Hearing Aid Compatibility (HAC) TEST REPORT

<For RF-Emission Measurement>

Applicant Name	Sony Mobile Communications AB
Address of Applicant	Nya Vattentornet 22188 Lund/Sweden
EUT Name	PDA Phone
Model No.	C1904
Brand Name	Sony
Type No.	PM-0480-BV
FCC ID	PY7PM-0480
Date of receive	Apr.10.2013
Date of Test(s)	May.16.2013
Date of Issue	Jun. 07, 2013

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.

Signed on behalf of SGS

Sr. Engineer

John Yeh

John Yeh

Date: Jun. 07, 2013

Supervisor

Ricky Huang

Ricky Huang

Date: Jun. 07, 2013

Revision Version

Report Number	Revision	Description	Issue Date
ES/2013/50011	Rev. 01	Initial Version	31 May 2013
ES/2013/50011	Rev. 02	Modify “Marketing Name” to “Model No.” and “Model No.” to “Type No.” on page 1 and 5.	07 Jun. 2013

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

Table of Contents

1. Introduction

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

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

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

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

Hence, the following are measurements made for the WD:

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

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

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

2. Testing Laboratory

Company Name	SGS Taiwan Ltd. Electronics & Communication Laboratory
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Telephone	+886-2-2299-3279
Fax	+886-2-2298-0488
Website	http://www.tw.sgs.com/

3. Details of Applicant

Applicant Name	Sony Mobile Communications AB
Applicant Address	Nya Vattentornet 22188 Lund/SWEDEN

4. Description of EUT

EUT Name	PDA Phone
Model No.	C1904
Brand Name	Sony
Type No.	PM-0480-BV
HW Version	A
SW Version	15.1.A.1.3
FCC ID	PY7PM-0480
Serial No.	YT9106UD4X
IMEI Code	004402146725829
Mode of Operation	☒GSM ☒ GPRS ☒ EDGE ☒ WCDMA ☒HSDPA ☒HSUPA ☒WLAN802.11 a/b/g/n (20M/40M)

Duty Cycle	GSM	1/8.3		
	GPRS / EDGE (support multi class 12 max)	1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)		
	WCDMA	1		
	WLAN 802.11 a/b/g/n(20M/40M)	1		
	Bluetooth	1		
TX Frequency Range (MHz)	GSM850	824.2	—	848.8
	GSM1900	1850.2	—	1909.8
	WCDMA Band II	1852.4	—	1907.6
	WCDMA Band IV	1712.4	—	1752.6
	WCDMA Band V	826.4	—	846.6
	WLAN 802.11 b/g/n(20M)	2412	—	2462
	WLAN802.11 a 5.2G	5180	—	5240
	WLAN802.11 a 5.3G	5260	—	5320
	WLAN802.11 a 5.5G	5500	—	5700
	WLAN802.11 a 5.8G	5745	—	5825
	WLAN802.11 n (20M) 5.2G	5180	—	5240
	WLAN802.11 n (20M) 5.3G	5260	—	5320
	WLAN802.11 n (20M) 5.5G	5500	—	5700
	WLAN802.11 n (20M) 5.8G	5745	—	5825
	WLAN802.11 n (40M) 5.2G	5190	—	5230
	WLAN802.11 n (40M) 5.3G	5270	—	5310
	WLAN802.11 n (40M) 5.5G	5510	—	5670
	WLAN802.11 n (40M) 5.8G	5755	—	5795
	Bluetooth	2402	—	2480

Channel Number (ARFCN)	GSM850	128	—	251
	GSM1900	512	—	810
	WCDMA Band II	9262	—	9538
	WCDMA Band IV	1312	—	1513
	WCDMA Band V	4132	—	4233
	WLAN 802.11 b/g/n(20M)	1	—	11
	WLAN802.11 a 5.2G	36	—	48
	WLAN802.11 a 5.3G	52	—	64
	WLAN802.11 a 5.5G	100	—	140
	WLAN802.11 a 5.8G	149	—	165
	WLAN802.11 n (20M) 5.2G	36	—	48
	WLAN802.11 n (20M) 5.3G	52	—	64
	WLAN802.11 n (20M) 5.5G	100	—	140
	WLAN802.11 n (20M) 5.8G	149	—	165
	WLAN802.11 n (40M) 5.2G	38	—	46
	WLAN802.11 n (40M) 5.3G	54	—	62
	WLAN802.11 n (40M) 5.5G	102	—	134
	WLAN802.11 n (40M) 5.8G	151	—	159
	Bluetooth	0	—	78
VOIP Function	☒YES ☐NO			

5. Test Environment

Ambient Temperature	21.7° C
Relative Humidity	<60 %

6. System Specifications of DASY5

6.1 Measurement system Diagram for SPEAG Robotic

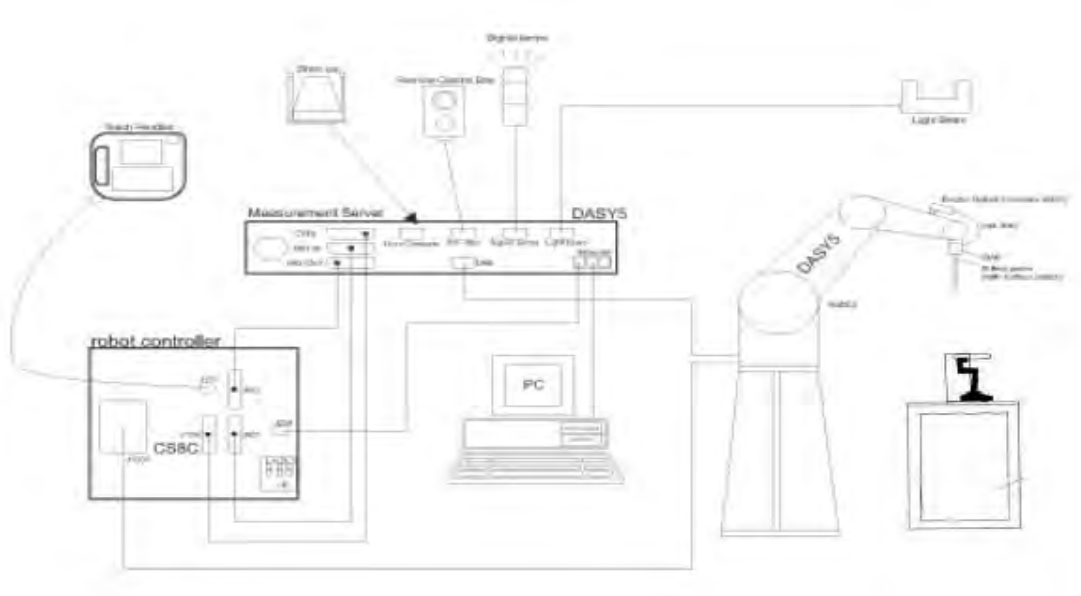


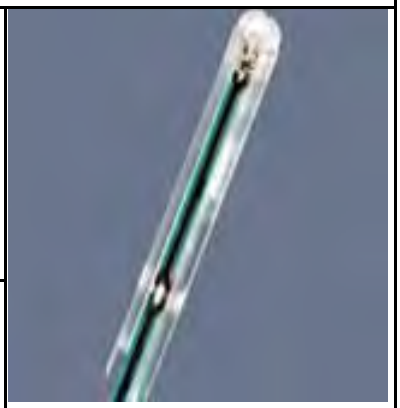
Fig.1 The SPEAG Robotic Diagram

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- E and H Field probe.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.

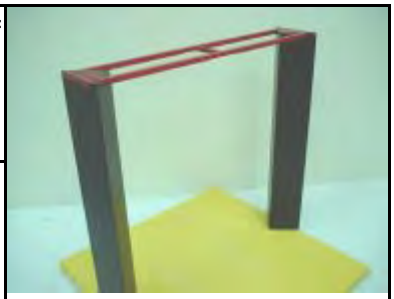
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The Test Arch phantom.
- The device holder for handheld mobile phones.
- Validation dipole kits allowing to validate the proper functioning of the system.

6.2 E and H Field Probe

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material	 ER3DV6 E-Field Probe
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy ±6.0%, k=2)	
Frequency	(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	Tip diameter: 8 mm Distance from probe tip to dipole centers: 2.5 mm	
Construction	Three concentric loop sensors with 3.8 mm loop diameters Resistively loaded detector diodes for linear response Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)	 H3DV6 H-Field Probe
Frequency	200 MHz to 3 GHz (absolute accuracy ± 6.0%, k=2); Output linearized	
Directivity	± 0.2 dB (spherical isotropy error)	
Dynamic Range	10 mA/m to 2 A/m at 1 GHz	
E-Field Interference	< 10% at 3 GHz (for plane wave)	

Dimensions	Tip diameter: 6 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.	 Test Arch
Dimensions	length: 370 mm width: 370 mm height: 370 mm	

6.4 Phone Holder

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

7. Measurement Procedure

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

1. Proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system was confirmed.
2. WD is positioned in its intended test position, acoustic output point of the device perpendicular to the field probe.
3. The WD operation for maximum rated RF output power was configured and confirmed with the base station simulator, at the test channel and other normal operating parameters as intended for the test. The battery was ensured to be fully charged before each test.
4. The center sub-grid was centered over the center of the acoustic output (also audio band magnetic output, if applicable). The WD audio output was positioned tangent (as physically possible) to the measurement plane.
5. A surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the HAC Phantom.
6. The measurement system measured the field strength at the reference location.
7. Measurements at 5 mm 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.

Note.

#.The WLAN and Bluetooth maybe activated by 3rd party software applications, Per KDB 285076 D01 v03 section 10)a, during RF-emission testing, concurrent transmission is disabled. Per ANSI C63.19_2007, WLAN and Bluetooth were not tested for M- rating.

Air- Interface	Band (MHZ)	Type Transport	C63.19/tested	Simultaneous Transmissions Note:Not to be tested	Reduced Power	Voice Over Digital Transport(Data)
GSM	850	VO	Yes	Yes,WiFi or Bluetooth	No	No
	1900	VO	Yes	Yes,WiFi or Bluetooth	No	No
	GPRS/EDGE	DT	NA	Yes,WiFi or Bluetooth	No	Yes
WCDMA	850	V/D	Yes	Yes,WiFi or Bluetooth	No	No
	1700	V/D	Yes	Yes,WiFi or Bluetooth	No	No
	1900	V/D	Yes	Yes,WiFi or Bluetooth	No	No
	HSPA	DT	NA	Yes,WiFi or Bluetooth	No	Yes
WiFi	2450/5G	DT	NA	Yes,GSM/WCDMA	No	Yes
Bluetooth	2450	DT	NA	Yes,GSM/WCDMA	No	No

Type Transport

VO: Voice Only

DT: Digital data-Not intended for CMRS service

Fig.2 Air Interface

8. System Verification

A dipole antenna meeting the requirements given in C63.19 was placed in the position normally occupied by the WD.

The length of the dipole was scanned with both E-field and H-field probes and the maximum values for each were recorded.

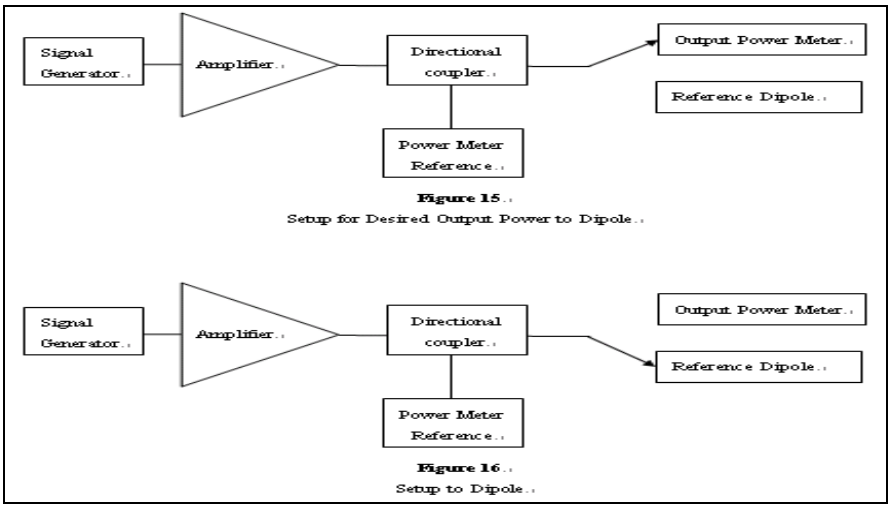


Figure 15
Setup for Desired Output Power to Dipole

Figure 16
Setup to Dipole

For H-Field Scan

Mode	Frequency	Input Power	Measured Value(A/m)	Target Value(A/m)	Measured Date
CW	835	20	0.453	0.468	May.16.2013
CW	1880	20	0.458	0.473	May.16.2013

For E-Field Scan

Mode	Frequency (MHz)	Input Power(dBm)	Measured Value(V/m)	Target Value(V/m)	Measured Date
CW	835	20	167.8	170.3	May.16.2013
CW	1880	20	140.6	142.5	May.16.2013

9. Probe Modulation Factor

The measurement setup for determination of the PMF is given in DASY5 manual section 24.7.

The following points describe the installation, the measurement procedure and the evaluation.

1. Install the field probe in the DASY5 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 maybe 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 DASY5 settings may be varied.

   Spectrum analyzer settings:
   - Center Frequency: nominal center frequency of channel
   - Span: zero
   - Resolution bandwidth >= emission bandwidth
   - Video bandwidth >= 20kHz
   - 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 DASY5 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 DASY5 document with a procedure for the evaluation of the CW signal (frequency, modulation frequency = 0, crest factor = 1) with a multimeter job.

The HAC measurement procedure is as follows:

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

10. Test Standards and Limits

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

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

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

11. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
Schmid & Partner Engineering AG	E-Field and H-Field Probe	H3DV6 ER3DV6	6187 2306	Jun.20,2012 Nov.19,2012	Jun.19,2013 Nov.18,2013
Schmid & Partner Engineering AG	835/1880 MHz System Validation Dipole	CD835V3 CD1880V3	1052 1044	Mar.15,2013 Mar.15,2013	Mar.14,2014 Mar.14,2014
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE4	547	Mar.19.2013	Mar.18.2014
Schmid & Partner Engineering AG	Software	DASY52 52.8.5(1059)	N/A	Calibration not required	Calibration not required
Agilent	Dielectric Probe Kit	85070D	US01440168	Calibration not required	Calibration not required
Agilent	Dual-directional coupler	778D	50313	Aug.16.2012	Aug.15.2013
Agilent	RF Signal Generator	N5181A	MY50144143	Jun.16,2012	Jun.15,2013
R&S	Radio Communication Test	CMU200	113505	May.14,2013	May.13,2014
Schmid & Partner Engineering AG	Test Arch SD HAC	P01	1047	Calibration not required	Calibration not required
Agilent	Power meter	E4417A	MY52240003	May.07,2013	May.06,2014

12. Summary of Results

H-Field

H-Field Emission	Channel	Modulation Factor	Conducted Power (dBm)	Measured Drift (%)	Time Avg. Field (A/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.98	33.30	0.03	0.264	M4	147
	190	2.98	33.40	0.05	0.260	M4	147
	251	2.98	33.40	-0.00	0.269	M4	147
H-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
GSM1900	512	2.78	30.50	-0.00	0.195	M3	478
	661	2.78	30.40	-0.02	0.185	M3	478
	810	2.78	30.20	0.02	0.183	M3	478
H-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA Band II	9262	1	24.31	-0.05	0.058	M4	478
	9400	1	24.50	0.05	0.049	M4	478
	9538	1	24.46	-0.01	0.056	M4	478
H-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA Band IV	1312	1	24.50	-0.03	0.071	M4	147
	1412	1	24.34	0.07	0.059	M4	147
	1513	1	24.50	-0.08	0.056	M4	147
H-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA Band V	4132	1	24.46	-0.04	0.095	M4	147
	4183	1	24.15	-0.04	0.084	M4	147
	4233	1	24.23	-0.17	0.092	M4	147

E-Field

E-Field Emission	Channel	Modulation Factor	Conducted Power (dBm)	Measured Drift (%)	Time Avg. Field (V/m)	RESULT	Excl Blocks per 4.3.1.2.2
GSM850	128	2.83	33.30	-0.00	151.7	M3	689
	190	2.83	33.40	-0.02	153.3	M3	689
	251	2.83	33.40	-0.02	155.4	M3	689
E-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
GSM1900	512	2.94	30.50	0.02	68.88	M3	689
	661	2.94	30.40	0.07	65.29	M3	689
	810	2.94	30.20	0.03	62.73	M3	689
E-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA Band II	9262	1	24.31	0.16	30.34	M4	789
	9400	1	24.50	0.09	28.83	M4	689
	9538	1	24.46	0.02	31.65	M4	689
E-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA Band IV	1312	1	24.50	0.15	22.91	M4	789
	1412	1	24.34	0.14	20.44	M4	789
	1513	1	24.50	-0.07	20.79	M4	689
E-Field Emission	**Channel**	**Modulation Factor**	**Conducted Power (dBm)**	**Measured Drift (%)**	**Time Avg. Field (V/m)**	**RESULT**	**Excl Blocks per 4.3.1.2.2**
WCDMA Band V	4132	1	24.46	0.07	58.38	M4	689
	4183	1	24.15	-0.02	52.37	M4	689
	4233	1	24.23	-0.13	58.06	M4	689

13. Measurement Data

Date: 2013/5/16

HAC-E_GSM850_CH128

Communication System: GSM; Communication System Band: GSM850; Frequency: 824.2 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 65.87 V/m; Power Drift = -0.00 dB
PMF = 2.830
E-field emissions = 151.7 V/m
Near-field category: M3 (AWF -5 dB)

