HAC TEST REPORT

Test Item: Summary Result HAC Category = M3

REPORT NO.: HA970708L06

MODEL NO.: RAPH500

RECEIVED: Jul. 09, 2008

TESTED: Jul. 16, 2008

ISSUED: Aug. 12, 2008

APPLICANT: HTC Corporation

ADDRESS: No. 23, Xinghua Rd., Taoyuan City, 330, Taiwan, R.O.C.

ISSUED BY: Advance Data Technology Corporation

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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1. CERTIFICATION

PRODUCT : Pocket PC Phone
MODEL NO. : RAPH500
APPLICANT : HTC Corporation
TESTED : Jul. 16, 2008
TEST SAMPLE : Engineering sample
STANDARDS : **FCC Part 20.19**
ANSI PC63.19 2006
TEST ITEM: RF emissions

The above equipment (model no: RAPH500) have been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's characteristics under the conditions specified in this report.

PREPARED BY : Andrea Hsia , **DATE:** Aug. 12, 2008
Andrea Hsia / Specialist

TECHNICAL ACCEPTANCE : James Fan , **DATE:** Aug. 12, 2008
Responsible for RF
James Fan / Engineer

APPROVED BY : Gary Chang , **DATE:** Aug. 12, 2008
Gary Chang / Assistant Manager

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Wireless 802.11b/g and Bluetooth channel frequencies are only documented to demonstrate compliance testing for composite functions in the CDMA 850 and 1900 bands.

PRODUCT	Pocket PC Phone	
MODEL NO.	RAPH500	
FCC ID	NM8RAPH500	
POWER SUPPLY	3.7Vdc from rechargeable lithium battery 5.0Vdc from power adapter 5.0Vdc from host equipment	
CLASSIFICATION	Portable device, production unit	
MODULATION TYPE	OQPSK, HPSK	
FREQUENCY RANGE	824MHz ~ 849MHz (CDMA850) 1850MHz ~ 1910MHz (CDMA1900)	
CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER	CDMA850: 24.35dBm / 824.70MHz for channel 1013 24.40dBm / 836.50MHz for channel 384 24.57dBm / 848.30MHz for channel 777 CDMA1900: 24.71dBm / 1851.25MHz for channel 25 24.62dBm / 1880.00MHz for channel 600 24.51dBm / 1908.75MHz for channel 1175	
HAC RATE CATEGORY	M3	
ANTENNA TYPE	PIFA antenna	
MAX. ANTENNA GAIN	**850MHz:** 0dBi	**1900MHz:** 1dBi
DATA CABLE	1.25m shielded USB cable without core 0.10m shielded 4-in-1 cable without core	
I/O PORTS	Refer to user's manual	
ACCESSORY DEVICES	Adapter, Battery, Earphone (Brand: hTC, model: HS S300, 1.9m)	

NOTE:

1. The communicated functions of EUT listed as below:

		850MHz	1900MHz	
3G	CDMA	V	V	With WLAN 802.11b/g + BT 2.0 with EDR + AGPS
	1*EVDO	V	V	
	1*RTT	V	V	
	IS-95A/B	V	V	

2. The EUT has lithium battery listed as below:

BRAND:	hTC
MODEL:	DIAM171
RATING:	3.7Vdc, 1340mAh

3. The EUT was operated with following power adapter:

BRAND:	hTC
MODEL:	TC P300
INPUT:	100-240Vac, 0.2A, 50-60Hz
OUTPUT:	5Vdc, 1A
POWER LINE:	1.25m non-shielded cable without core

4. Refer to following table for MEID no.:

MEID NO.
A1000007******

5. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

2.2 DESCRIPTIONOF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
1	Universal Radio Communication Tester	R&S	CMU200	101372	Nov. 25, 2008

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

NOTE: All power cords of the above support units are non shielded (1.8m).

2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturer, this product must comply with the requirements of the following standards:

FCC Part 20.19

ANSI PC63.19 – 2006

All test items have been performed and recorded as per the above standards.

3. GENERAL INFORMATION OF THE DASY4 SYSTEM

3.1. GENERAL INFORMATION OF TEST EQUIPMENT

DASY4 (software 4.7 Build 53) consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY4 software defined. The DASY4 software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

ER3DV6 E-FIELD PROBE

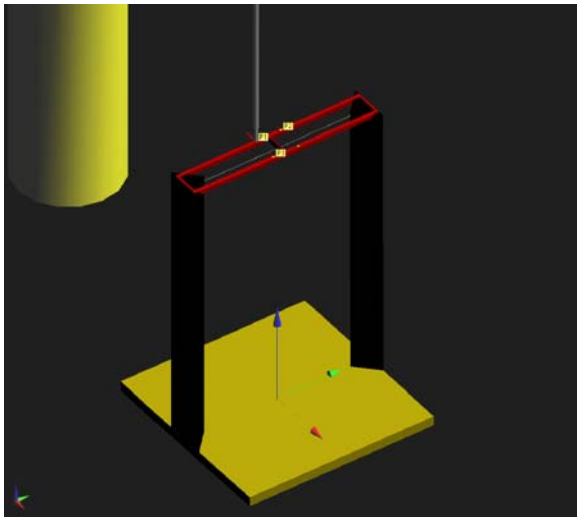
CONSTRUCTION	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges
CALIBRATION	In air from 100MHz to 3.0GHz (absolute accuracy ± 6.0%, k = 2)
FREQUENCY	100MHz to > 6GHz; Linearity: ± 0.2dB (100MHz to 3GHz)
DIRECTIVITY	± 0.2dB in air (rotation around probe axis) ± 0.4dB in air (rotation normal to probe axis)
DYNAMIC RANGE	2V/m to > 1000V/m (M3 or better device readings fall well below diode compression point) Linearity: ± 0.2dB
DIMENSIONS	Overall length: 330mm (Tip: 16mm)
	Tip diameter: 8mm (Body: 12mm)
	Distance from probe tip to dipole centers: 2.5mm

H3DV6 H-FIELD PROBE

CONSTRUCTION	Three concentric loop sensors with 3.8mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges
FREQUENCY	200MHz to 3GHz (absolute accuracy ± 6.0%, k = 2); Output linearized
DIRECTIVITY	± 0.25dB (spherical isotropy error)
DYNAMIC RANGE	10mA/m to 2A/m at 1GHz (M3 or better device readings fall well below diode compression point)
DIMENSIONS	Overall length: 330mm (Tip: 40mm)
	Tip diameter: 6mm (Body: 12mm)
	Distance from probe tip to dipole centers: 3mm
E-FIELD INTERFERENCE	< 10% at 3GHz (for plane wave)

NOTE: The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX D” for the Calibration Certification Report.

HAC ARCH



DIMENSIONS 370 x 370 x 370mm

SYSTEM VALIDATION KITS:

CD835V3

Frequency Band: 800 ~ 960MHz (free space)
Return Loss: > 15dB
Calibrated at: 835MHz
Power Capability: 50W continuous
Length & Height: 166 x 330mm

CD1880V3

Frequency Band: 1710 ~ 2000MHz (free space)
Return Loss: > 18dB
Calibrated at: 1880MHz
Power Capability: 50W continuous
Length & Height: 80.8 x 330mm

DEVICE HOLDER

CONSTRUCTION Supports accurate and reliable positioning of any phone effect on near field <+/- 0.5dB

DATA ACQUISITION ELECTRONICS (DAE)

CONSTRUCTION

The data acquisition electronics (DAE3) consists of a highly sensitive electrometer grade preamplifier with auto-zeroing, a channel and gain-switching multiplex, a fast 16 bit AD converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The mechanical probe is mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.

3.2. TEST EQUIPMENT LIST

ITEM	NAME	BAND	TYPE	SERIES NO.	CALIBRATED UNTIL
1	SAM Phantom	S & P	SD HAC P01 BA	1034	NA
2	Robot Positioner	Staubli Unimation	NA	NA	NA
3	Signal Generator	Agilent	E8257C	MY43320668	Dec. 25, 2008
4	E-Field Probe	Speag	ER3DV6	2293	Jan. 22, 2009
5	H-Field Probe	Speag	H3DV6	6124	Jan. 22, 2009
6	DAE	Speag	DAE3 V1	510	Aug. 28, 2008
7	Validation Dipole	Speag	CD835V3	1041	May 13, 2010
			CD1880V3	1044	Apr. 09, 2009

NOTE: Before starting the measurement, all test equipment shall be warmed up for 30min.

3.3. MEASUREMENT UNCERTAINTY

HAC UNCERTAINTY BUDGET ACCORDING TO ANSI C63.19[1]							
ERROR DESCRIPTION	**UNCERTAINTY VALUE**	**PROBABILITY DISTRIBUTION**	**DIVISOR**	**(Ci) E**	**(Ci) H**	**STD. UNC. E**	**STD. UNC. H**
MEASUREMENT SYSTEM							
Probe calibration	±5.1%	Normal	1	1	1	±5.1%	±5.1%
Axial isotropy	±4.7%	Rectangular	√3	1	1	±2.7%	±2.7%
Sensor Displacement	±16.5%	Rectangular	√3	1	0.145	±9.5%	±1.4%
Boundary Effects	±2.4%	Rectangular	√3	1	1	±1.4%	±1.4%
Linearity	±4.7%	Rectangular	√3	1	1	±2.7%	±2.7%
Scaling to Peak Envelope Power	±2.0%	Rectangular	√3	1	1	±1.2%	±1.2%
System Detection Limit	±1.0%	Rectangular	√3	1	1	±0.6%	±0.6%
Readout Electronics	±0.3%	Rectangular	√3	1	1	±0.3%	±0.3%
Response Time	±0.8%	Rectangular	√3	1	1	±0.5%	±0.5%
Integration Time	±2.6%	Rectangular	√3	1	1	±1.5%	±1.5%
RF Ambient Condition	±3.0%	Rectangular	√3	1	1	±1.7%	±1.7%
RF Reflections	±12.0%	Rectangular	√3	1	1	±6.9%	±6.9%
Probe Positioner	±1.2%	Rectangular	√3	1	0.67	±0.7%	±0.5%
Probe Positioning	±4.7%	Rectangular	√3	1	0.67	±2.7%	±1.8%
Extrap. And Interpolation	±1.0%	Rectangular	√3	1	1	±0.6%	±0.6%
TEST SAMPLE RELATED							
Device Positioning Vertical	±4.7%	Rectangular	√3	1	0.67	±2.7%	±1.8%
Device Positioning Lateral	±1.0%	Rectangular	√3	1	1	±0.6%	±0.6%
Device Holder and Phantom	±2.4%	Rectangular	√3	1	1	±1.4%	±1.4%
Power Drift	±5.0%	Rectangular	√3	1	1	±2.9%	±2.9%
PHANTOM AND SETUP RELATED							
Phantom Thickness	±2.4%	Rectangular	√3	1	0.67	±1.4%	±0.9%
COMBINED STD. UNCERTAINTY						±14.7%	±10.9%
EXPANDED STD. UNCERTAINTY ON POWER						±29.4%	±21.8%
EXPANDED STD. UNCERTAINTY ON FIELD						±14.7%	±10.9%

NOTE: Worst-case uncertainty budget for HAC free field assessment according to ANSI C63.19 [1]. The budget is valid for the frequency range 800MHz ~ 3GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerably smaller.

3.4. GENERAL DESCRIPTION OF THE HAC EVALUATION

The DASY4 post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the micro-volt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters:	- Frequency	F
	- Crest factor	Cf

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

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

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

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

$$\textbf{\textit{E-field probes:}}\quad E_i = \sqrt{\frac{V_1}{Norm_i \cdot ConvF}}$$

$$\textbf{\textit{H-field probes:}}\quad H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

V_i = compensated signal of channel I (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i μV/(V/m)2 for E-field Probes (i = x, y, z)

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

F = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

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

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

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

E = field strength in V/m

E_{tot} = total field strength in V/m

NOTE: The signal response time is evaluated as the time required by the system to reach 90% of the expected final value after an on/off switch of the power source with an integration time of 500ms and a probe response time of < 5ms. In the current implementation, DASY4 waits longer than 100ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

4. PERFORMANCE CATEGORIES

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

CATEGORY NEAR FIELD	TELEPHONE RF PARAMETERS < 960MHz				
	AWF	E-FIELD EMISSION CW (dBV/m)	E-FIELD EMISSION CW (V/m)	H-FIELD EMISSION CW (dBA/m)	H-FIELD EMISSION CW (A/m)
M1	0	56.0 to 61.0	631.0 to 1122.0	5.6 to 10.6	1.91 to 3.39
	-5	53.5 to 58.5	473.2 to 841.4	3.1 to 8.1	1.43 to 2.54
M2	0	51.0 to 56.0	354.8 to 631.0	0.6 to 5.6	1.07 to 1.91
	-5	48.5 to 53.5	266.1 to 473.2	-1.9 to 3.1	0.80 to 1.43
M3	0	46.0 to 51.0	199.5 to 354.8	-4.4 to 0.6	0.60 to 1.07
	-5	43.5 to 48.5	149.6 to 266.1	-6.9 to -1.9	0.45 to 0.80
M4	0	< 46.0	< 199.5	< -4.4	< 0.60
	-5	< 43.5	< 149.6	< -6.9	< 0.45

CATEGORY NEAR FIELD	TELEPHONE RF PARAMETERS > 960MHz				
	AWF	E-FIELD EMISSION CW (dBV/m)	E-FIELD EMISSION CW (V/m)	H-FIELD EMISSION CW (dBA/m)	H-FIELD EMISSION CW (A/m)
M1	0	46.0 to 51.0	199.5 to 354.8	-4.4 to 0.6	0.60 to 1.07
	-5	43.5 to 48.5	149.6 to 266.1	-6.9 to -1.9	0.45 to 0.80
M2	0	41.0 to 46.0	112.2 to 199.5	-9.4 to -4.4	0.34 to 0.60
	-5	48.5 to 53.5	84.1 to 149.6	-11.9 to -6.9	0.25 to 0.45
M3	0	36.0 to 41.0	63.1 to 112.2	-14.4 to -9.4	0.19 to 0.34
	-5	33.5 to 38.5	47.3 to 84.1	-16.9 to -11.9	0.14 to 0.25
M4	0	< 36.0	< 63.1	< -14.4	< 0.19
	-5	< 33.5	< 47.3	< -16.9	< 0.14

ARTICULATION WEIGHING FACTOR (AWF)

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

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

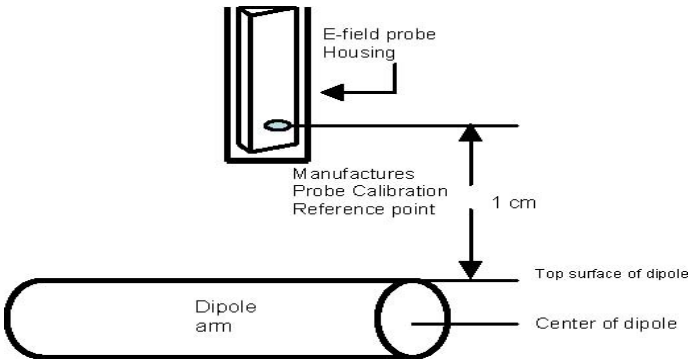
5. SYSTEM CHECK

The measured values (E-field and H-field) were compared with the values provided by the probe manufacturer and must within the allowed tolerance of **25%**.

5.1. VALIDATION STRUCTURE

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

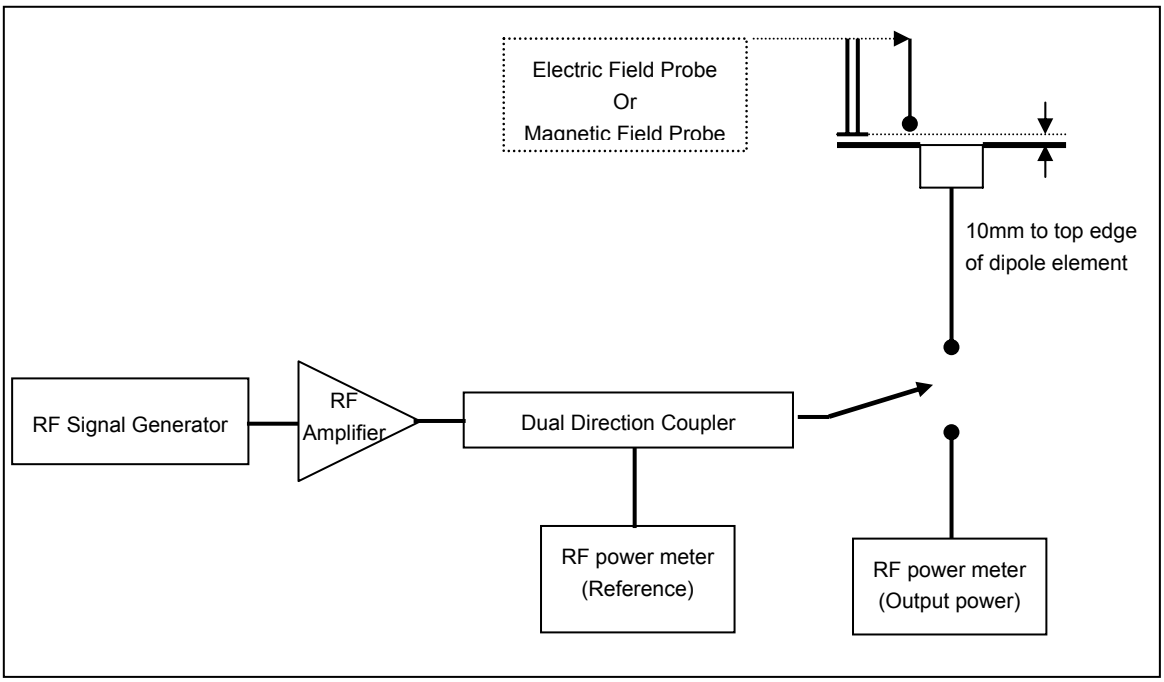
- Average Input Power P = 100mW RMS (20dBm RMS) after adjustment for return loss
- The test fixture must meet the 2 wavelength separation criterion
- The proper measurement of the 1cm probe to dipole separation, which is measured from top surface of the dipole to the calibration reference point of the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



5.2. SYSTEM CHECK PROCEDURE

1. Before you start the system performance check, need only to tell the system with which components (probe type, validation dipole and HAC arch) are performing the system performance check; the system will take care of all parameters.

The system check configuration is shown in the following figure:



2. The dipole was energized with a 20dBm unmodulated continuous-wave signal.
3. The length of the dipole was scanned with both E-field and H-field probes and the maximum values for each were recorded.

5.3. VALIDATION RESULTS

SYSTEM CHECK						
TEST FREQUENCY (MHz)	**BEGIN TEST SG POWER (mW)**	**REQUIRED E-FILED (V/m)**	**MEASURED E-FILED (V/m)**	**DEVIATION (%)**	**SEPARATION DISTANCE (mm)**	**TESTED DATE**
835	100.0	161.7	171.5	6.06	10	Jul. 16, 2008
1880	100.0	141.4	130.9	-7.43	10	Jul. 16, 2008
TEST FREQUENCY (MHz)	**BEGIN TEST SG POWER (mW)**	**REQUIRED H-FILED (V/m)**	**MEASURED H-FILED (V/m)**	**DEVIATION (%)**	**SEPARATION DISTANCE (mm)**	**TESTED DATE**
835	100.0	0.457	0.478	4.60	10	Jul. 16, 2008
1880	100.0	0.464	0.462	-0.43	10	Jul. 16, 2008
TESTED BY	Sam Onn					

NOTE: Please see Appendix for the system validation test data.

6. MODULATION FACTOR

A calibration was made of the modulation response of the probe and its instrumentation chain. This calibration was performed with the field probe, attached to its instrumentation. The response of the probe system to a CW field at the frequency of interest is compared to its response to a modulated signal with equal peak amplitude to that of a CW signal. The field level of the test signals are ensured to be more than 10dB above the ambient level and the noise floor of the instrumentation being used. The ratio of the CW reading to that taken with a modulated reading was applied to the DUT measurements.

This was done using the following procedure:

1. Fixing the probe in a set location relative to a field generating device, such as a reference dipole antenna, as illustrated in the system check procedure.
2. Illuminate the probe using the wireless device connected to the reference dipole with a test signal at the intended measurement frequency, Ensure there is sufficient field coupling between the probe and the antenna so the resulting reading is greater than 10dB above the probe system noise floor but within the systems operating range.
3. Record the amplitude applied to the antenna during transmission and the field strength measured by the E-field probe located near the tip of the dipole antenna.
4. Replace the wireless device with an RF signal generator producing an unmodulated CW signal and set to the wireless device operating frequency.
5. Set the amplitude of the unmodulated signal to equal that recorded from the wireless device.
6. Record the reading of the probe measurement system of the unmodulated signal.
7. The RF signal generator producing an 80%AM signal and set to the wireless device operating frequency. Set the amplitude of the signal to equal that recorded from the wireless device.
8. Record the reading of the probe measurement system of the 80%AM signal.
9. The ratio, in linear units, of the probe reading in Step 3) or 8) to the reading in Step 6) is the E-field modulation factor.
10. Steps 1-9 were repeated at all frequency bands and for both E and H field probes.

