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Accredited testing laboratory

CNAS Registration number: L0310

Report On SAR Test of HSPA Rotatable USB Stick M/N: E1815

Test report no. : SYBH(Z-SAR)003072010
Type identification : E1815
FCC-ID : QISE1815
Test specification : IEEE 1528-2003
: ANSI C95.1-1999
: OET Bulletin 65 Supplement C
: IEC 62209-2:Ed1.0(2010-3)

Table of Contents

Revision History

Date	Revision	Description	Author
2010-7-15	1.0	Initial issue report	Luo Yusheng
2010-08-04	2.0	1) Added 2.5.3 Power Reduction 2) Added missing High-Low channel results which Middle channel SAR is over 0.8W/kg in 2.6 3) Added power drift result of each SAR test in 2.6	Luo Yusheng
2010-08-18	2.1	Added 2.6.2 Justification for SAR test positions	Luo Yusheng
2010-09-03	2.2	Added additional EGPRS test in 2.6	Luo Yusheng

1 General Information

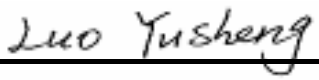
1.1 Notes

The test results of this test report relate exclusively to the test item specified in 1.5. The HUAWEI does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of HUAWEI.

1.1.1 Statement of Compliance

The SAR values found for the E1815 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 95.1:1999, 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.
The measurement together with the test system set-up is described in chapter 2.3 of this test report. A detailed description of the equipment under test can be found in chapter 1.5.

Test engineer:

2010-09-03	**Luo Yusheng**	
Date	Name	Signature

Reviewed by:

2010-09-03	**Hu Zhongxun**	
Date	Name	Signature

Approved by:

2010-09-03	**Liu Chunlin**	
Date	Name	Signature

1.2 Testing laboratory

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State of accreditation: The Test laboratory (area of testing) is accredited according to ISO/IEC 17025.
CNAS Registration number: L0310

1.3 Details of applicant

Name: HUAWEI TECHNOLOGIES CO., LTD

Street: Huawei Base, Bantian, Longgang District
Town: Shenzhen
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Contact: Ms. Pan Lifang
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1.4 Application details

Date of receipt of application:	2010-07-01
Date of receipt of test item:	2010-07-01
Start/Date of test:	2010-07-05
End of test:	2010-09-03

1.5 Test item

Description of the test item:	HSPA Rotatable USB Stick
Type identification:	E1815
FCC-ID :	QISE1815
Serial number:	----
Manufacturer name:	Huawei Technologies Co.,Ltd.
Street:	Huawei Base, Bantian,Longgang District
Town:	Shenzhen
Country:	P.R.China

additional information on the DUT:		
device type :	portable device	
IMEI No :	359206030003735	
exposure category:	uncontrolled environment / general population	
test device production information	production unit	
operating mode(s)	GSM,PCS,UMTS/HSPA	
modulation	GMSK,8-PSK,QPSK	
operating frequency range(s)	transmitter frequency range	receiver frequency range
PCS 1900 (tested):	1850.2 MHz ~1909.8 MHz	1930.2 MHz ~1989.8 MHz
GSM 850 (tested):	824.2 MHz ~ 848.8 MHz	869.2 MHz ~893.8 MHz
WCDMA Band II	1852.4 MHz~1907.6 MHz	1932.4 MHz~1987.6 MHz
WCDMA Band V	826.4 MHz~846.6 MHz	871.4 MHz~891.6 MHz
Power class :	1,tested with power level 0 (GSM 1900)	
	4,tested with power level 5 (GSM 850)	
	3, tested with power control all up bits(WCDMA Band II)	
	3, tested with power control all up bits(WCDMA Band V)	
test channels (low-mid-high) :	512-661-810 (GSM 1900)	
	128-192-251(GSM 850)	
	9262-9400-9538(WCDMA Band II)	
	4132-4182-4233(WCDMA Band V)	
hardware version :	CD1E1815M	
software version :	11.128.03.05.457	
Antenna Type :	E1815	
Tested with host laptop:	Lenovo THINKPAD T61 Lenovo THINKPAD X301	

1.5.1 EUT Description

E1815 HSPA/WCDMA/EDGE/GPRS/GSM dual mode Rotatable USB Stick is subscriber equipment in the UMTS/GSM system. E1815 implement such functions as RF signal receiving/transmitting, HSPA/WCDMA and EDGE/GPRS/GSM protocol processing, data service etc. Externally it provides USB interface (to connect to the notebook etc.), USIM card interface and Micro SD card interface. E1815 has an internal antenna as default.

1.6 Test specification(s)

Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01)

IEEE 1528-2003 (April 21, 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: Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands (Issue 2 of November 2005)

Canada's Safety Code 6: Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz (99-EHD-237)

IEEE Std C95.3 – 1991, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.

IEEE Std C95.1 – 1999, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.

IEC 62209-2:Ed1.0(2010-3)Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

FCC KDB 447498 D02 SAR Procedures for Dongle Xmtr v02 ,Published on Nov 16 2009

FCC Inquiry tracking number: 153646

1.6.1 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain)	**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 1: 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).

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.	☒
The deviations as specified in 2.5 were ascertained in the course of the tests performed.	☐

The maximum SAR of E1815 is 1.43W/kg.

2.2 Test environment

General Environment conditions in the test area are as follows:

Ambient temperature: 20°C – 24°C
Tissue simulating liquid: 20°C – 24°C
Humidity: 30% – 70%

Exact temperature values for each test are shown in the table(s) under 2.5. and/or on the measurement plots.

2.3 Measurement and test set-up

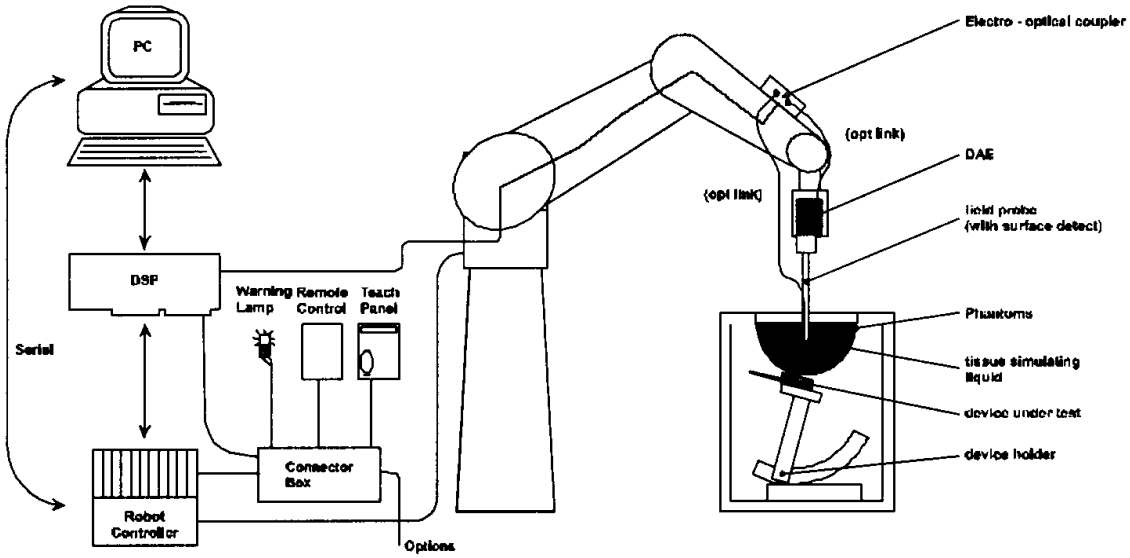
The measurement system is described in chapter 2.4.

The test setup for the system validation can be found in chapter 2.4.14.

A description of positioning and test signal control can be found in chapter 2.5 together with the test results.

2.4 Measurement system

2.4.1 System Description



The DASY5 system for performing compliance tests consists of the following items:

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

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

- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows XP.
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

2.4.2 Test environment

The DASY5 measurement system is placed at the head end of a room with dimensions: 4.5 x 4 x 3 m³, the SAM phantom is placed in a distance of 1.3 m from the side walls and 1.1m from the rear wall.
Picture 1 of the photo documentation shows a complete view of the test environment.
The system allows the measurement of SAR values larger than 0.005 mW/g.

2.4.3 Probe description

Isotropic E-Field Probe EX3DV4 for Dosimetric Measurements

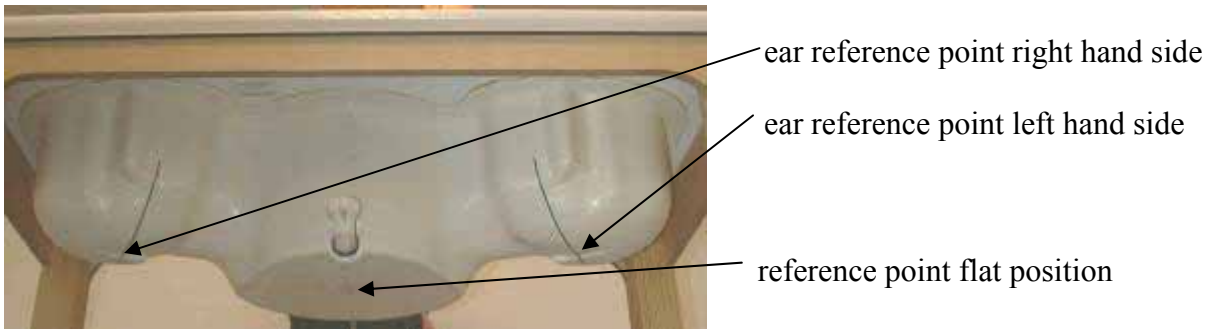
Technical data according to manufacturer information	
Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration	In air from 10 MHz to 2.5 GHz In head tissue simulating liquid (HSL) at 900 (800-1000) MHz and 1.8 GHz (1700-1910 MHz) (accuracy ± 11%; 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 (EX3DV4 only)
Dimensions	Overall length: 337 mm Tip length: 9 mm Body diameter: 10 mm Tip diameter:2.5 mm Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms (EX3DV4)

Isotropic E-Field Probe ES3DV3 for Dosimetric Measurements

Technical data according to manufacturer information	
Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

2.4.4 Phantom description

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



2.4.5 Device holder description

The DASY5 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.

2.4.6 Scanning procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

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

- The „surface check“ measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

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

- A „7x7x7 zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous „coarse“ scan. This is a fine 7x7 grid where the robot additionally moves the probe in 7 steps along the z-axis away from the bottom of the Phantom. Grid spacing for the cube measurement is 5 mm in x and y-direction and 5 mm in z-direction. DASY5 is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in annex 2. Test results relevant for the specified standard (see chapter 1.6.) are shown in table form in chapter 2.5.

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

2.4.7 Spatial Peak SAR Evaluation

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

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

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

- All neighboring volumes are evaluated until no neighboring 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

DASY5 uses the advanced extrapolation option which is able to compansate boundary effects on E-field probes.

2.4.8 Data Storage and Evaluation

Data Storage

The DASY5 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". 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 DASY5 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 (i = x, y, z)
$[mV/(V/m)^2]$ for E-field Probes
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.

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

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

2.4.9 Test equipment utilized

This table gives a complete overview of the SAR measurement equipment

Devices used during the test described in chapter 2.5. are marked ☒

	Manufacturer	Device	Type	Serial number	Date of last calibration)*
☒	Schmid & Partner Engineering AG	Dosimetric E-Field Probe	ES3DV3	3168	2009-12-18
☒	Schmid & Partner Engineering AG	835 MHz System Validation Dipole	D835V2	4d095	2009-05-25
☐	Schmid & Partner Engineering AG	900 MHz System Validation Dipole	D900V2	1d063	2009-05-26
☐	Schmid & Partner Engineering AG	1800 MHz System Validation Dipole	D1800V2	2d157	2009-05-27
☒	Schmid & Partner Engineering AG	1900 MHz System Validation Dipole	D1900V2	5d091	2009-05-28
☐	Schmid & Partner Engineering AG	2000 MHz System Validation Dipole	D2000V2	1036	2009-05-29
☐	Schmid & Partner Engineering AG	Data acquisition electronics	DAE4	851	2010-06-30
☒	Schmid & Partner Engineering AG	Data acquisition electronics	DAE4	852	2009-12-18
☒	Schmid & Partner Engineering AG	Software	DASY 5 V5.0	N/A	N/A
☒	Schmid & Partner Engineering AG	Twin Phantom	SAM1	TP-1475	N/A
☒	Schmid & Partner Engineering AG	Twin Phantom	SAM2	TP-1474	N/A
☒	Rohde & Schwarz	Universal Radio Communication Tester	CMU 200	111379	2009-09-26
☒	Agilent)*	Network Analyser 300 kHz to 8.5 GHz	E5071B	MY42404956	2010-03-08
☒	Agilent	Dielectric Probe Kit	85070E	2484	N/A
☒	Agilent	Signal Generator	N5181A	MY47420989	2010-03-08
☒	MINI-CIRCUITS	Amplifier	ZHL-42W	QA0746001	N/A
☒	Agilent	Power Meter	E4417A	MY45101339	2010-05-19
☒	Agilent	Power Meter Sensor	E9321A	MY44420359	2010-05-19

Note: The calibration interval of validation dipoles is 3 years.
)*: Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

2.4.10 Tissue simulating liquids: dielectric properties

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

(liquids used for tests described in chapter 2.5. are marked with ☒) :

Ingredients (% of weight)	**Frequency (MHz)**					
frequency band	☐ 450	☒ 835	☐ 900	☐ 1800	☒ 1900	☐ 2450
Tissue Type	Body	Body	Body	Body	Body	Body
Water	51.16	52.4	56.0	69.91	69.91	73.2
Salt (NaCl)	1.49	1.40	0.76	0.13	0.13	0.04
Sugar	46.78	45.0	41.76	0.0	0.0	0.0
HEC	0.52	1.0	1.21	0.0	0.0	0.0
Bactericide	0.05	0.1	0.27	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	0.0	29.96	29.96	26.7

Table 2: Body tissue dielectric properties

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16MΩ+ resistivity 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

Note : Due to their availability body tissue simulating liquids as defined by FCC OET Bulletin 65 Supplement C are generally used for body worn SAR testing according to European standards.

