

# TEST REPORT

## 1. Applicant

**Name** : M Seven System Ltd.  
**Address** : 24F, Trust Tower Bldg, 275-7, Yangjae Dong, Seocho-gu, Seoul, 137-739, Korea

## 2. Products

**Name** : Digital Enhanced Cordless Telephone (mPERS)  
**Model** : ER10VW  
**Manufacturer** : MIC Korea Co., Ltd.

## 3. Test Standard

: FCC 47 CFR § 2.1093

## 4. Test Method

: IEEE 1528, OET Bulletin 65, Supplement C(July 2001)

## 5. Test Result

: Positive

## 6. Date of Application

: December 22, 2011

## 7. Date of Issue

: March 22, 2012

### Tested by



Jong-Gon Ban

Telecommunication Center  
Senior Engineer

*The test results contained apply only to the test sample(s) supplied by the applicant, and this test report shall not be reproduced in full or in part without approval of the KTL in advance.*

### Approved by



Jeong-Min Kim

Telecommunication Center  
Manager

# Korea Testing Laboratory

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## 1. EQUIPMENT UNDER TEST

### 1.1 Applicant (Client)

Name	M Seven System Ltd.
Address	24F, Trust Tower Bldg, 275-7, Yangjae Dong, Seocho-gu, Seoul, 137-739, Korea
Contact Person	CS Lee
Telephone No.	82 2 368 8023
Facsimile No.	82 2 2057 0183
E-mail address	cslee@m7system.com
Manufacturer	MIC Korea Co., Ltd.
Manufacturer Address	No. 813, 12th Daeryung Techno Town, 327-32, Gasan Dong, Geumcheon-gu, Seoul, KOREA

### 1.2 Description of Device

Name	Digital Enhanced Cordless Telephone (mPERS)
Model Name	ER10VW
FCC ID	XOEER10VW
Type of Modulation	UPCS (GFSK)
Maximum Conducted Power	19.74 dBm
Tx Frequency Range	1921.536 MHz ~ 1928.448 MHz
Number of Channels	5
Duty Cycle	1:24 (Normal voice call mode)/ 1:12 (Data mode)
Antenna Type	Internal Antenna
Serial No.	Prototype
FCC Classification	Part 15 Unlicensed PCS portable Tx held to ear (PUE)
Hardware Version	VW8M_3A.M01
Software Version	VW8M_MA02.27
<b>Maximum 1g SAR</b>	<b>0.026mW/g</b>

## 2. INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency(RF) radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emission due to FCC-regulated portable devices.[1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. (c) 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017.[2] The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave[3] is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements(NCRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields “NCRP Report No. 86 (c) NCRP, 1986, Bethesda, MD 20814.[4] SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

### 2.1 SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy ( $dU$ ) absorbed by (dissipated in) an incremental mass ( $dm$ ) contained in a volume element ( $dV$ ) of a given density( $p$ ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body. (see Figure.1)

$$SAR = \frac{d}{dt} \left( \frac{dU}{dm} \right) = \frac{d}{dt} \left( \frac{dU}{pdv} \right)$$

**Figure 1. SAR Mathematical Equation**

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \sigma E^2 / p$$

Where :

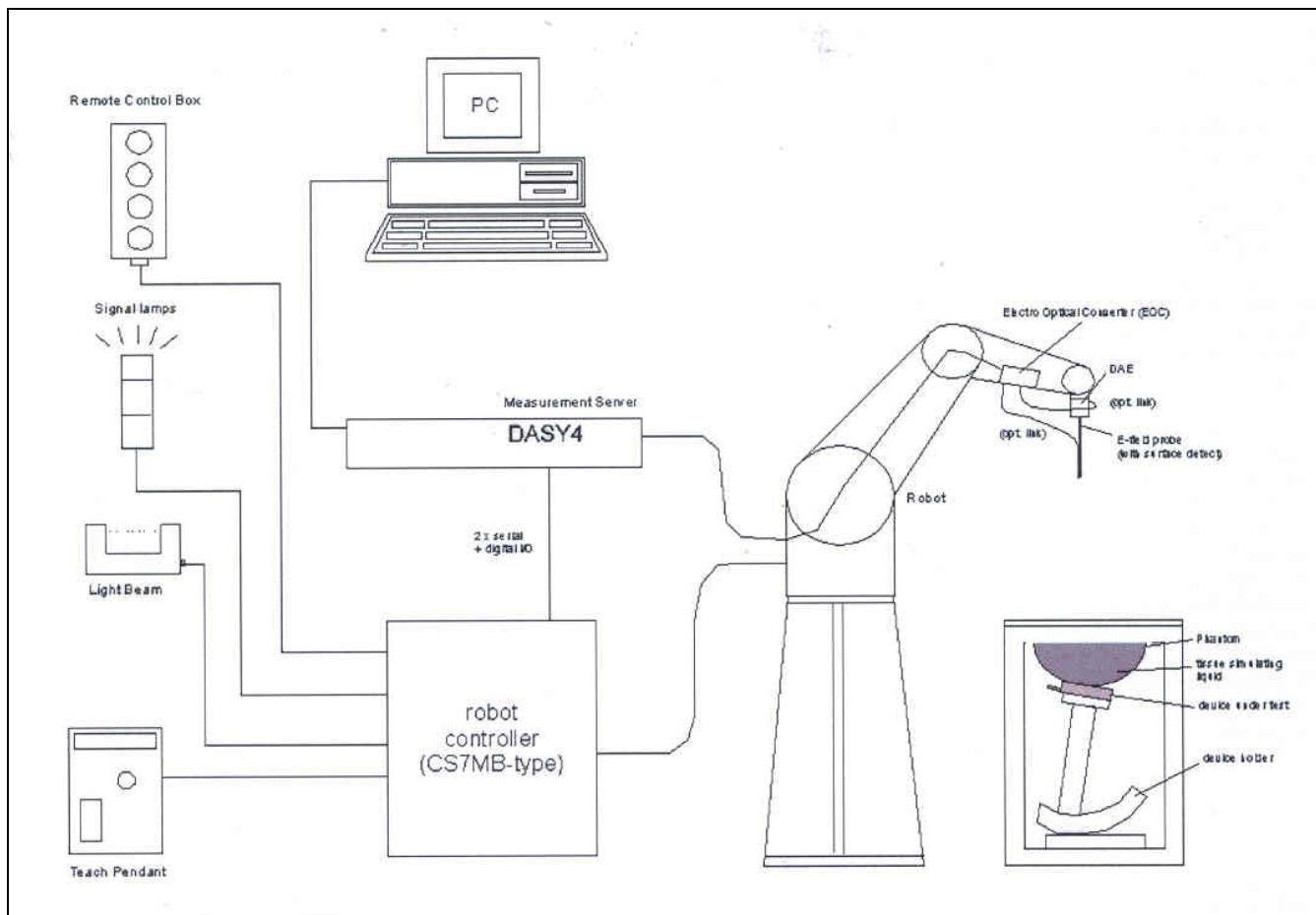
- $\sigma$  = conductivity of the tissue-simulant material (S/m)
- $p$  = mass density of the tissue-simulant material (kg/m<sup>3</sup>)
- $E$  = Total RMS electric field strength (V/m)

Note: The primary factors that control rate or energy absorption were found to be the wavelength of the incident field in realtions to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflectinf surfaces, and whether conductive contact is made by the organism with a ground plane.[4]

### **3. DESCRIPTION OF SAR MEASUREMENT SYSTEM**

#### **3.1 SAR Measurement System**

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Staubli), robot controller, measurement server, Measurement computer, near-field probe, probe alignment sensor, and the SAM twin phantom containing the brain 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) (see Fig.2).



**Figure 2. SAR Measurement System**

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, 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. The system is described in detail in [5].

### 3.2 E-Field Probe Type and Performance

The SAR measurements were conducted with the dosimetric probe ET3DV6, (see Figure 4) designed in the classical triangular configuration [5] and optimised for dosimetric evaluation. The probe has been constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical mortifier line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2<sup>nd</sup> order fitting. The approach is stopped at reaching the maximum.