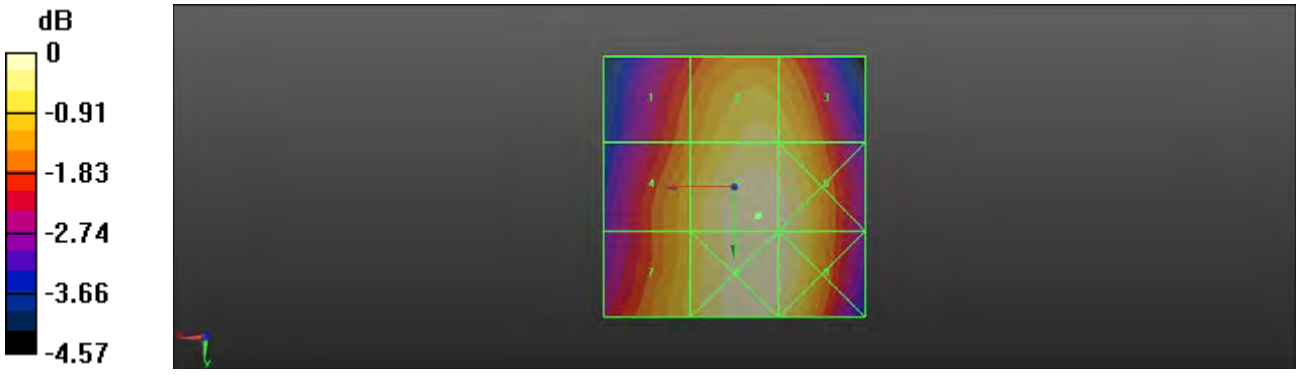
PMF scaled E-field

Grid 1 **M4** **129.2 V/m**	Grid 2 **M4** **143.8 V/m**	Grid 3 **M4** **142.1 V/m**
Grid 4 **M4** **136.9 V/m**	Grid 5 **M3** **151.7 V/m**	Grid 6 **M3** **149.9 V/m**
Grid 7 **M4** **138.4 V/m**	Grid 8 **M3** **151.1 V/m**	Grid 9 **M4** **149.6 V/m**

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

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

Cursor:
Total = 151.7 V/m
E Category: M3
Location: -4.5, 5.5, 8.7 mm



0 dB = 151.7 V/m = 43.62 dBV/m

Date: 2013/5/16

HAC-E_GSM850_CH190

Communication System: GSM; Communication System Band: GSM850; Frequency: 836.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 66.41 V/m; Power Drift = -0.02 dB
PMF = 2.830
E-field emissions = 153.3 V/m
Near-field category: M3 (AWF -5 dB)

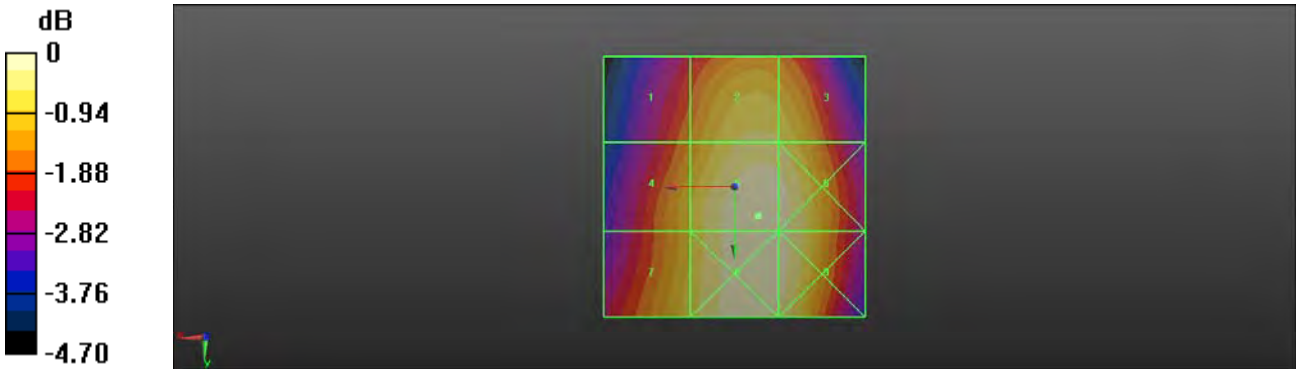
PMF scaled E-field

Grid 1 **M4** **128.9 V/m**	Grid 2 **M4** **144.6 V/m**	Grid 3 **M4** **143.4 V/m**
Grid 4 **M4** **137.9 V/m**	Grid 5 **M3** **153.3 V/m**	Grid 6 **M3** **151.2 V/m**
Grid 7 **M4** **140.6 V/m**	Grid 8 **M3** **152.6 V/m**	Grid 9 **M3** **151.2 V/m**

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 = 153.3 V/m
E Category: M3
Location: -4.5, 5.5, 8.7 mm



0 dB = 153.3 V/m = 43.71 dBV/m

Date: 2013/5/16

HAC-E_GSM850_CH251

Communication System: GSM; Communication System Band: GSM850; Frequency: 848.8 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 66.95 V/m; Power Drift = -0.02 dB
PMF = 2.830
E-field emissions = 155.4 V/m
Near-field category: M3 (AWF -5 dB)

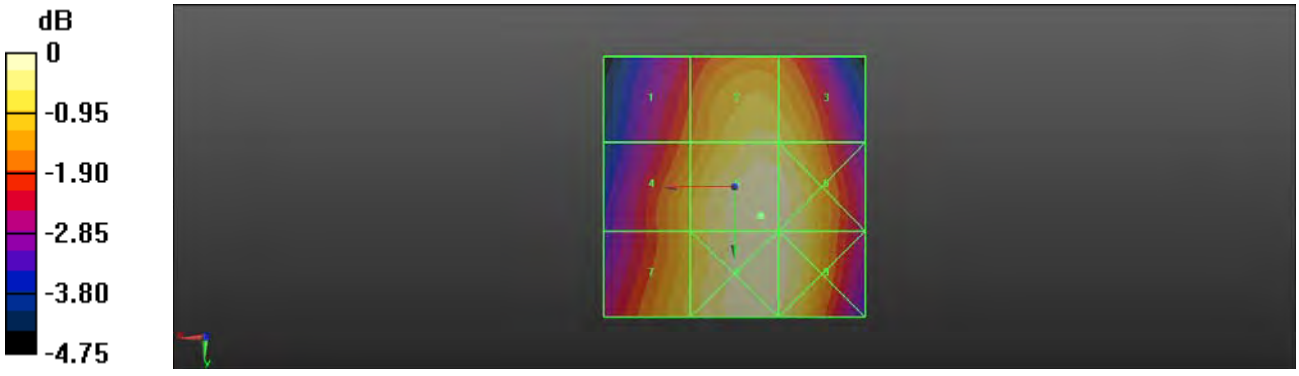
PMF scaled E-field

Grid 1 **M4** **129.3 V/m**	Grid 2 **M4** **146.7 V/m**	Grid 3 **M4** **145.4 V/m**
Grid 4 **M4** **139.4 V/m**	Grid 5 **M3** **155.4 V/m**	Grid 6 **M3** **153.5 V/m**
Grid 7 **M4** **141.7 V/m**	Grid 8 **M3** **155.3 V/m**	Grid 9 **M3** **153.6 V/m**

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

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

Cursor:
Total = 155.4 V/m
E Category: M3
Location: -5, 5.5, 8.7 mm



0 dB = 155.4 V/m = 43.83 dBV/m

Date: 2013/5/16

HAC-H_GSM850_CH128

Communication System: GSM; Communication System Band: GSM850; Frequency: 824.2 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.07100 A/m; Power Drift = 0.03 dB
PMF = 2.980
H-field emissions = 0.264 A/m
Near-field category: M4 (AWF -5 dB)

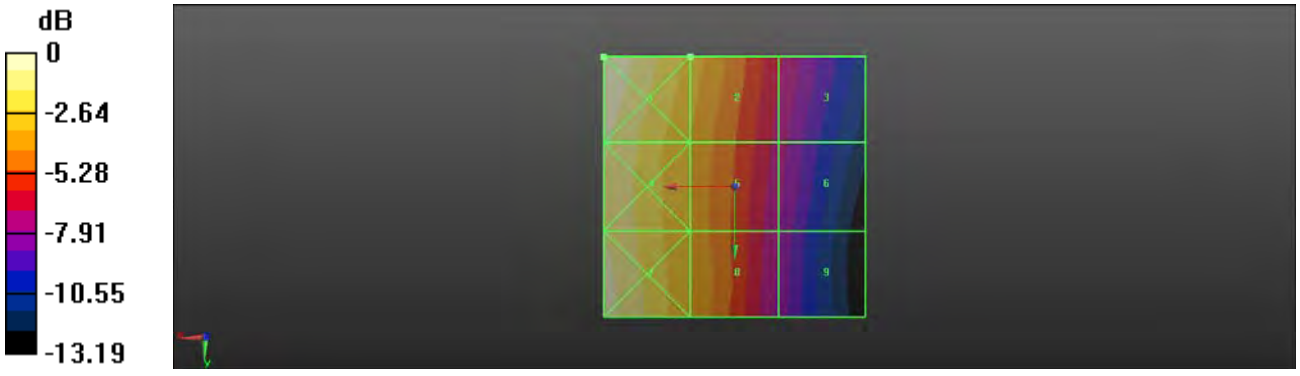
PMF scaled H-field

Grid 1 **M4** **0.369 A/m**	Grid 2 **M4** **0.264 A/m**	Grid 3 **M4** **0.168 A/m**
Grid 4 **M4** **0.340 A/m**	Grid 5 **M4** **0.247 A/m**	Grid 6 **M4** **0.158 A/m**
Grid 7 **M4** **0.348 A/m**	Grid 8 **M4** **0.248 A/m**	Grid 9 **M4** **0.149 A/m**

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 = 0.3691 A/m
H Category: M4
Location: 25, -25, 8.7 mm



0 dB = 0.3691 A/m = -8.66 dBA/m

Date: 2013/5/16

HAC-H_GSM850_CH190

Communication System: GSM; Communication System Band: GSM850; Frequency: 836.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06900 A/m; Power Drift = 0.05 dB
PMF = 2.980
H-field emissions = 0.260 A/m
Near-field category: M4 (AWF -5 dB)

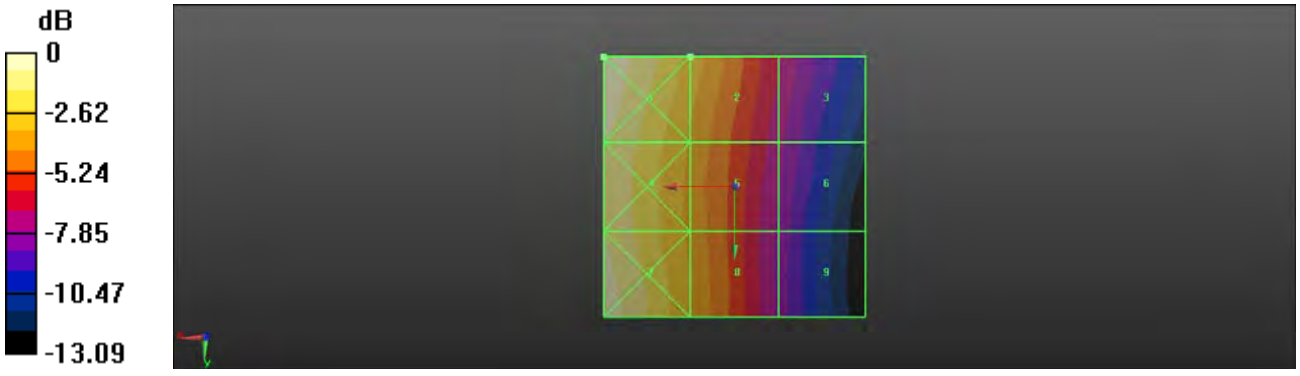
PMF scaled H-field

Grid 1 **M4** **0.364 A/m**	Grid 2 **M4** **0.260 A/m**	Grid 3 **M4** **0.165 A/m**
Grid 4 **M4** **0.332 A/m**	Grid 5 **M4** **0.242 A/m**	Grid 6 **M4** **0.153 A/m**
Grid 7 **M4** **0.348 A/m**	Grid 8 **M4** **0.246 A/m**	Grid 9 **M4** **0.144 A/m**

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 = 0.3640 A/m
H Category: M4
Location: 25, -25, 8.7 mm



0 dB = 0.3640 A/m = -8.78 dBA/m

Date: 2013/5/16

HAC-H_GSM850_CH251

Communication System: GSM; Communication System Band: GSM850; Frequency: 848.8 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06900 A/m; Power Drift = -0.00 dB
PMF = 2.980
H-field emissions = 0.269 A/m
Near-field category: M4 (AWF -5 dB)

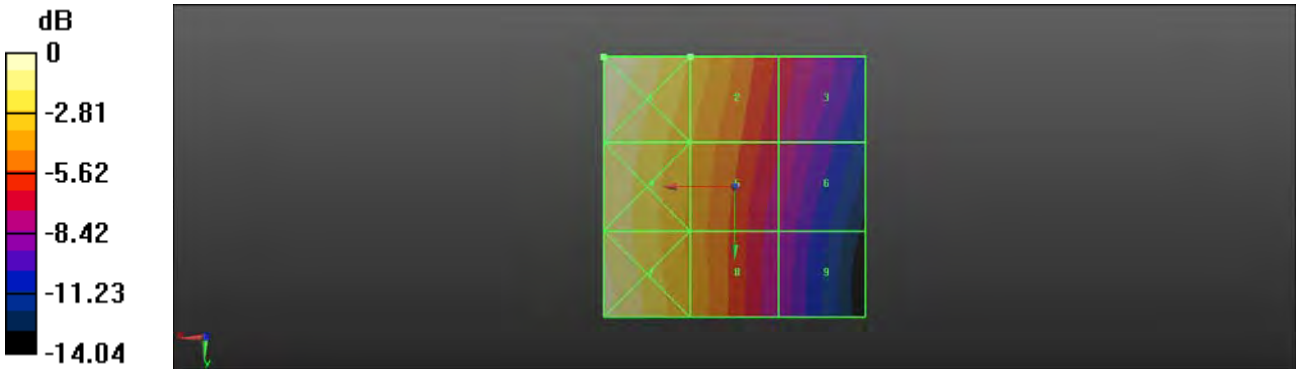
PMF scaled H-field

Grid 1 **M4** **0.376 A/m**	Grid 2 **M4** **0.269 A/m**	Grid 3 **M4** **0.174 A/m**
Grid 4 **M4** **0.342 A/m**	Grid 5 **M4** **0.248 A/m**	Grid 6 **M4** **0.160 A/m**
Grid 7 **M4** **0.350 A/m**	Grid 8 **M4** **0.243 A/m**	Grid 9 **M4** **0.145 A/m**

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 = 0.3763 A/m
H Category: M4
Location: 25, -25, 8.7 mm



0 dB = 0.3763 A/m = -8.49 dBA/m

Date: 2013/5/16

HAC-E_GSM1900_CH512

Communication System: GSM; Communication System Band: GSM1900; Frequency: 1850.2 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 18.22 V/m; Power Drift = 0.02 dB
PMF = 2.940
E-field emissions = 68.88 V/m
Near-field category: M3 (AWF -5 dB)

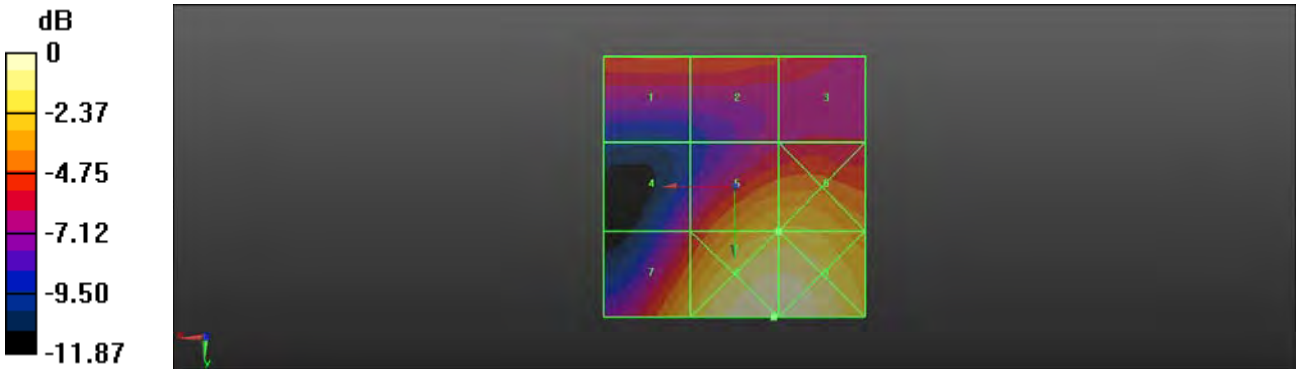
PMF scaled E-field

Grid 1 **M3** **52.22 V/m**	Grid 2 **M3** **52.06 V/m**	Grid 3 **M3** **48.50 V/m**
Grid 4 **M4** **43.55 V/m**	Grid 5 **M3** **68.88 V/m**	Grid 6 **M3** **69.45 V/m**
Grid 7 **M3** **67.80 V/m**	Grid 8 **M2** **88.75 V/m**	Grid 9 **M2** **88.64 V/m**

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 = 88.75 V/m
E Category: M2
Location: -7.5, 25, 8.7 mm



0 dB = 88.75 V/m = 38.96 dBV/m

Date: 2013/5/16

HAC-E_GSM1900_CH661

Communication System: GSM; Communication System Band: GSM1900; Frequency: 1880 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 17.64 V/m; Power Drift = 0.07 dB
PMF = 2.940
E-field emissions = 65.29 V/m
Near-field category: M3 (AWF -5 dB)

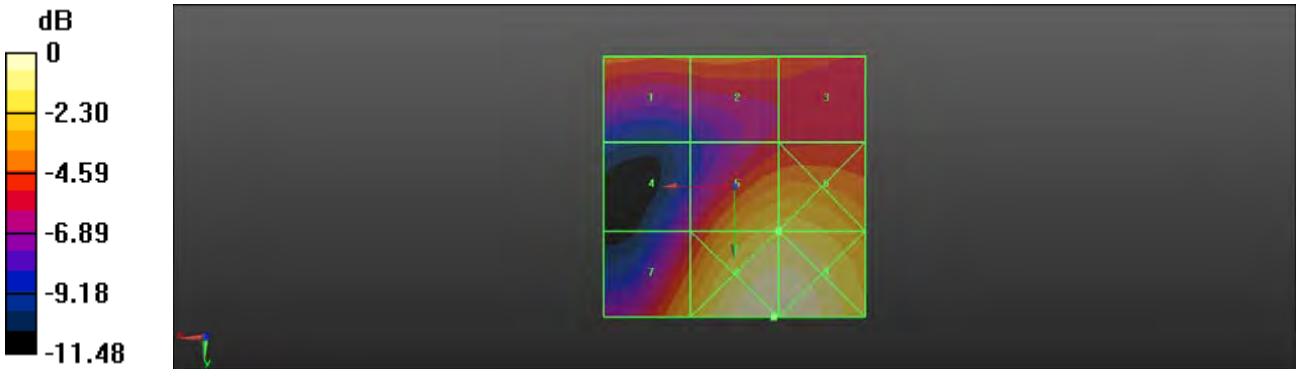
PMF scaled E-field

Grid 1 **M3** **49.49 V/m**	Grid 2 **M3** **49.71 V/m**	Grid 3 **M3** **47.89 V/m**
Grid 4 **M4** **39.47 V/m**	Grid 5 **M3** **65.29 V/m**	Grid 6 **M3** **65.71 V/m**
Grid 7 **M3** **58.93 V/m**	Grid 8 **M3** **80.73 V/m**	Grid 9 **M3** **80.68 V/m**

