0.065	0.860		
UMTS FDD IV	rear 15mm	0.872	0.255	1.127		

Table 60: SAR_{max} WWAN and **WLAN 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

reported SAR **WWAN** and **WLAN 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR** <1.6W/kg	distance **Ri**, mm	**ratio** ≤ 0.040
		WWAN	WLAN			
WCDMA FDD V	left cheek	0.528	0.865	1.393		
WCDMA FDD V	left tilted 15°	0.219	0.685	0.904		
WCDMA FDD V	right cheek	0.380	0.474	0.854		
WCDMA FDD V	right tilted 15°	0.232	0.845	1.077		
WCDMA FDD V	front 10mm	0.752	0.157	0.909		
WCDMA FDD V	rear 10mm	0.568	0.643	1.211		
WCDMA FDD V	front 15mm	0.621	0.065	0.686		
WCDMA FDD V	rear 15mm	0.511	0.255	0.766		
LTE FDD 2	left cheek	0.916	0.865	**1.781**	86.2	0.028
LTE FDD 2	left tilted 15°	0.422	0.685	1.107		
LTE FDD 2	right cheek	0.756	0.474	1.230		
LTE FDD 2	right tilted 15°	0.300	0.845	1.145		
LTE FDD 2	front 10mm	0.708	0.157	0.865		
LTE FDD 2	rear 10mm	1.269	0.643	**1.912**	105.8	0.025
LTE FDD 2	front 15mm	0.443	0.065	0.508		
LTE FDD 2	rear 15mm	0.718	0.255	0.973		
LTE FDD 4	left cheek	0.834	0.865	**1.699**	72.6	0.031
LTE FDD 4	left tilted 15°	0.500	0.685	1.185		
LTE FDD 4	right cheek	0.860	0.474	1.334		
LTE FDD 4	right tilted 15°	0.312	0.845	1.157		
LTE FDD 4	front 10mm	1.193	0.157	1.350		
LTE FDD 4	rear 10mm	1.148	0.643	**1.791**	109.6	0.022
LTE FDD 4	front 15mm	0.834	0.065	0.899		
LTE FDD 4	rear 15mm	0.828	0.255	1.083		
LTE FDD 5	left cheek	0.499	0.865	1.364		
LTE FDD 5	left tilted 15°	0.318	0.685	1.003		
LTE FDD 5	right cheek	0.572	0.474	1.046		
LTE FDD 5	right tilted 15°	0.354	0.845	1.199		
LTE FDD 5	front 10mm	0.756	0.157	0.913		
LTE FDD 5	rear 10mm	0.778	0.643	1.421		
LTE FDD 5	front 15mm	0.671	0.065	0.736		
LTE FDD 5	rear 15mm	0.589	0.255	0.844		
LTE FDD 17	left cheek	0.368	0.865	1.233		
LTE FDD 17	left tilted 15°	0.175	0.685	0.860		
LTE FDD 17	right cheek	0.245	0.474	0.719		
LTE FDD 17	right tilted 15°	0.173	0.845	1.018		
LTE FDD 17	front 10mm	0.474	0.157	0.631		
LTE FDD 17	rear 10mm	0.580	0.643	1.223		
LTE FDD 17	front 15mm	0.338	0.065	0.403		
LTE FDD 17	rear 15mm	0.368	0.255	0.623		

Table 61: SAR_{max} WWAN and **WLAN 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

reported SAR **WWAN** and **WLAN 5GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR** <1.6W/kg	distance **Ri**, mm	**ratio** ≤ 0.040
		WWAN	WLAN			
GSM 850	left cheek	0.354	0.313	0.667		
GSM 850	left tilted 15°	0.204	0.281	0.485		
GSM 850	right cheek	0.478	0.341	0.819		
GSM 850	right tilted 15°	0.238	0.272	0.510		
GSM 850	front 15mm	0.501	0.058	0.559		
GSM 850	rear 15mm	0.423	0.469	0.892		
GSM 1900	left cheek	0.770	0.313	1.083		
GSM 1900	left tilted 15°	0.382	0.281	0.663		
GSM 1900	right cheek	0.647	0.341	0.988		
GSM 1900	right tilted 15°	0.204	0.272	0.476		
GSM 1900	front 15mm	0.380	0.058	0.438		
GSM 1900	rear 15mm	0.748	0.469	1.217		
UMTS FDD II	left cheek	0.903	0.313	1.216		
UMTS FDD II	left tilted 15°	0.420	0.281	0.701		
UMTS FDD II	right cheek	0.850	0.341	1.191		
UMTS FDD II	right tilted 15°	0.285	0.272	0.557		
UMTS FDD II	front 15mm	0.518	0.058	0.576		
UMTS FDD II	rear 15mm	0.780	0.469	1.249		
UMTS FDD IV	left cheek	1.043	0.313	1.356		
UMTS FDD IV	left tilted 15°	0.652	0.281	0.933		
UMTS FDD IV	right cheek	1.099	0.341	1.440		
UMTS FDD IV	right tilted 15°	0.423	0.272	0.695		
UMTS FDD IV	front 15mm	0.795	0.058	0.853		
UMTS FDD IV	rear 15mm	0.872	0.469	1.341		
WCDMA FDD V	left cheek	0.528	0.313	0.841		
WCDMA FDD V	left tilted 15°	0.219	0.281	0.500		
WCDMA FDD V	right cheek	0.380	0.341	0.721		
WCDMA FDD V	right tilted 15°	0.232	0.272	0.504		
WCDMA FDD V	front 15mm	0.621	0.058	0.679		
WCDMA FDD V	rear 15mm	0.511	0.469	0.980		

Table 62: SAR_{max} WWAN and **WLAN 5GHz**, ΣSAR evaluation, **$SPLSR_i$**

reported SAR **WWAN** and **WLAN 5GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR** <1.6W/kg	distance **Ri**, mm	**ratio** ≤ 0.040
		WWAN	WLAN			
LTE FDD 2	left cheek	0.916	0.313	1.229		
LTE FDD 2	left tilted 15°	0.422	0.281	0.703		
LTE FDD 2	right cheek	0.756	0.341	1.097		
LTE FDD 2	right tilted 15°	0.300	0.272	0.572		
LTE FDD 2	front 15mm	0.443	0.058	0.501		
LTE FDD 2	rear 15mm	0.718	0.469	1.187		
LTE FDD 4	left cheek	0.834	0.313	1.147		
LTE FDD 4	left tilted 15°	0.500	0.281	0.781		
LTE FDD 4	right cheek	0.860	0.341	1.201		
LTE FDD 4	right tilted 15°	0.312	0.272	0.584		
LTE FDD 4	front 15mm	0.834	0.058	0.892		
LTE FDD 4	rear 15mm	0.828	0.469	1.297		
LTE FDD 5	left cheek	0.499	0.313	0.812		
LTE FDD 5	left tilted 15°	0.318	0.281	0.599		
LTE FDD 5	right cheek	0.572	0.341	0.913		
LTE FDD 5	right tilted 15°	0.354	0.272	0.626		
LTE FDD 5	front 15mm	0.671	0.058	0.729		
LTE FDD 5	rear 15mm	0.589	0.469	1.058		
LTE FDD 17	left cheek	0.368	0.313	0.681		
LTE FDD 17	left tilted 15°	0.175	0.281	0.456		
LTE FDD 17	right cheek	0.245	0.341	0.586		
LTE FDD 17	right tilted 15°	0.173	0.272	0.445		
LTE FDD 17	front 15mm	0.338	0.058	0.396		
LTE FDD 17	rear 15mm	0.368	0.469	0.837		

Table 63: SAR_{max} WWAN and **WLAN 5GHz**, ΣSAR evaluation, **$SPLSR_i$**

reported SAR **WWAN** and **Bluetooth 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR** <1.6W/kg	distance **Ri**, mm	**ratio** ≤ 0.040
		WWAN	BT			
GSM 850	left cheek	0.354	0.313	0.667		
GSM 850	left tilted 15°	0.204	0.313	0.517		
GSM 850	right cheek	0.478	0.313	0.791		
GSM 850	right tilted 15°	0.238	0.313	0.551		
GSM 850	front 10mm	0.771	0.157	0.928		
GSM 850	rear 10mm	0.536	0.157	0.693		
GSM 850	front 15mm	0.501	0.104	0.605		
GSM 850	rear 15mm	0.423	0.104	0.527		
GSM 1900	left cheek	0.770	0.313	1.083		
GSM 1900	left tilted 15°	0.382	0.313	0.695		
GSM 1900	right cheek	0.647	0.313	0.960		
GSM 1900	right tilted 15°	0.204	0.313	0.517		
GSM 1900	front 10mm	0.685	0.157	0.842		
GSM 1900	rear 10mm	1.358	0.157	1.515		
GSM 1900	front 15mm	0.380	0.104	0.484		
GSM 1900	rear 15mm	0.748	0.104	0.852		
UMTS FDD II	left cheek	0.903	0.313	1.216		
UMTS FDD II	left tilted 15°	0.420	0.313	0.733		
UMTS FDD II	right cheek	0.850	0.313	1.163		
UMTS FDD II	right tilted 15°	0.285	0.313	0.598		
UMTS FDD II	front 10mm	0.697	0.157	0.854		
UMTS FDD II	rear 10mm	1.030	0.157	1.187		
UMTS FDD II	front 15mm	0.518	0.104	0.622		
UMTS FDD II	rear 15mm	0.780	0.104	0.884		
UMTS FDD IV	left cheek	1.043	0.313	1.356		
UMTS FDD IV	left tilted 15°	0.652	0.313	0.965		
UMTS FDD IV	right cheek	1.099	0.313	1.412		
UMTS FDD IV	right tilted 15°	0.423	0.313	0.736		
UMTS FDD IV	front 10mm	1.184	0.157	1.341		
UMTS FDD IV	rear 10mm	1.264	0.157	1.421		
UMTS FDD IV	front 15mm	0.795	0.104	0.899		
UMTS FDD IV	rear 15mm	0.872	0.104	0.976		

Table 64: SAR_{max} WWAN and **Bluetooth 2450MHz**, ΣSAR evaluation

reported SAR **WWAN** and **Bluetooth 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR** <1.6W/kg	distance **Ri**, mm	**ratio** ≤ 0.040
		WWAN	BT			
WCDMA FDD V	left cheek	0.528	0.313	0.841		
WCDMA FDD V	left tilted 15°	0.219	0.313	0.532		
WCDMA FDD V	right cheek	0.380	0.313	0.693		
WCDMA FDD V	right tilted 15°	0.232	0.313	0.545		
WCDMA FDD V	front 10mm	0.752	0.157	0.909		
WCDMA FDD V	rear 10mm	0.568	0.157	0.725		
WCDMA FDD V	front 15mm	0.621	0.104	0.725		
WCDMA FDD V	rear 15mm	0.511	0.104	0.615		
LTE FDD 2	left cheek	0.916	0.313	1.229		
LTE FDD 2	left tilted 15°	0.422	0.313	0.735		
LTE FDD 2	right cheek	0.756	0.313	1.069		
LTE FDD 2	right tilted 15°	0.300	0.313	0.613		
LTE FDD 2	front 10mm	0.708	0.157	0.865		
LTE FDD 2	rear 10mm	1.269	0.157	1.426		
LTE FDD 2	front 15mm	0.443	0.104	0.547		
LTE FDD 2	rear 15mm	0.718	0.104	0.822		
LTE FDD 4	left cheek	0.834	0.313	1.147		
LTE FDD 4	left tilted 15°	0.500	0.313	0.813		
LTE FDD 4	right cheek	0.860	0.313	1.173		
LTE FDD 4	right tilted 15°	0.312	0.313	0.625		
LTE FDD 4	front 10mm	1.193	0.157	1.350		
LTE FDD 4	rear 10mm	1.148	0.157	1.305		
LTE FDD 4	front 15mm	0.834	0.104	0.938		
LTE FDD 4	rear 15mm	0.828	0.104	0.932		
LTE FDD 5	left cheek	0.499	0.313	0.812		
LTE FDD 5	left tilted 15°	0.318	0.313	0.631		
LTE FDD 5	right cheek	0.572	0.313	0.885		
LTE FDD 5	right tilted 15°	0.354	0.313	0.667		
LTE FDD 5	front 10mm	0.756	0.157	0.913		
LTE FDD 5	rear 10mm	0.778	0.157	0.935		
LTE FDD 5	front 15mm	0.671	0.104	0.775		
LTE FDD 5	rear 15mm	0.589	0.104	0.693		
LTE FDD 17	left cheek	0.368	0.313	0.681		
LTE FDD 17	left tilted 15°	0.175	0.313	0.488		
LTE FDD 17	right cheek	0.245	0.313	0.558		
LTE FDD 17	right tilted 15°	0.173	0.313	0.486		
LTE FDD 17	front 10mm	0.474	0.157	0.631		
LTE FDD 17	rear 10mm	0.580	0.157	0.737		
LTE FDD 17	front 15mm	0.338	0.104	0.442		
LTE FDD 17	rear 15mm	0.368	0.104	0.472		

Table 65: SAR_{max} WWAN and **Bluetooth 2450MHz**, ΣSAR evaluation

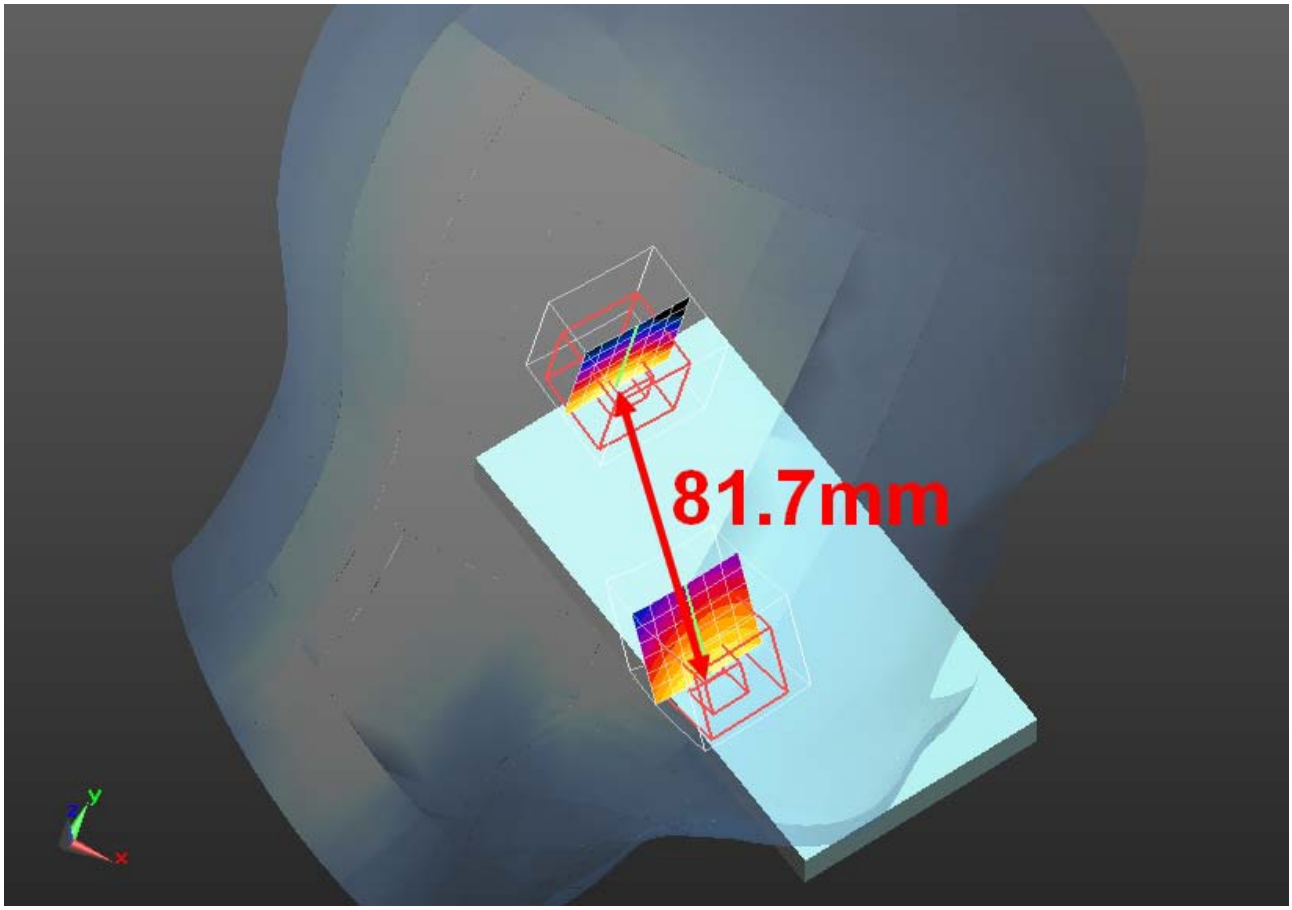
Minimum antenna separation distance between MAIN antenna and Bluetooth antenna – **94.9 mm**

Conclusion:

ΣSAR > 1.6 W/kg, but SAR-to-(peak-locations spacing) **ratio** (**SPLSR$_i$**) is less than **0.04** therefore simultaneous transmissions SAR measurement with the enlarged zoom scan measurement and volume scan post-processing procedures is **not** required.

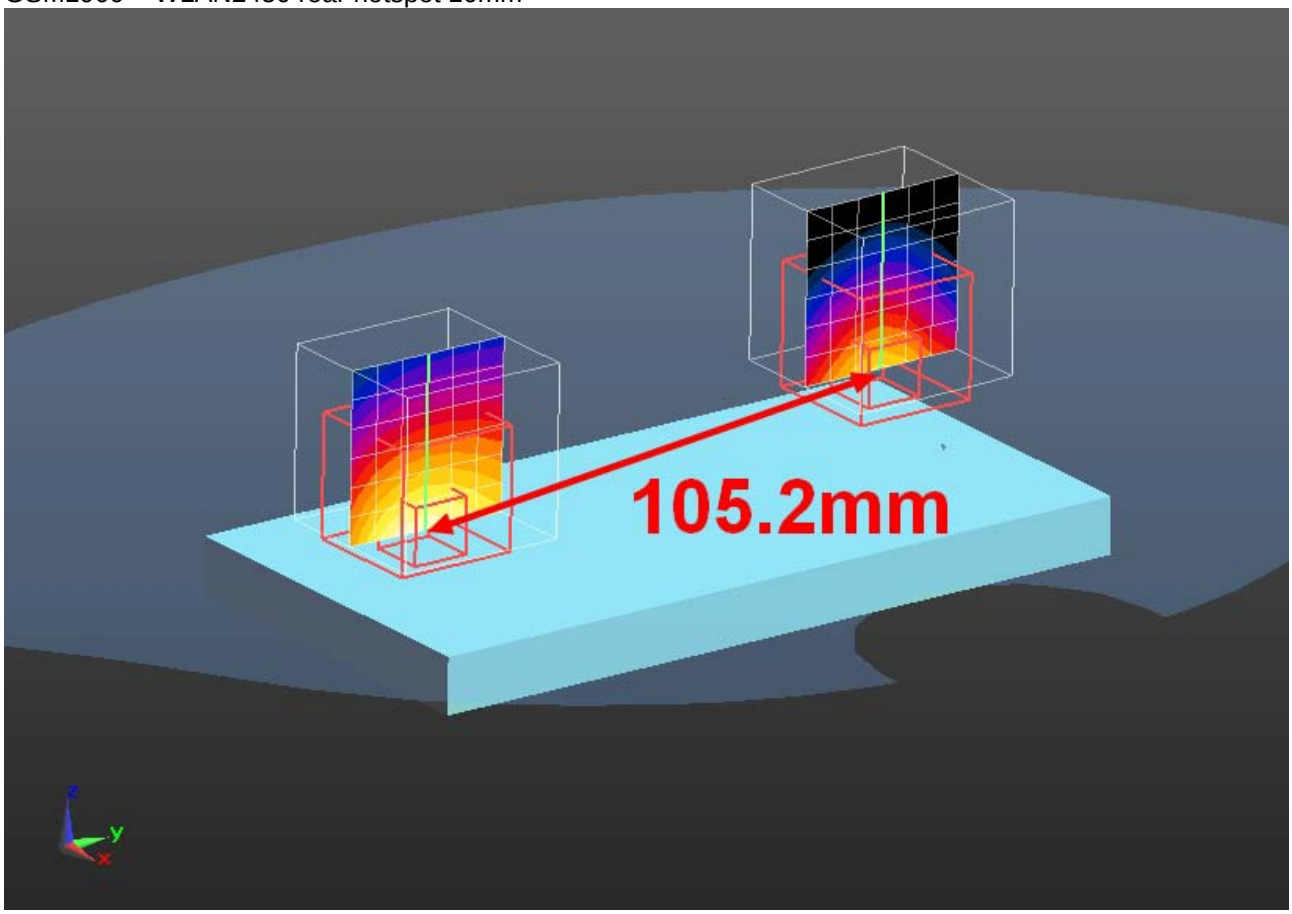
7.2.4 SAR peak location separation

GSM1900 + WLAN2450 left cheek



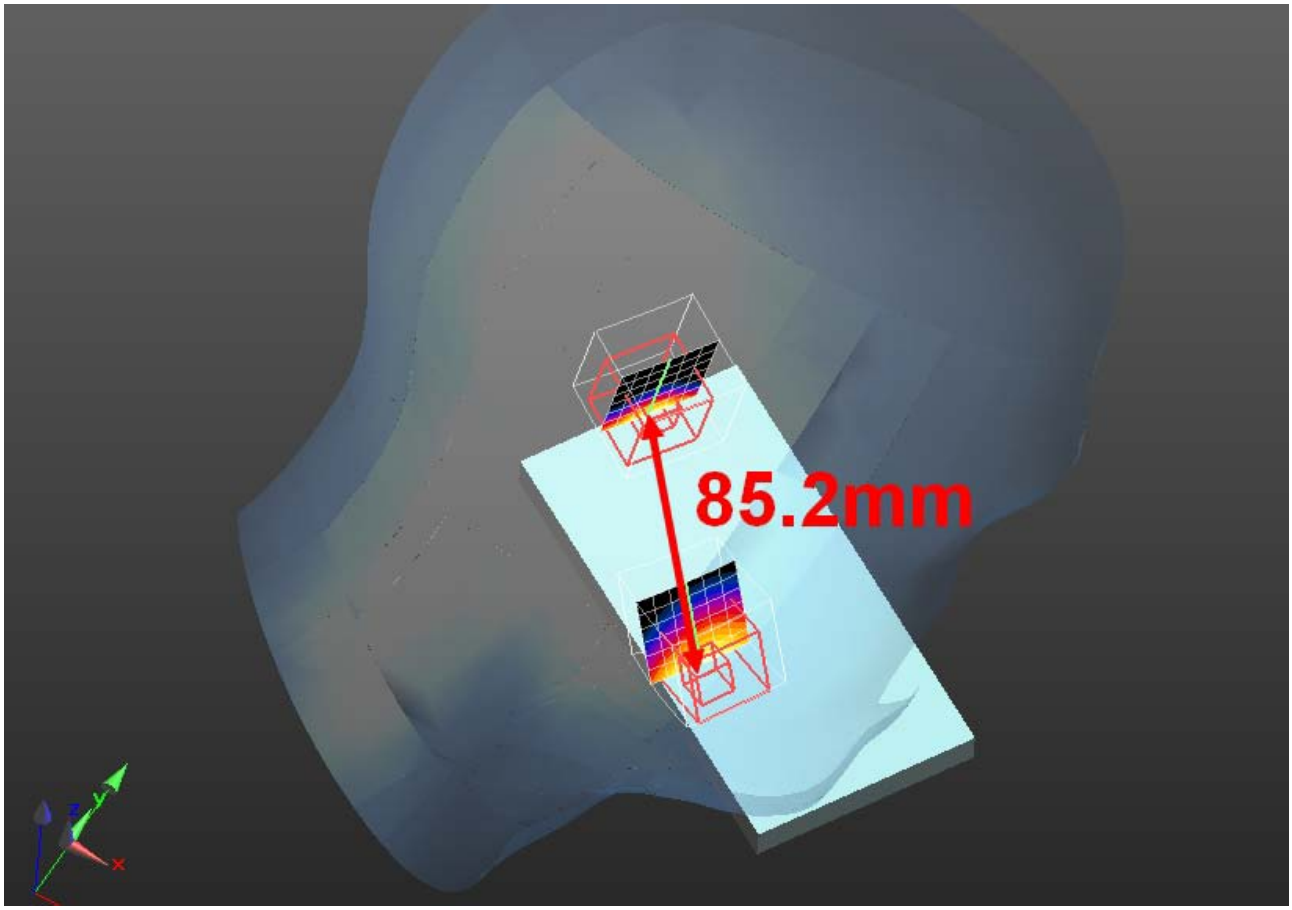
Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\IEEE1528_EN62209 - WLAN2450 head.da52:0/Touch Position - Low)	
Max. 1 at (-0.01, 0.22, -0.10) cm	0.83 W/kg
Zoom Scan (D:\Projekte2013\1-6234-8-14\1900\IEEE1528-GSM1900 head.da52:0/Touch Position - Hi)	
Max. 2 at (5.08, -6.17, -0.05) cm	0.63 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 8.17 / Separation ratio [W/kg/cm]: 0.18

GSM1900 + WLAN2450 rear hotspot 10mm



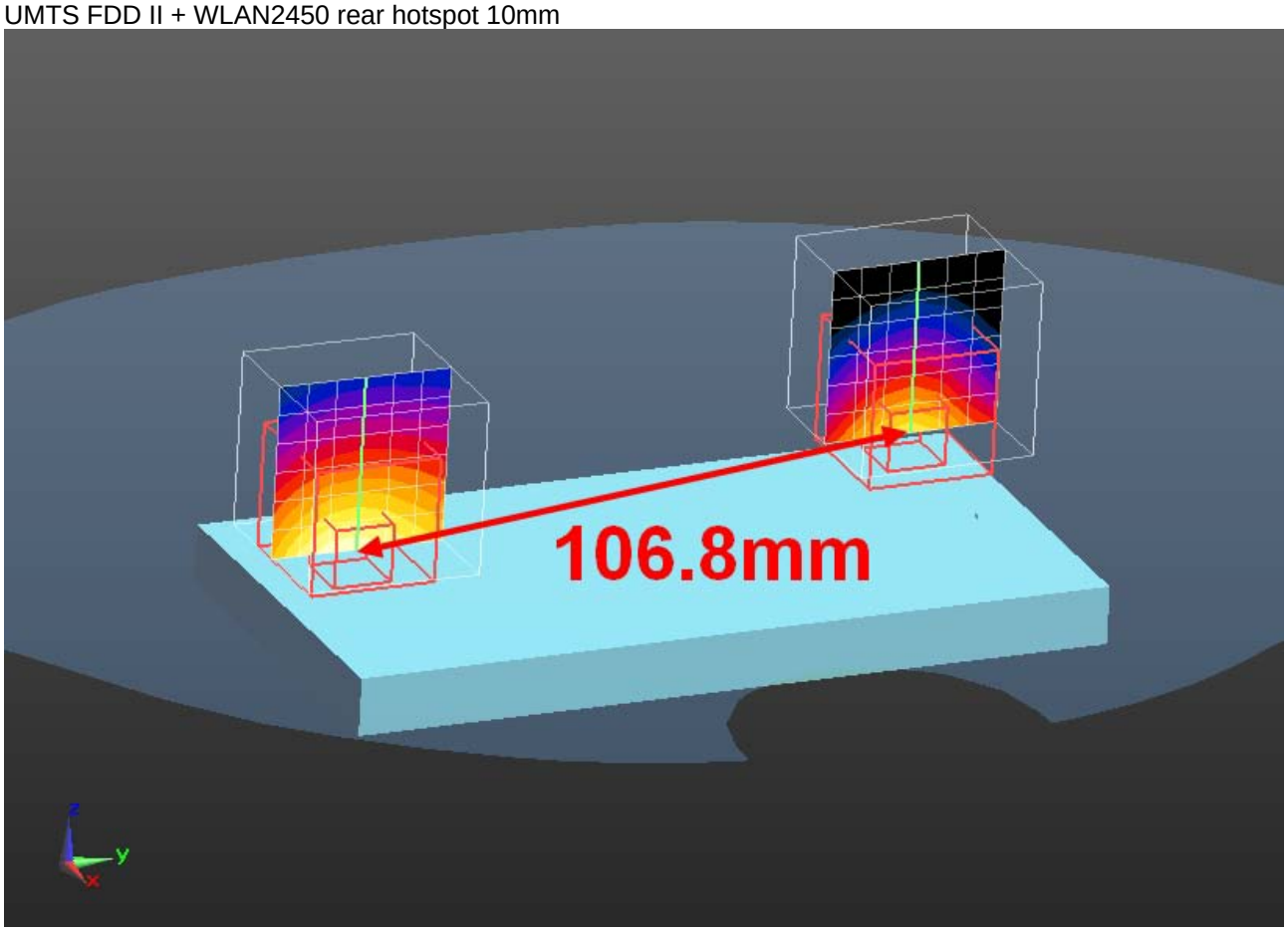
Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\FCC_EN62209-2-WLAN2450-body.da52:0/Rear Position - Middle)	
Max. 1 at (-0.10, 4.70, -0.35) cm	0.59 W/kg
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1900\FCC-Body-GSM1900.da53:1/Rear position - Low)	
Max. 2 at (1.75, -5.65, -0.08) cm	1.21 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 10.52 / Separation ratio [W/kg/cm]: 0.17

UMTS FDD II + WLAN2450 left cheek



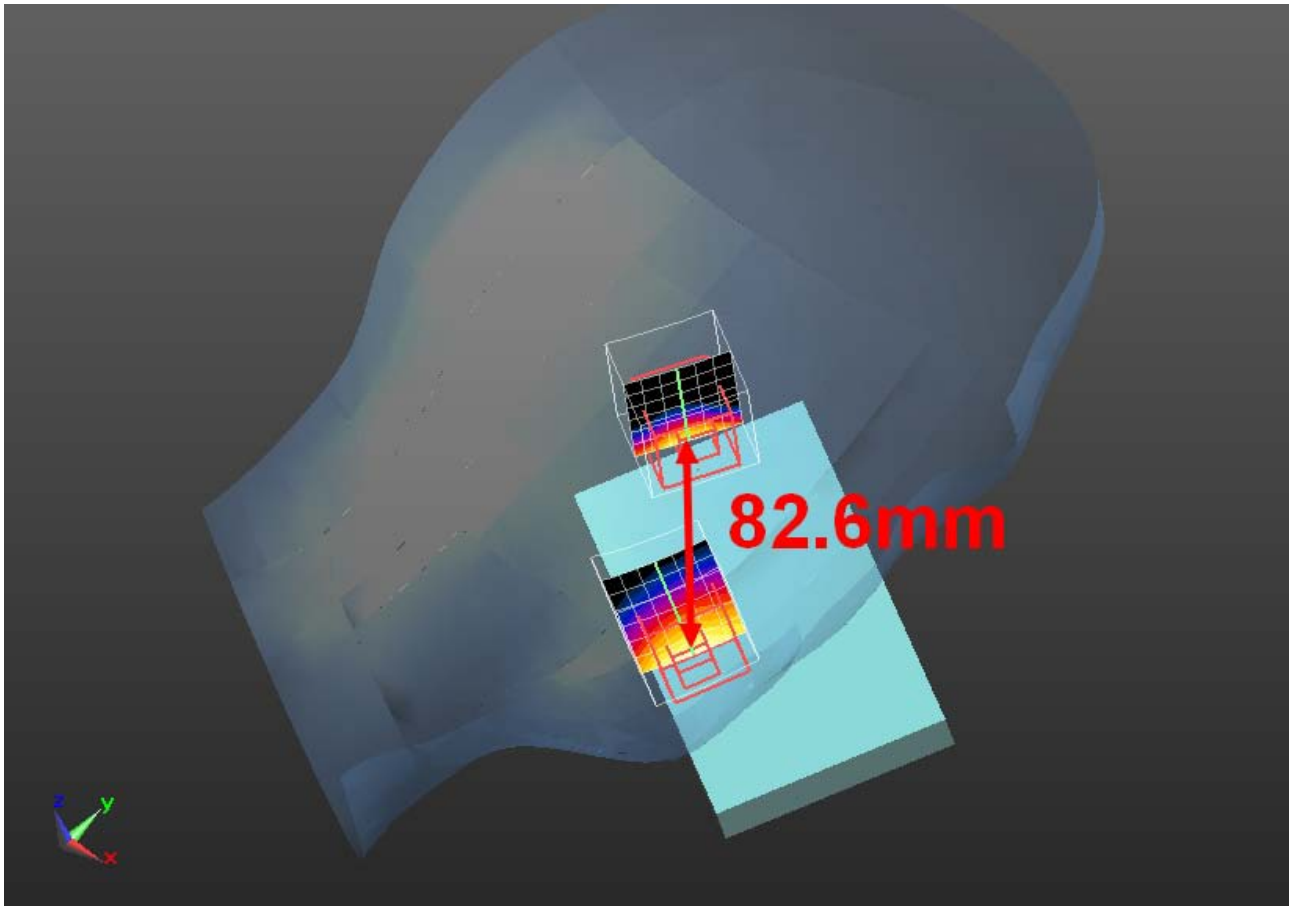
Maxima and position w.r.t. Grid Reference Point | associated 1g averages	
Zoom Scan (D:\Projekte2013\1-6234-8-14\1900\IEEE1528-UMTS FDD II head.da52:0/Touch Position - Low)	
Max. 1 at (5.44, -6.32, 0.04) cm	0.90 W/kg
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\IEEE1528_EN62209 - WLAN2450 head.da52:0/Touch Position - Low)	
Max. 2 at (-0.01, 0.22, -0.10) cm	0.83 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 8.52 / Separation ratio [W/kg/cm]: 0.20

UMTS FDD II + WLAN2450 rear hotspot 10mm



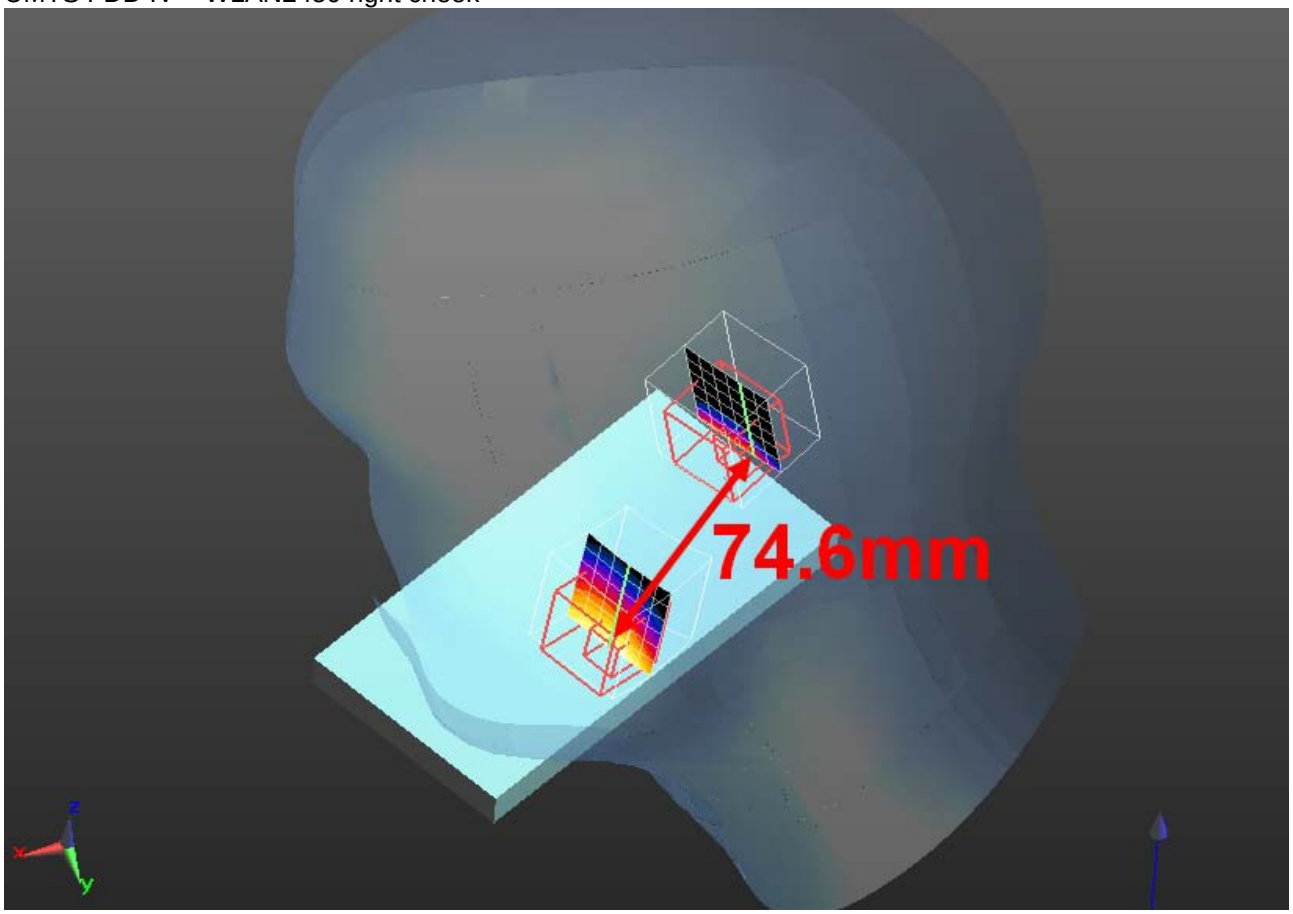
Maxima and position w.r.t. Grid Reference Point | associated 1g averages	
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\FCC_EN62209-2-WLAN2450-body.da52:0/Rear Position - Middle)	
Max. 1 at (-0.10, 4.70, -0.35) cm	0.59 W/kg
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1900\FCC-Body-UMTS FDD II - Power back off.da53:0/Rear position - Middle)	
Max. 2 at (1.85, -5.80, -0.10) cm	1.03 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 10.68 / Separation ratio [W/kg/cm]: 0.15