Figure 3. Probe and DAE

#### Probe Specifications

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System Built-in shielding against static charges
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at Frequencies of 450 MHz, 900 MHz and 1.8 GHz (accuracy 8%)
Frequency	10 MHz to > 6 GHz; Linearity: 0.2 dB (30 MHz to 3 GHz)
Directivity	0.2 dB in brain tissue (rotation around probe axis) 0.4 dB in brain tissue (rotation normal probe axis)
Dynamic Range Linearity	5 uW/g to > 100 mW/g; 0.2 dB
Surface Detection	0.2 mm repeatability in air and clear liquids Over diffuse reflecting surfaces.
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dissymmetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

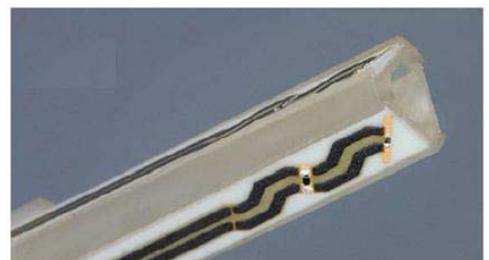


Figure 4. ET3DV6 E-Field Probe

### 3.3 Probe Calibration Process

#### Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described [6] with an accuracy better than +/- 10%. The spherical isotropy was evaluated with the procedure described in [7] and found to be better than +/- 0.25dB. The sensitivity parameters (NornX, NornY, NornZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

where:

$\Delta t$  = exposure time (30 seconds),

$C$  = heat capacity of tissue (brain or muscle),

$\Delta T$  = temperature increase due to RF exposure.

SAR is proportional to  $\Delta T / \Delta t$ , the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

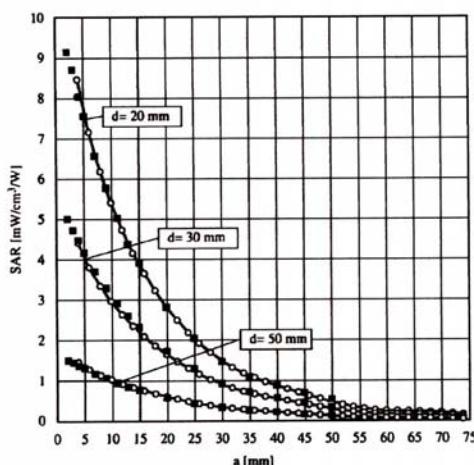


Figure B.1. E-Field and Temperature measurements at 900MHz[5]

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

where:

$\sigma$  = simulated tissue conductivity,

$\rho$  = Tissue density (1.25 g/cm³ for brain tissue)

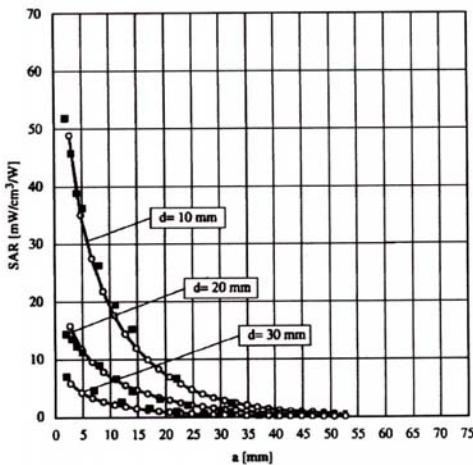


Figure B.2. E -field and temperature measurements at 1.8GHz[5]

### 3.4 Data Acquisition Electronics

The data acquisition electronics (DAE4) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. The input impedance of the DAE4 box is 200 Mohm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB. Transmission to the PC-card is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The mechanical probe-mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

### 3.5 Phantom Properties



The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users [9][10]. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Figure 5. SAM twin phantom

Phantom Properties	Requirement for specific EUT	Measured
Depth of Phantom	> 150 mm	200 mm
Width of flat section	> 10 cm (Twice EUT Width)	20 cm
Length of flat section	> 26 cm (Twice EUT Length)	30 cm
Thickness of flat section	2 mm ± 0.2 mm	2.08 ~ 2.20 mm

Table 1. Flat Section Properties of SAM Twin Phantom

### 3.6 Device Holder for DASY4

In combination with the SAM Phantom V4.0, the Mounting Device(POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatable positioned according to the FCC CENELEC specifications. The device holder can be locked at different phantom locations(left head, right head, flat phantom).

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations [10]. To produce the Worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.



Figure 4. Device Holder

### 3.7 Brain & Muscle Simulating Mixture Characteristic

The brain and muscle mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution (see Table 2). Preservation with bacteriocide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove [11].

Ingredients	1900MHz Brain	1900MHz Muscle
Water	55.24%	70.23%
Sugar	-	-
Salt	0.31%	0.29%
DGBE	44.45%	29.47%
Bacteriocide	-	-
HEC	-	-

Table 2. Composition of Tissue Equivalent Matter

### 4. System Verification

#### 4.1 Tissue Verification

The dielectric parameters of the brain and muscle simulating liquid were measured prior to SAR assessment using the HP85070D dielectric probe kit and Agilent 8753D Network Analyzer. The actual dielectric parameters are shown in the following table.

Freq. [MHz]	Liquid	Date	Liquid Temp [°C]	parameters	Target Value	Measured Value	Deviation (%)	Limit (%)
1900	Head	January 9, 2012	21.5	ε <sub>r</sub>	40.0	39.3	- 2.7	± 5
				σ	1.40	1.37	- 2.2	± 5
	Body	January 9, 2012	21.3	ε <sub>r</sub>	53.3	51.9	- 2.6	± 5
				σ	1.52	1.54	+ 1.3	± 5
		March 21, 2012	21.0	ε <sub>r</sub>	53.3	51.9	- 2.6	± 5
				σ	1.52	1.55	+ 2.0	± 5

Table 3. Measured Simulating Liquid Dielectric Values

The humidity and dielectric/ambient temperatures are recorded during the assessment of the tissue material dielectric parameters. The difference between the ambient temperature of the liquid during the dielectric measurement and the temperature during tests was less than |2|°C.

## 4.2 System Validation



**Figure 5. Validation setup**

Prior to the SAR assessment, the system validation kit was used to verify that the DASY4 was operating within its specifications. The validation dipoles are highly symmetric and matched at the centre frequency for the specified liquid and distance to the phantom. The accurate distance between the liquid surface and the dipole centre is achieved with a distance holder that snaps onto the dipole.

System validation is performed by feeding a known power level into a reference dipole, set at a known distance from the phantom. The measured SAR is compared to the theoretically derived level.

The reference SAR values are derived using a reference dipole and flat phantom suitable. The forward power into the reference dipole for each SAR validation was adjusted to 250 mW.

These reference SAR values are obtained from the IEEE Std. 1528 and are normalized to 1 W. The measured 1g(10g) SAR should be within 10 % of the expected target reference values shown in table 4 below.

System Validation Kit	Date	Tissue	Liquid Temp.(°C)	Ambient Temp.( °C)	Targeted SAR <sub>1g</sub> (mW/g)	Measured SAR 1 g (mW/g)	Deviation (%)
D1900V2 S/N:5d038	January 9, 2012	1900MHz Brain	21.5	21.0	39.70	37.80	- 4.8
	January 9, 2012	1900MHz Muscle	21.3	21.0	39.70	39.56	-0.4
	March 21, 2012	1900MHz Muscle	21.0	21.0	39.70	40.40	+1.7

**Table 4 : Deviation from Reference Validation Values**

During the SAR measurement process the liquid depth was maintained to a level of a least 15 tolerance of  $\pm 0.2\text{cm}$ .

The following photo shows the depth of the liquid depth of the liquid maintained during the testing.



**Figure 6. Liquid Depth**

### 4.3 Justification for Extended SAR Dipole Calibrations

According to maintaining return loss and impedance requirements per extended calibrations in KDB 450824, usage of SAR dipole calibrated less than 2 years ago but more than 1 year ago was confirmed.

#### KDB 450824 requirements

- a) return loss : < -20 dB, within 20% of prior calibration
- b) impedance : within  $5\Omega$  from prior calibration.

D1900V2 S/N:5d038				
Date of Measurement	Return Loss (dB)	$\Delta\%$	Impedance ( $\Omega$ )	$\Delta\Omega$
11/25/2010	-23.5	-	52.9	-
01/09/2012	-22.4	-4.7%	51.8	-1.1
03/21/2012	-22.5	-4.3%	51.9	-1.0

## 5. SAR MEASUREMENT PROCEDURE USING DASY4

The SAR evaluation was performed with the SPEAG DASY4 system. A summary of the procedure follows ;

- a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the EUT. The SAR at this point is measured at the start of the test and then again at the end of the test.
- b) The SAR distribution at the exposed side of the phantom is measured at a distance of 3.9 mm from the inner surface of the shell. The area covers the entire dimension of the EUT and the horizontal grid spacing is 15 mm x 15 mm( or 20mm x 20mm). The actual Area Scan has dimensions surrounding the test device. Based on this data, the area of the maximum absorption is determined by Spline interpolation.
- c) Around this point, a volume is assessed by measuring 5 x 5 x 7 (7 x 7 x 7) points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure ;
  - (i) The data at the surface are extrapolated, since the centre of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation is based on a least square algorithm[13]. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.
  - (ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot”- condition (in x, y and z-direction)[13][14]. The volume is integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.
  - (iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.
  - (iv) The SAR value at the same location as in Step (a) is again measured (If the value changed by more than 5%, the evaluation is repeated.)

