

Report No.: RZA1012-2080HAC01



# ANSI C63.19

# TEST REPORT

<b>Product Name</b>	cdma2000 Digital Mobile Phone
<b>Model</b>	HUAWEI M835/M835/HUAWEI C8500-3/C8500-3
<b>FCC ID</b>	QISM835
<b>Client</b>	Huawei Technologies Co., Ltd.

**TA Technology (Shanghai) Co., Ltd.**



## GENERAL SUMMARY

<b>Product Name</b>	cdma2000 Digital Mobile Phone	<b>Model</b>	HUAWEI M835/M835/HUAWEI C8500-3/C8500-3
<b>FCC ID</b>	QISM835	<b>Report No.</b>	RZA1012-2080HAC01
<b>Client</b>	Huawei Technologies Co., Ltd.		
<b>Manufacturer</b>	Huawei Technologies Co., Ltd.		
<b>Reference Standard(s)</b>	<b>ANSI C63.19-2007:</b> American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.		
<b>Conclusion</b>	<p>This portable wireless equipment has been measured in all cases requested by the relevant standards.</p> <p>General Judgment: <b>M4 (RF Emission)</b></p> <div style="text-align: right;">  <p>(Stamp) Date of issue: January 27<sup>th</sup>, 2011</p> </div>		
<b>Comment</b>	The test result only responds to the measured sample.		

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## 1. General Information

### 1.1. Notes of the Test Report

**TA Technology (Shanghai) Co., Ltd.** guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

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If the electrical report is inconsistent with the printed one, it should be subject to the latter.

### 1.2. Testing Laboratory

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### 1.3. Applicant Information

Company: Huawei Technologies Co., Ltd.  
Address: Bantian, Longgang District  
City: Shenzhen  
Postal Code: 518129  
Country: P.R. China  
Contact: Wang Wei  
Telephone: 0755-28780808  
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### 1.4. Manufacturer Information

Company: Huawei Technologies Co., Ltd.  
Address: Bantian, Longgang District  
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**1.5. Information of EUT**

**General Information**

Device Type:	Portable Device		
Product Name:	Cdma2000 Digital Mobile Phone		
MEID:	A00000201B964C		
Hardware Version:	HC1C815M		
Software Version:	M835V100R001C00B177B608		
Antenna Type:	Internal Antenna		
Device Operating Configurations:			
Supporting Mode(s):	CDMA Cellular (tested)		
	CDMA PCS (tested)		
	CDMA AWS (tested)		
	WiFi		
	Bluetooth		
Test Modulation:	QPSK		
Operating Frequency Range(s):	Mode	Tx (MHz)	Rx (MHz)
	CDMA Cellular	824.7 ~ 848.31	869.7 ~ 893.31
	CDMA PCS	1851.25 ~ 1908.75	1931.25 ~ 1988.75
	CDMA AWS	1711.25 ~ 1752.5	2111.25 ~ 2152.5
Test Channel: (Low - Middle - High)	1013 - 384 - 777	(CDMA Cellular)	(tested)
	25 - 600 - 1175	(CDMA PCS)	(tested)
	25 - 450 - 850	(CDMA AWS)	(tested)
Power Class:	CDMA Cellular: Tested with Power Control All up bits		
	CDMA PCS: Tested with Power Control All up bits		
	CDMA AWS: Tested with Power Control All up bits		

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### Auxiliary Equipment Details

#### AE1:Battery

Model: HB4J1H  
Manufacturer: Huawei Technologies Co., Ltd.  
S/N: UNHAA23XA4207336

Equipment Under Test (EUT) is a model of cdma2000 Digital Mobile Phone. The detail about Mobile phone and Lithium Battery is in chapter 1.5 in this report. HAC is tested for CDMA Cellular, CDMA PCS and CDMA AWS. The EUT has a CDMA antenna that is used for Tx/Rx, and the other is BT/WIFI antenna that is used for Tx/Rx.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

### 1.6. The Ambient Conditions during Test

Temperature	Min. = 18°C, Max. = 28 °C
Relative humidity	Min. = 0%, Max. = 80%
Ground system resistance	< 0.5 $\Omega$
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

### 1.7. The Total M-rating of each tested band

Band	Rating
CDMA Cellular	<b>M4</b>
CDMA PCS	<b>M4</b>
CDMA AWS	<b>M4</b>

### 1.8. Test Date

The test is performed on January 4, 2011.

## 2. Test Information

### 2.1. Operational Conditions during Test

#### 2.1.1. General Description of Test Procedures

The phone was tested in all normal configurations for the ear use. The EUT is mounted in the device holder equivalent as for classic dosimeter measurements. The acoustic output of the EUT shall coincide with the center point of the area formed by the dielectric wire and the middle bar of the arch's top frame. The EUT shall be moved vertically upwards until it touches the frame. The fine adjustment is possible by sliding the complete. The EUT holder is on the yellow base plate of the Test Arch phantom. These test configurations are tested at the high, middle and low frequency channels of each applicable operating mode; for example, GSM, WCDMA (UMTS), CDMA and TDMA.

#### 2.1.2. CDMA Test Configuration

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) are allocated to 1013, 384 and 777 respectively in the case of CDMA Cellular, allocated to 25, 600 and 1175 respectively in the case of CDMA PCS, allocated to 25, 450 and 850 respectively in the case of CDMA AWS, The EUT is commanded to operate at maximum transmitting power.

Test Parameter setup for maximum RF output power according to section 4.4.5 of 3GPP2.

Parameter	Units	Value
I or	dBm/1.23MHz	-104
PilotE c /I or	dB	-7
TrafficE c /I or	dB	-7.4

## 2.2. HAC RF Measurements System Configuration

### 2.2.1. HAC Measurement Set-up

These measurements are performed using the DASY5 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Stäubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor. The robot is a six-axis industrial robot performing precise movements. Cell controller systems contain the power supply, robot controller, teach pendant (Joystick) and remote control, and are used to drive the robot motors. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification; signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

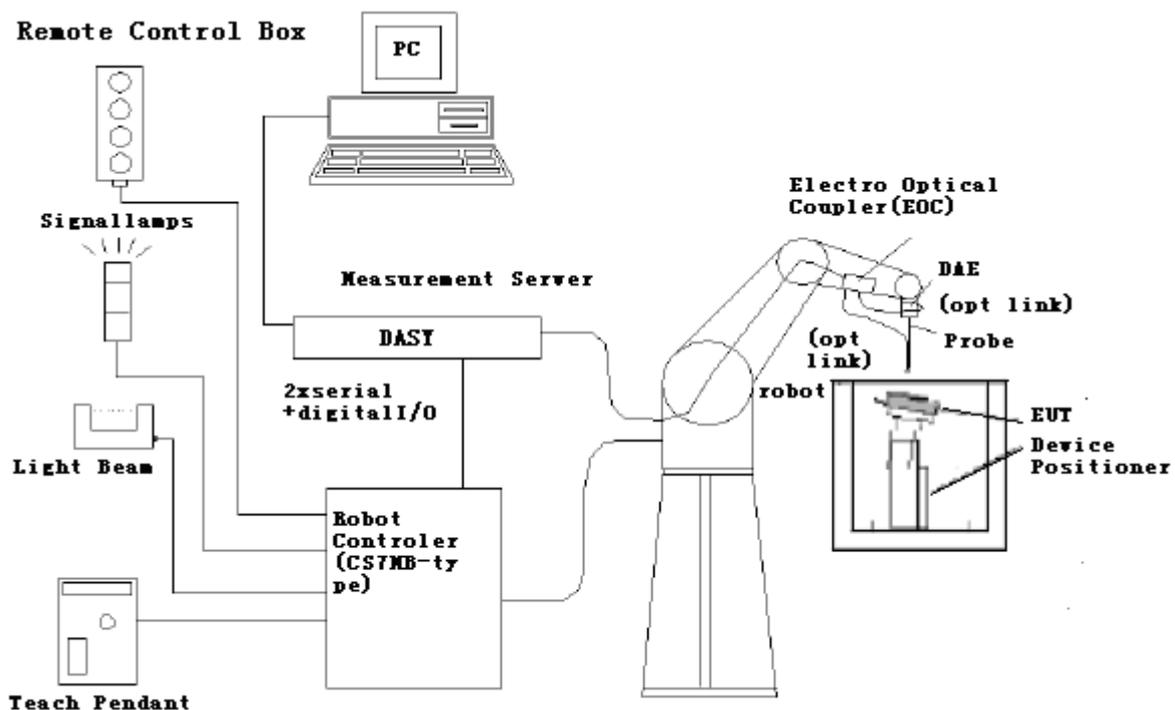


Figure 1 HAC Test Measurement Set-up

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.

### 2.2.2. Probe System

The HAC measurements were conducted with the E-Field Probe ER3DV6 and the H-Field Probe H3DV6 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

#### E-Field Probe Description

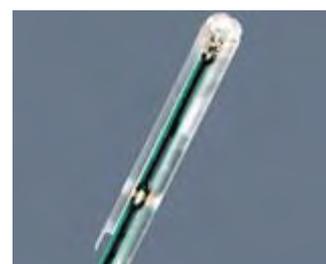
Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy $\pm 6.0\%$ , $k=2$ )
Frequency	40 MHz to > 6 GHz (can be extended to < 20 MHz) Linearity: $\pm 0.2$ dB (100 MHz to 3 GHz)
Directivity	$\pm 0.2$ dB in air (rotation around probe axis) $\pm 0.4$ dB in air (rotation normal to probe axis)
Dynamic Range	2 V/m to > 1000 V/m; Linearity: $\pm 0.2$ 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
Application	General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms



**Figure 2 ER3DV6 E-field Probe**

#### H-Field Probe Description

Construction	Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Frequency	200 MHz to 3 GHz (absolute accuracy $\pm 6.0\%$ , $k=2$ ); Output linearized
Directivity	$\pm 0.2$ dB (spherical isotropy error)
Dynamic Range	10 mA/m to 2 A/m at 1 GHz
E-Field Interference	< 10% at 3 GHz (for plane wave)
Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm



**Figure 3 H3DV6 H-field Probe**

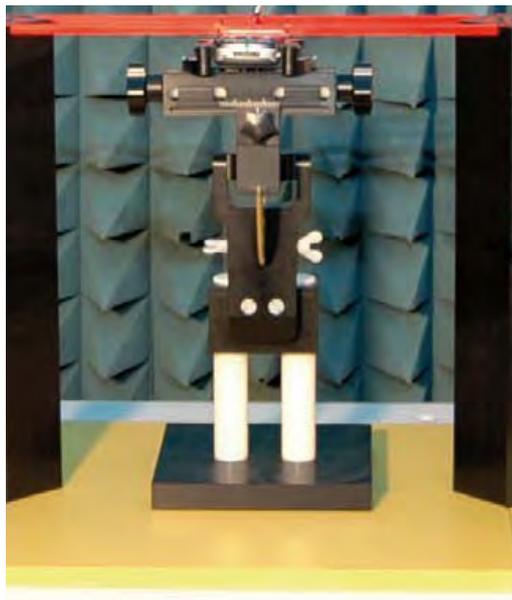
Application	General magnetic near-field measurements up to 3 GHz (in air or liquids) Field component measurements Surface current measurements Low interaction with the measured field
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### 2.2.3. Test Arch Phantom & Phone Positioner

The Test Arch phantom should be positioned horizontally on a stable surface. 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. It 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).

The Device reference point is set for the EUT at 6.3 mm, the Grid reference point is on the upper surface at the origin of the coordinates, and the “user point \Height Check 0.5 mm” is 0.5mm above the center, allowing verification of the gap of 0.5mm while the probe is positioned there.

The Phone Positioner supports accurate and reliable positioning of any phone with effect on near field  $<\pm 0.5$  dB.