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 = 80.73 V/m
E Category: M3
Location: -7.5, 25, 8.7 mm



0 dB = 80.73 V/m = 38.14 dBV/m

Date: 2013/5/16

HAC-E_GSM1900_CH810

Communication System: GSM; Communication System Band: GSM1900; Frequency: 1909.8 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 16.70 V/m; Power Drift = 0.03 dB
PMF = 2.940
E-field emissions = 62.73 V/m
Near-field category: M3 (AWF -5 dB)

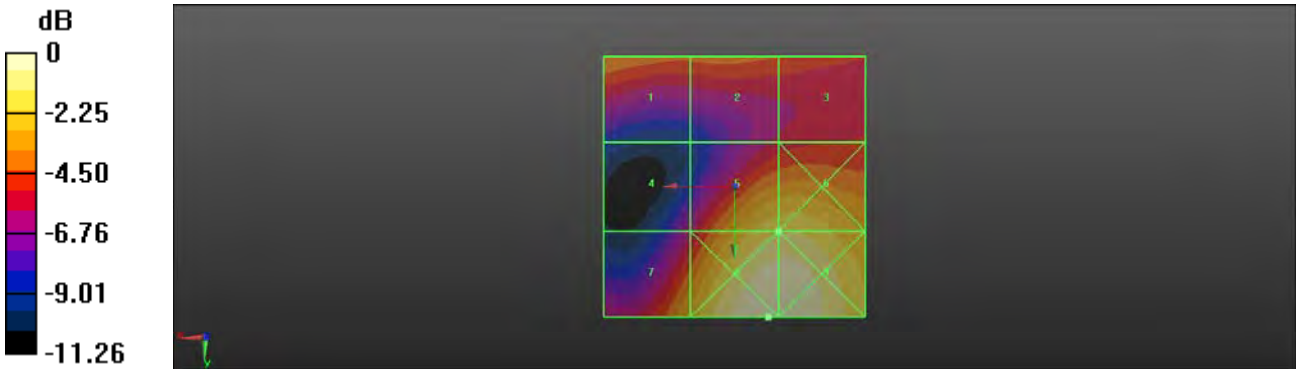
PMF scaled E-field

Grid 1 **M3** **49.70 V/m**	Grid 2 **M4** **47.06 V/m**	Grid 3 **M4** **45.37 V/m**
Grid 4 **M4** **36.74 V/m**	Grid 5 **M3** **62.73 V/m**	Grid 6 **M3** **63.15 V/m**
Grid 7 **M3** **55.00 V/m**	Grid 8 **M3** **75.36 V/m**	Grid 9 **M3** **75.09 V/m**

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 = 75.36 V/m
E Category: M3
Location: -6.5, 25, 8.7 mm



0 dB = 75.36 V/m = 37.54 dBV/m

Date: 2013/5/16

HAC-H_GSM1900_CH512

Communication System: GSM; Communication System Band: GSM1900; Frequency: 1850.2 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.07400 A/m; Power Drift = -0.00 dB
PMF = 2.780
H-field emissions = 0.195 A/m
Near-field category: M3 (AWF -5 dB)

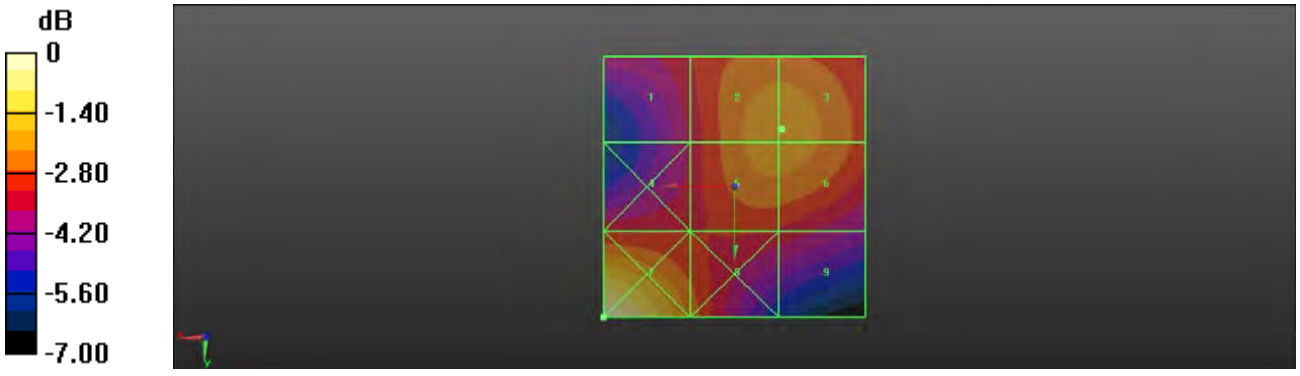
PMF scaled H-field

Grid 1 **M3** **0.169 A/m**	Grid 2 **M3** **0.195 A/m**	Grid 3 **M3** **0.195 A/m**
Grid 4 **M3** **0.169 A/m**	Grid 5 **M3** **0.194 A/m**	Grid 6 **M3** **0.194 A/m**
Grid 7 **M3** **0.246 A/m**	Grid 8 **M3** **0.186 A/m**	Grid 9 **M3** **0.168 A/m**

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 = 0.2464 A/m
H Category: M3
Location: 25, 25, 8.7 mm



0 dB = 0.2464 A/m = -12.17 dBA/m

Date: 2013/5/16

HAC-H_GSM1900_CH661

Communication System: GSM; Communication System Band: GSM1900; Frequency: 1880 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.07100 A/m; Power Drift = -0.02 dB
PMF = 2.780
H-field emissions = 0.185 A/m
Near-field category: M3 (AWF -5 dB)

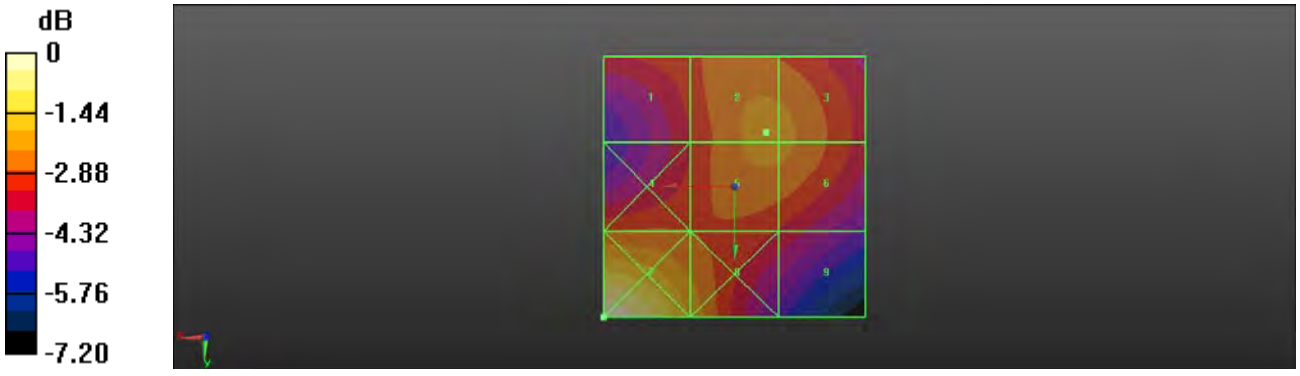
PMF scaled H-field

Grid 1 **M3** **0.170 A/m**	Grid 2 **M3** **0.185 A/m**	Grid 3 **M3** **0.184 A/m**
Grid 4 **M3** **0.173 A/m**	Grid 5 **M3** **0.185 A/m**	Grid 6 **M3** **0.184 A/m**
Grid 7 **M3** **0.239 A/m**	Grid 8 **M3** **0.191 A/m**	Grid 9 **M3** **0.162 A/m**

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 = 0.2393 A/m
H Category: M3
Location: 25, 25, 8.7 mm



0 dB = 0.2393 A/m = -12.42 dBA/m

Date: 2013/5/16

HAC-H_GSM1900_CH810

Communication System: GSM; Communication System Band: GSM1900; Frequency: 1909.8 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06900 A/m; Power Drift = 0.02 dB
PMF = 2.780
H-field emissions = 0.183 A/m
Near-field category: M3 (AWF -5 dB)

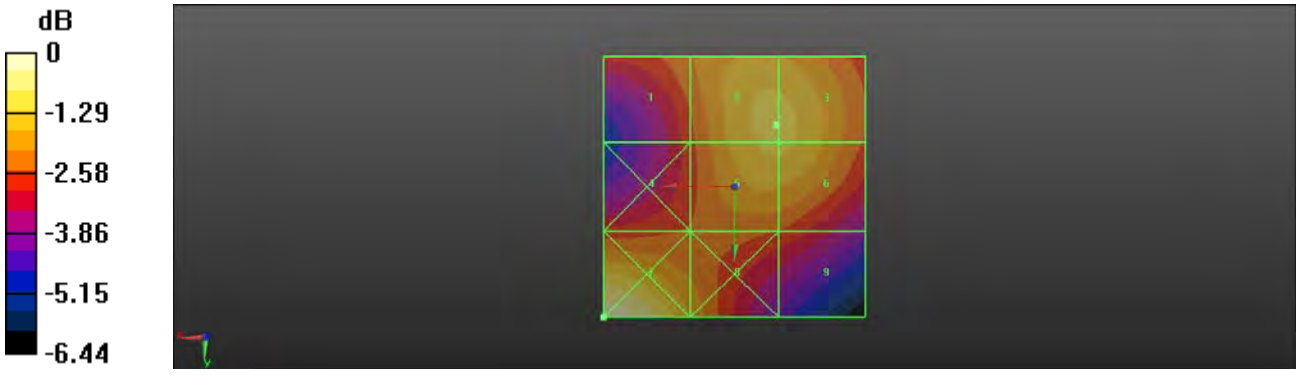
PMF scaled H-field

Grid 1 **M3** **0.163 A/m**	Grid 2 **M3** **0.183 A/m**	Grid 3 **M3** **0.183 A/m**
Grid 4 **M3** **0.156 A/m**	Grid 5 **M3** **0.182 A/m**	Grid 6 **M3** **0.182 A/m**
Grid 7 **M3** **0.209 A/m**	Grid 8 **M3** **0.171 A/m**	Grid 9 **M3** **0.155 A/m**

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 = 0.2088 A/m
H Category: M3
Location: 25, 25, 8.7 mm



0 dB = 0.2088 A/m = -13.60 dBA/m

Date: 2013/5/16

HAC-E_WCDMA Band II_CH9262

Communication System: WCDMA; Communication System Band: WCDMA Band II; Frequency: 1852.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 22.92 V/m; Power Drift = 0.16 dB
PMF = 1.000
E-field emissions = 30.34 V/m
Near-field category: M4 (AWF 0 dB)

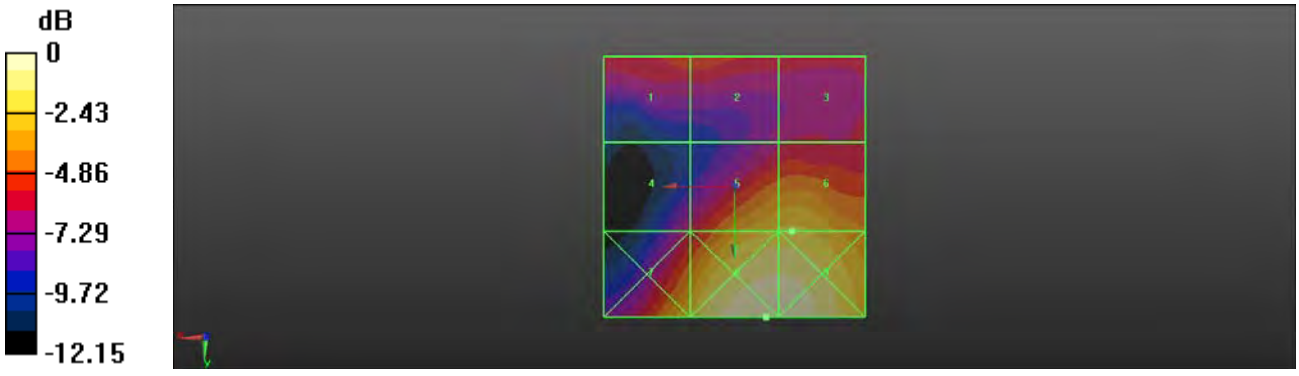
PMF scaled E-field

Grid 1 **M4** **22.14 V/m**	Grid 2 **M4** **22.16 V/m**	Grid 3 **M4** **20.14 V/m**
Grid 4 **M4** **18.75 V/m**	Grid 5 **M4** **30.14 V/m**	Grid 6 **M4** **30.34 V/m**
Grid 7 **M4** **30.37 V/m**	Grid 8 **M4** **39.05 V/m**	Grid 9 **M4** **38.91 V/m**

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 = 39.05 V/m
E Category: M4
Location: -6, 25, 8.7 mm



0 dB = 39.05 V/m = 31.83 dBV/m

Date: 2013/5/16

HAC-E_WCDMA Band II_CH9400

Communication System: WCDMA; Communication System Band: WCDMA Band II; Frequency: 1880 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 21.32 V/m; Power Drift = 0.09 dB
PMF = 1.000
E-field emissions = 28.83 V/m
Near-field category: M4 (AWF 0 dB)

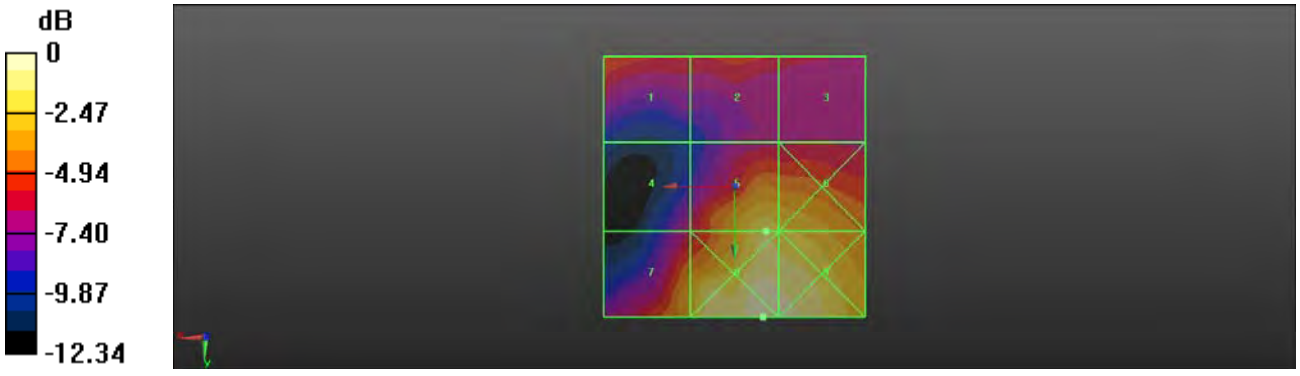
PMF scaled E-field

Grid 1 **M4** **20.13 V/m**	Grid 2 **M4** **19.48 V/m**	Grid 3 **M4** **17.96 V/m**
Grid 4 **M4** **16.99 V/m**	Grid 5 **M4** **28.83 V/m**	Grid 6 **M4** **27.68 V/m**
Grid 7 **M4** **25.27 V/m**	Grid 8 **M4** **35.62 V/m**	Grid 9 **M4** **33.92 V/m**

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 = 35.62 V/m
E Category: M4
Location: -5.5, 25, 8.7 mm



0 dB = 35.62 V/m = 31.03 dBV/m

Date: 2013/5/16

HAC-E_WCDMA Band II_CH9538

Communication System: WCDMA; Communication System Band: WCDMA Band II; Frequency: 1907.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 23.29 V/m; Power Drift = 0.02 dB
PMF = 1.000
E-field emissions = 31.65 V/m
Near-field category: M4 (AWF 0 dB)

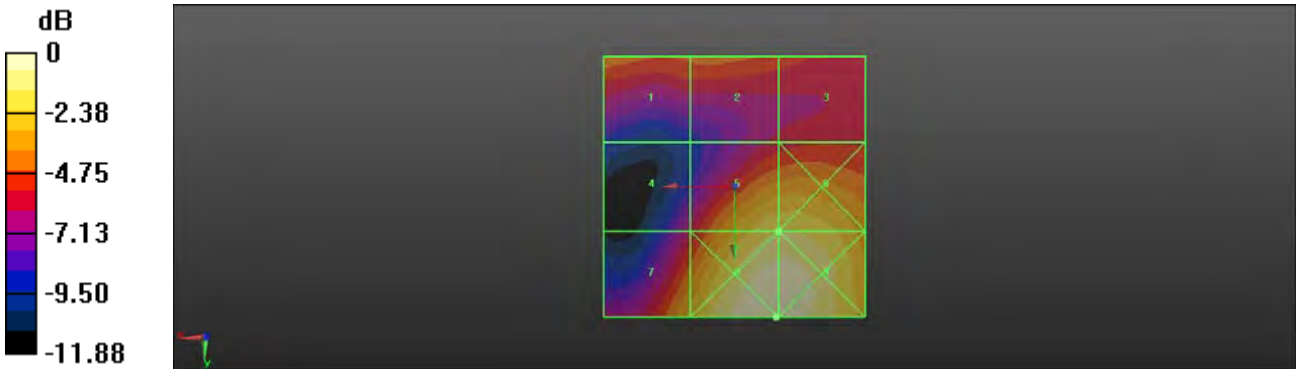
PMF scaled E-field

Grid 1 **M4** **23.79 V/m**	Grid 2 **M4** **23.21 V/m**	Grid 3 **M4** **21.54 V/m**
Grid 4 **M4** **18.51 V/m**	Grid 5 **M4** **31.65 V/m**	Grid 6 **M4** **31.82 V/m**
Grid 7 **M4** **27.55 V/m**	Grid 8 **M4** **38.18 V/m**	Grid 9 **M4** **38.15 V/m**

