FCC Published RF Exposure KDB Procedures
IEEE Std 1528-2013

SAR EVALUATION REPORT

For

Blu+

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Prepared for

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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
--	08 June 2014	Initial Issue	--
1	16 Sept 2014	Following changes have been: 1. Re-testing on alternative samples. 2. The software version in section 6.1 has been updated.	Naseer Mirza
2	23 Sept 2014	Following changes have been: 1. Updated the test equipment used in Appendix 1.	Naseer Mirza

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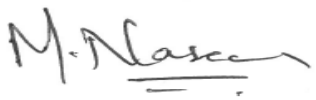
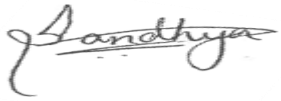
1. Attestation of Test Results

Applicant Name:	Satellite Tracking of People LLC			
Application Purpose	☒ FCC Approval			
DUT Description	Offender Ankle Worn Tracking Device			
Test Device is	An identical prototype			
Device category	Portable use			
Exposure Category	General Population/Uncontrolled Exposure (10g SAR limit: 4.0W/kg)			
Date Tested	14 April 2014 to 15 Sept 2014			
The highest reported SAR values	RF Exposure Conditions	Equipment Class		
		Licensed	DTS	UNII
	Ankle-Worn	3.080 W/kg	N/A	N/A
	Simultaneous Transmission	N/A	N/A	N/A
Applicable Standards	FCC Published RF Exposure KDB Procedures IEEE Std 1528-2013			
Test Results	Pass			

UL Verification Services Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties are in accordance with the above standard and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample(s), under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by UKAS. This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By:	Prepared By:
	
Naseer Mirza Project Lead UL Verification Services Ltd.	Sandhya Menon Laboratory Engineer UL Verification Services Ltd.

2. Test Specification, Methods and Procedures

2.1. Test Specification

Reference:	KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
Title:	SAR Measurement Requirements for 100 MHz to 6 GHz
Purpose of Test:	Field probes, tissue dielectric properties, SAR scans, measurement accuracy and variability of the measured results are discussed. The field probe and SAR scan requirements are derived from criteria considered in draft standard IEEE P1528-2011.
The Equipment Under Test complied with the Specific Absorption Rate for general population/uncontrolled exposure limit of 4.0 W/kg as specified in FCC 47 CFR part 2 (2.1093) and ANSI C95.1-1992 and has been tested in accordance with the reference documents in section 2.2 of this report.	

2.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

IEEE 1528: 2013
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

Thomas Schmid, Oliver Egger and Neils Kuster, “Automated E-field scanning system for dosimetric assessments”, IEEE Transaction on microwave theory and techniques,
Vol. 44, pp. 105-113, January 1996.

Neils Kuster, Ralph Kastle and Thomas Schmid, “Dosimetric evaluation of mobile communications equipment with known precision”, IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

FCC KDB Publication:

KDB 447498 D01 General RF Exposure Guidance v05r02
KDB 941225 D01 SAR test for 3G devices v02
KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE v01
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
KDB 865664 D02 RF Exposure Reporting v01r01

2.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

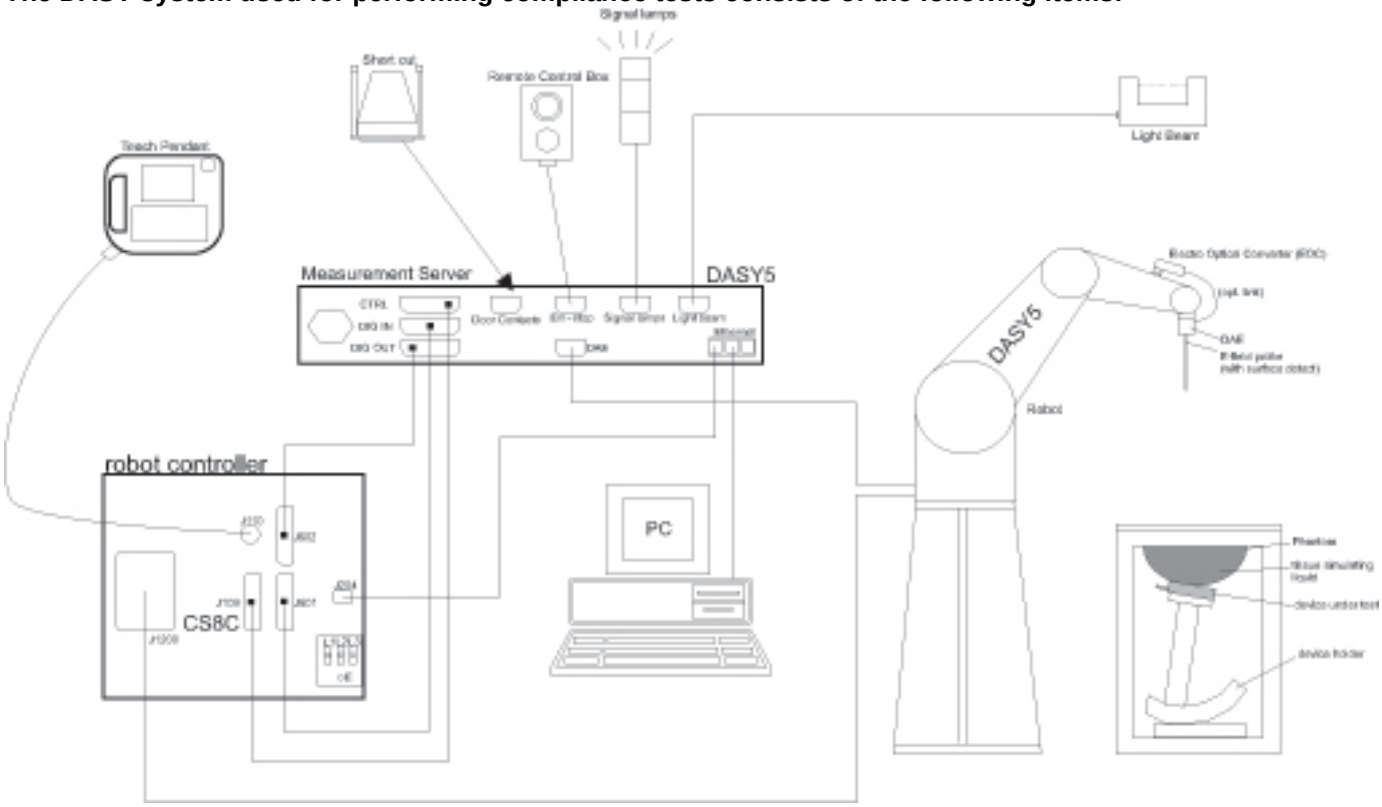
Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG UK	Facility Type
SAR Lab 56	Controlled Environment Chamber

UL Verification Services Ltd, is accredited by UKAS (United Kingdom Accreditation Service), Laboratory UKAS Code 0644.

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.2. Test Equipment

The measuring equipment used to perform the tests documented in this report has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards. Appendix 1 of the report details the equipment used.

4.3. SAR Measurement Procedure

4.3.1. Normal SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be larger than the step size in Z-direction.

4.4. Volumetric Scan Procedure

Step 1: Repeat Step 1-4 in Section 4.3

Step 2: Volume Scan

Volume Scans are used to assess peak SAR and averaged SAR measurements in largely extended 3-dimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location.

Step 3: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

5. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Test Name	Confidence Level	Calculated Uncertainty
Specific Absorption Rate-GPRS 850 / UMTS FDD 5 / CDMA BC0 Body Configuration 10g	95%	17.88%
Specific Absorption Rate-GPRS 1900 / UMTS FDD 2 / CDMA BC1 Body / Configuration 10g	95%	17.93%

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

See Appendix 7 for all uncertainty tables.

6. Equipment Under Test (EUT)

6.1. Identification of Equipment Under Test (EUT)

IMEI Number:	IMEI: 990002189946195 – used to perform GSM850, UMTS FDD 5, CDMA BC 0 and CDMA BC 1 SAR measurements only. IMEI: 990002189946468 – used to perform PCS1900 and UMTS FDD 2 SAR measurements only. IMEI: 990002189946190– used to perform conducted power measurements only.
Hardware Version Number:	KK36
Software Version Number:	10.0.0
Country of Origin:	USA

6.2. Further Description of EUT

The equipment under test was an 'Offender Ankle Worn Tracking device' .The EUT supports GSM850 / 1900, UMTS-FDD 2 / 5 and CDMA BC0/BC1 with GPRS/EDGE class 12 and HSPA (HSDPA/HSUPA) capabilities.

6.3. Modifications Incorporated in the EUT

The plastic handles on the EUT was removed to allow the Back of the EUT to be in direct contact with the 'SAM' phantom. This orientation represents the most conservative when the Back of the EUT faces the ankle as it allows the antenna to be closer to the ankle.

Prior to testing the FCC was contacted for above modification on the EUT and testing was performed as per their confirmation.

6.4. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Brand Name:	Model Name or Number:	Serial Number:	Cable Length and Type:	Connected to Port
Communication Test Set	Agilent	8960 Series 10 (E5515C)	GB46311280	~4.0m Utiflex Cable	RF (Input / Output) Air Link
Communication Test Set	Agilent	8960 Series 10 (E5515E)	GB46200666	~4.0m Utiflex Cable	RF (Input / Output) Air Link
Communication Test Set	R&S	CMW500 (1201.0002K50)	145921	~4.0m Utiflex Cable	RF (Input / Output) Air Link
Communication Test Set	R&S	CMW500 (1201.0002K50)	145922	~4.0m Utiflex Cable	RF (Input / Output) Air Link

6.5.Additional Information Related to Testing

Equipment Category	2G GSM / PCS	850 / 1900	GPRS EDGE
	3G UMTS Band	FDD 2/ 5	RMC12.2 Kbps
	CDMA	BC0 / BC1	RC3 SO32
Type of Unit	Portable Transceiver		
Intended Operating Environment:	Within GSM, UMTS and CDMA Coverage		
Transmitter Maximum Output Power Characteristics:	GSM850	Communication Test Set was configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 5.	
	PCS1900	Communication Test Set was configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 0.	
	UMTS FDD 2	Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.	
	UMTS FDD 5	Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.	
	CDMA BC0	Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.	
	CDMA BC1	Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D01.	
Transmitter Frequency Range:	GSM850	824 MHz – 849 MHz	
	PCS1900	1850 MHz – 1910 MHz	
	UMTS Band 2	1852 MHz – 1908 MHz	
	UMTS Band 5	826 MHz – 847 MHz	
	CDMA BC0	824 MHz – 850 MHz	
	CDMA BC1	1825 MHz – 1909 MHz	

Additional Information Related to Testing (Continued)

Transmitter Frequency Allocation of EUT When Under Test:	Bands	Channel Number	Channel Description	Frequency (MHz)
	GPRS850	128	Low	824.2
		190	Middle	836.6
		251	High	848.8
	PCS1900	512	Low	1850.2
		661	Middle	1880.0
		810	High	1909.8
	UMTS FDD 2	9262	Low	1852.4
		9400	Middle	1880.0
		9538	High	1907.6
	UMTS FDD 5	4132	Low	826.4
		4183	Middle	836.6
		4233	High	846.6
	CDMA BC0	1013	Low	824.70
		384	Middle	836.52
		777	High	848.31
	CDMA BC1	25	Low	1851.25
		600	Middle	1880.00
		1175	High	1908.75
Modulation(s):	GMSK (GSM / GPRS):			217 Hz
	SSMA (CDMA) ; QPSK(UMTS):			0Hz
Modulation Scheme (Crest Factor):	GMSK (GPRS/EDGE 4 Uplink)			4
	GMSK (GPRS/EDGE 3 Uplink)			2.67
	GMSK (GPRS/EDGE 2 Uplink)			4
	GMSK (GPRS/EDGE 1 Uplink)			8.3
	SSMA (CDMA) ; QPSK(UMTS):			1
Antenna Type:	Internal integral			
Number of Antenna Positions:	WWAN ~ CDMA / UMTS / GSM			1 fixed
Power Supply Requirement:	3.7 V			
Battery Type(s):	Embedded Li-ion			

6.5.1. Operating Modes

The EUT was tested in the following operating mode(s) unless otherwise stated:

- GPRS850 – Data allocated mode with communication Test SET configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 5. Tested using 1 Uplink time slots with CS1 for GPRS.
- GPRS1900 – Data allocated mode with communication Test SET configured to allow the EUT to transmit at a maximum power using Power Control Level (PCL) setting of 0. Tested using 3Uplink time slots with CS1 for GPRS.

GSM850: Power Table Settings used for Test Set	
Power Control Level PCL	Nominal Power (dBm)
0 … 2	39
3	37
4	35
5	**33**
6	31
7	29
8	27
9	25
10	23
11	21
12	19
13	17
14	15
15	13
16	11
17	9
18	7
19 ... 31	5

PCS1900: Power Table Settings used for Test Set	
Power Control Level PCL	Nominal Power (dBm)
22 … 29	Reserved
30	33
31	32
0	**30**
1	28
2	26
3	24
4	22
5	20
6	18
7	16
8	14
9	12
10	10
11	8
12	6
13	4
14	2
15	0
16 … 21	Reserved

- UMTS FDD 2, 5 - RMC 12.2kbps allocated data mode with Communication Test Set configured to allow the EUT to transmit at a maximum as per KDB 941225 D01.
- CDMA BC0, BC1 - Radio Config 3, Service Option 32allocated data mode with Communication Test Set configured to allow the EUT to transmit at a maximum as per KDB 941225 D01.

6.6.Nominal and Maximum Output power:

Power Back-Off Not Supported

Bands	GPRS							
	Tx Slot 1		Tx Slot 2		Tx Slot 3		Tx Slot 4	
	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)
GSM850	33.0	-1.0 ~ +0.5	30.0	-1.0 ~ +0.5	28.2	-1.0 ~ +0.5	27.0	-1.0 ~ +0.5
Bands	**EDGE GMSK (MCS1-4)**							
GSM850	33.0	-1.0 ~ +0.5	30.0	-1.0 ~ +0.5	28.2	-1.0 ~ +0.5	27.0	-1.0 ~ +0.5
Bands	**EDGE 8PSK (MCS5-9)**							
GSM850	27.0	-1.0 ~ +0.5	24.0	-1.0 ~ +0.5	22.2	-1.0 ~ +0.5	21.0	-1.0 ~ +0.5

Bands	GPRS							
	Tx Slot 1		Tx Slot 2		Tx Slot 3		Tx Slot 4	
	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)
PCS1900	30.0	-1.0 ~ +0.5	27.0	-1.0 ~ +0.5	25.2	-1.0 ~ +0.5	24.0	-1.0 ~ +0.5
Bands	**EDGE GMSK (MCS1-4)**							
PCS1900	30.0	-1.0 ~ +0.5	27.0	-1.0 ~ +0.5	25.2	-1.0 ~ +0.5	24.0	-1.0 ~ +0.5
Bands	**EDGE 8PSK (MCS5-9)**							
PCS1900	26.0	-1.0 ~ +0.5	23.0	-1.0 ~ +0.5	21.2	-1.0 ~ +0.5	20.0	-1.0 ~ +0.5

Bands	CS		HS	
	Target (dBm)	Tolerance ± (dB)	Target (dBm)	Tolerance ± (dB)
UMTS FDD 2	24.0	-1.0 ~ + 0.5	24.0	-1.0 ~ + 0.5
UMTS FDD 5	24.0	-1.0 ~ + 0.5	24.0	-1.0 ~ + 0.5

Bands	Target (dBm)	Tolerance ± (dB)
CDMA BC0	24.0	-1.0 ~ + 0.5
CDMA BC1	24.0	-1.0 ~ + 0.5

Note:

1. As per KDB865664 D02 SAR Reporting v01, 2.1.4(a), the nominal and maximum average source based rated power, declared and supplied by manufacturer are shown in the above tables.
2. These are specified maximum allowed average power for all the wireless modes and frequencies bands supported.

6.7. RF Exposure Conditions (Test Configurations)

The EUT was tested in the following configuration(s) unless otherwise stated:

- Standalone fully charged battery powered.
- Ankle worn configurations were evaluated.

Ankle Worn Configuration

a) The EUT was placed in a normal operating position where the centre of EUT was aligned with the centre reference point on the flat section of the 'SAM' phantom.

b) With the EUT touching the phantom at an imaginary centre line. The EUT was aligned with a marked plane (X and Y axis) consisting of two lines.

c) For the touch-safe position the EUT was gradually moved towards the flat section of the 'SAM' phantom until any point of the EUT touched the phantom.

d) SAR measurements were evaluated at maximum power and the unit was operated for an appropriate period prior to the evaluation in order to minimise the drift.

e) The device was keyed to operate continuously in the transmit mode for the duration of the test.

f) The location of the maximum spatial SAR distribution (peak) was determined relative to the EUT and its antenna.

g) The EUT was transmitting at full power throughout the duration of the test powered by a fully charged battery.

6.8. SAR Test Exclusion Consideration

Technology Antenna	Configuration	Antenna-to-User Separation	Position	Evaluation Considered
WWAN	Ankle Worn	0mm	Front	Yes
			Back	Yes

Note:

1. The details for the ***Maximum Rated Power*** and tolerance(s) can be found in section 6.6.
2. Testing was not done on Bluetooth as it is not supported on this device

6.9. RF Output Average Power Measurement: 2G

6.9.1. GSM850

GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)				Frame Power (dB*m*)			
		1Uplink	2Uplink	3Uplink	4Uplink	1Uplink	2Uplink	3Uplink	4Uplink
128	824.2	33.5	30.5	28.5	26.9	24.5	24.5	24.2	23.9
190	836.6	33.5	30.5	28.6	27.1	24.5	24.5	24.3	24.1
251	848.8	33.5	30.4	28.3	27.2	24.5	24.4	24.0	24.2
EDGE (GMSK) – Coding Scheme: MCS4									
128	824.2	33.5	30.4	28.4	26.7	24.5	24.4	24.1	23.7
190	836.6	33.5	30.5	28.6	26.7	24.5	24.5	24.3	23.7
251	848.8	33.5	30.5	28.6	26.7	24.5	24.5	24.3	23.7
EDGE (8PSK) – Coding Scheme: MCS9									
128	824.2	27.4	24.2	22.6	21.5	18.4	18.2	18.3	18.5
190	836.6	27.5	24.3	22.7	21.5	18.5	18.3	18.4	18.5
251	848.8	27.3	24.2	22.6	21.5	18.3	18.2	18.3	18.5

6.9.2.PCS1900

GPRS (GMSK) – Coding Scheme: CS1

Channel Number	Frequency (MHZ)	Avg Burst Power (dBm)				Frame Power (dB*m*)			
		1Uplink	2Uplink	3Uplink	4Uplink	1Uplink	2Uplink	3Uplink	4Uplink
512	1850.2	30.1	27.1	25.7	24.3	21.1	21.1	21.4	21.3
661	1880.0	29.7	26.9	25.2	23.7	20.7	20.9	20.9	20.7
810	1909.8	29.6	26.6	24.8	23.6	20.6	20.6	20.5	20.6
EDGE (GMSK) – Coding Scheme: MCS4									
512	1850.2	29.8	27.3	25.5	24.3	20.8	21.3	21.2	21.3
661	1880.0	29.6	26.8	24.9	23.7	20.6	20.8	20.6	20.7
810	1909.8	29.6	26.6	24.8	23.6	20.6	20.6	20.5	20.6
EDGE (8PSK) – Coding Scheme: MCS9									
512	1850.2	26.2	23.2	21.6	20.3	17.2	17.2	17.3	17.3
661	1880.0	25.7	22.6	21.0	19.7	16.7	16.6	16.7	16.7
810	1909.8	25.6	22.6	20.8	19.6	16.6	16.6	16.5	16.6

Note:

Scale factor for uplink time slot:

1. 1 Uplink: time slot ratio = 8:1 => 10*log(8/1) = **9.03 dB**
2. 2 Uplink: time slot ratio = 8:2 => 10*log(8/2) = **6.02 dB**
3. 3 Uplink: time slot ratio = 8:3 => 10*log(8/3) = **4.26 dB**
4. 4 Uplink: time slot ratio = 8:4 => 10*log(8/4) = **3.01 dB**

6.10. RF Output Average Power Measurement: WCDMA

6.10.1. RMC / HSDPA / HSUPA
Power Back-off Not Supported

Modes		HSDPA				HSUPA					WCDMA
Sets		1	2	3	4	1	2	3	4	5	Voice / RMC 12.2kbps
Band	Channel	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]	Power [dBm]
1900 (Band 2)	9262 9662	23.4	23.4	22.9	23.0	23.1	21.4	22.0	22.3	22.2	23.7
	9400 9800	23.2	23.2	22.8	22.8	23.0	21.4	22.2	21.7	21.6	23.5
	9538 9938	23.2	23.2	22.8	22.7	22.6	21.7	22.1	22.0	22.0	23.4
850 (Band 5)	4132 4357	23.1	23.1	22.8	22.7	22.8	21.8	21.6	21.9	21.9	23.4
	4183 4408	23.0	23.0	22.6	22.5	22.1	21.5	21.4	21.5	21.1	23.4
	4233 4458	23.1	23.0	22.7	22.5	22.7	21.5	21.5	21.9	21.5	23.3

The module power levels were measured in both HSPA and 3G RMC 12.2kbps modes and compared to ensure the correct mode of operation had been established.

The following tables taken from FCC 3G SAR procedures (KDB 941225 D01 SAR test for 3G devices v02) below were applied using an Agilent 8960 series 10 wireless communications test set which supports 3G / HSDPA release 5 / HSUPA release 6.

Sub-test Setup for Release 5 HSDPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	SM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \boldsymbol{\beta}_{hs}/\beta_c = 30/15 \Leftrightarrow \boldsymbol{\beta}_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $B_{hs}/\beta_c = 24/15$

Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

Sub-test Setup for Release 6 HSUPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	B_{oc}	B_{od}	B_{od} *(SF)*	B_{od} *(codes)*	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	31/15	B_{a11}: 47/15 B_{a12}: 47/15	4	1	2.0	1.0	15	92
4	2/15	15/15	64	2/15	2/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	24/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \boldsymbol{\beta}_{hs}/\beta_c = 30/15 \Leftrightarrow \boldsymbol{\beta}_{hs} = 30/15 * \beta_c$

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

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

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

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Tavle 5.1g.

Note 6: B_{od} can not be set directly; it is set by Absolute Grant Value.

6.11. RF Output Average Power Measurement: CDMA

CDMA BC0

Channel Number	Frequency (MHZ)	S032 F-SCH TX Power (dBm)	S032 SCH TX Power (dBm)	Note
1013	824.70	23.9	23.9	Conducted, DBPSK
384	836.52	23.8	23.8	Conducted, DBPSK
777	848.31	23.4	23.4	Conducted, DBPSK

CDMA BC1

Channel Number	Frequency (MHZ)	S032 F-SCH TX Power (dBm)	S032 SCH TX Power (dBm)	Note
25	1825.21	24.5	24.5	Conducted, DBPSK
600	1880.00	24.5	24.5	Conducted, DBPSK
1175	1908.75	24.4	24.5	Conducted, DBPSK

7. System Check and Dielectric Parameters

See Appendix 5 and Appendix 6 for tables and measurements.

8. Measurements, Examinations and Derived Results

8.1. General Comments

This section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to section 8 for details of measurement uncertainties.

8.2. Specific Absorption Rate - Test Results
For All SAR measurement in this report the SAR limit tested to is 4.0 W/Kg

8.2.1.GSM 850 Ankle-Worn Configuration 10g

Max Reported SAR = 1.380 (W/kg)

					For LTE Only		Power (dBm)		10g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK	0.0	Front	190	836.6	N/A	N/A	33.5	33.5	0.474	0.474	1	1
GMSK	0.0	Back	190	836.6	N/A	N/A	33.5	33.5	1.380	1.380	1, 2	2
GMSK	0.0	Back	128	824.2	N/A	N/A	33.5	33.5	1.210	1.210	1, 2	3
GMSK	0.0	Back	251	848.8	N/A	N/A	33.5	33.5	1.340	1.340	1, 2	4

Note(s):

1. Data - SAR measurements were performed using 1 uplink timeslots
2. Highest measured 10g-SAR configuration was also measured on the low and high channels.

*KDB 941225 D03 - SAR is not required for EDGE technology when the maximum average output power is lower than that measured on the corresponding GPRS channels.

8.2.2. GPRS 1900 Ankle-Worn Configuration 10g

Max Reported SAR = 1.833 (W/kg)

					For LTE Only		Power (dBm)		10g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
GMSK	0.0	Front	512	1850.2	N/A	N/A	25.7	25.7	0.323	0.323	1	5
GMSK	0.0	Back	512	1850.2	N/A	N/A	25.7	25.7	1.080	1.080	1, 2	6
GMSK	0.0	Back	661	1880.0	N/A	N/A	25.7	25.2	1.420	1.593	1, 2	7
GMSK	0.0	Back	810	1909.8	N/A	N/A	25.7	24.8	1.490	1.833	1, 2	8

Note(s):

1. Data - SAR measurements were performed using 3 uplink timeslots
2. Highest measured 10g-SAR configuration was also measured on the low and high channels.

*KDB 941225 D03 - SAR is not required for EDGE technology when the maximum average output power is lower than that measured on the corresponding GPRS channels.

8.2.3.UMTS FDD 2 Ankle-Worn Configuration 10g

Max Reported SAR = 2.783 (W/kg)

					For LTE Only		Power (dBm)		10g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
QPSK	0.0	Front	9400	1880.0	N/A	N/A	24.5	23.5	0.388	0.488	1	9
QPSK	0.0	Back	9400	1880.0	N/A	N/A	24.5	23.5	1.630	2.052	1, 2	10
QPSK	0.0	Back	9262	1852.4	N/A	N/A	24.5	23.7	1.680	2.020	1, 2	11
QPSK	0.0	Back	9538	1907.6	N/A	N/A	24.5	23.4	2.160	2.783	1, 2	12

Note(s):

1. Circuit Switch (CS) - RMC 12.2kbps with Test loop mode 1 and TPC bits configured to All "1's"
2. Highest measured 10g-SAR configuration was also measured on the low and high channels.

*KDB 941225 D02 – SAR is not required for RMC+HSPA (HSDPA/HSUPA) channels when the maximum average output power is less than ¼ dB higher than that measured on the corresponding RMC channels and 1g SAR level reported in 'RMC 12.2kbps' is <75% SAR limit.

8.2.4. UMTS FDD 5 Ankle-Worn Configuration 10g

Max Reported SAR = 2.109 (W/kg)

					For LTE Only		Power (dBm)		10g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
QPSK	0.0	Front	4183	836.6	N/A	N/A	24.5	23.4	0.554	0.714	1	13
QPSK	0.0	Back	4183	836.6	N/A	N/A	24.5	23.4	1.250	1.610	1, 2	14
QPSK	0.0	Back	4132	826.4	N/A	N/A	24.5	23.4	1.300	1.675	1, 2	15
QPSK	0.0	Back	4233	846.6	N/A	N/A	24.5	23.3	1.600	2.109	1, 2	16

Note(s):

1. Circuit Switch (CS) - RMC 12.2kbps with Test loop mode 1 and TPC bits configured to All "1's"
2. Highest measured 10g-SAR configuration was also measured on the low and high channels.

*KDB 941225 D02 – SAR is not required for RMC+HSPA (HSDPA/HSUPA) channels when the maximum average output power is less than ¼ dB higher than that measured on the corresponding RMC channels and 1g SAR level reported in 'RMC 12.2kbps' is <75% SAR limit.

8.2.5.CDMA BC 0 Ankle-Worn Configuration 10g

Max Reported SAR = 2.033 (W/kg)

					For LTE Only		Power (dBm)		10g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
SSMA	0.0	Front	384	836.52	N/A	N/A	24.5	23.8	0.665	0.781	1	17
SSMA	0.0	Back	384	836.52	N/A	N/A	24.5	23.8	1.730	2.033	1, 2	18
SSMA	0.0	Back	1013	824.70	N/A	N/A	24.5	23.9	1.250	1.435	1, 2	19
SSMA	0.0	Back	777	848.31	N/A	N/A	24.5	23.4	1.200	1.546	1, 2	20

Note(s):

1. Data - Radio Config 3, Service Option 32
2. Highest measured 10g-SAR configuration was also measured on the low and high channels.

