HAC RF EMISSIONS TEST REPORT

Test of: PM-0500-BV

To: FCC CFR47 Part 20.19

ANSI C63.19-2011

FCC ID: PY7PM-0500

Test Report Serial No:

UL-HAC-RP10027127JD01A V3.0

Version 3.0 supersedes previous report versions

This Test Report Is Issued Under The Authority Of Richelieu Quoi, SAR Technology Consultant:	(APPROVED SIGNATORY)
Checked By: Naseer Mirza	(APPROVED SIGNATORY)
Issue Date:	**06 August 2013**
Test Dates:	**19 July 2013**

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1. Customer Information

Company Name:	Sony Mobile Communications AB
Address:	Nya Vattentornet 22188 Lund Sweden

2. Summary of Test Results

Test Name	Specification Reference	Device Category	Result
Hearing Aid Compatibility - GSM 850	FCC CFR47 Part 20.19 ANSI C63.19-2011	M4	✓
Hearing Aid Compatibility - PCS 1900	FCC CFR47 Part 20.19 ANSI C63.19-2011	M3	✓
Hearing Aid Compatibility – UMTS FDD 2	FCC CFR47 Part 20.19 ANSI C63.19-2011	M4*	✓
Hearing Aid Compatibility - UMTS FDD 4	FCC CFR47 Part 20.19 ANSI C63.19-2011	M4*	✓
Hearing Aid Compatibility- UMTS FDD 5	FCC CFR47 Part 20.19 ANSI C63.19-2011	M4*	✓
Key to Results	✓ = Complied ✗ = Did not comply		

Conclusion:

Overall HAC RF Emissions Category = M3

*Categorised as M4 based on Low Power Exemption Rule in accordance with ANSI C63.19-2011

2.1. Location of Tests

All the measurements described in this report were performed at the premises of
UL, Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire, RG23 8BG United Kingdom

3. Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.19-2011 Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids and FCC KDB 285076 D01 HAC Guidance v03r02

Prior to testing the FCC was contacted for HAC evaluation and, testing was performed as per response on Dual Transfer Mode (DTM) over GSM air interface. Only GSM mode RF HAC valuation is required and DTM evaluation is not required on GSM850 and PCS1900 Bands.

4. Calibration and Uncertainty

4.1. Measuring Instrument Calibration

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

UL No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1182	Handset Positioner	Schmid & Partner Engineering AG	V3.0	None	-	-
A2109	Data Acquisition Electronics	Schmid & Partner Engineering AG	DAE3	417	17 April 2013	12
A2239	Probe	Schmid & Partner Engineering AG	ER3 DV6	2260	03 Dec 2012	12
A2234	835 MHz Dipole Kit	Schmid & Partner Engineering AG	CD835V3	1000	06 Dec 2012	12
A2236	1880 MHz Dipole Kit	Schmid & Partner Engineering AG	CD1880V3	1000	06 Dec 2012	12
A2171	Test Arch Phantom	Schmid & Partner Engineering AG	SD HAC P01 BA	1032	Calibrated as part of system	-
A1497	Amplifier	Mini-Circuits	zhl-42w (sma)	e020105	Calibrated as part of system	-
A215	20 dB Attenuator	Narda	766-20	9402	Calibrated as part of system	-
A1137	3dB Attenuator	Narda	779	04690	Calibrated as part of system	-
A2263	Digital Camera	Samsung	PL211	9453C90B 607487L	-	-
C1145	Cable	Rosenberger MICRO-COAX	FA147A F003003030	41843-1	Calibrated as part of system	-
G0592	Robot Power Supply	Schmid & Partner Engineering AG	DASY53	F125MZ7A1/C/01	Calibrated before use	-
M1680	Robot Arm	Staubli	TX60 L	F12/5MZ7 A1/A/01	Calibrated before use	-
M1159	Signal Generator	Agilent Technologies	E8241A	US42110332	Internal Checked 10 Apr 2013	4
M1071	Spectrum Analyzer	Agilent	HP8590E	3647U00514	(Monitoring use only)	-
M1650	Digital Thermometer	Dickson	FH320	09099180	03 May 2013	12
M1662	Radio Communication Tester	Rohde & Schwarz	CMU200	109374	21 May 2013	12
M1023	Dual Channel Power Meter	R & S	NRVD	863715/030	06 Jun 2013	12
S513	SAR Lab	UL	Site 58	N/A	Calibrated before use	-

Note:

All the assets were in calibration during the course of testing.

*: According to SPEAG's Technical Report, E-field probes are calibrated with specified uncertainty according to ISO 17025 as described in their calibration certificate. The MIF according to the definition in ANSI C63.19 is specific for a modulation and can therefore be used as a constant value if the probe has been PMR calibrated. The Appendix contains document stating MIF provided by SPEAG for the Modulations relevant to this report.

4.2. Measurement Uncertainty

Source of uncertainty	± Value (%)	Probability Distribution	Divisor	(c_i) E	Standard Uncertainty ± E (%)
Probe calibration	10.1	normal (k=2)	2.0000	1	5.1
Axial Isotropy	0.5	normal (k=2)	2.0000	1	0.3
Spherical Isotropy	2.6	normal (k=2)	2.0000	1	1.3
Sensor Displacement	16.5	Rectangular	1.7321	1	9.5
Boundary Effect	2.4	Rectangular	1.7321	1	1.4
Phantom Boundary Effect	7.2	Rectangular	1.7321	1	4.2
Linearity	0.6	normal (k=2)	2.0000	1	0.3
Scaling with PMR Calibration	3.3	normal (k=2)	2.0000	1	1.7
System Detection Limits	0.2	normal (k=1)	1.0000	1	0.2
Readout Electronics	0.3	normal (k=1)	1.0000	1	0.3
Response Time	0.8	Rectangular	1.7321	1	0.5
Integration Time	2.6	Rectangular	1.7321	1	1.5
RF Ambient conditions	3.0	Rectangular	1.7321	1	1.7
RF Reflections	12.0	Rectangular	1.7321	1	6.9
Probe Positioner	1.2	Rectangular	1.7321	1	0.7
Probe Positioning	4.7	Rectangular	1.7321	1	2.7
Extrapolation and Interpolation	1.0	Rectangular	1.7321	1	0.6
Test Sample Related					
Device Positioning Vertical	0.1	normal (k=1)	1.0000	1	0.1
Device Positioning Lateral	1.0	Rectangular	1.7321	1	0.6
Device Holder and Phantom	0.2	normal (k=1)	1.0000	1	0.2
Power Drift	5.0	Rectangular	1.7321	1	1.8
Phantom and Setup Related					
Phantom Thickness	2.4	Rectangular	1.7321	1	0.9
Combined standard uncertainty					14.37
Expanded Std. uncertainty on Power					28.73
Expanded Std uncertainty on Field					14.37

5. Equipment Under Test (EUT)

5.1. Identification of Equipment Under Test (EUT)

Description:	Smartphone Handset
Brand Name:	Sony
Type Number:	PM-0500-BV
Serial Number:	CB5124U7FB
IMEI Number:	00440214-685867-9
Hardware Version Number:	AP2.0
Software Version Number:	14.1.G.1.241
FCC ID Number:	PY7PM-0500
IC Number:	4170B-PM0500
Country of Manufacture:	China
Date of Receipt:	01 July 2013

Note(s):

1. IMEI: 00440214-685867-9 used to perform HAC RF Emissions testing only.

5.2. List of Air Interfaces/Bands & Operating Modes

Air-Interface	Bands (MHz)	Type Transport	HAC Tested	Simultaneous but not Tested[1]	Concurrent HAC Tested or not Tested	Voice over digital Transport OTT Capability	Wi-Fi Low Power	Additional GSM Power Reduction
GSM	850	VO	Yes	Yes - WiFi/BT	Not tested[2]	NA	NA	NA
GSM	1900	VO	Yes	Yes - WiFi/BT	Not tested[2]	NA	NA	NA
GPRS	850/1900	DT	No	Yes - WiFi/BT	NA	Yes	NA	NA
EGPRS	850/1900	DT	No	Yes - WiFi/BT	NA	Yes	NA	NA
WCDMA R99	Band V (850)	VO	Yes	Yes - WiFi/BT	Not tested[3]	NA	NA	NA
WCDMA R99	Band IV (1700)	VO	Yes	Yes - WiFi/BT	Not tested[3]	NA	NA	NA
WCDMA R99	Band II (1900)	VO	Yes	Yes - WiFi/BT	Not tested[3]	NA	NA	NA
HSPA	Band V, IV & II	DT	No	Yes - WiFi/BT	NA	Yes	NA	NA
WiFi	2400	DT	No	Yes –WCDMA	NA	Yes	No	NA
WiFi	5200	DT	No	Yes –WCDMA	NA	Yes	No	NA
WiFi	5300	DT	No	Yes –WCDMA	NA	Yes	No	NA
WiFi	5500	DT	No	Yes –WCDMA	NA	Yes	No	NA
WiFi	5800	DT	No	Yes –WCDMA	NA	Yes	No	NA
BT	2400	DT	No	Yes –WCDMA	NA	NA	NA	NA

Type Transport
VO = Voice only
DT = Digital Transport
VD = CMRS and Data transport (HAC Tested)

1. At the present time the C63.19 standard does not provide simultaneous transmission test procedures.
2. Dual Transfer Mode (Voice + Data) concurrent mode was tested and found to give better rating than Voice only. Worst case mode is documented in this report.
3. Low Power Exemption for WCDMA Bands as sum of average antenna input power plus its MIF is ≤17 dBm (Refer Section 9)

6. System Specifications

E-field measurements are performed using the DASY5 automated dosimetric assessment system. The DASY5 is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. The DASY5 HAC Extension consists of the following parts:

Test Arch Phantom

The specially designed Test Arch allows high precision positioning of both the device and any of the validation dipoles.

ER3DV6 Isotropic E-Field Probe	
Construction:	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., glycolether)
Calibration:	In air from 100 MHz to 3.0 GHz (absolute accuracy ±6.0%, k=2)
Frequency:	100 MHz to > 6 GHz; Linearity: ± 0.2 dB (100 MHz to 3 GHz)
Directivity:	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)
Dynamic Range:	2 V/m to > 1000 V/m; Linearity: ± 0.2 dB
Dimensions:	Overall length: 330 mm (Tip: 16 mm)

7. System Validation

The test setup should be validates when configured initially and hereafter at regular intervals to ensure proper function. The validation for RF setup is carried out using a dipole antenna for which field levels were computed by numeric modelling. The dipole antenna serves as a known source of electrical and magnetic output. The measured readings after validating the system are compared to the simulated values during calibration of the reference dipole

7.1. Procedure

- Average input power to dipole = 100mW (20dBm)
- Place the calibrated reference dipole antenna under the arc phantom such that the arms of the dipole are parallel to the dielectric wire.
- The probes and their cables are parallel to the coaxial feed of the dipole antenna
- The probe to dipole separation, measured from the closest surface of the dipole to centre point of probe sensor element should be 15mm

The length of the dipole is scanned with an E-probe and the maximum E-field is measured at the two ends of the dipole. The average of these two readings is compared to that in the calibration certificate.

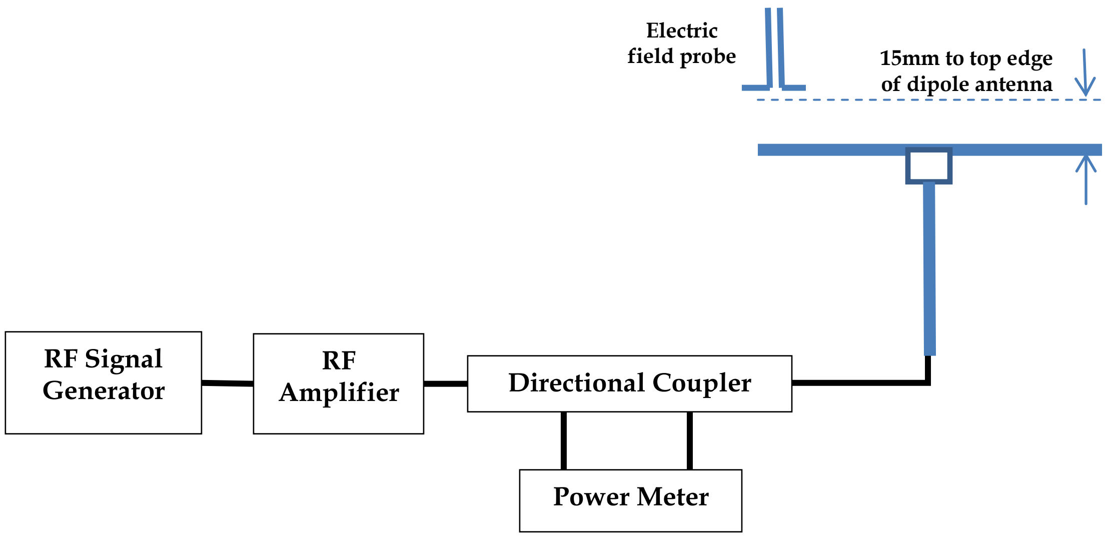


Figure 1: Setup Diagram

7.2. System Validation Results

Date: 19/07/2013
Validation Dipole and Serial Number: CD835V3; SN1000

Frequency (MHz)	Room Temp	Max. Measured (V/m)		Average E-field (V/m)*	Target Value	Deviation (%)
		High End	Low End			
835	24.0 ºC	104.40	104.40	104.40	104.30	0.10

Date: 19/07/2013
Validation Dipole and Serial Number: CD1880V3; SN1000

Frequency (MHz)	Room Temp	Max. Measured (V/m)		Average E-field (V/m)*	Target Value	Deviation (%)
		High End	Low End			
835	24.0 ºC	89.27	87.62	88.45	90.30	-2.05

Note(s):

1) Delta (Deviation) % = 100 * (Measured value minus Target value) divided by the Target value. Deltas within ±25% are acceptable, of which 12% is deviation and 13% is measurement uncertainty.
2) The maximum E-field or were evaluated and compared to the target values provided by SPEAG in the calibration certificate of specific dipoles.
3) Please refer to the appendix for detailed measurement data and plots.

