
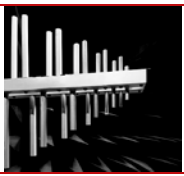
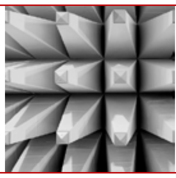

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TEST REPORT

Test Report No.: 1-6965/13-16-02

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

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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

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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:	Smart Phone
Device type:	portable device
S/N serial number:	CB5126D718 / CB5126DAY7 / CB5126D6VN / CB5126D715
FCC-ID:	PY7PM-0750
IMEI-Number:	004402452141272 / 004402452143096
Hardware status:	AP1.0
Software status:	17.1.C.0.127
Frequency:	see technical details
Antenna:	integrated antenna
Battery option:	Integrated battery
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:

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Testing Manager

1 Table of contents

1 Table of contents 2

2 General information 4

2.1 Notes and disclaimer 4
2.2 Application details 4
2.3 Statement of compliance 4
2.4 Technical details 5
2.5 Transmitter and Antenna Operating Configurations 6

3 Test standards/ procedures references 7

3.1 RF exposure limits 9

4 Summary of Measurement Results 10

4.1 SAR measurement variability and measurement uncertainty analysis 10

5 Test Environment 10

6 Test Set-up 11

6.1 Measurement system 11
6.1.1 System Description 11
6.1.2 Test environment 12
6.1.3 Probe description 12
6.1.4 Phantom description 13
6.1.5 Device holder description 14
6.1.6 Scanning procedure 15
6.1.7 Spatial Peak SAR Evaluation 16
6.1.8 Data Storage and Evaluation 17
6.1.9 Tissue simulating liquids: dielectric properties 19
6.1.10 Tissue simulating liquids: parameters 20
6.1.11 Measurement uncertainty evaluation for SAR test 22
6.1.12 Measurement uncertainty evaluation for System Check 26
6.1.13 System check 28
6.1.14 System check procedure 29
6.1.15 System validation 30

7 Detailed Test Results 31

7.1 Conducted power measurements 31
7.1.1 Conducted power measurements GSM 850 MHz 32
7.1.2 Conducted power measurements GSM 1900 MHz 33
7.1.3 Justification of SAR measurements in GSM mode 34
7.1.4 Conducted power measurements UMTS FDD V (850 MHz) 34
7.1.5 Conducted power measurements UMTS FDD II (1900 MHz) 35
7.1.6 Test-set-up information for WCDMA / HSPDA / HSUPA 36
7.1.7 Conducted power measurements LTE FDD 17 700 MHz 40
7.1.8 Justification of SAR measurements in LTE mode 41
7.1.9 MPR information in LTE mode 41
7.1.1 Conducted power measurements WLAN 2.4 GHz 42
7.1.2 Conducted power measurements WLAN 5 GHz 43
7.1.3 Standalone SAR Test Exclusion 46
7.1.4 Hotspot mode SAR measurement positions 47
7.2 SAR test results 48
7.2.1 Results overview 48
7.2.2 General description of test procedures 56
7.2.3 Multiple Transmitter Information 57

8 Test equipment and ancillaries used for tests 60

9 Observations 60

Annex A: System performance check 61

Annex B: DASY5 measurement results..76

Annex B.1: GSM 850MHz 76
Annex B.2: GSM 1900MHz 79
Annex B.3: UMTS FDD II 82
Annex B.4: UMTS FDD V...85
Annex B.5: LTE FDD 17 88
Annex B.6: WLAN 2450MHz 91
Annex B.7: WLAN 5GHz...94
Annex B.8: Bluetooth 2450MHz 96
Annex B.9: Liquid depth 97

Annex C: Photo documentation...102

Annex D: Calibration parameters...102

Annex E: Document History...103

Annex F: Further Information 103

2 General information

2.1 Notes and disclaimer

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2.2 Application details

Date of receipt of order:	2014-02-19
Date of receipt of test item:	2014-03-06
Start of test:	2014-03-07
End of test:	2014-03-17
Person(s) present during the test:	

2.3 Statement of compliance

The SAR values found for the 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.

2.4 Technical details

Band tested for this test report	Technology	Lowest transmit frequency/MHz	Highest transmit frequency/MHz	Lowest receive Frequency/MHz	Highest receive Frequency/MHz	Kind of modulation	Power Class	Tested power control level	GPRS/EGPRS mobile station class	GPRS/EGPRS multislot class	(E)GPRS voice mode or DTM	Test channel low	Test channel middle	Test channel high	Maximum output power/dBm)*
☐	GSM	880.2	914.8	925.2	959.8	GMSK 8-PSK	4 E2	5	A	33	no	975	37	124	--
☐	GSM DCS	1710.2	1784.8	1805.2	1879.8	GMSK 8-PSK	1 E2	0	A	33	no	512	698	885	--
☒	GSM cellular	824.2	848.8	869.2	893.8	GMSK 8-PSK	4 E2	5	A	33	no	128	190	251	33.2
☒	GSM PCS	1850.2	1909.8	1930.2	1989.8	GMSK 8-PSK	1 E2	0	A	33	no	512	661	810	30.4
☐	UMTS FDD I	1922.4	1977.6	2112.4	2167.6	QPSK	3	max	--	--	--	9612	9750	9888	--
☒	UMTS FDD II	1852.4	1907.6	1932.4	1987.6	QPSK	3	max	--	--	--	9262	9400	9538	23.0
☒	UMTS FDD V	826.4	846.6	871.4	891.6	QPSK	3	max	--	--	--	4132	4182	4233	23.5
☐	LTE FDD 1	1920	1980	2110	2170	QPSK	3	max	--	--	--	18100	18300	18500	--
☐	LTE FDD 3	1710	1785	1805	1880	QPSK	3	max	--	--	--	19300	19575	19850	--
☒	LTE FDD 17	704	716	734	746	QPSK	3	max	--	--	--	23780	23790	23800	23.6
☐	LTE FDD 18	815	830	860	875	QPSK	3	max	--	--	--	23900	23925	23950	--
☐	WLAN	2412	2472	2412	2472	CCK OFDM	--	max	--	--	--	1	7	13	--
☒	WLAN US	2412	2462	2412	2462		--	max	--	--	--	1	6	11	16.2
☒	WLAN	5180	5240	5180	5240	OFDM	--	max	--	--	--	40	--	--	14.2
☒	WLAN	5260	5320	5260	5320	OFDM	--	max	--	--	--	--	--	64	14.0
☒	WLAN	5500	5700	5500	5700	OFDM	--	max	--	--	--	108	--	--	14.3
☒	WLAN	5745	5825	5745	5825	OFDM	--	max	--	--	--	--	157	--	14.2
☒	BT	2402	2480	2402	2480	GFSK	3	max	--	--	--	0	39	78	8.65

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

Features:

GSM bands 2.5	(GPRS, EDGE) class A, Multislot class 33 (max 4 TS uplink, max 5 TS downlink, max. 6 TS active) DTM class 11 (max 3 TS uplink, max 4 TS downlink, max 5 TS active)
Rel 9 HSDPA UE	cat 10 bands 1, 2, 5 (QPSK, 16QAM, 14 Mbps)
Rel 9 HSPA UE	cat: 6 bands 1, 2, 5 (QPSK, no 16QAM, 5.76 Mbps)
Rel 10 LTE UE	cat: 4 bands 1, 3, 17, 18, 41 (QPSK, 16QAM, no MIMO, 50Mbps uplink)
BT BR / BT LE	
ANT+	
RFID 13.56 MHz	

2.5 Transmitter and Antenna Operating Configurations

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

Table 1: Simultaneous transmission conditions

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

BLE[1] - Bluetooth low energy

3 Test standards/ procedures references

Test Standard	Version	Test Standard Description
IEEE 1528-2003	2003-04	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEEE 1528-2013	2014-06	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	February 7, 2014	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB 648474D04v01	May 28, 2013	SAR Evaluation Considerations for Wireless Handsets
KDB 941225D01v02	April 10, 2007	SAR Measurements Procedures for 3G Devices
KDB 941225D02v01	December 14, 2009	3GPP R6 HSPA and R7 HSPA+ SAR Guidance
KDB 941225D02v02	May 28, 2013	SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced
KDB 941225D05v02	May 28, 2013	SAR for LTE Devices
KDB 941225D03v01	December, 2008	SAR Test Reduction Procedure for GSM/GPRS/EDGE
KDB 941225D06v01	May 28, 2013	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
KDB 248227D01v01	May, 2007	SAR Measurement Procedures for 802.11 a/b/g Transmitters
KDB 450824D01v01	January, 2007	SAR Probe Calibration and System Verification considerations for measurements from 150 MHz to 3 GHz
KDB 450824D01v01	March 4, 2012	Dipole Requirements for SAR System Validation and Verification

3.1 RF exposure limits

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

Table 2: RF exposure limits

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

Notes:

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

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

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

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

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

4 Summary of Measurement Results

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

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

		PCE	DTS	UNII
head		**0.656**	**0.410**	**0.156**
body worn 15 mm distance		**0.646**	**0.131**	**0.240**
hotspot operation 10 mm distance		**1.023**	**0.264**	**---**
collocated situations	**ΣSAR evaluation**	**1.257**		

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 position (W/kg)	ratio <1.2
GSM 1900	0.982	0.973	1.01
UMTS FDD II	1.000	0.976	1.02

5 Test Environment

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

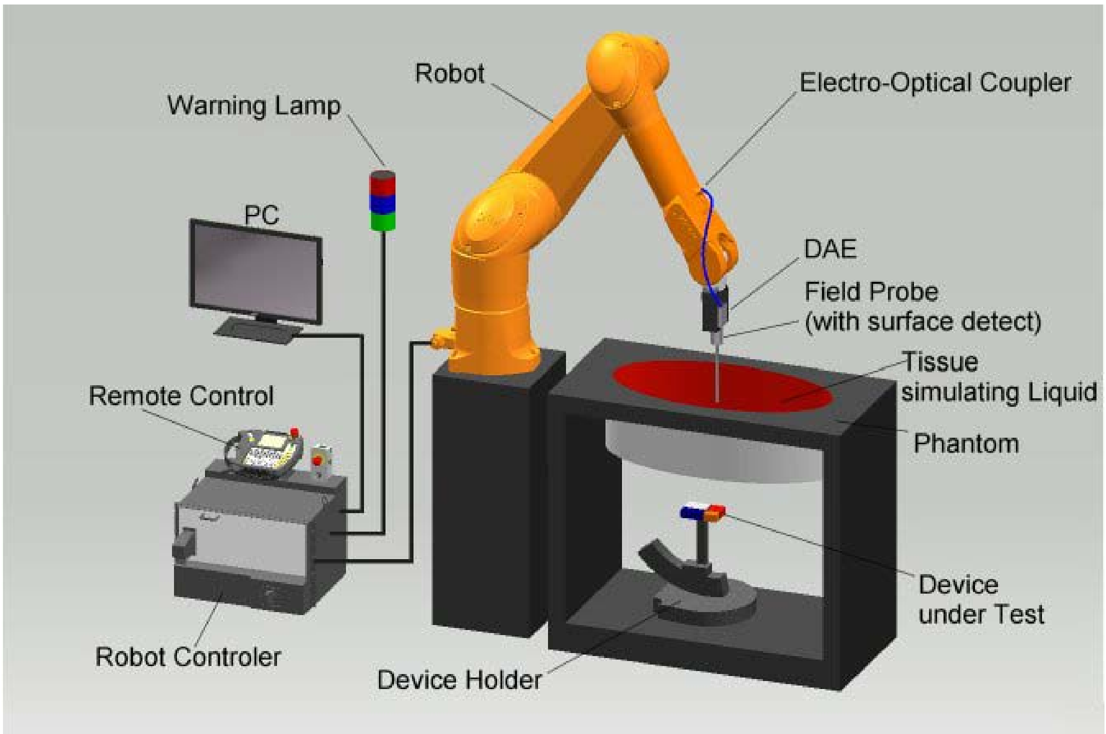
Relative humidity content: 40 – 50 %
Air pressure: not relevant for this kind of testing
Power supply: 230 V / 50 Hz

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/TX 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.
- 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.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY measurement server.
- The DASY measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 7.
- DASY software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The triple flat and eli phantom for the testing of handheld and body-mounted wireless devices.
- The device holder for handheld mobile phones and mounting device adaptor for laptops
- 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 in a laboratory room within an environment which avoids influence on SAR measurements by ambient electromagnetic fields and any reflection from the environment. The pictures at the beginning of the photo documentation show a complete view of the test environment. The system allows the measurement of SAR values larger than 0.005 mW/g.

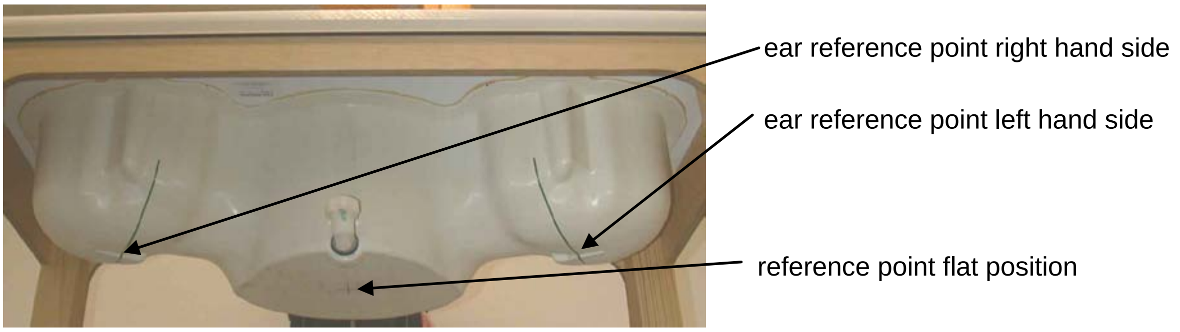
6.1.3 Probe description

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 FCC KDB865664 D01 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.



Triple Modular Phantom consists of three identical modules which can be installed and removed separately without emptying the liquid. It includes three reference points for phantom installation. Covers prevent evaporation of the liquid. Phantom material is resistant to DGBE based tissue simulating liquids.

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 highest integrated SAR value is the main concern in compliance test applications. These values can mostly be found at the inner surface of the phantom and cannot be measured directly due to the sensor offset in the probe. To extrapolate the surface values, the measurement distances to the surface must be known accurately. A distance error of 0.5mm could produce SAR errors of 6% at 1800 MHz. Using predefined locations for measurements is not accurate enough. Any shift of the phantom (e.g., slight deformations after filling it with liquid) would produce high uncertainties. For an automatic and accurate detection of the phantom surface, the DASY5 system uses the mechanical surface detection. The detection is always at touch, but the probe will move backward from the surface the indicated distance before starting the measurement.

- 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 strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The scan uses different grid spacings for different frequency measurements. Standard grid spacing for head measurements in frequency ranges ≤ 2GHz is 15 mm in x - and y-dimension. For higher frequencies a finer resolution is needed, thus for the grid spacing is reduced according the following table:

Area scan grid spacing for different frequency ranges	
Frequency range	Grid spacing
≤ 2 GHz	≤ 15 mm
2 – 4 GHz	≤ 12 mm
4 – 6 GHz	≤ 10 mm

  Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation. Results of this coarse scan are shown in annex B.

- A „zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous „coarse“ scan. It uses a fine meshed grid where the robot moves the probe in steps along all the 3 axis (x,y and z-axis) starting at the bottom of the Phantom. The grid spacing for the cube measurement is varied according to the measured frequency range, the dimensions are given in the following table:

Zoom scan grid spacing and volume for different frequency ranges			
Frequency range	Grid spacing for x, y axis	Grid spacing for z axis	Minimum zoom scan volume
≤ 2 GHz	≤ 8 mm	≤ 5 mm	≥ 30 mm
2 – 3 GHz	≤ 5 mm	≤ 5 mm	≥ 28 mm
3 – 4 GHz	≤ 5 mm	≤ 4 mm	≥ 28 mm
4 – 5 GHz	≤ 4 mm	≤ 3 mm	≥ 25 mm
5 – 6 GHz	≤ 4 mm	≤ 2 mm	≥ 22 mm

  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 B. Test results relevant for the specified standard (see section 3) are shown in table form in section 7.

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 all points in the three directions x, y and z. 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 1 to 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	☐ 1750	☒ 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	☐ 1750	☒ 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 ε''	Conductivity [S/m]	Dev. %	
750	709	42.15	0.89	41.9	-0.7%	21.74	0.86	-3.7%	2014-03-11
	710	42.15	0.89	41.8	-0.7%	21.75	0.86	-3.5%	
	711	42.14	0.89	41.8	-0.8%	21.73	0.86	-3.5%	
	750	41.94	0.89	41.3	-1.5%	21.44	0.89	0.1%	
850/900	824	41.56	0.90	41.5	-0.2%	20.05	0.92	2.2%	2014-03-08
	826	41.55	0.90	41.4	-0.3%	20.06	0.92	2.5%	
	835	41.50	0.90	41.3	-0.5%	20.06	0.93	3.5%	
	836	41.50	0.90	41.3	-0.6%	20.05	0.93	3.5%	
	837	41.50	0.90	41.3	-0.6%	20.06	0.93	3.5%	
	847	41.50	0.91	41.1	-1.0%	20.02	0.94	3.3%	
	849	41.50	0.92	41.1	-1.1%	20.02	0.95	3.3%	
1900	1850	40.00	1.40	40.7	1.6%	13.00	1.34	-4.4%	2014-03-10
	1852	40.00	1.40	40.7	1.6%	13.01	1.34	-4.3%	
	1880	40.00	1.40	40.7	1.9%	13.07	1.37	-2.4%	
	1900	40.00	1.40	40.4	1.1%	13.18	1.39	-0.5%	
	1908	40.00	1.40	40.3	0.7%	13.12	1.39	-0.5%	
	1910	40.00	1.40	40.2	0.6%	13.12	1.39	-0.4%	
2450	2402	39.29	1.76	37.6	-4.2%	12.83	1.71	-2.4%	2014-03-10
	2412	39.27	1.77	37.6	-4.2%	12.90	1.73	-2.0%	
	2437	39.22	1.79	37.6	-4.0%	13.07	1.77	-0.9%	
	2441	39.22	1.79	37.7	-4.0%	13.10	1.78	-0.7%	
	2442	39.21	1.79	37.6	-4.0%	13.11	1.78	-0.7%	
	2450	39.20	1.80	37.6	-4.0%	13.15	1.79	-0.4%	
	2462	39.18	1.81	37.6	-4.0%	13.17	1.80	-0.6%	
	2472	39.17	1.82	37.6	-4.1%	13.16	1.81	-0.8%	
	2480	39.16	1.83	37.5	-4.3%	13.13	1.81	-1.2%	
5GHz	5200	35.99	4.66	36.3	1.0%	15.46	4.47	-3.9%	2014-03-11
	5320	35.85	4.78	36.0	0.5%	15.58	4.61	-3.5%	
	5500	35.64	4.96	35.8	0.4%	15.76	4.82	-2.9%	
	5540	35.60	5.00	36.0	1.0%	15.87	4.89	-2.2%	
	5785	35.32	5.25	35.5	0.6%	15.89	5.11	-2.7%	
	5800	35.30	5.27	35.4	0.2%	15.85	5.11	-3.0%	

Table 5: Parameter of the head tissue simulating liquid

Liquid **MSL**	Freq. (MHz)	Target **body** tissue		Measurement **body** tissue				
		Permittivity	Conductivity [S/m]	Permittivity	Dev. %	Conductivity ε''	Conductivity [S/m]	Dev. %
750	709	55.69	0.96	54.9	-1.4%	23.30	0.92	-4.3%
	710	55.69	0.96	54.9	-1.4%	23.31	0.92	-4.1%
	711	55.68	0.96	54.9	-1.4%	23.30	0.92	-4.1%
	750	55.53	0.96	54.4	-2.1%	22.94	0.96	-0.7%
850/900	824	55.24	0.97	54.0	-2.2%	21.32	0.98	0.8%
	826	55.24	0.97	54.0	-2.2%	21.34	0.98	1.2%
	835	55.20	0.97	53.9	-2.3%	21.33	0.99	2.1%
	836	55.20	0.97	53.9	-2.3%	21.34	0.99	2.3%
	837	55.19	0.97	53.9	-2.3%	21.35	0.99	2.2%
	847	55.16	0.98	53.8	-2.4%	21.28	1.00	1.8%
	849	55.16	0.99	53.8	-2.4%	21.25	1.00	1.7%
1900	1850	53.30	1.52	52.7	-1.0%	14.12	1.45	-4.4%
	1852	53.30	1.52	52.7	-1.0%	14.11	1.45	-4.4%
	1880	53.30	1.52	52.8	-1.0%	14.16	1.48	-2.6%
	1900	53.30	1.52	52.5	-1.4%	14.25	1.51	-0.9%
	1908	53.30	1.52	52.4	-1.6%	14.21	1.51	-0.8%
	1910	53.30	1.52	52.4	-1.6%	14.18	1.51	-0.9%
2450	2412	52.75	1.91	51.5	-2.3%	14.36	1.93	0.7%
	2437	52.72	1.94	51.7	-2.0%	14.49	1.96	1.4%
	2450	52.70	1.95	51.7	-1.9%	14.54	1.98	1.6%
	2462	52.68	1.97	51.6	-2.0%	14.55	1.99	1.3%
	2472	52.67	1.98	51.5	-2.1%	14.53	2.00	0.8%
5GHz	5200	49.01	5.30	48.4	-1.3%	18.04	5.22	-1.6%
	5320	48.85	5.44	48.1	-1.5%	18.15	5.37	-1.3%
	5500	48.61	5.65	47.6	-2.0%	18.32	5.61	-0.8%
	5540	48.55	5.70	47.6	-2.0%	18.39	5.67	-0.5%
	5785	48.22	5.98	47.1	-2.4%	18.49	5.95	-0.5%
	5800	48.20	6.00	47.1	-2.4%	18.48	5.96	-0.6%

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 (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	± 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 (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 %	∞
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 (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 %	∞
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

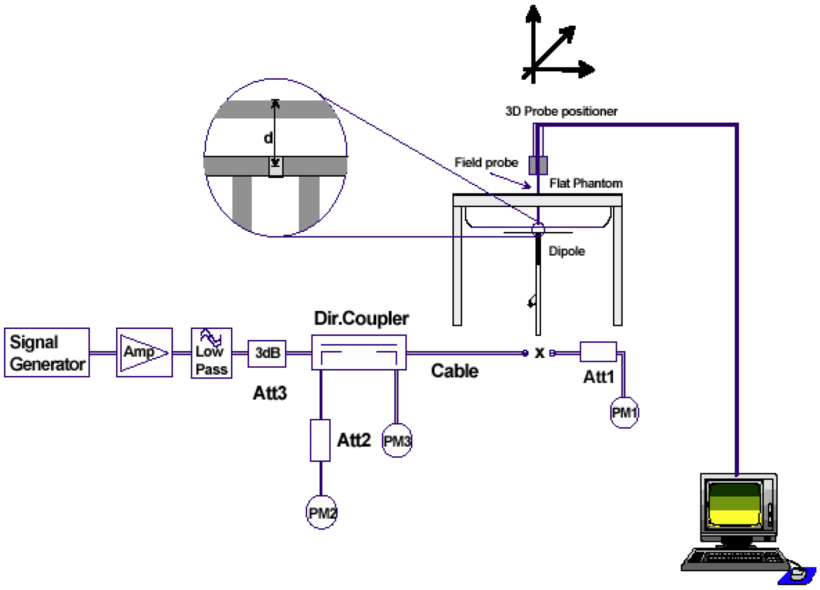
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE 1528. The following table shows system check results for all frequency bands and tissue liquids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

System performence check (1000 mW)								
System validation Kit	Frequency	Target SAR_{1g} /mW/g (+/- 10%)	Target SAR_{10g} /mW/g (+/- 10%)	Measured SAR_{1g} mW/g	SAR_{1g} dev. %	Measured SAR_{10g} mW/g	SAR_{10g} dev. %	Measured date
D750V3 S/N: 1041	750 MHz head	8.52	5.56	8.02	-5.9%	5.28	-5.0%	2014-03-11
D750V3 S/N: 1041	750 MHz body	8.75	5.79	8.75	0.0%	5.81	0.3%	2014-03-17
D835V2 S/N: 4d153	835 MHz head	9.58	6.21	9.73	1.6%	6.39	2.9%	2014-03-08
D835V2 S/N: 4d153	835 MHz body	9.40	6.12	9.60	2.1%	6.36	3.9%	2014-03-11
D1900V2 S/N: 5d009	1900 MHz head	40.10	21.00	39.10	-2.5%	20.60	-1.9%	2014-03-10
D1900V2 S/N: 5d009	1900 MHz body	40.90	21.70	39.60	-3.2%	21.00	-3.2%	2014-03-12
D2450V2 S/N: 710	2450 MHz head	51.50	24.00	50.90	-1.2%	23.40	-2.5%	2014-03-10
D2450V2 S/N: 710	2450 MHz head	51.50	24.00	52.20	1.4%	24.30	1.3%	2014-03-17
D2450V2 S/N: 710	2450 MHz body	51.20	23.90	51.80	1.2%	23.90	0.0%	2014-03-14
D5GHzV2 S/N: 1055	5200 MHz head	80.40	23.00	84.20	4.7%	24.10	4.8%	2014-03-11
D5GHzV2 S/N: 1055	5500 MHz head	84.90	24.30	84.80	-0.1%	24.10	-0.8%	2014-03-11
D5GHzV2 S/N: 1055	5800 MHz head	80.10	22.70	82.60	3.1%	23.30	2.6%	2014-03-11
D5GHzV2 S/N: 1055	5200 MHz body	74.20	20.80	72.60	-2.2%	20.60	-1.0%	2014-03-13
D5GHzV2 S/N: 1055	5500 MHz body	77.90	21.70	77.90	0.0%	21.90	0.9%	2014-03-13
D5GHzV2 S/N: 1055	5800 MHz body	73.30	20.20	71.60	-2.3%	19.90	-1.5%	2014-03-13

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:

Probe Calibration Point	Test	DASY	Dipole	Probe	Calibrated signal type(s)	DAE unit	Validation done	
f / MHz	System	SW	Type / SN	Type / SN		Type / SN	Head tissue simulant	Body tissue simulant
750	Saarbrücken / SAR-1	V52.8.7	D750V2 / 1041	ES3DV3 / 3320	CW	DAE3/ 413	2014-01	2014-01
835	Saarbrücken / SAR-1	V52.8.7	D835V2 / 4d153	ES3DV3 / 3320	CW	DAE3/ 413	2014-01	2014-01
1900	Saarbrücken / SAR-1	V52.8.7	D1900V2 / 5d009	ES3DV3 / 3320	CW	DAE3 / 413	2014-01	2014-01
2450	Saarbrücken / SAR-1	V52.8.7	D2450V2 / 710	ES3DV3 / 3320	CW	DAE3 / 413	2014-01	2014-01
5200	Saarbrücken / SAR-1	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE3 / 413	2014-01	2014-01
5500	Saarbrücken / SAR-1	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE3 / 413	2014-01	2014-01
5800	Saarbrücken / SAR-1	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE3 / 413	2014-01	2014-01
750	Saarbrücken / SAR-3	V52.8.7	D750V2 / 1041	ES3DV3 / 3326	CW	DAE4/ 1387	2013-10	2013-10
835	Saarbrücken / SAR-3	V52.8.7	D835V2 / 4d153	ES3DV3 / 3326	CW	DAE4/ 1387	2013-09	2013-10
1750	Saarbrücken / SAR-3	V52.8.7	D1750V2 / 1093	ES3DV3 / 3326	CW	DAE4/ 1387	2013-09	2013-10
1900	Saarbrücken / SAR-3	V52.8.7	D1900V2 / 5d009	ES3DV3 / 3326	CW	DAE4/ 1387	2013-09	2013-10
2450	Saarbrücken / SAR-3	V52.8.7	D2450V2 / 710	ES3DV3 / 3326	CW	DAE4/ 1387	2013-11	2013-11
5200	Saarbrücken / SAR-3	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE4/ 1387	2013-11	2013-11
5500	Saarbrücken / SAR-3	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE4/ 1387	2013-11	2013-11
5800	Saarbrücken / SAR-3	V52.8.7	D5GHzV2 / 1055	EX3DV4 / 3944	CW	DAE4/ 1387	2013-11	2013-11

7 Detailed Test Results

7.1 Conducted power measurements

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

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

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

The signalling modes differ as follows :

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

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

7.1.1 Conducted power measurements GSM 850 MHz

Channel / frequency	modulation	timeslots	slotted avg. power	time based avg. Power (calculated)
128 / 824.2 MHz	GMSK	1	33.1 dBm	24.1 dBm
190 / 836.6 MHz	GMSK	1	33.1 dBm	24.1 dBm
251 / 848.8 MHz	GMSK	1	33.2 dBm	24.2 dBm
128 / 824.2 MHz	GMSK	**2**	**30.9 dBm**	**24.9** dBm
190 / 836.6 MHz	GMSK	**2**	**31.0 dBm**	**25.0** dBm
251 / 848.8 MHz	GMSK	**2**	**31.0 dBm**	**25.0** dBm
128 / 824.2 MHz	GMSK	3	28.6 dBm	24.35 dBm
190 / 836.6 MHz	GMSK	3	28.7 dBm	24.45 dBm
251 / 848.8 MHz	GMSK	3	28.8 dBm	24.55 dBm
128 / 824.2 MHz	GMSK	4	27.6 dBm	24.6 dBm
190 / 836.6 MHz	GMSK	4	27.7 dBm	24.7 dBm
251 / 848.8 MHz	GMSK	4	27.7 dBm	24.7 dBm
128 / 824.2 MHz	8PSK	1	27.6 dBm	18.6 dBm
190 / 836.6 MHz	8PSK	1	27.6 dBm	18.6 dBm
251 / 848.8 MHz	8PSK	1	27.7 dBm	18.7 dBm
128 / 824.2 MHz	8PSK	2	25.2 dBm	19.2 dBm
190 / 836.6 MHz	8PSK	2	25.3 dBm	19.3 dBm
251 / 848.8 MHz	8PSK	2	25.3 dBm	19.3 dBm
128 / 824.2 MHz	8PSK	3	24.3 dBm	20.05 dBm
190 / 836.6 MHz	8PSK	3	24.4 dBm	20.15 dBm
251 / 848.8 MHz	8PSK	3	24.4 dBm	20.15 dBm
128 / 824.2 MHz	8PSK	4	22.3 dBm	19.3 dBm
190 / 836.6 MHz	8PSK	4	22.2 dBm	19.2 dBm
251 / 848.8 MHz	8PSK	4	22.3 dBm	19.3 dBm