UMTS FDD IV + WLAN2450 left cheek



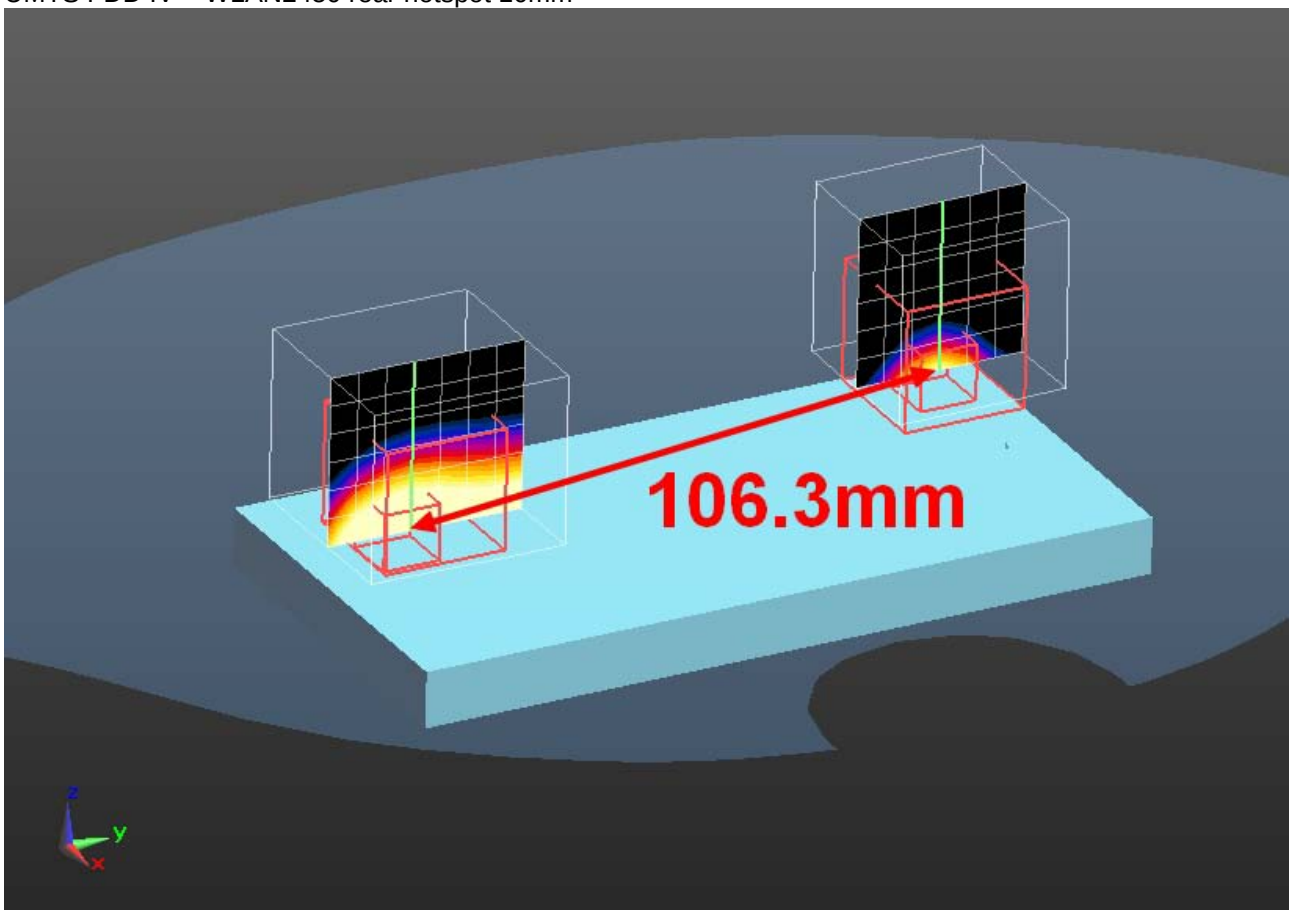
Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\IEEE1528_EN62209 - WLAN2450 head.da52:0/Touch Position - Low)	
Max. 1 at (-0.01, 0.22, -0.10) cm	0.83 W/kg
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1800\IEEE1528-UMTS FDD IV head.da52:0/Touch Position - Low)	
Max. 2 at (5.38, -6.05, -0.02) cm	0.97 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 8.26 / Separation ratio [W/kg/cm]: 0.22

UMTS FDD IV + WLAN2450 right cheek



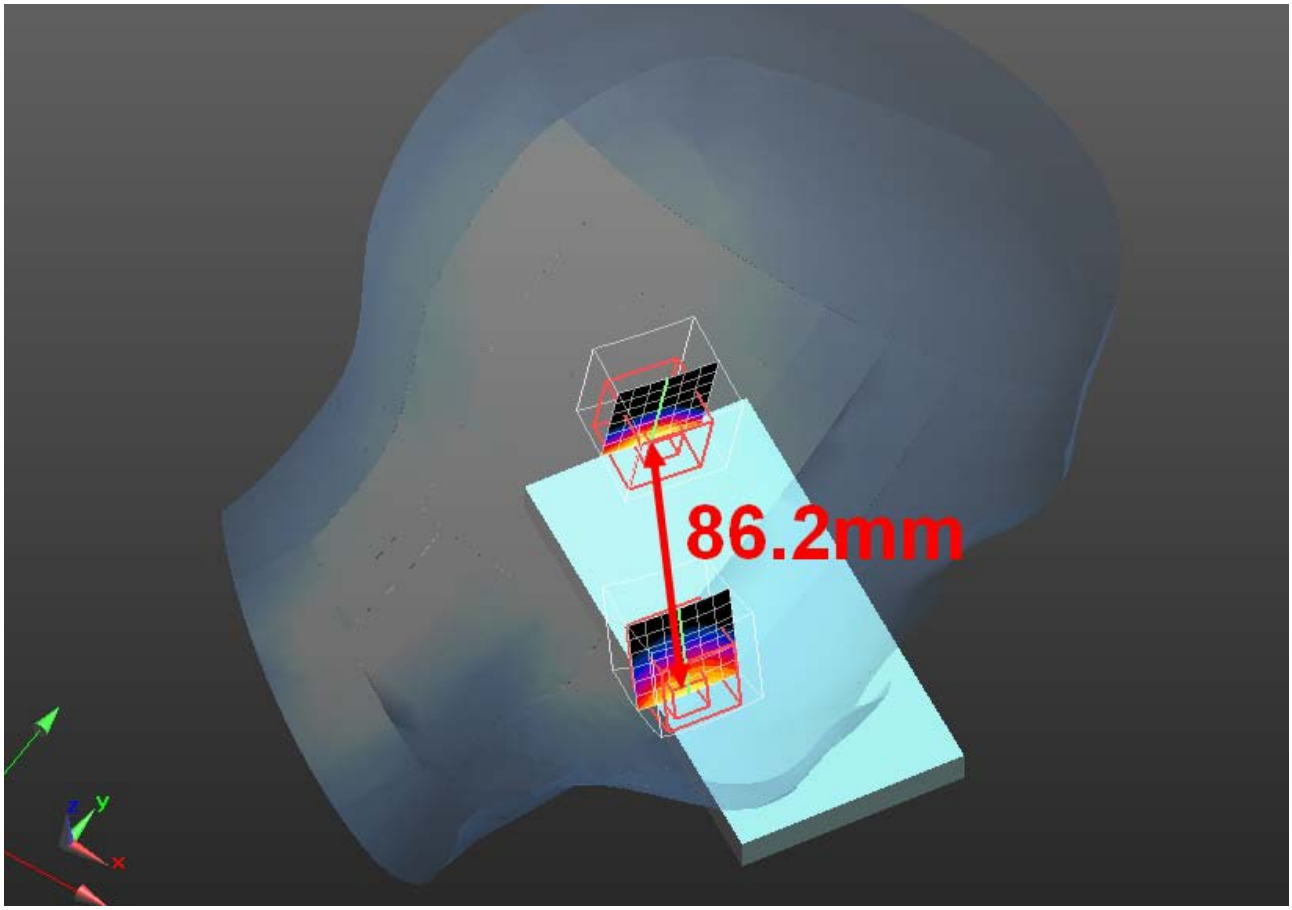
Maxima and position w.r.t. Grid Reference Point	associated 1g averages
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1800\IEEE1528-UMTS FDD IV head.da52:1/Touch Position - Hi)	
Max. 1 at (4.41, 5.66, -0.15) cm	1.05 W/kg
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\IEEE1528_EN62209 - WLAN2450 head.da52:1/Touch Position - Low)	
Max. 2 at (-0.74, 0.27, 0.10) cm	0.45 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 7.46 / Separation ratio [W/kg/cm]: 0.20

UMTS FDD IV + WLAN2450 rear hotspot 10mm



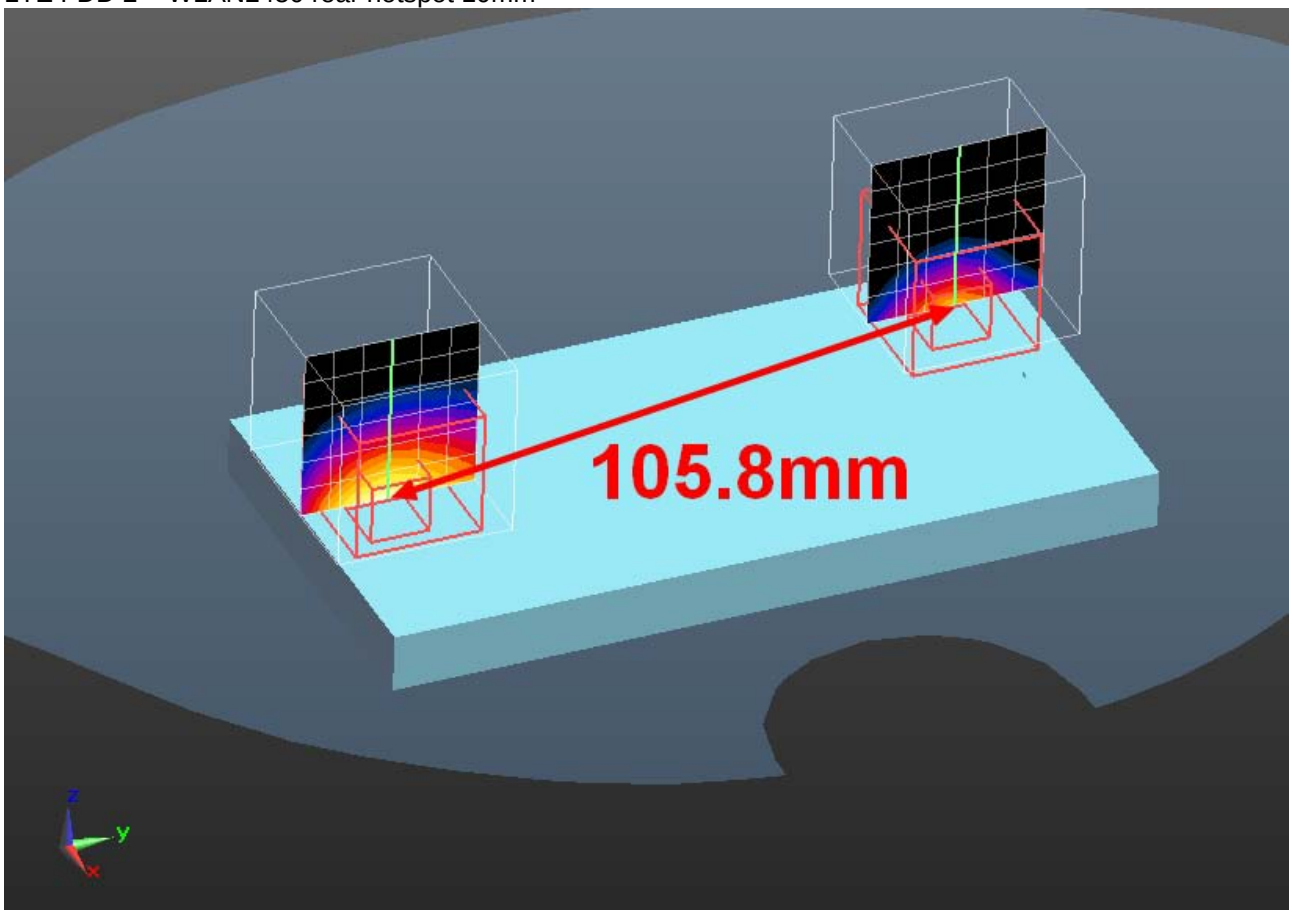
Maxima and position w.r.t. Grid Reference Point	associated 1g averages
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1800\FCC-Body-UMTS FDD IV.da53:1/Rear position - Middle)	
Max. 1 at (1.15, -5.85, -0.10) cm	1.18 W/kg
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\FCC_EN62209-2-WLAN2450-body.da52:0/Rear Position - Middle)	
Max. 2 at (-0.10, 4.70, -0.35) cm	0.59 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 10.63 / Separation ratio [W/kg/cm]: 0.17

LTE FDD 2 + WLAN2450 left cheek



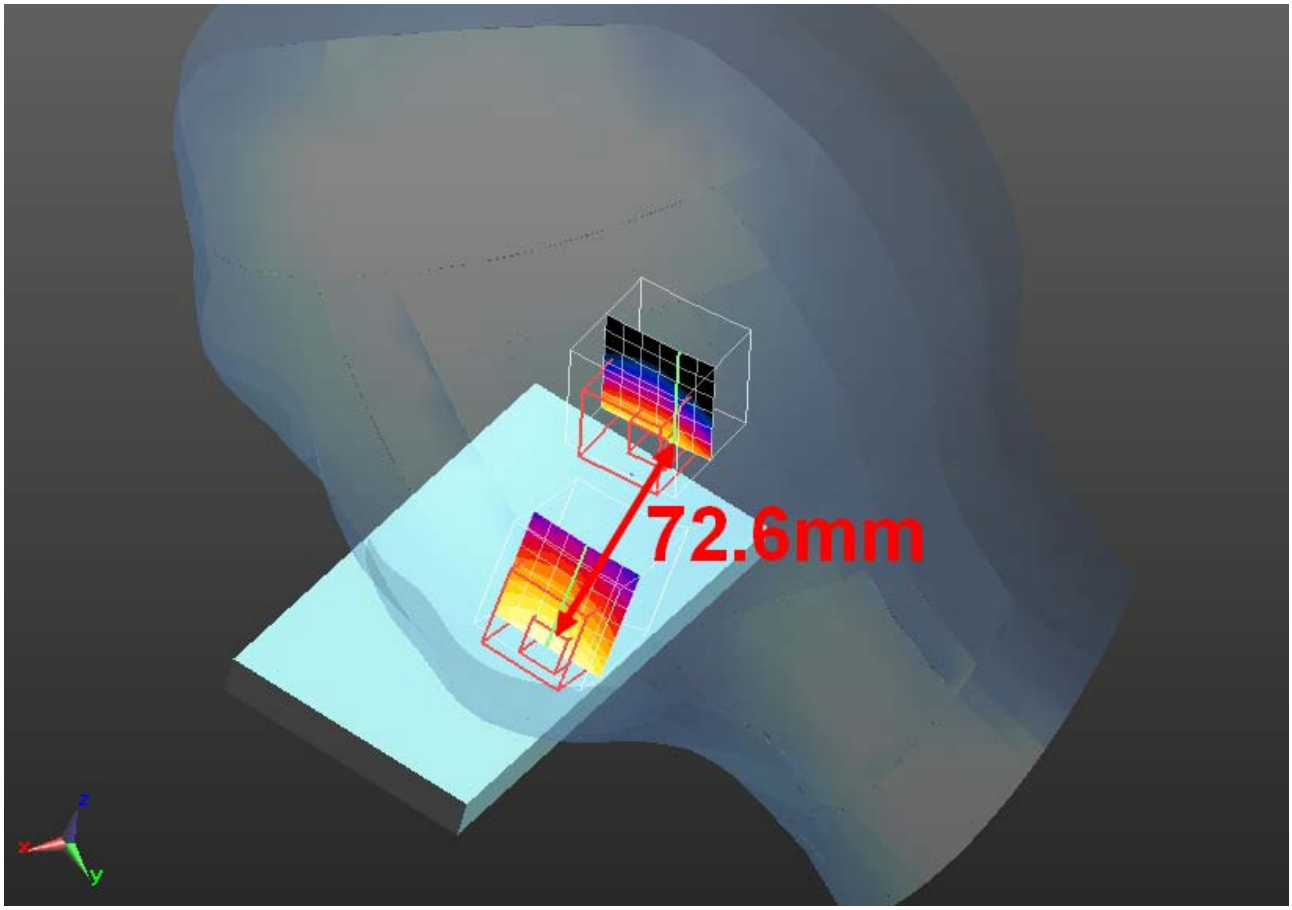
Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (D:\Projekte2013\1-6234-8-14\1900\IEEE1528-LTE FDD 2 head.da52:0/Touch Position - Hi)	
Max. 1 at (5.29, -6.58, 0.06) cm	0.71 W/kg
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\IEEE1528_EN62209 - WLAN2450 head.da52:0/Touch Position - Low)	
Max. 2 at (-0.01, 0.22, -0.10) cm	0.83 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 8.62 / Separation ratio [W/kg/cm]: 0.18

LTE FDD 2 + WLAN2450 rear hotspot 10mm



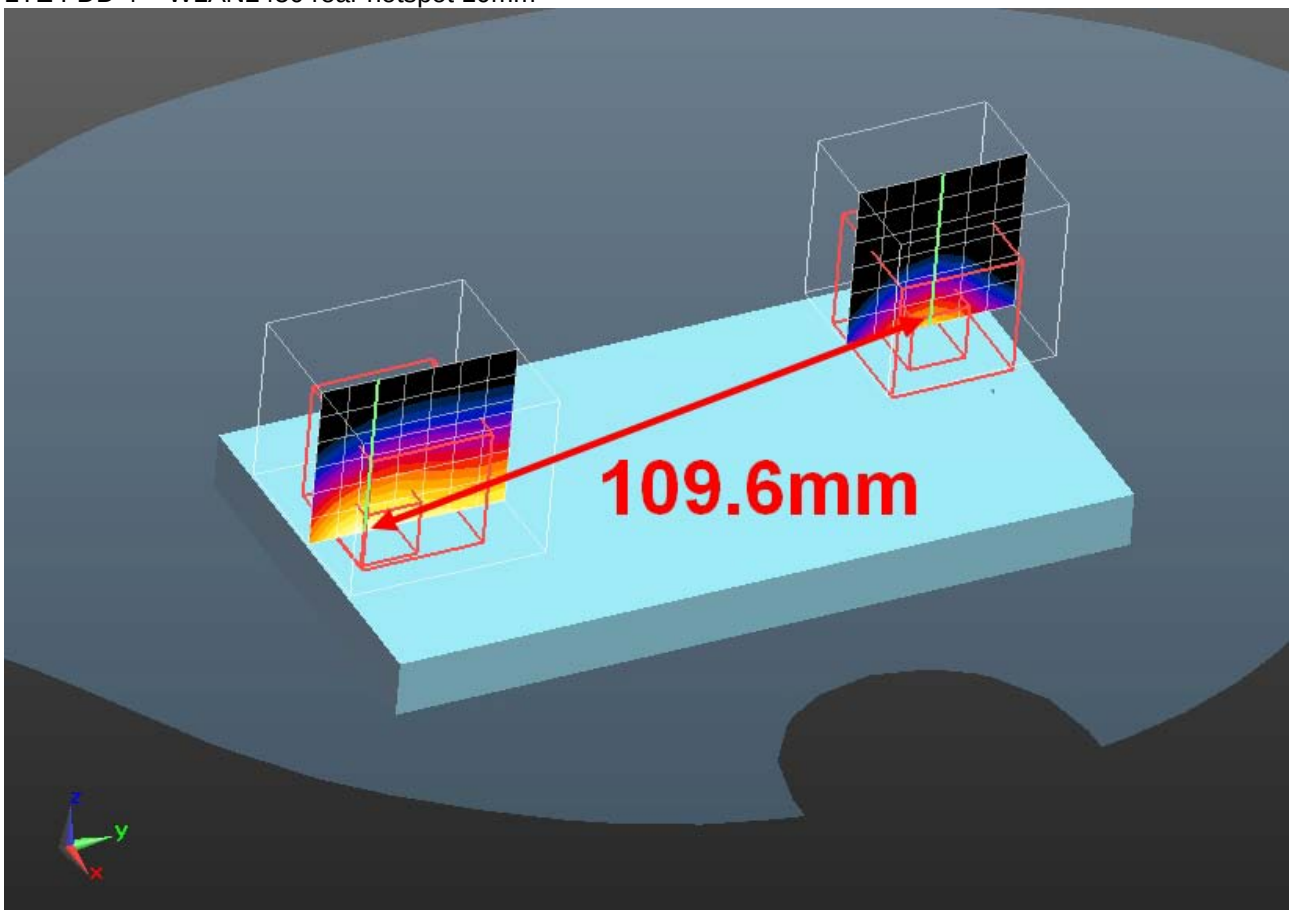
Maxima and position w.r.t. Grid Reference Point	associated 1g averages
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\FCC_EN62209-2-WLAN2450-body.da52:0/Rear Position - Middle)	
Max. 1 at (-0.10, 4.70, -0.35) cm	0.59 W/kg
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1900\FCC-Body-LTE FDD 2 - Power back off.da53:1/Rear position - Low 50RB offset)	
Max. 2 at (1.85, -5.70, -0.10) cm	1.08 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 10.58 / Separation ratio [W/kg/cm]: 0.16

LTE FDD 4 + WLAN2450 left cheek



Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\IEEE1528_EN62209 - WLAN2450 head.da52:1/Touch Position - Low)	
Max. 1 at (-0.74, 0.27, 0.10) cm	0.45 W/kg
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1800\IEEE1528-LTE FDD 4 head.da52:1/Touch Position - Mid 0RB offset)	
Max. 2 at (4.26, 5.52, -0.18) cm	0.78 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 7.26 / Separation ratio [W/kg/cm]: 0.17

LTE FDD 4 + WLAN2450 rear hotspot 10mm



Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (D:\Projekte2013\1-6234-8-14\2450\FCC_EN62209-2-WLAN2450-body.da52:0/Rear Position - Middle)	
Max. 1 at (-0.10, 4.70, -0.35) cm	0.59 W/kg
Zoom Scan (Z:\Projekte2013\1-6234-8-14\1800\FCC-Body-LTE FDD 4 - Power back off.da53:1/Rear position - Mid 0RB offset)	
Max. 2 at (1.75, -6.10, -0.09) cm	1.00 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 10.96 / Separation ratio [W/kg/cm]: 0.15

8 Test equipment and ancillaries used for tests

To simplify the identification of the test equipment and/or ancillaries which were used, the reporting of the relevant test cases only refer to the test item number as specified in the table below.

Equipment	Type	Manufacturer	Serial No.	Last Calibration	Frequency (months)
Dosimetric E-Field Probe	ET3DV6	Schmid & Partner Engineering AG	1558	August 22, 2013	12
Dosimetric E-Field Probe	ES3DV3	Schmid & Partner Engineering AG	3320	June 04, 2013	12
Dosimetric E-Field Probe	EX3DV4	Schmid & Partner Engineering AG	3944	August 02, 2013	12
750 MHz System Validation Dipole	D750V3	Schmid & Partner Engineering AG	1041	August 15, 2013	24
835 MHz System Validation Dipole	D835V2	Schmid & Partner Engineering AG	4d153	June 06, 2013	24
900 MHz System Validation Dipole	D900V2	Schmid & Partner Engineering AG	102	May 14, 2013	24
1750 MHz System Validation Dipole	D1750V2	Schmid & Partner Engineering AG	1093	June 06, 2013	24
1900 MHz System Validation Dipole	D1900V2	Schmid & Partner Engineering AG	5d009	May 15, 2013	24
2450 MHz System Validation Dipole	D2450V2	Schmid & Partner Engineering AG	710	August 13, 2012	24
5 GHz System Validation Dipole	D5GHzV2	Schmid & Partner Engineering AG	1055	August 19, 2013	24
Data acquisition electronics	DAE3V1	Schmid & Partner Engineering AG	413	January 11, 2013	12
Data acquisition electronics	DAE3V1	Schmid & Partner Engineering AG	477	May 13, 2013	12
Software	DASY52 52.8.7	Schmid & Partner Engineering AG	---	N/A	--
Phantom	SAM	Schmid & Partner Engineering AG	---	N/A	--
Universal Radio Communication Tester	CMU 200	Rohde & Schwarz	106826	January 16, 2013	24
Universal Radio Communication Tester	CMW500	Rohde & Schwarz	102375	January 16, 2013	24
Network Analyser 300 kHz to 6 GHz	8753ES	Hewlett Packard)*	US39174436	February 24, 2012	24
Dielectric Probe Kit	85070C	Hewlett Packard	US99360146	N/A	12
Signal Generator	8671B	Hewlett Packard	2823A00656	January 15, 2013	24
Amplifier	25S1G4 (25 Watt)	Amplifier Reasearch	20452	N/A	--
Power Meter	NRP	Rohde & Schwarz	101367	January 15, 2013	24
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100227	January 14, 2013	12
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100234	January 14, 2013	12
Directional Coupler	778D	Hewlett Packard	19171	January 14, 2013	12

)* : Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

9 Observations

No observations exceeding those reported with the single test cases have been made.

Annex A: System performance check

Date/Time: 02.09.2013 10:30:46

SystemPerformanceCheck-D750 head 2013-09-02

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1041

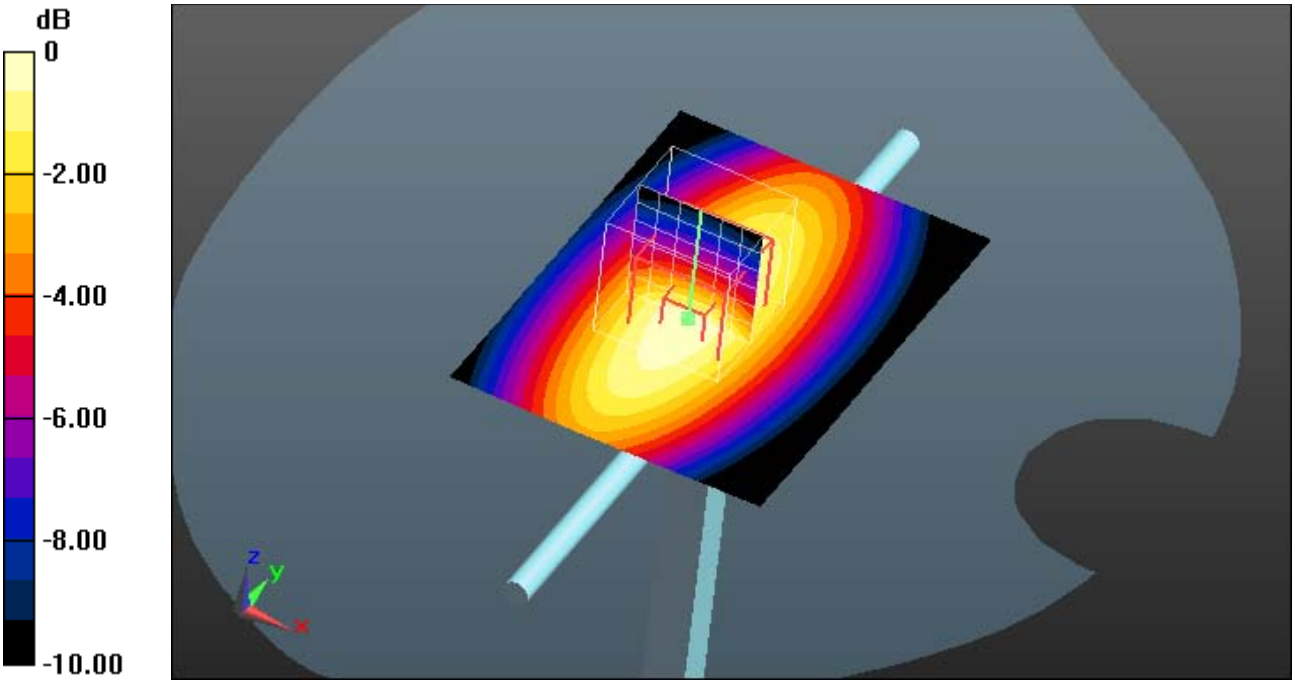
Communication System: UID 0, CW (0); Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 750 MHz; σ = 0.886 S/m; ε_r = 40.932; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.54, 6.54, 6.54); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL750/d=15mm, Pin=1000 mW, dist=3.0mm/Area Scan (51x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 9.67 W/kg

HSL750/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.0 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 12.7 W/kg
SAR(1 g) = 8.26 W/kg; SAR(10 g) = 5.36 W/kg
Maximum value of SAR (measured) = 9.74 W/kg



0 dB = 9.74 W/kg = 9.89 dBW/kg

Additional information:
ambient temperature: 23.3°C; liquid temperature: 22.4°C

Date/Time: 03.09.2013 11:11:47

SystemPerformanceCheck-D750 body 2013-09-03

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1041

Communication System: UID 0, CW (0); Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 750 MHz; σ = 0.972 S/m; ε_r = 56.221; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.36, 6.36, 6.36); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL750/d=15mm, Pin=1000 mW, dist=3.0mm/Area Scan (51x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 10.1 W/kg

HSL750/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x7)/Cube 0:

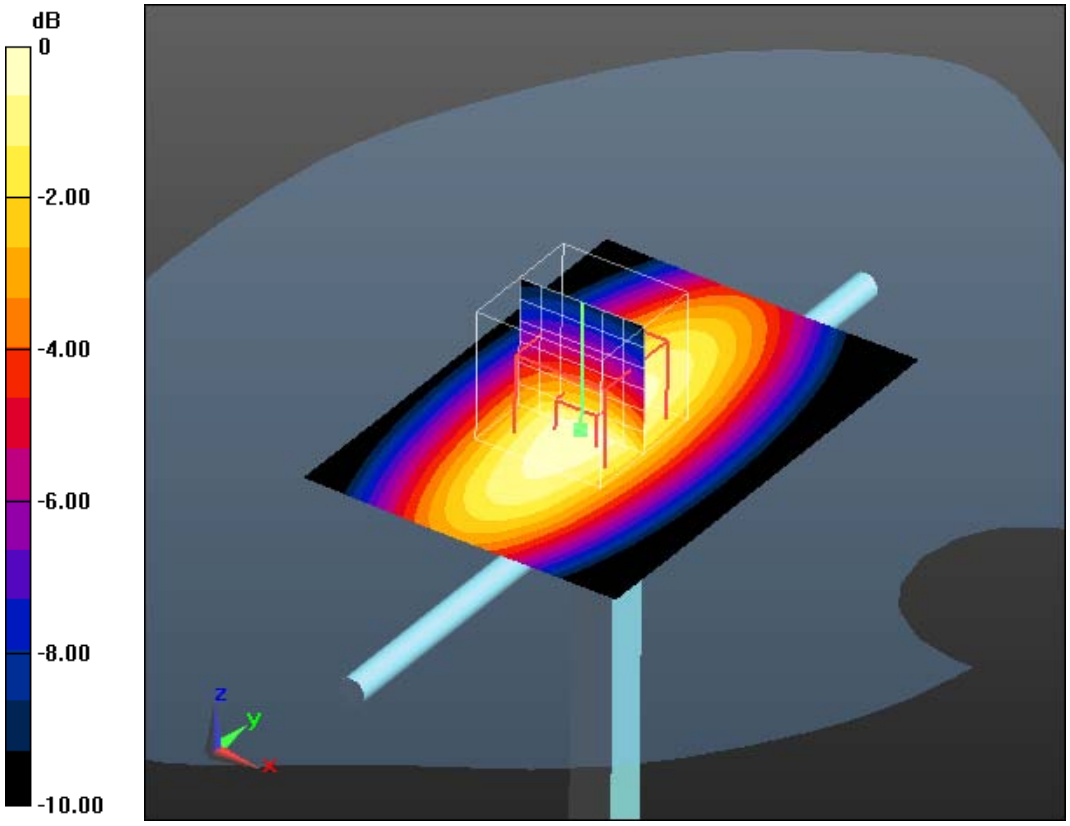
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.9 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 13.1 W/kg

SAR(1 g) = 8.76 W/kg; SAR(10 g) = 5.77 W/kg

Maximum value of SAR (measured) = 10.2 W/kg



0 dB = 10.2 W/kg = 10.09 dBW/kg

Additional information:

ambient temperature: 23.6°C; liquid temperature: 23.0°C

Date/Time: 28.08.2013 11:58:41

SystemPerformanceCheck-D900 head 2013-08-28

DUT: Dipole 900 MHz; Type: D900V2; Serial: 102

Communication System: UID 0, CW; Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 900 MHz; σ = 0.945 S/m; ε_r = 41.051; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.21, 6.21, 6.21); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Area Scan (51x51x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.5 W/kg

System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x7)/Cube 0:

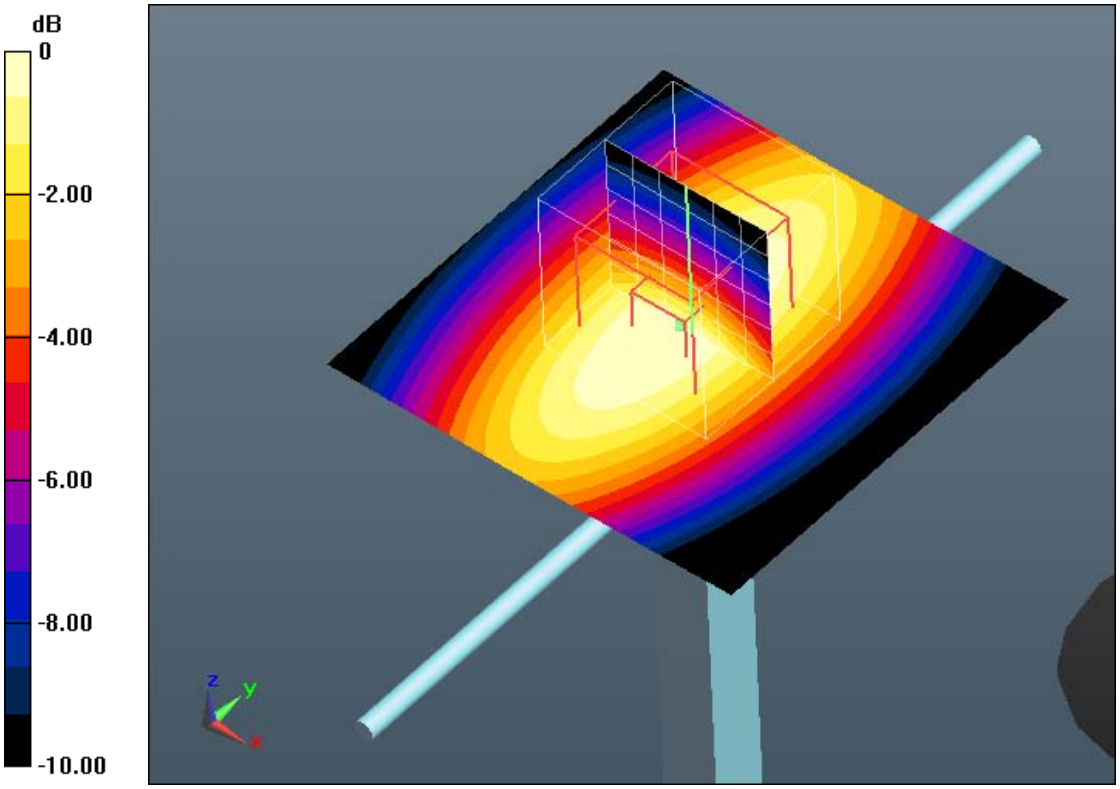
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 117.4 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 16.4 W/kg

SAR(1 g) = 10.5 W/kg; SAR(10 g) = 6.68 W/kg

Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

Additional information:

ambient temperature: 23.5°C; liquid temperature: 22.5°C

Date/Time: 29.08.2013 13:34:19

SystemPerformanceCheck-D900 head 2013-08-29

DUT: Dipole 900 MHz; Type: D900V2; Serial: 102

Communication System: UID 0, CW; Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 900 MHz; σ = 0.945 S/m; ε_r = 41.051; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.21, 6.21, 6.21); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.1 W/kg

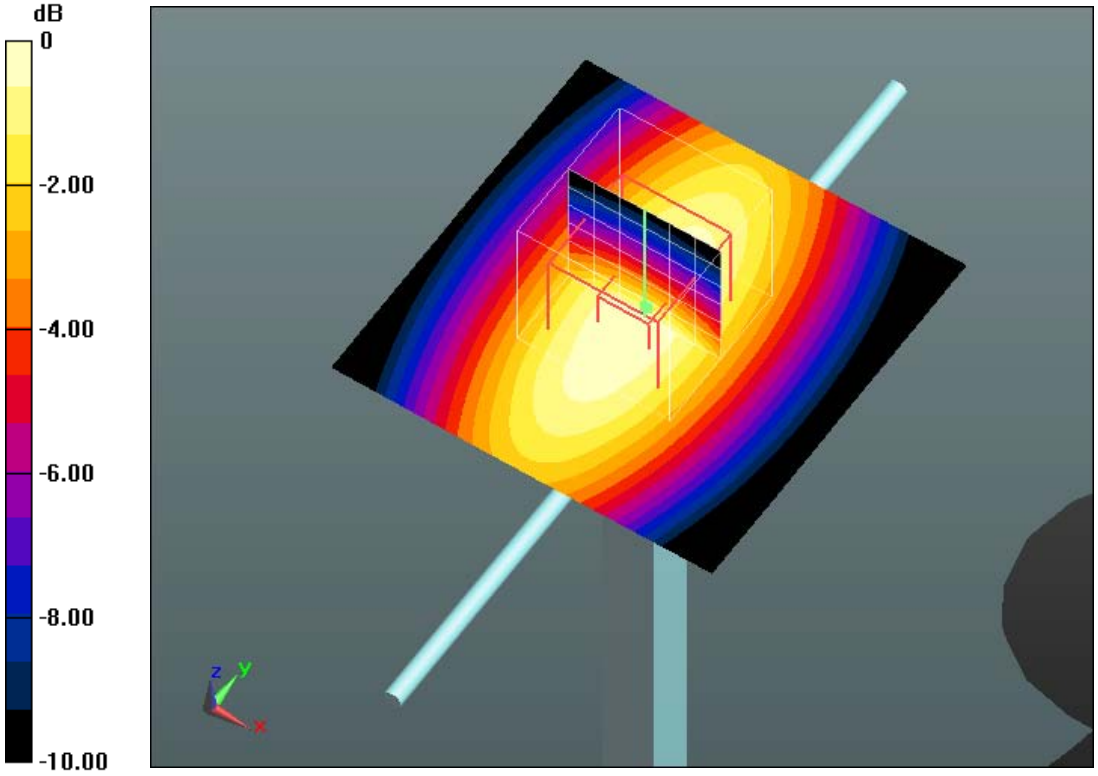
System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 118.1 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 16.1 W/kg

SAR(1 g) = 10.5 W/kg; SAR(10 g) = 6.74 W/kg

Maximum value of SAR (measured) = 12.3 W/kg



0 dB = 12.3 W/kg = 10.90 dBW/kg

Additional information:

ambient temperature: 23.3°C; liquid temperature: 22.3°C

Date/Time: 30.08.2013 17:10:21

SystemPerformanceCheck-D900 body 2013-08-30

DUT: Dipole 900 MHz; Type: D900V2; Serial: 102

Communication System: UID 0, CW; Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 900 MHz; σ = 1.029 S/m; ε_r = 55.315; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.25, 6.25, 6.25); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.5 W/kg