**Figure 4 HAC Phantom & Device Holder**

### **2.3. RF Test Procedures**

**The evaluation was performed with the following procedure:**

1. Confirm proper operation of the field probe, probe measurement system and other instrumentation and the positioning system.
2. Position the WD in its intended test position. The gauge block can simplify this positioning. Note that a separate E-field and H-field gauge block will be needed if the center of the probe sensor elements is at different distances from the tip of the probe.
3. Configure the WD normal operation for maximum rated RF output power, at the desired channel and other operating parameters (e.g., test mode), as intended for the test.
4. The center sub-grid shall center on the center of the axial measurement point or the acoustic output, as appropriate. Locate the field probe at the initial test position in the 50 mm by 50 mm grid, which is contained in the measurement plane. If the field alignment method is used, align the probe for maximum field reception.
5. Record the reading.
6. Scan the entire 50 mm by 50 mm region in equally spaced increments and record the reading at each measurement point. The grid is 5 cm by 5 cm area that is divided into 9 evenly sized blocks or sub-grids. The distance between measurement points shall be sufficient to assure the identification of the maximum reading.
7. Identify the five contiguous sub-grids around the center sub-grid with the lowest maximum field strength readings. Thus the six areas to be used to determine the WD's highest emissions are identified and outlined for the final manual scan. Please note that a maximum of five blocks can be excluded for both E-field and H-field measurements for the WD output being measured. Stated another way, the center sub-grid and three others must be common to both the E-field and H-field measurements.
8. Identify the maximum field reading within the non-excluded sub-grids identified in Step 7.
9. Convert the maximum field strength reading identified in Step 8 to V/m or A/m, as appropriate. For probes which require a probe modulation factor, this conversion shall be done using the appropriate probe modulation factor and the calibration.
10. Repeat Step 1 through Step 10 for both the E-field and H-field measurements.
11. Compare this reading to the categories in ANSI C63.19 Clause 7 and record the resulting category. The lowest category number listed in 7.2, Table 7.4, or Table 7.5 obtained in Step 10 for either E- or H-field determines the M category for the audio coupling mode assessment. Record the WD category rating.



Figure 5 WD reference and plane for RF emission measurements

## 2.4. System Check

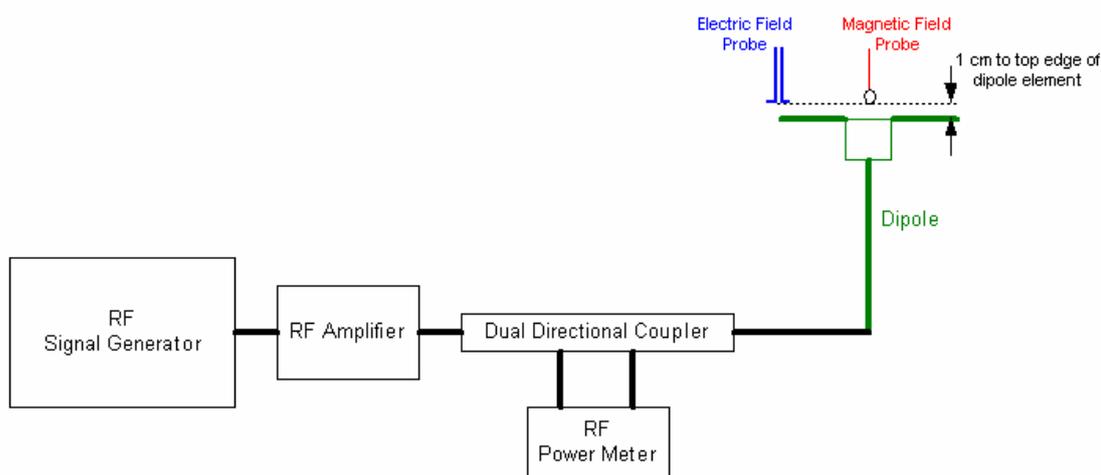
### Validation Procedure

Place a dipole antenna meeting the requirements given in ANSI C63.19 D.5 in the position normally occupied by the WD. The dipole antenna serves as a known source for an electrical and magnetic output. Position the E-field and H-field probes so that:

The probes and their cables are parallel to the coaxial feed of the dipole antenna.

The probe cables and the coaxial feed of the dipole antenna approach the measurement area from opposite directions.

The center point of the probe element(s) are 10 mm from the closest surface of the dipole elements. Validation was performed to verify that measured E-field and H-field values are within +/-25% from the target reference values provided by the manufacturer. "Values within +/-25% are acceptable. Of which 12% is deviation and 13% is measurement uncertainty."



**Figure 6 Dipole Validation Setup**

### Dipole Measurement Summary

E-Field Scan						
Mode	Frequency (MHz)	Input Power (mW)	Measured <sup>1</sup> Value(V/m)	Target <sup>2</sup> Value(V/m)	Deviation <sup>3</sup> (%)	Test Date
CW	835	100	149.2	170.7	12.60	January 4, 2011
CW	1880	100	131.4	142.9	8.05	January 4, 2011
F-Field Scan						
Mode	Frequency (MHz)	Input Power (mW)	Measured Value(A/m)	Target Value(A/m)	Deviation (%)	Test Date
CW	835	100	0.443	0.465	4.73	January 4, 2011
CW	1880	100	0.449	0.475	5.47	January 4, 2011

Notes: 1. please refer to the attachment for detailed measurement data and plot.

2. Target value is provided by SPEAD in the calibration certificate of specific dipoles.

3. Deviation (%) = 100 \* (Target value minus Measured value) divided by Target value.

## 2.5. Probe Modulation Factor

The Probe Modulation Factor (PMF) is defined as the ratio of the field readings for a CW and a modulated signal with the equivalent Field Envelope Peak as defined in ANSI C63.19 (Chapter C.3.1). 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 10dB 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.

### Modulation Factor Test Procedure

This may be done using the following procedure:

1. Fix the field probe in a set location relative to a field generating device, such as the reference dipole antenna.
2. Illuminate the probe using the wireless device connected to the reference dipole with a test signal at the intended measurement frequency, Ensure there is sufficient field coupling between the probe and the antenna so the resulting reading is greater than 10 dB above the probe system noise floor but within the systems operating range.
3. Record the amplitude applied to the antenna during transmission and the field strength measured by the E-field probe located near the tip of the dipole antenna
4. Replace the wireless device with an RF signal generator producing an unmodulated CW signal and set to the wireless device operating frequency.
5. Set the amplitude of the unmodulated signal to equal that recorded from the wireless device.
6. Record the reading of the probe measurement system of the unmodulated signal.
7. The ratio, in linear units, of the probe reading in Step 6 to the reading in Step 3 is the E-field modulation factor.  $PMF_E = E_{CW} / E_{mod}$  ( $PMF_H = H_{CW} / H_{mod}$ )
8. Repeat the previous steps using the H-field probe, except locate the probe at the center of the dipole.

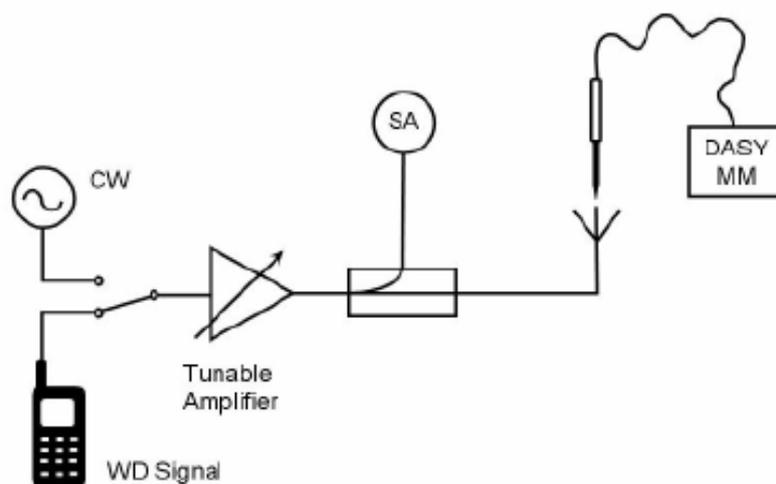


Figure Figure 7 Probe Modulation Factor Test Setup

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**PMF**

<b>Band</b>	<b>E-Field Probe Modulation Factor</b>	<b>H-Field Probe Modulation Factor</b>
CDMA Cellular	1.00	1.00
CDMA PCS	1.00	1.00
CDMA AWS	1.00	1.00

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### 2.6. Conducted Output Power Measurement

#### Summary

The DUT is tested using an E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted power. Conducted output power was measured using an integrated RF connector and attached RF cable. This result contains conducted output power for the EUT.

#### Conducted Power Results

CDMA Cellular		Conducted Power (dBm)		
		Channel 1013	Channel 384	Channel 777
RC3	Before test	24.89	24.75	24.63
	After test	24.88	24.74	24.62
RC1	Before test	24.99	24.78	24.74
	After test	24.97	24.77	24.73
EVDO(Rev.0)	Before test	24.49	24.25	24.29
	After test	24.48	24.24	24.27
EVDO(Rev.A)	Before test	24.87	24.57	24.50
	After test	24.86	24.55	24.49
CDMA PCS		Conducted Power (dBm)		
		Channel 25	Channel 600	Channel 1175
RC3	Before test	24.75	24.79	24.61
	After test	24.74	24.77	24.60
RC1	Before test	24.86	24.84	24.67
	After test	24.85	24.82	24.66
EVDO(Rev.0)	Before test	24.61	24.87	24.59
	After test	24.60	24.85	24.58
EVDO(Rev.A)	Before test	24.51	24.54	24.61
	After test	24.50	24.53	24.30
CDMA AWS		Conducted Power (dBm)		
		Channel 25	Channel 450	Channel 850
RC3	Before test	24.65	24.69	24.78
	After test	24.64	24.68	24.77
RC1	Before test	24.76	24.79	24.83
	After test	24.75	24.77	24.82
EVDO(Rev.0)	Before test	23.98	23.96	24.17
	After test	23.97	23.95	24.16
EVDO(Rev.A)	Before test	24.33	24.43	24.51
	After test	24.32	24.42	24.50

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### 3. Test Results

#### 3.1. ANSI C63.19-2007 Limits

Category		Telephone RF parameters < 960 MHz			
Near field	AWF	E-field emissions		H-field emissions	
Category M1/T1	0	631.0 to 1122.0	V/m	1.91 to 3.39	A/m
	-5	473.2 to 841.4	V/m	1.43 to 2.54	A/m
Category M2/T2	0	354.8 to 631.0	V/m	1.07 to 1.91	A/m
	-5	266.1 to 473.2	V/m	0.80 to 1.43	A/m
Category M3/T3	0	199.5 to 354.8	V/m	0.60 to 1.07	A/m
	-5	149.6 to 266.1	V/m	0.45 to 0.80	A/m
Category M4/T4	0	< 199.5	V/m	< 0.60	A/m
	-5	< 149.6	V/m	< 0.45	A/m
Category		Telephone RF parameters > 960 MHz			
Near field	AWF	E-field emissions		H-field emissions	
Category M1/T1	0	199.5 to 354.8	V/m	0.60 to 1.07	A/m
	-5	149.6 to 266.1	V/m	0.45 to 0.80	A/m
Category M2/T2	0	112.2 to 199.5	V/m	0.34 to 0.60	A/m
	-5	84.1 to 149.6	V/m	0.25 to 0.45	A/m
Category M3/T3	0	63.1 to 112.2	V/m	0.19 to 0.34	A/m
	-5	47.3 to 84.1	V/m	0.14 to 0.25	A/m
Category M4/T4	0	< 63.1	V/m	< 0.19	A/m
	-5	< 47.3	V/m	< 0.14	A/m

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**3.2. Summary Test Results**

**CDMA Cellular Results**

E-Field					
Channel	Frequency (MHz)	Peak Field (V/m)	Power Drift (dB)	Rating	Graph Results
777	848.31	57.00	-0.046	M4	Figure 12
384	836.52	53.20	0.078	M4	Figure 13
1013	824.70	40.20	-0.046	M4	Figure 14
H-Field					
Channel	Frequency (MHz)	Peak Field (A/m)	Power Drift (dB)	Rating	Graph Results
777	848.31	0.210	-0.087	M4	Figure 15
384	836.52	0.213	0.006	M4	Figure 16
1013	824.70	0.162	-0.060	M4	Figure 17

**CDMA PCS Results**

E-Field					
Channel	Frequency (MHz)	Peak Field (V/m)	Power Drift (dB)	Rating	Graph Results
1175	1908.75	42.30	-0.030	M4	Figure 18
600	1880	43.60	0.080	M4	Figure 19
25	1851.25	44.20	0.154	M4	Figure 20
H-Field					
Channel	Frequency (MHz)	Peak Field (A/m)	Power Drift (dB)	Rating	Graph Results
1175	1908.75	0.153	-0.029	M4	Figure 21
600	1880	0.156	0.005	M4	Figure 22
25	1851.25	0.158	-0.034	M4	Figure 23

