

Hearing Aid Compatibility(HAC)

TEST REPORT

<For RF-Emission measurement>

Applicant Name	DELL Inc.
Address of Applicant	One Dell Way Round Rock Texas 78682 United States
EUT Name	Smart Phone
Model Number	V03B002
Date of receive	2010.07.26
Date of Test(s)	2009.09.23
Date of Issue	2009.10.18

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

Asst. Supervisor

Approved by:

Nick Hsu

Supervisor

Date: 2010/10/18

Date: 2010/10/18

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Version

Version No.	Date	Description
1.0	Oct. 04, 2010	Initial issue of report
1.1	Oct. 18, 2010	1 st modification

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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 indicating 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.

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2. Testing Laboratory

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3. Details of Applicant

Applicant Name	DELL Inc.
Applicant Address	One Dell Way Round Rock Texas 78682 United States
Contact Person	Matthew Samonek
TEL	815-382-4275
E-mail	matthew_samonek@dell.com

4. Description of EUT

EUT Name	Smart Phone
Model Name	V03B002
Brand Name	DELL
Marketing Name	Venue
TAC Code	01221200
FCC ID	E2KV03B002

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Mode of Operation	GSM/GPRS/EGPRS/WCDMA/HSDPA/ HSUPA/WLAN802.11 b/g /n band
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Definition	Production unit		
Duty Cycle	GSM	GPRS	WCDMA B4
	1/8	1/2	1
TX Frequency Range (MHz)	GSM 850	GSM1900	WCDMA B4
	824.2-848.8MHZ	1850.2-1909.8MHZ	1712.4-1752.6 MHZ
Channel Number (ARFCN)	GSM 850	GSM1900	WCDMA B4
	128-251	512- 810	1312-1513
VOIP Function	No		
Battery Type	3.7 V Lithium-Ion		
Antenna Type	Internal Antenna		

5. Test Environment

Ambient Temperature	22.2° C
Relative Humidity	<60 %

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6.1 Measurement system Diagram for SPEAG Robotic



- 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.

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- 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 $\pm 6.0\%$, $k=2$)	
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., glycoether)	 H3DV6 H-Field Probe
Frequency	200 MHz to 3 GHz (absolute accuracy $\pm 6.0\%$, $k=2$); Output linearized	

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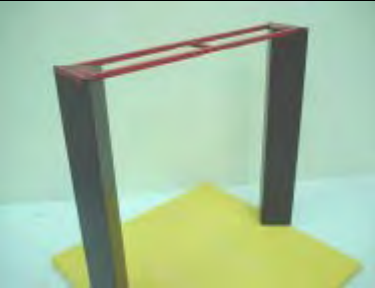
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Directivity	± 0.2 dB (spherical isotropy error)
Dynamic Range	10 mA/m to 2 A/m at 1 GHz
E-Field Interference	< 10% at 3 GHz (for plane wave)
Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to 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	
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Phone Holder

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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.

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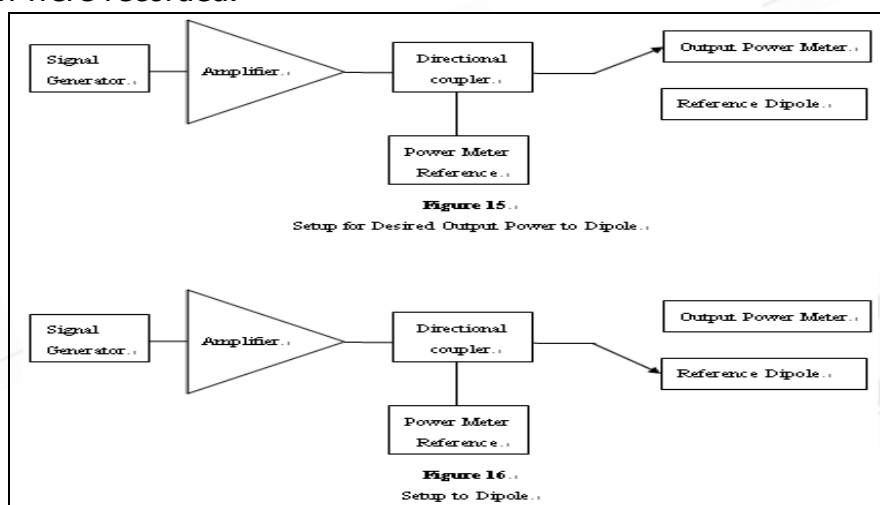
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8. System Verification

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.



For E-Field Scan

Mode	Frequency (MHz)	Input Power(dBm)	Measured Value(V/m)	Target Value(V/m)	Measured Date
CW	835	20	173.3	175	2010/09/23
Mode	Frequency (MHz)	Input Power(dBm)	Measured Value(V/m)	Target Value(V/m)	Measured Date
CW	1880	20	137.4	138.4	2010/09/23

For H-Field Scan

Mode	Frequency	Input Power	Measured Value(A/m)	Target Value(A/m)	Measured Date
CW	835	20	0.453	0.459	2010/09/23
Mode	Frequency	Input Power	Measured Value(A/m)	Target Value(A/m)	Measured Date
CW	1880	20	0.454	0.469	2010/09/23

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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 \geq 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 transmission 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:

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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.

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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

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11. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration
Schmid & Partner Engineering AG	E-Field and H-Field Probe	ER3DV6 H3DV6	2306 6142	Apr.26.2010 Apr.26.2010
Schmid & Partner Engineering AG	835&1880 MHz System Validation Dipole In Air	CD835V3 CD1880V3	1052 1044	Apr.26.2010 Apr.26.2010
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
Agilent	Power Sensor	U2001B	MY48100169	Apr.30.2010
R&S	Radio Communication Test	CMU200	113505	Mar.25.2010
Schmid & Partner Engineering AG	Test Arch SD HAC	P01	1047	N/A

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12. Summary of Results

E-Field

E-Field Emission	Channel	Modulation Factor	Conducte d Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (V/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.83	32.8	0.076	133	M4	236
	190	2.83	32.7	-0.040	136.5	M4	236
	251	2.83	32.6	0.035	146.8	M4	236
E-Field Emission	Channel	Modulation Factor	Conducte d Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (V/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM1900	512	2.99	30	0.088	73.5	M3	789
	661	2.99	30	0.106	80.8	M3	789
	810	2.99	30	0.057	72.2	M3	789
E-Field Emission	Channel	Modulation Factor	Conducte d Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (V/m)	RESULT	Excl Blocks per 4.3.1.2.2
WCDMA B4	1312	1	22.71	-0.014	31	M4	789
	1412	1	22.88	-0.059	41	M4	789
	1513	1	22.93	0.090	41.8	M4	789

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H-Filed

H-Field Emission	Channel	Modulation Factor	Conducte d Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (A/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.98	32.8	0.074	0.207	M4	147
	190	2.98	32.7	0.042	0.219	M4	147
	251	2.98	32.6	0.051	0.237	M4	147
H-Field Emission	Channel	Modulation Factor	Conducte d Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (A/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM1900	512	2.84	30	-0.013	0.213	M3	689
	661	2.84	30	0.048	0.229	M3	689
	810	2.84	30	-0.012	0.196	M3	689
H-Field Emission	Channel	Modulation Factor	Conducte d Power at BS (dBm)	Measured Drift(%)	Time Avg. Field (A/m)	RESULT	Excl Blocks per 4.3.1.2.2
WCDMA B4	1312	1	22.71	-0.082	0.077	M4	789
	1412	1	22.88	-0.017	0.103	M4	478
	1513	1	22.93	0.000	0.104	M4	478

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13. Measurement Data

Date: 2010/9/23

HAC_E GSM 850_CH128

DUT:V03B002 ;

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 133.0 V/m

Probe Modulation Factor = 2.83

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 59.6 V/m; Power Drift = 0.076 dB

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

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Peak E-field in V/m

Grid 1 117.0 M4	Grid 2 131.2 M4	Grid 3 129.0 M4
Grid 4 117.6 M4	Grid 5 133.0 M4	Grid 6 130.3 M4
Grid 7 114.0 M4	Grid 8 129.6 M4	Grid 9 127.4 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

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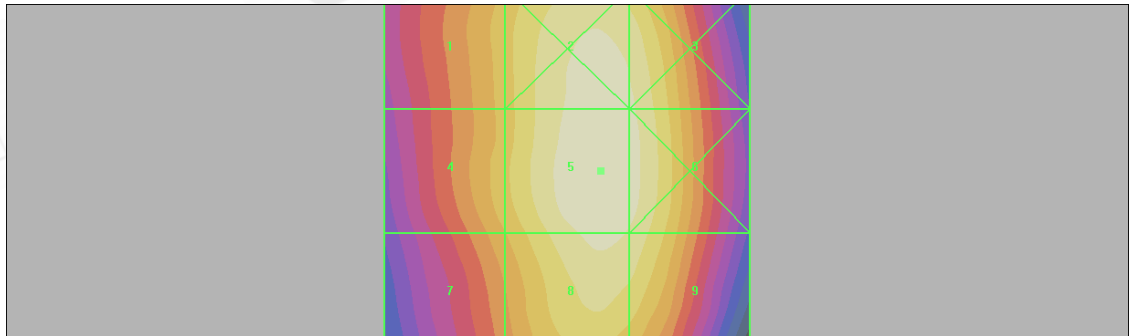
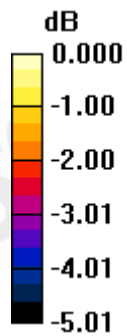
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Cursor:

Total = 133.0 V/m

E Category: M4

Location: -4.5, 0, 368.7 mm



0 dB = 133.0V/m

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Date: 2010/9/23

HAC_E GSM 850_CH190

DUT:V03B002 ;

