



**Accredited testing laboratory**

**CNAS Registration number: L0310**

**Report On SAR Test of  
HSDPA USB Stick  
M/N: E153u-65**

**Test report no. : SYBH(Z-SAR)014062010**  
**Type identification: E153u-65**  
**FCC-ID : QISE153U-65**  
**Test specification : IEEE 1528-2003**  
**: ANSI C95.1-1999**  
**: OET Bulletin 65 Supplement C**  
**: IEC 62209-2:Ed1.0(2010-3)**

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## 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 E153u-65 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:

2010-06-26	Luo Yusheng	
Date	Name	Signature

#### Reviewed by:

2010-06-26	Hu Zhongxun	
Date	Name	Signature

#### Approved by:

2010-06-26	Liu Chunlin	
Date	Name	Signature



## 1.2 Testing laboratory

Huawei Technologies Co.,Ltd.  
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Country: P.R.China

Telephone: +86-755-28785278  
Fax: +86-755-36834474

e-mail: huzhongxun@huawei.com  
Internet: www.huawei.com

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  
Country: P.R.China  
Contact: Pan Lifang  
Telephone: +86-755-36835392

## 1.4 Application details

Date of receipt of application: 2010-6-23  
Date of receipt of test item: 2010-6-23  
Start/Date of test: 2010-6-23  
End of test: 2010-6-25

Person(s) present during the test: ---

## 1.5 Test item

Description of the test item:	HSDPA USB Stick
Type identification:	E153u-65
FCC-ID :	QISE153U-65
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 :	353504040001566	
exposure category:	uncontrolled environment / general population	
test device production information	production unit	
operating mode(s)	GSM,PCS,UMTS/HSDPA	
modulation	GMSK,8PSK,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)	
	128-190-251(GSM 850)	
	9262-9400-9538(WCDMA Band II)	
	4132-4182-4233(WCDMA Band V)	
hardware version :	CD1E153M	
software version :	16.002.08.03.03	
Antenna Type :	Internal Antenna	
Tested with host laptop:	Lenovo THINKPAD T61 Lenovo THINKPAD X301	

### 1.5.1 EUT Description

E153u-65 HSDPA/WCDMA/EDGE/GPRS/GSM dual bands USB Stick is subscriber equipment in the UMTS/GSM system. E153u-65 implement such functions as RF signal receiving/transmitting, HSDPA/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. E153u-65 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

## 1.6.1 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
<b>Spatial Peak SAR*</b> (Brain)	<b>1.60 mW/g</b>	8.00 mW/g
<b>Spatial Average SAR**</b> (Whole Body)	0.08 mW/g	0.40 mW/g
<b>Spatial Peak SAR***</b> (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.	<input checked="" type="checkbox"/>
The deviations as specified in 2.5 were ascertained in the course of the tests performed.	<input type="checkbox"/>

The maximum SAR of E153u-65 is 1.13W/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

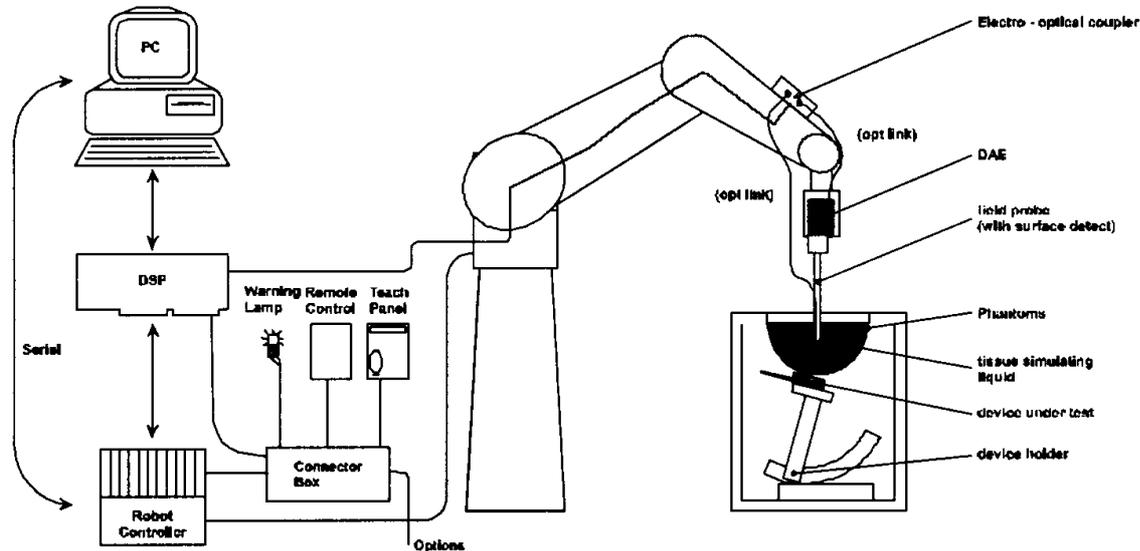
The measurement system is described in chapter 2.4.

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 DASYS5 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 DASYS5 measurement server.
- The DASYS5 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.
- DASYS5 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 m<sup>3</sup>, 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

<b>Technical data according to manufacturer information</b>	
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 $\pm 11\%$ ; k=2) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to 3 GHz (dosimetry); Linearity: $\pm 0.2$ dB (30 MHz to 3 GHz)
Directivity	$\pm 0.2$ dB in HSL (rotation around probe axis) $\pm 0.4$ dB in HSL (rotation normal to probe axis)
Dynamic range	5 $\mu$ W/g to > 100 mW/g; Linearity: $\pm 0.2$ dB
Optical Surface Detection	$\pm 0.2$ 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)



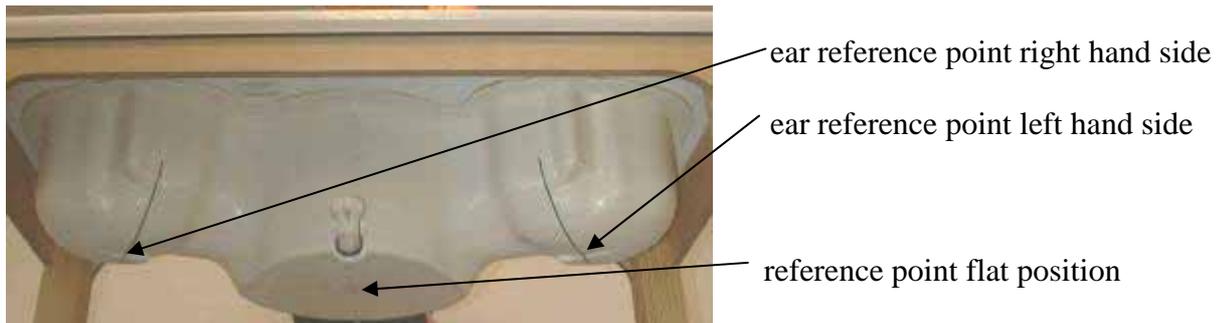
## Isotropic E-Field Probe ES3DV3 for Dosimetric Measurements

<b>Technical data according to manufacturer information</b>	
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: $\pm 0.2$ dB (30 MHz to 4 GHz)
Directivity	$\pm 0.2$ dB in HSL (rotation around probe axis) $\pm 0.3$ dB in tissue material (rotation normal to probe axis)
Dynamic range	5 $\mu$ W/g to > 100 mW/g; Linearity: $\pm 0.2$ 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  $\pm 0.1\text{mm}$ ). 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  $\pm 30^\circ$ .)
- 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 compensate 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/cm<sup>2</sup>], [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 <sub>i</sub> , a <sub>i0</sub> , a <sub>i1</sub> , a <sub>i2</sub>
	- Conversion factor	ConvF <sub>i</sub>
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	$\sigma$
	- Density	$\rho$

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)<sup>2</sup>] 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  
 $\sigma$  = conductivity in [mho/m] or [Siemens/m]  
 $\rho$  = equivalent tissue density in g/cm<sup>3</sup>

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<sup>2</sup>  
 $E_{tot}$  = 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	2009-05-14
☒	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	2010-05-21
☒	Agilent	Power Meter Sensor	E9321A	MY44420359	2010-05-21

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)					
	<input type="checkbox"/> 450	<input checked="" type="checkbox"/> 835	<input type="checkbox"/> 900	<input type="checkbox"/> 1800	<input checked="" type="checkbox"/> 1900	<input type="checkbox"/> 2450
frequency band						
Tissue Type	Head	Head	Head	Head	Head	Head
Water	38.56	41.45	40.92	52.64	54.9	62.7
Salt (NaCl)	3.95	1.45	1.48	0.36	0.18	0.5
Sugar	56.32	56.0	56.5	0.0	0.0	0.0
HEC	0.98	1.0	1.0	0.0	0.0	0.0
Bactericide	0.19	0.1	0.1	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	36.8
DGBE	0.0	0.0	0.0	47.0	44.92	0.0

Table 2: Head tissue dielectric properties

Ingredients (% of weight)	Frequency (MHz)					
	<input type="checkbox"/> 450	<input checked="" type="checkbox"/> 835	<input type="checkbox"/> 900	<input type="checkbox"/> 1800	<input checked="" type="checkbox"/> 1900	<input type="checkbox"/> 2450
frequency band						
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 3: 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	
835	55.2	0.97	53.59	1.07	2010-06-24
1900	53.3	1.52	54.3	1.49	2010-06-23

Table 4: 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  $\pm 10.7\%$  ( $K=1$ ).

The expanded uncertainty ( $k=2$ ) is assessed to be  $\pm 21.4\%$

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 Uncertainty 10g	$v_i^2$ or $v_{eff}$
<b>Measurement System</b>								
Probe calibration	$\pm 5.9\%$	Normal	1	1	1	$\pm 5.9\%$	$\pm 5.9\%$	$\infty$
Axial isotropy	$\pm 4.7\%$	Rectangular	$\sqrt{3}$	0.7	0.7	$\pm 1.9\%$	$\pm 1.9\%$	$\infty$
Hemispherical isotropy	$\pm 9.6\%$	Rectangular	$\sqrt{3}$	0.7	0.7	$\pm 3.9\%$	$\pm 3.9\%$	$\infty$
Spatial resolution	$\pm 0.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.0\%$	$\pm 0.0\%$	$\infty$
Boundary effects	$\pm 1.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
Probe linearity	$\pm 4.7\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 2.7\%$	$\pm 2.7\%$	$\infty$
System detection limits	$\pm 1.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
Readout electronics	$\pm 0.3\%$	Normal	1	1	1	$\pm 0.3\%$	$\pm 0.3\%$	$\infty$
Response time	$\pm 0.8\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.5\%$	$\pm 0.5\%$	$\infty$
Integration time	$\pm 2.6\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 1.5\%$	$\pm 1.5\%$	$\infty$
RF ambient conditions	$\pm 3.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7\%$	$\infty$
Probe positioner	$\pm 0.4\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.2\%$	$\pm 0.2\%$	$\infty$
Probe positioning	$\pm 2.9\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7\%$	$\infty$
Max. SAR evaluation	$\pm 1.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
<b>Test Sample Related</b>								
Device positioning	$\pm 2.9\%$	Normal	1	1	1	$\pm 2.9\%$	$\pm 2.9\%$	145
Device holder uncertainty	$\pm 3.6\%$	Normal	1	1	1	$\pm 3.6\%$	$\pm 3.6\%$	5
Power drift	$\pm 5.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 2.9\%$	$\pm 2.9\%$	$\infty$
<b>Phantom and Set-up</b>								
Phantom uncertainty	$\pm 4.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 2.3\%$	$\pm 2.3\%$	$\infty$
Liquid conductivity (target)	$\pm 5.0\%$	Rectangular	$\sqrt{3}$	0.64	0.43	$\pm 1.8\%$	$\pm 1.2\%$	$\infty$
Liquid conductivity (meas.)	$\pm 2.5\%$	Normal	1	0.64	0.43	$\pm 1.6\%$	$\pm 1.1\%$	$\infty$
Liquid permittivity (target)	$\pm 5.0\%$	Rectangular	$\sqrt{3}$	0.6	0.49	$\pm 1.7\%$	$\pm 1.4\%$	$\infty$
Liquid permittivity (meas.)	$\pm 2.5\%$	Normal	1	0.6	0.49	$\pm 1.5\%$	$\pm 1.2\%$	$\infty$
<b>Combined Uncertainty</b>						$\pm 10.9\%$	$\pm 10.7\%$	387
<b>Expanded Std. Uncertainty</b>						$\pm 21.9\%$	$\pm 21.4\%$	

Table 5: Measurement uncertainties

## 2.4.13 Measurement uncertainty evaluation for system validation

The overall combined measurement uncertainty of the measurement system is  $\pm 9.2\%$  ( $K=1$ ).

The expanded uncertainty ( $k=2$ ) is assessed to be  $\pm 18.4\%$

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 y 1g	Standard Uncertainty y10g	$v_i^2$ or $v_{eff}$
<b>Measurement System</b>								
Probe calibration	$\pm 5.9\%$	Normal	1	1	1	$\pm 5.9\%$	$\pm 5.9\%$	$\infty$
Axial isotropy	$\pm 4.7\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 2.7\%$	$\pm 2.7\%$	$\infty$
Hemispherical isotropy	$\pm 9.6\%$	Rectangular	$\sqrt{3}$	0.7	0.7	$\pm 0.0\%$	$\pm 0.0\%$	$\infty$
Boundary effects	$\pm 1.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
Probe linearity	$\pm 4.7\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 2.7\%$	$\pm 2.7\%$	$\infty$
System detection limits	$\pm 1.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
Readout electronics	$\pm 0.3\%$	Normal	1	1	1	$\pm 0.3\%$	$\pm 0.3\%$	$\infty$
Response time	$\pm 0.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.0\%$	$\pm 0.0\%$	$\infty$
Integration time	$\pm 0.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.0\%$	$\pm 0.0\%$	$\infty$
RF ambient conditions	$\pm 1.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
Probe positioner	$\pm 0.4\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.2\%$	$\pm 0.2\%$	$\infty$
Probe positioning	$\pm 2.9\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 1.7\%$	$\pm 1.7\%$	$\infty$
Max. SAR evaluation	$\pm 1.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 0.6\%$	$\pm 0.6\%$	$\infty$
<b>Dipole</b>								
Deviation of experimental dipole	$\pm 5.5\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 3.2\%$	$\pm 3.2\%$	$\infty$
Dipole axis to liquid distance	$\pm 2.0\%$	Rectangular	1	1	1	$\pm 1.2\%$	$\pm 1.2\%$	$\infty$
Power drift	$\pm 4.7\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 2.7\%$	$\pm 2.7\%$	$\infty$
<b>Phantom and Set-up</b>								
Phantom uncertainty	$\pm 4.0\%$	Rectangular	$\sqrt{3}$	1	1	$\pm 2.3\%$	$\pm 2.3\%$	$\infty$
Liquid conductivity (target)	$\pm 5.0\%$	Rectangular	$\sqrt{3}$	0.64	0.43	$\pm 1.8\%$	$\pm 1.2\%$	$\infty$
Liquid conductivity (meas.)	$\pm 2.5\%$	Normal	1	0.64	0.43	$\pm 1.6\%$	$\pm 1.1\%$	$\infty$
Liquid permittivity (target)	$\pm 5.0\%$	Rectangular	$\sqrt{3}$	0.6	0.49	$\pm 1.7\%$	$\pm 1.4\%$	$\infty$
Liquid permittivity (meas.)	$\pm 2.5\%$	Normal	1	0.6	0.49	$\pm 1.5\%$	$\pm 1.2\%$	$\infty$
<b>Combined Uncertainty</b>						<b><math>\pm 9.5\%</math></b>	<b><math>\pm 9.2\%</math></b>	
<b>Expanded Std. Uncertainty</b>						<b><math>\pm 18.9\%</math></b>	<b><math>\pm 18.4\%</math></b>	

Table 6: 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).

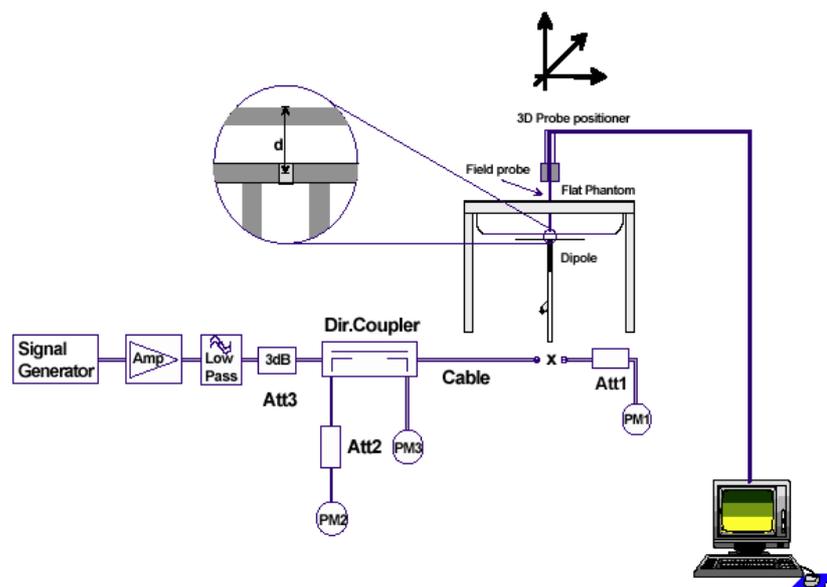
Validation Kit	Frequency	Target SAR <sub>1g</sub> (250 mW) (+/- 10%)	Target SAR <sub>10g</sub> (250 mW) (+/- 10%)	Measured SAR <sub>1g</sub>	Measured SAR <sub>10g</sub>	Measured date
D835V2 S/N: 4d095	835 MHz body	2.49mW/g	1.62mW/g	2.58mW/g	1.69mW/g	2010-06-24
D1900V2 S/N: 5d091	1900 MHz body	10.1mW/g	5.27mW/g	10.3mW/g	5.4mW/g	2010-06-23

Table 7: 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	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		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	32.66	32.45	32.51	23.66	23.45	23.51
	After	32.64	32.44	32.50	23.64	23.44	23.50
2 tx slots	Before	29.66	29.42	29.42	23.66	23.42	23.42
	After	29.63	29.41	29.41	23.63	23.41	23.41
3 tx slots	Before	28.64	28.42	28.43	24.39	24.17	24.18
	After	28.63	28.40	28.42	24.38	24.15	24.17
4 tx slots	Before	26.63	26.41	26.42	23.63	23.41	23.42
	After	26.62	26.40	26.41	23.62	23.40	23.41
GSM850 + EGPRS		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	26.95	26.73	26.80	17.95	17.73	17.80
	After	26.93	26.70	26.79	17.93	17.70	17.79
2 tx slots	Before	26.17	26.09	26.05	20.17	20.09	20.05
	After	26.15	26.08	26.03	20.15	20.08	20.03
3 tx slots	Before	24.15	24.01	24.00	19.90	19.76	19.75
	After	24.14	24.00	23.99	19.89	19.75	19.74
4 tx slots	Before	22.14	21.96	21.99	19.14	18.96	18.99
	After	22.11	21.94	21.98	19.11	18.94	18.98



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	29.16	29.15	29.17	20.16	20.15	20.17
	After	29.15	29.13	29.16	20.15	20.13	20.16
2 tx slots	Before	25.60	25.59	25.68	19.60	19.59	19.68
	After	25.58	25.57	25.67	19.58	19.57	19.67
3 tx slots	Before	24.66	24.62	24.58	20.41	20.37	20.33
	After	24.64	24.60	24.56	20.39	20.35	20.31
4 tx slots	Before	23.14	23.15	23.11	20.14	20.15	20.11
	After	23.13	23.13	23.10	20.13	20.13	20.10
GSM1900 + EGPRS		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	26.17	26.15	26.17	17.17	17.15	17.17
	After	26.16	26.14	26.16	17.16	17.14	17.16
2 tx slots	Before	25.14	25.17	25.14	19.14	19.17	19.14
	After	25.13	25.15	25.12	19.13	19.15	19.12
3 tx slots	Before	22.50	22.48	22.53	18.25	18.23	18.28
	After	22.49	22.47	22.52	18.24	18.22	18.27
4 tx slots	Before	21.15	21.13	21.15	18.15	18.13	18.15
	After	21.13	21.10	21.14	18.13	18.10	18.14

WCDMA Band II		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
12.2kbps RMC	Before	20.78	20.75	20.62
	After	20.76	20.73	20.60
64kbps RMC	Before	20.79	20.77	20.55
	After	20.78	20.75	20.53
144kbps RMC	Before	20.79	20.78	20.61
	After	20.78	20.77	20.60
384kbps RMC	Before	20.78	20.76	20.66
	After	20.75	20.74	20.65
WCDMA Band II +HSDPA		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
Sub Test - 1	Before	20.79	20.71	20.58
	After	20.78	20.70	20.57
Sub Test - 2	Before	20.51	20.48	20.46
	After	20.50	20.46	20.45
Sub Test - 3	Before	20.42	20.07	20.15
	After	20.41	20.05	20.14
Sub Test - 4	Before	20.33	20.01	20.17

	After	20.32	20.00	20.16
--	-------	-------	-------	-------

WCDMA Band V		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
12.2kbps RMC	Before	22.91	22.85	22.61
	After	22.90	22.84	22.60
64kbps RMC	Before	22.81	22.84	22.63
	After	22.79	22.83	22.61
144kbps RMC	Before	22.79	22.89	22.57
	After	22.78	22.88	22.56
384kbps RMC	Before	22.83	22.91	22.66
	After	22.82	22.90	22.65
WCDMA Band V +HSDPA		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
Sub Test - 1	Before	22.96	22.94	22.66
	After	22.94	22.93	22.63
Sub Test - 2	Before	22.53	22.15	22.03
	After	22.52	22.13	22.02
Sub Test - 3	Before	21.95	21.96	21.62
	After	21.93	21.95	21.60
Sub Test - 4	Before	21.53	21.34	21.21
	After	21.52	21.33	21.20

## 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	Limit	Liquid temperature
E153u-65 GPRS				
661 / 1880.0 MHz	rear 4TS	0.847 W/kg	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	rear 3TS	0.95 W/kg	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	rear 2TS	0.847 W/kg	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	rear 1TS	0.903 W/kg	1.6 W/kg	21.5 °C
E153u-65 EGPRS				
661 / 1880.0 MHz	front 3TS	0.768 W/kg	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	left 3TS	0.204 W/kg	1.6 W/kg	21.5 °C
661 / 1880.0 MHz	right 3TS	0.515 W/kg	1.6 W/kg	21.5 °C
512 / 1850.2 MHz	rear 3TS	0.791 W/kg	1.6 W/kg	21.5 °C
810 / 1909.8 MHz	rear 3TS	1.1 W/kg	1.6 W/kg	21.5 °C
E153u-65 EGPRS				
810 / 1909.8 MHz	rear 3TS	1.13 W/kg	1.6 W/kg	21.5 °C

Table 4: Test results GSM 1900

Note: The test distance between EUT and phantom please refer to Annex 4.

### 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 2	High	24.58	1.13	24.7	1.162		



**GSM 850**

The table contains the measured SAR values averaged over a mass of 1 g

Channel / frequency	Position	Body worn	Limit	Liquid temperature
E153u-65 GPRS				
192 / 837 MHz	rear 4TS	0.654 W/kg	1.6 W/kg	21.5 °C
192 / 837 MHz	rear 3TS	0.769 W/kg	1.6 W/kg	21.5 °C
192 / 837 MHz	rear 2TS	0.651 W/kg	1.6 W/kg	21.5 °C
192 / 837 MHz	rear 1TS	0.655 W/kg	1.6 W/kg	21.5 °C
E153u-65 EGPRS				
192 / 837 MHz	front 3TS	0.761 W/kg	1.6 W/kg	21.5 °C
192 / 837 MHz	left 3TS	0.315 W/kg	1.6 W/kg	21.5 °C
192 / 837 MHz	right 3TS	0.577 W/kg	1.6 W/kg	21.5 °C
128 / 824.2MHz	rear 3TS	0.714 W/kg	1.6 W/kg	21.5 °C
251 / 848.8MHz	rear 3TS	0.791 W/kg	1.6 W/kg	21.5 °C
E153u-65 EGPRS				
251 / 848.8MHz	rear 3TS	0.796 W/kg	1.6 W/kg	21.5 °C

Table 9: Test results GSM 850

Note: The test distance between EUT and phantom please refer to Annex 4.

**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 2	High	28.43	0.796		28.7	0.847	



**UMTS (WCDMA) FDD II 1900MHz**

The table contains the measured SAR values averaged over a mass of 1 g				
Channel / frequency	Position	Body worn	Limit	Liquid temperature
E153u-65				
9400 / 1880 MHz	rear	0.971 W/kg	1.6 W/kg	21.5 °C
9400 / 1880 MHz	front	0.711 W/kg	1.6 W/kg	21.5 °C
9400 / 1880 MHz	left	0.195 W/kg	1.6 W/kg	21.5 °C
9400 / 1880 MHz	right	0.49 W/kg	1.6 W/kg	21.5 °C
E153u-65 HSDPA				
9262/ 1852.4 MHz	rear	0.915 W/kg	1.6 W/kg	21.5 °C
9538 / 19076 MHz	rear	1.06 W/kg	1.6 W/kg	21.5 °C
E153u-65 HSDPA				
9538 / 19076 MHz	rear	1.12 W/kg	1.6 W/kg	21.5 °C

Table 50: 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
Different Test Position	Channel	Measurement Result(dBm)	Measurement Result(W/kg)		Extrapolated Result(W/kg)
IBM T61					
Test Position 2	High	20.58	1.12	21.8	1.483

**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	Limit	Liquid temperature
E153u-65				
4182 / 836.4 MHz	rear	0.65 W/kg	1.6 W/kg	21.5 °C
4182 / 836.4 MHz	front	0.649 W/kg	1.6 W/kg	21.5 °C
4182 / 836.4 MHz	left	0.278 W/kg	1.6 W/kg	21.5 °C
4182 / 836.4 MHz	right	0.46 W/kg	1.6 W/kg	21.5 °C
E153u-65 HSDPA				
4132/ 826.4 MHz	rear	0.585 W/kg	1.6 W/kg	21.5 °C
4233 / 846.6 MHz	rear	0.643 W/kg	1.6 W/kg	21.5 °C
E153u-65 HSDPA				
4233 / 846.6 MHz	rear	0.627 W/kg	1.6 W/kg	21.5 °C

Table 11: 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 2	Middle	22.58	0.65		23	0.716	



## 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.

**Annex 1 System performance verification**

Date/Time: 2010-06-23 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;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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) = 11.2 mW/g

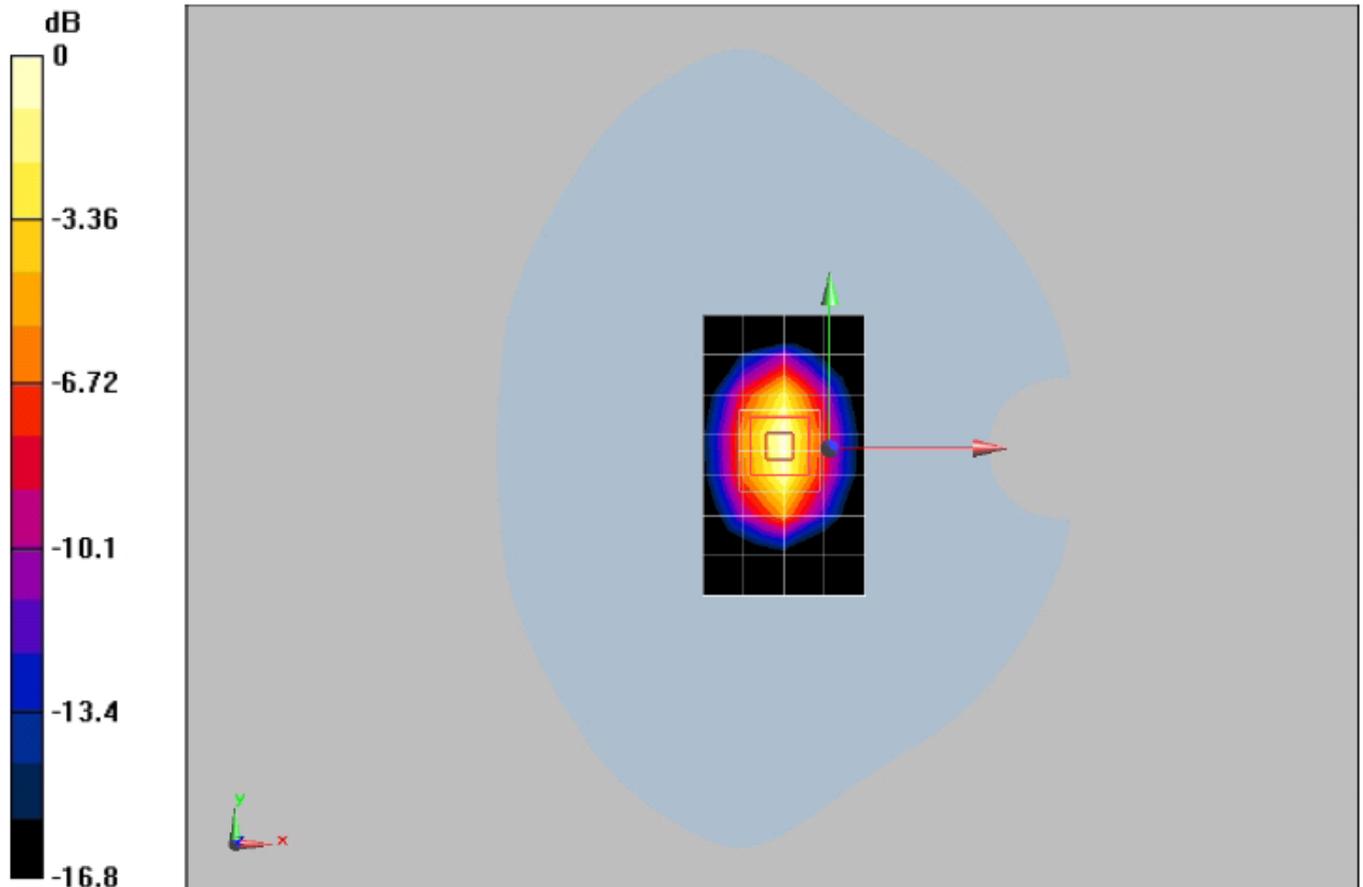
**d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.7 V/m; Power Drift = 0.154 dB

Peak SAR (extrapolated) = 18.4 W/kg

**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.4 mW/g**

Maximum value of SAR (measured) = 11.7 mW/g



0 dB = 11.7mW/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

### 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;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

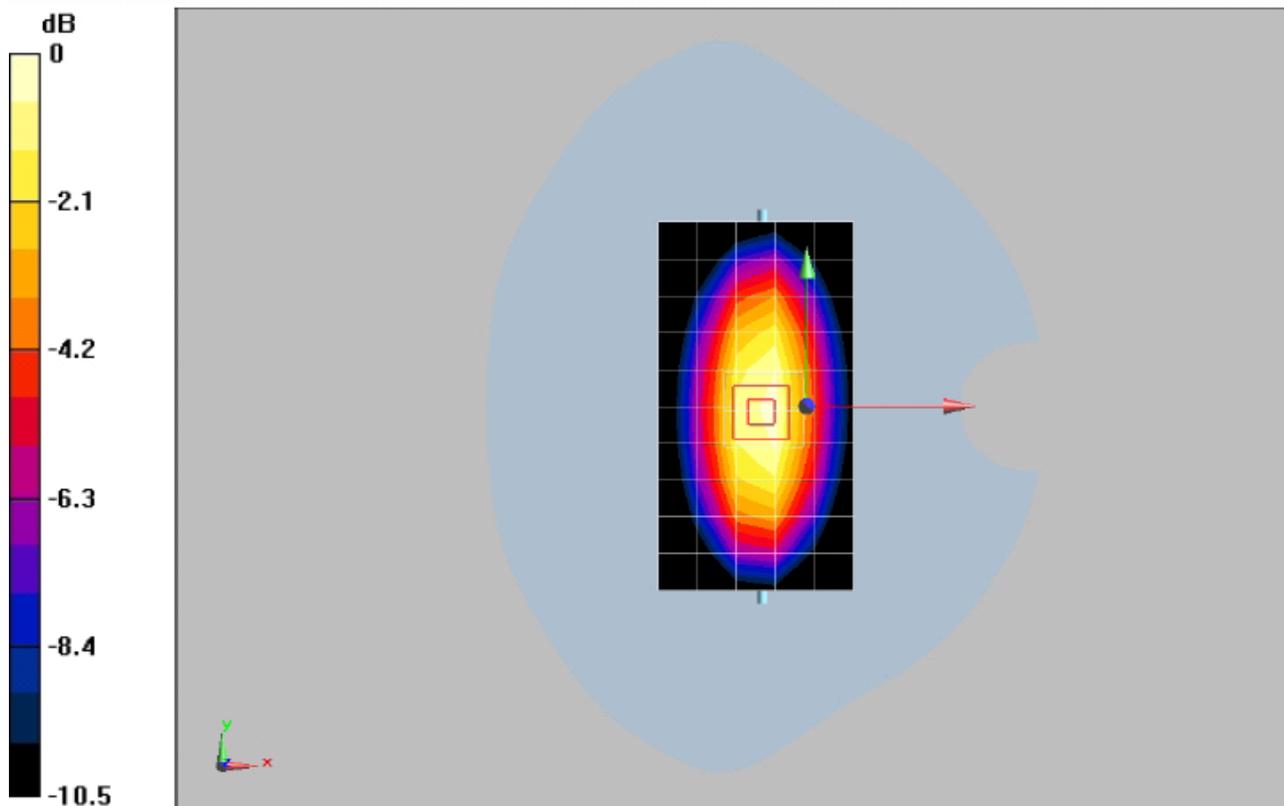
**d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

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

**Annex 2 Measurement results (printout from DASY TM)**

**Annex 2.1 GSM 1900 MHz body**

Date/Time: 2010-06-23 22:27:12

**P1528\_OET65-GPRS (4 timeslots in uplink) with IBM T61 rear side-GSM1900**

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.1

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.899 mW/g

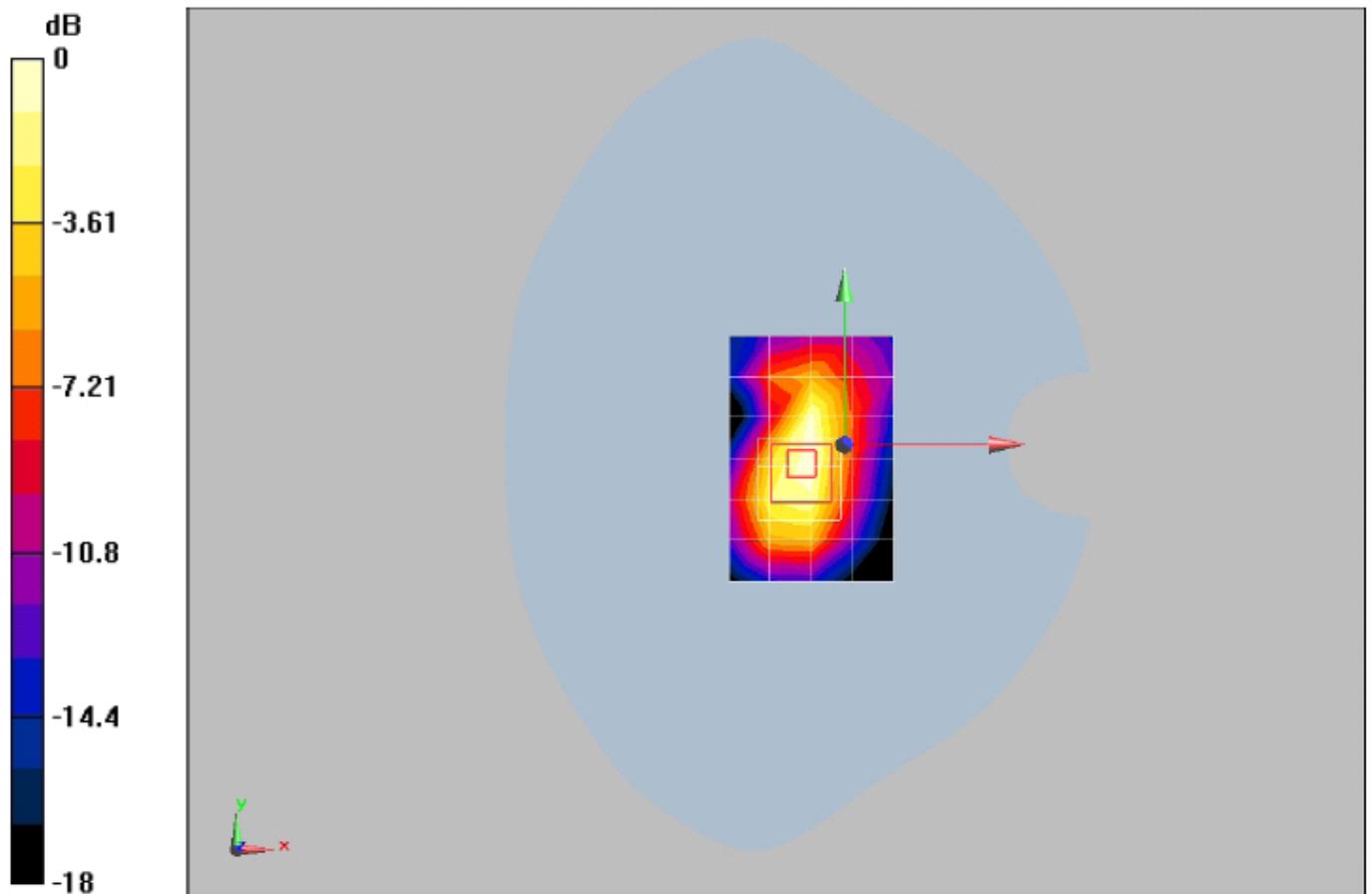
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.5 V/m; Power Drift = -0.135 dB