GSM 850MHz DTM			
Channel / frequency	modulation	slotted avg. power	time based avg. Power (calculated)
128 / 824.2 MHz	GMSK + 1 GMSK	30.9 dBm	**24.9 dBm**
190 / 836.6 MHz	GMSK + 1 GMSK	30.9 dBm	**24.9 dBm**
251 / 848.8 MHz	GMSK + 1 GMSK	30.9 dBm	**24.9 dBm**
128 / 824.2 MHz	GMSK + 2 GMSK	28.9 dBm	24.7 dBm
190 / 836.6 MHz	GMSK + 2 GMSK	28.9 dBm	24.7 dBm
251 / 848.8 MHz	GMSK + 2 GMSK	29.0 dBm	24.8 dBm
128 / 824.2 MHz	GMSK + 1 8PSK	25.7 dBm	19.7 dBm
190 / 836.6 MHz	GMSK + 1 8PSK	25.6 dBm	19.6 dBm
251 / 848.8 MHz	GMSK + 1 8PSK	25.7 dBm	19.7 dBm
128 / 824.2 MHz	GMSK + 2 8PSK	25.4 dBm	21.2 dBm
190 / 836.6 MHz	GMSK + 2 8PSK	25.4 dBm	21.2 dBm
251 / 848.8 MHz	GMSK + 2 8PSK	25.4 dBm	21.2 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	30.4 dBm	21.4 dBm
661 / 1880.0 MHz	GMSK	1	30.3 dBm	21.3 dBm
810 / 1909.8 MHz	GMSK	1	30.2 dBm	21.2 dBm
512 / 1850.2 MHz	GMSK	2	27.8 dBm	21.8 dBm
661 / 1880.0 MHz	GMSK	2	27.8 dBm	21.8 dBm
810 / 1909.8 MHz	GMSK	2	27.6 dBm	21.6 dBm
512 / 1850.2 MHz	GMSK	3	26.5 dBm	22.25 dBm
661 / 1880.0 MHz	GMSK	3	26.5 dBm	22.25 dBm
810 / 1909.8 MHz	GMSK	3	26.5 dBm	22.25 dBm
512 / 1850.2 MHz	GMSK	**4**	**25.5 dBm**	**22.5 dBm**
661 / 1880.0 MHz	GMSK	**4**	**25.5 dBm**	**22.5 dBm**
810 / 1909.8 MHz	GMSK	**4**	**25.5 dBm**	**22.5 dBm**
512 / 1850.2 MHz	8PSK	1	26.6 dBm	17.6 dBm
661 / 1880.0 MHz	8PSK	1	26.6 dBm	17.6 dBm
810 / 1909.8 MHz	8PSK	1	26.5 dBm	17.5 dBm
512 / 1850.2 MHz	8PSK	2	24.5 dBm	18.5 dBm
661 / 1880.0 MHz	8PSK	2	24.5 dBm	18.5 dBm
810 / 1909.8 MHz	8PSK	2	24.4 dBm	18.4 dBm
512 / 1850.2 MHz	8PSK	3	23.7 dBm	19.45 dBm
661 / 1880.0 MHz	8PSK	3	23.7 dBm	19.45 dBm
810 / 1909.8 MHz	8PSK	3	23.6 dBm	19.35 dBm
512 / 1850.2 MHz	8PSK	4	22.6 dBm	19.6 dBm
661 / 1880.0 MHz	8PSK	4	22.6 dBm	19.6 dBm
810 / 1909.8 MHz	8PSK	4	22.5 dBm	19.5 dBm

GSM 850MHz DTM			
Channel / frequency	modulation	slotted avg. power	time based avg. Power (calculated)
512 / 1850.2 MHz	GMSK + 1 GMSK	27.6 dBm	21.6 dBm
661 / 1880.0 MHz	GMSK + 1 GMSK	27.7 dBm	21.7 dBm
810 / 1909.8 MHz	GMSK + 1 GMSK	27.7 dBm	21.7 dBm
512 / 1850.2 MHz	GMSK + 2 GMSK	26.7 dBm	**22.45 dBm**
661 / 1880.0 MHz	GMSK + 2 GMSK	26.7 dBm	**22.45 dBm**
810 / 1909.8 MHz	GMSK + 2 GMSK	26.6 dBm	**22.35 dBm**
512 / 1850.2 MHz	GMSK + 1 8PSK	24.7 dBm	18.7 dBm
661 / 1880.0 MHz	GMSK + 1 8PSK	24.7 dBm	18.7 dBm
810 / 1909.8 MHz	GMSK + 1 8PSK	24.7 dBm	18.7 dBm
512 / 1850.2 MHz	GMSK + 2 8PSK	24.5 dBm	20.25 dBm
661 / 1880.0 MHz	GMSK + 2 8PSK	24.4 dBm	20.15 dBm
810 / 1909.8 MHz	GMSK + 2 8PSK	24.5 dBm	20.25 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.

7.1.4 Conducted power measurements UMTS FDD V (850 MHz)

Max. RMS output power UMTS 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	**23.5**	**23.4**	**23.4**
RMC 64 kbit/s	23.5	23.4	23.4
RMC 144 kbit/s	23.5	23.4	23.4
RMC 384 kbit/s	23.5	23.4	23.4
AMR 4.75 kbit/s	23.5	23.3	23.3
AMR 5.15 kbit/s	23.5	23.4	23.3
AMR 5.9 kbit/s	23.5	23.4	23.4
AMR 6.7 kbit/s	23.5	23.3	23.3
AMR 7.4 kbit/s	23.4	23.3	23.3
AMR 7.95 kbit/s	23.5	23.3	23.3
AMR 10.2 kbit/s	23.5	23.3	23.4
AMR 12.2 kbit/s	23.5	23.4	23.4
HSDPA Sub test 1	**23.5**	**23.4**	**23.4**
HSDPA Sub test 2	22.0	21.9	21.8
HSDPA Sub test 3	20.8	20.8	20.7
HSDPA Sub test 4	20.8	20.7	20.7
DC-HSDPA Sub test 1	23.2	23.1	23.1
DC-HSDPA Sub test 2	21.6	21.5	21.6
DC-HSDPA Sub test 3	22.3	22.4	22.4
DC-HSDPA Sub test 4	21.9	22.0	21.9
HSUPA Sub test 1	**23.3**	**23.2**	**23.2**
HSUPA Sub test 2	**23.5**	**23.4**	**23.4**
HSUPA Sub test 3	23.5	23.4	23.4
HSUPA Sub test 4	23.5	23.4	23.4
HSUPA Sub test 5	23.5	23.4	23.4

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

7.1.5 Conducted power measurements UMTS FDD II (1900 MHz)

Max. RMS output power UMTS 1900 MHz (FDD II) / dBm			
	Channel / frequency		
mode	9262 / 1852.4 MHz	9400 / 1880.0 MHz	9538 / 1907.6 MHz
RMC 12.2 kbit/s	**23.0**	**22.9**	**22.9**
RMC 64 kbit/s	22.9	22.9	22.8
RMC 144 kbit/s	23.0	22.9	22.9
RMC 384 kbit/s	22.9	22.9	22.9
AMR 4.75 kbit/s	22.9	22.8	22.8
AMR 5.15 kbit/s	22.8	22.8	22.8
AMR 5.9 kbit/s	22.9	22.8	22.8
AMR 6.7 kbit/s	22.8	22.7	22.8
AMR 7.4 kbit/s	22.9	22.8	22.9
AMR 7.95 kbit/s	22.9	22.7	22.8
AMR 10.2 kbit/s	22.9	22.8	22.8
AMR 12.2 kbit/s	22.9	22.8	22.8
HSDPA Sub test 1	**22.7**	**22.6**	**22.6**
HSDPA Sub test 2	21.3	21.3	21.3
HSDPA Sub test 3	20.7	20.6	20.6
HSDPA Sub test 4	20.5	20.4	20.5
HSUPA Sub test 1	22.6	22.8	22.7
HSUPA Sub test 2	21.3	21.5	21.3
HSUPA Sub test 3	21.8	22.0	21.7
HSUPA Sub test 4	21.4	21.6	21.4
HSUPA Sub test 5	**22.6**	**22.8**	**22.7**

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 $\Longleftrightarrow$ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\Longleftrightarrow$ $\beta_{hs} = 30/15 * \beta_c$ 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) 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 ⟸⟹ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⟸⟹ $\beta_{hs} = 30/15 * \beta_c$

Note 2 : CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference

Note 3 : For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$

Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : 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 20: 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 power measurements LTE FDD 17 700 MHz

Bandwidth (MHz)	Channel / Frequency (MHz)	Resource block allocation	Average Output Power (dBm)	
			QPSK	16-QAM
5.0	23755 / 706.5	1 RB low	23.5	22.5
		1 RB mid	23.4	22.5
		1 RB high	23.6	22.4
		50% RB low	22.5	21.4
		50% RB mid	22.4	21.5
		50% RB high	22.5	21.4
		100% RB	22.4	21.4
	23790 / 710.0	1 RB low	23.4	22.8
		1 RB mid	23.5	22.9
		1 RB high	23.5	22.9
		50% RB low	22.5	21.4
		50% RB mid	22.5	21.4
		50% RB high	22.6	21.5
		100% RB	22.4	21.4
	23825 / 713.5	1 RB low	23.6	22.4
		1 RB mid	23.5	22.3
		1 RB high	23.6	22.4
		50% RB low	22.5	21.5
		50% RB mid	22.5	21.5
		50% RB high	22.5	21.5
		100% RB	22.5	21.5
10.0	23780 / 709.0	1 RB low	23.5	22.6
		1 RB mid	23.4	22.6
		1 RB high	**23.6**	22.7
		50% RB low	22.5	21.5
		50% RB mid	22.5	21.4
		50% RB high	**22.5**	21.5
		100% RB	22.4	21.4
	23790 / 710.0	1 RB low	23.4	22.3
		1 RB mid	23.5	22.3
		1 RB high	**23.6**	22.3
		50% RB low	22.4	21.5
		50% RB mid	22.5	21.5
		50% RB high	**22.6**	21.6
		100% RB	22.4	21.4
	23800 / 711.0	1 RB low	23.5	22.3
		1 RB mid	23.6	22.4
		1 RB high	**23.6**	22.4
		50% RB low	22.5	21.4
		50% RB mid	22.4	21.4
		50% RB high	**22.5**	21.5
		100% RB	**22.5**	21.4

Table 21: Test results conducted power measurement LTE FDD 17 700 MHz.

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7.1.8 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.

Conducted and radiated measurements were performed with the maximum number of bundled TTIs supported by the DUT (see section 2.4 for details).

7.1.9 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.

7.1.1 Conducted power measurements WLAN 2.4 GHz

802.11b		maximum average conducted output power [dBm]			
Band	channel	1Mbps	2Mbps	5.5Mbps	11Mbps
2450MHz	1	13.1	13.1	13.2	12.9
	6	16.2	16.2	16.0	15.9
	11	13.0	12.9	13.0	12.9

Table 22: Test results conducted power measurement 802.11b

802.11g		maximum average conducted output power [dBm]							
Band	channel	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
2450MHz	1	10.9	10.8	10.8	10.7	10.5	10.3	10.0	10.0
	6	13.9	14.1	13.7	13.6	13.6	13.4	13.0	12.9
	11	10.7	10.6	10.6	10.5	10.2	10.0	9.9	9.8

Table 23: Test results conducted power measurement 802.11g

802.11n HT-20		maximum average conducted output power [dBm]							
Band	channel	MCS-0 6.5Mbps	MCS-1 13Mbps	MCS-2 19.5Mbps	MCS-3 26Mbps	MCS-4 39Mbps	MCS-5 52Mbps	MCS-6 58.5Mbps	MCS-7 65Mbps
2450MHz	1	10.7	10.4	10.5	10.4	10.1	9.9	9.7	9.8
	6	13.6	13.5	13.1	13.3	12.9	12.7	12.9	12.5
	11	10.3	10.2	10.0	9.9	9.8	9.5	9.7	9.4

Table 24: Test results conducted power measurement 802.11n HT-20

7.1.2 Conducted power measurements WLAN 5 GHz

802.11a		maximum average conducted output power [dBm]							
Band	channel	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
5200MHz	36	14.1	14.0	13.8	13.7	13.8	13.6	13.5	13.4
	40	14.2	14.0	13.9	13.9	13.9	13.6	13.5	13.4
	44	14.1	14.0	14.0	13.8	13.9	13.7	13.6	13.4
	48	14.1	14.0	14.0	13.9	13.9	13.7	13.6	13.4
5300MHz	52	14.0	13.7	13.9	13.6	13.7	13.4	13.3	13.2
	56	13.9	13.8	13.9	13.7	13.7	13.4	13.4	13.1
	60	13.9	13.7	13.7	13.6	13.7	13.4	13.3	13.1
	64	14.0	13.9	13.7	13.7	13.8	13.6	13.3	13.2
5600MHz	100	14.1	14.1	14.0	13.9	14.0	13.7	13.6	13.4
	104	14.2	14.1	14.0	13.8	13.9	13.8	13.6	13.5
	108	14.3	14.2	14.0	14.0	14.0	13.8	13.6	13.5
	112	14.1	14.1	14.2	13.9	14.0	13.7	13.6	13.6
	116	14.2	14.1	14.2	13.9	14.0	13.8	13.6	13.5
	120	14.1	14.1	14.1	14.0	14.1	13.8	13.7	13.4
	124	14.2	14.1	14.1	13.9	14.0	13.8	13.6	13.5
	128	14.0	14.0	14.0	13.8	13.8	13.6	13.5	13.4
	132	14.1	14.0	13.9	13.8	13.9	13.7	13.5	13.3
	136	14.1	14.0	13.9	13.8	13.8	13.6	13.5	13.4
	140	14.0	13.9	14.0	13.8	13.7	13.5	13.4	13.3
5800MHz	149	14.1	13.9	13.9	13.7	13.8	13.6	13.5	13.3
	153	14.0	13.8	13.7	13.7	13.7	13.6	13.3	13.3
	157	14.2	14.1	14.0	14.0	14.1	13.9	13.7	13.5
	161	14.0	14.0	13.9	13.8	13.9	13.6	13.6	13.4
	165	14.0	13.9	13.8	13.7	13.8	13.5	13.4	13.3

Table 25: Test results conducted power measurement 802.11a

802.11n HT-20 / 802.11ac VHT-20		maximum average conducted output power [dBm]								
Band	channel	MCS-0 6.5Mbps	MCS-1 13Mbps	MCS-2 19.5Mbps	MCS-3 26Mbps	MCS-4 39Mbps	MCS-5 52Mbps	MCS-6 58.5Mbps	MCS-7 65Mbps	MCS-8 78Mbps
5200MHz	36	14.1	13.9	13.6	14.0	13.7	13.4	13.4	13.2	13.2
	40	14.0	13.9	13.7	13.8	13.6	13.4	13.4	13.2	13.2
	44	13.9	13.9	13.7	14.0	13.6	13.4	13.4	13.3	13.2
	48	13.9	13.8	13.6	13.9	13.6	13.5	13.4	13.3	13.2
5300MHz	52	13.9	13.7	13.5	13.8	13.5	13.2	13.2	13.1	13.1
	56	13.8	13.6	13.5	13.6	13.4	13.2	13.1	13.1	12.9
	60	13.8	13.7	13.5	13.7	13.5	13.2	13.1	13.0	13.0
	64	13.9	13.5	13.5	13.6	13.5	13.4	13.2	13.2	13.0
5600MHz	100	14.1	14.0	13.8	14.0	13.7	13.5	13.4	13.2	13.2
	104	14.1	14.0	13.8	14.0	13.8	13.5	13.5	13.4	13.3
	108	14.1	14.1	13.8	14.1	13.8	13.6	13.6	13.5	13.4
	112	14.3	14.0	14.0	14.0	13.8	13.7	13.6	13.5	13.3
	116	14.2	13.9	13.8	14.0	13.8	13.6	13.5	13.5	13.3
	120	14.0	14.0	13.9	13.9	13.8	13.6	13.5	13.4	13.2
	124	14.1	13.9	13.8	13.9	13.7	13.5	13.4	13.3	13.3
	128	13.9	13.8	13.7	13.9	13.7	13.5	13.4	13.3	13.2
	132	13.9	13.8	13.6	13.8	13.6	13.4	13.4	13.3	13.2
	136	14.0	13.8	13.7	13.9	13.5	13.5	13.4	13.2	13.1
	140	13.8	13.8	13.6	13.9	13.6	13.4	13.4	13.3	13.1
5800MHz	149	14.0	13.7	13.7	13.8	13.7	13.4	13.3	13.3	13.2
	153	13.7	13.6	13.4	13.7	13.6	13.2	13.2	13.1	13.0
	157	14.0	13.9	13.8	14.0	13.8	13.7	13.6	13.5	13.4
	161	14.0	13.7	13.6	13.8	13.7	13.4	13.3	13.2	13.2
	165	13.8	13.6	13.6	13.8	13.5	13.4	13.3	13.2	13.1

Table 26: Test results conducted power measurement 802.11n HT-20 / 802.11ac VHT-20

802.11n HT-40 / 802.11ac VHT-40		maximum average conducted output power [dBm]									
Band	channel	MCS-0 13.5Mbps	MCS-1 27Mbps	MCS-2 40.5Mbps	MCS-3 54Mbps	MCS-4 81Mbps	MCS-5 108Mbps	MCS-6 121.5Mbps	MCS-7 135Mbps	MCS-8 162Mbps	MCS-9 180Mbps
5200MHz	38	9.7	9.4	9.2	9.3	9.0	8.7	8.6	8.6	8.4	8.3
	46	9.7	9.5	9.3	9.4	9.0	8.9	8.6	8.5	8.3	8.4
5300MHz	54	9.6	9.3	9.1	8.9	8.6	8.4	8.3	8.2	8.0	8.0
	62	9.5	9.2	9.0	9.0	8.6	8.4	8.2	8.2	8.1	7.9
5600MHz	102	9.9	9.7	9.5	9.7	9.0	8.7	8.7	8.6	8.4	8.4
	118	10.1	9.8	9.4	9.4	9.7	8.8	8.7	8.6	8.5	8.5
	134	9.9	9.5	9.2	9.1	8.8	8.6	8.4	8.3	8.2	8.2
5800MHz	151	10.1	9.8	9.6	9.5	9.1	9.0	8.8	8.8	8.6	8.5
	159	9.7	9.5	9.3	9.2	8.8	8.6	8.3	8.4	8.3	8.2

Table 27: Test results conducted power measurement 802.11n HT-40 / 802.11ac VHT-40

802.11ac VHT-80		maximum average conducted output power [dBm]									
Band	channel	MCS-0 29.3Mbps	MCS-1 58.5Mbps	MCS-2 87.8Mbps	MCS-3 117Mbps	MCS-4 175.5Mbps	MCS-5 234Mbps	MCS-6 263.3Mbps	MCS-7 292.5Mbps	MCS-8 351Mbps	MCS-9 390Mbps
5200MHz	42	9.4	8.9	8.6	8.8	8.4	8.1	8.1	8.0	7.7	7.8
5300MHz	58	9.3	8.9	8.6	8.7	8.4	8.1	8.0	8.1	7.8	7.8
5600MHz	106	9.2	8.9	8.6	8.7	8.3	8.0	7.9	7.9	7.7	7.6
	122	9.2	8.8	8.3	8.4	8.3	7.9	7.8	7.8	7.5	7.6
5800MHz	155	9.5	9.1	8.8	8.9	8.5	8.3	8.1	8.2	8.0	8.0

Table 28: Test results conducted power measurement 802.11ac VHT-80

7.1.3 Standalone SAR Test Exclusion

Standalone SAR test exclusion considerations for **Head** position					
Communication system	freq. (MHz)	P_{avg}* (dBm)	P_{avg}* (mW)	**threshold$_{1-g}$ comparison value**	SAR test exclusion
GSM 850	835	25.0	316.2	57.8	no
GSM 1900	1880	22.4	171.8	47.1	no
UMTS FDD II	1880	23.0	199.5	54.7	no
UMTS FDD V	835	23.5	223.9	40.9	no
LTE FDD 17	710	24.0	251.2	42.3	no
WLAN 2450	2450	17.3	53.7	16.8	no
WLAN 5.2 GHz	5200	15.2	33.1	15.1	no
WLAN 5.3 GHz	5300	15.2	33.1	15.2	no
WLAN 5.6 GHz	5600	15.2	33.1	15.7	no
WLAN 5.8 GHz	5800	15.2	33.1	15.9	no
Bluetooth 2450	2450	10.5	11.2	3.5	no

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

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

Standalone SAR test exclusion considerations for **Hot spot mode** position						
Communication system	freq. (MHz)	distance (mm)	P_{avg}* (dBm)	P_{avg}* (mW)	**threshold$_{1-g}$ comparison value**	SAR test exclusion
GSM 850	835	10	25.0	316.2	28.9	no
GSM 1900	1880	10	22.5	177.8	24.4	no
UMTS FDD II	1880	10	23.0	199.5	27.4	no
UMTS FDD V	835	10	23.5	223.9	20.5	no
LTE FDD 17	710	10	24.0	251.2	21.2	no
WLAN 2450	2450	10	17.3	53.7	8.4	no
Bluetooth 2450	2450	10	10.5	11.2	1.8	yes

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

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

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

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

Standalone SAR test exclusion considerations for **Body worn** position						
Communication system	freq. (MHz)	distance (mm)	P_{avg}* (dBm)	P_{avg}* (mW)	**threshold$_{1-g}$ comparison value**	SAR test exclusion
GSM 850	835	15	25.0	316.2	19.3	no
GSM 1900	1880	15	22.5	177.8	16.3	no
UMTS FDD II	1880	15	23.0	199.5	18.2	no
UMTS FDD V	835	15	23.5	223.9	13.6	no
LTE FDD 17	710	15	24.0	251.2	14.1	no
WLAN 2450	2450	15	17.3	53.7	5.6	no
WLAN 5.2 GHz	5200	15	15.2	33.1	5.0	no
WLAN 5.3 GHz	5300	15	15.2	33.1	5.1	no
WLAN 5.6 GHz	5600	15	15.2	33.1	5.2	no
WLAN 5.8 GHz	5800	15	15.2	33.1	5.3	no
Bluetooth 2450	2450	15	10.5	11.2	1.2	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

7.1.4 Hotspot mode SAR measurement positions

Hotspot mode SAR measurement positions						
mode	front	rear	left edge	right edge	top edge	bottom edge
GSM 850	yes	yes	yes	yes	no	yes
GSM 1900	yes	yes	yes	yes	no	yes
WCDMA FDD II	yes	yes	yes	yes	no	yes
WCDMA FDD V	yes	yes	yes	yes	no	yes
LTE FDD 17 750	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.

Antenna dimensions and separation distances see in photo documentation

7.2 SAR test results

7.2.1 Results overview

measured / extrapolated SAR numbers - Head - GSM 850 MHz - DTM									
Ch.	Freq. (MHz)	time slots	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
				declared**	measured	Measured	Extrapolated	measured	
190	836.6	2	left cheek	31.0	31.0	0.574	0.574	0.443	21.5
190	836.6	2	left tilted 15°	31.0	31.0	0.338	0.338	0.264	21.5
128	824.2	2	right cheek	31.0	30.9	**0.641**	**0.656**	**0.494**	21.5
190	836.6	2	right cheek	31.0	31.0	0.643	0.643	0.494	21.5
251	848.8	2	right cheek	31.0	31.0	0.605	0.605	0.463	21.5
190	836.6	2	right tilted 15°	31.0	31.0	0.322	0.322	0.255	21.5

Table 32: Test results head SAR GSM 850MHz GMSK **2TS** in uplink (see max. SAR plot in Annex B.1: GSM 850MHz page 76)

measured / extrapolated SAR numbers - hotspot mode - GSM 850 MHz										
Ch.	Freq. (MHz)	time slots	distance (mm)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
					declared**	measured	measured	extrapolated	measured	
190	836.6	2	10	front	31.0	31.0	0.657	0.657	0.509	21.9
128	824.2	2	10	rear	31.0	30.9	0.724	0.741	0.542	21.9
190	836.6	2	10	rear	31.0	31.0	0.774	0.774	0.587	21.9
251	848.8	2	10	rear	31.0	31.0	**0.787**	**0.787**	**0.598**	21.9
190	836.6	2	10	left edge	31.0	31.0	0.341	0.341	0.239	21.9
190	836.6	2	10	right edge	31.0	31.0	0.374	0.374	0.261	21.9
190	836.6	2	10	bottom edge	31.0	31.0	0.227	0.227	0.149	21.9

Table 33: Test results hotspot mode SAR GSM 850 MHz (see max. SAR plot in Annex B.1: GSM 850MHz page 76)

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

measured / extrapolated SAR numbers - Body worn - GSM 850 MHz										
Ch.	Freq. (MHz)	time slots	distance (mm)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
					declared**	measured	measured	extrapolated	measured	
190	836.6	2	15	front	31.0	31.0	0.548	0.548	0.420	21.9
128	824.2	2	15	rear	31.0	30.9	0.554	0.567	0.420	21.9
190	836.6	2	15	rear	31.0	31.0	0.609	0.609	0.460	21.9
251	848.8	2	15	rear	31.0	31.0	**0.646**	**0.646**	**0.488**	21.9

Table 34: Test results body worn SAR GSM 850 MHz (see max. SAR plot in Annex B.1: GSM 850MHz page 76)

** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - GSM 1900 MHz - DTM									
Ch.	Freq. (MHz)	time slots	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
				declared**	measured	measured	extrapolated	measured	
512	1850.2	3	left cheek	26.5	26.5	**0.352**	**0.352**	**0.220**	22.3
661	1910	3	left cheek	26.5	26.5	0.347	0.347	0.213	22.3
810	1880.0	3	left cheek	26.5	26.5	0.332	0.332	0.205	22.3
661	1880.0	3	left tilted 15°	26.5	26.5	0.086	0.086	0.051	22.3
661	1880.0	3	right cheek	26.5	26.5	0.210	0.210	0.133	22.3
661	1880.0	3	right tilted 15°	26.5	26.5	0.064	0.064	0.039	22.3

Table 35: Test results head SAR GSM 1900MHz GMSK **3TS** in uplink (see max. SAR plot in Annex B.2: GSM 1900MHz page 79)

measured / extrapolated SAR numbers - hotspot mode - GSM 1900 MHz											
Ch.	Freq. (MHz)	time slots	distance	modulation	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
						declared**	measured	measured	extrapolated	measured	
661	1880.0	4	10	GMSK	rear	25.5	25.5	0.786	0.786	0.448	21.8
512	1850.2	4	10	GMSK	front	25.5	25.5	0.915	0.915	0.504	21.8
661	1880.0	4	10	GMSK	front	25.5	25.5	**0.982**	**0.982**	**0.530**	21.8
810	1909.8	4	10	GMSK	front	25.5	25.5	0.910	0.910	0.494	21.8
661	1880.0	4	10	GMSK	left edge	25.5	25.5	0.182	0.182	0.111	21.8
661	1880.0	4	10	GMSK	right edge	25.5	25.5	0.131	0.131	0.082	21.8
512	1850.2	4	10	GMSK	bottom edge	25.5	25.5	0.875	0.875	0.463	21.8
661	1880.0	4	10	GMSK	bottom edge	25.5	25.5	0.907	0.907	0.466	21.8
810	1909.8	4	10	GMSK	bottom edge	25.5	25.5	0.918	0.918	0.479	21.8
661	1880.0	4	10	GMSK	front	25.5	25.5	**0.973**	**0.973**	**1.512**	21.8

Table 36: Test results hotspot mode SAR GSM 1900 MHz (see max. SAR plot in Annex B.2: GSM 1900MHz page 79)
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

measured / extrapolated SAR numbers - Body worn - GSM 1900 MHz											
Ch.	Freq. (MHz)	time slots	distance	modulation	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
						declared**	measured	measured	extrapolated	measured	
512	1850.2	4	15	GMSK	front	25.5	25.5	**0.527**	**0.527**	**0.310**	21.8
661	1880.0	4	15	GMSK	front	25.5	25.5	0.478	0.478	0.282	21.8
810	1909.8	4	15	GMSK	front	25.5	25.5	0.513	0.513	0.298	21.8
661	1880.0	4	15	GMSK	rear	25.5	25.5	0.430	0.430	0.258	21.8

Table 37: Test results body worn SAR GSM 1900 MHz (see max. SAR plot in Annex B.2: GSM 1900MHz page 79)

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

measured / extrapolated SAR numbers - Head - UMTS FDD II 1880 MHz								
Ch.	Freq. (MHz)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
			declared**	measured	measured	extrapolated	measured	
9262	1852.4	left cheek	23.0	23.0	0.376	0.376	0.234	22.3
9400	1880.0	left cheek	23.0	22.9	**0.420**	**0.430**	**0.261**	22.3
9538	1907.6	left cheek	23.0	22.9	0.393	0.402	0.243	22.3
9400	1880.0	left tilted 15°	23.0	22.9	0.109	0.112	0.066	22.3
9400	1880.0	right cheek	23.0	22.9	0.289	0.296	0.186	22.3
9400	1880.0	right tilted 15°	23.0	22.9	0.081	0.083	0.049	22.3

Table 38: Test results head SAR UMTS FDD II 1880 MHz (see max. SAR plot in Annex B.3: UMTS FDD II page 82)

measured / extrapolated SAR numbers - hotspot mode - UMTS FDD II 1880 MHz										
Ch.	Freq. (MHz)	test condition	distance (mm)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
					declared**	measured	measured	extrapolated	measured	
9262	1852.4	RMC	10	front	23.0	23.0	0.879	0.879	0.483	21.8
9400	1880.0	RMC	10	front	23.0	22.9	**1.000**	**1.023**	**0.543**	21.8
9538	1907.6	RMC	10	front	23.0	22.9	0.945	0.967	0.512	21.8
9400	1880.0	RMC	10	rear	23.0	22.9	0.730	0.747	0.418	21.8
9400	1880.0	RMC	10	left edge	23.0	22.9	0.204	0.209	0.123	21.8
9400	1880.0	RMC	10	right edge	23.0	22.9	0.138	0.141	0.087	21.8
9262	1852.4	RMC	10	bottom edge	23.0	23.0	0.843	0.843	0.438	21.8
9400	1880.0	RMC	10	bottom edge	23.0	22.9	0.897	0.918	0.463	21.8
9538	1907.6	RMC	10	bottom edge	23.0	22.9	0.924	0.946	0.477	21.8
9400	1880.0	RMC	10	front	23.0	22.9	0.976	0.999	0.529	21.8