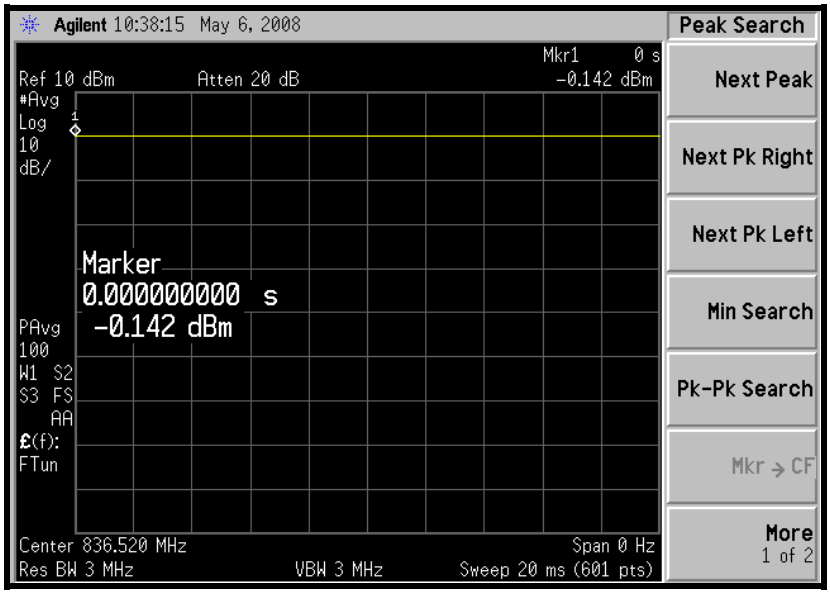
NOTE: The ratio of the CW to modulated signal reading is the modulation factor. The modulation factors obtained were applied to readings taken of the actual wireless device, in order to obtain an accurate peak field reading using the formula:

$$\mathbf{Peak = 20 \cdot log(Raw \cdot P}\text{robe}\mathbf{M}\text{odulation}\mathbf{F}\text{actor}\mathbf{)}$$

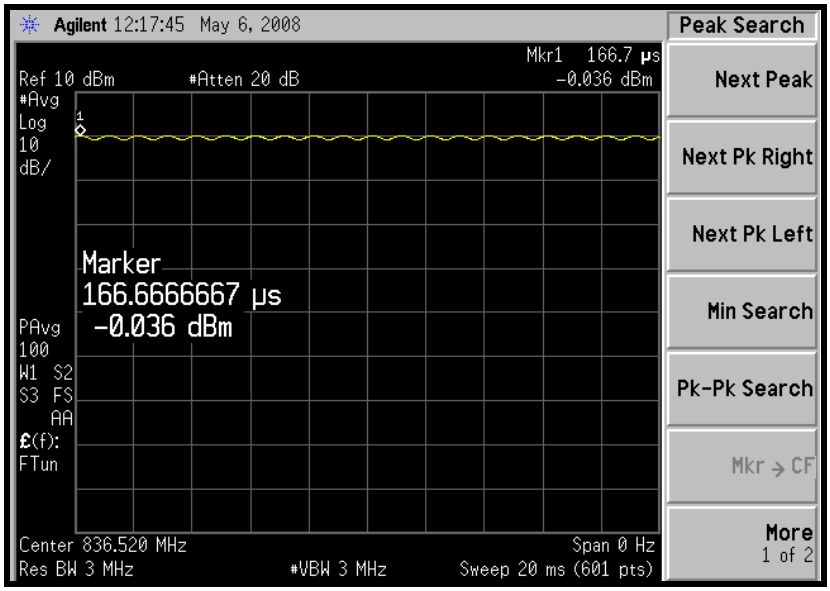
6.1 MODULATION FACTOR TEST RESULTS

TEST FREQUENCY (MHz)	PROTOCOL	REFERENCE LEVEL	MEASURED E-FILED (V/m)	E-FILED MODULATION FACTOR	TESTED DATE
836.5	CW	Refer to the next three plots	191.40	NA	Jul. 16, 2008
	80% AM		178.40	1.07	
	CDMA		187.50	1.02	
TEST FREQUENCY (MHz)	**PROTOCOL**	**REFERENCE LEVEL**	**MEASURED H-FILED (A/m)**	**H-FILED MODULATION FACTOR**	**TESTED DATE**
836.5	CW	Refer to the next three plots	0.541	NA	Jul. 16, 2008
	80% AM		0.516	1.05	
	CDMA		0.544	0.99	
TESTED BY	Sam Onn				

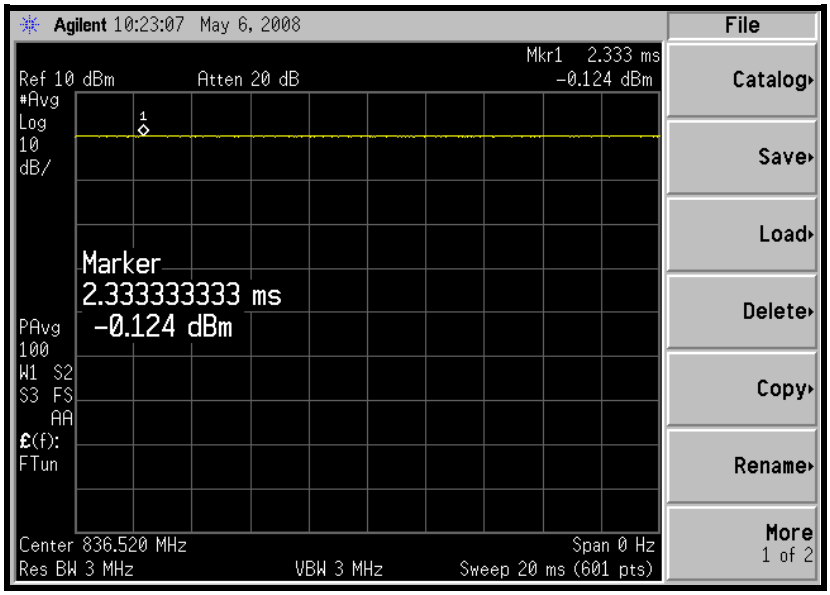
CW SIGNAL:



80% AM SIGNAL:

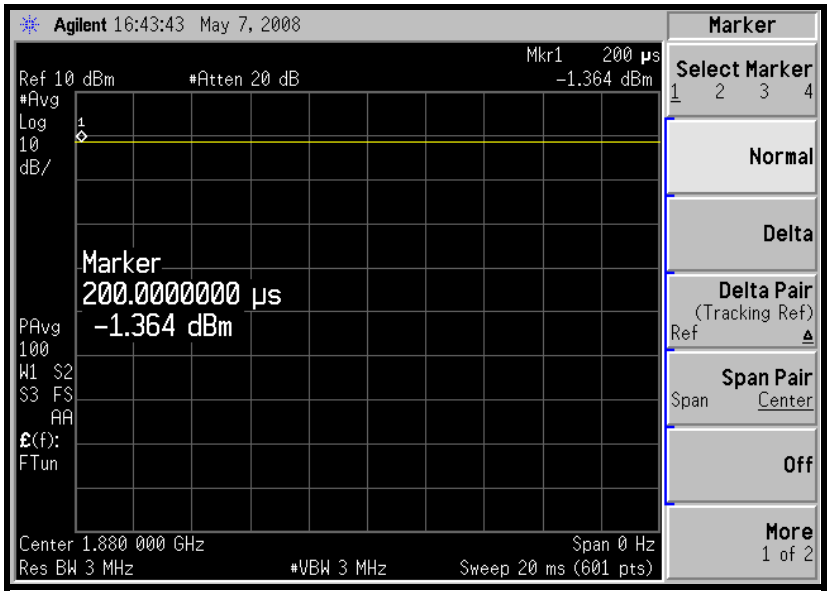


CDMA SIGNAL:

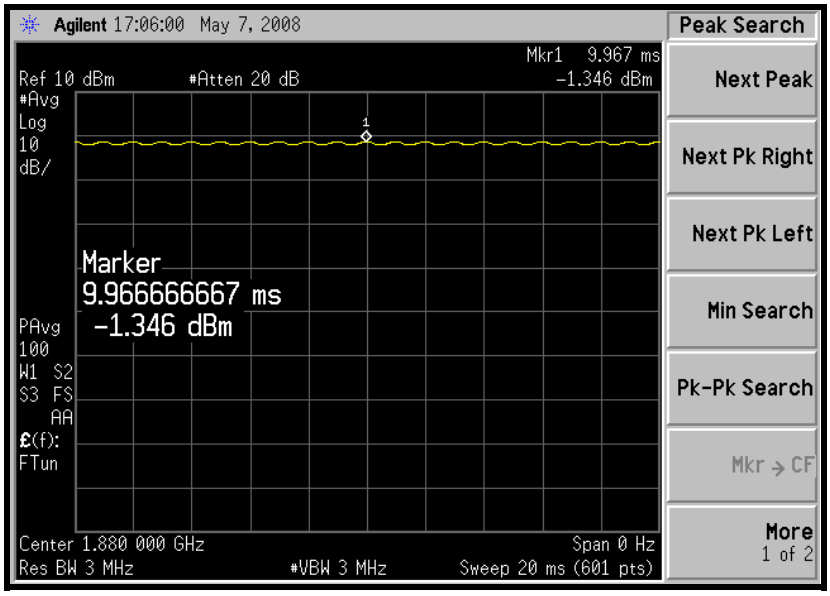


TEST FREQUENCY (MHz)	PROTOCOL	REFERENCE LEVEL	MEASURED E-FILED (V/m)	E-FILED MODULATION FACTOR	TESTED DATE
1880.0	CW	Refer to the next three plots	129.40	NA	Jul. 16, 2008
	80% AM		127.70	1.01	
	CDMA		135.50	0.95	
TEST FREQUENCY (MHz)	**PROTOCOL**	**REFERENCE LEVEL**	**MEASURED H-FILED (A/m)**	**H-FILED MODULATION FACTOR**	**TESTED DATE**
1880.0	CW	Refer to the next three plots	0.483	NA	Jul. 16, 2008
	80% AM		0.431	1.12	
	CDMA		0.453	1.07	
TESTED BY	Sam Onn				

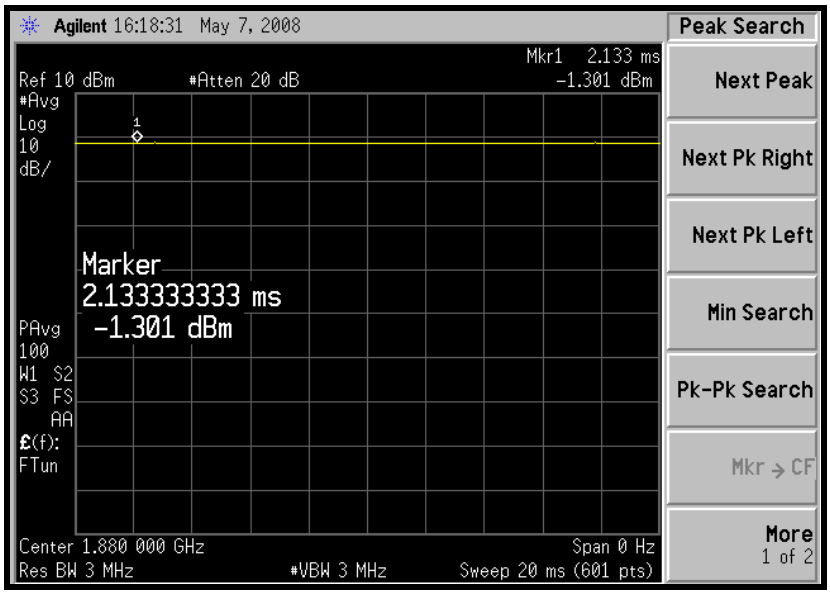
CW SIGNAL:



80% AM SIGNAL:

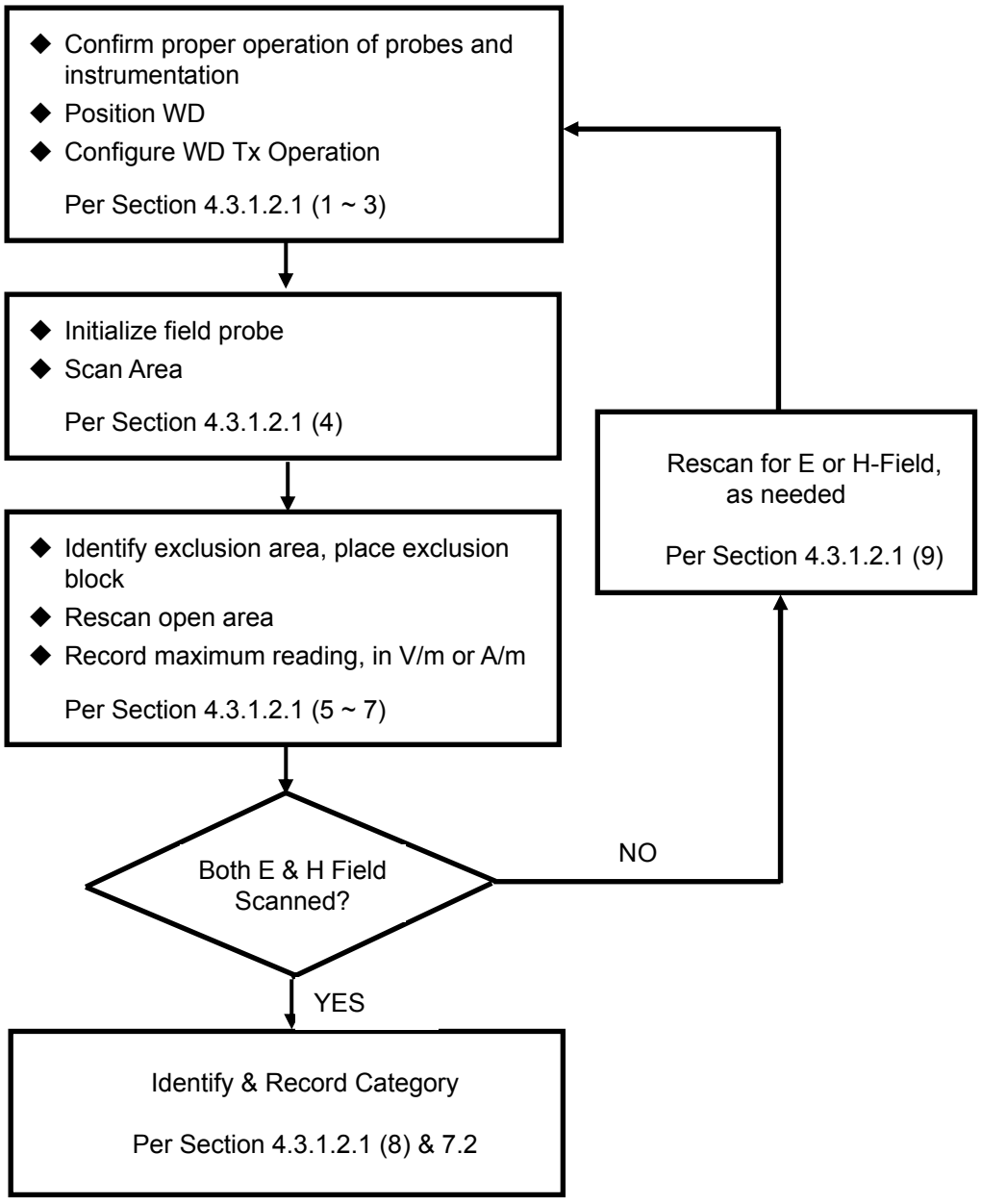


CDMA SIGNAL:



7. RF EMISSION TEST PROCEDURES

7.1. TEST INSTRUCTION



7.2. TEST PROCEDURES

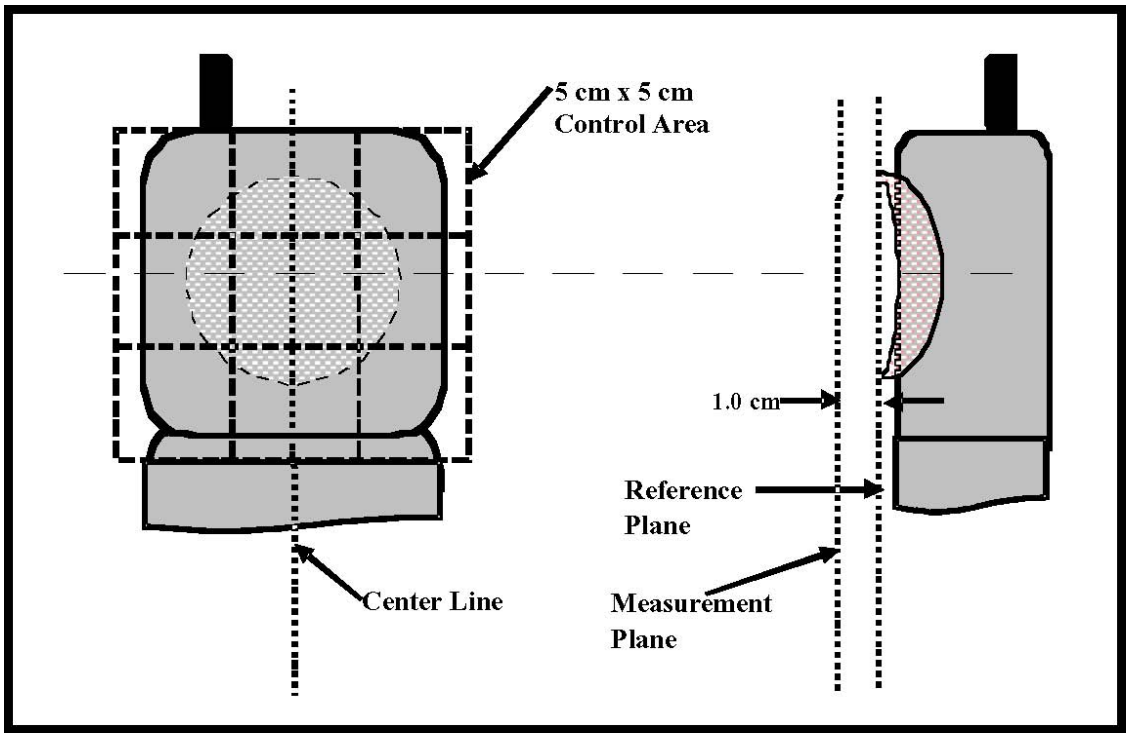
The EUT (Pocket PC Phone) makes a phone call to the GSM base station. Establish the simulation communication configuration rather the actual communication. Then the EUT could continuous the transmission mode. Adjust the PCL of the base station could controlled the EUT to transmitted the maximum output power. The base station also could control the transmission channel.

The recommended procedure for assessing the RF emission value consists of the following steps:

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 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.
4. A surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the HAC arch.
5. The measurement system measured the field strength at the reference location.
6. Measurements at 2mm increments in the 5 x 5cm region were performed and recorded. A 360^{o} 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.
7. Steps 1-6 were done for both the E and H-Field measurements.

•

7.3. DESCRIPTION OF TEST POSITION AND CONFIGURATIONS



7.4. SUMMARY OF MEASURED HAC RESULTS

E-FIELD EMISSION

ENVIRONMENTAL CONDITION			Air Temperature：23.5°C, Humidity：63%RH					
TESTED BY			Sam Onn		DATE	Jul. 16, 2008		
FREQ. (MHz)	CHAN.	MODE	CONDUCTED POWER (dBm)	DRIFT (dB)	MEASURED PMF	EXCLUDED CELLS	PEAK FIELD (V/m)	RATING
824.70 (Low)	1013	CDMA850	24.35	-0.021	1.02	6.8.9	86.6	M4
836.50 (Mid.)	384		24.40	-0.056		6.8.9	85.1	M4
848.30 (High)	777		24.57	-0.079		6.8.9	86.1	M4
824.70 (Low)	1013	CDMA850 (Light off)	24.35	-0.083		6.8.9	82.2	M4

NOTE:

1. The LCD back-light “ON” & battery A are the worst case for measurement.
2. Please see the Appendix A for the measured data and test plots.
3. The variation of the EUT conducted power measured before and after HAC testing should not over 5%.

ENVIRONMENTAL CONDITION	Air Temperature：23.5°C, Humidity：63%RH		
TESTED BY	Sam Onn	DATE	Jul. 16, 2008

FREQ. (MHz)	CHAN.	MODE	CONDUCTED POWER (dBm)	DRIFT (dB)	MEASURED PMF	EXCLUDED CELLS	PEAK FIELD (V/m)	RATING
1851.25 (Low)	25	CDMA1900	24.71	-0.068	0.95	1.2.3	73.3	M3
1880.00 (Mid.)	600	CDMA1900	24.62	-0.083		7.8.9	73.3	M3
1908.75 (High)	1175	CDMA1900	24.51	-0.043		1.2.3	69.0	M3
1851.25 (Low)	25	CDMA1900 (Light off)	24.71	-0.015		1.2.3	71.7	M3

NOTE:

1. The LCD back-light “ON” & battery A are the worst case for measurement.
2. Please see the Appendix A for the measured data and test plots.
3. The variation of the EUT conducted power measured before and after HAC testing should not over 5%.

H-FIELD EMISSION

ENVIRONMENTAL CONDITION	Air Temperature：23.5°C, Humidity：63%RH		
TESTED BY	Sam Onn	DATE	Jul. 16, 2008

FREQ. (MHz)	CHAN.	MODE	CONDUCTED POWER (dBm)	DRIFT (dB)	MEASURED PMF	EXCLUDED CELLS	PEAK FIELD (A/m)	RATING
824.70 (Low)	1013	CDMA850	24.35	-0.111	0.99	1.2.3	0.130	M4
836.50 (Mid.)	384	CDMA850	24.40	-0.021		6.8.9	0.133	M4
848.30 (High)	777	CDMA850	24.57	-0.047		2.3.6	0.137	M4
848.30 (High)	777	CDMA850 (Light off)	24.57	-0.030		2.3.6	0.137	M4

NOTE:

1. The LCD back-light “ON” & battery A are the worst case for measurement.
2. Please see the Appendix A for the measured data and test plots.
3. The variation of the EUT conducted power measured before and after HAC testing should not over 5%.

ENVIRONMENTAL CONDITION	Air Temperature：23.5°C, Humidity：63%RH		
TESTED BY	Sam Onn	DATE	Jul. 16, 2008

FREQ. (MHz)	CHAN.	MODE	CONDUCTED POWER (dBm)	DRIFT (dB)	MEASURED PMF	EXCLUDED CELLS	PEAK FIELD (A/m)	RATING
1851.25 (Low)	25	CDMA1900	24.71	-0.005	1.07	2.3.6	0.321	M3
1880.00 (Mid.)	600	CDMA1900	24.62	-0.050		2.3.6	0.319	M3
1908.75 (High)	1175	CDMA1900	24.51	-0.004		2.3.6	0.299	M3
1851.25 (Low)	25	CDMA1900 (Light off)	24.71	-0.011		2.3.6	0.318	M3

NOTE:

1. The LCD back-light “ON” & battery A are the worst case for measurement.
2. Please see the Appendix A for the measured data and test plots.
3. The variation of the EUT conducted power measured before and after HAC testing should not over 5%.

8. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC, UL
GERMANY	TUV Rheinland
JAPAN	VCCI
NORWAY	NEMKO
CANADA	INDUSTRY CANADA , CSA
R.O.C.	TAF, BSMI, NCC
NETHERLANDS	Telefication
SINGAPORE	GOST-ASIA (MOU)
RUSSIA	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

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Date/Time: 2008/7/16 16:28:34

Test Laboratory: Advance Data Technology

E_CDMA850_Ch1013

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 824.7 MHz

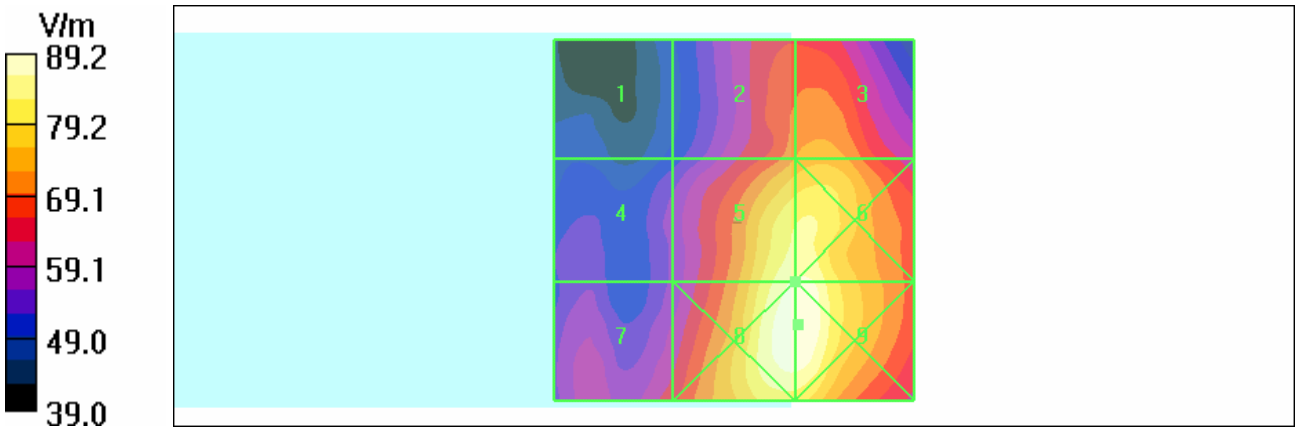
Communication System: CDMA ; Frequency: 824.7 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference Low Channel 1013/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 86.6 V/m
Probe Modulation Factor = 1.02
Reference Value = 75.1 V/m; Power Drift = -0.021 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **50.9**	Grid 2 **72.7**	Grid 3 **75.0**
Grid 4 **57.5**	Grid 5 **86.6**	Grid 6 **86.9**
Grid 7 **64.8**	Grid 8 **89.2**	Grid 9 **89.2**



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Test Laboratory: Advance Data Technology

E_CDMA850_Ch384

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 836.5 MHz

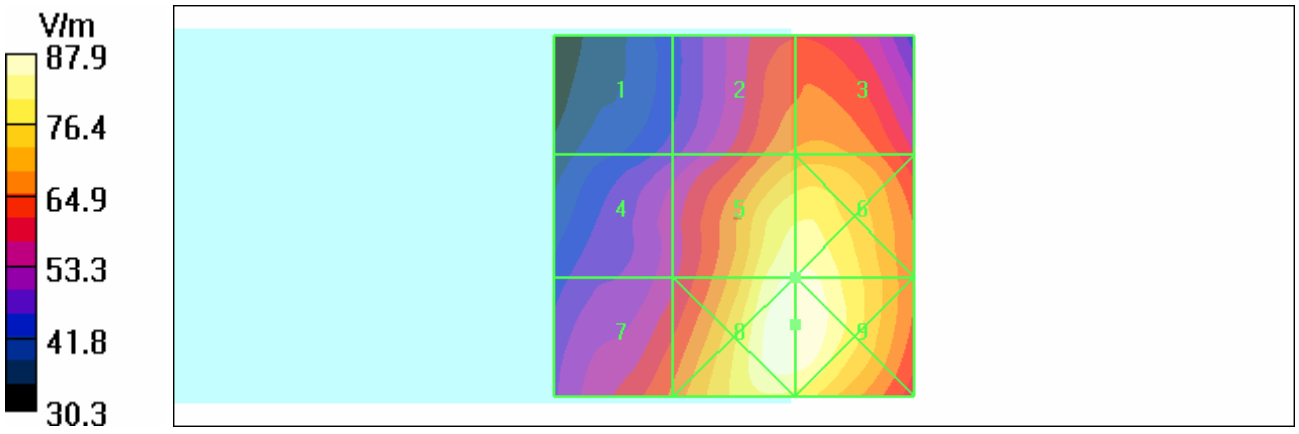
Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference Mid Channel 384/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 85.1 V/m
Probe Modulation Factor = 1.02
Reference Value = 67.7 V/m; Power Drift = -0.056 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **48.6**	Grid 2 **69.8**	Grid 3 **70.8**
Grid 4 **56.4**	Grid 5 **85.1**	Grid 6 **85.3**
Grid 7 **66.0**	Grid 8 **87.9**	Grid 9 **87.9**



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Test Laboratory: Advance Data Technology

E_CDMA850_Ch777

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 848.3 MHz

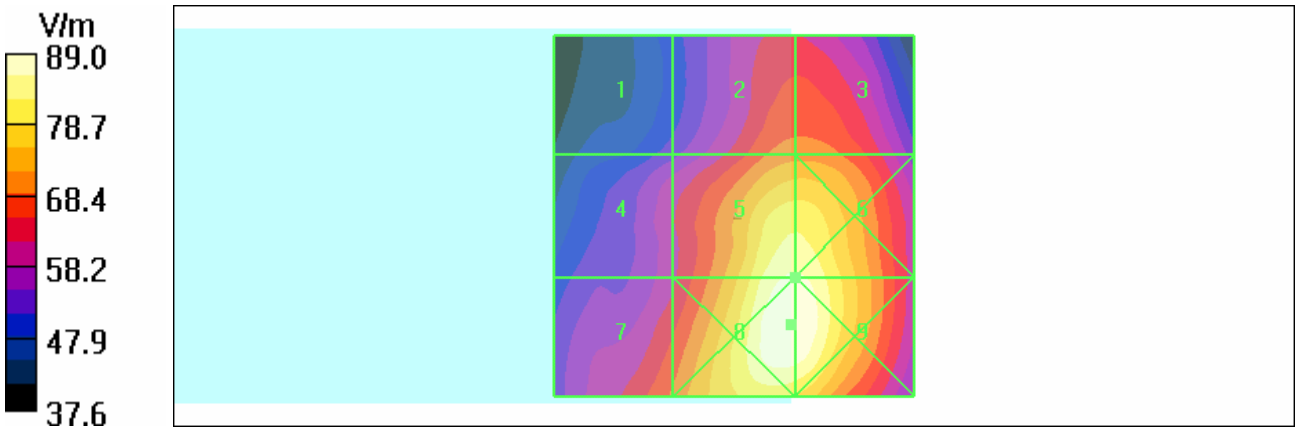
Communication System: CDMA ; Frequency: 848.3 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference High Channel 777/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 86.1 V/m
Probe Modulation Factor = 1.02
Reference Value = 72.5 V/m; Power Drift = -0.079 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **53.9**	Grid 2 **70.7**	Grid 3 **70.8**
Grid 4 **61.4**	Grid 5 **86.1**	Grid 6 **86.1**
Grid 7 **69.2**	Grid 8 **89.0**	Grid 9 **88.9**



Date/Time: 2008/7/16 16:44:52

Test Laboratory: Advance Data Technology

E_CDMA850_Ch1013 Light off

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 824.7 MHz

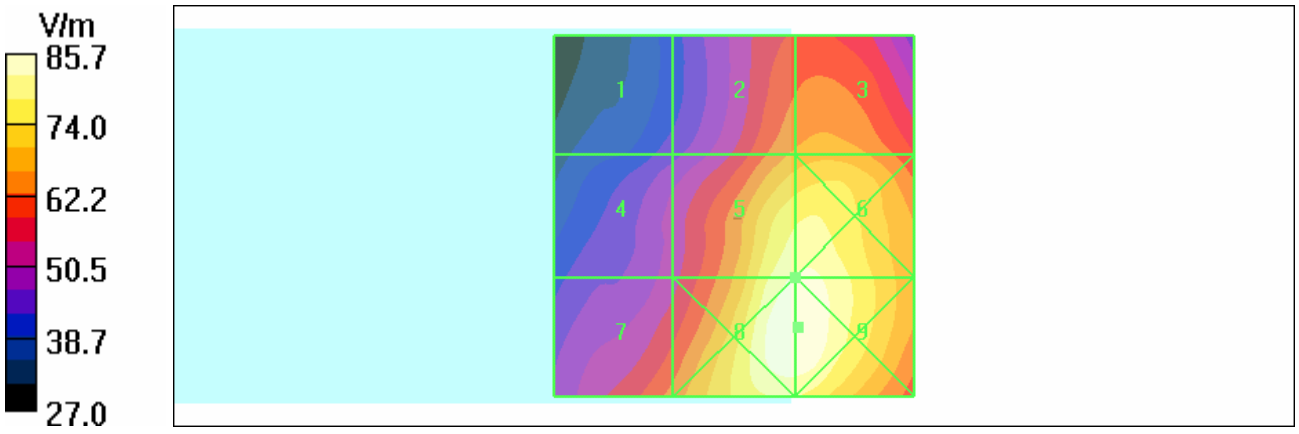
Communication System: CDMA ; Frequency: 824.7 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference Low Channel 1013/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 82.2 V/m
Probe Modulation Factor = 1.02
Reference Value = 63.6 V/m; Power Drift = -0.083 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **45.5**	Grid 2 **67.1**	Grid 3 **69.0**
Grid 4 **53.1**	Grid 5 **82.2**	Grid 6 **82.7**
Grid 7 **63.9**	Grid 8 **85.7**	Grid 9 **85.7**



Date/Time: 2008/7/16 16:51:43

Test Laboratory: Advance Data Technology

E_CDMA1900_Ch25

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1851.25 MHz

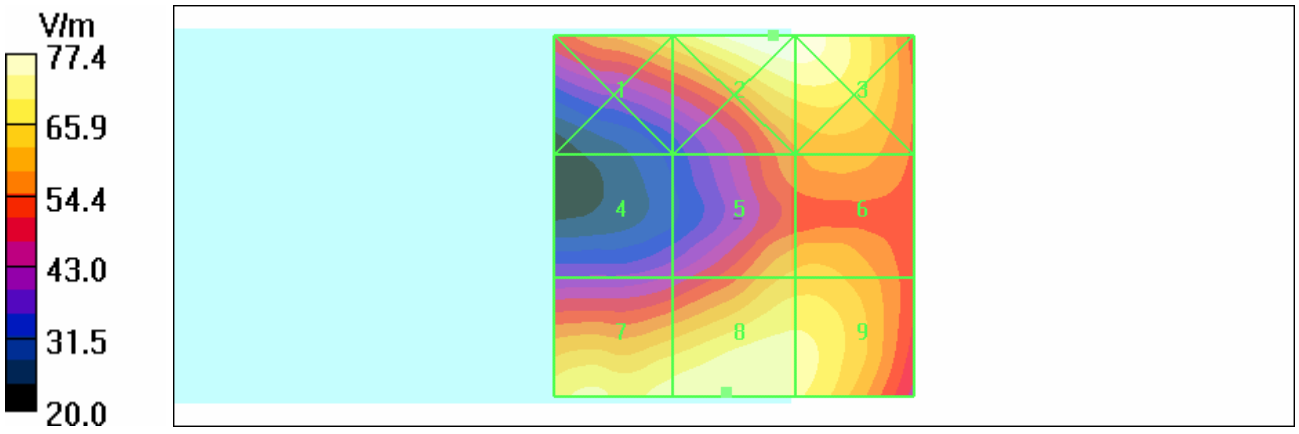
Communication System: CDMA ; Frequency: 1851.25 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference Low Channel 25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 73.3 V/m
Probe Modulation Factor = 0.950
Reference Value = 43.6 V/m; Power Drift = -0.068 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **66.9**	Grid 2 **77.4**	Grid 3 **76.9**
Grid 4 **44.2**	Grid 5 **63.3**	Grid 6 **63.8**
Grid 7 **71.6**	Grid 8 **73.3**	Grid 9 **71.9**



Date/Time: 2008/7/16 17:03:58

Test Laboratory: Advance Data Technology

E_CDMA1900_Ch600

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1880 MHz

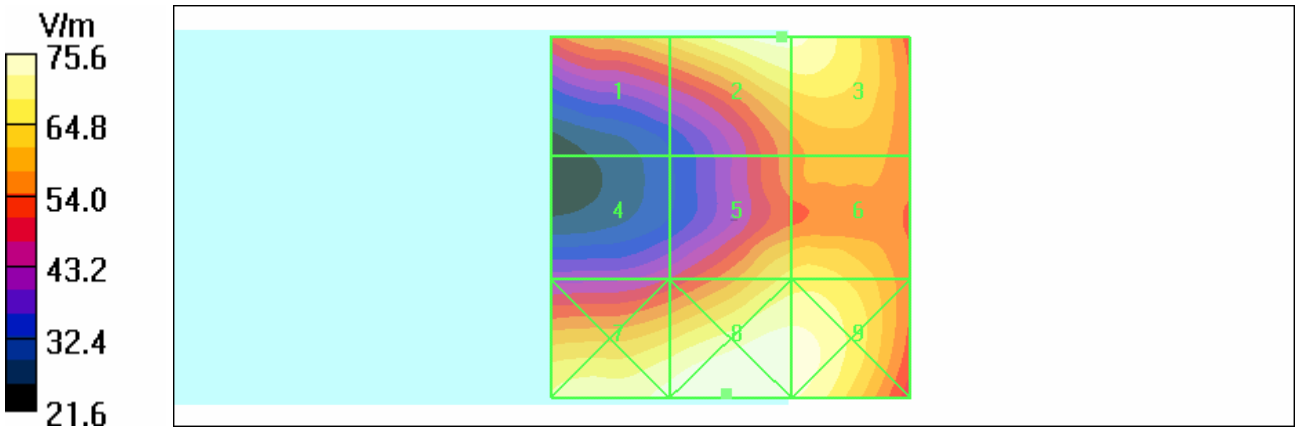
Communication System: CDMA ; Frequency: 1880 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference Mid Channel 600/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 73.3 V/m
Probe Modulation Factor = 0.950
Reference Value = 44.8 V/m; Power Drift = -0.083 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **64.1**	Grid 2 **73.3**	Grid 3 **73.1**
Grid 4 **47.2**	Grid 5 **66.2**	Grid 6 **66.8**
Grid 7 **73.3**	Grid 8 **75.6**	Grid 9 **74.4**



Date/Time: 2008/7/16 17:11:44

Test Laboratory: Advance Data Technology

E_CDMA1900_Ch1175

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1908.75 MHz

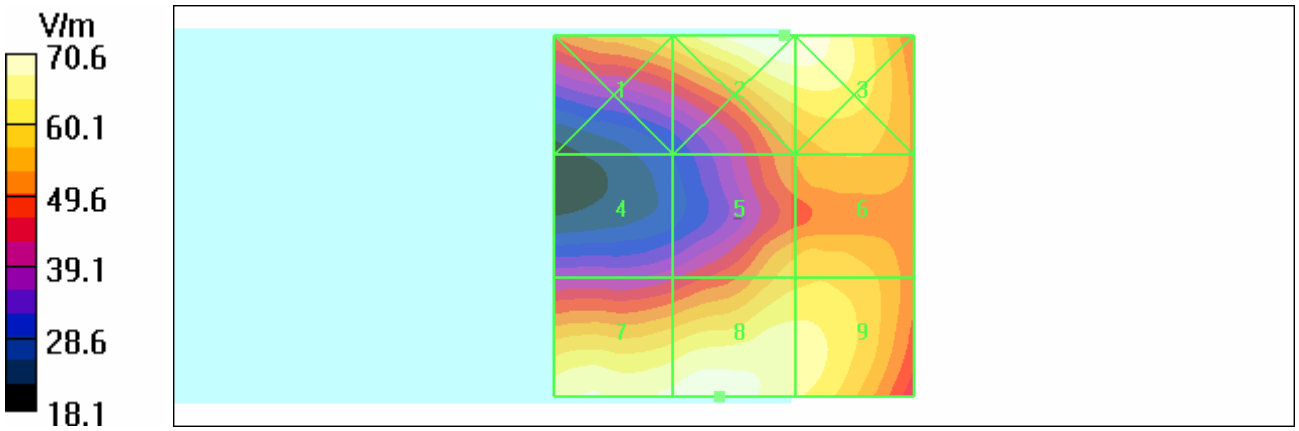
Communication System: CDMA ; Frequency: 1908.75 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference High Channel 1175/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 69.0 V/m
Probe Modulation Factor = 0.950
Reference Value = 39.1 V/m; Power Drift = -0.043 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **60.8**	Grid 2 **70.6**	Grid 3 **70.5**
Grid 4 **41.9**	Grid 5 **58.9**	Grid 6 **59.9**
Grid 7 **67.8**	Grid 8 **69.0**	Grid 9 **66.2**



Date/Time: 2008/7/16 17:17:51

Test Laboratory: Advance Data Technology

E_CDMA1900_Ch25 Light off

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1851.25 MHz

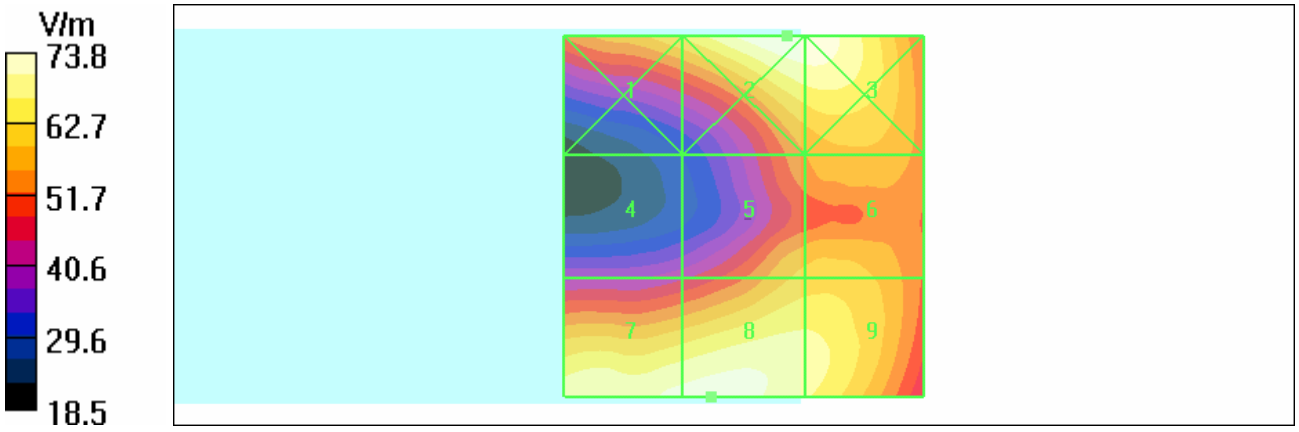
Communication System: CDMA ; Frequency: 1851.25 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3 ;
Phantom section: E Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above Device Reference Low Channel 25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 71.7 V/m
Probe Modulation Factor = 0.950
Reference Value = 40.8 V/m; Power Drift = -0.015 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **63.6**	Grid 2 **73.8**	Grid 3 **73.5**
Grid 4 **43.6**	Grid 5 **60.4**	Grid 6 **61.3**
Grid 7 **71.3**	Grid 8 **71.7**	Grid 9 **68.5**



Date/Time: 2008/7/16 13:56:50

Test Laboratory: Advance Data Technology

H_CDMA850_Ch1013

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 824.7 MHz

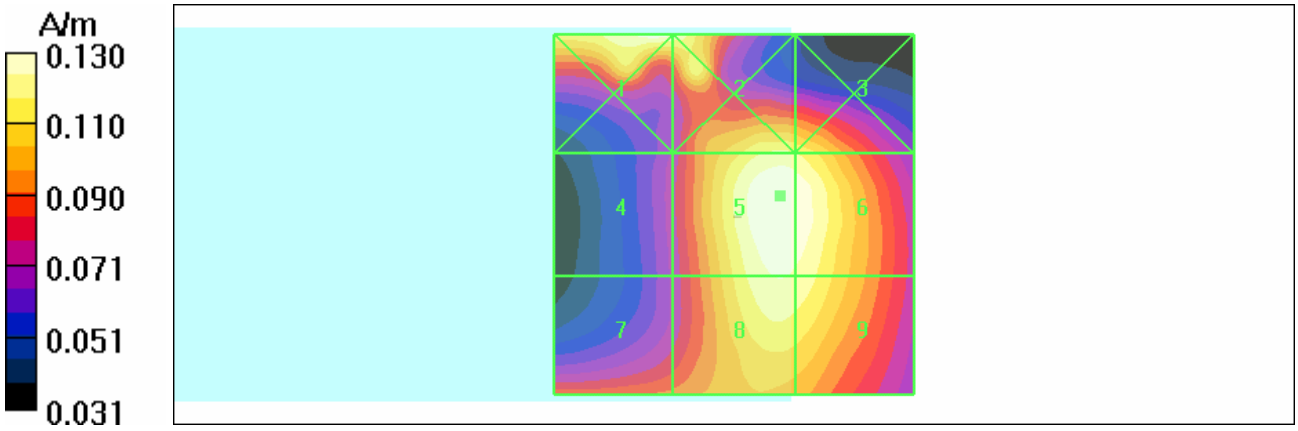
Communication System: CDMA ; Frequency: 824.7 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference Low Channel 1013/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.130 A/m
Probe Modulation Factor = 0.990
Reference Value = 0.115 A/m; Power Drift = -0.111 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.129**	Grid 2 **0.124**	Grid 3 **0.117**
Grid 4 **0.076**	Grid 5 **0.130**	Grid 6 **0.128**
Grid 7 **0.093**	Grid 8 **0.124**	Grid 9 **0.122**



Date/Time: 2008/7/16 14:03:22

Test Laboratory: Advance Data Technology

H_CDMA850_Ch384

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 836.5 MHz

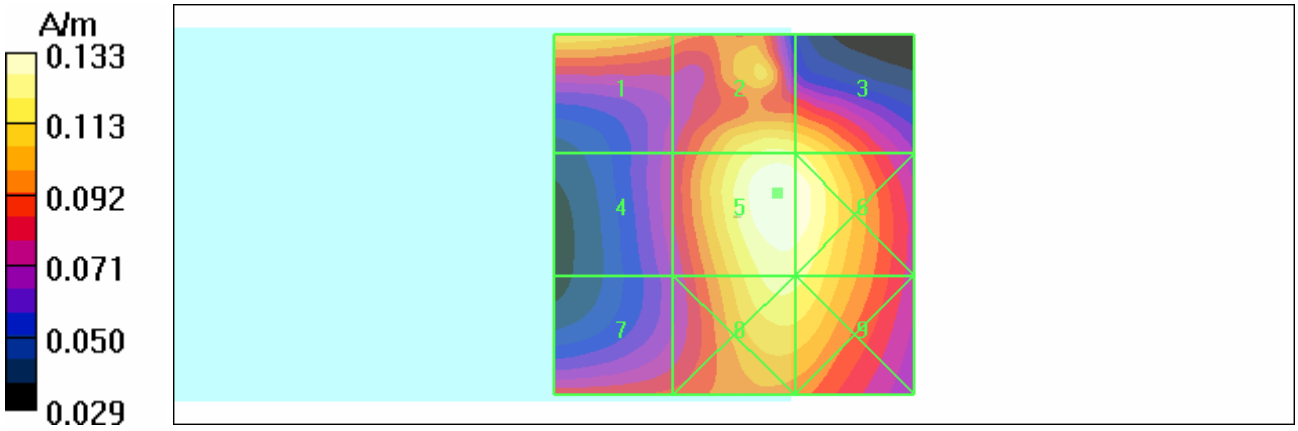
Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference Mid Channel 384/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
Reference Value = 0.118 A/m; Power Drift = -0.021 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.113**	Grid 2 **0.122**	Grid 3 **0.121**
Grid 4 **0.079**	Grid 5 **0.133**	Grid 6 **0.132**
Grid 7 **0.087**	Grid 8 **0.123**	Grid 9 **0.122**



