Hearing Aid Compatibility (HAC) RF Emissions Test Report

APPLICANT	**: ZTE CORPORATION**
EQUIPMENT	**: WCDMA/GSM (GPRS) Dual-mode digital mobile phone**
BRAND NAME	**: ZTE**
MODEL NAME	**: Z222**
FCC ID	**: Q78-Z222**
STANDARD	**: FCC 47 CFR §20.19**
	ANSI C63.19-2007
M CATEGORY	**: M3**

The product was completely tested on Oct. 25, 2012. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

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No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
HA2O2301A	Rev. 01	Initial issue of report	Nov. 22, 2012

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1. *Statement of Compliance*

The maximum results of RF Emission of Hearing Aid Compliance (HAC) found during testing for the **ZTE CORPORATION DUT: WCDMA/GSM (GPRS) Dual-mode digital mobile phone, Brand Name: ZTE, Model Name: Z222** are follows (with expanded uncertainly ±30.4％ for E-field and ±21.6% for H-field):

Band	HAC RF Emission Test Result		M Rating
GSM850	E-Field (V/m)	256.1	M3
	H-Field (A/m)	0.497	M3
GSM1900	E-Field (V/m)	74.001	M3
	H-Field (A/m)	0.236	M3
WCDMA Band V	E-Field (V/m)	85.837	M4
	H-Field (A/m)	0.166	M4
WCDMA Band II	E-Field (V/m)	41.059	M4
	H-Field (A/m)	0.114	M4

They are in compliance with HAC limits (HAC Rated category M3) specified in guidelines FCC 47 CFR §20.19 and ANSI Standard ANSI C63.19.

Results Summary : M Category = M3 (ANSI C63.19-2007)

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2. *Administration Data*

2.1 *Testing Laboratory*

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958
Test Site No.	**Sporton Site No. :** SAR01-KS

2.2 *Applicant*

Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

2.3 *Manufacturer*

Company Name	ZTE CORPORATION
Address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

2.4 *Application Details*

Date of Start during the Test	Oct. 25, 2012
Date of End during the Test	Oct. 25, 2012

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3. *General Information*

3.1 *Description of Device Under Test (DUT)*

Product Feature & Specification	
DUT Type	WCDMA/GSM (GPRS) Dual-mode digital mobile phone
Brand Name	ZTE
Model Name	Z222
FCC ID	Q78-Z222
IMEI Code	863806013043878
Tx Frequency	GSM850 : 824.2 MHz ~ 848.8 MHz GSM1900 : 1850.2 MHz ~ 1909.8 MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz WCDMA Band II : 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	GSM850 : 869.2 MHz ~ 893.8 MHz GSM1900 : 1930.2 MHz ~ 1989.8 MHz WCDMA Band V : 871.4 MHz ~ 891.6 MHz WCDMA Band II : 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna	GSM850 : 32.29 dBm GSM1900 : 29.44 dBm WCDMA Band V : 23.19 dBm WCDMA Band II : 23.02 dBm
Antenna Type	PIFA Antenna
HW Version	wx8A
SW Version	Z222 1.0.0
Type of Modulation	GSM : GMSK GPRS : GMSK EDGE : GMSK / 8PSK WCDMA : QPSK (Uplink) HSDPA : QPSK (Uplink)
DUT Stage	Identical Prototype

List of air interfaces / frequency bands:

Air Interface	Band (MHz)	Voice/Data	C63.19-2007 Tested	Concurrent connections	Reduced power 20.19 (c)(1)
GSM	850,1900	Voice	Yes	BT	No
WCDMA	Band V, Band II	Voice	Yes	BT	No
BT	2450	Data	No	GSM, WCDMA	No

Note:

1. (*): The voice function maybe be activated via 3rd party software application.

2. Per KDB 285076 D01 7(a), during RF test, concurrent transmission is disabled.

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3.2 Product Photos

Refer to Appendix D.

3.3 Applied Standards

The ANSI Standard ANSI C63.19-2007 represents performance requirements for acceptable interoperability of hearing aids with wireless communications devices. When these parameters are met, a hearing aid operates acceptably in close proximity to a wireless communications device.

The following AWF factors shall be used for the standard transmission protocols:

Standard	Technology	AWF (dB)
TIA/EIA/IS-2000	CDMA	0
TIA/EIA-136	TDMA (50 Hz)	0
J-STD-007	GSM (217)	-5
T1/T1P1/3GPP	UMTS (WCDMA)	0
iDENTM	TDMA (22 and 11 Hz)	0

Table 3.1 Articulation Weighting Factor (AWF)

Category	Telephone RF Parameters		
Near Field	AWF	E-Field Emissions	H-Field Emissions
< 960 MHz			
Category M1	0	631.0 – 1122.0 V/m	1.91 – 3.39 A/m
	-5	473.2 – 841.4 V/m	1.43 – 2.54 A/m
Category M2	0	354.8 – 631.0 V/m	1.07 – 1.91 A/m
	-5	266.1 – 473.2 V/m	0.80 – 1.43 A/m
Category M3	0	199.5 – 354.8 V/m	0.6 – 1.07 A/m
	-5	149.6 – 266.1 V/m	0.45 – 0.80 A/m
Category M4	0	< 199.5 V/m	< 0.60 A/m
	-5	< 149.6 V/m	< 0.45 A/m
> 960 MHz			
Category M1	0	199.5 – 354.8 V/m	0.60 – 1.07 A/m
	-5	149.6 – 266.1 V/m	0.45 – 0.80 A/m
Category M2	0	112.2 – 199.5 V/m	0.34 – 0.60 A/m
	-5	84.1 – 149.6 V/m	0.25 – 0.45 A/m
Category M3	0	63.1 – 112.2 V/m	0.19 – 0.34 A/m
	-5	47.3 – 84.1 V/m	0.14 – 0.25 A/m
Category M4	0	< 63.1 V/m	< 0.19 A/m
	-5	< 47.3 V/m	< 0.14 A/m

Table 3.2 Telephone near-field categories in linear units

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3.4 Test Conditions

3.4.1 Ambient Condition

Ambient Temperature	20 to 24 ℃
Humidity	< 60 %

3.4.2 Test Configuration

The device was controlled by using a base station emulator R&S CMU200. Communication between the device and the emulator was established by air link. Measurements were performed on the low, middle and high channels of all bands. The DUT was set from the emulator to radiate maximum output power during all tests.
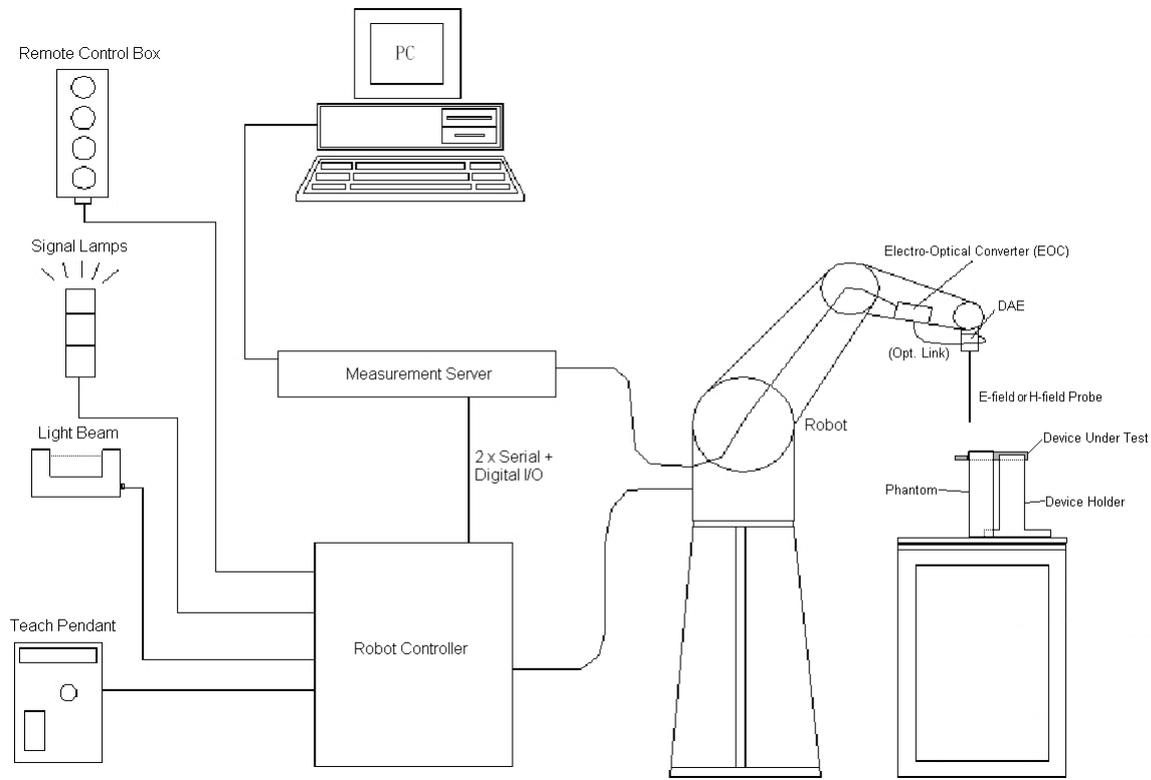
4. *Hearing Aid Compliance (HAC)*

4.1 *Introduction*

The federal communication commission (FCC) adopted ANSI C63.19 as HAC test standard.

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5. HAC RF Emission Measurement Setup

Fig 5.1   SPEAG DASY4 or DASY5 System Configurations

The DASY4 or DASY5 system for performance compliance tests is illustrated above graphically. This system consists of the following items:

➢ A standard high precision 6-axis robot with controller, a teach pendant and software
➢ A data acquisition electronic (DAE) attached to the robot arm extension
➢ A dosimetric probe equipped with an optical surface detector system
➢ The electro-optical converter (EOC) performs the conversion between optical and electrical signals
➢ A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
➢ A probe alignment unit which improves the accuracy of the probe positioning
➢ A computer operating Windows XP
➢ DASY4 or DASY5 software
➢ Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
➢ A device holder
➢ Dipole for evaluating the proper functioning of the system
➢ Test Arch Phantom

Detail component information are described in the following sub-clauses.

5.1 E-Field and H-Field Probe System

The HAC measurement is conducted with the dosimetric probe ER3DV6 and H3DV6 (manufactured by SPEAG). The probe is specially designed and calibrated. This probe has a built in optical surface detection system to prevent from collision with DUT.

5.1.1 E-Field Probe Specification
<ER3DV6>

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges	
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy ±6.0%, k=2)	
Frequency	100 MHz to 6 GHz; Linearity: ± 2.0 dB (100 MHz to 3 GHz)	
Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)	
Dynamic Range	2 V/m to 1000 V/m (M3 or better device readings fall well below diode compression point)	
Linearity	± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm	**Fig 5.2 Photo of E-field Probe**

5.1.2 H-Field Probe Description
<H3DV6>

Construction	Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges	
Frequency	200 MHz to 3 GHz (absolute accuracy ± 6.0%, k=2); Output linearized	
Directivity	± 0.25 dB (spherical isotropy error)	
Dynamic Range	10 m A/m to 2 A/m at 1 GHz (M3 or better device readings fall well below diode compression point)	
Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm	
E-Field Interference	< 10% at 3 GHz (for plane wave)	**Fig 5.3 Photo of H-field Probe**

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5.1.3 Probe Tip Description

HAC field measurements take place in the close near field with high gradients. Increasing the measuring distance from the source will generally decrease the measured field values (in case of the validation dipole approx. 10％per mm).

Magnetic field sensors are measuring the integral of the H-field across their sensor area surrounded by the loop. They are calibrated in a precise, homogeneous field. When measuring a gradient field, the result will be very close to the field in the center of the loop which is equivalent to the value of a homogeneous field equivalent to the center value. But it will be different from the field at the field at the border of the loop.

Consequently, two sensors with different loop diameters – both calibrated ideally – would give different results when measuring from the edge of the probe sensor elements. The behavior for electrically small E-field sensors is equivalent. See below for distance plots from a WD which show the conservative nature of field readings at the probe element center vs. measurements at the sensor end:
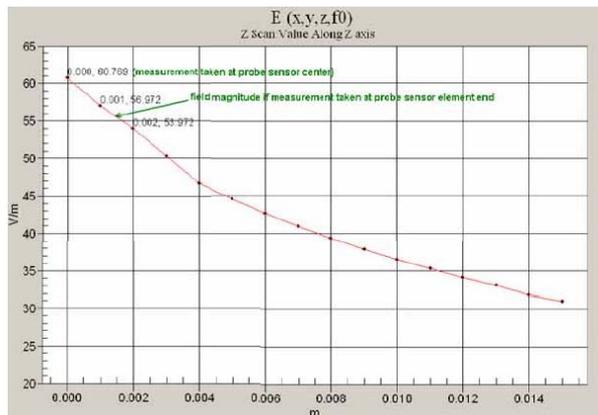
Fig 5.4   Z-Axis Scan at maximum point above a typical wireless device for E-field
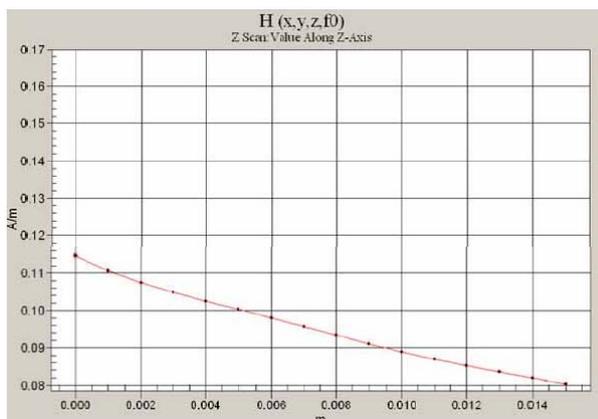
Fig 5.5   Z-Axis Scan at maximum point above a typical wireless device for H-field

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The magnetic field loops of the H3D probes are concentric, with the center 3mm from the tip for H3DV6.

Their radius is 1.9 mm.

The electric field probes have a more irregular internal geometry because it is physically not possible to have the 3 orthogonal sensors situated with the same center. The effect of the different sensor centers is accounted for in the HAC uncertainty budget ("sensor displacement"). Their geometric center is at 2.5 mm from the tip, and the element ends are 1.1 mm closer to the tip.

Where:

Peak Field = Peak field (in dB V/m or dB A/m)
Raw = Raw field measurement from the measurement system (in V/m or A/m).
PMF = Probe Modulation Factor (in Linear units). See Chapter 8 of test report.

5.2 DATA Acquisition Electronics (DAE)

The data acquisition electronics (DAE) 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 measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.6   Photo of DAE

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5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

➢ High precision (repeatability ±0.035 mm)

➢ High reliability (industrial design)

➢ Jerk-free straight movements

➢ Low ELF interference (the closed metallic construction shields against motor control fields)

➢ 6-axis controller

Fig 5.7   Photo of DASY5

5.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig 5.8   Photo of Server for DASY5

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5.5 Phone Positioner

The phone positioner shown in Fig. 5.11 is used to adjust DUT to the suitable position.

Fig 5.9   Phone Positioner

5.6 Test Arch Phantom

Construction :	Enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot.	
Dimensions :	370 x 370 x 370 mm	**Fig 5.10 Photo of Arch Phantom**
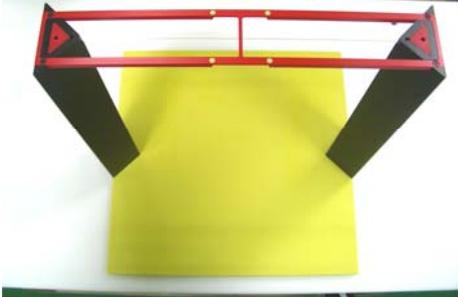
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5.7 Data Storage and Evaluation

5.7.1 Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings.

5.7.2 Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software：

Probe parameters：	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters：	- Frequency	f
	- Crest factor	cf
Media parameters：	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as：

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with V_i = compensated signal of channel i, (i = x, y, z)
       U_i = input signal of channel i, (i = x, y, z)
       cf = crest factor of exciting field (DASY parameter)
       dcp_i = diode compression point (DASY parameter)

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From the compensated input signals, the primary field data for each channel can be evaluated：

$$\text{E-field Probes：} \mathbf{E_i} = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

$$\text{H-field Probes：} \mathbf{H_i} = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1}f + a_{i2}f^2}{f}$$

with V_i = compensated signal of channel i, (i = x, y, z)
Norm$_i$ = sensor sensitivity of channel i, (i = x, y, z), µV/(V/m)^2 for E-field Probes
ConvF = sensitivity enhancement in solution
a_{ij} = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
E_i = electric field strength of channel i in V/m
H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude)：

$$\mathbf{E_{tot}} = \sqrt{\mathbf{E_x^2} + \mathbf{E_y^2} + \mathbf{E_z^2}}$$

The primary field data are used to calculate the derived field units.

The measurement/integration time per point, as specified by the system manufacturer is > 500 ms. The signal response time is evaluated as the time required by the system to reach 90％ of the expected final value after an on/off switch of the power source with an integration time of 500 ms and a probe response time of < 5 ms. In the current implementation, DASY waits longer than 100 ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

If the device under test does not emit a CW signal, the integration time applied to measure the electric field at a specific point may introduce additional uncertainties due to the discretization. The tolerances for the different systems had the worst-case of 2.6％.

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5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dipole	CD835V3	1045	Jun. 14. 2012	Jun. 13. 2013
SPEAG	Dipole	CD1880V3	1038	Jun. 14. 2012	Jun. 13. 2013
SPEAG	Data Acquisition Electronics	DAE4	1210	Nov. 18, 2011	Nov. 17, 2012
SPEAG	Probe	ER3DV6	2476	Nov. 21, 2011	Nov. 20, 2012
SPEAG	Probe	H3DV6	6300	Nov. 22, 2011	Nov. 21, 2012
SPEAG	Test Arch Phantom	Par phantom	1105	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Agilent	Wireless Communication Test Set	E5515C	MY48367160	Oct. 26, 2011	Oct. 25, 2013
R&S	Signal Generator	SMR40	100455	Dec. 30, 2011	Dec. 29, 2012
AR	Amplifier	551G4	333096	NCR	NCR
Agilent	Power Meter	E4416A	MY45101555	Aug. 22, 2012	Aug. 21, 2013
Agilent	Power Sensor	E9327A	MY44421198	Aug. 22, 2012	Aug. 21, 2013
ARRA	Power Divider	A3200-2	N/A	NA	NA
MCL	Attenuation	BW-S10W5	N/A	NA	NA
R&S	Spectrum Analyzer	FSP30	101399	Jun. 01, 2012	May 31, 2013

Table 5.1 Test Equipment List

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6. *Uncertainty Assessment*

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 6.1.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[a]	$1/k$[b]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 6.1 Multiplying Factions for Various Distributions

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is showed in Table 6.2.

