HAC RF TEST REPORT

No. 2009HAC00004

For

TCT Mobile Limited

GSM/GPRS/EDGE 850/1800/1900 Tri-band mobile phone

Jade A

With

Hardware Version: Lot0

Software Version: V178

Results Summary: M Category = M3

Issued Date: 2009-11-5

***No.* DAT-P-114/01-01**

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

Test Laboratory:

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TABLE OF CONTENT

1 Test Laboratory

1.1 Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
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Postal Code:	100191
Telephone:	+86-10-62303288
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1.2 Testing Environment

Temperature:	18°C~25 °C,
Relative humidity:	30%~ 70%
Ground system resistance:	< 0.5 Ω

Ambient noise is checked and found very low and in compliance with requirement of standards.
Reflection of surrounding objects is minimized and in compliance with requirement of standards.

1.3 Project Data

Project Leader:	Sun Qian
Test Engineer:	Lin Hao
Testing Start Date:	October 30, 2009
Testing End Date:	October 30, 2009

1.4 Signature

Lin Hao

(Prepared this test report)

Sun Qian

(Reviewed this test report)

Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2 Client Information

2.1 Applicant Information

Company Name:	TCT Mobile Limited
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City:	Shanghai
Postal Code:	201203
Country:	P. R. China
Telephone:	0086-21-61460876
Fax:	0086-21-61460602

2.2 Manufacturer Information

Company Name:	TCT Mobile Limited
Address /Post:	4/F, South Building,No.2966, Jinke Road, Zhangjiang High-Tech Park, Pudong,Shanghai, 201203, P.R.China
City:	Shanghai
Postal Code:	201203
Country:	P. R. China
Telephone:	0086-21-61460876
Fax:	0086-21-61460602

3 Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1 About EUT

EUT Description:	GSM/GPRS/EDGE 850/1800/1900 Tri-band mobile phone
Model Name:	Jade A
Commercial Name:	OT-800A
Frequency Band:	GSM 850/ GSM 1800/ GSM 1900

Figure 3.1: Constituents of the sample

3.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	011851003178947	Lot0	V178

*EUT ID: is used to identify the test sample in the lab internally.

3.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Travel charger	T5002684AGAC	/	BYD
AE2	Travel charger	T5002684AGAA	/	Tenpao
AE3	Travel charger	CBA30Y0AG0C1	/	BYD
AE4	Battery	CAB30P0000C1	B0499601FEA	ZTE CORPORATION

*AE ID: is used to identify the test sample in the lab internally

4. Reference Documents

4.1Reference Documents for testing

The following document listed in this section is referred for testing.

Reference	Title	Version
ANSI C63.19-2007	American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids	2007 Edition

5 OPERATIONAL CONDITIONS DURING TEST

5.1 HAC MEASUREMENT SET-UP

These measurements are performed using the DASY5 NEO automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Stäubli), robot controller, Intel Core2 computer, near-field probe, probe alignment sensor. The robot is a six-axis industrial robot performing precise movements. A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the HP Intel Core2 1.86 GHz computer with Windows XP system and HAC Measurement Software DASY5 NEO, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

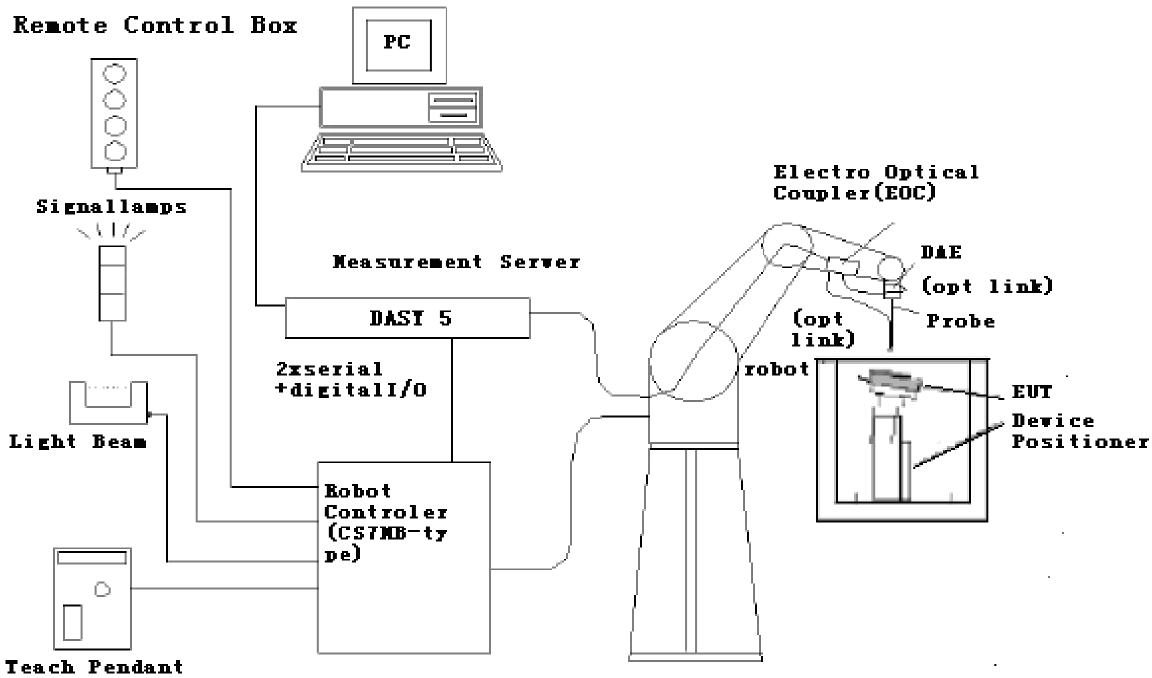


Fig. 2 HAC Test Measurement Set-up

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

5.2 Probe Specification

5.2.1 E-Field Probe Description

[ER3DV6]

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material
Calibration	In air from 100 MHz to 3.0 GHz (absolute accuracy ±6.0%, k=2)
Frequency	40 MHz to > 6 GHz (can be extended to < 20 MHz) Linearity: ± 0.2 dB (100 MHz to 3 GHz)
Directivity	± 0.2 dB in air (rotation around probe axis) ± 0.4 dB in air (rotation normal to probe axis)
Dynamic Range	2 V/m to > 1000 V/m; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.5 mm
Application	General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms

5.2.2 H-Field Probe Description

[H3DV6]

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)
Frequency	200 MHz to 3 GHz (absolute accuracy ± 6.0%, k=2); Output linearized
Directivity	± 0.2 dB (spherical isotropy error)
Dynamic Range	10 mA/m to 2 A/m at 1 GHz
E-Field Interference	< 10% at 3 GHz (for plane wave)
Dimensions	Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm) Distance from probe tip to dipole centers: 3 mm
Application	General magnetic near-field measurements up to 3 GHz (in air or liquids) Field component measurements Surface current measurements Low interaction with the measured field

5.3 Test Arch Phantom & Phone Positioner

The Test Arch phantom should be positioned horizontally on a stable surface. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. It enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot (Dimensions: 370 x 370 x 370 mm).

The Phone Positioner supports accurate and reliable positioning of any phone with effect on near field <±0.5 dB.

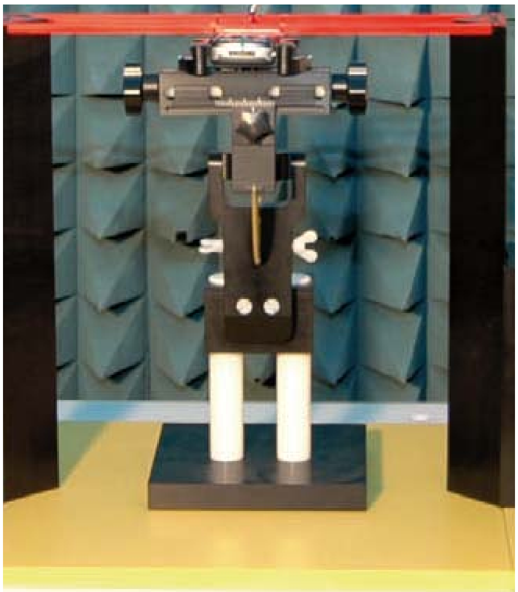


Fig. 3 HAC Phantom & Device Holder

5.4 Robotic System Specifications

Specifications

Positioner: Stäubli Unimation Corp. Robot Model: RX160L

Repeatability: ±0.02 mm

No. of Axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: Intel Core2

Clock Speed: 1.86 GHz

Operating System: Windows XP

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter, and control logic

Software: DASY5 software

Connecting Lines: Optical downlink for data and status info.
Optical uplink for commands and clock

6 EUT ARRANGEMENT

6.1 WD RF Emission Measurements Reference and Plane

Figure 4 illustrates the references and reference plane that shall be used in the WD emissions measurement.

- The grid is 5 cm by 5 cm area that is divided into 9 evenly sized blocks or sub-grids.
- The grid is centered on the audio frequency output transducer of the WD (speaker or T-coil).
- The grid is located by reference to a reference plane. This reference plane is the planar area that contains the highest point in the area of the WD that normally rests against the user's ear
- The measurement plane is located parallel to the reference plane and 15 mm from it, out from the phone. The grid is located in the measurement plane.

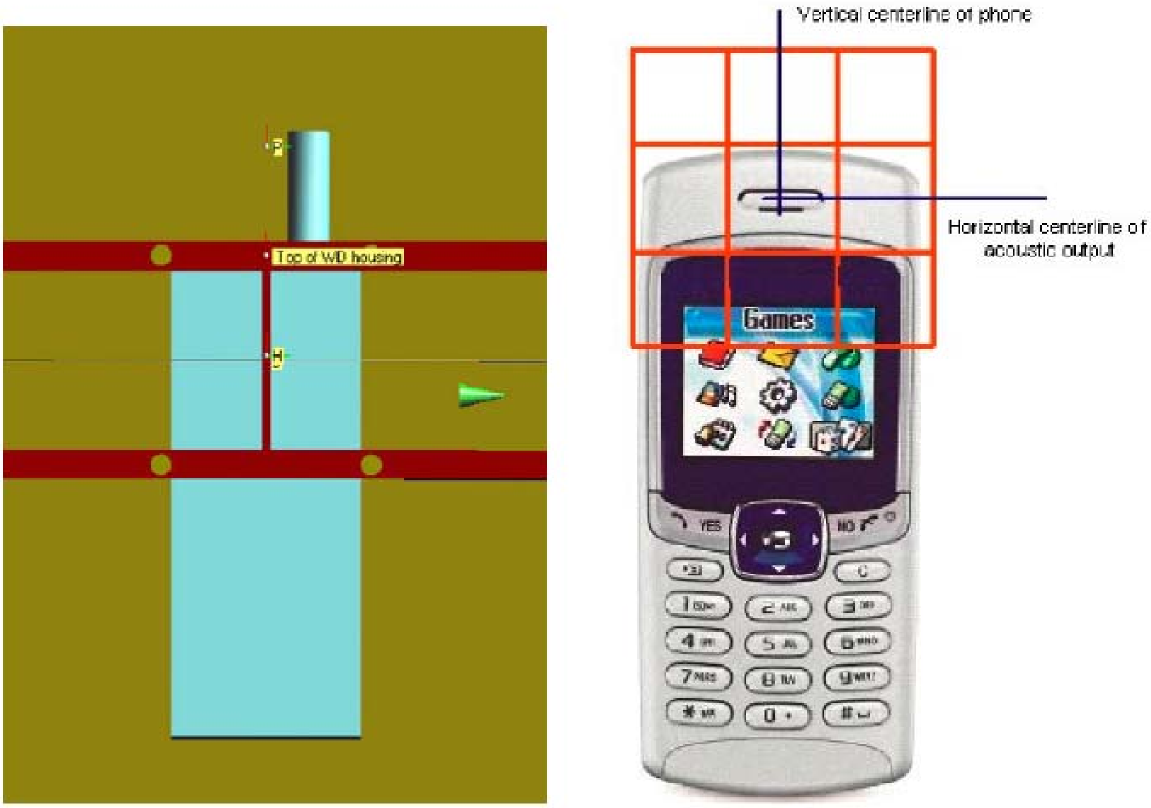


Fig. 4 WD reference and plane for RF emission measurements

7 SYSTEM VALIDATION

7.1 Validation Procedure

Place a dipole antenna meeting the requirements given in ANSI C63.19 D.5 in the position normally occupied by the WD. The dipole antenna serves as a known source for an electrical and magnetic output. Position the E-field and H-field probes so that:

• The probes and their cables are parallel to the coaxial feed of the dipole antenna

• The probe cables and the coaxial feed of the dipole antenna approach the measurement area from opposite directions

• The center point of the probe element(s) are 10 mm from the closest surface of the dipole elements.