8.2.6. CDMA BC 1 Ankle-Worn Configuration 10g

Max Reported SAR = 3.080 (W/kg)

					For LTE Only		Power (dBm)		10g : SAR Results (W/kg)			
Mode or Modulation	Dist (mm)	Test Position	Channel No.	Freq (MHz)	RB Allocation	RB Offset	Tune-up limit	Meas.	Meas.	Scaled	Note(s)	Scan No.
SSMA	0.0	Front	600	1880.00	N/A	N/A	24.5	24.5	0.548	0.548	1	21
SSMA	0.0	Back	600	1880.00	N/A	N/A	24.5	24.5	1.880	1.880	1, 2	22
SSMA	0.0	Back	25	1851.25	N/A	N/A	24.5	24.5	2.620	2.620	1, 2	23
SSMA	0.0	Back	1175	1908.75	N/A	N/A	24.5	24.5	3.080	3.080	1, 2	24

Note(s):

1. Data - Radio Config 3, Service Option 32
2. Highest measured 10g-SAR configuration was also measured on the low and high channels.

9. SAR measurement variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

9.1. Repeated Measurement Results

Exposure Configuration	Technology Band	Measured 1g -SAR (W/Kg)	Equipment Class	Max Meas. Source base Avg Power [dBm]	Ratio of Largest to Smallest SAR Measured
ANKLE-WORN (Separation Distance 0mm)	GSM850	1.380	PCE	33.5	1.01
		1.370			
	PCS1900	1.490	PCE	30.5	1.10
		1.360			
	UMTS FDD 2	2.160	PCE	24.5	1.09
		1.990			
	UMTS FDD 5	1.600	PCE	24.5	1.07
		1.490			
	CDMA BC 0	1.730	PCE	24.5	1.12
		1.540			
	CDMA BC 1	2.950	PCE	24.5	1.08
		2.720			

Appendix 1. Test Equipment Used

UL No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A034	Narda 20W Termination	Narda	374BNM	8706	Calibrated as part of system	-
A1097	SMA Directional Coupler	MiDISCO	MDC6223-30	None	Calibrated as part of system	-
A1137	3dB Attenuator	Narda	779	04690	Calibrated as part of system	-
A1174	Dielectric Probe Kit	Agilent Technologies	85070C	Us99360072	Calibrated before use	-
A1328	Handset Positioner	Schmid & Partner Engineering AG	Modification	SD 000 H01 DA	-	-
A1182	Handset Positioner	Schmid & Partner Engineering AG	V3.0	None	-	-
A1184	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	394	16 May 2014	12
A1186	Probe	Schmid & Partner Engineering AG	ET3DV6	1529	22 May 2014	12
A2201	900 MHz Dipole Kit	Schmid & Partner Engineering AG	D900V2	035	20 Jan 2014	12
A2200	1900 MHz Dipole Kit	Schmid & Partner Engineering AG	D1900V2	537	22 Jan 2014	12
A1497	Amplifier	Mini-Circuits	zhl-42w (sma)	e020105	Calibrated as part of system	-
A1566	SAM Phantom	Schmid & Partner Engineering AG	SAM a (Site 56)	002	Calibrated before use	-
A1238	SAM Phantom	Schmid & Partner Engineering AG	SAM b (Site 56)	001	Calibrated before use	-
A215	20 dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
A1531	Antenna	AARONIA AG	7025	02458	-	-
A2263	Digital Camera	Samsung	PL211	9453C90B 607487L	-	-
M1015	Network Analyser	Agilent Technologies	8753ES	US39172406	04 Oct 2013	12
C1145	Cable	Rosenberger MICRO-COAX	FA147A F003003030	41843-1	Calibrated as part of system	-
G0528	Robot Power Supply	Schmid & Partner Engineering AG	DASY4	None	Calibrated before use	-
G087	PSU	Thurlby Thandar	CPX200	100701	Calibrated before use	-
M1047	Robot Arm	Staubli	RX908 L	F00/SD8 9A1/A/01	Calibrated before use	-
M1839	Signal Generator	R&S	SME06	837633/001	15 Apr 2014	12
M1838	Signal Generator	R&S	SME06	831377/005	14 Apr 2014	12
M1023	Dual Channel Power Meter	R & S	NRVD	863715/030	01 May 2014	12
M1840	Dual Channel Power Meter	R & S	NRVD	844860/040	16 Apr 2014	12
M1634	Power Sensor	R & S	NRV-Z1	860462/016	02 May 2014	12
M1855	Power Sensor	R & S	NRP-Z51	103246	06 May 2014	12
M1270	Digital Thermometer	R & S	N/A	N/A	Internal Cal 06 May 2014	12

UL No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
S0566	SAR Lab	UL	Site 56	N/A	Calibrated before use	-

A.1.1. Calibration Certificates

This section contains the calibration certificates and data for the Probe(s) and Dipole(s) used, which are not included in the total number of pages for this report.

Checked By 13/06/14

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

A1186

Client UL RFI UK

Certificate No: ET3-1529_May14

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1529

Calibration procedure(s): QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: May 22, 2014

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 22, 2014

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ET3DV6

SN:1529

Manufactured: March 21, 2000
Calibrated: May 22, 2014

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1529

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.69	1.91	1.80	± 10.1 %
DCP (mV)[B]	113.9	98.0	99.0	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	235.7	±3.0 %
		Y	0.0	0.0	1.0		226.3	
		Z	0.0	0.0	1.0		224.2	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1529

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	41.9	0.89	6.60	6.60	6.60	0.44	2.27	± 12.0 %
835	41.5	0.90	6.28	6.28	6.28	0.28	3.00	± 12.0 %
900	41.5	0.97	6.15	6.15	6.15	0.38	2.46	± 12.0 %
1450	40.5	1.20	5.23	5.23	5.23	0.53	2.94	± 12.0 %
1750	40.1	1.37	5.08	5.08	5.08	0.80	2.20	± 12.0 %
1900	40.0	1.40	4.76	4.76	4.76	0.80	2.21	± 12.0 %
2100	39.8	1.49	4.80	4.80	4.80	0.80	2.24	± 12.0 %
2300	39.5	1.67	4.36	4.36	4.36	0.80	2.02	± 12.0 %
2450	39.2	1.80	4.08	4.08	4.08	0.85	2.10	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1529

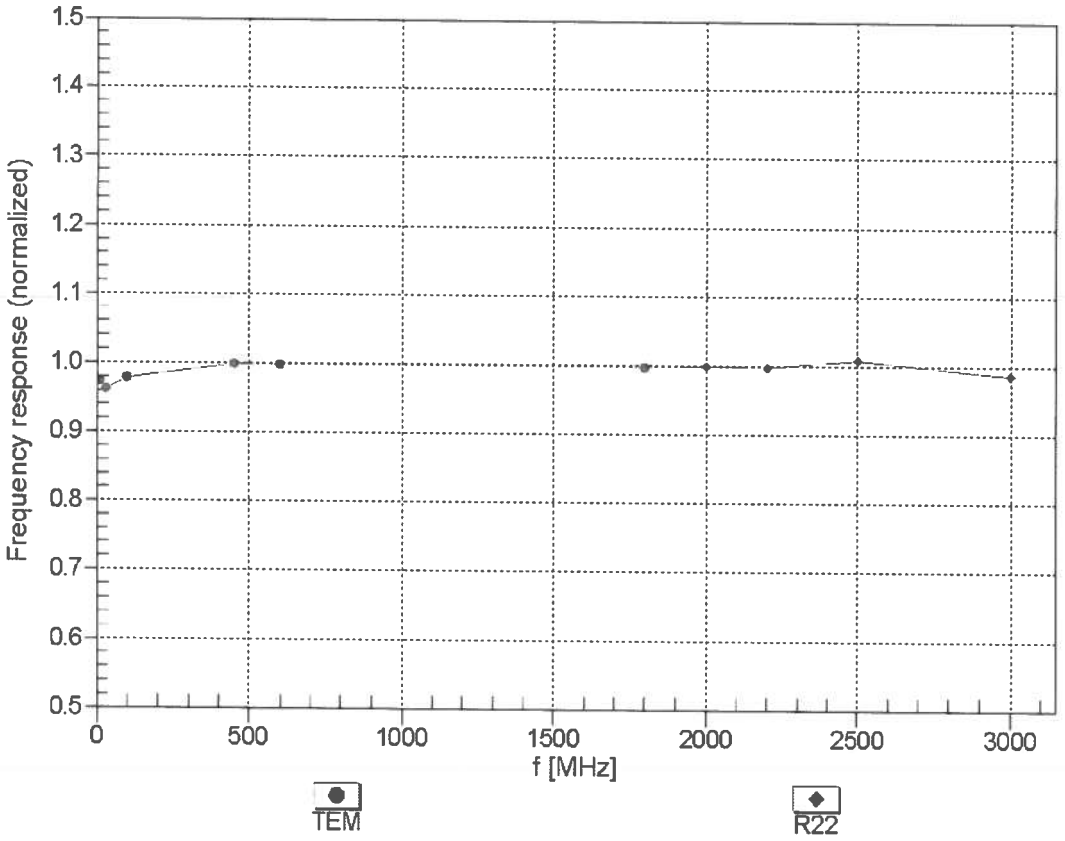
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	55.5	0.96	6.15	6.15	6.15	0.44	2.22	± 12.0 %
835	55.2	0.97	6.00	6.00	6.00	0.35	2.67	± 12.0 %
900	55.0	1.05	5.85	5.85	5.85	0.55	2.40	± 12.0 %
1450	54.0	1.30	4.92	4.92	4.92	0.80	1.99	± 12.0 %
1750	53.4	1.49	4.66	4.66	4.66	0.80	2.31	± 12.0 %
1900	53.3	1.52	4.46	4.46	4.46	0.80	2.28	± 12.0 %
2100	53.2	1.62	4.57	4.57	4.57	0.80	2.05	± 12.0 %
2300	52.9	1.81	4.18	4.18	4.18	0.80	1.64	± 12.0 %
2450	52.7	1.95	3.95	3.95	3.95	0.55	2.05	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field

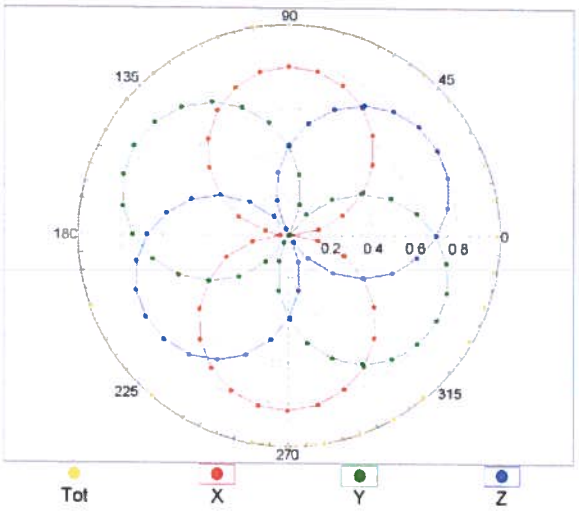
(TEM-Cell:ifi110 EXX, Waveguide: R22)



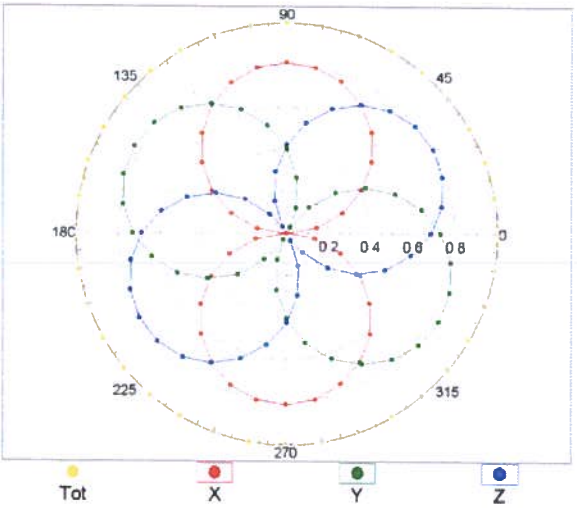
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

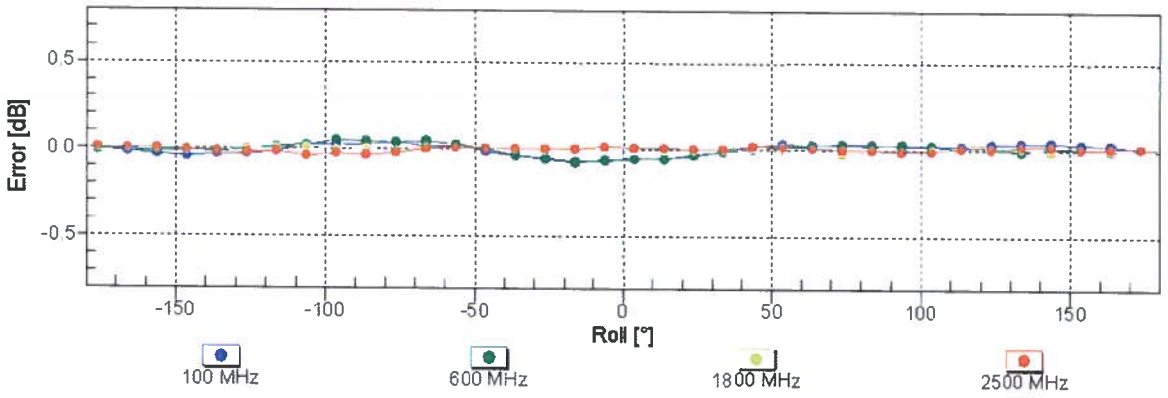
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

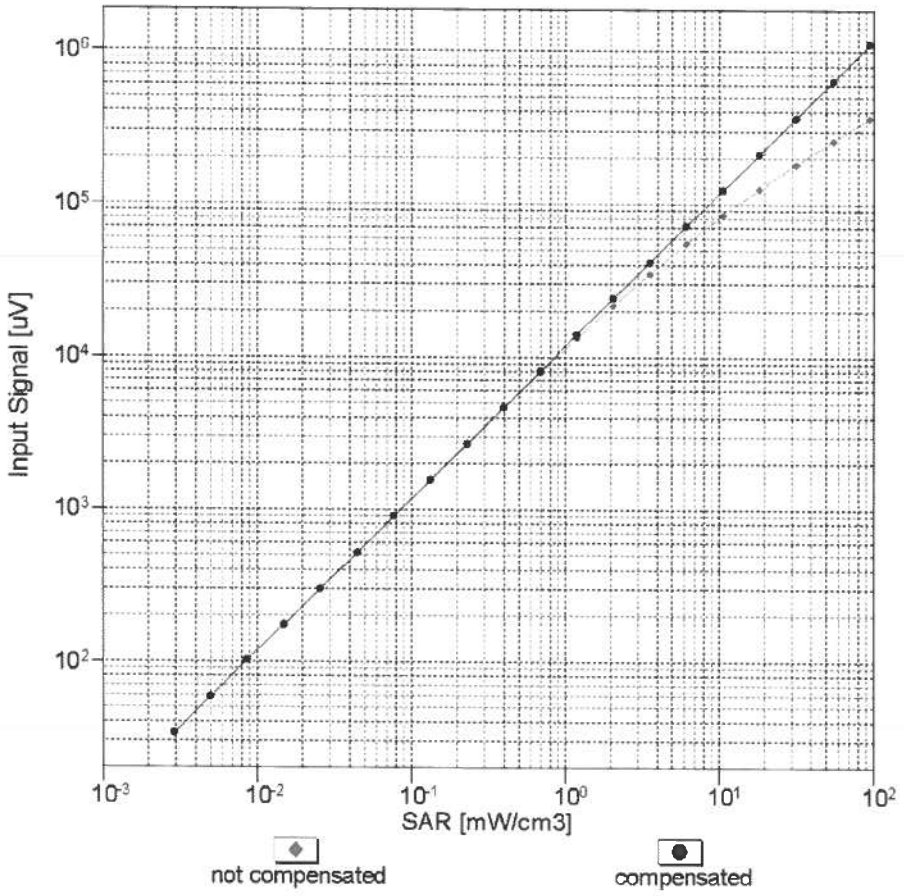


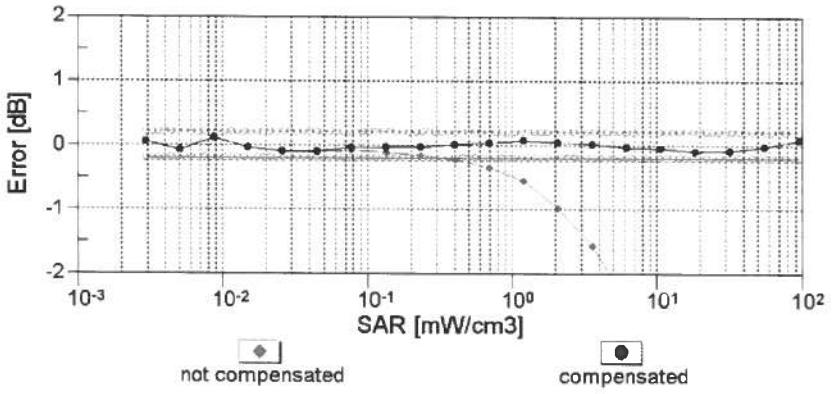


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)

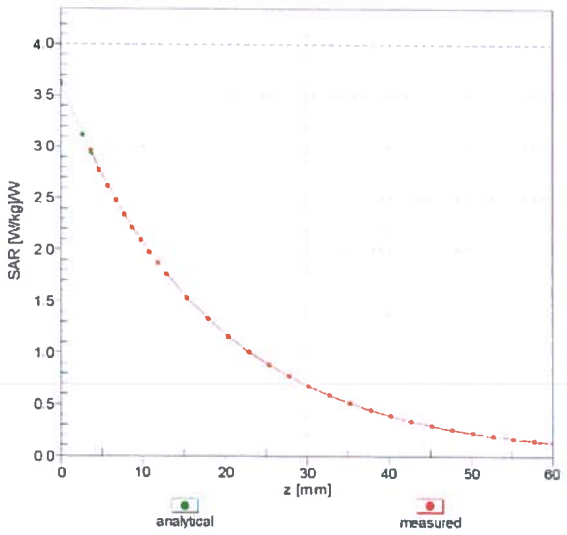




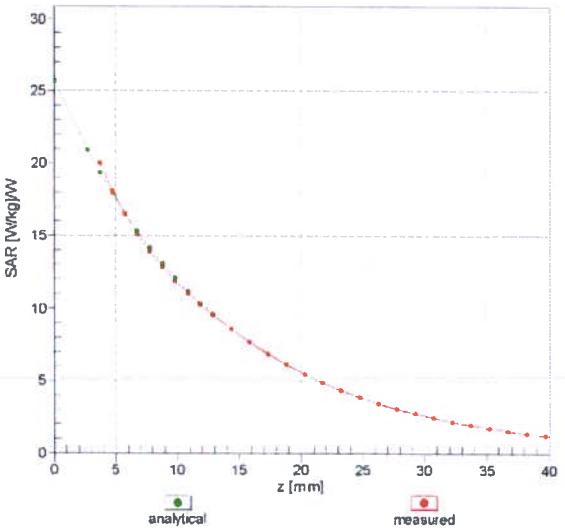
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

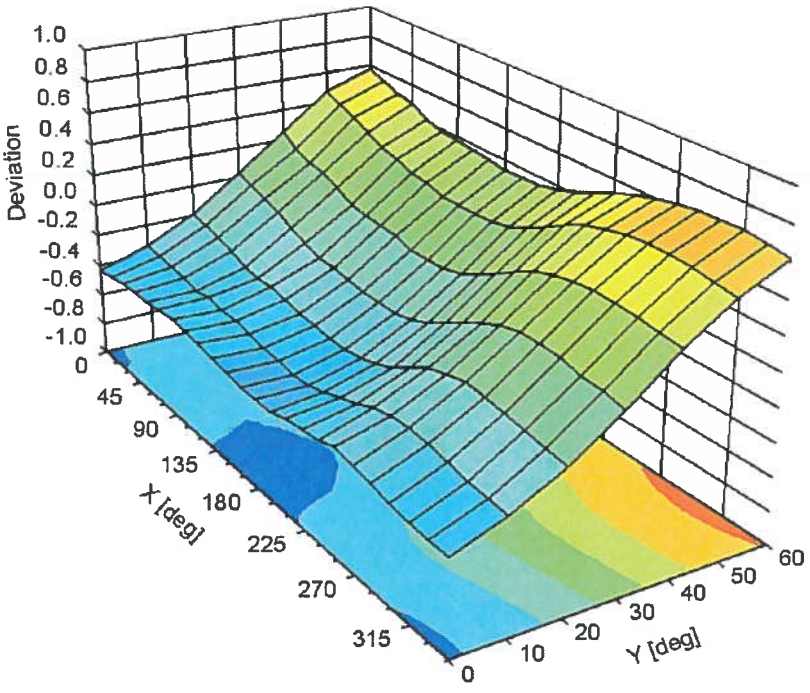


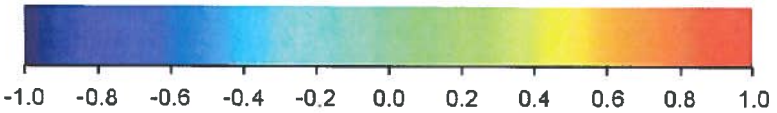
f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1529

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-6.3
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

checked by R. Thus A1329 DATE: 21-JUNE-2013

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client UL-RFI

Certificate No: D900V2-185_May13

CALIBRATION CERTIFICATE

Object: D900V2 - SN: 185

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: May 22, 2013

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 22, 2013

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.2 ± 6 %	0.97 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.73 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**10.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.75 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.97 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.4 ± 6 %	1.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.63 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**10.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.71 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.95 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω - 8.8 jΩ
Return Loss	- 21.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.9 Ω - 8.1 jΩ
Return Loss	- 20.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.403 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 27, 2003

DASY5 Validation Report for Head TSL

Date: 21.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 185

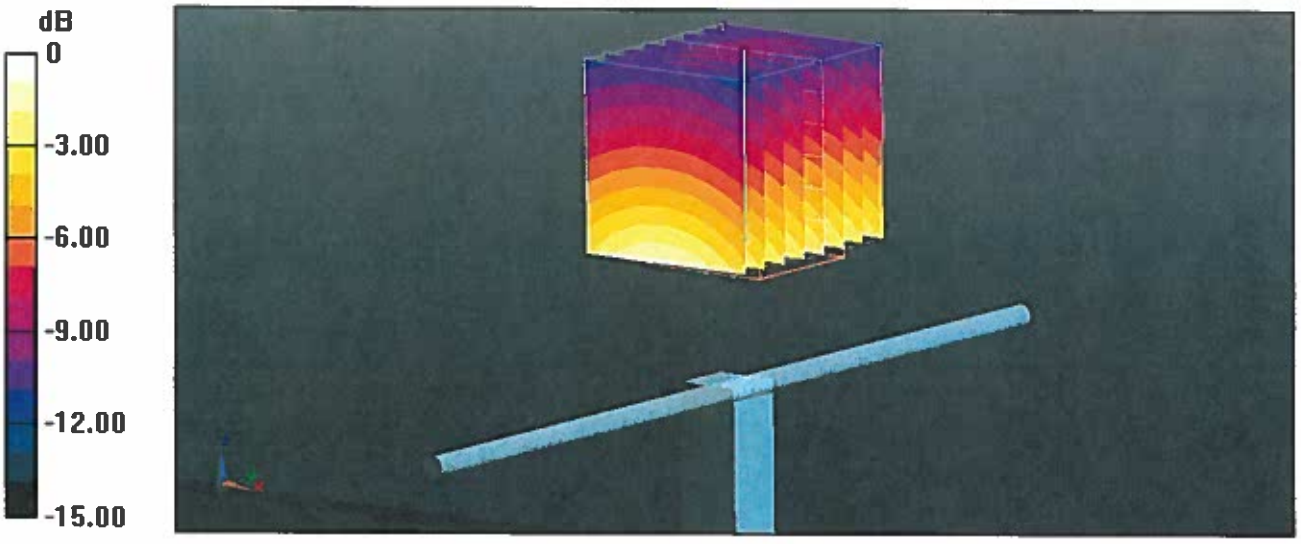
Communication System: UID 0 - CW ; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 0.97 S/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.95, 5.95, 5.95); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

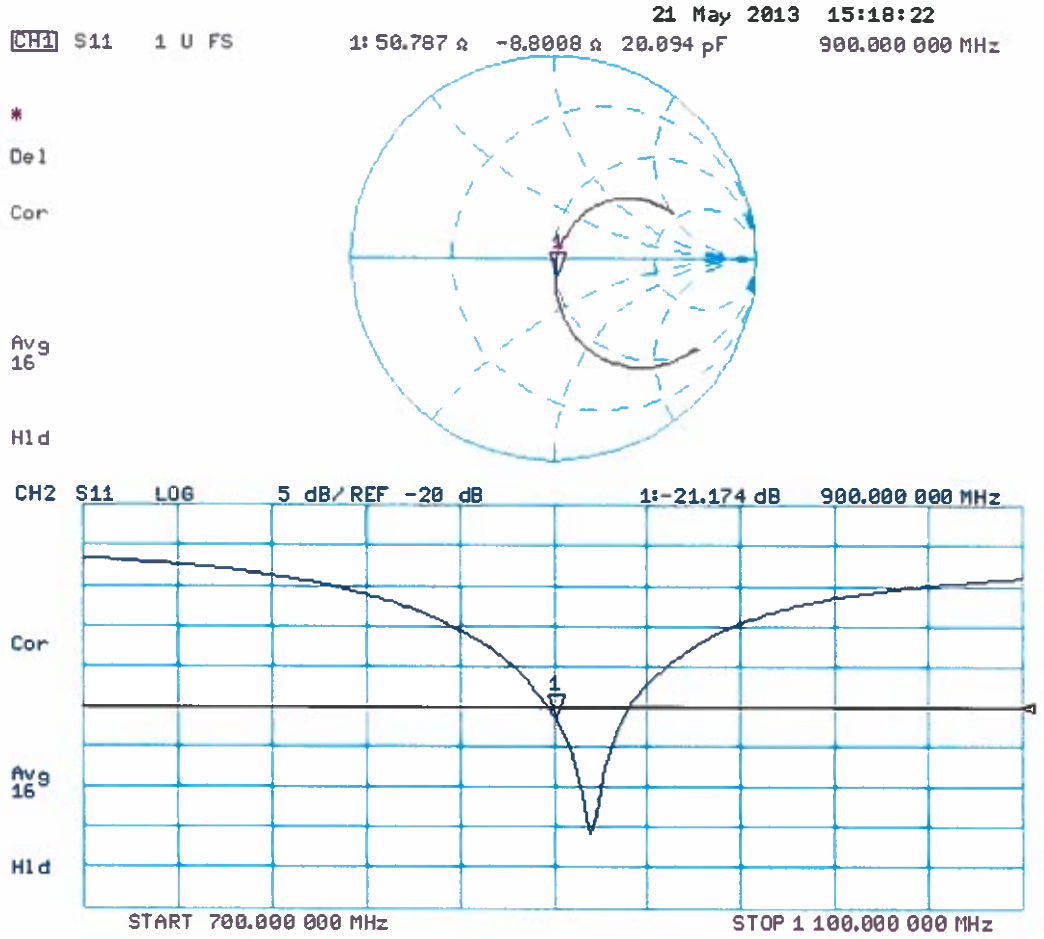
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x8x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.912 V/m; Power Drift = -0.27 dB
Peak SAR (extrapolated) = 4.18 W/kg
SAR(1 g) = 2.73 W/kg; SAR(10 g) = 1.75 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 185

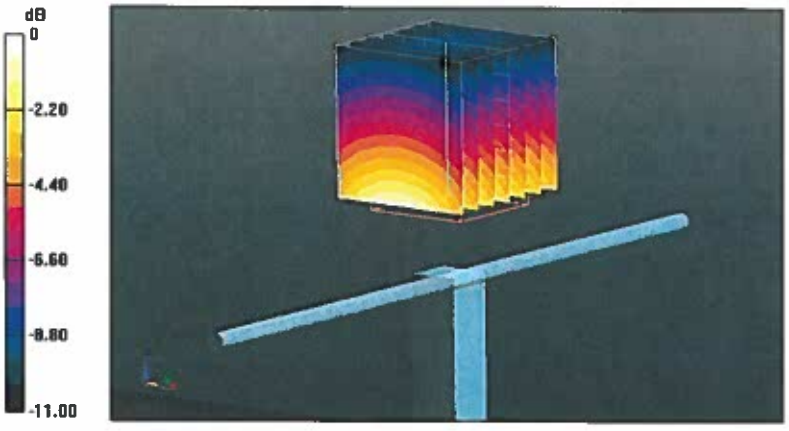
Communication System: UID 0 - CW ; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 1.02 S/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.95, 5.95, 5.95); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