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

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

Cursor:
Total = 38.18 V/m
E Category: M4
Location: -8, 25, 8.7 mm



0 dB = 38.18 V/m = 31.64 dBV/m

Date: 2013/5/16

HAC-H_WCDMA Band II_CH9262

Communication System: WCDMA; Communication System Band: WCDMA Band II; Frequency: 1852.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06100 A/m; Power Drift = -0.05 dB
PMF = 1.000
H-field emissions = 0.058 A/m
Near-field category: M4 (AWF 0 dB)

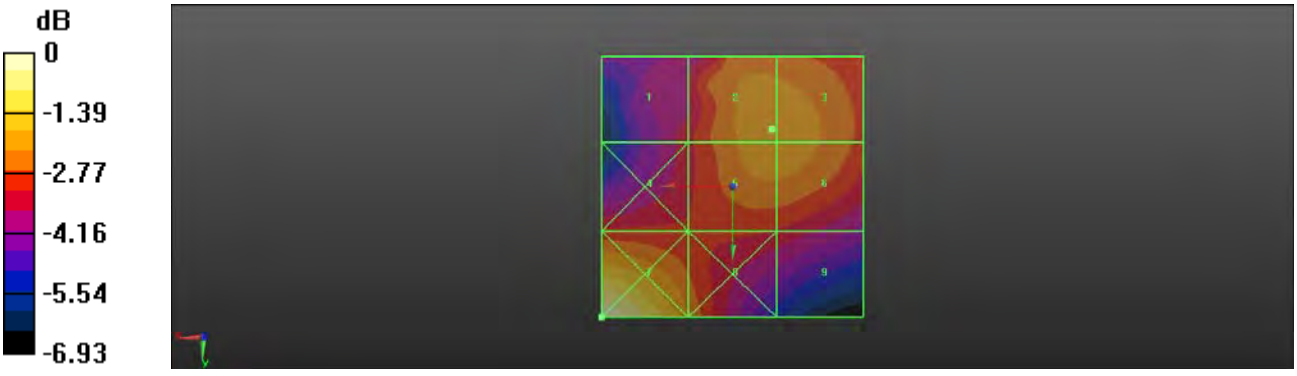
PMF scaled H-field

Grid 1 **M4** **0.050 A/m**	Grid 2 **M4** **0.058 A/m**	Grid 3 **M4** **0.058 A/m**
Grid 4 **M4** **0.051 A/m**	Grid 5 **M4** **0.058 A/m**	Grid 6 **M4** **0.058 A/m**
Grid 7 **M4** **0.073 A/m**	Grid 8 **M4** **0.056 A/m**	Grid 9 **M4** **0.050 A/m**

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 = 0.07292 A/m
H Category: M4
Location: 25, 25, 8.7 mm



0 dB = 0.07292 A/m = -22.74 dBA/m

Date: 2013/5/16

HAC-H_WCDMA Band II_CH9400

Communication System: WCDMA; Communication System Band: WCDMA Band II; Frequency: 1880 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.05100 A/m; Power Drift = 0.05 dB
PMF = 1.000
H-field emissions = 0.049 A/m
Near-field category: M4 (AWF 0 dB)

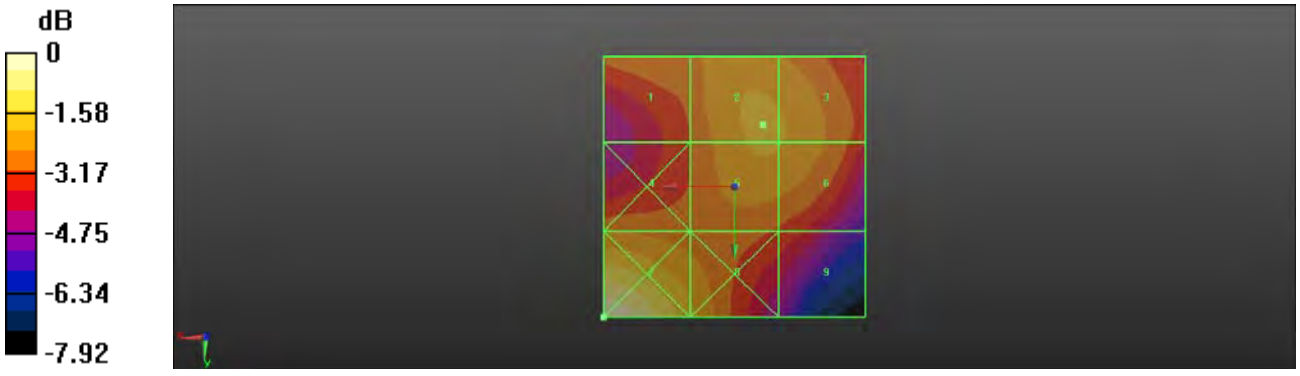
PMF scaled H-field

Grid 1 **M4** **0.045 A/m**	Grid 2 **M4** **0.049 A/m**	Grid 3 **M4** **0.048 A/m**
Grid 4 **M4** **0.045 A/m**	Grid 5 **M4** **0.048 A/m**	Grid 6 **M4** **0.048 A/m**
Grid 7 **M4** **0.061 A/m**	Grid 8 **M4** **0.049 A/m**	Grid 9 **M4** **0.042 A/m**

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 = 0.06123 A/m
H Category: M4
Location: 25, 25, 8.7 mm



0 dB = 0.06123 A/m = -24.26 dBA/m

Date: 2013/5/16

HAC-H_WCDMA Band II_CH9538

Communication System: WCDMA; Communication System Band: WCDMA Band II; Frequency: 1907.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.05800 A/m; Power Drift = -0.01 dB
PMF = 1.000
H-field emissions = 0.056 A/m
Near-field category: M4 (AWF 0 dB)

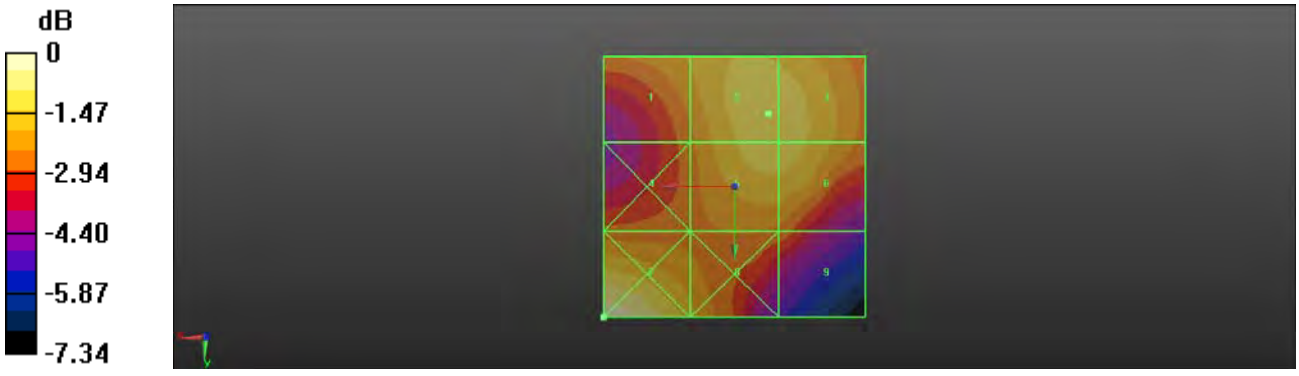
PMF scaled H-field

Grid 1 **M4** **0.051 A/m**	Grid 2 **M4** **0.056 A/m**	Grid 3 **M4** **0.056 A/m**
Grid 4 **M4** **0.047 A/m**	Grid 5 **M4** **0.056 A/m**	Grid 6 **M4** **0.056 A/m**
Grid 7 **M4** **0.064 A/m**	Grid 8 **M4** **0.052 A/m**	Grid 9 **M4** **0.047 A/m**

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 = 0.06376 A/m
H Category: M4
Location: 25, 25, 8.7 mm



0 dB = 0.06376 A/m = -23.91 dBA/m

Date: 2013/5/16

HAC-E_WCDMA Band IV_CH1312

Communication System: WCDMA; Communication System Band: WCDMA Band IV; Frequency: 1712.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 19.88 V/m; Power Drift = 0.15 dB
PMF = 1.000
E-field emissions = 22.91 V/m
Near-field category: M4 (AWF 0 dB)

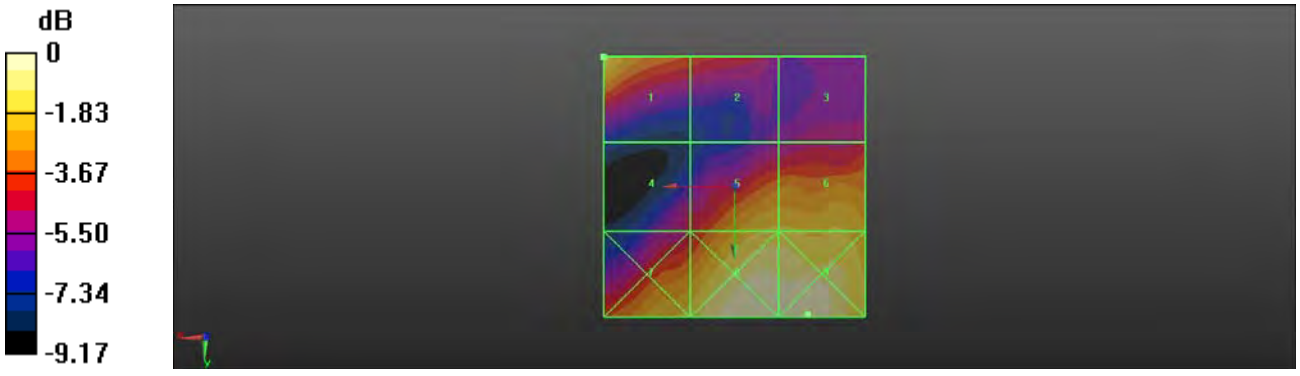
PMF scaled E-field

Grid 1 **M4** **22.91 V/m**	Grid 2 **M4** **17.35 V/m**	Grid 3 **M4** **15.24 V/m**
Grid 4 **M4** **15.65 V/m**	Grid 5 **M4** **22.04 V/m**	Grid 6 **M4** **22.05 V/m**
Grid 7 **M4** **22.41 V/m**	Grid 8 **M4** **26.53 V/m**	Grid 9 **M4** **26.68 V/m**

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 = 26.68 V/m
E Category: M4
Location: -14, 24.5, 8.7 mm



0 dB = 26.68 V/m = 28.52 dBV/m

Date: 2013/5/16

HAC-E_WCDMA Band IV_CH1412

Communication System: WCDMA; Communication System Band: WCDMA Band IV; Frequency: 1732.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 16.98 V/m; Power Drift = 0.14 dB
PMF = 1.000
E-field emissions = 20.44 V/m
Near-field category: M4 (AWF 0 dB)

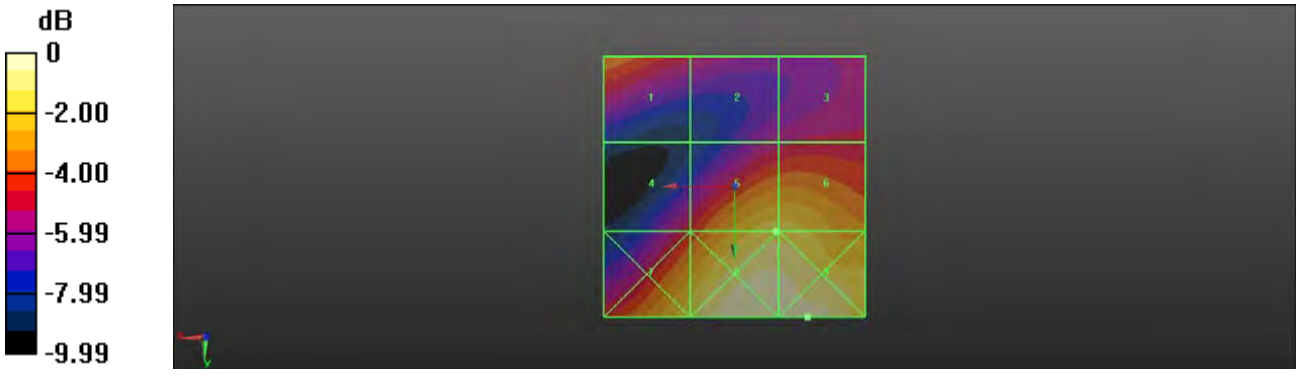
PMF scaled E-field

Grid 1 **M4** **16.85 V/m**	Grid 2 **M4** **13.77 V/m**	Grid 3 **M4** **13.78 V/m**
Grid 4 **M4** **14.48 V/m**	Grid 5 **M4** **20.44 V/m**	Grid 6 **M4** **20.44 V/m**
Grid 7 **M4** **21.03 V/m**	Grid 8 **M4** **24.47 V/m**	Grid 9 **M4** **24.70 V/m**

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 = 24.70 V/m
E Category: M4
Location: -14, 25, 8.7 mm



0 dB = 24.70 V/m = 27.85 dBV/m

Date: 2013/5/16

HAC-E_WCDMA Band IV_CH1513

Communication System: WCDMA; Communication System Band: WCDMA Band IV; Frequency: 1752.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 15.90 V/m; Power Drift = -0.07 dB
PMF = 1.000
E-field emissions = 20.79 V/m
Near-field category: M4 (AWF 0 dB)

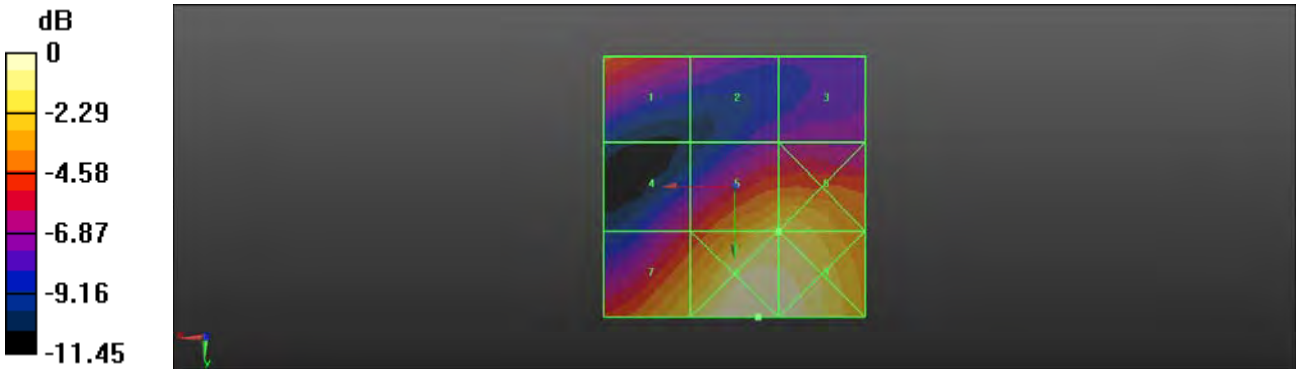
PMF scaled E-field

Grid 1 **M4** **15.69 V/m**	Grid 2 **M4** **12.23 V/m**	Grid 3 **M4** **11.72 V/m**
Grid 4 **M4** **13.53 V/m**	Grid 5 **M4** **20.79 V/m**	Grid 6 **M4** **20.83 V/m**
Grid 7 **M4** **20.52 V/m**	Grid 8 **M4** **25.71 V/m**	Grid 9 **M4** **25.14 V/m**

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 = 25.71 V/m
E Category: M4
Location: -4.5, 25, 8.7 mm



0 dB = 25.71 V/m = 28.20 dBV/m

Date: 2013/5/16

HAC-H_WCDMA Band IV_CH1312

Communication System: WCDMA; Communication System Band: WCDMA Band IV; Frequency: 1712.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06900 A/m; Power Drift = -0.03 dB
PMF = 1.000
H-field emissions = 0.071 A/m
Near-field category: M4 (AWF 0 dB)

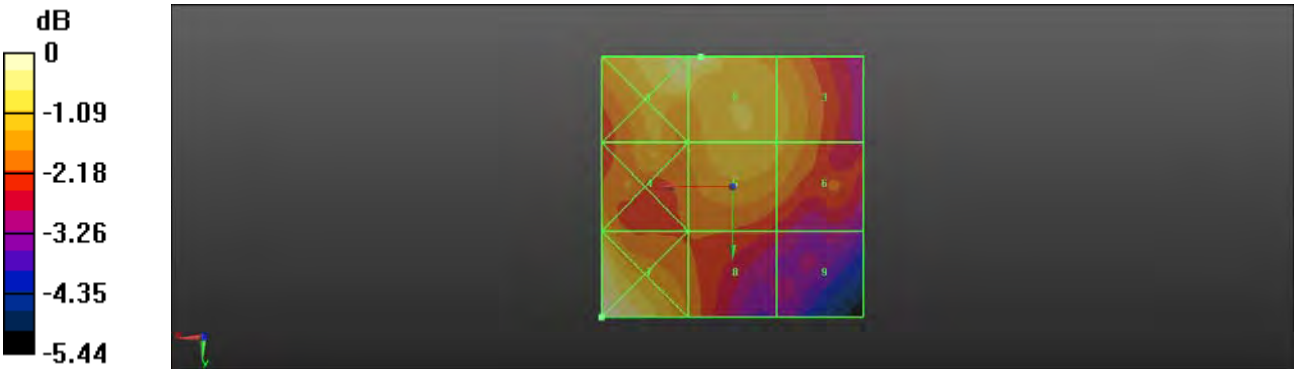
PMF scaled H-field

Grid 1 **M4** **0.070 A/m**	Grid 2 **M4** **0.071 A/m**	Grid 3 **M4** **0.064 A/m**
Grid 4 **M4** **0.064 A/m**	Grid 5 **M4** **0.065 A/m**	Grid 6 **M4** **0.063 A/m**
Grid 7 **M4** **0.074 A/m**	Grid 8 **M4** **0.060 A/m**	Grid 9 **M4** **0.054 A/m**

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 = 0.07381 A/m
H Category: M4
Location: 25, 25, 8.7 mm



0 dB = 0.07381 A/m = -22.64 dBA/m

Date: 2013/5/16

HAC-H_WCDMA Band IV_CH1412

Communication System: WCDMA; Communication System Band: WCDMA Band IV; Frequency: 1732.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06100 A/m; Power Drift = 0.07 dB
PMF = 1.000
H-field emissions = 0.059 A/m
Near-field category: M4 (AWF 0 dB)