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 136.5 V/m

Probe Modulation Factor = 2.83

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 61.3 V/m; Power Drift = -0.040 dB

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

Peak E-field in V/m

Grid 1 117.9 M4	Grid 2 134.6 M4	Grid 3 133.0 M4
Grid 4 119.0 M4	Grid 5 136.5 M4	Grid 6 134.9 M4
Grid 7 115.4 M4	Grid 8 133.4 M4	Grid 9 131.7 M4

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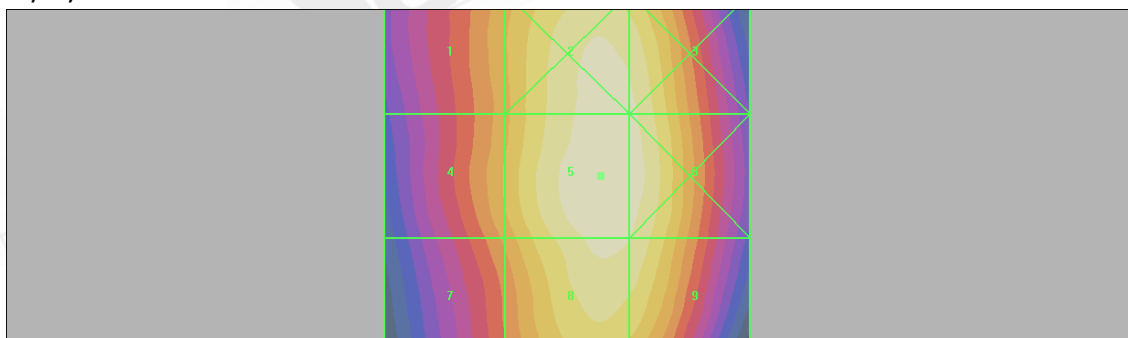
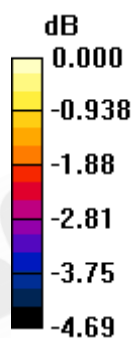
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 136.5 V/m

E Category: M4

Location: -4.5, 0, 368.7 mm



0 dB = 136.5V/m

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Date: 2010/9/23

HAC_E GSM 850_CH251

DUT:V03B002 ;

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 146.8 V/m

Probe Modulation Factor = 2.83

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 66.0 V/m; Power Drift = 0.035 dB

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

Peak E-field in V/m

Grid 1 128.1 M4	Grid 2 144.8 M4	Grid 3 143.5 M4
Grid 4 128.6 M4	Grid 5 146.8 M4	Grid 6 145.5 M4
Grid 7 124.9 M4	Grid 8 144.2 M4	Grid 9 142.3 M4

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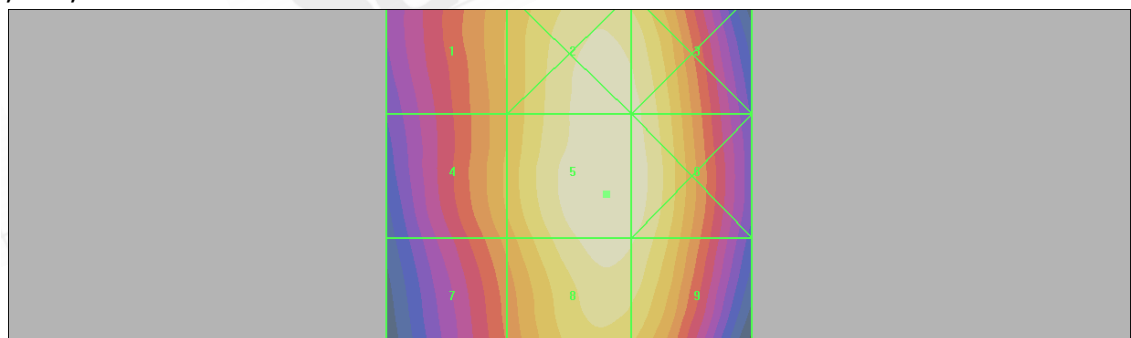
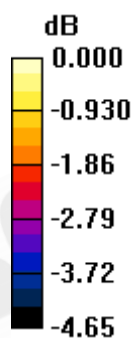
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 146.8 V/m

E Category: M4

Location: -5, 2.5, 368.7 mm



0 dB = 146.8V/m

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Date: 2010/9/23

HAC_E GSM 1900_CH512

DUT:V03B002 ;

Communication System: GSM1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 73.5 V/m

Probe Modulation Factor = 2.99

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 18.7 V/m; Power Drift = 0.088 dB

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

Peak E-field in V/m

Grid 1 53.4 M3	Grid 2 73.5 M3	Grid 3 73.2 M3
Grid 4 44.5 M4	Grid 5 62.1 M3	Grid 6 62.3 M3
Grid 7 78.2 M3	Grid 8 67.8 M3	Grid 9 58.8 M3

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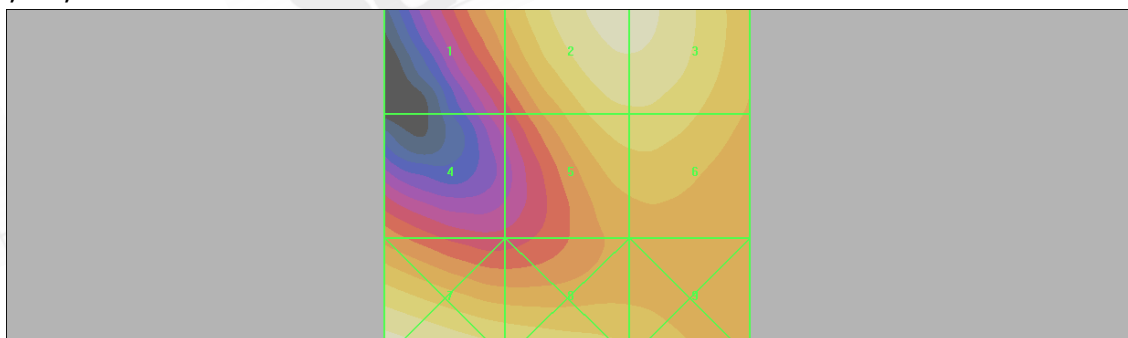
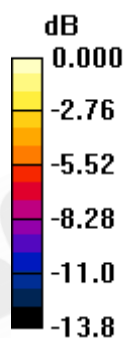
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 78.2 V/m

E Category: M3

Location: 25, 25, 368.7 mm



0 dB = 78.2V/m

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Date: 2010/9/23

HAC_E GSM 1900_CH661

DUT:V03B002 ;

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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

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

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

Maximum value of peak Total field = 80.8 V/m

Probe Modulation Factor = 2.99

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 20.1 V/m; Power Drift = 0.106 dB

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

Peak E-field in V/m

Grid 1 55.8 M3	Grid 2 80.8 M3	Grid 3 80.7 M3
Grid 4 51.8 M3	Grid 5 67.8 M3	Grid 6 68.3 M3
Grid 7 86.6 M2	Grid 8 78.0 M3	Grid 9 69.6 M3

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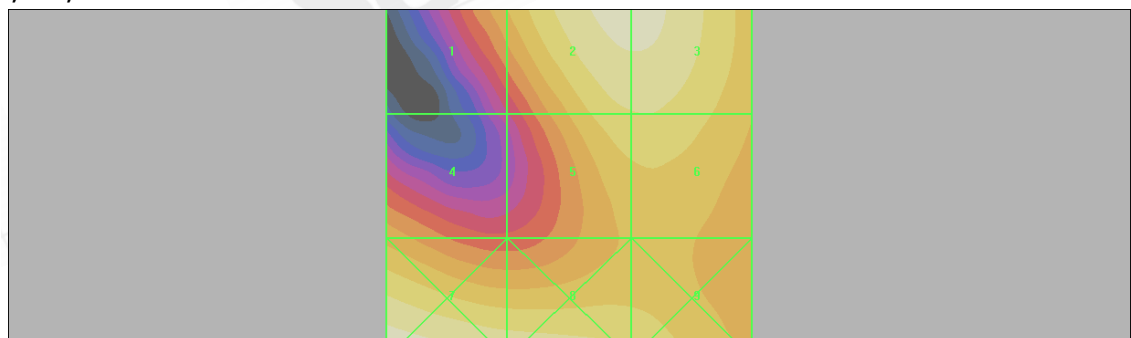
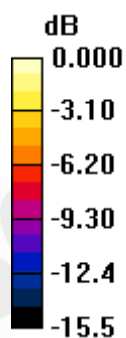
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 86.6 V/m

E Category: M2

Location: 25, 25, 368.7 mm



0 dB = 86.6V/m

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Date: 2010/9/23

HAC_E GSM 1900_CH810

DUT:V03B002 ;

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 72.2 V/m

Probe Modulation Factor = 2.99

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 19.7 V/m; Power Drift = 0.057 dB

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

Peak E-field in V/m

Grid 1 46.9 M4	Grid 2 72.2 M3	Grid 3 72.2 M3
Grid 4 47.4 M3	Grid 5 63.1 M3	Grid 6 63.8 M3
Grid 7 75.8 M3	Grid 8 70.9 M3	Grid 9 65.8 M3

