



# A Test Lab Techno Corp.

Changan Lab : No. 140 -1, Changan Street, Bade City, Taoyuan County, Taiwan R.O.C.  
Tel : 886-3-271-0188 / Fax : 886-3-271-0190

## HAC EVALUATION REPORT



Test Report No.	: 1107FS15
Applicant	: HTC Corporation
Trade Name	: HTC
Model Number	: PG76200
EUT Type	: Smartphone
FCC ID	: NM8PG76200
Dates of Test	: Jun. 23 ~ Jun. 29, 2011
Issued Date	: Jul. 11, 2011
Test Environment	: Ambient Temperature : $22 \pm 2$ °C Relative Humidity : 40 - 70 %
FCC Rule Part(s)	: FCC 47 CFR § 20.19.
HAC Standard	: ANSI C63.19-2007
C63.19 HAC Rated Category	: M4 (RF EMISSIONS)
Test Lab.	: Chang-An Lab

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
3. The measurement report has to be written approval of A Test Lab Techno Corp. It may only be reproduced or published in full. This report shall not be reproduced except in full, without the written approval of A Test Lab Techno Corp.
4. This document may be altered or revised by A Test Lab Techno. Corp. personnel only, and shall be noted

Approved By : Sam Chuang  
(Sam Chuang)

Tested By : Alex Wu  
(Alex Wu)



# Contents

1. Description of Equipment under Test (EUT) .....	3
2. Introduction .....	4
3. Test Equipment List.....	4
4. Test Procedure .....	5
5. System Check.....	6
5.1 System check parameters.....	6
5.2 Validation Procedure .....	6
5.3 Illustrative dipole calculated and measured values.....	7
5.4 Validation Results .....	8
6. Probe Modulation Factor.....	9
7. HAC Testing with RF Transmitters .....	11
8. Test Results.....	12
8.1 Description of the Device under Test (DUT).....	12
8.2 HAC E-Field measurement results.....	12
8.3 HAC H-Field measurement results.....	13
Appendix A - Details of WD signal.....	16
Appendix B - Validation .....	18
Appendix C - HAC distribution plots for E-Field and H-Field.....	26
Appendix D - Calibration.....	58
Appendix E - Uncertainty.....	96



## 1. Description of Equipment under Test (EUT)

Applicant	:	HTC Corporation
Applicant Address	:	No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan
Manufacturer	:	HTC Corporation
Manufacturer Address	:	No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan
EUT Type	:	Smartphone
Trade Name	:	HTC
Model Number	:	PG76200
FCC ID	:	NM8PG76200
MEID No	:	Sample 1: A100000794F928, Sample 2: A100000794FAE3
Tx Frequency	:	CDMA/1xRTT/1xEVDO Rev.0/1xEVDO Rev.A Cellular Band: 824.0 - 849.0 MHz PCS Band: 1850.2 - 1909.8 MHz
RF Output Power	:	0.250 W / 23.98 dBm Cellular Band 0.271 W / 24.33 dBm PCS Band
Antenna Type	:	PIFA Type
Battery Option	:	Standard / Model No.: BD29100 ( 3.7V 1230mAh )
Test Device	:	Production Unit
Device Category	:	Portable

Note: This device does not support power reduction option for GSM1900.

This wireless portable device has performed Hearing Aid Compatibility (HAC) measurements for the portable cellular phone. The measurements were performed to ensure compliance to the ANSI C63.19-2007 standards.

### <All Air Interfaces / Bands List>

Air-Interface	Band (MHz)	Type	C63.19 Tested	Simultaneous Transmissions	Concurrent Single Transmission	Reduced Power 20.19(e)	Voice Over Digital Transport (Data)
CDMA2000	850	Voice	Yes	Yes BT/WLAN	Yes	N/A	No
	1900	Voice	Yes		Yes	N/A	No
	1xRTT/EVDO	Data	No	Yes BT/WLAN	Yes	N/A	Yes
WLAN	2450	Data	No	Yes CDMA2000 or 1xRTT or 1xEVDO & BT	Yes	N/A	Yes
Bluetooth	2450	Data	No	Yes CDMA2000 or 1xRTT or 1xEVDO & WLAN	Yes	N/A	No



## 2. Introduction

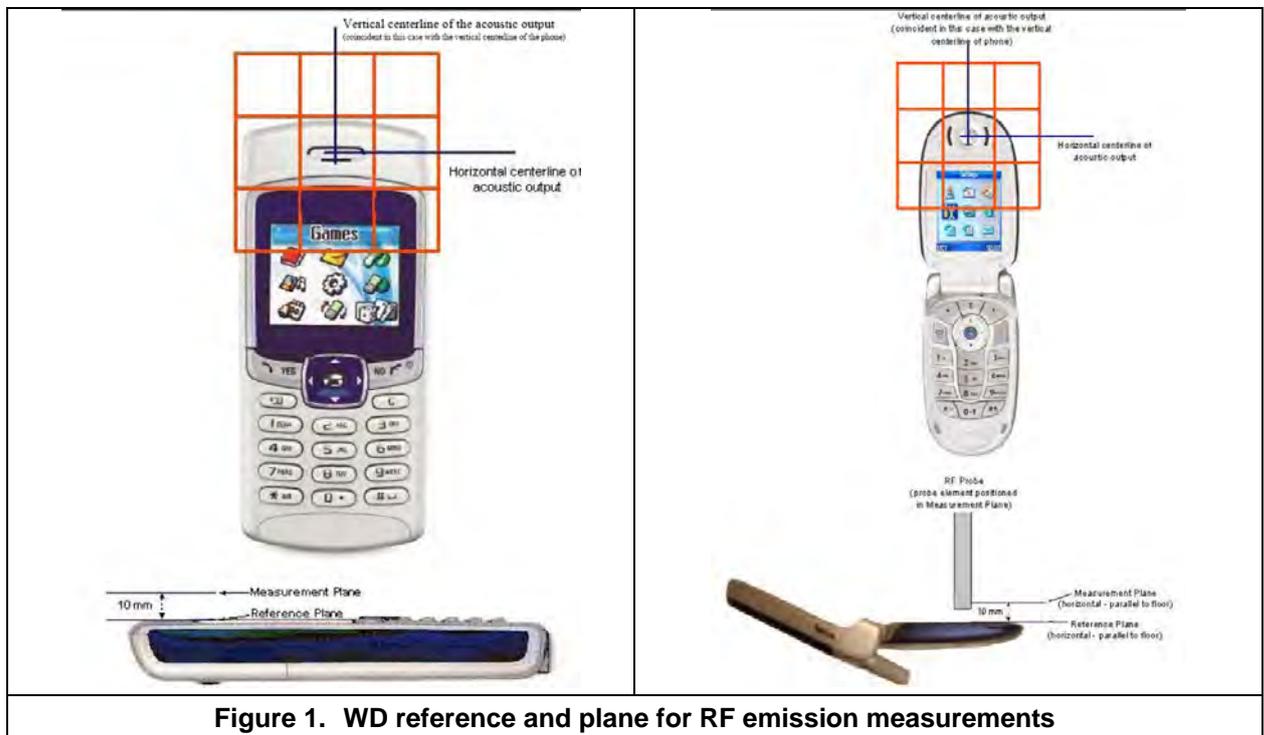
The A Test Lab Techno Corp. has performed measurements of the maximum potential exposure to the user of **HTC Corporation Trade Name: HTC Model(s) : PG76200**. The test procedures, as described in ANSI C63.19-2007 standard were employed. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the equipment are included within this test report.

## 3. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Filed Probe	ER3DV6R	2256	Aug. 23, 2010	Aug. 23, 2011
SPEAG	Dosimetric H-Filed Probe	H3DV6	6076	Aug. 23, 2010	Aug. 23, 2011
SPEAG	835 MHz System Validation Kit	CD835V3	1017	Jul. 13, 2010	Jul. 13, 2011
SPEAG	1880 MHz System Validation Kit	CD1880V3	1036	Jul. 13, 2010	Jul. 13, 2011
SPEAG	Data Acquisition Electronics	DAE4	779	Jan. 31, 2011	Jan. 31, 2012
SPEAG	Device Holder	N/A	N/A	N.C.R.	
SPEAG	Phantom	SAM V4.0	TP-1150	N.C.R.	
SPEAG	Robot	Staubli TX90XL	F07/564ZA1/C/01	N.C.R.	
SPEAG	Software	DASY5 V5.0 Build 91	N/A	N.C.R.	
SPEAG	Software	SEMCAD X V13.4 Build 125	N/A	N.C.R.	
SPEAG	Measurement Server	SE UMS 011 AA	1025	N.C.R.	
Agilent	Wireless Communication Test Set	CMU200	109369	Aug. 10, 2010	Aug. 10, 2011
Agilent	Spectrum Analyzer(ESA-L)	E4408B	MY45107753	Jul. 07, 2011	Jul. 07, 2012
R&S	Spectrum Analyzer(FSL)	FSL6	100410	N.C.R.	
Agilent	MXG Vector Signal Generator	N5182A	MY47420962	May 16, 2011	May 16, 2012
R&S	Power Sensor	NRP-Z22	100179	May 27, 2011	May 27, 2012
Agilent	Dual Directional Coupler	778D	50334	N.C.R.	
Mini-Circuits	Power Amplifier	ZVE-8G	D042005 671800514	N.C.R.	
Mini-Circuits	Power Amplifier	ZHL-42W-SMA	D111103#5	N.C.R.	

**Table 1. Test Equipment List**

## 4. Test Procedure



**Figure 1. WD reference and plane for RF emission measurements**

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

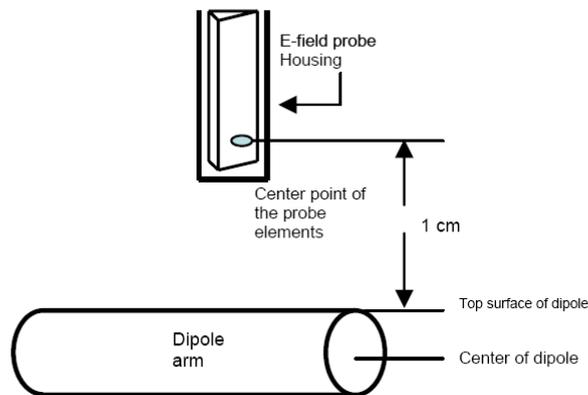
1. Proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system was confirmed.
2. WD is positioned in its intended test position, acoustic output point of the device perpendicular to the field probe.
3. The WD operation for maximum rated RF output power 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 WD 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 HAC Phantom.
6. The measurement system measured the field strength at the reference location.
7. Measurements at 2mm or 5mm increments in the 5 x 5 cm region were performed at a distance 15 mm from the center point of the probe measurement element to the WD. A 360o 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.

## 5. System Check

### 5.1 System check parameters

The input signal was an un-modulated continuous wave. The following points were taken into consideration in performing this check:

- Average Input Power  $P = 100\text{mW RMS}$  ( $20\text{dBm RMS}$ ) after adjustment for return loss.
- The test fixture must meet the 2 wavelength separation criterion.
- The proper measurement of the 1 cm probe to dipole separation, which is measured from top surface of the dipole to the calibration reference point of the sensor, defined by the probe manufacturer is shown in the following diagram:



### 5.2 Validation Procedure

Place a dipole antenna meeting the requirements given in ANSI-PC63.19 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; and
- the probes are 10 mm from the surface of the dipole elements.

Scan the length of the dipole with both E-field and H-field probes and record the maximum values for each. Compare the readings to expected values.

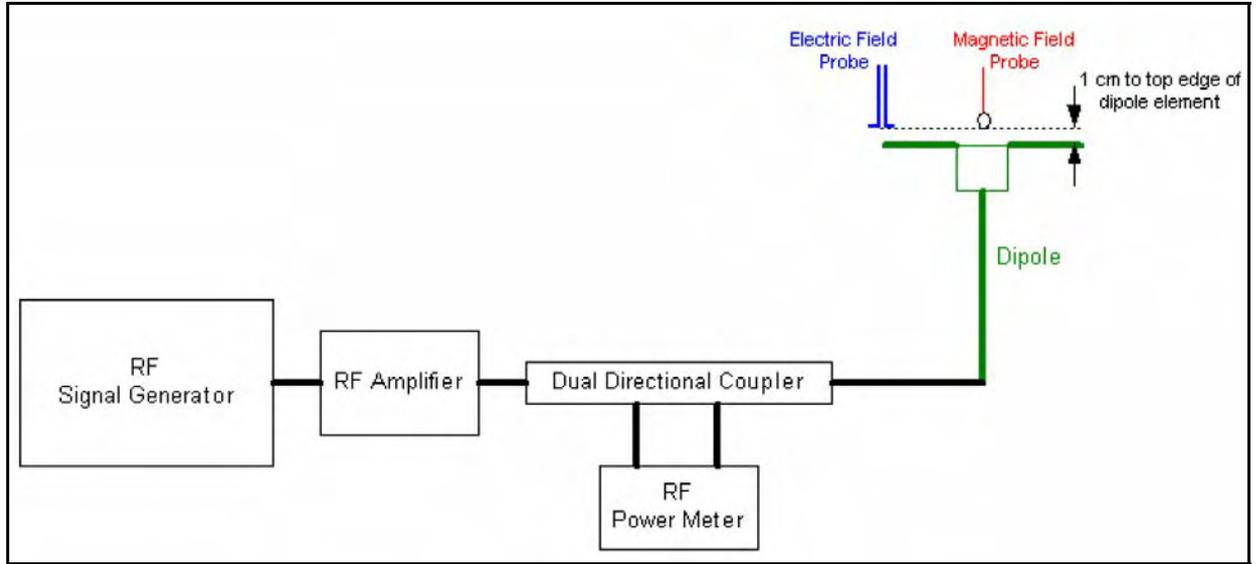


Figure 2. WD dipole calibration procedure

### 5.3 Illustrative dipole calculated and measured values

Baseband frequencies (MHz)	Frequency (MHz)	E-field calculated values (V/m)	E-field measured values (V/m)	E-field delta (calculated to measured) (V/m) & %	H-field calculated values (A/m)	H-field measured values (A/m)	H-field delta (calculated to measured) (A/m) & %
790–850	835	187			0.476		
806–821	813.5	190			0.481		
896–901	898.5	185			0.477		
1880–2000	1880	149			0.456		
		224.6–236.4			0.5139–0.5226		
		214.9–232.2			0.4954–0.5164		
		213.2–220.9			0.5032–0.5005		
		153.6–149.3			0.4478–0.4035		

NOTE 1— Numeric modeling results will vary based on several factors, including the size of the computational area, boundary conditions selected, grid resolution, accuracy of models for material properties, and other factors. Further, the results obtained by numeric modeling will vary from measured results based on many additional factors, including the degree to which the probe perturbs the field, the degree to which the probe averages the field strength over its dimensions, the linearity of the probe, the differences between the physical dipole and its modeled representation, and many other factors. Numeric computations provided to the committee showed significant variability between different results. Accordingly the values provided should be used judiciously and not interpreted to be absolutely correct. The calculated values provided for dipoles were developed using theoretical numerical computation.

NOTE 2— Delta % =  $100 \times (\text{measured peak} - \text{calculated}) / \text{calculated}$ . Values within  $\pm 25\%$  are acceptable, of which 12% is deviation and 13% is measurement uncertainty. Values independently validated for the dipole actually used in the measurements should be used, when available.



## 5.4 Validation Results

Dipole	Freq. (MHz)	Protocol	Input Power (mW)	Target for Dipole (V/m)	E-Field Results (V/m)	Deviation	Date
SN:1017	835	CW	100	168.6	163.8	-2.85%	06/23/2011
SN:1017	835	CW	100	168.6	176.9	4.92%	06/29/2011
SN:1036	1880	CW	100	139.2	137.4	-1.29%	06/23/2011
SN:1036	1880	CW	100	139.2	145.8	4.74%	06/29/2011

**Table 2. Dipole E-Field Measurement Summary**

Dipole	Freq. (MHz)	Protocol	Input Power (mW)	Target for Dipole (A/m)	H-Field Results (A/m)	Deviation	Date
SN:1017	835	CW	100	0.457	0.445	-2.63%	06/23/2011
SN:1017	835	CW	100	0.457	0.439	-3.94%	06/29/2011
SN:1036	1880	CW	100	0.468	0.441	-5.77%	06/23/2011
SN:1036	1880	CW	100	0.468	0.436	-6.84%	06/29/2011

**Table 3. Dipole H-Field Measurement Summary**

## 6. Probe Modulation Factor

After every probe calibration, the response of the probe to each applicable modulated signal (CDMA, GSM, WCDMA (UMTS), etc) must be assessed at both 835 MHz, 1880 MHz. 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. For each PMF assessment, a Signal Generator was used to replace the original CW signal with the desired modulated signal. The PMF results are shown in Table 4. RF Field Probe Modulation Response was measured with the field probe and associated measurement equipment. The PMF was measured per ANSI C63.19-2007 using a signal generator as follows:

1. Illuminate a dipole with a CW signal at the intended measured frequency.
2. Fix the probe at a set location relative to the dipole; typically located at the field reference point.
3. Record the reading of the probe measurement system of the CW signal.
4. Substitute a modulated signal of the same amplitude, using the same modulation as that used by the intended WD for the CW signal.
5. Record the reading of the probe measurement system of the modulated signal.
6. The ratio of the CW to modulated signal reading is the probe modulation factor.
7. Spectrum analyzer settings:
  - Center Frequency: nominal center frequency of channel
  - Span: zero
  - Resolution bandwidth  $\geq$  emission bandwidth
  - Video bandwidth  $\geq$  20 kHz.
  - Detection: RMS detection.
  - Trigger: Video or IF trigger, adjusted to give a stable display of the transmission.
  - Sweep rate: Set to show a complete transmission cycle.
  - Line max hold may be used temporarily to ease the peak reading.
8. Calculate the Probe Modulation Factor as the ratio between the CW multimeter field reading and the reading for the applicable modulation. I.e.,  $PMF = \frac{E_{CW}}{E_{mod}}$  and similar for H.

gfortheapplicablemodulation.I.e.,  $PMF = \frac{E_{CW}}{E_{mod}}$  and similar for H.