Peak SAR (extrapolated) = 1.42 W/kg

**SAR(1 g) = 0.847 mW/g; SAR(10 g) = 0.475 mW/g**

Maximum value of SAR (measured) = 0.947 mW/g



0 dB = 0.947mW/g

**Additional information:**

position or distance of DUT to SAM:5 mm

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

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 rear side-GSM1900**

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.7

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1 mW/g

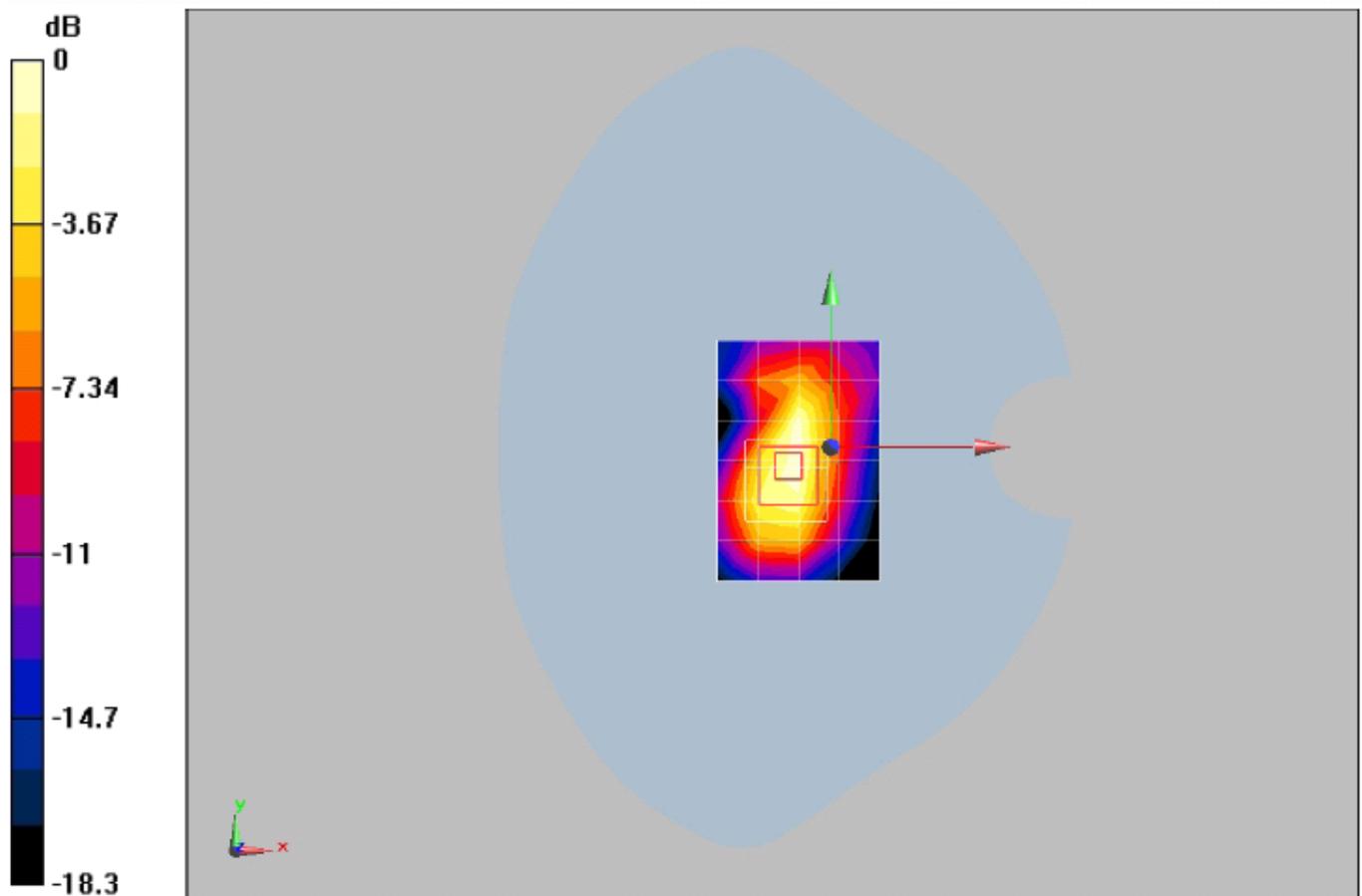
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.8 V/m; Power Drift = -0.090 dB

Peak SAR (extrapolated) = 1.6 W/kg

**SAR(1 g) = 0.950 mW/g; SAR(10 g) = 0.532 mW/g**

Maximum value of SAR (measured) = 1.06 mW/g



0 dB = 1.06mW/g

**Additional information:**

position or distance of DUT to SAM: 5mm

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

**P1528\_OET65-GPRS (2 timeslots in uplink) with IBM T61 rear side-GSM1900**

**DUT: E153U-65**

Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.1  
 Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 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 (5x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.890 mW/g

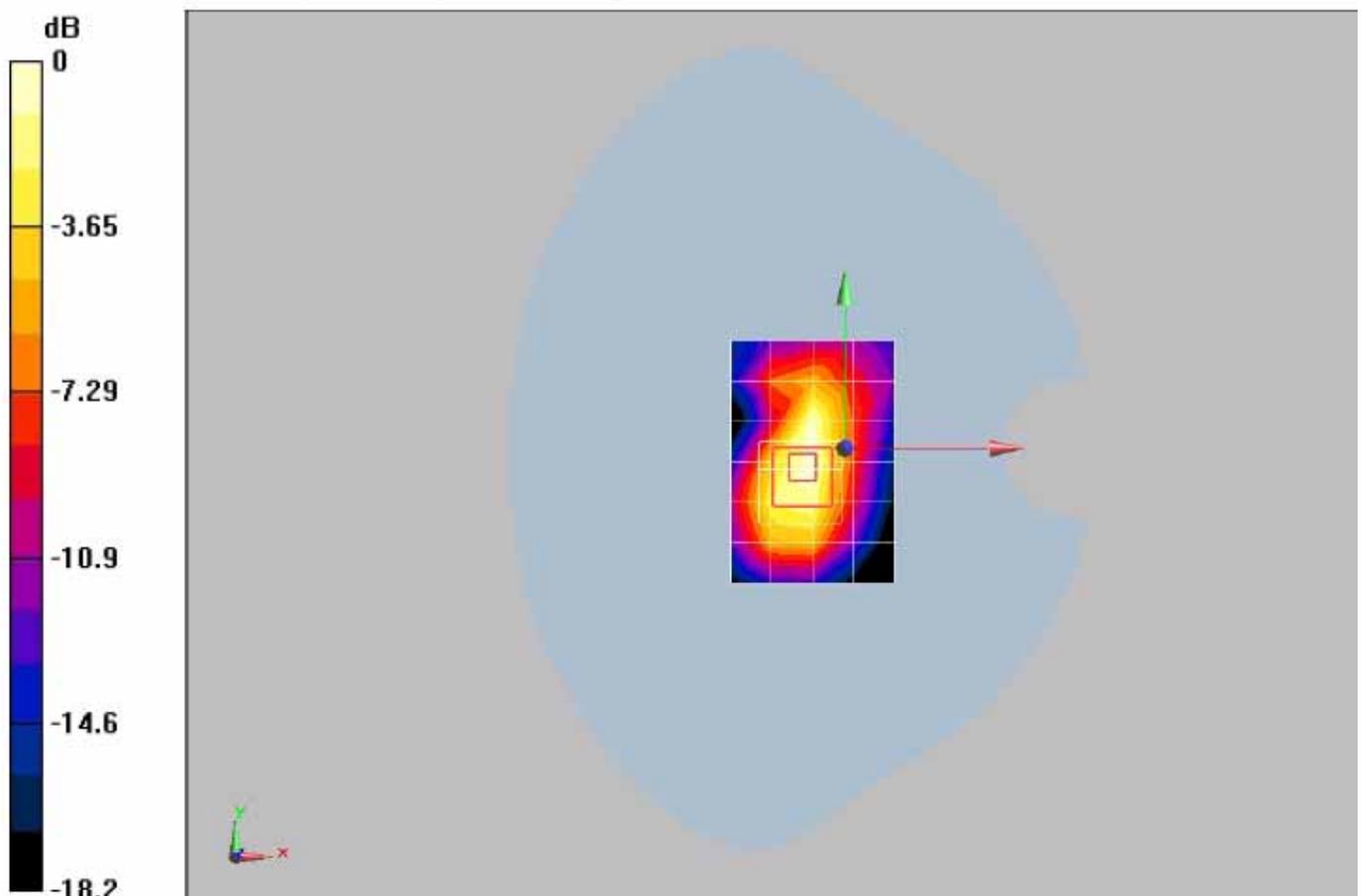
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.5 V/m; Power Drift = -0.131 dB

Peak SAR (extrapolated) = 1.43 W/kg

**SAR(1 g) = 0.847 mW/g; SAR(10 g) = 0.474 mW/g**

Maximum value of SAR (measured) = 0.953 mW/g



0 dB = 0.953mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

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

**P1528\_OET65-GPRS (1 timeslots in uplink) with IBM T61 rear side-GSM1900**

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.956 mW/g

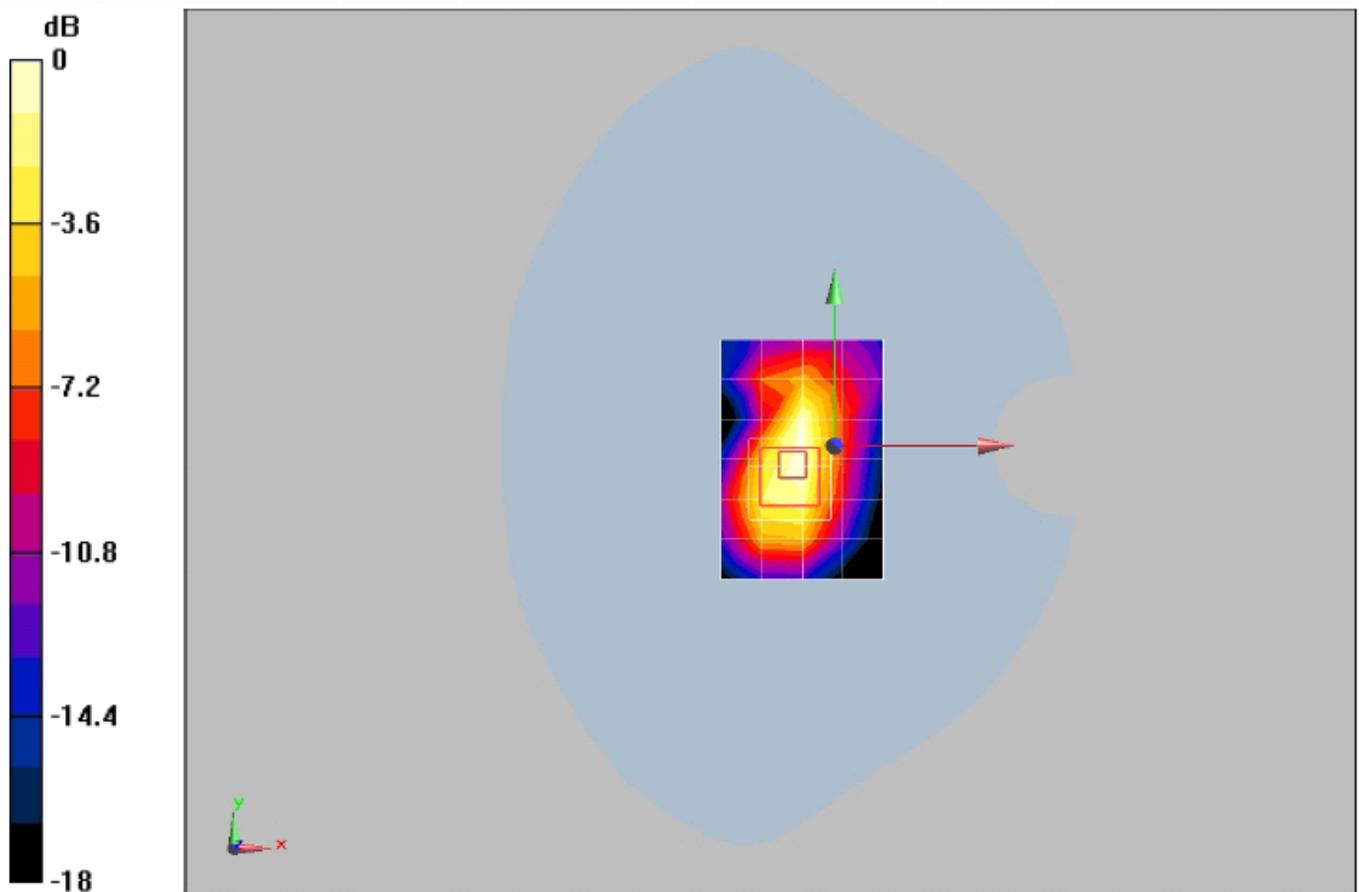
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.2 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 1.49 W/kg

**SAR(1 g) = 0.903 mW/g; SAR(10 g) = 0.505 mW/g**

Maximum value of SAR (measured) = 1.02 mW/g



0 dB = 1.02mW/g

**Additional information:**

position or distance of DUT to SAM: 5mm

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

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM X301 front side-GSM1900**

**DUT: E153U-65**

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.7

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.779 mW/g

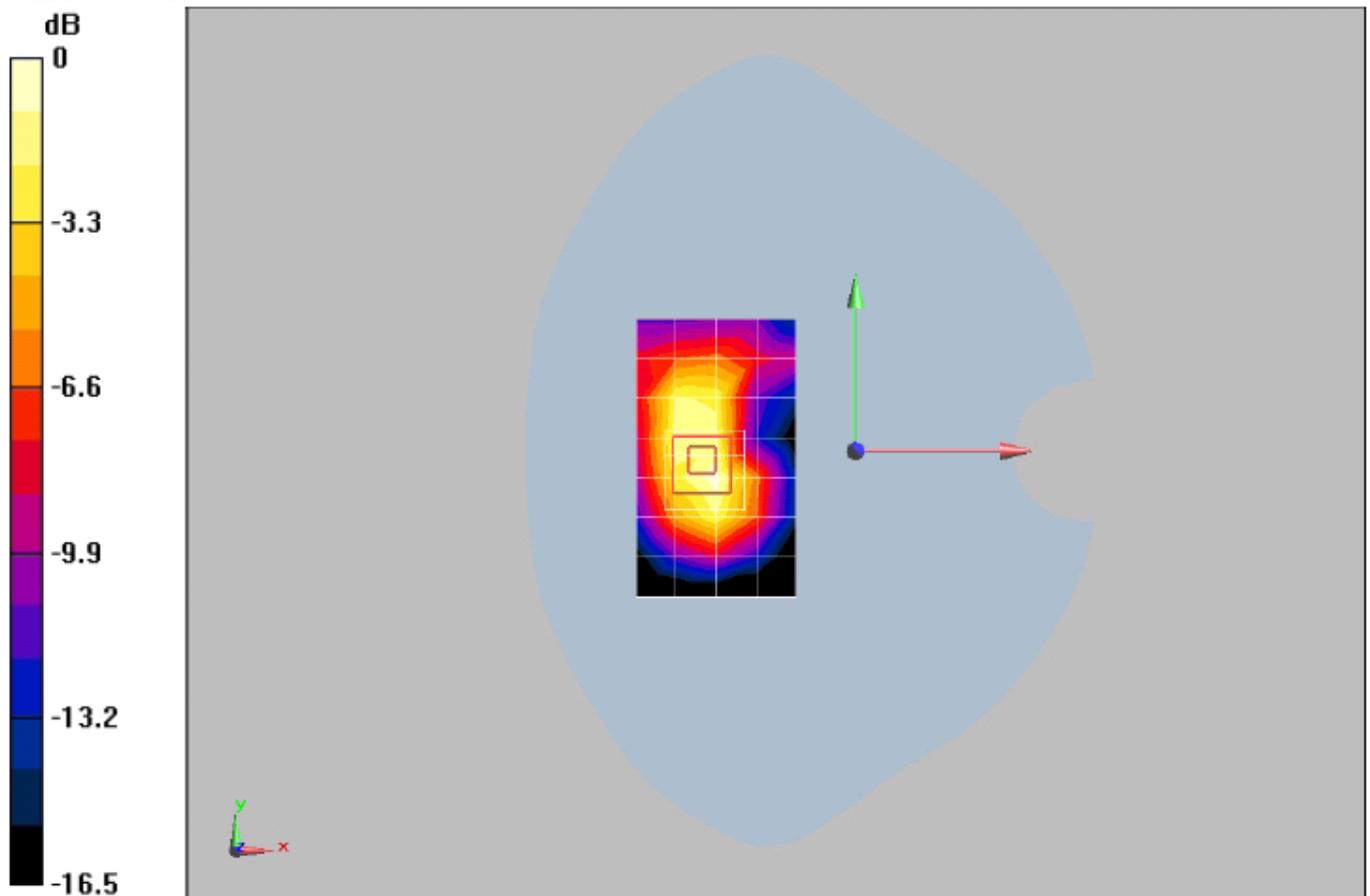
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.4 V/m; Power Drift = 0.148 dB

Peak SAR (extrapolated) = 1.27 W/kg

**SAR(1 g) = 0.768 mW/g; SAR(10 g) = 0.441 mW/g**

Maximum value of SAR (measured) = 0.850 mW/g



0 dB = 0.850mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

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

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 left side-GSM1900**

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.7

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.202 mW/g

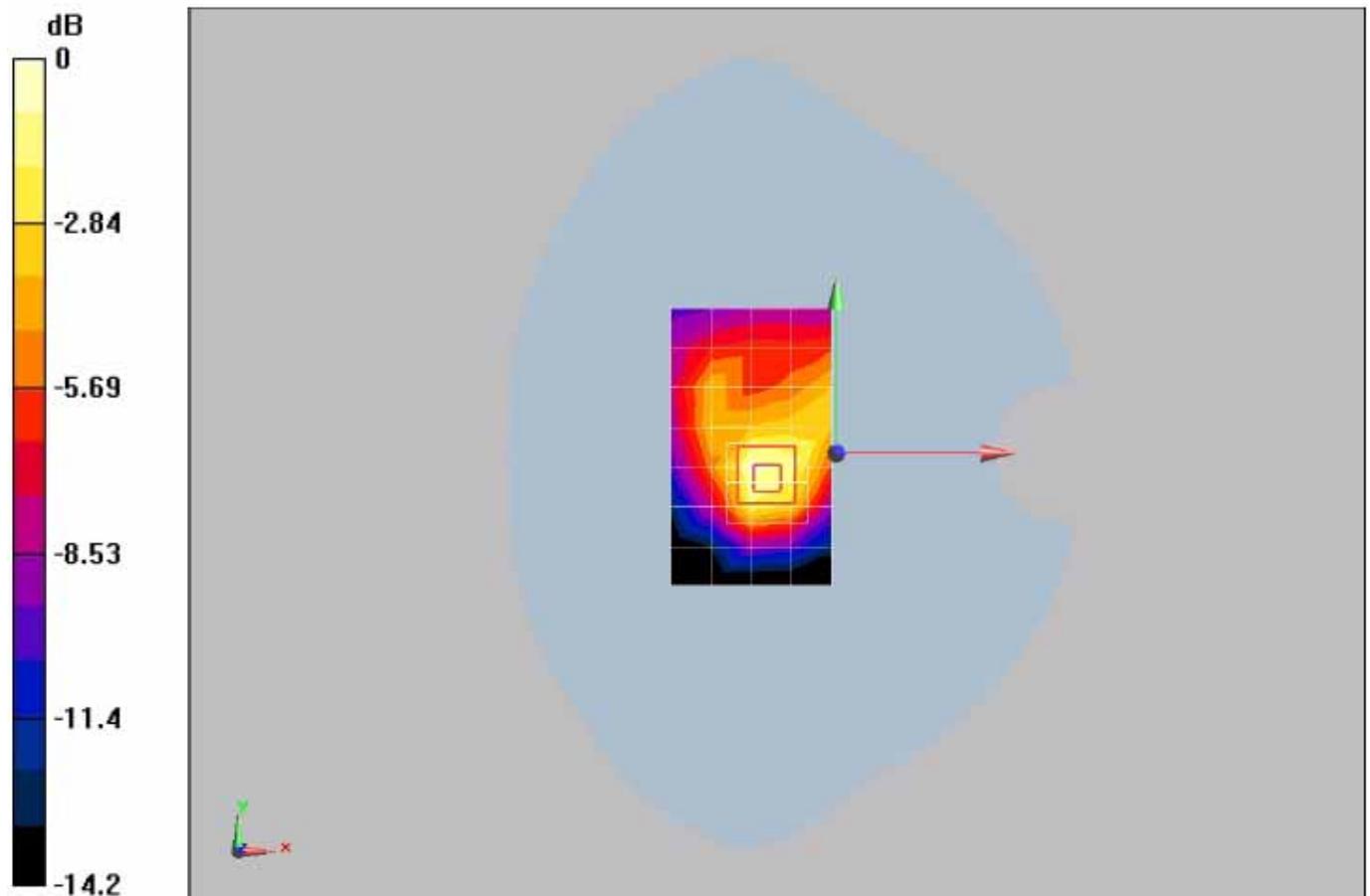
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.8 V/m; Power Drift = 0.039 dB

Peak SAR (extrapolated) = 0.345 W/kg

**SAR(1 g) = 0.204 mW/g; SAR(10 g) = 0.115 mW/g**

Maximum value of SAR (measured) = 0.227 mW/g



0 dB = 0.227mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

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

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 right side-GSM1900**

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.7

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.584 mW/g

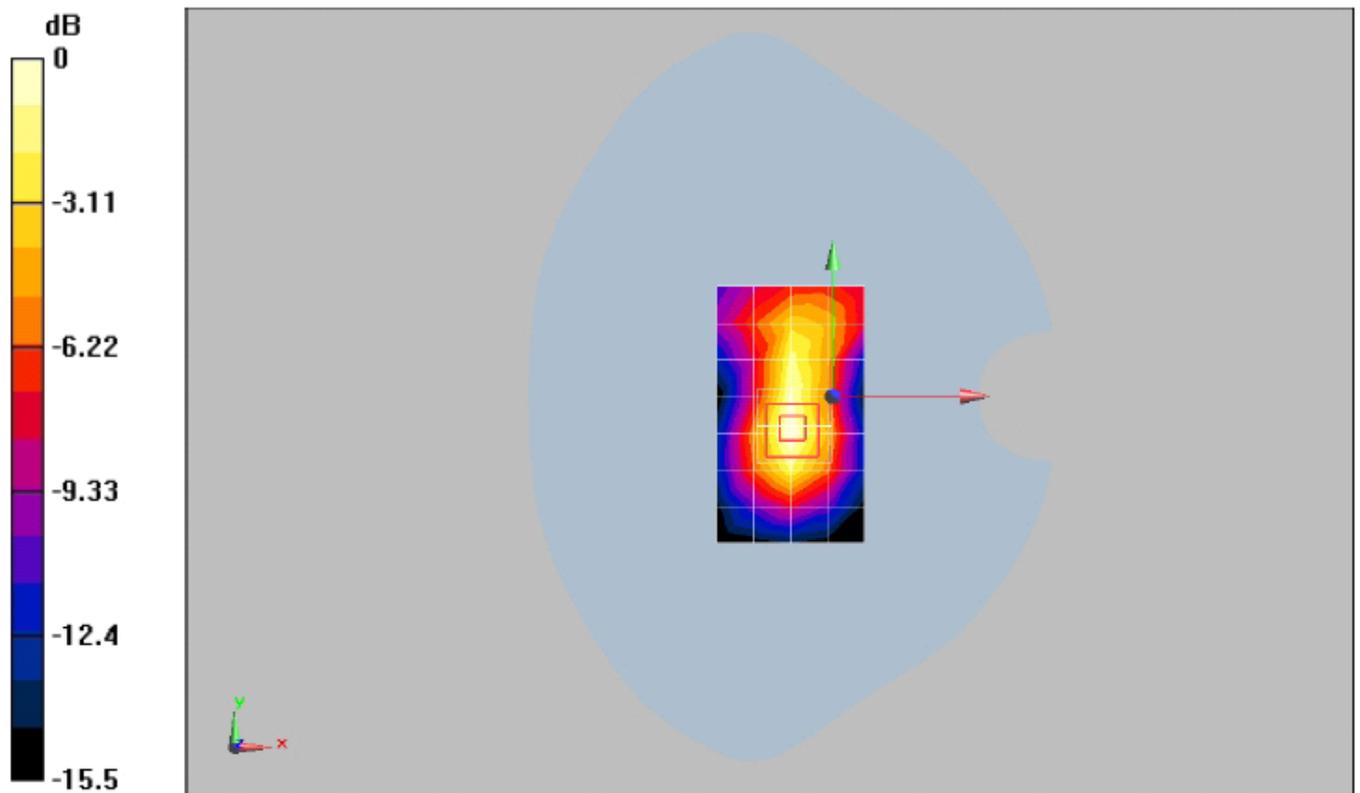
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.8 V/m; Power Drift = -0.184 dB

Peak SAR (extrapolated) = 0.832 W/kg

**SAR(1 g) = 0.515 mW/g; SAR(10 g) = 0.290 mW/g**

Maximum value of SAR (measured) = 0.577 mW/g



0 dB = 0.577mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

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

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 rear side-GSM1900**

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:2.7

Medium parameters used (interpolated):  $f = 1850.2$  MHz;  $\sigma = 1.44$  mho/m;  $\epsilon_r = 54.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x7x1):** Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.829 mW/g

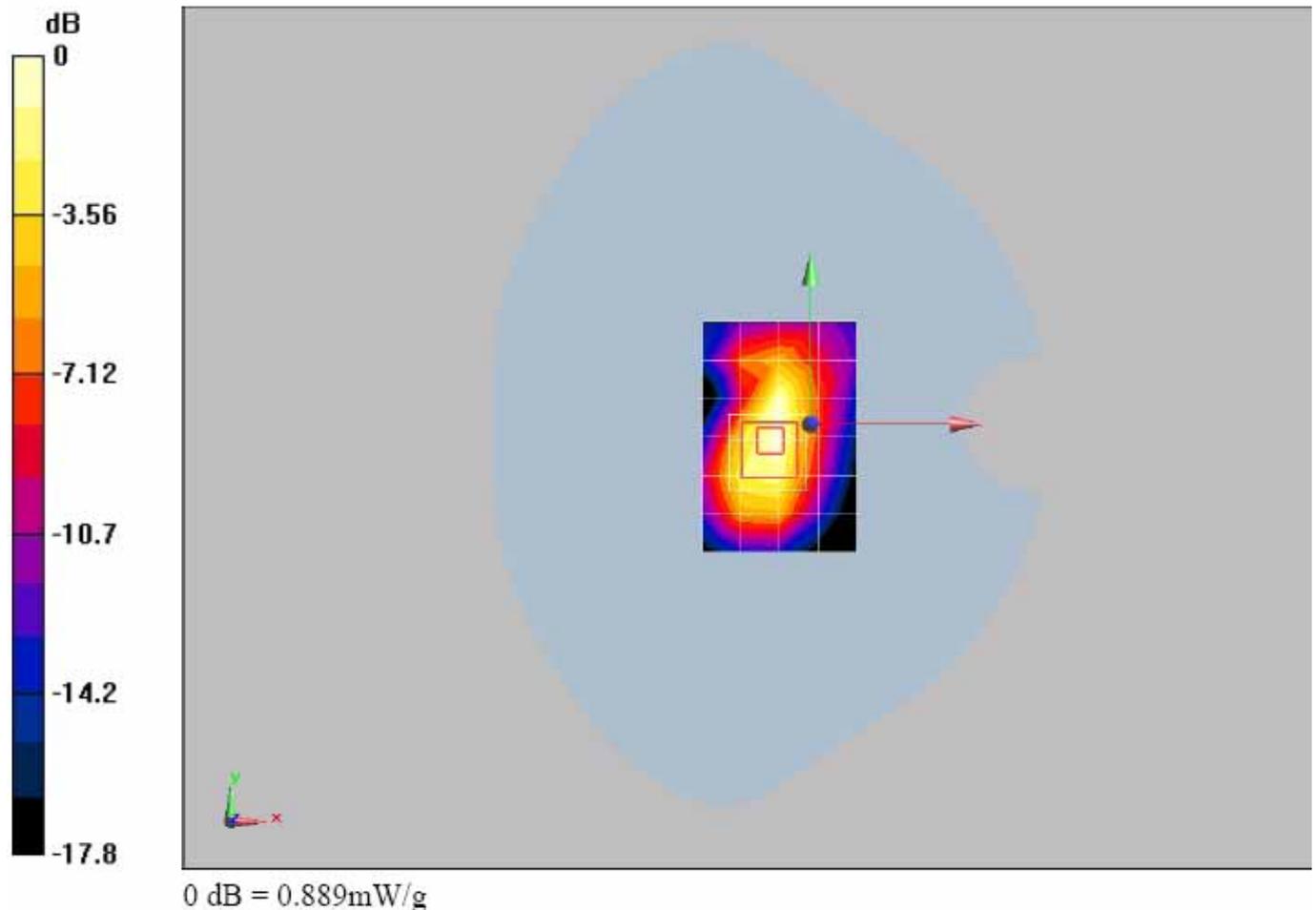
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.1 V/m; Power Drift = -0.130 dB

Peak SAR (extrapolated) = 1.35 W/kg

**SAR(1 g) = 0.791 mW/g; SAR(10 g) = 0.443 mW/g**[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.889 mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

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

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 reart side-GSM1900**

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:2.7

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 54.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x7x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.15 mW/g

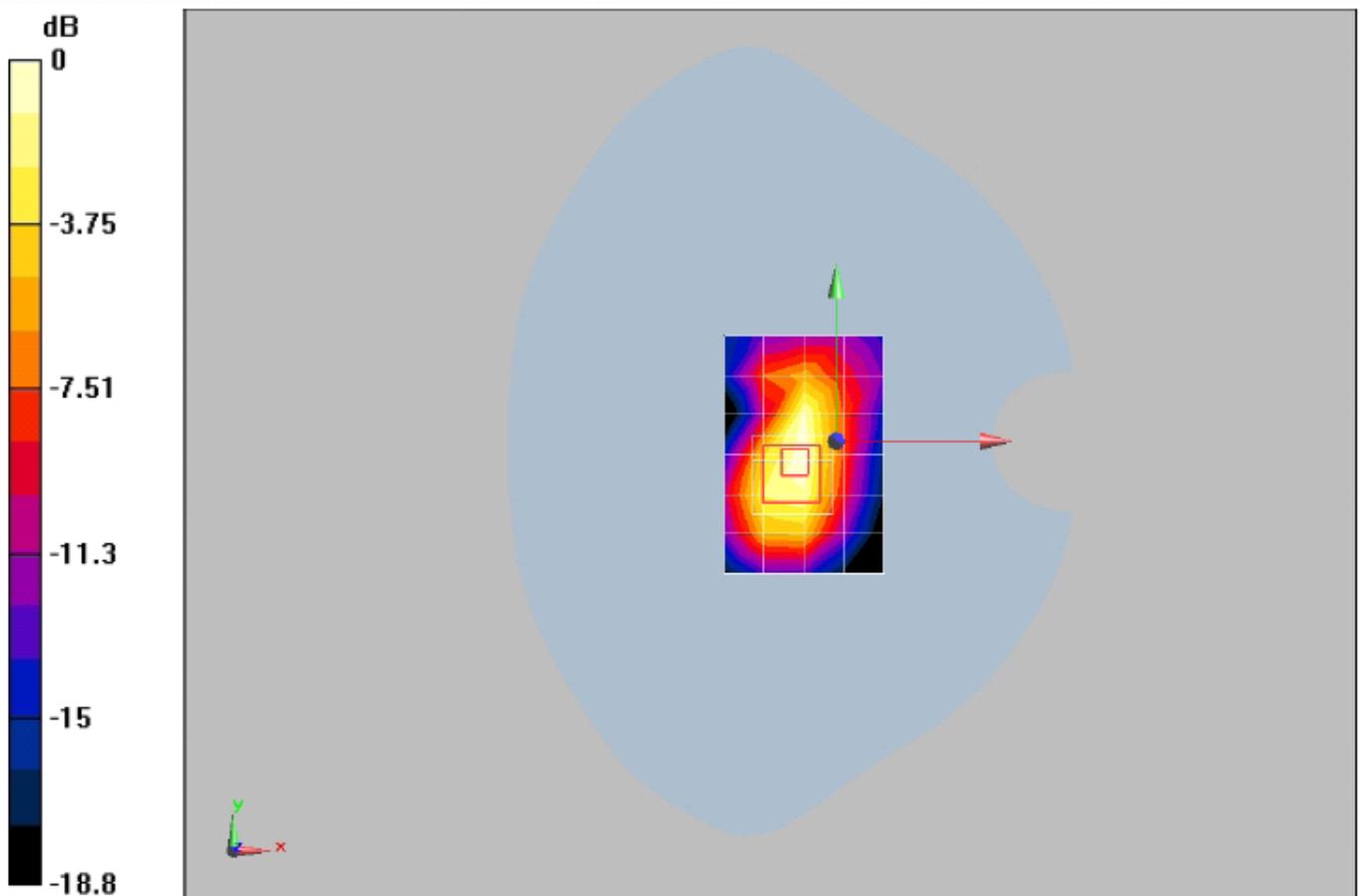
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 27.2 V/m; Power Drift = -0.158 dB

Peak SAR (extrapolated) = 1.85 W/kg

**SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.618 mW/g**

Maximum value of SAR (measured) = 1.24 mW/g



0 dB = 1.24mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

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

## P1528\_OET65-EGPRS (3 timeslots in uplink) with IBM T61 rear side-GSM1900

DUT: E153U-65

Communication System: PCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:2.7

Medium parameters used:  $f = 1910$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 54.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.2 mW/g

