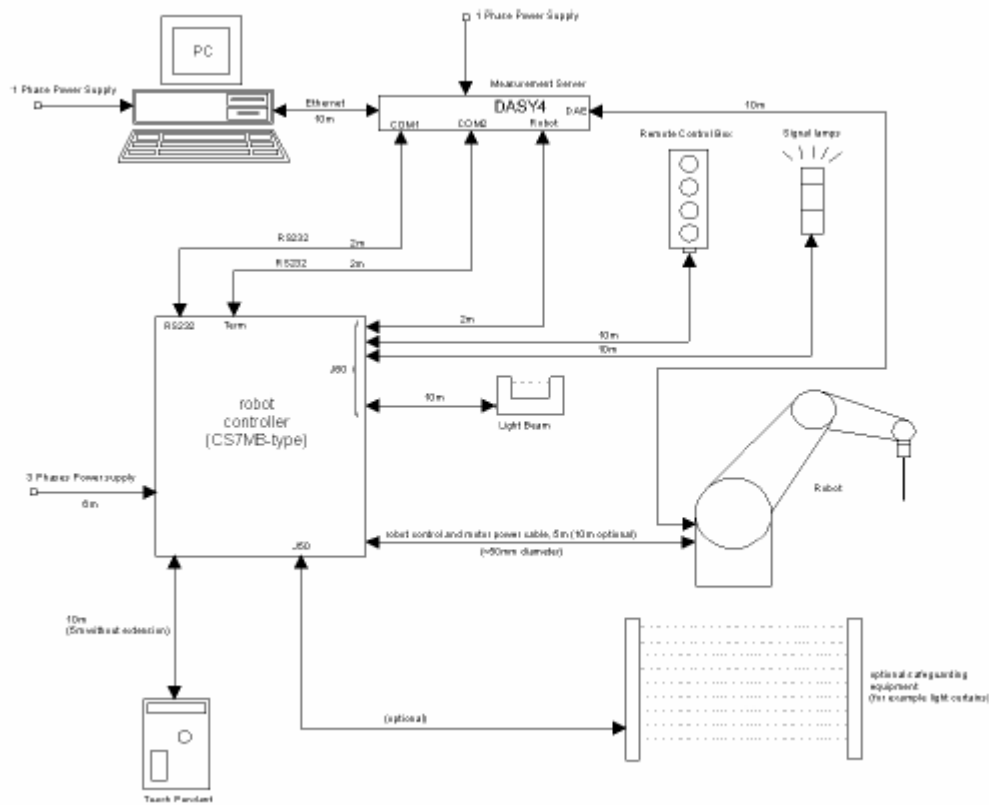


## 8. System Specifications and Calibration

### 8.1 System Specifications

Figure 8-1 shows a diagram of the Schmid & Partner DASY4 system.

**Figure 8-1 Diagram of DASY4 System, from S&P Applications Notes System Description and Setup**



#### Data Acquisition

Processor

Intel Pentium 4, 2.40 GHz

Operating System

MS Windows XP

Software

DASY4 V4.1 Build 47.1, Schmid & Partners Eng. AG,  
Switzerland  
SEMCAD V1.6 Build 115

## Surface Detection

## Optical and Mechanical

**E-Field Probe**

Offset tip to sensor center	2.7 mm
Offset surface to probe tip	$1.8 \pm 0.2$
Frequency	30 MHz to 3.0 GHz
Dynamic Range	5 $\mu$ W/g to 100 mW/g
Isotropy	$\pm 0.15$ dB (in brain liquid)

**Phantom**

Dielectric	EGSM band: Homogeneous sugar/salt/cellulose liquid DCS/IMT bands: Homogeneous water/glycol/salt liquid
Shell	2 mm $\pm$ 0.2 mm polyester fiber glass
Ear:	Integral model per SAM phantom specification

**8.2 Calibration**

Equipment Mfr & Type	Serial number	Last Calibrated	Next Calibration
Schmid & Partner Engineering AG Dosimetric E-field Probe, ET3DV5	1733	3 December 2002	3 December 2003
Schmid & Partner Engineering AG dipole validation kit, D1800V2	269	16 July 2003	16 July 2004
Schmid & Partner Engineering AG dipole validation kit, D900V2	083	17 July 2003	17 July 2004
Schmid & Partner Engineering AG Data Acquisition Electronics, DAE3 V1	566	23 May 2003	23 May 2004
Gigatronics 8541C RF Power Meter	1834580	17 October 2002	17 October 2003
Hewlett-Packard 8714C Vector Network Analyzer	US38171129	28 January 2003	28 January 2004
Hewlett-Packard 85070M Dielectric Probe System	N/A	N/A	N/A
835 Mhz Head Tissue Simulating Liquid	N/A	March 2003	N/A
835 Mhz Body Tissue Simulating Liquid	N/A	October 2002	N/A
1800/1900 Mhz Head tissue Simulating Liquid	N/A	July 2002	N/A
1800/1900 Mhz Body Tissue Simulating	N/A	January 2003	N/A

Liquid			
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## 9. Validations

### 9.1 General Validation Procedure

Validation scans were performed prior to testing of each different medium used. Prior to installing a body medium, a validation scan is performed using a corresponding head medium. A validation dipole antenna was selected that roughly matched the center frequency of the band being tested. A CW sine wave with a matching frequency is then applied to the antenna from a signal generator through an amplifier for a power level of 1 W (30 dBm). Validation SAR has a tolerance of  $\pm 5\%$ .