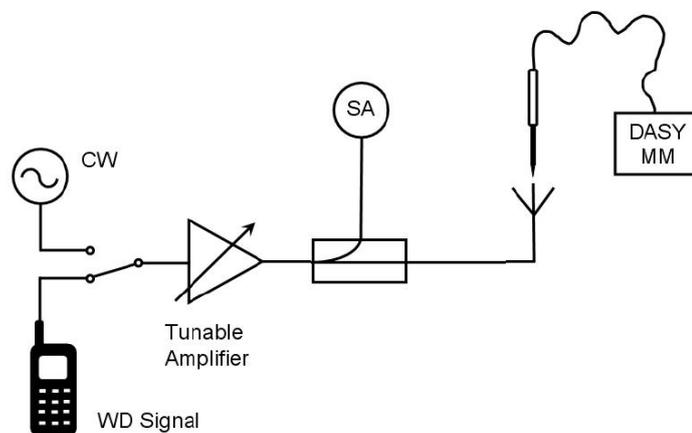


Figure 3. Probe Modulation Factor Measurement Diagram



**Formula between PMF and test results**

1. HAC test of device and determine the maximum value (M) of grids.
2. Determine the value (P) of PMF according to (M).
3. Find the maximum value (F) from the other data.

$$R = P * F$$

Example:

E-Field Maximum value (M) = 52, Maximum value (F) = 51.8, PMF (P) = 2.82

R = 51.8 \* 2.82 = 146.076 V/m

Frequency (MHz)	Protocol	E-Field Probe SN:2256		H-Field Probe SN:6076	
		E-Field (V/m)	E-Field Modulation Factor	H-Field (A/m)	H-Field Modulation Factor
835.0	CDMA	< 47	1.13	< 0.14	0.98
		47 - 63	1.10	0.14 - 0.19	0.99
		63 - 84	1.07	0.19 - 0.25	1.00
		84 - 112	1.04	0.25 - 0.34	0.98
		112 - 150	1.01	0.34 - 0.45	0.95
		150 - 200	0.98	0.45 - 0.60	0.91
		200 - 266	0.96	0.60 - 0.80	0.85
		266 - 355	0.93	0.80 - 1.07	0.79
		355 - 473	0.90	1.07 - 1.43	0.72
		473 - 631	0.88	1.43 - 1.91	0.64
		631 - 841	0.85	1.91 - 2.54	0.57
841 - 1122	0.83	2.54 - 3.39	0.49		
1880.0	CDMA	< 47	1.01	< 0.14	0.97
		47 - 63	1.01	0.14 - 0.19	0.95
		63 - 84	1.00	0.19 - 0.25	0.91
		84 - 112	0.99	0.25 - 0.34	0.86
		112 - 150	0.98	0.34 - 0.45	0.80
		150 - 200	0.97	0.45 - 0.60	0.73
		200 - 266	0.96	0.60 - 0.80	0.66
		266 - 355	0.95	0.80 - 1.07	0.58
		355 - 473	0.94	1.07 - 1.43	0.51
		473 - 631	0.94	1.43 - 1.91	0.43
		631 - 841	0.93	1.91 - 2.54	0.36
841 - 1122	0.92	2.54 - 3.39	0.30		

**Table 4. PMF Measurement Summary**

Note: PMF measurements were verified at WD's power as an input to the dipole.



## **7. HAC Testing with RF Transmitters**

The phone was tested in all normal configurations for the ear use. A DUT is mounted in the device holder equivalent as for classic dosimetric measurements. The acoustic output of the DUT 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 DUT shall be moved vertically upwards until it touches the frame. The fine adjustment is possible by sliding the complete DUT holder 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.

### **CDMA Devices setup for HAC Measurement.**

The signal was setup by creating and maintaining an over the coaxial connection between the DUT and an R&S CMU200 Wireless Communications Test Set. The CDMA radio is available on CDMA 2000(1X) and IS-95. The test equipment was configured to use "all up bits" for RC1 / SO2 on J-STD-008 for CDMA 1900 and TSB-84 for CDMA 800 MHz. The 5cm x 5cm area measurement grid is centered on the acoustic output of the device. The Test Arch provided by SPEAG is used to position the DUT. The WD reference plane is parallel to the device and contains the highest point on its contour in the area of the phone that normally rests against the user's ear. The measurement plane contains the nearest point on the probe sensor(s) relative to the WD. The pictures of the setup are included in 7.3.

### **WCDMA Devices setup for HAC Measurement.**

The following procedures are applicable to WCDMA handsets operating under 3GPP Release 99 and Release 5. The default test configuration is to measure HAC with an established radio link between the DUT and a communication test set using a 12.2 kbps RMC (reference measurement channel) configured in Test Loop Mode 1. HAC is selectively confirmed for other physical channel configurations (DPCCH & DPDCH<sub>n</sub>) according to output power, exposure conditions and device operating capabilities. Both uplink and downlink should be configured with the same RMC or AMR, when required. Maximum output power is verified according to 3GPP TS 34.121 and HAC must be measured according to these maximum output conditions.



## 8. Test Results

### 8.1 Description of the Device under Test (DUT)

Modes and Bands of Operation	CDMA Cellular Band	CDMA PCS Band
Modulation Mode	GMSK	GMSK
Duty Cycle	1/1	1/1
Transmitter Frequency Range (MHz)	824.0 – 849.0	1850.0 -1910.0

### 8.2 HAC E-Field measurement results

Band	Rating	E-Field
CDMA Cellular Band	M3	149.6 to 266.1 V/m
	M4	< 149.6 V/m
CDMA PCS Band	M3	47.3 to 84.1 V/m
	M4	< 47.3 V/m

Table 5. Emissions Limits

Band	Channel	Conducted Power (dBm)	Measured PMF	Drift (dB)	Excluded Cells	Peak Field (V/m)	Rating	Note
CDMA Cellular Band	1013	23.98	1.04	0.078	2,3,6	96.3	M4	Sample1+battery#1
	1013	23.98	1.04	0.103	2,3,6	98.4	M4	Sample1+battery#2
	1013	23.98	0.990	0.030	2,3,6	83.6	M4	Sample2+battery#1
	1013	23.98	1.04	-0.052	2,3,6	92.0	M4	Sample2+battery#2
	384	23.92	1.04	0.168	2,3,6	83.3	M4	Sample1+battery#2
	384	23.92	1.04	0.023	2,3,6	82.3	M4	Sample2+battery#2
	777	23.83	1.04	0.141	6,8,9	81.9	M4	Sample1+battery#2
	777	23.83	1.07	0.139	2,3,6	80.3	M4	Sample2+battery#2
CDMA PCS Band	25	24.33	1.01	-0.071	7,8,9	32.1	M4	Sample1+battery#1
	25	24.33	1.01	-0.023	7,8,9	32.1	M4	Sample1+battery#2
	25	24.33	1.01	0.025	7,8,9	33.7	M4	Sample2+battery#1
	25	24.33	1.01	-0.031	7,8,9	34.3	M4	Sample2+battery#2
	600	24.21	1.01	0.050	7,8,9	29.1	M4	Sample1+battery#2
	600	24.21	1.01	0.048	7,8,9	33.4	M4	Sample2+battery#2
	1175	24.12	1.01	-0.008	7,8,9	27.3	M4	Sample1+battery#2
	1175	24.12	1.01	-0.050	7,8,9	29.9	M4	Sample2+battery#2

Note: HAC E-Field measurement results for the portable cellular telephone at highest possible output power.



**Turn on Wi-Fi and Bluetooth Function**

Band	Channel	Wireless Mode	Peak Field (V/m)	Note
CDMA Cellular Band	1013	-----	98.4	Sample1+battery#2
		Wi-Fi	98.3	
		Bluetooth	98.2	
CDMA PCS Band	25	-----	32.1	Sample1+battery#2
		Wi-Fi	31.8	
		Bluetooth	32.0	
CDMA Cellular Band	1013	-----	92.0	Sample2+battery#2
		Wi-Fi	91.8	
		Bluetooth	91.5	
CDMA PCS Band	25	-----	34.3	Sample2+battery#2
		Wi-Fi	34.0	
		Bluetooth	34.1	



### 8.3 HAC H-Field measurement results

Band	Rating	H-Field
CDMA Cellular Band	M3	0.45 to 0.80 A/m
	M4	< 0.45 A/m
CDMA PCS Band	M3	0.14 to 0.25 A/m
	M4	<0.14 A/m

Table 6. Emissions Limits

Band	Channel	Conducted Power (dBm)	Measured PMF	Drift (dB)	Excluded Cells	Peak Field (A/m)	Rating	Note
CDMA Cellular Band	1013	23.98	1.00	-0.044	1,4,7	0.152	M4	Sample1+battery#1
	1013	23.98	1.00	-0.069	1,4,7	0.156	M4	Sample1+battery#2
	1013	23.98	0.970	0.166	1,4,7	0.135	M4	Sample2+battery#1
	1013	23.98	0.990	-0.053	1,4,7	0.140	M4	Sample2+battery#2
	384	23.92	0.990	0.040	1,4,7	0.131	M4	Sample1+battery#2
	384	23.92	0.990	-0.153	1,4,7	0.133	M4	Sample2+battery#2
	777	23.83	0.990	0.068	1,4,7	0.131	M4	Sample1+battery#2
	777	23.83	0.990	-0.020	1,4,7	0.128	M4	Sample2+battery#2
CDMA PCS Band	25	24.33	0.970	-0.013	7,8,9	0.102	M4	Sample1+battery#1
	25	24.33	0.970	0.001	2,3,6	0.103	M4	Sample1+battery#2
	25	24.33	0.970	-0.001	7,8,9	0.108	M4	Sample2+battery#1
	25	24.33	0.970	0.039	7,8,9	0.109	M4	Sample2+battery#2
	600	24.21	0.970	-0.068	2,3,6	0.096	M4	Sample1+battery#2
	600	24.21	0.970	-0.041	7,8,9	0.106	M4	Sample2+battery#2
	1175	24.12	0.970	-0.015	2,3,6	0.095	M4	Sample1+battery#2
	1175	24.12	0.970	0.050	7,8,9	0.098	M4	Sample2+battery#2

Note: HAC H-Field measurement results for the portable cellular telephone at highest possible output power.



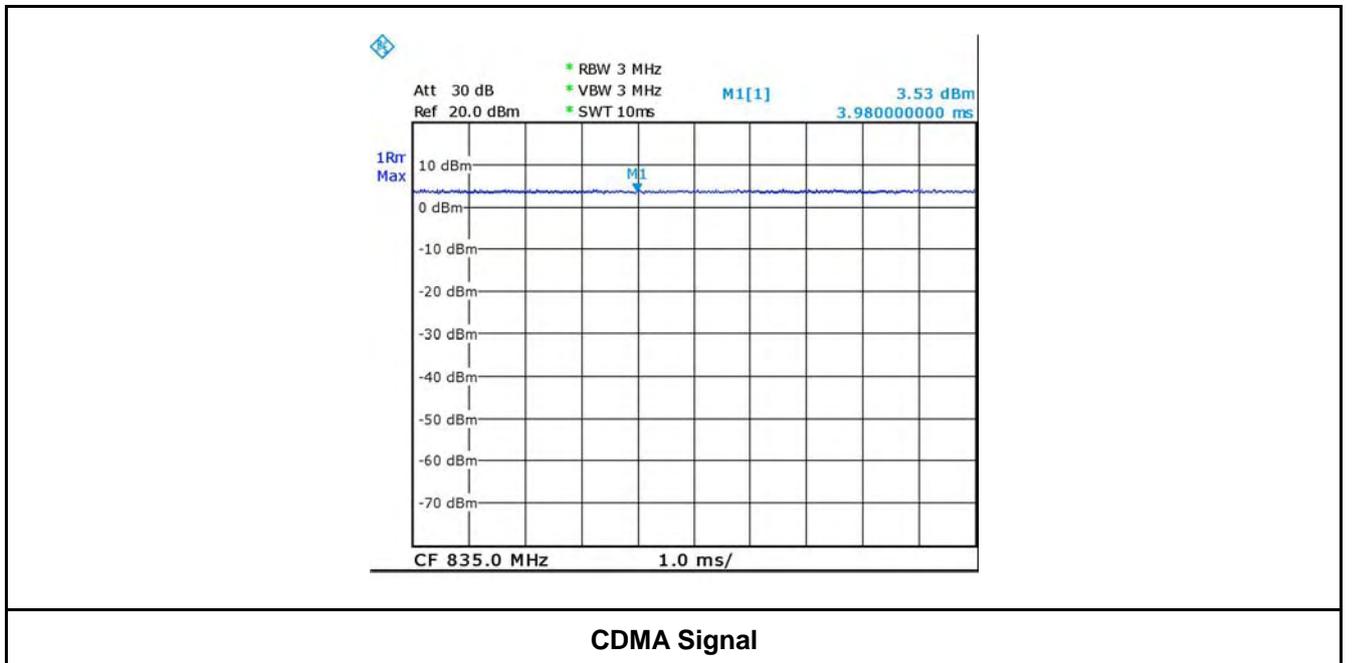
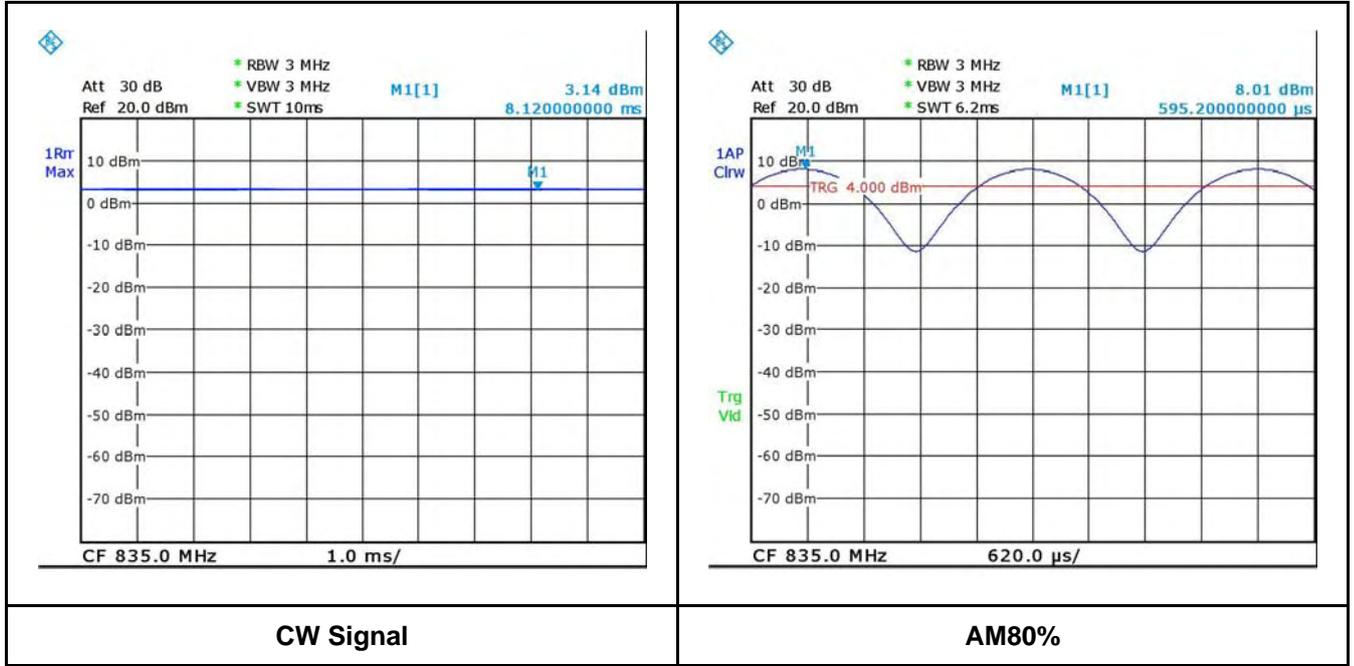
**Turn on Wi-Fi and Bluetooth Function**

Band	Channel	Wireless Mode	Peak Field (V/m)	Note
CDMA Cellular Band	1013	-----	0.156	Sample1+battery#2
		Wi-Fi	0.151	
		Bluetooth	0.153	
CDMA PCS Band	25	-----	0.103	Sample1+battery#2
		Wi-Fi	0.101	
		Bluetooth	0.101	
CDMA Cellular Band	1013	-----	0.140	Sample2+battery#2
		Wi-Fi	0.137	
		Bluetooth	0.139	
CDMA PCS Band	25	-----	0.109	Sample2+battery#2
		Wi-Fi	0.108	
		Bluetooth	0.106	