2.4.11 Tissue simulating liquids: parameters

Used Target Frequency	**Target Body Tissue**		**Measured Body Tissue**		**Measured Date**
[MHz]	Permittivity	Conductivity [S/m]	Permittivity	Conductivity [S/m]	
835	55.2	0.97	56.06	1.03	2010-07-07
835	55.2	0.97	55.15	1.02	2010-07-09
1900	53.3	1.52	51.4	1.5	2010-07-05
1900	53.3	1.52	51.4	1.5	2010-07-08
1900	53.3	1.52	52.4	1.51	2010-08-02
835	55.2	0.97	53.88	1.02	2010-09-03
1900	53.3	1.52	51.2	1.51	2010-09-03

Table 3: Parameter of the body tissue simulating liquid

Note: The dielectric properties have been measured using the contact probe method at 22°C.

2.4.12 Measurement uncertainty evaluation for SAR test

The overall combined measurement uncertainty of the measurement system is ± 10.7% (K=1).
The expanded uncertainty (k=2) is assessed to be ± 21.4%
This measurement uncertainty budget is suggested by IEEE P1528 and determined by Schmid & Partner Engineering AG. The breakdown of the individual uncertainties is as follows:

Error Sources	Uncertainty Value	Probability Distribution	Divisor	c_i 1g	c_i 10g	Standard Uncertainty 1g	Standard Uncertainty10g	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 5.9%	Normal	1	1	1	± 5.9%	± 5.9%	∞
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%	∞
Spatial resolution	± 0.0%	Rectangular	√3	1	1	± 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	± 0.8%	Rectangular	√3	1	1	± 0.5%	± 0.5%	∞
Integration time	± 2.6%	Rectangular	√3	1	1	± 1.5%	± 1.5%	∞
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								
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.)	± 2.5%	Normal	1	0.64	0.43	± 1.6%	± 1.1%	∞
Liquid permittivity (target)	± 5.0%	Rectangular	√3	0.6	0.49	± 1.7%	± 1.4%	∞
Liquid permittivity (meas.)	± 2.5%	Normal	1	0.6	0.49	± 1.5%	± 1.2%	∞
Combined Uncertainty						± 10.9%	± 10.7%	387
Expanded Std. Uncertainty						**± 21.9%**	**± 21.4%**	

Table 4: Measurement uncertainties

2.4.13 Measurement uncertainty evaluation for system validation

The overall combined measurement uncertainty of the measurement system is ± 9.2% (K=1).
The expanded uncertainty (k=2) is assessed to be ± 18.4%
This measurement uncertainty budget is suggested by IEEE P1528 and determined by Schmid & Partner Engineering AG. The breakdown of the individual uncertainties is as follows:

Error Sources	Uncertainty Value	Probability Distribution	Divisor	c_i 1g	c_i 10g	Standard Uncertainty 1g	Standard Uncertainty10g	v_i^2 or v_{eff}
Measurement System								
Probe calibration	± 5.9%	Normal	1	1	1	± 5.9%	± 5.9%	∞
Axial isotropy	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
Hemispherical isotropy	± 9.6%	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	± 1.0%	Rectangular	√3	1	1	± 0.6%	± 0.6%	∞
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%	∞
Dipole								
Deviation of experimental dipole	± 5.5%	Rectangular	√3	1	1	± 3.2%	± 3.2%	∞
Dipole axis to liquid distance	± 2.0%	Rectangular	1	1	1	± 1.2%	± 1.2%	∞
Power drift	± 4.7%	Rectangular	√3	1	1	± 2.7%	± 2.7%	∞
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.)	± 2.5%	Normal	1	0.64	0.43	± 1.6%	± 1.1%	∞
Liquid permittivity (target)	± 5.0%	Rectangular	√3	0.6	0.49	± 1.7%	± 1.4%	∞
Liquid permittivity (meas.)	± 2.5%	Normal	1	0.6	0.49	± 1.5%	± 1.2%	∞
Combined Uncertainty						**± 9.5%**	**± 9.2%**	
Expanded Std. Uncertainty						**± 18.9%**	**± 18.4%**	

Table 5: Measurement uncertainties

2.4.14 System validation

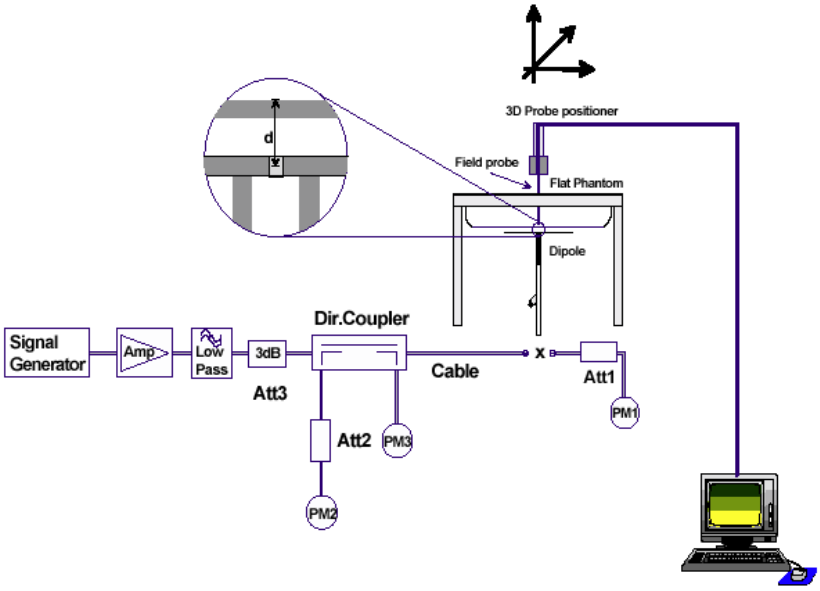
The system validation is performed for verifying the accuracy of the complete measurement system and performance of the software. The system validation is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows validation results for all frequency bands and tissue liquids used during the tests of the test item described in chapter 1.5.
(graphic plot(s) see annex 1).

Validation Kit	Frequency	Target SAR_{1g} (250 mW) (+/- 10%)	Target SAR_{10g} (250 mW) (+/- 10%)	Measured SAR_{1g}	Measured SAR_{10g}	Measured date
D835V2 S/N: 4d095	835 MHz body	2.49mW/g	1.62mW/g	2.62mW/g	1.72mW/g	2010-07-07
D835V2 S/N: 4d095	835 MHz body	2.49mW/g	1.62mW/g	2.57mW/g	1.68mW/g	2010-07-09
D1900V2 S/N: 5d091	1900 MHz body	10.1mW/g	5.27mW/g	10.4mW/g	5.42mW/g	2010-07-05
D1900V2 S/N: 5d091	1900 MHz body	10.1mW/g	5.27mW/g	10.6mW/g	5.54mW/g	2010-07-08
D1900V2 S/N: 5d091	1900 MHz body	10.1mW/g	5.27mW/g	10.1mW/g	5.32mW/g	2010-08-02
D835V2 S/N: 4d095	835 MHz body	2.49mW/g	1.62mW/g	2.58mW/g	1.69mW/g	2010-09-03
D1900V2 S/N: 5d091	1900 MHz body	10.1mW/g	5.27mW/g	10.7mW/g	5.54mW/g	2010-09-02

Table 6: Results system validation

2.4.15 Validation procedure

The validation 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 250 mW. To adjust this power a power meter is used. The power sensor is connected to the cable before the validation 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).
Validation 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.



2.5 Conducted Power Test

2.5.1 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 timebased 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
timebased 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
EDGE	MCS1 to MCS4	GMSK
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.

2.5.2 Conducted power results

GSM850 + GPRS (GMSK)		Conducted power (dBm)			Averaged power(dBm)		
		Channel 128 (824.2MHz)	Channel 192 (837MHz)	Channel 251 (848.8MHz)	Channel 128	Channel 192	Channel 251
1 tx slot	Before	31.85	31.83	31.92	22.85	22.83	22.92
	After	31.87	31.84	31.93	22.87	22.84	22.93
2 tx slots	Before	29.79	29.98	29.79	23.79	23.98	23.79
	After	29.76	29.98	29.78	23.76	23.98	23.78
GSM850 + EGPRS (8PSK)		Conducted power (dBm)			Averaged power(dBm)		
		Channel 128 (824.2MHz)	Channel 192 (837MHz)	Channel 251 (848.8MHz)	Channel 128	Channel 192	Channel 251
1 tx slot	Before	25.96	25.93	25.97	16.96	16.93	16.97
	After	25.97	25.94	25.98	16.97	16.94	16.98
2 tx slots	Before	25.94	26.10	25.96	19.94	20.1	19.96
	After	25.92	26.13	25.93	19.92	20.13	19.93
3 tx slots	Before	26.05	26.17	26.09	21.8	21.92	21.84
	After	26.07	26.19	26.1	21.82	21.94	21.85
4 tx slots	Before	25.95	26.11	25.95	22.95	23.11	22.95
	After	25.94	26.1	25.97	22.94	23.1	22.97
GSM850 + EGPRS (GMSK)		Conducted power (dBm)			Averaged power(dBm)		
		Channel 128 (824.2MHz)	Channel 192 (837MHz)	Channel 251 (848.8MHz)	Channel 128	Channel 192	Channel 251
1 tx slot	Before	31.88	31.87	31.85	22.88	22.87	22.85
	After	31.89	31.86	31.87	22.89	22.86	22.87
2 tx slots	Before	29.71	29.80	29.82	23.71	23.80	23.82
	After	29.70	29.82	29.81	23.70	23.82	23.81
3 tx slots	Before	27.65	27.64	27.54	23.40	23.39	23.29
	After	27.64	27.65	27.55	23.39	23.40	23.30
4 tx slots	Before	25.77	25.70	25.56	22.77	22.70	22.56
	After	25.75	25.71	25.58	22.75	22.71	22.58
GSM1900 + GPRS		Conducted power (dBm)			Averaged power(dBm)		
		Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)	Channel 512	Channel 661	Channel 810
1 tx slot	Before	29.05	29.07	29.01	20.05	20.07	20.01
	After	29.03	29.04	29	20.03	20.04	20
2 tx slots	Before	28.57	28.54	28.45	22.57	22.54	22.45
	After	28.56	28.55	28.47	22.56	22.55	22.47
GSM1900 + EGPRS (8PSK)		Conducted power (dBm)			Averaged power(dBm)		
		Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)	Channel 512	Channel 661	Channel 810
1 tx slot	Before	25.13	25.11	25.17	16.13	16.11	16.17
	After	25.15	25.12	25.19	16.15	16.12	16.19

2 tx slots	Before	25.19	25.20	25.11	19.19	19.21	19.11
	After	25.20	25.20	25.13	19.2	19.21	19.13
3 tx slots	Before	25.16	25.20	25.13	20.91	20.95	20.88
	After	25.17	25.2	25.15	20.92	20.95	20.9
4 tx slots	Before	25.15	25.13	25.06	22.15	22.13	22.06
	After	25.14	25.13	25.07	22.14	22.13	22.07
GSM1900 + EGPRS (GMSK)		Conducted power (dBm)			Averaged power(dBm)		
		Channel 512 (1850.2MHz)	Channel 661 (1880MHz)	Channel 810 (1909.8MHz)	Channel 512	Channel 661	Channel 810
1 tx slot	Before	29.11	29.15	29.13	20.11	20.15	20.13
	After	29.10	29.16	29.14	20.10	20.16	20.14
2 tx slots	Before	28.61	28.66	28.59	22.61	22.66	22.59
	After	28.60	28.64	28.57	22.60	22.64	22.57
3 tx slots	Before	25.25	25.38	25.30	21.00	21.13	21.05
	After	25.26	25.36	25.29	21.01	21.11	21.04
4 tx slots	Before	23.34	23.41	23.29	20.34	20.41	20.29
	After	23.33	23.40	23.31	20.33	20.40	20.31