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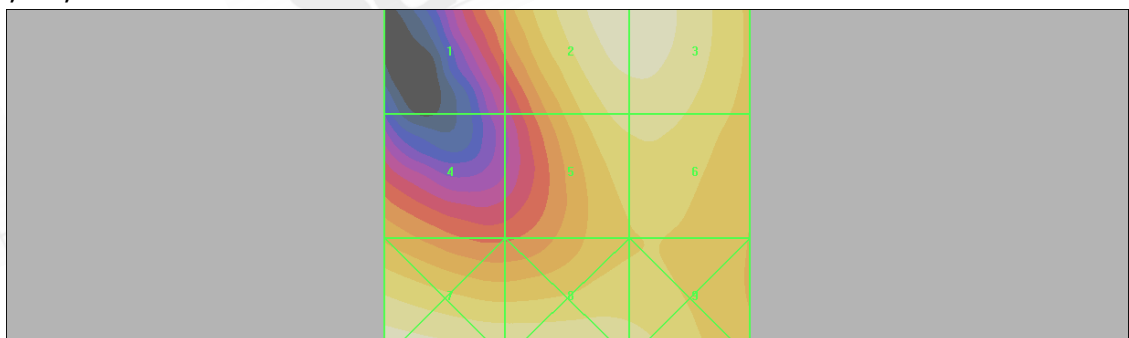
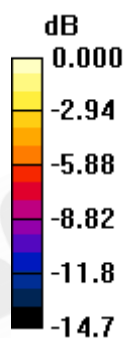
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 75.8 V/m

E Category: M3

Location: 25, 25, 368.7 mm



0 dB = 75.8V/m

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Date: 2010/9/23

HAC_E WCDMA B4_CH1312

DUT:V03B002 ;

Communication System: WCDMA BAND4; Frequency: 1712.4 MHz; Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 31.0 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 20.5 V/m; Power Drift = -0.014 dB

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

Peak E-field in V/m

Grid 1 24.1 M4	Grid 2 31.0 M4	Grid 3 30.9 M4
Grid 4 19.2 M4	Grid 5 24.9 M4	Grid 6 25.0 M4
Grid 7 32.2 M4	Grid 8 25.3 M4	Grid 9 21.1 M4

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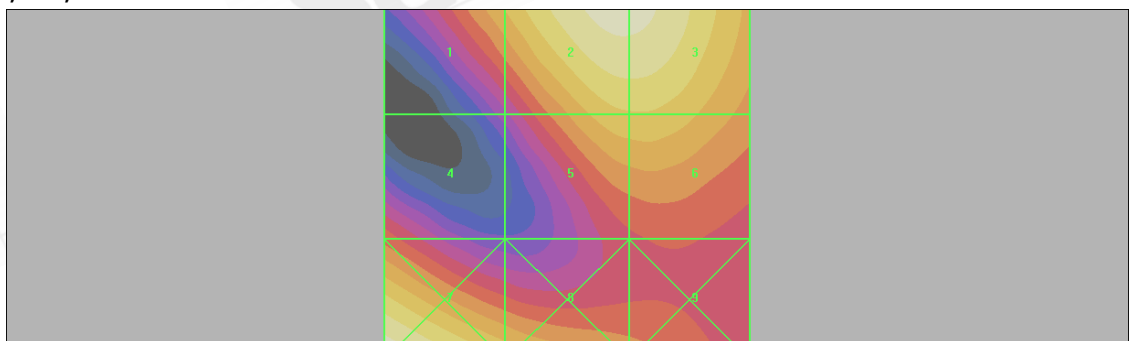
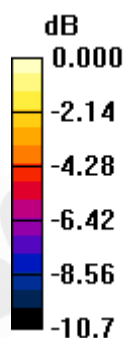
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 32.2 V/m

E Category: M4

Location: 25, 25, 368.7 mm



0 dB = 32.2V/m

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Date: 2010/9/23

HAC_E WCDMA B4_CH1412

DUT:V03B002 ;

Communication System: WCDMA BAND4; Frequency: 1732.4 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 41.0 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 27.5 V/m; Power Drift = -0.059 dB

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

Peak E-field in V/m

Grid 1 31.4 M4	Grid 2 41.0 M4	Grid 3 41.0 M4
Grid 4 26.5 M4	Grid 5 33.2 M4	Grid 6 33.3 M4
Grid 7 43.4 M4	Grid 8 35.4 M4	Grid 9 29.7 M4

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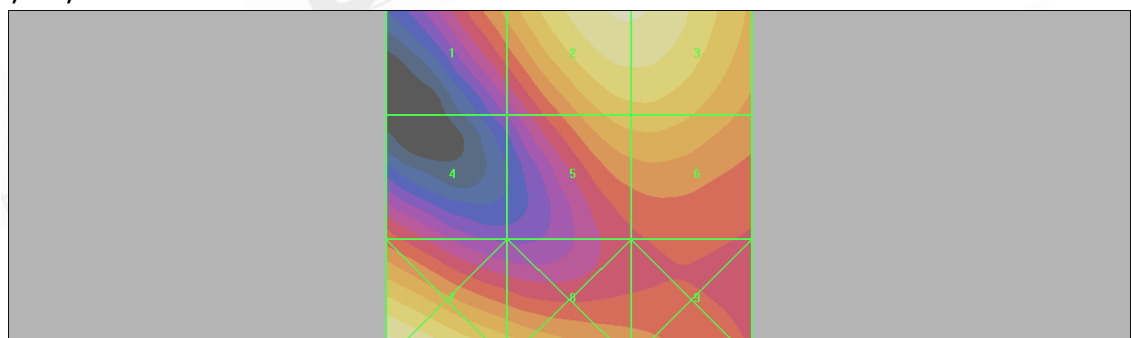
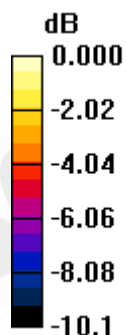
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 43.4 V/m

E Category: M4

Location: 25, 25, 368.7 mm



0 dB = 43.4V/m

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Date: 2010/9/23

HAC_E WCDMA B4_CH1513

DUT:V03B002 ;

Communication System: WCDMA BAND4; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 41.8 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 28.6 V/m; Power Drift = 0.090 dB

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

Peak E-field in V/m

Grid 1 32.1 M4	Grid 2 41.8 M4	Grid 3 41.7 M4
Grid 4 26.3 M4	Grid 5 34.1 M4	Grid 6 34.3 M4
Grid 7 42.5 M4	Grid 8 35.9 M4	Grid 9 30.7 M4

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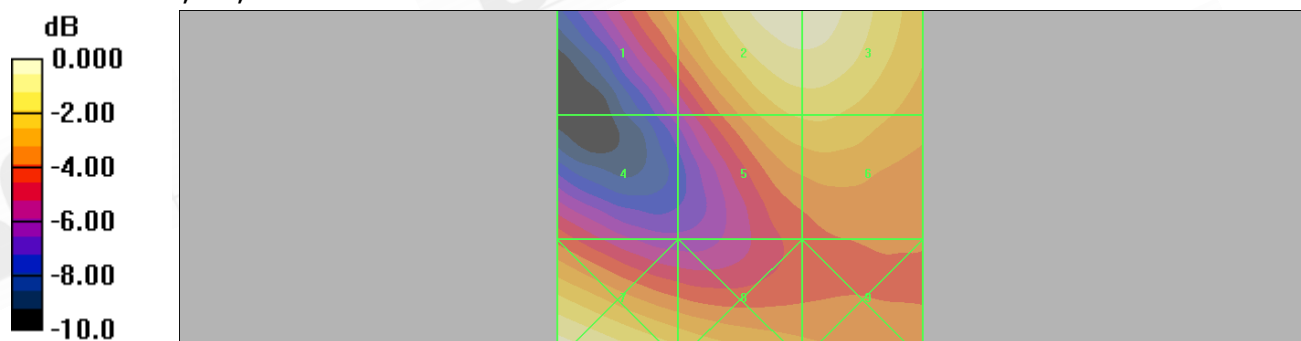
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 42.5 V/m

E Category: M4

Location: 25, 25, 368.7 mm



0 dB = 42.5V/m

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Date: 2010/9/23

HAC_H_GSM 850_CH128

DUT:V03B002 ;

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.207 A/m

Probe Modulation Factor = 2.98

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.051 A/m; Power Drift = 0.074 dB

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

Peak H-field in A/m

Grid 1 0.285 M4	Grid 2 0.207 M4	Grid 3 0.125 M4
Grid 4 0.268 M4	Grid 5 0.194 M4	Grid 6 0.116 M4
Grid 7 0.283 M4	Grid 8 0.204 M4	Grid 9 0.124 M4

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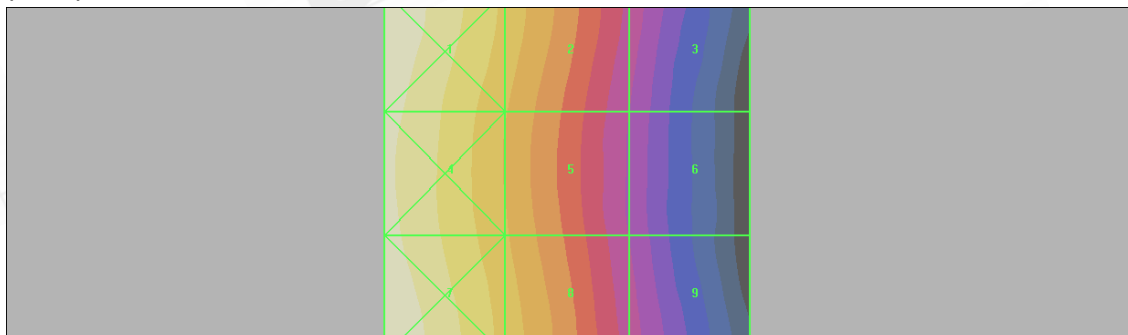
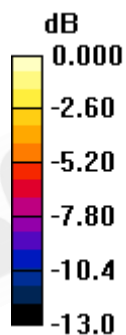
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.285 A/m

H Category: M4

Location: 25, -25, 368.7 mm



0 dB = 0.285A/m

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Date: 2010/9/23

HAC_H_GSM 850_CH190

DUT:V03B002 ;

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.219 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 = 0.042 dB