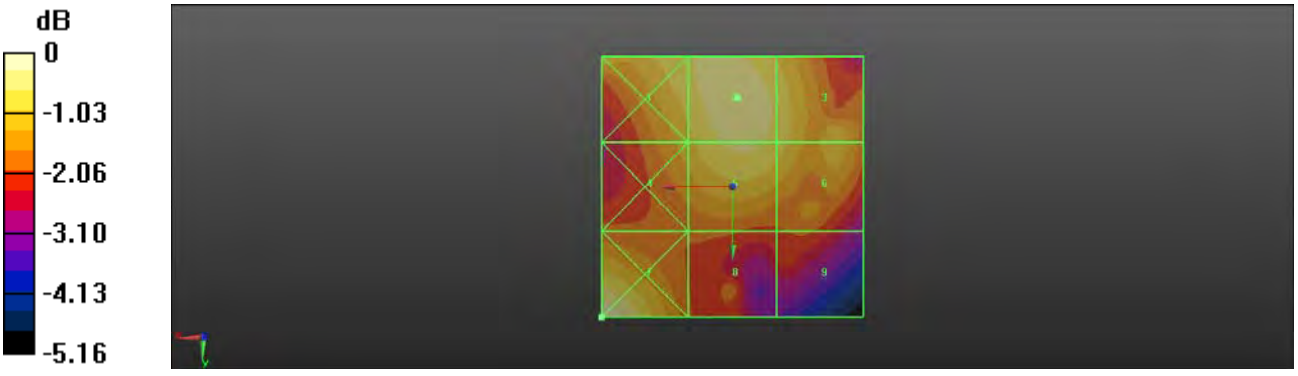
PMF scaled H-field

Grid 1 **M4** **0.058 A/m**	Grid 2 **M4** **0.059 A/m**	Grid 3 **M4** **0.058 A/m**
Grid 4 **M4** **0.055 A/m**	Grid 5 **M4** **0.059 A/m**	Grid 6 **M4** **0.057 A/m**
Grid 7 **M4** **0.063 A/m**	Grid 8 **M4** **0.051 A/m**	Grid 9 **M4** **0.050 A/m**

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 = 0.06283 A/m
H Category: M4
Location: 25, 25, 8.7 mm



0 dB = 0.06283 A/m = -24.04 dBA/m

Date: 2013/5/16

HAC-H_WCDMA Band IV_CH1513

Communication System: WCDMA; Communication System Band: WCDMA Band IV; Frequency: 1752.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06000 A/m; Power Drift = -0.08 dB
PMF = 1.000
H-field emissions = 0.056 A/m
Near-field category: M4 (AWF 0 dB)

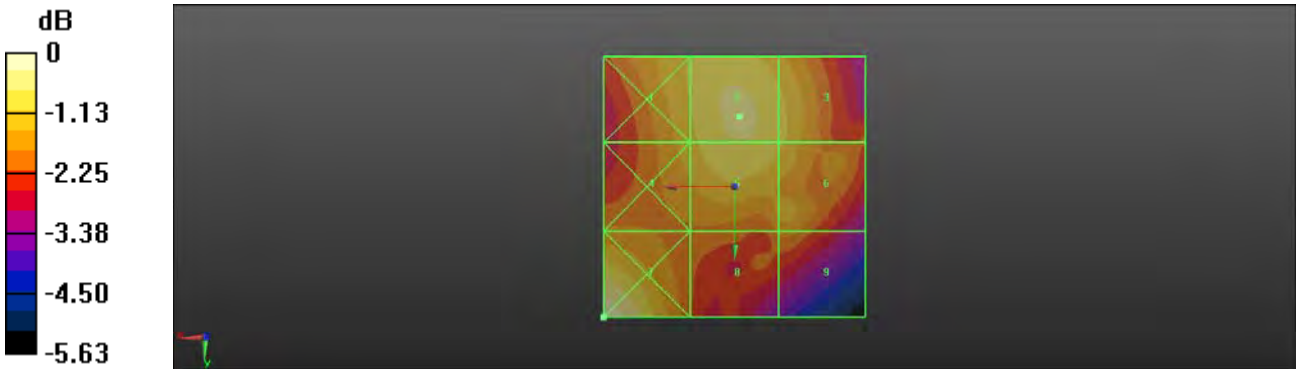
PMF scaled H-field

Grid 1 **M4** **0.054 A/m**	Grid 2 **M4** **0.056 A/m**	Grid 3 **M4** **0.055 A/m**
Grid 4 **M4** **0.053 A/m**	Grid 5 **M4** **0.056 A/m**	Grid 6 **M4** **0.054 A/m**
Grid 7 **M4** **0.061 A/m**	Grid 8 **M4** **0.049 A/m**	Grid 9 **M4** **0.050 A/m**

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 = 0.06098 A/m
H Category: M4
Location: 25, 25, 8.7 mm



0 dB = 0.06098 A/m = -24.30 dBA/m

Date: 2013/5/16

HAC-E_WCDMA Band V_CH4132

Communication System: WCDMA; Communication System Band: WCDMA Band V; Frequency: 826.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 71.98 V/m; Power Drift = 0.07 dB
PMF = 1.000
E-field emissions = 58.38 V/m
Near-field category: M4 (AWF 0 dB)

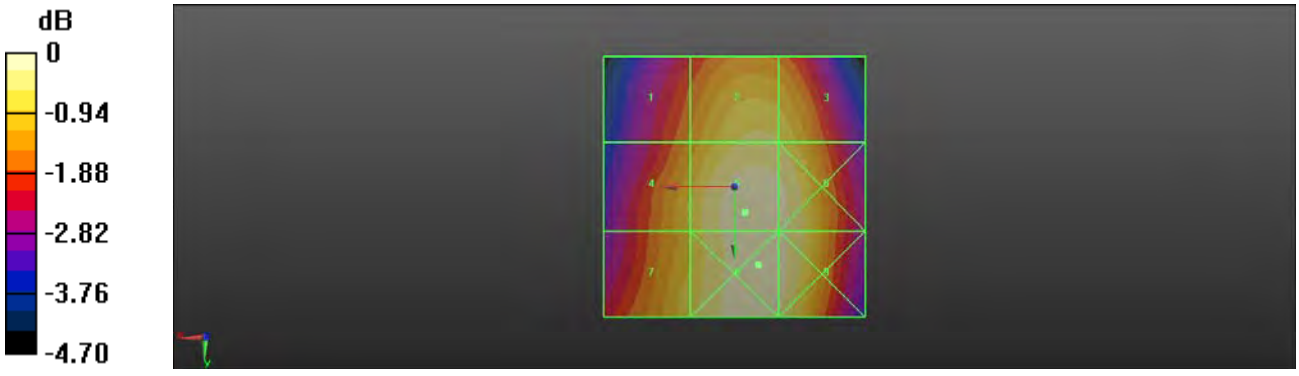
PMF scaled E-field

Grid 1 **M4** **49.74 V/m**	Grid 2 **M4** **55.44 V/m**	Grid 3 **M4** **54.95 V/m**
Grid 4 **M4** **53.41 V/m**	Grid 5 **M4** **58.38 V/m**	Grid 6 **M4** **57.80 V/m**
Grid 7 **M4** **54.27 V/m**	Grid 8 **M4** **58.80 V/m**	Grid 9 **M4** **57.80 V/m**

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 = 58.80 V/m
E Category: M4
Location: -4.5, 15, 8.7 mm



0 dB = 58.80 V/m = 35.39 dBV/m

Date: 2013/5/16

HAC-E_WCDMA Band V_CH4183

Communication System: WCDMA; Communication System Band: WCDMA Band V; Frequency: 836.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 64.36 V/m; Power Drift = -0.02 dB
PMF = 1.000
E-field emissions = 52.37 V/m
Near-field category: M4 (AWF 0 dB)

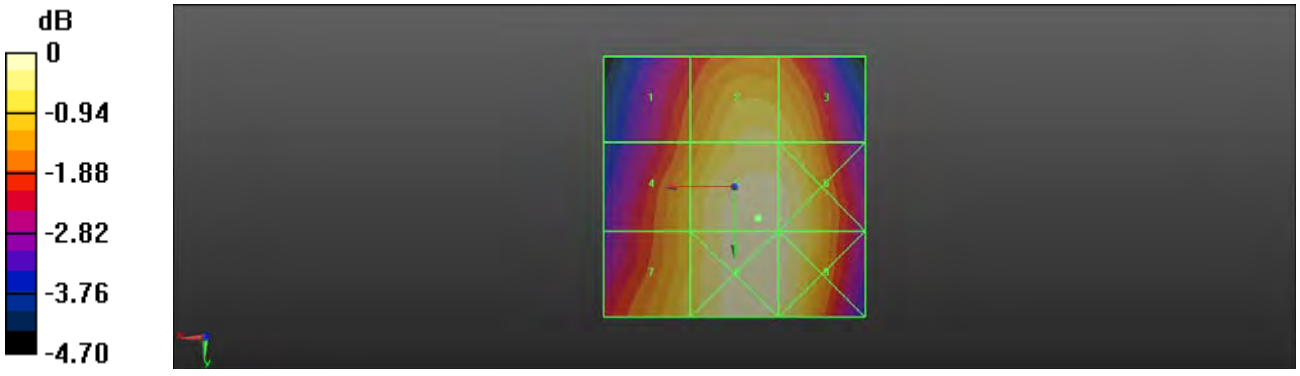
PMF scaled E-field

Grid 1 **M4** **43.99 V/m**	Grid 2 **M4** **49.45 V/m**	Grid 3 **M4** **48.87 V/m**
Grid 4 **M4** **47.24 V/m**	Grid 5 **M4** **52.37 V/m**	Grid 6 **M4** **51.72 V/m**
Grid 7 **M4** **48.04 V/m**	Grid 8 **M4** **52.17 V/m**	Grid 9 **M4** **51.74 V/m**

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 = 52.37 V/m
E Category: M4
Location: -4.5, 6, 8.7 mm



0 dB = 52.37 V/m = 34.38 dBV/m

Date: 2013/5/16

HAC-E_WCDMA Band V_CH4233

Communication System: WCDMA; Communication System Band: WCDMA Band V; Frequency: 846.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device E-Field measurement: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 71.81 V/m; Power Drift = -0.13 dB
PMF = 1.000
E-field emissions = 58.06 V/m
Near-field category: M4 (AWF 0 dB)

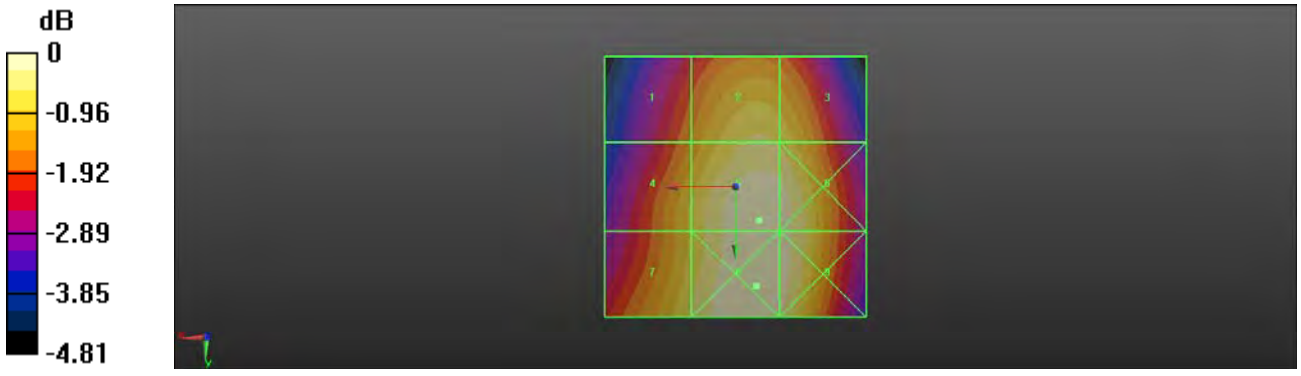
PMF scaled E-field

Grid 1 **M4** **48.74 V/m**	Grid 2 **M4** **54.56 V/m**	Grid 3 **M4** **53.79 V/m**
Grid 4 **M4** **52.54 V/m**	Grid 5 **M4** **58.06 V/m**	Grid 6 **M4** **57.41 V/m**
Grid 7 **M4** **54.28 V/m**	Grid 8 **M4** **58.18 V/m**	Grid 9 **M4** **57.36 V/m**

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 = 58.18 V/m
E Category: M4
Location: -4, 19, 8.7 mm



0 dB = 58.18 V/m = 35.30 dBV/m

Date: 2013/5/16

HAC-H_WCDMA Band V_CH4132

Communication System: WCDMA; Communication System Band: WCDMA Band V; Frequency: 826.4 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.07500 A/m; Power Drift = -0.04 dB
PMF = 1.000
H-field emissions = 0.095 A/m
Near-field category: M4 (AWF 0 dB)

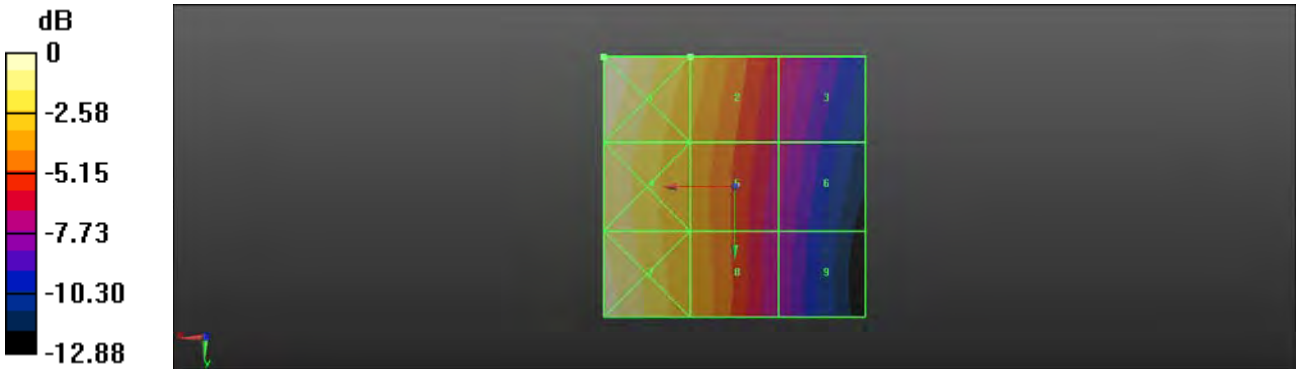
PMF scaled H-field

Grid 1 **M4** **0.131 A/m**	Grid 2 **M4** **0.095 A/m**	Grid 3 **M4** **0.062 A/m**
Grid 4 **M4** **0.120 A/m**	Grid 5 **M4** **0.088 A/m**	Grid 6 **M4** **0.057 A/m**
Grid 7 **M4** **0.124 A/m**	Grid 8 **M4** **0.089 A/m**	Grid 9 **M4** **0.054 A/m**

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 = 0.1307 A/m
H Category: M4
Location: 25, -25, 8.7 mm



0 dB = 0.1307 A/m = -17.68 dBA/m

Date: 2013/5/16

HAC-H_WCDMA Band V_CH4183

Communication System: WCDMA; Communication System Band: WCDMA Band V; Frequency: 836.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.06600 A/m; Power Drift = -0.04 dB
PMF = 1.000
H-field emissions = 0.084 A/m
Near-field category: M4 (AWF 0 dB)

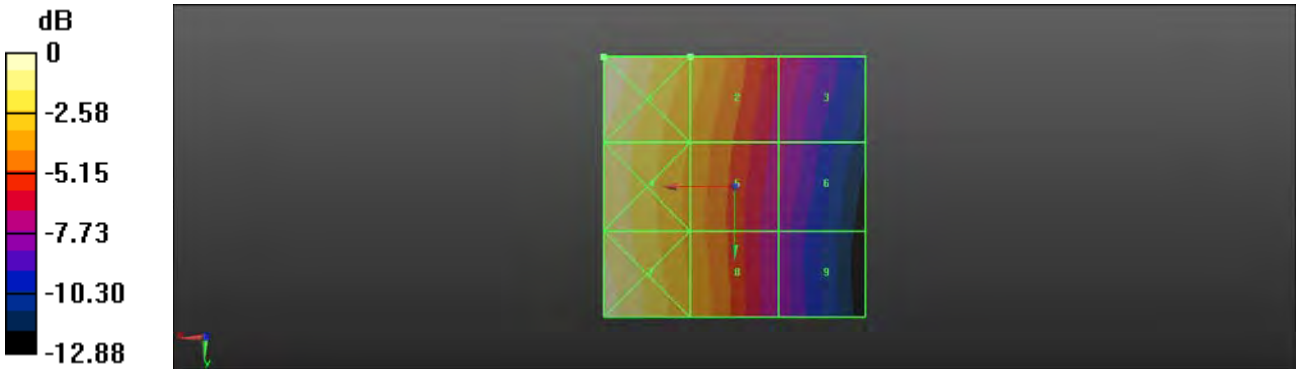
PMF scaled H-field

Grid 1 **M4** **0.116 A/m**	Grid 2 **M4** **0.084 A/m**	Grid 3 **M4** **0.054 A/m**
Grid 4 **M4** **0.105 A/m**	Grid 5 **M4** **0.077 A/m**	Grid 6 **M4** **0.050 A/m**
Grid 7 **M4** **0.110 A/m**	Grid 8 **M4** **0.078 A/m**	Grid 9 **M4** **0.047 A/m**

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 = 0.1157 A/m
H Category: M4
Location: 25, -25, 8.7 mm



0 dB = 0.1157 A/m = -18.73 dBA/m

Date: 2013/5/16

HAC-H_WCDMA Band V_CH4233

Communication System: WCDMA; Communication System Band: WCDMA Band V; Frequency: 846.6 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Device H-Field measurement with H3DV6 probe: Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.07200 A/m; Power Drift = -0.17 dB
PMF = 1.000
H-field emissions = 0.092 A/m
Near-field category: M4 (AWF 0 dB)

