
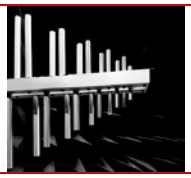
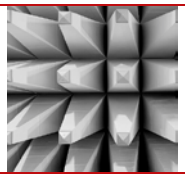

CETECOM™
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TEST REPORT

Test Report No.: 1-6234/13-06-02-C

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
305 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

BlackBerryLimited
305 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 Smart Phone
Device type:	portable device
Model name:	**RFX101LW**
S/N serial number:	085971159656
FCC-ID:	L6ARFX100LW
IMEI-Number:	#1: 004401139608620 /#46: 004402242373359 / #48:004401139608539 / #49: 004402242373235 / #28:004401139608539 / #30: 004401139609008
Hardware status:	CER-54735-001Rev2-04-02
Software status:	OS: 10.2.0.345; Build ID: 534884
Frequency:	see technical details
Antenna:	integrated antenna
Battery option:	Integrated battery 2880mAh
Accessories:	Leather holster HDW-55471-001
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:

cn=Oleksandr Hnatovskiy, o=CETECOM ICT, ou=HNA-100728, email=Oleksandr.Hnatovskiy@cetecom.com, c=DE
2013.09.10 09:52:45 +02'00'

Oleksandr Hnatovskiy
Testing Manager

Test performed:

Marco Scigliano

cn=Marco Scigliano, o=CETECOM ICT Services GmbH, ou=SCI-120430, email=Marco.Scigliano@Cetecom.com, c=DE
2013.09.10 09:54:43 +02'00'

Marco Scigliano
Expert

1 Table of contents

2 General information

2.1 Notes and disclaimer

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2.2 Application details

Date of receipt of order:	2013-06-19
Date of receipt of test item:	2013-06-24
Start of test:	2013-06-26
End of test:	2013-08-06
Person(s) present during the test:	

2.3 Statement of compliance

The SAR values found for the RFX101LW Blackberry Smart Phone 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 hot spot mode.
Leather Holster P/N: HDW-55471-001 maintains separation distance of ~ 20mm.
Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used. BlackBerry body-worn holsters with belt-clip have been designed to maintain ~ 20 mm separation distance from body.

2.4 Technical details

Band tested for this test report	Technology	Frequency band	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 class	Test channel low	Test channel middle	Test channel high	Maximum output power/dBm)*
☐	GSM	GSM	880.2	914.8	925.2	959.8	GMSK 8-PSK	4 E2	5	B	12	11	975	37	124	32.2
☐	GSM	DCS	1710.2	1784.8	1805.2	1879.8	GMSK 8-PSK	1 E2	0	B	12	11	512	698	885	28.7
☒	GSM	cellular	824.2	848.8	869.2	893.8	GMSK 8-PSK	4 E2	5	B	12	11	128	190	251	32.0
☒	GSM	PCS	1850.2	1909.8	1930.2	1989.8	GMSK 8-PSK	1 E2	0	B	12	11	512	661	810	28.5
☒	CDMA	BC0	824.7	848.3	869.7	893.3	QPSK	3	max	--	--	--	1013	384	777	23.9
☒	CDMA	BC1	1851.25	1908.75	1931.25	1988.75	QPSK	3	max	--	--	--	25	600	1175	23.7
☐	UMTS	FDD I	1922.4	1977.6	2112.4	2167.6	QPSK	3	max	--	--	--	9612	9750	9888	23.0
☒	UMTS	FDD II	1852.4	1907.6	1982.4	1987.6	QPSK	3	max	--	--	--	9262	9400	9538	23.1
☒	UMTS	FDD V	826.4	846.6	871.4	891.6	QPSK	3	max	--	--	--	4132	4182	4233	23.3
☐	UMTS	FDD VIII	882.4	912.6	927.4	957.6	QPSK	3	max	--	--	--	2712	2787	2863	23.0
☒	LTE	FDD 4	1710	1755	2110	2155	QPSK 16QAM	3	max	--	--	--	20050	20175	20300	22.4
☒	LTE	FDD 13	777	787	746	756	OFDM QPSK 16QAM	3	max	--	--	--	23180	23230	23279	22.9
☐	WLAN	ISM	2412	2472	2412	2472	CCK OFDM	--	max	--	--	--	1	7	13	15.6
☒	WLAN US	ISM	2412	2462	2412	2462	CCK OFDM	--	max	--	--	--	1	6	11	15.6
☒	WLAN	ISM	5180	5240	5180	5240	OFDM	--	max	--	--	--	36	--	--	15.1
☒	WLAN	ISM	5260	5320	5260	5320	OFDM	--	max	--	--	--	52	--	--	14.9
☒	WLAN	ISM	5500	5700	5500	5700	OFDM	--	max	--	--	--	104	--	--	14.7
☒	WLAN	ISM	5745	5825	5745	5825	OFDM	--	max	--	--	--	149	--	--	14.3
☐	BT	ISM	2402	2480	2402	2480	GFSK	3	max	--	--	--	0	39	78	9.5

)*: 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	8	no 16QAM , no MIMO, 11.5 Mbit/s

LTE: Release 8, Category 3

2.5 Transmitter and Antenna Operating Configurations

Simultaneous transmission conditions		
GSM / GPRS / EDGE	+	BT/BLE)*
GSM / GPRS / EDGE	+	WLAN 2.4GHz
GSM / GPRS / EDGE	+	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
CDMA + SVLTE	+	BT/BLE
CDMA + SVLTE	+	WLAN 2.4GHz
CDMA + SVLTE	+	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: Bluetooth low energy

2.5.1 Additional power reduction to comply with SAR

The following power reduction settings are used to comply with SAR limits during simultaneous transmission conditions:

1) Dynamic power reduction on LTE band in SvLTE mode (see section 7.1.9).

2) Static/Fixed power reduction on WiFi when it is transmitting simultaneously with CDMA/EvDO and SvLTE+CDMA/EvDO mode as well as in hotspot/MHS mobile hotspot mode. WiFi power reduction in hotspot is triggered, when the device is in this mode (see conducted power overview in section 7.1.14 and 7.1.15 and test result Table 61, Table 64 and Table 65)

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
KDB 616217D03v01	November13, 2009	SAR Evaluation Considerations for Laptop Computers with Antennas Built-in on Display Screens

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		**1.262**	**1.268**	**0.578**
body worn 15 mm distance		**0.863**	**0.368**	**0.418**
hotspot operation 10 mm distance		**1.341**	**0.254**	---
collocated situations	**$SPLSR_i \leq 0.040$**	**0.029**		

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 835	1.010	1.160	1.15
GSM 1900	1.210	1.070	1.13
UMTS FDD II	1.090	1.000	1.09
CDMA BC1	0.948	0.928	1.02
LTE FDD 4 head	0.957	0.864	1.11
LTE FDD 4 body	1.040	1.040	1.00
WLAN 2450MHz	1.130	1.110	1.02

5 Test Environment

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

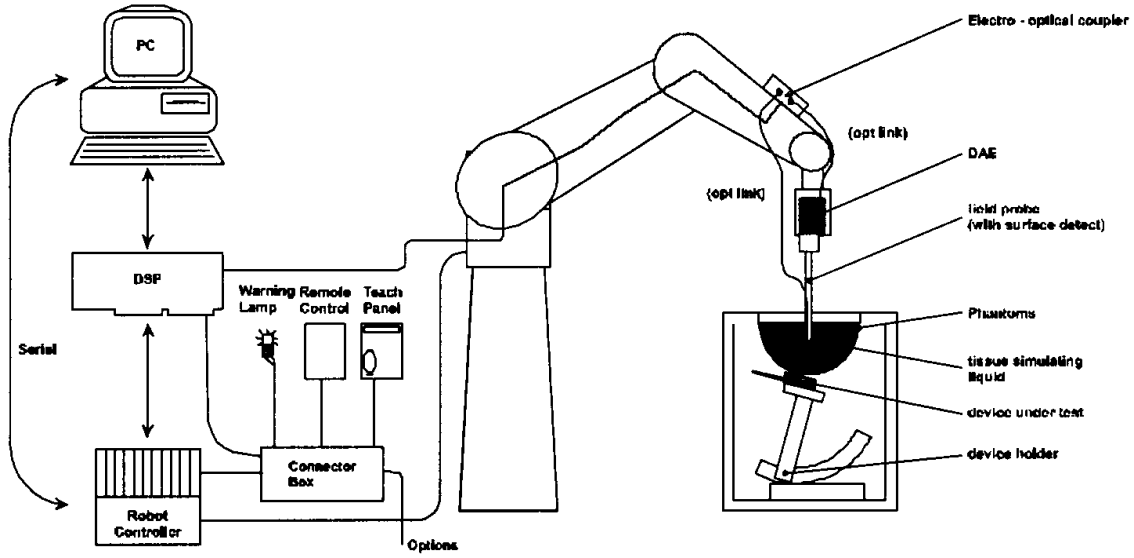
Relative humidity content: 40 – 50 %
Air pressure: not relevant for this kind of testing
Power supply: 230 V / 50 Hz

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 XP or 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.

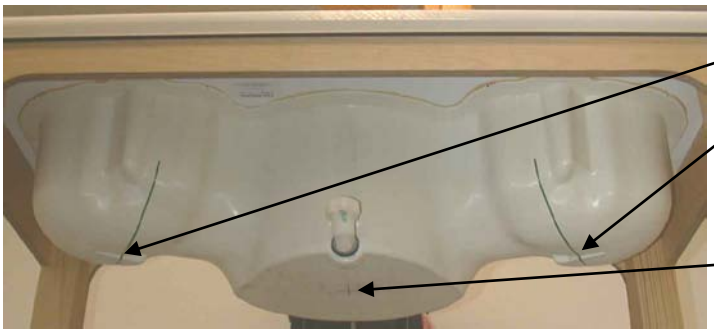
6.1.3 Probe description

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 2.

- 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 2.

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	750	41.9	0.89	42.4	1.2%	0.92	3.4%	2013-07-19
	777	41.9	0.89	43.9	4.8%	0.85	-4.5%	2013-07-19
	782	41.9	0.89	43.9	4.8%	0.86	-3.4%	2013-07-19
	787	41.9	0.89	43.8	4.5%	0.87	-2.2%	2013-07-19
850/900	824	41.5	0.90	41.6	0.2%	0.88	-2.2%	2013-06-27
	835	41.5	0.90	42.6	2.7%	0.90	0.0%	2013-06-27
	837	41.5	0.90	41.4	-0.2%	0.90	0.0%	2013-06-27
	849	41.5	0.90	41.2	-0.7%	0.91	1.1%	2013-06-27
1750/1800	1720	40.0	1.40	40.5	1.3%	1.40	0.0%	2013-06-20
	1732	40.0	1.40	40.4	1.0%	1.40	0.0%	2013-06-20
	1745	40.0	1.40	40.4	1.0%	1.40	0.0%	2013-06-20
	1750	40.0	1.40	40.4	1.0%	1.40	0.0%	2013-06-20
1900	1850	40.0	1.40	40.4	1.0%	1.33	-5.0%	2013-06-26
	1880	40.0	1.40	40.4	1.0%	1.36	-2.9%	2013-06-26
	1900	40.0	1.40	40.3	0.7%	1.37	-2.1%	2013-06-26
	1910	40.0	1.40	40.3	0.7%	1.38	-1.4%	2013-06-26
2450	2412	39.2	1.80	39.2	0.0%	1.78	-1.1%	2013-08-03
	2437	39.2	1.80	39.1	-0.3%	1.80	0.1%	2013-08-03
	2450	39.2	1.80	39.0	-0.4%	1.82	0.8%	2013-08-03
	2462	39.2	1.80	39.0	-0.5%	1.83	1.7%	2013-08-03
5GHz	5180	36.0	4.63	36.6	1.7%	4.50	-2.8%	2013-07-11
	5200	36.0	4.66	36.6	1.7%	4.52	-3.0%	2013-07-11
	5260	35.9	4.74	36.5	1.7%	4.58	-3.4%	2013-07-11
	5500	35.6	4.96	36.1	1.4%	4.82	-2.8%	2013-07-11
	5520	35.6	4.99	36.1	1.4%	4.84	-3.0%	2013-07-11
	5600	35.5	5.07	35.9	1.1%	4.91	-3.2%	2013-07-11
	5745	35.4	5.19	35.7	0.8%	5.05	-2.7%	2013-07-11

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	750	55.5	0.96	56.0	0.9%	0.98	2.1%	2013-07-20
	777	55.5	0.96	55.7	0.4%	1.00	4.4%	2013-07-20
	782	55.5	0.96	55.7	0.4%	1.01	4.9%	2013-07-20
	787	55.5	0.96	55.6	0.2%	1.01	4.9%	2013-07-20
850/900	824	55.2	0.97	56.0	1.4%	0.97	0.0%	2013-07-06
	835	55.2	0.97	55.9	1.3%	0.98	1.0%	2013-07-06
	837	55.2	0.97	55.9	1.3%	0.98	1.0%	2013-07-06
	849	55.2	0.97	55.9	1.3%	0.99	2.1%	2013-07-06
1750/1800	1720	53.3	1.52	54.7	2.6%	1.50	-1.3%	2013-07-13
	1732	53.3	1.52	54.6	2.4%	1.51	-0.7%	2013-07-13
	1745	53.3	1.52	54.6	2.4%	1.53	0.7%	2013-07-13
	1750	53.3	1.52	54.6	2.4%	1.53	0.7%	2013-07-13
1750/1800	1720	53.3	1.52	53.0	-0.6%	1.47	-3.2%	2013-08-05
	1732	53.3	1.52	52.9	-0.7%	1.49	-2.2%	2013-08-05
	1745	53.3	1.52	52.9	-0.8%	1.50	-1.1%	2013-08-05
	1750	53.3	1.52	52.8	-0.9%	1.51	-0.8%	2013-08-05
1900	1850	53.3	1.52	52.0	-2.4%	1.45	-4.6%	2013-07-03
	1880	53.3	1.52	51.9	-2.6%	1.48	-2.6%	2013-07-03
	1900	53.3	1.52	51.8	-2.8%	1.50	-1.3%	2013-07-03
	1910	53.3	1.55	51.8	-2.8%	1.52	-1.9%	2013-07-03
1900	1850	53.3	1.52	53.1	-0.3%	1.45	-4.4%	2013-08-05
	1880	53.3	1.52	53.1	-0.5%	1.49	-1.8%	2013-08-05
	1900	53.3	1.52	53.0	-0.5%	1.52	-0.3%	2013-08-05
	1910	53.3	1.55	53.0	-0.6%	1.53	-1.6%	2013-08-05
2450	2412	52.7	1.95	51.5	-2.3%	1.91	-1.9%	2013-08-03
	2437	52.7	1.95	51.4	-2.5%	1.94	-0.3%	2013-08-03
	2450	52.7	1.95	51.4	-2.6%	1.96	0.7%	2013-08-03
	2462	52.7	1.95	51.3	-2.6%	1.98	1.5%	2013-08-03
5GHz	5180	49.0	5.30	48.1	-1.8%	5.29	-0.2%	2013-07-10
	5200	49.0	5.30	48.0	-2.0%	5.34	0.8%	2013-07-10
	5260	48.9	5.40	47.9	-2.1%	5.43	0.6%	2013-07-10
	5500	48.6	5.65	47.3	-2.7%	5.71	1.1%	2013-07-10
	5520	48.6	5.65	47.2	-2.8%	5.74	1.6%	2013-07-10
	5600	48.4	5.85	47.1	-2.8%	5.83	-0.3%	2013-07-10
	5745	48.3	5.95	46.8	-3.1%	6.00	0.8%	2013-07-10

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).

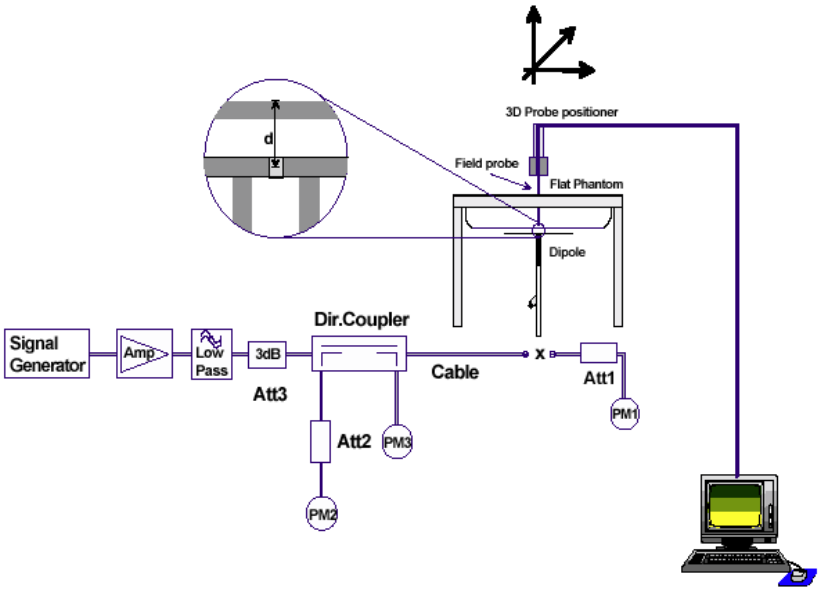
System performence check (1000 mW)								
System validation Kit	Frequency	Target SAR_{1g} (+/- 10%)	Target SAR_{10g} (+/- 10%)	Measured SAR_{1g} mW/g	SAR_{1g} dev. %	Measured SAR_{10g} mW/g	SAR_{10g} dev. %	Measured date
D750V3 S/N: 1041	750 MHz head	8.44	5.54	8.69	3.0%	5.69	2.7%	2013-07-19
D750V3 S/N: 1041	750 MHz body	8.80	5.80	9.26	5.2%	6.08	4.8%	2013-07-20
D835V2 S/N: 4d153	835 MHz head	9.58	6.21	9.75	1.8%	6.40	3.1%	2013-06-27
D835V2 S/N: 4d153	835 MHz head	9.58	6.21	9.84	2.7%	6.46	4.0%	2013-06-28
D835V2 S/N: 4d153	835 MHz head	9.58	6.21	9.72	1.5%	6.42	3.4%	2013-07-18
D835V2 S/N: 4d153	835 MHz body	9.40	6.12	9.65	2.7%	6.37	4.1%	2013-07-05
D835V2 S/N: 4d153	835 MHz body	9.40	6.12	9.62	2.3%	6.34	3.6%	2013-07-06
D835V2 S/N: 4d153	835 MHz body	9.40	6.12	9.57	1.8%	6.40	4.6%	2013-07-19
D1750V2 S/N: 1093	1750 MHz head	36.60	19.30	38.30	4.6%	20.40	5.7%	2013-07-08
D1750V2 S/N: 1093	1750 MHz head	36.60	19.30	37.90	3.6%	20.10	4.1%	2013-07-09
D1750V2 S/N: 1093	1750 MHz body	37.90	20.30	35.80	-5.5%	20.10	-1.0%	2013-07-13
D1750V2 S/N: 1093	1750 MHz body	37.90	20.30	35.70	-5.8%	20.10	-1.0%	2013-07-15
D1750V2 S/N: 1093	1750 MHz body	37.90	20.30	36.30	-4.2%	20.50	1.0%	2013-07-16
D1750V2 S/N: 1093	1750 MHz body	37.90	20.30	35.00	-7.7%	19.30	-4.9%	2013-08-05
D1900V2 S/N: 5d009	1900 MHz head	40.10	21.00	39.40	-1.7%	20.50	-2.4%	2013-06-26
D1900V2 S/N: 5d009	1900 MHz head	40.10	21.00	38.90	-3.0%	21.00	0.0%	2013-07-17
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	40.50	-1.0%	21.50	-0.9%	2013-07-03
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	39.90	-2.4%	21.10	-2.8%	2013-07-04
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	37.20	-9.0%	20.60	-5.1%	2013-07-18
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	40.10	-2.0%	21.00	-3.2%	2013-08-05

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
D2450V2 S/N: 710	2450 MHz head	51.50	24.00	54.50	5.8%	25.20	5.0%	2013-08-03
D2450V2 S/N: 710	2450 MHz body	51.20	23.90	52.90	3.3%	24.10	0.8%	2013-08-03
D2450V2 S/N: 710	2450 MHz body	51.20	23.90	54.20	5.9%	25.00	4.6%	2013-08-05
D5GHzV2 S/N: 1055	5200 MHz head	77.30	22.00	73.30	-5.2%	20.70	-5.9%	2013-07-12
D5GHzV2 S/N: 1055	5500 MHz head	81.10	23.00	77.30	-4.7%	21.50	-6.5%	2013-07-12
D5GHzV2 S/N: 1055	5800 MHz head	75.40	21.30	72.40	-4.0%	20.20	-5.2%	2013-07-12
D5GHzV2 S/N: 1055	5200 MHz body	73.40	20.70	73.80	0.5%	20.60	-0.5%	2013-07-10
D5GHzV2 S/N: 1055	5500 MHz body	78.40	21.70	76.70	-2.2%	21.10	-2.8%	2013-07-10
D5GHzV2 S/N: 1055	5800 MHz body	74.00	20.40	74.60	0.8%	20.40	0.0%	2013-07-10

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	ET3DV6 / 1558	447	D750V3 / 1041	V52.8	2013-07
ICT #2	750	Body	ET3DV6 / 1558	447	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	835	Head	ET3DV6 / 1554	447	D835V2 / 4d153	V52.8	2013-07
ICT #2	835	Body	ET3DV6 / 1554	447	D835V2 / 4d153	V52.8	2013-07
ICT #1	1750	Head	ES3DV4 / 3320	413	D1750V2 / 1093	V52.8	2013-07
ICT #2	1750	Body	ET3DV6 / 1554	447	D1750V2 / 1093	V52.8	2013-07
ICT #1	1900	Head	ES3DV4 / 3320	413	D1900V2 / 5d009	V52.8	2013-06
ICT #2	1900	Head	ET3DV6 / 1554	447	D1900V2 / 5d009	V52.8	2013-06
ICT #1	1900	Body	ES3DV4 / 3320	413	D1900V2 / 5d009	V52.8	2013-07
ICT #1	1900	Body	ET3DV6 / 1554	447	D1900V2 / 5d009	V52.8	2013-07
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 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07
ICT #1	5500	Head	EX3DV4 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07
ICT #1	5800	Head	EX3DV4 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07
ICT #1	5200	Body	EX3DV4 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07
ICT #1	5300	Body	EX3DV4 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07
ICT #1	5500	Body	EX3DV4 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07
ICT #1	5600	Body	EX3DV4 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07
ICT #1	5800	Body	EX3DV4 / SN3536	413	D5GHzV2 / 1055	V52.8	2013-07

7 Detailed Test Results

7.1 Conducted power measurements

For the measurements 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	32.0 dBm	23.0 dBm
190 / 836.6 MHz	GMSK	1	31.4 dBm	22.4 dBm
251 / 848.0 MHz	GMSK	1	31.4 dBm	22.4 dBm
128 / 824.2 MHz	GMSK	2	29.2 dBm	23.2 dBm
190 / 836.6 MHz	GMSK	2	29.3 dBm	23.3 dBm
251 / 848.0 MHz	GMSK	2	29.3 dBm	23.3 dBm
128 / 824.2 MHz	**GMSK**	**3**	**28.5 dBm**	**24.25 dBm**
190 / 836.6 MHz	**GMSK**	**3**	**28.2 dBm**	**23.95 dBm**
251 / 848.0 MHz	**GMSK**	**3**	**28.3 dBm**	**24.05 dBm**
128 / 824.2 MHz	GMSK	4	26.3 dBm	23.3 dBm
190 / 836.6 MHz	GMSK	4	26.0 dBm	23.0 dBm
251 / 848.0 MHz	GMSK	4	26.1 dBm	23.1 dBm
128 / 824.2 MHz	8PSK	1	26.4 dBm	17.4 dBm
190 / 836.6 MHz	8PSK	1	26.3 dBm	17.3 dBm
251 / 848.0 MHz	8PSK	1	26.2 dBm	17.2 dBm
128 / 824.2 MHz	8PSK	2	26.3 dBm	20.3 dBm
190 / 836.6 MHz	8PSK	2	26.2 dBm	20.2 dBm
251 / 848.0 MHz	8PSK	2	26.1 dBm	20.1 dBm
128 / 824.2 MHz	8PSK	3	24.7 dBm	20.45 dBm
190 / 836.6 MHz	8PSK	3	24.6 dBm	20.35 dBm
251 / 848.0 MHz	8PSK	3	24.5 dBm	20.25 dBm
128 / 824.2 MHz	8PSK	4	23.7 dBm	20.7 dBm
190 / 836.6 MHz	8PSK	4	23.6 dBm	20.6 dBm
251 / 848.0 MHz	8PSK	4	23.5 dBm	20.5 dBm

Table 14: Test results conducted power measurement GSM 850 MHz

7.1.2 Conducted power measurements GSM 1900 MHz

Channel / frequency	modulation	timeslots	slotted avg. power	time based avg. Power (calculated)
512 / 1850.2 MHz	GMSK	1	28.5 dBm	19.5 dBm
661 / 1880.0 MHz	GMSK	1	28.4 dBm	19.4 dBm
810 / 1909.8 MHz	GMSK	1	28.3 dBm	19.3 dBm
512 / 1850.2 MHz	GMSK	2	27.9 dBm	21.9 dBm
661 / 1880.0 MHz	GMSK	2	27.9 dBm	21.9 dBm
810 / 1909.8 MHz	GMSK	2	27.8 dBm	21.8 dBm
512 / 1850.2 MHz	GMSK	3	25.5 dBm	21.25 dBm
661 / 1880.0 MHz	GMSK	3	25.3 dBm	21.05 dBm
810 / 1909.8 MHz	GMSK	3	25.3 dBm	21.05 dBm
512 / 1850.2 MHz	**GMSK**	**4**	**24.9 dBm**	**21.9 dBm**
661 / 1880.0 MHz	**GMSK**	**4**	**24.9 dBm**	**21.9 dBm**
810 / 1909.8 MHz	**GMSK**	**4**	**24.9 dBm**	**21.9 dBm**
512 / 1850.2 MHz	8PSK	1	25.4 dBm	16.4 dBm
661 / 1880.0 MHz	8PSK	1	25.3 dBm	16.3 dBm
810 / 1909.8 MHz	8PSK	1	25.1 dBm	16.1 dBm
512 / 1850.2 MHz	8PSK	2	24.7 dBm	18.7 dBm
661 / 1880.0 MHz	8PSK	2	24.7 dBm	18.7 dBm
810 / 1909.8 MHz	8PSK	2	24.7 dBm	18.7 dBm
512 / 1850.2 MHz	8PSK	3	23.7 dBm	19.45 dBm
661 / 1880.0 MHz	8PSK	3	23.6 dBm	19.35 dBm
810 / 1909.8 MHz	8PSK	3	23.6 dBm	19.35 dBm
512 / 1850.2 MHz	8PSK	4	22.8 dBm	19.8 dBm
661 / 1880.0 MHz	8PSK	4	22.7 dBm	19.7 dBm
810 / 1909.8 MHz	8PSK	4	22.7 dBm	19.7 dBm

Table 15: 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.
In EDGE mode no delta measurement was performed.

7.1.4 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	**23.2**	**23.3**	**22.8**
RMC 64 kbit/s	23.2	23.3	22.8
RMC 144 kbit/s	23.1	23.2	22.6
RMC 384 kbit/s	23.2	23.3	22.6
AMR 4.75 kbit/s	23.0	23.2	22.6
AMR 5.15 kbit/s	23.0	23.2	22.5
AMR 5.9 kbit/s	23.0	23.1	22.5
AMR 6.7 kbit/s	23.0	23.2	22.6
AMR 7.4 kbit/s	23.0	23.1	22.6
AMR 7.95 kbit/s	23.0	23.1	22.5
AMR 10.2 kbit/s	23.0	23.0	22.6
AMR 12.2 kbit/s	23.0	23.1	22.6
HSDPA Sub test 1	**23.1**	**23.1**	**23.6**
HSDPA Sub test 2	21.9	21.7	21.6
HSDPA Sub test 3	19.6	19.7	19.4
HSDPA Sub test 4	19.4	19.4	19.3
HSUPA Sub test 1	22.8	22.9	22.4
HSUPA Sub test 2	20.6	20.8	20.3
HSUPA Sub test 3	21.2	21.3	21.8
HSUPA Sub test 4	20.2	20.3	20.8
HSUPA Sub test 5	**22.1**	**22.3**	**22.7**

Table 16: Test results conducted power measurement UMTS FDD V 850MHz

7.1.5 Conducted power measurements WCDMA 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	
	no back off	MHS	no back off	MHS	no back off	MHS
RMC 12.2 kbit/s	**23.1**	21.8	**22.9**	21.6	**22.9**	21.6
RMC 64 kbit/s	23.1	21.8	22.9	21.6	22.8	21.5
RMC 144 kbit/s	23.1	21.8	22.8	21.5	22.9	21.6
RMC 384 kbit/s	23.1	21.8	22.7	21.4	22.9	21.6
AMR 4.75 kbit/s	23.0	21.7	22.7	21.4	22.9	21.6
AMR 5.15 kbit/s	23.0	21.7	22.7	21.4	22.8	21.5
AMR 5.9 kbit/s	23.0	21.7	22.8	21.5	22.8	21.5
AMR 6.7 kbit/s	23.0	21.7	22.8	21.5	22.8	21.5
AMR 7.4 kbit/s	23.0	21.7	22.7	21.4	22.8	21.5
AMR 7.95 kbit/s	23.0	21.7	22.8	21.5	22.8	21.5
AMR 10.2 kbit/s	23.0	21.7	22.8	21.5	22.8	21.5
AMR 12.2 kbit/s	23.0	21.7	22.7	21.4	22.8	21.5
HSDPA Sub test 1	**23.1**	21.7	**22.8**	21.4	**22.9**	21.5
HSDPA Sub test 2	21.8	20.4	21.7	20.3	21.6	20.2
HSDPA Sub test 3	20.7	19.3	20.6	19.2	20.5	19.1
HSDPA Sub test 4	20.6	19.2	20.5	19.1	20.5	19.1
HSUPA Sub test 1	22.8	21.3	22.6	21.1	22.7	21.2
HSUPA Sub test 2	20.7	19.2	20.4	19.9	21.0	19.0
HSUPA Sub test 3	22.1	20.6	21.9	20.4	22.0	20.5
HSUPA Sub test 4	20.2	19.7	20.0	19.5	20.0	19.5
HSUPA Sub test 5	**23.2**	21.7	**22.9**	21.4	**22.8**	21.5

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

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.

7.1.6 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 18: 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 19: settings of required H-Set 1 QPSK acc. to 3GPP 34.121

c) DC-HSDPA (3GPP Release 8)

Dual Cell – HSDPA has been signalized using the following settings for connection setup:

Parameter During Connection Setup	Value
P-CPICH_Ec/Ior	-10 dB
P-CCPCH	-12
SCH_Ec/Ior	-12
PICH_Ec/Ior	-15
HS-PDSCH	off
HS-SCCH_1	off
DPCH_Ec/Ior	-5
OCNS_Ec/Ior	-3.1

Table 20: Downlink Physical Channels according to 3GPP 34.121 Table E.5.0

The fixed reference channel has been set to H-set 12 according to 3GPP TS 34.121 Table C.8.1.12:

Parameter	Unit	Value
Nominal Average Inf. Bit Rate	kbit/s	60
Inter-TTI Distance	TTI's	1
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Process	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codecs	Codecs	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

Table 21: H-Set 12 QPSK configuration

The same Sub-test settings as for Release 5 HSDPA were used for the tests.

d) 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.

7.1.7 Conducted average power measurements Bluetooth 2.4 GHz

Channel	Frequency (MHz)	Average power (dBm)	
		DH5	3DH5
0	2402	9.5	6.6
39	2441	8.8	6.3
78	2480	7.8	5.1

Table 23: Test results conducted average power measurement Bluetooth 2.4 GHz

7.1.8 Conducted average power measurements CDMA

Band	Channel	Frequency (MHz)	Average power (dBm)			
			RC1/1, SO55	RC3/3, SO55	SO32, SCH0 disabled	SO32, SCH0 enabled
BC0	1013	824.70	23.7	23.8	23.7	23.8
	384	836.60	23.9	23.8	23.8	23.9
	777	848.31	23.6	23.5	23.5	23.6
BC1	25	1851.25	23.6	23.5	23.5	23.5
	600	1880.00	23.6	23.7	23.7	23.7
	1175	1908.75	23.6	23.6	23.6	23.6

Table 24: Test results conducted average power measurement **CDMA**

Band	Channel	Frequency (MHz)	Average power (dBm)	
			Rev 0	Rev A
BC0	1013	824.70	23.1	23.5
	384	836.60	23.4	23.6
	777	848.31	22.5	22.8
BC1	25	1851.25	23.0	23.1
	600	1880.00	22.9	23.2
	1175	1908.75	23.5	23.8

Table 25: Test results conducted average power measurement **EVDO CDMA**

7.1.9 Conducted SVLTE power reduction overview

The following table shows the maximum conducted output power of LTE depending on the output power of the simultaneous transmitting CDMA signal.
Both LTE 4 and LTE 13 bands have been measured in combination with CDMA BC0 and BC1.
Channels with highest output power during stand-alone operation have been selected for this comparison.
LTE was programmed to maximum output power, while CDMA output power was stepped down from maximum in 1 dB steps. LTE output power is lowest at maximum CDMA output power and increased by internal software setting of the DUT when CDMA output power is reduced.

So the following dynamic power reduction targets could be proven:

LTE FDD 4 with CDMA BC0: **-2 dB**
LTE FDD 4 with CDMA BC1: **-5 dB**
LTE FDD 13 with CDMA BC0: **-4 dB**
LTE FDD 13 with CDMA BC1: **-2 dB**

This power reduction is fully documented for all channel/RB combinations in the following sections 7.10 and 7.11 and applies exclusively for parallel operation of CDMA and LTE.

Band	LTE Bandwidth [MHz]	Channel	Frequency [MHz]	#RB/ RB Position	Average Power [dBm]	
					LTE	CDMA
LTE 4 CDMA BC0	20	LTE: 20175 CDMA: 384	LTE: 1732.5 CDMA: 836.6	1 / High	20.7	23.7
					20.7	23.0
					21.6	22.0
					21.6	21.1
					22.6	20.0
					22.6	19.0
LTE 4 CDMA BC1	20	LTE: 20175 CDMA: 600	LTE: 1732.5 CDMA: 1880	1 / High	17.7	23.7
					17.7	23.0
					18.7	22.0
					19.7	21.0
					19.7	20.0
					20.7	18.9
					20.7	17.0
					22.6	16.0
					22.6	15.0
					22.6	14.0
					22.6	13.0

Band	LTE Bandwidth [MHz]	Channel	Frequency [MHz]	#RB/ RB Position	Average Power [dBm]	
					LTE	CDMA
LTE 13 CDMA BC0	10	LTE: 23230 CDMA: 384	LTE: 782.0 CDMA: 836.6	1 / High	19.3	23.7
					19.3	23.0
					21.2	22.0
					21.2	21.1
					21.2	20.0
					23.4	19.1
					23.4	18.0
LTE 13 CDMA BC1	10	LTE: 23230 CDMA: 600	LTE: 782.0 CDMA: 1880	1 / High	21.2	23.7
					21.2	23.0
					23.4	22.0
					23.4	21.1
					23.4	20.0

7.1.10 Conducted power measurements LTE FDD 4 1700 MHz

	Channel / frequency	BW	RB Size	RB offset	Modulation	Conducted power / dBm		
						full	-2dB	-5dB
Low Channel	19957 / 1710.7MHz	1.4	1	0	QPSK	22.4*	20.3	17.4
			1	3	QPSK	22.4*	20.2	17.4
			1	5	QPSK	22.4*	20.2	17.4
			3	0	QPSK	22.3*	20.2	17.5
			3	2	QPSK	22.4*	20.2	17.5
			3	3	QPSK	22.3*	20.2	17.5
			6	0	QPSK	21.4	19.3	16.4
			1	0	16-QAM	21.6	18.8	16.2
			1	3	16-QAM	21.6	18.8	16.2
			1	5	16-QAM	21.6	18.8	16.2
			3	0	16-QAM	21.4	19.3	16.4
			3	2	16-QAM	21.3	19.4	16.4
			3	3	16-QAM	21.3	19.4	16.5
			6	0	16-QAM	20.3	18.5	15.4
	19965 / 1711.5MHz	3	1	0	QPSK	22.4*	20.1	17.5
			1	8	QPSK	22.5*	20.1	17.6
			1	13	QPSK	22.5*	20.1	17.6
			8	0	QPSK	21.4	19.2	16.5
			8	4	QPSK	21.5	19.2	16.5
			8	7	QPSK	21.5	19.3	16.5
			15	0	QPSK	21.4	19.2	16.5
			1	0	16-QAM	21.6	18.7	16.3
			1	8	16-QAM	21.7	18.8	16.7
			1	13	16-QAM	21.7	18.8	16.3
			8	0	16-QAM	20.4	18.3	15.1
			8	4	16-QAM	20.5	18.3	15.2
			8	7	16-QAM	20.5	18.3	15.1
			15	0	16-QAM	20.5	18.4	15.2
	19975 / 1712.5MHz	5	1	0	QPSK	22.4*	20.2	17.5
			1	12	QPSK	22.5*	20.2	17.5
			1	24	QPSK	22.5*	20.3	17.5
			12	0	QPSK	21.4	19.3	16.6
			12	8	QPSK	21.5	19.3	16.7
			12	13	QPSK	21.5	19.3	16.6
			25	0	QPSK	21.4	19.2	16.7
			1	0	16-QAM	21.6	18.6	16.1
			1	12	16-QAM	21.7	18.6	16.2
			1	24	16-QAM	21.6	18.6	16.1
			12	0	16-QAM	20.5	18.2	15.2
			12	8	16-QAM	20.6	18.2	15.3
			12	13	16-QAM	20.5	18.4	15.2
			25	0	16-QAM	20.4	18.3	15.4
	20000 / 1715.0MHz	10	1	0	QPSK	22.1*	20.1	17.3
			1	25	QPSK	22.2*	20.2	17.4
			1	49	QPSK	22.1*	20.2	17.3
			25	0	QPSK	21.2	19.2	16.7
			25	12	QPSK	21.2	19.3	16.7
			25	25	QPSK	21.2	19.3	16.7
			50	0	QPSK	21.1	19.3	16.8
			1	0	16-QAM	20.7	18.8	16.2
			1	25	16-QAM	20.8	18.9	16.6
			1	49	16-QAM	20.8	18.9	16.2
			25	0	16-QAM	20.3	18.3	15.4
			25	12	16-QAM	20.3	18.4	15.4
			25	25	16-QAM	20.3	18.4	15.4
			50	0	16-QAM	20.2	18.3	15.4

	Channel / frequency	BW	RB Size	RB offset	Modulation	Conducted power / dBm		
						full	-2dB	-5dB
Low Channel	20025 / 1717.5MHz	15	1	0	QPSK	22.2*	20.1	17.3
			1	36	QPSK	22.4*	20.2	17.4
			1	74	QPSK	22.2*	20.2	17.5
			36	0	QPSK	21.2	19.3	16.8
			36	25	QPSK	21.1	19.2	16.8
			36	39	QPSK	21.1	19.2	16.7
			75	0	QPSK	21.2	19.2	16.7
			1	0	16-QAM	21.5	18.8	16.2
			1	36	16-QAM	21.6	18.9	16.6
			1	74	16-QAM	21.4	18.9	16.2
			36	0	16-QAM	20.3	18.4	15.3
			36	25	16-QAM	20.2	18.3	15.3
			36	39	16-QAM	20.2	18.3	15.2
			75	0	16-QAM	20.2	18.3	15.3
	20050 / 1720.0MHz	20	1	0	QPSK	22.1*	20.2	17.4
			1	50	QPSK	22.1*	20.2	17.4
			1	**99**	**QPSK**	**22.3***	20.2	17.6
			50	0	QPSK	21.2	19.2	16.9
			50	25	QPSK	21.2	19.3	16.8
			50	50	QPSK	21.0	19.2	16.8
			100	0	QPSK	21.1	19.2	16.9
			1	0	16-QAM	20.9	19.3	17.0
			1	50	16-QAM	20.9	19.4	17.4
			1	99	16-QAM	20.9	19.4	16.8
			50	0	16-QAM	20.2	19.4	15.4
			50	25	16-QAM	20.2	18.2	15.4
			50	50	16-QAM	20.1	19.2	15.3
			100	0	16-QAM	20.1	18.3	15.3

	Channel / frequency	BW	RB Size	RB offset	Modulation	Conducted power / dBm		
						full	-2dB	-5dB
Middle Channel	20175 / 1732.5MHz	1.4	1	0	QPSK	22.5*	20.2	17.4
			1	3	QPSK	22.4*	20.2	17.4
			1	5	QPSK	22.5*	20.2	17.5
			3	0	QPSK	22.4*	20.2	17.4
			3	2	QPSK	22.4*	20.2	17.4
			3	3	QPSK	22.4*	20.2	17.4
			6	0	QPSK	21.4	19.3	17.4
			1	0	16-QAM	21.5	18.7	16.2
			1	3	16-QAM	21.6	18.8	16.2
			1	5	16-QAM	21.5	18.8	16.2
			3	0	16-QAM	21.3	19.3	16.6
			3	2	16-QAM	21.3	19.4	16.6
			3	3	16-QAM	21.2	19.4	16.6
			6	0	16-QAM	20.1	18.4	15.1
		3	1	0	QPSK	22.3*	20.0	17.3
			1	8	QPSK	22.4*	20.1	17.3
			1	13	QPSK	22.3*	20.0	17.3
			8	0	QPSK	21.3	19.2	16.4
			8	4	QPSK	21.3	19.2	16.4
			8	7	QPSK	21.3	19.2	16.3
			15	0	QPSK	21.3	19.2	16.4
			1	0	16-QAM	21.5	18.3	16.3
			1	8	16-QAM	21.5	18.7	16.5
			1	13	16-QAM	21.5	18.7	16.3
			8	0	16-QAM	20.3	18.3	15.3
			8	4	16-QAM	20.3	18.2	15.4
			8	7	16-QAM	20.3	18.3	15.3
			15	0	16-QAM	20.3	18.3	15.3
		5	1	0	QPSK	22.2*	20.1	17.5
			1	12	QPSK	22.4*	20.1	17.5
			1	24	QPSK	22.2*	20.1	17.4
			12	0	QPSK	21.3	19.2	16.6
			12	8	QPSK	21.3	19.2	16.7
			12	13	QPSK	21.3	19.2	16.6
			25	0	QPSK	21.3	19.1	16.6
			1	0	16-QAM	21.4	18.5	16.1
			1	12	16-QAM	21.5	18.5	16.5
			1	24	16-QAM	21.4	18.5	16.0
			12	0	16-QAM	20.3	18.1	15.2
			12	8	16-QAM	20.4	18.1	15.3
			12	13	16-QAM	20.3	18.3	15.2
			25	0	16-QAM	20.2	18.3	15.3
		10	1	0	QPSK	22.3*	20.0	17.4
			1	25	QPSK	22.4*	20.1	17.4
			1	49	QPSK	22.2*	19.9	17.4
			25	0	QPSK	21.3	19.2	16.9
			25	12	QPSK	21.2	19.2	16.8
			25	25	QPSK	21.1	19.1	16.7
			50	0	QPSK	21.1	19.2	16.8
			1	0	16-QAM	21.4	18.8	16.4
			1	25	16-QAM	21.5	18.8	16.6
			1	49	16-QAM	21.4	18.6	16.1
			25	0	16-QAM	20.3	18.2	15.5
			25	12	16-QAM	20.2	18.2	15.4
			25	25	16-QAM	20.2	18.2	15.3
			50	0	16-QAM	20.1	18.1	15.3

	Channel / frequency	BW	RB Size	RB offset	Modulation	Conducted power / dBm		
						full	-2dB	-5dB
Middle Channel		15	1	0	QPSK	22.2*	20.0	17.5
			1	36	QPSK	22.3*	20.0	17.4
			1	74	QPSK	22.2*	20.1	17.4
			36	0	QPSK	21.1	19.2	16.8
			36	25	QPSK	21.2	19.2	16.6
			36	39	QPSK	21.1	19.1	16.6
			75	0	QPSK	21.1	19.1	16.7
			1	0	16-QAM	21.5	18.7	16.3
			1	36	16-QAM	21.6	18.8	16.5
			1	74	16-QAM	21.4	18.7	16.1
			36	0	16-QAM	20.2	18.3	15.3
			36	25	16-QAM	20.2	18.2	15.1
			36	39	16-QAM	20.1	18.3	15.1
			75	0	16-QAM	20.1	18.2	15.2
		20	1	0	QPSK	22.3*	20.1	17.4
			1	50	QPSK	22.4*	20.2	17.4
			1	**99**	**QPSK**	**22.4***	20.1	17.5
			50	0	QPSK	21.1	19.1	16.8
			50	25	QPSK	21.1	19.2	16.7
			50	50	QPSK	21.1	19.1	16.6
			100	0	QPSK	21.1	19.1	16.7
			1	0	16-QAM	21.5	19.3	17.1
			1	50	16-QAM	21.5	19.4	17.2
			1	99	16-QAM	21.5	19.2	16.7
			50	0	16-QAM	20.1	18.1	15.3
			50	25	16-QAM	20.1	18.1	15.2
			50	50	16-QAM	20.1	18.2	15.1
			100	0	16-QAM	20.1	18.1	15.2

	Channel / frequency	BW	RB Size	RB offset	Modulation	Conducted power / dBm		
						full	-2dB	-5dB
High Channel	20393 / 1754.3MHz	1.4	1	0	QPSK	22.3*	20.1	17.3
			1	3	QPSK	22.3*	20.0	17.3
			1	5	QPSK	22.3*	20.0	17.3
			3	0	QPSK	22.2*	20.0	17.2
			3	2	QPSK	22.2*	20.0	17.4
			3	3	QPSK	22.2*	20.0	17.4
			6	0	QPSK	21.3	19.1	16.2
			1	0	16-QAM	21.5	18.6	16.1
			1	3	16-QAM	21.5	18.6	16.2
			1	5	16-QAM	21.4	18.6	16.1
			3	0	16-QAM	21.3	19.2	16.5
			3	2	16-QAM	21.2	19.2	16.6
			3	3	16-QAM	21.2	19.2	16.6
			6	0	16-QAM	20.1	18.3	15.0
	20385 / 1753.5MHz	3	1	0	QPSK	22.4*	19.8	17.1
			1	8	QPSK	22.3*	19.9	17.3
			1	13	QPSK	22.3*	19.9	17.1
			8	0	QPSK	21.3	19.0	16.6
			8	4	QPSK	21.3	19.1	16.5
			8	7	QPSK	21.2	19.1	17.6
			15	0	QPSK	21.2	19.0	17.9
			1	0	16-QAM	21.5	19.0	16.4
			1	8	16-QAM	21.4	18.6	16.6
			1	13	16-QAM	21.5	18.6	16.5
			8	0	16-QAM	20.2	18.1	14.9
			8	4	16-QAM	20.2	18.2	15.1
			8	7	16-QAM	20.2	18.1	15.9
			15	0	16-QAM	20.3	18.2	16.1
	20375 / 1752.5MHz	5	1	0	QPSK	22.2*	20.1	17.3
			1	12	QPSK	22.3*	19.9	17.2
			1	24	QPSK	22.3*	20.1	17.3
			12	0	QPSK	21.2	19.1	16.5
			12	8	QPSK	21.3	19.0	16.5
			12	13	QPSK	21.2	19.1	16.6
			25	0	QPSK	21.2	19.0	16.5
			1	0	16-QAM	21.7	18.4	15.9
			1	12	16-QAM	21.7	18.3	15.9
			1	24	16-QAM	21.7	18.4	16.0
			12	0	16-QAM	20.3	18.1	15.0
			12	8	16-QAM	20.3	18.0	15.0
			12	13	16-QAM	20.2	18.1	15.1
			25	0	16-QAM	22.2	18.1	15.2
	20350 / 1750.0MHz	10	1	0	QPSK	22.4*	20.1	17.2
			1	25	QPSK	22.4*	20.0	17.1
			1	49	QPSK	22.3*	19.9	17.0
			25	0	QPSK	21.3	19.1	16.2
			25	12	QPSK	21.3	19.1	16.2
			25	25	QPSK	21.2	19.0	16.3
			50	0	QPSK	21.1	19.0	15.6
			1	0	16-QAM	21.7	18.7	16.0
			1	25	16-QAM	22.2	18.7	16.0
			1	49	16-QAM	21.6	18.6	16.0
			25	0	16-QAM	20.3	18.2	15.1
			25	12	16-QAM	20.3	18.2	15.2
			25	25	16-QAM	20.2	18.0	14.9
			50	0	16-QAM	20.1	18.1	14.5