If testing of a particular frequency band took more than one day, a new validation scan was done prior to commencing with testing for the subsequent day.

### 9.2 Validation Data

Table 9-1 shows validation data for the respective days of the test program.

**Table 9-1 SAR Validation Data for QSEC-2700 Test Program**

Date	Frequency (MHz)	Permittivity ( $\epsilon_r$ )	Conductivity ( $\sigma$ )	1 g SAR (mW/g)		
				Measured	Target	Difference (%)
8/20/2003	1800	39.9	1.4	36.3	38.1	-4.7%
8/21/2003	1800	40.7	1.4	37.0	38.1	-2.9%
9/8/2003	900	39.8	0.94	11.3	10.8	4.6%
9/9/2003	900	40.0	0.94	10.8	10.8	0.0%
9/10/2003	900	39.6	0.94	11.0	10.8	1.9%
9/10/2003	1800	40.0	1.4	37.2	38.1	-2.4%
10/29/2003	1800	40.2	1.38	36.7	38.1	-3.6%
10/30/2003	900	40.3	0.94	10.3	10.8	-4.6%

### 9.3 Validation Plots

The following pages show validation plots for the respective days of the test program

Date/Time: 08/20/03 17:58:57

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20030820-Val1800MHz-30dBm.da4](#)

## 20030820-Val1800MHz-30dBm

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:269**  
**Program: System Performance Check at 1800 MHz**

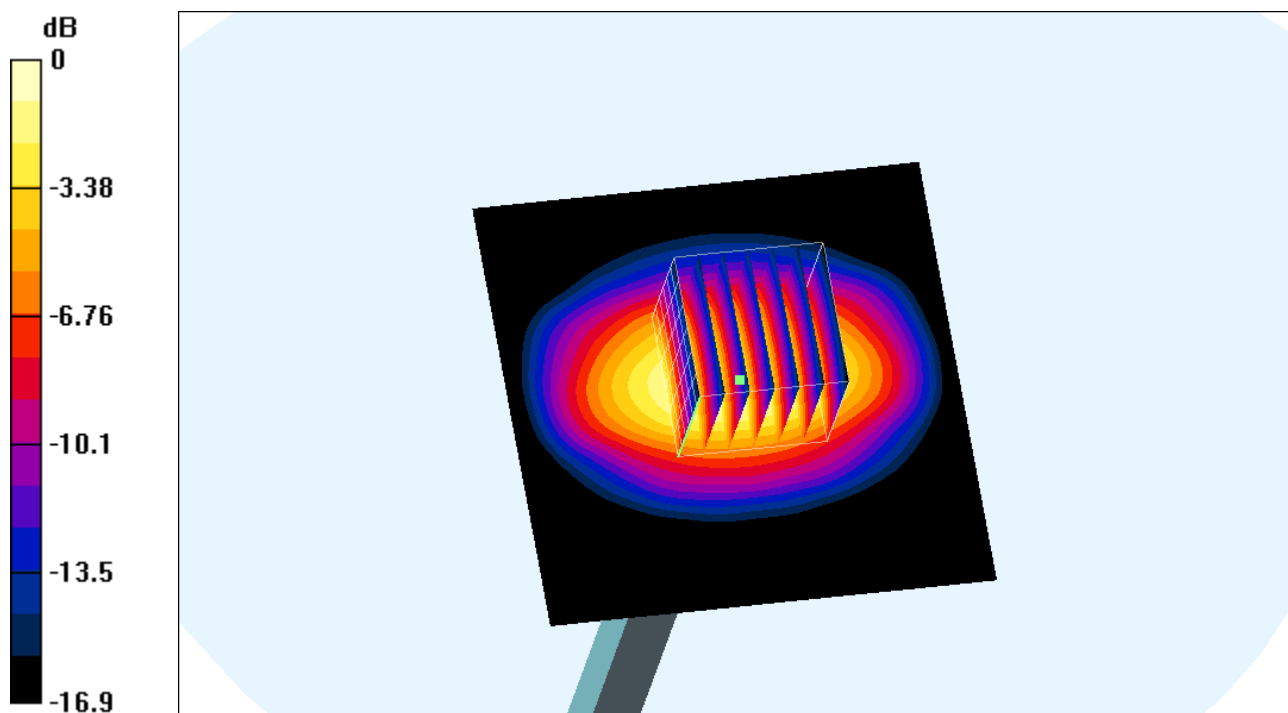
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1  
 Medium: HSL1800 ( $\sigma = 1.407$  mho/m,  $\epsilon_r = 39.8776$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

### DASY4 Configuration:

- Probe: ET3DV6 - SN1733; ConvF(5.4, 5.4, 5.4); Calibrated: 12/3/2002
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 5/23/2003
- Phantom: SAM with CRP; Type: SAM; Serial: 001
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=10mm, Pin=1 W/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 177.1 V/m  
 Power Drift = 0.06 dB  
 Maximum value of SAR = 40.3 mW/g