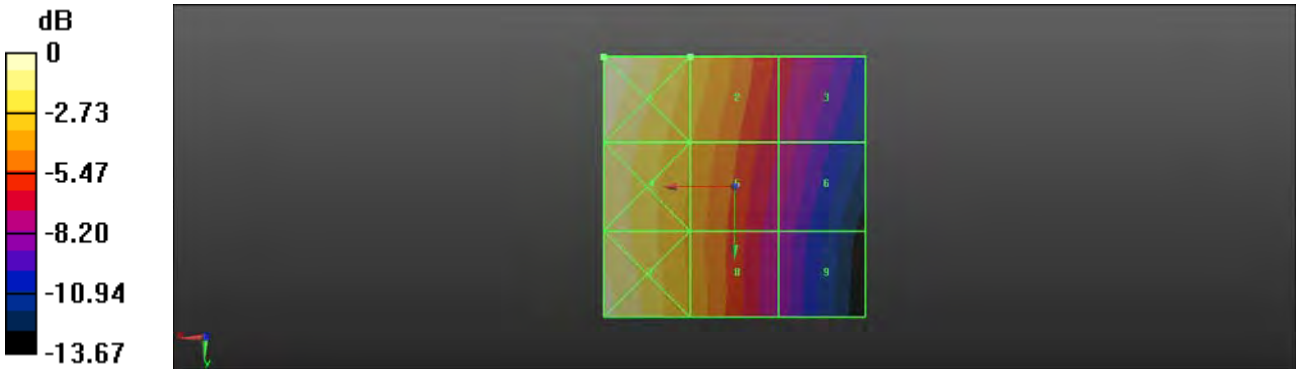
PMF scaled H-field

Grid 1 **M4** **0.128 A/m**	Grid 2 **M4** **0.092 A/m**	Grid 3 **M4** **0.060 A/m**
Grid 4 **M4** **0.115 A/m**	Grid 5 **M4** **0.085 A/m**	Grid 6 **M4** **0.055 A/m**
Grid 7 **M4** **0.119 A/m**	Grid 8 **M4** **0.083 A/m**	Grid 9 **M4** **0.050 A/m**

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 = 0.1276 A/m
H Category: M4
Location: 25, -25, 8.7 mm



0 dB = 0.1276 A/m = -17.88 dBA/m

14. System Verification

Date: 2013/5/16

HAC_E_Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz; Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

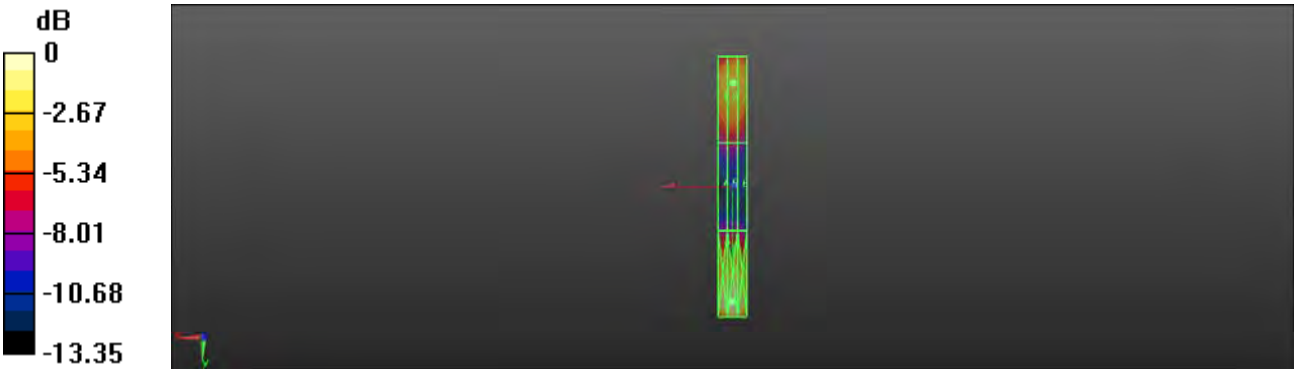
- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Configuration/E Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, 354.7 mm
Reference Value = 130.5 V/m; Power Drift = 0.01 dB
PMF = 1.000
E-field emissions = 167.8 V/m
Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 **M4** **163.8 V/m**	Grid 2 **M4** **167.8 V/m**	Grid 3 **M4** **165.1 V/m**
Grid 4 **M4** **96.05 V/m**	Grid 5 **M4** **97.65 V/m**	Grid 6 **M4** **94.15 V/m**
Grid 7 **M3** **218.6 V/m**	Grid 8 **M3** **225.9 V/m**	Grid 9 **M3** **215.2 V/m**

Cursor:
Total = 225.9 V/m
E Category: M3
Location: 0.5, 79, 364.7 mm



0 dB = 225.9 V/m = 47.08 dBV/m

Date: 2013/5/16

HAC_H_Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

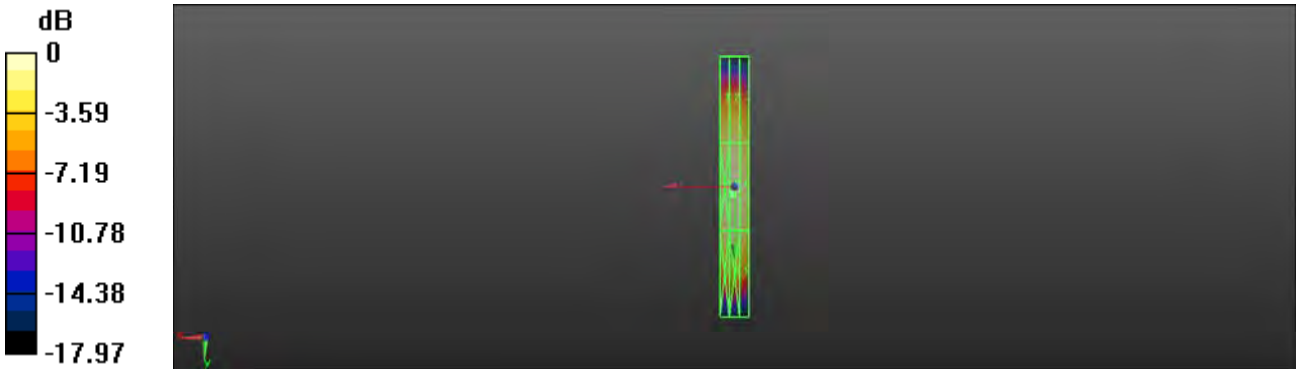
- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Configuration/H Scan - H3DV6 probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, 354.7 mm
Reference Value = 0.4800 A/m; Power Drift = -0.01 dB
PMF = 1.000
H-field emissions = 0.453 A/m
Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

Grid 1 **M4** **0.371 A/m**	Grid 2 **M4** **0.376 A/m**	Grid 3 **M4** **0.352 A/m**
Grid 4 **M4** **0.441 A/m**	Grid 5 **M4** **0.453 A/m**	Grid 6 **M4** **0.424 A/m**
Grid 7 **M4** **0.401 A/m**	Grid 8 **M4** **0.413 A/m**	Grid 9 **M4** **0.385 A/m**

Cursor:
Total = 0.4535 A/m
H Category: M4
Location: 1, 5.5, 364.7 mm



0 dB = 0.4535 A/m = -6.87 dBA/m

Date: 2013/5/16

HAC_E_Dipole 1880MHz

Communication System: CW; Frequency: 1880 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1000 kg/m^3
DASY 5 Configuration:

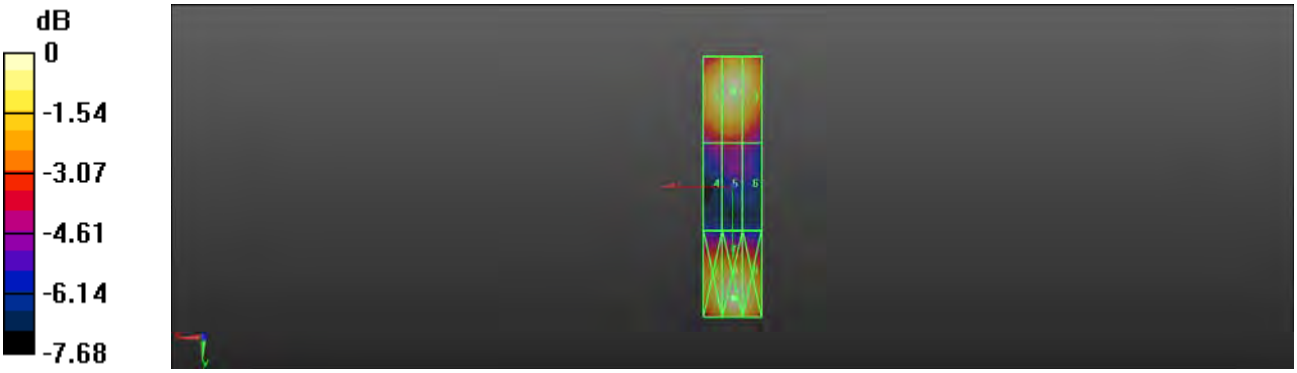
- Probe: ER3DV6 - SN2306; ConvF(1, 1, 1); Calibrated: 2012/11/19;
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Configuration/E Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Interpolated grid:
dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, 354.7 mm
Reference Value = 163.3 V/m; Power Drift = -0.00 dB
PMF = 1.000
E-field emissions = 140.6 V/m
Near-field category: M2 (AWF 0 dB)

PMF scaled E-field

Grid 1 **M2** **137.1 V/m**	Grid 2 **M2** **140.6 V/m**	Grid 3 **M2** **136.1 V/m**
Grid 4 **M3** **91.34 V/m**	Grid 5 **M3** **92.78 V/m**	Grid 6 **M3** **89.33 V/m**
Grid 7 **M2** **137.7 V/m**	Grid 8 **M2** **144.8 V/m**	Grid 9 **M2** **142.4 V/m**

Cursor:
Total = 144.8 V/m
E Category: M2
Location: -0.5, 38.5, 364.7 mm



0 dB = 144.8 V/m = 43.22 dBV/m

Date: 2013/5/16

HAC_H_Dipole 1880MHz

Communication System: CW; Frequency: 1880 MHz;Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 1 kg/m^3
DASY 5 Configuration:

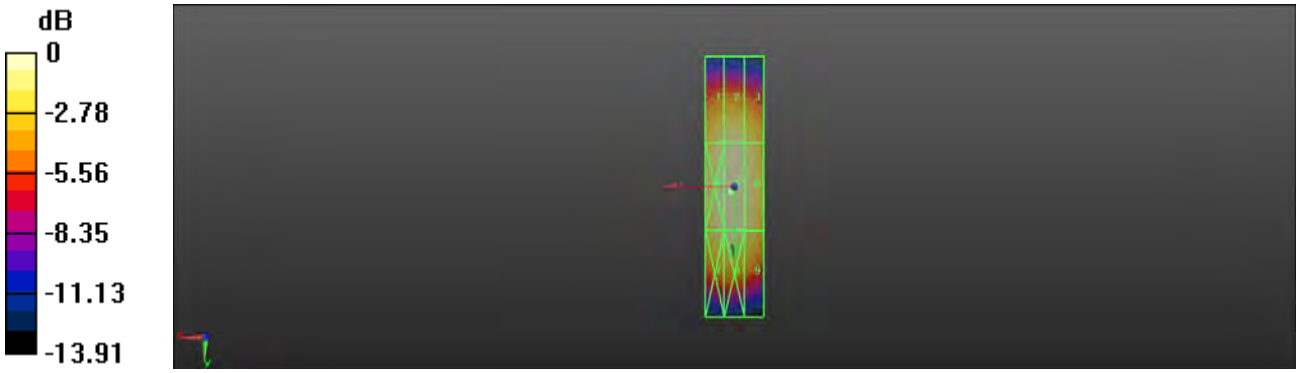
- Probe: H3DV6 - SN6187; ; Calibrated: 2012/6/20
- Sensor-Surface: (Fix Surface),
- Electronics: DAE4 Sn547; Calibrated: 2013/3/19
- Phantom: HAC Test Arch;
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Configuration/H Scan - H3DV6 probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, 354.7 mm
Reference Value = 0.4830 A/m; Power Drift = -0.00 dB
PMF = 1.000
H-field emissions = 0.458 A/m
Near-field category: M2 (AWF 0 dB)

PMF scaled H-field

Grid 1 **M2** **0.408 A/m**	Grid 2 **M2** **0.421 A/m**	Grid 3 **M2** **0.395 A/m**
Grid 4 **M2** **0.446 A/m**	Grid 5 **M2** **0.458 A/m**	Grid 6 **M2** **0.429 A/m**
Grid 7 **M2** **0.418 A/m**	Grid 8 **M2** **0.431 A/m**	Grid 9 **M2** **0.397 A/m**

Cursor:
Total = 0.4583 A/m
H Category: M2
Location: 1, 1.5, 364.7 mm



0 dB = 0.4583 A/m = -6.78 dBA/m

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

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: DAE4-547_Mar13

CALIBRATION CERTIFICATE

Object DAE4 - SD 000 D04 BJ - SN: 547

Calibration procedure(s) QA CAL-06.v25
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: March 19, 2013

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	02-Oct-12 (No:12728)	Oct-13
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	07-Jan-13 (in house check)	In house check: Jan-14
Calibrator Box V2.1	SE UMS 006 AA 1002	07-Jan-13 (in house check)	In house check: Jan-14

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	

Issued: March 19, 2013

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Certificate No: DAE4-547_Mar13 Page 1 of 5

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Accreditation No.: SCS 108

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

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

Calibration Factors	X	Y	Z
High Range	404.021 ± 0.02% (k=2)	404.067 ± 0.02% (k=2)	404.200 ± 0.02% (k=2)
Low Range	3.95755 ± 1.55% (k=2)	3.96067 ± 1.55% (k=2)	3.97511 ± 1.55% (k=2)

Connector Angle

Connector Angle to be used in DASY system	159.5 ° ± 1 °

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Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199989.94	-2.47	-0.00
Channel X	+ Input	20003.37	3.96	0.02
Channel X	- Input	-19997.23	3.73	-0.02
Channel Y	+ Input	199995.29	2.73	0.00
Channel Y	+ Input	19998.90	-0.61	-0.00
Channel Y	- Input	-20001.19	-0.37	0.00
Channel Z	+ Input	199992.88	0.36	0.00
Channel Z	+ Input	20000.94	1.49	0.01
Channel Z	- Input	-20003.26	-2.37	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.36	0.34	0.02
Channel X	+ Input	200.82	0.29	0.14
Channel X	- Input	-200.37	-0.99	0.50
Channel Y	+ Input	2000.08	-0.04	-0.00
Channel Y	+ Input	200.50	-0.17	-0.08
Channel Y	- Input	-199.79	-0.52	0.26
Channel Z	+ Input	2000.48	0.30	0.02
Channel Z	+ Input	199.82	-0.83	-0.42
Channel Z	- Input	-200.63	-1.34	0.67

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	2.87	1.74
	- 200	-1.69	-2.59
Channel Y	200	-21.18	-22.16
	- 200	20.02	20.39
Channel Z	200	20.06	20.09
	- 200	-21.97	-22.40

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	3.33	-2.42
Channel Y	200	9.32	-	4.14
Channel Z	200	6.20	7.89	-

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4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	16138	15290
Channel Y	16452	16239
Channel Z	15982	16909

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	2.86	1.75	3.69	0.45
Channel Y	-1.52	-2.51	-0.79	0.37
Channel Z	0.34	-1.21	1.52	0.53

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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Accreditation No.: SCS 108

Client: Auden

Certificate No: H3-6187_Jun12

CALIBRATION CERTIFICATE

Object: H3DV6 - SN:6187

Calibration procedure(s): QA CAL-03.v6, QA CAL-25.v4
Calibration procedure for H-field probes optimized for close near field evaluations in air

Calibration date: June 20, 2012

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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe H3DV6	SN: 6182	11-Oct-11 (No. H3-6182_Oct11)	Oct-12
DAE4	SN: 789	30-Jan-12 (No. DAE4-789_Jan12)	Jan-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: June 20, 2012

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-2005, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005.
b) CTIA Test Plan for Hearing Aid Compatibility, April 2010.

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 for XY sensors and ϑ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- *X,Y,Z(f)_a0a1a2= X,Y,Z_a0a1a2* frequency_response* (see Frequency Response Chart).
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *Spherical isotropy (3D deviation from isotropy):* in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *X_a0a1a2* (no uncertainty required).

Probe H3DV6

SN:6187

Manufactured: June 8, 2004
Calibrated: June 20, 2012

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

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

Basic Calibration Parameters

		Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / √(mV))	a0	3.18E-003	2.54E-003	3.05E-003	± 5.1 %
Norm (A/m / √(mV))	a1	-3.81E-006	1.66E-005	-4.79E-005	± 5.1 %
Norm (A/m / √(mV))	a2	1.76E-005	1.61E-005	6.07E-005	± 5.1 %
DCP (mV)[B]		113.6	92.1	93.4	

Modulation Calibration Parameters

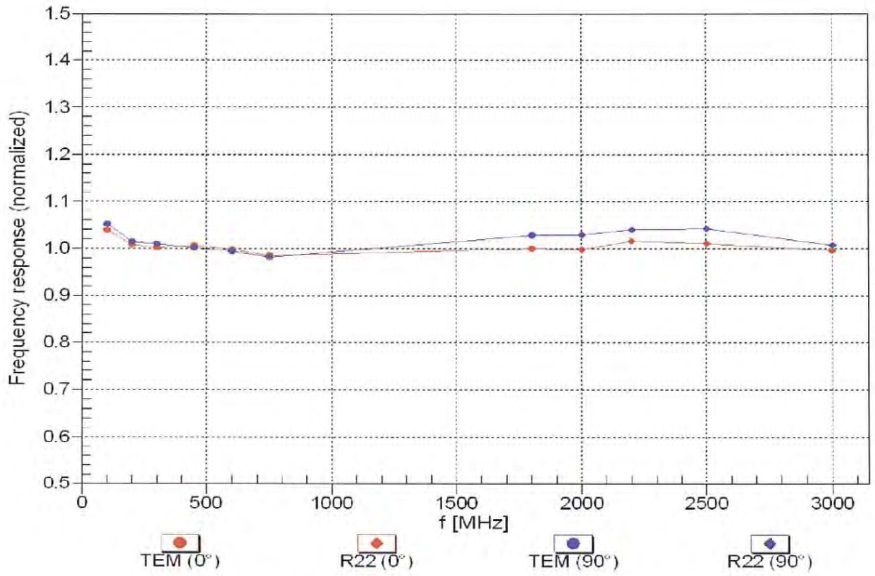
UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	111.3	±3.0 %
			Y	0.00	0.00	1.00	137.8	
			Z	0.00	0.00	1.00	130.7	