WCDMA Band II		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
12.2kbps RMC	Before	22.25	22.06	22.09
	After	22.27	22.07	22.11
64kbps RMC	Before	22.21	22.03	22.11
	After	22.20	22.05	22.10
144kbps RMC	Before	22.23	22.09	22.04
	After	22.26	22.10	22.05
384kbps RMC	Before	22.27	22.01	22.07
	After	22.28	22.03	22.09
WCDMA Band II +HSDPA		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
Sub Test - 1	Before	22.17	22.05	22.01
	After	22.16	22.06	22.04
Sub Test - 2	Before	22.06	21.98	22.12
	After	22.08	21.97	22.14
Sub Test - 3	Before	22.13	22.07	22.10
	After	22.15	22.08	22.11
Sub Test - 4	Before	21.88	21.96	21.68

	After	21.87	21.95	21.69
WCDMA Band II +HSUPA		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
Sub Test - 1	Before	21.01	21.38	21.14
	After	21.03	21.39	21.16
Sub Test - 2	Before	19.83	19.55	19.36
	After	19.85	19.54	19.38
Sub Test - 3	Before	20.44	20.52	20.37
	After	20.46	20.52	20.38
Sub Test - 4	Before	20.16	20.31	20.01
	After	20.14	20.29	20.00
Sub Test - 5	Before	21.28	21.06	20.60
	After	21.28	21.08	20.63
WCDMA Band V		Conducted Power (dBm)		
		Channel 4132	Channel 4182	Channel 4233
12.2kbps RMC	Before	21.47	21.52	21.46
	After	21.49	21.53	21.48
64kbps RMC	Before	21.49	21.48	21.40
	After	21.48	21.46	21.42
144kbps RMC	Before	21.45	21.43	21.48
	After	41.46	21.43	21.49
384kbps RMC	Before	21.42	21.54	21.43
	After	21.45	21.55	21.46
WCDMA Band V +HSDPA		Conducted Power (dBm)		
		Channel 4132	Channel 4182	Channel 4233
Sub Test - 1	Before	21.43	21.51	21.41
	After	21.45	21.50	21.44
Sub Test - 2	Before	21.01	21.16	21.03
	After	21.03	21.17	21.05
Sub Test - 3	Before	20.93	21.02	20.96
	After	20.95	21.05	20.98
Sub Test - 4	Before	20.85	20.92	20.91
	After	20.84	20.93	20.94
WCDMA Band V		Conducted Power (dBm)		

+HSUPA		Channel 4132	Channel 4182	Channel 4233
Sub Test - 1	Before	20.52	20.91	20.55
	After	20.53	20.93	20.58
Sub Test - 2	Before	18.77	18.84	18.86
	After	18.79	18.85	18.85
Sub Test - 3	Before	19.43	19.18	19.45
	After	19.42	19.17	19.46
Sub Test - 4	Before	19.71	19.88	19.37
	After	19.73	19.87	19.38
Sub Test - 5	Before	20.96	20.93	20.55
	After	20.95	20.94	20.56

To verify if the output changes within the tolerance before and after each SAR test, please see the power drift of each test in chapter 2.6.

2.5.3 Power Reduction

GSM850:

GPRS（GMSK）:

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	0
3	0
4	0

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	2
3	4.5
4	6

GSM1900:

GPRS（GMSK）:

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	0.5

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	0
3	0
4	0

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	0.5
3	3.5
4	5.5

2.6 Test Results

GSM 1900

The table contains the measured SAR values averaged over a mass of 1 g					
Channel / frequency	Position	Body worn	Power Drift (dB)	Limit	Liquid temperature
E1815 GPRS					
661 / 1880.0 MHz	front 2TS	1.18 W/kg	0.091	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	front 1TS	0.78 W/kg	0.162	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	rear 2TS	0.989 W/kg	-0.088	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	left 2TS	0.727 W/kg	-0.046	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	right 2TS	0.906 W/kg	0.178	1.6 W/kg	21.5 °C
512 / 1850.2 MHz	front 2TS	0.865 W/kg	0.032	1.6 W/kg	21.5 °C
810 / 1909.8 MHz	front 2TS	1.39 W/kg	-0.015	1.6 W/kg	21.5 °C
512 / 1850.2 MHz	rear 2TS	0.808 W/kg	0.137	1.6 W/kg	21.5 °C
810 / 1909.8 MHz	rear 2TS	1.07 W/kg	0.050	1.6 W/kg	21.5 °C
512 / 1850.2 MHz	right 2TS	0.705 W/kg	-0.112	1.6 W/kg	21.5 °C
810 / 1909.8 MHz	right 2TS	0.955 W/kg	0.088	1.6 W/kg	21.5 °C
E1815 EGPRS					
810 / 1909.8 MHz	front 1TS	0.973 W/kg	-0.032	1.6 W/kg	21.5 °C
810 / 1909.8 MHz	front 2TS	1.43 W/kg	0.089	1.6 W/kg	21.5 °C
810 / 1909.8 MHz	front 3TS	0.969 W/kg	0.148	1.6 W/kg	21.5 °C
810 / 1909.8 MHz	front 4TS	0.822 W/kg	0.113	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	front 2TS	1.26 W/kg	-0.025	1.6 W/kg	21.5 °C
512 / 1850.2 MHz	front 2TS	0.935 W/kg	-0.130	1.6 W/kg	21.5 °C

Table 7: Test results GSM 1900
Note: The test distance between EUT and phantom please refer to Annex 4.
According to KDB941225 D03, we tested EGPRS in GMSK mode and not using MCS5-9.

Extrapolated SAR Values of highest measured SAR (GSM 1900)

Limit of SAR (W/kg)		Conducted Power	1g Average	Tune-up procedures maximum Power(dBm)	1g Average
			1.6		1.6
Test Case of Body		Measurement Result(dBm)	Measurement Result(W/kg)		Extrapolated Result(W/kg)
Different Test Position	Channel				
IBM T61					
Test Position 1	High	28.59	1.43	28.7	1.467

GSM 850

The table contains the measured SAR values averaged over a mass of 1 g					
Channel / frequency	Position	Body worn	Power Drift(dB)	Limit	Liquid temperature
E1815 GPRS					
192 / 837 MHz	front 2TS	0.623 W/kg	-0.094	1.6 W/kg	21.5 °C
192 / 837 MHz	front 1TS	0.817 W/kg	0.177	1.6 W/kg	21.5 °C
192 / 837 MHz	rear 1TS	0.671 W/kg	0.003	1.6 W/kg	21.5 °C
192 / 837 MHz	left 1TS	0.275 W/kg	0.002	1.6 W/kg	21.5 °C
192 / 837 MHz	right 1TS	0.504 W/kg	0.051	1.6 W/kg	21.5 °C
128 / 824.2MHz	front 1TS	0.698 W/kg	0.148	1.6 W/kg	21.5 °C
251 / 848.8MHz	front 1TS	0.928 W/kg	0.116	1.6 W/kg	21.5 °C
E1815 EGPRS					
251 / 848.8MHz	front 1TS	0.932 W/kg	0.158	1.6 W/kg	21.5 °C
251 / 848.8MHz	front 2TS	0.684 W/kg	0.034	1.6 W/kg	21.5 °C
251 / 848.8MHz	front 3TS	0.696 W/kg	-0.086	1.6 W/kg	21.5 °C
251 / 848.8MHz	front 4TS	0.639 W/kg	-0.155	1.6 W/kg	21.5 °C
192 / 837 MHz	front 1TS	0.789 W/kg	-0.132	1.6 W/kg	21.5 °C
128 / 824.2MHz	front 1TS	0.69 W/kg	-0.057	1.6 W/kg	21.5 °C

Table 8: Test results GSM 850
Note: The test distance between EUT and phantom please refer to Annex 4.
According to KDB941225 D03, we tested EGPRS in GMSK mode and not using MCS5-9.

Extrapolated SAR Values of highest measured SAR (GSM 850)

Limit of SAR (W/kg)		Conducted Power	1g Average	Tune-up procedures maximum Power(dBm)	1g Average
			1.6		1.6
Test Case of Body		Measurement Result(dBm)	Measurement Result(W/kg)		Extrapolated Result(W/kg)
Different Test Position	Channel				
IBM T61					
Test Position 1	High	31.85	0.932	32.2	1.01

UMTS (WCDMA) FDD II 1900MHz

The table contains the measured SAR values averaged over a mass of 1 g					
Channel / frequency	Position	Body worn	Power Drift(dB)	Limit	Liquid temperature
E1815					
9400 / 1880 MHz	front	1.23 W/kg	0.170	1.6 W/kg	21.5 °C
9400 / 1880 MHz	rear	0.873 W/kg	0.180	1.6 W/kg	21.5 °C
9400 / 1880 MHz	left	0.719 W/kg	-0.051	1.6 W/kg	21.5 °C
9400 / 1880 MHz	right	0.751 W/kg	0.192	1.6 W/kg	21.5 °C
9262 / 1852.4 MHz	rear	0.951 W/kg	0.158	1.6 W/kg	21.5 °C
9538 / 1907.6 MHz	rear	0.813 W/kg	0.186	1.6 W/kg	21.5 °C
9262 / 1852.4 MHz	front	1.21 W/kg	0.095	1.6 W/kg	21.5 °C
9538 / 1907.6 MHz	front	1.32 W/kg	0.104	1.6 W/kg	21.5 °C
E1815 HSDPA					
9538 / 1907.6 MHz	front	1.23 W/kg	0.082	1.6 W/kg	21.5 °C
E1815 HSUPA					
9538 / 1907.6 MHz	front	0.75 W/kg	-0.187	1.6 W/kg	21.5 °C

Table 9: Test results UMTS (WCDMA) FDD II 1900MHz
Note: The test distance between EUT and phantom please refer to Annex 4.

Extrapolated SAR Values of highest measured SAR (WCDMA Band II)

Limit of SAR (W/kg)		Conducted Power	1g Average	Tune-up procedures maximum Power(dBm)	1g Average
			1.6		1.6
Test Case of Body		Measurement Result(dBm)	Measurement Result(W/kg)		Extrapolated Result(W/kg)
Different Test Position	Channel				
IBM T61					
Test Position 1	High	22.09	1.32	22.3	1.385

UMTS (WCDMA) FDD V 850 MHz

The table contains the measured SAR values averaged over a mass of 1 g					
Channel / frequency	Position	Body worn	Power Drift(dB)	Limit	Liquid temperature
E1815					
4182 / 836.4 MHz	front	0.753 W/kg	-0.009	1.6 W/kg	21.5 °C
4182 / 836.4 MHz	rear	0.573 W/kg	0.064	1.6 W/kg	21.5 °C
4182 / 836.4 MHz	left	0.258 W/kg	0.090	1.6 W/kg	21.5 °C
4182 / 836.4 MHz	right	0.437 W/kg	-0.158	1.6 W/kg	21.5 °C
4132/ 826.4 MHz	front	0.687 W/kg	-0.005	1.6 W/kg	21.5 °C
4233 / 846.6 MHz	front	0.8 W/kg	-0.020	1.6 W/kg	21.5 °C
E1815 HSDPA					
4233 / 846.6 MHz	front	0.744 W/kg	-0.012	1.6 W/kg	21.5 °C
E1815 HSUPA					
4233 / 846.6 MHz	front	0.47 W/kg	-0.057	1.6 W/kg	21.5 °C

Table 10: Test results UMTS (WCDMA) FDD V 850 MHz
Note: The test distance between EUT and phantom please refer to Annex 4.

Extrapolated SAR Values of highest measured SAR (WCDMA Band V)

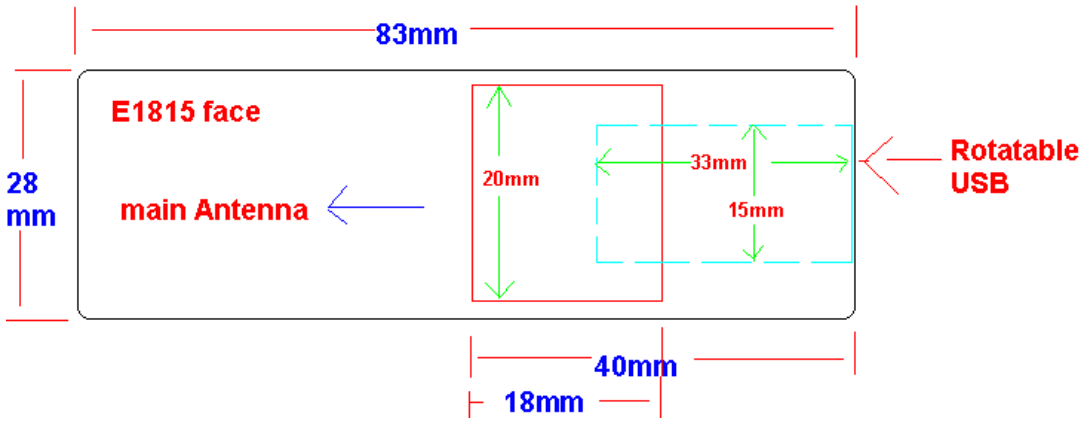
Limit of SAR (W/kg)		Conducted Power	1g Average	Tune-up procedures maximum Power(dBm)	1g Average
			1.6		1.6
Test Case of Body		Measurement Result(dBm)	Measurement Result(W/kg)		Extrapolated Result(W/kg)
Different Test Position	Channel				
IBM T61					
Test Position 1	Middle	21.52	0.8	21.8	0.853

2.6.1 General description of test procedures

The DUT is tested using a CMU 200 communications tester 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 are performed with the maximum number of timeslots in uplink.
Tests in head position are performed in voice mode with 1 timeslot unless GPRS/EGPRS function allows parallel voice and data traffic on 2 or more timeslots (see chapter 1.5 for details).
Conducted output power was measured using an integrated RF connector and attached RF cable.