**d=10mm, Pin=1 W/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 64.9 W/kg  
 SAR(1 g) = 36.3 mW/g; SAR(10 g) = 18.8 mW/g  
 Reference Value = 177.1 V/m  
 Power Drift = 0.06 dB  
 Maximum value of SAR = 41 mW/g



0 dB = 41mW/g

Date/Time: 08/21/03 08:21:44

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20030821-Val1800MHz-30dBm.da4](#)

## 20030821-Val1800MHz-30dBm

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:269**  
**Program: System Performance Check at 1800 MHz**

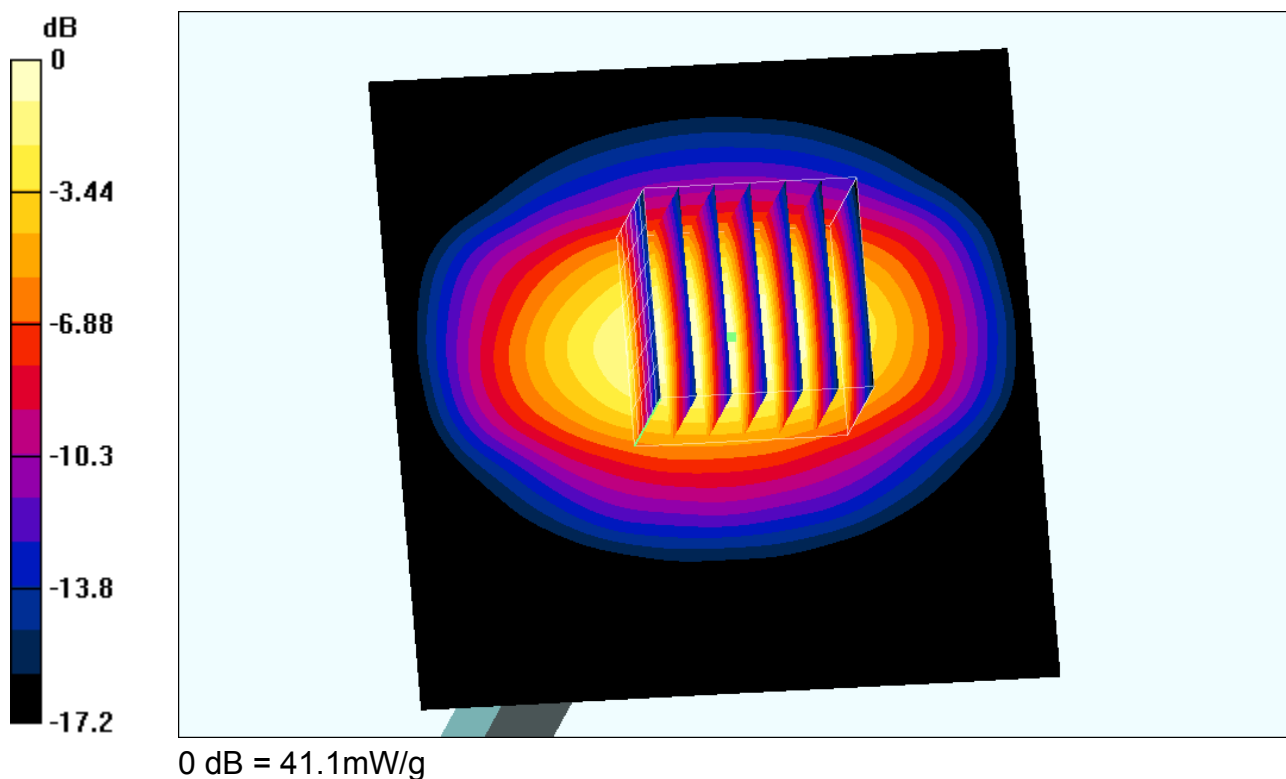
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1  
 Medium: HSL1800 ( $\sigma = 1.41$  mho/m,  $\epsilon_r = 40.724$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

### DASY4 Configuration:

- Probe: ET3DV6 - SN1733; ConvF(5.4, 5.4, 5.4); Calibrated: 12/3/2002
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 5/23/2003
- Phantom: SAM with CRP; Type: SAM; Serial: 001
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=10mm, Pin=1W/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 179.6 V/m  
 Power Drift = 0.01 dB  
 Maximum value of SAR = 41.6 mW/g

**d=10mm, Pin=1W/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 65.4 W/kg  
 SAR(1 g) = 37 mW/g; SAR(10 g) = 19.3 mW/g  
 Reference Value = 179.6 V/m  
 Power Drift = 0.01 dB  
 Maximum value of SAR = 41.1 mW/g



Date/Time: 09/08/03 11:54:24

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20030908-Val900MHz-30dBm.da4](#)