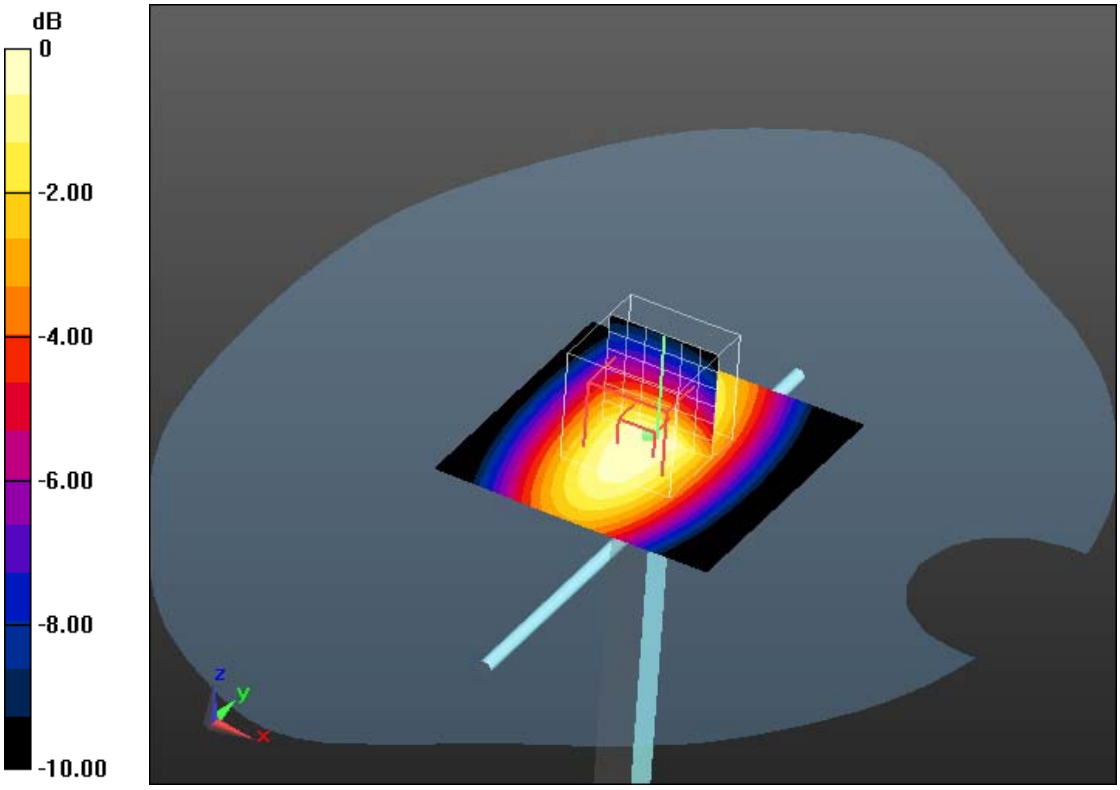
System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 112.6 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.5 W/kg

SAR(1 g) = 10.8 W/kg; SAR(10 g) = 6.95 W/kg

Maximum value of SAR (measured) = 12.5 W/kg



0 dB = 12.5 W/kg = 10.97 dBW/kg

Additional information:

ambient temperature: 23.2°C; liquid temperature: 22.5°C

Date/Time: 31.08.2013 17:01:22

SystemPerformanceCheck-D900 body 2013-08-31

DUT: Dipole 900 MHz; Type: D900V2; Serial: 102

Communication System: UID 0, CW; Communication System Band: D900 (900.0 MHz); Frequency: 900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 900 MHz; σ = 1.029 S/m; ε_r = 55.315; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.25, 6.25, 6.25); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Area Scan (51x51x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.7 W/kg

System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x7)/Cube 0:

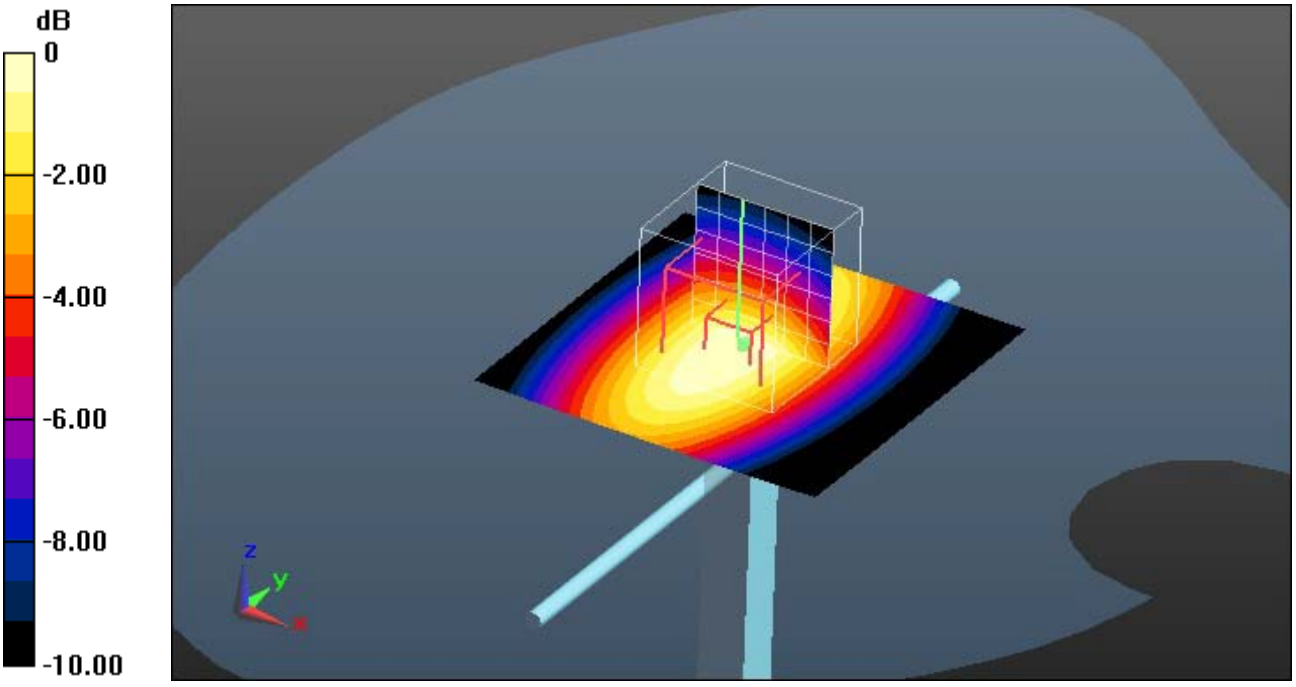
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 111.5 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 10.8 W/kg; SAR(10 g) = 6.96 W/kg

Maximum value of SAR (measured) = 12.6 W/kg



0 dB = 12.6 W/kg = 11.00 dBW/kg

Additional information:

ambient temperature: 23.2°C; liquid temperature: 23.0°C

Date/Time: 30.08.2013 09:38:13

SystemPerformanceCheck-D1750 head 2013-08-30

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1093

Communication System: UID 0, CW (0); Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1750 MHz; σ = 1.383 S/m; ε_r = 39.844; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.93, 4.93, 4.93); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 49.8 W/kg

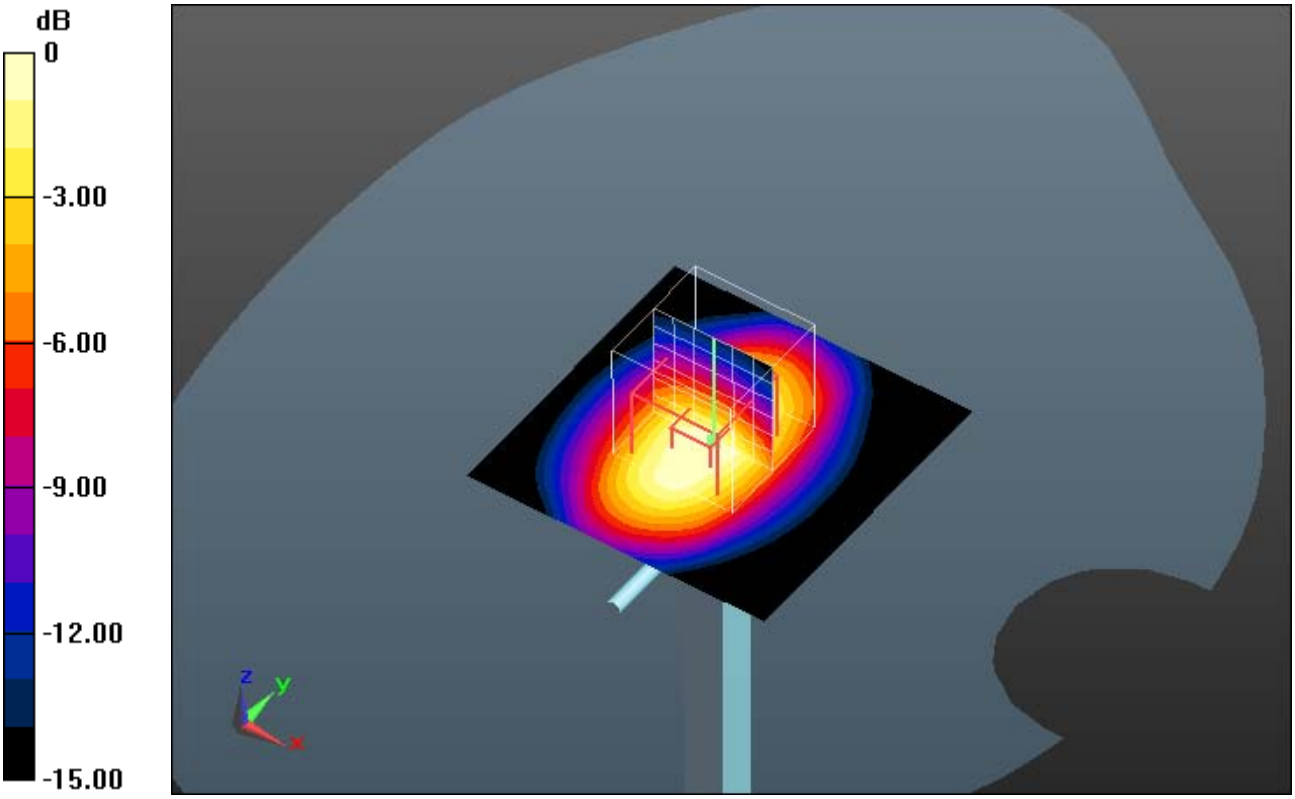
HSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 188.5 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 65.6 W/kg

SAR(1 g) = 38.8 W/kg; SAR(10 g) = 20.9 W/kg

Maximum value of SAR (measured) = 43.8 W/kg



0 dB = 43.8 W/kg = 16.41 dBW/kg

Additional information:

ambient temperature: 23.5°C; liquid temperature: 23.1°C

Date/Time: 04.09.2013 09:43:32

SystemPerformanceCheck-D1750 body 2013-09-04

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1093

Communication System: UID 0, CW (0); Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1750 MHz; σ = 1.503 S/m; ε_r = 52.586; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 50.8 W/kg

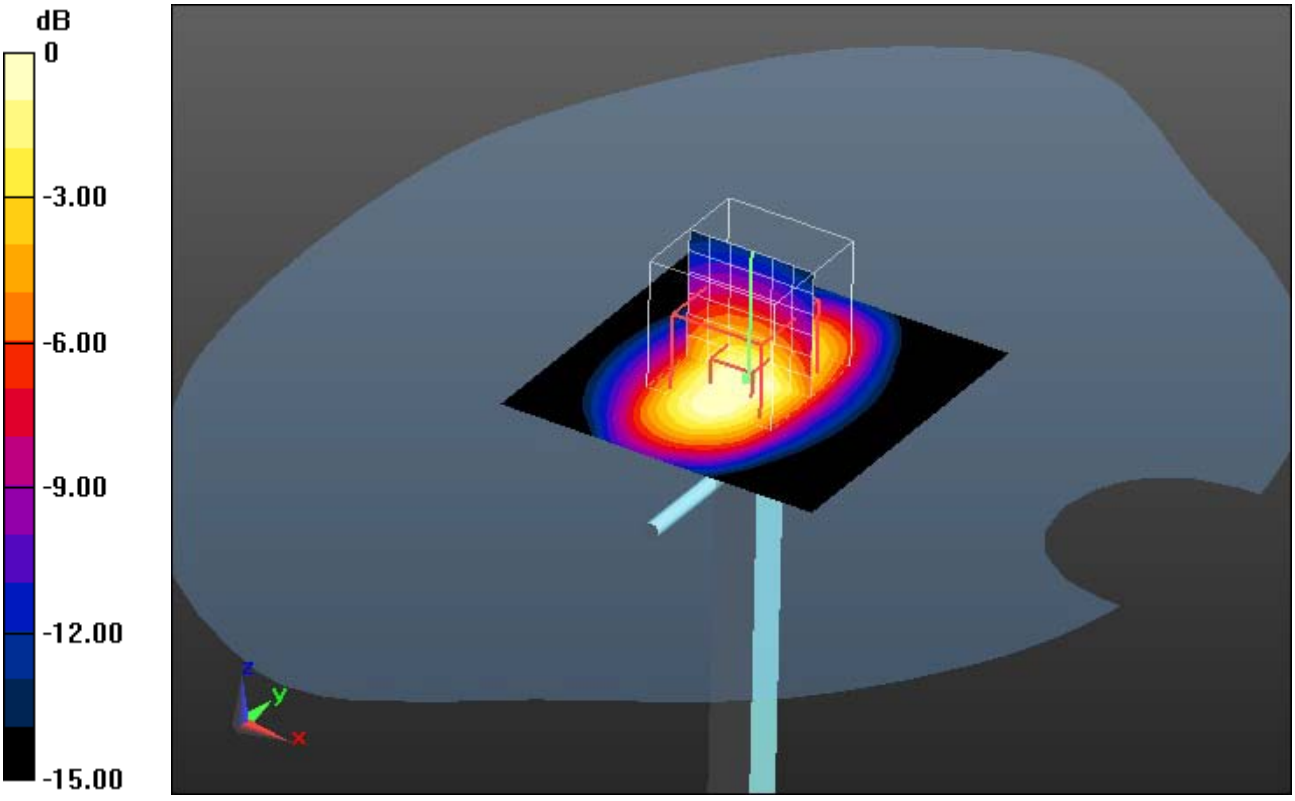
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 178.9 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 58.6 W/kg

SAR(1 g) = 37.9 W/kg; SAR(10 g) = 20.9 W/kg

Maximum value of SAR (measured) = 43.0 W/kg



0 dB = 43.0 W/kg = 16.33 dBW/kg

Additional information:

ambient temperature: 23.3°C; liquid temperature: 22.9°C

Date/Time: 05.09.2013 18:48:35

SystemPerformanceCheck-D1750 body 2013-09-05

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1093

Communication System: UID 0, CW (0); Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1750 MHz; σ = 1.503 S/m; ε_r = 52.586; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 48.4 W/kg

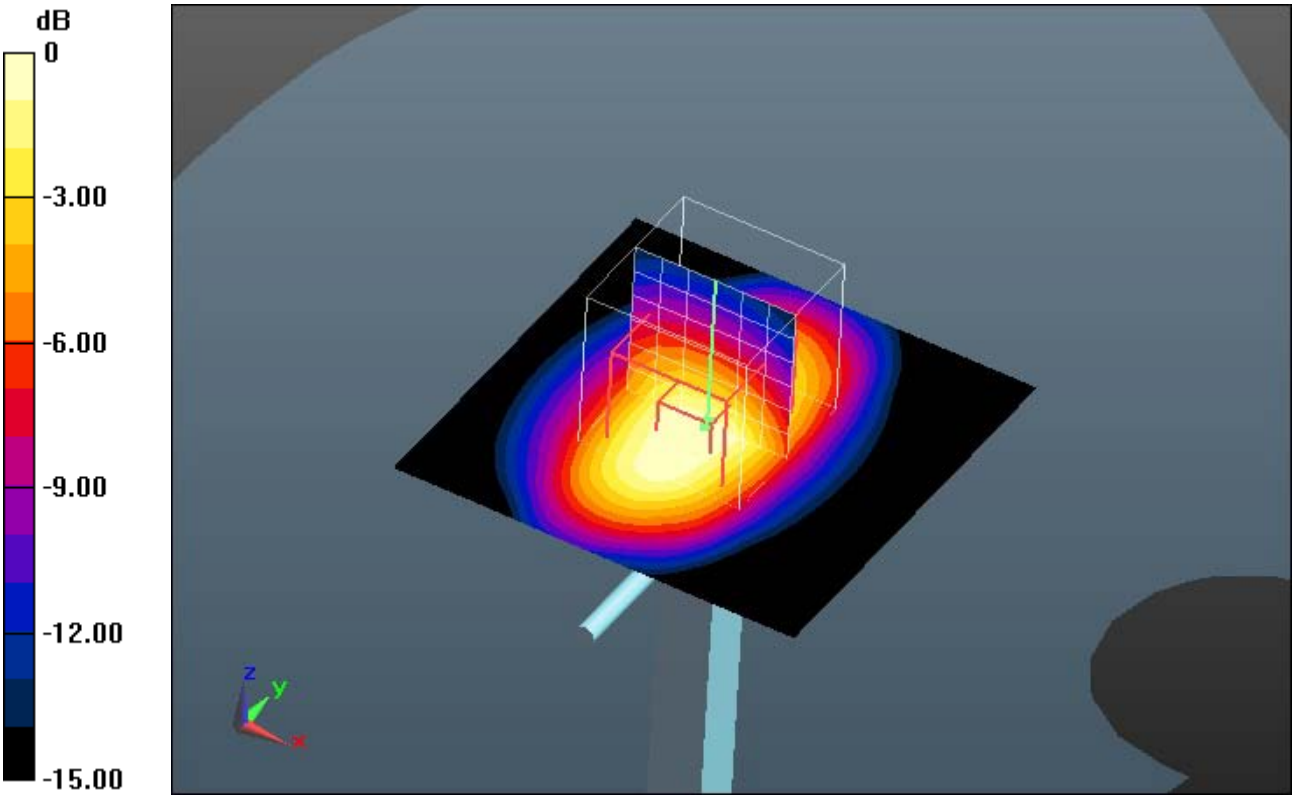
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 175.9 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 55.3 W/kg

SAR(1 g) = 35.6 W/kg; SAR(10 g) = 19.7 W/kg

Maximum value of SAR (measured) = 40.4 W/kg



0 dB = 40.4 W/kg = 16.06 dBW/kg

Additional information:

ambient temperature: 23.2°C; liquid temperature: 22.9°C

Date/Time: 06.09.2013 16:26:17

SystemPerformanceCheck-D1750 body 2013-09-06

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1093

Communication System: UID 0, CW (0); Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1750 MHz; σ = 1.503 S/m; ε_r = 52.586; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 49.9 W/kg

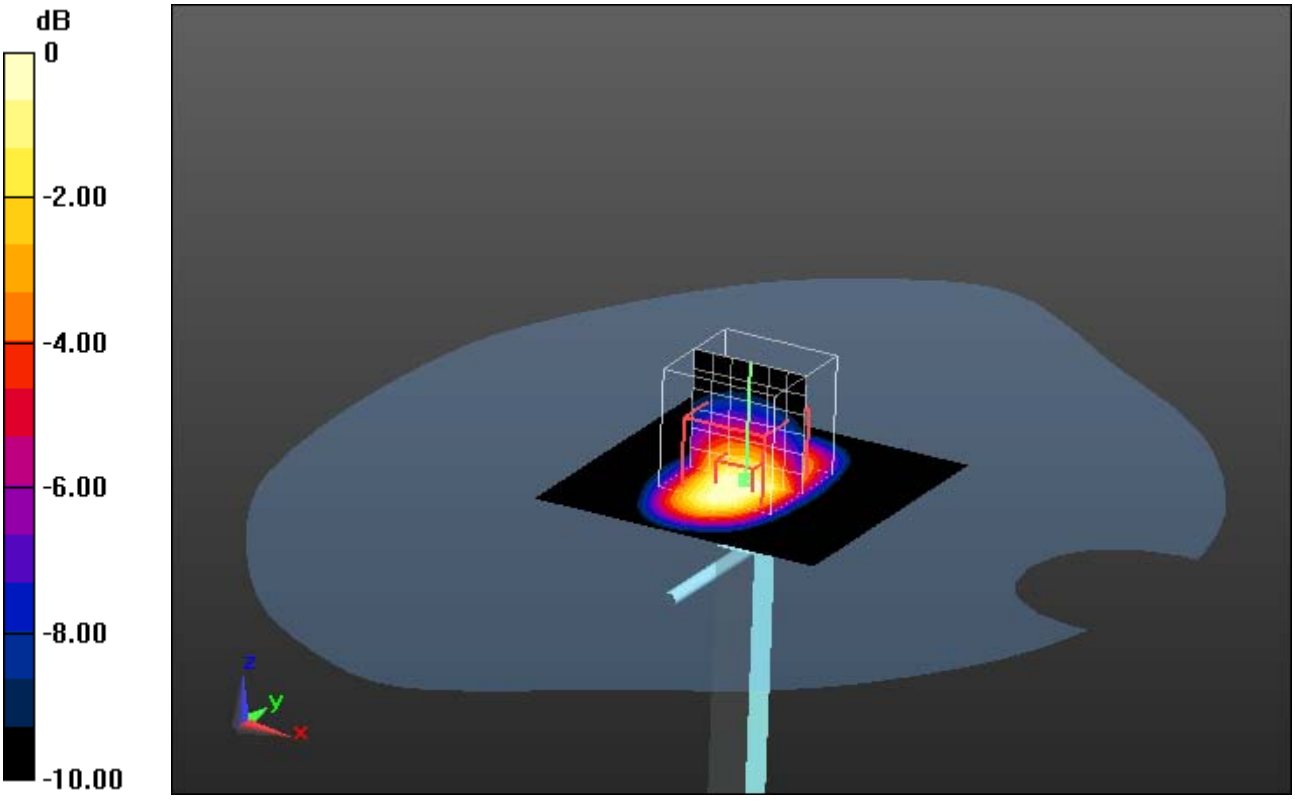
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Power Drift = -0.00 dB

Peak SAR (extrapolated) = 56.0 W/kg

SAR(1 g) = 36.5 W/kg; SAR(10 g) = 20.2 W/kg

Maximum value of SAR (measured) = 41.6 W/kg



0 dB = 41.6 W/kg = 16.19 dBW/kg

Additional information:

ambient temperature: 23.8°C; liquid temperature: 23.6°C

Date/Time: 07.09.2013 17:34:25

SystemPerformanceCheck-D1900 head 2013-09-07

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1900 MHz; σ = 1.369 S/m; ε_r = 39.892; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 50.9 W/kg

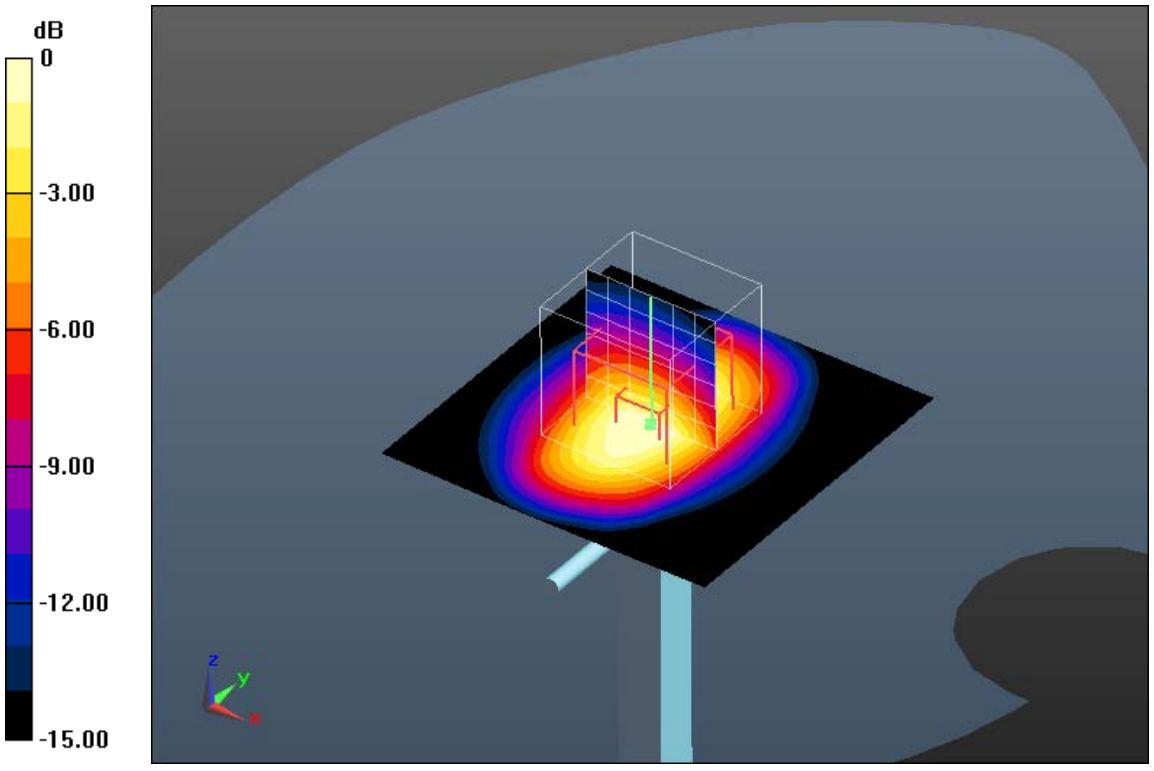
HSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 177.6 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 71.2 W/kg

SAR(1 g) = 38.6 W/kg; SAR(10 g) = 20.1 W/kg

Maximum value of SAR (measured) = 43.1 W/kg



0 dB = 43.1 W/kg = 16.34 dBW/kg

Additional information:

ambient temperature: 22.5°C; liquid temperature: 22.0°C

Date/Time: 09.09.2013 11:57:45

SystemPerformanceCheck-D1900 head 2013-09-09

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009

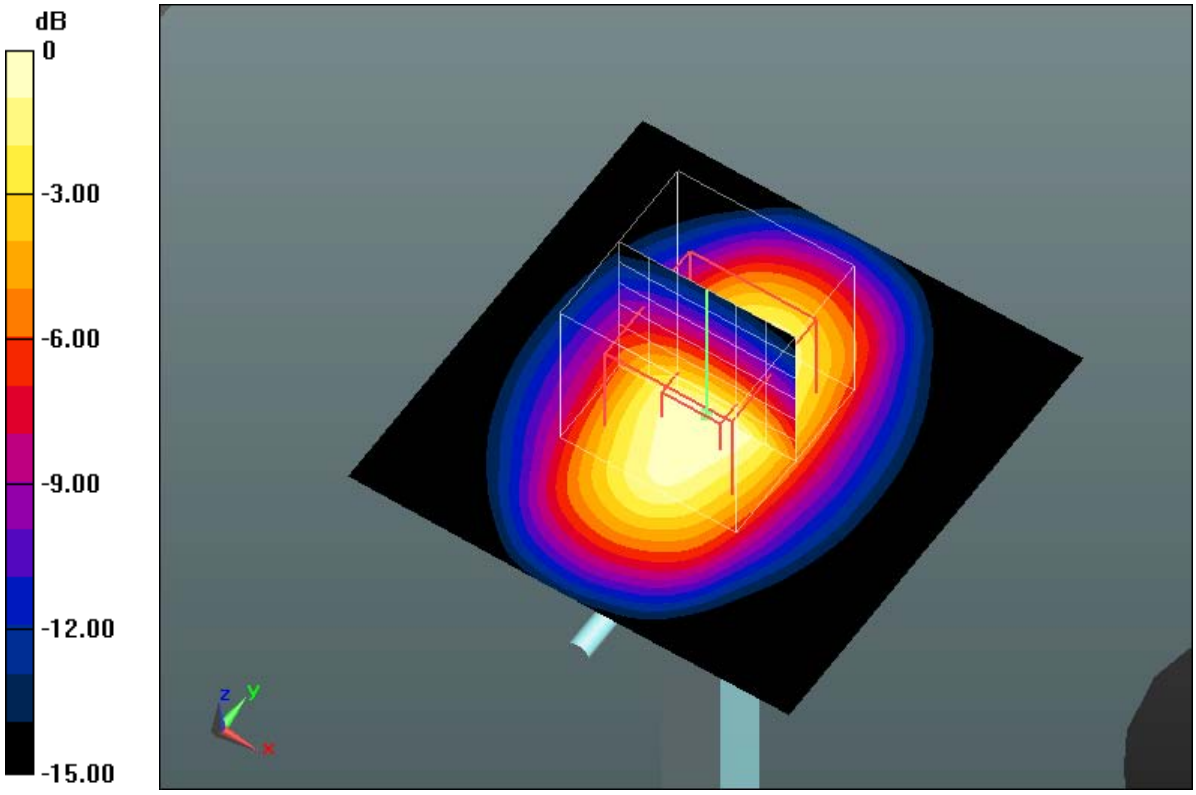
Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.369 S/m; ε_r = 39.892; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 52.3 W/kg

HSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 181.3 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 70.8 W/kg
SAR(1 g) = 38.9 W/kg; SAR(10 g) = 20.5 W/kg
Maximum value of SAR (measured) = 43.8 W/kg



0 dB = 43.8 W/kg = 16.41 dBW/kg

Additional information:
ambient temperature: 22.9°C; liquid temperature: 22.7°C

Date/Time: 02.09.2013 11:38:36

SystemPerformanceCheck-D1900 body 2013-09-02

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1900 MHz; σ = 1.51 S/m; ε_r = 52.78; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 56.6 W/kg

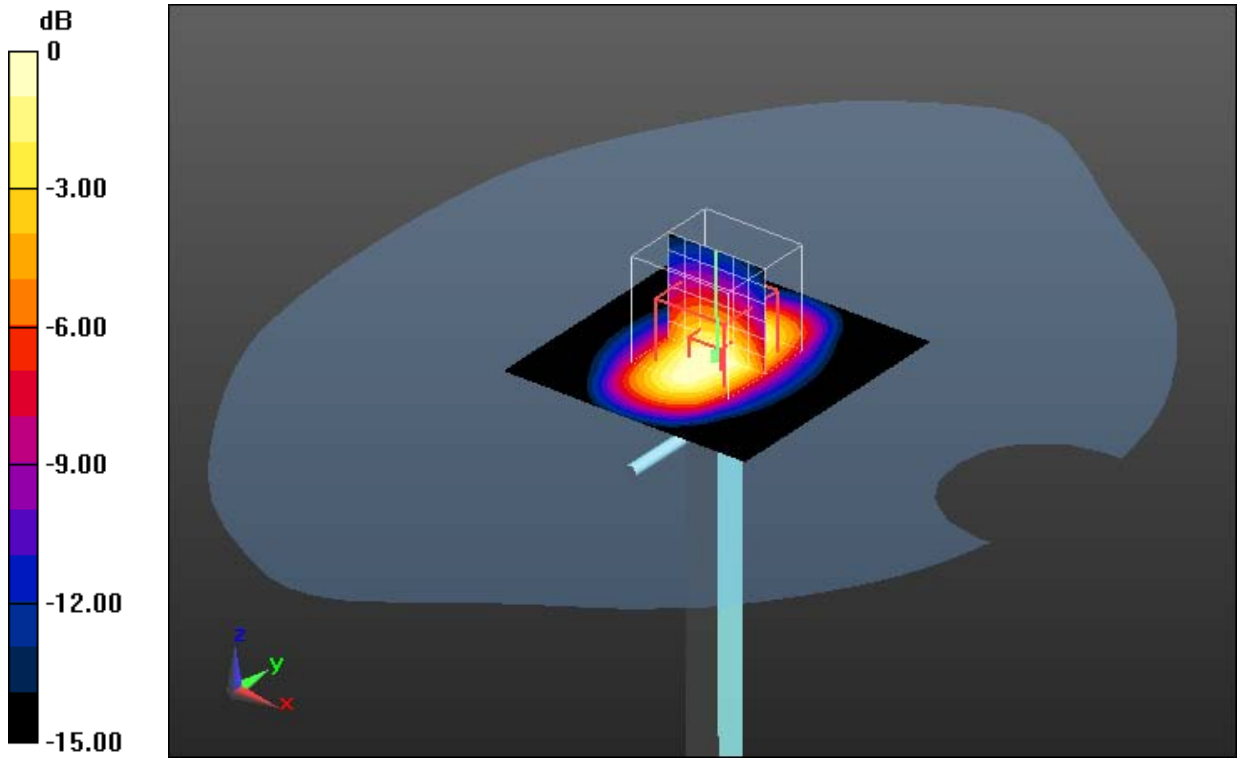
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Power Drift = 0.01 dB

Peak SAR (extrapolated) = 64.4 W/kg

SAR(1 g) = 39 W/kg; SAR(10 g) = 21 W/kg

Maximum value of SAR (measured) = 44.6 W/kg



0 dB = 44.6 W/kg = 16.49 dBW/kg

Additional information:

ambient temperature: 23.4°C; liquid temperature: 22.8°C

Date/Time: 03.09.2013 09:33:16

SystemPerformanceCheck-D1900 body 2013-09-03

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1900 MHz; σ = 1.51 S/m; ε_r = 52.78; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 55.8 W/kg

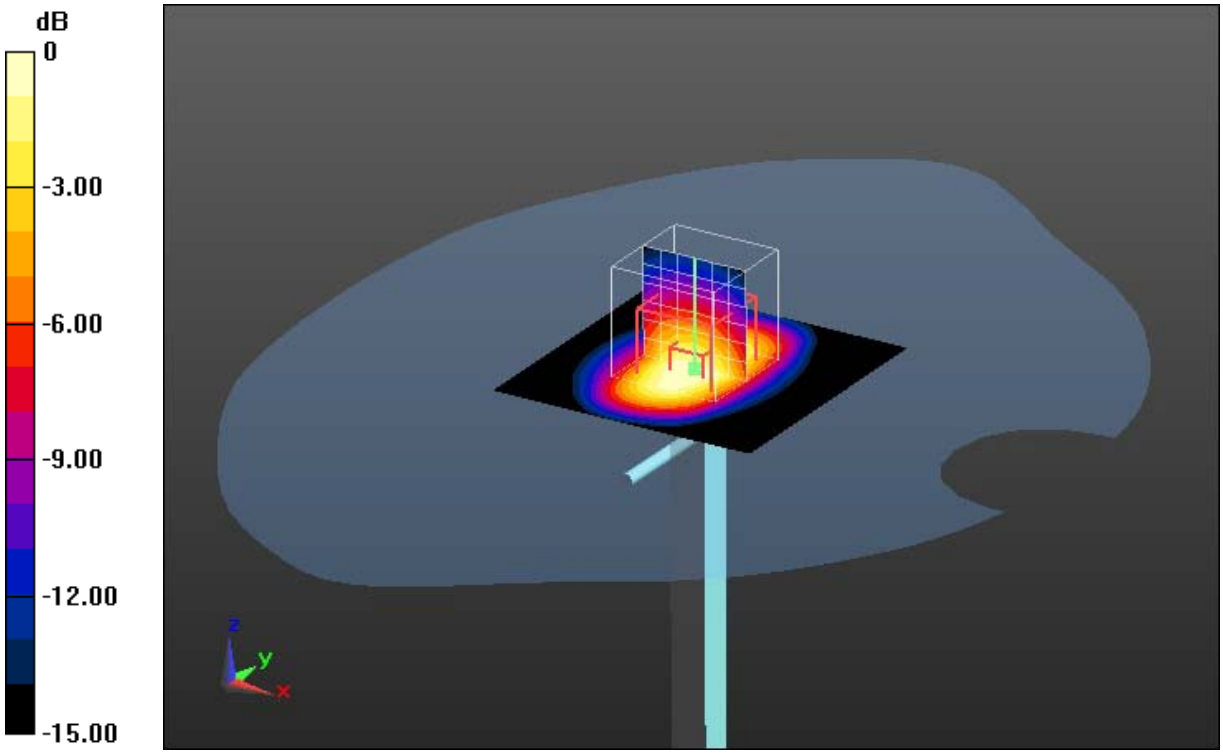
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Power Drift = 0.00 dB

Peak SAR (extrapolated) = 64.3 W/kg

SAR(1 g) = 39.1 W/kg; SAR(10 g) = 21 W/kg

Maximum value of SAR (measured) = 44.2 W/kg



0 dB = 44.2 W/kg = 16.45 dBW/kg

Additional information:

ambient temperature: 23.2°C; liquid temperature: 22.8°C

Date/Time: 06.09.2013 20:28:28

SystemPerformanceCheck-D1900 body 2013-09-06

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1900 MHz; σ = 1.51 S/m; ε_r = 52.78; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 57.8 W/kg

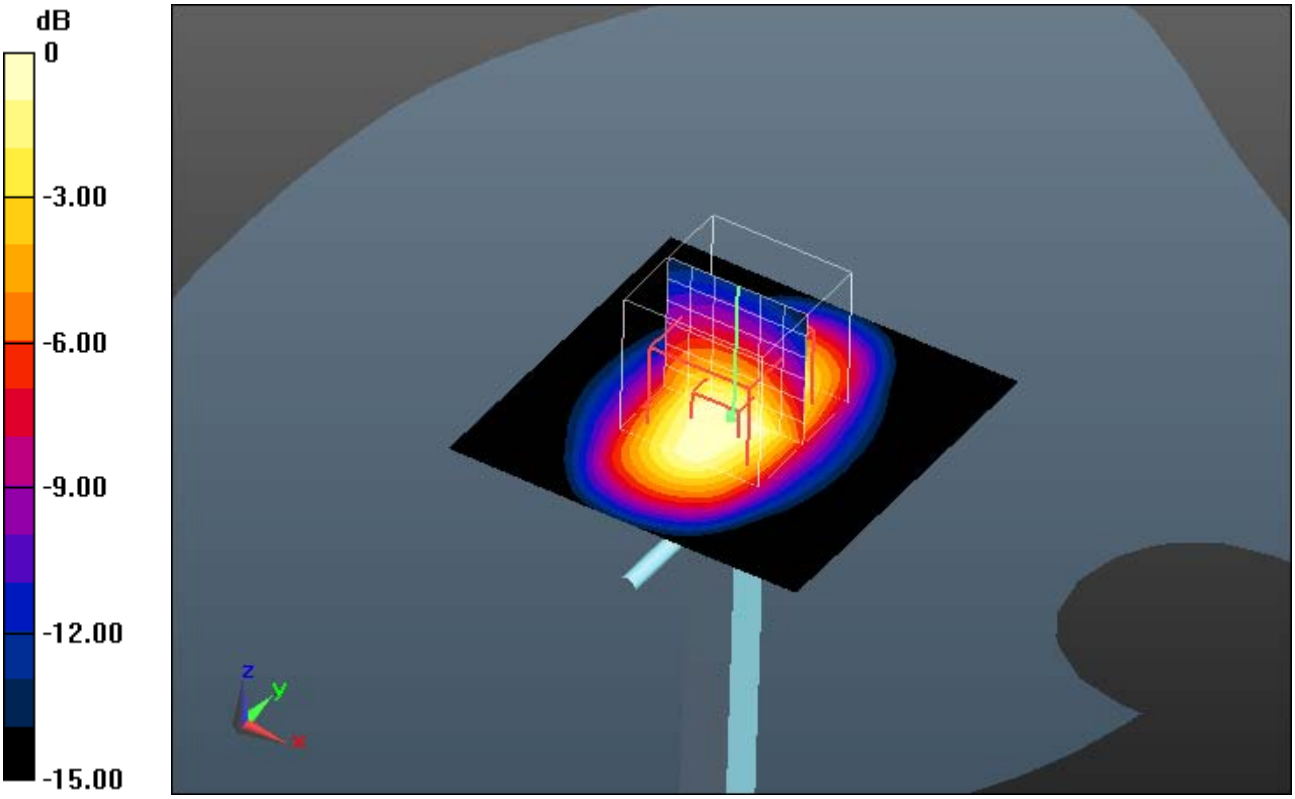
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Power Drift = -0.01 dB