	Channel / frequency	BW	RB Size	RB offset	Modulation	Conducted power / dBm		
						full	-2dB	-5dB
High Channel	20325 / 1747.5MHz	15	1	0	QPSK	22.3*	20.0	17.4
			1	36	QPSK	22.4*	20.0	17.3
			1	74	QPSK	22.2*	20.0	17.2
			36	0	QPSK	21.2	19.0	16.6
			36	25	QPSK	21.2	19.0	16.5
			36	39	QPSK	21.1	19.0	16.6
			75	0	QPSK	21.1	19.1	16.6
			1	0	16-QAM	21.7	18.6	16.1
			1	36	16-QAM	21.6	18.7	16.1
			1	74	16-QAM	21.6	18.7	16.3
			36	0	16-QAM	20.3	18.2	15.4
			36	25	16-QAM	20.2	18.2	15.2
			36	39	16-QAM	20.2	18.1	15.2
			75	0	16-QAM	20.1	18.1	15.2
	20300 / 1745.0MHz	20	1	0	QPSK	22.2*	20.1	17.4
			1	**50**	**QPSK**	**22.3***	20.1	17.4
			1	99	QPSK	22.1*	20.0	17.4
			50	0	QPSK	21.2	19.0	16.6
			50	25	QPSK	21.1	19.0	16.6
			50	50	QPSK	21.2	19.0	16.6
			100	0	QPSK	21.2	19.0	16.6
			1	0	16-QAM	20.9	19.3	16.7
			1	50	16-QAM	20.9	19.2	16.8
			1	99	16-QAM	20.8	19.2	16.8
			50	0	16-QAM	20.2	18.0	15.2
			50	25	16-QAM	20.2	18.0	15.1
			50	50	16-QAM	20.2	18.1	15.1
			100	0	16-QAM	20.2	18.1	15.1

Table 26: Test results conducted power measurement LTE FDD 4 1700 MHz
***** - output power is reduced 1dB in MHS-Mode

7.1.11 Conducted power measurements LTE FDD 13 700 MHz

	Channel / frequency	BW	RB Size	RB offset	Modulation	Conducted power / dBm		
						full	-2dB	-4dB
Low Channel	23205 / 779.5MHz	5	1	0	QPSK	23.0	20.8	18.9
			1	12	QPSK	22.6	20.9	18.9
			1	24	QPSK	22.5	20.8	18.9
			12	0	QPSK	21.6	19.7	17.9
			12	8	QPSK	21.5	19.8	17.9
			12	13	QPSK	21.5	19.8	17.9
			25	0	QPSK	21.4	19.6	17.8
			1	0	16-QAM	22.0	19.0	17.2
			1	12	16-QAM	21.8	19.1	17.2
			1	24	16-QAM	21.7	19.1	17.1
			12	0	16-QAM	20.7	18.7	16.9
			12	8	16-QAM	20.6	18.7	16.8
			12	13	16-QAM	20.6	18.7	16.8
			25	0	16-QAM	20.5	18.7	16.9
Middle Channel	23230 / 782.0MHz	5	1	0	QPSK	22.5	20.9	18.9
			1	12	QPSK	22.5	20.8	18.9
			1	24	QPSK	22.7	20.8	18.9
			12	0	QPSK	21.4	19.8	17.9
			12	8	QPSK	21.4	19.8	17.8
			12	13	QPSK	21.6	19.8	17.8
			25	0	QPSK	21.4	19.8	17.8
			1	0	16-QAM	21.9	19.9	17.9
			1	12	16-QAM	21.9	19.9	17.8
			1	24	16-QAM	22.0	19.9	17.9
			12	0	16-QAM	20.4	18.8	17.1
			12	8	16-QAM	20.4	18.9	16.9
			12	13	16-QAM	20.6	18.9	16.9
			25	0	16-QAM	20.3	18.9	17.0
High Channel	23255 / 784.5MHz	5	1	0	QPSK	22.4	20.7	18.8
			1	12	QPSK	22.7	20.8	18.9
			1	24	QPSK	22.8	20.9	19.1
			12	0	QPSK	21.6	19.9	18.0
			12	8	QPSK	21.6	19.9	18.0
			12	13	QPSK	21.7	19.9	18.0
			25	0	QPSK	21.5	19.7	17.8
			1	0	16-QAM	20.9	19.9	17.9
			1	12	16-QAM	21.2	20.0	18.0
			1	24	16-QAM	21.4	20.0	18.2
			12	0	16-QAM	20.5	18.9	17.0
			12	8	16-QAM	20.7	18.9	17.0
			12	13	16-QAM	20.6	18.9	16.9
			25	0	16-QAM	20.5	18.7	16.8
Middle Channel	23230 / 782.0MHz	10	1	0	QPSK	22.7	20.9	18.8
			1	25	QPSK	22.5	20.9	18.8
			1	**49**	**QPSK**	**22.9**	20.9	18.9
			25	0	QPSK	21.4	19.7	17.8
			25	12	QPSK	21.4	19.8	17.8
			25	25	QPSK	21.5	19.7	17.8
			50	0	QPSK	21.3	19.7	17.7
			1	0	16-QAM	21.9	19.5	17.5
			1	25	16-QAM	21.7	19.5	17.4
			1	49	16-QAM	22.0	19.3	17.5
			25	0	16-QAM	20.3	18.8	17.0
			25	12	16-QAM	20.4	18.9	16.9
			25	25	16-QAM	20.4	18.8	16.9
			50	0	16-QAM	20.2	18.7	16.8

Table 27: Test results conducted power measurement LTE FDD 13 700 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

The following table shows the conducted power overview for WLAN 2.4 GHz both in stand-alone operation without any power reduction and with 3 modes where additional power back-off is required for simultaneous operation:

- WLAN + CDMA BC1: **-3 dB**
- WLAN + LTE FDD 4 + CDMA BC0: **-9 dB**
- Mobile Hot Spot with max. 10 dBm setting

Channel / frequency	modulation	bit rate	maximum avg. power			
			no back-off	cdma Bc1	svLte Bc0_4	MHS 10
1 / 2412 MHz	CCK	1 MBit/s	14.9	11.7	5.4	9.6
6 / 2437 MHz	CCK	1 MBit/s	**15.1**	11.9	5.4	9.7
11 / 2462 MHz	CCK	1 MBit/s	15.1	11.8	5.3	9.6
1 / 2412 MHz	OFDM	6 MBit/s	15.4	12.4	6.4	10.7
6 / 2437 MHz	OFDM	6 MBit/s	15.6	12.7	6.6	10.8
11 / 2462 MHz	OFDM	6 MBit/s	13.5	12.5	6.5	10.7
1 / 2412 MHz	OFDM	6.5 MBit/s	15.4	12.3	6.4	10.6
6 / 2437 MHz	OFDM	6.5 MBit/s	15.6	12.7	6.6	10.8
11 / 2462 MHz	OFDM	6.5 MBit/s	13.5	12.5	6.5	10.7

Table 28: Test results conducted power measurement WLAN 2.4 GHz

7.1.15 Conducted power measurements WLAN 5 GHz

The following table shows the conducted power overview for WLAN 5 GHz both in stand-alone operation without any power reduction and with 2 modes where additional power back-off is required for simultaneous operation:

- WLAN + CDMA BC1: **-2.5 dB**
- WLAN + LTE FDD 4 + CDMA BC0: **-8 dB**

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	**14.9**	12.4	6.9	**15.1**	12.6	7.1	**14.1**	11.8	6.3	
40	5200	OFDM	14.9	12.4	6.9	15.1	12.5	7.1				
44	5220	OFDM	14.8	12.2	6.7	15.1	12.5	6.9	14.0	11.7	6.2	
48	5240	OFDM	14.9	12.4	6.9	15.0	12.5	6.8				
52	5260	OFDM	**14.8**	12.2	6.8	**14.9**	12.4	7.0	**13.9**	11.6	6.1	
56	5280	OFDM	14.8	12.1	6.5	14.9	12.4	6.8				
60	5300	OFDM	14.8	12.2	6.6	14.8	12.3	6.8	13.9	11.6	6.1	
64	5320	OFDM	14.8	12.1	6.6	14.8	12.3	6.8				
100	5500	OFDM	14.6	12.0	6.5	14.7	12.2	6.7	**13.9**	11.5	6.0	
104	5520	OFDM	**14.7**	12.1	6.6	**14.7**	12.2	6.8				
108	5540	OFDM	14.6	12.0	6.5	14.7	12.2	6.7	13.9	11.6	6.1	
112	5560	OFDM	14.6	12.0	6.5	14.6	12.1	6.7				
116	5580	OFDM	14.5	11.9	6.4	14.6	12.1	6.6	13.9	11.6	6.1	
120	5600	OFDM	14.5	11.9	6.4	14.5	12.1	6.6				
124	5620	OFDM	14.5	11.9	6.4	14.5	12.1	6.6	13.9	11.7	6.2	
128	5640	OFDM	14.4	11.7	6.2	14.5	12.0	6.4				
132	5660	OFDM	14.3	11.7	6.2	14.4	12.0	6.4	13.9	11.6	6.1	
136	5680	OFDM	14.3	11.6	6.0	14.3	11.8	6.2				
140	5700	OFDM	14.3	11.7	6.2	14.3	11.8	6.2	---	---	---	
149	5745	OFDM	**14.3**	11.7	6.2	**14.3**	11.9	6.3	**13.9**	11.6	6.1	
153	5765	OFDM	14.3	11.7	6.2	14.3	11.9	6.3				
157	5785	OFDM	14.3	11.7	6.1	14.3	11.9	6.3	13.9	11.6	6.1	
161	5805	OFDM	14.3	11.7	6.2	14.3	11.8	6.2				
165	5825	OFDM	14.2	11.7	6.1	14.2	11.6	6.1	---	---	---	
			no back off	**cdma Bc1**	**svLte Bc0_4**	**no back off**	**cdma Bc1**	**svLte Bc0_4**	**no back off**	**cdma Bc1**	**svLte Bc0_4**	

Table 29: 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	28.5	707.9	129.4	no
GSM 1900	1900	28.0	631.0	173.9	no
UMTS FDD II	1900	23.5	223.9	61.7	no
UMTS FDD V	835	23.5	223.9	40.9	no
CDMA BC0	835	24.0	251.2	45.9	no
CDMA BC1	1900	24.0	251.2	69.2	no
LTE FDD 4	1750	23.5	223.9	59.2	no
LTE FDD 5	782	23.0	199.5	35.3	no
WLAN 2450	2450	16.0	39.8	12.5	no
WLAN 5.2 GHz	5200	16.0	39.8	18.2	no
WLAN 5.3 GHz	5300	16.0	39.8	18.3	no
WLAN 5.6 GHz	5600	16.0	39.8	18.8	no
WLAN 5.8 GHz	5800	16.0	39.8	19.2	no
Bluetooth 2450	2450	9.5	8.9	2.8	yes

Table 30: Standalone SAR test exclusion considerations in **head position**

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	10	28.5	707.9	64.7	no
GSM 1900	1900	10	25.0	316.2	43.6	no
UMTS FDD II	1900	10	22.5	177.8	24.5	no
UMTS FDD V	835	10	23.5	223.9	20.5	no
CDMA BC 0	835	10	24.0	251.2	23.0	no
CDMA BC1	1900	10	24.0	251.2	34.6	no
LTE FDD 4	1750	10	21.5	141.3	18.7	no
LTE FDD 17	782	10	23.0	199.5	17.6	no
WLAN 2450	2450	10	11.0	12.6	2.0	yes
WLAN 2450	2450	15	16.0	39.8	4.2	no
WLAN 5.2 GHz	5200	15	16.0	39.8	6.1	no
WLAN 5.3 GHz	5300	15	16.0	39.8	6.1	no
WLAN 5.6 GHz	5600	15	16.0	39.8	6.3	no
WLAN 5.8 GHz	5800	15	16.0	39.8	6.4	no
Bluetooth 2450	2450	10	9.5	8.9	1.4	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	9.5	8.9	0.372
Bluetooth 2450 MHS	2.45	10	9.5	8.9	0.186
Bluetooth 2450 body worn	2.45	15	9.5	8.9	0.124
Bluetooth 2450 body worn with holster	2.45	20	9.5	8.9	0.093

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.

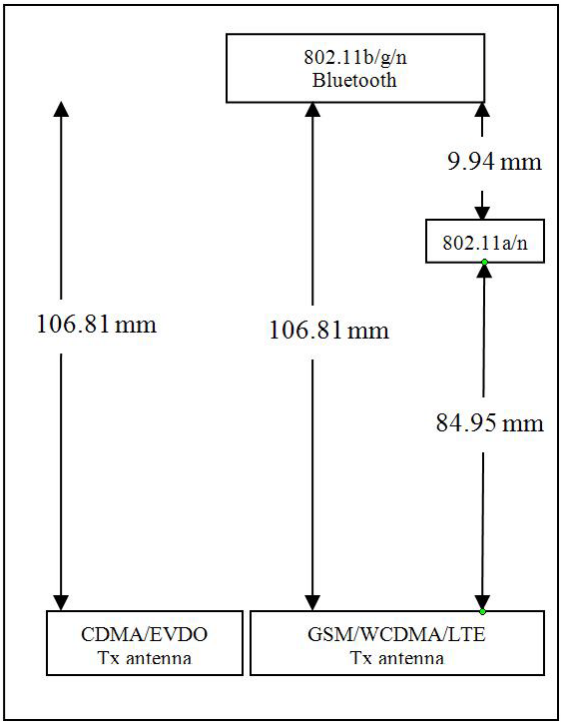
Note: Test separation distance is the distance between phantom and DUT.

7.1.18 Mobile hotspot SAR measurement positions

Mobile hotspot 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 V 850	yes	yes	yes	yes	no	yes
WCDMA FDD II 1900	yes	yes	yes	yes	no	yes
CDMA BC0 850	yes	yes	yes	yes	no	yes
CDMA BC1 1900	yes	yes	yes	yes	no	yes
LTE FDD 17 750	yes	yes	yes	yes	no	yes
LTE FDD 4 1750	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 SAR.

top



right **left**

bottom

Antenna dimensions and separation distances

7.2 SAR test results

7.2.1 Results overview

Important Note:
The following tables include results both for standalone and simultaneous operation including power back off. See notes in section 7.2.3 which power reduction is applied for the different simultaneous transmission situations.

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	
128	824.2	left cheek	28.5	28.5	0.399	0.399	21.5
190	836.6	left cheek	28.5	28.2	0.567	0.608	21.5
251	848.8	left cheek	28.5	28.3	**0.591**	**0.619**	21.5
190	836.6	left tilted 15°	28.5	28.2	0.288	0.309	21.5
190	836.6	right cheek	28.5	28.2	0.482	0.516	21.5
190	836.6	right tilted 15°	28.5	28.2	0.280	0.300	21.5

Table 33: Test results head SAR GSM 850MHz 3TS in uplink. See max. SAR plot page 112.

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 - MHS - 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	28.5	28.5	0.702	0.702	21.1
190	836.6	3	10	front	28.5	28.2	0.821	0.880	21.1
251	848.8	3	10	front	28.5	28.3	0.874	0.915	21.1
128	824.2	3	10	rear	28.5	28.5	0.873	0.873	21.1
190	836.6	3	10	rear	28.5	28.2	0.961	1.030	21.1
251	848.8	3	10	rear	28.5	28.3	1.010	1.058	21.1
190	836.6	3	10	left edge	28.5	28.2	0.390	0.418	21.1
190	836.6	3	10	right edge	28.5	28.2	0.290	0.311	21.1
190	836.6	3	10	bottom edge	28.5	28.2	0.347	0.372	21.1
251	848.8	3	10	rear*	28.5	28.3	**1.160**	**1.215**	21.1
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	
190	836.6	3	15	front	28.5	28.2	0.629	0.674	21.1
128	824.2	3	15	rear	28.5	28.5	0.653	0.653	21.1
190	836.6	3	15	rear	28.5	28.2	0.723	0.775	21.1
251	848.8	3	15	rear	28.5	28.3	**0.754**	**0.790**	21.1
190	836.6	3	holster	rear	28.5	28.3	0.523	0.548	21.1

Table 34: Test results MHS and body worn SAR GSM 850 MHz. See max. SAR plot page 113, 114.

* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer
Top edge position for MHS is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

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	28.0	27.9	**0.730**	**0.747**	22.6
661	1880.0	left cheek	28.0	27.9	0.576	0.589	22.6
810	1909.8	left cheek	28.0	27.8	0.417	0.437	22.6
661	1880.0	left tilted 15°	28.0	27.9	0.132	0.135	22.6
661	1880.0	right cheek	28.0	27.9	0.273	0.279	22.6
661	1880.0	right tilted 15°	28.0	27.9	0.164	0.168	22.6

Table 35: Test results head SAR GSM 1900MHz 2TS in uplink. See max. SAR plot page 115.

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 - MHS - 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	25.0	24.9	0.708	0.724	22.9
512	1850.2	4	10	GMSK	rear	25.0	24.9	1.210	1.238	22.9
661	1880.0	4	10	GMSK	rear	25.0	24.9	**1.210**	**1.238**	22.9
810	1909.8	4	10	GMSK	rear	25.0	24.9	0.977	1.000	22.9
661	1880.0	4	10	GMSK	left edge	25.0	24.9	0.636	0.651	22.9
661	1880.0	4	10	GMSK	right edge	25.0	24.9	0.083	0.085	22.9
661	1880.0	4	10	GMSK	bottom edge	25.0	24.9	0.171	0.175	22.9
661	1880.0	4	10	GMSK	rear*	25.0	24.9	1.070	1.095	22.9
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	25.0	24.9	0.361	0.369	22.9
512	1850.2	4	15	GMSK	rear	25.0	24.9	0.521	0.533	22.9
661	1880.0	4	15	GMSK	rear	25.0	24.9	**0.560**	**0.573**	22.9
810	1909.8	4	15	GMSK	rear	25.0	24.9	0.469	0.480	22.9
661	1880.0	4	holster	GMSK	rear	25.0	24.9	0.260	0.266	22.9

Table 36: Test results MHS and body worn SAR GSM 1900 MHz. See max. SAR plot page 116, 117.

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

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

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	23.5	23.1	**0.906**	**0.993**	22.6
9400	1880	left cheek	23.5	22.9	0.760	0.873	22.6
9538	1907.6	left cheek	23.5	22.9	0.645	0.741	22.6
9538	1907.6	left tilted 15°	23.5	22.9	0.166	0.191	22.6
9538	1907.6	right cheek	23.5	22.9	0.366	0.420	22.6
9538	1907.6	right tilted 15°	23.5	22.9	0.211	0.242	22.6

Table 37: Test results head SAR UMTS FDD II 1880 MHz. See max. SAR plot page 118.

measured / extrapolated SAR numbers - MHS - 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	
9262	1852.4	RMC	10	front	22.5	21.8	0.680	0.799	22.3
9400	1880	RMC	10	front	22.5	21.6	0.792	0.974	22.3
9538	1907.6	RMC	10	front	22.5	21.6	0.757	0.931	22.3
9262	1852.4	RMC	10	rear	22.5	21.8	0.922	1.083	22.3
9400	1880	RMC	10	rear	22.5	**21.6**	**1.090**	**1.341**	22.3
9538	1907.6	RMC	10	rear	22.5	21.6	0.837	1.030	22.3
9262	1852.4	RMC	10	left edge	22.5	21.8	0.683	0.802	22.3
9400	1880	RMC	10	left edge	22.5	21.6	0.888	1.092	22.3
9538	1907.6	RMC	10	left edge	22.5	21.6	0.717	0.882	22.3
9400	1880	RMC	10	right edege	22.5	21.6	0.063	0.078	22.3
9400	1880	RMC	10	bottom edge	22.5	21.6	0.162	0.199	22.3
9400	1880	HSDPA	10	rear	22.5	21.4	0.763	0.983	22.3
9400	1880	HSUPA	10	rear	22.5	21.4	0.685	0.882	22.3
9400	1880	RMC	10	rear*	22.5	21.6	1.000	1.230	22.3
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	23.5	22.9	0.421	0.483	22.3
9262	1852.4	RMC	15	rear	23.5	23.1	0.587	0.644	22.3
9400	1880	RMC	15	rear	23.5	22.9	**0.729**	**0.837**	22.3
9538	1907.6	RMC	15	rear	23.5	22.9	0.617	0.708	22.3
9400	1880	RMC	Holster	rear	23.5	22.9	0.399	0.458	22.3

Table 38: Test results MHS and body worn SAR UMTS FDD II 1880 MHz. See max. SAR plot page 119, 120.

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

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

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	23.5	23.2	0.225	0.241	21.2
4182	836.4	left cheek	23.5	23.3	**0.327**	0.342	21.2
4233	846.6	left cheek	23.5	22.8	0.297	**0.349**	21.2
4182	836.4	left tilted 15°	23.5	23.3	0.179	0.187	21.2
4182	836.4	right cheek	23.5	23.3	0.279	0.292	21.2
4182	836.4	right tilted 15°	23.5	23.3	0.168	0.176	21.2

Table 39: Test results head SAR UMTS FDD V 850 MHz. See max. SAR plot page 121, 122.

measured / extrapolated SAR numbers - MHS - 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	
4182	836.4	RMC	10	front	23.5	23.3	0.522	0.547	22.2
4132	826.4	RMC	10	rear	23.5	23.3	0.533	0.558	22.2
4182	836.4	RMC	10	rear	23.5	23.3	0.625	0.654	22.2
4233	846.6	RMC	10	rear	23.5	22.8	**0.644**	**0.757**	22.2
4182	836.4	RMC	10	left edge	23.5	23.3	0.290	0.304	22.2
4182	836.4	RMC	10	right edge	23.5	23.3	0.184	0.193	22.2
4182	836.4	RMC	10	bottom edge	23.5	23.3	0.180	0.188	22.2
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	
4182	836.4	RMC	15	front	23.5	23.3	0.382	0.400	22.2
4132	826.4	RMC	15	rear	23.5	23.2	0.361	0.387	22.2
4182	836.4	RMC	15	rear	23.5	23.3	**0.426**	0.446	22.2
4233	846.6	RMC	15	rear	23.5	22.8	0.419	**0.492**	22.2
4182	836.4	RMC	holster	rear	23.5	23.3	0.298	0.312	22.2

Table 40: Test results MHS and body worn SAR UMTS FDD V 850 MHz. See max. SAR plot page 123-125.

* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer
Top edge position for MHS is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

measured / extrapolated SAR numbers - Head - CDMA BC0 835 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
384	836.6	left cheek	24.0	23.8	0.318	0.333	23.9
384	836.6	left tilted 15°	24.0	23.8	0.180	0.188	23.9
1013	824.7	right cheek	24.0	23.8	0.330	0.346	23.9
384	836.6	right cheek	24.0	23.8	**0.340**	0.356	23.9
777	848.31	right cheek	24.0	23.5	0.340	**0.381**	23.9
384	836.6	right tilted 15°	24.0	23.8	0.193	0.202	23.9

Table 41: Test results head SAR CDMA BC0 835 MHz RC3/3, SO55. See max. SAR plot page 126, 127.

measured / extrapolated SAR numbers - MHS - CDMA BC0 835 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	
384	836.6	SO55	10	front	24.0	23.8	0.469	0.491	22.8
1013	824.7	SO55	10	rear	24.0	23.8	**0.631**	**0.661**	22.8
384	836.6	SO55	10	rear	24.0	23.8	0.605	0.634	22.8
777	848.31	SO55	10	rear	24.0	23.5	0.567	0.636	22.8
384	836.6	SO55	10	left edge	24.0	23.8	0.252	0.264	22.8
384	836.6	SO55	10	right edege	24.0	23.8	0.443	0.464	22.8
384	836.6	SO55	10	bottom edge	24.0	23.8	0.117	0.123	22.8
measured / extrapolated SAR numbers - Body worn - CDMA BC0 835 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	
384	836.6	SO55	15	front	24.0	23.8	0.420	0.440	22.8
1013	824.7	SO55	15	rear	24.0	23.8	0.433	0.453	22.8
384	836.6	SO55	15	rear	24.0	23.8	**0.459**	**0.481**	22.8
777	848.31	SO55	15	rear	24.0	23.5	0.412	0.462	22.8
384	836.6	SO55	holster	rear	24.0	23.8	0.291	0.305	22.8

Table 42: Test results MHS and body worn SAR CDMA BC0 835 MHz RC3/3, SO55. See max. SAR plot page 128, 129.

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

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

measured / extrapolated SAR numbers - Head - CDMA BC1 1880 MHz							
Ch.	frequency (MHz)	Position	cond. output power (dBm)		SAR_{1g} results(W/kg)		liquid temp. (°C)
			declared**	measured	measured	extrapolated	
600	1880	left cheek	24.0	23.7	0.441	0.473	23.9
600	1880	left tilted 15°	24.0	23.7	0.314	0.336	23.9
25	1851.25	right cheek	24.0	23.5	**0.948**	**1.064**	23.9
600	1880	right cheek	24.0	23.7	0.776	0.831	23.9
1175	1908.75	right cheek	24.0	23.6	0.737	0.808	23.9
600	1880	right tilted 15°	24.0	23.7	0.346	0.371	23.9
25	1851.25	right cheek*	24.0	23.5	0.928	1.041	23.9

Table 43: Test results head SAR CDMA BC1 1880 MHz RC3/3, SO55. See max. SAR plot page 130.

measured / extrapolated SAR numbers - MHS - CDMA BC1 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	
25	1851.3	SO55	10	front	24.0	23.5	**0.929**	**1.042**	22.3
600	1880	SO55	10	front	24.0	23.7	0.896	0.960	22.3
1175	1908.8	SO55	10	front	24.0	23.6	0.720	0.789	22.3
600	1880	SO55	10	rear	24.0	23.7	0.707	0.758	22.3
600	1880	SO55	10	left edge	24.0	23.7	0.074	0.079	22.3
600	1880	SO55	10	right edege	24.0	23.7	0.636	0.681	22.3
600	1880	SO55	10	bottom edge	24.0	23.7	0.268	0.287	22.3
measured / extrapolated SAR numbers - Body worn - CDMA BC1 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	
25	1851.3	SO55	15	front	24.0	23.5	**0.558**	**0.626**	22.3
600	1880	SO55	15	front	24.0	23.7	0.529	0.567	22.3
1175	1908.8	SO55	15	front	24.0	23.6	0.464	0.509	22.3
600	1880	SO55	15	rear	24.0	23.7	0.429	0.460	22.3
25	1851.3	SO55	holster	front	24.0	23.5	0.332	0.373	22.3

Table 44: Test results MHS and body worn SAR CDMA BC1 1880 MHz RC3/3, SO55. See max. SAR plot page 131, 132.

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

Top edge position for MHS 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 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/99RB offset/QPSK							
20050	1720	left cheek	23.5	22.3	**0.957**	**1.262**	23.3
20175	1732.5	left cheek	23.5	22.4	0.926	1.193	23.3
20300	1745	left cheek	23.5	22.3	0.881	1.161	23.3
20175	1732.5	left tilted 15°	23.5	22.4	0.288	0.371	23.3
20175	1732.5	right cheek	23.5	22.4	0.450	0.580	23.3
20175	1732.5	right tilted 15°	23.5	22.4	0.253	0.326	23.3
20050	1720	left cheek	23.5	22.3	0.864	1.139	23.3
20MHz BW/50RB/0RB offset/QPSK							
20050	1720	left cheek	22.5	21.2	**0.756**	1.020	23.3
20175	1732.5	left cheek	22.5	21.1	0.734	1.013	23.3
20300	1745	left cheek	22.5	21.2	0.650	0.877	23.3
20175	1732.5	left tilted 15°	22.5	21.1	0.273	0.377	23.3
20050	1720	right cheek	22.5	21.2	0.303	0.409	23.3
20050	1720	right tilted 15°	22.5	21.2	0.229	0.309	23.3
20MHz BW/100RB/0RB offset/QPSK							
20300	1745	left cheek	22.5	21.2	0.725	0.978	23.1
20300	1745	left tilted 15°	22.5	21.2	0.206	0.278	23.1
20300	1745	right cheek	22.5	21.2	0.400	0.540	23.1
20300	1745	right tilted 15°	22.5	21.2	0.211	0.285	23.1
20MHz BW/1RB/99RB offset/QPSK 2dBm Power Back Off DUT #28							
20050	1720	left cheek	21.5	20.2	0.557	0.751	23.1
20050	1720	right cheek	21.5	20.2	0.288	0.389	23.1
20MHz BW/1RB/99RB offset/QPSK 5dBm Power Back Off DUT #30							
20050	1720	left cheek	18.5	17.6	0.285	0.351	23.1
20050	1720	right cheek	18.5	17.6	0.136	0.167	23.1

Table 45: Test results head SAR LTE FDD 4 1750 MHz. See max. SAR plot page 133.

measured / extrapolated SAR numbers - MHS - 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	99	10	front	21.5	21.3	0.953	0.998	23.7
20175	1732.5	99	10	front	21.5	21.4	0.884	0.905	23.7
20300	1745	50	10	front	21.5	21.3	0.959	1.004	23.7
20050	1720	99	10	rear	21.5	21.3	1.010	1.058	23.7
20175	1732.5	99	10	rear	21.5	21.4	1.000	1.023	23.7
20300	1745	50	10	rear	21.5	**21.3**	**1.040**	**1.089**	23.7
20175	1732.5	99	10	left edge	21.5	21.4	0.602	0.616	23.7
20175	1732.5	99	10	right edge	21.5	21.4	0.121	0.124	23.7
20175	1732.5	99	10	bottom edge	21.5	21.4	0.192	0.196	23.7
20300	1745	50	10	rear*	21.5	21.3	**1.040**	**1.089**	23.7
20MHz BW/50RB/0RB offset/QPSK									
20050	1720	0	10	front	21.5	21.2	0.838	0.898	22.8
20175	1732.5	0	10	front	21.5	21.1	0.832	0.912	22.8
20300	1745	0	10	front	21.5	21.2	0.768	0.823	22.8
20050	1720	0	10	rear	21.5	21.2	0.942	1.009	22.8
20175	1732.5	0	10	rear	21.5	21.1	0.962	1.055	22.8
20300	1745	0	10	rear	21.5	21.2	0.919	0.985	22.8
20050	1720	0	10	left edge	21.5	21.2	0.477	0.511	22.8
20050	1720	0	10	right edge	21.5	21.2	0.141	0.151	22.8
20050	1720	0	10	bottom edge	21.5	21.2	0.200	0.214	22.8
20MHz BW/100RB/0RB offset/QPSK									
20300	1745	0	10	front	21.5	21.2	0.735	0.788	22.8
20050	1720	0	10	rear	21.5	21.1	0.952	1.044	22.8
20175	1732.5	0	10	rear	21.5	21.1	0.929	1.019	22.8
20300	1745	0	10	rear	21.5	21.2	0.889	0.953	22.8
20300	1745	0	10	left edge	21.5	21.2	0.472	0.506	22.8
20300	1745	0	10	right edge	21.5	21.2	0.162	0.174	22.8
20300	1745	0	10	bottom edge	21.5	21.2	0.178	0.191	22.8

Table 46: Test results mobile hotspot SAR LTE FDD 4 1750 MHz. See max. SAR plot page 134.
* - repeated at the highest SAR measurement according to the FCC KDB 865664
** - maximum possible output power declared by manufacturer

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

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	99	15	front	23.5	22.3	**0.655**	**0.863**	22.8
20175	1732.5	99	15	front	23.5	22.4	0.633	0.815	22.8
20300	1745	50	15	front	23.5	22.3	0.623	0.821	22.8
20175	1732.5	99	15	rear	23.5	22.4	0.623	0.803	22.8
20050	1720	99	holster	front	23.5	22.3	0.331	0.436	22.8
SVLTE 20MHz BW/1RB/ 99RB offset/QPSK 2dBm Power Back Off DUT #28									
20050	1720	99	15	front	21.5	20.1	0.441	0.609	22.8
20050	1720	99	15	rear	21.5	20.1	0.419	0.578	22.8
SVLTE 20MHz BW/1RB/ 99RB offset/QPSK 5dBm Power Back Off DUT #30									
20050	1720	99	15	front	18.5	17.4	0.222	0.286	22.8
20050	1720	99	15	rear	18.5	17.4	0.202	0.260	22.8

Table 47: Test results body worn SAR LTE FDD 4 1750 MHz. See max. SAR plot page 135.

measured / extrapolated SAR numbers - Head - LTE FDD 13 700 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							
23230	782	left cheek	23.0	22.9	**0.430**	**0.440**	22.8
23230	782	left tilted 15°	23.0	22.9	0.189	0.193	22.8
23230	782	right cheek	23.0	22.9	0.372	0.381	22.8
23230	782	right tilted 15°	23.0	22.9	0.167	0.171	22.8
10MHz BW/25RB/25RB offset/QPSK							
23230	782	left cheek	22.0	21.4	0.245	0.281	22.8
23230	782	left tilted 15°	22.0	21.4	0.149	0.171	22.8
23230	782	right cheek	22.0	21.4	0.188	0.216	22.8
23230	782	right tilted 15°	22.0	21.4	0.140	0.161	22.8
SVLTE 10MHz BW/1RB/ 49RB offset/QPSK 2dBm Power Back Off							
23230	782	left cheek	21.0	20.9	0.267	0.273	22.8
23230	782	right cheek	21.0	20.9	0.231	0.236	22.8
SVLTE 10MHz BW/1RB/49RB offset/QPSK 4dBm Power Back Off							
23230	782	left cheek	19.0	18.9	0.165	0.169	22.8
23230	782	right cheek	19.0	18.9	0.143	0.146	22.8

Table 48: Test results head SAR LTE FDD 13 700 MHz. See max. SAR plot page 136.

measured / extrapolated SAR numbers - MHS - LTE FDD 13 700 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/49RB offset/QPSK									
23230	782	49	10	front	23.0	22.9	**0.698**	**0.714**	23.4
23230	782	49	10	rear	23.0	22.9	0.694	0.710	23.4
23230	782	49	10	left edge	23.0	22.9	0.505	0.517	23.4
23230	782	49	10	right edge	23.0	22.9	0.485	0.496	23.4
23230	782	49	10	bottom edge	23.0	22.9	0.300	0.307	23.4
10MHz BW/25RB/25RB offset/QPSK									
23230	782	25	10	front	22.0	21.4	0.561	0.644	23.4
23230	782	25	10	rear	22.0	21.4	0.562	0.645	23.4
23230	782	25	10	left edge	22.0	21.4	0.427	0.490	23.4
23230	782	25	10	right edge	22.0	21.4	0.341	0.392	23.4
23230	782	25	10	bottom edge	22.0	21.4	0.192	0.220	23.4
measured / extrapolated SAR numbers - Body worn - LTE FDD 13 700 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/49RB offset/QPSK									
23230	782	49	15	front	23.0	22.9	**0.549**	**0.562**	23.4
23230	782	49	15	rear	23.0	22.9	0.528	0.540	23.4
23230	782	49	holster	front	23.0	22.9	0.322	0.330	23.4
10MHz BW/25RB/25RB offset/QPSK									
SVLTE 10MHz BW/1RB/ 49RB offset/QPSK 2dBm Power Back Off									
23230	782	49	15	front	21.0	20.9	0.321	0.328	23.4
23230	782	49	15	rear	21.0	20.9	0.319	0.326	23.4
SVLTE 10MHz BW/1RB/ 49RB offset/QPSK 4dBm Power Back Off									
23230	782	49	15	front	19.0	18.9	0.210	0.215	23.4
23230	782	49	15	rear	19.0	18.9	0.209	0.214	23.4

Table 49: Test results MHS and body worn SAR LTE FDD 13 700 MHz. See max. SAR plot page 137, 138.

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

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

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**	
6	2437	left cheek	15.6	15.1	0.585	0.656	23.1
6	2437	left tilted 15°	15.6	15.1	0.596	0.669	23.1
1	2412	right cheek	15.6	15.1	0.920	1.032	23.1
6	2437	right cheek	15.6	15.1	0.882	0.990	23.1
11	2462	right cheek	15.6	15.1	0.964	1.082	23.1
1	2412	right tilted 15°	15.6	14.9	1.020	1.198	23.1
6	2437	right tilted 15°	15.6	**15.1**	**1.130**	**1.268**	23.1
11	2462	right tilted 15°	15.6	15.1	1.110	1.245	23.1
6	2437	6 Mbit/s right tilted 15°	15.6	15.6	1.240	1.240	23.1
6	2437	MCS0 right tilted 15°	15.6	15.6	1.210	1.210	23.1
11	2462	right tilted 15°	15.6	15.1	1.110	1.245	23.1
CDMA_BC1 - Power back off							
6	2437	left cheek	13.0	11.9	0.323	0.416	23.1
6	2437	right cheek	13.0	11.9	0.504	0.649	23.1
6	2437	right tilted 15°	13.0	11.9	0.606	0.781	23.1
SVLTE BC0 Band 4 - Power back off							
6	2437	left cheek	7.0	5.4	0.047	0.068	23.1
6	2437	right cheek	7.0	5.4	0.119	0.172	23.1
6	2437	right tilted 15°	7.0	5.4	0.144	0.208	23.1

Table 50: Test results head SAR WLAN 2450 MHz. See max. SAR plot page 139.
* - repeated at the highest SAR measurement according to the FCC KDB 865664

measured / extrapolated SAR numbers - MHS - 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**	
6	2437	1Mbit/s	10	front	11.0	9.7	0.043	0.058	22.2
1	2412	1Mbit/s	10	rear	11.0	9.6	0.169	0.233	22.2
6	2437	1Mbit/s	10	rear	11.0	9.7	0.162	0.219	22.2
11	2462	1Mbit/s	10	rear	11.0	9.6	0.131	0.181	22.2
1	2412	1Mbit/s	10	rear 6 Mbit/s	11.0	10.7	0.227	0.243	22.2
1	2412	1Mbit/s	10	rear MCS 0	11.0	**10.6**	**0.232**	**0.254**	22.2
6	2437	1Mbit/s	10	left edge	11.0	9.7	0.024	0.032	22.2
6	2437	1Mbit/s	10	right edge	11.0	9.7	0.000	0.000	22.2
6	2437	1Mbit/s	10	top	11.0	9.7	0.060	0.081	22.2

Table 51: Test results mobile hotspot SAR WLAN 2450 MHz. See max. SAR plot page 140.

** - maximum possible output power declared by manufacturer

Bottom side edge positions for MHS 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**	
6	2437	1Mbit/s	15	front	15.6	15.1	0.085	0.095	22.2
1	2412	1Mbit/s	15	rear	15.6	14.9	0.301	0.354	22.2
6	2437	1Mbit/s	15	rear	15.6	15.1	0.212	0.238	22.2
11	2462	1Mbit/s	15	rear	15.6	15.1	0.219	0.246	22.2
1	2437	6Mbit/s	15	rear	15.6	**15.4**	**0.351**	**0.368**	22.2
1	2437	MCS 0	15	rear	15.6	15.4	0.316	0.331	22.2
1	2437	6Mbit/s	holster	rear	15.6	15.1	0.114	0.128	22.2
1	2437	6Mbit/s CDMA BC1	15	front	13.0	12.4	0.068	0.078	22.2
1	2437	6Mbit/s CDMA BC1	15	rear	13.0	12.4	0.170	0.195	22.2
1	2437	6Mbit/s svLTE BC0	15	front	7.0	6.4	0.017	0.020	22.2
1	2437	6Mbit/s svLTE BC0	15	rear	7.0	6.4	0.042	0.048	22.2

Table 52: Test results body worn SAR WLAN 2450 MHz. See max. SAR plot page 141.

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**	
36	5180	left cheek	16.0	14.9	0.098	0.126	21.7
52	5260	left cheek	16.0	14.8	0.100	0.132	21.7
104	5520	left cheek	16.0	14.7	0.110	0.148	21.7
149	5745	left cheek	16.0	14.3	0.133	0.197	21.7
36	5180	left tilted 15°	16.0	14.9	0.089	0.115	21.7
52	5260	left tilted 15°	16.0	14.8	0.082	0.108	21.7
104	5520	left tilted 15°	16.0	14.7	0.081	0.109	21.7
149	5745	left tilted 15°	16.0	14.3	0.078	0.115	21.7
36	5180	right cheek	16.0	14.9	0.319	0.411	21.7
52	5260	right cheek	16.0	14.8	0.357	0.471	21.7
104	5520	right cheek	16.0	14.7	0.350	0.472	21.7
149	5745	right cheek	16.0	14.3	**0.391**	**0.578**	21.7
36	5180	right tilted 15°	16.0	14.9	0.165	0.213	21.7
52	5260	right tilted 15°	16.0	14.8	0.200	0.264	21.7
104	5520	right tilted 15°	16.0	14.7	0.115	0.155	21.7
149	5745	right tilted 15°	16.0	14.3	0.169	0.250	21.7
CDMA_BC1 - Power back off							
149	5745	left cheek	13.0	11.7	0.066	0.089	21.7
149	5745	right cheek	13.0	11.7	**0.194**	**0.262**	21.7
SVLTE BC0 Band 4 - Power back off							
149	5745	left cheek	7.0	6.2	0.024	0.029	21.7
149	5745	right cheek	7.0	6.2	**0.087**	**0.105**	21.7

Table 53: Test results head SAR WLAN 5 GHz. See max. SAR plot page 142.

measured / extrapolated SAR numbers - Body - 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**	
36	5180	6Mbit/s	15	front	16.0	14.9	0.045	0.058	22.6
52	5260	6Mbit/s	15	front	16.0	14.8	0.060	0.079	22.6
104	5520	6Mbit/s	15	front	16.0	14.7	0.072	0.097	22.6
149	5745	6Mbit/s	15	front	16.0	14.3	0.073	0.108	22.6
36	5180	6Mbit/s	15	rear	16.0	14.9	0.168	0.216	22.6
52	5260	6Mbit/s	15	rear	16.0	14.8	0.219	0.289	22.6
104	5520	6Mbit/s	15	rear	16.0	14.7	0.223	0.301	22.6
149	5745	6Mbit/s	15	rear	16.0	14.3	0.168	0.248	22.6
104	5520	6Mbit/s	holster	rear	16.0	14.7	**0.310**	0.418	22.6
CDMA_BC1 - Power back off									
149	5745	6Mbit/s	15	front	13.0	11.7	0.037	0.050	22.6
104	5520	6Mbit/s	15	rear	13.0	12.1	0.110	0.135	22.6
SVLTE BC0 Band 4 - Power back off									
149	5745	6Mbit/s	15	front	7.0	6.2	0.015	0.018	22.6
104	5520	6Mbit/s	15	rear	7.0	6.6	0.048	0.053	22.6

Table 54: Test results body worn SAR WLAN 5 GHz. See max. SAR plot page 143.

** - 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.
- Leather Holster P/N: HDW-55471-001 maintains separation distance of ~ 20mm.
- Device was tested with 15 mm BlackBerry recommended separation distance to allow typical after-market holster to be used. BlackBerry body-worn holsters with belt-clip have been designed to maintain ~ 20 mm separation distance from bodyTests with holster were performed with leather holster HDW-55471-001
- 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.
- 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 Test conditions with power reduction

Test samples with dynamic power reduction have been used for conducted power measurements in SVLTE mode.
For SAR measurements test samples with fixed power back off have been used in LTE and WCDMA mode for all configurations that require power backoff during normal operation (MHS and SVLTE).
WLAN output power was programmed manually via test software during conducted power measurements and SAR tests. For regular use WLAN output power reduction is automatically activated during MHS and SVLTE operation (see also general note in section 2.5.1).