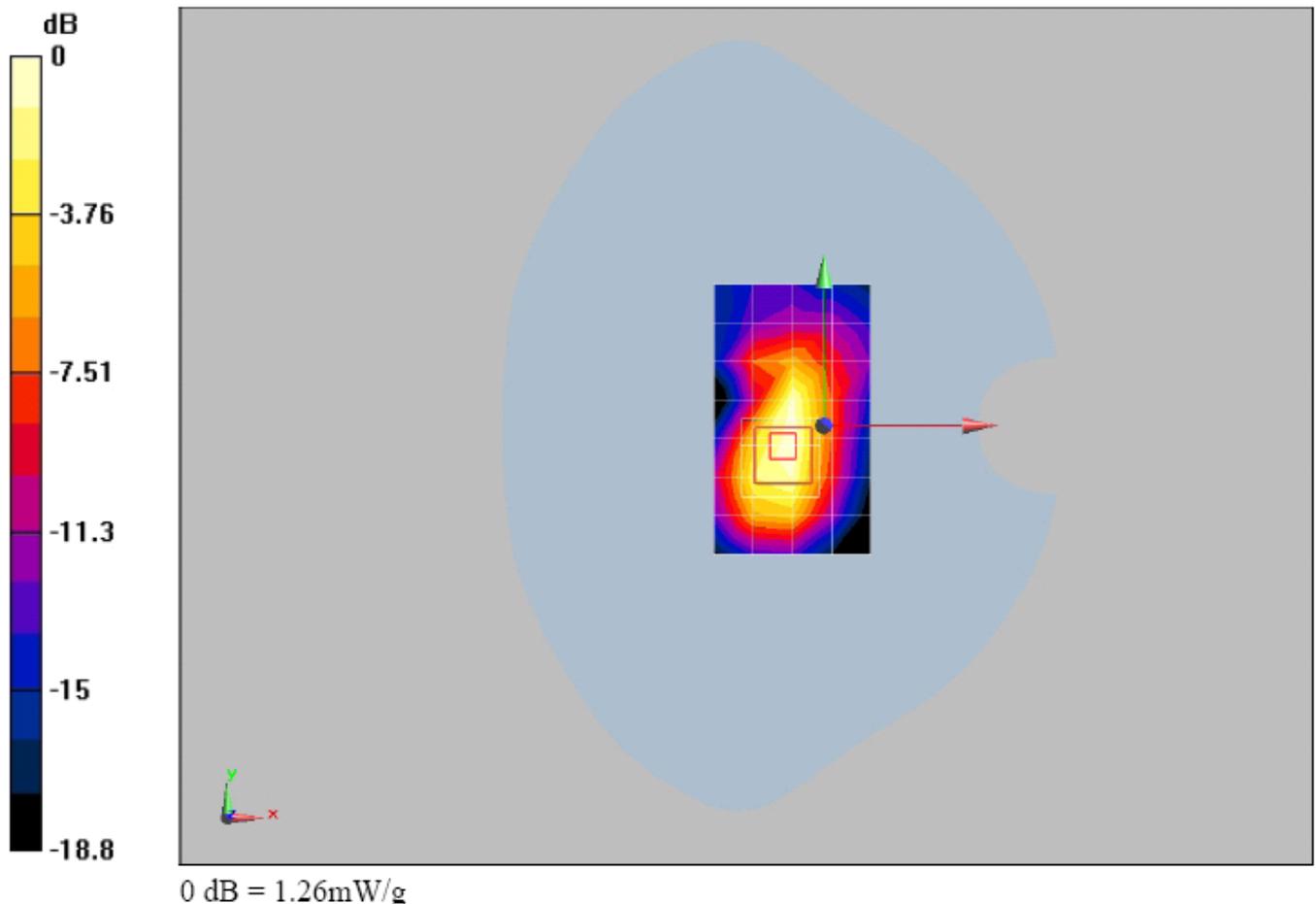
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 27.5 V/m; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 1.9 W/kg

**SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.631 mW/g**

Maximum value of SAR (measured) = 1.26 mW/g



### Additional information:

position or distance of DUT to SAM: 5 mm

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

**Annex 2.2 GSM 850 MHz body**

Date/Time: 2010-06-24 17:50:23

**P1528\_OET65-GPRS (4 timeslots in uplink) with IBM T61 rear side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:2.1

Medium parameters used (interpolated):  $f = 837$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.603 mW/g

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

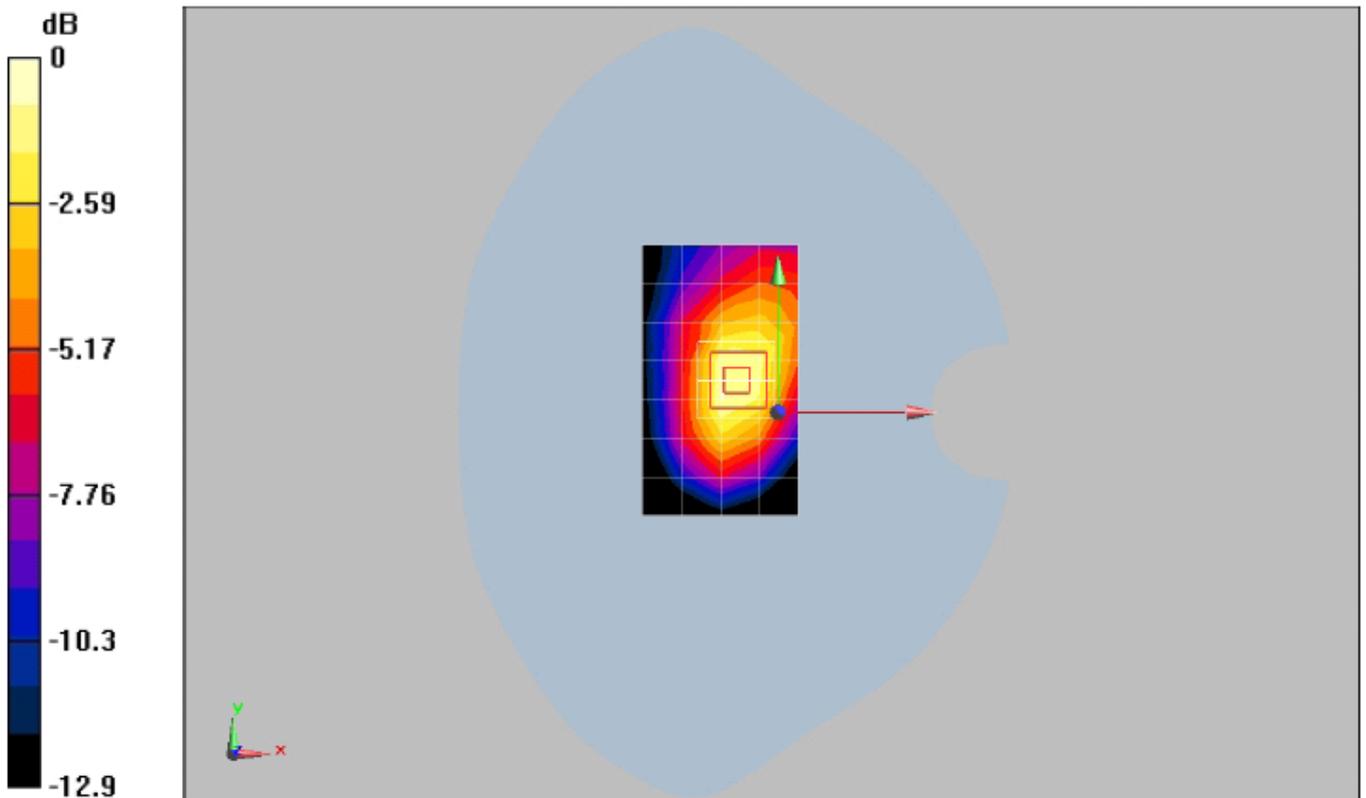
Reference Value = 24.5 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 1.03 W/kg

**SAR(1 g) = 0.654 mW/g; SAR(10 g) = 0.395 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.723 mW/g



0 dB = 0.723mW/g

**Additional information:**

position or distance of DUT to SAM: 5mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 rear side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:2.7

Medium parameters used (interpolated):  $f = 837$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.719 mW/g

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

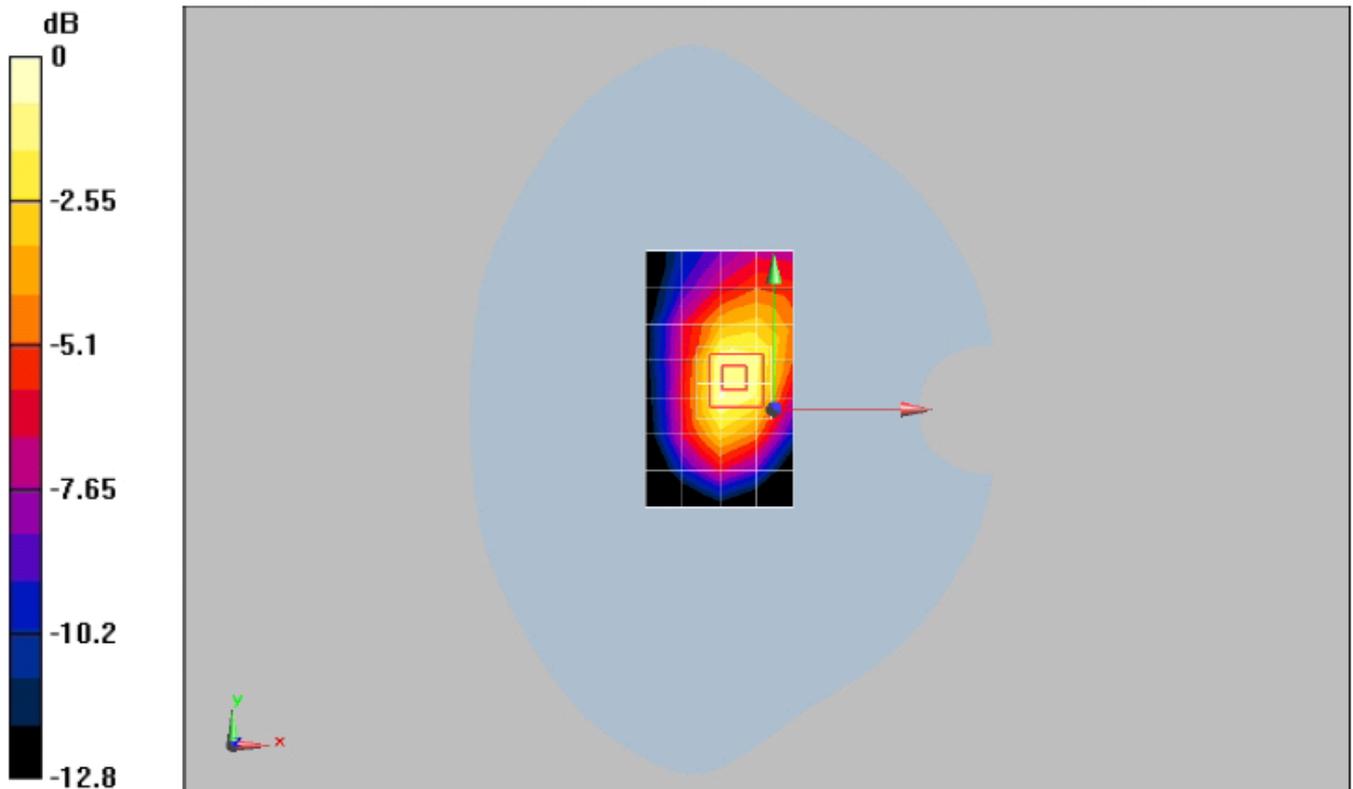
Reference Value = 26.4 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 1.19 W/kg

**SAR(1 g) = 0.769 mW/g; SAR(10 g) = 0.464 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.848 mW/g



0 dB = 0.848mW/g

**Additional information:**

position or distance of DUT to SAM:5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (2 timeslots in uplink) with IBM T61 rear side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 837 MHz; Duty Cycle: 1:4.1

Medium parameters used (interpolated):  $f = 837$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.709 mW/g

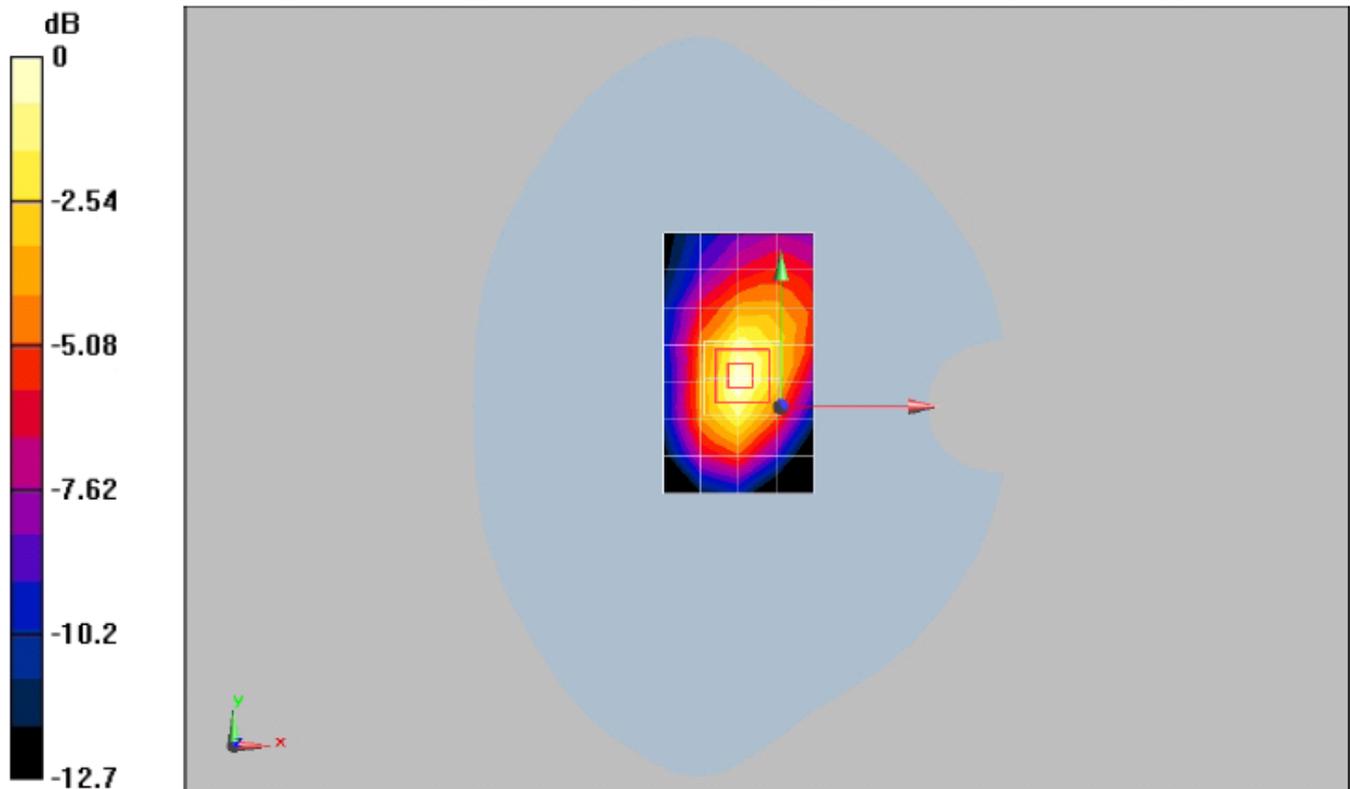
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.2 V/m; Power Drift = 0.039 dB

Peak SAR (extrapolated) = 1.02 W/kg

**SAR(1 g) = 0.651 mW/g; SAR(10 g) = 0.394 mW/g**[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.715 mW/g



0 dB = 0.715mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (1 timeslots in uplink) with IBM T61 rear side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:8.3

Medium parameters used (interpolated):  $f = 837$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.714 mW/g

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

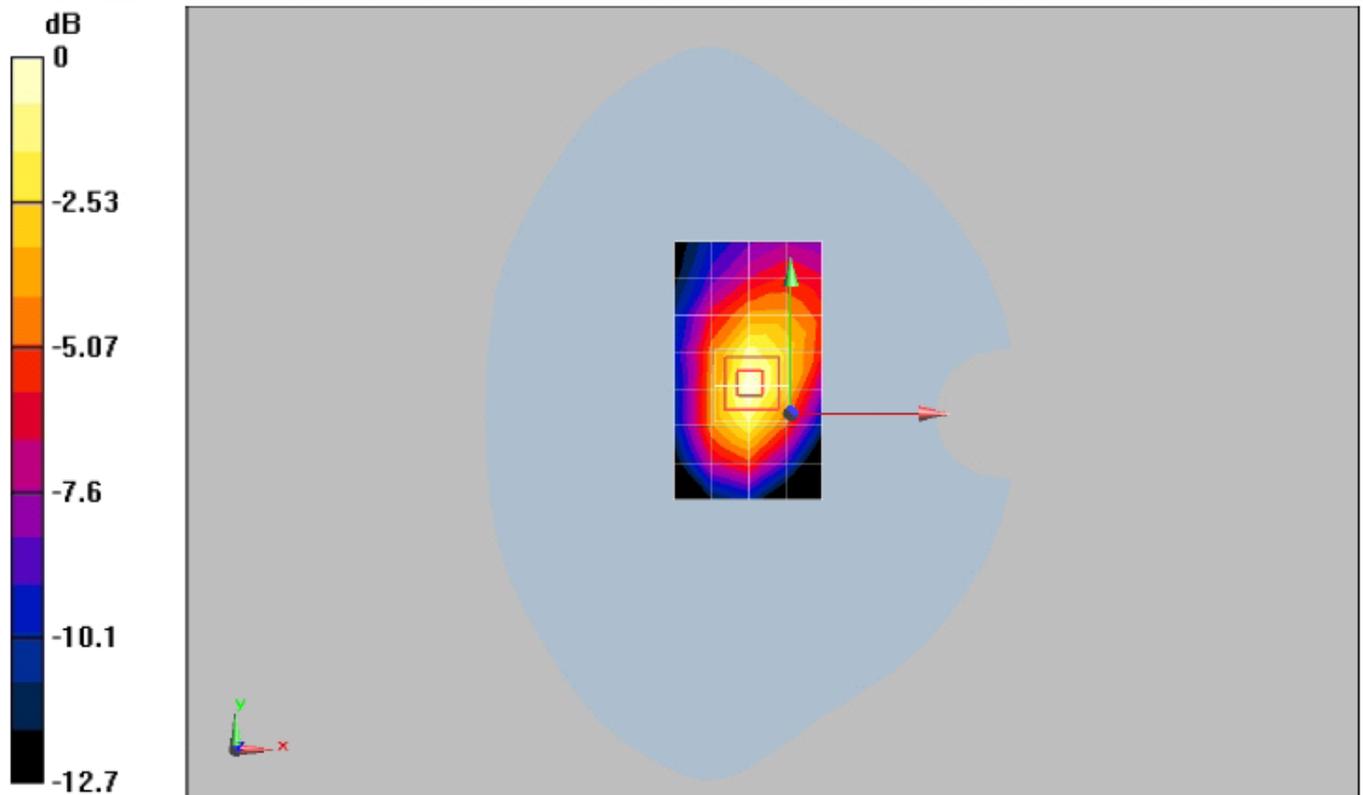
Reference Value = 24.1 V/m; Power Drift = 0.089 dB

Peak SAR (extrapolated) = 1.02 W/kg

**SAR(1 g) = 0.655 mW/g; SAR(10 g) = 0.395 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.724 mW/g



0 dB = 0.724mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM X301 front side-GSM850**

**DUT: E153U-65**

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:2.7

Medium parameters used (interpolated):  $f = 837$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.811 mW/g

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

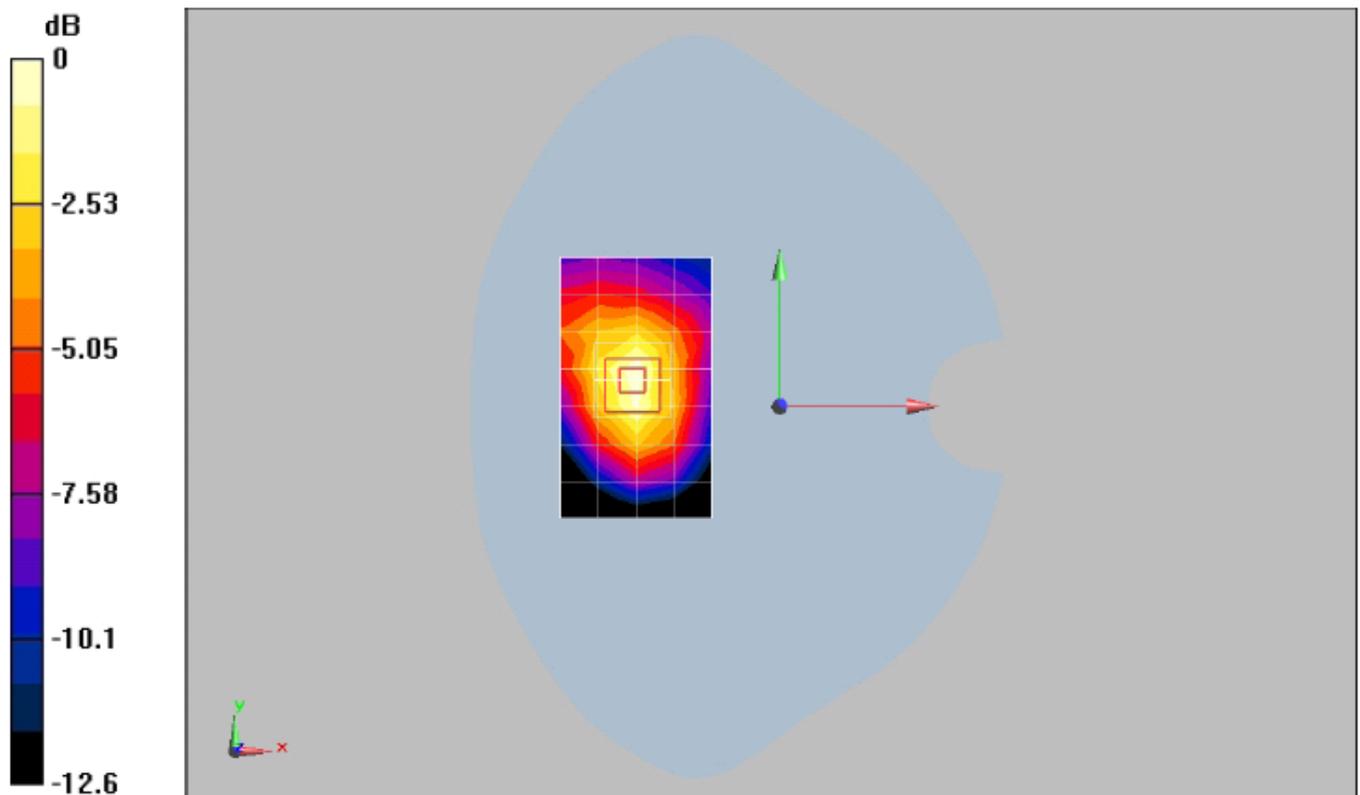
Reference Value = 6.77 V/m; Power Drift = 0.174 dB

Peak SAR (extrapolated) = 1.18 W/kg

**SAR(1 g) = 0.761 mW/g; SAR(10 g) = 0.469 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.838 mW/g



0 dB = 0.838mW/g

**Additional information:**

position or distance of DUT to SAM: 5mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 left side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:2.7

Medium parameters used (interpolated):  $f = 837$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.321 mW/g

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

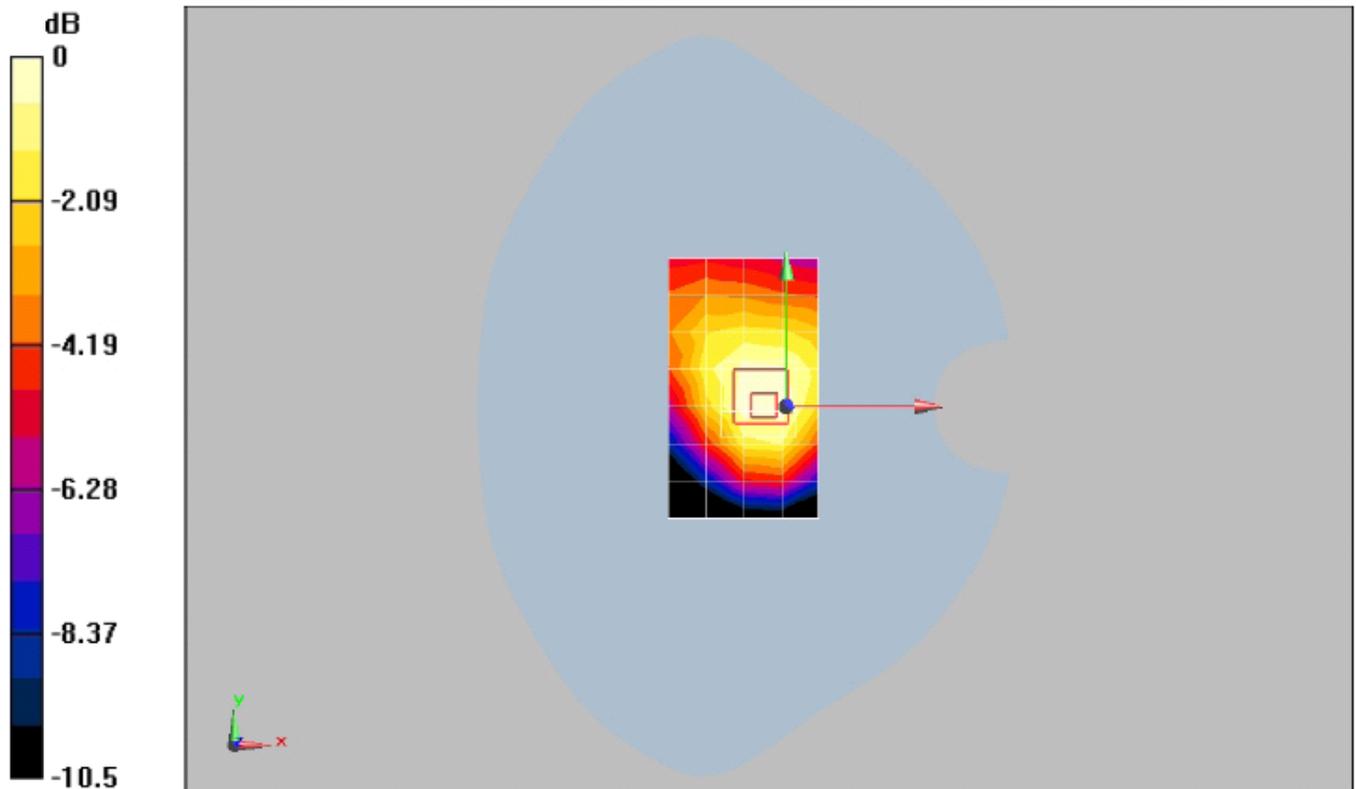
Reference Value = 18.2 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 0.465 W/kg

**SAR(1 g) = 0.315 mW/g; SAR(10 g) = 0.214 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.337 mW/g



0 dB = 0.337mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 right side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 837 MHz;Duty Cycle: 1:2.7

Medium parameters used (interpolated):  $f = 837$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.638 mW/g

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

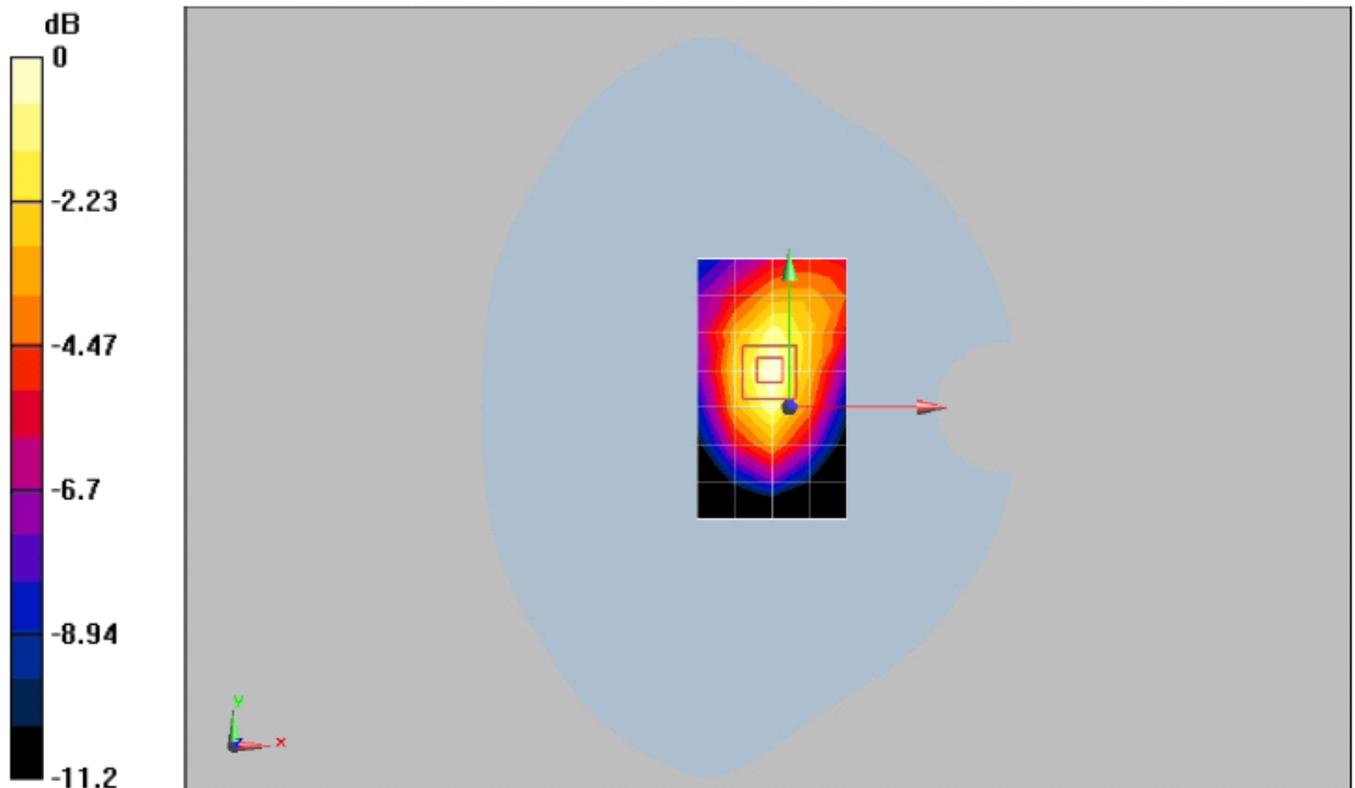
Reference Value = 20.5 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 0.880 W/kg

**SAR(1 g) = 0.577 mW/g; SAR(10 g) = 0.362 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.633 mW/g



0 dB = 0.633mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 rear side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:2.7

Medium parameters used:  $f = 825$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.788 mW/g

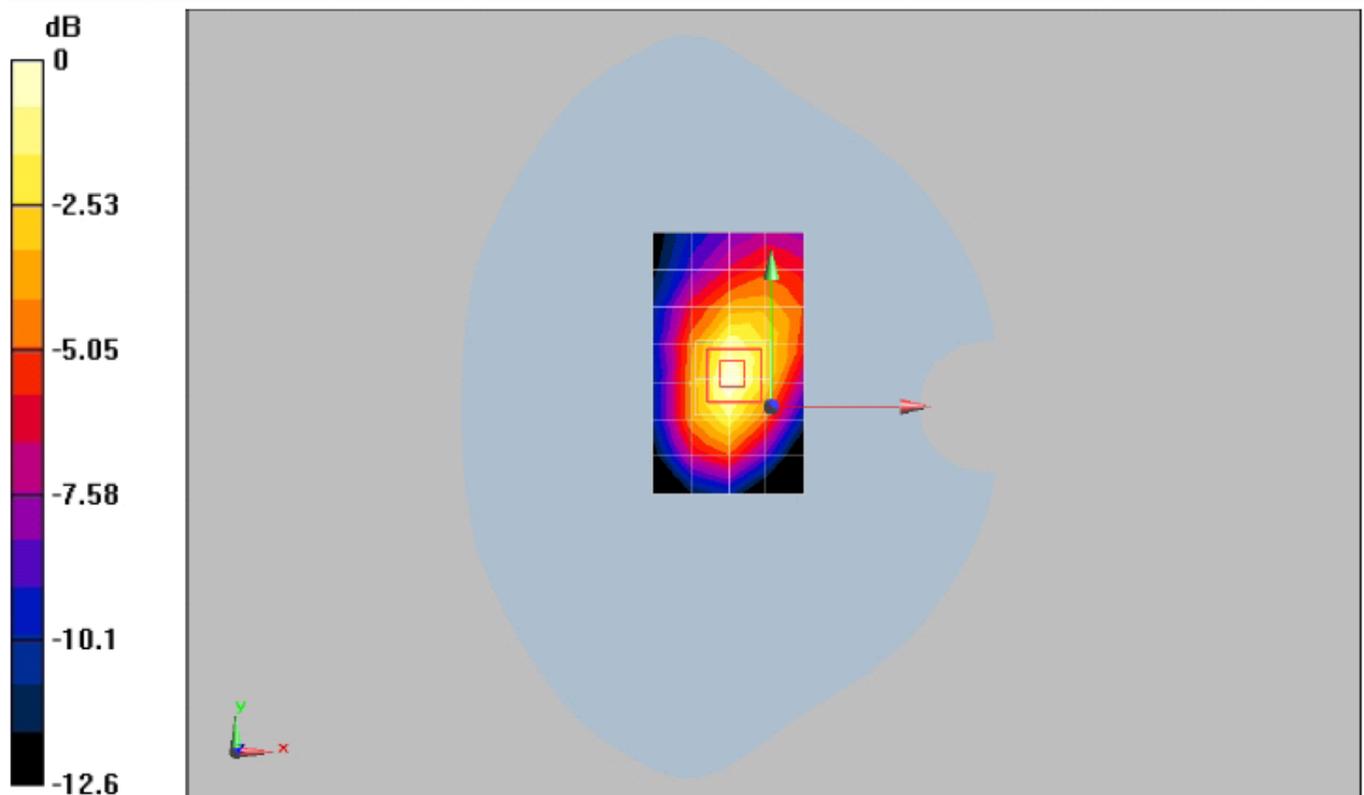
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 25.6 V/m; Power Drift = -0.029 dB

Peak SAR (extrapolated) = 1.1 W/kg

**SAR(1 g) = 0.714 mW/g; SAR(10 g) = 0.434 mW/g**

Maximum value of SAR (measured) = 0.785 mW/g



0 dB = 0.785mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-GPRS (3 timeslots in uplink) with IBM T61 rear side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:2.7

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 1.03$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.865 mW/g