Date/Time: 2008/7/16 14:08:46

Test Laboratory: Advance Data Technology

H_CDMA850_Ch777

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 848.3 MHz

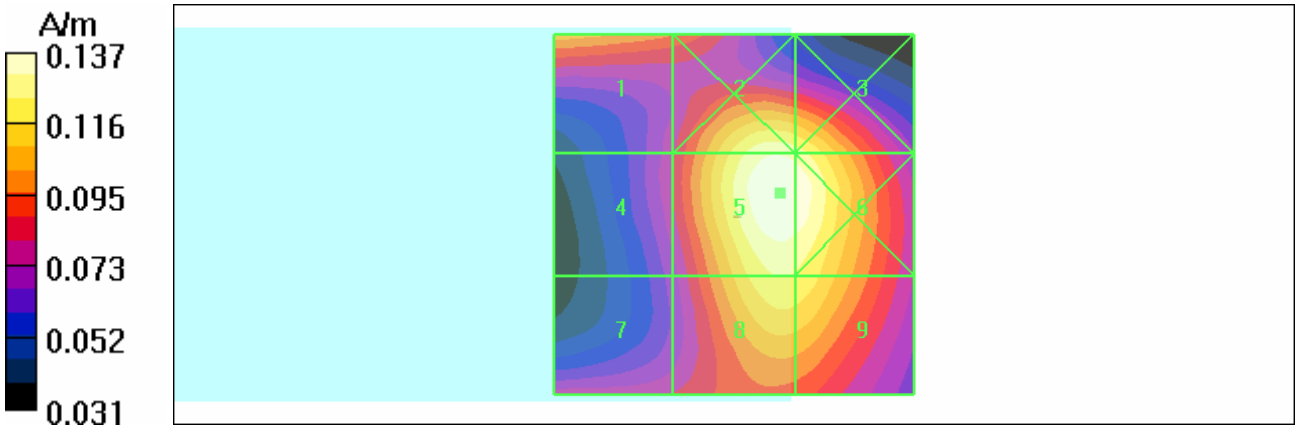
Communication System: CDMA ; Frequency: 848.3 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference High Channel 777/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.137 A/m
Probe Modulation Factor = 0.990
Reference Value = 0.121 A/m; Power Drift = -0.047 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.106**	Grid 2 **0.129**	Grid 3 **0.127**
Grid 4 **0.082**	Grid 5 **0.137**	Grid 6 **0.136**
Grid 7 **0.081**	Grid 8 **0.123**	Grid 9 **0.122**



Date/Time: 2008/7/16 02:18:48

Test Laboratory: Advance Data Technology

H_CDMA850_Ch777 Light Off

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 848.3 MHz

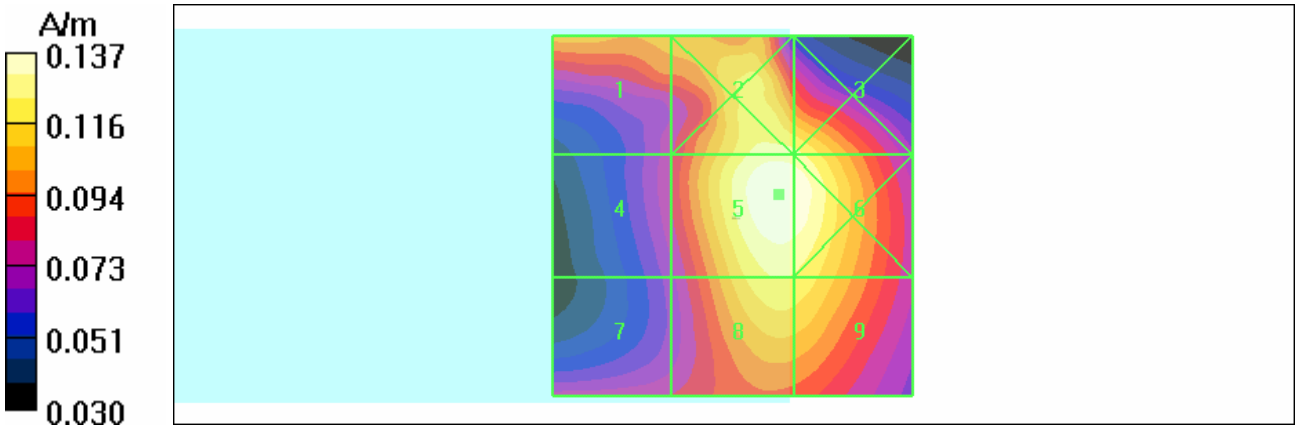
Communication System: CDMA ; Frequency: 848.3 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference High Channel 777/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.137 A/m
Probe Modulation Factor = 0.990
Reference Value = 0.120 A/m; Power Drift = -0.030 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.106**	Grid 2 **0.127**	Grid 3 **0.126**
Grid 4 **0.081**	Grid 5 **0.137**	Grid 6 **0.136**
Grid 7 **0.081**	Grid 8 **0.123**	Grid 9 **0.122**



Date/Time: 2008/7/16 14:25:31

Test Laboratory: Advance Data Technology

H_CDMA1900_Ch25

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1851.25 MHz

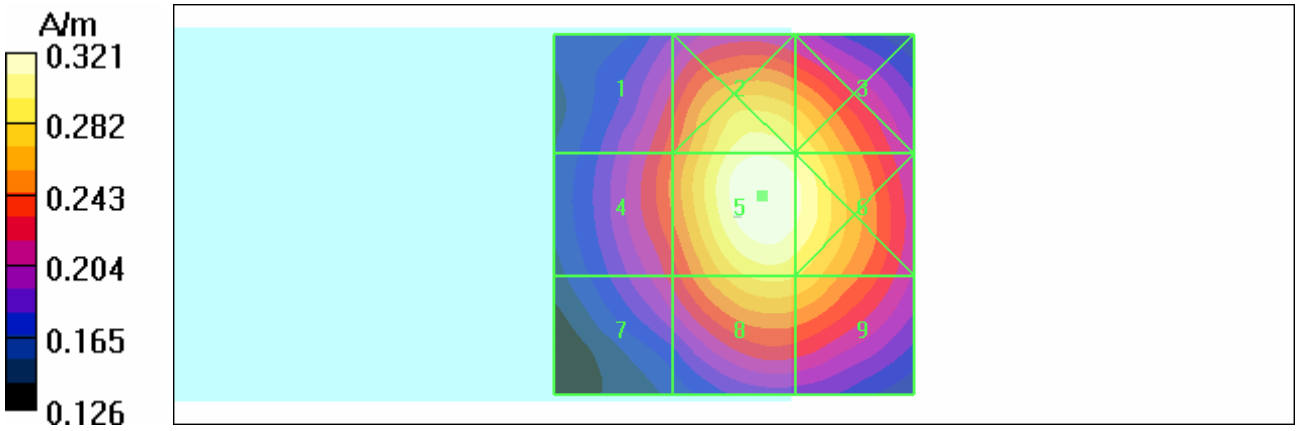
Communication System: CDMA ; Frequency: 1851.25 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference Low Channel 25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.321 A/m
Probe Modulation Factor = 1.07
Reference Value = 0.283 A/m; Power Drift = -0.005 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.240**	Grid 2 **0.307**	Grid 3 **0.297**
Grid 4 **0.248**	Grid 5 **0.321**	Grid 6 **0.312**
Grid 7 **0.224**	Grid 8 **0.287**	Grid 9 **0.283**



Date/Time: 2008/7/16 14:30:55

Test Laboratory: Advance Data Technology

H_CDMA1900_Ch600

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1880 MHz

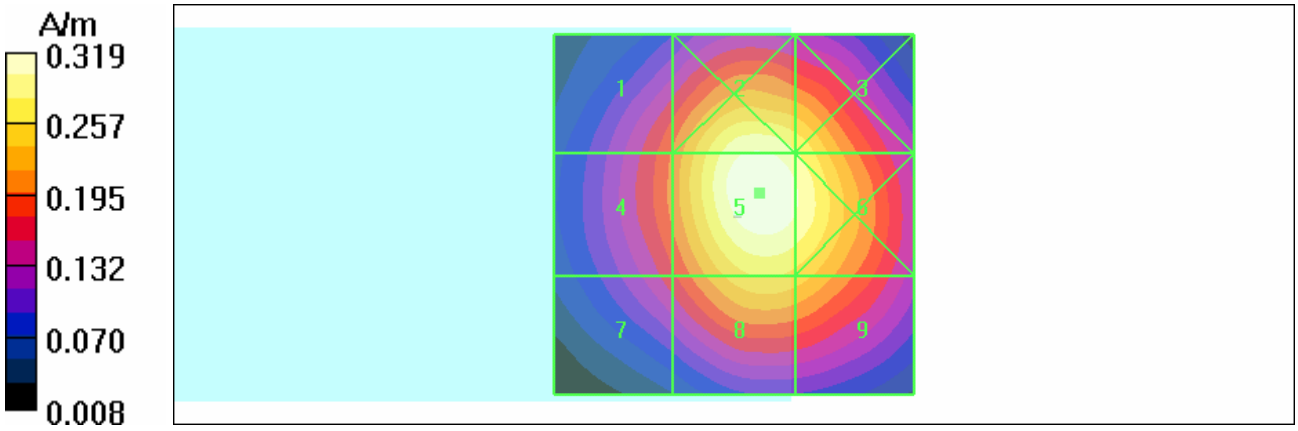
Communication System: CDMA ; Frequency: 1880 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference Mid Channel 600/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.319 A/m
Probe Modulation Factor = 1.07
Reference Value = 0.281 A/m; Power Drift = -0.050 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.240**	Grid 2 **0.310**	Grid 3 **0.297**
Grid 4 **0.246**	Grid 5 **0.319**	Grid 6 **0.303**
Grid 7 **0.222**	Grid 8 **0.299**	Grid 9 **0.296**



Date/Time: 2008/7/16 14:36:19

Test Laboratory: Advance Data Technology

H_CDMA1900_Ch1175

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1908.75 MHz

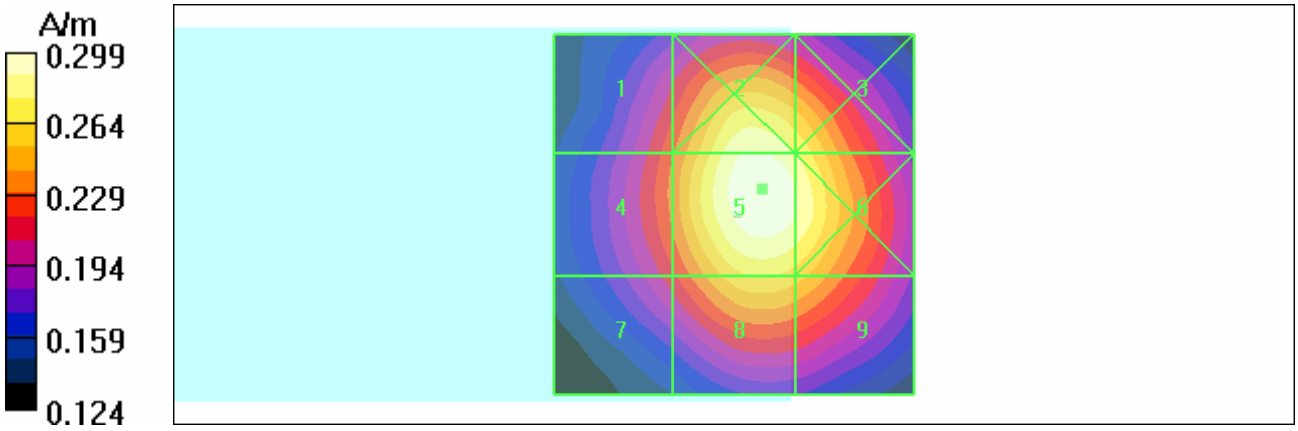
Communication System: CDMA ; Frequency: 1908.75 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference High Channel 1175/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.299 A/m
Probe Modulation Factor = 1.07
Reference Value = 0.266 A/m; Power Drift = -0.004 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.228**	Grid 2 **0.288**	Grid 3 **0.276**
Grid 4 **0.234**	Grid 5 **0.299**	Grid 6 **0.289**
Grid 7 **0.215**	Grid 8 **0.265**	Grid 9 **0.258**



Date/Time: 2008/7/16 14:51:14

Test Laboratory: Advance Data Technology

H_CDMA1900_Ch25 Light Off

DUT: Pocket PC Phone ; Type: RAPH500 ; Test Frequency: 1851.25 MHz

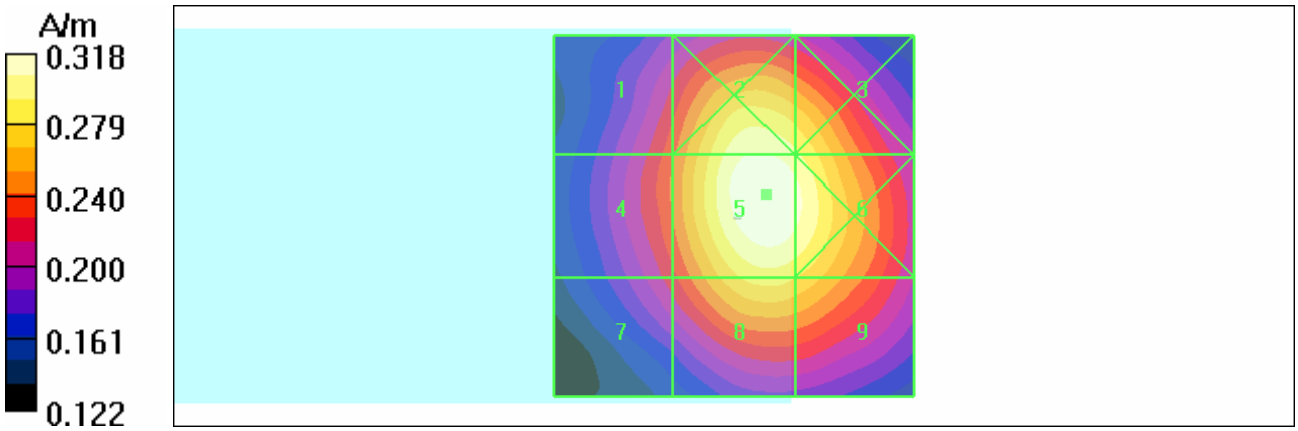
Communication System: CDMA ; Frequency: 1851.25 MHz ; Duty Cycle: 1:1Modulation type: OQPSK
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3 ;
Phantom section: H Device Section ;
Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above Device Reference Low Channel 25/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.318 A/m
Probe Modulation Factor = 1.07
Reference Value = 0.280 A/m; Power Drift = -0.011 dB
Hearing Aid Near-Field Category: M3 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.237**	Grid 2 **0.306**	Grid 3 **0.295**
Grid 4 **0.243**	Grid 5 **0.318**	Grid 6 **0.309**
Grid 7 **0.223**	Grid 8 **0.286**	Grid 9 **0.279**



Date/Time: 2008/7/16 10:57:26

Test Laboratory: Advance Data Technology

H_836.5MHz (WD)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 836.5 MHz

Communication System: CDMA ; Frequency: 836.5 MHz; Duty Cycle: 1:1; Modulation type: OQPSK
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

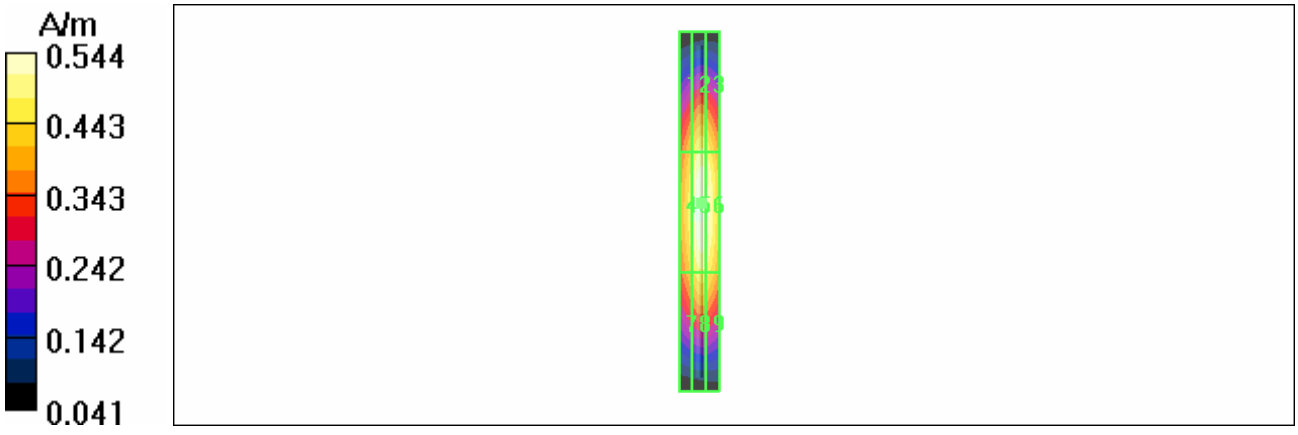
DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.544 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.574 A/m; Power Drift = -0.015 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.431**	Grid 2 **0.486**	Grid 3 **0.474**
Grid 4 **0.483**	Grid 5 **0.544**	Grid 6 **0.532**
Grid 7 **0.425**	Grid 8 **0.473**	Grid 9 **0.464**



Date/Time: 2008/7/16 11:16:48

Test Laboratory: Advance Data Technology

H_836.5MHz (CW)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 836.5 MHz

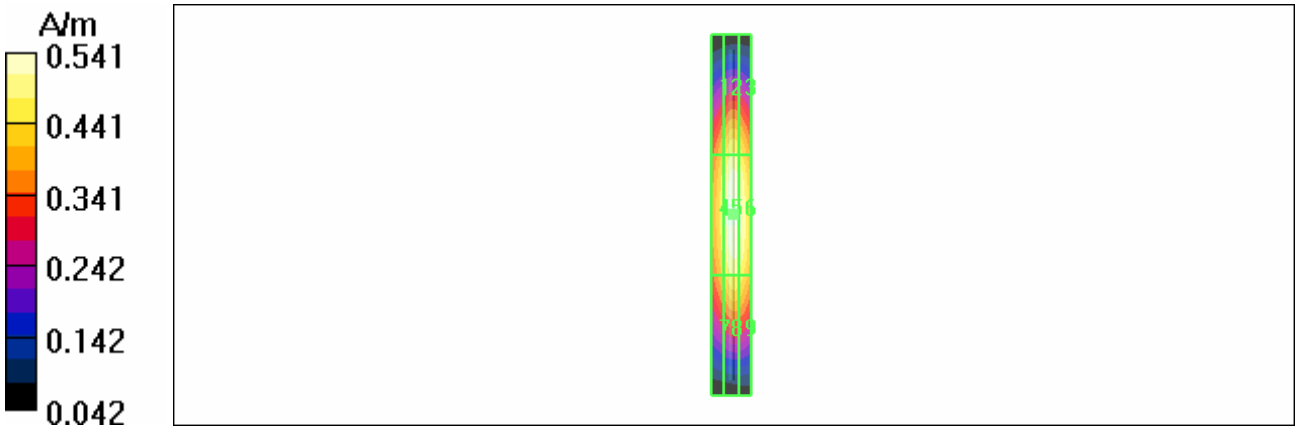
Communication System: CW ; Frequency: 836.5 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.541 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.567 A/m; Power Drift = -0.086 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.433**	Grid 2 **0.482**	Grid 3 **0.468**
Grid 4 **0.484**	Grid 5 **0.541**	Grid 6 **0.528**
Grid 7 **0.427**	Grid 8 **0.480**	Grid 9 **0.470**



Date/Time: 2008/7/16 11:33:10

Test Laboratory: Advance Data Technology

H_836.5MHz (AM 80%)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 836.5 MHz

Communication System: AM ; Frequency: 836.5 MHz; Duty Cycle: 1:1; Modulation type: AM
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

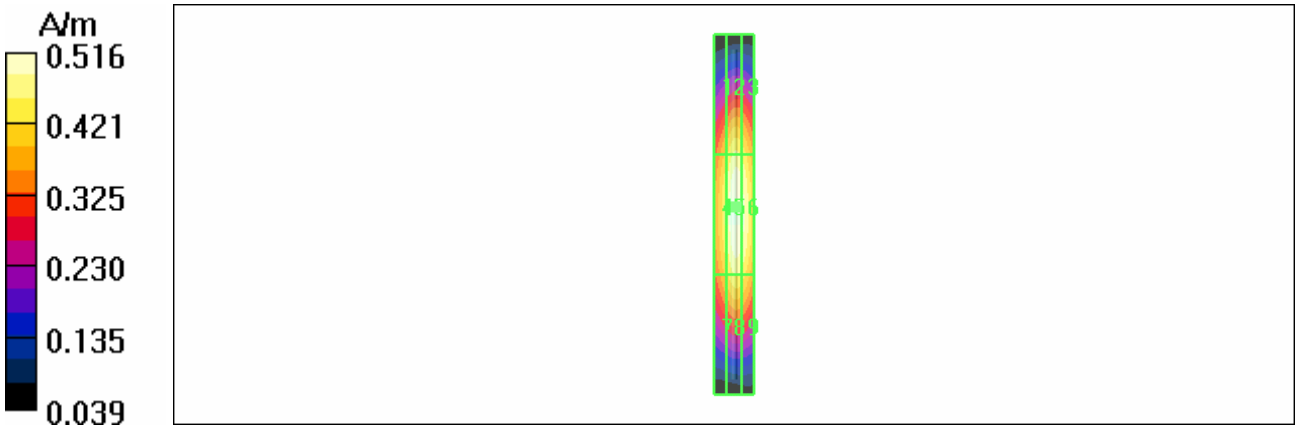
DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.516 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.550 A/m; Power Drift = -0.003 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.414**	Grid 2 **0.462**	Grid 3 **0.450**
Grid 4 **0.464**	Grid 5 **0.516**	Grid 6 **0.502**
Grid 7 **0.410**	Grid 8 **0.455**	Grid 9 **0.443**



Date/Time: 2008/7/16 13:07:13

Test Laboratory: Advance Data Technology

H_1880MHz (WD)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

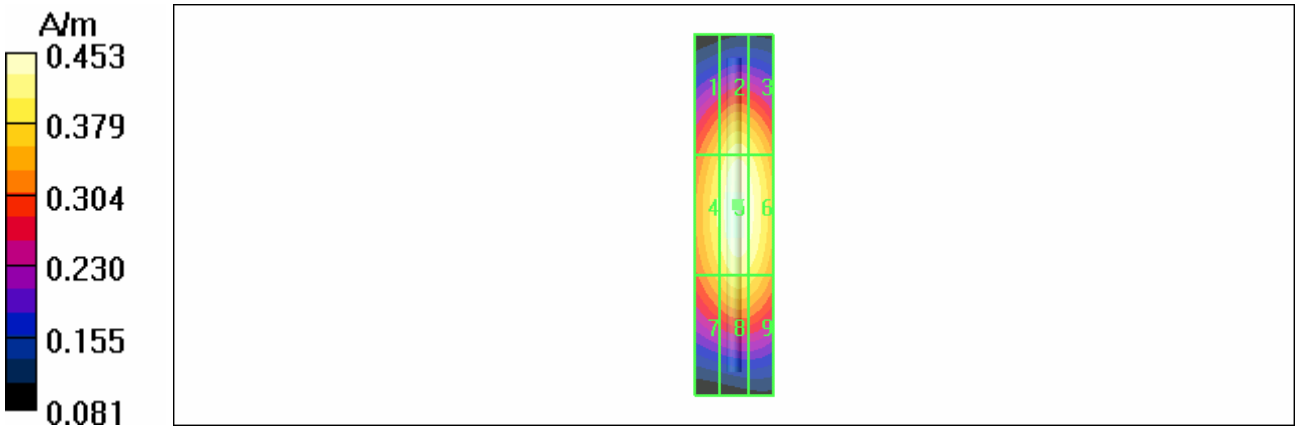
Communication System: CDMA ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: OQPSK
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.453 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.476 A/m; Power Drift = -0.025 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.381**	Grid 2 **0.423**	Grid 3 **0.411**
Grid 4 **0.415**	Grid 5 **0.453**	Grid 6 **0.442**
Grid 7 **0.371**	Grid 8 **0.404**	Grid 9 **0.397**