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

Peak H-field in A/m

Grid 1 0.300 M4	Grid 2 0.219 M4	Grid 3 0.134 M4
Grid 4 0.278 M4	Grid 5 0.202 M4	Grid 6 0.121 M4
Grid 7 0.289 M4	Grid 8 0.209 M4	Grid 9 0.123 M4

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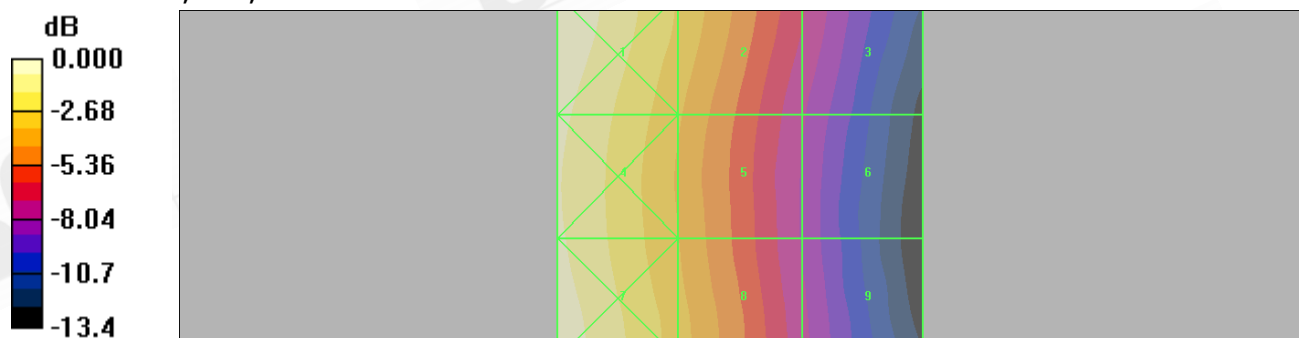
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.300 A/m

H Category: M4

Location: 25, -25, 368.7 mm



0 dB = 0.300A/m

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Date: 2010/9/23

HAC_H_GSM 850_CH251

DUT:V03B002 ;

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.237 A/m

Probe Modulation Factor = 2.98

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.056 A/m; Power Drift = 0.051 dB

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

Peak H-field in A/m

Grid 1 0.326 M4	Grid 2 0.237 M4	Grid 3 0.144 M4
Grid 4 0.303 M4	Grid 5 0.219 M4	Grid 6 0.130 M4
Grid 7 0.313 M4	Grid 8 0.225 M4	Grid 9 0.131 M4

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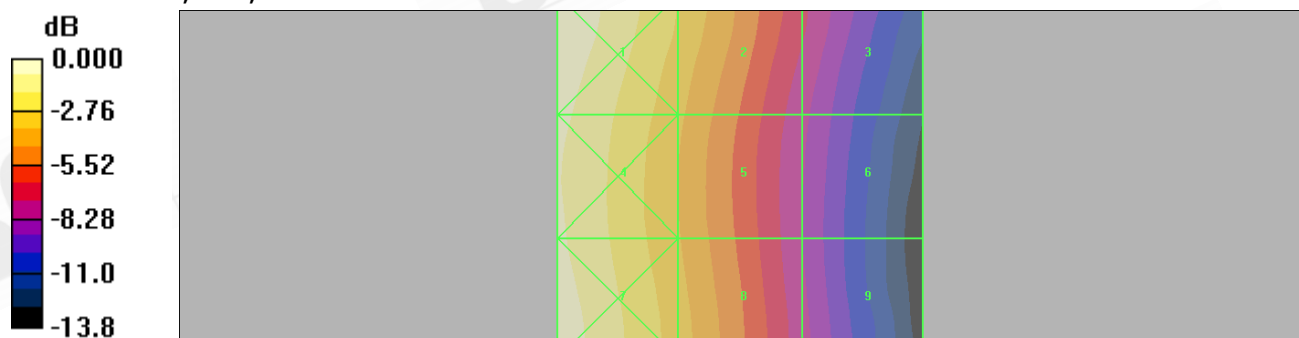
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.326 A/m

H Category: M4

Location: 25, -25, 368.7 mm



0 dB = 0.326A/m

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Date: 2010/9/23

HAC_H_GSM 1900_CH512

DUT:V03B002 ;

Communication System: GSM1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.213 A/m

Probe Modulation Factor = 2.84

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.079 A/m; Power Drift = -0.013 dB

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

Peak H-field in A/m

Grid 1 0.184 M3	Grid 2 0.189 M3	Grid 3 0.180 M3
Grid 4 0.194 M3	Grid 5 0.213 M3	Grid 6 0.212 M3
Grid 7 0.209 M3	Grid 8 0.217 M3	Grid 9 0.215 M3

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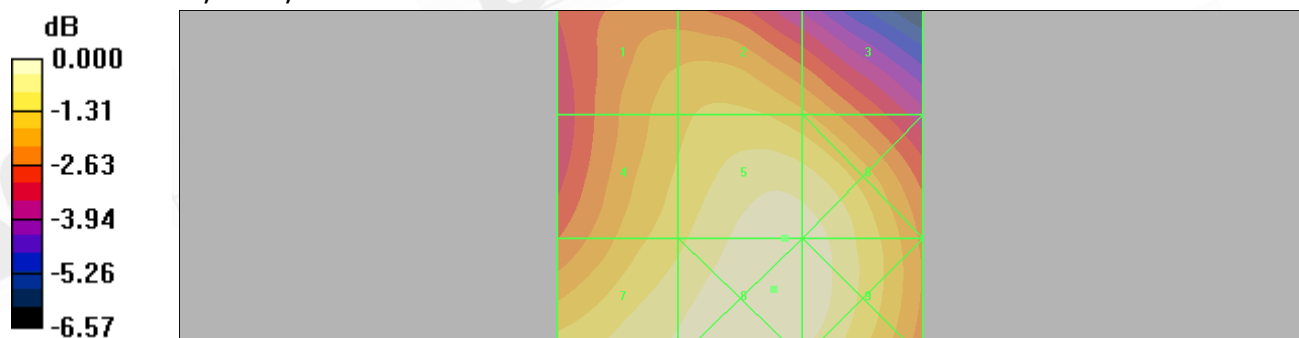
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.217 A/m

H Category: M3

Location: -4.5, 15.5, 368.7 mm



0 dB = 0.217A/m

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Date: 2010/9/23

HAC_H_GSM 1900_CH661

DUT:V03B002 ;

Communication System: GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.229 A/m

Probe Modulation Factor = 2.84

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.083 A/m; Power Drift = 0.048 dB

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

Peak H-field in A/m

Grid 1 0.201 M3	Grid 2 0.207 M3	Grid 3 0.196 M3
Grid 4 0.204 M3	Grid 5 0.229 M3	Grid 6 0.228 M3
Grid 7 0.217 M3	Grid 8 0.230 M3	Grid 9 0.229 M3

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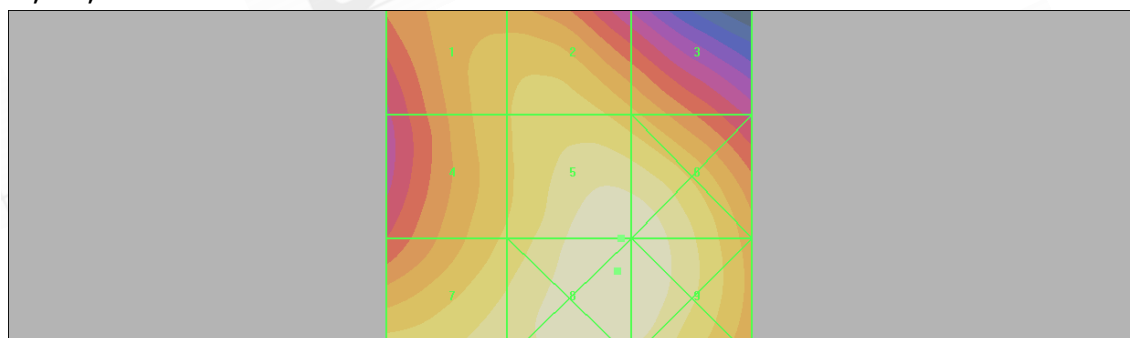
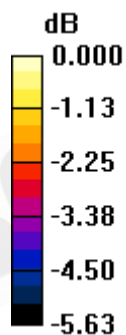
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.230 A/m

H Category: M3

Location: -6.5, 13, 368.7 mm



0 dB = 0.230A/m

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Date: 2010/9/23

HAC_H_GSM 1900_CH810

DUT:V03B002 ;

Communication System: GSM1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.196 A/m

Probe Modulation Factor = 2.84

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.070 A/m; Power Drift = -0.012 dB

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

Peak H-field in A/m

Grid 1 0.172 M3	Grid 2 0.176 M3	Grid 3 0.166 M3
Grid 4 0.171 M3	Grid 5 0.196 M3	Grid 6 0.195 M3
Grid 7 0.188 M3	Grid 8 0.198 M3	Grid 9 0.197 M3

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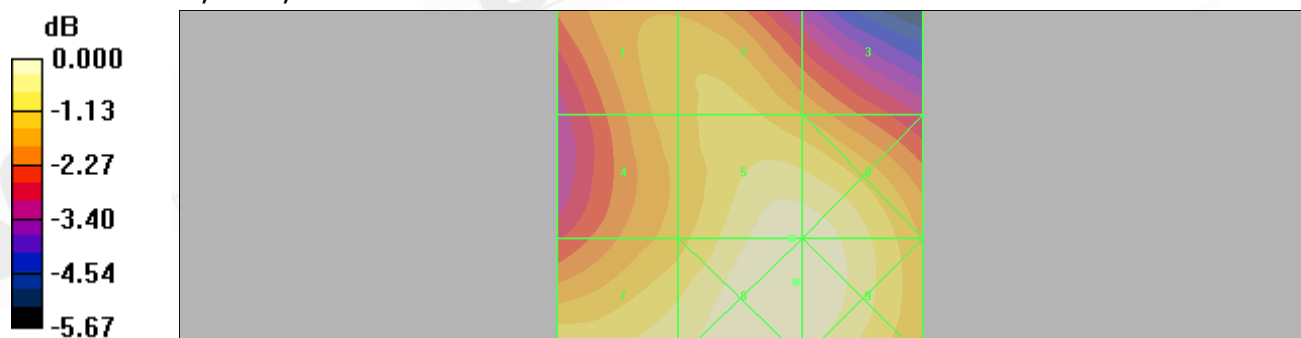
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.198 A/m