## 20030908-Val900MHz-30dBm

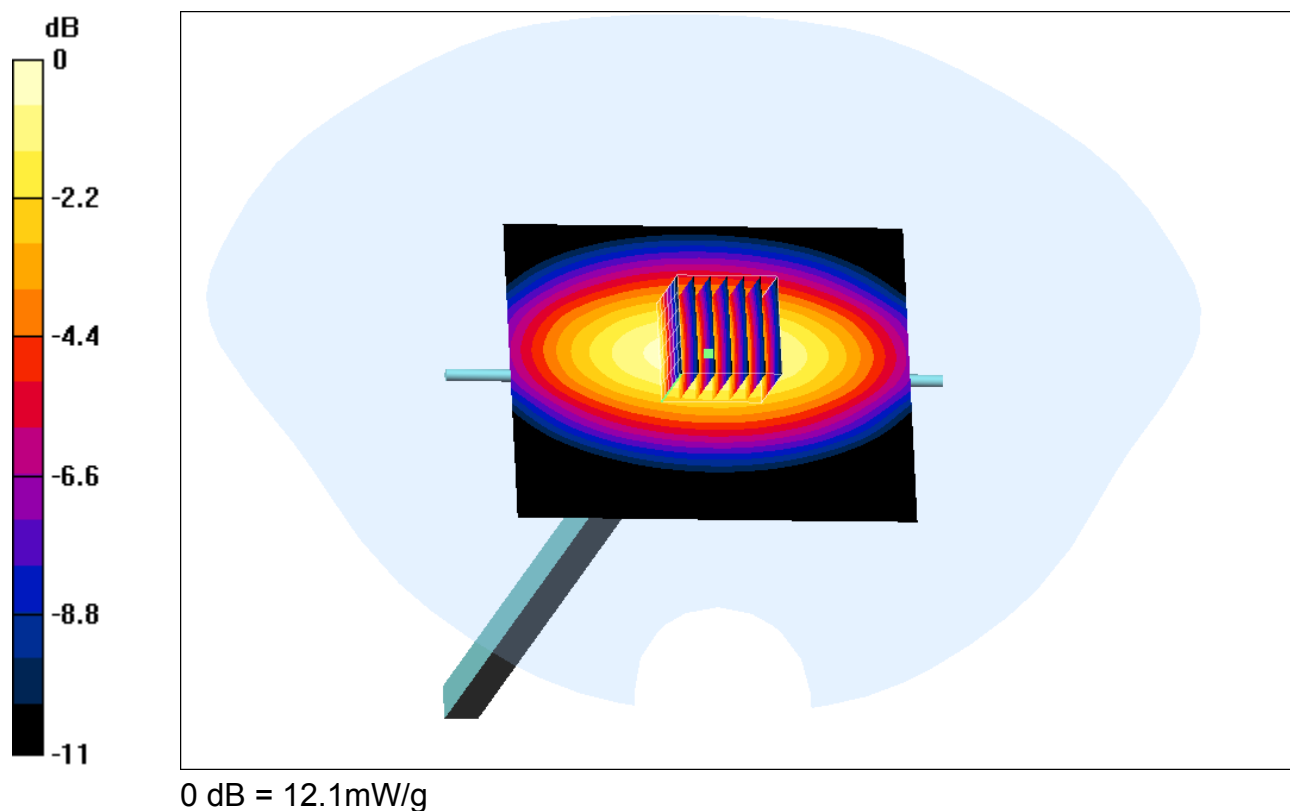
**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:083**  
**Program: System Performance Check at 900 MHz**

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1  
 Medium: HSL835 ( $\sigma = 0.939324$  mho/m,  $\epsilon_r = 39.8082$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: ET3DV6 - SN1733; ConvF(6.5, 6.5, 6.5); Calibrated: 12/3/2002  
 - Sensor-Surface: 4mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn566; Calibrated: 5/23/2003  
 - Phantom: SAM with CRP; Type: SAM; Serial: 001  
 - Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=15mm, Pin=1W/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 117.3 V/m  
 Power Drift = 0.02 dB  
 Maximum value of SAR = 11.8 mW/g

**d=15mm, Pin=1W/Zoom Scan (7x7x7)/(7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 16.9 W/kg  
 SAR(1 g) = 11.3 mW/g; SAR(10 g) = 7.17 mW/g  
 Reference Value = 117.3 V/m  
 Power Drift = 0.02 dB  
 Maximum value of SAR = 12.1 mW/g





Date/Time: 09/09/03 08:29:20

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20030909-Val900MHz-30dBm.da4](#)