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Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (E)	Ci (H)	Standard Uncertainty (E)	Standard Uncertainty (H)
Measurement System							
Probe Calibration	5.1	Normal	1	1	1	± 5.1 %	± 5.1 %
Axial Isotropy	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
Sensor Displacement	16.5	Rectangular	√3	1	0.145	± 9.5 %	± 1.4 %
Test Arch	7.2	Rectangular	√3	1	0	± 4.1 %	± 0.0 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
Scaling to Peak Envelope Power	0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %
System Detection Limit	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Conditions	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Reflections	12.0	Rectangular	√3	1	1	± 6.9 %	± 6.9 %
Probe Positioner	1.2	Rectangular	√3	1	0.67	± 0.7 %	± 0.5 %
Probe Positioning	4.7	Rectangular	√3	1	0.67	± 2.7 %	± 1.8 %
Extrap. and Interpolation	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning Vertical	4.7	Rectangular	√3	1	0.67	± 2.7 %	± 1.8 %
Device Positioning Lateral	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Device Holder and Phantom	2.4	Rectangular	√3	1	1	± 1.4 %	± 1.4 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup Related							
Phantom Thickness	2.4	Rectangular	√3	1	0.67	± 1.4 %	± 0.9 %
Combined Standard Uncertainty						± 15.2 %	± 10.8 %
Coverage Factor for 95 %						K = 2	
Expanded Uncertainty						**± 30.4 %**	**± 21.6 %**

Table 6.2 Uncertainty Budget of DASY

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7. HAC RF Emission Measurement Evaluation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the test Arch and a corresponding distance holder.

7.1 Purpose of System Performance Check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal HAC measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

7.2 System Setup

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave which comes from a signal generator. The calibrated dipole must be placed beneath the arch phantom. The equipment setup is shown below:
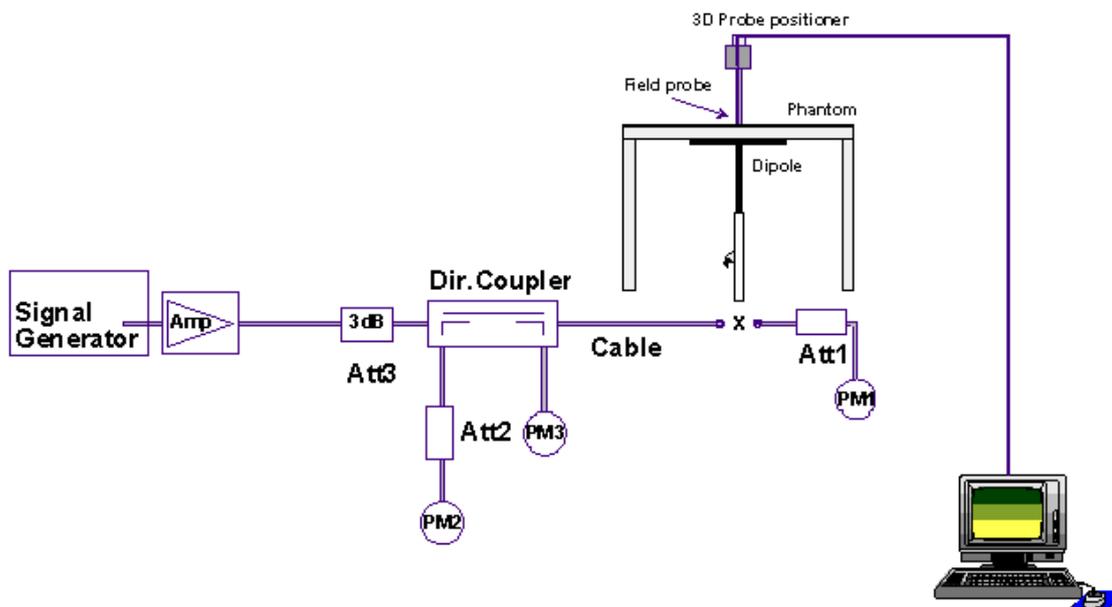
Fig. 7.1 System Setup of System Evaluation

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 20dBm (100mW) before dipole is connected.

Fig 7.2 Dipole Setup

7.3 Validation Results

Comparing to the original E-field or H-field value provided by SPEAG, the validation data should be within its specification of 25 %. Table 7.1 shows the target value and measured value. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to appendix A of this report.

Frequency (MHz)	Input Power (dBm)	Target Value (V/m)	E-Field 1 (V/m)	E-Field 2 (V/m)	Average Value (V/m)	Deviation (%)	Date
835	20	167.6	152.4	166.8	159.6	–4.77	Oct. 25, 2012
1880	20	139.0	133.0	142.1	137.55	–1.68	Oct. 25, 2012
Frequency (MHz)	Input Power (dBm)	Target Value (A/m)	H-Field (A/m)		Deviation (%)	Date
835	20	0.455	0.471		3.52	Oct. 25, 2012
1880	20	0.463	0.456		–1.51	Oct. 25, 2012

Table 7.1 Test Results of System Validation

Note: Deviation = ((E or H-field Result) - (Target field)) / (Target field) * 100%

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8. RF Field Probe Modulation Factor

A calibration shall be made of the modulation response of the probe and its instrumentation chain. This calibration shall be performed with the field probe, attached to the instrumentation that is to be used with it during the measurement. The response of the probe system to a CW field at the frequency(s) of interest is compared to its response to a modulated signal with equal peak amplitude. The field level of the test signals shall be more than 10 dB above the ambient level and the noise floor of the instrumentation being used. The ratio of the CW reading to that taken with a modulated field shall be applied to the readings taken of modulated fields of the specified type.
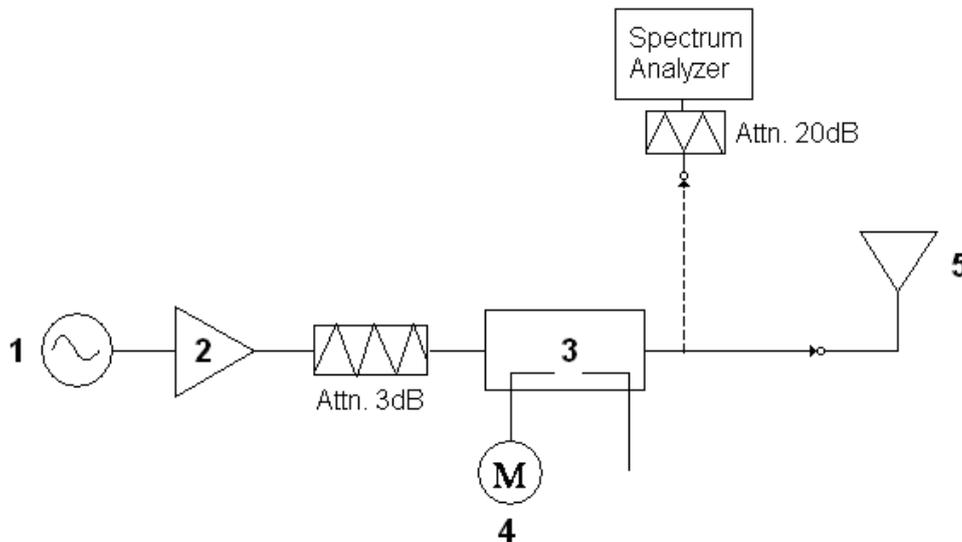
Fig. 8.1 System Calibration

This was done using the following procedure:
1. Fixing the probe in a set location relative to a field generating device.
2. Illuminate the probe with a CW signal at the intended measurement frequency.
3. Record the reading of the probe measurement system of the CW signal.
4. Determine the level of the CW signal being used to drive the field generating device.
5. Substitute a signal using the same modulation as that used by the intended WD for the CW signal.
6. Set the peak amplitude during transmission of the modulated signal to equal the amplitude of the CW signal.
7. Record the reading of the probe measurement system of the modulated signal.
8. The ratio of the CW to modulated signal reading is the modulation factor.
9. Repeat 2~8 steps at intended measurement frequency for both E and H field probe.

PMF Measurement Summary:

Frequency (MHz)	Functions	E-field	H-field	PMF	
		V/m	A/m	E-field	H-field
835	CW	711.0	3.830	-	-
835	AM 80%	436.0	1.532	1.63	2.50
835	GSM	225.0	1.316	3.16	2.91
1880	CW	464.0	3.439	-	-
1880	AM 80%	294.1	1.278	1.58	2.69
1880	GSM	172.5	1.190	2.69	2.89

Frequency (MHz)	Functions	E-field	H-field	PMF	
		V/m	A/m	E-field	H-field
835	CW	296.7	0.613	-	-
835	AM 80%	194.7	0.432	1.52	1.42
835	WCDMA	282.6	0.736	1.05	1.03
1880	CW	215.4	1.402	-	-
1880	AM 80%	150.5	0.604	1.43	2.32
1880	WCDMA	207.1	1.348	1.04	1.04

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Zero span Spectrum Plots for RF Field Probe Modulation Factor
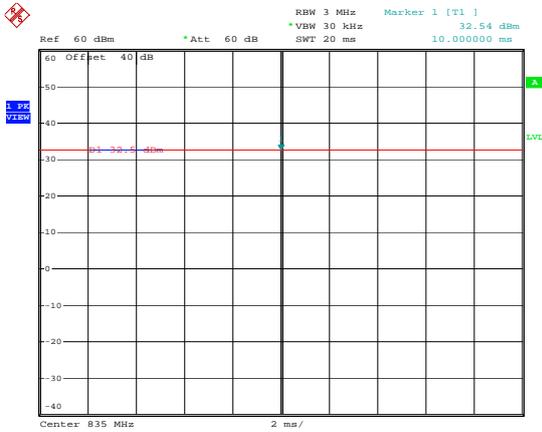
835MHz - CW
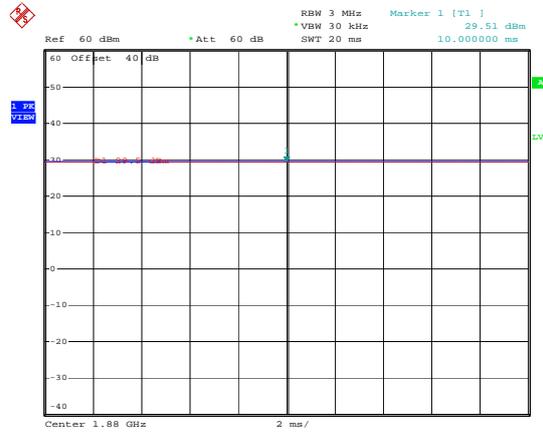
1880MHz - CW
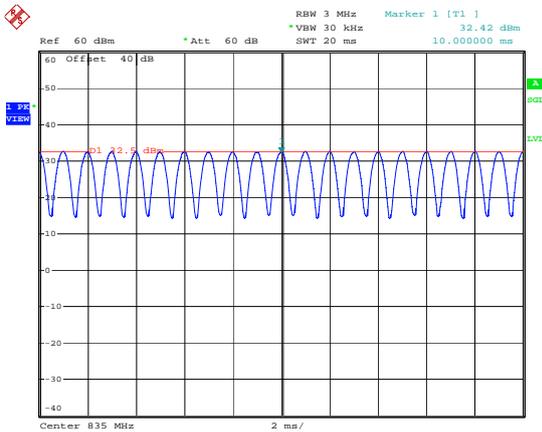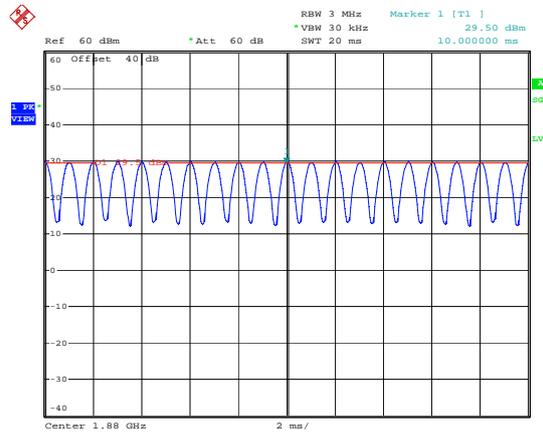
835MHz - 80% AM

1880MHz - 80% AM

835MHz - GSM

1880MHz - GSM

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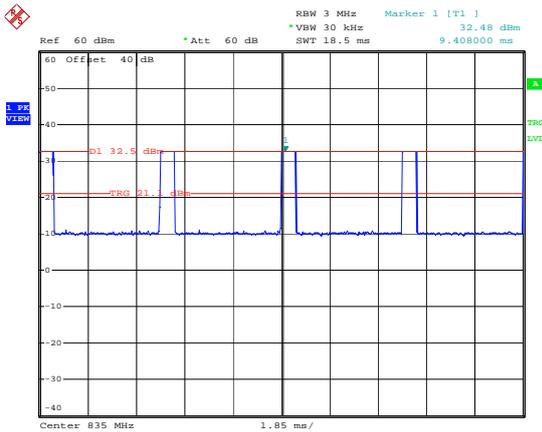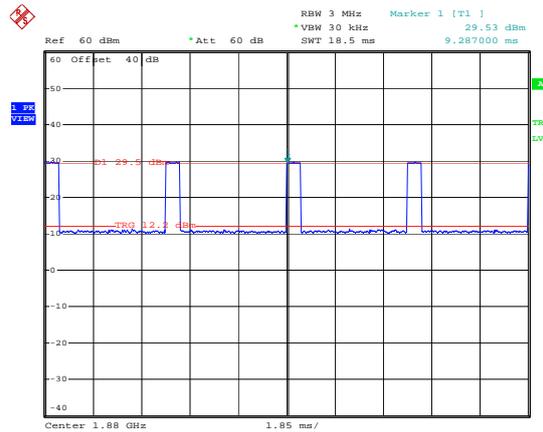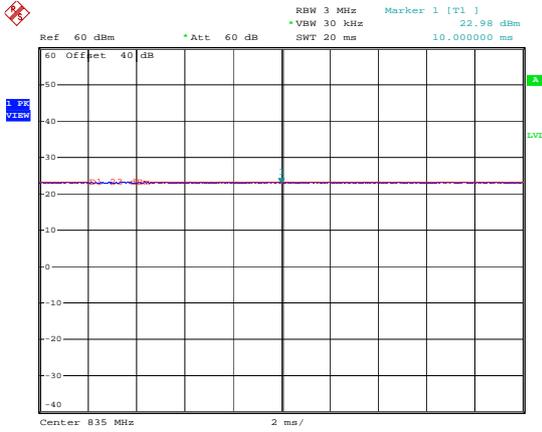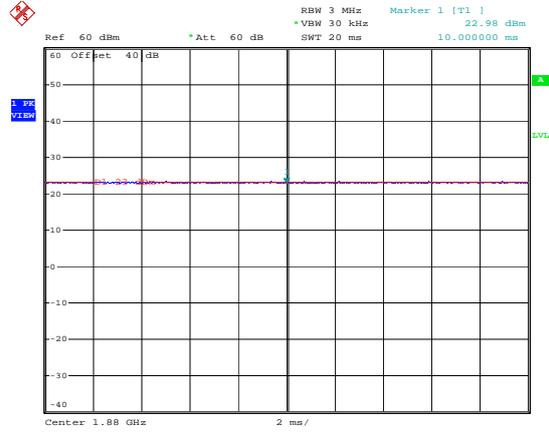
835MHz - CW
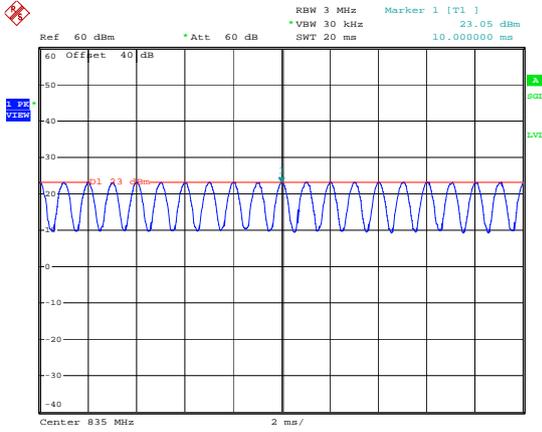
1880MHz - CW
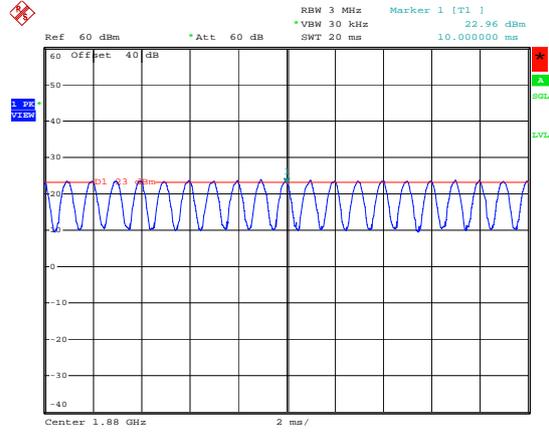
835MHz - 80% AM

1880MHz - 80% AM
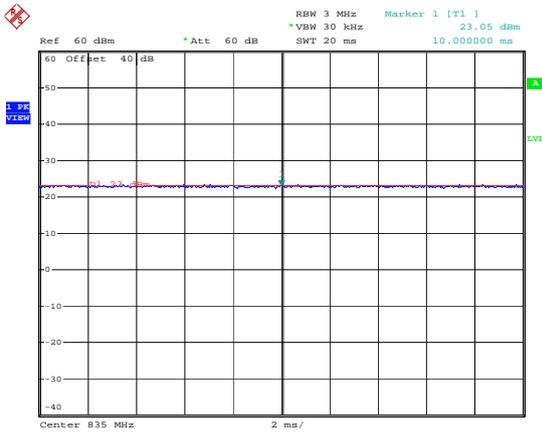
835MHz - WCDMA

1880MHz - WCDMA

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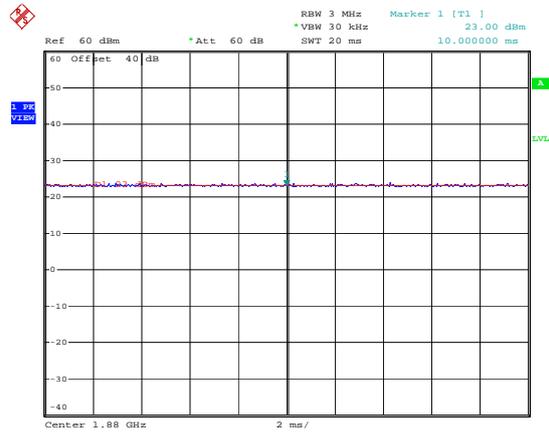
9. *Description for DUT Testing Position*

The DUT was put on device holder and adjusted to the accurate and reliable position. Please refer to Appendix E for the Setup photographs.

Fig. 9.1 illustrate the references and reference plane that shall be used in a typical DUT emissions measurement. The principle of this section is applied to DUT with similar geometry.

➢ The grid is 5 cm by 5 cm area that is divided into 9 evenly sized blocks or sub-grids.

➢ The grid is centered on the audio frequency output transducer of the DUT.

➢ The grid is in a reference plane, which is defined as the planar area that contains the highest point in the area of the phone that normally rests against the user's ear. It is parallel to the centerline of the receiver area of the phone and is defined by the points of the receiver-end of the DUT handset, which, in normal handset use, rest against the ear.

➢ The measurement plane is parallel to, and 15 mm in front of, the reference plane.