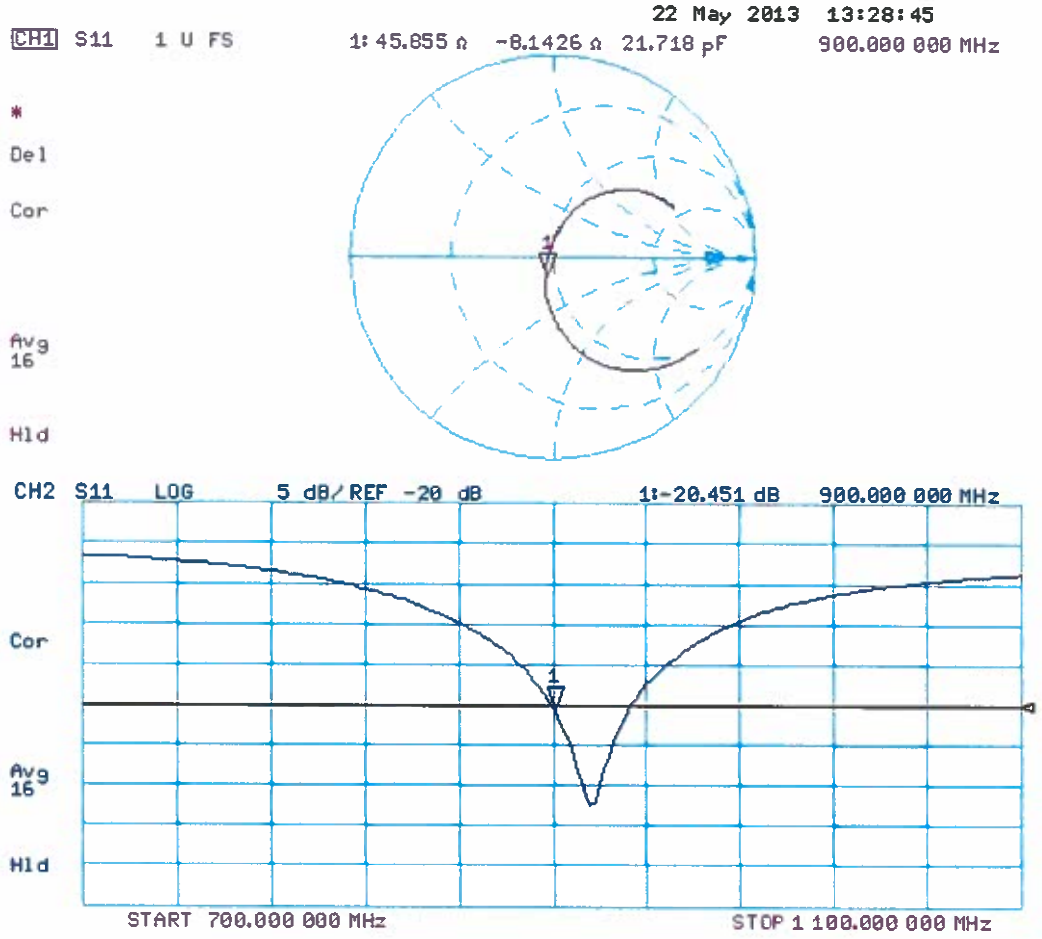
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.028 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.89 W/kg
SAR(1 g) = 2.63 W/kg; SAR(10 g) = 1.71 W/kg
Maximum value of SAR (measured) = 3.09 W/kg



0 dB = 3.09 W/kg = 4.90 dBW/kg

Impedance Measurement Plot for Body TSL



Checked by A1237 DATE: 24-JUNE-2013

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client UL-RFI

Certificate No: D1900V2-540_May13

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 540
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 23, 2013

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 24, 2013

Calibration Laboratory of
Schmid & Partner
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.3 ± 6 %	1.35 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.4 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.6 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**41.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.9 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω + 4.6 jΩ
Return Loss	- 24.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω + 5.0 jΩ
Return Loss	- 25.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.120 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 26, 2001

DASY5 Validation Report for Head TSL

Date: 23.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 540

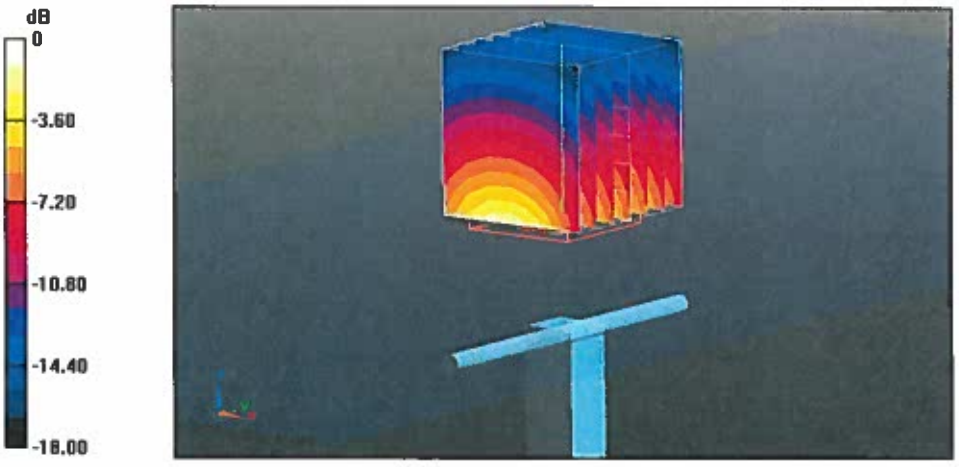
Communication System: UID 0 - CW ; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.35 S/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.98, 4.98, 4.98); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

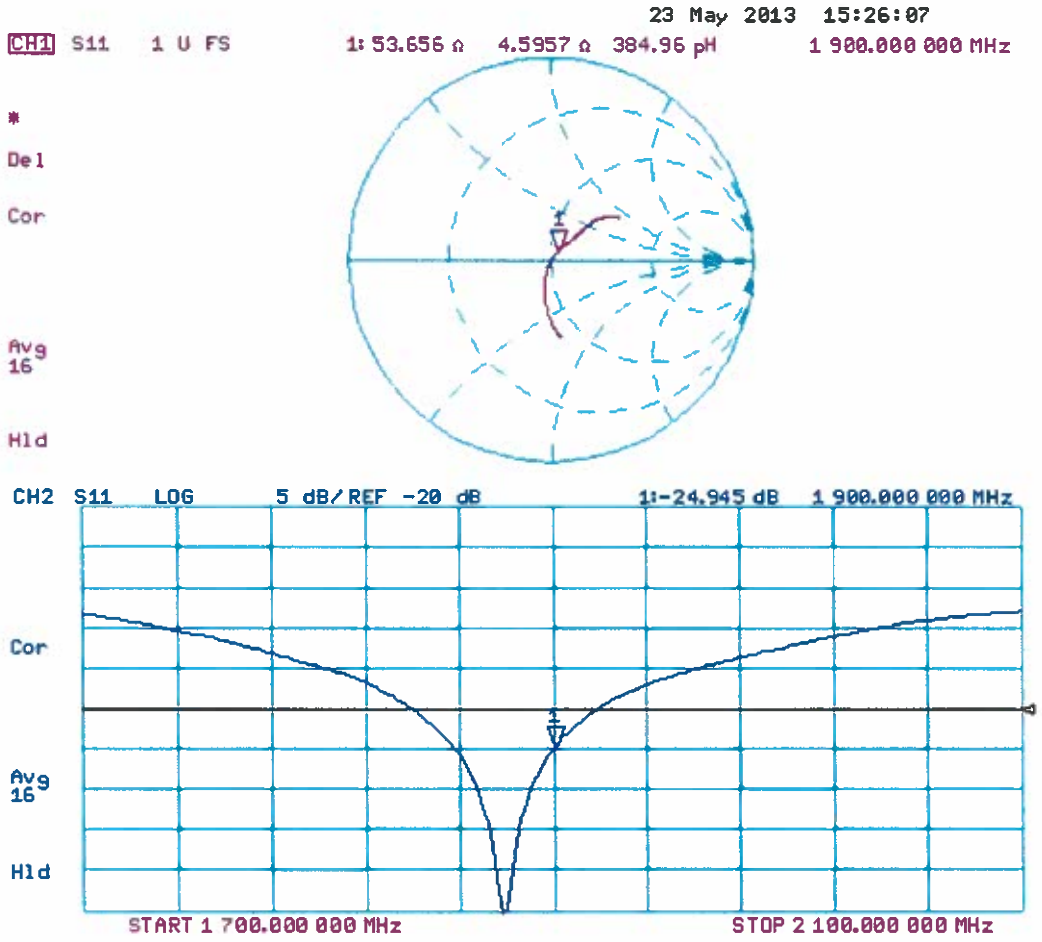
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.521 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 10 W/kg; SAR(10 g) = 5.28 W/kg
Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4 W/kg = 10.93 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.05.2013

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 540

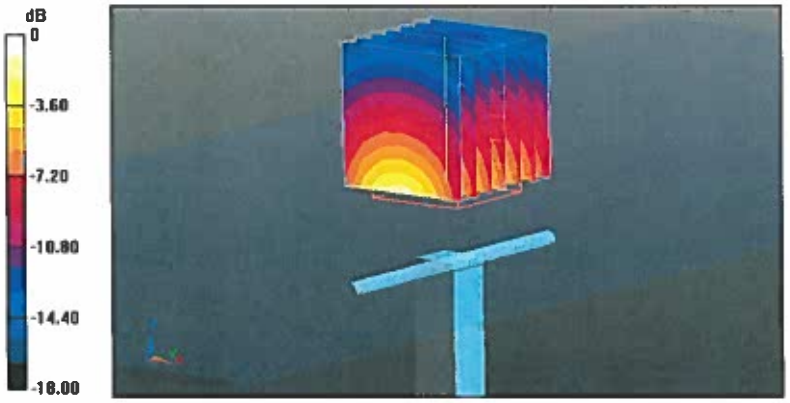
Communication System: UID 0 - CW ; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.49 S/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.6, 4.6, 4.6); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

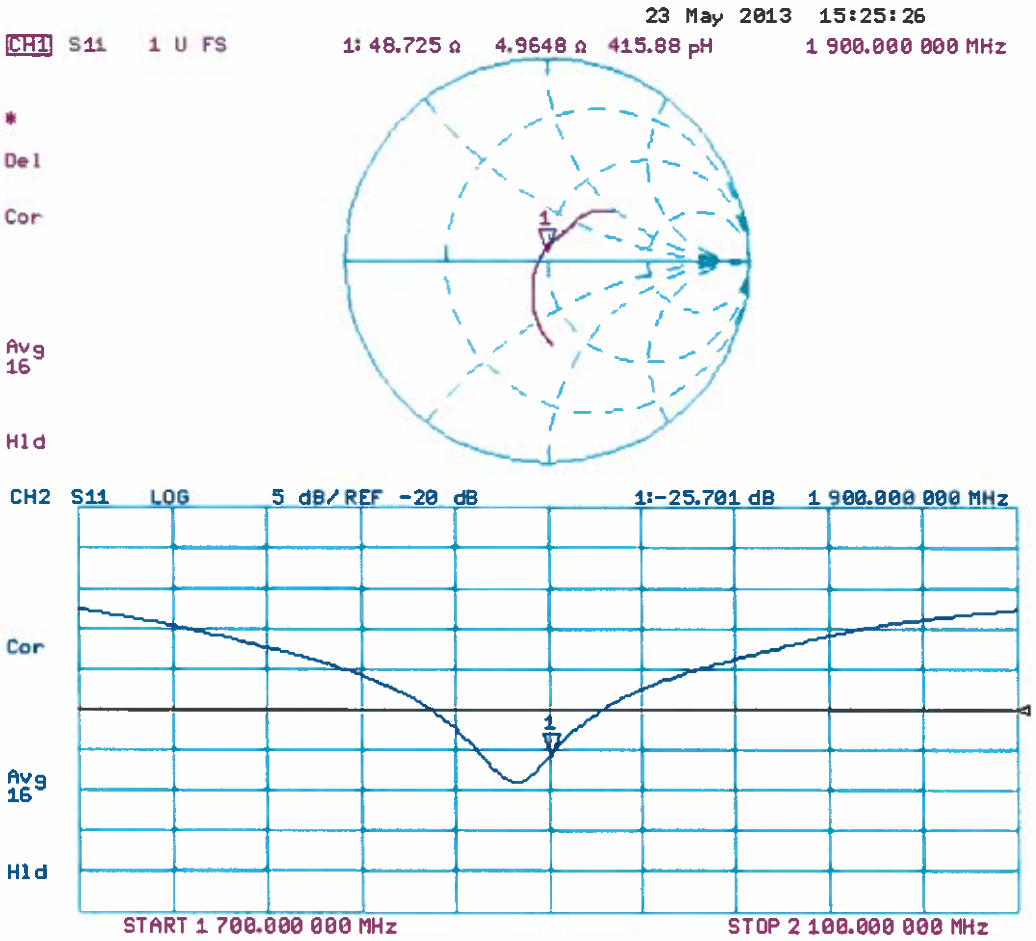
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.521 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.44 W/kg
Maximum value of SAR (measured) = 12.7 W/kg



0 dB = 12.7 W/kg = 11.04 dBW/kg

Impedance Measurement Plot for Body TSL



Appendix 2. Measurement Methods

A.2.1. Evaluation Procedure

The Specific Absorption Rate (SAR) evaluation was performed in the following manner:

a) (i) The evaluation was performed in an applicable area of the phantom depending on the type of device being tested. For devices worn about the ear during normal operation, both the left and right ear positions were evaluated at the centre frequency of the band at maximum power. The side, which produced the greatest SAR, determined which side of the phantom would be used for the entire evaluation. The positioning of the head worn device relative to the phantom was dictated by the test specification identified in section 3.1 of this report.

(ii) For body worn devices or devices which can be operated within 20 cm of the body, the flat section of the SAM phantom was used were the size of the device(s) is normal. for bigger devices and base station the 2mm Oval phantom is used for evaluation. The type of device being evaluated dictated the distance of the EUT to the outer surface of the phantom flat section.

b) The SAR was determined by a pre-defined procedure within the DASY4 software. The exposed region of the phantom was scanned near the inner surface with a grid spacing of 20mm x 20mm or appropriate resolution.

c) A 5x5x7 matrix for measurement < 2.0 GHz, 7x7x7 matrix for measurement 2.0 GHz to 3.0 GHz, and 7x7x12 for > 5.0 GHz was performed around the greatest spatial SAR distribution found during the area scan of the applicable exposed region. SAR values were then calculated using a 3-D spline interpolation algorithm and averaged over spatial volumes of 1 and 10 grams.

d) If the EUT had any appreciable drift over the course of the evaluation, then the EUT was re-evaluated. Any unusual anomalies over the course of the test also warranted a re-evaluation.

A.2.2. Specific Absorption Rate (SAR) Measurements to 865664 D01 SAR Measurement 100 MHz to 6MHz

Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

SAR measurements were performed in accordance with IEEE 1528 and FCC KDB procedures, against appropriate limits for each measurement position in accordance with the standard. In some cases the FCC was contacted using a PBA or KDB process to ensure test is performed correctly.

The test was performed in a shielded enclosure with the temperature controlled to remain between +18.0ºC and +25.0ºC. The tissue equivalent material fluid temperature was controlled to give a maximum variation of ± 2.0ºC

Prior to any SAR measurements on the EUT, system Check and material dielectric property measurements were conducted. In the absence of a detailed procedure within the specification, system Check and material dielectric property measurements were performed in accordance with FCC KDB publication 865664 D01.

Following the successful system Check and material dielectric property measurements, a SAR versus time sweep shall be performed within 10 mm of the phantom inner surface. If the EUT power output is stable after three minutes then the measurement probe will perform a coarse surface level scan at each test position in order to ascertain the location of the maximum local SAR level. Once this area had been established, a 5x5x7 cube of 175 points for frequency below 2.0 GHz, above 2.0GHz up to 3.0 GHz 7x7x7 cube of 343 points and a 7x7x12 cube of 588 points for frequency 5.0 GHz and above will be centred at the area of concern. Extrapolation and interpolation will then be carried out on the 27g of tissue and the highest averaged SAR over a 1g cube determined.

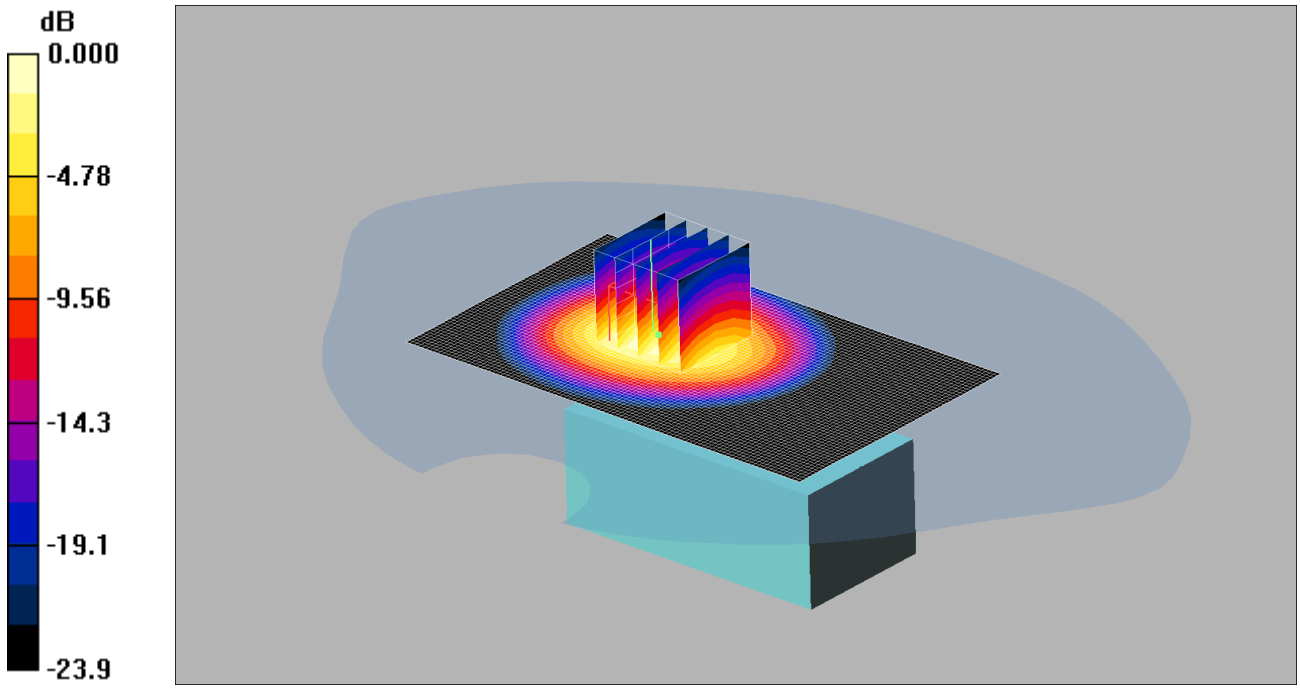
Once the maximum interpolated SAR measurement is complete; the coarse scan is visually assessed to check for secondary peaks within 50% of the maximum SAR level. If there are any further SAR measurements required, extra 5x5x7 or 7x7x7 or 7x7x12 cubes shall be centred on each of these extra local SAR maxima.

At the end of each position test case a second time sweep shall be performed to check whether the EUT has remained stable throughout the test.

Appendix 3. SAR Distribution Scans

Scan Reference Number	Title
001	Front of EUT Facing Phantom GSM 850 GPRS CH190
002	Back of EUT Facing Phantom GSM 850 GPRS CH190
003	Back of EUT Facing Phantom GSM 850 GPRS CH128
004	Back of EUT Facing Phantom GSM 850 GPRS CH251
005	Front of EUT Facing Phantom PCS1900 GPRS CH512
006	Back of EUT Facing Phantom PCS1900 GPRS CH512
007	Back of EUT Facing Phantom PCS1900 GPRS CH661
008	Back of EUT Facing Phantom PCS1900 GPRS CH810
009	Front of EUT Facing Phantom UMTS-FDD 2 CH9400
010	Back of EUT Facing Phantom UMTS-FDD 2 CH9400
011	Back of EUT Facing Phantom UMTS-FDD 2 CH9262
012	Back of EUT Facing Phantom UMTS-FDD 2 CH9538
013	Front of EUT Facing Phantom UMTS-FDD 5 CH4183
014	Back of EUT Facing Phantom UMTS-FDD 5 CH4183
015	Back of EUT Facing Phantom UMTS-FDD 5 CH4132
016	Back of EUT Facing Phantom UMTS-FDD 5 CH4233
017	Front of EUT Facing Phantom CDMA BC0 CH384
018	Back of EUT Facing Phantom CDMA BC0 CH384
019	Back of EUT Facing Phantom CDMA BC0 CH1013
020	Back of EUT Facing Phantom CDMA BC0 CH777
021	Front of EUT Facing Phantom CDMA BC1 CH600
022	Back of EUT Facing Phantom CDMA BC1 CH600
023	Back of EUT Facing Phantom CDMA BC1 CH25
024	Back of EUT Facing Phantom CDMA BC1 CH1175
025	System Performance Check 900MHz Body 18 08 14
026	System Performance Check 900MHz Body 01 09 14
027	System Performance Check 900MHz Body 04 09 14
028	System Performance Check 900MHz Body 11 09 14
029	System Performance Check 900MHz Body 15 09 14
030	System Performance Check 1900MHz Body 11 08 14
031	System Performance Check 1900MHz Body 08 09 14

001: Front of EUT Facing Phantom GSM 850 GPRS CH190
Date: 04/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07

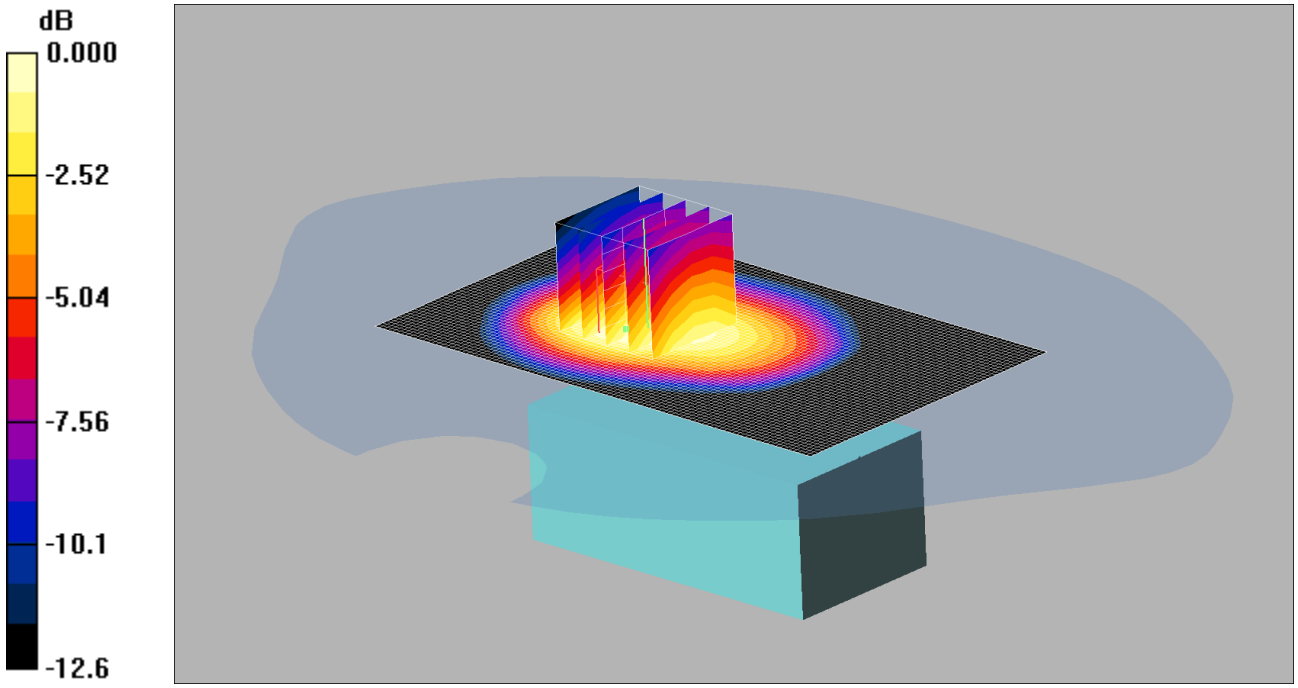


0 dB = 0.722mW/g

Communication System: GPRS 850 MHz 1TX; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.988 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Front of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.733 mW/g
Front of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.9 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 0.891 W/kg
SAR(1 g) = 0.676 mW/g; SAR(10 g) = 0.474 mW/g
Maximum value of SAR (measured) = 0.722 mW/g

002: Back of EUT Facing Phantom GSM 850 GPRS CH190
Date: 03/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



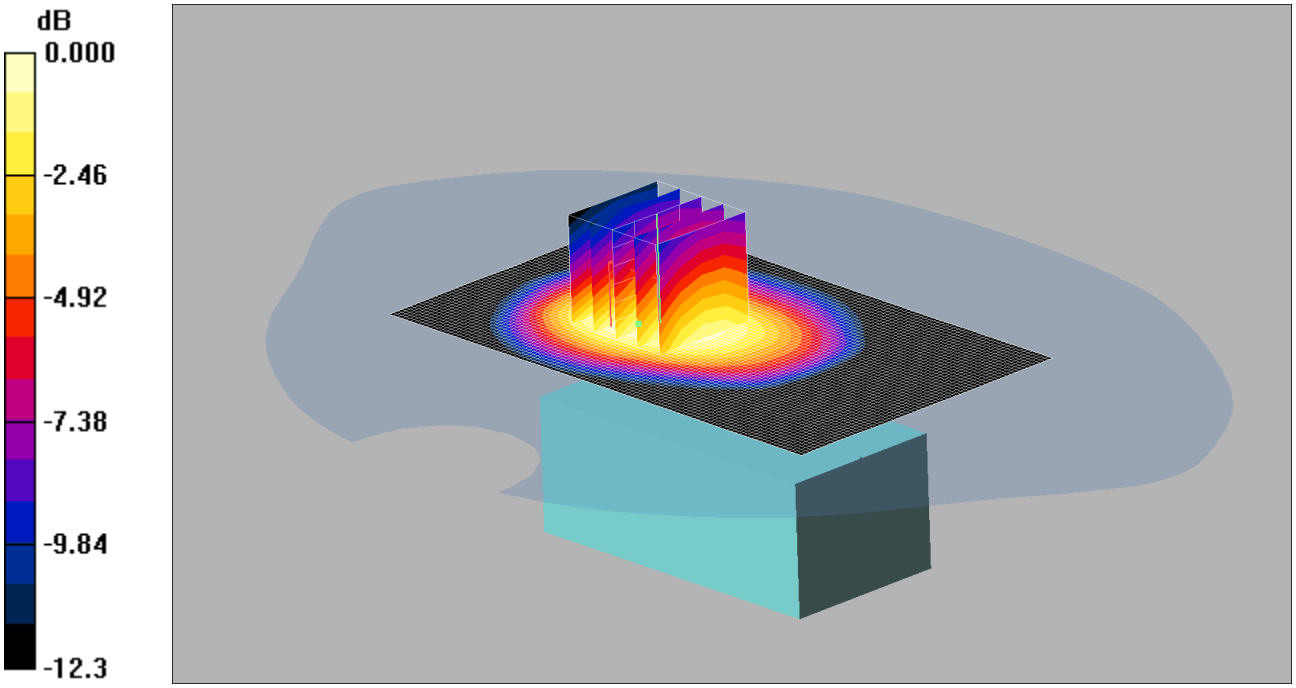
0 dB = 2.14mW/g

Communication System: GPRS 850 MHz 1TX; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 836.6 MHz; σ = 1 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.22 mW/g

Back of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 43.0 V/m; Power Drift = -0.078 dB
Peak SAR (extrapolated) = 2.90 W/kg
SAR(1 g) = 2 mW/g; SAR(10 g) = 1.38 mW/g
Maximum value of SAR (measured) = 2.14 mW/g

003: Back of EUT Facing Phantom GSM 850 GPRS CH128
Date: 03/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