Peak SAR (extrapolated) = 64.7 W/kg

SAR(1 g) = 39.3 W/kg; SAR(10 g) = 21.3 W/kg

Maximum value of SAR (measured) = 44.7 W/kg



0 dB = 44.7 W/kg = 16.50 dBW/kg

Additional information:

ambient temperature: 23.6°C; liquid temperature: 23.2°C

Date/Time: 07.09.2013 15:47:52

SystemPerformanceCheck-D1900 body 2013-09-07

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d009

Communication System: UID 0, CW (0); Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1900 MHz; σ = 1.51 S/m; ε_r = 52.78; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 55.7 W/kg

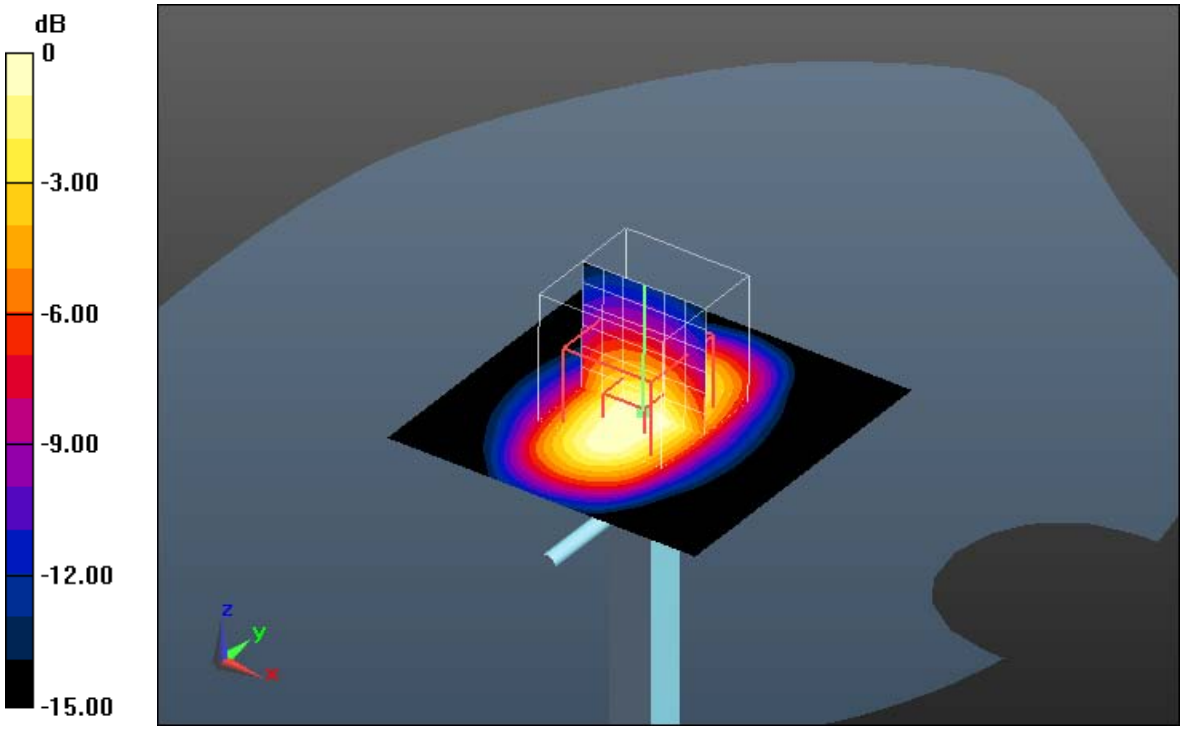
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 184.7 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 64.6 W/kg

SAR(1 g) = 39.2 W/kg; SAR(10 g) = 21.2 W/kg

Maximum value of SAR (measured) = 44.5 W/kg



0 dB = 44.5 W/kg = 16.48 dBW/kg

Additional information:

ambient temperature: 22.0°C; liquid temperature: 21.7°C

Date/Time: 04.09.2013 17:40:43

SystemPerformanceCheck-D2450 head 2013-09-04

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 710

Communication System: UID 0, CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 2450 MHz; σ = 1.815 S/m; ε_r = 39.044; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(4.49, 4.49, 4.49); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 79.9 W/kg

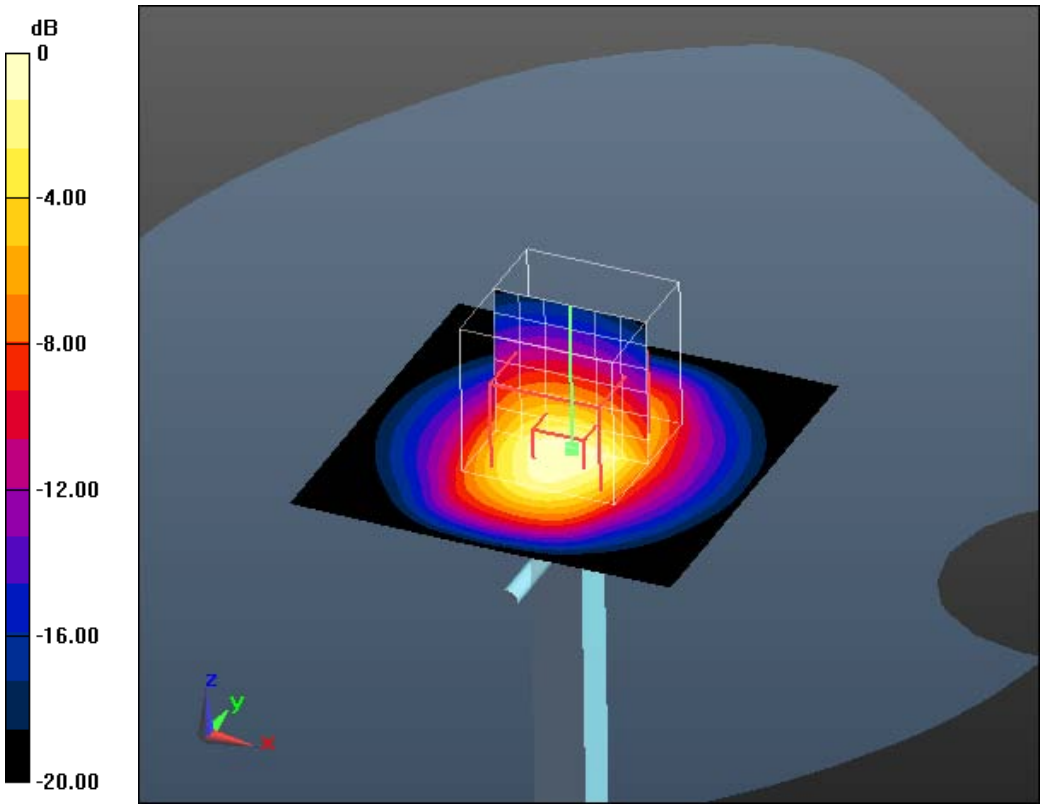
HSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 188.3 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 113 W/kg

SAR(1 g) = 54 W/kg; SAR(10 g) = 25 W/kg

Maximum value of SAR (measured) = 61.9 W/kg



0 dB = 61.9 W/kg = 17.92 dBW/kg

Additional information:

ambient temperature: 22.9°C; liquid temperature: 22.7°C

Date/Time: 04.09.2013 16:12:47

SystemPerformanceCheck-D2450 body 2013-09-04

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 710

Communication System: UID 0, CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 2450 MHz; σ = 1.963 S/m; ε_r = 51.347; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(4.36, 4.36, 4.36); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 80.9 W/kg

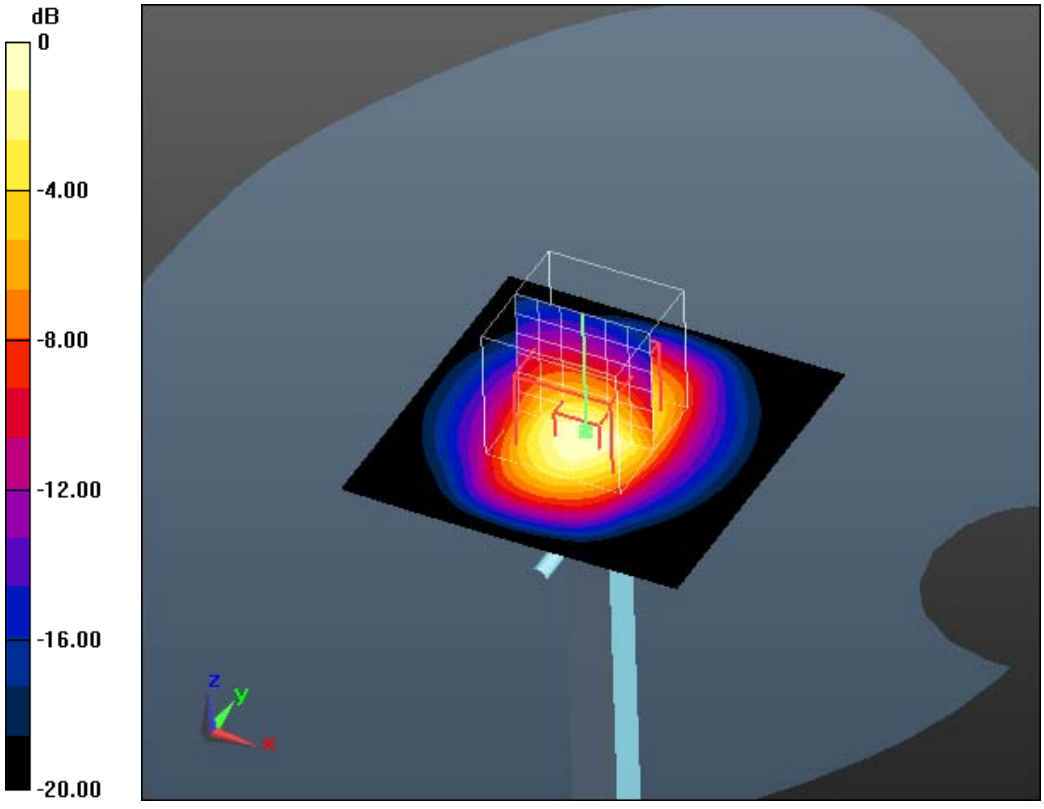
MSL/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 177.7 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 112 W/kg

SAR(1 g) = 54.3 W/kg; SAR(10 g) = 25.3 W/kg

Maximum value of SAR (measured) = 62.1 W/kg



0 dB = 62.1 W/kg = 17.93 dBW/kg

Additional information:

ambient temperature: 22.9°C; liquid temperature: 22.7°C

Date/Time: 11.10.2013 06:05:28

SystemPerformanceCheck-D5GHz head 2013-10-11

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

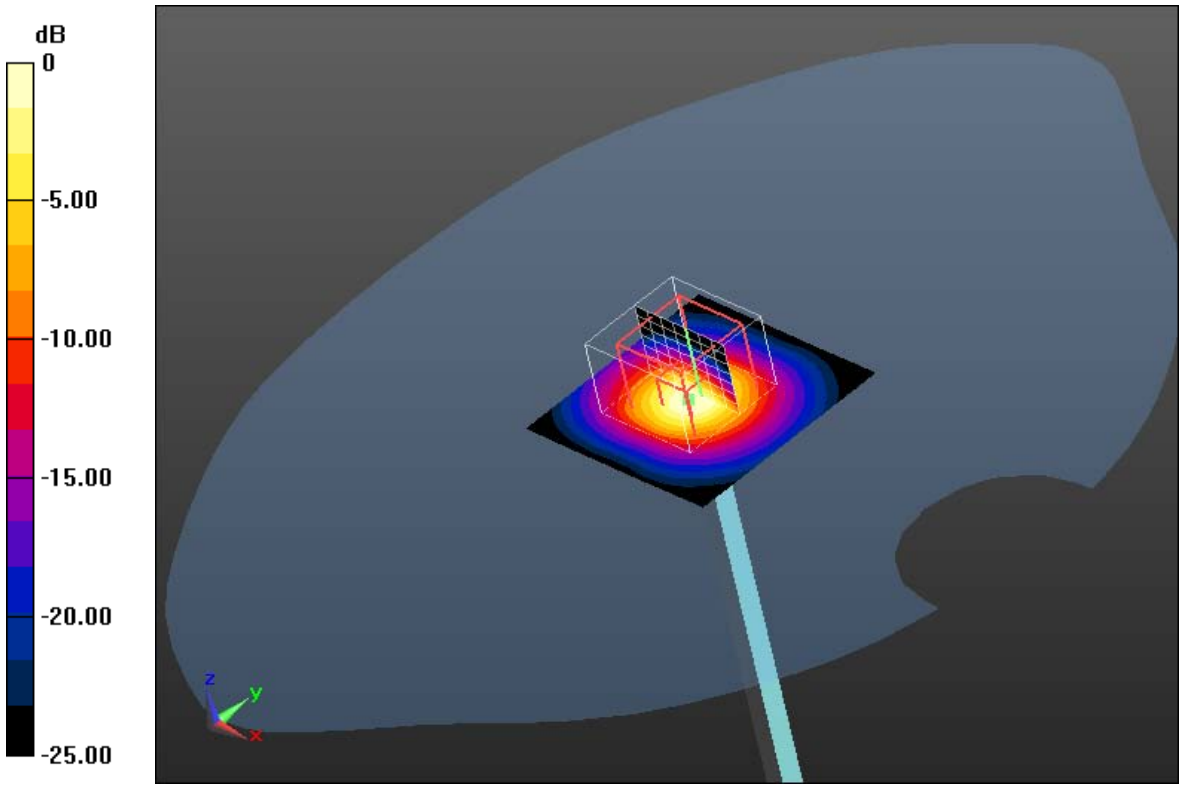
Communication System: UID 0, CW; Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 36.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(5.37, 5.37, 5.37); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 22.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.8 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Zoom Scan (8x8x8)/Cube 0:

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 44.095 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 32.4 W/kg
SAR(1 g) = 7.94 W/kg; SAR(10 g) = 2.24 W/kg
Maximum value of SAR (measured) = 15.7 W/kg



0 dB = 15.7 W/kg = 11.96 dBW/kg

Additional information:
ambient temperature: 22.8°C; liquid temperature: 22.5°C

Date/Time: 11.10.2013 06:24:05

SystemPerformanceCheck-D5GHz head 2013-10-11

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

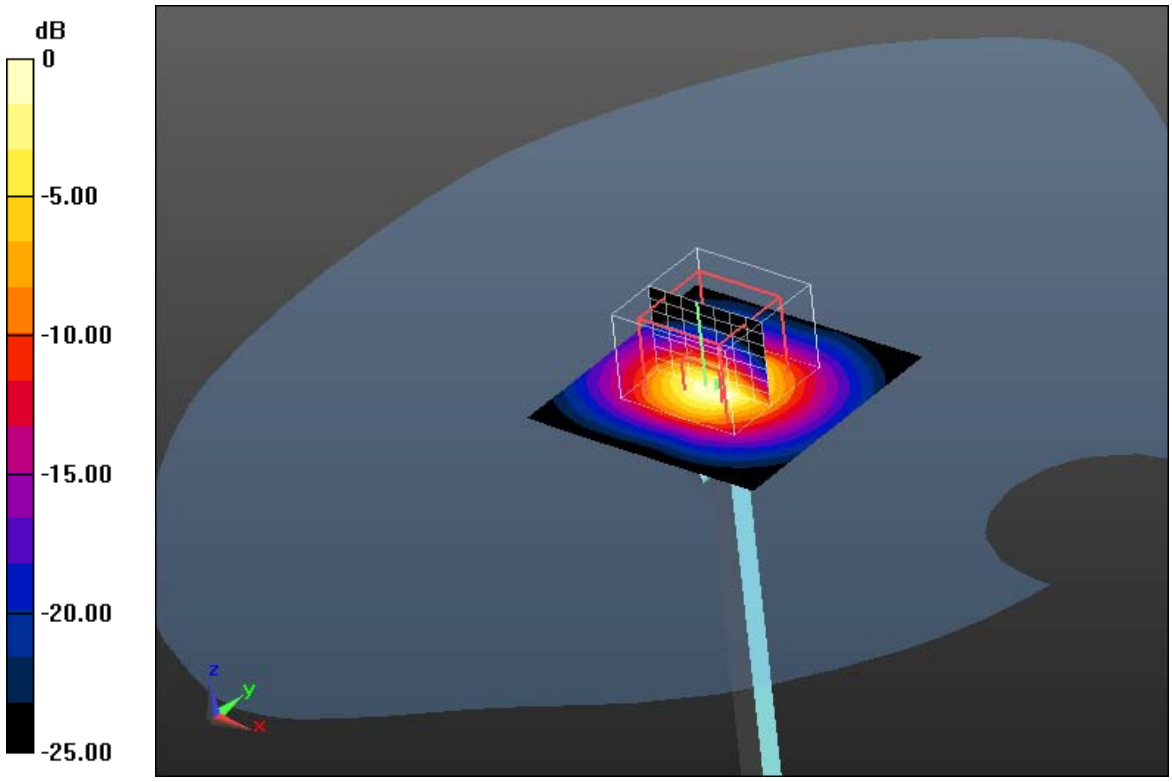
Communication System: UID 0, CW; Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 4.82 S/m; ε_r = 36.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(5, 5, 5); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 22.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.1 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Zoom Scan (8x8x8)/Cube 0:

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 42.215 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 35.0 W/kg
SAR(1 g) = 8 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 16.0 W/kg



0 dB = 16.0 W/kg = 12.04 dBW/kg

Additional information:
ambient temperature: 22.8°C; liquid temperature: 22.5°C

Date/Time: 11.10.2013 07:07:32

SystemPerformanceCheck-D5GHz head 2013-10-11

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

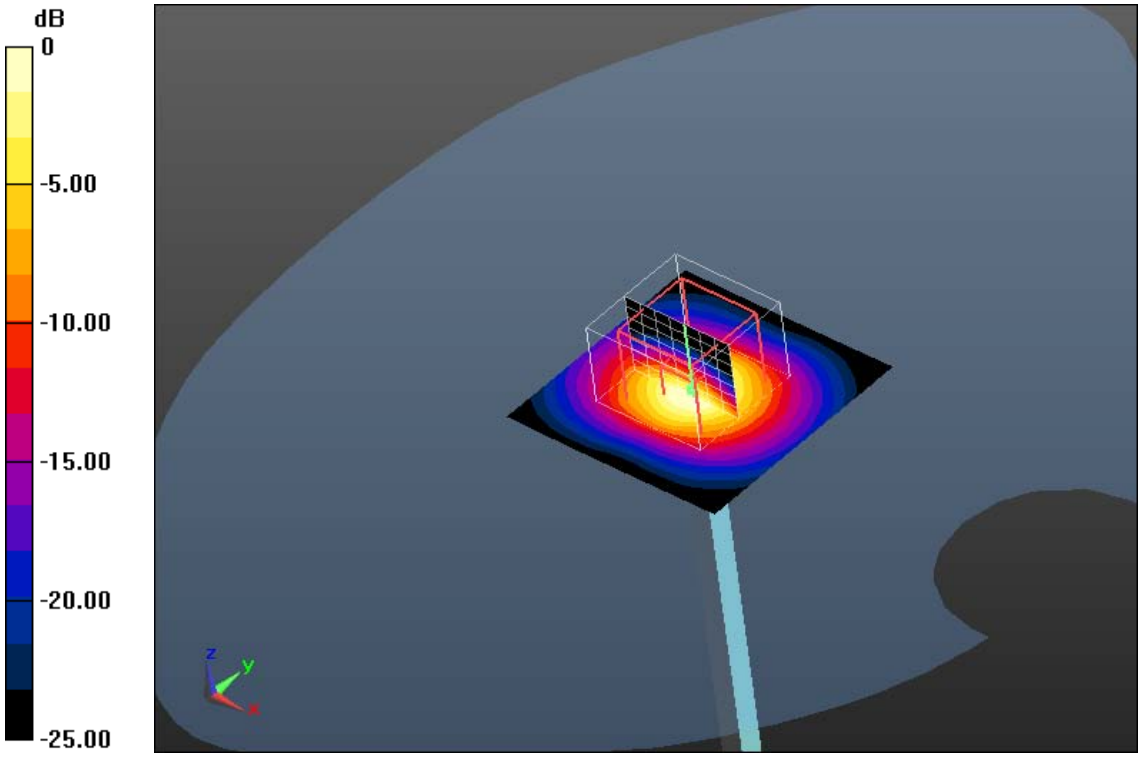
Communication System: UID 0, CW; Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 5.12 S/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.75, 4.75, 4.75); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 22.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.8 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Zoom Scan (8x8x8)/Cube 0:

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 40.517 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.56 W/kg; SAR(10 g) = 2.09 W/kg
Maximum value of SAR (measured) = 14.9 W/kg



0 dB = 14.9 W/kg = 11.73 dBW/kg

Additional information:
ambient temperature: 22.8°C; liquid temperature: 22.5°C

Date/Time: 10.10.2013 08:57:25

SystemPerformanceCheck-D5GHz body 2013-10-10

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

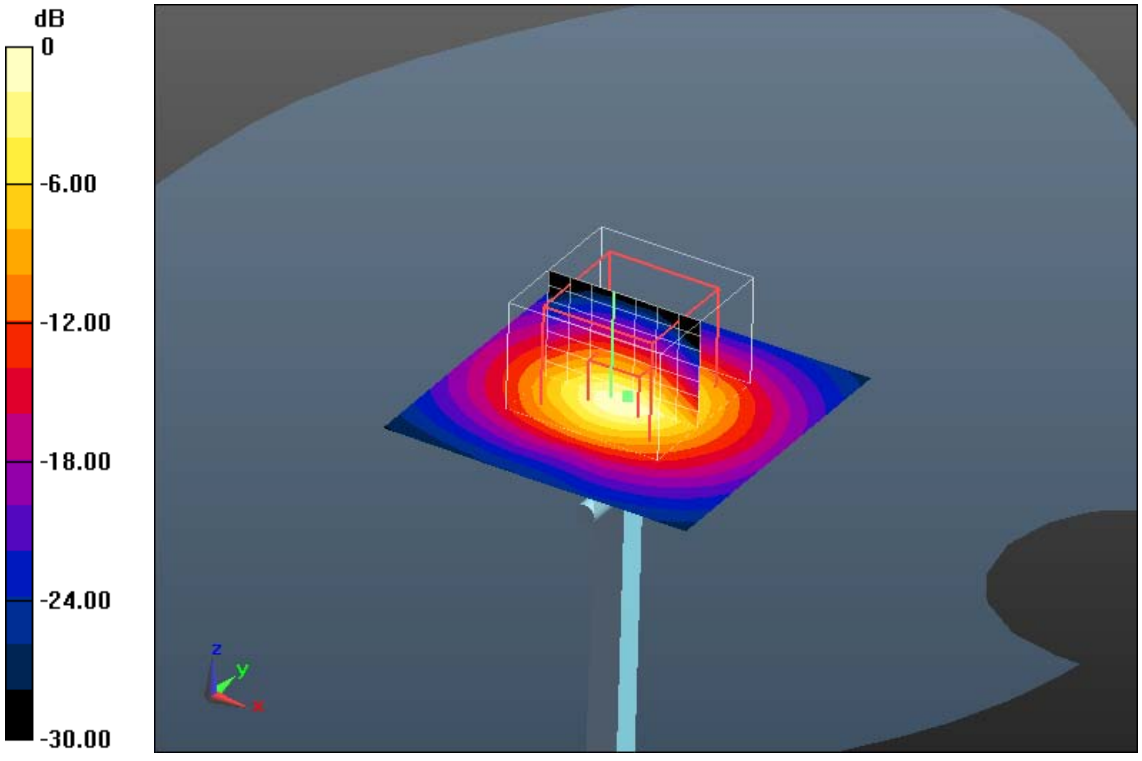
Communication System: UID 0, CW; Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5200 MHz; σ = 5.34 S/m; ε_r = 48.02; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.47, 4.47, 4.47); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 22.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 15.9 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Zoom Scan (8x8x8)/Cube 0:

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 42.182 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 28.9 W/kg
SAR(1 g) = 7.8 W/kg; SAR(10 g) = 2.21 W/kg
Maximum value of SAR (measured) = 14.9 W/kg



0 dB = 14.9 W/kg = 11.73 dBW/kg

Additional information:
ambient temperature: 23.0°C; liquid temperature: 22.6°C

Date/Time: 10.10.2013 09:35:32

SystemPerformanceCheck-D5GHz body 2013-10-10

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

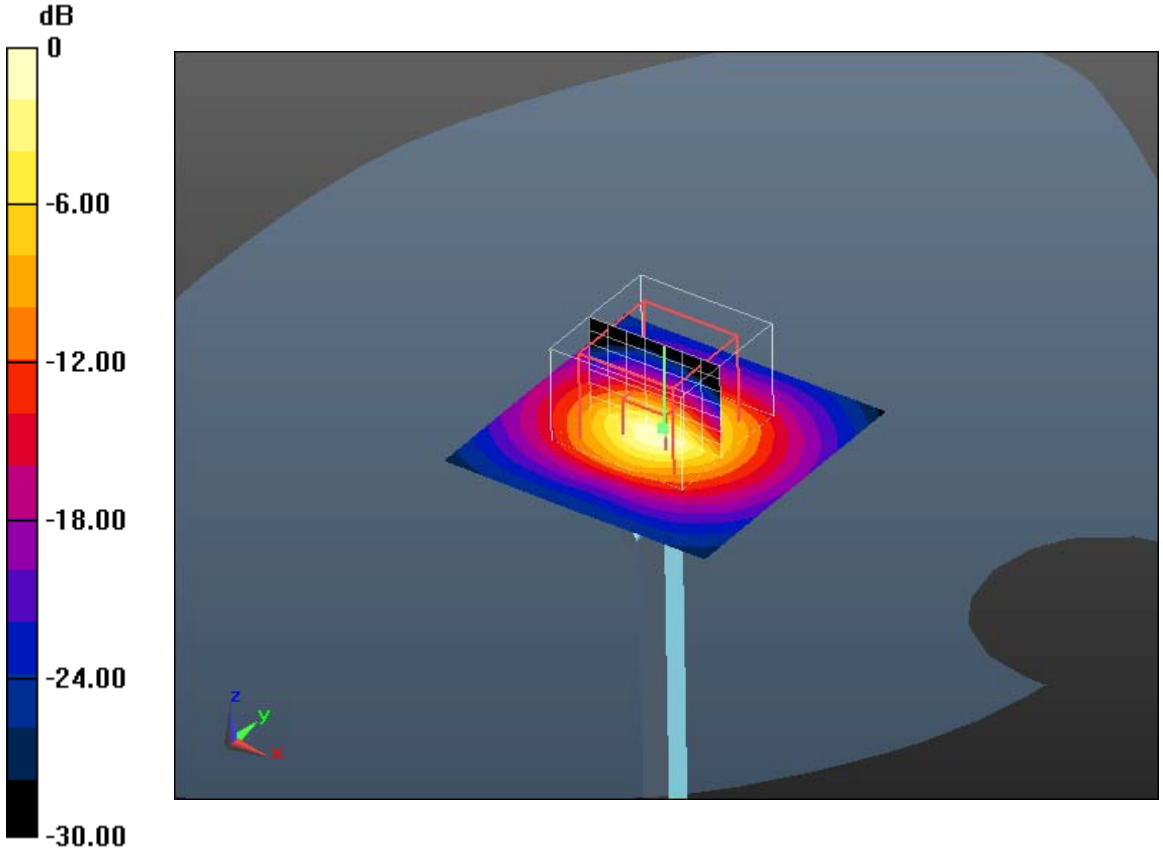
Communication System: UID 0, CW; Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 5.71 S/m; ε_r = 47.27; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.09, 4.09, 4.09); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 22.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.8 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Zoom Scan (8x8x8)/Cube 0:

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 40.906 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 33.3 W/kg
SAR(1 g) = 8.31 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 16.4 W/kg



0 dB = 16.4 W/kg = 12.15 dBW/kg

Additional information:
ambient temperature: 23.0°C; liquid temperature: 22.6°C

Date/Time: 10.10.2013 09:55:20

SystemPerformanceCheck-D5GHz body 2013-10-10

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055

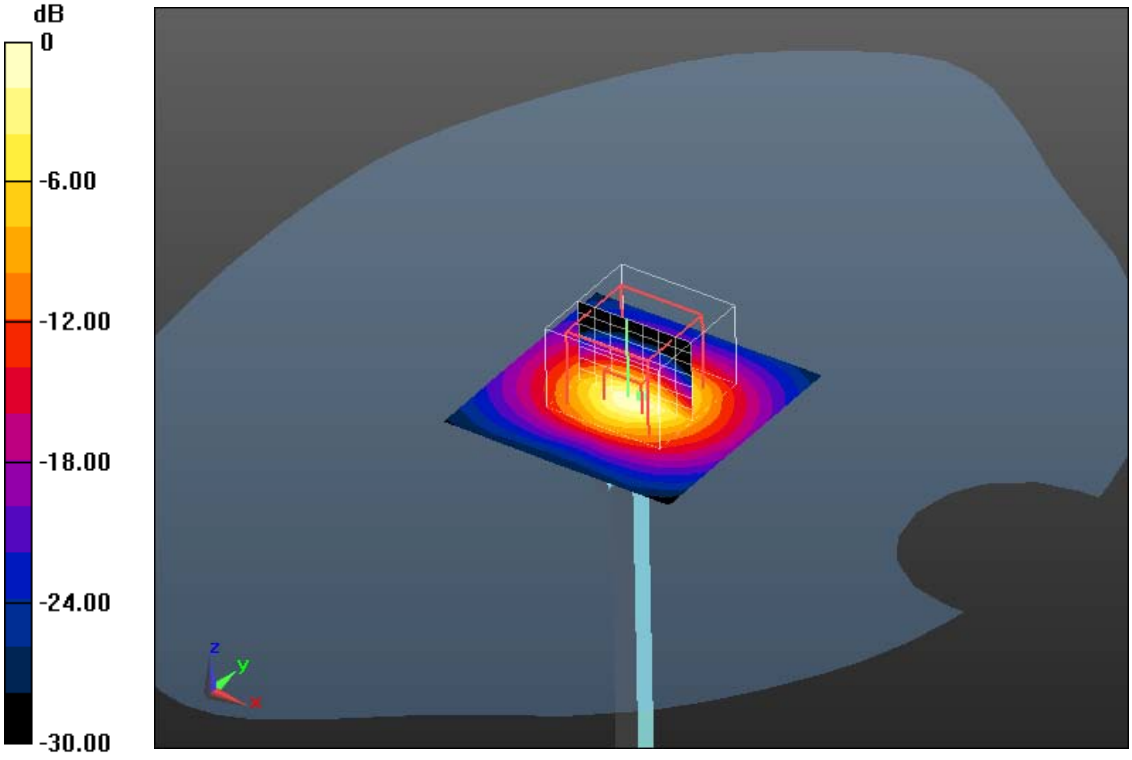
Communication System: UID 0, CW; Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 6.1 S/m; ε_r = 46.69; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.2, 4.2, 4.2); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 22.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Area Scan (61x61x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 14.3 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Zoom Scan (8x8x8)/Cube 0:

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 36.633 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 29.7 W/kg
SAR(1 g) = 6.88 W/kg; SAR(10 g) = 1.89 W/kg
Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

Additional information:
ambient temperature: 23.0°C; liquid temperature: 22.6°C

Annex B: DASY5 measurement results

SAR plots for **the highest measured SAR** in each exposure configuration, wireless mode and frequency band combination according to FCC KDB 865664 D02

Annex B.1: GSM 850MHz

Date/Time: 28.08.2013 18:53:02

IEEE1528- head-GSM850 3TS

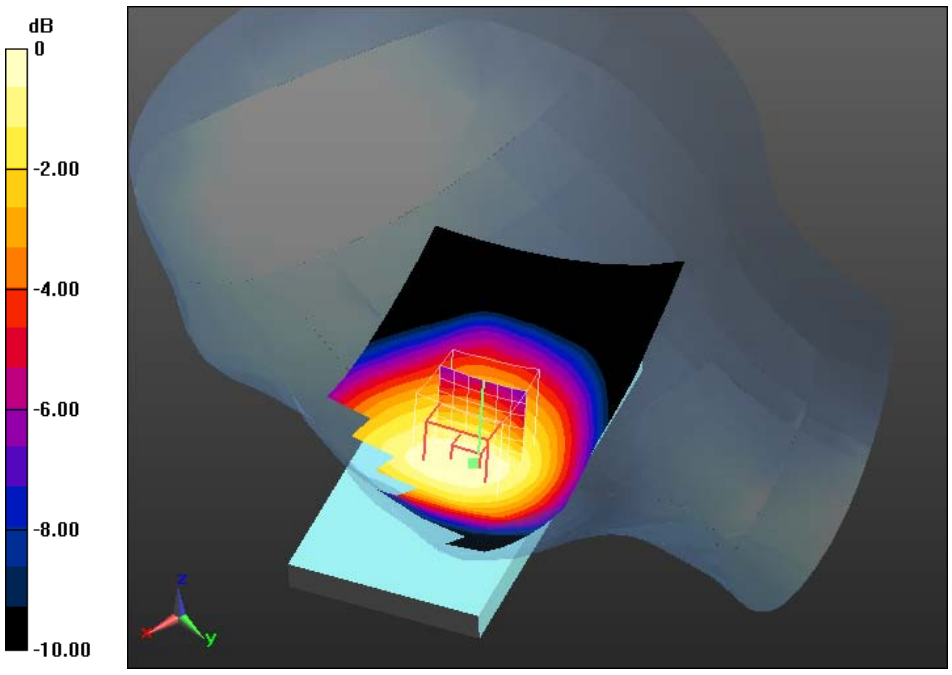
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, GSM 850 3TS (0); Communication System Band: GSM850; Frequency: 848.8 MHz; Communication System PAR: 4.472 dB; PMF: 1.6734
Medium parameters used: f = 849 MHz; σ = 0.895 S/m; ε_r = 41.66; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.32, 6.32, 6.32); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Right-Hand-Side HSL/Touch Position - Hi/Area Scan (61x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.424 W/kg

Right-Hand-Side HSL/Touch Position - Hi/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.925 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.481 W/kg
SAR(1 g) = 0.407 W/kg; SAR(10 g) = 0.318 W/kg
Maximum value of SAR (measured) = 0.427 W/kg



0 dB = 0.427 W/kg = -3.70 dBW/kg

Additional information:
ambient temperature: 22.9°C; liquid temperature: 22.5°C

Date/Time: 30.08.2013 16:25:23

FCC-hotspot-GSM850 GPRS 3TS

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133

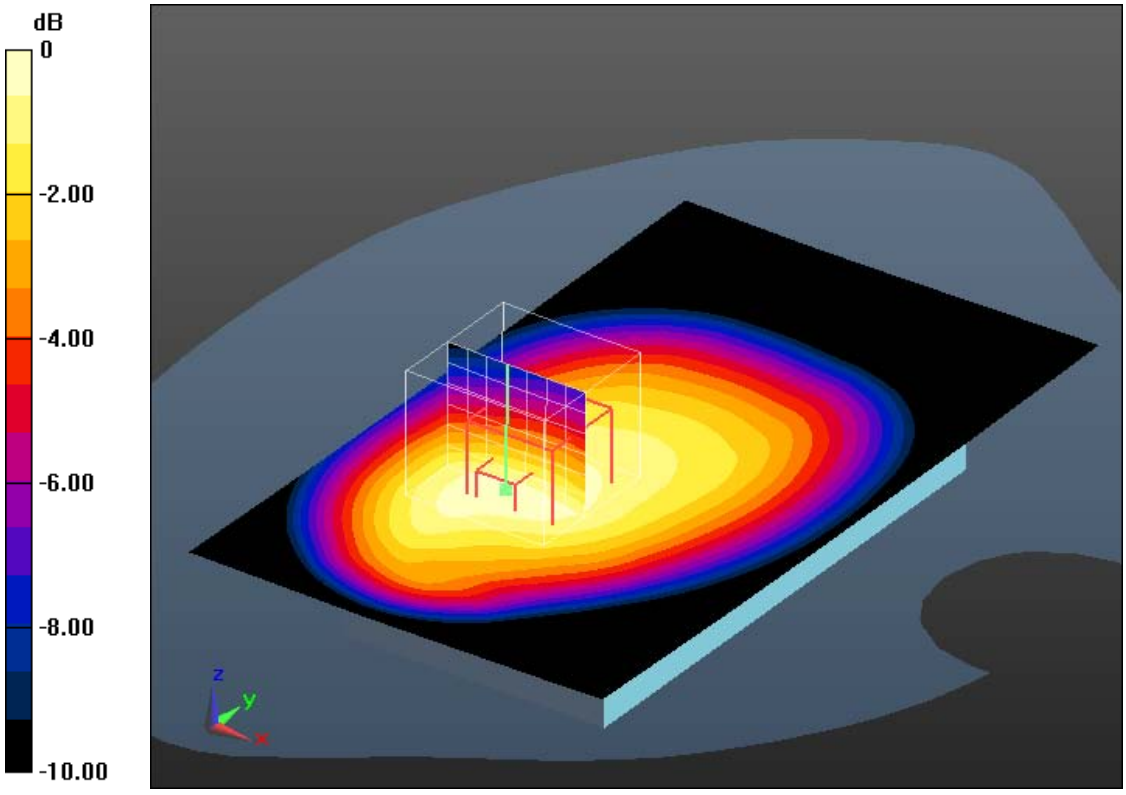
Communication System: UID 0, 3-slot GPRS850 (0); Communication System Band: GSM850; Frequency: 848.8 MHz; Communication System PAR: 4.472 dB; PMF: 1.6734
Medium parameters used: f = 849 MHz; σ = 0.979 S/m; ε_r = 55.782; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.29, 6.29, 6.29); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot 10mm/Front position - High/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.698 W/kg

MSL hotspot 10mm/Front position - High/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.836 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.909 W/kg
SAR(1 g) = 0.656 W/kg; SAR(10 g) = 0.481 W/kg
Maximum value of SAR (measured) = 0.700 W/kg