Test results hotspot mode SAR UMTS FDD II 1880 MHz (see max. SAR plot in Annex B.3: UMTS FDD II page 82)
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

measured / extrapolated SAR numbers - Body worn - UMTS FDD II 1880 MHz										
Ch.	Freq. (MHz)	test condition	distance (mm)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (\	liquid (°C)
					declared**	measured	measured	extrapolated	measurec	
9262	1852.4	RMC	15	front	23.0	23.0	0.440	0.440	0.262	21.8
9400	1880.0	RMC	15	front	23.0	22.9	**0.459**	**0.470**	**0.271**	21.8
9538	1907.6	RMC	15	front	23.0	22.9	0.448	0.458	0.264	21.8
9400	1880.0	RMC	15	rear	23.0	22.9	0.411	0.421	0.249	21.8

Table 39: Test results body worn SAR UMTS FDD II 1880 MHz (see max. SAR plot in Annex B.3: UMTS FDD II page 82)

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

measured / extrapolated SAR numbers - Head - UMTS FDD V 850 MHz								
Ch.	Freq. (MHz)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
			declared**	measured	measured	extrapolated	measured	(°C)
4132	826.4	left cheek	23.5	23.4	**0.416**	**0.426**	**0.317**	21.5
4182	836.4	left cheek	23.5	23.4	0.412	0.422	0.313	21.5
4233	846.6	left cheek	23.5	23.4	0.392	0.401	0.298	21.5
4182	836.4	left tilted 15°	23.5	23.4	0.238	0.244	0.186	21.5
4182	836.4	right cheek	23.5	23.4	0.389	0.398	0.297	21.5
4182	836.4	right tilted 15°	23.5	23.4	0.210	0.215	0.166	21.5

Table 40: Test results head SAR UMTS FDD V 850 MHz (see max. SAR plot in Annex B.4: UMTS FDD V page 85)

measured / extrapolated SAR numbers - hotspot mode - UMTS FDD V 850 MHz										
Ch.	Freq. (MHz)	test conditio	distance (mm)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
					declared**	measured	measured	extrapolated	measured	(°C)
4182	836.4	RMC	10	front	23.5	23.4	0.411	0.421	0.318	21.9
4132	826.4	RMC	10	rear	23.5	23.5	0.502	0.502	0.376	21.9
4182	836.4	RMC	10	rear	23.5	23.4	0.487	0.498	0.366	21.9
4233	846.6	RMC	10	rear	23.5	23.4	**0.519**	**0.531**	**0.387**	21.9
4182	836.4	RMC	10	left edge	23.5	23.4	0.258	0.264	0.181	21.9
4182	836.4	RMC	10	right edge	23.5	23.4	0.258	0.264	0.181	21.9
4182	836.4	RMC	10	bottom edge	23.5	23.4	0.125	0.128	0.082	21.9

Table 41: Test results hotspot mode SAR UMTS FDD V 850 MHz (see max. SAR plot in Annex B.4: UMTS FDD V page 85)
Top edge position for hotspot mode is not required since the distance from the main antenna to the edge is greater than 2.5 cm.

measured / extrapolated SAR numbers - Body worn - UMTS FDD V 850 MHz										
Ch.	Freq. (MHz)	test condition	distance (mm)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
					declared**	measured	measured	extrapolated	measured	(°C)
4132	826.4	RMC	15	front	23.5	23.5	0.355	0.355	0.272	21.9
4182	836.4	RMC	15	front	23.5	23.4	0.359	0.367	0.277	21.9
4233	846.6	RMC	15	front	23.5	23.4	**0.361**	**0.369**	**0.278**	21.9
4182	836.4	RMC	15	rear	23.5	23.4	0.358	0.366	0.271	21.9

Table 42: Test results body worn SAR UMTS FDD V 850 MHz (see max. SAR plot in Annex B.4: UMTS FDD V page 85)

** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - LTE FDD 17 700 MHz									
Ch.	Freq. (MHz)	RB offset	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
				declared**	measured	measured	extrapolated	measured	(°C)
10MHz BW/1RB/QPSK									
23780	709	high	left cheek	24.0	23.6	0.327	0.359	0.252	21.5
23790	710	high	left cheek	24.0	23.6	0.329	0.361	0.255	21.5
23800	711	high	left cheek	24.0	23.6	**0.338**	**0.371**	**0.263**	21.5
23780	709	high	left tilted 15°	24.0	23.6	0.164	0.180	0.131	21.5
23790	710	high	right cheek	24.0	23.6	0.292	0.320	0.223	21.5
23780	709	high	right tilted 15°	24.0	23.6	0.147	0.161	0.116	21.5
10MHz BW/25RB/QPSK									
23790	710	high	left cheek	23.0	22.6	0.256	0.281	0.196	21.5
23790	710	high	left tilted 15°	23.0	22.6	0.131	0.144	0.104	21.5
23790	710	high	right cheek	23.0	22.6	0.233	0.255	0.179	21.5
23790	710	high	right tilted 15°	23.0	22.6	0.116	0.127	0.092	21.5

Table 43: Test results head SAR LTE FDD 17 700 MHz (see max. SAR plot in Annex B.5: LTE FDD 17 page 88)

measured / extrapolated SAR numbers - hotspot mode - LTE FDD 17 700 MHz										
Ch.	Freq. (MHz)	RB offset	distance (mm)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
					declared**	measured	measured	extrapolated	measured	(°C)
10MHz BW/1RB/QPSK										
23780	709	high	10	front	24.0	23.6	0.422	0.463	0.323	21.8
23780	709	high	10	rear	24.0	23.6	0.499	0.547	0.373	21.8
23790	710	high	10	rear	24.0	23.6	0.503	0.552	0.377	21.8
23800	711	high	10	rear	24.0	23.6	**0.540**	**0.592**	**0.401**	21.8
23780	709	high	10	left edge	24.0	23.6	0.315	0.345	0.224	21.8
23780	709	high	10	right edge	24.0	23.6	0.070	0.077	0.050	21.8
23780	709	high	10	bottom edge	24.0	23.6	0.055	0.060	0.033	21.8
10MHz BW/25RB/QPSK										
23790	710	high	10	front	23.0	22.6	0.336	0.368	0.258	21.8
23790	710	high	10	rear	23.0	22.6	0.403	0.442	0.301	21.8
23790	710	high	10	left edge	23.0	22.6	0.248	0.272	0.177	21.8
23790	710	high	10	right edge	23.0	22.6	0.078	0.085	0.056	21.8
23790	710	high	10	bottom edge	23.0	22.6	0.048	0.052	0.029	21.8

Table 44: Test results hotspot mode SAR LTE FDD 17 700 MHz (see max. SAR plot in Annex B.5: LTE FDD 17 page 88)

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

measured / extrapolated SAR numbers - Body worn - LTE FDD 17 700 MHz										
Ch.	Freq. (MHz)	RB offset	distance	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
					declared**	measured	measured	extrapolated	measured	
10MHz BW/1RB/QPSK										
23780	709	high	15	front	24.0	23.6	0.328	0.360	0.251	21.8
23780	709	high	15	rear	24.0	23.6	0.381	0.418	0.288	21.8
23790	710	high	15	rear	24.0	23.6	0.394	0.432	0.297	21.8
23800	711	high	15	rear	24.0	23.6	**0.399**	**0.437**	**0.300**	21.8
10MHz BW/25RB/QPSK										
23790	710	high	15	front	23.0	22.6	0.257	0.282	0.197	21.8
23790	710	high	15	rear	23.0	22.6	0.308	0.338	0.231	21.8

Table 45: Test results body worn SAR LTE FDD 17 700 MHz (see max. SAR plot in Annex B.5: LTE FDD 17 page 88)
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - WLAN 2450 MHz								
Ch.	Freq. (MHz)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
			declared**	measured	measured	extrapolated	measured	(°C)
1	2412	left cheek	14.3	13.1	0.203	0.268	0.095	21.0
6	2437	left cheek	17.3	16.2	**0.318**	**0.410**	**0.151**	21.0
11	2462	left cheek	14.3	13.0	0.119	0.161	0.056	21.0
6	2437	left tilted 15°	17.3	16.2	0.101	0.130	0.051	21.0
6	2437	right cheek	17.3	16.2	0.156	0.201	0.081	21.0
6	2437	right tilted 15°	17.3	16.2	0.088	0.114	0.043	21.0

Table 46: Test results head SAR WLAN 2450 MHz (see max. SAR plot in Annex B.6: WLAN 2450MHz page 91)

measured / extrapolated SAR numbers - hotspot mode - WLAN 2450 MHz										
Ch.	Freq. (MHz)	Test condition	distance	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
					declared**	measured	measured	extrapolated	measured	
6	2437	1Mbit/s	10	front	17.3	16.2	0.082	0.105	0.042	21.5
1	2412	1Mbit/s	10	rear	14.3	13.1	0.131	0.173	0.065	21.5
6	2437	1Mbit/s	10	rear	17.3	16.2	**0.205**	**0.264**	**0.103**	21.5
11	2462	1Mbit/s	10	rear	14.3	13.0	0.089	0.120	0.043	21.5
6	2437	1Mbit/s	10	left edge	17.3	16.2	0.004	0.005	0.002	21.5
6	2437	1Mbit/s	10	right edge	17.3	16.2	0.156	0.201	0.077	21.5
6	2437	1Mbit/s	10	top	17.3	16.2	0.018	0.023	0.010	21.5

Table 47: Test results hotspot mode SAR WLAN 2450 MHz (see max. SAR plot in Annex B.6: WLAN 2450MHz page 91)
Bottom side edge positions for hotspot mode are not required since the distance from the WLAN antenna to the edge is greater than 2.5cm.

measured / extrapolated SAR numbers - Body worn - WLAN 2450 MHz										
Ch.	Freq. (MHz)	Test condition	distance	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
					declared**	measured	measured	extrapolated	measured	
6	2437	1Mbit/s	15	front	17.3	16.2	0.044	0.057	0.024	21.5
1	2412	1Mbit/s	15	rear	14.3	13.1	0.056	0.074	0.030	21.5
6	2437	1Mbit/s	15	rear	17.3	16.2	**0.102**	**0.131**	**0.054**	21.5
11	2462	1Mbit/s	15	rear	14.3	13.0	0.038	0.051	0.019	21.5

Table 48: Test results body worn SAR WLAN 2450 MHz (see max. SAR plot in Annex B.6: WLAN 2450MHz page 91)
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - WLAN 5 GHz								
Ch.	Freq. (MHz)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
			declared**	measured	measured	extrapolated	measured	(°C)
40	5200	left cheek	15.2	14.2	0.072	0.091	0.025	22.6
64	5320	left cheek	15.2	14.0	**0.118**	**0.156**	**0.050**	22.6
108	5540	left cheek	15.2	14.3	0.093	0.114	0.031	22.6
157	5785	left cheek	15.2	14.2	0.072	0.091	0.035	22.6
40	5200	left tilted 15°	15.2	14.2	0.049	0.061	0.023	22.6
64	5320	left tilted 15°	15.2	14.0	0.055	0.072	0.030	22.6
108	5540	left tilted 15°	15.2	14.3	0.053	0.065	0.029	22.6
157	5785	left tilted 15°	15.2	14.2	0.035	0.044	0.023	22.6
40	5200	right cheek	15.2	14.2	0.050	0.063	0.024	22.6
64	5320	right cheek	15.2	14.0	0.048	0.064	0.013	22.6
108	5540	right cheek	15.2	14.3	0.025	0.031	0.006	22.6
157	5785	right cheek	15.2	14.2	0.028	0.035	0.007	22.6
40	5200	right tilted 15°	15.2	14.2	0.010	0.012	0.002	22.6
64	5320	right tilted 15°	15.2	14.0	0.012	0.015	0.002	22.6
108	5540	right tilted 15°	15.2	14.3	0.023	0.028	0.014	22.6
157	5785	right tilted 15°	15.2	14.2	0.011	0.014	0.002	22.6

Table 49: Test results head SAR WLAN 5 GHz (see max. SAR plot in Annex B.7: WLAN 5GHz page 94)

measured / extrapolated SAR numbers - Body worn - WLAN 5 GHz										
Ch.	Freq. (MHz)	Test condition	distance	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid (°C)
					declared**	measured	measured	extrapolated	measured	
40	5200	6Mbit/s	15	front	15.2	14.2	0.031	0.039	0.011	21.7
64	5320	6Mbit/s	15	front	15.2	14.0	0.044	0.059	0.017	21.7
108	5540	6Mbit/s	15	front	15.2	14.3	0.025	0.031	0.007	21.7
157	5785	6Mbit/s	15	front	15.2	14.2	0.010	0.013	0.002	21.7
40	5200	6Mbit/s	15	rear	15.2	14.2	0.146	0.184	0.058	21.7
64	5320	6Mbit/s	15	rear	15.2	14.0	**0.182**	**0.240**	**0.070**	21.7
108	5540	6Mbit/s	15	rear	15.2	14.3	0.151	0.186	0.061	21.7
157	5785	6Mbit/s	15	rear	15.2	14.2	0.118	0.149	0.043	21.7

Table 50: Test results body worn SAR WLAN 5 GHz (see max. SAR plot in Annex B.7: WLAN 5GHz page 94)
** - maximum possible output power declared by manufacturer

measured / extrapolated SAR numbers - Head - Bluetooth 2450 MHz								
Ch.	Freq. (MHz)	Position	cond. P_{max} (dBm)		SAR_{1g} results(W/kg)		SAR_{10g} (W/kg)	liquid
			declared**	measured	measured	extrapolated	measured	(°C)
39	2441	left cheek	10.50	8.65	0.001	0.001	0.001	21.9
39	2441	left tilted 15°	10.50	8.65	0.001	0.001	0.000	21.9
39	2441	right cheek	10.5	8.65	0.001	0.001	0.000	21.9
39	2441	right tilted 15°	10.5	8.65	0.000	0.000	0.000	21.9

Table 51: Test results head SAR Bluetooth 2.4 GHz (see max. SAR plot in Annex B.8: Bluetooth 2450MHz page 96)

Estimated stand alone SAR.					
Communication system	freq. (GHz)	distance (mm)	P_{avg} (dBm)	P_{avg} (mW)	$estimated_{1-g}$ (W/kg)
Bluetooth 2450 hotspot	2.45	10	10.5	11.2	0.234
Bluetooth 2450 body worn	2.45	15	10.5	11.2	0.156

Table 52: Estimated stand alone SAR_{max} for **Bluetooth 2450MHz** hotspot mode and body worn

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

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.
- For 802.11ac slide 78 of 79 in the October 2012 TCB workshop slides and slide 44 of 49 in the April 2013 TCB workshop slides were referred to (RF exposure slides for both)
- Required WLAN test channels were selected according to KDB 248227
- For body worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15 mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.
- 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
- IEEE 1528-2003 require the middle channel to be tested first. This generally applies to wireless devices that are designed to operate in technologies with tight tolerances for maximum output power variations across channels in the band. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
- **10-g extremity SAR** is required only for the surfaces and edges with hotspot mode 1-g SAR > 1.2 W/kg.

7.2.3 Multiple Transmitter Information

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

reported SAR **WWAN** and **WLAN 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR**	distance	**ratio**
		WWAN	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
GSM 850	left cheek	0.574	0.410	0.984		
	left tilted 15°	0.338	0.130	0.468		
	right cheek	0.656	0.201	0.857		
	right tilted 15°	0.322	0.114	0.436		
	front 10mm	0.657	0.105	0.762		
	rear 10mm	0.787	0.264	1.051		
	front 15mm	0.548	0.057	0.605		
	rear 15mm	0.646	0.131	0.777		
GSM 1900	left cheek	0.352	0.410	0.762		
	left tilted 15°	0.086	0.130	0.216		
	right cheek	0.210	0.201	0.411		
	right tilted 15°	0.064	0.114	0.178		
	front 10mm	0.982	0.105	1.087		
	rear 10mm	0.786	0.264	1.050		
	front 15mm	0.527	0.057	0.584		
	rear 15mm	0.430	0.131	0.561		
UMTS FDD II	left cheek	0.430	0.410	0.840		
	left tilted 15°	0.112	0.130	0.242		
	right cheek	0.296	0.201	0.497		
	right tilted 15°	0.083	0.114	0.197		
	front 10mm	1.023	0.105	**1.128**		
	rear 10mm	0.747	0.264	1.011		
	front 15mm	0.470	0.057	0.527		
	rear 15mm	0.421	0.131	0.552		
UMTS FDD V	left cheek	0.426	0.410	0.836		
	left tilted 15°	0.244	0.130	0.374		
	right cheek	0.398	0.201	0.599		
	right tilted 15°	0.215	0.114	0.329		
	front 10mm	0.421	0.105	0.526		
	rear 10mm	0.531	0.264	0.795		
	front 15mm	0.369	0.057	0.426		
	rear 15mm	0.366	0.131	0.497		
LTE FDD 17	left cheek	0.371	0.410	0.781		
	left tilted 15°	0.180	0.130	0.310		
	right cheek	0.320	0.201	0.521		
	right tilted 15°	0.161	0.114	0.275		
	front 10mm	0.463	0.105	0.568		
	rear 10mm	0.592	0.264	0.856		
	front 15mm	0.360	0.057	0.417		
	rear 15mm	0.437	0.131	0.568		

Table 53: SAR_{max} WWAN and **WLAN 2.4GHz**, ΣSAR evaluation, **$SPLSR_i$**

reported SAR **WWAN** and **WLAN 5GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR**	distance	**ratio**
		WWAN	WLAN	<1.6W/kg	**Ri**, mm	≤ 0.040
GSM 850	left cheek	0.574	0.156	**0.730**		
	left tilted 15°	0.338	0.072	0.410		
	right cheek	0.656	0.064	0.720		
	right tilted 15°	0.322	0.028	0.350		
	front 15mm	0.548	0.059	0.607		
	rear 15mm	0.646	0.240	0.886		
GSM 1900	left cheek	0.352	0.156	0.508		
	left tilted 15°	0.086	0.072	0.158		
	right cheek	0.210	0.064	0.274		
	right tilted 15°	0.064	0.028	0.092		
	front 15mm	0.527	0.059	0.586		
	rear 15mm	0.430	0.240	0.670		
UMTS FDD II	left cheek	0.430	0.156	0.586		
	left tilted 15°	0.112	0.072	0.184		
	right cheek	0.296	0.064	0.360		
	right tilted 15°	0.083	0.028	0.111		
	front 15mm	0.470	0.059	0.529		
	rear 15mm	0.421	0.240	0.661		
UMTS FDD V	left cheek	0.426	0.156	0.582		
	left tilted 15°	0.244	0.072	0.316		
	right cheek	0.398	0.064	0.462		
	right tilted 15°	0.215	0.028	0.243		
	front 15mm	0.369	0.059	0.428		
	rear 15mm	0.366	0.240	0.606		
LTE FDD 17	left cheek	0.371	0.156	0.527		
	left tilted 15°	0.180	0.072	0.252		
	right cheek	0.320	0.064	0.384		
	right tilted 15°	0.161	0.028	0.189		
	front 15mm	0.360	0.059	0.419		
	rear 15mm	0.437	0.240	0.677		

Table 54: SAR_{max} WWAN and **WLAN 5GHz**, ΣSAR evaluation, **$SPLSR_i$**

reported SAR **WWAN** and **BT 2.4GHz**, **ΣSAR** evaluation, **SPLSRi**						
Frequency band	Position	SARmax /W/kg		**ΣSAR**	distance	**ratio**
		WWAN	BT	<1.6W/kg	**Ri**, mm	≤ 0.040
GSM 850	left cheek	0.574	0.001	0.575		
	left tilted 15°	0.338	0.001	0.339		
	right cheek	0.656	0.001	0.657		
	right tilted 15°	0.322	0.000	0.322		
	front 10mm	0.657	0.234	0.891		
	rear 10mm	0.787	0.234	1.021		
	front 15mm	0.548	0.156	0.704		
	rear 15mm	0.646	0.156	0.802		
GSM 1900	left cheek	0.352	0.001	0.353		
	left tilted 15°	0.086	0.001	0.087		
	right cheek	0.210	0.001	0.211		
	right tilted 15°	0.064	0.000	0.064		
	front 10mm	0.982	0.234	1.216		
	rear 10mm	0.786	0.234	1.020		
	front 15mm	0.527	0.156	0.683		
	rear 15mm	0.430	0.156	0.586		
UMTS FDD II	left cheek	0.430	0.001	0.431		
	left tilted 15°	0.112	0.001	0.113		
	right cheek	0.296	0.001	0.297		
	right tilted 15°	0.083	0.000	0.083		
	front 10mm	1.023	0.234	**1.257**		
	rear 10mm	0.747	0.234	0.981		
	front 15mm	0.470	0.156	0.626		
	rear 15mm	0.421	0.156	0.577		
UMTS FDD V	left cheek	0.426	0.001	0.427		
	left tilted 15°	0.244	0.001	0.245		
	right cheek	0.398	0.001	0.399		
	right tilted 15°	0.215	0.000	0.215		
	front 10mm	0.421	0.234	0.655		
	rear 10mm	0.531	0.234	0.765		
	front 15mm	0.369	0.156	0.525		
	rear 15mm	0.366	0.156	0.522		
LTE FDD 17	left cheek	0.371	0.001	0.372		
	left tilted 15°	0.180	0.001	0.181		
	right cheek	0.320	0.001	0.321		
	right tilted 15°	0.161	0.000	0.161		
	front 10mm	0.463	0.234	0.697		
	rear 10mm	0.592	0.234	0.826		
	front 15mm	0.360	0.156	0.516		
	rear 15mm	0.437	0.156	0.593		

Table 55: SAR_{max} WWAN and **Bluetooth 2450MHz**, ΣSAR evaluation

Conclusion:

ΣSAR < 1.6 W/kg therefore simultaneous transmissions SAR measurement with the enlarged zoom scan measurement and volume scan post-processing procedures is **not** required.

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	ES3DV3	Schmid & Partner Engineering AG	3320	June 04, 2013	12
Dosimetric E-Field Probe	ES3DV3	Schmid & Partner Engineering AG	3326	September 02, 2013	12
Dosimetric E-Field Probe	EX3DV4	Schmid & Partner Engineering AG	3944	August 02, 2013	12
750 MHz System Validation Dipole	D750V3	Schmid & Partner Engineering AG	1041	August 15, 2013	24
835 MHz System Validation Dipole	D835V2	Schmid & Partner Engineering AG	4d153	June 06, 2013	24
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	D5GHzV 2	Schmid & Partner Engineering AG	1055	August 19, 2013	24
Data acquisition electronics	DAE3V1	Schmid & Partner Engineering AG	413	January 16, 2014	12
Data acquisition electronics	DAE4	Schmid & Partner Engineering AG	1387	August 28, 2013	12
Software	DASY52 52.8.7	Schmid & Partner Engineering AG	---	N/A	--
Triple Modular Flat Phantom V5.1	QD 000 P51 C	Schmid & Partner Engineering AG	1154	N/A	--
SAM Twin Phantom V5.0	QD 000 P40 C	Schmid & Partner Engineering AG	1813	N/A	--
Universal Radio Communication Tester	CMU 200	Rohde & Schwarz	106826	January 27, 2014	24
Universal Radio Communication Tester	CMW500	Rohde & Schwarz	102375	January 16, 2013	24
Network Analyser 300 kHz to 6 GHz	8753ES	Hewlett Packard)*	US39174436	January 28, 2014	24
Dielectric Probe Kit	85070C	Hewlett Packard	US99360146	N/A	12
Signal Generator	8671B	Hewlett Packard	2823A00656	January 22, 2013	24
Amplifier	25S1G4 (25 Watt)	Amplifier Reasearch	20452	N/A	--
Power Meter	NRP	Rohde & Schwarz	101367	January 21, 2014	24
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100227	January 21, 2014	12
Power Meter Sensor	NRP Z22	Rohde & Schwarz	100234	January 21, 2014	12
Directional Coupler	778D	Hewlett Packard	19171	January 21, 2014	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: 11.03.2014 09:20:16

SystemPerformanceCheck-D750 head 2014-03-11

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

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

Medium parameters used: f = 750 MHz; σ = 0.895 S/m; ε_r = 41.332; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(6.54, 6.54, 6.54); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL750/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) = 8.32 W/kg

HSL750/d=15mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

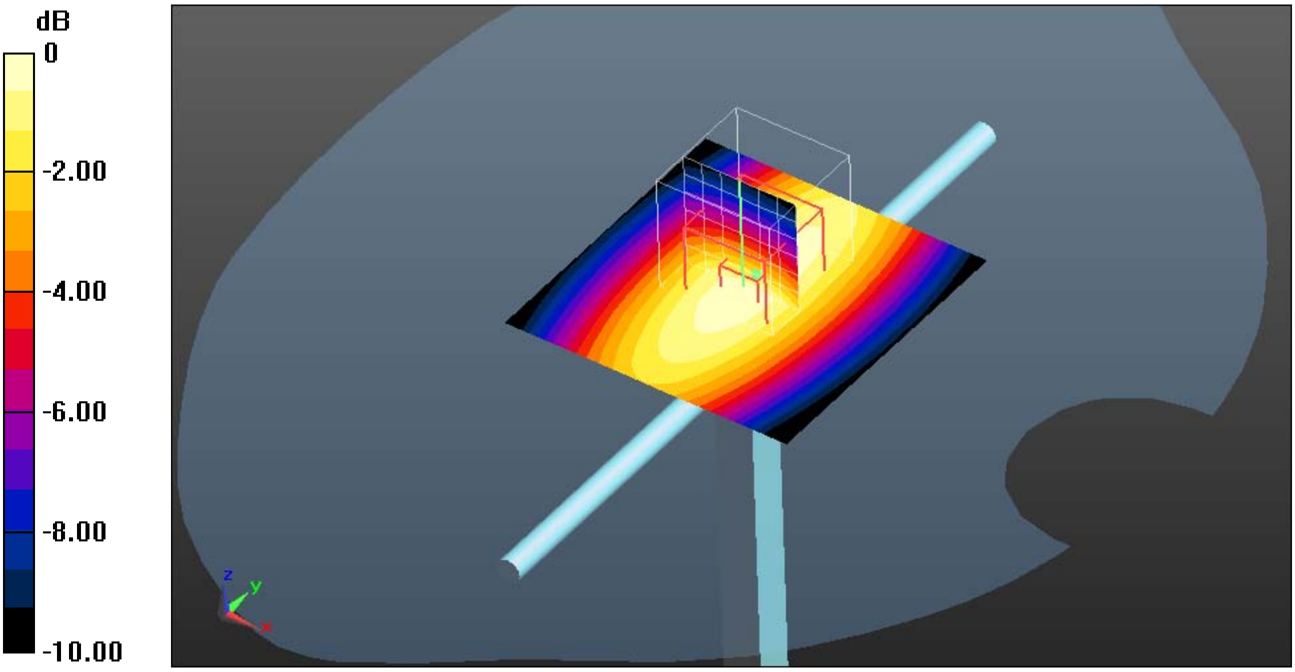
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.803 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 11.9 W/kg

SAR(1 g) = 8.02 W/kg; SAR(10 g) = 5.28 W/kg

Maximum value of SAR (measured) = 8.67 W/kg



0 dB = 8.67 W/kg = 9.38 dBW/kg

Additional information:

ambient temperature: 22.1°C; liquid temperature: 21.5°C

Date/Time: 3/17/2014 8:48:11 AM

SystemPerformanceCheck-D750 body 2014-03-17

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

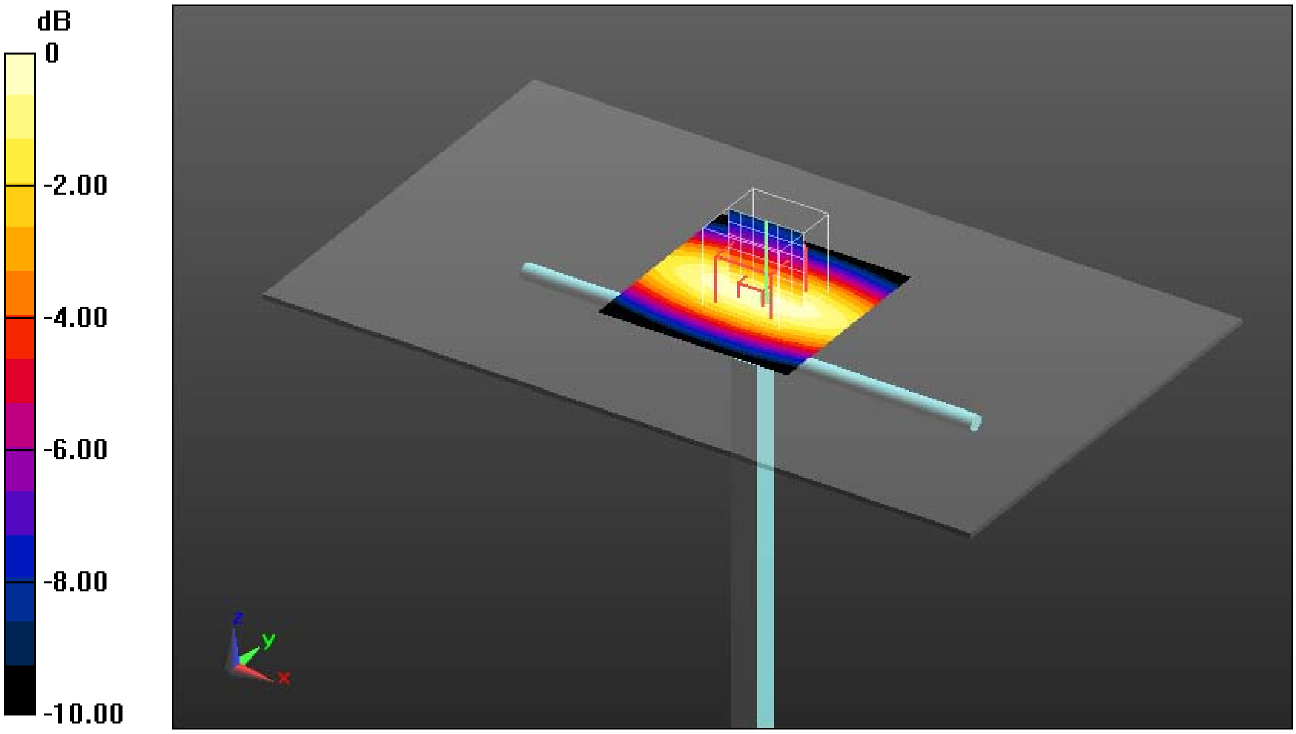
Communication System: UID 0, CW (0); Communication System Band: D750 (750.0 MHz); Frequency: 750 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 750 MHz; σ = 0.957 S/m; ε_r = 54.355; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(6.12, 6.12, 6.12); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL750/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) = 9.26 W/kg

MSL750/d=15mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.4 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 12.7 W/kg
SAR(1 g) = 8.75 W/kg; SAR(10 g) = 5.81 W/kg
Maximum value of SAR (measured) = 9.45 W/kg