H Category: M3

Location: -7.5, 14.5, 368.7 mm



0 dB = 0.198A/m

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Date: 2010/9/23

HAC_H_WCDMA B4_CH1312

DUT:V03B002 ;

Communication System: WCDMA BAND4; Frequency: 1712.4 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.077 A/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.081 A/m; Power Drift = -0.082 dB

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

Peak H-field in A/m

Grid 1 0.077 M4	Grid 2 0.074 M4	Grid 3 0.067 M4
Grid 4 0.076 M4	Grid 5 0.077 M4	Grid 6 0.076 M4
Grid 7 0.086 M4	Grid 8 0.084 M4	Grid 9 0.076 M4

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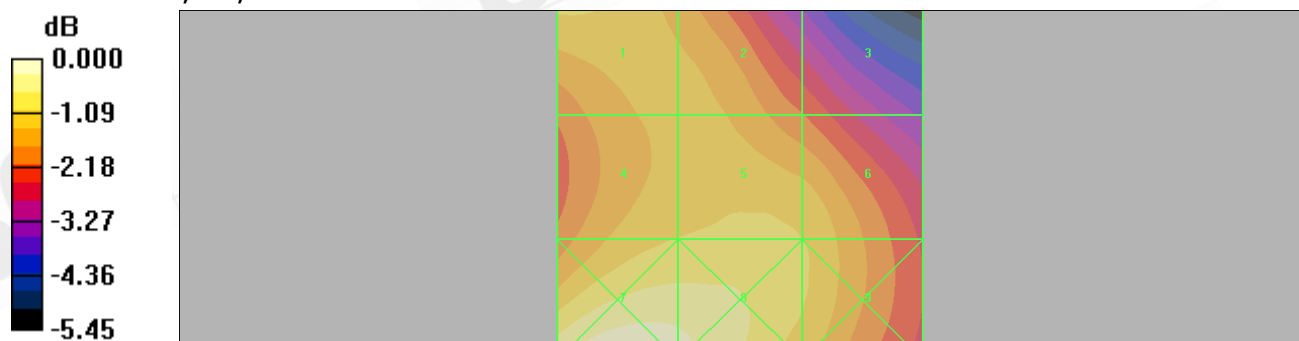
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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: 16, 25, 368.7 mm



0 dB = 0.086A/m

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Date: 2010/9/23

HAC_H_WCDMA B4_CH1412

DUT:V03B002 ;

Communication System: WCDMA BAND4; Frequency: 1732.4 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.103 A/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.103 A/m; Power Drift = -0.017 dB

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

Peak H-field in A/m

Grid 1 0.103 M4	Grid 2 0.096 M4	Grid 3 0.086 M4
Grid 4 0.097 M4	Grid 5 0.098 M4	Grid 6 0.096 M4
Grid 7 0.105 M4	Grid 8 0.104 M4	Grid 9 0.096 M4

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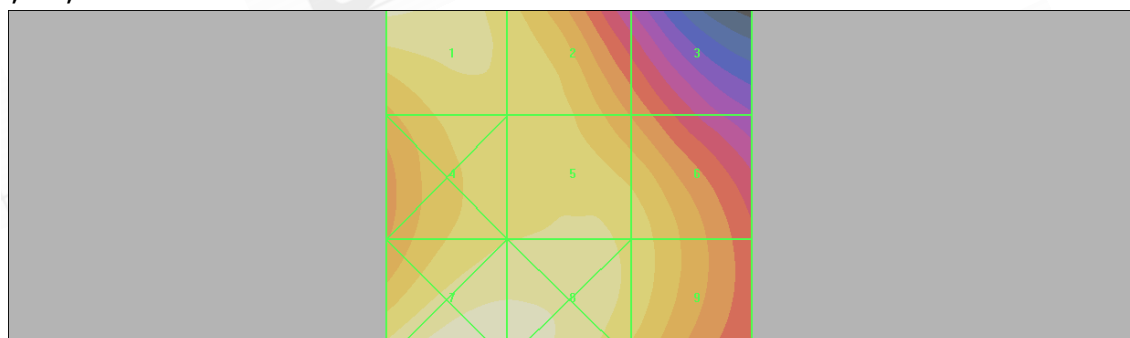
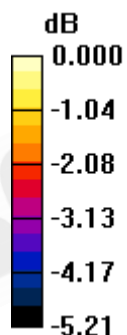
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.105 A/m

H Category: M4

Location: 12, 25, 368.7 mm



0 dB = 0.105A/m

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Date: 2010/9/23

HAC_H_WCDMA B4_CH1513

DUT:V03B002 ;

Communication System: WCDMA BAND4; Frequency: 1752.6 MHz; Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Device Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.104 A/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 0.111 A/m; Power Drift = 0.000 dB

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

Peak H-field in A/m

Grid 1 0.102 M4	Grid 2 0.102 M4	Grid 3 0.091 M4
Grid 4 0.102 M4	Grid 5 0.104 M4	Grid 6 0.101 M4
Grid 7 0.106 M4	Grid 8 0.106 M4	Grid 9 0.101 M4

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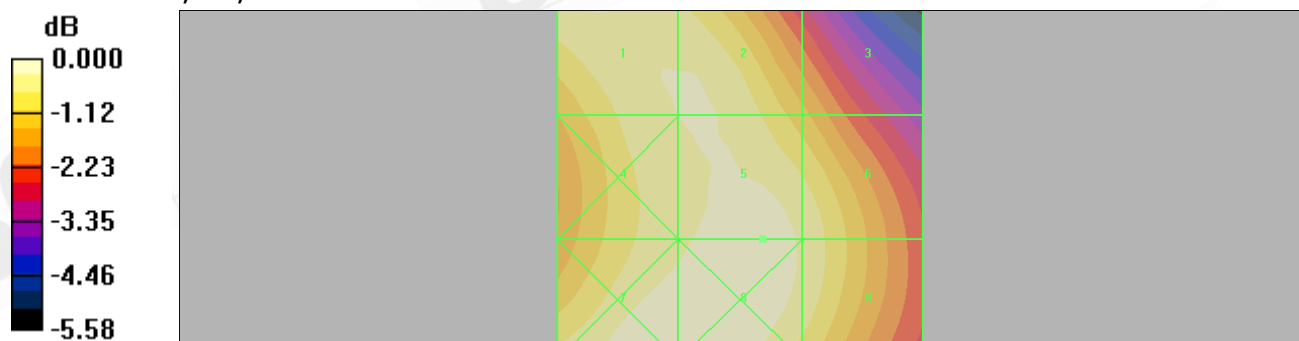
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.106 A/m

H Category: M4

Location: 10, 25, 368.7 mm



0 dB = 0.106A/m

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14. System Verification

Date: 2010/9/23

DUT: HAC-Dipole 835 MHz;

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 173.3 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 117.2 V/m; Power Drift = 0.002 dB

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

Peak E-field in V/m

Grid 1 170.0 M4	Grid 2 173.3 M4	Grid 3 168.7 M4
Grid 4 92.2 M4	Grid 5 93.8 M4	Grid 6 90.3 M4
Grid 7 180.9 M4	Grid 8 189.5 M4	Grid 9 185.7 M4

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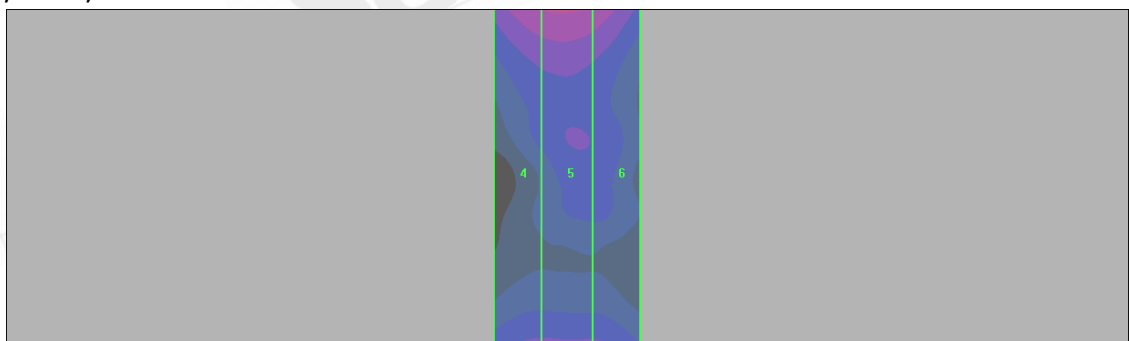
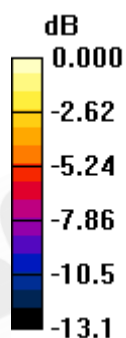
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 189.5 V/m

E Category: M4

Location: -1, 79.5, 364.7 mm



0 dB = 189.5V/m

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Date: 2010/9/23

DUT: HAC-Dipole 835 MHz;

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³

Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 = 0.480 A/m; Power Drift = 0.018 dB