*Average E-field = (Max. Measured High End + Max. Measured Low End)/2

8. Modulation Interference Factor (MIF)

The HAC Standard ANSI C63.19-2011 defines a new scaling using the Modulation Interference Factor (MIF) which replaces the need for the Articulation Weighting Factor (AWF) during the evaluation and is applicable to any modulation scheme.
The Modulation Interference factor (MIF, in dB) is added to the measured average E-field (in dBV/m) and converts it to the RF Audio Interference level (in dBV/m). This level considers the audible amplitude modulation components in the RF E-field. CW fields without amplitude modulation are assumed to not interfere with the hearing aid electronics. Modulations without time slots and low fluctuations at low frequencies have low MIF values, TDMA modulations with narrow transmission and repetition rates of few 100 Hz have high MIF values and give similar classifications as ANSI C63-2007.

Definitions
ER3D, E-field probes have a bandwidth <10 kHz and can therefore not evaluate the RF envelope in the full audio band. DASY52 is therefore using the “indirect" measurement method according to ANSI C63.19-2011 which is the primary method. These near field probes read the averaged E-field measurement. Especially for the new high peak-to-average (PAR) signal types, the probes shall be linearized by probe modulation response (PMR) calibration in order to not overestimate the field reading.
The evaluation method or the MIF is defined in ANSI C63.19-2011 section D.7. An RMS demodulated RF signal is fed to a spectral filter (similar to an A weighting filter) and forwarded to a temporal filter acting as a quasi-peak detector. The averaged output of these filtering is called to a 1 kHz 80% AM signal as reference. MIF measurement requires additional instrumentation and is not well suited for evaluation by the end user with reasonable uncertainty. It may alternatively be determined through analysis and simulation, because it is constraint and characteristic for a communication signal. DASY52 uses well defined signals for PMR calibration. The MIF of these signals has been determined by simulation and is automatically applied.
MIF values were not tested by a probe or as specified in the standards but are based on analysis provided by SPEAG for all the air interfaces (GSM, WCDMA, CDMA). For GSM, User Identifier (UID) UID 10021 was used; for WCDMA, UID 10011 was used. The data included in this report are for the worst case operating modes.

UID	Version Date	Communication System Name	MIF (dB)
10011 - CAA	28-Feb-13	UMTS-FDD (WCDMA)	-27.23
10021 - DAA	13-May-13	GSM-FDD (TDMA, GMSK)	3.63

A PMR calibrated probe is linearized for the selected waveform over the full dynamic range within the uncertainty specified in its calibration certificate. ER3D, EF3D and EU2D E-field probes have a bandwidth <10 kHz and can therefore not evaluate the RF envelope in the full audio band. DASY52 is therefore using the \indirect" measurement method according to ANSI C63.19-2011 which is the primary method. These near field probes read the averaged E-field measurement. Especially for the new high peak-to-average (PAR) signal types, the probes shall be linearized by PMR calibration in order to not overestimate the field reading.
The MIF measurement uncertainty is estimated as follows, for modulation frequencies from slotted waveforms with fundamental frequency and at least 2 harmonics within 10 kHz:

- *0.2 dB for MIF -7 to +5 dB,*
- *0.5 dB for MIF -13 to +11 dB*
- *1 dB for MIF > -20 dB*

9. Evaluation for Low- Power Exemption

An RF air interface technology of a device is exempt from testing when its average antenna input power plus its MIF is ≤17 dBm for any of its operating modes. If a device supports multiple RF air interfaces, each RF air interface shall be evaluated individually.

Table 1: Average Antenna Input Power

Air Interface	Average Power (dBm)	
	Target (dBm)	Max. Rated Power (Target + Tune up Tolerance) (dBm)
GSM850	33.0	33.6
PCS1900	30.0	30.6
UMTS FDD 2	23.5	24.0
UMTS FDD 4	24.0	24.5
UMTS FDD 5	24.0	24.5

Table 2: Low Power Exemption Calculation

Air Interface	Max. Rated Power (dBm)	MIF (dB)	Input Power + MIF (dBm)	HAC Testing Required
GSM850	33.60	3.63	37.23	Yes
PCS1900	30.60	3.63	34.23	Yes
UMTS FDD 2	24.00	-27.23	-3.23	No
UMTS FDD 4	24.50	-27.23	-2.73	No
UMTS FDD 5	24.50	-27.23	-2.73	No

Conclusion:

RF Emission testing for this device is required only for GSM voice mode. All other applicable air-interfaces are exempt.

10. HAC RF Emissions Test Procedure

The following are step-by-step test procedures.

a) Confirm proper operation of the field probe, probe measurement system and other instrumentation and the positioning system.

b) Position the WD in its intended test position.

c) Set the WD to transmit a fixed and repeatable combination of signal power and modulation characteristic that is representative of the worst case (highest interference potential) encountered in normal use. Transiently occurring start-up, changeover, or termination conditions, or other operations likely to occur less than 1% of the time during normal operation, may be excluded from consideration.

d) The centre sub-grid shall be centred on the T-Coil mode perpendicular measurement point or the acoustic output, as appropriate. Locate the field probe at the initial test position in the 50 mm by 50 mm grid, which is contained in the measurement plane, refer to illustrated in Figure 1. If the field alignment method is used, align the probe for maximum field reception.

e) Record the reading at the output of the measurement system

f) Scan the entire 50 mm by 50 mm region in equally spaced increments and record the reading at each measurement point. The distance between measurement points shall be sufficient to assure the identification of the maximum reading.

g) Identify the five contiguous sub-grids around the centre sub-grid whose maximum reading is the lowest of all available choices. This eliminates the three sub-grids with the maximum readings. Thus, the six areas to be used to determine the WD's highest emissions are identified.

h) Identify the maximum reading within the non-excluded sub-grids identified in step g).

i) Convert the highest field reading within identified in step h) to RF audio interference level, in V/m, by taking the square root of the reading and then dividing it by the measurement system transfer function, established in 5.5.1.1 Convert this result to dB(V/m) by taking the base-10 logarithm and multiplying by 20.

   Indirect measurement method
   Replacing step i), the RF audio interference level in dB (V/m) is obtained by adding the MIF (in dB) to the maximum steady-state RMS field-strength reading, in dB (V/m), from step h). Use this result to determine the category rating

j) Compare this RF audio interference level with the categories in Clause 8 (ANSI C63.19-2011) and record the resulting WD category rating

k) For the T-Coil mode M-rating assessment, determine whether the chosen perpendicular measurement point is contained in an included sub-grid of the first scan. If so, then a second scan is not necessary. The first scan and resultant category rating may be used for the T-Coil mode M rating.

   Otherwise, repeat step a) through step i), with the grid shifted so that it is centred on the perpendicular measurement point. Record the WD category rating.

HAC RF Emissions Test Procedure (Continued):

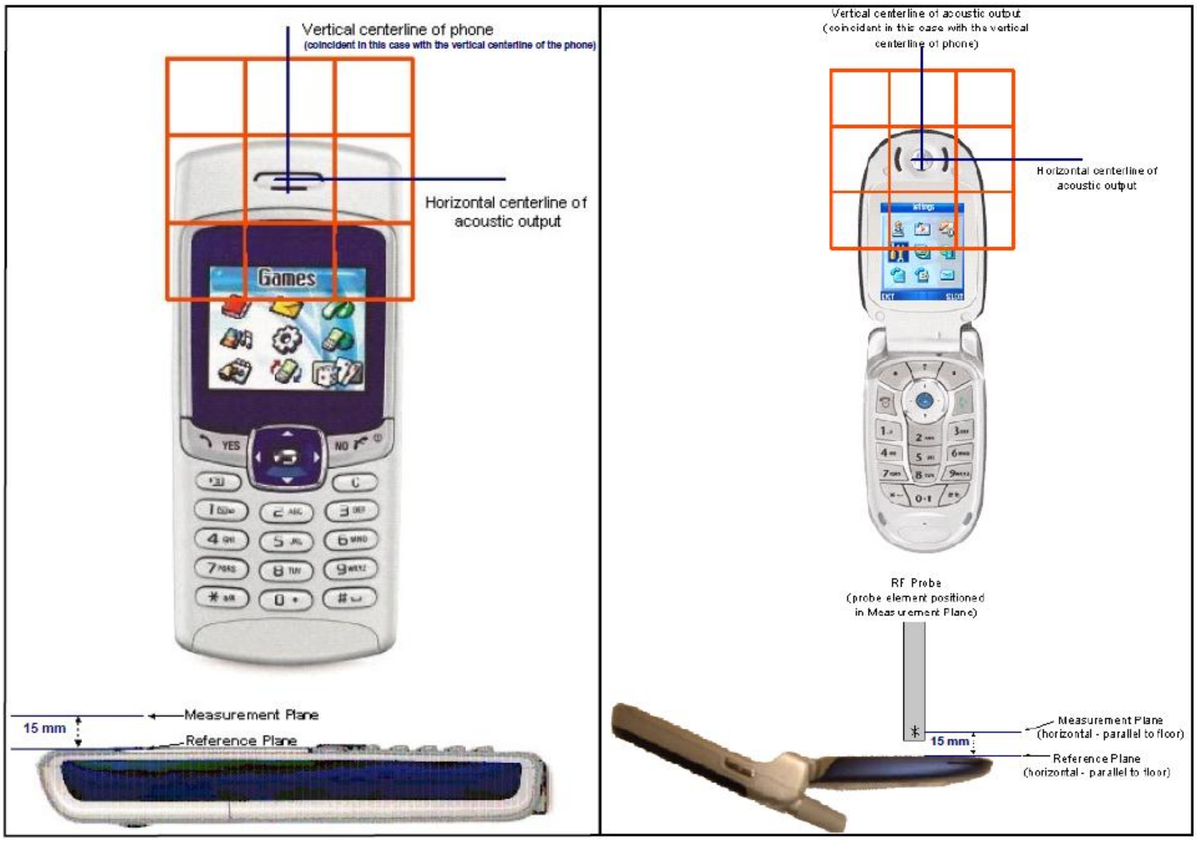
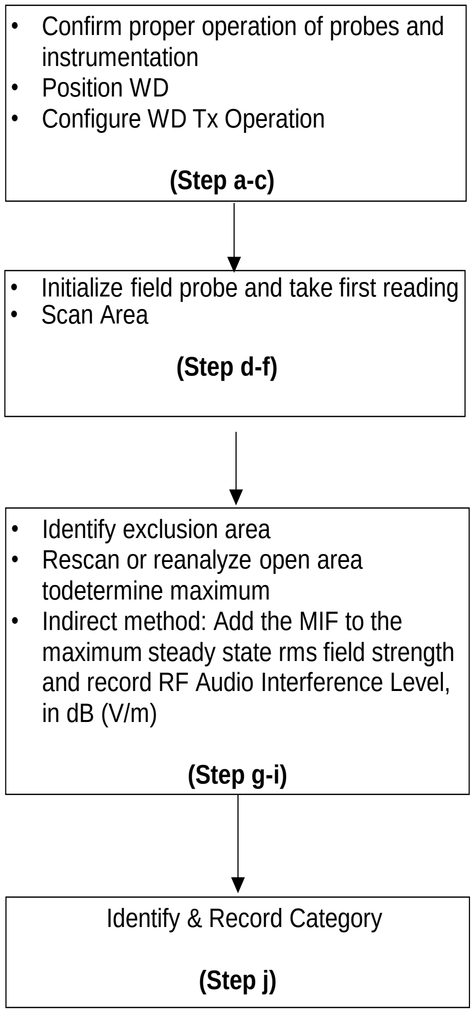


Figure 2 - WD reference and plane for RF emission measurements

11. Test flowchart Per ANSI-PC63.19 2011

Test Instructions



12. Emissions Measurement Criteria

WD RF Audio Interference Level Categories in Logarithmic Units

Category	Limits for E-Field Emissions < 960MHz	Limits for E-Field Emissions > 960MHz
M1	50 dB V/m - 55 dB V/m	40 dB V/m - 45 dB V/m
M2	45 dB V/m - 50 dB V/m	35 dB V/m - 40 dB V/m
M3	40 dB V/m - 45 dB V/m	30 dB V/m - 35 dB V/m
M4	<40 dB V/m	<30 dB V/m

13. HAC (RF Emissions) Test Results

MIF values were not tested by a probe or as specified in the standards but are based on analysis provided by SPEAG for all the air interfaces (GSM, WCDMA). For GSM, User Identifier (UID) 10021 was used; for WCDMA, UID 10011 was used (Refer Section 8).

The data included in this report are for the worst case operating modes. Appendix 4 contains the attestation letter signed by the grantee that the MIF vales represent worst case operation modes.

