Hearing Aid Compatibility(HAC) TEST REPORT

<For RF-Emission measurement>

Applicant Name	HTC Corporation.
Address of Applicant	No.23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan
EUT Name	Smartphone
Model Number	PH06130
Date of receive	2011.04.13
Date of Test(s)	2011.04.24, 2011.05.10
Date of Issue	2011.06.14

Standards:

ANSI C63.19-2007

FCC RULE PART(S): 47 CFR PART 20.19(B)
HAC CATEGORY: M3 (M Category)

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan Electronics & Communication Laboratory or testing done by SGS Taiwan Electronics & Communication Laboratory in connection with distribution or use of the product described in this report must be approved by SGS Taiwan Electronics & Communication Laboratory in writing.

Tested by : Ricky Huang

Ricky Huang
Asst. Supervisor Date: 2011/06/14

Approved by: Nick Hsu

Nick Hsu
Supervisor Date: 2011/06/14

Revision Version

Report Number	Revision	Date	Memo
ES/2011/40009-01	00	2011/06/10	Initial creation of test report.
ES/2011/40009-01	01	2011/06/14	1st modification

This test repot contains a reference to the previous version test report that it replaces.

Table of Contents

1. Introduction

The purpose of the Hearing Aid Compatibility extension is to enable measurements of the near electric and magnetic fields generated by wireless communication devices in the region controlled for use by a hearing aid in accordance with ANSI-C63.19-2007

FCC has granted a request for waiver of the HAC rules in section 20.19 for dual band GSM handsets. The waiver has specific conditions, as stated in the order (FCC 05-166) and expires 1 August 2006.

The purpose of this standard is to establish categories for hearing aids and for WD (wireless communications devices) that can indicate to health care practitioners and hearing aid users which hearing aids are compatible with which WD, and to provide tests that can be used to assess the electromagnetic characteristics of hearing aids and WD and assign them to these categories. The various parameters required, in order to demonstrate compatibility and accessibility are measured. The design of the standard is such that when a hearing aid and WD achieve one of the categories specified, as measured by the methodology of this standard, the indicated performance is realized.

In order to provide for the usability of a hearing aid with a WD, several factors must be coordinated:

a) Radio frequency (RF) measurements of the near-field electric and magnetic fields emitted by a WD to categorize these emissions for correlation with the RF immunity of a hearing aid.

Hence, the following are measurements made for the WD:

a) RF E-Field emissions
b) RF H-Field emissions

The measurement plane is parallel to, and 1.5cm in front of, the reference plane.

Applications for certification of equipment operation under part 20, that a manufacturer is seeking to certify as hearing aid compatible, as set forth in §20.19 of that part, shall include a statement indication compliance with the test requirements of §20.19 and indicating the appropriate U-rating for the equipment. The manufacturer of the equipment shall be responsible for maintaining the test results.

2. Testing Laboratory

Company Name	SGS Taiwan Ltd. Electronics & Communication Laboratory
Company address	134, Wu Kung Road, Wuku Industrial Zone Taipei, Taiwan, R.O.C.
Telephone	+886-2-2299-3279
Fax	+886-2-2298-0488
Website	http://www.tw.sgs.com/

3. Details of Applicant

Applicant Name	HTC Corporation.
Applicant Address	No.23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan

4. Description of EUT

EUT Name	Smartphone
Model Name	PH06130
Mode of Operation	GSM/GPRS/EGPRS/WCDMA/HSDPA/ HSUPA/WLAN/Bluetooth band

Definition	Production unit					
FCC ID	NM8PH06130					
Duty Cycle	GSM	WCDMA B2	WCDMA B5	WLAN 802.11 b/g/n	Bluetooth	
	1/8	1	1	1	1	
TX Frequency Range (MHz)	GSM 850	GSM 1900	WCDMA B2	WCDMA B5	WLAN 802.11 b/g/n	Bluetooth
	824.2-848.8	1850.2-1909.8	1852.4-1907.6	826.4-846.6	2412-2462	2402-2480
Channel Number (ARFCN)	GSM 850	GSM1900	WCDMA B2	WCDMA B5	WLAN 802.11 b/g/n	Bluetooth
	128-251	512-810	9262-9538	4132-4233	1-11	0-78
VOIP Function	No					
Antenna Type	Internal Antenna					
Declaration	**Second solution(change Camera)**					
	In addition to the Original sample shown in these test results, model PH06130 also has an option for a camera; RF-Emission values were checked on these options using the spot check method. We found results were same or lower than Original for GSM850/GSM1900/ WCDMA B2/ WCDMA B5 but still within 20% of highest measured RF-Emission.					

#. OCT 2010 TCB workshop

Air- Interface	Band (MHZ)	Type	C63.19/tested	Simultaneous Transmissions Note:Not to be tested	Reduced Power 20.19(c)(1)	Voice Over Digital Transpot(Data)
GSM	850	VO	Yes	Yes,WiFi	No	NO
	1900	VO	Yes	Yes,WiFi	No	NO
	GPRS/EDGE	DT	NA	Yes,WiFi	No	NO
WCDMA	850	V/D	Yes	Yes,WiFi	No	NO
	1900	V/D	Yes	Yes,WiFi	No	NO
WiFi	2400	DT	NA	Yes,GSM/EDGA/WCDMA	No	NO

5. Test Environment

Ambient Temperature	22.2° C
Relative Humidity	<60 %

6. System Specifications of DASY4

6.1 Measurement system Diagram for SPEAG Robotic

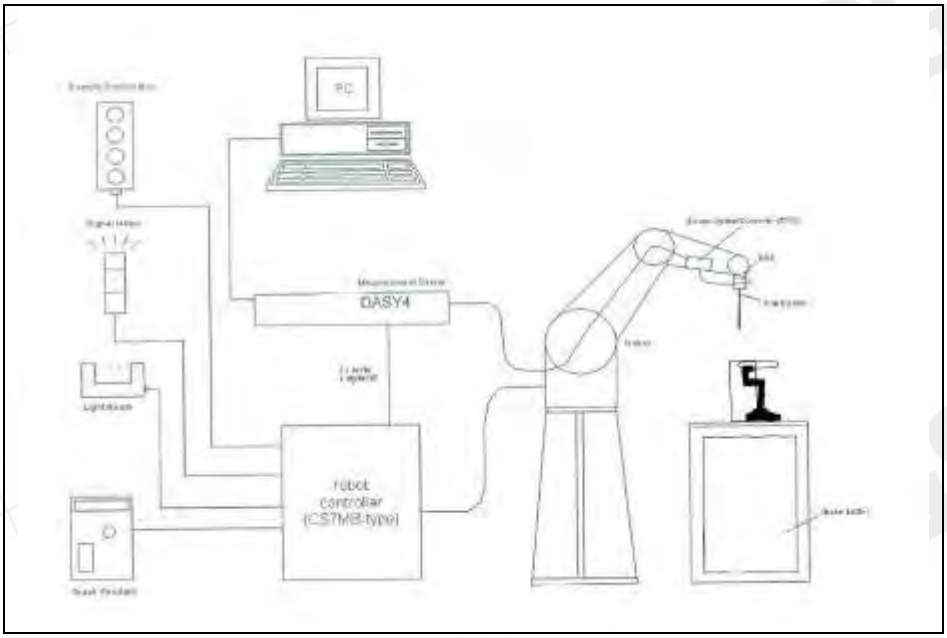


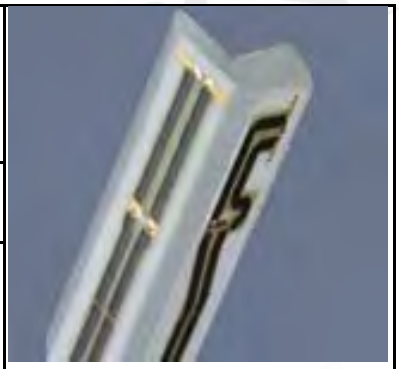
Fig 1. The SPEAG Robotic Diagram

The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- E and H Field probe.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.

- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The Test Arch phantom.
- The device holder for handheld mobile phones.
- Validation dipole kits allowing to validate the proper functioning of the system.

6.2 E and H Field Probe

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material	 ER3DV6 E-Field Probe
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy ±6.0%, k=2)	
Frequency	100 MHz to > 6 GHz (extended to 20 MHz for MRI), Linearity: ± 0.2 dB (100 MHz to 3 GHz)	
Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)	
Dynamic Range	2 V/m to > 1000 V/m; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm	
Application	General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms	
Construction	Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)	 H3DV6 H-Field Probe
Frequency	200 MHz to 3 GHz (absolute accuracy ± 6.0%, k=2); Output linearized	
Directivity	± 0.2 dB (spherical isotropy error)	
Dynamic Range	10 mA/m to 2 A/m at 1 GHz	

E-Field Interference	< 10% at 3 GHz (for plane wave)
Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm
Application	General magnetic near-field measurements up to 3 GHz (in air or liquids) Field component measurements Surface current measurements Low interaction with the measured field

6.3 Test Arch

Description	Enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot.	
Dimensions	length: 370 mm width: 370 mm height: 370 mm	Test Arch

6.4 Phone Holder

Description	Supports accurate and reliable positioning of any phone Effect on near field <+/- 0.5 dB	
		Phone Holder

7. Measurement Procedure

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

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

8. System Verification

A dipole antenna meeting the requirements given in C63.19 was placed in the position normally occupied by the WD.
The length of the dipole was scanned with both E-field and H-field probes and the maximum values for each were recorded.

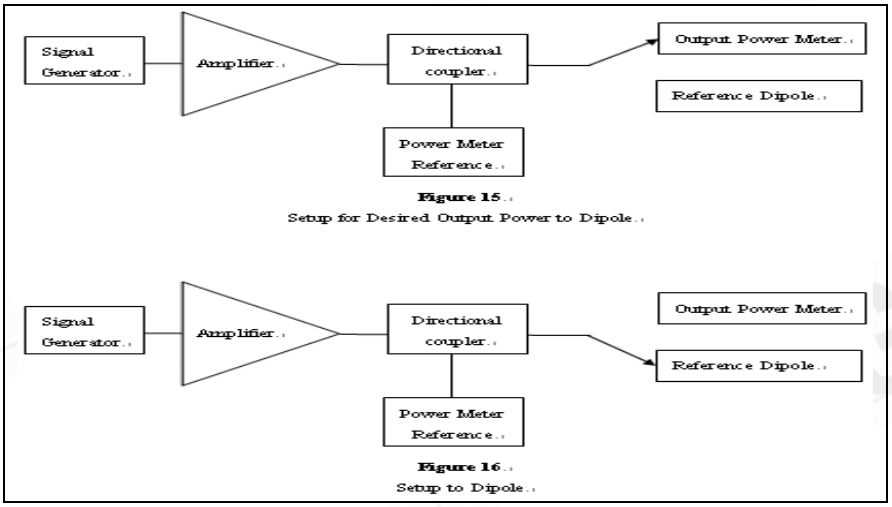


Figure 15
Setup for Desired Output Power to Dipole

Figure 16
Setup to Dipole

For E-Field Scan

Mode	Frequency (MHz)	Input Power(dBm)	Measured Value(V/m)	Target Value(V/m)	Measured Date
CW	835	20	180.9	175	2011/04/24
CW	835	20	174.9	176.8	2011/05/10
Mode	Frequency (MHz)	Input Power(dBm)	Measured Value(V/m)	Target Value(V/m)	Measured Date
CW	1880	20	138.8	138.4	2011/04/24
CW	1880	20	142.4	137.1	2011/05/10

For H-Field Scan

Mode	Frequency	Input Power	Measured Value(A/m)	Target Value(A/m)	Measured Date
CW	835	20	0.452	0.459	2011/04/24
CW	835	20	0.453	0.473	2011/05/10
Mode	Frequency	Input Power	Measured Value(A/m)	Target Value(A/m)	Measured Date
CW	1880	20	0.471	0.469	2011/04/24
CW	1880	20	0.458	0.465	2011/05/10

9. Probe Modulation Factor

The measurement setup for determination of the PMF is given in DASY4 manual section 28.2. The following points describe the installation, the measurement procedure and the evaluation.

1. Install the field probe in the DASY4 window setup.
2. Mount a validation dipole for the appropriate frequency band under the Test Arch. Move the probe manually to a point of high field strength for the specific field type. The probe may be very close to the dipole and might even touch it. During the fine adjustment of the probe with a signal applied to the dipole, read the x, y and z channel amplitudes in a multimeter job. They should all show a similar amplitude.
3. For comparing the peak amplitudes of modulated and CW signal, the same spectrum analyzer settings are required. The signal path (and setup geometry) between spectrum analyzer and probe must not be changed during the evaluation of the PMF! Only signal type and amplitudes as well as DASY4 settings may be varied.

Spectrum analyzer settings:

- Center Frequency: nominal center frequency of channel
- Span: zero
- Resolution bandwidth >= emission bandwidth
- Video bandwidth = 20dB
- Detection: RMS detection
- Trigger: Video or IF trigger, adjusted to give a stable display of the transmission
- Sweep rate: Set to show a complete tranmission cycle
- Line max hold may be used temporarily to ease the peak reading.

4. Define a DASY4 document and set the procedure properties (frequency as above, modulation frequency and crest factor for the modulated signal) according to the measured signal. Define a multimeter job (continuous mode) for the field reading. The probe shall not move. A predefined document is available.
5. Define a DASY4 document with a procedure for the evaluation of the CW signal (frequency, modulation frequency = 0, crest factor = 1) with a multimeter job.
The HAC measurement procedure is as follows:
6. Prepare the evaluation sheet for the installed field probe, frequency and modulation type.
7. Modulated signal measurement: Connect the modulated signal using the appropriate frequency via the cable to the setup. Do not move the setup between the following measurements.
8. Run the multimeter job in the procedure with the corresponding modulation setting in continuous mode.
9. Adjust the signal amplitude to achieve the the desired field level display in the multimeter. (A number of levels over the full dynamic range of the probe in the desired range shall be set, including the values read during the WD scans.)
10. Read the total field for the modulated signal.
11. Read the peak envelope signal on the spectrum analyzer.
12. Repeat these readings for other amplitude settings.
13. Switch the signal source off and verify that the ambient and instrumentation noise level is at least 10dB lower (a factor of 3 in field).
14. CW measurement: Change the signal to CW at the same center frequency, without touching or moving dipole or probe in the setup.
15. Adjust the CW signal amplitude to a similar range of peak levels on the spectrum analyzer.
16. Run the multimeter in the CW procedure in continuous mode.
17. Read the multimeter total field display.
18. Read the signal on the spectrum analyzer.
19. Repeat these readings for other amplitude settings.
20. Select the correct type of predefined Excel calculation sheet and insert the readings into the appropriate measurement columns. Conversion from linear DASY readings to logarithmic will be automatically made. The diagrams contain fitting curves for the logarithmic quantities. CW and E-field values will be fitted by linear trend lines, H-field values by quadratic.

10. Test Standards and Limits

The measurements were performed to ensure compliance to the ANSI C63.19-2007 standard,

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

11. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration
Schmid & Partner Engineering AG	E-Field and H-Field Probe	ER3DV6 ER3DV6 H3DV6 H3DV6	2302 2306 6187 6142	Jun.15.2010 Apr.18.2011 Jun.15.2010 Apr.18.2011
Schmid & Partner Engineering AG	835&1880 MHz System Validation Dipole In Air	CD835V3 CD835V3 CD1880V3 CD1880V3	1052 1149 1044 1135	Apr.26.2010 Dec.01.2010 Apr.26.2010 Dec.01.2010
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE4	547	Aug.18.2010
Schmid & Partner Engineering AG	Software	DASY 4 V4.7 Build 80	N/A	Calibration isn't necessary
Agilent	Dielectric Probe Kit	85070D	US01440168	Calibration isn't necessary
Agilent	Dual-directional coupler	778D	50313	Aug.25.2010
Agilent	RF Signal Generator	8648D	3847M00432	Jun.06.2010
R&S	Radio Communication Test	CMU200	109326	Apr.01.2011
Schmid & Partner Engineering AG	Test Arch SD HAC	P01	1047	N/A

12. Summary of Results

Main Solution

E-Field

E-Field Emission	Channel	Modulation Factor	Conducted Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (V/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.83	33.0	-0.023	162.0	M3	689
	190	2.83	33.0	-0.058	151.7	M3	689
	251	2.83	32.9	-0.042	137.5	M4	689
E-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power at BS (dBm)**	**Measured Drift(%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
GSM1900	512	2.94	29.8	-0.002	56.5	M3	789
	661	2.94	30.0	0.019	47.2	M4	789
	810	2.94	30.1	0.033	45.8	M4	789
E-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power at BS (dBm)**	**Measured Drift(%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA B2	9262	1	22.46	-0.110	23.7	M4	789
	9400	1	22.57	0.005	22.8	M4	789
	9538	1	22.26	0.043	23.7	M4	789
E-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power at BS (dBm)**	**Measured Drift(%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA B5	4132	1	22.71	-0.015	51.7	M4	689
	4183	1	22.67	-0.058	46.1	M4	689
	4233	1	22.66	-0.045	48.4	M4	689

H-Filed

H-Field Emission	Channel	Modulation Factor	Conducted Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (A/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.98	33.0	0.013	0.228	M4	147
	190	2.98	33.0	0.009	0.208	M4	147
	251	2.98	32.9	-0.047	0.194	M4	147
H-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power at BS (dBm)**	**Measured Drift(%)**	**Time Avg. Field (A/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
GSM1900	512	2.69	29.8	-0.073	0.168	M3	789
	661	2.69	30.0	-0.035	0.148	M3	789
	810	2.69	30.1	-0.074	0.147	M3	789
H-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power at BS (dBm)**	**Measured Drift(%)**	**Time Avg. Field (A/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA B2	9262	1	22.46	0.075	0.077	M4	789
	9400	1	22.57	-0.099	0.079	M4	789
	9538	1	22.26	-0.030	0.083	M4	236
H-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power at BS (dBm)**	**Measured Drift(%)**	**Time Avg. Field (A/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA B5	4132	1	22.71	0.027	0.069	M4	147
	4183	1	22.67	0.028	0.062	M4	147
	4233	1	22.66	0.126	0.065	M4	147

Second Solution

E-Field

E-Field Emission	Channel	Modulation Factor	Conducted Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (V/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.83	33.0	-0.037	156.2	M3	689
GSM1900	512	2.94	29.8	0.016	53.4	M3	789
WCDMA B2	9262	1	22.46	-0.042	22.3	M4	789
WCDMA B2	9538	1	22.26	-0.059	25.9	M4	789
WCDMA B5	4132	1	22.71	-0.029	54.8	M4	689

H-Filed

H-Field Emission	Channel	Modulation Factor	Conducted Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (A/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.98	33.0	-0.007	0.249	M4	147
GSM1900	512	2.78	29.8	-0.031	0.177	M3	789
WCDMA B2	9538	1	22.26	0.058	0.099	M4	236
WCDMA B5	4132	1	22.71	0.050	0.079	M4	147

13. Measurement Data

Date: 2011/4/24

HAC_E GSM850_CH128

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 162.0 V/m
Probe Modulation Factor = 2.83
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 73.5 V/m; Power Drift = -0.023 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

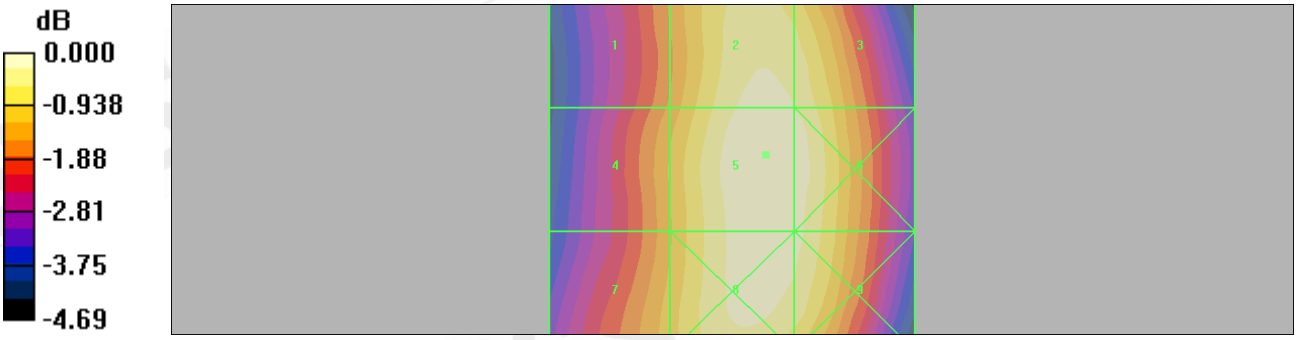
Peak E-field in V/m

Grid 1 **136.8 M4**	Grid 2 **158.9 M3**	Grid 3 **156.5 M3**
Grid 4 **141.1 M4**	Grid 5 **162.0 M3**	Grid 6 **160.0 M3**
Grid 7 **143.3 M4**	Grid 8 **160.5 M3**	Grid 9 **158.1 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 162.0 V/m
E Category: M3
Location: -4.5, -2, 368.7 mm