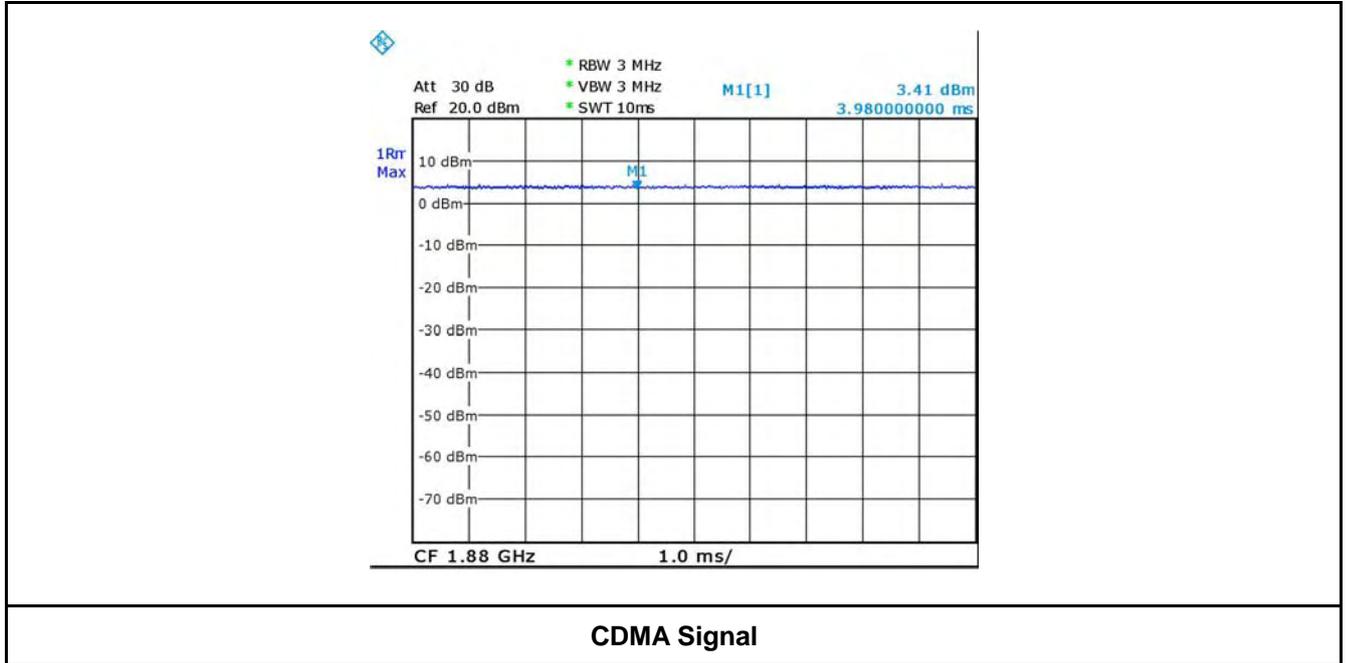
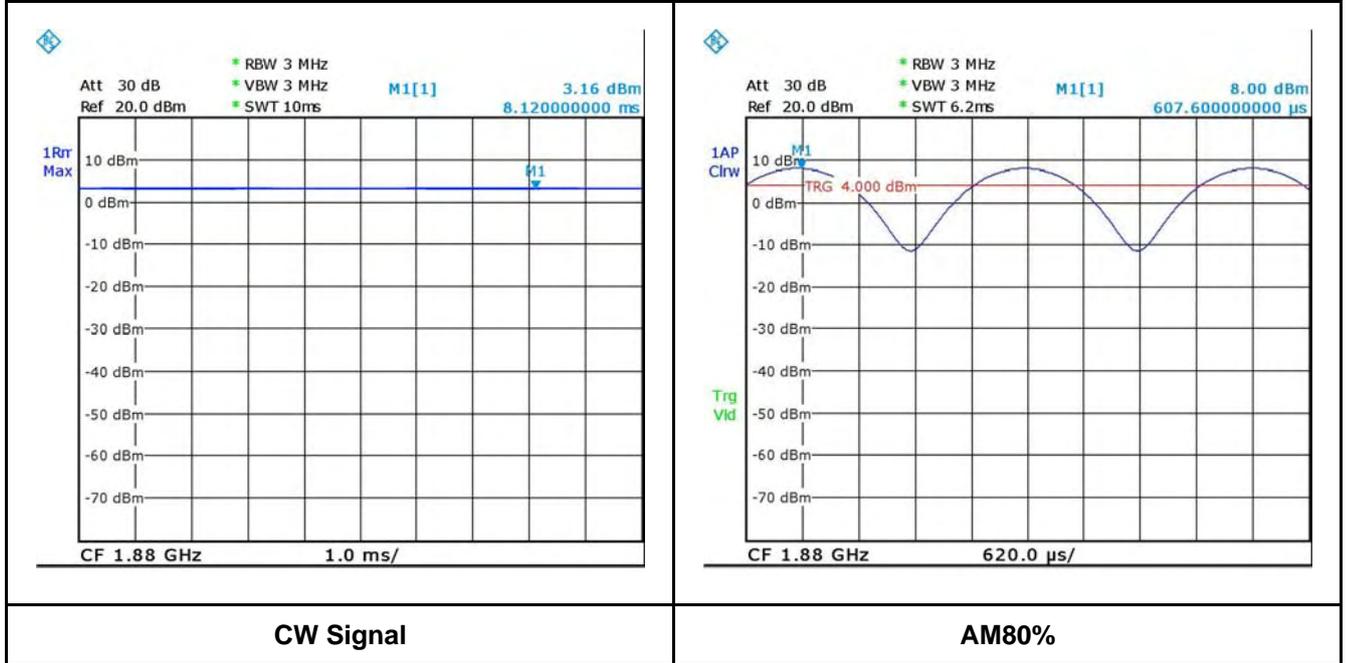
## Appendix A - Details of WD signal

835 MHz





1880 MHz





## Appendix B - Validation

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 9:59:15 AM

### HAC\_System Performance Check at 835MHz\_20100623\_E

**DUT: Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN:1017**

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>

Phantom section: E Dipole Section

Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

### E Scan - ER3DV6 - 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 = 162.6 V/m

Probe Modulation Factor = 1

Device Reference Point: 0, 0, 354.7 mm

Reference Value = 121.5 V/m; Power Drift = -0.00924 dB

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

#### Cursor:

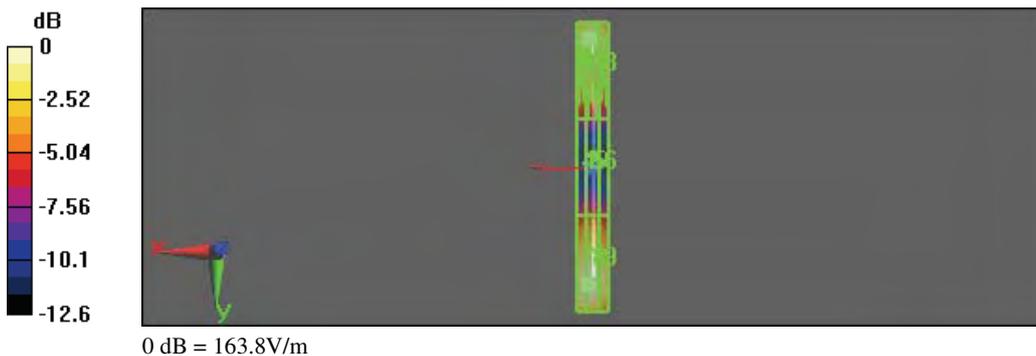
Total = 163.8 V/m

E Category: M4

Location: 1.5, -79, 364.7 mm

Peak E-field in V/m

Grid 1 <b>162.0 M4</b>	Grid 2 <b>163.8 M4</b>	Grid 3 <b>152.5 M4</b>
Grid 4 <b>87.1 M4</b>	Grid 5 <b>88.3 M4</b>	Grid 6 <b>83.8 M4</b>
Grid 7 <b>161.9 M4</b>	Grid 8 <b>162.6 M4</b>	Grid 9 <b>152.5 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:05:40 PM

**HAC\_System Performance Check at 835MHz\_20110629\_E**

**DUT: Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN:1017**

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>  
 Phantom section: E Dipole Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

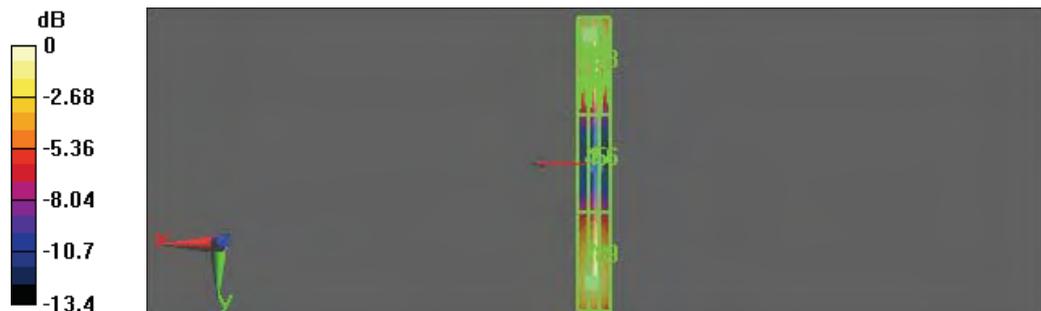
**E Scan - ER3DV6 - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 151.8 V/m  
 Probe Modulation Factor = 1  
 Device Reference Point: 0, 0, 354.7 mm  
 Reference Value = 116.6 V/m; Power Drift = -0.00865 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 176.9 V/m  
 E Category: M4  
 Location: 2.5, -79, 364.7 mm

Peak E-field in V/m

Grid 1 <b>176.2 M4</b>	Grid 2 <b>176.9 M4</b>	Grid 3 <b>161.5 M4</b>
Grid 4 <b>84 M4</b>	Grid 5 <b>85.1 M4</b>	Grid 6 <b>81.2 M4</b>
Grid 7 <b>150.3 M4</b>	Grid 8 <b>151.8 M4</b>	Grid 9 <b>144.9 M4</b>



0 dB = 176.9V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 5:47:26 PM

**HAC\_System Performance Check at 835MHz\_20110623\_H**

**DUT: Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN:1017**

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>  
 Phantom section: H Dipole Section  
 Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

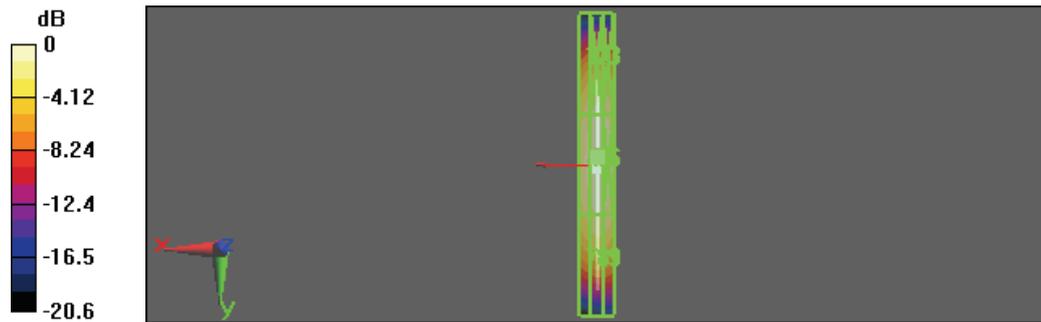
**H Scan - H3DV6 - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.445 A/m  
 Probe Modulation Factor = 1  
 Device Reference Point: 0, 0, 354.7 mm  
 Reference Value = 0.468 A/m; Power Drift = -0.017 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 0.445 A/m  
 H Category: M4  
 Location: -1, -4.5, 364.7 mm

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.378 M4</b>	<b>0.406 M4</b>	<b>0.398 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.415 M4</b>	<b>0.445 M4</b>	<b>0.438 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.357 M4</b>	<b>0.384 M4</b>	<b>0.379 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 5:28:04 PM

**HAC\_System Performance Check at 835MHz\_20110629\_H**

**DUT: Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN:1017**

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>  
 Phantom section: H Dipole Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):** Measurement grid: dx=5mm, dy=5mm

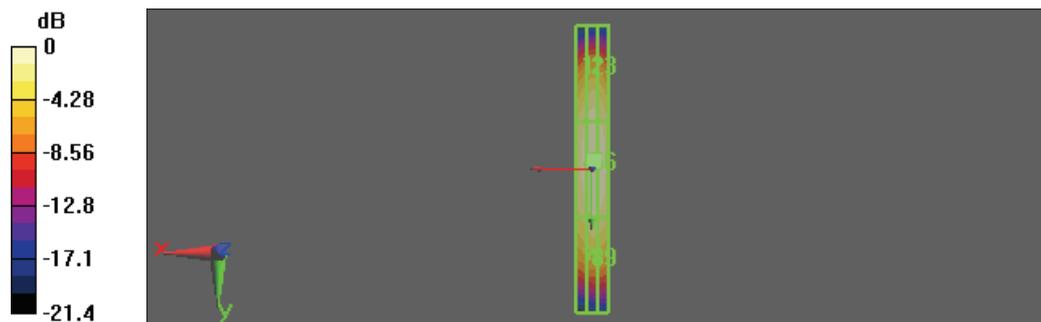
Maximum value of peak Total field = 0.439 A/m  
 Probe Modulation Factor = 1  
 Device Reference Point: 0, 0, 354.7 mm  
 Reference Value = 0.465 A/m; Power Drift = -0.037 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.439 A/m  
 H Category: M4  
 Location: -1, -5, 364.7 mm

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.377 M4</b>	<b>0.405 M4</b>	<b>0.391 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.411 M4</b>	<b>0.439 M4</b>	<b>0.428 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.347 M4</b>	<b>0.373 M4</b>	<b>0.367 M4</b>



0 dB = 0.439A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 10:32:41 AM

**HAC\_System Performance Check at 1880MHz\_20110623\_E**

**DUT: Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN:1036**

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>  
 Phantom section: E Dipole Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

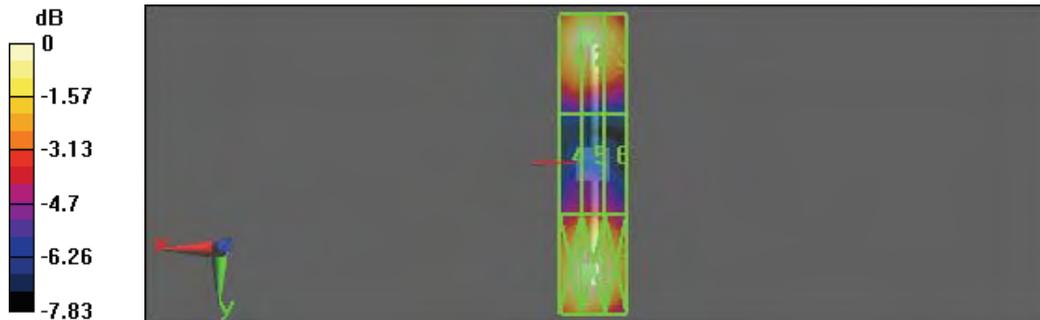
**E Scan - ER3DV6 - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 136.6 V/m  
 Probe Modulation Factor = 1  
 Device Reference Point: 0, 0, 354.7 mm  
 Reference Value = 140.1 V/m; Power Drift = -0.088 dB  
**Hearing Aid Near-Field Category: M2 (AWF 0 dB)**

**Cursor:**  
 Total = 137.4 V/m  
 E Category: M2  
 Location: 1, 32.5, 364.7 mm

Peak E-field in V/m

Grid 1 <b>135.2 M2</b>	Grid 2 <b>136.6 M2</b>	Grid 3 <b>126.3 M2</b>
Grid 4 <b>90 M3</b>	Grid 5 <b>92.2 M3</b>	Grid 6 <b>88.4 M3</b>
Grid 7 <b>135.6 M2</b>	Grid 8 <b>137.4 M2</b>	Grid 9 <b>129.2 M2</b>



0 dB = 137.4V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 7:47:24 PM

**HAC\_System Performance Check at 1880MHz\_20110629\_E**

**DUT: Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN:1036**

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>  
 Phantom section: E Dipole Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

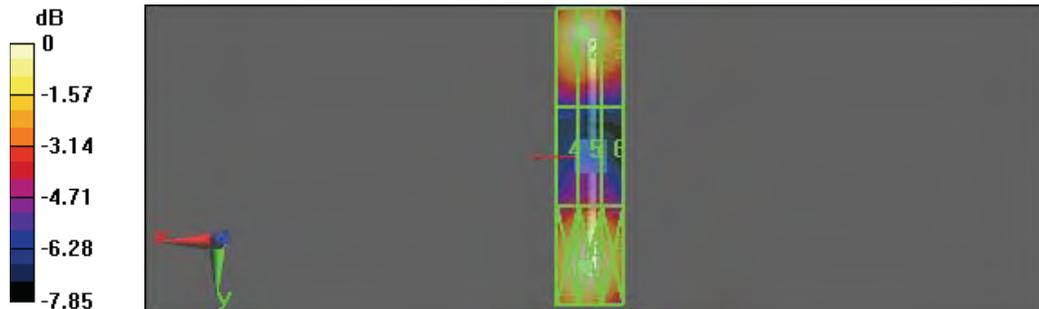
**E Scan - ER3DV6 - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 144.3 V/m  
 Probe Modulation Factor = 1  
 Device Reference Point: 0, 0, 354.7 mm  
 Reference Value = 149.8 V/m; Power Drift = 0.00893 dB  
**Hearing Aid Near-Field Category: M2 (AWF 0 dB)**

**Cursor:**  
 Total = 145.8 V/m  
 E Category: M2  
 Location: 1.5, 33.5, 364.7 mm

Peak E-field in V/m

Grid 1 <b>143.0 M2</b>	Grid 2 <b>144.3 M2</b>	Grid 3 <b>132.7 M2</b>
Grid 4 <b>94.2 M3</b>	Grid 5 <b>96.8 M3</b>	Grid 6 <b>92.7 M3</b>
Grid 7 <b>144.1 M2</b>	Grid 8 <b>145.8 M2</b>	Grid 9 <b>136.9 M2</b>



0 dB = 145.8V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 5:33:23 PM

**HAC\_System Performance Check at 1880MHz\_20110623\_H**

**DUT: Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN:1036**

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>  
 Phantom section: H Dipole Section  
 Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