Scan No.	Operating Band	Channel Number	Frequency (MHz)	Measured Results dB V/m	EUT Class	Lab Temp. (ºC)	Mod.
1	GSM 850	128	824.2	37.28	M4	24.0	GMSK
2		190	836.6	37.45	M4	24.0	GMSK
3		251	848.8	39.76	M4	24.0	GMSK
4	PCS1900	512	1850.2	30.60	M3	24.0	GMSK
5		661	1880.0	31.53	M3	24.0	GMSK
6		810	1909.8	31.56[1]	M3	24.0	GMSK
-	WCDMA	Refer to Section 9. Evaluation for Low-Power Exception. RF Emissions testing for this device is required only for GSM Voice Mode. All other applicable Air-Interfaces are exempted from testing					

Worst Case results

Band	Frequency (MHz)	Measured Results dB V/m	Upper Limit for E-Field Emission dB V/m	Margin dB V/m
PCS1900	1909.8	31.56	35.00	3.44

Note(s):

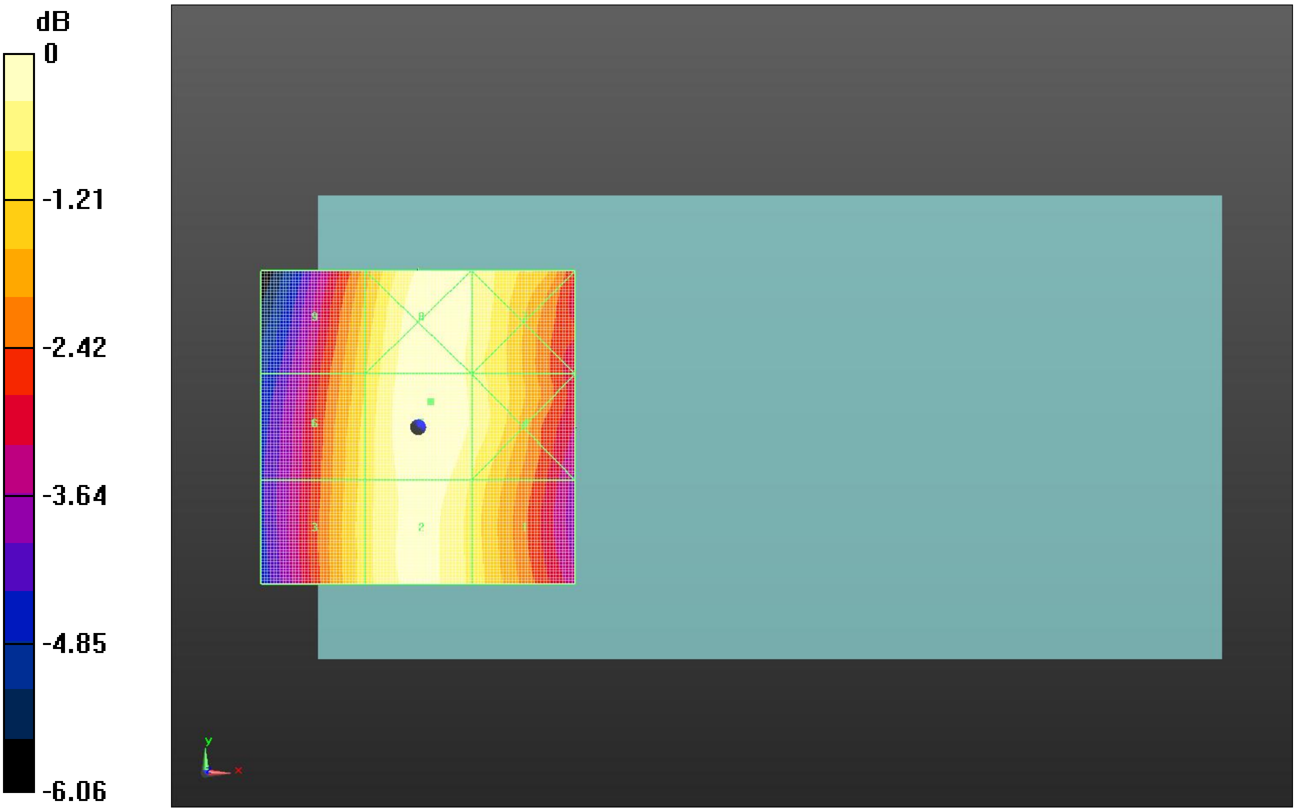
1. According to the last paragraph of Section 8, the MIF measurement uncertainty is estimated to be 0.2 dB for MIF -7 to + 5 dB; Applying this to the table above, the maximum E-field result of **31.56 dB V/m** plus measurement uncertainty of 0.2 dB is **31.76 dB V/m**, which is still within M3 rating.

Appendix 1: HAC RF Scans

This appendix contains RF distribution scans which are not included in the total number of pages for this report.

Scan Reference Number	Title
001	RF Emissions GSM850 CH128
002	RF Emissions GSM850 CH190
003	RF Emissions GSM850 CH251
004	RF Emissions PCS1900 CH512
005	RF Emissions PCS1900 CH661
006	RF Emissions PCS1900 CH810
007	System Performance Check 835 MHz
008	System Performance Check 1880 MHz

001: RF Emissions GSM850 CH128
Date: 19/07/2013
DUT: Sony Honami ; Type: Honami Rita; Serial: PM-0500-BV



0 dB = 73.15 V/m = 37.28 dBV/m

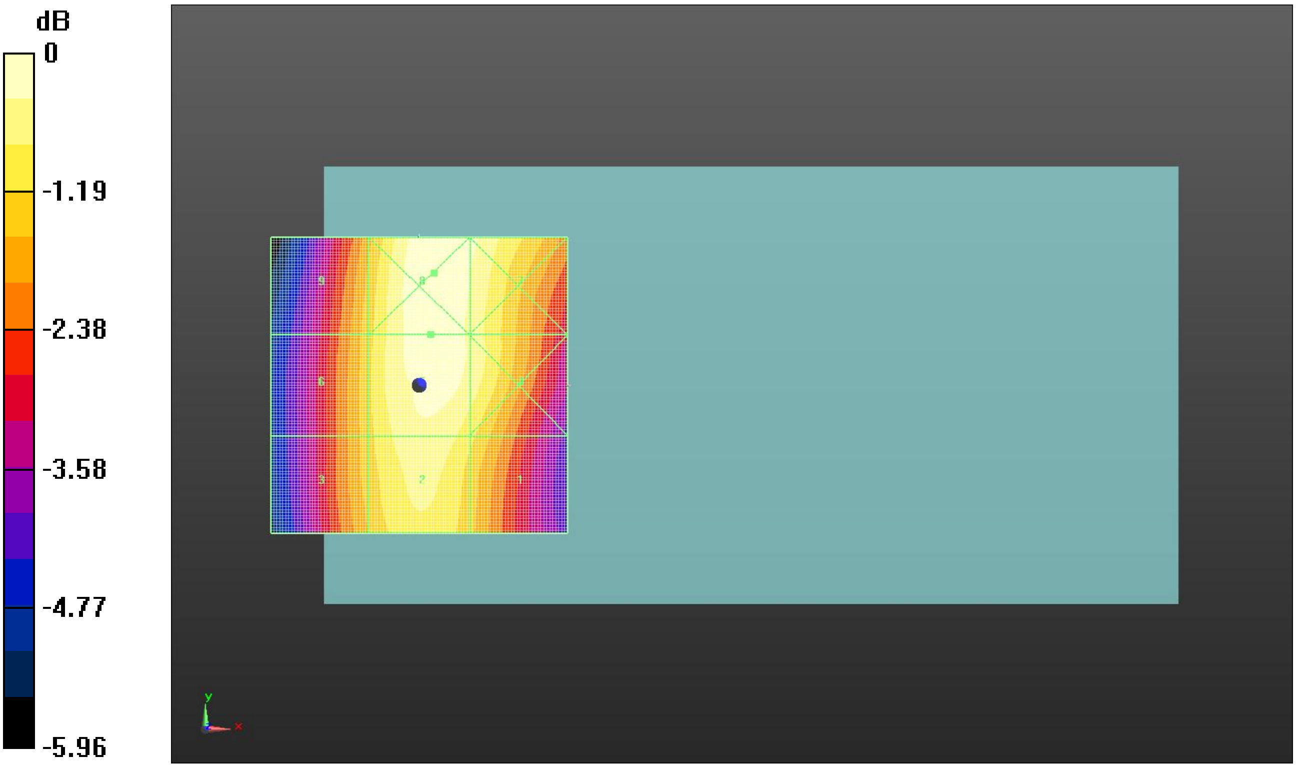
Communication System: UID 10021 - CAA, GSM-FDD (TDMA, GMSK); Frequency: 824.2 MHz;Duty Cycle: 1:8.6896
Medium: Air Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 0 kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device GSM850 Low/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 63.27 V/m; Power Drift = -0.06 dB
Applied MIF = 3.63 dB
RF audio interference level = 37.28 dBV/m
Emission category: M4

MIF scaled E-field

Grid 1 **M4** **36.44 dBV/m**	Grid 2 **M4** **37.05 dBV/m**	Grid 3 **M4** **36.31 dBV/m**
Grid 4 **M4** **36.84 dBV/m**	Grid 5 **M4** **37.28 dBV/m**	Grid 6 **M4** **36.26 dBV/m**
Grid 7 **M4** **36.88 dBV/m**	Grid 8 **M4** **37.26 dBV/m**	Grid 9 **M4** **36.04 dBV/m**

002: RF Emissions GSM850 CH190
Date 19/07/2013
DUT: Sony Honami ; Type: Honami Rita; Serial: PM-0500-BV



0 dB = 75.41 V/m = 37.55 dBV/m

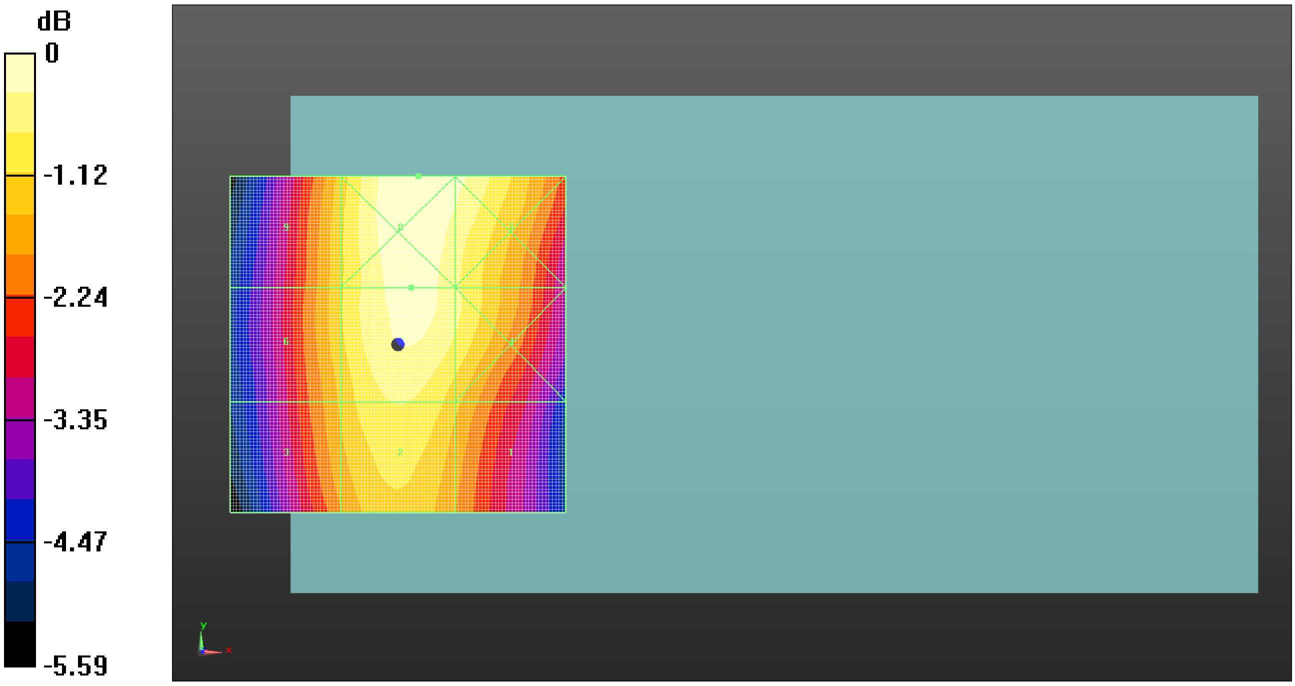
Communication System: UID 10021 - CAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz;Duty Cycle: 1:8.6896
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device GSM850 Middle/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 63.06 V/m; Power Drift = 0.03 dB
Applied MIF = 3.63 dB
RF audio interference level = 37.45 dBV/m
Emission category: M4

MIF scaled E-field

Grid 1 **M4** **36.49 dBV/m**	Grid 2 **M4** **37.03 dBV/m**	Grid 3 **M4** **36.23 dBV/m**
Grid 4 **M4** **37.1 dBV/m**	Grid 5 **M4** **37.45 dBV/m**	Grid 6 **M4** **36.28 dBV/m**
Grid 7 **M4** **37.26 dBV/m**	Grid 8 **M4** **37.55 dBV/m**	Grid 9 **M4** **36.23 dBV/m**

003: RF Emissions GSM850 CH251
Date 19/07/2013
DUT: Sony Honami ; Type: Honami Rita; Serial: PM-0500-BV