7.2.4 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**	distance	**ratio**
		WWAN	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
GSM 850	left cheek	0.619	0.656	1.275		
GSM 850	left tilted 15°	0.309	0.669	0.978		
GSM 850	right cheek	0.516	1.082	1.598		
GSM 850	right tilted 15°	0.300	1.268	1.568		
GSM 850	front 10mm	0.915	0.058	0.973		
GSM 850	rear 10mm	1.215	0.254	1.469		
GSM 850	front 15mm	0.674	0.095	0.769		
GSM 850	rear 15mm	0.790	0.368	1.158		
GSM 1900	left cheek	0.747	0.656	1.403		
GSM 1900	left tilted 15°	0.135	0.669	0.804		
GSM 1900	right cheek	0.279	1.082	1.361		
GSM 1900	right tilted 15°	0.168	1.268	1.436		
GSM 1900	front 10mm	0.724	0.058	0.782		
GSM 1900	rear 10mm	1.238	0.254	1.492		
GSM 1900	front 15mm	0.369	0.095	0.464		
GSM 1900	rear 15mm	0.573	0.368	0.941		
CDMA BC0	left cheek	0.333	0.656	0.989		
CDMA BC0	left tilted 15°	0.188	0.669	0.857		
CDMA BC0	right cheek	0.381	1.082	1.463		
CDMA BC0	right tilted 15°	0.202	1.268	1.470		
CDMA BC0	front 10mm	0.491	0.058	0.549		
CDMA BC0	rear 10mm	0.661	0.254	0.915		
CDMA BC0	front 15mm	0.440	0.095	0.535		
CDMA BC0	rear 15mm	0.481	0.368	0.849		
CDMA BC1	left cheek	0.473	0.416	0.889		
CDMA BC1	left tilted 15°	0.336	0.669	1.005		
CDMA BC1	right cheek	1.064	0.649	**1.713**	89.3	0.025
CDMA BC1	right tilted 15°	0.371	0.781	1.152		
CDMA BC1	front 10mm	1.042	0.058	1.100		
CDMA BC1	rear 10mm	0.758	0.254	1.012		
CDMA BC1	front 15mm	0.626	0.095	0.721		
CDMA BC1	rear 15mm	0.460	0.368	0.828		

Table 55: SAR_{max} WWAN and **WLAN 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

Note: Power backoff for WLAN is set to 13 dBm for operation together with CDMA BC1.

reported SAR **WWAN** and **WLAN 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR**	distance	**ratio**
		WWAN	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
WCDMA FDD V	left cheek	0.349	0.656	1.005		
WCDMA FDD V	left tilted 15°	0.187	0.669	0.856		
WCDMA FDD V	right cheek	0.292	1.082	1.374		
WCDMA FDD V	right tilted 15°	0.176	1.268	1.444		
WCDMA FDD V	front 10mm	0.547	0.058	0.605		
WCDMA FDD V	rear 10mm	0.757	0.254	1.011		
WCDMA FDD V	front 15mm	0.400	0.095	0.495		
WCDMA FDD V	rear 15mm	0.492	0.368	0.860		
WCDMA FDD II	left cheek	0.993	0.656	**1.649**	82.4	0.026
WCDMA FDD II	left tilted 15°	0.191	0.669	0.860		
WCDMA FDD II	right cheek	0.420	1.082	1.502		
WCDMA FDD II	right tilted 15°	0.242	1.268	1.510		
WCDMA FDD II	front 10mm	0.974	0.058	1.032		
WCDMA FDD II	rear 10mm	1.341	0.254	1.595		
WCDMA FDD II	front 15mm	0.483	0.095	0.578		
WCDMA FDD II	rear 15mm	0.837	0.368	1.205		
LTE FDD 4	left cheek	1.262	0.656	**1.918**	82.4	0.032
LTE FDD 4	left tilted 15°	0.377	0.669	1.046		
LTE FDD 4	right cheek	0.580	1.082	**1.662**	82.4	0.026
LTE FDD 4	right tilted 15°	0.326	1.268	1.594		
LTE FDD 4	front 10mm	1.004	0.058	1.062		
LTE FDD 4	rear 10mm	1.089	0.254	1.343		
LTE FDD 4	front 15mm	0.863	0.095	0.958		
LTE FDD 4	rear 15mm	0.803	0.368	1.171		
LTE FDD 13	left cheek	0.440	0.656	1.096		
LTE FDD 13	left tilted 15°	0.193	0.669	0.862		
LTE FDD 13	right cheek	0.381	1.082	1.463		
LTE FDD 13	right tilted 15°	0.171	1.268	1.439		
LTE FDD 13	front 10mm	0.801	0.058	0.859		
LTE FDD 13	rear 10mm	0.797	0.254	1.051		
LTE FDD 13	front 15mm	0.630	0.095	0.725		
LTE FDD 13	rear 15mm	0.606	0.368	0.974		

Table 56: SAR_{max} WWAN and **WLAN 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

Note: Power backoff of 1 dB is used for WCDMA FDD II for mobile hotspot operation at 10 mm distance.
Power backoff of 2 dB is used for LTE FDD 4 for mobile hotspot operation at 10 mm distance

reported SAR **WWAN** and **WLAN 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**							
Frequency band	Position	SARmax /W/kg			**ΣSAR**	distance	**ratio**
		CDMA	LTE 4	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
CDMA BC0	left cheek	0.333	0.751	0.068	1.152		
CDMA BC0	right cheek	0.381	0.389	0.172	0.942		
CDMA BC0	rear 15mm	0.481	0.578	0.048	1.107		
CDMA BC1	left cheek	0.473	0.351	0.416	1.240		
CDMA BC1	right cheek	1.064	0.167	0.649	**1.880**	89.3	0.029
CDMA BC1	rear 15mm	0.460	0.260	0.195	0.915		

Table 57: SAR_{max} SVLTE **CDMA + LTE4** and **WLAN 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

Note: Power backoff is used for LTE FDD 4 (**2 dB** with CDMA BC0 and **5 dB** with CDMA BC1).
Power backoff for WLAN is set to 7 dBm for operation together with CDMA BC0 and LTE FDD 4.
Power backoff for WLAN is set to 13 dBm for operation together with CDMA BC1.
For mobile hot spot at 10 mm distance the WLAN output power is generally set to 11 dBm.

reported SAR **WWAN** and **WLAN 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**							
Frequency band	Position	SARmax /W/kg			**ΣSAR**	distance	**ratio**
		CDMA	LTE 13	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
CDMA BC0	left cheek	0.333	0.273	0.068	0.674		
CDMA BC0	right cheek	0.381	0.236	0.172	0.789		
CDMA BC0	right tilted 15°	0.202	0.171	0.208	0.581		
CDMA BC0	rear 15mm	0.481	0.214	0.368	1.063		
CDMA BC1	left cheek	0.473	0.169	0.416	1.058		
CDMA BC1	right cheek	1.064	0.146	0.649	**1.859**	89.3	0.028
CDMA BC1	right tilted 15°	0.371	0.171	0.781	1.323		
CDMA BC1	rear 15mm	0.460	0.326	0.195	0.981		

Table 58: SAR_{max} SVLTE **CDMA + LTE13** and **WLAN 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

Note: Power backoff is used for LTE FDD 13 (**2 dB** with CDMA BC0 and **4 dB** with CDMA BC1)
Power backoff for WLAN is set to 13 dBm for operation together with CDMA BC1.
For mobile hot spot at 10 mm distance the WLAN output power is generally set to 11 dBm.

reported SAR **WWAN** and **WLAN 5GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR**	distance	**ratio**
		WWAN	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
GSM 850	left cheek	0.619	0.197	0.816		
GSM 850	right cheek	0.516	0.578	1.094		
GSM 850	front 15mm	0.674	0.073	0.747		
GSM 850	rear 15mm	0.790	0.310	1.100		
GSM 1900	left cheek	0.747	0.197	0.944		
GSM 1900	right cheek	0.279	0.578	0.857		
GSM 1900	front 15mm	0.369	0.073	0.442		
GSM 1900	rear 15mm	0.573	0.310	0.883		
CDMA BC0	left cheek	0.333	0.197	0.530		
CDMA BC0	right cheek	0.381	0.578	0.959		
CDMA BC0	front 15mm	0.440	0.073	0.513		
CDMA BC0	rear 15mm	0.481	0.310	0.791		
CDMA BC1	left cheek	0.473	0.197	0.670		
CDMA BC1	right cheek	1.064	0.578	**1.642**	82.7	0.025
CDMA BC1	front 15mm	0.626	0.073	0.699		
CDMA BC1	rear 15mm	0.460	0.310	0.770		
WCDMA FDD V	left cheek	0.349	0.197	0.546		
WCDMA FDD V	right cheek	0.292	0.578	0.870		
WCDMA FDD V	front 15mm	0.400	0.073	0.473		
WCDMA FDD V	rear 15mm	0.492	0.310	0.802		
WCDMA FDD II	left cheek	0.993	0.197	1.190		
WCDMA FDD II	right cheek	0.420	0.578	0.998		
WCDMA FDD II	front 15mm	0.483	0.073	0.556		
WCDMA FDD II	rear 15mm	0.837	0.310	1.147		
LTE FDD 4	left cheek	1.262	0.197	1.459		
LTE FDD 4	right cheek	0.580	0.578	1.158		
LTE FDD 4	front 15mm	0.863	0.073	0.936		
LTE FDD 4	rear 15mm	0.803	0.310	1.113		
LTE FDD 13	left cheek	0.440	0.197	0.637		
LTE FDD 13	right cheek	0.381	0.578	0.959		
LTE FDD 13	front 15mm	0.630	0.073	0.703		
LTE FDD 13	rear 15mm	0.606	0.310	0.916		

Table 59: SAR_{max} WWAN and **WLAN 5GHz**, ΣSAR evaluation, $\mathbf{SPLSR_i}$

Note: Power backoff of 1 dB is used for WCDMA FDD II for mobile hotspot operation at 10 mm distance.
Power backoff of 2 dB is used for LTE FDD 4 for mobile hotspot operation at 10 mm distance

reported SAR **WWAN** and **WLAN 5GHz**, **ΣSAR** evaluation, **SPLSRi**							
Frequency band	Position	SARmax /W/kg			**ΣSAR**	distance	**ratio**
		CDMA	LTE 4	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
CDMA BC0	left cheek	0.333	0.751	0.029	1.113		
CDMA BC0	right cheek	0.381	0.389	0.105	0.875		
CDMA BC0	rear 15mm	0.481	0.578	0.053	1.112		
CDMA BC1	left cheek	0.473	0.351	0.089	0.913		
CDMA BC1	right cheek	1.064	0.167	0.262	1.493		
CDMA BC1	rear 15mm	0.460	0.260	0.135	0.855		

Table 60: SAR_{max} **CDMA + LTE4** and **WLAN 5GHz**, ΣSAR evaluation, **$SPLSR_i$**

Note: Power backoff is used for LTE FDD 4 (**2 dB** with CDMA BC0 and **5 dB** with CDMA BC1).
Power backoff for WLAN is set to 7 dBm for operation together with CDMA BC0 and LTE FDD 4.
Power backoff for WLAN is set to 13 dBm for operation together with CDMA BC1.

reported SAR **WWAN** and **WLAN 5GHz**, **ΣSAR** evaluation, **SPLSRi**							
Frequency band	Position	SARmax /W/kg			**ΣSAR**	distance	**ratio**
		CDMA	LTE 13	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
CDMA BC0	left cheek	0.333	0.273	0.029	0.635		
CDMA BC0	right cheek	0.381	0.236	0.105	0.722		
CDMA BC0	rear 15mm	0.481	0.214	0.053	0.748		
CDMA BC1	left cheek	0.473	0.169	0.089	0.731		
CDMA BC1	right cheek	1.064	0.146	0.262	1.472		
CDMA BC1	rear 15mm	0.460	0.326	0.135	0.921		

Table 61: SAR_{max} **CDMA + LTE13** and **WLAN 5GHz**, ΣSAR evaluation, **$SPLSR_i$**

Note: Power backoff is used for LTE FDD 13 (**2 dB** with CDMA BC0 and **4 dB** with CDMA BC1)
Power backoff for WLAN is set to 13 dBm for operation together with CDMA BC1.

reported SAR **WWAN** and **Bluetooth 2.45GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR**	distance	**ratio**
		WWAN	Bluetooth	<1.6W/kg	**Ri**, mm	≤ 0.040
GSM 850	left cheek	0.619	0.372	0.991		
GSM 850	right cheek	0.516	0.372	0.888		
GSM 850	front 10mm	0.915	0.186	1.101		
GSM 850	rear 10mm	1.215	0.186	1.401		
GSM 850	front 15mm	0.674	0.124	0.798		
GSM 850	rear 15mm	0.790	0.124	0.914		
GSM 1900	left cheek	0.747	0.372	1.119		
GSM 1900	right cheek	0.279	0.372	0.651		
GSM 1900	front 10mm	0.724	0.186	0.910		
GSM 1900	rear 10mm	1.238	0.186	1.424		
GSM 1900	front 15mm	0.369	0.124	0.493		
GSM 1900	rear 15mm	0.573	0.124	0.697		
CDMA BC0	left cheek	0.333	0.372	0.705		
CDMA BC0	right cheek	0.381	0.372	0.753		
CDMA BC0	front 10mm	0.491	0.186	0.677		
CDMA BC0	rear 10mm	0.661	0.186	0.847		
CDMA BC0	front 15mm	0.440	0.124	0.564		
CDMA BC0	rear 15mm	0.481	0.124	0.605		
CDMA BC1	left cheek	0.473	0.372	0.845		
CDMA BC1	right cheek	1.064	0.372	1.436		
CDMA BC1	front 10mm	1.042	0.186	1.228		
CDMA BC1	rear 10mm	0.758	0.186	0.944		
CDMA BC1	front 15mm	0.626	0.124	0.750		
CDMA BC1	rear 15mm	0.460	0.124	0.584		
WCDMA FDD V	left cheek	0.349	0.372	0.721		
WCDMA FDD V	right cheek	0.292	0.372	0.664		
WCDMA FDD V	front 10mm	0.547	0.186	0.733		
WCDMA FDD V	rear 10mm	0.757	0.186	0.943		
WCDMA FDD V	front 15mm	0.400	0.124	0.524		
WCDMA FDD V	rear 15mm	0.492	0.124	0.616		
WCDMA FDD II	left cheek	0.993	0.372	1.365		
WCDMA FDD II	right cheek	0.420	0.372	0.792		
WCDMA FDD II	front 10mm	0.974	0.186	1.160		
WCDMA FDD II	rear 10mm	1.341	0.186	1.527		
WCDMA FDD II	front 15mm	0.483	0.124	0.607		
WCDMA FDD II	rear 15mm	0.837	0.124	0.961		

Table 62: SAR_{max} WWAN and **Bluetooth 2450MHz**, ΣSAR evaluation

Note: Power backoff of 1 dB is used for WCDMA FDD II for mobile hotspot operation at 10 mm distance.

reported SAR **WWAN** and **Bluetooth 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR**	distance	**ratio**
		WWAN	Bluetooth	<1.6W/kg	**Ri**, mm	≤ 0.040
LTE FDD 4	left cheek	1.262	0.372	**1.634**	106.8	0.020
LTE FDD 4	right cheek	0.580	0.372	0.952		
LTE FDD 4	front 10mm	1.004	0.186	1.190		
LTE FDD 4	rear 10mm	1.089	0.186	1.275		
LTE FDD 4	front 15mm	0.863	0.124	0.987		
LTE FDD 4	rear 15mm	0.803	0.124	0.927		
LTE FDD 13	left cheek	0.440	0.372	0.812		
LTE FDD 13	right cheek	0.381	0.372	0.753		
LTE FDD 13	front 10mm	0.801	0.186	0.987		
LTE FDD 13	rear 10mm	0.797	0.186	0.983		
LTE FDD 13	front 15mm	0.630	0.124	0.754		
LTE FDD 13	rear 15mm	0.606	0.124	0.730		

Table 63: SAR_{max} WWAN and **Bluetooth 2450MHz**, ΣSAR evaluation

Note: Power backoff of 2 dB is used for LTE FDD 4 for mobile hotspot operation at 10 mm distance

reported SAR **WWAN** and **Bluetooth 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**							
Frequency band	Position	SARmax /W/kg			**ΣSAR**	distance	**ratio**
		CDMA	LTE 4	BT	<1.6W/kg	**Ri**, mm	≤ 0.040
CDMA BC0	left cheek	0.333	0.751	0.372	1.456		
CDMA BC0	right cheek	0.381	0.389	0.372	1.142		
CDMA BC0	rear 15mm	0.481	0.578	0.124	1.183		
CDMA BC1	left cheek	0.473	0.351	0.372	1.196		
CDMA BC1	right cheek	1.064	0.167	0.372	**1.603**	106.8	0.019
CDMA BC1	rear 15mm	0.460	0.260	0.124	0.844		

Table 64: SAR_{max} **CDMA + LTE4** and **Bluetooth 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

Note: Power backoff is used for LTE FDD 4 (**2 dB** with CDMA BC0 and **5 dB** with CDMA BC1).

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
		CDMA	LTE 13	BT			
CDMA BC0	left cheek	0.333	0.273	0.372	0.978		
CDMA BC0	right cheek	0.381	0.236	0.372	0.989		
CDMA BC0	right tilted 15°	0.202	0.171	0.372	0.745		
CDMA BC0	rear 15mm	0.481	0.214	0.124	0.819		
CDMA BC1	left cheek	0.473	0.169	0.372	1.014		
CDMA BC1	right cheek	1.064	0.146	0.372	1.582		
CDMA BC1	right tilted 15°	0.371	0.171	0.372	0.914		
CDMA BC1	rear 15mm	0.460	0.326	0.124	0.910		

Table 65: SAR_{max} **CDMA + LTE13** and **Bluetooth 2.4GHz**, ΣSAR evaluation, $\mathbf{SPLSR_i}$

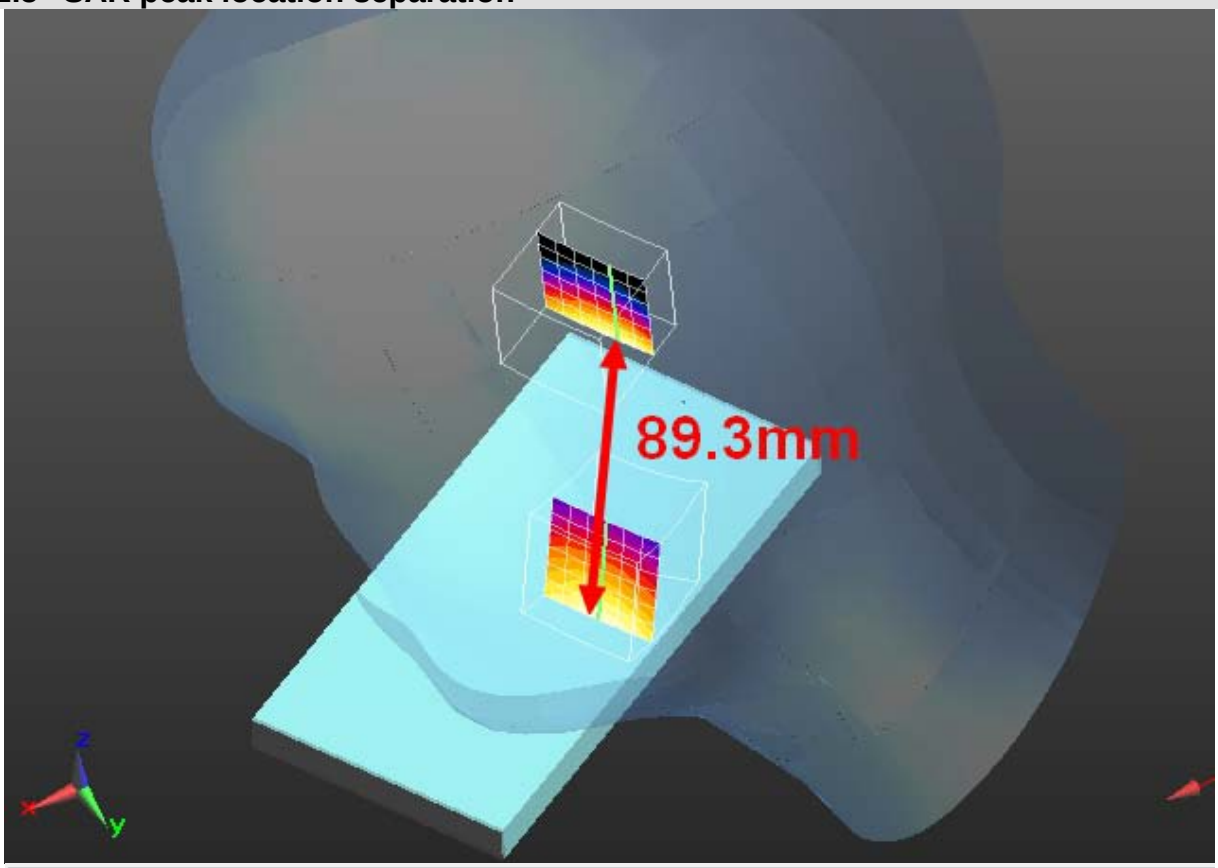
Note: Power backoff is used for LTE FDD 13 (**2 dB** with CDMA BC0 and **4 dB** with CDMA BC1)

Minimum antenna separation distance between **MAIN** antenna and **Bluetooth** antenna –**106.81 mm**

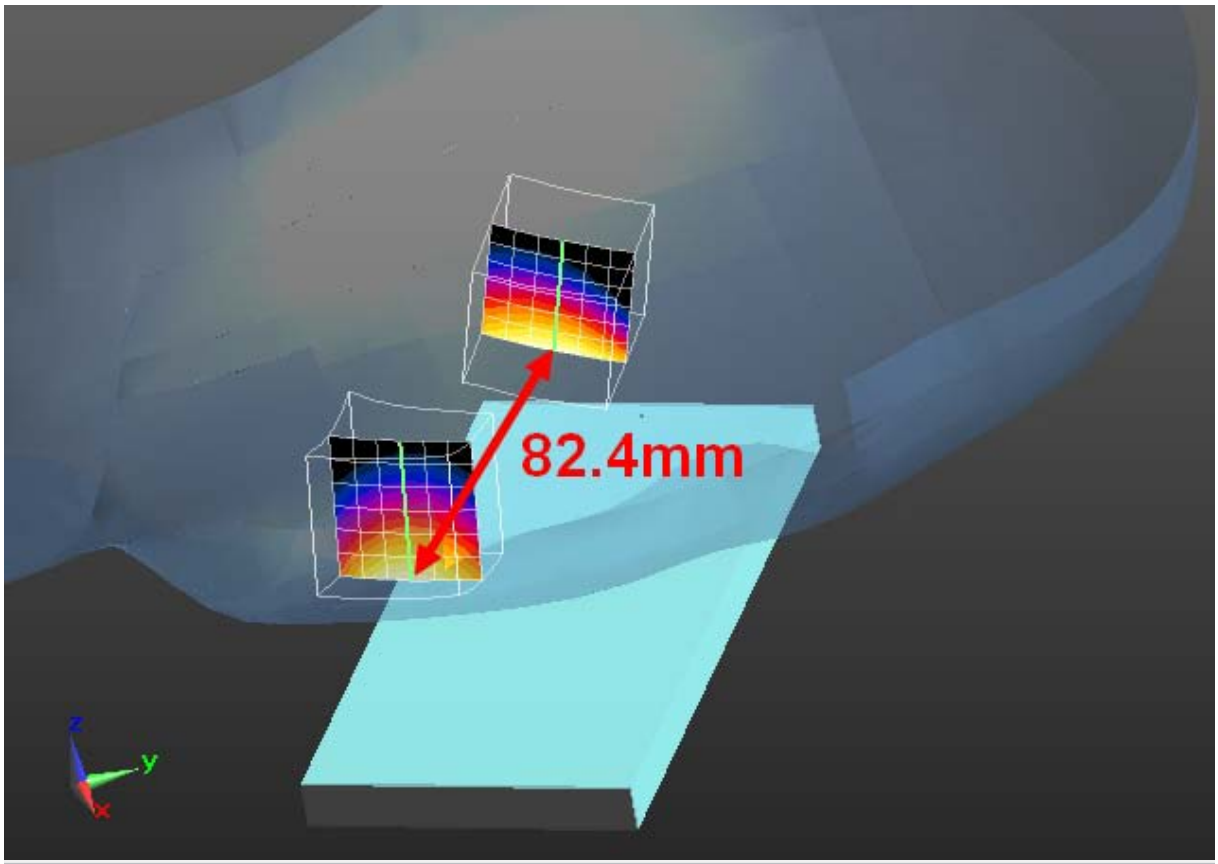
Conclusion:

ΣSAR > 1.6 W/kg, but SAR-to-(peak-locations spacing) **ratio** ($\mathbf{SPLSR_i}$) 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.

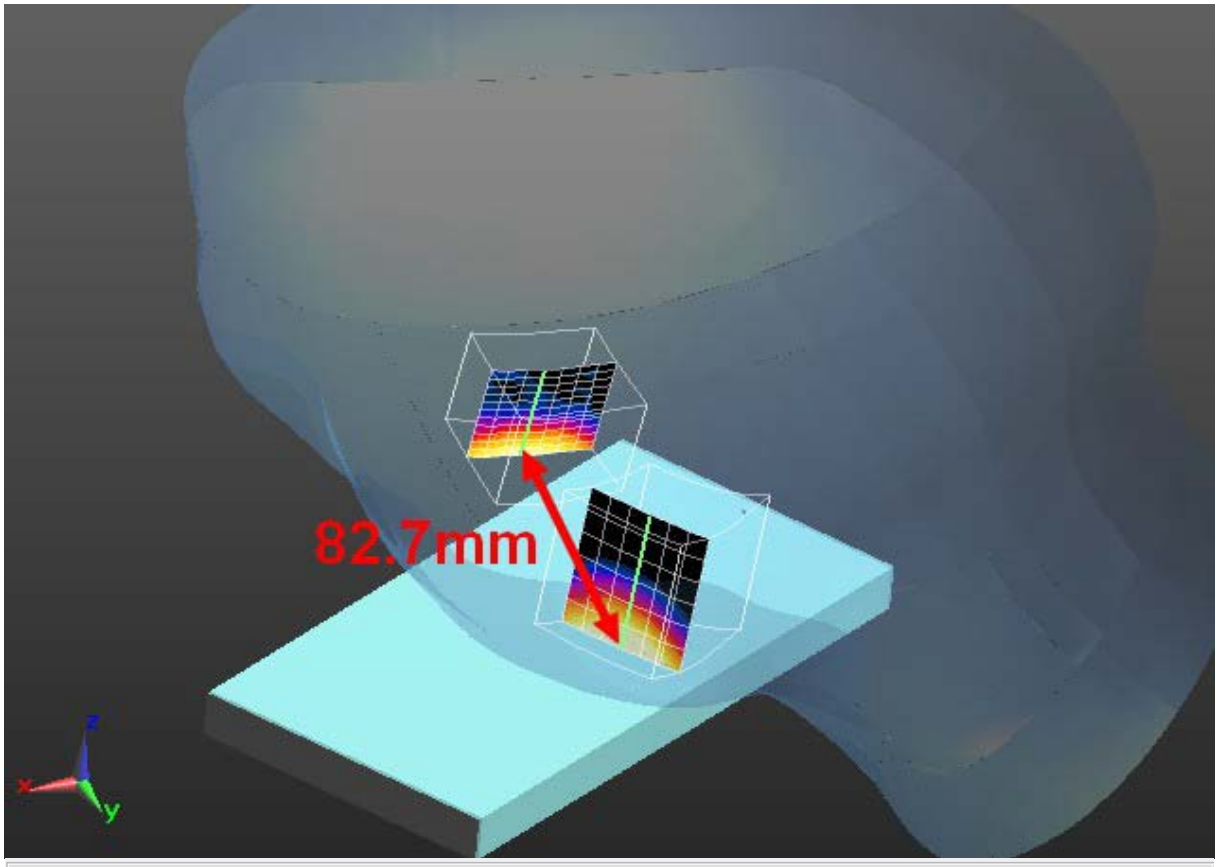
7.2.5 SAR peak location separation



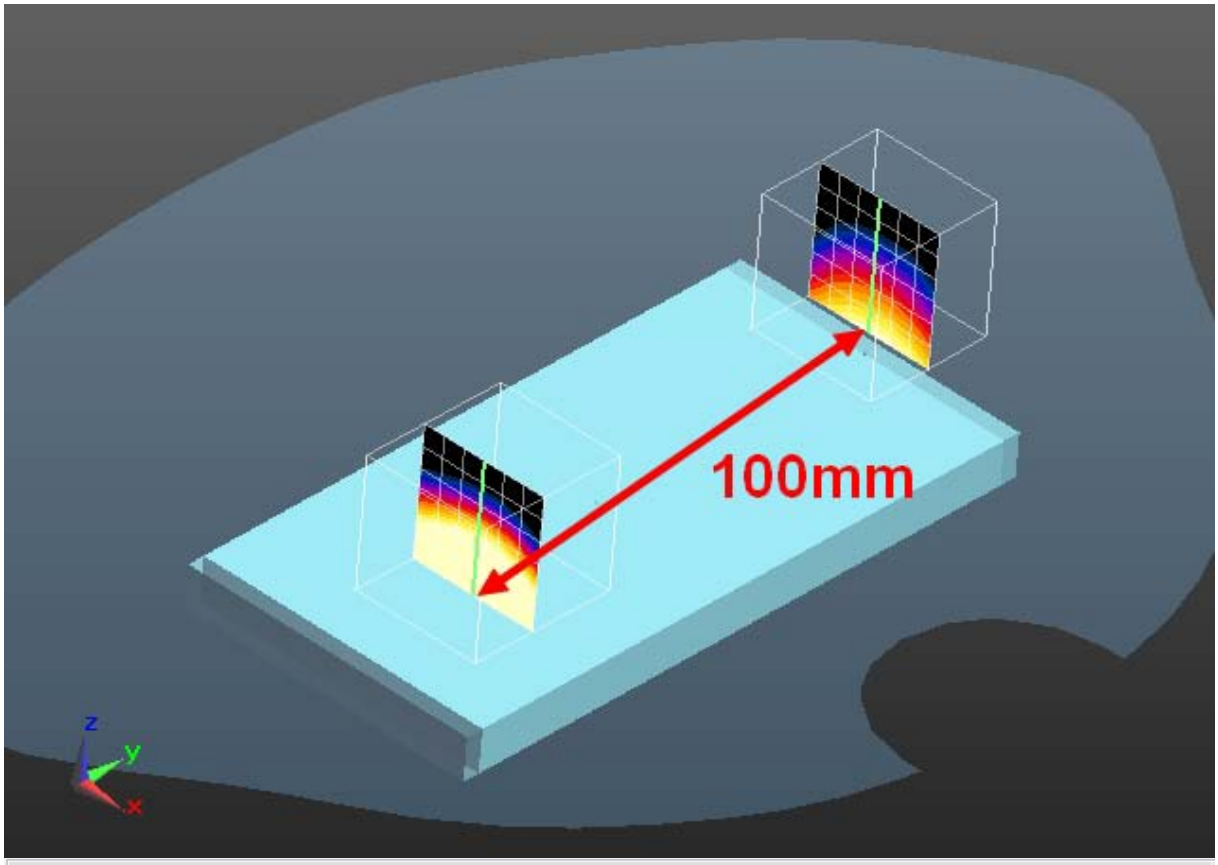
Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (D:\Projekte2013\1-6234-6-2\2450\IEEE1528_EN62209 - WLAN2450 head.da52:1/Touch Position - High)	
Max. 1 at (0.62, -1.49, -0.12) cm	0.96 W/kg
Zoom Scan (D:\Projekte2013\1-6234-6-2\1900\IEEE1528-CDMA BC1 head.da52:1/Touch Position - Low)	
Max. 2 at (5.20, 6.18, -0.01) cm	0.95 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 8.93 / Separation ratio [W/kg/cm]: 0.21



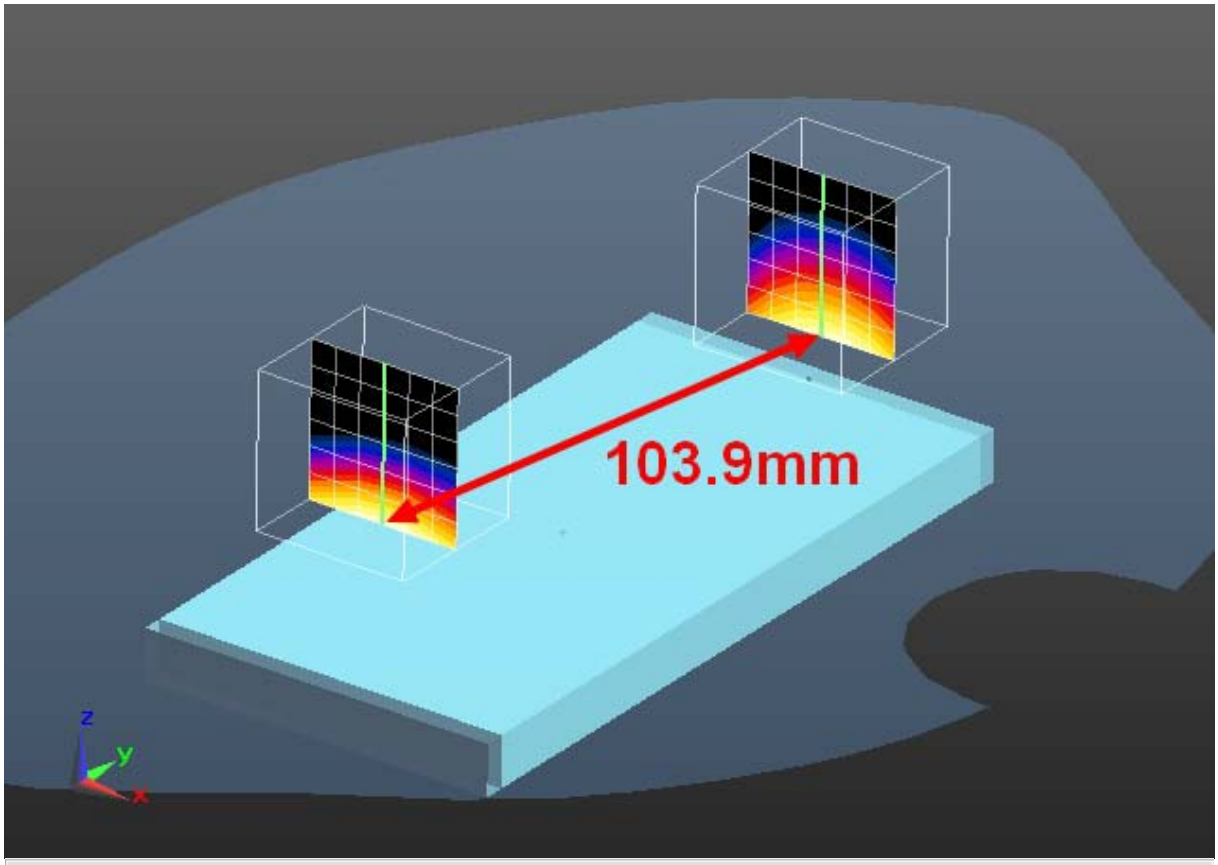
Maxima and position w.r.t. Grid Reference Point	associated 1g averages	
Zoom Scan (D:\Projekte2013\1-6234-6-2\2450\IEEE1528_EN62209 - WLAN2450 head.da52:0/Touch Position - Middle)		
Max. 1 at (-1.08, -1.24, 0.28) cm	0.59 W/kg	
Zoom Scan (\\Ws233\d\Projekte2013\1-6234-6-2\1900_FDD\IEEE1528 - UMTS FDD II head.da52:0/Touch Position - Low)		
Max. 2 at (5.32, -6.42, 0.01) cm	0.91 W/kg	
Distances and Separation Ratios		
Max. 1 - Max. 2	Distance [cm]: 8.24 / Separation ratio [W/kg/cm]: 0.18	



Maxima and position w.r.t. Grid Reference Point	**associated 1g averages**
Zoom Scan (\\Ws233\d\Projekte2013\1-6234-6-2\5GHz\IEEE1528_OET65_EN62209-RightHandSide-WLAN5GHz.da4:0/Touch position - Channel 149)	
Max. 1 at (4.13, -2.02, -0.17) cm	0.39 W/kg
Zoom Scan (D:\Projekte2013\1-6234-6-2\1900\IEEE1528-CDMA BC1 head.da52:1/Touch Position - Low)	
Max. 2 at (5.20, 6.18, -0.01) cm	0.95 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 8.27 / Separation ratio [W/kg/cm]: 0.16



Maxima and position w.r.t. Grid Reference Point | associated 1g averages	
Zoom Scan (D:\Projekte2013\1-6234-6-2\LTE4\OET65-Body-LTE FDD 4 1750.da53:6/Rear position - Low 1RB / 99RB offset 10mm)	
Max. 1 at (1.46, -4.10, -0.09) cm	0.79 W/kg
Zoom Scan (\\Ws233\d\Projekte2013\1-6234-6-2\2.4GHz\Body remeasured 2013-08-03\OET65_EN62209-2-WLAN2450-body.da52:0/Rear Position - Low MCS 0)	
Max. 2 at (1.21, 5.90, -0.19) cm	0.23 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 10.00 / Separation ratio [W/kg/cm]: 0.10



Maxima and position w.r.t. Grid Reference Point | associated 1g averages	
Zoom Scan (D:\Projekte2013\1-6234-6-2\900\OET65-Body-CDMA BC0.da53:1/Rear position - Low)	
Max. 1 at (-1.00, -4.25, -0.16) cm	0.63 W/kg
Zoom Scan (\\Ws233\d\Projekte2013\1-6234-6-2\2.4GHz\Body remeasured 2013-08-03\OET65_EN62209-2-WLAN2450-body.da52:0/Rear Position - Low MCS 0)	
Max. 2 at (1.21, 5.90, -0.19) cm	0.23 W/kg
Distances and Separation Ratios	
Max. 1 - Max. 2	Distance [cm]: 10.39 / Separation ratio [W/kg/cm]: 0.08

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	1554	May 16, 2013	12
Dosimetric E-Field Probe	ET3DV6	Schmid & Partner Engineering AG	1558	August 24, 2012	12
Dosimetric E-Field Probe	ES3DV3	Schmid & Partner Engineering AG	3320	June 04, 2013	12
Dosimetric E-Field Probe	EX3DV4	Schmid & Partner Engineering AG	3536	September 24, 2012	12
750 MHz System Validation Dipole	D750V3	Schmid & Partner Engineering AG	1041	August 10, 2011	24
835 MHz System Validation Dipole	D835V2	Schmid & Partner Engineering AG	4d153	June 06, 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 22, 2011	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: 19.07.2013 21:04:38

SystemPerformanceCheck-D750 head 2013-07-19

DUT: Dipole 750 MHz D750V3; Type: D750V3; Serial: D750V3 - SN1041

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 = 0.918 S/m; ε_r = 42.366; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(6.4, 6.4, 6.4); Calibrated: 24.08.2012;
- 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)

Configuration/d=15mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

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

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

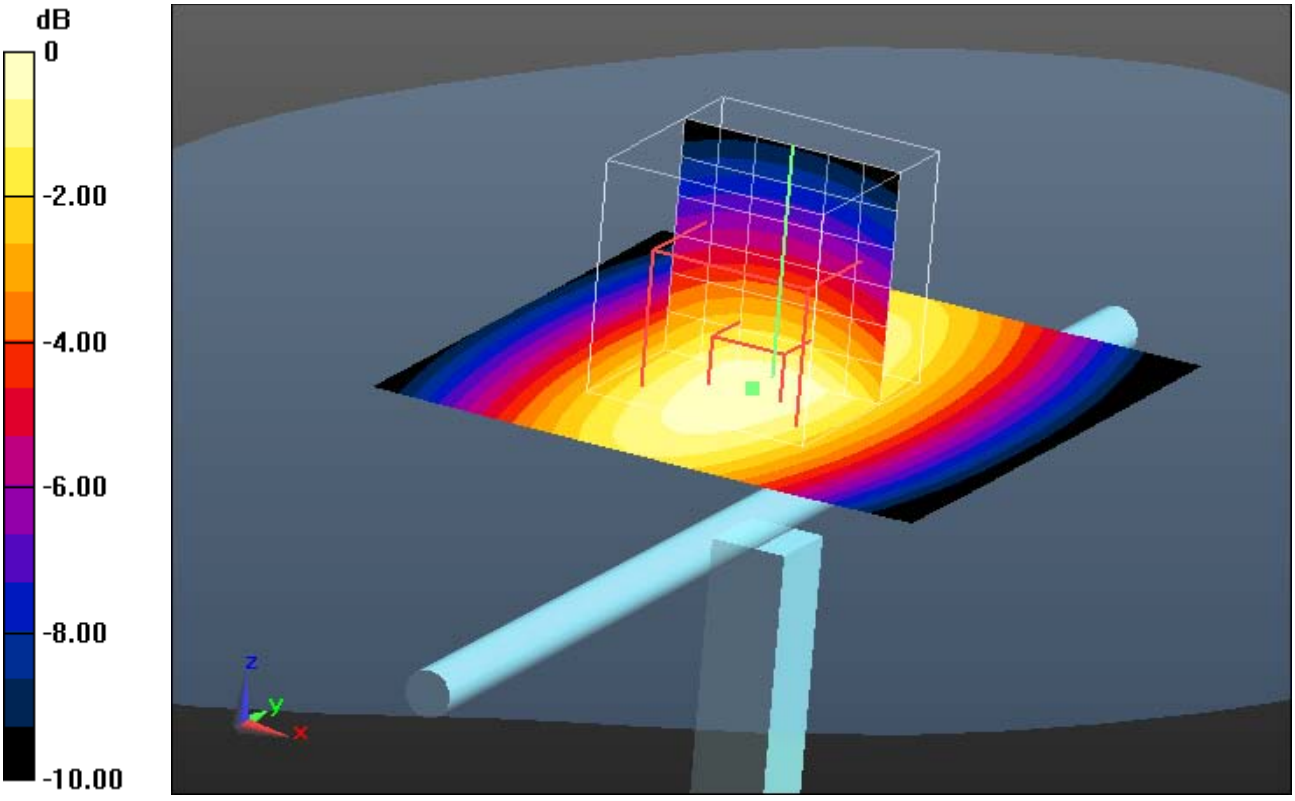
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 110.1 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 14.3 W/kg

SAR(1 g) = 8.69 W/kg; SAR(10 g) = 5.69 W/kg

Maximum value of SAR (measured) = 10.4 W/kg



0 dB = 10.4 W/kg = 10.17 dBW/kg

Additional information:

ambient temperature: 23.1°C; liquid temperature: 22.8°C

Date/Time: 20.07.2013 10:25:03

SystemPerformanceCheck-D750 body 2013-07-20

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

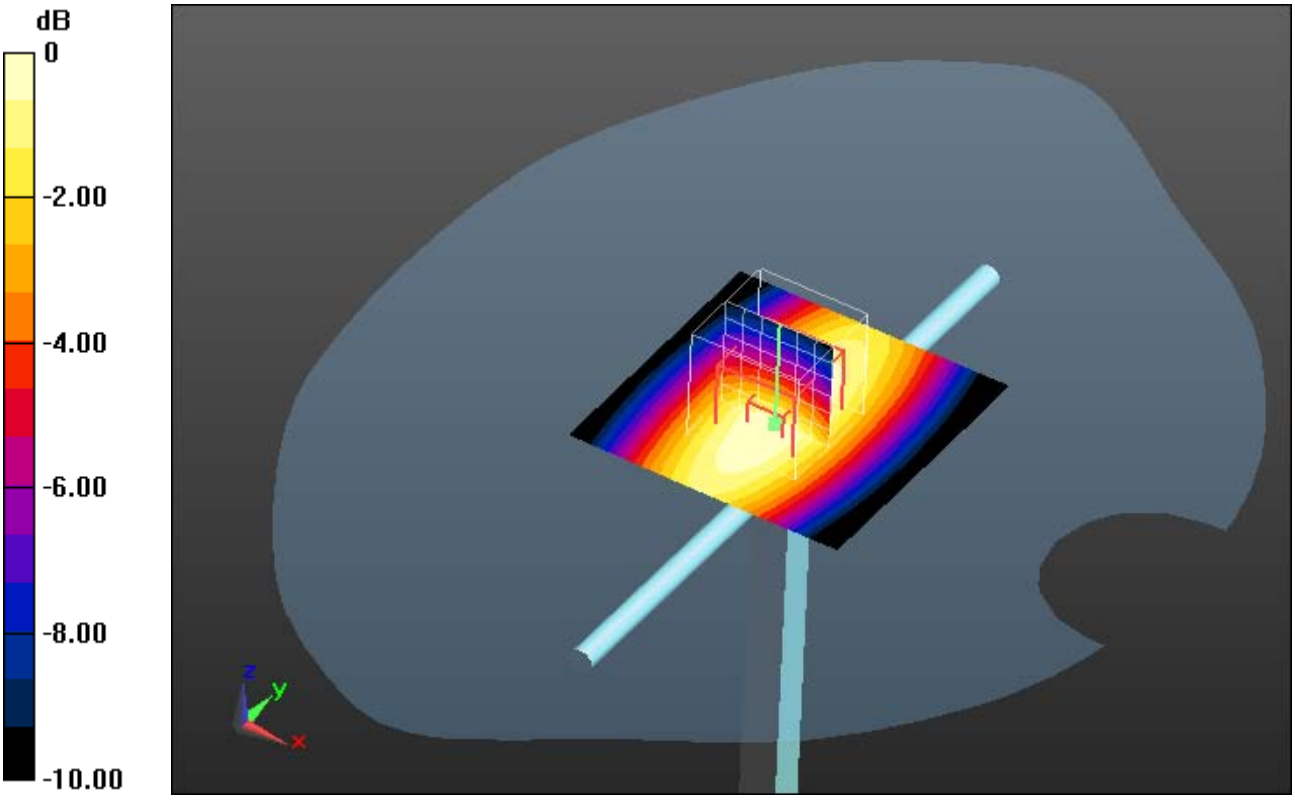
Communication System: UID 0, CW (0); Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 750 MHz; σ = 0.977 S/m; ε_r = 56.018; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.11, 6.11, 6.11); Calibrated: 24.08.2012;
- 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)

Configuration/d=15mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 10.0 W/kg

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.2 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 13.7 W/kg
SAR(1 g) = 9.26 W/kg; SAR(10 g) = 6.08 W/kg
Maximum value of SAR (measured) = 10.0 W/kg



0 dB = 10.0 W/kg = 10.00 dBW/kg

Additional information:
ambient temperature: 23.4°C; liquid temperature: 23.4°C

Date/Time: 27.06.2013 15:24:37

SystemPerformanceCheck-D835 2013-06-27

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d153

Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 835 MHz; σ = 0.899 S/m; ε_r = 42.613; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.32, 6.32, 6.32); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 27.0
- 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) = 11.3 W/kg

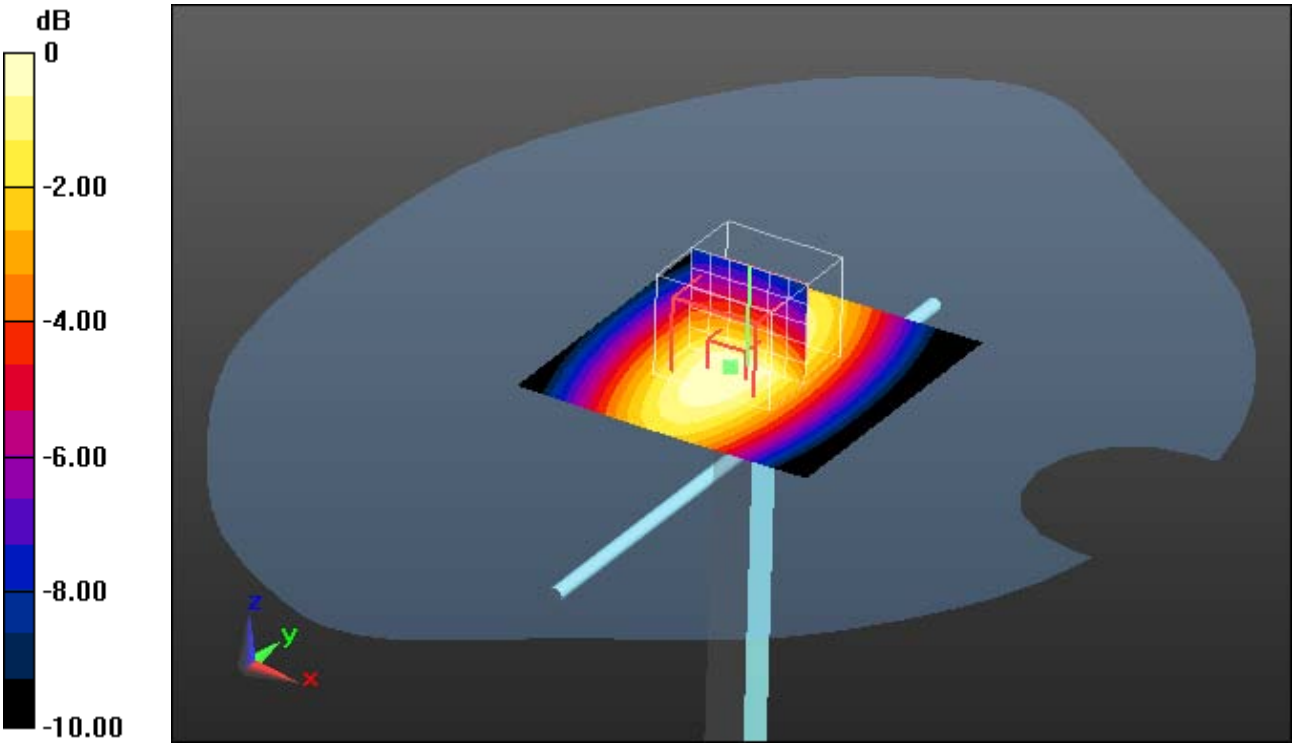
System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 114.8 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 14.4 W/kg

SAR(1 g) = 9.75 W/kg; SAR(10 g) = 6.4 W/kg

Maximum value of SAR (measured) = 11.2 W/kg



0 dB = 11.2 W/kg = 10.49 dBW/kg

Additional information:

ambient temperature: 22.1 °C; liquid temperature: 21.3°C

Date/Time: 28.06.2013 11:29:54

SystemPerformanceCheck-D835 2013-06-28

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d153

Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 835 MHz; σ = 0.899 S/m; ε_r = 42.613; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.32, 6.32, 6.32); Calibrated: 04.06.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 27.0
- 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) = 11.3 W/kg

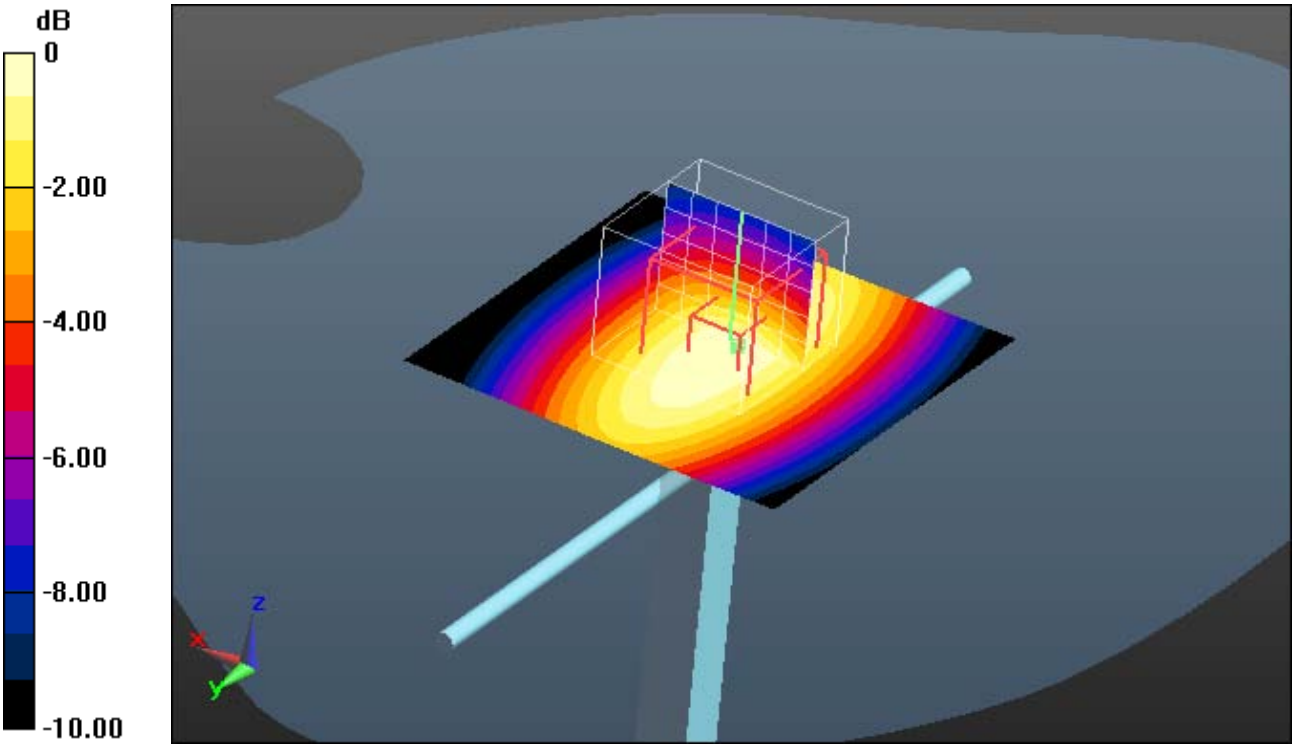
System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 115.8 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 14.5 W/kg