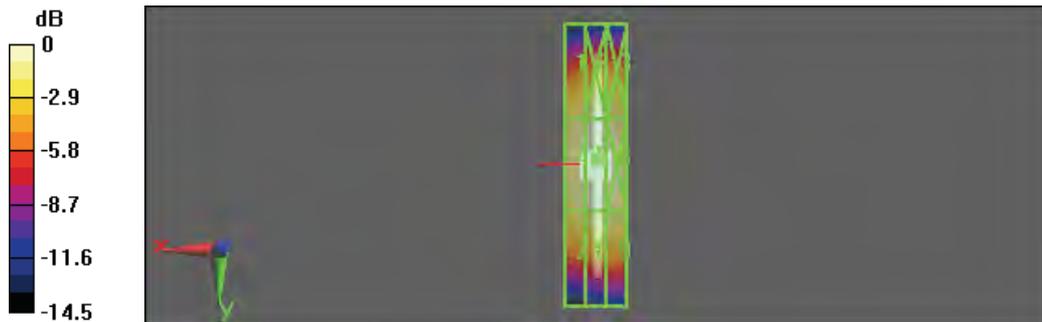
**H Scan - H3DV6 - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.441 A/m  
 Probe Modulation Factor = 1  
 Device Reference Point: 0, 0, 354.7 mm  
 Reference Value = 0.463 A/m; Power Drift = -0.028 dB  
**Hearing Aid Near-Field Category: M2 (AWF 0 dB)**

**Cursor:**  
 Total = 0.441 A/m  
 H Category: M2  
 Location: -1, -1.5, 364.7 mm

Peak H-field in A/m

Grid 1 <b>0.381 M2</b>	Grid 2 <b>0.408 M2</b>	Grid 3 <b>0.399 M2</b>
Grid 4 <b>0.415 M2</b>	Grid 5 <b>0.441 M2</b>	Grid 6 <b>0.433 M2</b>
Grid 7 <b>0.373 M2</b>	Grid 8 <b>0.397 M2</b>	Grid 9 <b>0.392 M2</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 5:46:04 PM

**HAC\_System Performance Check at 1880MHz\_20110629\_H**

**DUT: Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN:1036**

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>

Phantom section: H Dipole Section

Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - 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 = 0.436 A/m

Probe Modulation Factor = 1

Device Reference Point: 0, 0, 354.7 mm

Reference Value = 0.460 A/m; Power Drift = -0.013 dB

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

**Cursor:**

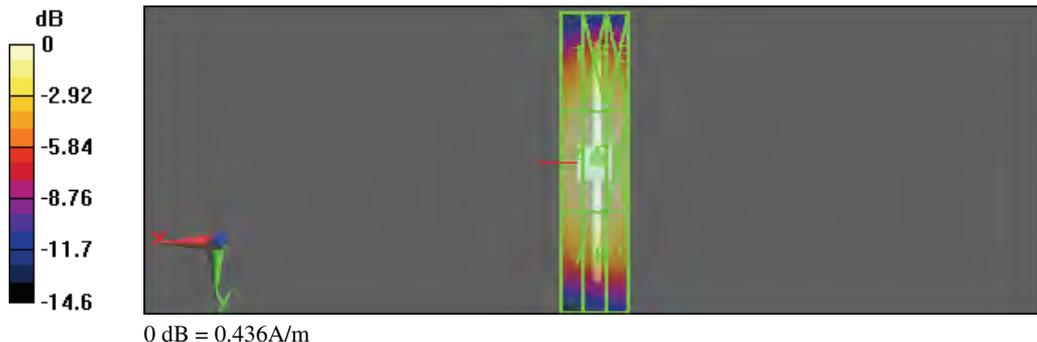
Total = 0.436 A/m

H Category: M2

Location: -1, -1.5, 364.7 mm

Peak H-field in A/m

Grid 1 <b>0.379 M2</b>	Grid 2 <b>0.404 M2</b>	Grid 3 <b>0.394 M2</b>
Grid 4 <b>0.413 M2</b>	Grid 5 <b>0.436 M2</b>	Grid 6 <b>0.427 M2</b>
Grid 7 <b>0.370 M2</b>	Grid 8 <b>0.393 M2</b>	Grid 9 <b>0.387 M2</b>





## Appendix C - HAC distribution plots for E-Field and H-Field

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 11:59:52 AM

**HAC\_CDMA Cellular CH1013\_E\_Sample1 with battery#1**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>

Phantom section: E Device Section

Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm,

dy=5mm

Maximum value of peak Total field = 96.3 V/m

Probe Modulation Factor = 1.04

Device Reference Point: 0, 0, 353.7 mm

Reference Value = 120.9 V/m; Power Drift = 0.078 dB

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

**Cursor:**

Total = 96.3 V/m

E Category: M4

Location: -4.5, -4.5, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
83.8 M4	94.7 M4	92 M4
Grid 4	Grid 5	Grid 6
83.8 M4	96.3 M4	94 M4
Grid 7	Grid 8	Grid 9
81.5 M4	93.2 M4	90.2 M4



0 dB = 96.3V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 1:04:42 PM

**HAC\_CDMA Cellular CH1013\_E\_Sample1 with battery#2**

**DUT: PG76200; Type:** Smartphone; FCC ID: NM8PG76200

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 98.4 V/m  
 Probe Modulation Factor = 1.04  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 123.2 V/m; Power Drift = 0.103 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 98.4 V/m  
 E Category: M4  
 Location: -1, -0.5, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>85.5 M4</b>	<b>96.3 M4</b>	<b>93.3 M4</b>
Grid 4	Grid 5	Grid 6
<b>86.8 M4</b>	<b>98.4 M4</b>	<b>96.3 M4</b>
Grid 7	Grid 8	Grid 9
<b>83.8 M4</b>	<b>96.1 M4</b>	<b>93.5 M4</b>



0 dB = 98.4V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 9:02:25 PM

**HAC\_CDMA Cellular CH1013\_E\_Sample2 with battery#1**

**DUT: PG76200; Type:** Smartphone; FCC ID: NM8PG76200

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 83.6 V/m  
 Probe Modulation Factor = 0.990  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 108.9 V/m; Power Drift = 0.030 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 83.6 V/m  
 E Category: M4  
 Location: -3, -4, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
73.3 M4	82.8 M4	79.6 M4
Grid 4	Grid 5	Grid 6
73.3 M4	83.6 M4	80.2 M4
Grid 7	Grid 8	Grid 9
71.1 M4	81.3 M4	79.2 M4





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:18:41 PM

**HAC\_CDMA Cellular CH1013\_E\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

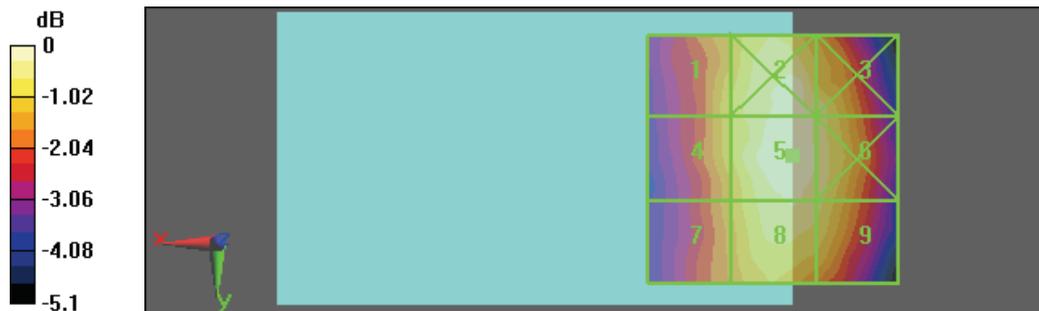
Maximum value of peak Total field = 92 V/m  
 Probe Modulation Factor = 1.04  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 118.1 V/m; Power Drift = -0.052 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 92 V/m  
 E Category: M4  
 Location: -4, -0.5, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
81.9 M4	90 M4	88.1 M4
Grid 4	Grid 5	Grid 6
81.8 M4	92 M4	88.3 M4
Grid 7	Grid 8	Grid 9
78.4 M4	88.7 M4	86.7 M4



0 dB = 92V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 1:28:58 PM

**HAC\_CDMA Cellular CH384\_E\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
Phantom section: E Device Section  
Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

Maximum value of peak Total field = 83.3 V/m  
Probe Modulation Factor = 1.04  
Device Reference Point: 0, 0, 353.7 mm  
Reference Value = 104.7 V/m; Power Drift = 0.168 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 83.3 V/m  
E Category: M4  
Location: -4, -4.5, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
73.8 M4	81.9 M4	79.4 M4
Grid 4	Grid 5	Grid 6
74.8 M4	83.3 M4	80.8 M4
Grid 7	Grid 8	Grid 9
72.4 M4	81 M4	78.5 M4



0 dB = 83 3V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:24:19 PM

**HAC\_CDMA Cellular CH384\_E\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

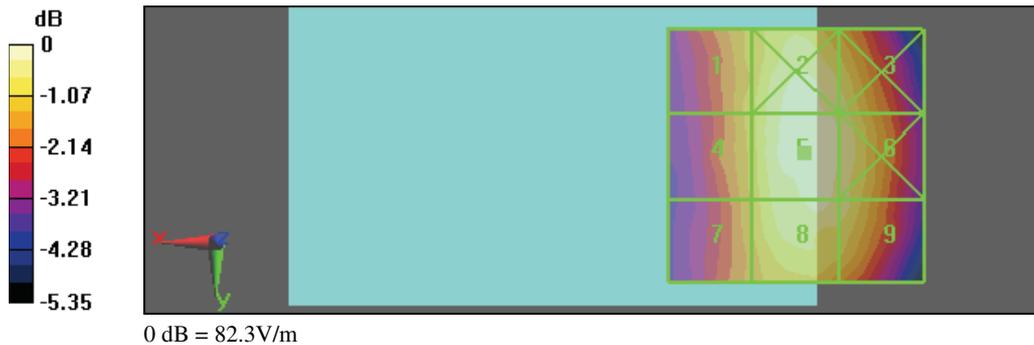
**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 82.3 V/m  
 Probe Modulation Factor = 1.04  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 103.3 V/m; Power Drift = 0.023 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 82.3 V/m  
 E Category: M4  
 Location: -1.5, -0.5, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
72.3 M4	81.1 M4	77.8 M4
Grid 4	Grid 5	Grid 6
72.3 M4	82.3 M4	79.3 M4
Grid 7	Grid 8	Grid 9
70.6 M4	79.9 M4	78.1 M4





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 3:16:21 PM

**HAC\_CDMA Cellular CH777\_E\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 81.9 V/m  
 Probe Modulation Factor = 1.04  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 101.9 V/m; Power Drift = 0.141 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 81.9 V/m  
 E Category: M4  
 Location: -2.5, -2.5, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
71.7 M4	80.6 M4	79.7 M4
Grid 4	Grid 5	Grid 6
73 M4	81.9 M4	80.6 M4
Grid 7	Grid 8	Grid 9
69.7 M4	81 M4	78.2 M4



0 dB = 81.9V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:29:43 PM

**HAC\_CDMA Cellular CH777\_E\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 80.3 V/m  
 Probe Modulation Factor = 1.07  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 96 V/m; Power Drift = 0.139 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 80.3 V/m  
 E Category: M4  
 Location: -1, -0.5, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
70.2 M4	78.2 M4	75.3 M4
Grid 4	Grid 5	Grid 6
70.3 M4	80.3 M4	77.3 M4
Grid 7	Grid 8	Grid 9
67.3 M4	76.1 M4	74.7 M4



0 dB = 80.3V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 4:46:52 PM

**HAC\_CDMA PCS CH25\_E\_Sample1 with battery#1**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

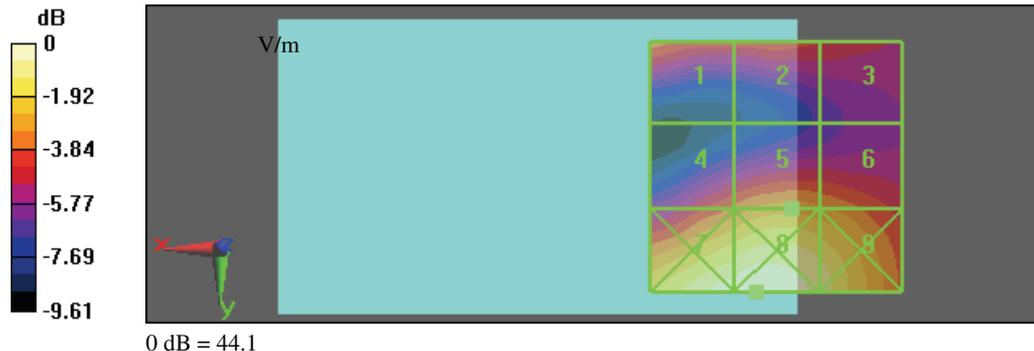
Maximum value of peak Total field = 32.1 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 25.2 V/m; Power Drift = -0.071 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 44.1 V/m  
 E Category: M4  
 Location: 4, 25, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>29.6 M4</b>	<b>27.9 M4</b>	<b>26.6 M4</b>
Grid 4	Grid 5	Grid 6
<b>29 M4</b>	<b>32.1 M4</b>	<b>31.2 M4</b>
Grid 7	Grid 8	Grid 9
<b>43.4 M4</b>	<b>44.1 M4</b>	<b>39.8 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 3:26:54 PM

**HAC\_CDMA PCS CH25\_E\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

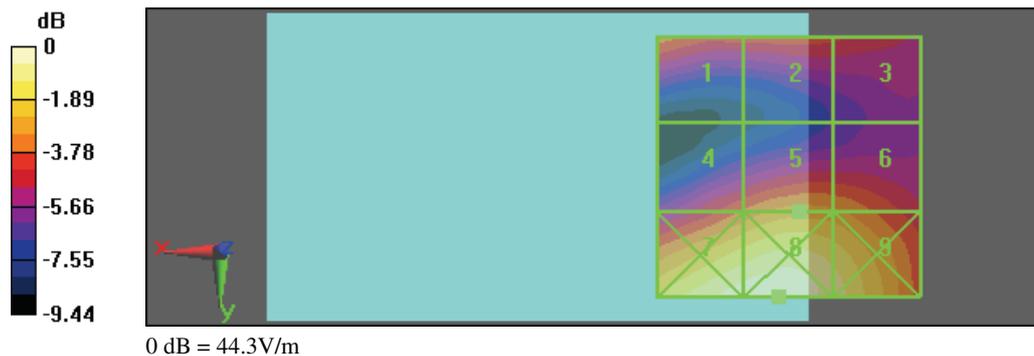
Maximum value of peak Total field = 32.1 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 25.1 V/m; Power Drift = -0.023 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 44.3 V/m  
 E Category: M4  
 Location: 2, 25, 368.7 mm

Peak E-field in V/m

Grid 1 <b>30.2 M4</b>	Grid 2 <b>28.4 M4</b>	Grid 3 <b>27.4 M4</b>
Grid 4 <b>29 M4</b>	Grid 5 <b>32.1 M4</b>	Grid 6 <b>31.4 M4</b>
Grid 7 <b>43.4 M4</b>	Grid 8 <b>44.3 M4</b>	Grid 9 <b>40.1 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:56:04 PM

**HAC\_CDMA PCS CH25\_E\_Sample2 with battery#1**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 33.7 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 23.6 V/m; Power Drift = 0.025 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 46 V/m  
 E Category: M4  
 Location: 3.5, 25, 368.7 mm

Peak E-field in V/m

Grid 1 <b>33.7 M4</b>	Grid 2 <b>32.5 M4</b>	Grid 3 <b>29.5 M4</b>
Grid 4 <b>29.5 M4</b>	Grid 5 <b>32.4 M4</b>	Grid 6 <b>31.8 M4</b>
Grid 7 <b>44.9 M4</b>	Grid 8 <b>46 M4</b>	Grid 9 <b>41.9 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:37:09 PM

**HAC\_CDMA PCS CH25\_E\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

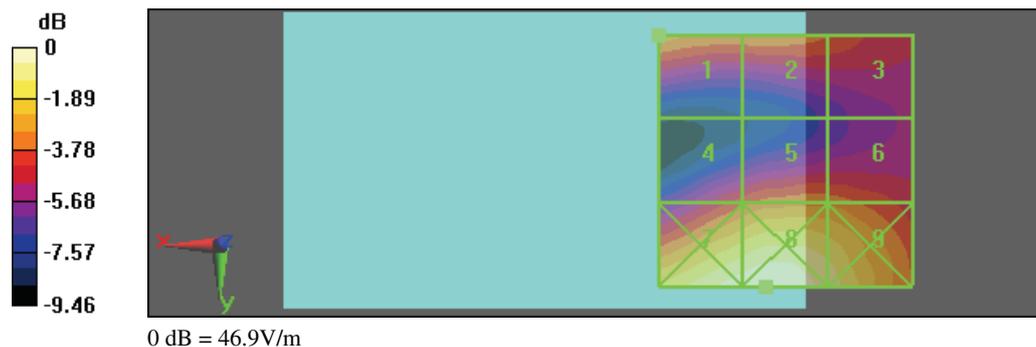
Maximum value of peak Total field = 34.3 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 23.5 V/m; Power Drift = -0.031 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 46.9 V/m  
 E Category: M4  
 Location: 4, 25, 368.7 mm

Peak E-field in V/m

Grid 1 <b>34.3 M4</b>	Grid 2 <b>33.2 M4</b>	Grid 3 <b>30.5 M4</b>
Grid 4 <b>29.7 M4</b>	Grid 5 <b>32.3 M4</b>	Grid 6 <b>32.2 M4</b>
Grid 7 <b>46 M4</b>	Grid 8 <b>46.9 M4</b>	Grid 9 <b>42.4 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 3:36:05 PM