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

Peak H-field in A/m

Grid 1 0.371 M4	Grid 2 0.403 M4	Grid 3 0.389 M4
Grid 4 0.414 M4	Grid 5 0.453 M4	Grid 6 0.442 M4
Grid 7 0.370 M4	Grid 8 0.408 M4	Grid 9 0.399 M4

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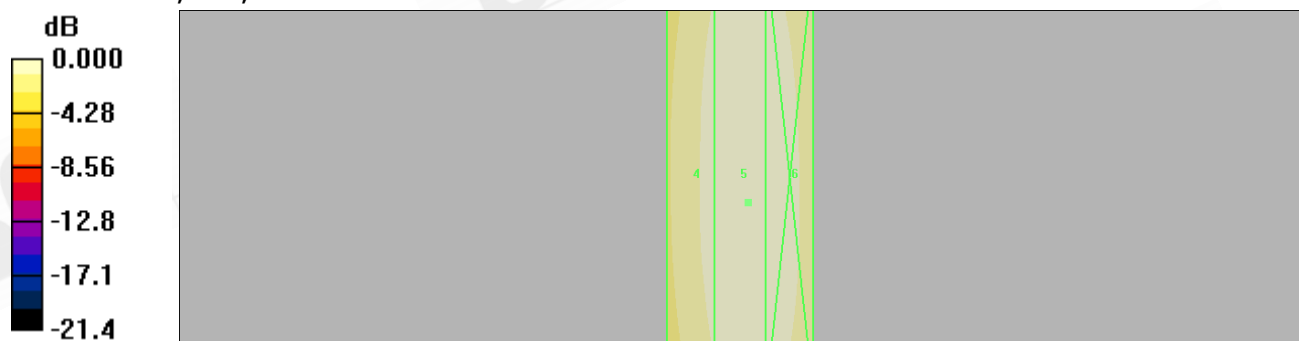
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.453 A/m

H Category: M4

Location: -1, 3.5, 364.7 mm



0 dB = 0.453A/m

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Date: 2010/9/23

DUT: HAC-Dipole 1880MHz;

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

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2010/4/26
- 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 = 137.4 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 177.3 V/m; Power Drift = 0.025 dB

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

Peak E-field in V/m

Grid 1 133.5 M2	Grid 2 137.4 M2	Grid 3 134.5 M2
Grid 4 106.1 M3	Grid 5 108.0 M3	Grid 6 105.5 M3
Grid 7 150.5 M2	Grid 8 157.6 M2	Grid 9 154.1 M2

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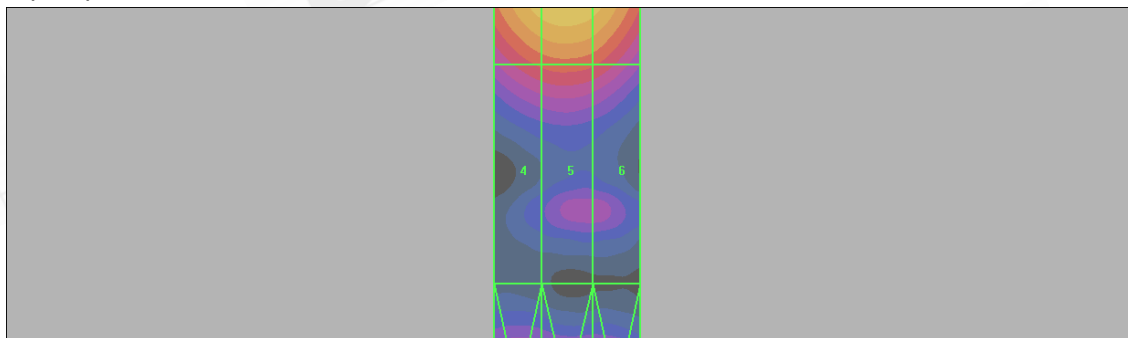
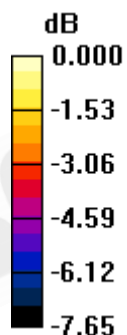
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 157.6 V/m

E Category: M2

Location: -0.5, 43, 364.7 mm



0 dB = 157.6V/m

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Date: 2010/9/23

DUT: HAC-Dipole 1880MHz;

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6142; ; Calibrated: 2010/4/26
- 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 = 0.454 A/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.482 A/m; Power Drift = -0.099 dB

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

Peak H-field in A/m

Grid 1 0.376 M2	Grid 2 0.412 M2	Grid 3 0.408 M2
Grid 4 0.417 M2	Grid 5 0.454 M2	Grid 6 0.448 M2
Grid 7 0.390 M2	Grid 8 0.426 M2	Grid 9 0.416 M2

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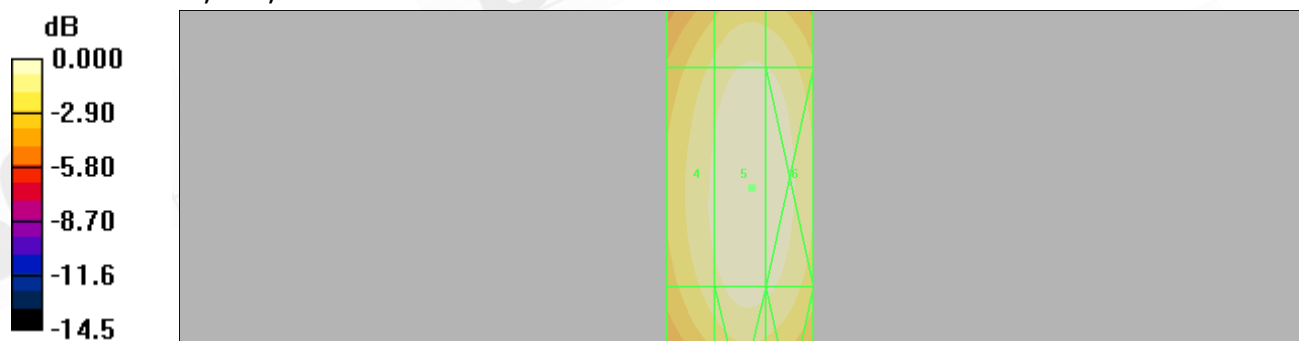
Category	AWF (dB)	Limits for E-Field Emissions (V/m) > 960MHz	Limits for H-Field Emissions (A/m) > 960MHz
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.14 - 0.25
M4	0	<63.1	<0.19
	-5	<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 = 0.454 A/m

H Category: M2

Location: -1.5, 1.5, 364.7 mm



0 dB = 0.454A/m

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15. DAE & Probe Calibration certificate

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

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

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

Accreditation No.: SCS 108

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
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

Calibrated by:

Name	Function	Signature
Dominique Steffen	Technician	

Approved by:

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

Accreditation No.: **SCS 108**

Client **SGS-TW (Auden)**

Certificate No: **ER3-2306_Apr10**

CALIBRATION CERTIFICATE

Object **ER3DV6 - SN:2306**

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: **April 26, 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: Oct-10

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

Issued: April 27, 2010

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Certificate No: **ER3-2306_Apr10**

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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

NORM _{x,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., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ for XY sensors and $\vartheta = 90$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart).
- DCP_{x,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.
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 NORM_x (no uncertainty required).

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ER3DV6 SN:2306

April 26, 2010

Probe ER3DV6

SN:2306

Manufactured:	December 17, 2002
Last calibrated:	April 27, 2009
Recalibrated:	April 26, 2010

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: ER3-2306_Apr10

Page 3 of 10

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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	$\pm 10.1\%$
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	$\pm 1.5\%$
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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

^A numerical linearization parameter: uncertainty not required

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

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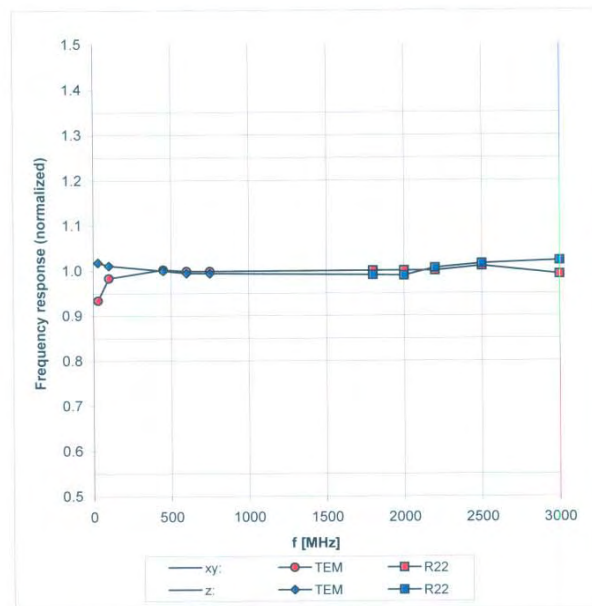
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ER3DV6 SN:2306

April 26, 2010

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide R22)