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

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

H3DV6– SN:6187 June 20, 2012

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



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

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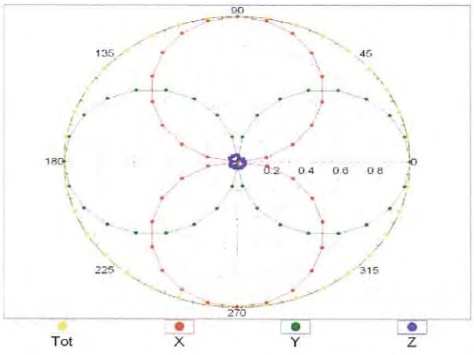
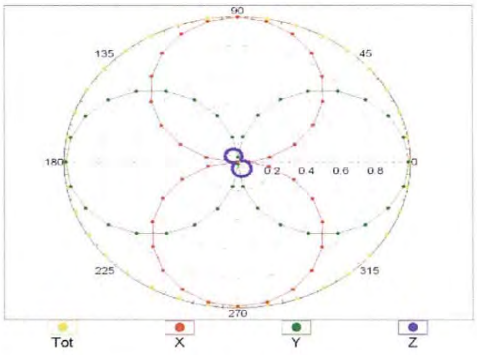
H3DV6– SN:6187 June 20, 2012

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM,0°

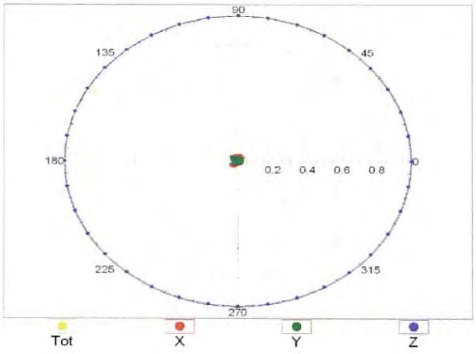


f=2500 MHz,R22,0°

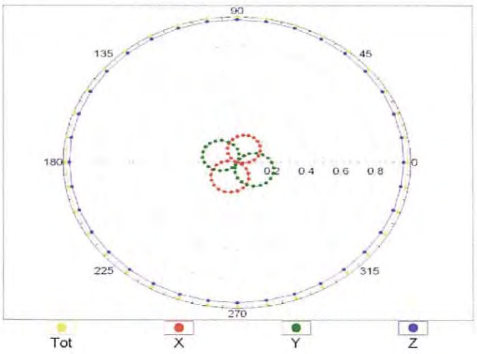


Receiving Pattern (ϕ), ϑ = 90°

f=600 MHz,TEM,90°



f=2500 MHz,R22,90°



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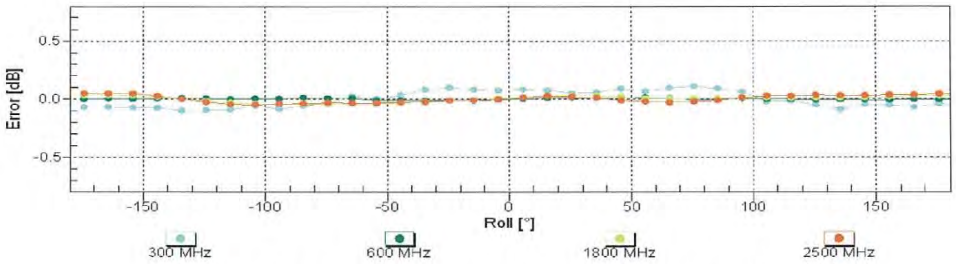
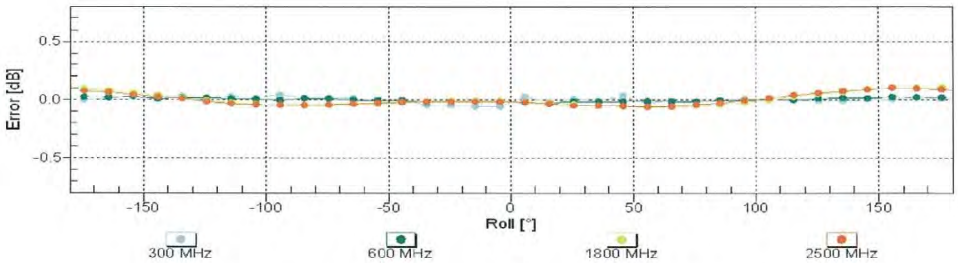
H3DV6– SN:6187 June 20, 2012

Receiving Pattern (ϕ), ϑ = 0°



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

Receiving Pattern (ϕ), ϑ = 90°



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

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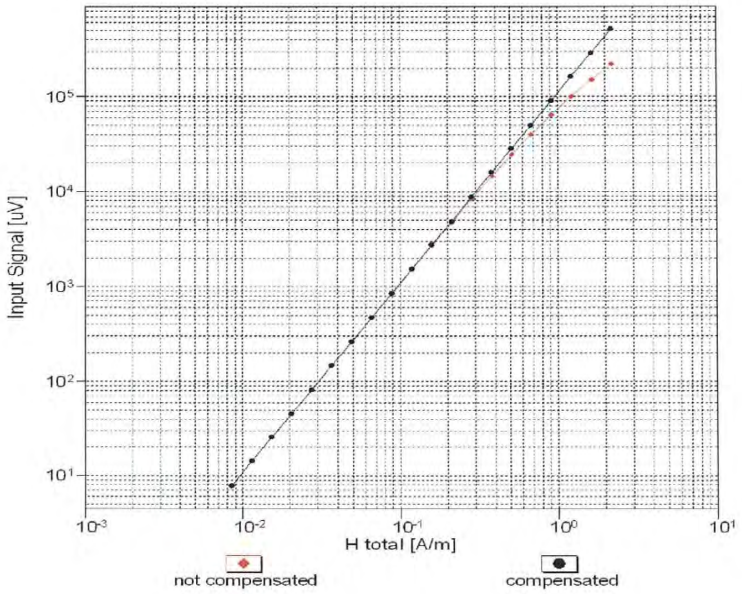
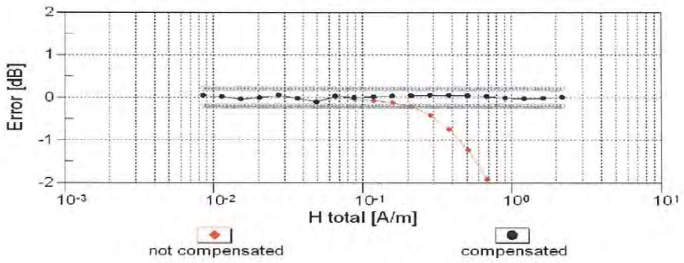
Dynamic Range f(H-field)
(TEM cell, f = 900 MHz)





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

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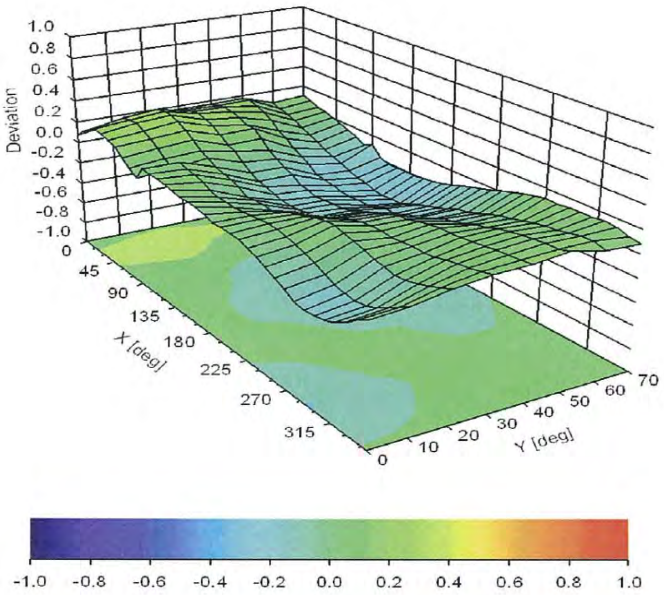
Deviation from Isotropy in Air

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	65.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	20 mm
Tip Diameter	6 mm
Probe Tip to Sensor X Calibration Point	3 mm
Probe Tip to Sensor Y Calibration Point	3 mm
Probe Tip to Sensor Z Calibration Point	3 mm

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: ER3-2306_Nov12

CALIBRATION CERTIFICATE

Object	ER3DV6 - SN:2306
Calibration procedure(s)	QA CAL-02.v6, QA CAL-25.v4 Calibration procedure for E-field probes optimized for close near field evaluations in air
Calibration date:	November 19, 2012

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	29-Mar-12 (No. 217-01508)	Apr-13
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Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ER3DV6	SN: 2328	12-Oct-12 (No. ER3-2328_Oct12)	Oct-13
DAE4	SN: 789	18-Sep-12 (No. DAE4-789_Sep12)	Sep-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 20, 2012

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Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-2005, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", December 2005
b) CTIA Test Plan for Hearing Aid Compatibility, April 2010.

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization ϑ = 0 for XY sensors and ϑ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart).
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z*: *A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ER3DV6

SN:2306

Manufactured: December 17, 2002
Calibrated: November 19, 2012

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

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)	1.10	1.13	1.25	± 10.1 %
DCP (mV)[B]	101.2	101.1	102.1	

Modulation Calibration Parameters

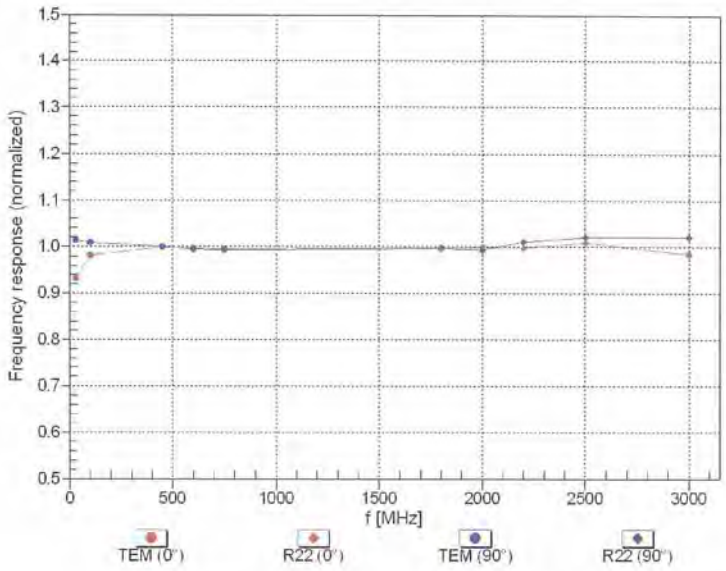
UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.0	0.0	1.0	155.3	±3.8 %
			Y	0.0	0.0	1.0	167.8	
			Z	0.0	0.0	1.0	163.5	
10011	UMTS-FDD (WCDMA)	2.91	X	3.14	66.3	18.2	121.3	±1.9 %
			Y	3.18	66.7	18.6	134.4	
			Z	3.26	66.8	18.3	128.6	
10012	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	1.87	X	2.55	66.6	17.8	122.3	±1.2 %
			Y	2.51	66.6	18.0	136.4	
			Z	2.87	68.7	18.6	130.0	
10013	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	9.46	X	10.16	69.0	22.7	109.4	±3.3 %
			Y	10.43	70.1	23.5	123.6	
			Z	10.27	69.2	22.6	118.0	
10021	GSM-FDD (TDMA, GMSK)	9.39	X	3.55	74.3	18.2	141.1	±2.2 %
			Y	4.16	79.0	20.5	115.1	
			Z	3.44	71.6	16.9	115.2	
10039	CDMA2000 (1xRTT, RC1)	4.57	X	4.29	65.4	18.4	114.4	±3.5 %
			Y	4.41	66.2	18.9	129.9	
			Z	4.44	66.1	18.6	120.5	
10081	CDMA2000 (1xRTT, RC3)	3.97	X	3.59	64.8	18.0	114.7	±2.7 %
			Y	3.70	65.6	18.5	130.5	
			Z	3.73	65.5	18.1	121.2	
10114	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	8.10	X	9.97	68.7	21.4	117.7	±2.7 %
			Y	10.26	69.7	22.1	136.4	
			Z	9.97	68.6	21.2	124.8	
10193	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	8.09	X	9.52	68.3	21.3	113.7	±2.5 %
			Y	9.85	69.4	22.0	131.0	
			Z	9.55	68.4	21.2	119.7	
10276	CDMA2000 (1xRTT, RC1, 1/8 Rate)	12.97	X	5.17	64.3	23.4	45.4	±4.9 %
			Y	4.59	60.0	20.0	48.5	
			Z	5.23	63.5	22.1	47.9	

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

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

ER3DV6– SN:2306 November 19, 2012

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



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

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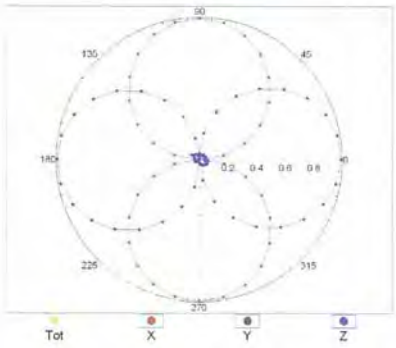
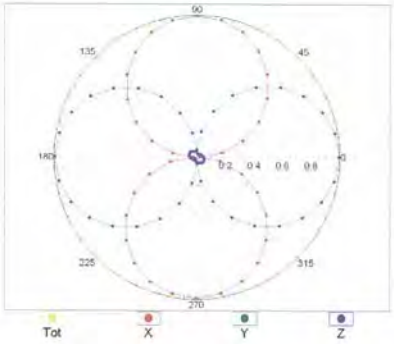
ER3DV6– SN:2306 November 19, 2012

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM,0°

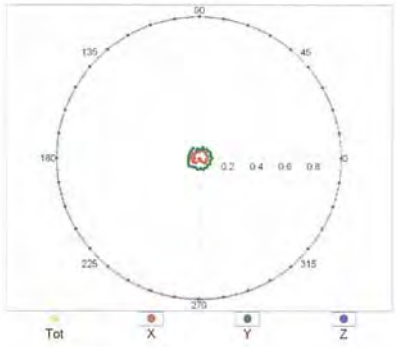


f=2500 MHz,R22,0°

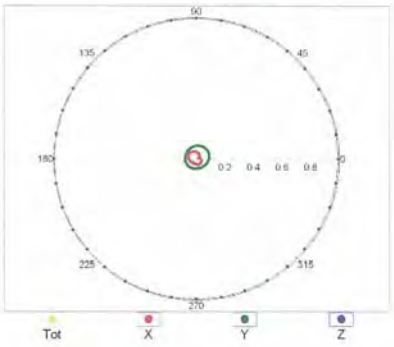


Receiving Pattern (ϕ), ϑ = 90°

f=600 MHz,TEM,90°



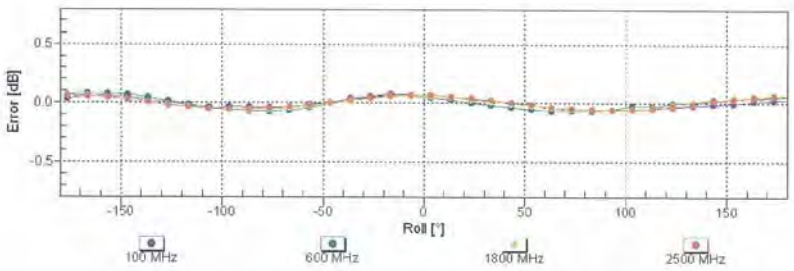
f=2500 MHz,R22,90°



Certificate No: ER3-2306_Nov12 Page 6 of 10

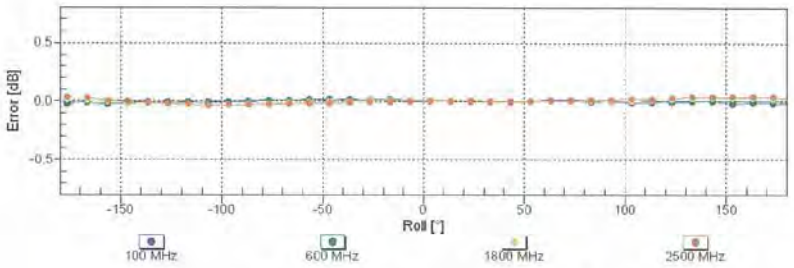
ER3DV6– SN:2306 November 19, 2012

Receiving Pattern (ϕ), ϑ = 0°



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

Receiving Pattern (ϕ), ϑ = 90°

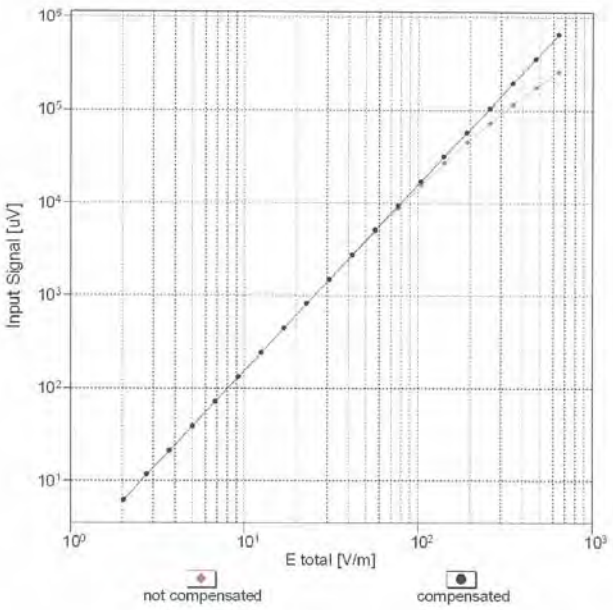


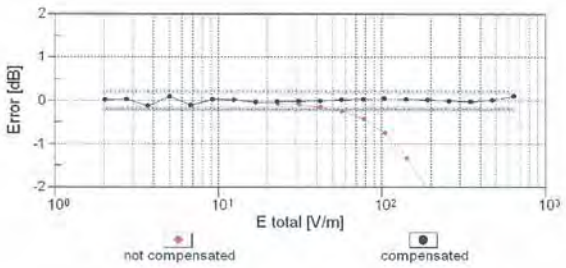
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Certificate No: ER3-2306_Nov12 Page 7 of 10

ER3DV6– SN:2306 November 19, 2012

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



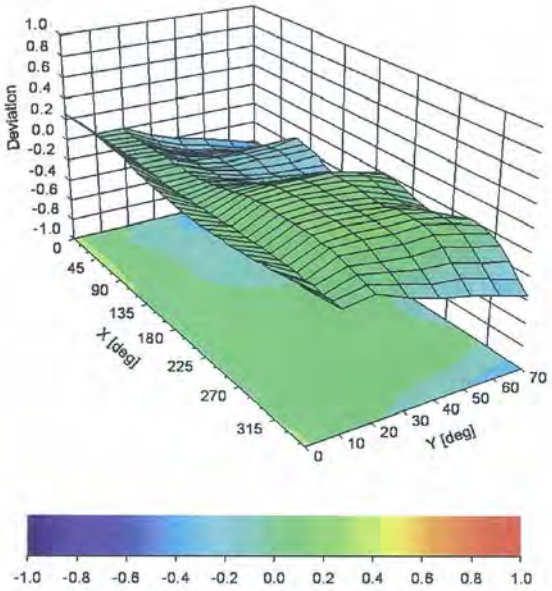


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ER3DV6– SN:2306 November 19, 2012