0 dB = 99.72 V/m = 39.98 dBV/m

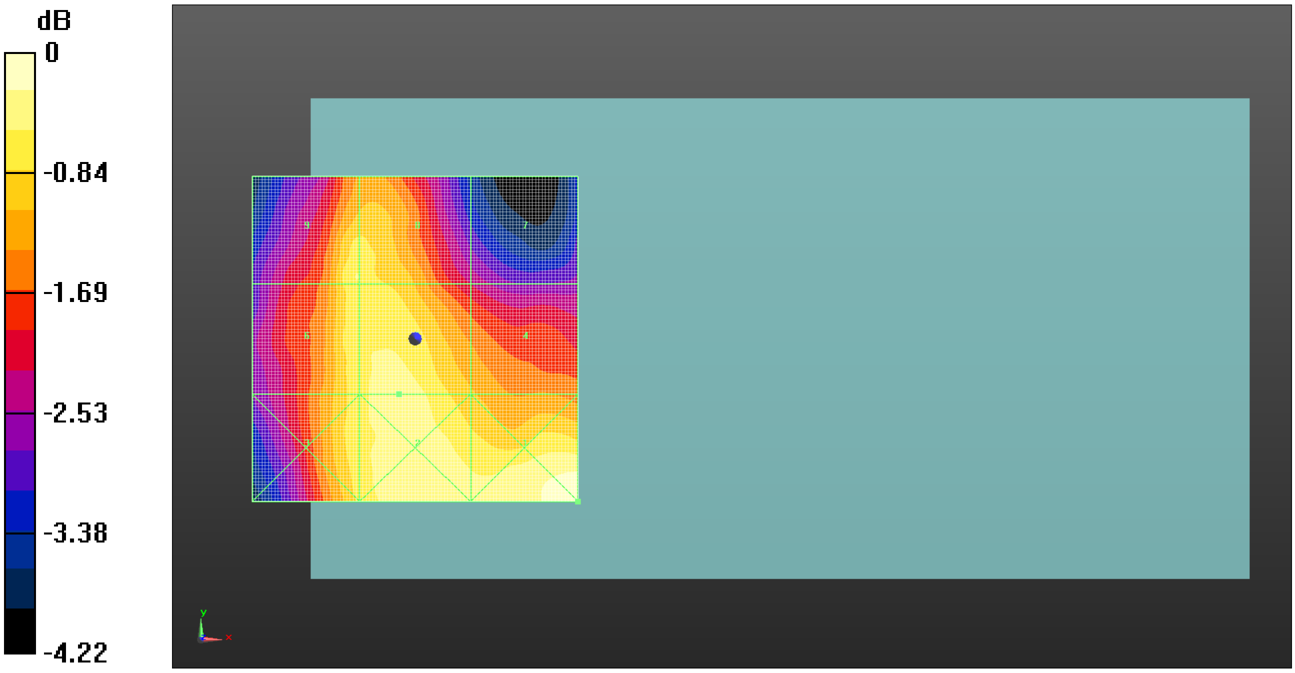
Communication System: UID 10021 - CAA, GSM-FDD (TDMA, GMSK); Frequency: 848.6 MHz;Duty Cycle: 1:8.6896
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device GSM850 High/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 79.01 V/m; Power Drift = 0.20 dB
Applied MIF = 3.63 dB
RF audio interference level = 39.76 dBV/m
Emission category: M4

MIF scaled E-field

Grid 1 **M4** **38.62 dBV/m**	Grid 2 **M4** **39.25 dBV/m**	Grid 3 **M4** **38.57 dBV/m**
Grid 4 **M4** **39.35 dBV/m**	Grid 5 **M4** **39.76 dBV/m**	Grid 6 **M4** **38.82 dBV/m**
Grid 7 **M4** **39.73 dBV/m**	Grid 8 **M4** **39.98 dBV/m**	Grid 9 **M4** **38.81 dBV/m**

004: RF Emissions PCS1900 CH512
Date 19/07/2013
DUT: Sony Honami ; Type: Honami Rita; Serial: PM-0500-BV



0 dB = 35.65 V/m = 31.04 dBV/m

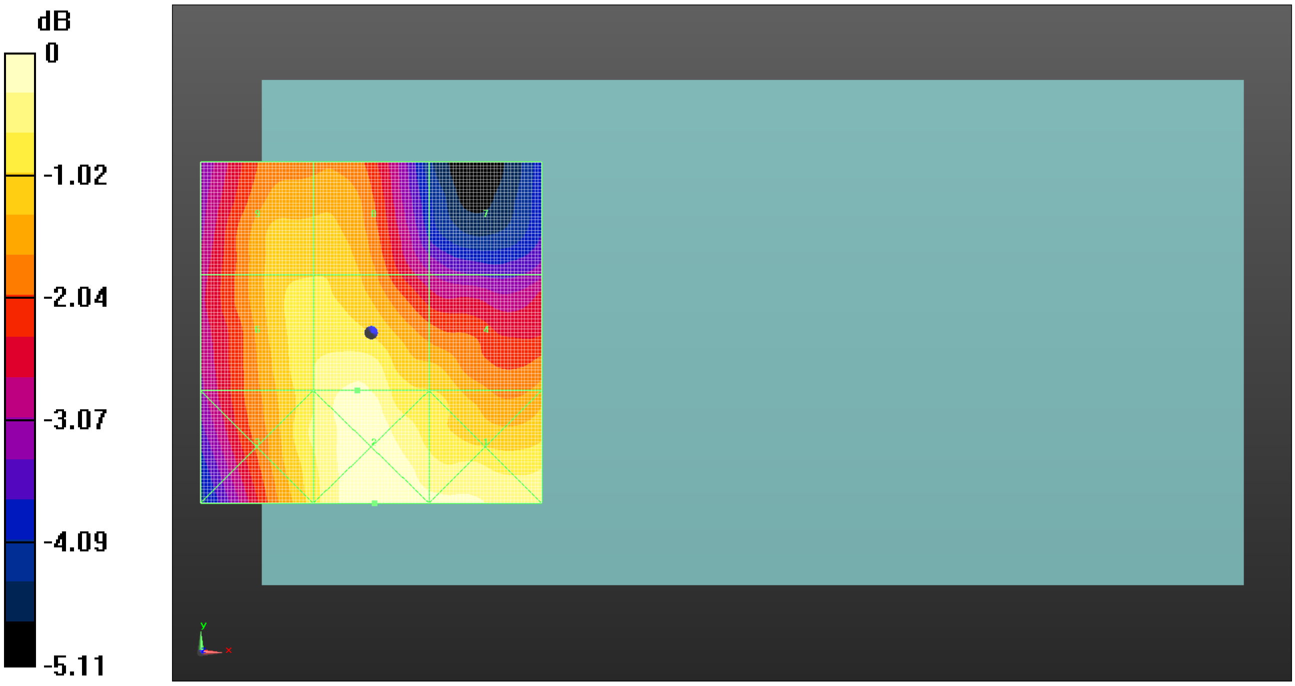
Communication System: UID 10021 - CAA, GSM-FDD (TDMA, GMSK); Frequency: 1850.2 MHz;Duty Cycle: 1:8.6896
Medium: Air Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 0 kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device PCS1900 Low/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 25.78 V/m; Power Drift = 0.08 dB
Applied MIF = 3.63 dB
RF audio interference level = 30.60 dBV/m
Emission category: M3

MIF scaled E-field

Grid 1 **M3** **31.04 dBV/m**	Grid 2 **M3** **30.72 dBV/m**	Grid 3 **M3** **30.44 dBV/m**
Grid 4 **M4** **29.97 dBV/m**	Grid 5 **M3** **30.6 dBV/m**	Grid 6 **M3** **30.47 dBV/m**
Grid 7 **M4** **28.79 dBV/m**	Grid 8 **M3** **30.48 dBV/m**	Grid 9 **M3** **30.49 dBV/m**

005: RF Emissions PCS1900 CH661
Date 19/07/2013
DUT: Sony Honami ; Type: Honami Rita; Serial: PM-0500-BV



0 dB = 38.91 V/m = 31.80 dBV/m

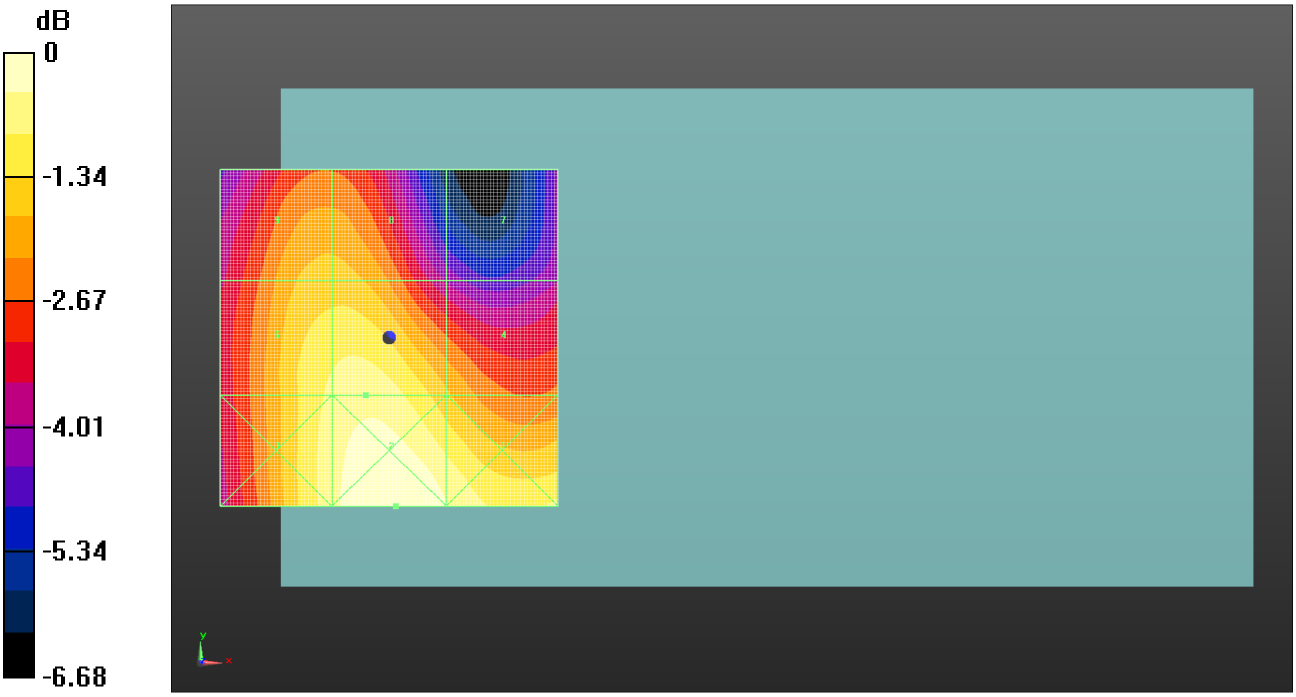
Communication System: UID 10021 - CAA, GSM-FDD (TDMA, GMSK); Frequency: 1880 MHz;Duty Cycle: 1:8.6896
Medium: Air Medium parameters used: σ = 0 S/m, $\varepsilon_r = 1$; ρ = 0 kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device PCS1900 Middle/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 26.78 V/m; Power Drift = -0.08 dB
Applied MIF = 3.63 dB
RF audio interference level = 31.53 dBV/m
Emission category: M3

MIF scaled E-field

Grid 1 **M3** **31.55 dBV/m**	Grid 2 **M3** **31.8 dBV/m**	Grid 3 **M3** **31.19 dBV/m**
Grid 4 **M3** **30.8 dBV/m**	Grid 5 **M3** **31.53 dBV/m**	Grid 6 **M3** **31.13 dBV/m**
Grid 7 **M4** **28.81 dBV/m**	Grid 8 **M3** **30.77 dBV/m**	Grid 9 **M3** **30.77 dBV/m**

006: RF Emissions PCS1900 CH810
Date 19/07/2013
DUT: Sony Honami ; Type: Honami Rita; Serial: PM-0500-BV



0 dB = 40.55 V/m = 32.16 dBV/m

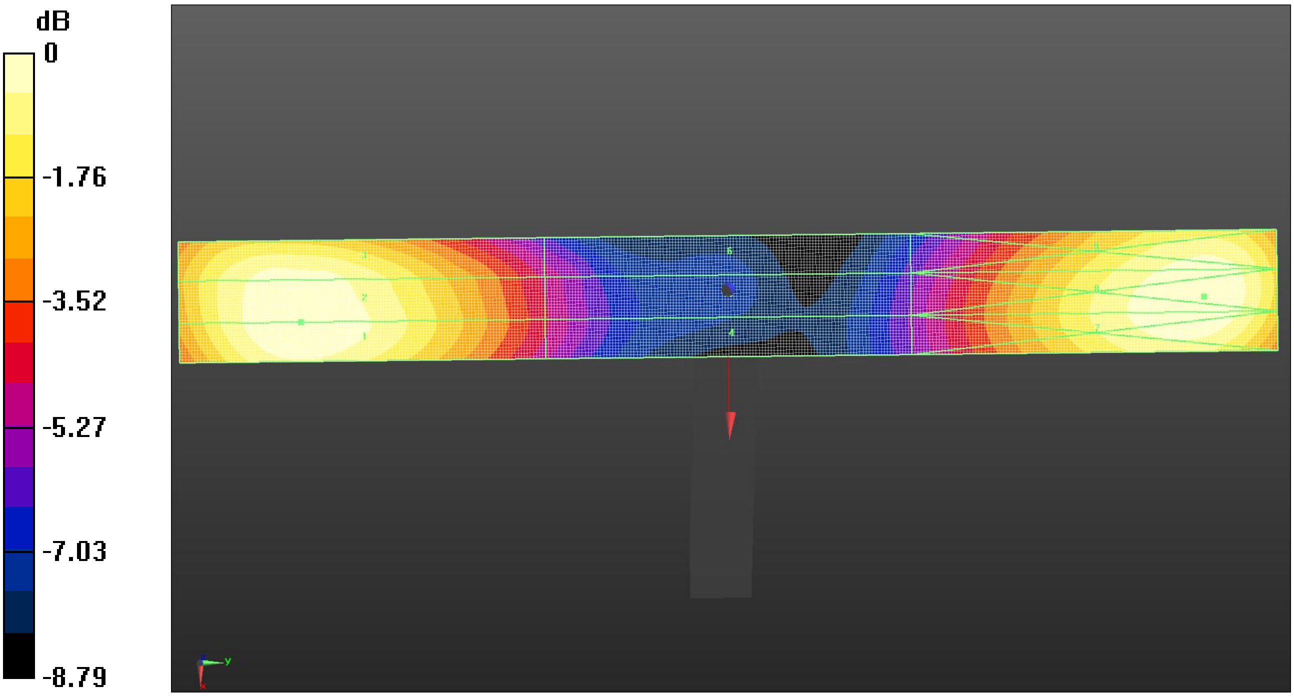
Communication System: UID 10021 - CAA, GSM-FDD (TDMA, GMSK); Frequency: 1909.8 MHz;Duty Cycle: 1:8.6896
Medium: Air Medium parameters used: $\sigma = 0$ S/m, $\varepsilon_r = 1$; $\rho = 0$ kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

