TEST REPORT

Test of: General Dynamics Broadband, LTE USB Stick: ARM

&

Antenna: LTE-ODUP003-IPW

To: OET Bulletin 65 Supplement C: (2001-01)
IEEE 1528: 2003

FCC ID: PKTUSBSTKARM

Test Report Serial No:
UL-SAR-RP88727J02A V6.0

Version 6.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Richelieu Quoi, SAR Technology Consultant:	 (APPROVED SIGNATORY)
Checked By: Naseer Mirza	 (APPROVED SIGNATORY)
Issue Date:	**30 November 2012**
Test Dates:	**20 August 2012 to 31 October 2012**

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TABLE OF CONTENTS

1. Customer Information

Company Name:	General Dynamics Broadband
Address:	Unit 7 Greenways Business Park Bellinger Close Chippenham Wilts SN15 1BN United Kingdom

2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	LTE USB Stick
Brand Name:	General Dynamics Broadband.
Model Name or Number:	ARM
Serial Number:	ARMHC0001F12
IMEI Number:	Not Applicable
Hardware Version Number:	Pass 1
Software Version Number:	Rel.3
Hardware Revision of GSM Module:	Not Applicable
Software Revision of GSM Module:	Not Applicable
FCC ID Number:	PKTUSBSTKARM
Country of Manufacture:	None Stated
Date of Receipt:	20 August 2012

2.2. Identification of Equipment Under Test (EUT)

Description:	LTE USB Stick Antenna
Brand Name:	General Dynamics Broadband.
Model Name or Number:	LTE-ODUP003-IPW
Serial Number:	GT1229LT006040
IMEI Number:	Not Applicable
Cable Length and Type:	~3.2 m Dual RF Cable
Hardware Version Number:	None Stated
Country of Manufacture:	China
Date of Receipt:	20 August 2012

2.3. Description of EUT

The Equipment Under Test is a LTE USB Dongle Stick Modem and an attachable antenna with Mono band capability supporting LTE Band 12, 5 MHz Bandwidth channel. The EUT is a power class 3 device.

2.4. Accessories

The following accessories were supplied with the EUT during testing:

Description:	USB Cable
Brand Name:	None Stated
Model Name or Number:	None Stated
Serial Number:	Not Applicable
Cable Length and Type:	~132.5mm USB Cable
Country of Manufacture:	None Sated
Connected to Port	Standard USB Port

2.5. Support Equipment

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

Description:	Laptop PC
Brand Name:	Dell
Model Name or Number:	Latitude D620
Serial Number:	None Stated
Cable Length and Type:	Not Applicable
Connected to Port:	Not Applicable

Description:	Radio Communication Analyzer
Brand Name:	Anritsu
Model Name or Number:	MT8820C
Serial Number:	6200938937
Cable Length and Type:	~4.0m Utiflex Cable
Connected to Port:	RF (Input / Output) Air Link

2.6. Additional Information Related to Testing

Equipment Category	LTE Band 12		
Type of Unit	Fixed Transceiver supported via Portable device		
Intended Operating Environment:	Within LTE coverage/ General Population/Uncontrolled limits		
Transmitter Maximum Output Power Characteristics:	LTE Band 12	Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D05.	
Transmitter Frequency Range:	LTE Band 12	699 to 716 MHz	
Transmitter Frequency Allocation of EUT When Under Test:	**Channel Number**	**Channel Description**	**Frequency (MHz)**
	LTE Band 12 – 5 MHz Bandwidth		
	23035	Low	701.5
	23095	Middle	707.5
	23155	High	713.5
Modulation(s):	FDD(QPSK / 16QAM): 0 Hz		
Modulation Scheme (Crest Factor):	FDD (QPSK / 16QAM): 1		
Antenna Type:	USB Dongle: Internal Integral Unknown Type Attachable Antenna: Unknown Type		
Antenna Length:	USB Dongle: Unknown Attachable Antenna: 172mm		
Antenna Dimension:	Attachable Antenna: (172 x 28 x 15) mm		
Number of Antenna Positions:	1 Fixed		
Power Supply Requirement:	5v (USB Port Supply)		
Battery Type(s):	Not Applicable		

Additional Information Related to LTE Test parameter		
#	**Description**	**Parameter**
1	Identify the operating frequency range of each LTE transmission band used by the device	Band 12: frequency range – 699 MHz – 716 MHz
2	Identify the channel bandwidths used in each frequency band; e.g.: 1.4, 3, 5, 10, 15, 20 MHz etc.	Channel Bandwidths used are: B12 (5 MHz)
3	Identify the high, middle and low (L, M, H) channel numbers and frequencies in each LTE frequency band	B12 -5 MHz (L, M, H)= (23035, 23095, 23155) (701.5, 707.5, 713.5) MHz
4	Specify the UE category and uplink modulations used	The UE Category is 3 and the Uplink modulations used are QPSK, 16QAM.
5	Descriptions of the LTE transmitter and antenna implementation & identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc.	This model (ARM) has hardware for LTE band only with an only one main antenna. (as pictured below in the Appendix 4, PHT/88727JD02/012 to PHT/88727JD02/015).
6	Identify the LTE Band Voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions, etc.	The following exposure condition with respect to body test is required for only data modes only due to EUT functionality and antenna location(s).
7	Identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design: a) only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards b) A-MPR (additional MPR) must be disabled.	MPR is not supported on this EUT.
8	Include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band: a) with 1 RB allocated at the upper edge of a channel b) with 1 RB allocated at the lower edge of a channel c) using 50% RB allocation centered within a channel d) using 100% RB allocation	This is included in the section 7.2.2 of this report.
9	Identify all other U.S. wireless operating modes (3G, Wi-Fi, WiMax, Bluetooth etc), device/exposure configurations (head and body, antenna and handset flip-cover or slide positions, antenna diversity conditions etc.) and frequency bands used for these modes	Not applicable.

Additional Information Related to LTE Test parameter(Continued):		
#	**Description**	**Parameter**
10	Include the maximum average conducted output power measured for the other wireless mode and frequency bands	Not applicable.
11	Identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating configurations (handset flip or cover positions, antenna diversity conditions etc.)	Not applicable
12	When power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup	Not applicable.
13	Include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission	An Anritsu MT8820C communication simulator which supports LTE modes (voice/data) was used for testing.
14	When appropriate, include a SAR test plan proposal with respect to the above.	Not Applicable
15	If applicable, include preliminary SAR test data and/or supporting information in laboratory testing inquiries to address specific issues and concerns or for requesting further test reduction considerations appropriate for the device; for example simultaneous transmission configurations.	Not Applicable

3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	OET Bulletin 65 Supplement C: (2001-01)
Title:	Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.
Purpose of Test:	To determine whether the equipment met the basic restrictions as defined in OET Bulletin 65 Supplement C: (2001-01) using the SAR averaging method as described in the test specification above.

3.2. Methods and Procedures Reference Documentation

The methods and procedures used were as detailed in:

Federal Communications Commission, “Evaluating compliance with FCC Guidelines for human exposure to radio frequency electromagnetic fields”, OET Bulletin 65 Supplement C, FCC, Washington, D.C, 20554, 2001.

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 know precision”, IEICE Transactions of communications, Vol. E80-B, No.5, pp. 645-652, May 1997.

KDB 447498 D01 Mobile Portable RF Exposure v04

KDB 447498 D02 SAR Procedures for Dongle Xmtr v02

KDB 450824 D01 SAR Prob Cal and Ver Meas v01r01

KDB 450824 D02 Dipole SAR Validation Verification V01

KDB 941225 D05 SAR for LTE Devices v01

KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01

RF Exposure Procedures TCB Workshop April 2012

3.3. 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.

4. Deviations from the Test Specification

Test was performed as per ‘’KDB 447498 D01 Mobile Portable RF Exposure v04’’, ‘’KDB 447498 D02 SAR Procedures for Dongle Xmtr v02’’, ‘’KDB 450824 D01 SAR Prob Cal and Ver Meas v01r01’’, ‘’KDB 450824 D02 Dipole SAR Validation Verification V01’’, KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01, KDB 941225 D05 SAR for LTE Devices v01 and according to the handset procedures in IEEE Std 1528-2003, OET Bulletin 65 Supplement C 01-01 and the specific FCC test procedures.

Prior to testing the FCC was contacted for LTE evaluation under FCC KDB Tracking Number 629554 and KDB Tracking Number 510722.

SAR test was performed using the LTE test methods of FCC KDB 941225 D05 SAR for LTE Devices v01 and RF Exposure Procedures TCB Workshop April 2012.

5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

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

- LTE Band 12 data allocated mode at QPSK & 16 QAM on the 5 MHz channel only, using an Anritsu MT8820C Communication Test Set configured to allow to EUT to transmit at a maximum power as per KDB 941225 D05.

5.2. Configuration and Peripherals

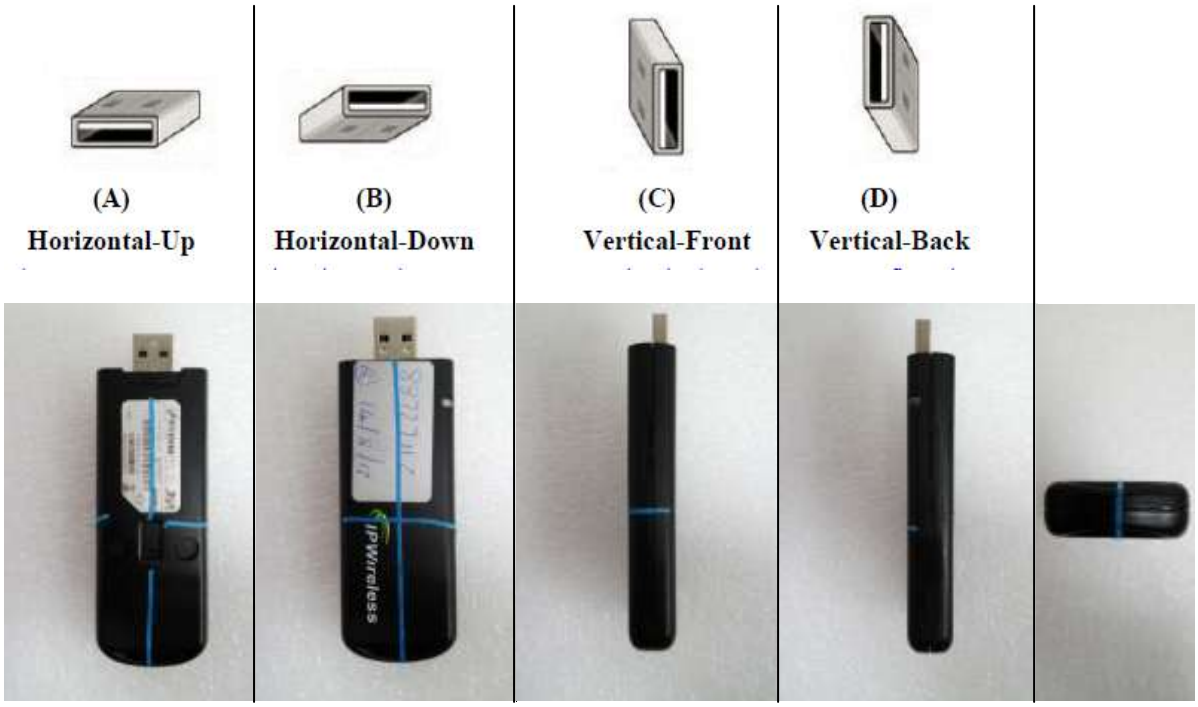
The EUT was tested in the following configuration(s) unless otherwise stated:

- Powered via a USB port.
- SAR measurements were performed using a duty cycle of 100% and maximum average power of 23 dBm (+/-1dBm tolerance). All modulation types (QPSK and 16QAM) were evaluated.
- EUT was tested in the body-worn position with all 5 edges (Horizontal-Down, Horizontal-Up, Vertical-Front, Vertical-Back and Top or Tip) facing the SAR phantom at a separation distance of 5mm for the USB dongle and at 10mm for the antenna. The following configurations highlighted below were used.
- The below are the configuration covered is as per KDB 447498 D02 SAR Procedures for Dongle Xmtr v02. Appendix 4 shows the EUT setup in these configurations.

SAR Test Configuration for USB Dongle and Channel supported:

Frequency **701.5 MHz** (Low Channel) Channel Number = 23035	Frequency **707.5 MHz** (Middle Channel) Channel Number = 23095	Frequency **713.5 MHz** (High) Channel Channel Number = 23155

USB configuration with respect to connector orientation implemented on laptop computer:



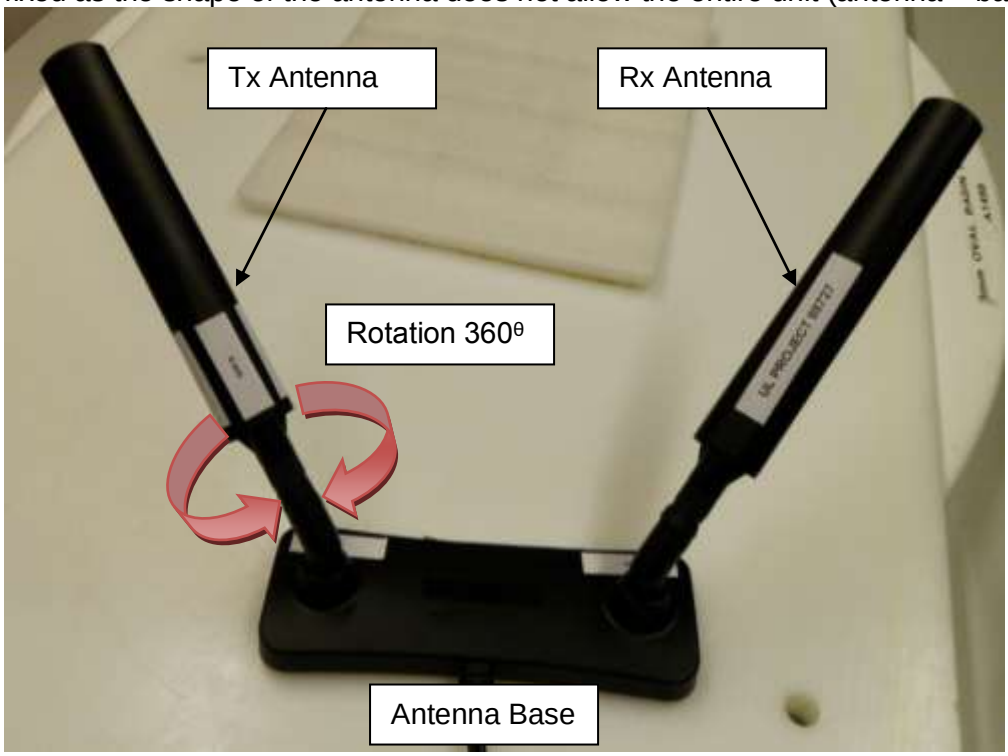
Tip Configuration

EUT Position For USB dongle
Side (A): Horizontal-Up
Side (B): Horizontal-Down
Side (C): Vertical-Front
Side (D): Vertical-Back
Tip

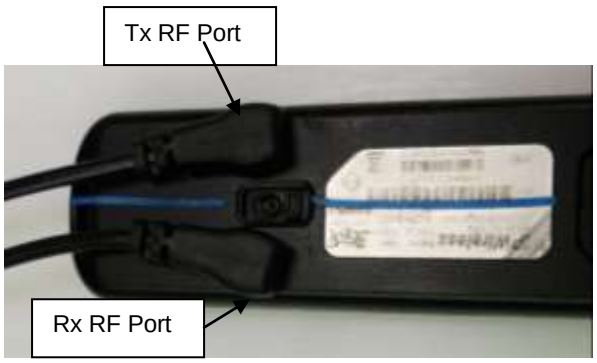
SAR Test Configuration for USB Dongle + Antenna Operating and Channel supported:

Frequency **701.5 MHz** (Low Channel) Channel Number = 23035	Frequency **707.5 MHz** (Middle Channel) Channel Number = 23095	Frequency **713.5 MHz** (High) Channel Channel Number = 23155

Antenna configuration: The neck of the antenna rotates in a 360 degrees angle of rotation. To ensure all surfaces of the antenna is evaluated the neck is rotated while the base holder is kept fixed as the shape of the antenna does not allow the entire unit (antenna + base) to be rotated.



The antenna when mounted to the base has 2 elements, one for Tx and one for Rx. SAR test will be performed on the Tx element indicated below. Prior to selecting the Tx antenna, the output of the RF port on the base unit was checked to ensure power was transmitting from the correct RF port to the antenna.



General view of setup with Tx Antenna under phantom and RF cable plug in USB port

Side (A): Horizontal-Up	Side (B): Horizontal-Down	Side (C): Vertical-Front	Side (D): Vertical-Back

Tip

EUT Position For USB dongle
Side (A): Horizontal-Up
Side (B): Horizontal-Down
Side (C): Vertical-Front
Side (D): Vertical-Back
Tip

Body Configuration

a) The EUT was placed ir 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) For position(s) greater then 0mm separation the EUT was positioned as per the touch-safe position, and then the vertical height was decreased/adjusted as required.

e) 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.

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

g) The location of the maximum spatial SAR distribution (hot spot) was determined relative to the handset and its antenna.

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

6. Summary of Test Results

Test Name	Specification Reference	Result
Specific Absorption Rate- LTE Band 12 QPSK 5MHz Channel BW - USB Dongle	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate- LTE Band 12 16-QAM 5MHz Channel BW - USB Dongle	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate- LTE Band 12 QPSK 5MHz Channel BW – Transmitter Antenna	OET Bulletin 65 Supplement C: (2001-01)	Complied
Specific Absorption Rate- LTE Band 12 16-QAM 5MHz Channel BW - Transmitter Antenna	OET Bulletin 65 Supplement C: (2001-01)	Complied
Note(s):		

Simultaneous transmission was not evaluated as the EUT does not support this feature.

Summary of Test Results Measured and Scaled value to maximum tolerance

SAR Scale-Up Worst case Configuration Measurements per mode per side: USB Dongle

1g SAR

Technology Mode	Configuration	Channel Number	Mode	Meas output power [1] [dBm]	Max Rated Power[2] dBm]	Measured SAR(W/kg)[3]	**Calculated Scaled SAR(W/kg)**
						1g mass	**1g mass**
LTE Band 12	Side (B): Horizontal Down	23095	QPSK	23.4	24.0	0.591	0.679

SAR Scale-Up Worst case Configuration Measurements per mode per side: Transmitter Antenna

1g SAR

Technology Mode	Configuration	Channel Number	Mode	Meas output power [1] [dBm]	Max Rated Power[2] dBm]	Measured SAR(W/kg)[3]	**Calculated Scaled SAR(W/kg)**
						1g mass	**1g mass**
LTE Band 12	Side (B): Horizontal Down	23095	16-QAM	22.8	24.0	0.962	1.268

Note:

- The worst case configuration exceeding 1.2W/kg when scaled to the maximum rated power plus the upper tolerance therefore this was repeated twice as per KDB 865664. The calculated Scaled SAR values obtained were 1.269W/kg and1.262W/kg.
- The maximum measured SAR level was 1.04 W/kg, when scaled-up was found not to be the highest SAR level as the actual measured conducted power was at the upper range of the tolerance. The measured level 0.962 W/kg was found to be the highest scaled up SAR level as the conducted power was at the lower end of the rated tolerance. Hence the reported scaled-up level is 1.268 W/kg (see table below)

Highest measure SAR vs. Highest scaled-up SAR levels

Technology Mode	Configuration	Channel Number/ RB/ Edge	Mode	Measured output power [dBm]	Maximum Rated Power [dBm]	Measured SAR(W/kg)	Calculated SAR(W/kg)
						1g mass	1g mass
LTE Band 12	Side (B): Horizontal Down	23155 / 50% RB / Mid	16-QAM	22.8	24.0	**0.962**	1.268
LTE Band 12	Side (B): Horizontal Down	23095 / 50% RB / Mid	QPSK	23.4	24.0	**1.040**	1.194

*Maximum tolerance:
LTE: (+1dB）

*Maximum rated power:
LTE: (23.0 + 1) dBm

Note(s):

1. Meas output power (Source Base average power) level measured by RFI.
2. Max Rated power (Source Base average power) level supplied by manufacturer plus tolerance.
3. Measured SAR value measured by RFI.

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, trading as UL, Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG United Kingdom

7. Measurements, Examinations and Derived Results

7.1. 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.

7.2. Test Results

For All SAR measurement in this report the SAR limit tested to is 1.6 W/kg

Specific Absorption Rate- LTE Band 12 QPSK 5MHz Channel BW - USB Dongle

EUT Position	Phantom Configuration	Separation Distance (mm)	Channel Number	RB Allocation	Meas. Avg. Power (dBm)	Meas. Level (W/Kg)	Mod.
Side (A): Horizontal-Up							
Side (A): Horizontal-Up	Flat (SAM)	5.0	23095	50%	23.4	0.378	QPSK
Side (A): Horizontal-Up	Flat (SAM)	5.0	23095	1 RB Low End	23.4	0.37	QPSK
Side (A): Horizontal-Up	Flat (SAM)	5.0	23095	1 RB High End	22.9	0.271	QPSK
Side (B): Horizontal-Down							
Side (B): Horizontal-Down	Flat (SAM)	5.0	23095	50%	23.4	0.579	QPSK
Side (B): Horizontal-Down	Flat (SAM)	5.0	23095	1 RB Low End	**23.4**	**0.591**	**QPSK**
Side (B): Horizontal-Down	Flat (SAM)	5.0	23095	1 RB High End	22.9	0.459	QPSK
Side (C): Vertical-Front							
Side (C): Vertical-Front	Flat (SAM)	5.0	23095	50%	23.4	0.307	QPSK
Side (C): Vertical-Front	Flat (SAM)	5.0	23095	1 RB Low End	23.4	0.241	QPSK
Side (C): Vertical-Front	Flat (SAM)	5.0	23095	1 RB High End	22.9	0.194	QPSK
Side (D): Vertical-Back							
Side (D): Vertical-Back	Flat (SAM)	5.0	23095	50%	23.4	0.376	QPSK
Side (D): Vertical-Back	Flat (SAM)	5.0	23095	1 RB Low End	23.4	0.493	QPSK
Side (D): Vertical-Back	Flat (SAM)	5.0	23095	1 RB High End	22.9	0.317	QPSK
Tip							
Tip	Flat (SAM)	5.0	23095	50%	23.4	0.013	QPSK
Tip	Flat (SAM)	5.0	23095	1 RB Low End	23.4	0.013	QPSK
Tip	Flat (SAM)	5.0	23095	1 RB High End	22.9	0.013	QPSK

Note: As per FCC KDB pub. 941225 the following is true:-
Test was started on middle channel (Note 2 and 7 of FCC KDB pub. 941225 was true) using largest channel bandwidth, in QPSK with 50% RB allocation centred within the channel bandwidth. SAR measured for 50% RB allocation was < 1.45 therefore QPSK with 100% RB allocation was not required and H and L channel was not required. SAR measured for 1 RB allocation for both High and Low channel edge was < 1.45 therefore QPSK with 1 RB allocation was not required on H and L channels.

Specific Absorption Rate- LTE Band 12 16-QAM 5MHz Channel BW - USB Dongle

EUT Position	Phantom Configuration	Separation Distance (mm)	Channel Number	RB Allocation	Meas. Avg. Power (dBm)	Meas. Level (W/Kg)	Mod.
Side (A): Horizontal-Up							
Side (A): Horizontal-Up	Flat (SAM)	5.0	23095	50%	23.5	0.327	16QAM
Side (A): Horizontal-Up	Flat (SAM)	5.0	23095	1 RB Low End	23.5	0.384	16QAM
Side (A): Horizontal-Up	Flat (SAM)	5.0	23095	1 RB High End	23.3	0.316	16QAM
Side (B): Horizontal-Down							
Side (B): Horizontal-Down	Flat (SAM)	5.0	23095	50%	23.5	0.507	16QAM
Side (B): Horizontal-Down	Flat (SAM)	5.0	23095	1 RB Low End	23.5	0.541	16QAM
Side (B): Horizontal-Down	Flat (SAM)	5.0	23095	1 RB High End	23.3	0.504	16QAM
Side (C): Vertical-Front							
Side (C): Vertical-Front	Flat (SAM)	5.0	23095	50%	23.5	0.285	16QAM
Side (C): Vertical-Front	Flat (SAM)	5.0	23095	1 RB Low End	23.5	0.233	16QAM
Side (C): Vertical-Front	Flat (SAM)	5.0	23095	1 RB High End	23.3	0.22	16QAM
Side (D): Vertical-Back							
Side (D): Vertical-Back	Flat (SAM)	5.0	23095	50%	23.5	0.326	16QAM
Side (D): Vertical-Back	Flat (SAM)	5.0	23095	1 RB Low End	23.5	0.408	16QAM
Side (D): Vertical-Back	Flat (SAM)	5.0	23095	1 RB High End	23.3	0.308	16QAM
Tip							
Tip	Flat (SAM)	5.0	23095	50%	23.5	0.013	16QAM
Tip	Flat (SAM)	5.0	23095	1 RB Low End	23.5	0.014	16QAM
Tip	Flat (SAM)	5.0	23095	1 RB High End	23.3	0.016	16QAM

Note: As per FCC KDB pub. 941225 the following is true:-
Test was started on middle channel (Note 2 and 7 of FCC KDB pub. 941225 was true) using largest channel bandwidth, in QPSK with 50% RB allocation centred within the channel bandwidth. SAR measured for 50% RB allocation was < 1.45 therefore QPSK with 100% RB allocation was not required and H and L channel was not required. SAR measured for 1 RB allocation for both High and Low channel edge was < 1.45 therefore QPSK with 1 RB allocation was not required on H and L channels.

Specific Absorption Rate- LTE Band 12 QPSK 5MHz Channel BW – Transmitter Antenna

EUT Position	Phantom Configuration	Separation Distance (mm)	Channel Number	RB Allocation	Meas. Avg. Power (dBm)	Meas. Level (W/Kg)	Mod.
Side (A): Horizontal-Up							
Side (A): Horizontal-Up	Flat (SAM)	10.0	23095	50%	23.4	0.662	QPSK
Side (A): Horizontal-Up	Flat (SAM)	10.0	23095	1 RB Low End	23.4	0.712	QPSK
Side (A): Horizontal-Up	Flat (SAM)	10.0	23095	1 RB High End	22.9	0.666	QPSK
Side (B): Horizontal-Down							
Side (B): Horizontal-Down	Flat (SAM)	10.0	23095	50%	23.4	1.040	QPSK
Side (B): Horizontal-Down	Flat (SAM)	10.0	23035	50%	23.4	0.948	QPSK
Side (B): Horizontal-Down	Flat (SAM)	10.0	23155	50%	22.9	0.931	QPSK
Side (B): Horizontal-Down	Flat (SAM)	10.0	23095	1 RB Low End	23.4	0.796	QPSK
Side (B): Horizontal-Down	Flat (SAM)	10.0	23095	1 RB High End	22.9	0.843	QPSK
Side (C): Vertical-Front							
Side (C): Vertical-Front	Flat (SAM)	10.0	23095	50%	23.4	0.840	QPSK
Side (C): Vertical-Front	Flat (SAM)	10.0	23035	50%	23.4	0.823	QPSK
Side (C): Vertical-Front	Flat (SAM)	10.0	23155	50%	22.9	0.814	QPSK
Side (C): Vertical-Front	Flat (SAM)	10.0	23095	1 RB Low End	23.4	0.789	QPSK
Side (C): Vertical-Front	Flat (SAM)	10.0	23095	1 RB High End	22.9	0.780	QPSK

Specific Absorption Rate- LTE Band 12 QPSK 5MHz Channel BW – Transmitter Antenna (Continued):

EUT Position	Phantom Configuration	Separation Distance (mm)	Channel Number	RB Allocation	Meas. Avg. Power (dBm)	Meas. Level (W/Kg)	Mod.
Side (D): Vertical-Back							
Side (D): Vertical-Back	Flat (SAM)	10.0	23095	50%	23.4	0.821	QPSK
Side (D): Vertical-Back	Flat (SAM)	10.0	23035	50%	23.4	0.826	QPSK
Side (D): Vertical-Back	Flat (SAM)	10.0	23155	50%	23.9	0.772	QPSK
Side (D): Vertical-Back	Flat (SAM)	10.0	23035	1 RB Low End	23.2	0.744	QPSK
Side (D): Vertical-Back	Flat (SAM)	10.0	23035	1 RB High End	23.4	0.78	QPSK
Tip							
Tip	Flat (SAM)	10.0	23095	50%	23.4	0.021	QPSK
Tip	Flat (SAM)	10.0	23095	1 RB Low End	23.4	0.020	QPSK
Tip	Flat (SAM)	10.0	23095	1 RB High End	22.9	0.019	QPSK

Note: As per FCC KDB pub. 941225 the following is true:-
Test was started on middle channel (Note 2 and 7 of FCC KDB pub. 941225 was true) using largest channel bandwidth, in QPSK with 50% RB allocation centred within the channel bandwidth. SAR measured for 50% RB allocation was < 1.45 therefore QPSK with 100% RB allocation was not required and H and L channel was not required. SAR measured for 1 RB allocation for both High and Low channel edge was < 1.45 therefore QPSK with 1 RB allocation was not required on H and L channels.

Specific Absorption Rate- LTE Band 12 16-QAM 5MHz Channel BW – Transmitter Antenna

EUT Position	Phantom Configuration	Separation Distance (mm)	Channel Number	RB Allocation	Meas. Avg. Power (dBm)	Meas. Level (W/Kg)	Mod.
Side (A): Horizontal-Up							
Side (A): Horizontal-Up	Flat (SAM)	10.0	23095	50%	23.5	0.696	16QAM
Side (A): Horizontal-Up	Flat (SAM)	10.0	23095	1 RB Low End	23.5	0.699	16QAM
Side (A): Horizontal-Up	Flat (SAM)	10.0	23095	1 RB High End	23.3	0.701	16QAM
Side (B): Horizontal-Down							
Side (B): Horizontal-Down	Flat (SAM)	10.0	23095	50%	23.5	0.901	16QAM
Side (B): Horizontal-Down	Flat (SAM)	10.0	23035	50%	23.5	1.020	16QAM
Side (B): Horizontal-Down	Flat (SAM)	10.0	23155	50%	**22.8**	**0.962**	**16QAM**
Side (B): Horizontal-Down	Flat (SAM)	10.0	23095	1 RB Low End	23.5	0.833	16QAM
Side (B): Horizontal-Down	Flat (SAM)	10.0	23095	1 RB High End	23.3	0.918	16QAM
Side (C): Vertical-Front							
Side (C): Vertical-Front	Flat (SAM)	10.0	23095	50%	23.5	0.830	16QAM
Side (C): Vertical-Front	Flat (SAM)	10.0	23035	50%	23.5	0.839	16QAM
Side (C): Vertical-Front	Flat (SAM)	10.0	23155	50%	22.8	0.869	16QAM
Side (C): Vertical-Front	Flat (SAM)	10.0	23155	1 RB Low End	22.7	0.836	16QAM
Side (C): Vertical-Front	Flat (SAM)	10.0	23155	1 RB High End	22.2	0.700	16QAM

Specific Absorption Rate- LTE Band 12 16-QAM 5MHz Channel BW – Transmitter Antenna (Continued):

EUT Position	Phantom Configuration	Separation Distance (mm)	Channel Number	RB Allocation	Meas. Avg. Power (dBm)	Meas. Level (W/Kg)	Mod.
Side (D): Vertical-Back							
Side (D): Vertical-Back	Flat (SAM)	10.0	23095	50%	23.5	0.848	16QAM
Side (D): Vertical-Back	Flat (SAM)	10.0	23035	50%	23.5	0.851	16QAM
Side (D): Vertical-Back	Flat (SAM)	10.0	23155	50%	22.8	0.776	16QAM
Side (D): Vertical-Back	Flat (SAM)	10.0	23035	1 RB Low End	23.2	0.735	16QAM
Side (D): Vertical-Back	Flat (SAM)	10.0	23035	1 RB High End	23.5	0.788	16QAM
Tip							
Tip	Flat (SAM)	10.0	23095	50%	23.5	0.021	QPSK
Tip	Flat (SAM)	10.0	23095	1 RB Low End	23.5	0.022	QPSK
Tip	Flat (SAM)	10.0	23095	1 RB High End	23.3	0.021	QPSK

Note: As per FCC KDB pub. 941225 the following is true:-

- *Test was started on middle channel (Note 2 and 7 of FCC KDB pub. 941225 was true) using largest channel bandwidth, in QPSK with 50% RB allocation centred within the channel bandwidth. SAR measured for 50% RB allocation was < 1.45 therefore QPSK with 100% RB allocation was not required and H and L channel was not required. SAR measured for 1 RB allocation for both High and Low channel edge was < 1.45 therefore QPSK with 1 RB allocation was not required on H and L channels.*

- *The maximum measured SAR level was 1.04 W/kg, when scaled-up was found not to be the highest SAR level as the actual measured conducted power was at the upper range of the tolerance. The measured level 0.962 w/kg was found to be the highest scaled up SAR level as the conducted power was at the lower end of the rated tolerance. Hence the reported scaled-up level is 1.268 w/kg. See table below.*

Highest measure SAR vs. Highest scaled-up SAR levels

Technology Mode	Configuration	Channel Number/ RB/ Edge	Mode	Measured output power [dBm]	Maximum Rated Power [dBm]	Measured SAR(W/kg)	Calculated SAR(W/kg)
						1g mass	1g mass
LTE Band 12	Side (B): Horizontal Down	23155 / 50% RB / Mid	16-QAM	22.8	24.0	0.962	1.268
LTE Band 12	Side (B): Horizontal Down	23095 / 50% RB / Mid	QPSK	23.4	24.0	1.040	1.194

7.2.1.Conducted Average Power Measurement: LTE Band 12 (700 MHz)

Ch. BW	Modulations	RB Config	Start RB Offset		MPR	Actual Max Power (dBm)	Measured Avg Power (dBm).		
							Frequency **701.5 MHz** (Low)	Frequency **707.5 MHz** (Middle)	Frequency **713.5 MHz** (High)
5 MHz	QPSK	1	Low	0	N/A	23.0	23.2	23.4	22.6
		1	High	24	N/A	23.0	23.4	22.9	22.1
		12	Mid	6	N/A	23.0	23.4	23.4	22.9
		25	-	0	N/A	23.0	23.2	23.1	22.8
	16QAM	1	Low	0	N/A	23.0	23.2	23.5	22.7
		1	High	24	N/A	23.0	23.5	23.3	22.2
		12	Mid	6	N/A	23.0	23.5	23.5	22.7
		25	-	0	N/A	23.0	23.3	23.2	22.8

Device Tolerance = +/-1dB

8. 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-LTE Band 12 Body Configuration 1g	95%	19.51%

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.

8.1. Specific Absorption Rate- LTE Band 12 Body Configuration 1g

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	5.500	5.500	∞
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	1.900	1.900	normal (k=1)	1.0000	1.0000	2.900	2.900	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	0.6400	1.848	1.848	∞
A	Liquid Conductivity (measured value)	4.690	4.690	normal (k=1)	1.0000	0.6400	3.002	3.002	5
B	Liquid Permittivity (target value)	5.000	5.000	Rectangular	1.7321	0.6000	1.732	1.732	∞
A	Liquid Permittivity (measured value)	4.860	4.860	normal (k=1)	1.0000	0.6000	2.916	2.916	5
	Combined standard uncertainty			t-distribution			9.96	9.96	>250
	Expanded uncertainty			k = 1.96			19.51	19.51	>250

Appendix 1. Test Equipment Used

RFI 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	-	-
A2111	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	432	02 May 2012	12
A2077	Probe	Schmid & Partner Engineering AG	EX3 DV4	3814	24 Sep 2012	12
A2243	Probe	Schmid & Partner Engineering AG	ES3DV3	3304	31 Aug 2012	12
A1985	750 Dipole	Schmid & Partner Engineering AG	D750V3	1011	09 Feb 2012	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	-
A2124	SAM Phantom	Schmid & Partner Engineering AG	SAM a (Site 57)	TP-1030	Calibrated before use	-
A215	20 dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
A1531	Antenna	AARONIA AG	7025	02458	-	-
C1145	Cable	Rosenberger MICRO-COAX	FA147A F003003030	41843-1	Calibrated as part of system	-
C1146	Cable	Rosenberger MICRO-COAX	FA147A F030003030	41752-1	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	-

L1077	Network Analyser	Agilent Technologies	E5071C	SNMY46214396	29 May 2012	12
M1015	Network Analyser	Agilent Technologies	8753ES	US39172406	09 Oct 2012	12
M1047	Robot Arm	Staubli	RX908 L	F00/SD8 9A1/A/01	Calibrated before use	-
M1023	Dual Channel Power Meter	Rhode & Schwarz	NRVD	863715/030	18 Jul 2012	12
M1159	Signal Generator	Agilent Technologies	E8241A	US42110332	Internal Checked 10 Aug 2012	4
M1071	Spectrum Analyzer	Agilent	HP8590E	3647U00514	(Monitoring use only)	-
M1270	Digital Thermometer	RS	N/A	N/A	Internal Checked 13 May 2012	12
S256	SAR Lab	RFI	Site 56	N/A	Calibrated before use	-

Note(s):

All the assets were in calibration during the course of testing.

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 [illegible] DATE: 26-SEPT-2012

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) ASSET A2077 **Accreditation No.: SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client RFI **Certificate No: EX3-3814_Sep12**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3814

Calibration procedure(s) QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: September 24, 2012

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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: September 24, 2012

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	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

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

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, VRx,y,z*: *A, B, C* 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.

Probe EX3DV4

SN:3814

Manufactured: September 2, 2011
Calibrated: September 24, 2012

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3814

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.53	0.50	0.44	± 10.1 %
DCP (mV)[B]	99.9	93.7	98.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	172.6	±3.0 %
			Y	0.00	0.00	1.00	154.1	
			Z	0.00	0.00	1.00	144.1	

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: EX3DV4 - SN:3814

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	Depth (mm)	Unct. (k=2)
1450	40.5	1.20	8.56	8.56	8.56	0.19	2.04	± 12.0 %
2450	39.2	1.80	6.89	6.89	6.89	0.33	0.97	± 12.0 %
2600	39.0	1.96	6.81	6.81	6.81	0.34	1.00	± 12.0 %
5200	36.0	4.66	5.06	5.06	5.06	0.42	1.80	± 13.1 %
5300	35.9	4.76	4.73	4.73	4.73	0.42	1.80	± 13.1 %
5500	35.6	4.96	4.54	4.54	4.54	0.45	1.80	± 13.1 %
5600	35.5	5.07	4.26	4.26	4.26	0.50	1.80	± 13.1 %
5800	35.3	5.27	4.50	4.50	4.50	0.45	1.80	± 13.1 %

[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.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3814

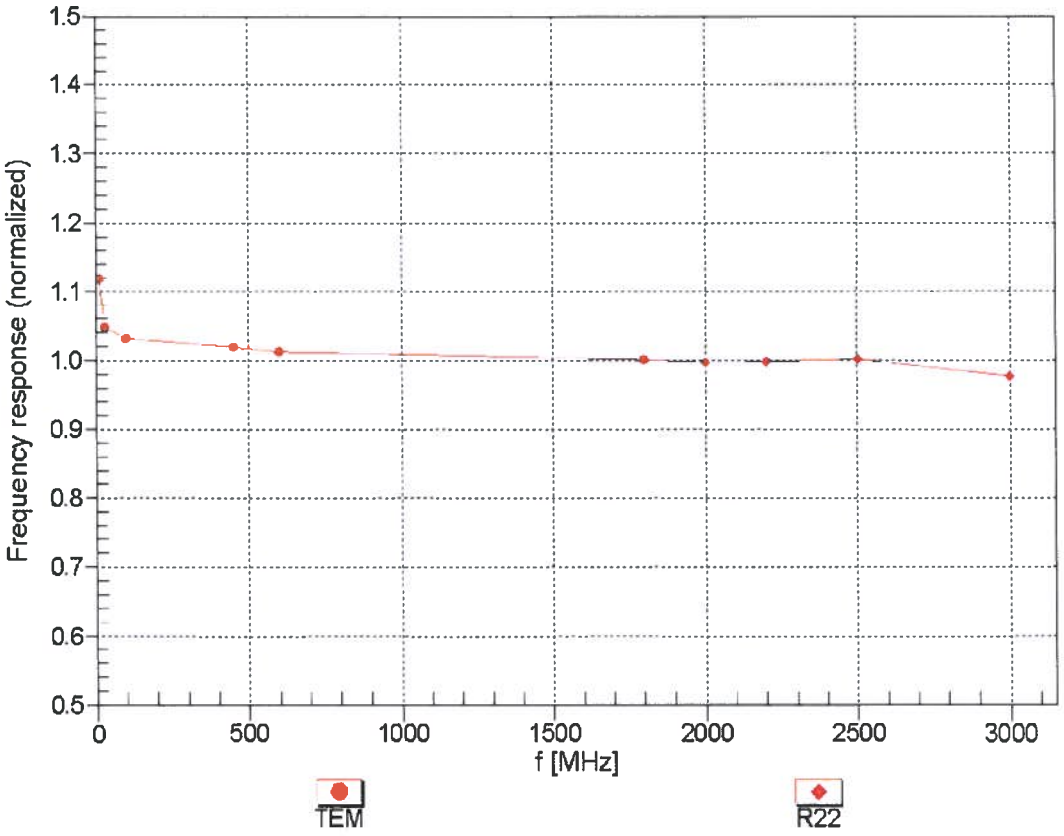
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
1450	54.0	1.30	8.26	8.26	8.26	0.23	1.40	± 12.0 %
2450	52.7	1.95	7.41	7.41	7.41	0.80	0.66	± 12.0 %
2600	52.5	2.16	7.08	7.08	7.08	0.79	0.61	± 12.0 %
3700	51.0	3.55	6.27	6.27	6.27	0.22	2.24	± 13.1 %
5200	49.0	5.30	4.39	4.39	4.39	0.52	1.90	± 13.1 %
5300	48.9	5.42	4.11	4.11	4.11	0.55	1.90	± 13.1 %
5500	48.6	5.65	4.02	4.02	4.02	0.52	1.90	± 13.1 %
5600	48.5	5.77	3.71	3.71	3.71	0.60	1.90	± 13.1 %
5800	48.2	6.00	3.97	3.97	3.97	0.60	1.90	± 13.1 %

[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.

Frequency Response of E-Field

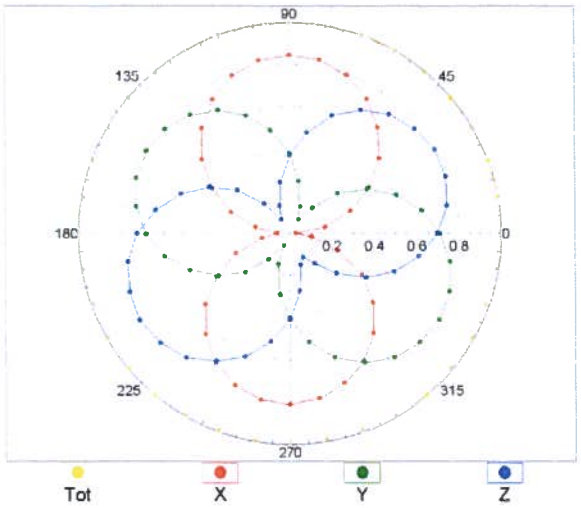
(TEM-Cell:ifi110 EXX, Waveguide: R22)



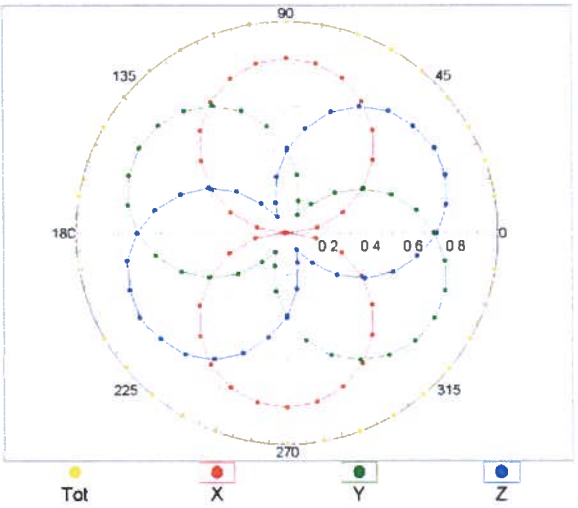
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

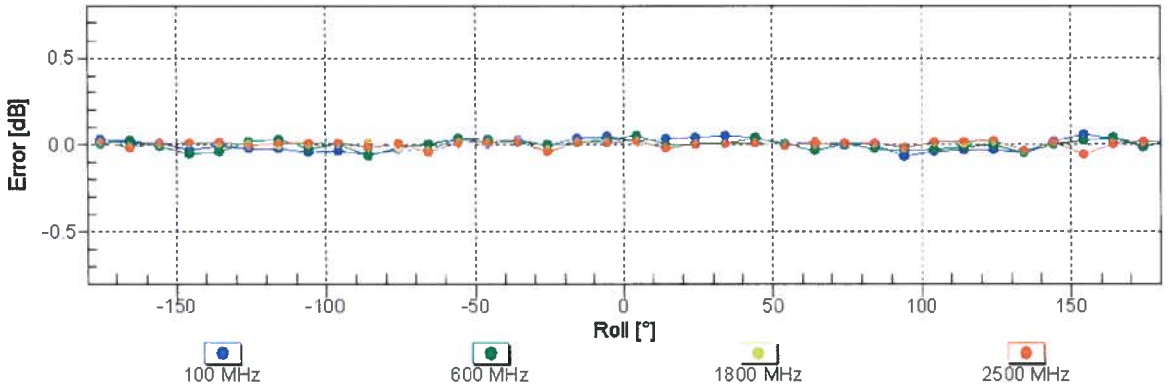
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



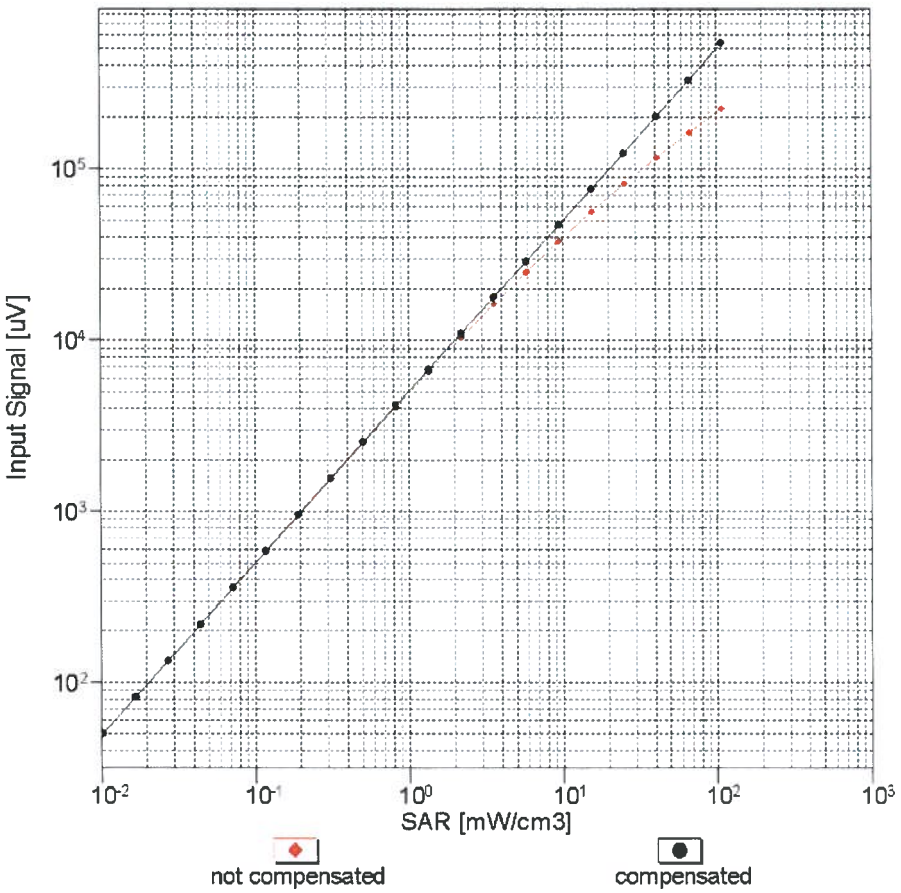
f=1800 MHz,R22

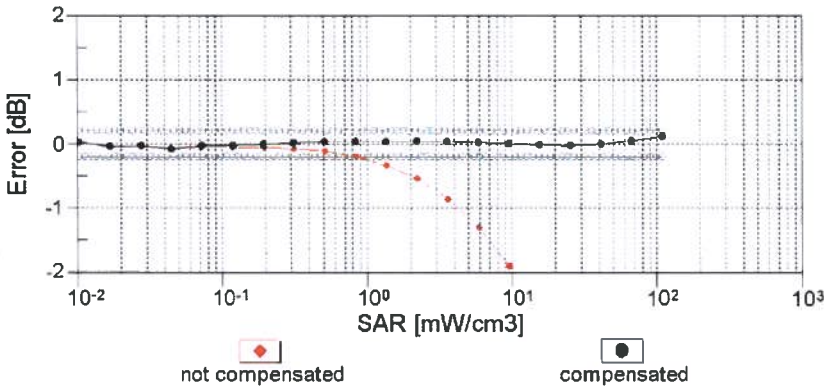




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)
(TEM cell , f = 900 MHz)

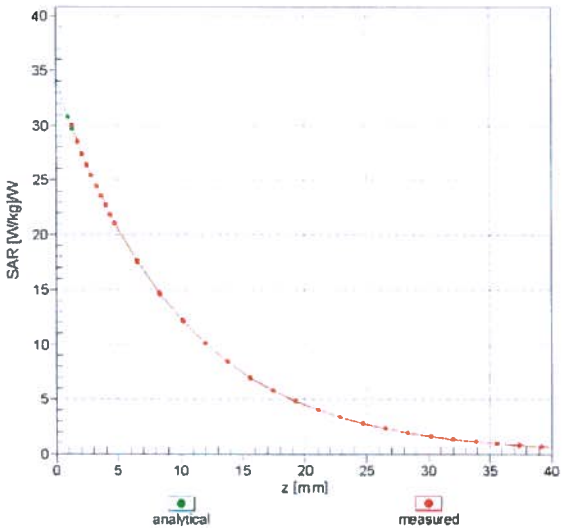




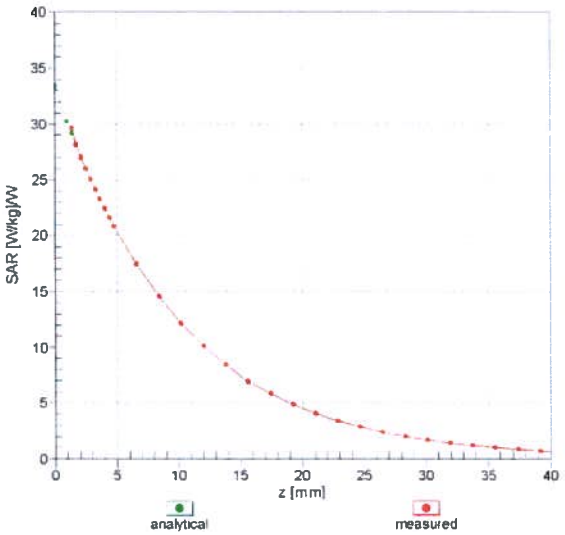
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 2450 MHz,WGLS R22 (H_convF)

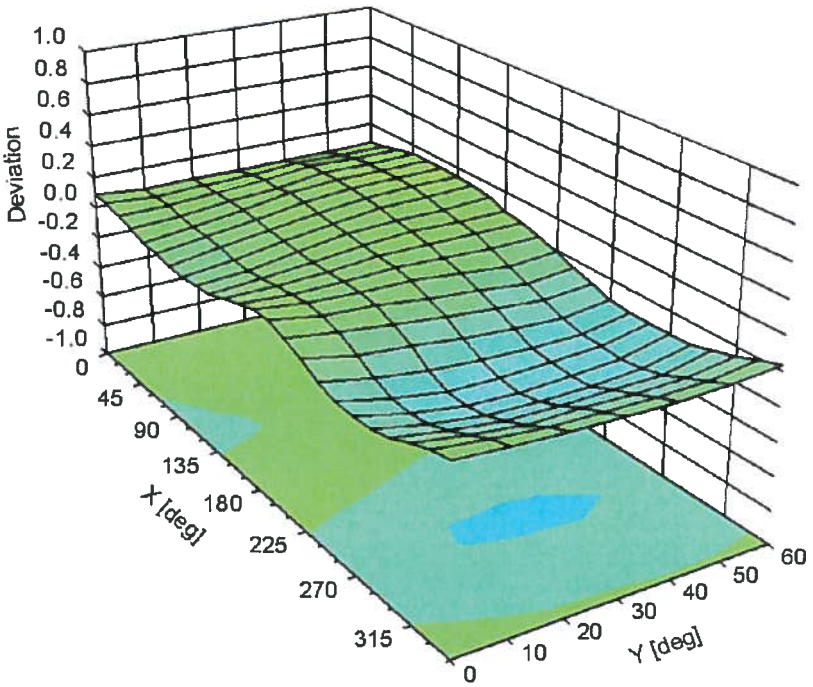


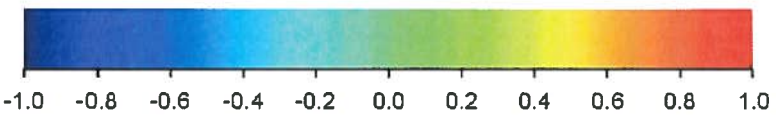
f = 2450 MHz,WGLS R22 (M_convF)



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: EX3DV4 - SN:3814

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-65.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

checked by DATE: 18-09-2012

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

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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

Client RFI **Certificate No: ES3-3304_Aug12**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3304

Calibration procedure(s) QA CAL-01.v8, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: August 31, 2012

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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: September 3, 2012

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

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) **Accreditation No.: SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

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	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

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

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, VRx,y,z*: *A, B, C* 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.