## 20030909-Val900MHz-30dBm

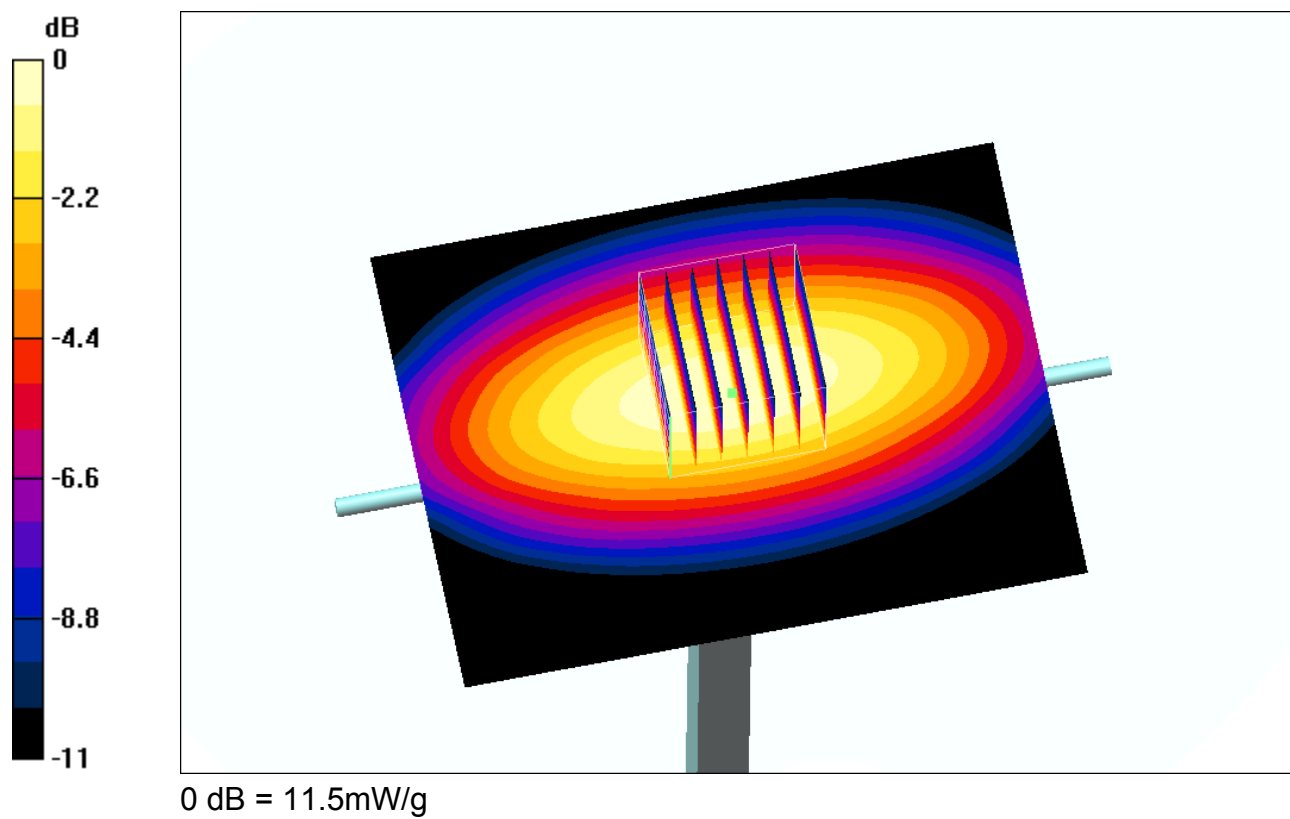
**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:083**  
**Program: System Performance Check at 900 MHz**

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1  
 Medium: HSL835 ( $\sigma = 0.944712$  mho/m,  $\epsilon_r = 39.9677$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: ET3DV6 - SN1733; ConvF(6.5, 6.5, 6.5); Calibrated: 12/3/2002  
 - Sensor-Surface: 4mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn566; Calibrated: 5/23/2003  
 - Phantom: SAM with CRP; Type: SAM; Serial: 001  
 - Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=15mm, Pin=1 W/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 115.8 V/m  
 Power Drift = -0.05 dB  
 Maximum value of SAR = 11.5 mW/g

**d=15mm, Pin=1 W/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 16.1 W/kg  
 SAR(1 g) = 10.8 mW/g; SAR(10 g) = 6.85 mW/g  
 Reference Value = 115.8 V/m  
 Power Drift = -0.05 dB  
 Maximum value of SAR = 11.5 mW/g



Date/Time: 09/10/03 09:10:31

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20030910-Val900MHz-30dBm.da4](#)

## 20030910-Val900MHz-30dBm

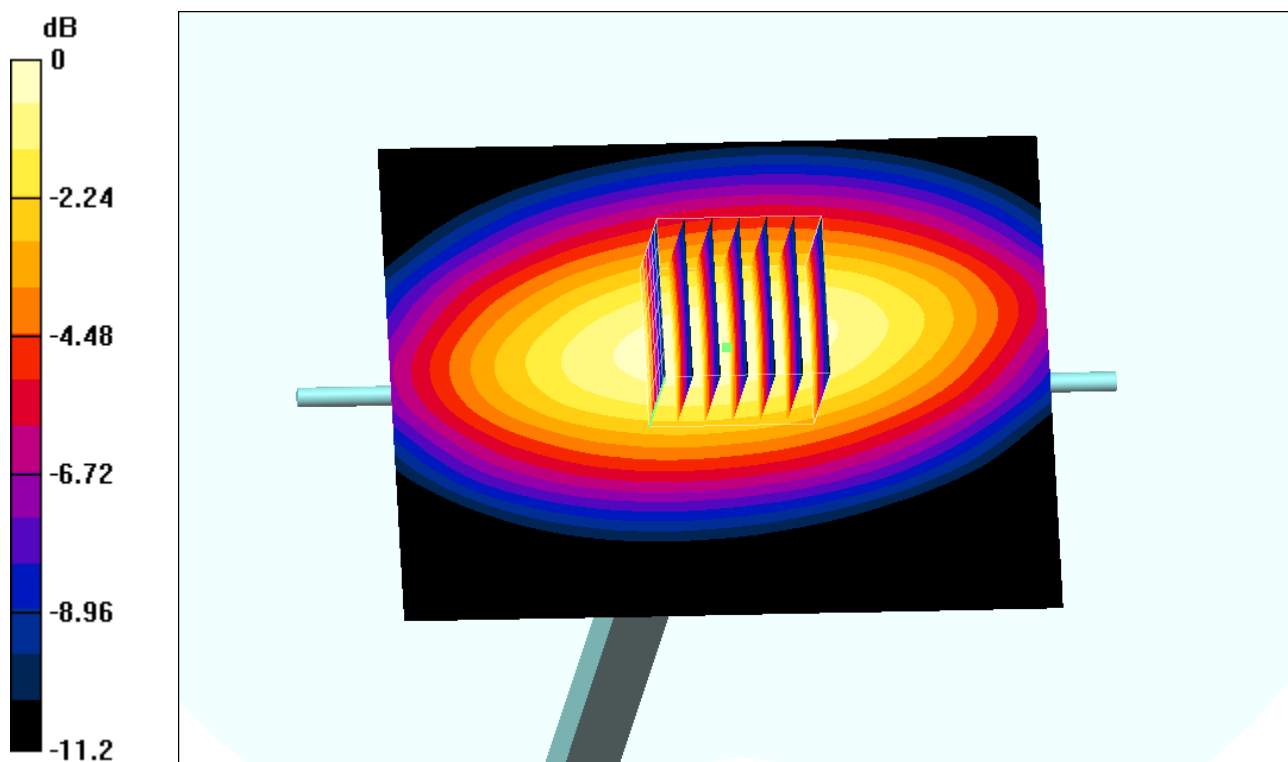
**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:083**  
**Program: System Performance Check at 900 MHz**