## 6. MEASUREMENT UNCERTAINTY

The uncertainty analysis is based on the template listed in the IEEE Std 1528-2003 for both EUT SAR tests and Validation uncertainty. The measurement uncertainty of a specific device is evaluated independently and the total uncertainty for both evaluations (95 % confidence level) must be less than 25 %.

a	b	c	d	e= f(d,k)	f	g	h=cxf/e	i=cxg/e	k
Uncertainty Component	Sec.	Tol. (%)	Prob. Dist.	Div.	Ci (1 g)	Ci (10 g)	1 g Ui (± %)	10 g Ui (± %)	vi
<b>Measurement System</b>									
Probe Calibration (k=1)	E.2.1	5.9	N	1	1	1	5.9	5.9	∞
Axial Isotropy	E.2.2	4.7	R	√ 3	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	R	√ 3	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1.0	R	√ 3	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	R	√ 3	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1.0	R	√ 3	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	√ 3	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	√ 3	1	1	1.5	1.5	∞
RF Ambient Noise	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
RF Ambient Refections	E.6.1	3.0	R	√ 3	1	1	1.7	1.7	∞
Probe Positioner	E.6.2	0.4	R	√ 3	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	E.6.3	2.9	R	√ 3	1	1	1.7	1.7	∞
Algorithms for Max. SAR Evaluation	E.5	1.0	R	√ 3	1	1	0.6	0.6	∞
<b>Test Sample Related</b>									
Test Sample Positioning	E.4.2	2.9	N	1	1	1	2.9	2.9	145
Device Holder Uncertainty	E.4.1	3.6	N	1	1	1	3.6	3.6	5
Output Power Variation — SAR Drift Measurement	6.6.2	5.0	R	√ 3	1	1	2.9	2.9	∞
<b>Phantom and Tissue Parameters</b>									
Phantom Uncertainty (shape and thickness tolerances)	E.3.1	4.0	R	√ 3	1	1	2.3	2.3	∞
Liquid Conductivity — Deviation from target values	E.3.2	5.0	R	√ 3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity — Measurement uncertainty	E.3.3	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid Permititvity — Deviation from target values	E.3.2	5.0	R	√ 3	0.6	0.49	1.7	1.4	∞
Liquid Pemiittivity — Measurement uncertainty	E.3.3	2.5	N	1	0.6	0.49	1.5	1.2	∞
Cornbined standard Uncertainty			RSS				± 10.9	± 10.7	387
Expanded Uncertainty (95% CONFIDENCE LEVEL)			K=2				± 21.9	± 21.4	

**Table 5. EUT SAR Test - Uncertainty Budget for DASY4 Version V4.6 Build 19**

Estimated total measurement uncertainty for the DASY4 measurement system was ± 10.9 %.  
The extended uncertainty (K=2) was assessed to be ± 21.9 % based on 95 % confidence level.  
The uncertainty is not added to the measurement result.

## 7. Description of Test Position

### 7.1 Face Position

The device was positioned in the “Face” position with 10mm distance to the phantom.

### 7.2 Body Position

Body-worn operating configurations were tested with the belt-clip, wrist-strap and necklace-clip attached to the device and positioned against a flat phantom in a normal use configuration.

## 8. FCC RF Exposure Limits

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/Kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/Kg) or (mW/g)
SPATIAL PEAK SAR (Brain)	1.60	8.00
SPATIAL AVERAGE SAR (Whole Body)	0.08	0.40
SPATIAL PEAK SAR (Hand / Feet / Ankle / Wrist)	4.00	20.00

Table. 8 Safety Limits for Partial Body Exposure

NOTE 1 : **Whole-Body SAR** is averaged over the entire body, **partial-body SAR** is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. **SAR for hands, wrists, feet and ankles** is averaged over any 10 grams of tissue defined as a tissue volume in the shape of cube

NOTE 2 : At frequencies above 6.0 GHz, SAR limits are not applicable and MPE limits for power density should be applied at 5 cm or more from the transmitting device.

NOTE 3 : The time averaging criteria for field strength and power density do not apply to general population SAR limit of 47 CFR § 2.1093.

## 9. SAR MEASUREMENT RESULTS

### 1) UP-CS Head SAR Measurement Results

◆ Date of Test: Jan. 9<sup>th</sup>, 2012

- Mixture Type: 1900MHz Brain
- Ambient Temperature (C): 21.0
- Liquid Temperature (C) : 21.5
- Humidity (%): 45

Mode	Position	Distance	Single/ Double slots	Frequency		SAR 1g (W/kg)	Limit
				MHz	CH		
UP-CS	Face Front	10 mm	single slot	1921.536	1	0.0044	1.6 W/kg
				1924.992	3	0.0041	1.6 W/kg
				1928.448	5	0.0042	1.6 W/kg

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration
2. All modes of operation were investigated and the worst-case are reported.
3. Battery was fully charged for all readings.
4. Test Signal Call mode: Base Station Simulator (CMD60)
5. Duty Cycle: 24 (EUT operates in single slot for voice call mode)
6. Depth of simulation Tissue is 15.0 cm ± 0.2 cm

## 2) UP-CS Body SAR Measurement Results

◆ Date of Test: Jan. 9<sup>th</sup>, 2012

- Mixture Type: 1900MHz Muscle
- Ambient Temperature (C): 21.0
- Liquid Temperature (C) : 21.3
- Humidity (%): 45

Mode	Position	Distance	Single/ Double slots	Frequency		SAR 1g (W/kg)	Limit
				MHz	CH		
UP-CS	Body Rear	0mm Necklace-clip	single slot	1924.992	3	0.0150	1.6 W/kg
		0mm Wrist-strap	single slot	1924.992	3	0.0073	1.6 W/kg
		0mm Belt-clip	single slot	1924.992	3	0.0096	1.6 W/kg

◆ Date of Test: Mar. 21<sup>st</sup>, 2012

- Mixture Type: 1900MHz Muscle
- Ambient Temperature (C): 21.0
- Liquid Temperature (C) : 21.0
- Humidity (%): 46

Mode	Position	Distance	Single/ Double slots	Frequency		SAR 1g (W/kg)	Limit
				MHz	CH		
UP-CS	Body Rear	0mm Necklace-clip	double slots	1924.992	3	<b>0.026</b>	1.6 W/kg
		0mm Wrist-strap	double slots	1924.992	3	0.014	1.6 W/kg
		0mm Belt-clip	double slots	1924.992	3	0.016	1.6 W/kg

### NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated and the worst-case are reported.
3. Battery was fully charged for all readings.
4. Test Signal Call mode: Base Station Simulator (CMD60)
5. Duty Cycle: 1:24 (EUT operates in single slot for voice call mode)  
1:12 (EUT operates in double slots for data mode)
6. Depth of simulation Tissue is 15.0 cm ± 0.2 cm
7. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode.  
If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 0.8 W/kg), testing at the high and low channels is optional.

## **10. CONCLUSION**

The SAR evaluation indicates that ER10VW complies with the RF radiation exposure limits of the FCC in UPCS mode. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

## 11. EQUIPMENT LIST AND CALIBRATION DETAILS

Equipment Type	Manufacturer	Model Number	Serial Number	Calibration Due	Used For this Test?
Robot - Six Axes	Staubli	RX60	N/A	N/A	Yes
Robot Remote Control	SPEAG	CS7MB	F03/5U96A1 /C/01	N/A	Yes
SAM Twin Phantom	SPEAG	TP1276	QD000P40CA	N/A	Yes
Flat Phantom V4.4	SPEAG	QD000P44BA, BB	1001, higher	N/A	No
Data Acquisition Electronics	SPEAG	DAE4	559	2013.01.23	Yes
Probe E-Field	SPEAG	ES3DV3	3020	2013.01.26	Yes
Antenna Dipole 835 MHz	SPEAG	D835V2	481	2013.03.15	No
Antenna Dipole 900 MHz	SPEAG	D900V2	194	2013.11.18	No
Antenna Dipole 1800 MHz	SPEAG	D1800V2	2d066	2013.04.18	No
Antenna Dipole 1900 MHz	SPEAG	D1900V2	5d038	2012.11.25	Yes
Antenna Dipole 1950 MHz	SPEAG	D1950V2	1027	2012.04.20	No
Antenna Dipole 2450 MHz	SPEAG	D2450V2	746	2012.04.19	No
High power RF Amplifier	EMPOWER	2057-BBS3Q5KCK	1002D/C0321	2013.02.07	Yes
Digital Communication Tester	R&S	CMD60	842989/006	2013.02.08	Yes
Signal Generator	Agilent	8648C	3629U00868	2013.02.10	Yes
RF Power Meter Dual	Hewlett Packard	E4419A	GB37170495	2013.02.08	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	US37299851	2013.02.15	Yes
RF Power Sensor 0.01 - 18 GHz	Hewlett Packard	8481A	3318A92872	2013.02.15	Yes
S-Parameter Network Analyzer	Agilent	8753D	3410A07251	2013.03.07	Yes
Dual Directional Coupler	Hewlett Packard	778D	1144AO4576	2013.02.12	Yes
Directional Coupler	Agilent	773D	MY28390213	2013.02.12	No
Bluetooth Test Set	Anritsu	MT8852B	6K00006994	2013.01.28	No