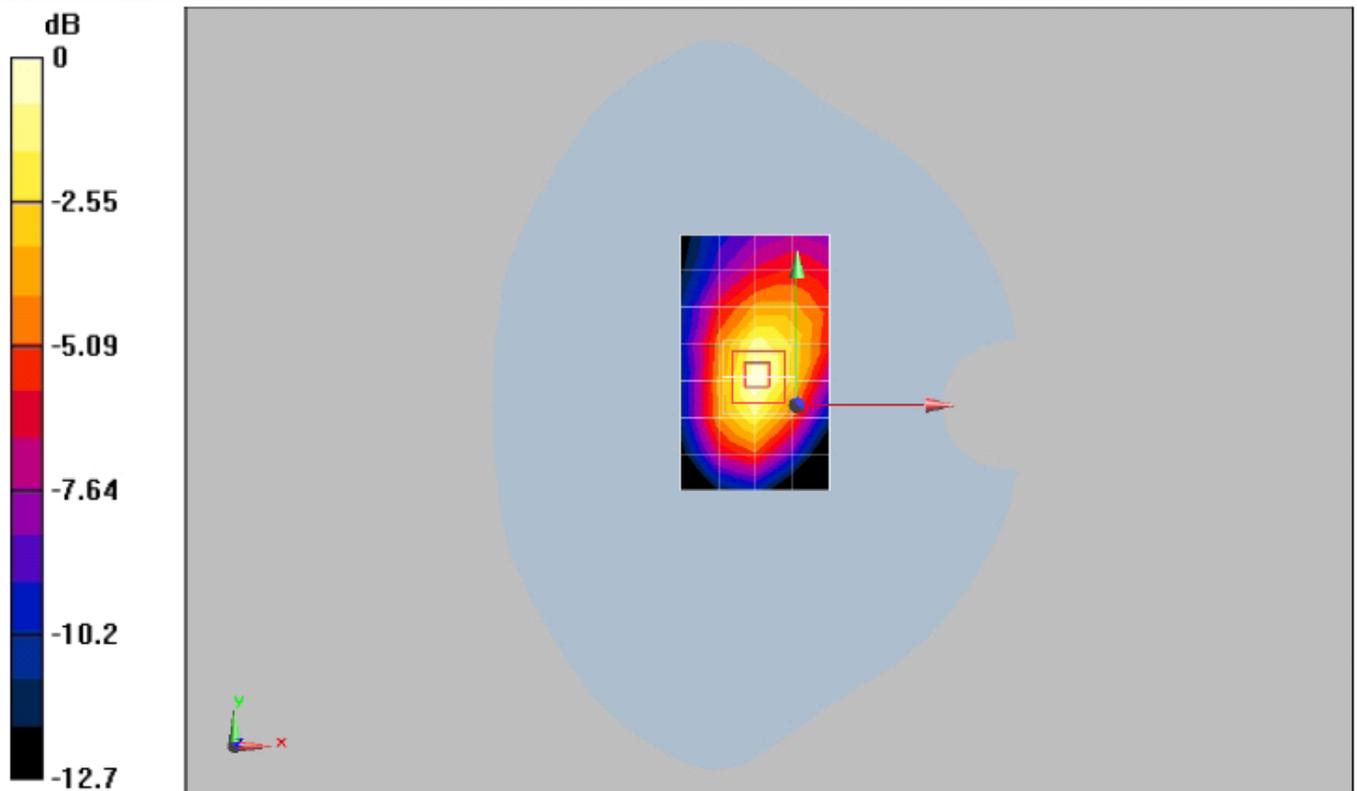
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.6 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 1.25 W/kg

**SAR(1 g) = 0.791 mW/g; SAR(10 g) = 0.477 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)



0 dB = 0.865mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-EGPRS (3 timeslots in uplink) with IBM T61 rear side-GSM850**

DUT: E153U-65

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:2.7

Medium parameters used (interpolated):  $f = 848.8$  MHz;  $\sigma = 1.03$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.873 mW/g

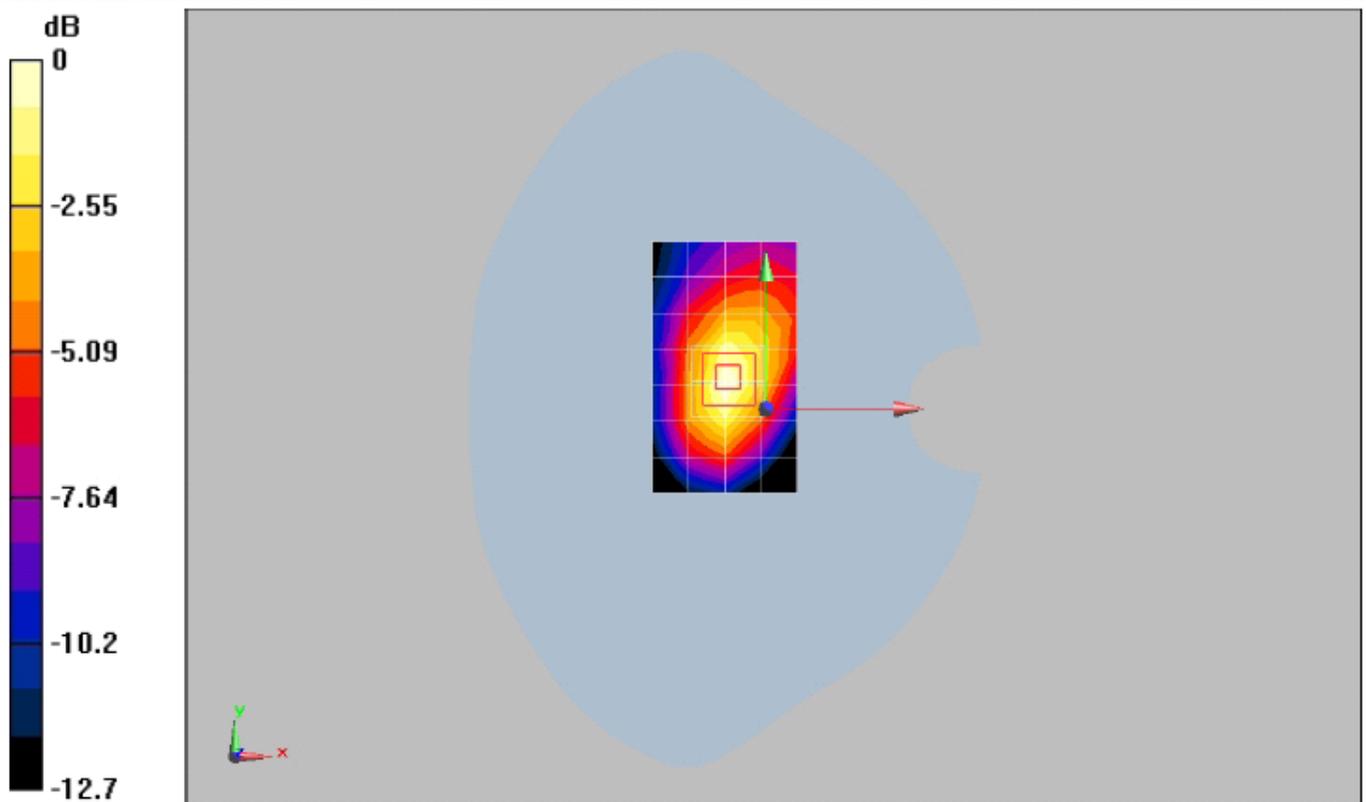
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 26.8 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 1.25 W/kg

**SAR(1 g) = 0.796 mW/g; SAR(10 g) = 0.480 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)



0 dB = 0.873mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**Annex 2.3 WCDMA 1900 MHz body**

Date/Time: 2010-06-24 08:54:21

**P1528\_OET65-WCDMA with IBM T61 rear side-WCDMA1900**

DUT: E153U-65

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.869 mW/g

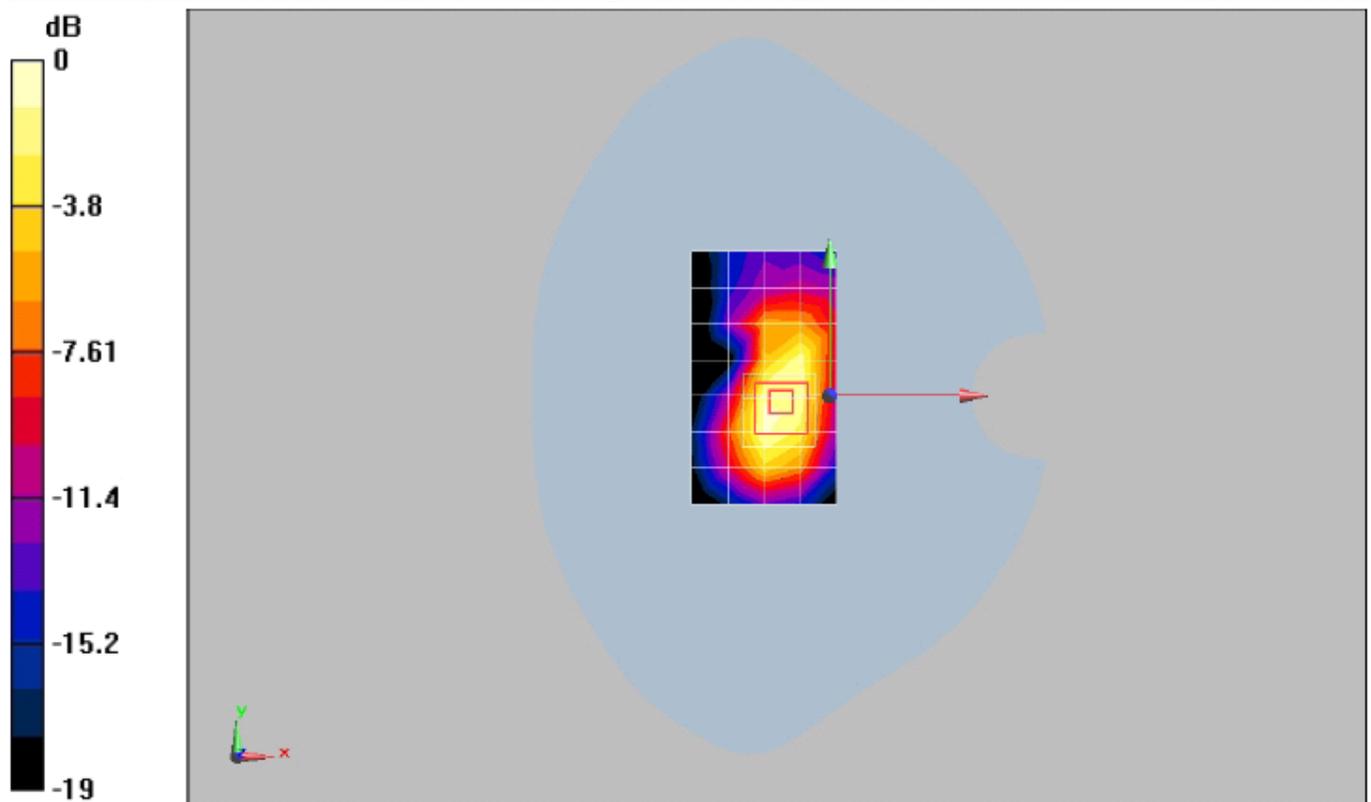
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 27.7 V/m; Power Drift = -0.094 dB

Peak SAR (extrapolated) = 1.66 W/kg

**SAR(1 g) = 0.971 mW/g; SAR(10 g) = 0.538 mW/g**

Maximum value of SAR (measured) = 1.09 mW/g



0 dB = 1.09mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.4 °C

**P1528\_OET65-WCDMA with IBM X301 front side-WCDMA1900**

DUT: E153U-65

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.630 mW/g

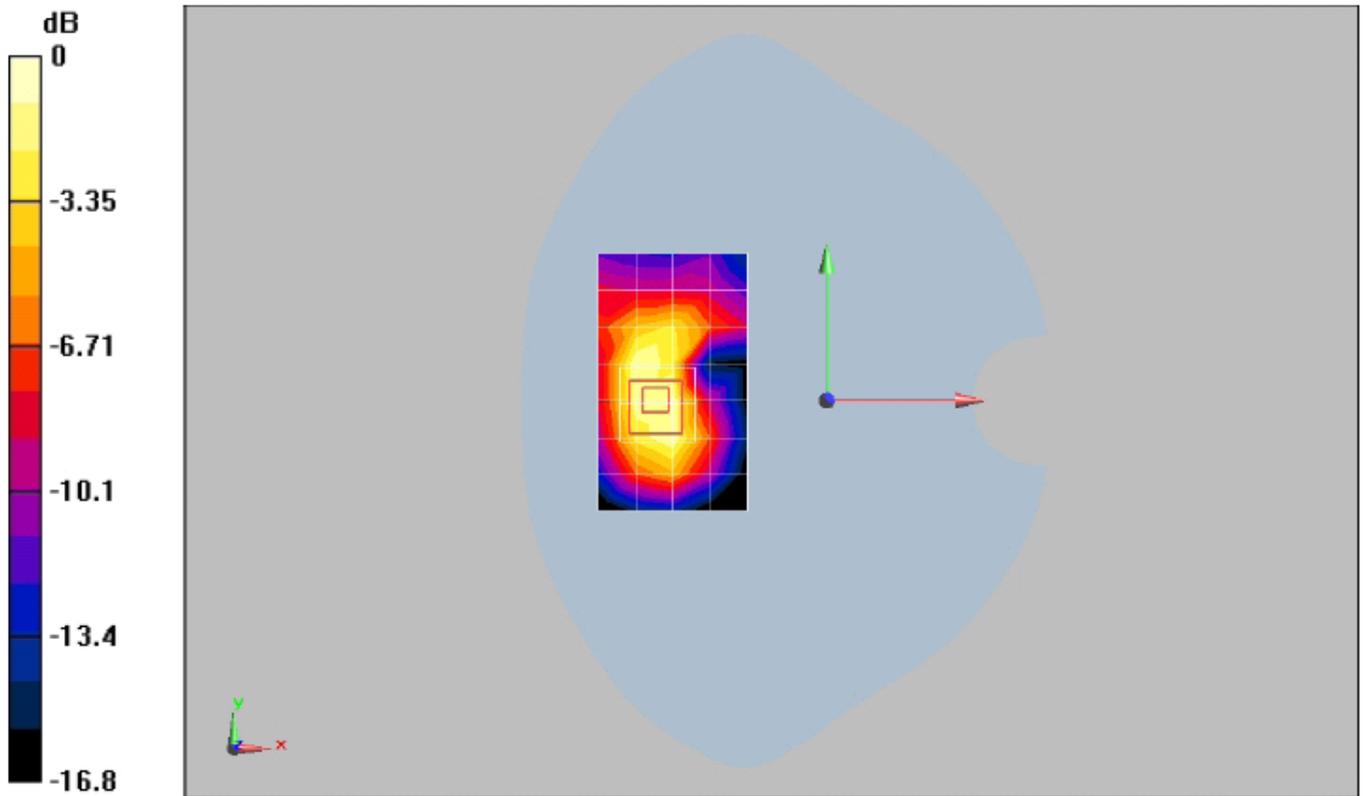
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.22 V/m; Power Drift = 0.036 dB

Peak SAR (extrapolated) = 1.24 W/kg

**SAR(1 g) = 0.711 mW/g; SAR(10 g) = 0.405 mW/g**

Maximum value of SAR (measured) = 0.790 mW/g



0 dB = 0.790mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.4 °C

**P1528\_OET65-WCDMA with IBM T61 left side-WCDMA1900**

**DUT: E153U-65**

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1  
Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.216 mW/g

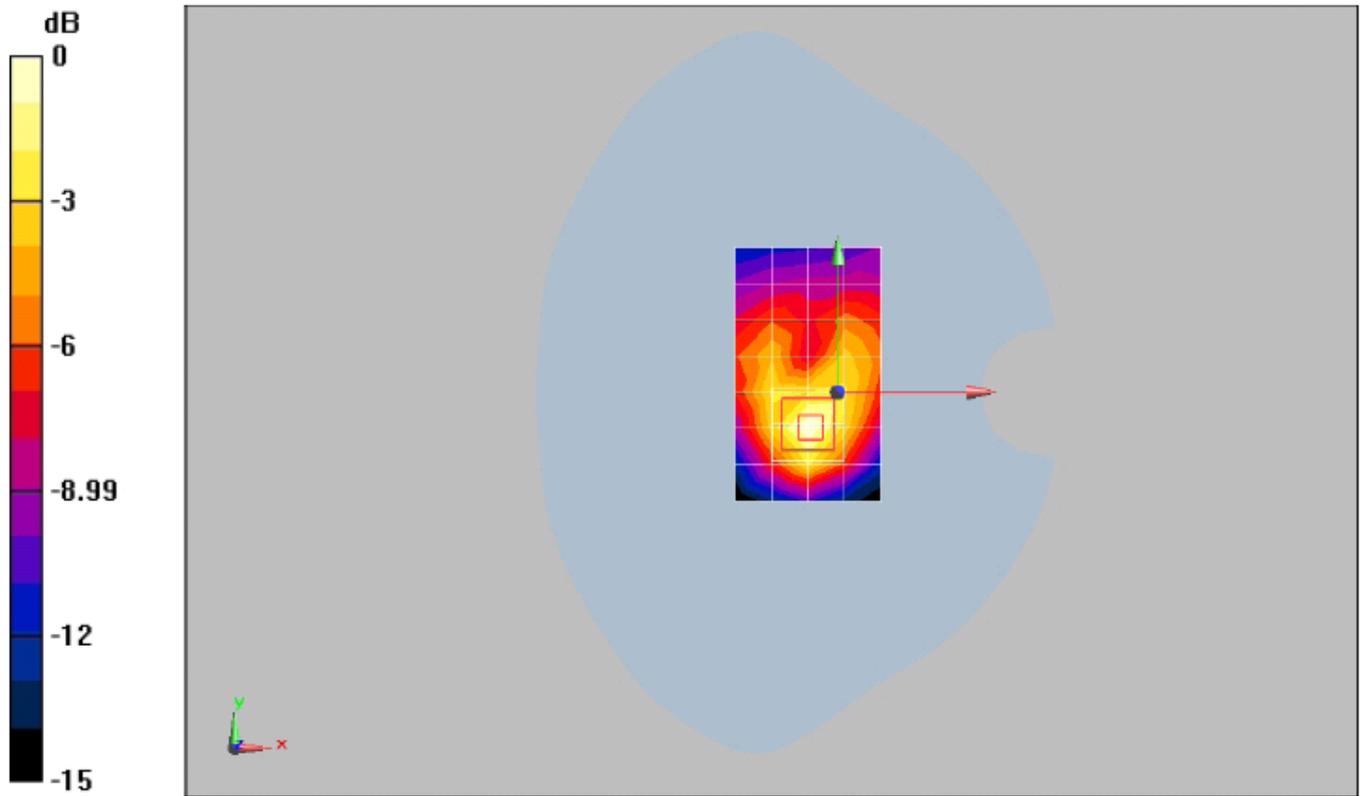
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.97 V/m; Power Drift = 0.188 dB

Peak SAR (extrapolated) = 0.330 W/kg

**SAR(1 g) = 0.195 mW/g; SAR(10 g) = 0.109 mW/g**

Maximum value of SAR (measured) = 0.217 mW/g



0 dB = 0.217mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.4 °C

**P1528\_OET65-WCDMA with IBM T61 right side-WCDMA1900**

DUT: E153U-65

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.550 mW/g

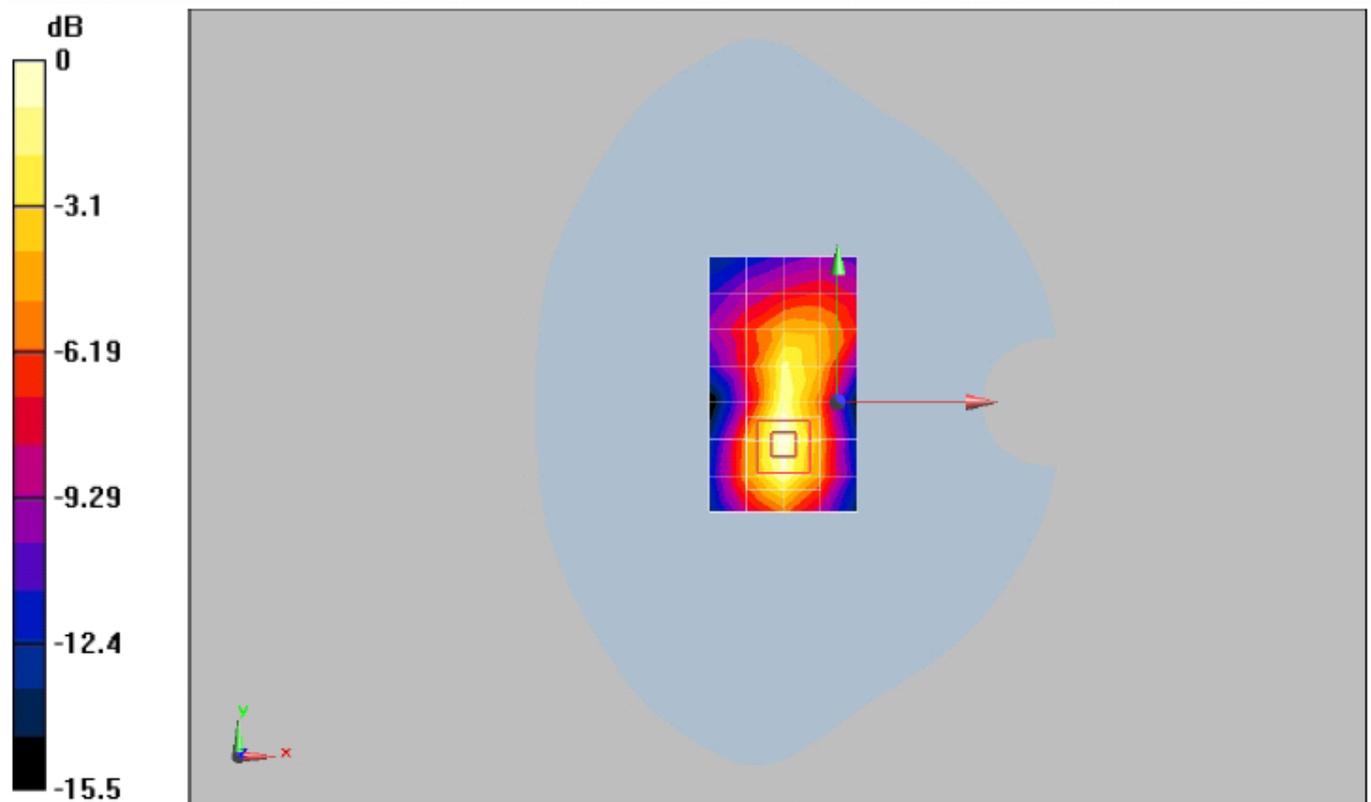
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.3 V/m; Power Drift = -0.170 dB

Peak SAR (extrapolated) = 0.806 W/kg

**SAR(1 g) = 0.490 mW/g; SAR(10 g) = 0.276 mW/g**

Maximum value of SAR (measured) = 0.545 mW/g



0 dB = 0.545mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.4 °C

### P1528\_OET65-WCDMA with IBM T61 rear side-WCDMA1900

DUT: E153U-65

Communication System: WCDMA1900; Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1852.4$  MHz;  $\sigma = 1.44$  mho/m;  $\epsilon_r = 54.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.984 mW/g

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

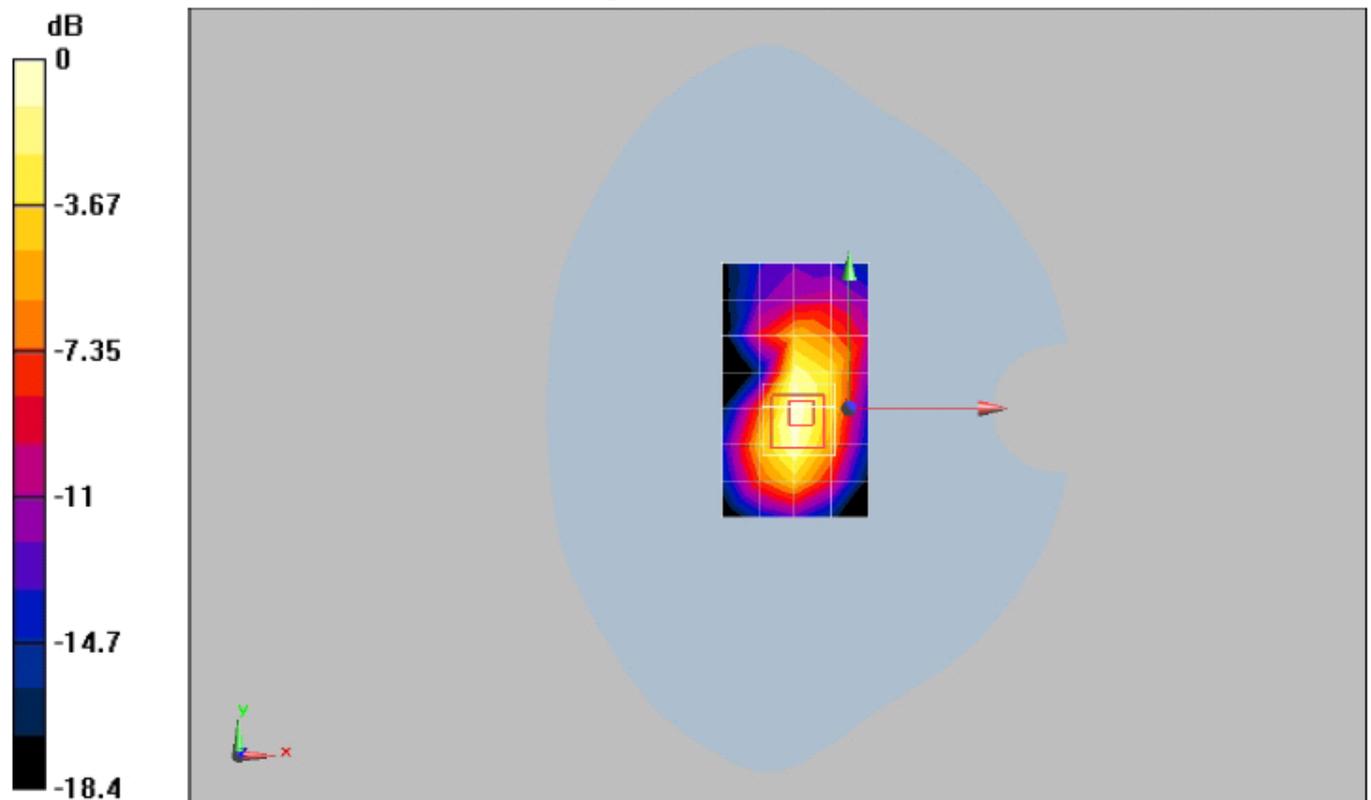
Reference Value = 26.8 V/m; Power Drift = 0.084 dB

Peak SAR (extrapolated) = 1.55 W/kg

**SAR(1 g) = 0.915 mW/g; SAR(10 g) = 0.509 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.03 mW/g



0 dB = 1.03mW/g

#### Additional information:

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.4 °C

**P1528\_OET65-WCDMA with IBM T61 rear side-WCDMA1900**

DUT: E153U-65

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1907.6$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 54.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.15 mW/g

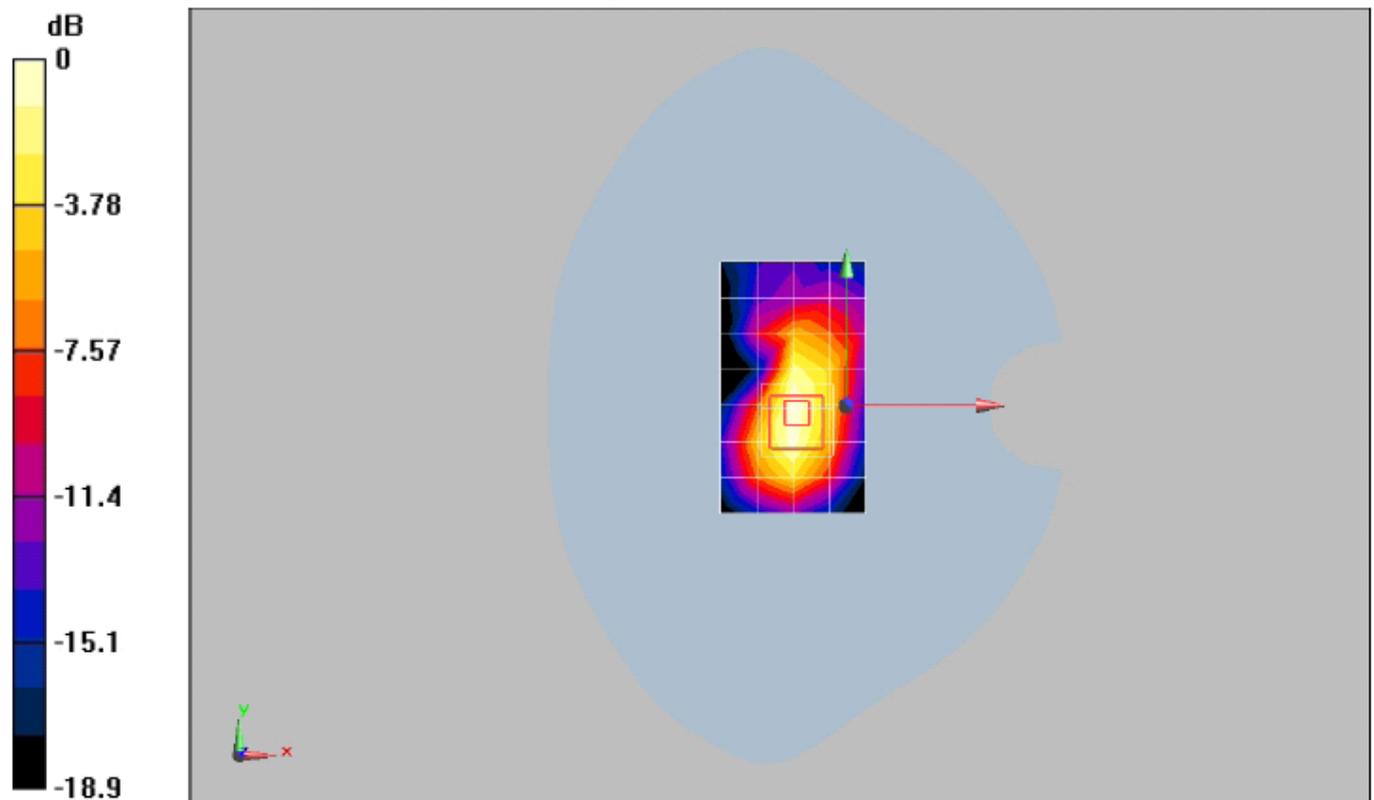
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 28.2 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 1.78 W/kg

**SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.592 mW/g**[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.19 mW/g



0 dB = 1.19mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.4 °C

**P1528\_OET65-HSDPA with IBM T61 rear side-WCDMA1900**

DUT: E153U-65

Communication System: WCDMA1900; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 1907.6$  MHz;  $\sigma = 1.51$  mho/m;  $\epsilon_r = 54.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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 (5x8x1):** Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.17 mW/g

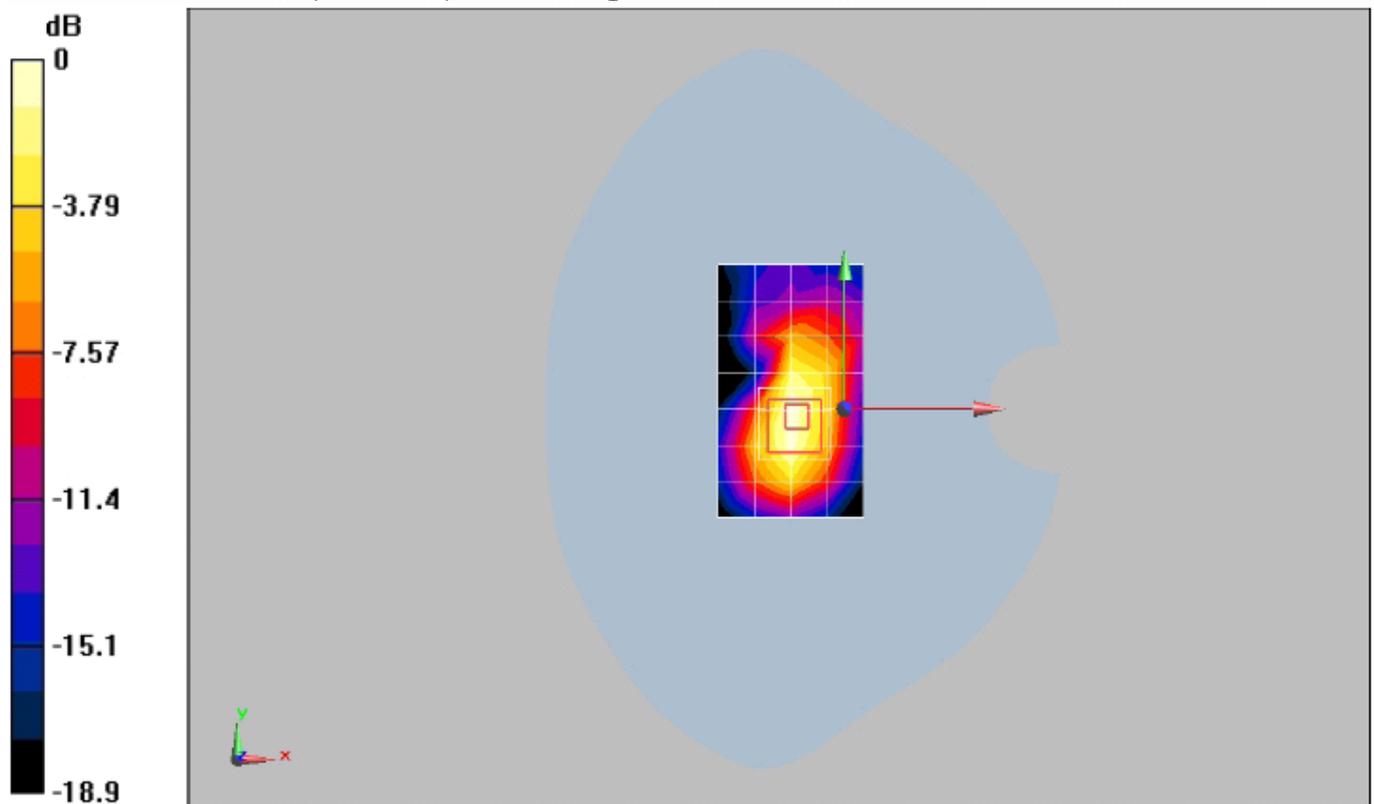
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 28.3 V/m; Power Drift = 0.170 dB

Peak SAR (extrapolated) = 1.87 W/kg

**SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.622 mW/g**[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 1.25 mW/g



0 dB = 1.25mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.4 °C

**Annex 2.4 WCDMA 850 MHz body**

Date/Time: 2010-06-25 05:23:15

**P1528\_OET65-WCDMA with IBM T61 rear side-WCDMA850**

DUT: E153U-65

Communication System: WCDMA850; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.643 mW/g

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

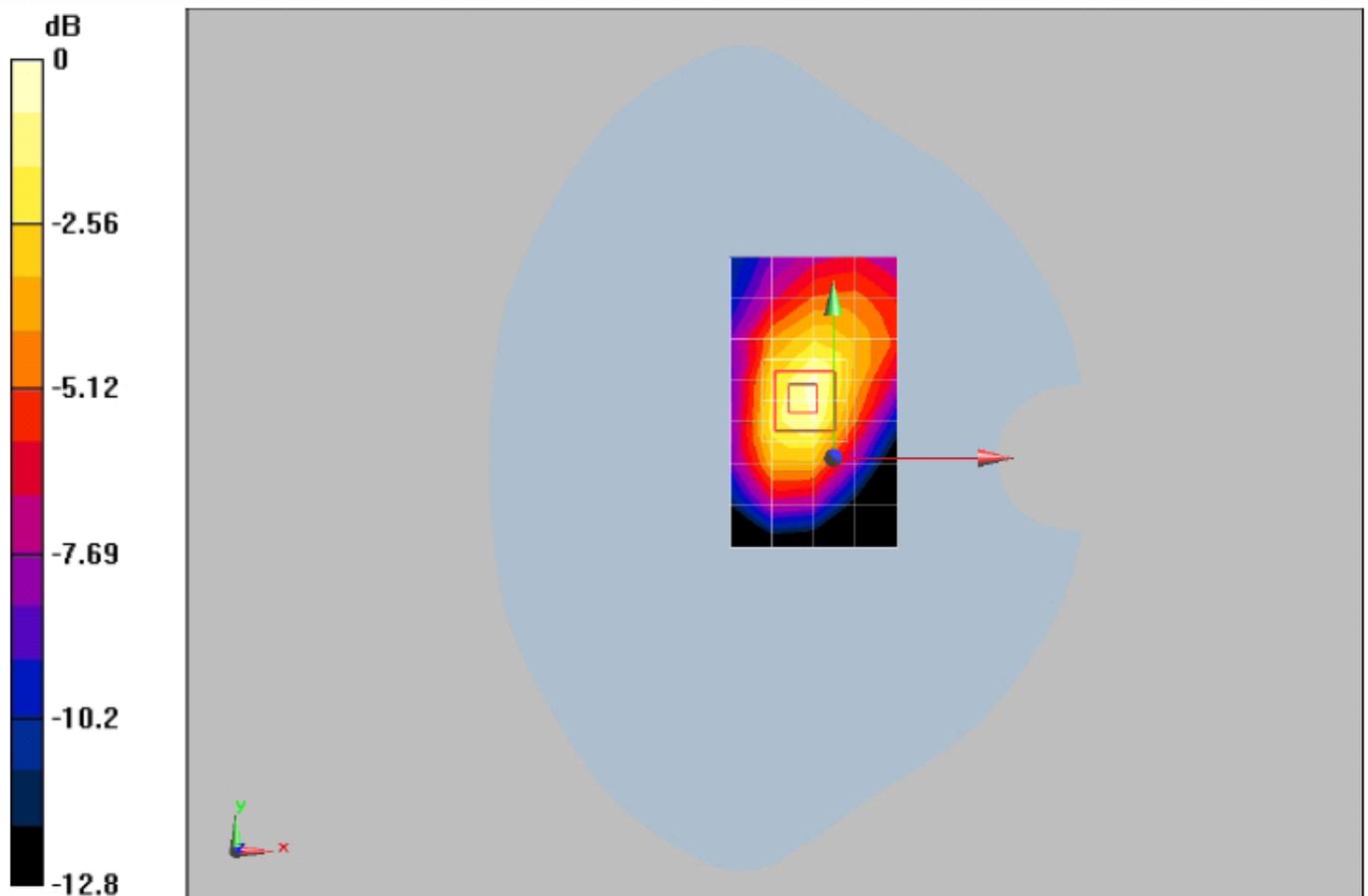
Reference Value = 20.1 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 1.02 W/kg