**HAC\_CDMA PCS CH600\_E\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

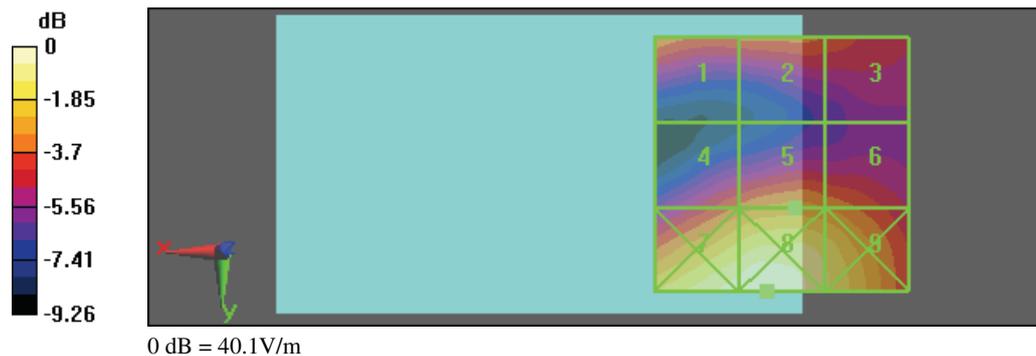
Maximum value of peak Total field = 29.1 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 22.6 V/m; Power Drift = 0.050 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 40.1 V/m  
 E Category: M4  
 Location: 3, 25, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
<b>28.1 M4</b>	<b>26.9 M4</b>	<b>26.1 M4</b>
Grid 4	Grid 5	Grid 6
<b>26.7 M4</b>	<b>29.1 M4</b>	<b>28.2 M4</b>
Grid 7	Grid 8	Grid 9
<b>39.2 M4</b>	<b>40.1 M4</b>	<b>35.3 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:42:46 PM

**HAC\_CDMA PCS CH600\_E\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 33.4 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 22.1 V/m; Power Drift = 0.048 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 45.1 V/m  
 E Category: M4  
 Location: 4, 25, 368.7 mm

Peak E-field in V/m

Grid 1 <b>33.4 M4</b>	Grid 2 <b>32.5 M4</b>	Grid 3 <b>30.5 M4</b>
Grid 4 <b>28 M4</b>	Grid 5 <b>31.1 M4</b>	Grid 6 <b>30.2 M4</b>
Grid 7 <b>43.5 M4</b>	Grid 8 <b>45.1 M4</b>	Grid 9 <b>39.7 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 3:43:08 PM

**HAC\_CDMA PCS CH1175\_E\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

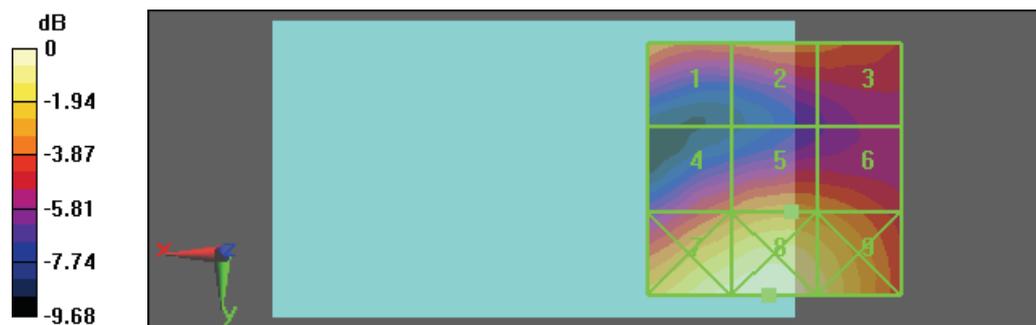
**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 27.3 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 22.1 V/m; Power Drift = -0.0076 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 37.6 V/m  
 E Category: M4  
 Location: 1, 25, 368.7 mm

Peak E-field in V/m

Grid 1 <b>26.3 M4</b>	Grid 2 <b>25.6 M4</b>	Grid 3 <b>25 M4</b>
Grid 4 <b>24.6 M4</b>	Grid 5 <b>27.3 M4</b>	Grid 6 <b>26.5 M4</b>
Grid 7 <b>36.4 M4</b>	Grid 8 <b>37.6 M4</b>	Grid 9 <b>33.8 M4</b>



0 dB = 37.6V/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 8:48:37 PM

**HAC\_CDMA PCS CH1175\_E\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: E Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: ER3DV6R - SN2256; ConvF(1, 1, 1); Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 29.9 V/m  
 Probe Modulation Factor = 1.01  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 20.1 V/m; Power Drift = -0.050 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 40.1 V/m  
 E Category: M4  
 Location: 2, 25, 368.7 mm

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
29.7 M4	29.9 M4	27.7 M4
Grid 4	Grid 5	Grid 6
24.9 M4	27.6 M4	26.7 M4
Grid 7	Grid 8	Grid 9
39.2 M4	40.1 M4	35.9 M4





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 6:32:41 PM

**HAC\_CDMA Cellular CH1013\_H\_Sample1 with battery#1**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.152 A/m  
 Probe Modulation Factor = 1  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.082 A/m; Power Drift = 0.044 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 0.204 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.204 M4</b>	Grid 2 <b>0.152 M4</b>	Grid 3 <b>0.089 M4</b>
Grid 4 <b>0.150 M4</b>	Grid 5 <b>0.113 M4</b>	Grid 6 <b>0.075 M4</b>
Grid 7 <b>0.195 M4</b>	Grid 8 <b>0.143 M4</b>	Grid 9 <b>0.085 M4</b>



0 dB = 0.204A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 6:16:07 PM

**HAC\_CDMA Cellular CH1013\_H\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/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, 353.7 mm  
 Reference Value = 0.082 A/m; Power Drift = -0.069 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.208 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.208 M4</b>	Grid 2 <b>0.156 M4</b>	Grid 3 <b>0.091 M4</b>
Grid 4 <b>0.148 M4</b>	Grid 5 <b>0.111 M4</b>	Grid 6 <b>0.073 M4</b>
Grid 7 <b>0.198 M4</b>	Grid 8 <b>0.139 M4</b>	Grid 9 <b>0.083 M4</b>



0 dB = 0.208A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 7:29:32 PM

**HAC\_CDMA Cellular CH1013\_H\_Sample2 with battery#1**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.135 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.073 A/m; Power Drift = 0.166 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.178 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.178 M4</b>	Grid 2 <b>0.135 M4</b>	Grid 3 <b>0.078 M4</b>
Grid 4 <b>0.135 M4</b>	Grid 5 <b>0.099 M4</b>	Grid 6 <b>0.065 M4</b>
Grid 7 <b>0.171 M4</b>	Grid 8 <b>0.126 M4</b>	Grid 9 <b>0.074 M4</b>



0 dB = 0.178A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 6:46:39 PM

**HAC\_CDMA Cellular CH1013\_H\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

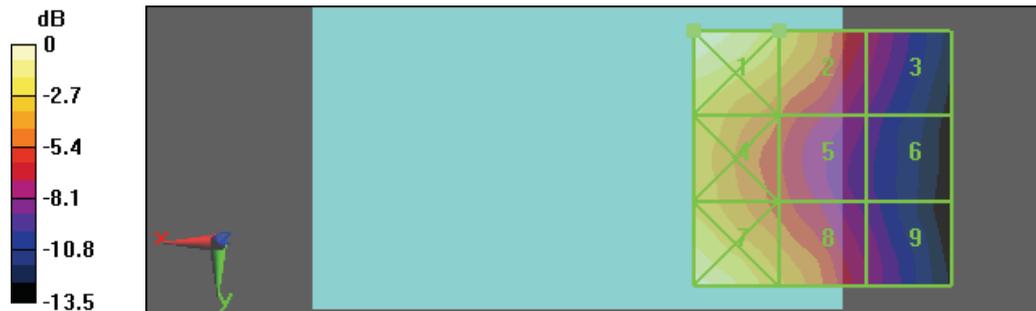
Maximum value of peak Total field = 0.140 A/m  
 Probe Modulation Factor = 0.990  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.074 A/m; Power Drift = -0.053 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.188 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.188 M4</b>	Grid 2 <b>0.140 M4</b>	Grid 3 <b>0.082 M4</b>
Grid 4 <b>0.141 M4</b>	Grid 5 <b>0.103 M4</b>	Grid 6 <b>0.067 M4</b>
Grid 7 <b>0.179 M4</b>	Grid 8 <b>0.128 M4</b>	Grid 9 <b>0.075 M4</b>



0 dB = 0.188A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 6:06:11 PM

**HAC\_CDMA Cellular CH384\_H\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

Maximum value of peak Total field = 0.131 A/m  
 Probe Modulation Factor = 0.990  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.070 A/m; Power Drift = 0.040 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.177 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.177 M4</b>	Grid 2 <b>0.131 M4</b>	Grid 3 <b>0.076 M4</b>
Grid 4 <b>0.132 M4</b>	Grid 5 <b>0.097 M4</b>	Grid 6 <b>0.064 M4</b>
Grid 7 <b>0.170 M4</b>	Grid 8 <b>0.122 M4</b>	Grid 9 <b>0.070 M4</b>



0 dB = 0.177A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 6:39:10 PM

**HAC\_CDMA Cellular CH384\_H\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

Maximum value of peak Total field = 0.133 A/m  
 Probe Modulation Factor = 0.990  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.069 A/m; Power Drift = -0.153 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.182 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.182 M4</b>	Grid 2 <b>0.133 M4</b>	Grid 3 <b>0.075 M4</b>
Grid 4 <b>0.133 M4</b>	Grid 5 <b>0.096 M4</b>	Grid 6 <b>0.061 M4</b>
Grid 7 <b>0.166 M4</b>	Grid 8 <b>0.121 M4</b>	Grid 9 <b>0.069 M4</b>



0 dB = 0.182A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 6:22:57 PM

**HAC\_CDMA Cellular CH777\_H\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

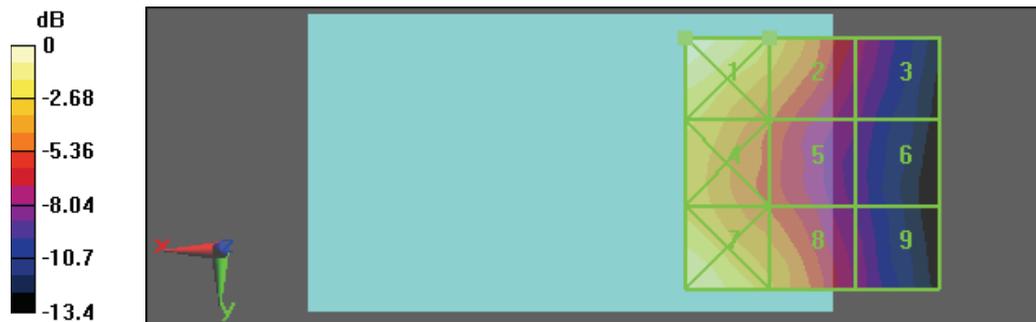
Maximum value of peak Total field = 0.131 A/m  
 Probe Modulation Factor = 0.990  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.071 A/m; Power Drift = 0.068 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.177 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.177 M4</b>	Grid 2 <b>0.131 M4</b>	Grid 3 <b>0.076 M4</b>
Grid 4 <b>0.133 M4</b>	Grid 5 <b>0.098 M4</b>	Grid 6 <b>0.065 M4</b>
Grid 7 <b>0.163 M4</b>	Grid 8 <b>0.122 M4</b>	Grid 9 <b>0.069 M4</b>



0 dB = 0.177A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 6:52:29 PM

**HAC\_CDMA Cellular CH777\_H\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

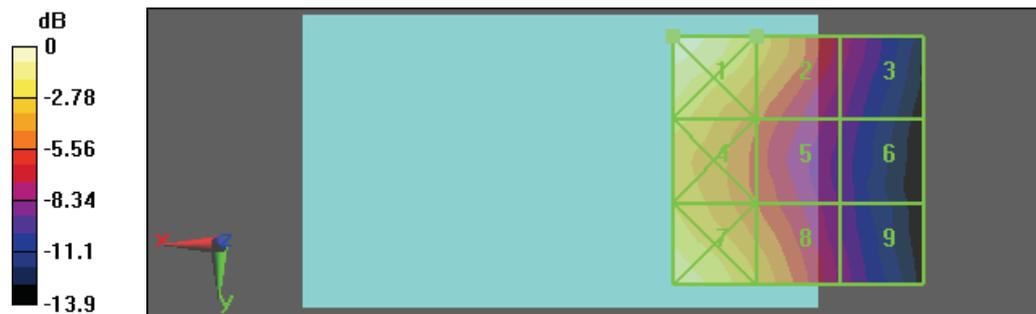
Maximum value of peak Total field = 0.128 A/m  
 Probe Modulation Factor = 0.990  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.072 A/m; Power Drift = -0.020 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.178 A/m  
 H Category: M4  
 Location: 25, -25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.178 M4</b>	Grid 2 <b>0.128 M4</b>	Grid 3 <b>0.073 M4</b>
Grid 4 <b>0.136 M4</b>	Grid 5 <b>0.099 M4</b>	Grid 6 <b>0.063 M4</b>
Grid 7 <b>0.163 M4</b>	Grid 8 <b>0.118 M4</b>	Grid 9 <b>0.067 M4</b>



0 dB = 0.178A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/24/2011 12:48:07 AM

**HAC\_CDMA PCS CH25\_H\_Sample1 with battery#1**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

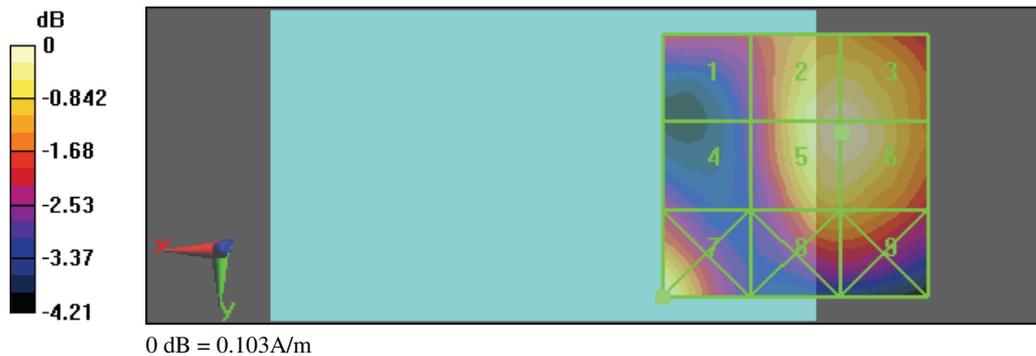
**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.102 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.110 A/m; Power Drift = -0.013 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 0.103 A/m  
 H Category: M4  
 Location: 25, 25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.083 M4</b>	Grid 2 <b>0.101 M4</b>	Grid 3 <b>0.101 M4</b>
Grid 4 <b>0.079 M4</b>	Grid 5 <b>0.102 M4</b>	Grid 6 <b>0.102 M4</b>
Grid 7 <b>0.103 M4</b>	Grid 8 <b>0.093 M4</b>	Grid 9 <b>0.092 M4</b>





Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 6:47:19 PM

**HAC\_CDMA PCS CH25\_H\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

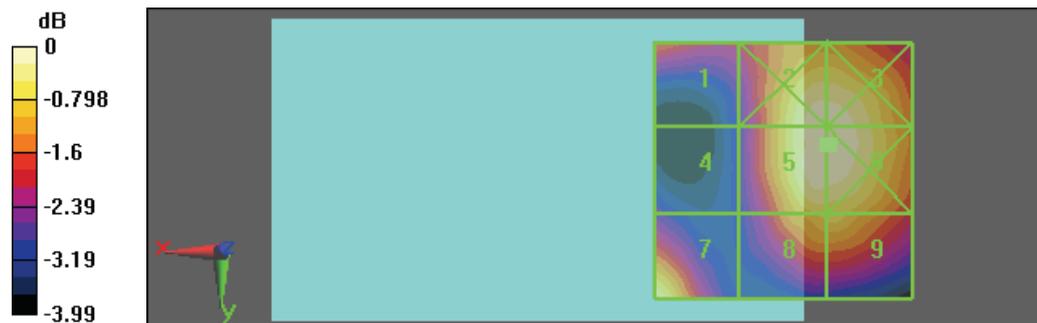
Maximum value of peak Total field = 0.103 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.113 A/m; Power Drift = 0.000635 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.103 A/m  
 H Category: M4  
 Location: -9, -5, 368.7 mm

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
<b>0.088 M4</b>	<b>0.102 M4</b>	<b>0.102 M4</b>
Grid 4	Grid 5	Grid 6
<b>0.076 M4</b>	<b>0.103 M4</b>	<b>0.103 M4</b>
Grid 7	Grid 8	Grid 9
<b>0.102 M4</b>	<b>0.095 M4</b>	<b>0.096 M4</b>



0 dB = 0.103A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 7:35:14 PM

**HAC\_CDMA PCS CH25\_H\_Sample2 with battery#1**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

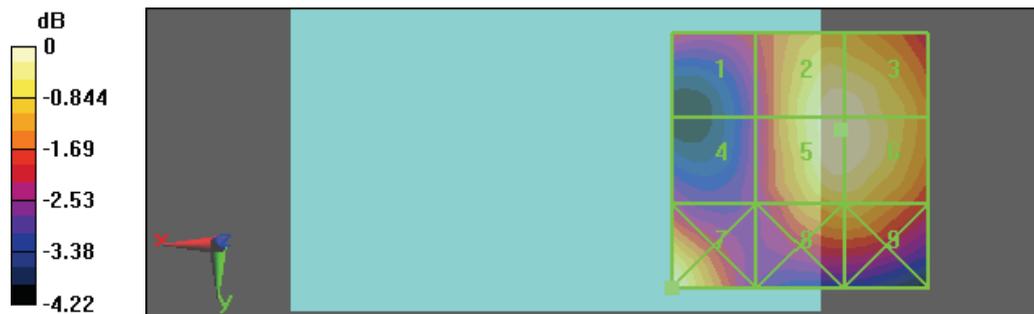
Maximum value of peak Total field = 0.108 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.117 A/m; Power Drift = -0.000992 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.108 A/m  
 H Category: M4  
 Location: 25, 25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.087 M4</b>	Grid 2 <b>0.107 M4</b>	Grid 3 <b>0.107 M4</b>
Grid 4 <b>0.083 M4</b>	Grid 5 <b>0.108 M4</b>	Grid 6 <b>0.108 M4</b>
Grid 7 <b>0.108 M4</b>	Grid 8 <b>0.099 M4</b>	Grid 9 <b>0.099 M4</b>