2.6.2 Justification for SAR test positions

The antenna position is showing below:



Since it is a normal rotatable USB modem, according to FCC inquiry 153646, we performed the SAR test as a normal straight USB modem. The test separation between the USB modem and phantom is 5mm. The test positions please refer to Annex 4.3.

Annex 1 System performance verification

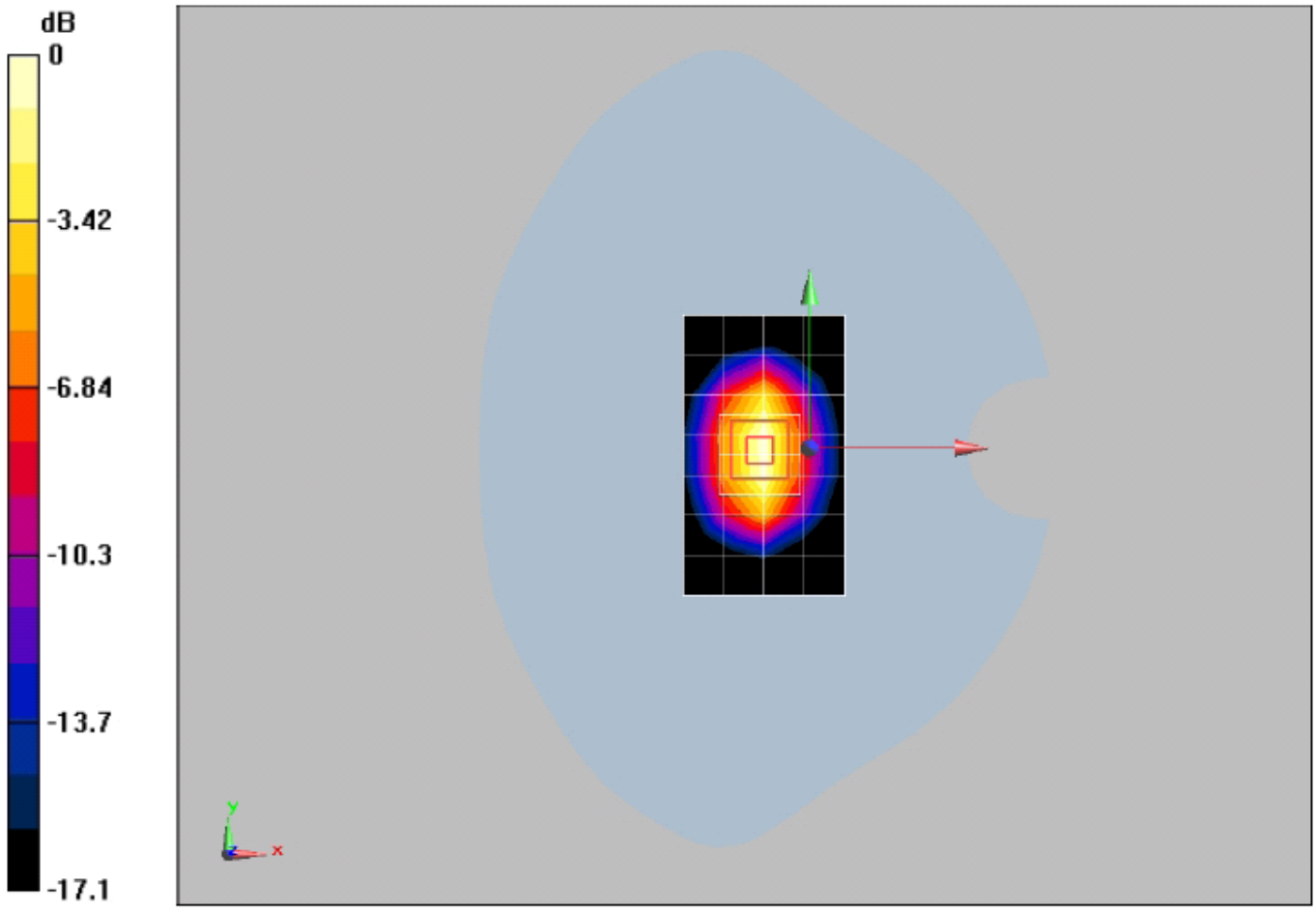
Date/Time: 2010-07-05 21:46:22

SystemPerformanceCheck-D1900 body

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d091
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.5 mho/m; ε_r = 51.4; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

d=10mm, Pin=250mW/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90 V/m; Power Drift = 0.043 dB
Peak SAR (extrapolated) = 18.6 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.42 mW/g
Maximum value of SAR (measured) = 11.8 mW/g



0 dB = 11.8mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 23.0°C; liquid temperature: 22.3°C

Date/Time: 2010-07-07 22:05:31

Date/Time: 2010-07-07 21:49:51

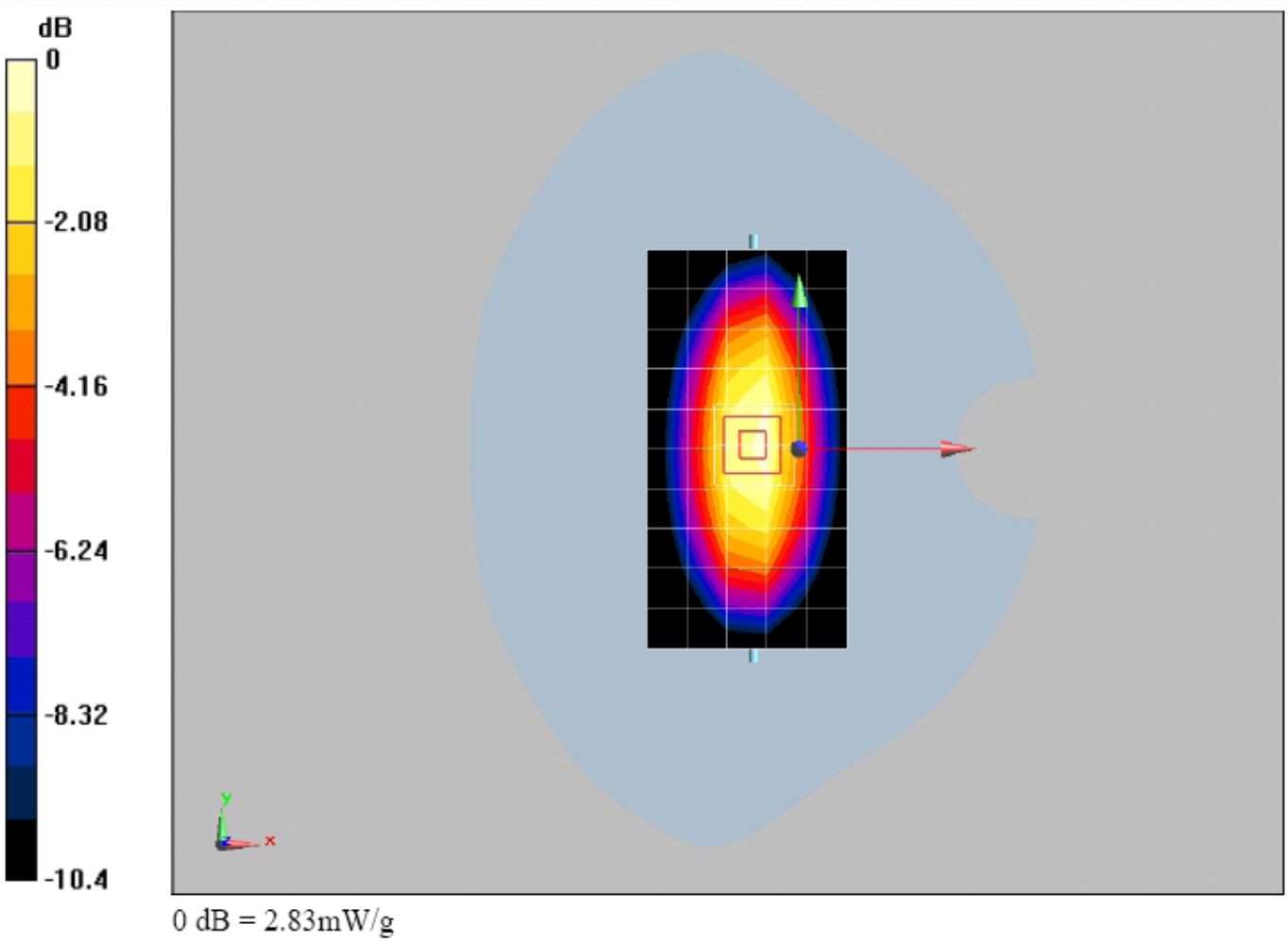
SystemPerformanceCheck-D835 body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d059

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.02 mho/m; ε_r = 55.2; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(5.97, 5.97, 5.97); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

d=15mm, Pin=250mW/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.59 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.6 V/m; Power Drift = -0.00128 dB
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 2.62 mW/g; SAR(10 g) = 1.72 mW/g
Maximum value of SAR (measured) = 2.83 mW/g



0 dB = 2.83mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 23.0°C; liquid temperature: 22.2°C

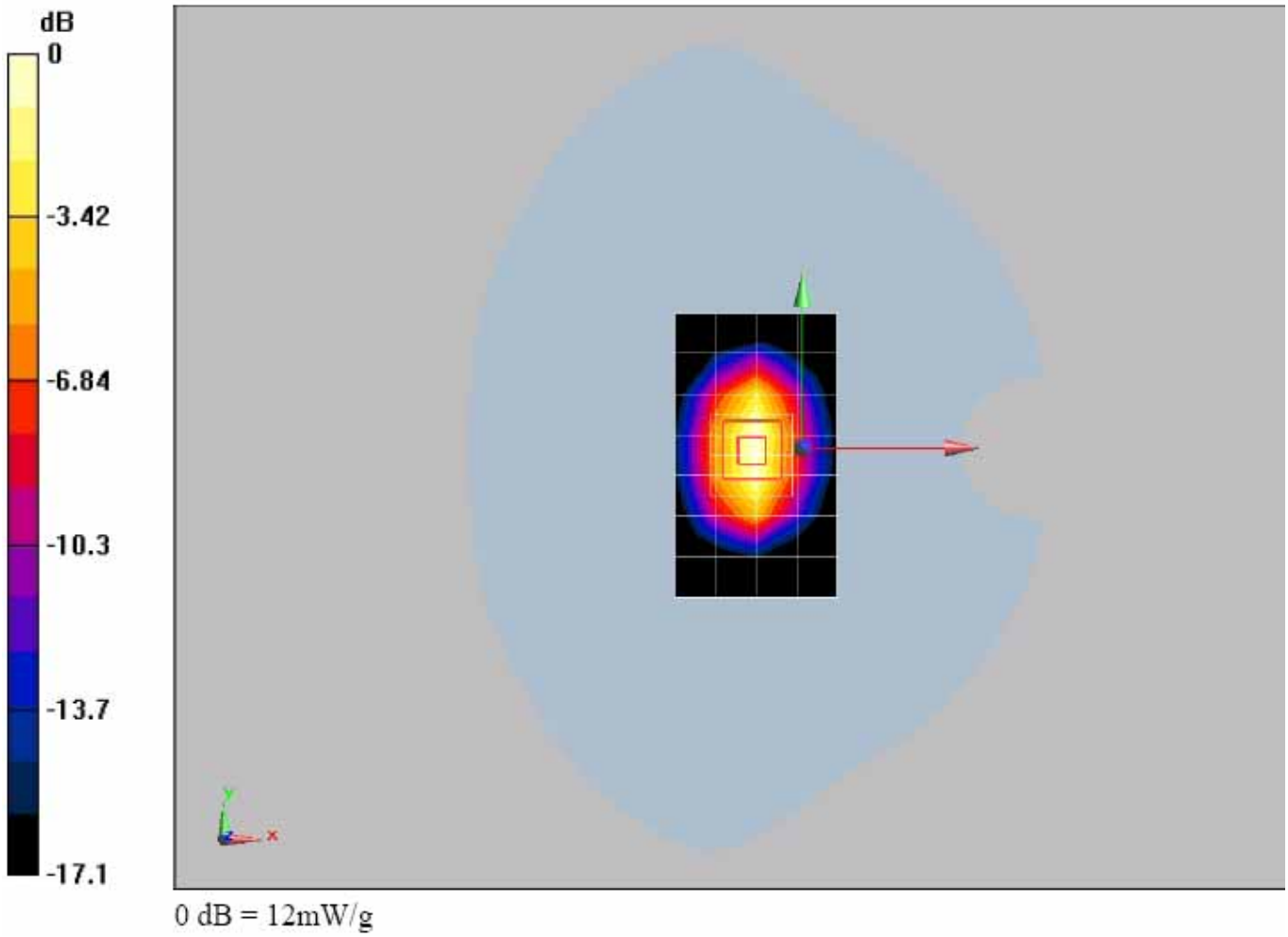
Date/Time: 2010-07-08 21:56:40

SystemPerformanceCheck-D1900 body

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d091
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.5 mho/m; ε_r = 51.4; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

d=10mm, Pin=250mW/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11.6 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92 V/m; Power Drift = 0.00587 dB
Peak SAR (extrapolated) = 19.1 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.54 mW/g
Maximum value of SAR (measured) = 12 mW/g