0 dB = 162.0V/m

Date: 2011/4/24

HAC_E GSM850_CH190

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 151.7 V/m
Probe Modulation Factor = 2.83
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 68.2 V/m; Power Drift = -0.058 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

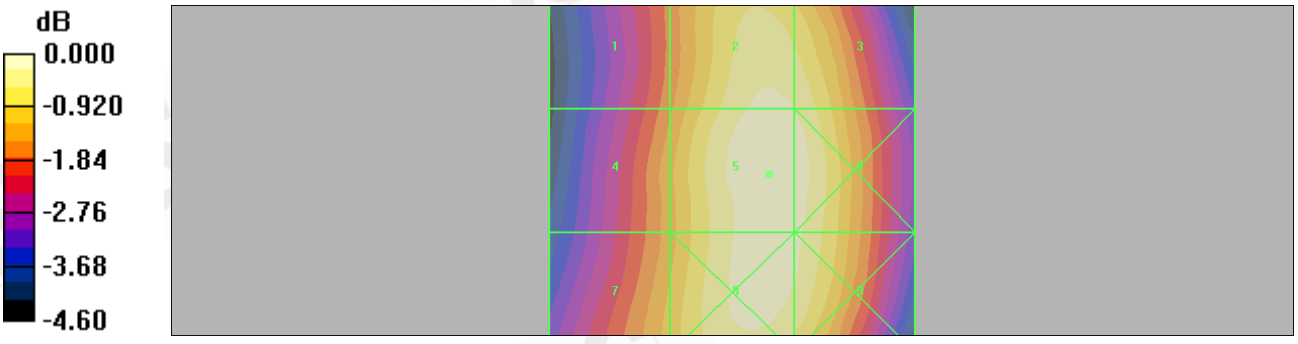
Peak E-field in V/m

Grid 1 **126.5 M4**	Grid 2 **147.9 M4**	Grid 3 **146.3 M4**
Grid 4 **130.9 M4**	Grid 5 **151.7 M3**	Grid 6 **149.6 M3**
Grid 7 **134.0 M4**	Grid 8 **150.3 M3**	Grid 9 **148.1 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 151.7 V/m
E Category: M3
Location: -5, 0.5, 368.7 mm



0 dB = 151.7V/m

Date: 2011/4/24

HAC_E GSM850_CH251

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 137.5 V/m
Probe Modulation Factor = 2.83
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 62.0 V/m; Power Drift = -0.042 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

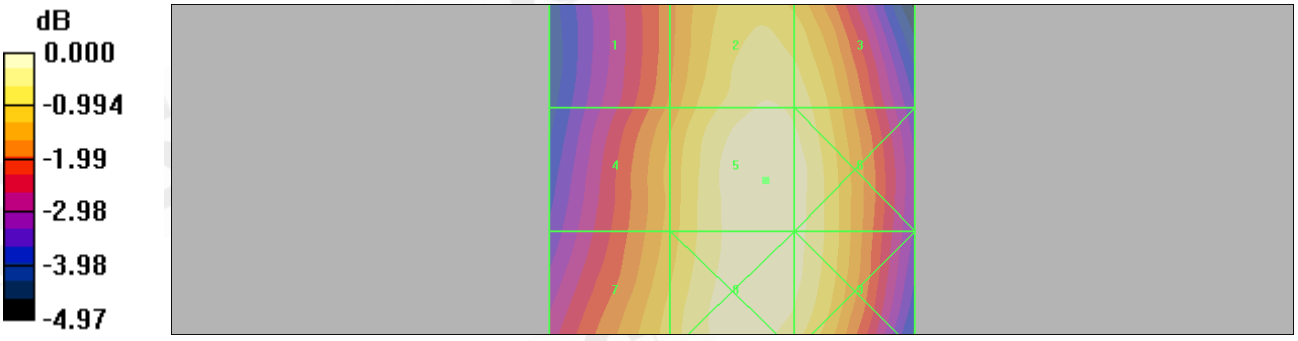
Peak E-field in V/m

Grid 1 **115.2 M4**	Grid 2 **133.0 M4**	Grid 3 **131.2 M4**
Grid 4 **120.2 M4**	Grid 5 **137.5 M4**	Grid 6 **135.1 M4**
Grid 7 **125.3 M4**	Grid 8 **137.1 M4**	Grid 9 **134.6 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 137.5 V/m
E Category: M4
Location: -4.5, 1.5, 368.7 mm



0 dB = 137.5V/m

Date: 2011/4/24

HAC_H_GSM 850_CH128

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.228 A/m
Probe Modulation Factor = 2.98
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.054 A/m; Power Drift = 0.013 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

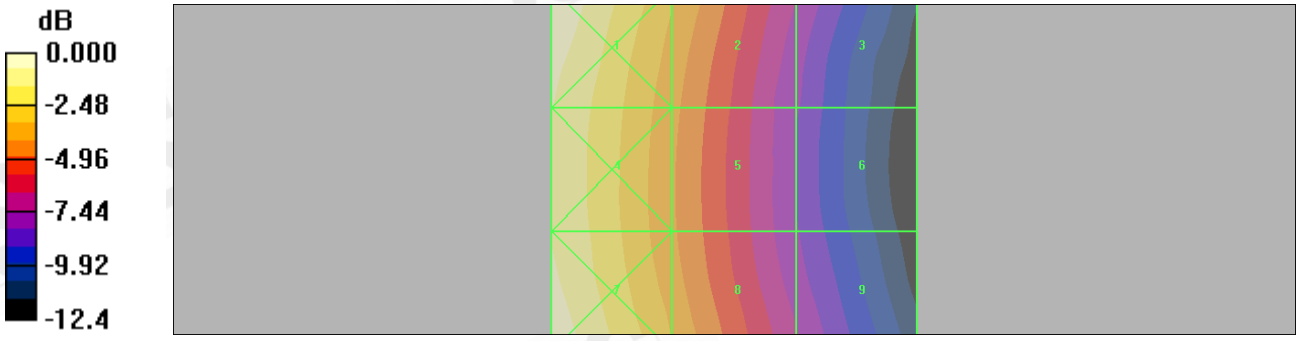
Peak H-field in A/m

Grid 1 **0.327 M4**	Grid 2 **0.228 M4**	Grid 3 **0.142 M4**
Grid 4 **0.298 M4**	Grid 5 **0.209 M4**	Grid 6 **0.128 M4**
Grid 7 **0.319 M4**	Grid 8 **0.226 M4**	Grid 9 **0.143 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.327 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.327A/m

Date: 2011/4/24

HAC_H_GSM 850_CH190

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.208 A/m
Probe Modulation Factor = 2.98
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.049 A/m; Power Drift = 0.009 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

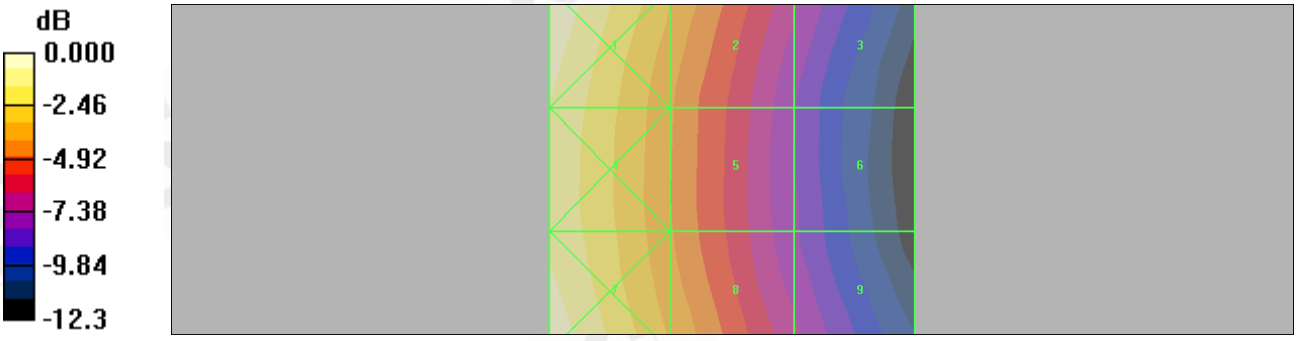
Peak H-field in A/m

Grid 1 **0.297 M4**	Grid 2 **0.208 M4**	Grid 3 **0.131 M4**
Grid 4 **0.270 M4**	Grid 5 **0.188 M4**	Grid 6 **0.118 M4**
Grid 7 **0.289 M4**	Grid 8 **0.205 M4**	Grid 9 **0.133 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.297 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.297A/m

Date: 2011/4/24

HAC_H_GSM 850_CH251

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.194 A/m
Probe Modulation Factor = 2.98
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.045 A/m; Power Drift = -0.047 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

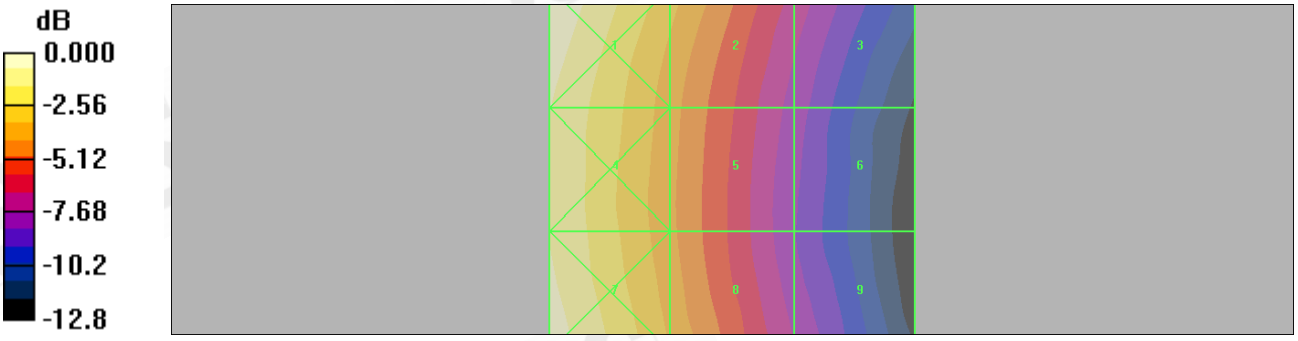
Peak H-field in A/m

Grid 1 **0.273 M4**	Grid 2 **0.194 M4**	Grid 3 **0.122 M4**
Grid 4 **0.248 M4**	Grid 5 **0.174 M4**	Grid 6 **0.109 M4**
Grid 7 **0.263 M4**	Grid 8 **0.185 M4**	Grid 9 **0.114 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.273 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.273A/m

Date: 2011/4/24

HAC_E GSM1900_CH512

Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 56.5 V/m
Probe Modulation Factor = 2.94
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 14.6 V/m; Power Drift = -0.002 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

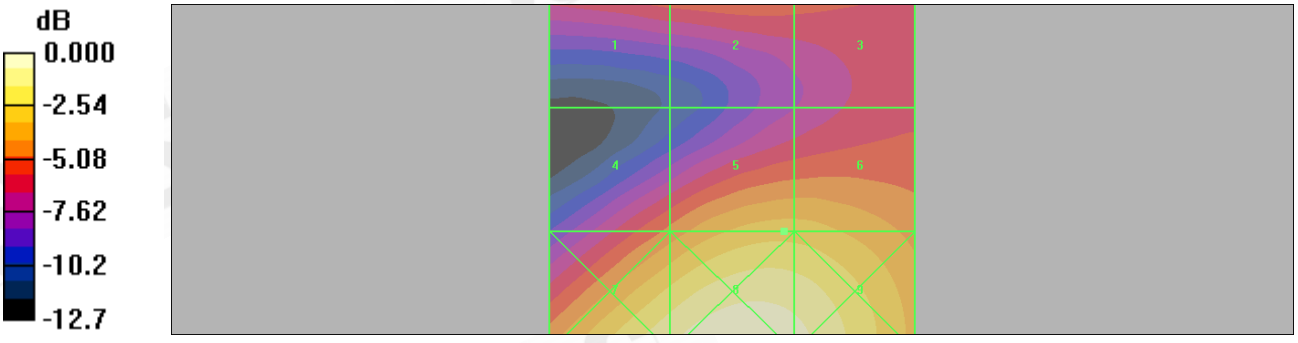
Peak E-field in V/m

Grid 1 **45.7 M4**	Grid 2 **47.1 M4**	Grid 3 **44.3 M4**
Grid 4 **45.6 M4**	Grid 5 **56.5 M3**	Grid 6 **56.3 M3**
Grid 7 **72.4 M3**	Grid 8 **78.9 M3**	Grid 9 **74.6 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 78.9 V/m
E Category: M3
Location: -0.5, 25, 368.7 mm



0 dB = 78.9V/m

Date: 2011/4/24

HAC_E GSM1900_CH661

Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 47.2 V/m
Probe Modulation Factor = 2.94
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 11.9 V/m; Power Drift = 0.019 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

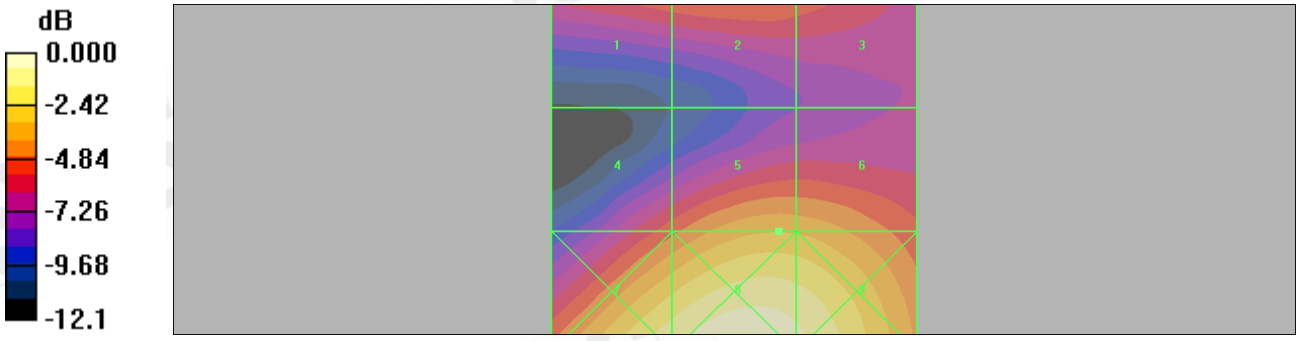
Peak E-field in V/m

Grid 1 **41.8 M4**	Grid 2 **43.4 M4**	Grid 3 **40.3 M4**
Grid 4 **38.4 M4**	Grid 5 **47.2 M4**	Grid 6 **46.9 M4**
Grid 7 **62.8 M3**	Grid 8 **68.7 M3**	Grid 9 **64.6 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 68.7 V/m
E Category: M3
Location: -1, 25, 368.7 mm



0 dB = 68.7V/m

Date: 2011/4/24

HAC_E GSM1900_CH810

Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 45.8 V/m
Probe Modulation Factor = 2.94
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 11.6 V/m; Power Drift = 0.033 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

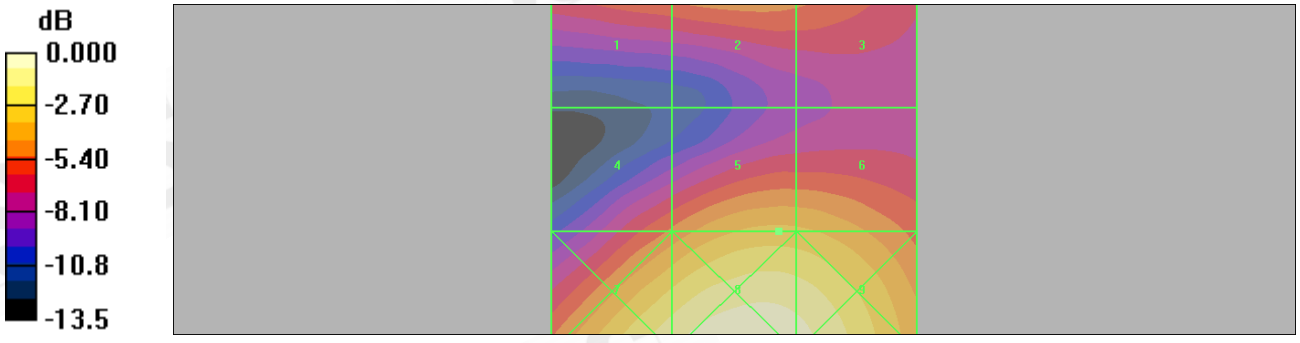
Peak E-field in V/m

Grid 1 **39.6 M4**	Grid 2 **41.3 M4**	Grid 3 **39.0 M4**
Grid 4 **37.0 M4**	Grid 5 **45.8 M4**	Grid 6 **45.4 M4**
Grid 7 **60.6 M3**	Grid 8 **67.0 M3**	Grid 9 **63.5 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 67.0 V/m
E Category: M3
Location: -1, 25, 368.7 mm



0 dB = 67.0V/m

Date: 2011/4/24

HAC_H_GSM 1900_CH512

Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.168 A/m
Probe Modulation Factor = 2.69
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.071 A/m; Power Drift = -0.073 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

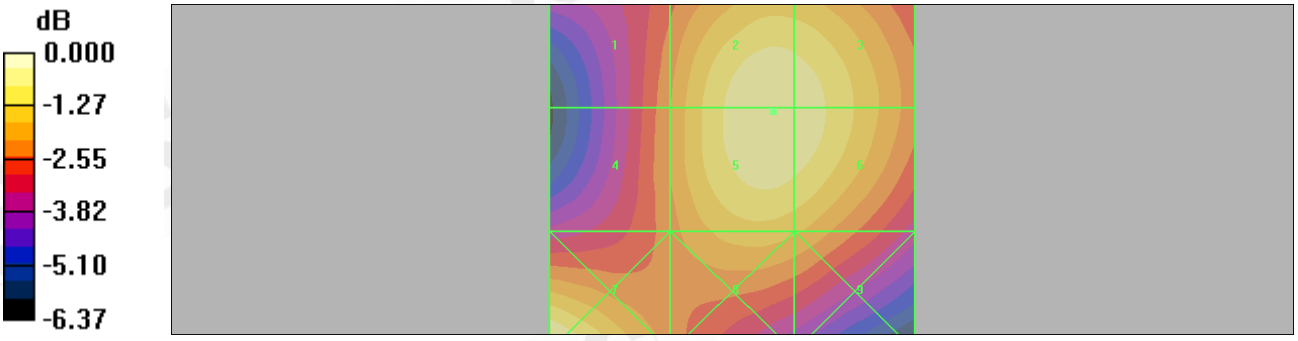
Peak H-field in A/m

Grid 1 **0.139 M4**	Grid 2 **0.168 M3**	Grid 3 **0.167 M3**
Grid 4 **0.140 M4**	Grid 5 **0.168 M3**	Grid 6 **0.167 M3**
Grid 7 **0.177 M3**	Grid 8 **0.150 M3**	Grid 9 **0.147 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.177 A/m
H Category: M3
Location: 25, 25, 368.7 mm



0 dB = 0.177A/m

Date: 2011/4/24

HAC_H_GSM 1900_CH661

Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.148 A/m
Probe Modulation Factor = 2.69
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.062 A/m; Power Drift = -0.035 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

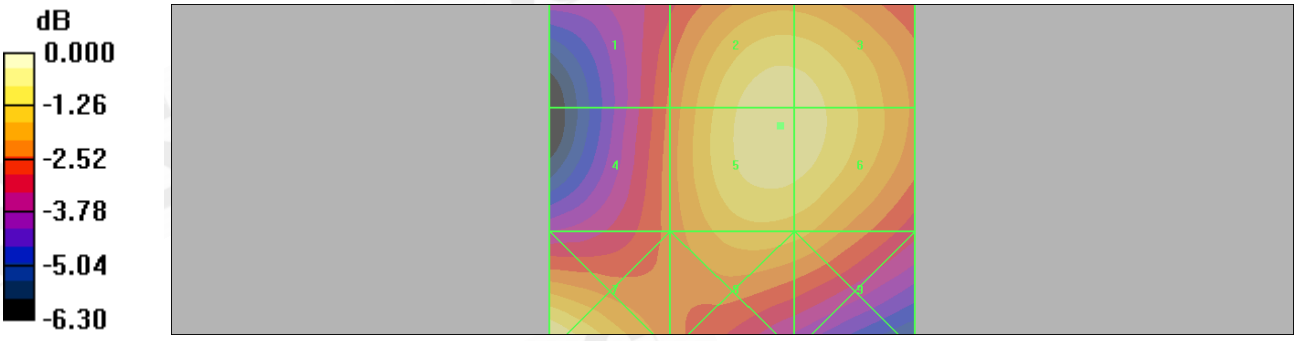
Peak H-field in A/m

Grid 1 **0.119 M4**	Grid 2 **0.147 M3**	Grid 3 **0.147 M3**
Grid 4 **0.121 M4**	Grid 5 **0.148 M3**	Grid 6 **0.147 M3**
Grid 7 **0.157 M3**	Grid 8 **0.134 M4**	Grid 9 **0.132 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.157 A/m
H Category: M3
Location: 25, 25, 368.7 mm