SAR(1 g) = 9.84 W/kg; SAR(10 g) = 6.46 W/kg

Maximum value of SAR (measured) = 11.4 W/kg



0 dB = 11.4 W/kg = 10.57 dBW/kg

Additional information:

ambient temperature: 21.9°C; liquid temperature: 21.5°C

Date/Time: 18.07.2013 16:15:39

SystemPerformanceCheck-D835 head 2013-07-18

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d153

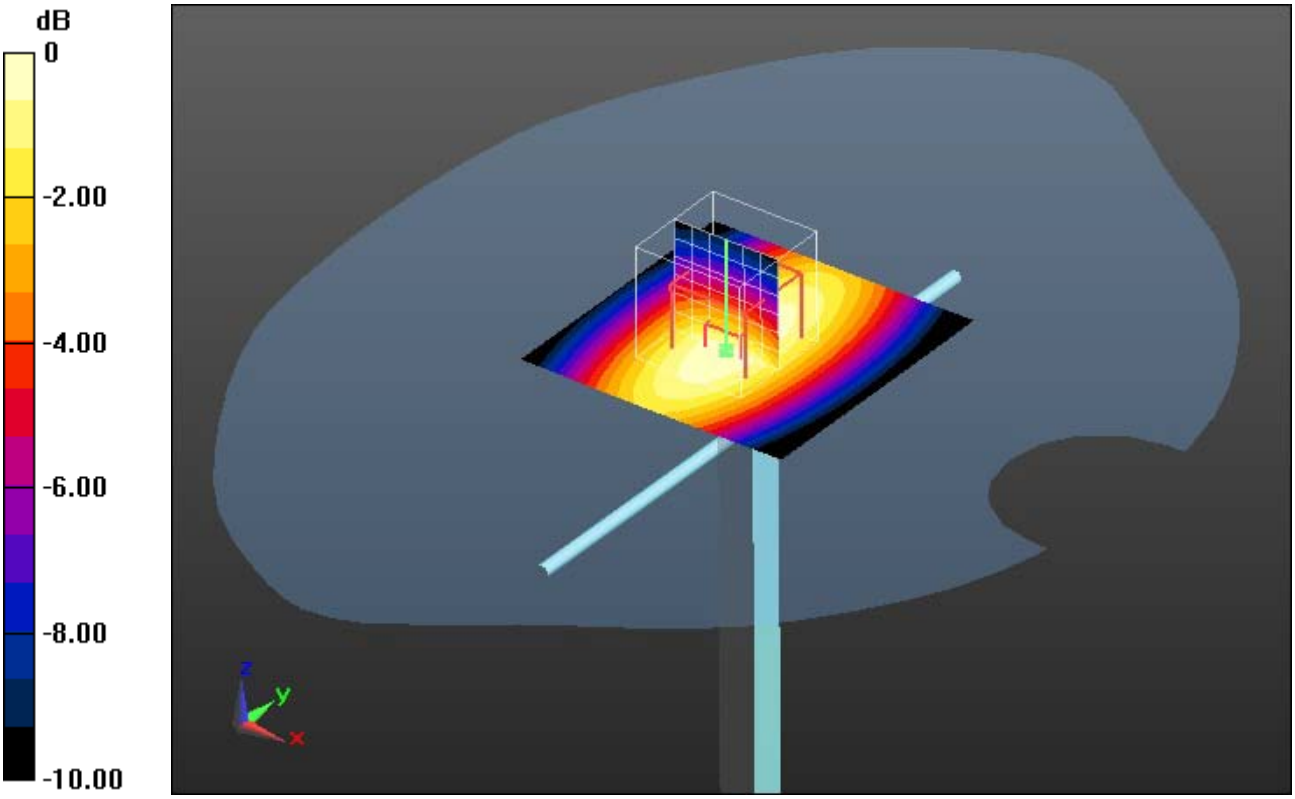
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.915 S/m; ε_r = 43.214; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(6.99, 6.99, 6.99); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: SEMCAD X 14.6.10(7164)

System Performance Check/d=15mm, Pin=1000 mW, dist=4.0mm/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 10.3 W/kg

System Performance Check/d=15mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 110.0 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 14.2 W/kg
SAR(1 g) = 9.72 W/kg; SAR(10 g) = 6.42 W/kg
Maximum value of SAR (measured) = 10.5 W/kg



0 dB = 10.5 W/kg = 10.21 dBW/kg

Additional information:
position or distance of DUT to SAM: 0mm
ambient temperature: 22.4°C; liquid temperature: 23.9°C

Date/Time: 05.07.2013 14:28:34

SystemPerformanceCheck-D835 body 2013-07-05

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d153

Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 835 MHz; σ = 0.979 S/m; ε_r = 55.913; 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: 3mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 3mm (Mechanical Surface Detection), z = 2.0, 27.0
- 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) = 11.1 W/kg

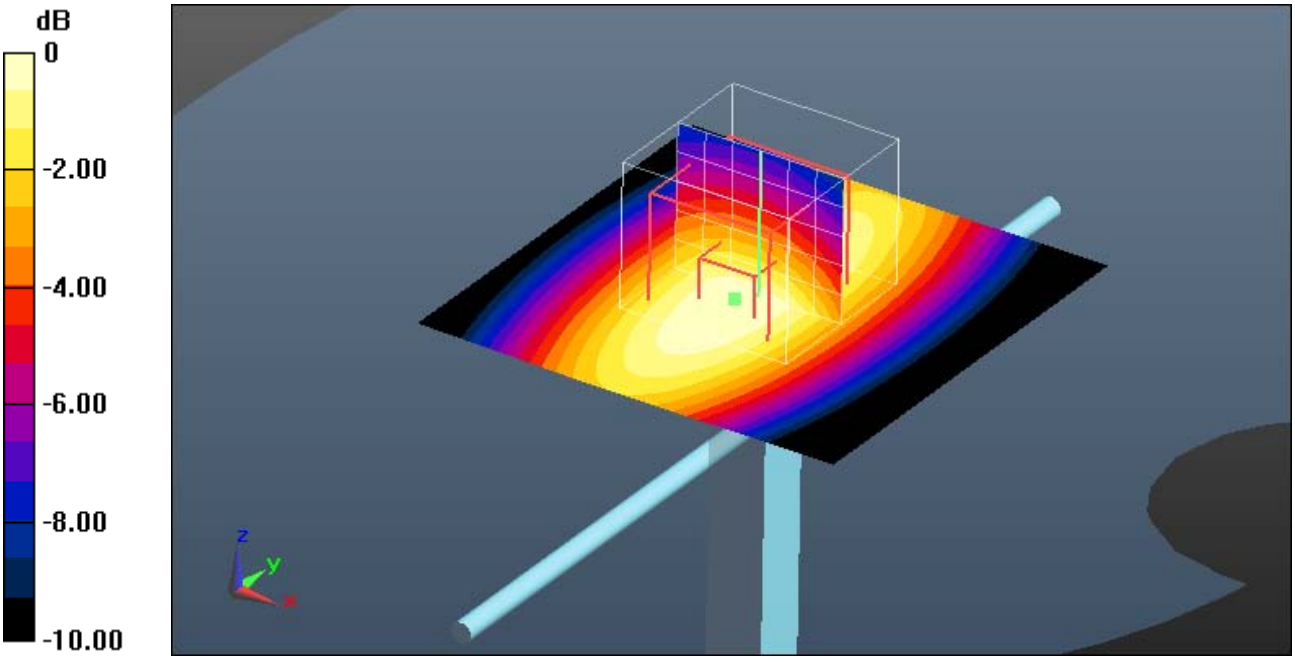
System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 110.1 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 14.1 W/kg

SAR(1 g) = 9.65 W/kg; SAR(10 g) = 6.37 W/kg

Maximum value of SAR (measured) = 11.1 W/kg



0 dB = 11.1 W/kg = 10.45 dBW/kg

Additional information:

ambient temperature: 22.5°C; liquid temperature: 22.2°C

Date/Time: 06.07.2013 15:29:15

SystemPerformanceCheck-D835 body 2013-07-06

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d153

Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 835 MHz; σ = 0.979 S/m; ε_r = 55.913; 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: 3mm (Mechanical Surface Detection), z = 2.0, 27.0
- 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) = 11.0 W/kg

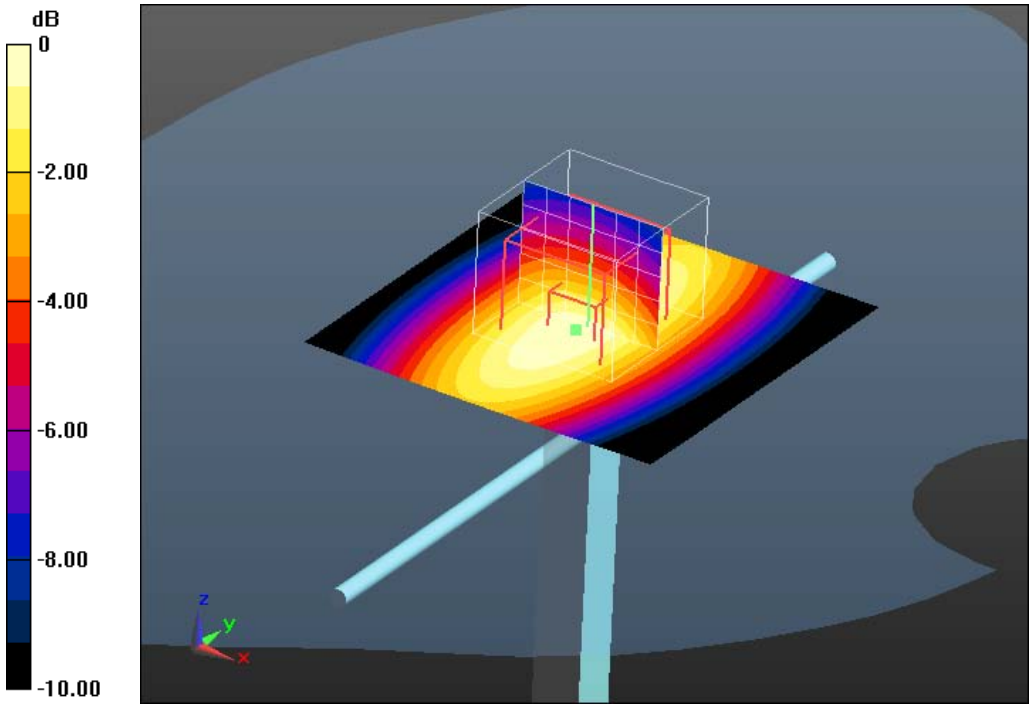
System Performance Check/d=15mm, Pin=1000 mW, dist=3.0mm/Zoom Scan (7x7x6)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 110.3 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 14.1 W/kg

SAR(1 g) = 9.62 W/kg; SAR(10 g) = 6.34 W/kg

Maximum value of SAR (measured) = 11.2 W/kg



0 dB = 11.2 W/kg = 10.49 dBW/kg

Additional information:

ambient temperature: 22.4°C; liquid temperature: 22.2°C

Date/Time: 19.07.2013 13:14:19

SystemPerformanceCheck-D835 body 2013-07-19

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d153

Communication System: UID 0, CW (0); Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 835 MHz; σ = 0.995 S/m; ε_r = 55.357; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1554; ConvF(6.89, 6.89, 6.89); Calibrated: 16.05.2013;
- 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)

System Performance Check/d=15mm, Pin=1000 mW, dist=4.0mm/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 10.4 W/kg

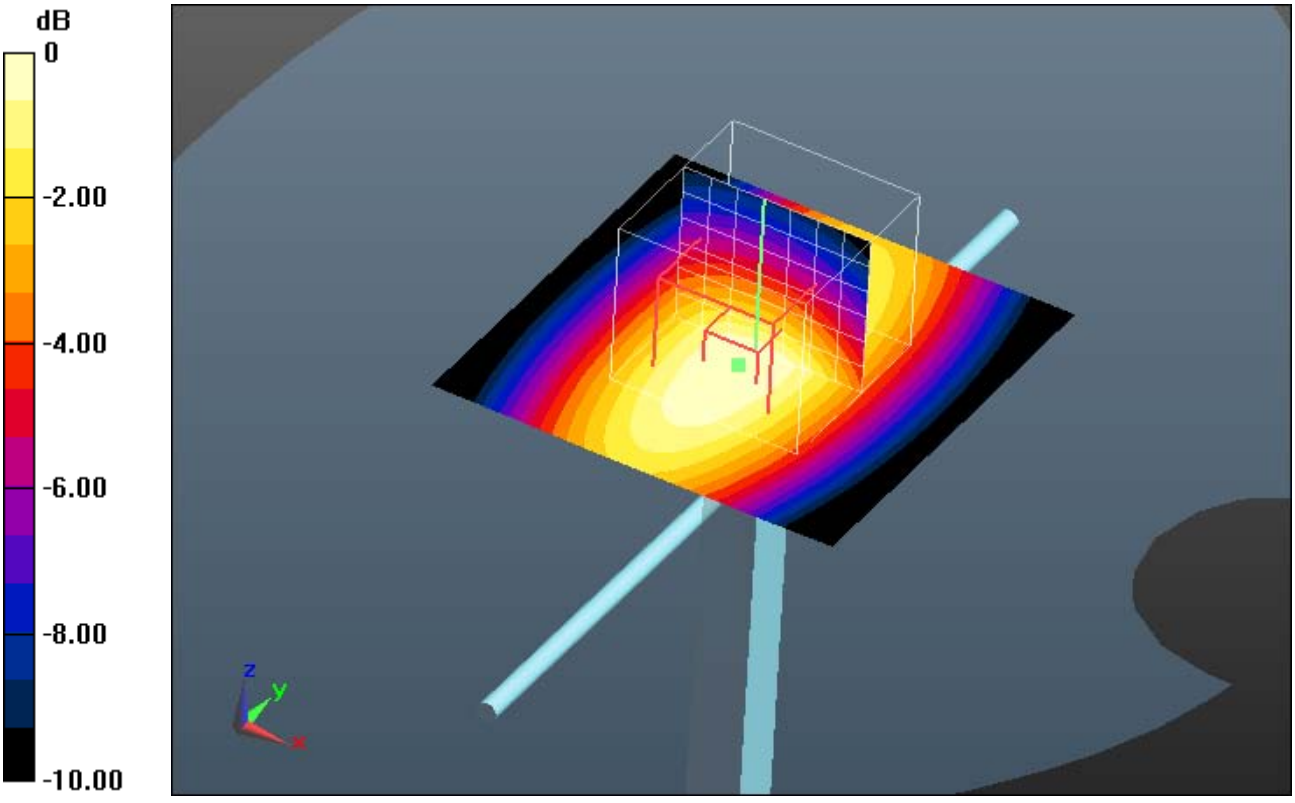
System Performance Check/d=15mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.8 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 13.5 W/kg

SAR(1 g) = 9.57 W/kg; SAR(10 g) = 6.4 W/kg

Maximum value of SAR (measured) = 10.4 W/kg



0 dB = 10.4 W/kg = 10.17 dBW/kg

Additional information:

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

Date/Time: 08.07.2013 12:55:45

SystemPerformanceCheck-D1750 head 2013-07-08

DUT: Dipole 1750 MHz D1750V2; 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 (interpolated): f = 1750 MHz; σ = 1.403 S/m; ε_r = 40.386; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(5.23, 5.23, 5.23); 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)

Configuration/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 49.5 W/kg

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

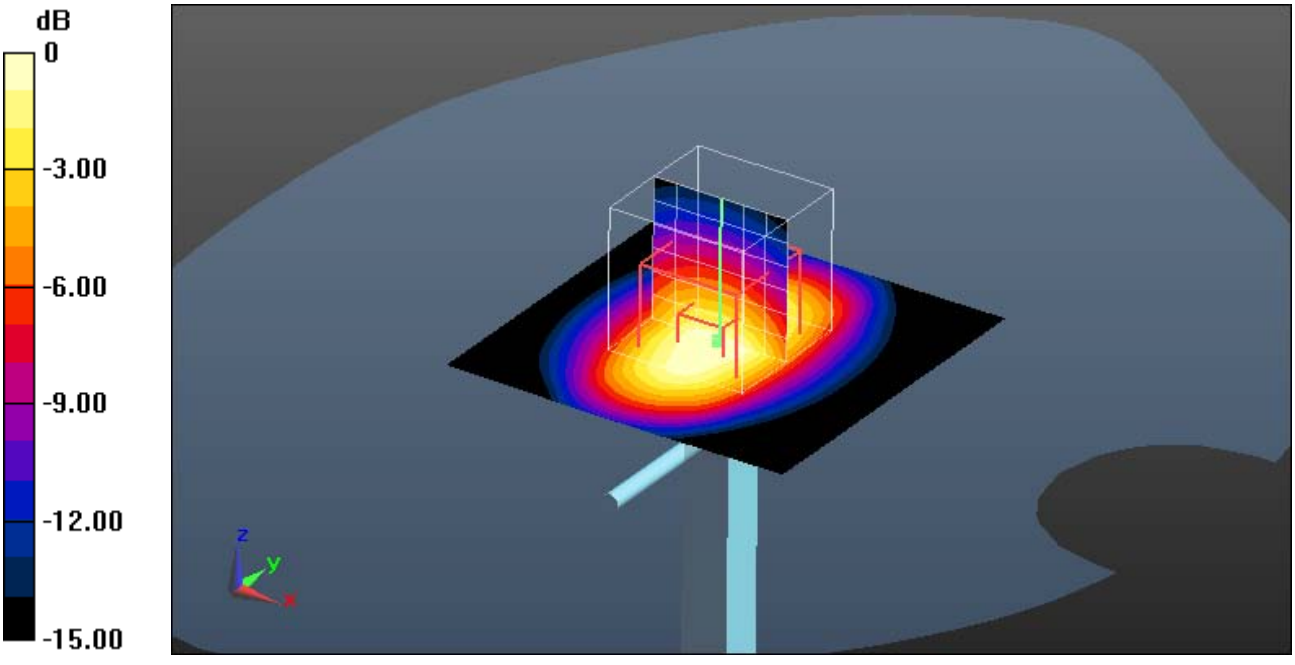
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 176.5 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 69.9 W/kg

SAR(1 g) = 38.3 W/kg; SAR(10 g) = 20.4 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: 22.4°C; liquid temperature: 22.2°C

Date/Time: 09.07.2013 18:17:07

SystemPerformanceCheck-D1750 head 2013-07-09

DUT: Dipole 1750 MHz D1750V2; 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 (interpolated): f = 1750 MHz; σ = 1.403 S/m; ε_r = 40.386; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(5.23, 5.23, 5.23); 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)

Configuration/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 46.8 W/kg

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

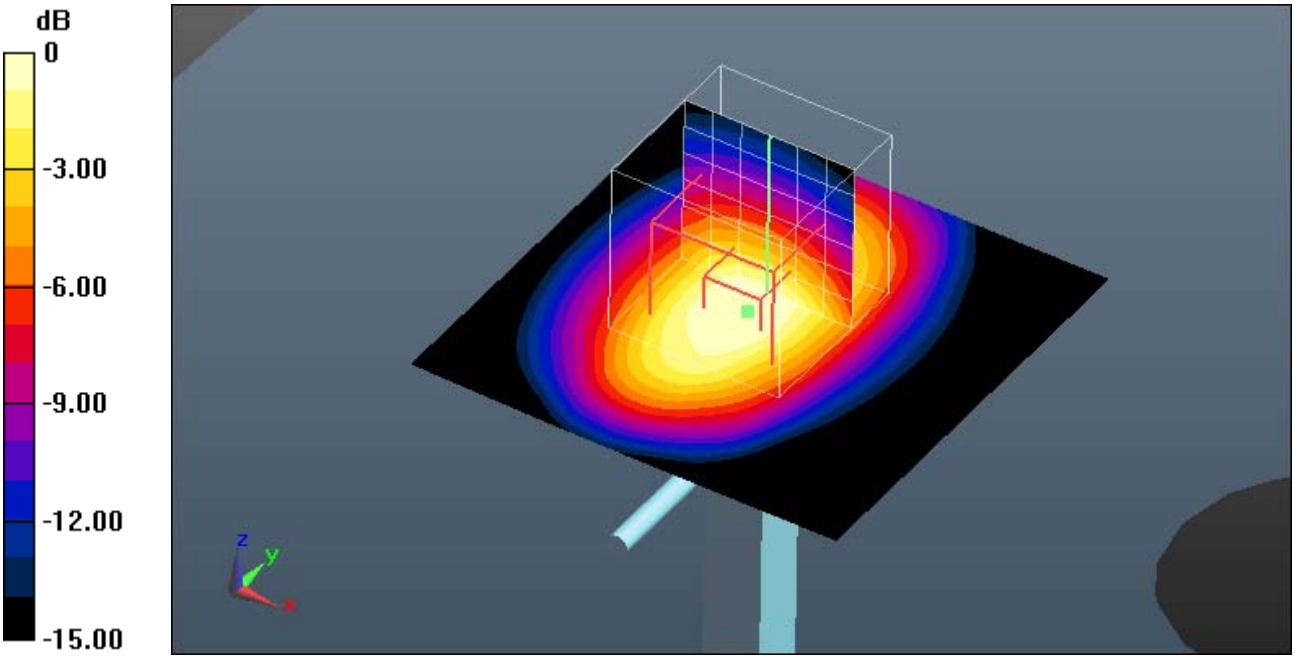
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 167.9 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 69.6 W/kg

SAR(1 g) = 37.9 W/kg; SAR(10 g) = 20.1 W/kg

Maximum value of SAR (measured) = 42.2 W/kg



0 dB = 42.2 W/kg = 16.25 dBW/kg

Additional information:

ambient temperature: 23.0°C; liquid temperature: 23.3°C

Date/Time: 13.07.2013 15:45:02

SystemPerformanceCheck-D1750 body 2013-07-13

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

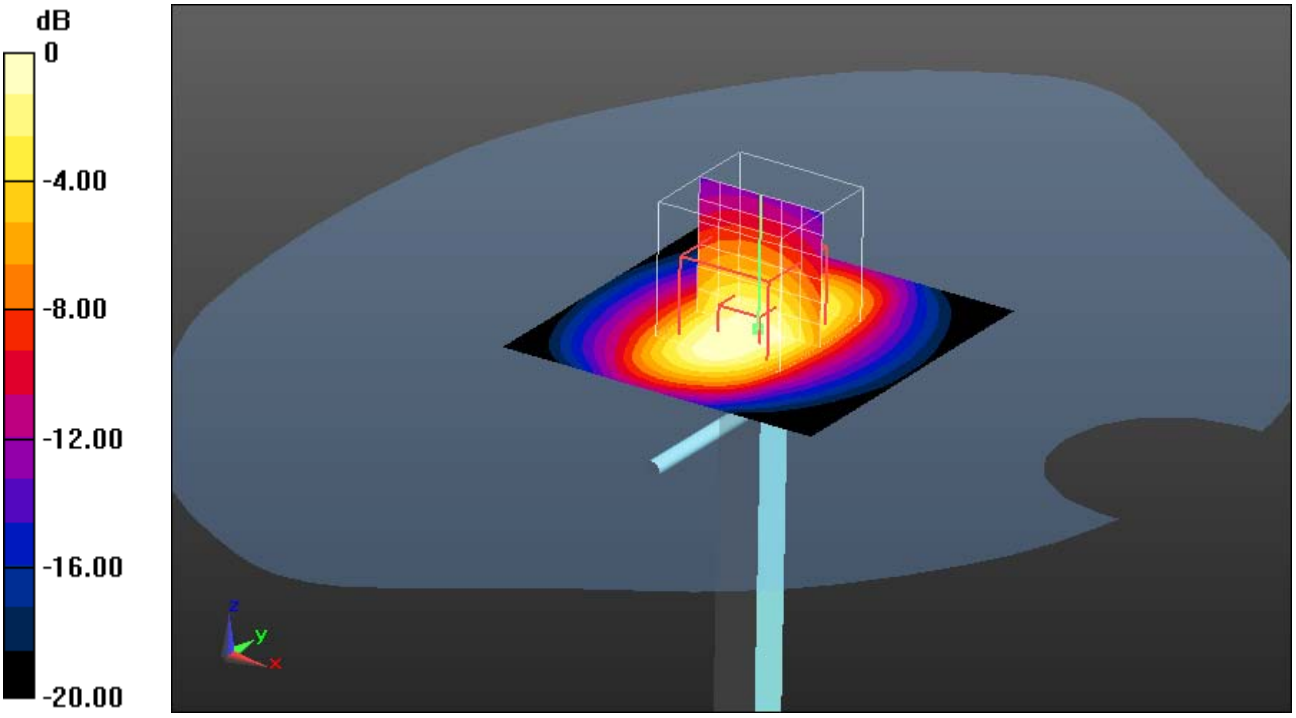
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1750 MHz; σ = 1.493 S/m; ε_r = 53.393; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(4.94, 4.94, 4.94); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: SEMCAD X 14.6.10(7164)

Configuration/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

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 179.5 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 53.0 W/kg
SAR(1 g) = 35.8 W/kg; SAR(10 g) = 20.1 W/kg
Maximum value of SAR (measured) = 40.8 W/kg



0 dB = 40.8 W/kg = 16.11 dBW/kg

Additional information:
ambient temperature: 23.3°C; liquid temperature: 22.1°C

Date/Time: 15.07.2013 15:58:28

SystemPerformanceCheck-D1750 body 2013-07-15

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

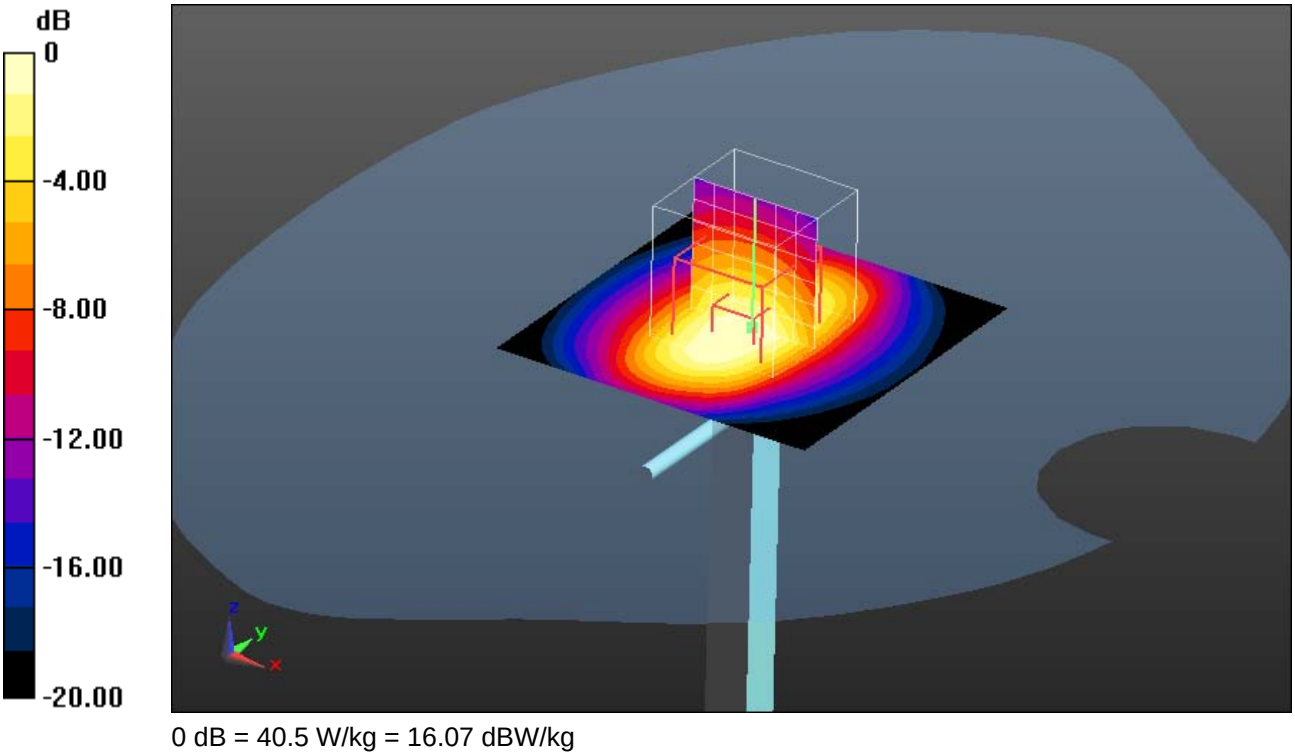
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1750 MHz; σ = 1.493 S/m; ε_r = 53.393; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(4.94, 4.94, 4.94); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: SEMCAD X 14.6.10(7164)

Configuration/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 49.7 W/kg

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 179.7 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 52.9 W/kg
SAR(1 g) = 35.7 W/kg; SAR(10 g) = 20.1 W/kg
Maximum value of SAR (measured) = 40.5 W/kg



0 dB = 40.5 W/kg = 16.07 dBW/kg

Additional Information:
ambient temperature: 23.3°C; liquid temperature: 22.1°C

Date/Time: 16.07.2013 16:54:37

SystemPerformanceCheck-D1750 body 2013-07-16

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

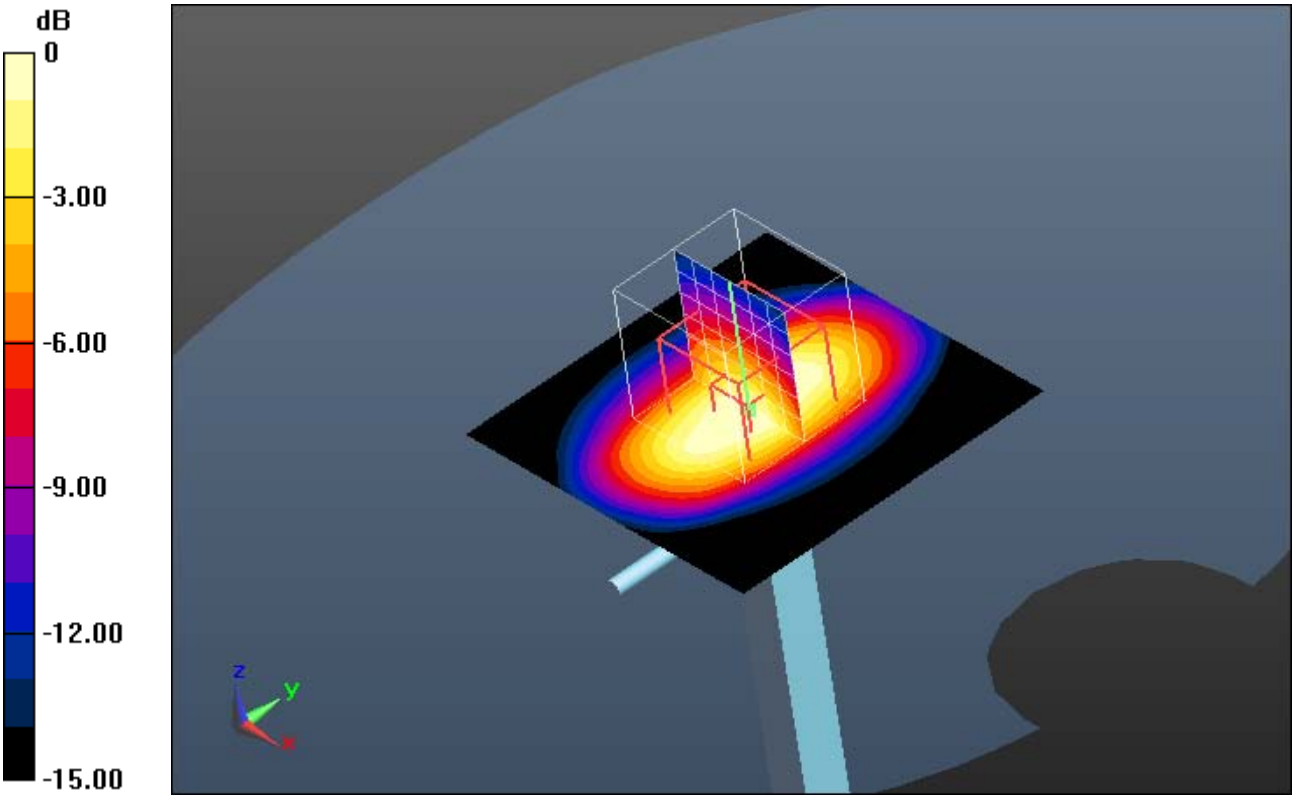
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1750 MHz; σ = 1.533 S/m; ε_r = 54.579; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(4.94, 4.94, 4.94); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: SEMCAD X 14.6.10(7164)

Configuration/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 50.3 W/kg

Configuration/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 = -0.02 dB
Peak SAR (extrapolated) = 53.0 W/kg
SAR(1 g) = 36.3 W/kg; SAR(10 g) = 20.5 W/kg
Maximum value of SAR (measured) = 41.3 W/kg



0 dB = 41.3 W/kg = 16.16 dBW/kg

Date/Time: 05.08.2013 12:18:54

SystemPerformanceCheck-D1750 body 2013-08-05

DUT: Dipole 1750 MHz D1750V2; 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 = 1.508 S/m; ε_r = 52.824; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.39, 4.39, 4.39); Calibrated: 24.08.2012;
- 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)

Configuration/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 46.5 W/kg

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0:

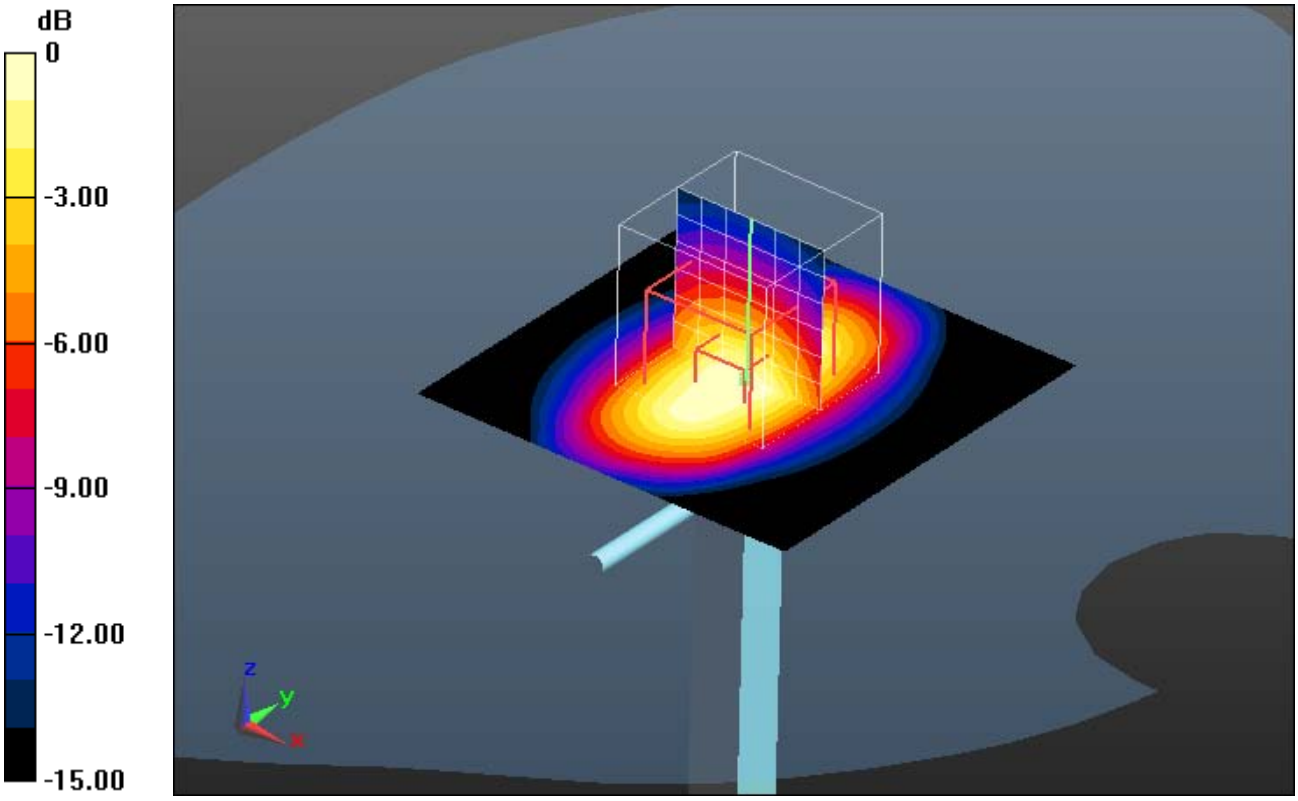
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 172.7 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 53.9 W/kg

SAR(1 g) = 35 W/kg; SAR(10 g) = 19.3 W/kg

Maximum value of SAR (measured) = 39.7 W/kg



0 dB = 39.7 W/kg = 15.99 dBW/kg

Additional information:

ambient temperature: 23.9°C; liquid temperature: 23.7°C

Date/Time: 26.06.2013 09:18:37

SystemPerformanceCheck-D1900 head 2013-06-26

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 531

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

Medium parameters used: f = 1900 MHz; σ = 1.37 S/m; ε_r = 40.3; 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;
- Modulation Compensation:
- 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)

System Performance Check/d=10mm, Pin=1000 mW, dist=4.0mm/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 53.6 W/kg

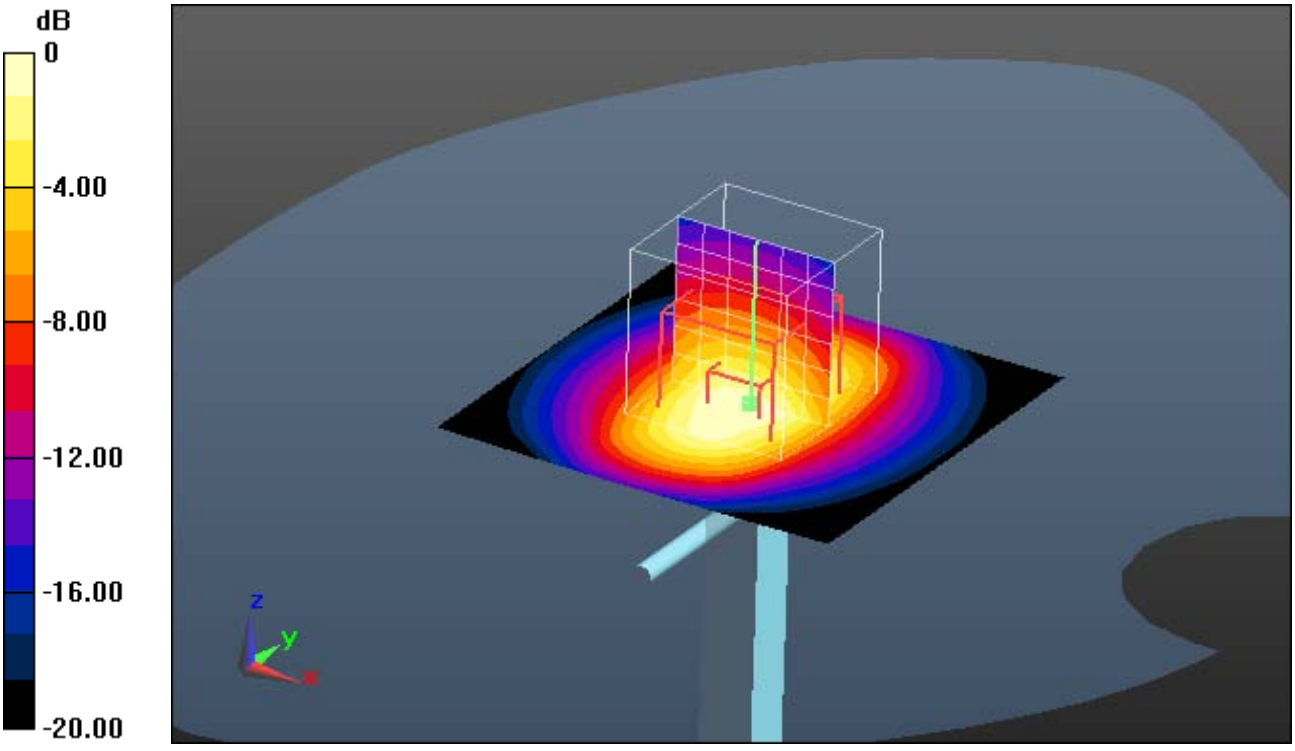
System Performance Check/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 182.6 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 72.8 W/kg

SAR(1 g) = 39.4 W/kg; SAR(10 g) = 20.5 W/kg

Maximum value of SAR (measured) = 44.3 W/kg



0 dB = 44.3 W/kg = 16.46 dBW/kg

Additional information:

ambient temperature: 23.6°C; liquid temperature: 22.6°C

Date/Time: 17.07.2013 10:54:31

SystemPerformanceCheck-D1900 head 2013-07-17

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

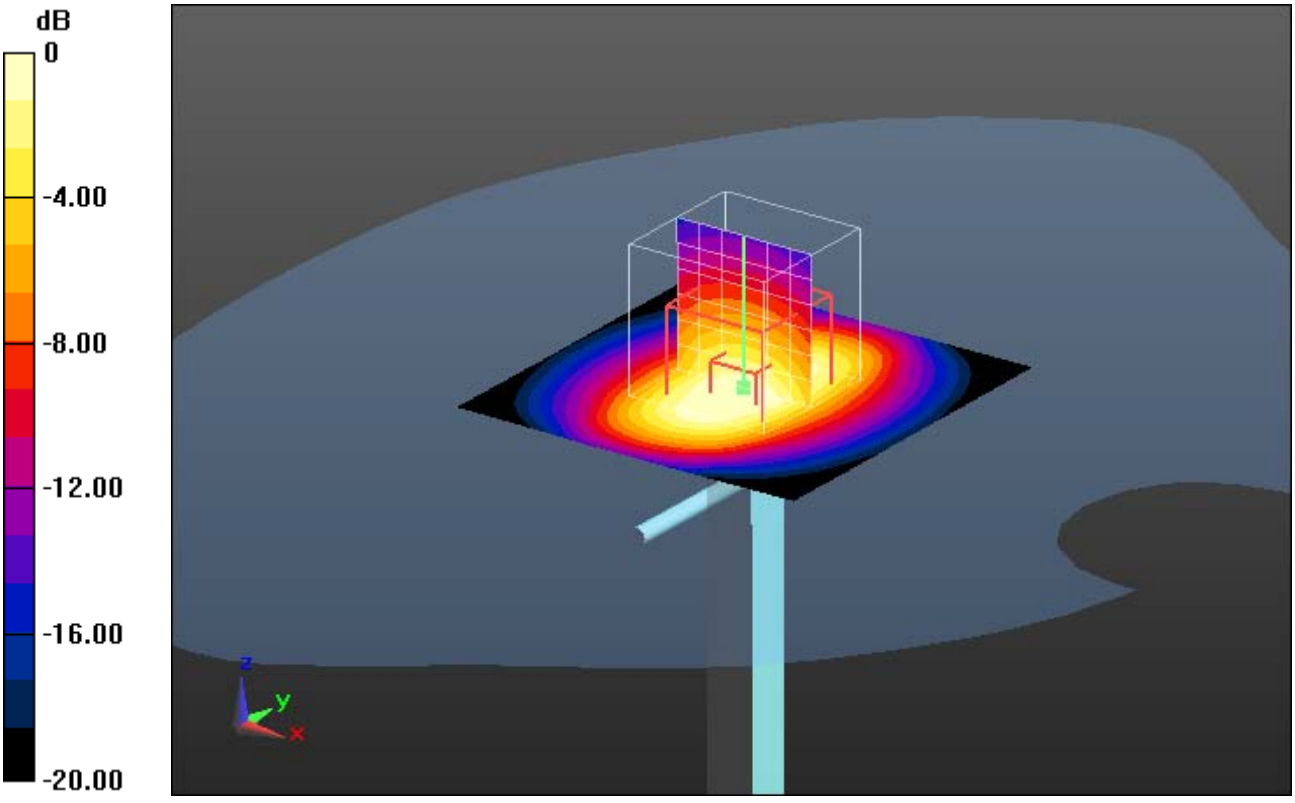
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.39 S/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(5.2, 5.2, 5.2); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: SEMCAD X 14.6.10(7164)

System Performance Check/d=10mm, Pin=1000 mW, dist=4.0mm 2/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 59.2 W/kg

System Performance Check/d=10mm, Pin=1000 mW, dist=4.0mm 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 188.4 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 64.2 W/kg
SAR(1 g) = 38.9 W/kg; SAR(10 g) = 21 W/kg
Maximum value of SAR (measured) = 44.0 W/kg



0 dB = 44.0 W/kg = 16.43 dBW/kg

Additional information:
ambient temperature: 22.5°C; liquid temperature: 23.4°C

Date/Time: 03.07.2013 14:20:57

SystemPerformanceCheck-D1900 body 2013-07-03

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

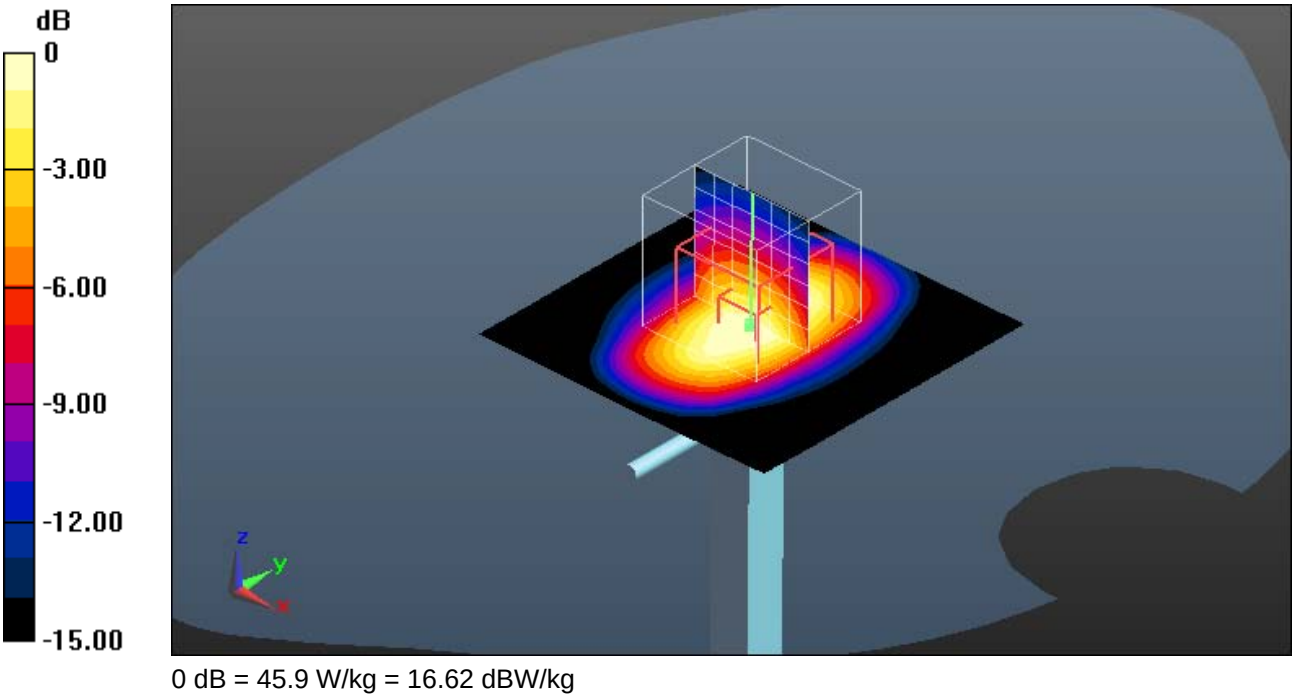
Communication System: UID 0, CW; Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.78, 4.78, 4.78); 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)

Configuration/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

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 177.1 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 71.9 W/kg
SAR(1 g) = 40.5 W/kg; SAR(10 g) = 21.5 W/kg
Maximum value of SAR (measured) = 45.9 W/kg