Date/Time: 2008/7/16 13:21:43

Test Laboratory: Advance Data Technology

H_1880MHz (CW)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

Communication System: CW ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

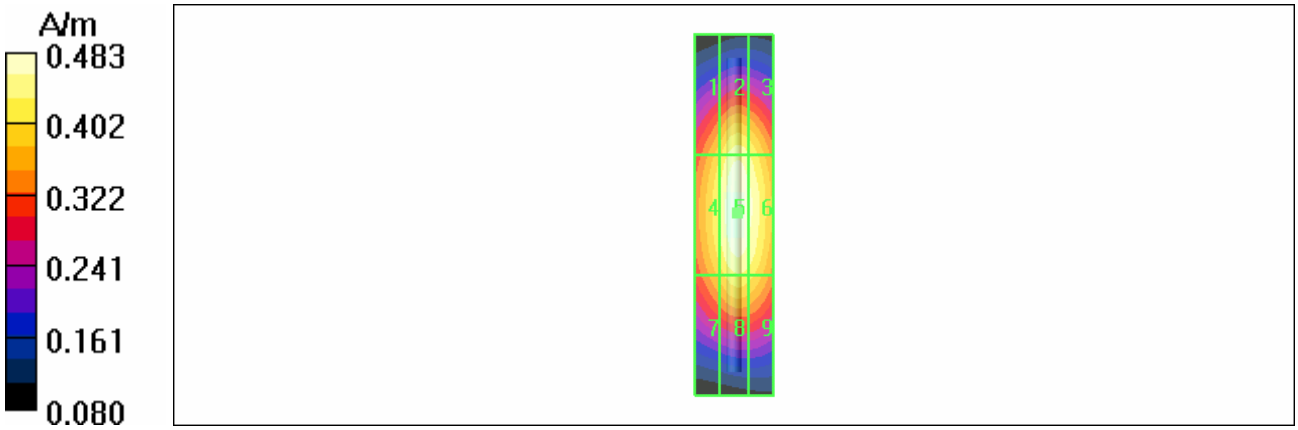
DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.483 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.512 A/m; Power Drift = -0.018 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.399**	Grid 2 **0.449**	Grid 3 **0.433**
Grid 4 **0.434**	Grid 5 **0.483**	Grid 6 **0.468**
Grid 7 **0.388**	Grid 8 **0.427**	Grid 9 **0.417**



Date/Time: 2008/7/16 13:33:04

Test Laboratory: Advance Data Technology

H_1880MHz (AM 80%)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

Communication System: AM ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: AM
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

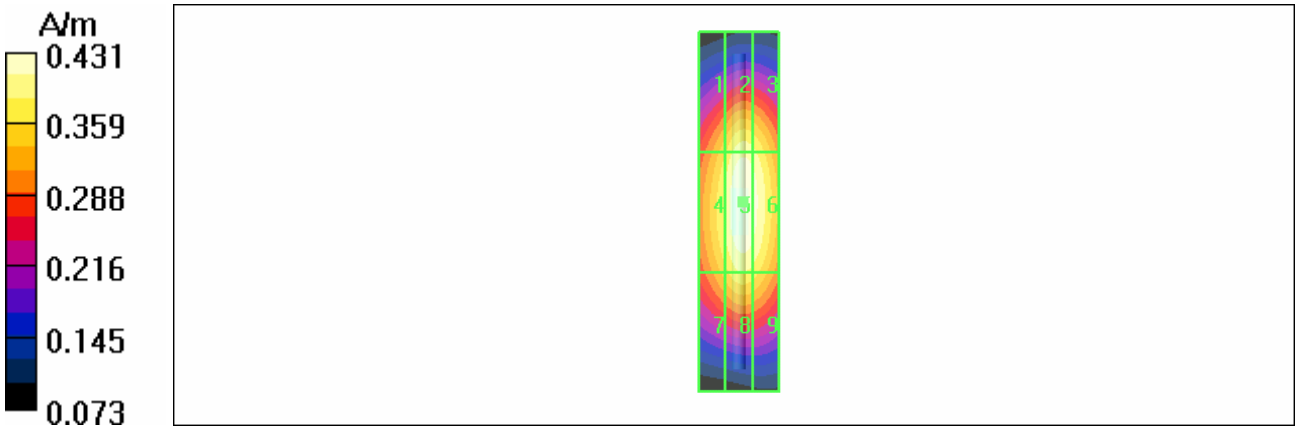
DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.431 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.457 A/m; Power Drift = -0.052 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.355**	Grid 2 **0.400**	Grid 3 **0.389**
Grid 4 **0.389**	Grid 5 **0.431**	Grid 6 **0.418**
Grid 7 **0.349**	Grid 8 **0.383**	Grid 9 **0.372**



Date/Time: 2008/7/16 15:32:15

Test Laboratory: Advance Data Technology

E_836.5MHz (WD)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 836.5 MHz

Communication System: CDMA ; Frequency: 836.5 MHz; Duty Cycle: 1:1; Modulation type: OQPSK
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

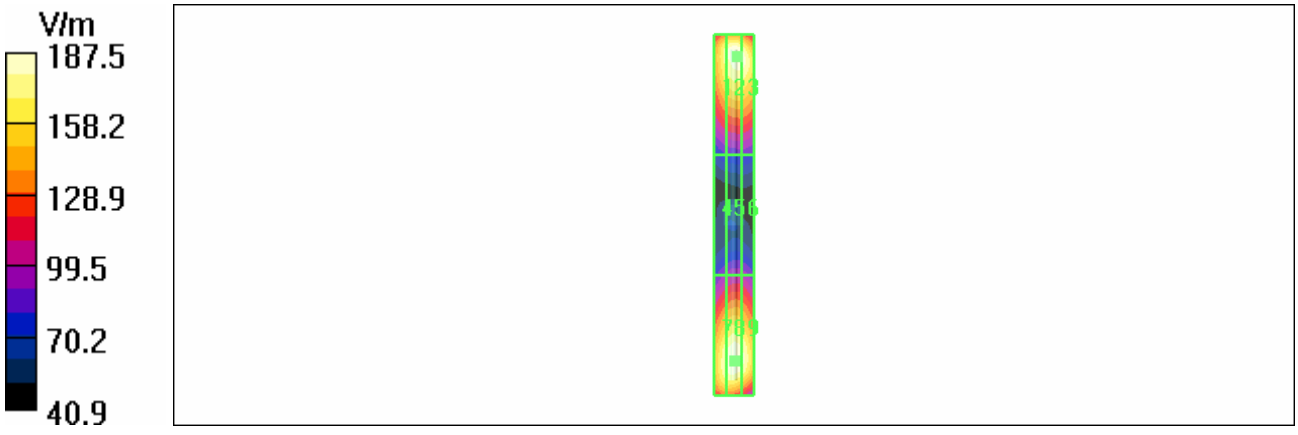
DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 187.5 V/m
Probe Modulation Factor = 1.00
Reference Value = 138.1 V/m; Power Drift = -0.071 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **176.8**	Grid 2 **186.1**	Grid 3 **184.9**
Grid 4 **94.8**	Grid 5 **99.2**	Grid 6 **97.7**
Grid 7 **181.5**	Grid 8 **187.5**	Grid 9 **183.6**



Date/Time: 2008/7/16 15:44:32

Test Laboratory: Advance Data Technology

E_836.5MHz (CW)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 836.5 MHz

Communication System: CW ; Frequency: 836.5 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

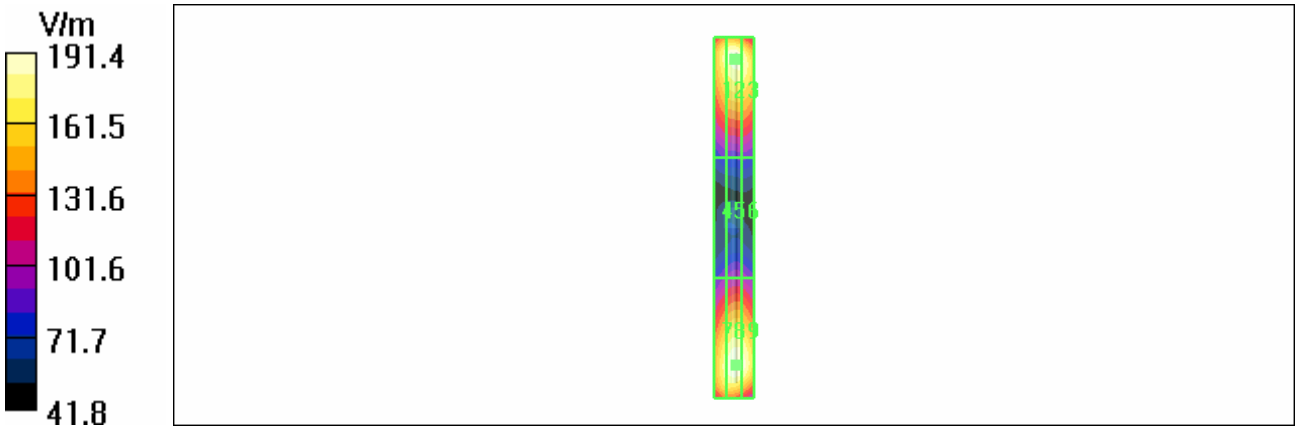
DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 191.4 V/m
Probe Modulation Factor = 1.00
Reference Value = 140.0 V/m; Power Drift = 0.103 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **181.9**	Grid 2 **187.7**	Grid 3 **185.5**
Grid 4 **96.1**	Grid 5 **102.2**	Grid 6 **100.6**
Grid 7 **181.8**	Grid 8 **191.4**	Grid 9 **189.1**



Date/Time: 2008/7/16 15:53:14

Test Laboratory: Advance Data Technology

E_836.5MHz (AM 80%)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 836.5 MHz

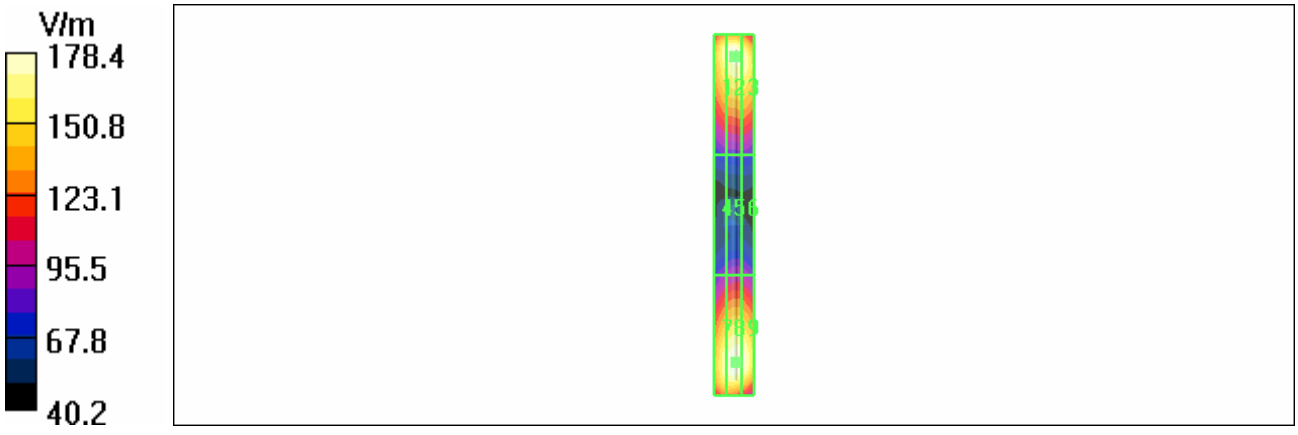
Communication System: AM ; Frequency: 836.5 MHz; Duty Cycle: 1:1; Modulation type: AM
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 178.4 V/m
Probe Modulation Factor = 1.00
Reference Value = 126.2 V/m; Power Drift = -0.067 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **171.5**	Grid 2 **174.7**	Grid 3 **172.9**
Grid 4 **92.1**	Grid 5 **97.0**	Grid 6 **95.9**
Grid 7 **171.6**	Grid 8 **178.4**	Grid 9 **177.2**



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Test Laboratory: Advance Data Technology

E_1880MHz (WD)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

Communication System: CDMA ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: OQPSK
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

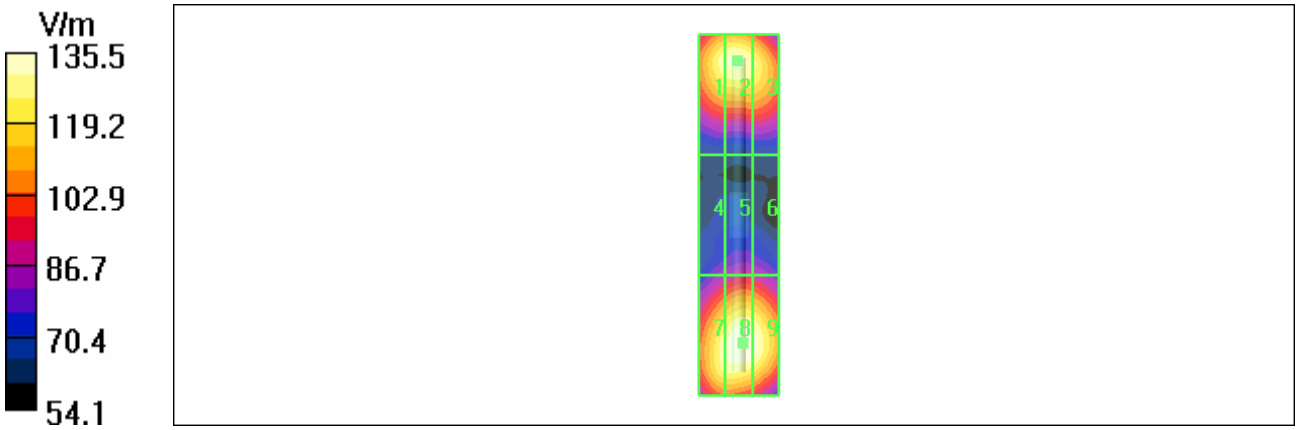
DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD1880 Dipole 2/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 135.5 V/m
Probe Modulation Factor = 1.00
Reference Value = 139.3 V/m; Power Drift = -0.077 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **129.4**	Grid 2 **132.5**	Grid 3 **127.0**
Grid 4 **85.7**	Grid 5 **90.7**	Grid 6 **89.2**
Grid 7 **129.6**	Grid 8 **135.5**	Grid 9 **133.3**



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Test Laboratory: Advance Data Technology

E_1880MHz (CW)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

Communication System: CW ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

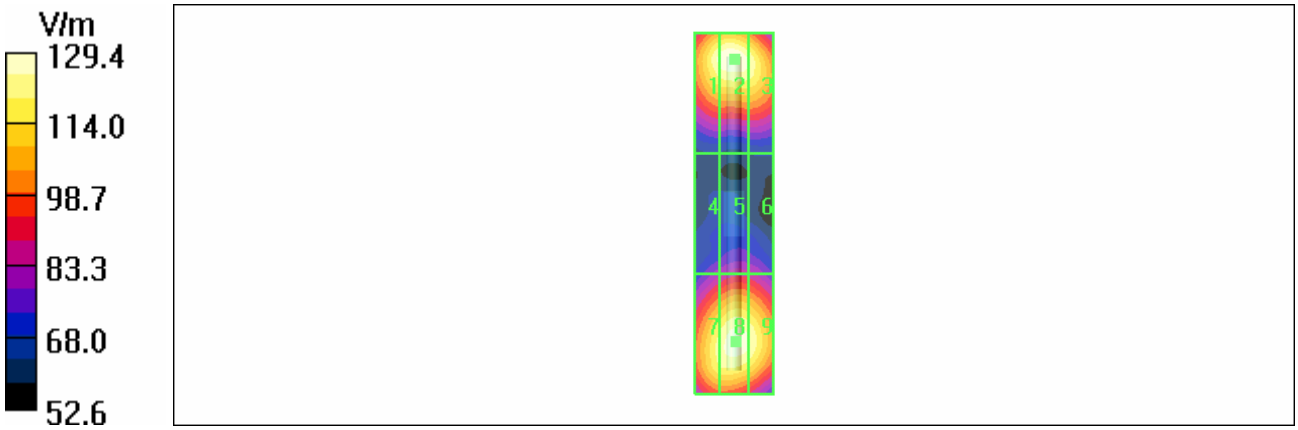
DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 129.4 V/m
Probe Modulation Factor = 1.00
Reference Value = 128.5 V/m; Power Drift = -0.057 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **126.1**	Grid 2 **129.4**	Grid 3 **124.6**
Grid 4 **82.1**	Grid 5 **86.9**	Grid 6 **85.6**
Grid 7 **122.5**	Grid 8 **127.2**	Grid 9 **124.9**



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Test Laboratory: Advance Data Technology

E_1880MHz (AM 80%)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

Communication System: AM ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: AM
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

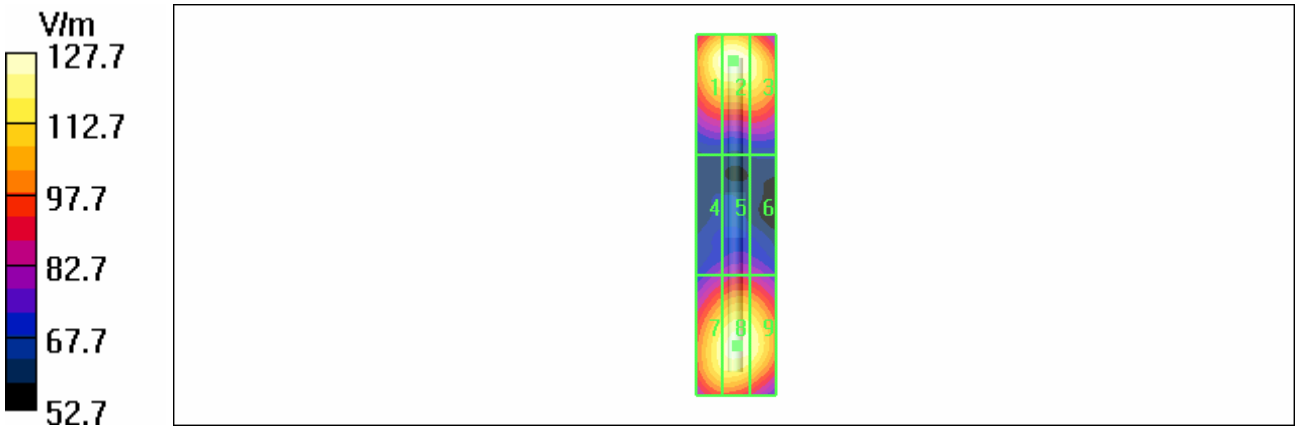
DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 127.7 V/m
Probe Modulation Factor = 1.00
Reference Value = 129.8 V/m; Power Drift = -0.027 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **125.3**	Grid 2 **127.7**	Grid 3 **123.4**
Grid 4 **81.4**	Grid 5 **86.5**	Grid 6 **84.6**
Grid 7 **121.5**	Grid 8 **125.4**	Grid 9 **123.6**



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Test Laboratory: Advance Data Technology

H_835MHz (System Validation)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 835 MHz

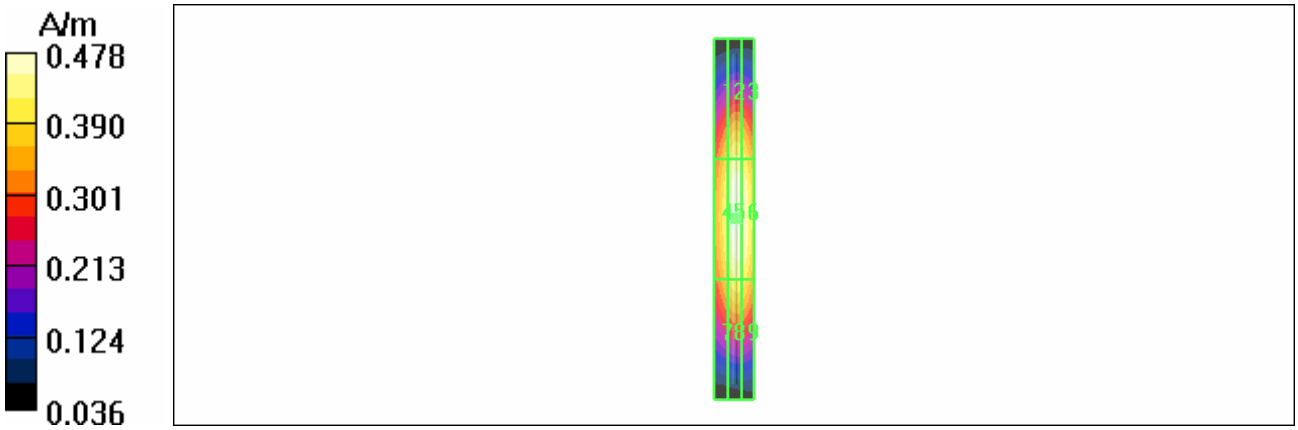
Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.478 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.502 A/m; Power Drift = -0.062 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.383**	Grid 2 **0.429**	Grid 3 **0.416**
Grid 4 **0.429**	Grid 5 **0.478**	Grid 6 **0.466**
Grid 7 **0.376**	Grid 8 **0.420**	Grid 9 **0.412**



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Test Laboratory: Advance Data Technology

H_1880MHz (System Validation)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