## 12. REFERENCES

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## APPENDIX A. SAR PLOTS

- **Test Laboratory: KTL**
- **D1900V2: HEAD 1900MHz Validation**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.5 °C, Ambient Temperature: 21.0 °C**

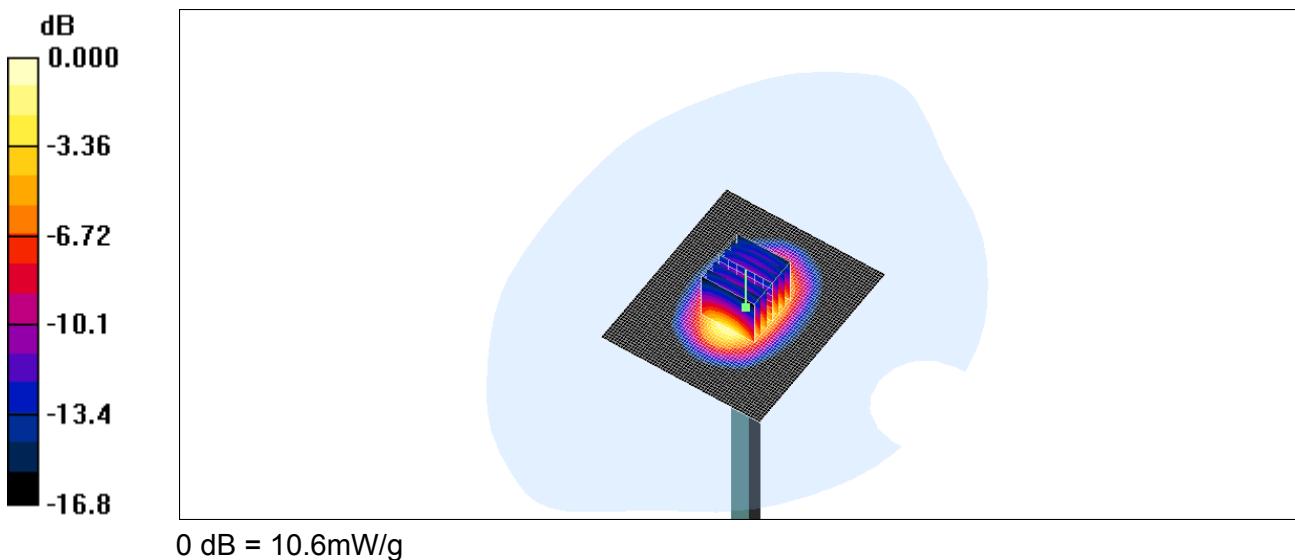
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1  
Medium: HSL1900 Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.37$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.9, 4.9, 4.9); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 12.7 mW/g

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 93.1 V/m; Power Drift = -0.374 dB  
Peak SAR (extrapolated) = 17.2 W/kg  
**SAR(1 g) = 9.45 mW/g; SAR(10 g) = 5 mW/g**  
Maximum value of SAR (measured) = 10.6 mW/g



- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: FACE 10mm distance to Phantom 1CH – single slot**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.5 °C, Ambient Temperature: 21.0 °C**

Communication System: UPCS1900; Frequency: 1921.36 MHz; Duty Cycle: 1:24

Medium: HSL1900 Medium parameters used:  $f = 1921.36$  MHz;  $\sigma = 1.38$  mho/m;  $\epsilon_r = 39.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.9, 4.9, 4.9); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.007 mW/g

**Z Scan (1x1x16):** Measurement grid: dx=20mm, dy=20mm, dz=20mm

Maximum value of SAR (interpolated) = 0.002 mW/g

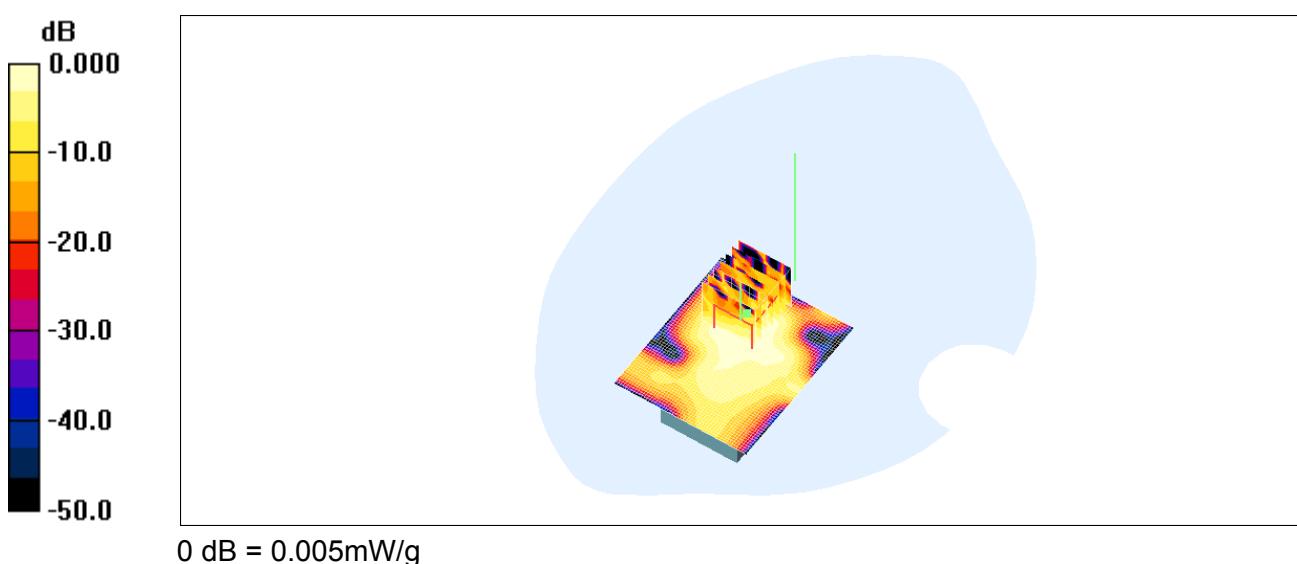
**M7 face 1CH 2 2/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

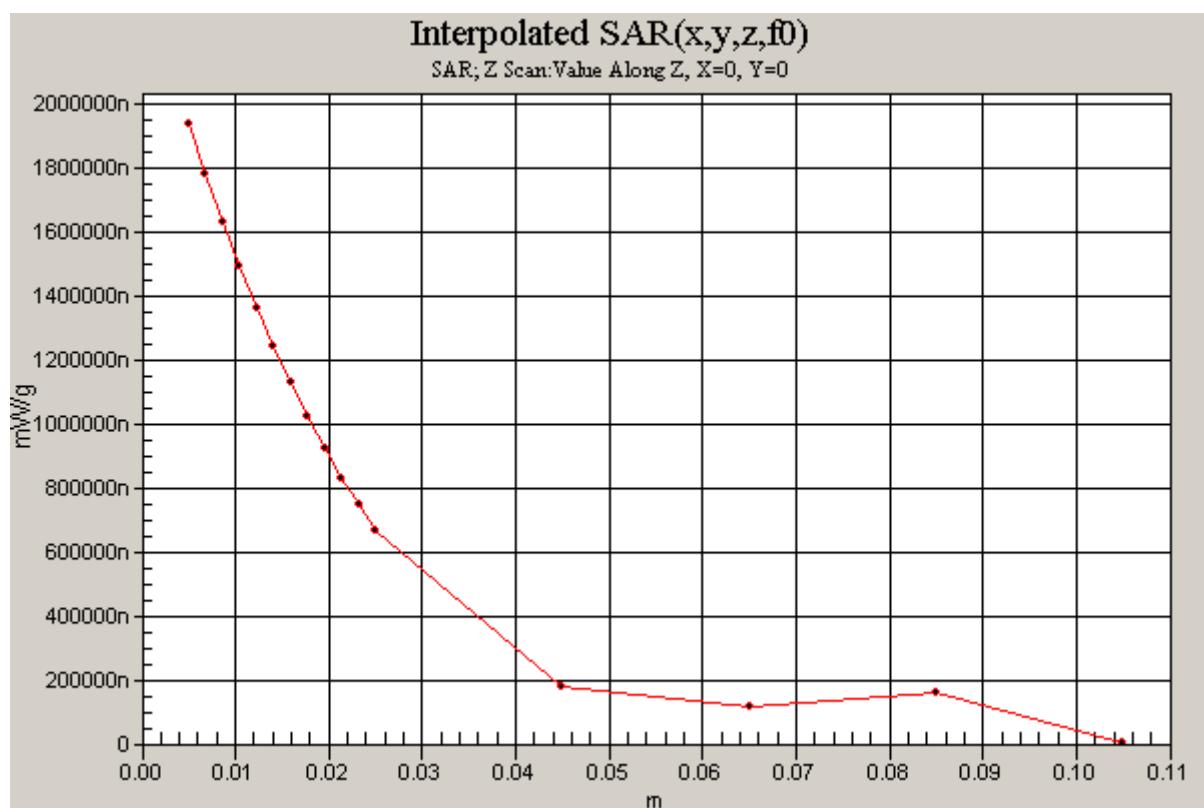
Reference Value = 0.235 V/m; Power Drift = 0.172 dB