**CDMA AWS Results**

E-Field					
Channel	Frequency (MHz)	Peak Field (V/m)	Power Drift (dB)	Rating	Graph Results
850	1752.5	44.50	-0.004	M4	Figure 24
450	1732.5	43.50	-0.007	M4	Figure 25
25	1711.25	43.30	-0.100	M4	Figure 26
H-Field					
Channel	Frequency (MHz)	Peak Field (A/m)	Power Drift (dB)	Rating	Graph Results
850	1752.5	0.169	-0.030	M4	Figure 27
450	1732.5	0.156	-0.003	M4	Figure 28
25	1711.25	0.137	0.043	M4	Figure 29

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**4. Measurement Uncertainty**

No.	Error source	Type	Uncertainty Value (%)	Prob. Dist.	k	$c_{iE}$	$c_{iH}$	Standard Uncertainty (%) $u_i$ (%) E	Standard Uncertainty (%) $u_i$ (%) H	Degree of freedom $V_{eff}$ or $v_i$
<b>Measurement System</b>										
1	Probe Calibration	B	5.	N	1	1	1	5.1	5.1	$\infty$
2	Axial Isotropy	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
3	Sensor Displacement	B	16.5	R	$\sqrt{3}$	1	0.145	9.5	1.4	$\infty$
4	Boundary Effects	B	2.4	R	$\sqrt{3}$	1	1	1.4	1.4	$\infty$
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
6	Scaling to Peak Envelope Power	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	$\infty$
7	System Detection Limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
8	Readout Electronics	B	0.3	N	1	1	1	0.3	0.3	$\infty$
9	Response Time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
10	Integration Time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	$\infty$
11	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	$\infty$
12	RF Reflections	B	12.0	R	$\sqrt{3}$	1	1	6.9	6.9	$\infty$
13	Probe Positioner	B	1.2	R	$\sqrt{3}$	1	0.67	0.7	0.5	$\infty$
14	Probe Positioning	A	4.7	R	$\sqrt{3}$	1	0.67	2.7	1.8	$\infty$
15	Extra. And Interpolation	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
<b>Test Sample Related</b>										
16	Device Positioning Vertical	B	4.7	R	$\sqrt{3}$	1	0.67	2.7	1.8	$\infty$
17	Device Positioning Lateral	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
18	Device Holder and Phantom	B	2.4	R	$\sqrt{3}$	1	1	1.4	1.4	$\infty$

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19	Power Drift	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	$\infty$
<b>Phantom and Setup related</b>										
20s	Phantom Thickness	B	2.4	R	$\sqrt{3}$	1	0.67	1.4	0.9	$\infty$
Combined standard uncertainty(%)								14.7	10.9	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2			29.4	21.8	

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**5. Main Test Instruments**

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Power meter	Agilent E4417A	GB41291714	March 13, 2010	One year
02	Power sensor	Agilent N8481H	MY50350004	September 26, 2010	One year
03	Signal Generator	HP 8341B	2730A00804	September 13, 2010	One year
04	Amplifier	IXA-020	0401	No Calibration Requested	
05	BTS	E5515C	MY48360988	December 3, 2010	One year
06	E-Field Probe	ER3DV6	2428	October 20, 2009	Two years
07	H-Field Probe	H3DV6	6260	October 20, 2009	Two years
08	DAE	DAE4	871	November 18, 2010	One year
09	Validation Kit 835MHz	CD835V3	1149	January 12, 2010	Two years
10	Validation Kit 1880MHz	CD1880V3	1135	January 13, 2010	Two years

\*\*\*\*\*END OF REPORT BODY\*\*\*\*\*

**ANNEX A: System Check Results**

**HAC\_System Performance Check at 835MHz\_E**

**DUT: Dipole 835 MHz; Type: CD835V3; SN:1149**

Date/Time: 1/4/2011 7:20:32 AM

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature:22.3 °C      Liquid Temperature: 21.5°C

Phantom section: RF Section

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**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 = 149.2 V/m

Probe Modulation Factor = 1.00

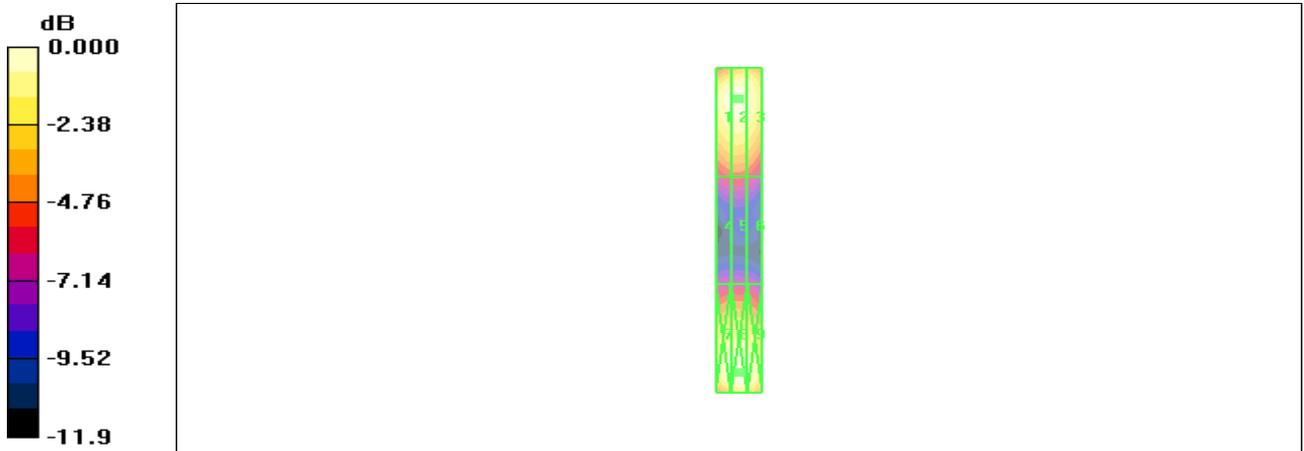
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 100.7 V/m; Power Drift = -0.066 dB

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

Peak E-field in V/m

Grid 1 <b>147.0 M4</b>	Grid 2 <b>149.2 M4</b>	Grid 3 <b>143.9 M4</b>
Grid 4 <b>83.4 M4</b>	Grid 5 <b>85.0 M4</b>	Grid 6 <b>81.1 M4</b>
Grid 7 <b>148.8 M4</b>	Grid 8 <b>154.0 M4</b>	Grid 9 <b>148.9 M4</b>



0 dB = 154.0V/m

**Figure 8 System Performance Check 835MHz\_E**

# TA Technology (Shanghai) Co., Ltd. Test Report

**HAC\_System Performance Check at 835MHz\_H**

**DUT: Dipole 835 MHz; Type: CD835V3; SN: 1149**

Date/Time: 1/4/2011 11:13:58 AM

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Probe: H3DV6 - SN6260 ; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H 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 = 0.443 A/m

Probe Modulation Factor = 1.00

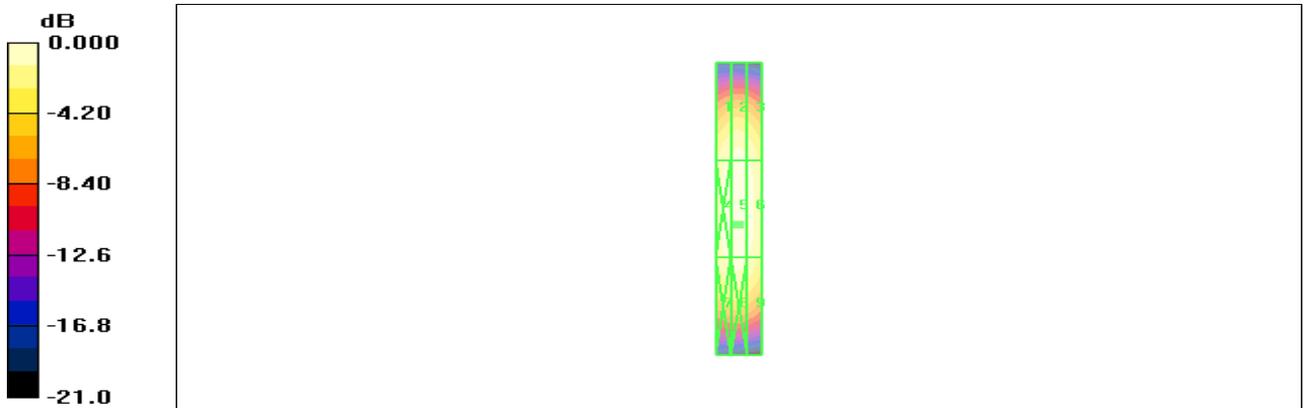
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.464 A/m; Power Drift = 0.019 dB

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

Peak H-field in A/m

Grid 1 <b>0.391 M4</b>	Grid 2 <b>0.408 M4</b>	Grid 3 <b>0.384 M4</b>
Grid 4 <b>0.427 M4</b>	Grid 5 <b>0.443 M4</b>	Grid 6 <b>0.414 M4</b>
Grid 7 <b>0.397 M4</b>	Grid 8 <b>0.410 M4</b>	Grid 9 <b>0.381 M4</b>



0 dB = 0.443A/m

**Figure 9 System Performance Check 835MHz\_H**

# TA Technology (Shanghai) Co., Ltd. Test Report

**HAC\_System Performance Check at 1880MHz\_E**

**DUT: Dipole 1880 MHz; Type: CD1880V3; SN:1135**

Date/Time: 1/4/2011 8:40:34 AM

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**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 = 131.4 V/m

Probe Modulation Factor = 1.00

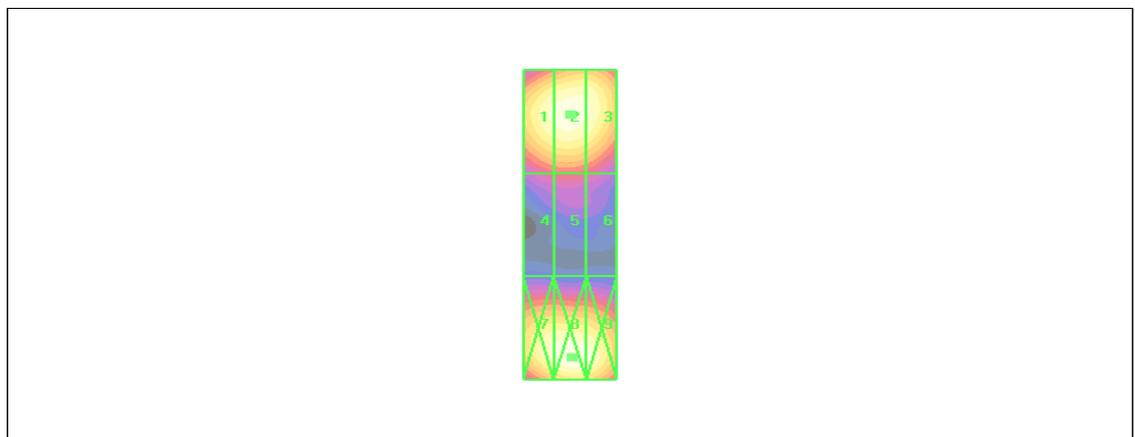
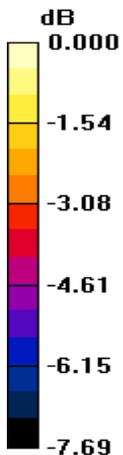
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 151.0 V/m; Power Drift = -0.047 dB

**Hearing Aid Near-Field Category: M2 (AWF 0 dB)**

Peak E-field in V/m

Grid 1 <b>128.5 M2</b>	Grid 2 <b>131.4 M2</b>	Grid 3 <b>128.5 M2</b>
Grid 4 <b>87.5 M3</b>	Grid 5 <b>89.7 M3</b>	Grid 6 <b>86.2 M3</b>
Grid 7 <b>128.7 M2</b>	Grid 8 <b>134.0 M2</b>	Grid 9 <b>130.3 M2</b>