Communication System: CW ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

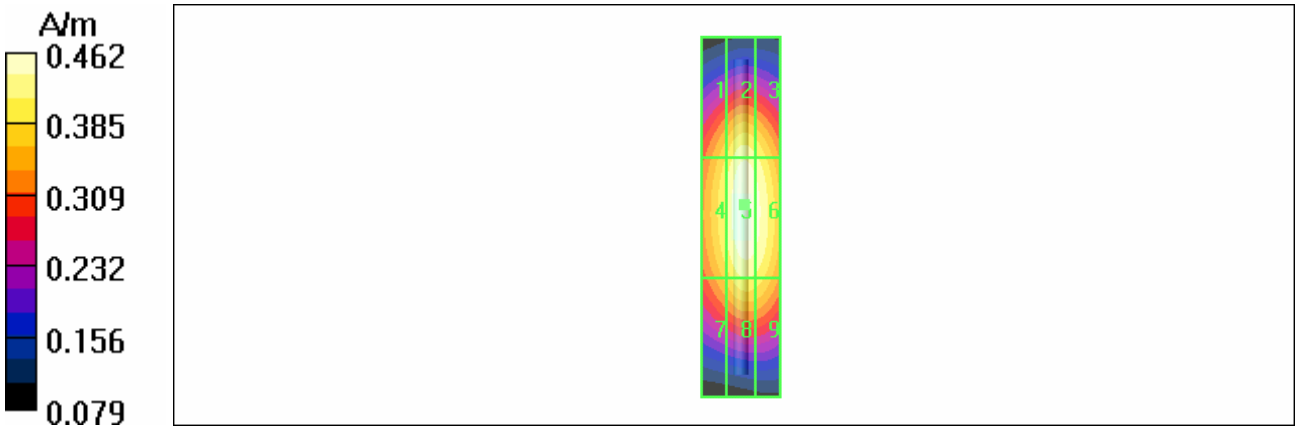
DASY4 Configuration:
- Probe: H3DV6 - SN6124 ; ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

H Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.462 A/m
Probe Modulation Factor = 1.00
Reference Value = 0.485 A/m; Power Drift = -0.033 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.390**	Grid 2 **0.432**	Grid 3 **0.418**
Grid 4 **0.420**	Grid 5 **0.462**	Grid 6 **0.450**
Grid 7 **0.374**	Grid 8 **0.413**	Grid 9 **0.406**



Date/Time: 2008/7/16 15:13:11

Test Laboratory: Advance Data Technology

E_835MHz (System Validation)

DUT: HAC-Dipole 835 MHz ; Type: D835V3 ; Serial: 1041 ; Test Frequency: 835 MHz

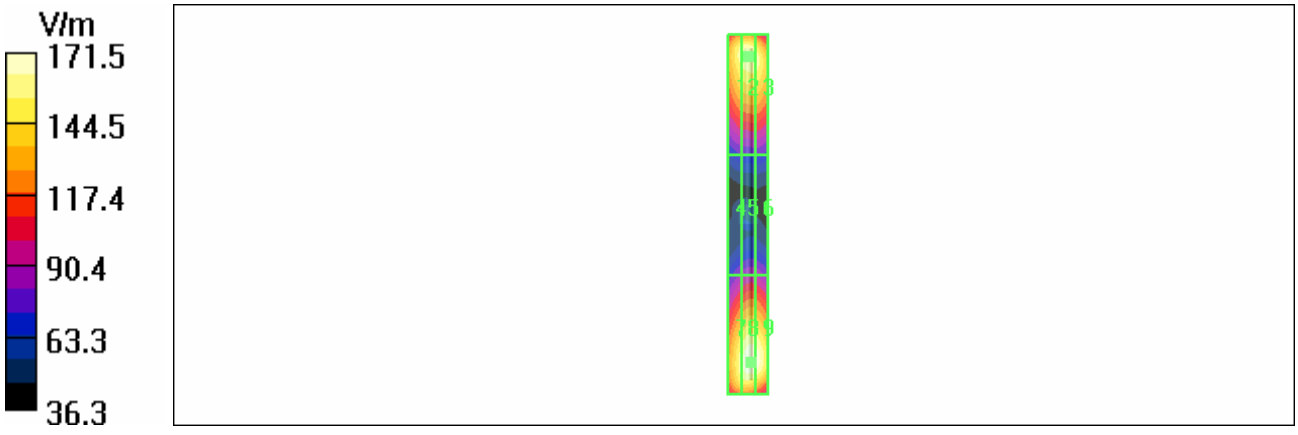
Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 171.5 V/m
Probe Modulation Factor = 1.00
Reference Value = 123.9 V/m; Power Drift = -0.156 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **159.7**	Grid 2 **163.0**	Grid 3 **160.2**
Grid 4 **84.5**	Grid 5 **90.6**	Grid 6 **89.5**
Grid 7 **160.2**	Grid 8 **171.5**	Grid 9 **169.9**



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Test Laboratory: Advance Data Technology

E_1880MHz (System Validation)

DUT: HAC Dipole 1880 MHz ; Type: CD1880V3 ; Serial: 1044 ; Test Frequency: 1880 MHz

Communication System: CW ; Frequency: 1880 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: Air;Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section Measurement Standard: DASY4 (High Precision Assessment);

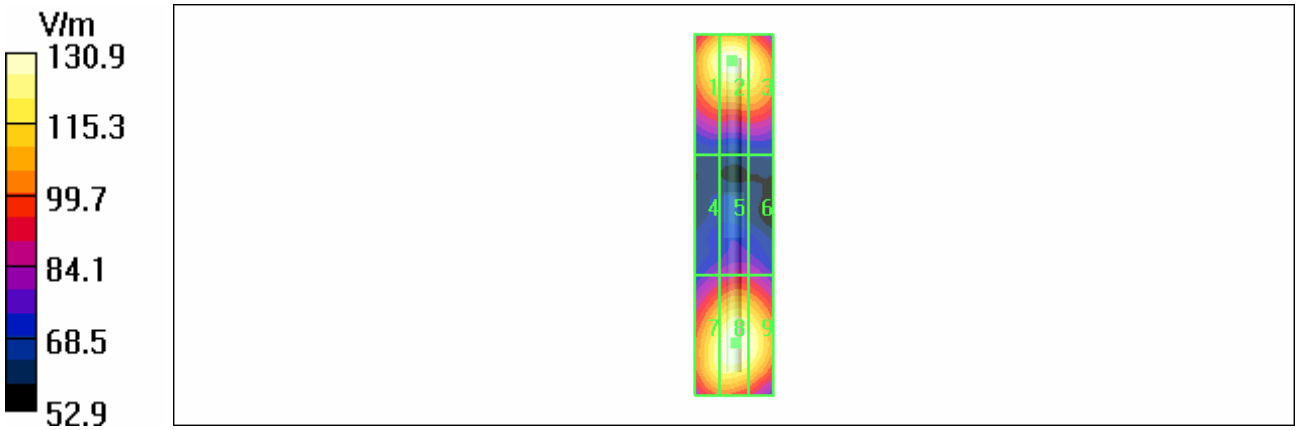
DASY4 Configuration:
- Probe: ER3DV6 - SN2293 ; ConvF(1, 1, 1) ; Calibrated: 2007/1/23
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn510; Calibrated: 2007/8/29
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

E Scan - ER probe center 10mm above CD1880 Dipole 2/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 130.9 V/m
Probe Modulation Factor = 1.00
Reference Value = 132.8 V/m; Power Drift = -0.058 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **127.2**	Grid 2 **130.5**	Grid 3 **125.5**
Grid 4 **83.1**	Grid 5 **88.2**	Grid 6 **86.8**
Grid 7 **125.8**	Grid 8 **130.9**	Grid 9 **128.4**



APPENDIX B: SYSTEM CERTIFICATE & CALIBRATION

B1: SAM PHANTOM

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 CA
Series No	TP-1150 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

[1] CENELEC EN 50361
[2] IEEE P1528-200x draft 6.5
[3] IEC PT 62209 draft 0.9
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 28.02.2002

Signature / Stamp

Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

B2: DOSIMETRIC E-FIELD PROBE

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 Federal Office of Metrology and Accreditation
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 ADT (Auden)

Certificate No: ER3-2293_Jan07

CALIBRATION CERTIFICATE

Object	ER3DV6 - SN:2293
Calibration procedure(s)	QA CAL-02.v4 Calibration procedure for E-field probes optimized for close near field evaluations in air
Calibration date:	January 23, 2007
Condition of the calibrated item	In Tolerance

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe ER3DV6	SN: 2328	2-Oct-06 (SPEAG, No. ER3-2328_Oct06)	Oct-07
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: January 23, 2007

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 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 1309-1996, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 for XY sensors and ϑ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart).
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- *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 *NORMx* (no uncertainty required).

Probe ER3DV6

SN:2293

Manufactured:	October 1, 2002
Last calibrated:	September 22, 2005
Recalibrated:	January 23, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ER3DV6 SN:2293

Sensitivity in Free Space [μV/(V/m)^2]		Diode Compression[A]	
NormX	**1.27** ± 10.1 % (k=2)	DCP X	**95** mV
NormY	**1.06** ± 10.1 % (k=2)	DCP Y	**95** mV
NormZ	**1.42** ± 10.1 % (k=2)	DCP Z	**96** mV

Frequency Correction

X	**0.0**
Y	**0.0**
Z	**0.0**

Sensor Offset (Probe Tip to Sensor Center)

X	**2.5** mm
Y	**2.5** mm
Z	**2.5** mm

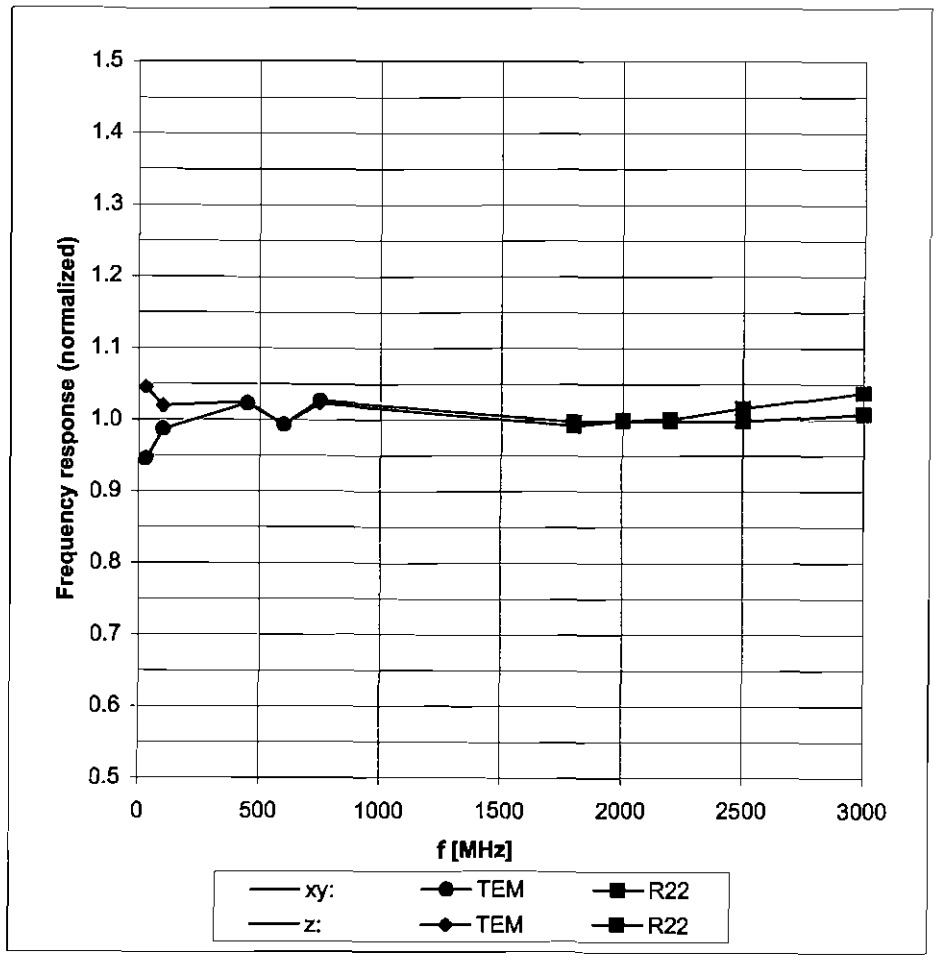
Connector Angle **-12** °

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%.

[A] numerical linearization parameter: uncertainty not required

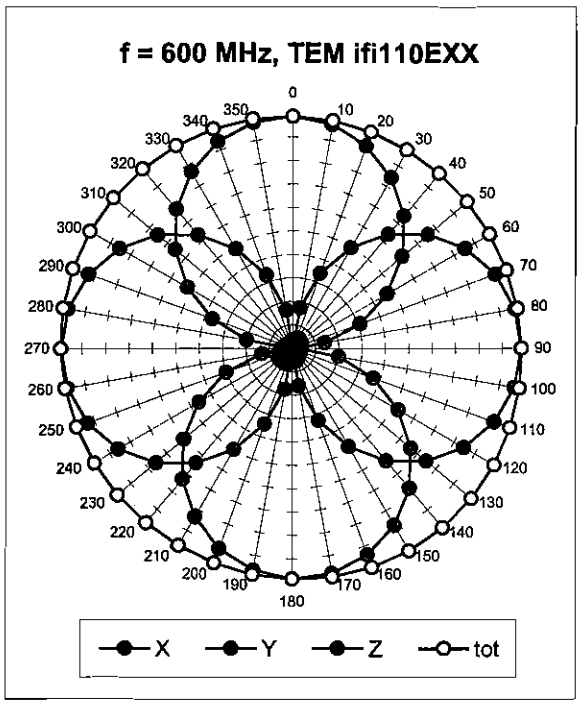
Frequency Response of E-Field

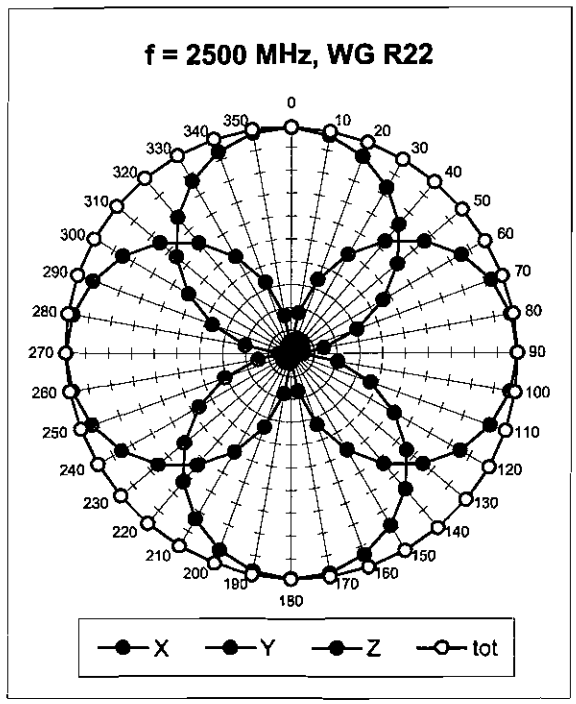
(TEM-Cell:ifi110 EXX, Waveguide R22)



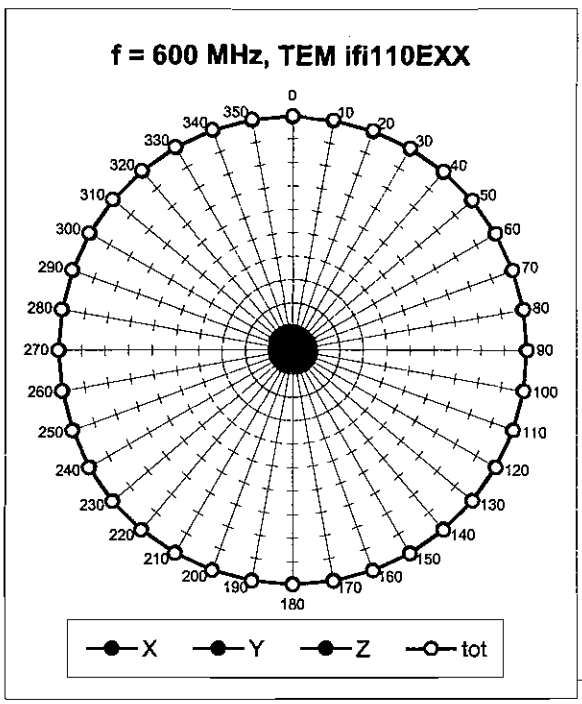
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

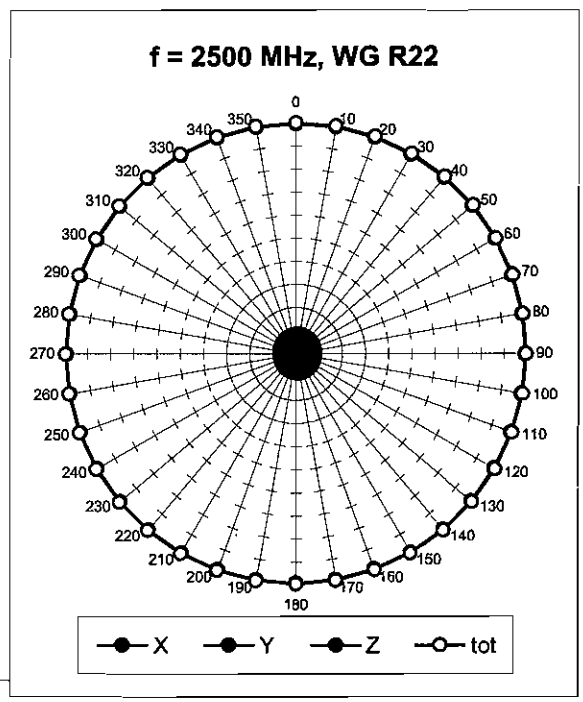
Receiving Pattern (ϕ), ϑ = 0°



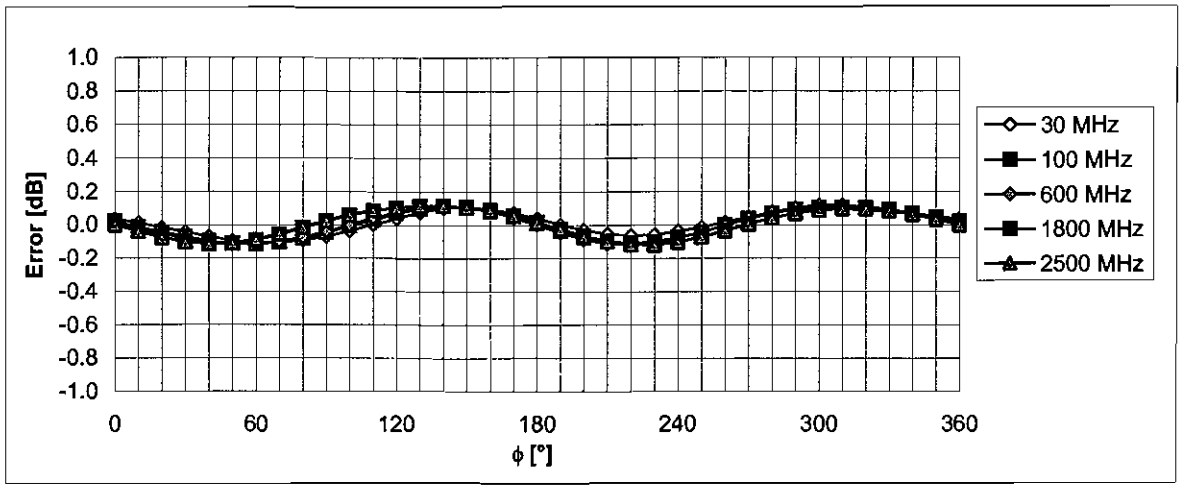


Receiving Pattern (ϕ), ϑ = 90°



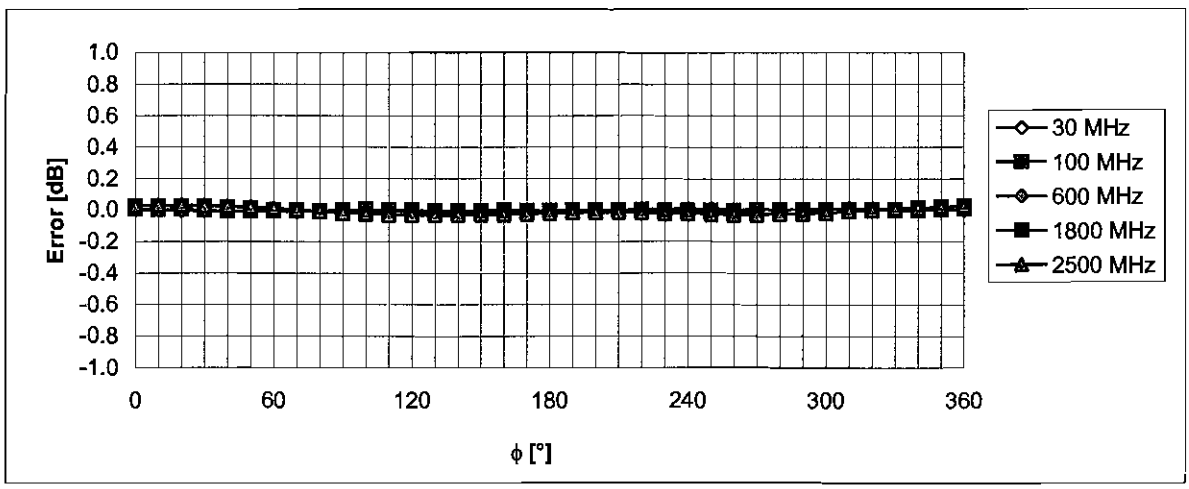


Receiving Pattern (ϕ), ϑ = 0°



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

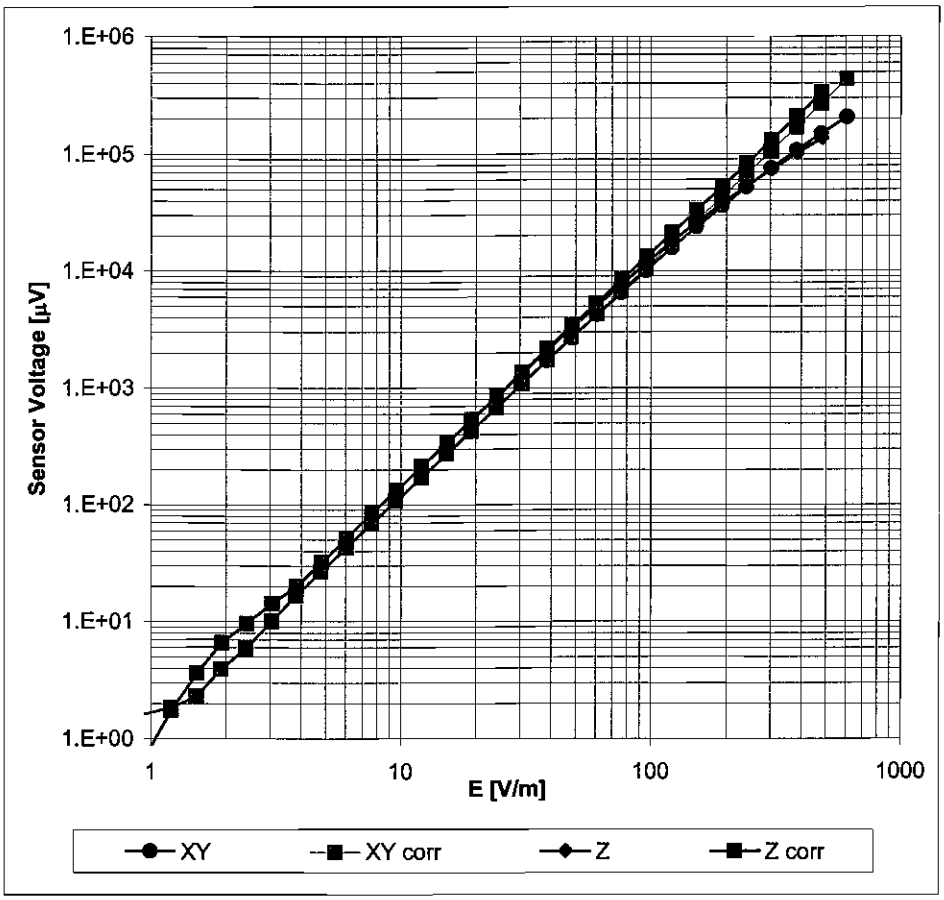
Receiving Pattern (ϕ), ϑ = 90°

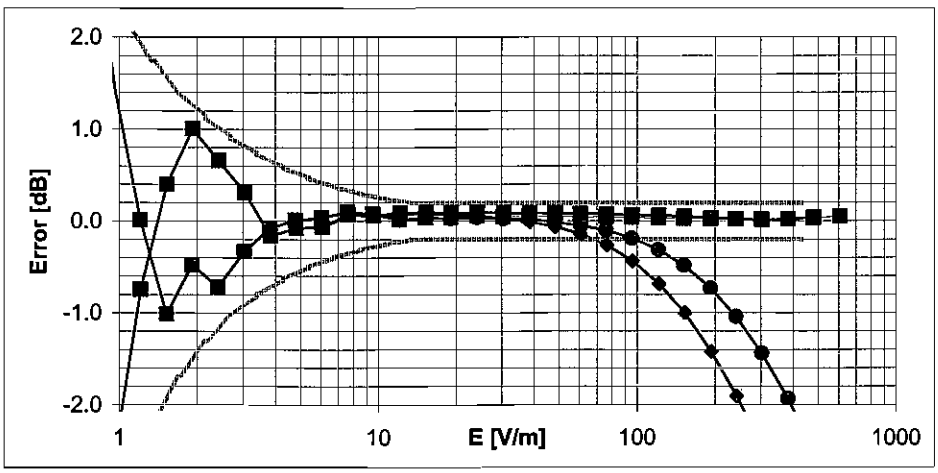


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(E-field)