Peak SAR (extrapolated) = 0.008 W/kg

**SAR(1 g) = 0.00443 mW/g; SAR(10 g) = 0.00214 mW/g**

Maximum value of SAR (measured) = 0.005 mW/g





- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: FACE 10mm distance to Phantom 3CH – single slot**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.5 °C, Ambient Temperature: 21.0 °C**

Communication System: UPICS1900; Frequency: 1924.99 MHz; Duty Cycle: 1:24

Medium: HSL1900 Medium parameters used:  $f = 1924.99$  MHz;  $\sigma = 1.38$  mho/m;  $\epsilon_r = 39.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.9, 4.9, 4.9); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.006 mW/g

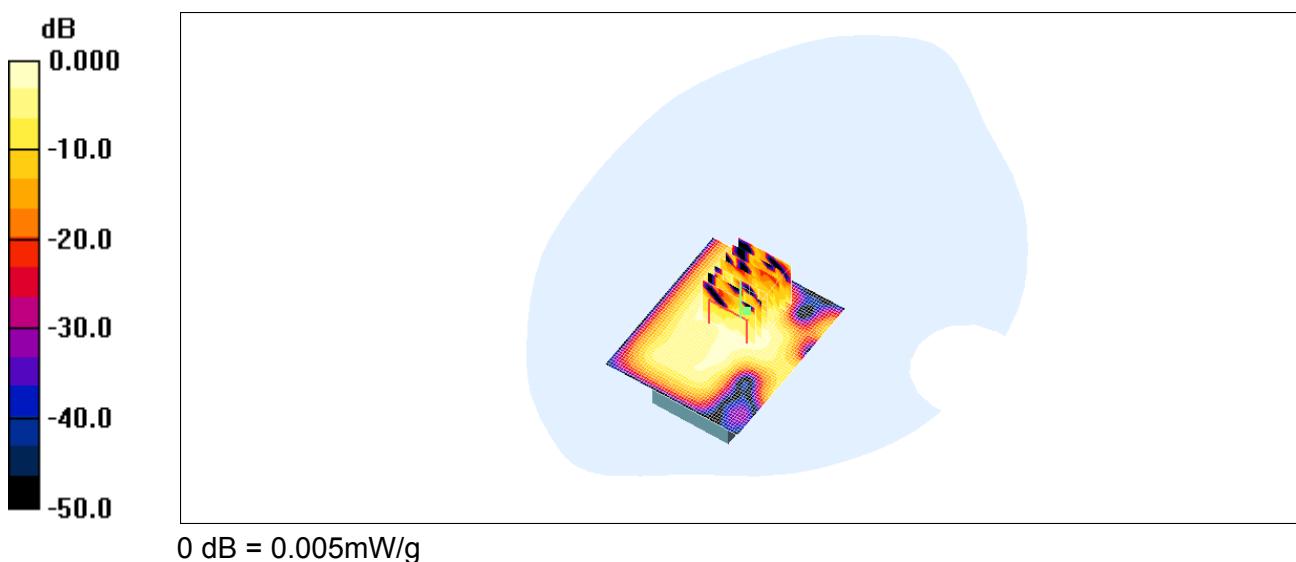
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.436 V/m; Power Drift = 0.121 dB

Peak SAR (extrapolated) = 0.009 W/kg

**SAR(1 g) = 0.00407 mW/g; SAR(10 g) = 0.00208 mW/g**

Maximum value of SAR (measured) = 0.005 mW/g



- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: FACE 10mm distance to Phantom 5CH – single slot**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.5 °C, Ambient Temperature: 21.0 °C**

Communication System: UPKS1900; Frequency: 1928.45 MHz; Duty Cycle: 1:24

Medium: HSL1900 Medium parameters used:  $f = 1928.45$  MHz;  $\sigma = 1.38$  mho/m;  $\epsilon_r = 39.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.9, 4.9, 4.9); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.007 mW/g

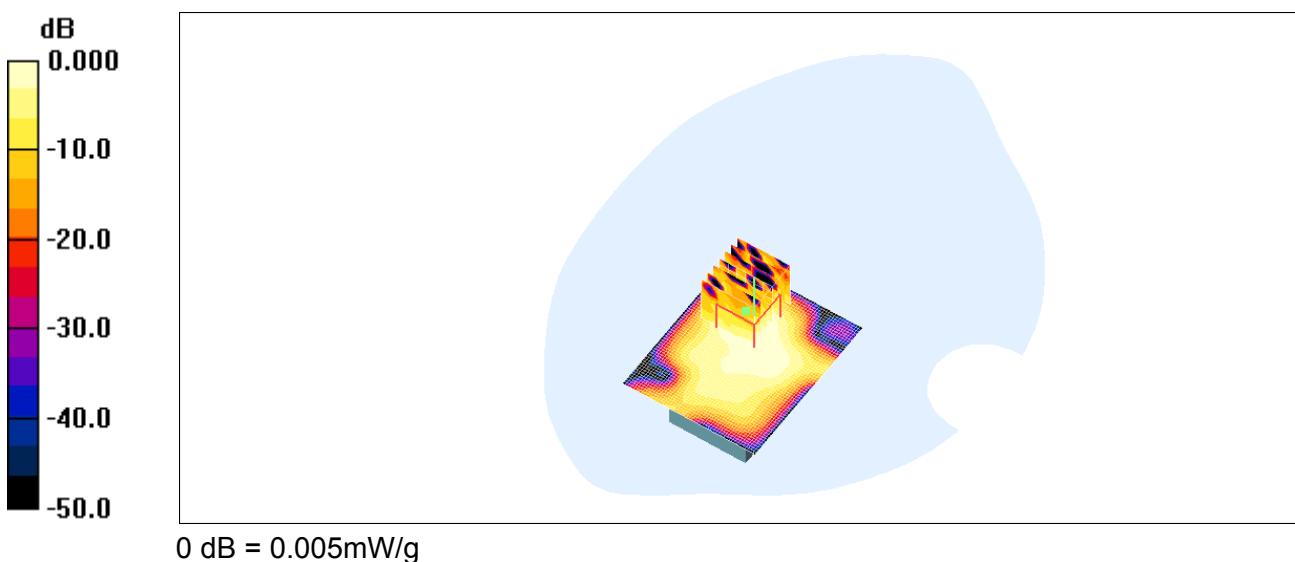
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.338 V/m; Power Drift = 0.141 dB

Peak SAR (extrapolated) = 0.014 W/kg

**SAR(1 g) = 0.00424 mW/g; SAR(10 g) = 0.00198 mW/g**

Maximum value of SAR (measured) = 0.005 mW/g



- **Test Laboratory: KTL**
- **D1900V2: BODY 1900MHz Validation**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.3 °C, Ambient Temperature: 21.0 °C**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1  
Medium: MSL1900 Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.54$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.36, 4.36, 4.36); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 11.9 mW/g