0 dB = 134.0V/m

**Figure 10 System Performance Check 1880MHz\_E**

# TA Technology (Shanghai) Co., Ltd. Test Report

**HAC\_System Performance Check at 1880MHz\_H**

**DUT: Dipole 1880 MHz; Type: CD1880V3; SN:1135**

Date/Time: 1/4/2011 9:55:22 AM

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

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

Phantom section: RF Section

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - measurement distance from the probe sensor center to Dipole = 10mm/Hearing Aid**

**Compatibility Test (41x181x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.449 A/m

Probe Modulation Factor = 1.00

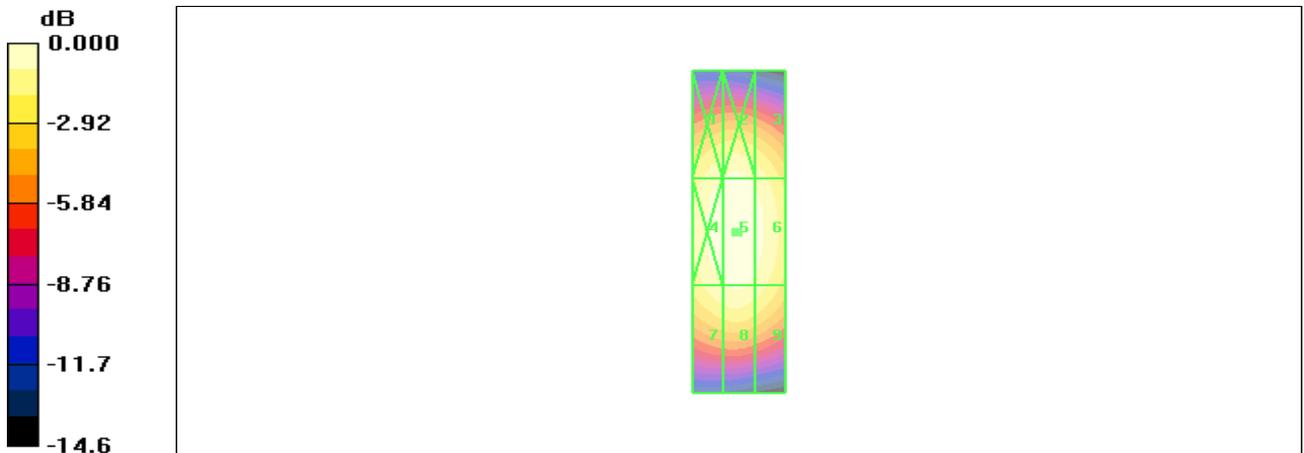
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.472 A/m; Power Drift = -0.005 dB

**Hearing Aid Near-Field Category: M2 (AWF 0 dB)**

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.400 M2</b>	<b>0.413 M2</b>	<b>0.387 M2</b>
Grid 4	Grid 5	Grid 6
<b>0.435 M2</b>	<b>0.449 M2</b>	<b>0.422 M2</b>
Grid 7	Grid 8	Grid 9
<b>0.397 M2</b>	<b>0.410 M2</b>	<b>0.384 M2</b>



0 dB = 0.449A/m

**Figure 11 System Performance Check 1880MHz\_H**

**ANNEX B: Graph Results**

**HAC RF E-Field CDMA Cellular High**

Date/Time: 1/4/2011 2:14:50 PM

Communication System: CDMA Cellular; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility**

**Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 57 V/m

Probe Modulation Factor = 1

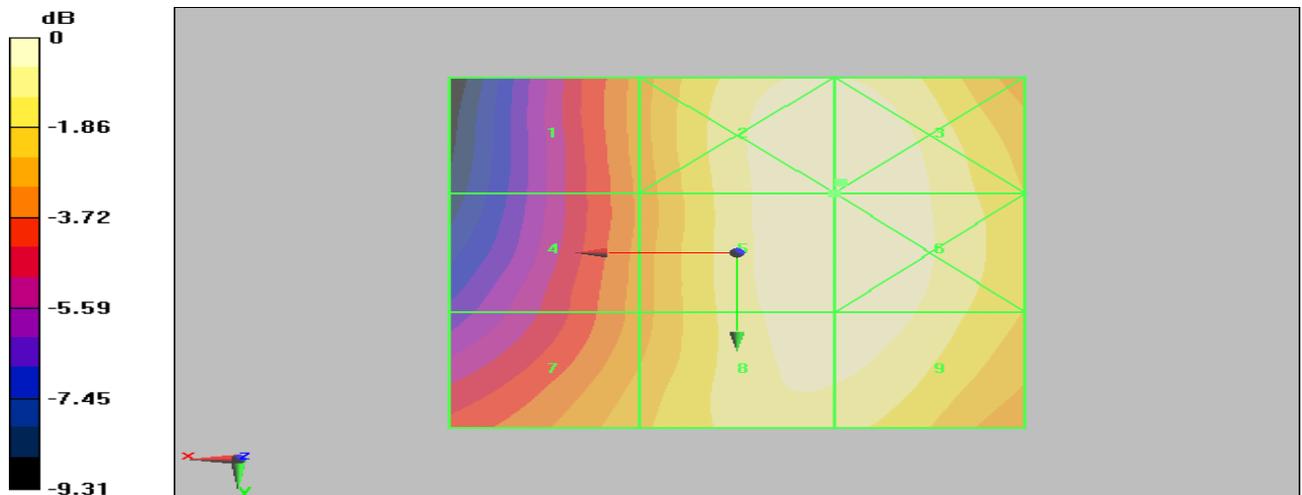
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 69.3 V/m; Power Drift = -0.046 dB

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

Peak E-field in V/m

Grid 1 <b>41.6 M4</b>	Grid 2 <b>57.1 M4</b>	Grid 3 <b>57.1 M4</b>
Grid 4 <b>41.4 M4</b>	Grid 5 <b>57 M4</b>	Grid 6 <b>57 M4</b>
Grid 7 <b>45.3 M4</b>	Grid 8 <b>55.5 M4</b>	Grid 9 <b>55.5 M4</b>



0 dB = 57.1V/m

**Figure 12 HAC RF E-Field CDMA Cellular Channel 777**

**HAC RF E-Field CDMA Cellular Middle**

Date/Time: 1/4/2011 2:44:48 PM

Communication System: CDMA Cellular; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid**

**Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 53.2 V/m

Probe Modulation Factor = 1

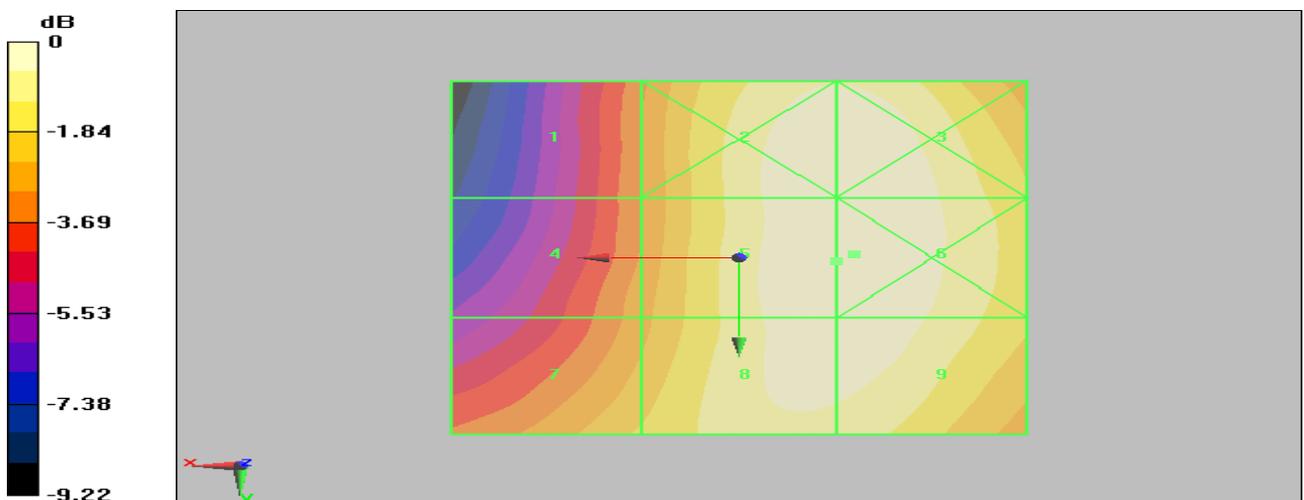
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 63.8 V/m; Power Drift = 0.078 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>37.5 M4</b>	<b>53 M4</b>	<b>53.1 M4</b>
Grid 4	Grid 5	Grid 6
<b>39.1 M4</b>	<b>53.2 M4</b>	<b>53.3 M4</b>
Grid 7	Grid 8	Grid 9
<b>43.7 M4</b>	<b>52.4 M4</b>	<b>52.5 M4</b>



0 dB = 53.3V/m

**Figure 13 HAC RF E-Field CDMA Cellular Channel 384**

**HAC RF E-Field CDMA Cellular Low**

Date/Time: 1/4/2011 2:28:15 PM

Communication System: CDMA Cellular; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility**

**Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 40.2 V/m

Probe Modulation Factor = 1

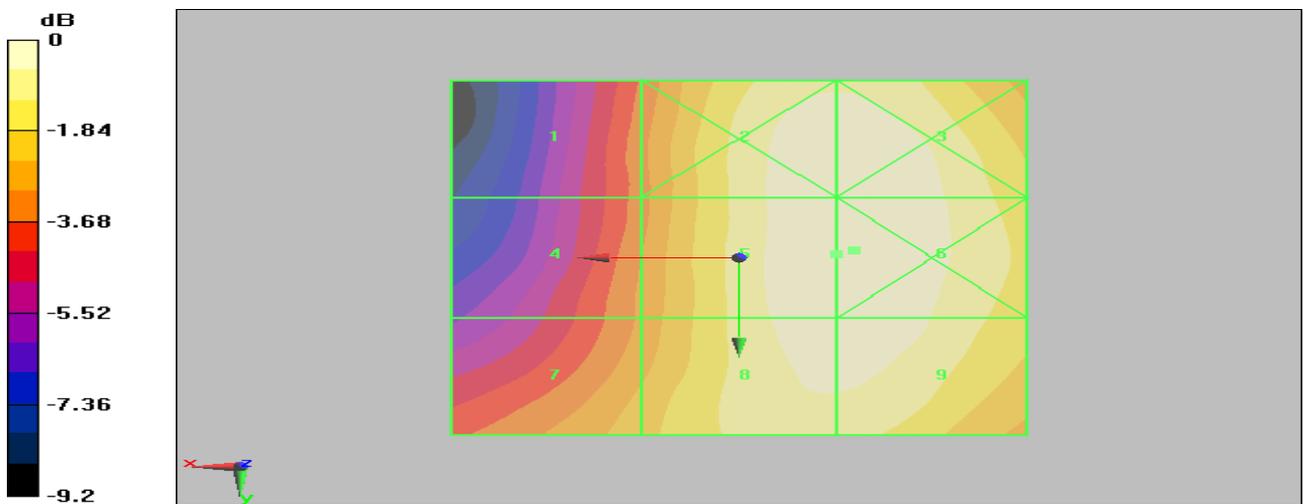
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 48.1 V/m; Power Drift = -0.046 dB

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

Peak E-field in V/m

Grid 1 <b>27.8 M4</b>	Grid 2 <b>40 M4</b>	Grid 3 <b>40.1 M4</b>
Grid 4 <b>28.8 M4</b>	Grid 5 <b>40.2 M4</b>	Grid 6 <b>40.3 M4</b>
Grid 7 <b>31.8 M4</b>	Grid 8 <b>39.5 M4</b>	Grid 9 <b>39.5 M4</b>



0 dB = 40.3V/m

**Figure 14 HAC RF E-Field CDMA Cellular Channel 1013**

**HAC RF H-Field CDMA Cellular High**

Date/Time: 1/4/2011 12:42:44 PM

Communication System: CDMA Cellular; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe High/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.210 A/m