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1  
 Medium: HSL835 ( $\sigma = 0.938368$  mho/m,  $\epsilon_r = 39.6007$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: ET3DV6 - SN1733; ConvF(6.5, 6.5, 6.5); Calibrated: 12/3/2002  
 - Sensor-Surface: 4mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn566; Calibrated: 5/23/2003  
 - Phantom: SAM with CRP; Type: SAM; Serial: 001  
 - Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=15mm, Pin=1 W/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 116.2 V/m  
 Power Drift = -0.06 dB  
 Maximum value of SAR = 11.5 mW/g

**d=15mm, Pin=1 W/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 16.6 W/kg  
 SAR(1 g) = 11 mW/g; SAR(10 g) = 6.95 mW/g  
 Reference Value = 116.2 V/m  
 Power Drift = -0.06 dB  
 Maximum value of SAR = 11.8 mW/g



0 dB = 11.8mW/g

Date/Time: 09/10/03 15:39:39

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20030910-Val1800MHz-30dBm.da4](#)

## 20030910-Val1800MHz-30dBm

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:269**  
**Program: System Performance Check at 1800 MHz**

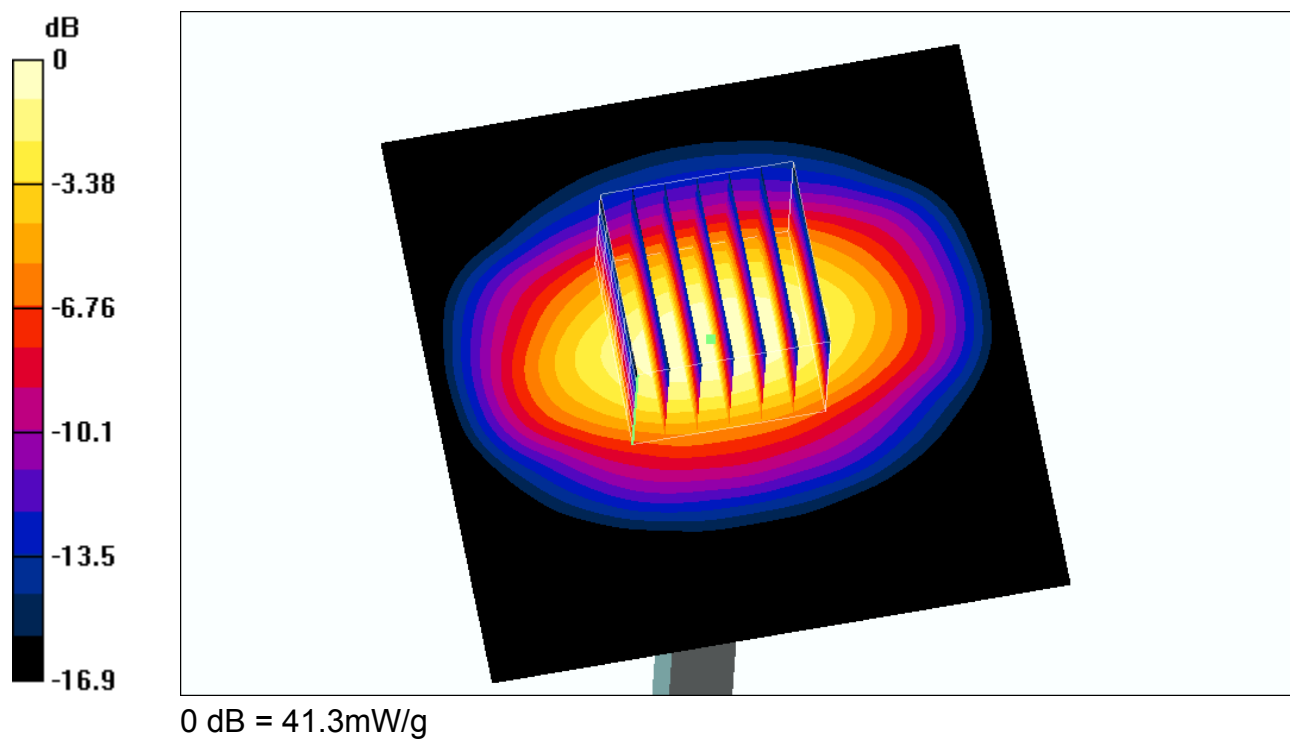
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1  
 Medium: HSL1800 ( $\sigma = 1.41064$  mho/m,  $\epsilon_r = 40.0268$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