0 dB = 0.108A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 7:02:16 PM

**HAC\_CDMA PCS CH25\_H\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.109 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.119 A/m; Power Drift = 0.039 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.109 A/m  
 H Category: M4  
 Location: 25, 25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.090 M4</b>	Grid 2 <b>0.108 M4</b>	Grid 3 <b>0.108 M4</b>
Grid 4 <b>0.082 M4</b>	Grid 5 <b>0.109 M4</b>	Grid 6 <b>0.108 M4</b>
Grid 7 <b>0.109 M4</b>	Grid 8 <b>0.100 M4</b>	Grid 9 <b>0.100 M4</b>



0 dB = 0.109A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 6:52:54 PM

**HAC\_CDMA PCS CH600\_H\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

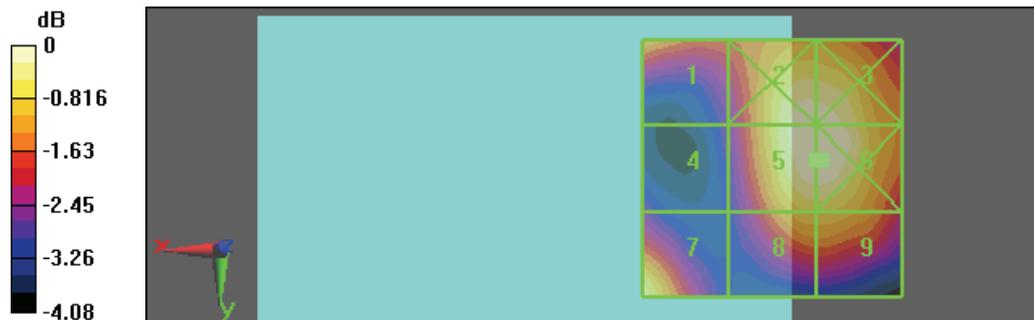
**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.096 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.105 A/m; Power Drift = -0.068 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 0.096 A/m  
 H Category: M4  
 Location: -9.5, -1.5, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.087 M4</b>	Grid 2 <b>0.095 M4</b>	Grid 3 <b>0.095 M4</b>
Grid 4 <b>0.071 M4</b>	Grid 5 <b>0.096 M4</b>	Grid 6 <b>0.096 M4</b>
Grid 7 <b>0.094 M4</b>	Grid 8 <b>0.088 M4</b>	Grid 9 <b>0.088 M4</b>



0 dB = 0.096A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 7:08:08 PM

**HAC\_CDMA PCS CH600\_H\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm**

Maximum value of peak Total field = 0.106 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.116 A/m; Power Drift = -0.041 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.109 A/m  
 H Category: M4  
 Location: 25, 25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.093 M4</b>	Grid 2 <b>0.105 M4</b>	Grid 3 <b>0.105 M4</b>
Grid 4 <b>0.080 M4</b>	Grid 5 <b>0.106 M4</b>	Grid 6 <b>0.106 M4</b>
Grid 7 <b>0.109 M4</b>	Grid 8 <b>0.097 M4</b>	Grid 9 <b>0.097 M4</b>



0 dB = 0.109A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/23/2011 7:02:12 PM

**HAC\_CDMA PCS CH1175\_H\_Sample1 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

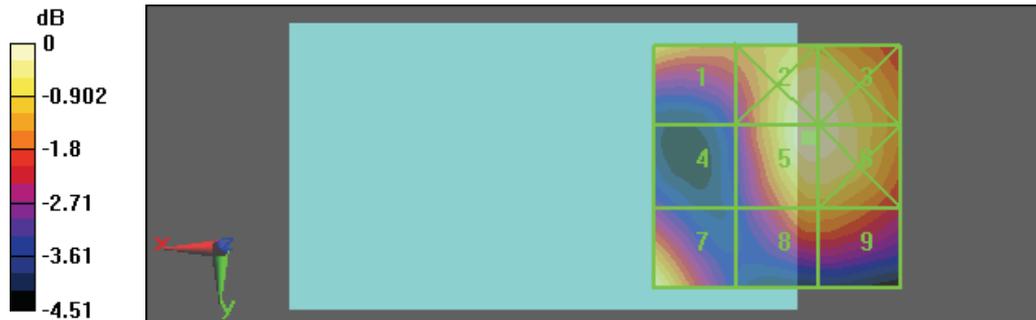
**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.095 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.102 A/m; Power Drift = -0.015 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**  
 Total = 0.095 A/m  
 H Category: M4  
 Location: -6.5, -6, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.088 M4</b>	Grid 2 <b>0.094 M4</b>	Grid 3 <b>0.094 M4</b>
Grid 4 <b>0.068 M4</b>	Grid 5 <b>0.095 M4</b>	Grid 6 <b>0.094 M4</b>
Grid 7 <b>0.093 M4</b>	Grid 8 <b>0.084 M4</b>	Grid 9 <b>0.084 M4</b>



0 dB = 0.095A/m



Test Laboratory: A Test Lab Techno Corp.

Date/Time: 6/29/2011 7:14:11 PM

**HAC\_CDMA PCS CH1175\_H\_Sample2 with battery#2**

**DUT: PG76200; Type: Smartphone; FCC ID: NM8PG76200**

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>  
 Phantom section: H Device Section  
 Measurement Standard: DASYS (IEEE/IEC)

DASY5 Configuration:

- Probe: H3DV6 - SN6076; ; Calibrated: 8/23/2010
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn779; Calibrated: 1/31/2011
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1038
- Measurement SW: DASYS, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

**H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):** Measurement grid: dx=5mm, dy=5mm

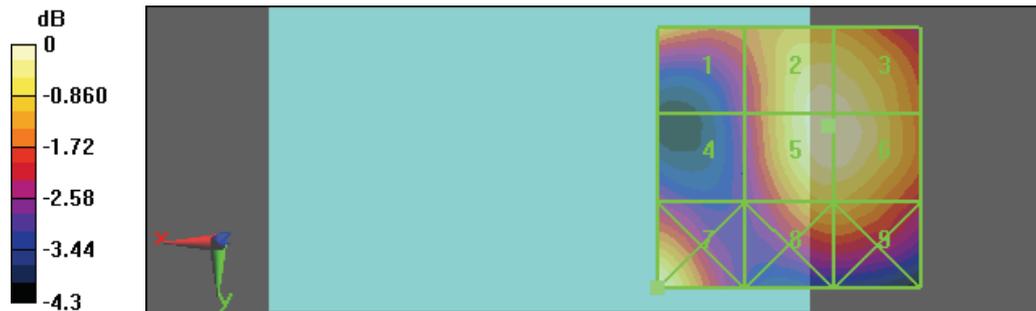
Maximum value of peak Total field = 0.098 A/m  
 Probe Modulation Factor = 0.970  
 Device Reference Point: 0, 0, 353.7 mm  
 Reference Value = 0.108 A/m; Power Drift = -0.050 dB  
**Hearing Aid Near-Field Category: M4 (AWF 0 dB)**

**Cursor:**

Total = 0.099 A/m  
 H Category: M4  
 Location: 25, 25, 368.7 mm

Peak H-field in A/m

Grid 1 <b>0.090 M4</b>	Grid 2 <b>0.098 M4</b>	Grid 3 <b>0.098 M4</b>
Grid 4 <b>0.074 M4</b>	Grid 5 <b>0.098 M4</b>	Grid 6 <b>0.098 M4</b>
Grid 7 <b>0.099 M4</b>	Grid 8 <b>0.090 M4</b>	Grid 9 <b>0.090 M4</b>



0 dB = 0.099A/m



## ***Appendix D - Calibration***

All of the instruments Calibration information are listed below.

- Dipole \_ CD835V3 SN:1017 Calibration No.CD835V3-1017\_Jul10
- Dipole \_ CD1880V3 SN:1036 Calibration No.CD1880V3-1036\_Jul10
- Probe \_ ER3DV6R SN: 2256 Calibration No. ER3-2256\_Aug10
- Probe \_ H3DV6 SN: 6076 Calibration No. H3-6076\_ Aug10
- DAE \_ DAE4 SN:779 Calibration No.DAE4-779\_ Jan11



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



**S** Schweizerischer Kalibrierdienst  
**S** 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 **ATL (Auden)**

Certificate No: **CD835V3-1017\_Jul10**

### CALIBRATION CERTIFICATE

Object **CD835V3 - SN: 1017**

Calibration procedure(s) **QA CAL-20.v5  
Calibration procedure for dipoles in air**

Calibration date: **July 13, 2010**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	22-Jan-10 (No. DAE4-781_Jan10)	Jan-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Network Analyzer HP 8753E	US37380585	18-Oct-01 (in house check Oct-09)	In house check: Oct-10
RF generator E4433B	MY 4100675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	
Approved by:	Fin Bornholt	Technical Director	

Issued: July 15, 2010

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

Certificate No: CD835V3-1017\_Jul10

Page 1 of 6

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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**

#### References

- [1] ANSI-C63.19-2006  
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [2] ANSI-C63.19-2007  
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

#### Methods Applied and Interpretation of Parameters:

- *Coordinate System:* y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1, 2], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- *Measurement Conditions:* Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- *Antenna Positioning:* The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- *Feed Point Impedance and Return Loss:* These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminated by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- *E-field distribution:* E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1, 2], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- *H-field distribution:* H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.



## 1 Measurement Conditions

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

<b>DASY Version</b>	DASY5	V52.2 B0
<b>DASY PP Version</b>	SEMCAD X	V14.2 B2
<b>Phantom</b>	HAC Test Arch	SD HAC P01 BA, #1070
<b>Distance Dipole Top - Probe Center</b>	10 mm	
<b>Scan resolution</b>	dx, dy = 5 mm	area = 20 x 180 mm
<b>Frequency</b>	<b>835 MHz ± 1 MHz</b>	
<b>Forward power at dipole connector</b>	20.0 dBm = 100mW	
<b>Input power drift</b>	< 0.05 dB	

## 2 Maximum Field values

<b>H-field 10 mm above dipole surface</b>	condition	<b>interpolated maximum</b>
Maximum measured	100 mW forward power	<b>0.457 A/m</b>

Uncertainty for H-field measurement: 8.2% (k=2)

<b>E-field 10 mm above dipole surface</b>	condition	<b>Interpolated maximum</b>
Maximum measured above high end-	100 mW forward power	168.6 V/m
Maximum measured above low end	100 mW forward power	155.7 V/m
Averaged maximum above arm	100 mW forward power	<b>162.2 V/m</b>

Uncertainty for E-field measurement: 12.8% (k=2)

## 3 Appendix

### 3.1 Antenna Parameters

<b>Frequency</b>	<b>Return Loss</b>	<b>Impedance</b>
800 MHz	16.2 dB	( 42.3 – j12.1 ) Ohm
<b>835 MHz</b>	<b>28.6 dB</b>	<b>( 50.2 + j3.7 ) Ohm</b>
900 MHz	17.7 dB	( 56.1 – j12.6 ) Ohm
950 MHz	20.8 dB	( 45.5 + j7.5 ) Ohm
960 MHz	15.5 dB	( 51.3 + j17.2 ) Ohm

### 3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

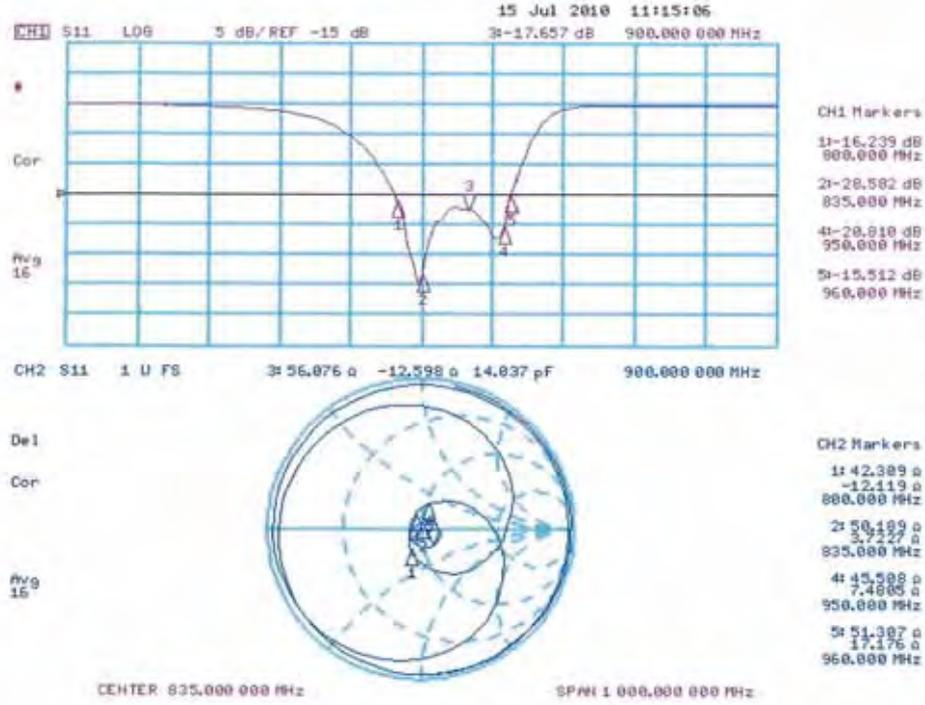
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.



### 3.3 Measurement Sheets

#### 3.3.1 Return Loss and Smith Chart



**3.3.2 DASY4 H-field Result**

Date/Time: 13.07.2010 18:17:07

Test Laboratory: SPEAG Lab2

**DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1017**

Communication System: CW; Communication System Band: CD835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: H3DV6 - SN6065; : Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685)

**Dipole H-Field measurement @ 835MHz/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 = 0.457 A/m

Probe Modulation Factor = 1

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.486 A/m; Power Drift = -9.15e-005 dB

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

Peak H-field in A/m

Grid 1 0.381 M4	Grid 2 0.397 M4	Grid 3 0.373 M4
Grid 4 0.431 M4	Grid 5 0.457 M4	Grid 6 0.435 M4
Grid 7 0.377 M4	Grid 8 0.403 M4	Grid 9 0.387 M4



0 dB = 0.457A/m

### 3.3.3 DASY4 E-field Result

Date/Time: 13.07.2010 12:42:14

Test Laboratory: SPEAG Lab2

**DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1017**

Communication System: CW; Communication System Band: CD835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685)

**Dipole E-Field measurement @ 835MHz/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 = 168.6 V/m

Probe Modulation Factor = 1

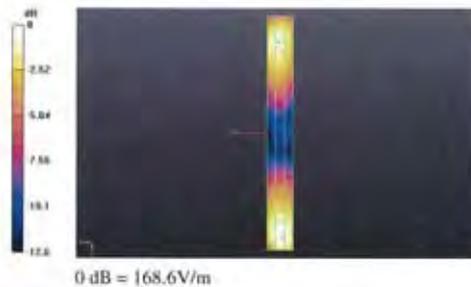
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 106.1 V/m; Power Drift = -0.050 dB

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

Peak E-field in V/m

Grid 1 154.5 M4	Grid 2 155.7 M4	Grid 3 147.4 M4
Grid 4 87.8 M4	Grid 5 89.1 M4	Grid 6 85.4 M4
Grid 7 157.6 M4	Grid 8 168.6 M4	Grid 9 166.9 M4





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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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 **ATL (Auden)**

Certificate No: **CD1880V3-1036\_Jul10**

### CALIBRATION CERTIFICATE

Object **CD1880V3 - SN: 1036**

Calibration procedure(s) **QA CAL-20.v5  
Calibration procedure for dipoles in air**

Calibration date: **July 13, 2010**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	22-Jan-10 (No. DAE4-781_Jan10)	Jan-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct-10
RF generator E4433B	MY 4100675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

Calibrated by: **Name: Mike Meili, Function: Laboratory Technician, Signature: [Signature]**

Approved by: **Name: Fin Bomholt, Function: Technical Director, Signature: [Signature]**

Issued: July 15, 2010

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

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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**

#### References

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

#### Methods Applied and Interpretation of Parameters:

- **Coordinate System:** y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- **Measurement Conditions:** Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- **Antenna Positioning:** The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole reference wire with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- **Feed Point Impedance and Return Loss:** These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminated by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- **E-field distribution:** E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- **H-field distribution:** H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

### 1. Measurement Conditions

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

DASY Version	DASY5	V52.2 B0
DASY PP Version	SEMCAD X	V14.2 B2
Phantom	HAC Test Arch	SD HAC P01 BA, #1070
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 90 mm
Frequency	<b>1880 MHz ± 1 MHz</b>	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

### 2. Maximum Field values

H-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured	100 mW forward power	<b>0.468 A/m</b>

Uncertainty for H-field measurement: 8.2% (k=2)

E-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured above high end	100 mW forward power	139.2 V/m
Maximum measured above low end	100 mW forward power	136.7 V/m
Averaged maximum above arm	100 mW forward power	<b>138.0 V/m</b>

Uncertainty for E-field measurement: 12.8% (k=2)