0 dB = 0.700 W/kg = -1.55 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.2°C; liquid temperature: 22.5°C

Date/Time: 30.08.2013 15:45:39

FCC-Body worn-GSM850 GPRS 3TS

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133

Communication System: UID 0, 3-slot GPRS850 (0); Communication System Band: GSM850; Frequency: 848.8 MHz; Communication System PAR: 4.472 dB; PMF: 1.6734

Medium parameters used: f = 849 MHz; σ = 0.979 S/m; ε_r = 55.782; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.29, 6.29, 6.29); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm/Front position - High/Area Scan (71x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.500 W/kg

MSL body worn 15mm/Front position - High/Zoom Scan (7x8x7)/Cube 0:

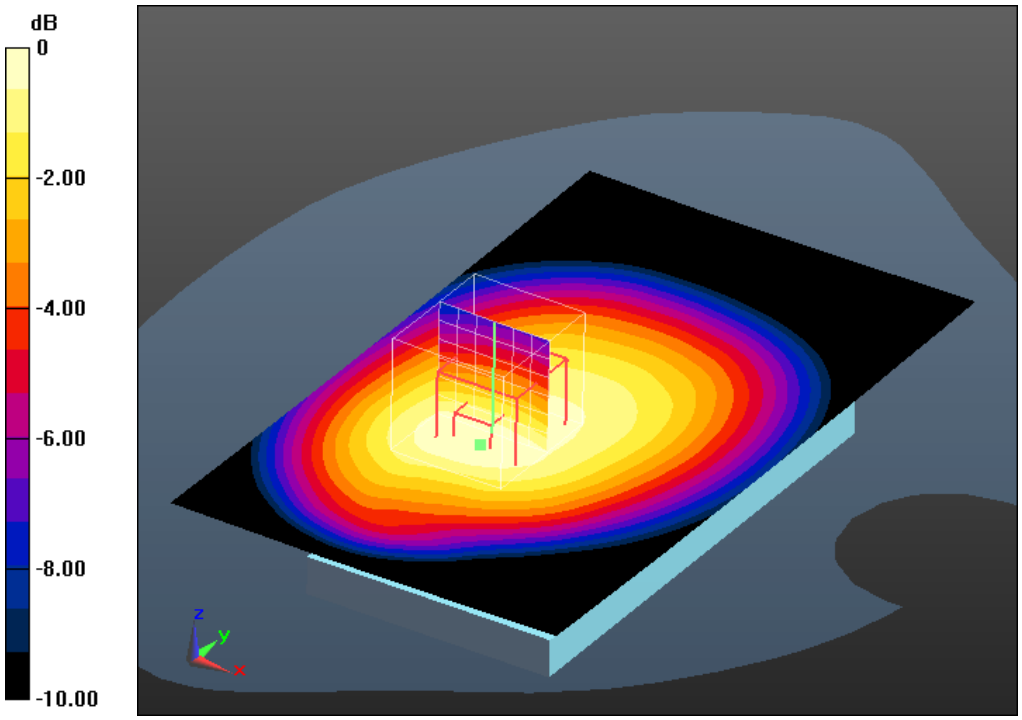
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.702 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.615 W/kg

SAR(1 g) = 0.478 W/kg; SAR(10 g) = 0.359 W/kg

Maximum value of SAR (measured) = 0.503 W/kg



0 dB = 0.503 W/kg = -2.98 dBW/kg

Additional information:

position or distance of DUT to SAM: 15mm

ambient temperature: 23.2°C; liquid temperature: 22.5°C

Annex B.2: GSM 1900MHz

Date/Time: 07.09.2013 19:36:16

IEEE1528-GSM1900 head 2TS

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133

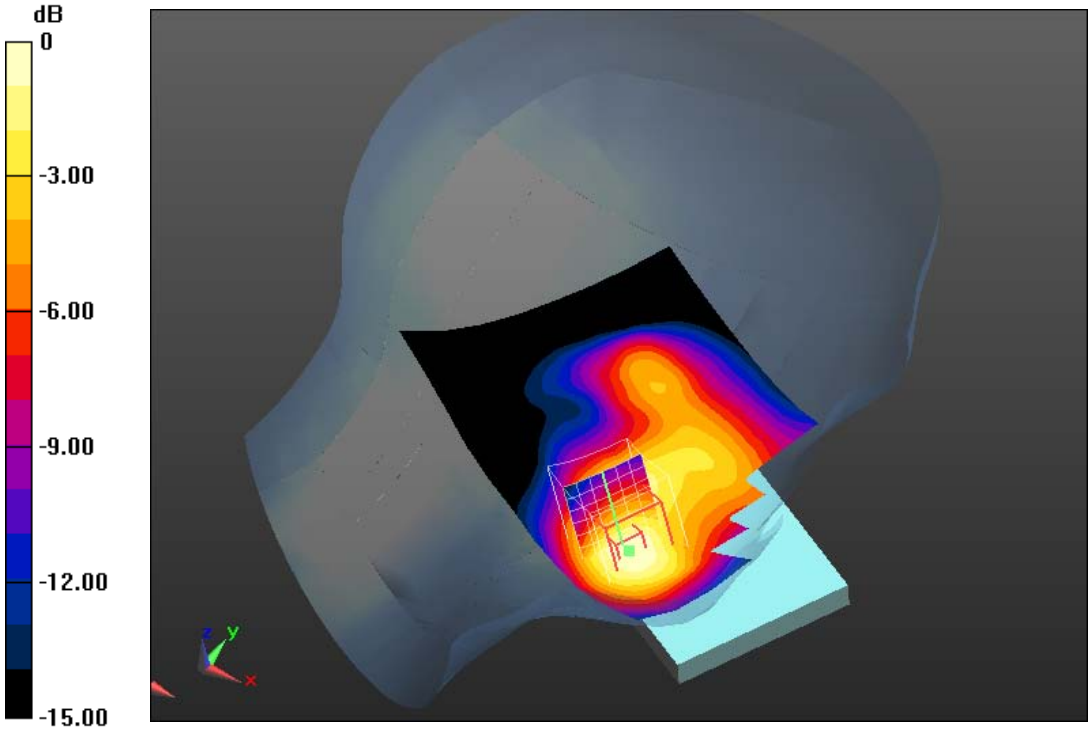
Communication System: UID 0, 2-slot GPRS1900 (0); Communication System Band: GSM 1900; Frequency: 1850.2 MHz; Communication System PAR: 6.232 dB; PMF: 2.04927
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.336 S/m; ε_r = 40.065; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Low/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.687 W/kg

Left-Hand-Side HSL/Touch Position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.604 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.972 W/kg
SAR(1 g) = 0.633 W/kg; SAR(10 g) = 0.389 W/kg
Maximum value of SAR (measured) = 0.690 W/kg



0 dB = 0.690 W/kg = -1.61 dBW/kg

Additional information:
ambient temperature: 22.5°C; liquid temperature: 22.0°C

Date/Time: 07.09.2013 19:54:13

IEEE1528-GSM1900 head 2TS

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133

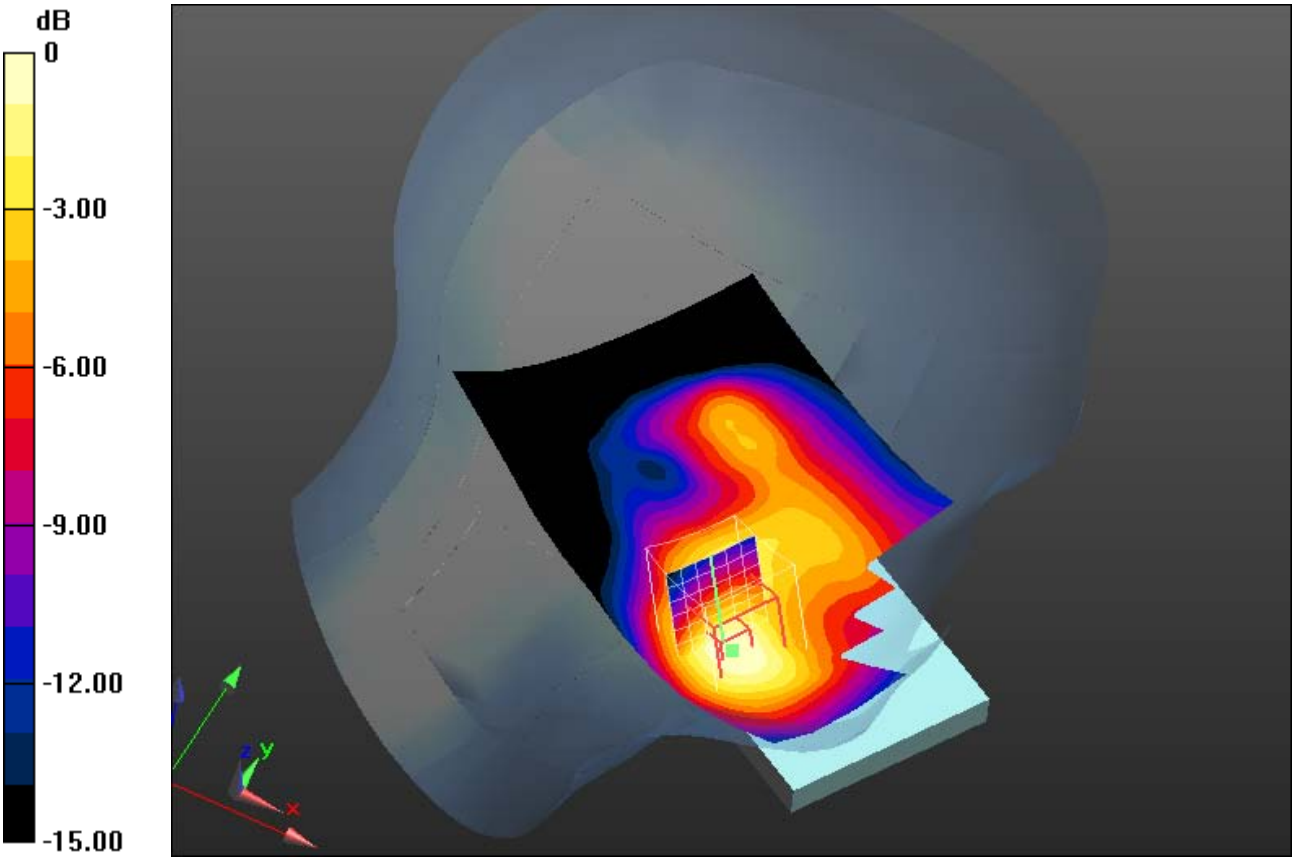
Communication System: UID 0, 2-slot GPRS1900 (0); Communication System Band: GSM 1900; Frequency: 1909.8 MHz; Communication System PAR: 6.232 dB; PMF: 2.04927
Medium parameters used: f = 1910 MHz; σ = 1.378 S/m; ε_r = 39.851; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Hi/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.683 W/kg

Left-Hand-Side HSL/Touch Position - Hi/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.066 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.978 W/kg
SAR(1 g) = 0.626 W/kg; SAR(10 g) = 0.377 W/kg
Maximum value of SAR (measured) = 0.684 W/kg



0 dB = 0.684 W/kg = -1.65 dBW/kg

Additional information:
ambient temperature: 22.5°C; liquid temperature: 22.0°C

Date/Time: 02.09.2013 14:45:25

FCC-hotspot-GSM1900 GPRS 4TS

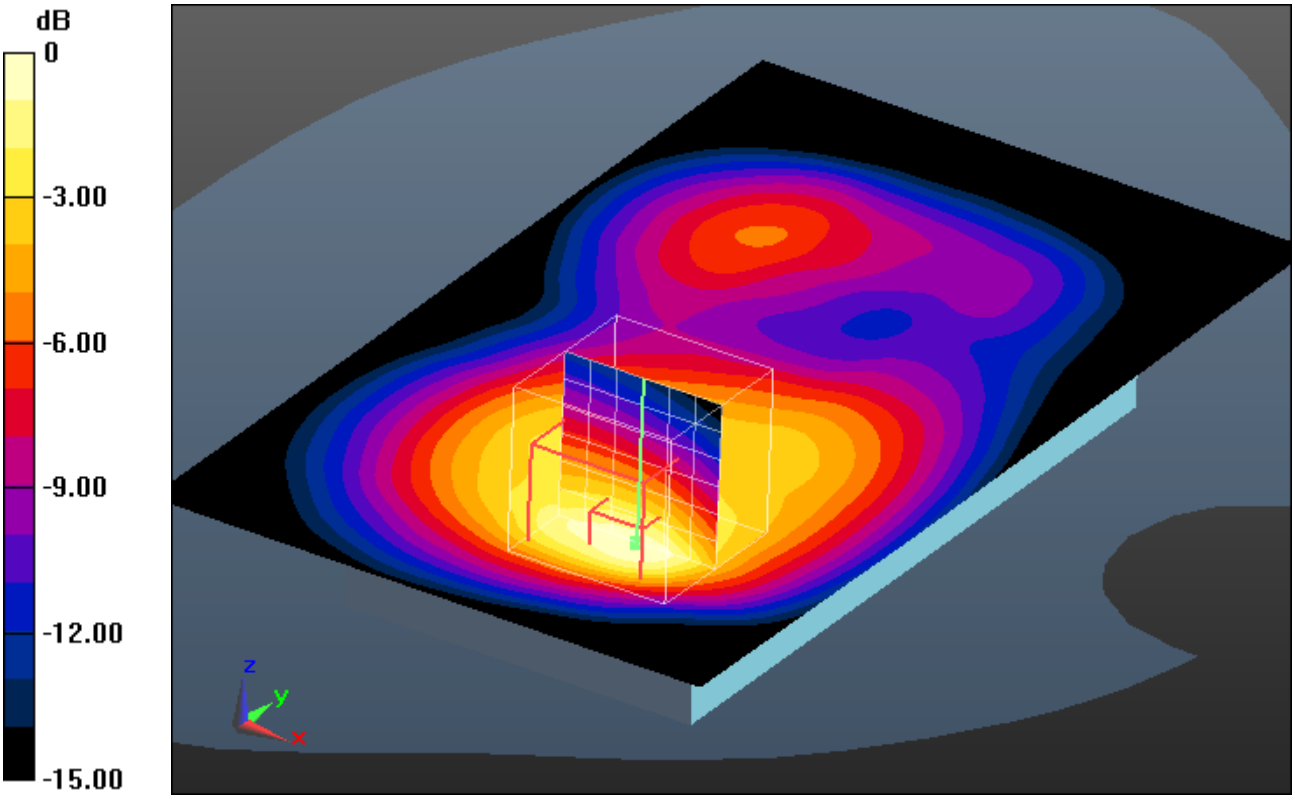
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059
Communication System: UID 0, GSM/GPRS 4TS (0); Communication System Band: GSM 1900; Frequency: 1850.2 MHz; Communication System PAR: 3.01 dB; PMF: 1.41416
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.454 S/m; ε_r = 52.97; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot 10mm/Rear position - Low/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.43 W/kg

MSL hotspot 10mm/Rear position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.256 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 2.06 W/kg
SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.659 W/kg
Maximum value of SAR (measured) = 1.38 W/kg



0 dB = 1.38 W/kg = 1.40 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.4°C; liquid temperature: 22.8°C

Date/Time: 02.09.2013 13:22:38

FCC-Body worn-GSM1900 GPRS 4TS

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

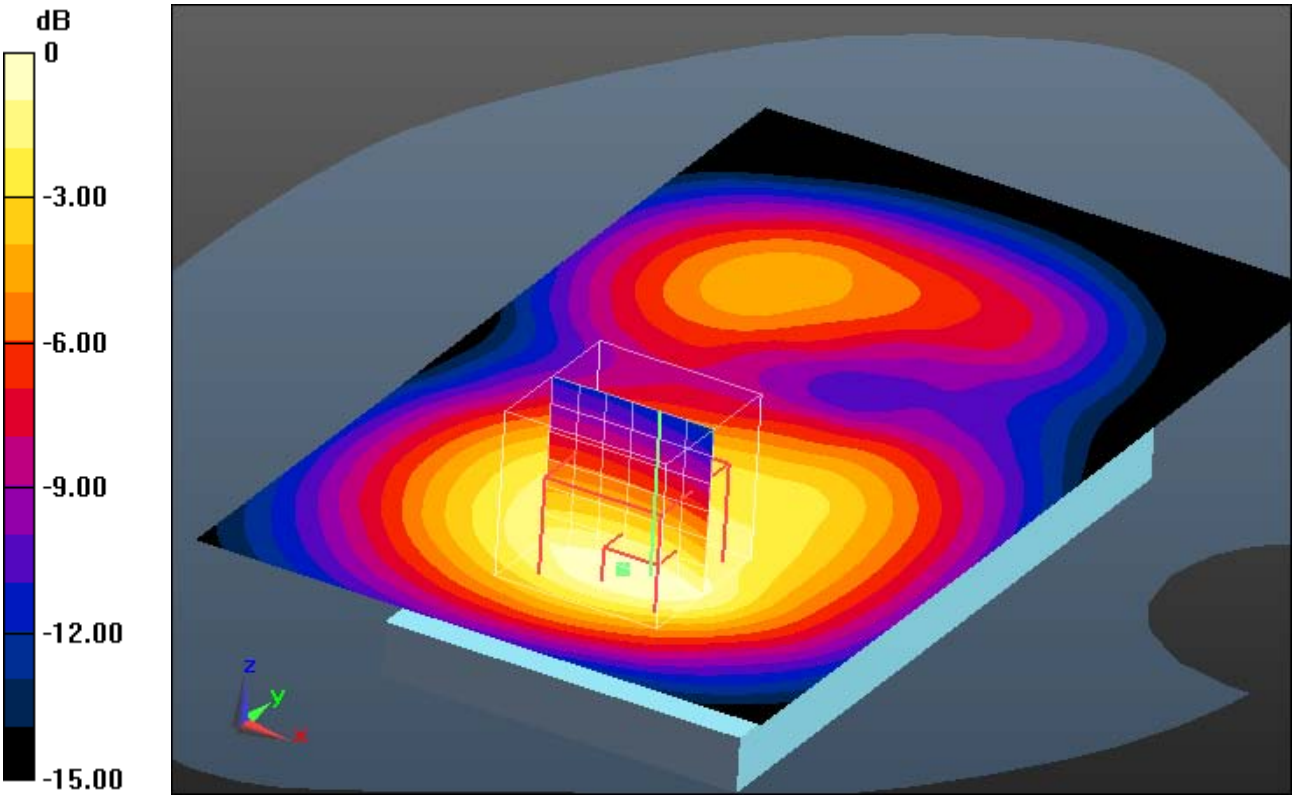
Communication System: UID 0, GSM/GPRS 4TS (0); Communication System Band: GSM 1900; Frequency: 1850.2 MHz; Communication System PAR: 3.01 dB; PMF: 1.41416
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.454 S/m; ε_r = 52.97; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm/Rear position - Low/Area Scan (71x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.708 W/kg

MSL body worn 15mm/Rear position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.215 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.961 W/kg
SAR(1 g) = 0.622 W/kg; SAR(10 g) = 0.379 W/kg
Maximum value of SAR (measured) = 0.686 W/kg



0 dB = 0.686 W/kg = -1.64 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.4°C; liquid temperature: 22.8°C

Annex B.3: UMTS FDD II

Date/Time: 09.09.2013 09:09:01

IEEE1528-UMTS FDD II head

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133

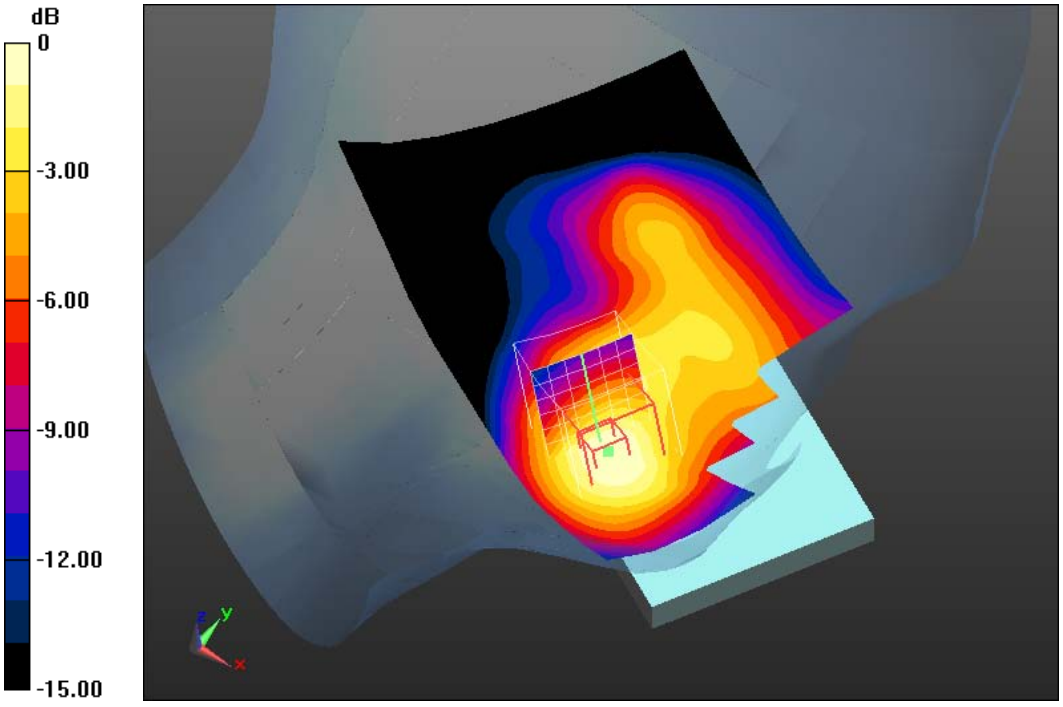
Communication System: UID 0, UMTS FDD II (1900MHz) (0); Communication System Band: UMTS FDD II; Frequency: 1852.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.337 S/m; ε_r = 40.065; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Low/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.998 W/kg

Left-Hand-Side HSL/Touch Position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.020 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.903 W/kg; SAR(10 g) = 0.562 W/kg
Maximum value of SAR (measured) = 0.977 W/kg



0 dB = 0.977 W/kg = -0.10 dBW/kg

Additional information:
ambient temperature: 23.0°C; liquid temperature: 22.6°C

Date/Time: 06.09.2013 18:23:16

FCC-hotspot-UMTS FDD II - Power back off

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

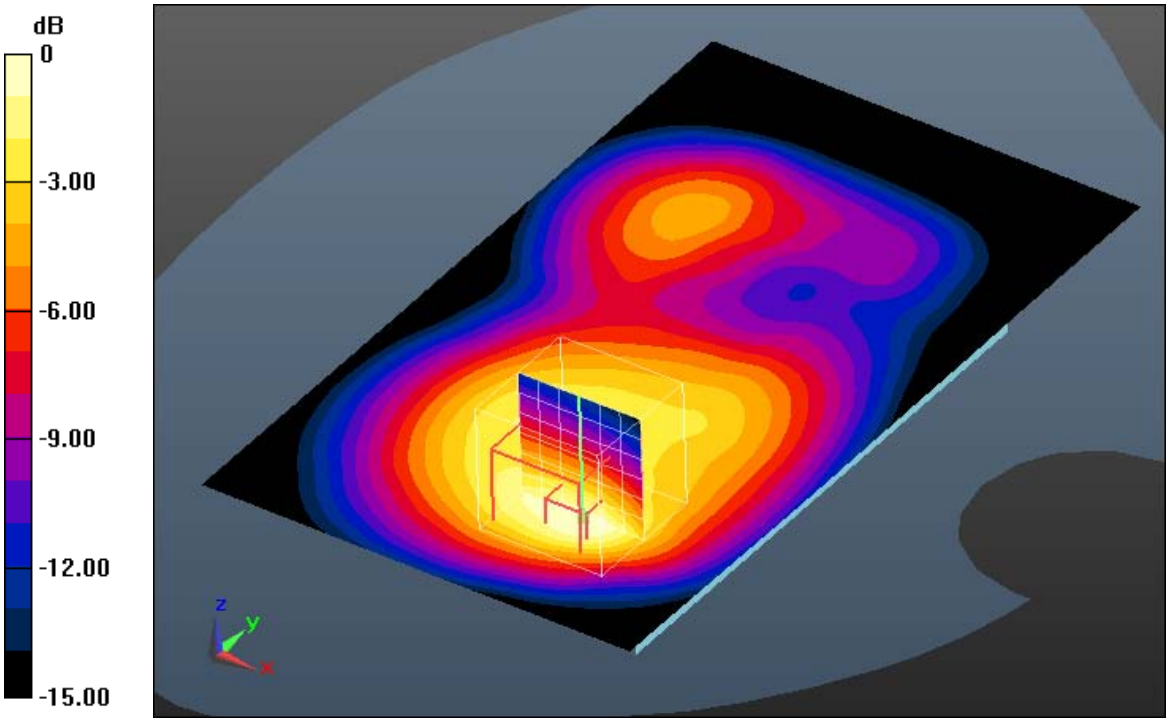
Communication System: UID 0, WCDMA FDD II (0); Communication System Band: UMTS FDD II; Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.488 S/m; ε_r = 52.85; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot 10mm/Rear position - Middle/Area Scan (71x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.23 W/kg

MSL hotspot 10mm/Rear position - Middle/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.632 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.574 W/kg
Maximum value of SAR (measured) = 1.17 W/kg



0 dB = 1.17 W/kg = 0.68 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.6°C; liquid temperature: 23.2°C

Date/Time: 02.09.2013 18:53:33

FCC-Body worn-UMTS FDD II

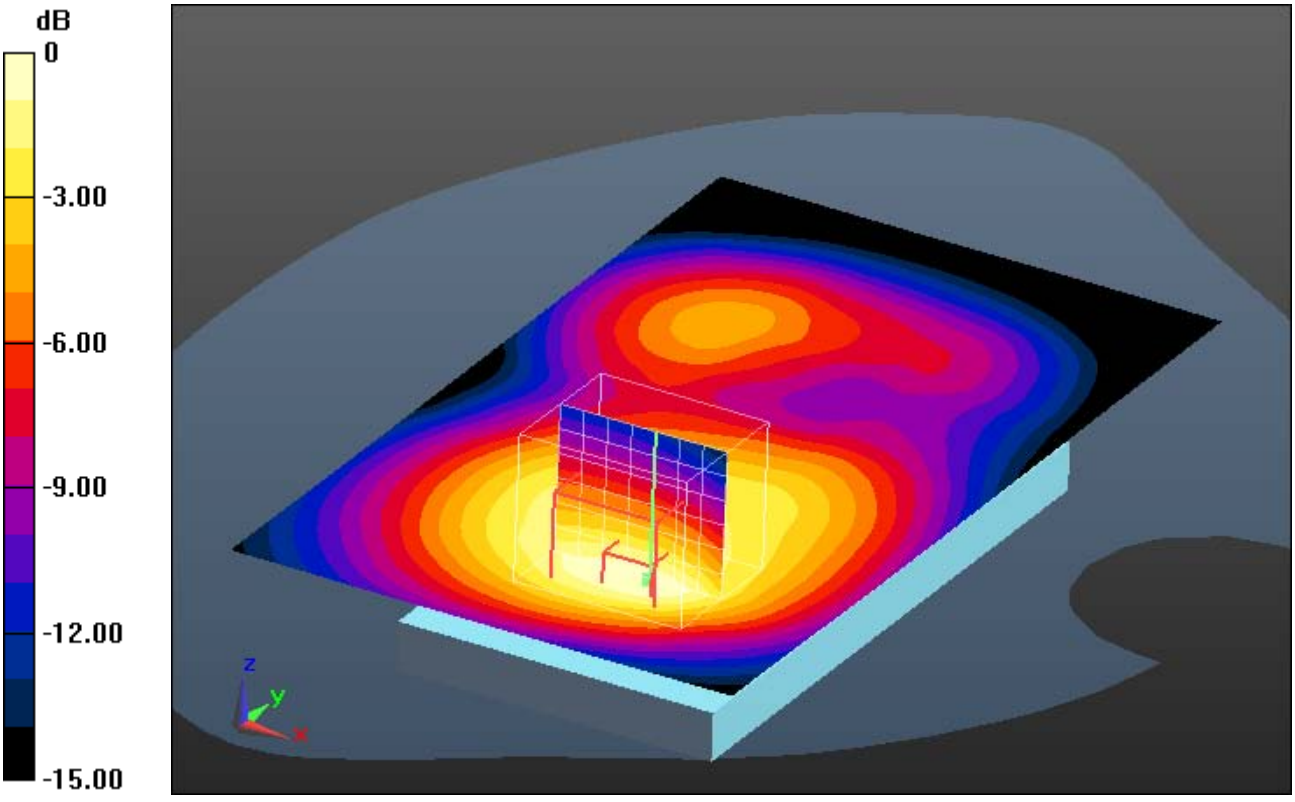
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059
Communication System: UID 0, WCDMA FDD II (0); Communication System Band: UMTS FDD II;
Frequency: 1852.5 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 1852.5 MHz; σ = 1.456 S/m; ε_r = 52.953; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm/Rear position - Low/Area Scan (71x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.878 W/kg

MSL body worn 15mm/Rear position - Low/Zoom Scan (8x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.076 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.780 W/kg; SAR(10 g) = 0.468 W/kg
Maximum value of SAR (measured) = 0.868 W/kg



0 dB = 0.868 W/kg = -0.61 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.4°C; liquid temperature: 22.8°C

Annex B.4: UMTS FDD IV

Date/Time: 30.08.2013 21:21:33

IEEE1528-UMTS FDD IV head

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

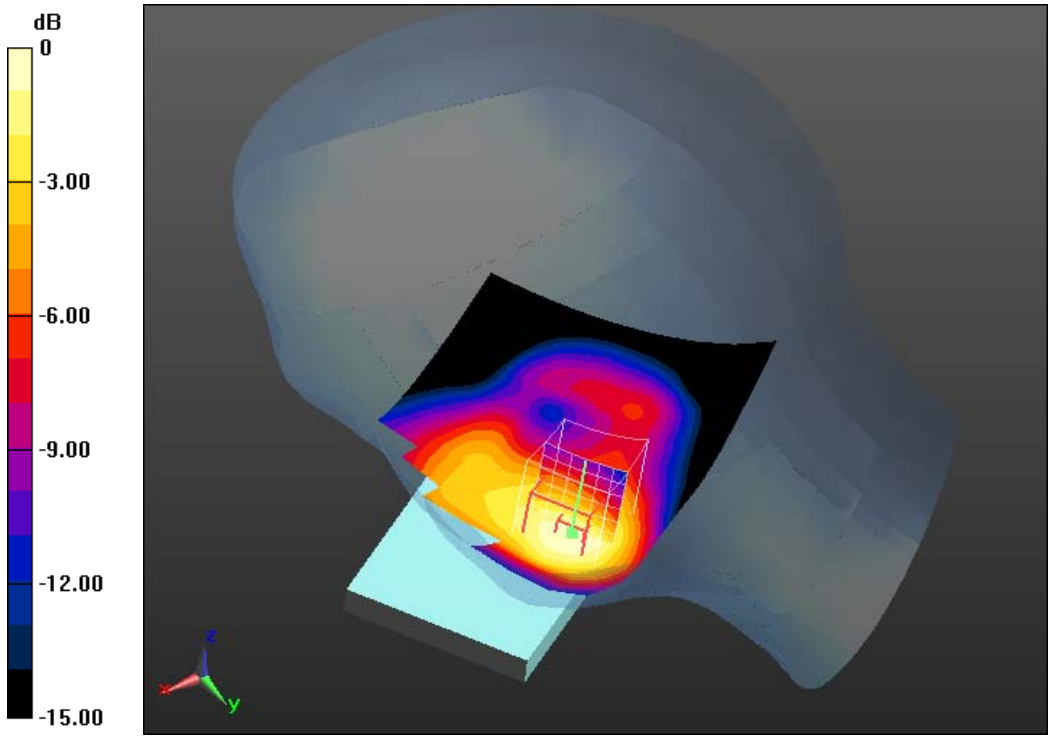
Communication System: UID 0, UMTS FDD IV (1750) (0); Communication System Band: UMTS FDD IV; Frequency: 1752.6 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 1752.6 MHz; σ = 1.386 S/m; ε_r = 39.842; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.93, 4.93, 4.93); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Right-Hand-Side HSL/Touch Position - Hi/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.19 W/kg

Right-Hand-Side HSL/Touch Position - Hi/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.844 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.688 W/kg
Maximum value of SAR (measured) = 1.14 W/kg



0 dB = 1.14 W/kg = 0.57 dBW/kg

Additional information:
ambient temperature: 23.5°C; liquid temperature: 23.1°C

Date/Time: 06.09.2013 10:03:39

FCC-hotspot-UMTS FDD IV

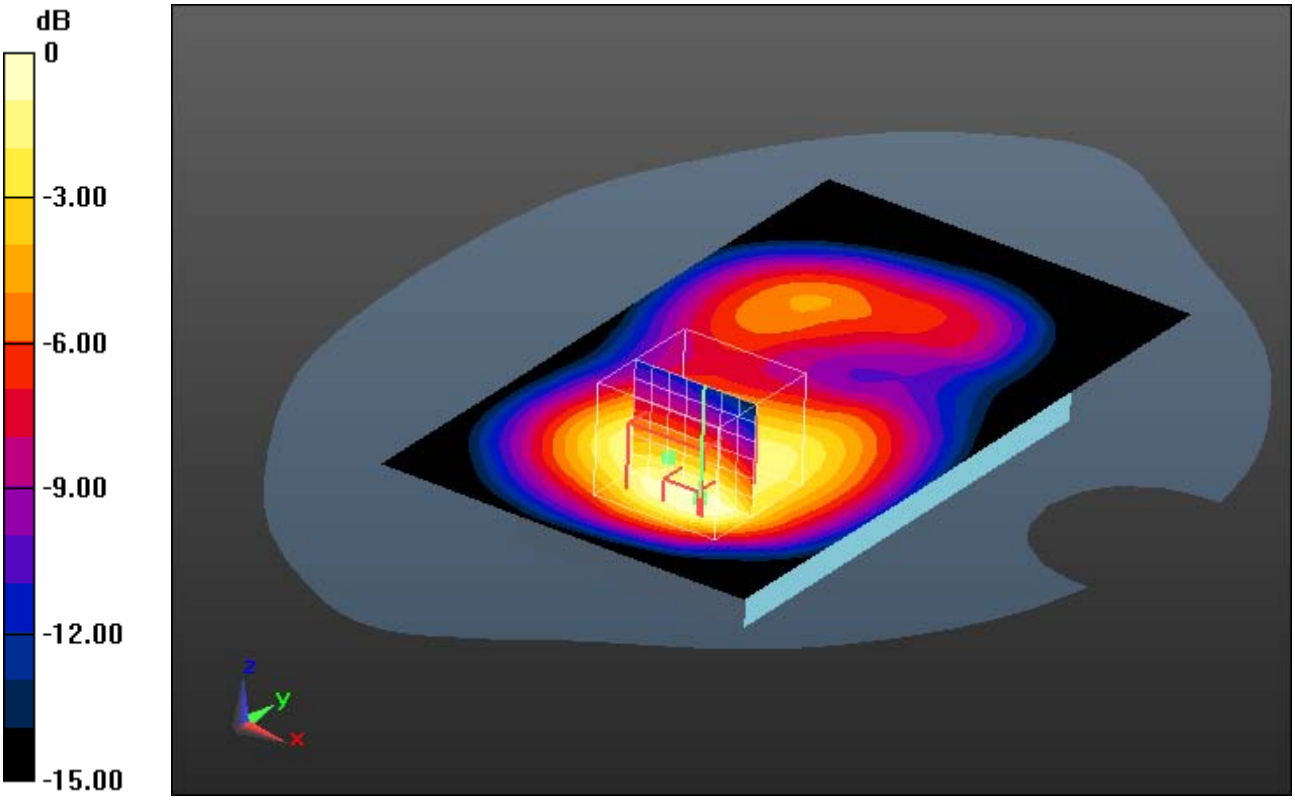
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059
Communication System: UID 0, UMTS FDD IV (1750) (0); Communication System Band: UMTS FDD IV; Frequency: 1732.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.484 S/m; ε_r = 52.644; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 10mm hotspot power back off/Rear position - Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.46 W/kg

MSL 10mm hotspot power back off/Rear position - Middle/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30.610 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.719 W/kg
Maximum value of SAR (measured) = 1.31 W/kg



0 dB = 1.32 W/kg = 1.21 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.8°C; liquid temperature: 23.6°C

Date/Time: 06.09.2013 13:36:16

FCC-Body worn-UMTS FDD IV

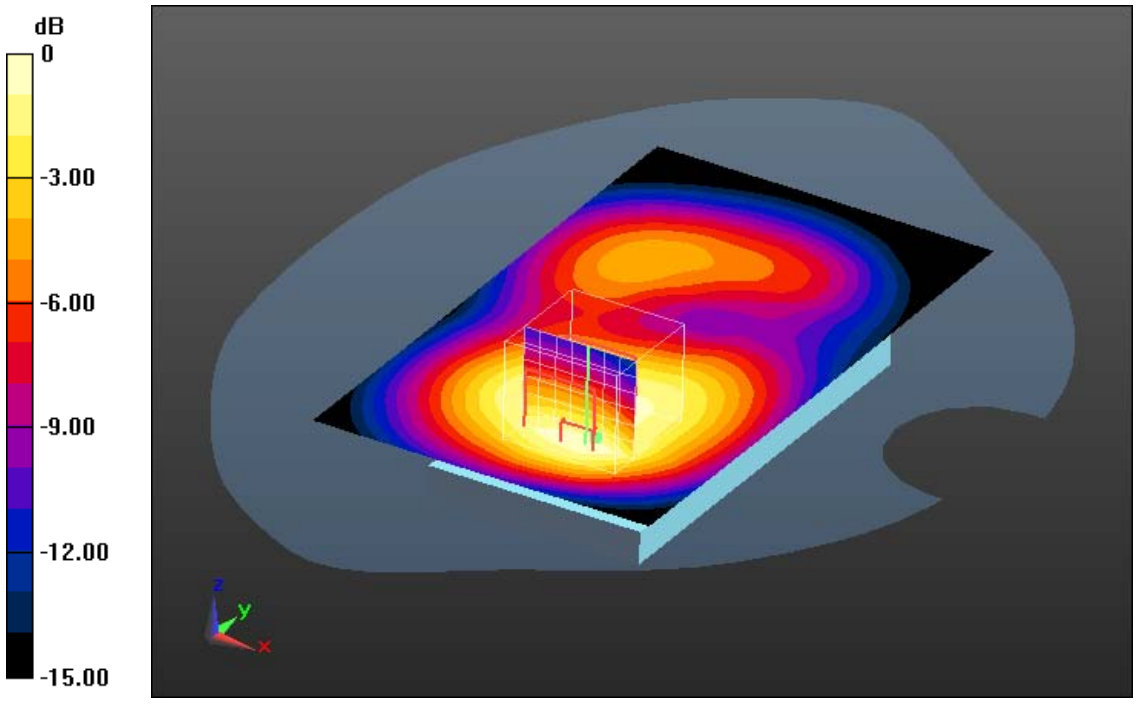
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059
Communication System: UID 0, UMTS FDD IV (1750) (0); Communication System Band: UMTS FDD IV; Frequency: 1732.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.484 S/m; ε_r = 52.644; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm/Rear position - Middle/Area Scan (71x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.945 W/kg