Probe ES3DV3

SN:3304

Manufactured: August 27, 2010
Calibrated: August 31, 2012

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3304

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.14	1.33	1.33	± 10.1 %
DCP (mV)[B]	104.7	101.1	103.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	146.4	±3.8 %
			Y	0.00	0.00	1.00	159.8	
			Z	0.00	0.00	1.00	158.8	

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: ES3DV3 - SN:3304

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	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.44	6.44	6.44	0.29	1.92	± 12.0 %
835	41.5	0.90	6.17	6.17	6.17	0.27	1.96	± 12.0 %
900	41.5	0.97	6.09	6.09	6.09	0.33	1.75	± 12.0 %
1750	40.1	1.37	5.47	5.47	5.47	0.61	1.36	± 12.0 %
1900	40.0	1.40	5.24	5.24	5.24	0.80	1.18	± 12.0 %
2100	39.8	1.49	5.24	5.24	5.24	0.80	1.16	± 12.0 %
2450	39.2	1.80	4.59	4.59	4.59	0.78	1.22	± 12.0 %
2600	39.0	1.96	4.40	4.40	4.40	0.75	1.28	± 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.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3304

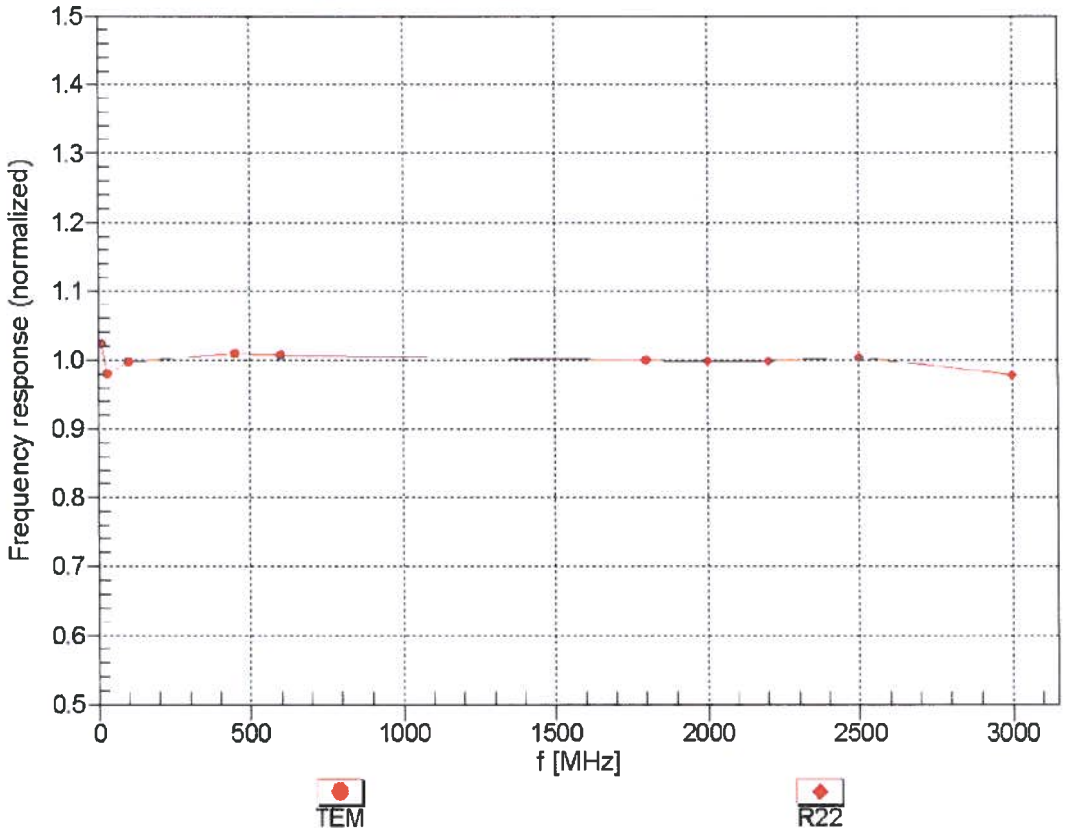
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.25	6.25	6.25	0.58	1.30	± 12.0 %
835	55.2	0.97	6.13	6.13	6.13	0.60	1.32	± 12.0 %
900	55.0	1.05	6.11	6.11	6.11	0.80	1.18	± 12.0 %
1750	53.4	1.49	5.15	5.15	5.15	0.45	1.78	± 12.0 %
1900	53.3	1.52	4.88	4.88	4.88	0.70	1.35	± 12.0 %
2100	53.2	1.62	4.94	4.94	4.94	0.64	1.43	± 12.0 %
2450	52.7	1.95	4.32	4.32	4.32	0.74	1.09	± 12.0 %
2600	52.5	2.16	4.16	4.16	4.16	0.68	0.99	± 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.

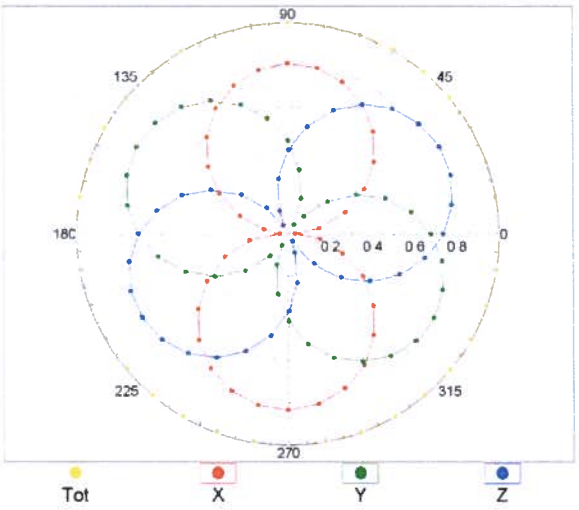
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



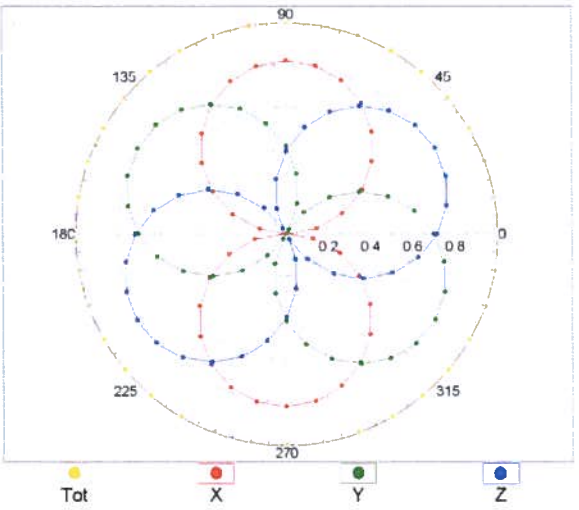
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

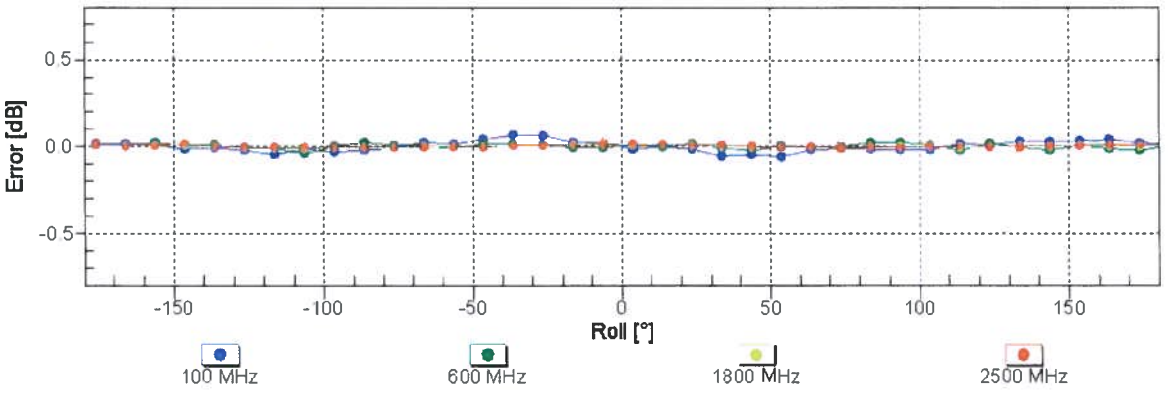
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



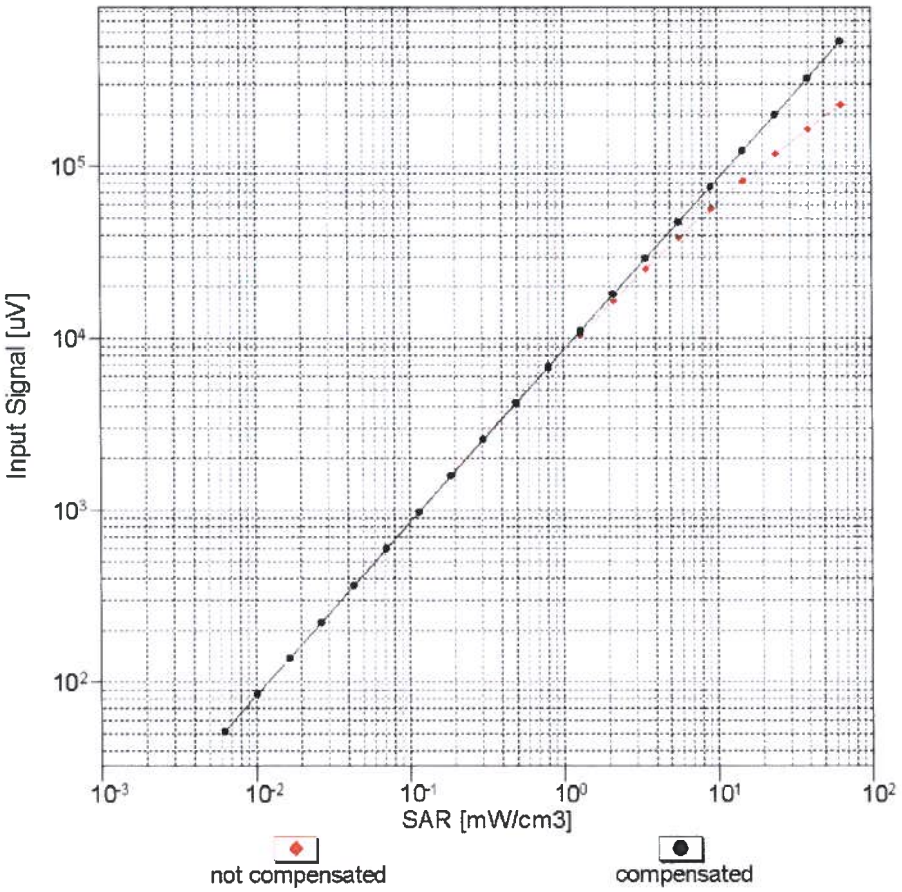
f=1800 MHz,R22

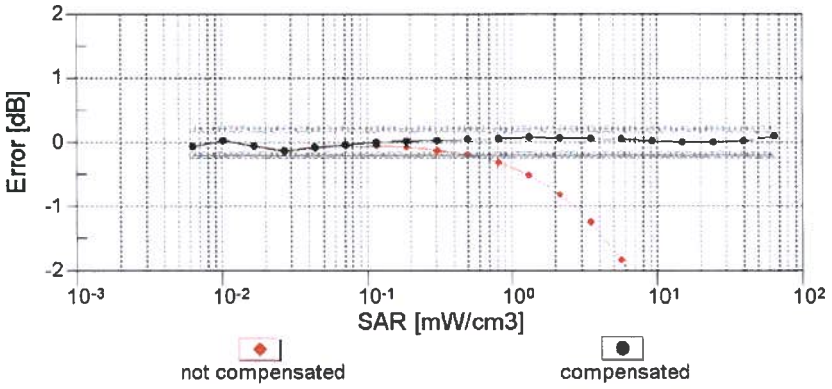




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)

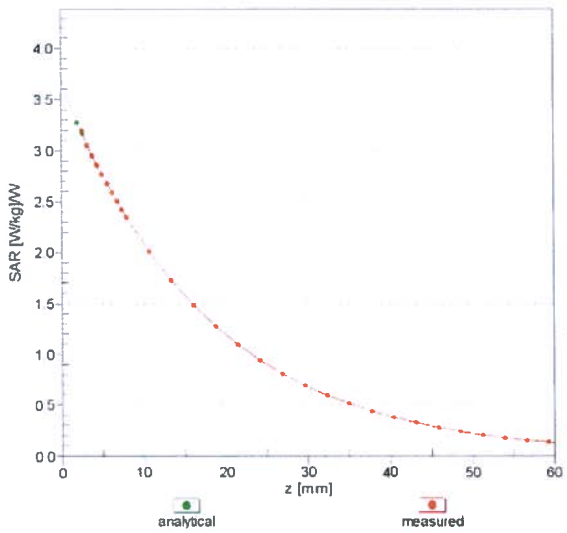




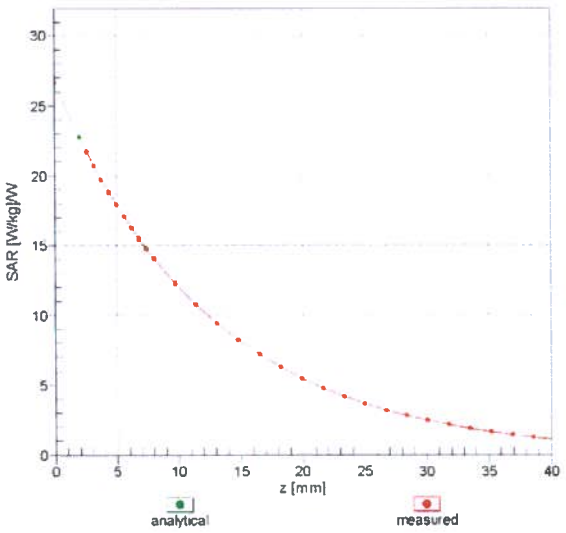
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

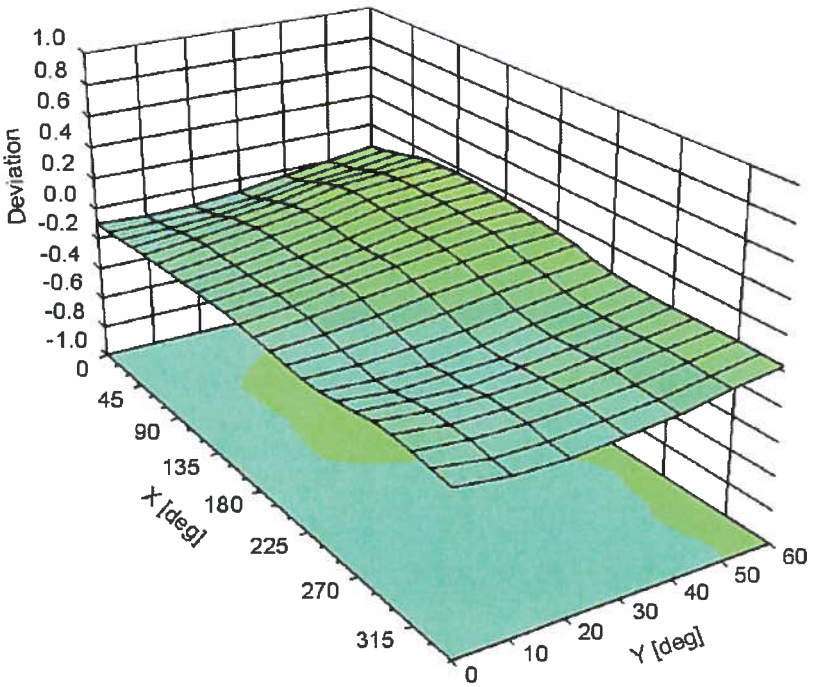


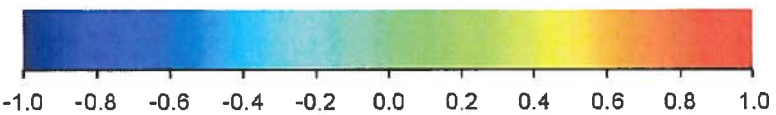
f = 1750 MHz,WGLS R22 (H_convF)



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: ES3DV3 - SN:3304

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	33.7
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	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

ASSET: A 1985 checked by: DATE 17 FEB 20

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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 RFI

Certificate No: D750V3-1011_Feb12

CALIBRATION CERTIFICATE

Object: D750V3 - SN: 1011

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: February 09, 2012

Device under 1year calibration

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	Israe El-Naouq
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 9, 2012

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.

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 6 %	0.92 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	2.17 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**8.48 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.42 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.57 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.6 ± 6 %	0.96 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	2.21 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**8.84 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.46 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**5.84 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.6 Ω + 0.2 jΩ
Return Loss	- 29.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.9 Ω - 2.7 jΩ
Return Loss	- 30.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.039 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	September 29, 2009

DASY5 Validation Report for Head TSL

Date: 09.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1011

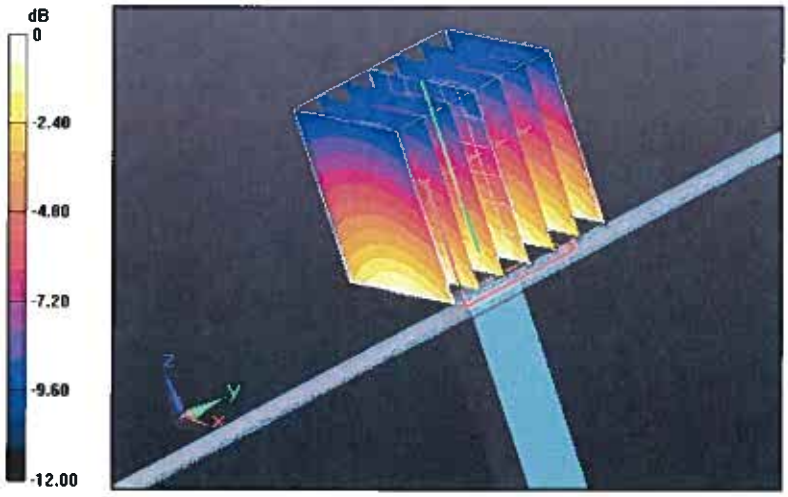
Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.92 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

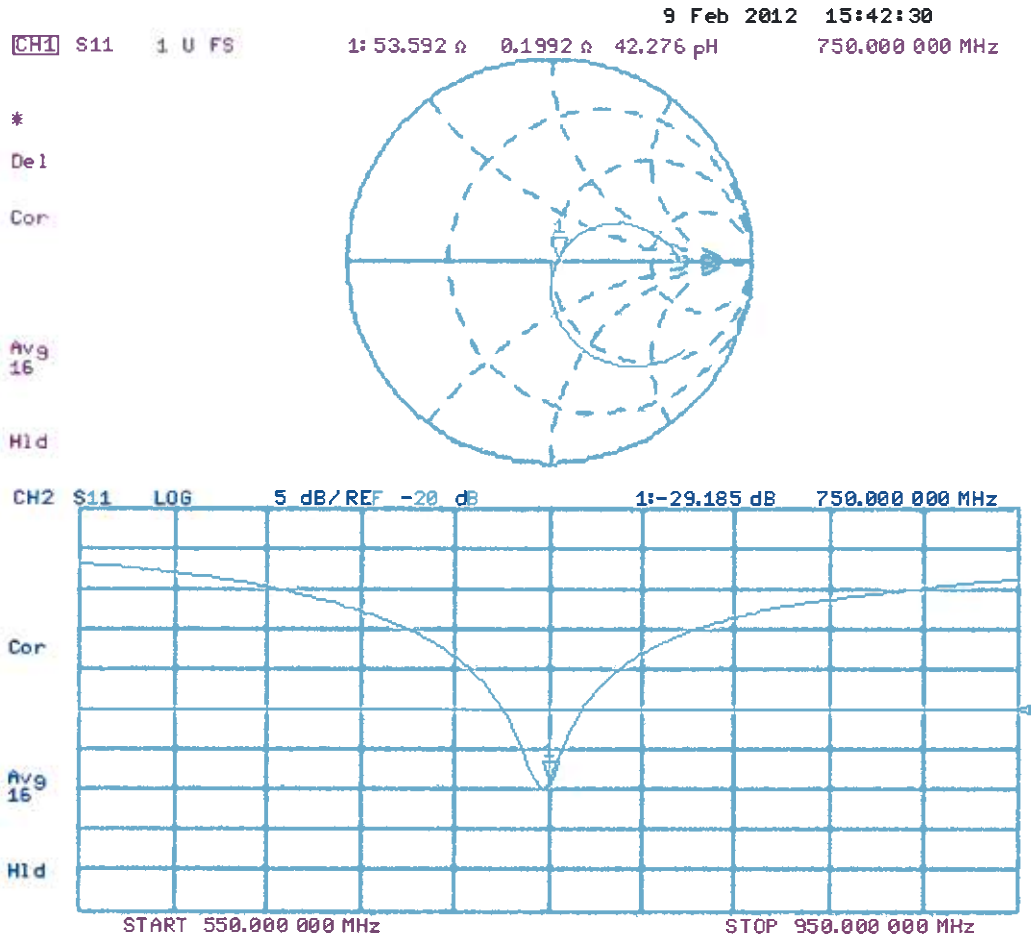
Dipole Calibration for Head Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.774 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 3.3050
SAR(1 g) = 2.17 mW/g; SAR(10 g) = 1.42 mW/g
Maximum value of SAR (measured) = 2.549 mW/g



0 dB = 2.550mW/g = 8.13 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1011

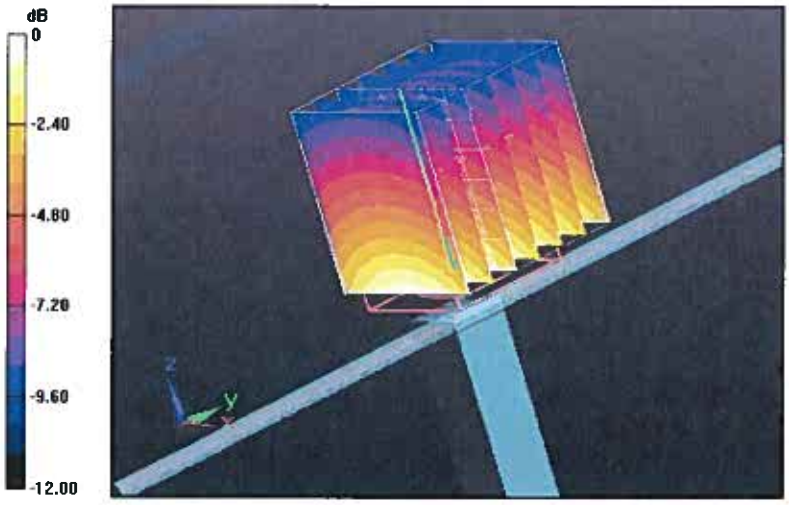
Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

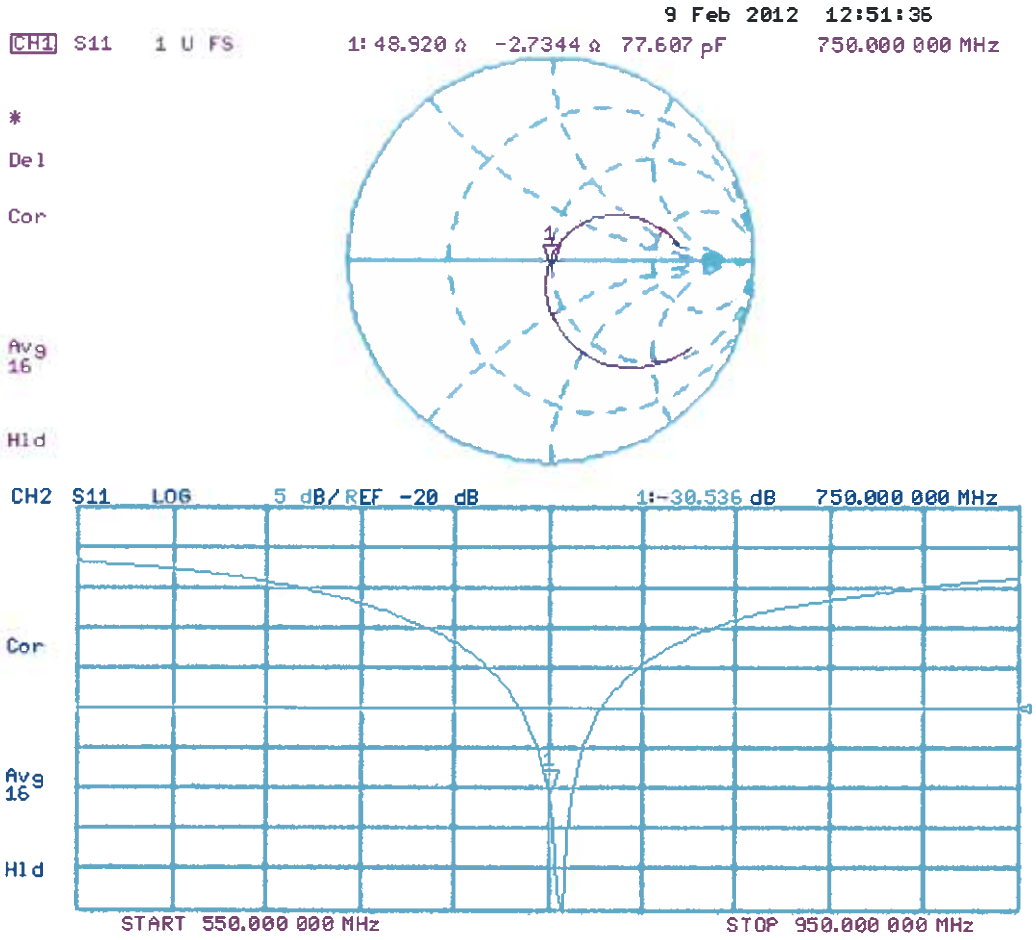
Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.902 V/m; Power Drift = 0.0098 dB
Peak SAR (extrapolated) = 3.2810
SAR(1 g) = 2.21 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 2.573 mW/g



0 dB = 2.570mW/g = 8.20 dB mW/g

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 7x7x7 matrix 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 OET Bulletin 65 Supplement C: (2001-01)

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

SAR measurements were performed in accordance with Appendix D of the standard FCC OET Bulletin 65 Supplement C: 2001, 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 validation and material dielectric property measurements were conducted. In the absence of a detailed procedure within the specification, system validation and material dielectric property measurements were performed in accordance with Appendix C and Appendix D of FCC OET Bulletin 65 Supplement C: 2001 and FCC KDB publication 450824.

Following the successful system validation 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 7x7x7 cube of 343 points (5 mm spacing in each axis ≈ 27g) 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 10g 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 7x7x7 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.

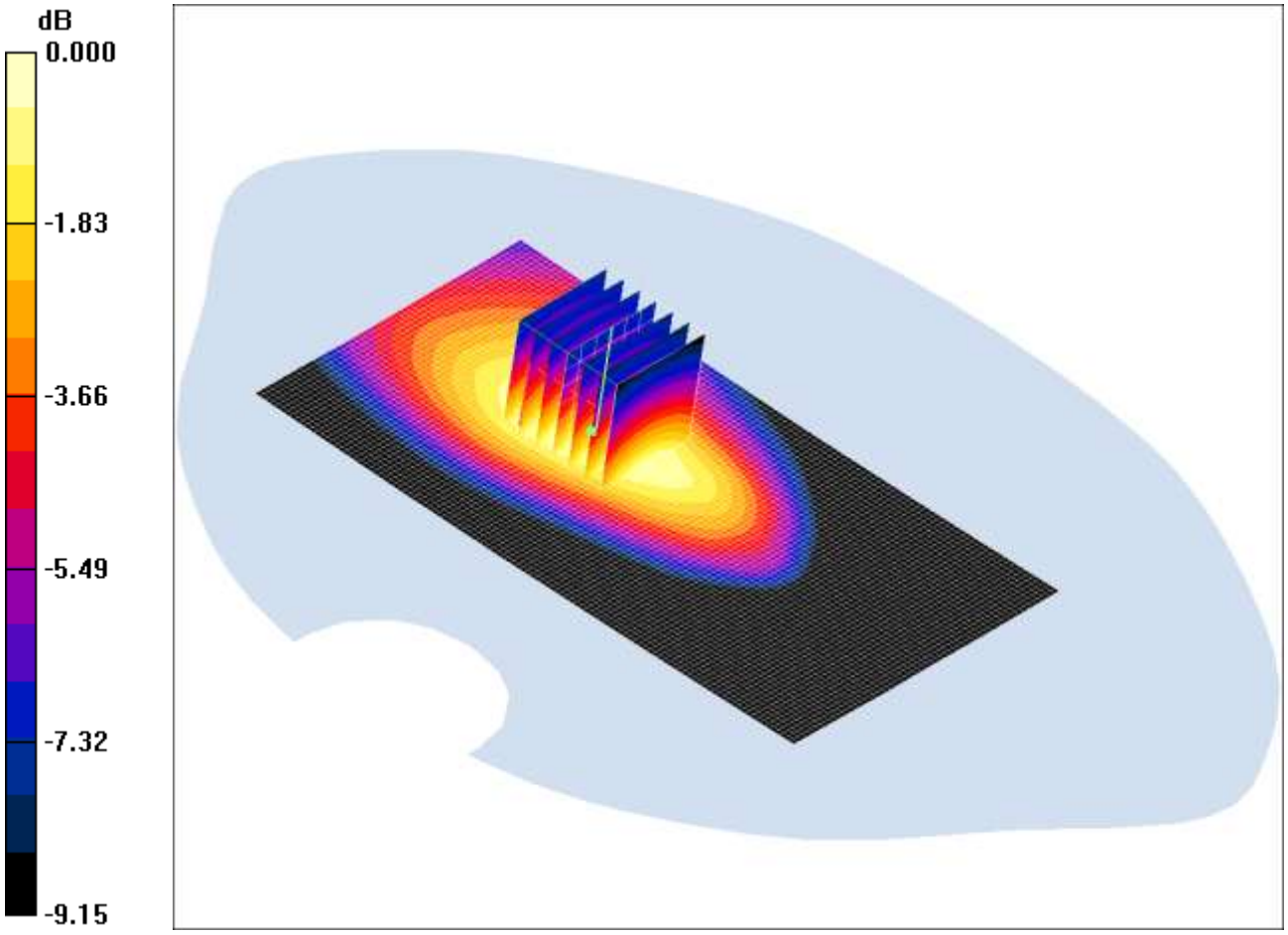
Appendix 3. SAR Distribution Scans for USB Dongle

This appendix contains SAR distribution scans which are not included in the total number of pages for this report.

Scan Reference Number	Title
SCN/88727J02A/001	Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
SCN/88727J02A/002	Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
SCN/88727J02A/003	Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
SCN/88727J02A/004	Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
SCN/88727J02A/005	Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
SCN/88727J02A/006	Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
SCN/88727J02A/007	Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
SCN/88727J02A/008	Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB Low QPSK CH23095
SCN/88727J02A/009	Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB High QPSK CH23095
SCN/88727J02A/010	Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
SCN/88727J02A/011	Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB Low 16-QAM CH23095
SCN/88727J02A/012	Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB High 16-QAM CH23095
SCN/88727J02A/013	Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
SCN/88727J02A/014	Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
SCN/88727J02A/015	Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
SCN/88727J02A/016	Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
SCN/88727J02A/017	Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
SCN/88727J02A/018	Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
SCN/88727J02A/019	Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
SCN/88727J02A/020	Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095

SAR Distribution Scans (Continued):	
Scan Reference Number	**Title**
SCN/88727J02A/021	Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
SCN/88727J02A/022	Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
SCN/88727J02A/023	Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
SCN/88727J02A/024	Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
SCN/88727J02A/025	Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
SCN/88727J02A/026	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
SCN/88727J02A/027	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
SCN/88727J02A/028	Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
SCN/88727J02A/029	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
SCN/88727J02A/030	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095

SCN/88727J02A/001: Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
Date: 20/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

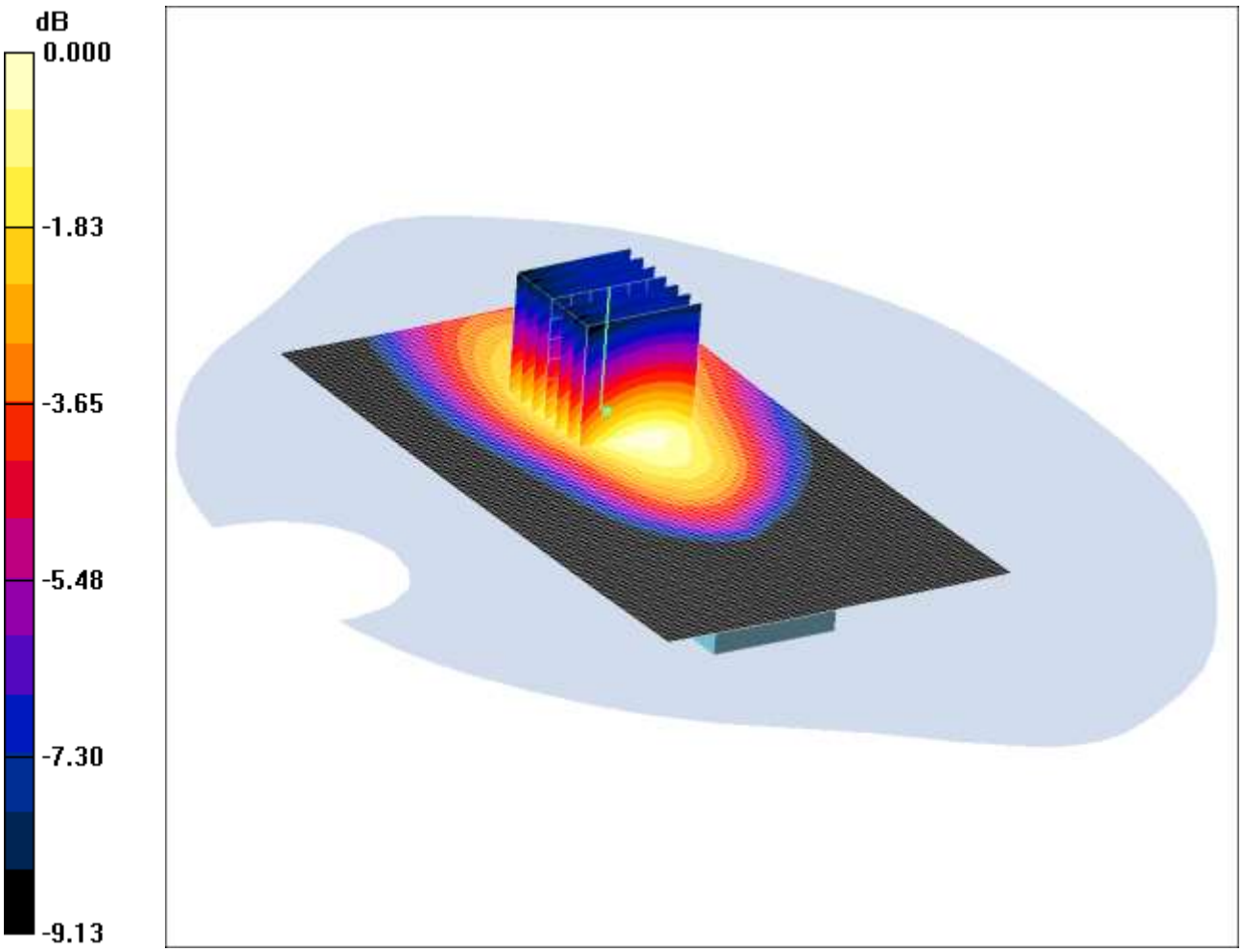


0 dB = 0.402mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.916 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Up EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.398 mW/g
Horizontal-Up EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 0.515 W/kg
SAR(1 g) = 0.378 mW/g; SAR(10 g) = 0.267 mW/g
Maximum value of SAR (measured) = 0.402 mW/g

SCN/88727J02A/002: Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

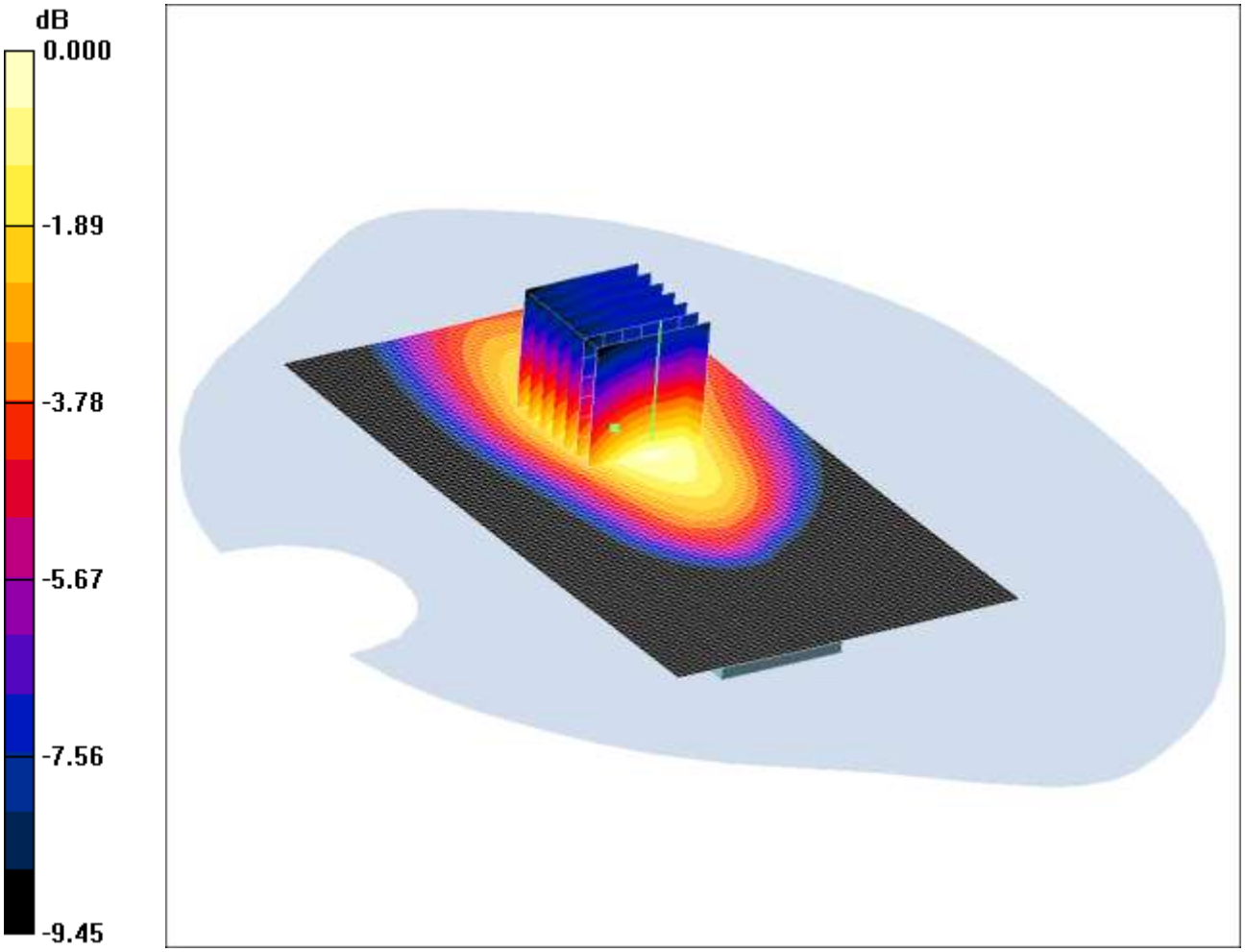


0 dB = 0.392mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Up EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.401 mW/g
Horizontal-Up EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.8 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.503 W/kg
SAR(1 g) = 0.370 mW/g; SAR(10 g) = 0.261 mW/g
Maximum value of SAR (measured) = 0.392 mW/g

SCN/88727J02A/003: Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

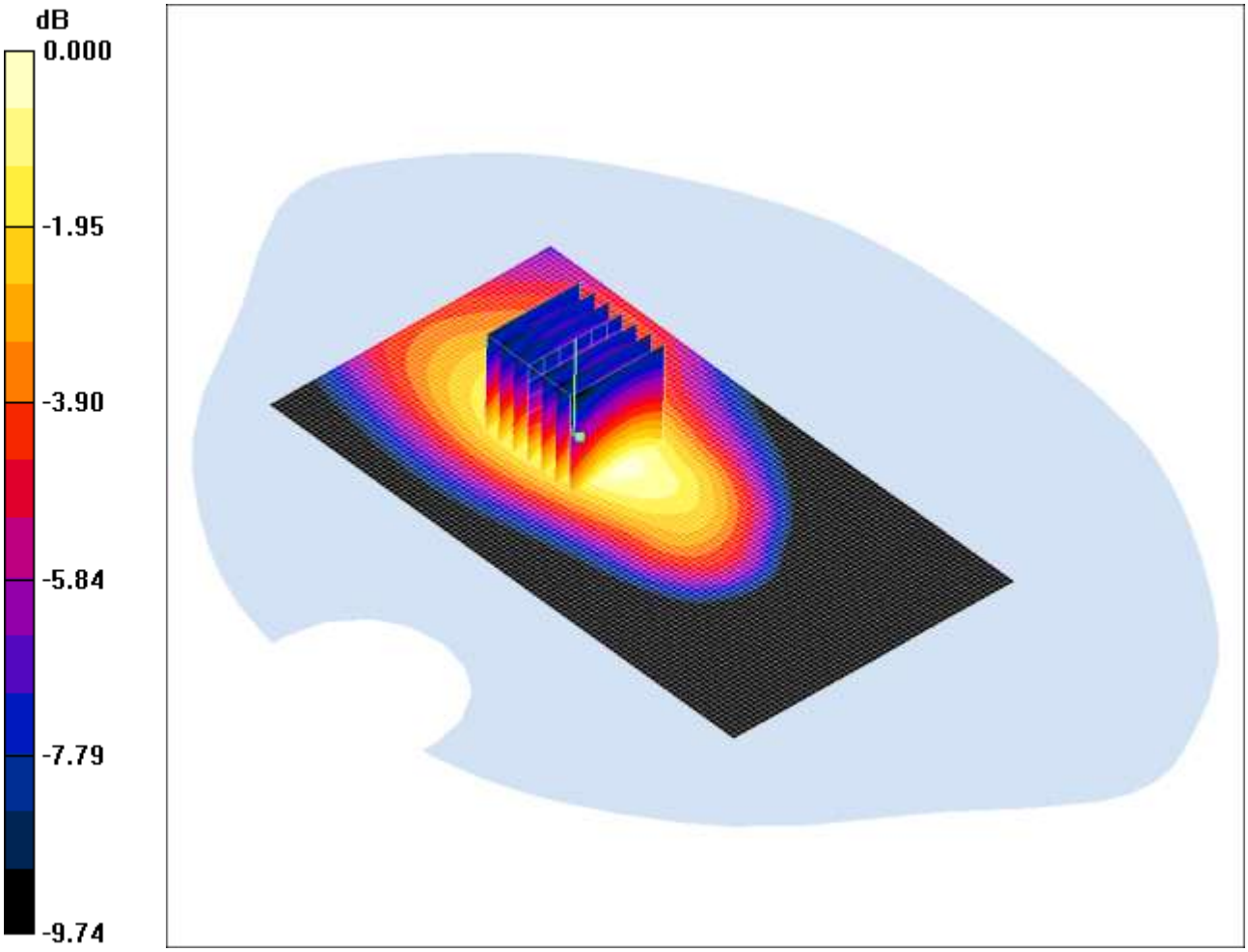


0 dB = 0.294mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Up EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.287 mW/g
Horizontal-Up EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 0.371 W/kg
SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.192 mW/g
Maximum value of SAR (measured) = 0.294 mW/g

SCN/88727J02A/004: Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
Date: 18/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

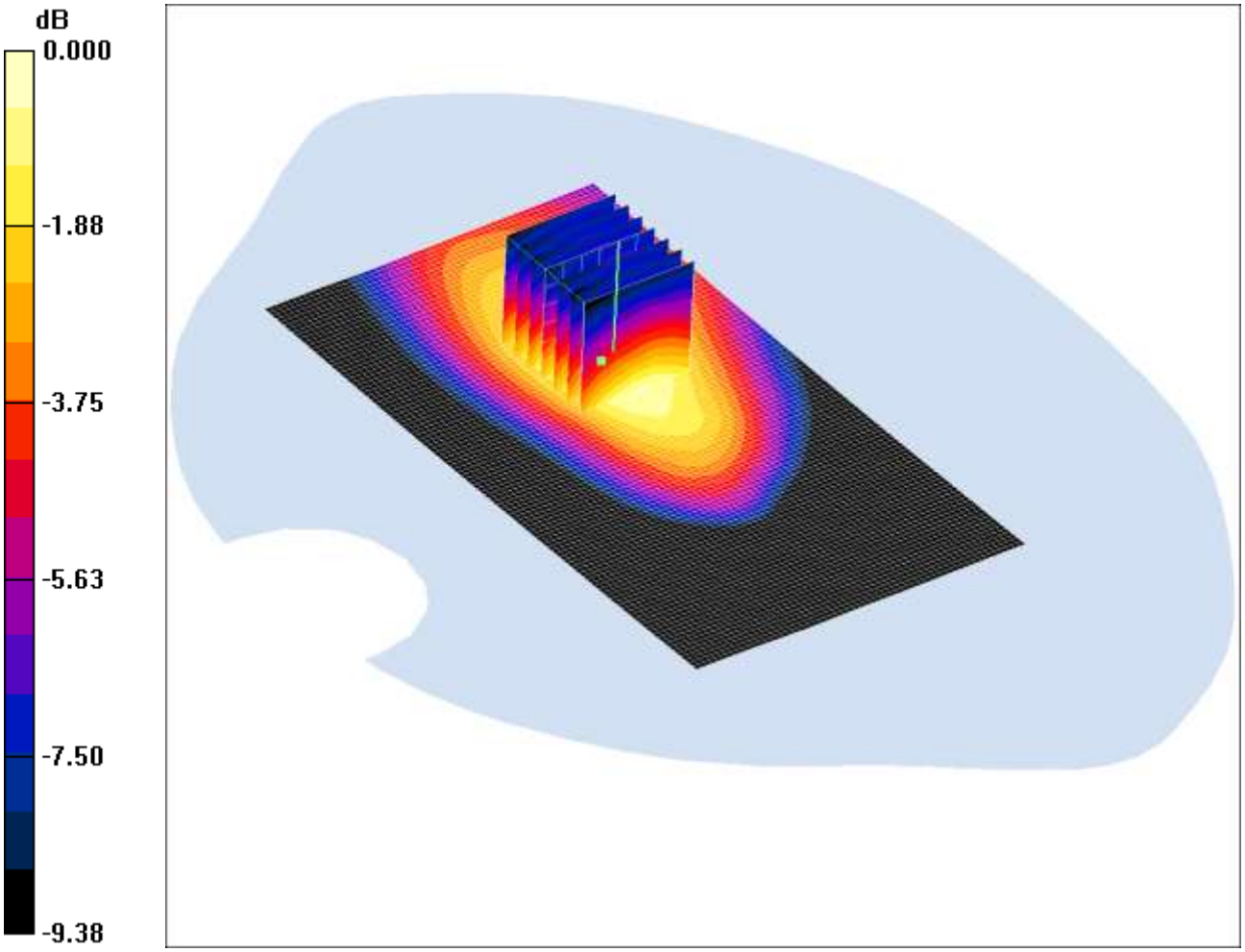


0 dB = 0.373mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.922 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Up EUT Facing Phantom - Middle 2/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.376 mW/g
Horizontal-Up EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.458 W/kg
SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.225 mW/g
Maximum value of SAR (measured) = 0.373 mW/g

SCN/88727J02A/005: Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

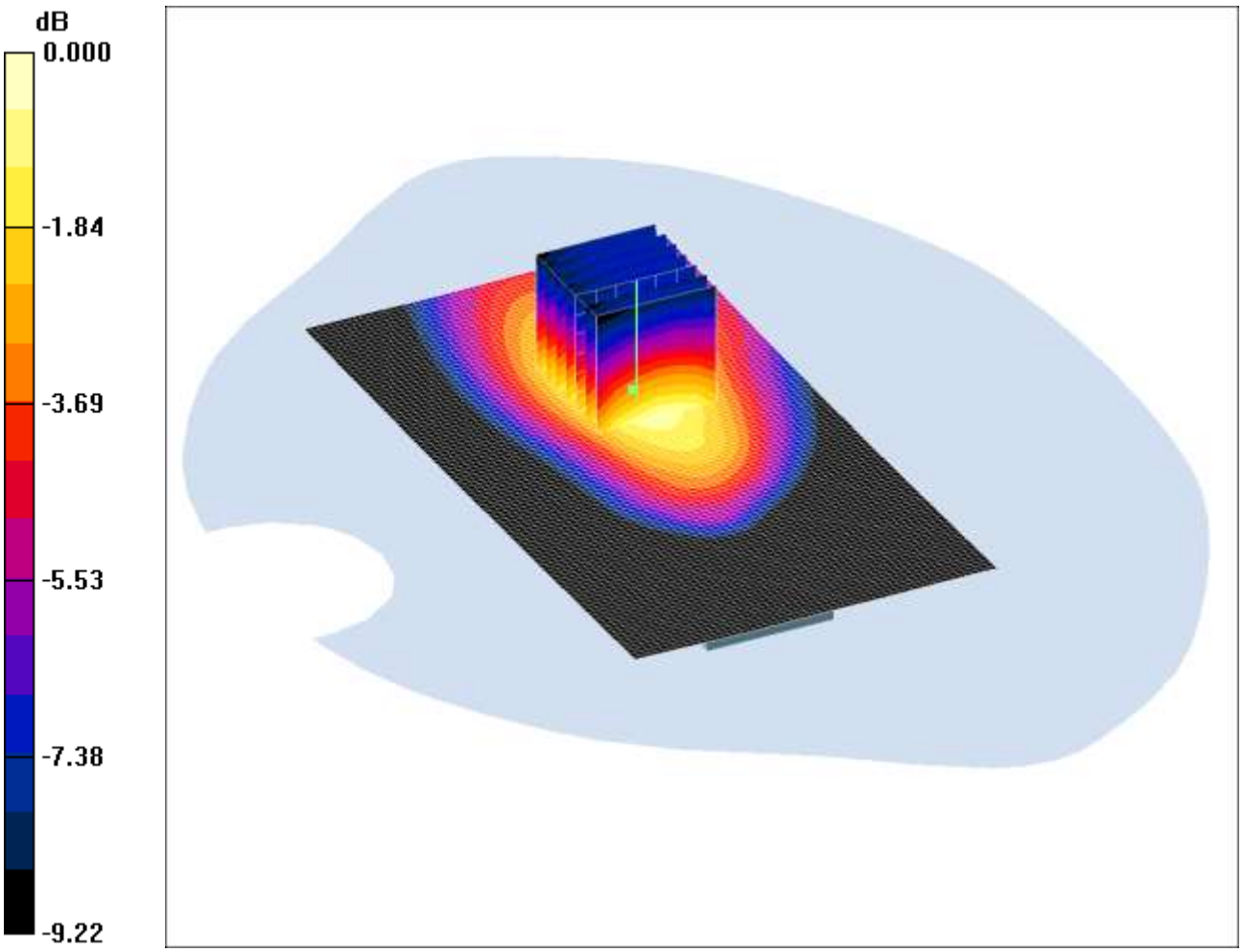


0 dB = 0.411mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Up EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.401 mW/g
Horizontal-Up EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 0.541 W/kg
SAR(1 g) = 0.384 mW/g; SAR(10 g) = 0.267 mW/g
Maximum value of SAR (measured) = 0.411 mW/g

SCN/88727J02A/006: Side A Horizontal-Up EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

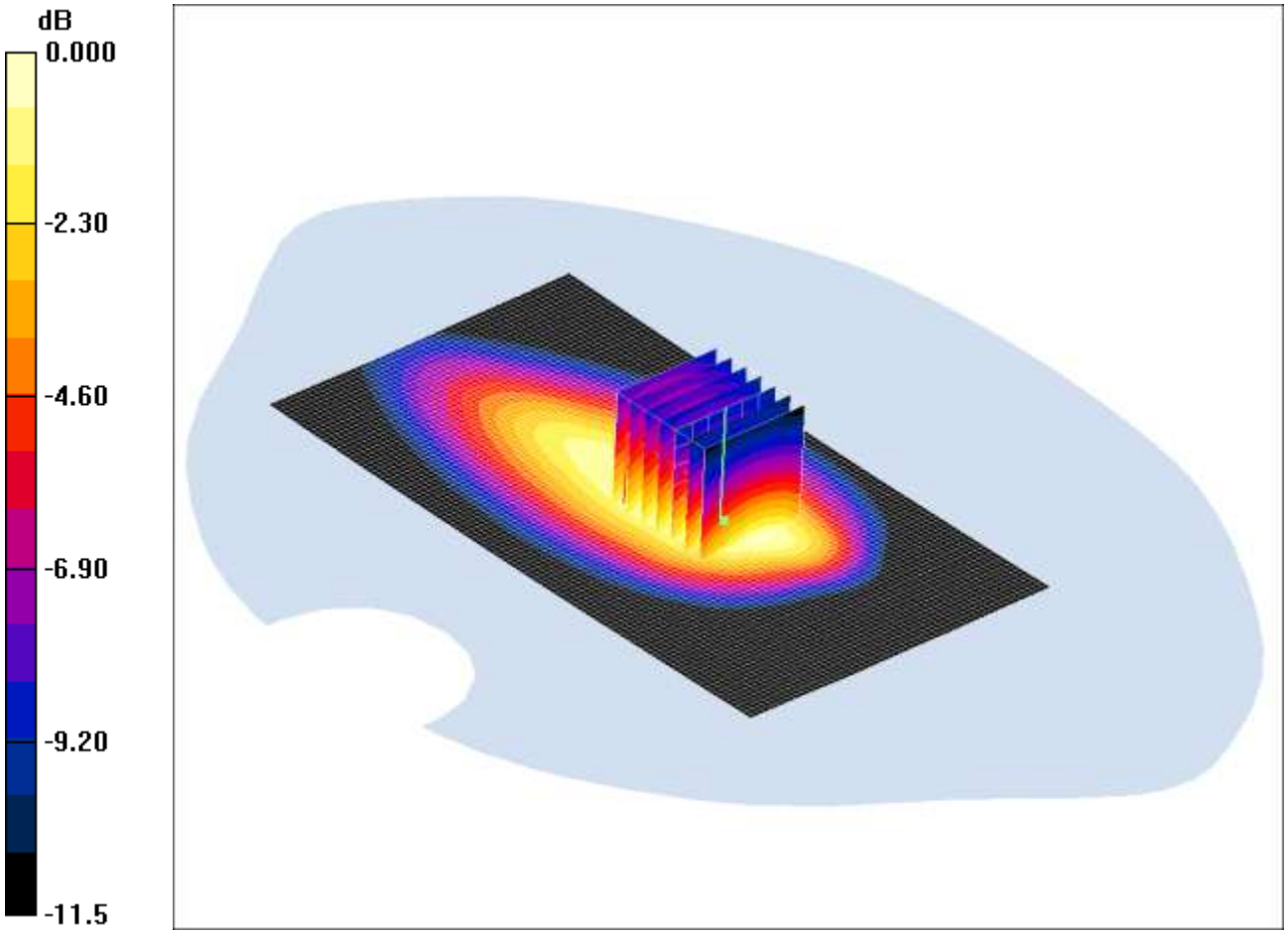


0 dB = 0.341mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Up EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.302 mW/g
Horizontal-Up EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 0.437 W/kg
SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.222 mW/g
Maximum value of SAR (measured) = 0.341 mW/g