Fig 9.1 A typical DUT reference and plane for HAC measurements

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E – Field
Probe

Center point
of the probe
elements

Offset

15 mm from EUT
10 mm from validation dipole

Gauge

T

Top surface

EUT
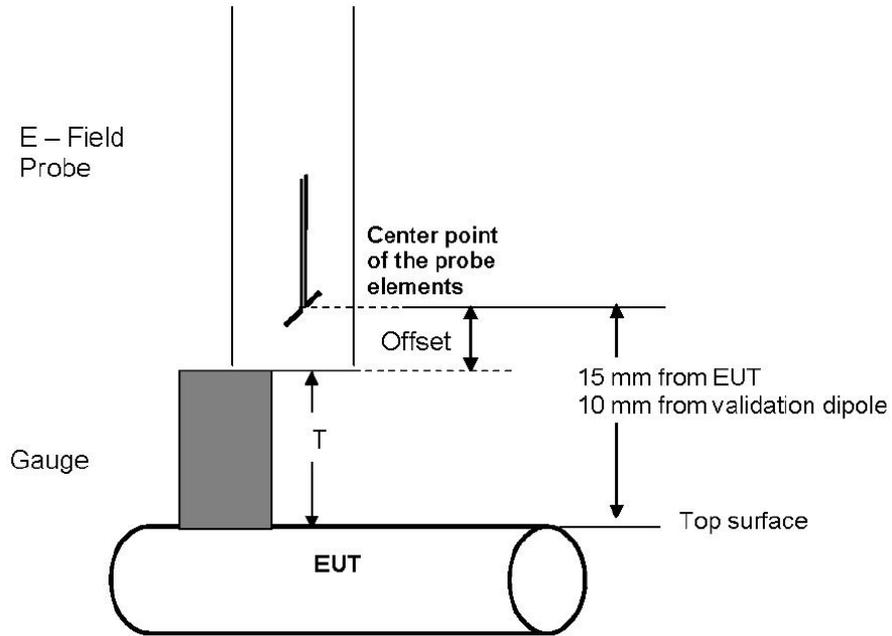
Fig. 9.2 Gauge block with E-field probe

H – Field
Probe

Center point
of the probe
elements

Offset

15 mm from EUT
10 mm from validation dipole

Gauge

T

Top surface

EUT
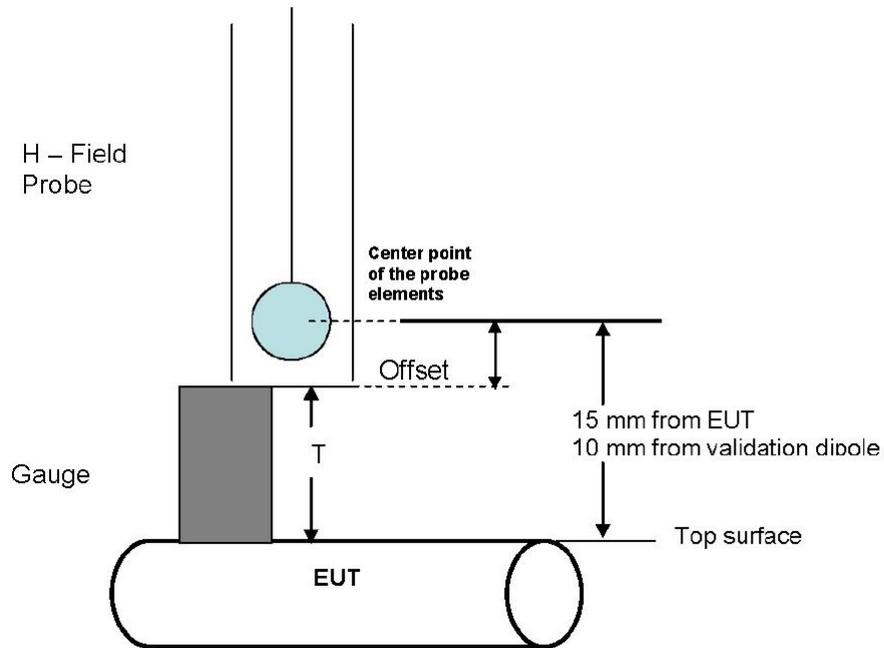
Fig. 9.3 Gauge block with H-field probe

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10. *RF Emissions Test Procedure*

The following illustrate a typical RF emissions test scan over a wireless communications device:

1. Proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system was confirmed.
2. DUT is positioned in its intended test position, acoustic output point of the device perpendicular to the field probe.
3. The DUT operation for maximum rated RF output power was configured and confirmed with the base station simulator, at the test channel and other normal operating parameters as intended for the test. The battery was ensured to be fully charged before each test.
4. The center sub-grid was centered over the center of the acoustic output (also audio band magnetic output, if applicable). The DUT audio output was positioned tangent (as physically possible) to the measurement plane.
5. A surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the test Arch.
6. The measurement system measured the field strength at the reference location.
7. Measurements at 5 mm increments in the 5 x 5 cm region were performed and recorded. A 360° rotation about the azimuth axis at the maximum interpolated position was measured. For the worst-case condition, the peak reading from this rotation was used in re-evaluating the HAC category.
8. The system performed a drift evaluation by measuring the field at the reference location.
9. Steps 1 ~ 8 were done for both the E and H-Field measurements.

11. HAC RF Emission Test Results

11.1 Conducted Power (Unit: dBm)

<GSM>

Burst Average Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GSM (GMSK, 1 Tx slot)	32.20	32.29	32.27	29.12	29.36	29.44
GPRS (GMSK, 1 Tx slot) – CS1	32.19	32.28	32.26	29.07	29.29	29.36
GPRS (GMSK, 2 Tx slots) – CS1	30.18	30.27	30.26	27.12	27.32	27.46
EDGE (GMSK, 1 Tx slot) – MCS1	32.18	32.28	32.24	29.09	29.33	29.43
EDGE (GMSK, 2 Tx slots) – MCS1	30.17	30.26	30.23	27.14	27.36	27.45
EDGE (8PSK, 1 Tx slot) – MCS5	26.31	26.39	26.36	25.23	25.46	25.58
EDGE (8PSK, 2 Tx slots) – MCS5	24.26	24.35	24.28	23.21	23.45	23.58

<WCDMA>

Band	**WCDMA Band V**			**WCDMA Band II**		
Channel	**4132**	**4182**	**4233**	**9262**	**9400**	**9538**
Frequency (MHz)	**826.4**	**836.4**	**846.6**	**1852.4**	**1880.0**	**1907.6**
AMR	23.16	22.92	23.18	22.70	23.00	22.58
RMC 12.2K	23.18	22.93	23.19	22.72	23.02	22.58
HSDPA Subtest-1	23.18	22.89	23.18	22.78	23.00	22.53
HSDPA Subtest-2	23.17	22.84	23.17	22.73	22.97	22.50
HSDPA Subtest-3	22.22	21.82	22.20	21.76	21.97	21.46
HSDPA Subtest-4	23.15	22.84	23.18	22.70	23.01	22.40

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11.2 *E-Field Emission*

Plot No.	Band	Mode	Channel	PMF	Peak E-Field (V/m)	M-Rating
1	GSM850	GSM	128	3.16	200.1	M3
2	GSM850	GSM	189	3.16	227.9	M3
3	**GSM850**	**GSM**	**251**	**3.16**	**256.1**	**M3**
4	**GSM1900**	**GSM**	**512**	**2.69**	**74.001**	**M3**
5	GSM1900	GSM	661	2.69	73.260	M3
6	GSM1900	GSM	810	2.69	69.862	M3
7	WCDMA V	RMC12.2K	4132	1.05	73.644	M4
8	WCDMA V	RMC12.2K	4182	1.05	64.607	M4
9	**WCDMA V**	**RMC12.2K**	**4233**	**1.05**	**85.837**	**M4**
10	**WCDMA II**	**RMC12.2K**	**9262**	**1.04**	**41.059**	**M4**
11	WCDMA II	RMC12.2K	9400	1.04	40.001	M4
12	WCDMA II	RMC12.2K	9538	1.04	33.995	M4

11.3 *H-Field Emission*

Plot No.	Band	Mode	Channel	PMF	Peak H-Field (A/m)	M-Rating
1	GSM850	GSM	128	2.91	0.372	M4
2	GSM850	GSM	189	2.91	0.430	M4
3	**GSM850**	**GSM**	**251**	**2.91**	**0.497**	**M3**
4	**GSM1900**	**GSM**	**512**	**2.89**	**0.236**	**M3**
5	GSM1900	GSM	661	2.89	0.234	M3
6	GSM1900	GSM	810	2.89	0.226	M3
7	WCDMA Band V	RMC12.2K	4132	1.03	0.144	M4
8	WCDMA Band V	RMC12.2K	4182	1.03	0.125	M4
9	**WCDMA Band V**	**RMC12.2K**	**4233**	**1.03**	**0.166**	**M4**
10	**WCDMA Band II**	**RMC12.2K**	**9262**	**1.04**	**0.114**	**M4**
11	**WCDMA Band II**	**RMC12.2K**	**9400**	**1.04**	**0.114**	**M4**
12	WCDMA Band II	RMC12.2K	9538	1.04	0.099	M4

Remark:

1. The volume was adjusted to maximum level and the backlight turned off during RF Emission testing.

2. There is no special HAC mode software on this DUT.

3. Test Engineer：Fulu Hu

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12. *References*

[1] ANSI C63.19-2007, "American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids", 8 June 2007

[2] SPEAG DASY System Handbook

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Appendix A. Plots of System Performance Check

The plots are shown as follows.

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HAC_E_Dipole_835_121025

DUT: HAC-Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 0 kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.4.5 (3634)

E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 166.8 V/m
Probe Modulation Factor = 1.000
Reference Value = 104.7 V/m; Power Drift = -0.0088 dB
Average value of Total=(152.4+166.8) / 2=159.6 V/m

Peak E-field in V/m

Grid 1 **150.0 M4**	Grid 2 **152.4 M4**	Grid 3 **148.3 M4**
Grid 4 **83.232 M4**	Grid 5 **84.481 M4**	Grid 6 **81.551 M4**
Grid 7 **161.7 M4**	Grid 8 **166.8 M4**	Grid 9 **161.8 M4**

Cursor:
Total = 166.9 V/m
E Category: M4
Location: 0, 79.5, 4.7 mm
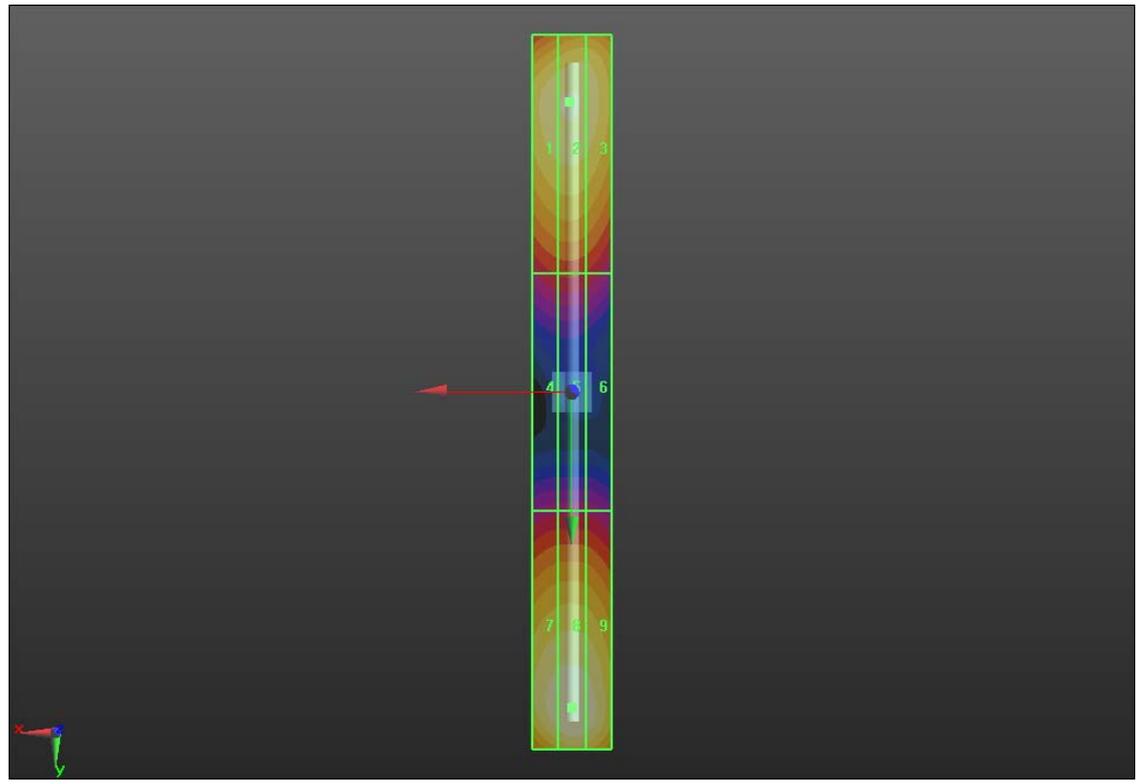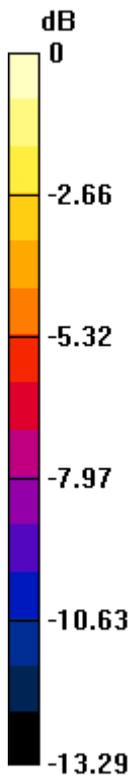
0 dB = 166.9V/m

HAC_E_Dipole_1880_121025

DUT: HAC Dipole 1880 MHz

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.4.5 (3634)

E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 142.1 V/m
Probe Modulation Factor = 1.000
Reference Value = 161.2 V/m; Power Drift = 0.02 dB
Average value of Total=(133.0+142.1) / 2=137.55V/m

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
130.3 M2	**133.0 M2**	**128.9 M2**
Grid 4	Grid 5	Grid 6
88.894 M3	**90.341 M3**	**85.561 M3**
Grid 7	Grid 8	Grid 9
135.2 M2	**142.1 M2**	**137.4 M2**

Cursor:
Total = 142.1 V/m
E Category: M2
Location: 0, 38.5, 4.7 mm
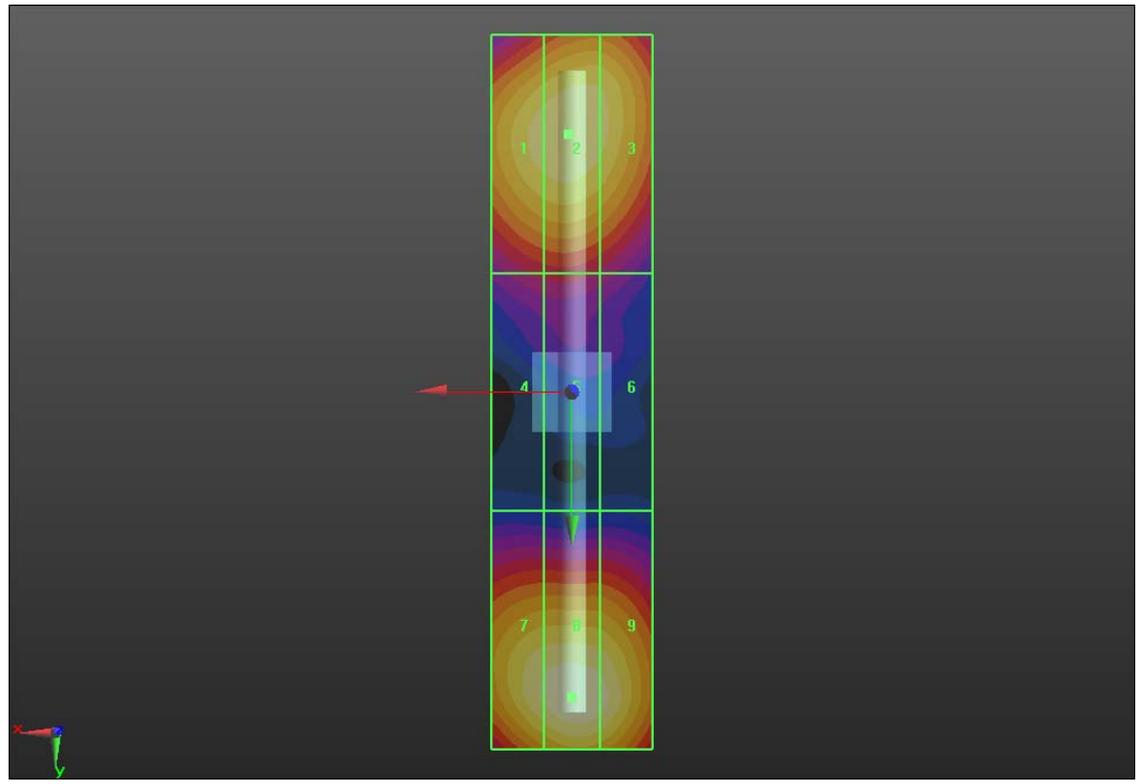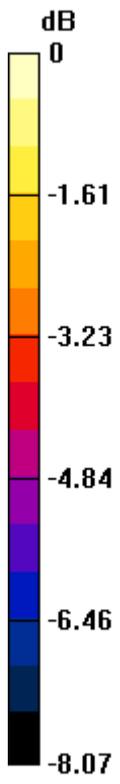
0 dB = 142.1V/m

HAC_H_Dipole_835_121025

DUT: HAC-Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.4.5 (3634)

H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
Probe Modulation Factor = 1.000
Reference Value = 0.499 A/m; Power Drift = 0.01 dB
Maximum value of peak Total field = 0.471 A/m

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.403 M4	**0.417 M4**	**0.391 M4**
Grid 4	Grid 5	Grid 6
0.453 M4	**0.471 M4**	**0.443 M4**
Grid 7	Grid 8	Grid 9
0.404 M4	**0.422 M4**	**0.398 M4**

Cursor:
Total = 0.471 A/m
H Category: M4
Location: 0.5, 3.5, 4.7 mm
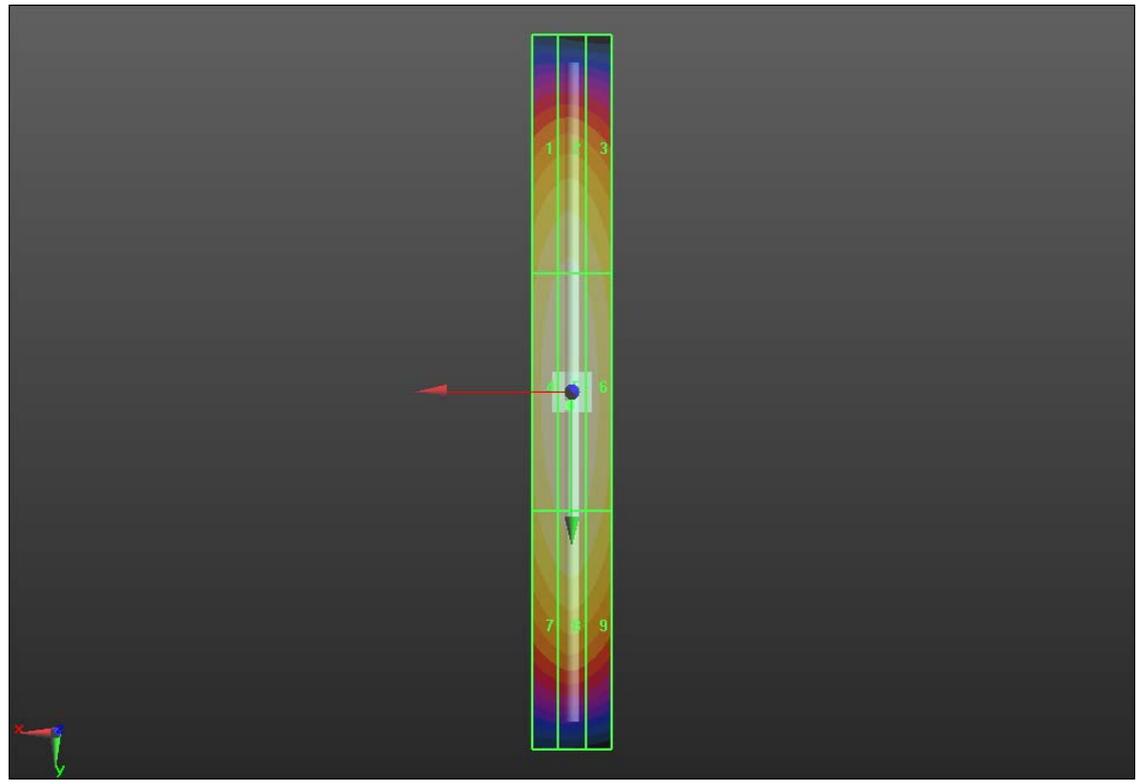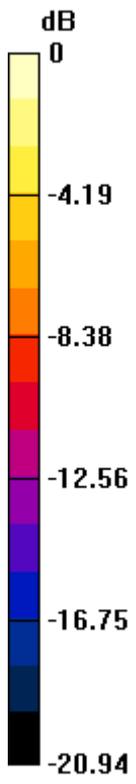
0 dB = 0.470A/m