0 dB = 12mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 23.0°C; liquid temperature: 22.3°C

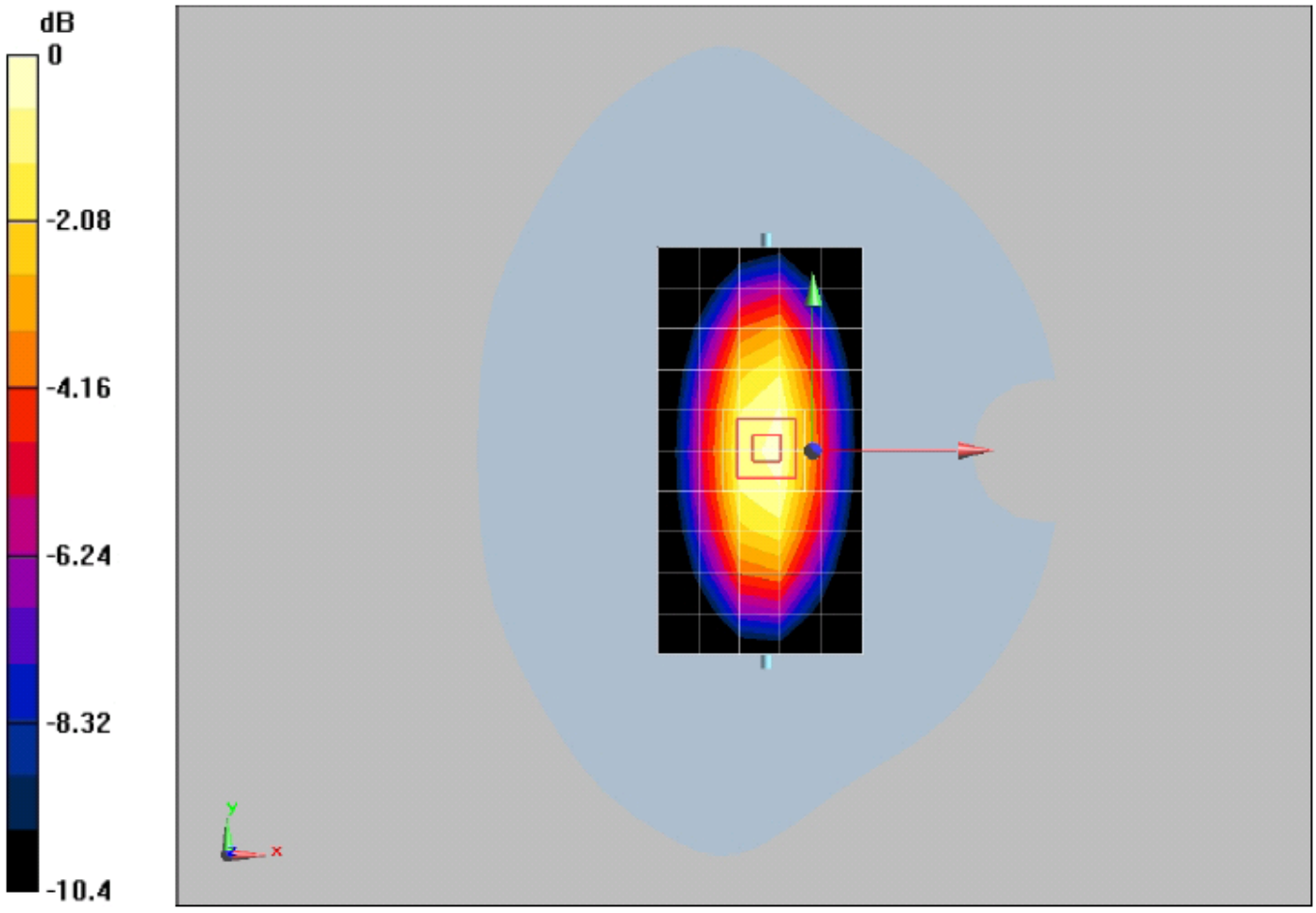
Date/Time: 2010-07-09 22:10:48

SystemPerformanceCheck-D835 body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d059
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.03 mho/m; ε_r = 56.1; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(5.97, 5.97, 5.97); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

d=15mm, Pin=250mW/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.56 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53 V/m; Power Drift = 0.00153 dB
Peak SAR (extrapolated) = 3.74 W/kg
SAR(1 g) = 2.57 mW/g; SAR(10 g) = 1.68 mW/g
Maximum value of SAR (measured) = 2.78 mW/g



0 dB = 2.78mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 23.0°C; liquid temperature: 22.2°C

Date/Time: 2010-08-02 22:10:48

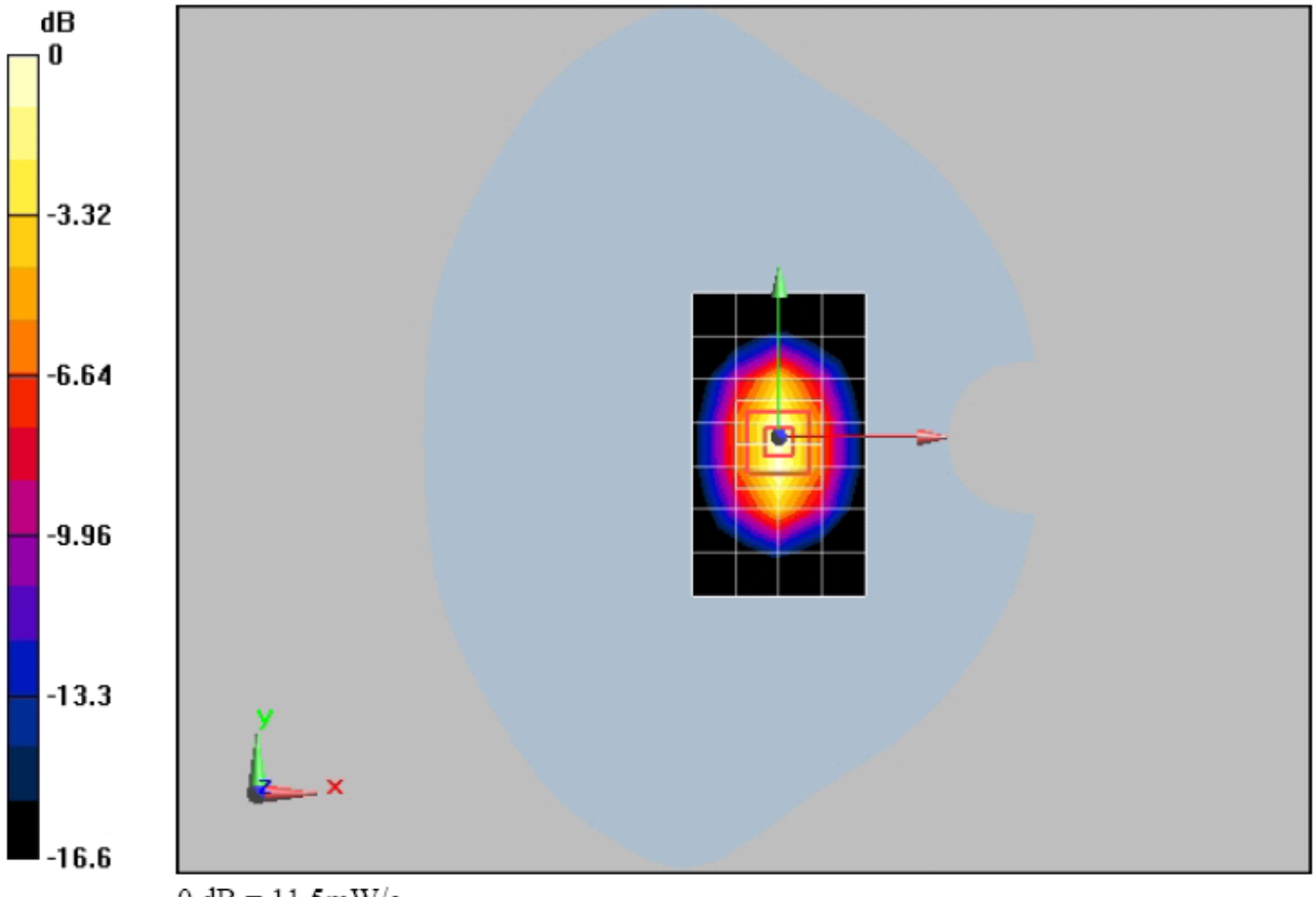
SystemPerformanceCheck-D1900 body

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d091

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 52.4; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

d=10mm, Pin=250mW/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.7 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89 V/m; Power Drift = 0.00779 dB
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.32 mW/g
Maximum value of SAR (measured) = 11.5 mW/g



0 dB = 11.5mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 23.0°C; liquid temperature: 22.2°C

Date/Time: 2010-09-03 15:10:48

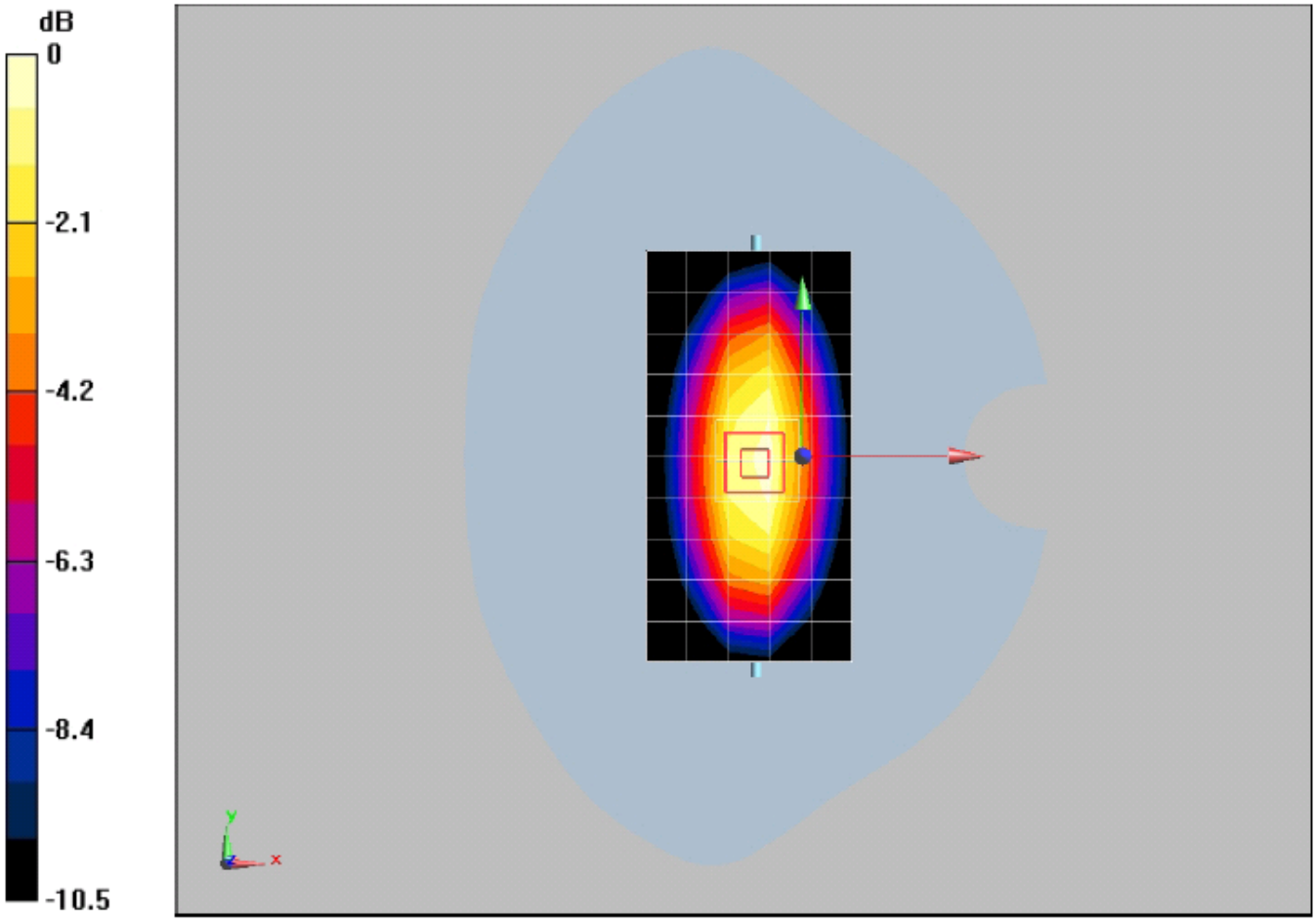
SystemPerformanceCheck-D835 body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d059