**SAR(1 g) = 0.650 mW/g; SAR(10 g) = 0.392 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.719 mW/g



0 dB = 0.719mW/g

**Additional information:**

position or distance of DUT to SAM:5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-WCDMA with IBM X301 front side-WCDMA850**

DUT: E153U-65

Communication System: WCDMA850; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.675 mW/g

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

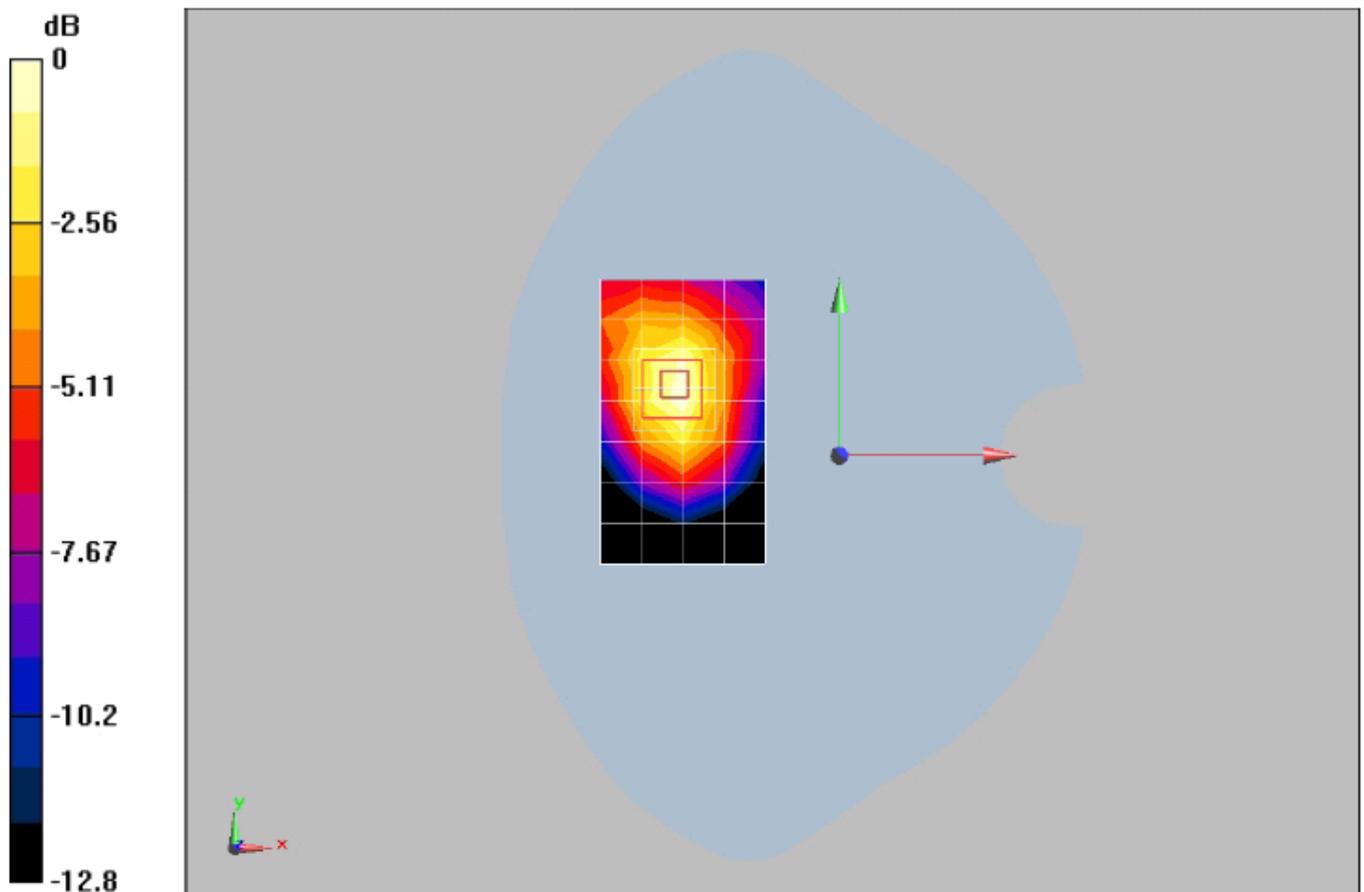
Reference Value = 4.59 V/m; Power Drift = 0.117 dB

Peak SAR (extrapolated) = 1.01 W/kg

**SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.397 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.714 mW/g



0 dB = 0.714mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-WCDMA with IBM T61 left side-WCDMA850**

DUT: E153U-65

Communication System: WCDMA850; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.297 mW/g

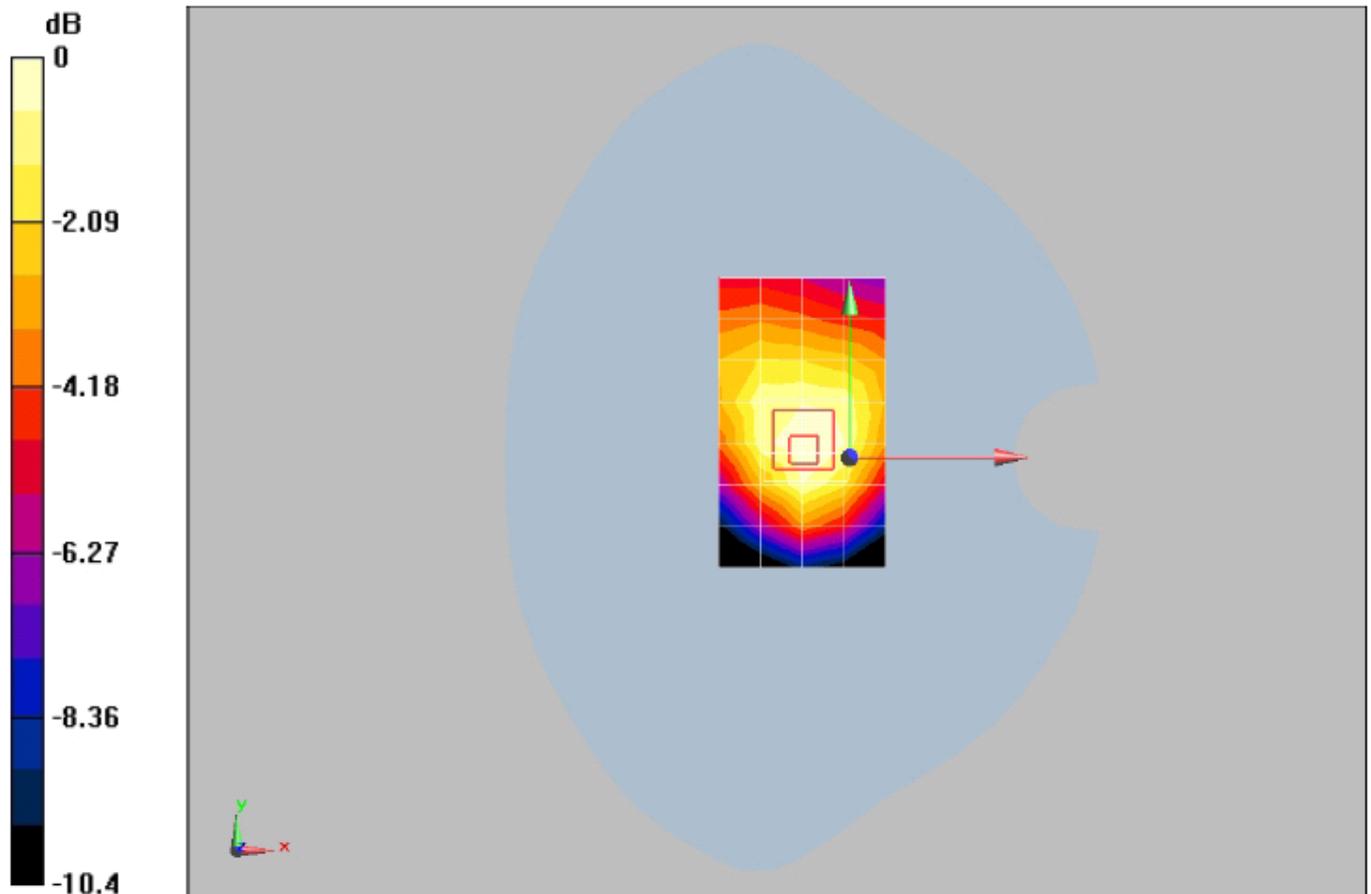
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.4 V/m; Power Drift = -0.059 dB

Peak SAR (extrapolated) = 0.411 W/kg

**SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.188 mW/g**[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.299 mW/g



0 dB = 0.299mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-WCDMA with IBM T61 right side-WCDMA850****DUT: E153U-65**

Communication System: WCDMA850; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.453 mW/g

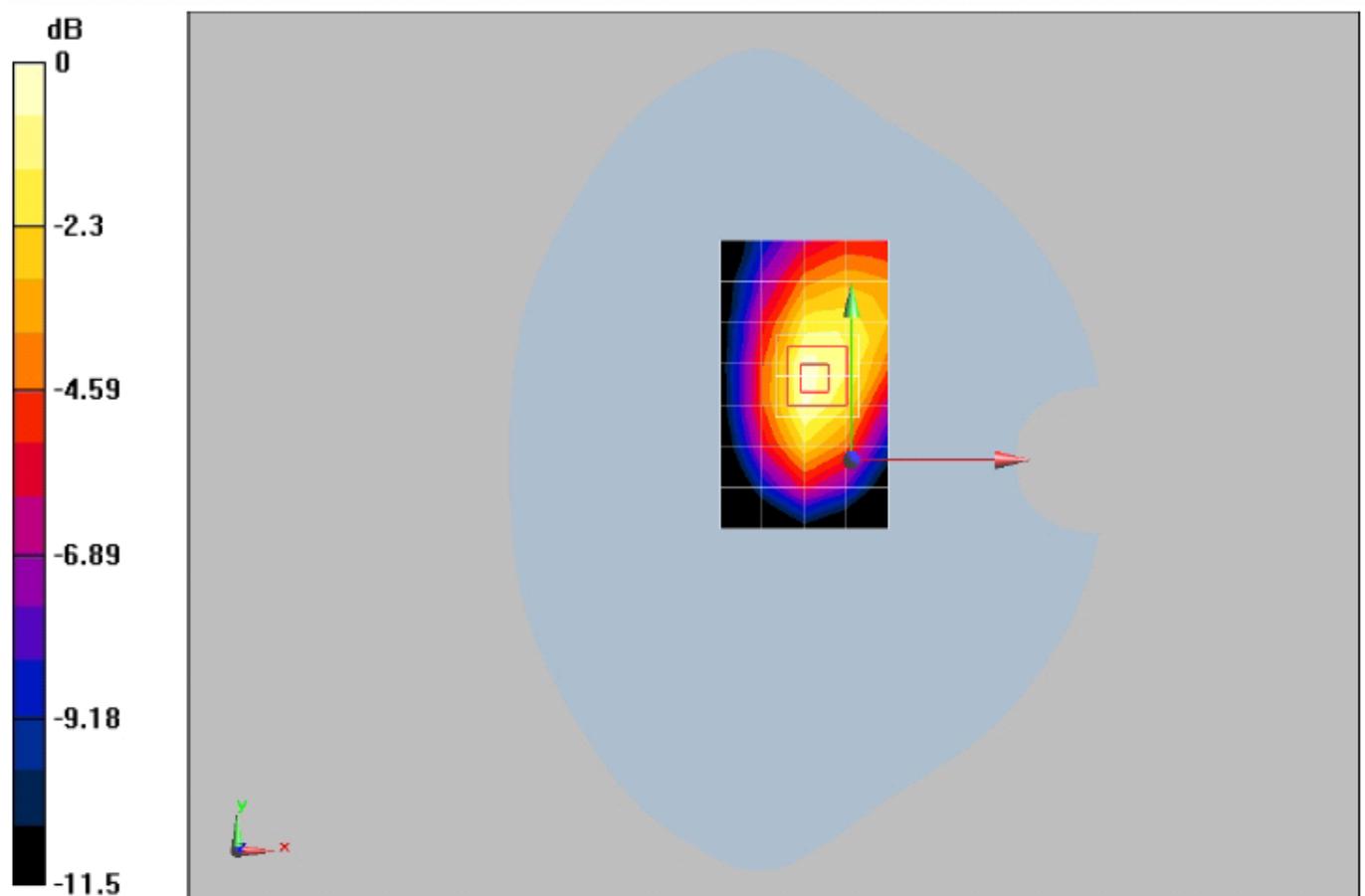
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.4 V/m; Power Drift = 0.043 dB

Peak SAR (extrapolated) = 0.706 W/kg

**SAR(1 g) = 0.460 mW/g; SAR(10 g) = 0.288 mW/g**[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.500 mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

Test report no.: SYBH(Z-SAR)014062010

Date/Time: 2010-06-25 10:23:27

**P1528\_OET65-WCDMA with IBM T61 rear side-WCDMA850**

**DUT: E153U-65**

Communication System: WCDMA850; Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 826.4$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon_r = 54.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.575 mW/g

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

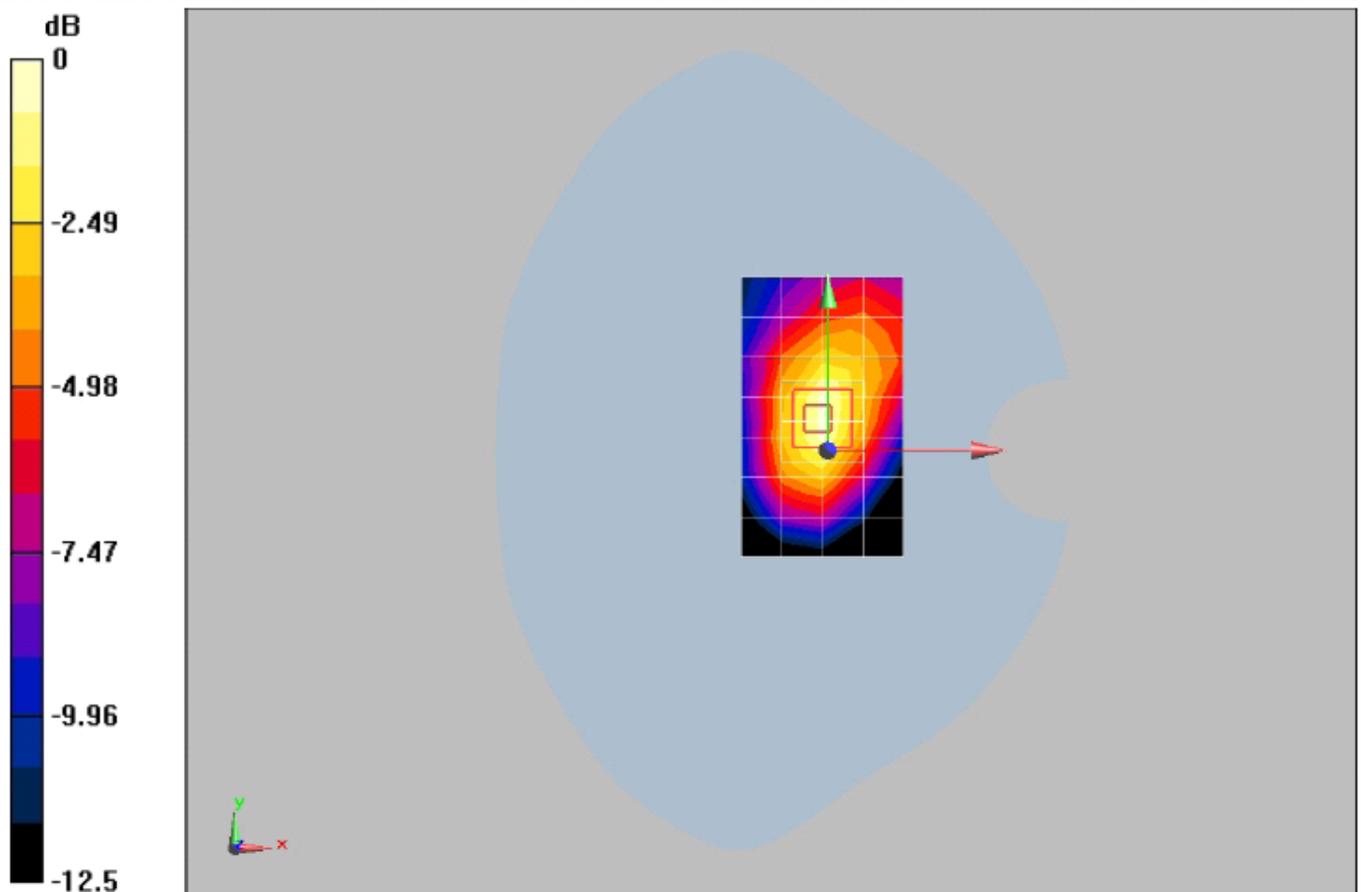
Reference Value = 17.8 V/m; Power Drift = -0.164 dB

Peak SAR (extrapolated) = 0.921 W/kg

**SAR(1 g) = 0.585 mW/g; SAR(10 g) = 0.351 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.644 mW/g



0 dB = 0.644mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-WCDMA with IBM T61 rear side-WCDMA850****DUT: E153U-65**

Communication System: WCDMA850; Frequency: 846.6 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 846.6$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.631 mW/g

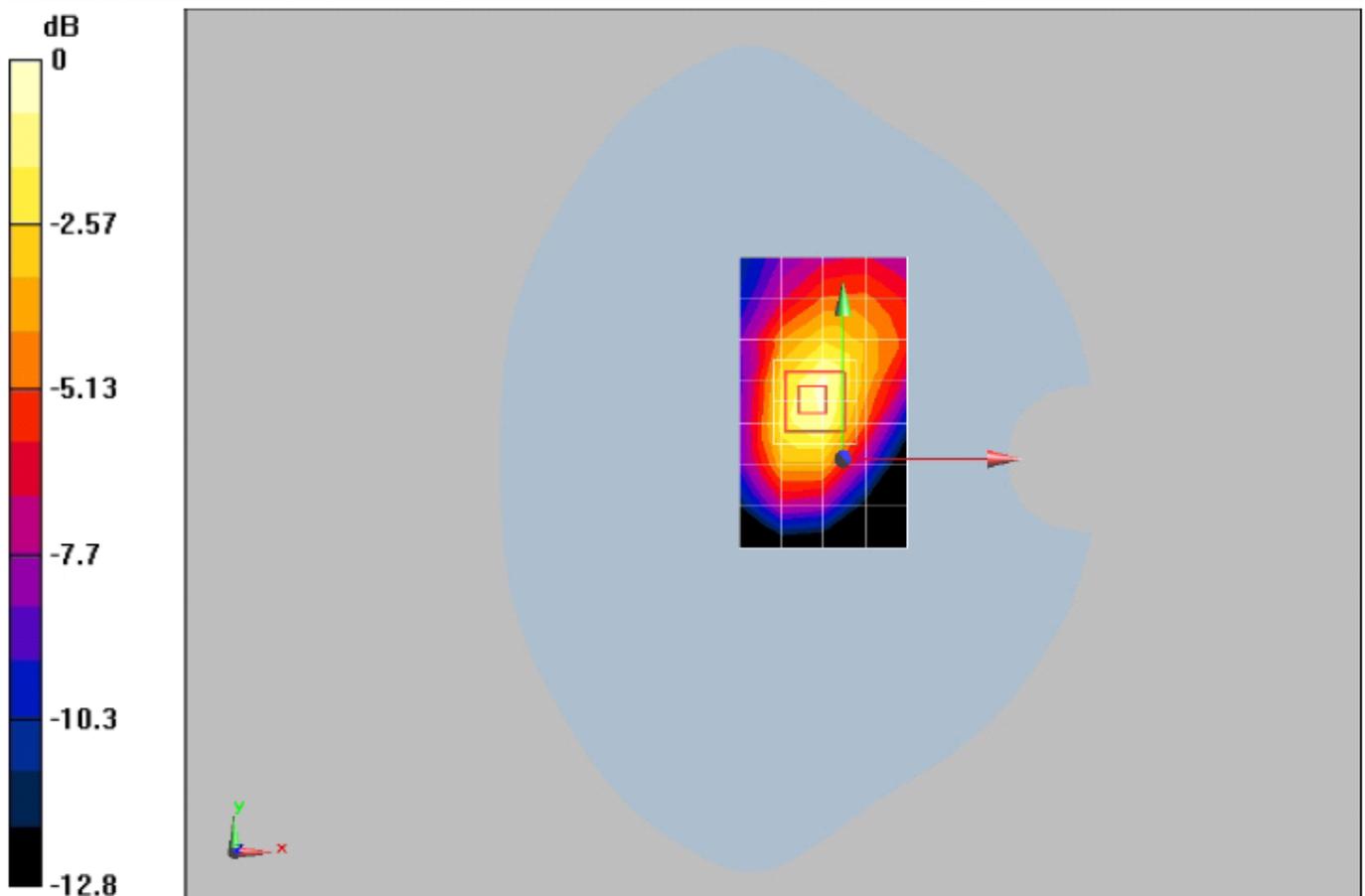
**body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.9 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 1.01 W/kg

**SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.388 mW/g**[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.709 mW/g



0 dB = 0.709mW/g

**Additional information:**

position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

**P1528\_OET65-HSDPA with IBM T61 rear side-WCDMA850**

DUT: E153U-65

Communication System: WCDMA850; Frequency: 836.4 MHz; Duty Cycle: 1:1

Medium parameters used (interpolated):  $f = 836.4$  MHz;  $\sigma = 1.02$  mho/m;  $\epsilon_r = 54.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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

**body/Area Scan (5x8x1):** Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.637 mW/g

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

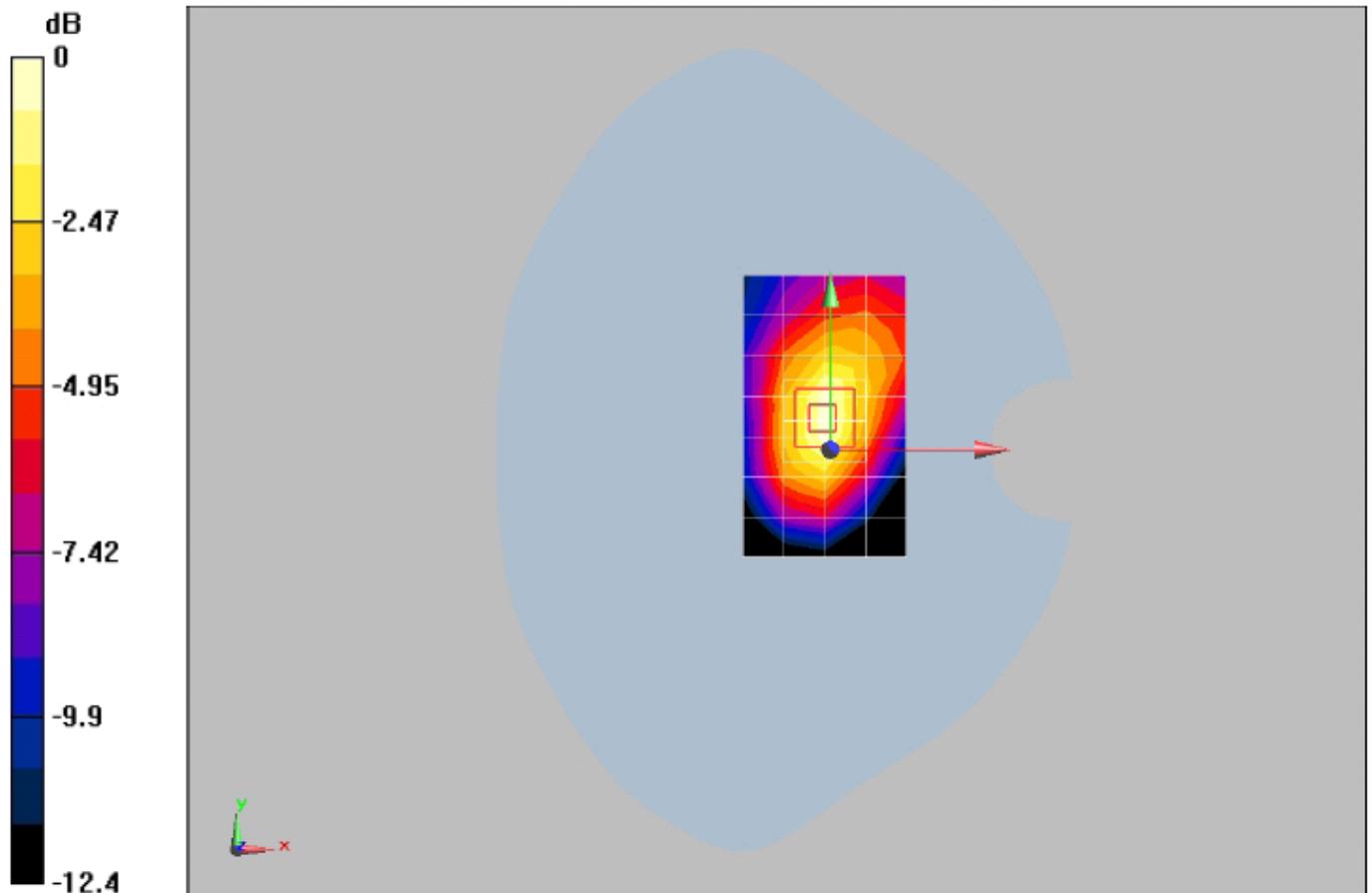
Reference Value = 18.6 V/m; Power Drift = -0.144 dB

Peak SAR (extrapolated) = 0.983 W/kg

**SAR(1 g) = 0.627 mW/g; SAR(10 g) = 0.379 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.688 mW/g



0 dB = 0.688mW/g

**Additional information:**

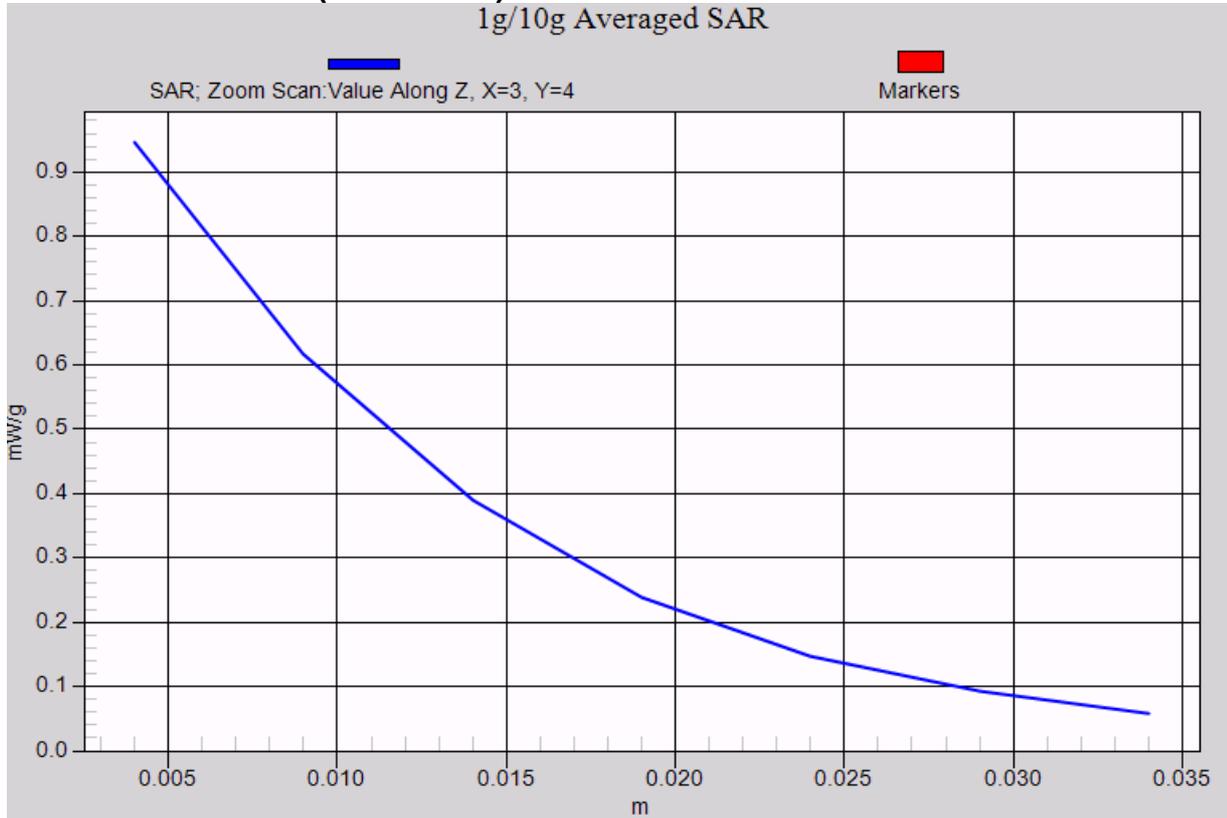
position or distance of DUT to SAM: 5 mm

ambient temperature: 23.0 °C; liquid temperature: 22.2°C

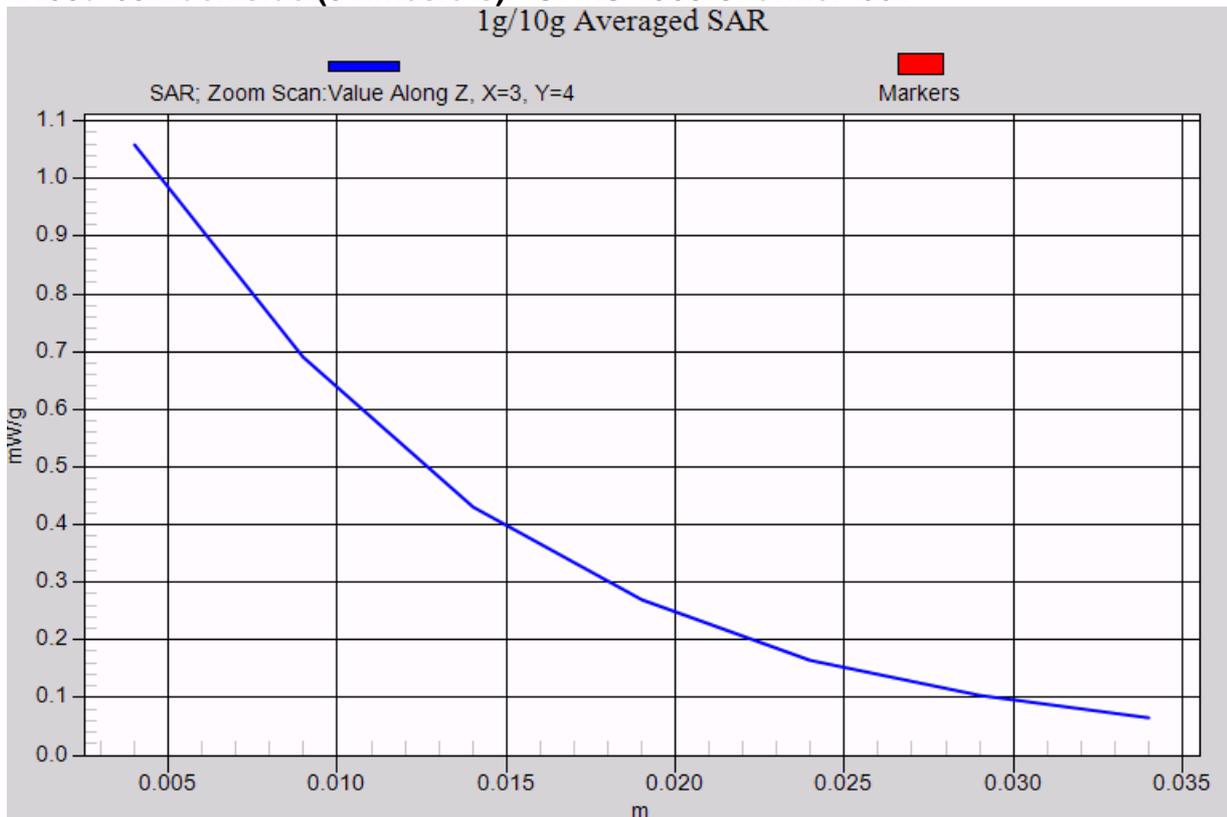
**Annex 2.5 Z-axis scans**

**GSM 1900**

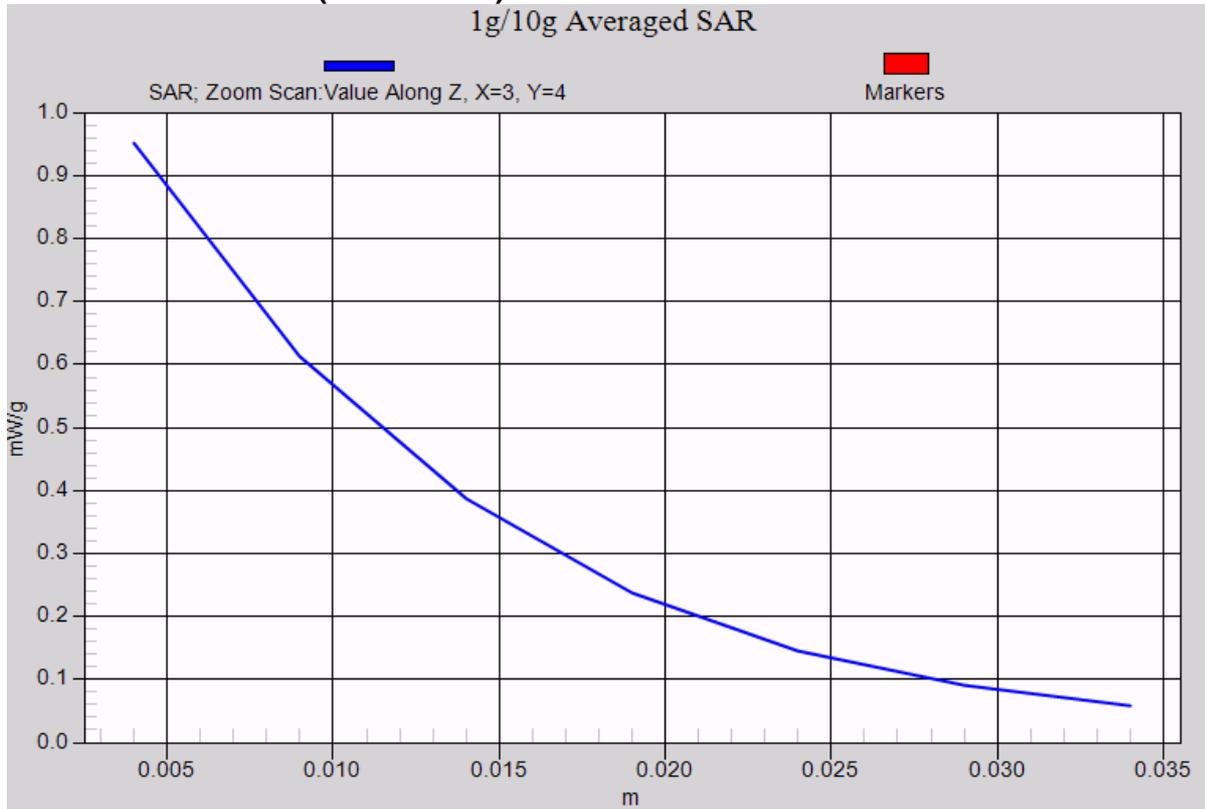
**E153u-65 Back side (4 timeslots) –GPRS 1900 Channel 661**