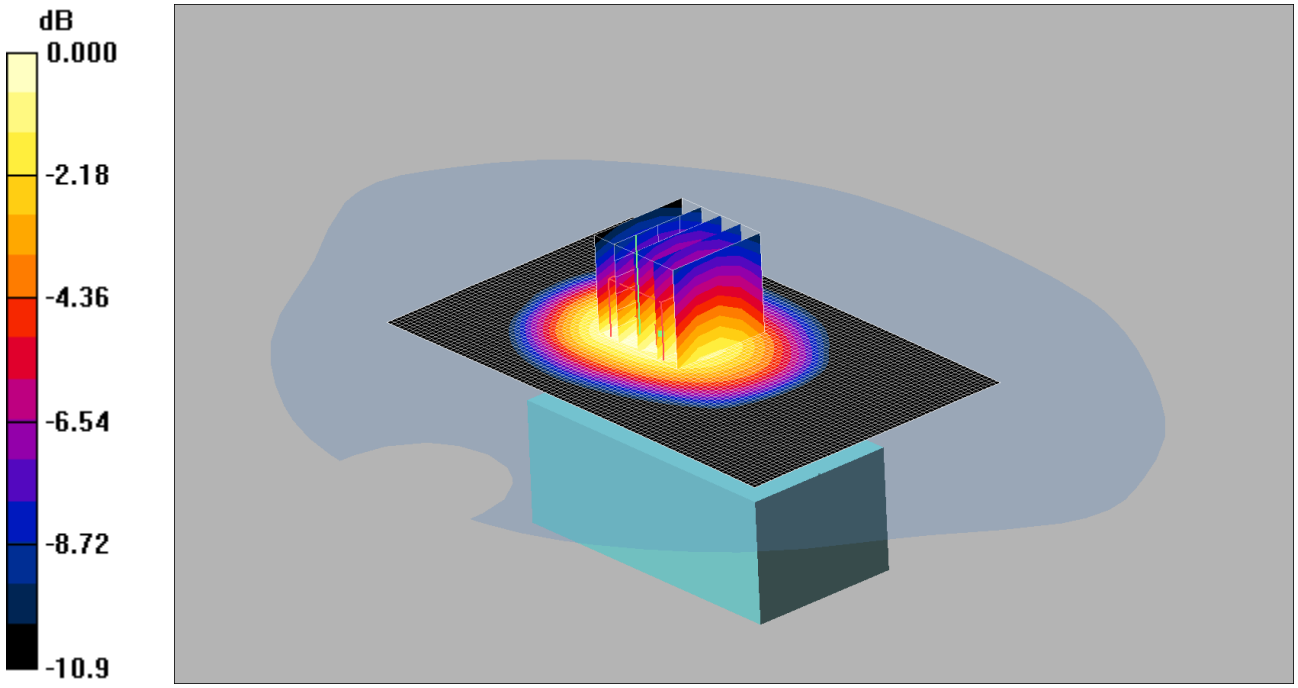
0 dB = 1.88mW/g

Communication System: GPRS 850 MHz 1TX; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.995 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159
Back of EUT Facing Phantom - Low/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.94 mW/g

Back of EUT Facing Phantom - Low/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.6 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 2.58 W/kg
SAR(1 g) = 1.76 mW/g; SAR(10 g) = 1.21 mW/g
Maximum value of SAR (measured) = 1.88 mW/g

004: Back of EUT Facing Phantom GSM 850 GPRS CH251
Date: 04/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07

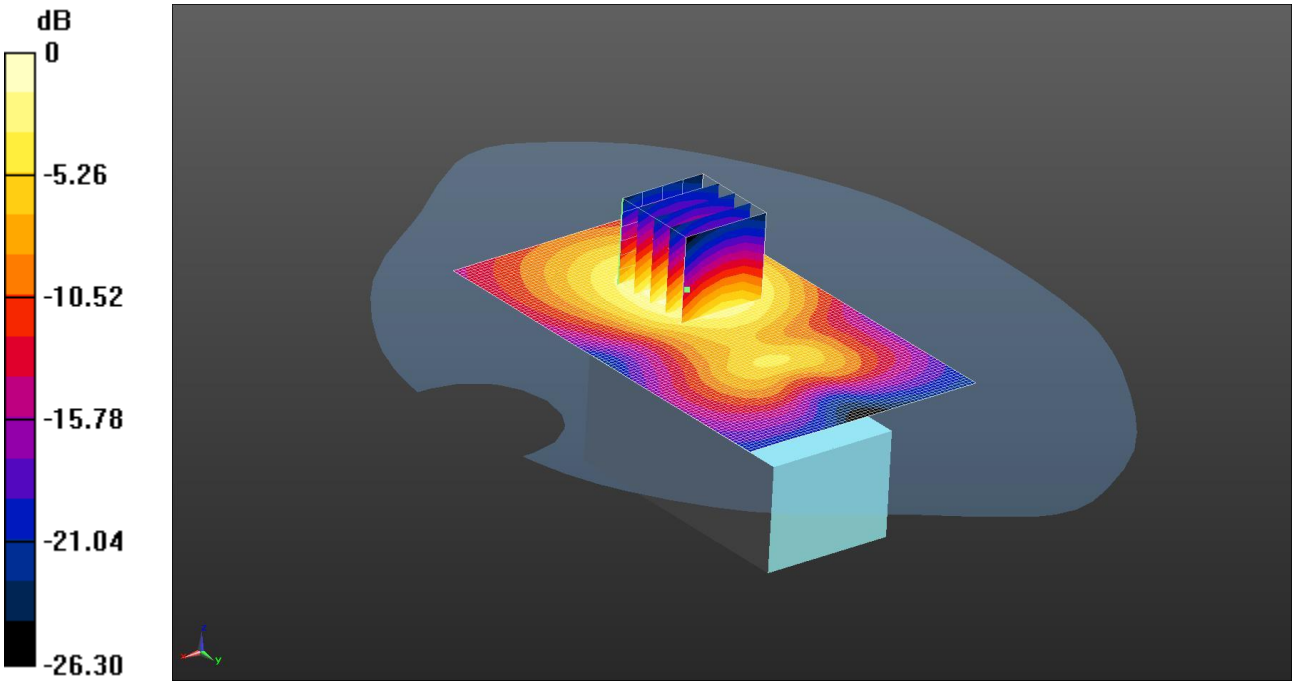


0 dB = 2.05mW/g

Communication System: GPRS 850 MHz 1TX; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.995 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - High/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.01 mW/g
Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 43.7 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 2.78 W/kg
SAR(1 g) = 1.94 mW/g; SAR(10 g) = 1.34 mW/g
Maximum value of SAR (measured) = 2.05 mW/g

005: Front of EUT Facing Phantom PCS1900 GPRS CH512
Date : 12/08/14
DUT: STOP; Type: FCC ID: S5E0114BLU07

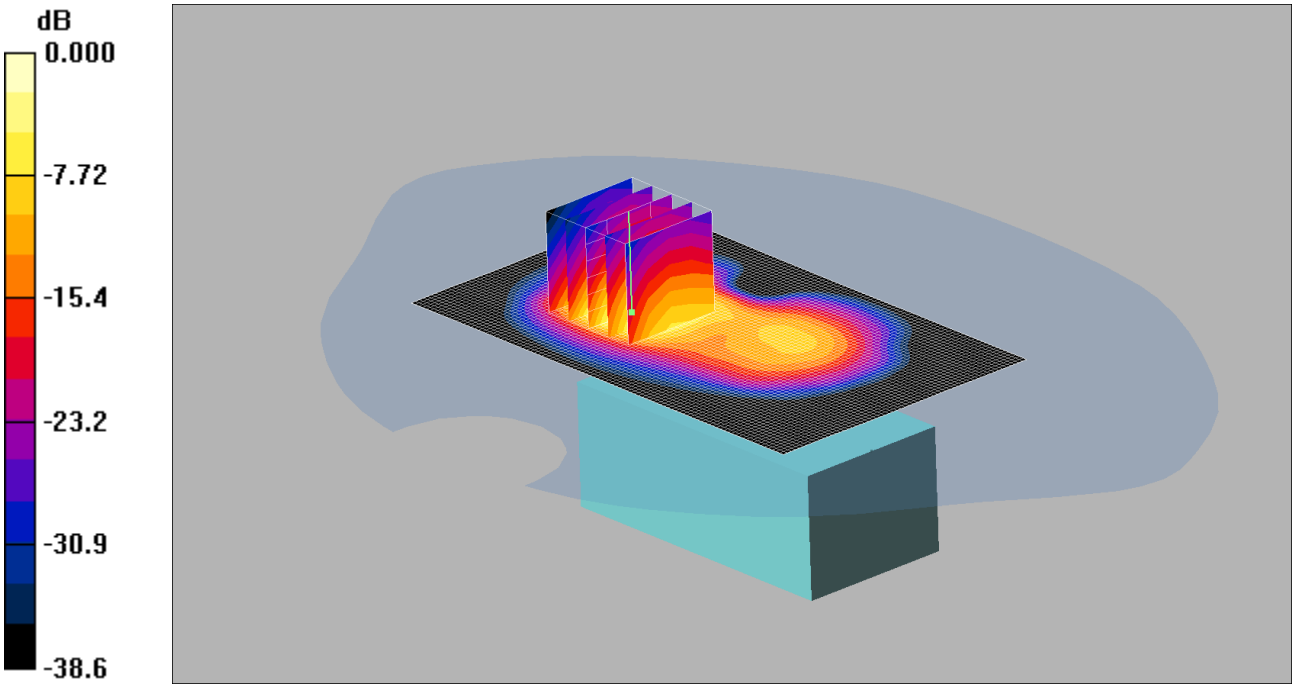


0 dB = 0.597 W/kg = -2.24 dBW/kg

Communication System: UID 0, Generic GSM (0); Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.456 S/m; εr = 54.057; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46); Calibrated: 22/05/14;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/14
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Front of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.597 W/kg
Front of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) 2 (5x5x7)/Cube (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.78 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.808 W/kg
SAR(1 g) = 0.520 W/kg; SAR(10 g) = 0.323 W/kg
Maximum value of SAR (measured) = 0.558 W/kg

006: Back of EUT Facing Phantom PCS1900 GPRS CH512
Date: 12/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07

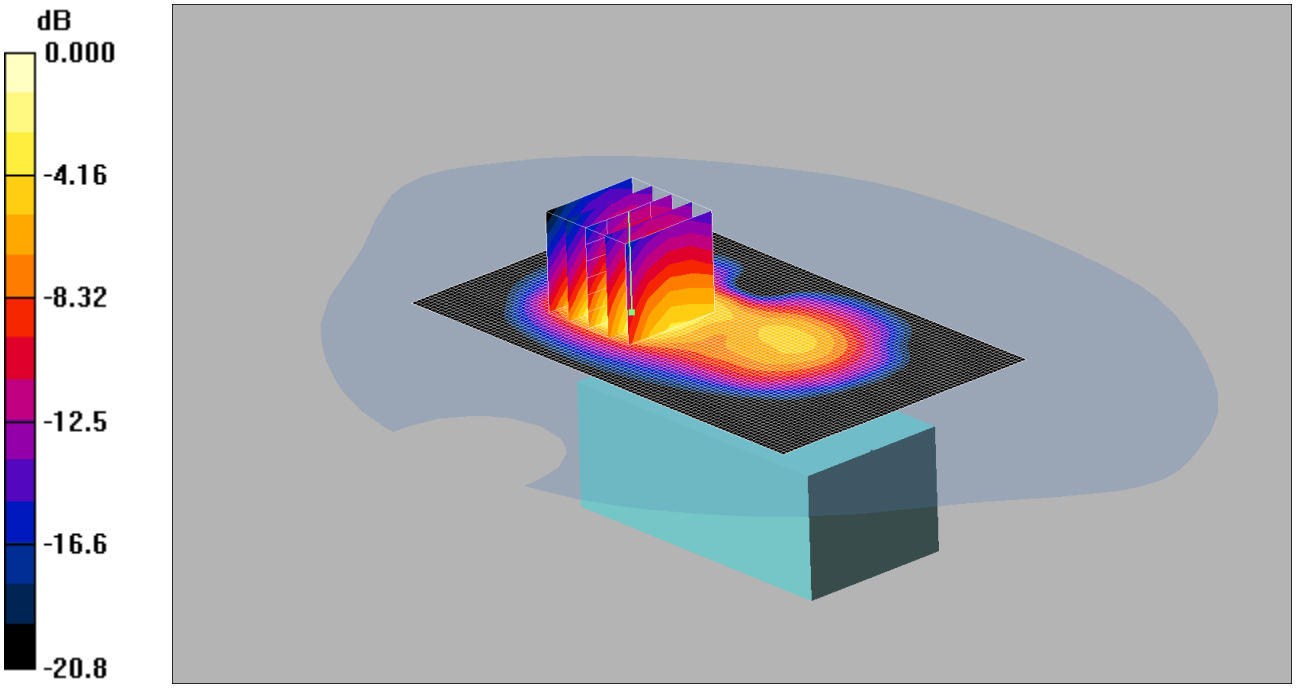


0 dB = 2.15mW/g

Communication System: GPRS 1900 3Tx; Frequency: 1850.2 MHz;Duty Cycle: 1:2.67
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.46 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - High/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.63 mW/g
Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.9 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 3.17 W/kg
SAR(1 g) = 1.95 mW/g; SAR(10 g) = 1.08 mW/g
Maximum value of SAR (measured) = 2.15 mW/g

007: Back of EUT Facing Phantom PCS1900 GPRS CH661
Date: 12/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



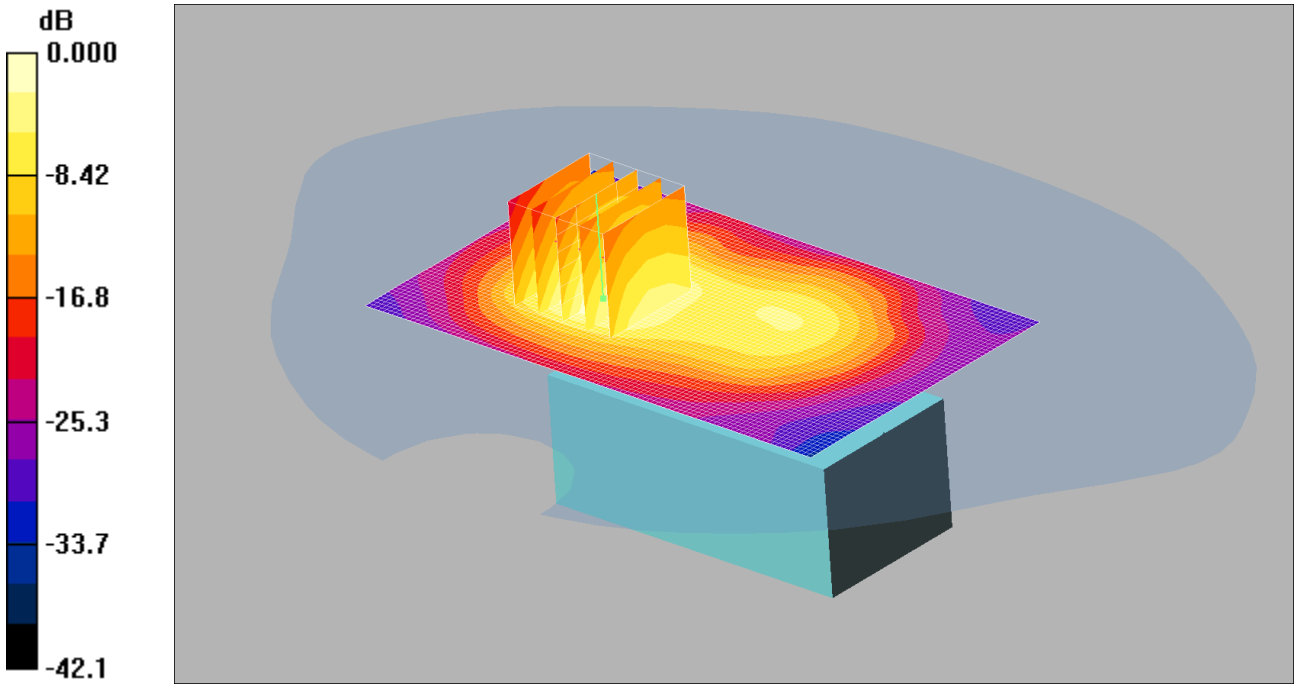
0 dB = 2.93mW/g

Communication System: GPRS 1900 3Tx; Frequency: 1880 MHz;Duty Cycle: 1:2.67
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; σ = 1.49 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.21 mW/g

Back of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.3 V/m; Power Drift = -0.054 dB
Peak SAR (extrapolated) = 4.33 W/kg
SAR(1 g) = 2.63 mW/g; SAR(10 g) = 1.42 mW/g
Maximum value of SAR (measured) = 2.93 mW/g

008: Back of EUT Facing Phantom PCS1900 GPRS CH810
Date: 12/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



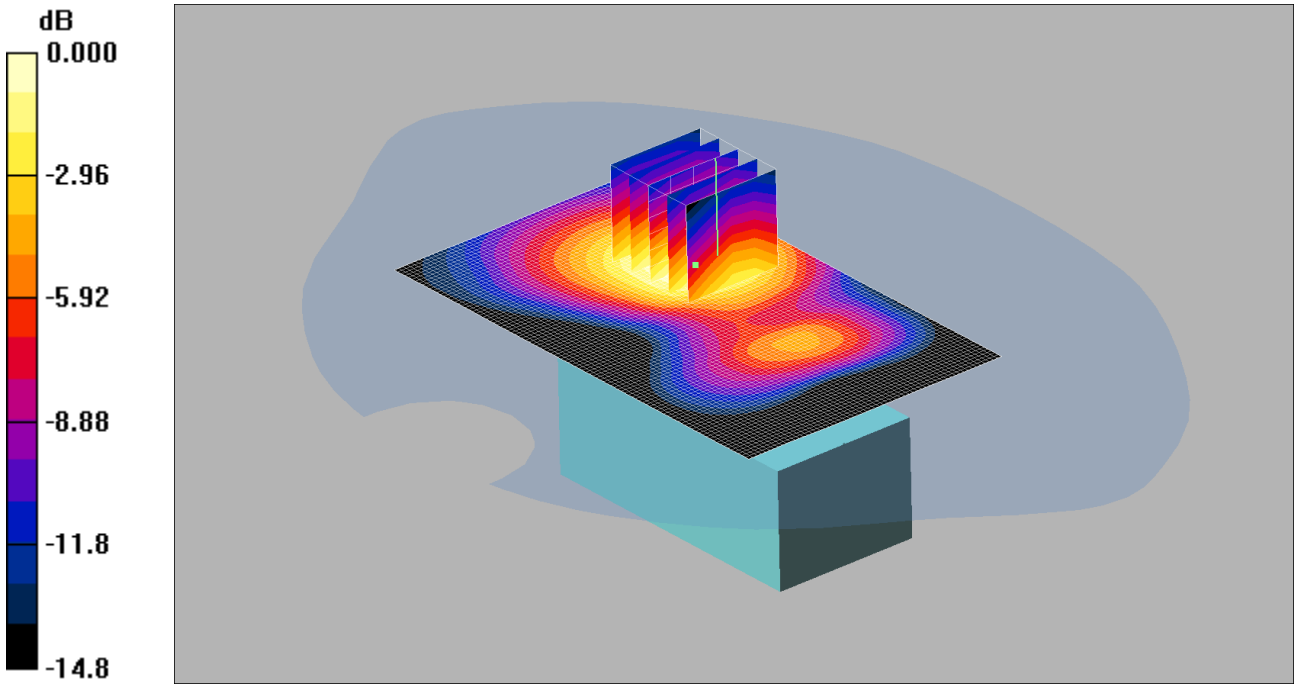
0 dB = 3.10mW/g

Communication System: GPRS 1900 3Tx; Frequency: 1909.8 MHz;Duty Cycle: 1:2.67
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.53 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - High/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.41 mW/g

Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.5 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 4.28 W/kg
SAR(1 g) = 2.71 mW/g; SAR(10 g) = 1.49 mW/g
Maximum value of SAR (measured) = 3.10 mW/g

009: Front of EUT Facing Phantom UMTS-FDD 2 CH9400
Date: 11/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



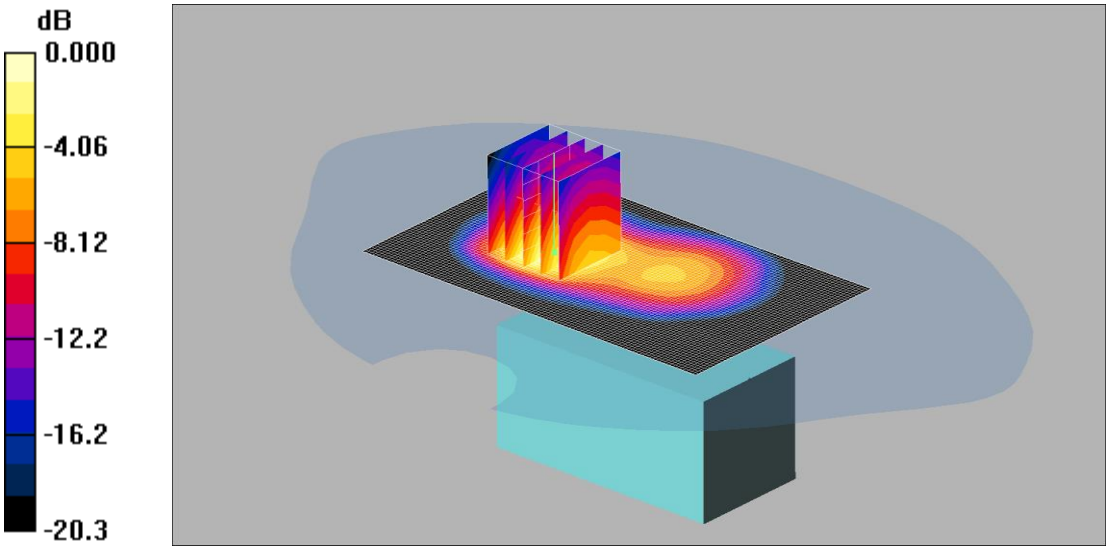
0 dB = 0.655mW/g

Communication System: UMTS-FDD II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; σ = 1.49 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Front of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.687 mW/g

Front of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 0.931 W/kg
SAR(1 g) = 0.612 mW/g; SAR(10 g) = 0.388 mW/g
Maximum value of SAR (measured) = 0.655 mW/g

010: Back of EUT Facing Phantom UMTS-FDD 2 CH9400
Date/Time: 11/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



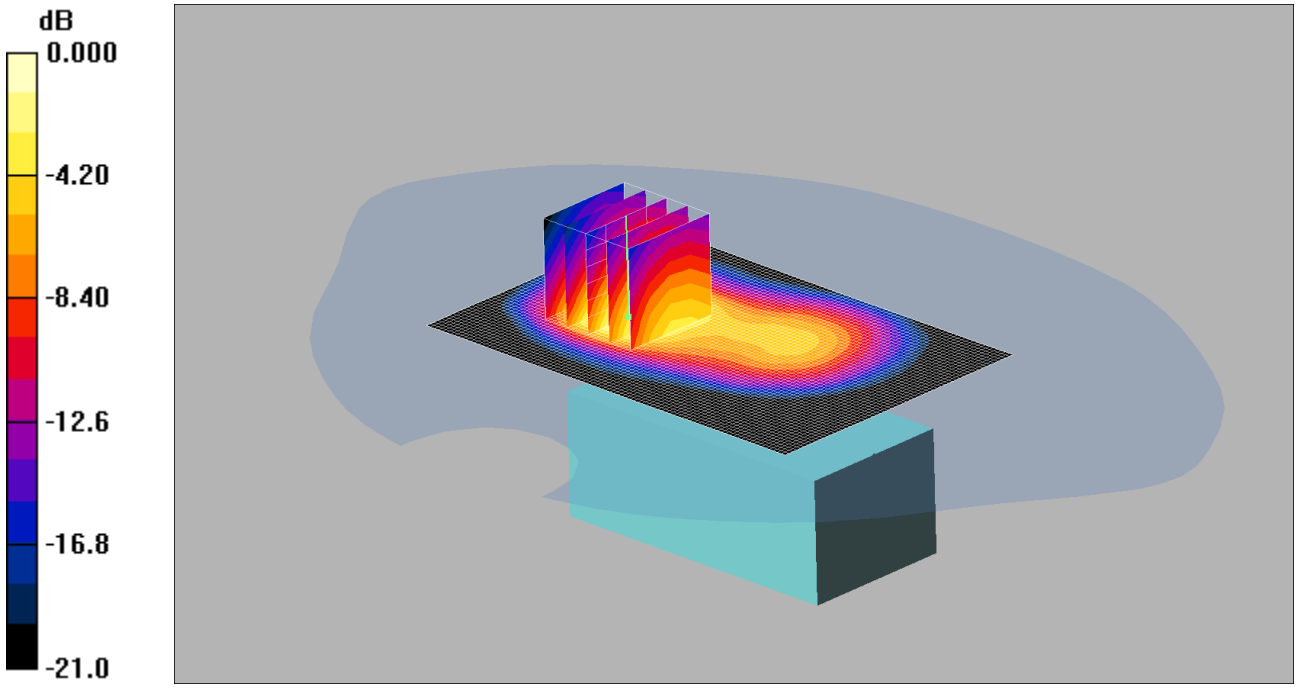
0 dB = 3.44mW/g

Communication System: UMTS-FDD II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; σ = 1.49 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Mid 2 2/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.74 mW/g

Back of EUT Facing Phantom - Mid 2 2/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.8 V/m; Power Drift = -0.058 dB
Peak SAR (extrapolated) = 5.26 W/kg
SAR(1 g) = 3.07 mW/g; SAR(10 g) = 1.63 mW/g
Maximum value of SAR (measured) = 3.44 mW/g

011: Back of EUT Facing Phantom UMTS-FDD 2 CH9262
Date: 11/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



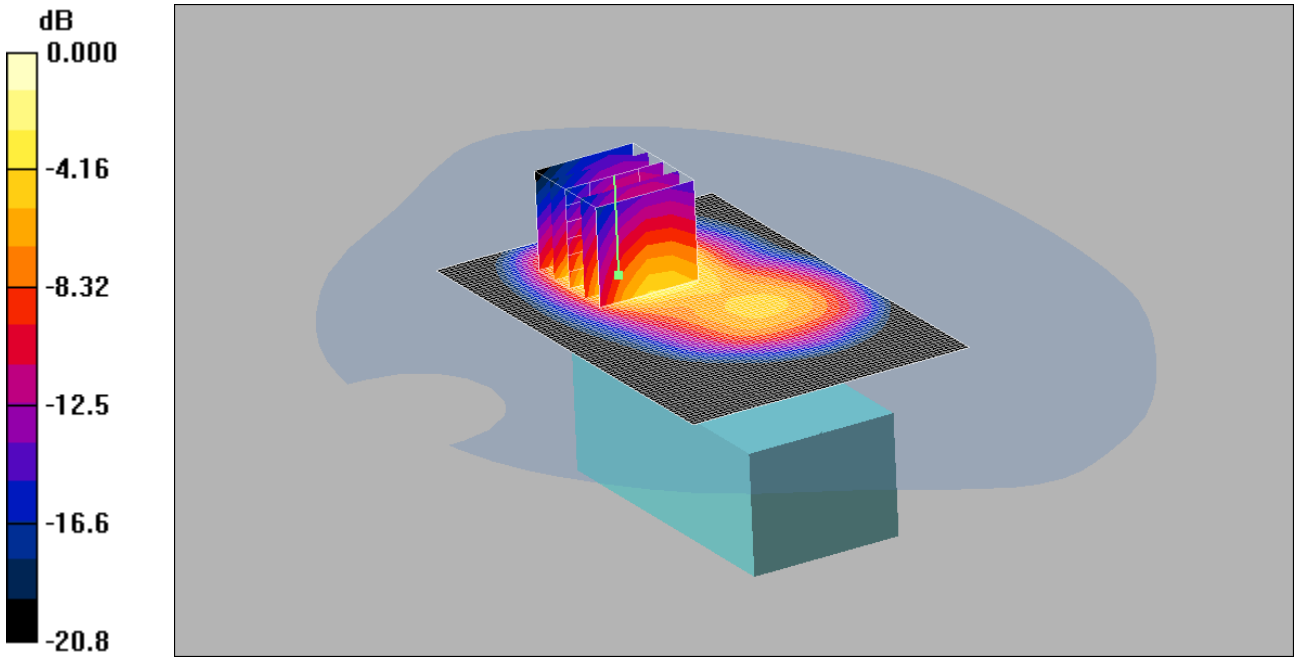
0 dB = 3.36mW/g

Communication System: UMTS-FDD II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.46 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Low/Area Scan 2 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.93 mW/g

Back of EUT Facing Phantom - Low/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.9 V/m; Power Drift = 0.073 dB
Peak SAR (extrapolated) = 5.08 W/kg
SAR(1 g) = 3.07 mW/g; SAR(10 g) = 1.68 mW/g
Maximum value of SAR (measured) = 3.36 mW/g