Device E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - ER3D: 15 mm from Probe Center to the Device PCS1900 High/Hearing Aid Compatibility Test (101x101x1):
Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 26.52 V/m; Power Drift = 0.13 dB
Applied MIF = 3.63 dB
RF audio interference level = 31.56 dBV/m
Emission category: M3

MIF scaled E-field

Grid 1 **M3** **31.73 dBV/m**	Grid 2 **M3** **32.16 dBV/m**	Grid 3 **M3** **31.57 dBV/m**
Grid 4 **M3** **30.47 dBV/m**	Grid 5 **M3** **31.56 dBV/m**	Grid 6 **M3** **31.38 dBV/m**
Grid 7 **M4** **28.16 dBV/m**	Grid 8 **M3** **30.6 dBV/m**	Grid 9 **M3** **30.6 dBV/m**

007: System Performance Check 835 MHz
Date: 19/07/2013
DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1000



0 dB = 104.4 V/m = 40.37 dBV/m

Communication System: UID 0 - n/a, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 0 kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

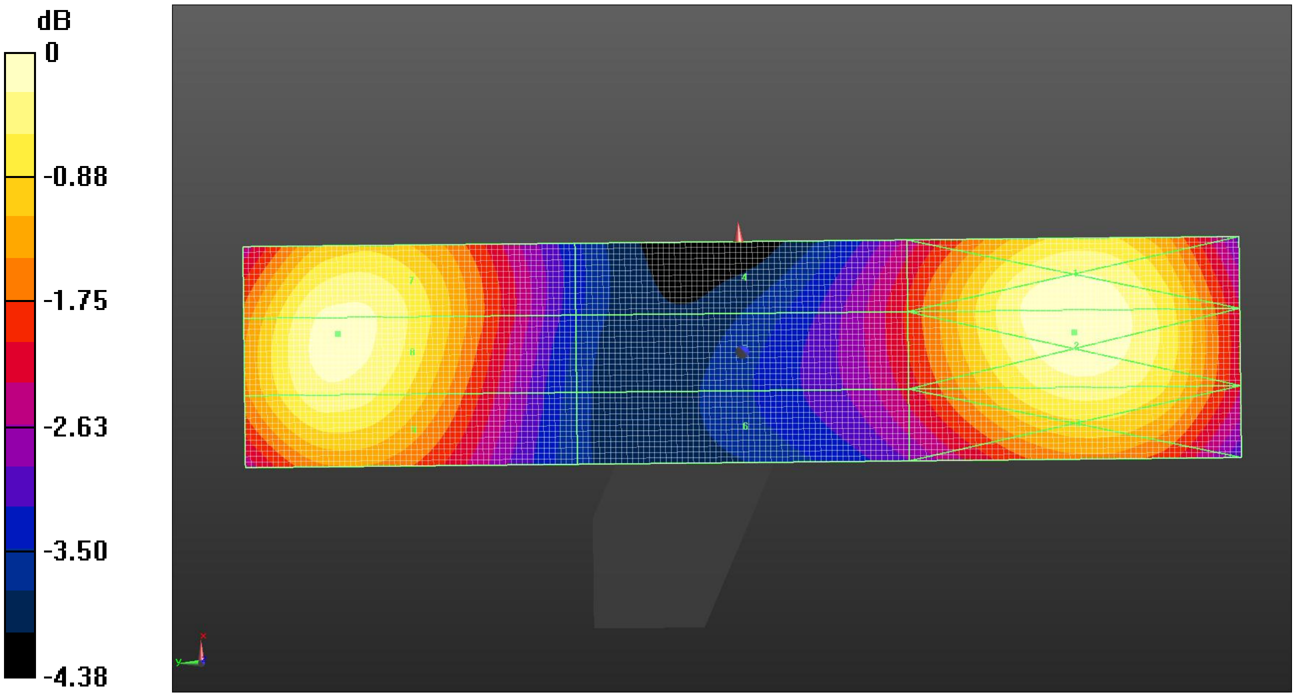
Dipole E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - measurement distance from the probe sensor center to CD835 = 10mm & 15mm 2/Hearing Aid Compatibility Test at 15mm distance (41x361x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 101.6 V/m; Power Drift = -0.05 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 104.4 V/m
Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 **M4** **104.4 V/m**	Grid 2 **M4** **104.4 V/m**	Grid 3 **M4** **101.0 V/m**
Grid 4 **M4** **61.88 V/m**	Grid 5 **M4** **61.88 V/m**	Grid 6 **M4** **59.88 V/m**
Grid 7 **M4** **103.7 V/m**	Grid 8 **M4** **104.4 V/m**	Grid 9 **M4** **101.4 V/m**

Cursor:
Total = 104.4 V/m
E Category: M4
Location: 1, 78, 9.7 mm

008: System Performance Check 1880 MHz
Date: 19/07/2013
DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1000



0 dB = 89.27 V/m = 39.01 dBV/m

Communication System: UID 0 - n/a, CW; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Air Medium parameters used: σ = 0 S/m, ε_r = 1; ρ = 0 kg/m^3
Phantom section: RF Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2260; ConvF(1, 1, 1); Calibrated: 12/12/2012;
- Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn417; Calibrated: 17/04/2013
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1032
- ; SEMCAD X Version 14.6.9 (7117)

Dipole E-Field measurement (E-field scan for ANSI C63.19-2007 & -2011 compliance)/E Scan - measurement distance from the probe sensor center to CD1880 = 10mm & 15mm/Hearing Aid Compatibility Test at 15mm distance (41x181x1): Interpolated grid: dx=0.5000 mm, dy=0.5000 mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 150.7 V/m; Power Drift = 0.02 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 87.62 V/m
Near-field category: M3 (AWF 0 dB)

PMF scaled E-field

Grid 1 **M3** **89.13 V/m**	Grid 2 **M3** **89.27 V/m**	Grid 3 **M3** **85.18 V/m**
Grid 4 **M3** **71.13 V/m**	Grid 5 **M3** **71.18 V/m**	Grid 6 **M3** **69.32 V/m**
Grid 7 **M3** **87.30 V/m**	Grid 8 **M3** **87.62 V/m**	Grid 9 **M3** **85.41 V/m**

Cursor:
Total = 89.27 V/m
E Category: M3
Location: 1.5, -30, 9.7 mm

Appendix 2: Cal Certificates

This section contains the calibration certificates and data for the Probe(s) and Dipole(s) used, which are not included in the total number of pages for this report.

Checked by: R. [illegible] Date: 2-May-2013

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) ASSET A2239 **Accreditation No.: SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client RFI **Certificate No: ER3-2260_Dec12/2**

CALIBRATION CERTIFICATE (Replacement of No: ER3-2260_Dec12)

Object	ER3DV6 - SN:2260
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:	December 12, 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: S5277 (20x)	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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 22, 2013

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

S **Schweizerischer Kalibrierdienst**
C **Service suisse d'étalonnage**
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Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

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, D	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).
- *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; Dx,y,z; VRx,y,z: A, B, C, D* 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:2260

Manufactured: May 18, 2001
Calibrated: December 12, 2012

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

DASY/EASY - Parameters of Probe: ER3DV6 - SN:2260

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)	1.37	1.49	1.74	± 10.1 %
DCP (mV)[B]	99.4	101.7	102.0	

Modulation Calibration Parameters

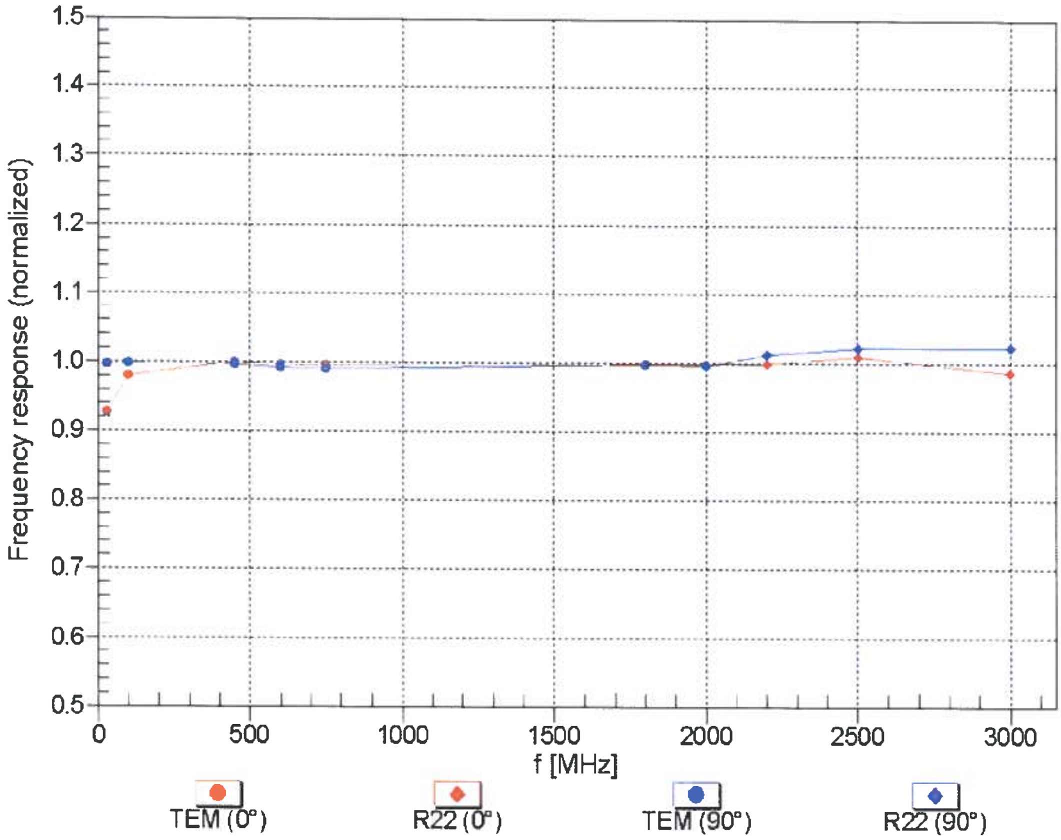
UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	147.8	±3.3 %
		Y	0.0	0.0	1.0		143.9	
		Z	0.0	0.0	1.0		141.8	
10011-CAA	UMTS-FDD (WCDMA)	X	3.05	65.6	18.0	2.91	116.8	±2.2 %
		Y	3.15	66.1	18.0		114.4	
		Z	3.30	67.4	19.0		113.6	
10021-CAA	GSM-FDD (TDMA, GMSK)	X	7.59	87.6	24.7	9.39	144.5	±3.3 %
		Y	7.32	83.5	22.2		106.2	
		Z	23.27	100.0	28.7		127.9	
10081-CAA	CDMA2000 (1xRTT, RC3)	X	3.71	65.2	18.3	3.97	113.5	±2.7 %
		Y	3.78	65.4	18.1		112.0	
		Z	3.81	65.6	18.4		109.8	

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.

Frequency Response of E-Field

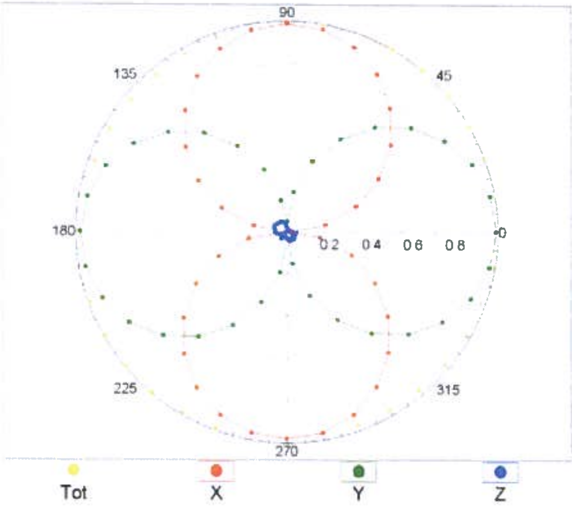
(TEM-Cell:ifi110 EXX, Waveguide: R22)



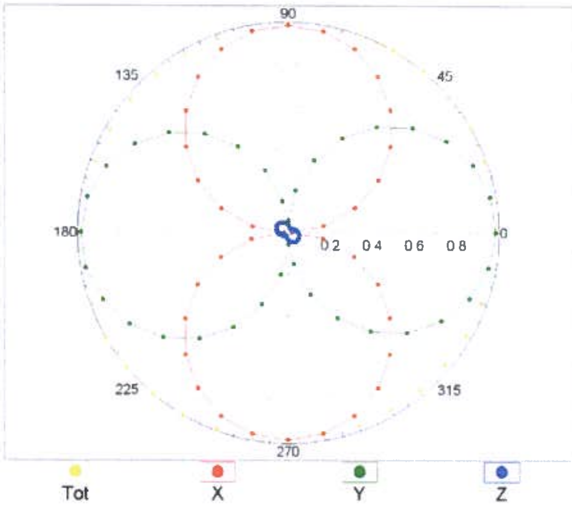
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM,0°