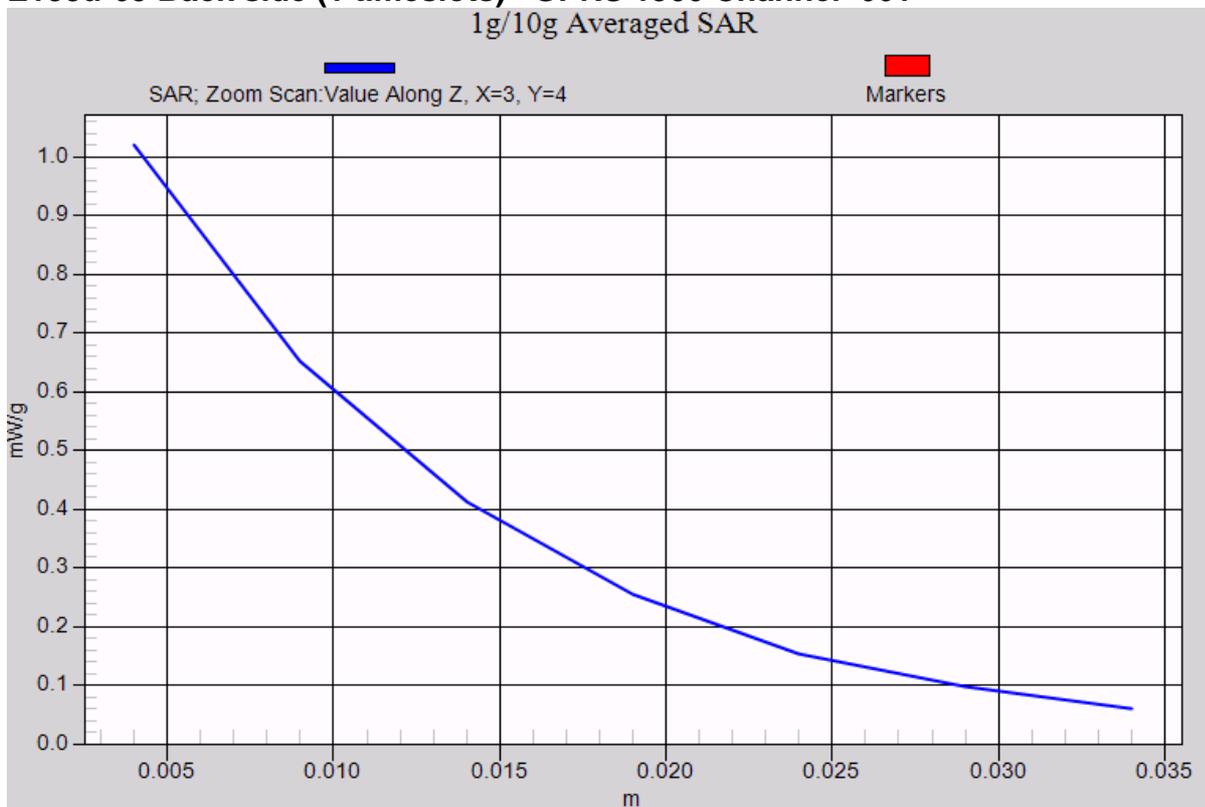
**E153u-65 Back side (3 timeslots) –GPRS 1900 Channel 661**



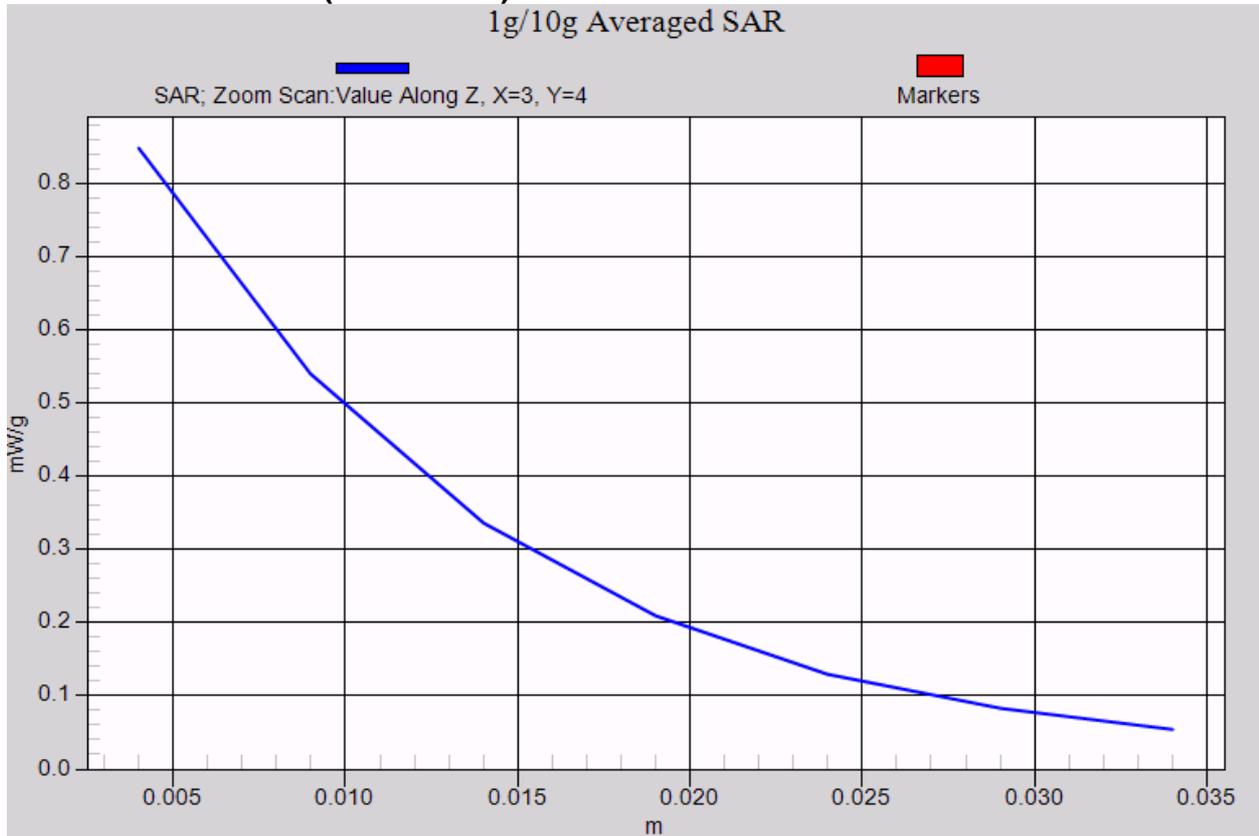
**E153u-65 Back side (2 timeslots) –GPRS 1900 Channel 661**



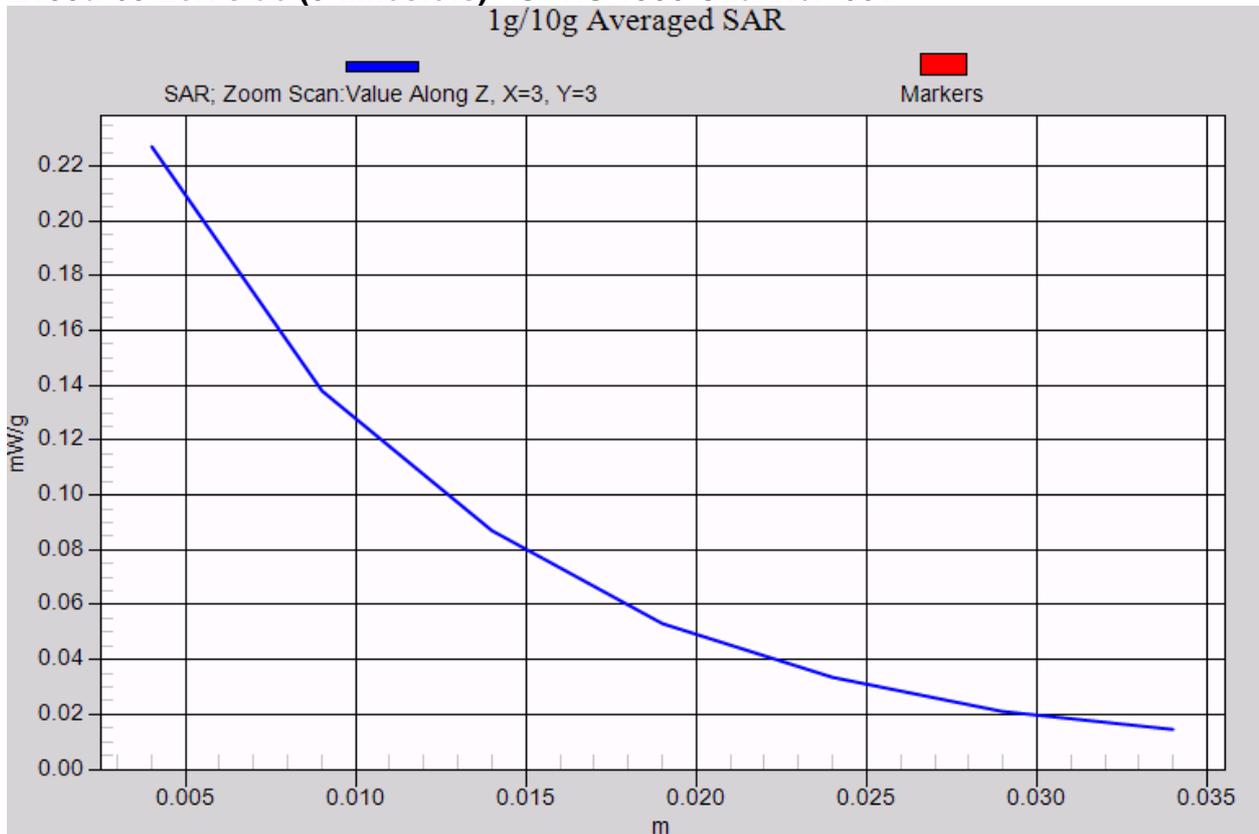
**E153u-65 Back side (1 timeslots) –GPRS 1900 Channel 661**



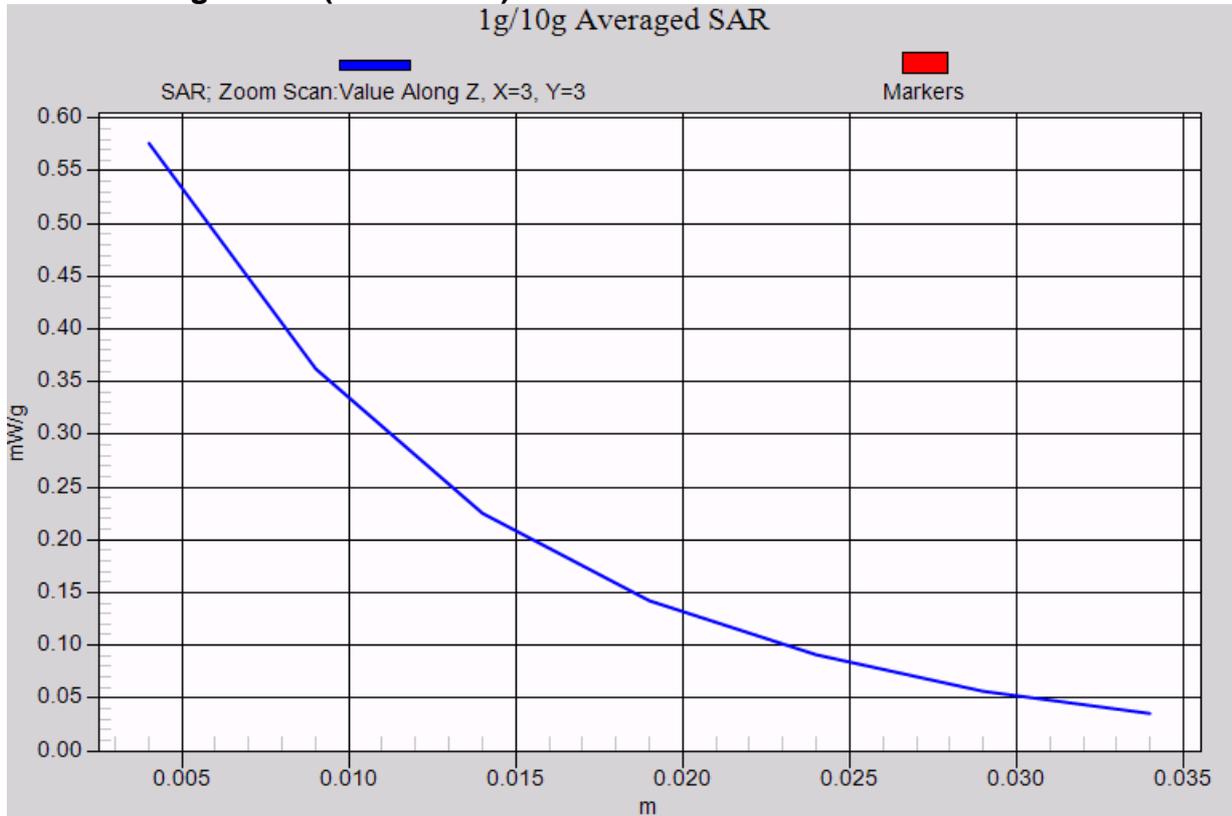
**E153u-65 Front side (3 timeslots) –GPRS 1900 Channel 661**



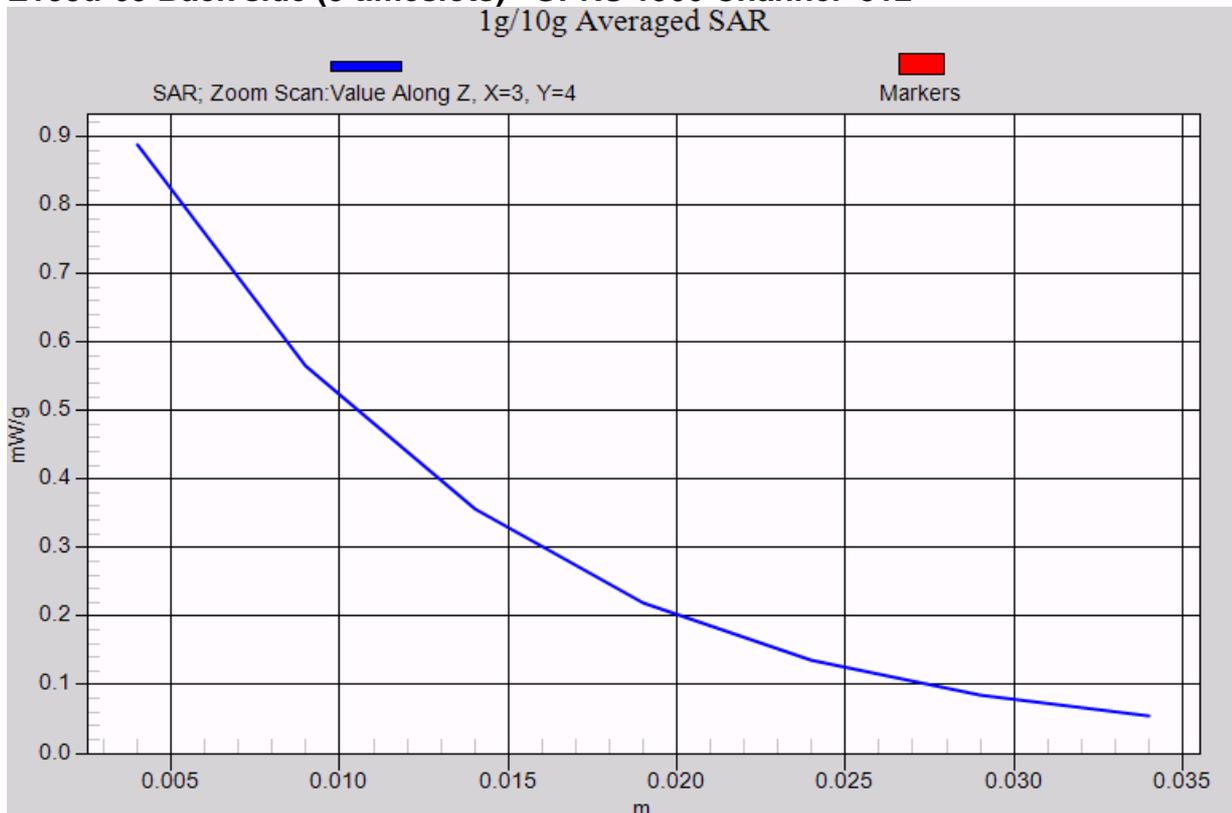
**E153u-65 Left side (3 timeslots) –GPRS 1900 Channel 661**



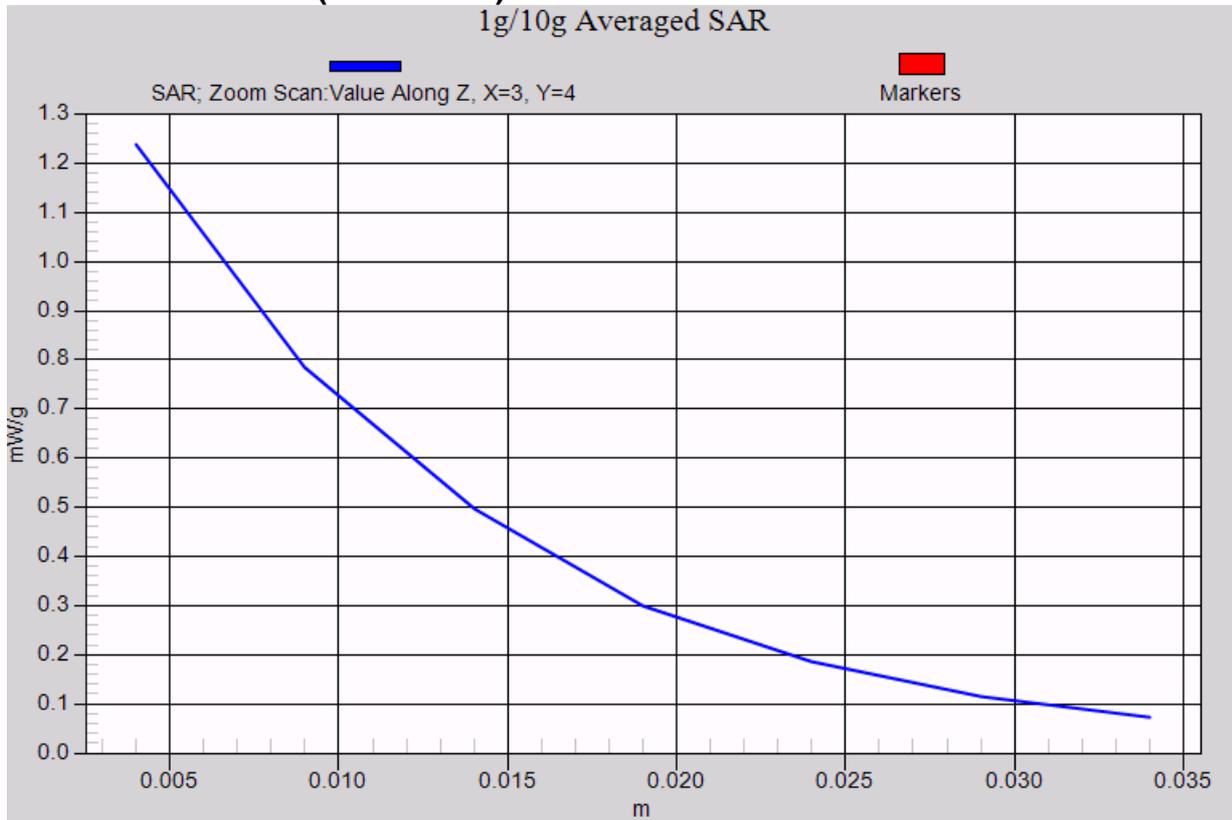
**E153u-65 Right side (3 timeslots) –GPRS 1900 Channel 661**



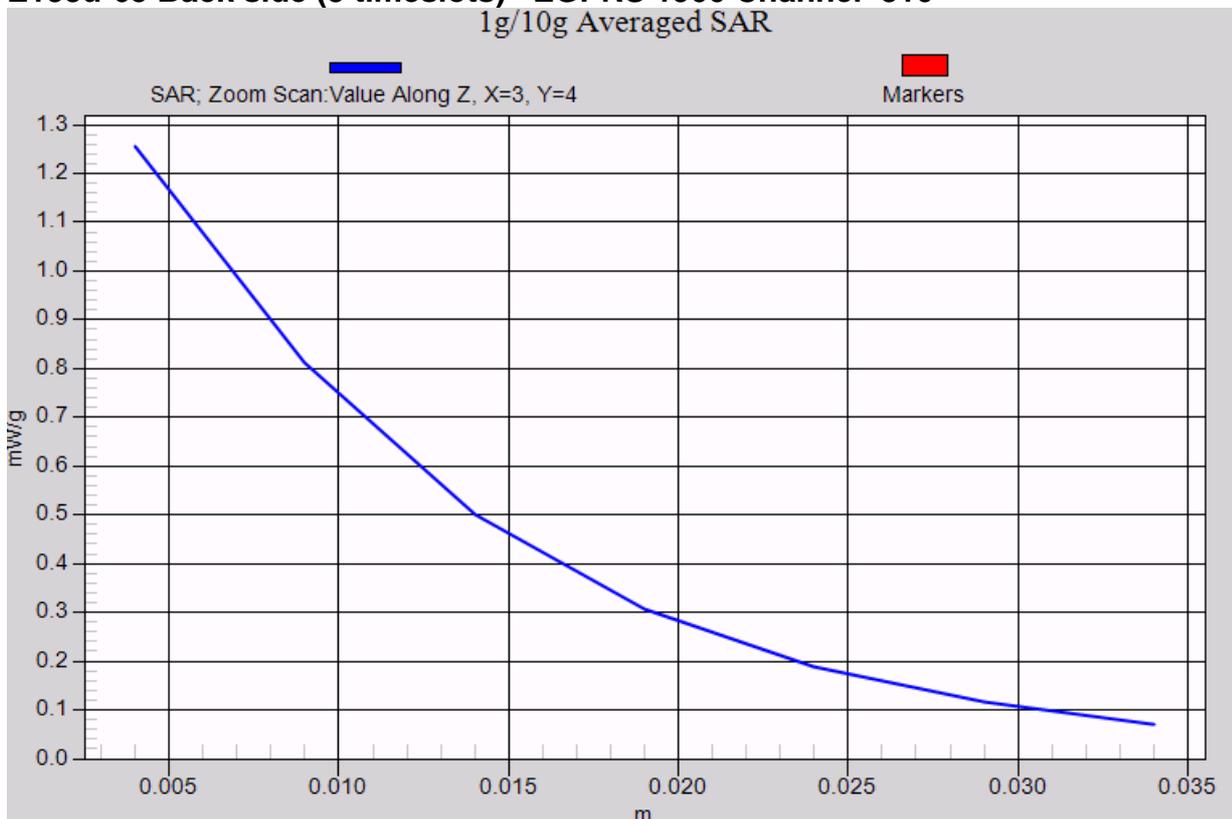
**E153u-65 Back side (3 timeslots) –GPRS 1900 Channel 512**



**E153u-65 Back side (3 timeslots) –GPRS 1900 Channel 810**

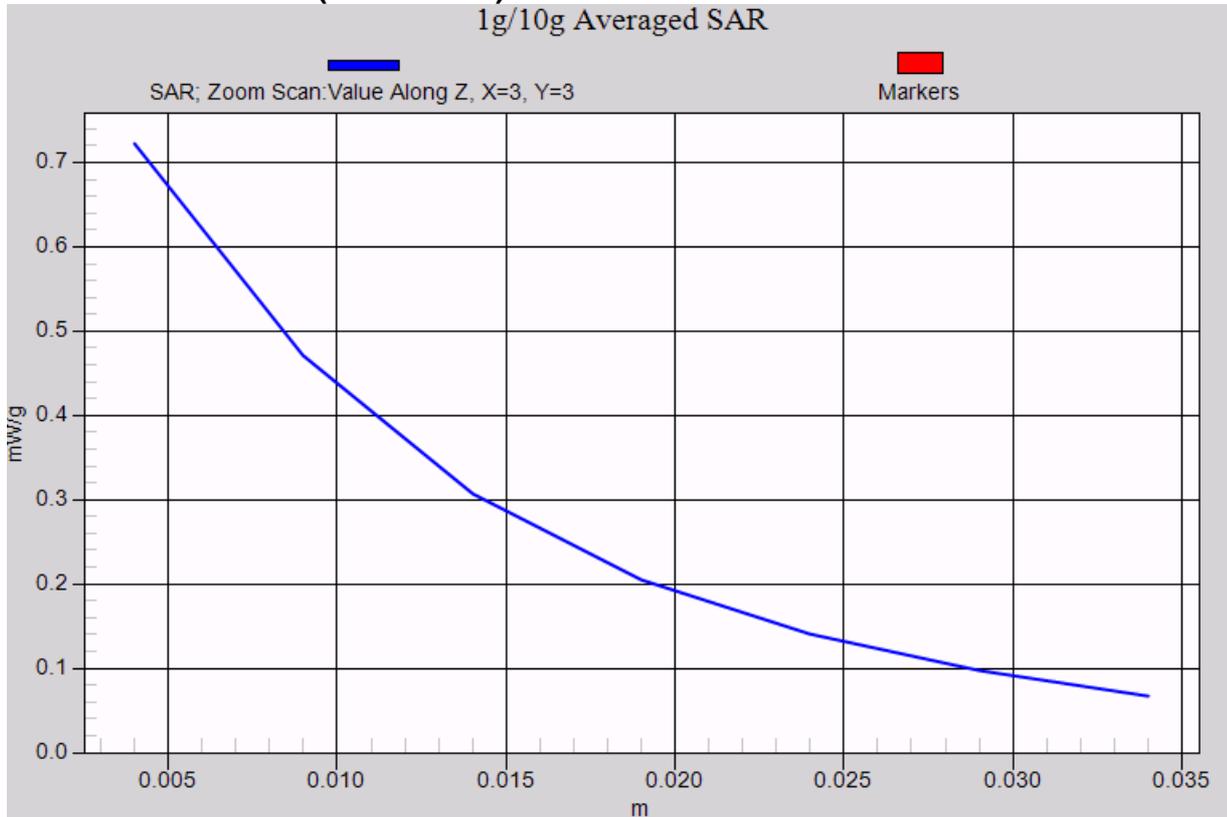


**E153u-65 Back side (3 timeslots) –EGPRS 1900 Channel 810**

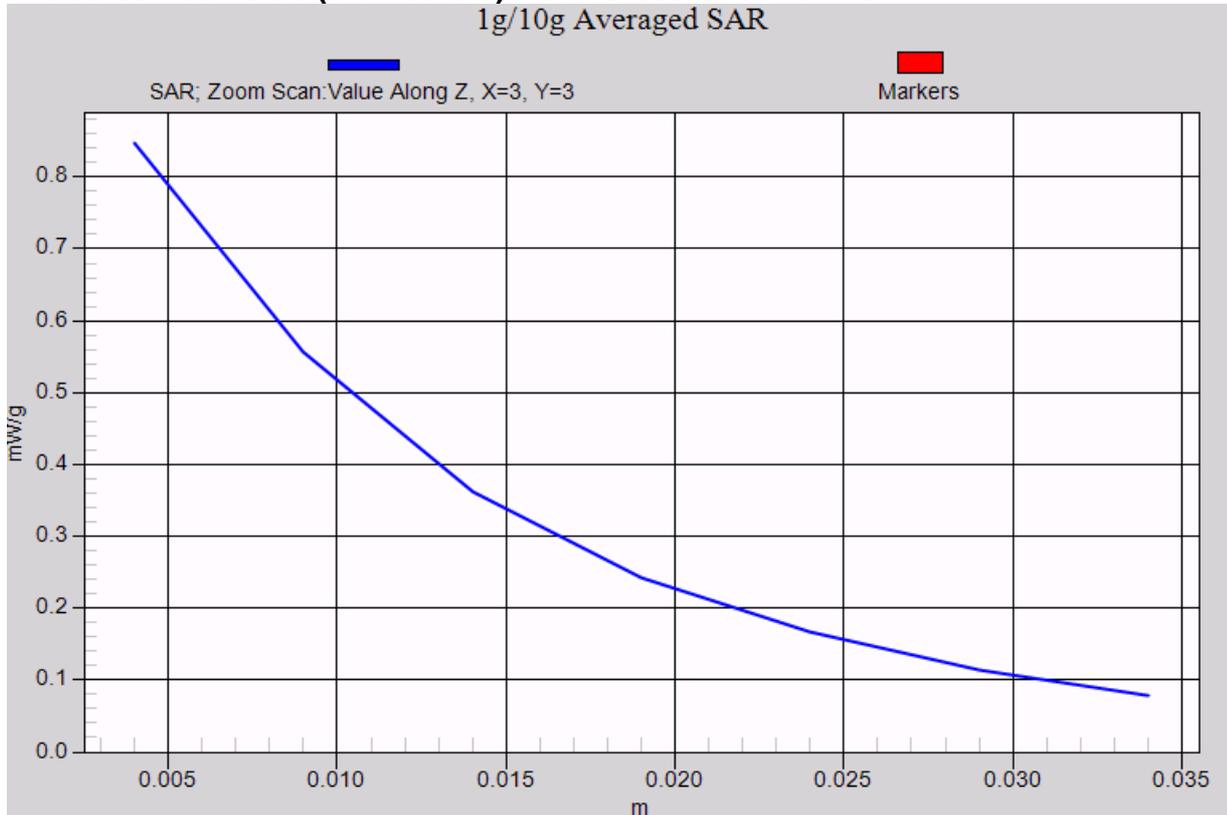


### GSM 850

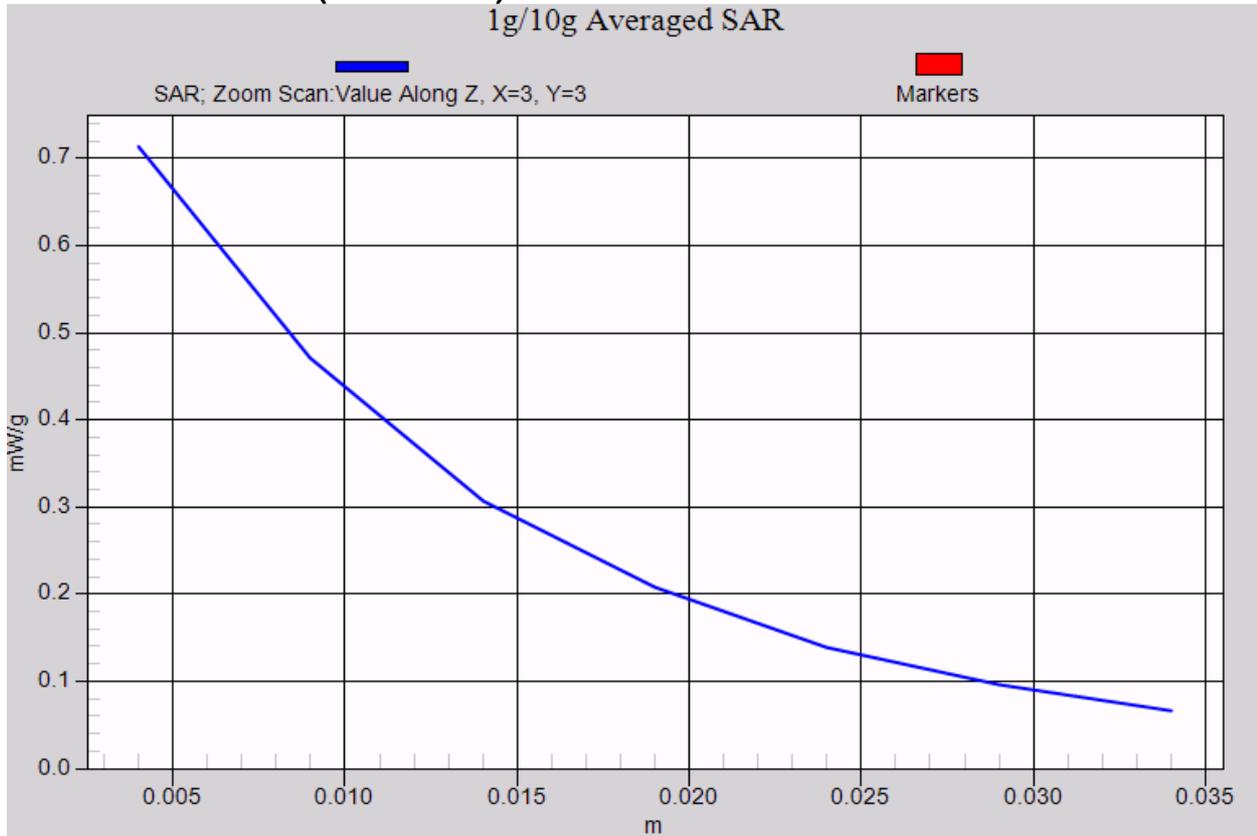
#### E153u-65 Back side (4 timeslots) –GPRS 850 Channel 192



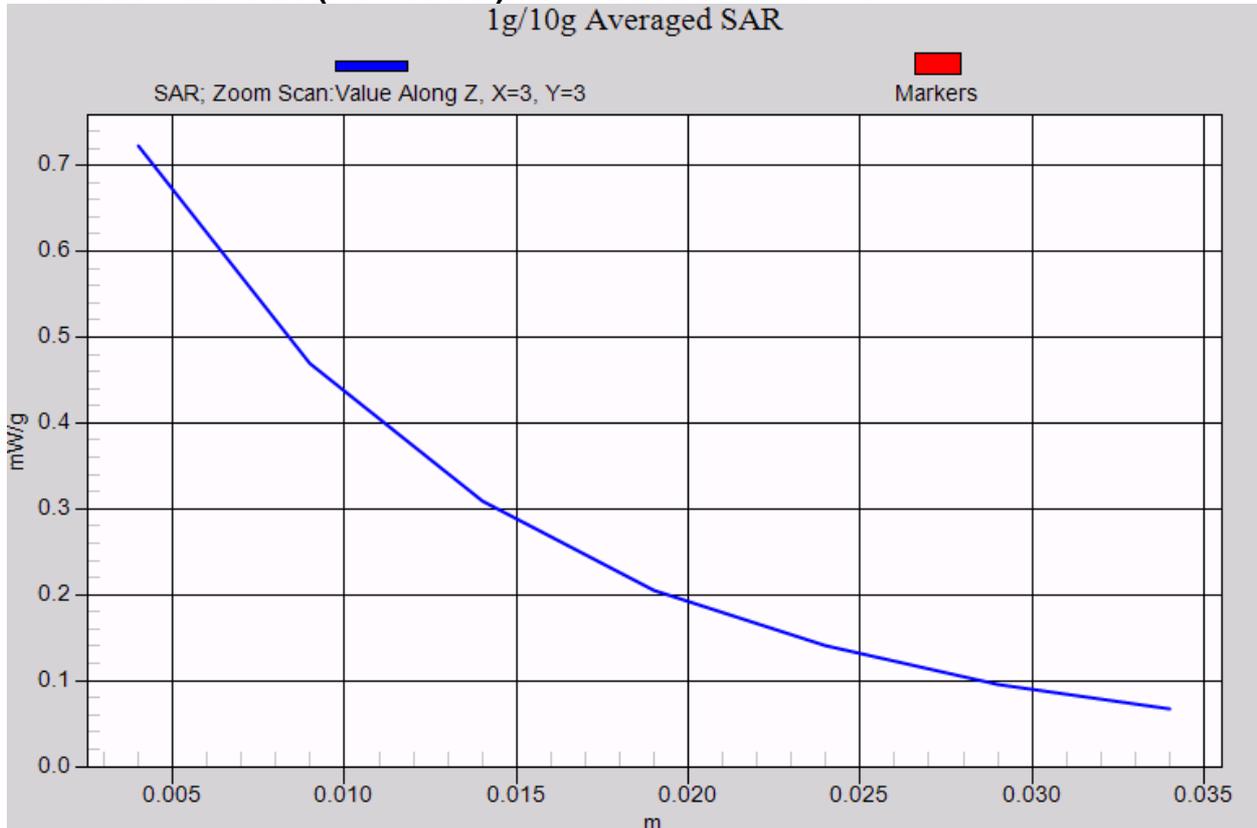
#### E153u-65 Back side (3 timeslots) –GPRS 850 Channel 192