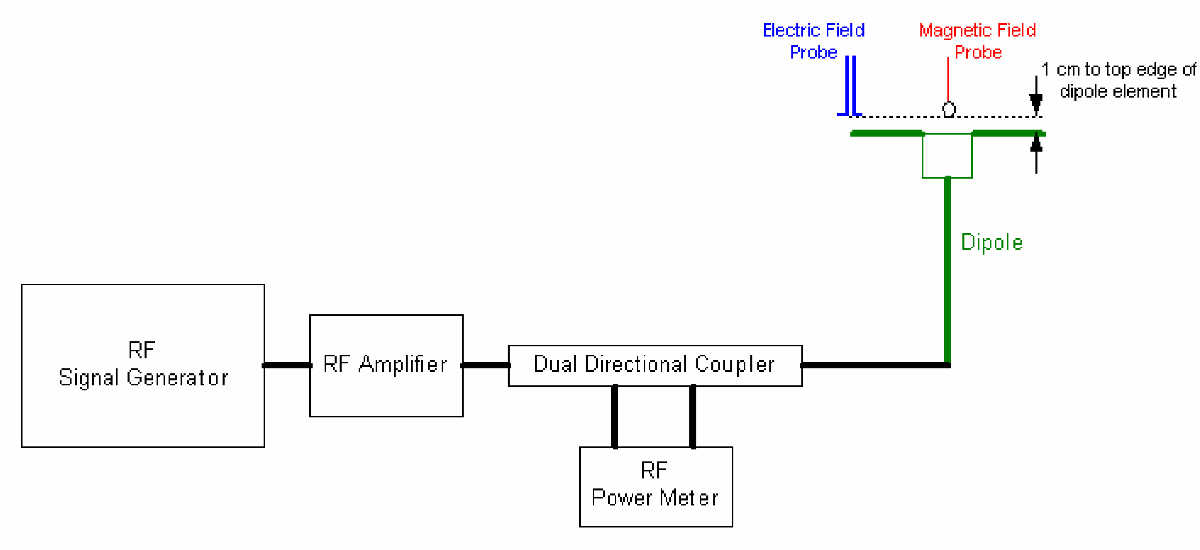


Fig. 5 Dipole Validation Setup

7.2 Validation Result

E-Field Scan						
Mode	**Frequency (MHz)**	**Input Power (mW)**	**Measured[1] Value(V/m)**	**Target[2] Value(V/m)**	**Deviation[3] (%)**	**Limit[4] (%)**
CW	835	100	173.3	163.3	+6.12%	±25
CW	1880	100	134.2	136.7	-1.83%	±25
H-Field Scan						
Mode	**Frequency (MHz)**	**Input Power (mW)**	**Measured Value(A/m)**	**Target Value(A/m)**	**Deviation (%)**	**Limit (%)**
CW	835	100	0.423	0.451	-6.21%	±25
CW	1880	100	0.413	0.461	-10.4%	±25

Notes:

1. Please refer to the attachment for detailed measurement data and plot.

2. Target value is provided by SPEAD in the calibration certificate of specific dipoles.

3. Deviation (%) = 100 * (Measured value minus Target value) divided by Target value.

4. ANSI C63.19 requires values within ± 25% are acceptable, of which 12% is deviation and 13% is measurement uncertainty. Values independently validated for the dipole actually used in the measurements should be used, when available.

8 Probe Modulation Factor

The Probe Modulation Factor (PMF) is defined as the ratio of the field readings for a CW and a modulated signal with the equivalent Field Envelope Peak as defined in ANSI C63.19 (Chapter C.3.1).Calibration shall be made of the modulation response of the probe and its instrumentation chain. This Calibration shall be performed with the field probe, attached to the instrumentation that is to be used with it during the measurement. The response of the probe system to a CW field at the frequency(s) of interest is compared to its response to a modulated signal with equal peak amplitude. The field level of the test signals shall be more than 10dB above the ambient level and the noise floor of the instrumentation being used. The ratio of the CW reading to that taken with a modulated field shall be applied to the readings taken of modulated fields of the specified type.

8.1 Modulation Factor Test Procedure

This may be done using the following procedure:

1. Fix the field probe in a set location relative to a field generating device, such as the reference dipole antenna, as illustrated in Figure 6.
2. Illuminate the probe using the wireless device connected to the reference dipole with a test signal at the intended measurement frequency, Ensure there is sufficient field coupling between the probe and the antenna so the resulting reading is greater than 10 dB above the probe system noise floor but within the systems operating range.
3. Record the amplitude applied to the antenna during transmission and the field strength measured by the E-field probe located near the tip of the dipole antenna
4. Replace the wireless device with an RF signal generator producing an unmodulated CW signal and set to the wireless device operating frequency.
5. Set the amplitude of the unmodulated signal to equal that recorded from the wireless device.
6. Record the reading of the probe measurement system of the unmodulated signal.
7. The ratio, in linear units, of the probe reading in Step 6) to the reading in Step 3) is the E-field modulation factor. $PMF_E = E_{CW} / E_{mod}$ ($PMF_H = H_{CW} / H_{mod}$)
8. Repeat the previous steps using the H-field probe, except locate the probe at the center of the dipole.

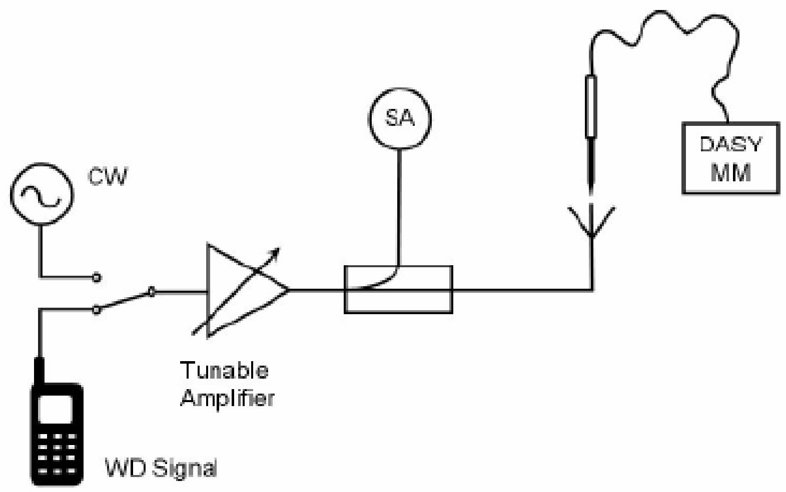


Fig. 6 Probe Modulation Factor Test Setup

8.2 Modulation Factor

8.2.1 E-Field

Frequency (MHz)	Mode	Input Power (mW)	E-Field Measured Value (V/m)	Probe Modulation Factor
835	**CW**	**100**	**173.3**	****
	GSM	100	60.2	**2.88**
1880	**CW**	**100**	**134.2**	****
	GSM	100	46.6	**2.88**

8.2.2 H-Field

Frequency (MHz)	Mode	Input Power (mW)	H-Field Measured Value (V/m)	Probe Modulation Factor
835	**CW**	**100**	**0.423**	****
	GSM	100	0.147	**2.88**
1880	**CW**	**100**	**0.413**	****
	GSM	100	0.143	**2.88**

9 RF TEST PROCEDUERES

The evaluation was performed with the following procedure:

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

2) Position the WD in its intended test position. The gauge block can simplify this positioning. Note that a separate E-field and H-field gauge block will be needed if the center of the probe sensor elements are at different distances from the tip of the probe.

3) Configure the WD normal operation for maximum rated RF output power, at the desired channel and other operating parameters (e.g., test mode), as intended for the test.

4) The center sub-grid shall centered on the center of the T-Coil mode axial 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. If the field alignment method is used, align the probe for maximum field reception.

5) Record the reading.

6) 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.

7) Identify the five contiguous sub-grids around the center sub-grid with the lowest maximum field strength readings. Thus the six areas to be used to determine the WD's highest emissions are identified and outlined for the final manual scan. Please note that a maximum of five blocks can be excluded for both E-field and H-field measurements for the WD output being measured. Stated another way, the center sub-grid and three others must be common to both the E-field and H-field measurements.

8) Identify the maximum field reading within the non-excluded sub-grids identified in Step 7)

9) Convert the maximum field strength reading identified in Step 8) to V/m or A/m, as appropriate. For probes which require a probe modulation factor, this conversion shall be done using the appropriate probe modulation factor and the calibration.

10) Repeat Step 1) through Step 10) for both the E-field and H-field measurements.

11) Compare this reading to the categories in ANSI C63.19 Clause 7 and record the resulting category. The lowest category number listed in 7.2, Table 7.4, or Table 7.5 obtained in Step 10) for either E- or H-field determines the M category for the audio coupling mode assessment. Record the WD category rating.

10 HAC RF TEST DATA SUMMARY

10.1 Measurement Results (E-Field)

Frequency		AWF	Measured Value (V/m)	Power Drift (dB)	Category
MHz	Channel				
GSM 850					
848.8	251	-5	97.1	-0.059	**M4**(see Fig B.1)
836.6	190	-5	120.3	0.042	**M4**(see Fig B.2)
824.2	128	-5	90.5	0.026	**M4**(see Fig B.3)
GSM 1900					
1909.8	810	-5	67	0.023	**M3**(see Fig B.4)
1880	661	-5	71.3	-0.043	**M3**(see Fig B.5)
1850.2	512	-5	71.8	0.032	**M3**(see Fig B.6)

10.2 Measurement Results (H-Field)

Frequency		AWF	Measured Value (A/m)	Power Drift (dB)	Category
MHz	Channel				
GSM 850					
848.8	251	-5	0.331	-0.041	**M4**(see Fig B.7)
836.6	190	-5	0.378	-0.010	**M4**(see Fig B.8)
824.2	128	-5	0.370	-0.074	**M4**(see Fig B.9)
GSM 1900					
1909.8	810	-5	0.161	-0.00688	**M3**(see Fig B.10)
1880	661	-5	0.181	0.00791	**M3**(see Fig B.11)
1850.2	512	-5	0.187	-0.026	**M3**(see Fig B.12)

10.3 Total M-rating

Mode	Maximum value of peak Total E-Field (V/m)	Maximum value of peak Total H-Field (A/m)	E-Field M Rating	H-Field M Rating	Total M Rating
GSM 850	90.5	0.370	M4 (AWF -5 dB)	M4 (AWF -5 dB)	**M4**(see Fig B.13)
GSM 1900	71.8	0.187	M3 (AWF -5 dB)	M3 (AWF -5 dB)	**M3**(see Fig B.14)

11 ANSI C 63.19-2007 LIMITS

Table 1: Telephone near-field categories in linear units

Category		Telephone RF parameters < 960 MHz			
Near field	AWF	E-field emissions		H-field emissions	
Category M1/T1	0	631.0 to 1122.0	V/m	1.91 to 3.39	A/m
	–5	473.2 to 841.4	V/m	1.43 to 2.54	A/m
Category M2/T2	0	354.8 to 631.0	V/m	1.07 to 1.91	A/m
	–5	266.1 to 473.2	V/m	0.80 to 1.43	A/m
Category M3/T3	0	199.5 to 354.8	V/m	0.60 to 1.07	A/m
	–5	149.6 to 266.1	V/m	0.45 to 0.80	A/m
Category M4/T4	0	< 199.5	V/m	< 0.60	A/m
	–5	< 149.6	V/m	< 0.45	A/m
Category		**Telephone RF parameters > 960 MHz**			
Near field	**AWF**	**E-field emissions**		**H-field emissions**	
Category M1/T1	0	199.5 to 354.8	V/m	0.60 to 1.07	A/m
	–5	149.6 to 266.1	V/m	0.45 to 0.80	A/m
Category M2/T2	0	112.2 to 199.5	V/m	0.34 to 0.60	A/m
	–5	84.1 to 149.6	V/m	0.25 to 0.45	A/m
Category M3/T3	0	63.1 to 112.2	V/m	0.19 to 0.34	A/m
	–5	47.3 to 84.1	V/m	0.14 to 0.25	A/m
Category M4/T4	0	< 63.1	V/m	< 0.19	A/m
	–5	< 47.3	V/m	< 0.14	A/m