0 dB = 9.45 W/kg = 9.75 dBW/kg

Additional information:
ambient temperature: 22.5°C; liquid temperature: 21.8°C

Date/Time: 08.03.2014 13:43:41

SystemPerformanceCheck-D835 head 2014-03-08

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 = 0.932 S/m; ε_r = 41.282; 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: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL835/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

HSL835/d=15mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

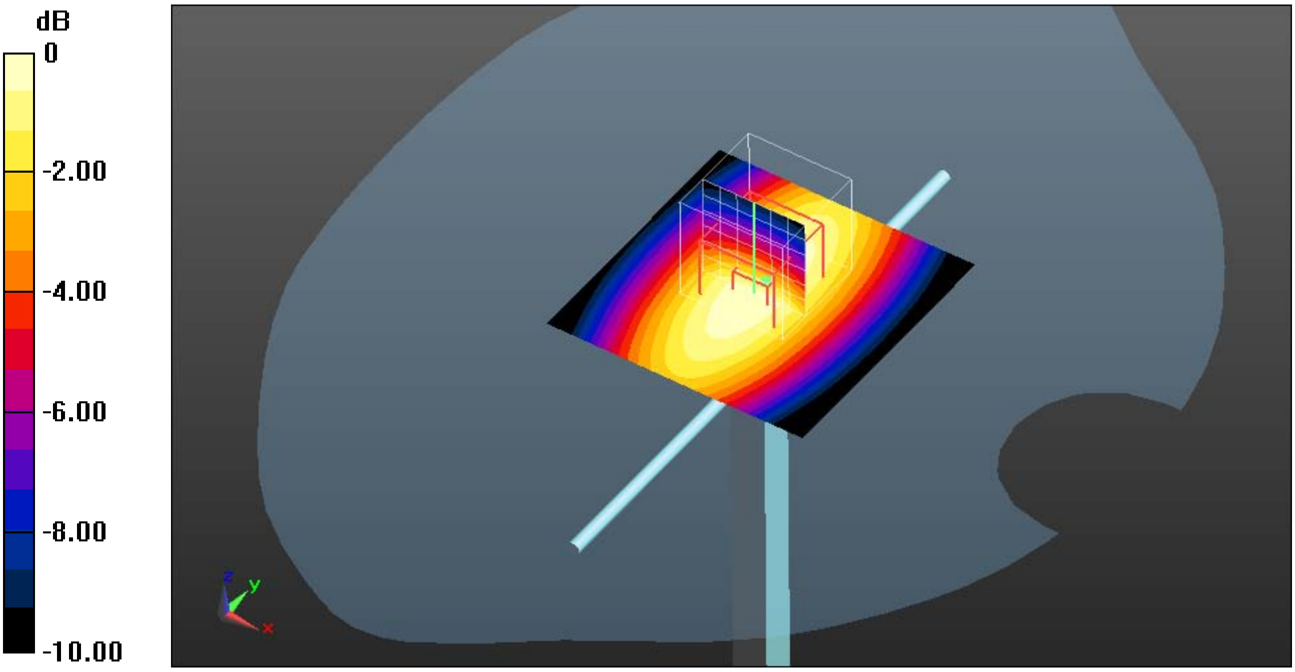
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.8 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 14.5 W/kg

SAR(1 g) = 9.73 W/kg; SAR(10 g) = 6.39 W/kg

Maximum value of SAR (measured) = 10.5 W/kg



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

Additional information:

ambient temperature: 22.0°C; liquid temperature: 21.5°C

Date/Time: 3/11/2014 3:19:14 PM

SystemPerformanceCheck-D835 body 2014-03-11

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 = 0.991 S/m; ε_r = 53.92; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(6.04, 6.04, 6.04); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL835/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

MSL835/d=15mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

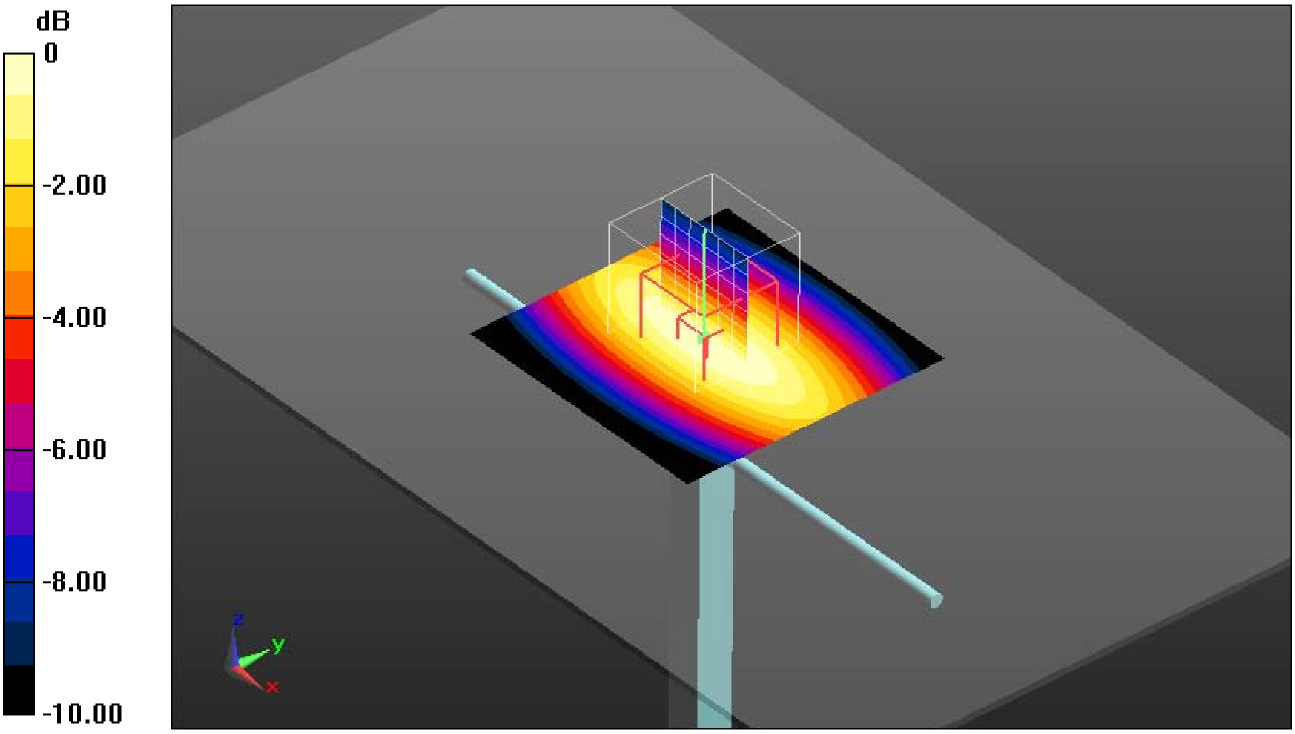
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.8 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 13.8 W/kg

SAR(1 g) = 9.6 W/kg; SAR(10 g) = 6.36 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: 22.4°C; liquid temperature: 21.9°C

Date/Time: 3/10/2014 2:58:31 PM

SystemPerformanceCheck-D1900 head 2014-03-10

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

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

Medium parameters used: f = 1900 MHz; σ = 1.393 S/m; ε_r = 40.43; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(5.05, 5.05, 5.05); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: SAM front; Type: QD000P40CC; Serial: TP:1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL1900/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) = 47.9 W/kg

HSL1900/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

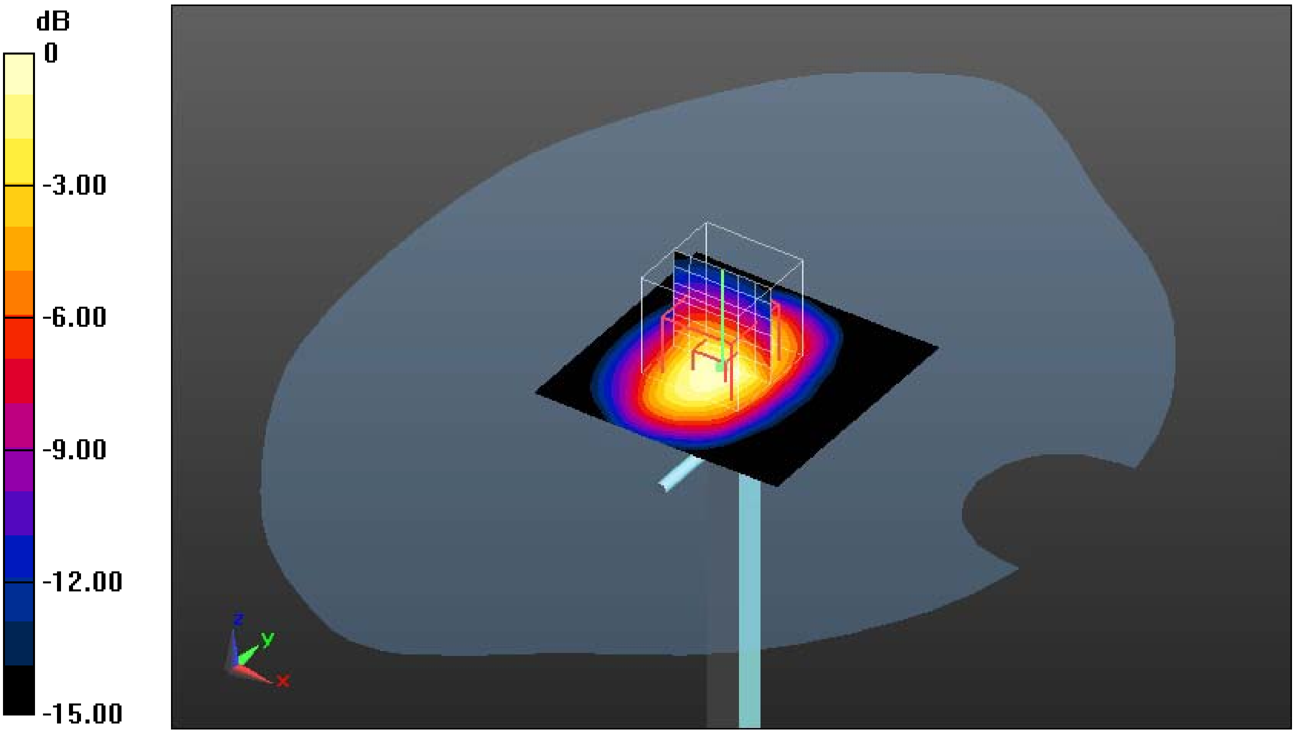
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 172.9 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 71.3 W/kg

SAR(1 g) = 39.1 W/kg; SAR(10 g) = 20.6 W/kg

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



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

Additional information:

ambient temperature: 23.0°C; liquid temperature: 22.3°C

Date/Time: 3/12/2014 17:33:26 AM

SystemPerformanceCheck-D1900 body 2014-03-12

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

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

Medium parameters used: f = 1900 MHz; σ = 1.506 S/m; ε_r = 52.538; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(4.65, 4.65, 4.65); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL1900/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) = 48.9 W/kg

MSL1900/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

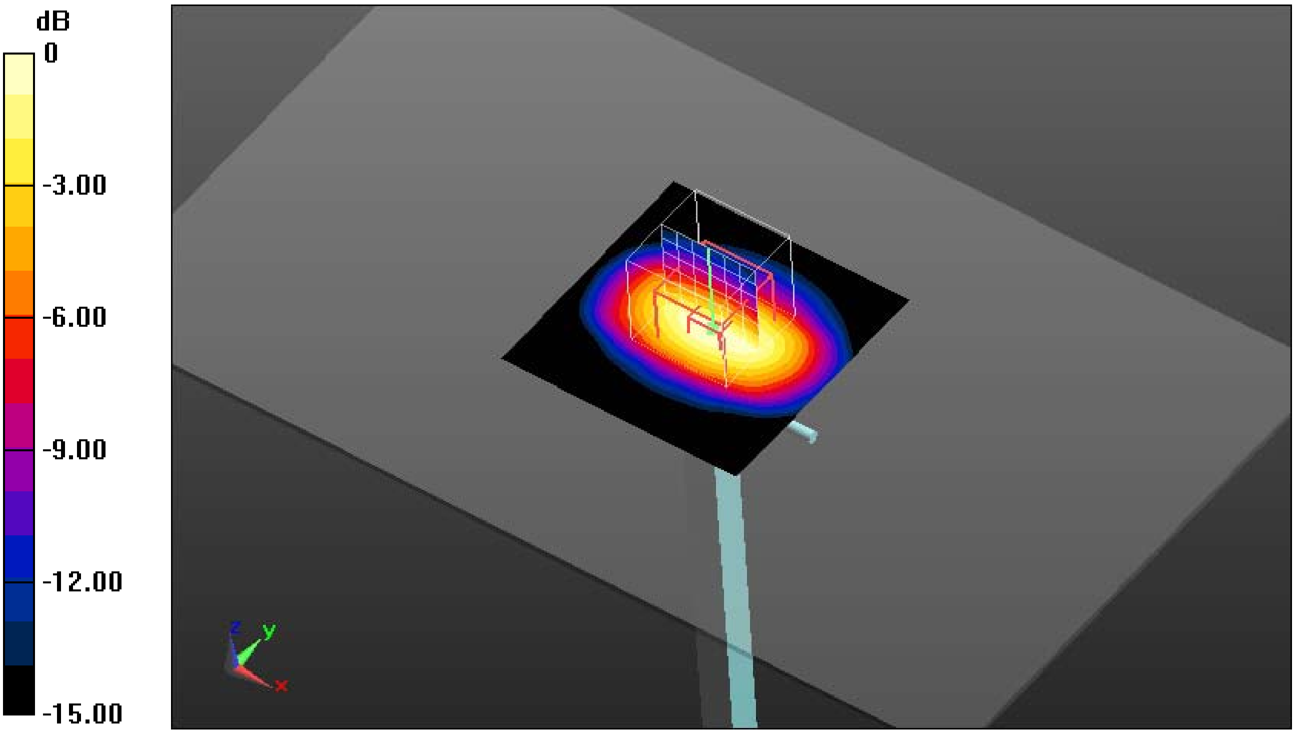
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 171.8 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 69.7 W/kg

SAR(1 g) = 39.6 W/kg; SAR(10 g) = 21 W/kg

Maximum value of SAR (measured) = 44.8 W/kg



0 dB = 44.8 W/kg = 16.51 dBW/kg

Additional information:

ambient temperature: 22.2°C; liquid temperature: 21.8°C

Date/Time: 10.03.2014 10:06:10

SystemPerformanceCheck-D2450 head 2014-03-10

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

Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 1.793 S/m; ε_r = 37.648; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:

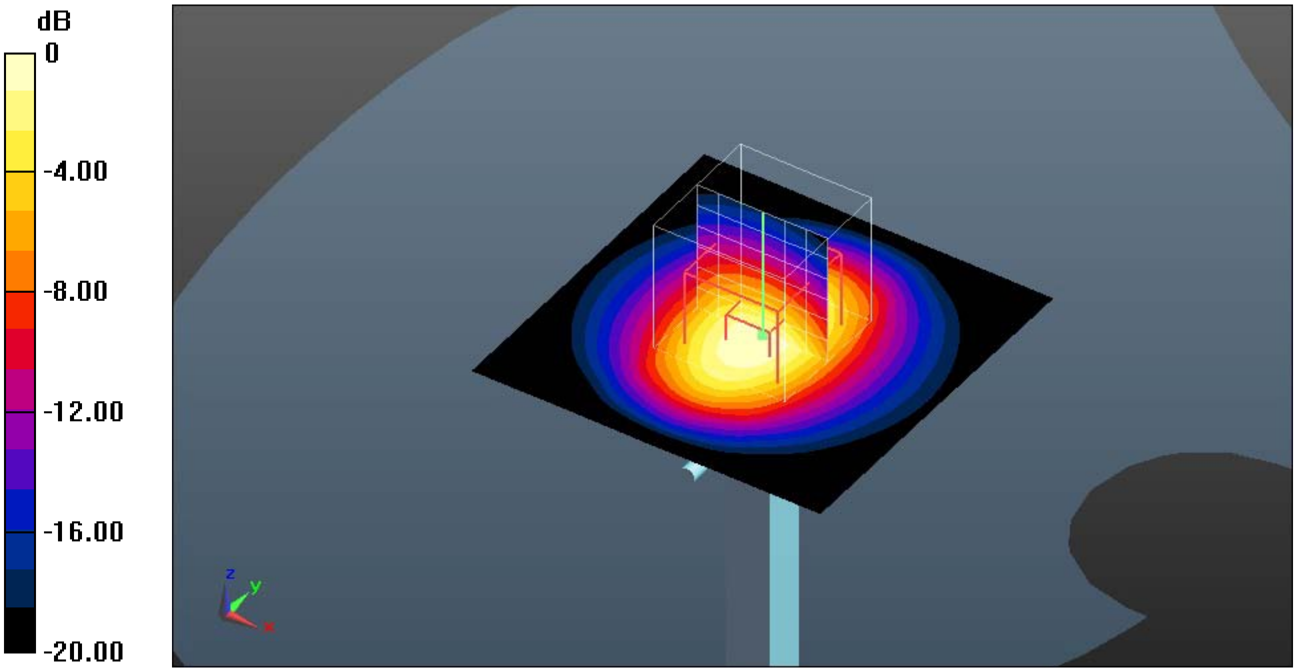
- Probe: ES3DV3 - SN3320; ConvF(4.49, 4.49, 4.49); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Area Scan (81x81x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 59.2 W/kg

HSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 185.6 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 106 W/kg
SAR(1 g) = 50.9 W/kg; SAR(10 g) = 23.4 W/kg
Maximum value of SAR (measured) = 58.1 W/kg



0 dB = 58.1 W/kg = 17.64 dBW/kg

Additional information:
ambient temperature: 21.4°C; liquid temperature: 21.0°C

Date/Time: 3/17/2014 1:07:16 PM

SystemPerformanceCheck-D2450 head 2014-03-17

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

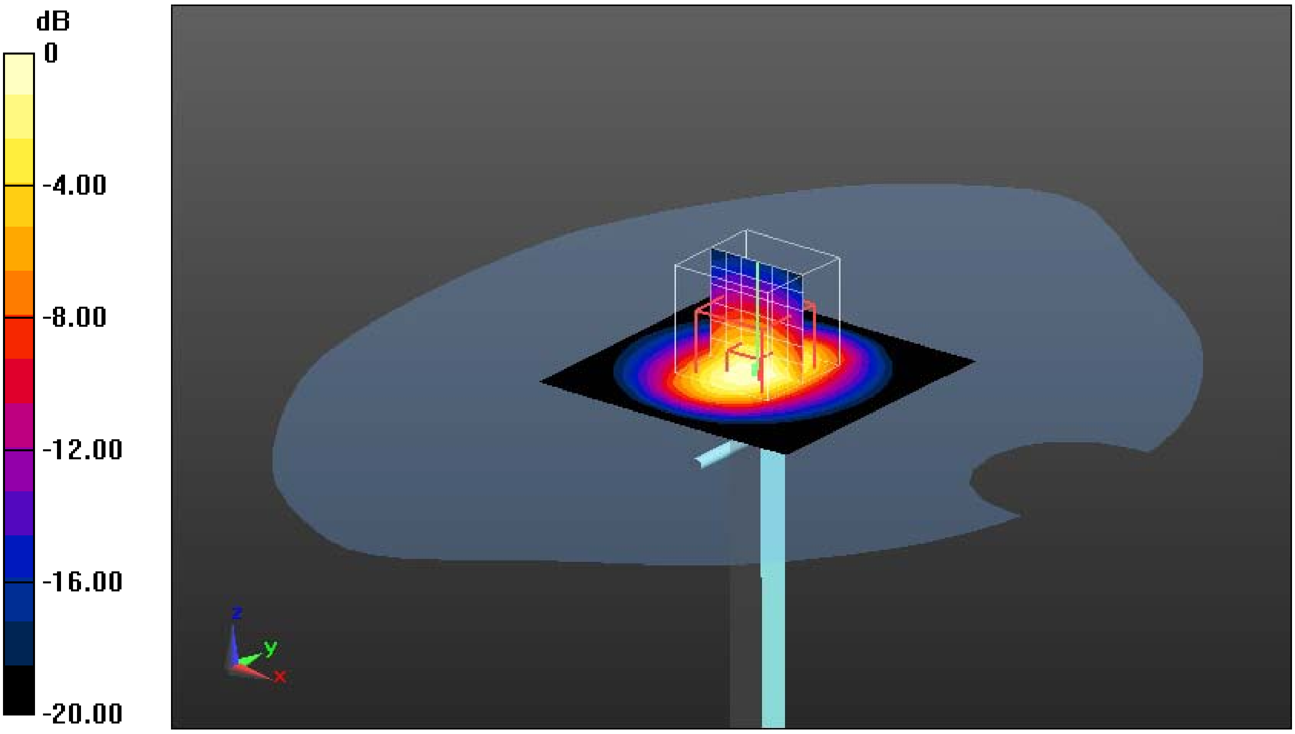
Communication System: UID 0, CW (0); Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2450 MHz; σ = 1.793 S/m; ε_r = 37.648; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(4.47, 4.47, 4.47); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: SAM front; Type: QD000P40CC; Serial: TP:1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Area Scan (81x81x1):

Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 60.0 W/kg

HSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 185.7 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 107 W/kg
SAR(1 g) = 52.2 W/kg; SAR(10 g) = 24.3 W/kg
Maximum value of SAR (measured) = 59.7 W/kg



0 dB = 59.7 W/kg = 17.76 dBW/kg

Additional information:
ambient temperature: 22.2°C; liquid temperature: 21.9°C

Date/Time: 3/14/2014 2:08:08 PM

SystemPerformanceCheck-D2450 body 2014-03-14

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

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

Medium parameters used: f = 2450 MHz; σ = 1.982 S/m; ε_r = 51.691; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(4.18, 4.18, 4.18); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Area Scan (81x81x1):

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

Maximum value of SAR (interpolated) = 63.5 W/kg

MSL2450/d=10mm, Pin=1000 mW, dist=4.0mm/Zoom Scan (7x7x7)/Cube 0:

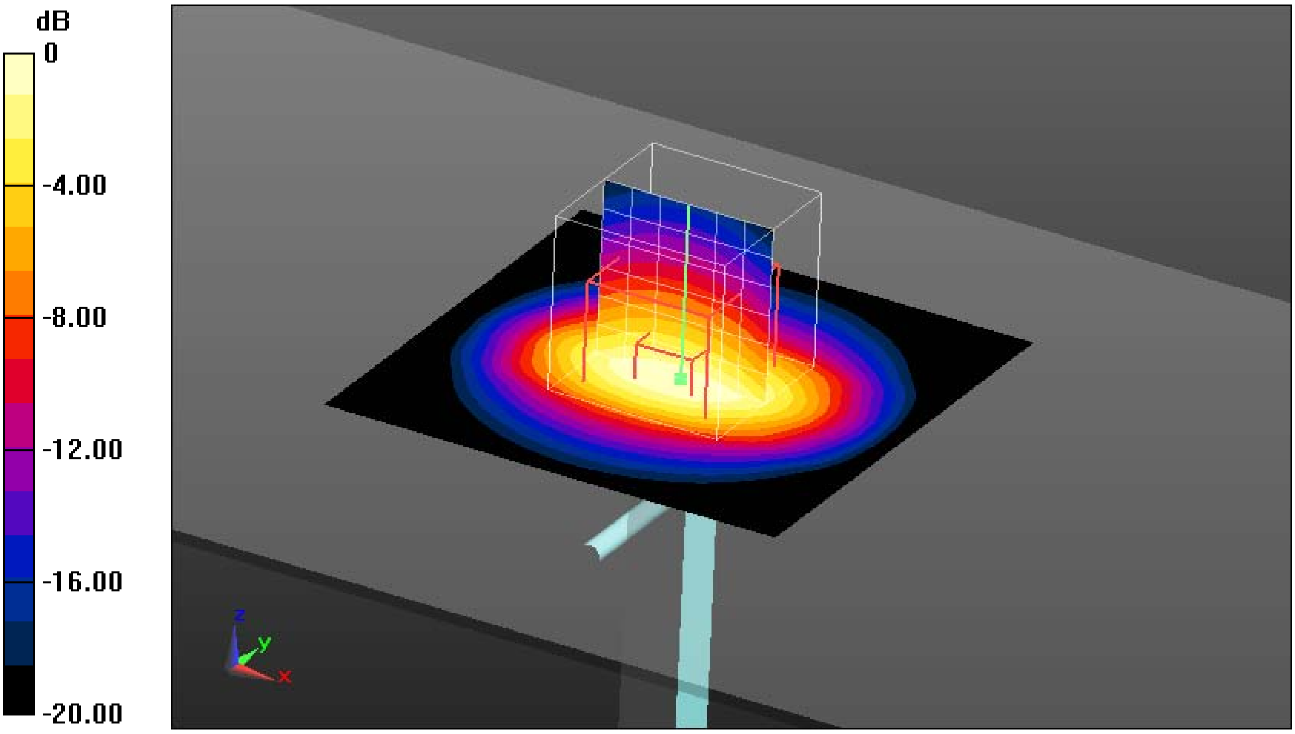
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 180.8 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 107 W/kg

SAR(1 g) = 51.8 W/kg; SAR(10 g) = 23.9 W/kg

Maximum value of SAR (measured) = 59.3 W/kg



0 dB = 59.3 W/kg = 17.73 dBW/kg

Additional information:

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

Date/Time: 11.03.2014 16:16:23

SystemPerformanceCheck-D5GHz head 2014-03-11

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

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 5200 MHz; σ = 4.473 S/m; ε_r = 36.336; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: EX3DV4 - SN3944; ConvF(5.37, 5.37, 5.37); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 17.5 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Zoom Scan (7x7x12)/Cube 0:

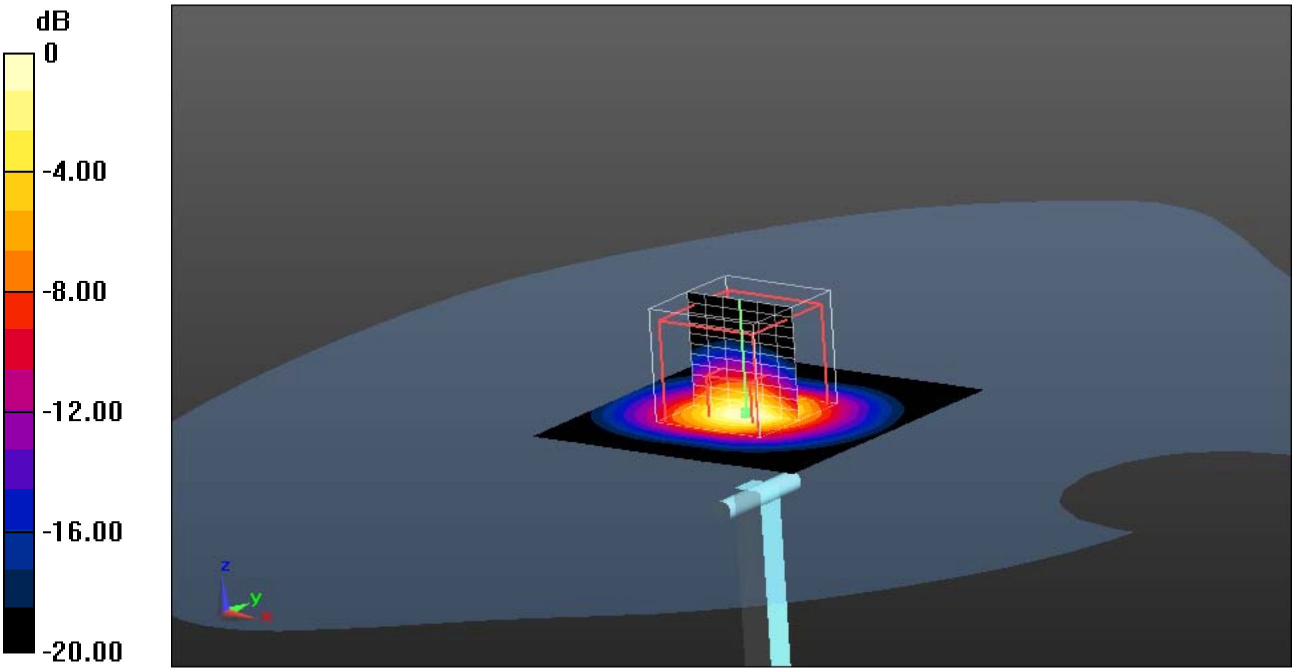
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 64.091 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 35.6 W/kg

SAR(1 g) = 8.42 W/kg; SAR(10 g) = 2.41 W/kg

Maximum value of SAR (measured) = 17.7 W/kg



0 dB = 17.7 W/kg = 12.48 dBW/kg

Additional information:

ambient temperature: 23.1°C; liquid temperature: 22.6°C

Date/Time: 11.03.2014 17:01:38

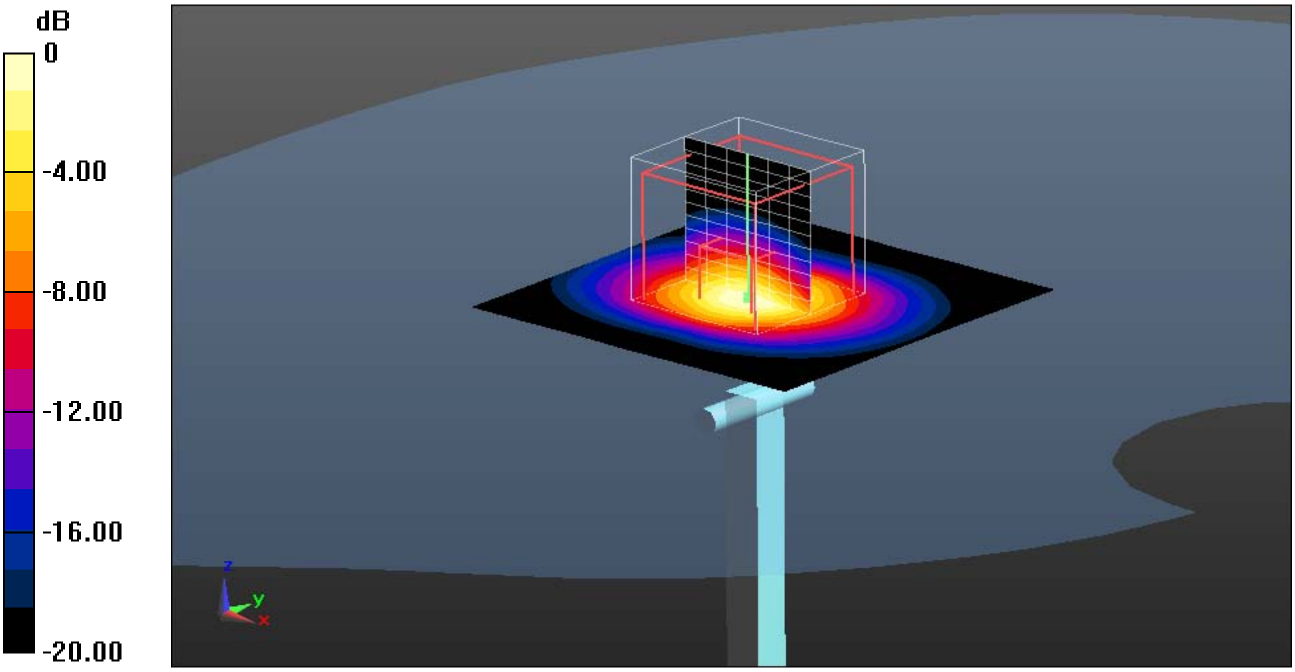
SystemPerformanceCheck-D5GHz head 2014-03-11