0 dB = 0.157A/m

Date: 2011/4/24

HAC_H_GSM 1900_CH810

Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.147 A/m
Probe Modulation Factor = 2.69
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.063 A/m; Power Drift = -0.074 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

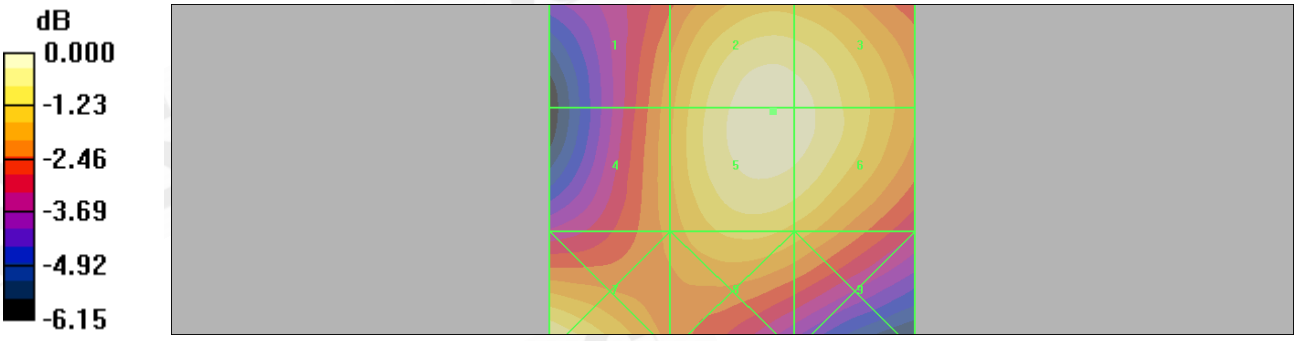
Peak H-field in A/m

Grid 1 **0.122 M4**	Grid 2 **0.147 M3**	Grid 3 **0.145 M3**
Grid 4 **0.123 M4**	Grid 5 **0.147 M3**	Grid 6 **0.146 M3**
Grid 7 **0.149 M3**	Grid 8 **0.131 M4**	Grid 9 **0.127 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.149 A/m
H Category: M3
Location: 25, 25, 368.7 mm



0 dB = 0.149A/m

Date: 2011/4/24

HAC_E_WCDMA2_CH9262

Communication System: WCDMA BAND2; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 23.7 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 18.1 V/m; Power Drift = -0.110 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

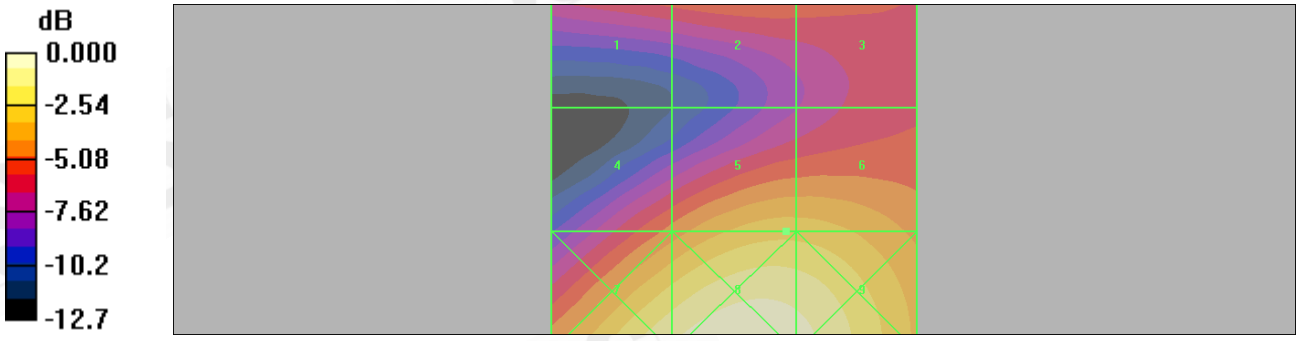
Peak E-field in V/m

Grid 1 **19.1 M4**	Grid 2 **19.8 M4**	Grid 3 **18.9 M4**
Grid 4 **19.1 M4**	Grid 5 **23.7 M4**	Grid 6 **23.6 M4**
Grid 7 **30.3 M4**	Grid 8 **32.8 M4**	Grid 9 **31.2 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 32.8 V/m
E Category: M4
Location: -1, 25, 368.7 mm



0 dB = 32.8V/m

Date: 2011/4/24

HAC_E_WCDMA2_CH9400

Communication System: WCDMA BAND2; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 22.8 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 17.2 V/m; Power Drift = 0.005 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

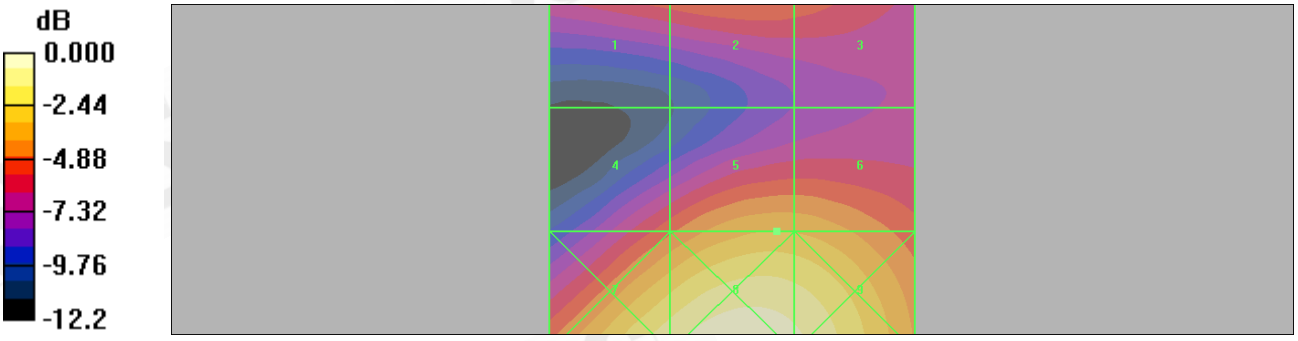
Peak E-field in V/m

Grid 1 **19.9 M4**	Grid 2 **20.8 M4**	Grid 3 **19.6 M4**
Grid 4 **18.6 M4**	Grid 5 **22.8 M4**	Grid 6 **22.7 M4**
Grid 7 **30.3 M4**	Grid 8 **33.1 M4**	Grid 9 **31.2 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 33.1 V/m
E Category: M4
Location: -0.5, 25, 368.7 mm



0 dB = 33.1V/m

Date: 2011/4/24

HAC_E_WCDMA2_CH9538

Communication System: WCDMA BAND2; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 23.7 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 17.9 V/m; Power Drift = 0.043 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

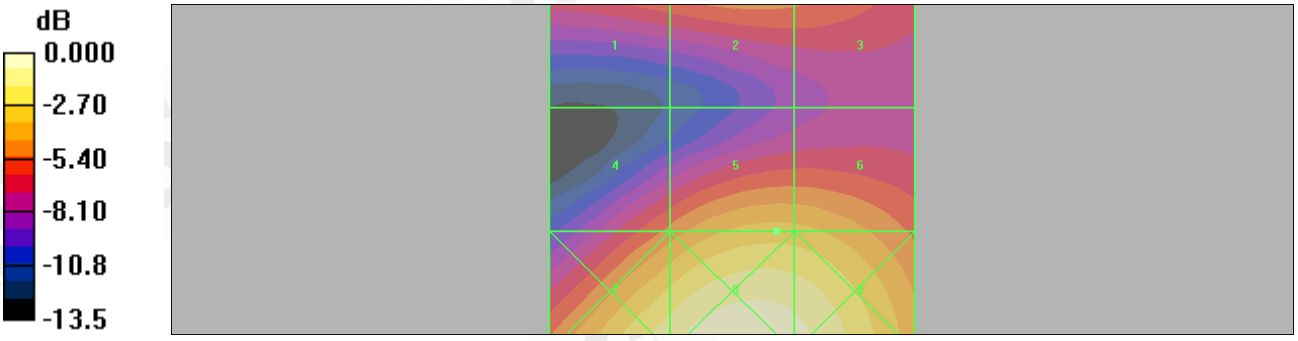
Peak E-field in V/m

Grid 1 **19.8 M4**	Grid 2 **20.8 M4**	Grid 3 **20.0 M4**
Grid 4 **19.2 M4**	Grid 5 **23.7 M4**	Grid 6 **23.5 M4**
Grid 7 **30.8 M4**	Grid 8 **34.2 M4**	Grid 9 **32.4 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 34.2 V/m
E Category: M4
Location: -1, 25, 368.7 mm



0 dB = 34.2V/m

Date: 2011/4/24

HAC_H_WCDMA2_CH9262

Communication System: WCDMA BAND2; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.077 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.085 A/m; Power Drift = 0.075 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

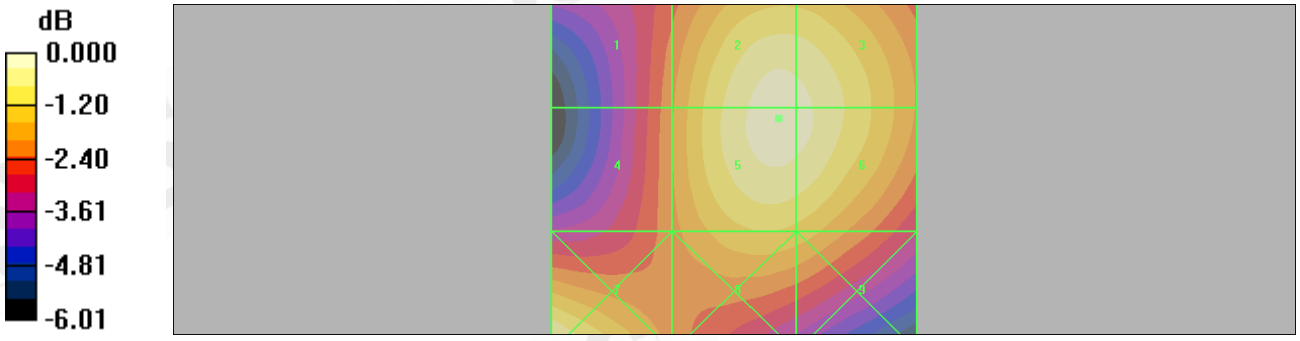
Peak H-field in A/m

Grid 1 **0.062 M4**	Grid 2 **0.077 M4**	Grid 3 **0.077 M4**
Grid 4 **0.063 M4**	Grid 5 **0.077 M4**	Grid 6 **0.077 M4**
Grid 7 **0.079 M4**	Grid 8 **0.069 M4**	Grid 9 **0.068 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.079 A/m
H Category: M4
Location: 25, 25, 368.7 mm



0 dB = 0.079A/m

Date: 2011/4/24

HAC_H_WCDMA2_CH9400

Communication System: WCDMA BAND2; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.079 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.089 A/m; Power Drift = -0.099 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

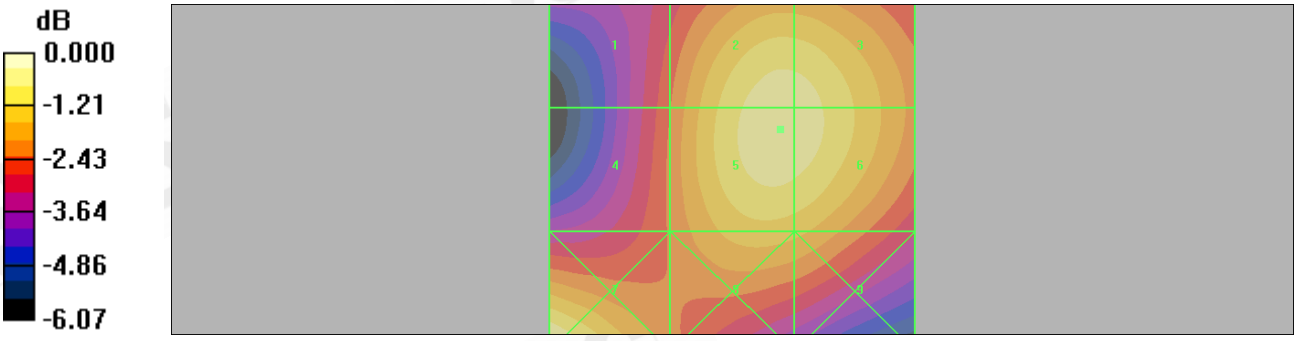
Peak H-field in A/m

Grid 1 **0.064 M4**	Grid 2 **0.079 M4**	Grid 3 **0.078 M4**
Grid 4 **0.064 M4**	Grid 5 **0.079 M4**	Grid 6 **0.079 M4**
Grid 7 **0.084 M4**	Grid 8 **0.072 M4**	Grid 9 **0.071 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.084 A/m
H Category: M4
Location: 25, 25, 368.7 mm



0 dB = 0.084A/m

Date: 2011/4/24

HAC_H_WCDMA2_CH9538

Communication System: WCDMA BAND2; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.083 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.093 A/m; Power Drift = -0.030 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

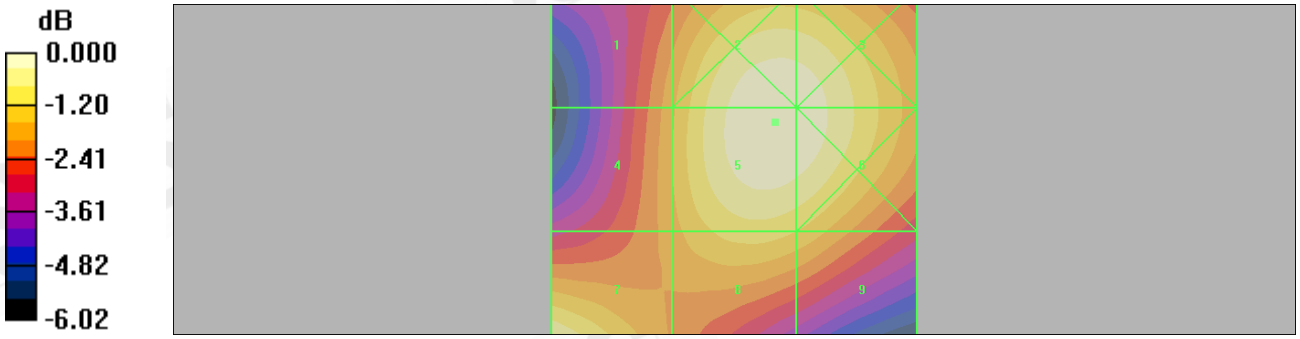
Peak H-field in A/m

Grid 1 **0.068 M4**	Grid 2 **0.083 M4**	Grid 3 **0.082 M4**
Grid 4 **0.069 M4**	Grid 5 **0.083 M4**	Grid 6 **0.082 M4**
Grid 7 **0.083 M4**	Grid 8 **0.074 M4**	Grid 9 **0.072 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.083 A/m
H Category: M4
Location: -5.5, -6.5, 368.7 mm



0 dB = 0.083A/m

Date: 2011/4/24

HAC_E_WCDMA5_CH4132

Communication System: WCDMA BAND5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 51.7 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 65.8 V/m; Power Drift = -0.015 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

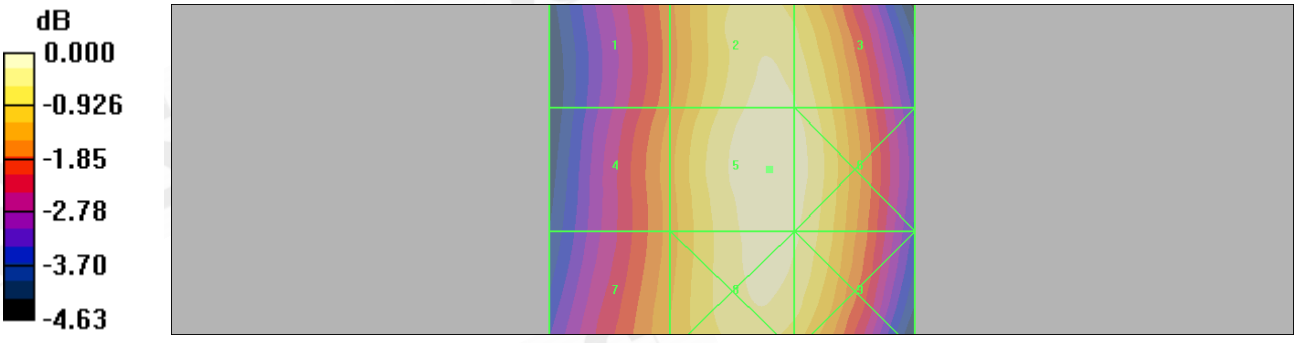
Peak E-field in V/m

Grid 1 **43.3 M4**	Grid 2 **50.8 M4**	Grid 3 **50.1 M4**
Grid 4 **44.5 M4**	Grid 5 **51.7 M4**	Grid 6 **51.0 M4**
Grid 7 **44.9 M4**	Grid 8 **51.0 M4**	Grid 9 **50.2 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 51.7 V/m
E Category: M4
Location: -5, 0, 368.7 mm



0 dB = 51.7V/m

Date: 2011/4/24

HAC_E_WCDMA5_CH4183

Communication System: WCDMA BAND5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 46.1 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 58.6 V/m; Power Drift = -0.058 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

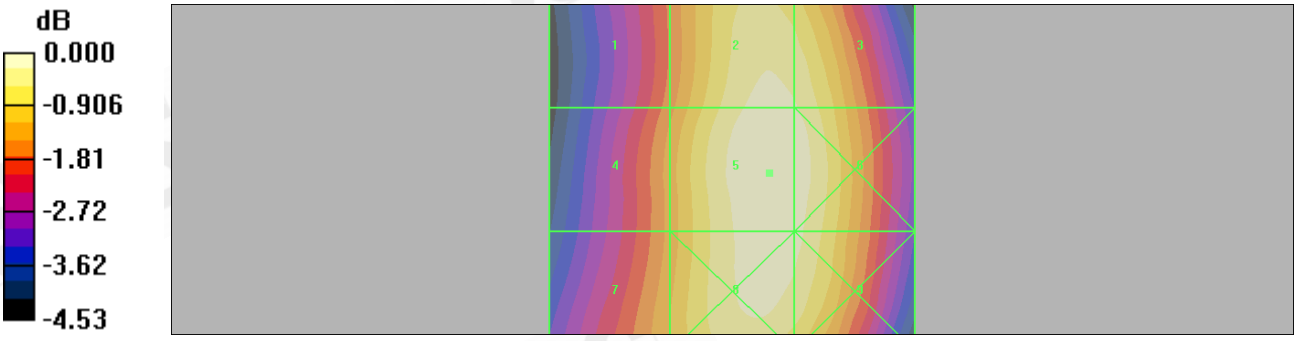
Peak E-field in V/m

Grid 1 **38.3 M4**	Grid 2 **45.2 M4**	Grid 3 **44.7 M4**
Grid 4 **39.5 M4**	Grid 5 **46.1 M4**	Grid 6 **45.6 M4**
Grid 7 **40.2 M4**	Grid 8 **45.6 M4**	Grid 9 **45.0 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 46.1 V/m
E Category: M4
Location: -5, 0.5, 368.7 mm



0 dB = 46.1V/m

Date: 2011/4/24

HAC_E_WCDMA5_CH4233

Communication System: WCDMA BAND5; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 48.4 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 62.3 V/m; Power Drift = -0.045 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