0 dB = 45.9 W/kg = 16.62 dBW/kg

Additional information:
ambient temperature: 23.4°C; liquid temperature: 22.9°C

Date/Time: 04.07.2013 16:13:54

SystemPerformanceCheck-D1900 2013-07-04

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

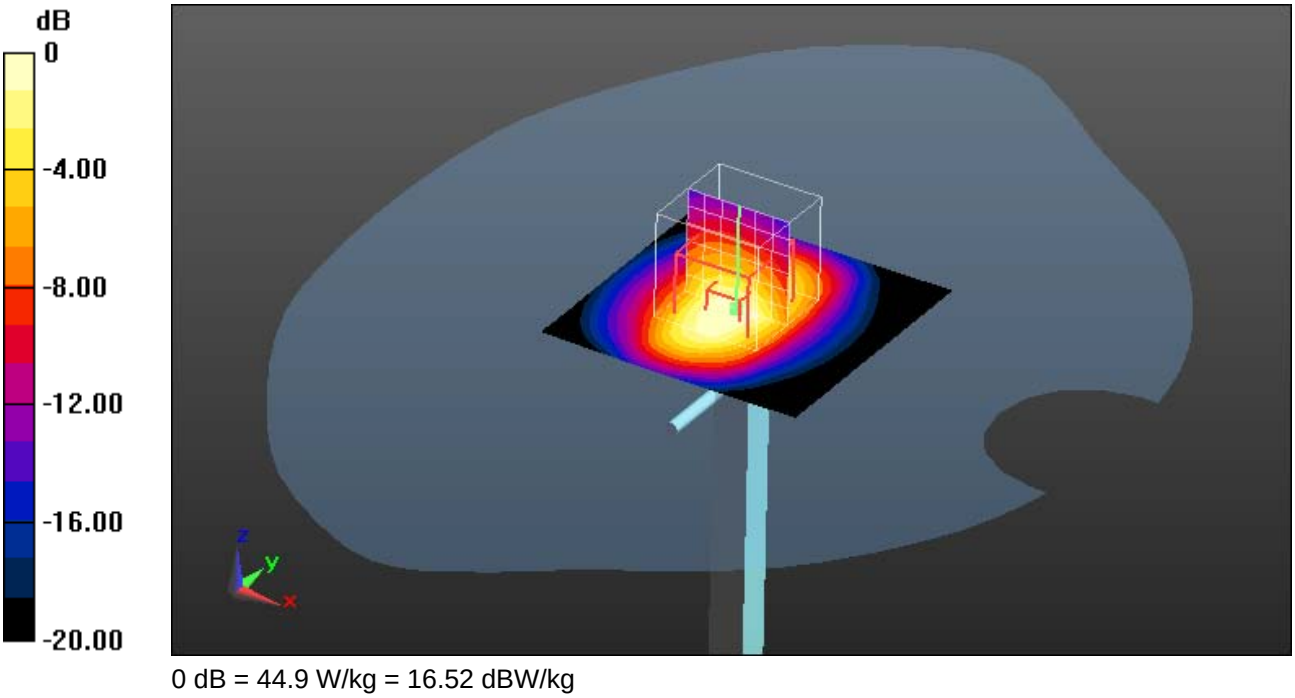
Communication System: UID 0, CW; Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.78, 4.78, 4.78); 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)

Configuration/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 53.2 W/kg

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 169.5 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 70.9 W/kg
SAR(1 g) = 39.9 W/kg; SAR(10 g) = 21.1 W/kg
Maximum value of SAR (measured) = 44.9 W/kg



0 dB = 44.9 W/kg = 16.52 dBW/kg

Additional information:
ambient temperature: 23.8°C; liquid temperature: 22.3°C

Date/Time: 18.07.2013 20:52:29

SystemPerformanceCheck-D1900 body 2013-07-18

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

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

Medium parameters used: f = 1900 MHz; σ = 1.5 S/m; ε_r = 51.8; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1554; ConvF(4.64, 4.64, 4.64); Calibrated: 16.05.2013;
- 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)

System Performance Check/d=10mm, Pin=1000 mW, dist=4.0mm/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 53.7 W/kg

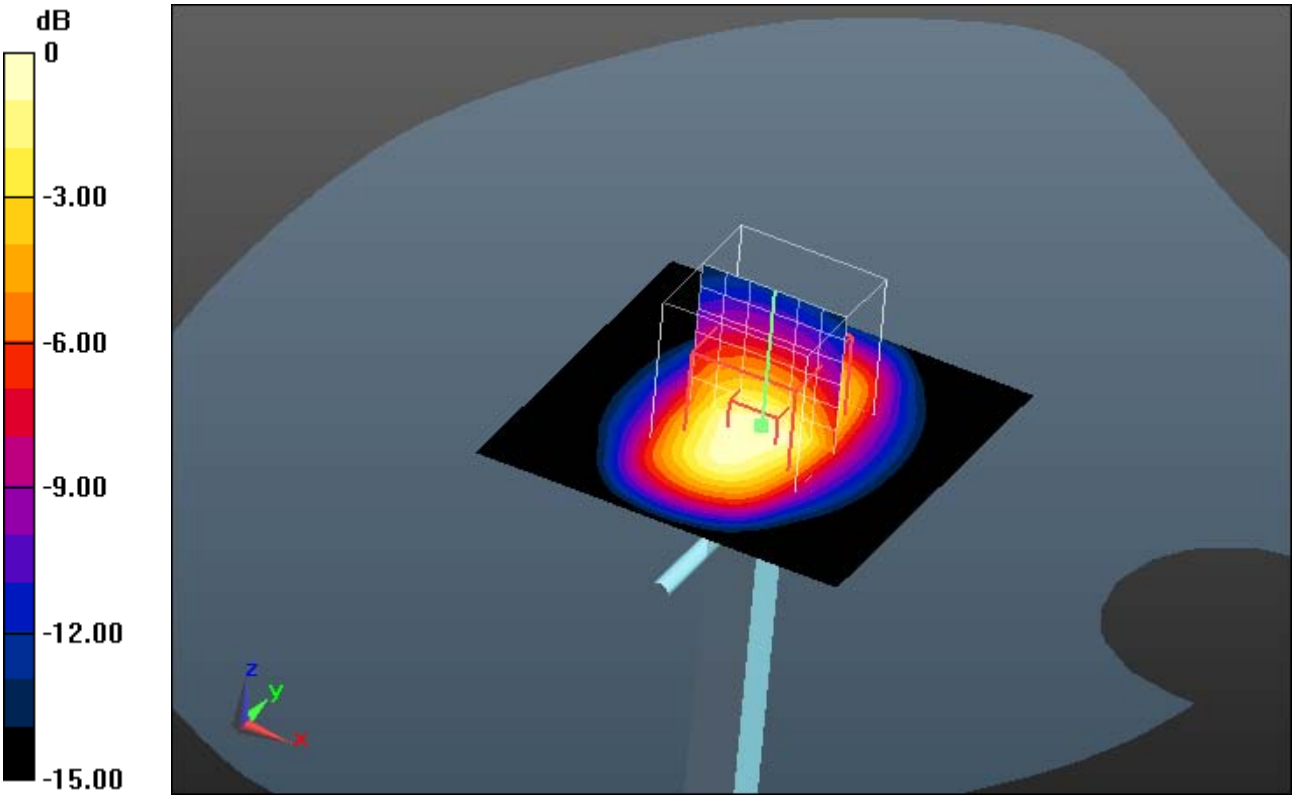
System Performance Check/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 180.9 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 57.0 W/kg

SAR(1 g) = 37.2 W/kg; SAR(10 g) = 20.6 W/kg

Maximum value of SAR (measured) = 42.3 W/kg



0 dB = 42.3 W/kg = 16.26 dBW/kg

Additional information:

ambient temperature: 22.7°C; liquid temperature: 22.3°C

Date/Time: 05.08.2013 14:59:48

SystemPerformanceCheck-D1900 2013-08-05

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

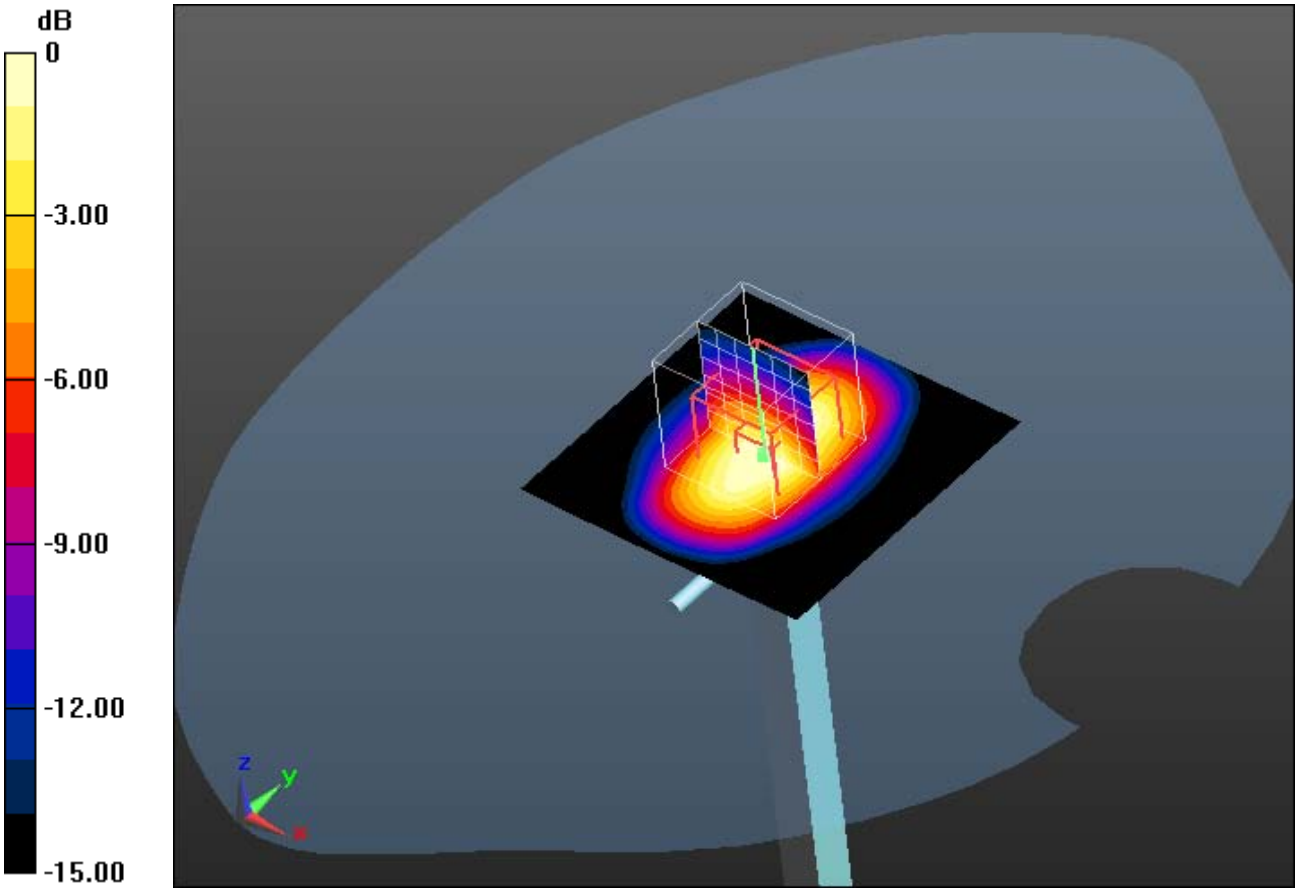
Communication System: UID 0, CW; ; Frequency: 1900 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1900 MHz; σ = 1.515 S/m; ε_r = 53.023; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.78, 4.78, 4.78); 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)

Configuration/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

Configuration/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 176.8 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 72.0 W/kg
SAR(1 g) = 40.1 W/kg; SAR(10 g) = 21 W/kg
Maximum value of SAR (measured) = 45.2 W/kg



0 dB = 45.2 W/kg = 16.55 dBW/kg

Additional information:
ambient temperature: 22:2°C; liquid temperature: 22:2°C

Date/Time: 03.08.2013 14:05:11

SystemPerformanceCheck-D2450 head 2013-08-03

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

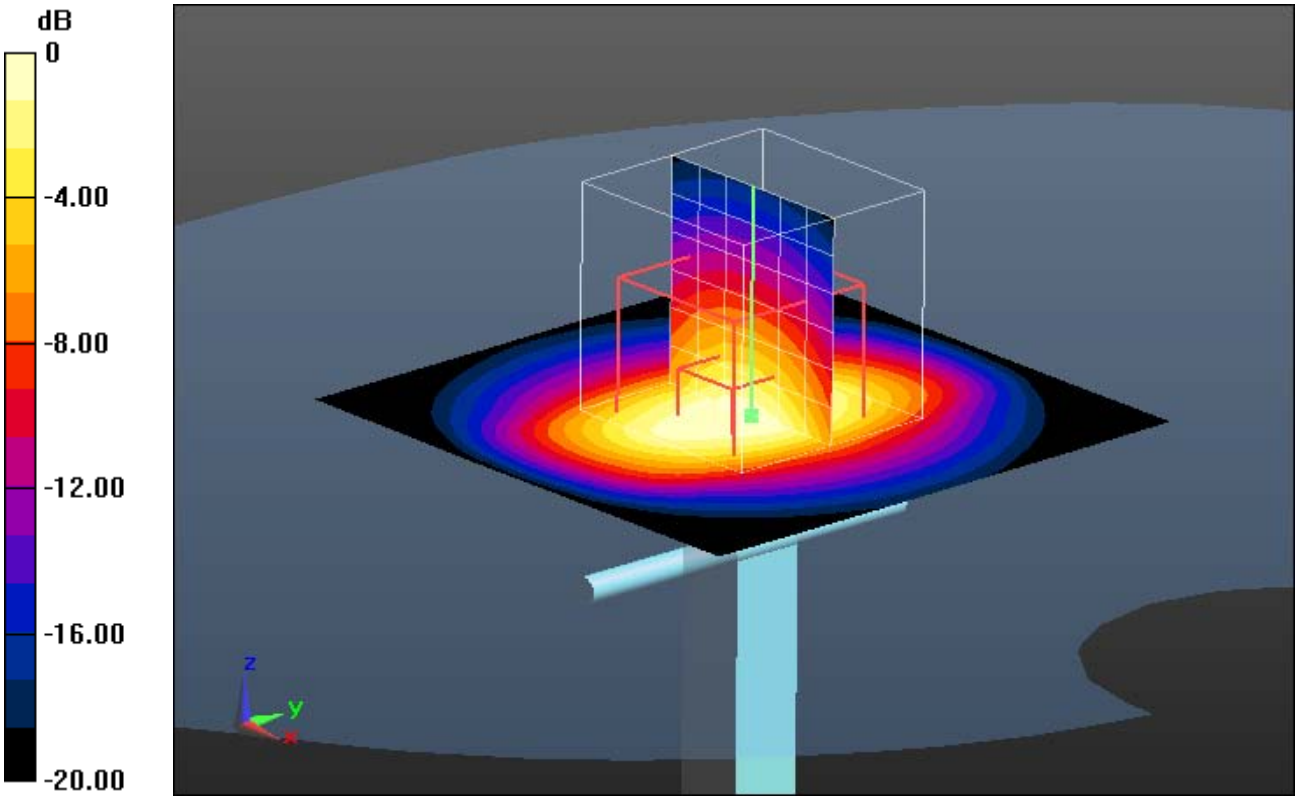
Communication System: UID 0, CW; Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 1.815 S/m; ε_r = 39.044; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(4.15, 4.15, 4.15); Calibrated: 24.08.2012;
- 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)

HSL2450/d=10mm, Pin=100mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 7.65 W/kg

HSL2450/d=10mm, Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 60.228 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 12.2 W/kg
SAR(1 g) = 5.45 W/kg; SAR(10 g) = 2.52 W/kg
Maximum value of SAR (measured) = 6.03 W/kg



0 dB = 6.03 W/kg = 7.80 dBW/kg

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

Date/Time: 03.08.2013 13:51:17

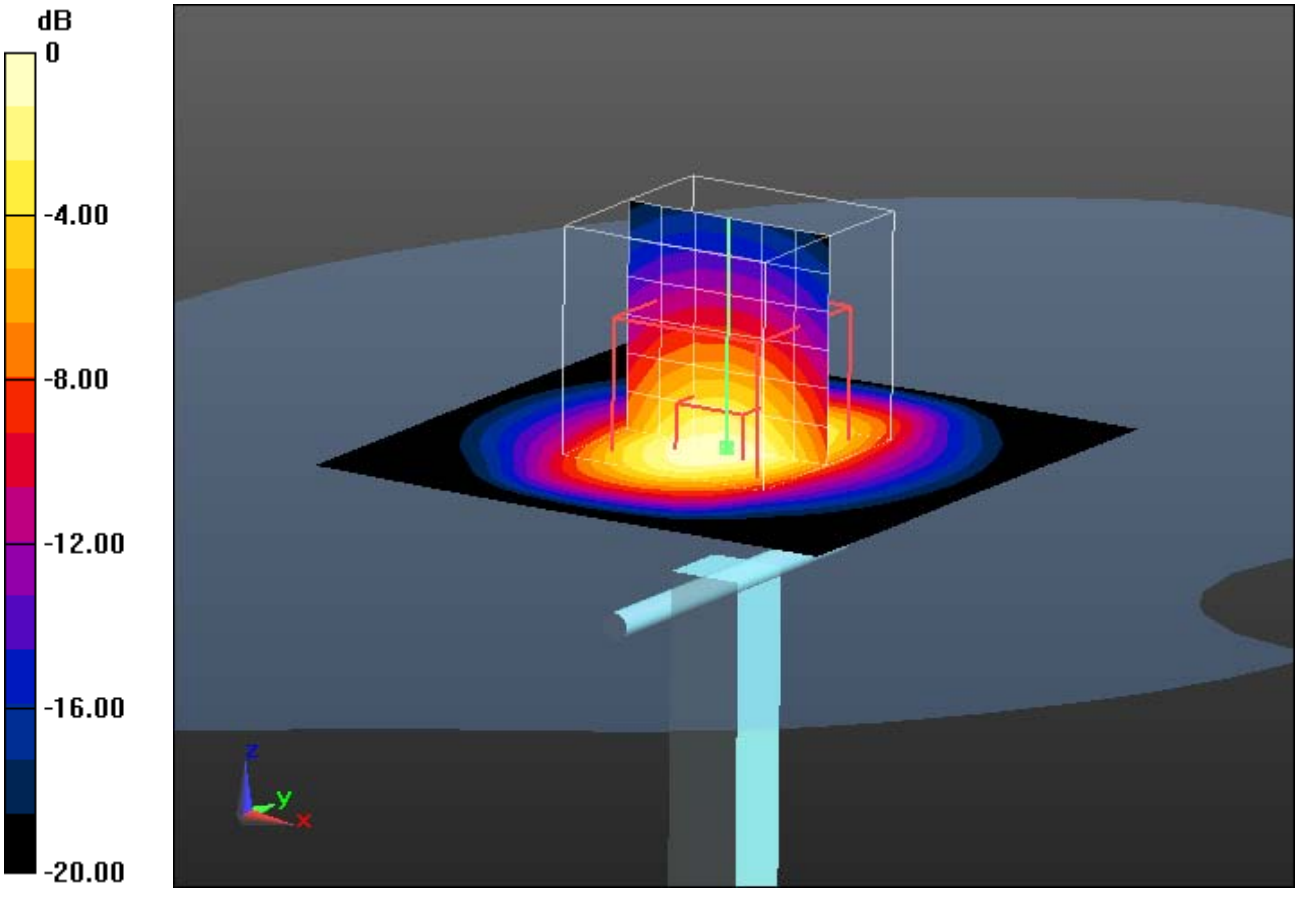
SystemPerformanceCheck-D2450 body 2013-08-03

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

Communication System: UID 0, CW; 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)

HSL2450/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 80.5 W/kg

HSL2450/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 177.9 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 114 W/kg
SAR(1 g) = 52.9 W/kg; SAR(10 g) = 24.1 W/kg
Maximum value of SAR (measured) = 60.9 W/kg



0 dB = 60.9 W/kg = 17.85 dBW/kg

Additional information:
ambient temperature: 22.7°C; liquid temperature: 22.2°C

Date/Time: 05.08.2013 13:41:48

SystemPerformanceCheck-D2450 body 2013-08-05

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

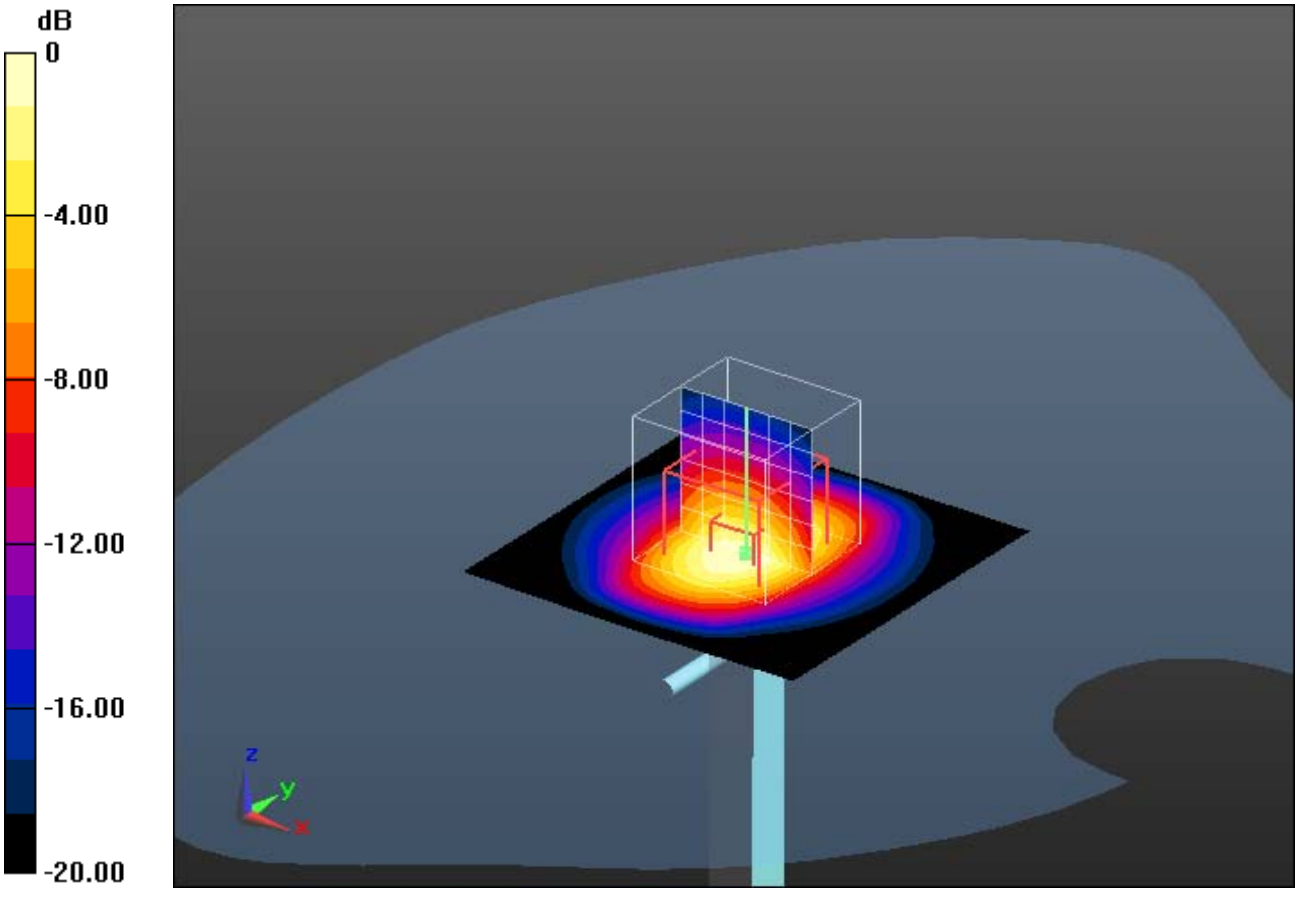
Communication System: UID 0, CW; Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 1.963 S/m; ε_r = 51.347; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.36, 4.36, 4.36); 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)

HSL2450/d=10mm, Pin=1000mW/Area Scan (51x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 80.0 W/kg

HSL2450/d=10mm, Pin=1000mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 177.9 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 114 W/kg
SAR(1 g) = 54.2 W/kg; SAR(10 g) = 25 W/kg
Maximum value of SAR (measured) = 61.3 W/kg



0 dB = 61.3 W/kg = 17.87 dBW/kg

Additional information:
ambient temperature: 23.4°C; liquid temperature: 22.2°C

Date/Time: 12.07.2013 09:23:05

SystemPerformanceCheck-D5GHz head 2013-07-12

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

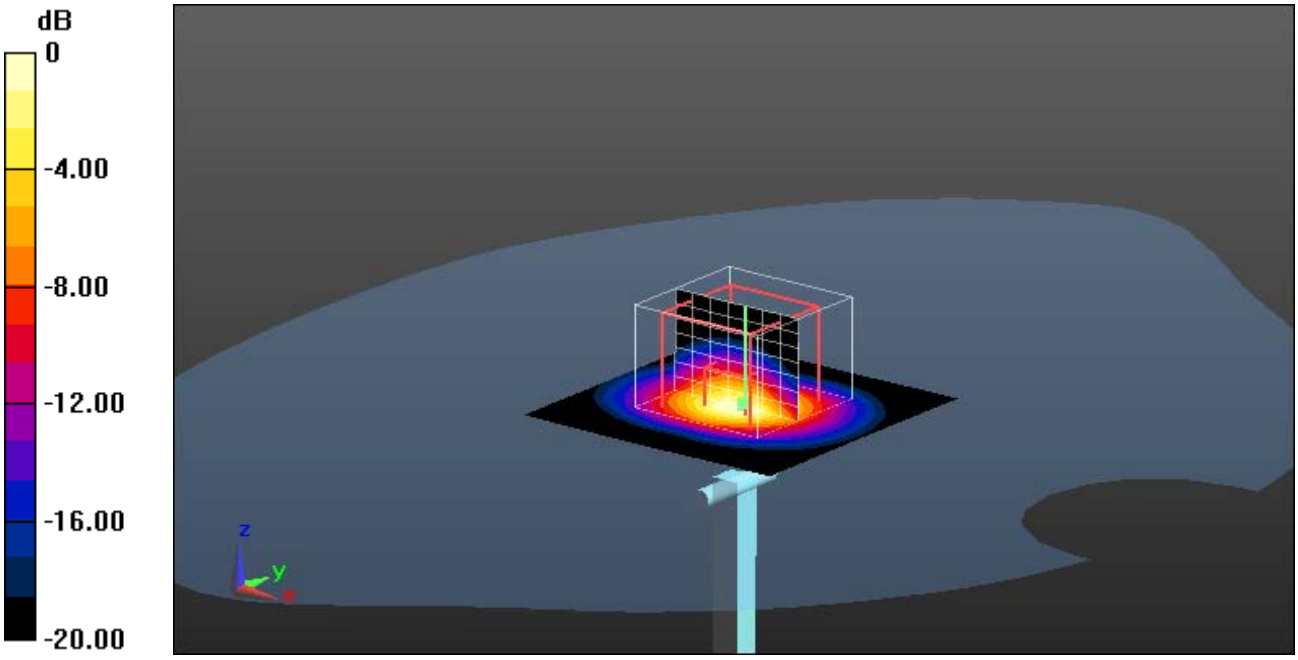
Communication System: UID 0, CW; Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5200 MHz; σ = 4.52 S/m; ε_r = 36.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3536; ConvF(5.34, 5.34, 5.34); Calibrated: 24.09.2012;
- Modulation Compensation:
- 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)

Configuration/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

Configuration/d=10mm, Pin=100mW 5.2GHz/Zoom Scan (8x8x8) (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 45.427 V/m; Power Drift = -0.29 dB
Peak SAR (extrapolated) = 28.7 W/kg
SAR(1 g) = 7.33 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 14.5 W/kg



0 dB = 14.5 W/kg = 11.61 dBW/kg

Additional information:
position or distance of DUT to SAM: 0mm
ambient temperature: 22.0°C; liquid temperature: 22.6°C

Date/Time: 12.07.2013 10:01:09

SystemPerformanceCheck-D5GHz head 2013-07-12

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

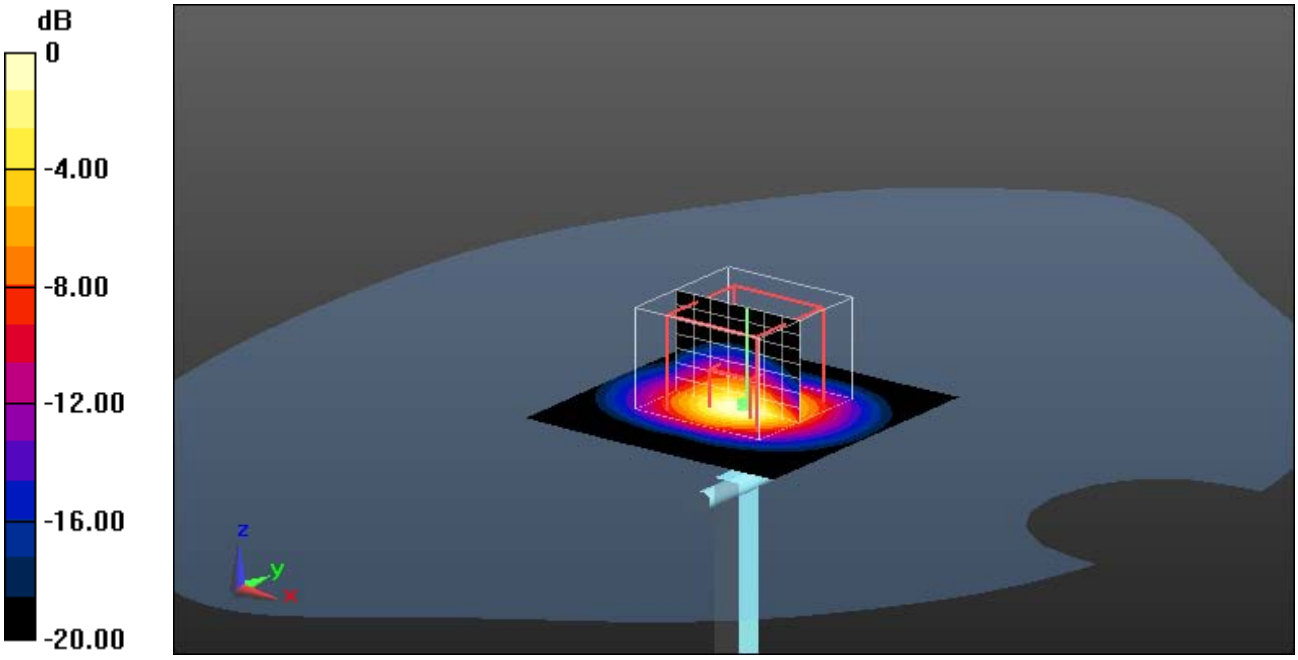
Communication System: UID 0, CW; Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 4.82 S/m; ε_r = 36.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3536; ConvF(4.79, 4.79, 4.79); Calibrated: 24.09.2012;
- Modulation Compensation:
- 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)

Configuration/d=10mm, Pin=100mW 5.5GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 17.0 W/kg

Configuration/d=10mm, Pin=100mW 5.5GHz/Zoom Scan (8x8x8) (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 43.252 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 7.73 W/kg; SAR(10 g) = 2.15 W/kg
Maximum value of SAR (measured) = 14.9 W/kg



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

Additional information:
position or distance of DUT to SAM: 0mm
ambient temperature: 22.0°C; liquid temperature: 22.6°C

Date/Time: 12.07.2013 10:29:12

SystemPerformanceCheck-D5GHz head 2013-07-12

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

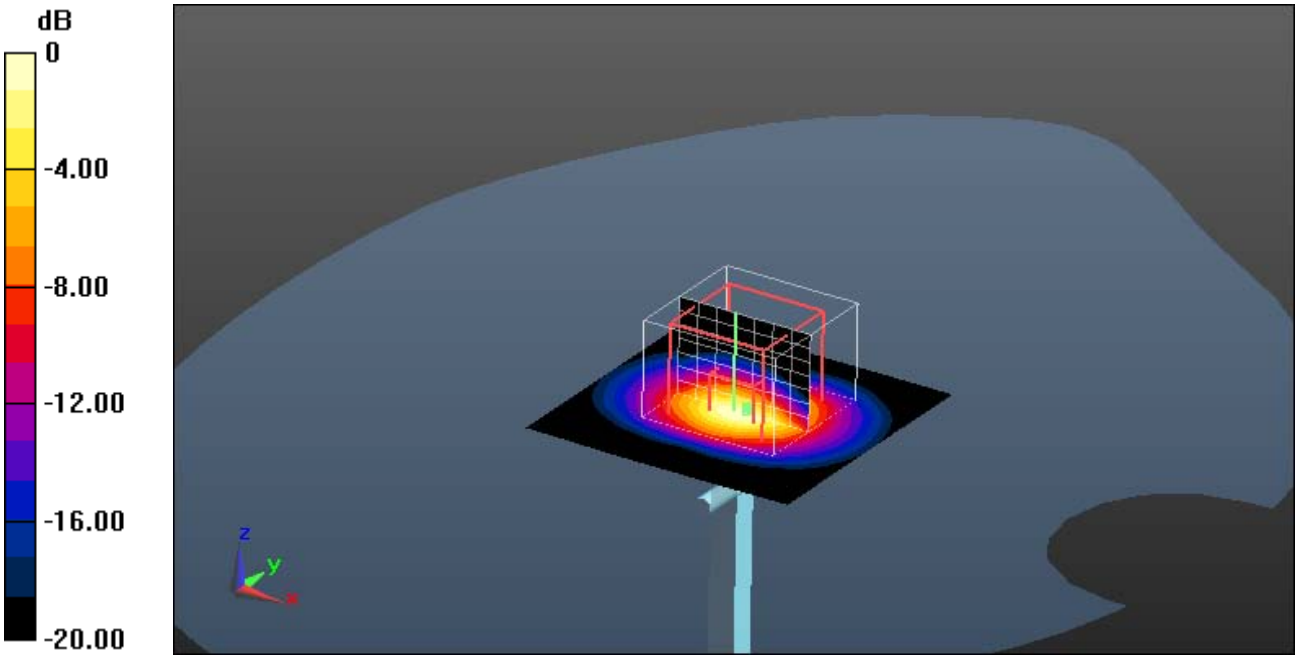
Communication System: UID 0, CW; Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 5.12 S/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3536; ConvF(4.66, 4.66, 4.66); Calibrated: 24.09.2012;
- 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)

Configuration/d=10mm, Pin=100mW 5.8GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 15.7 W/kg

Configuration/d=10mm, Pin=100mW 5.8GHz/Zoom Scan (8x8x8) (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 39.791 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 31.1 W/kg
SAR(1 g) = 7.24 W/kg; SAR(10 g) = 2.02 W/kg
Maximum value of SAR (measured) = 14.5 W/kg



0 dB = 14.5 W/kg = 11.61 dBW/kg

Additional information:
position or distance of DUT to SAM: 0mm
ambient temperature: 22.0°C; liquid temperature: 22.6°C

Date/Time: 10.07.2013 11:12:09

SystemPerformanceCheck-D5GHz-body 2013-07-10

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

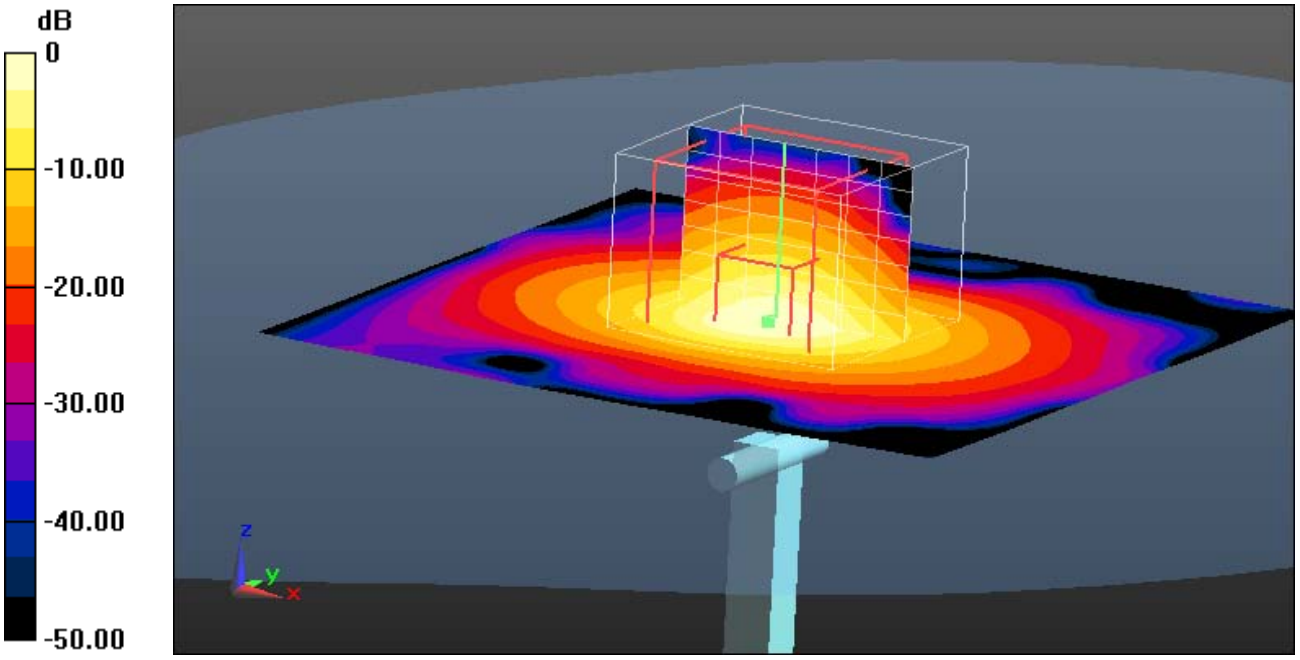
Communication System: UID 0, CW; Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5200 MHz; σ = 5.34 S/m; ε_r = 48.02; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3536; ConvF(4.87, 4.87, 4.87); Calibrated: 24.09.2012;
- Modulation Compensation:
- 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/d=10mm, Pin=100mW 5.2GHz/Area Scan (91x91x1): Interpolated grid:

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

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

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 59.166 V/m; Power Drift = -0.109 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 7.38 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 15.1 W/kg



0 dB = 15.1 W/kg = 11.79 dBW/kg

Additional information:
ambient temperature: 22.0°C; liquid temperature: 22.6°C

Date/Time: 10.07.2013 11:38:53

SystemPerformanceCheck-D5GHz-body 2013-07-10

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

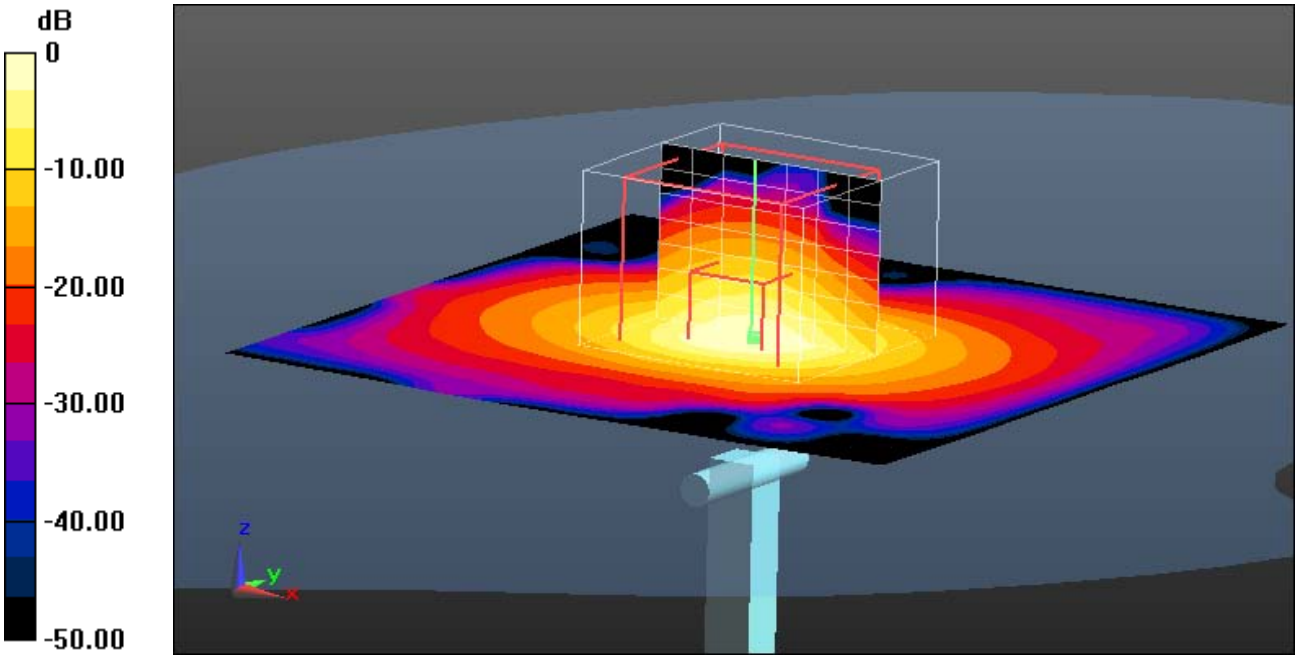
Communication System: UID 0, CW; Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 5.71 S/m; ε_r = 47.27; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3536; ConvF(4.32, 4.32, 4.32); Calibrated: 24.09.2012;
- 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/d=10mm, Pin=100mW 5.5GHz/Area Scan (91x91x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.7 W/kg

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

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 57.252 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 7.67 W/kg; SAR(10 g) = 2.11 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: 22.0°C; liquid temperature: 22.6°C

Date/Time: 10.07.2013 12:03:56

SystemPerformanceCheck-D5GHz-body 2013-07-10

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

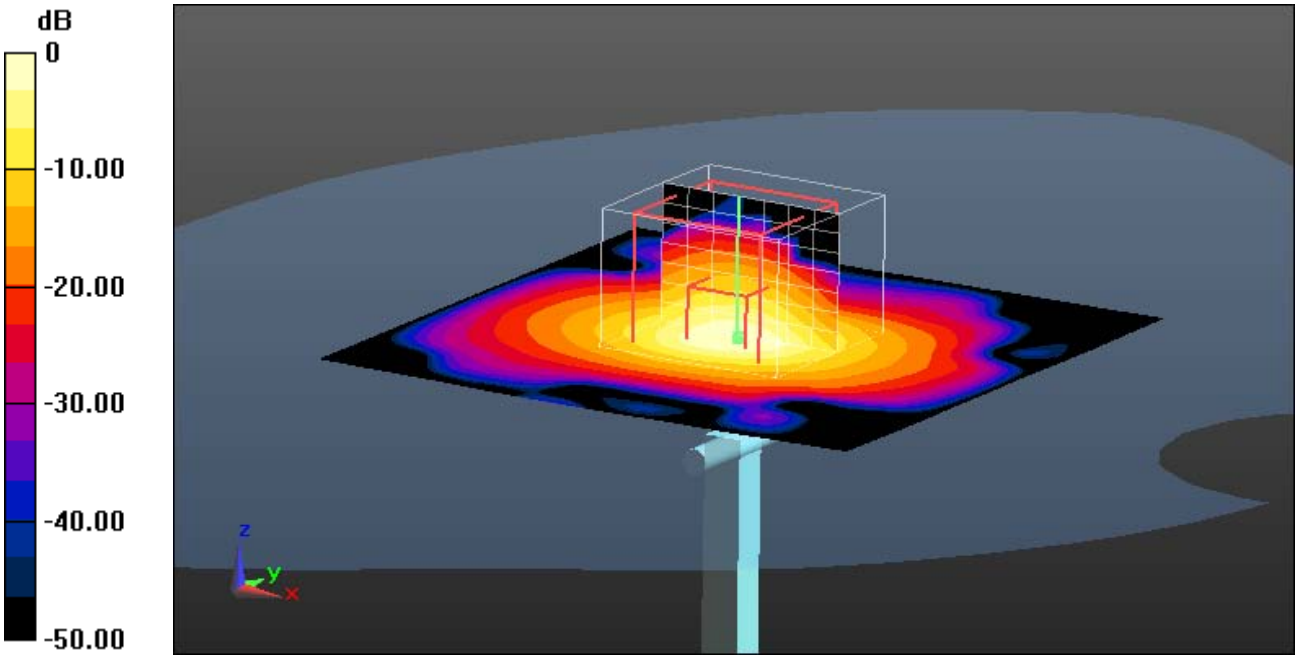
Communication System: UID 0, CW; Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 6.1 S/m; ε_r = 46.69; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3536; ConvF(4.43, 4.43, 4.43); Calibrated: 24.09.2012;
- 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/d=10mm, Pin=100mW 5.8GHz/Area Scan (91x91x1): Interpolated grid:

dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 16.4 W/kg

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

Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 55.913 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 30.1 W/kg
SAR(1 g) = 7.46 W/kg; SAR(10 g) = 2.04 W/kg
Maximum value of SAR (measured) = 15.8 W/kg



0 dB = 15.8 W/kg = 11.99 dBW/kg

Additional information:
ambient temperature: 22.0°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 850

Date/Time: 28.06.2013 11:04:45

IEEE1528 - GSM850 head 3TS

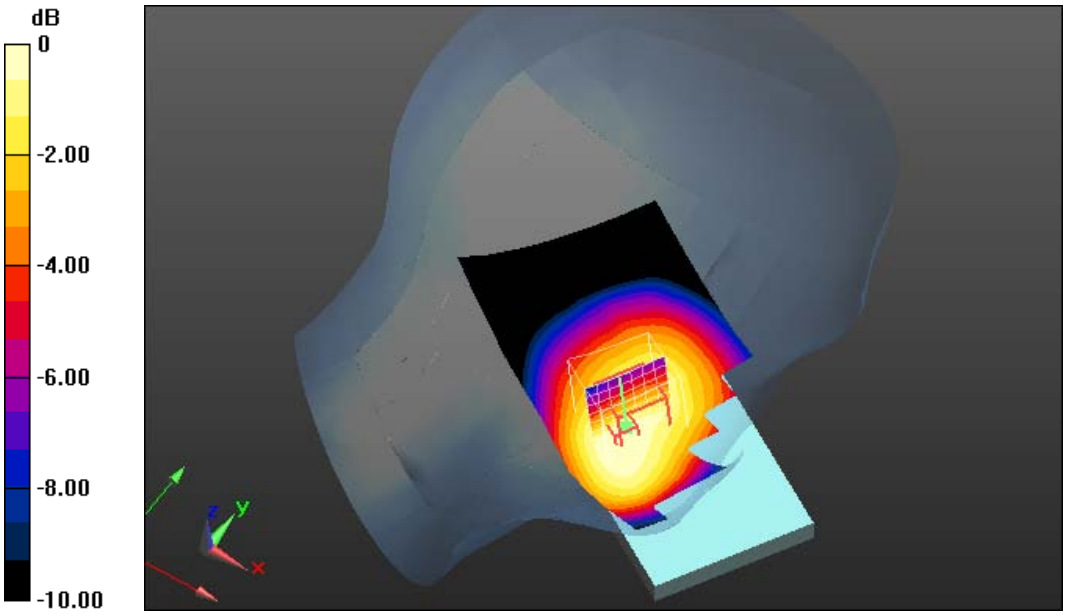
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, PCS 850 GPRS 3TS (0); Communication System Band: GSM850;
Frequency: 848.8 MHz; Communication System PAR: 4.314 dB; PMF: 1.64324
Medium parameters used: f = 848.8 MHz; σ = 0.91 S/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Left 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) = 0.630 W/kg

Left-Hand-Side HSL/Touch Position - Hi/Zoom Scan (8x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.400 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.810 W/kg
SAR(1 g) = 0.591 W/kg; SAR(10 g) = 0.440 W/kg
Maximum value of SAR (measured) = 0.627 W/kg