012: Back of EUT Facing Phantom UMTS-FDD 2 CH9538
Date: 11/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



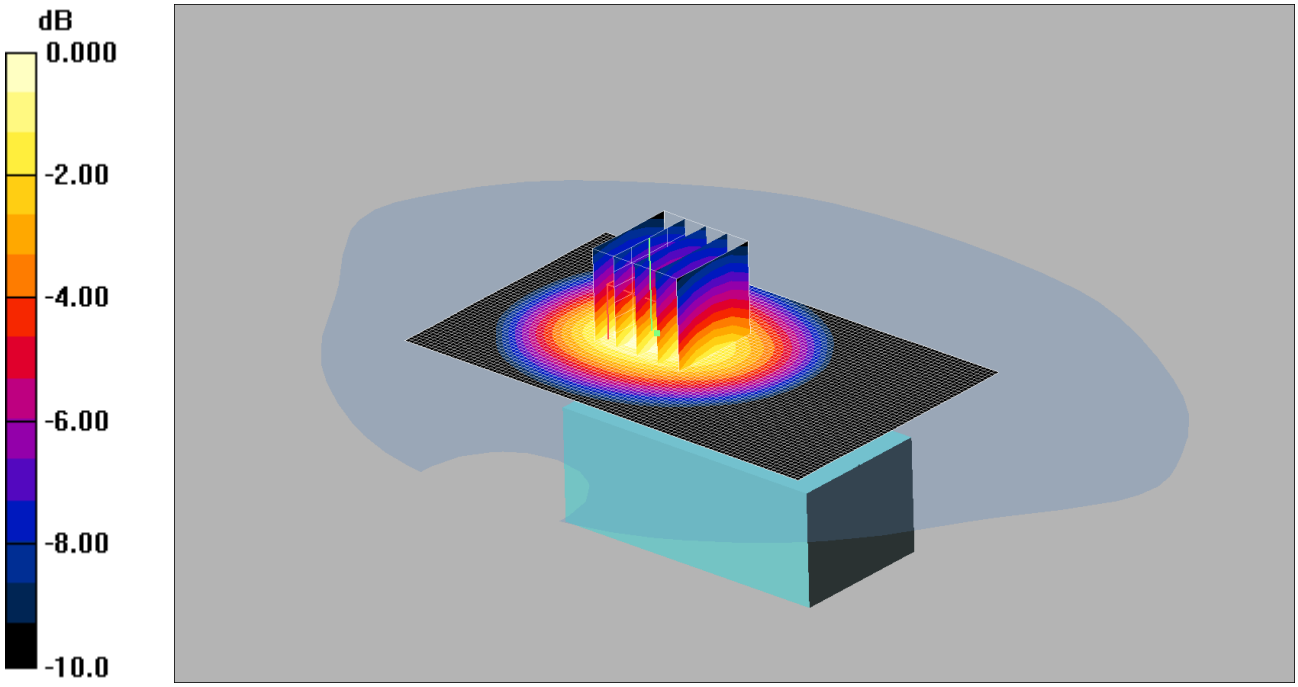
0 dB = 4.51mW/g

Communication System: UMTS-FDD II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1907.6 MHz; σ = 1.52 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - High 2/Area Scan 2 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.92 mW/g

Back of EUT Facing Phantom - High 2/Zoom Scan (5x5x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.1 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 7.01 W/kg
SAR(1 g) = 4.08 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (measured) = 4.51 mW/g

013: Front of EUT Facing Phantom UMTS-FDD 5 CH4183
Date: 15/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



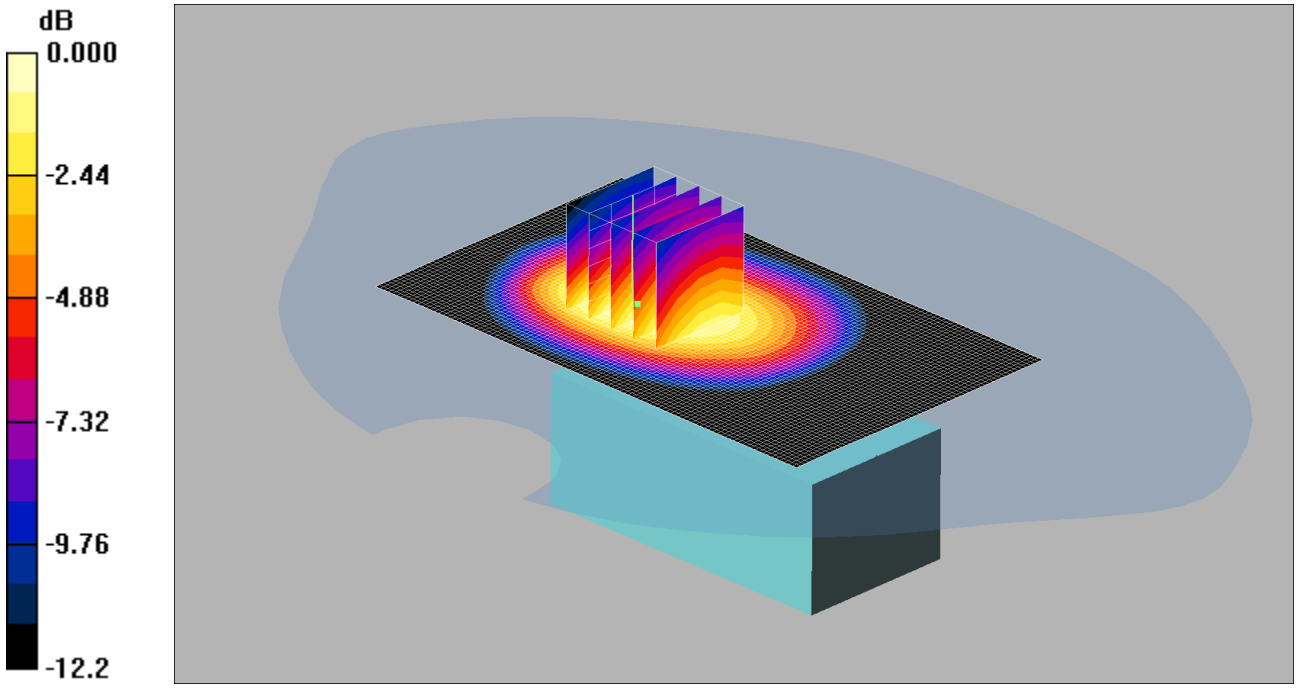
0 dB = 0.853mW/g

Communication System: UMTS-FDD 5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.981 mho/m; εr = 54.9; ρ = 1000 kg/m3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY52, V52.8 Build 8; Postprocessing SW: SEMCAD, V1.8 Build 159

Front of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.878 mW/g

Front of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.3 V/m; Power Drift = -0.159 dB
Peak SAR (extrapolated) = 1.07 W/kg
SAR(1 g) = 0.800 mW/g; SAR(10 g) = 0.554 mW/g
Maximum value of SAR (measured) = 0.853 mW/g

014: Back of EUT Facing Phantom UMTS-FDD 5 CH4183
Date: 12/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



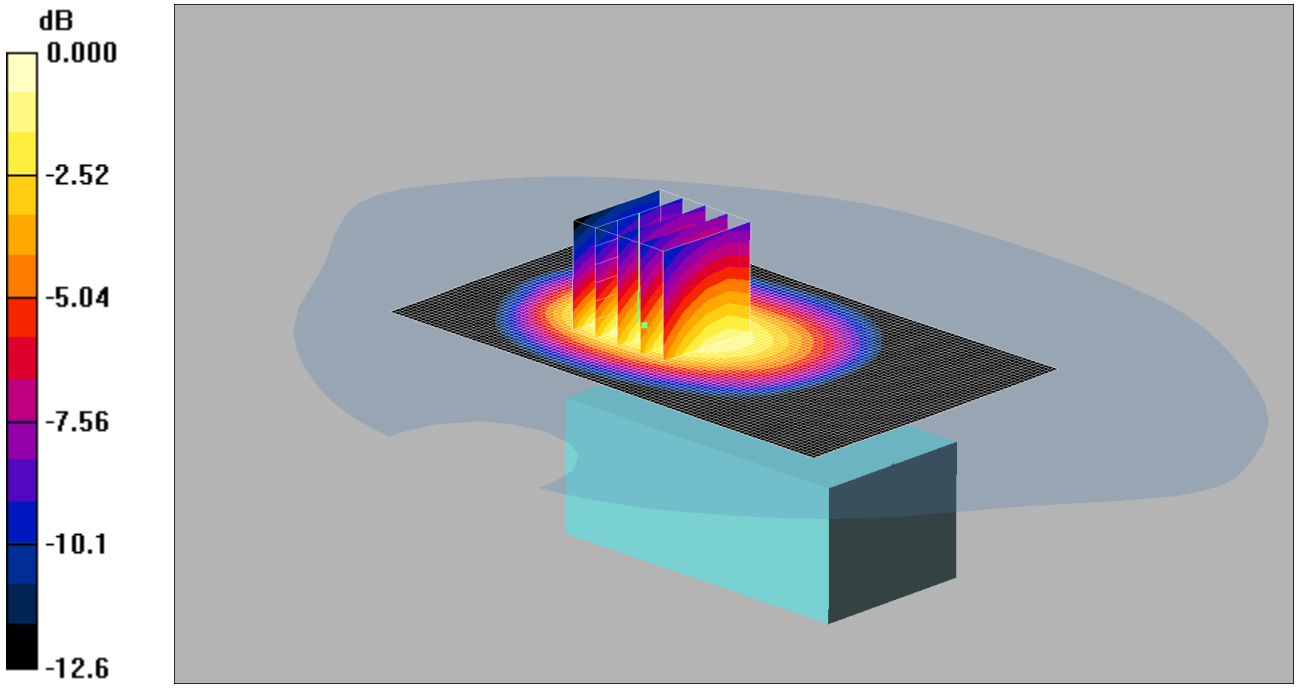
0 dB = 1.95mW/g

Communication System: UMTS-FDD 5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.978 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Mid 2/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.06 mW/g

Back of EUT Facing Phantom - Mid 2/Zoom Scan (5x5x7) 2 2 2 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 40.0 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 2.67 W/kg
SAR(1 g) = 1.85 mW/g; SAR(10 g) = 1.25 mW/g
Maximum value of SAR (measured) = 1.95 mW/g

015: Back of EUT Facing Phantom UMTS-FDD 5 CH4132
Date: 12/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



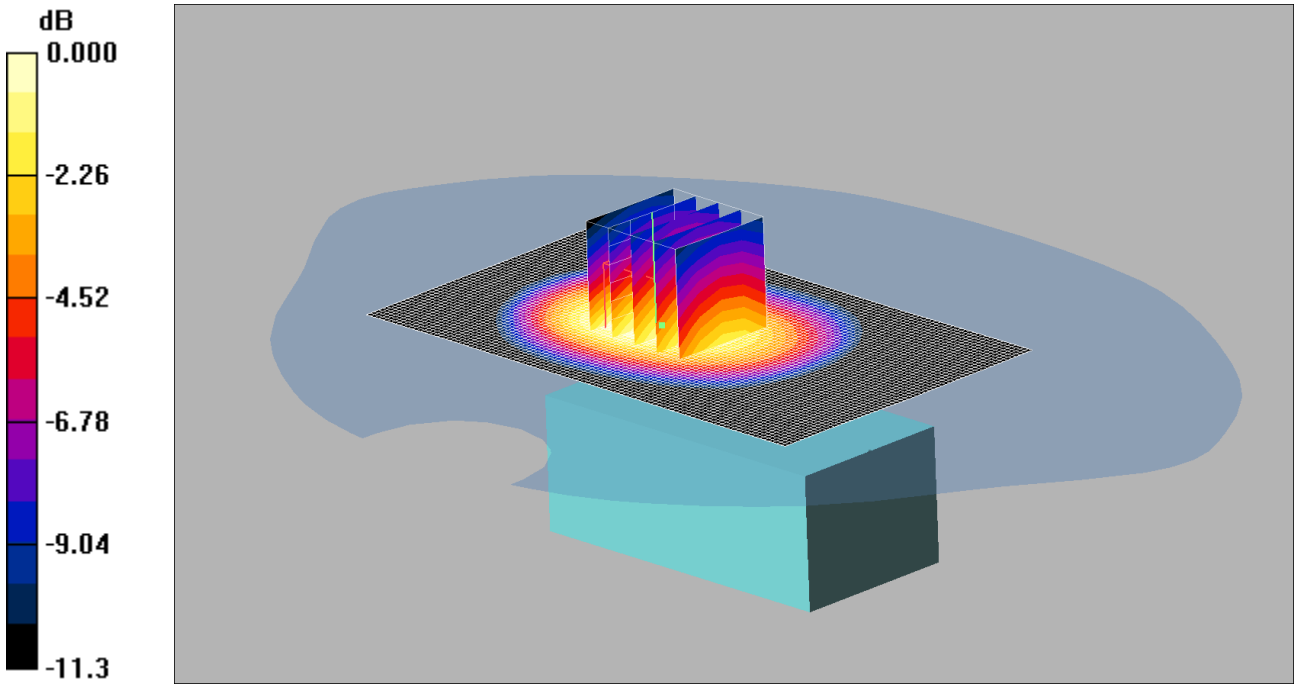
0 dB = 2.02mW/g

Communication System: UMTS-FDD 5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.972 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Low/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.11 mW/g

Back of EUT Facing Phantom - Low/Zoom Scan (5x5x7) 2 2 2 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.5 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 2.82 W/kg
SAR(1 g) = 1.92 mW/g; SAR(10 g) = 1.3 mW/g
Maximum value of SAR (measured) = 2.02 mW/g

016: Back of EUT Facing Phantom UMTS-FDD 5 CH4233
Date: 15/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



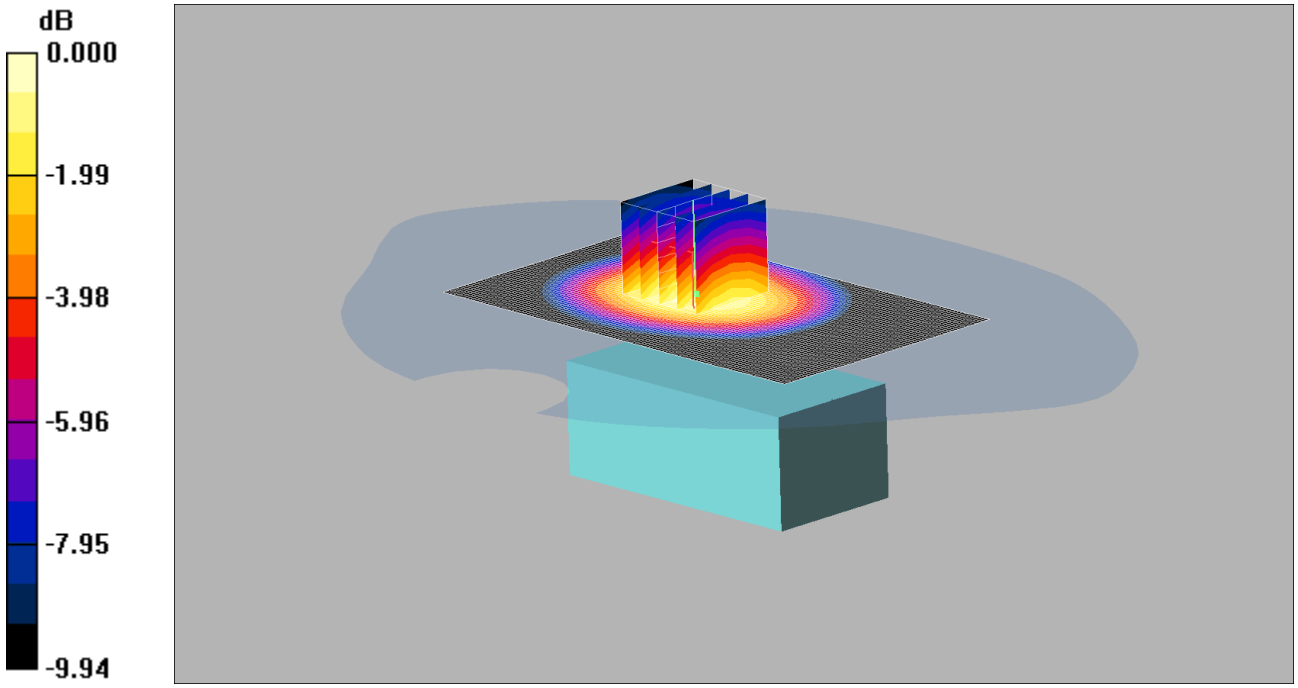
0 dB = 2.51mW/g

Communication System: UMTS-FDD 5; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 846.6 MHz; σ = 0.995 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - High/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.64 mW/g

Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) 2 2 2 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.1 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 3.39 W/kg
SAR(1 g) = 2.33 mW/g; SAR(10 g) = 1.6 mW/g
Maximum value of SAR (measured) = 2.51 mW/g

017: Front of EUT Facing Phantom CDMA BC0 CH384
Date: 20/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



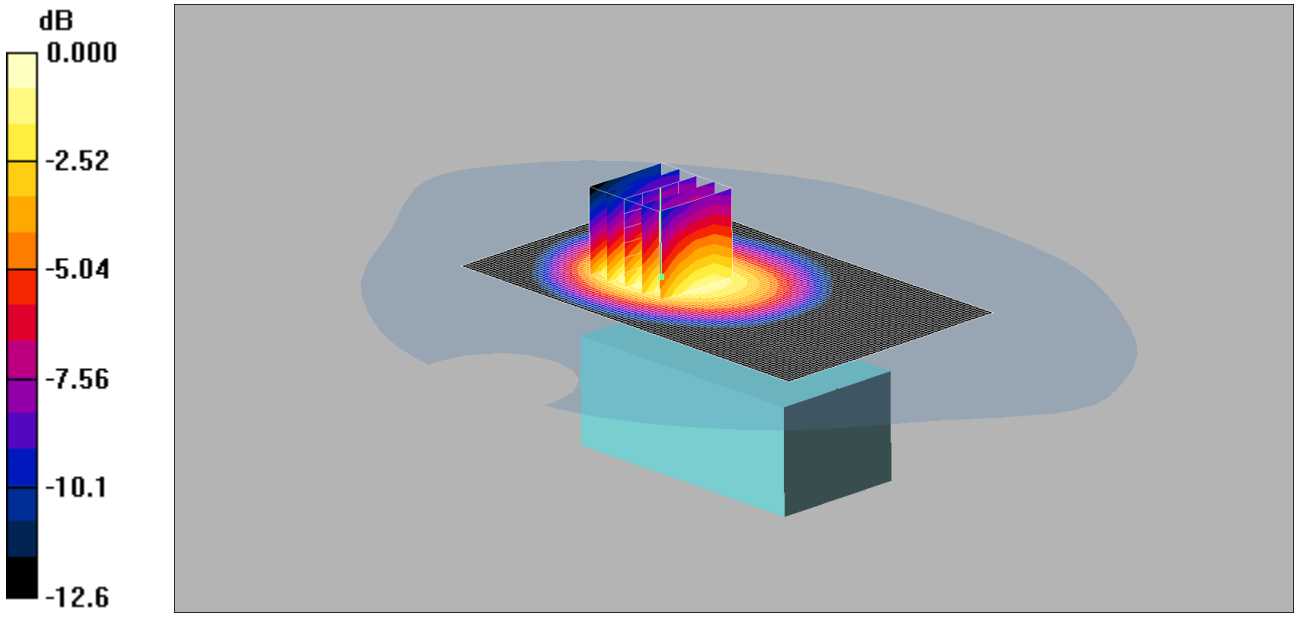
0 dB = 1.02mW/g

Communication System: CDMA 2000 BC0 US; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.965 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Front of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.00 mW/g

Front of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.0 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.945 mW/g; SAR(10 g) = 0.665 mW/g
Maximum value of SAR (measured) = 1.02 mW/g

018: Back of EUT Facing Phantom CDMA BC0 CH384
Date: 20/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



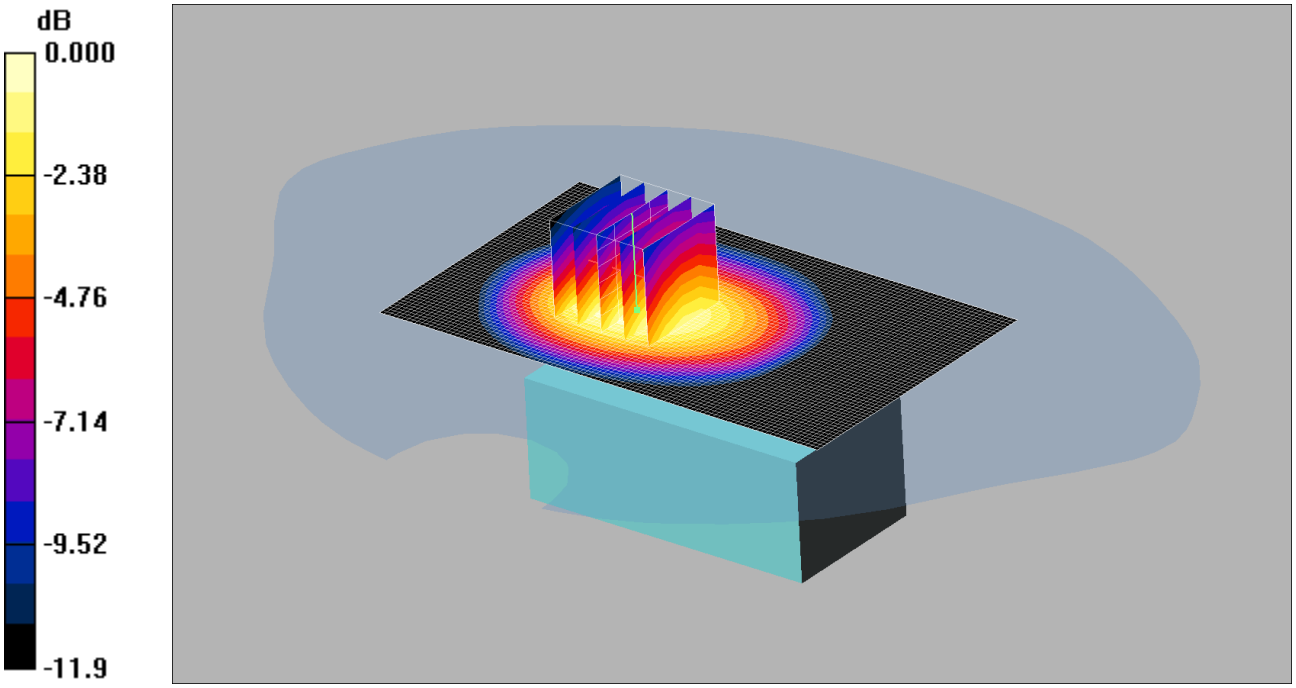
0 dB = 2.73mW/g

Communication System: CDMA 2000 BC0 US; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.965 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Mid 2/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.79 mW/g

Back of EUT Facing Phantom - Mid 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 43.8 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 2.57 mW/g; SAR(10 g) = 1.73 mW/g
Maximum value of SAR (measured) = 2.73 mW/g

019: Back of EUT Facing Phantom CDMA BC0 CH1013
Date: 20/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07

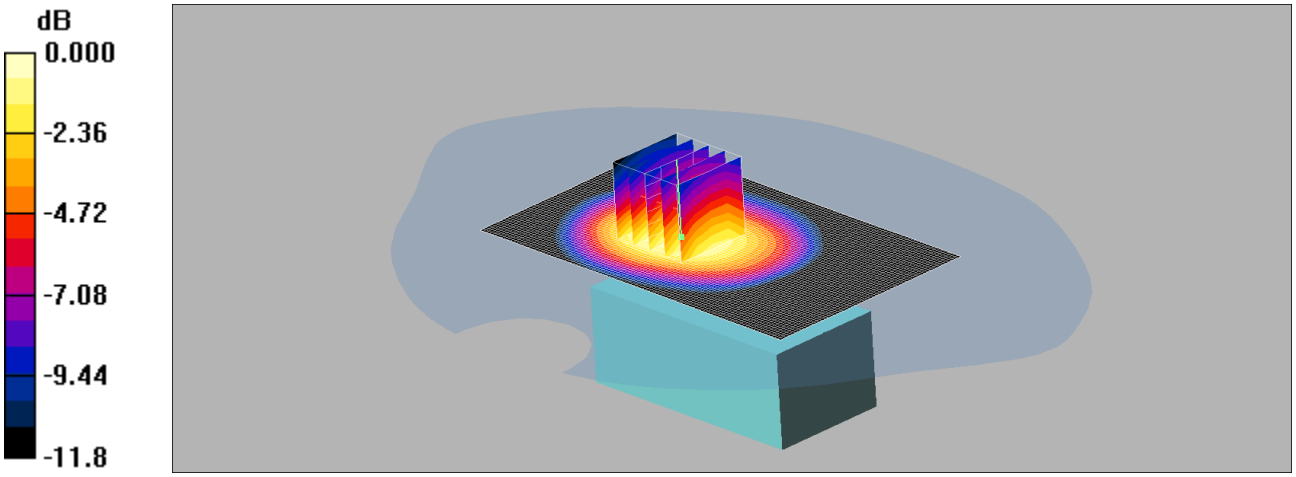


0 dB = 1.98mW/g

Communication System: CDMA 2000 BC0 US; Frequency: 824.7 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 824.7 MHz; σ = 0.958 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Low/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.97 mW/g
Back of EUT Facing Phantom - Low/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 42.3 V/m; Power Drift = -0.064 dB
Peak SAR (extrapolated) = 2.56 W/kg
SAR(1 g) = 1.84 mW/g; SAR(10 g) = 1.25 mW/g
Maximum value of SAR (measured) = 1.98 mW/g

020: Back of EUT Facing Phantom CDMA BC0 CH777
Date: 20/08/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



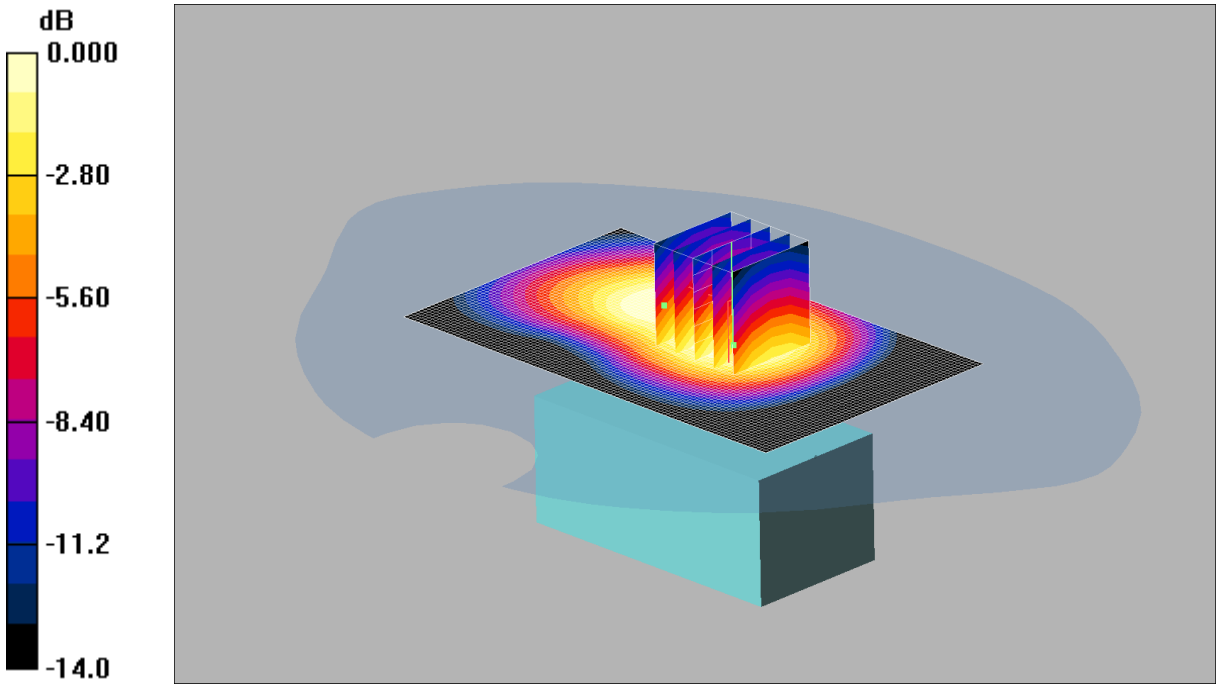
0 dB = 1.90mW/g

Communication System: CDMA 2000 BC0 US; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.972 mho/m; ε_r = 55.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(6, 6, 6);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - High/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.94 mW/g

Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 41.2 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 2.41 W/kg
SAR(1 g) = 1.77 mW/g; SAR(10 g) = 1.2 mW/g
Maximum value of SAR (measured) = 1.90 mW/g

021: Front of EUT Facing Phantom CDMA BC1 CH600
Date: 08/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07

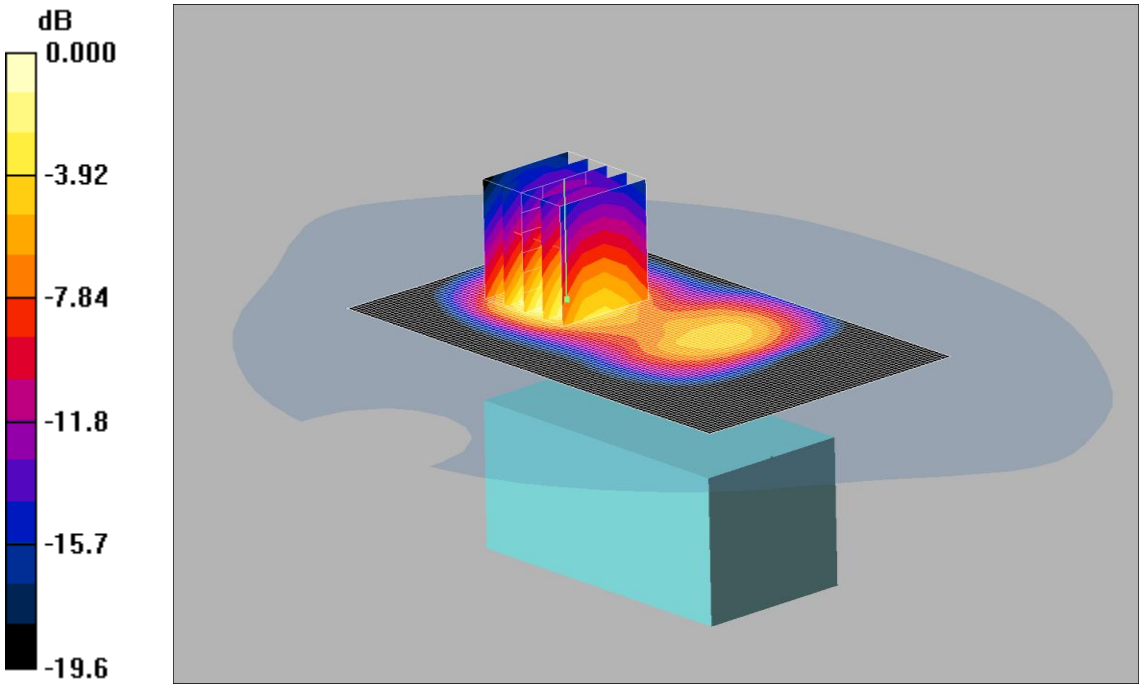


0 dB = 0.894mW/g

Communication System: CDMA 2000 BC1 US; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; σ = 1.49 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Front of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.999 mW/g
Front of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.7 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.834 mW/g; SAR(10 g) = 0.548 mW/g
Maximum value of SAR (measured) = 0.894 mW/g

022: Back of EUT Facing Phantom CDMA BC1 CH600
Date: 08/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



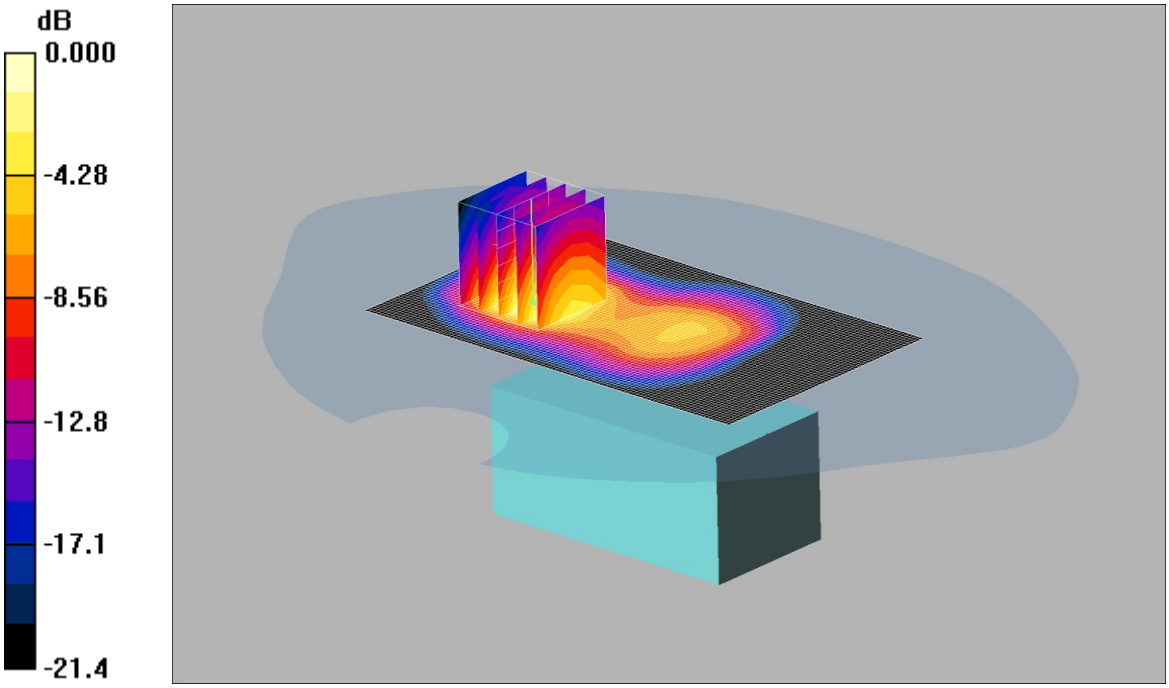
0 dB = 3.83mW/g

Communication System: CDMA 2000 BC1 US; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1880 MHz; σ = 1.49 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Mid/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.63 mW/g

Back of EUT Facing Phantom - Mid/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.7 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 6.16 W/kg
SAR(1 g) = 3.52 mW/g; SAR(10 g) = 1.88 mW/g
Maximum value of SAR (measured) = 3.83 mW/g

023: Back of EUT Facing Phantom CDMA BC1 CH25
Date: 08/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07



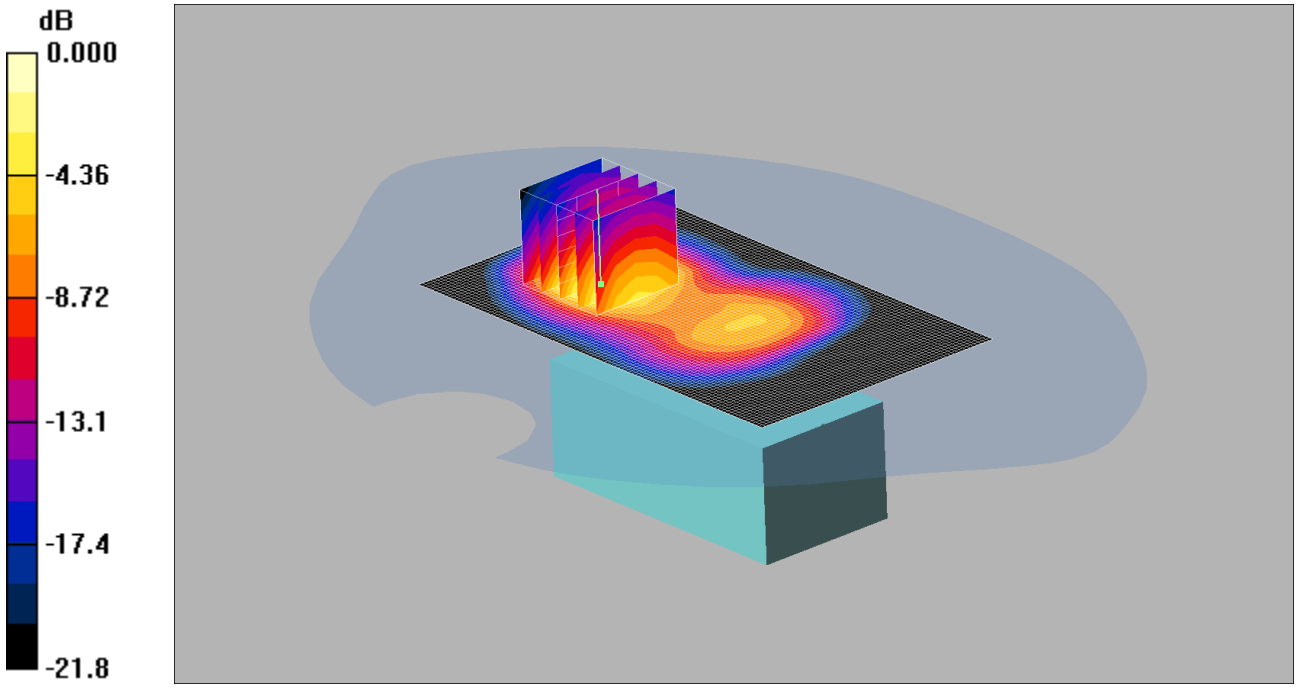
0 dB = 5.46mW/g

Communication System: CDMA 2000 BC1 US; Frequency: 1851.25 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.46 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - Low 2/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.80 mW/g

Back of EUT Facing Phantom - Low 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.1 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 8.62 W/kg
SAR(1 g) = 4.98 mW/g; SAR(10 g) = 2.62 mW/g
Maximum value of SAR (measured) = 5.46 mW/g

024: Back of EUT Facing Phantom CDMA BC1 CH1175
Date: 08/09/2014
DUT: STOP; Type: FCC ID: S5E0114BLU07

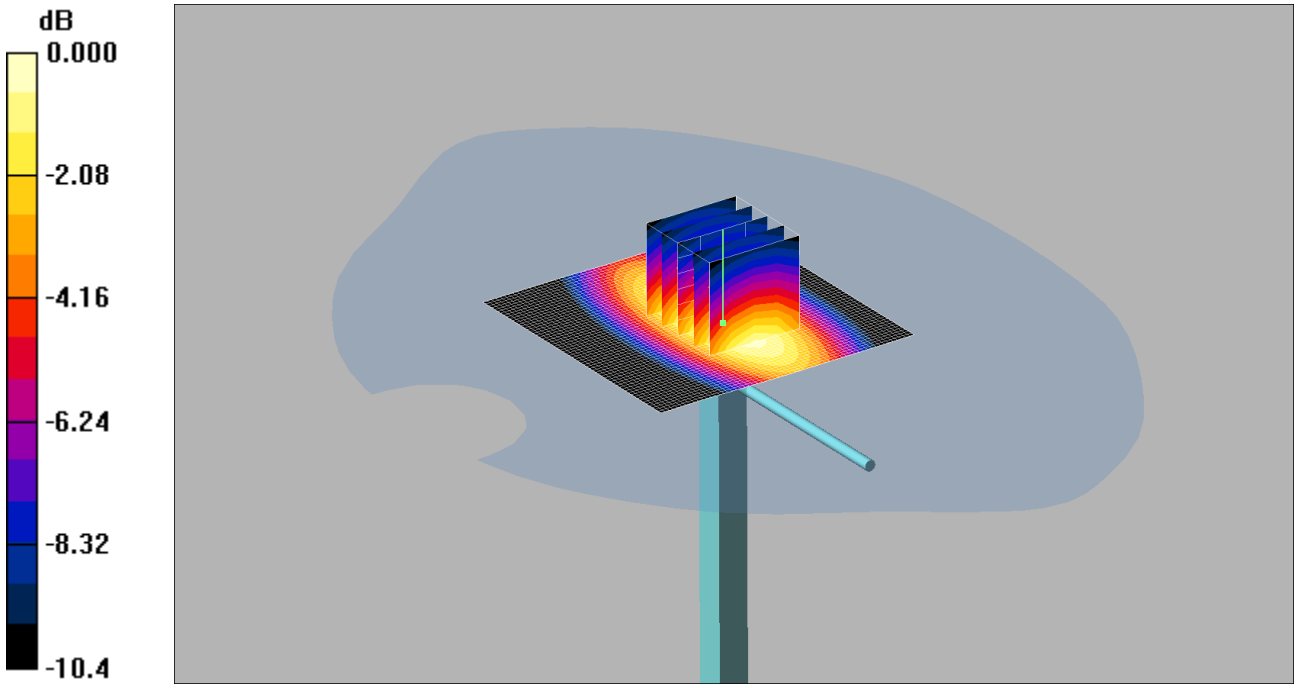


0 dB = 6.53mW/g

Communication System: CDMA 2000 BC1 US; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used (interpolated): f = 1908.75 MHz; σ = 1.52 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Back of EUT Facing Phantom - High/Area Scan 2 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 8.28 mW/g
Back of EUT Facing Phantom - High/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.0 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 10.4 W/kg
SAR(1 g) = 5.91 mW/g; SAR(10 g) = 3.08 mW/g
Maximum value of SAR (measured) = 6.53 mW/g

025: System Performance Check 900MHz Body 18 08 14
Date: 18/08/2014
DUT: Dipole 900 MHz; SN: 185; Type: D900V2; Serial: SN185



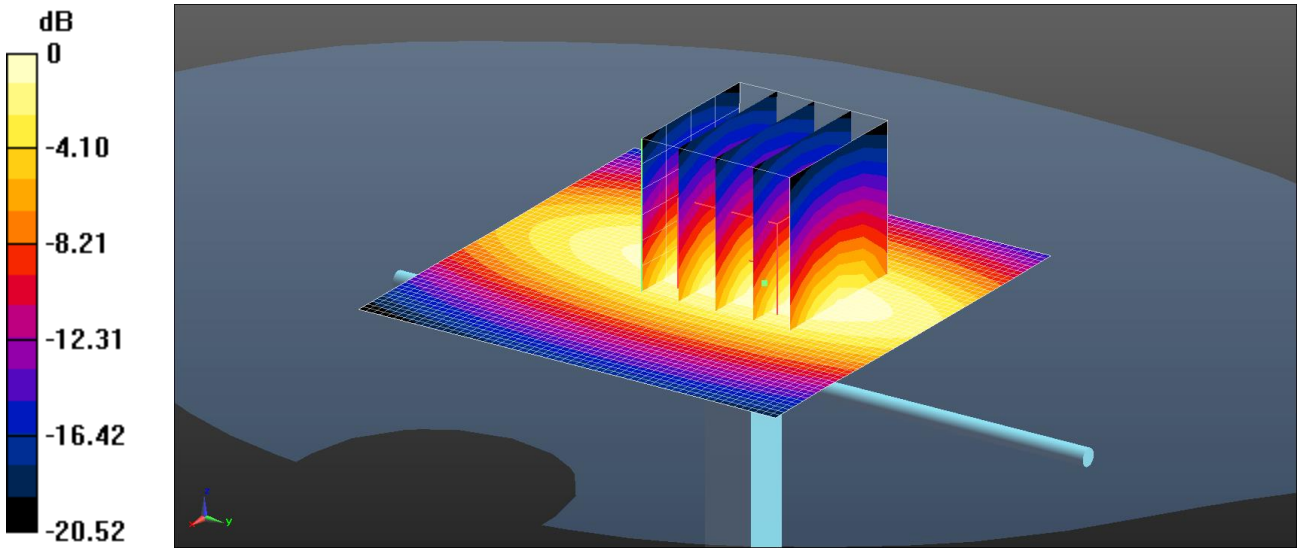
0 dB = 2.76mW/g

Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used: f = 900 MHz; σ = 1 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(5.85, 5.85, 5.85);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=250mW 2 2/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.76 mW/g

d=15mm, Pin=250mW 2 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.4 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 2.53 mW/g; SAR(10 g) = 1.68 mW/g
Maximum value of SAR (measured) = 2.76 mW/g

026: System Performance Check 900MHz Body 01 09 14
Date: 1/9/2014
DUT: Dipole 900 MHz; SN: 185; Type: D900V2; Serial: SN185

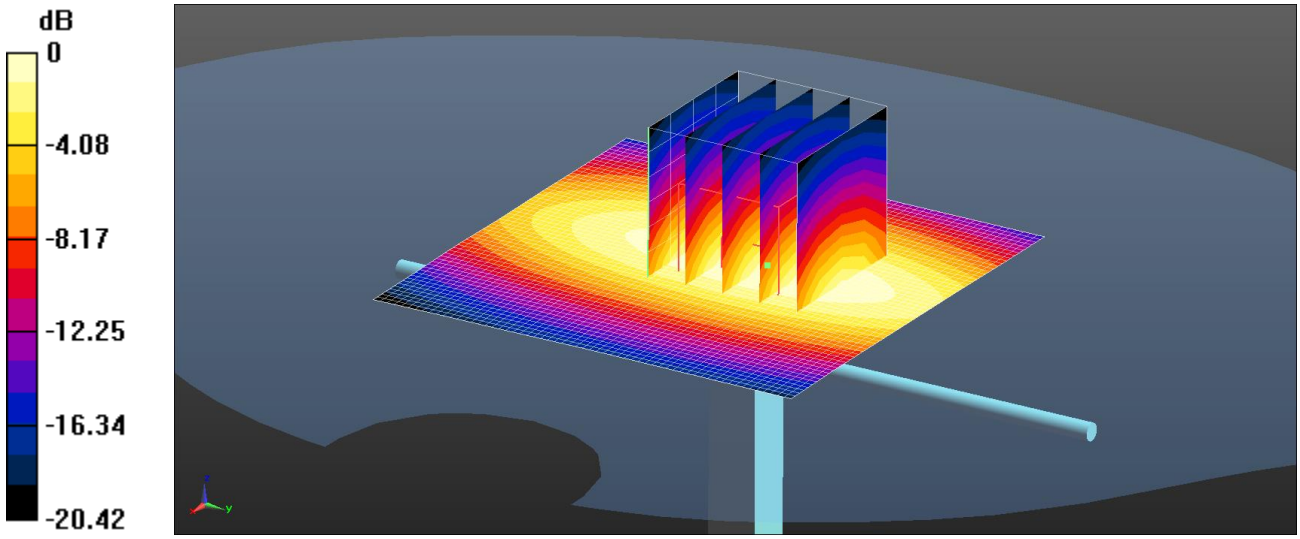


0 dB = 2.86 W/kg = 4.56 dBW/kg

Communication System: UID 0, CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used: f = 900 MHz; σ = 1.043 S/m; ε_r = 54.581; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(5.85, 5.85, 5.85); Calibrated: 22/5/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/5/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- ; SEMCAD X Version 14.6.10 (7331)

Configuration/d=15mm, Pin=250mW 2 2 2/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.86 W/kg
Configuration/d=15mm, Pin=250mW 2 2 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.96 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.57 W/kg
SAR(1 g) = 2.63 W/kg; SAR(10 g) = 1.74 W/kg
Maximum value of SAR (measured) = 2.86 W/kg

027: System Performance Check 900MHz Body 04 09 14
Date: 4/9/2014
DUT: Dipole 900 MHz; SN: 185; Type: D900V2; Serial: SN185

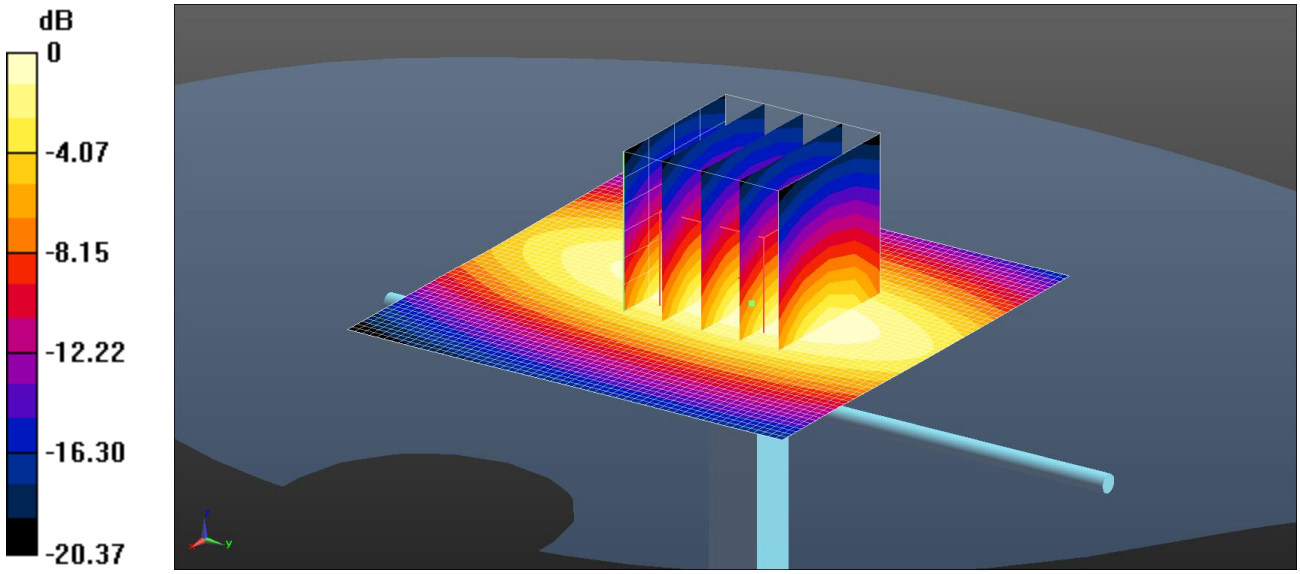


0 dB = 2.75 W/kg = 4.39 dBW/kg

Communication System: UID 0, CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used: f = 900 MHz; σ = 1.031 S/m; ε_r = 54.364; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(5.85, 5.85, 5.85); Calibrated: 22/5/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/5/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- ; SEMCAD X Version 14.6.10 (7331)

Configuration/d=15mm, Pin=250mW 2 2 2 2/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.75 W/kg
Configuration/d=15mm, Pin=250mW 2 2 2 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.32 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.40 W/kg
SAR(1 g) = 2.52 W/kg; SAR(10 g) = 1.68 W/kg
Maximum value of SAR (measured) = 2.74 W/kg

028: System Performance Check 900MHz Body 11 09 14
Date: 11/9/2014
DUT: Dipole 900 MHz; SN: 185; Type: D900V2; Serial: SN185

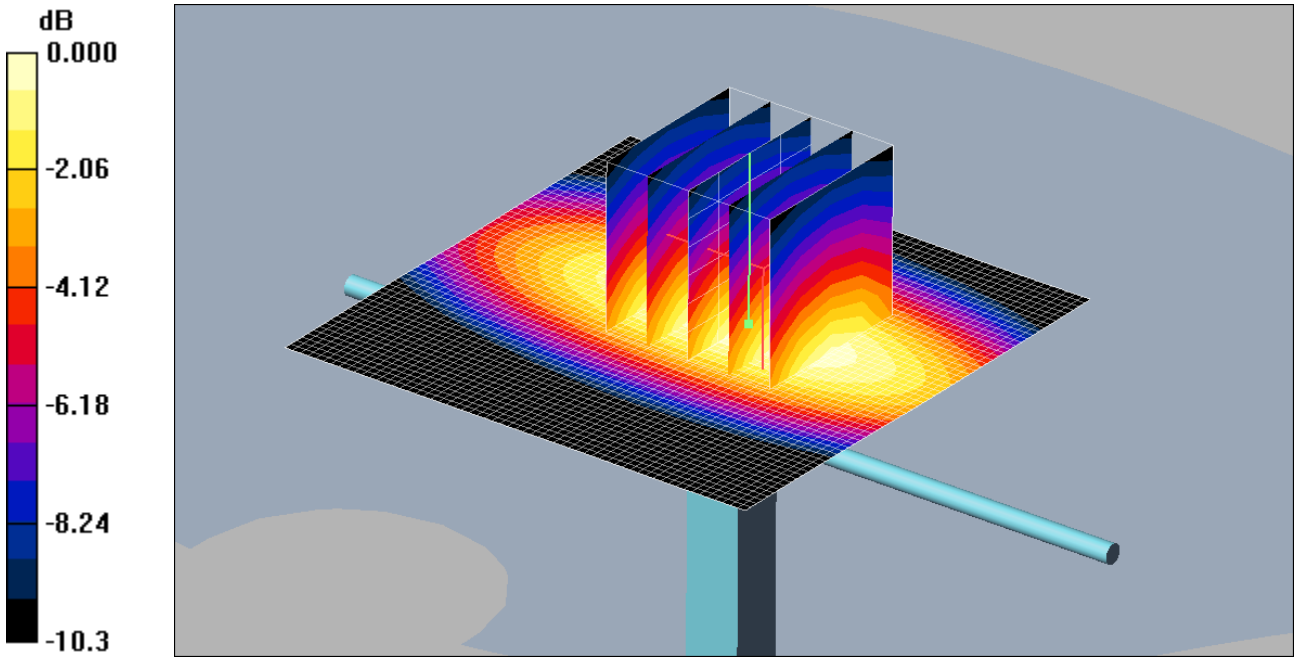


0 dB = 2.88 W/kg = 4.59 dBW/kg

Communication System: UID 0, CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used: f = 900 MHz; σ = 1.016 S/m; ε_r = 54.693; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(5.85, 5.85, 5.85); Calibrated: 22/5/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/5/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- ; SEMCAD X Version 14.6.10 (7331)

Configuration/d=15mm, Pin=250mW 2 2/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.88 W/kg
Configuration/d=15mm, Pin=250mW 2 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 56.30 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.59 W/kg
SAR(1 g) = 2.66 W/kg; SAR(10 g) = 1.76 W/kg
Maximum value of SAR (measured) = 2.89 W/kg

029: System Performance Check 900MHz Body 15 09 14
Date: 15/09/2014
DUT: Dipole 900 MHz; SN: 185; Type: D900V2; Serial: SN185

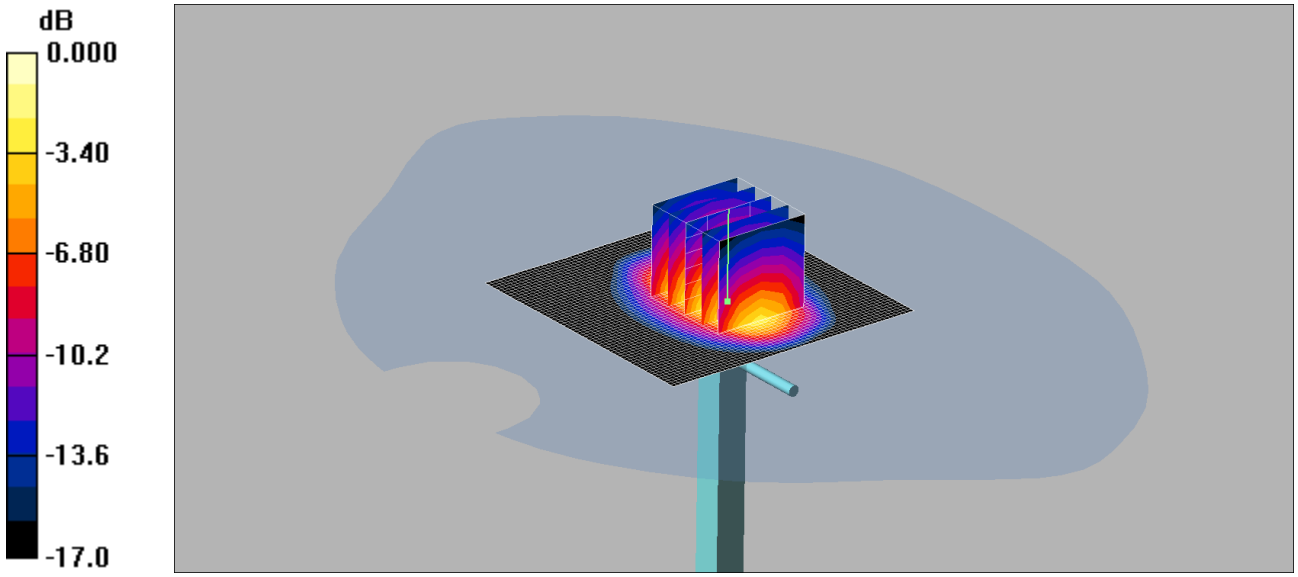


0 dB = 2.80mW/g

Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: 900 MHz MSL Medium parameters used: f = 900 MHz; σ = 1.02 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(5.85, 5.85, 5.85);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12a (Site 56); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

d=15mm, Pin=250mW 2 2 2/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.81 mW/g
d=15mm, Pin=250mW 2 2 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.3 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.72 mW/g
Maximum value of SAR (measured) = 2.80 mW/g