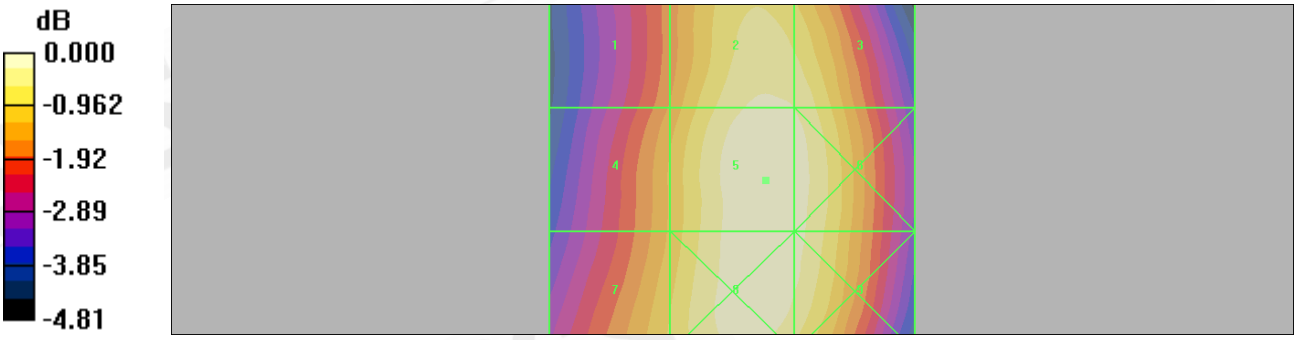
Peak E-field in V/m

Grid 1 **40.5 M4**	Grid 2 **47.1 M4**	Grid 3 **46.6 M4**
Grid 4 **42.1 M4**	Grid 5 **48.4 M4**	Grid 6 **47.7 M4**
Grid 7 **43.6 M4**	Grid 8 **48.1 M4**	Grid 9 **47.4 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 48.4 V/m
E Category: M4
Location: -4.5, 1.5, 368.7 mm



0 dB = 48.4V/m

Date: 2011/4/24

HAC_H_WCDMA5_CH4132

Communication System: WCDMA BAND5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.069 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.049 A/m; Power Drift = 0.027 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

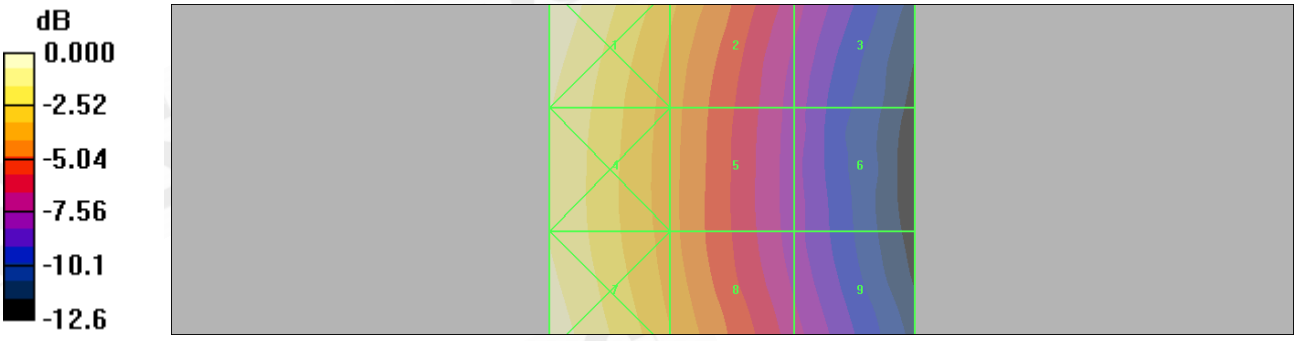
Peak H-field in A/m

Grid 1 **0.098 M4**	Grid 2 **0.069 M4**	Grid 3 **0.043 M4**
Grid 4 **0.089 M4**	Grid 5 **0.063 M4**	Grid 6 **0.039 M4**
Grid 7 **0.095 M4**	Grid 8 **0.068 M4**	Grid 9 **0.044 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.098 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.098A/m

Date: 2011/4/24

HAC_H_WCDMA5_CH4183

Communication System: WCDMA BAND5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.062 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.043 A/m; Power Drift = 0.028 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

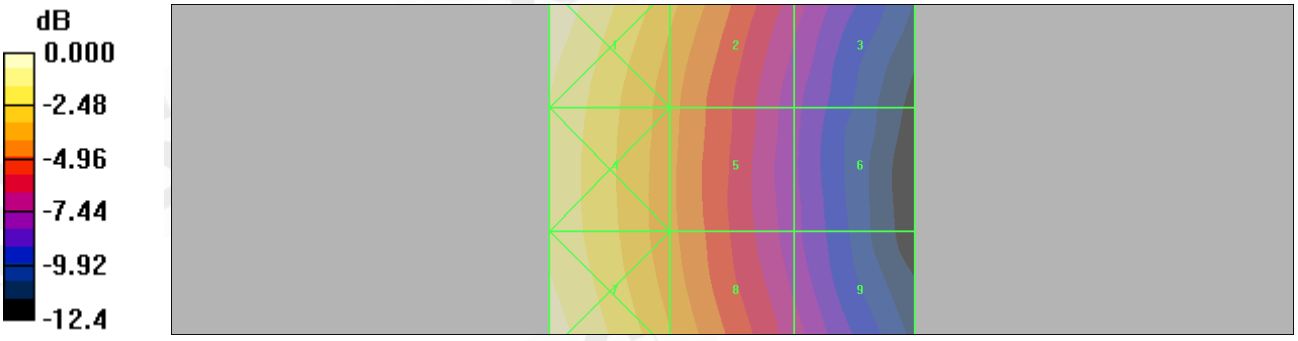
Peak H-field in A/m

Grid 1 **0.086 M4**	Grid 2 **0.062 M4**	Grid 3 **0.039 M4**
Grid 4 **0.078 M4**	Grid 5 **0.055 M4**	Grid 6 **0.034 M4**
Grid 7 **0.083 M4**	Grid 8 **0.060 M4**	Grid 9 **0.039 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.086 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.086A/m

Date: 2011/4/24

HAC_H_WCDMA5_CH4233

Communication System: WCDMA BAND5; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.065 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.045 A/m; Power Drift = 0.126 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

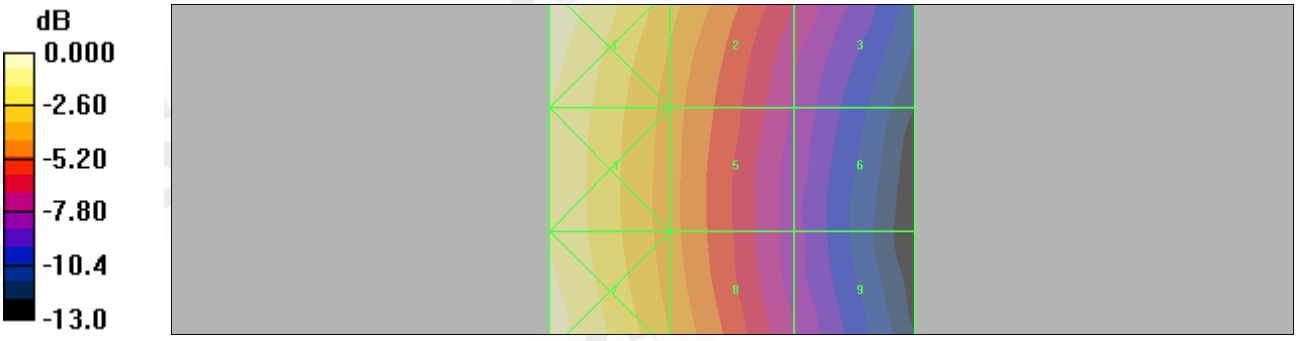
Peak H-field in A/m

Grid 1 **0.092 M4**	Grid 2 **0.065 M4**	Grid 3 **0.042 M4**
Grid 4 **0.083 M4**	Grid 5 **0.059 M4**	Grid 6 **0.037 M4**
Grid 7 **0.089 M4**	Grid 8 **0.063 M4**	Grid 9 **0.039 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.092 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.092A/m

Date: 2011/5/10

HAC_E GSM850_CH128_ Second Solution

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 156.2 V/m
Probe Modulation Factor = 2.83
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 70.0 V/m; Power Drift = -0.037 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

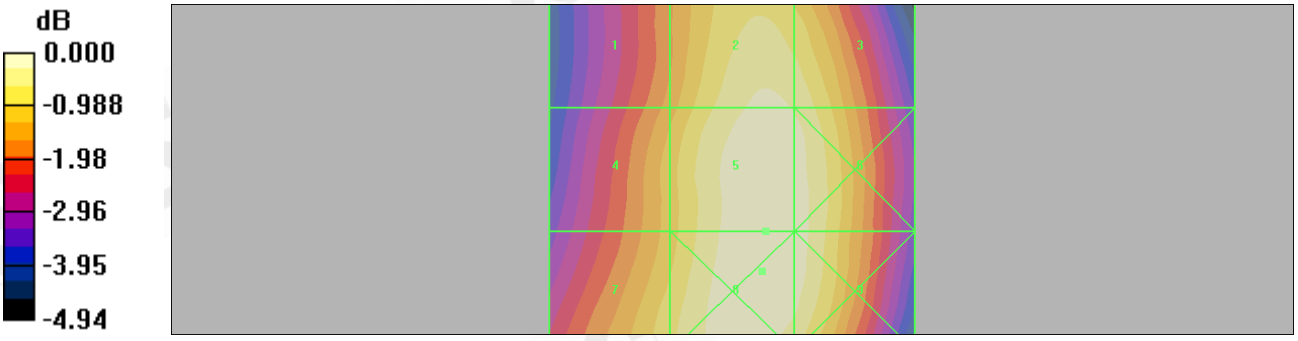
Peak E-field in V/m

Grid 1 **132.3 M4**	Grid 2 **152.2 M3**	Grid 3 **150.0 M3**
Grid 4 **137.7 M4**	Grid 5 **156.2 M3**	Grid 6 **153.9 M3**
Grid 7 **144.1 M4**	Grid 8 **156.4 M3**	Grid 9 **153.9 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 156.4 V/m
E Category: M3
Location: -4, 14, 368.7 mm



0 dB = 156.4V/m

Date: 2011/5/10

HAC_H_GSM 850_CH128_ Second Solution

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.249 A/m
Probe Modulation Factor = 2.98
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.052 A/m; Power Drift = -0.007 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

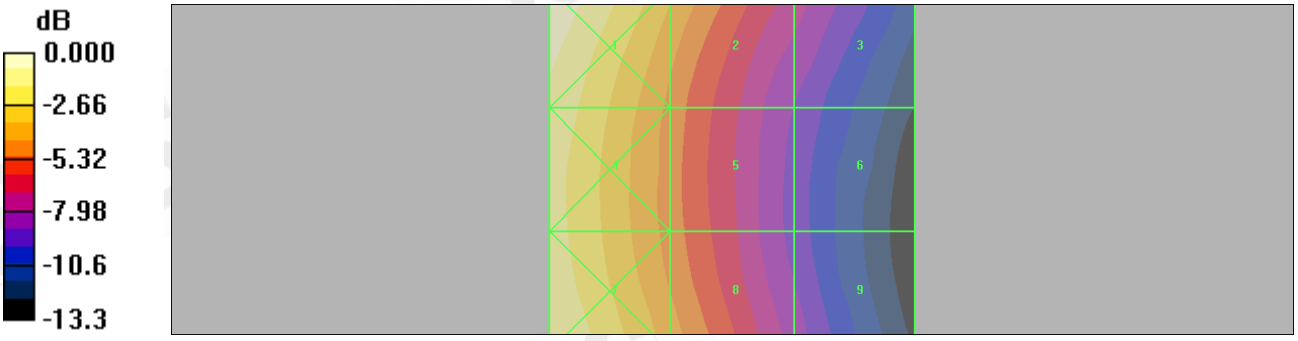
Peak H-field in A/m

Grid 1 **0.363 M4**	Grid 2 **0.249 M4**	Grid 3 **0.156 M4**
Grid 4 **0.319 M4**	Grid 5 **0.212 M4**	Grid 6 **0.131 M4**
Grid 7 **0.333 M4**	Grid 8 **0.232 M4**	Grid 9 **0.140 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.363 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.363A/m

Date: 2011/5/10

HAC_E GSM1900_CH512_ Second Solution

Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 53.4 V/m
Probe Modulation Factor = 2.94
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 14.2 V/m; Power Drift = 0.016 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

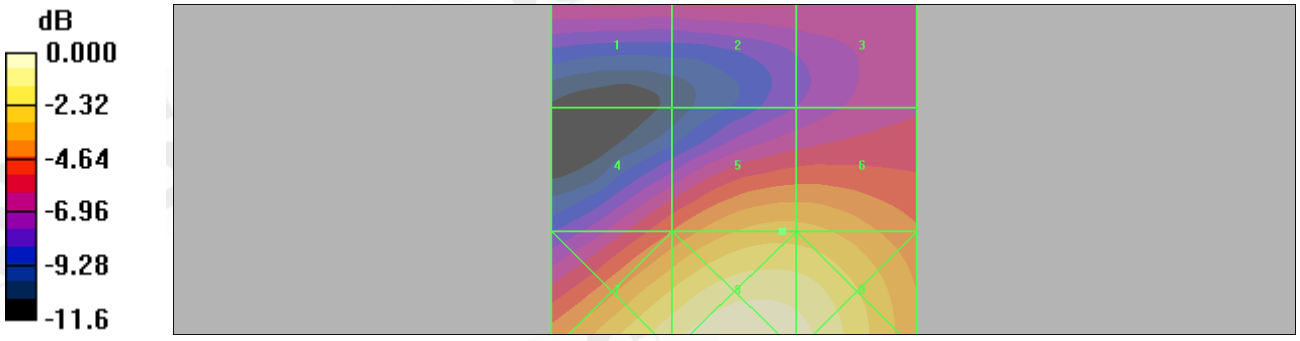
Peak E-field in V/m

Grid 1 **40.8 M4**	Grid 2 **41.0 M4**	Grid 3 **38.6 M4**
Grid 4 **43.0 M4**	Grid 5 **53.4 M3**	Grid 6 **53.2 M3**
Grid 7 **67.5 M3**	Grid 8 **73.0 M3**	Grid 9 **69.6 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 73.0 V/m
E Category: M3
Location: -2, 25, 368.7 mm



0 dB = 73.0V/m

Date: 2011/5/10

HAC_H_GSM 1900_CH512_ Second Solution

Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.177 A/m
Probe Modulation Factor = 2.78
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.069 A/m; Power Drift = -0.031 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

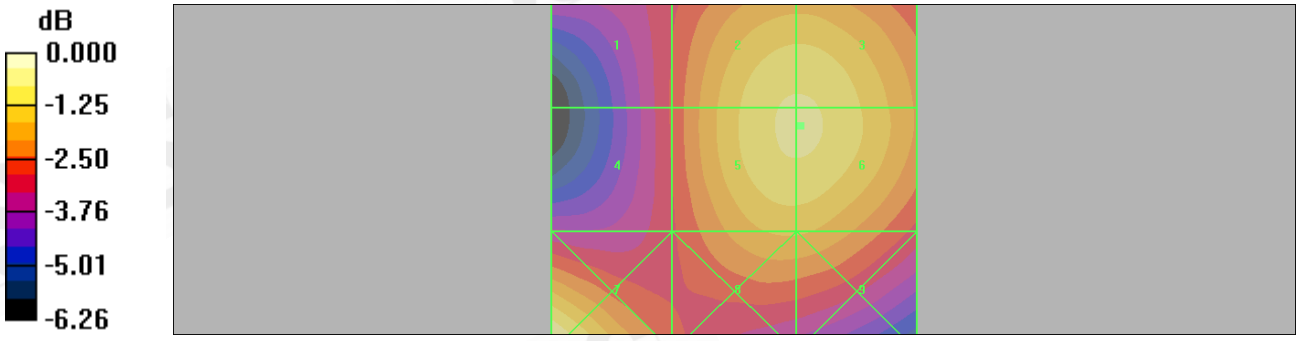
Peak H-field in A/m

Grid 1 **0.140 M4**	Grid 2 **0.176 M3**	Grid 3 **0.176 M3**
Grid 4 **0.140 M4**	Grid 5 **0.177 M3**	Grid 6 **0.177 M3**
Grid 7 **0.193 M3**	Grid 8 **0.161 M3**	Grid 9 **0.161 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.193 A/m
H Category: M3
Location: 25, 25, 368.7 mm



0 dB = 0.193A/m

Date: 2011/5/10

HAC_E_WCDMA2_CH9262_ Second Solution

Communication System: WCDMA BAND2; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 22.3 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 17.1 V/m; Power Drift = -0.042 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

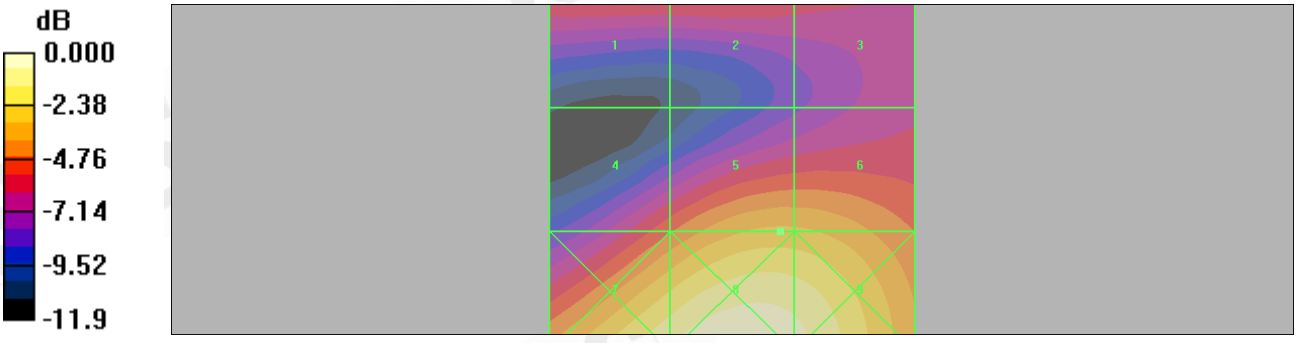
Peak E-field in V/m

Grid 1 **18.4 M4**	Grid 2 **18.5 M4**	Grid 3 **16.9 M4**
Grid 4 **18.0 M4**	Grid 5 **22.3 M4**	Grid 6 **22.2 M4**
Grid 7 **29.0 M4**	Grid 8 **31.4 M4**	Grid 9 **29.8 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 31.4 V/m
E Category: M4
Location: -0.5, 25, 368.7 mm



0 dB = 31.4V/m

Date: 2011/5/10

HAC_E_WCDMA2_CH9538_ Second Solution

Communication System: WCDMA BAND2; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 25.9 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 18.7 V/m; Power Drift = -0.059 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

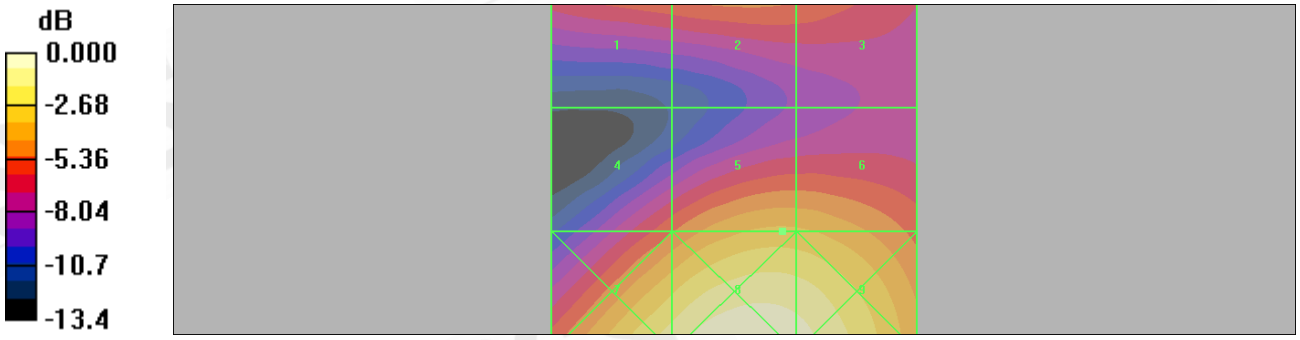
Peak E-field in V/m

Grid 1 **22.2 M4**	Grid 2 **23.0 M4**	Grid 3 **21.7 M4**
Grid 4 **20.4 M4**	Grid 5 **25.9 M4**	Grid 6 **25.7 M4**
Grid 7 **33.9 M4**	Grid 8 **38.0 M4**	Grid 9 **36.2 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 38.0 V/m
E Category: M4
Location: -1, 25, 368.7 mm



0 dB = 38.0V/m

Date: 2011/5/10

HAC_H_WCDMA2_CH9538_ Second Solution

Communication System: WCDMA BAND2; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.099 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.107 A/m; Power Drift = 0.058 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