HAC_H_Dipole_1880_121025

DUT: HAC Dipole 1880 MHz

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 0 kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.4.5 (3634)

H Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Probe Modulation Factor = 1.000
Reference Value = 0.481 A/m; Power Drift = -0.00082 dB
Maximum value of peak Total field = 0.456 A/m

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.404 M2	**0.414 M2**	**0.390 M2**
Grid 4	Grid 5	Grid 6
0.442 M2	**0.456 M2**	**0.430 M2**
Grid 7	Grid 8	Grid 9
0.406 M2	**0.423 M2**	**0.398 M2**

Cursor:
Total = 0.456 A/m
H Category: M2
Location: 0.5, 0.5, 4.7 mm
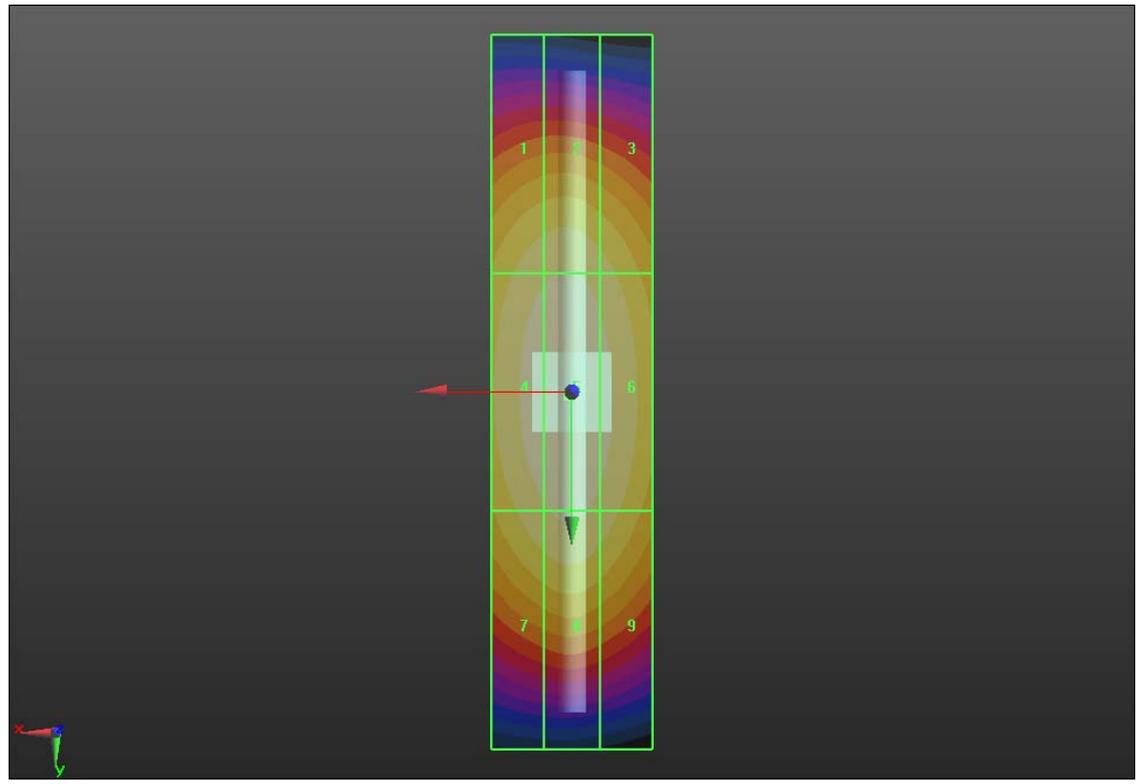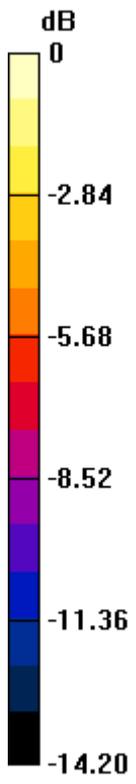
0 dB = 0.460A/m

Appendix B.   Plots of RF Emission Measurement

The plots are shown as follows.

SPORTON INTERNATIONAL (KUNSHAN) INC.

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Report Issued Date : Nov. 22, 2012

Report Version   : Rev. 01

#01 HAC RF_GSM850_GSM_Ch128(E)

DUT: 2O2301A

Communication System: General GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch128/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 200.1 V/m

Probe Modulation Factor = 3.160

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 85.894 V/m; Power Drift = 0.05 dB

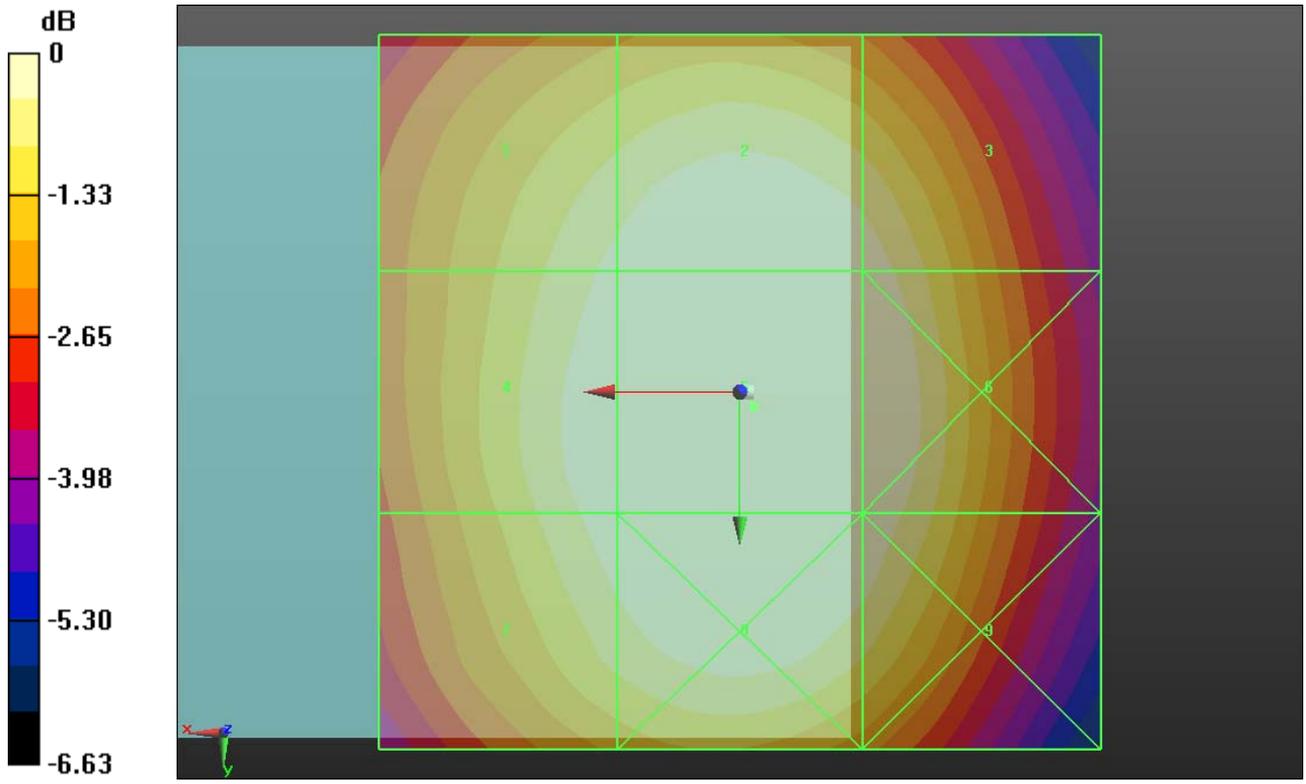**Hearing Aid Near-Field Category: M3 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
175.8 M3	**190.4 M3**	**181.9 M3**
Grid 4	Grid 5	Grid 6
183.6 M3	**200.1 M3**	**190.1 M3**
Grid 7	Grid 8	Grid 9
179.7 M3	**195.2 M3**	**185.2 M3**

Cursor:
Total = 200.1 V/m
E Category: M3
Location: -1.5, 3, 8.7 mm
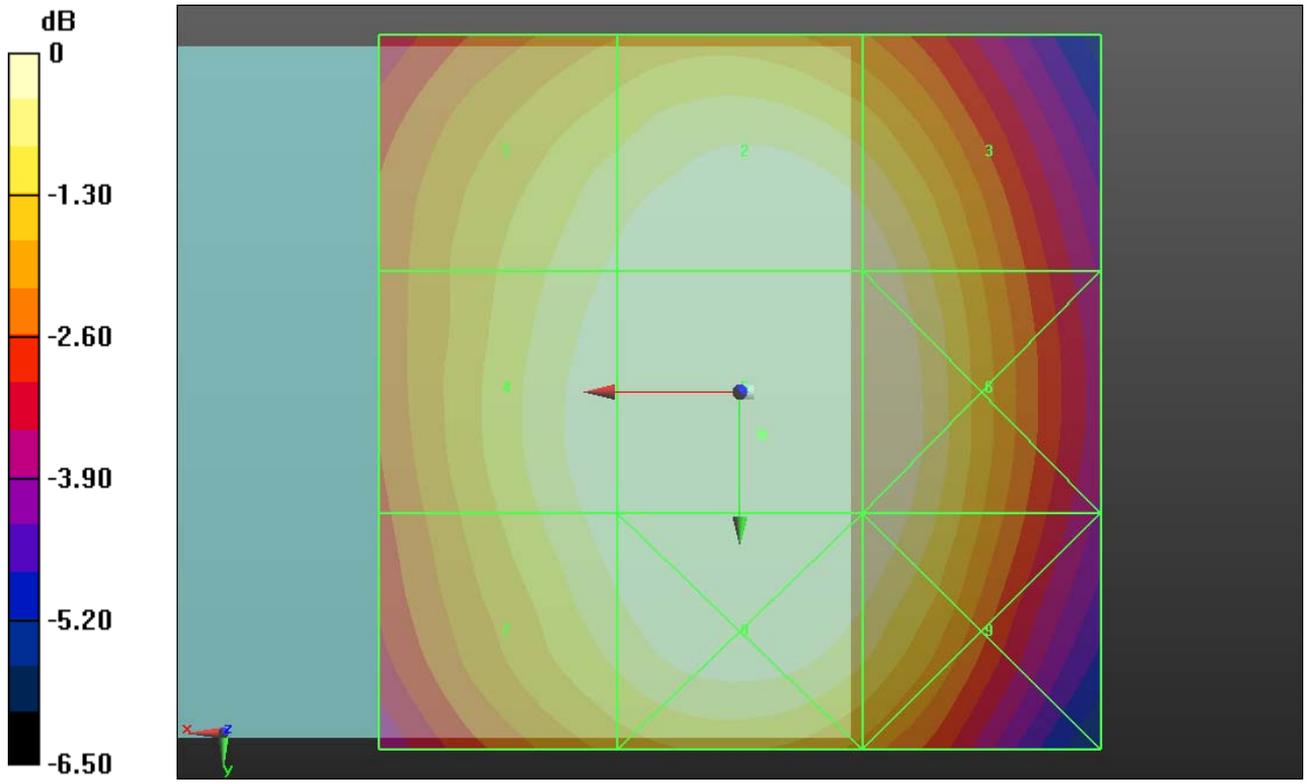
0 dB = 182.3V/m

#02 HAC RF_GSM850_GSM_Ch189(E)

DUT: 2O2301A

Communication System: General GSM; Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch189/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 227.9 V/m
Probe Modulation Factor = 3.160
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 99.089 V/m; Power Drift = -0.03 dB
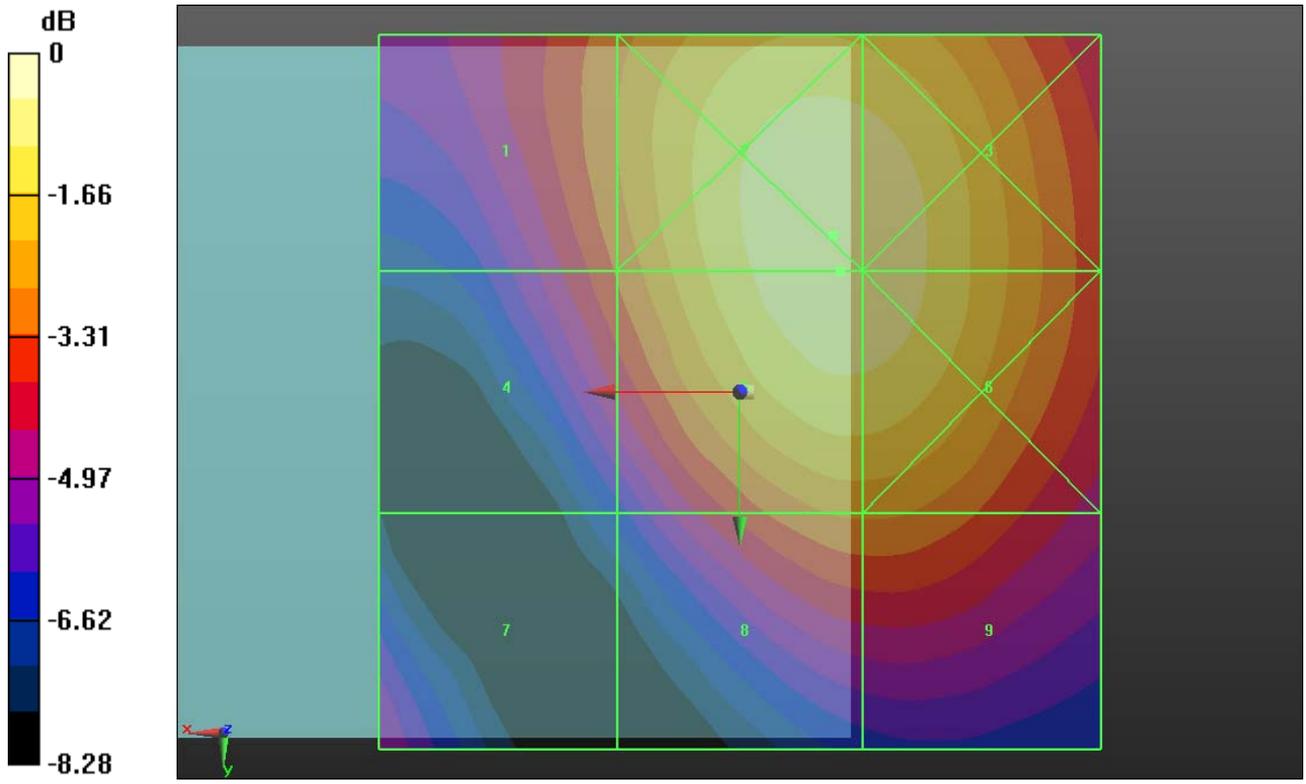**Hearing Aid Near-Field Category: M3 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
201.0 M3	**217.3 M3**	**207.0 M3**
Grid 4	Grid 5	Grid 6
209.8 M3	**227.9 M3**	**215.9 M3**
Grid 7	Grid 8	Grid 9
205.0 M3	**221.8 M3**	**209.6 M3**

Cursor:
Total = 227.9 V/m
E Category: M3
Location: -1, 2.5, 8.7 mm
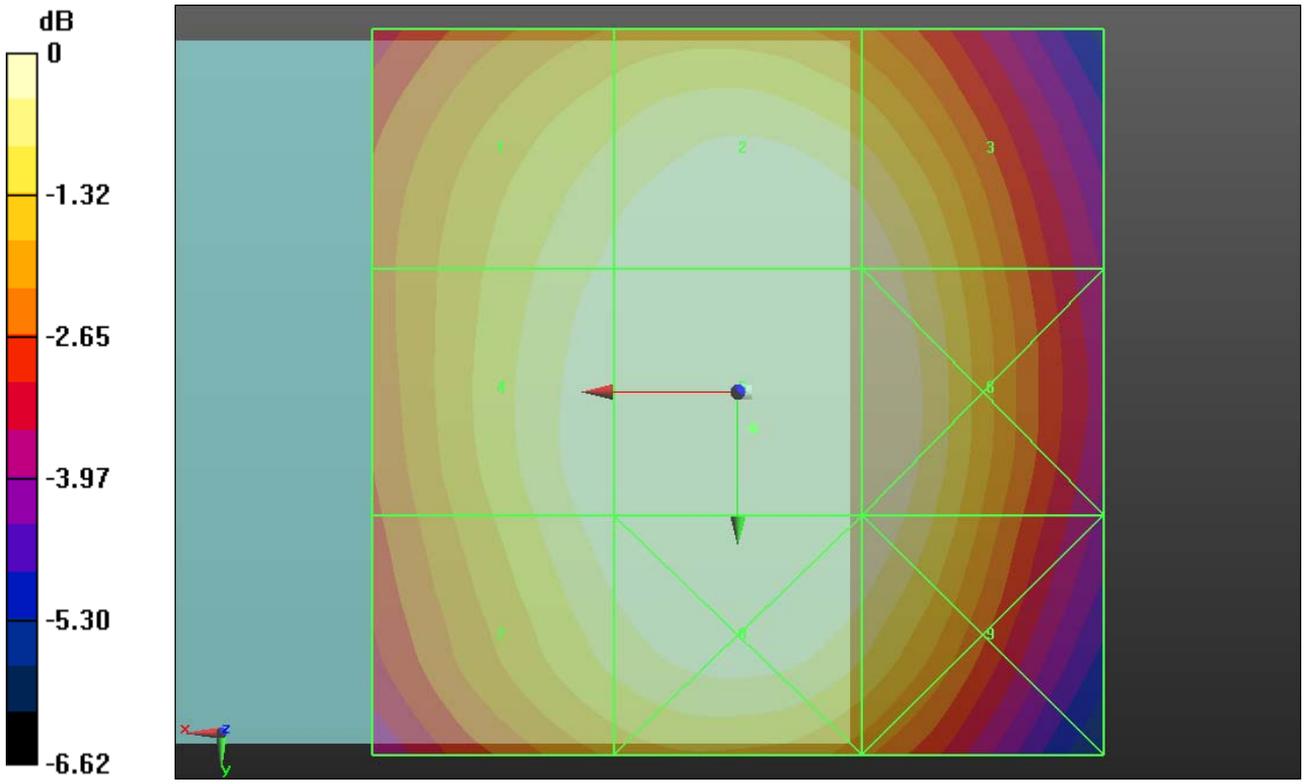
0 dB = 207.7V/m

#03 HAC RF_GSM850_GSM_Ch251(E)

DUT: 2O2301A

Communication System: General GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 256.1 V/m

Probe Modulation Factor = 3.160

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 111.6 V/m; Power Drift = 0.0058 dB