12 MEASUREMENT UNCERTAINTY

No.	Error source	Type	Uncertainty Value (%)	Prob. Dist.	k	c_i E	c_i H	Standard Uncertainty (%) u_i' (%) E	Standard Uncertainty (%) u_i' (%) H	Degree of freedom V_{eff} or v_i
Measurement System										
1	Probe Calibration	B	5.	N	1	1	1	5.1	5.1	∞
2	Axial Isotropy	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞
3	Sensor Displacement	B	16.5	R	$\sqrt{3}$	1	0.145	9.5	1.4	∞
4	Boundary Effects	B	2.4	R	$\sqrt{3}$	1	1	1.4	1.4	∞
5	Linearity	B	4.7	R	$\sqrt{3}$	1	1	2.7	2.7	∞

6	Scaling to Peak Envelope Power	B	2.0	R	$\sqrt{3}$	1	1	1.2	1.2	∞
7	System Detection Limit	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
8	Readout Electronics	B	0.3	N	1	1	1	0.3	0.3	∞
9	Response Time	B	0.8	R	$\sqrt{3}$	1	1	0.5	0.5	∞
10	Integration Time	B	2.6	R	$\sqrt{3}$	1	1	1.5	1.5	∞
11	RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1	1.7	1.7	∞
12	RF Reflections	B	12.0	R	$\sqrt{3}$	1	1	6.9	6.9	∞
13	Probe Positioner	B	1.2	R	$\sqrt{3}$	1	0.67	0.7	0.5	∞
14	Probe Positioning	A	4.7	R	$\sqrt{3}$	1	0.67	2.7	1.8	∞
15	Extra. And Interpolation	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
Test Sample Related										
16	Device Positioning Vertical	B	4.7	R	$\sqrt{3}$	1	0.67	2.7	1.8	∞
17	Device Positioning Lateral	B	1.0	R	$\sqrt{3}$	1	1	0.6	0.6	∞
18	Device Holder and Phantom	B	2.4	R	$\sqrt{3}$	1	1	1.4	1.4	∞
19	Power Drift	B	5.0	R	$\sqrt{3}$	1	1	2.9	2.9	∞
Phantom and Setup related										
20s	Phantom Thickness	B	2.4	R	$\sqrt{3}$	1	0.67	1.4	0.9	∞
Combined standard uncertainty(%)								14.7	10.9	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2			29.4	21.8	

13 MAIN TEST INSTRUMENTS

Table 2: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	E-Field Probe	ER3DV6	2428	December 12, 2008	One year
02	H-Field Probe	H3DV6	6260	December 12, 2008	One year
03	HAC Dipole	CD835V3	1023	July 9, 2008	Two years
04	HAC Dipole	CD1880V3	1018	July 9, 2008	Two years
05	BTS	CMU 200	113312	August 10, 2009	One year
06	DAE	SPEAG DAE4	777	November 21, 2008	One year

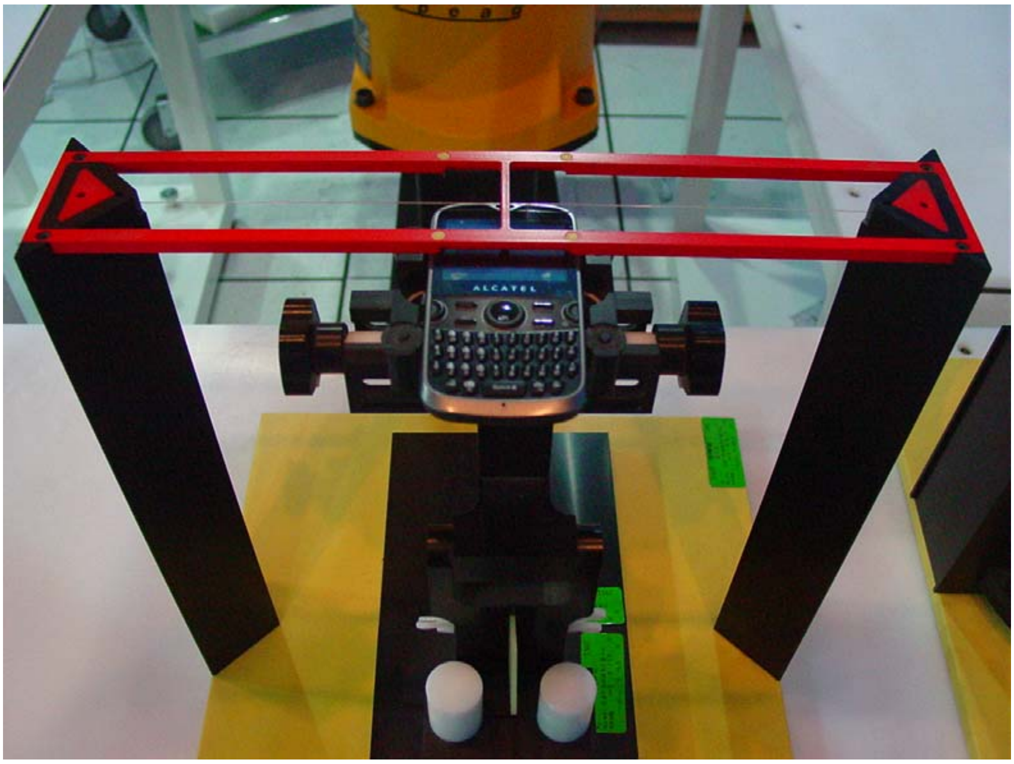
14 CONCLUSION

The HAC measurement indicates that the EUT complies with the HAC limits of the ANSI C63.19-2007. The total M-ratings is **M4** for **GSM 850** and **M3** for **GSM 1900.**

END OF REPORT BODY

ANNEX A TEST LAYOUT

Picture A1: HAC RF System Layout



Picture A2: EUT Positioning

ANNEX B TEST PLOTS

HAC RF E-Field GSM 850 High

Date/Time: 10/30/2009 6:15:22 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

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

Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 97.1 V/m

Probe Modulation Factor = 2.88

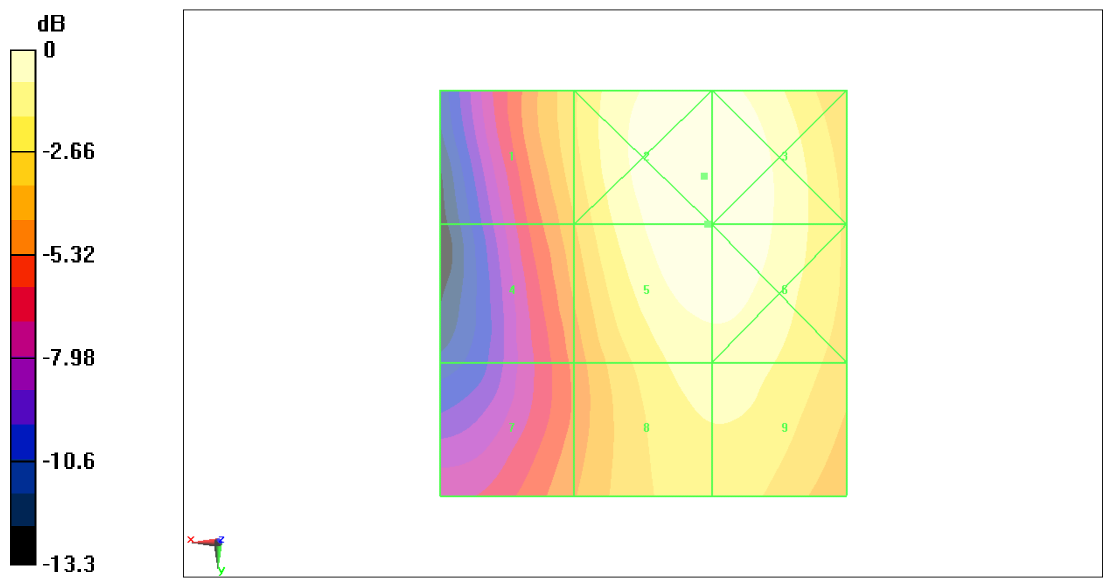
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 40.1 V/m; Power Drift = -0.059 dB

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

Peak E-field in V/m

Grid 1 **71.5 M4**	Grid 2 **98.3 M4**	Grid 3 **98.2 M4**
Grid 4 **64.8 M4**	Grid 5 **97.1 M4**	Grid 6 **97.1 M4**
Grid 7 **58.6 M4**	Grid 8 **84.9 M4**	Grid 9 **85 M4**



0 dB = 98.3V/m

Fig B.1 HAC RF E-Field GSM 850 High

HAC RF E-Field GSM 850 Middle

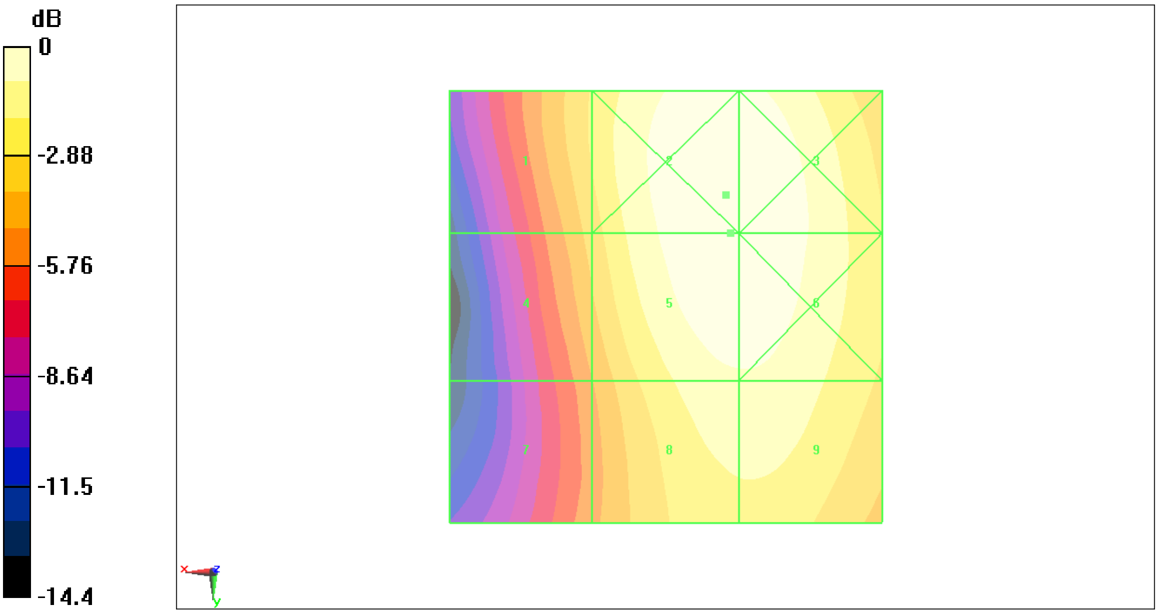
Date/Time: 10/30/2009 6:21:19 PM

Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Ambient Temperature:23.3°C   Liquid Temperature: 22.5°C
Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 120.3 V/m
Probe Modulation Factor = 2.88
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 50.7 V/m; Power Drift = 0.042 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1 **88.6 M4**	Grid 2 **121.0 M4**	Grid 3 **120.6 M4**
Grid 4 **81.9 M4**	Grid 5 **120.3 M4**	Grid 6 **120.1 M4**
Grid 7 **69.5 M4**	Grid 8 **106.7 M4**	Grid 9 **106.8 M4**



0 dB = 121.0V/m

Fig B.2 HAC RF E-Field GSM 850 Middle

HAC RF E-Field GSM 850 Low

Date/Time: 10/30/2009 6:27:06 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