MSL body worn 15mm/Rear position - Middle/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.317 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.833 W/kg; SAR(10 g) = 0.555 W/kg
Maximum value of SAR (measured) = 0.905 W/kg



0 dB = 0.905 W/kg = -0.43 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.8°C; liquid temperature: 23.6°C

Annex B.5: UMTS FDD V

Date/Time: 28.08.2013 20:54:35

IEEE1528 - head-FDD V

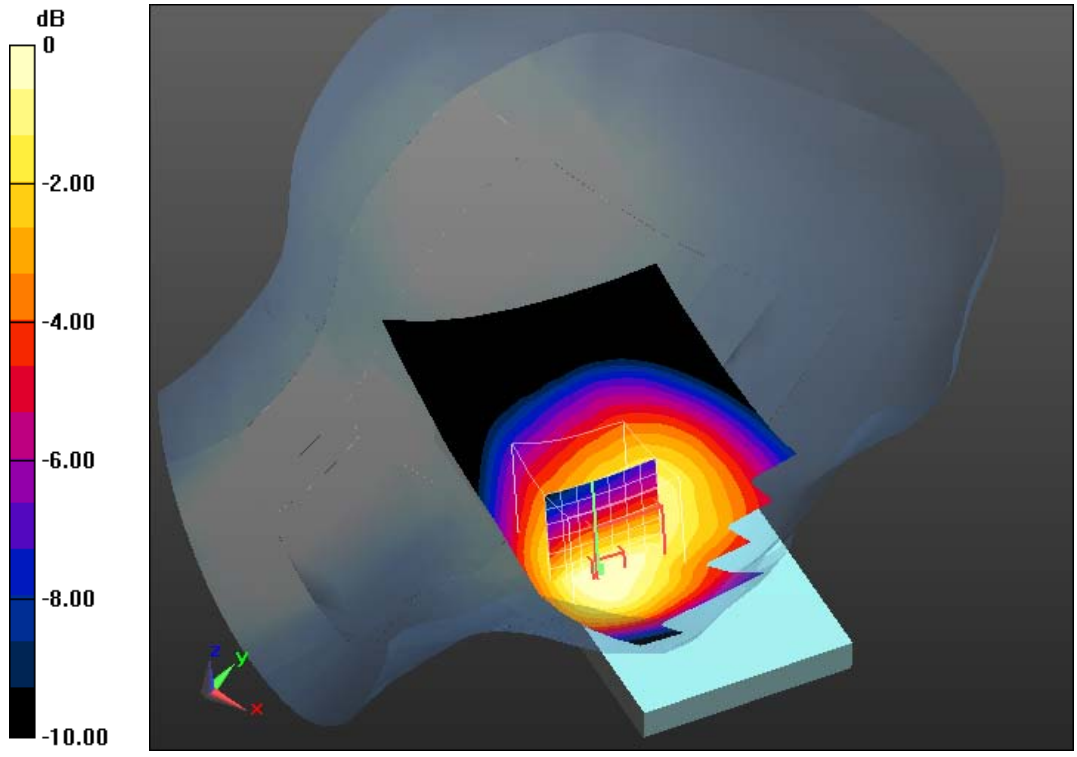
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, WCDMA850 (Band 5) (0); Communication System Band: UMTS FDD V; Frequency: 826.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.876 S/m; ε_r = 42.02; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.32, 6.32, 6.32); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Low/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.546 W/kg

Left-Hand-Side HSL/Touch Position - Low/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.973 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.683 W/kg
SAR(1 g) = 0.492 W/kg; SAR(10 g) = 0.352 W/kg
Maximum value of SAR (measured) = 0.523 W/kg



0 dB = 0.523 W/kg = -2.81 dBW/kg

Additional information:
ambient temperature: 22.9°C; liquid temperature: 22.5°C

Date/Time: 28.08.2013 21:17:03

IEEE1528 - head-FDD V

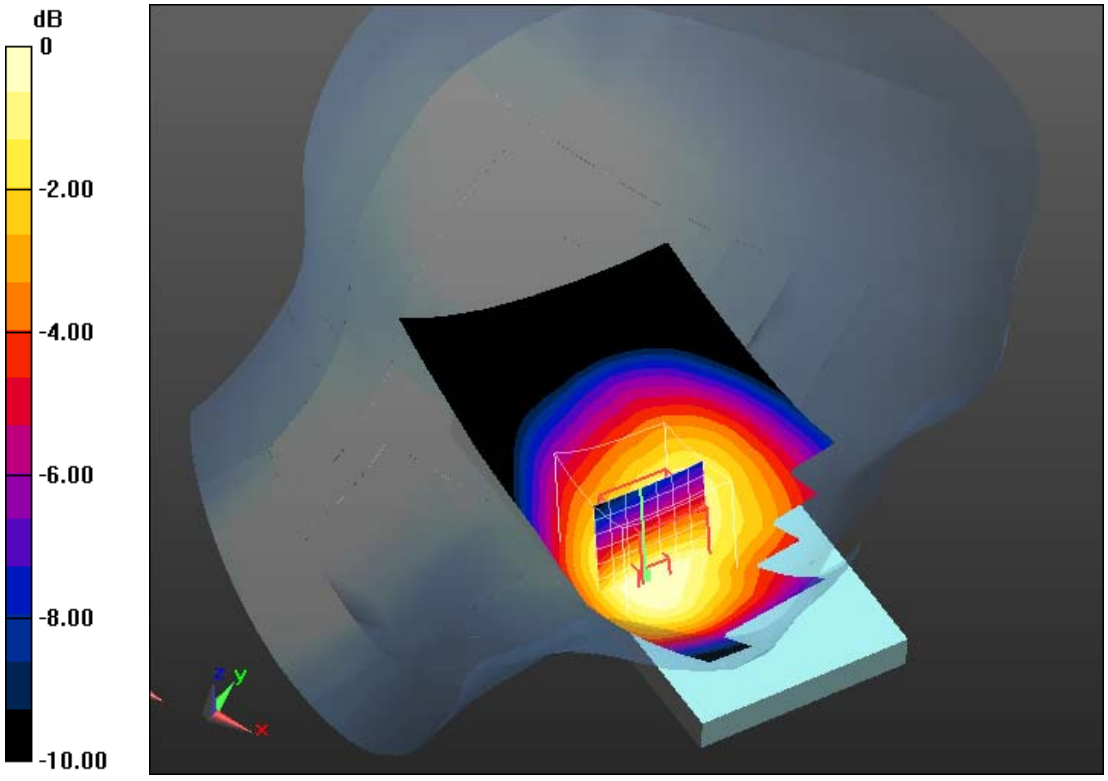
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, WCDMA850 (Band 5) (0); Communication System Band: UMTS FDD V; Frequency: 846.6 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 847 MHz; σ = 0.893 S/m; ε_r = 41.681; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.32, 6.32, 6.32); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Hi/Area Scan (61x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.512 W/kg

Left-Hand-Side HSL/Touch Position - Hi/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.176 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.639 W/kg
SAR(1 g) = 0.460 W/kg; SAR(10 g) = 0.328 W/kg
Maximum value of SAR (measured) = 0.490 W/kg



0 dB = 0.490 W/kg = -3.10 dBW/kg

Additional information:
ambient temperature: 22.9°C; liquid temperature: 22.5°C

Date/Time: 30.08.2013 12:27:39

FCC-hotspot-UMTS FDD V

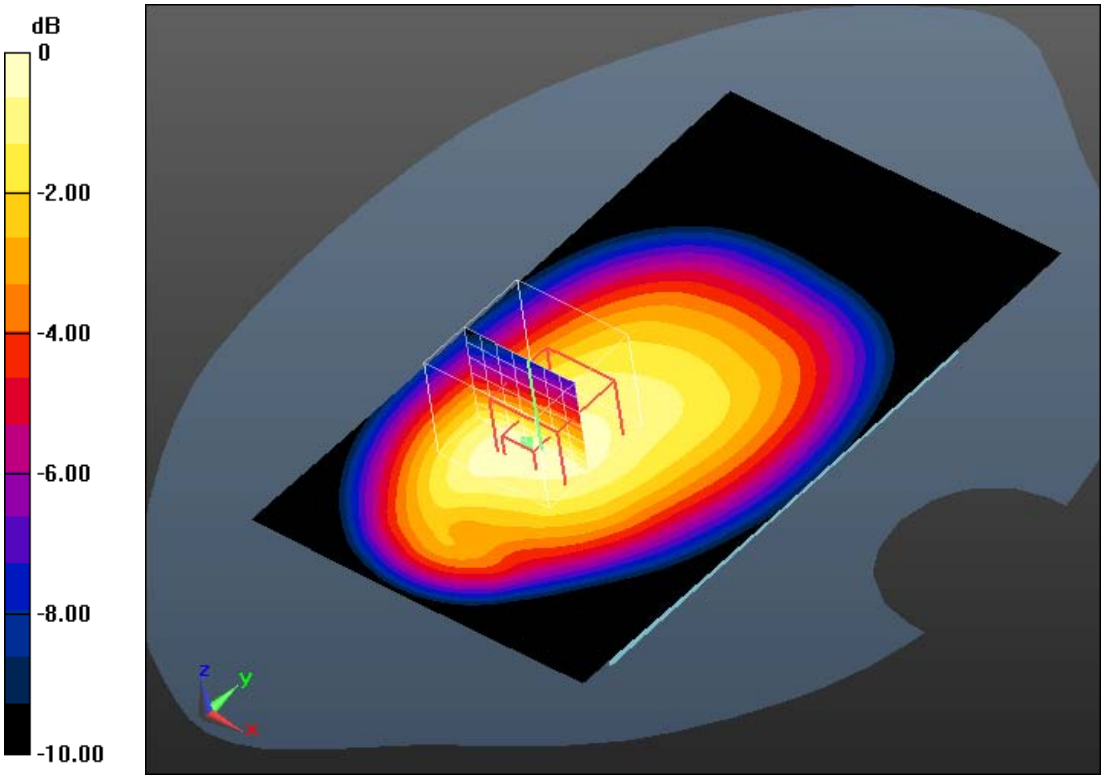
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, WCDMA850 (Band 5) (0); Communication System Band: UMTS FDD V; Frequency: 826.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.957 S/m; ε_r = 56.002; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.29, 6.29, 6.29); Calibrated: 04.06.2013;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot 10mm/Front position - Low/Area Scan (71x121x1): Interpolated

grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.723 W/kg

MSL hotspot 10mm/Front position - Low/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.891 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.964 W/kg
SAR(1 g) = 0.702 W/kg; SAR(10 g) = 0.513 W/kg
Maximum value of SAR (measured) = 0.744 W/kg



0 dB = 0.744 W/kg = -1.28 dBW/kg

Additional information:
position or distance of DUT to SAM: 10 mm
ambient temperature: 23.7°C; liquid temperature: 22.8°C

Date/Time: 30.08.2013 09:52:18

FCC-Body worn-UMTS FDD V

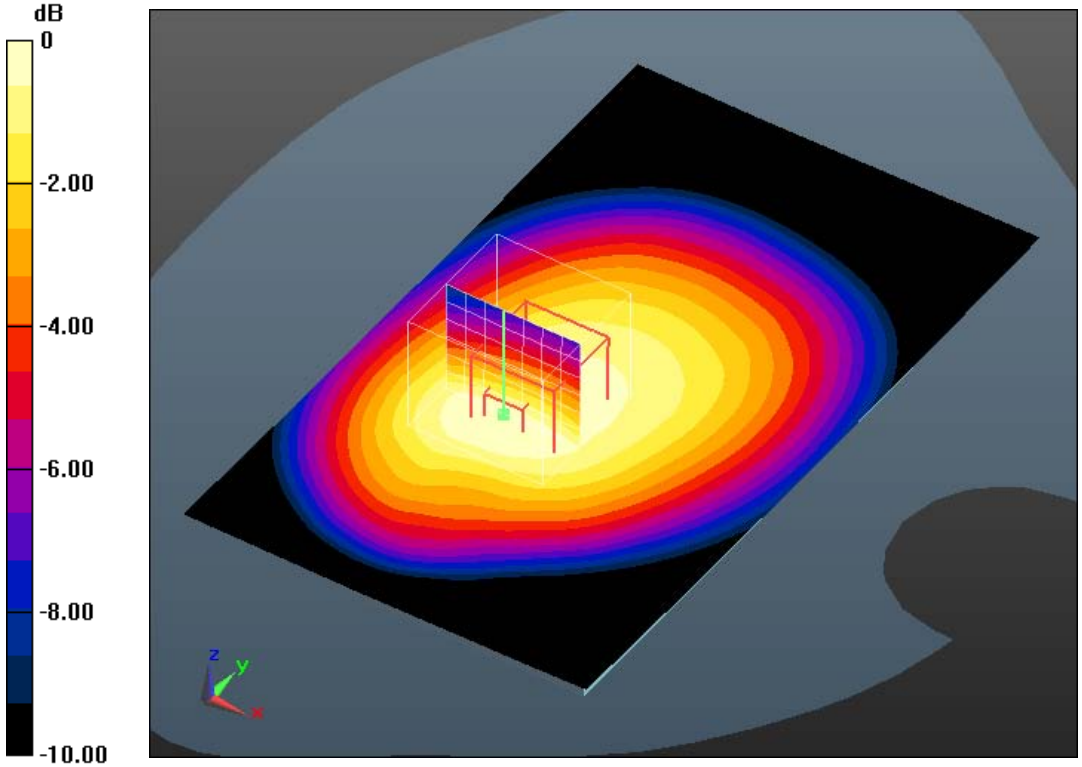
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, WCDMA850 (Band 5) (0); Communication System Band: UMTS FDD V; Frequency: 826.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.957 S/m; ε_r = 56.002; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.29, 6.29, 6.29); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm/Front position - Low/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.614 W/kg

MSL body worn 15mm/Front position - Low/Zoom Scan (8x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.314 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.750 W/kg
SAR(1 g) = 0.580 W/kg; SAR(10 g) = 0.436 W/kg
Maximum value of SAR (measured) = 0.610 W/kg



0 dB = 0.610 W/kg = -2.15 dBW/kg

Additional information:
position or distance of DUT to SAM: 15 mm
ambient temperature: 23.7°C; liquid temperature: 22.8°C

Annex B.6: LTE FDD 2

Date/Time: 09.09.2013 15:27:49

IEEE1528-LTE FDD 2 head

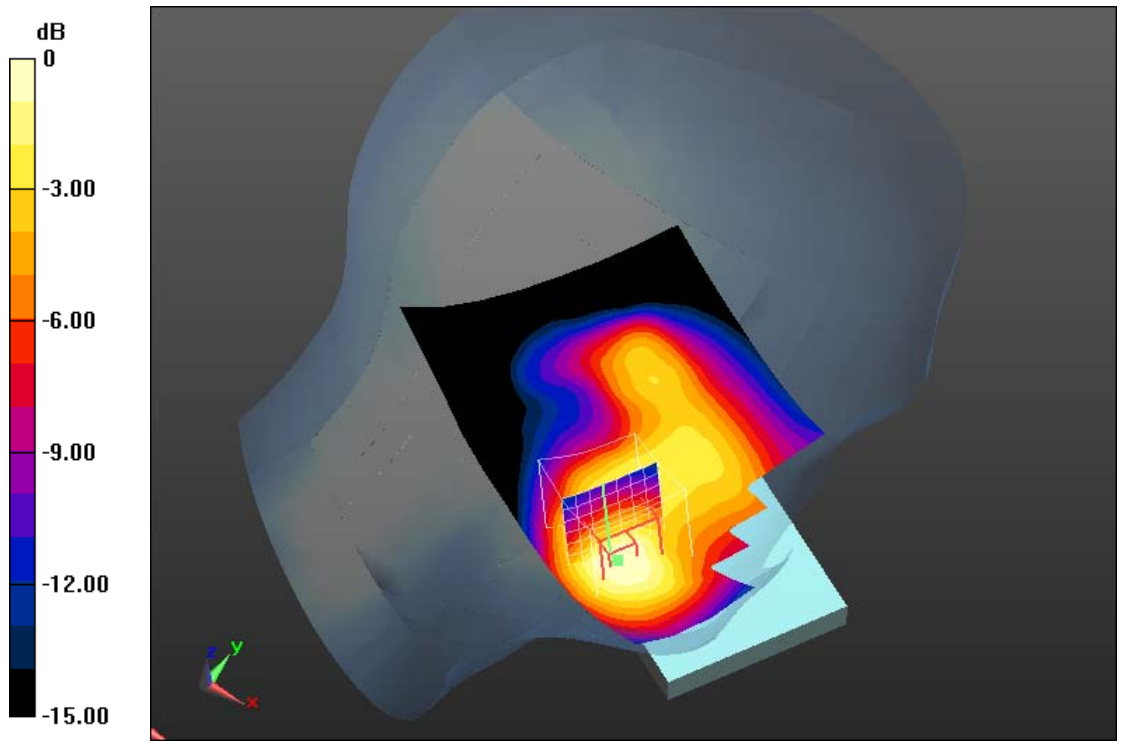
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE1900 (Band 2) (0); Communication System Band: LTE FDD 2;
Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.355 S/m; ε_r = 39.989; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL 20MHz BW 1RB/Touch Position - Middle/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.821 W/kg

Left-Hand-Side HSL 20MHz BW 1RB/Touch Position - Middle/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.019 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.742 W/kg; SAR(10 g) = 0.458 W/kg
Maximum value of SAR (measured) = 0.813 W/kg



0 dB = 0.813 W/kg = -0.90 dBW/kg

Additional information:
ambient temperature: 22.9°C; liquid temperature: 22.7°C

Date/Time: 09.09.2013 16:14:11

IEEE1528-LTE FDD 2 head

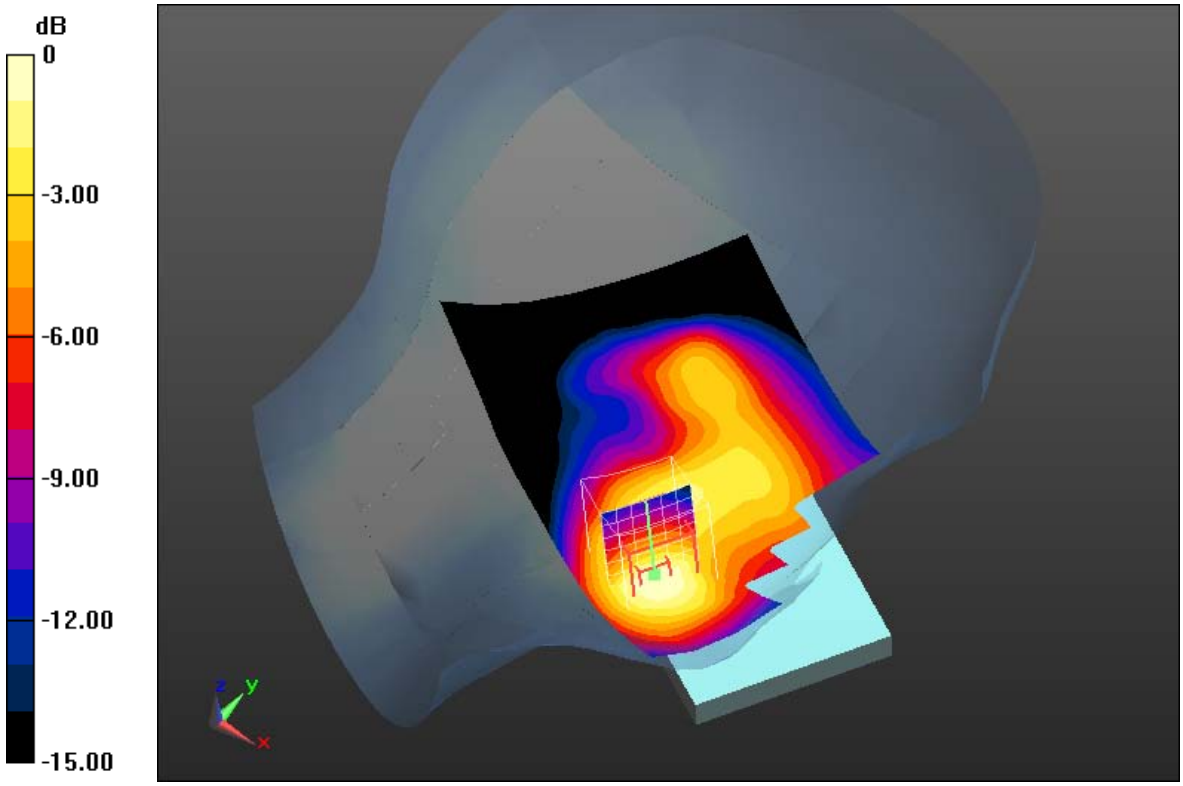
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE1900 (Band 2) (0); Communication System Band: LTE FDD 2; Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.369 S/m; ε_r = 39.892; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL 20MHz BW 1RB/Touch Position - Hi/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.763 W/kg

Left-Hand-Side HSL 20MHz BW 1RB/Touch Position - Hi/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.276 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.711 W/kg; SAR(10 g) = 0.436 W/kg
Maximum value of SAR (measured) = 0.770 W/kg



0 dB = 0.770 W/kg = -1.14 dBW/kg

Additional information:
ambient temperature: 22.9°C; liquid temperature: 22.7°C

Date/Time: 07.09.2013 16:09:21

FCC-hotspot-LTE FDD 2 - Power back off

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 2 (1900MHz); Frequency: 1860 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1860 MHz; σ = 1.464 S/m; ε_r = 52.916; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot hotspot 10mm 20MHz BW - 50RB/Rear position - Low 50RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.31 W/kg

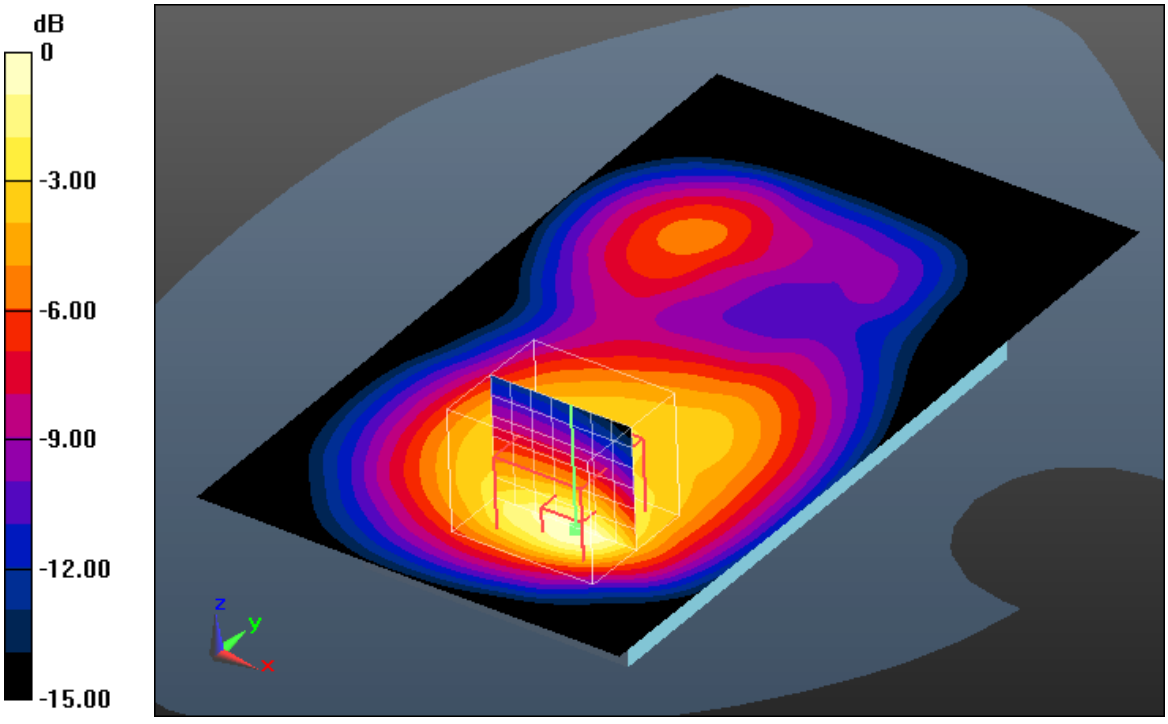
MSL hotspot 10mm 20MHz BW - 50RB/Rear position - Low 50RB offset/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 28.657 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.89 W/kg

SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.583 W/kg

Maximum value of SAR (measured) = 1.26 W/kg



0 dB = 1.26 W/kg = 1.00 dBW/kg

Additional information:

position or distance of DUT to SAM: 10mm

ambient temperature: 22.0°C; liquid temperature: 21.7°C

Date/Time: 03.09.2013 11:43:45

FCC-Body worn-LTE FDD 2

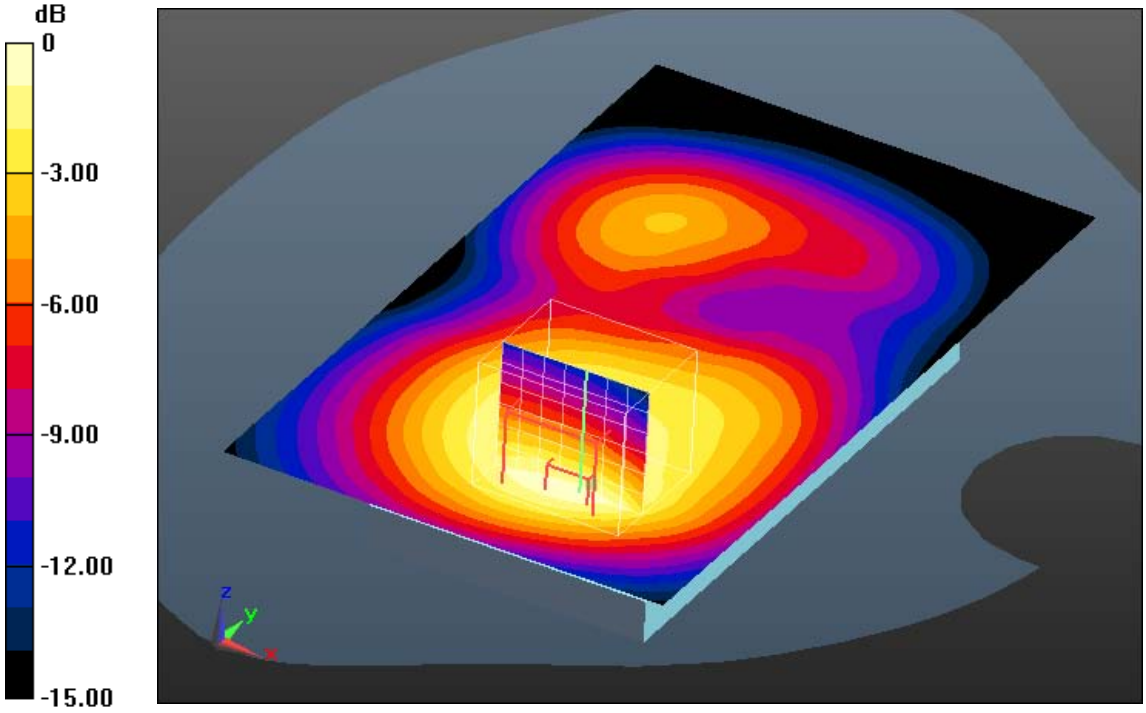
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059
Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 2 (1900MHz); Frequency: 1860 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1860 MHz; σ = 1.464 S/m; ε_r = 52.916; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm 20MHz BW - 1RB/Rear position - Low 0RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.688 W/kg

MSL body worn 15mm 20MHz BW - 1RB/Rear position - Low 0RB offset/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.774 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.997 W/kg
SAR(1 g) = 0.611 W/kg; SAR(10 g) = 0.378 W/kg
Maximum value of SAR (measured) = 0.675 W/kg



0 dB = 0.675 W/kg = -1.71 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.5°C; liquid temperature: 22.8°C

Date/Time: 03.09.2013 11:25:54

FCC-Body worn-LTE FDD 2

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

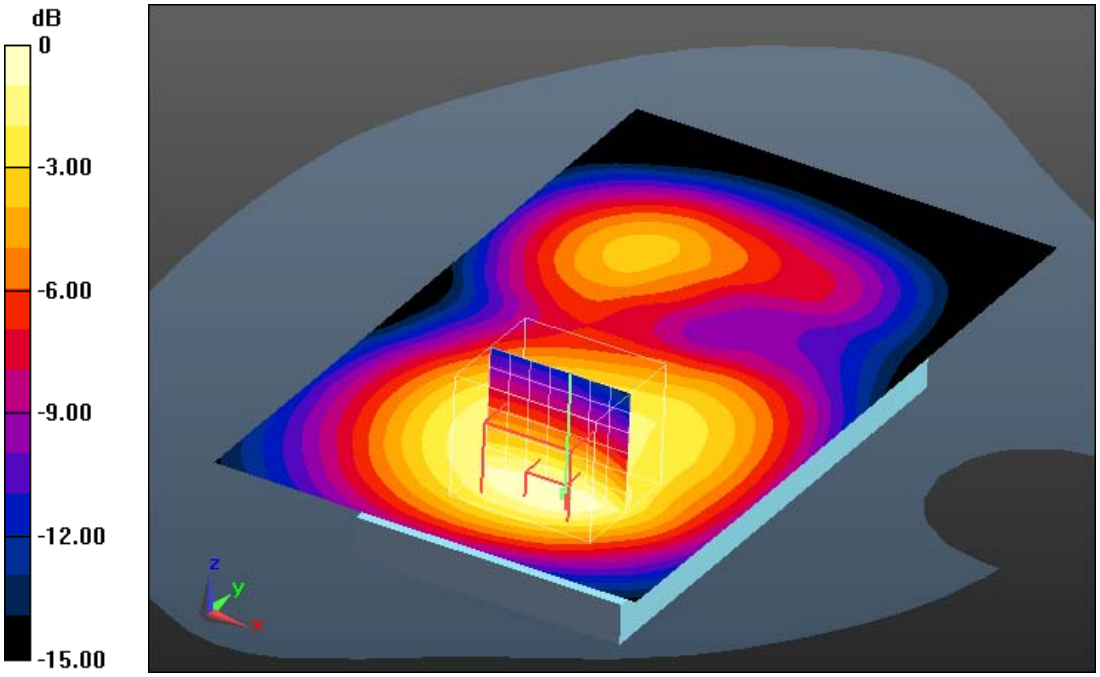
Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 2 (1900MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.488 S/m; ε_r = 52.85; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.21, 4.21, 4.21); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm 20MHz BW - 1RB/Rear position - Middle 50RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.668 W/kg

MSL body worn 15mm 20MHz BW - 1RB/Rear position - Middle 50RB offset/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.915 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.929 W/kg
SAR(1 g) = 0.595 W/kg; SAR(10 g) = 0.362 W/kg
Maximum value of SAR (measured) = 0.649 W/kg



0 dB = 0.649 W/kg = -1.88 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.5°C; liquid temperature: 22.8°C

Annex B.7: LTE FDD 4

Date/Time: 30.08.2013 11:27:33

IEEE1528-LTE FDD 4 head

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 4 (1700MHz); Frequency: 1732.5 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.37 S/m; ε_r = 39.865; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.93, 4.93, 4.93); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Right-Hand-Side HSL 20MHz BW - 1RB/Touch Position - Mid 0RB offset/Area Scan (71x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.882 W/kg

Right-Hand-Side HSL 20MHz BW - 1RB/Touch Position - Mid 0RB offset/Zoom Scan (7x7x7)/Cube 0:

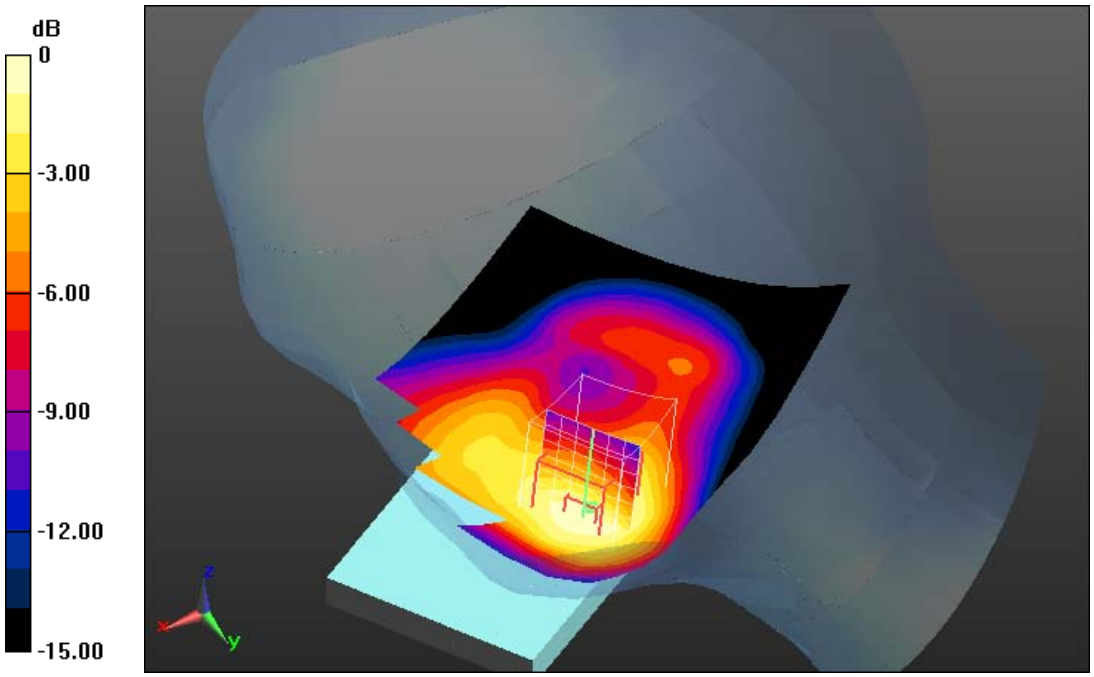
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 27.070 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.784 W/kg; SAR(10 g) = 0.530 W/kg

Maximum value of SAR (measured) = 0.849 W/kg



0 dB = 0.849 W/kg = -0.71 dBW/kg

Additional information:

ambient temperature: 23.5°C; liquid temperature: 23.1°C

Date/Time: 05.09.2013 16:05:36

FCC-hotspot-LTE FDD 4 - Power back off

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 4 (1700MHz); Frequency: 1732.5 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.484 S/m; ε_r = 52.644; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot 10mm 20MHz BW - 50RB/Rear position - Mid 0RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.26 W/kg

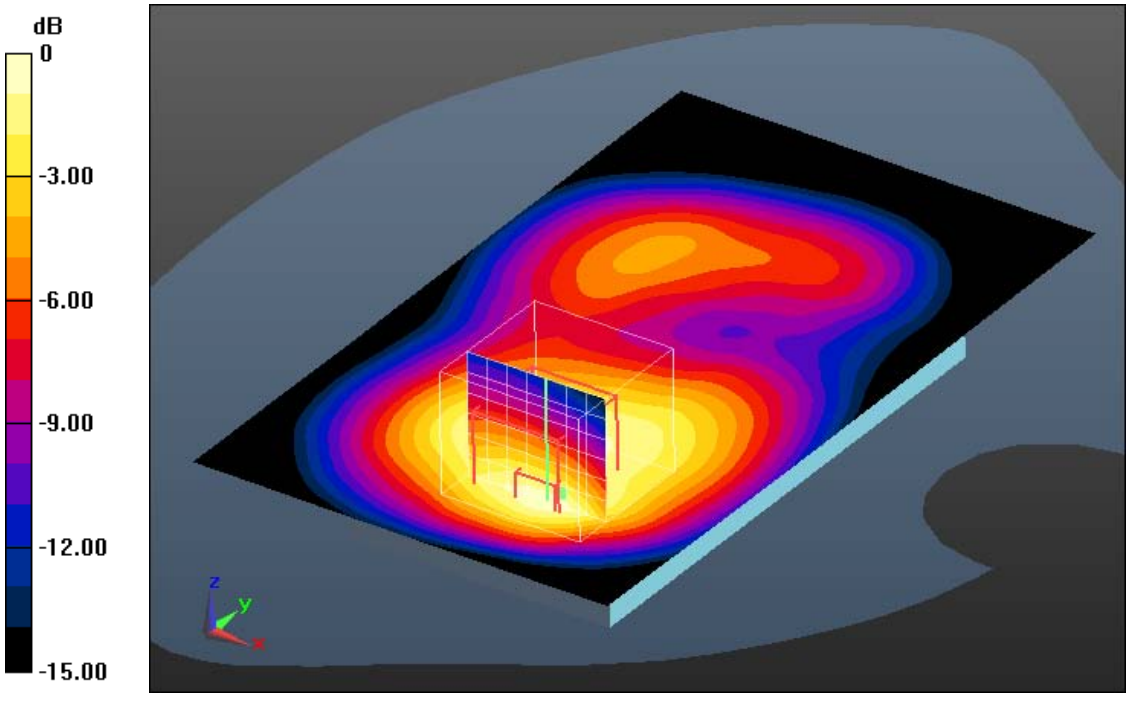
MSL hotspot 10mm 20MHz BW - 50RB/Rear position - Mid 0RB offset/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.174 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.51 W/kg

SAR(1 g) = 1 W/kg; SAR(10 g) = 0.618 W/kg

Maximum value of SAR (measured) = 1.10 W/kg



0 dB = 1.10 W/kg = 0.41 dBW/kg

Additional information:

position or distance of DUT to SAM: 10mm

ambient temperature: 23.2°C; liquid temperature: 22.9°C

Date/Time: 04.09.2013 10:15:00

FCC-Body worn-LTE FDD 4

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 4 (1700MHz); Frequency: 1720 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1720 MHz; σ = 1.471 S/m; ε_r = 52.673; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm 20MHz BW - 1RB/Front position - Low 0RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.847 W/kg