0 dB = 0.627 W/kg = -2.03 dBW/kg

Additional information:
ambient temperature: 21.9°C; liquid temperature: 21.5°C

Date/Time: 06.07.2013 18:18:40

OET65 - GSM850 mobile hotspot 3TS

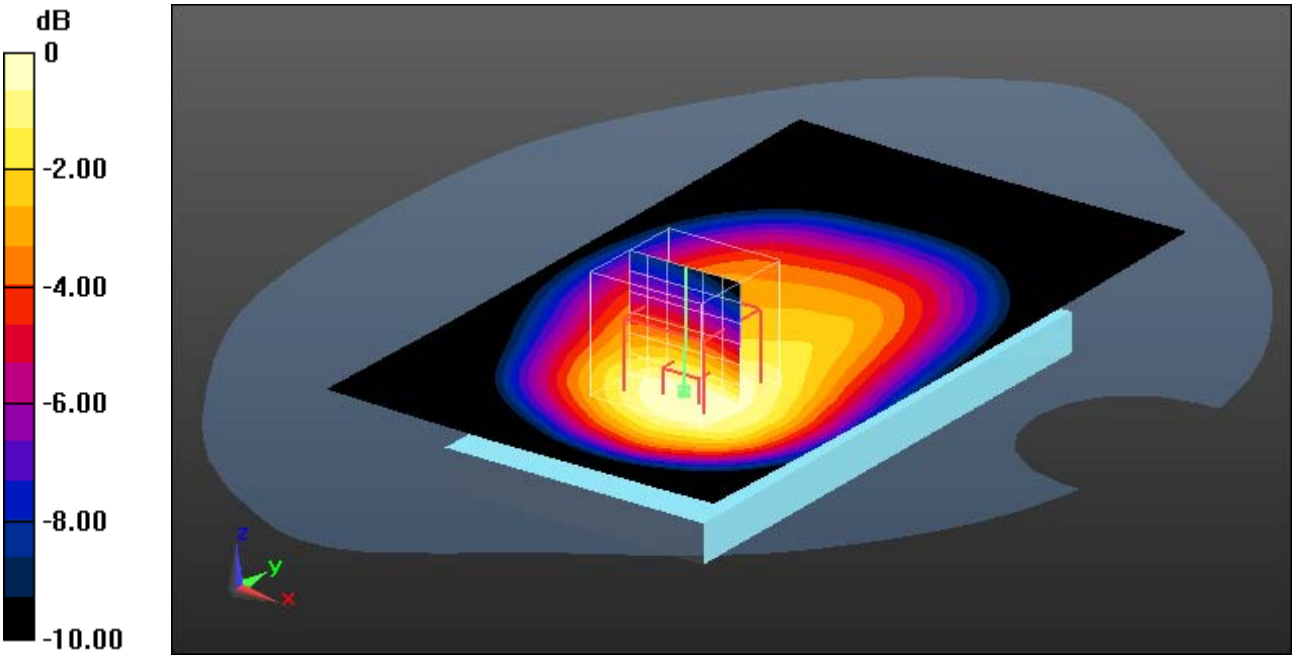
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, PCS 850 GPRS 3TS (0); Communication System Band: GSM850;
Frequency: 848.8 MHz; Communication System PAR: 4.314 dB; PMF: 1.64324
Medium parameters used: f = 848.8 MHz; σ = 0.99 S/m; ε_r = 55.9; ρ = 1000 kg/m^3
Phantom section: Flat 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), 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/Rear Position - High WC/Area Scan (71x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Body MSL/Rear Position - High WC/Zoom Scan (7x7x7)/Cube 0: Measurement

grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35.570 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.795 W/kg
Maximum value of SAR (measured) = 1.24 W/kg



0 dB = 1.24 W/kg = 0.93 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.0°C; liquid temperature: 21.1°C

Date/Time: 06.07.2013 10:09:17

OET65 - GSM850 body worn 3TS

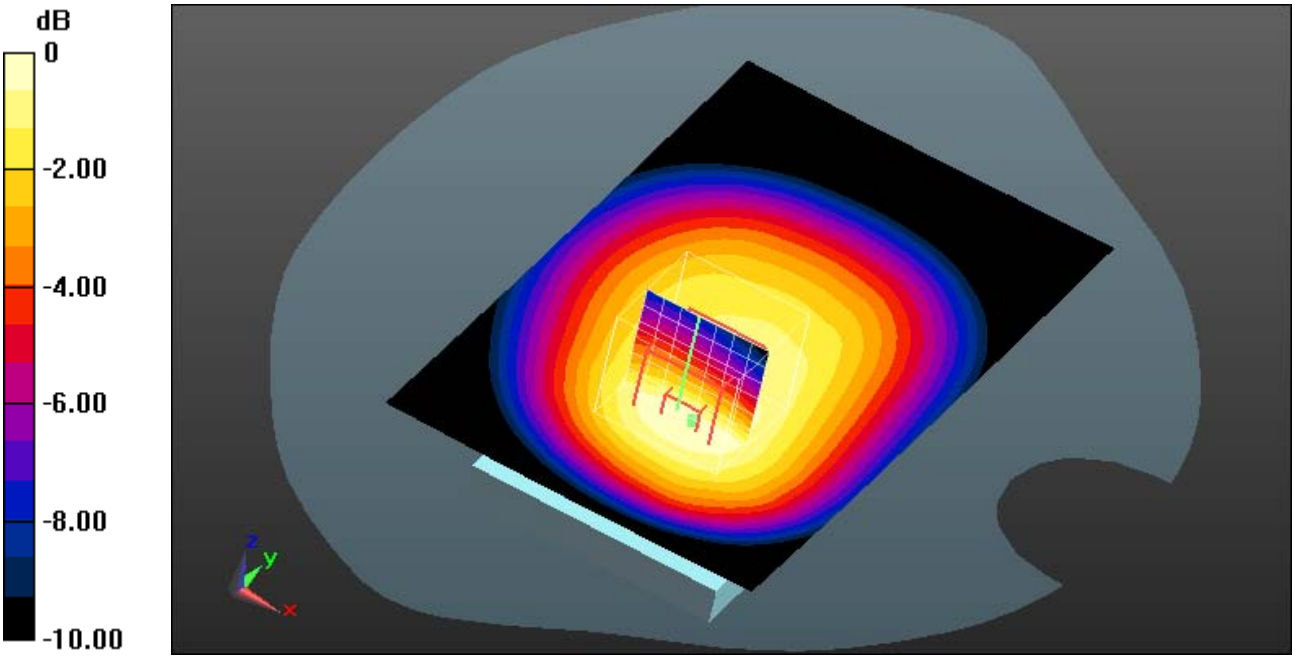
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, PCS 850 GPRS 3TS (0); Communication System Band: GSM850;
Frequency: 848.8 MHz; Communication System PAR: 4.314 dB; PMF: 1.64324
Medium parameters used: f = 848.8 MHz; σ = 0.99 S/m; ε_r = 55.9; ρ = 1000 kg/m^3
Phantom section: Flat 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)

Body MSL/Rear Position - Hi 15mm/Area Scan (71x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.802 W/kg

Body MSL/Rear Position - Hi 15mm/Zoom Scan (8x8x7)/Cube 0: Measurement

grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.320 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.754 W/kg; SAR(10 g) = 0.544 W/kg
Maximum value of SAR (measured) = 0.799 W/kg



0 dB = 0.799 W/kg = -0.97 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.0°C; liquid temperature: 21.1°C

Annex B.2: GSM 1900

Date/Time: 26.06.2013 14:56:15

IEEE1528 - GSM1900 head 2TS

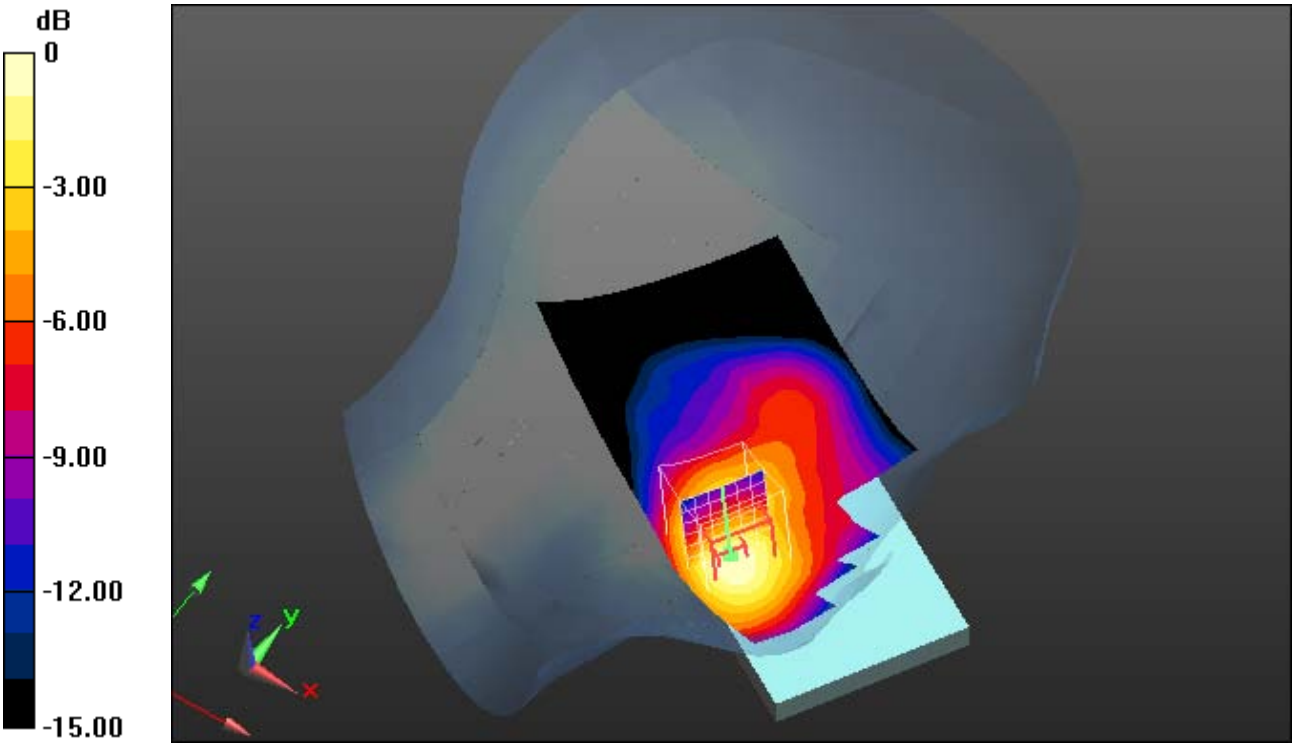
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, GSM 1900 GPRS 2TS (0); Communication System Band: GSM1900;
Frequency: 1850.2 MHz; Communication System PAR: 6.021 dB; PMF: 2.00009
Medium parameters used: f = 1850.2 MHz; σ = 1.33 S/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: 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 (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.844 W/kg

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.609 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.730 W/kg; SAR(10 g) = 0.450 W/kg
Maximum value of SAR (measured) = 0.798 W/kg



0 dB = 0.798 W/kg = -0.98 dBW/kg

Additional information:
ambient temperature: 23.6°C; liquid temperature: 22.6°C

Date/Time: 03.07.2013 11:18:16

OET65-GSM 1900 mobile hotspot 4TS

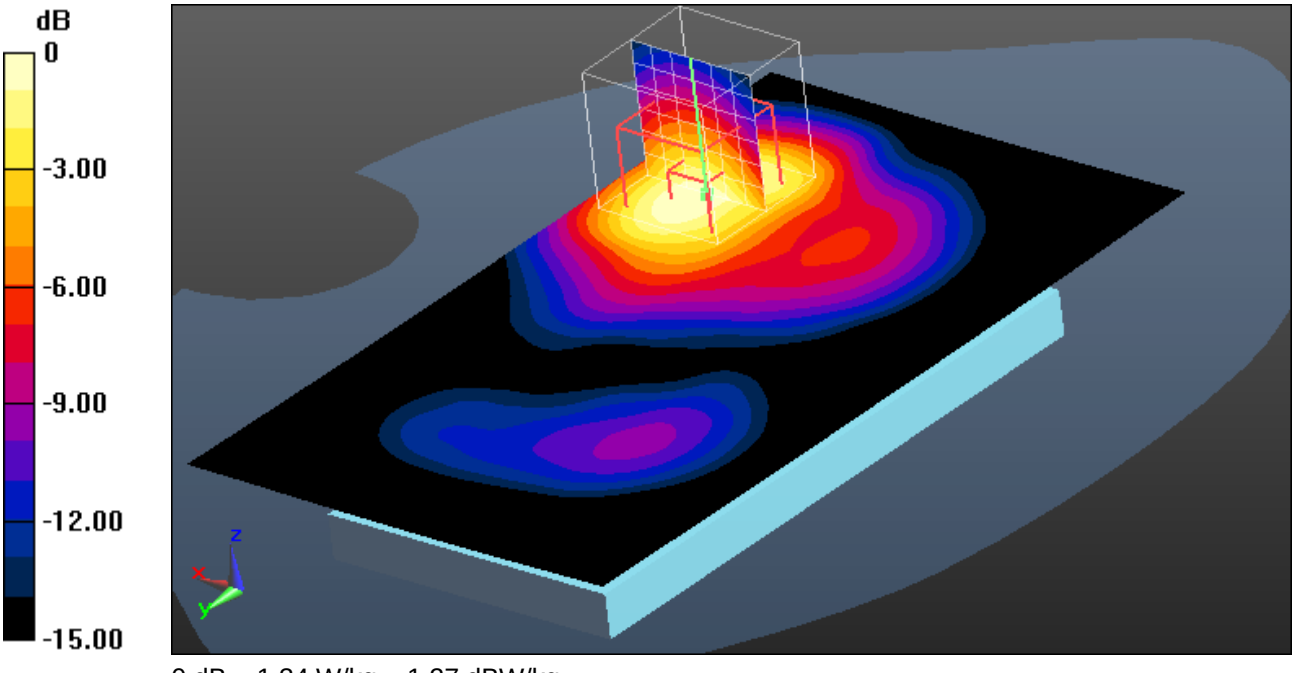
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, PCS 1900 GPRS 4TS (0); Communication System Band: GSM1900;
Frequency: 1880 MHz; Communication System PAR: 3.01 dB; PMF: 1.41416
Medium parameters used: f = 1880 MHz; σ = 1.48 S/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.78, 4.78, 4.78); 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/Rear Position - Mid/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.38 W/kg

Body MSL/Rear Position - Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.673 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.94 W/kg
SAR(1 g) = 1.21 W/kg; SAR(10 g) = 0.700 W/kg
Maximum value of SAR (measured) = 1.34 W/kg



0 dB = 1.34 W/kg = 1.27 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.4°C; liquid temperature: 22.9°C

Date/Time: 03.07.2013 09:43:50

OET65-GSM 1900 body worn 4TS

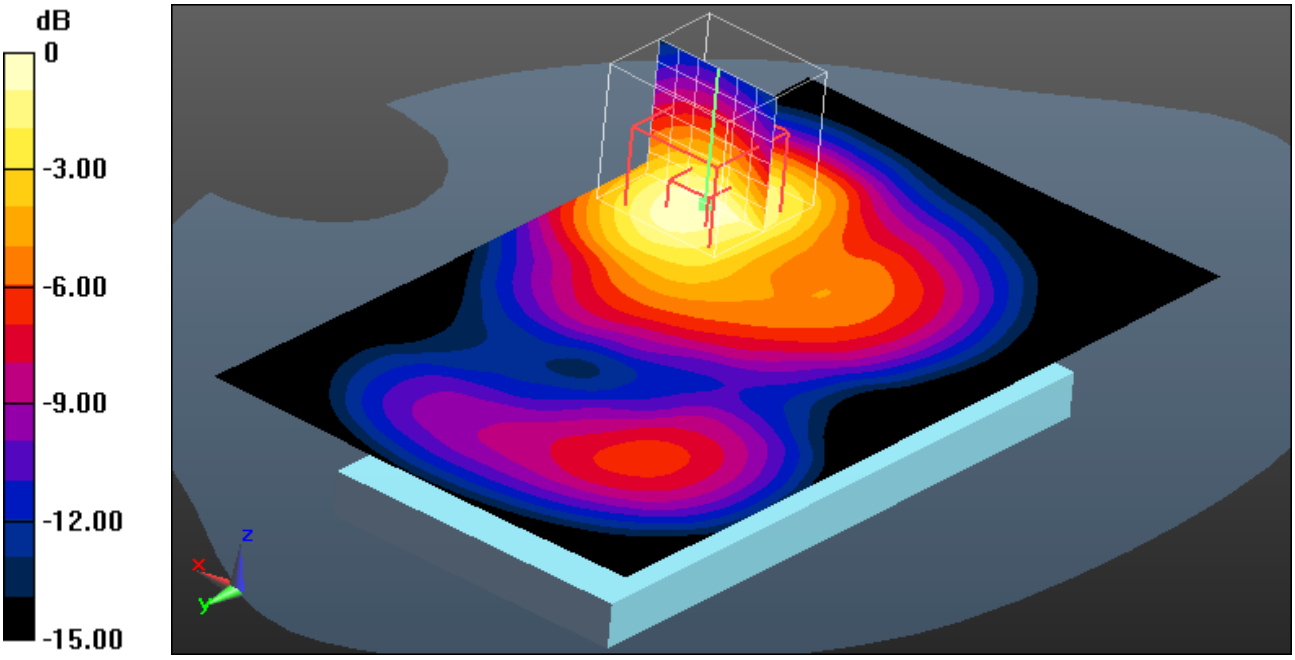
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, PCS 1900 GPRS 4TS (0); Communication System Band: GSM1900;
Frequency: 1880 MHz; Communication System PAR: 3.01 dB; PMF: 1.41416
Medium parameters used: f = 1880 MHz; σ = 1.48 S/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.78, 4.78, 4.78); 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/Rear Position - Mid 15mm/Area Scan (71x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.630 W/kg

Body MSL/Rear Position - Mid 15mm/Zoom Scan (7x7x7)/Cube 0: Measurement

grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.857 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.867 W/kg
SAR(1 g) = 0.560 W/kg; SAR(10 g) = 0.336 W/kg
Maximum value of SAR (measured) = 0.614 W/kg



0 dB = 0.614 W/kg = -2.12 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.4°C; liquid temperature: 22.9°C

Annex B.3: UMTS FDD II

Date/Time: 26.06.2013 11:17:06

IEEE1528 - UMTS FDD II head

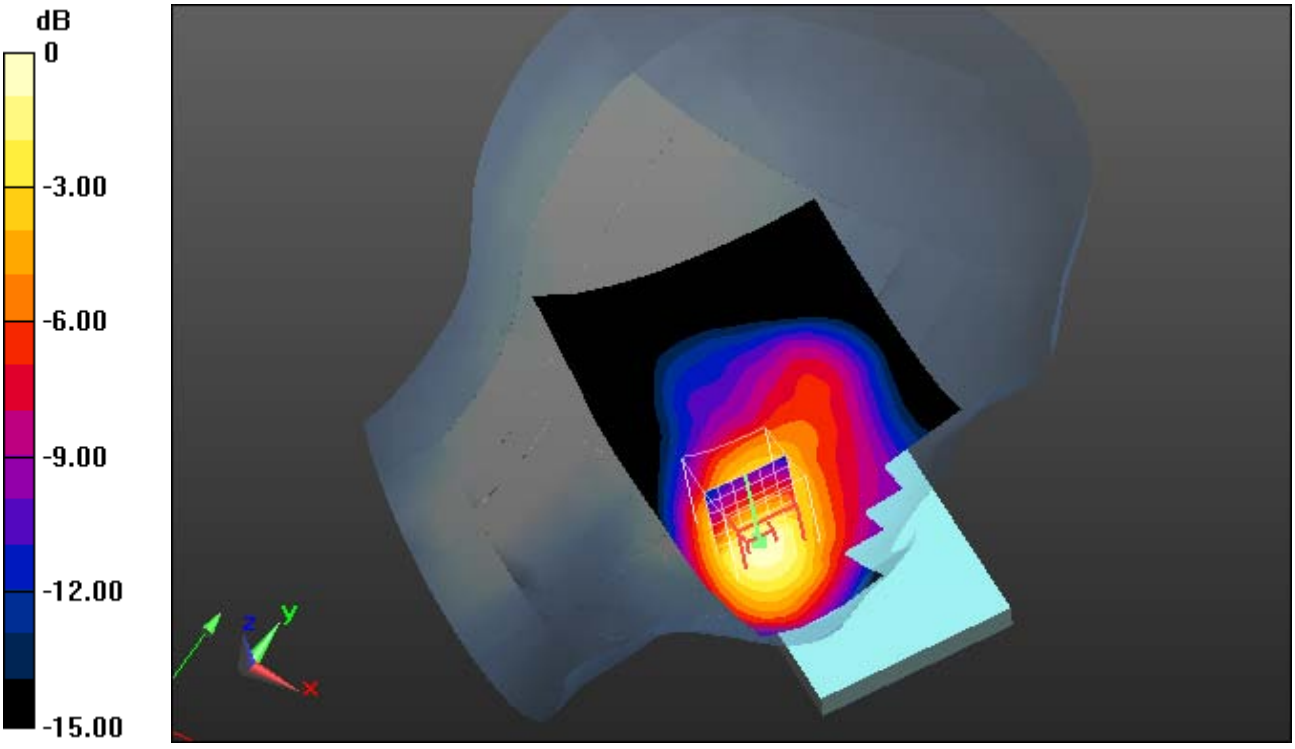
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, WCDMA FDD II (0); Communication System Band: WCDMA FDD II; Frequency: 1852.5 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 1852.5 MHz; σ = 1.332 S/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(5.06, 5.06, 5.06); Calibrated: 04.06.2013;
- 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)

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) = 0.954 W/kg

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.692 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.906 W/kg; SAR(10 g) = 0.555 W/kg
Maximum value of SAR (measured) = 0.985 W/kg



0 dB = 0.985 W/kg = -0.07 dBW/kg

Additional information:
ambient temperature: 23.6°C; liquid temperature: 22.6°C

Date/Time: 05.08.2013 16:46:31

OET65-UMTS FDD II body MHS

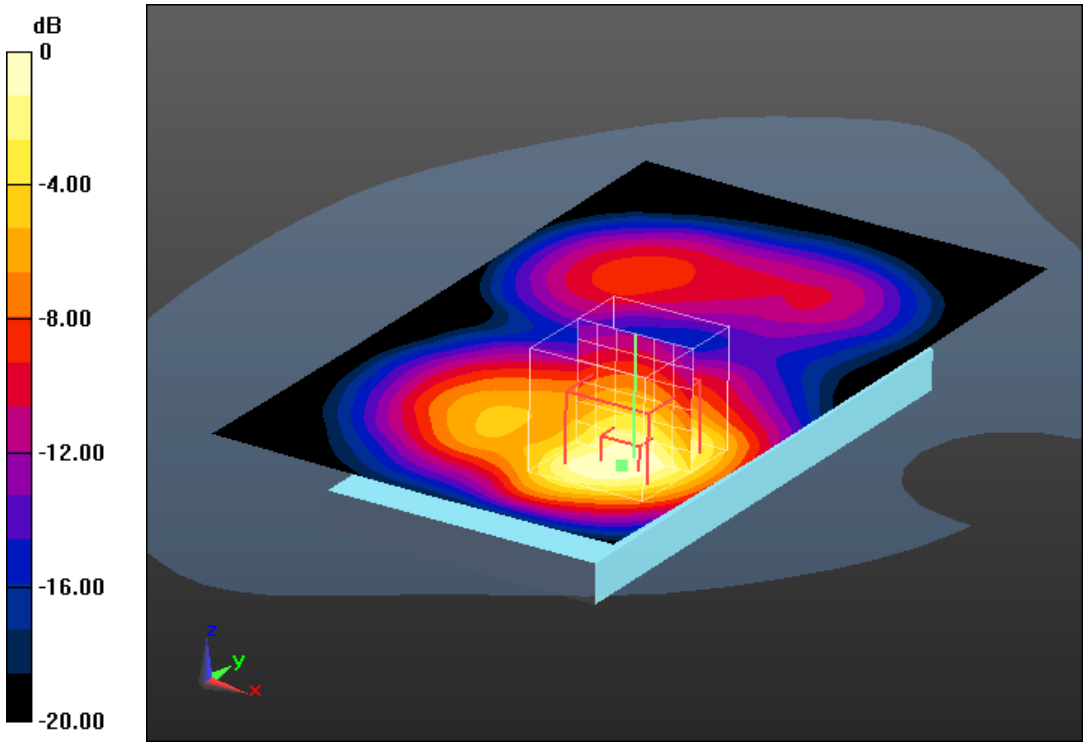
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, WCDMA FDD II (0); Communication System Band: WCDMA FDD II; Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.48 S/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.78, 4.78, 4.78); 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/Rear Position - Mid/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

Body MSL/Rear Position - Mid/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.688 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.622 W/kg
Maximum value of SAR (measured) = 1.19 W/kg



0 dB = 1.19 W/kg = 0.76 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.0°C; liquid temperature: 22.3°C

Date/Time: 03.07.2013 14:48:09

OET65-UMTS FDD II body worn

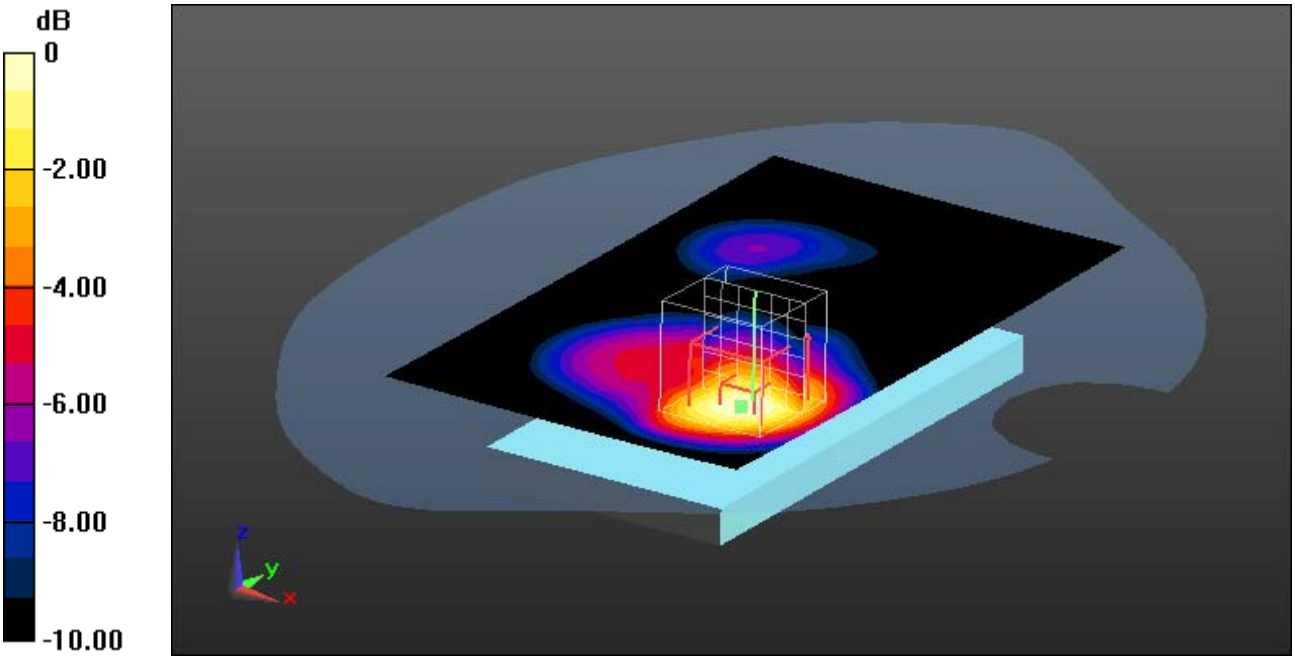
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, WCDMA FDD II (0); Communication System Band: WCDMA FDD II; Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.48 S/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(4.78, 4.78, 4.78); 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)

Body MSL/Rear Position - Mid 15mm/Area Scan (71x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.794 W/kg

Body MSL/Rear Position - Mid 15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.141 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.729 W/kg; SAR(10 g) = 0.434 W/kg
Maximum value of SAR (measured) = 0.795 W/kg



0 dB = 0.795 W/kg = -1.00 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.8°C; liquid temperature: 22.3°C

Annex B.4: UMTS FDD V

Date/Time: 27.06.2013 16:26:04

IEEE1528- head-UMTS FDD V

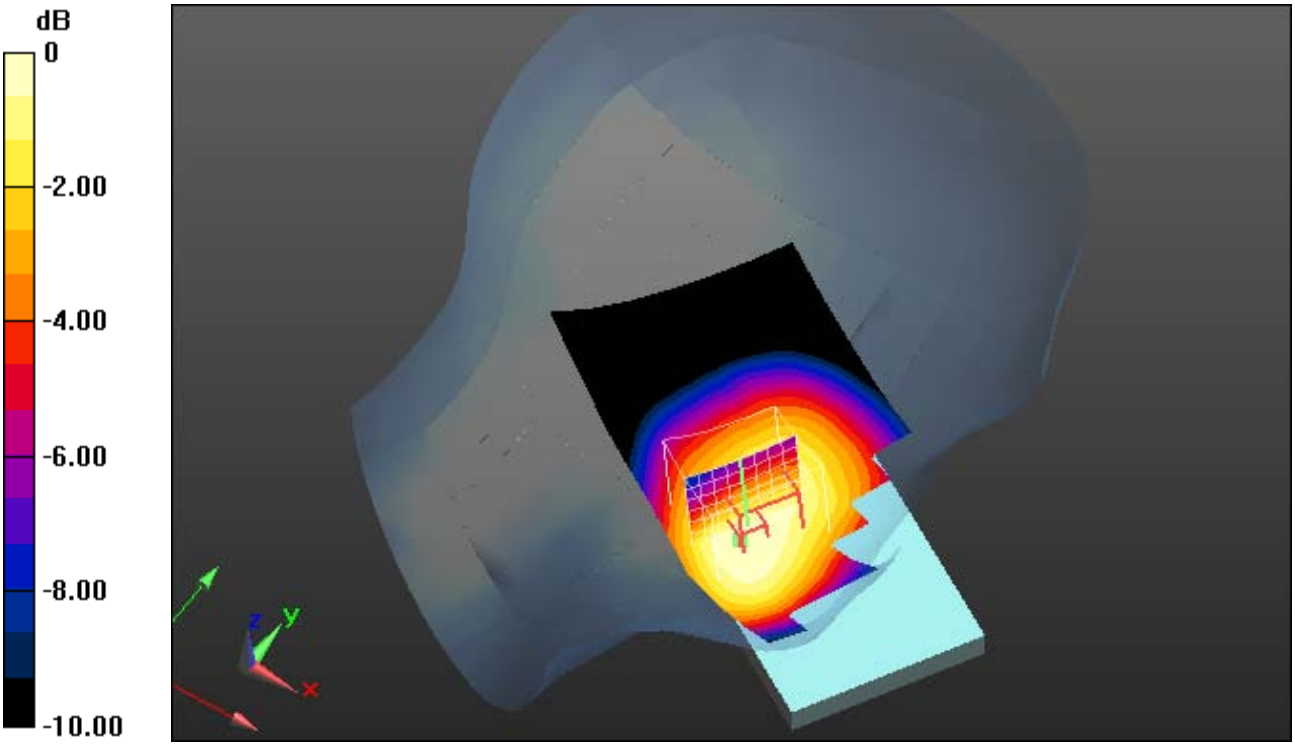
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, WCDMA FDD V (0); Communication System Band: FDD V; Frequency: 836.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 836.6 MHz; σ = 0.9 S/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement 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 - Middle/Area Scan (61x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.355 W/kg

Left-Hand-Side HSL/Touch Position - Middle/Zoom Scan (9x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.632 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.433 W/kg
SAR(1 g) = 0.327 W/kg; SAR(10 g) = 0.245 W/kg
Maximum value of SAR (measured) = 0.345 W/kg



0 dB = 0.345 W/kg = -4.62 dBW/kg

Additional information:
ambient temperature: 21.9°C; liquid temperature: 21.2°C

Date/Time: 27.06.2013 18:23:58

IEEE1528- head-UMTS FDD V

DUT: BlackBerry; Type: RFX101LW; Serial: #1

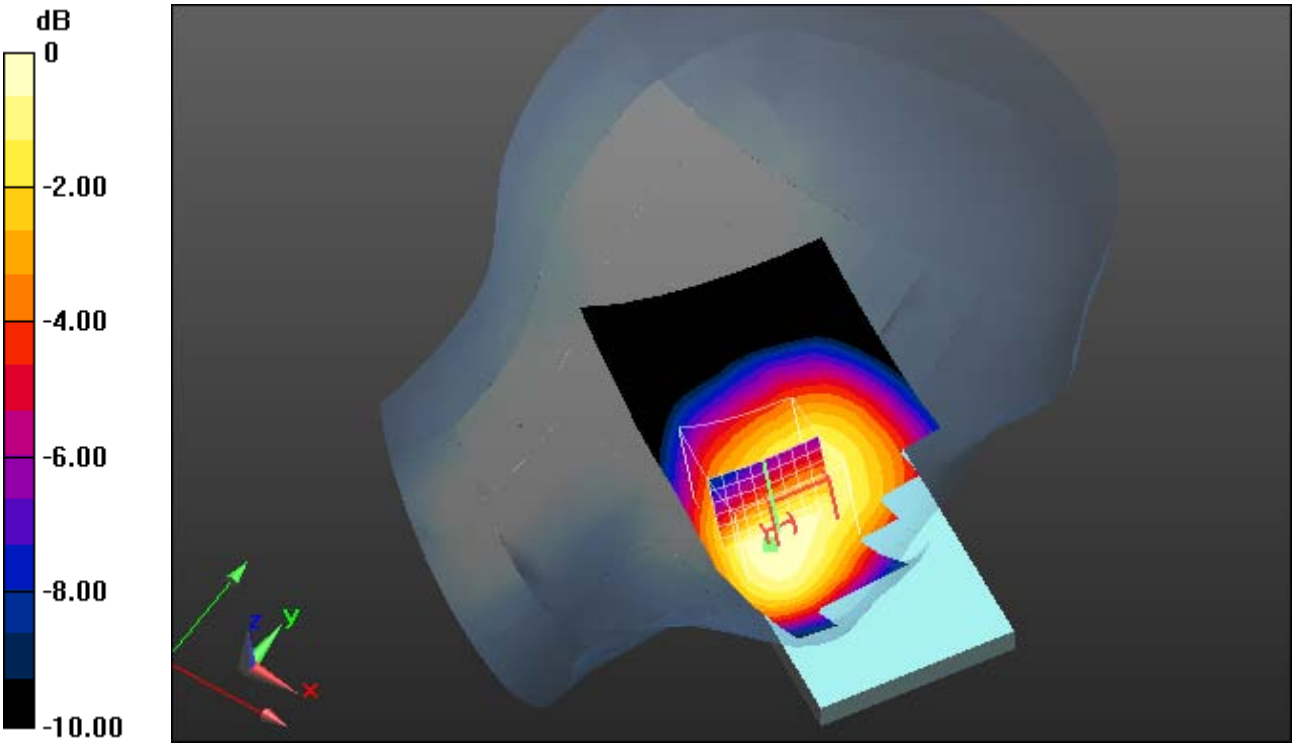
Communication System: UID 0, WCDMA FDD V (0); Communication System Band: FDD V; Frequency: 846.6 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.908 S/m; ε_r = 41.236; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 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) = 0.315 W/kg

Left-Hand-Side HSL/Touch Position - Hi/Zoom Scan (9x9x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.577 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.400 W/kg
SAR(1 g) = 0.297 W/kg; SAR(10 g) = 0.222 W/kg
Maximum value of SAR (measured) = 0.312 W/kg



0 dB = 0.312 W/kg = -5.06 dBW/kg

Additional information:
ambient temperature: 21.9°C; liquid temperature: 21.2°C

Date/Time: 05.07.2013 19:21:38

OET65-UMTS FDD V mobile hotspot

DUT: BlackBerry; Type: RFX101LW; Serial: #1

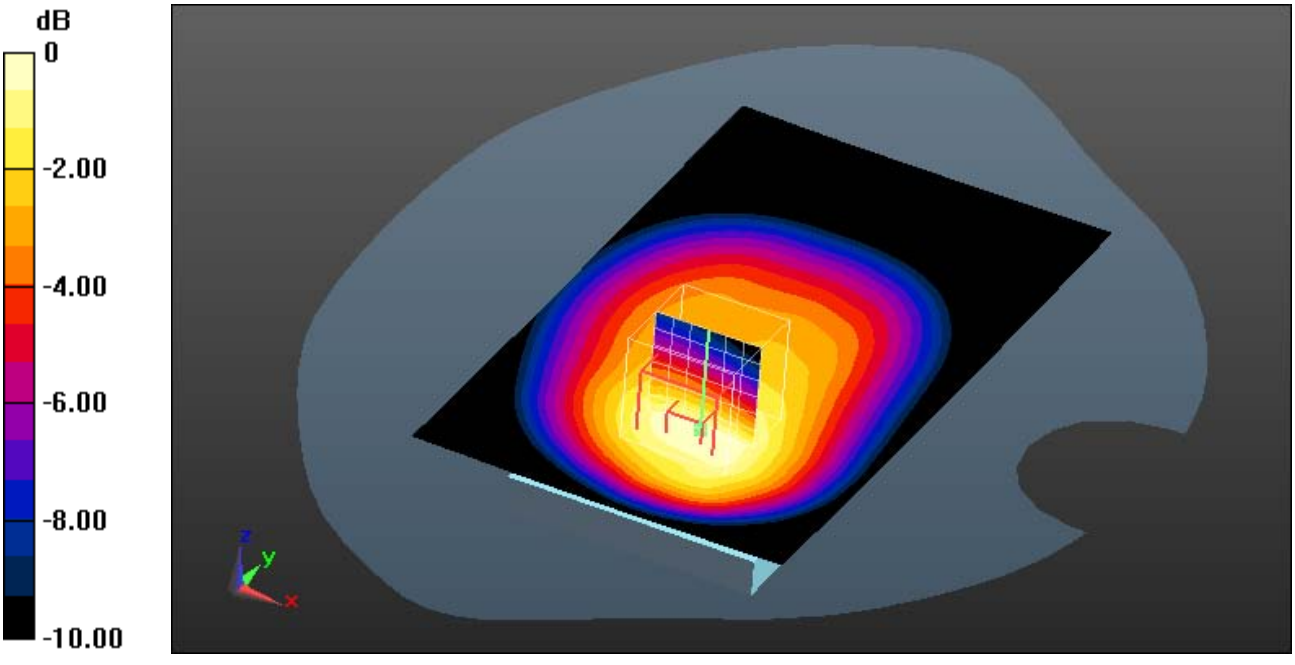
Communication System: UID 0, WCDMA FDD V (0); Communication System Band: FDD V; Frequency: 846.6 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.988 S/m; ε_r = 55.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 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)

Body MSL/Rear Position - Hi/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

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

Body MSL/Rear Position - Hi/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.625 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.919 W/kg
SAR(1 g) = 0.644 W/kg; SAR(10 g) = 0.442 W/kg
Maximum value of SAR (measured) = 0.688 W/kg



0 dB = 0.688 W/kg = -1.62 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 22.5°C; liquid temperature: 22.2°C

Date/Time: 05.07.2013 15:46:01

OET65-UMTS FDD V body worn

DUT: BlackBerry; Type: RFX101LW; Serial: #1

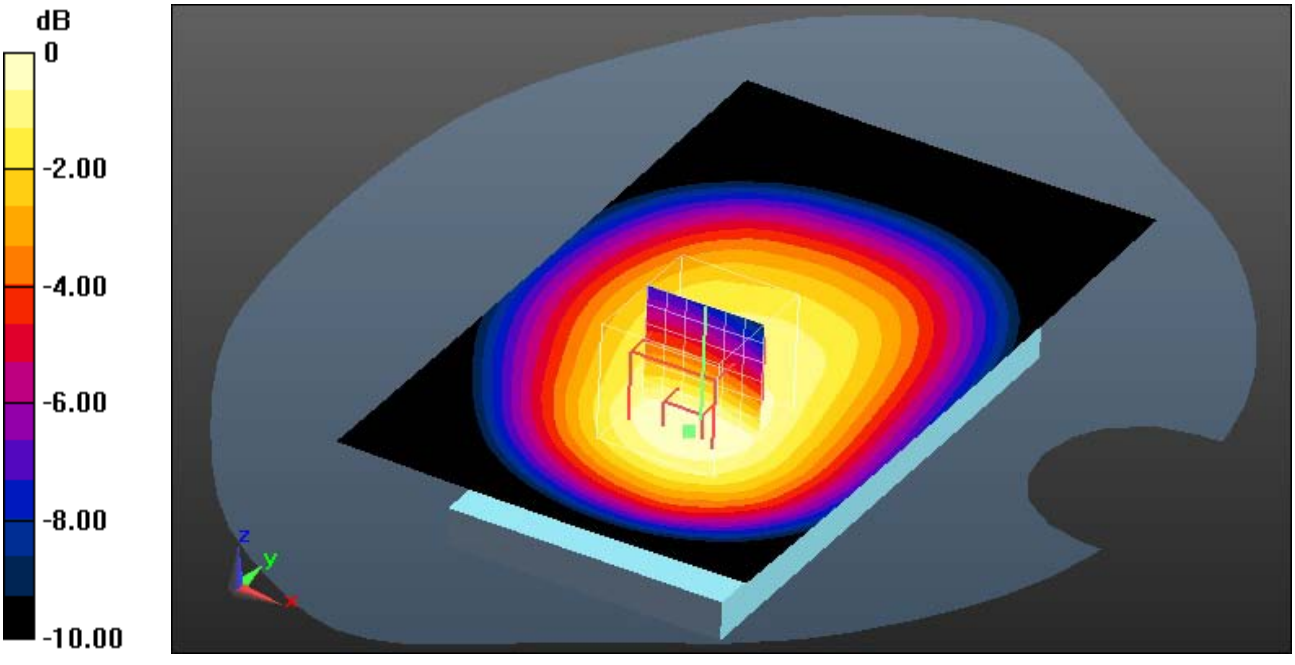
Communication System: UID 0, WCDMA FDD V (0); Communication System Band: FDD V; Frequency: 836.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 836.6 MHz; σ = 0.98 S/m; ε_r = 55.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- 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)

Body MSL/Rear Position - Mid 15mm/Area Scan (71x121x1): Interpolated grid:

dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.453 W/kg

Body MSL/Rear Position - Mid 15mm/Zoom Scan (7x8x7)/Cube 0: Measurement grid:

dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.321 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.571 W/kg
SAR(1 g) = 0.426 W/kg; SAR(10 g) = 0.310 W/kg
Maximum value of SAR (measured) = 0.449 W/kg



0 dB = 0.449 W/kg = -3.48 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.5°C; liquid temperature: 22.2°C

Date/Time: 05.07.2013 16:21:37

OET65-UMTS FDD V body

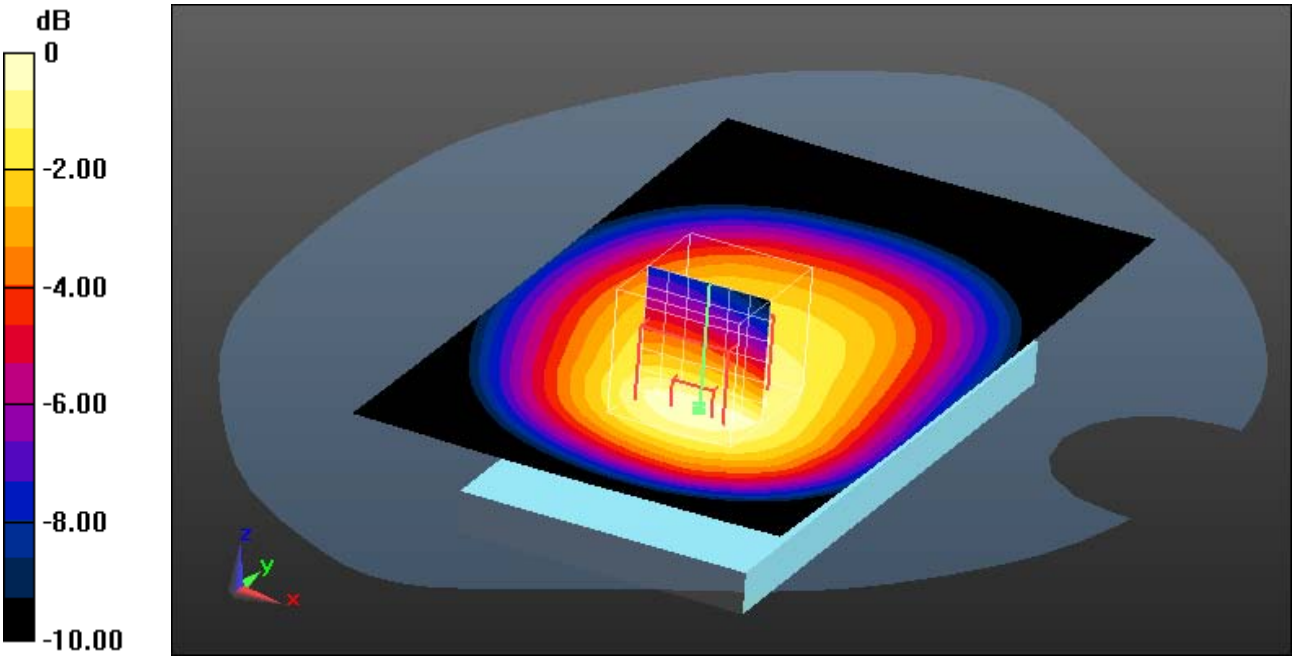
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, WCDMA FDD V (0); Communication System Band: FDD V; Frequency: 846.6 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.988 S/m; ε_r = 55.9; ρ = 1000 kg/m^3
Phantom section: Flat 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)

Body MSL/Rear Position - Hi 15mm/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.436 W/kg

Body MSL/Rear Position - Hi 15mm/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.902 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.566 W/kg
SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.301 W/kg
Maximum value of SAR (measured) = 0.444 W/kg



0 dB = 0.444 W/kg = -3.53 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.5°C; liquid temperature: 22.2°C

Annex B.5: CDMA BC0 835

Date/Time: 18.07.2013 09:25:37

IEEE1528-CDMA BC0 head

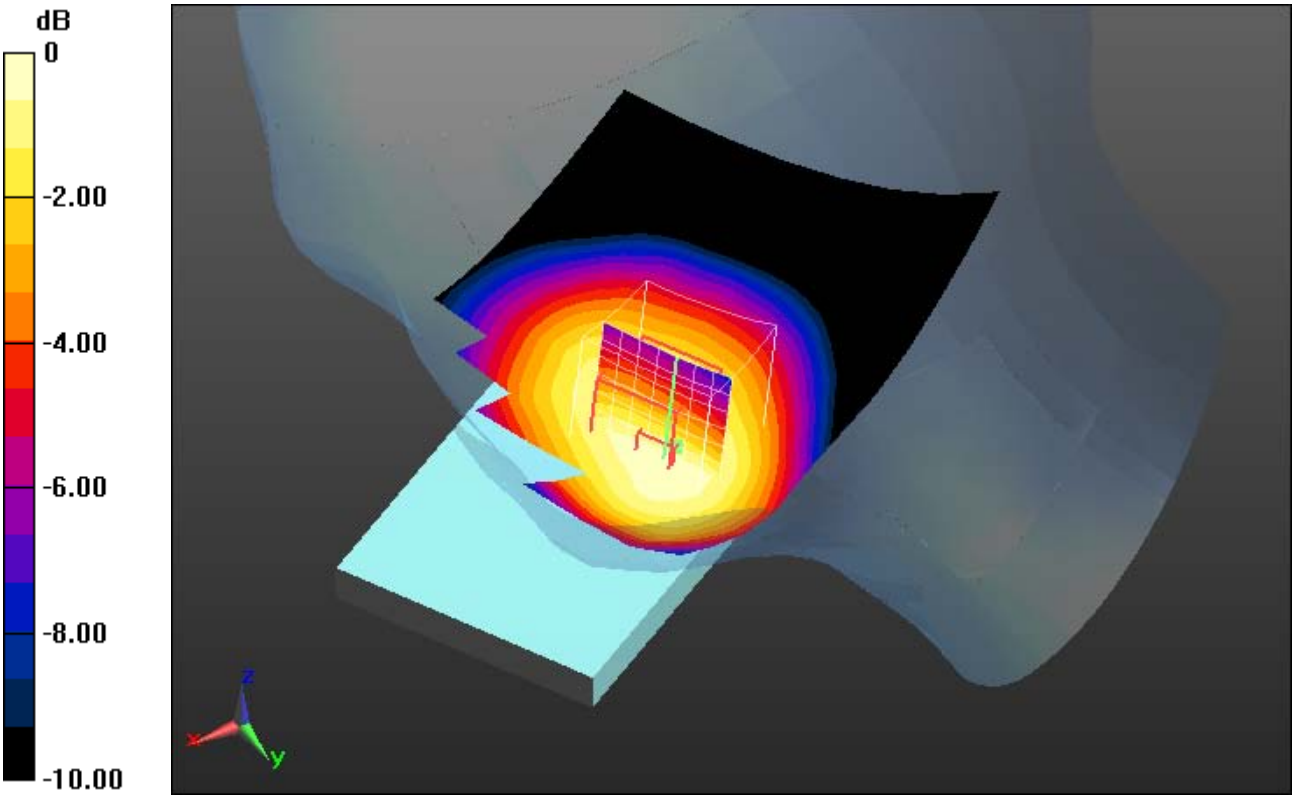
DUT: BlackBerry; Type: RFX101LW; Serial: #46
Communication System: UID 0, CDMA2000 (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.917 S/m; ε_r = 43.186; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(6.99, 6.99, 6.99); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: SEMCAD X 14.6.10(7164)