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

Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 90.5 V/m

Probe Modulation Factor = 2.88

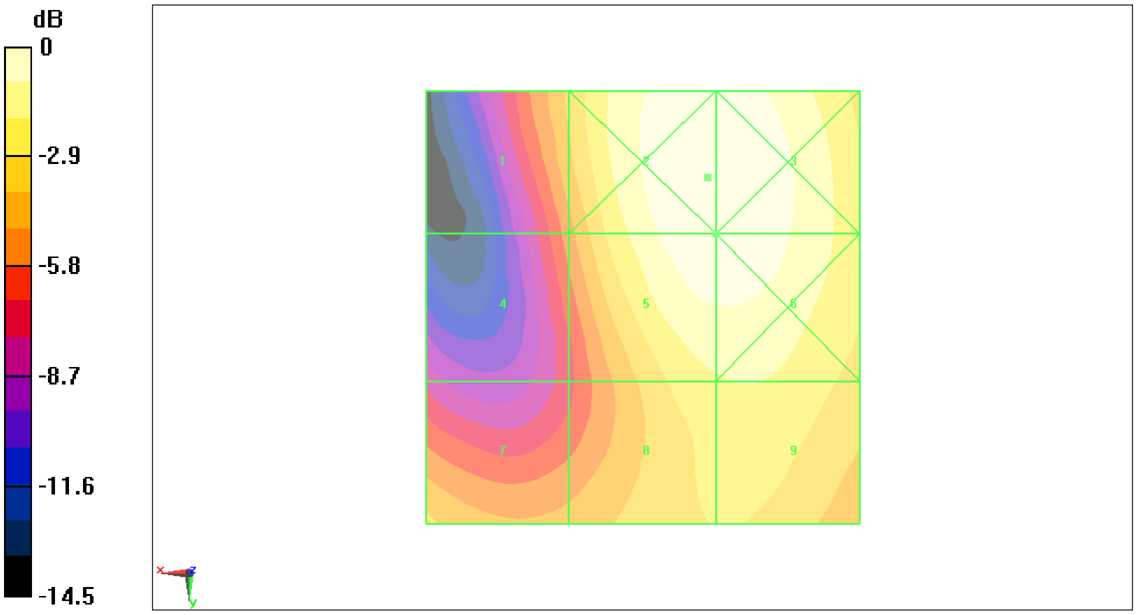
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 34.8 V/m; Power Drift = 0.026 dB

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

Peak E-field in V/m

Grid 1 **60.9 M4**	Grid 2 **92.6 M4**	Grid 3 **92.5 M4**
Grid 4 **50.7 M4**	Grid 5 **90.5 M4**	Grid 6 **90.5 M4**
Grid 7 **61.5 M4**	Grid 8 **73.3 M4**	Grid 9 **74.5 M4**



0 dB = 92.6V/m

Fig B.3 HAC RF E-Field GSM 850 Low

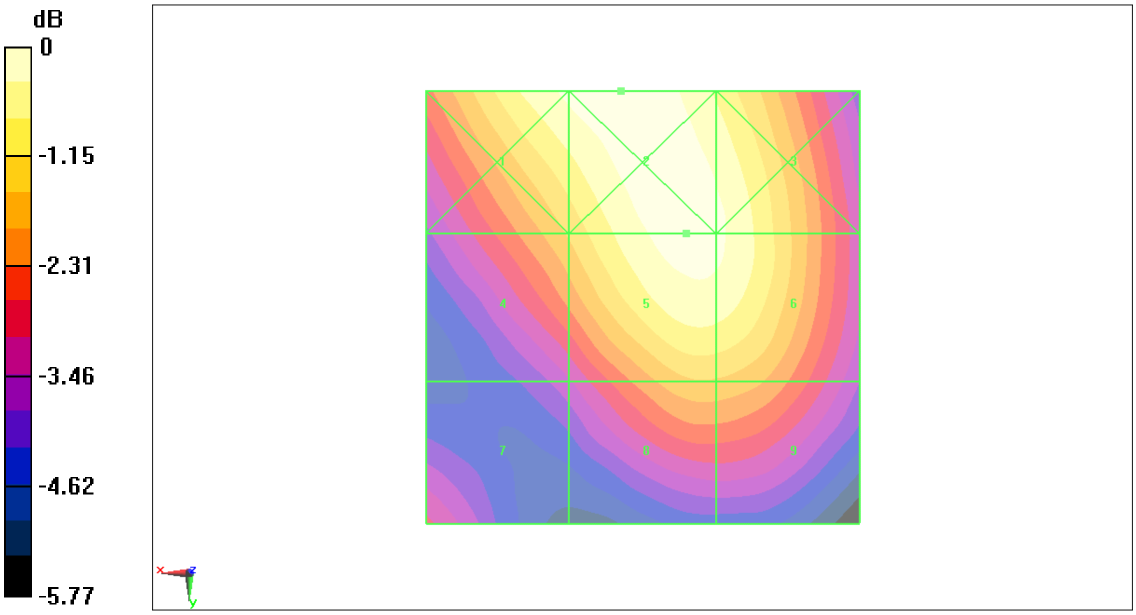
HAC RF E-Field GSM 1900 High

Date/Time: 10/30/2009 6:44:26 PM
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Ambient Temperature:23.3°C Liquid Temperature: 22.5°C
Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3
Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 67 V/m
Probe Modulation Factor = 2.88
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 28.2 V/m; Power Drift = 0.023 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1 **66.7 M3**	Grid 2 **68.8 M3**	Grid 3 **66.5 M3**
Grid 4 **58 M3**	Grid 5 **67 M3**	Grid 6 **66.4 M3**
Grid 7 **49.2 M3**	Grid 8 **57.6 M3**	Grid 9 **57.4 M3**



0 dB = 68.8V/m

Fig B.4 HAC RF E-Field GSM 1900 High

HAC RF E-Field GSM 1900 Middle

Date/Time: 10/30/2009 6:51:01 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 71.3 V/m

Probe Modulation Factor = 2.88

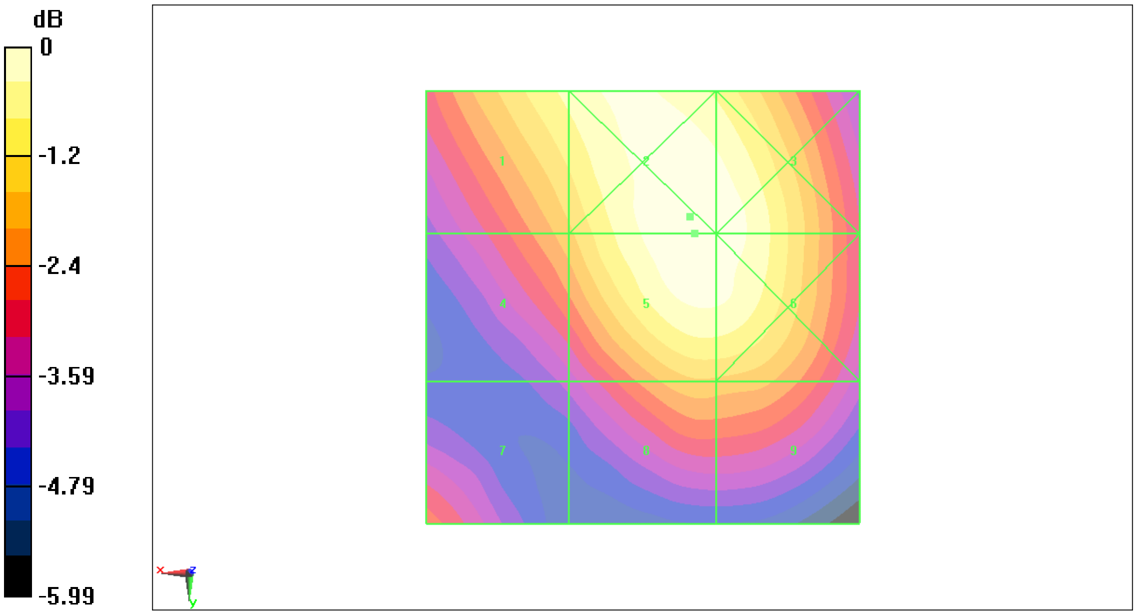
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 29.9 V/m; Power Drift = -0.043 dB

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

Peak E-field in V/m

Grid 1 **66.1 M3**	Grid 2 **71.4 M3**	Grid 3 **70.9 M3**
Grid 4 **58.7 M3**	Grid 5 **71.3 M3**	Grid 6 **70.8 M3**
Grid 7 **53.4 M3**	Grid 8 **59.2 M3**	Grid 9 **58.9 M3**



0 dB = 71.4V/m

Fig B.5 HAC RF E-Field GSM 1900 Middle

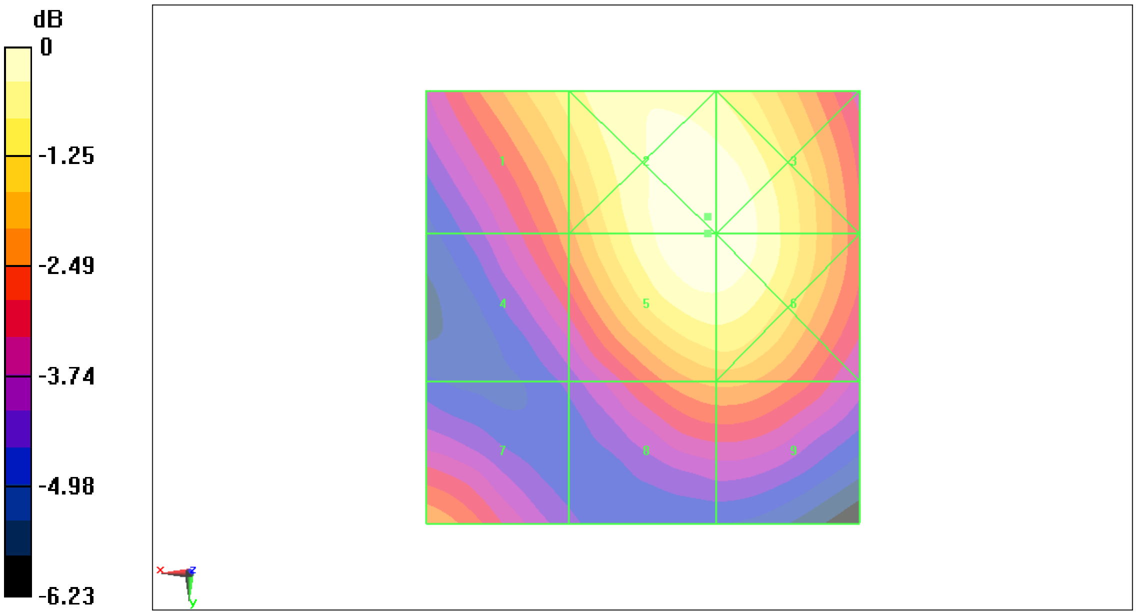
HAC RF E-Field GSM 1900 Low

Date/Time: 10/30/2009 6:56:46 PM
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3
Ambient Temperature:23.3°C Liquid Temperature: 22.5°C
Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 71.8 V/m
Probe Modulation Factor = 2.88
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 28.6 V/m; Power Drift = 0.032 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1 **63.9 M3**	Grid 2 **72 M3**	Grid 3 **71.9 M3**
Grid 4 **55.7 M3**	Grid 5 **71.8 M3**	Grid 6 **71.8 M3**
Grid 7 **56.6 M3**	Grid 8 **57.6 M3**	Grid 9 **57.7 M3**



0 dB = 72V/m

Fig B.6 HAC RF E-Field GSM 1900 Low

HAC RF H-Field GSM 850 High

Date/Time: 10/30/2009 7:32:32 PM

Electronics: DAE4 Sn777

Medium: Air

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

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

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

Probe: H3DV6 - SN6260;

H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.331 A/m

Probe Modulation Factor = 2.88

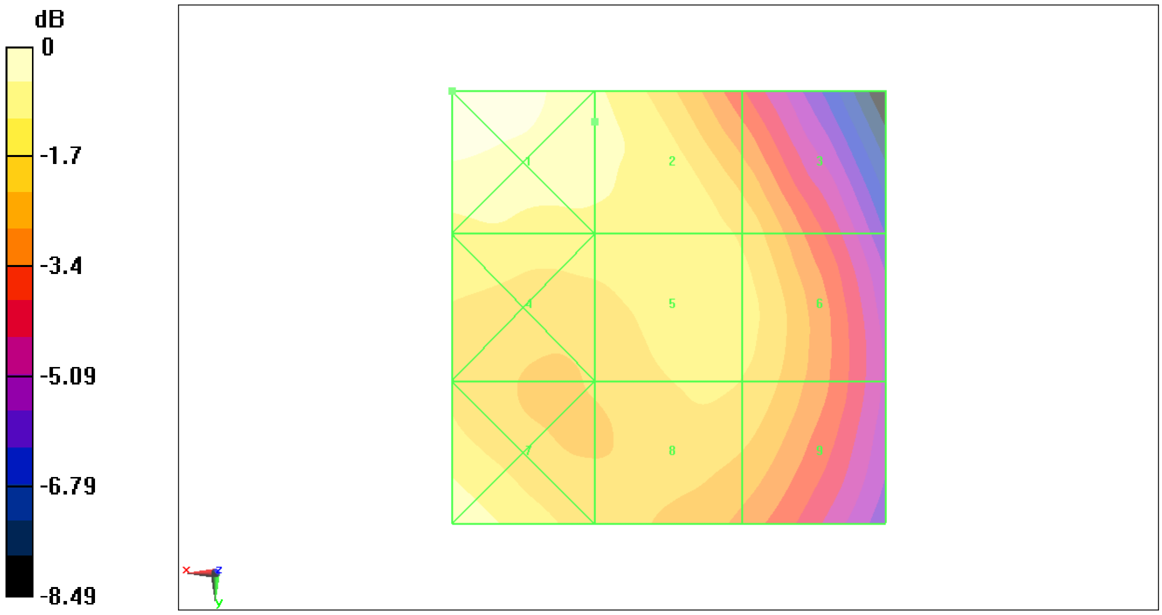
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.138 A/m; Power Drift = -0.041 dB