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.02 mho/m; ε_r = 54.4; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(5.97, 5.97, 5.97); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

d=15mm, Pin=250mW/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.59 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.2 V/m; Power Drift = 0.00324 dB
Peak SAR (extrapolated) = 3.77 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.69 mW/g
Maximum value of SAR (measured) = 2.8 mW/g



0 dB = 2.8mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 23.0°C; liquid temperature: 22.2°C

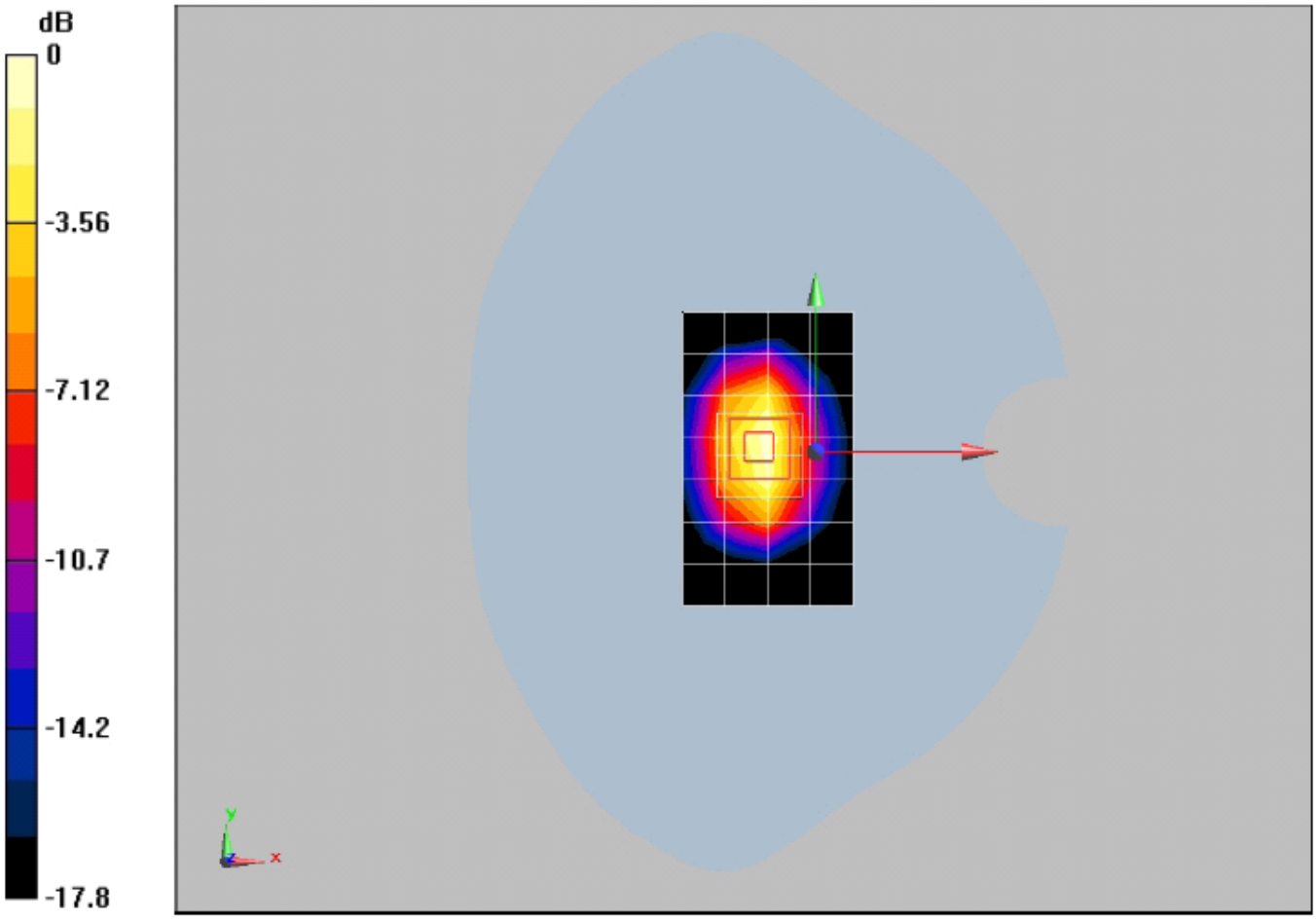
Date/Time: 2010-09-02 22:10:48

SystemPerformanceCheck-D1900 body

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d091
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

d=10mm, Pin=250mW/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.8 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.8 V/m; Power Drift = 0.180 dB
Peak SAR (extrapolated) = 19.5 W/kg
SAR(1 g) = 10.7 mW/g; SAR(10 g) = 5.54 mW/g
Maximum value of SAR (measured) = 12.1 mW/g



0 dB = 12.1mW/g

Additional information:
position or distance of DUT to SAM (if not standard head positions) :
ambient temperature: 23.0°C; liquid temperature: 22.2°C

Annex 2 Measurement results (printout from DASY TM)

Annex 2.1 GSM 1900 MHz body

Date/Time: 2010-07-05 22:32:45

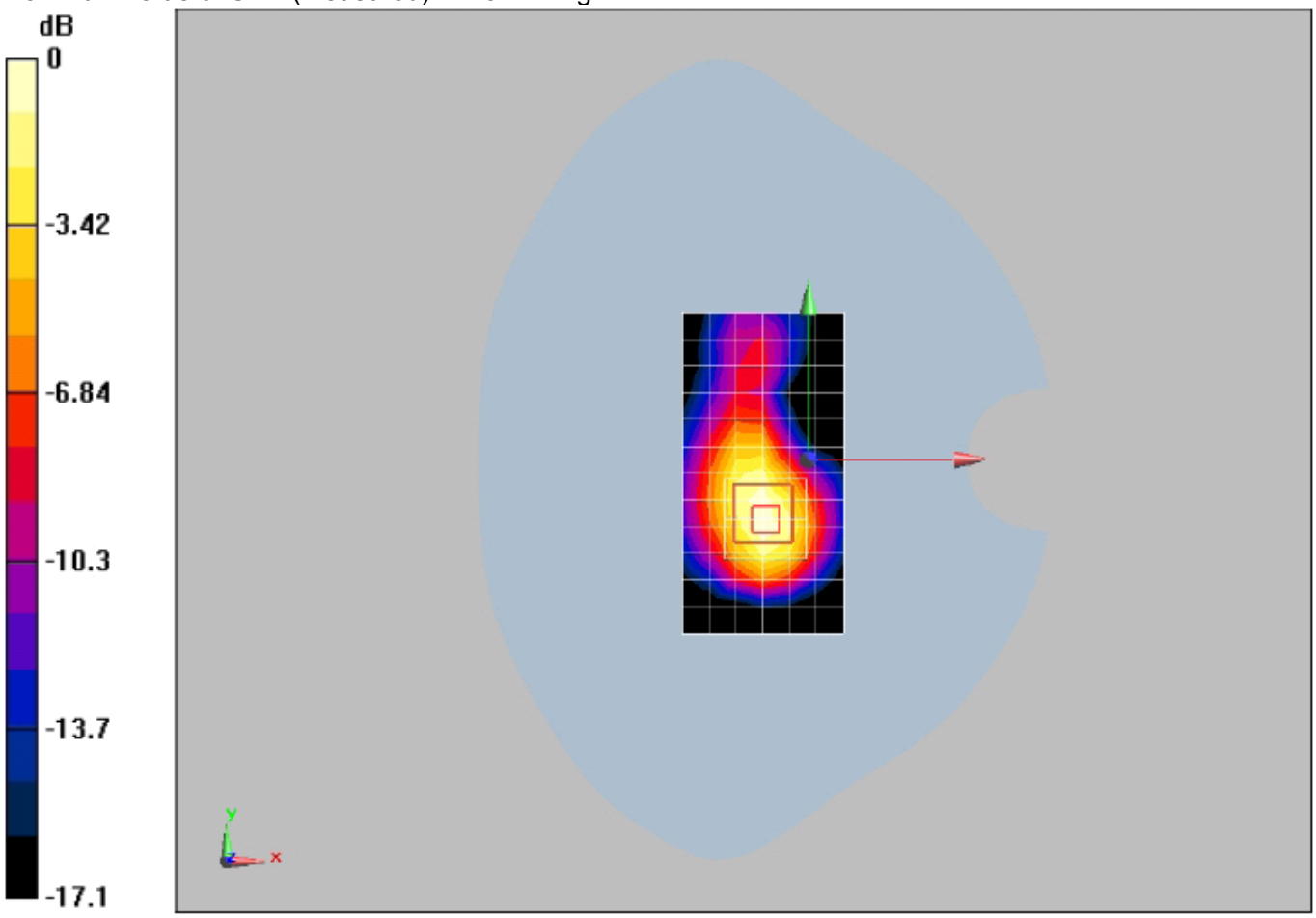
P1528_OET65-GPRS (2 timeslots in uplink) with IBM T61 front side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.5; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.27 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.9 V/m; Power Drift = 0.091 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.661 mW/g
Maximum value of SAR (measured) = 1.32 mW/g



0 dB = 1.32mW/g

Additional information:
position or distance of DUT to SAM: 5 mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C

Date/Time: 2010-07-05 23:27:17

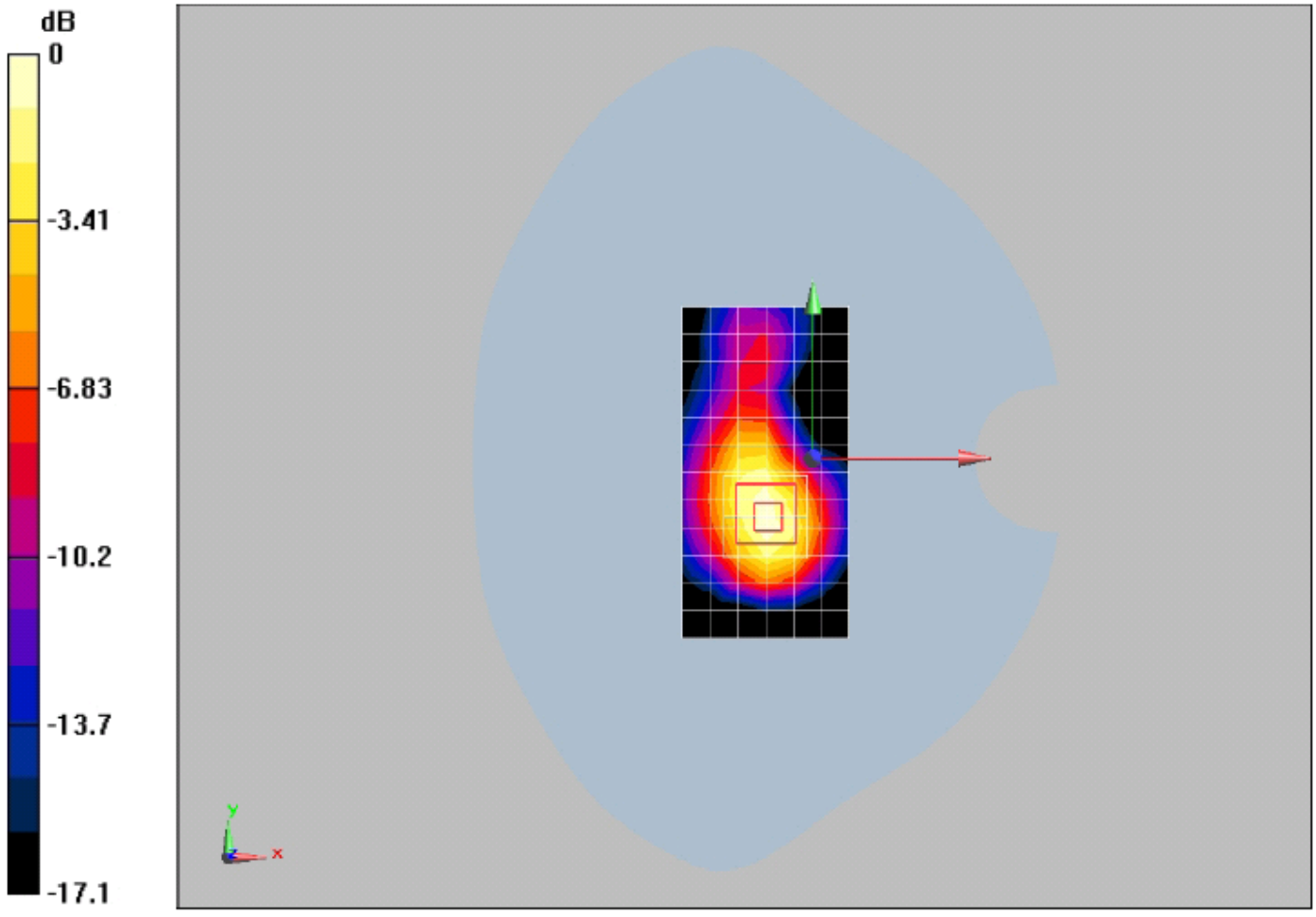
P1528_OET65-GPRS (1 timeslots in uplink) with IBM T61 front side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.5; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 0.822 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.3 V/m; Power Drift = 0.162 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.780 mW/g; SAR(10 g) = 0.440 mW/g
Maximum value of SAR (measured) = 0.865 mW/g