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

Maximum value of SAR (interpolated) = 0.362 W/kg

Right-Hand-Side HSL/Touch Position - Mid/Zoom Scan (8x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.069 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.437 W/kg
SAR(1 g) = 0.340 W/kg; SAR(10 g) = 0.259 W/kg
Maximum value of SAR (measured) = 0.360 W/kg



0 dB = 0.360 W/kg = -4.44 dBW/kg

Additional information:
ambient temperature: 22.4°C; liquid temperature: 23.9°C

Date/Time: 18.07.2013 10:05:22

IEEE1528-CDMA MC0 head

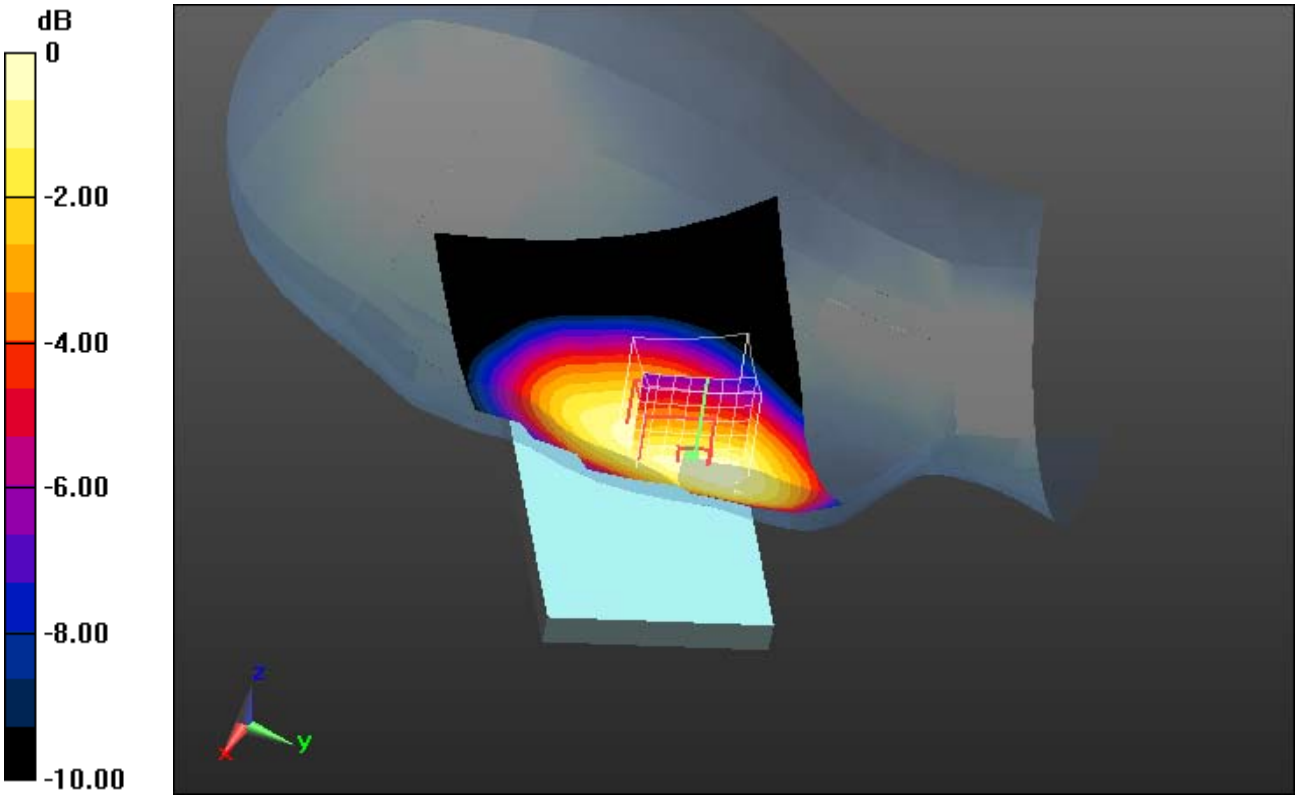
DUT: BlackBerry; Type: RFX101LW; Serial: #46
Communication System: UID 0, CDMA2000 (0); Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.927 S/m; ε_r = 43.041; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(6.99, 6.99, 6.99); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: 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) = 0.361 W/kg

Right-Hand-Side HSL/Touch Position - Hi/Zoom Scan (8x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.026 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.443 W/kg
SAR(1 g) = 0.340 W/kg; SAR(10 g) = 0.259 W/kg
Maximum value of SAR (measured) = 0.360 W/kg



0 dB = 0.360 W/kg = -4.44 dBW/kg

Additional information:
ambient temperature: 22.4°C; liquid temperature: 23.9°C

Date/Time: 19.07.2013 09:52:55

OET65-Mobile hotspot-CDMA BC0

DUT: BlackBerry; Type: RFX101LW; Serial: #46

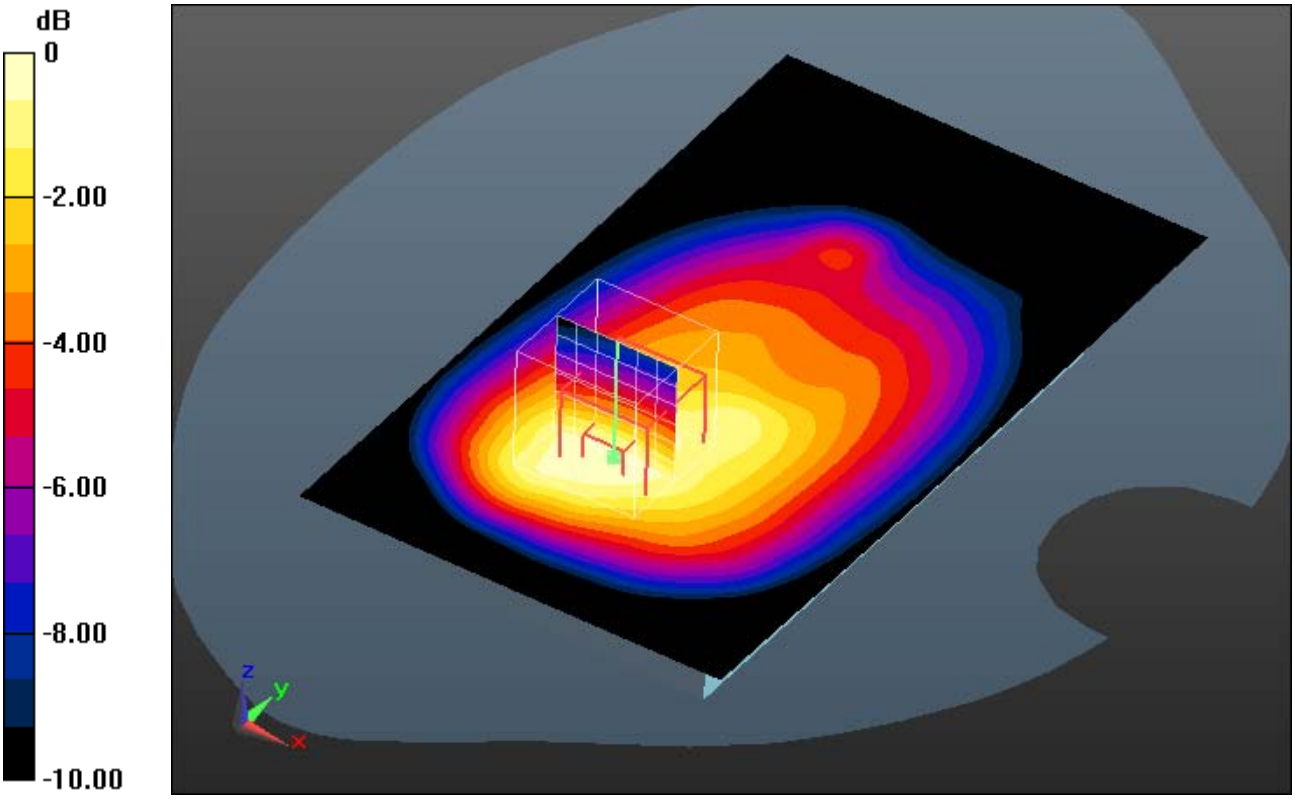
Communication System: UID 0, CDMA2000 (0); Communication System Band: MC0; Frequency: 824.7 MHz; Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used: f = 825 MHz; σ = 0.982 S/m; ε_r = 55.451; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(6.89, 6.89, 6.89); Calibrated: 16.05.2013;
- 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)

MSL900 10mm distance/Rear position - Low/Area Scan (71x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.674 W/kg

MSL900 10mm distance/Rear position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.566 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.834 W/kg
SAR(1 g) = 0.631 W/kg; SAR(10 g) = 0.439 W/kg
Maximum value of SAR (measured) = 0.672 W/kg



0 dB = 0.672 W/kg = -1.73 dBW/kg

Additional information:
position or distance of DUT to SAM : 10mm
ambient temperature: 23.2°C; liquid temperature: 22.8°C

Date/Time: 19.07.2013 08:15:44

OET65-Body worn-CDMA BC0

DUT: BlackBerry; Type: RFX101LW; Serial: #46

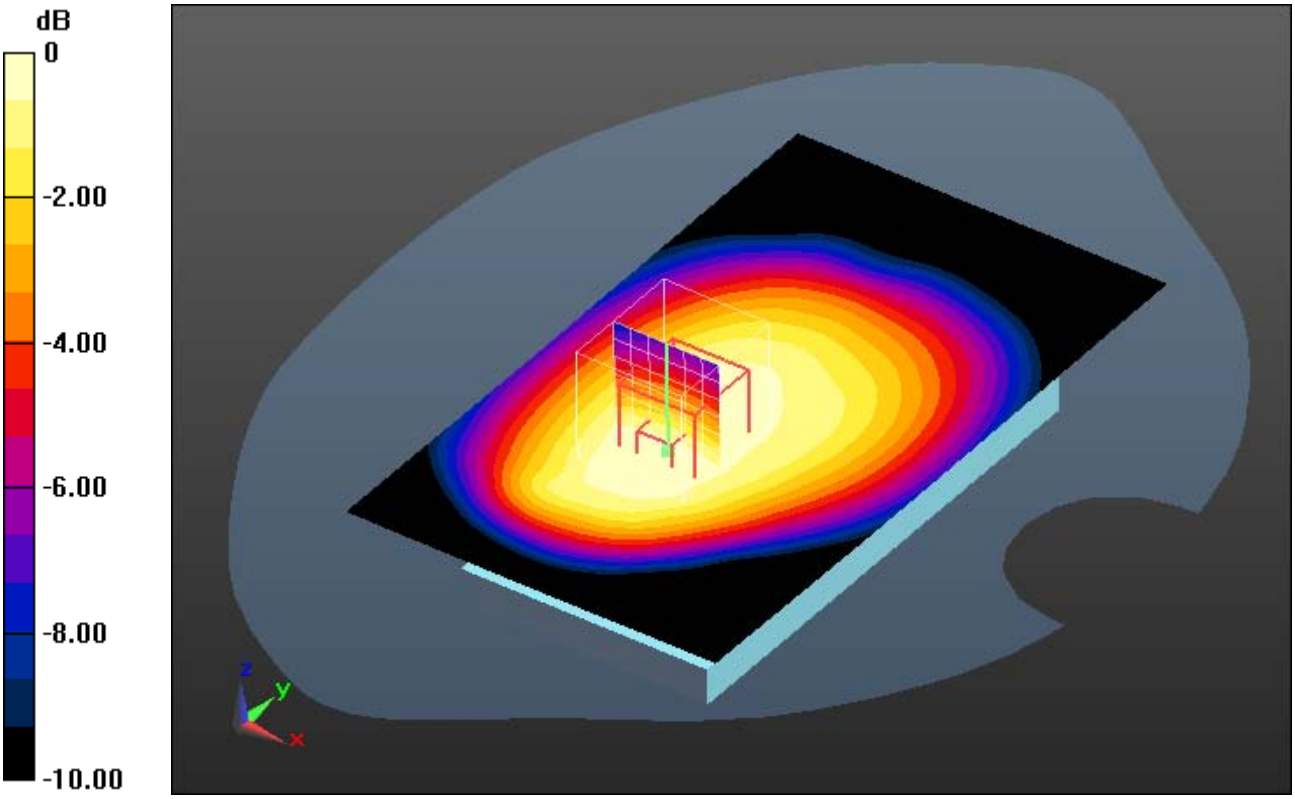
Communication System: UID 0, CDMA2000 (0); Communication System Band: MC0; Frequency: 836.6 MHz; Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used: f = 837 MHz; σ = 0.997 S/m; ε_r = 55.315; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(6.89, 6.89, 6.89); Calibrated: 16.05.2013;
- 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)

MSL900 15mm distance/Rear position - Middle/Area Scan (71x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.485 W/kg

MSL900 15mm distance/Rear position - Middle/Zoom Scan (7x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.702 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.580 W/kg
SAR(1 g) = 0.459 W/kg; SAR(10 g) = 0.350 W/kg
Maximum value of SAR (measured) = 0.483 W/kg



0 dB = 0.483 W/kg = -3.16 dBW/kg

Additional information:
position or distance of DUT to SAM : 15mm
ambient temperature: 23.2°C; liquid temperature: 22.8°C

Annex B.6: CDMA BC1 1880

Date/Time: 17.07.2013 13:48:00

IEEE1528-CDMA BC1 head

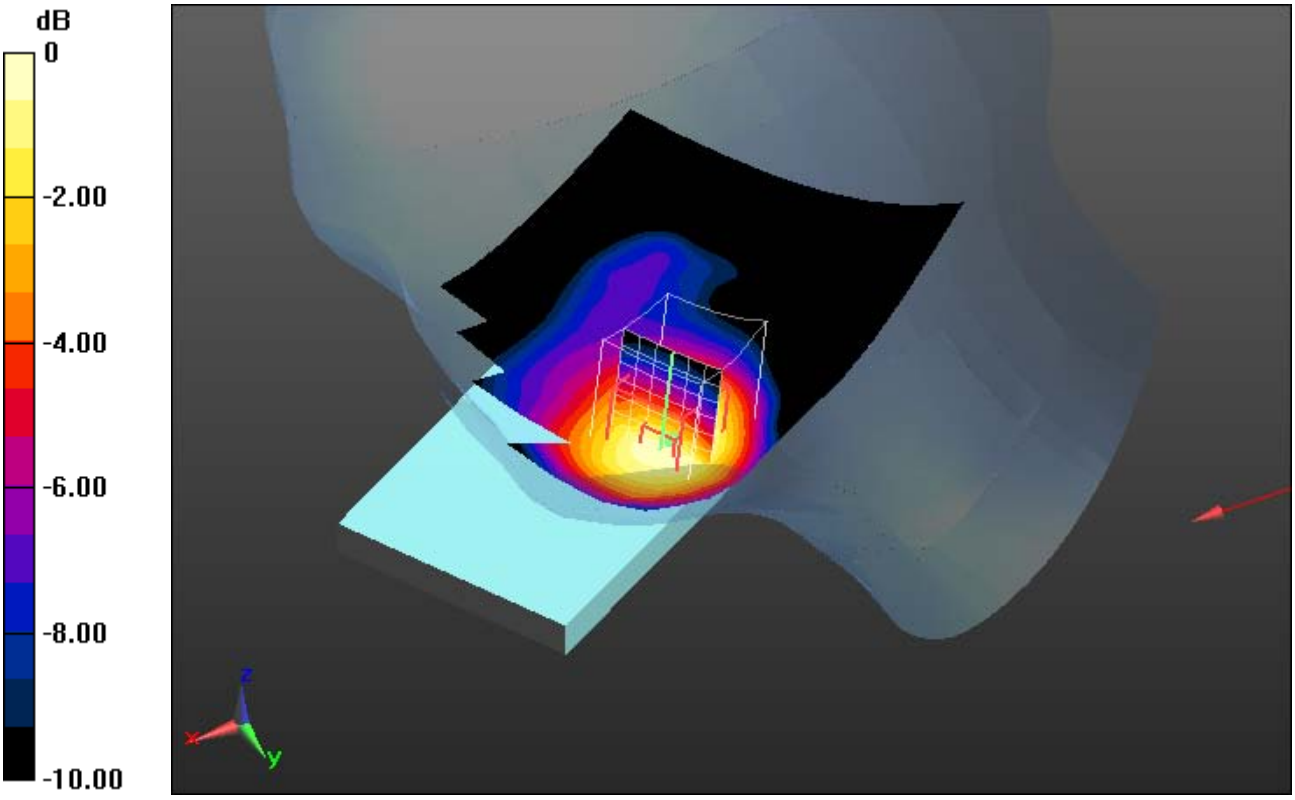
DUT: BlackBerry; Type: RFX101LW; Serial: #46
Communication System: UID 0, CDMA2000 (0); Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.331 S/m; ε_r = 39.693; ρ = 1000 kg/m^3
Phantom section: Right Section
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(5.2, 5.2, 5.2); Calibrated: 16.05.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn477; Calibrated: 13.05.2013
- Phantom: SAM Left; Type: SAM ; Serial: TP 1041
- Measurement SW: DASY52 52.8.7(1137); Postprocessing SW: SEMCAD X 14.6.10(7164)

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

Maximum value of SAR (interpolated) = 1.05 W/kg

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.708 V/m; Power Drift = 0.61 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.948 W/kg; SAR(10 g) = 0.620 W/kg
Maximum value of SAR (measured) = 1.02 W/kg



0 dB = 1.02 W/kg = 0.09 dBW/kg

Additional information:
position or distance of DUT to SAM: 0mm
ambient temperature: 22.4°C; liquid temperature: 23.9°C

Date/Time: 18.07.2013 19:03:17

OET65-Mobile hotspot-CDMA BC1

DUT: BlackBerry; Type: RFX101LW; Serial: #46

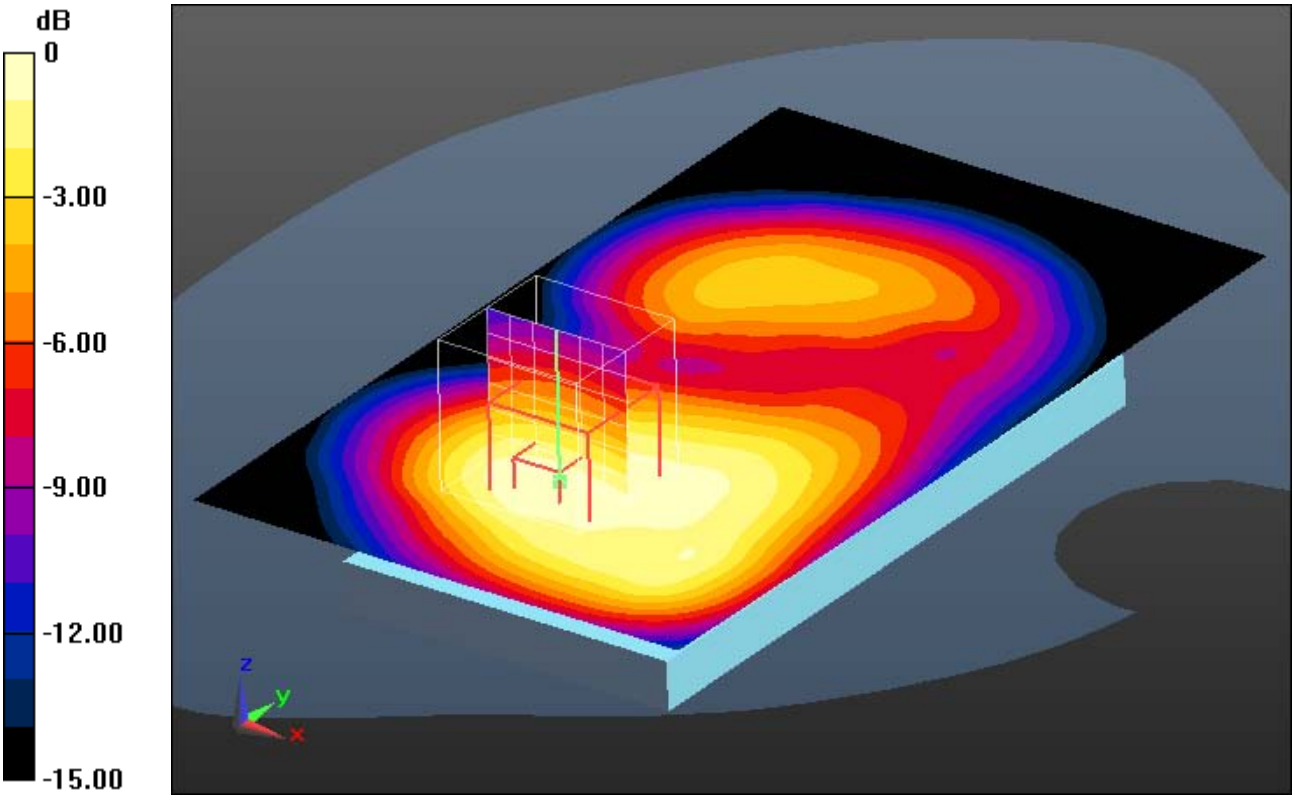
Communication System: UID 0, CDMA2000 (0); Communication System Band: MC1; Frequency: 1851.25 MHz; Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.451 S/m; ε_r = 51.996; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(4.64, 4.64, 4.64); Calibrated: 16.05.2013;
- 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)

MSL1900 10mm distance/Front position - Low/Area Scan (71x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.999 W/kg

MSL1900 10mm distance/Front position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.854 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.929 W/kg; SAR(10 g) = 0.633 W/kg
Maximum value of SAR (measured) = 0.993 W/kg



0 dB = 0.993 W/kg = -0.03 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 22.7°C; liquid temperature: 22.3°C

Date/Time: 18.07.2013 15:46:28

OET65-Body worn-CDMA BC1

DUT: BlackBerry; Type: RFX101LW; Serial: #46

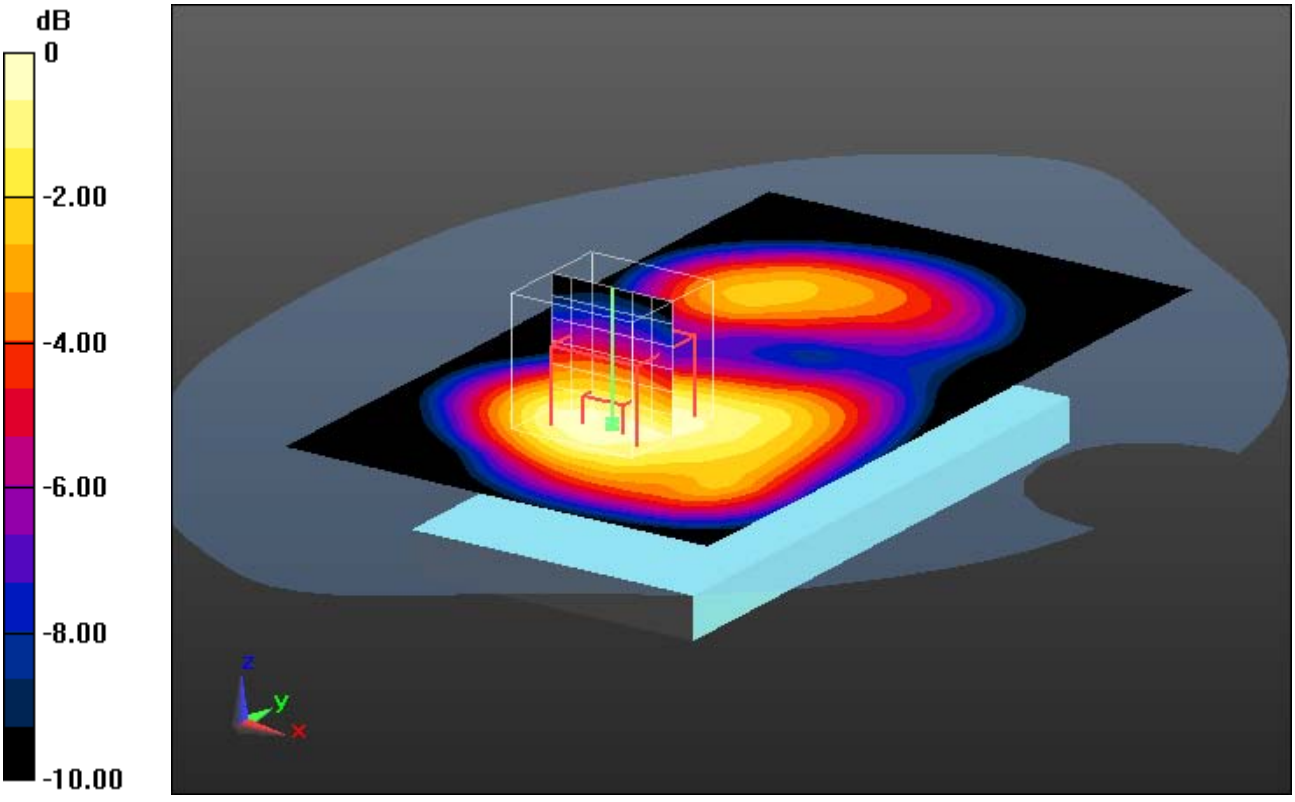
Communication System: UID 0, CDMA2000 (0); Communication System Band: MC1; Frequency: 1851.25 MHz; Communication System PAR: 0 dB; PMF: 1.12202e-005
Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.451 S/m; ε_r = 51.996; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1554; ConvF(4.64, 4.64, 4.64); Calibrated: 16.05.2013;
- 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)

MSL1900 15mm distance/Front position - Low/Area Scan (71x121x1):

Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.613 W/kg

MSL1900 15mm distance/Front position - Low/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.720 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.748 W/kg
SAR(1 g) = 0.558 W/kg; SAR(10 g) = 0.380 W/kg
Maximum value of SAR (measured) = 0.596 W/kg



0 dB = 0.596 W/kg = -2.25 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.7°C; liquid temperature: 22.3°C

Annex B.7: LTE FDD 4 1750MHz

Date/Time: 08.07.2013 16:39:49

IEEE1528_OET65-LeftHandSide-LTE FDD 4 1750

DUT: BlackBerry; Type: RFX101LW; Serial: #1

Communication System: UID 0, LTE FDD 4 (0); Communication System Band: 1750 MHz; Frequency: 1720 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 1720 MHz; σ = 1.378 S/m; ε_r = 40.474; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(5.23, 5.23, 5.23); 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)

1RB allocation - 20MHz Bandwidth/Touch position - Low 1RB/99RB offset/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.14 W/kg

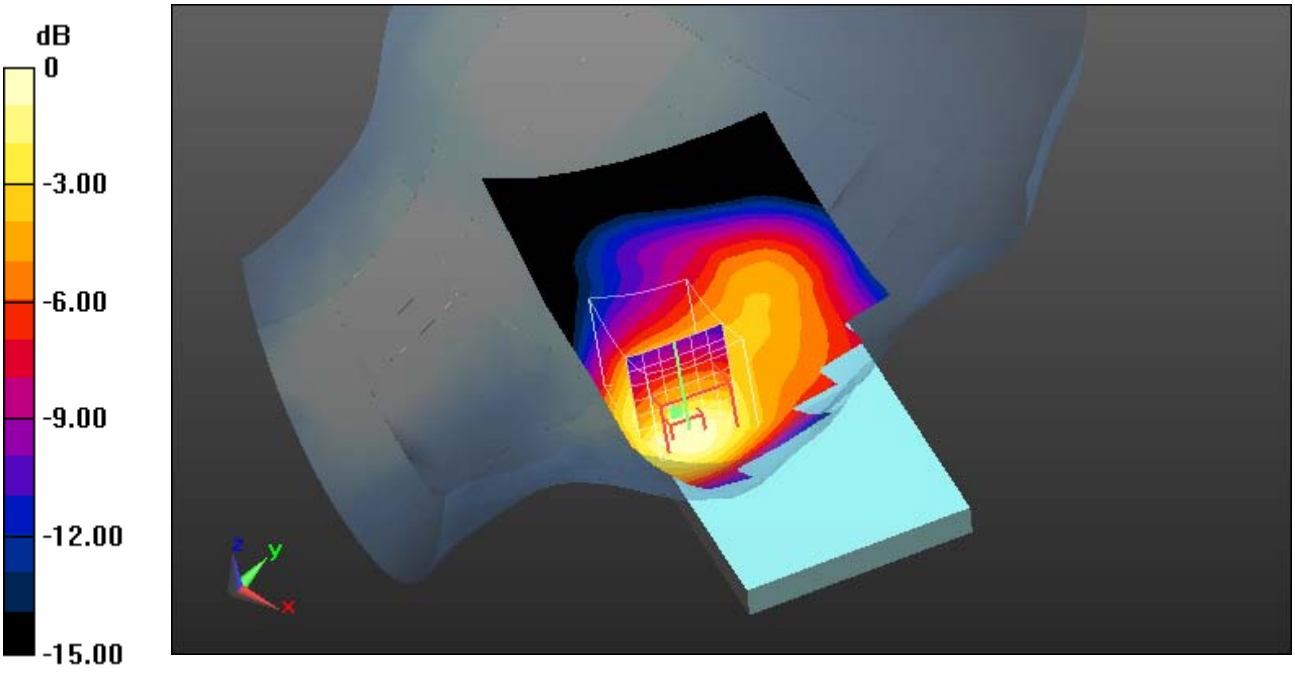
1RB allocation - 20MHz Bandwidth/Touch position - Low 1RB/99RB offset/Zoom Scan (7x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 27.879 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 0.957 W/kg; SAR(10 g) = 0.611 W/kg

Maximum value of SAR (measured) = 1.03 W/kg



0 dB = 1.03 W/kg = 0.13 dBW/kg

Additional information:

ambient temperature: 23.0°C; liquid temperature: 23.3°C

Date/Time: 05.08.2013 14:55:46

OET65-Mobile hotspot-LTE FDD 4 1750 PR

DUT: BlackBerry; Type: RFX101LW; Serial: #1

Communication System: UID 0, LTE FDD 4 (0); Communication System Band: 1750 MHz; Frequency: 1745 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1745 MHz; σ = 1.503 S/m; ε_r = 52.865; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.39, 4.39, 4.39); Calibrated: 24.08.2012;
- 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)

1RB_20MHz BW/Rear position - High 1RB / 50RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.28 W/kg

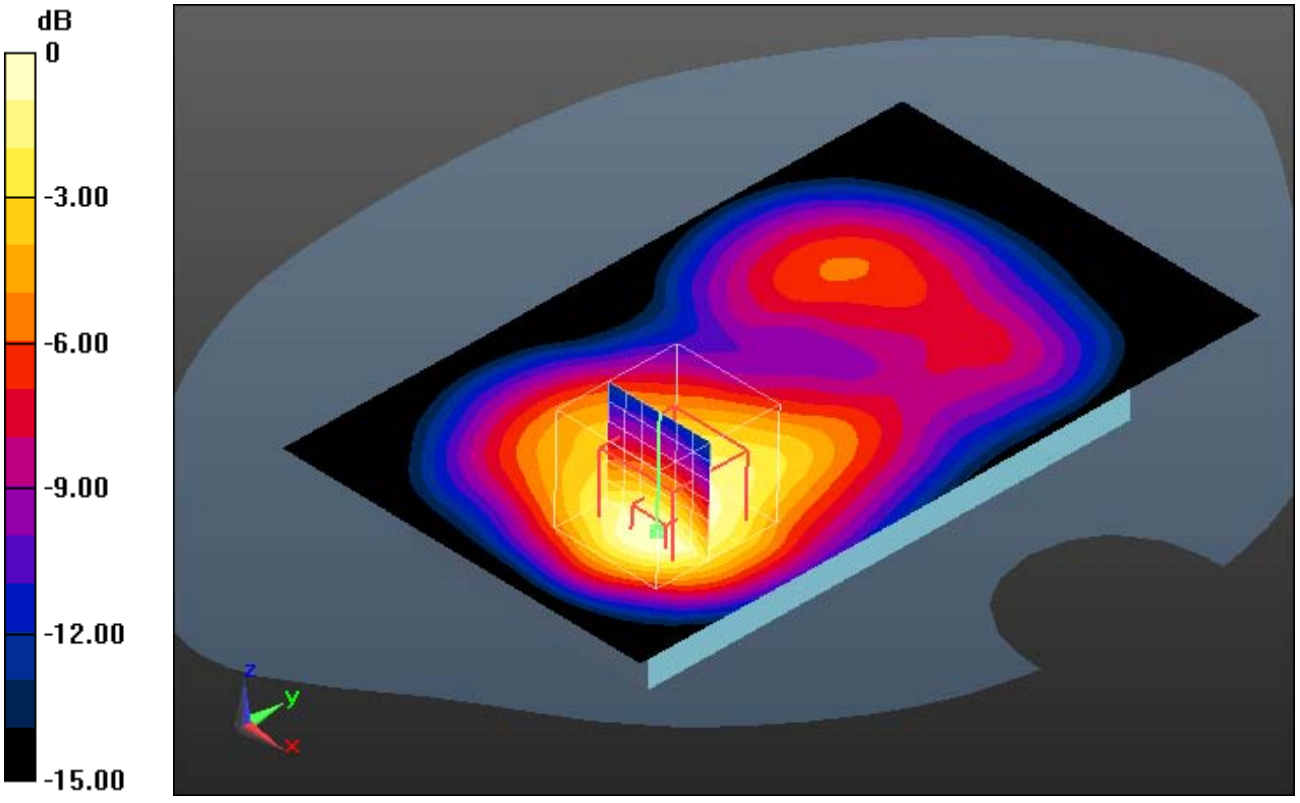
1RB_20MHz BW/Rear position - High 1RB / 50RB offset/Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 28.939 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.636 W/kg

Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.15 W/kg = 0.61 dBW/kg

Additional information:

position or distance of DUT to SAM: 10mm

ambient temperature: 23.9°C; liquid temperature: 23.7°C

Date/Time: 16.07.2013 10:59:13

OET65-Body worn-LTE FDD 4 1750

DUT: BlackBerry; Type: RFX101LW; Serial: #1

Communication System: UID 0, LTE FDD 4 (0); Communication System Band: 1750 MHz; Frequency: 1720 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 1720 MHz; σ = 1.501 S/m; ε_r = 54.674; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1554; ConvF(4.94, 4.94, 4.94); Calibrated: 16.05.2013;
- 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)

1RB_20MHz BW_15mm/Front position - Low 1RB / 99RB offset/Area Scan (71x121x1):

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

Maximum value of SAR (interpolated) = 0.717 W/kg

1RB_20MHz BW_15mm/Front position - Low 1RB / 99RB offset/Zoom Scan (7x7x7)/Cube 0:

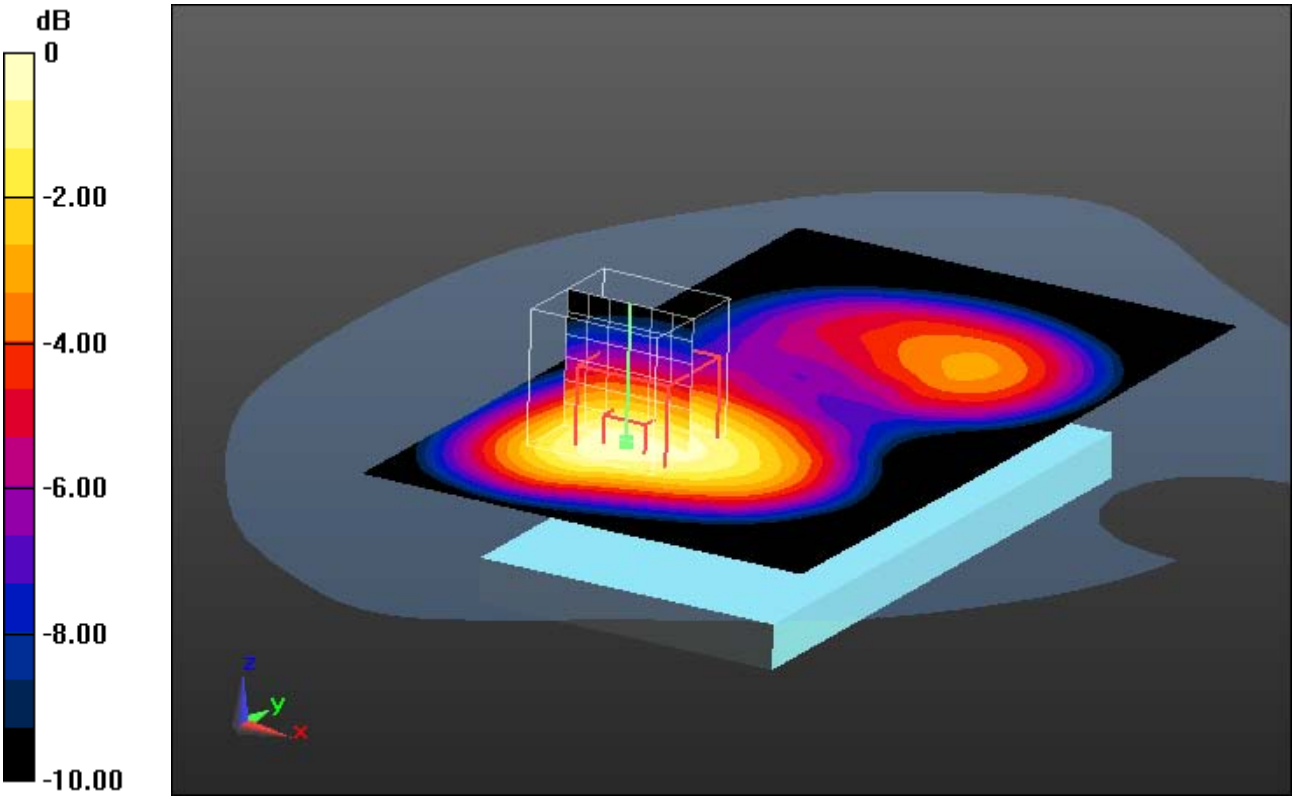
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.014 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.841 W/kg

SAR(1 g) = 0.655 W/kg; SAR(10 g) = 0.443 W/kg

Maximum value of SAR (measured) = 0.707 W/kg



0 dB = 0.707 W/kg = -1.51 dBW/kg

Additional information:

position or distance of DUT to SAM: 15mm

ambient temperature: 23.9°C; liquid temperature: 22.8°C

Annex B.8: LTE FDD 13 700MHz

Date/Time: 19.07.2013 18:48:28

IEEE1528-LeftHandSide-LTE FDD 13 700

DUT: BlackBerry; Type: RFX101LW; Serial: #1

Communication System: UID 10175 - CAB, LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK); Communication System Band: Band 13, E-UTRA/FDD (777.0 - 787.0 MHz); Frequency: 782 MHz; Communication System PAR: 5.72 dB; PMF: 1.13894

Medium parameters used: f = 782 MHz; σ = 0.86 S/m; ε_r = 43.861; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(6.4, 6.4, 6.4); Calibrated: 24.08.2012;
- Modulation Compensation: PMR for UID 10175 - CAB, Calibrated: 24.08.2012
- 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)

1RB allocation - 10MHz Bandwidth/Touch position - Middle 1RB/49RB offset/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.437 W/kg

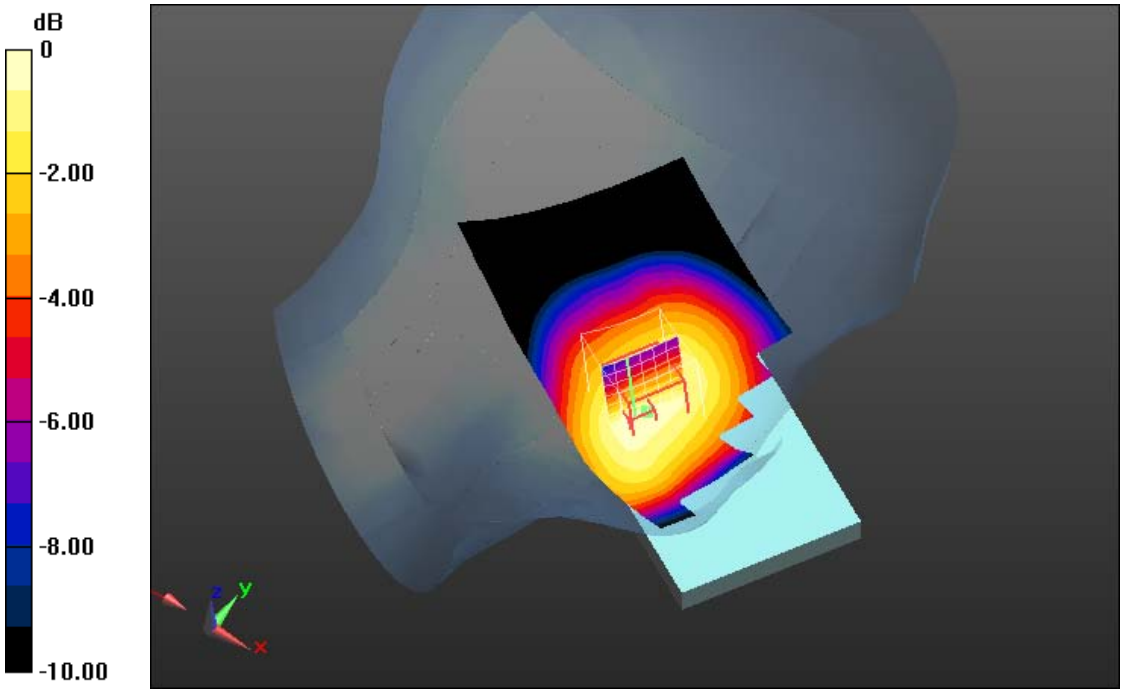
1RB allocation - 10MHz Bandwidth/Touch position - Middle 1RB/49RB offset/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.064 V/m; Power Drift = 0.128 dB

Peak SAR (extrapolated) = 0.564 W/kg

SAR(1 g) = 0.430 W/kg; SAR(10 g) = 0.318 W/kg

Maximum value of SAR (measured) = 0.454 W/kg



0 dB = 0.454 W/kg = -3.43 dBW/kg

Additional information:

ambient temperature: 23.1°C; liquid temperature: 22.8°C

Date/Time: 20.07.2013 12:42:30

OET65-Body-LTE FDD 13 700

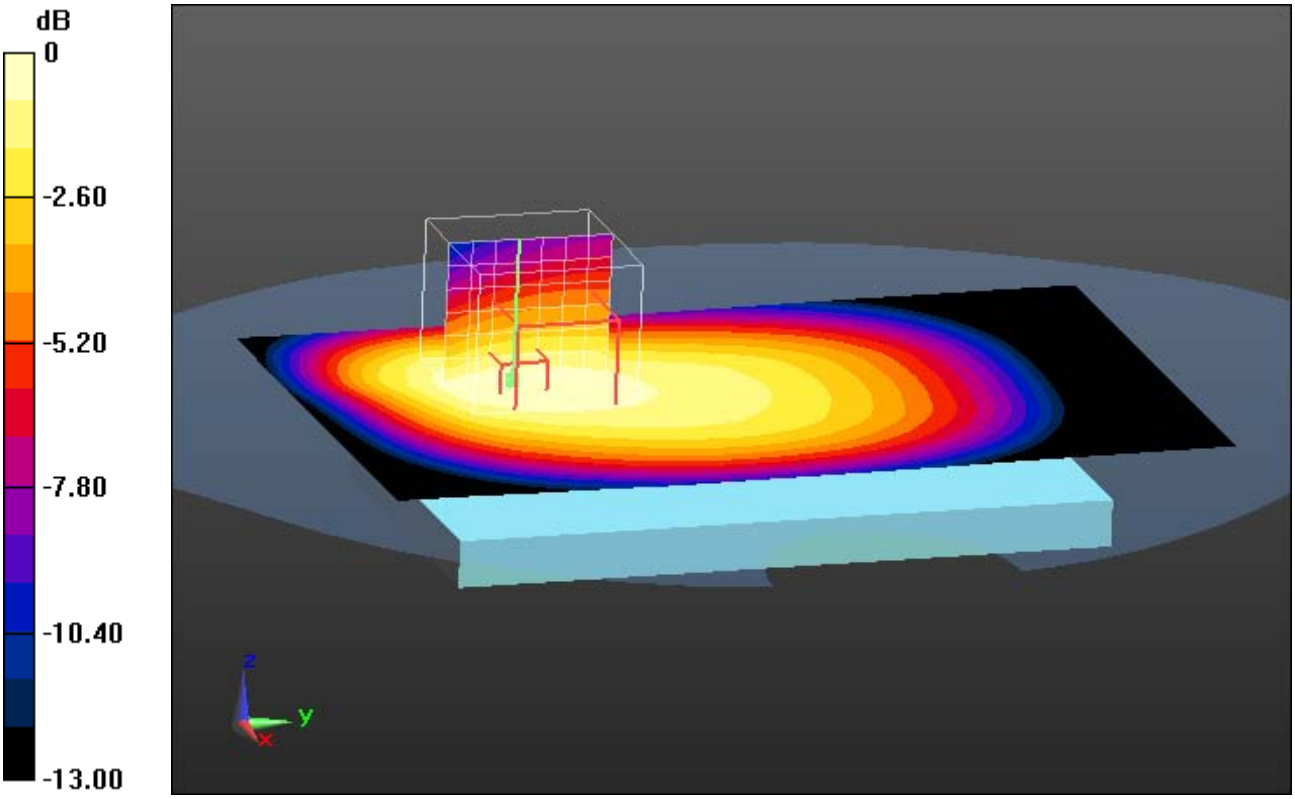
DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, LTE750 (Band 13) (0); Communication System Band: LTE FDD 13;
Frequency: 782 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 782 MHz; σ = 1.007 S/m; ε_r = 55.648; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.11, 6.11, 6.11); Calibrated: 24.08.2012;
- 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)

MSL750_10MHz BW/Front position - Middle 1RB / 49RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.739 W/kg

MSL750_10MHz BW/Front position - Middle 1RB / 49RB offset/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 27.439 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.976 W/kg
SAR(1 g) = 0.698 W/kg; SAR(10 g) = 0.498 W/kg
Maximum value of SAR (measured) = 0.743 W/kg



0 dB = 0.743 W/kg = -1.29 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.8°C; liquid temperature: 23.4°C

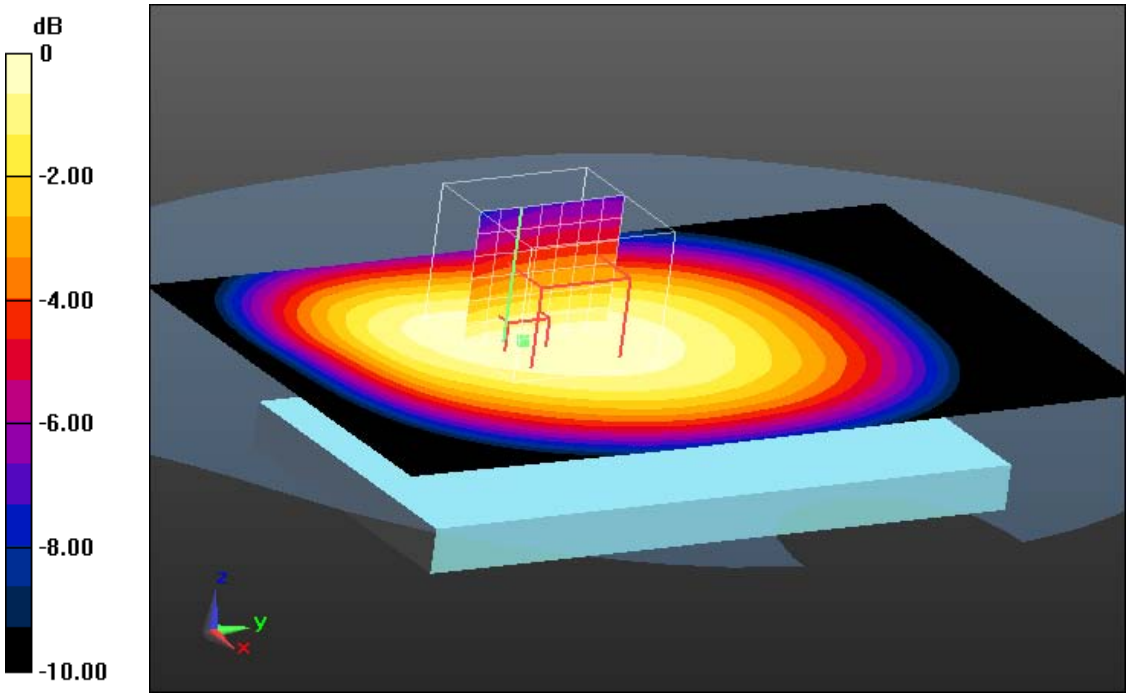
Date/Time: 20.07.2013 13:28:57

OET65-Body-LTE FDD 13 700

DUT: BlackBerry; Type: RFX101LW; Serial: #1
Communication System: UID 0, LTE750 (Band 13) (0); Communication System Band: LTE FDD 13; Frequency: 782 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 782 MHz; σ = 1.007 S/m; ε_r = 55.648; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ET3DV6 - SN1558; ConvF(6.11, 6.11, 6.11); Calibrated: 24.08.2012;
- 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)