Probe Modulation Factor = 1

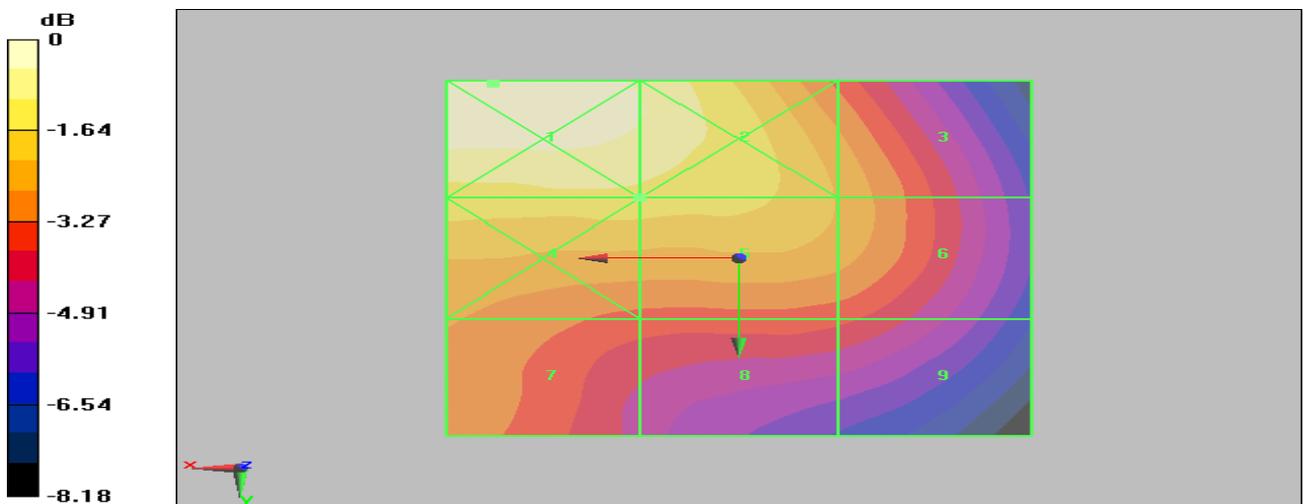
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.240 A/m; Power Drift = -0.087 dB

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

Peak H-field in A/m

Grid 1 <b>0.244 M4</b>	Grid 2 <b>0.230 M4</b>	Grid 3 <b>0.189 M4</b>
Grid 4 <b>0.212 M4</b>	Grid 5 <b>0.210 M4</b>	Grid 6 <b>0.189 M4</b>
Grid 7 <b>0.179 M4</b>	Grid 8 <b>0.164 M4</b>	Grid 9 <b>0.160 M4</b>



0 dB = 0.244A/m

**Figure 15 HAC RF H-Field CDMA Cellular Channel 777**

**HAC RF H-Field CDMA Cellular Middle**

Date/Time: 1/4/2011 12:28:17 PM

Communication System: CDMA Cellular; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe Middle/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.213 A/m

Probe Modulation Factor = 1

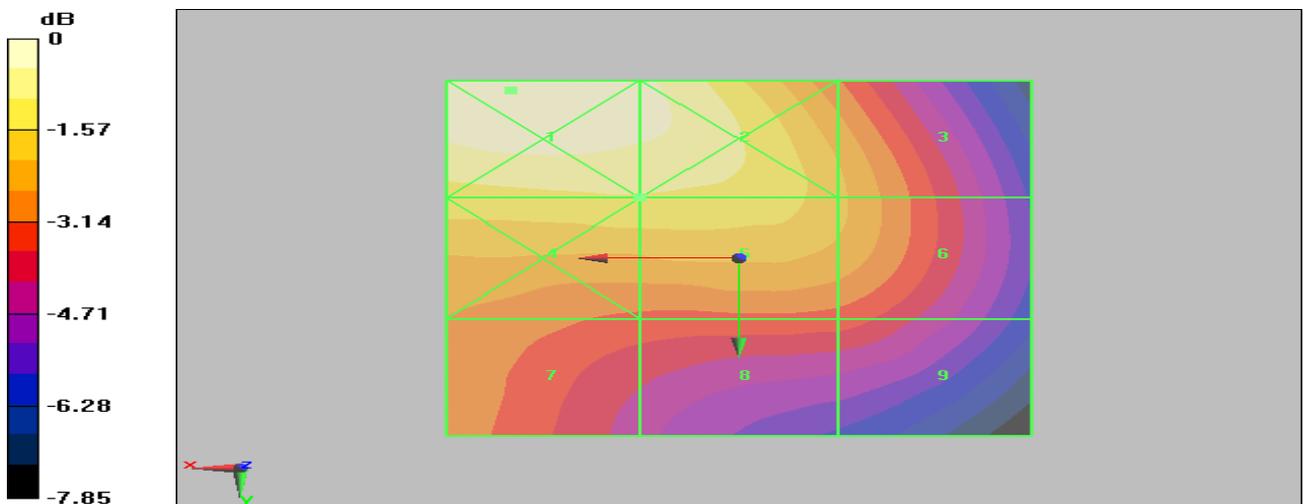
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.246 A/m; Power Drift = 0.006 dB

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

Peak H-field in A/m

Grid 1 <b>0.242 M4</b>	Grid 2 <b>0.232 M4</b>	Grid 3 <b>0.193 M4</b>
Grid 4 <b>0.213 M4</b>	Grid 5 <b>0.213 M4</b>	Grid 6 <b>0.193 M4</b>
Grid 7 <b>0.179 M4</b>	Grid 8 <b>0.166 M4</b>	Grid 9 <b>0.164 M4</b>



0 dB = 0.242A/m

**Figure 16 HAC RF H-Field CDMA Cellular Channel 384**

**HAC RF H-Field CDMA Cellular Low**

Date/Time: 1/4/2011 12:33:44 PM

Communication System: CDMA Cellular; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe Low/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.162 A/m

Probe Modulation Factor = 1

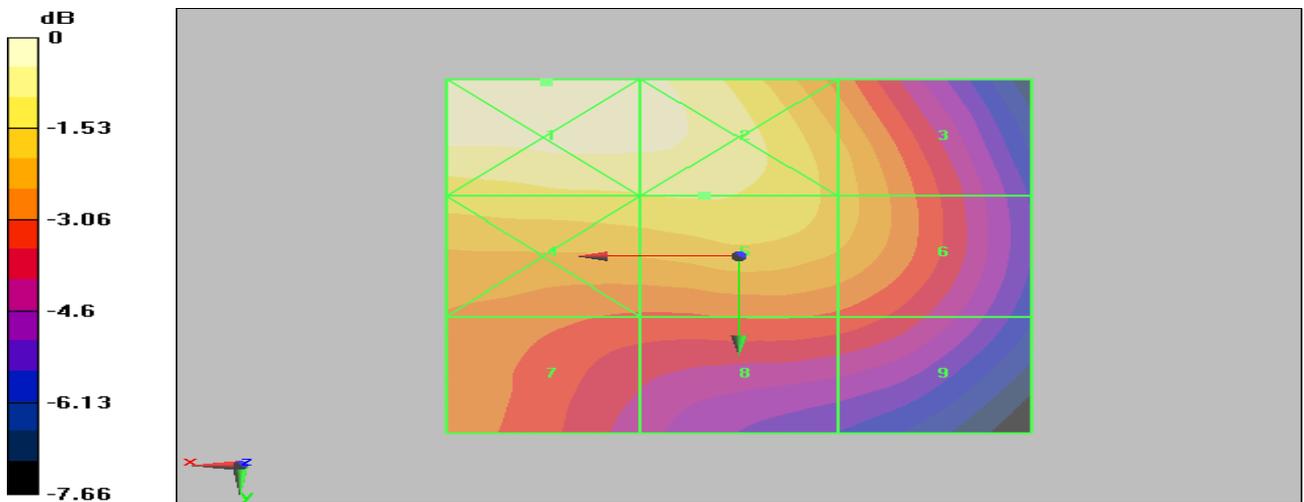
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.190 A/m; Power Drift = -0.060 dB

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

Peak H-field in A/m

Grid 1 <b>0.181 M4</b>	Grid 2 <b>0.176 M4</b>	Grid 3 <b>0.148 M4</b>
Grid 4 <b>0.160 M4</b>	Grid 5 <b>0.162 M4</b>	Grid 6 <b>0.148 M4</b>
Grid 7 <b>0.135 M4</b>	Grid 8 <b>0.128 M4</b>	Grid 9 <b>0.126 M4</b>



0 dB = 0.181A/m

**Figure 17 HAC RF H-Field CDMA Cellular Channel 1013**

**HAC RF E-Field CDMA PCS High**

Date/Time: 1/4/2011 1:44:57 PM

Communication System: CDMA PCS; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility**

**Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 42.3 V/m

Probe Modulation Factor = 1

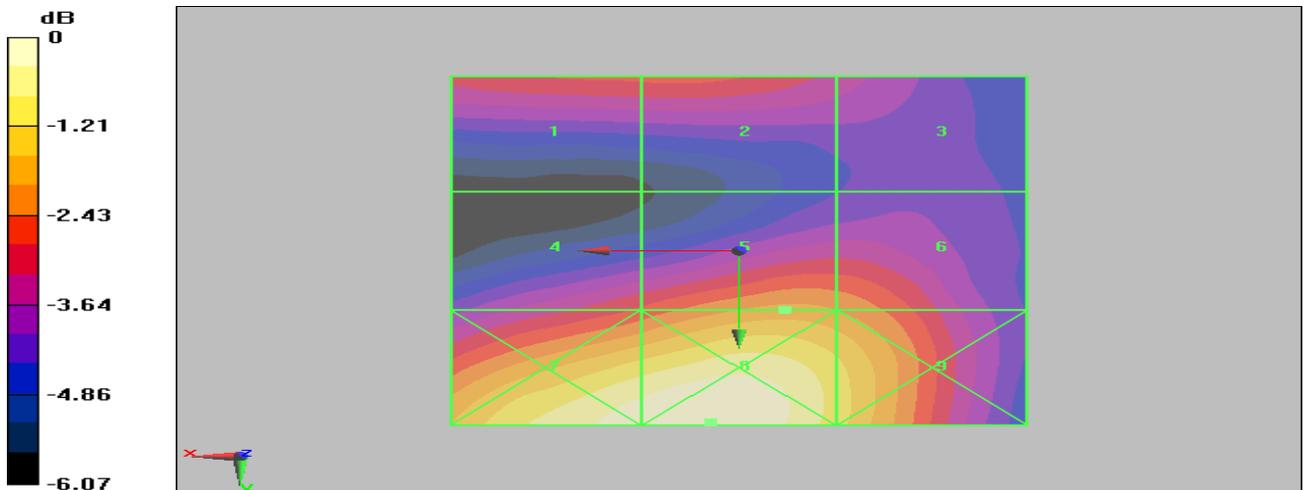
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 42.3 V/m; Power Drift = -0.030 dB

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

Peak E-field in V/m

Grid 1 <b>38.4 M4</b>	Grid 2 <b>38.6 M4</b>	Grid 3 <b>35.5 M4</b>
Grid 4 <b>38.2 M4</b>	Grid 5 <b>42.3 M4</b>	Grid 6 <b>41.5 M4</b>
Grid 7 <b>51.3 M4</b>	Grid 8 <b>52.3 M4</b>	Grid 9 <b>46.7 M4</b>



0 dB = 52.3V/m

**Figure 18 HAC RF E-Field CDMA PCS Channel 1175**

**HAC RF E-Field CDMA PCS Middle**

Date/Time: 1/4/2011 1:36:03 PM

Communication System: CDMA PCS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid**

**Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 43.6 V/m

Probe Modulation Factor = 1

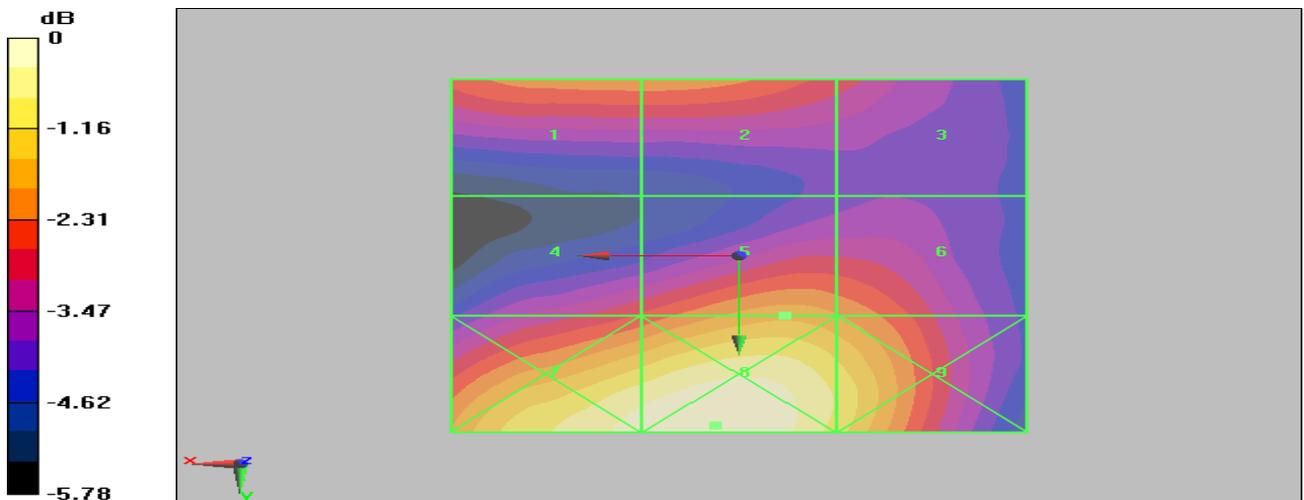
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 43.6 V/m; Power Drift = 0.080 dB