030: System Performance Check 1900MHz Body 11 08 14
Date: 11/08/2014
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN537

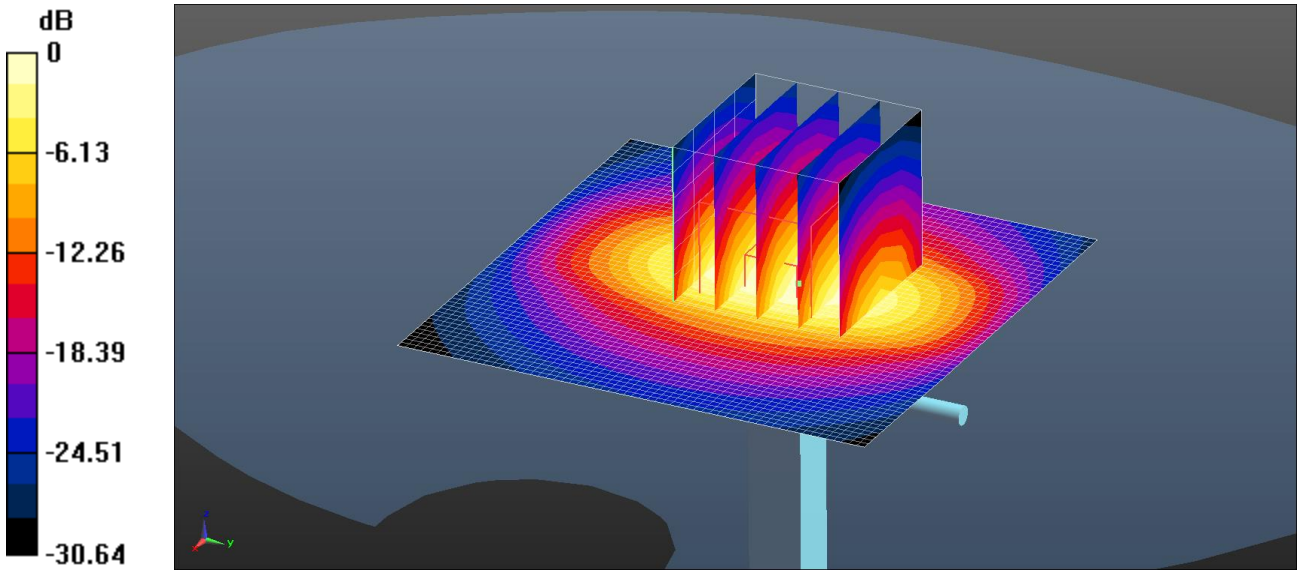


0 dB = 11.4mW/g

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46);
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/05/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159
d=10mm, Pin=250mW 2 2 2/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.9 mW/g

d=10mm, Pin=250mW 2 2 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 92.9 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.43 mW/g
Maximum value of SAR (measured) = 11.4 mW/g

031: System Performance Check 1900MHz Body 08 09 14
Date: 8/9/2014
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN537



0 dB = 12.6 W/kg = 11.01 dBW/kg

Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: 1900 MHz MSL Medium parameters used: f = 1900 MHz; σ = 1.512 S/m; ε_r = 51.342; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ET3DV6 - SN1529; ConvF(4.46, 4.46, 4.46); Calibrated: 22/5/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn394; Calibrated: 16/5/2014
- Phantom: SAM 12b (Site 56); Type: SAM 4.0; Serial: TP:1192
- ; SEMCAD X Version 14.6.10 (7331)

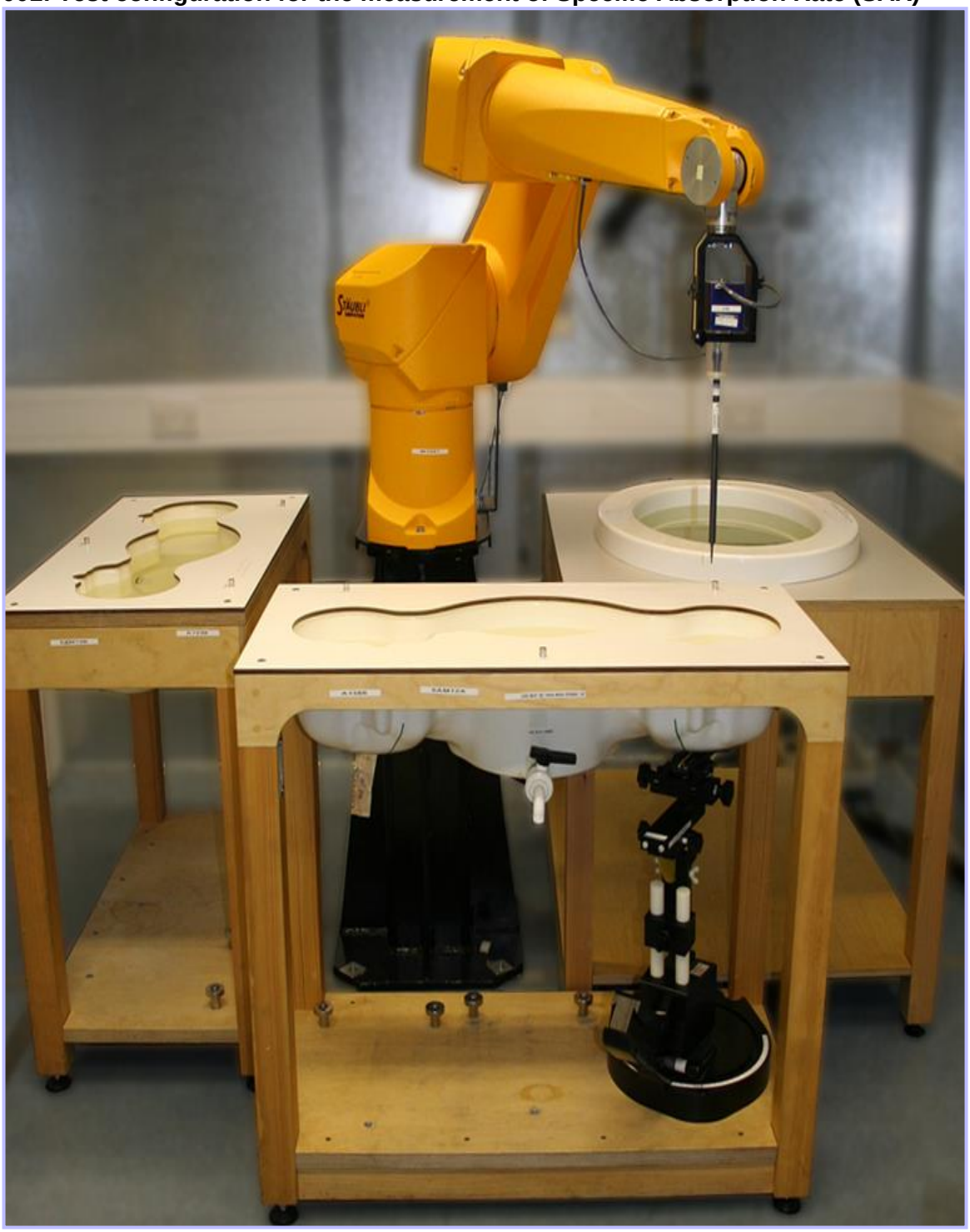
Configuration/d=10mm, Pin=250mW 2 2 2/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 12.6 W/kg
Configuration/d=10mm, Pin=250mW 2 2 2/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 90.33 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 9.59 W/kg; SAR(10 g) = 5.14 W/kg
Maximum value of SAR (measured) = 10.8 W/kg

Appendix 4. Photographs

This appendix contains the following photographs:

Photo Reference Number	Title
001	Test configuration for the measurement of Specific Absorption Rate (SAR)
002	Front of EUT Facing Phantom
003	Back of EUT Facing Phantom
004	Front View of EUT
005	Back View of EUT with Handle Removed
006	Front View of Conducted EUT
007	Back View of Conducted EUT
008	Internal View of EUT
009	900 MHz Body Fluid Level
010	1900 MHz Body Fluid Level

001: Test configuration for the measurement of Specific Absorption Rate (SAR)



002: Front of EUT Facing Phantom

003: Back of EUT Facing Phantom

004: Front View of EUT

005: Back View of EUT with Handle Removed

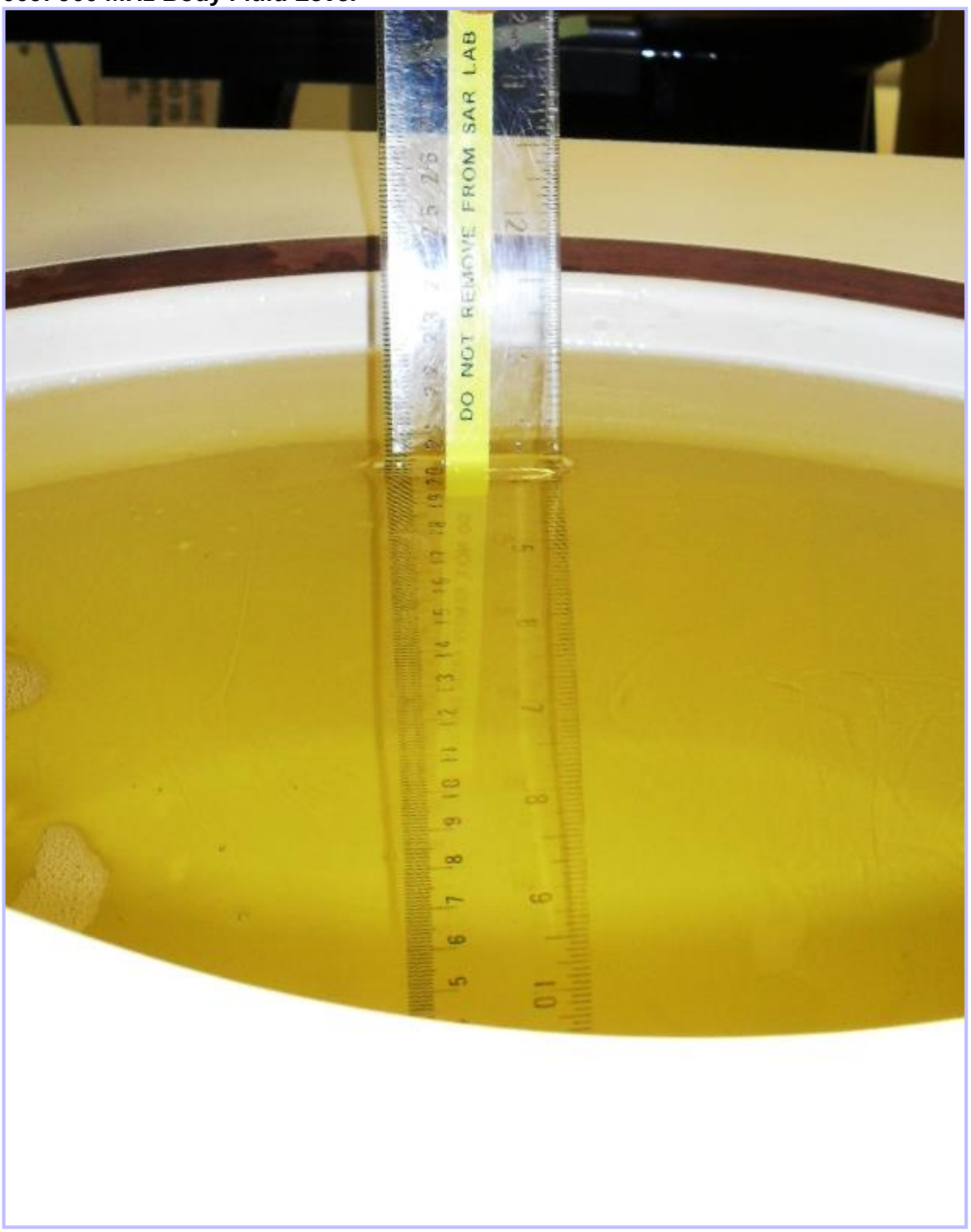
006: Front View of Conducted EUT

007: Back View of Conducted EUT

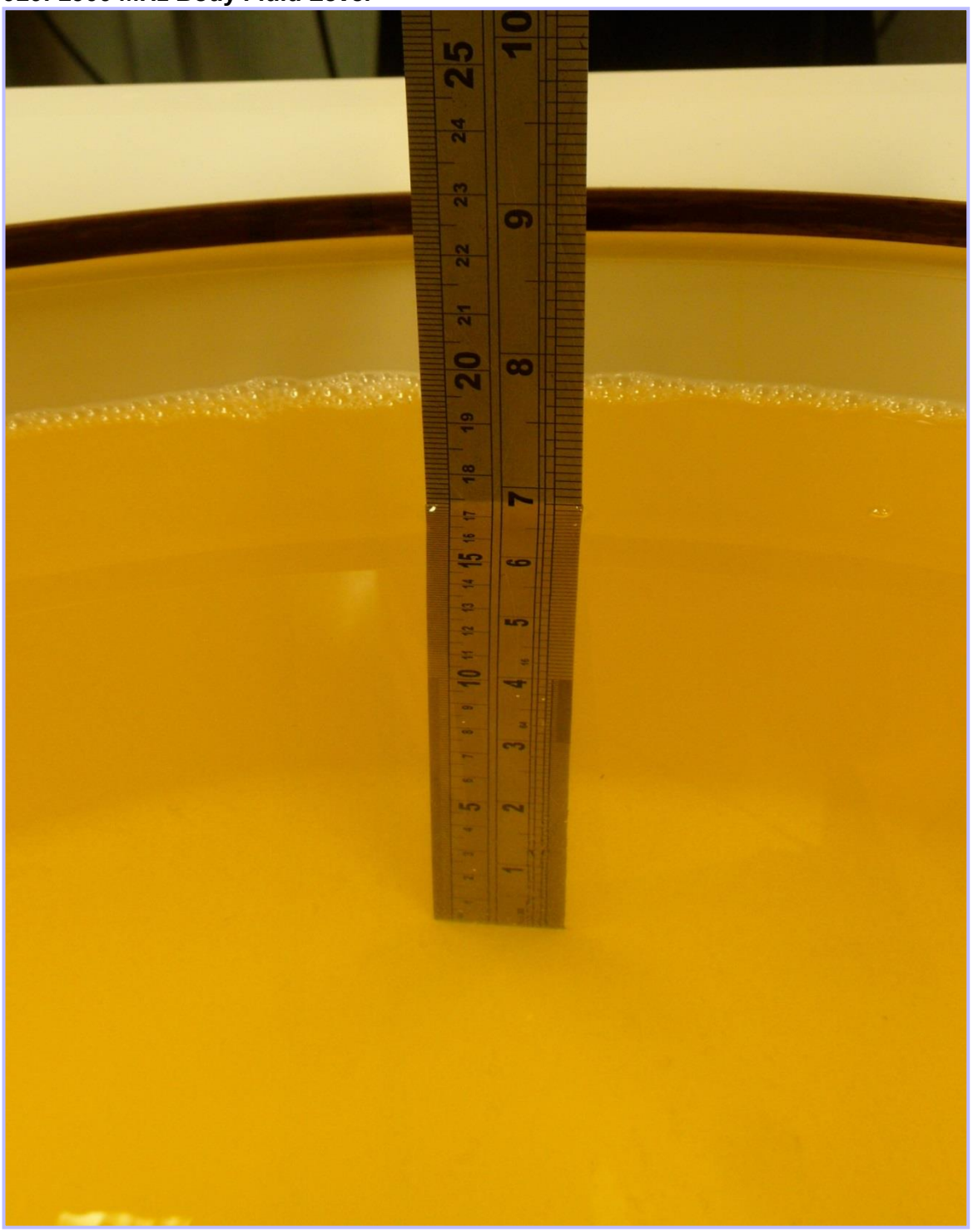
008: Internal View of EUT

Note: The internal View of the EUT was supplied by the manufacturer.

009: 900 MHz Body Fluid Level



010: 1900 MHz Body Fluid Level



Appendix 5. Simulated Tissues

The body mixture consists of water, Polysorbate (Tween 20) and salt. Visual inspection is made to ensure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

Ingredient	Frequency
	835/850/900 MHz Body
De-Ionized Water	71.30
Polysorbate 20 (Tween 20)	28.00
Salt	0.70

Ingredient	Frequency
	1900/1950 MHz Body
De-Ionized Water	71.50
Polysorbate 20 (Tween 20)	28.00
Salt	0.50

Appendix 6. System Check and Dielectric Parameters

Dielectric Property Measurements: The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after each 3 to 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

System Performance Check: Prior to the assessment, the system was verified in the flat region of the phantom, 900 MHz and 1900 MHz dipoles were used. A forward power of 250 mW was applied to the 900 MHz and 1900 MHz dipoles and the system was verified to a tolerance of ±5% for the dipoles.

The applicable verification normalised to 1 Watt.

System Check 900 Body
Date: 18/08/2014
Validation Dipole and Serial Number: D900V2 SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	23.0	24.0	ε_r	55.00	54.90	-0.18	5.00
				σ	1.05	1.00	-4.48	5.00
				1g SAR	10.40	10.12	-2.69	5.00
				10g SAR	6.73	6.72	-0.15	5.00

Channel Number	Band	Frequency (MHz)	Parameters	
1013	CDMA BC0	824.70	ε_r	55.20
			σ	0.96
384		836.52	ε_r	55.20
			σ	0.97
777		848.31	ε_r	55.20
			σ	0.97

Date: 01/09/2014
Validation Dipole and Serial Number: D900V2 SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	24.0	23.0	ε_r	55.00	54.58	-0.76	5.00
				σ	1.05	1.04	-0.76	5.00
				1g SAR	10.40	10.52	1.15	5.00
				10g SAR	6.73	6.96	3.42	5.00

Channel Number	Band	Frequency (MHz)	Parameters	
128	GSM850	824.2	ε_r	54.90
			σ	1.00
190		836.6	ε_r	54.80
			σ	1.00
251		848.8	ε_r	54.78
			σ	1.01

System Check 900 Body (Continued)
Date: 04/09/2014
Validation Dipole and Serial Number: D900V2 SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	24.0	23.0	ε_r	55.00	54.36	-1.16	5.00
				σ	1.05	1.03	-1.90	5.00
				1g SAR	10.40	10.08	-3.08	5.00
				10g SAR	6.73	6.72	-0.15	5.00

Channel Number	Band	Frequency (MHz)	Parameters	
128	GSM850	824.2	ε_r	54.75
			σ	0.98
190		836.6	ε_r	54.70
			σ	0.99
251		848.8	ε_r	54.60
			σ	1.00

Date: 11/09/2014
Validation Dipole and Serial Number: D900V2 SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	24.0	24.0	ε_r	55.00	54.50	-0.91	5.00
				σ	1.05	1.07	1.43	5.00
				1g SAR	10.40	10.64	2.31	5.00
				10g SAR	6.73	7.04	4.61	5.00

Channel Number	Band	Frequency (MHz)	Parameters	
4132	UMTD FDD 5	826.4	ε_r	55.00
			σ	0.97
4183		836.6	ε_r	55.00
			σ	0.98
4233		846.6	ε_r	54.93
			σ	0.99

Date: 15/09/2014
Validation Dipole and Serial Number: D900V2 SN: 035

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	900	24.0	21.1	ε_r	55.00	54.64	-0.65	5.00
				σ	1.05	1.02	-2.67	5.00
				1g SAR	10.40	10.32	-0.77	5.00
				10g SAR	6.73	6.88	2.23	5.00

Channel Number	Band	Frequency (MHz)	Parameters	
4132	UMTD FDD 5	826.4	ε_r	54.91
			σ	0.98
4183		836.6	ε_r	54.80
			σ	1.00
4233		846.6	ε_r	54.80
			σ	1.00

System Check 1900 Body
Date: 11/08/2014
Validation Dipole and Serial Number: D1900V2 SN: 537

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	23.0	23.0	ε_r	53.30	53.97	1.26	5.00
				σ	1.52	1.51	-0.42	5.00
				1g SAR	40.20	40.40	0.50	5.00
				10g SAR	21.1	21.72	2.94	5.00

Channel Number	Band	Frequency (MHz)	Parameters	
512	PCS1900	1850.2	ε_r	54.10
			σ	1.46
661		1880.0	ε_r	54.00
			σ	1.49
810		1909.8	ε_r	53.90
			σ	1.53

Channel Number	Band	Frequency (MHz)	Parameters	
9262	UMTS FDD 2	1852.4	ε_r	54.10
			σ	1.46
9400		1880.0	ε_r	54.00
			σ	1.49
9538		1907.6	ε_r	53.90
			σ	1.52

Date: 08/09/2014
Validation Dipole and Serial Number: D1900V2 SN: 537

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	1900	23.0	24.0	ε_r	53.30	51.34	-3.68	5.00
				σ	1.52	1.51	-0.69	5.00
				1g SAR	40.20	38.36	-4.58	5.00
				10g SAR	21.1	20.56	-2.56	5.00

Channel Number	Band	Frequency (MHz)	Parameters	
25	CDMA BC1	1851.25	ε_r	51.50
			σ	1.46
600		1880	ε_r	51.40
			σ	1.49
1175		1908.75	ε_r	51.30
			σ	1.52

Appendix 7. Measurement Uncertainty Table

Measurement uncertainty tables for technologies tested.

A.7.1 Specific Absorption Rate Uncertainty – GPRS900 / UMTS FDD 5 / CDMA BC0 Body Configuration 10g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\ (1g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration / Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.410	2.410	normal (k=1)	1.0000	1.0000	2.410	2.410	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.4300	1.241	1.241	∞
A	Liquid Conductivity (measured value)	2.000	2.000	normal (k=1)	1.0000	0.4300	0.860	0.860	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.4900	1.415	1.415	∞
A	Liquid Permittivity (measured value)	1.560	1.560	normal (k=1)	1.0000	0.4900	0.764	0.764	5
	Combined standard uncertainty			t-distribution			9.12	9.12	>500
	Expanded uncertainty			k = 1.96			17.88	17.88	>500

A.7.2 Specific Absorption Rate- GPRS1900 / UMTS FDD 2 / CDMA BC1 Body Configuration 10g

Type	Source of uncertainty	+ Value	- Value	Probability Distribution	Divisor	$c_{i\ (1g)}$	Standard Uncertainty		υ_i or υ_{eff}
							+ u (%)	- u (%)	
B	Probe calibration	6.000	6.000	normal (k=1)	1.0000	1.0000	6.000	6.000	∞
B	Axial Isotropy	0.250	0.250	normal (k=1)	1.0000	1.0000	0.250	0.250	∞
B	Hemispherical Isotropy	1.300	1.300	normal (k=1)	1.0000	1.0000	1.300	1.300	∞
B	Spatial Resolution	0.500	0.500	Rectangular	1.7321	1.0000	0.289	0.289	∞
B	Boundary Effect	0.769	0.769	Rectangular	1.7321	1.0000	0.444	0.444	∞
B	Linearity	0.600	0.600	Rectangular	1.7321	1.0000	0.346	0.346	∞
B	Detection Limits	0.200	0.200	Rectangular	1.7321	1.0000	0.115	0.115	∞
B	Readout Electronics	0.160	0.160	normal (k=1)	1.0000	1.0000	0.160	0.160	∞
B	Response Time	0.000	0.000	Rectangular	1.7321	1.0000	0.000	0.000	∞
B	Integration Time	1.730	1.730	Rectangular	1.7321	1.0000	0.999	0.999	∞
B	RF Ambient conditions	3.000	3.000	Rectangular	1.7321	1.0000	1.732	1.732	∞
B	Probe Positioner Mechanical Restrictions	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Probe Positioning with regard to Phantom Shell	2.850	2.850	Rectangular	1.7321	1.0000	1.645	1.645	∞
B	Extrapolation and integration /Maximum SAR evaluation	5.080	5.080	Rectangular	1.7321	1.0000	2.933	2.933	∞
A	Test Sample Positioning	2.290	2.290	normal (k=1)	1.0000	1.0000	2.290	2.290	10
A	Device Holder uncertainty	0.154	0.154	normal (k=1)	1.0000	1.0000	0.154	0.154	10
B	Phantom Uncertainty	4.000	4.000	Rectangular	1.7321	1.0000	2.309	2.309	∞
B	Drift of output power	5.000	5.000	Rectangular	1.7321	1.0000	2.887	2.887	∞
B	Liquid Conductivity (target value)	5.000	5.000	Rectangular	1.7321	0.4300	1.241	1.241	∞
A	Liquid Conductivity (measured value)	2.610	2.610	normal (k=1)	1.0000	0.4300	1.122	1.122	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.4900	1.415	1.415	∞
A	Liquid Permittivity (measured value)	2.140	2.140	normal (k=1)	1.0000	0.4900	1.049	1.049	5
	Combined standard uncertainty			t-distribution			9.15	9.15	>500
	Expanded uncertainty			k = 1.96			17.93	17.93	>500

Appendix 8. 3G Test set-up

3G (12.K RMC / HSDPA / HSUPA) setup
To switch from 2G to 3G, on the system config screen choose Format Switch and select WCDMA. The Call Setup Screen as shown in figure 1 pops up.

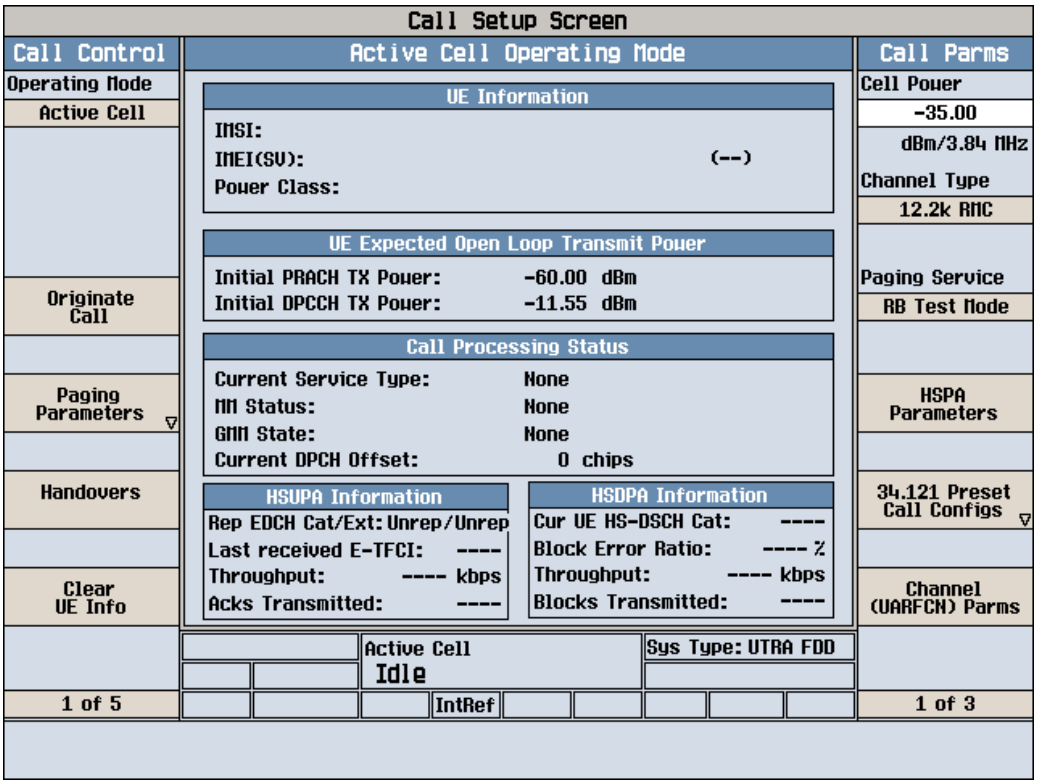


Figure 1: 3G Call Setup Screen

For a 12.2k RMC call follow the steps below.

8.1. Steps for 12.2k RMC

1. Ensure that the Operating Mode of the cell is off before setting up the instrument.
2. On the Call Setup Screen, under Call Parameters, press the button against Cell Power. The Cell Power value is set to about -35dBm to account for all the losses and ensure sufficient signal strength to the EUT.
3. The Channel Type is selected to 12.2k RMC. Press button against Channel (VARFCN) Parms select the correct Downlink Channel for the required UMTS FDD Band.
4. On the Call Setup Screen, under Call Parameters, press the button against HSPA Parameters. Under HSDPA Parameters on page 1, press HSDPA Uplink parameters and set the Delta ACK, Delta NACK, Delta CQI values to 8. Under HSDPA Parms itself, press HSDPA RB Test Mode Setup button and then the HSDPA RB Test Mode Settings and change HS-DSCH Data Pattern to All Ones.