SCN/88727J02A/007: Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

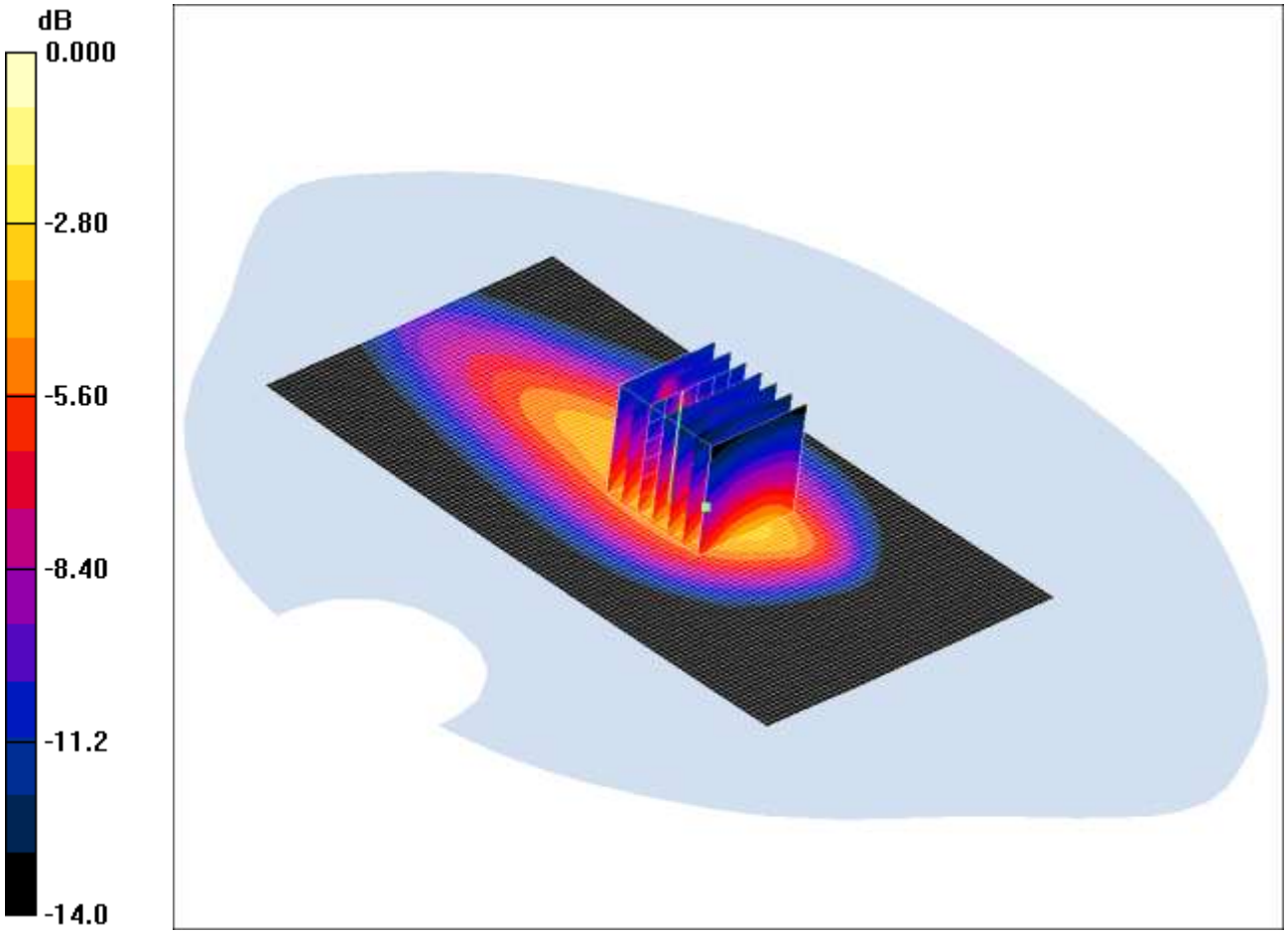


0 dB = 0.620mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Down EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.639 mW/g
Horizontal-Down EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = -0.095 dB
Peak SAR (extrapolated) = 0.836 W/kg
SAR(1 g) = 0.579 mW/g; SAR(10 g) = 0.391 mW/g
Maximum value of SAR (measured) = 0.620 mW/g

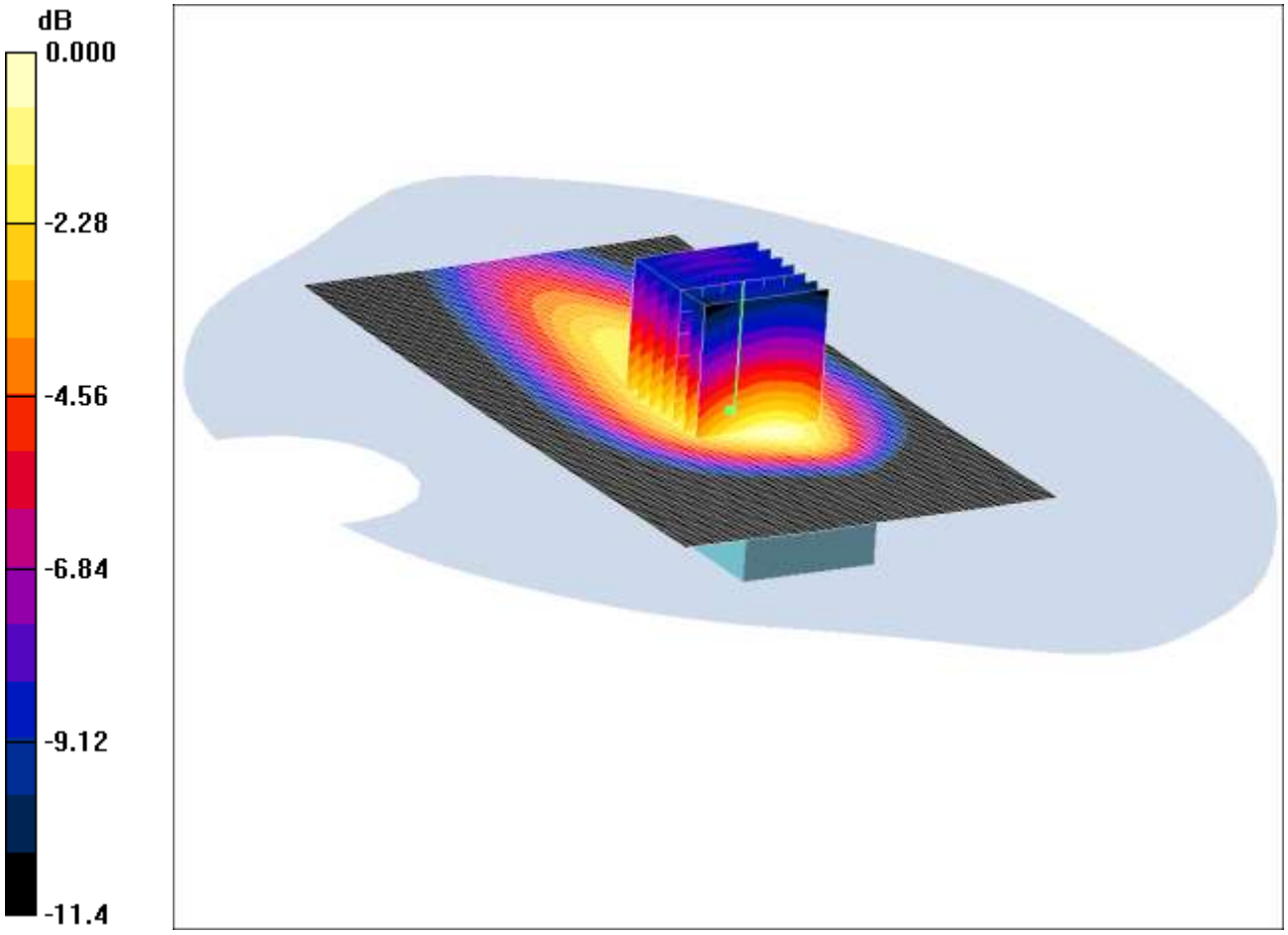
SCN/88727J02A/008: Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB Low QPSK CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12



0 dB = 1.07mW/g
Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Down EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.568 mW/g
Horizontal-Down EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.0 V/m; Power Drift = -0.038 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.591 mW/g; SAR(10 g) = 0.372 mW/g
Maximum value of SAR (measured) = 1.07 mW/g

SCN/88727J02A/009: Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB High QPSK CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

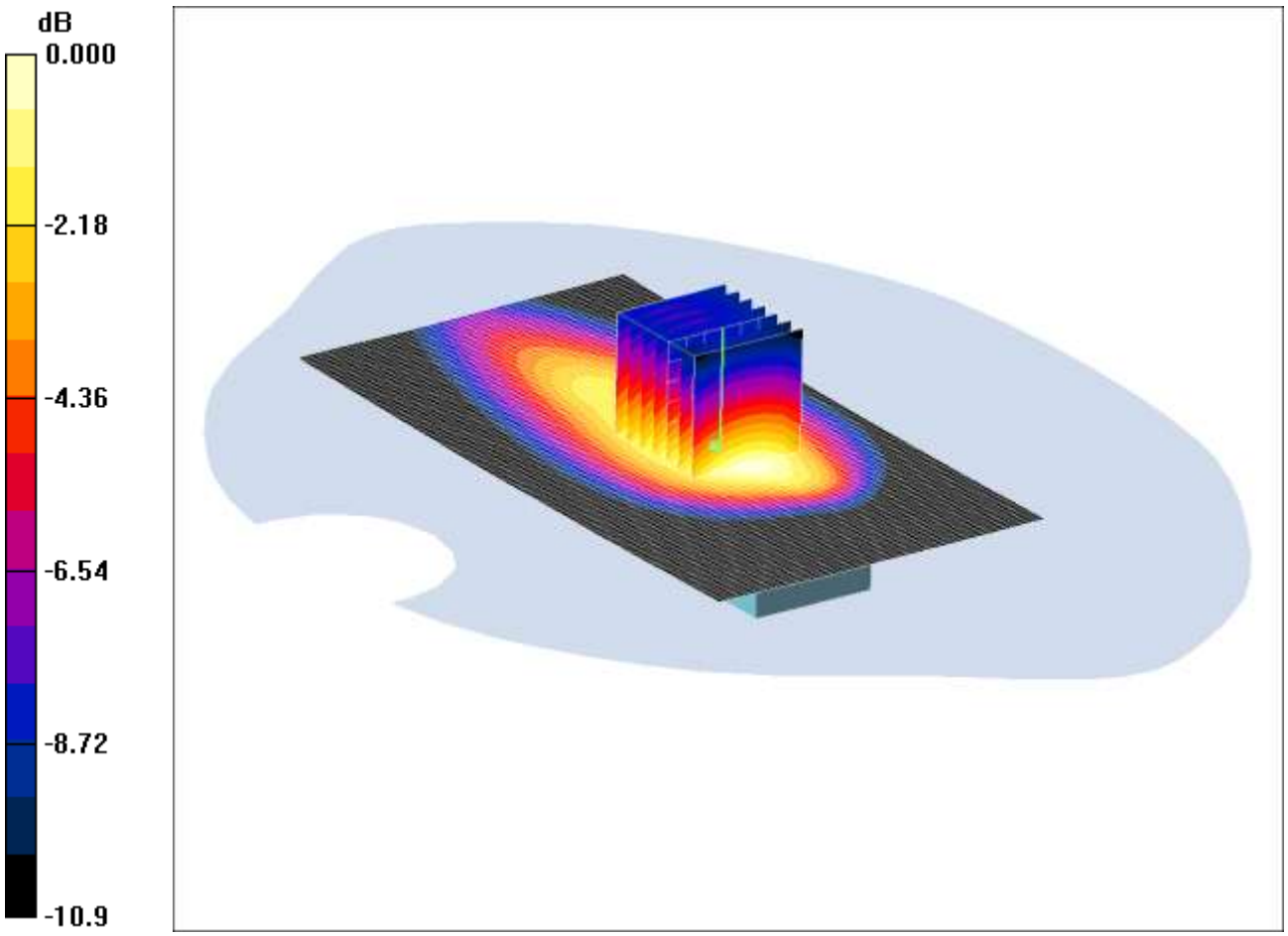


0 dB = 0.494mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Down EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.506 mW/g
Horizontal-Down EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = -0.055 dB
Peak SAR (extrapolated) = 0.675 W/kg
SAR(1 g) = 0.459 mW/g; SAR(10 g) = 0.308 mW/g
Maximum value of SAR (measured) = 0.494 mW/g

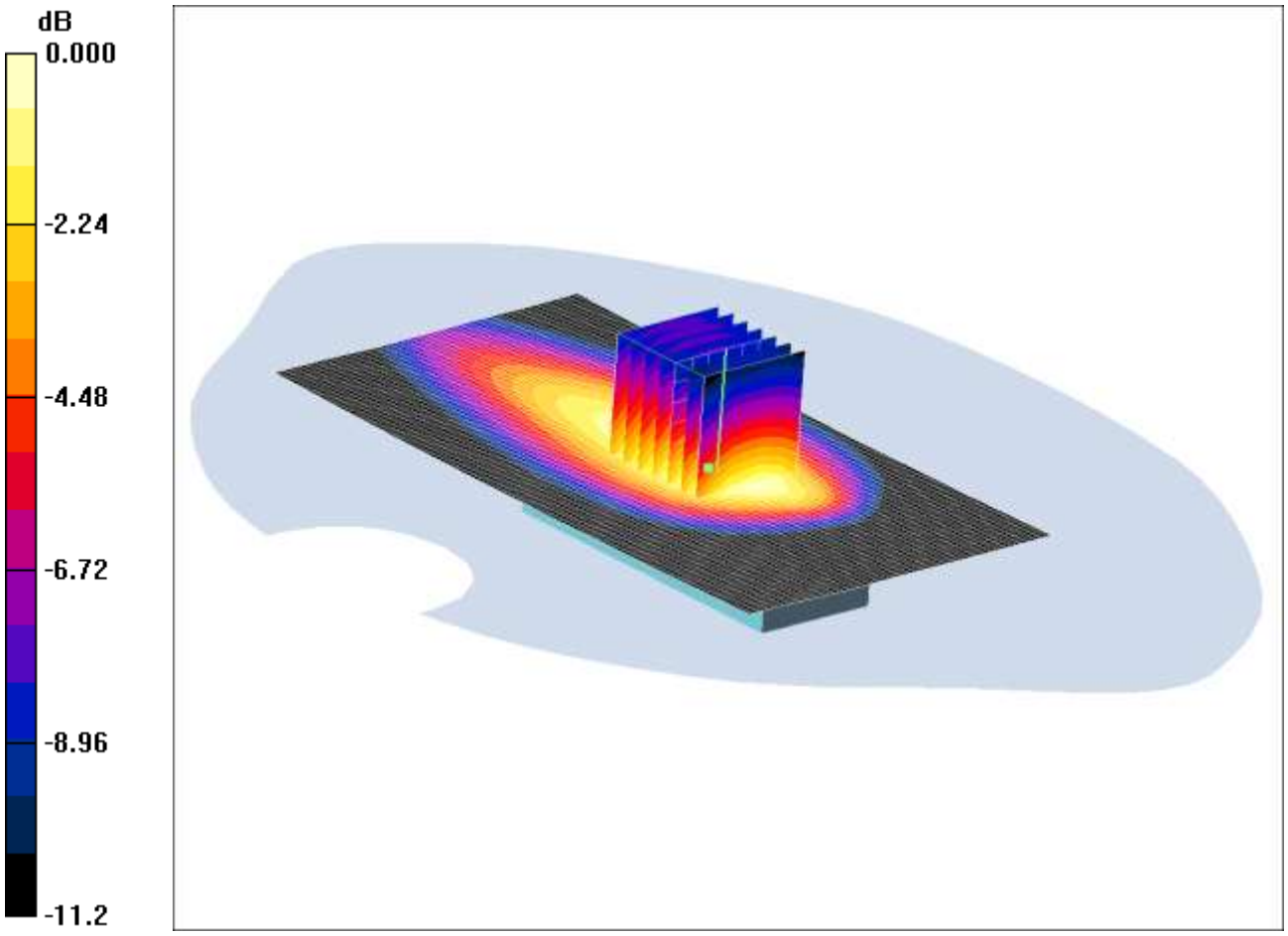
SCN/88727J02A/010: Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12



0 dB = 0.545mW/g
Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Down EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.552 mW/g
Horizontal-Down EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.4 V/m; Power Drift = 0.160 dB
Peak SAR (extrapolated) = 0.729 W/kg
SAR(1 g) = 0.507 mW/g; SAR(10 g) = 0.340 mW/g
Maximum value of SAR (measured) = 0.545 mW/g

SCN/88727J02A/011: Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB Low 16-QAM CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

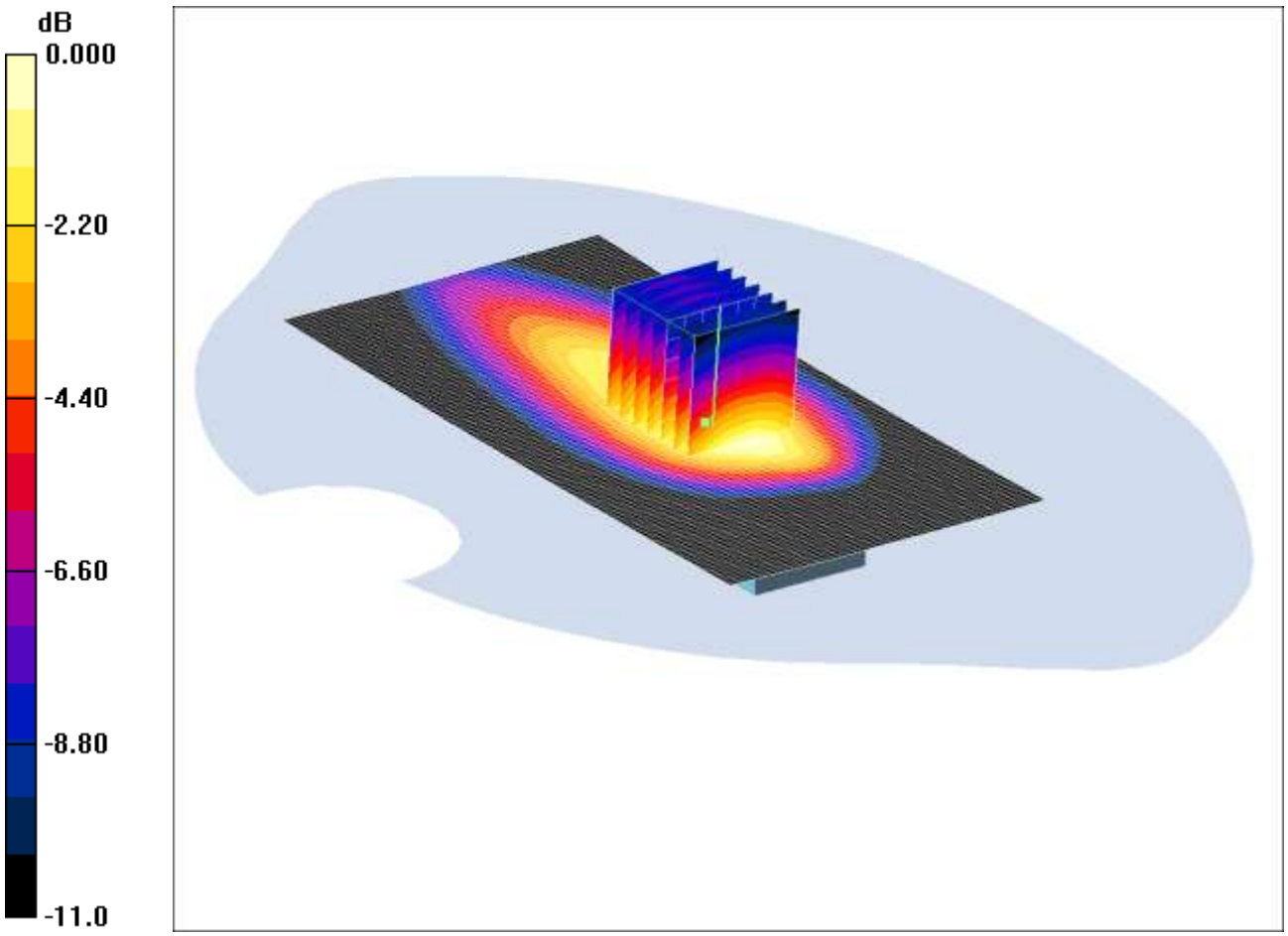


0 dB = 0.577mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Down EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.575 mW/g
Horizontal-Down EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.3 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 0.776 W/kg
SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.366 mW/g
Maximum value of SAR (measured) = 0.577 mW/g

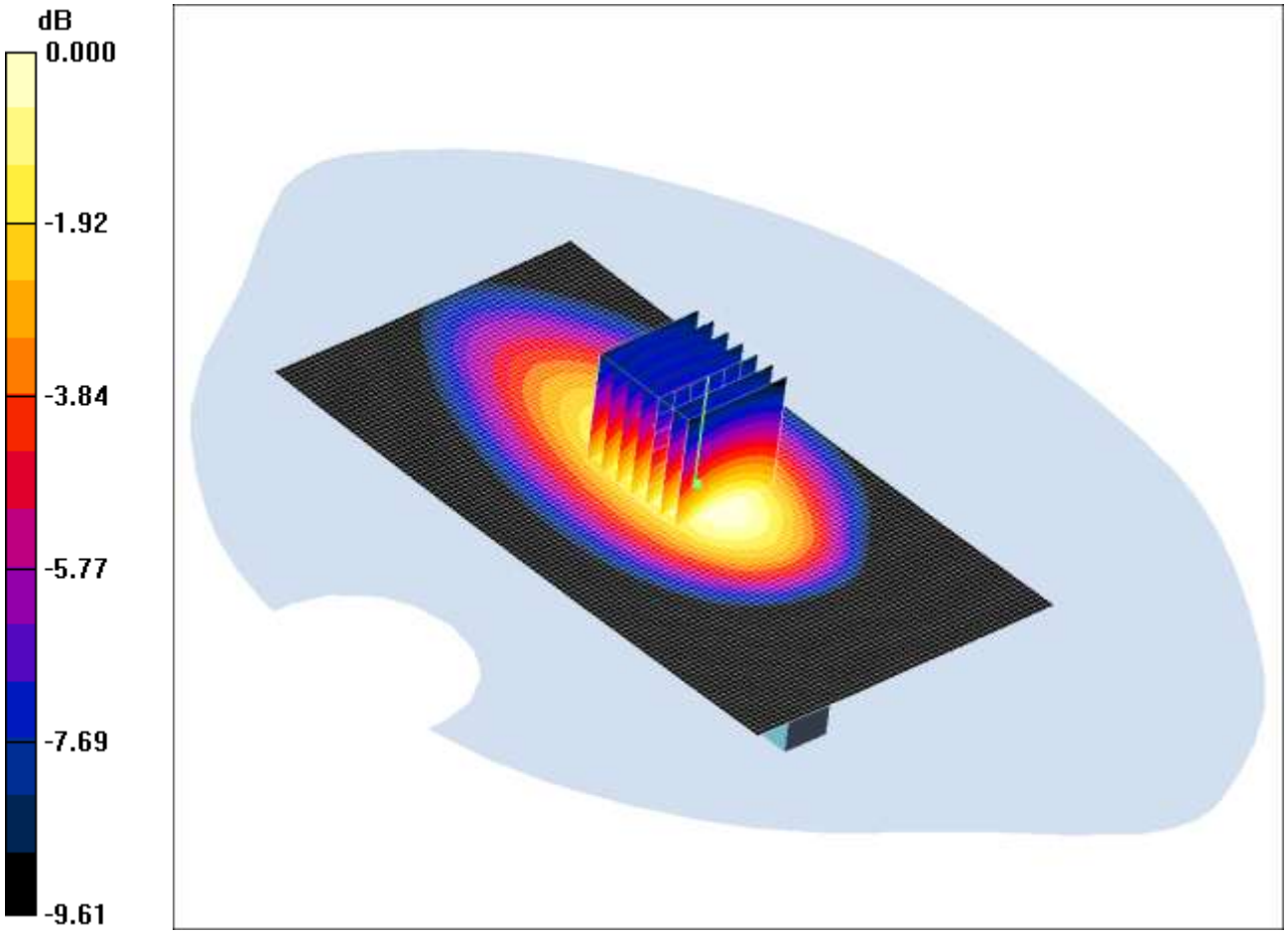
SCN/88727J02A/012: Side B Horizontal-Down EUT Facing Phantom LTE 12 5MHz BW 1% RB High 16-QAM CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12



0 dB = 0.547mW/g
Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Horizontal-Down EUT Facing Phantom - Middle/Area Scan 2 (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.549 mW/g
Horizontal-Down EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = 0.000 dB
Peak SAR (extrapolated) = 0.733 W/kg
SAR(1 g) = 0.504 mW/g; SAR(10 g) = 0.340 mW/g
Maximum value of SAR (measured) = 0.547 mW/g

SCN/88727J02A/013: Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

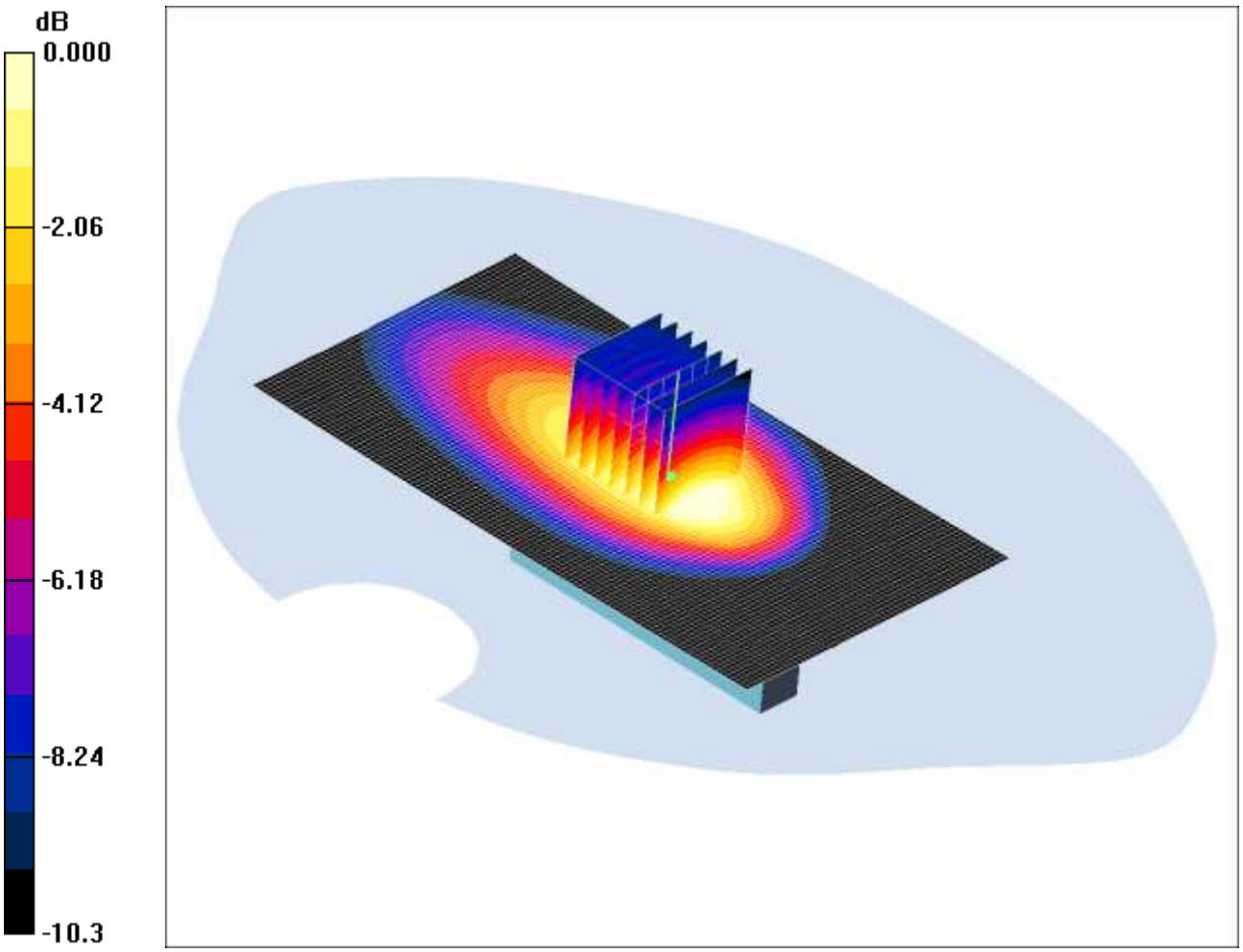


0 dB = 0.331mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Front EUT Facing Phantom - Middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.337 mW/g
Vertical-Front EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.8 V/m; Power Drift = -0.162 dB
Peak SAR (extrapolated) = 0.437 W/kg
SAR(1 g) = 0.307 mW/g; SAR(10 g) = 0.210 mW/g
Maximum value of SAR (measured) = 0.331 mW/g

SCN/88727J02A/014: Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

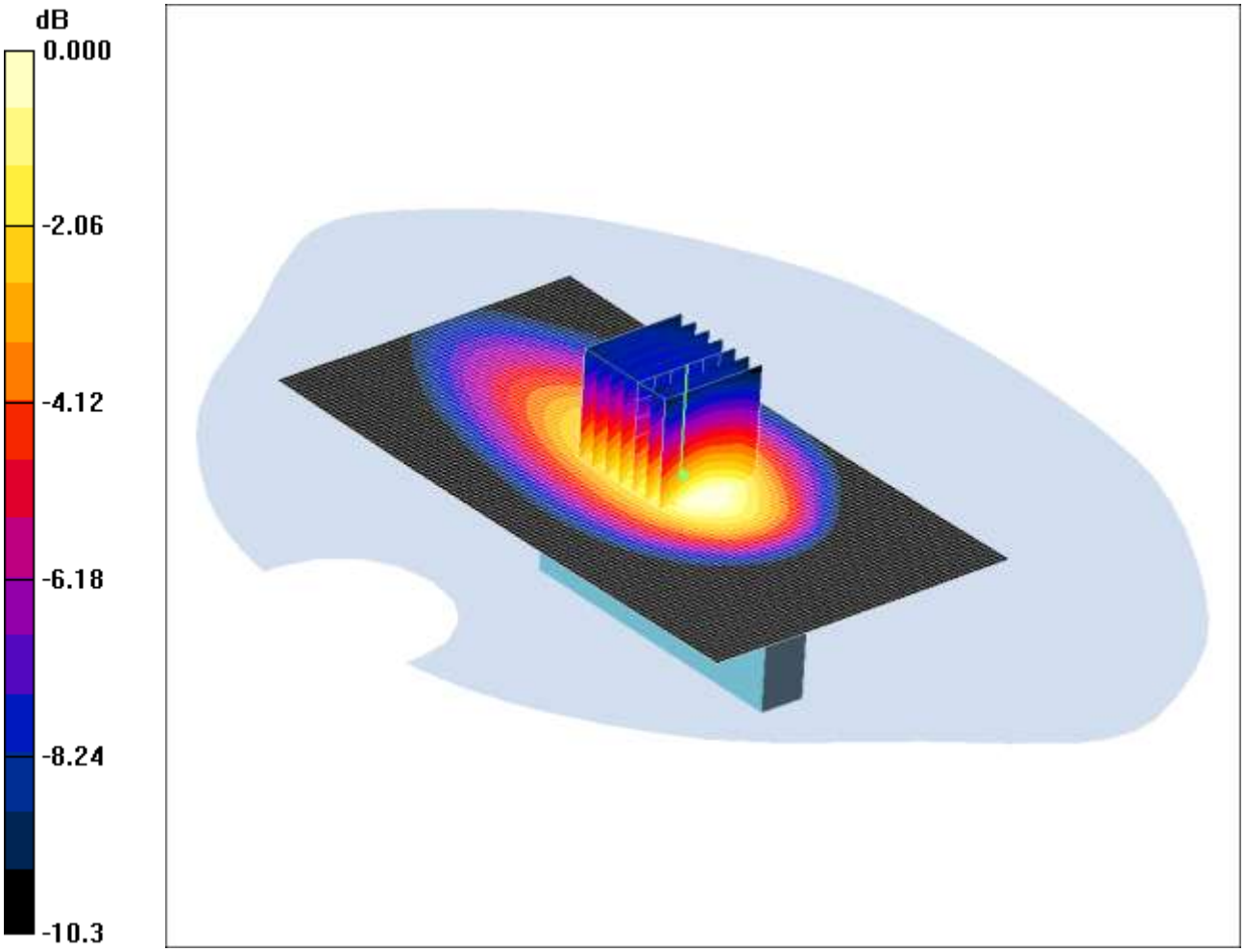


0 dB = 0.259mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Front EUT Facing Phantom - Middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.281 mW/g
Vertical-Front EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = 0.191 dB
Peak SAR (extrapolated) = 0.345 W/kg
SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.163 mW/g
Maximum value of SAR (measured) = 0.259 mW/g

SCN/88727J02A/015: Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

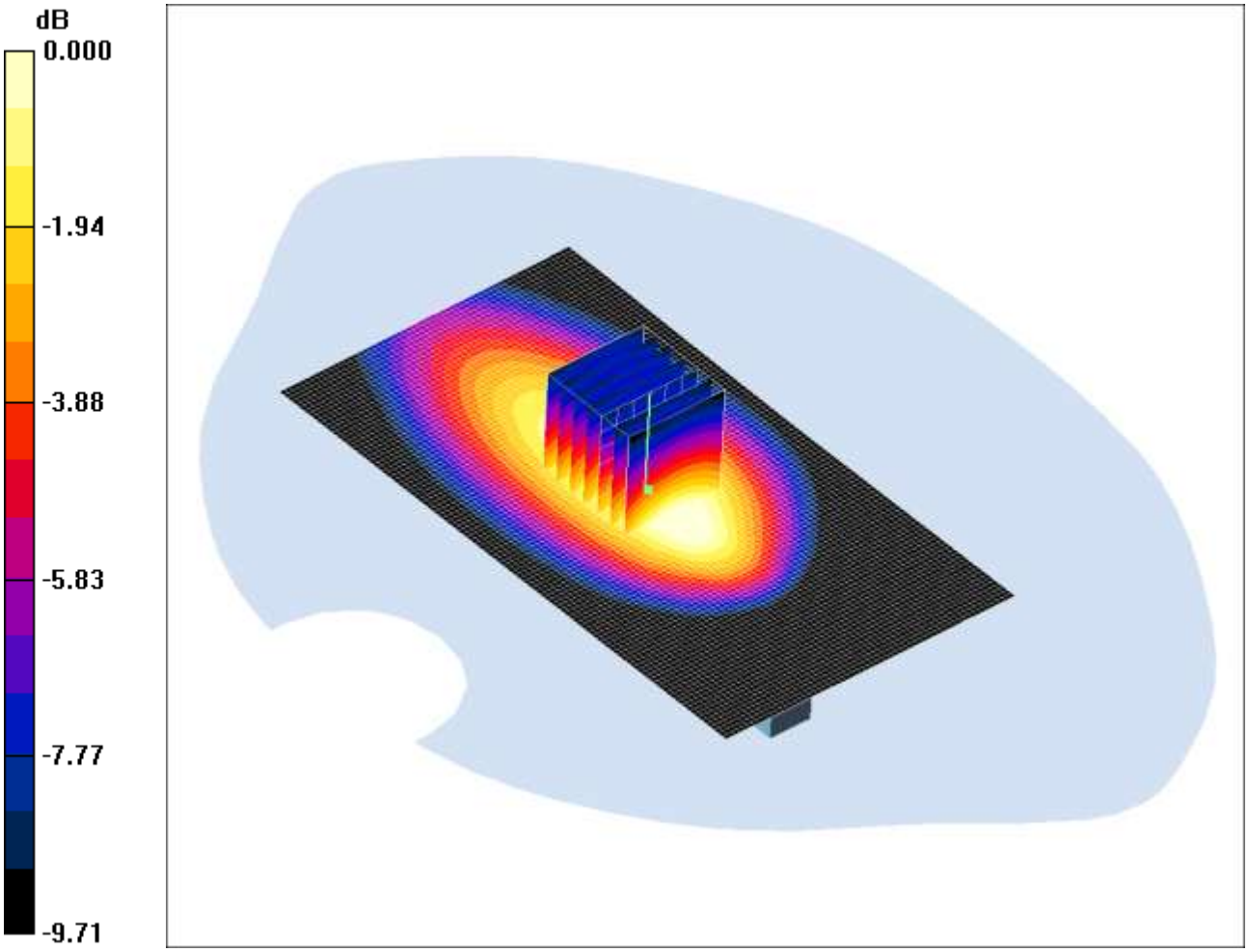


0 dB = 0.211mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Front EUT Facing Phantom - Middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.214 mW/g
Vertical-Front EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.9 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 0.279 W/kg
SAR(1 g) = 0.194 mW/g; SAR(10 g) = 0.131 mW/g
Maximum value of SAR (measured) = 0.211 mW/g

SCN/88727J02A/016: Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
Date: 18/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

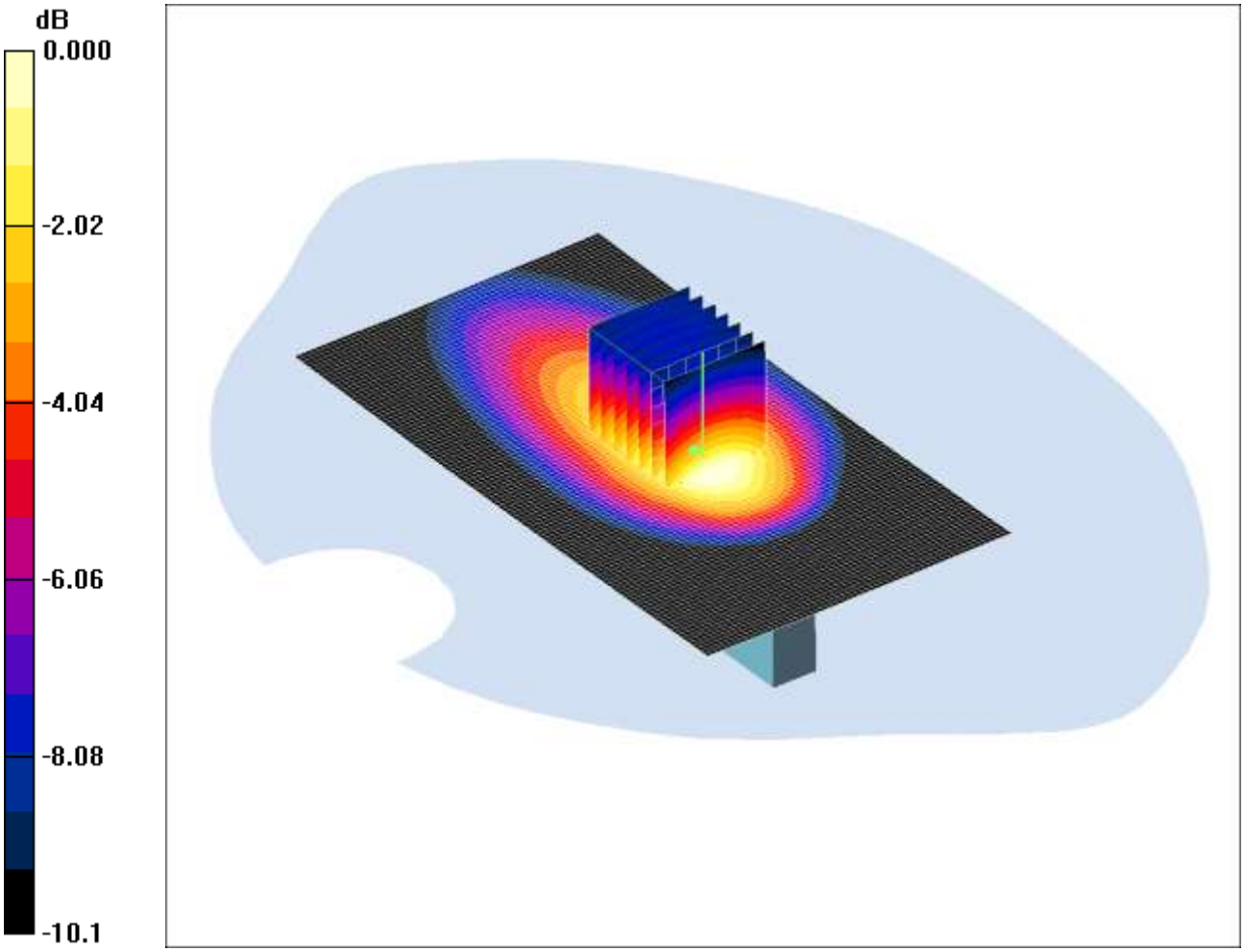


0 dB = 0.302mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.922 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Front EUT Facing Phantom - Middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.324 mW/g
Vertical-Front EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 0.421 W/kg
SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.192 mW/g
Maximum value of SAR (measured) = 0.302 mW/g

SCN/88727J02A/017: Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

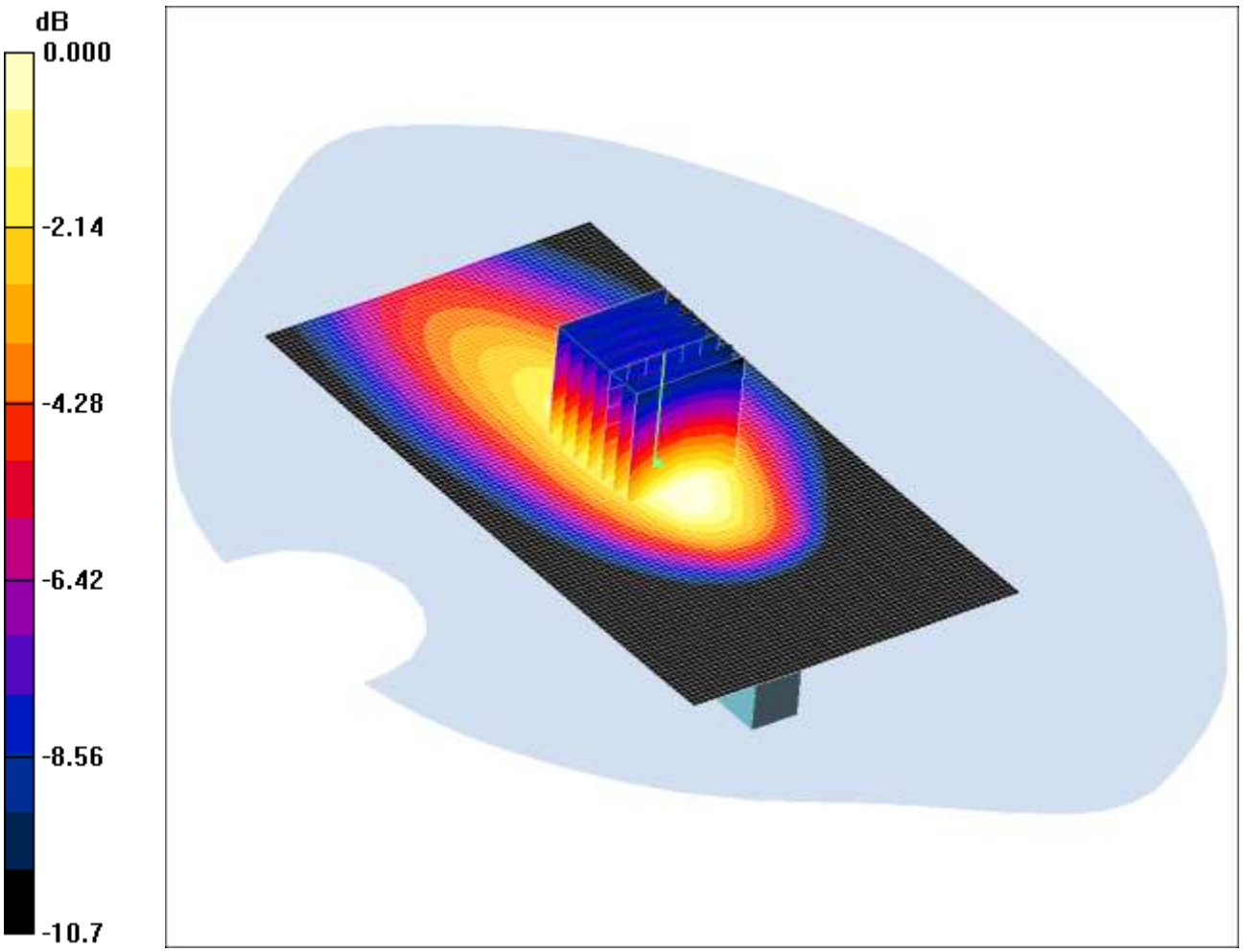


0 dB = 0.249mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Front EUT Facing Phantom - Middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.248 mW/g
Vertical-Front EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 0.338 W/kg
SAR(1 g) = 0.233 mW/g; SAR(10 g) = 0.157 mW/g
Maximum value of SAR (measured) = 0.249 mW/g

SCN/88727J02A/018: Side C Vertical-Front EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
Date: 29/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

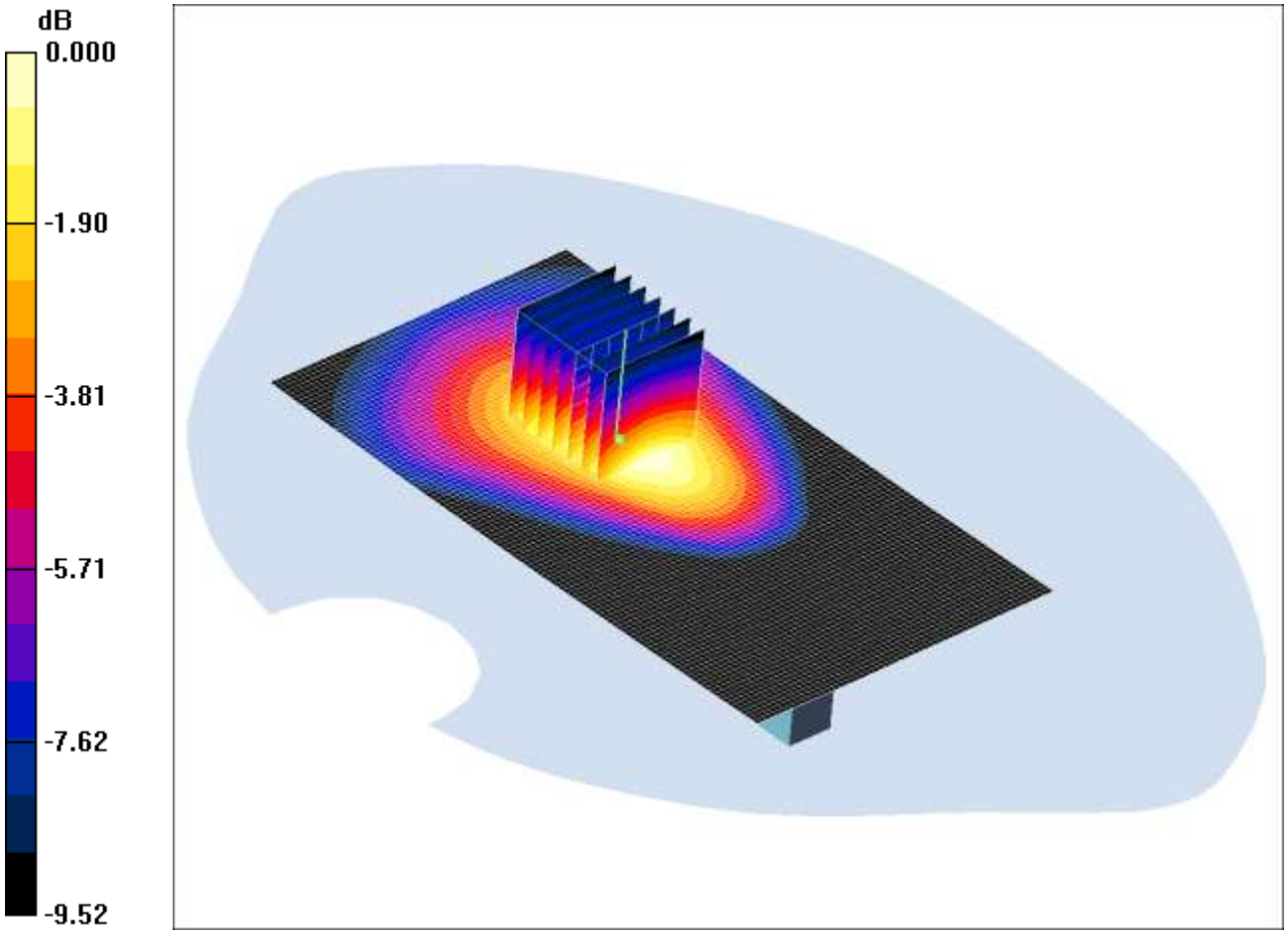


0 dB = 0.256mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.929 mho/m; ε_r = 57.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Front EUT Facing Phantom - Middle/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.259 mW/g
Vertical-Front EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = 0.069 dB
Peak SAR (extrapolated) = 0.329 W/kg
SAR(1 g) = 0.220 mW/g; SAR(10 g) = 0.147 mW/g
Maximum value of SAR (measured) = 0.256 mW/g

SCN/88727J02A/019: Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

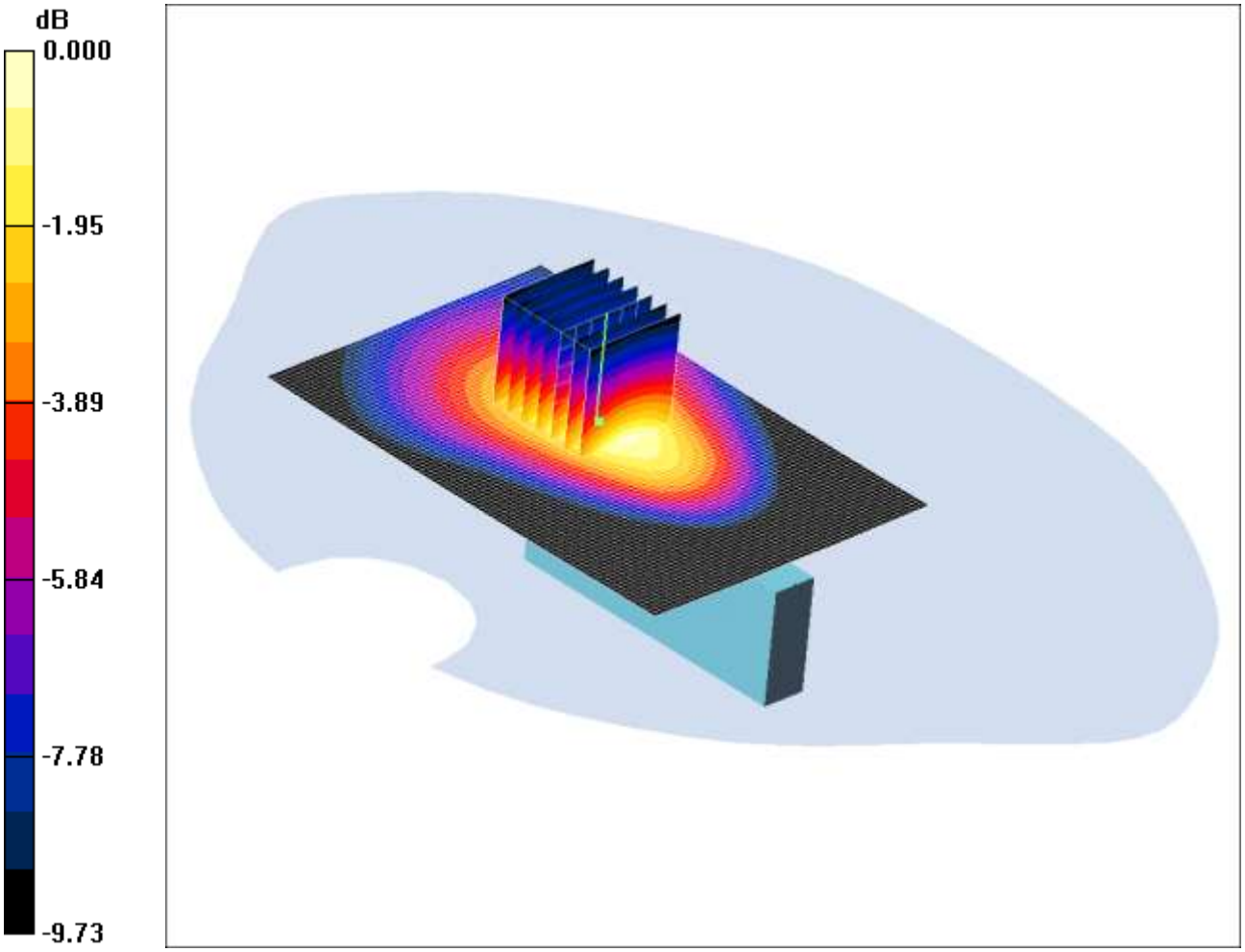


0 dB = 0.405mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Back EUT Facing Phantom - Middle 2/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.417 mW/g
Vertical-Back EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.2 V/m; Power Drift = -0.150 dB
Peak SAR (extrapolated) = 0.556 W/kg
SAR(1 g) = 0.376 mW/g; SAR(10 g) = 0.251 mW/g
Maximum value of SAR (measured) = 0.405 mW/g

SCN/88727J02A/020: Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 29/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

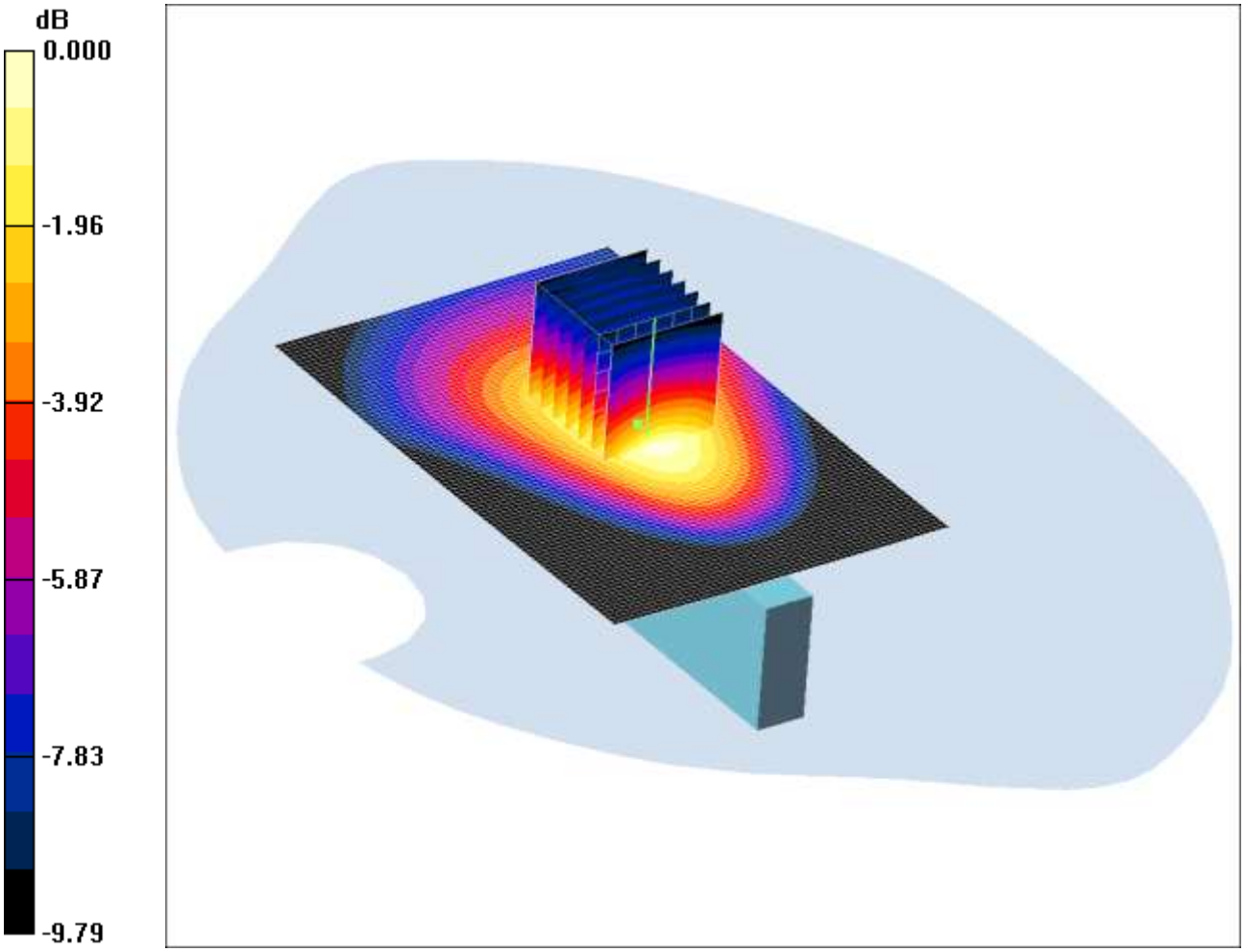


0 dB = 0.575mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.929 mho/m; ε_r = 57.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Back EUT Facing Phantom - Middle 2/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.556 mW/g
Vertical-Back EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.4 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.751 W/kg
SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.324 mW/g
Maximum value of SAR (measured) = 0.575 mW/g