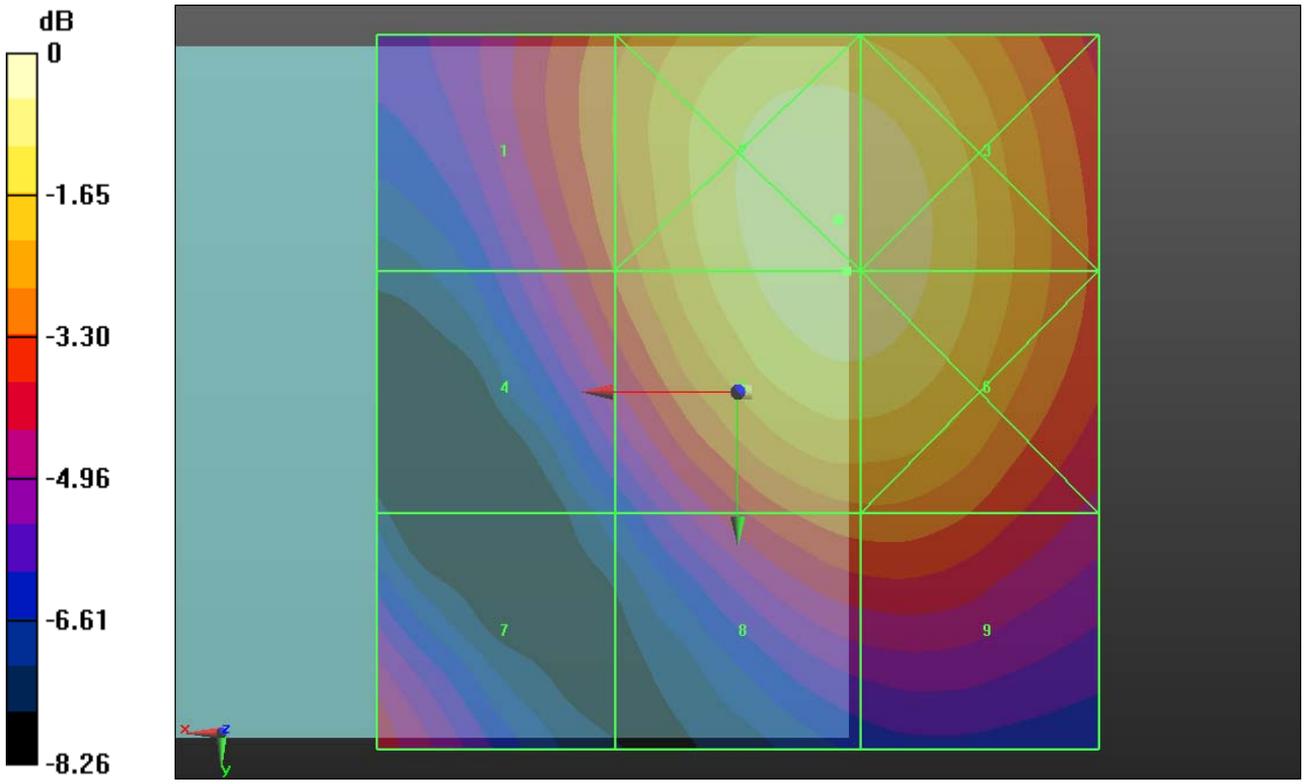**Hearing Aid Near-Field Category: M3 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
225.8 M3	**243.6 M3**	**231.2 M3**
Grid 4	Grid 5	Grid 6
236.5 M3	**256.1 M3**	**242.4 M3**
Grid 7	Grid 8	Grid 9
230.9 M3	**249.8 M3**	**234.8 M3**

Cursor:
Total = 256.1 V/m
E Category: M3
Location: -1, 1, 8.7 mm

0 dB = 233.4V/m

#04 HAC RF_GSM1900_GSM_Ch512(E)

DUT: 2O2301A

Communication System: General GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch512/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 74.001 V/m

Probe Modulation Factor = 2.690

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 31.586 V/m; Power Drift = 0.02 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m
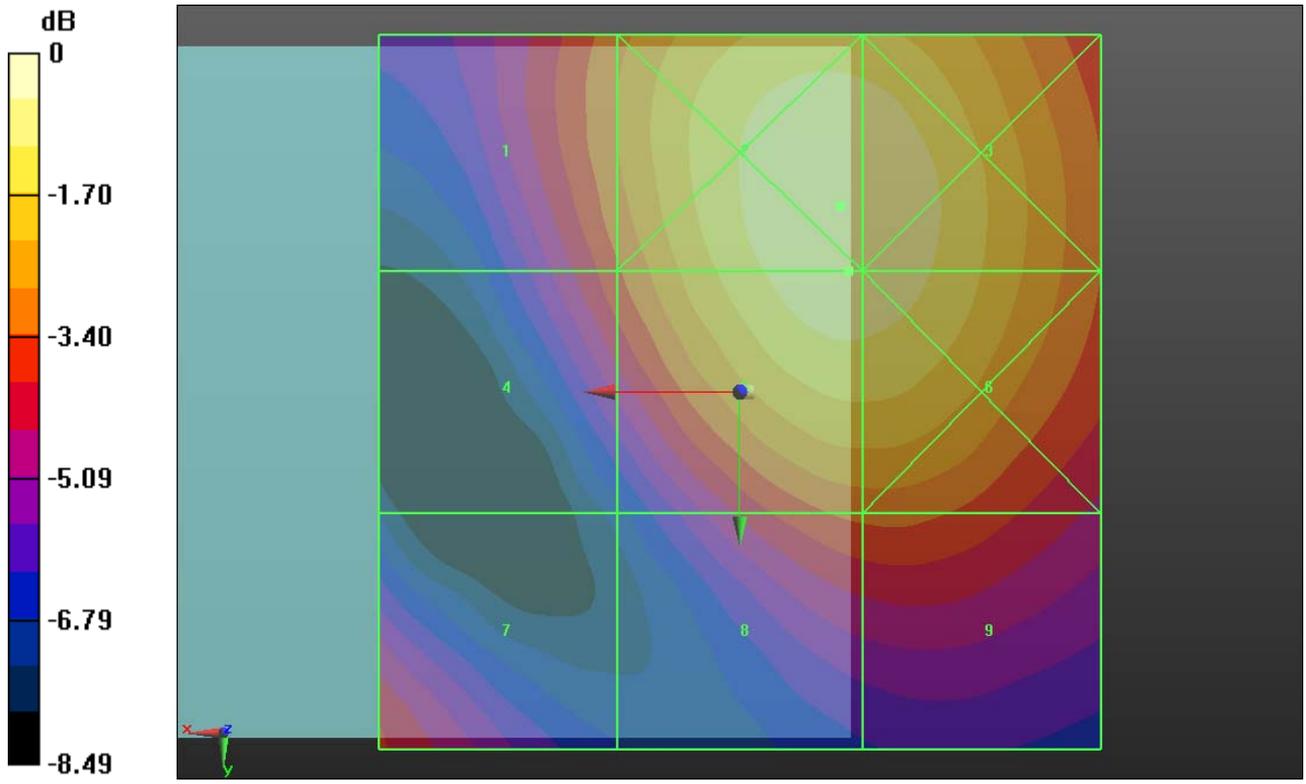
Grid 1	Grid 2	Grid 3
58.011 M3	**74.302 M3**	**73.997 M3**
Grid 4	Grid 5	Grid 6
54.865 M3	**74.001 M3**	**73.767 M3**
Grid 7	Grid 8	Grid 9
45.429 M4	**58.548 M3**	**58.562 M3**

Cursor:
Total = 74.302 V/m
E Category: M3
Location: -6.5, -11, 8.7 mm

0 dB = 79.550V/m

#05 HAC RF_GSM1900_GSM_Ch661(E)

DUT: 2O2301A

Communication System: General GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch661/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 73.260 V/m

Probe Modulation Factor = 2.690

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 30.341 V/m; Power Drift = 0.02 dB

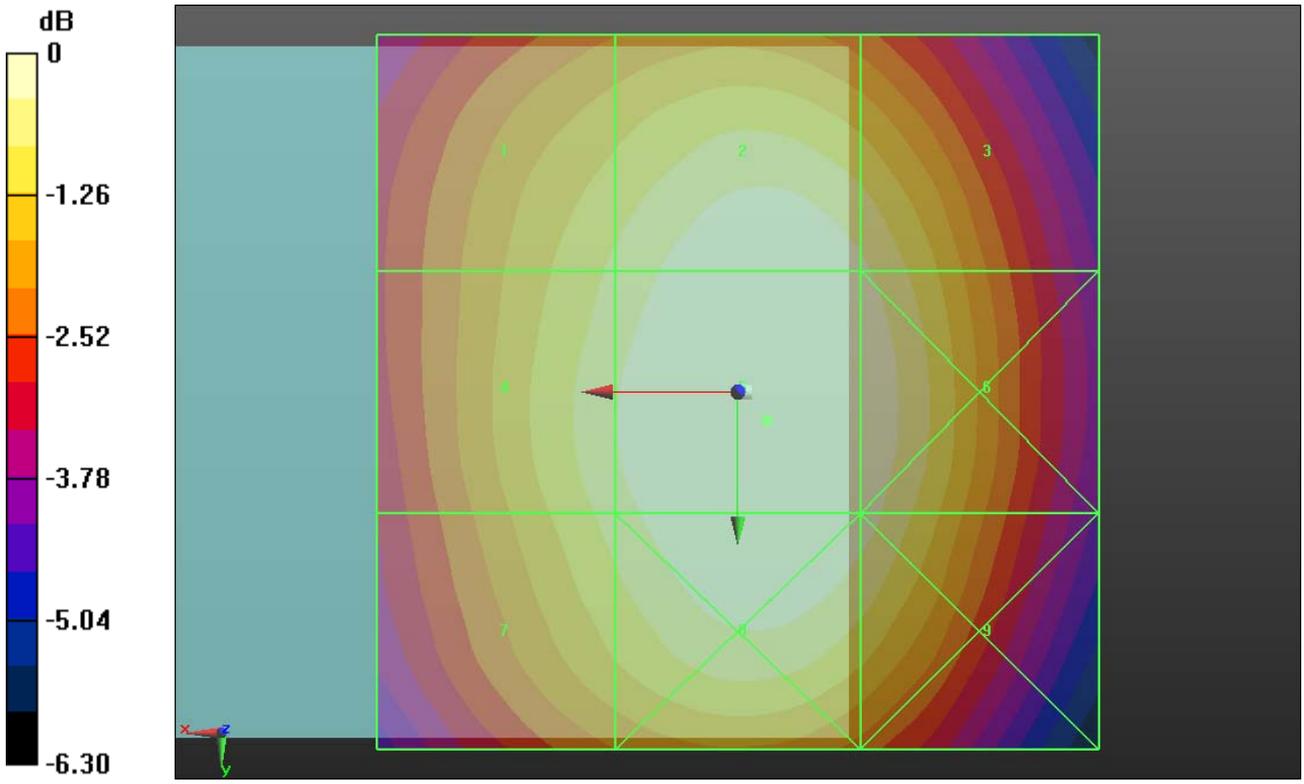**Hearing Aid Near-Field Category: M3 (AWF -5 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
57.990 M3	**73.815 M3**	**73.591 M3**
Grid 4	Grid 5	Grid 6
54.460 M3	**73.260 M3**	**73.129 M3**
Grid 7	Grid 8	Grid 9
49.745 M3	**56.671 M3**	**56.841 M3**

Cursor:
Total = 73.815 V/m
E Category: M3
Location: -7, -12, 8.7 mm

0 dB = 79.030V/m

#06 HAC RF_GSM1900_GSM_Ch810(E)

DUT: 2O2301A

Communication System: General GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 69.862 V/m

Probe Modulation Factor = 2.690

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 28.205 V/m; Power Drift = -0.02 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)
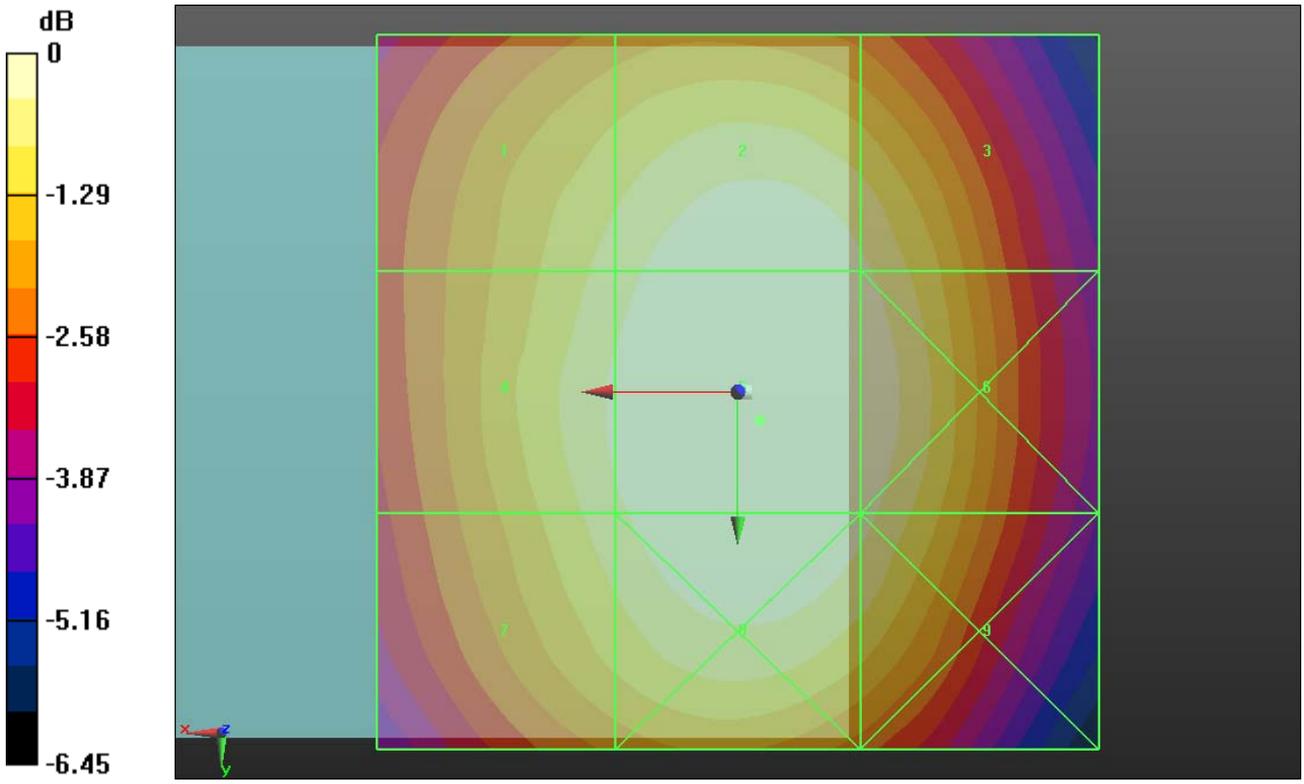
Peak E-field in V/m

Grid 1	Grid 2	Grid 3
54.996 M3	**70.900 M3**	**70.689 M3**
Grid 4	Grid 5	Grid 6
50.953 M3	**69.862 M3**	**69.714 M3**
Grid 7	Grid 8	Grid 9
48.785 M3	**52.371 M3**	**52.623 M3**

Cursor:
Total = 70.900 V/m
E Category: M3
Location: -7, -13, 8.7 mm

0 dB = 75.910V/m

#07 HAC RF_WCDMA V_RMC 12.2K_Ch4132(E)

DUT: 2O2301A

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

Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 0 kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch4132/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 73.644 V/m

Probe Modulation Factor = 1.050

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 93.667 V/m; Power Drift = 0.11 dB

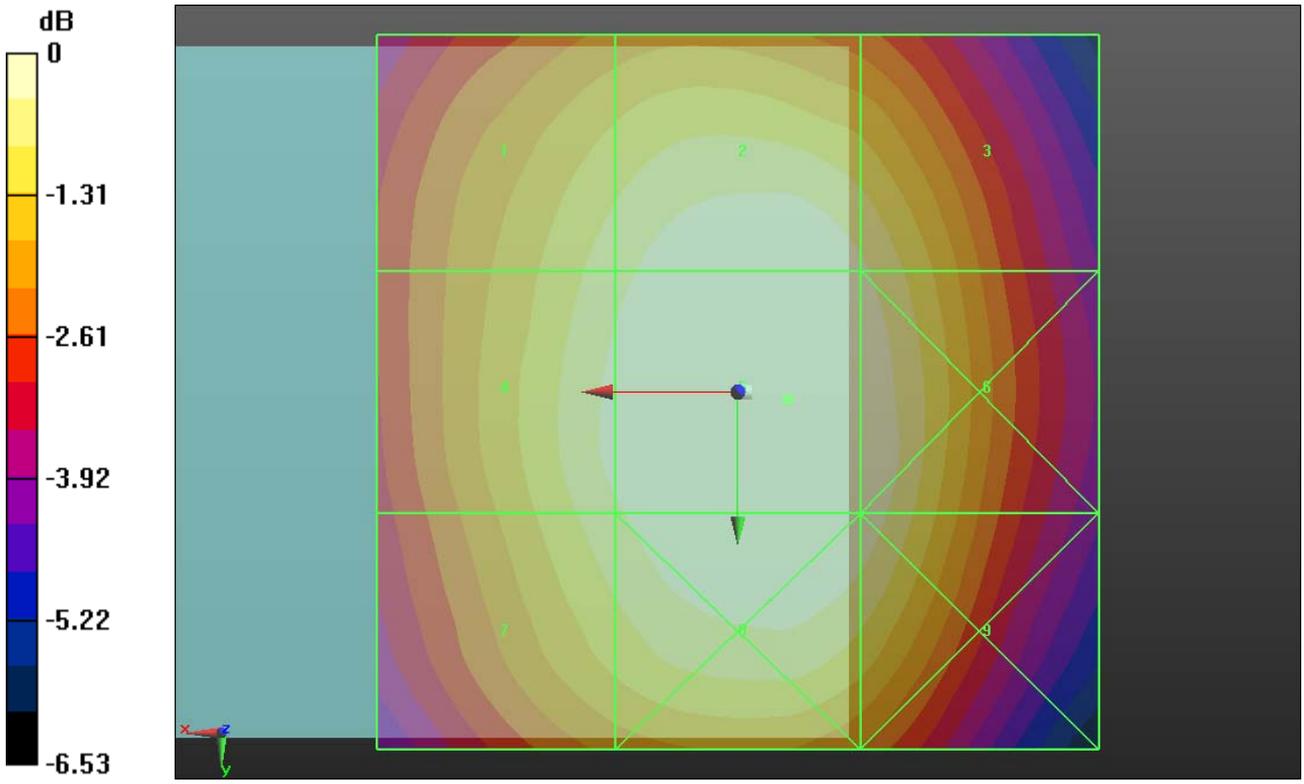**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
64.331 M4	**70.462 M4**	**67.559 M4**
Grid 4	Grid 5	Grid 6
66.692 M4	**73.644 M4**	**70.204 M4**
Grid 7	Grid 8	Grid 9
65.138 M4	**71.858 M4**	**68.482 M4**

Cursor:
Total = 73.644 V/m
E Category: M4
Location: -2, 2, 8.7 mm

0 dB = 70.140V/m

#08 HAC RF_WCDMA V_RMC 12.2K_Ch4182(E)

DUT: 2O2301A

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

Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 0 kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 64.607 V/m

Probe Modulation Factor = 1.050

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 83.419 V/m; Power Drift = 0.0028 dB