0 dB = 0.865mW/g

Additional information:
position or distance of DUT to SAM: 5mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C

Date/Time: 2010-07-06 00:18:30

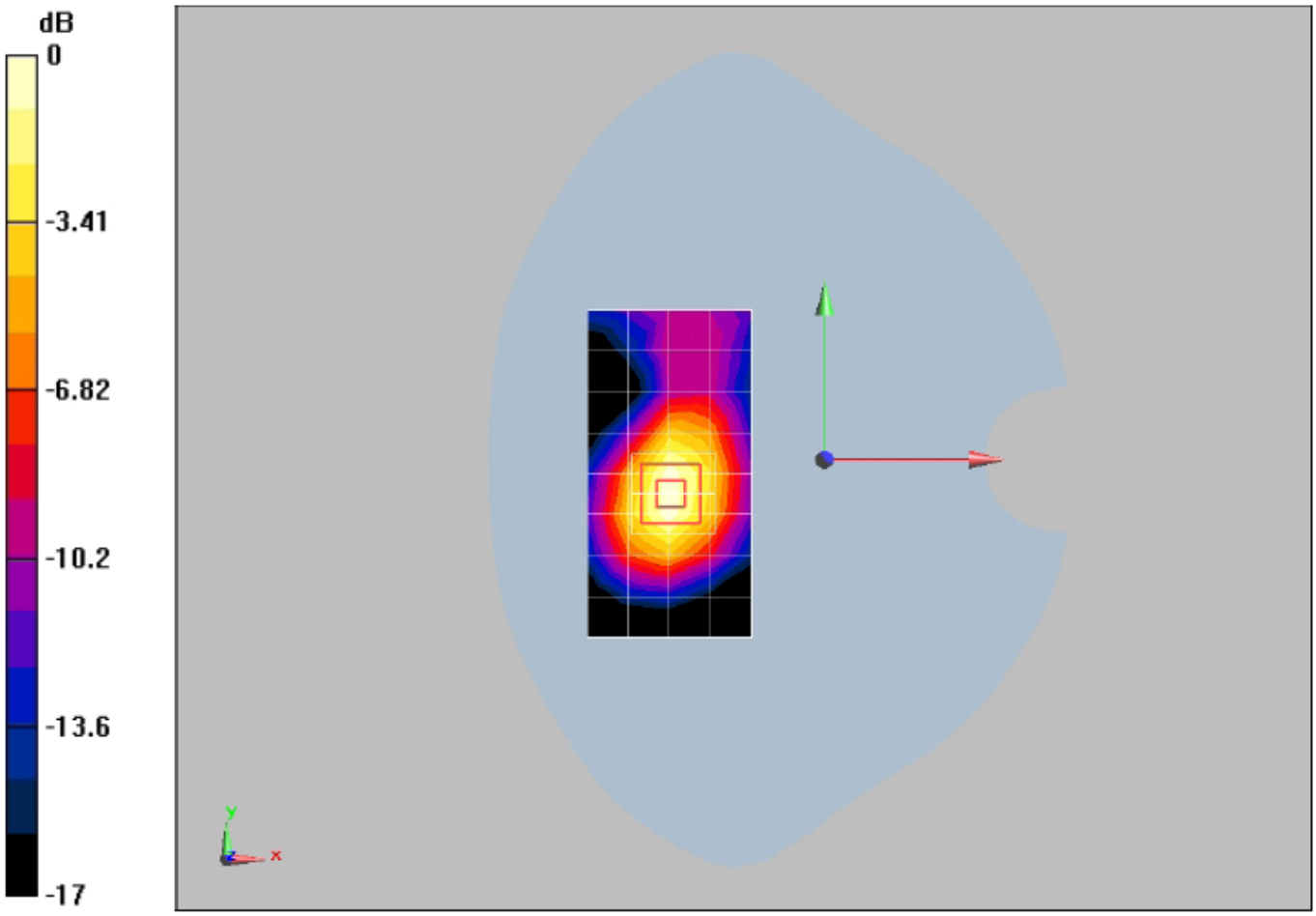
P1528_OET65-GPRS (2 timeslots in uplink) with IBM X301 rear side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.5; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.02 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.57 V/m; Power Drift = -0.088 dB
Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.565 mW/g
Maximum value of SAR (measured) = 1.1 mW/g



0 dB = 1.1mW/g

Additional information:
position or distance of DUT to SAM: 5 mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C

Date/Time: 2010-07-06 01:03:13

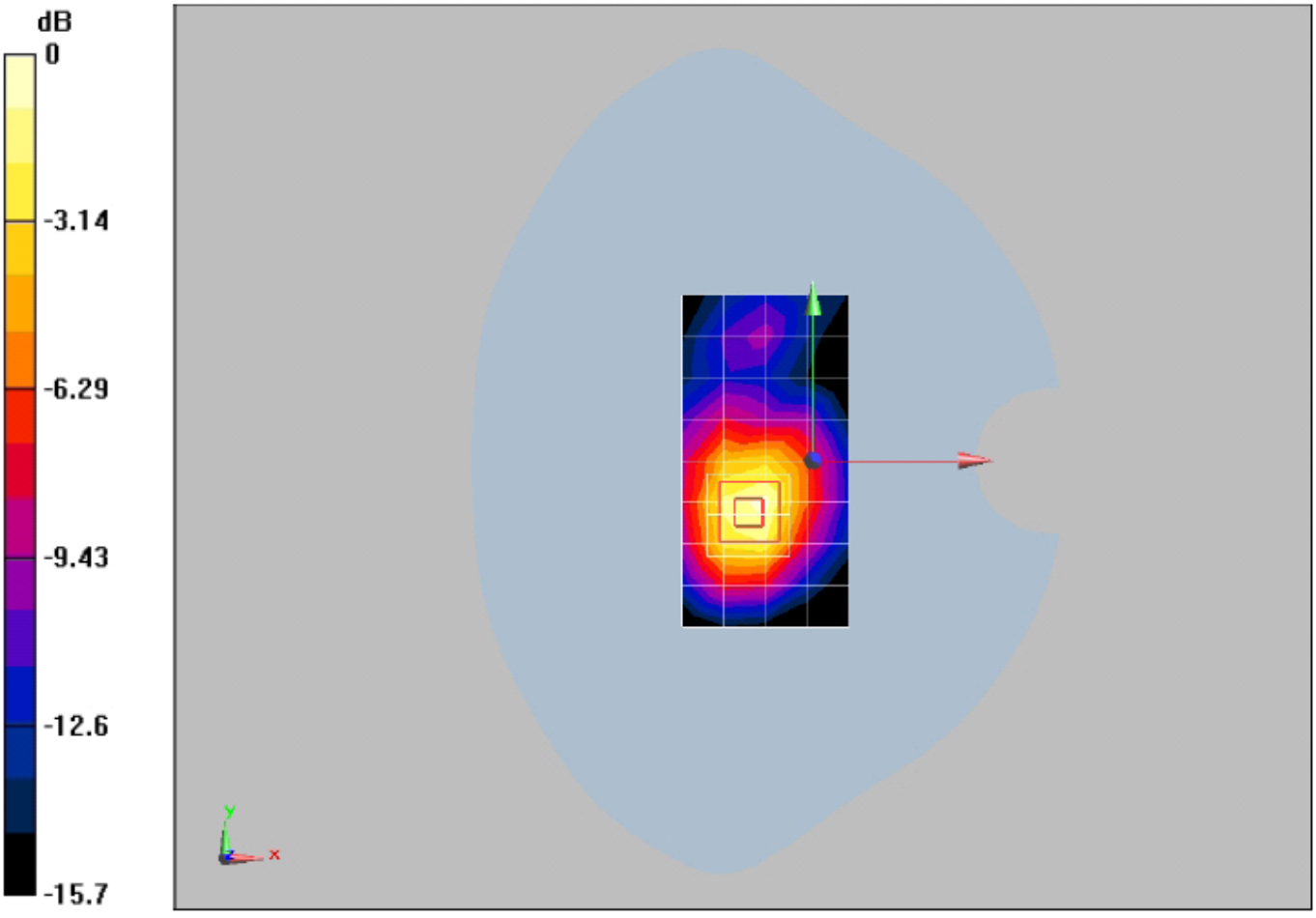
P1528_OET65-GPRS (2 timeslots in uplink) with IBM T61 left side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.5; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.721 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.727 mW/g; SAR(10 g) = 0.401 mW/g
Maximum value of SAR (measured) = 0.818 mW/g



0 dB = 0.818mW/g

Additional information:
position or distance of DUT to SAM: 5 mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C

Date/Time: 2010-07-06 03:35:24

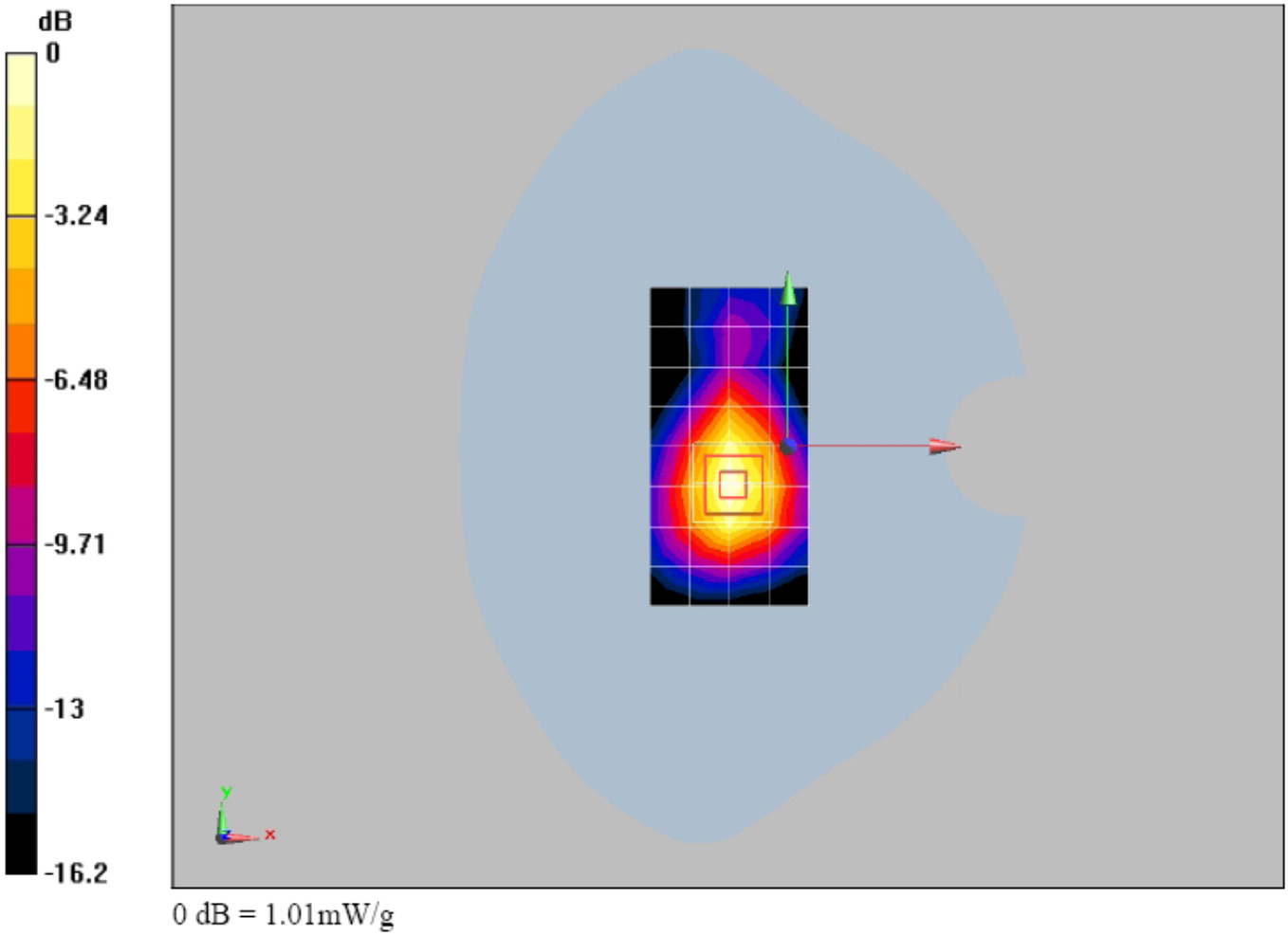
P1528_OET65-GPRS (2 timeslots in uplink) with IBM T61 right side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.5; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.01 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.1 V/m; Power Drift = 0.178 dB
Peak SAR (extrapolated) = 1.5 W/kg
SAR(1 g) = 0.906 mW/g; SAR(10 g) = 0.505 mW/g



0 dB = 1.01mW/g

Additional information:
position or distance of DUT to SAM: 5 mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C