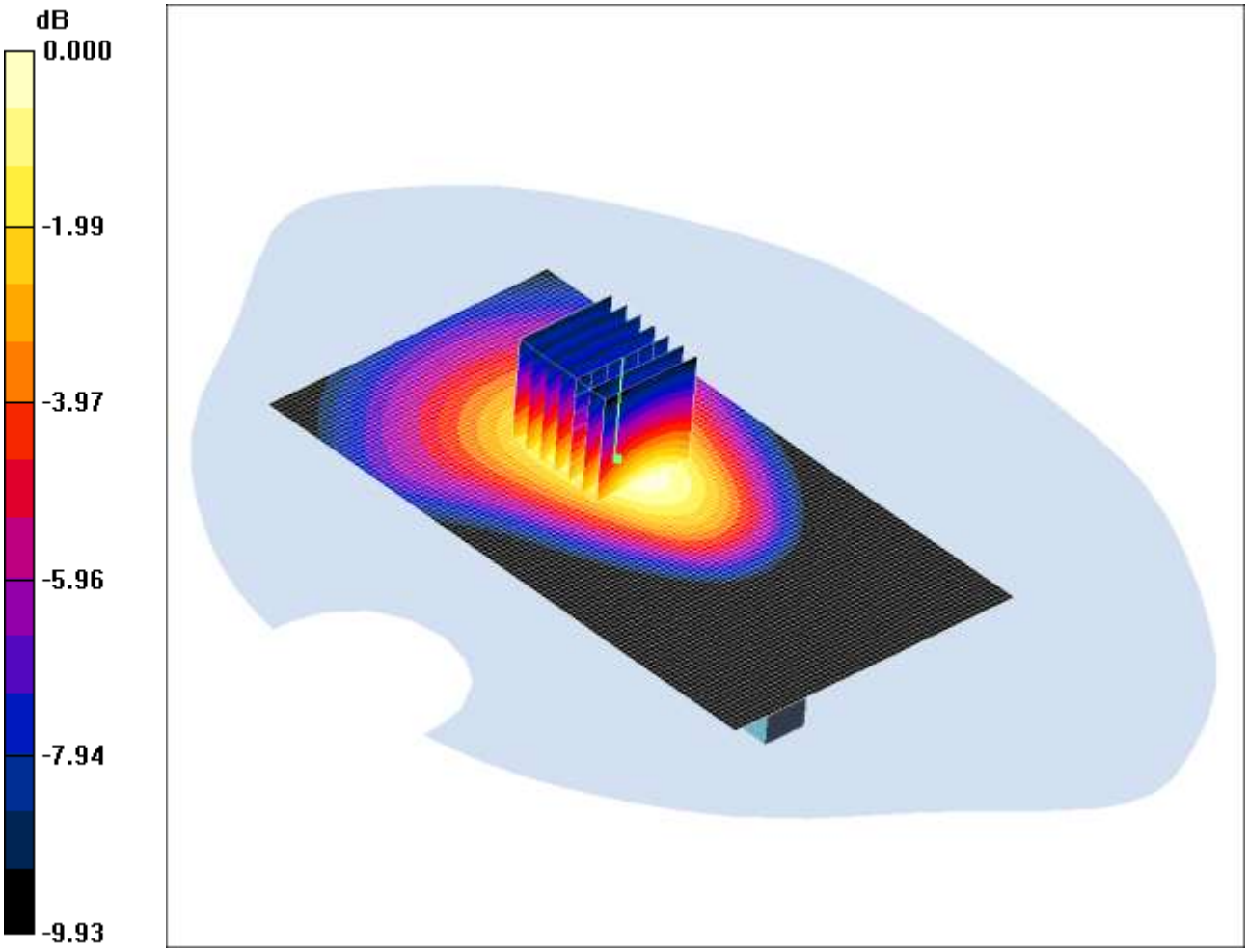
SCN/88727J02A/021: Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 29/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12



0 dB = 0.370mW/g
Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.929 mho/m; ε_r = 57.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Back EUT Facing Phantom - Middle 2 2 2 2/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.375 mW/g
Vertical-Back EUT Facing Phantom - Middle 2 2 2 2/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.2 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 0.479 W/kg
SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.209 mW/g
Maximum value of SAR (measured) = 0.370 mW/g

SCN/88727J02A/022: Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
Date: 18/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

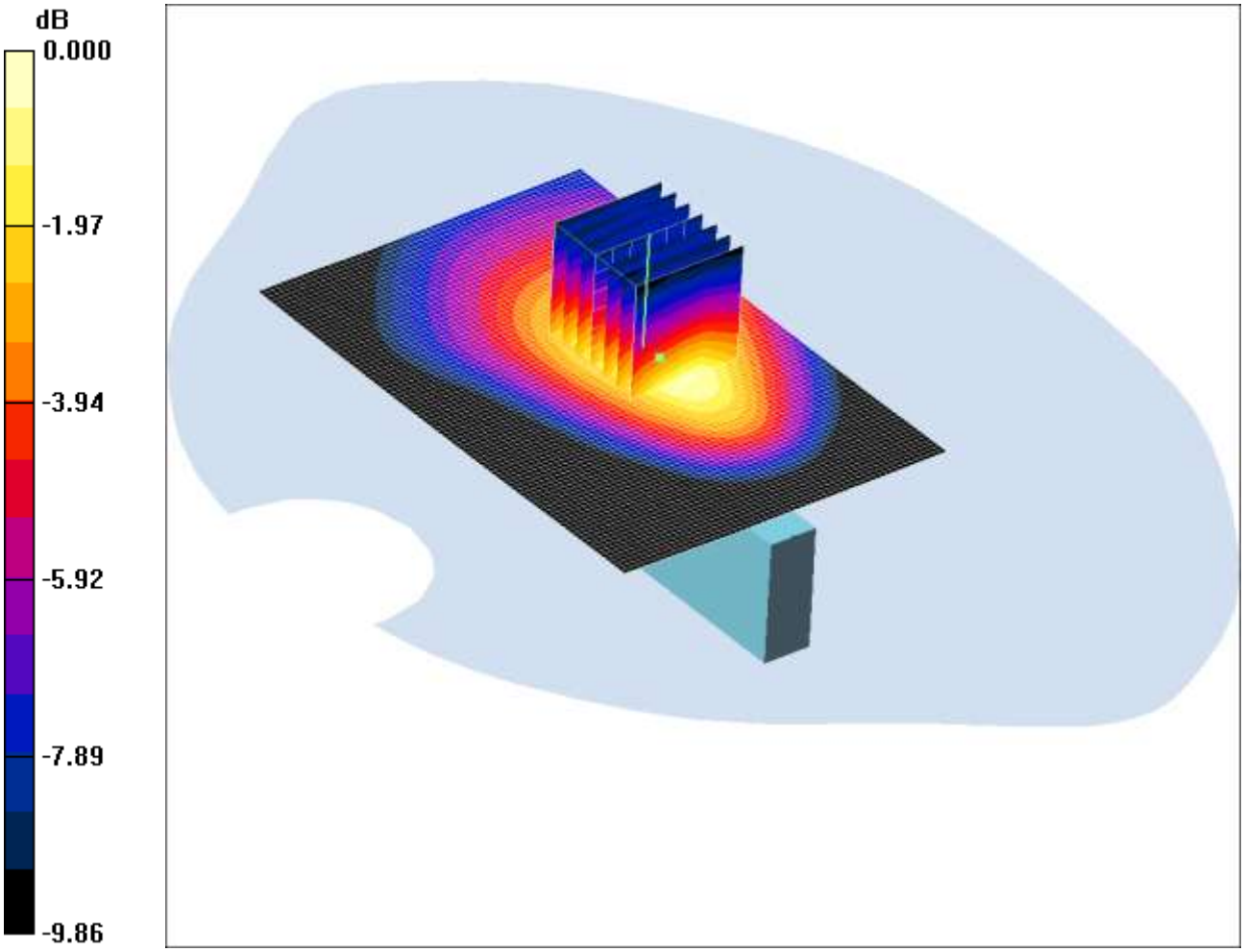


0 dB = 0.352mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.922 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Back EUT Facing Phantom - Middle 2/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.364 mW/g
Vertical-Back EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.9 V/m; Power Drift = -0.061 dB
Peak SAR (extrapolated) = 0.487 W/kg
SAR(1 g) = 0.326 mW/g; SAR(10 g) = 0.214 mW/g
Maximum value of SAR (measured) = 0.352 mW/g

SCN/88727J02A/023: Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
Date: 29/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

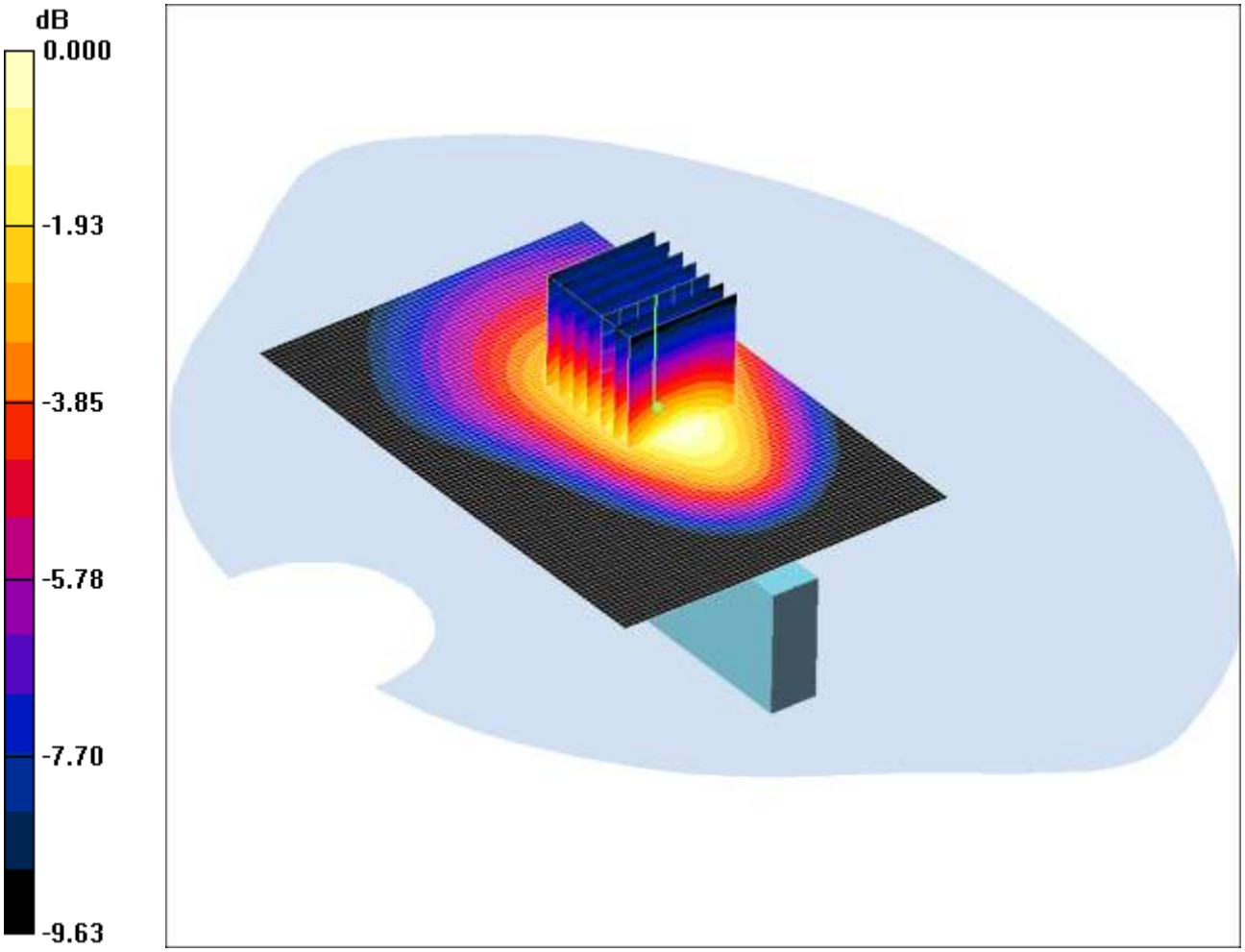


0 dB = 0.474mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.929 mho/m; ε_r = 57.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Back EUT Facing Phantom - Middle 2 2/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.457 mW/g
Vertical-Back EUT Facing Phantom - Middle 2 2/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.619 W/kg
SAR(1 g) = 0.408 mW/g; SAR(10 g) = 0.269 mW/g
Maximum value of SAR (measured) = 0.474 mW/g

SCN/88727J02A/024: Side D Vertical-Back EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
Date: 29/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

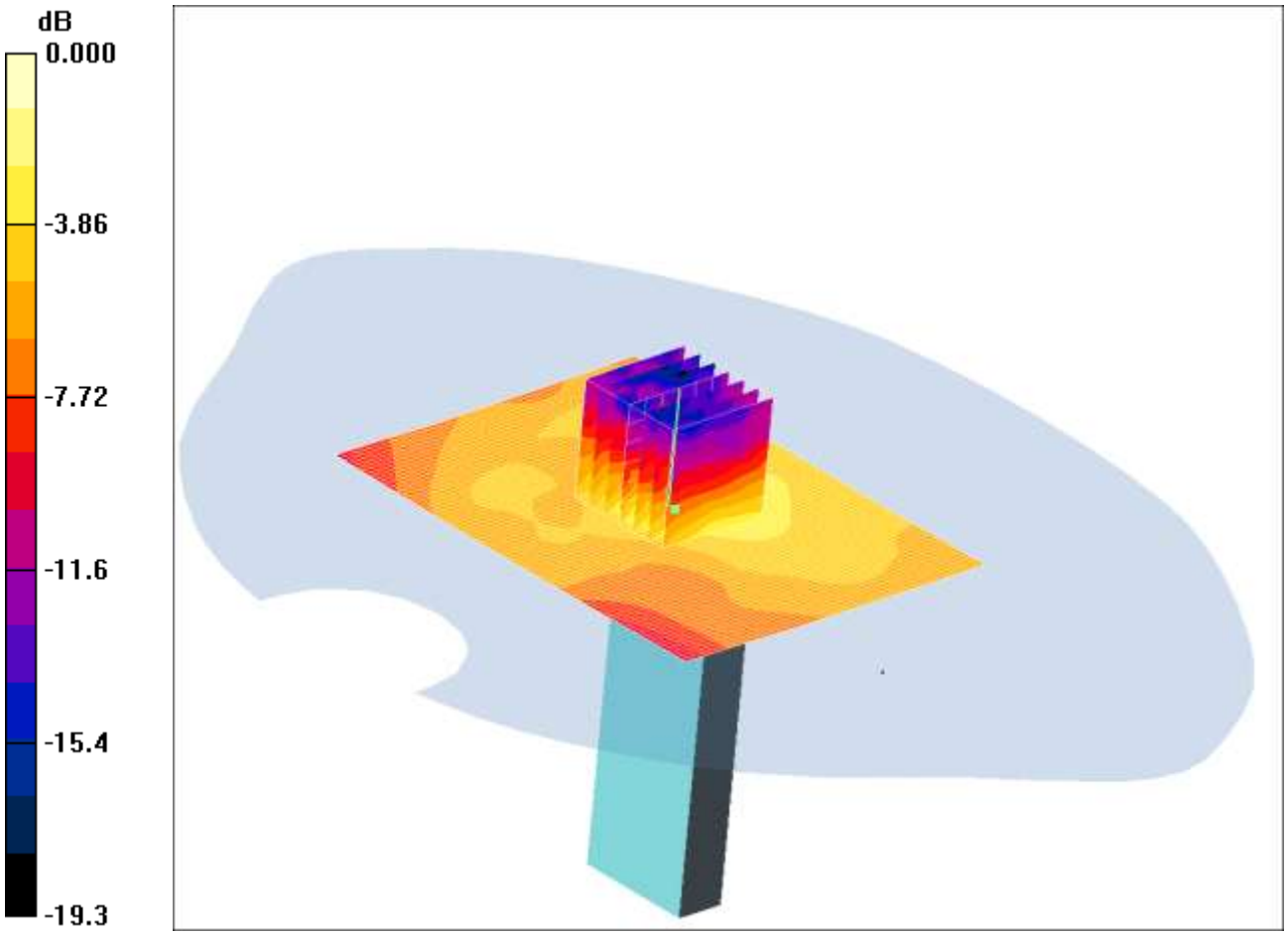


0 dB = 0.359mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.929 mho/m; ε_r = 57.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Vertical-Back EUT Facing Phantom - Middle 2 3 2 2/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.372 mW/g
Vertical-Back EUT Facing Phantom - Middle 2 3 2 2/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = 0.066 dB
Peak SAR (extrapolated) = 0.458 W/kg
SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.204 mW/g
Maximum value of SAR (measured) = 0.359 mW/g

SCN/88727J02A/025: Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid QPSK CH23095
Date: 22/08/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

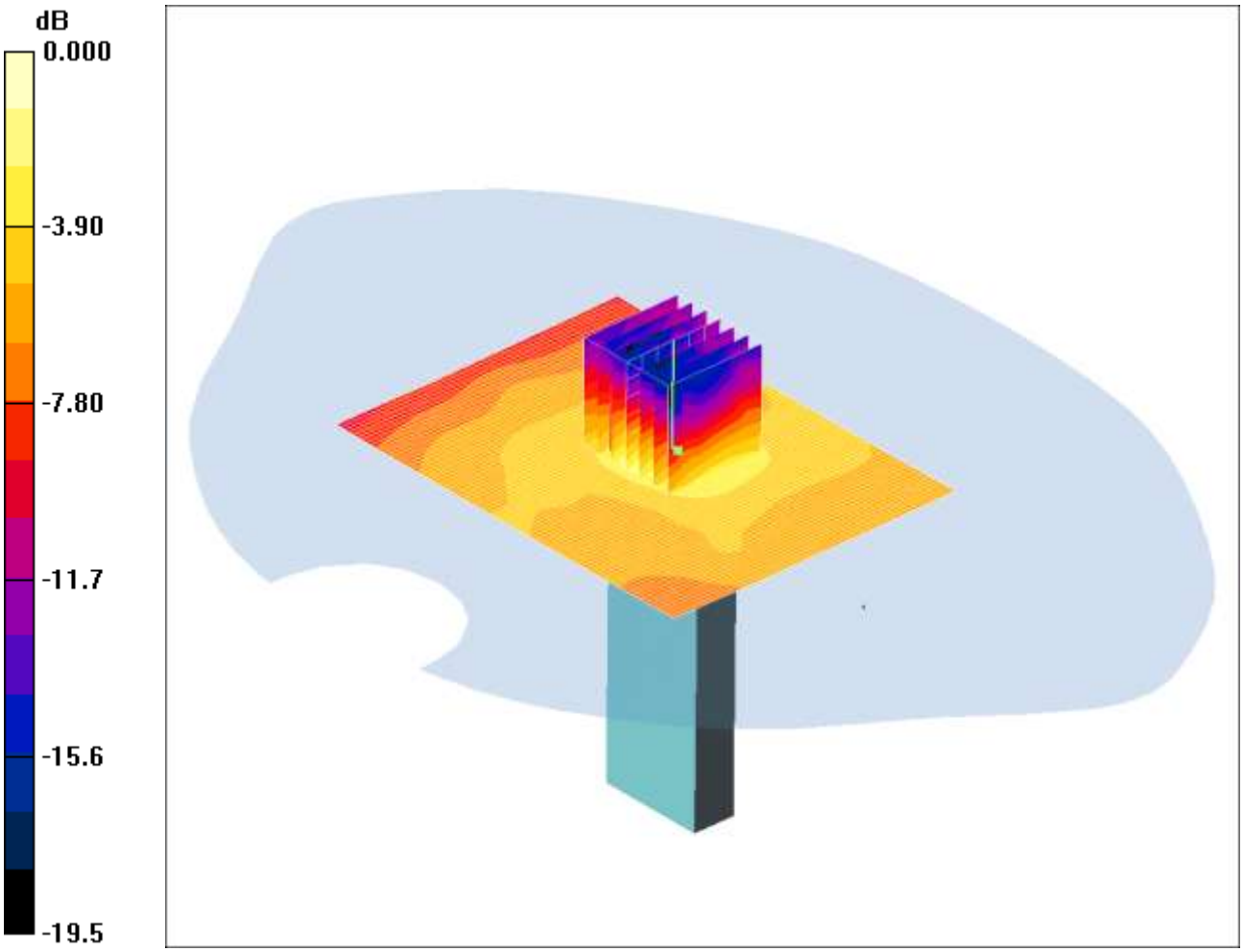


0 dB = 0.014mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.952 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Top of EUT Facing Phantom - Middle/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.012 mW/g
Top of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.82 V/m; Power Drift = 0.089 dB
Peak SAR (extrapolated) = 0.031 W/kg
SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00632 mW/g
Maximum value of SAR (measured) = 0.014 mW/g

SCN/88727J02A/026: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

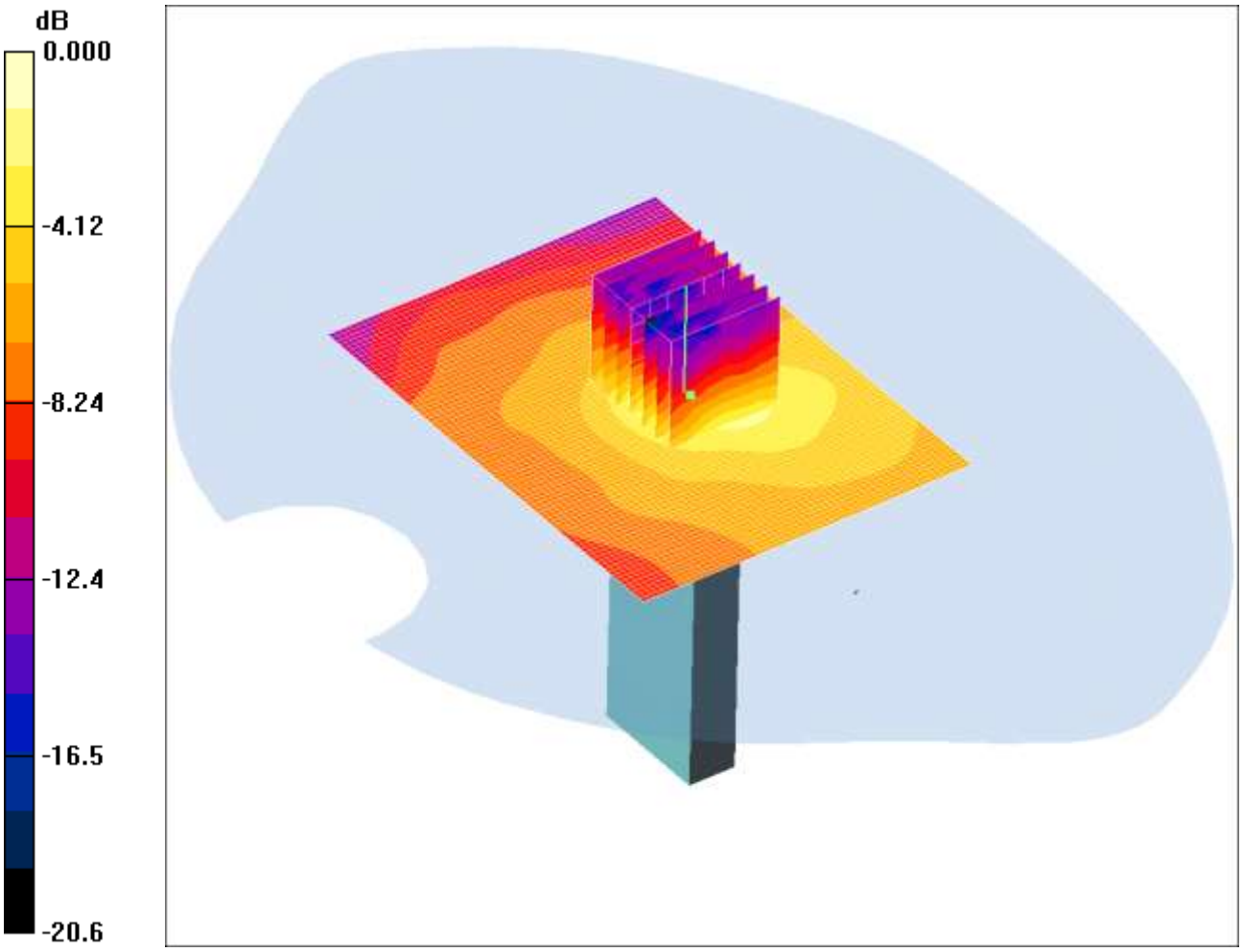


0 dB = 0.014mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Top of EUT Facing Phantom - Middle/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.013 mW/g
Top of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.07 V/m; Power Drift = 0.057 dB
Peak SAR (extrapolated) = 0.030 W/kg
SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00611 mW/g
Maximum value of SAR (measured) = 0.014 mW/g

SCN/88727J02A/027: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

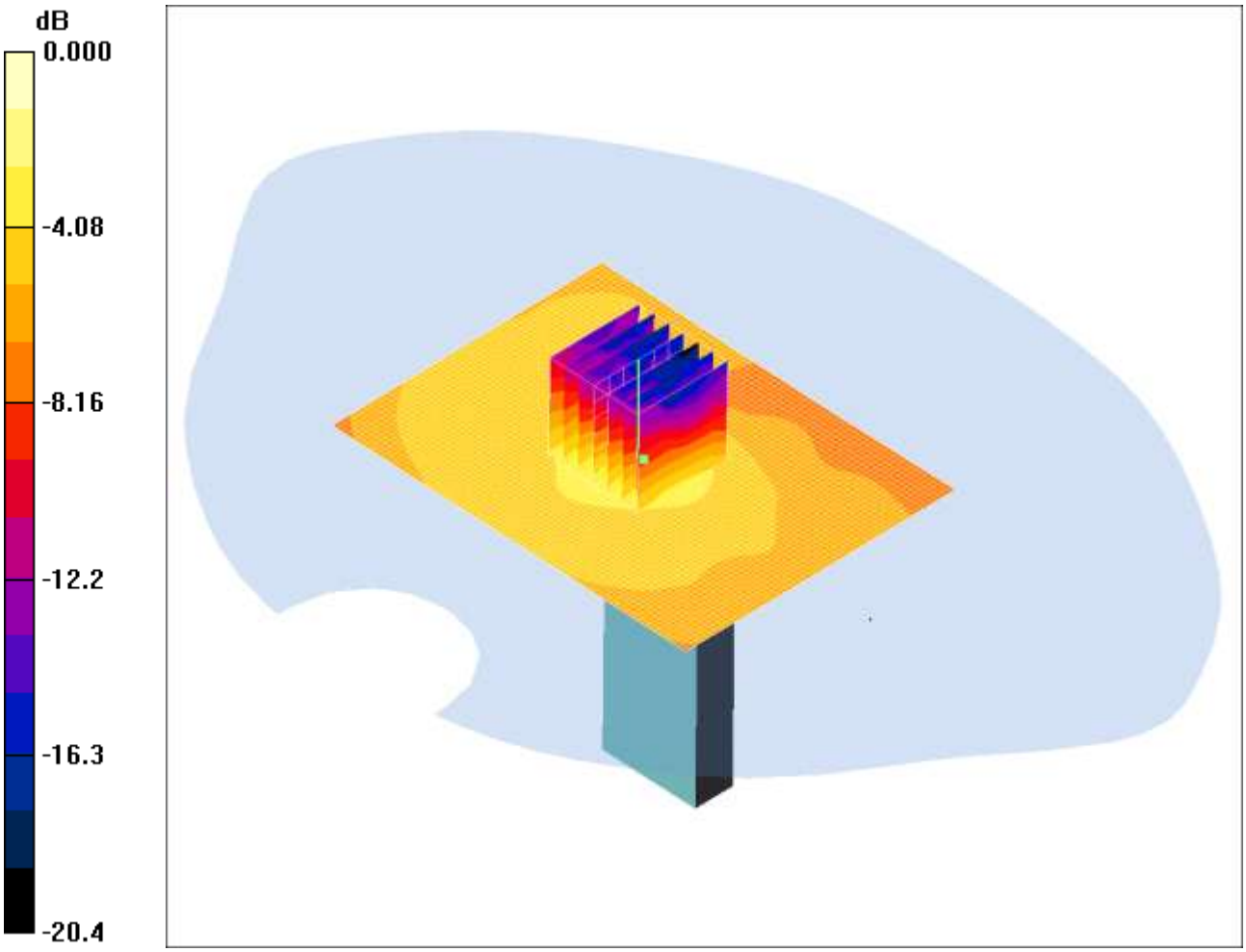


0 dB = 0.015mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Top of EUT Facing Phantom - Middle/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.013 mW/g
Top of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.95 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 0.029 W/kg
SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.0065 mW/g
Maximum value of SAR (measured) = 0.015 mW/g

SCN/88727J02A/028: Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB Mid 16-QAM CH23095
Date: 18/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

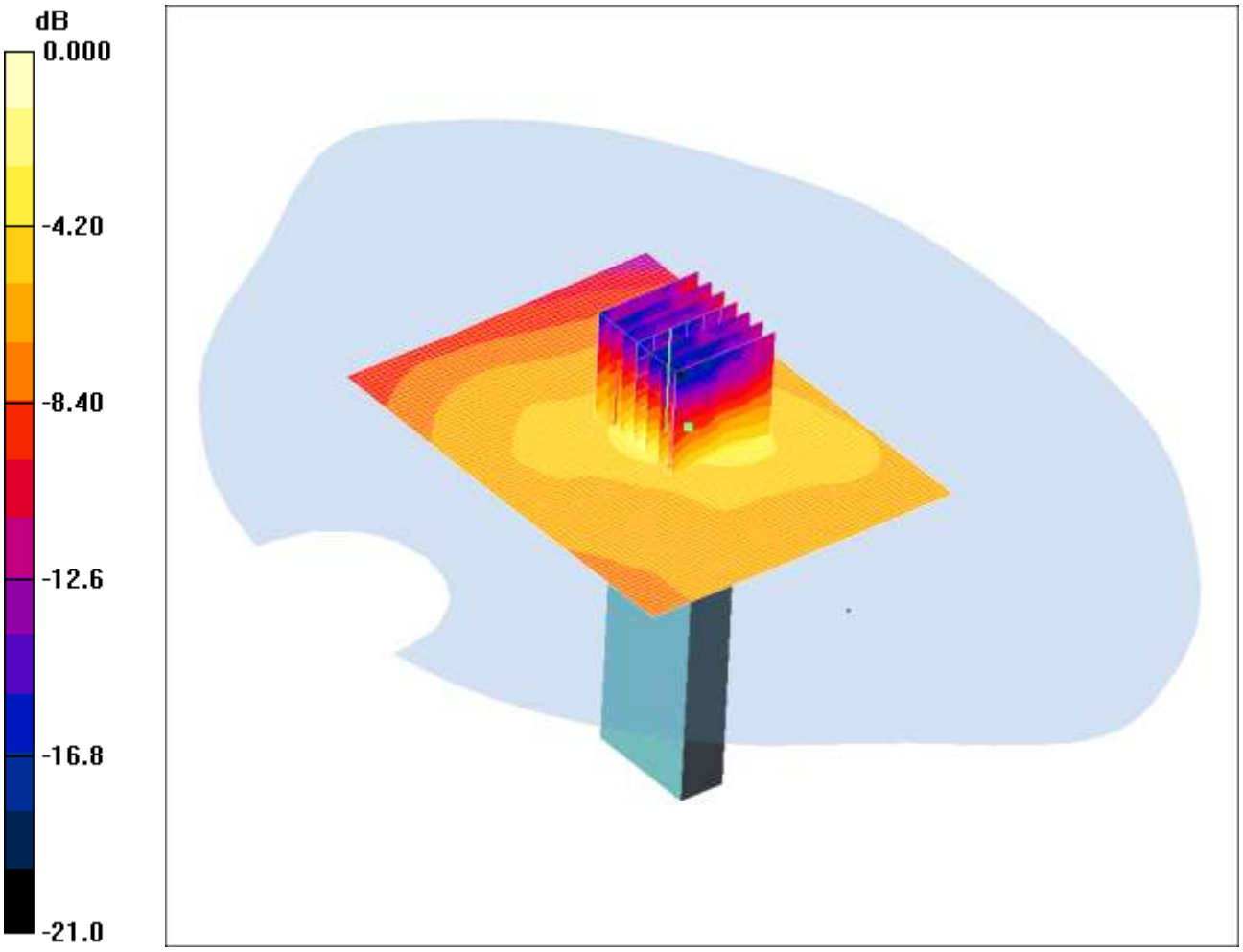


0 dB = 0.014mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.922 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Top of EUT Facing Phantom - Middle/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.016 mW/g
Top of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.73 V/m; Power Drift = 0.130 dB
Peak SAR (extrapolated) = 0.031 W/kg
SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00597 mW/g
Maximum value of SAR (measured) = 0.014 mW/g

SCN/88727J02A/029: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12

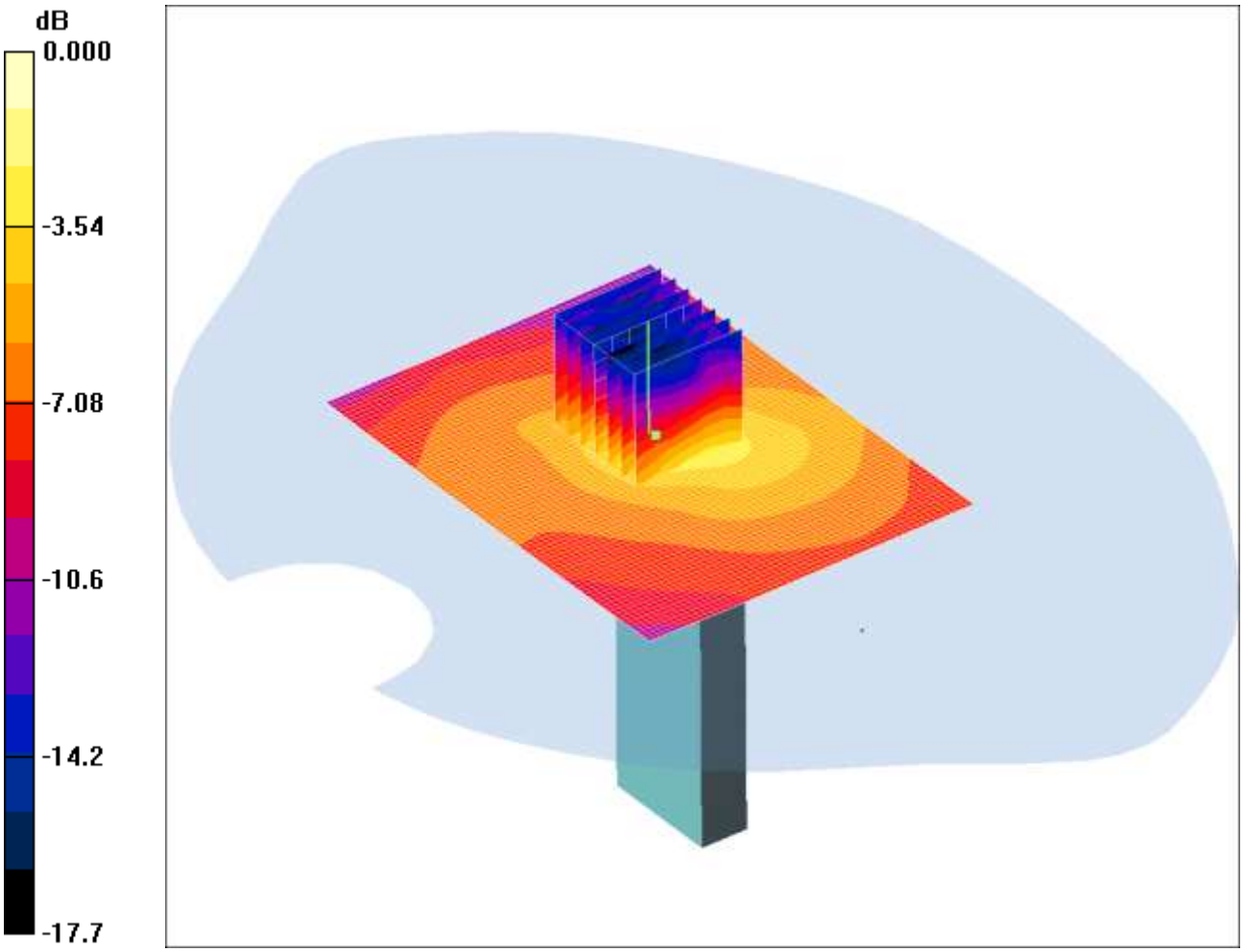


0 dB = 0.016mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Top of EUT Facing Phantom - Middle/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.013 mW/g
Top of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.97 V/m; Power Drift = -0.104 dB
Peak SAR (extrapolated) = 0.037 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00662 mW/g
Maximum value of SAR (measured) = 0.016 mW/g

SCN/88727J02A/030: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
Date: 27/10/2012
DUT: IP Wireless (UK) Ltd; Type: LTE USB Stick; Model: ARM; Serial: ARMHC0001F12



0 dB = 0.018mW/g

Communication System: LTE - Band 12 / 5 MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.897 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

Top of EUT Facing Phantom - Middle 2/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.013 mW/g
Top of EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.63 V/m; Power Drift = 0.099 dB
Peak SAR (extrapolated) = 0.036 W/kg
SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00755 mW/g
Maximum value of SAR (measured) = 0.018 mW/g

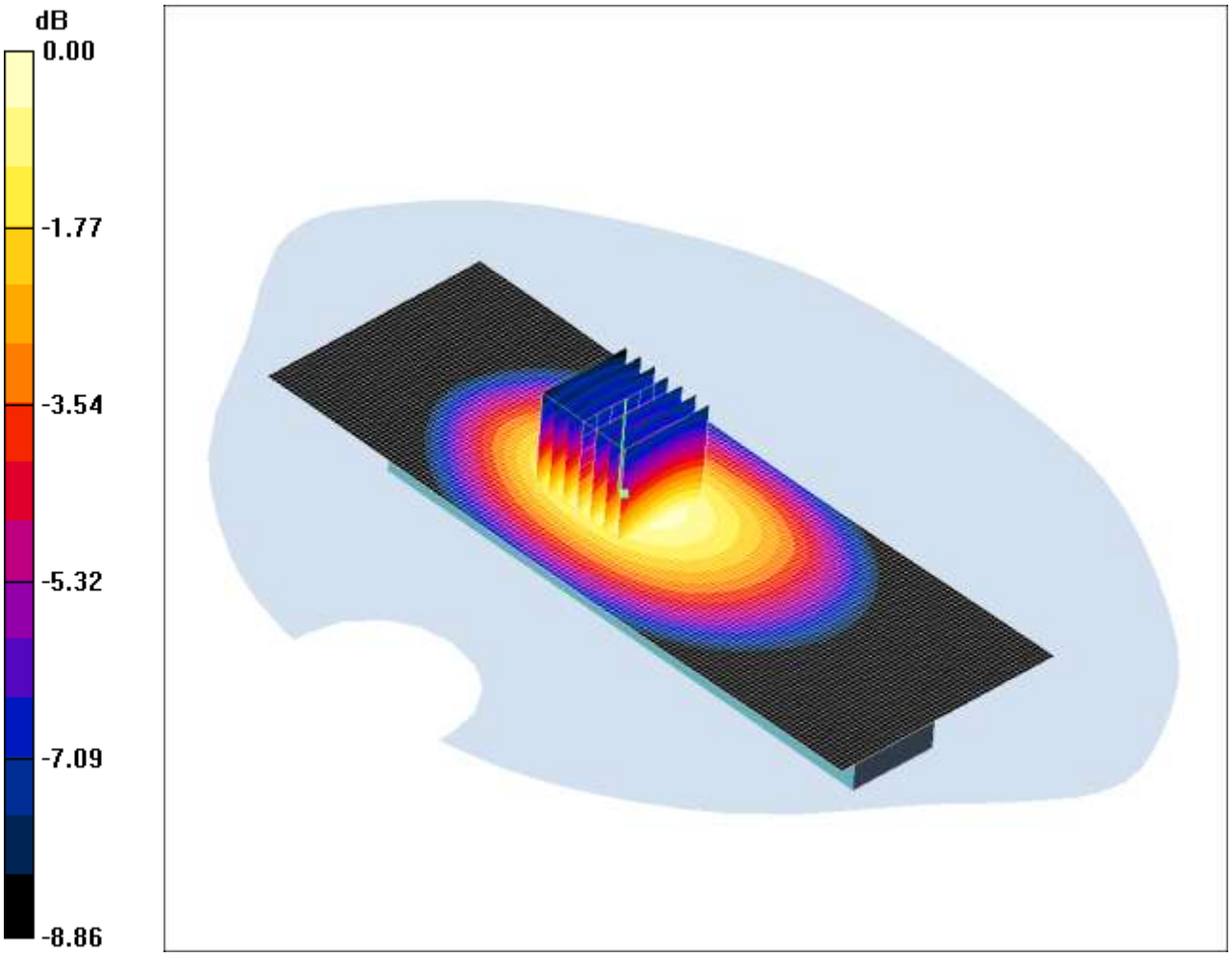
Appendix 4. SAR Distribution Scans for USB Dongle + Antenna Attached

This appendix contains SAR distribution scans which are included in the total number of pages for this report.

Scan Reference Number	Title
SCN/88727J02A/031	Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
SCN/88727J02A/032	Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
SCN/88727J02A/033	Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
SCN/88727J02A/034	Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
SCN/88727J02A/035	Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
SCN/88727J02A/036	Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
SCN/88727J02A/037	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
SCN/88727J02A/038	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23035
SCN/88727J02A/039	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23155
SCN/88727J02A/040	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
SCN/88727J02A/041	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
SCN/88727J02A/042	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
SCN/88727J02A/043	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23035
SCN/88727J02A/044	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23155
SCN/88727J02A/045	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23035
SCN/88727J02A/046	Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23035
SCN/88727J02A/047	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
SCN/88727J02A/048	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23035
SCN/88727J02A/049	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23155
SCN/88727J02A/050	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
SCN/88727J02A/051	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095

SCN/88727J02A/052	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
SCN/88727J02A/053	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23035
SCN/88727J02A/054	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23155
SCN/88727J02A/055	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23155
SCN/88727J02A/056	Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23155
SCN/88727J02A/057	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
SCN/88727J02A/058	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23035
SCN/88727J02A/059	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23155
SCN/88727J02A/060	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23035
SCN/88727J02A/061	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23035
SCN/88727J02A/062	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
SCN/88727J02A/063	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23035
SCN/88727J02A/064	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23155
SCN/88727J02A/065	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23035
SCN/88727J02A/066	Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23035
SCN/88727J02A/067	Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095-
SCN/88727J02A/068	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
SCN/88727J02A/069	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
SCN/88727J02A/070	Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095-
SCN/88727J02A/071	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
SCN/88727J02A/072	Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095

SCN/88727J02A/031: Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

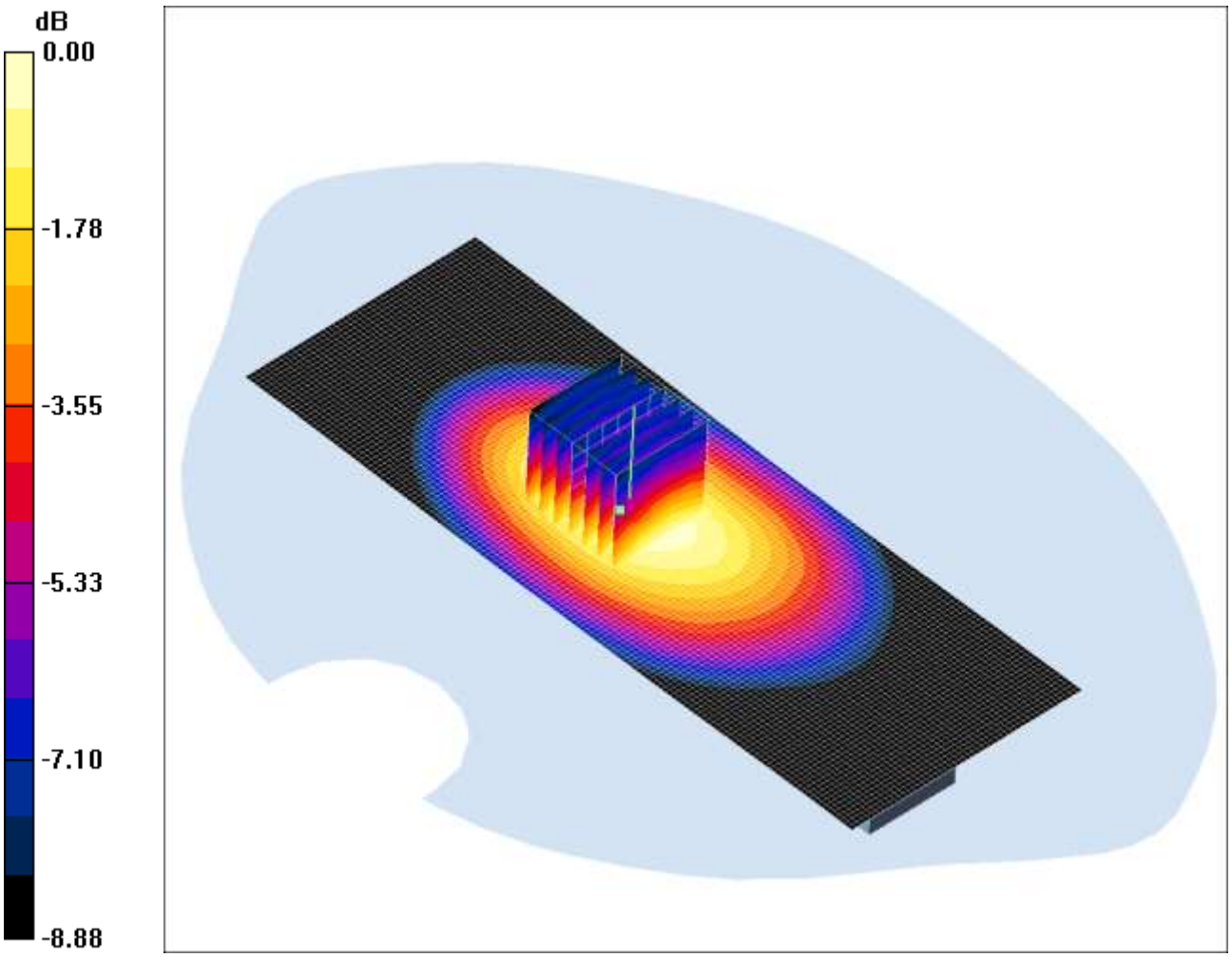


0 dB = 0.701mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side A Horizontal Up of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.692 mW/g
Side A Horizontal Up of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 0.890 W/kg
SAR(1 g) = 0.662 mW/g; SAR(10 g) = 0.475 mW/g
Maximum value of SAR (measured) = 0.701 mW/g

SCN/88727J02A/032: Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

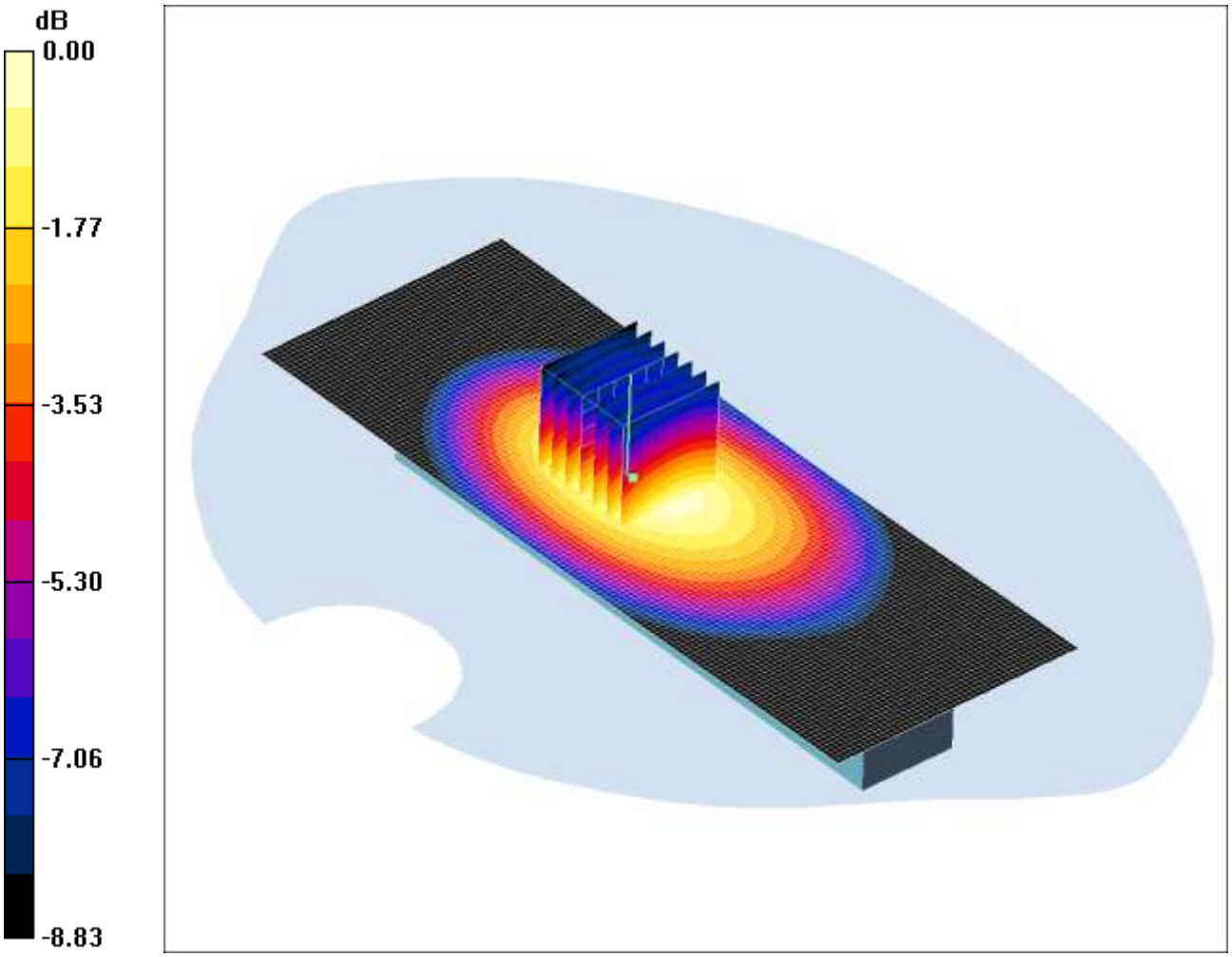


0 dB = 0.751mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side A Horizontal Up of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.756 mW/g
Side A Horizontal Up of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.2 V/m; Power Drift = -0.118 dB
Peak SAR (extrapolated) = 0.989 W/kg
SAR(1 g) = 0.712 mW/g; SAR(10 g) = 0.510 mW/g
Maximum value of SAR (measured) = 0.751 mW/g

SCN/88727J02A/033: Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

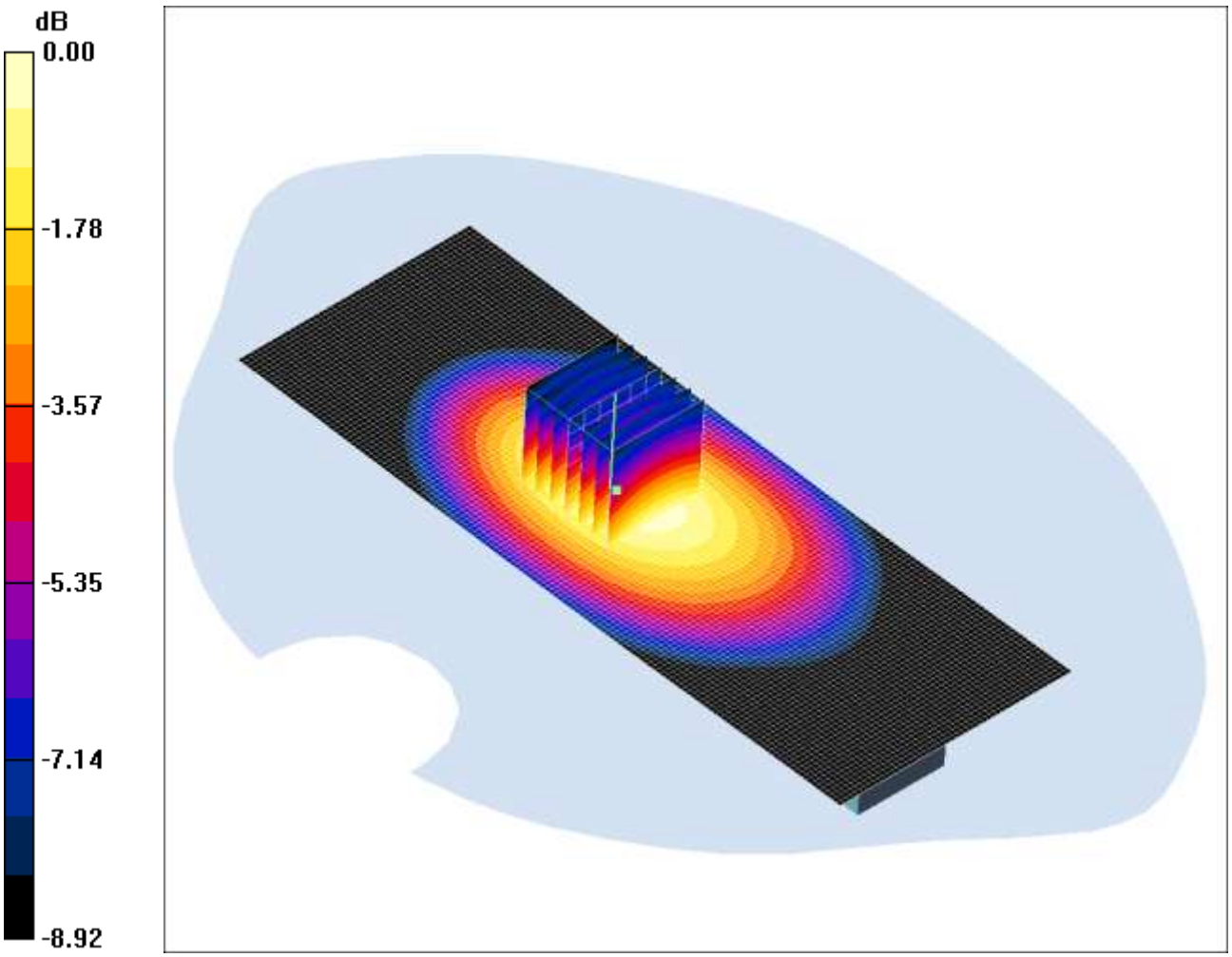


0 dB = 0.703mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side A Horizontal Up of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.715 mW/g
Side A Horizontal Up of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.9 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.895 W/kg
SAR(1 g) = 0.666 mW/g; SAR(10 g) = 0.476 mW/g
Maximum value of SAR (measured) = 0.703 mW/g