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

Peak H-field in A/m

Grid 1 **0.370 M4**	Grid 2 **0.331 M4**	Grid 3 **0.301 M4**
Grid 4 **0.321 M4**	Grid 5 **0.322 M4**	Grid 6 **0.313 M4**
Grid 7 **0.346 M4**	Grid 8 **0.309 M4**	Grid 9 **0.304 M4**



0 dB = 0.370A/m

Fig B.7 HAC RF H-Field GSM 850 High

HAC RF H-Field GSM 850 Middle

Date/Time: 10/30/2009 7:43:24 PM

Electronics: DAE4 Sn777

Medium: Air

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

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

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

Probe: H3DV6 - SN6260;

H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.378 A/m

Probe Modulation Factor = 2.88

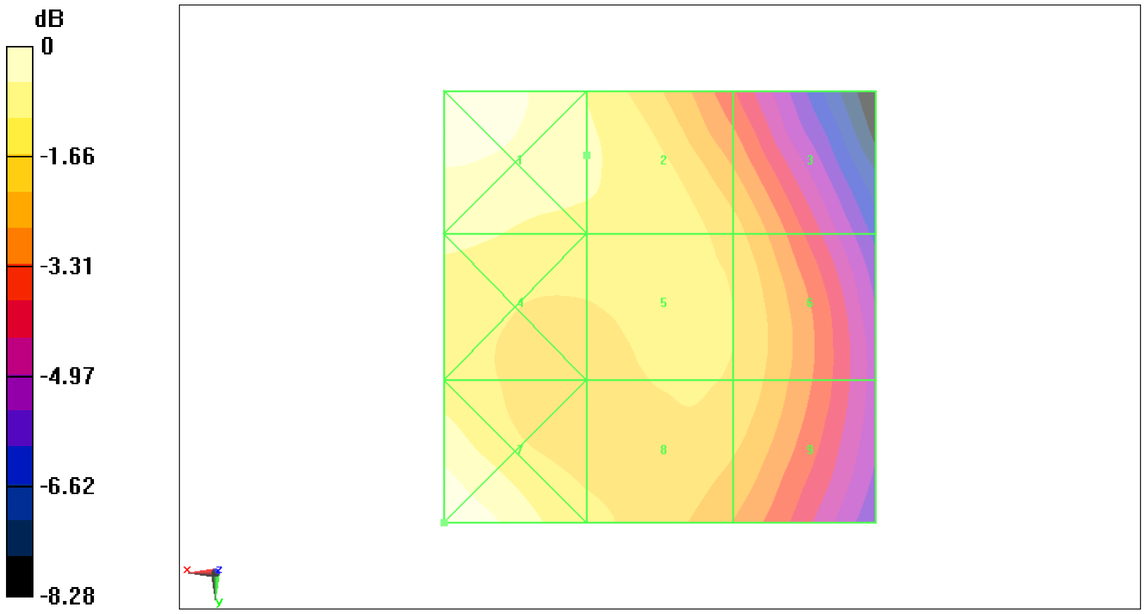
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.156 A/m; Power Drift = -0.010 dB

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

Peak H-field in A/m

Grid 1 **0.423 M4**	Grid 2 **0.378 M4**	Grid 3 **0.339 M4**
Grid 4 **0.380 M4**	Grid 5 **0.368 M4**	Grid 6 **0.352 M4**
Grid 7 **0.425 M4**	Grid 8 **0.358 M4**	Grid 9 **0.348 M4**



0 dB = 0.425A/m

Fig B.8 HAC RF H-Field GSM 850 Middle

HAC RF H-Field GSM 850 Low

Date/Time: 10/30/2009 7:53:10 PM

Electronics: DAE4 Sn777

Medium: Air

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

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

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

Probe: H3DV6 - SN6260;

H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.370 A/m

Probe Modulation Factor = 2.88

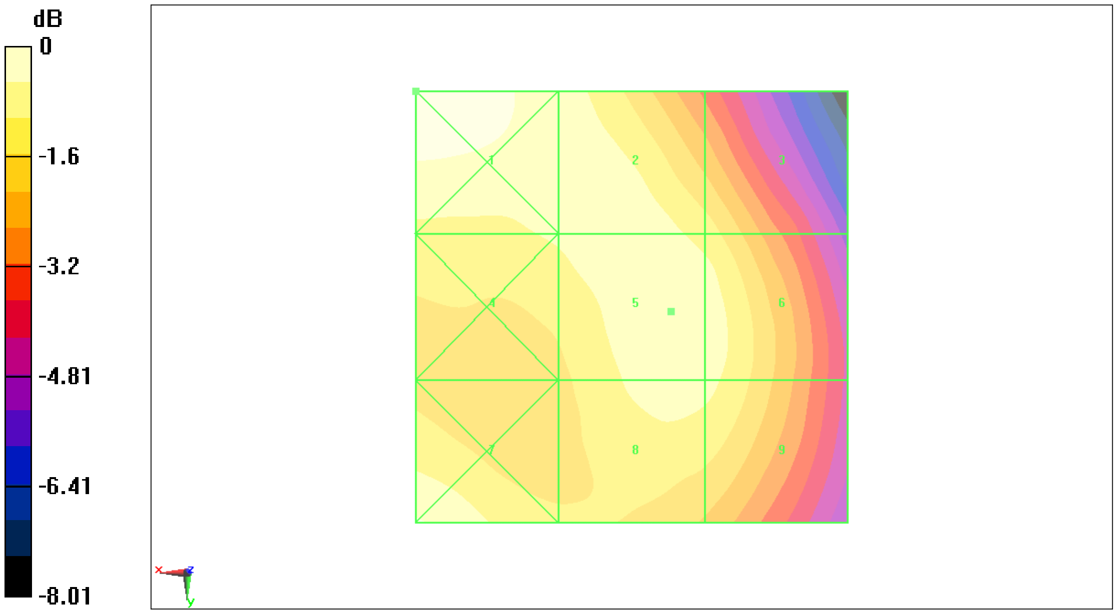
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.163 A/m; Power Drift = -0.074 dB

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

Peak H-field in A/m

Grid 1 **0.398 M4**	Grid 2 **0.365 M4**	Grid 3 **0.342 M4**
Grid 4 **0.355 M4**	Grid 5 **0.370 M4**	Grid 6 **0.365 M4**
Grid 7 **0.378 M4**	Grid 8 **0.362 M4**	Grid 9 **0.358 M4**



0 dB = 0.398A/m

Fig B.9 HAC RF H-Field GSM 850 Low

HAC RF H-Field GSM 1900 High

Date/Time: 10/30/2009 7:12:17 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3

Ambient Temperature:23.3°C   Liquid Temperature: 22.5°C

Communication System: DCS 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:8.3

Probe: H3DV6 - SN6260;

H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.161 A/m

Probe Modulation Factor = 2.88

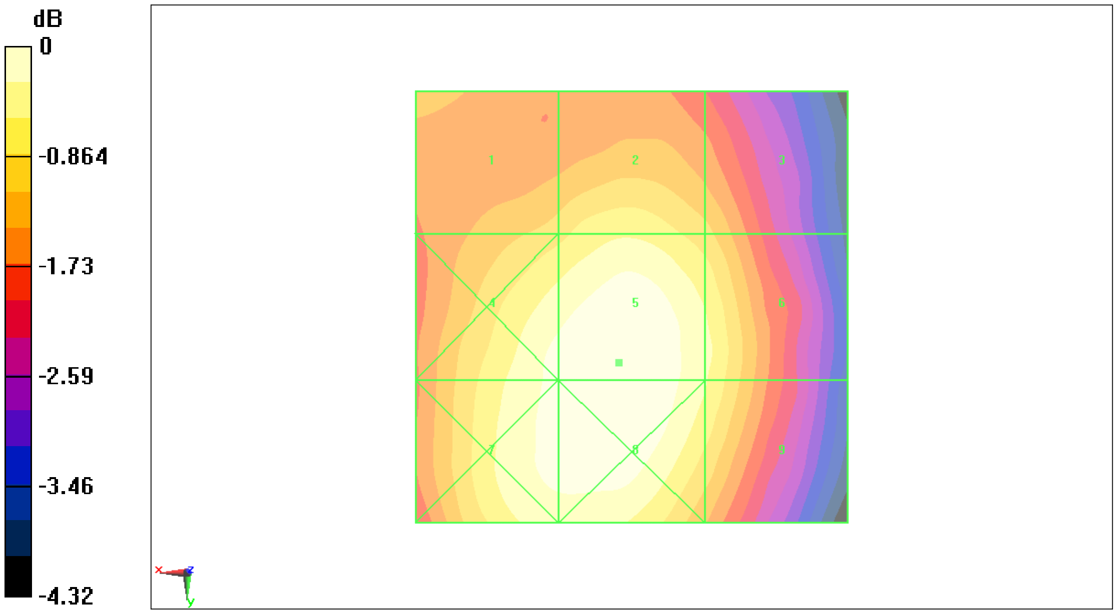
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.067 A/m; Power Drift = -0.00688 dB

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

Peak H-field in A/m

Grid 1 **0.144 M3**	Grid 2 **0.150 M3**	Grid 3 **0.143 M3**
Grid 4 **0.158 M3**	Grid 5 **0.161 M3**	Grid 6 **0.152 M3**
Grid 7 **0.158 M3**	Grid 8 **0.161 M3**	Grid 9 **0.151 M3**



0 dB = 0.161A/m

Fig B.10 HAC RF H-Field GSM 1900 High

HAC RF H-Field GSM 1900 Middle

Date/Time: 10/30/2009 7:18:10 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3

Ambient Temperature:23.3°C Liquid Temperature: 22.5°C

Communication System: DCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Probe: H3DV6 - SN6260;

H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.181 A/m

Probe Modulation Factor = 2.88

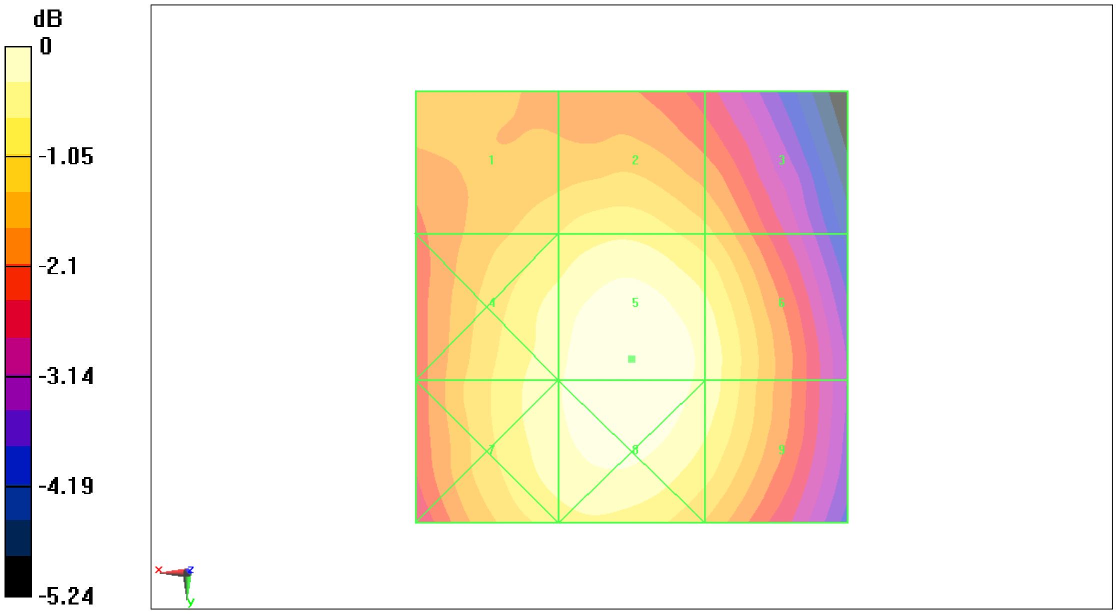
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.077 A/m; Power Drift = 0.00791 dB