### 3. Appendix

#### 3.1 Antenna Parameters

Frequency	Return Loss	Impedance
1710 MHz	19.6 dB	( 50.2 + j10.6 ) Ohm
<b>1880 MHz</b>	<b>22.4 dB</b>	<b>( 52.1 + j7.5 ) Ohm</b>
1900 MHz	22.8 dB	( 54.1 + j6.3 ) Ohm
1950 MHz	31.1 dB	( 52.7 - j1.0 ) Ohm
2000 MHz	20.2 dB	( 41.3 + j2.0 ) Ohm

#### 3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

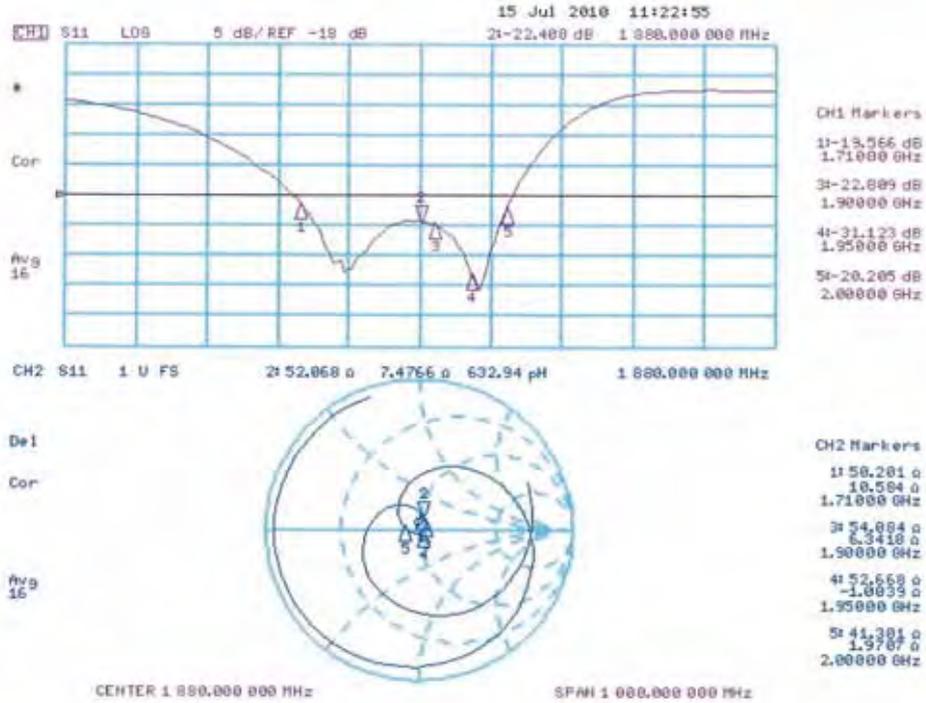
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.



### 3.3 Measurement Sheets

#### 3.3.1 Return Loss and Smith Chart



### 3.3.2 DASY4 H-Field Result

Date/Time: 13.07.2010 17:49:33

Test Laboratory: SPEAG Lab2

**DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1036**

Communication System: CW; Communication System Band: CD1880 (1880.0 MHz); Frequency: 1880 MHz;

Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685)

#### Dipole H-Field measurement @ 1880MHz/H 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 = 0.468 A/m

Probe Modulation Factor = 1

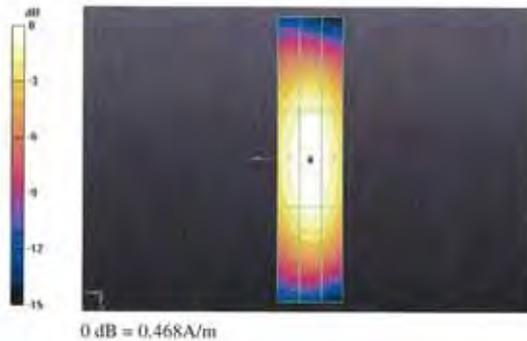
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.496 A/m; Power Drift = -0.00099 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.404	0.422	0.400
M2	M2	M2
Grid 4	Grid 5	Grid 6
0.447	0.468	0.446
M2	M2	M2
Grid 7	Grid 8	Grid 9
0.408	0.433	0.411
M2	M2	M2



### 3.3.3 DASY4 E-Field Result

Date/Time: 13.07.2010 14:56:29

Test Laboratory: SPEAG Lab2

**DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1036**

Communication System: CW; Communication System Band: CD1880 (1880.0 MHz); Frequency: 1880 MHz;

Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685)

#### Dipole E-Field measurement @ 1880MHz/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 = 139.2 V/m

Probe Modulation Factor = 1

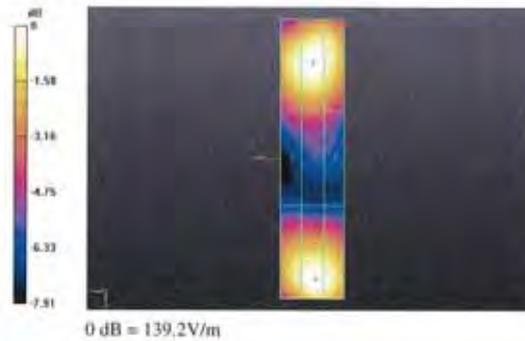
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 156.8 V/m; Power Drift = 0.043 dB

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

Peak E-field in V/m

Grid 1 132.8 M2	Grid 2 136.7 M2	Grid 3 133.9 M2
Grid 4 92.6 M3	Grid 5 95.1 M3	Grid 6 91.8 M3
Grid 7 130.6 M2	Grid 8 139.2 M2	Grid 9 137.4 M2



**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**

Client **ATL (Auden)**

Certificate No: **ER3-2256\_Aug10**

## CALIBRATION CERTIFICATE

Object **ER3DV6R - SN:2256**

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: **August 23, 2010**

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  $(22 \pm 3)^\circ\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ER3DV6	SN: 2328	3-Oct-09 (No. ER3-2328_Oct09)	Oct-10
DAE4	SN: 789	23-Dec-09 (No. DAE4-789_Dec09)	Dec-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8948C	US3642U01700	4-Aug-99 (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: Oct-10

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

Issued: August 24, 2010

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

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** 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:**

- a) 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>; VR<sub>x,y,z</sub>*: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *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).



ER3DV6R SN:2256

August 23, 2010

# Probe ER3DV6R

## SN:2256

Manufactured:	March 15, 2001
Last calibrated:	August 21, 2009
Recalibrated:	August 23, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)



ER3DV6R SN:2256

August 23, 2010

**DASY/EASY - Parameters of Probe: ER3DV6R SN:2256**

**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu V/(V/m)^2$ )	2.21	1.59	1.68	$\pm 10.1\%$
DCP (mV) <sup>a</sup>	94.2	93.8	101.1	

**Modulation Calibration Parameters**

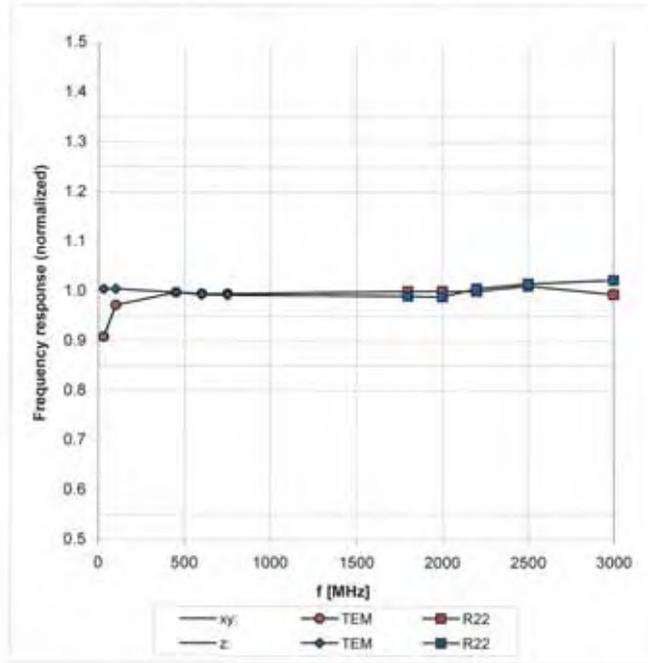
UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc <sup>e</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	$\pm 1.5\%$
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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

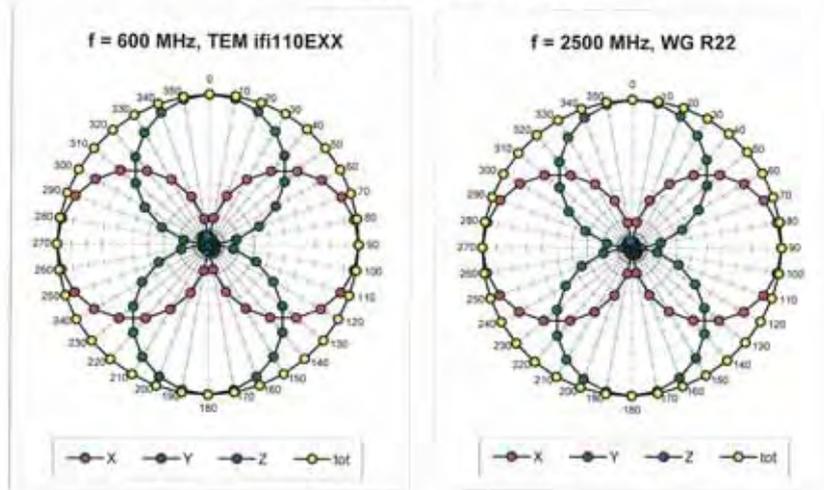
<sup>e</sup> Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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

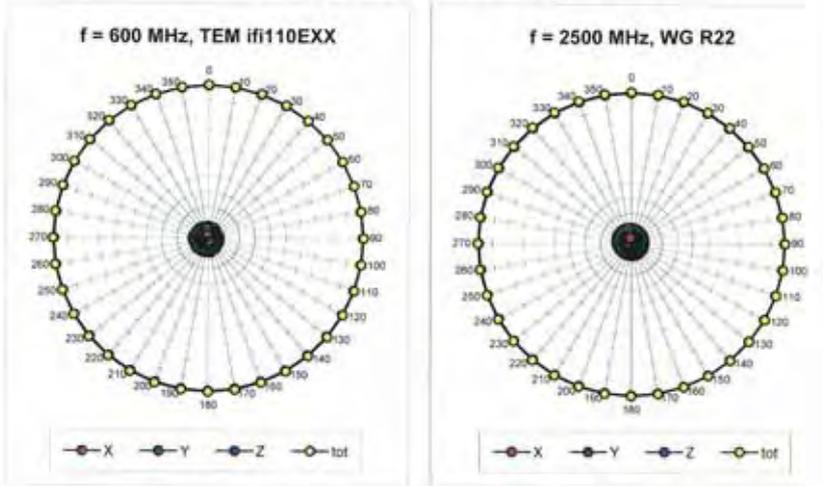


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

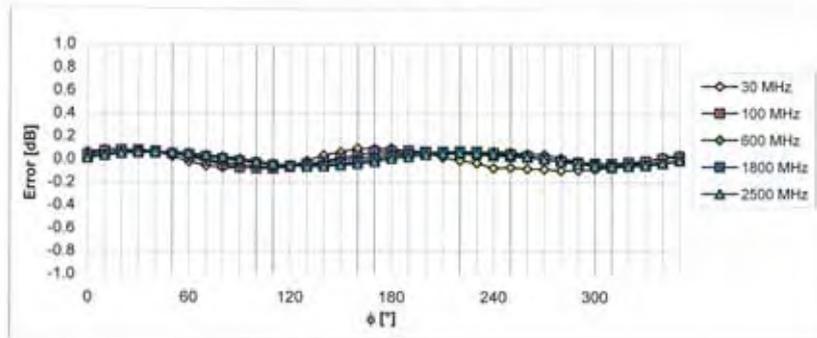
Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$



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

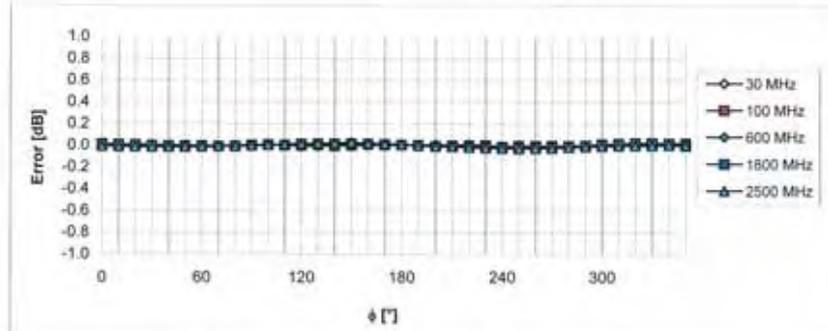


### Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$



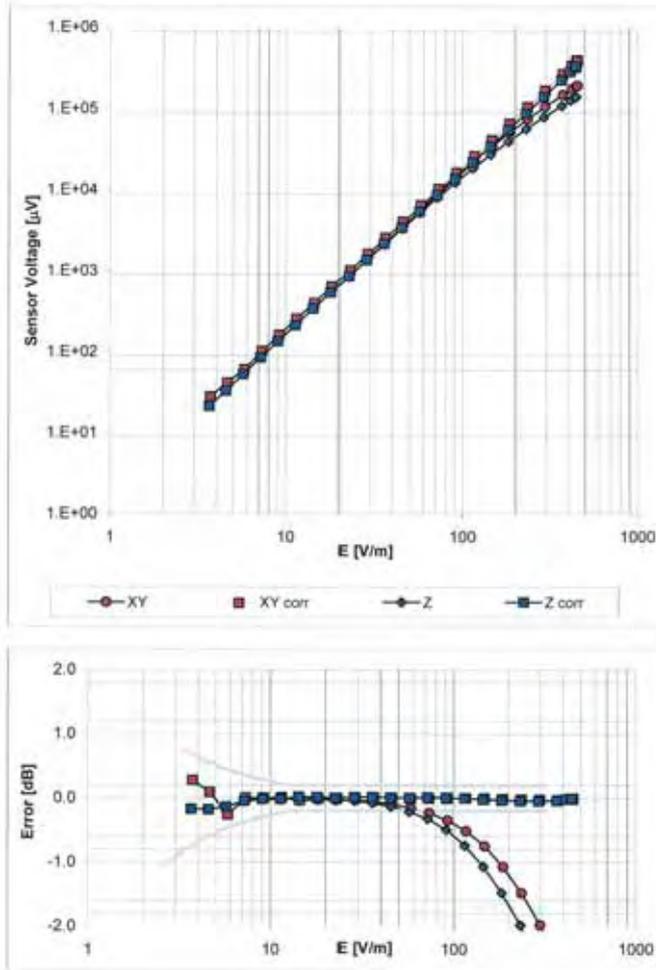
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

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



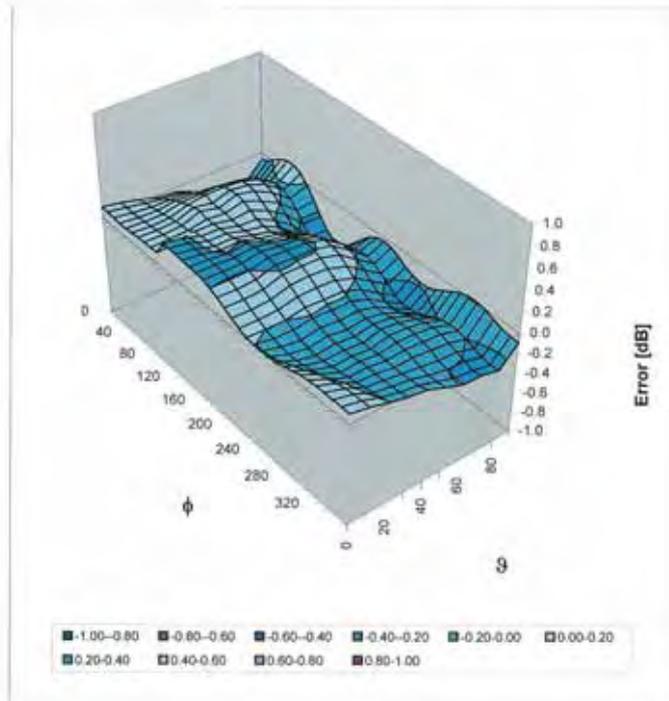
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

### Dynamic Range f(E-field) (Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

**Deviation from Isotropy in Air**  
**Error ( $\phi, \theta$ ),  $f = 900$  MHz**



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )



ER3DV6R SN:2256

August 23, 2010

### Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-244.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	8.0 mm
Probe Tip to Sensor X Calibration Point	2.5 mm
Probe Tip to Sensor Y Calibration Point	2.5 mm
Probe Tip to Sensor Z Calibration Point	2.5 mm



**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**

Client **ATL (Auden)**

Certificate No: **H3-6076\_Aug10**

### CALIBRATION CERTIFICATE

Object **H3DV6 - SN:6076**

Calibration procedure(s) **QA CAL-03.v5 and QA CAL-25.v2  
Calibration procedure for H-field probes optimized for close near field  
evaluations in air**

Calibration date: **August 23, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe H3DV6	SN: 6182	3-Oct-09 (No. H3-6182_Oct09)	Oct-10
DAE4	SN: 789	23-Dec-09 (No. DAE4-789_Dec09)	Dec-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (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: Oct-10

Calibrated by:	Name <b>Jeton Kastrati</b>	Function <b>Laboratory Technician</b>	Signature 
Approved by:	Name <b>Katja Pokovic</b>	Technical Manager	

Issued: August 24, 2010

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

**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:**

- a) 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).
- X, Y, Z(f)  $a_0 a_1 a_2 = X, Y, Z_{a_0 a_1 a_2}$  \* 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.
- Ax,y,z; Bx,y,z; Cx,y,z, VR<sub>x,y,z</sub>: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- 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 X<sub>a0a1a2</sub> (no uncertainty required).