MSL750_10MHz BW/Front position - Middle 1RB / 49RB offset 15mm/Area Scan (71x121x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.586 W/kg

MSL750_10MHz BW/Front position - Middle 1RB / 49RB offset 15mm/Zoom Scan (8x8x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.743 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.701 W/kg
SAR(1 g) = 0.549 W/kg; SAR(10 g) = 0.418 W/kg
Maximum value of SAR (measured) = 0.580 W/kg



0 dB = 0.580 W/kg = -2.37 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.8°C; liquid temperature: 23.4°C

Annex B.9: WLAN 2450MHz

Date/Time: 03.08.2013 13:50:27

IEEE1528_EN62209 - WLAN2450 head

DUT: BlackBerry; Type: RFX101LW; Serial: #49

Communication System: UID 0, WLAN2450 (0); Communication System Band: WLAN; Frequency: 2437 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 2437 MHz; σ = 1.802 S/m; ε_r = 39.089; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ET3DV6 - SN1558; ConvF(4.15, 4.15, 4.15); Calibrated: 24.08.2012;
- 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/Tilt Position - Middle/Area Scan (101x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

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

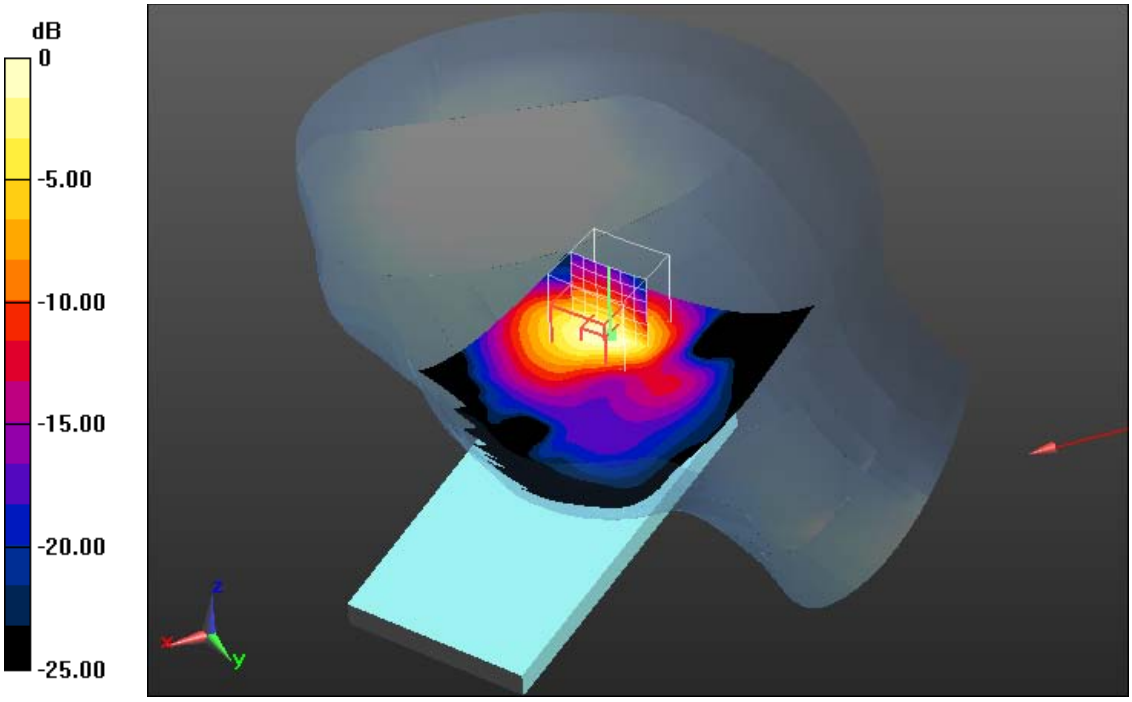
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.516 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 2.58 W/kg

SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.490 W/kg

Maximum value of SAR (measured) = 1.24 W/kg



0 dB = 1.24 W/kg = 0.93 dBW/kg

Additional information:

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

Date/Time: 03.08.2013 21:07:14

OET65_EN62209-2-WLAN2450-mobile hotspot

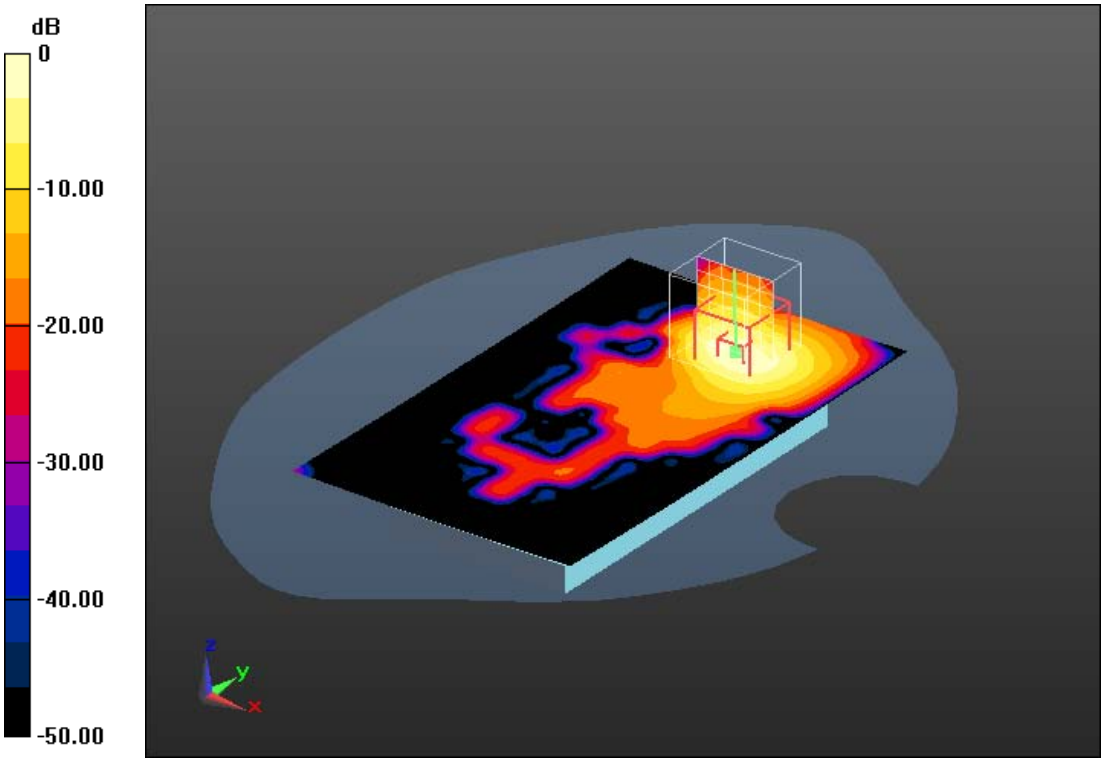
DUT: BlackBerry; Type: RFX101LW; Serial: #48
Communication System: UID 0, WLAN2450 (0); Communication System Band: WLAN; Frequency: 2412 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2412 MHz; σ = 1.913 S/m; ε_r = 51.492; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement 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/Rear Position - Low MCS 0/Area Scan (111x181x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.279 W/kg

Body MSL/Rear Position - Low MCS 0/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.739 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.511 W/kg
SAR(1 g) = 0.232 W/kg; SAR(10 g) = 0.101 W/kg
Maximum value of SAR (measured) = 0.268 W/kg



0 dB = 0.268 W/kg = -5.72 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 23.4°C; liquid temperature: 22.2°C

Date/Time: 05.08.2013 11:07:36

OET65_EN62209-2-WLAN2450-body worn

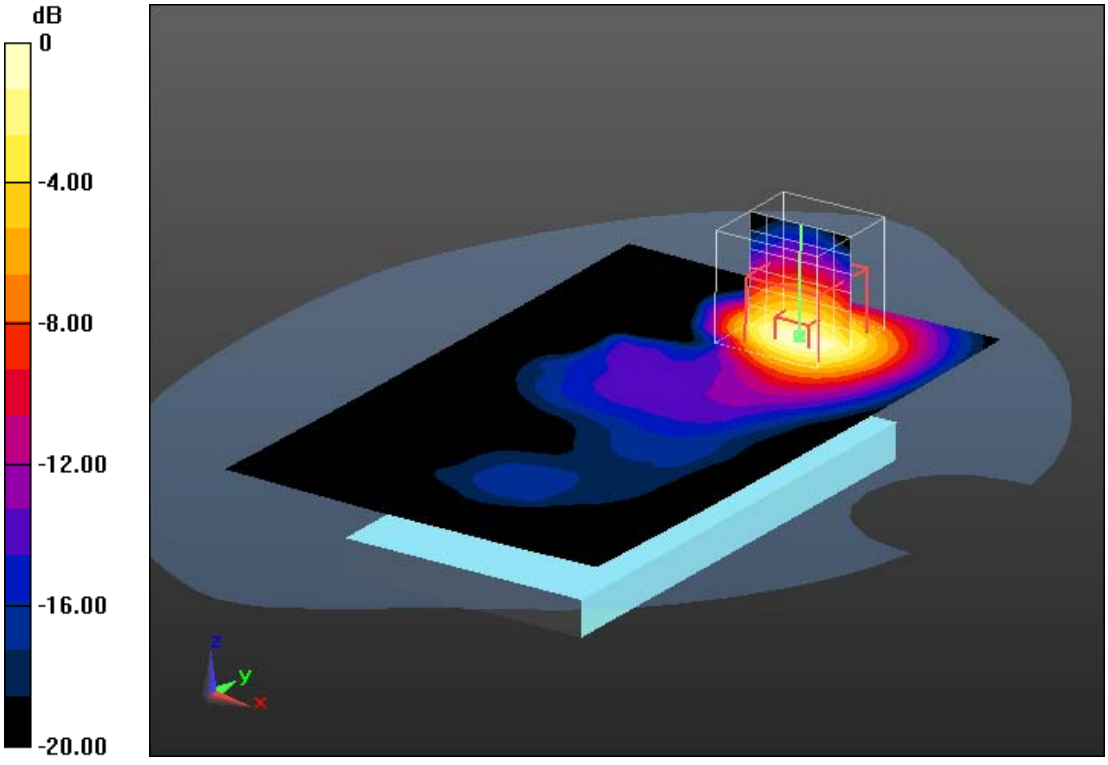
DUT: BlackBerry; Type: RFX101LW; Serial: #48
Communication System: UID 0, WLAN2450 (0); Communication System Band: WLAN; Frequency: 2412 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2412 MHz; σ = 1.913 S/m; ε_r = 51.492; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement 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)

MSL2450 15mm/Rear Position - Low 15mm 6MBit/s/Area Scan (111x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.410 W/kg

MSL2450 15mm/Rear Position - Low 15mm 6MBit/s/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.361 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.725 W/kg
SAR(1 g) = 0.351 W/kg; SAR(10 g) = 0.163 W/kg
Maximum value of SAR (measured) = 0.400 W/kg



0 dB = 0.400 W/kg = -3.98 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 23.4°C; liquid temperature: 22.2°C

Annex B.10: WLAN 5GHz

Date/Time: 12.07.2013 06:28:34

IEEE1528_OET65_EN62209-RightHandSide-WLAN5GHz

DUT: BlackBerry; Type: RFX101LW; Serial: #48

Communication System: UID 0, WLAN 5GHz (0); Communication System Band: 5 GHz Band; Frequency: 5745 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used (interpolated): f = 5745 MHz; σ = 5.065 S/m; ε_r = 35.71; ρ = 1000 kg/m^3

Phantom section: Right Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: EX3DV4 - SN3536; ConvF(4.66, 4.66, 4.66); Calibrated: 24.09.2012;
- Modulation Compensation:
- 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)

Configuration/Touch position - Channel 149/Area Scan (101x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.827 W/kg

Configuration/Touch position - Channel 149/Zoom Scan (8x8x12)/Cube 0:

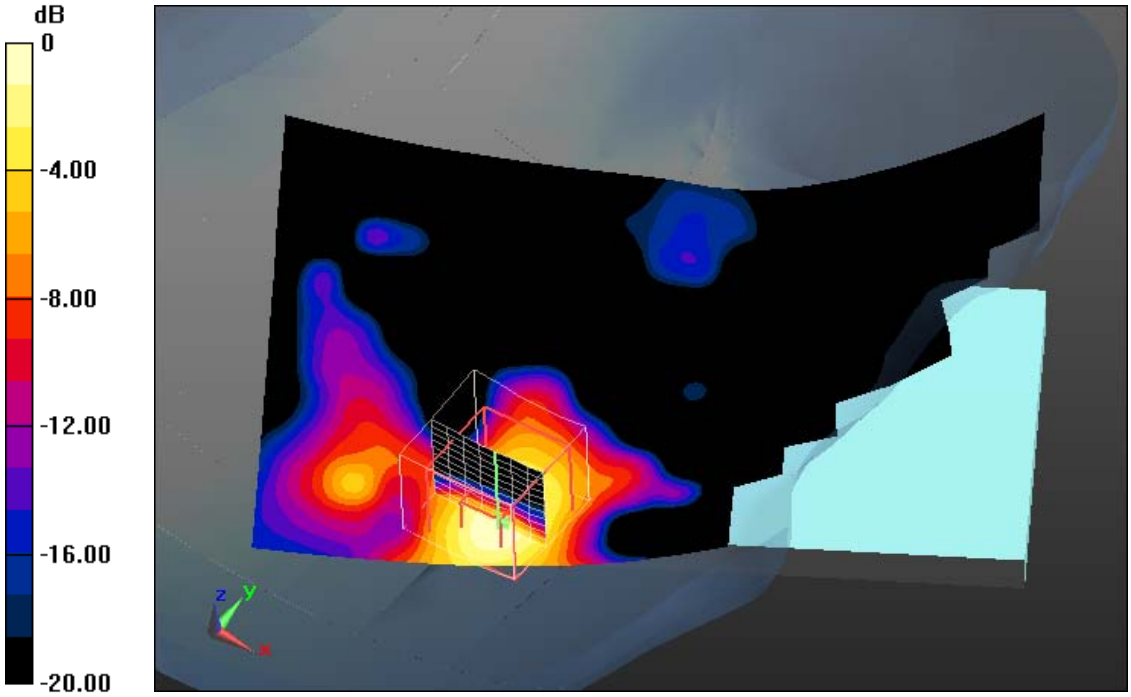
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 13.662 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 0.391 W/kg; SAR(10 g) = 0.137 W/kg

Maximum value of SAR (measured) = 0.816 W/kg



0 dB = 0.816 W/kg = -0.88 dBW/kg

Additional information:

ambient temperature: 21.3°C; liquid temperature: 21.7°C

Date/Time: 11.07.2013 13:01:26

OET65_EN62209-2-Body worn-WLAN 5GHz

DUT: BlackBerry; Type: RFX101LW; Serial: #49

Communication System: UID 0, WLAN 5GHz (0); Communication System Band: WLAN 5GHz; Frequency: 5520 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 5520 MHz; σ = 5.74 S/m; ε_r = 47.25; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: EX3DV4 - SN3536; ConvF(4.32, 4.32, 4.32); Calibrated: 24.09.2012;
- Modulation Compensation:
- 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 104 with Holster/Area Scan (101x181x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.606 W/kg

MSL-5GHz/Rear position - Channel 104 with Holster/Zoom Scan (8x8x12)/Cube 0:

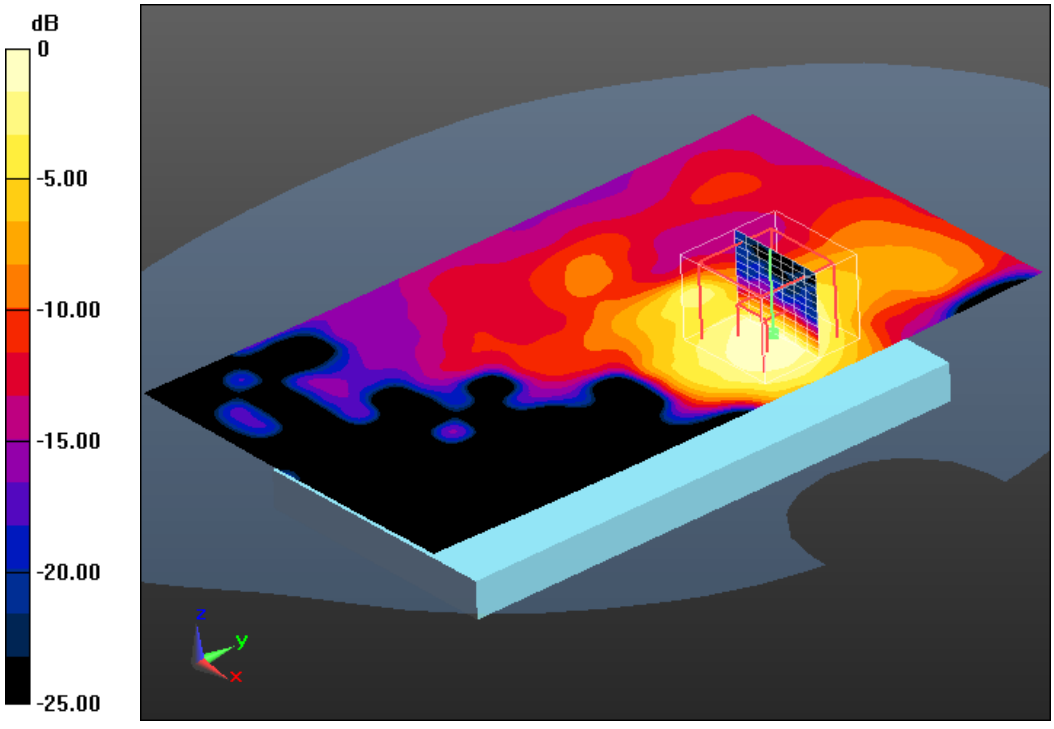
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 10.807 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.310 W/kg; SAR(10 g) = 0.121 W/kg

Maximum value of SAR (measured) = 0.584 W/kg



0 dB = 0.584 W/kg = -2.34 dBW/kg

Additional information:

position or distance of DUT to SAM: 0mm with holster

ambient temperature: 22.0°C; liquid temperature: 22.6°C

Annex B.11: Liquid depth

Photo 1: Liquid depth 750 MHz head simulating liquid

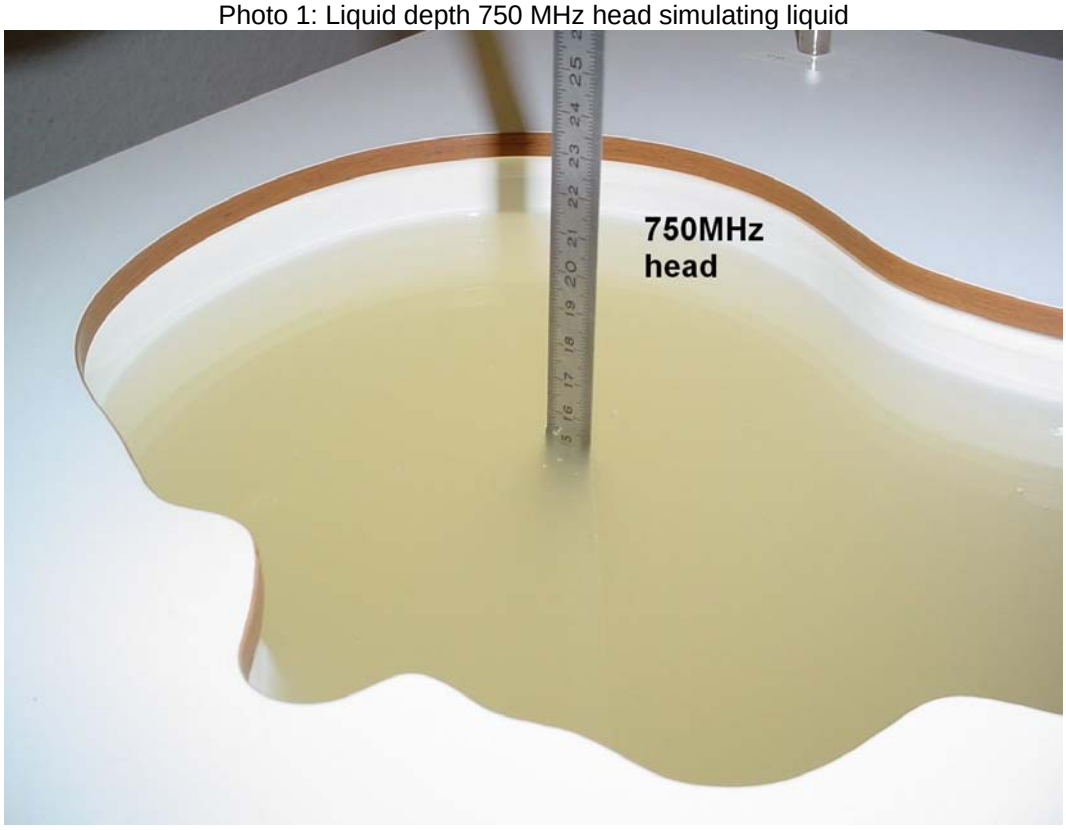


Photo 2: Liquid depth 750 MHz body simulating liquid

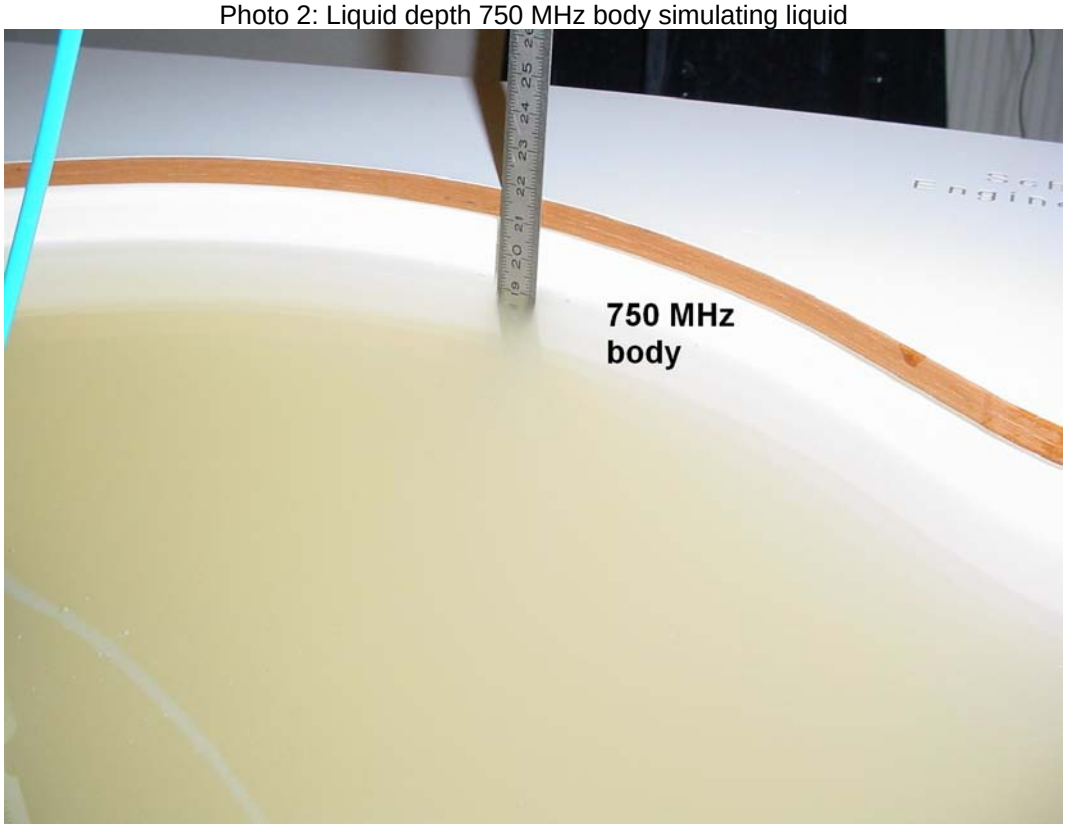


Photo 3: Liquid depth 850 MHz head simulating liquid

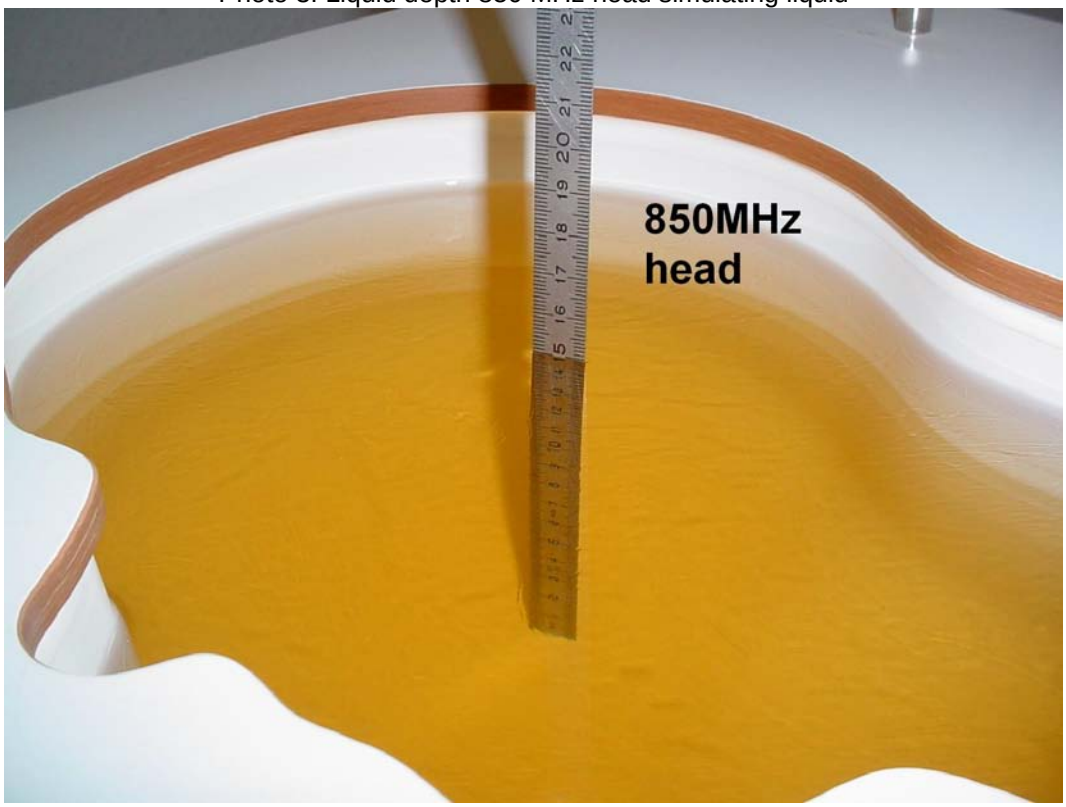


Photo 4: Liquid depth 850 MHz body simulating liquid

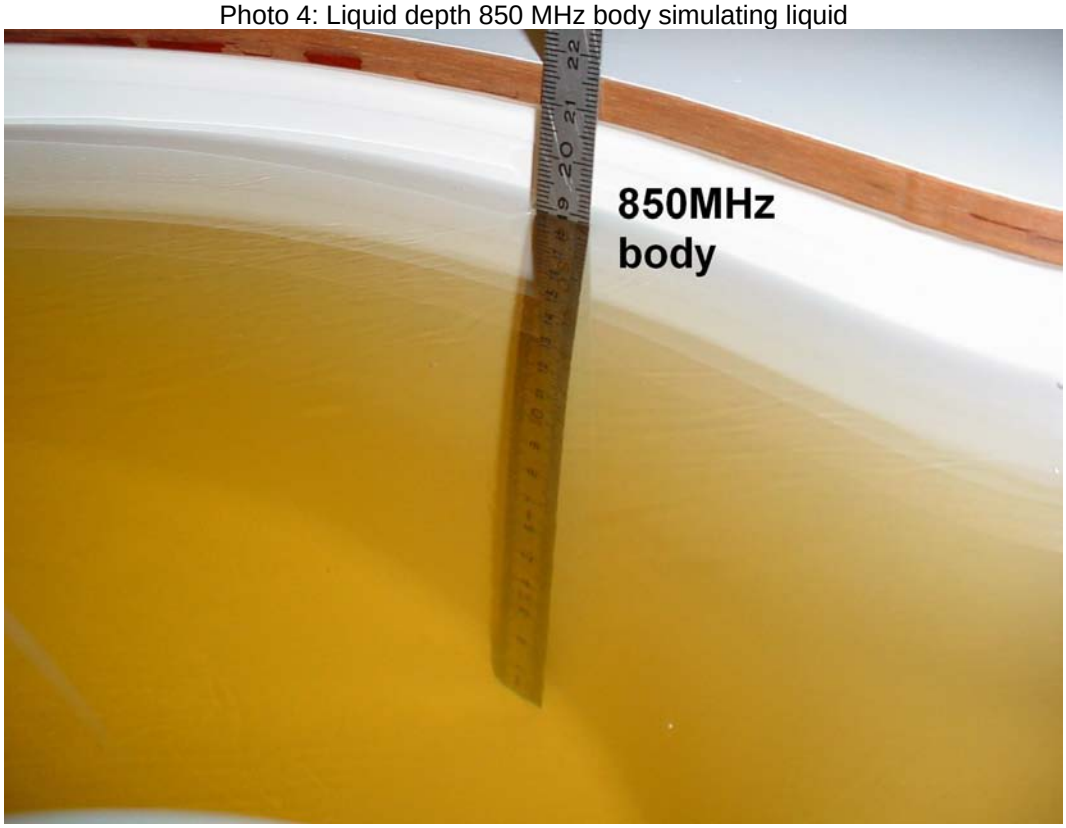


Photo 5: Liquid depth 1800MHz head simulating liquid

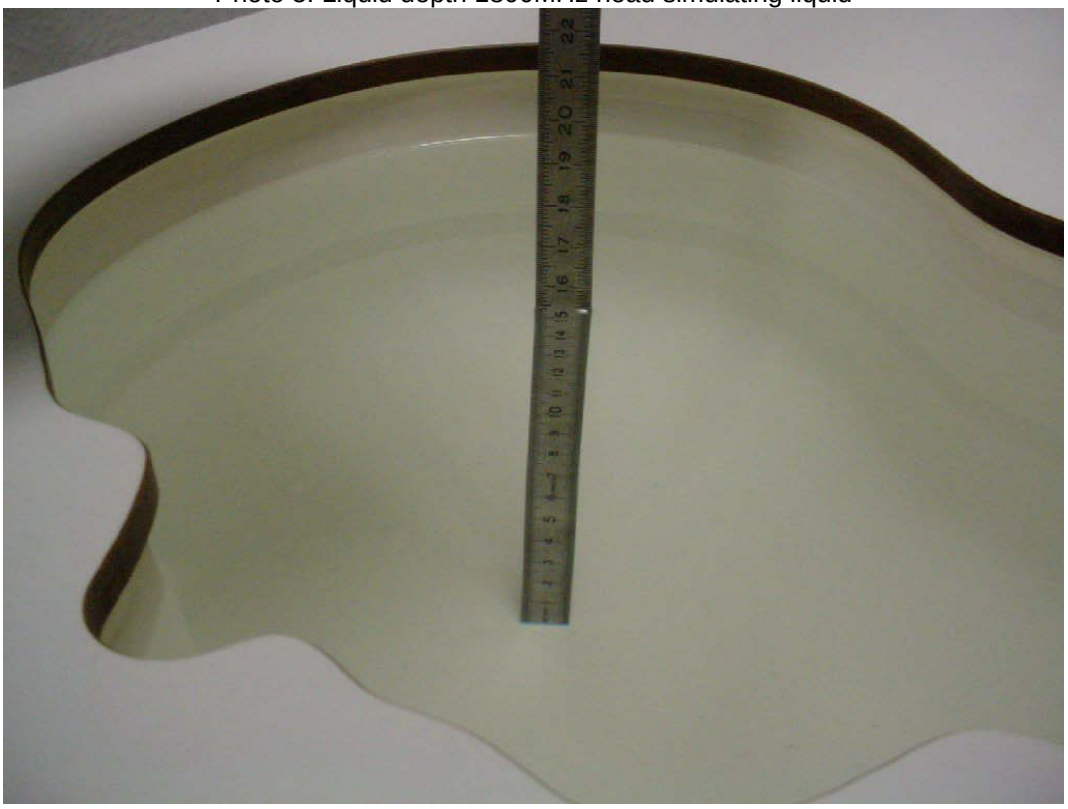


Photo 6: Liquid depth 1800 MHz body simulating liquid

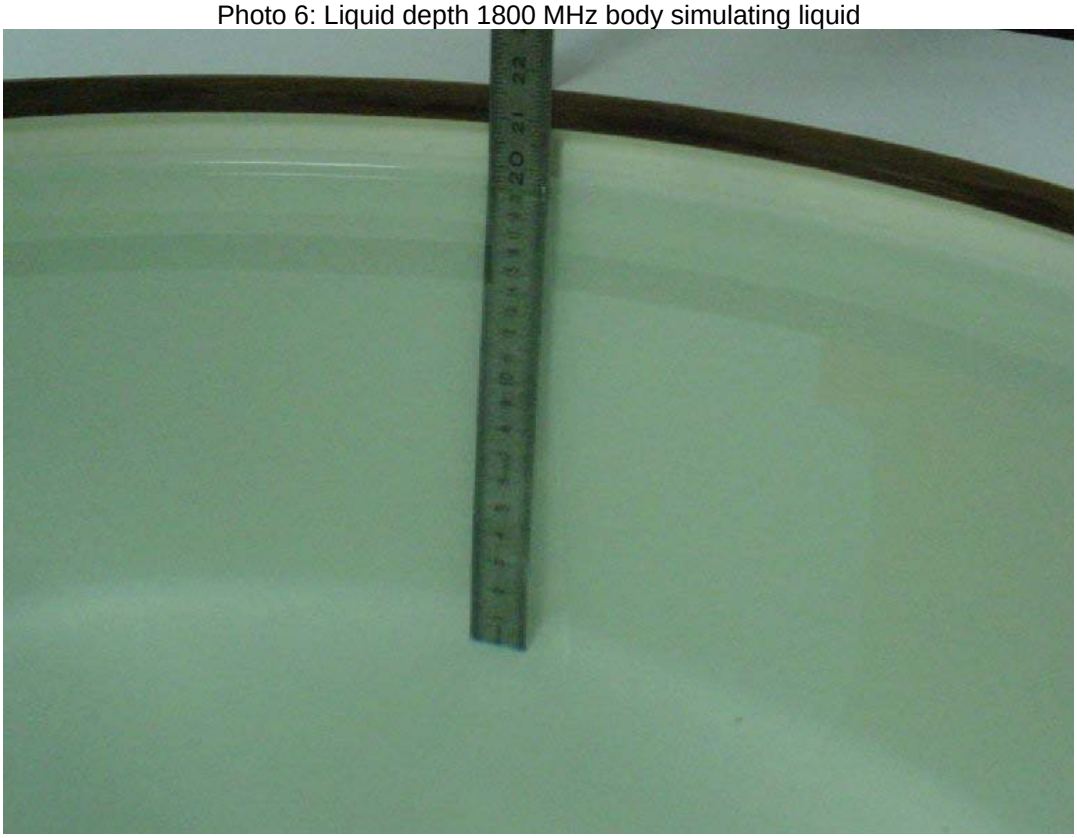


Photo 7: Liquid depth 1900MHz head simulating liquid

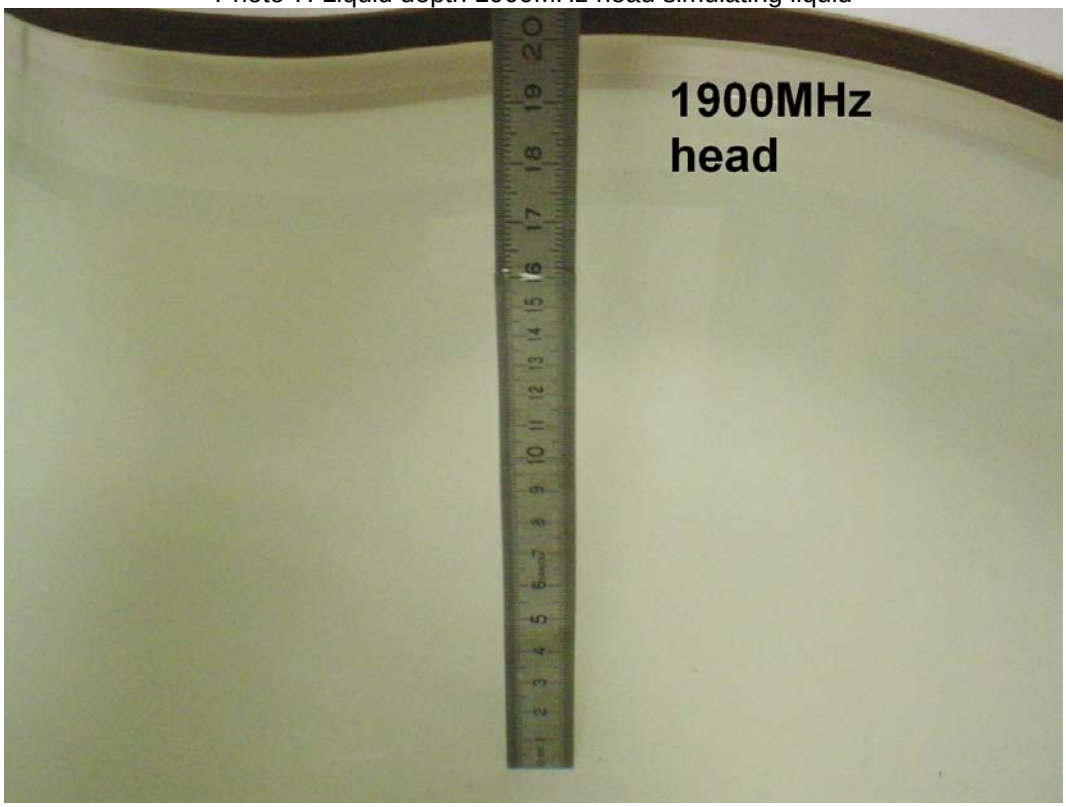


Photo 8: Liquid depth 1900 MHz body simulating liquid

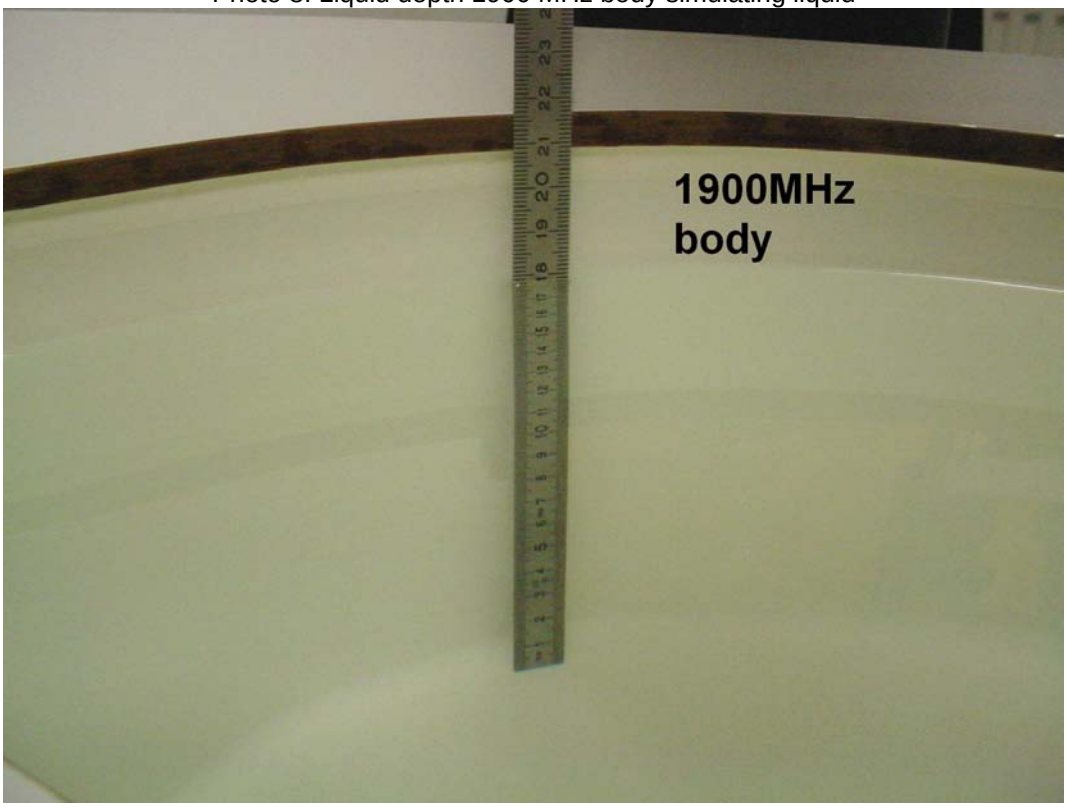


Photo 9: Liquid depth 2450MHz head simulating liquid

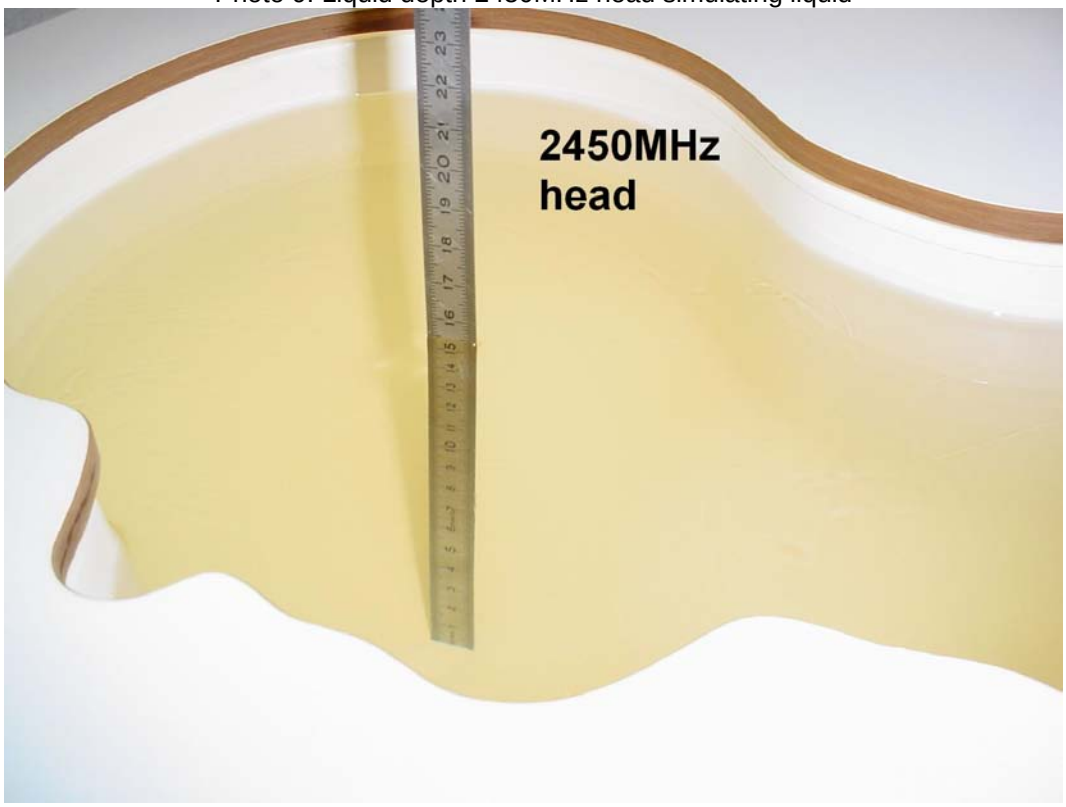


Photo 10: Liquid depth 2450 MHz body simulating liquid

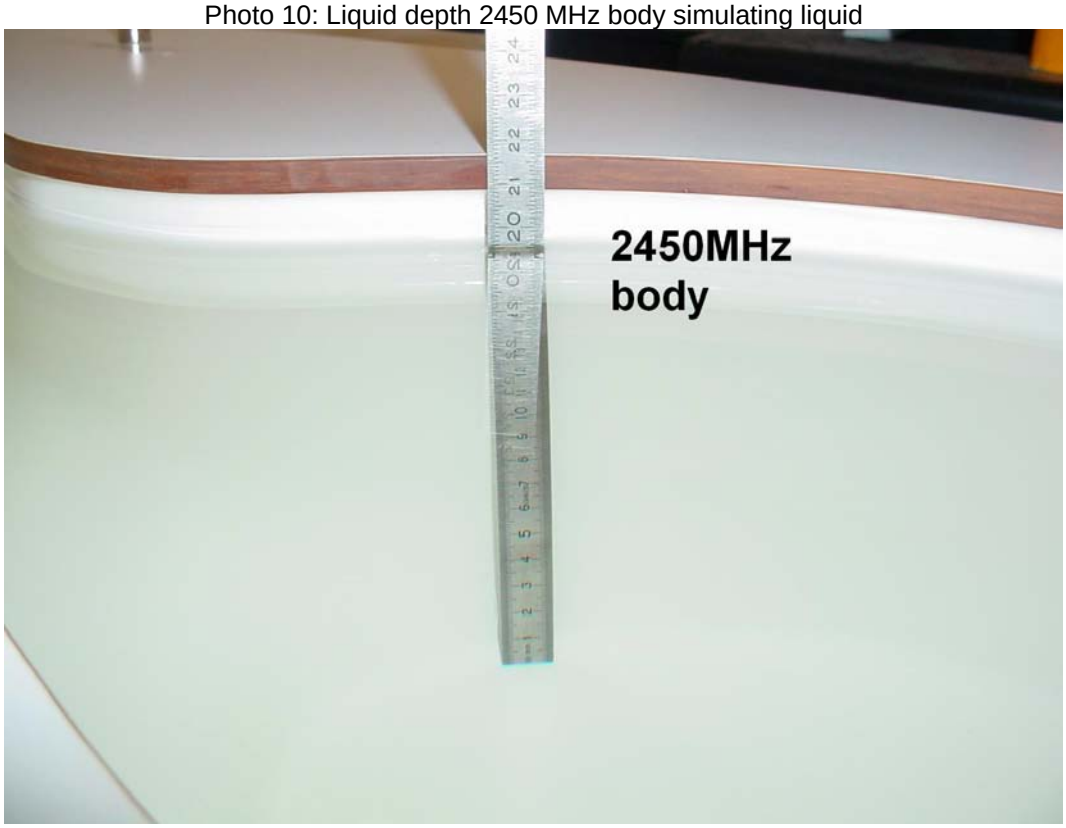


Photo 11: Liquid depth 5 GHz head simulating liquid

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. 1-6234/13-06-02-C Photo documentation

Annex D: Calibration parameters

Calibration parameters are described in the additional document:

Appendix to test report no. 1-6234/13-06-02-C
Calibration data, Phantom certificate
and detail information of the DASY5 System

Annex E: Document History

Version	Applied Changes	Date of Release
	Initial Release	2013-08-08
-A	- Section 2.4: BC0 frequency information corrected. DTM added. - Section 2.5: explanation for 'BLE' added. - Section 4 updated. - Section 7.1.9: explanation for power backoff settings added (also relevant for section 7.1.10 and 7.1.11). - Section 7.1.14 and 7.1.15: explanation for WLAN power backoff settings added. - Simultaneous transmission tables moved from section 7.1 to 7.2 behind standalone test results. Notes added, which power backoff was used for the different simultaneous transmission situations. Small errors corrected. Some 10 mm entries removed (SVLTE + Mobile Hotspot)). - Estimated SAR overview for Bluetooth updated (now only table 66, after standalone results). - Section 7.2.3 with information about triggering conditions added. Section 7.2.1: - Information about DTM added. - Body worn/mobile hotspot overview separated and optimized. - Test result entries with holster revised and corrected. - SVLTE+Mobile Hotspot results removed (no relevant test case). - LTE FDD 13 5 MHz BW results removed (special Canada requirement, not relevant for this test report). - Error corrections of target power values.	2013-09-06
-B	- replaced the antenna diagram on the page 53	2013-09-09
-C	- Corrected inscription in the Table 28 and Table 29 on the page 50 and 51. - Estimated SAR for Bluetooth was included at the front of 7.1.18 Mobile hotspot SAR measurement positions - Added information about holster and test separation distance from body in Statement of compliance on page 4	2013-09-10

Annex F: Further Information

Glossary

BW	-	Bandwidth
BLE		Bluetooth low energy
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
SVLTE		Simultaneous Voice and LTE
SW	-	Software
UNII	-	Unlicensed National Information Infrastructure