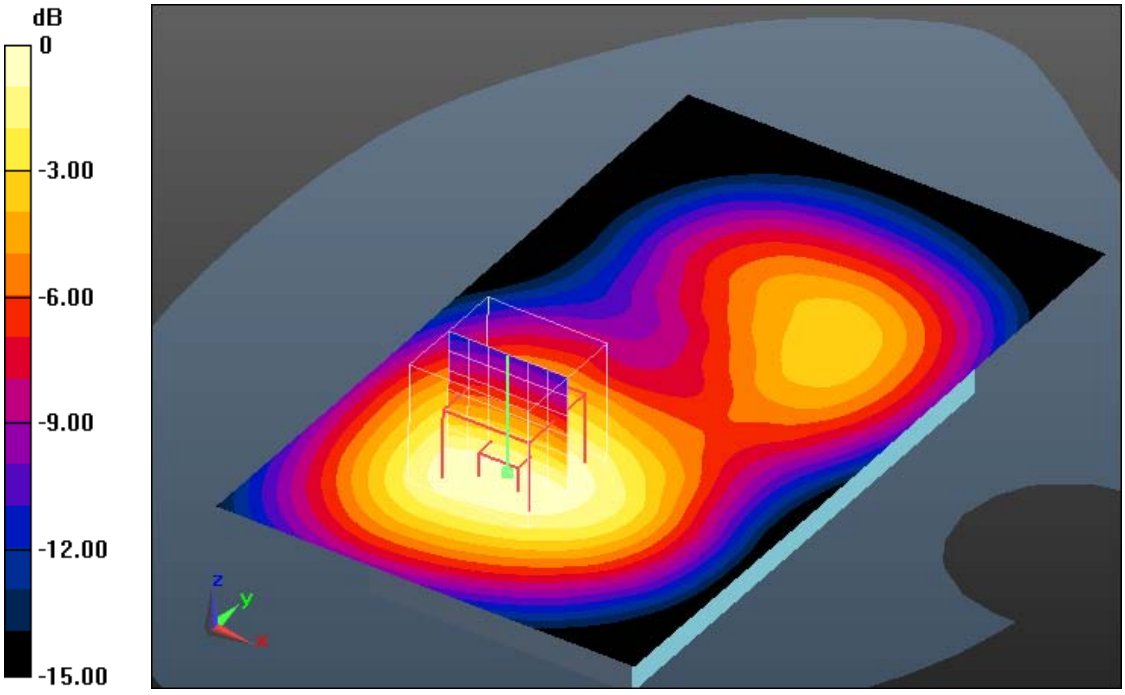
MSL body worn 15mm 20MHz BW - 1RB/Front position - Low 0RB offset/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.759 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.772 W/kg; SAR(10 g) = 0.508 W/kg

Maximum value of SAR (measured) = 0.835 W/kg



0 dB = 0.835 W/kg = -0.78 dBW/kg

Additional information:

position or distance of DUT to SAM: 15mm

ambient temperature: 23.3°C; liquid temperature: 22.9°C

Date/Time: 04.09.2013 18:01:42

FCC-Body worn-LTE FDD 4

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478059

Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 4 (1700MHz); Frequency: 1732.5 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.484 S/m; ε_r = 52.644; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.41, 4.41, 4.41); Calibrated: 22.08.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.7, 32.7
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm 20MHz BW - 1RB/Front position - Middle 0RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.821 W/kg

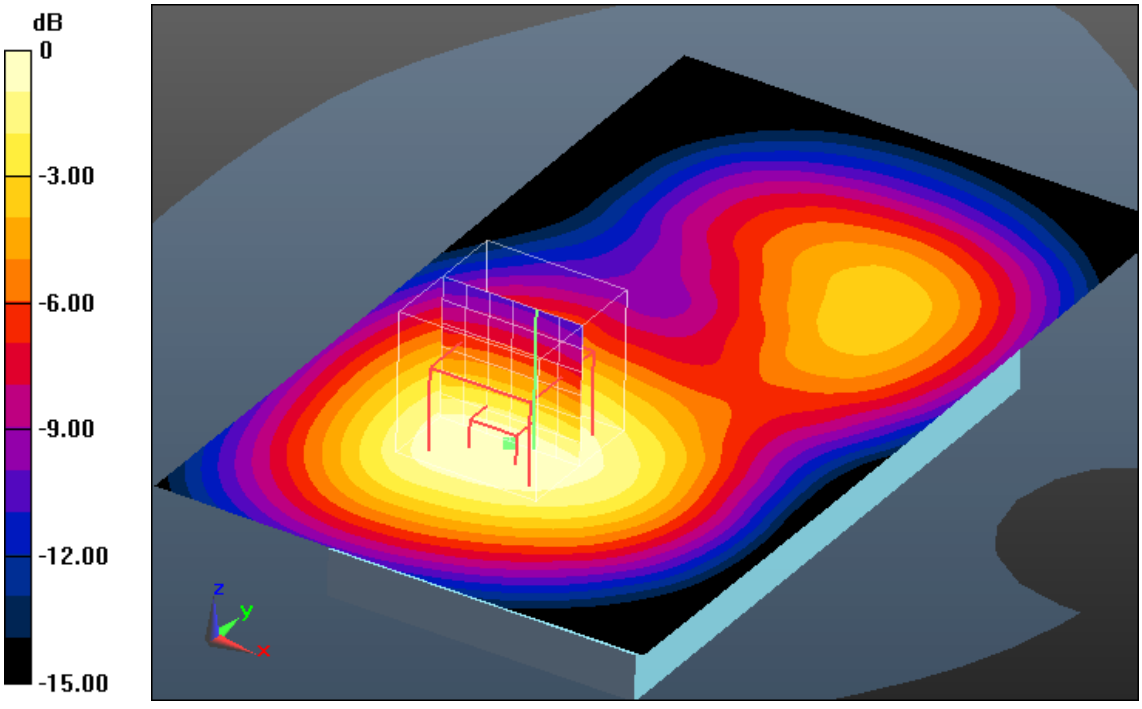
MSL body worn 15mm 20MHz BW - 1RB/Front position - Middle 0RB offset/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.408 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = 0.761 W/kg; SAR(10 g) = 0.508 W/kg

Maximum value of SAR (measured) = 0.814 W/kg



0 dB = 0.814 W/kg = -0.89 dBW/kg

Additional information:

position or distance of DUT to SAM: 15mm

ambient temperature: 23.3°C; liquid temperature: 22.9°C

Annex B.8: LTE FDD 5

Date/Time: 29.08.2013 17:53:23

IEEE1528- head-LTE 5

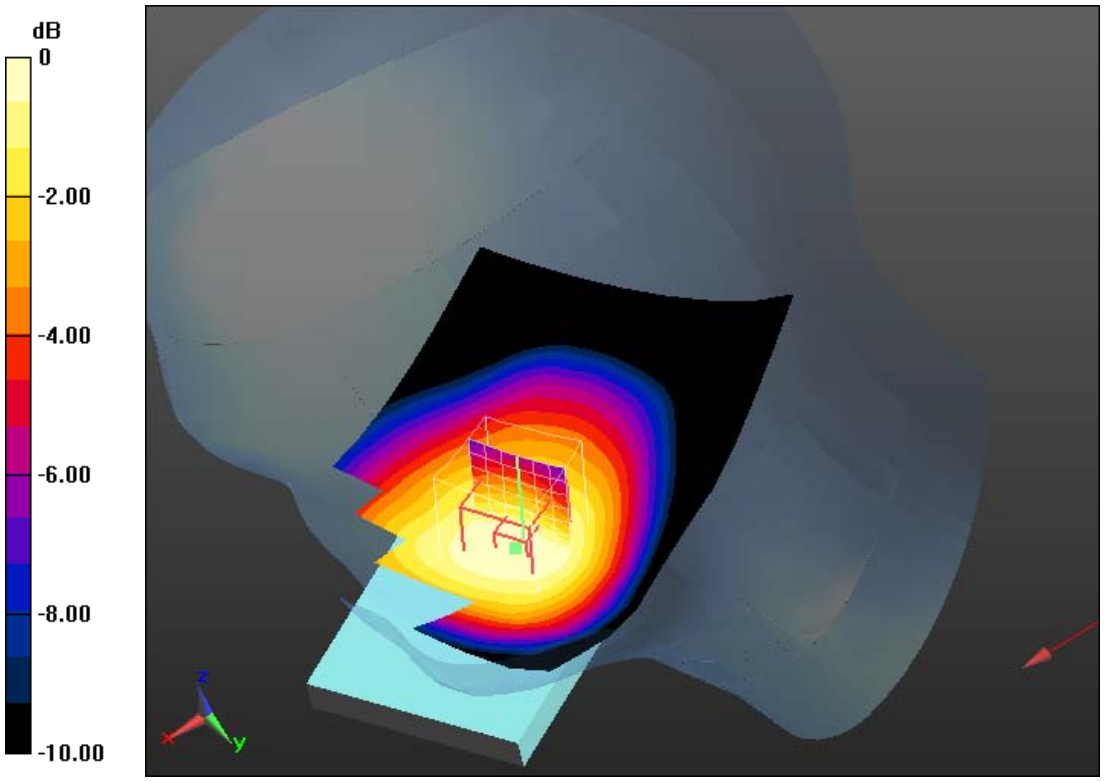
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE850 (Band 5) (0); Communication System Band: LTE 5; Frequency: 829 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 829 MHz; σ = 0.879 S/m; ε_r = 42.002; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.32, 6.32, 6.32); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Right-Hand-Side HSL 10MHz BW 1RB/Touch Position - Low/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.561 W/kg

Right-Hand-Side HSL 10MHz BW 1RB/Touch Position - Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.750 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.653 W/kg
SAR(1 g) = 0.534 W/kg; SAR(10 g) = 0.412 W/kg
Maximum value of SAR (measured) = 0.561 W/kg



0 dB = 0.561 W/kg = -2.51 dBW/kg

Additional information:
ambient temperature: 23.3°C; liquid temperature: 22.3°C

Date/Time: 31.08.2013 10:47:14

FCC-hotspot-LTE 5

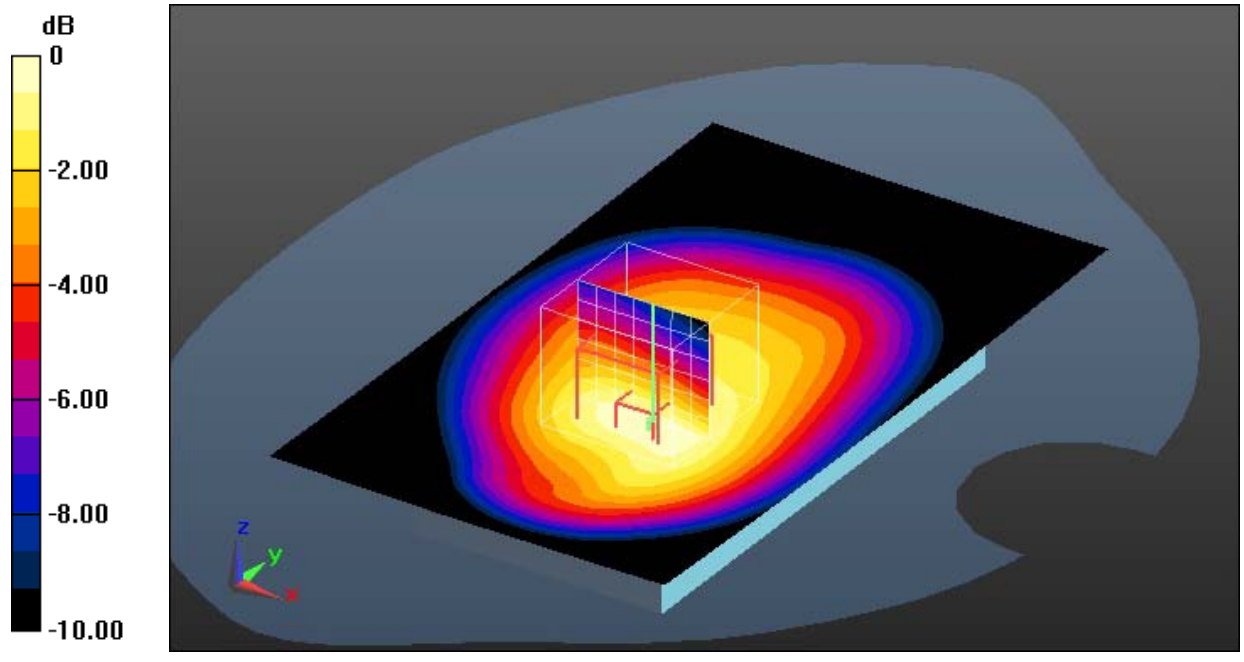
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE850 (Band 5) (0); Communication System Band: LTE 5; Frequency: 829 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 829 MHz; σ = 0.959 S/m; ε_r = 55.973; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.29, 6.29, 6.29); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot 10mm 10MHz BW - 1RB/Rear position - Low 0RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.775 W/kg

MSL hotspot 10mm 10MHz BW - 1RB/Rear position - Low 0RB offset/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 28.827 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.726 W/kg; SAR(10 g) = 0.522 W/kg
Maximum value of SAR (measured) = 0.776 W/kg



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

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.2°C; liquid temperature: 23.0°C

Date/Time: 30.08.2013 19:48:01

FCC-Body worn-LTE 5

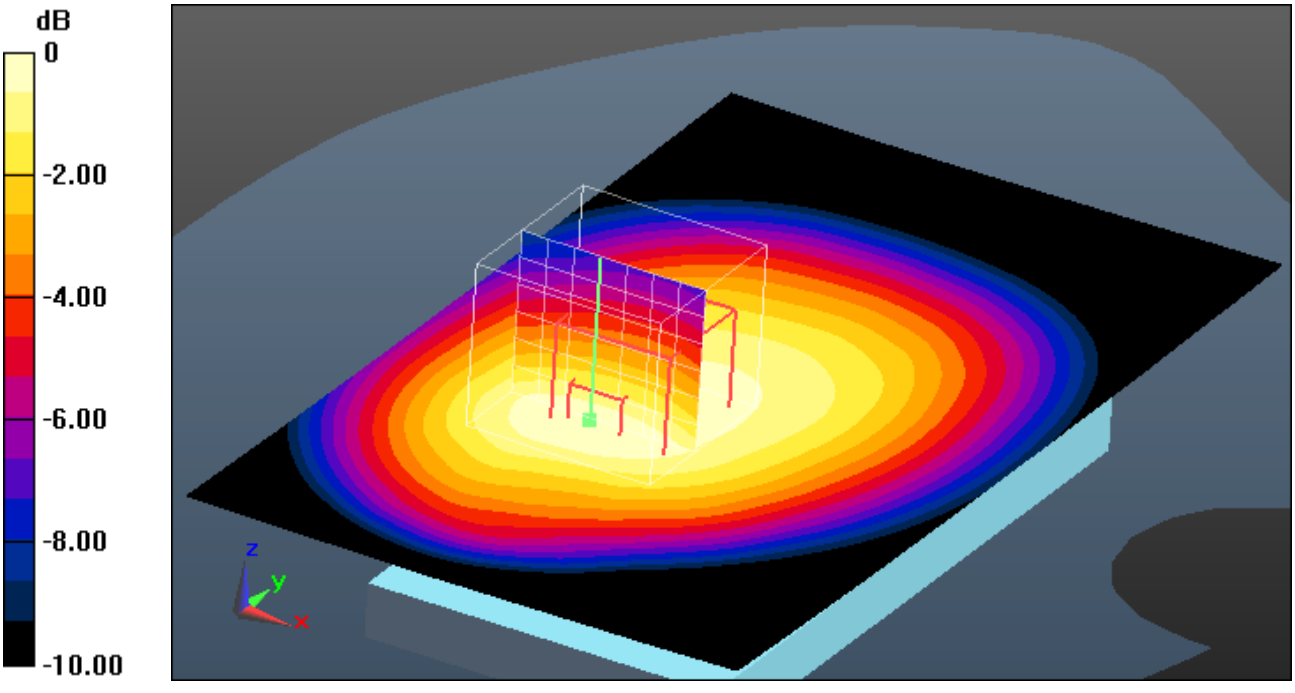
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE850 (Band 5) (0); Communication System Band: LTE 5; Frequency: 829 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 829 MHz; σ = 0.959 S/m; ε_r = 55.973; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.29, 6.29, 6.29); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm 10MHz BW - 1RB/Front position - Low 0 RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.655 W/kg

MSL body worn 15mm 10MHz BW - 1RB/Front position - Low 0 RB offset/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.179 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.808 W/kg
SAR(1 g) = 0.626 W/kg; SAR(10 g) = 0.474 W/kg
Maximum value of SAR (measured) = 0.655 W/kg



0 dB = 0.655 W/kg = -1.84 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.2°C; liquid temperature: 22.5°C

Annex B.9: LTE FDD 17

Date/Time: 02.09.2013 11:16:57

IEEE1528- head-LTE 17

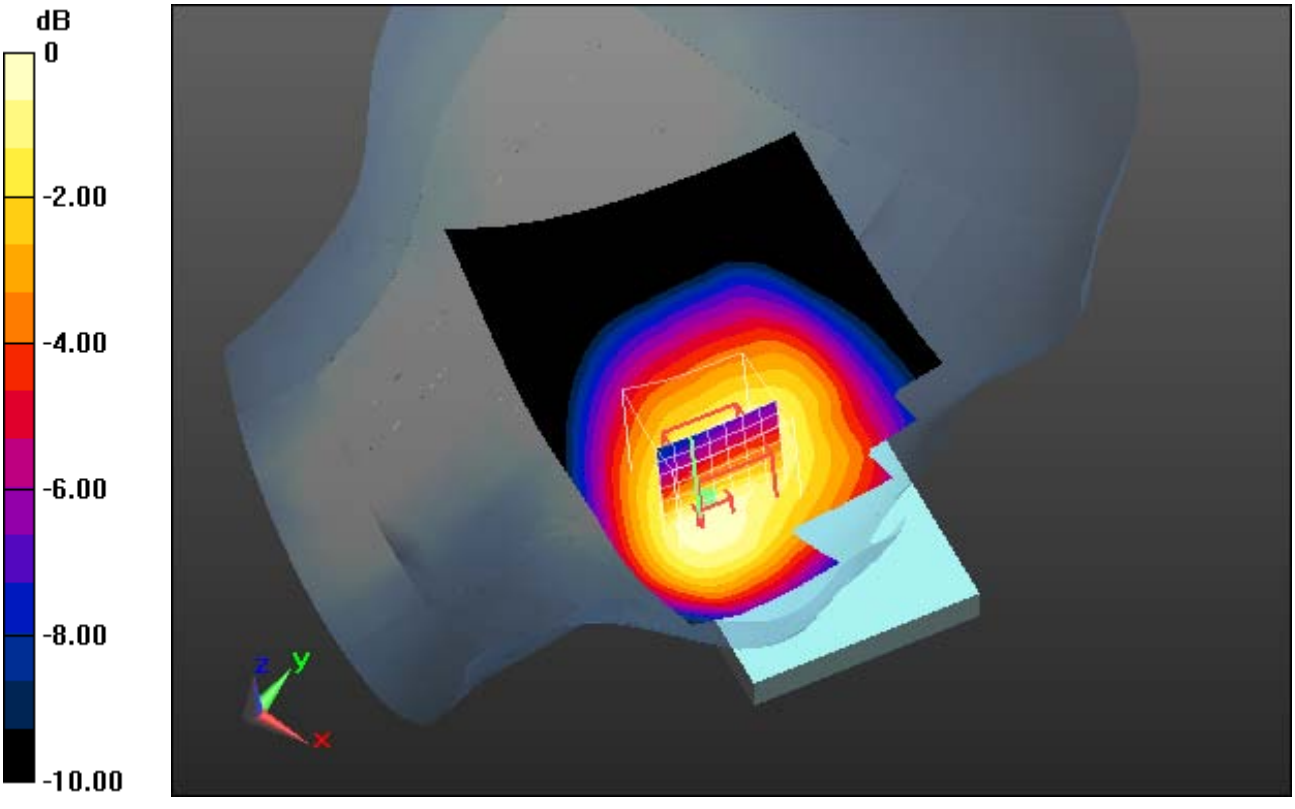
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE700 (Band 17) (0); Communication System Band: LTE FDD 17;
Frequency: 709 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 709 MHz; σ = 0.851 S/m; ε_r = 41.466; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.54, 6.54, 6.54); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL 10MHz BW 1RB/Touch Position - Low 49RB offset/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.380 W/kg

Left-Hand-Side HSL 10MHz BW 1RB/Touch Position - Low 49RB offset/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.972 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.481 W/kg
SAR(1 g) = 0.350 W/kg; SAR(10 g) = 0.256 W/kg
Maximum value of SAR (measured) = 0.370 W/kg



0 dB = 0.370 W/kg = -4.32 dBW/kg

Additional information:
ambient temperature: 23.3°C; liquid temperature: 22.4°C

Date/Time: 02.09.2013 14:39:24

IEEE1528- head-LTE 17

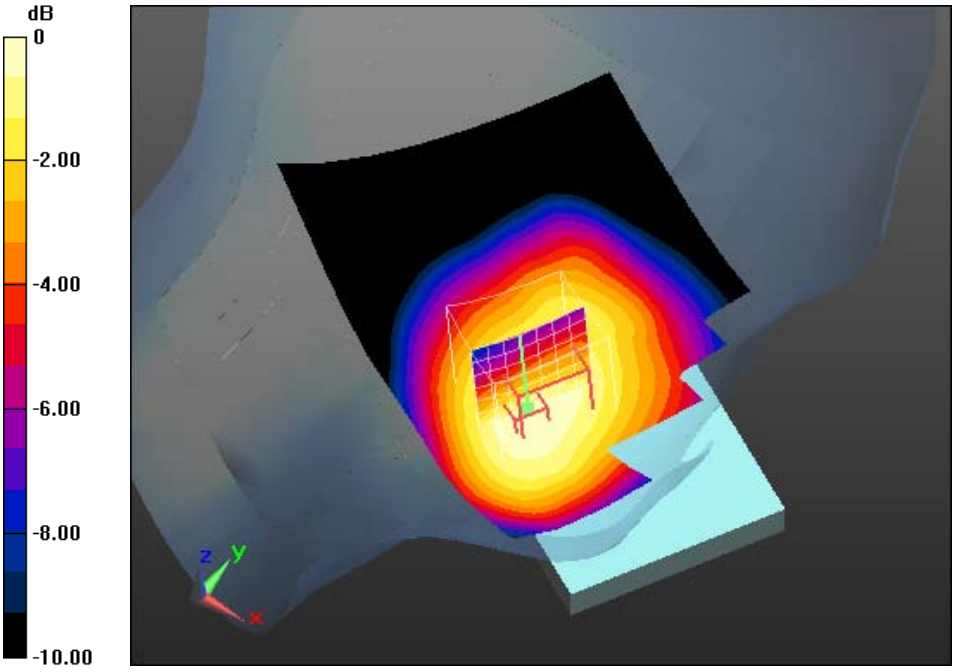
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE700 (Band 17) (0); Communication System Band: LTE FDD 17; Frequency: 710 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 710 MHz; σ = 0.852 S/m; ε_r = 41.486; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.54, 6.54, 6.54); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL 10MHz BW 1RB/Touch Position - Middle 49RB offset/Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.377 W/kg

Left-Hand-Side HSL 10MHz BW 1RB/Touch Position - Middle 49RB offset/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.608 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 0.513 W/kg
SAR(1 g) = 0.343 W/kg; SAR(10 g) = 0.253 W/kg
Maximum value of SAR (measured) = 0.366 W/kg



0 dB = 0.366 W/kg = -4.37 dBW/kg

Additional information:
ambient temperature: 23.3°C; liquid temperature: 22.4°C

Date/Time: 03.09.2013 15:15:10

FCC-hotspot-LTE 17

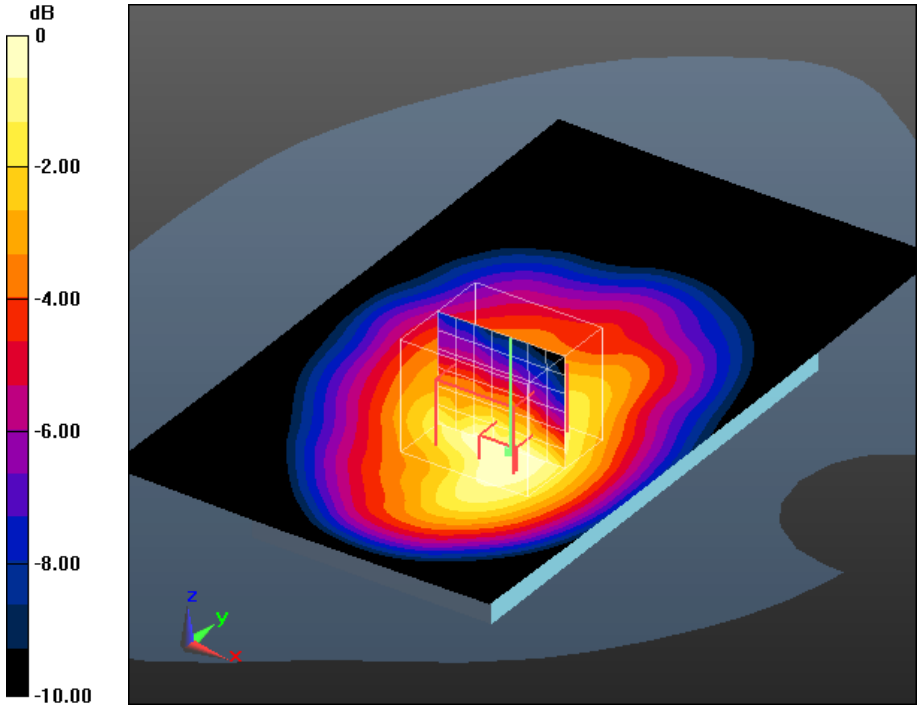
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE700 (Band 17) (0); Communication System Band: LTE FDD 17;
Frequency: 710 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 710 MHz; σ = 0.927 S/m; ε_r = 56.435; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.36, 6.36, 6.36); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL hotspot 10mm 10MHz BW - 1RB/Rear position - Mid 49RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.618 W/kg

MSL hotspot 10mm 10MHz BW - 1RB/Rear position - Mid 49RB offset/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.157 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.834 W/kg
SAR(1 g) = 0.541 W/kg; SAR(10 g) = 0.378 W/kg
Maximum value of SAR (measured) = 0.611 W/kg



0 dB = 0.611 W/kg = -2.14 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.6°C; liquid temperature: 23.0°C

Date/Time: 03.09.2013 14:15:51

FCC-Body worn-LTE 17

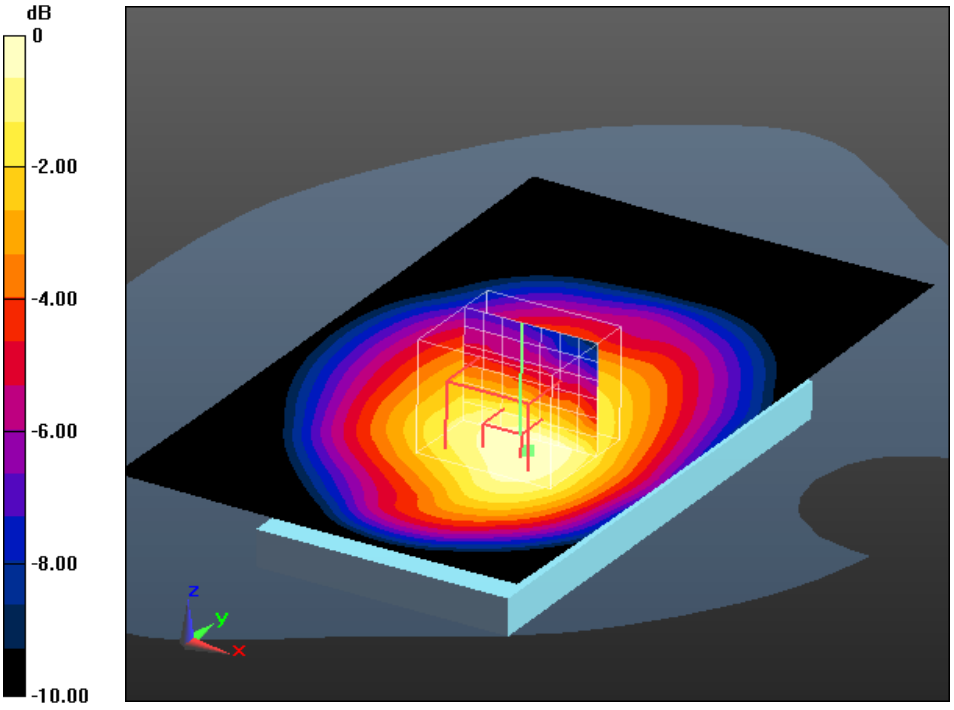
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, LTE700 (Band 17) (0); Communication System Band: LTE FDD 17;
Frequency: 710 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 710 MHz; σ = 0.927 S/m; ε_r = 56.435; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.36, 6.36, 6.36); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL body worn 15mm 10MHz BW - 1RB/Rear position - Mid 49RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.376 W/kg

MSL body worn 15mm 10MHz BW - 1RB/Rear position - Mid 49RB offset/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.062 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.530 W/kg
SAR(1 g) = 0.343 W/kg; SAR(10 g) = 0.241 W/kg
Maximum value of SAR (measured) = 0.367 W/kg



0 dB = 0.367 W/kg = -4.35 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.6°C; liquid temperature: 23.0°C

Annex B.10: WLAN 2450MHz

Date/Time: 04.09.2013 19:00:45

IEEE1528_EN62209 - WLAN2450 head

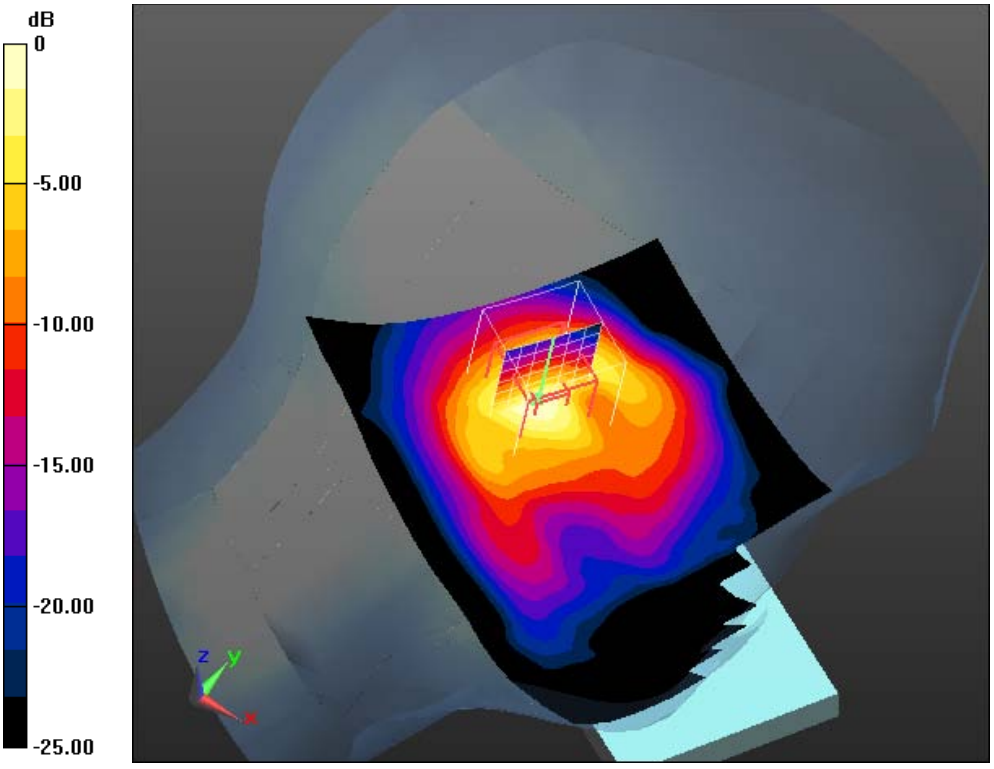
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133
Communication System: UID 0, WLAN2450 (0); Communication System Band: WLAN; Frequency: 2412 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2412 MHz; σ = 1.78 S/m; ε_r = 39.189; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.49, 4.49, 4.49); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Low/Area Scan (111x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.899 W/kg

Left-Hand-Side HSL/Touch Position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.100 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.92 W/kg
SAR(1 g) = 0.826 W/kg; SAR(10 g) = 0.342 W/kg
Maximum value of SAR (measured) = 0.970 W/kg



0 dB = 0.970 W/kg = -0.13 dBW/kg

Additional information:
ambient temperature: 22.9°C; liquid temperature: 22.7°C

Date/Time: 04.09.2013 14:15:07

FCC_EN62209-2-WLAN2450-hotspot

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133

Communication System: UID 0, WLAN 2450 (0); Communication System Band: 2450 MHz; Frequency: 2437 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 2437 MHz; σ = 1.944 S/m; ε_r = 51.398; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(4.36, 4.36, 4.36); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL - hotspot - 10mm/Rear Position - Middle/Area Scan (111x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.663 W/kg

MSL - hotspot - 10mm/Rear Position - Middle/Zoom Scan (7x7x7)/Cube 0:

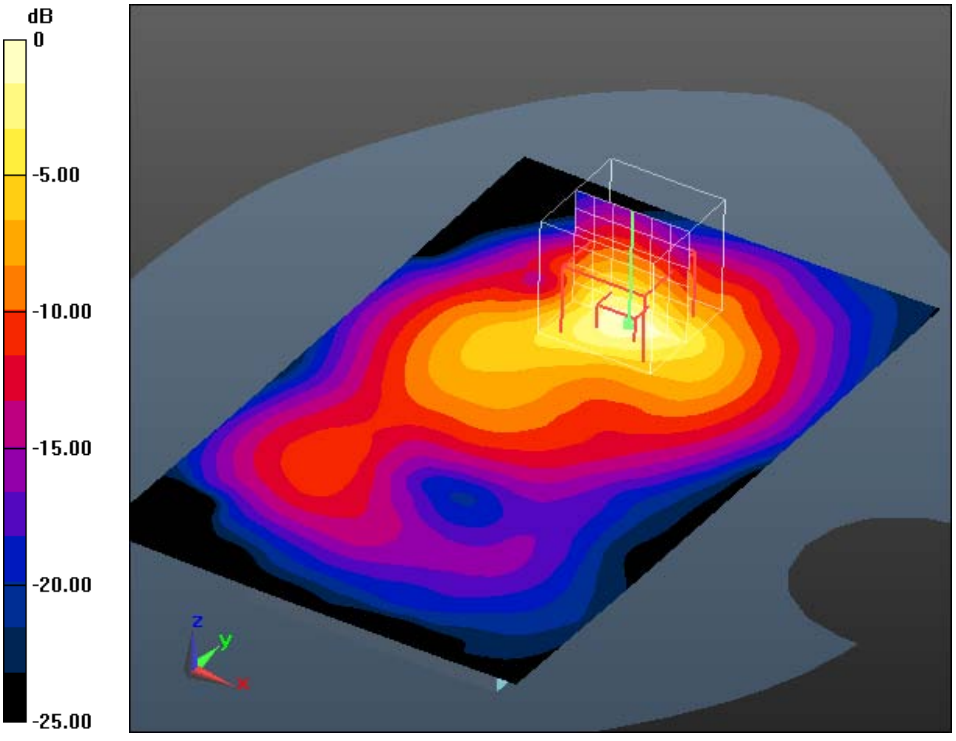
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.053 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.586 W/kg; SAR(10 g) = 0.264 W/kg

Maximum value of SAR (measured) = 0.702 W/kg



0 dB = 0.702 W/kg = -1.54 dBW/kg

Additional information:

position or distance of DUT to SAM: 10mm

ambient temperature: 22.9°C; liquid temperature: 22.7°C

Date/Time: 04.09.2013 15:20:26

FCC_EN62209-2-WLAN2450-body worn

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242478133

Communication System: UID 0, WLAN 2450 (0); Communication System Band: 2450 MHz; Frequency: 2462 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 2462 MHz; σ = 1.98 S/m; ε_r = 51.316; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(4.36, 4.36, 4.36); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Body MSL - body worn - 15mm/Rear Position - Hi/Area Scan (111x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.266 W/kg

Body MSL - body worn - 15mm/Rear Position - Hi/Zoom Scan (7x7x7)/Cube 0:

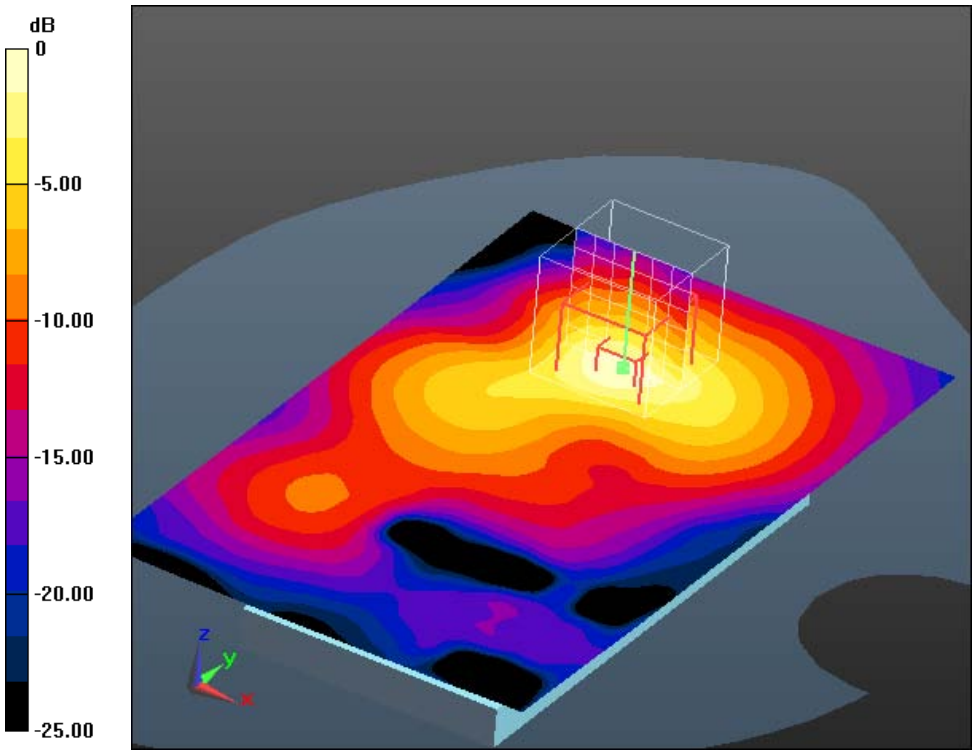
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.616 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.450 W/kg

SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.116 W/kg

Maximum value of SAR (measured) = 0.271 W/kg



0 dB = 0.271 W/kg = -5.67 dBW/kg

Additional information:

position or distance of DUT to SAM: 15mm

ambient temperature: 22.9°C; liquid temperature: 22.7°C

Annex B.11: WLAN 5GHz

Date/Time: 11.10.2013 09:58:42

IEEE1528_EN62209-WLAN5GHz-head 2013 10 11

DUT: BlackBerry; Type: RGF111LW; Serial: 004402242470056

Communication System: UID 0, WLAN 5GHz (0); Communication System Band: 5 GHz Band; Frequency: 5320 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 5320 MHz; σ = 4.636 S/m; ε_r = 36.36; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: EX3DV4 - SN3944; ConvF(5.22, 5.22, 5.22); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