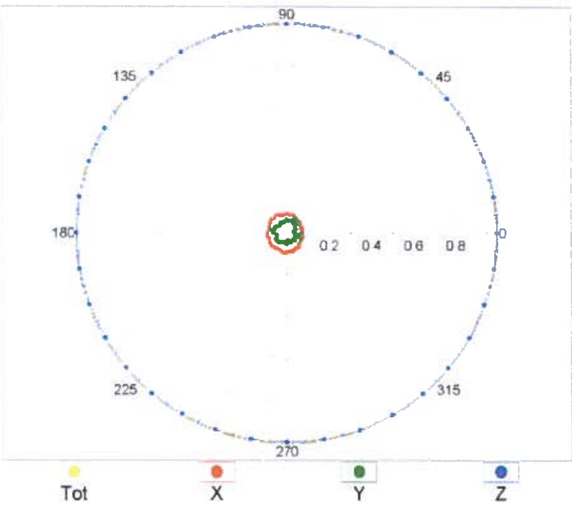


f=2500 MHz,R22,0°

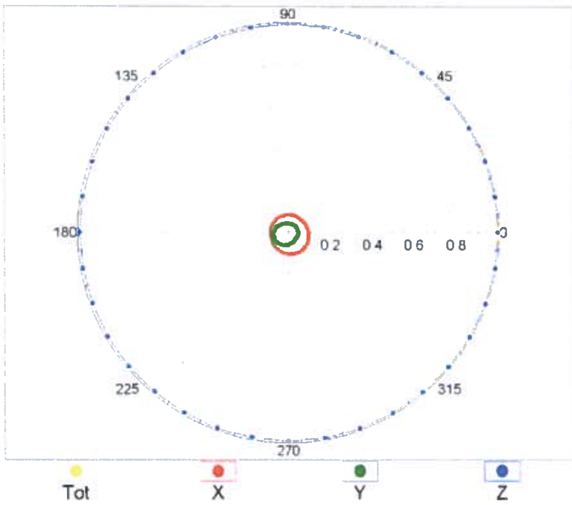


Receiving Pattern (ϕ), ϑ = 90°

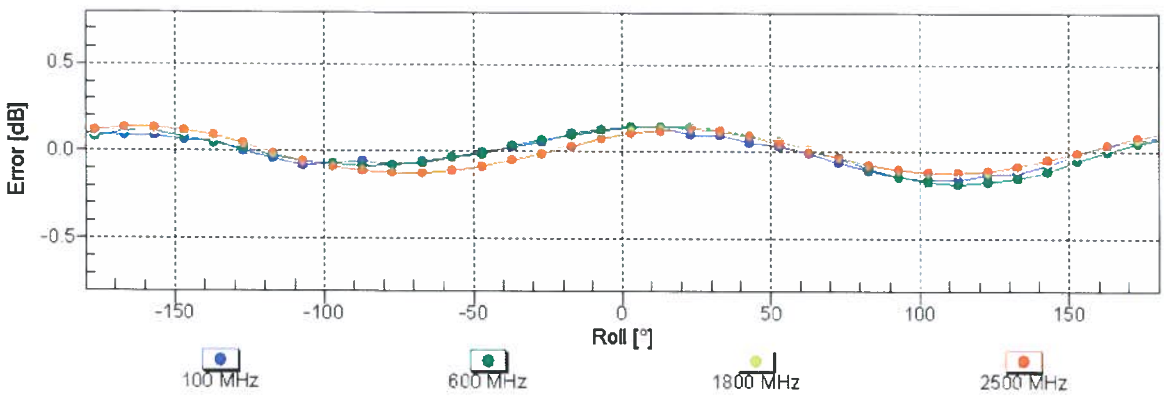
f=600 MHz,TEM,90°



f=2500 MHz,R22,90°

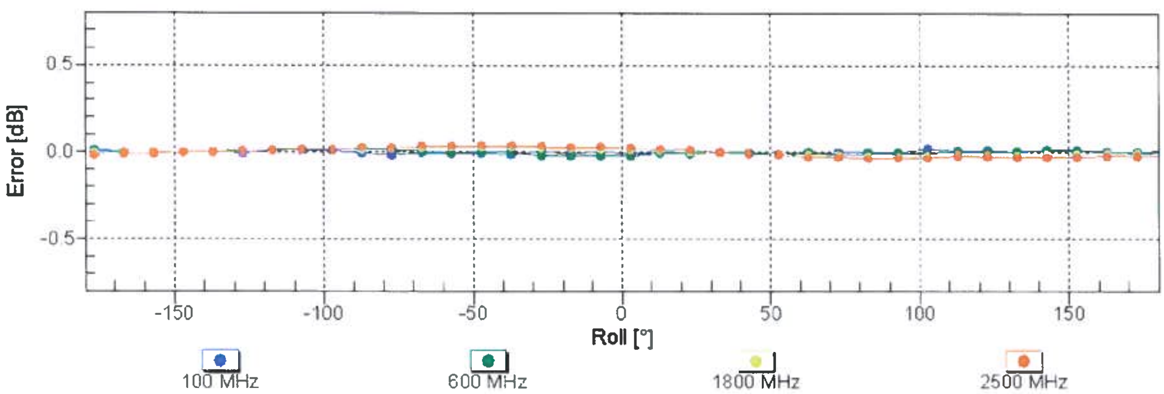


Receiving Pattern (ϕ), ϑ = 0°



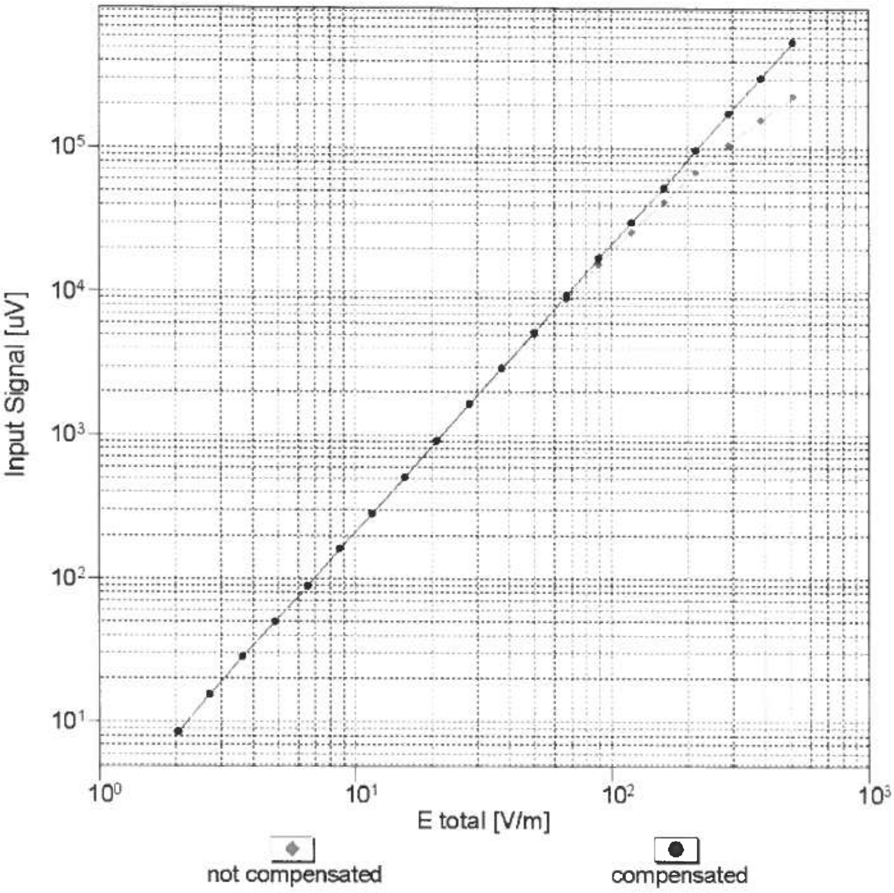
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

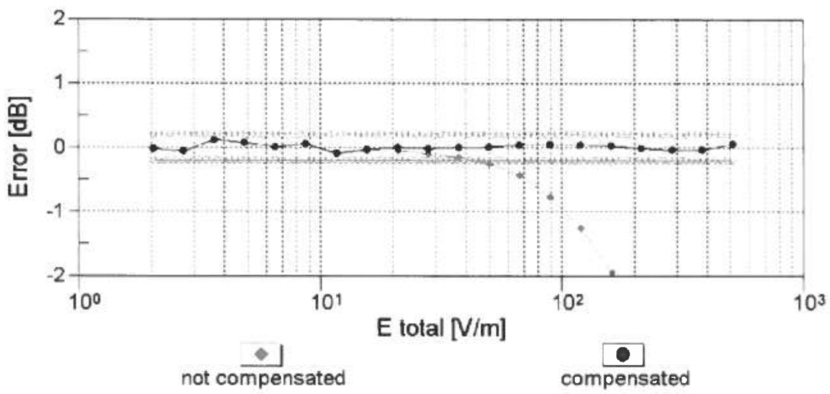
Receiving Pattern (ϕ), ϑ = 90°



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

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

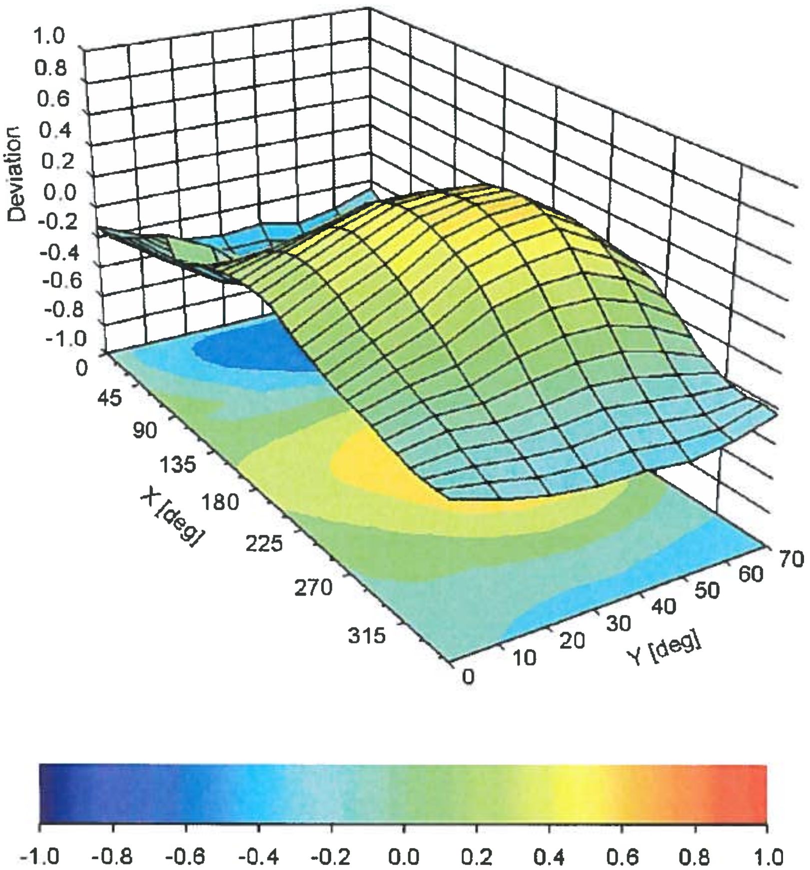




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Deviation from Isotropy in Air

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: ER3DV6 - SN:2260

Other Probe Parameters

Sensor Arrangement	Rectangular
Connector Angle (°)	-27.1
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

Checked by [signature] DATE 30-JAN-2013

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

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C **Service suisse d'étalonnage**
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Accreditation No.: SCS 108

Client **RFI**

Certificate No: CD835V3-1000_Dec12

CALIBRATION CERTIFICATE

Object	CD835V3 - SN: 1000
Calibration procedure(s)	QA CAL-20.v6 Calibration procedure for dipoles in air
Calibration date:	December 06, 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 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	29-Dec-11 (No. ER3-2336_Dec11)	Dec-12
Probe H3DV6	SN: 6065	29-Dec-11 (No. H3-6065_Dec11)	Dec-12
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:	Claudio Leubler	Laboratory Technician	[signature]
Approved by:	Fin Bomholt	R&D Director	[signature]

Issued: December 7, 2012

References

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

[2] ANSI-C63.19-2011
American National Standard, 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 (15 mm for [2]) above the top metal 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] and [2], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (15 mm for [2]) (in z) above the metal 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, in the plane 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	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10mm 15mm	
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	**0.449 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	167.1 V / m
Maximum measured above low end	100 mW input power	156.3 V / m
Averaged maximum above arm	100 mW input power	**161.7 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	107.3 V / m
Maximum measured above low end	100 mW input power	101.3 V / m
Averaged maximum above arm	100 mW input power	**104.3 V / m ± 12.8 % (k=2)**