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 4.822 S/m; ε_r = 35.774; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(5, 5, 5); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.8 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Zoom Scan (7x7x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.876 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 38.1 W/kg
SAR(1 g) = 8.48 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 17.9 W/kg



0 dB = 17.9 W/kg = 12.53 dBW/kg

Additional information:
ambient temperature: 23.1°C; liquid temperature: 22.6°C

Date/Time: 11.03.2014 17:22:19

SystemPerformanceCheck-D5GHz head 2014-03-11

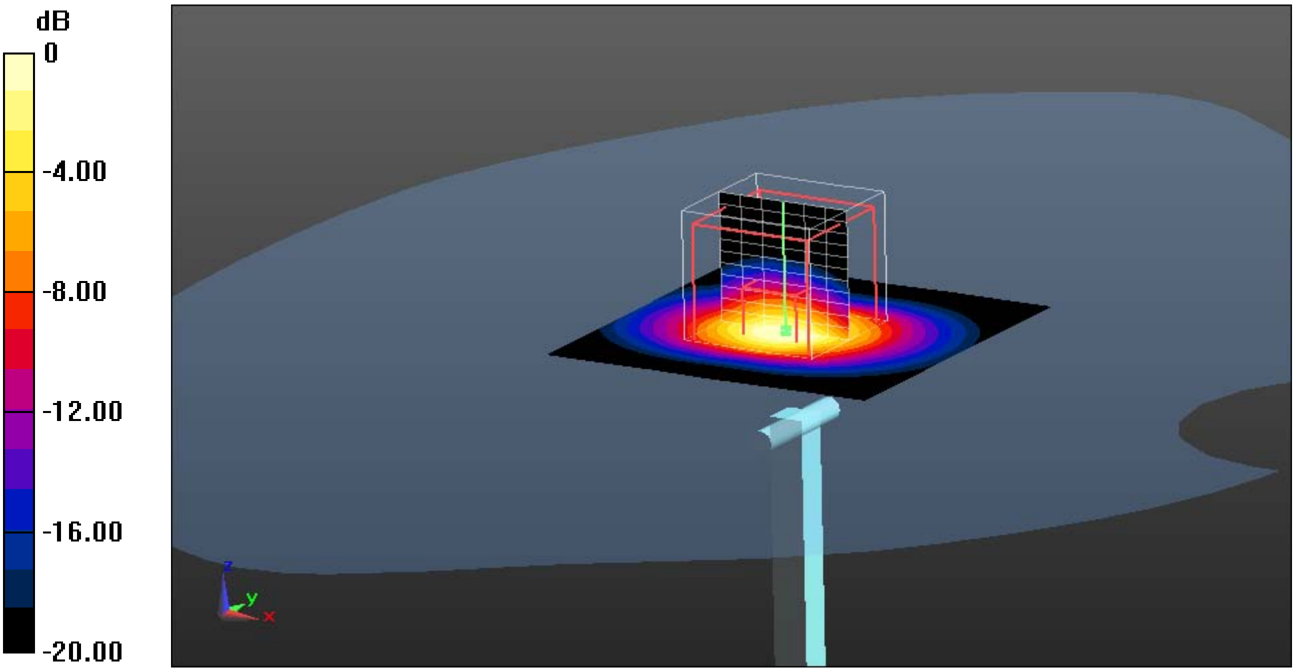
DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 5.114 S/m; ε_r = 35.361; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.75, 4.75, 4.75); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

HSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 17.9 W/kg

HSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Zoom Scan (7x7x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 65.140 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 38.2 W/kg
SAR(1 g) = 8.26 W/kg; SAR(10 g) = 2.33 W/kg
Maximum value of SAR (measured) = 17.6 W/kg



0 dB = 17.6 W/kg = 12.46 dBW/kg

Additional information:
ambient temperature: 23.1°C; liquid temperature: 22.6°C

Date/Time: 3/13/2014 8:20:54 AM

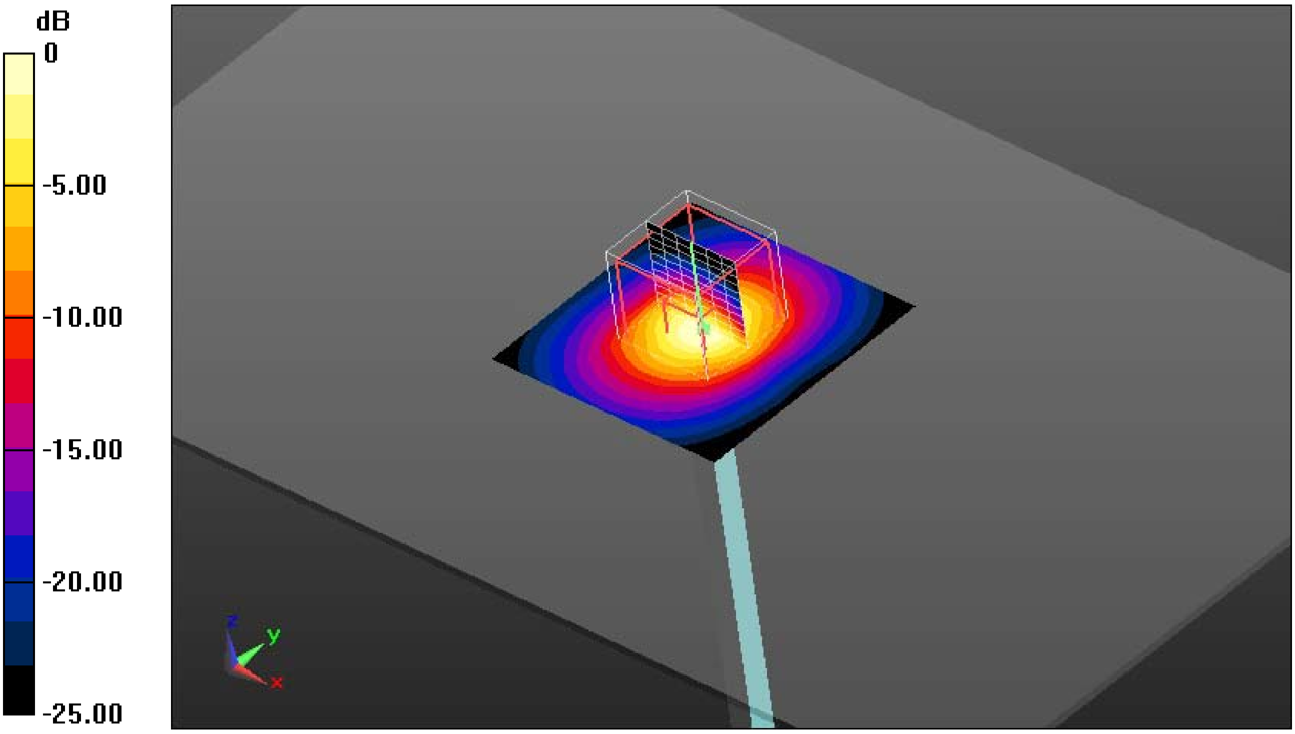
SystemPerformanceCheck-D5GHz body 2014-03-13

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

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz);
Frequency: 5200 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5200 MHz; σ = 5.217 S/m; ε_r = 48.385; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.47, 4.47, 4.47); Calibrated: 8/2/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 15.6 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.2GHz/Zoom Scan (7x7x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 59.642 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 29.0 W/kg
SAR(1 g) = 7.26 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: 21.7°C

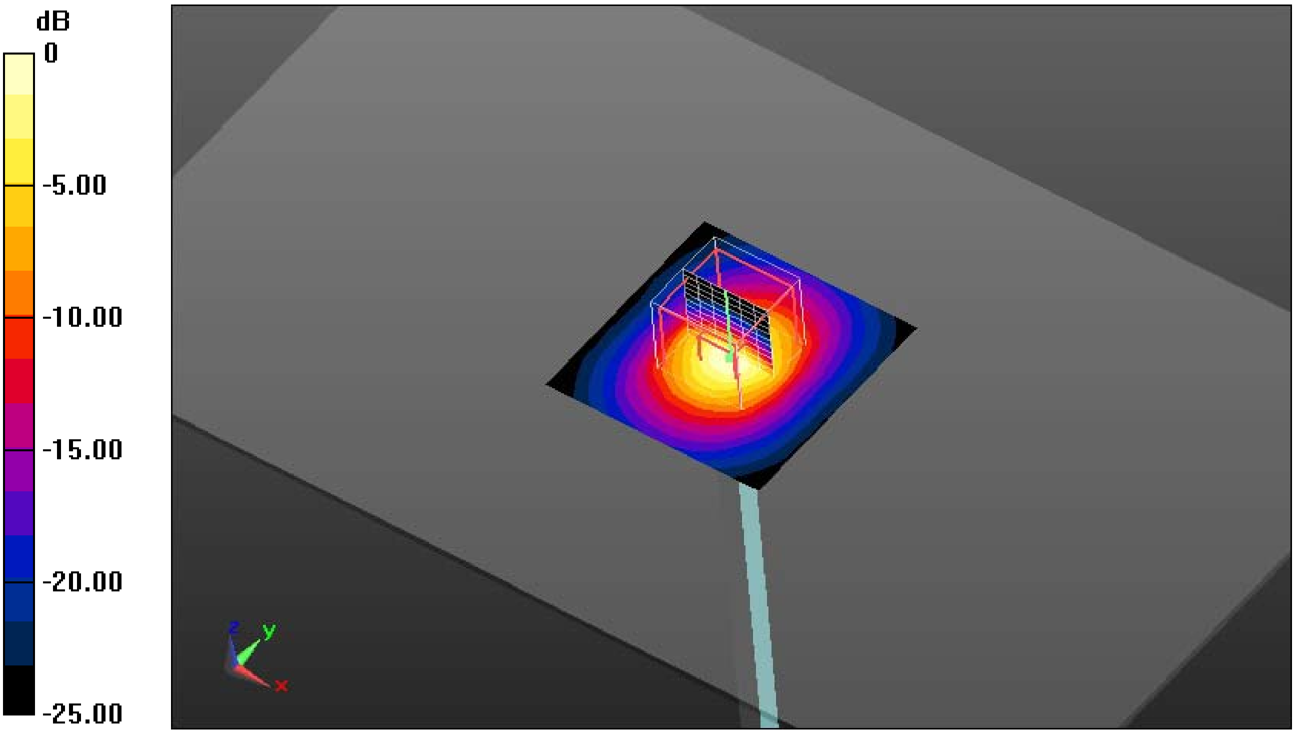
Date/Time: 3/13/2014 9:16:44 AM

SystemPerformanceCheck-D5GHz body 2014-03-13

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1055
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5500 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5500 MHz; σ = 5.606 S/m; ε_r = 47.627; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.09, 4.09, 4.09); Calibrated: 8/2/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.2 W/kg

MSL 5GHz/d=10mm, Pin=100mW 5.5GHz/Zoom Scan (7x7x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 60.175 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 33.1 W/kg
SAR(1 g) = 7.79 W/kg; SAR(10 g) = 2.19 W/kg
Maximum value of SAR (measured) = 16.6 W/kg



0 dB = 16.6 W/kg = 12.20 dBW/kg

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

Date/Time: 3/13/2014 9:47:20 AM

SystemPerformanceCheck-D5GHz body 2014-03-13

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

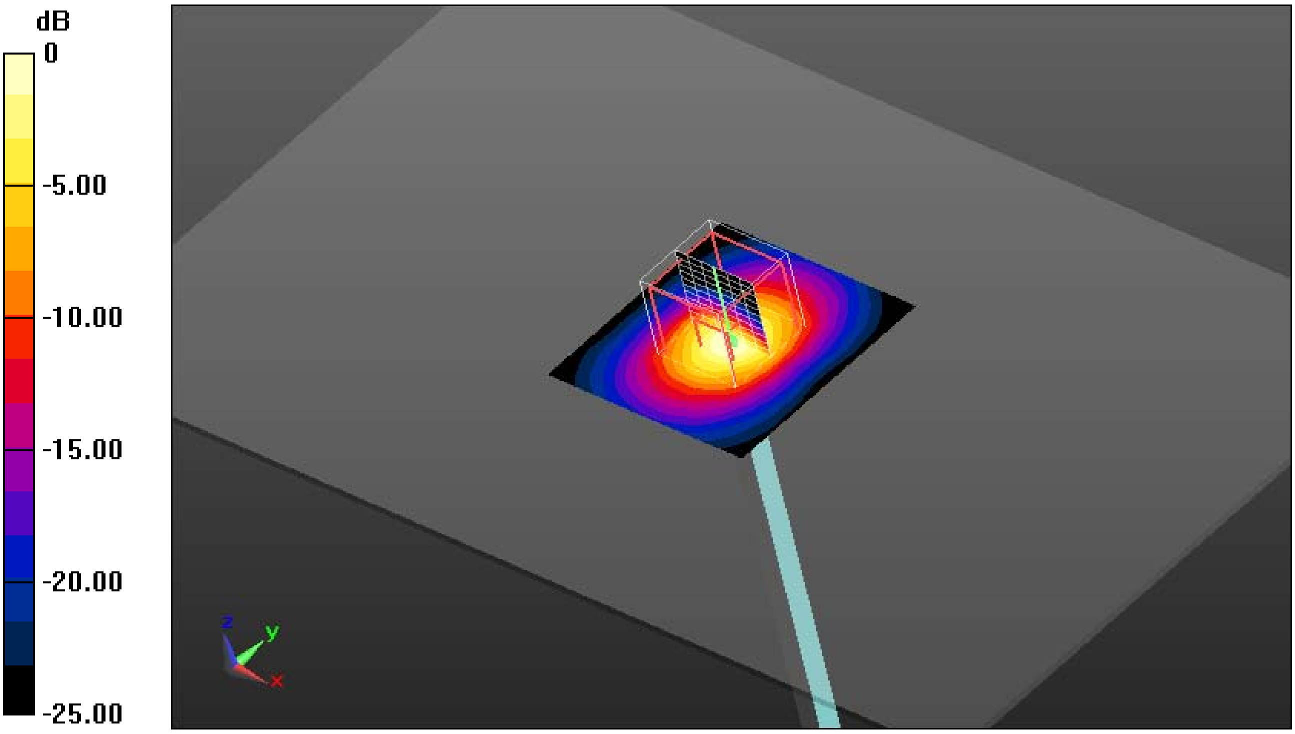
Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5800 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5800 MHz; σ = 5.962 S/m; ε_r = 47.058; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.2, 4.2, 4.2); Calibrated: 8/2/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Area Scan (61x61x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

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

MSL 5GHz/d=10mm, Pin=100mW 5.8GHz/Zoom Scan (7x7x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 55.761 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 7.16 W/kg; SAR(10 g) = 1.99 W/kg
Maximum value of SAR (measured) = 15.4 W/kg



0 dB = 15.4 W/kg = 11.88 dBW/kg

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

Annex B: DASY5 measurement results

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

Annex B.1: GSM 850MHz

Date/Time: 08.03.2014 18:47:01

IEEE1528-GSM850 head DTM

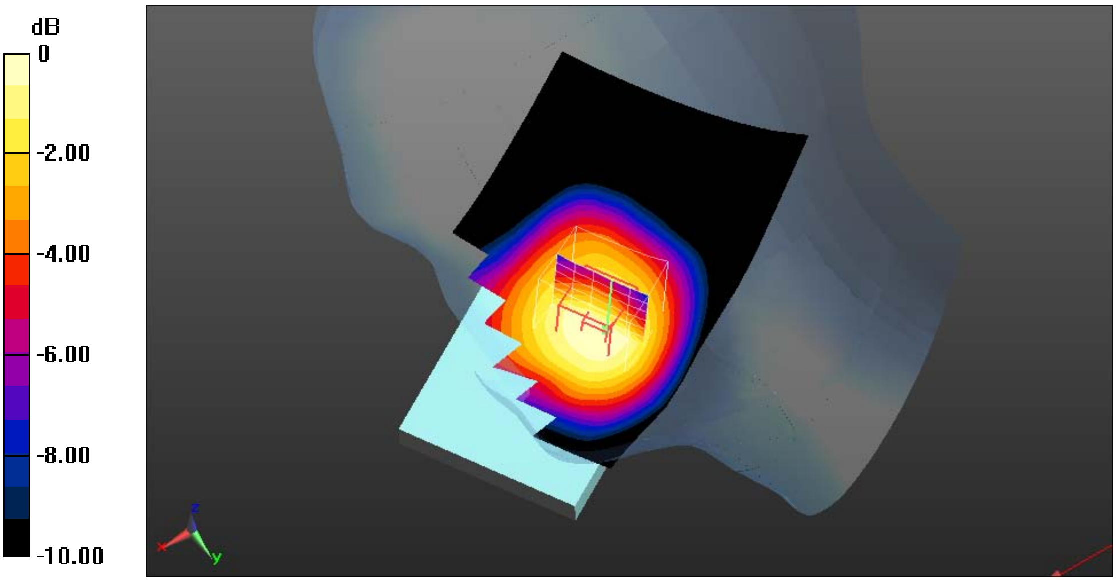
DUT: Sony; Serial: CB5126D718
Communication System: UID 0, GSM/GPRS 2TS (0); Communication System Band: GSM 850; Frequency: 824.2 MHz; Communication System PAR: 6.021 dB; PMF: 2.00009
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.92 S/m; ε_r = 41.476; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.32, 6.32, 6.32); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

Maximum value of SAR (interpolated) = 0.679 W/kg

Right-Hand-Side HS/Touch Position - Low/Zoom Scan (6x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 26.562 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.785 W/kg
SAR(1 g) = 0.641 W/kg; SAR(10 g) = 0.494 W/kg
Maximum value of SAR (measured) = 0.675 W/kg



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

Additional information:
ambient temperature: 22.0°C; liquid temperature: 21.5°C

Date/Time: 3/11/2014 1:40:12 PM

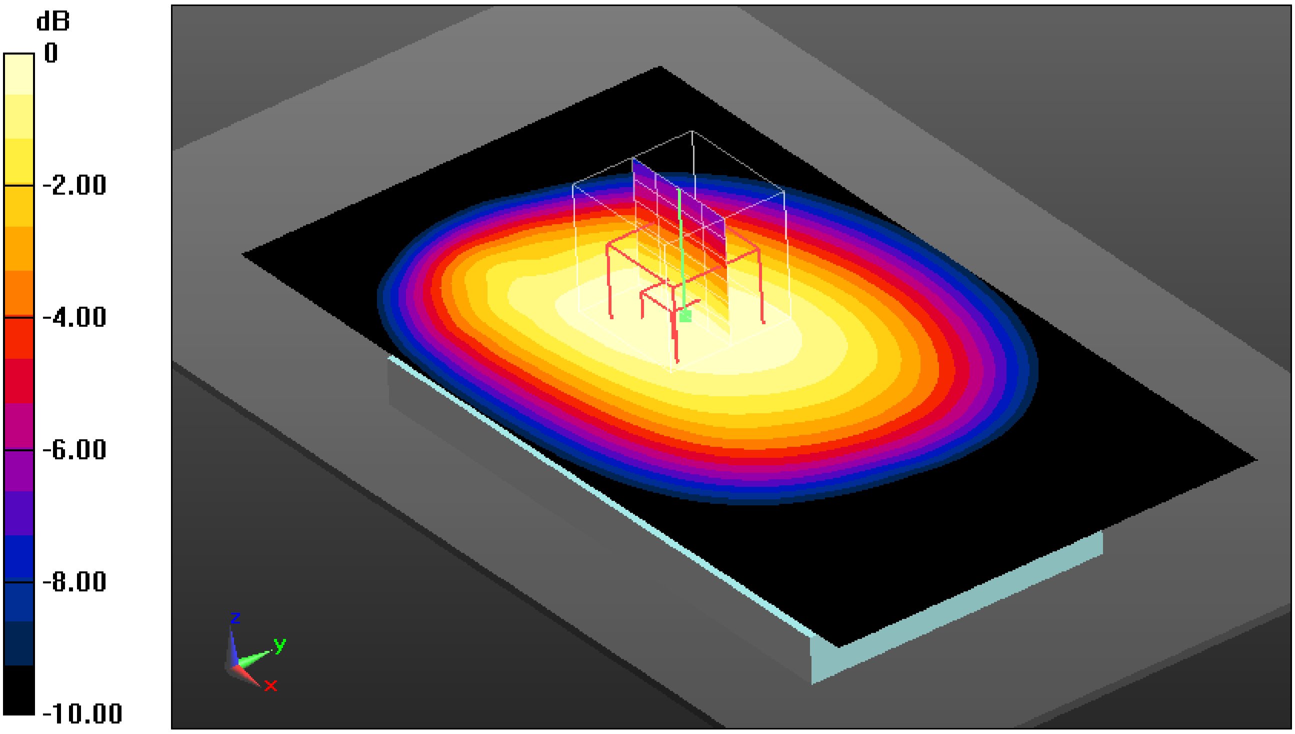
FCC_EN62209-2 GSM850 hotspot

DUT: Sony; Serial: CB5126DAY7

Communication System: UID 0, GSM/GPRS 2TS (0); Communication System Band: GSM 850; Frequency: 848.8 MHz; Communication System PAR: 6.021 dB; PMF: 2.00009
Medium parameters used: f = 849 MHz; σ = 1.004 S/m; ε_r = 53.811; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(6.04, 6.04, 6.04); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL835 - 10mm/Rear High/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.825 W/kg

MSL835 - 10mm/Rear High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 28.823 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.988 W/kg
SAR(1 g) = 0.787 W/kg; SAR(10 g) = 0.598 W/kg
Maximum value of SAR (measured) = 0.824 W/kg



0 dB = 0.824 W/kg = -0.84 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 22.4°C; liquid temperature: 21.9°C

Date/Time: 3/11/2014 12:45:30 PM

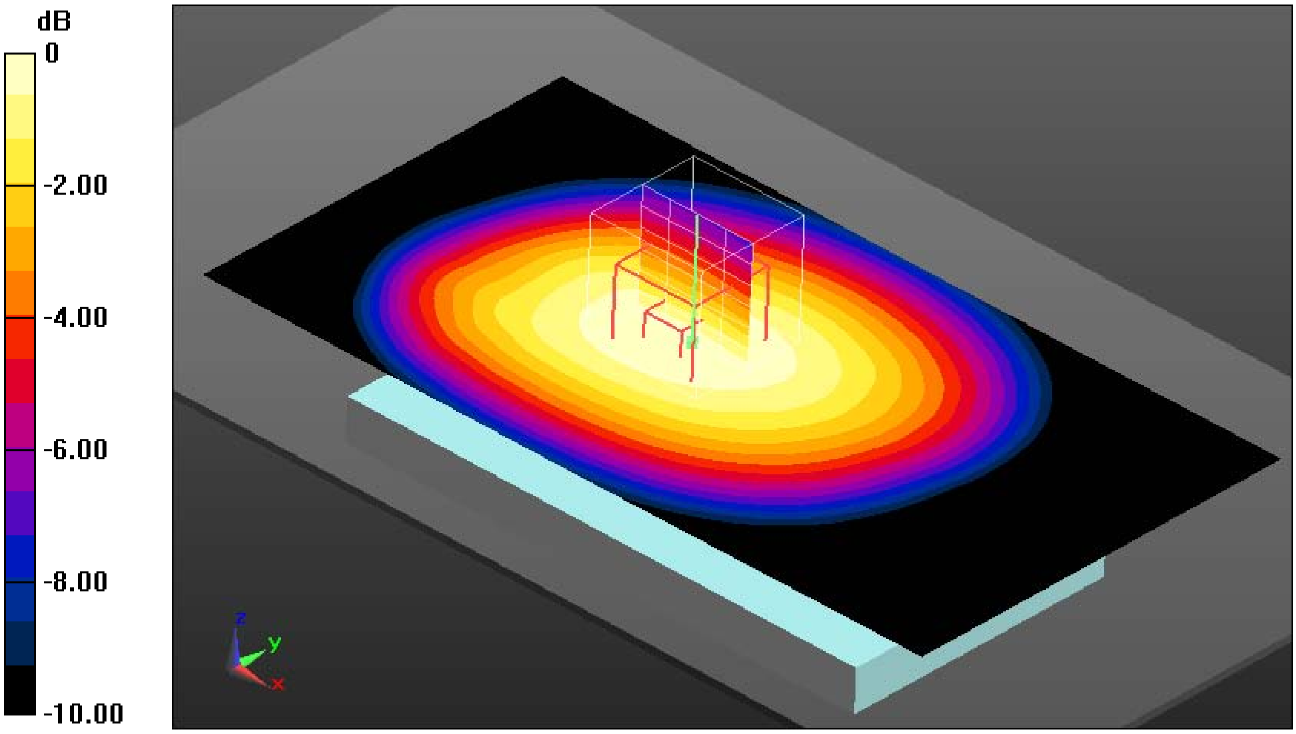
FCC_EN62209-2 GSM850 body worn

DUT: Sony; Serial: CB5126DAY7

Communication System: UID 0, GSM/GPRS 2TS (0); Communication System Band: GSM 850; Frequency: 848.8 MHz; Communication System PAR: 6.021 dB; PMF: 2.00009
Medium parameters used: f = 849 MHz; σ = 1.004 S/m; ε_r = 53.811; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(6.04, 6.04, 6.04); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL835 - 15mm/Rear High/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.675 W/kg

MSL835 - 15mm/Rear High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 25.874 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.798 W/kg
SAR(1 g) = 0.646 W/kg; SAR(10 g) = 0.488 W/kg
Maximum value of SAR (measured) = 0.679 W/kg



0 dB = 0.679 W/kg = -1.68 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.4°C; liquid temperature: 21.9°C

Annex B.2: GSM 1900MHz

Date/Time: 3/10/2014 5:12:44 PM

IEEE1528-GSM1900 head DTM

DUT: Sony; Serial: CB5126D718

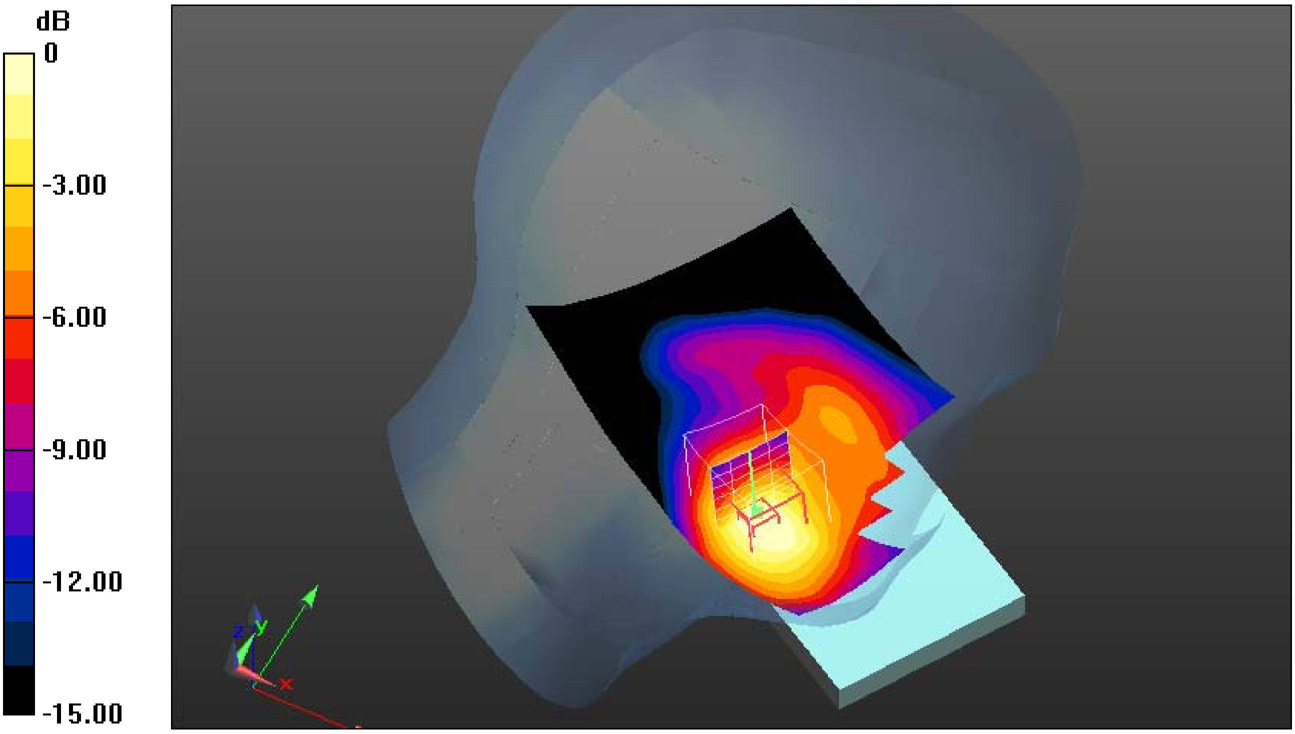
Communication System: UID 0, GSM/GPRS 3TS (0); Communication System Band: GSM 1900; Frequency: 1850.2 MHz; Communication System PAR: 4.314 dB; PMF: 1.64324
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.338 S/m; ε_r = 40.653; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(5.05, 5.05, 5.05); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: SAM front; Type: QD000P40CC; Serial: TP:1041
- 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) = 0.378 W/kg

Left-Hand-Side HSL/Touch Position - Low/Zoom Scan (5x6x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 16.768 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.536 W/kg
SAR(1 g) = 0.352 W/kg; SAR(10 g) = 0.220 W/kg
Maximum value of SAR (measured) = 0.380 W/kg