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

Peak H-field in A/m

Grid 1 **0.160 M3**	Grid 2 **0.166 M3**	Grid 3 **0.156 M3**
Grid 4 **0.173 M3**	Grid 5 **0.181 M3**	Grid 6 **0.172 M3**
Grid 7 **0.173 M3**	Grid 8 **0.180 M3**	Grid 9 **0.171 M3**



0 dB = 0.181A/m

Fig B.11 HAC RF H-Field GSM 1900 Middle

HAC RF H-Field GSM 1900 Low

Date/Time: 10/30/2009 7:23:49 PM

Electronics: DAE4 Sn777

Medium: Air

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

Ambient Temperature:23.3°C   Liquid Temperature: 22.5°C

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Probe: H3DV6 - SN6260;

H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.187 A/m

Probe Modulation Factor = 2.88

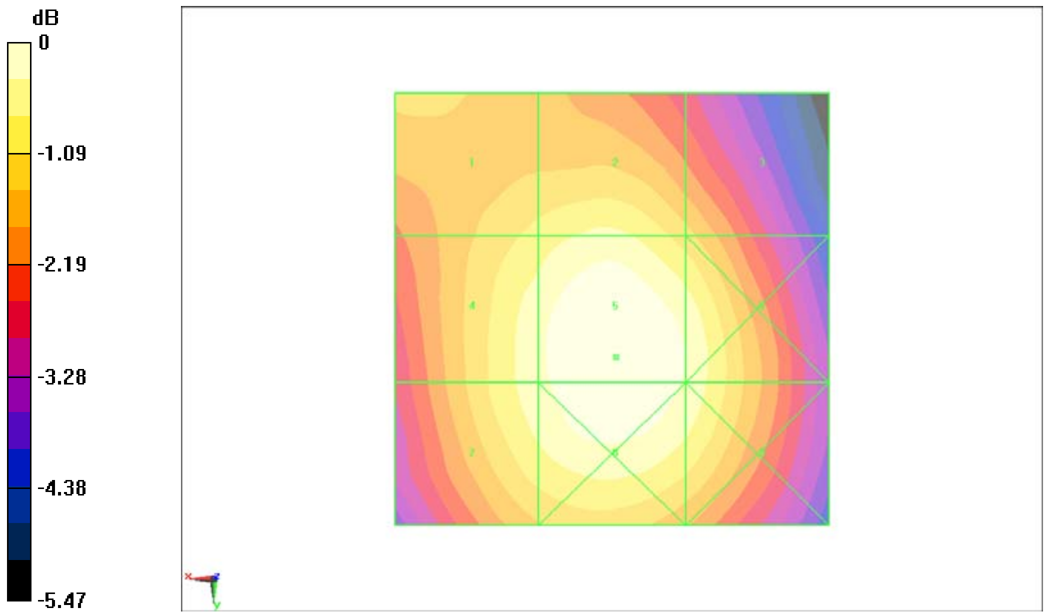
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.081 A/m; Power Drift = -0.026 dB

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

Peak H-field in A/m

Grid 1 **0.167 M3**	Grid 2 **0.174 M3**	Grid 3 **0.161 M3**
Grid 4 **0.177 M3**	Grid 5 **0.187 M3**	Grid 6 **0.179 M3**
Grid 7 **0.177 M3**	Grid 8 **0.186 M3**	Grid 9 **0.178 M3**



0 dB = 0.187A/m

Fig B.12 HAC RF H-Field GSM 1900 Low

Total M-rating of GSM 850 MHz Band

Date/Time: 10/30/2009 6:27:06 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3

Ambient Temperature:23.3°C   Liquid Temperature: 22.5°C

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

Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 90.5 V/m

Probe Modulation Factor = 2.88

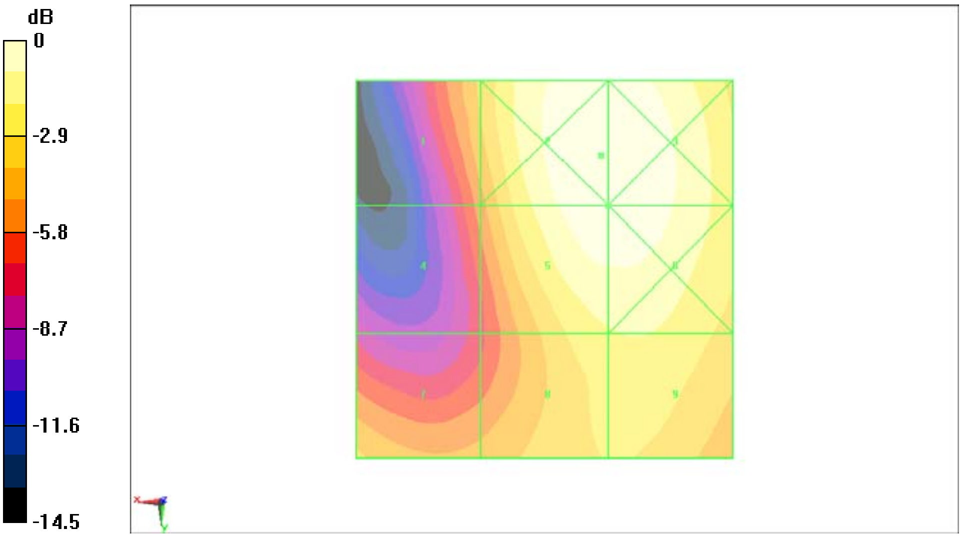
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 34.8 V/m; Power Drift = 0.026 dB

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

Peak E-field in V/m

Grid 1 **60.9 M4**	Grid 2 **92.6 M4**	Grid 3 **92.5 M4**
Grid 4 **50.7 M4**	Grid 5 **90.5 M4**	Grid 6 **90.5 M4**
Grid 7 **61.5 M4**	Grid 8 **73.3 M4**	Grid 9 **74.5 M4**

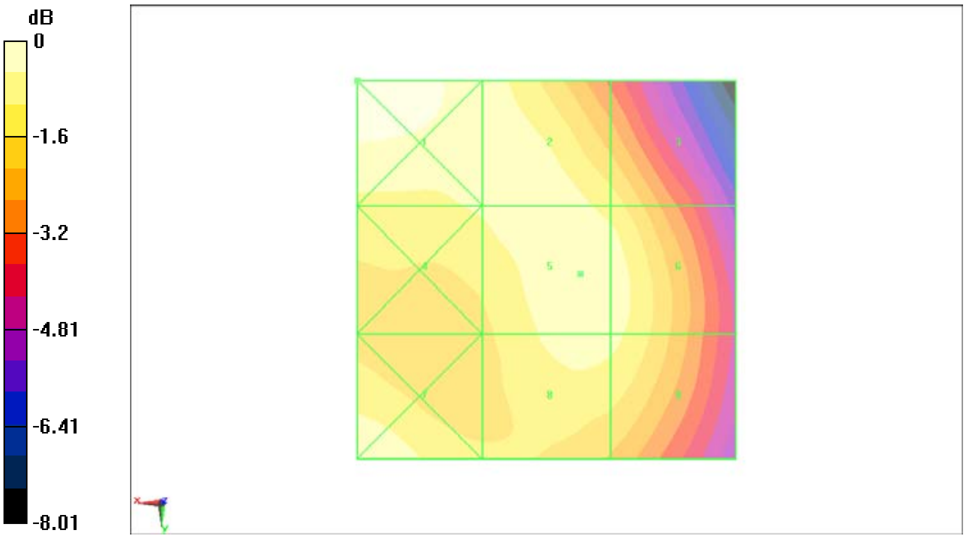


0 dB = 92.6V/m

Date/Time: 10/30/2009 7:53:10 PM
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Ambient Temperature:23.3°C Liquid Temperature: 22.5°C
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:8.3
Probe: H3DV6 - SN6260;
H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.370 A/m
Probe Modulation Factor = 2.88
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.163 A/m; Power Drift = -0.074 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1 **0.398 M4**	Grid 2 **0.365 M4**	Grid 3 **0.342 M4**
Grid 4 **0.355 M4**	Grid 5 **0.370 M4**	Grid 6 **0.365 M4**
Grid 7 **0.378 M4**	Grid 8 **0.362 M4**	Grid 9 **0.358 M4**



0 dB = 0.398A/m

RF RESULTS AND M-RATING	E-Field M Rating	M4 (AWF -5 dB)
	H-Field M Rating	M4 (AWF -5 dB)
	Total M Rating	M4

Fig B.13 Total M-rating of GSM 850

Total M-rating of GSM 1900 MHz Band

Date/Time: 10/30/2009 6:56:46 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m^3

Ambient Temperature:23.3°C   Liquid Temperature: 22.5°C

Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3

Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)

E Scan - ER3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 71.8 V/m

Probe Modulation Factor = 2.88

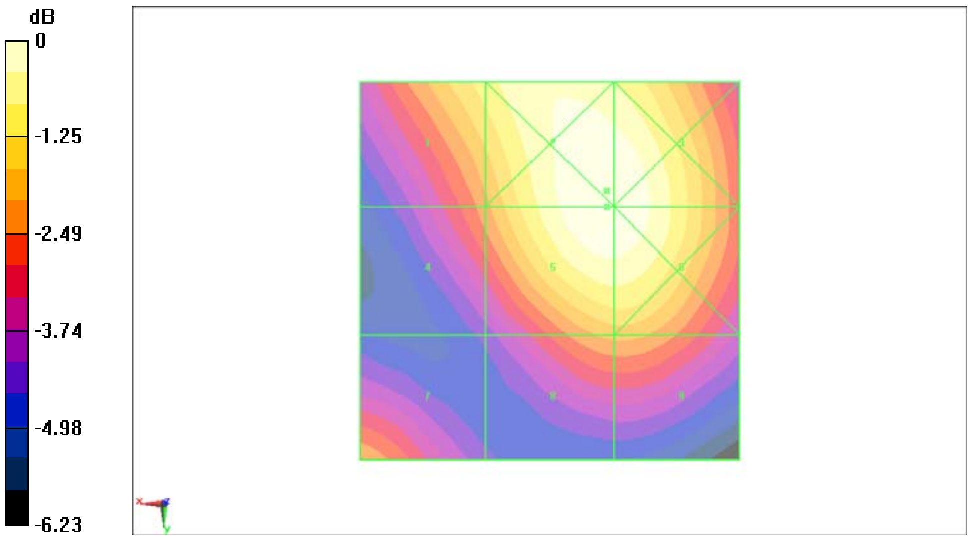
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 28.6 V/m; Power Drift = 0.032 dB

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

Peak E-field in V/m

Grid 1 **63.9 M3**	Grid 2 **72 M3**	Grid 3 **71.9 M3**
Grid 4 **55.7 M3**	Grid 5 **71.8 M3**	Grid 6 **71.8 M3**
Grid 7 **56.6 M3**	Grid 8 **57.6 M3**	Grid 9 **57.7 M3**