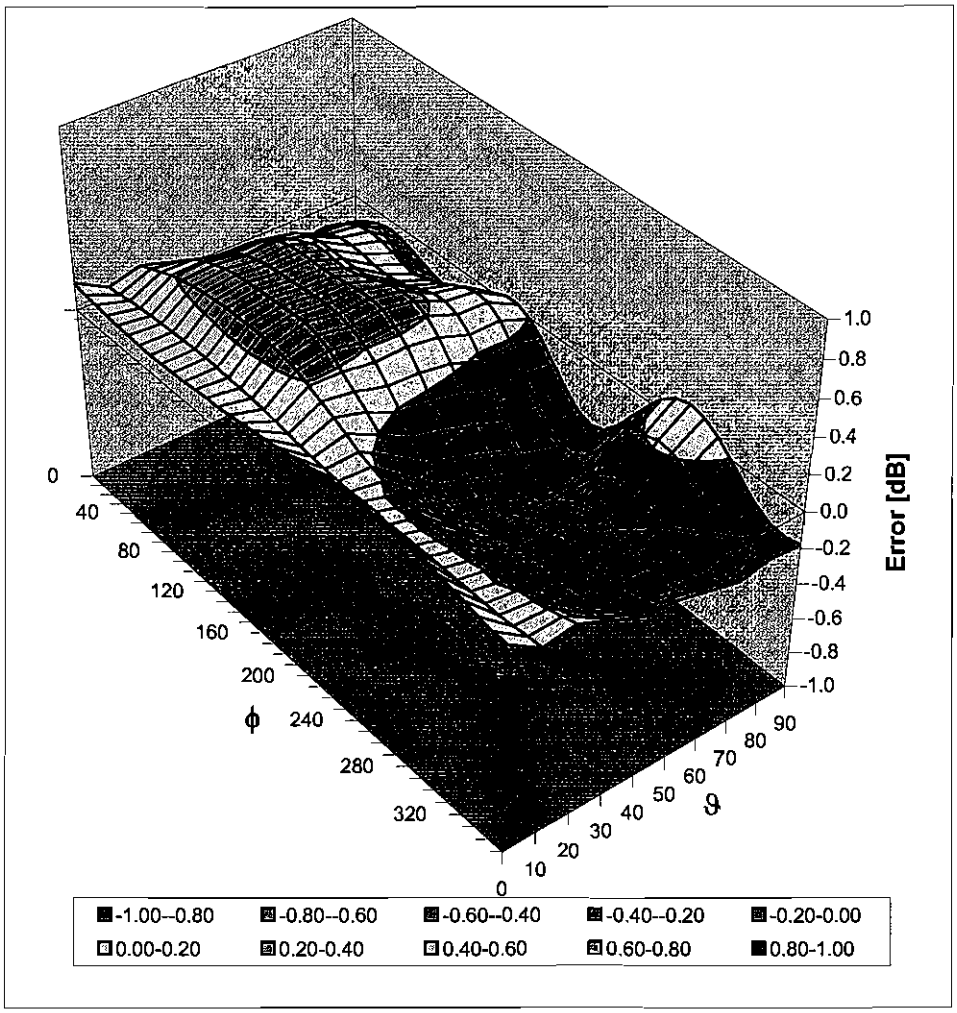
(Waveguide R22, f = 1800 MHz)





Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Deviation from Isotropy in Air
Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

B3: DOSIMETRIC H-FIELD PROBE

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Accreditation No.: SCS 108

Client ADT (Auden)

Certificate No: H3-6124_Jan07

CALIBRATION CERTIFICATE

Object	H3DV6 - SN:6124
Calibration procedure(s)	QA CAL-03.v4 Calibration procedure for H-field probes optimized for close near field evaluations in air
Calibration date:	January 23, 2007
Condition of the calibrated item	In Tolerance

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41495277	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Power sensor E4412A	MY41498087	5-Apr-06 (METAS, No. 251-00557)	Apr-07
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-06 (METAS, No. 217-00592)	Aug-07
Reference 20 dB Attenuator	SN: S5086 (20b)	4-Apr-06 (METAS, No. 251-00558)	Apr-07
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-06 (METAS, No. 217-00593)	Aug-07
Reference Probe H3DV6	SN: 6182	2-Oct-06 (SPEAG, No. H3-6182_Oct06)	Oct-07
DAE4	SN: 654	21-Jun-06 (SPEAG, No. DAE4-654_Jun06)	Jun-07

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: January 23, 2007

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Accreditation No.: SCS 108

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 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 1309-1996, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- *X,Y,Z_a0a1a2:* Assessed for E-field polarization ϑ = 90 for XY sensors and ϑ = 0 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- *X,Y,Z(f)_a0a1a2= X,Y,Z_a0a1a2* frequency_response* (see Frequency Response Chart).
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- *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_a0a1a2* (no uncertainty required).

Probe H3DV6

SN:6124

Manufactured:	June 8, 2002
Last calibrated:	September 22, 2005
Recalibrated:	January 23, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: H3DV6 SN:6124

Sensitivity in Free Space [A/m / √(μV)]

	a0	a1	a2
X	**2.679E-03**	**-9.856E-5**	**5.307E-5** ± 5.1 % (k=2)
Y	**2.790E-03**	**-2.467E-4**	**3.051E-5** ± 5.1 % (k=2)
Z	**3.037E-03**	**-1.907E-4**	**1.047E-5** ± 5.1 % (k=2)

Diode Compression[1]

DCP X	**86** mV
DCP Y	**86** mV
DCP Z	**88** mV

Sensor Offset (Probe Tip to Sensor Center)

X	**3.0** mm
Y	**3.0** mm
Z	**3.0** mm

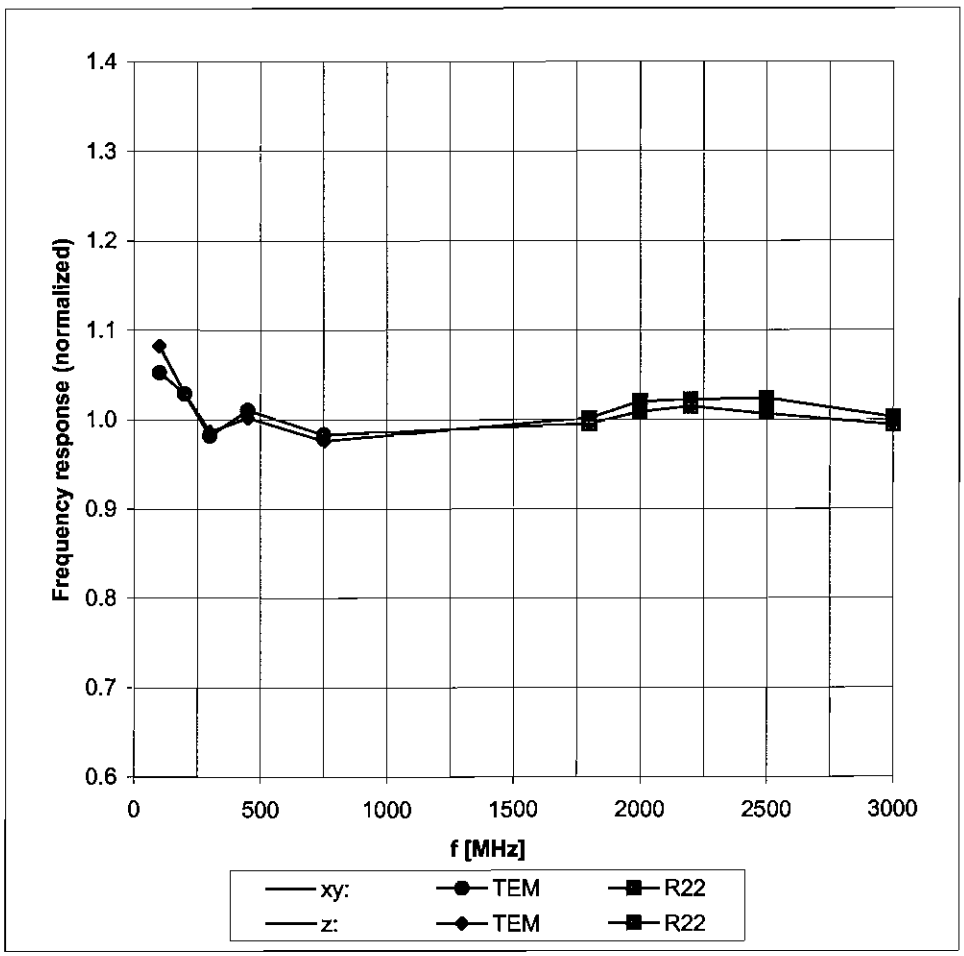
Connector Angle **-25** °

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%.

[1] numerical linearization parameter: uncertainty not required

Frequency Response of H-Field

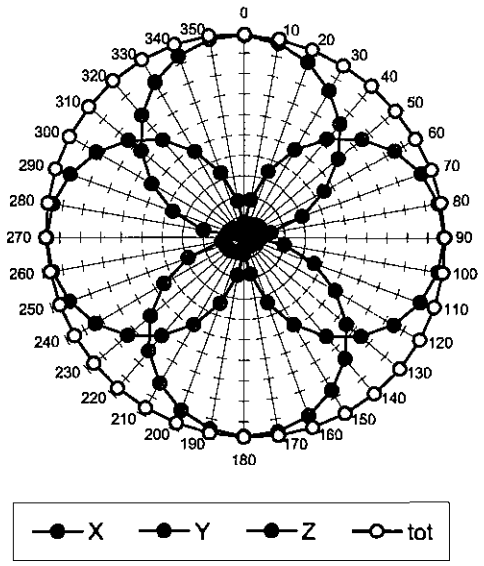
(TEM-Cell:ifi110, Waveguide R22)



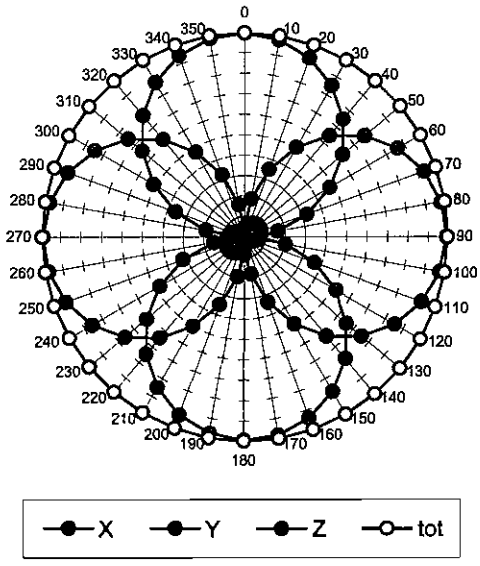
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 90°

f = 300 MHz, TEM ifi110EXX

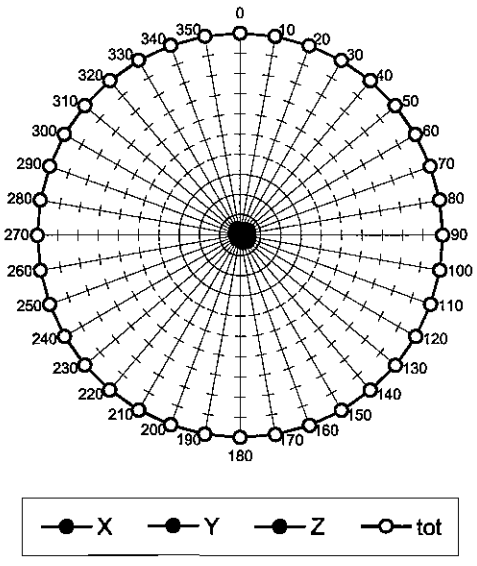


f = 2500 MHz, WG R22

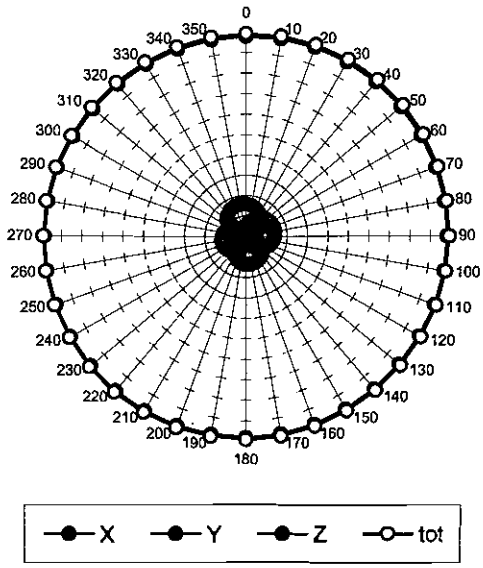


Receiving Pattern (ϕ), ϑ = 0°

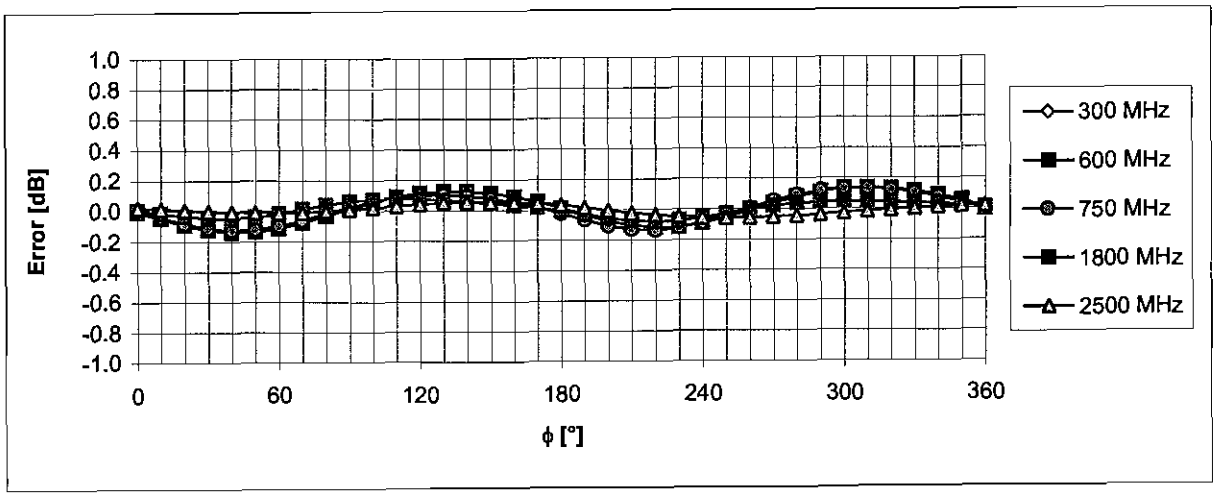
f = 300 MHz, TEM ifi110EXX



f = 2500 MHz, WG R22

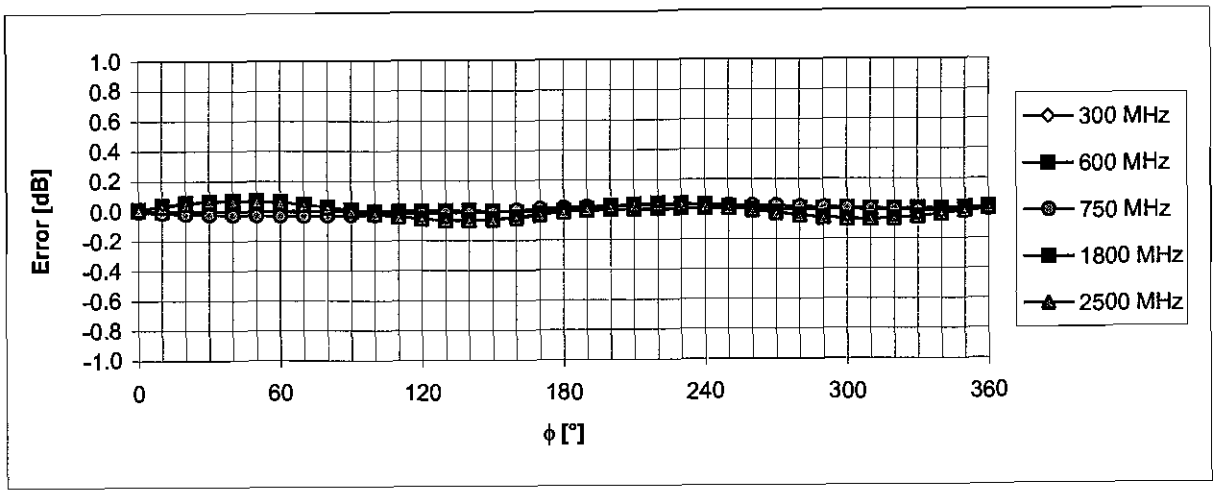


Receiving Pattern (ϕ), ϑ = 90°



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

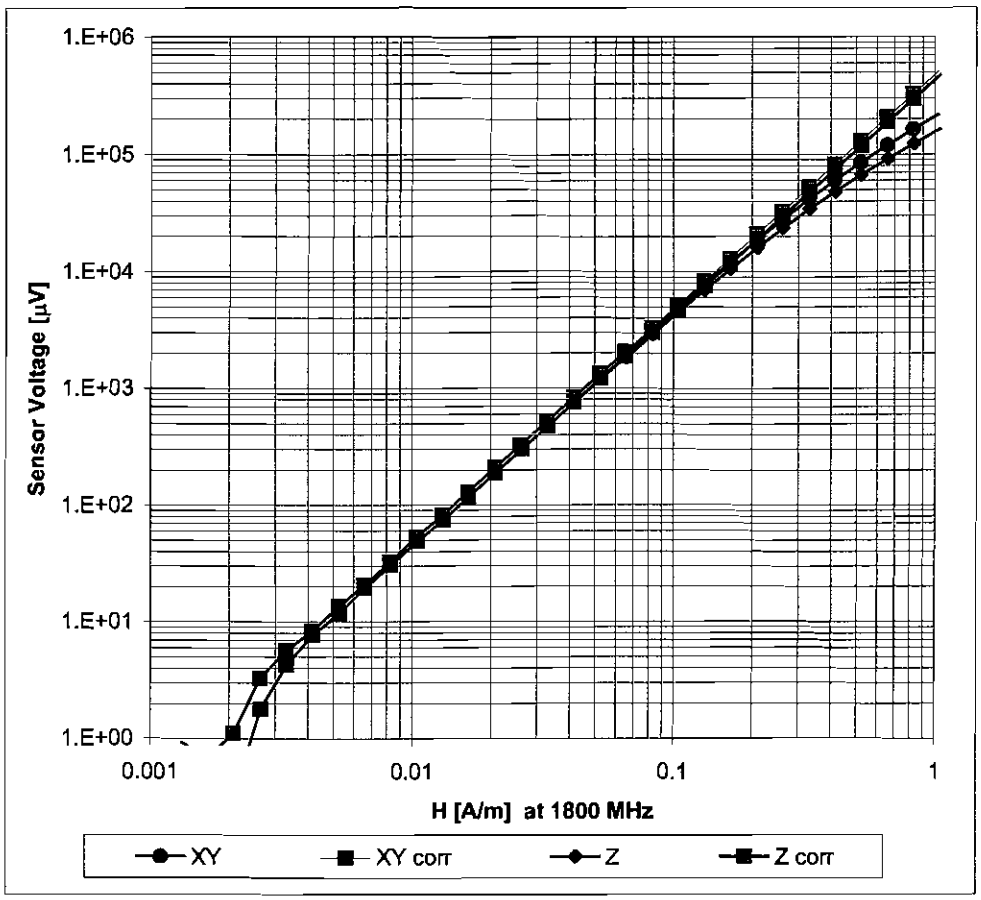
Receiving Pattern (ϕ), ϑ = 0°

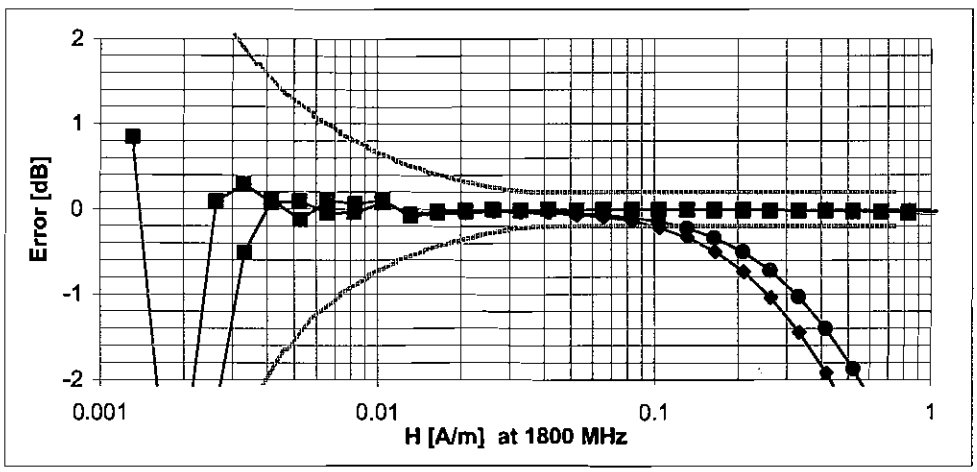


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(H-field)