0 dB = 0.380 W/kg = -4.20 dBW/kg

Additional information:
ambient temperature: 23.0°C; liquid temperature: 22.3°C

Date/Time: 3/12/2014 12:50:08 PM

FCC_EN62209-2 GSM1900 hotspot

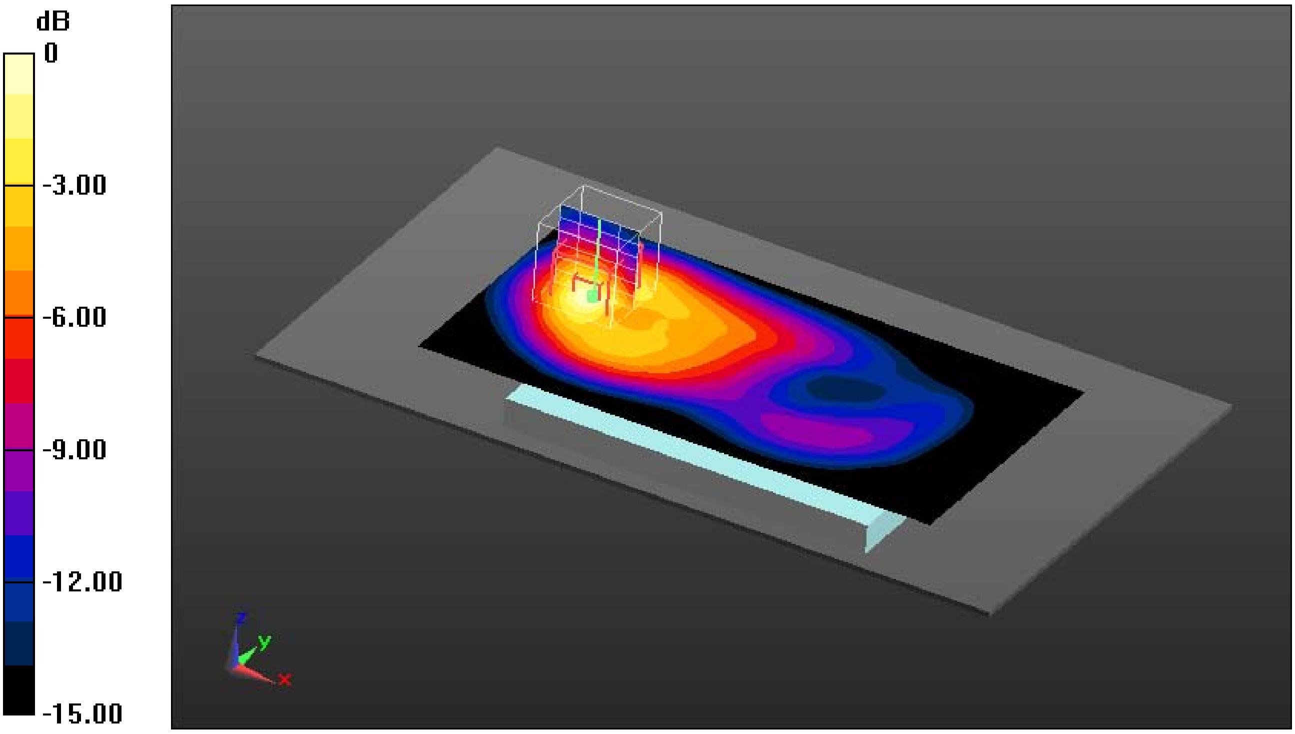
DUT: Sony; Serial: CB5126D718

Communication System: UID 0, GSM/GPRS 4TS (0); Communication System Band: GSM 1900; Frequency: 1880 MHz; Communication System PAR: 3.01 dB; PMF: 1.41416
Medium parameters used: f = 1880 MHz; σ = 1.481 S/m; ε_r = 52.79; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(4.65, 4.65, 4.65); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL1900 - 10mm/Front Middle/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.07 W/kg

MSL1900 - 10mm/Front Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 27.589 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 0.982 W/kg; SAR(10 g) = 0.530 W/kg
Maximum value of SAR (measured) = 1.09 W/kg



0 dB = 1.09 W/kg = 0.37 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 22.2°C; liquid temperature: 21.8°C

Date/Time: 3/12/2014 3:48:16 PM

FCC_EN62209-2 GSM1900 body worn

DUT: Sony; Serial: CB5126D718

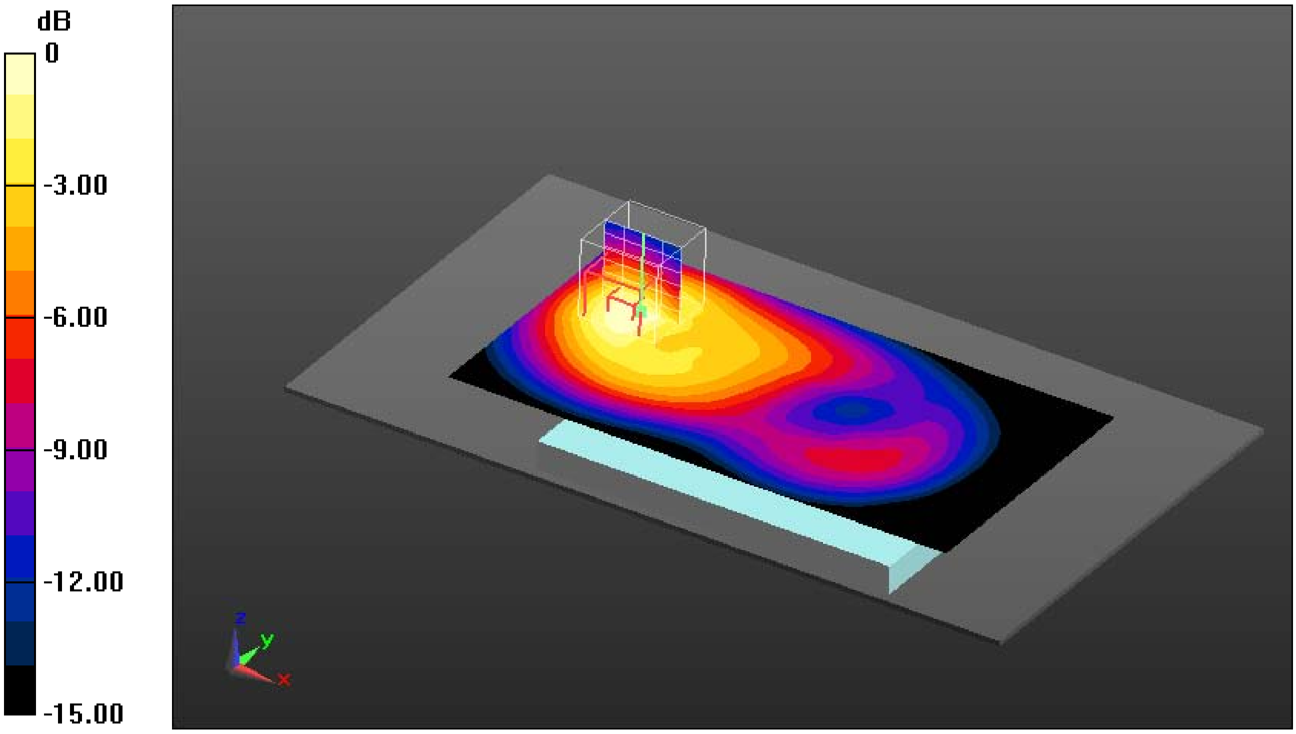
Communication System: UID 0, GSM/GPRS 4TS (0); Communication System Band: GSM 1900; Frequency: 1850.2 MHz; Communication System PAR: 3.01 dB; PMF: 1.41416
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.453 S/m; ε_r = 52.742; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(4.65, 4.65, 4.65); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL1900 - 15mm/Front Low/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.567 W/kg

MSL1900 - 15mm/Front Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 19.772 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.834 W/kg
SAR(1 g) = 0.527 W/kg; SAR(10 g) = 0.310 W/kg
Maximum value of SAR (measured) = 0.560 W/kg



0 dB = 0.560 W/kg = -2.52 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.2°C; liquid temperature: 21.8°C

Annex B.3: UMTS FDD II

Date/Time: 3/10/2014 6:45:30 AM

IEEE1528-UMTS FDD II head

DUT: Sony; Serial: CB5126D718

Communication System: UID 0, UMTS FDD (0); Communication System Band: UMTS FDD II; Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 1880 MHz; σ = 1.367 S/m; ε_r = 40.748; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(5.05, 5.05, 5.05); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: SAM front; Type: QD000P40CC; Serial: TP:1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

Maximum value of SAR (interpolated) = 0.459 W/kg

Left-Hand-Side HSL/Touch Position - Mid/Zoom Scan (5x6x7)/Cube 0:

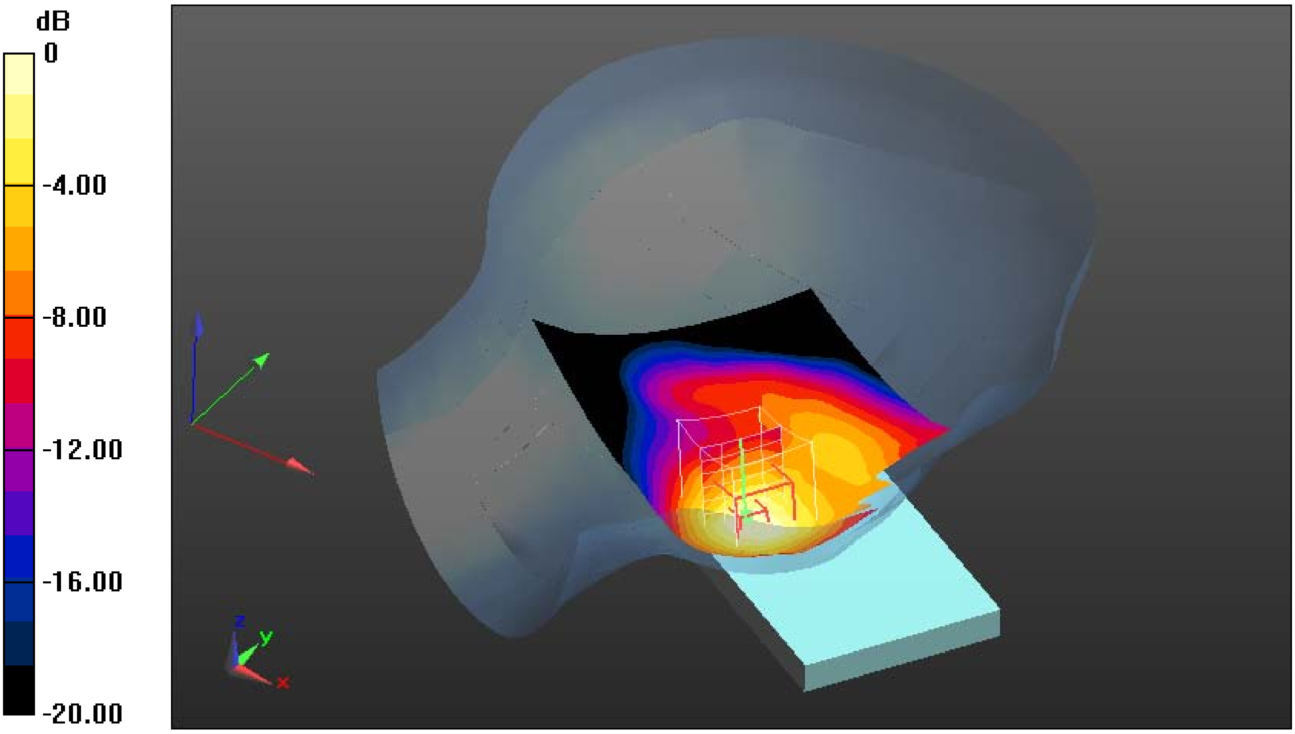
Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 18.438 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.644 W/kg

SAR(1 g) = 0.420 W/kg; SAR(10 g) = 0.261 W/kg

Maximum value of SAR (measured) = 0.456 W/kg



0 dB = 0.456 W/kg = -3.41 dBW/kg

Additional information:

ambient temperature: 23,0°C; liquid temperature: 22,3°C

Date/Time: 3/12/2014 6:53:04 AM

FCC_EN62209-2 UMTS FDD II hotspot

DUT: Sony; Serial: CB5126DAY7

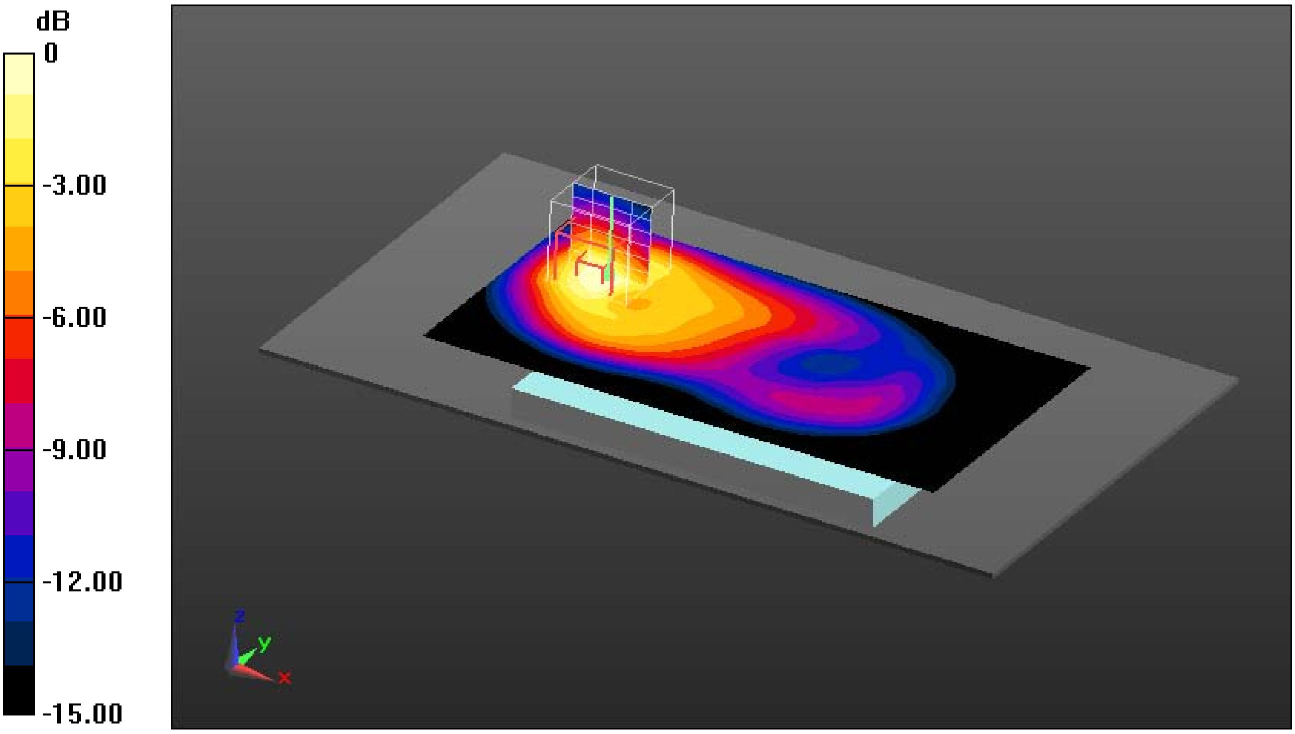
Communication System: UID 0, UMTS FDD (0); Communication System Band: UMTS FDD II; Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.481 S/m; ε_r = 52.79; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(4.65, 4.65, 4.65); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL1900 - 10mm/Front Middle/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.08 W/kg

MSL1900 - 10mm/Front Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 27.197 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.70 W/kg
SAR(1 g) = 1 W/kg; SAR(10 g) = 0.543 W/kg
Maximum value of SAR (measured) = 1.06 W/kg



0 dB = 1.06 W/kg = 0.25 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 22.2°C; liquid temperature: 21.8°C

Date/Time: 3/12/2014 7:52:50 AM

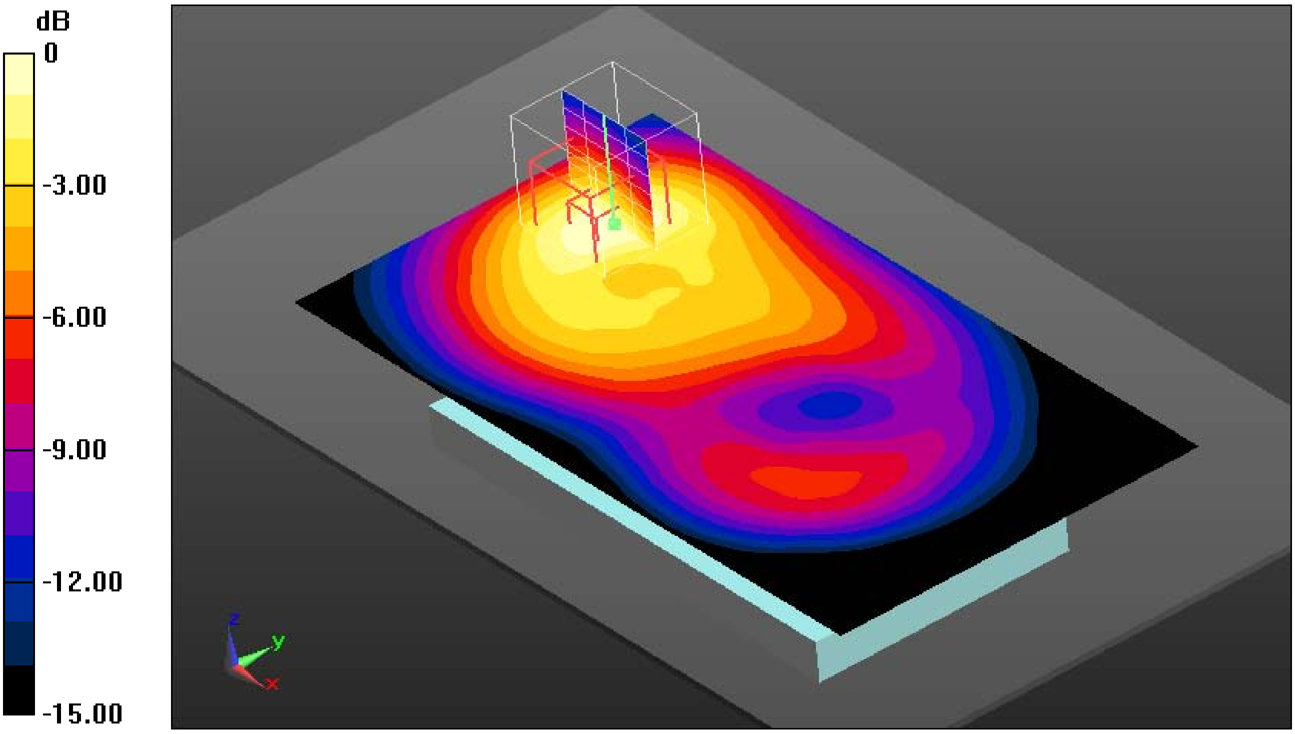
FCC_EN62209-2 UMTS FDD II body worn

DUT: Sony; Serial: CB5126DAY7

Communication System: UID 0, UMTS FDD (0); Communication System Band: UMTS FDD II; Frequency: 1880 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 1880 MHz; σ = 1.481 S/m; ε_r = 52.79; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(4.65, 4.65, 4.65); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL1900 - 15mm/Front Middle/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.490 W/kg

MSL1900 - 15mm/Front Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 18.183 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.728 W/kg
SAR(1 g) = 0.459 W/kg; SAR(10 g) = 0.271 W/kg
Maximum value of SAR (measured) = 0.497 W/kg



0 dB = 0.497 W/kg = -3.04 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.2°C; liquid temperature: 21.8°C

Annex B.4: UMTS FDD V

Date/Time: 08.03.2014 20:27:44

IEEE1528-UMTS FDD V head

DUT: Sony; Serial: CB5126DAY7

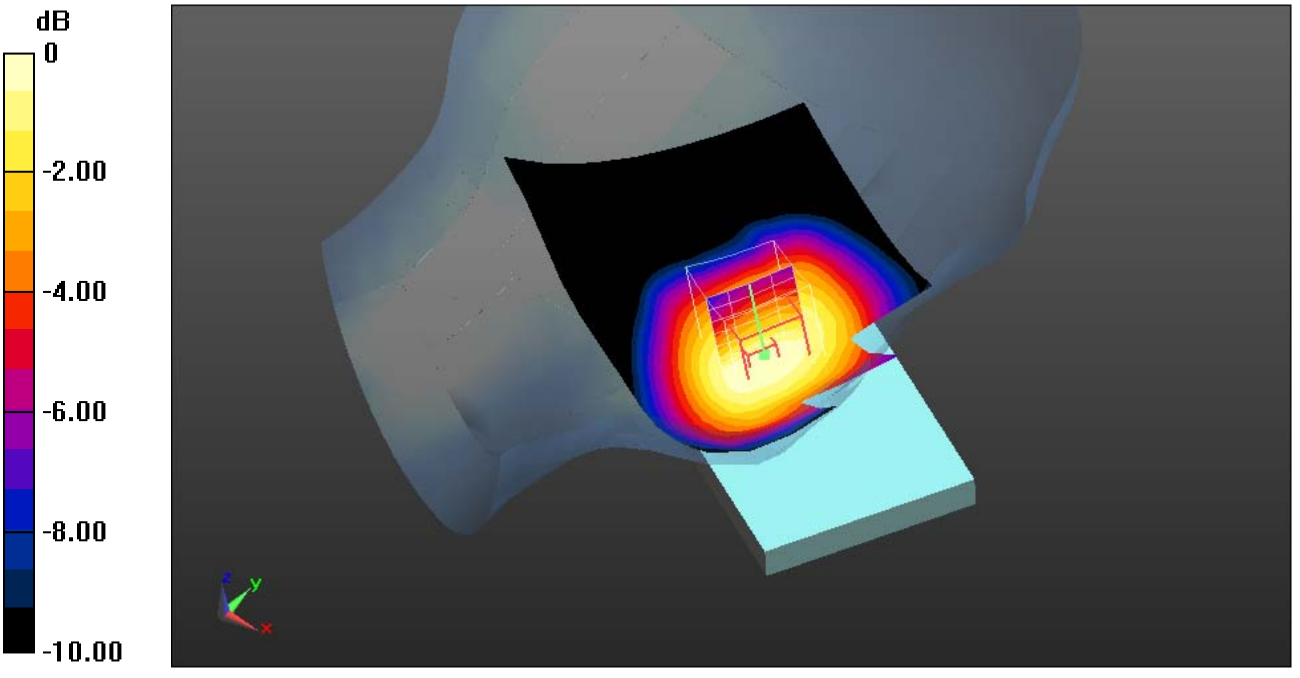
Communication System: UID 0, UMTS FDD (0); Communication System Band: UMTS FDD V; Frequency: 826.4 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.923 S/m; ε_r = 41.436; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 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: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- 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) = 0.443 W/kg

Left-Hand-Side HSL/Touch Position - Low/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 21.650 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.525 W/kg
SAR(1 g) = 0.416 W/kg; SAR(10 g) = 0.317 W/kg
Maximum value of SAR (measured) = 0.438 W/kg



0 dB = 0.438 W/kg = -3.59 dBW/kg

Additional information:
ambient temperature: 22.0°C; liquid temperature: 21.5°C

Date/Time: 3/11/2014 9:01:44 AM

FCC_EN62209-2 UMTS FDD V hotspot

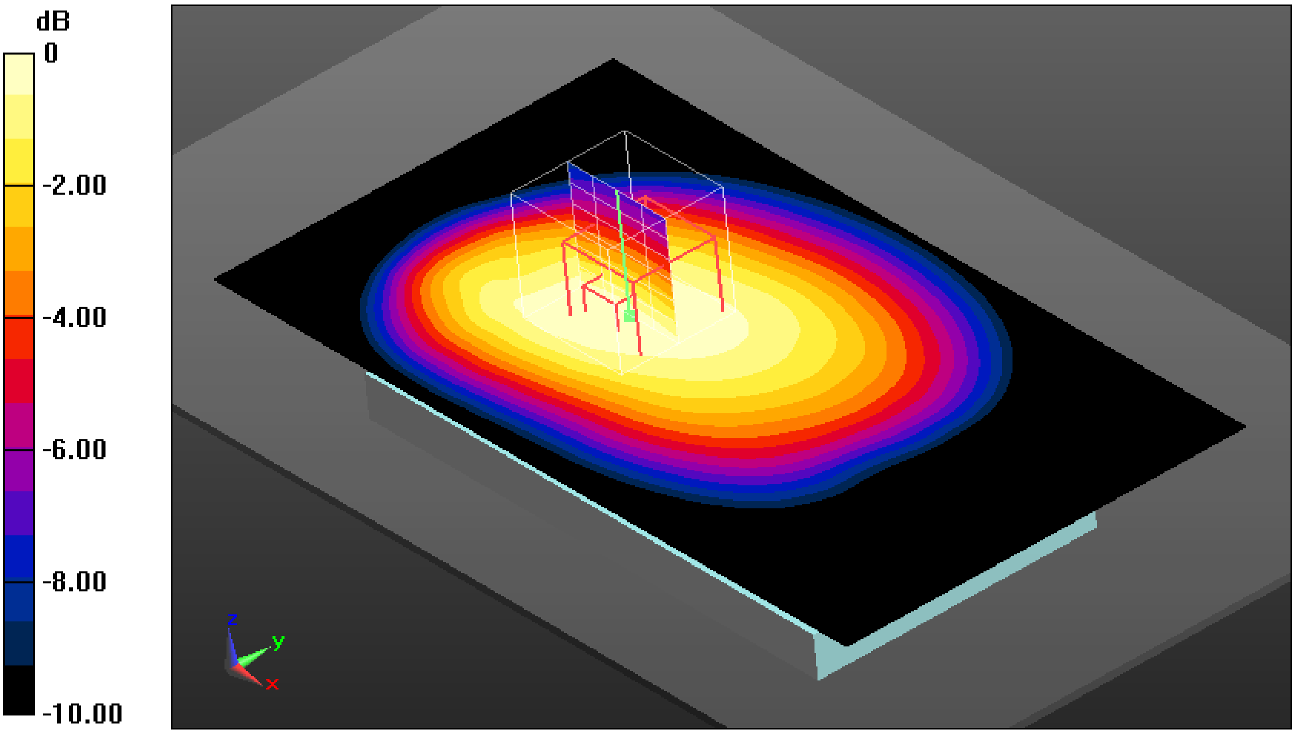
DUT: Sony; Serial: CB5126D718

Communication System: UID 0, UMTS FDD (0); Communication System Band: UMTS FDD V; Frequency: 846.6 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 847 MHz; σ = 1.003 S/m; ε_r = 53.821; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(6.04, 6.04, 6.04); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL835 - 10mm/Rear High/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.545 W/kg

MSL835 - 10mm/Rear High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 23.432 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.671 W/kg
SAR(1 g) = 0.519 W/kg; SAR(10 g) = 0.387 W/kg
Maximum value of SAR (measured) = 0.546 W/kg



0 dB = 0.546 W/kg = -2.63 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 22.4°C; liquid temperature: 21.9°C

Date/Time: 3/11/2014 11:00:38 AM

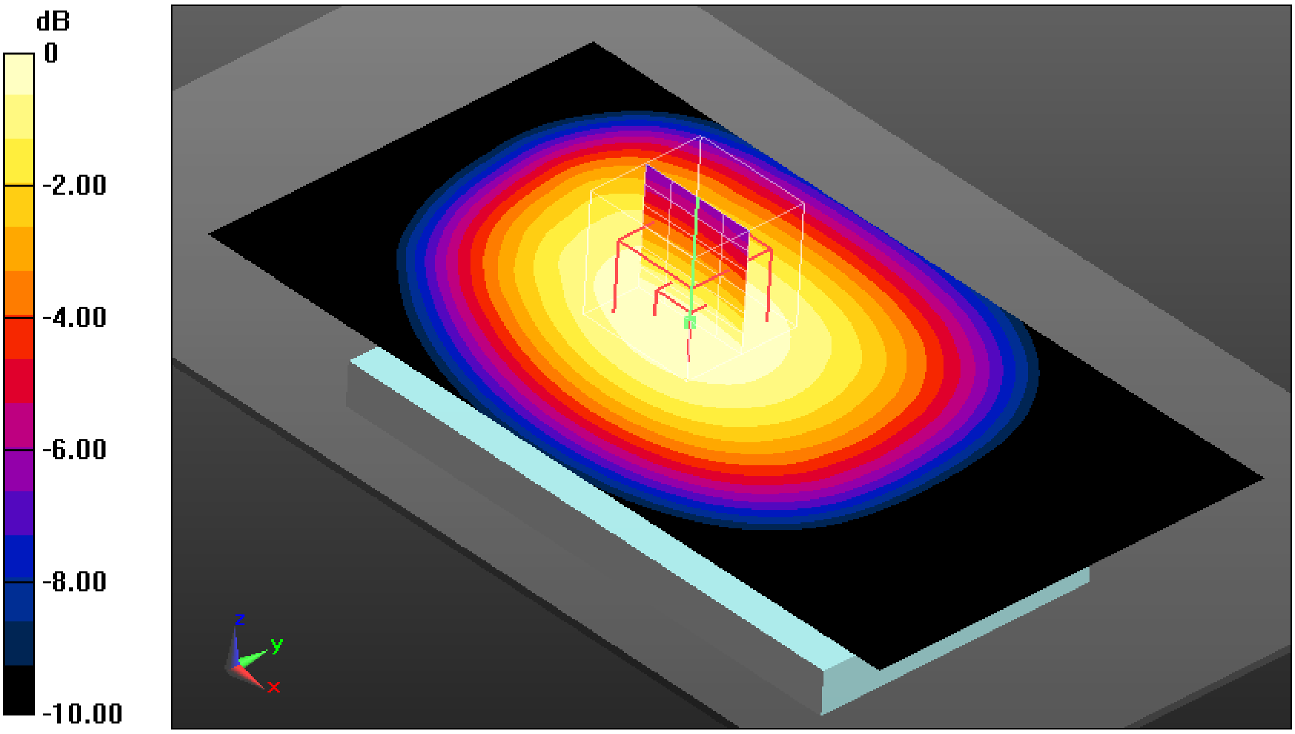
FCC_EN62209-2 UMTS FDD V body worn

DUT: Sony; Serial: CB5126D718

Communication System: UID 0, UMTS FDD (0); Communication System Band: UMTS FDD V; Frequency: 846.6 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 847 MHz; σ = 1.003 S/m; ε_r = 53.821; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(6.04, 6.04, 6.04); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: xxxx
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL835 - 15mm/Front High/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.378 W/kg

MSL835 - 15mm/Front High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 19.587 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.438 W/kg
SAR(1 g) = 0.361 W/kg; SAR(10 g) = 0.278 W/kg
Maximum value of SAR (measured) = 0.378 W/kg



0 dB = 0.378 W/kg = -4.23 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.4°C; liquid temperature: 21.9°C