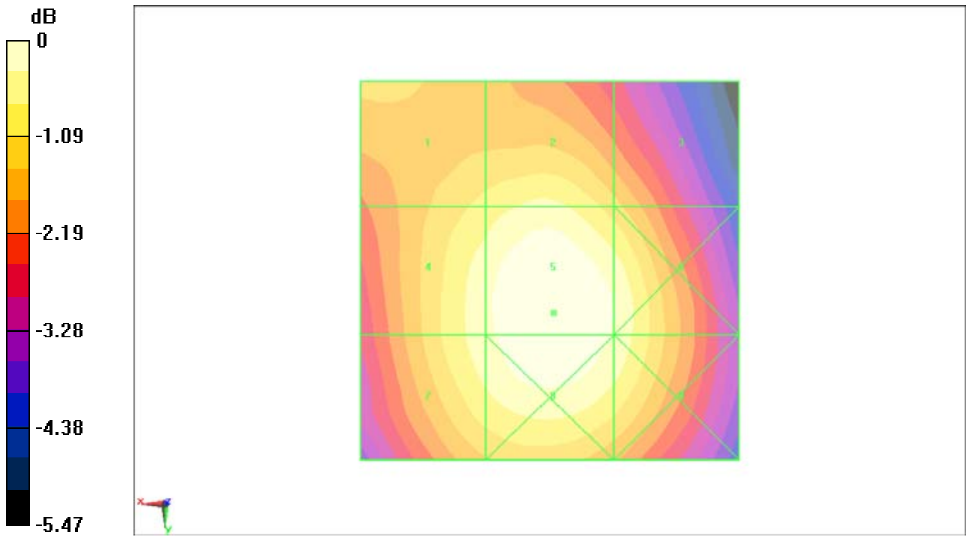


0 dB = 72V/m

Date/Time: 10/30/2009 7:23:49 PM
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: $\sigma = 0$ mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m^3
Ambient Temperature:23.3°C Liquid Temperature: 22.5°C
Communication System: DCS 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Probe: H3DV6 - SN6260;
H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.187 A/m
Probe Modulation Factor = 2.88
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.081 A/m; Power Drift = -0.026 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1 **0.167 M3**	Grid 2 **0.174 M3**	Grid 3 **0.161 M3**
Grid 4 **0.177 M3**	Grid 5 **0.187 M3**	Grid 6 **0.179 M3**
Grid 7 **0.177 M3**	Grid 8 **0.186 M3**	Grid 9 **0.178 M3**



0 dB = 0.187A/m

RF RESULTS AND M-RATING	E-Field M Rating	M3 (AWF -5 dB)
	H-Field M Rating	M3 (AWF -5 dB)
	Total M Rating	M3

Fig B.14 Total M-rating of GSM 1900

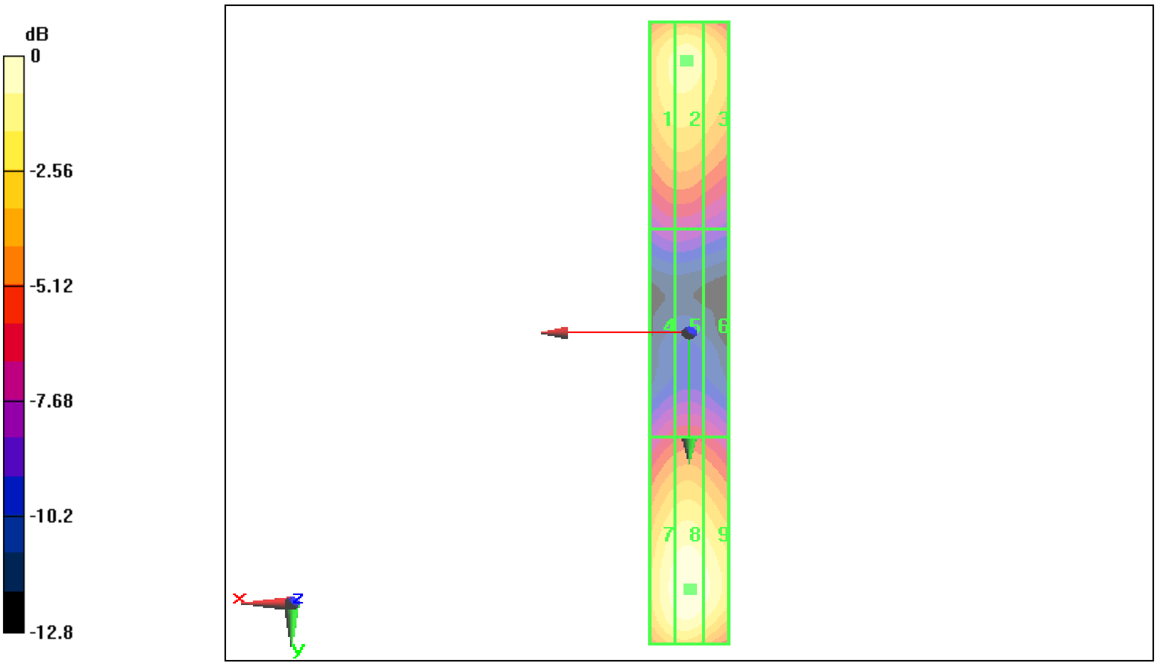
ANNEX C SYSTEM VALIDATION RESULT

E SCAN of Dipole 835 MHz

Date/Time: 10/30/2009 4:23:16 PM
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: σ = 0 mho/m, ε r = 1; ρ = 1000 kg/m3
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)
E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 173.3 V/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 123.6 V/m; Power Drift = -0.036 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **147.9 M4**	Grid 2 **150.7 M4**	Grid 3 **142.5 M4**
Grid 4 **84.7 M4**	Grid 5 **87 M4**	Grid 6 **83.5 M4**
Grid 7 **165.0 M4**	Grid 8 **173.3 M4**	Grid 9 **164.7 M4**



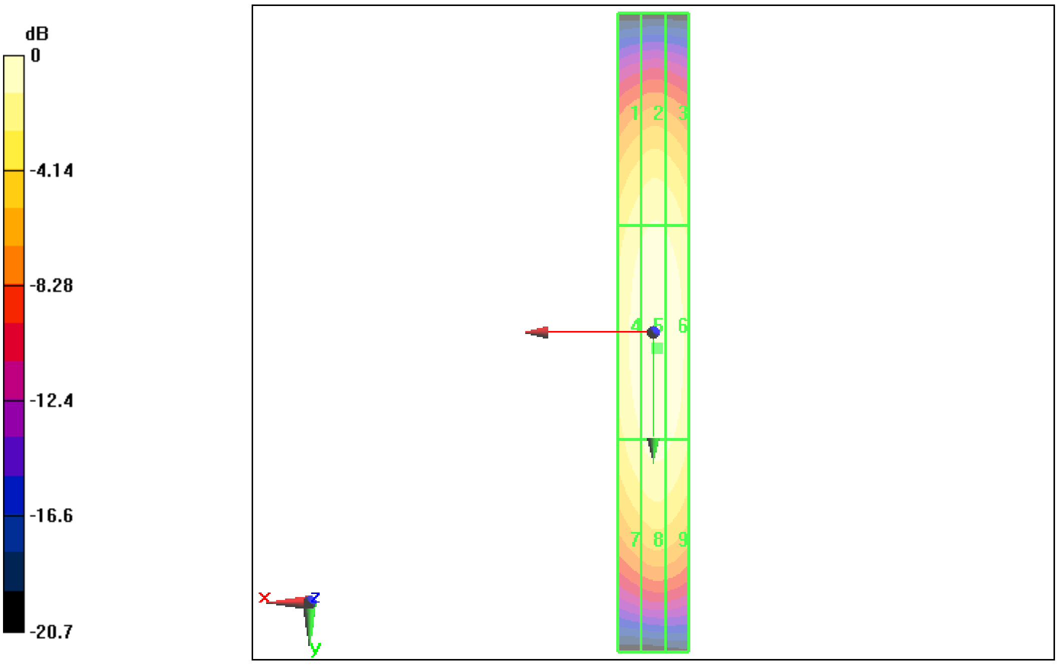
0 dB = 173.3V/m

H SCAN of Dipole 835 MHz

Date/Time: 10/30/2009 4:41:24 PM
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: σ = 0 mho/m, ε r = 1; ρ = 1 kg/m3
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Probe: H3DV6 - SN6260;
H Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.423 A/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.446 A/m; Power Drift = -0.017 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 **0.346 M4**	Grid 2 **0.367 M4**	Grid 3 **0.357 M4**
Grid 4 **0.396 M4**	Grid 5 **0.423 M4**	Grid 6 **0.413 M4**
Grid 7 **0.358 M4**	Grid 8 **0.384 M4**	Grid 9 **0.376 M4**



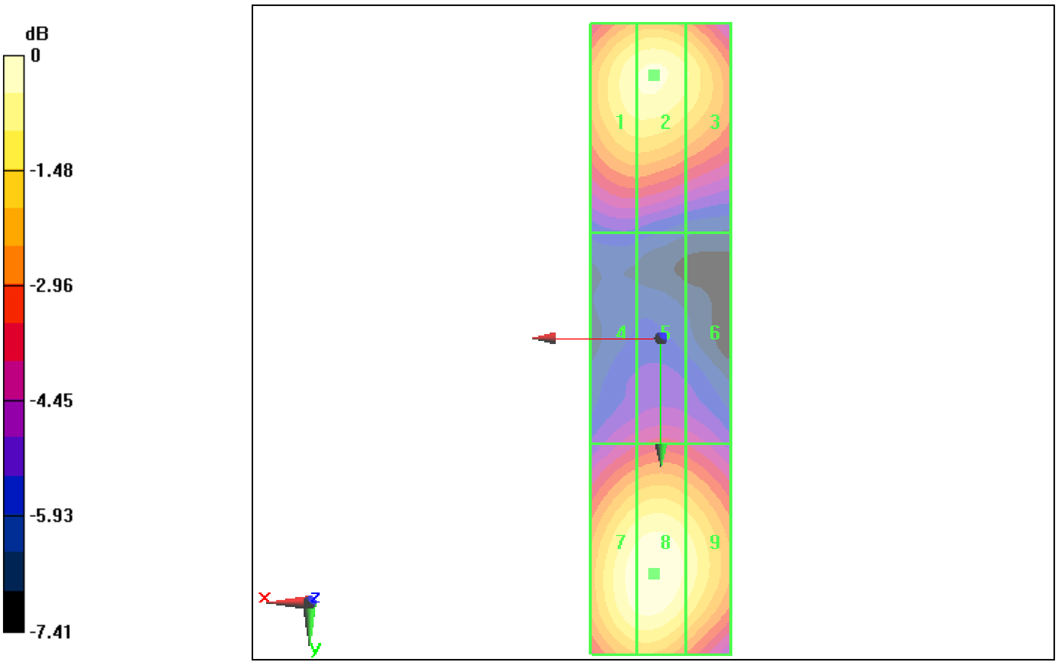
0 dB = 0.423A/m

E SCAN of Dipole 1880 MHz

Date/Time: 10/30/2009 5:05:51 PM
Electronics: DAE4 Sn777
Medium: Air
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1000 kg/m^3
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Probe: ER3DV6 - SN2428;ConvF(1, 1, 1)
E Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 134.2 V/m
Probe Modulation Factor = 1
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 140.2 V/m; Power Drift = -0.025 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 **126.6 M2**	Grid 2 **128.5 M2**	Grid 3 **121.0 M2**
Grid 4 **84.4 M3**	Grid 5 **87.4 M3**	Grid 6 **85.1 M3**
Grid 7 **131.7 M2**	Grid 8 **134.2 M2**	Grid 9 **125.6 M2**



0 dB = 134.2V/m

H SCAN of Dipole 1880 MHz

Date/Time: 10/30/2009 5:29:03 PM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Probe: H3DV6 - SN6260;

H Scan - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.413 A/m

Probe Modulation Factor = 1

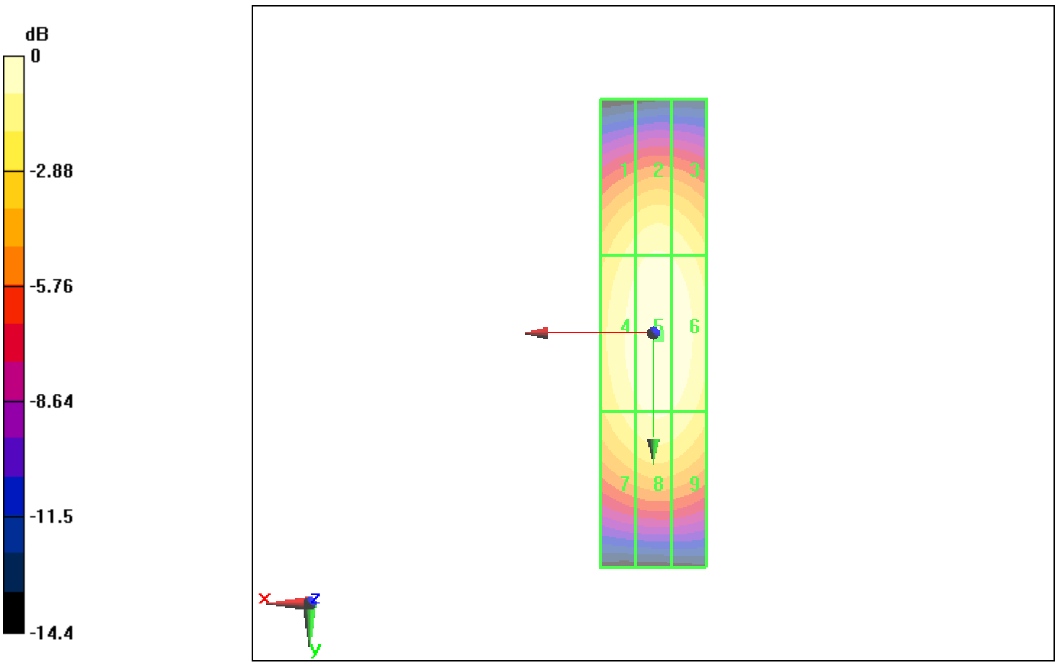
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.435 A/m; Power Drift = -0.00748 dB