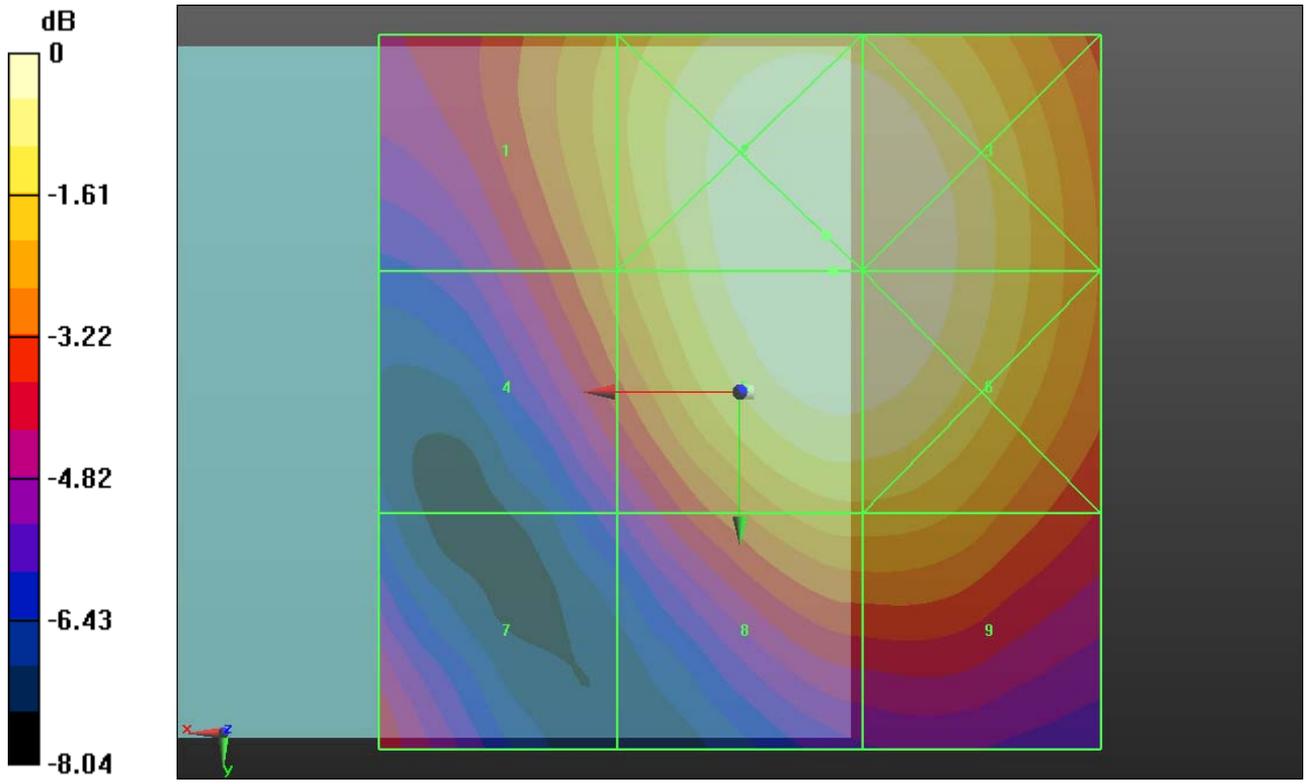**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
57.118 M4	**62.069 M4**	**59.272 M4**
Grid 4	Grid 5	Grid 6
59.185 M4	**64.607 M4**	**61.646 M4**
Grid 7	Grid 8	Grid 9
57.786 M4	**62.934 M4**	**59.663 M4**

Cursor:
Total = 64.607 V/m
E Category: M4
Location: -1.5, 2, 8.7 mm

0 dB = 61.530V/m

#09 HAC RF_WCDMA V_RMC 12.2K_Ch4233(E)

DUT: 2O2301A

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch4233/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 85.837 V/m

Probe Modulation Factor = 1.050

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 110.0 V/m; Power Drift = 0.07 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
76.318 M4	**82.222 M4**	**78.528 M4**
Grid 4	Grid 5	Grid 6
79.102 M4	**85.837 M4**	**82.473 M4**
Grid 7	Grid 8	Grid 9
77.090 M4	**83.940 M4**	**80.711 M4**

Cursor:
Total = 85.837 V/m
E Category: M4
Location: -3.5, 0.5, 8.7 mm

0 dB = 81.750V/m

#10 HAC RF_WCDMA II_RMC 12.2K_Ch9262(E)

DUT: 2O2301A

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch9262/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 41.059 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 45.057 V/m; Power Drift = -0.07 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
32.405 M4	**41.252 M4**	**40.896 M4**
Grid 4	Grid 5	Grid 6
30.414 M4	**41.059 M4**	**40.771 M4**
Grid 7	Grid 8	Grid 9
25.627 M4	**32.313 M4**	**32.304 M4**

Cursor:
Total = 41.252 V/m
E Category: M4
Location: -6, -11, 8.7 mm

0 dB = 39.670V/m

#11 HAC RF_WCDMA II_RMC 12.2K_Ch9400(E)

DUT: 2O2301A

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch9400/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 40.001 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 42.844 V/m; Power Drift = -0.03 dB

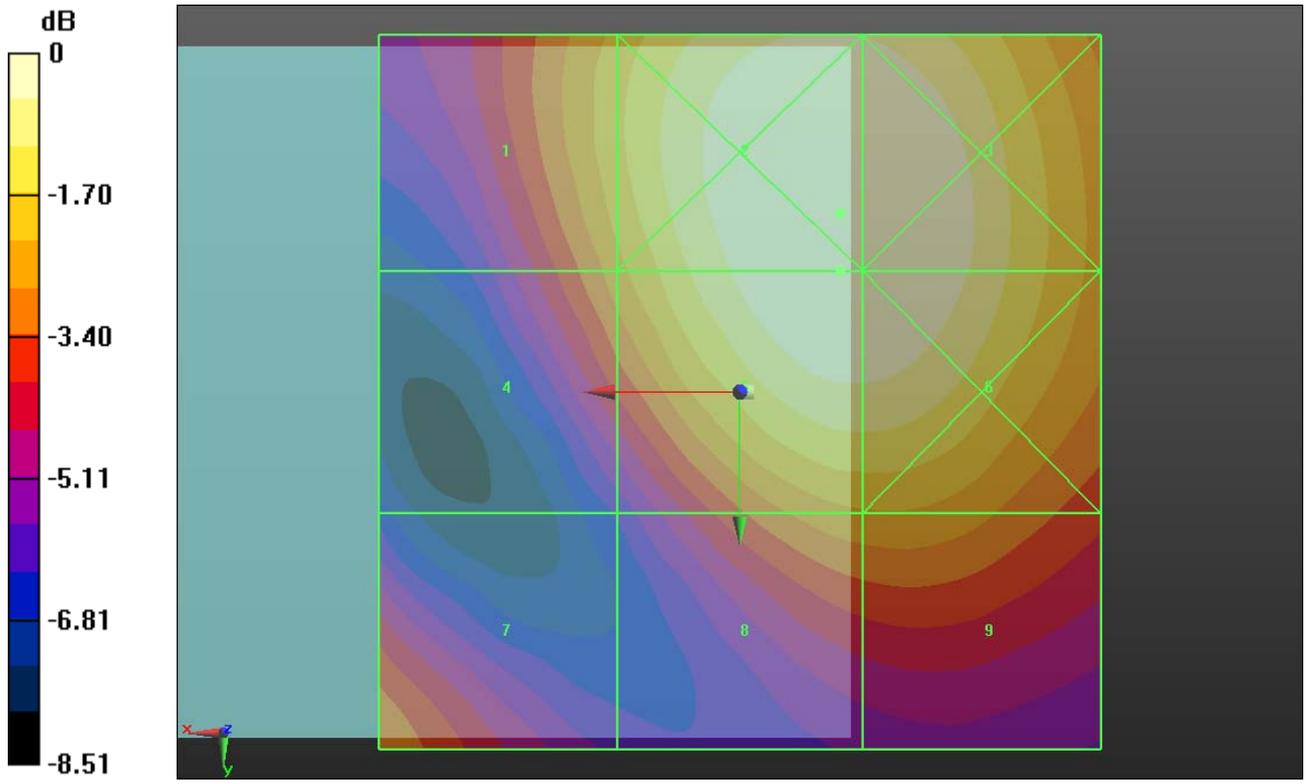**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
31.666 M4	**40.277 M4**	**40.141 M4**
Grid 4	Grid 5	Grid 6
29.666 M4	**40.001 M4**	**39.900 M4**
Grid 7	Grid 8	Grid 9
27.023 M4	**30.863 M4**	**30.905 M4**

Cursor:
Total = 40.277 V/m
E Category: M4
Location: -7, -11.5, 8.7 mm
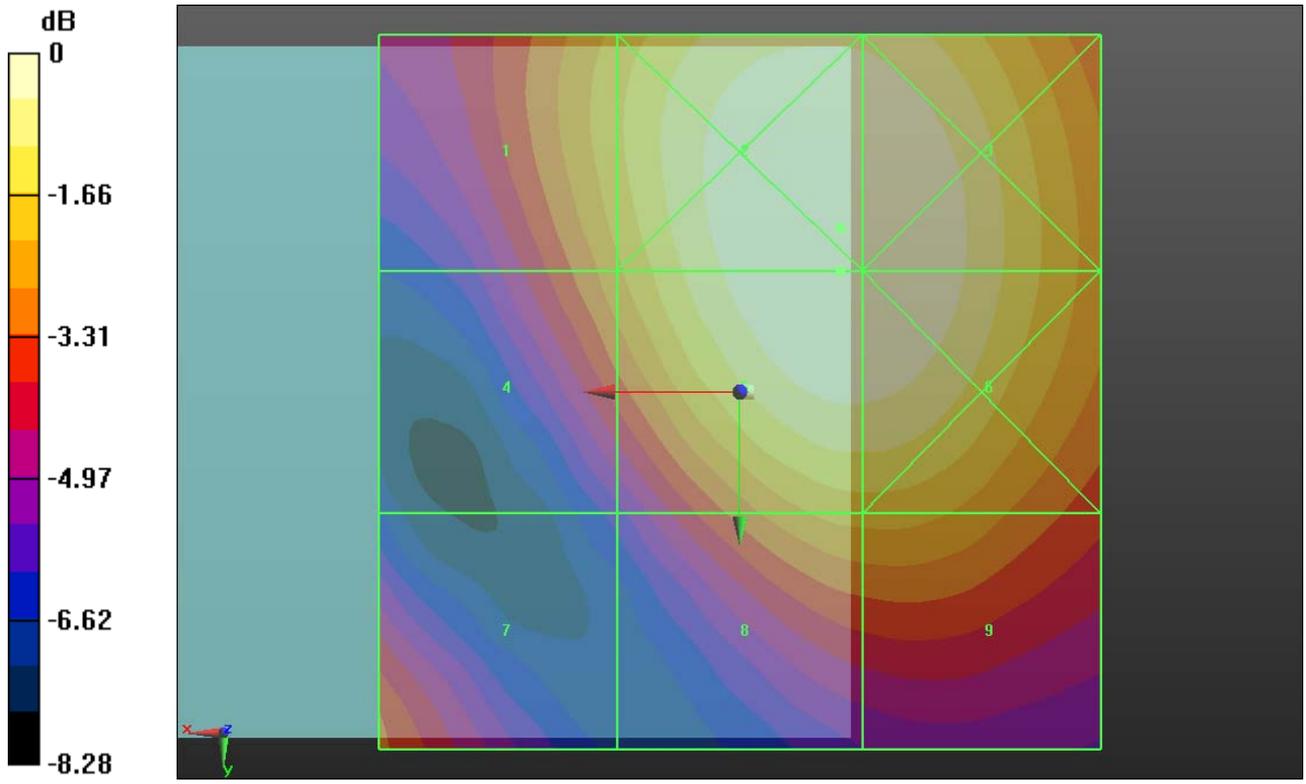
0 dB = 38.730V/m

#12 HAC RF_WCDMA II_RMC 12.2K_Ch9538(E)

DUT: 2O2301A

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: ER3DV6 - SN2476; ConvF(1, 1, 1); Calibrated: 2011-11-21
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch9538/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 33.995 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 35.574 V/m; Power Drift = -0.04 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)
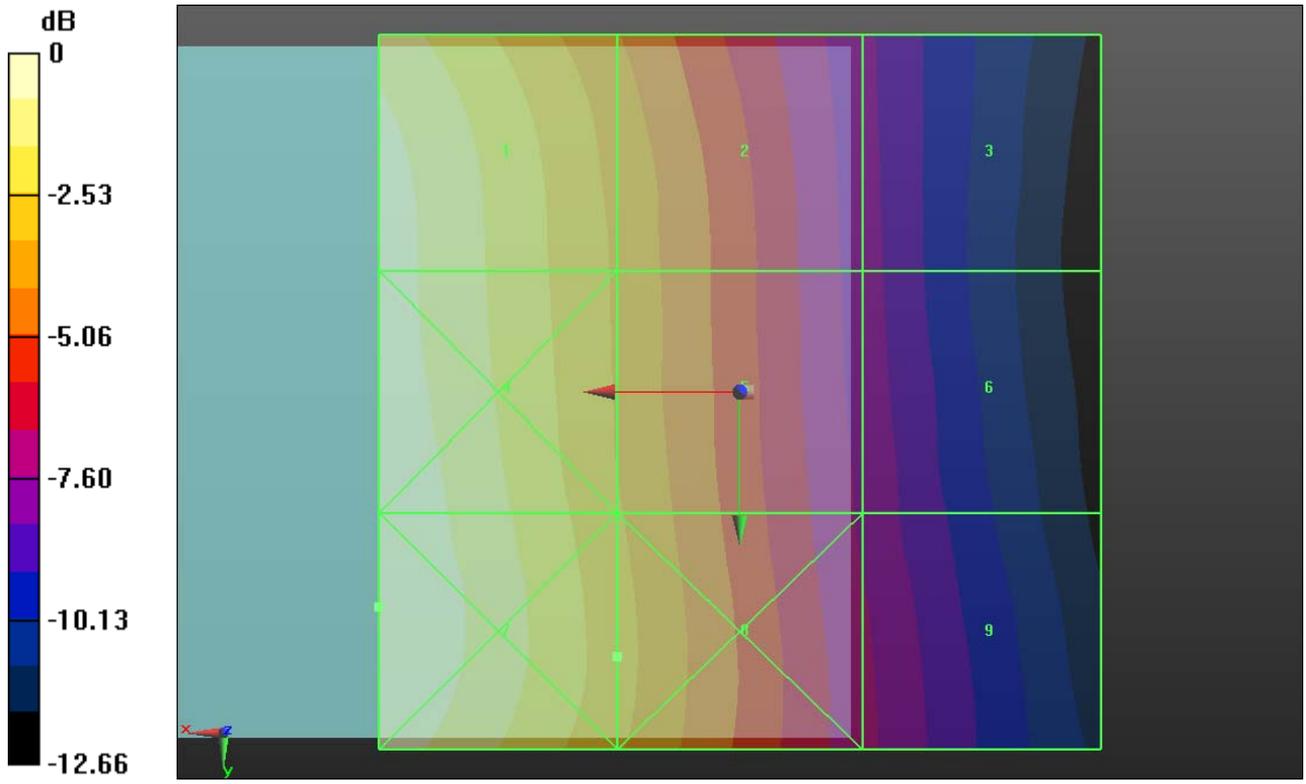
Peak E-field in V/m

Grid 1	Grid 2	Grid 3
26.875 M4	**34.461 M4**	**34.379 M4**
Grid 4	Grid 5	Grid 6
24.910 M4	**33.995 M4**	**33.912 M4**
Grid 7	Grid 8	Grid 9
23.855 M4	**25.324 M4**	**25.431 M4**

Cursor:
Total = 34.461 V/m
E Category: M4
Location: -7, -12.5, 8.7 mm

0 dB = 33.140V/m

#01 HAC RF_GSM850_GSM_Ch128(H)

DUT: 2O2301A

Communication System: General GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch128/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.372 A/m
Probe Modulation Factor = 2.910
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.075 A/m; Power Drift = 0.02 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)
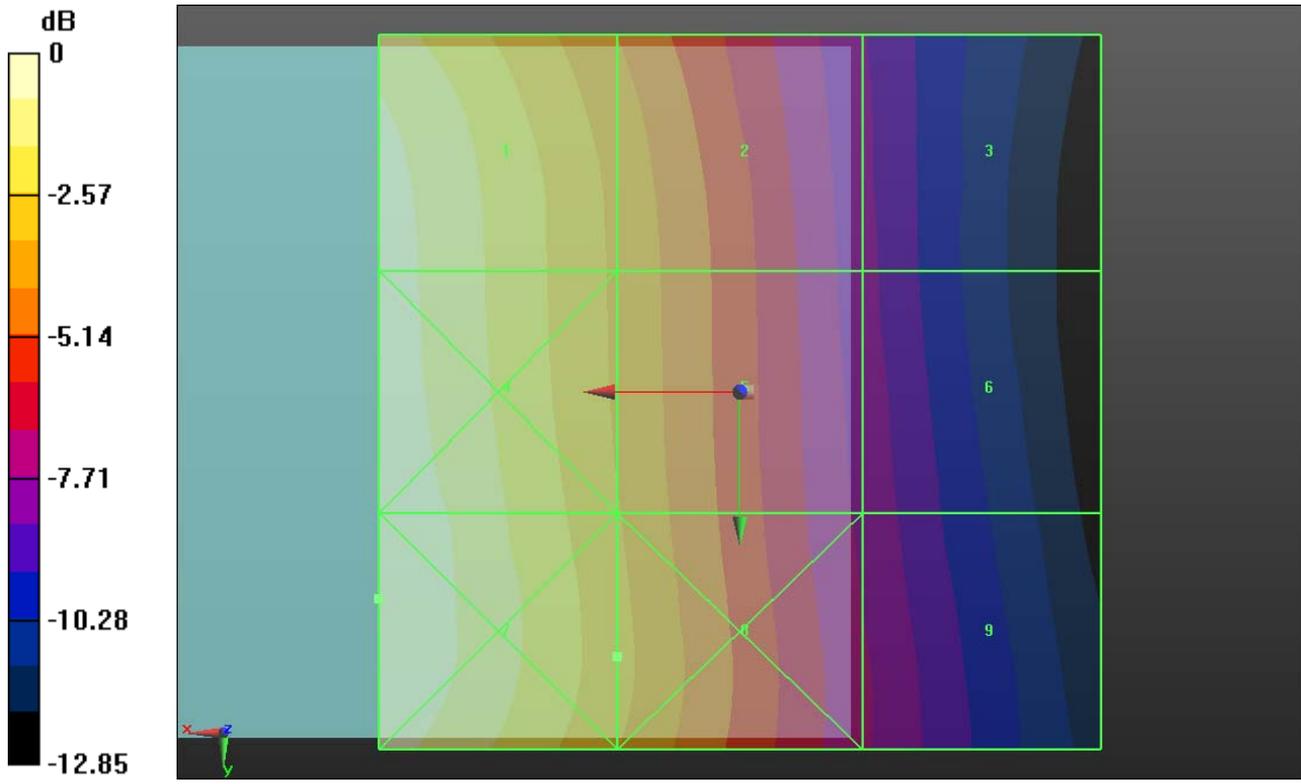
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.372 M4	**0.261 M4**	**0.155 M4**
Grid 4	Grid 5	Grid 6
0.390 M4	**0.268 M4**	**0.160 M4**
Grid 7	Grid 8	Grid 9
0.398 M4	**0.276 M4**	**0.168 M4**

Cursor:
Total = 0.398 A/m
H Category: M4
Location: 25, 15, 8.7 mm

0 dB = 0.390A/m

#02 HAC RF_GSM850_GSM_Ch189(H)

DUT: 2O2301A

Communication System: General GSM; Frequency: 836.4 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch189/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.430 A/m

Probe Modulation Factor = 2.910

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.085 A/m; Power Drift = 0.03 dB