SCN/88727J02A/034: Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

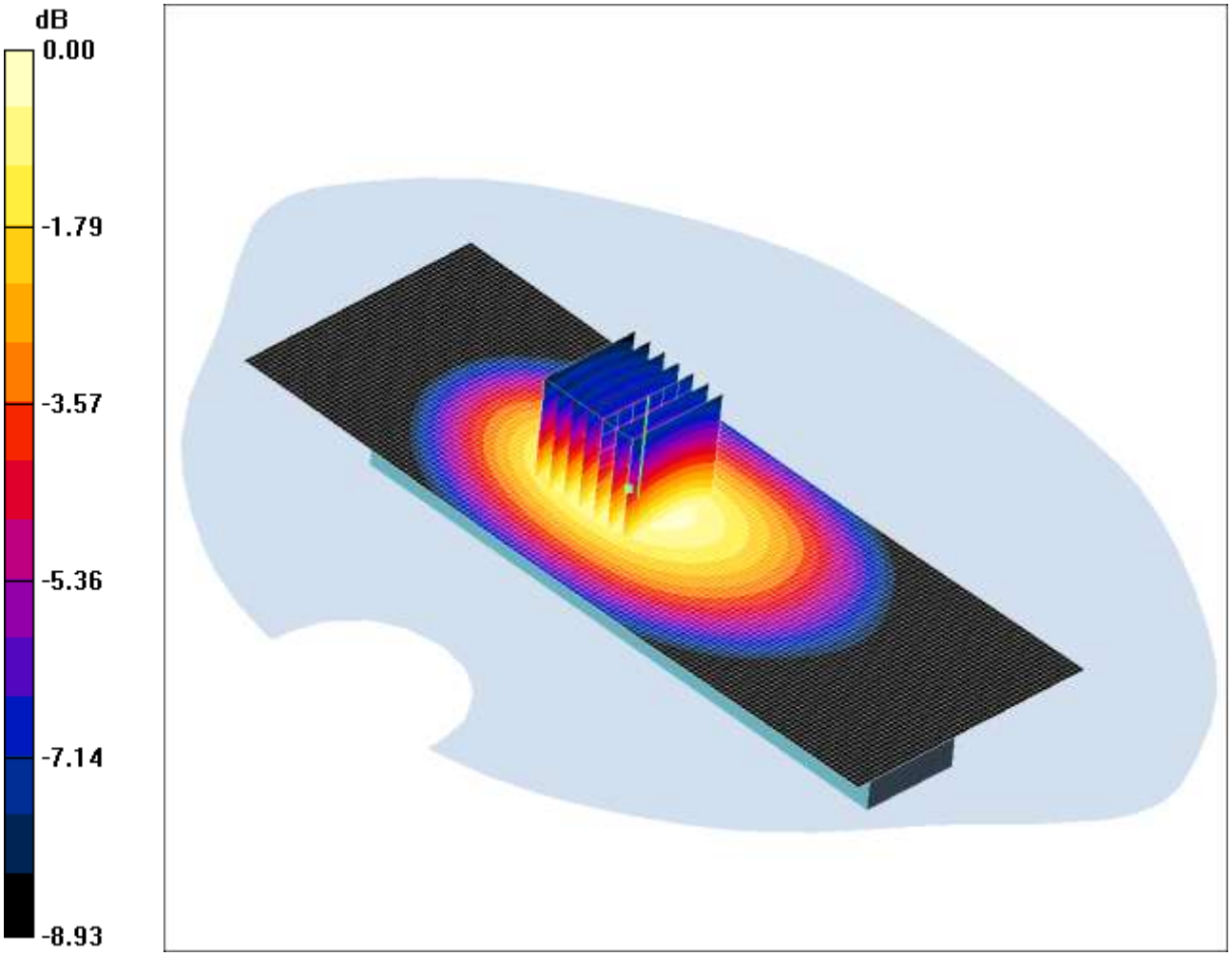


0 dB = 0.737mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side A Horizontal Up of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.742 mW/g
Side A Horizontal Up of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.7 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.936 W/kg
SAR(1 g) = 0.696 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 0.737 mW/g

SCN/88727J02A/035: Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

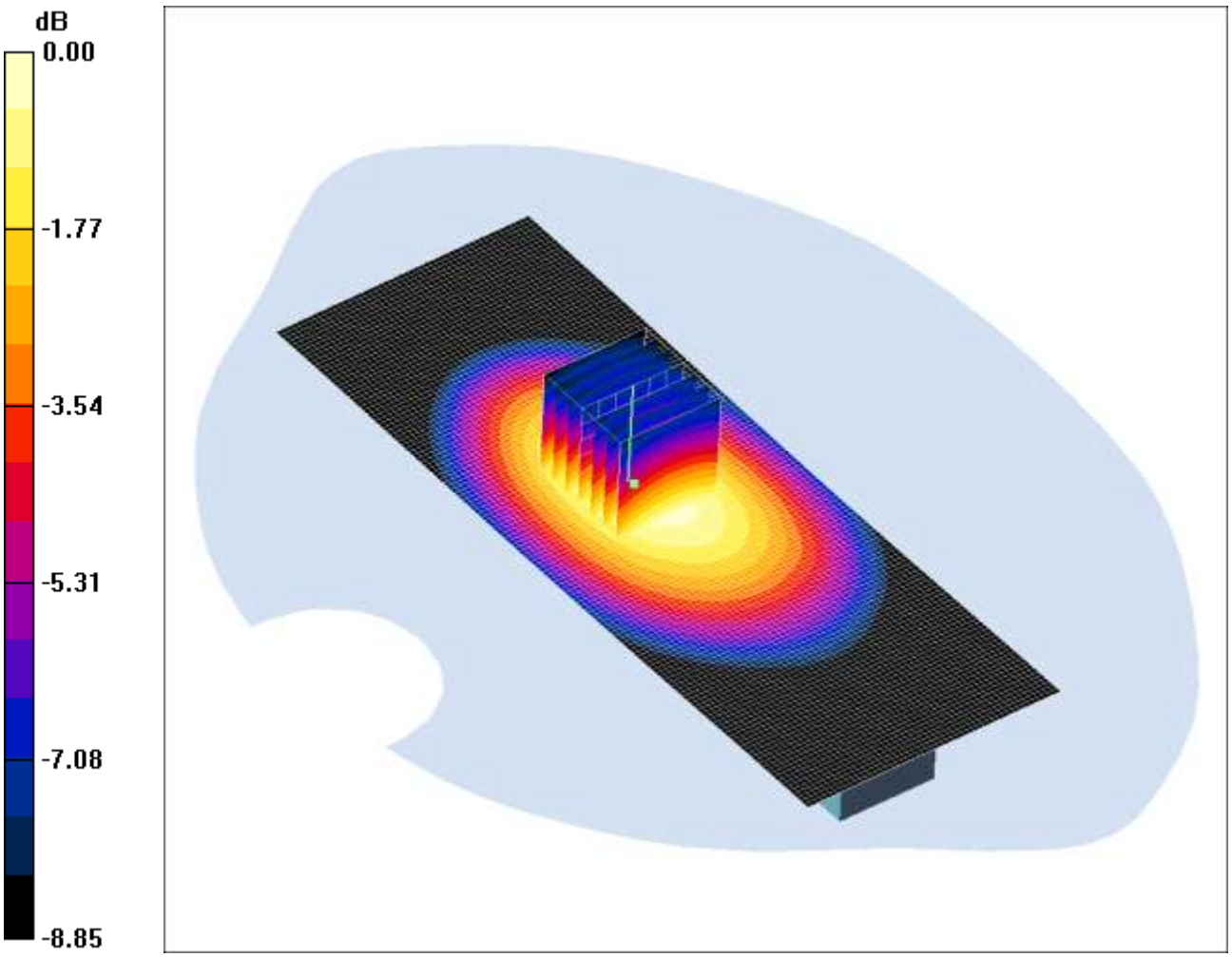


0 dB = 0.741mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side A Horizontal Up of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.747 mW/g
Side A Horizontal Up of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.8 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 0.939 W/kg
SAR(1 g) = 0.699 mW/g; SAR(10 g) = 0.501 mW/g
Maximum value of SAR (measured) = 0.741 mW/g

SCN/88727J02A/036: Side A Horizontal Up of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

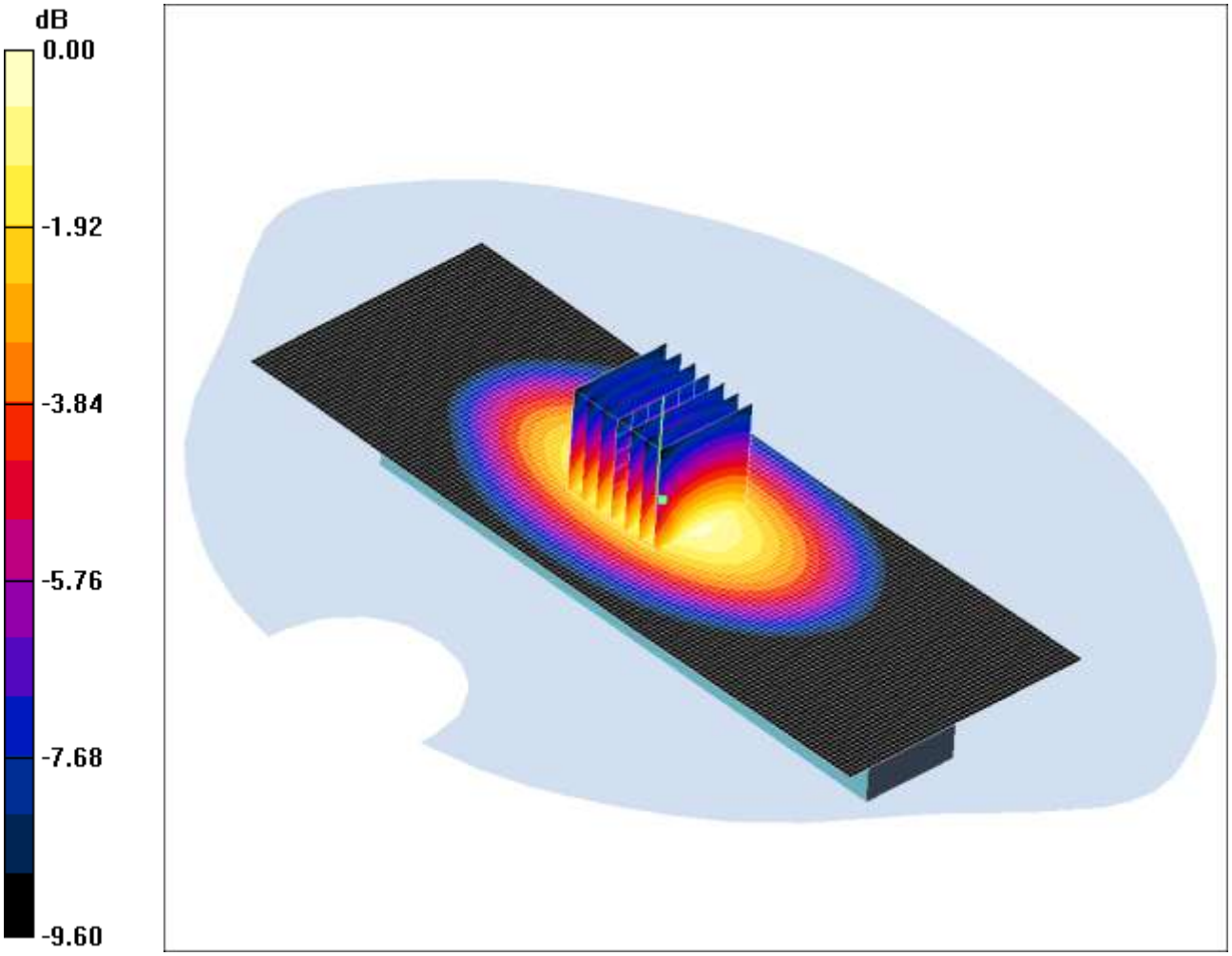


0 dB = 0.746mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side A Horizontal Up of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.747 mW/g
Side A Horizontal Up of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 0.939 W/kg
SAR(1 g) = 0.701 mW/g; SAR(10 g) = 0.502 mW/g
Maximum value of SAR (measured) = 0.746 mW/g

SCN/88727J02A/037: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

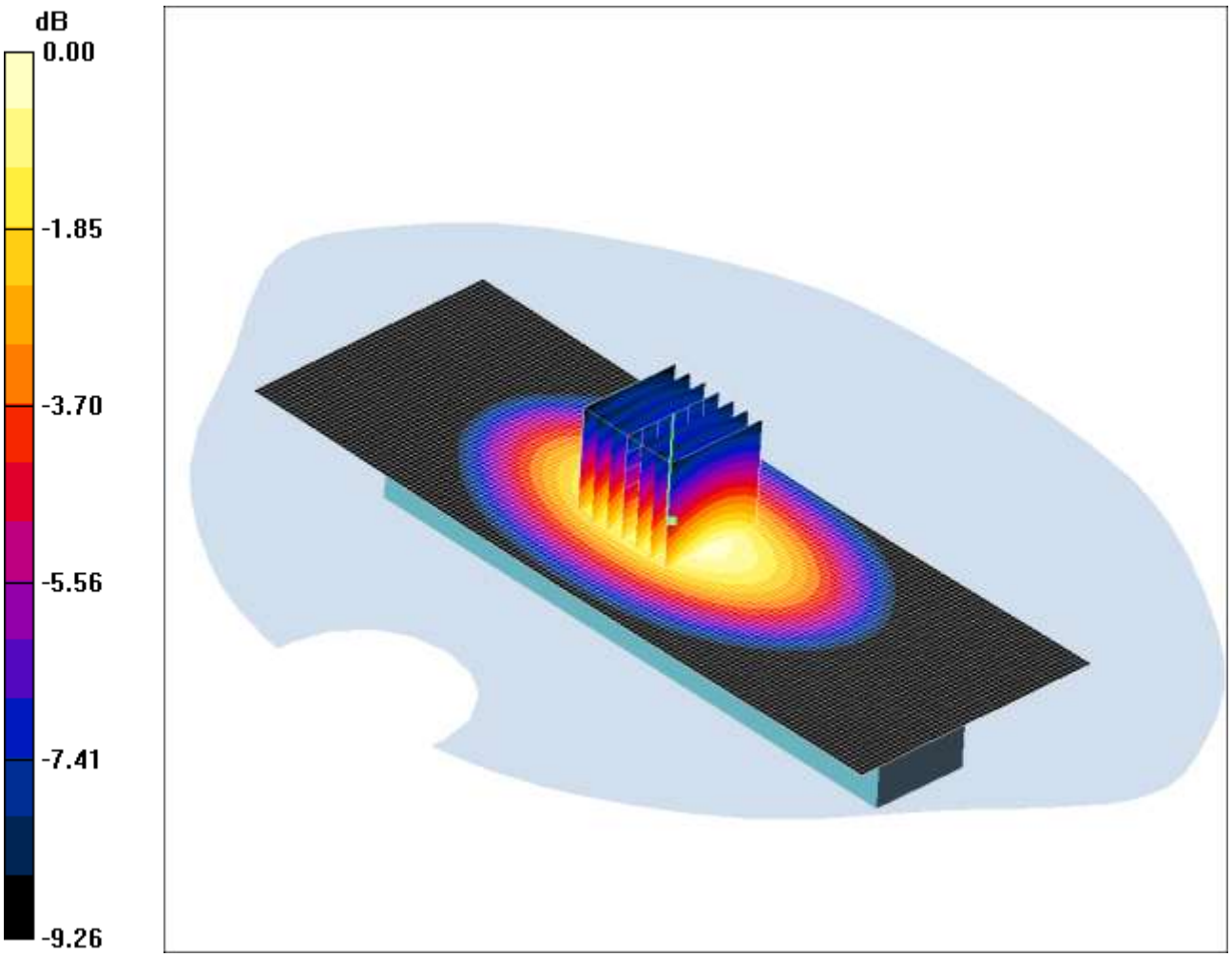


0 dB = 1.11mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.09 mW/g
Side B Horizontal Down of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 33.7 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.719 mW/g
Maximum value of SAR (measured) = 1.11 mW/g

SCN/88727J02A/038: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23035
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

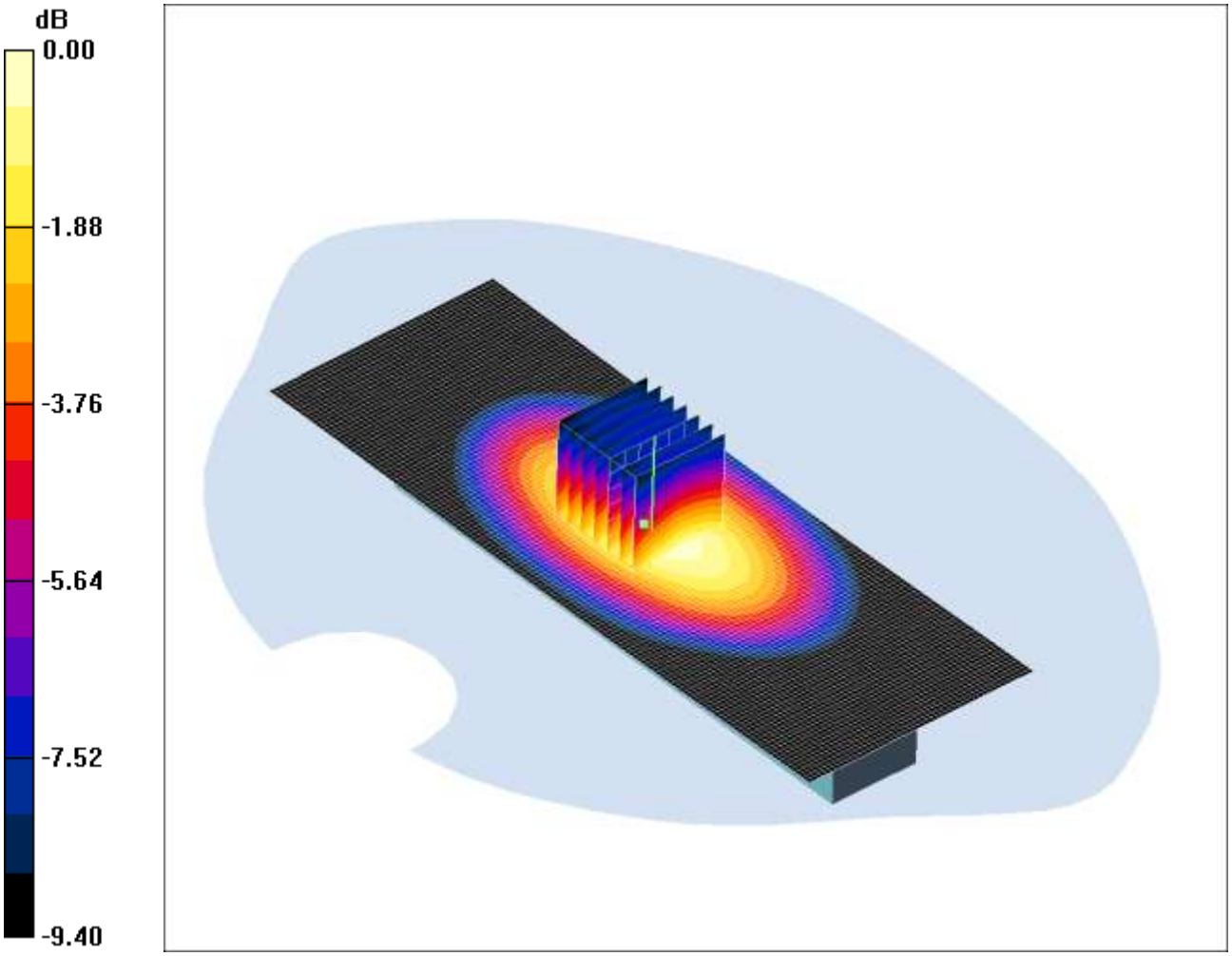


0 dB = 1.01mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.01 mW/g
Side B Horizontal Down of EUT Facing Phantom - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.8 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.948 mW/g; SAR(10 g) = 0.657 mW/g
Maximum value of SAR (measured) = 1.01 mW/g

SCN/88727J02A/039: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23155
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

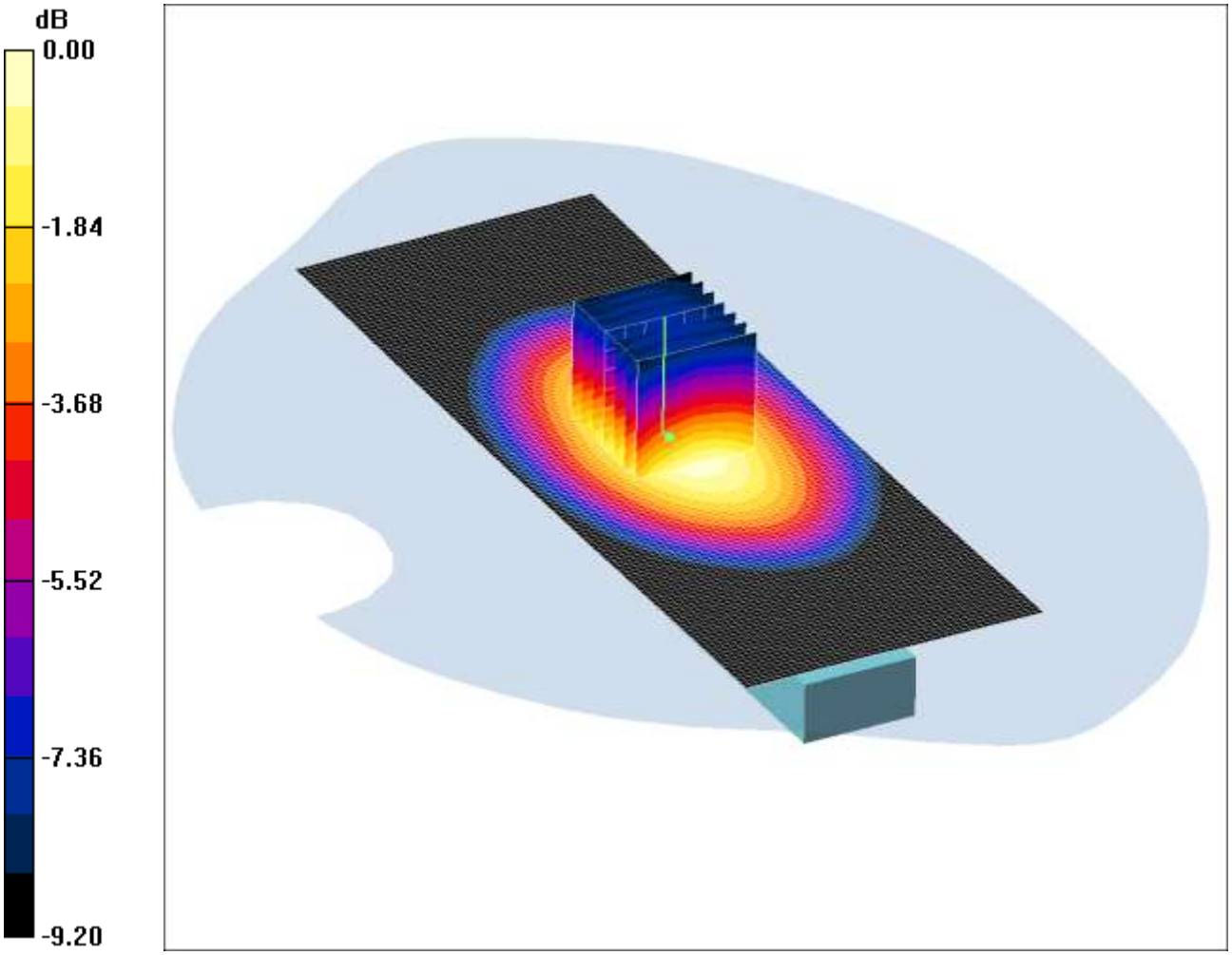


0 dB = 1.00mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.994 mW/g
Side B Horizontal Down of EUT Facing Phantom - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.7 V/m; Power Drift = -0.091 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.931 mW/g; SAR(10 g) = 0.644 mW/g
Maximum value of SAR (measured) = 1.00 mW/g

SCN/88727J02A/040: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

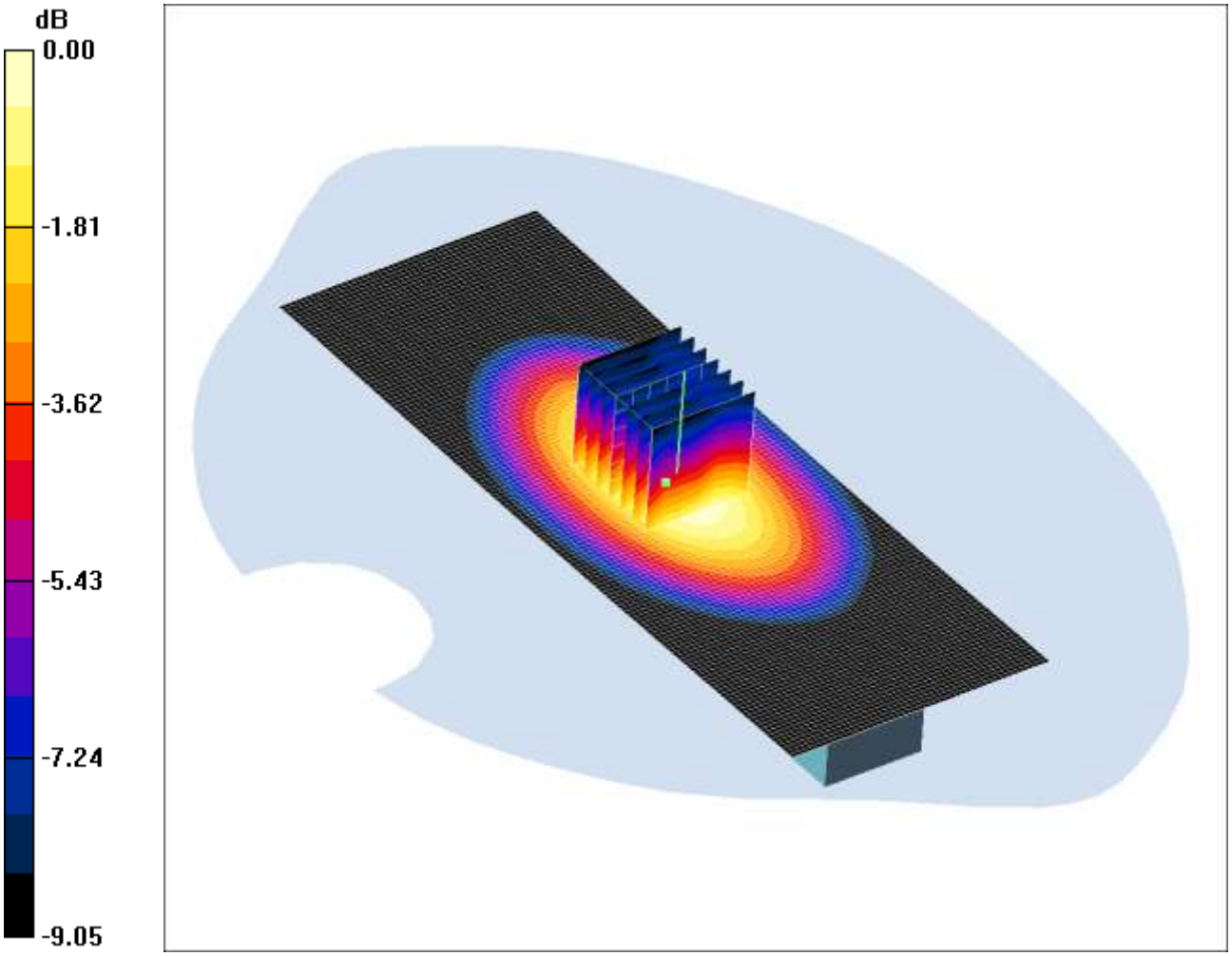


0 dB = 0.847mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.853 mW/g
Side B Horizontal Down of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.1 V/m; Power Drift = -0.061 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.796 mW/g; SAR(10 g) = 0.551 mW/g
Maximum value of SAR (measured) = 0.847 mW/g

SCN/88727J02A/041: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

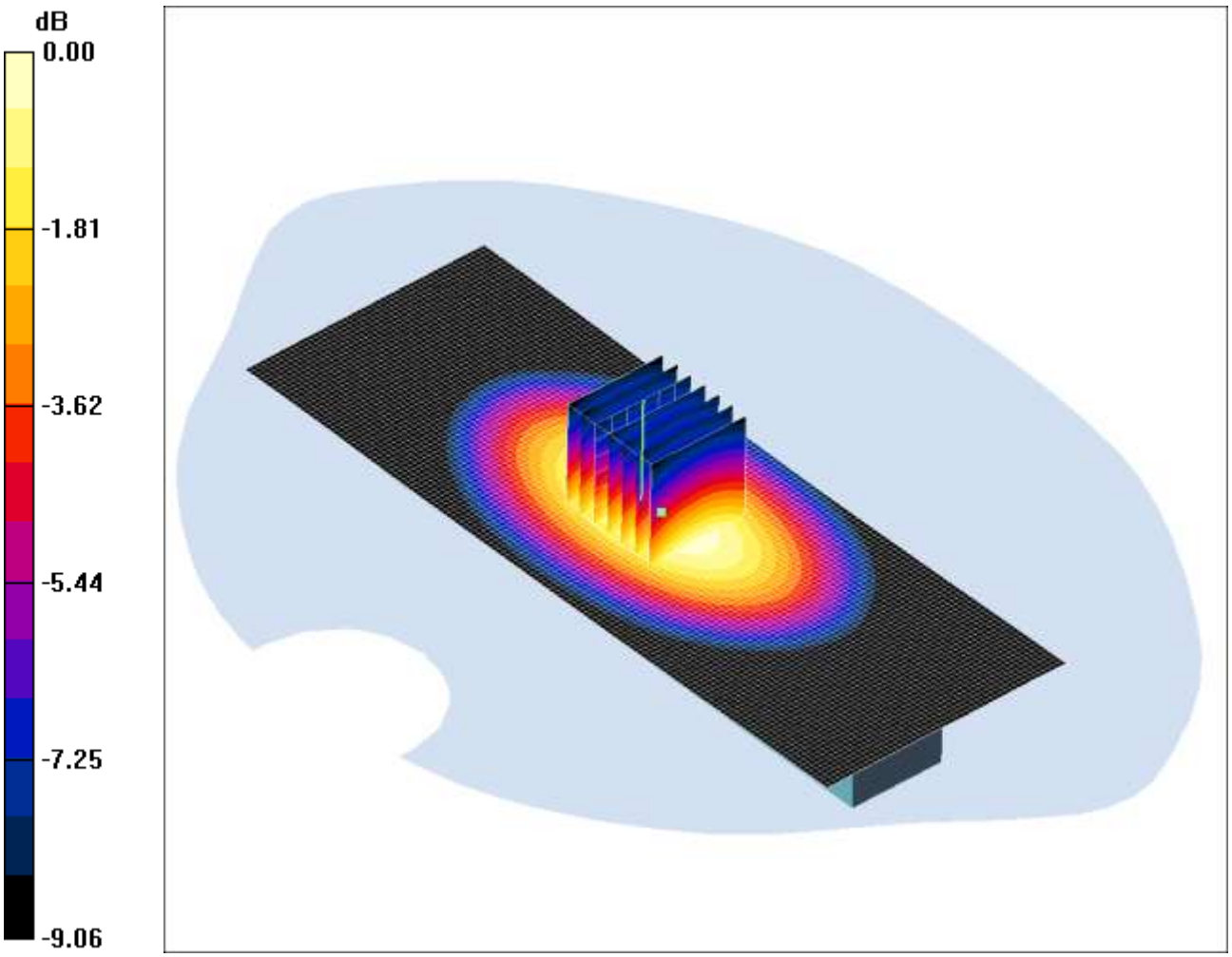


0 dB = 0.930mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.971 mW/g
Side B Horizontal Down of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.6 V/m; Power Drift = 0.079 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.843 mW/g; SAR(10 g) = 0.583 mW/g
Maximum value of SAR (measured) = 0.930 mW/g

SCN/88727J02A/042: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

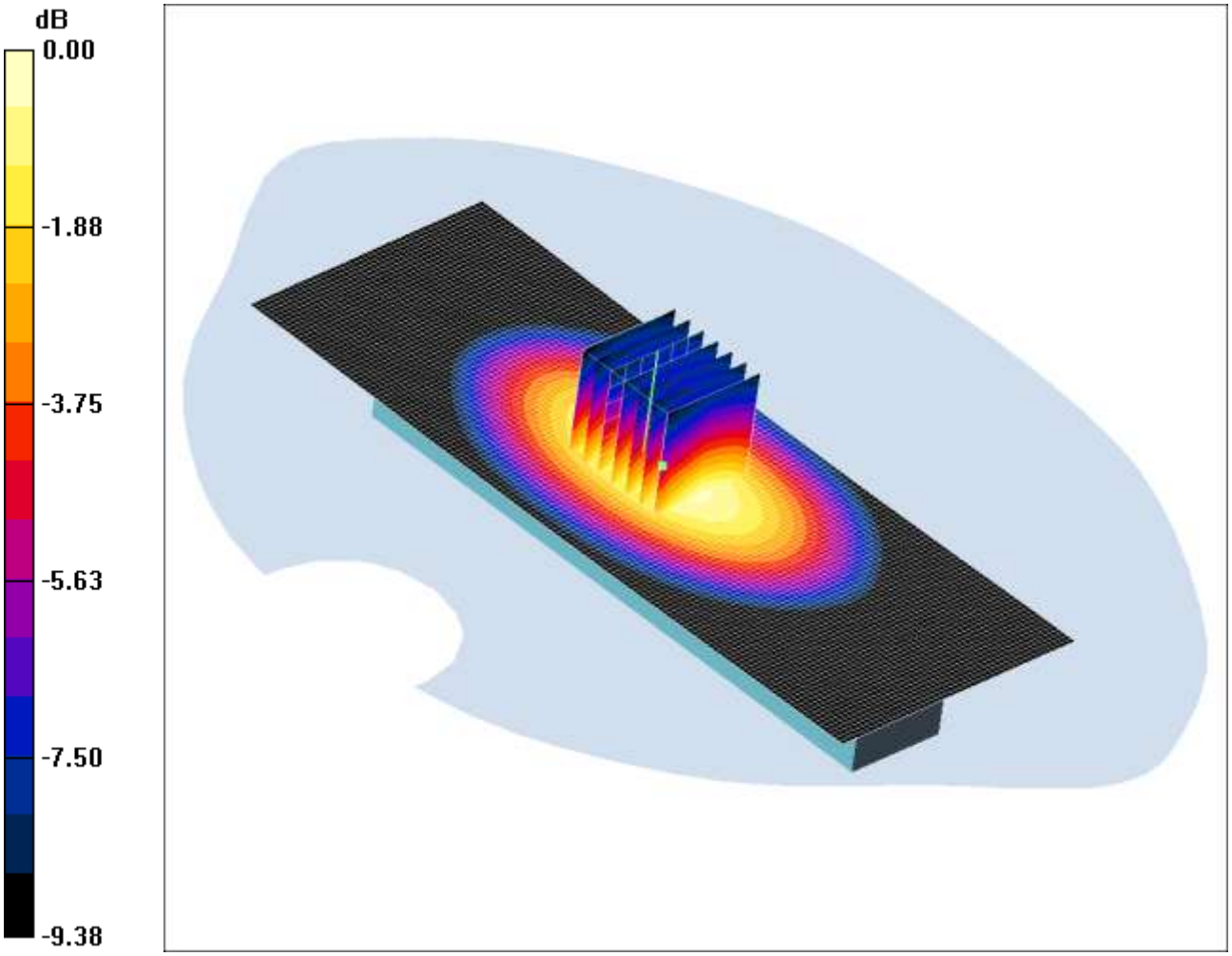


0 dB = 0.959mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.990 mW/g
Side B Horizontal Down of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.9 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.901 mW/g; SAR(10 g) = 0.627 mW/g
Maximum value of SAR (measured) = 0.959 mW/g

SCN/88727J02A/043: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23035
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

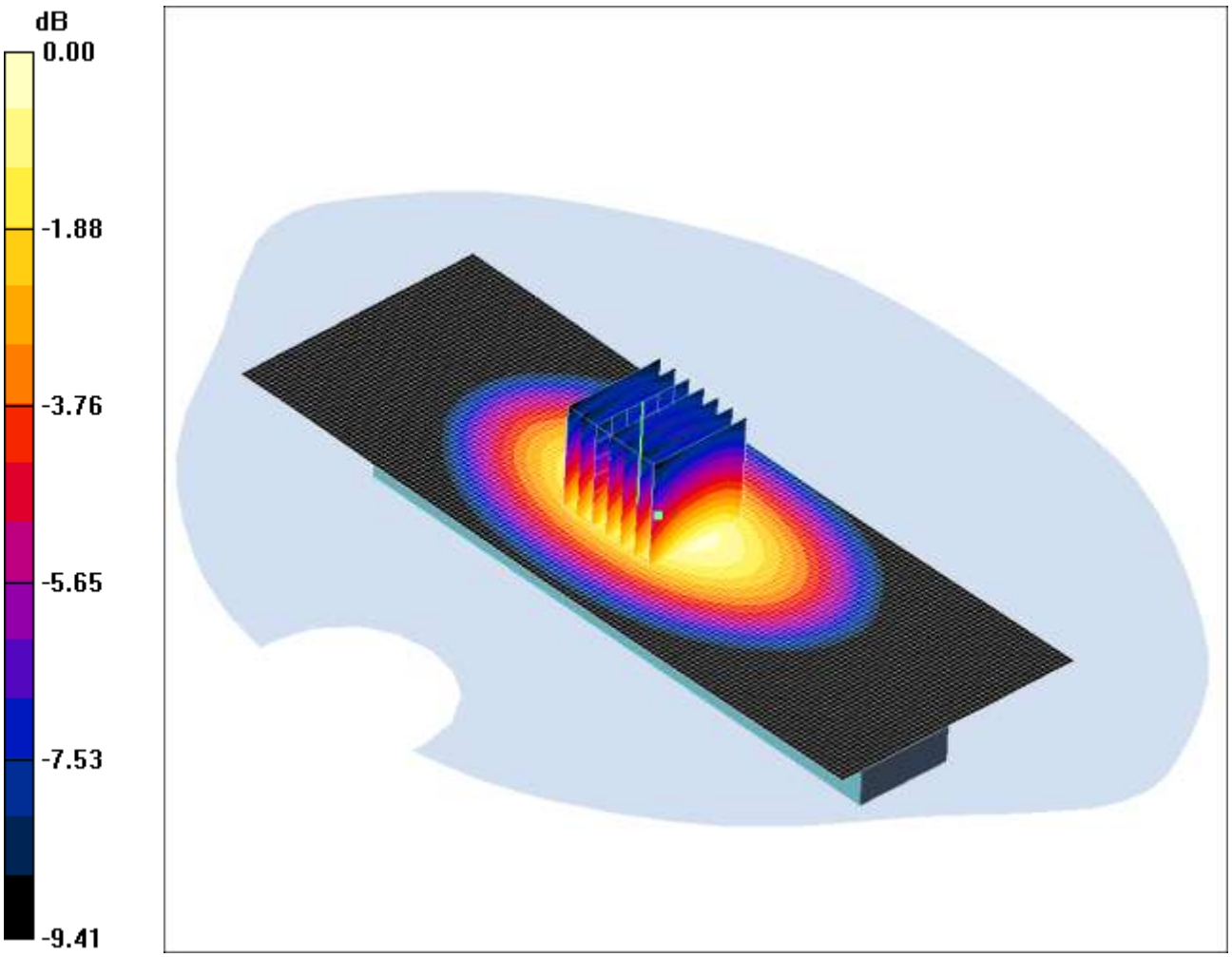


0 dB = 1.09mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g
Side B Horizontal Down of EUT Facing Phantom - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 33.5 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.698 mW/g
Maximum value of SAR (measured) = 1.09 mW/g

SCN/88727J02A/044: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23155
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

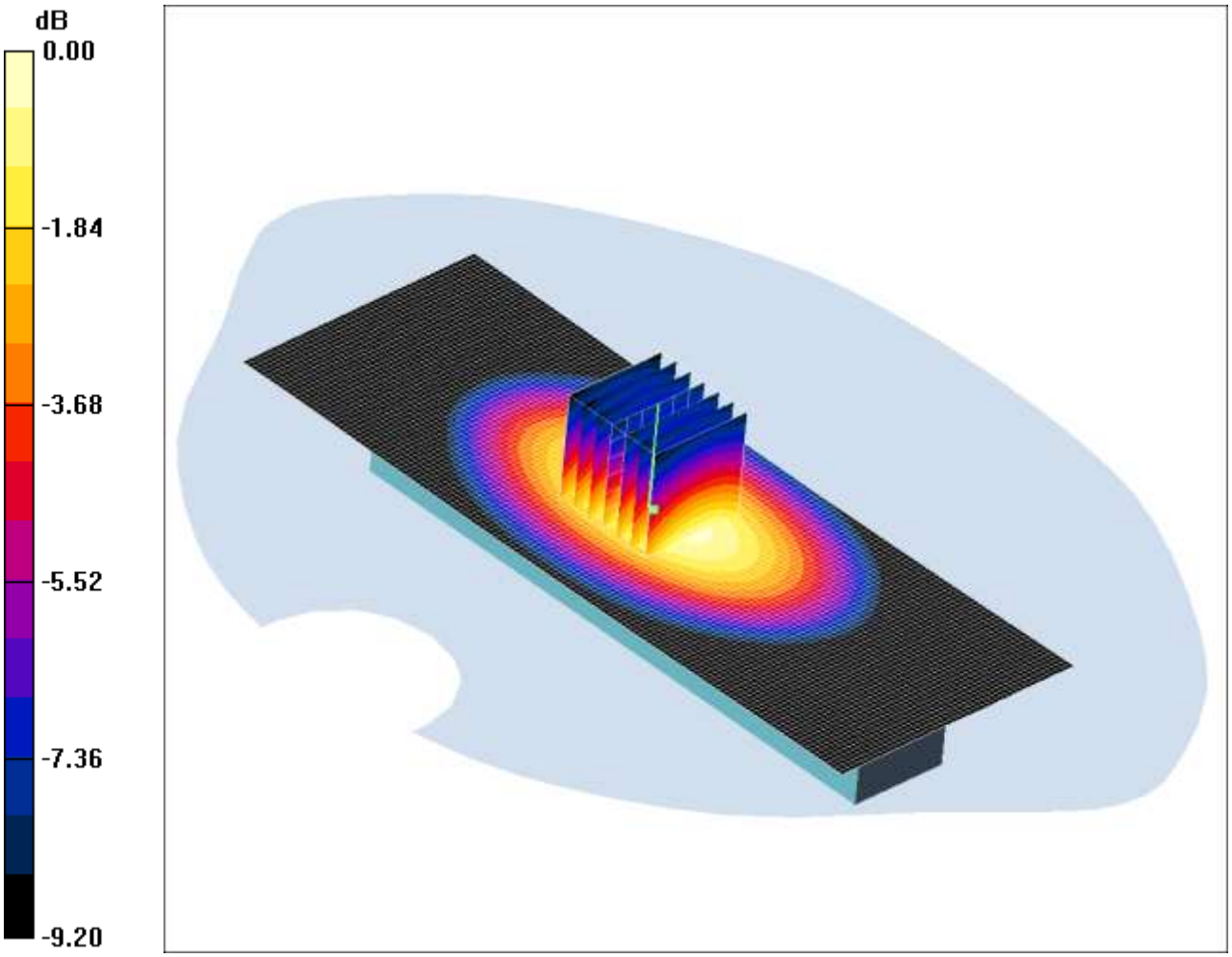


0 dB = 1.02mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.02 mW/g
Side B Horizontal Down of EUT Facing Phantom - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 32.6 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 0.962 mW/g; SAR(10 g) = 0.663 mW/g
Maximum value of SAR (measured) = 1.02 mW/g

SCN/88727J02A/045: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23035
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

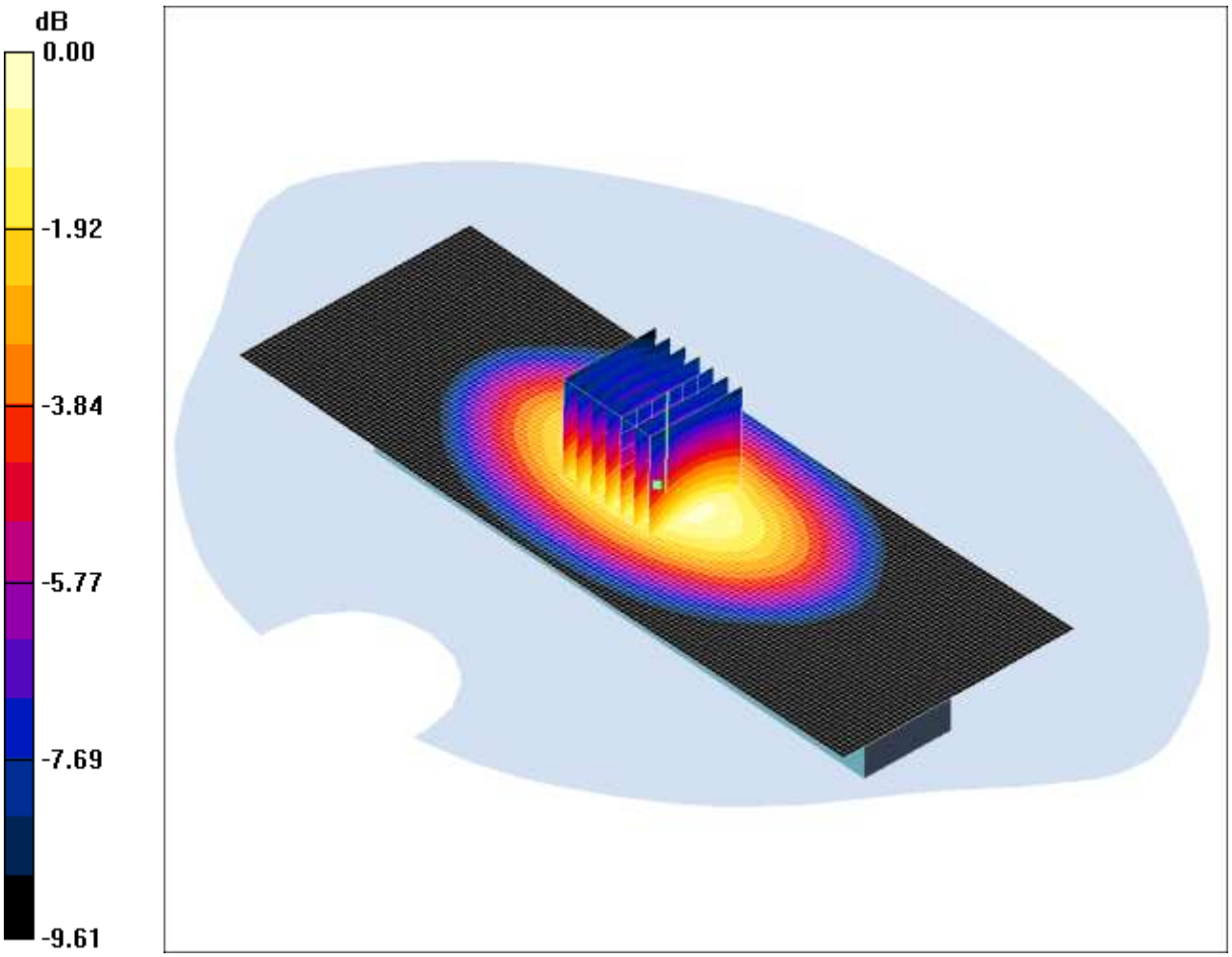


0 dB = 0.886mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.859 mW/g
Side B Horizontal Down of EUT Facing Phantom - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.9 V/m; Power Drift = 0.104 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.833 mW/g; SAR(10 g) = 0.578 mW/g
Maximum value of SAR (measured) = 0.886 mW/g

SCN/88727J02A/046: Side B Horizontal Down of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23035
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

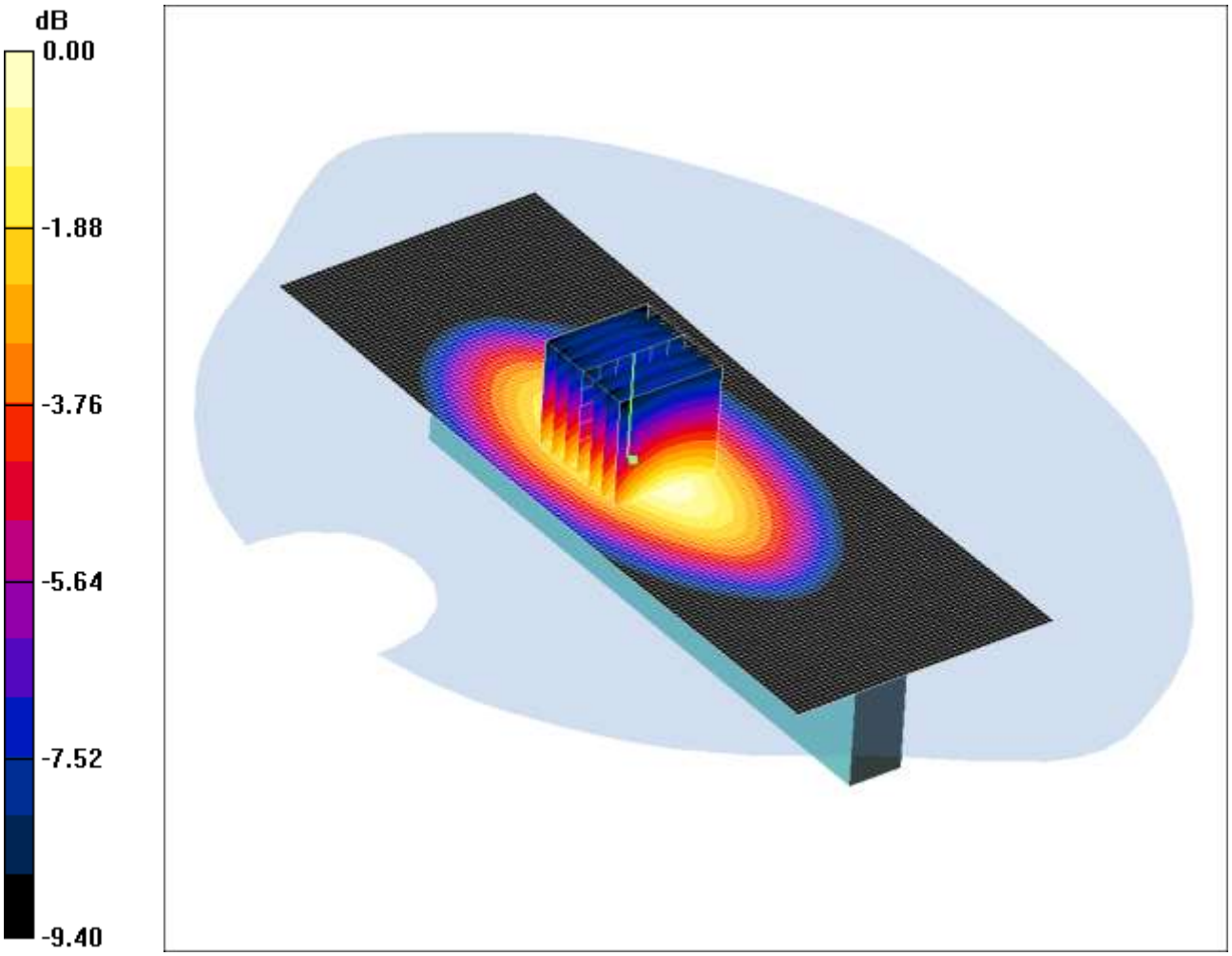


0 dB = 0.982mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side B Horizontal Down of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.984 mW/g
Side B Horizontal Down of EUT Facing Phantom - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 31.1 V/m; Power Drift = 0.096 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.918 mW/g; SAR(10 g) = 0.635 mW/g
Maximum value of SAR (measured) = 0.982 mW/g

SCN/88727J02A/047: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

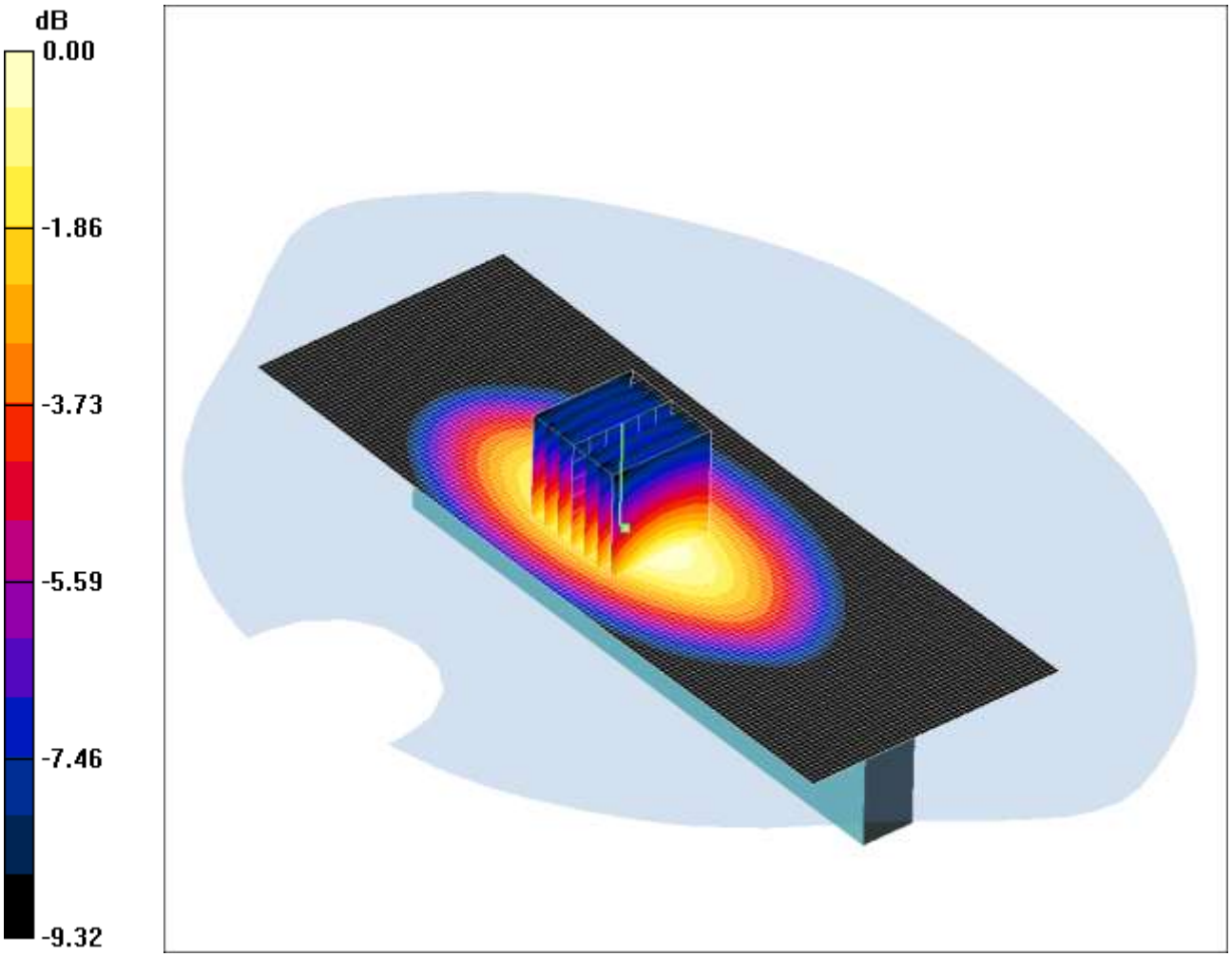


0 dB = 0.906mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.911 mW/g
Side C Vertical Front of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.9 V/m; Power Drift = -0.093 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.840 mW/g; SAR(10 g) = 0.571 mW/g
Maximum value of SAR (measured) = 0.906 mW/g