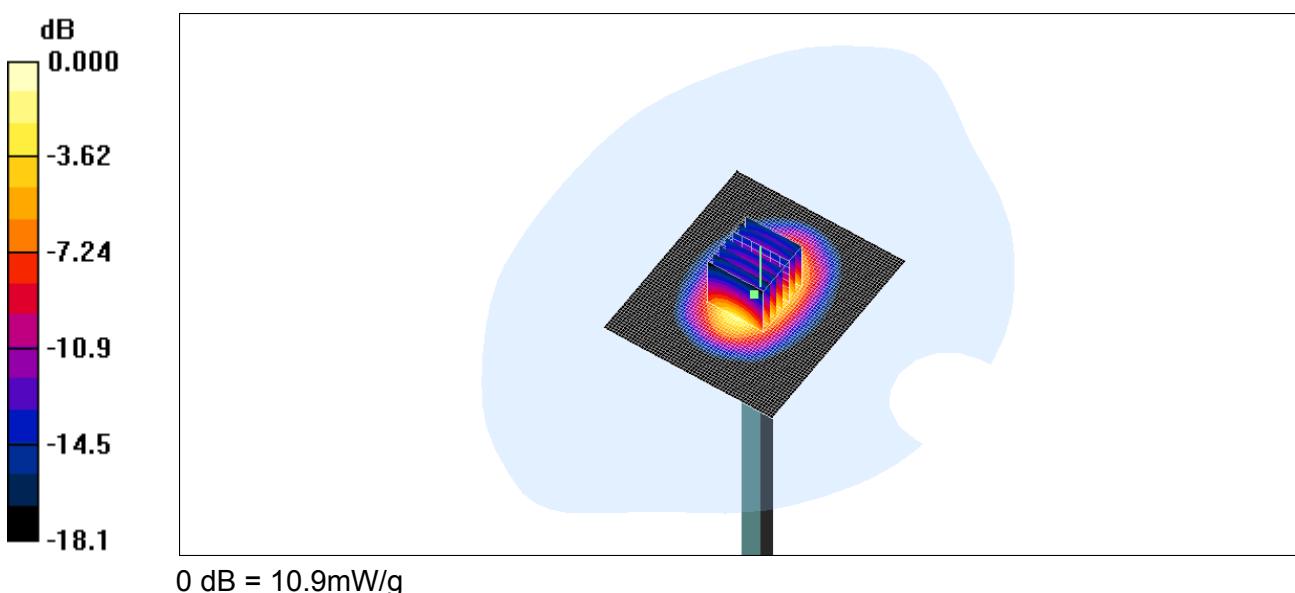
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 87.4 V/m; Power Drift = 0.013 dB

Peak SAR (extrapolated) = 17.4 W/kg

**SAR(1 g) = 9.89 mW/g; SAR(10 g) = 5.16 mW/g**

Maximum value of SAR (measured) = 10.9 mW/g



- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: BODY with Neck-lace 3CH – single slot**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.3 °C, Ambient Temperature: 21.0 °C**

Communication System: UPCS1900; Frequency: 1924.99 MHz; Duty Cycle: 1:24  
 Medium: MSL1900 Medium parameters used:  $f = 1924.99$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.36, 4.36, 4.36); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.018 mW/g

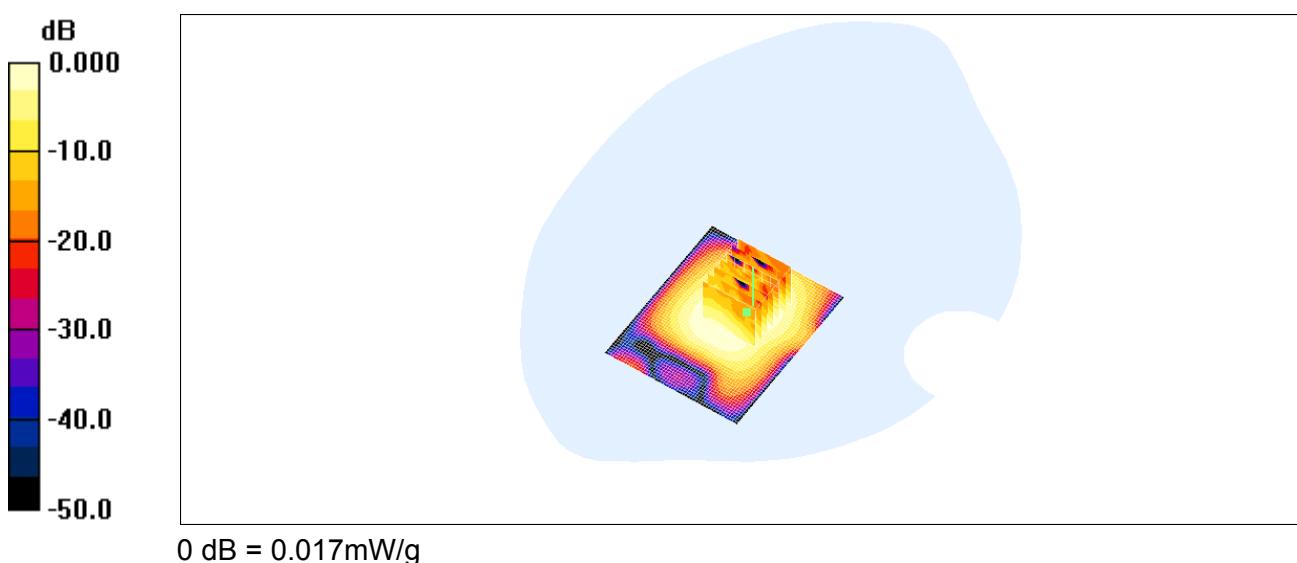
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.654 V/m; Power Drift = 0.112 dB

Peak SAR (extrapolated) = 0.026 W/kg

**SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00838 mW/g**

Maximum value of SAR (measured) = 0.017 mW/g



- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: BODY with Wrist-strap 3CH – single slot**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.3 °C, Ambient Temperature: 21.0 °C**

Communication System: UPCS1900; Frequency: 1924.99 MHz; Duty Cycle: 1:24  
Medium: MSL1900 Medium parameters used:  $f = 1924.99$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.36, 4.36, 4.36); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.008 mW/g

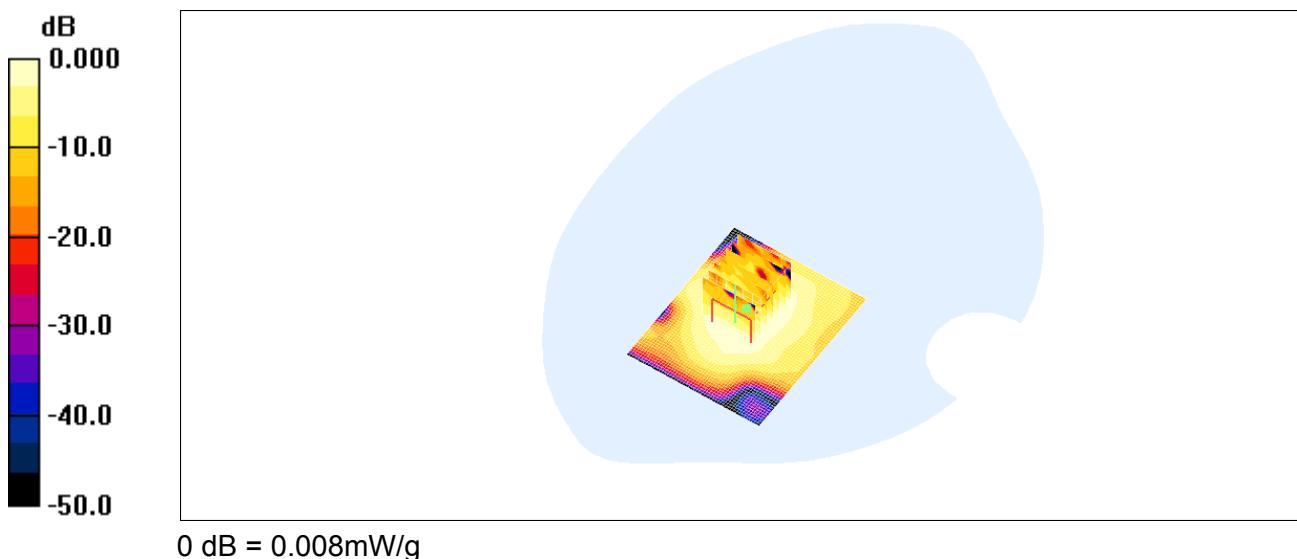
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.778 V/m; Power Drift = -0.233 dB

Peak SAR (extrapolated) = 0.013 W/kg

**SAR(1 g) = 0.00731 mW/g; SAR(10 g) = 0.00428 mW/g**

Maximum value of SAR (measured) = 0.008 mW/g



- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: BODY with Belt-clip 3CH**
- **Test Date: January 9, 2012**
- **Measured Liquid Temperature: 21.3 °C, Ambient Temperature: 21.0 °C**