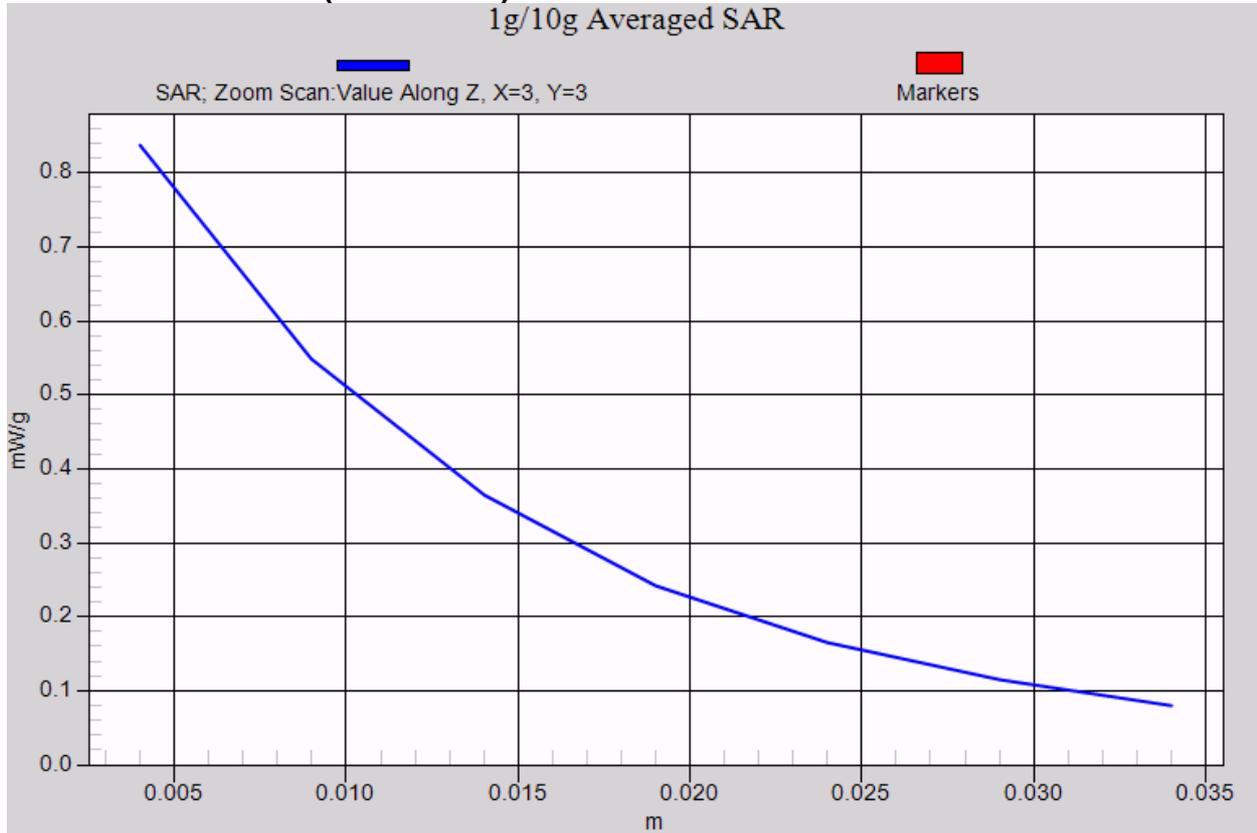
**E153u-65 Back side (2 timeslots) –GPRS 850 Channel 192**



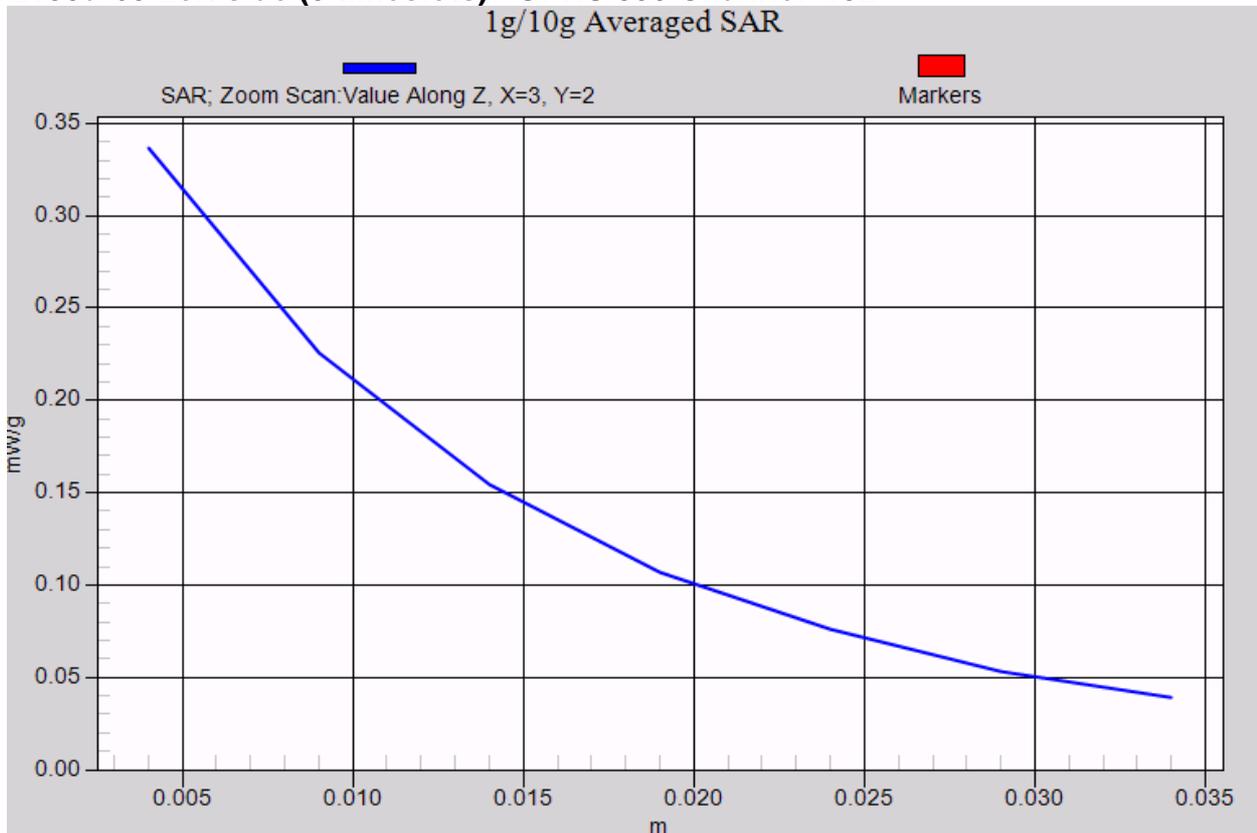
**E153u-65 Back side (1 timeslots) –GPRS 850 Channel 192**



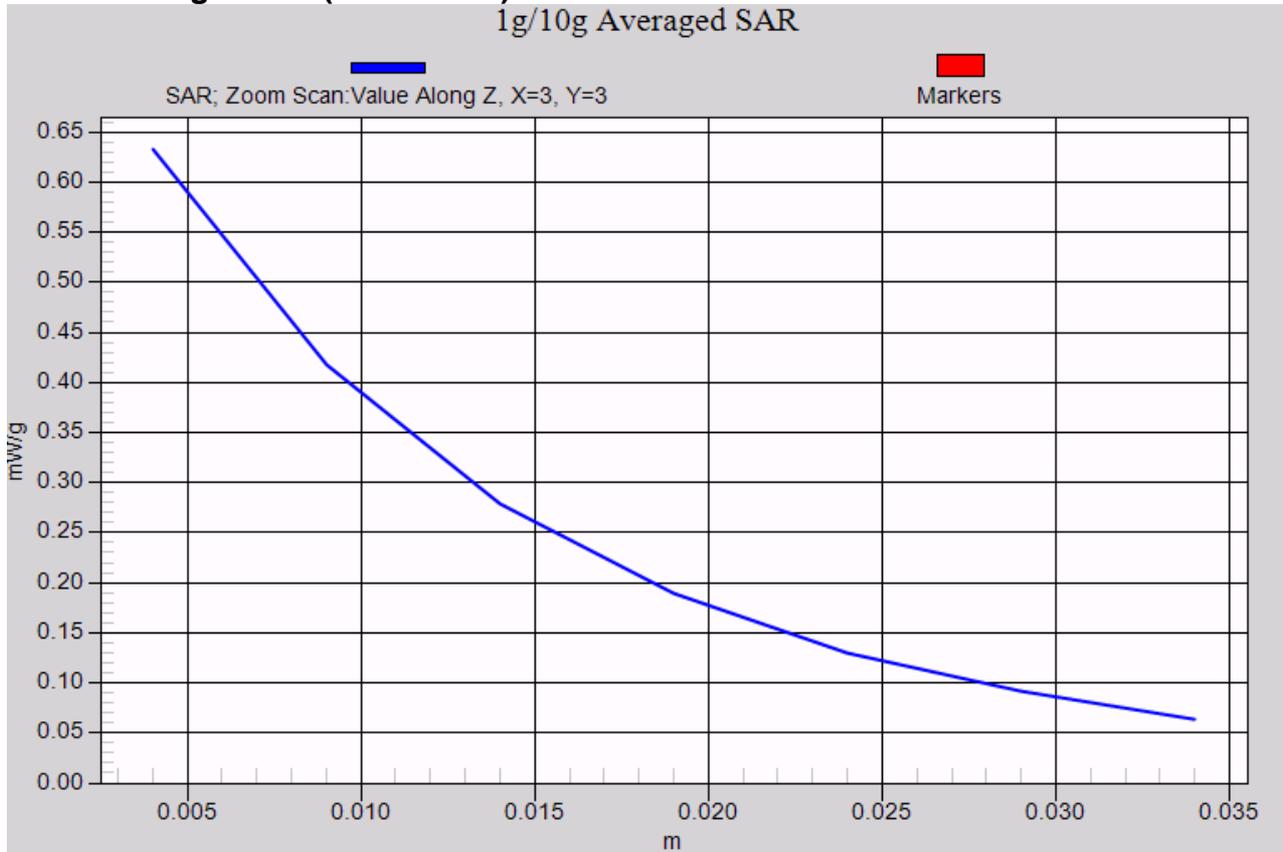
**E153u-65 Front side (3 timeslots) –GPRS 850 Channel 192**



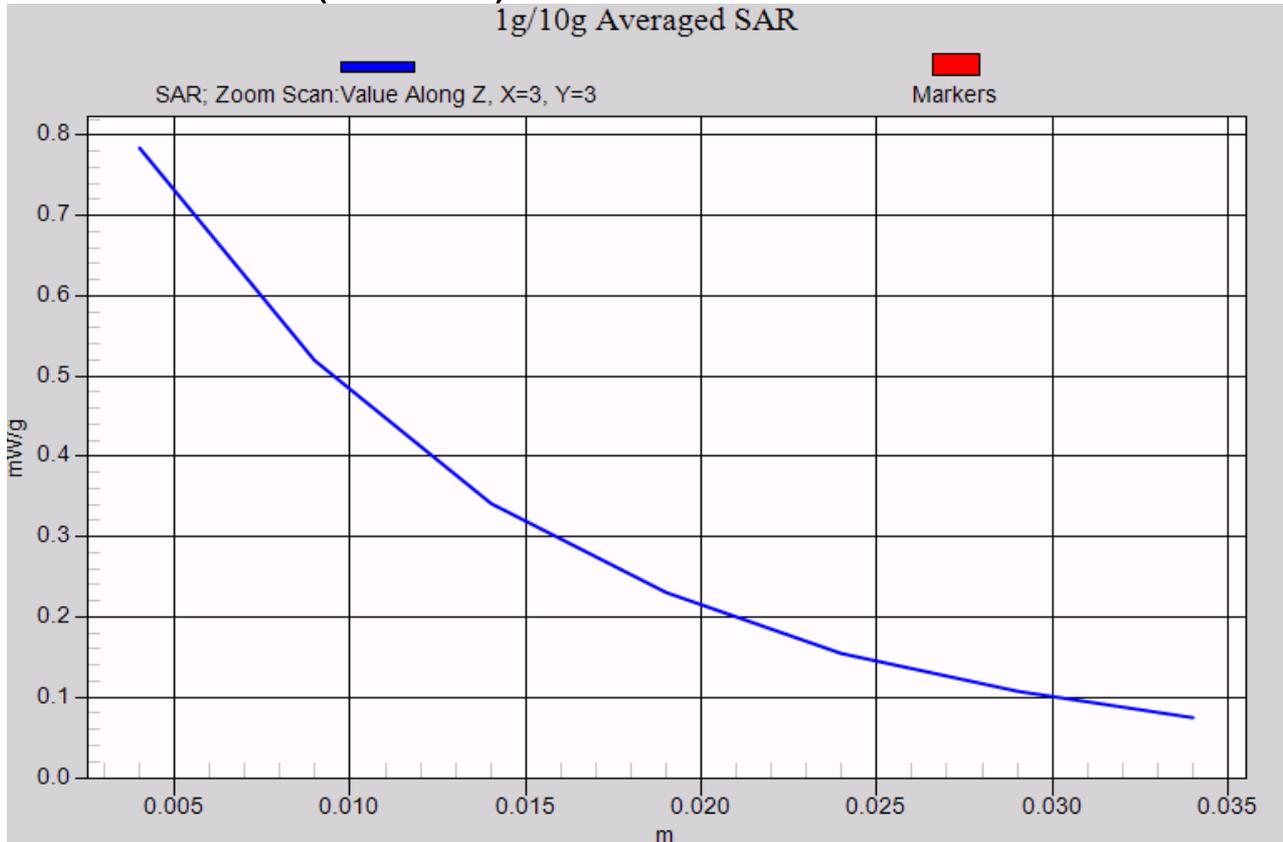
**E153u-65 Left side (3 timeslots) –GPRS 850 Channel 192**



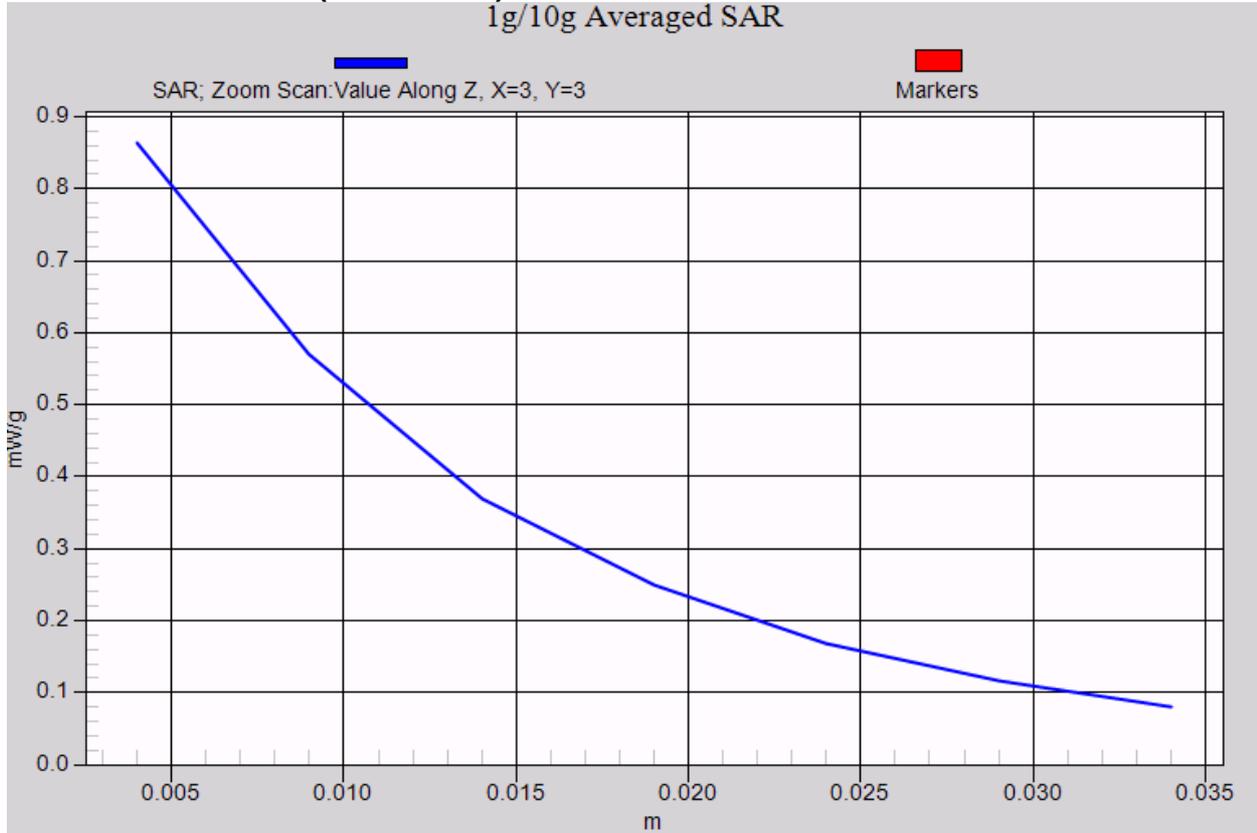
**E153u-65 Right side (3 timeslots) –GPRS 850 Channel 192**



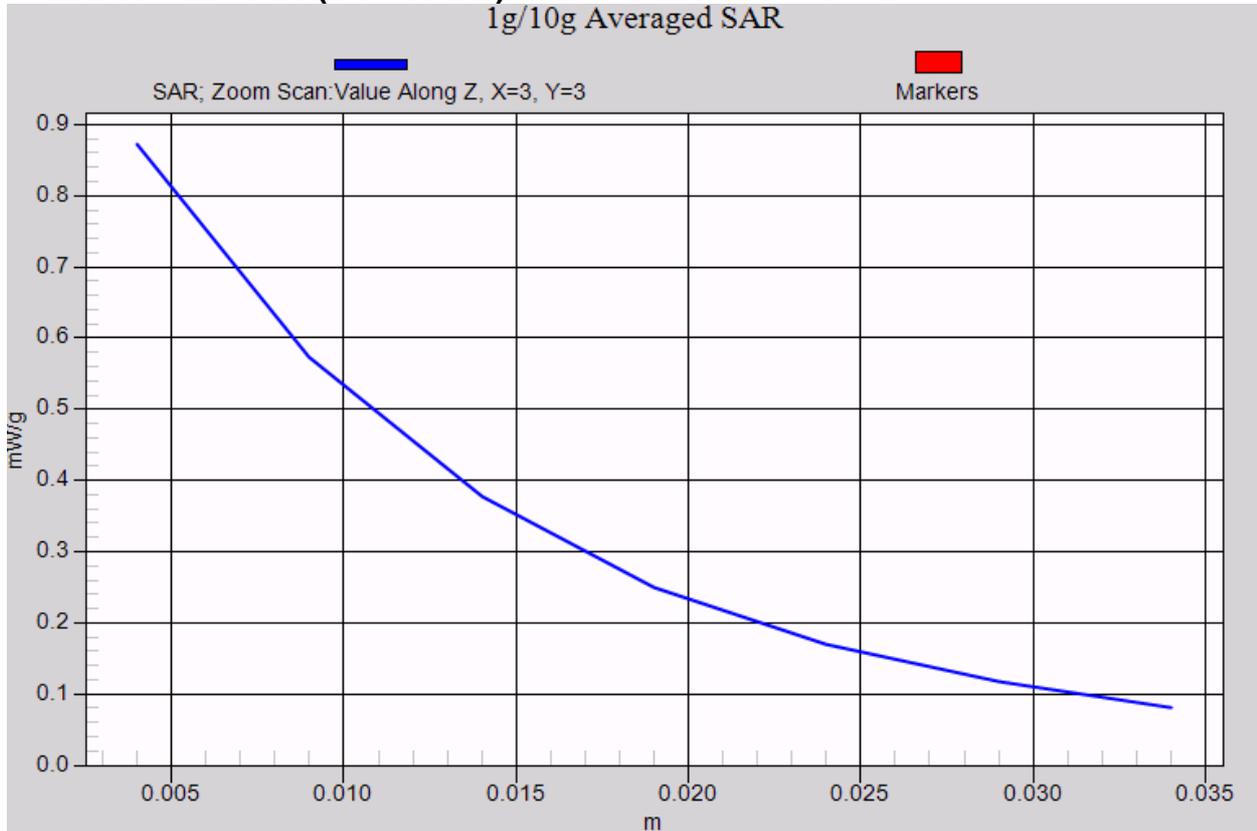
**E153u-65 Back side (3 timeslots) –GPRS 850 Channel 128**



**E153u-65 Back side (3 timeslots) –GPRS 850 Channel 251**

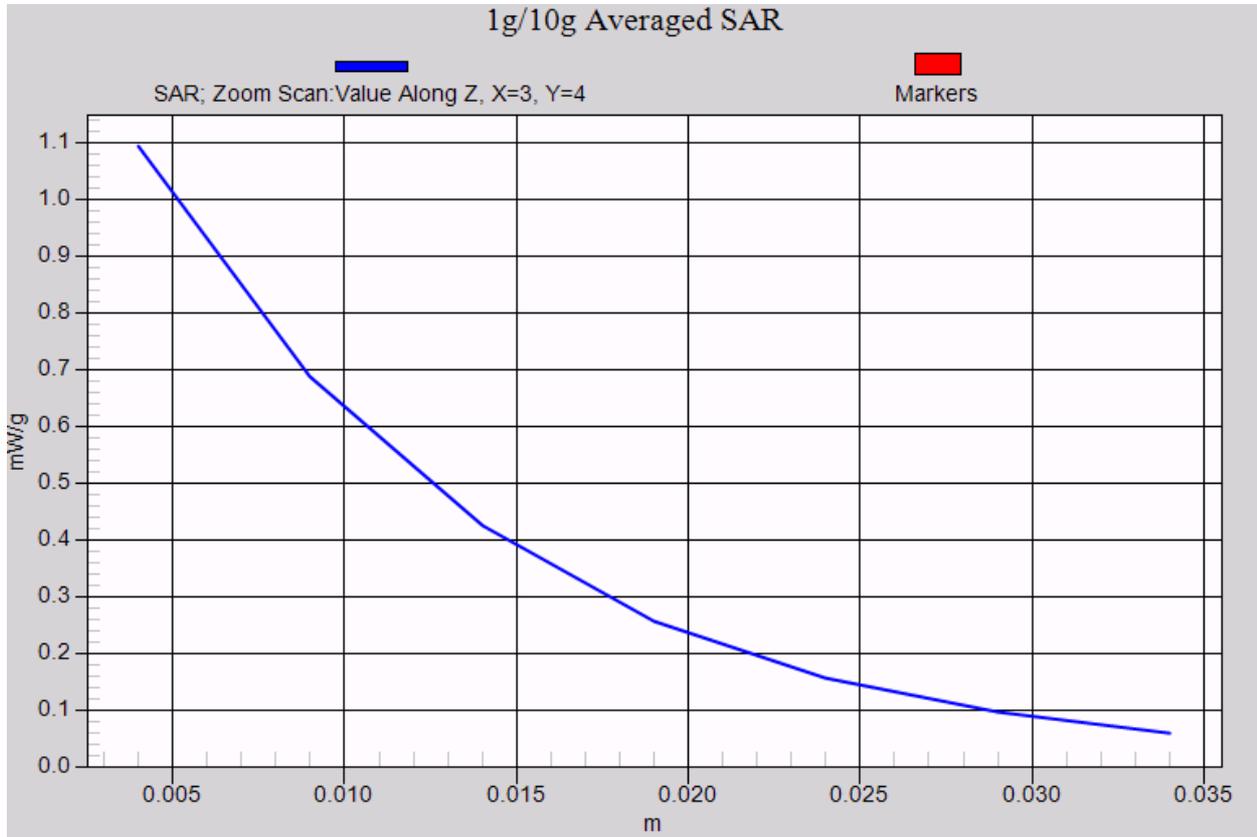


**E153u-65 Back side (3 timeslots) –EGPRS 850 Channel 251**

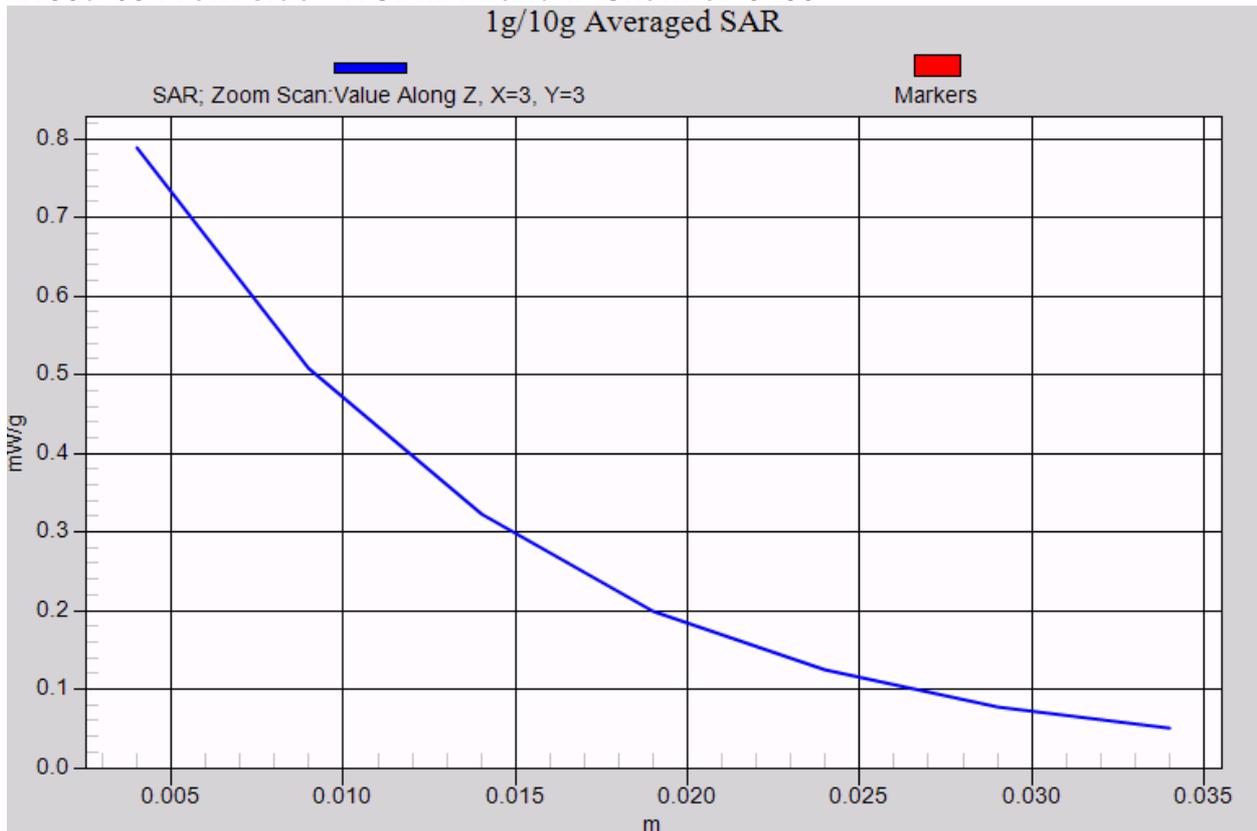


### WCDMA Band II

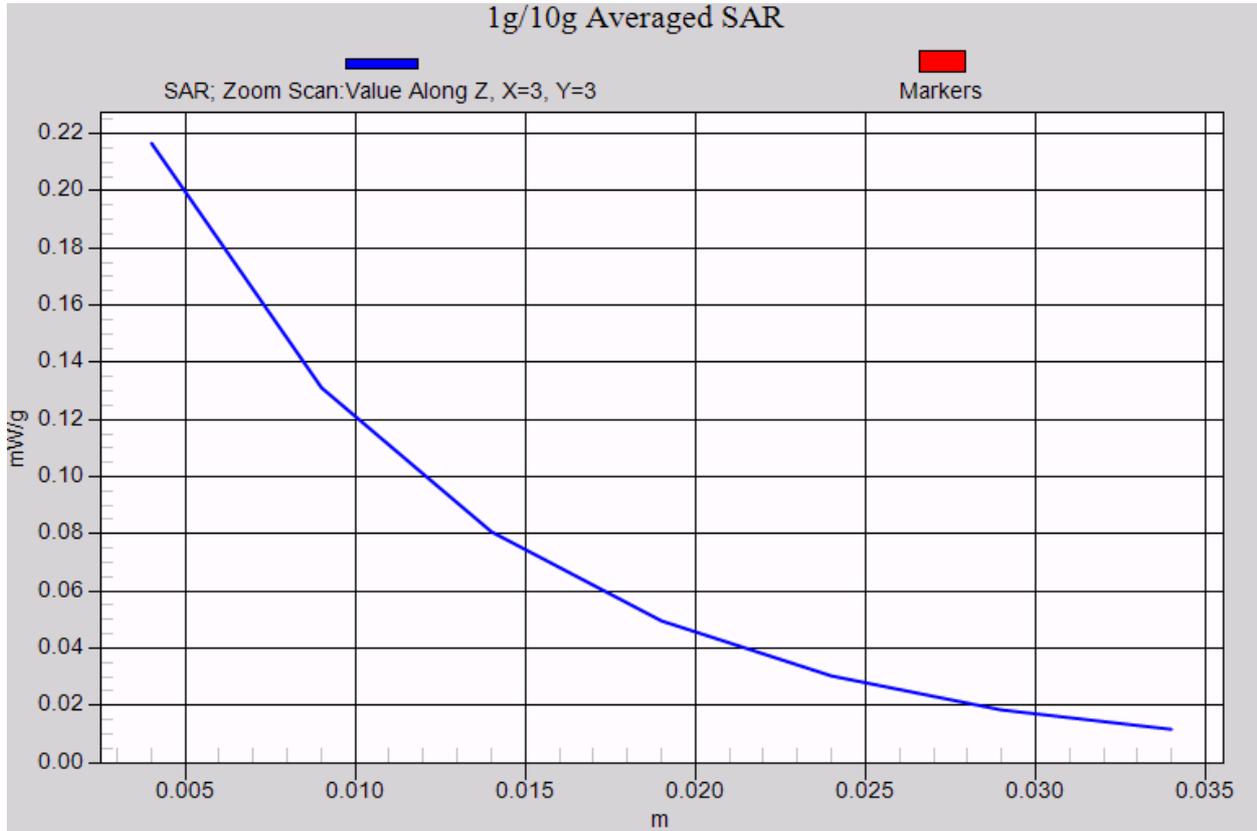
#### E153u-65 Back side –WCDMA Band II Channel 9400



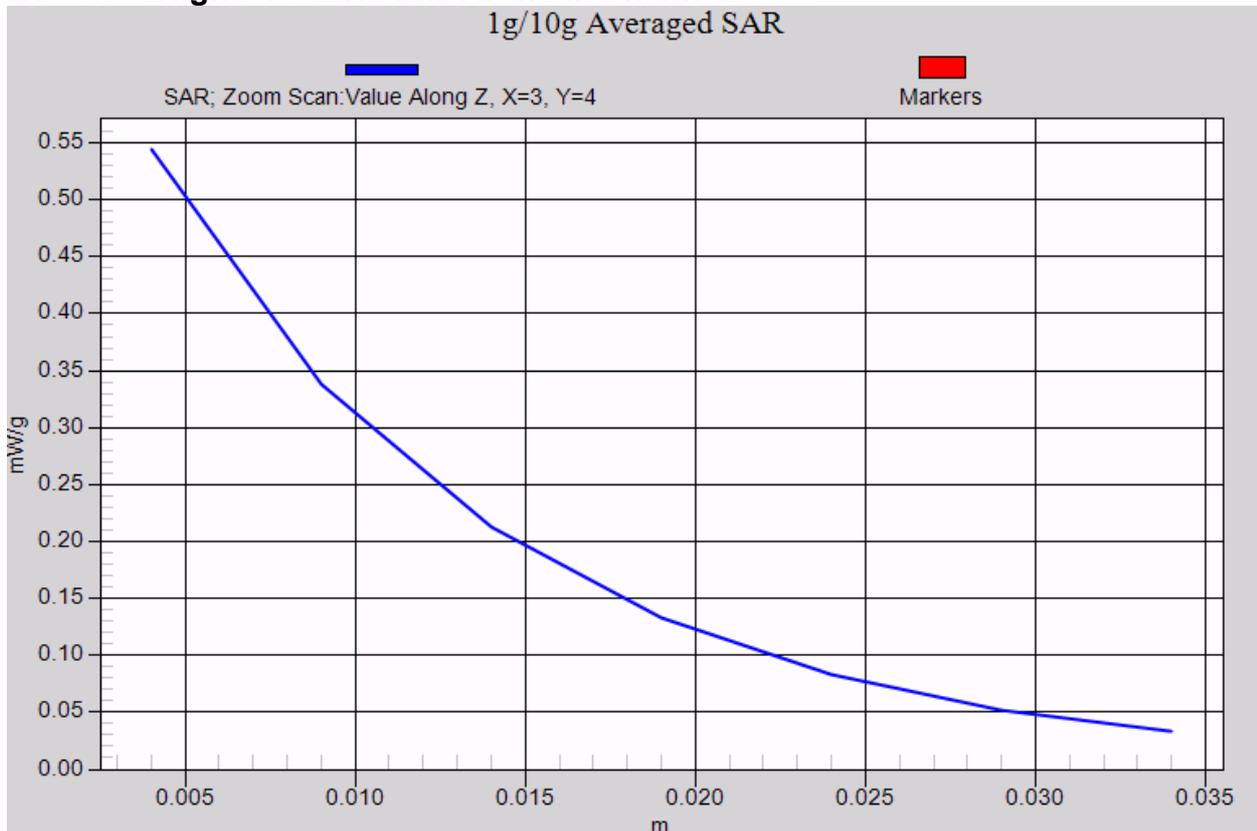
#### E153u-65 Front side –WCDMA Band II Channel 9400