SCN/88727J02A/048: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

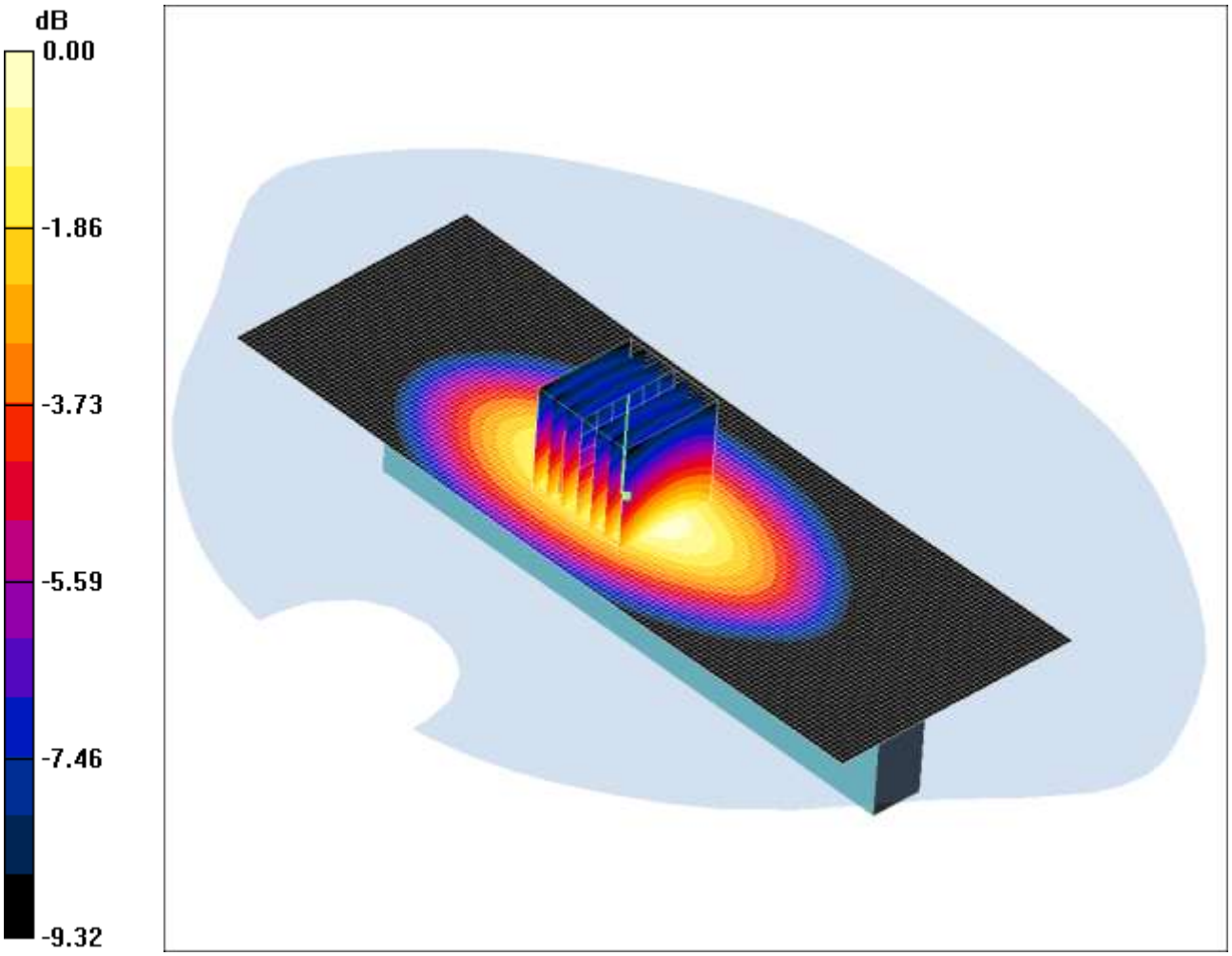


0 dB = 0.882mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.910 mW/g
Side C Vertical Front of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.2 V/m; Power Drift = 0.153 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.823 mW/g; SAR(10 g) = 0.563 mW/g
Maximum value of SAR (measured) = 0.882 mW/g

SCN/88727J02A/049: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23155
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

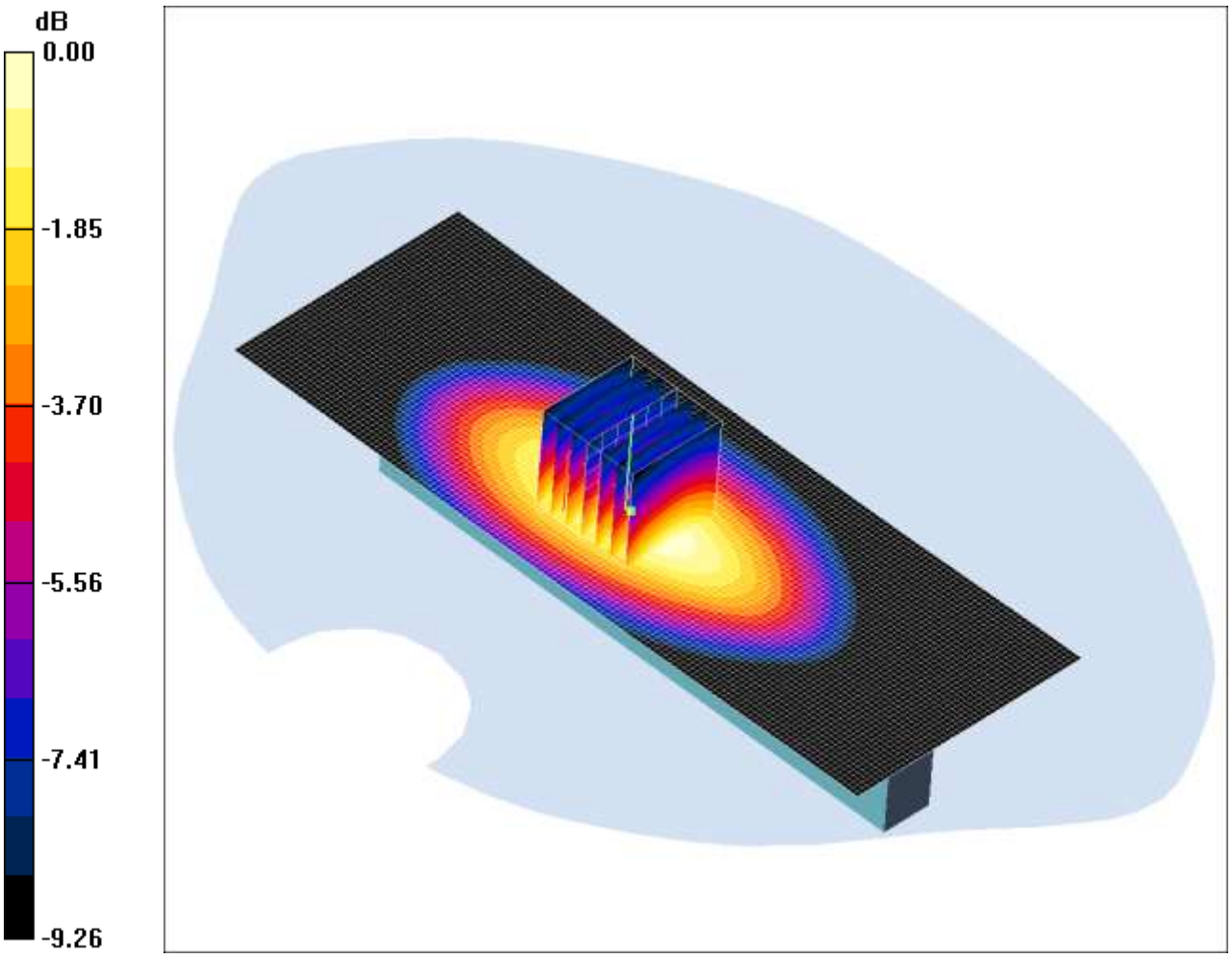


0 dB = 0.877mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.874 mW/g
Side C Vertical Front of EUT Facing Phantom - High/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.9 V/m; Power Drift = 0.106 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.814 mW/g; SAR(10 g) = 0.553 mW/g
Maximum value of SAR (measured) = 0.877 mW/g

SCN/88727J02A/050: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

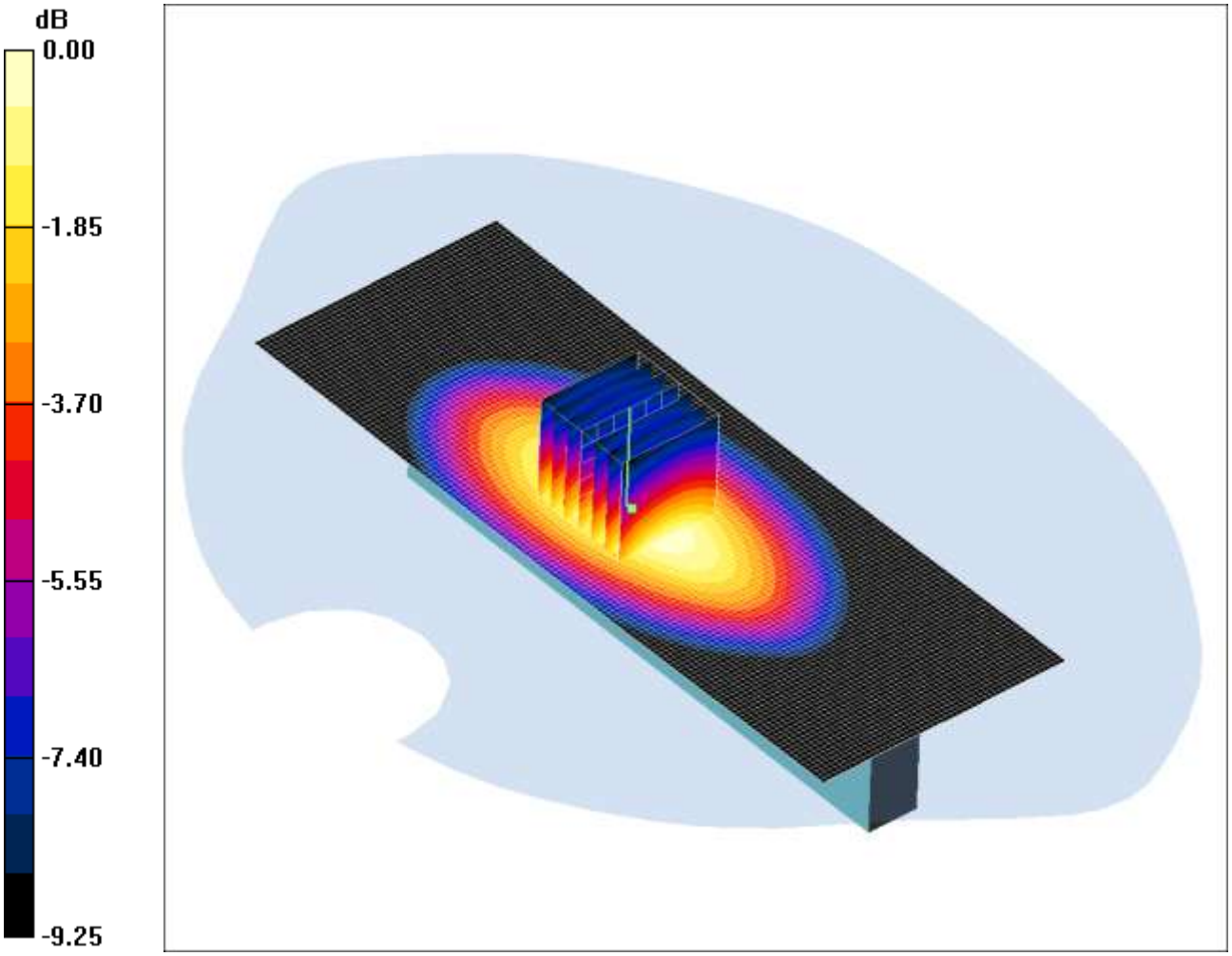


0 dB = 0.846mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.850 mW/g
Side C Vertical Front of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.8 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.789 mW/g; SAR(10 g) = 0.543 mW/g
Maximum value of SAR (measured) = 0.846 mW/g

SCN/88727J02A/051: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

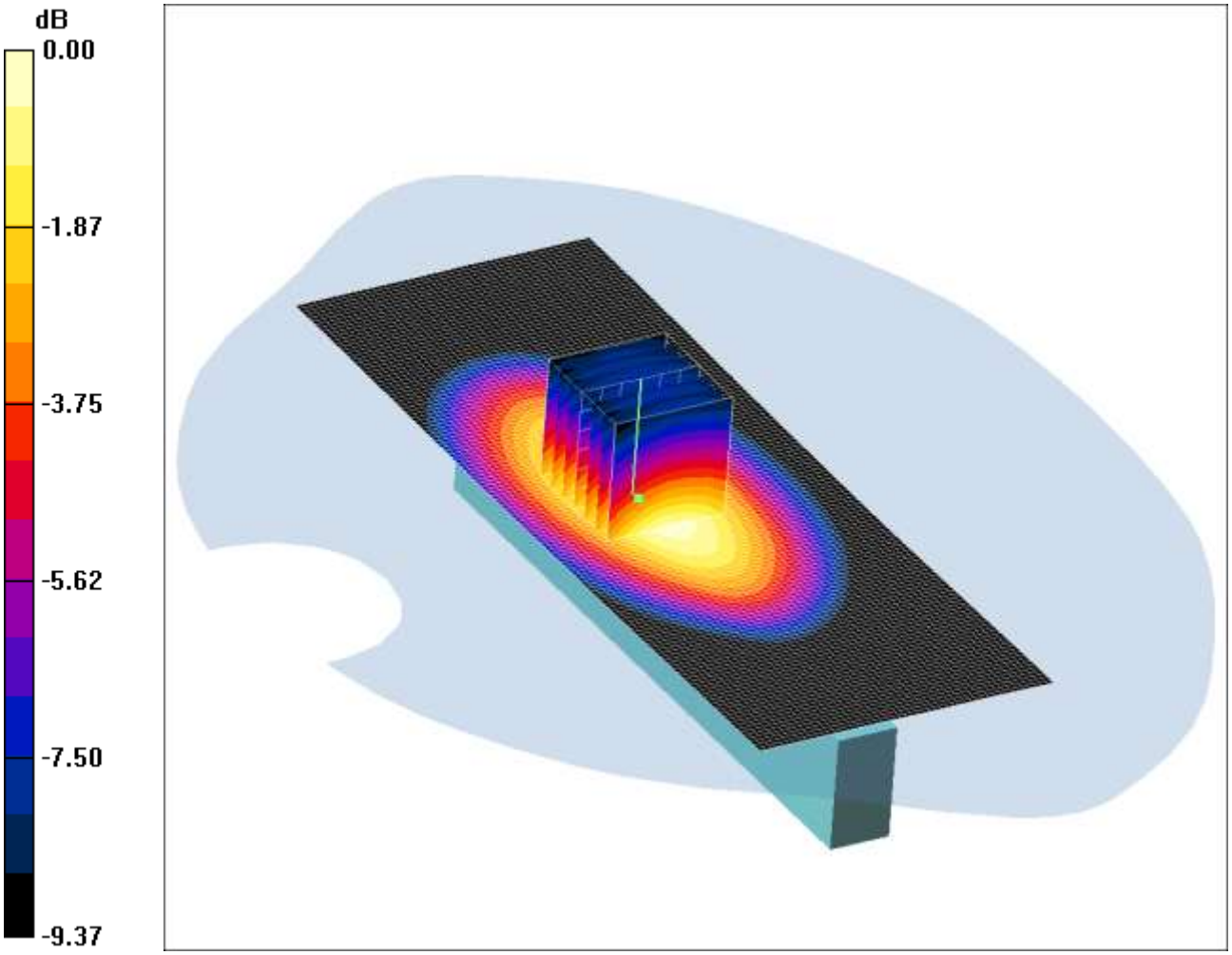


0 dB = 0.837mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.850 mW/g
Side C Vertical Front of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.5 V/m; Power Drift = 0.069 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.780 mW/g; SAR(10 g) = 0.536 mW/g
Maximum value of SAR (measured) = 0.837 mW/g

SCN/88727J02A/052: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

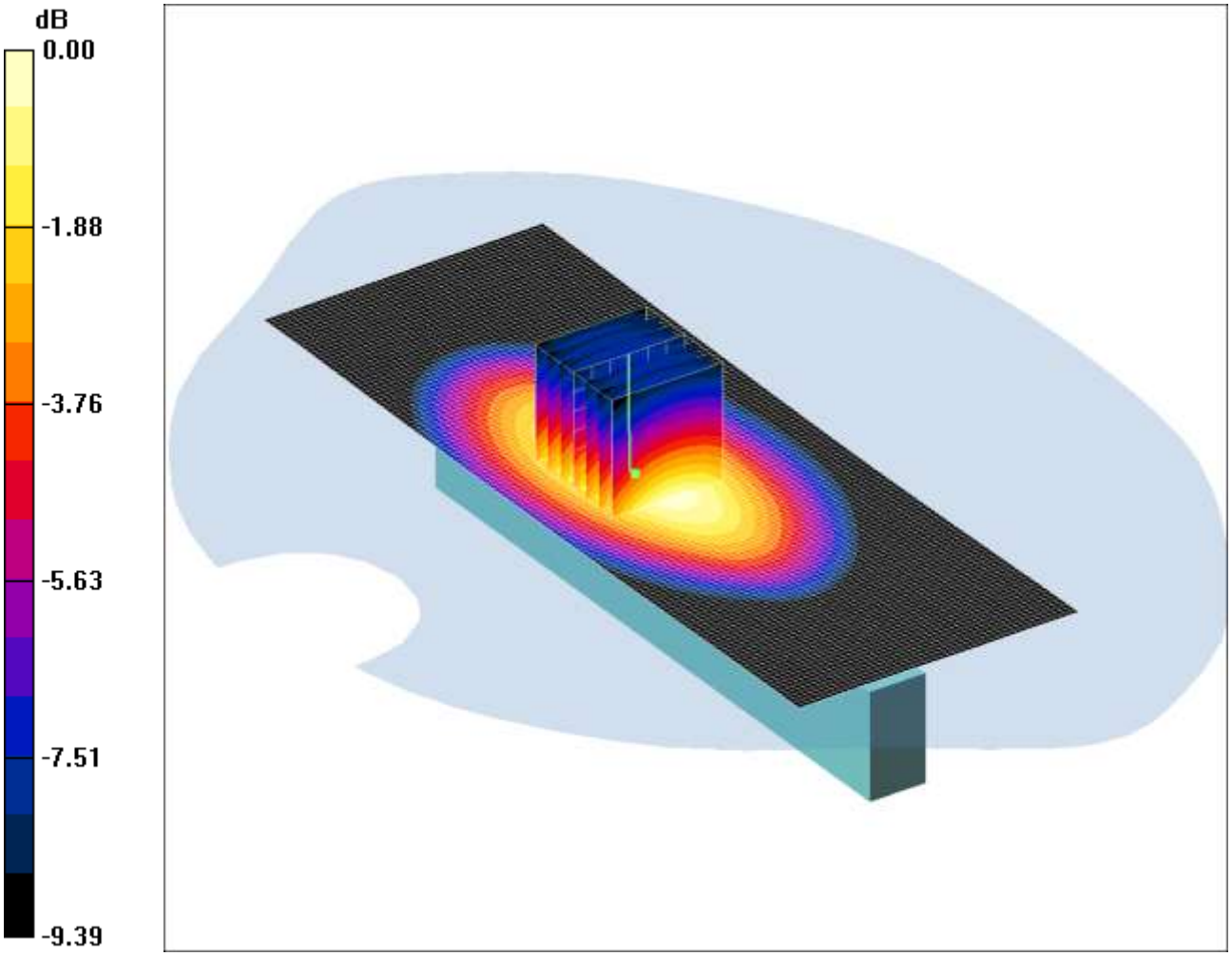


0 dB = 0.890mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - Middle 2/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.884 mW/g
Side C Vertical Front of EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.1 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.830 mW/g; SAR(10 g) = 0.567 mW/g
Maximum value of SAR (measured) = 0.890 mW/g

SCN/88727J02A/053: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

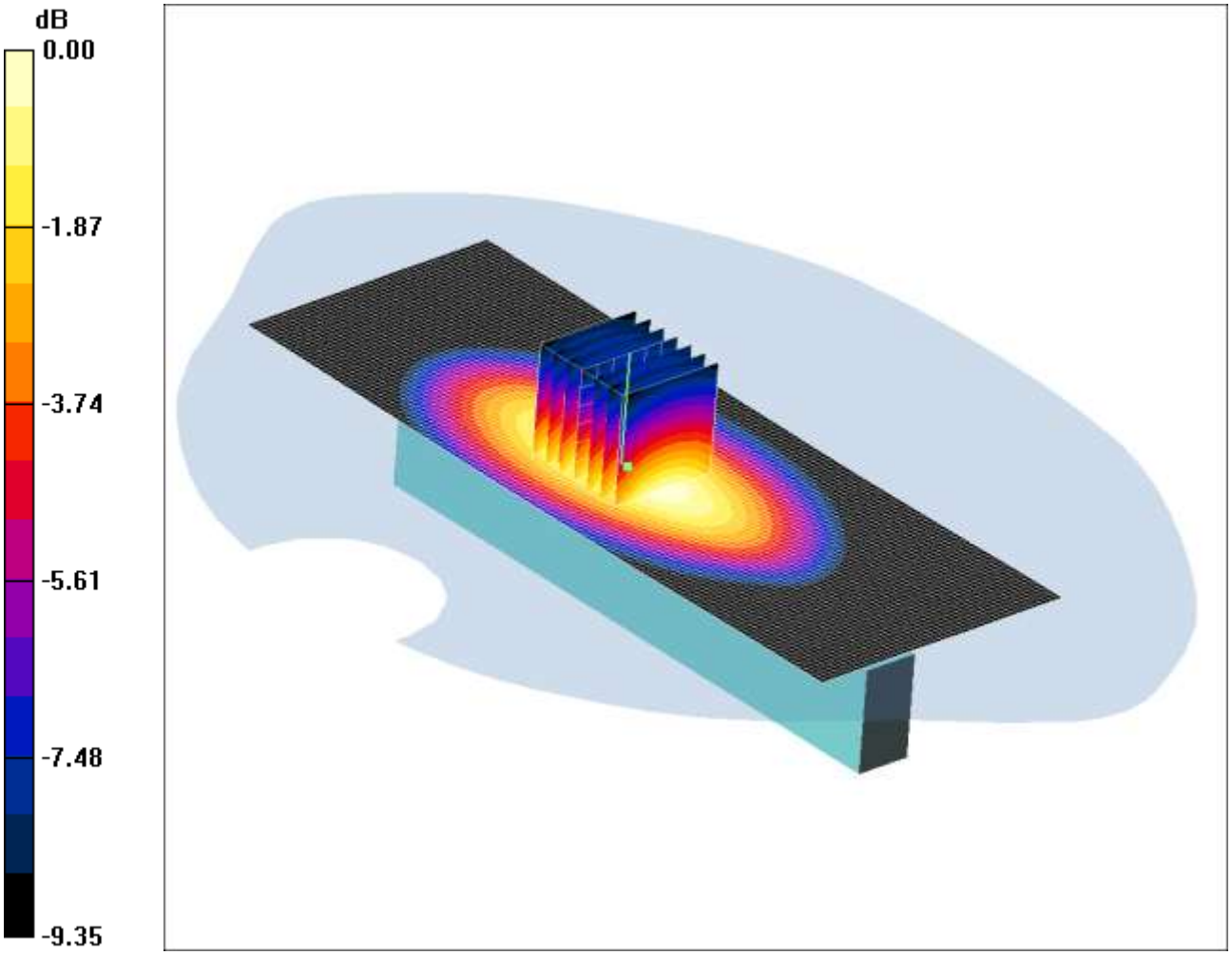


0 dB = 0.898mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.898 mW/g
Side C Vertical Front of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.0 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.839 mW/g; SAR(10 g) = 0.573 mW/g
Maximum value of SAR (measured) = 0.898 mW/g

SCN/88727J02A/054: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23155
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

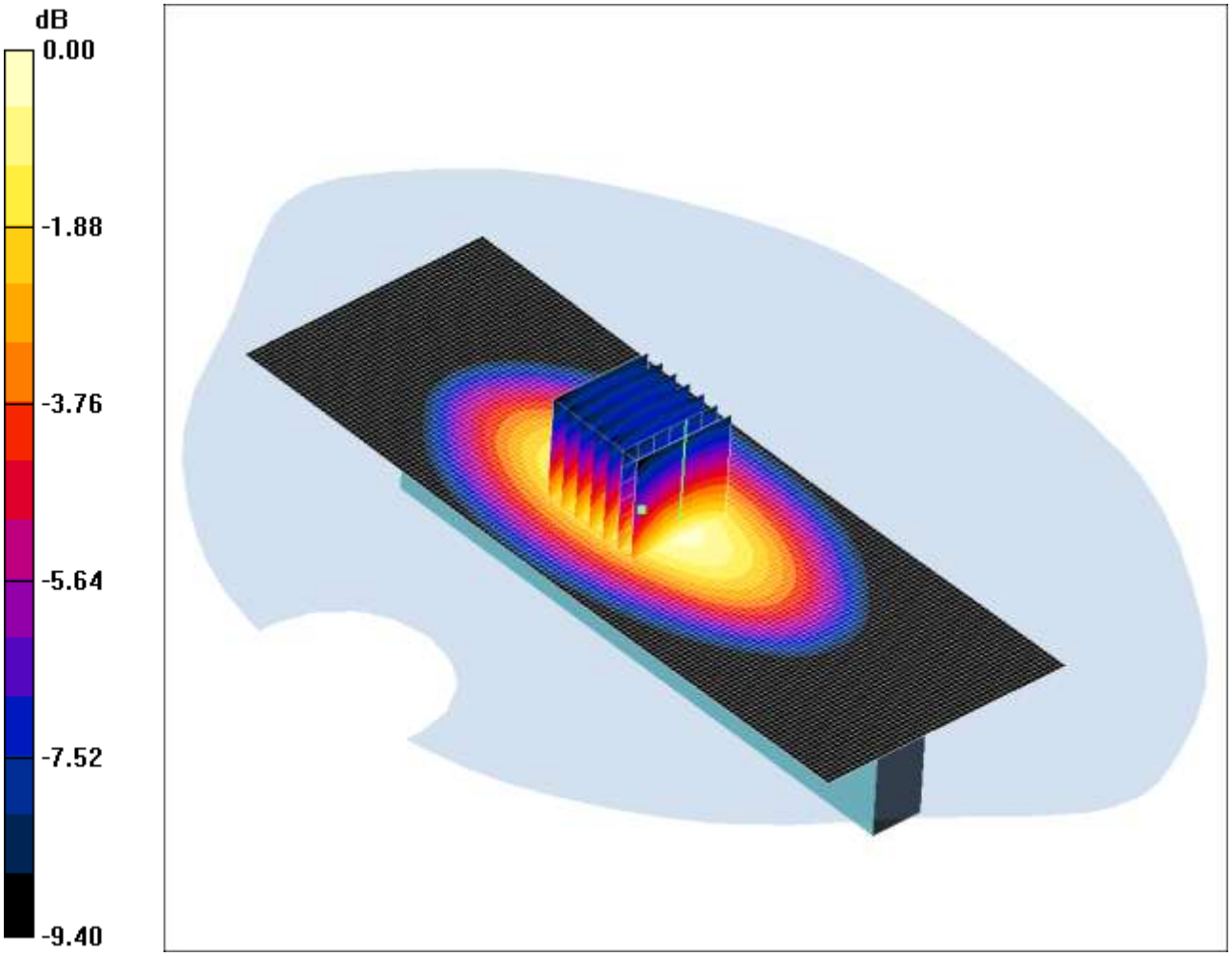


0 dB = 0.931mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.935 mW/g
Side C Vertical Front of EUT Facing Phantom - High/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.4 V/m; Power Drift = -0.058 dB
Peak SAR (extrapolated) = 1.23 W/kg
SAR(1 g) = 0.869 mW/g; SAR(10 g) = 0.592 mW/g
Maximum value of SAR (measured) = 0.931 mW/g

SCN/88727J02A/055: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23155
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

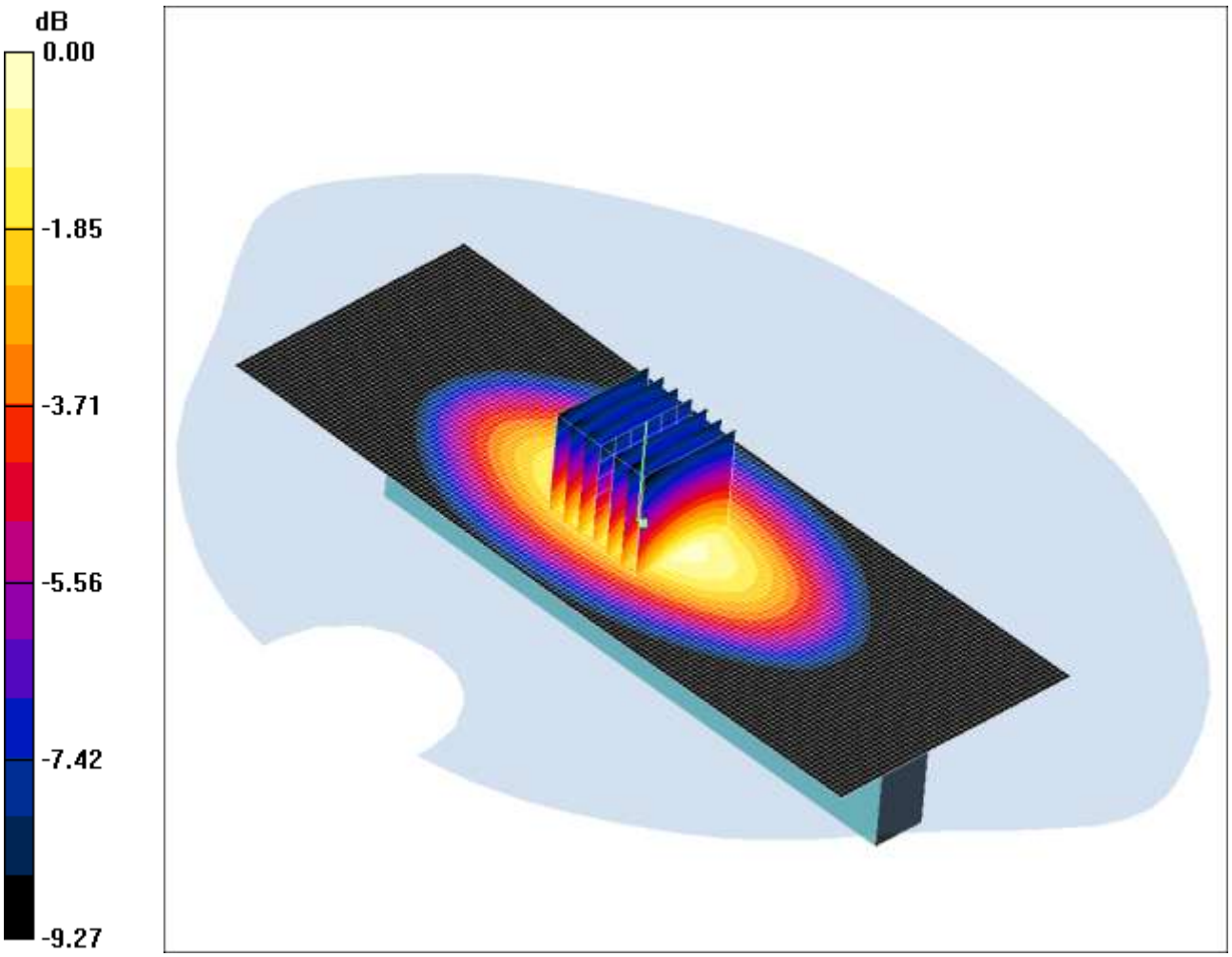


0 dB = 0.910mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.885 mW/g
Side C Vertical Front of EUT Facing Phantom - High/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.2 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.836 mW/g; SAR(10 g) = 0.574 mW/g
Maximum value of SAR (measured) = 0.910 mW/g

SCN/88727J02A/056: Side C Vertical Front of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23155
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

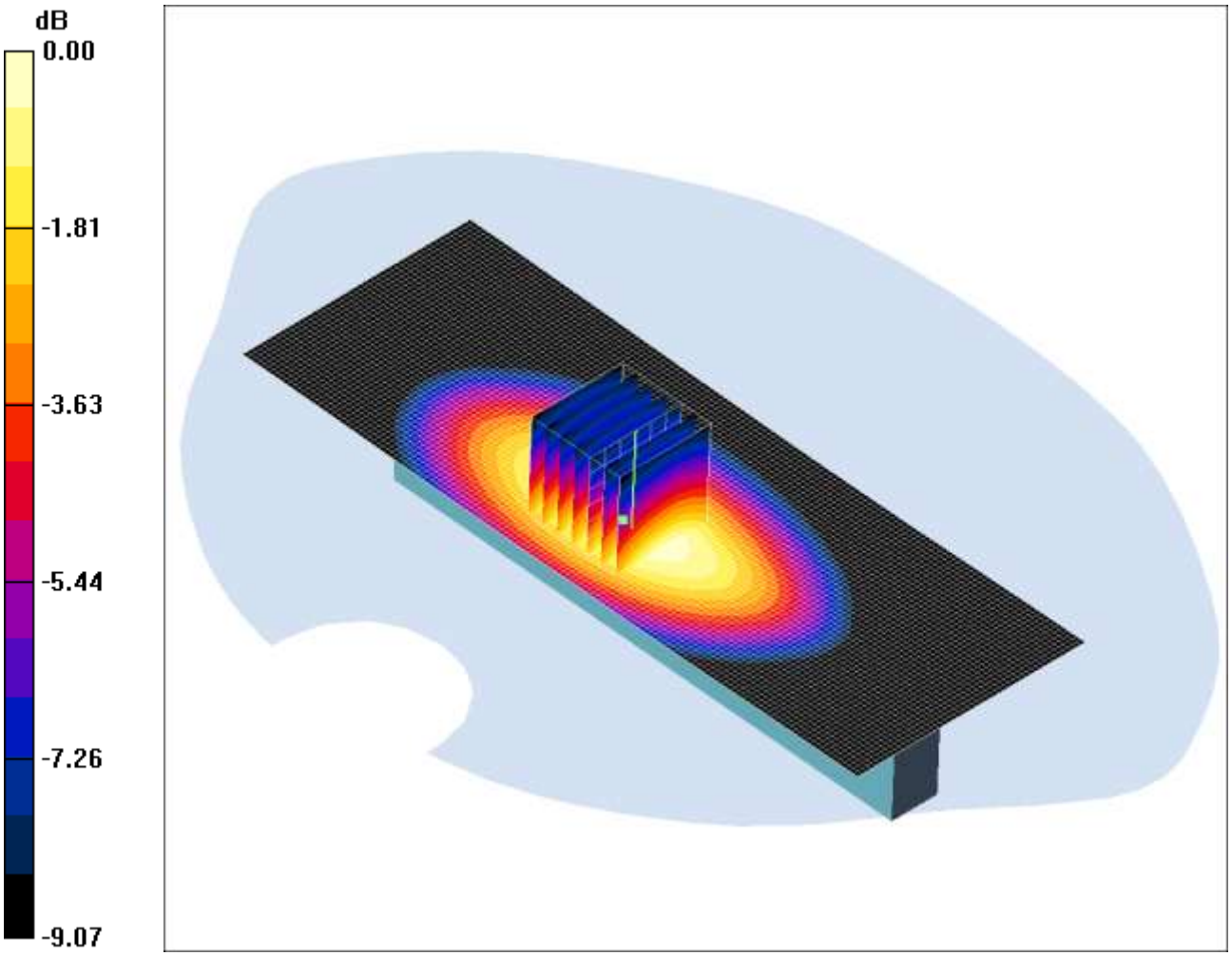


0 dB = 0.750mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side C Vertical Front of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.754 mW/g
Side C Vertical Front of EUT Facing Phantom - High/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.6 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 0.999 W/kg
SAR(1 g) = 0.700 mW/g; SAR(10 g) = 0.480 mW/g
Maximum value of SAR (measured) = 0.750 mW/g

SCN/88727J02A/057: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

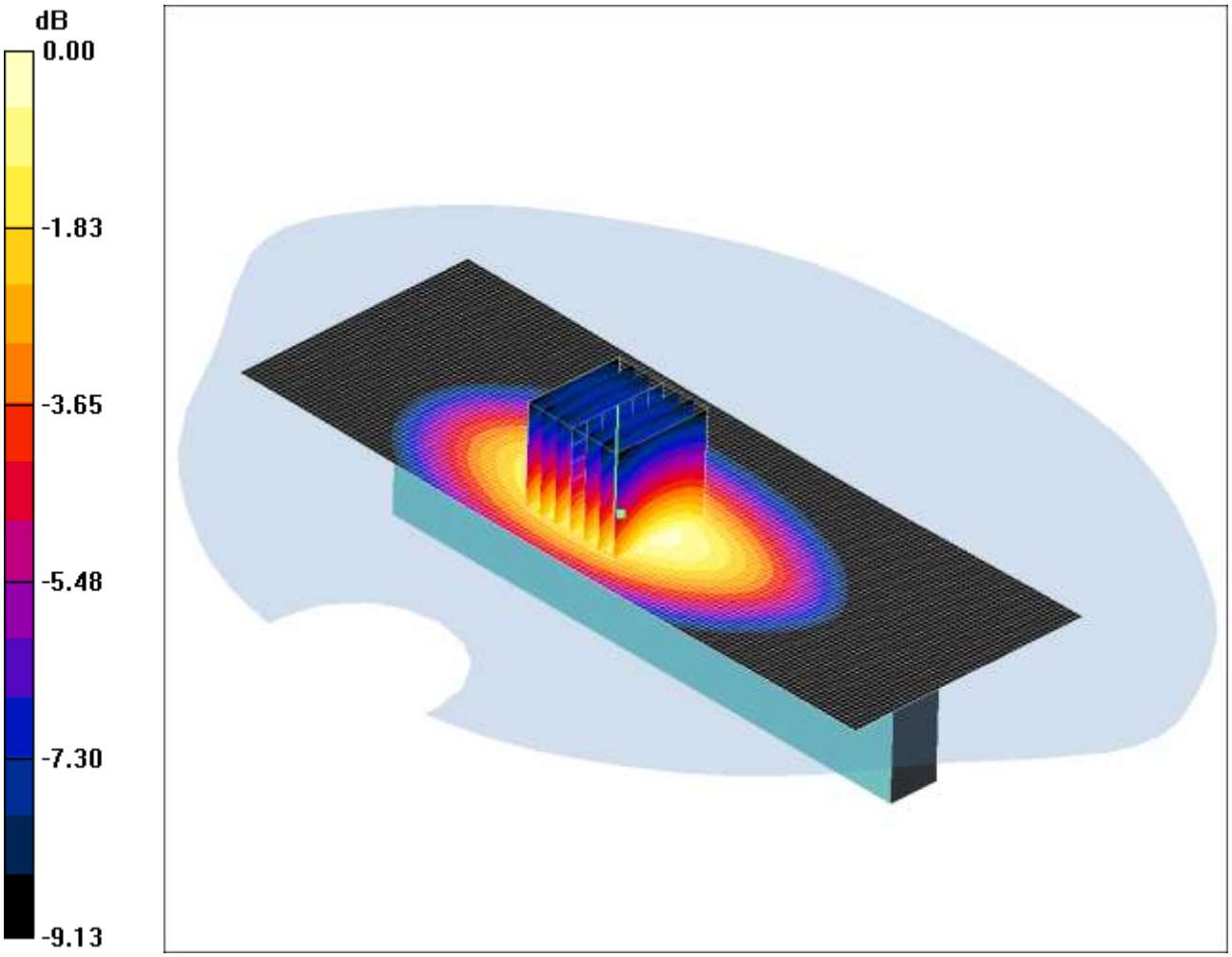


0 dB = 0.873mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.874 mW/g
Side D Vertical Back of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.7 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.821 mW/g; SAR(10 g) = 0.566 mW/g
Maximum value of SAR (measured) = 0.873 mW/g

SCN/88727J02A/058: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

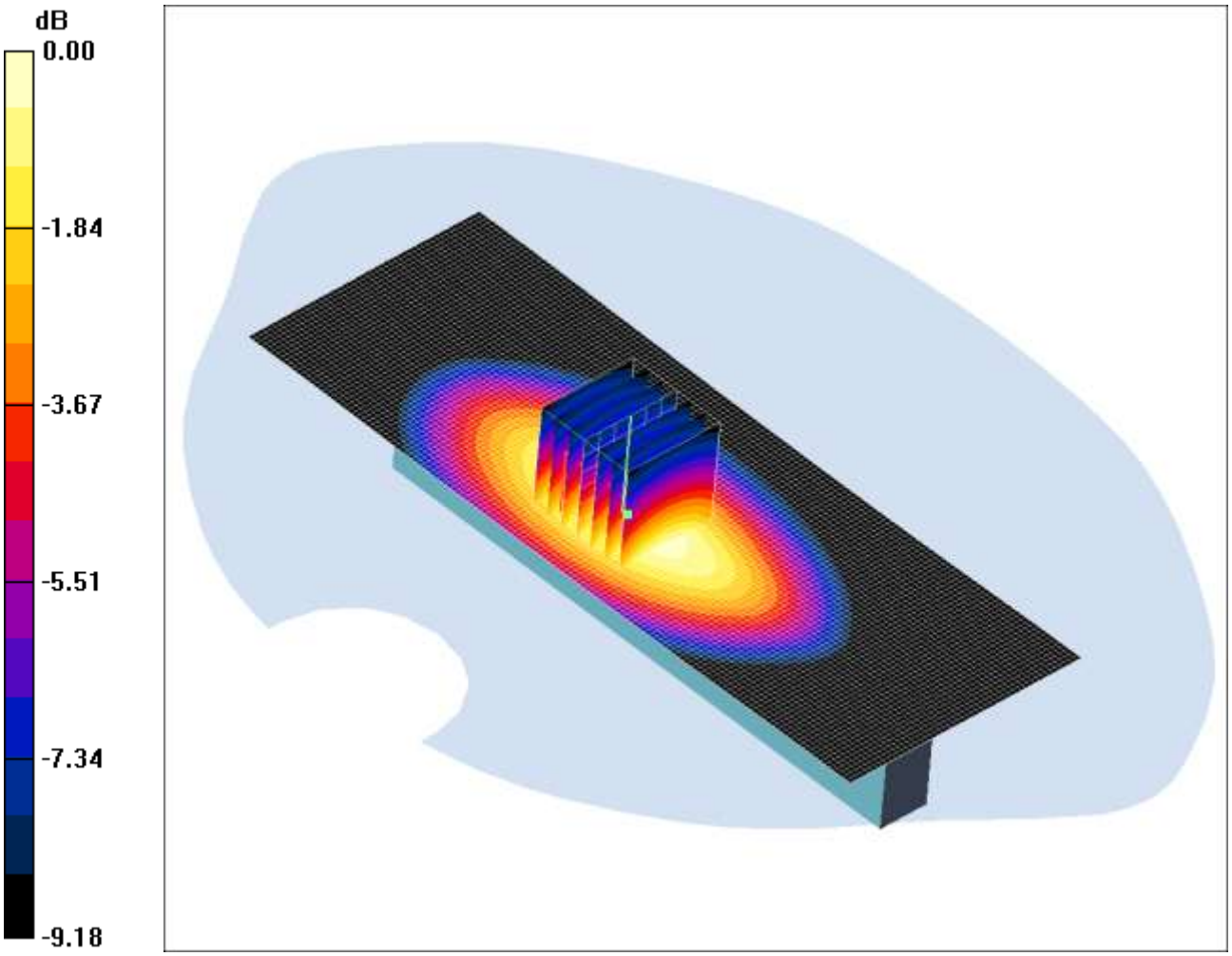


0 dB = 0.885mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.871 mW/g
Side D Vertical Back of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.9 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.826 mW/g; SAR(10 g) = 0.567 mW/g
Maximum value of SAR (measured) = 0.885 mW/g

SCN/88727J02A/059: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23155
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

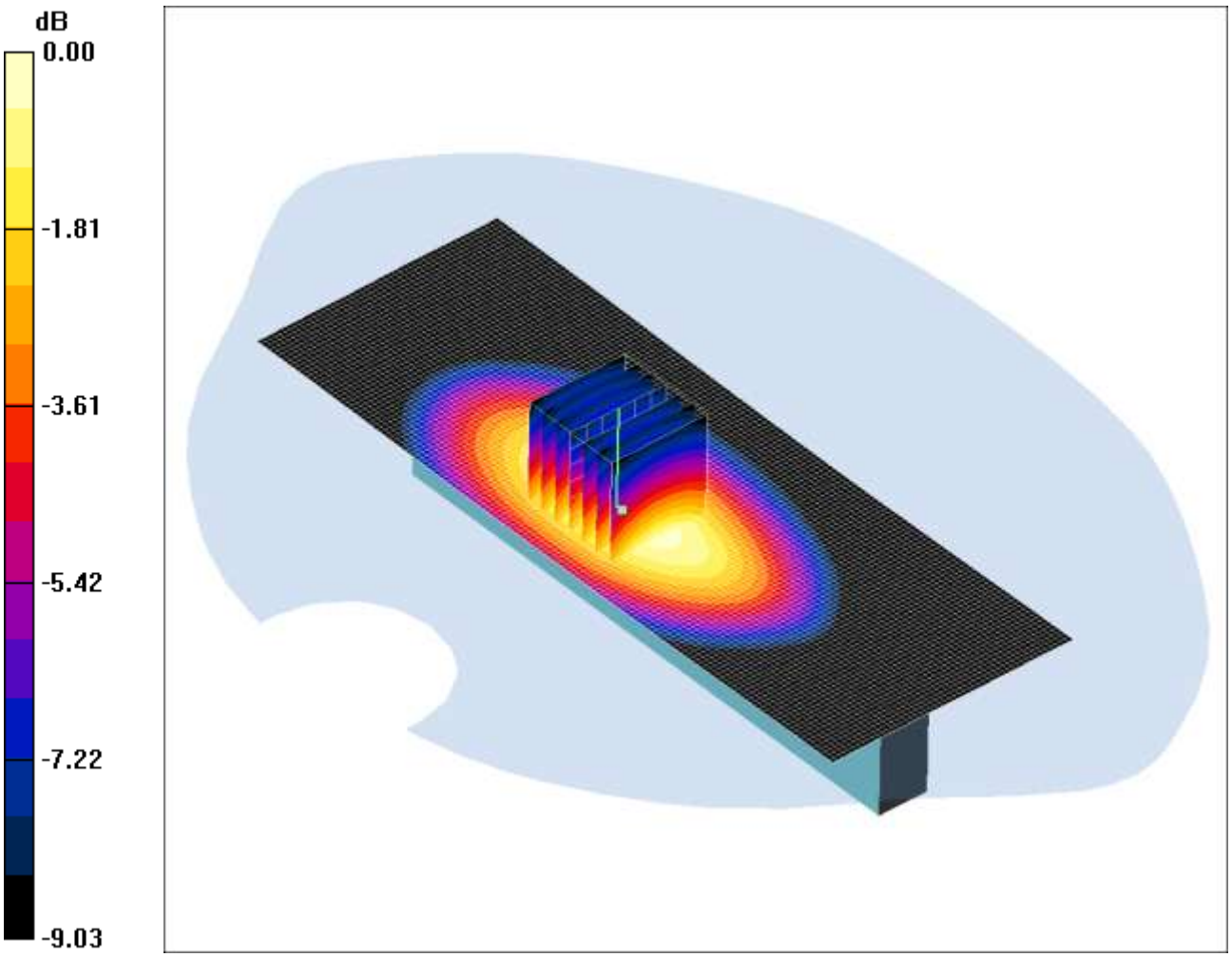


0 dB = 0.831mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.815 mW/g
Side D Vertical Back of EUT Facing Phantom - High/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.5 V/m; Power Drift = -0.070 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.772 mW/g; SAR(10 g) = 0.531 mW/g
Maximum value of SAR (measured) = 0.831 mW/g

SCN/88727J02A/060: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

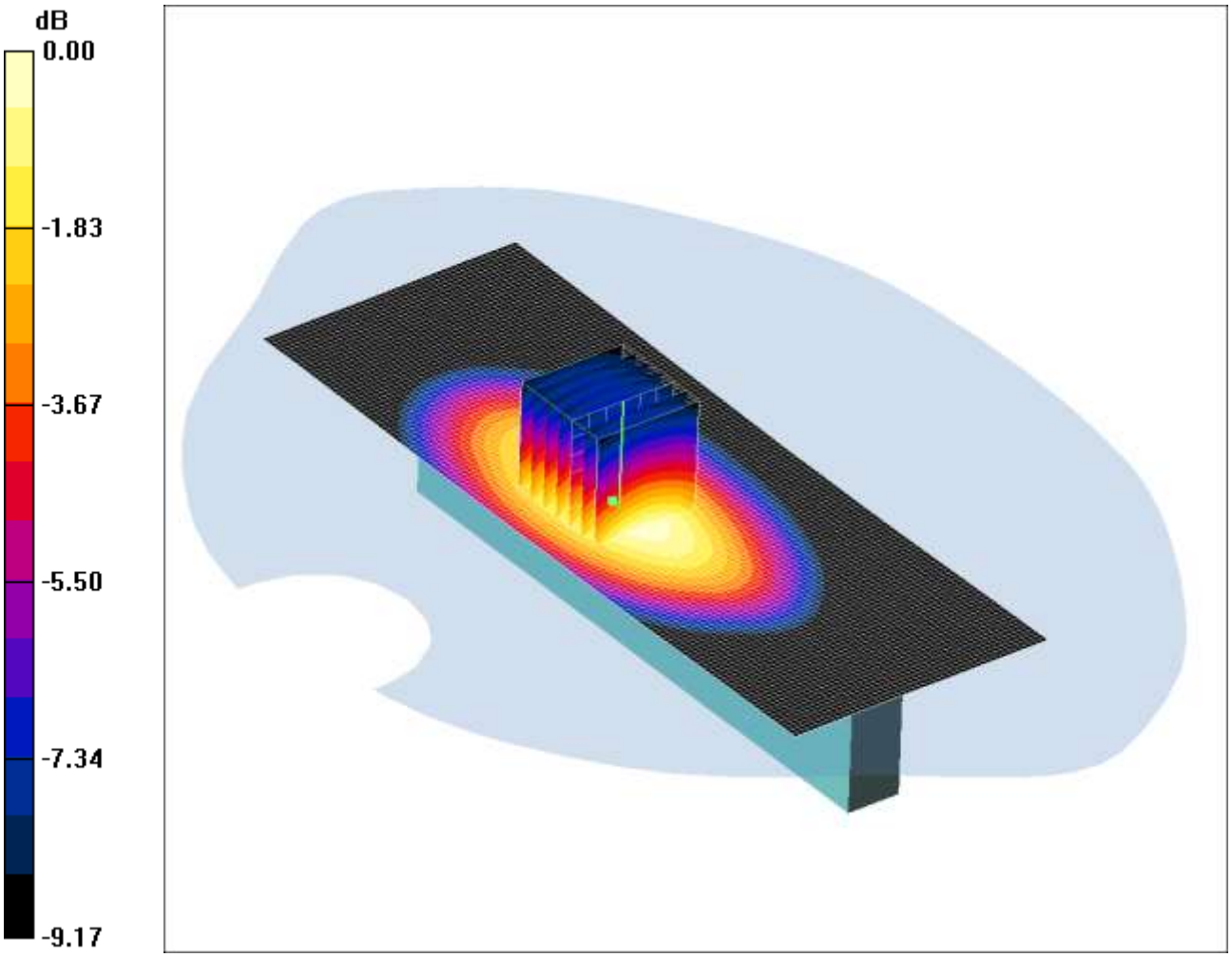


0 dB = 0.799mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.783 mW/g
Side D Vertical Back of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.5 V/m; Power Drift = -0.084 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.744 mW/g; SAR(10 g) = 0.513 mW/g
Maximum value of SAR (measured) = 0.799 mW/g

SCN/88727J02A/061: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

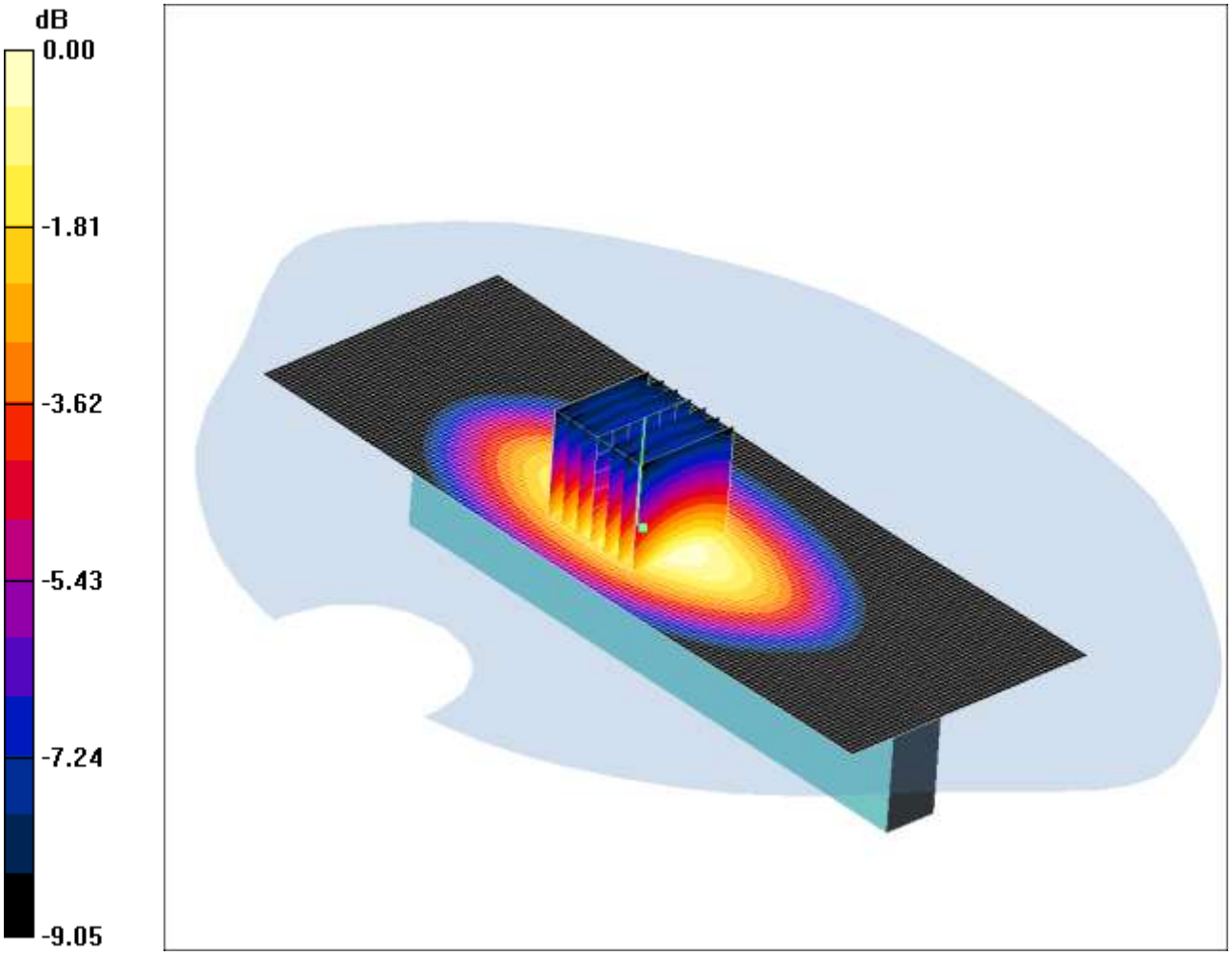


0 dB = 0.841mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.829 mW/g
Side D Vertical Back of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.4 V/m; Power Drift = 0.105 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.780 mW/g; SAR(10 g) = 0.540 mW/g
Maximum value of SAR (measured) = 0.841 mW/g