Annex B.5: LTE FDD 17

Date/Time: 11.03.2014 09:00:50

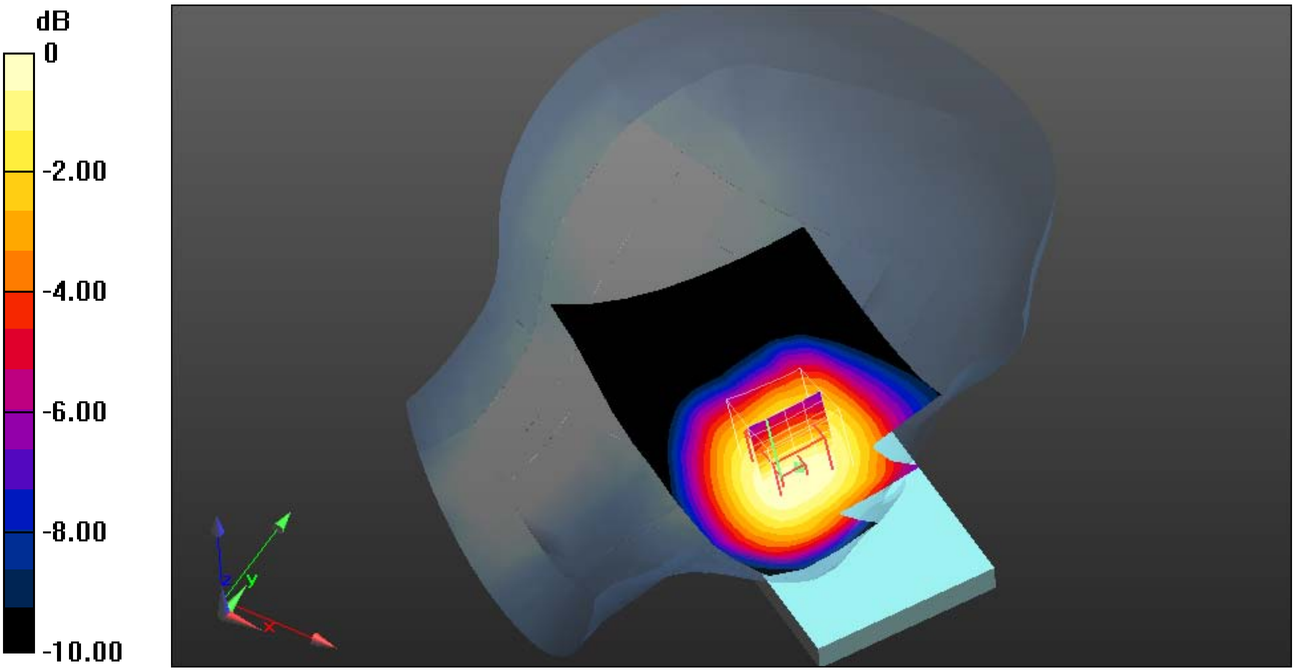
EN62209-LTE FDD 17 head

DUT: Sony; Serial: CB5126DAY7

Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 17 (700MHz); Frequency: 711 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 711 MHz; σ = 0.859 S/m; ε_r = 41.82; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3320; ConvF(6.54, 6.54, 6.54); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL - QPSK - 10MHz BW - 1RB/Touch Position - Hi - 49RB offset/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.356 W/kg

Left-Hand-Side HSL - QPSK - 10MHz BW - 1RB/Touch Position - Hi - 49RB offset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 20.112 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.417 W/kg
SAR(1 g) = 0.338 W/kg; SAR(10 g) = 0.263 W/kg
Maximum value of SAR (measured) = 0.353 W/kg



0 dB = 0.353 W/kg = -4.52 dBW/kg

Additional information:
ambient temperature: 22.1°C; liquid temperature: 21.5°C

Date/Time: 3/17/2014 6:42:47 AM

FCC_EN62209-2 LTE FDD 17 hotspot

DUT: Sony; Serial: CB5126DAY7

Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 17 (700MHz); Frequency: 711 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 711 MHz; σ = 0.922 S/m; ε_r = 54.882; ρ = 1000 kg/m^3

Phantom section: Center Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(6.12, 6.12, 6.12); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL750 - QPSK - 10MHz BW - 1RB - 10mm/Rear High - 49RB offset/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.571 W/kg

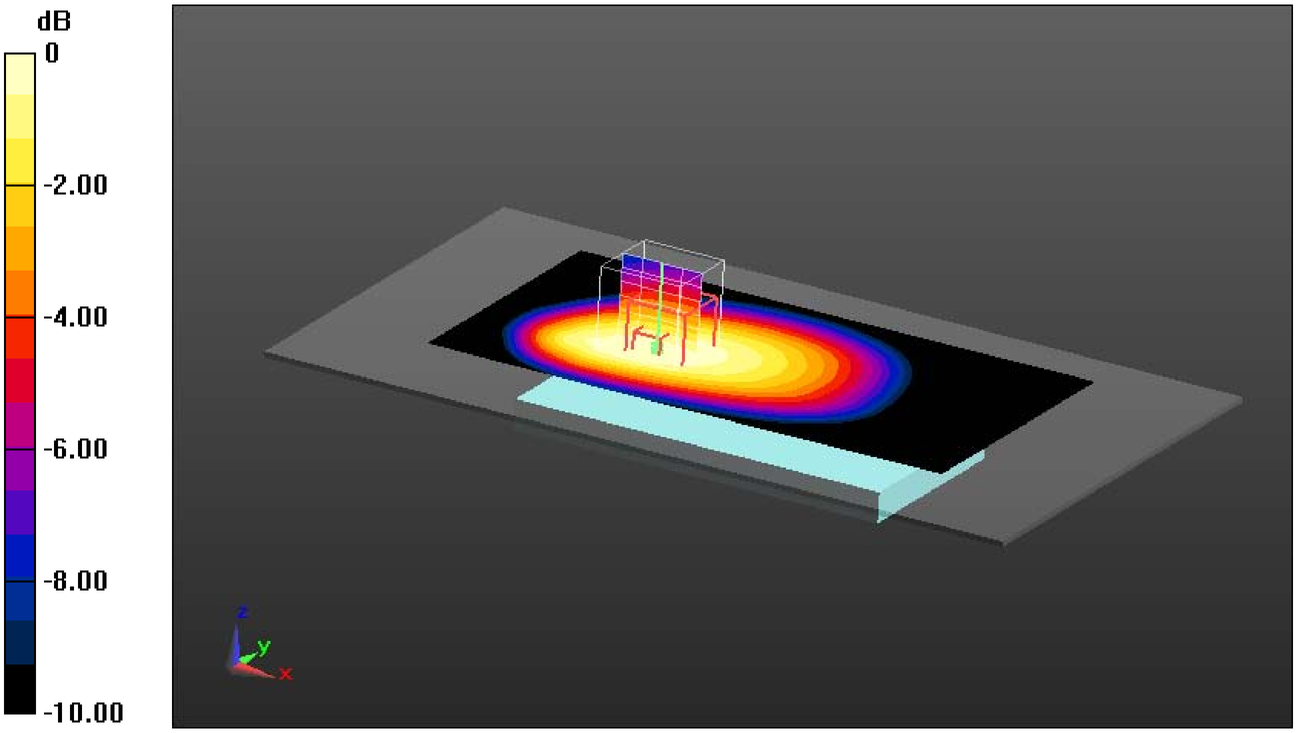
MSL750 - QPSK - 10MHz BW - 1RB - 10mm/Rear High - 49RB offset/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 25.114 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.710 W/kg

SAR(1 g) = 0.540 W/kg; SAR(10 g) = 0.401 W/kg

Maximum value of SAR (measured) = 0.569 W/kg



0 dB = 0.569 W/kg = -2.45 dBW/kg

Additional information:

position or distance of DUT to SAM: 10mm

ambient temperature: 22.5°C; liquid temperature: 21.8°C

Date/Time: 3/17/2014 7:04:30 PM

FCC_EN62209-2 LTE FDD 17 body worn

DUT: Sony; Serial: CB5126DAY7

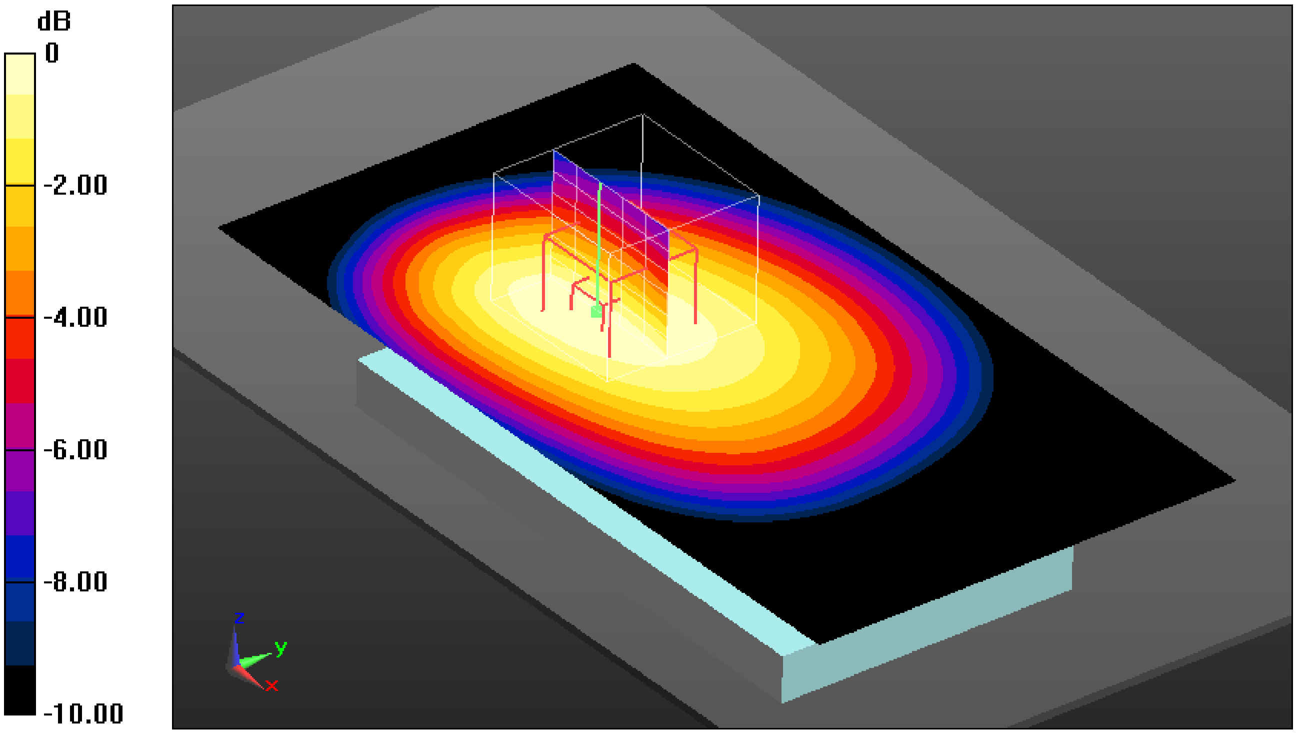
Communication System: UID 0, LTE FDD (0); Communication System Band: LTE 17 (700MHz); Frequency: 711 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 711 MHz; σ = 0.922 S/m; ε_r = 54.882; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(6.12, 6.12, 6.12); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL750 - QPSK - 10MHz BW - 1RB - 15mm/Rear High - 49RB offset/Area Scan (131x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.415 W/kg

MSL750 - QPSK - 10MHz BW - 1RB - 15mm/Rear High - 49RB offset/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 21.576 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.507 W/kg
SAR(1 g) = 0.399 W/kg; SAR(10 g) = 0.300 W/kg
Maximum value of SAR (measured) = 0.420 W/kg



0 dB = 0.420 W/kg = -3.77 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.5°C; liquid temperature: 21.8°C

Annex B.6: WLAN 2450MHz

Date/Time: 10.03.2014 11:28:19

IEEE1528_EN62209-WLAN2450 head

DUT: Sony; Serial: CB5126D6VN

Communication System: UID 0, WLAN 2450 (0); Communication System Band: 2.4 GHz; Frequency: 2437 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 2437 MHz; σ = 1.772 S/m; ε_r = 37.639; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3320; ConvF(4.49, 4.49, 4.49); Calibrated: 04.06.2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Middle/Area Scan (121x171x1):

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

Maximum value of SAR (interpolated) = 0.385 W/kg

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

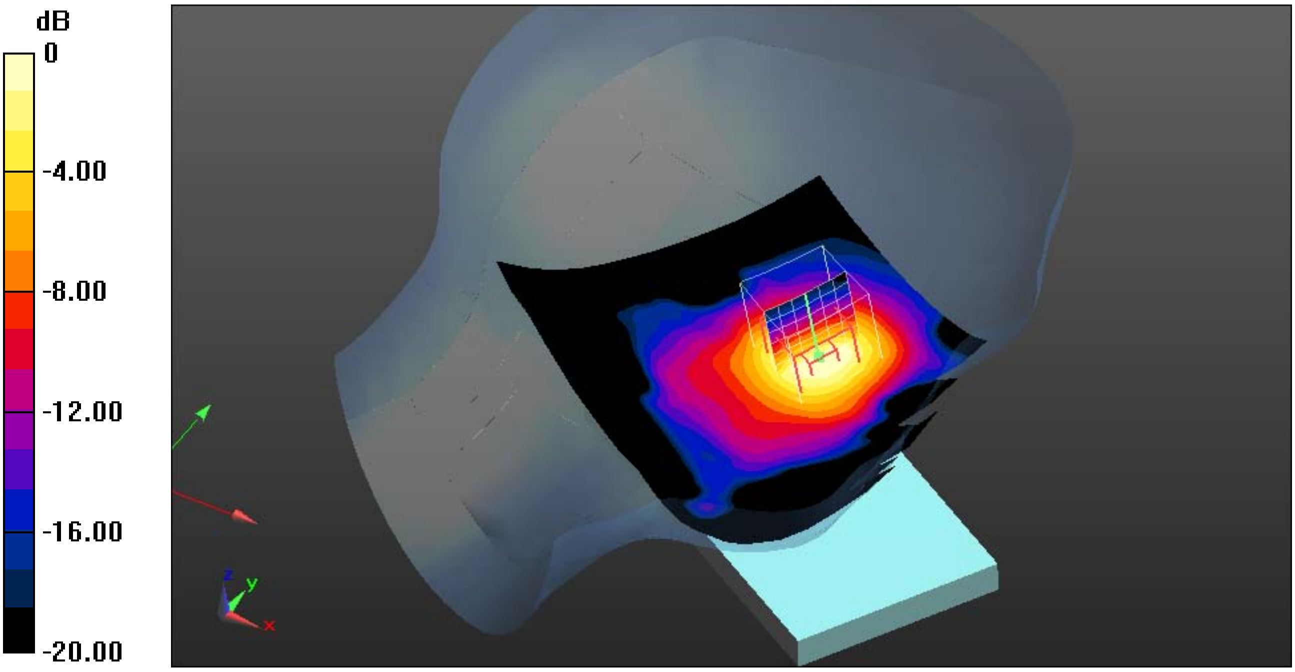
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.078 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.725 W/kg

SAR(1 g) = 0.318 W/kg; SAR(10 g) = 0.151 W/kg

Maximum value of SAR (measured) = 0.351 W/kg



0 dB = 0.351 W/kg = -4.55 dBW/kg

Additional information:

ambient temperature: 21.4°C; liquid temperature: 21.0°C

Date/Time: 3/14/2014 12:41:00 PM

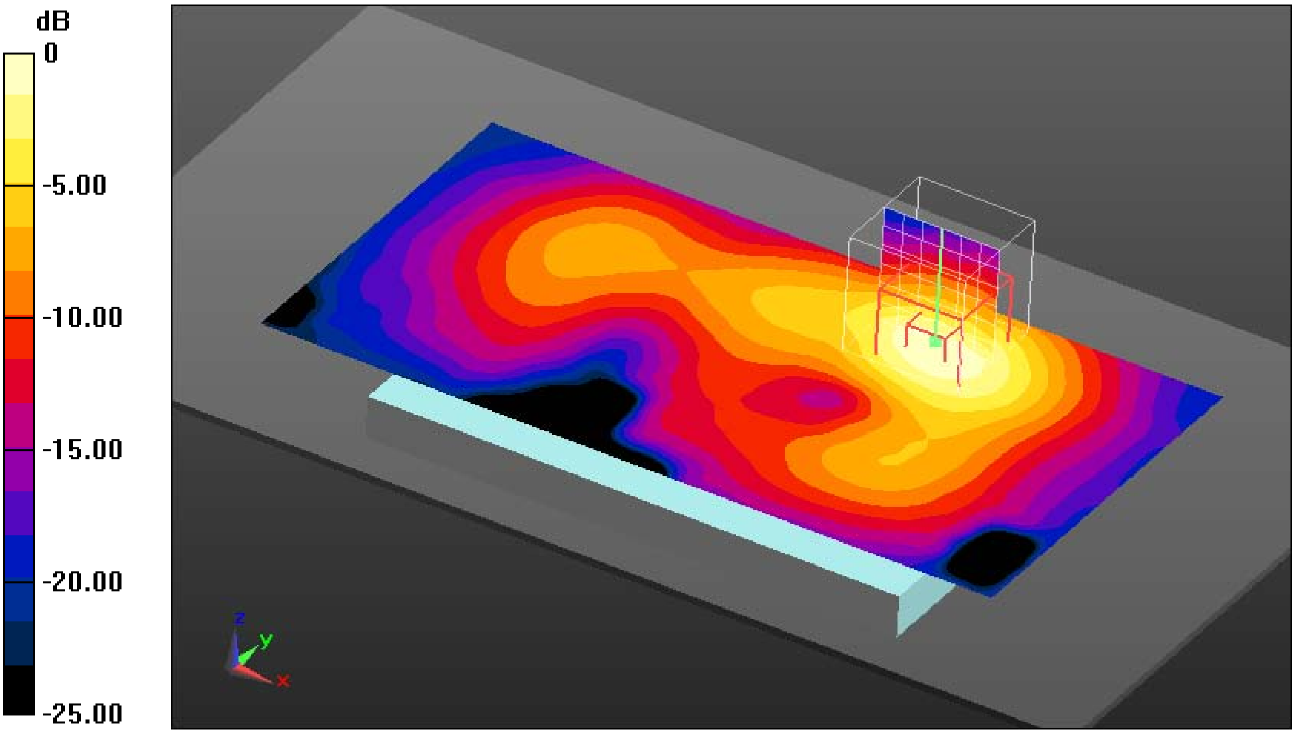
FCC_EN62209-2 WLAN2.4GHz hotspot

DUT: Sony; Serial: CB5126D6VN

Communication System: UID 0, WLAN 2450 (0); Communication System Band: 2.4 GHz; Frequency: 2437 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2437 MHz; σ = 1.964 S/m; ε_r = 51.671; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: ES3DV3 - SN3326; ConvF(4.18, 4.18, 4.18); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL2450 - 10mm/Rear Middle/Area Scan (191x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.234 W/kg

MSL2450 - 10mm/Rear Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.733 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.412 W/kg
SAR(1 g) = 0.205 W/kg; SAR(10 g) = 0.103 W/kg
Maximum value of SAR (measured) = 0.232 W/kg



0 dB = 0.232 W/kg = -6.35 dBW/kg

Additional information:
position or distance of DUT to SAM: 10mm
ambient temperature: 21.9°C; liquid temperature: 21.5°C

Date/Time: 3/14/2014 12:08:07 PM

FCC_EN62209-2 WLAN2.4GHz body-worn

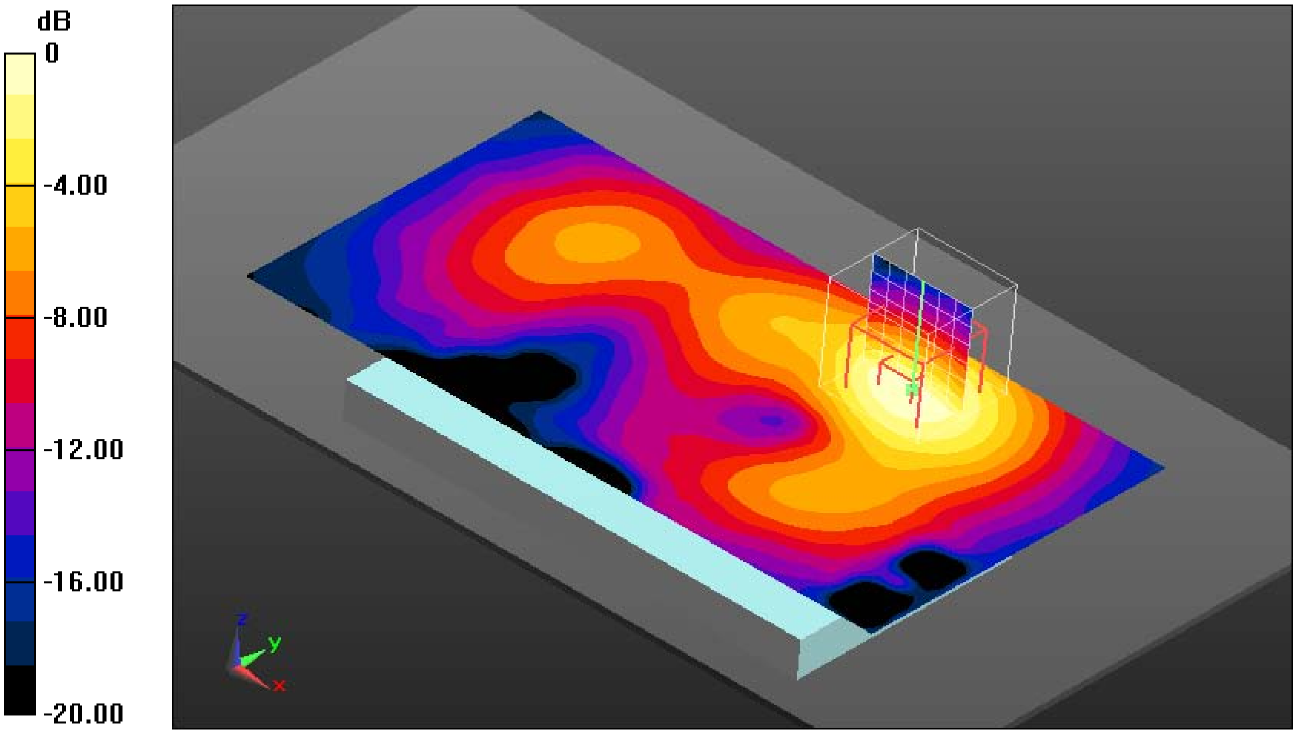
DUT: Sony; Serial: CB5126D6VN

Communication System: UID 0, WLAN 2450 (0); Communication System Band: 2.4 GHz; Frequency: 2437 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 2437 MHz; σ = 1.964 S/m; ε_r = 51.671; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(4.18, 4.18, 4.18); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL2450 - 15mm/Rear Middle/Area Scan (191x101x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.113 W/kg

MSL2450 - 15mm/Rear Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.628 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.193 W/kg
SAR(1 g) = 0.102 W/kg; SAR(10 g) = 0.054 W/kg
Maximum value of SAR (measured) = 0.111 W/kg



0 dB = 0.111 W/kg = -9.55 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 21.9°C; liquid temperature: 21.5°C

Annex B.7: WLAN 5GHz

Date/Time: 11.03.2014 14:28:19

IEEE1528_EN62209-WLAN5GHz head

DUT: Sony; Serial: CB5126D715

Communication System: UID 0, WLAN 5GHz (0); Communication System Band: 5 GHz Band; Frequency: 5320 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 5320 MHz; σ = 4.612 S/m; ε_r = 36.019; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: EX3DV4 - SN3944; ConvF(5.22, 5.22, 5.22); Calibrated: 02.08.2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE3 Sn413; Calibrated: 16.01.2014
- Phantom: SAM; Type: QD000P40C; Serial: TP1150
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Ch64/Area Scan (111x171x1):

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

Maximum value of SAR (interpolated) = 0.209 W/kg

Left-Hand-Side HSL/Touch Position - Ch64/Zoom Scan (9x12x12)/Cube 0:

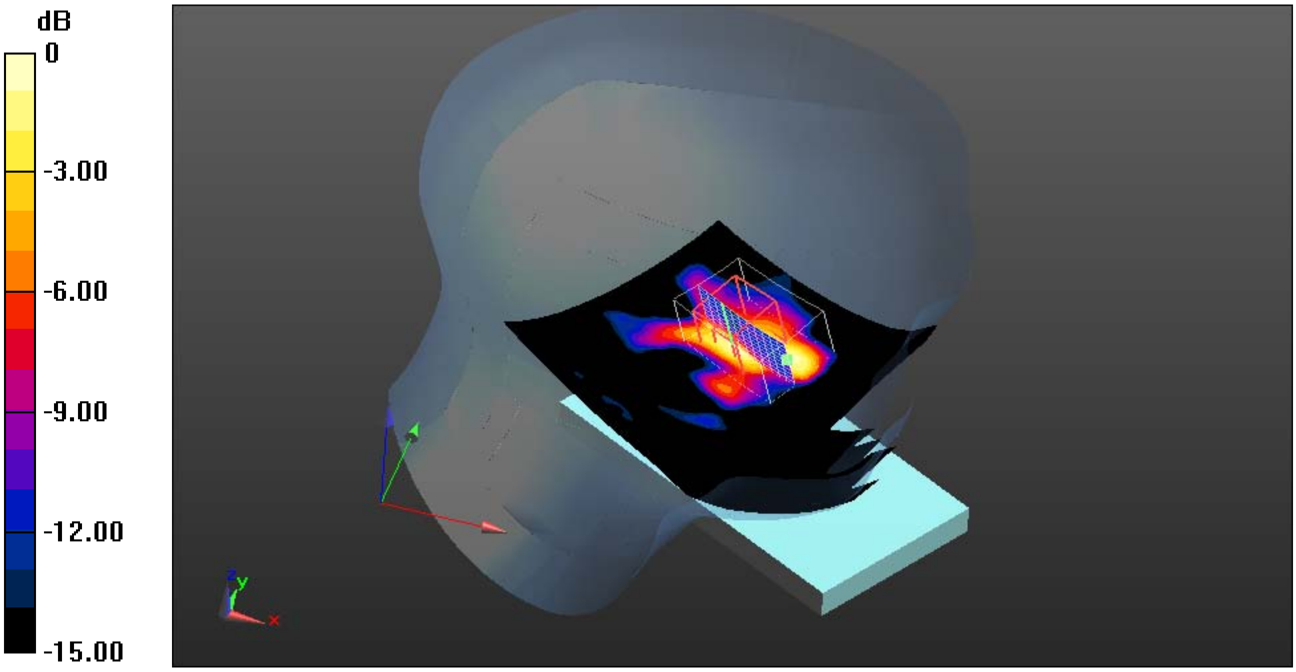
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 6.418 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.397 W/kg

SAR(1 g) = 0.118 W/kg; SAR(10 g) = 0.050 W/kg

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



0 dB = 0.220 W/kg = -6.58 dBW/kg

Additional information:

ambient temperature: 23.1°C; liquid temperature: 22.6°C

Date/Time: 3/13/2014 10:56:30 AM

FCC_EN62209-2 WLAN5GHz body worn

DUT: Sony; Serial: CB5126D6VN

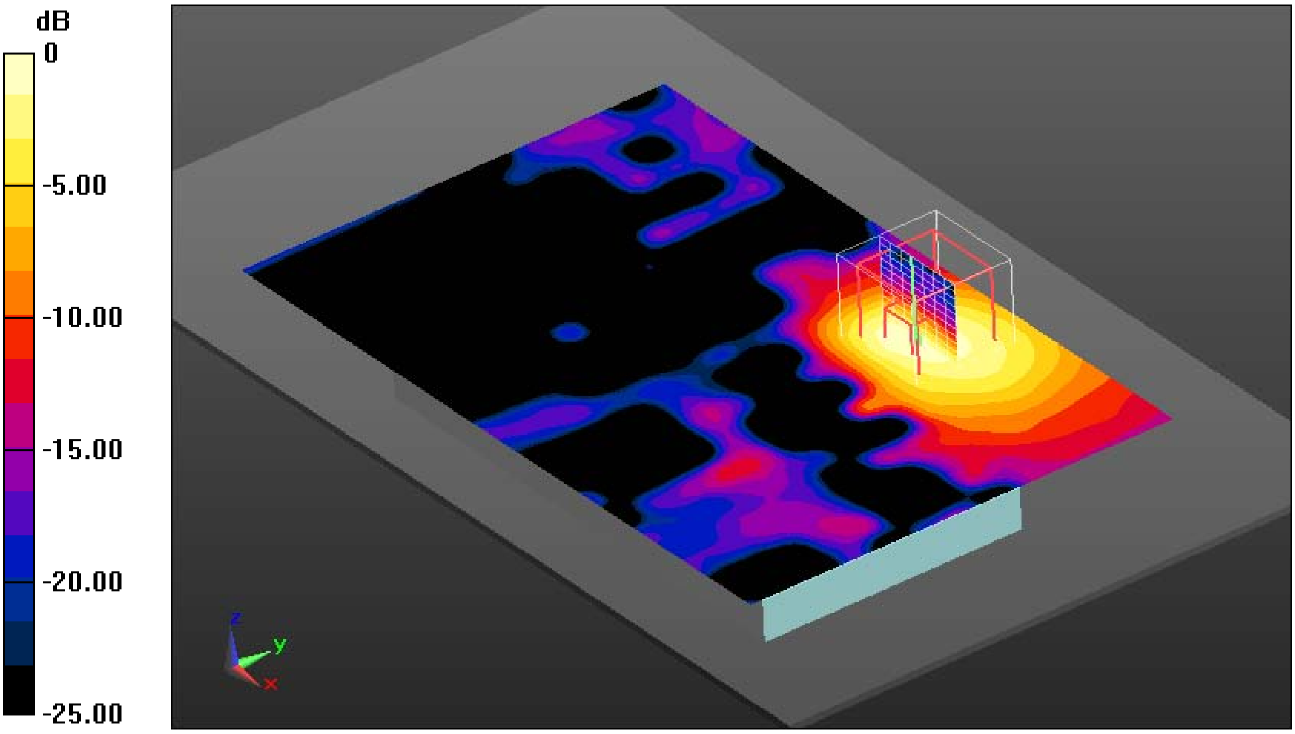
Communication System: UID 0, WLAN 5GHz (0); Communication System Band: 5 GHz Band; Frequency: 5320 MHz; Communication System PAR: 0 dB; PMF: 1
Medium parameters used: f = 5320 MHz; σ = 5.37 S/m; ε_r = 48.108; ρ = 1000 kg/m^3
Phantom section: Center Section
Measurement Standard: DASY5
DASY5 Configuration:
- Probe: EX3DV4 - SN3944; ConvF(4.3, 4.3, 4.3); Calibrated: 8/2/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection (Locations From Previous Scan Used)), Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 23.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA; Serial: 1154
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

MSL - 15mm/Rear Ch64/Area Scan (191x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.329 W/kg