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

Peak E-field in V/m

Grid 1 <b>41.7 M4</b>	Grid 2 <b>41.7 M4</b>	Grid 3 <b>38 M4</b>
Grid 4 <b>39 M4</b>	Grid 5 <b>43.6 M4</b>	Grid 6 <b>42.4 M4</b>
Grid 7 <b>51.3 M4</b>	Grid 8 <b>52.7 M4</b>	Grid 9 <b>48 M4</b>



0 dB = 52.7V/m

**Figure 19 HAC RF E-Field CDMA PCS Channel 600**

**HAC RF E-Field CDMA PCS Low**

Date/Time: 1/4/2011 1:50:26 PM

Communication System: CDMA PCS; Frequency: 1851.25 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility**

**Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 44.2 V/m

Probe Modulation Factor = 1

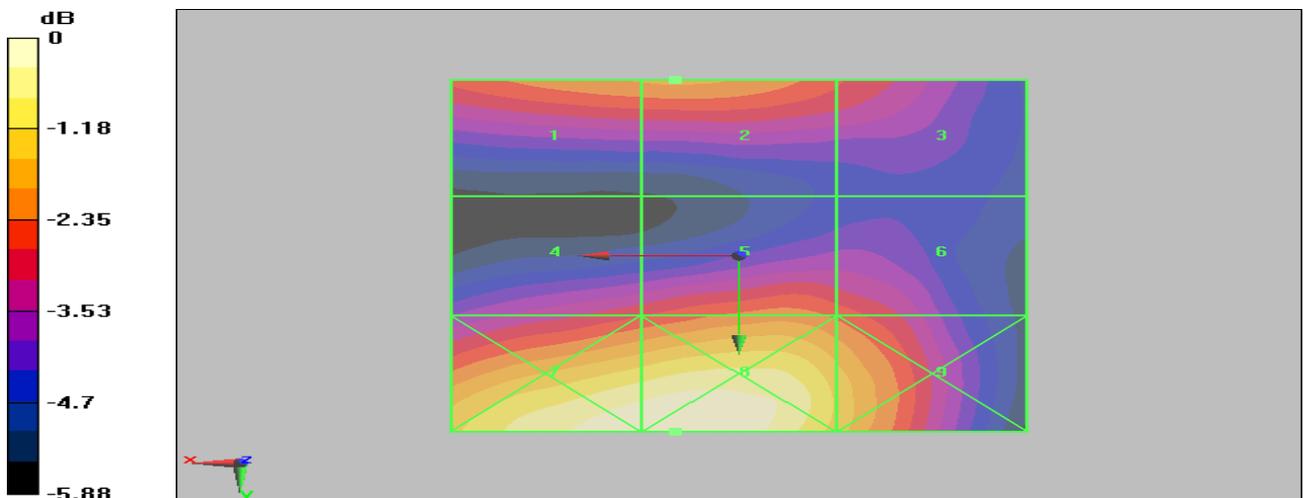
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 41.7 V/m; Power Drift = 0.154 dB

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

Peak E-field in V/m

Grid 1 <b>43.9 M4</b>	Grid 2 <b>44.2 M4</b>	Grid 3 <b>40.2 M4</b>
Grid 4 <b>39.8 M4</b>	Grid 5 <b>42.8 M4</b>	Grid 6 <b>41.2 M4</b>
Grid 7 <b>54.1 M4</b>	Grid 8 <b>54.6 M4</b>	Grid 9 <b>47.3 M4</b>



0 dB = 54.6V/m

**Figure 20 HAC RF E-Field CDMA PCS Channel 25**

**HAC RF H-Field CDMA PCS High**

Date/Time: 1/4/2011 12:57:42 PM

Communication System: CDMA PCS; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe High/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.153 A/m

Probe Modulation Factor = 1

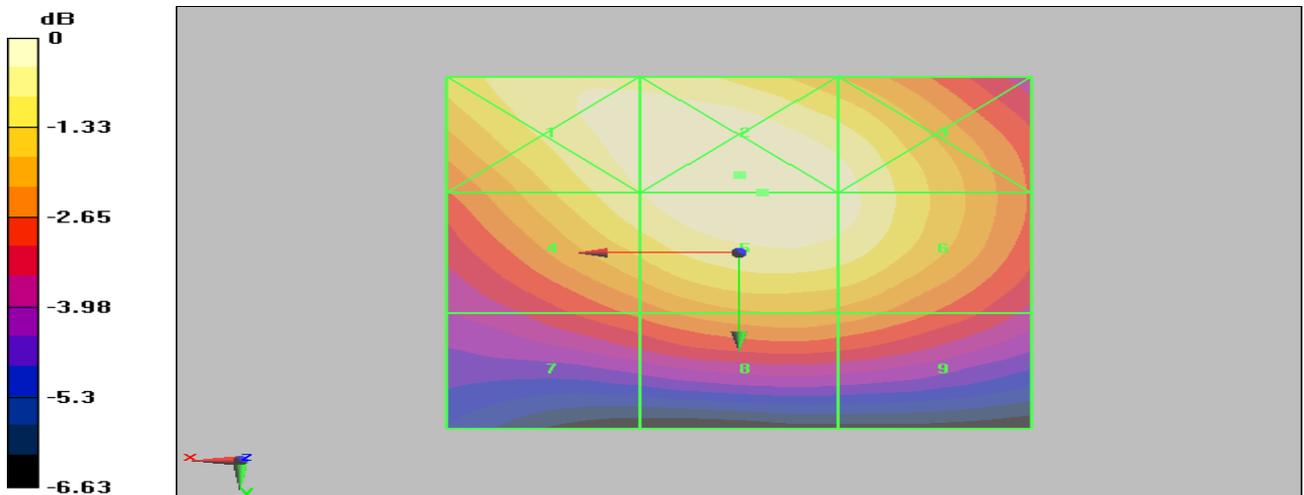
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.182 A/m; Power Drift = -0.029 dB

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

Peak H-field in A/m

Grid 1 <b>0.149 M4</b>	Grid 2 <b>0.153 M4</b>	Grid 3 <b>0.149 M4</b>
Grid 4 <b>0.145 M4</b>	Grid 5 <b>0.153 M4</b>	Grid 6 <b>0.149 M4</b>
Grid 7 <b>0.115 M4</b>	Grid 8 <b>0.125 M4</b>	Grid 9 <b>0.123 M4</b>



0 dB = 0.153A/m

**Figure 21 HAC RF H-Field CDMA PCS Channel 1175**

**HAC RF H-Field CDMA PCS Middle**

Date/Time: 1/4/2011 12:52:15 PM

Communication System: CDMA PCS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe Middle/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.156 A/m

Probe Modulation Factor = 1

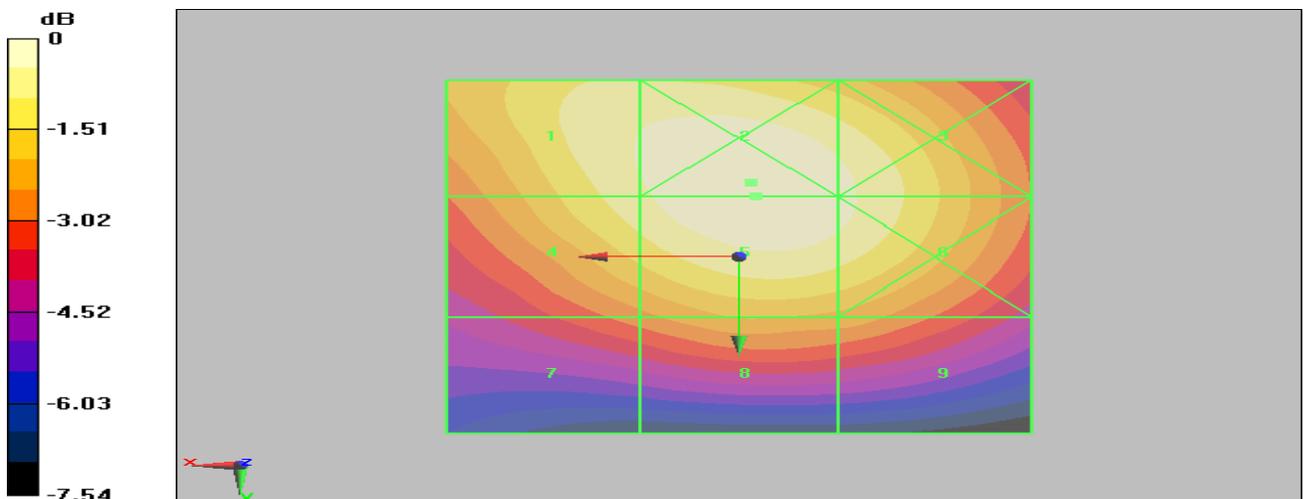
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.184 A/m; Power Drift = 0.005 dB

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

Peak H-field in A/m

Grid 1 <b>0.149 M4</b>	Grid 2 <b>0.157 M4</b>	Grid 3 <b>0.151 M4</b>
Grid 4 <b>0.146 M4</b>	Grid 5 <b>0.156 M4</b>	Grid 6 <b>0.151 M4</b>
Grid 7 <b>0.115 M4</b>	Grid 8 <b>0.125 M4</b>	Grid 9 <b>0.123 M4</b>



0 dB = 0.157A/m

**Figure 22 HAC RF H-Field CDMA PCS Channel 600**

**HAC RF H-Field CDMA PCS Low**

Date/Time: 1/4/2011 1:03:08 PM

Communication System: CDMA PCS; Frequency: 1851.25 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe Low/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.158 A/m

Probe Modulation Factor = 1

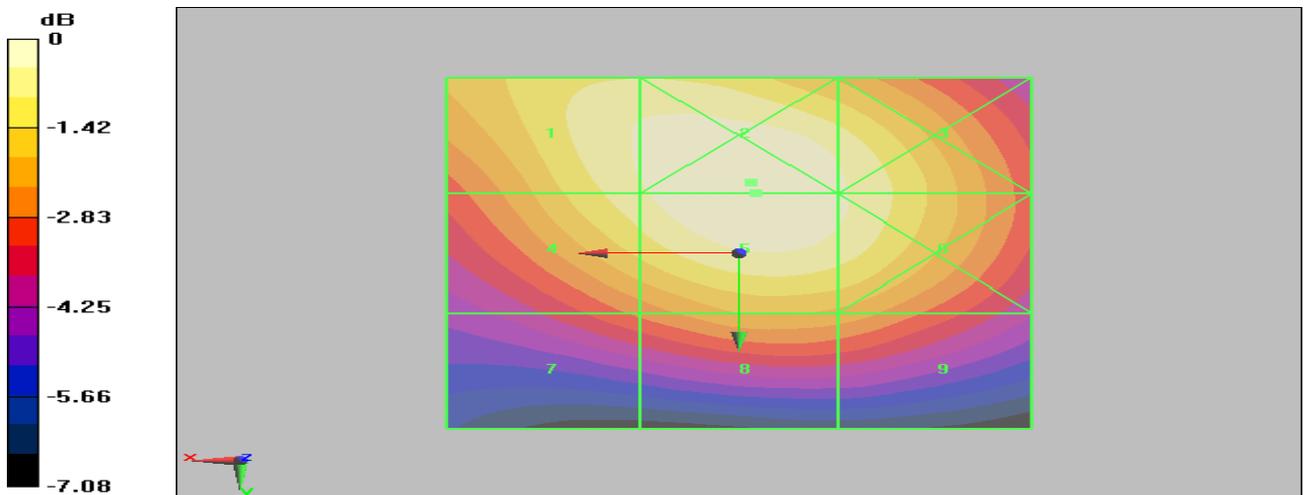
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.191 A/m; Power Drift = -0.034 dB