(Waveguide R22, f = 1800 MHz)





Uncertainty of Linearity Assessment: ± 0.6% (k=2)

B4: DAE

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Accreditation No.: SCS 108

Client ADT (Auden)

Certificate No: DAE3-510_Aug07

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 510
Calibration procedure(s)	QA CAL-06.v12 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	August 29, 2007
Condition of the calibrated item	In Tolerance

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Fluke Process Calibrator Type 702	SN: 6295803	13-Oct-06 (Elcal AG, No: 5492)	Oct-07
Keithley Multimeter Type 2001	SN: 0810278	03-Oct-06 (Elcal AG, No: 5478)	Oct-07
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	25-Jun-07 (SPEAG, in house check)	In house check Jun-08

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: August 29, 2007

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 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:* 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 =	6.1μV ,	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	404.150 ± 0.1% (k=2)	404.218 ± 0.1% (k=2)	404.585 ± 0.1% (k=2)
Low Range	3.98817 ± 0.7% (k=2)	3.97339 ± 0.7% (k=2)	3.96897 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	42 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	200000	200000.7	0.00
Channel X	+ Input	20000	20006.63	0.03
Channel X	- Input	20000	-19999.14	0.00
Channel Y	+ Input	200000	199999.5	0.00
Channel Y	+ Input	20000	20005.23	0.03
Channel Y	- Input	20000	-20002.04	0.01
Channel Z	+ Input	200000	199999.6	0.00
Channel Z	+ Input	20000	20006.53	0.03
Channel Z	- Input	20000	-20001.38	0.01

Low Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	2000	2000	0.00
Channel X	+ Input	200	199.97	-0.01
Channel X	- Input	200	-199.90	-0.05
Channel Y	+ Input	2000	2000.1	0.00
Channel Y	+ Input	200	199.64	-0.18
Channel Y	- Input	200	-200.58	0.29
Channel Z	+ Input	2000	2000	0.00
Channel Z	+ Input	200	199.20	-0.40
Channel Z	- Input	200	-200.81	0.41

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 (μV)	Low Range Average Reading (μV)
Channel X	200	17.82	16.82
	- 200	-16.18	-16.83
Channel Y	200	14.68	14.20
	- 200	-15.70	-16.05
Channel Z	200	-8.25	-8.73
	- 200	8.01	8.08

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	0.75	1.74
Channel Y	200	2.34	-	2.77
Channel Z	200	-1.43	0.25	-

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	15893	16120
Channel Y	16114	16051
Channel Z	16081	16196

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.67	-1.71	-0.06	0.26
Channel Y	-1.04	-3.37	0.35	0.34
Channel Z	-1.26	-3.29	0.15	0.35

6. Input Offset Current

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

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2001	198.5
Channel Y	0.2001	199.2
Channel Z	0.2000	200.3

8. Low Battery Alarm Voltage (verified during pre test)

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

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9

B5: VALIDATION DIPOLE

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Accreditation No.: SCS 108

Client **ADT (Auden)**

Certificate No: CD835V3-1041_May08

CALIBRATION CERTIFICATE

Object	CD835V3 - SN: 1041
Calibration procedure(s)	QA CAL-20.v4 Calibration procedure for dipoles in air
Calibration date:	May 14, 2008
Condition of the calibrated item	In Tolerance

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	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Probe ER3DV6	SN: 2336	31-Dec-07 (No. ER3-2336_Dec07)	Dec-08
Probe H3DV6	SN: 6065	31-Dec-07 (No. H3-6065_-Dec07)	Dec-08
DAE4	SN: 781	2-Oct-07 (No. DAE4-781_Oct07)	Oct-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB42420191	11-May-05 (in house check Oct -07)	In house check: Nov-08
Power sensor HP 8482A	US37295597	11-May-05 (in house check Oct -07)	In house check: Nov-08
Power sensor HP 8482H	3318A09450	08-Jan-02 (in house check Oct -07)	In house check: Nov-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Nov-09
RF generator E4433B	MY 41310391	22-Nov-04 (in house check Oct-07)	In house check: Nov-09

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	M. Meili
Approved by:	Fin Bomholt	Technical Director	F. Bomholt

Issued: May 19, 2008

References

[1] ANSI-C63.19-2006
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 standard [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 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 DASY4 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 eliminating 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	DASY4	V4.7 B71
DASY PP Version	SEMCAD	V1.8 B184
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 180 mm
Frequency	**835 MHz** ± 1 MHz	
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	**0.456 A/m**

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	164.3 V/m
Maximum measured above low end	100 mW forward power	160.9 V/m
Averaged maximum above arm	100 mW forward power	**162.6 V/m**

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

3 Appendix

3.1 Antenna Parameters

Frequency	**Return Loss**	**Impedance**
800 MHz	15.6 dB	(41.0 – j12.3) Ohm
835 MHz	**27.7 dB**	**(50.0 + j4.1) Ohm**
900 MHz	17.6 dB	(54.7 – j13.2) Ohm
950 MHz	18.2 dB	(48.6 + j12.2) Ohm
960 MHz	13.8 dB	(58.0 + j21.1) Ohm

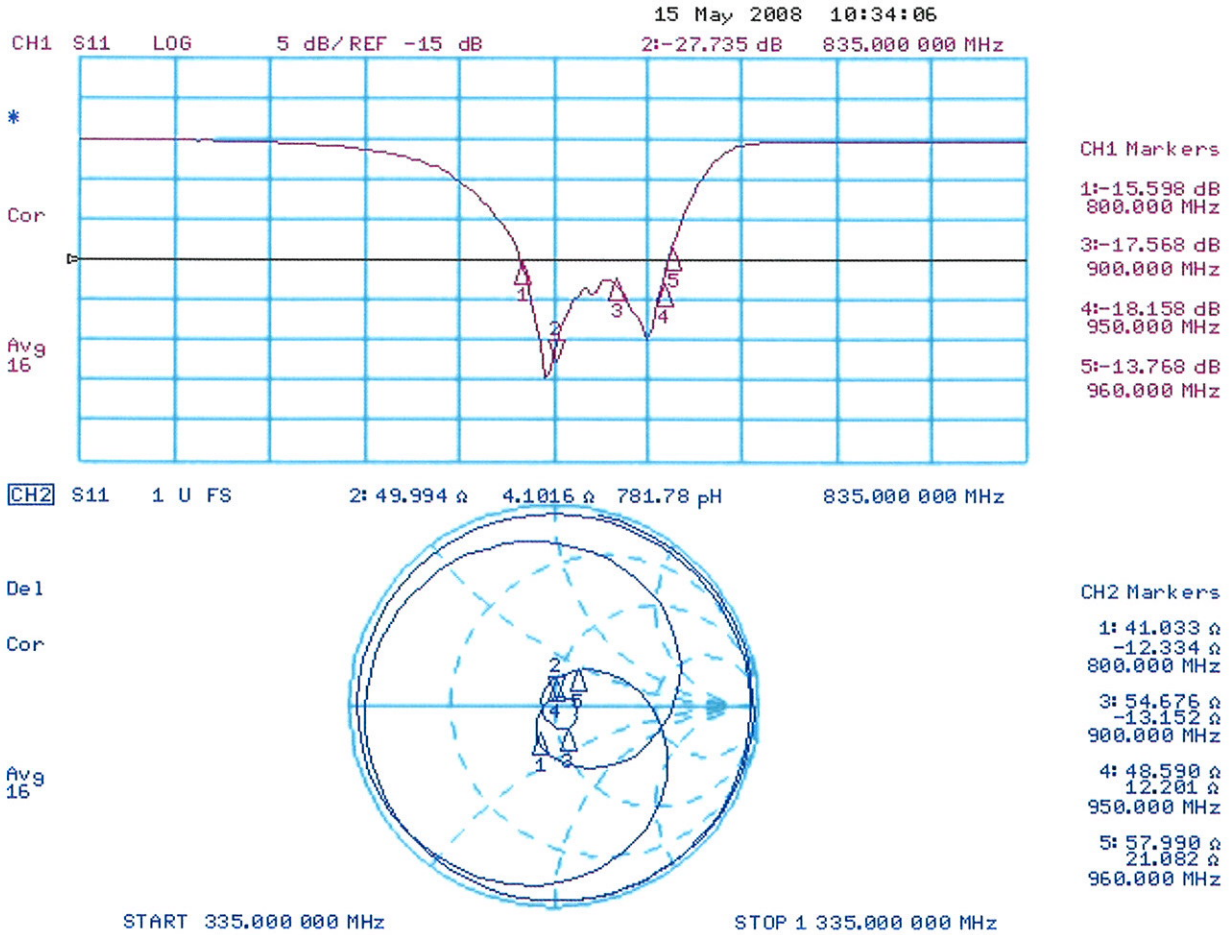
3.2 Antenna Design and Handling

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: 13.05.2008 12:52:58

Test Laboratory: SPEAG Lab 2

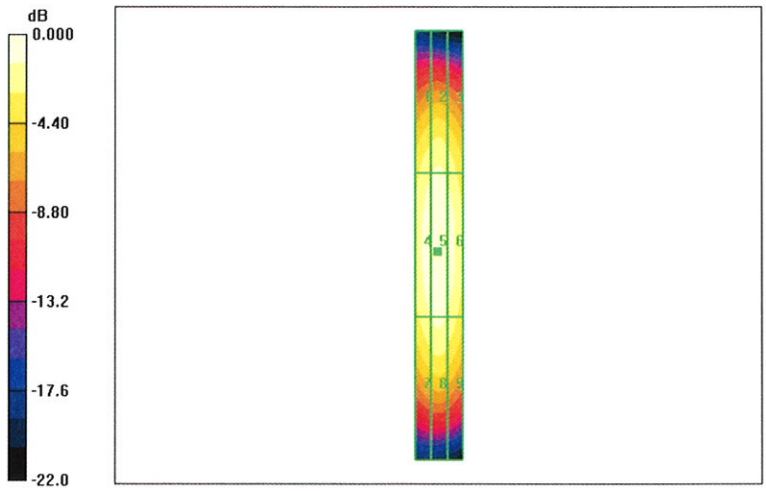
DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1041
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:

- Probe: H3DV6 - SN6065; Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

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 = 0.456 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, -6.30 mm
Reference Value = 0.485 A/m; Power Drift = -0.025 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.381** **M4**	Grid 2 **0.399** **M4**	Grid 3 **0.374** **M4**
Grid 4 **0.434** **M4**	Grid 5 **0.456** **M4**	Grid 6 **0.427** **M4**
Grid 7 **0.385** **M4**	Grid 8 **0.404** **M4**	Grid 9 **0.378** **M4**



0 dB = 0.456A/m

3.3.3 DASY4 E-field result

Date/Time: 14.05.2008 11:32:24

Test Laboratory: SPEAG Lab 2

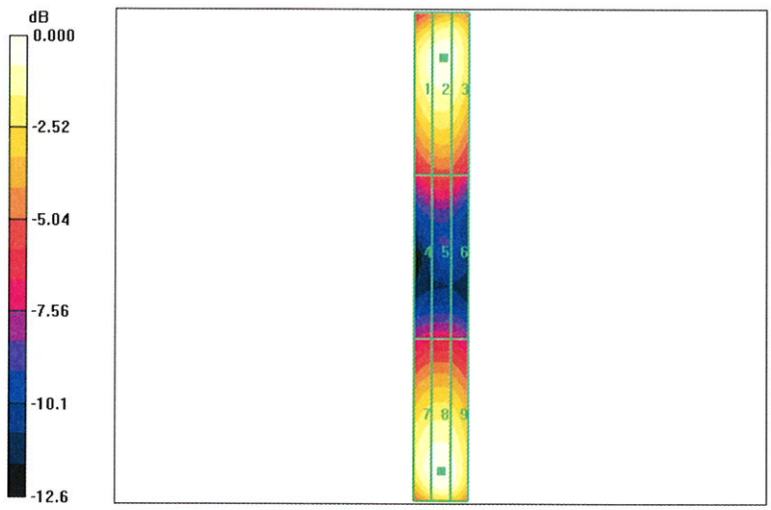
DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1041
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - Sensor Center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 164.3 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 105.9 V/m; Power Drift = -0.005 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **155.7** **M4**	Grid 2 **160.9** **M4**	Grid 3 **157.3** **M4**
Grid 4 **85.3** **M4**	Grid 5 **88.0** **M4**	Grid 6 **85.7** **M4**
Grid 7 **157.9** **M4**	Grid 8 **164.3** **M4**	Grid 9 **159.0** **M4**



0 dB = 164.3V/m

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

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

Certificate No: CD1880V3-1044_Apr08

CALIBRATION CERTIFICATE

Object	CD1880V3 - SN: 1044
Calibration procedure(s)	QA CAL-20.v4 Calibration procedure for dipoles in air
Calibration date:	April 10, 2008
Condition of the calibrated item	In Tolerance

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	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Probe ER3DV6	SN: 2336	31-Dec-07 (No. ER3-2336_Dec07)	Dec-08
Probe H3DV6	SN: 6065	31-Dec-07 (No. H3-6065_-Dec07)	Dec-08
DAE4	SN: 781	2-Oct-07 (No. DAE4-781_Oct07)	Oct-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB42420191	11-May-05 (in house check Oct -07)	In house check: Nov-08
Power sensor HP 8482A	US37295597	11-May-05 (in house check Oct -07)	In house check: Nov-08
Power sensor HP 8482H	3318A09450	08-Jan-02 (in house check Oct -07)	In house check: Nov-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Nov-09

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Fin Bomholt	Technical Director	

Issued: April 14, 2008

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

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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.

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 standard [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 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 DASY4 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 eliminating 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	DASY4	V4.7 B61
DASY PP Version	SEMCAD	V1.8 B176
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	**1880 MHz** ± 1 MHz	
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	**0.464 A/m**

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	141.4 V/m
Maximum measured above low end	100 mW forward power	139.9 V/m
Averaged maximum above arm	100 mW forward power	**140.7 V/m**

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

3. Appendix

3.1 Antenna Parameters

Frequency	**Return Loss**	**Impedance**
1710 MHz	19.6 dB	(49.6 + j10.5) Ohm
1880 MHz	**21.4 dB**	**(52.4 + j8.4) Ohm**
1900 MHz	22.1 dB	(54.7 + j6.7) Ohm
1950 MHz	28.8dB	(53.4 - j1.6) Ohm
2000 MHz	19.0 dB	(40.0 + j1.6) Ohm

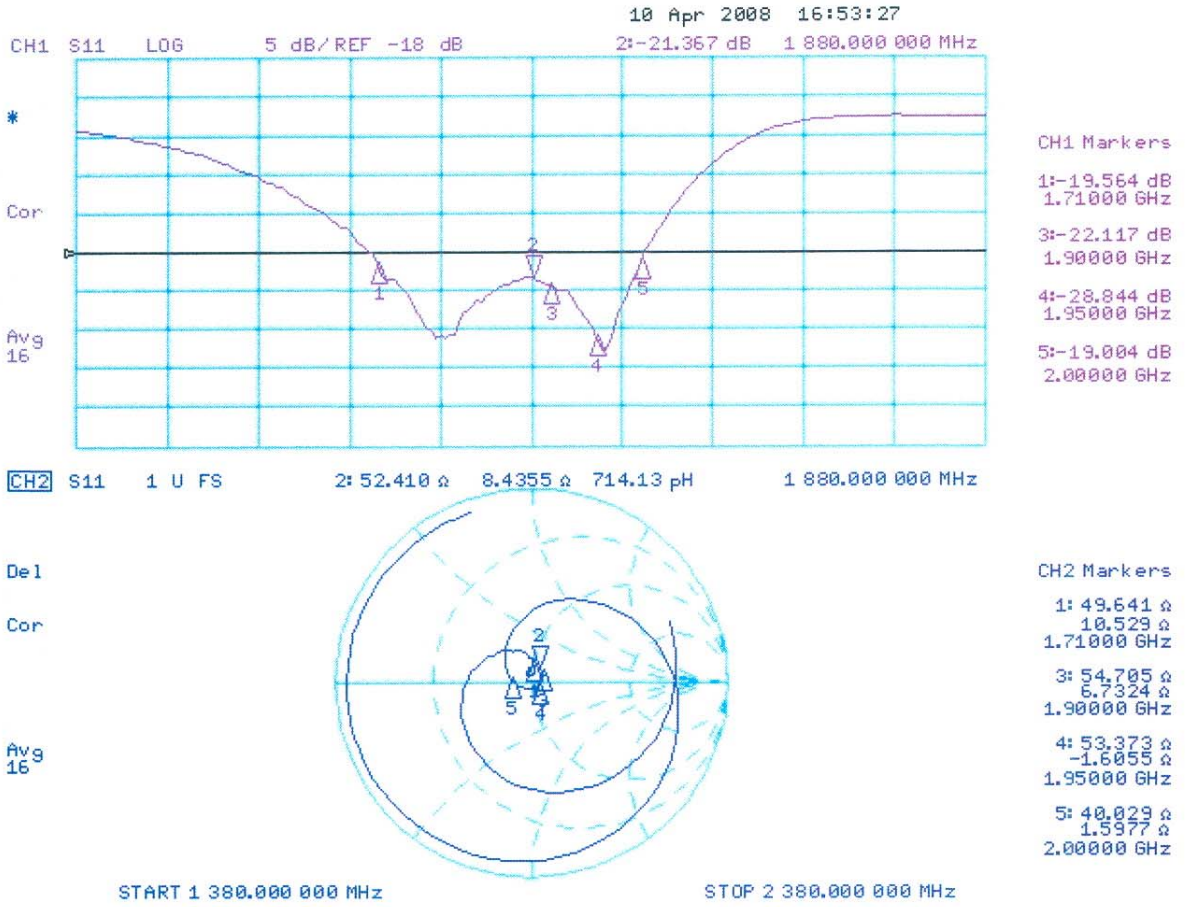
3.2 Antenna Design and Handling

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: 09.04.2008 15:00:21

Test Laboratory: SPEAG Lab 2

H_CD1880_1044_080409

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1044

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

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

Phantom section: H Dipole Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 65; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of peak Total field = 0.464 A/m

Probe Modulation Factor = 1.00

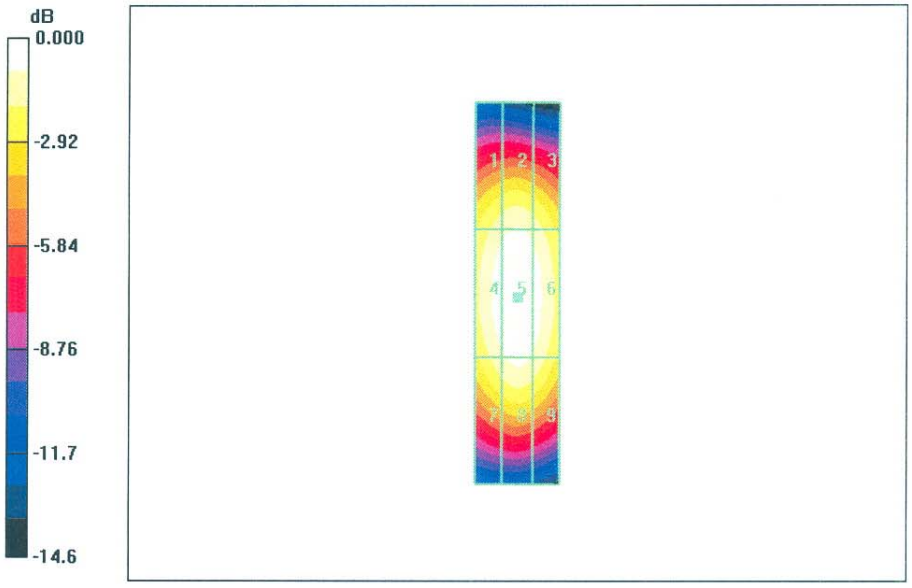
Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.492 A/m; Power Drift = -0.003 dB

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

Peak H-field in A/m

Grid 1 **0.402 M2**	Grid 2 **0.420 M2**	Grid 3 **0.398 M2**
Grid 4 **0.444 M2**	Grid 5 **0.464 M2**	Grid 6 **0.442 M2**
Grid 7 **0.406 M2**	Grid 8 **0.430 M2**	Grid 9 **0.409 M2**



0 dB = 0.464A/m

3.3.2 DASY4 E-Field Result

Date/Time: 10.04.2008 12:31:18

Test Laboratory: SPEAG Lab 2

E_CD1880_1044_080410

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1044

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section
Measurement Standard: DASY4 (High Precision Assessment)
DASY4 Configuration:

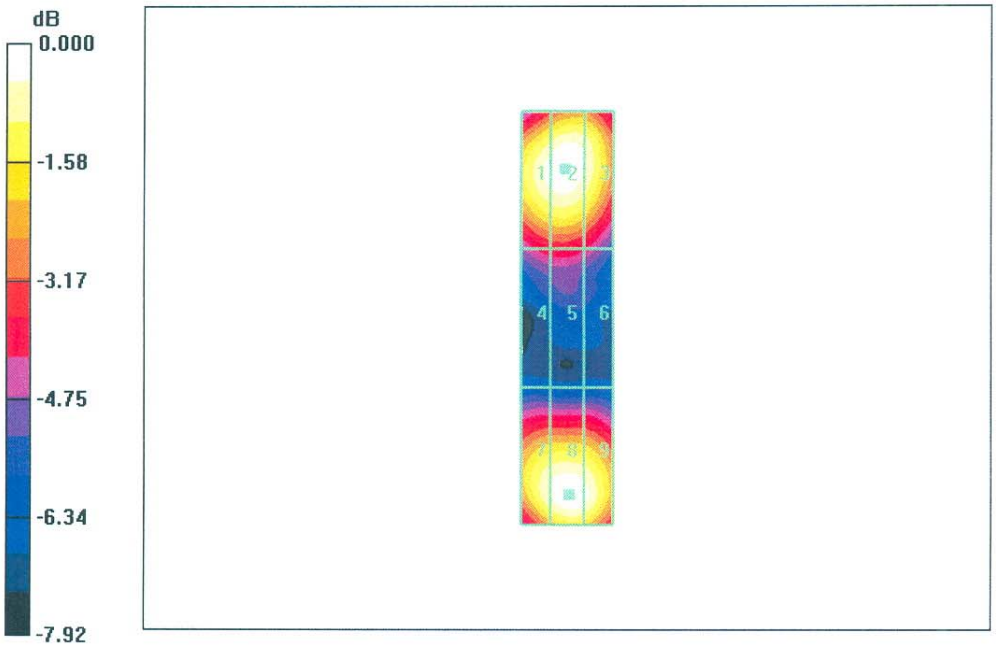
- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 61; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 141.4 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 160.0 V/m; Power Drift = 0.013 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **136.8 M2**	Grid 2 **139.9 M2**	Grid 3 **134.0 M2**
Grid 4 **91.9 M3**	Grid 5 **93.3 M3**	Grid 6 **87.9 M3**
Grid 7 **134.9 M2**	Grid 8 **141.4 M2**	Grid 9 **137.4 M2**



0 dB = 141.4V/m