### DASY4 Configuration:

- Probe: ET3DV6 - SN1733; ConvF(5.4, 5.4, 5.4); Calibrated: 12/3/2002
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 5/23/2003
- Phantom: SAM with CRP; Type: SAM; Serial: 001
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=10mm, Pin=1 W/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 180.3 V/m  
 Power Drift = -0.02 dB  
 Maximum value of SAR = 40.8 mW/g

**d=10mm, Pin=1 W/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 66.3 W/kg  
 SAR(1 g) = 37.2 mW/g; SAR(10 g) = 19.3 mW/g  
 Reference Value = 180.3 V/m  
 Power Drift = -0.02 dB  
 Maximum value of SAR = 41.3 mW/g



Date/Time: 10/29/03 12:21:05

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20031029-Val1800MHz-30dBm.da4](#)

## 20031029-Val1800MHz-30dBm

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:269**  
**Program: System Performance Check at 1800 MHz**

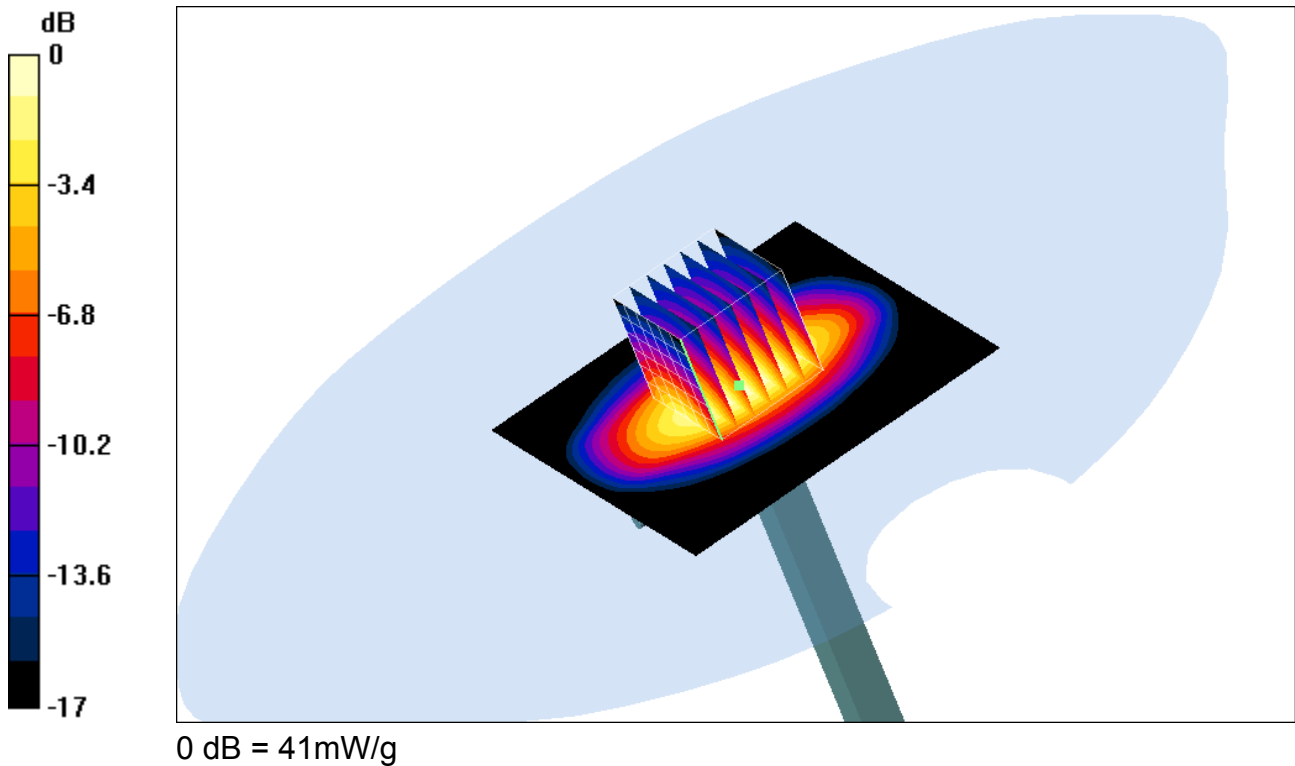
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1  
 Medium: HSL1800 ( $\sigma = 1.37664$  mho/m,  $\epsilon_r = 40.1686$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

### DASY4 Configuration:

- Probe: ET3DV6 - SN1733; ConvF(5.4, 5.4, 5.4); Calibrated: 12/3/2002
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn566; Calibrated: 5/23/2003
- Phantom: SAM with CRP; Type: SAM; Serial: 001
- Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=10mm, Pin=1 W/Area Scan (61x61x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 179.1 V/m  
 Power Drift = -0.02 dB  
 Maximum value of SAR = 40.3 mW/g