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

Peak H-field in A/m

Grid 1 <b>0.151 M4</b>	Grid 2 <b>0.158 M4</b>	Grid 3 <b>0.151 M4</b>
Grid 4 <b>0.148 M4</b>	Grid 5 <b>0.158 M4</b>	Grid 6 <b>0.151 M4</b>
Grid 7 <b>0.116 M4</b>	Grid 8 <b>0.128 M4</b>	Grid 9 <b>0.125 M4</b>



0 dB = 0.158A/m

**Figure 23 HAC RF H-Field CDMA PCS Channel 25**

**HAC RF E-Field CDMA AWS High**

Date/Time: 1/4/2011 2:09:01 PM

Communication System: CDMA AWS; Frequency: 1752.5 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device High/Hearing Aid Compatibility**

**Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 44.5 V/m

Probe Modulation Factor = 1

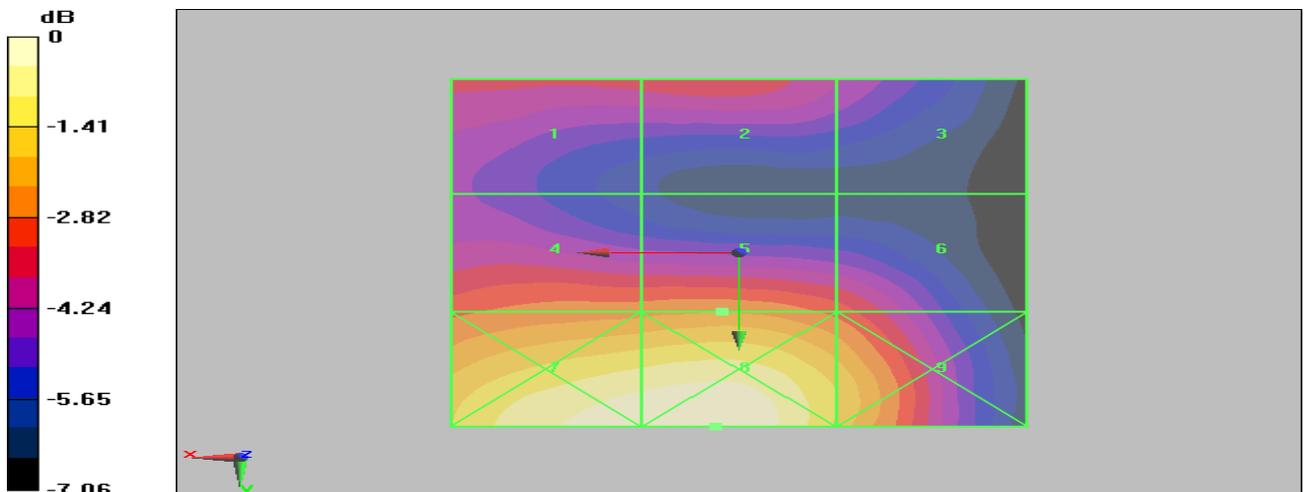
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 42.3 V/m; Power Drift = -0.004 dB

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

Peak E-field in V/m

Grid 1 <b>39.3 M4</b>	Grid 2 <b>40.1 M4</b>	Grid 3 <b>36.3 M4</b>
Grid 4 <b>43.8 M4</b>	Grid 5 <b>44.5 M4</b>	Grid 6 <b>41.4 M4</b>
Grid 7 <b>57.7 M4</b>	Grid 8 <b>58.4 M4</b>	Grid 9 <b>49.8 M4</b>



0 dB = 58.4V/m

**Figure 24 HAC RF E-Field CDMA AWS Channel 850**

**HAC RF E-Field CDMA AWS Middle**

Date/Time: 1/4/2011 1:58:14 PM

Communication System: CDMA AWS; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Middle/Hearing Aid**

**Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 43.5 V/m

Probe Modulation Factor = 1

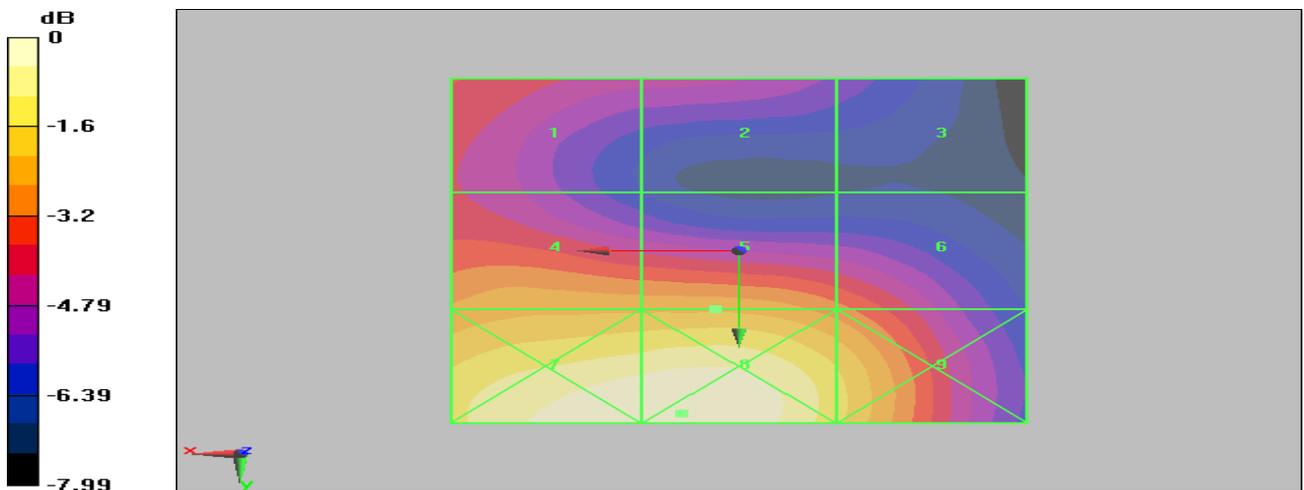
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 40.1 V/m; Power Drift = -0.007 dB

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

Peak E-field in V/m

Grid 1 <b>36.8 M4</b>	Grid 2 <b>33.5 M4</b>	Grid 3 <b>30.1 M4</b>
Grid 4 <b>43.4 M4</b>	Grid 5 <b>43.5 M4</b>	Grid 6 <b>39.9 M4</b>
Grid 7 <b>55.6 M4</b>	Grid 8 <b>56.1 M4</b>	Grid 9 <b>47.9 M4</b>



0 dB = 56.1V/m

**Figure 25 HAC RF E-Field CDMA AWS Channel 450**

**HAC RF E-Field CDMA AWS Low**

Date/Time: 1/4/2011 2:03:38 PM

Communication System: CDMA AWS; Frequency: 1711.25 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: ER3DV6 - SN2428; ConvF(1, 1, 1); Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**E Scan - ER3D - 2007: 15 mm from Probe Center to the Device Low/Hearing Aid Compatibility**

**Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 43.3 V/m

Probe Modulation Factor = 1

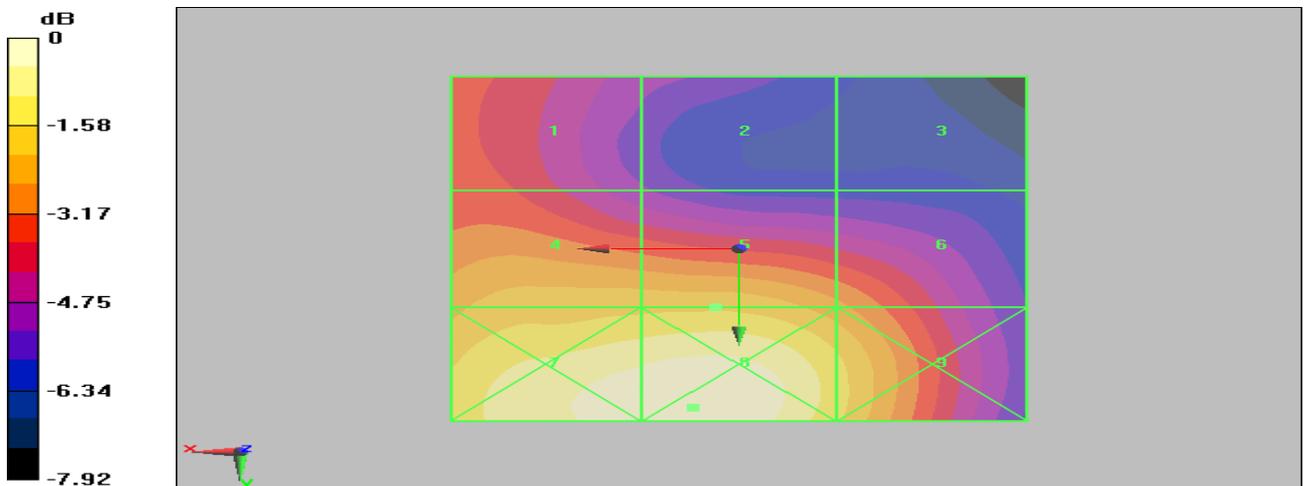
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 42.3 V/m; Power Drift = -0.100 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>35.4 M4</b>	<b>29.6 M4</b>	<b>26.3 M4</b>
Grid 4	Grid 5	Grid 6
<b>43.1 M4</b>	<b>43.3 M4</b>	<b>39.6 M4</b>
Grid 7	Grid 8	Grid 9
<b>51.7 M4</b>	<b>52.5 M4</b>	<b>45 M4</b>



0 dB = 52.5V/m

**Figure 26 HAC RF E-Field CDMA AWS Channel 25**

**HAC RF H-Field CDMA AWS High**

Date/Time: 1/4/2011 1:15:55 PM

Communication System: CDMA AWS; Frequency: 1752.5 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe High/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.169 A/m

Probe Modulation Factor = 1

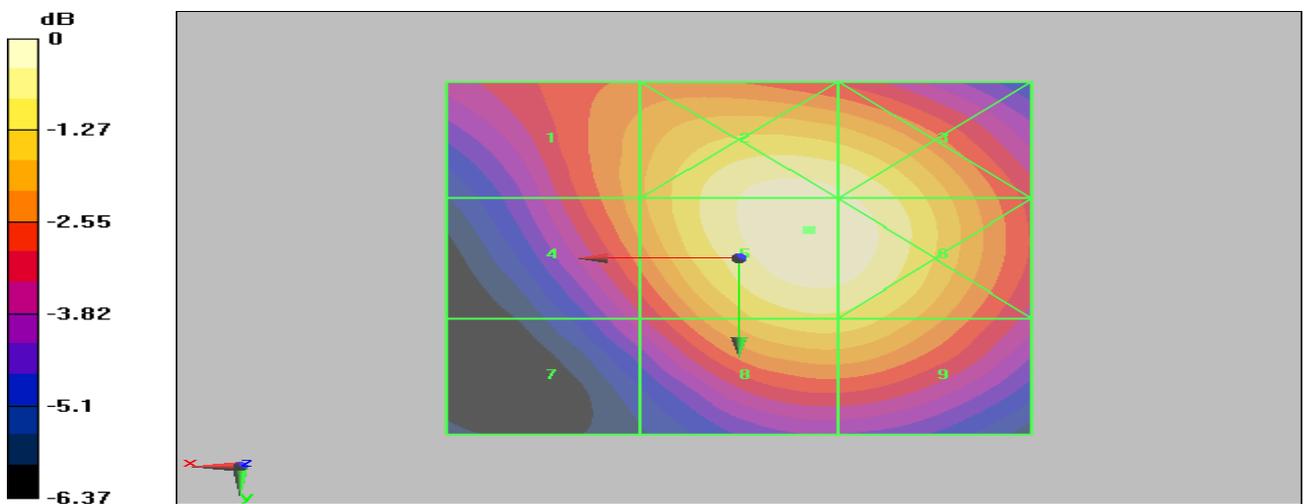
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.220 A/m; Power Drift = -0.030 dB