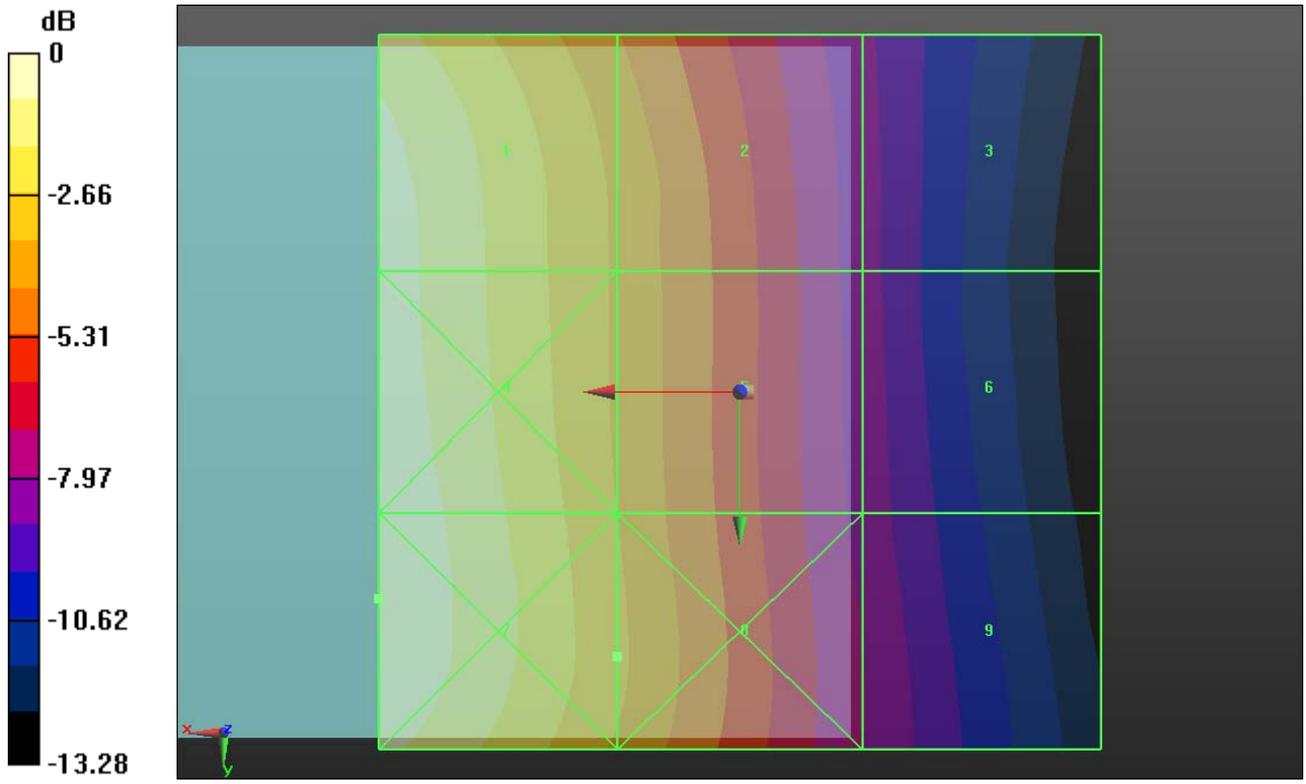**Hearing Aid Near-Field Category: M4 (AWF -5 dB)**

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.430 M4	**0.298 M4**	**0.175 M4**
Grid 4	Grid 5	Grid 6
0.449 M4	**0.306 M4**	**0.182 M4**
Grid 7	Grid 8	Grid 9
0.457 M3	**0.314 M4**	**0.190 M4**

Cursor:
Total = 0.457 A/m
H Category: M3
Location: 25, 14.5, 8.7 mm

0 dB = 0.450A/m

#03 HAC RF_GSM850_GSM_Ch251(H)

DUT: 2O2301A

Communication System: General GSM; Frequency: 848.8 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.497 A/m

Probe Modulation Factor = 2.910

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.097 A/m; Power Drift = 0.0021 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)
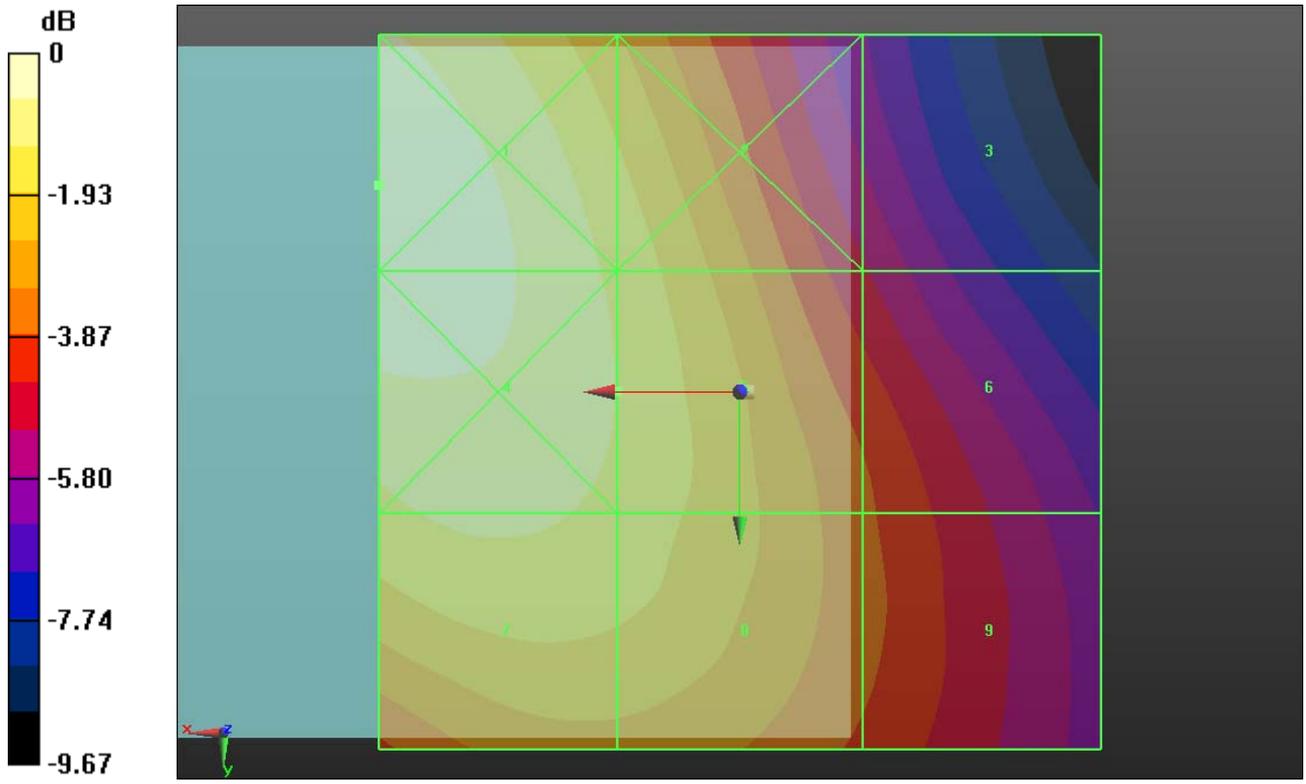
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.497 M3	**0.341 M4**	**0.197 M4**
Grid 4	Grid 5	Grid 6
0.515 M3	**0.347 M4**	**0.201 M4**
Grid 7	Grid 8	Grid 9
0.525 M3	**0.354 M4**	**0.210 M4**

Cursor:
Total = 0.525 A/m
H Category: M3
Location: 25, 14.5, 8.7 mm

0 dB = 0.520A/m

#04 HAC RF_GSM1900_GSM_Ch512(H)

DUT: 2O2301A

Communication System: General GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch512/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.236 A/m

Probe Modulation Factor = 2.890

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.078 A/m; Power Drift = 0.06 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)
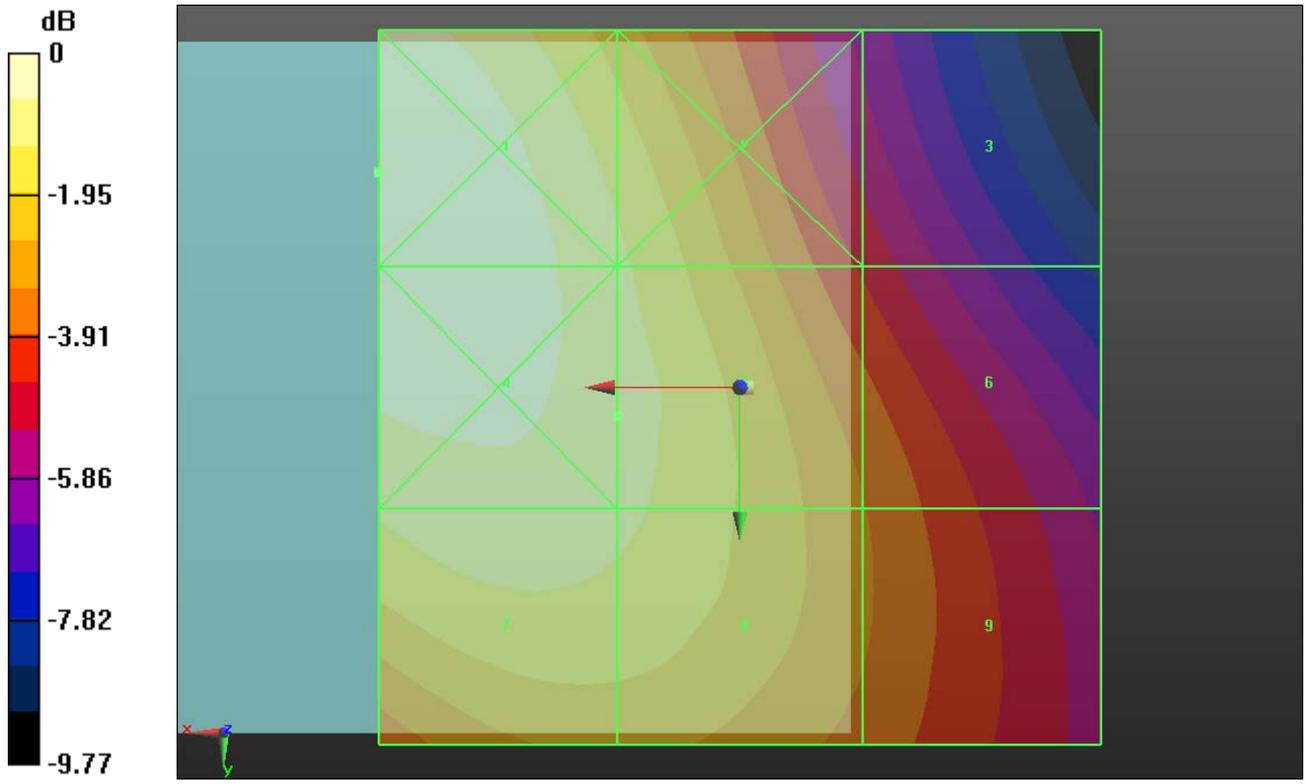
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.267 M2	**0.229 M3**	**0.151 M3**
Grid 4	Grid 5	Grid 6
0.262 M2	**0.232 M3**	**0.176 M3**
Grid 7	Grid 8	Grid 9
0.236 M3	**0.228 M3**	**0.178 M3**

Cursor:
Total = 0.267 A/m
H Category: M2
Location: 25, -14.5, 8.7 mm

0 dB = 0.270A/m

#05 HAC RF_GSM1900_GSM_Ch661(H)

DUT: 2O2301A

Communication System: General GSM; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch661/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.234 A/m

Probe Modulation Factor = 2.890

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.079 A/m; Power Drift = 0.09 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)
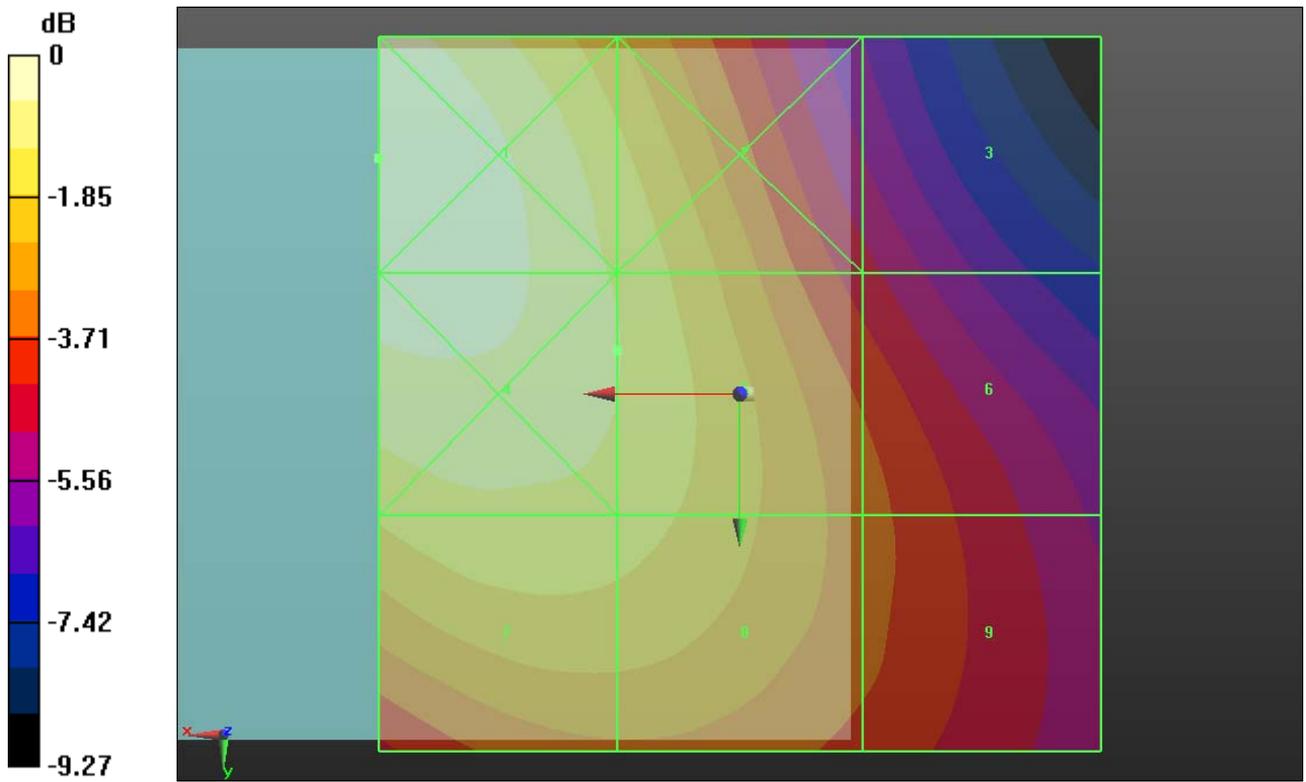
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.264 M2	**0.227 M3**	**0.152 M3**
Grid 4	Grid 5	Grid 6
0.259 M2	**0.232 M3**	**0.180 M3**
Grid 7	Grid 8	Grid 9
0.234 M3	**0.228 M3**	**0.181 M3**

Cursor:
Total = 0.264 A/m
H Category: M2
Location: 25, -15, 8.7 mm

0 dB = 0.260A/m

#06 HAC RF_GSM1900_GSM_Ch810(H)

DUT: 2O2301A

Communication System: General GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.226 A/m

Probe Modulation Factor = 2.890

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.077 A/m; Power Drift = 0.01 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.261 M2	**0.223 M3**	**0.152 M3**
Grid 4	Grid 5	Grid 6
0.253 M2	**0.226 M3**	**0.176 M3**
Grid 7	Grid 8	Grid 9
0.223 M3	**0.218 M3**	**0.176 M3**

Cursor:
Total = 0.261 A/m
H Category: M2
Location: 25, -16.5, 8.7 mm

0 dB = 0.260A/m

#07 HAC RF_WCDMA V_RMC 12.2K_Ch4132(H)

DUT: 2O2301A

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch4132/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.144 A/m

Probe Modulation Factor = 1.030

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.083 A/m; Power Drift = 0.06 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.144 M4	**0.103 M4**	**0.062 M4**
Grid 4	Grid 5	Grid 6
0.150 M4	**0.106 M4**	**0.065 M4**
Grid 7	Grid 8	Grid 9
0.154 M4	**0.110 M4**	**0.068 M4**

Cursor:
Total = 0.154 A/m
H Category: M4
Location: 25, 18, 8.7 mm
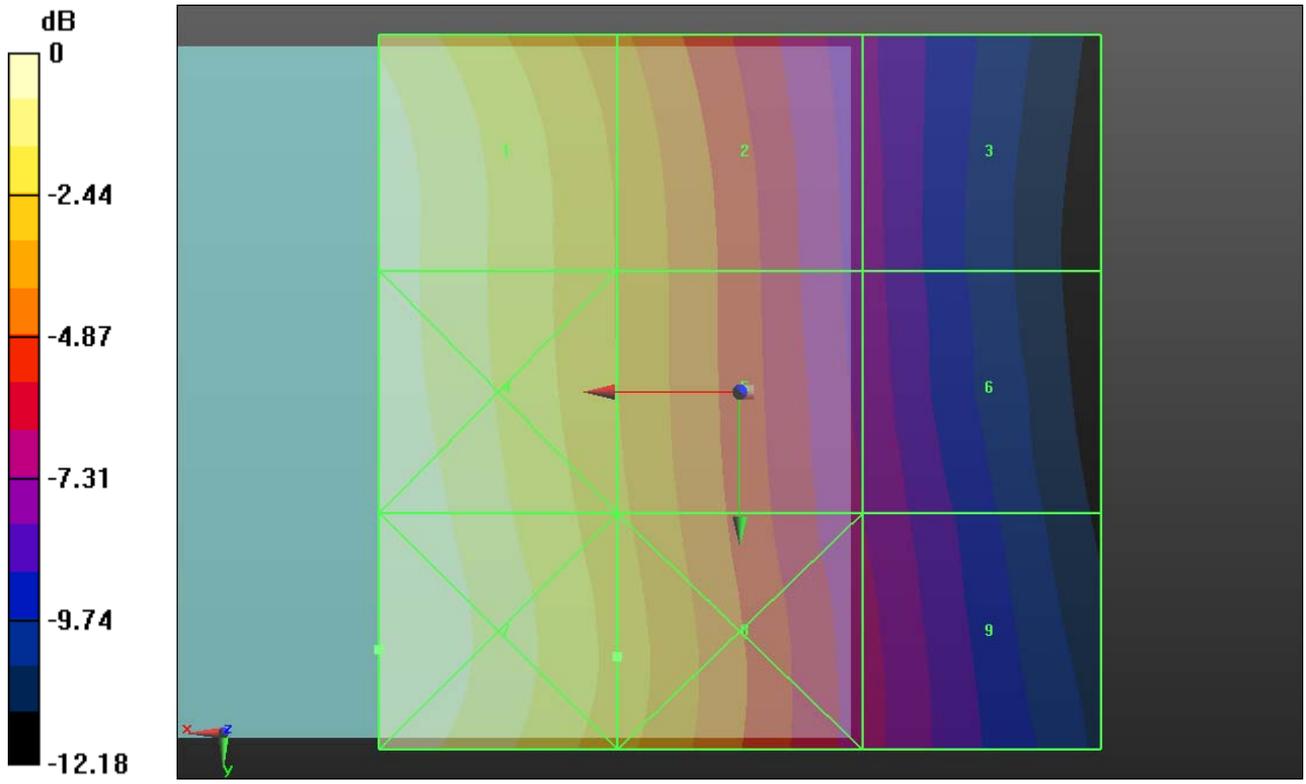
0 dB = 0.150A/m