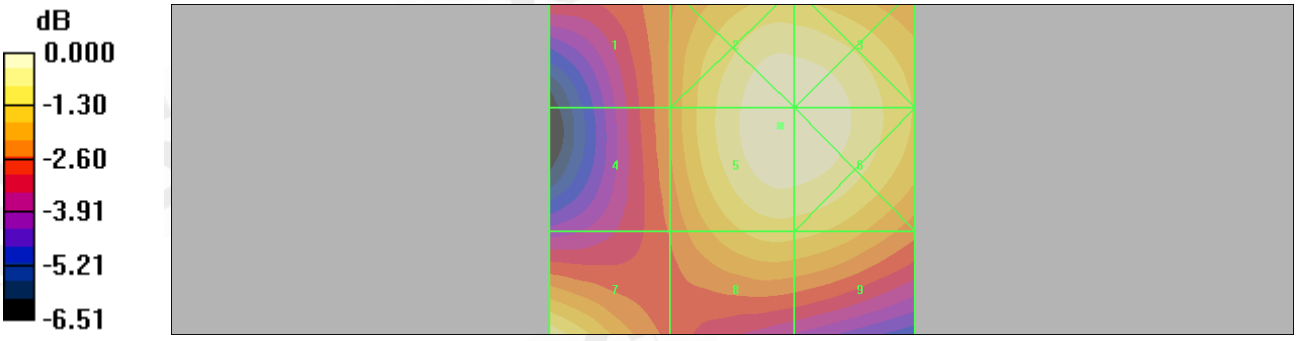
Peak H-field in A/m

Grid 1 **0.078 M4**	Grid 2 **0.099 M4**	Grid 3 **0.098 M4**
Grid 4 **0.078 M4**	Grid 5 **0.099 M4**	Grid 6 **0.098 M4**
Grid 7 **0.099 M4**	Grid 8 **0.087 M4**	Grid 9 **0.087 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.099 A/m
H Category: M4
Location: -6.5, -6, 368.7 mm



0 dB = 0.099A/m

Date: 2011/5/10

HAC_E_WCDMA5_CH4132_ Second Solution

Communication System: WCDMA BAND5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 54.8 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 68.7 V/m; Power Drift = -0.029 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

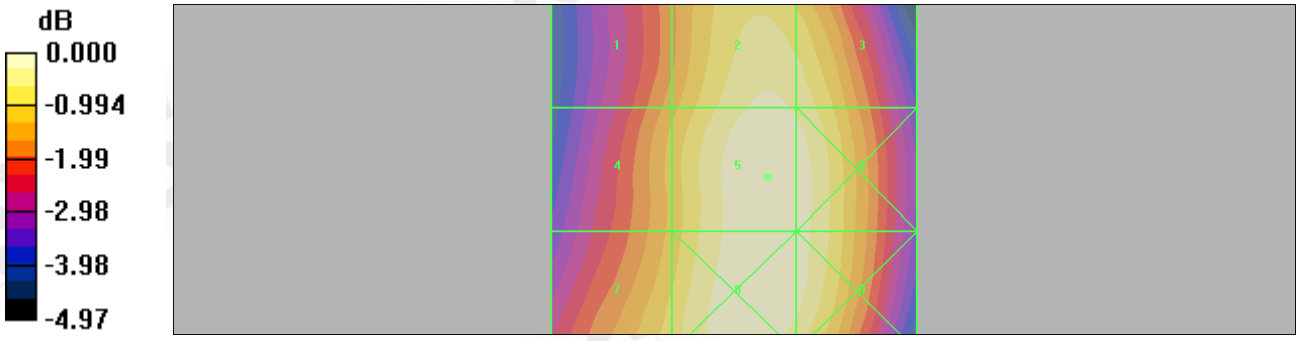
Peak E-field in V/m

Grid 1 **46.5 M4**	Grid 2 **53.3 M4**	Grid 3 **52.5 M4**
Grid 4 **48.0 M4**	Grid 5 **54.8 M4**	Grid 6 **54.0 M4**
Grid 7 **50.0 M4**	Grid 8 **54.6 M4**	Grid 9 **53.8 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 54.8 V/m
E Category: M4
Location: -4.5, 1, 368.7 mm



0 dB = 54.8V/m

Date: 2011/5/10

HAC_H_WCDMA5_CH4132_ Second Solution

Communication System: WCDMA BAND5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm / Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.079 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.050 A/m; Power Drift = 0.050 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

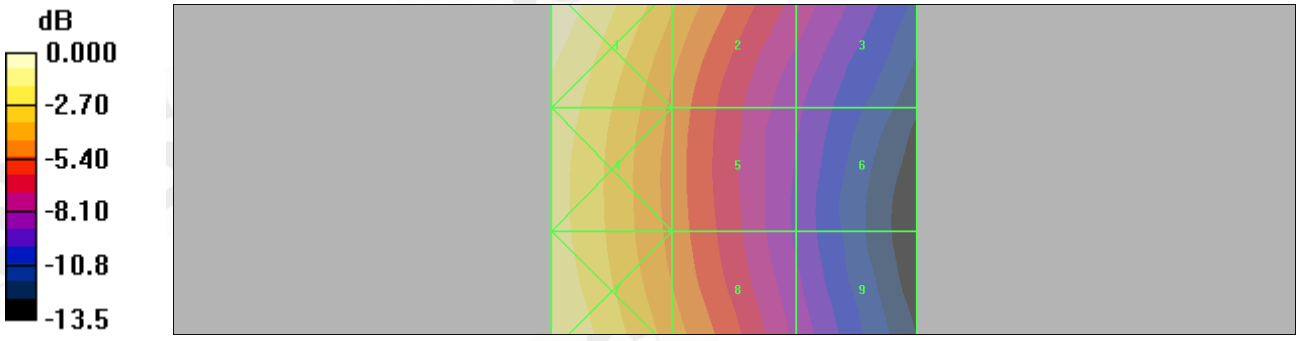
Peak H-field in A/m

Grid 1 **0.115 M4**	Grid 2 **0.079 M4**	Grid 3 **0.050 M4**
Grid 4 **0.101 M4**	Grid 5 **0.067 M4**	Grid 6 **0.042 M4**
Grid 7 **0.106 M4**	Grid 8 **0.074 M4**	Grid 9 **0.045 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.115 A/m
H Category: M4
Location: 25, -25, 368.7 mm



0 dB = 0.115A/m

14. System Verification

Date: 2011/4/24

DUT: HAC-Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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 = 180.9 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 135.6 V/m; Power Drift = 0.003 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

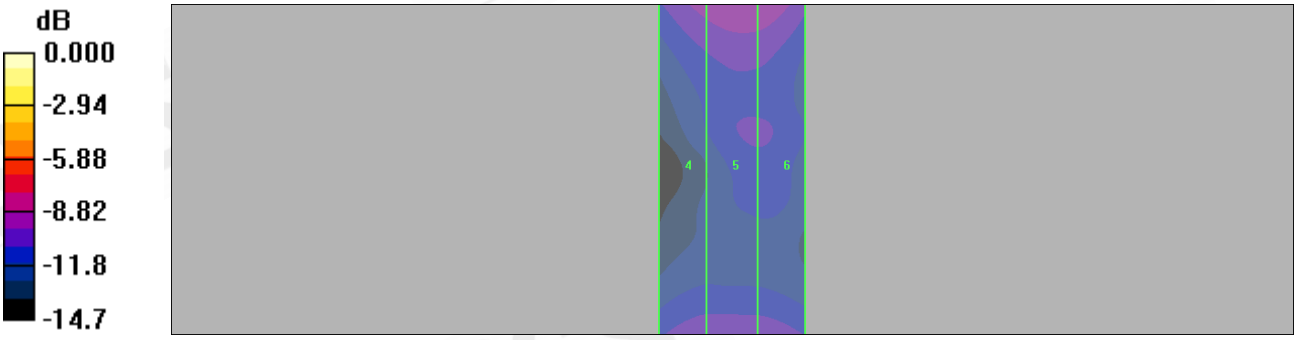
Peak E-field in V/m

Grid 1 **173.4 M4**	Grid 2 **180.9 M4**	Grid 3 **180.1 M4**
Grid 4 **95.7 M4**	Grid 5 **100.3 M4**	Grid 6 **99.8 M4**
Grid 7 **206.5 M3**	Grid 8 **230.7 M3**	Grid 9 **230.2 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 230.7 V/m
E Category: M3
Location: -3, 80.5, 364.7 mm



0 dB = 230.7V/m

Date: 2011/4/24

DUT: HAC-Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 probe center 10mm above CD835 Dipole / Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.452 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 0.463 A/m; Power Drift = -0.027 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

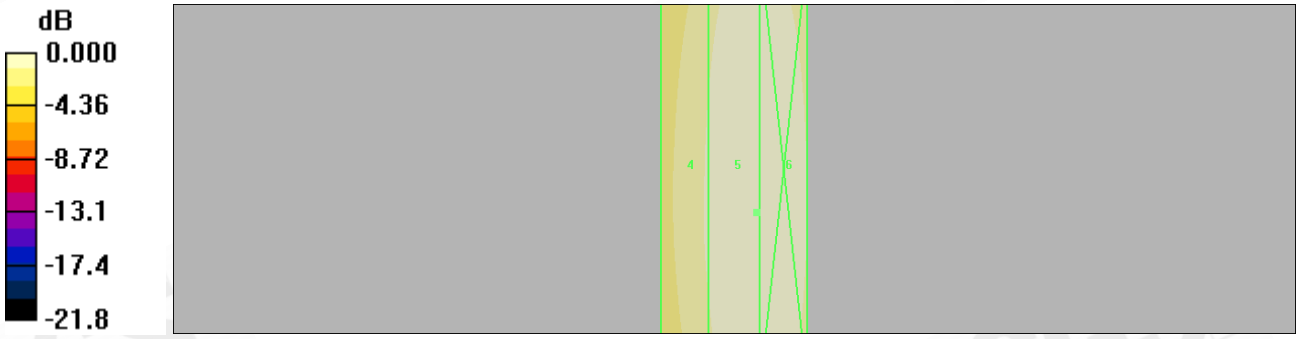
Peak H-field in A/m

Grid 1 **0.339 M4**	Grid 2 **0.390 M4**	Grid 3 **0.389 M4**
Grid 4 **0.393 M4**	Grid 5 **0.452 M4**	Grid 6 **0.452 M4**
Grid 7 **0.356 M4**	Grid 8 **0.412 M4**	Grid 9 **0.411 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8

M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.452 A/m
H Category: M4
Location: -3, 6, 364.7 mm



0 dB = 0.452A/m

Date: 2011/4/24

DUT: HAC-Dipole 1880MHz;

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2302; ConvF(1, 1, 1); Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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 = 138.8 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 168.1 V/m; Power Drift = 0.000 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

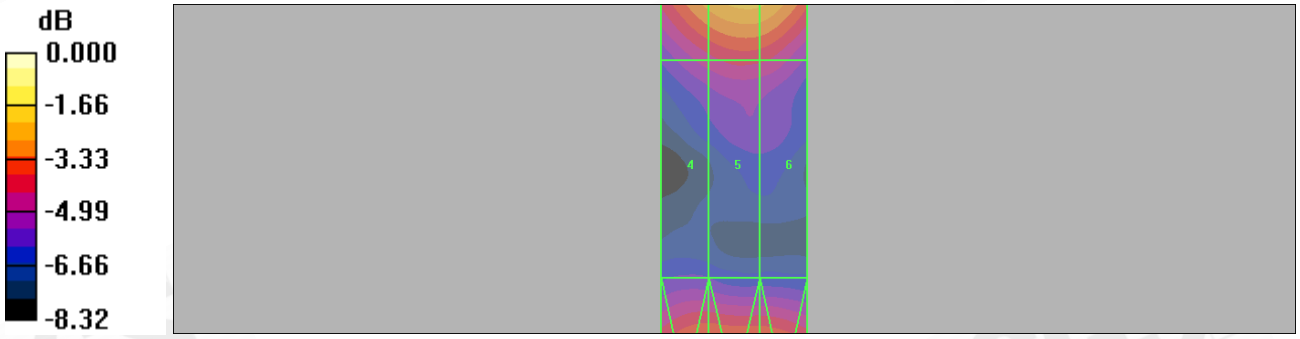
Peak E-field in V/m

Grid 1 **129.7 M2**	Grid 2 **138.8 M2**	Grid 3 **138.6 M2**
Grid 4 **89.1 M3**	Grid 5 **93.4 M3**	Grid 6 **92.5 M3**
Grid 7 **139.7 M2**	Grid 8 **152.0 M2**	Grid 9 **151.7 M2**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8

M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 152.0 V/m
E Category: M2
Location: -2.5, 38, 364.7 mm



0 dB = 152.0V/m

Date: 2011/4/24

DUT: HAC-Dipole 1880MHz;

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2010/6/15
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 probe center 10mm above CD1880 Dipole / Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.471 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 0.483 A/m; Power Drift = -0.009 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

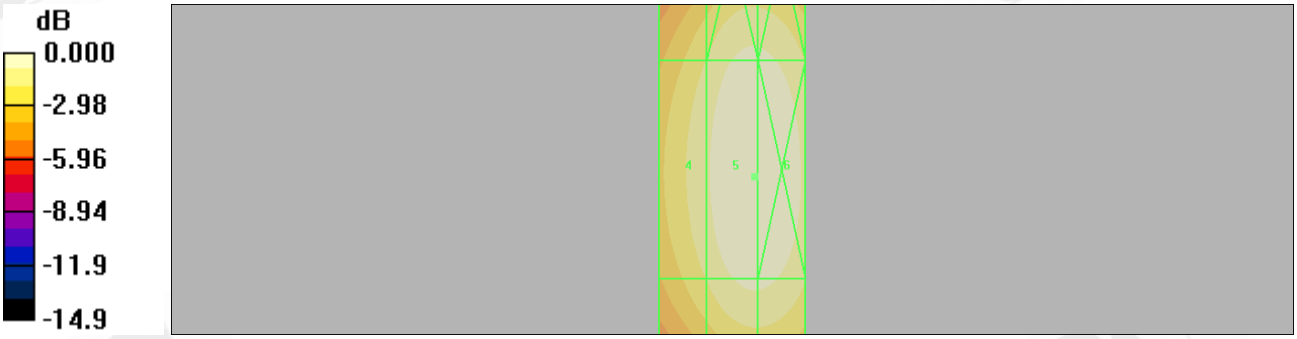
Peak H-field in A/m

Grid 1 **0.377 M2**	Grid 2 **0.433 M2**	Grid 3 **0.432 M2**
Grid 4 **0.414 M2**	Grid 5 **0.471 M2**	Grid 6 **0.471 M2**
Grid 7 **0.377 M2**	Grid 8 **0.432 M2**	Grid 9 **0.431 M2**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6

	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14
Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.471 A/m
H Category: M2
Location: -3, 1, 364.7 mm



0 dB = 0.471A/m

Date: 2011/5/10

HAC_E_Dipole_835MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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 = 174.9 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 131.3 V/m; Power Drift = -0.013 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

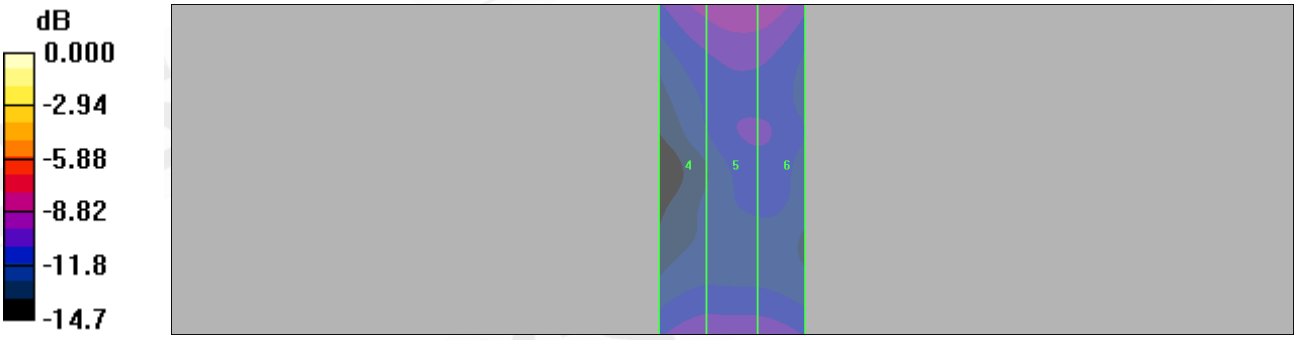
Peak E-field in V/m

Grid 1 **167.5 M4**	Grid 2 **174.9 M4**	Grid 3 **174.1 M4**
Grid 4 **92.3 M4**	Grid 5 **97.0 M4**	Grid 6 **96.5 M4**
Grid 7 **199.1 M4**	Grid 8 **223.1 M3**	Grid 9 **222.5 M3**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 223.1 V/m
E Category: M3
Location: -3, 80.5, 364.7 mm



0 dB = 223.1V/m

Date: 2011/5/10

HAC_H_Dipole_835MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 probe center 10mm above CD835 Dipole / Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.453 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 0.462 A/m; Power Drift = -0.029 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

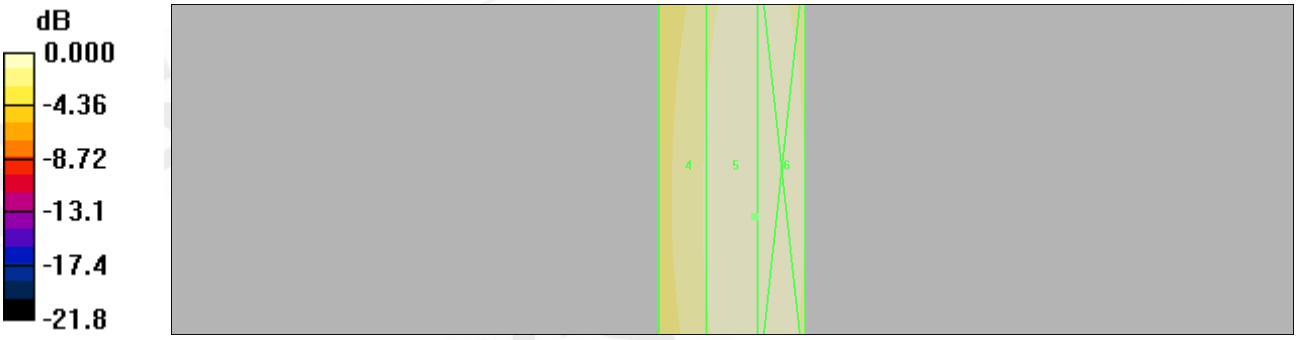
Peak H-field in A/m

Grid 1 **0.338 M4**	Grid 2 **0.390 M4**	Grid 3 **0.389 M4**
Grid 4 **0.392 M4**	Grid 5 **0.453 M4**	Grid 6 **0.451 M4**
Grid 7 **0.355 M4**	Grid 8 **0.412 M4**	Grid 9 **0.411 M4**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.452 A/m
H Category: M4
Location: -3, 6.5, 364.7 mm



0 dB = 0.452A/m

Date: 2011/5/10

HAC_E_Dipole_1880MHz

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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 = 142.4 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 172.1 V/m; Power Drift = -0.002 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

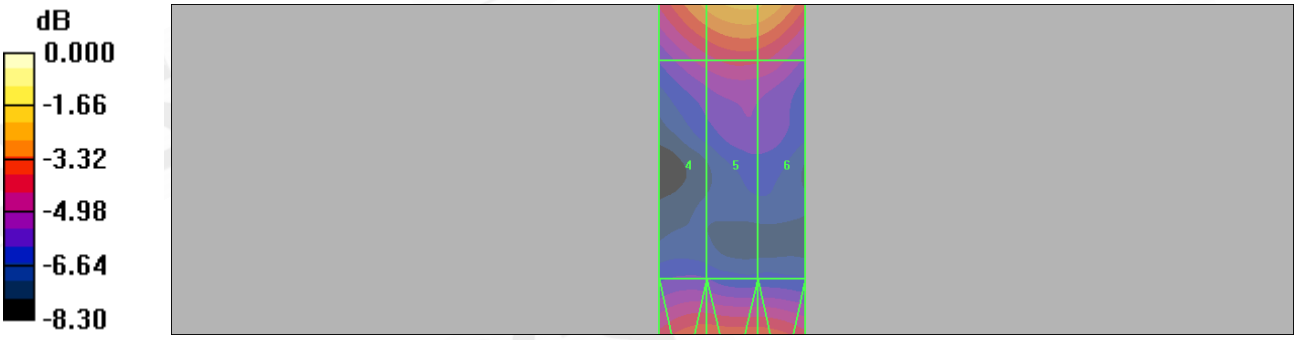
Peak E-field in V/m

Grid 1 **132.7 M2**	Grid 2 **142.4 M2**	Grid 3 **142.1 M2**
Grid 4 **91.3 M3**	Grid 5 **95.9 M3**	Grid 6 **94.9 M3**
Grid 7 **143.2 M2**	Grid 8 **155.7 M2**	Grid 9 **155.3 M2**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 155.7 V/m
E Category: M2
Location: -2.5, 38, 364.7 mm



0 dB = 155.7V/m

Date: 2011/5/10

HAC_H_Dipole_1880MHz

Communication System: CW; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2011/4/18
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2010/8/18
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