RightHandSide/Touch position - Channel 64/Area Scan (111x171x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.743 W/kg

RightHandSide/Touch position - Channel 64/Zoom Scan (8x8x12)/Cube 0:

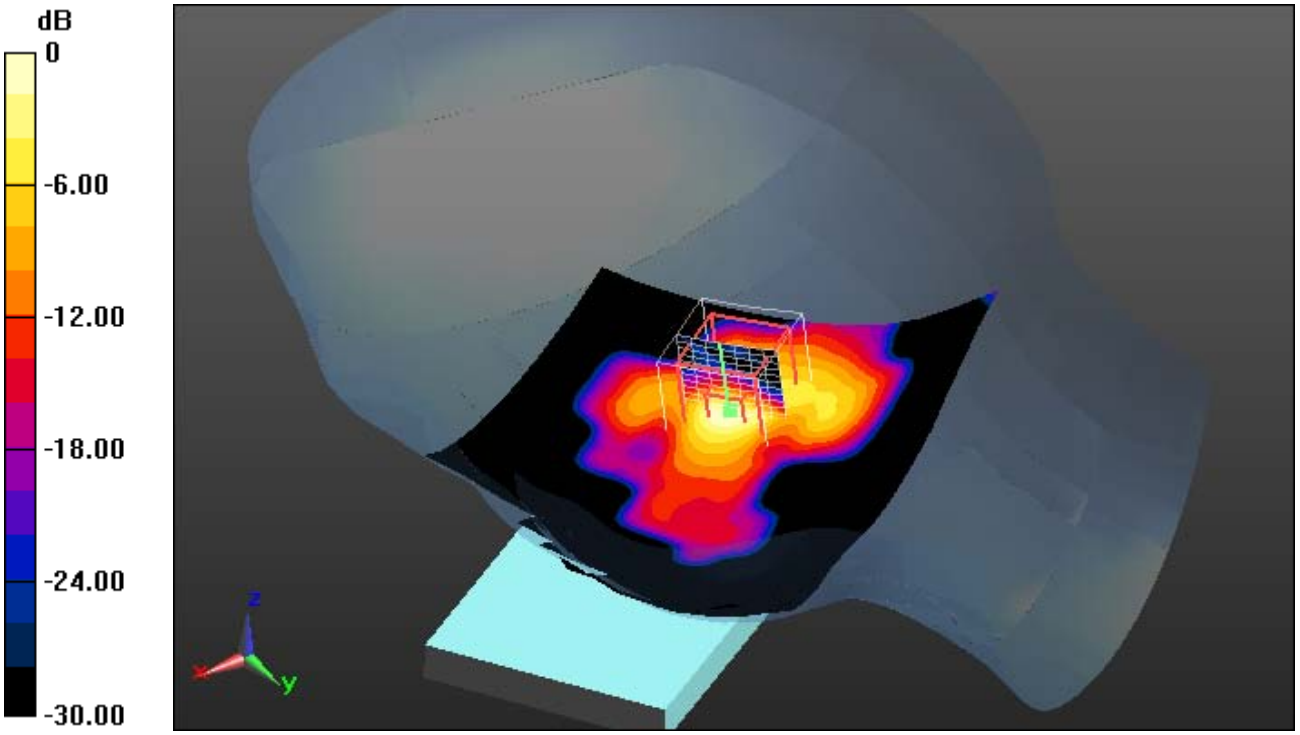
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 9.505 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.42 W/kg

SAR(1 g) = 0.321 W/kg; SAR(10 g) = 0.095 W/kg

Maximum value of SAR (measured) = 0.684 W/kg



0 dB = 0.684 W/kg = -1.65 dBW/kg

Additional information:

ambient temperature: 22.9°C; liquid temperature: 22.5°C

Date/Time: 10.10.2013 15:00:53

FCC_EN62209-2-Body worn WLAN 5GHz

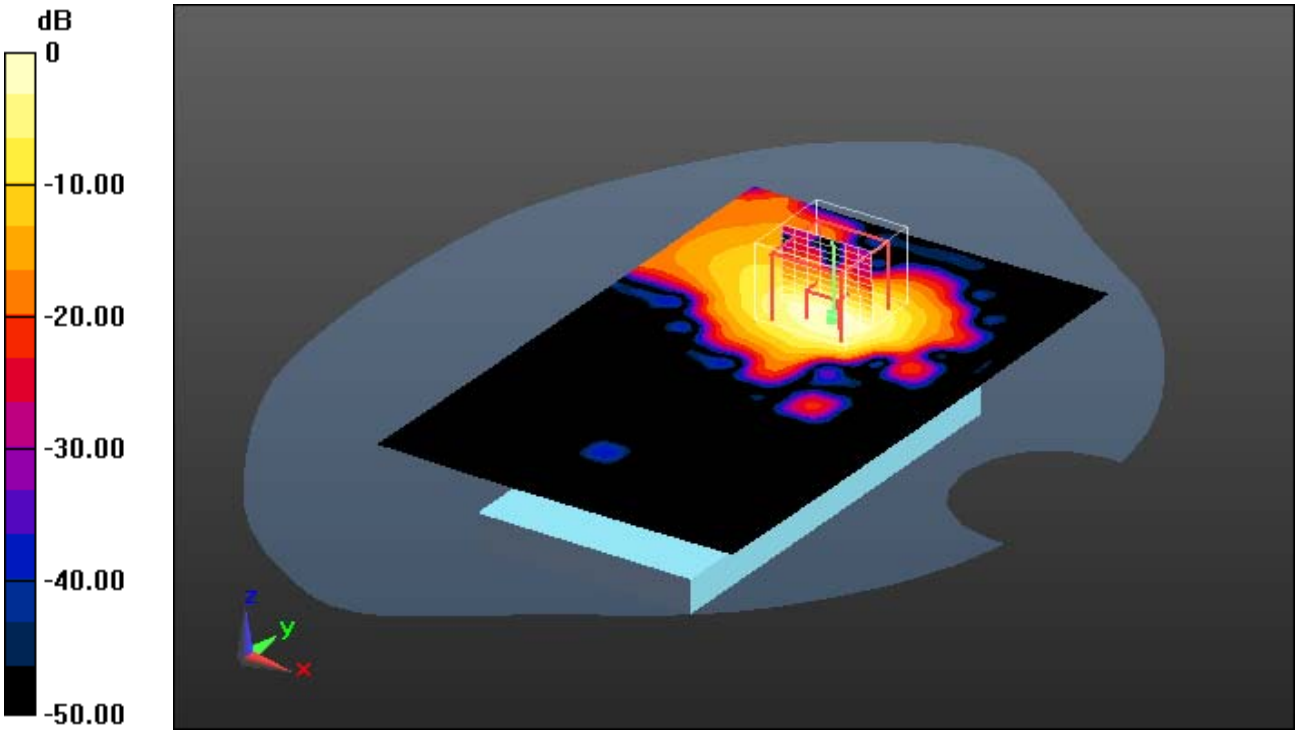
DUT: BlackBerry; Type: RGF111LW; Serial: 004402242470056
Communication System: UID 0, WLAN5000 a-mode (0); Communication System Band: WLAN5000;
Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 5.71 S/m; ε_r = 47.27; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.09, 4.09, 4.09); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 11.01.2013
- Phantom: SAM; Type: SAM; Serial: 1043
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL-5GHz/Rear position - Channel 100/Area Scan (111x171x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.758 W/kg

MSL-5GHz/Rear position - Channel 100/Zoom Scan (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.879 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 0.414 W/kg; SAR(10 g) = 0.138 W/kg
Maximum value of SAR (measured) = 0.810 W/kg



0 dB = 0.810 W/kg = -0.92 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.8°C; liquid temperature: 23.2°C

Annex B.12: Liquid depth

Photo 1: Liquid depth 750 MHz head simulating liquid

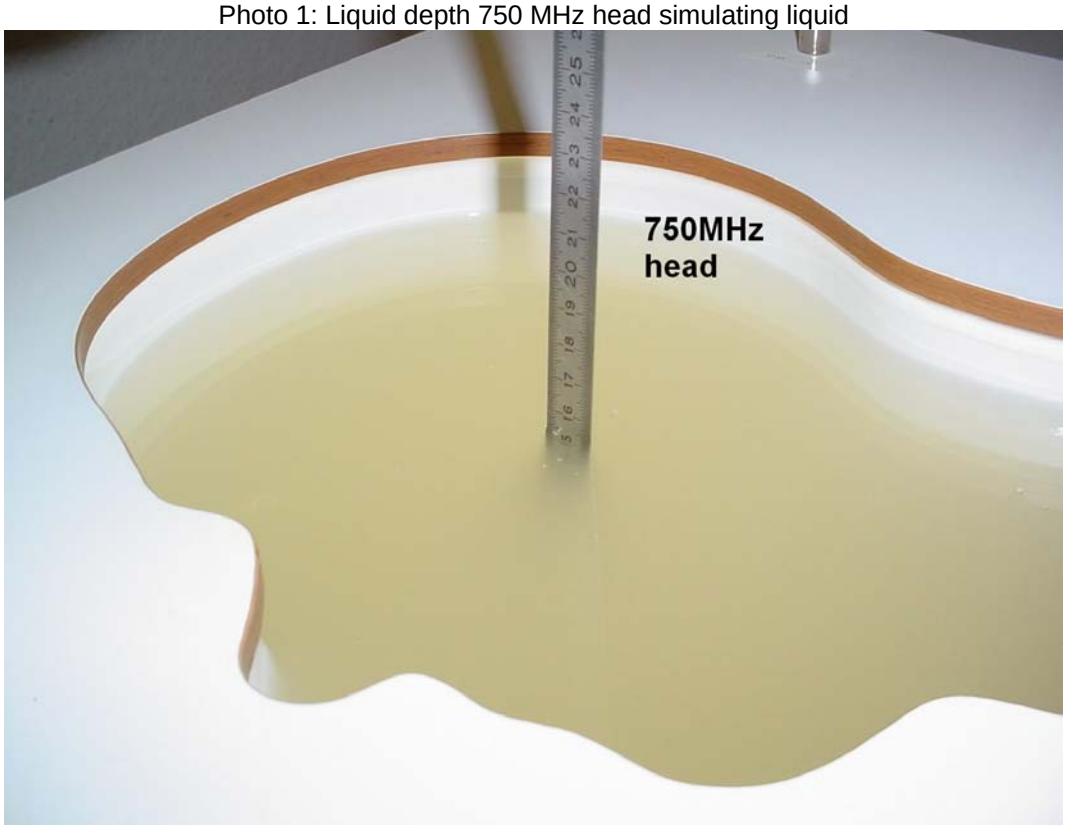


Photo 2: Liquid depth 750 MHz body simulating liquid

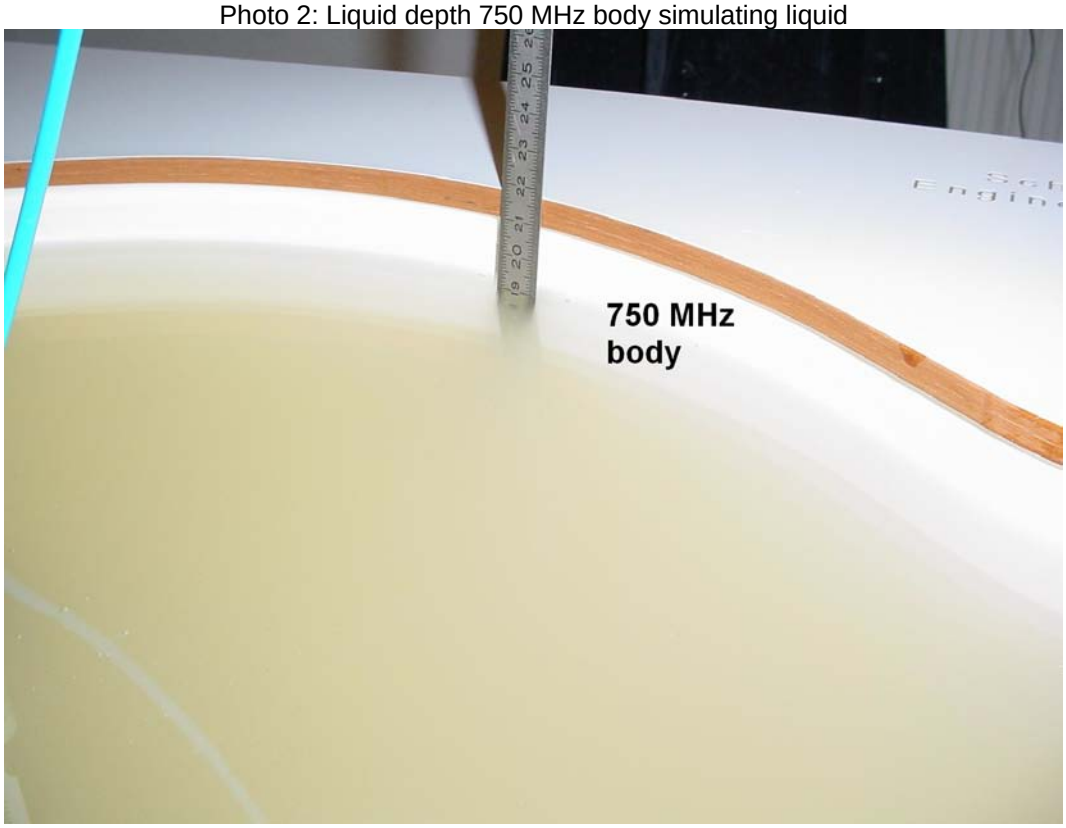


Photo 3: Liquid depth 850 MHz head simulating liquid

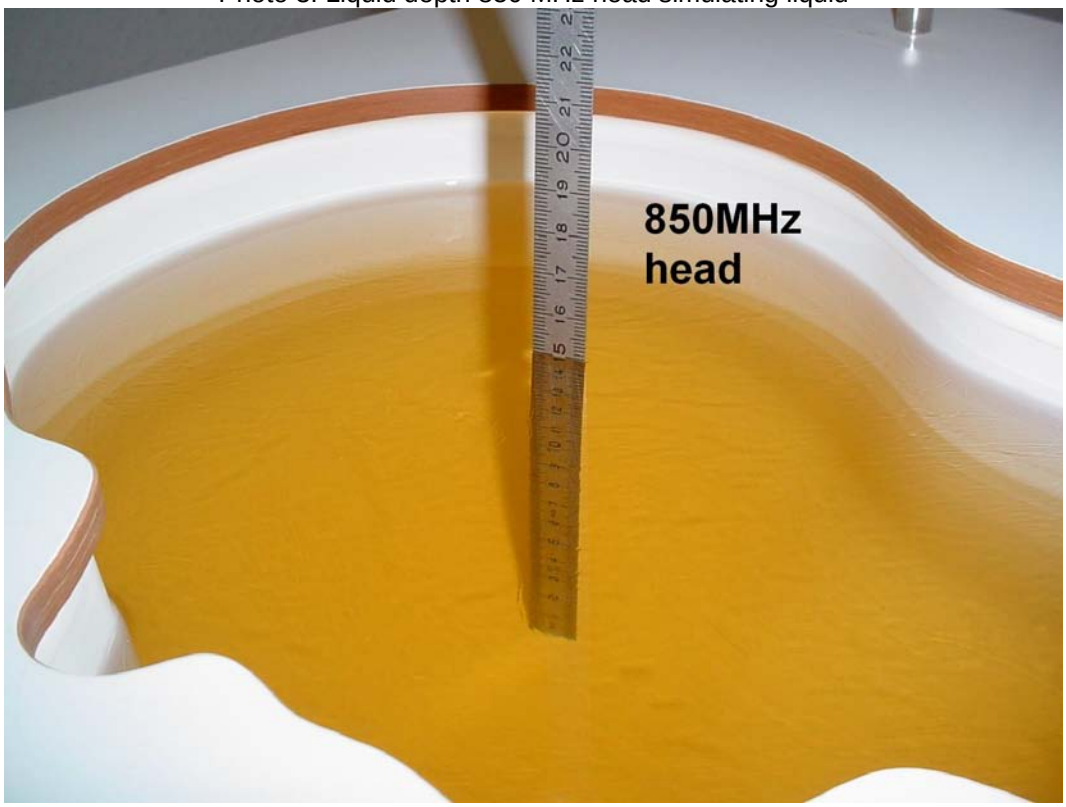


Photo 4: Liquid depth 850 MHz body simulating liquid

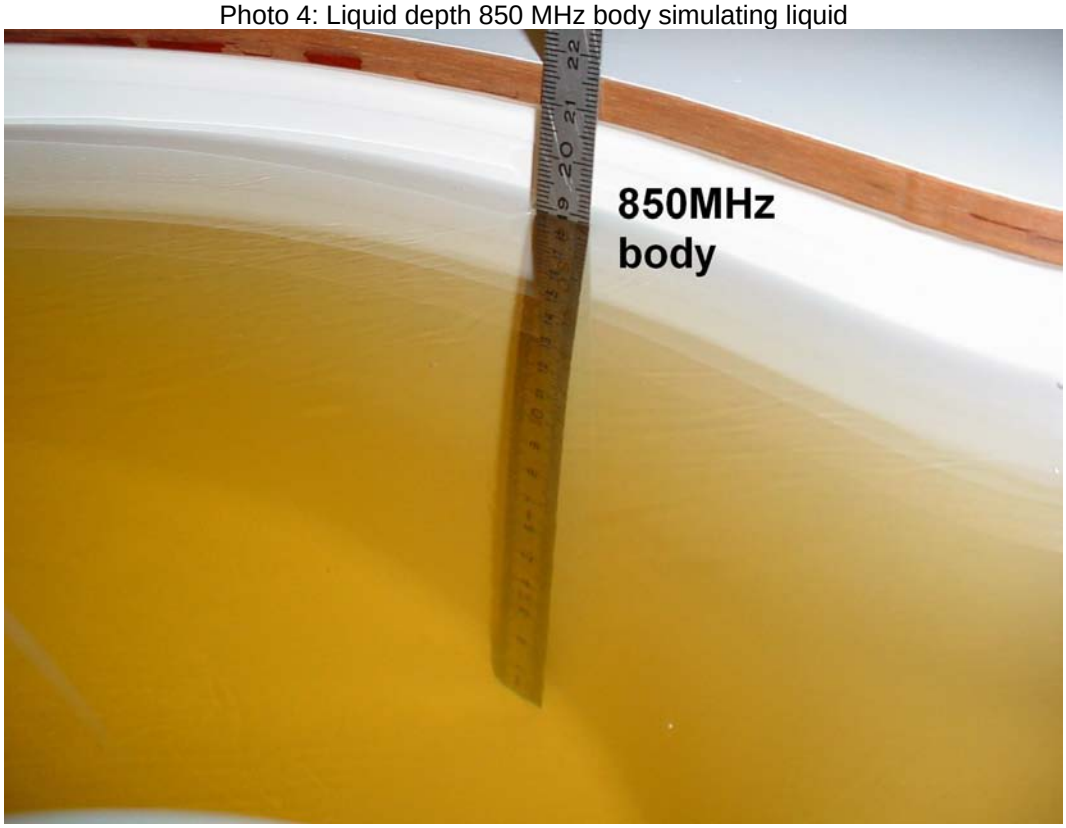


Photo 5: Liquid depth 1800MHz head simulating liquid

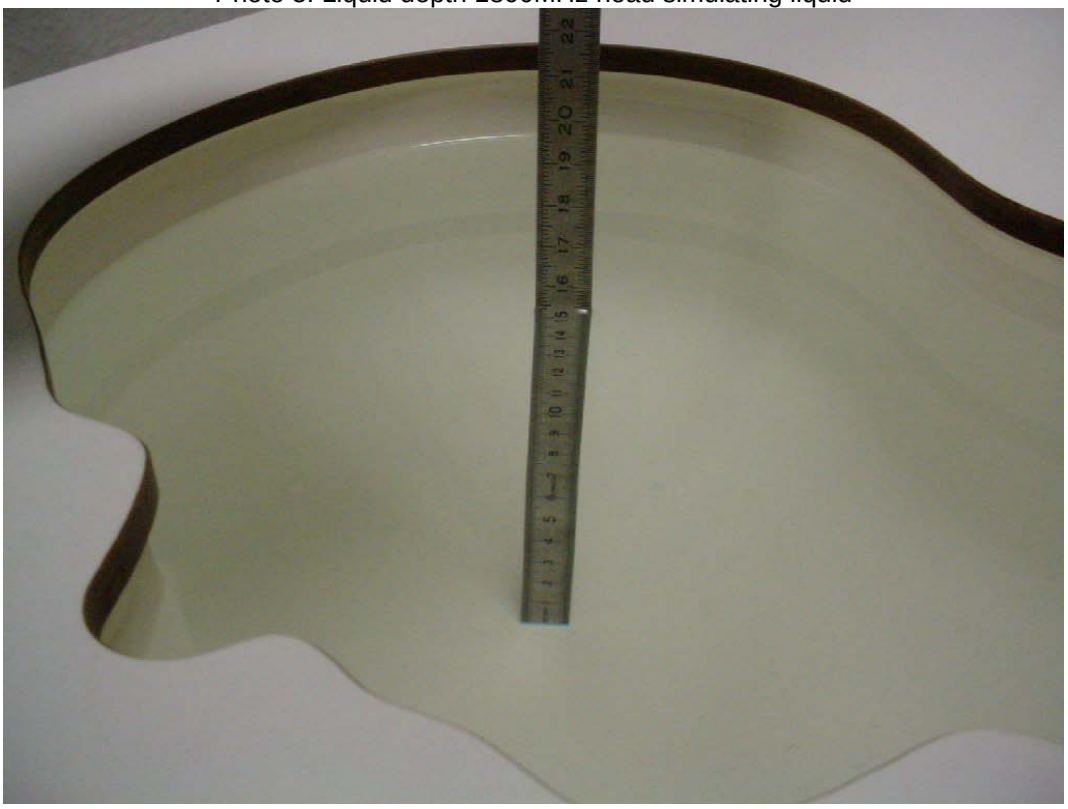


Photo 6: Liquid depth 1800 MHz body simulating liquid

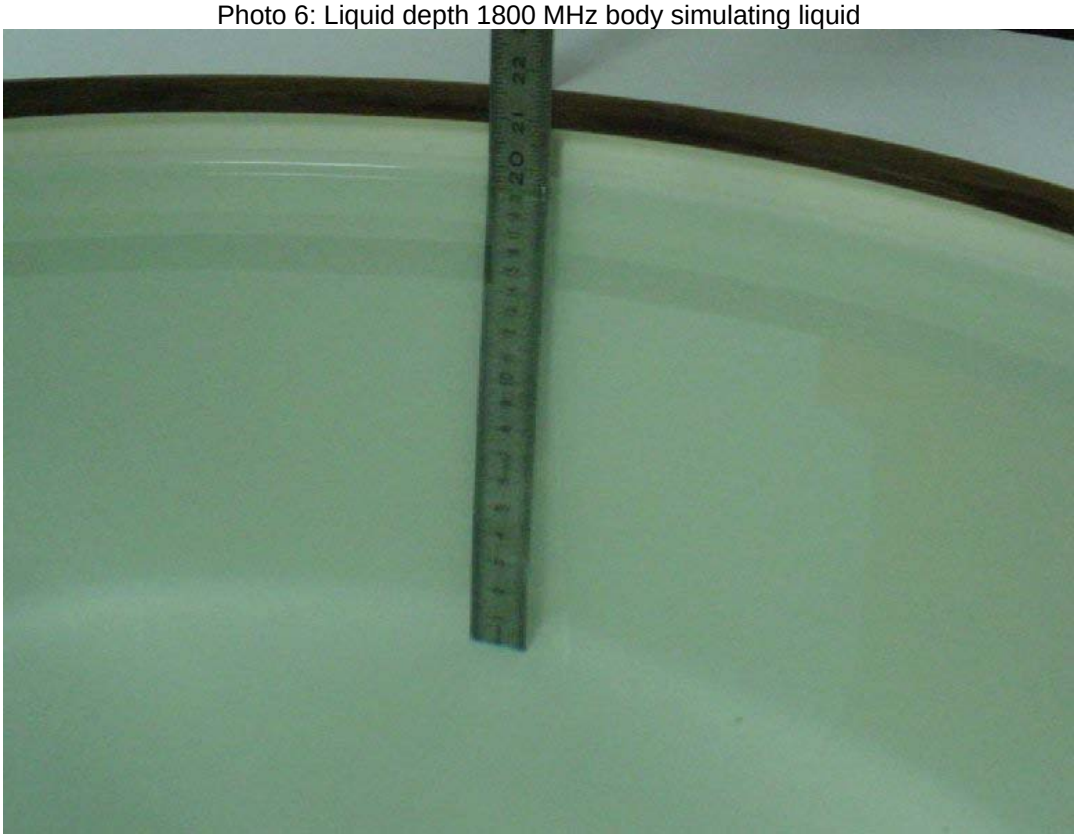


Photo 7: Liquid depth 1900MHz head simulating liquid

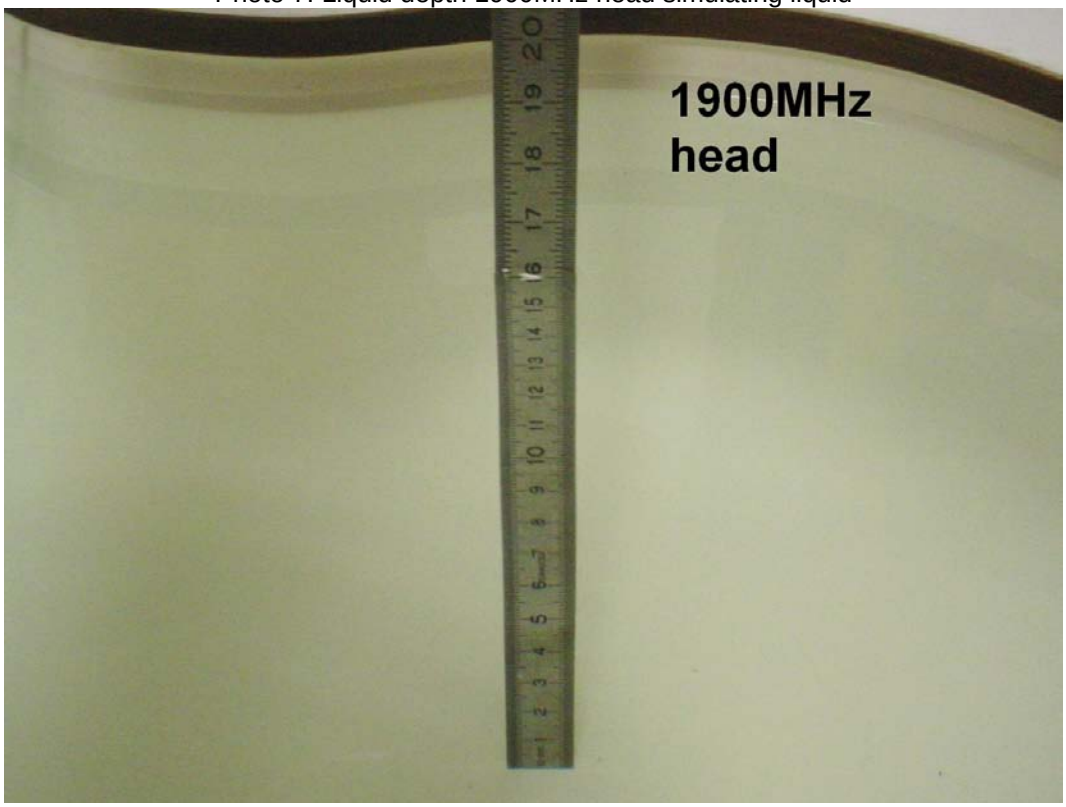


Photo 8: Liquid depth 1900 MHz body simulating liquid

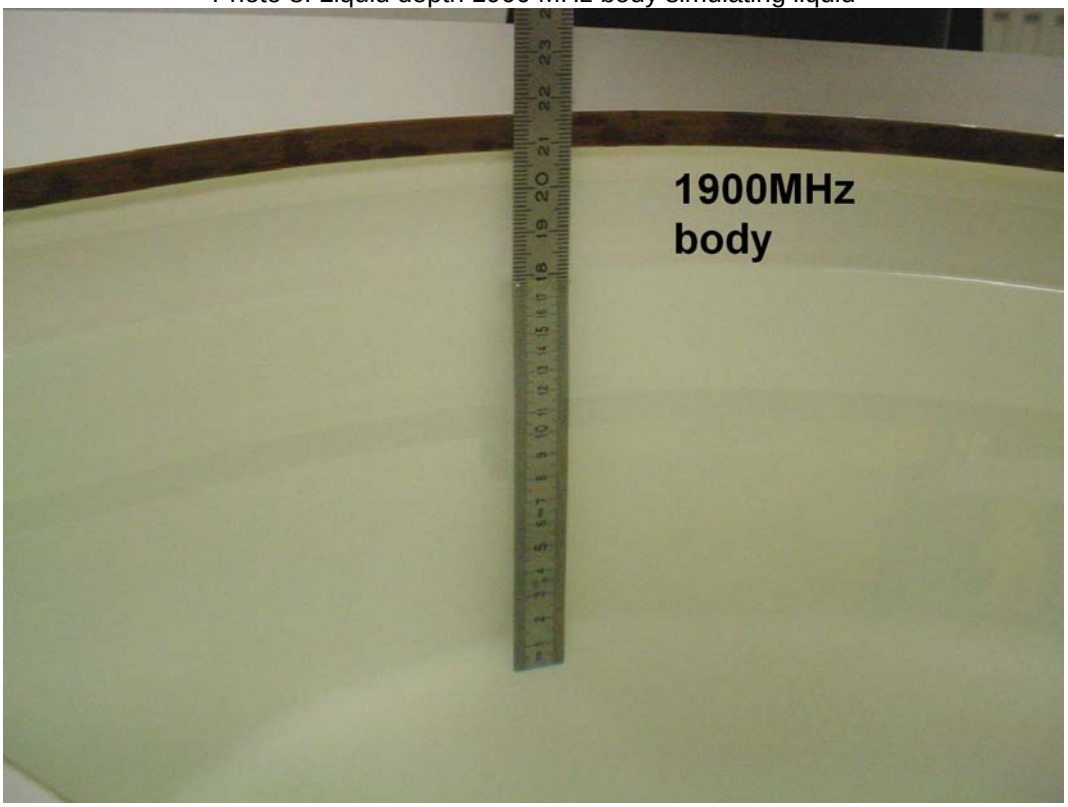


Photo 9: Liquid depth 2450MHz head simulating liquid

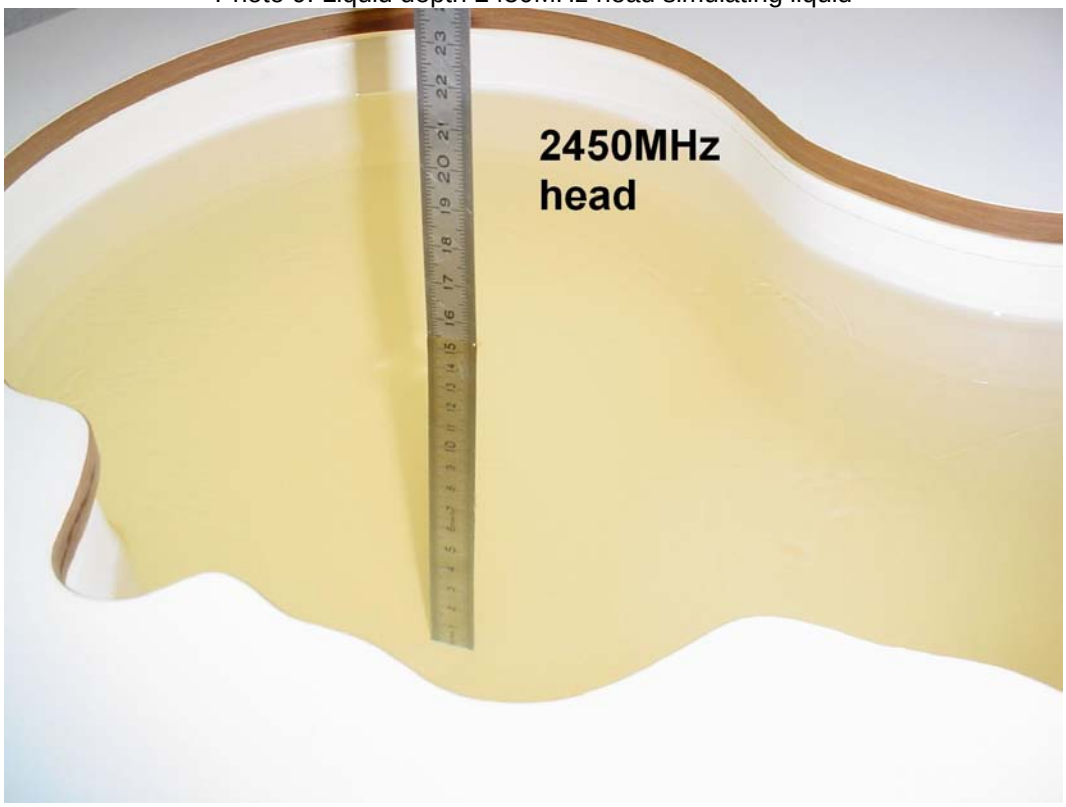


Photo 10: Liquid depth 2450 MHz body simulating liquid

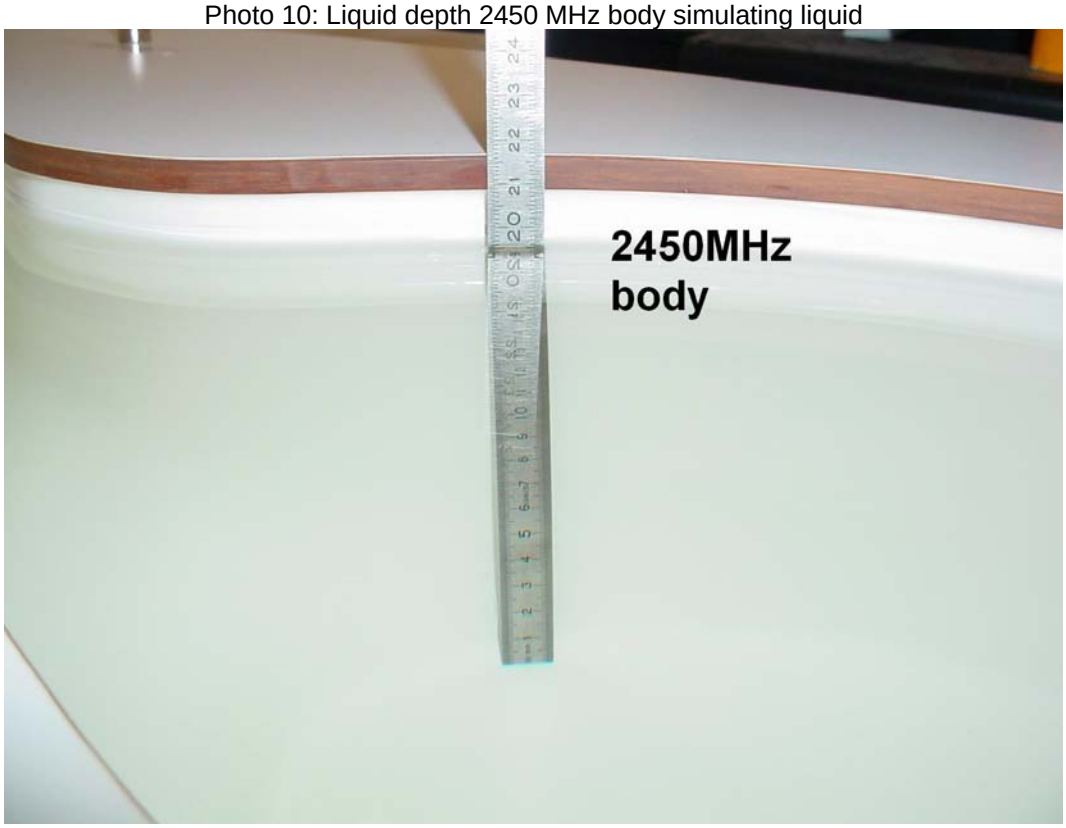


Photo 11: Liquid depth 5 GHz head simulating liquid

Photo 12: Liquid depth 5 GHz body simulating liquid

Annex C: Photo documentation

Photo documentation is described in the additional document:

Appendix to test report no. 1-6234/13-08-14-A Photo documentation

Annex D: RF Technical Brief Cover Sheet acc. to RSS-102 Annex A

1. COMPANY NUMBER: **2503A**

2. MODEL NUMBER: **RGF110LW**

3. MANUFACTURER: **Research In Motion Limited**

4. TYPE OF EVALUATION:

(a) SAR Evaluation: Device used in the Vicinity of the Human Head
- Multiple transmitters: Yes ☒ No ☐
- Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐
- Duty cycle used in evaluation: 100 %
- Standard used for evaluation: RSS-102 Issue 4 (2010-03)
- SAR value: **1.099 W/kg**. Measured ☒ Computed ☐ Calculated ☐

(b) SAR Evaluation: Body-worn Device
- Multiple transmitters: Yes ☒ No ☐
- Evaluated against exposure limits: General Public Use ☒ Controlled Use ☐
- Duty cycle used in evaluation: 50 %
- Standard used for evaluation: RSS-102 Issue 4 (2010-03)
- SAR value: **1.358 W/kg**. Measured ☒ Computed ☐ Calculated ☐

Annex D.1: Declaration of RF Exposure Compliance

ATTESTATION: I attest that the information provided in Annex D: is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Signature: Thomas Vogler

DN: cn=Thomas Vogler, o=CETECOM ICT Services GmbH, ou=VOG-100727, email=thomas.vogler@cetecom.com, c=DE
Datum: 2013.10.15 09:34:52 +02'00'

NAME : **Thomas Vogler**

TITLE : Dipl.-Ing. (FH)

COMPANY : CETECOM ICT Services GmbH

Annex E: Calibration parameters

Calibration parameters are described in the additional document:

Appendix to test report no. 1-6234/13-08-14-A
Calibration data, Phantom certificate
and detail information of the DASY System

Annex F: Document History

Version	Applied Changes	Date of Release
	Initial Release	2013-09-17
-A	Corrected maximum possible and measured output power in the chapter 7 Detailed Test Results Corrected reported value in chapter 4 Summary of Measurement Results Re-measured SAR WLAN 5GHz, corrected results in the Table 58; Table 59	2013-10-14

Annex G: Further Information

Glossary

BW	-	Bandwidth
DTS	-	Distributed Transmission System
DUT	-	Device under Test
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
LTE	-	Long Term Evolution
N/A	-	not applicable
PCE	-	Personal Consumption Expenditure
OET	-	Office of Engineering and Technology
RB	-	resource block(s)
SAR	-	Specific Absorption Rate
S/N	-	Serial Number
$SPLSR_i$	-	SAR-to-(peak-locations spacing) ratio
SW	-	Software
UNII	-	Unlicensed National Information Infrastructure