#08 HAC RF_WCDMA V_RMC 12.2K_Ch4182(H)

DUT: 2O2301A

Communication System: UMTS; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.125 A/m
Probe Modulation Factor = 1.030
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.072 A/m; Power Drift = 0.09 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)
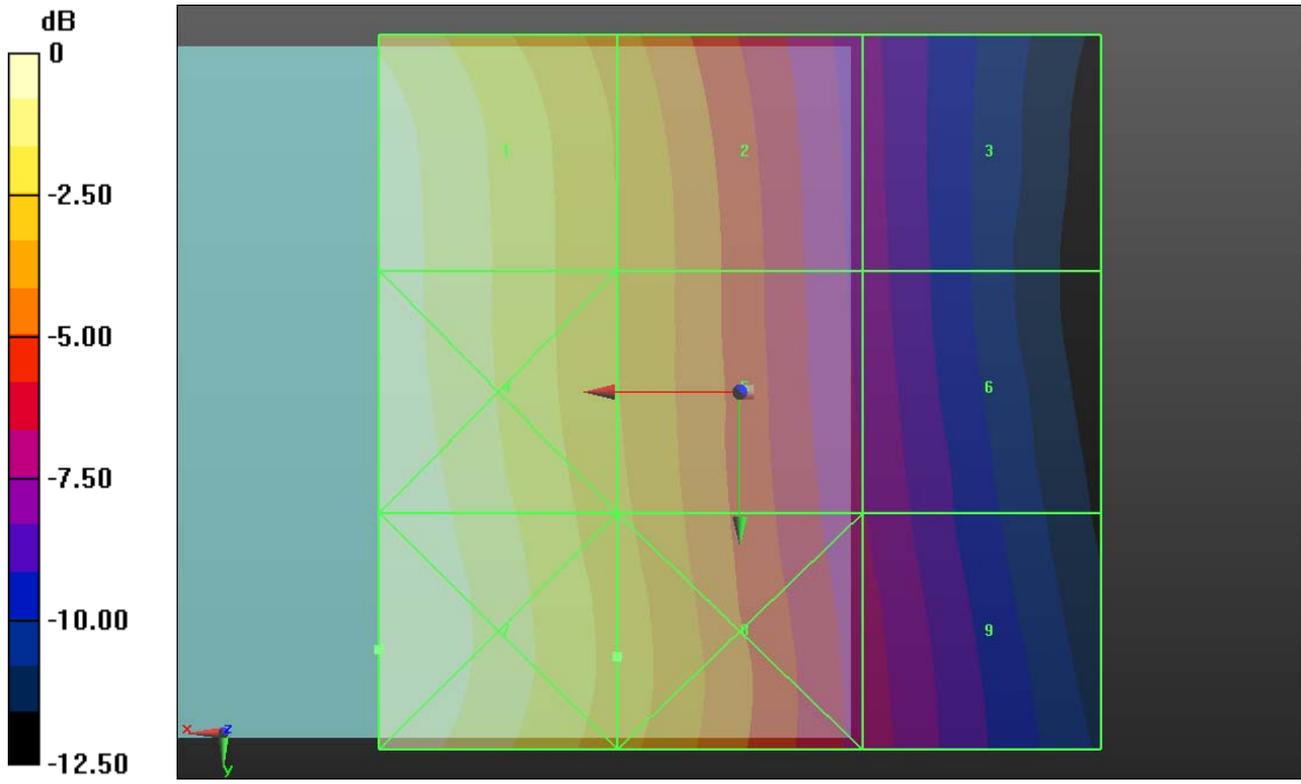
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.125 M4	**0.089 M4**	**0.053 M4**
Grid 4	Grid 5	Grid 6
0.130 M4	**0.091 M4**	**0.055 M4**
Grid 7	Grid 8	Grid 9
0.133 M4	**0.094 M4**	**0.058 M4**

Cursor:
Total = 0.133 A/m
H Category: M4
Location: 25, 18, 8.7 mm

0 dB = 0.130A/m

#09 HAC RF_WCDMA V_RMC 12.2K_Ch4233(H)

DUT: 2O2301A

Communication System: UMTS; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch4233/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.166 A/m
Probe Modulation Factor = 1.030
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.095 A/m; Power Drift = 0.05 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)
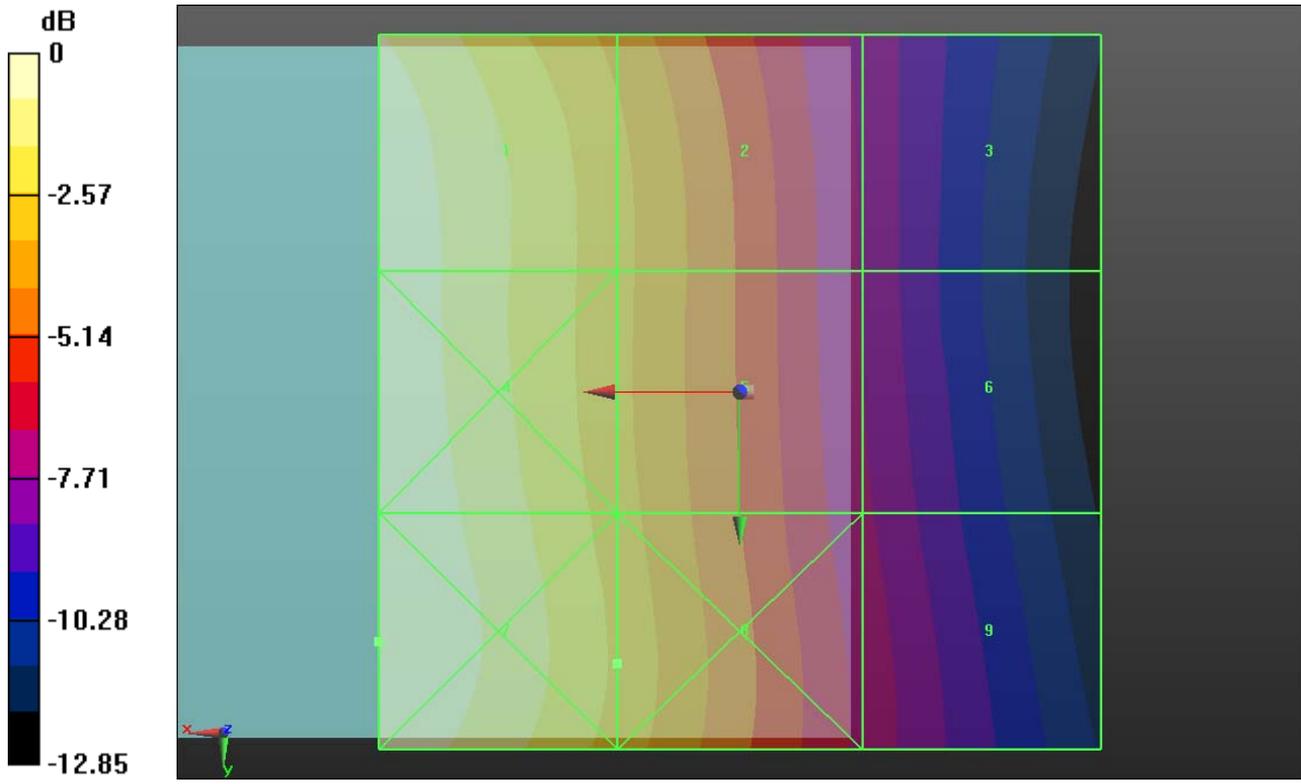
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.166 M4	**0.118 M4**	**0.070 M4**
Grid 4	Grid 5	Grid 6
0.172 M4	**0.120 M4**	**0.072 M4**
Grid 7	Grid 8	Grid 9
0.175 M4	**0.124 M4**	**0.075 M4**

Cursor:
Total = 0.175 A/m
H Category: M4
Location: 25, 17.5, 8.7 mm

0 dB = 0.170A/m

#10 HAC RF_WCDMA II_RMC 12.2K_Ch9262(H)

DUT: 2O2301A

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3

Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch9262/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.114 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.107 A/m; Power Drift = -0.03 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)
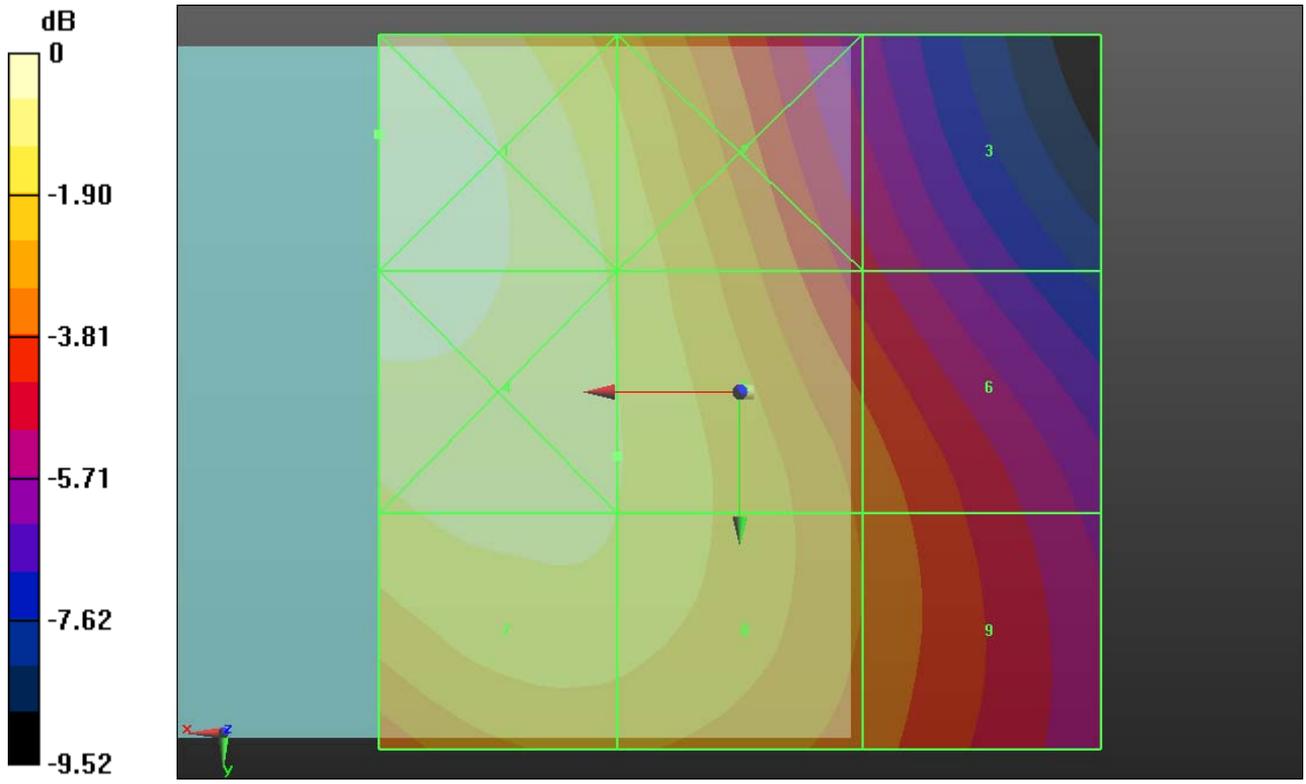
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.131 M4	**0.111 M4**	**0.075 M4**
Grid 4	Grid 5	Grid 6
0.126 M4	**0.113 M4**	**0.089 M4**
Grid 7	Grid 8	Grid 9
0.114 M4	**0.112 M4**	**0.090 M4**

Cursor:
Total = 0.131 A/m
H Category: M4
Location: 25, -18, 8.7 mm

0 dB = 0.130A/m

#11 HAC RF_WCDMA II_RMC 12.2K_Ch9400(H)

DUT: 2O2301A

Communication System: UMTS; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch9400/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.114 A/m
Probe Modulation Factor = 1.040
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.106 A/m; Power Drift = 0.02 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)
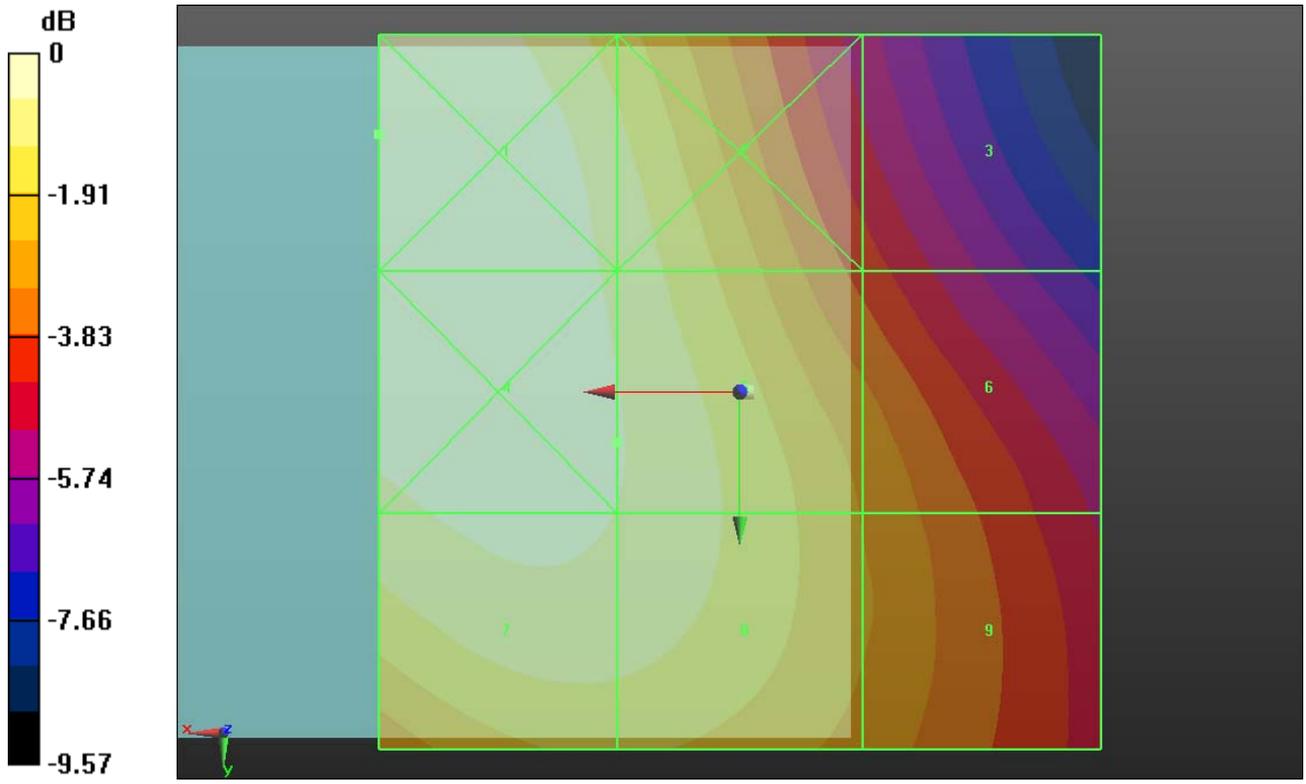
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.129 M4	**0.110 M4**	**0.075 M4**
Grid 4	Grid 5	Grid 6
0.124 M4	**0.112 M4**	**0.089 M4**
Grid 7	Grid 8	Grid 9
0.114 M4	**0.111 M4**	**0.091 M4**

Cursor:
Total = 0.129 A/m
H Category: M4
Location: 25, -18, 8.7 mm

0 dB = 0.120A/m

#12 HAC RF_WCDMA II_RMC 12.2K_Ch9538(H)

DUT: 2O2301A

Communication System: UMTS; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, $ε_r$ = 1; ρ = 0 kg/m^3
Ambient Temperature：23.1 ℃

DASY5 Configuration:
- Probe: H3DV6 - SN6300; ; Calibrated: 2011-11-22
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1210; Calibrated: 2011-11-18
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.4.5 (3634)

Ch9538/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.099 A/m
Probe Modulation Factor = 1.040
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.094 A/m; Power Drift = 0.06 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)
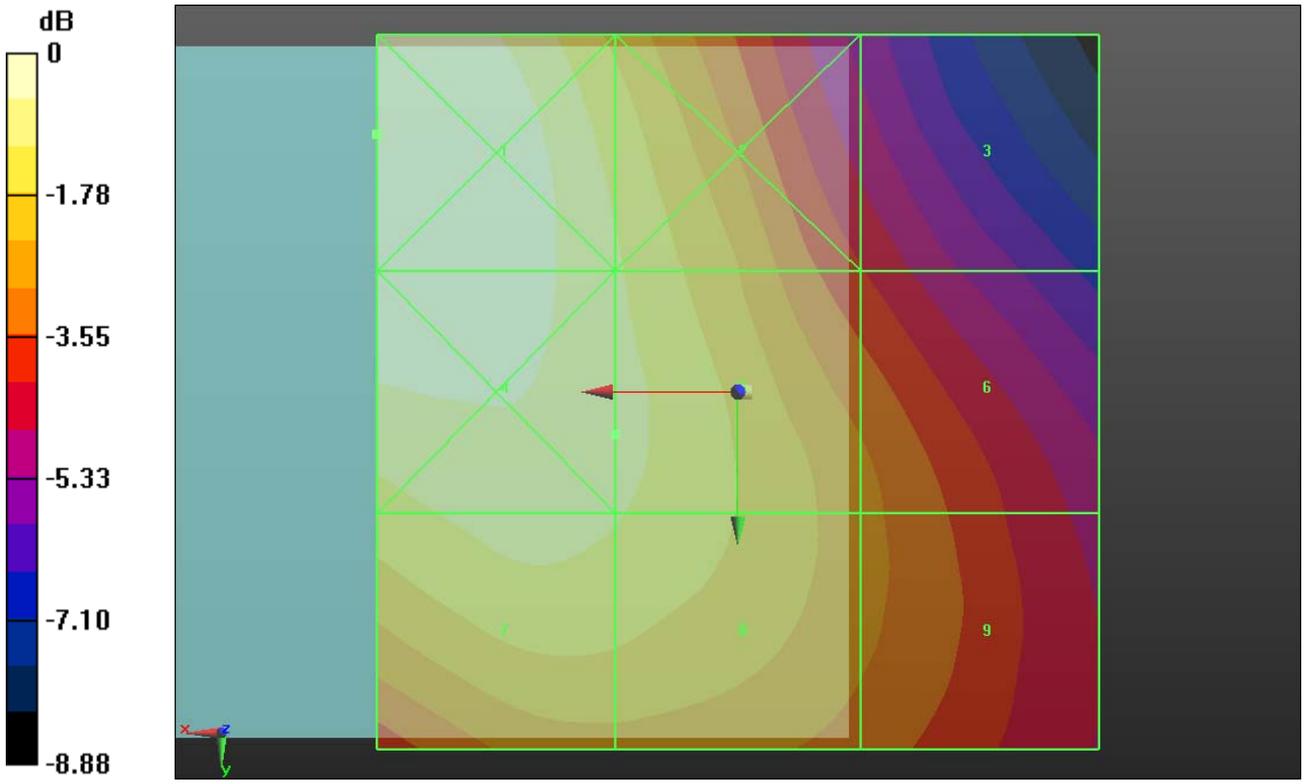
Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.115 M4	**0.097 M4**	**0.069 M4**
Grid 4	Grid 5	Grid 6
0.110 M4	**0.098 M4**	**0.080 M4**
Grid 7	Grid 8	Grid 9
0.099 M4	**0.096 M4**	**0.081 M4**

Cursor:
Total = 0.115 A/m
H Category: M4
Location: 25, -18, 8.7 mm

0 dB = 0.110A/m