H Scan - H3DV6 probe center 10mm above CD1880 Dipole / Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.458 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 0.469 A/m; Power Drift = -0.005 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

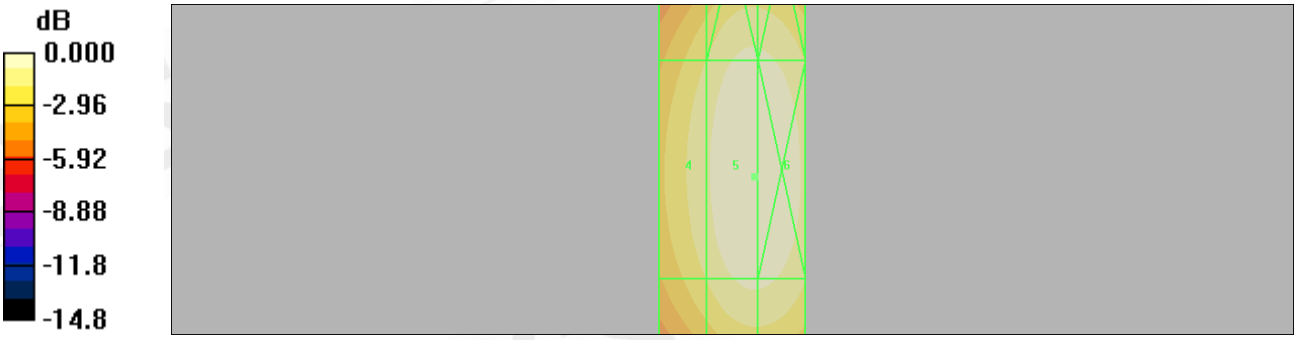
Peak H-field in A/m

Grid 1 **0.367 M2**	Grid 2 **0.420 M2**	Grid 3 **0.420 M2**
Grid 4 **0.403 M2**	Grid 5 **0.458 M2**	Grid 6 **0.457 M2**
Grid 7 **0.367 M2**	Grid 8 **0.419 M2**	Grid 9 **0.419 M2**

Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

Category	AWF (dB)	Limits for E-Field Emissions (V/m) < 960MHz	Limits for H-Field Emissions (A/m) < 960 MHz
M1	0	631 - 1122	1.91 - 3.39
	-5	473.2 - 841.4	1.43 - 2.54
M2	0	354.8 - 631	1.07 - 1.91
	-5	266.1 - 473.2	0.8 - 1.43
M3	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M4	0	<199.5	<0.6
	-5	<149.6	<0.45

Cursor:
Total = 0.458 A/m
H Category: M2
Location: -3, 1, 364.7 mm



0 dB = 0.458A/m

15. DAE & Probe Calibration certificate

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

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Accreditation No.: SCS 108

Client SGS-TW

Certificate No: DAE4-547_Aug10

CALIBRATION CERTIFICATE

Object: DAE4 - SD 000 D04 BJ - SN: 547

Calibration procedure(s): QA CAL-06.v22
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: August 18, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	1-Oct-09 (No: 9055)	Oct-10
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	07-Jun-10 (in house check)	In house check: Jun-11

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

Issued: August 18, 2010

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

Certificate No: DAE4-547_Aug10 Page 1 of 5

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Accreditation No.: SCS 108

Client: Auden

Certificate No: ER3-2302_Jun10

CALIBRATION CERTIFICATE

Object	ER3DV6 - SN:2302
Calibration procedure(s)	QA CAL-02.v5 and QA CAL-25.v2 Calibration procedure for E-field probes optimized for close near field evaluations in air
Calibration date:	June 15, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

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

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 16, 2010

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Accreditation No.: SCS 108

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization 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 1309-2005, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.

Methods Applied and Interpretation of Parameters:

- *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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z*: *A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ER3DV6

SN:2302

Manufactured:	November 6, 2002
Last calibrated:	June 23, 2009
Recalibrated:	June 15, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

ER3DV6 SN:2302 June 15, 2010

DASY/EASY - Parameters of Probe: ER3DV6 SN:2302

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)	1.49	1.36	1.46	± 10.1%
DCP (mV)[A]	91.2	91.4	100.2	

Modulation Calibration Parameters

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

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

[A] numerical linearization parameter: uncertainty not required

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

ER3DV6 SN:2306 April 26, 2010

DASY - Parameters of Probe: ER3DV6 SN:2306

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)	1.10	1.13	1.26	± 10.1%
DCP (mV)[A]	97.8	99.1	102.8	

Modulation Calibration Parameters

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

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

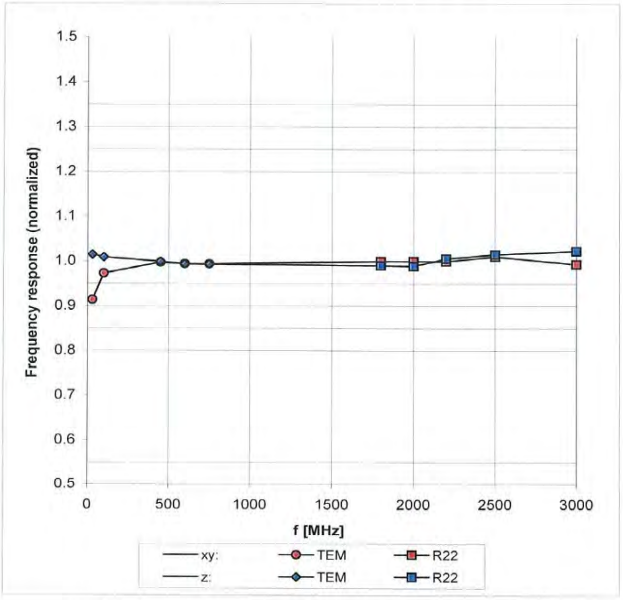
[A] numerical linearization parameter: uncertainty not required

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

ER3DV6 SN:2302 June 15, 2010

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide R22)



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

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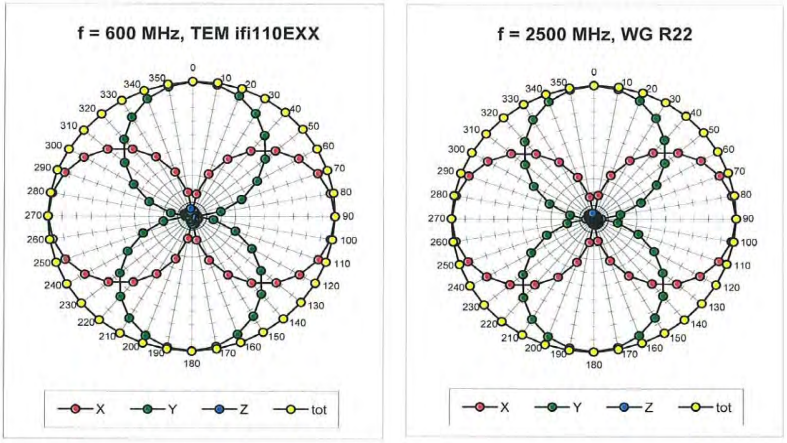
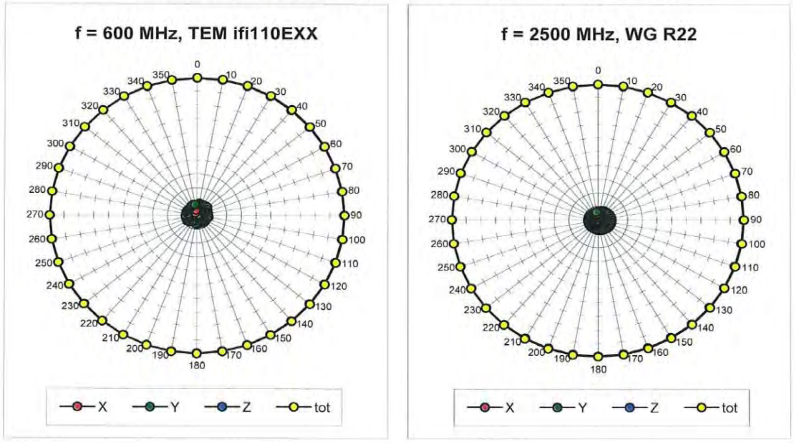
ER3DV6 SN:2302 June 15, 2010

Receiving Pattern (ϕ), ϑ = 0°



Receiving Pattern (ϕ), ϑ = 90°



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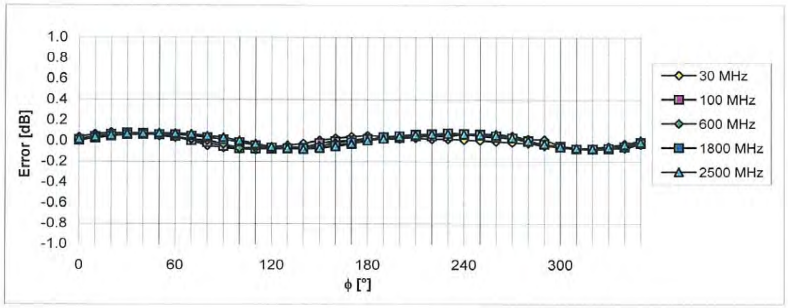
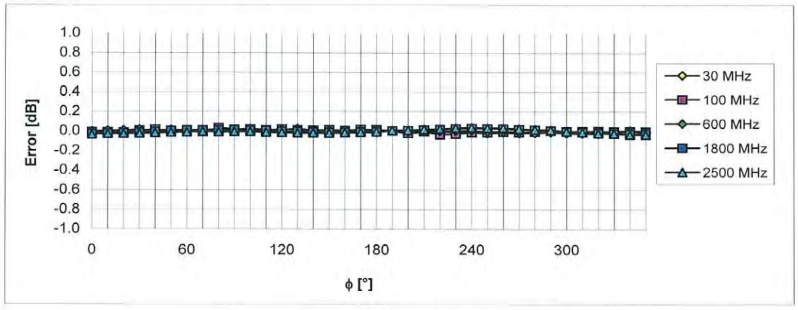
ER3DV6 SN:2302 June 15, 2010

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)

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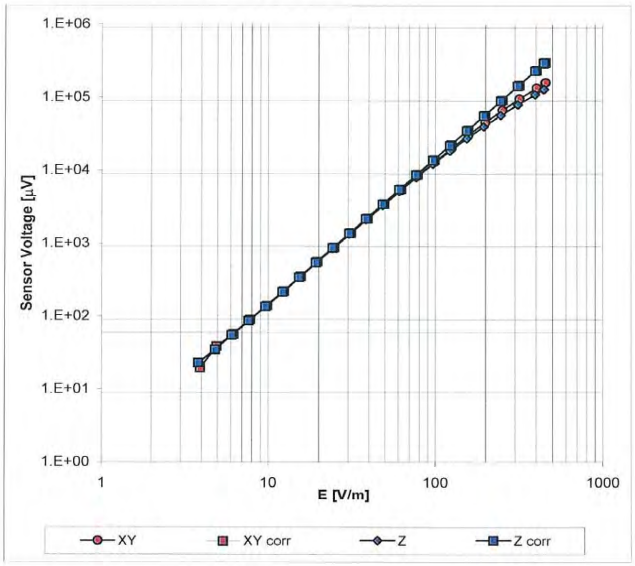
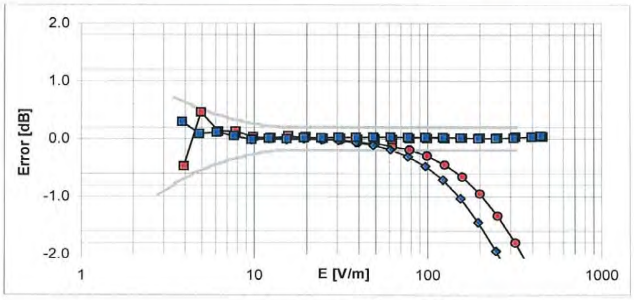
Dynamic Range f(E-field)

(Waveguide R22, f = 1800 MHz)

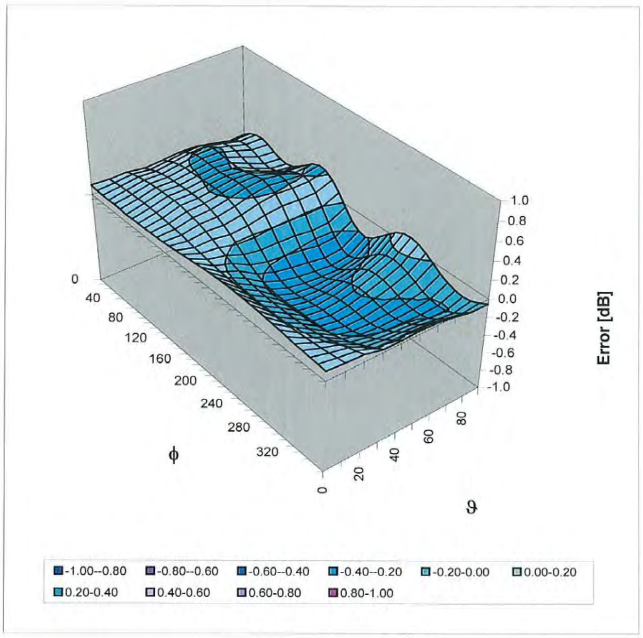




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ER3DV6 SN:2302 June 15, 2010

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



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

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ER3DV6 SN:2302 June 15, 2010

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-3.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	8.0 mm
Probe Tip to Sensor X Calibration Point	2.5 mm
Probe Tip to Sensor Y Calibration Point	2.5 mm
Probe Tip to Sensor Z Calibration Point	2.5 mm

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Accreditation No.: SCS 108

Client Auden

Certificate No: H3-6187_Jun10

CALIBRATION CERTIFICATE

Object	H3DV6 - SN:6187
Calibration procedure(s)	QA CAL-03.v5 and QA CAL-25.v2 Calibration procedure for H-field probes optimized for close near field evaluations in air
Calibration date:	June 15, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

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

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 16, 2010

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Accreditation No.: SCS 108

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization 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 1309-2005, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.

Methods Applied and Interpretation of Parameters:

- *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).
- *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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z*: *A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *X_a0a1a2* (no uncertainty required).

Probe H3DV6

SN:6187

Manufactured:	June 8, 2004
Last calibrated:	June 24, 2009
Recalibrated:	June 15, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

H3DV6 SN:6187 June 15, 2010

DASY/EASY - Parameters of Probe: H3DV6 SN:6187

Basic Calibration Parameters

		Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / √(μV))	a0	3.29E-3	2.52E-3	3.04E-3	± 5.1%
Norm (A/m / √(μV))	a1	-2.89E-6	3.58E-5	-4.67E-5	± 5.1%
Norm (A/m / √(μV))	a2	1.52E-5	1.18E-5	6.41E-5	± 5.1%
DCP (mV)[A]		101.0	93.0	83.2	

Modulation Calibration Parameters

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

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

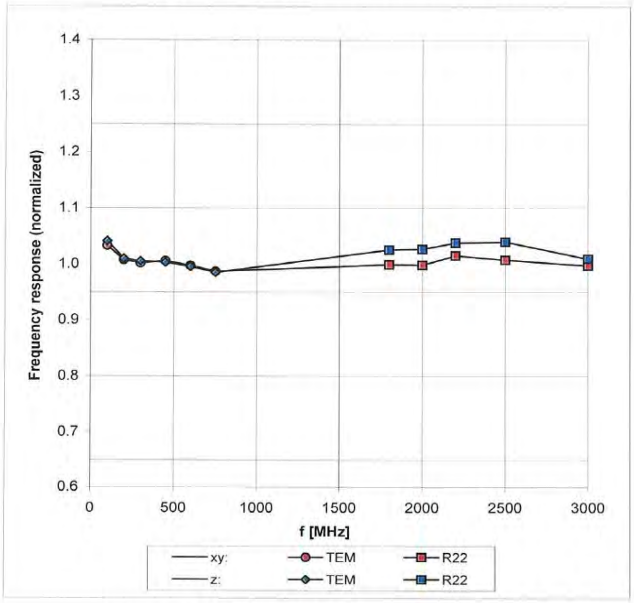
[A] numerical linearization parameter: uncertainty not required

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

H3DV6 SN:6187 June 15, 2010

Frequency Response of H-Field

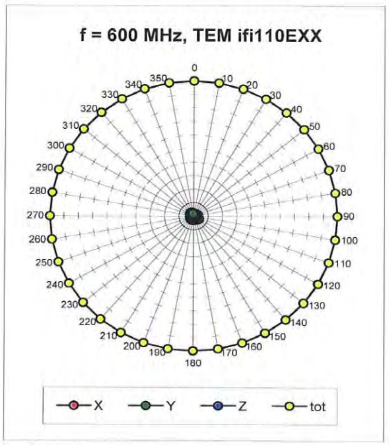
(TEM-Cell:ifi110 EXX, Waveguide R22)

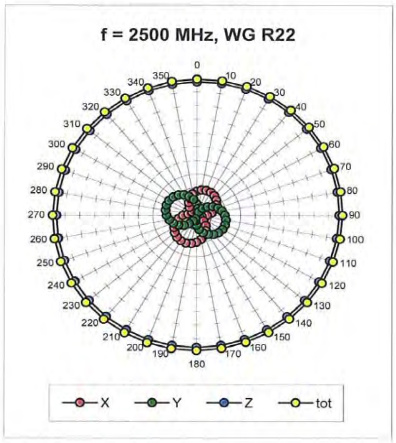


Uncertainty of Frequency Response of H-field: ± 6.3% (k=2)

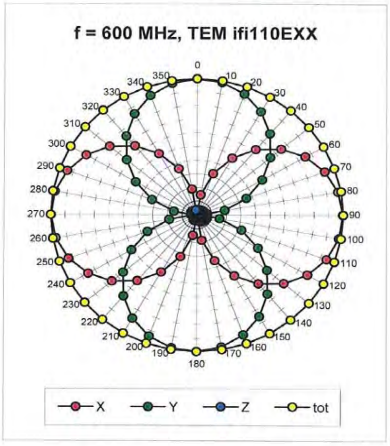
H3DV6 SN:6187 June 15, 2010

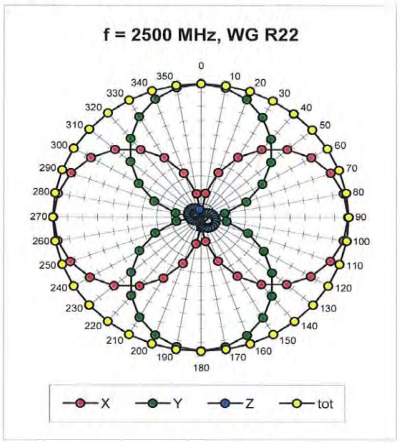
Receiving Pattern (ϕ), ϑ = 90°





Receiving Pattern (ϕ), ϑ = 0°





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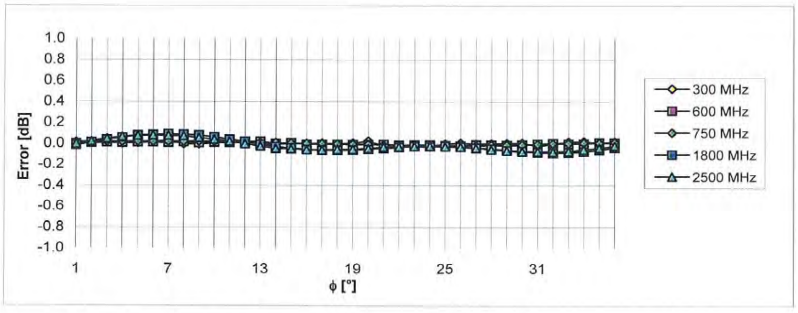
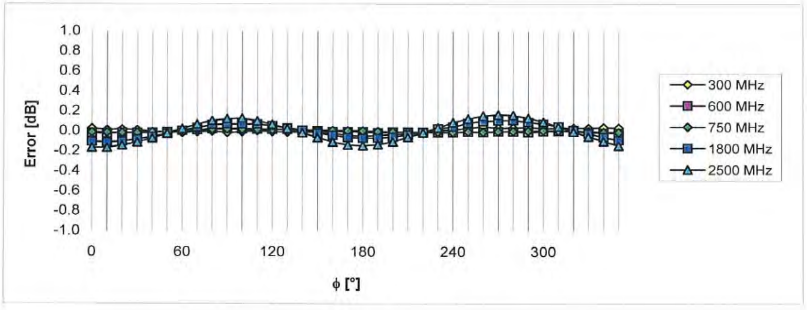
H3DV6 SN:6187 June 15, 2010

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)