Communication System: UPCS1900; Frequency: 1924.99 MHz; Duty Cycle: 1:24  
Medium: MSL1900 Medium parameters used:  $f = 1924.99$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV3 - SN3020; ConvF(4.36, 4.36, 4.36); Calibrated: 2011-07-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2011-05-23
- Phantom: SAM Twin Phantom\_835MHz; Type: SAM; Serial: TP-1276
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.018 mW/g

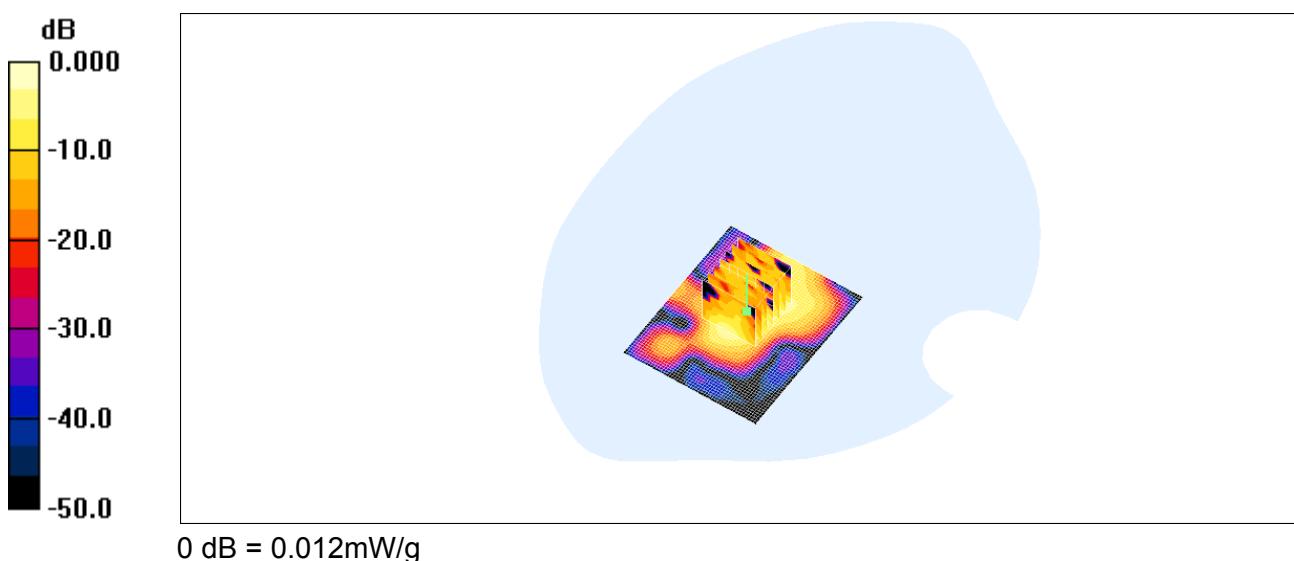
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.711 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 0.016 W/kg

**SAR(1 g) = 0.00959 mW/g; SAR(10 g) = 0.00469 mW/g**

Maximum value of SAR (measured) = 0.012 mW/g



- **Test Laboratory: KTL**
- **D1900V2: BODY 1900MHz Validation**
- **Test Date: March 21, 2012**
- **Measured Liquid Temperature: 21.0 °C, Ambient Temperature: 21.0 °C**

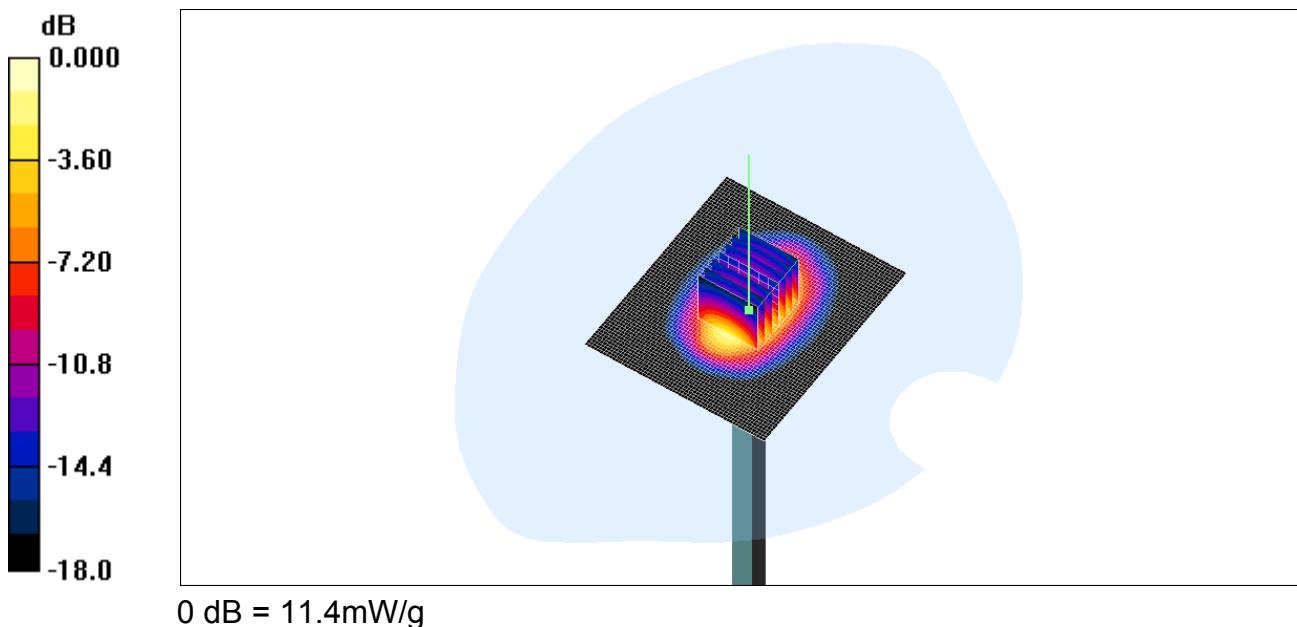
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1  
Medium: MSL1900 Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.55$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.44, 4.44, 4.44); Calibrated: 2012-01-26
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2012-01-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (61x71x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 12.4 mW/g

**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 87.4 V/m; Power Drift = -0.003 dB  
Peak SAR (extrapolated) = 18.3 W/kg  
**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.2 mW/g**  
Maximum value of SAR (measured) = 11.4 mW/g



- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: BODY with Neck-lace 3CH – double slots**
- **Test Date: March 21, 2012**
- **Measured Liquid Temperature: 21.0 °C, Ambient Temperature: 21.0 °C**

Communication System: UPCS1900; Frequency: 1924.99 MHz; Duty Cycle: 1:12  
Medium: MSL1900 Medium parameters used:  $f = 1924.99$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.44, 4.44, 4.44); Calibrated: 2012-01-26
- Sensor-Surface: 4mm (Mechanical Surface Detection) Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn559; Calibrated: 2012-01-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.028 mW/g

**Z Scan (1x1x16):** Measurement grid: dx=20mm, dy=20mm, dz=20mm

Maximum value of SAR (interpolated) = 0.003 mW/g

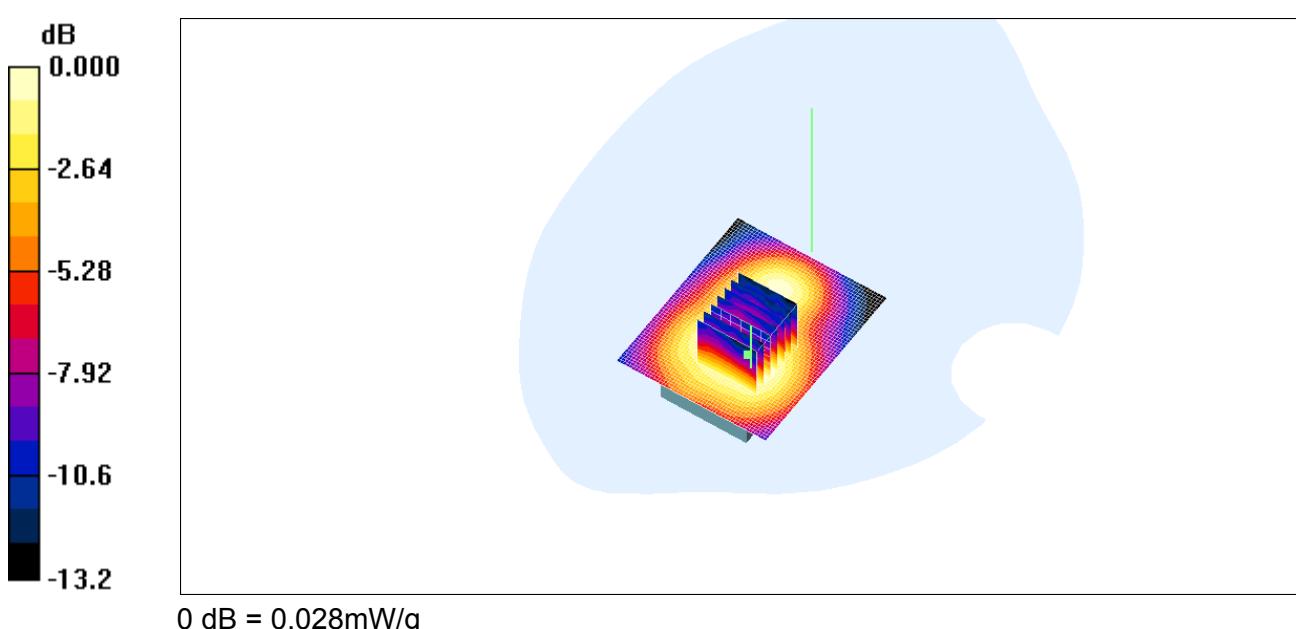
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