Appendix

Antenna Parameters

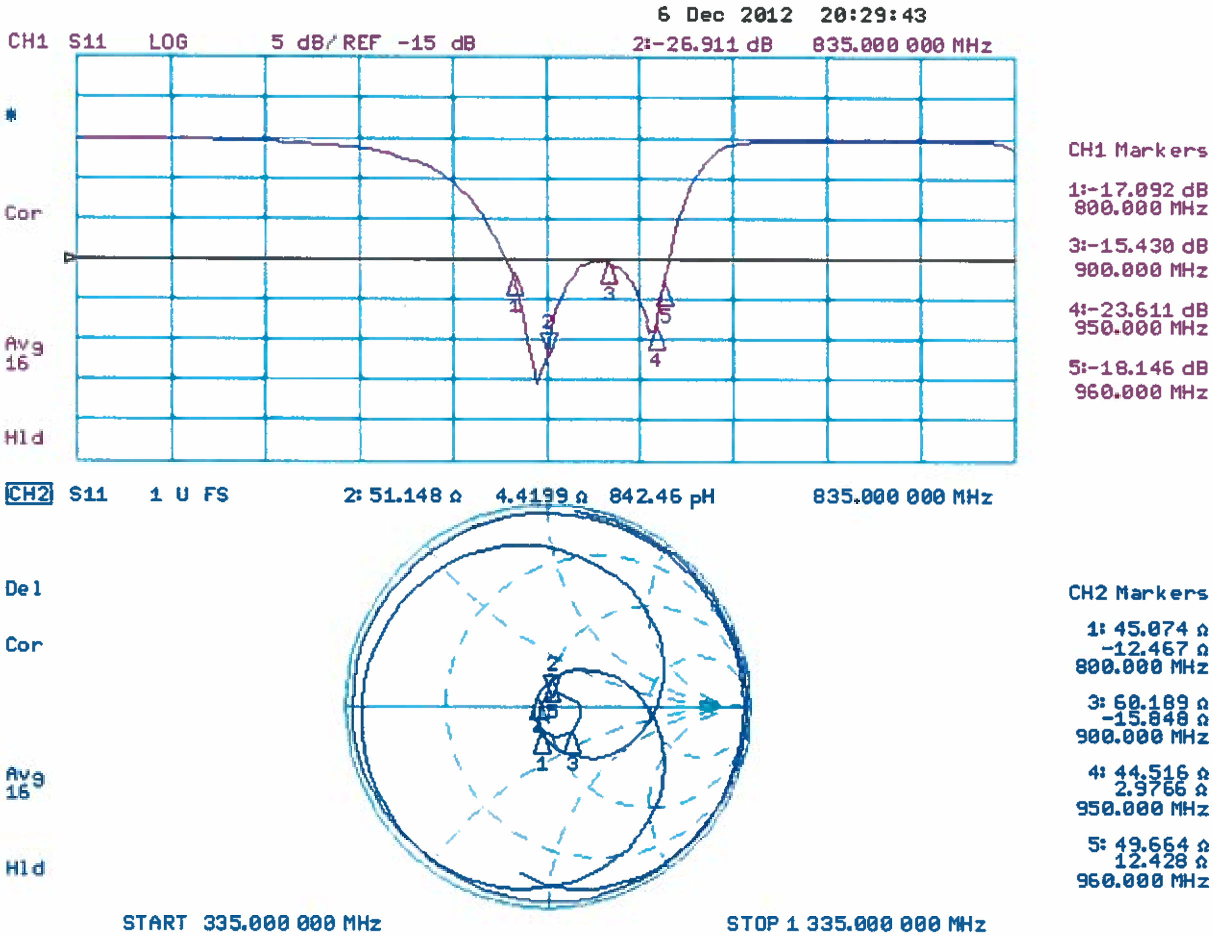
Frequency	Return Loss	Impedance
800 MHz	17.1 dB	45.1 Ω - 12.5 jΩ
835 MHz	26.9 dB	51.1 Ω + 4.4 jΩ
900 MHz	15.4 dB	60.2 Ω - 15.8 jΩ
950 MHz	23.6 dB	44.5 Ω + 3.0 jΩ
960 MHz	18.1 dB	49.7 Ω + 12.4 jΩ

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.

Impedance Measurement Plot



DASY5 H-field Result

Date: 06.12.2012

Test Laboratory: SPEAG Lab2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1000

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

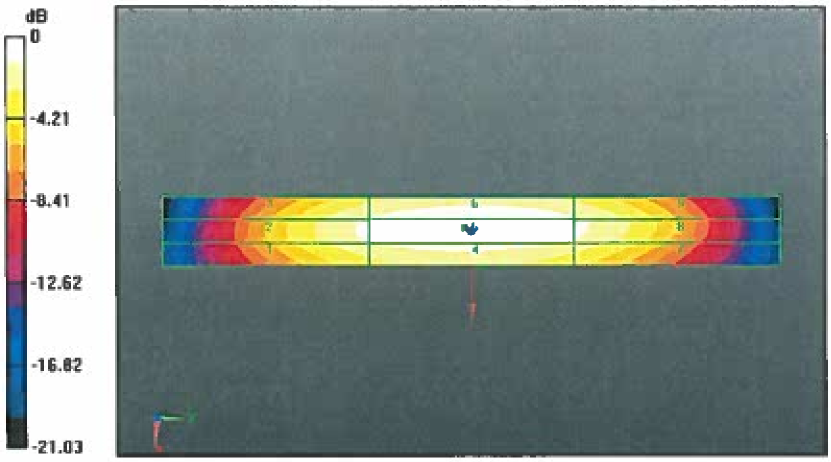
DASY52 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 29.12.2011
- 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 52.8.3(988); SEMCAD X 14.6.7(6848)

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 = 0.4770 A/m; Power Drift = -0.01 dB
PMR not calibrated. PMF = 1.000 is applied.
H-field emissions = 0.4488 A/m
Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

Grid 1 M4 0.371 A/m	Grid 2 M4 0.398 A/m	Grid 3 M4 0.383 A/m
Grid 4 M4 0.414 A/m	Grid 5 M4 0.449 A/m	Grid 6 M4 0.436 A/m
Grid 7 M4 0.360 A/m	Grid 8 M4 0.398 A/m	Grid 9 M4 0.388 A/m



0 dB = 0.4488 A/m = -6.96 dBA/m

DASY5 E-field Result

Date: 06.12.2012

Test Laboratory: SPEAG Lab2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: CD835V3 - SN: 1000

Communication System: CW; Frequency: 835 MHz
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 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: 29.12.2011;
- 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 52.8.3(988); SEMCAD X 14.6.7(6848)

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 = 103.7 V/m; Power Drift = -0.02 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 167.1 V/m
Near-field category: M4 (AWF 0 dB)

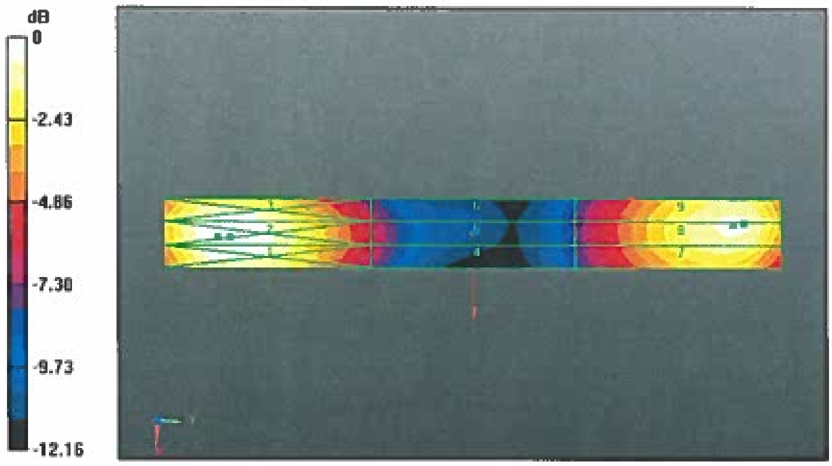
PMF scaled E-field

Grid 1 M4 **164.4 V/m**	Grid 2 M4 **167.1 V/m**	Grid 3 M4 **157.0 V/m**
Grid 4 M4 **85.63 V/m**	Grid 5 M4 **87.47 V/m**	Grid 6 M4 **84.00 V/m**
Grid 7 M4 **142.1 V/m**	Grid 8 M4 **156.3 V/m**	Grid 9 M4 **156.1 V/m**

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 = 103.4 V/m; Power Drift = -0.03 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 101.3 V/m
Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 M4 **106.3 V/m**	Grid 2 M4 **107.3 V/m**	Grid 3 M4 **104.2 V/m**
Grid 4 M4 **61.97 V/m**	Grid 5 M4 **62.63 V/m**	Grid 6 M4 **61.23 V/m**
Grid 7 M4 **97.01 V/m**	Grid 8 M4 **101.3 V/m**	Grid 9 M4 **101.0 V/m**



0 dB = 167.1 V/m = 44.46 dBV/m

Checked by [illegible]

DATE: 30 JAN 2013

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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

A2236

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 RFI

Certificate No: CD1880V3-1000_Dec12

CALIBRATION CERTIFICATE

Object	CD1880V3 - SN: 1000
Calibration procedure(s)	QA CAL-20.v6 Calibration procedure for dipoles in air
Calibration date:	December 06, 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 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	29-Dec-11 (No. ER3-2336_Dec11)	Dec-12
Probe H3DV6	SN: 6065	29-Dec-11 (No. H3-6065_Dec11)	Dec-12
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:	Claudio Leubler	Laboratory Technician	[signature]
Approved by:	Fin Bomholt	R&D Director	F. Bomholt

Issued: December 7, 2012

References

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

[2] ANSI-C63.19-2011
American National Standard, 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 (15 mm for [2]) above the top metal 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] and [2], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (15 mm for [2]) (in z) above the metal 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, in the plane 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 cresponds to a coverage probability of approximately 95%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	HAC Test Arch	
Distance Dipole Top - Probe Center	10mm 15mm	
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	**0.471 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	140.5 V / m
Maximum measured above low end	100 mW input power	138.5 V / m
Averaged maximum above arm	100 mW input power	**139.5 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	91.6 V / m
Maximum measured above low end	100 mW input power	88.9 V / m
Averaged maximum above arm	100 mW input power	**90.3 V / m ± 12.8 % (k=2)**

Appendix

Antenna Parameters

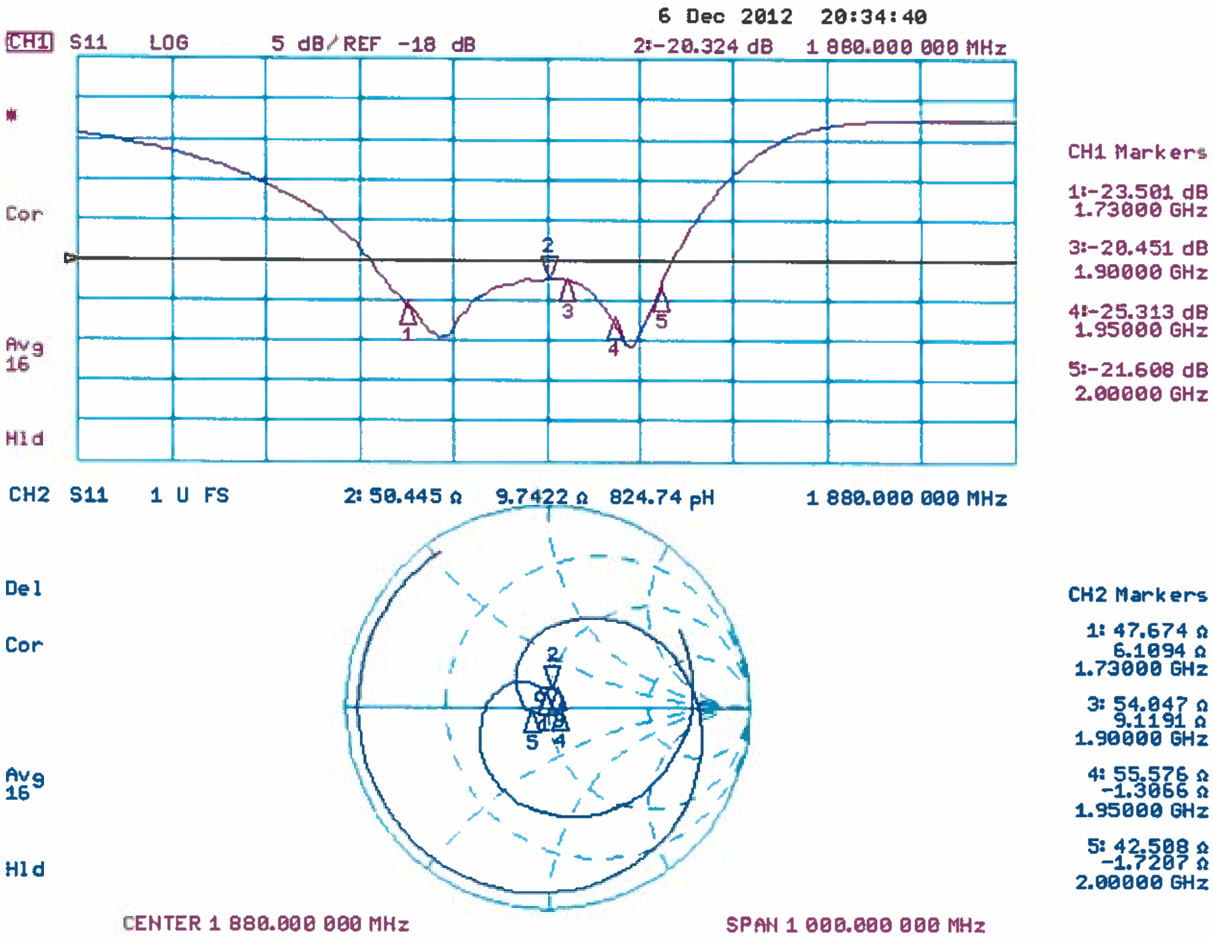
Frequency	Return Loss	Impedance
1730 MHz	23.5 dB	47.7 Ω + 6.1 jΩ
1880 MHz	20.3 dB	50.4 Ω + 9.7 jΩ
1900 MHz	20.5 dB	54.0 Ω + 9.1 jΩ
1950 MHz	25.3 dB	55.6 Ω - 1.3 jΩ
2000 MHz	21.6 dB	42.5 Ω - 1.7 jΩ

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.