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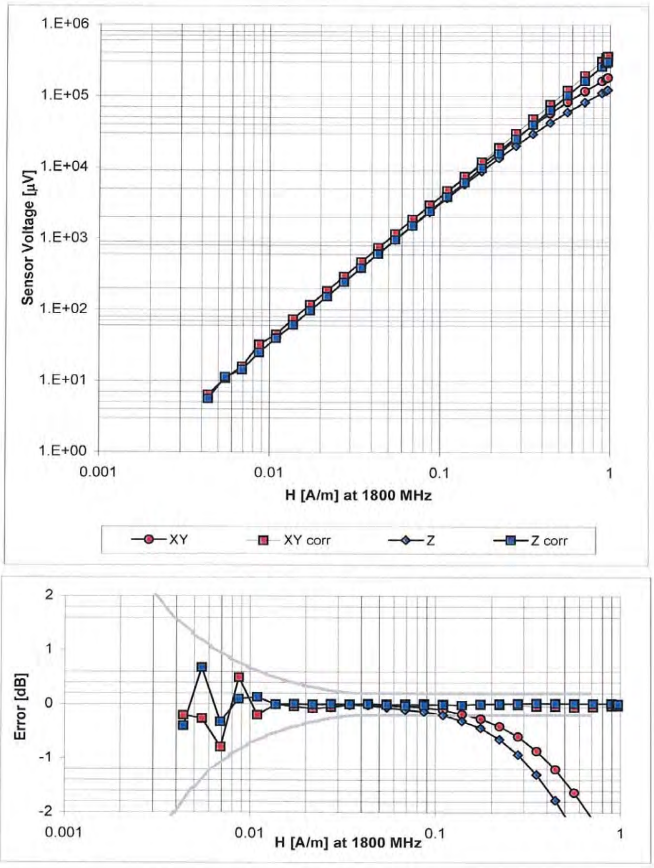
H3DV6 SN:6187 June 15, 2010

Dynamic Range f(H-field)

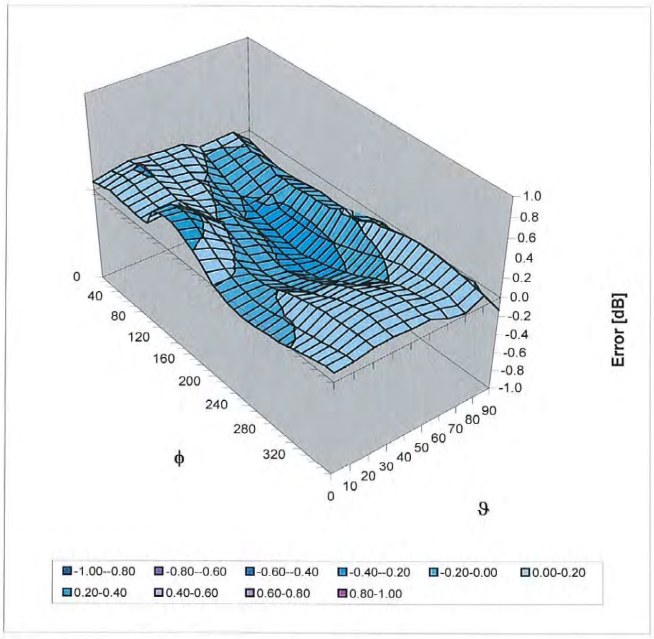
(Waveguide R22, f = 1800 MHz)



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

H3DV6 SN:6187 June 15, 2010

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



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

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H3DV6 SN:6187 June 15, 2010

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-113.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	20 mm
Tip Diameter	6.0 mm
Probe Tip to Sensor X Calibration Point	3 mm
Probe Tip to Sensor Y Calibration Point	3 mm
Probe Tip to Sensor Z Calibration Point	3 mm

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: ER3-2306_Apr11

CALIBRATION CERTIFICATE

Object	ER3DV6 - SN:2306
Calibration procedure(s)	QA CAL-02.v6, QA CAL-25.v3 Calibration procedure for E-field probes optimized for close near field evaluations in air
Calibration date:	April 18, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41495277	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ER3DV6	SN: 2328	4-Oct-10 (No. ER3-2328_Oct10)	Oct-11
DAE4	SN: 789	16-Feb-11 (No. DAE4-789_Feb11)	Feb-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: April 18, 2011

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Certificate No: ER3-2306_Apr11 Page 1 of 10

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Accreditation No.: SCS 108

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization 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 1309-2005, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.

Methods Applied and Interpretation of Parameters:

- *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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ER3DV6

SN:2306

Manufactured: December 17, 2002
Calibrated: April 18, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ER3DV6 - SN:2306

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)	1.11	1.14	1.27	± 10.1 %
DCP (mV)[B]	100.0	100.9	100.2	

Modulation Calibration Parameters

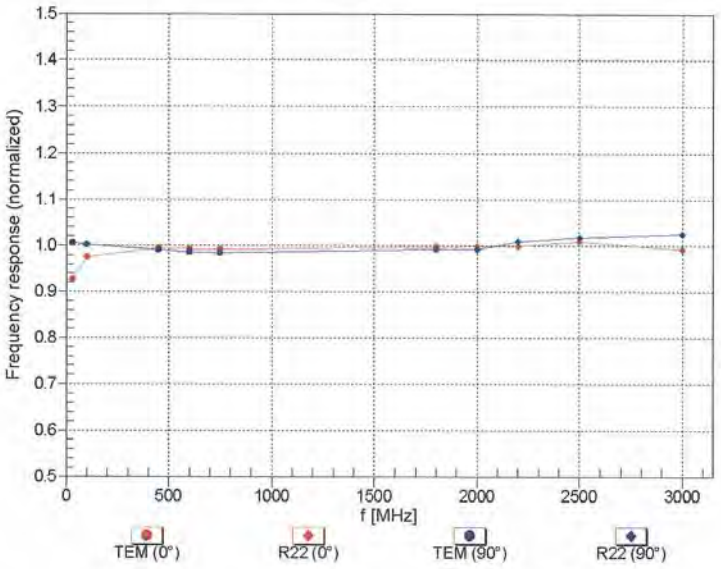
UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	114.4	±1.9 %
			Y	0.00	0.00	1.00	91.8	
			Z	0.00	0.00	1.00	87.0	

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%.

[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

ER3DV6– SN:2306 April 18, 2011

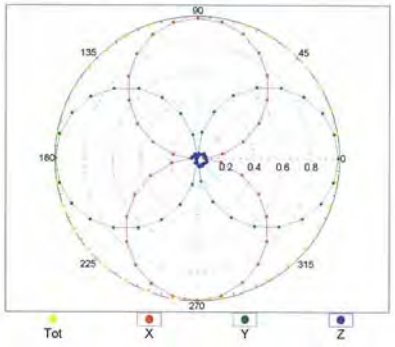
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



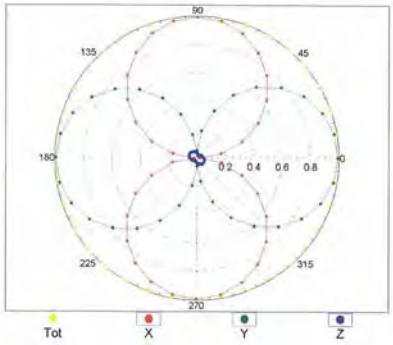
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM,0°

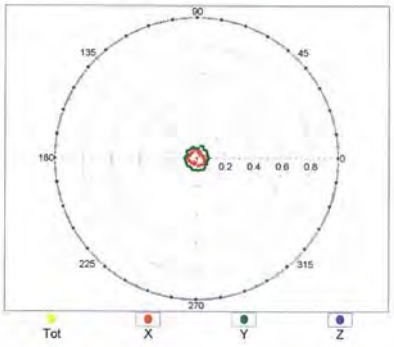


f=2500 MHz,R22,0°

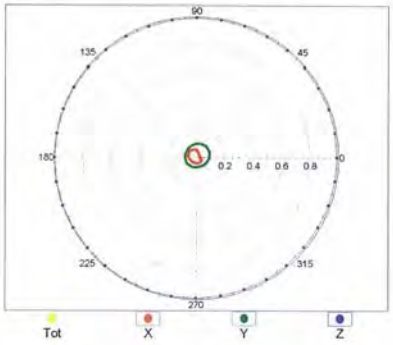


Receiving Pattern (ϕ), ϑ = 90°

f=600 MHz,TEM,90°

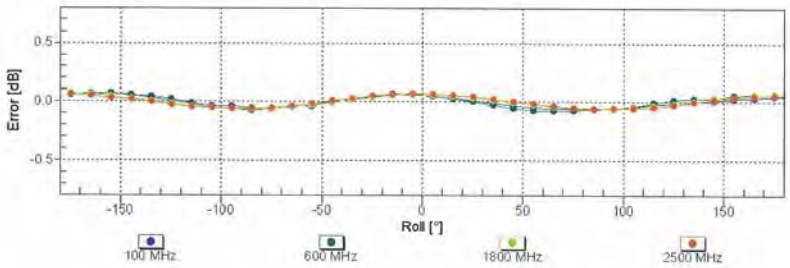


f=2500 MHz,R22,90°



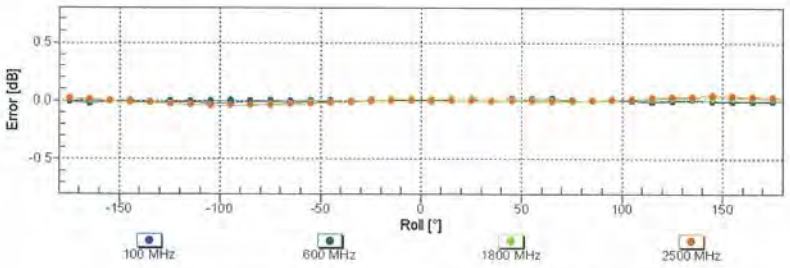
ER3DV6– SN:2306 April 18, 2011

Receiving Pattern (ϕ), ϑ = 0°



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

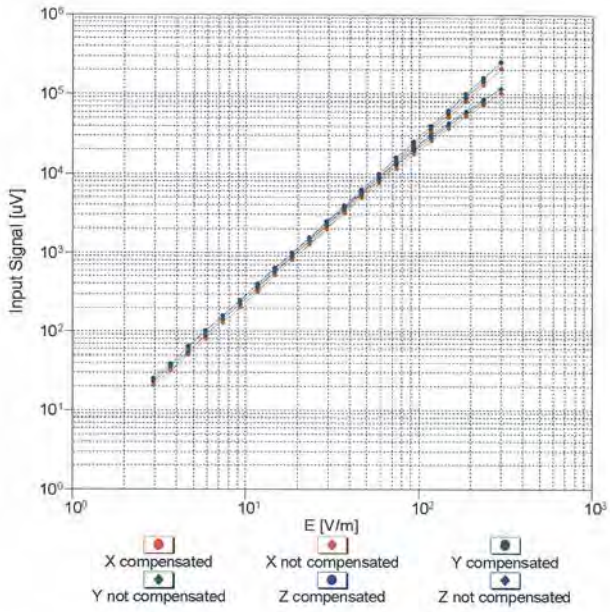
Receiving Pattern (ϕ), ϑ = 90°

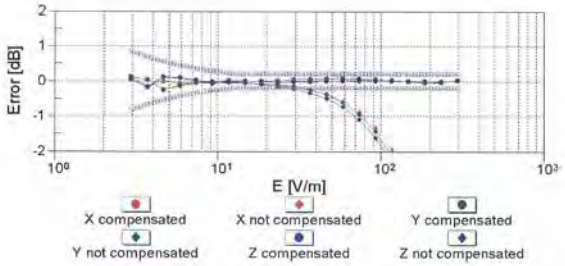


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ER3DV6– SN:2306 April 18, 2011

Dynamic Range f(E-field)
(TEM cell , f = 900 MHz)



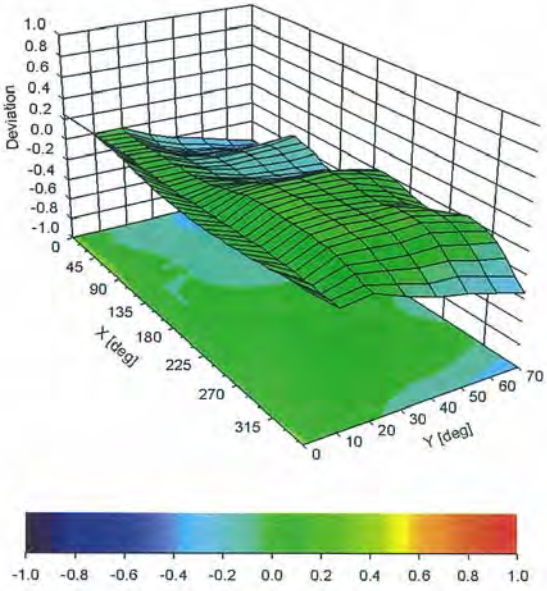


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ER3DV6– SN:2306 April 18, 2011

Deviation from Isotropy in Air

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: ER3DV6 - SN:2306

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-44.8
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	8 mm
Probe Tip to Sensor X Calibration Point	2.5 mm
Probe Tip to Sensor Y Calibration Point	2.5 mm
Probe Tip to Sensor Z Calibration Point	2.5 mm

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: H3-6142_Apr11

CALIBRATION CERTIFICATE

Object H3DV6 - SN:6142

Calibration procedure(s) QA CAL-03.v6, QA CAL-25.v3
Calibration procedure for H-field probes optimized for close near field evaluations in air

Calibration date: April 18, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41495277	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe H3DV6	SN: 6182	4-Oct-10 (No. H3-6182_Oct10)	Oct-11
DAE4	SN: 789	16-Feb-11 (No. DAE4-789_Feb11)	Feb-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: April 19, 2011

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Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization 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 1309-2005, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.

Methods Applied and Interpretation of Parameters:

- *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).
- *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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *X_a0a1a2* (no uncertainty required).

Probe H3DV6

SN:6142

Manufactured: July 3, 2002
Calibrated: April 18, 2011

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: H3DV6 - SN:6142

Basic Calibration Parameters

		Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / √(mV))	a0	2.75E-003	2.73E-003	3.09E-003	± 5.1 %
Norm (A/m / √(mV))	a1	-8.24E-005	-1.19E-004	-3.03E-004	± 5.1 %
Norm (A/m / √(mV))	a2	-1.43E-005	7.23E-006	3.64E-005	± 5.1 %
DCP (mV)[B]		92.4	88.1	92.2	

Modulation Calibration Parameters

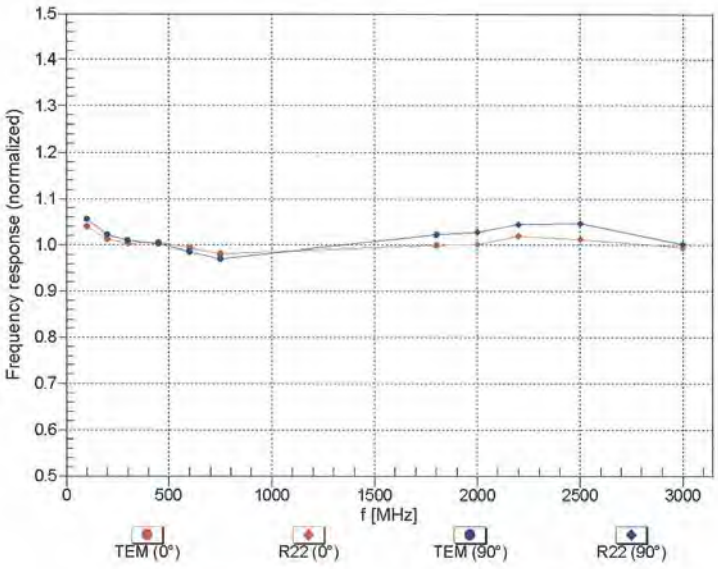
UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	95.6	±3.0 %
			Y	0.00	0.00	1.00	96.8	
			Z	0.00	0.00	1.00	97.5	

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%.

[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

H3DV6– SN:6142 April 18, 2011

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

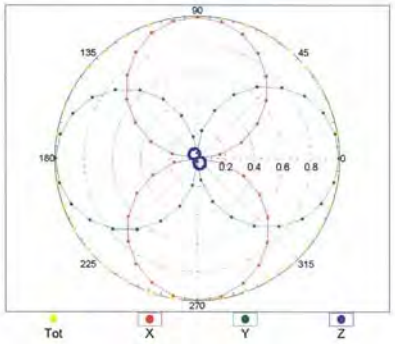


Uncertainty of Frequency Response of H-field: ± 6.3% (k=2)

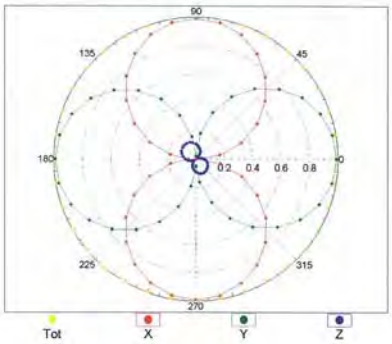
H3DV6– SN:6142 April 18, 2011

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM,0°

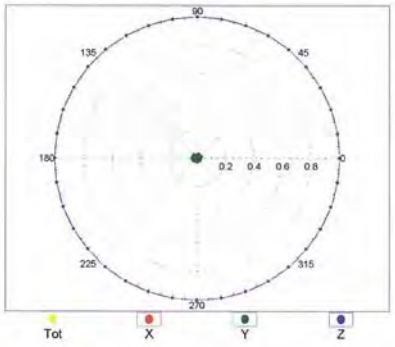


f=2500 MHz,R22,0°

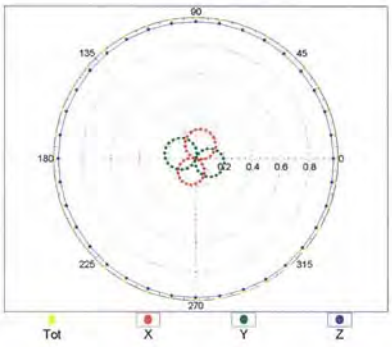


Receiving Pattern (ϕ), ϑ = 90°

f=600 MHz,TEM,90°



f=2500 MHz,R22,90°



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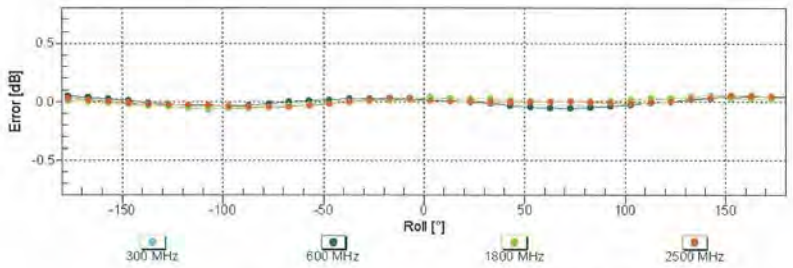
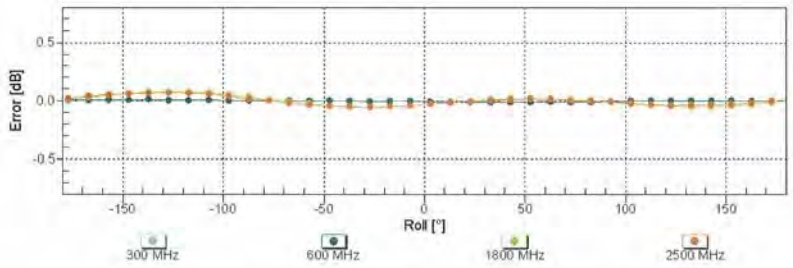
H3DV6– SN:6142 April 18, 2011

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)

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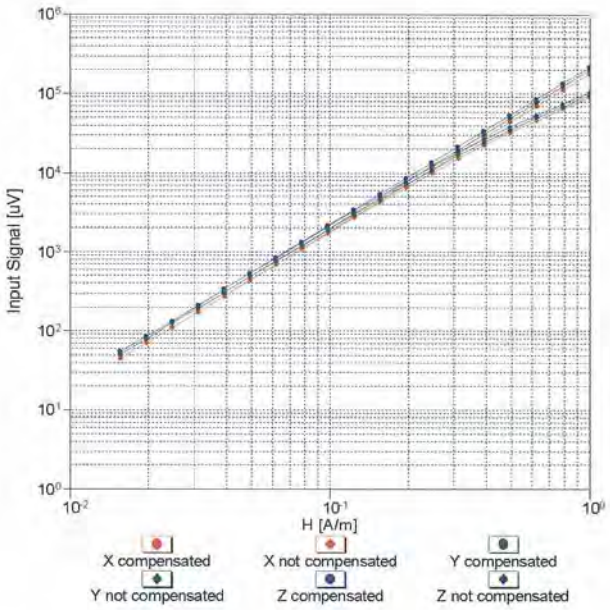
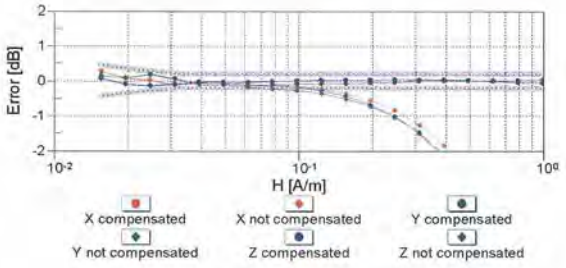
H3DV6– SN:6142 April 18, 2011