SCN/88727J02A/062: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

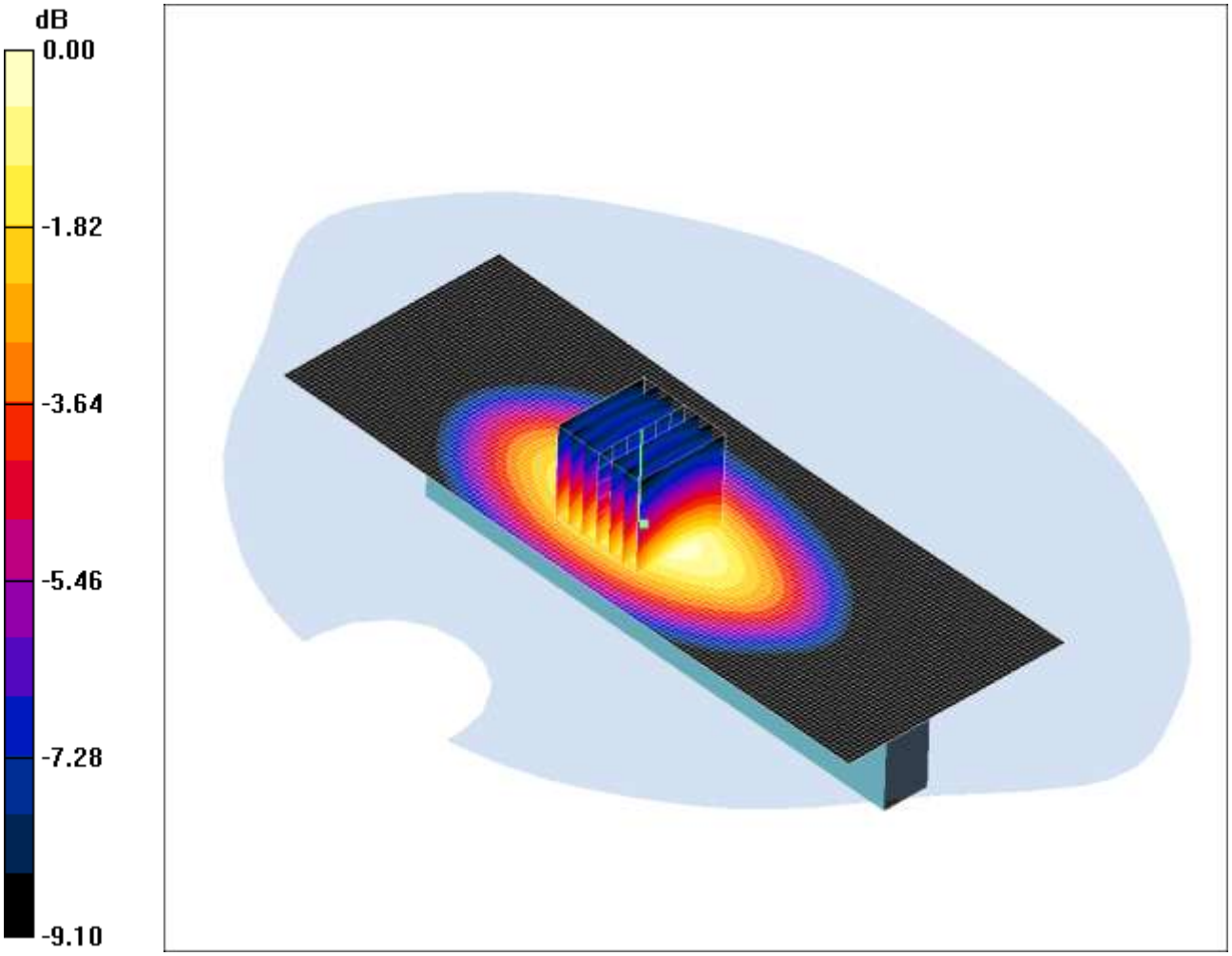


0 dB = 0.904mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Middle/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.911 mW/g
Side D Vertical Back of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.848 mW/g; SAR(10 g) = 0.584 mW/g
Maximum value of SAR (measured) = 0.904 mW/g

SCN/88727J02A/063: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

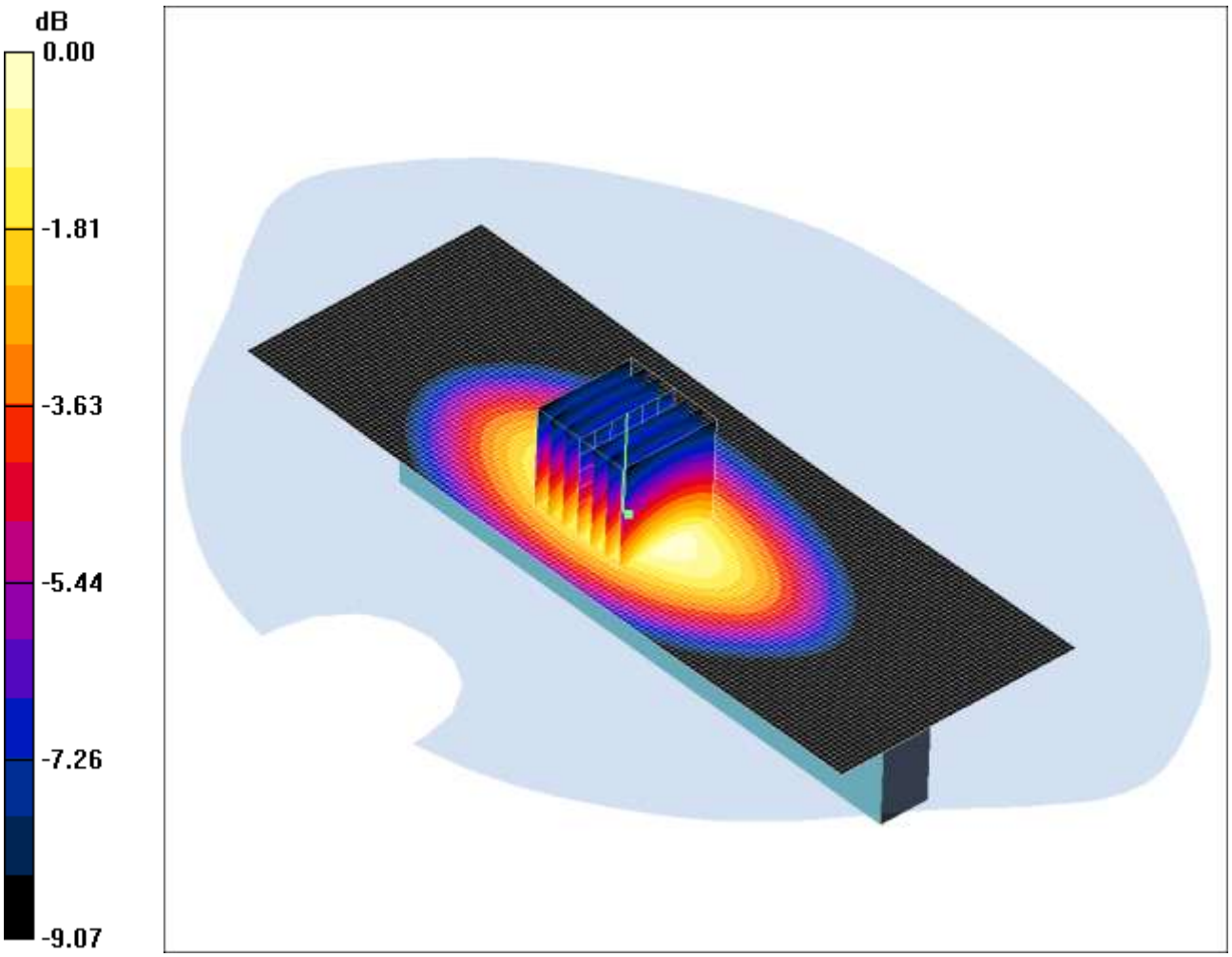


0 dB = 0.919mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.905 mW/g
Side D Vertical Back of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = -0.067 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.851 mW/g; SAR(10 g) = 0.582 mW/g
Maximum value of SAR (measured) = 0.919 mW/g

SCN/88727J02A/064: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23155
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

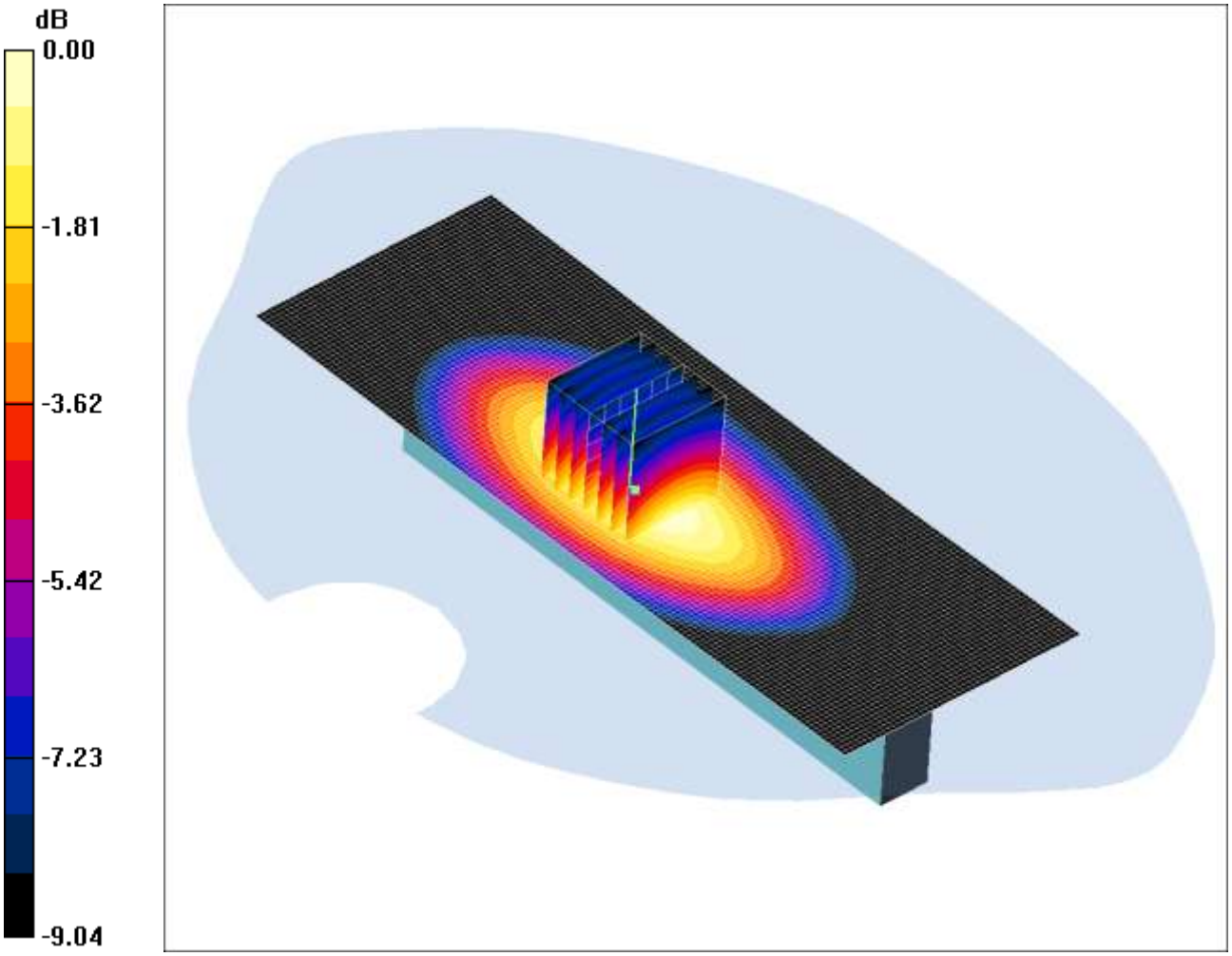


0 dB = 0.829mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 713.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 713.5 MHz; σ = 0.983 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - High/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.839 mW/g
Side D Vertical Back of EUT Facing Phantom - High/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = -0.110 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.776 mW/g; SAR(10 g) = 0.535 mW/g
Maximum value of SAR (measured) = 0.829 mW/g

SCN/88727J02A/065: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

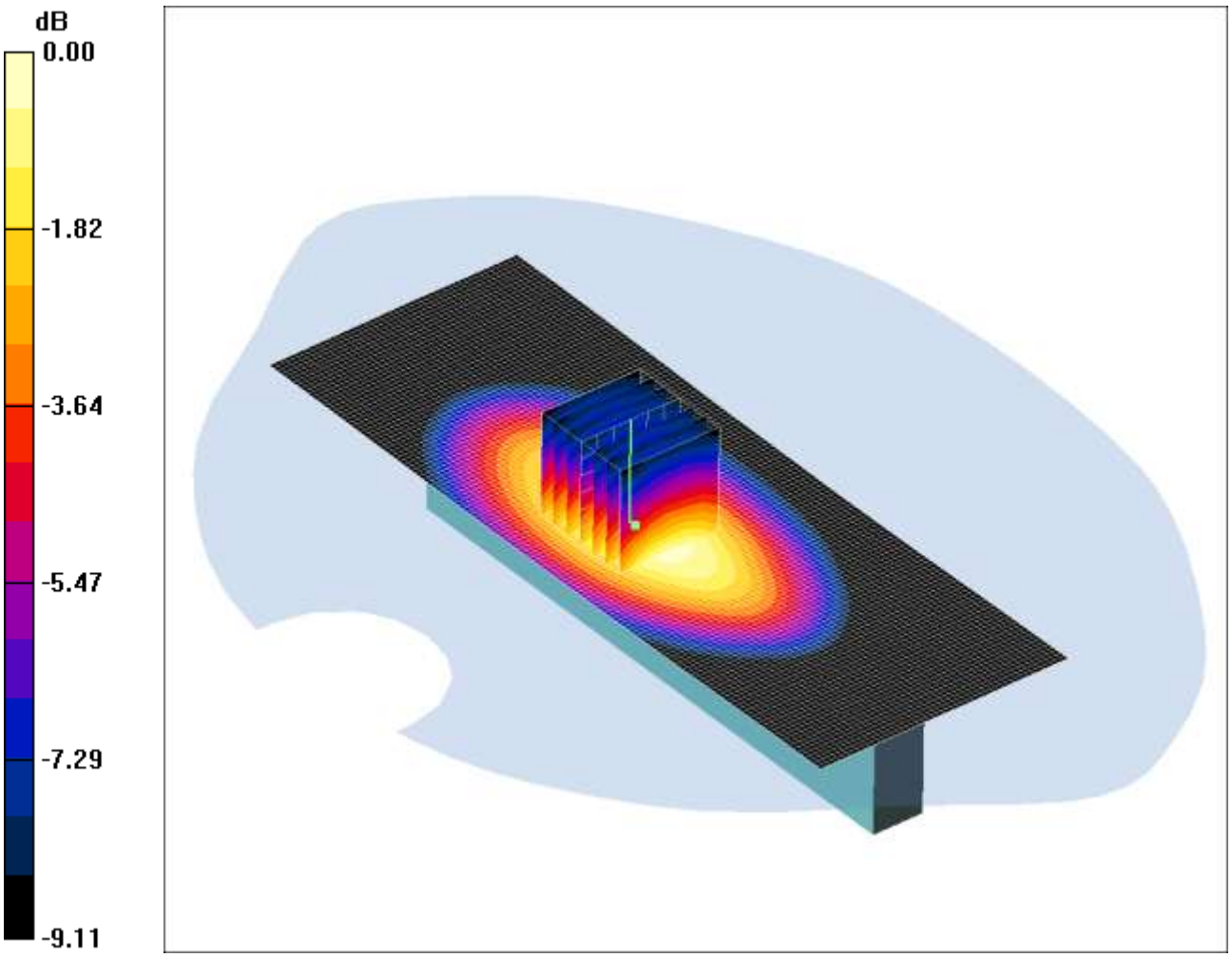


0 dB = 0.787mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.789 mW/g
Side D Vertical Back of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.3 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.506 mW/g
Maximum value of SAR (measured) = 0.787 mW/g

SCN/88727J02A/066: Side D Vertical Back of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23035
Date: 30/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

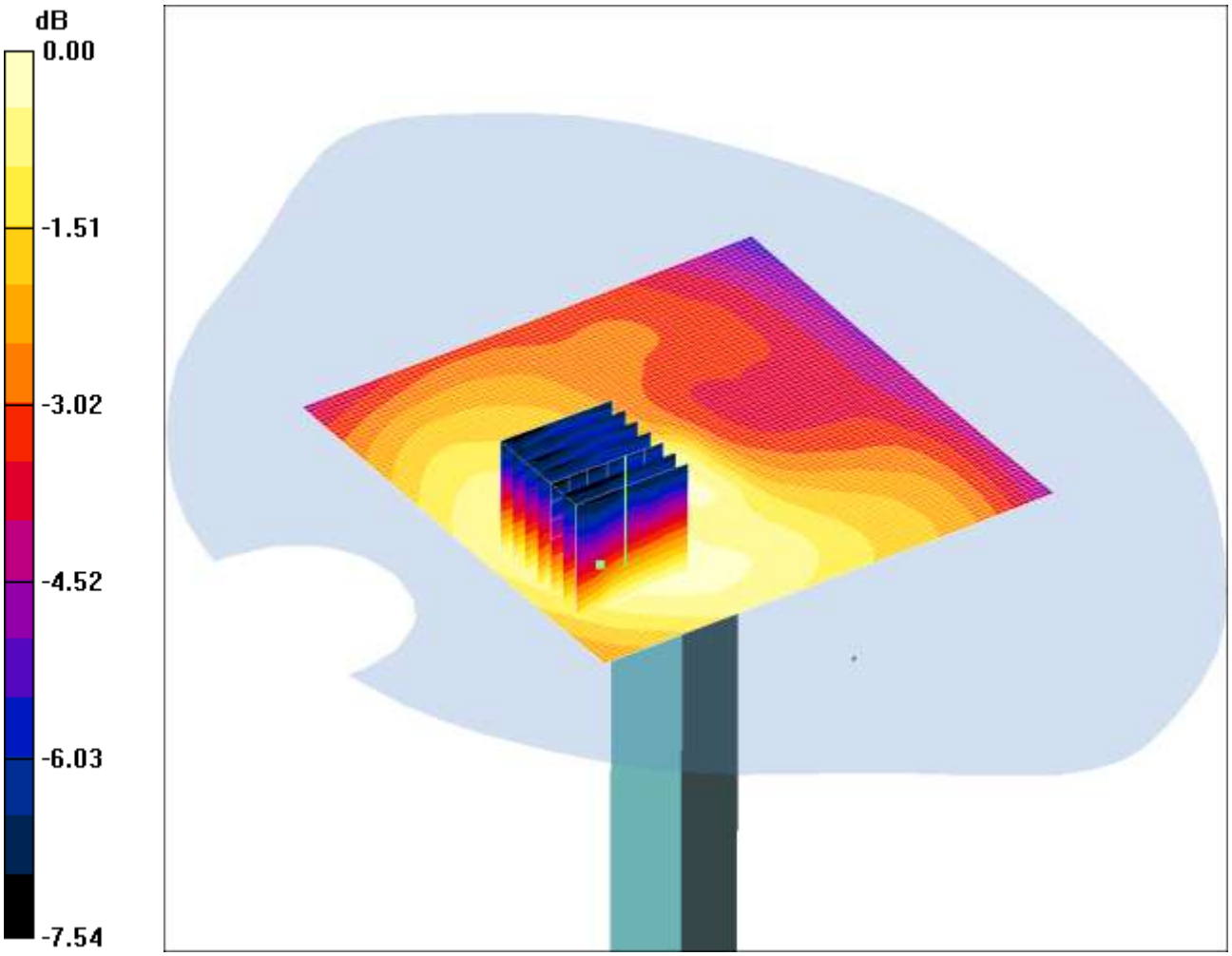


0 dB = 0.846mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 701.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 701.5 MHz; σ = 0.975 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Side D Vertical Back of EUT Facing Phantom - Low/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.851 mW/g
Side D Vertical Back of EUT Facing Phantom - Low/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = 0.047 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.788 mW/g; SAR(10 g) = 0.543 mW/g
Maximum value of SAR (measured) = 0.846 mW/g

SCN/88727J02A/067: Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB QPSK CH23095-
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

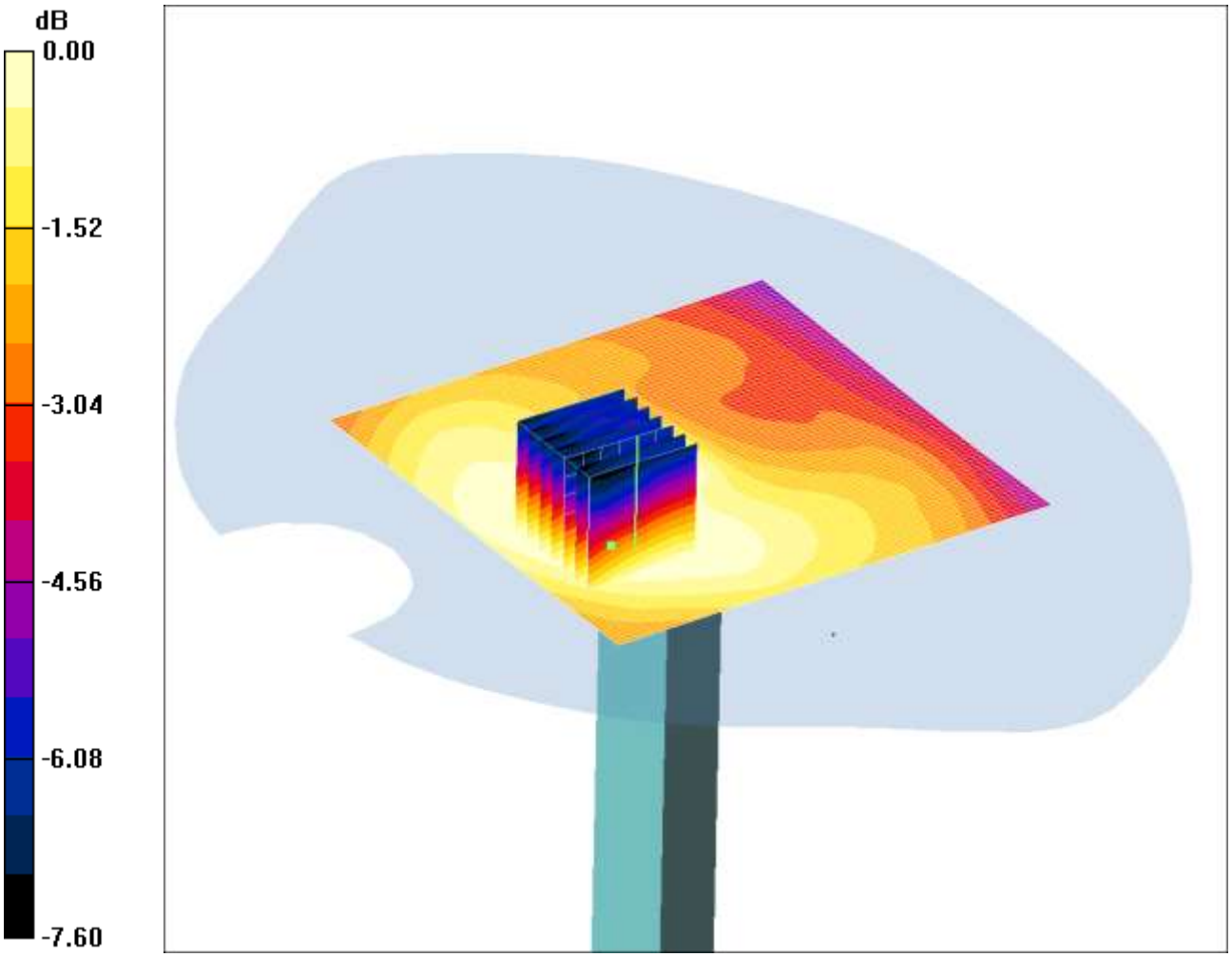


0 dB = 0.022mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Tip of EUT Facing Phantom - Middle 2/Area Scan 2 (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.021 mW/g
Tip of EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.38 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 0.026 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.016 mW/g
Maximum value of SAR (measured) = 0.022 mW/g

SCN/88727J02A/068: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

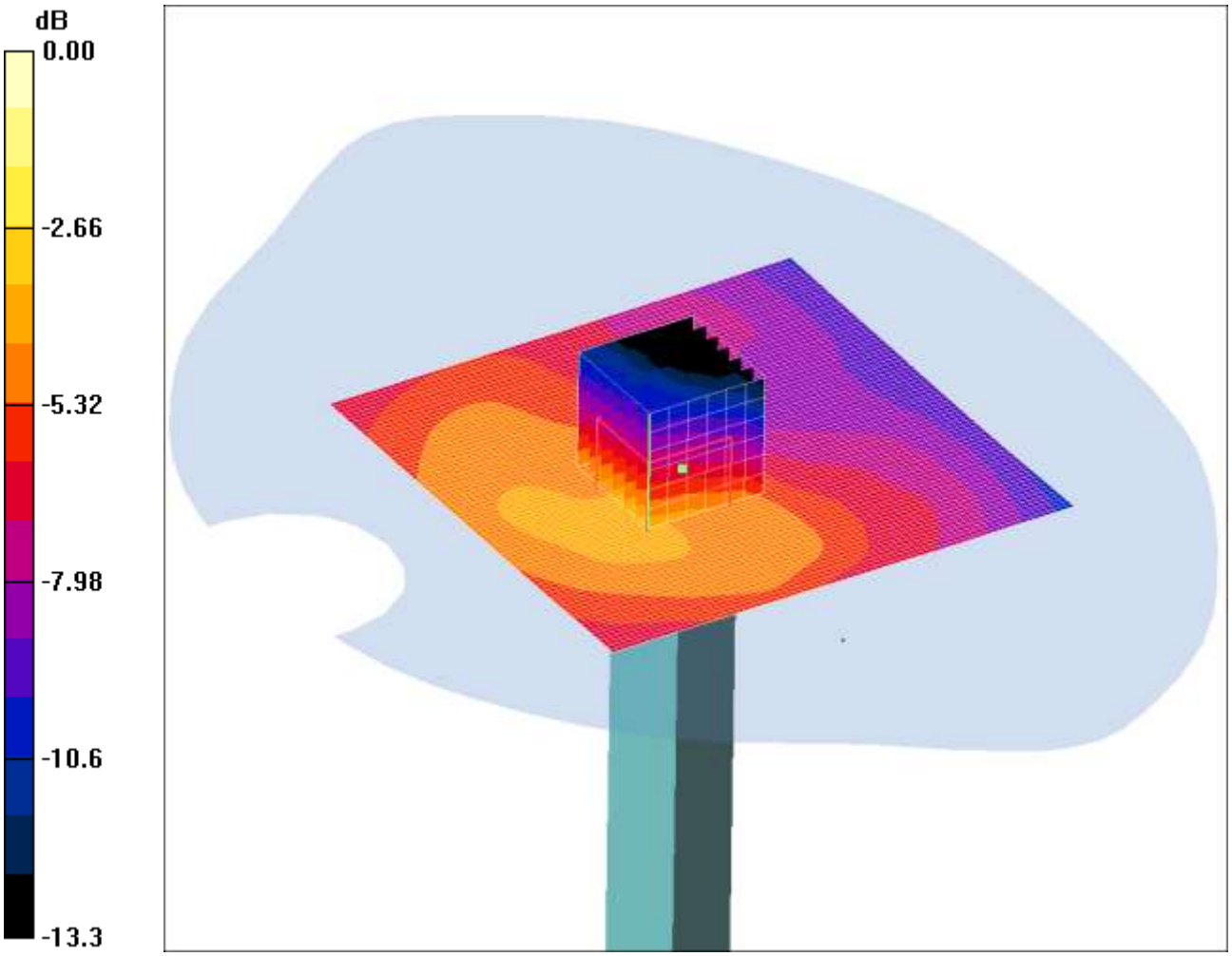


0 dB = 0.021mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Tip of EUT Facing Phantom - Middle 2/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.022 mW/g
Tip of EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.34 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 0.025 W/kg
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.016 mW/g
Maximum value of SAR (measured) = 0.021 mW/g

SCN/88727J02A/069: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End QPSK CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

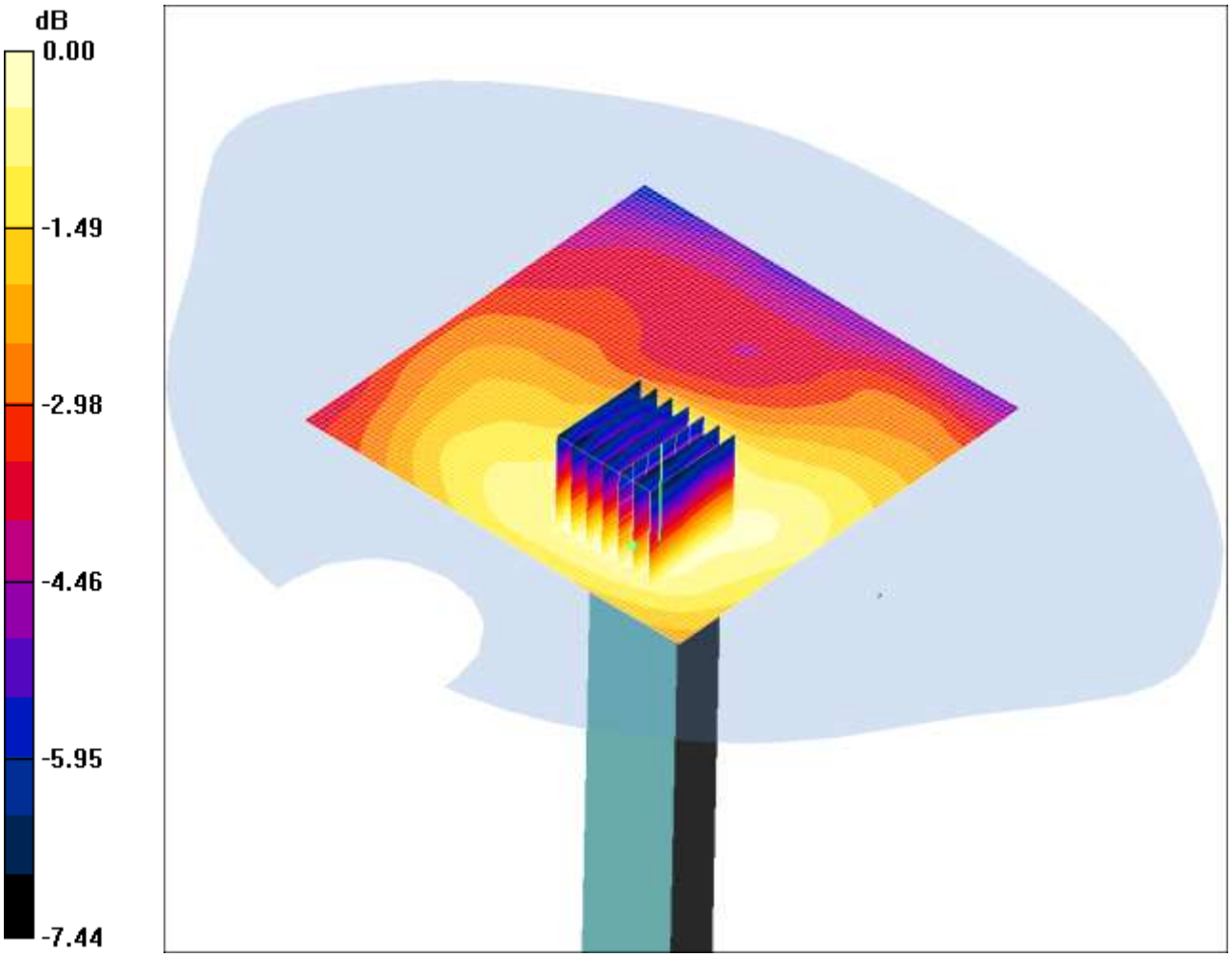


0 dB = 0.050mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Tip of EUT Facing Phantom - Middle 2/Area Scan (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.019 mW/g
Tip of EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.11 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 0.032 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.014 mW/g
Maximum value of SAR (measured) = 0.021 mW/g

SCN/88727J02A/070: Tip of EUT Facing Phantom LTE 12 5MHz BW 50% RB 16-QAM CH23095-
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

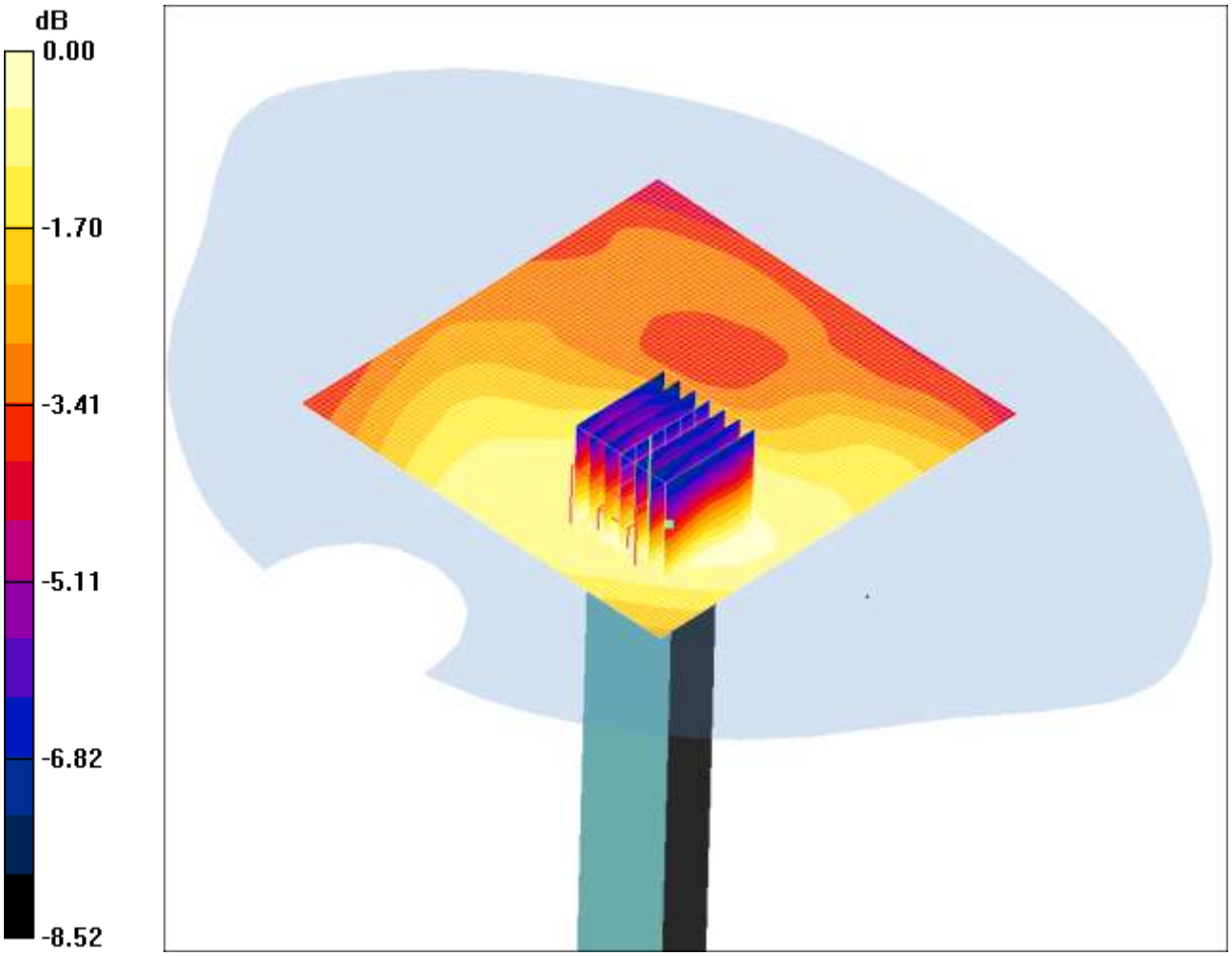


0 dB = 0.022mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Tip of EUT Facing Phantom - Middle/Area Scan 2 2 2 (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.021 mW/g
Tip of EUT Facing Phantom - Middle/Zoom Scan (7x7x7) 2 2 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.28 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.027 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.017 mW/g
Maximum value of SAR (measured) = 0.022 mW/g

SCN/88727J02A/071: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB Low End 16-QAM CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040

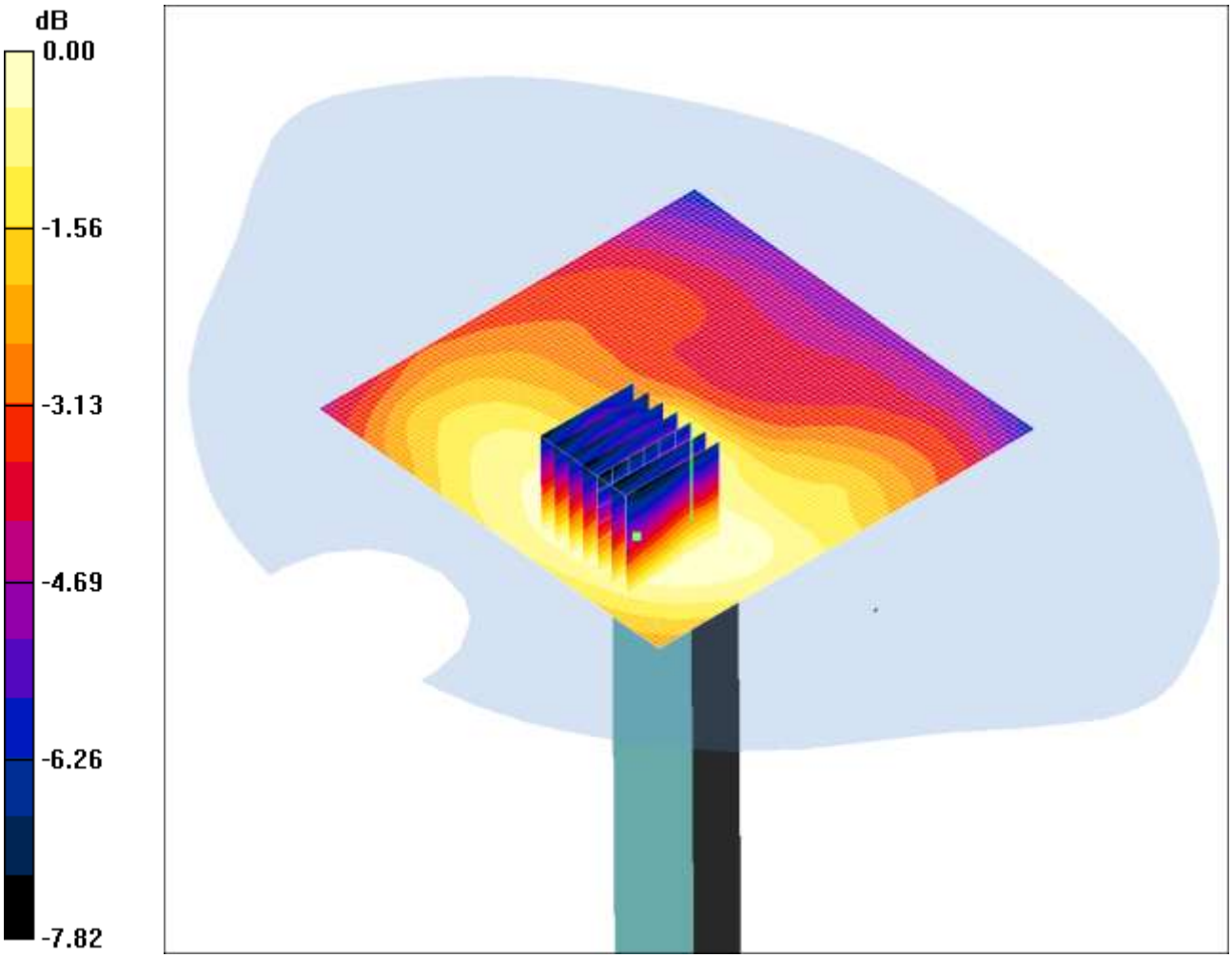


0 dB = 0.023mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Tip of EUT Facing Phantom - Middle 2/Area Scan 2 (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.022 mW/g
Tip of EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) 1 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.48 V/m; Power Drift = -0.034 dB
Peak SAR (extrapolated) = 0.028 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.017 mW/g
Maximum value of SAR (measured) = 0.023 mW/g

SCN/88727J02A/072: Tip of EUT Facing Phantom LTE 12 5MHz BW 1 RB High End 16-QAM CH23095
Date: 31/10/2012
DUT: GENERAL DYNAMICS Broadband Antenna; Type: LTE-ODUP003-IPW; Serial: GT1229LTT006040



0 dB = 0.022mW/g

Communication System: LTE - Band 12 / 5MHz Channel; Frequency: 707.5 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used (interpolated): f = 707.5 MHz; σ = 0.979 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

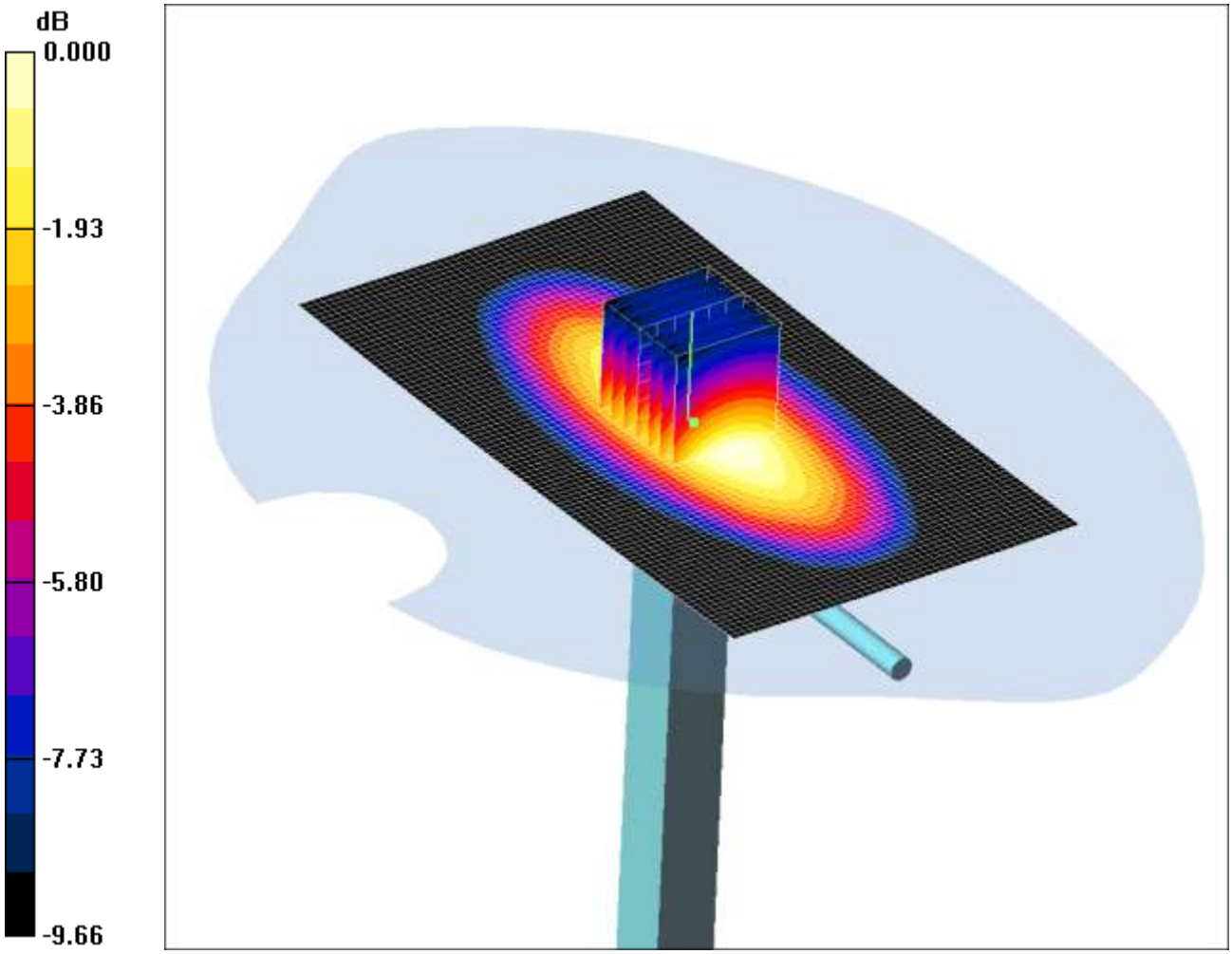
Tip of EUT Facing Phantom - Middle 2/Area Scan 2 (81x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.022 mW/g
Tip of EUT Facing Phantom - Middle 2/Zoom Scan (7x7x7) 1 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.30 V/m; Power Drift = -0.198 dB
Peak SAR (extrapolated) = 0.028 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.016 mW/g
Maximum value of SAR (measured) = 0.022 mW/g

Appendix 5. SAR Distribution Scans for System Performance Check

This appendix contains SAR distribution scans which are included in the total number of pages for this report.

SCN/88727J02A/073	System Performance Check 750MHz Body 20 08 12
SCN/88727J02A/074	System Performance Check 750MHz Body 22 08 12
SCN/88727J02A/075	System Performance Check 750MHz Body 18 10 12
SCN/88727J02A/076	System Performance Check 750MHz Body 27 10 12
SCN/88727J02A/077	System Performance Check 750MHz Body 29 10 12
SCN/88727J02A/078	System Performance Check 750MHz Body 30 10 12
SCN/88727J02A/079	System Performance Check 750MHz Body 31 10 12

SCN/88727J02A/073: System Performance Check 750MHz Body 20 08 12
Date 20/08/2012
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1011

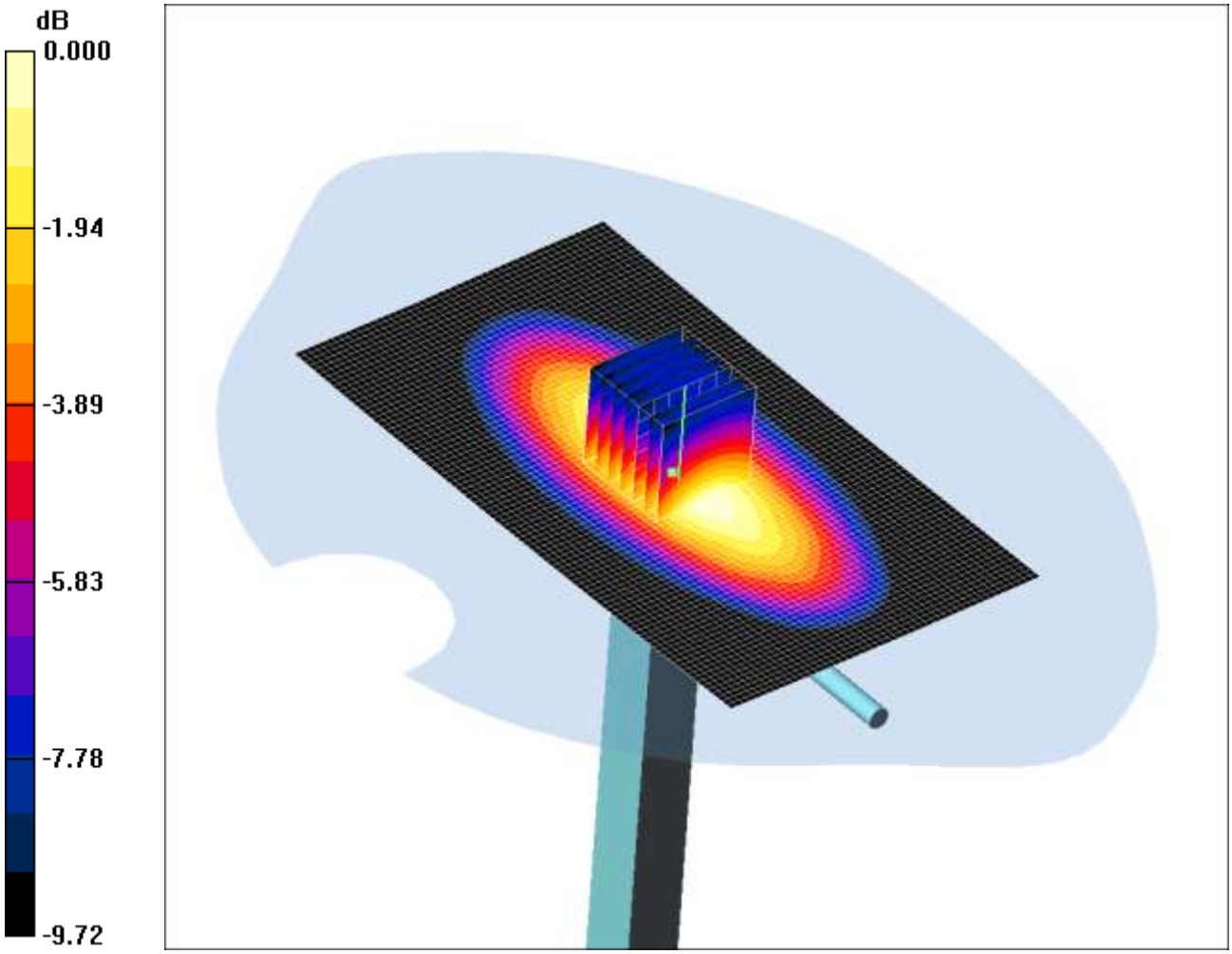


0 dB = 2.32mW/g

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used: f = 750 MHz; σ = 0.941 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=15mm, Pin=250mW 2/Area Scan (51x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.34 mW/g
d=15mm, Pin=250mW 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.9 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 3.13 W/kg
SAR(1 g) = 2.17 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 2.32 mW/g

SCN/88727J02A/074: System Performance Check 750MHz Body 22 08 12
Date 22/08/2012
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1011

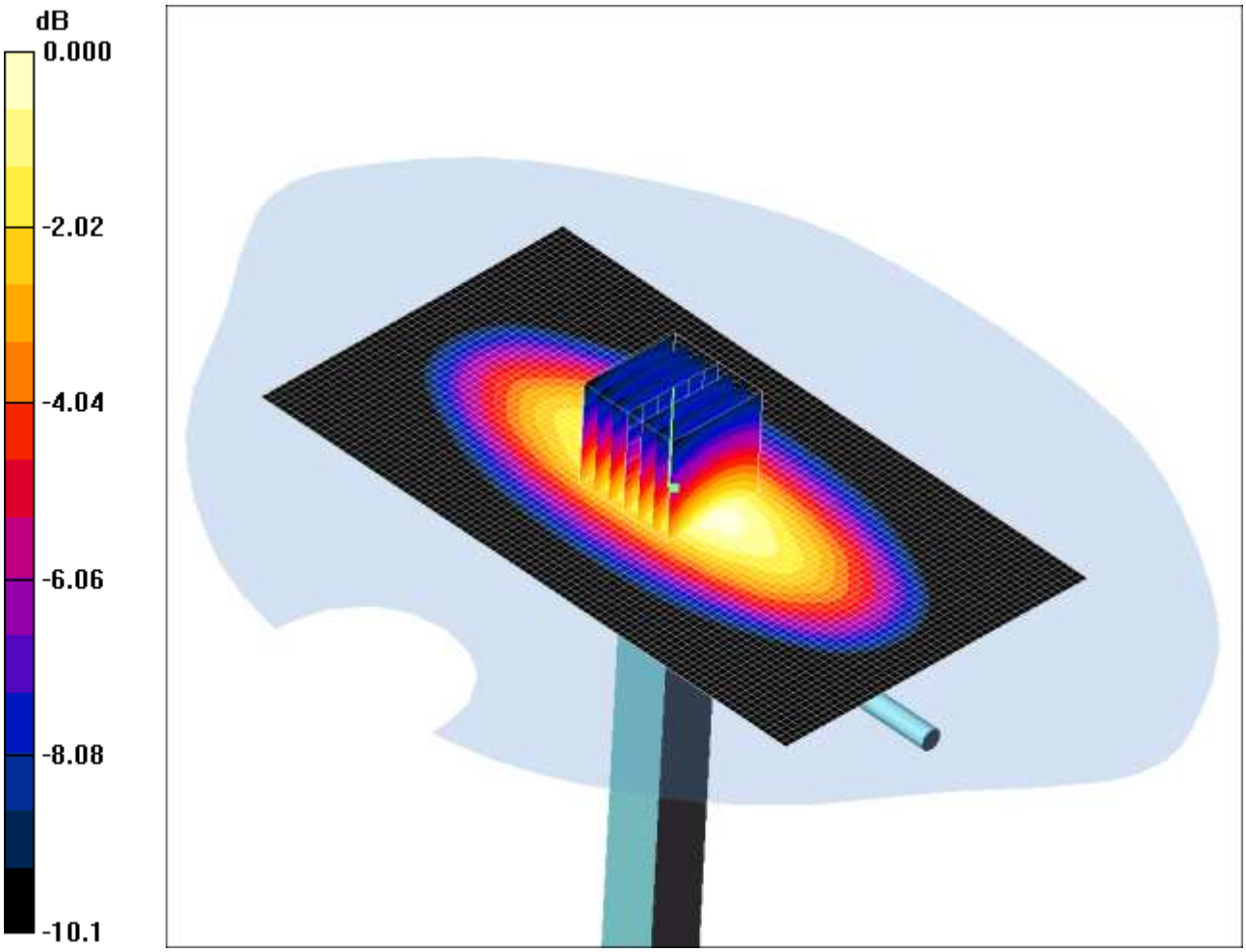


0 dB = 2.32mW/g

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used: f = 750 MHz; σ = 0.975 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: EX3DV4 - SN3814; ConvF(9.28, 9.28, 9.28); Calibrated: 22/09/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=15mm, Pin=250mW 2/Area Scan (51x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.30 mW/g
d=15mm, Pin=250mW 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.3 V/m; Power Drift = 0.118 dB
Peak SAR (extrapolated) = 3.15 W/kg
SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 2.32 mW/g

SCN/88727J02A/075: System Performance Check 750MHz Body 18 10 12
Date: 18/10/2012
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1011