Impedance Measurement Plot



DASY5 H-field Result

Date: 06.12.2012

Test Laboratory: SPEAG Lab2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN: 1000

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

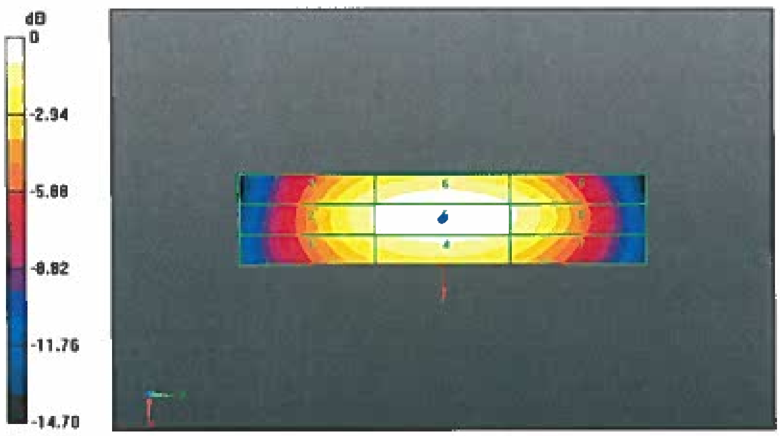
DASY52 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 29.12.2011
- 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 52.8.3(988); SEMCAD X 14.6.7(6848)

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 = 0.4970 A/m; Power Drift = 0.01 dB
PMR not calibrated. PMF = 1.000 is applied.
H-field emissions = 0.4707 A/m
Near-field category: M2 (AWF 0 dB)

PMF scaled H-field

Grid 1 **M2** **0.402 A/m**	Grid 2 **M2** **0.428 A/m**	Grid 3 **M2** **0.416 A/m**
Grid 4 **M2** **0.440 A/m**	Grid 5 **M2** **0.471 A/m**	Grid 6 **M2** **0.458 A/m**
Grid 7 **M2** **0.399 A/m**	Grid 8 **M2** **0.432 A/m**	Grid 9 **M2** **0.419 A/m**



0 dB = 0.4707 A/m = -6.55 dBA/m

DASY5 E-field Result

Date: 06.12.2012

Test Laboratory: SPEAG Lab2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: CD1880V3 - SN: 1000

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

DASY52 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 29.12.2011;
- 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 52.8.3(988); SEMCAD X 14.6.7(6848)

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 = 153.5 V/m; Power Drift = -0.01 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 140.5 V/m
Near-field category: M2 (AWF 0 dB)

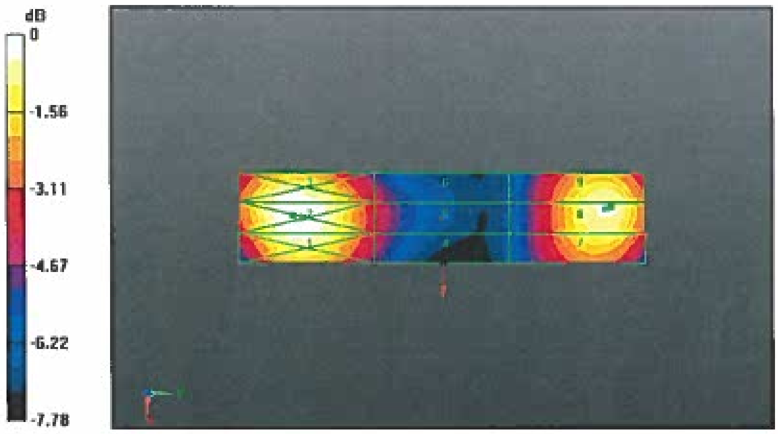
PMF scaled E-field

Grid 1 **M2** **133.8 V/m**	Grid 2 **M2** **138.5 V/m**	Grid 3 **M2** **135.7 V/m**
Grid 4 **M3** **88.91 V/m**	Grid 5 **M3** **91.14 V/m**	Grid 6 **M3** **87.96 V/m**
Grid 7 **M2** **129.4 V/m**	Grid 8 **M2** **140.5 V/m**	Grid 9 **M2** **139.7 V/m**

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 = 153.5 V/m; Power Drift = -0.01 dB
PMR not calibrated. PMF = 1.000 is applied.
E-field emissions = 88.85 V/m
Near-field category: M3 (AWF 0 dB)

PMF scaled E-field

Grid 1 M3 89.48 V/m	Grid 2 M3 91.56 V/m	Grid 3 M3 90.34 V/m
Grid 4 **M3** **70.33 V/m**	Grid 5 M3 71.24 V/m	Grid 6 **M3** **70.22 V/m**
Grid 7 **M3** **85.68 V/m**	Grid 8 **M3** **88.85 V/m**	Grid 9 **M3** **88.38 V/m**



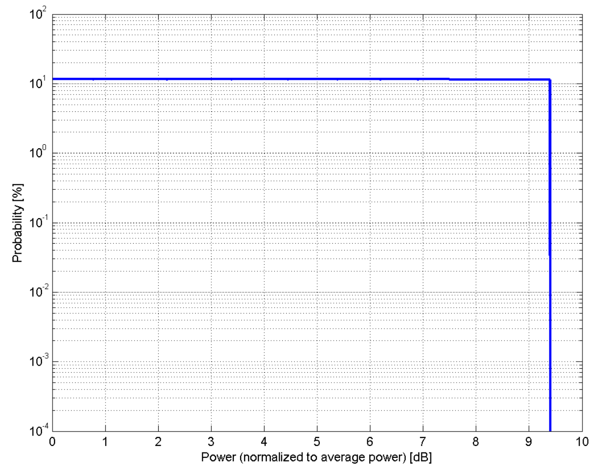
0 dB = 140.5 V/m = 42.95 dBV/m

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

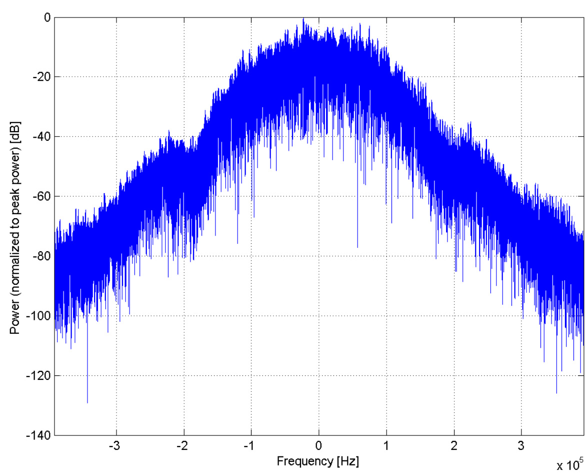
Name:	**GSM-FDD (TDMA, GMSK)**
Group:	GSM
UID:	10021-DAA
PAR: [1]	**9.39 dB**
MIF: [2]	**3.63 dB**
Standard Reference:	ETSI TS 100 909 V8.9.0 (2005-01) FCC OET KDB 941225, D03 and D04
Category:	Periodic pulsed modulation
Modulation:	GMSK
Frequency Band:	GSM 450 (450.4-457.6 MHz, 20016) GSM 480 (478.8-486.0 MHz, 20017) GSM 710 (698.0-716.0 MHz, 20018) GSM 750 (747.0-763.0 MHz, 20019) GSM 850 (824.0-849.0 MHz, 20021) P-GSM 900 (890.0-915.0 MHz, 20022) E-GSM 900 (880.0-915.0 MHz, 20023) R-GSM 900 (876.0-915.0 MHz, 20024) DCS 1800 (1710.0-1785.0 MHz, 20026) PCS 1900 (1850.0-1910.0 MHz, 20027)
Detailed Specification:	Active Slot: TN0 Data: PN9 continuous Frame: composed out of 8 Slots Multiframe: 26th (IDLE) Frame set blank Slottype & -timing: Normal burst for GMSK
Bandwidth:	0.4 MHz
Integration Time:	120.0 ms

[1] PAR (0.1%) in accordance with FCC KDB 971168, Section 6.0 "'Measurement of the Peak-to-Average Power Ratio (PAPR)"'

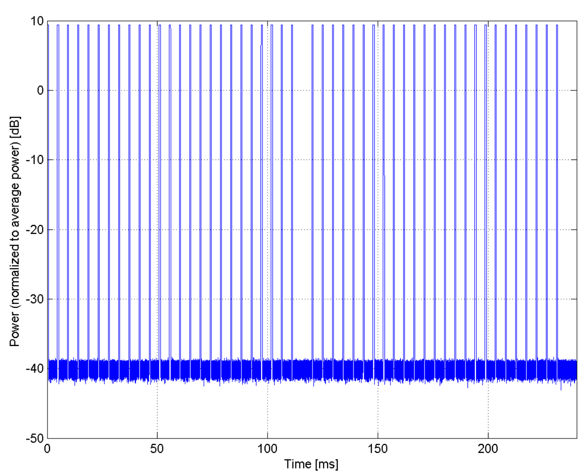
[2] Modulation Interference Factor (MIF) value valid only in conjunction with advanced probe response linearization calibration for the same communication system (same UID and version).



Complementary Cumulative Distribution Function (CCDF)



Frequency Domain

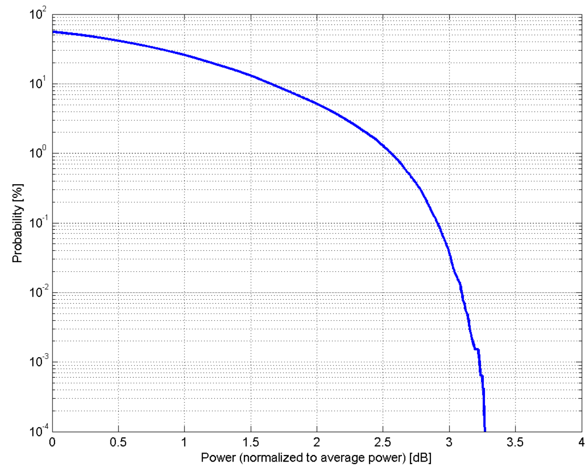


Time Domain

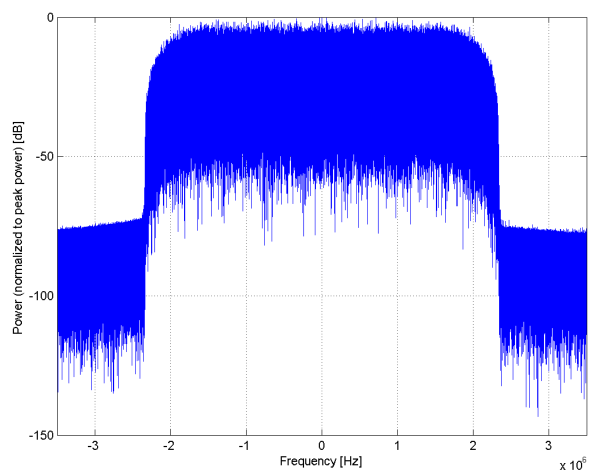
Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Name:	**UMTS-FDD (WCDMA)**
Group:	WCDMA
UID:	10011-CAA
PAR: [1]	**2.91 dB**
MIF: [2]	**-27.23 dB**
Standard Reference:	3GPP TS 25.141 Annex A FCC OET KDB 941225 D01 SAR test for 3G devices v02
Category:	Random amplitude modulation
Modulation:	QPSK
Frequency Band:	Band 1, UTRA/FDD (1920.0-1980.0 MHz, 20000) Band 2, UTRA/FDD (1850.0-1910.0 MHz, 20001) Band 3, UTRA/FDD (1710.0-1785.0 MHz, 20002) Band 4, UTRA/FDD (1710.0-1755.0 MHz, 20003) Band 5, UTRA/FDD (824.0-849.0 MHz, 20004) Band 6, UTRA/FDD (830.0-840.0 MHz, 20005) Band 7, UTRA/FDD (2500.0-2570.0 MHz, 20006) Band 8, UTRA/FDD (880.0-915.0 MHz, 20007) Band 9, UTRA/FDD (1749.9-1784.9 MHz, 20008) Band 10, UTRA/FDD (1710.0-1770.0 MHz, 20009) Band 11, UTRA/FDD (1427.9-1452.9 MHz, 20010) Band 12, UTRA/FDD (698.0-716.0 MHz, 20011) Band 13, UTRA/FDD (777.0-787.0 MHz, 20012) Band 14, UTRA/FDD (788.0-798.0 MHz, 20013) Band 19, UTRA/FDD (830.0-845.0 MHz, 20130) Band 20, UTRA/FDD (832.0-862.0 MHz, 20131) Band 21, UTRA/FDD (1447.9-1462.9 MHz, 20132)
Detailed Specification:	Dedicated Channel Type: RMC Bitrate: 12.2 kbps DPDCH: 60 kbps DPCCH: 15 kbps DPCCH/DPDCH power ratio: -5.46 dB
Bandwidth:	5.0 MHz
Integration Time:	100.0 ms

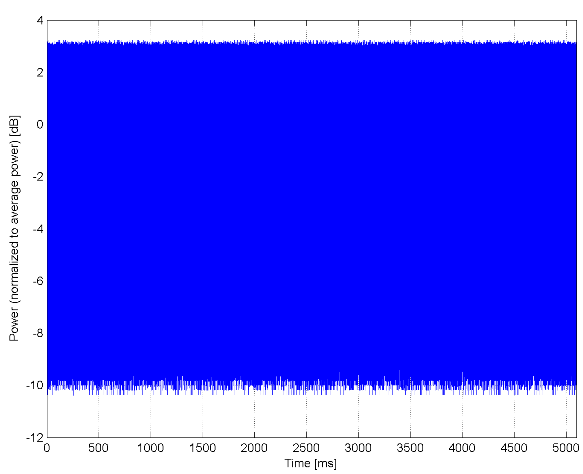
1 PAR (0.1%) in accordance with FCC KDB 971168, Section 6.0 "'Measurement of the Peak-to-Average Power Ratio (PAPR)"'
2 Modulation Interference Factor (MIF) value valid only in conjunction with advanced probe response linearization calibration for the same communication system (same UID and version).



Complementary Cumulative Distribution Function (CCDF)



Frequency Domain



Time Domain