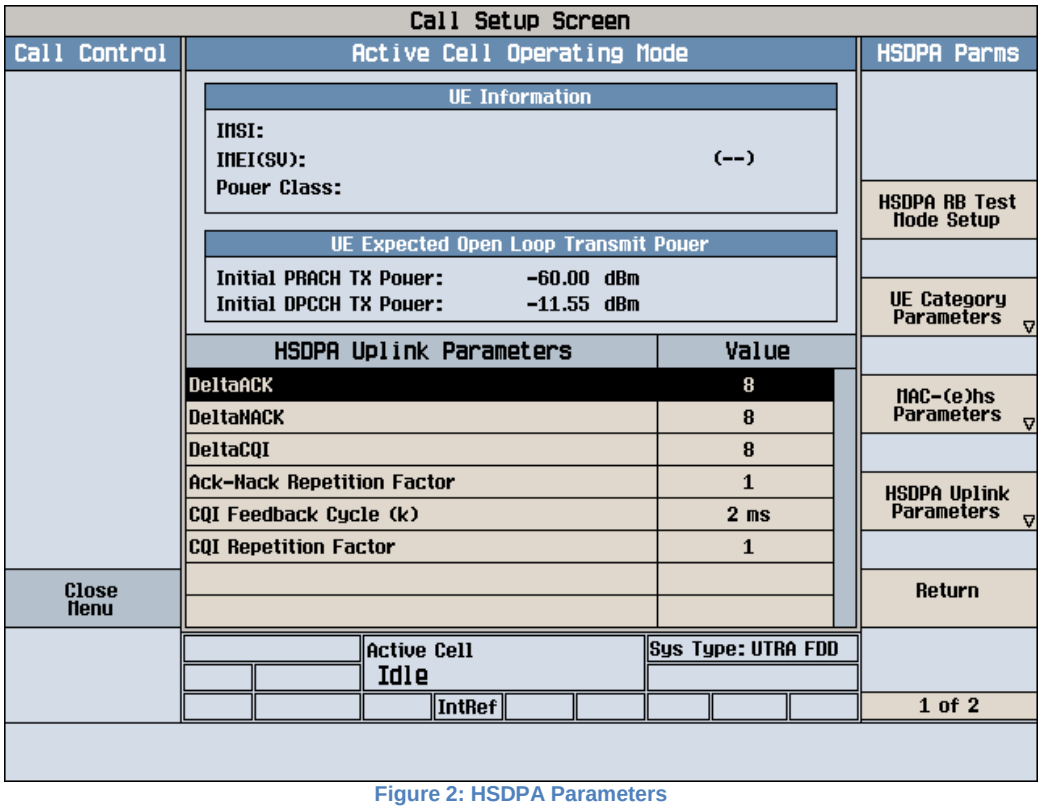


Figure 2: HSDPA Parameters

5. On the Call Setup Screen, under Call Parameters, on page 2, check if the DL DTCH Data is set to All Ones. On page 3, ensure that the Receiver is set to Manual. On page 3 itself, under UL CL Power Ctrl Parameters, UL CL Power Ctrl Mode is set to All Up Bits.

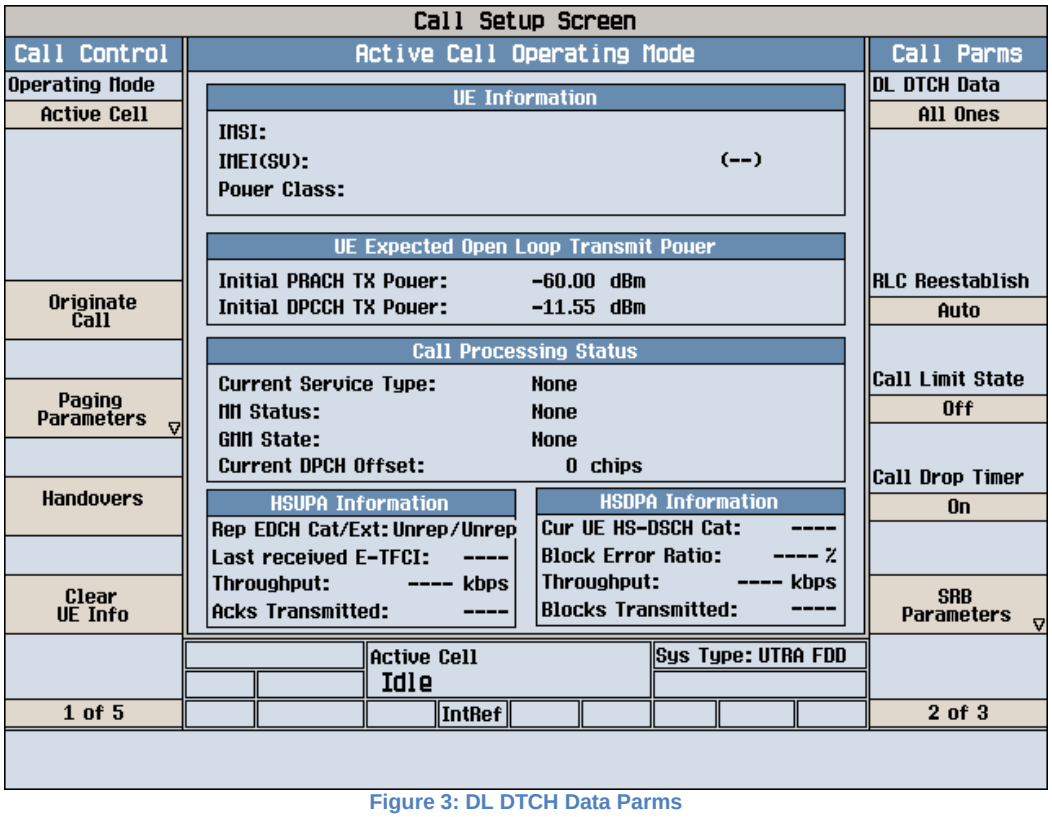


Figure 3: DL DTCH Data Parms

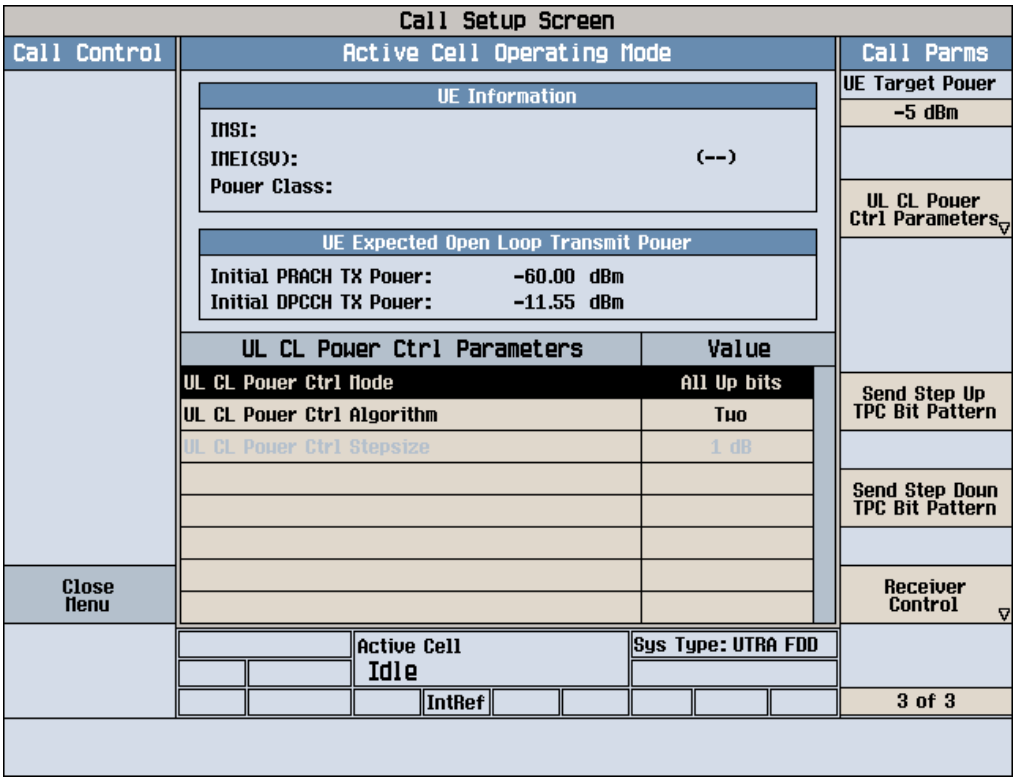


Figure 4: UL CL Power Ctrl Parameters

6. On the Call Setup Screen, under Call Control, page 2, Cell Parameters, it is ensured that PS Domain information is kept as Absent for RMC.

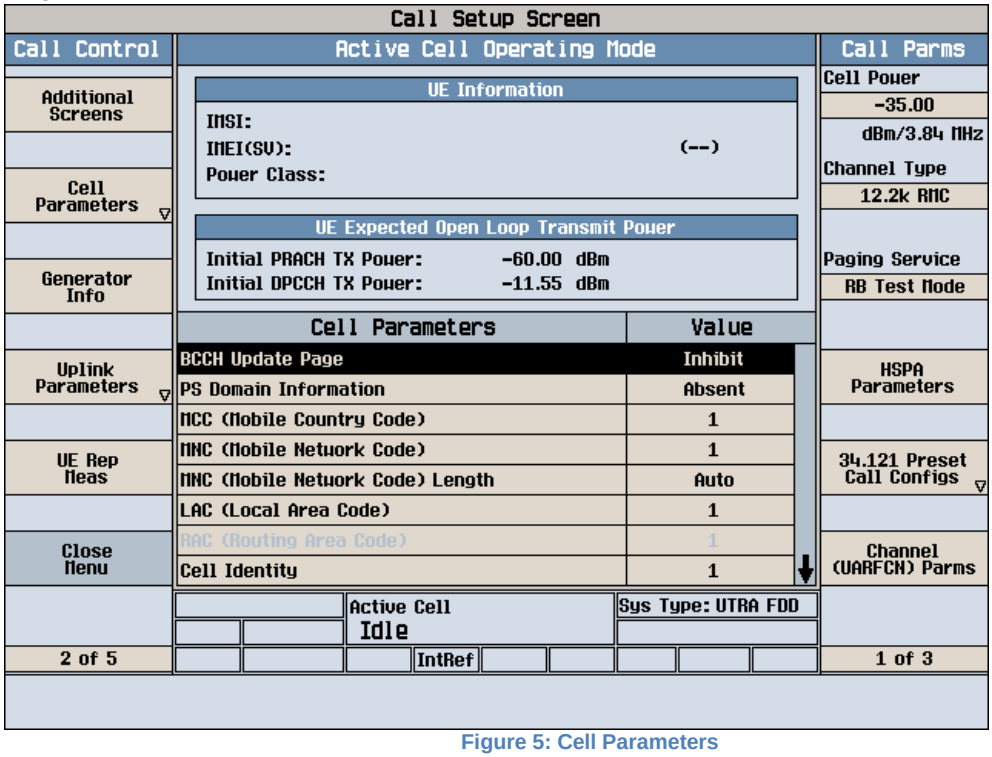


Figure 5: Cell Parameters

7. On the same page under Uplink Parameters the maximum Uplink Transmit Power is made 24dBm. Uplink DPCH Bc/Bd Control Settings are kept at Auto for RMC. These vary according for HSDPA and HSUPA as per the values given in KDB 941225 D01 SAR test for 3G devices v02.

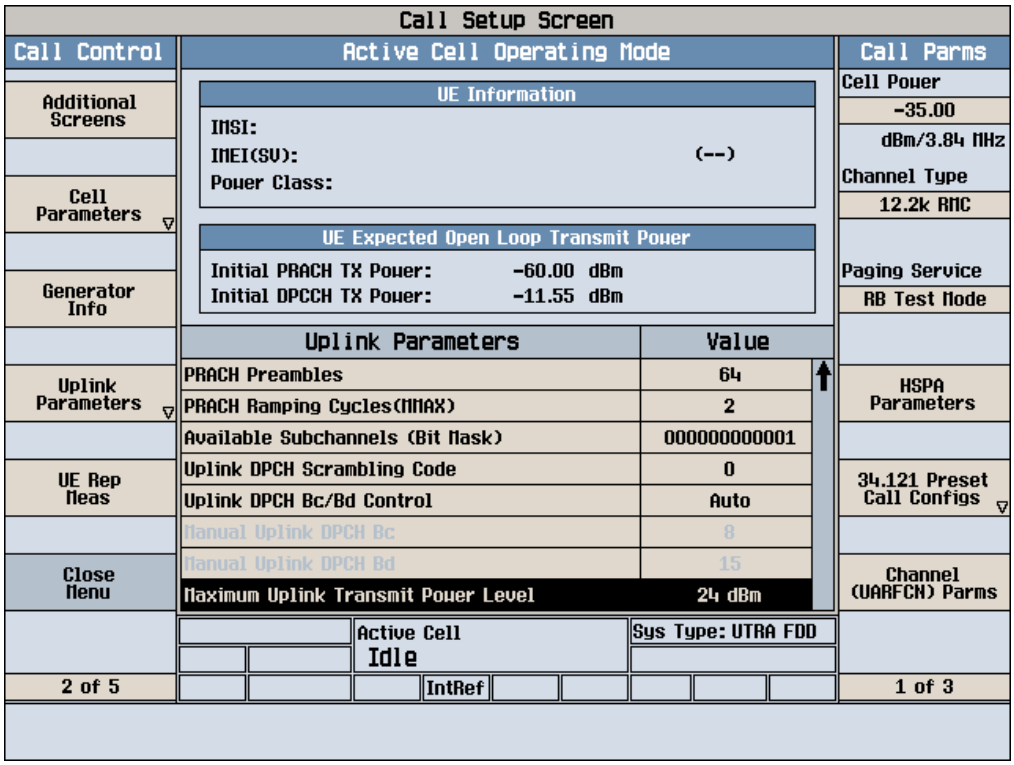


Figure 6: Uplink Parameters

8. On page 3 under Call Control, for the RB Test Mode setup, Asymmetric RMC CN Domain is ensured to be in CS Domain for RMC call.

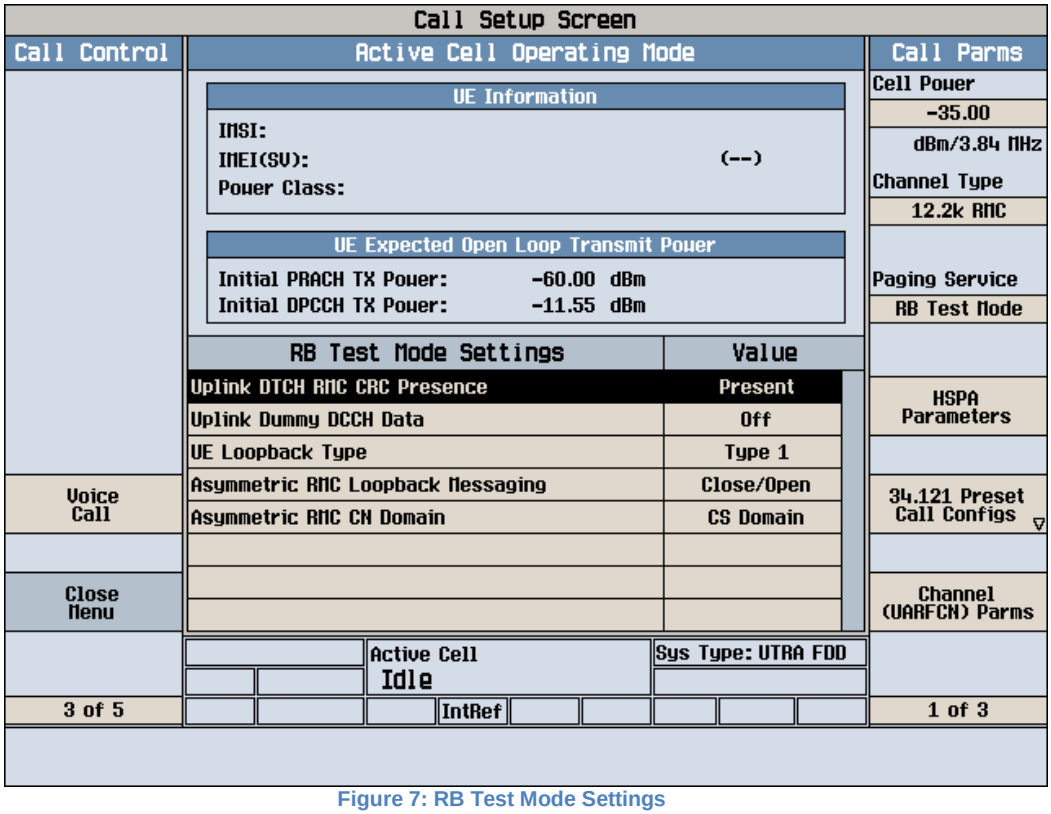


Figure 7: RB Test Mode Settings

9. After the test set has been set up, change the cell Operating Mode to Active Cell and originate a call.

8.2. Steps for 12.2k RMC + HSDPA/HSUPA

1. Most of the steps to be followed are as in the case of 12.2k RMC however, some of the settings need to be changed. The Channel Type is changed to 12.2k RMC+HSDPA or 12.2k RMC+HSUPA as required.
2. For HSDPA and HSUPA, the settings remain same as the case for RMC but the PS Domain is made Present for Cell Parameters (Figure 5) and RB Test Mode Setup (Figure 7).
3. The following tables taken from FCC 3G SAR procedures (KDB 941225 D01 SAR test for 3G devices v02) below were applied to the Agilent 8960 series 10 wireless communications test set which supports 3G / HSDPA release 5 / HSUPA release 6.

Sub-test 1 Setup for Release 5 HSDPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	SM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $B_{hs}/\beta_c = 24/15$

Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

Sub-test 5 Setup for Release 6 HSUPA

Sub-test	β_c	β_d	B_d *(SF)*	β_c/β_d	β_{hs} (1)	B_{oc}	B_{od}	B_{od} *(SF)*	B_{od} *(codes)*	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	31/15	B_{al1}: 47/15 B_{al2}: 47/15	4	1	2.0	1.0	15	92
4	2/15	15/15	64	2/15	2/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	24/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

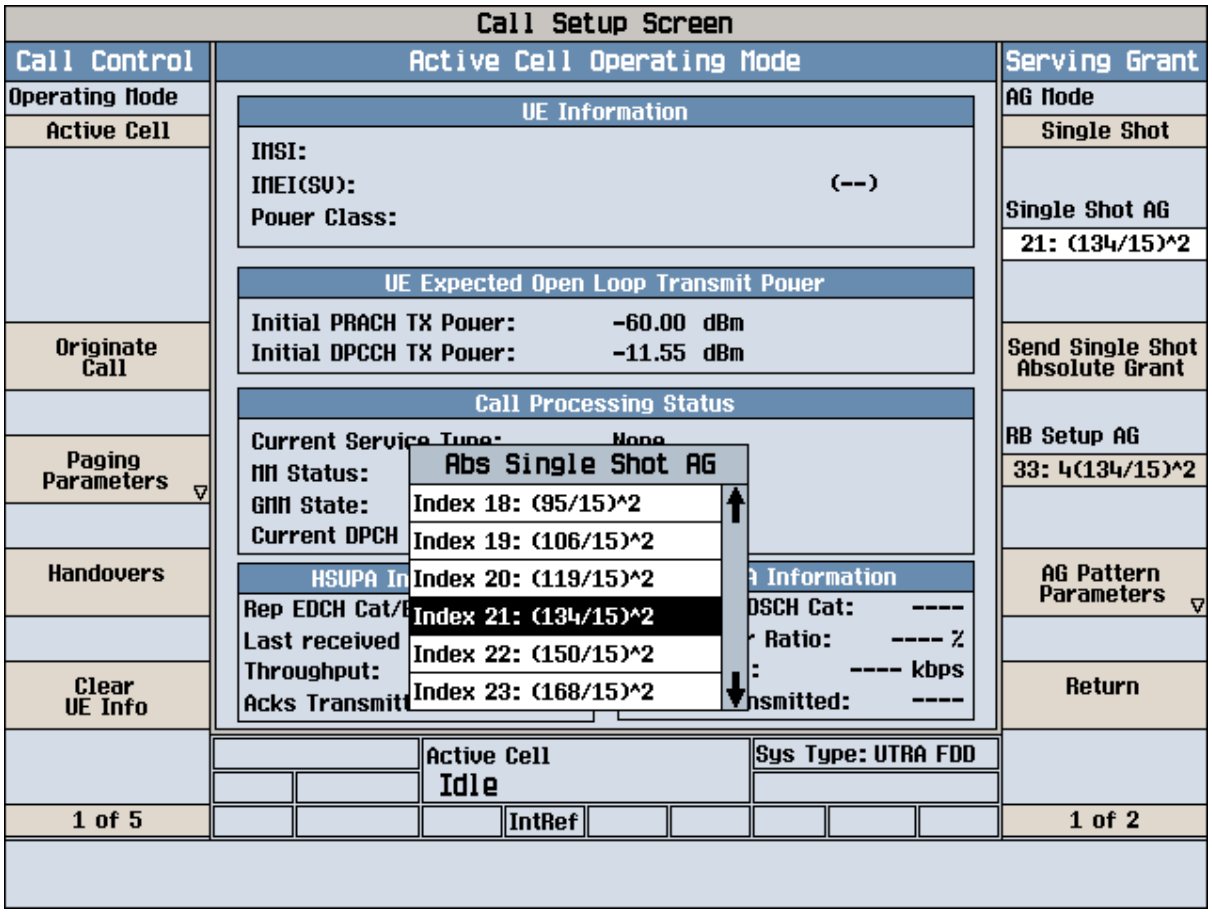
Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $B_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH AND E-DPCCH for the MPR is based on the relative CM difference.

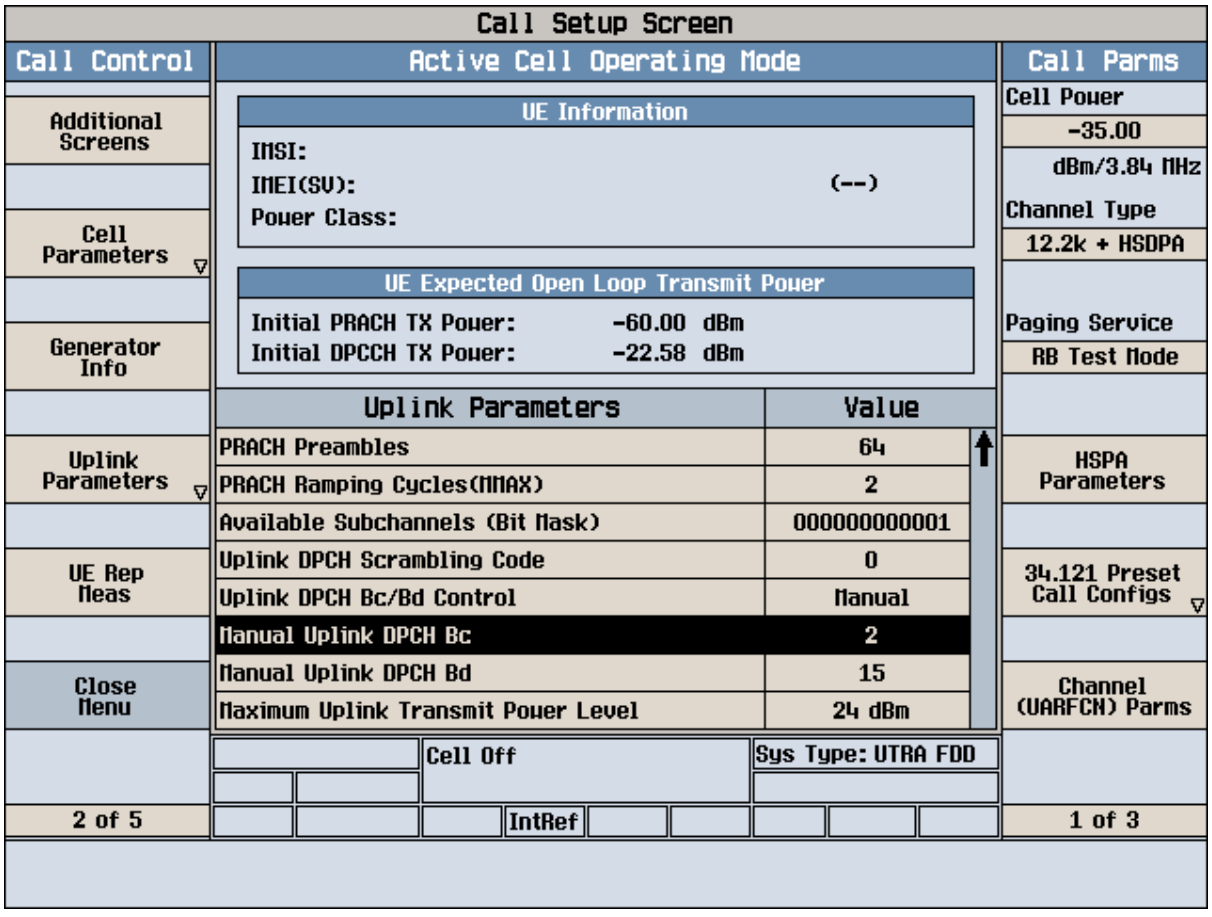
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

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

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Tavle 5.1g.

Note 6: B_{od} can not be set directly; it is set by Absolute Grant Value.





4. For HSUPA the Serving Grant Parameter needs to be set. On the Call Setup Screen, under Call Parameters, press the button against HSPA Parameters. On the new screen that pops up, press HSUPA and Serving Grant. The Serving Grant is set according to the table for HSPA in the KDB (AG Index). The correct AG is chosen from the Single Shot AG. Consecutively, the RG Setup AG is set as per the ratio set on Single Shot AG.

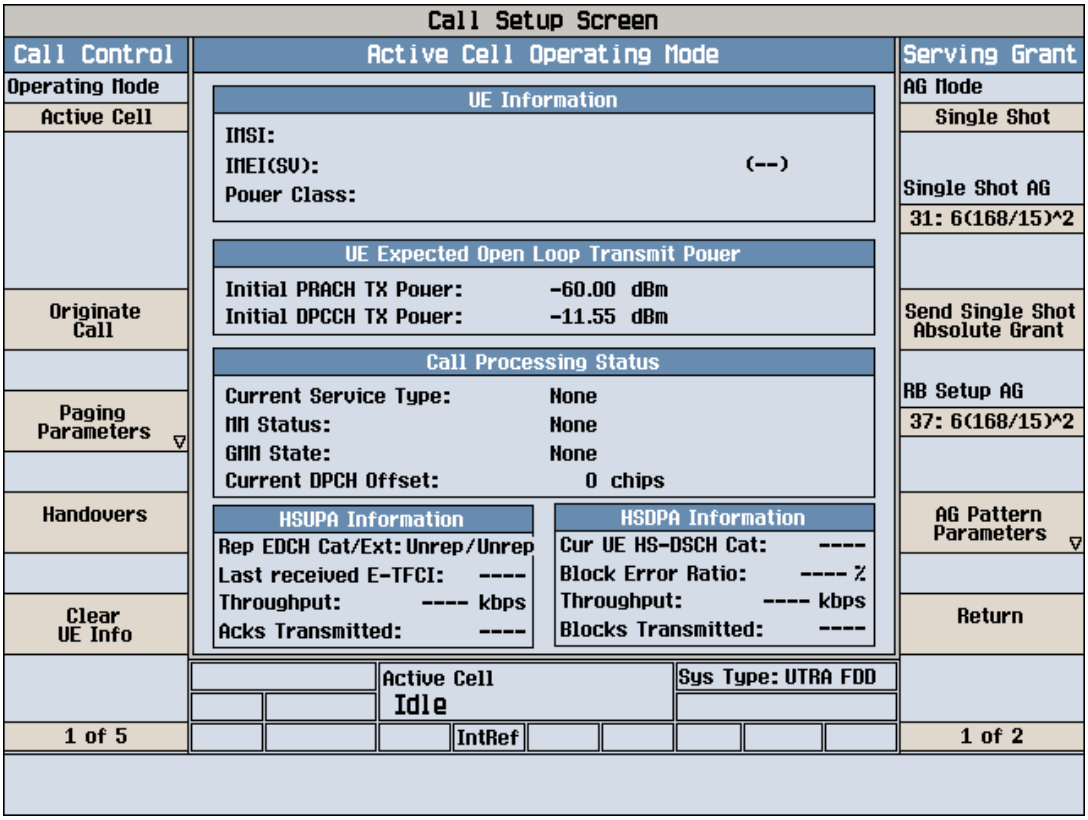


Figure 8: Serving Grant Example