Deviation from Isotropy in Air

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-46.7
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 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

16. Uncertainty Budget

HAC Uncertainty Budget
According to ANSI C63.19 [1], [2]

Error Description	Uncert. value	Prob. Dist.	Div.	(c_i) E	(c_i) H	Std. Unc. E	Std. Unc. H
Measurement System							
Probe Calibration	±5.1%	N	1	1	1	±5.1%	±5.1%
Axial Isotropy	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%
Sensor Displacement	±16.5%	R	$\sqrt{3}$	1	0.145	±9.5%	±1.4%
Boundary Effects	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%
Phantom Boundary Effect	±7.2%	R	$\sqrt{3}$	1	0	±4.1%	±0.0%
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%
Scaling with PMR calibration	±10.0%	R	$\sqrt{3}$	1	1	±5.8%	±5.8%
System Detection Limit	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%
Response Time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%
Integration Time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%
RF Ambient Conditions	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%
RF Reflections	±12.0%	R	$\sqrt{3}$	1	1	±6.9%	±6.9%
Probe Positioner	±1.2%	R	$\sqrt{3}$	1	0.67	±0.7%	±0.5%
Probe Positioning	±4.7%	R	$\sqrt{3}$	1	0.67	±2.7%	±1.8%
Extrap. and Interpolation	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
Test Sample Related							
Device Positioning Vertical	±4.7%	R	$\sqrt{3}$	1	0.67	±2.7%	±1.8%
Device Positioning Lateral	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%
Device Holder and Phantom	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%
Power Drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%
Phantom and Setup Related							
Phantom Thickness	±2.4%	R	$\sqrt{3}$	1	0.67	±1.4%	±0.9%
Combined Std. Uncertainty						±16.3%	±12.3%
Expanded Std. Uncertainty on Power						**±32.6%**	**±24.6%**
Expanded Std. Uncertainty on Field						**±16.3%**	**±12.3%**

17. System Validation from Original Equipment Supplier

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
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: CD835V3-1052_Mar13

CALIBRATION CERTIFICATE

Object: CD835V3 - SN: 1052

Calibration procedure(s): QA CAL-20.v6
Calibration procedure for dipoles in air

Calibration date: March 15, 2013

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 EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 10 dB Attenuator	SN: 5047.2 (10q)	27-Mar-12 (No. 217-01527)	Apr-13
Probe ER3DV6	SN: 2336	28-Dec-12 (No. ER3-2336_Dec12)	Dec-13
Probe H3DV6	SN: 6065	28-Dec-12 (No. H3-6065_Dec12)	Dec-13
DAE4	SN: 781	29-May-12 (No. DAE4-781_May12)	May-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Power sensor HP E4412A	SN: MY41495277	01-Apr-08 (in house check Oct-12)	In house check: Oct-13
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
RF generator R&S SMT-06	SN: 832283/011	27-Aug-12 (in house check Oct-12)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	

Issued: March 19, 2013

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

Certificate No: CD835V3-1052_Mar13 Page 1 of 8

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Accreditation No.: SCS 108

References

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

Methods Applied and Interpretation of Parameters:

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

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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.5
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10mm	
Scan resolution	dx, dy = 5 mm	
Frequency	835 MHz ± 1 MHz	
Input power drift	< 0.05 dB	

Maximum Field values at 835 MHz

H-field 10 mm above dipole surface	condition	**interpolated maximum**
Maximum measured	100 mW input power	**0.468 A / m ± 8.2 % (k=2)**

E-field 10 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW input power	170.3 V / m
Maximum measured above low end	100 mW input power	166.9 V / m
Averaged maximum above arm	100 mW input power	**168.6 V / m ± 12.8 % (k=2)**

E-field 15 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW input power	109.5 V / m
Maximum measured above low end	100 mW input power	108.7 V / m
Averaged maximum above arm	100 mW input power	**109.1 V / m ± 12.8 % (k=2)**

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Appendix

Antenna Parameters

Frequency	Return Loss	Impedance
800 MHz	15.6 dB	42.6 Ω - 13.7 jΩ
835 MHz	28.6 dB	49.2 Ω + 3.6 jΩ
900 MHz	16.8 dB	56.9 Ω - 13.9 jΩ
950 MHz	17.8 dB	44.6 Ω + 11.1 jΩ
960 MHz	14.1 dB	53.7 Ω + 20.6 jΩ

3.2 Antenna Design and Handling

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

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

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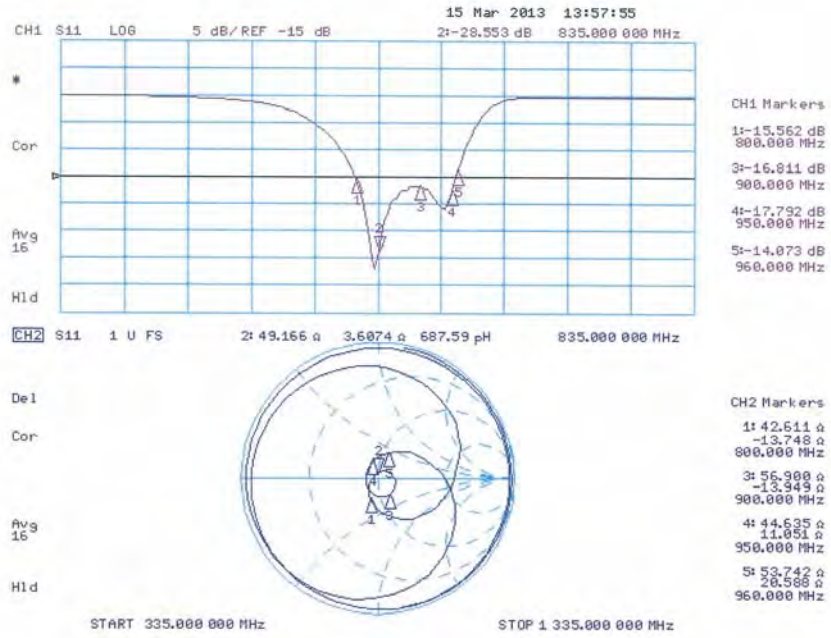
Impedance Measurement Plot



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DASY5 H-field Result

Date: 15.03.2013

Test Laboratory: SPEAG Lab2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1052

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

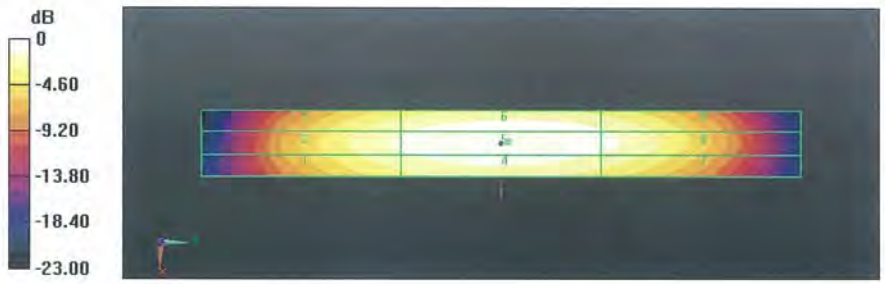
DASY52 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 28.12.2012
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 29.05.2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Dipole H-Field measurement @ 835MHz/H-Scan - 835MHz d=10mm/Hearing Aid Compatibility Test (41x361x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.4980 A/m; Power Drift = -0.04 dB
PMR not calibrated. PMF = 1.000 is applied.
H-field emissions = 0.4677 A/m
Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

Grid 1 M4 **0.383 A/m**	Grid 2 M4 **0.407 A/m**	Grid 3 M4 **0.388 A/m**
Grid 4 M4 **0.435 A/m**	Grid 5 M4 **0.468 A/m**	Grid 6 M4 **0.449 A/m**
Grid 7 M4 **0.382 A/m**	Grid 8 M4 **0.418 A/m**	Grid 9 M4 **0.403 A/m**



0 dB = 0.4677 A/m = -6.60 dBA/m

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DASY5 E-field Result

Date: 15.03.2013

Test Laboratory: SPEAG Lab2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1052

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

DASY52 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 28.12.2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 29.05.2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Dipole E-Field measurement @ 835MHz/E-Scan - 835MHz d=10mm/Hearing Aid Compatibility Test (41x361x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 110.8 V/m; Power Drift = -0.04 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 170.3 V/m
Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 M4 164.3 V/m	Grid 2 M4 166.9 V/m	Grid 3 M4 159.2 V/m
Grid 4 M4 88.43 V/m	Grid 5 M4 90.14 V/m	Grid 6 M4 86.48 V/m
Grid 7 M4 161.1 V/m	Grid 8 M4 170.3 V/m	Grid 9 M4 168.2 V/m

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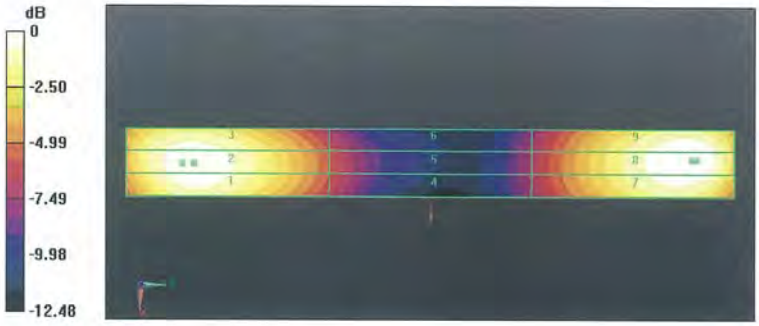
Dipole E-Field measurement @ 835MHz/E-Scan - 835MHz d=15mm/Hearing Aid Compatibility Test (41x361x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 110.4 V/m; Power Drift = -0.00 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 109.5 V/m
Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 M4 107.3 V/m	Grid 2 M4 108.7 V/m	Grid 3 M4 106.0 V/m
Grid 4 M4 64.23 V/m	Grid 5 M4 64.73 V/m	Grid 6 M4 63.48 V/m
Grid 7 M4 106.6 V/m	Grid 8 M4 109.5 V/m	Grid 9 M4 108.2 V/m



0 dB = 170.3 V/m = 44.62 dBV/m

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: CD1880V3-1044_Mar13

CALIBRATION CERTIFICATE

Object: CD1880V3 - SN: 1044

Calibration procedure(s): QA CAL-20.v6
Calibration procedure for dipoles in air

Calibration date: March 15, 2013

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 EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 10 dB Attenuator	SN: 5047.2 (10q)	27-Mar-12 (No. 217-01527)	Apr-13
Probe ER3DV6	SN: 2336	28-Dec-12 (No. ER3-2336_Dec12)	Dec-13
Probe H3DV6	SN: 6065	28-Dec-12 (No. H3-6065_Dec12)	Dec-13
DAE4	SN: 781	29-May-12 (No. DAE4-781_May12)	May-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Power sensor HP E4412A	SN: MY41495277	01-Apr-08 (in house check Oct-12)	In house check: Oct-13
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-12)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13
RF generator R&S SMT-06	SN: 832283/011	27-Aug-12 (in house check Oct-12)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	

Issued: March 19, 2013

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

Certificate No: CD1880V3-1044_Mar13 Page 1 of 8

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Accreditation No.: **SCS 108**

References

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

Methods Applied and Interpretation of Parameters:

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

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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.5
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10mm	
Scan resolution	dx, dy = 5 mm	
Frequency	1880 MHz ± 1 MHz	
Input power drift	< 0.05 dB	

Maximum Field values at 1880 MHz

H-field 10 mm above dipole surface	condition	**interpolated maximum**
Maximum measured	100 mW input power	**0.473 A / m ± 8.2 % (k=2)**

E-field 10 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW input power	142.5 V / m
Maximum measured above low end	100 mW input power	140.6 V / m
Averaged maximum above arm	100 mW input power	**141.6 V / m ± 12.8 % (k=2)**

E-field 15 mm above dipole surface	condition	**Interpolated maximum**
Maximum measured above high end	100 mW input power	92.7 V / m
Maximum measured above low end	100 mW input power	90.0 V / m
Averaged maximum above arm	100 mW input power	**91.3 V / m ± 12.8 % (k=2)**

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Appendix

Antenna Parameters

Frequency	Return Loss	Impedance
1730 MHz	24.4 dB	49.6 Ω + 6.0 jΩ
1880 MHz	19.8 dB	51.9 Ω + 10.3 jΩ
1900 MHz	20.2 dB	54.8 Ω + 9.0 jΩ
1950 MHz	26.9 dB	54.7 Ω - 0.5 jΩ
2000 MHz	21.6 dB	42.5 Ω + 1.5 jΩ

3.2 Antenna Design and Handling

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

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

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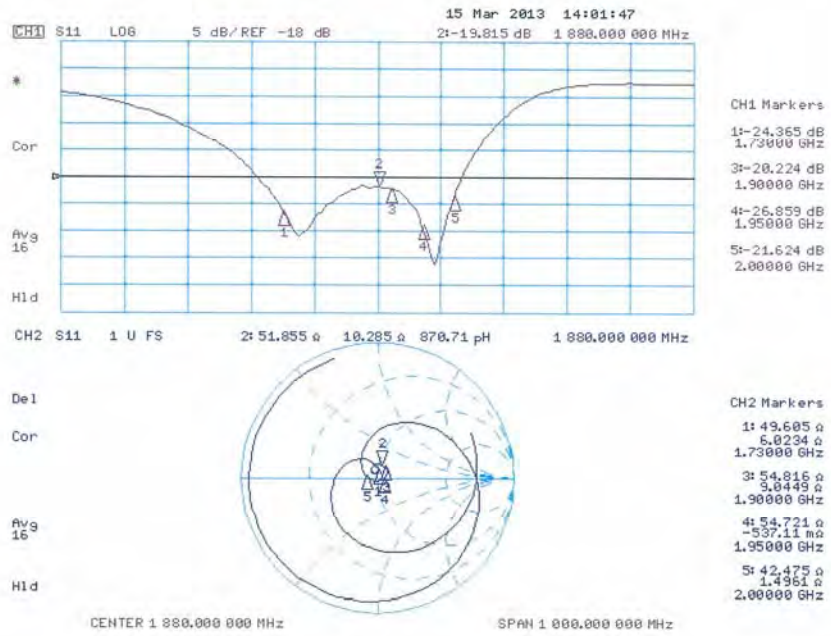
Impedance Measurement Plot



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DASY5 H-field Result

Date: 15.03.2013

Test Laboratory: SPEAG Lab2

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

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

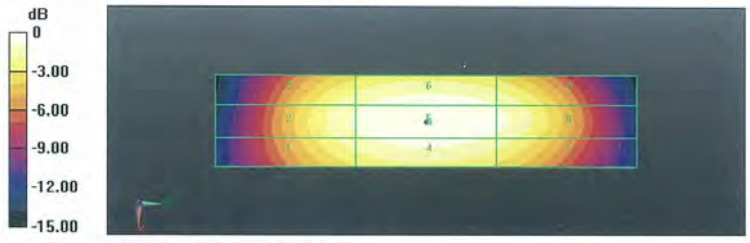
DASY52 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 28.12.2012
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 29.05.2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Dipole H-Field measurement @ 1880MHz/H-Scan - 1880MHz d=10mm/Hearing Aid Compatibility Test (41x181x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.5020 A/m; Power Drift = -0.02 dB
PMR not calibrated. PMF = 1.000 is applied.
H-field emissions = 0.4733 A/m
Near-field category: M2 (AWF 0 dB)

PMF scaled H-field

Grid 1 **M2** **0.409 A/m**	Grid 2 **M2** **0.432 A/m**	Grid 3 **M2** **0.413 A/m**
Grid 4 **M2** **0.447 A/m**	Grid 5 **M2** **0.473 A/m**	Grid 6 **M2** **0.455 A/m**
Grid 7 **M2** **0.409 A/m**	Grid 8 **M2** **0.439 A/m**	Grid 9 **M2** **0.422 A/m**



0 dB = 0.4733 A/m = -6.50 dBA/m

DASY5 E-field Result

Date: 15.03.2013

Test Laboratory: SPEAG Lab2

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

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

DASY52 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 28.12.2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 29.05.2012
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

Dipole E-Field measurement @ 1880MHz/E-Scan - 1880MHz d=10mm/Hearing Aid Compatibility Test (41x181x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 159.8 V/m; Power Drift = -0.00 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 142.5 V/m
Near-field category: M2 (AWF 0 dB)

PMF scaled E-field

Grid 1 **M2** **137.2 V/m**	Grid 2 **M2** **140.6 V/m**	Grid 3 **M2** **136.7 V/m**
Grid 4 **M3** **91.36 V/m**	Grid 5 **M3** **93.33 V/m**	Grid 6 **M3** **89.40 V/m**
Grid 7 **M2** **133.8 V/m**	Grid 8 **M2** **142.5 V/m**	Grid 9 **M2** **140.5 V/m**

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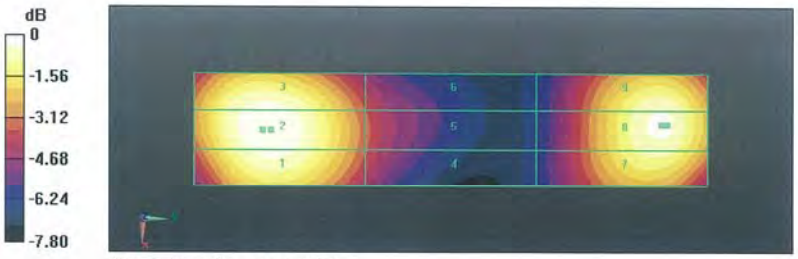
Dipole E-Field measurement @ 1880MHz/E-Scan - 1880MHz d=15mm/Hearing Aid Compatibility Test (41x181x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 159.2 V/m; Power Drift = -0.01 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 92.71 V/m
Near-field category: M3 (AWF 0 dB)

PMF scaled E-field

Grid 1 M3 90.95 V/m	Grid 2 M3 92.71 V/m	Grid 3 M3 91.30 V/m
Grid 4 M3 71.46 V/m	Grid 5 M3 72.21 V/m	Grid 6 M3 71.04 V/m
Grid 7 M3 87.43 V/m	Grid 8 M3 90.04 V/m	Grid 9 M3 89.19 V/m



0 dB = 142.5 V/m = 43.08 dBV/m

End of 1st part of report

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