Date/Time: 2010-07-06 04:16:14

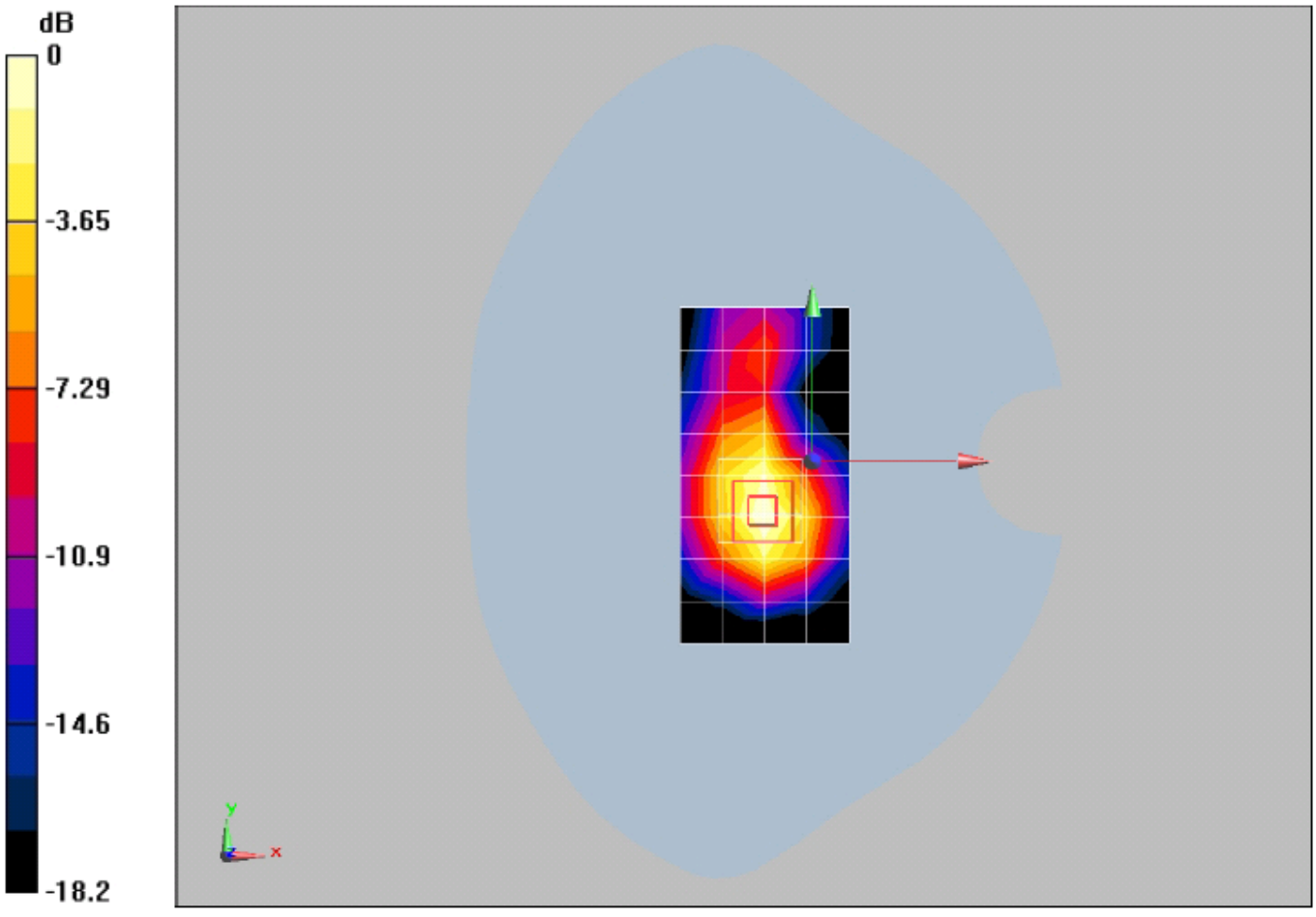
P1528_OET65-GPRS (2 timeslots in uplink) with IBM T61 front side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.1
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.978 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.1 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.865 mW/g; SAR(10 g) = 0.497 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.957 mW/g



0 dB = 0.957mW/g

Additional information:
position or distance of DUT to SAM: 5 mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C

Date/Time: 2010-07-06 05:04:12

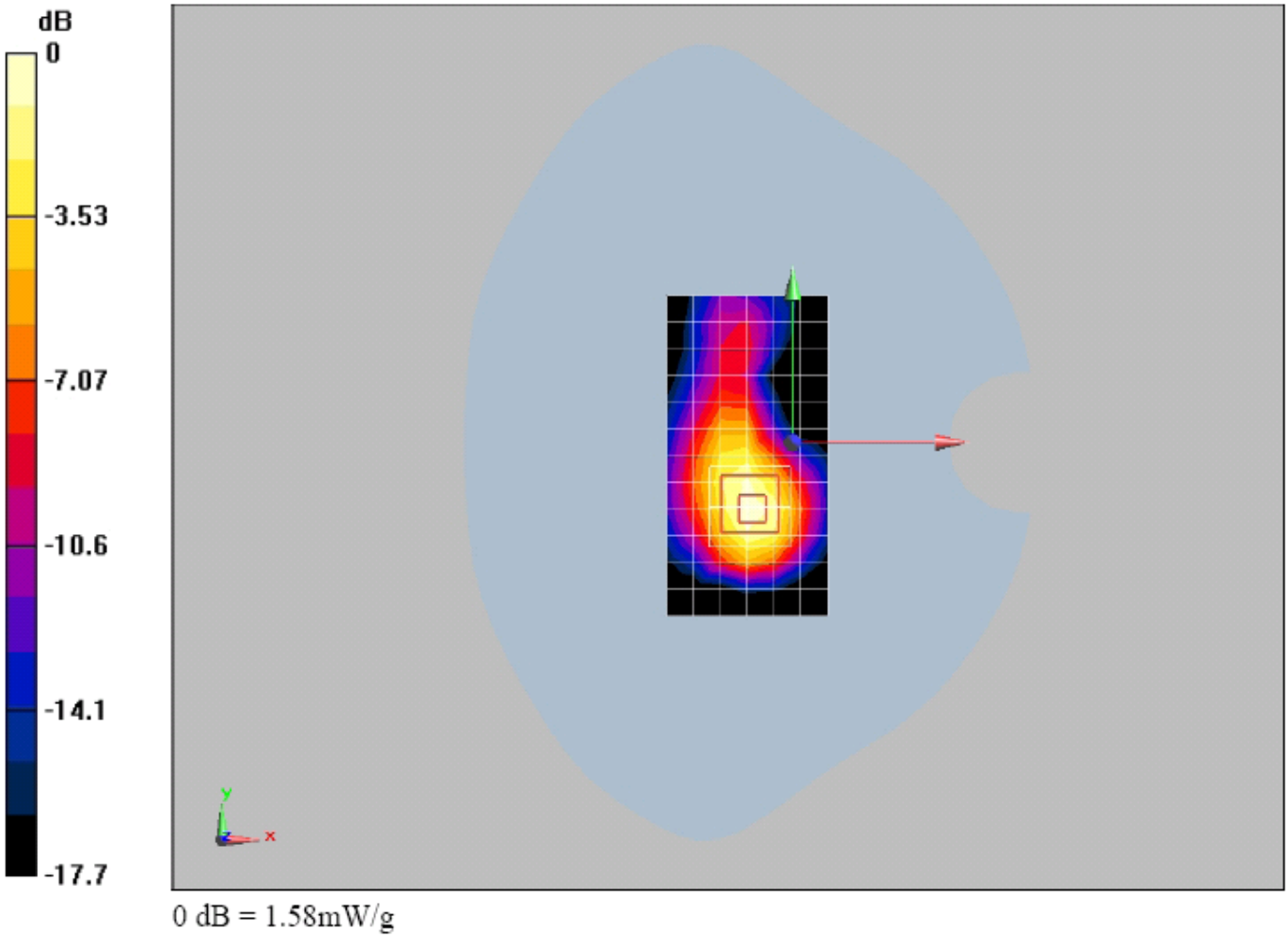
P1528_OET65-GPRS (2 timeslots in uplink) with IBM T61 front side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:4.1
Medium parameters used: f = 1910 MHz; σ = 1.51 mho/m; ε_r = 51.4; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.58 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.3 V/m; Power Drift = -0.148 dB
Peak SAR (extrapolated) = 2.31 W/kg
SAR(1 g) = 1.39 mW/g; SAR(10 g) = 0.757 mW/g



0 dB = 1.58mW/g

Additional information:
position or distance of DUT to SAM: 5 mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C

Date/Time: 2010-08-02 22:54:18

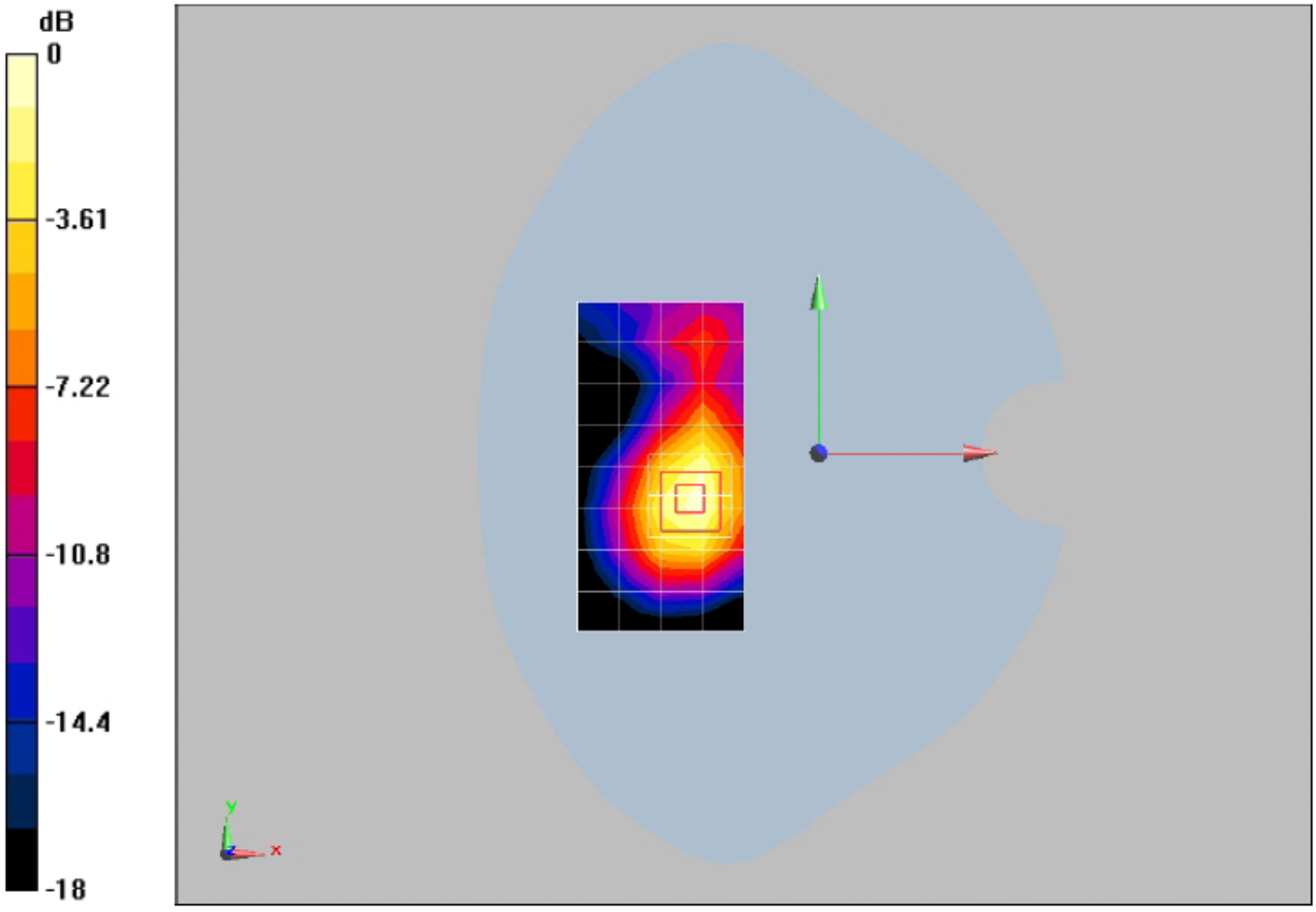
P1528_OET65-GPRS (2 timeslots in uplink) with IBM T61 back side-GSM1900

DUT: E1815

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.1
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.48 mho/m; ε_r = 51.1; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY5 Configuration:
- Probe: ES3DV3 - SN3168; ConvF(4.62, 4.62, 4.62); Calibrated: 12/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn852; Calibrated: 12/18/2009
- Phantom: SAM2; Type: SAM; Serial: TP-1474
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

body/Area Scan (5x9x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.800 mW/g

body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.86 V/m; Power Drift = 0.137 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.808 mW/g; SAR(10 g) = 0.460 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.900 mW/g



0 dB = 0.900mW/g

Additional information:
position or distance of DUT to SAM: 5 mm
ambient temperature: 23.0 °C; liquid temperature: 22.3 °C