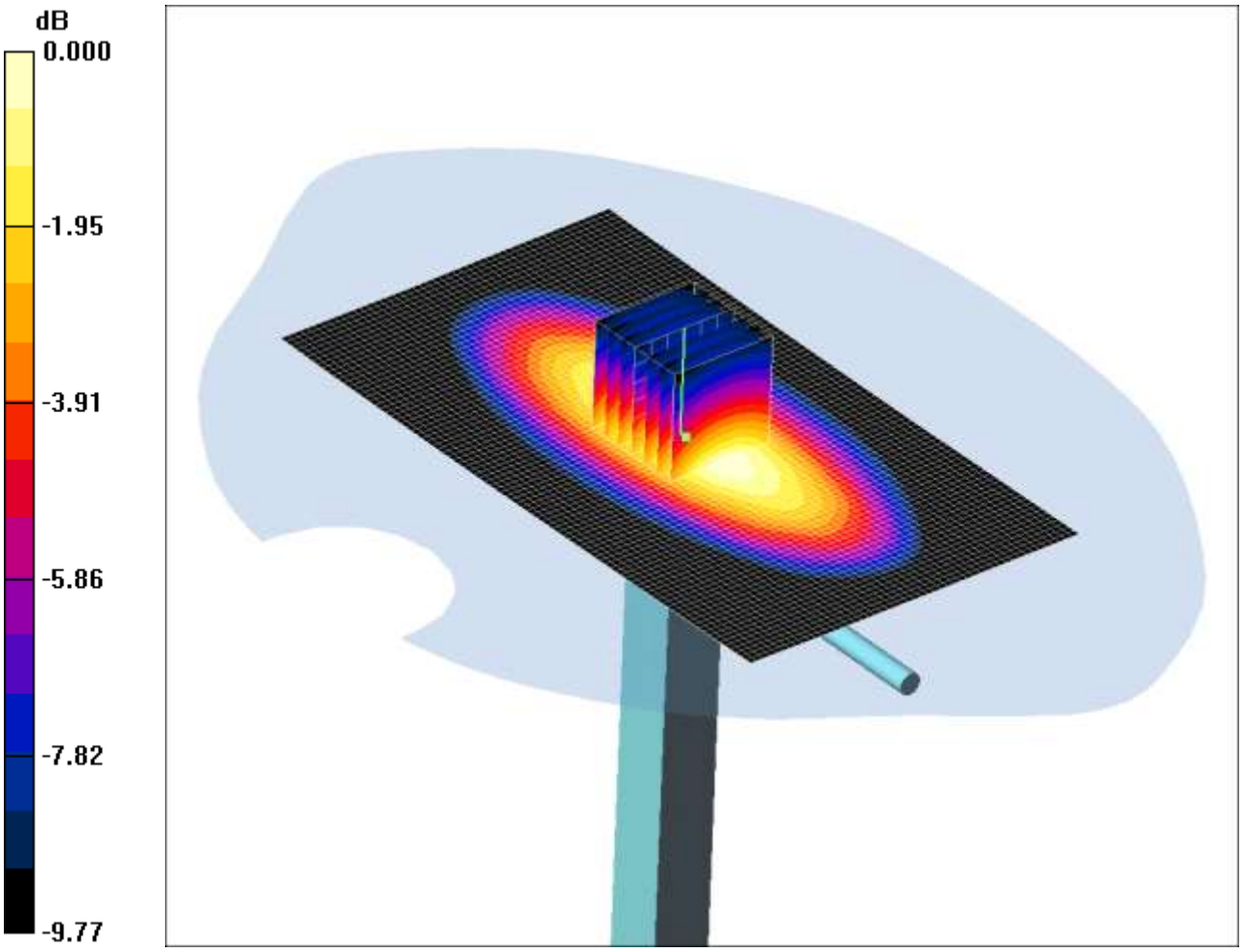


0 dB = 2.29mW/g

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used: f = 750 MHz; σ = 0.948 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12b; Type: SAM 4.0; Serial: TP:1207
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=15mm, Pin=250mW 2/Area Scan (51x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.24 mW/g
d=15mm, Pin=250mW 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.7 V/m; Power Drift = 0.044 dB
Peak SAR (extrapolated) = 3.12 W/kg
SAR(1 g) = 2.13 mW/g; SAR(10 g) = 1.41 mW/g
Maximum value of SAR (measured) = 2.29 mW/g

SCN/88727J02A/076: System Performance Check 750MHz Body 27 10 12
Date: 27/10/2012
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1011

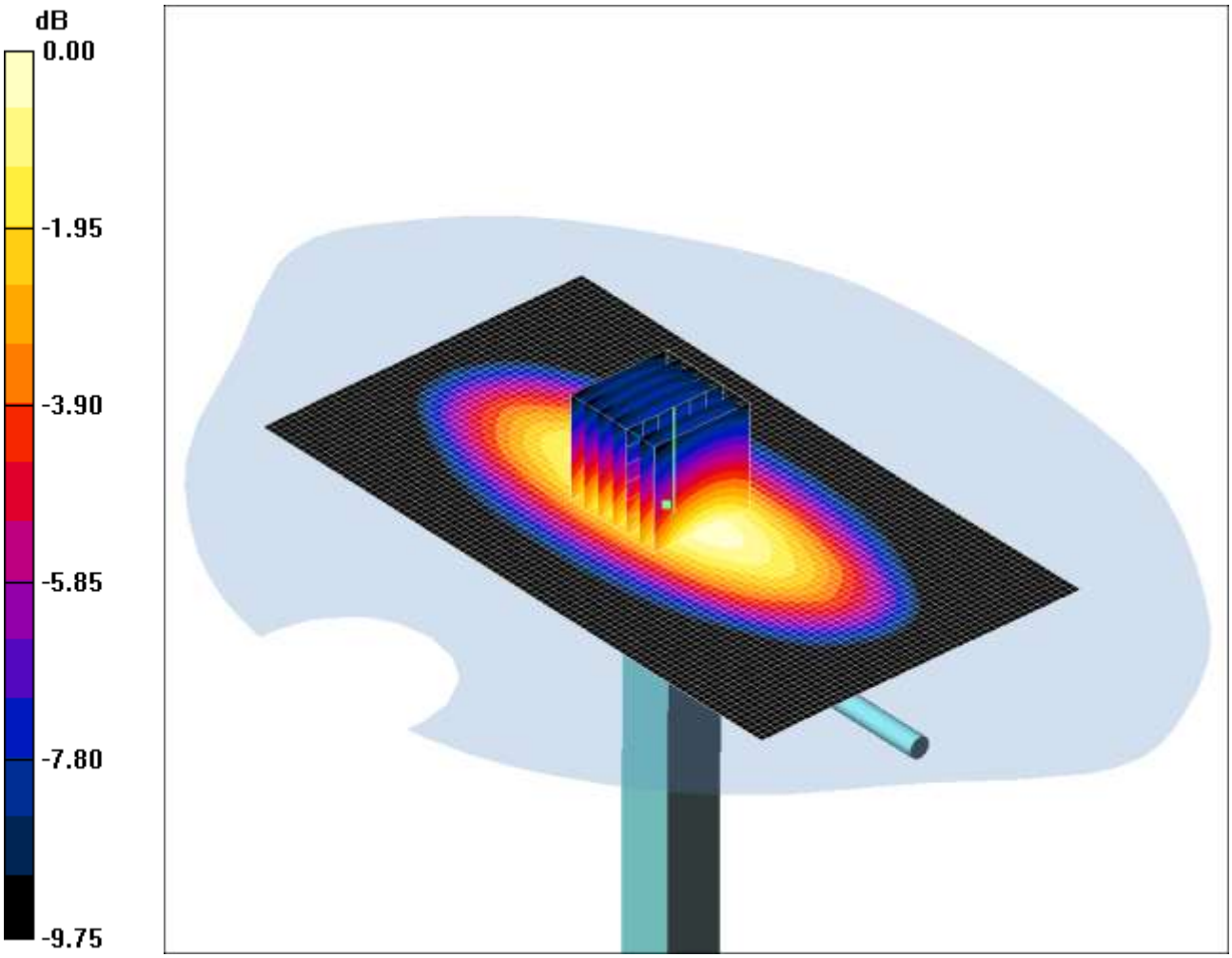


0 dB = 2.32mW/g

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used: f = 750 MHz; σ = 0.921 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1193
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

d=15mm, Pin=250mW 2/Area Scan (51x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.30 mW/g
d=15mm, Pin=250mW 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.3 V/m; Power Drift = 0.127 dB
Peak SAR (extrapolated) = 3.16 W/kg
SAR(1 g) = 2.16 mW/g; SAR(10 g) = 1.44 mW/g
Maximum value of SAR (measured) = 2.32 mW/g

SCN/88727J02A/077: System Performance Check 750MHz Body 29 10 12
Date: 29/10/2012
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1011

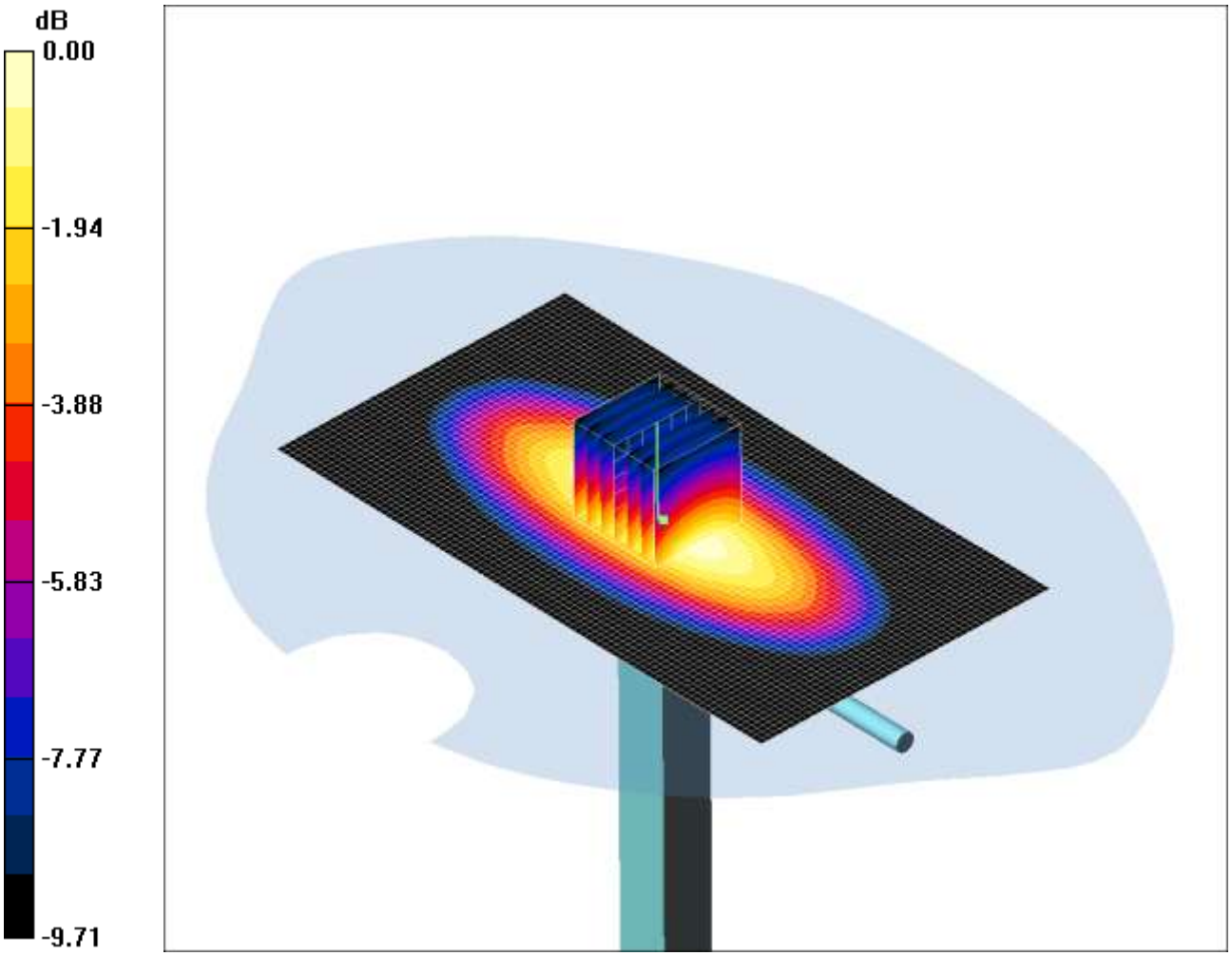


0 dB = 2.39mW/g

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used: f = 750 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a; Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=15mm, Pin=250mW 2/Area Scan (51x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.39 mW/g
d=15mm, Pin=250mW 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.4 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 2.23 mW/g; SAR(10 g) = 1.5 mW/g
Maximum value of SAR (measured) = 2.39 mW/g

SCN/88727J02A/078: System Performance Check 750MHz Body 30 10 12
Date: 30/10/2012
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1011

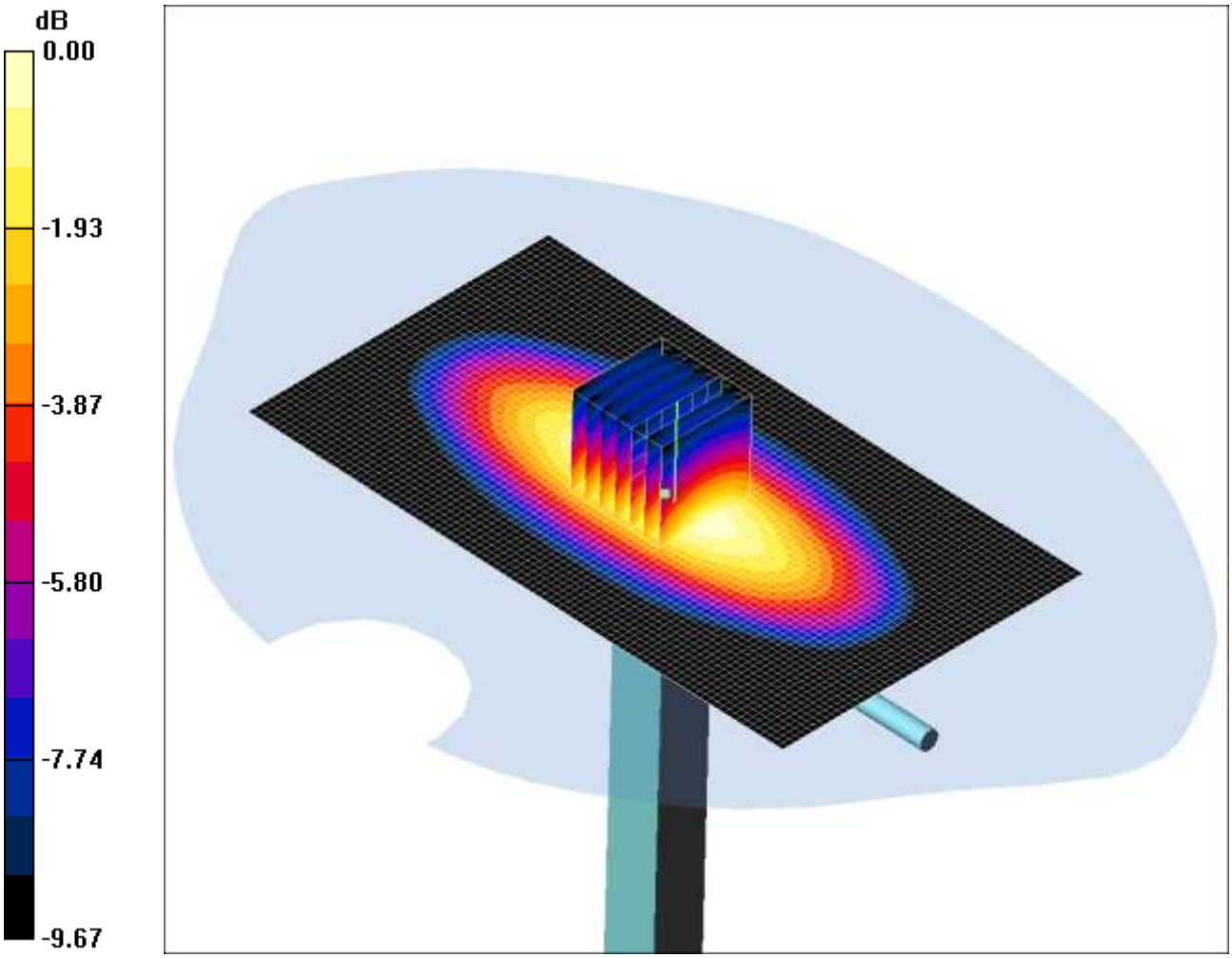


0 dB = 2.35mW/g

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used: f = 750 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=15mm, Pin=250mW 2/Area Scan (51x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.33 mW/g
d=15mm, Pin=250mW 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.0 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.18 W/kg
SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 2.35 mW/g

SCN/88727J02A/079: System Performance Check 750MHz Body 31 10 12
Date: 31/10/2012
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1011



0 dB = 2.36mW/g

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: 750 MHz MSL Medium parameters used: f = 750 MHz; σ = 1.01 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3304; ConvF(6.25, 6.25, 6.25); Calibrated: 31/08/2012
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn432; Calibrated: 02/05/2012
- Phantom: SAM 12a (Site 57); Type: SAM 4.0; Serial: TP:1020
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

d=15mm, Pin=250mW 2/Area Scan (51x91x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.36 mW/g
d=15mm, Pin=250mW 2/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.4 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.20 W/kg
SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.47 mW/g
Maximum value of SAR (measured) = 2.36 mW/g

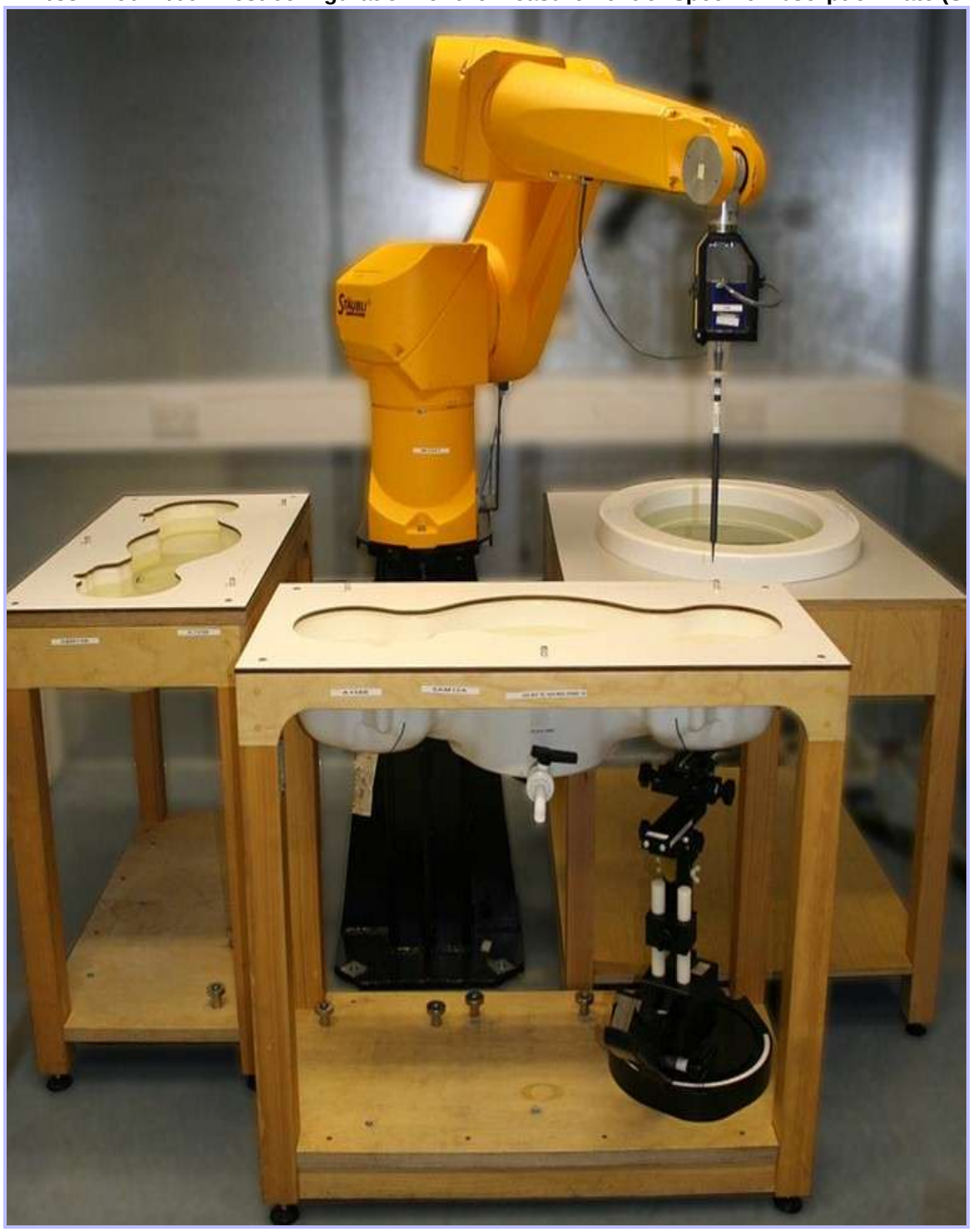
Appendix 6. Photographs

This appendix contains the following photographs:

Photo Reference Number	Title
PHT/88727J02A/001	Test configuration for the measurement of Specific Absorption Rate (SAR)
PHT/88727J02A/002	Side A Horizontal-Up of EUT Facing Phantom - USB Dongle
PHT/88727J02A/003	Side B Horizontal-Down of EUT Facing Phantom - USB Dongle
PHT/88727J02A/004	Side C Vertical-Front of EUT Facing Phantom - USB Dongle
PHT/88727J02A/005	Side D Vertical-Back of EUT Facing Phantom - USB Dongle
PHT/88727J02A/006	Top or Tip of EUT Facing Phantom - USB Dongle
PHT/88727J02A/007	Side A Horizontal-Up of EUT Facing Phantom - Transmitter Antenna
PHT/88727J02A/008	Side B Horizontal-Down of EUT Facing Phantom - Transmitter Antenna
PHT/88727J02A/009	Side C Vertical Front of EUT Facing Phantom - Transmitter Antenna
PHT/88727J02A/010	Side D Vertical Back of EUT Facing Phantom - Transmitter Antenna
PHT/88727J02A/011	Top or Tip of EUT Facing Phantom - Transmitter Antenna
PHT/88727J02A/012	Side A Horizontal-Up View + Internal View of Horizontal-Up
PHT/88727J02A/013	Side B Horizontal-Down View + Internal View of Horizontal-Down
PHT/88727J02A/014	Side C Vertical-Front View + Internal View of Vertical-Front
PHT/88727J02A/015	Side D Vertical- Back View + Internal View of Vertical- Back
PHT/88727J02A/016	Top or Tip View - USB Dongle
PHT/88727J02A/017	Internal View Of RF Ports
PHT/88727J02A/018	USB Extension View
PHT/88727J02A/019	Side A Horizontal-Up View - Transmitter Antenna
PHT/88727J02A/020	Side B Horizontal-Down View -Transmitter Antenna
PHT/88727J02A/021	Side C Vertical- Front View - Transmitter Antenna
PHT/88727J02A/022	Side D Vertical-Back View - Transmitter Antenna
PHT/88727J02A/023	Top or Tip View - Transmitter Antenna
PHT/88727J02A/024	Transmitter Antenna View
PHT/88727J02A/025	Dell Latitude D620 Laptop View
PHT/88727J02A/026	Base of Dell Latitude D620 Laptop View
PHT/88727J02A/027	750 MHz Body Fluid Level

Note: Internal View of EUT pictures were all supplied by customer, as the SAR sample could not be modified by test lab.

PHT/88727J02A/001:Test configuration for the measurement of Specific Absorption Rate (SAR)



PHT/88727J02A/002: Side A Horizontal-Up of EUT Facing Phantom - USB Dongle

PHT/88727J02A/003: Side B Horizontal-Down of EUT Facing Phantom - USB Dongle

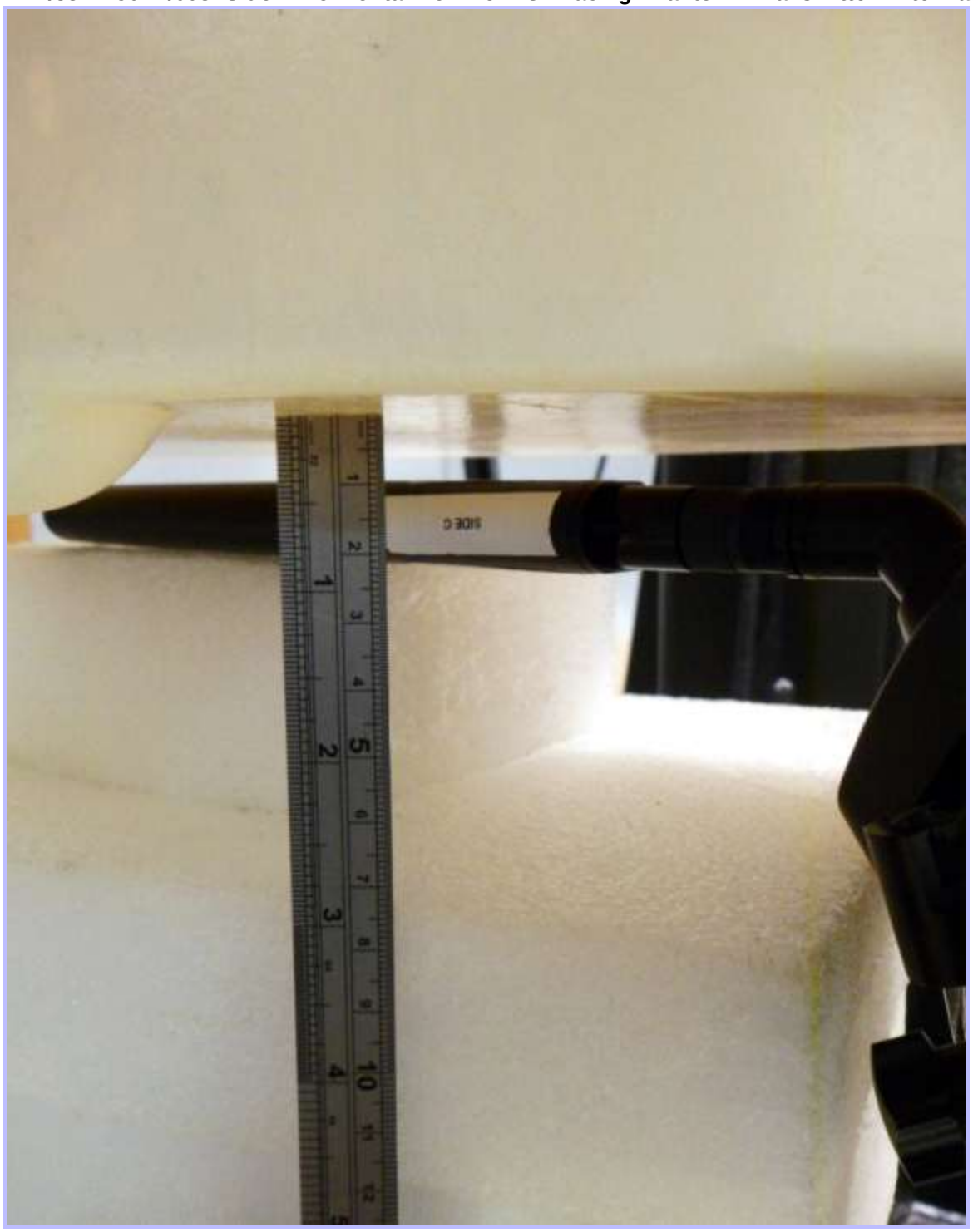
PHT/88727J02A/004: Side C Vertical-Front of EUT Facing Phantom - USB Dongle

PHT/88727J02A/005: Side D Vertical-Back of EUT Facing Phantom - USB Dongle

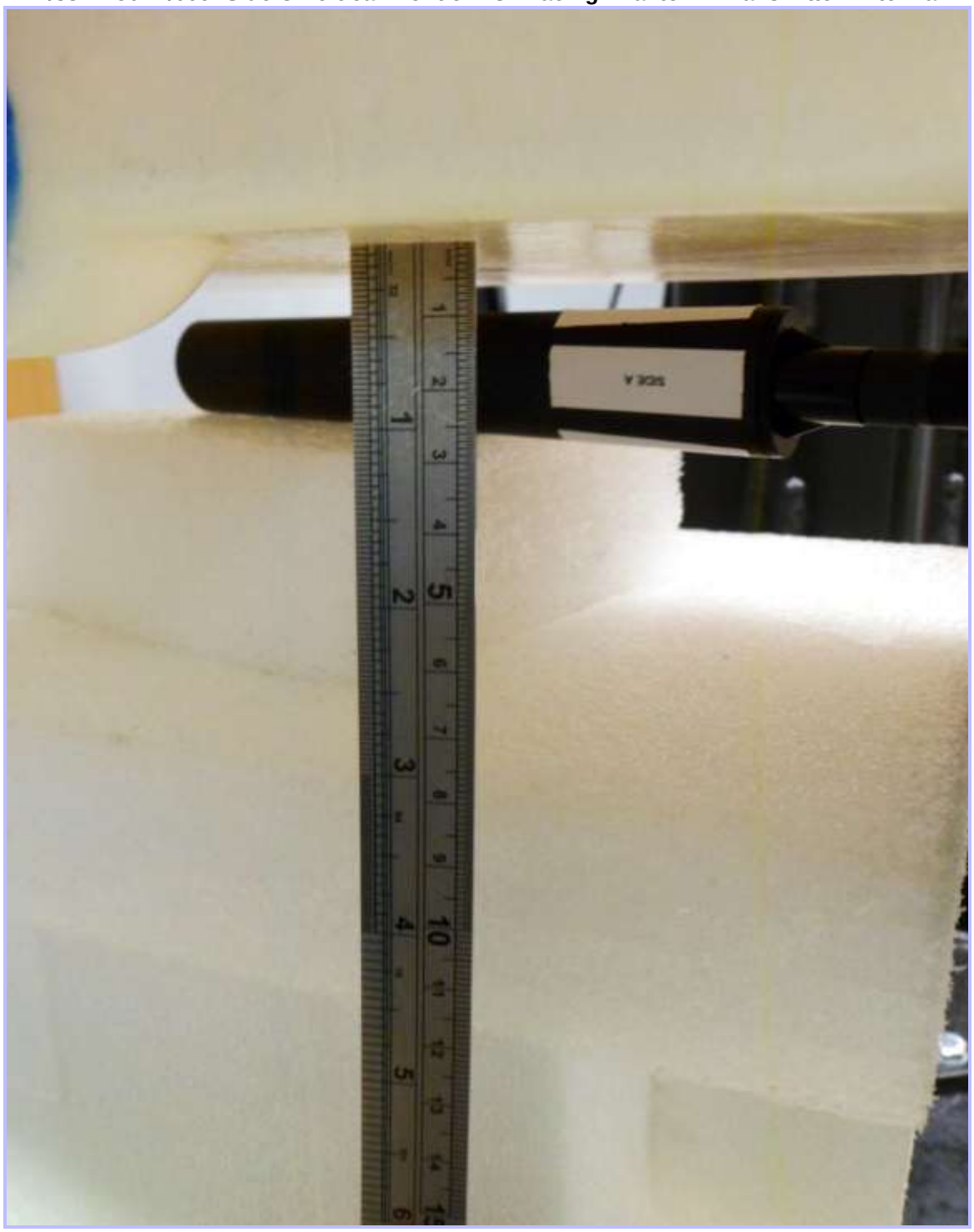
PHT/88727J02A/006: Top or Tip of EUT Facing Phantom - USB Dongle

PHT/88727J02A/007: Side A Horizontal-Up of EUT Facing Phantom - Transmitter Antenna

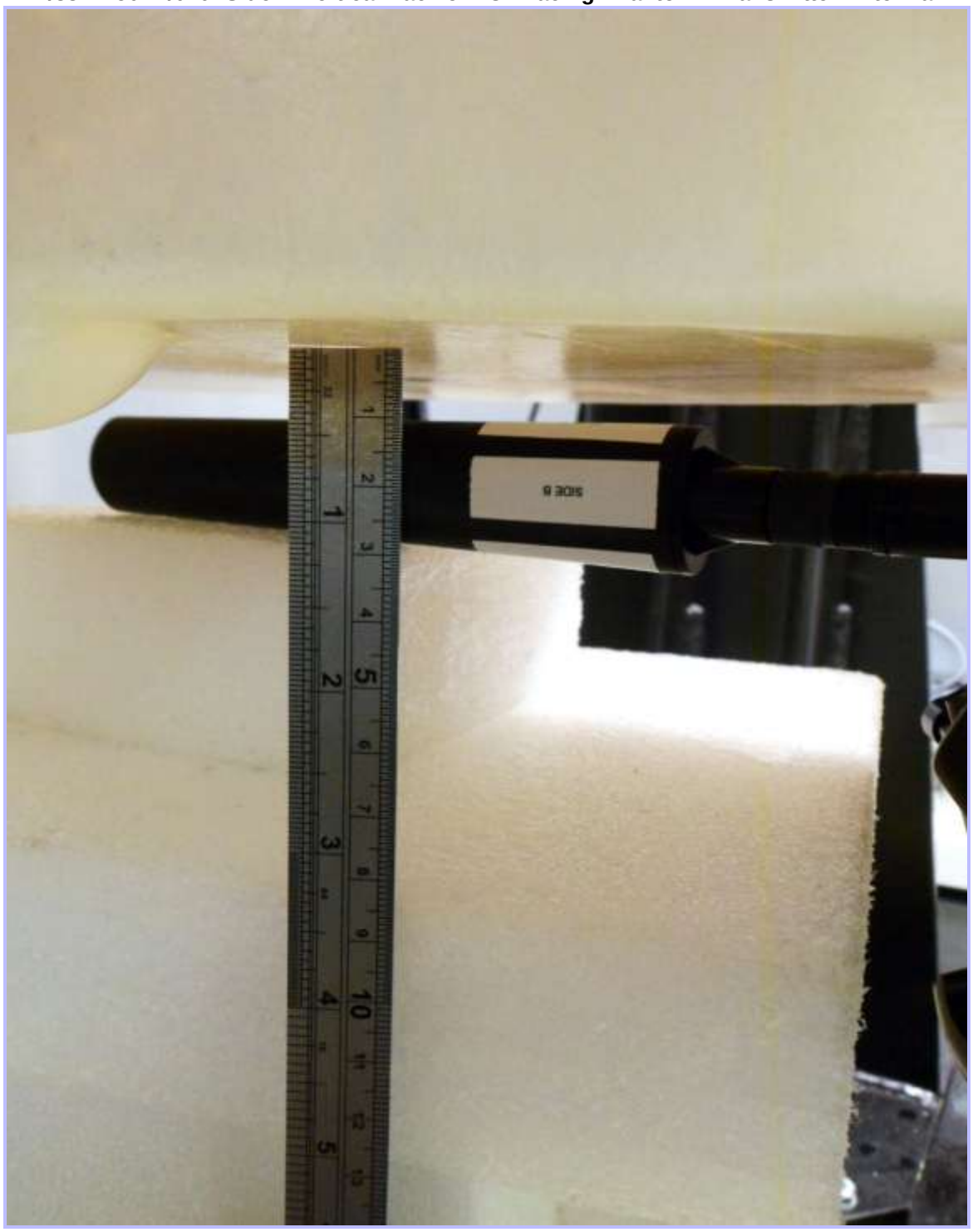
PHT/88727J02A/008: Side B Horizontal-Down of EUT Facing Phantom - Transmitter Antenna



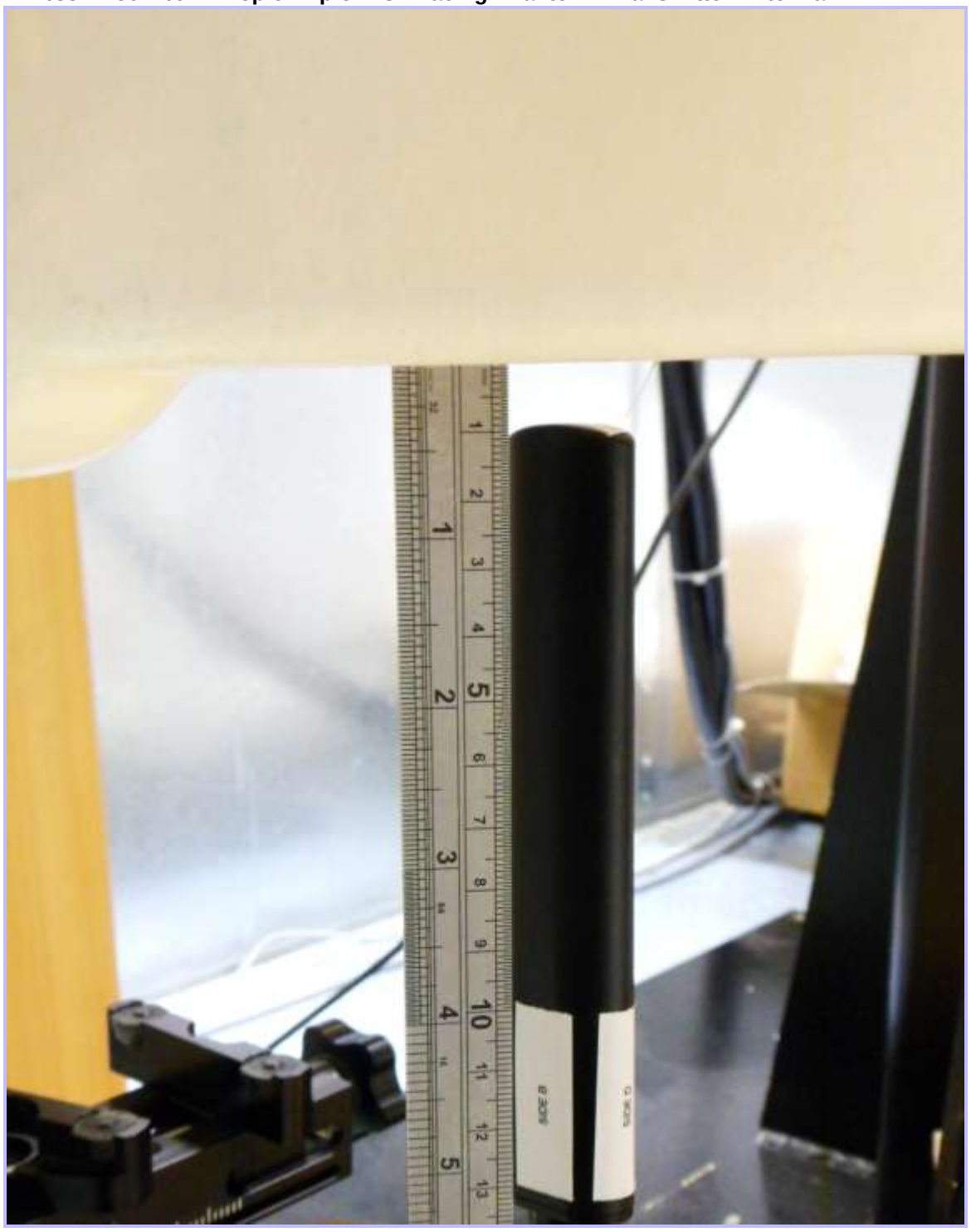
PHT/88727J02A/009: Side C Vertical Front of EUT Facing Phantom - Transmitter Antenna



PHT/88727J02A/010: Side D Vertical Back of EUT Facing Phantom - Transmitter Antenna

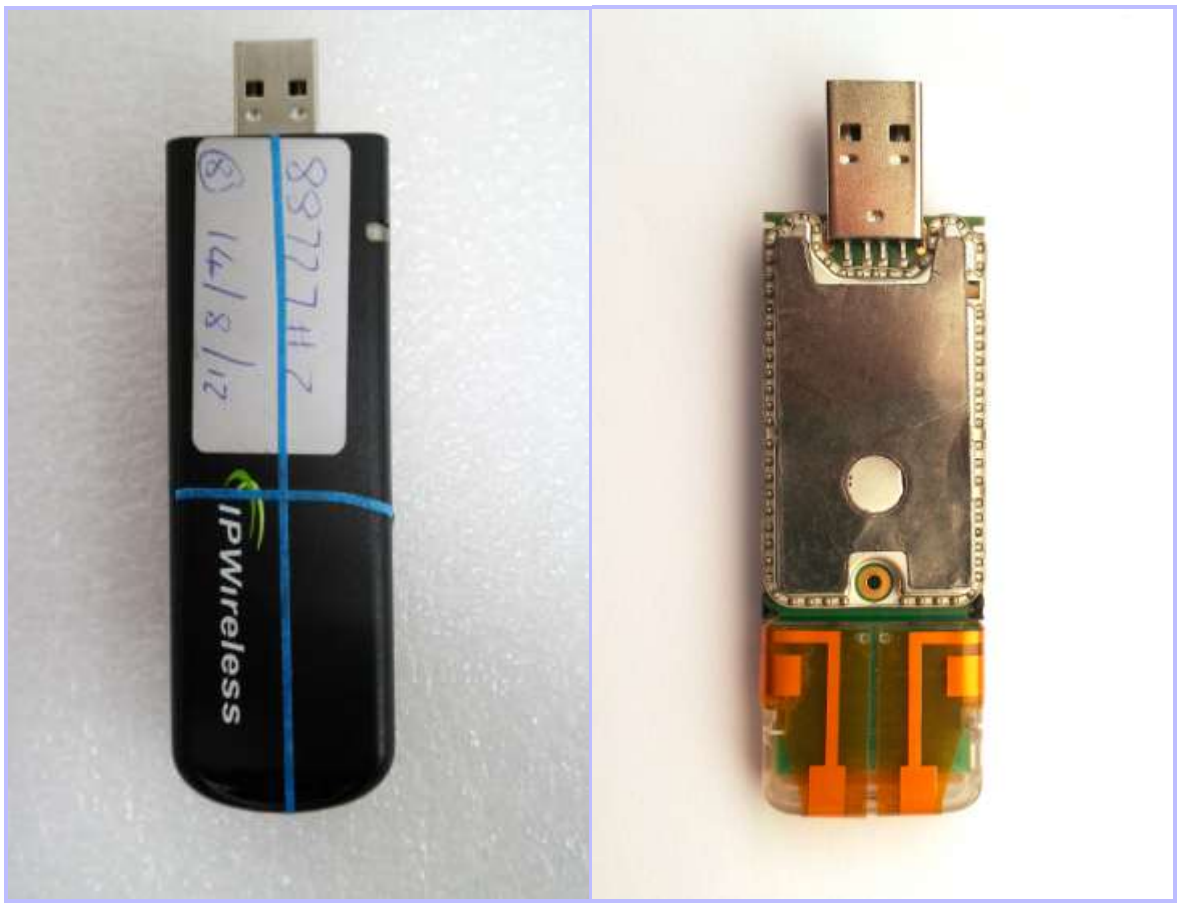


PHT/88727J02A/011: Top or Tip of EUT Facing Phantom - Transmitter Antenna



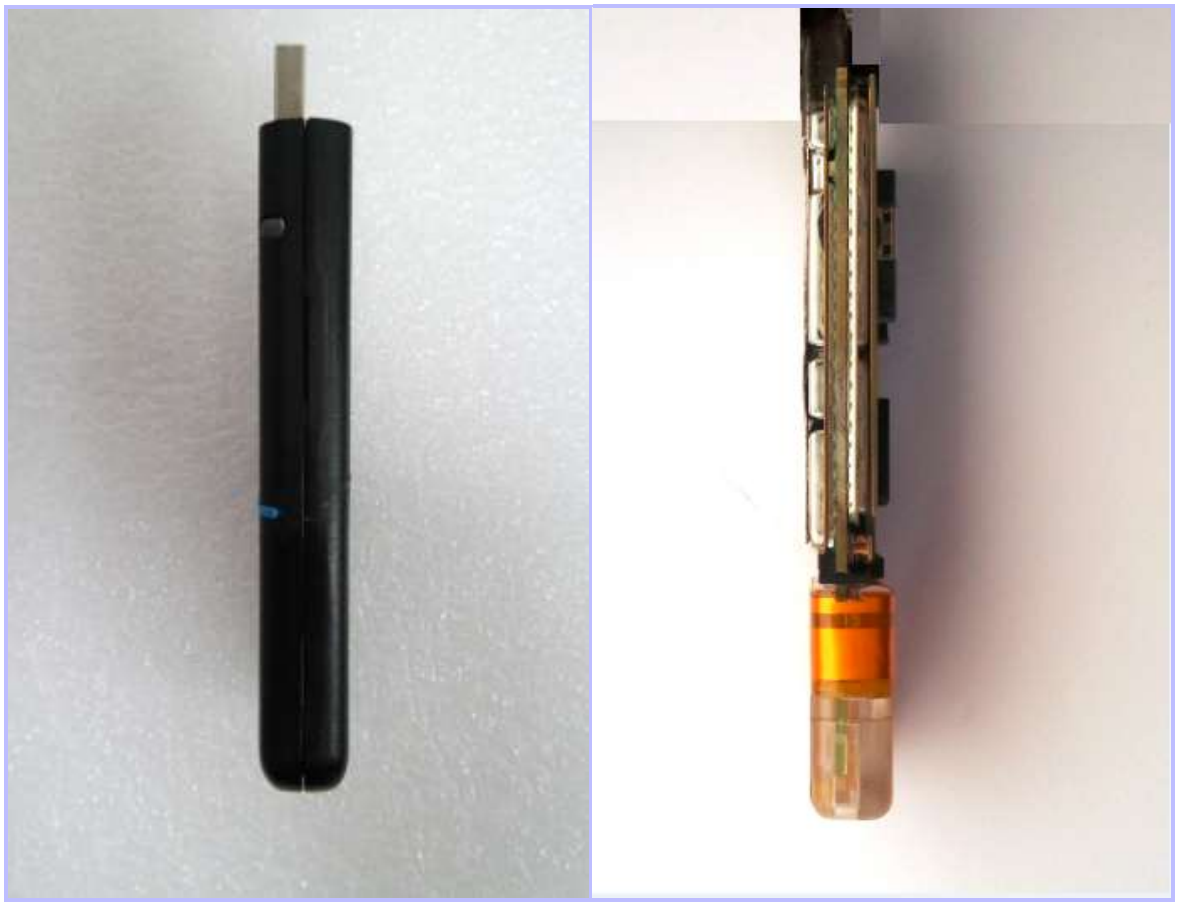
PHT/88727JD02/012: Side A Horizontal-Up View + Internal View of Horizontal-Up

PHT/88727JD02/013: Side B Horizontal-Down View + Internal View of Horizontal-Down



PHT/88727JD02/014: Side C Vertical- Front View+ Internal View of Vertical-Front

PHT/88727JD02/015: Side D Vertical-Back View + Internal View of Vertical-Back



PHT/88727J02A/016: Top or Tip View - USB Dongle

PHT/88727J02A/017: Internal View Of RF Ports

PHT/88727J02A/018: USB Extension View

PHT/88727J02A/019: Side A Horizontal-Up View - Transmitter Antenna

PHT/88727J02A/020: Side B Horizontal-Down View -Transmitter Antenna

PHT/88727J02A/021: Side C Vertical- Front View - Transmitter Antenna

PHT/88727J02A/022: Side D Vertical-Back View - Transmitter Antenna

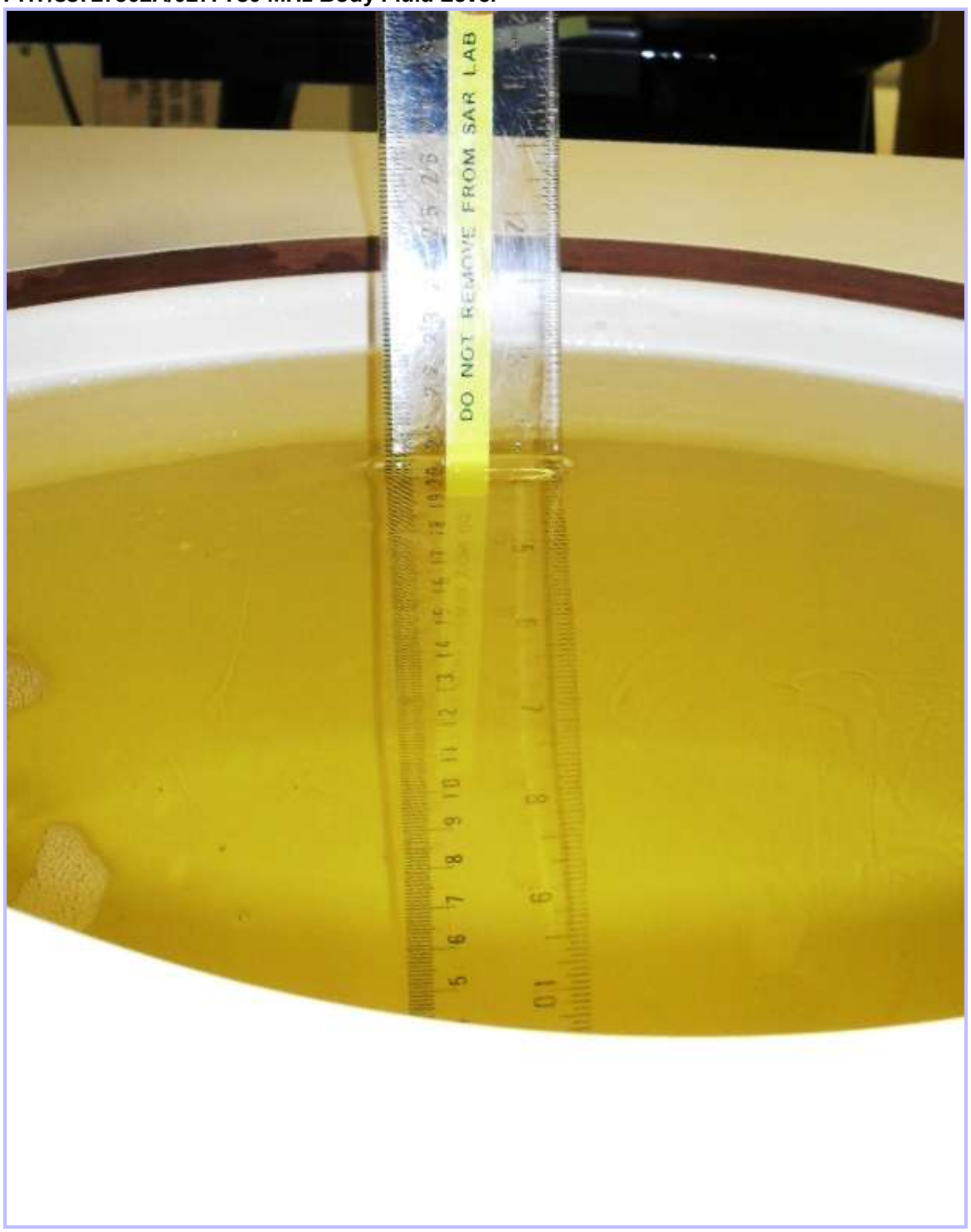
PHT/88727J02A/023: Top or Tip View - Transmitter Antenna

PHT/88727J02A/024: Transmitter Antenna View

PHT/88727J02A/025: Dell Latitude D620 Laptop View

PHT/88727J02A/026: Base of Dell Latitude D620 Laptop View

PHT/88727J02A/027: 750 MHz Body Fluid Level



Appendix 7. System Check

Prior to the assessment, the system was verified in the flat region of the phantom.
A 750 MHz dipole was used. A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of ±5% for the 750 MHz dipole.

The applicable verification normalised to 1 Watt.

System Check 750 Body

Date: 20/08/2012
Validation Dipole and Serial Number: D750V3; SN: 1011

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	750	24.0 ºC	22.8 ºC	ε_r	55.55	53.33	-4.00	5.00
				σ	0.96	0.94	-2.09	5.00
				1g SAR	8.84	8.68	-1.81	5.00
				10g SAR	5.84	5.84	0.00	5.00

Date: 22/08/2012
Validation Dipole and Serial Number: D750V3; SN: 1011

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	750	24.0 ºC	22.7 ºC	ε_r	55.55	53.34	-3.98	5.00
				σ	0.96	0.97	1.46	5.00
				1g SAR	8.84	8.72	-1.36	5.00
				10g SAR	5.84	5.84	0.00	5.00

Date: 18/10/2012
Validation Dipole and Serial Number: D750V3; SN: 1011

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	750	24.0 ºC	22.2 ºC	ε_r	55.55	53.87	-3.02	5.00
				σ	0.96	0.95	-0.61	5.00
				1g SAR	8.84	8.52	-3.62	5.00
				10g SAR	5.84	5.64	-3.42	5.00

System Check 750 Body (Continued):
Date: 27/10/2012
Validation Dipole and Serial Number: D750V3; SN: 1011

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	750	24.0 ºC	21.6 ºC	ε_r	55.55	54.89	-1.18	5.00
				σ	0.96	0.92	-4.15	5.00
				1g SAR	8.84	8.64	-2.26	5.00
				10g SAR	5.84	5.76	-1.37	5.00

Date: 29/10/2012
Validation Dipole and Serial Number: D750V3; SN: 1011

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	750	24.0 ºC	24.0 ºC	ε_r	55.55	57.17	2.92	5.00
				σ	0.96	0.95	-1.00	5.00
				1g SAR	8.84	8.92	0.90	5.00
				10g SAR	5.84	6.00	2.74	5.00

Date: 30/10/2012
Validation Dipole and Serial Number: D750V3; SN: 1011

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	750	23.0 ºC	21.0 ºC	ε_r	55.55	53.83	-3.10	5.00
				σ	0.96	1.00	4.68	5.00
				1g SAR	8.84	8.72	-1.36	5.00
				10g SAR	5.84	5.88	0.68	5.00

Date: 31/10/2012
Validation Dipole and Serial Number: D750V3; SN: 1011

Simulant	Frequency (MHz)	Room Temp	Liquid Temp	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
Body	750	23.0 ºC	21.0 ºC	ε_r	55.55	53.83	-3.10	5.00
				σ	0.96	1.00	4.68	5.00
				1g SAR	8.84	8.80	-0.45	5.00
				10g SAR	5.84	5.88	0.68	5.00

Appendix 8. Simulated Tissues

The body mixture consists of de-ionised water, Polysorbate 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
	750/835/850/900 MHz Body
De-Ionized Water	71.30
Polysorbate 20 (Tween 20)	28.00
Salt	0.70

Appendix 9. DASY4 System Details

RFI Global Services Ltd, SAR measurement facility utilises the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 system is coPower Back offised of the robot controller, computer, near-field probe, probe alignment sensor, and the SAM phantom containing brain or muscle equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller; teach pendant (Joystick), and remote control. This is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. The data acquisition electronics (DAE) performs signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection etc. The DAE is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card. The DAE3 utilises a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching mulitplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

A.9.1. DASY4 SAR System Specifications

Robot System	
Positioner:	Stäubli Unimation Corp. Robot Model: RX90L
Repeatability:	0.025 mm
No. of Axis:	6
Serial Number:	F00/SD89A1/A/01
Reach:	1185 mm
Payload:	3.5 kg
Control Unit:	CS7
Programming Language:	V+
Data Acquisition Electronic (DAE) System	
Serial Number:	DAE3 SN:432
PC Controller	
PC:	Dell Precision 340
Operating System:	Windows 2000
Data Card:	DASY4 Measurement Server
Serial Number:	1080
Data Converter	
Features:	Signal Amplifier, multiplexer, A/D converted and control logic.
Software:	DASY4 Software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock.
PC Interface Card	
Function:	24 bit (64 MHz) DSP for real time processing Link to DAE3 16 nit A/D converter for surface detection system serial link to robot direct emergency stop output for robot.

DASY4 SAR System Specifications (Continued)	
E-Field Probe	
Model:	EX3DV4
Serial No:	3814
Construction:	Triangular core
Frequency:	10 MHz to >6 GHz
Linearity:	±0.2 dB (30 MHz to 6 GHz)
Probe Length (mm):	330
Probe Diameter (mm):	12
Tip Length (mm):	20
Tip Diameter (mm):	2.5
Sensor X Offset (mm):	1
Sensor Y Offset (mm):	1
Sensor Z Offset (mm):	1
Phantom	
Phantom:	SAM Phantom
Shell Material:	Fibreglass
Thickness:	2.0 ±0.1 mm
E-Field Probe	
Model:	ES3DV3
Serial No:	3304
Construction:	Triangular core
Frequency:	10 MHz to 4.00GHz
Linearity:	±0.2 dB (30 MHz to 4.0 GHz)
Probe Length (mm):	337
Probe Diameter (mm):	10
Tip Length (mm):	10
Tip Diameter (mm):	4.0
Sensor X Offset (mm):	2.0
Sensor Y Offset (mm):	2.0
Sensor Z Offset (mm):	2.0
Phantom	
Phantom:	SAM Phantom
Shell Material:	Fibreglass
Thickness:	2.0 ±0.1 mm