MSL - 15mm/Rear Ch64/Zoom Scan (8x8x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 8.129 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.612 W/kg
SAR(1 g) = 0.182 W/kg; SAR(10 g) = 0.070 W/kg
Maximum value of SAR (measured) = 0.328 W/kg



0 dB = 0.328 W/kg = -4.84 dBW/kg

Additional information:
position or distance of DUT to SAM: 15mm
ambient temperature: 22.0°C; liquid temperature: 21.7°C

Annex B.8: Bluetooth 2450MHz

Date/Time: 3/17/2014 10:33:00 AM

IEEE1528_EN62209-BT2450 head

DUT: Sony; Serial: CB5126D6VN

Communication System: UID 0, Bluetooth (0); Communication System Band: BT; Frequency: 2441 MHz; Communication System PAR: 0 dB; PMF: 1

Medium parameters used: f = 2441 MHz; σ = 1.779 S/m; ε_r = 37.656; ρ = 1000 kg/m^3

Phantom section: Left Section

Measurement Standard: DASY5

DASY5 Configuration:

- Probe: ES3DV3 - SN3326; ConvF(4.47, 4.47, 4.47); Calibrated: 9/2/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 2.0, 32.0
- Electronics: DAE4 Sn1387; Calibrated: 8/28/2013
- Phantom: SAM front; Type: QD000P40CC; Serial: TP:1041
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Left-Hand-Side HSL/Touch Position - Middle/Area Scan (111x171x1):

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

Maximum value of SAR (interpolated) = 0.00269 W/kg

Left-Hand-Side HSL/Touch Position - Middle/Zoom Scan (9x10x7)/Cube 0:

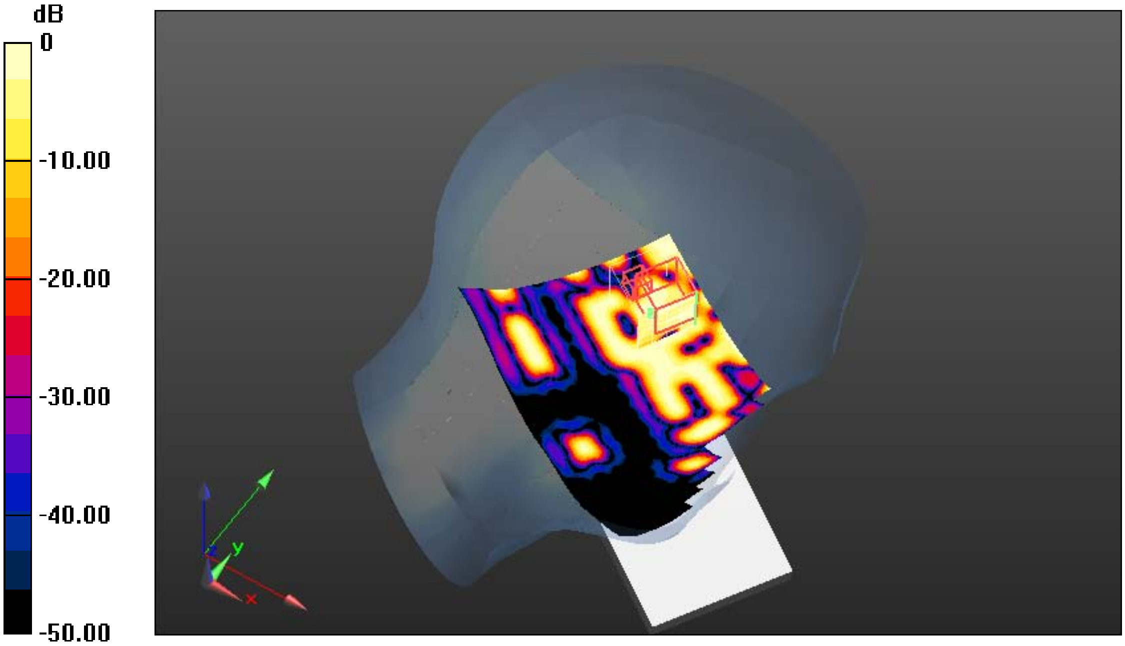
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.409 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.00328 W/kg

SAR(1 g) = 0.00081 W/kg; SAR(10 g) = 0.000561 W/kg

Maximum value of SAR (measured) = 0.00146 W/kg



0 dB = 0.00146 W/kg = -28.36 dBW/kg

Additional information:

ambient temperature: 22.2°C; liquid temperature: 21.9°C

Annex B.9: Liquid depth

Photo 1: Liquid depth 750 MHz head simulating liquid

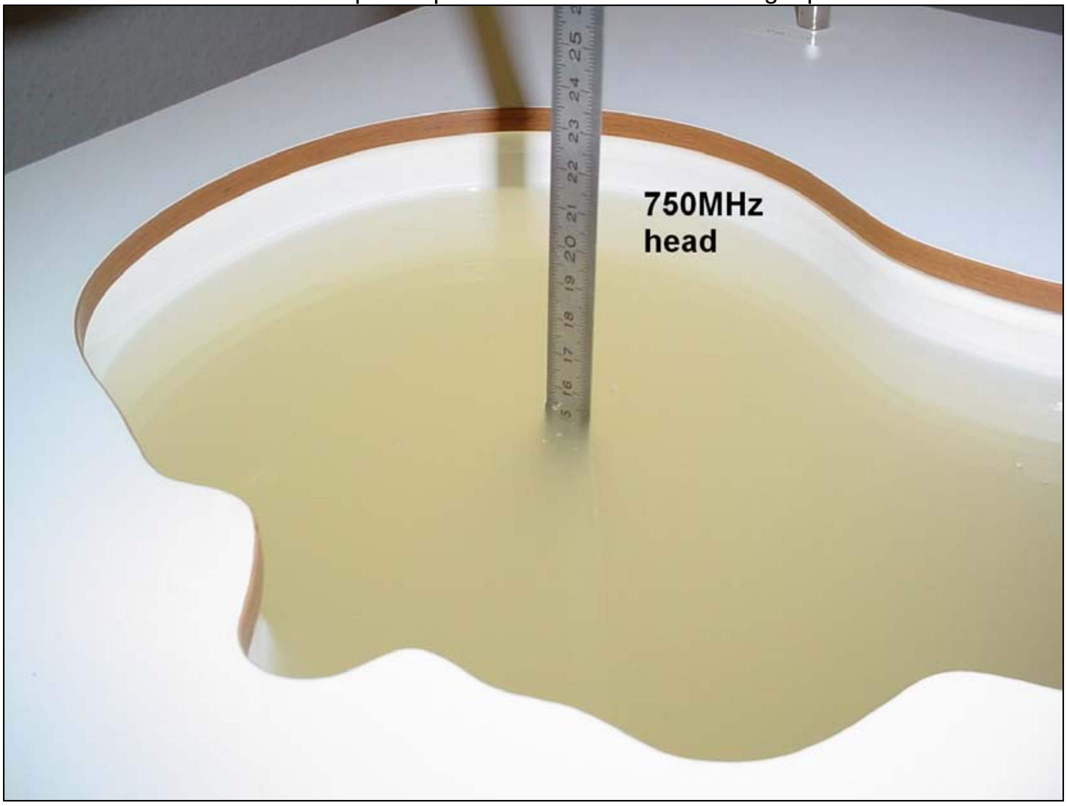


Photo 2: Liquid depth 750 MHz body simulating liquid

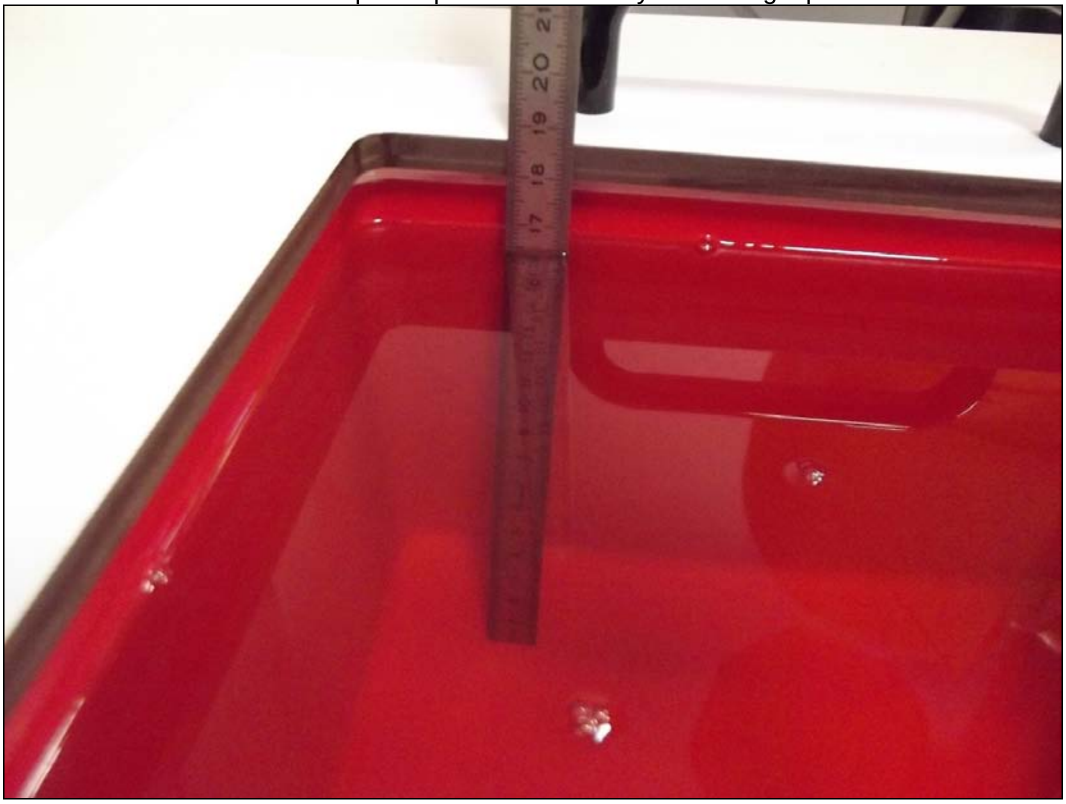


Photo 3: Liquid depth 850 MHz head simulating liquid

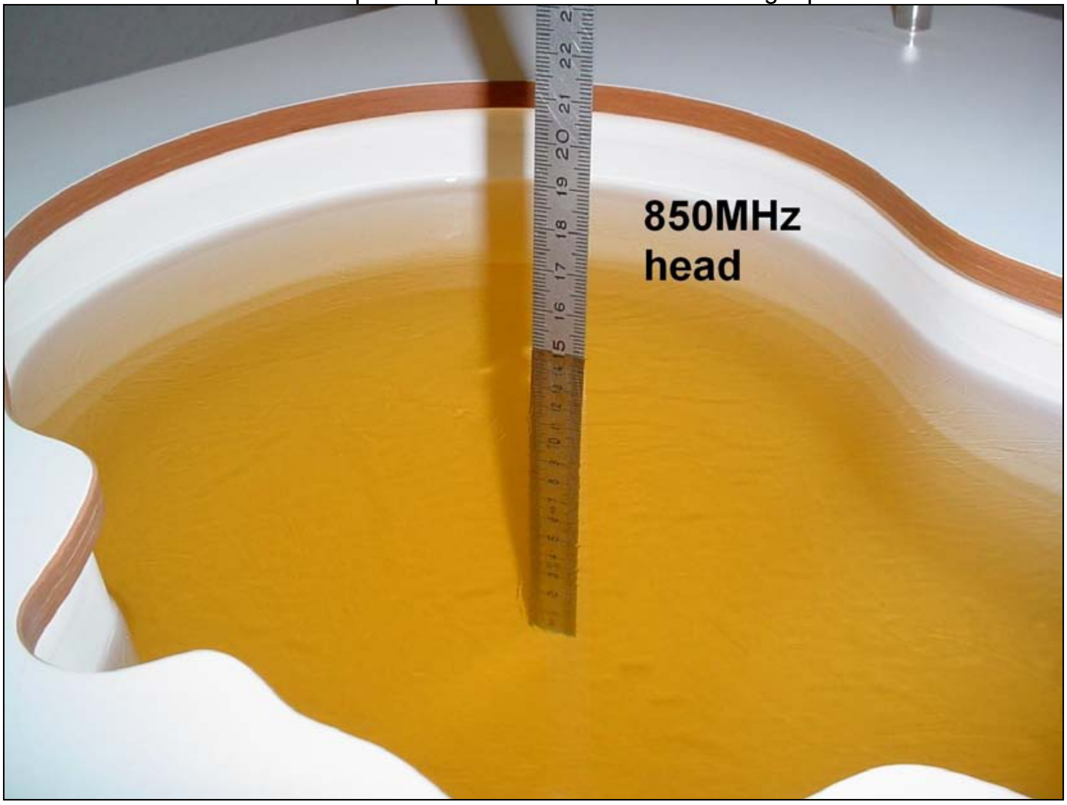


Photo 4: Liquid depth 850 MHz body simulating liquid

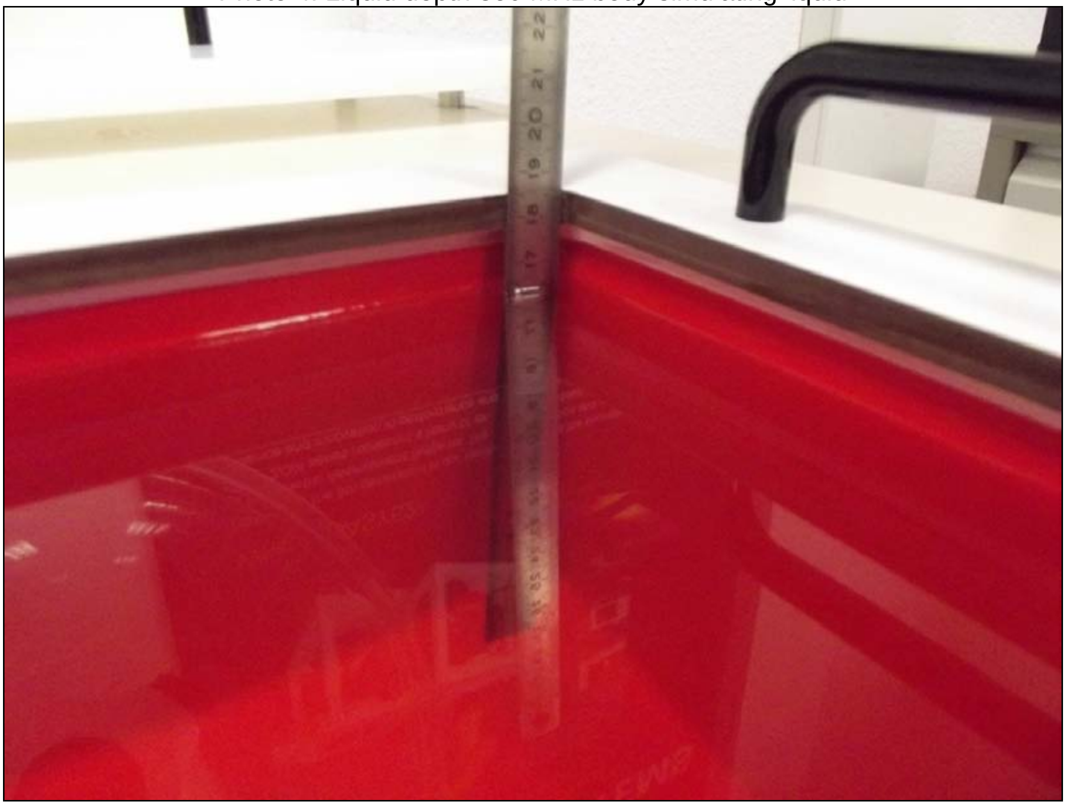


Photo 5: Liquid depth 1900MHz head simulating liquid

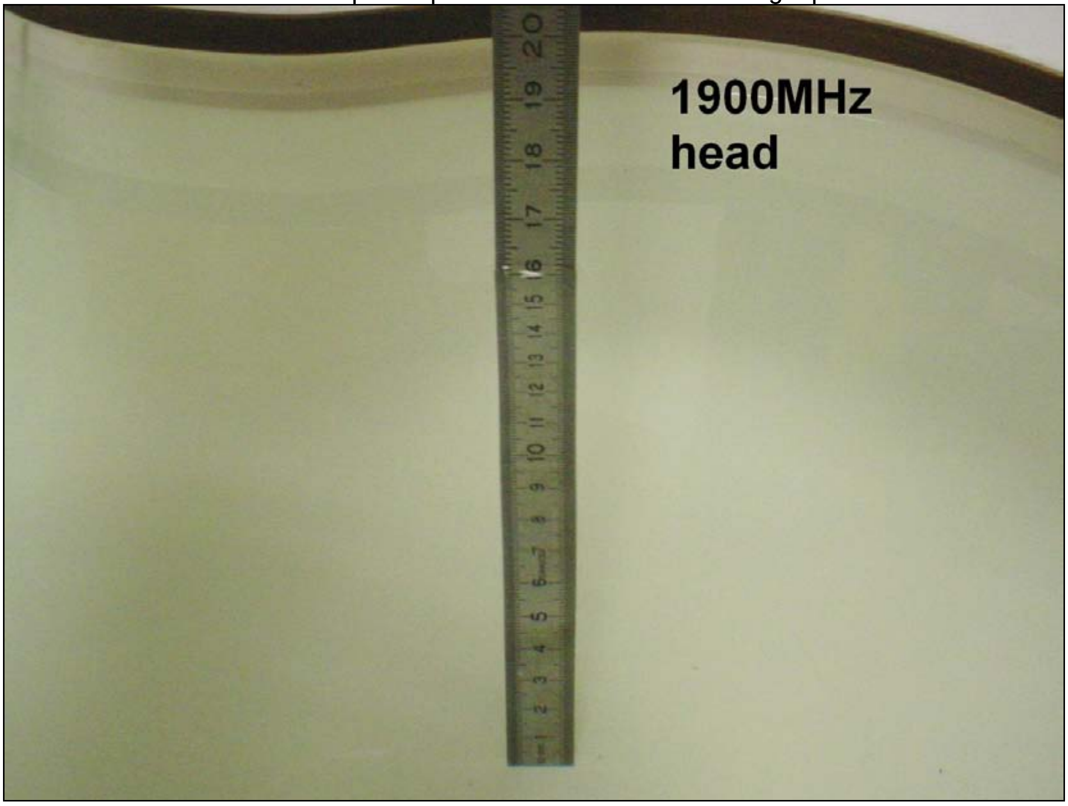


Photo 6: Liquid depth 1900 MHz body simulating liquid

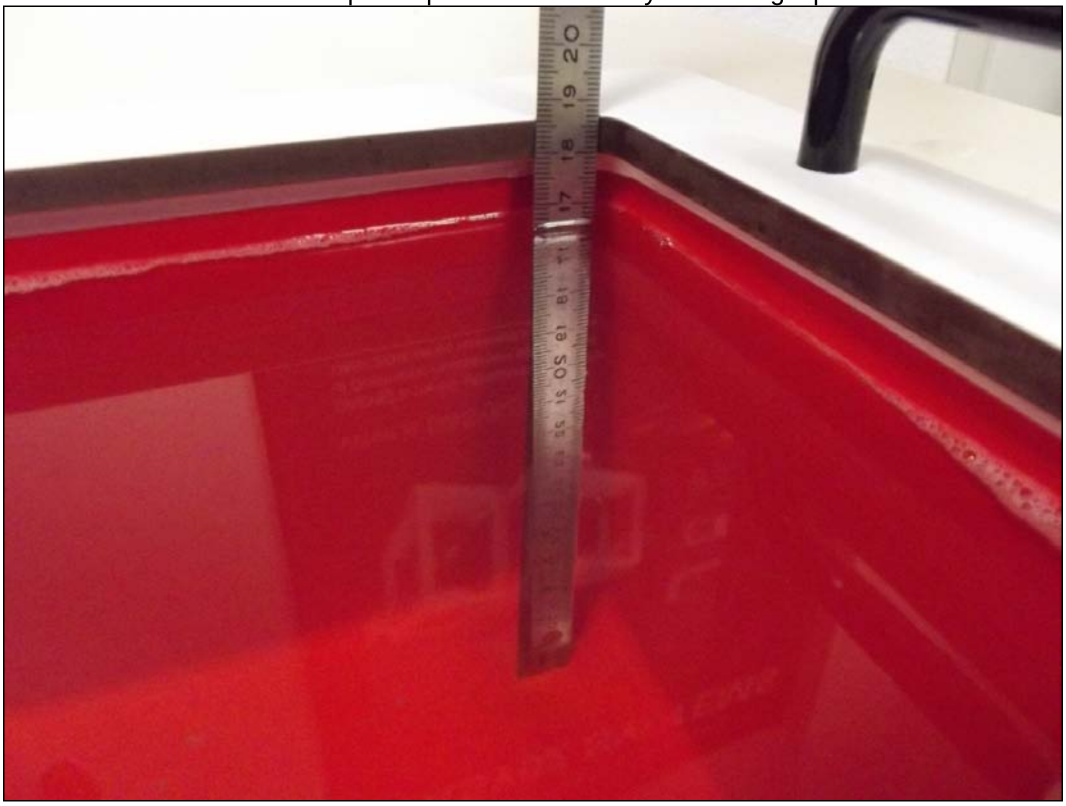


Photo 7: Liquid depth 2450MHz head simulating liquid

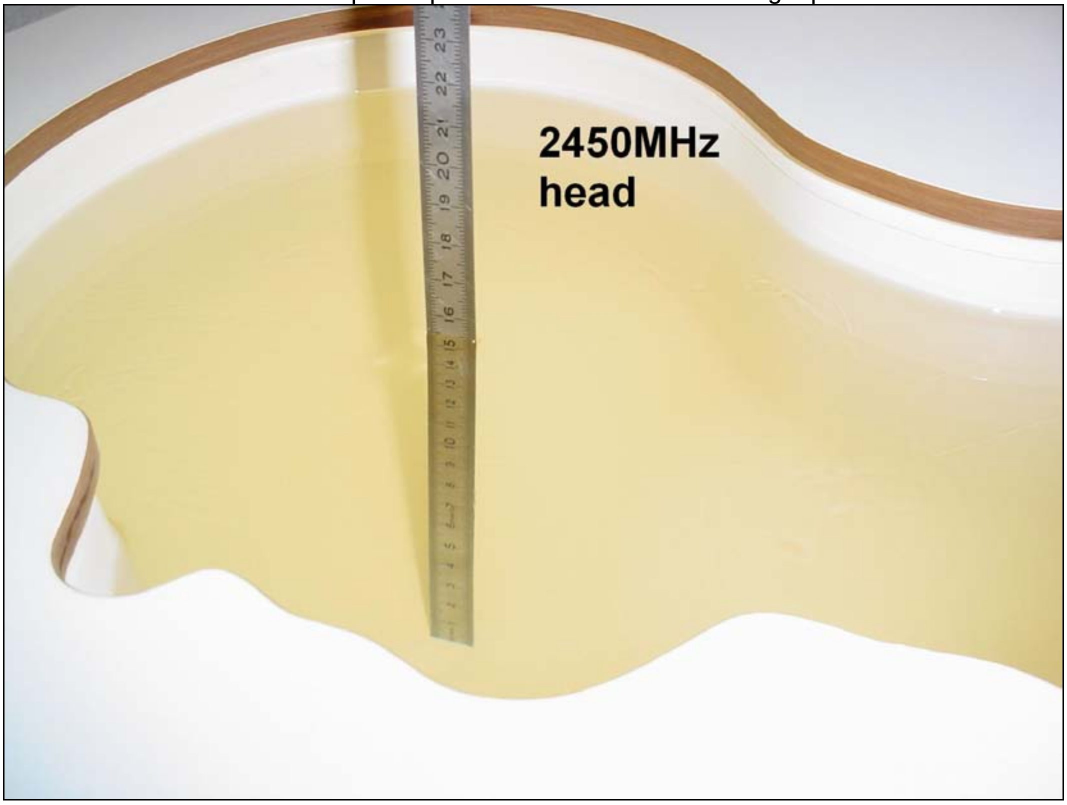


Photo 8: Liquid depth 2450 MHz body simulating liquid

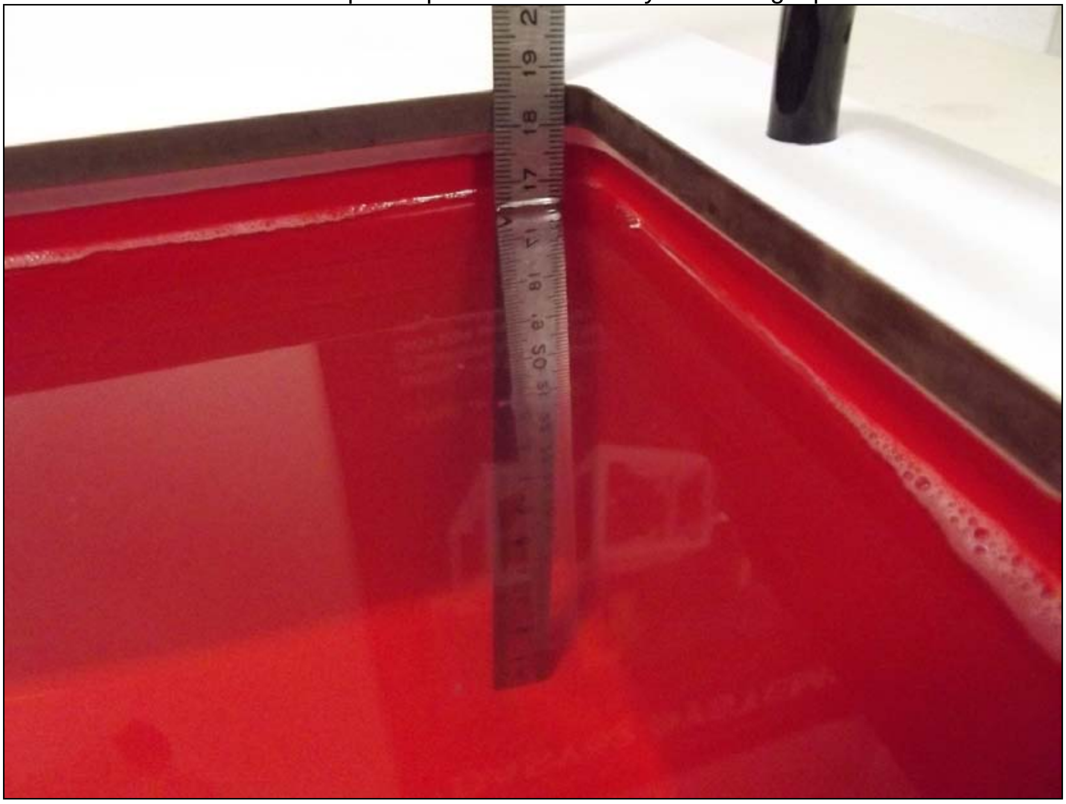
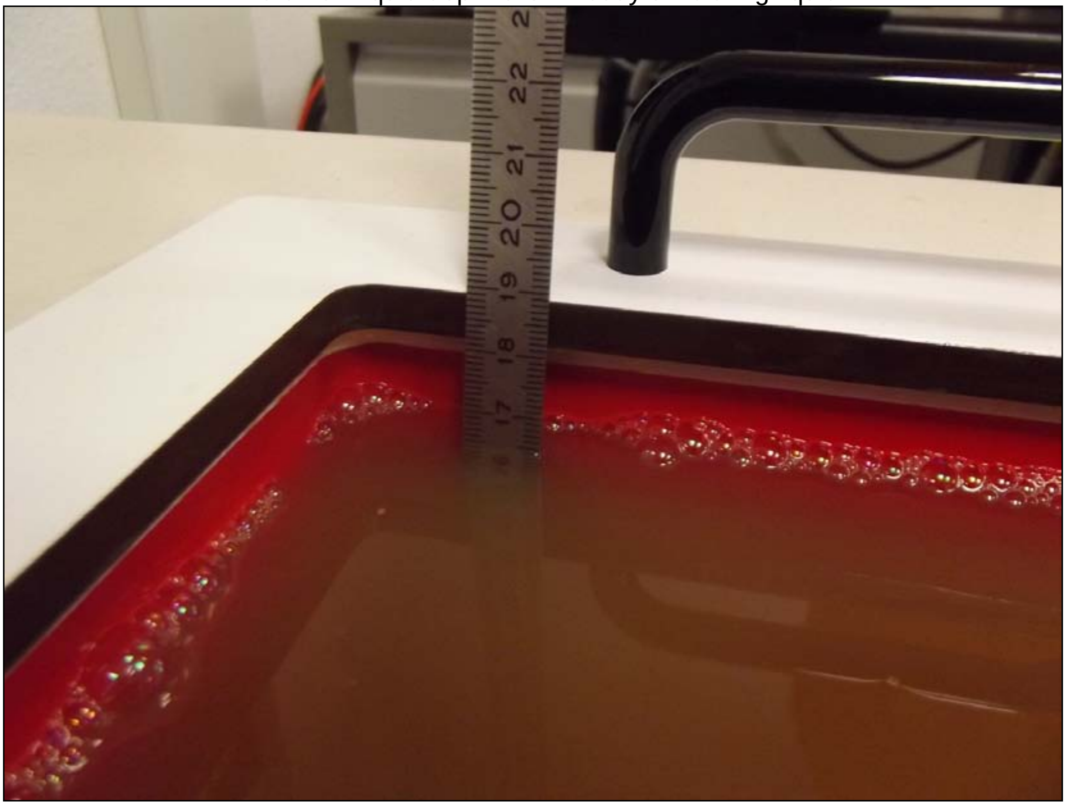


Photo 9: Liquid depth 5 GHz head simulating liquid

Photo 10: Liquid depth 5 GHz body simulating liquid



Annex C: Photo documentation

Photo documentation is described in the additional document:

Appendix to test report no. 1-6965/13-16-02 Photo documentation

Annex D: Calibration parameters

Calibration parameters are described in the additional document:

Appendix to test report no. 1-6965/13-16-02
Calibration data, Phantom certificate
and detail information of the DASY5 System

Annex E: Document History

Version	Applied Changes	Date of Release
	Initial Release	2014-03-19

Annex F: Further Information

Glossary

BW	-	Bandwidth
DTS	-	Distributed Transmission System
DUT	-	Device under Test
EUT	-	Equipment under Test
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
LTE	-	Long Term Evolution
N/A	-	not applicable
PCE	-	Personal Consumption Expenditure
OET	-	Office of Engineering and Technology
RB	-	resource block(s)
SAR	-	Specific Absorption Rate
S/N	-	Serial Number
$SPLSR_i$	-	SAR-to-(peak-locations spacing) ratio
SW	-	Software
UNII	-	Unlicensed National Information Infrastructure