H3DV6 SN:6076

August 23, 2010

# Probe H3DV6

## SN:6076

Manufactured:	October 2, 2000
Last calibrated:	August 19, 2009
Recalibrated:	August 23, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)



H3DV6 SN:6076

August 23, 2010

**DASY/EASY - Parameters of Probe: H3DV6 SN:6076**

**Basic Calibration Parameters**

		Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / $\sqrt{\mu V}$ )	a0	2.85E-3	2.72E-3	3.05E-3	± 5.1%
Norm (A/m / $\sqrt{\mu V}$ )	a1	-8.80E-5	-2.35E-4	-3.28E-5	± 5.1%
Norm (A/m / $\sqrt{\mu V}$ )	a2	3.38E-5	1.15E-5	-1.72E-4	± 5.1%
DCP (mV) <sup>A</sup>		92.1	81.7	78.1	

**Modulation Calibration Parameters**

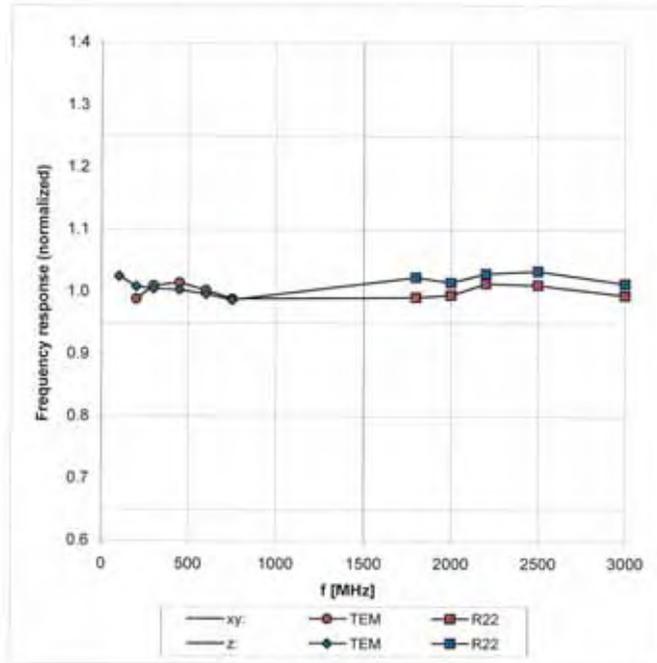
UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0,00	X	0.00	0.00	1.00	300	± 1.5 %
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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

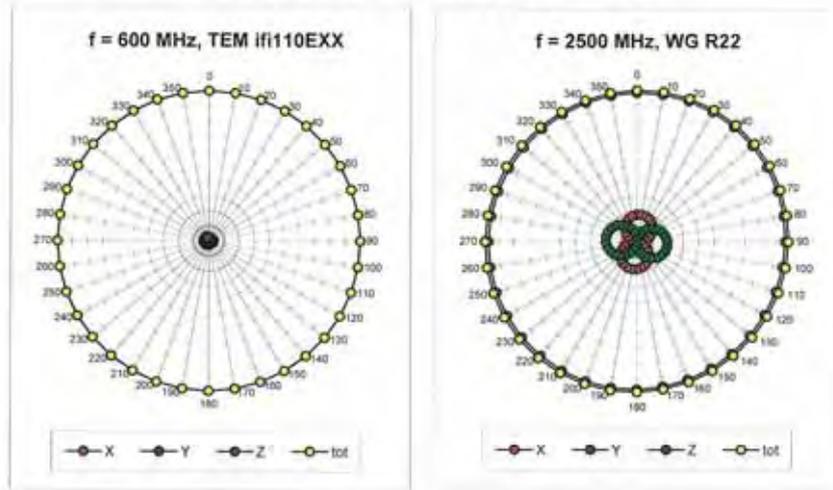
<sup>E</sup> Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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

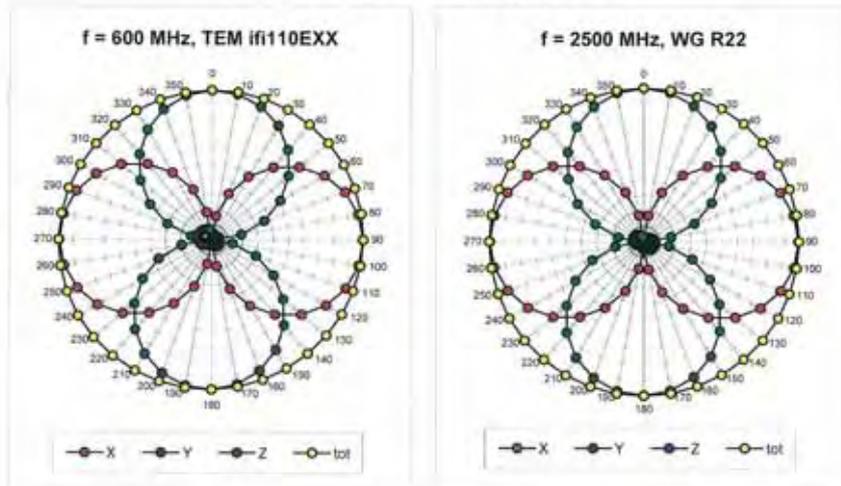


Uncertainty of Frequency Response of H-field:  $\pm 6.3\%$  (k=2)

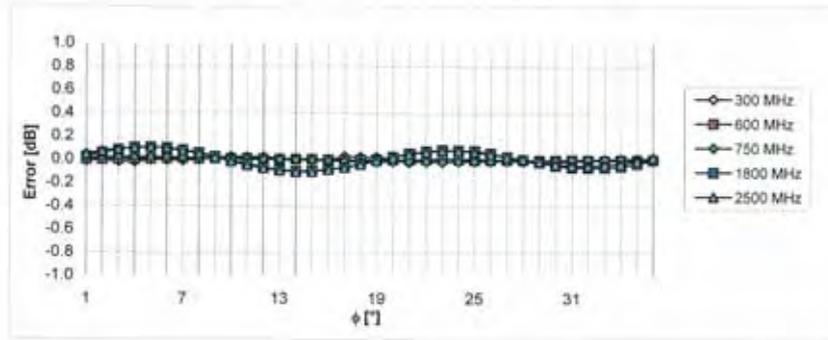
Receiving Pattern ( $\phi$ ),  $\vartheta = 90^\circ$



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

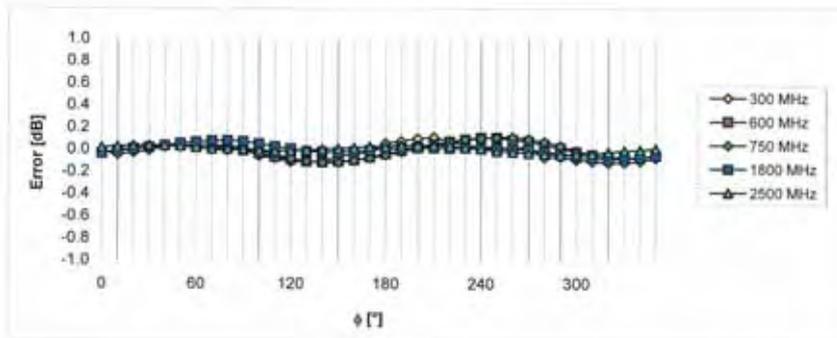


Receiving Pattern ( $\phi$ ),  $\vartheta = 90^\circ$



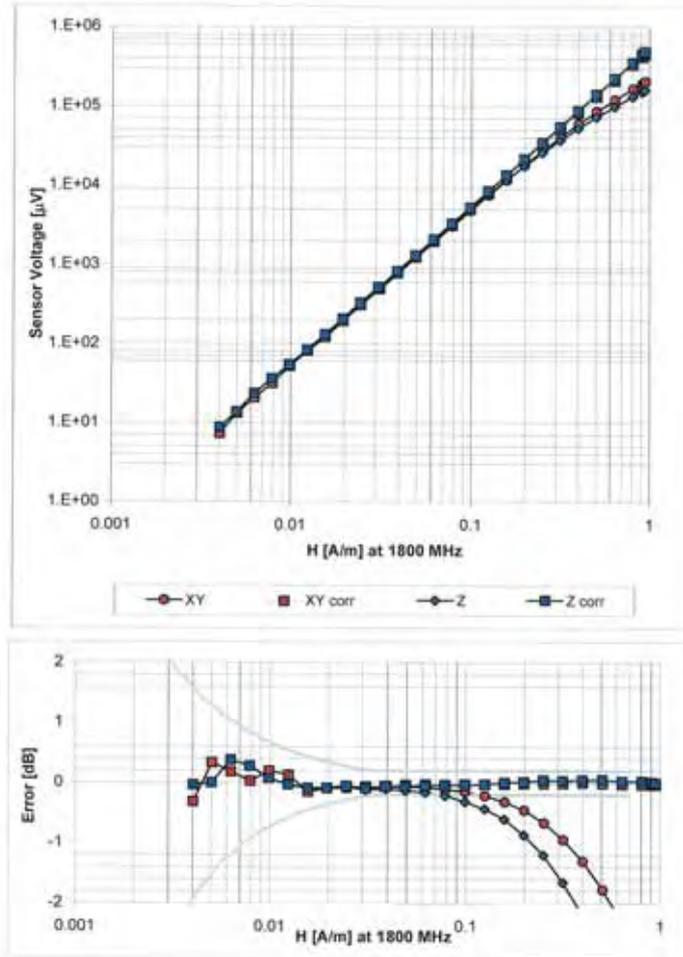
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

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



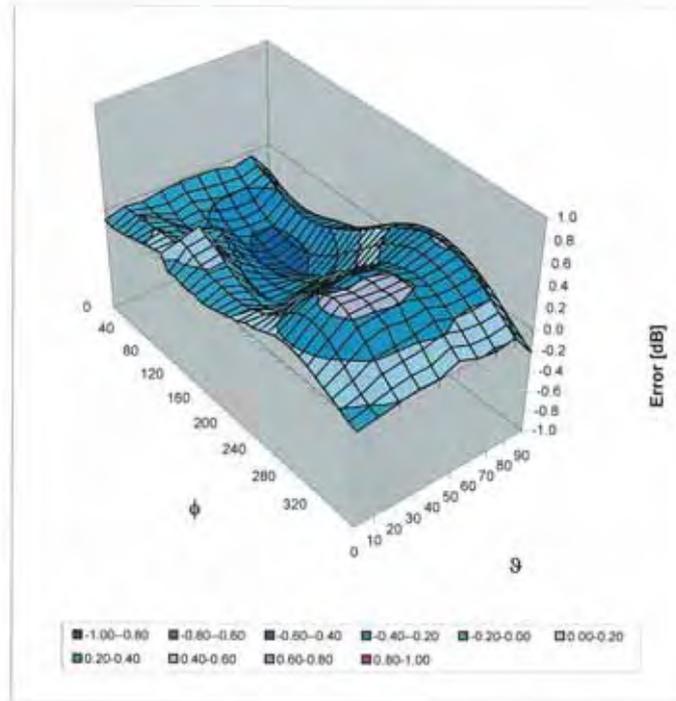
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

### Dynamic Range f(H-field) (Waveguide R22, f = 1800 MHz)



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

**Deviation from Isotropy in Air**  
**Error ( $\phi, \vartheta$ ),  $f = 900$  MHz**



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )



H3DV6 SN:6076

August 23, 2010

### Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	81.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	20 mm
Tip Diameter	6.0 mm
Probe Tip to Sensor X Calibration Point	3 mm
Probe Tip to Sensor Y Calibration Point	3 mm
Probe Tip to Sensor Z Calibration Point	3 mm

**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**

Client **ATL (Auden)**

Certificate No: **DAE4-779\_Jan11**

## CALIBRATION CERTIFICATE

Object **DAE4 - SD 000 D04 BJ - SN: 779**

Calibration procedure(s) **QA CAL-08.v22  
Calibration procedure for the data acquisition electronics (DAE)**

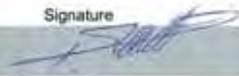
Calibration date: **January 31, 2011**

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
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V1.1	SE UMS 006 AB 1004	07-Jun-10 (in house check)	In house check: Jun-11

Calibrated by:	Name <b>Andrea Guntli</b>	Function <b>Technician</b>	Signature 
Approved by:	Name <b>Fin Bombholt</b>	Function <b>R&amp;D Director</b>	Signature 

Issued: January 31, 2011

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

**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

**DAE** data acquisition electronics  
**Connector angle** information used in DASY system to align probe sensor X to the robot coordinate system.

### Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
  - **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
  - **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
  - **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
  - **Input Offset Current:** Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - **Input resistance:** Typical value for information; DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
  - **Power consumption:** Typical value for information. Supply currents in various operating modes.



### DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 $\mu$ V, full range = -100...+300 mV

Low Range: 1LSB = 61nV, full range = -1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.517 $\pm$ 0.1% (k=2)	403.748 $\pm$ 0.1% (k=2)	403.972 $\pm$ 0.1% (k=2)
Low Range	3.96927 $\pm$ 0.7% (k=2)	3.98585 $\pm$ 0.7% (k=2)	3.99915 $\pm$ 0.7% (k=2)

### Connector Angle

Connector Angle to be used in DASY system	155.5 $\pm$ 1 $^{\circ}$
---	--------------------------

## Appendix

### 1. DC Voltage Linearity

High Range	Reading ( $\mu\text{V}$ )	Difference ( $\mu\text{V}$ )	Error (%)
Channel X + Input	200001.8	6.19	0.00
Channel X + Input	20003.75	4.25	0.02
Channel X - Input	-19996.56	3.04	-0.02
Channel Y + Input	200005.0	0.90	0.00
Channel Y + Input	20000.78	1.38	0.01
Channel Y - Input	-19996.43	2.97	-0.01
Channel Z + Input	200002.2	-1.15	-0.00
Channel Z + Input	19999.59	0.19	0.00
Channel Z - Input	-19995.05	4.35	-0.02

Low Range	Reading ( $\mu\text{V}$ )	Difference ( $\mu\text{V}$ )	Error (%)
Channel X + Input	2000.4	0.25	0.01
Channel X + Input	200.27	0.37	0.18
Channel X - Input	-199.08	1.12	-0.56
Channel Y + Input	2000.1	0.19	0.01
Channel Y + Input	199.01	-0.89	-0.45
Channel Y - Input	-199.30	0.50	-0.25
Channel Z + Input	1999.6	-0.40	-0.02
Channel Z + Input	199.22	-0.88	-0.44
Channel Z - Input	-200.27	-0.37	0.19

### 2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading ( $\mu\text{V}$ )	Low Range Average Reading ( $\mu\text{V}$ )
Channel X	200	-3.66	-5.39
	-200	5.82	4.90
Channel Y	200	13.39	13.58
	-200	-14.98	-15.16
Channel Z	200	2.20	2.53
	-200	-4.84	-4.61

### 3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X ( $\mu\text{V}$ )	Channel Y ( $\mu\text{V}$ )	Channel Z ( $\mu\text{V}$ )
Channel X	200	-	1.33	-0.57
Channel Y	200	1.97	-	3.29
Channel Z	200	1.19	-0.28	-

#### 4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15613	15134
Channel Y	15831	16218
Channel Z	16150	17743

#### 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10M $\Omega$

	Average ( $\mu$ V)	min. Offset ( $\mu$ V)	max. Offset ( $\mu$ V)	Std. Deviation ( $\mu$ V)
Channel X	-0.26	-1.03	0.79	0.42
Channel Y	0.52	-1.04	2.07	0.58
Channel Z	-2.22	-3.25	-0.85	0.44

#### 6. Input Offset Current

Nominal input circuitry offset current on all channels: <25fA

#### 7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

#### 8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

#### 9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9



## Appendix E - Uncertainty

<b>HAC Uncertainty Budget</b> According to NSIC63.19 [1], [2]							
Error Description	Uncertainty value	Prob. Dist.	Div.	(ci) E	(ci) H	Std. Unc. E	Std. Unc. H
<b>Measurement System</b>							
Probe Calibration	±5.1%	N	1	1	1	±5.1%	±5.1%
Axial Isotropy	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%
Sensor Displacement	±16.5%	R	$\sqrt{3}$	1	0.145	±9.5%	±1.4%
Test Arch	±7.2%	R	$\sqrt{3}$	1	0	±4.02%	±0.0%
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%
Probe modulation Factor	±15.0%	R	$\sqrt{3}$	1	1	±8.7%	±8.7%
Scaling to Peak Envelope Power	±0.0%	R	$\sqrt{3}$	1	1	±0.0%	±0.0%
System Detection Limit	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%
Response Time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%
Integration Time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%
RF Ambient Conditions	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%
RF Reflections	±12.0%	R	$\sqrt{3}$	1	1	±6.9%	±6.9%
Probe Positioner	±1.2%	R	$\sqrt{3}$	1	0.67	±0.7%	±0.5%
Probe Positioning	±4.7%	R	$\sqrt{3}$	1	0.67	±2.7%	±1.8%
Extrap. and Interpolation	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
<b>Test Sample Related</b>							
Device Positioning Vertical	±4.7%	R	$\sqrt{3}$	1	0.67	±2.7%	±1.8%
Device Positioning Lateral	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
Device Holder and Phantom	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%
Power Drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%
<b>Phantom and Setup Related</b>							
Phantom Thickness	±2.4%	R	$\sqrt{3}$	1	0.67	±1.4%	±0.9%
<b>Combined Std. Uncertainty</b>		RSS				±17.5%	±13.8%
<b>Expanded Std. Uncertainty on Power</b>		K=2				±35.0%	±27.6%
<b>Expanded Std. Uncertainty on Field</b>						±17.5%	±13.8%