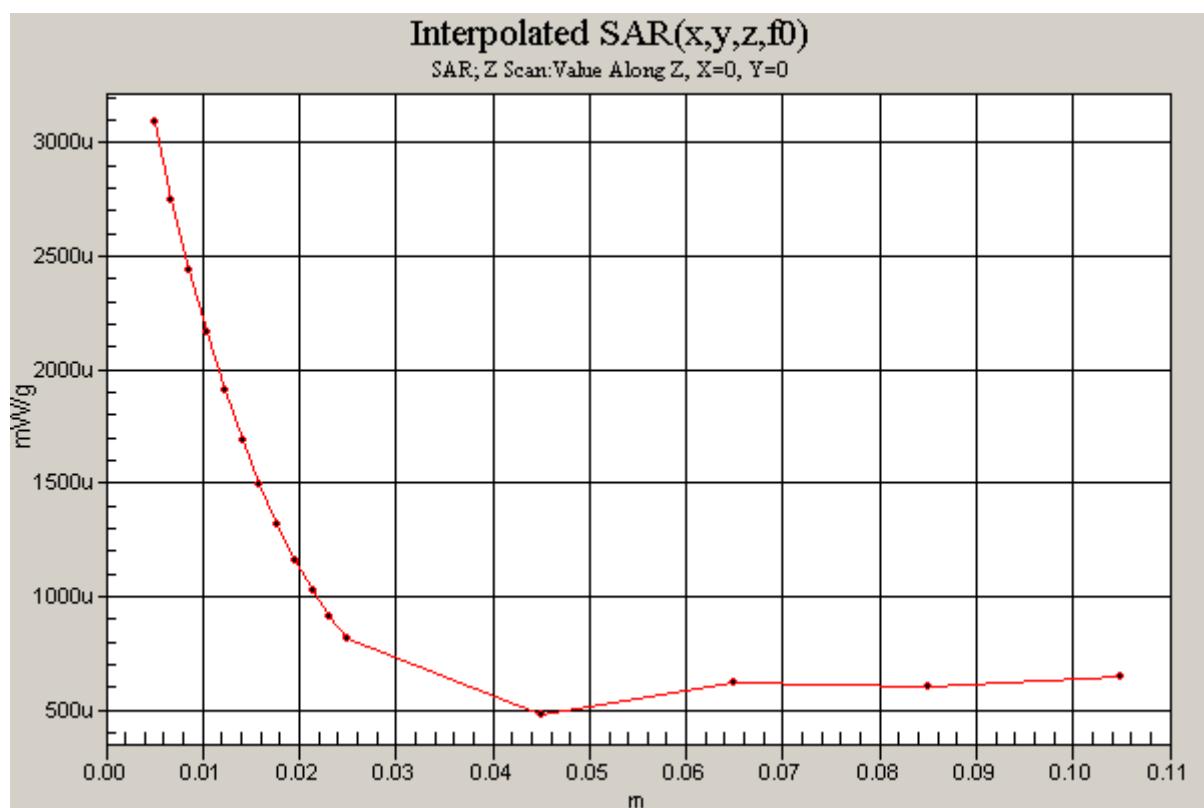
Reference Value = 0.857 V/m; Power Drift = 0.153 dB

Peak SAR (extrapolated) = 0.040 W/kg

**SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.017 mW/g**

Maximum value of SAR (measured) = 0.028 mW/g





- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: BODY with Wrist-strap 3CH – double slots**
- **Test Date: March 21, 2012**
- **Measured Liquid Temperature: 21.0 °C, Ambient Temperature: 21.0 °C**

Communication System: UPCS1900; Frequency: 1924.99 MHz; Duty Cycle: 1:12

Medium: MSL1900 Medium parameters used:  $f = 1924.99$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.44, 4.44, 4.44); Calibrated: 2012-01-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2012-01-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.016 mW/g

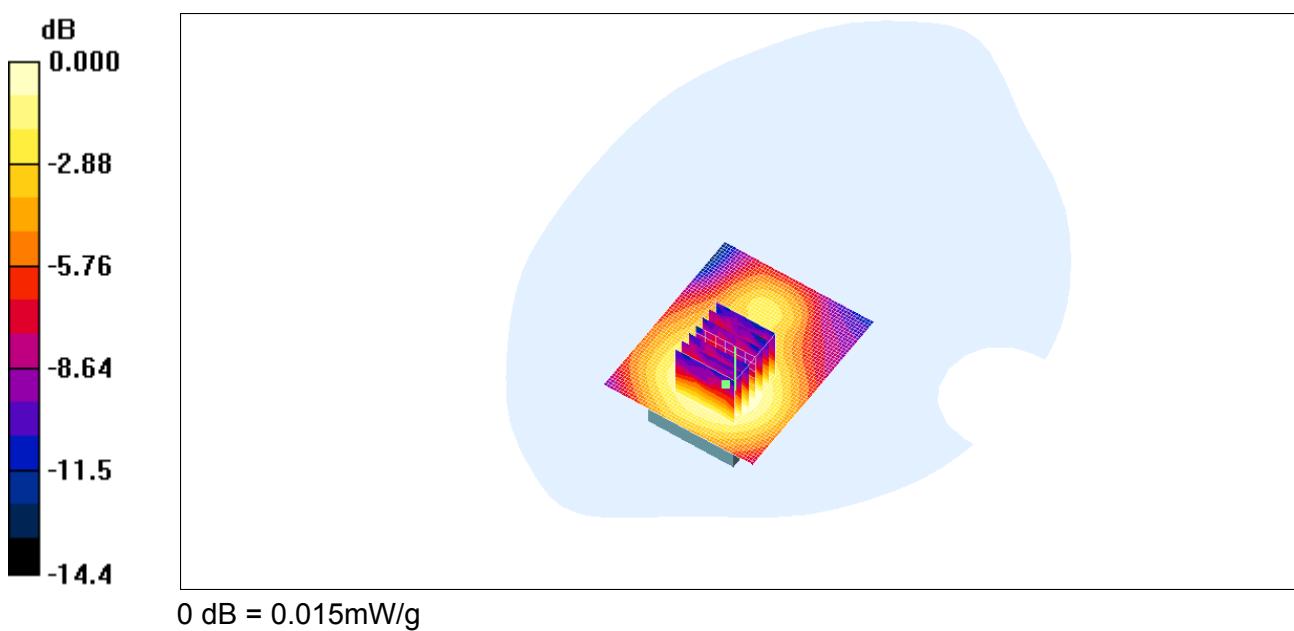
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.762 V/m; Power Drift = 0.176 dB

Peak SAR (extrapolated) = 0.022 W/kg

**SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00922 mW/g**

Maximum value of SAR (measured) = 0.015 mW/g



- **Test Laboratory: KTL**
- **Model: ER10VW**
- **Position: BODY with Belt-clip 3CH – double slots**
- **Test Date: March 21, 2012**
- **Measured Liquid Temperature: 21.0 °C, Ambient Temperature: 21.0 °C**

Communication System: UPCS1900; Frequency: 1924.99 MHz; Duty Cycle: 1:12  
Medium: MSL1900 Medium parameters used:  $f = 1924.99$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3020; ConvF(4.44, 4.44, 4.44); Calibrated: 2012-01-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn559; Calibrated: 2012-01-23
- Phantom: SAM Twin Phantom\_1800MHz; Type: SAM; Serial: TP-1433
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

**Area Scan (51x61x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.017 mW/g

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

Reference Value = 0.696 V/m; Power Drift = 0.113 dB

Peak SAR (extrapolated) = 0.024 W/kg

**SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.010 mW/g**

Maximum value of SAR (measured) = 0.017 mW/g