**d=10mm, Pin=1 W/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 66.4 W/kg  
 SAR(1 g) = 36.7 mW/g; SAR(10 g) = 19 mW/g  
 Reference Value = 179.1 V/m  
 Power Drift = -0.02 dB  
 Maximum value of SAR = 41 mW/g



Date/Time: 10/30/03 11:13:52

Test Laboratory: QUALCOMM Incorporated  
 File Name: [20031030-Val900MHz-30dBm.da4](#)

## 20031030-Val900MHz-30dBm

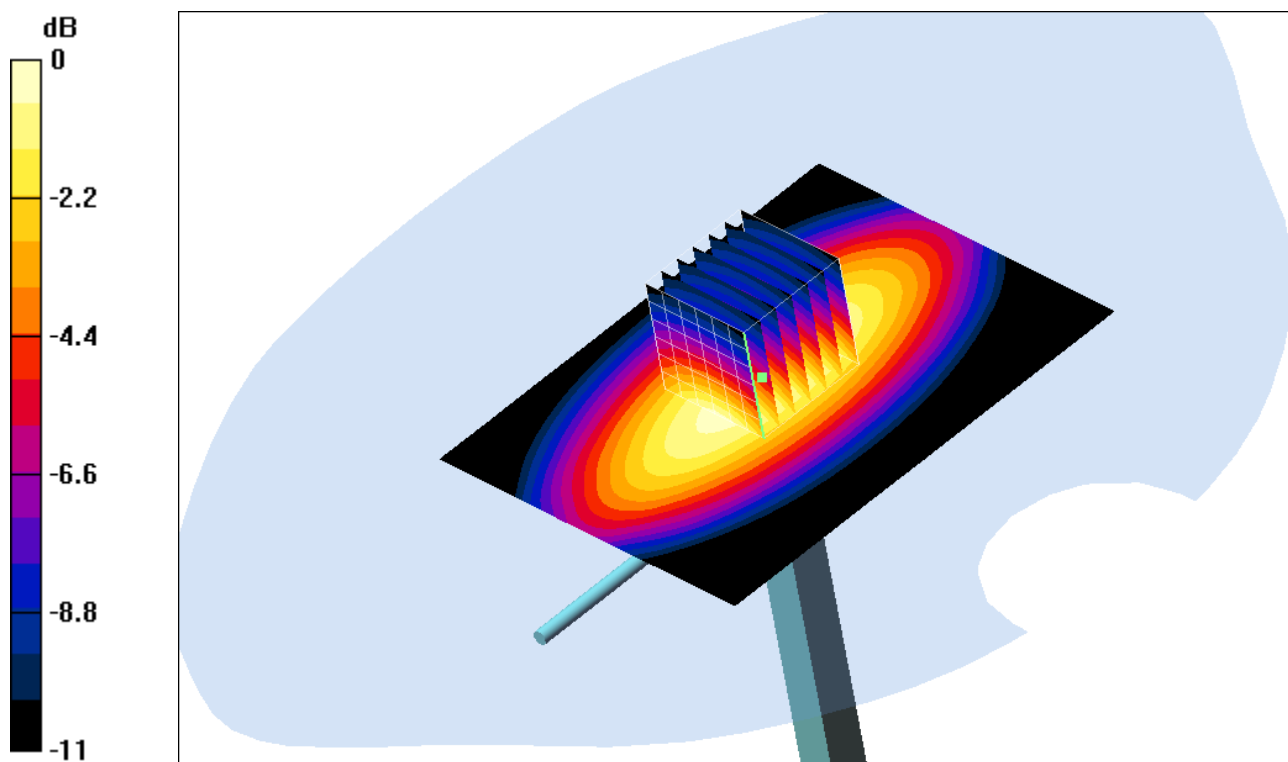
**DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:083**  
**Program: System Performance Check at 900 MHz**

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1  
 Medium: HSL835 ( $\sigma = 0.936315$  mho/m,  $\epsilon_r = 40.2993$ ,  $\rho = 1000$  kg/m<sup>3</sup>)  
 Phantom section: Flat Section

DASY4 Configuration:  
 - Probe: ET3DV6 - SN1733; ConvF(6.5, 6.5, 6.5); Calibrated: 12/3/2002  
 - Sensor-Surface: 4mm (Mechanical Surface Detection)  
 - Electronics: DAE3 Sn566; Calibrated: 5/23/2003  
 - Phantom: SAM with CRP; Type: SAM; Serial: 001  
 - Measurement SW: DASY4, V4.1 Build 47; Postprocessing SW: SEMCAD, V1.6 Build 115

**d=15mm, Pin=1 W/Area Scan (61x81x1):** Measurement grid: dx=15mm, dy=15mm  
 Reference Value = 113.2 V/m  
 Power Drift = -0.02 dB  
 Maximum value of SAR = 11 mW/g

**d=15mm, Pin=1 W/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Peak SAR (extrapolated) = 15.4 W/kg  
 SAR(1 g) = 10.3 mW/g; SAR(10 g) = 6.58 mW/g  
 Reference Value = 113.2 V/m  
 Power Drift = -0.02 dB  
 Maximum value of SAR = 11.1 mW/g



0 dB = 11.1mW/g