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

Peak H-field in A/m

Grid 1 <b>0.138 M4</b>	Grid 2 <b>0.166 M4</b>	Grid 3 <b>0.163 M4</b>
Grid 4 <b>0.137 M4</b>	Grid 5 <b>0.169 M4</b>	Grid 6 <b>0.167 M4</b>
Grid 7 <b>0.113 M4</b>	Grid 8 <b>0.152 M4</b>	Grid 9 <b>0.151 M4</b>



0 dB = 0.169A/m

**Figure 27 HAC RF H-Field CDMA AWS Channel 850**

**HAC RF H-Field CDMA AWS Middle**

Date/Time: 1/4/2011 1:10:25 PM

Communication System: CDMA AWS; Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe Middle/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.156 A/m

Probe Modulation Factor = 1

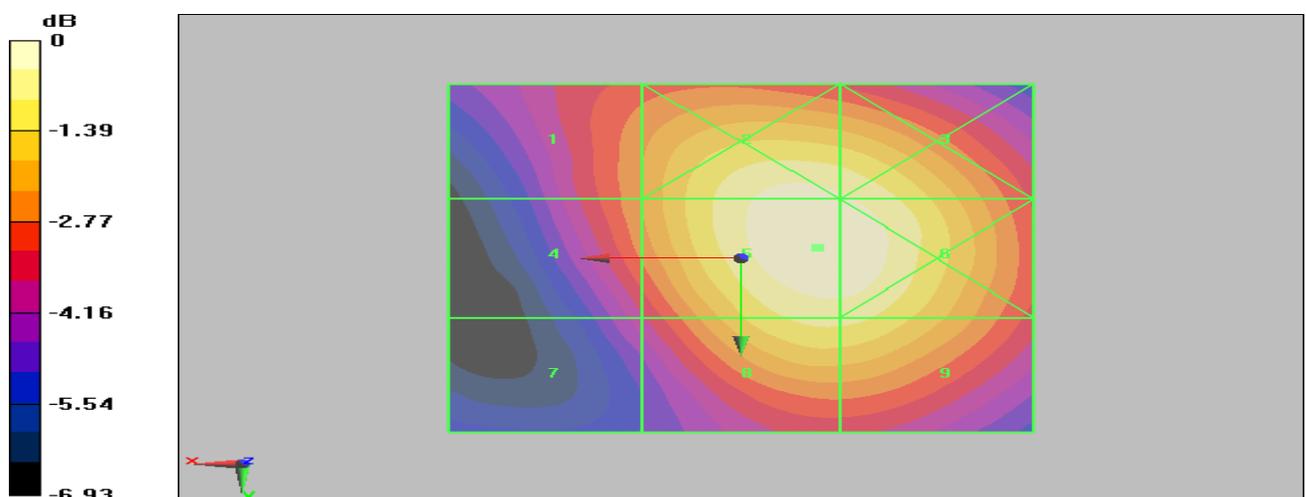
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.206 A/m; Power Drift = -0.003 dB

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

Peak H-field in A/m

Grid 1 <b>0.120 M4</b>	Grid 2 <b>0.152 M4</b>	Grid 3 <b>0.149 M4</b>
Grid 4 <b>0.120 M4</b>	Grid 5 <b>0.156 M4</b>	Grid 6 <b>0.155 M4</b>
Grid 7 <b>0.101 M4</b>	Grid 8 <b>0.143 M4</b>	Grid 9 <b>0.143 M4</b>



0 dB = 0.156A/m

**Figure 28 HAC RF H-Field CDMA AWS Channel 450**

**HAC RF H-Field CDMA AWS Low**

Date/Time: 1/4/2011 1:21:25 PM

Communication System: CDMA AWS; Frequency: 1711.25 MHz; Duty Cycle: 1:1

Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup>

Ambient Temperature: 22.3 °C      Liquid Temperature: 21.5 °C

DASY5 Configuration:

Probe: H3DV6 - SN6260; Calibrated: 10/20/2009

Electronics: DAE4 Sn871; Calibrated: 11/18/2010

Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;

Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**H Scan - H3DV6 - 2007: 15 mm from Probe Low/Hearing Aid Compatibility Test (101x101x1):**

Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.137 A/m

Probe Modulation Factor = 1

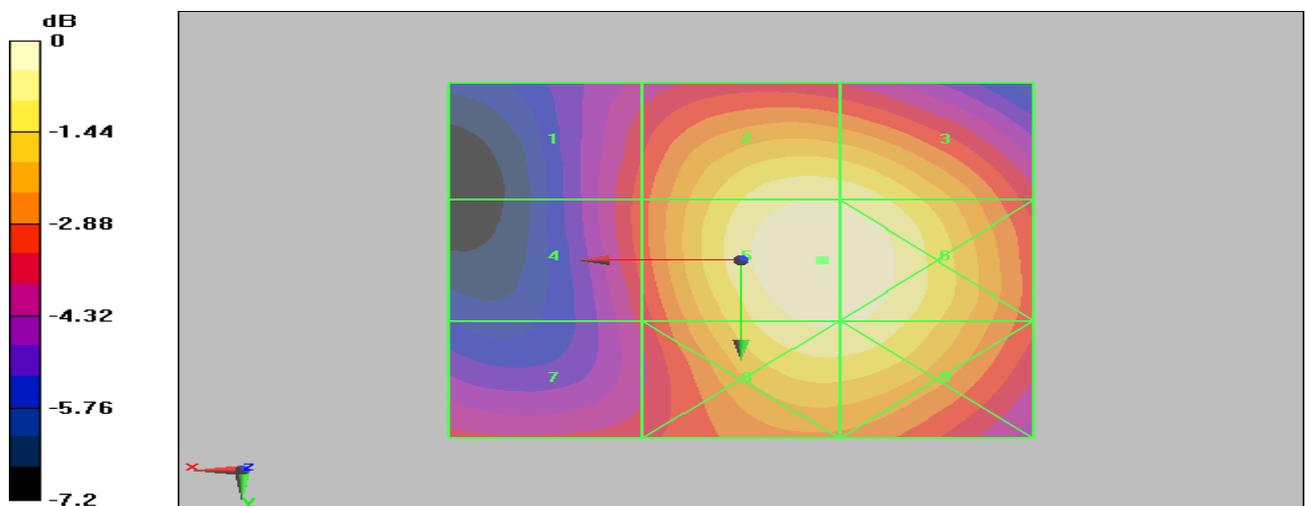
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.182 A/m; Power Drift = 0.043 dB

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

Peak H-field in A/m

Grid 1 <b>0.096 M4</b>	Grid 2 <b>0.130 M4</b>	Grid 3 <b>0.129 M4</b>
Grid 4 <b>0.097 M4</b>	Grid 5 <b>0.137 M4</b>	Grid 6 <b>0.137 M4</b>
Grid 7 <b>0.092 M4</b>	Grid 8 <b>0.131 M4</b>	Grid 9 <b>0.131 M4</b>



0 dB = 0.137A/m

**Figure 29 HAC RF H-Field CDMA AWS Channel 25**

# TA Technology (Shanghai) Co., Ltd. Test Report

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## ANNEX C: E-Probe Calibration Certificate

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



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

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

Accreditation No.: **SCS 108**

Client **TMC**

Certificate No: **ER3-2428\_Oct09**

### CALIBRATION CERTIFICATE

Object: **ER3DV6 - SN:2428**

Calibration procedure(s): **QA CAL-02.v5 and QA CAL-25.v2  
Calibration procedure for E-field probes optimized for close near field  
evaluations in air**

Calibration date: **October 20, 2009**

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

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

Calibration Equipment used (M&TE critical for calibration):

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4418B	GB41283874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ER3DV6	SN: 2328	3-Oct-09 (No. ER3-2328_Oct09)	Oct-10
DAE4	SN: 789	19-Dec-08 (No. DAE4-789_Dec08)	Dec-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-09 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Marcel Fehr	Laboratory Technician	
Approved by:	Katja Pekovic	Technical Manager	

Issued: October 22, 2009

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

# TA Technology (Shanghai) Co., Ltd.

## Test Report

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



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

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

Accreditation No.: **SCS 108**

### Glossary:

NORM <sub>x,y,z</sub>	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

### Calibration is Performed According to the Following Standards:

- IEEE Std 1309-2005, "IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>*: Assessed for E-field polarization  $\vartheta = 0$  for XY sensors and  $\vartheta = 90$  for Z sensor ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide).
- NORM(f)<sub>x,y,z</sub>* = *NORM<sub>x,y,z</sub>* \* *frequency\_response* (see Frequency Response Chart).
- DCP<sub>x,y,z</sub>*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- A<sub>x,y,z</sub>*; *B<sub>x,y,z</sub>*; *C<sub>x,y,z</sub>* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle*: The angle is assessed using the information gained by determining the *NORM<sub>x</sub>* (no uncertainty required).

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# Probe ER3DV6

## SN:2428

Manufactured:	September 11, 2007
Last calibrated:	December 13, 2007
Recalibrated:	October 20, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

# TA Technology (Shanghai) Co., Ltd. Test Report

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## DASY - Parameters of Probe: ER3DV6 SN:2428

### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ )	1.52	1.59	1.86	$\pm 10.1\%$
DCP (mV) <sup>A</sup>	91.5	93.0	98.9	

### Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc (k=2)
10000	CW		X	0.00	0.00	1.00	300	$\pm 1.5\%$
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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

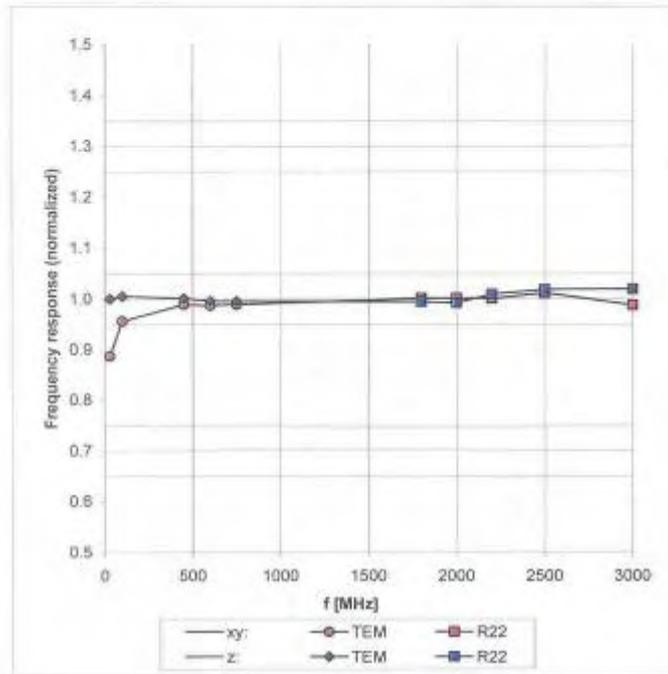
<sup>A</sup> numerical linearization parameter; uncertainty not required

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### Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide R22)

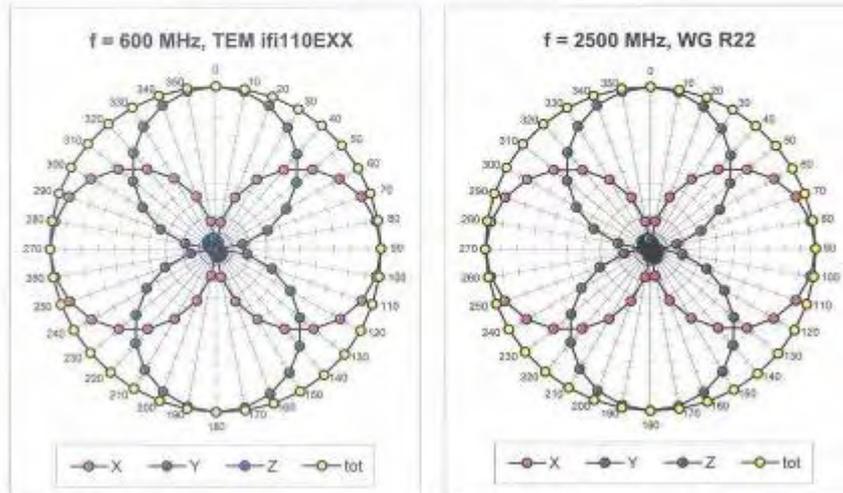


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$



Receiving Pattern ( $\phi$ ),  $\vartheta = 90^\circ$