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

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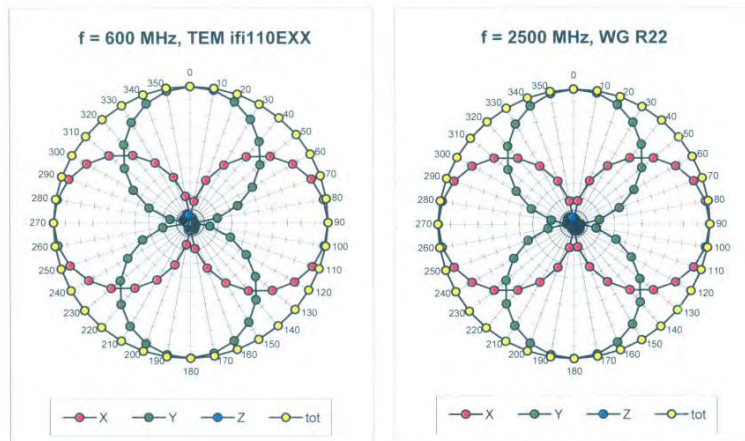
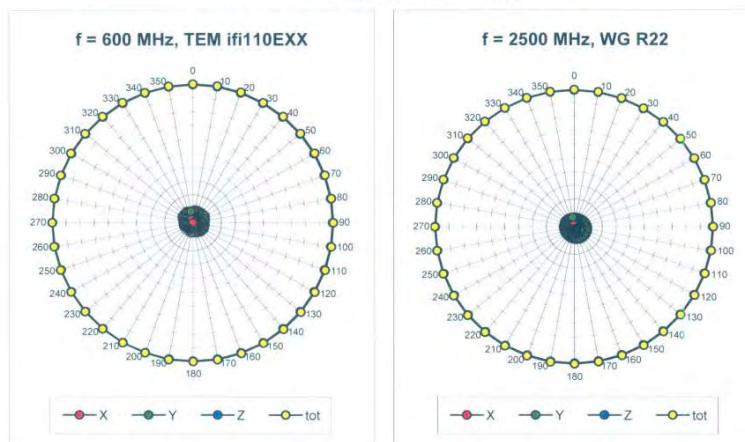
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ER3DV6 SN:2306

April 26, 2010

Receiving Pattern (ϕ), $\vartheta = 0^\circ$ Receiving Pattern (ϕ), $\vartheta = 90^\circ$ 

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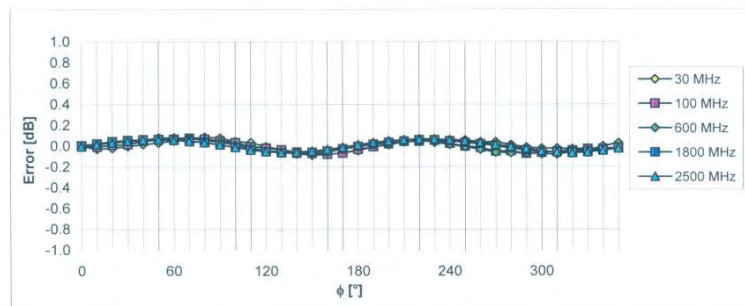
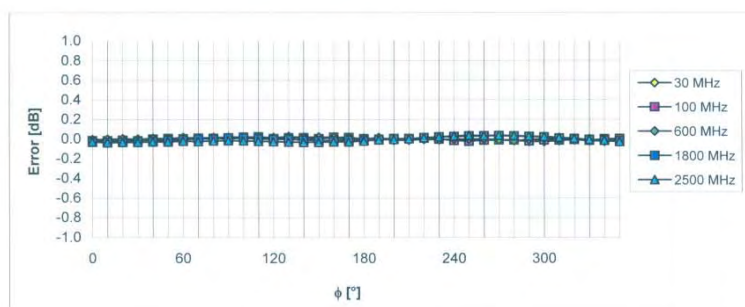
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Receiving Pattern (ϕ), $\vartheta = 0^\circ$ Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)Receiving Pattern (ϕ), $\vartheta = 90^\circ$ Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

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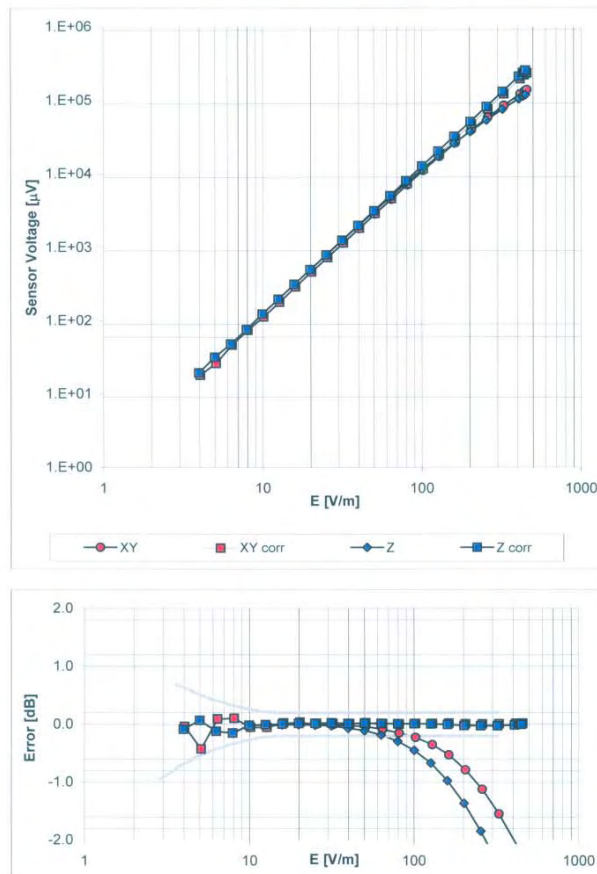
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ER3DV6 SN:2306

April 26, 2010

Dynamic Range f(E-field)
(Waveguide R22, f = 1800 MHz)Uncertainty of Linearity Assessment: $\pm 0.6\%$ (k=2)

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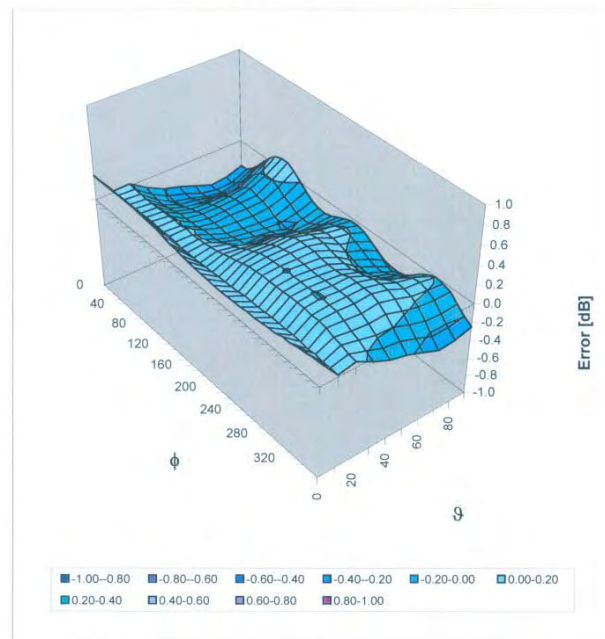
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April 26, 2010

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

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

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ER3DV6 SN:2306

April 26, 2010

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-223.7
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 **SGS-TW (Auden)**

Certificate No: **H3-6142_Apr10**

CALIBRATION CERTIFICATE

Object **H3DV6 - SN:6142**

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: **April 26, 2010**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^{\circ}\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

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

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

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

Issued: April 27, 2010

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Accreditation No.: **SCS 108**

Glossary:

NORM _{x,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., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}: Assessed for E-field polarization $\vartheta = 0$ for XY sensors and $\vartheta = 90$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide).
- $X, Y, Z(f)_{a0a1a2} = X, Y, Z_{a0a1a2} * \text{frequency_response}$ (see Frequency Response Chart).
- DCP_{x,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).

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H3DV6 SN:6142

April 26, 2010

Probe H3DV6

SN:6142

Manufactured:	July 3, 2002
Last calibrated:	April 27, 2009
Recalibrated:	April 26, 2010

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: H3-6142_Apr10

Page 3 of 10

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April 26, 2010

DASY - Parameters of Probe: H3DV6 SN:6142**Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / $\sqrt{(\mu V)}$)	a0 2.73E-3	2.71E-3	3.08E-3	± 5.1%
Norm (A/m / $\sqrt{(\mu V)}$)	a1 -6.53E-5	-1.16E-4	-3.09E-4	± 5.1%
Norm (A/m / $\sqrt{(\mu V)}$)	a2 -1.83E-5	4.57E-6	3.49E-5	± 5.1%
DCP (mV) ^A	91.3	82.0	82.1	

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.

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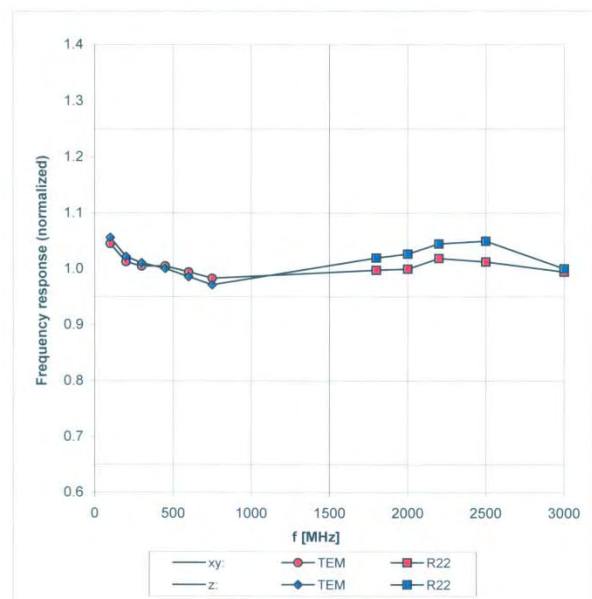
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April 26, 2010

Frequency Response of H-Field

(TEM-Cell:ifi110 EXX, Waveguide R22)