Dynamic Range f(H-field)
(TEM cell, f = 900 MHz)



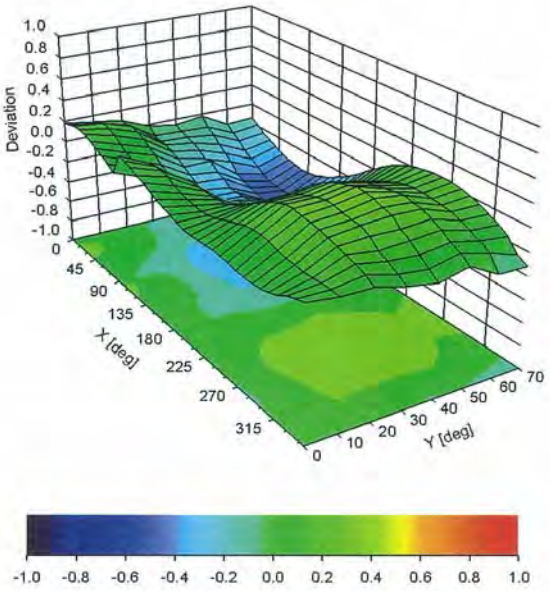


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

H3DV6– SN:6142 April 18, 2011

Deviation from Isotropy in Air

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: H3DV6 - SN:6142

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-67.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	20 mm
Tip Diameter	6 mm
Probe Tip to Sensor X Calibration Point	3 mm
Probe Tip to Sensor Y Calibration Point	3 mm
Probe Tip to Sensor Z Calibration Point	3 mm

16. Uncertainty Analysis

HAC-Extension Setup Performance Test
Using SPEAG Calibration Dipoles

Error Description	Uncertainty value	Prob. Dist.	Div.	(c_i) E	(c_i) H	Std. Unc. E	Std. Unc. H
Measurement System							
Probe Calibration	±5.1%	N	1	1	1	±5.1%	±5.1%
Axial Isotropy	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%
Sensor Displacement	±16.5%	R	$\sqrt{3}$	1	0.145	±9.5%	±1.4%
Boundary Effects	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%
Scaling to Peak Envelope Power	±0%	R	$\sqrt{3}$	1	1	±0%	±0%
System Detection Limit	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%
Response Time	±0%	R	$\sqrt{3}$	1	1	±0%	±0%
Integration Time	±0%	R	$\sqrt{3}$	1	1	±0%	±0%
RF Ambient Conditions	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%
RF Reflections	±6.0%	R	$\sqrt{3}$	1	1	±3.5%	±3.5%
Probe Positioner	±1.2%	R	$\sqrt{3}$	1	0.67	±0.7%	±0.5%
Probe Positioning	±4.7%	R	$\sqrt{3}$	1	0.67	±2.7%	±1.8%
Extrap. and Interpolation	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
Dipole Related							
Distance Dipole - Scanning Plane	±5.2%	R	$\sqrt{3}$	1	0.3	±3.0%	±0.9%
Input power	±4.7%	N	1	1	1	±4.7%	±4.7%
Combined Std. Uncertainty						±13.7%	±9.3%
Expanded Std. Uncertainty on Power						**±27.4%**	**±18.6%**
Expanded Std. Uncertainty on Field						**±13.7%**	**±9.3%**

Table 28.1: Uncertainty budget for HAC setup performance test. The budget is valid for the frequency range 800 MHz - 3 GHz and represents a worst-case analysis with respect to power uncertainty of the field. Some of the parameters are dependent on the user situations and need adjustment according to the actual laboratory conditions.

17. System Validation from Original equipment supplier

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Accreditation No.: SCS 108

Client SGS-TW (Auden) Certificate No: CD835V3-1052_Apr10

CALIBRATION CERTIFICATE

Object	CD835V3 - SN: 1052
Calibration procedure(s)	QA CAL-20.v5 Calibration procedure for dipoles in air
Calibration date:	April 26, 2010

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	22-Jan-10 (No. DAE4-781_Jan10)	Jan-11
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct-10
RF generator E4433B	MY 41000675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

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

Issued: April 27, 2010

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Certificate No: CD835V3-1052_Apr10 Page 1 of 6

3.3.2 DASY4 H-field Result

Date/Time: 26.04.2010 11:29:17

Test Laboratory: SPEAG Lab2

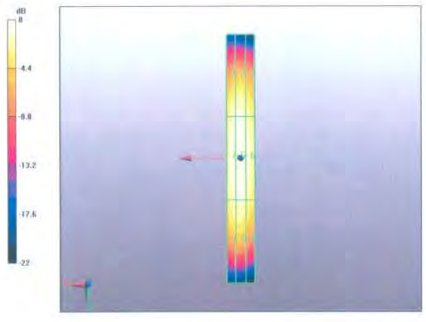
HAC RF_CD835_1052_H_100426_CL
DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1052
Communication System: CW; Communication System Band: CD835 (835.0 MHz); Frequency: 835 MHz;
Communication System PAR: 0 dB
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Dipole H-Field measurement @ 835MHz/H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.459 A/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.488 A/m; Power Drift = -0.015 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.394 M4**	Grid 2 **0.412 M4**	Grid 3 **0.385 M4**
Grid 4 **0.441 M4**	Grid 5 **0.459 M4**	Grid 6 **0.427 M4**
Grid 7 **0.390 M4**	Grid 8 **0.403 M4**	Grid 9 **0.368 M4**



0 dB = 0.459A/m

3.3.3 DASY4 E-field Result

Date/Time: 26.04.2010 16:28:20

Test Laboratory: SPEAG Lab2

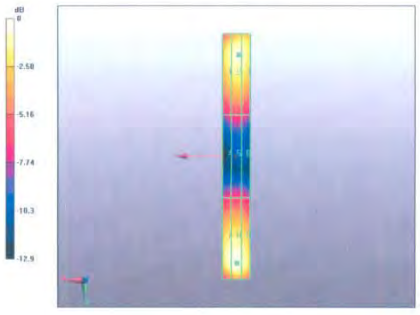
HAC RF_CD835_1052_E_100426_CL
DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1052
Communication System: CW; Communication System Band: CD835 (835.0 MHz); Frequency: 835 MHz;
Communication System PAR: 0 dB
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Dipole E-Field measurement @ 835MHz/E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm 2/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 175.0 V/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 114.7 V/m; Power Drift = 0.0013 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **154.6 M4**	Grid 2 **162.4 M4**	Grid 3 **161.0 M4**
Grid 4 **80.2 M4**	Grid 5 **83.2 M4**	Grid 6 **81.8 M4**
Grid 7 **166.7 M4**	Grid 8 **175.0 M4**	Grid 9 **167.6 M4**



0 dB = 175.0V/m

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: CD1880V3-1044_Apr10

CALIBRATION CERTIFICATE

Object	CD1880V3 - SN: 1044
Calibration procedure(s)	QA CAL-20.v5 Calibration procedure for dipoles in air
Calibration date:	April 26, 2010

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	22-Jan-10 (No. DAE4-781_Jan10)	Jan-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct-10
RF generator E4433B	MY 41000675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

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

Issued: April 27, 2010

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Certificate No: CD1880V3-1044_Apr10 Page 1 of 6

3.3.2 DASY4 H-Field Result

Date/Time: 26.04.2010 12:16:04

Test Laboratory: SPEAG Lab2

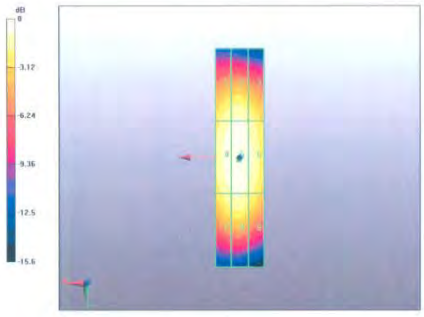
HAC_RF_CD1880_1044_H_100426_CL
DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1044
Communication System: CW; Communication System Band: CD1880 (1880.0 MHz); Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Dipole H-Field measurement @ 1880MHz/H Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.469 A/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.496 A/m; Power Drift = 0.00101 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.414 M2**	Grid 2 **0.428 M2**	Grid 3 **0.401 M2**
Grid 4 **0.453 M2**	Grid 5 **0.469 M2**	Grid 6 **0.438 M2**
Grid 7 **0.413 M2**	Grid 8 **0.429 M2**	Grid 9 **0.395 M2**



0 dB = 0.469A/m

3.3.3 DASY4 E-Field Result

Date/Time: 26.04.2010 14:58:13

Test Laboratory: SPEAG Lab2

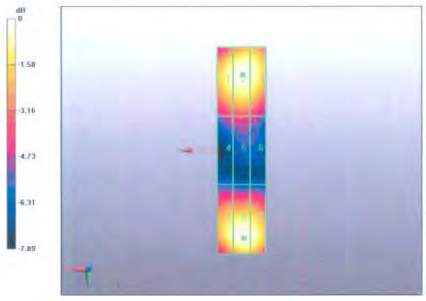
HAC_RF_CD1880_1044_E_100426_CL
DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1044
Communication System: CW; Communication System Band: CD1880 (1880.0 MHz); Frequency: 1880 MHz;
Communication System PAR: 0 dB
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Dipole E-Field measurement @ 1880MHz/E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 138.4 V/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 153.7 V/m; Power Drift = -0.00981 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **131.8 M2**	Grid 2 **136.2 M2**	Grid 3 **134.2 M2**
Grid 4 **86.8 M3**	Grid 5 **89.3 M3**	Grid 6 **86.6 M3**
Grid 7 **130.3 M2**	Grid 8 **138.4 M2**	Grid 9 **136.1 M2**



0 dB = 138.4V/m

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Accreditation No.: SCS 108

Client Auden

Certificate No: CD835V3-1149_Dec10

CALIBRATION CERTIFICATE

Object CD835V3 - SN: 1149

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

Calibration date: December 01, 2010

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	20-Oct-10 (No. DAE4-781_Oct10)	Oct-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-10)	In house check: Oct-11
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-10)	In house check: Oct-11
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-10)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11
RF generator E4433B	MY 41000675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

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

Issued: December 1, 2010

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Certificate No: CD835V3-1149_Dec10 Page 1 of 6

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Accreditation No.: SCS 108

References

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

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

Methods Applied and Interpretation of Parameters:

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

1 Measurement Conditions

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

DASY Version	DASY5	V52.2 B0
DASY PP Version	SEMCAD X	V14.2 B2
Phantom	HAC Test Arch	SD HAC P01 BA, #1070
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 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	**0.473 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	176.8 V/m
Maximum measured above low end	100 mW forward power	165.4 V/m
Averaged maximum above arm	100 mW forward power	**171.1 V/m**

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

3 Appendix

3.1 Antenna Parameters

Frequency	**Return Loss**	**Impedance**
800 MHz	18.4 dB	(46.0 – j10.9) Ohm
835 MHz	**26.2 dB**	**(50.8 + j4.9) Ohm**
900 MHz	15.8 dB	(60.7 – j14.5) Ohm
950 MHz	22.3 dB	(45.8 + j6.0) Ohm
960 MHz	16.7 dB	(51.1 + j15.0) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

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

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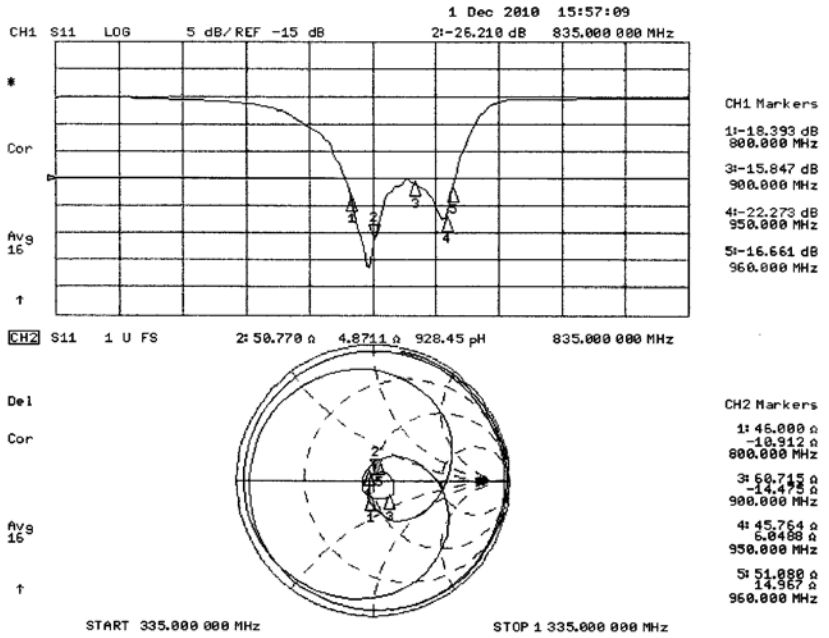
3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



3.3.3 DASY4 H-field Result

Date/Time: 30.11.2010 09:24:06

Test Laboratory: SPEAG Lab2

HAC RF_CD835_1149_H_101130_CL

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1149

Communication System: CW; Frequency: 835 MHz
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

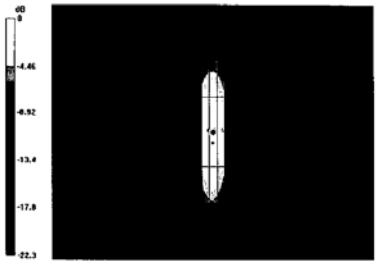
DASY5 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 20.10.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole H-Field measurement @ 835MHz/H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.473 A/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.502 A/m; Power Drift = -0.044 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.394 M4**	Grid 2 **0.411 M4**	Grid 3 **0.383 M4**
Grid 4 **0.456 M4**	Grid 5 **0.473 M4**	Grid 6 **0.438 M4**
Grid 7 **0.423 M4**	Grid 8 **0.440 M4**	Grid 9 **0.401 M4**



0 dB = 0.473A/m0 dB = 0.456A/m

3.3.2 DASY4 E-field Result

Date/Time: 01.12.2010 09:55:11

Test Laboratory: SPEAG Lab2

HAC RF_CD835_1149_E_101130_CL

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1149

Communication System: CW; Frequency: 835 MHz
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

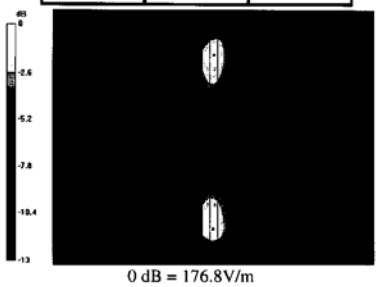
DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 20.10.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole E-Field measurement @ 835MHz/E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 176.8 V/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 114.1 V/m; Power Drift = -0.012 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **161.2 M4**	Grid 2 **165.4 M4**	Grid 3 **159.7 M4**
Grid 4 **88.3 M4**	Grid 5 **89.7 M4**	Grid 6 **85.7 M4**
Grid 7 **173.8 M4**	Grid 8 **176.8 M4**	Grid 9 **163.9 M4**



0 dB = 176.8V/m

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Accreditation No.: SCS 108

Client Audeli

Certificate No: CD1880V3-1135_Dec10

CALIBRATION CERTIFICATE

Object CD1880V3 - SN: 1135

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

Calibration date: December 01, 2010

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	20-Oct-10 (No. DAE4-781_Oct10)	Oct-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-10)	In house check: Oct-11
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-10)	In house check: Oct-11
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-10)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11
RF generator E4433B	MY 41000675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

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

Issued: December 1, 2010

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

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

References

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

Methods Applied and Interpretation of Parameters:

- *Coordinate System:* y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with the standards [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- *Measurement Conditions:* Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- *Antenna Positioning:* The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections.
  It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY5 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- *Feed Point Impedance and Return Loss:* These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was 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	DASY5	V52.2 B0
DASY PP Version	SEMCAD X	V14.2 B2
Phantom	HAC Test Arch	SD HAC P01 BA, #1070
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 90 mm
Frequency	**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	**0.465 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	137.1 V/m
Maximum measured above low end	100 mW forward power	134.3 V/m
Averaged maximum above arm	100 mW forward power	**135.7 V/m**

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

3. Appendix

3.1 Antenna Parameters

Frequency	**Return Loss**	**Impedance**
1730 MHz	22.5 dB	(49.9 + j7.6) Ohm
1880 MHz	**21.3 dB**	**(52.1 + j8.6) Ohm**
1900 MHz	21.6 dB	(54.5 + j7.4) Ohm
1950 MHz	27.0 dB	(54.5 - j1.4) Ohm
2000 MHz	20.0 dB	(40.9 - j0.2) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.
Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

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

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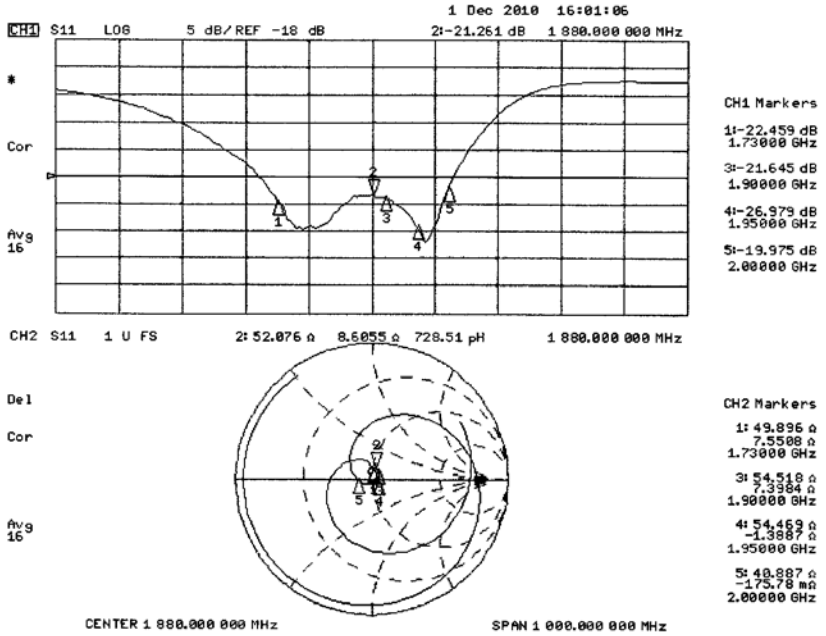
3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



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3.3.2 DASY4 H-Field Result

Date/Time: 30.11.2010 10:31:14

Test Laboratory: SPEAG Lab2

HAC_RF_CD1880_1135_H_101130_CL

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1135

Communication System: CW; Frequency: 1880 MHz
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

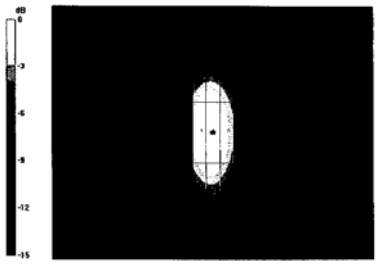
DASY5 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 20.10.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole H-Field measurement @ 1880MHz/H Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.465 A/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.491 A/m; Power Drift = 0.011 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.414 M2**	Grid 2 **0.426 M2**	Grid 3 **0.395 M2**
Grid 4 **0.453 M2**	Grid 5 **0.465 M2**	Grid 6 **0.432 M2**
Grid 7 **0.413 M2**	Grid 8 **0.426 M2**	Grid 9 **0.392 M2**



0 dB = 0.465A/m0

3.3.3 DASY4 E-Field Result

Date/Time: 01.12.2010 11:34:11

Test Laboratory: SPEAG Lab2

HAC_RF_CD1880_1135_E_101130_CL

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1135

Communication System: CW; Frequency: 1880 MHz
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Phantom section: RF Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

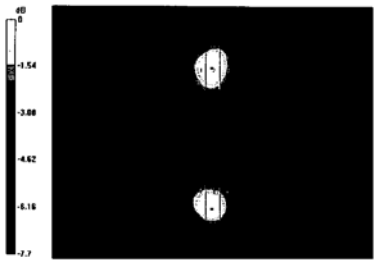
DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 20.10.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole E-Field measurement @ 1880MHz/E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 137.1 V/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 153.5 V/m; Power Drift = -0.018 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **131.3 M2**	Grid 2 **134.3 M2**	Grid 3 **129.7 M2**
Grid 4 **89 M3**	Grid 5 **90.4 M3**	Grid 6 **85.9 M3**
Grid 7 **134.0 M2**	Grid 8 **137.1 M2**	Grid 9 **129.6 M2**



0 dB = 137.1 V/m

End of 1st part of report