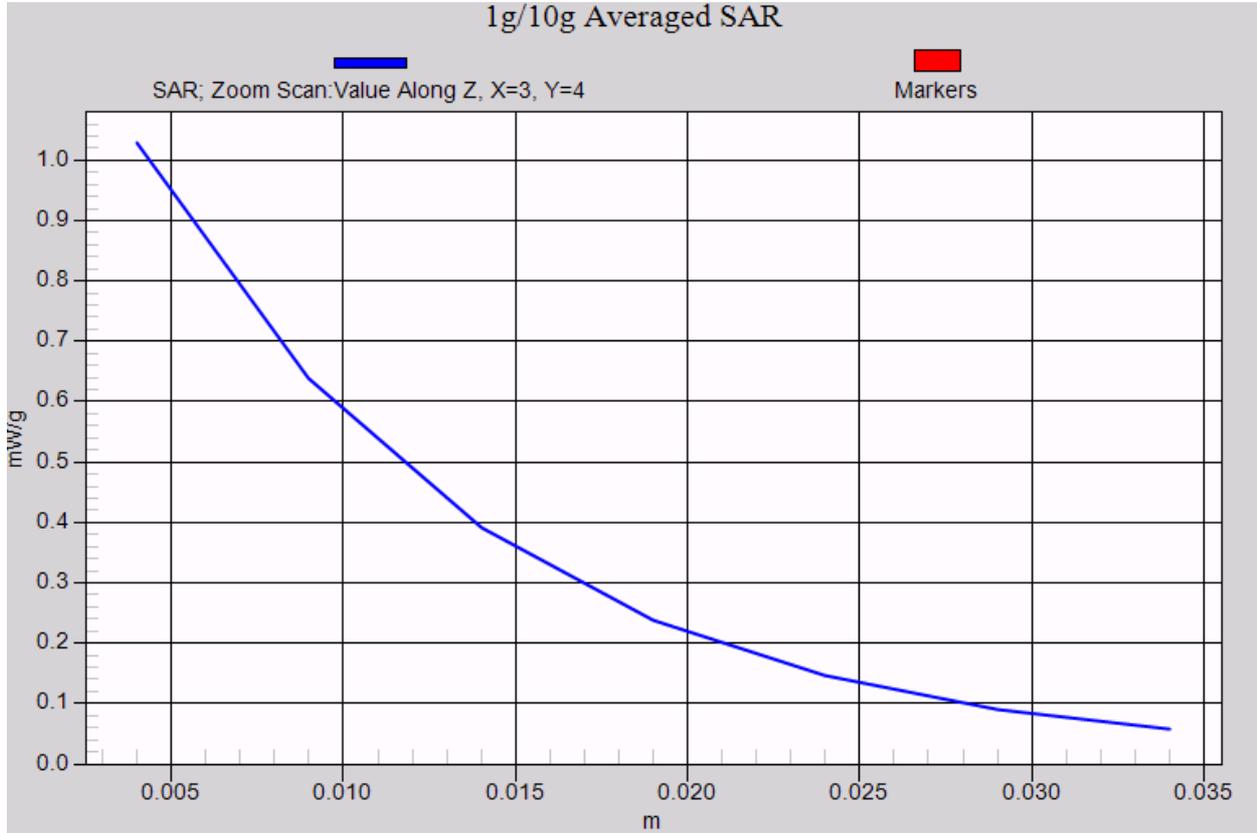
**E153u-65 Left side –WCDMA Band II Channel 9400**



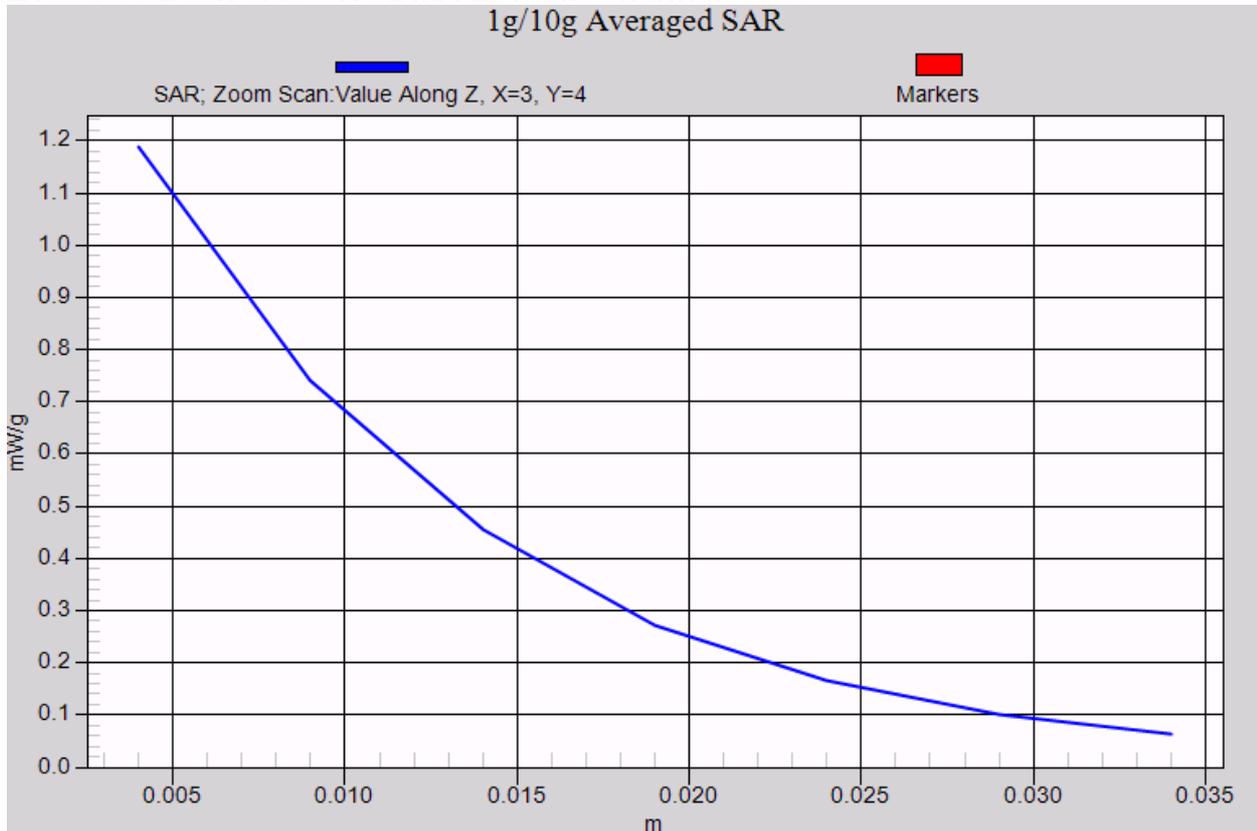
**E153u-65 Right side –WCDMA Band II Channel 9400**



**E153u-65 Back side –WCDMA Band II Channel 9262**

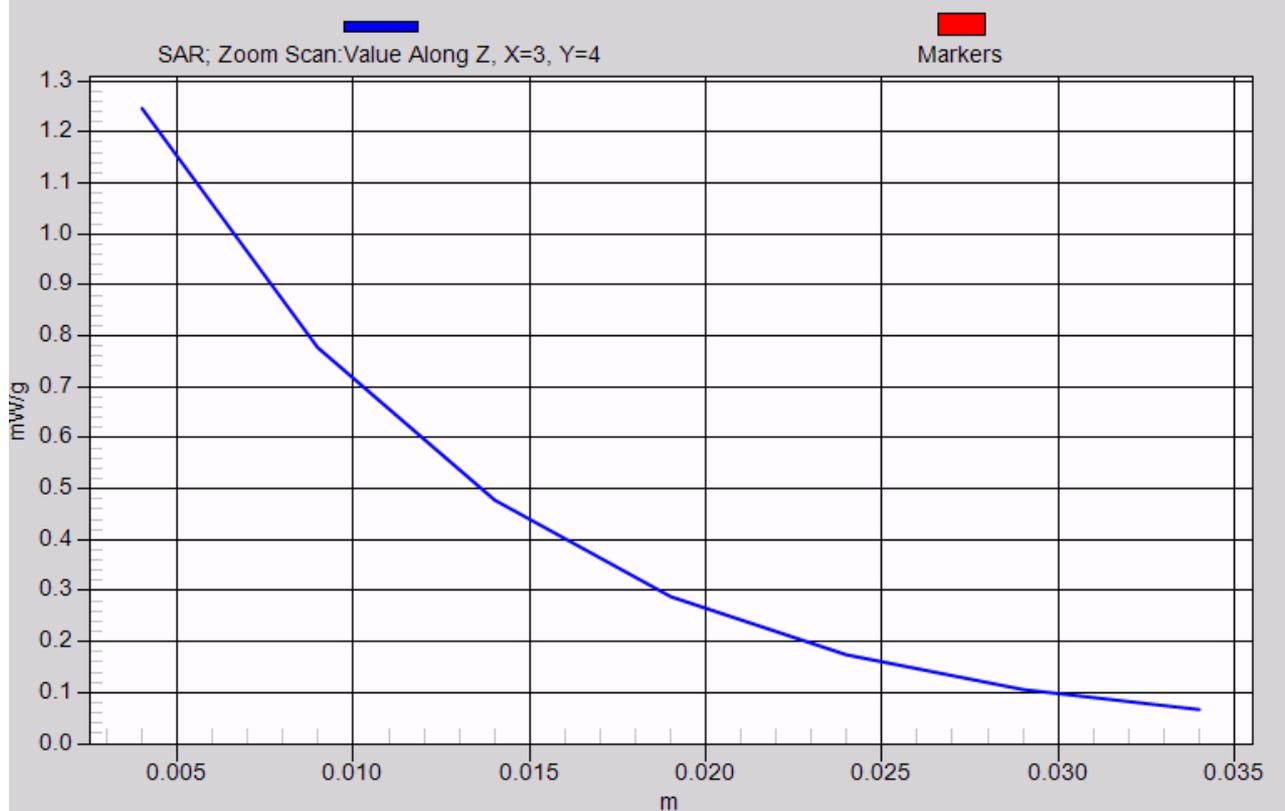


**E153u-65 Back side –WCDMA Band II Channel 9538**

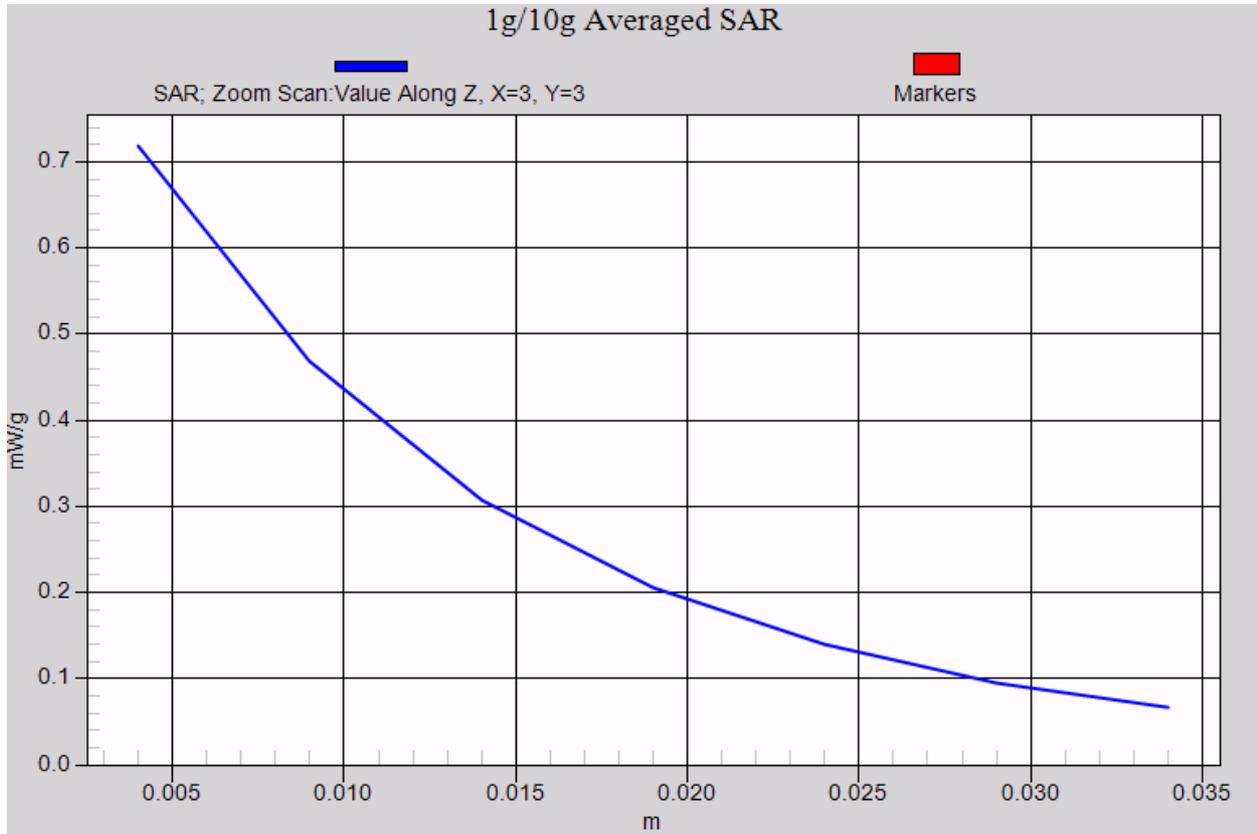


**E153u-65 Back side –WCDMA Band II with HSDPA Channel 9538**

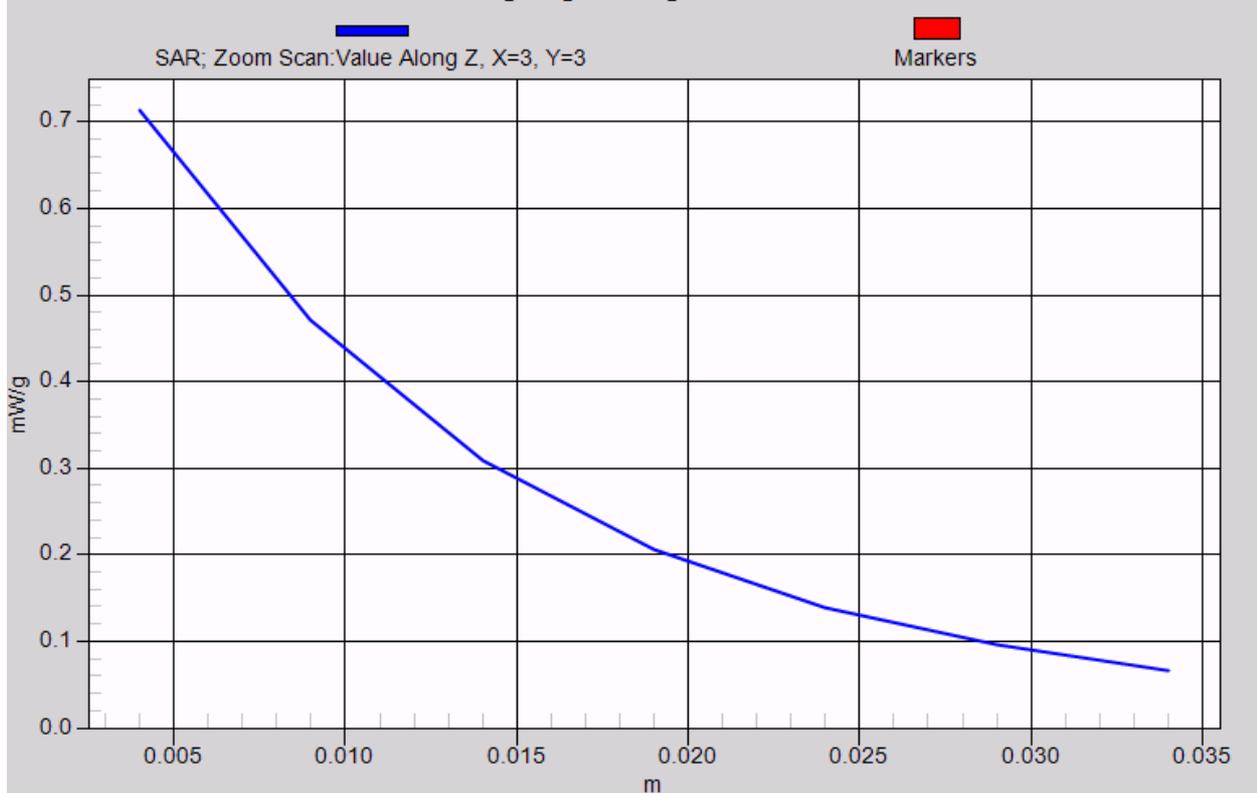
1g/10g Averaged SAR



**WCDMA Band V**  
**E153u-65 Back side –WCDMA Band V Channel 4182**

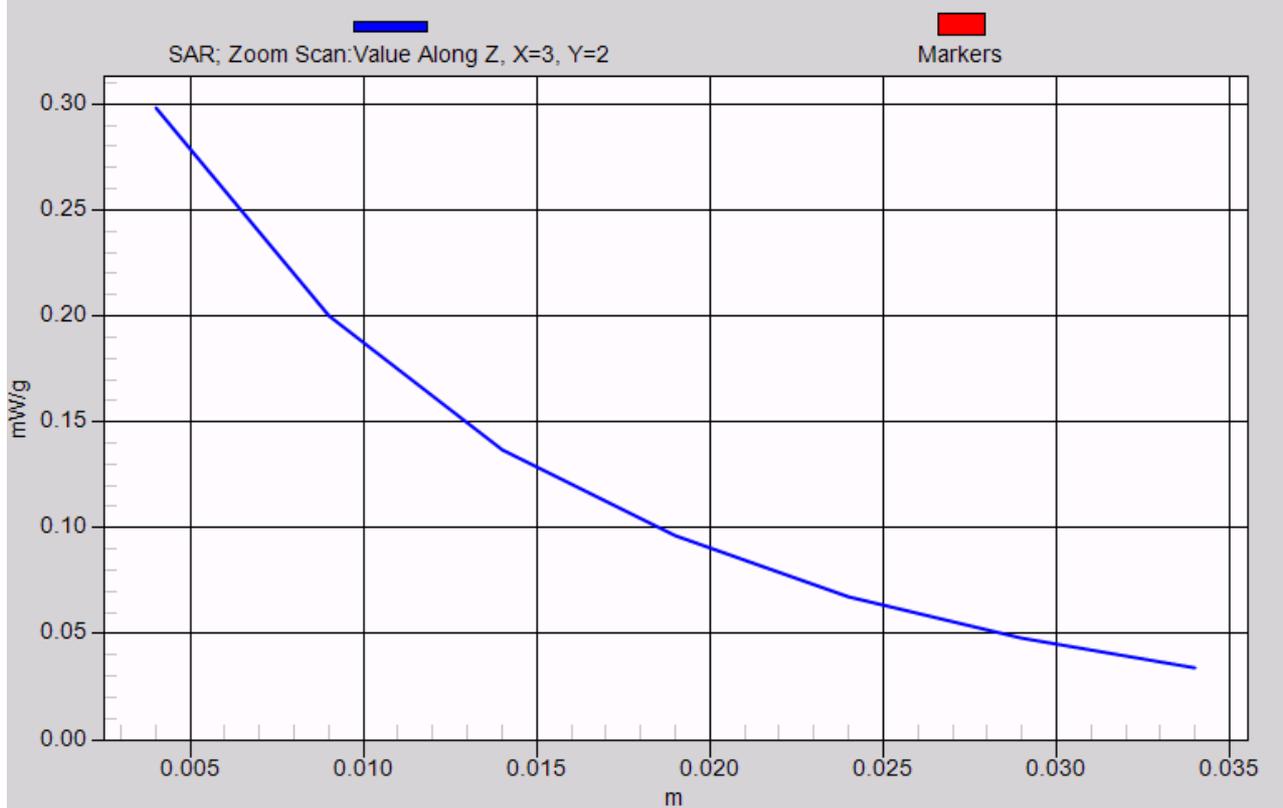


**E153u-65 Front side –WCDMA Band V Channel 4182**



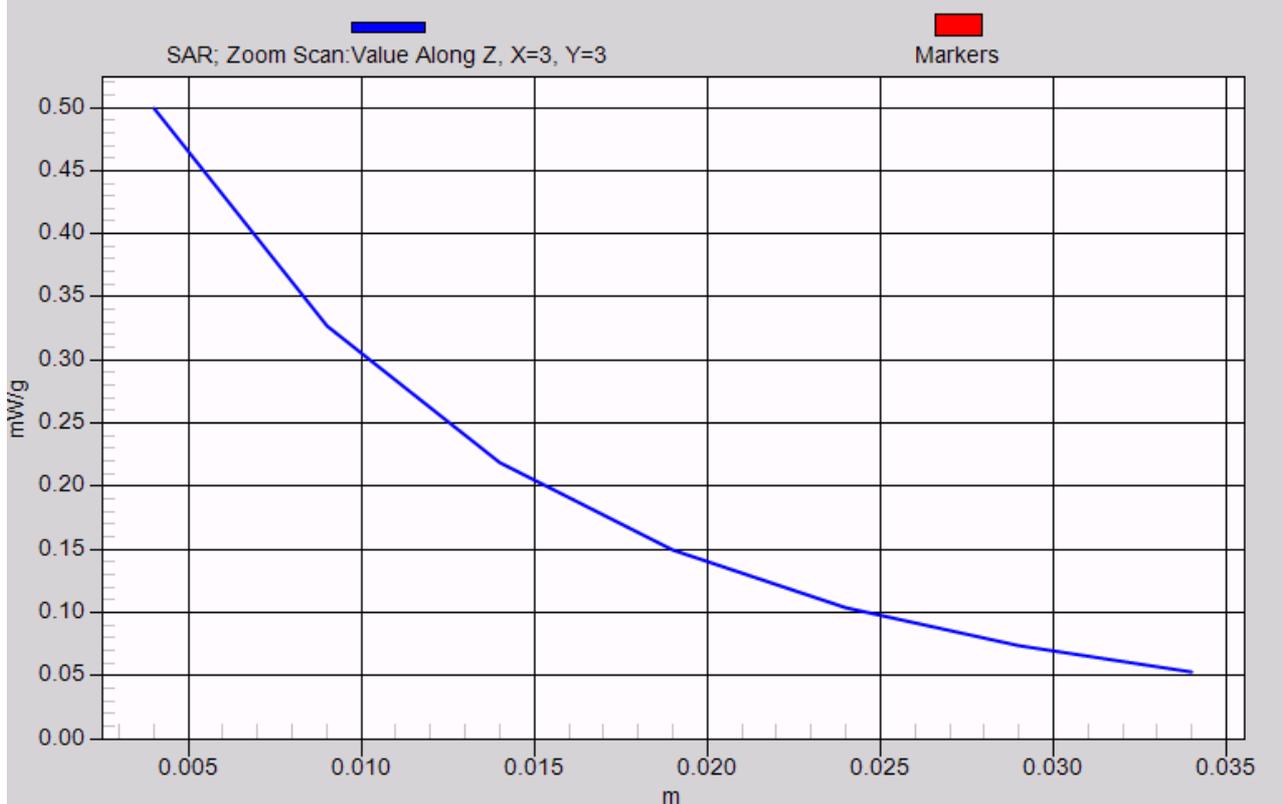
**E153u-65 Left side –WCDMA Band V Channel 4182**

1g/10g Averaged SAR

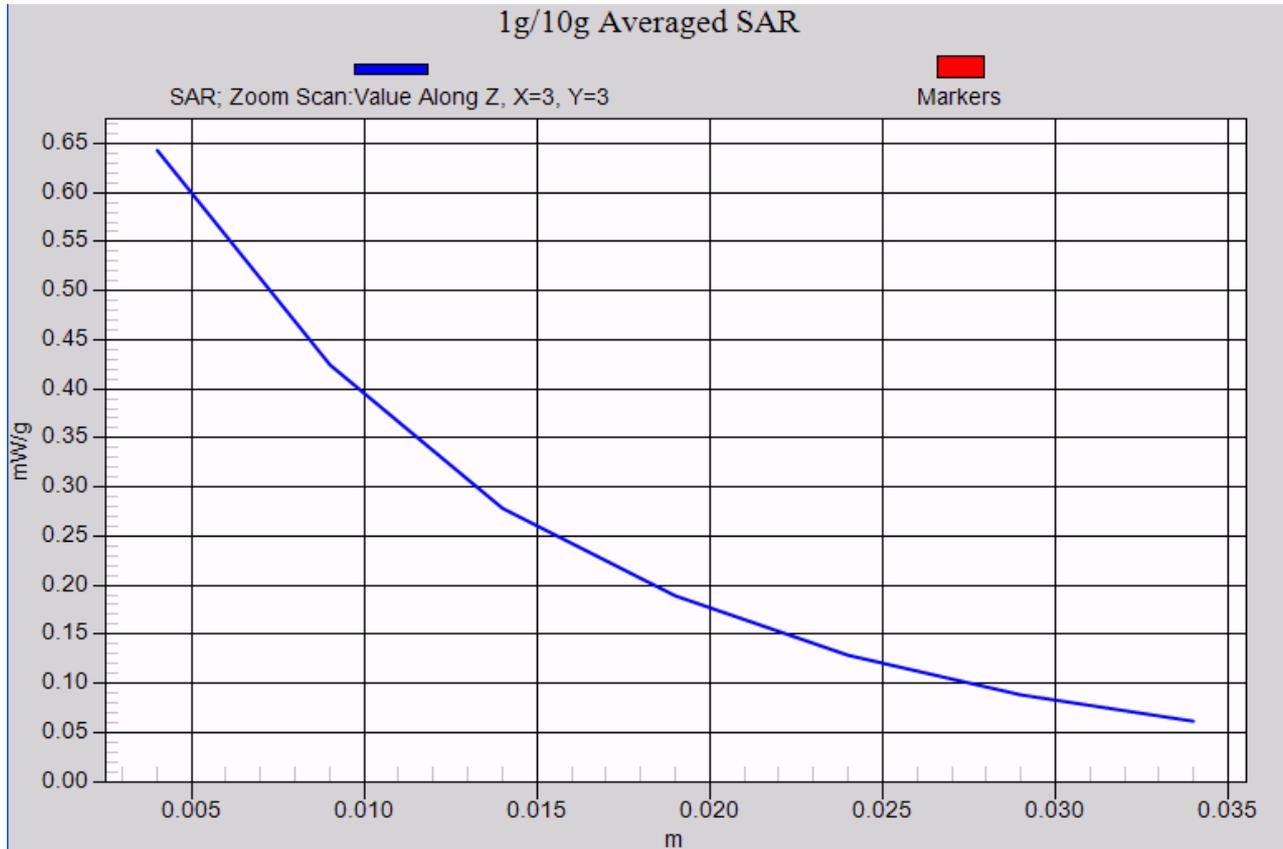


**E153u-65 Right side –WCDMA Band V Channel 4182**

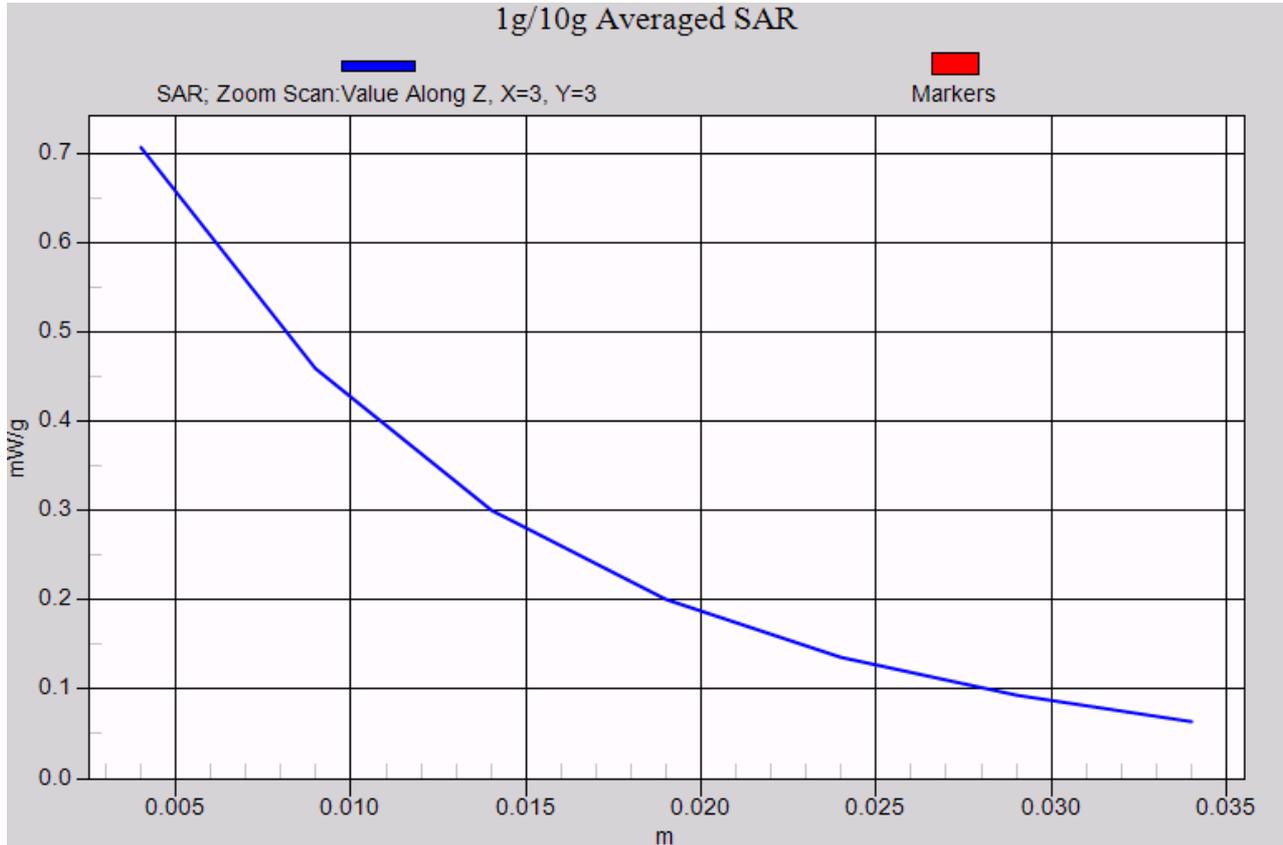
1g/10g Averaged SAR



**E153u-65 Back side –WCDMA Band V Channel 4132**

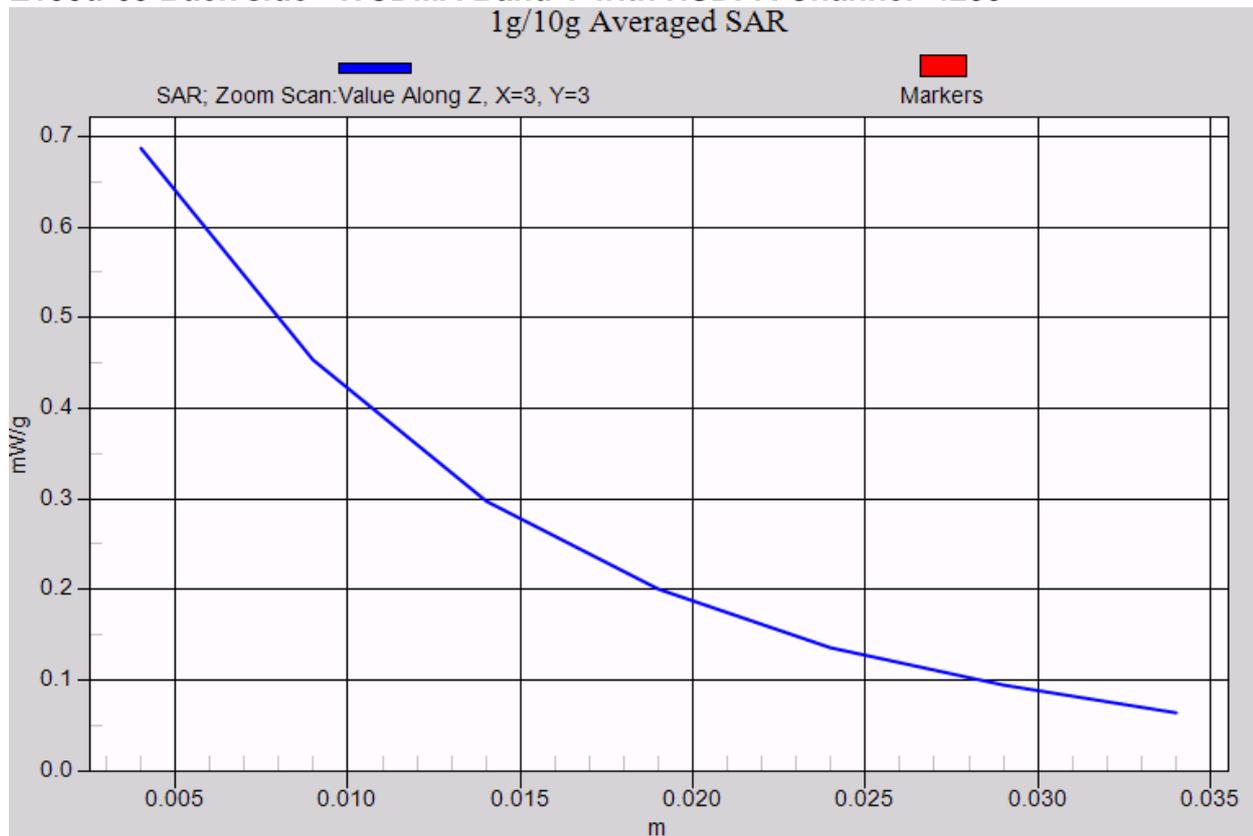


**E153u-65 Back side –WCDMA Band V Channel 4233**





**E153u-65 Back side –WCDMA Band V with HSDPA Channel 4233**  
1g/10g Averaged SAR





## **Annex 3 Calibration parameters**

**Calibration parameters are described in the additional document:**

**Appendix to test report no. SYBH(Z-SAR)014062010  
Calibration data, Phantom certificate  
and detail information of the DASY5 System**

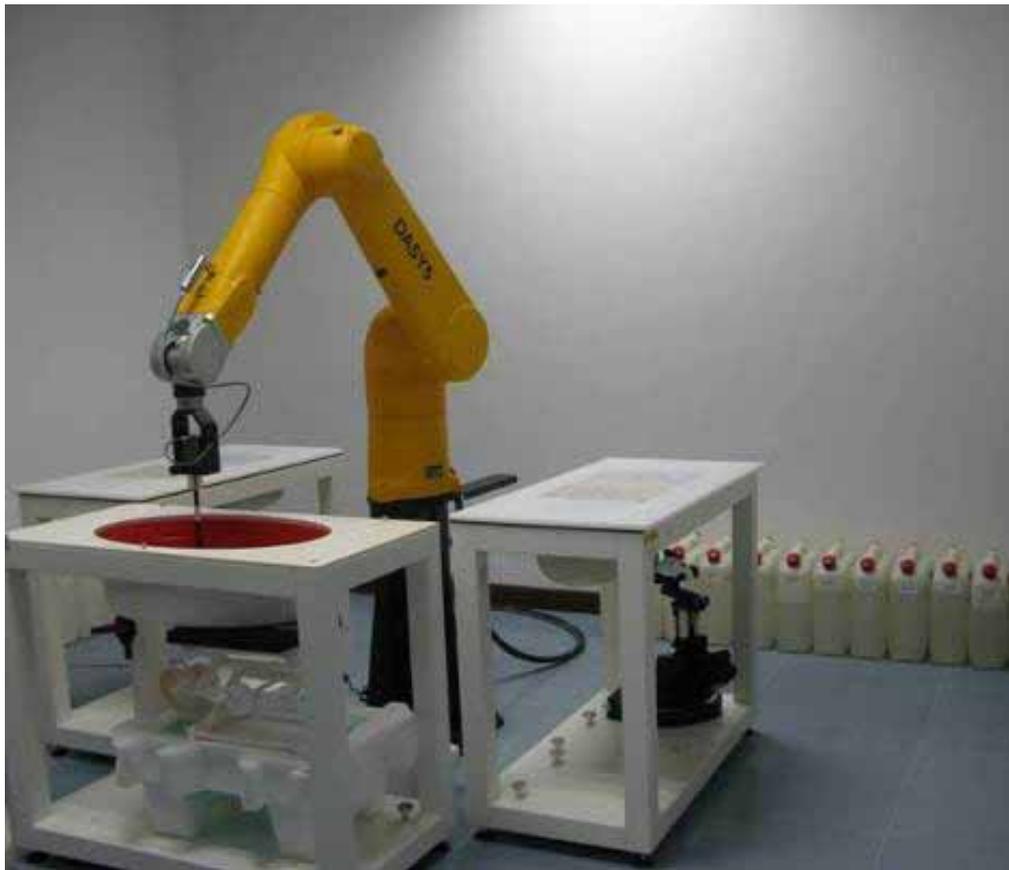
## Annex 4 Photo documentation

### Annex 4.1 Test Facility

Photo 1: Measurement System DASY5



Photo 2: Measurement System DASY5



**Annex 4.2 Host Laptop Computer**

Photo 3: Lenovo THINKAPAD T61



Photo 4: Lenovo THINKAPAD X301