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

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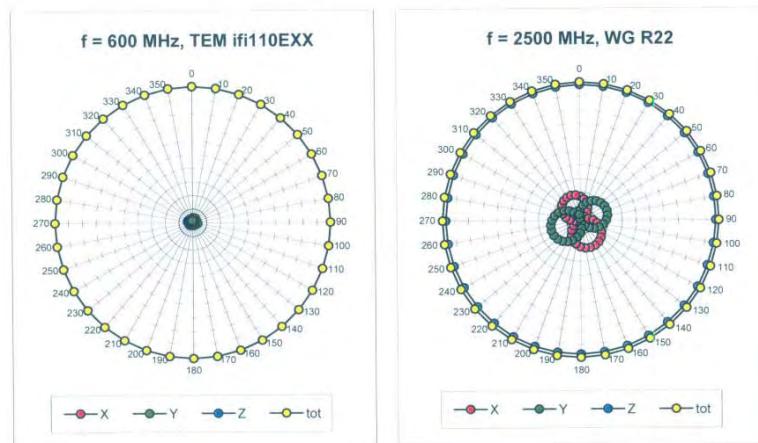
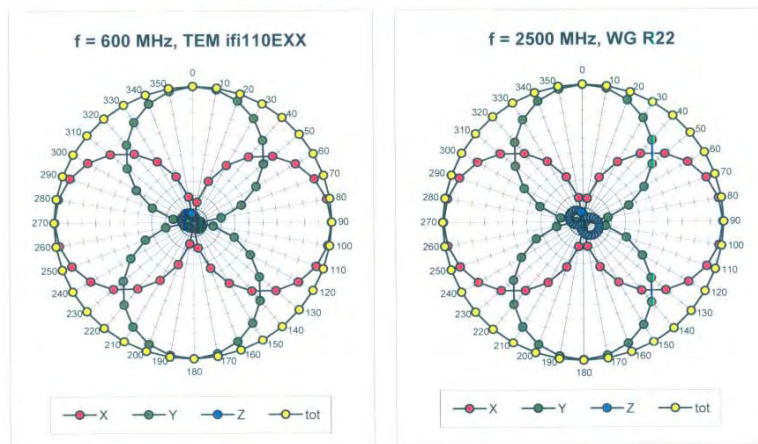
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April 26, 2010

Receiving Pattern (ϕ), $\vartheta = 90^\circ$ Receiving Pattern (ϕ), $\vartheta = 0^\circ$ 

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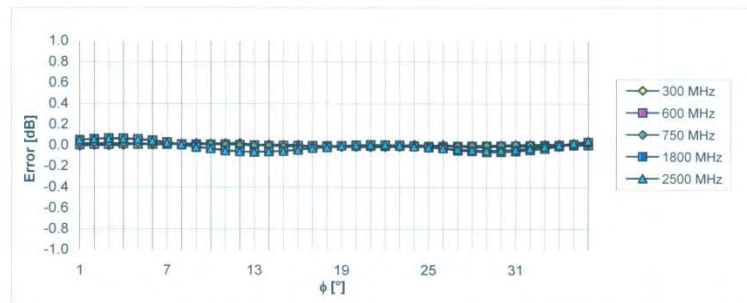
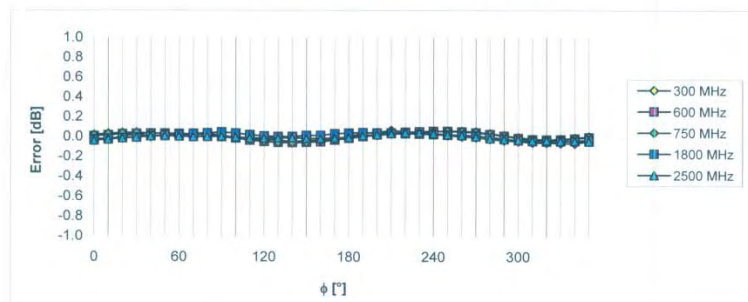
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Receiving Pattern (ϕ), $\vartheta = 90^\circ$ Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)Receiving Pattern (ϕ), $\vartheta = 0^\circ$ Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

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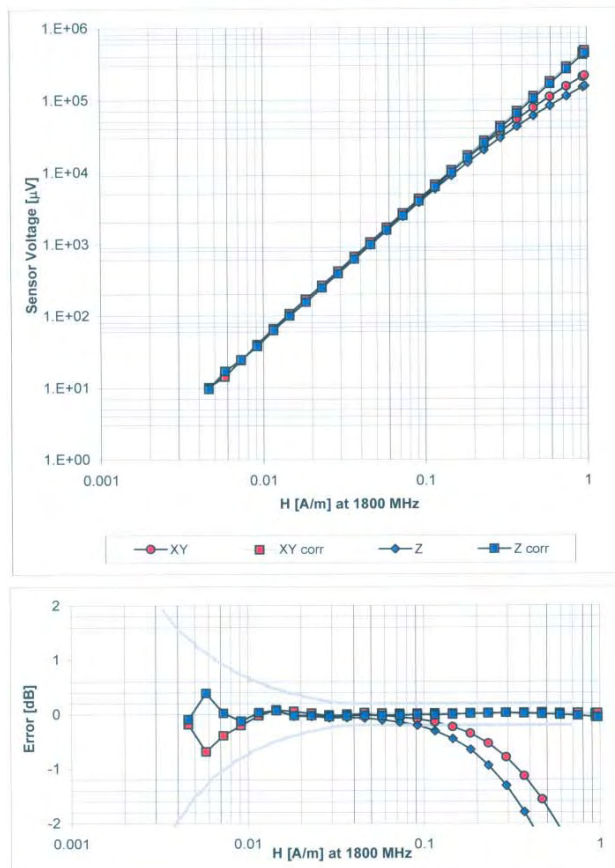
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April 26, 2010

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

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

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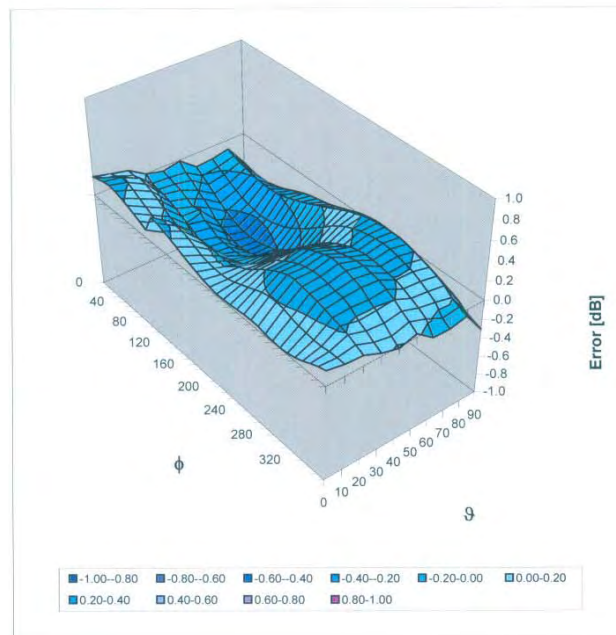
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April 26, 2010

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

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

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April 26, 2010

Sensor Arrangement	Rectangular
Connector Angle (°)	-247.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	20 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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16. Uncertainty Analysis

HAC-Extension Setup Performance Test Using SPEAG Calibration Dipoles							
Error Description	Uncertainty value	Prob. Dist.	Div.	(c_1) E	(c_2) 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.

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17. System Validation from Original equipment supplier

Calibration Laboratory of Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland
Itunes.lnk



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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

Calibrated by: Name Claudio Leubler Function Laboratory Technician Signature

Approved by: Name Fin Bornholt Function Technical Director Signature

Issued: April 27, 2010

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Certificate No: CD835V3-1052_Apr10

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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, $\epsilon_r = 1$; $\rho = 1$ kg/m³

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

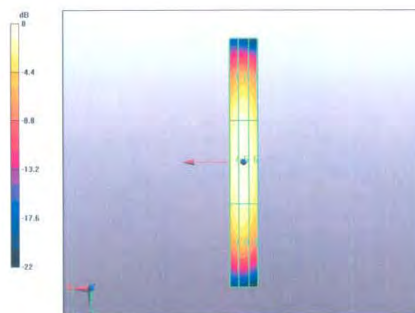
Device Reference Point: 0, 0, -6.3 mm

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 = 0.459 A/m

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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, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

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

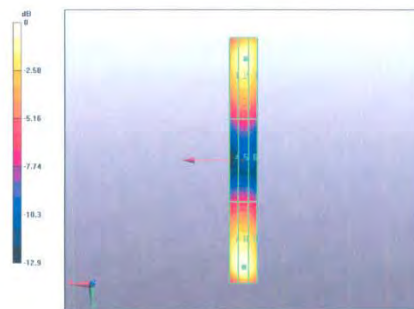
Device Reference Point: 0, 0, -6.3 mm

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

Certificate No: CD835V3-1052_Apr10

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S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client **SGS-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

Calibrated by: **Claudio Leubler** **Laboratory Technician**

Approved by: **Fin Bornholt** **Technical Director**

Issued: April 27, 2010

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

Certificate No: CD1880V3-1044_Apr10

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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, $\epsilon_r = 1$; $\rho = 1$ kg/m³

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

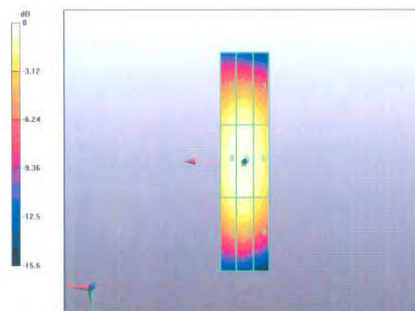
Device Reference Point: 0, 0, -6.3 mm

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

Certificate No: CD1880V3-1044_Apr10

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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, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

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

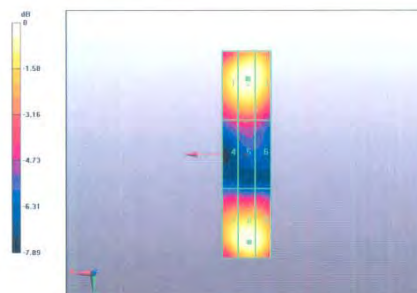
Device Reference Point: 0, 0, -6.3 mm

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

End of 1st part of report

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