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

Peak H-field in A/m

Grid 1 **0.352 M2**	Grid 2 **0.375 M2**	Grid 3 **0.367 M2**
Grid 4 **0.389 M2**	Grid 5 **0.413 M2**	Grid 6 **0.405 M2**
Grid 7 **0.356 M2**	Grid 8 **0.378 M2**	Grid 9 **0.370 M2**



0 dB = 0.413A/m

ANNEX D PROBE CALIBRATION CERTIFICATE

E_Probe ER3DV6

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

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

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

Accreditation No.: **SCS 108**

Client TMC

Certificate No: ER3-2428_Dec08

CALIBRATION CERTIFICATE

Object	ER3DV6-SN: 2428
Calibration procedure(s)	QA CAL-02.v5 Calibration procedure for E-field probes optimized for close near field evaluations in air
Calibration date:	December 12, 2008
Condition of the calibrated item	In Tolerance

This calibration certify 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 at an environment temperature (22±3)°C and humidity<70%

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Data (Calibrated by, Certification NO.)	Scheduled Calibration
Power meter E4419B	GB41293874	28-Mar-08 (METAS, NO. 217-00670)	Mar-09
Power sensor E4412A	MY41495277	28-Mar-08 (METAS, NO. 217-00670)	Mar-09
Power sensor E4412A	MY41498087	28-Mar-08 (METAS, NO. 217-00670)	Mar-09
Reference 3 dB Attenuator	SN: S5054 (3c)	7-Aug-08 (METAS, NO. 217-00719)	Aug-09
Reference 20 dB Attenuator	SN: S5086 (20b)	28-Mar-08 (METAS, NO. 217-00671)	Mar-09
Reference 30 dB Attenuator	SN: S5129 (30b)	7-Aug-08 (METAS, NO. 217-00720)	Aug-09
Reference Probe ER3DV6	SN: 2328	1-Oct-08 (SPEAG, NO.ER3-2328_Oct08)	Oct-09
DAE4	SN: 654	19-Apr-08 (SPEAG, NO. DAE4-654_Apr08)	Apr-09

Secondary Standards	ID#	Check Data (in house)	Scheduled Calibration
RF generator HP8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-08)	In house check: Oct-09

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

Issued: December 12, 2008

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

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

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Accredited by the Swiss Accreditation Service (SAS)
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ER3DV6

SN: 2428

Manufactured: September 11, 2007

Calibrated: December 12, 2008

Calibrated for DASY Systems

DASY-Parameters of Probe: ER3DV6 SN: 2428

Sensitivity in Free Space

NormX	1.48	$\mu V/(V/m)^2$
NormY	1.58	$\mu V/(V/m)^2$
NormZ	1.88	$\mu V/(V/m)^2$

Frequency Correction

X	0.0
Y	0.0
Z	0.0

Diode Compression

DCP X	95	mV
DCP Y	95	mV
DCP Z	96	mV

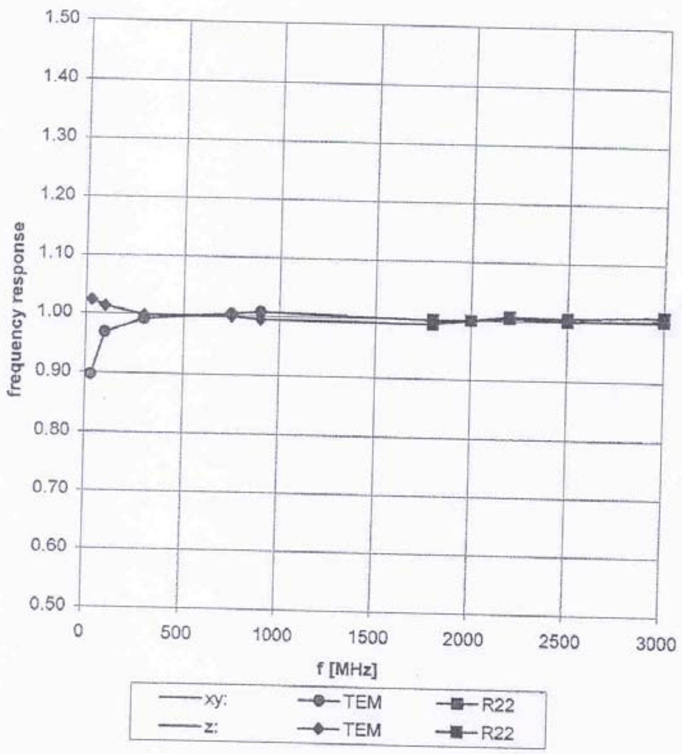
Sensor Offect (Probe Tip to Sensor Center)

X	2.5	mm
Y	2.5	mm
Z	2.5	mm

Connector Angle -212 ^{0}

Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)



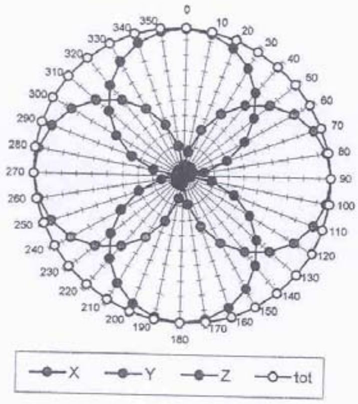
Uncertainty of Frequency Response of E-field: ±6.3% (k=2)

ER3DV6 SN: 2428

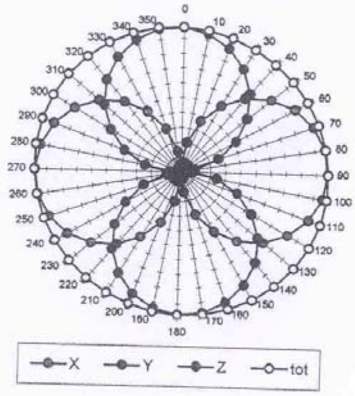
December 12, 2008

Receiving Pattern (Φ), θ =0 °

f=600 MHz, TEM ifi110EXX

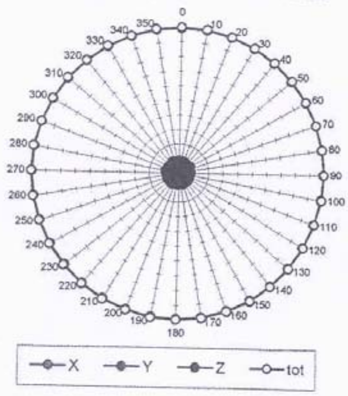


f=2500 MHz, WG R22

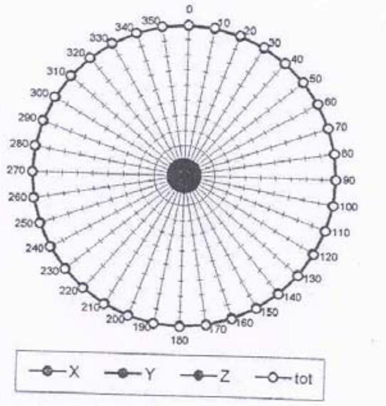


Receiving Pattern (Φ), θ =90 °

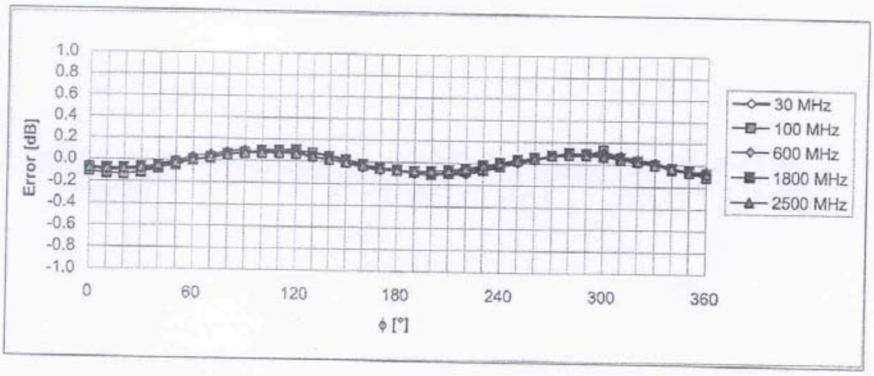
f=600 MHz, TEM ifi110EXX



f=2500 MHz, WG R22

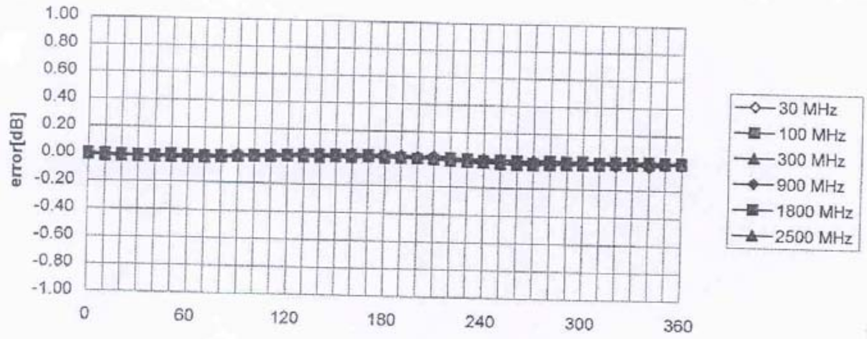


Receiving Pattern (Φ), θ =0°



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

Receiving Pattern (Φ), θ =90°

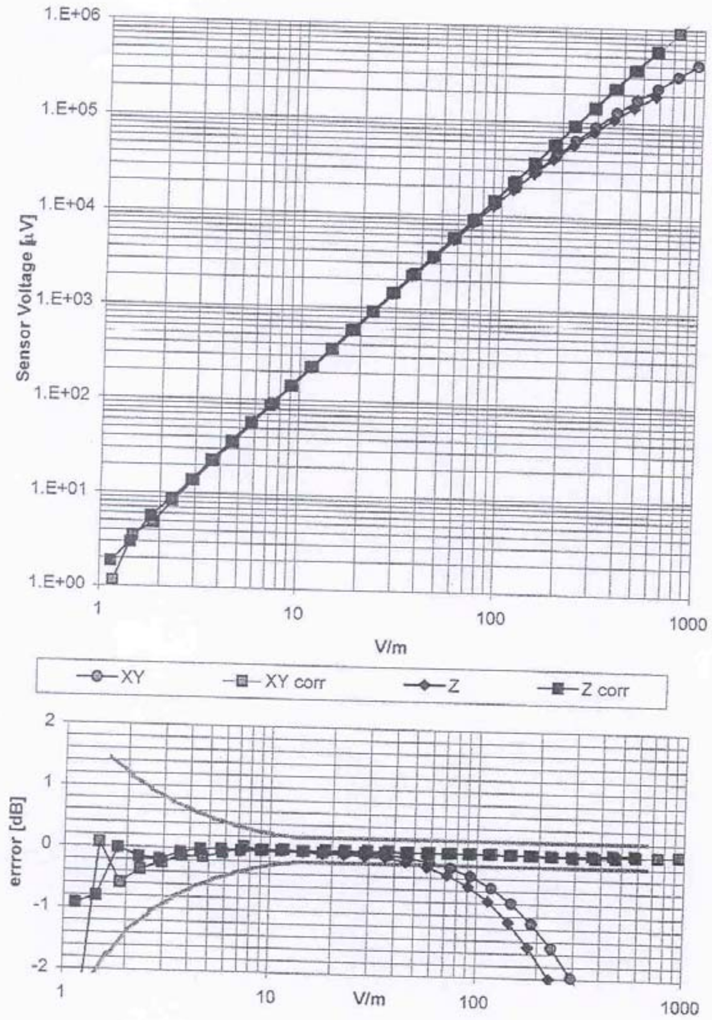


Uncertainty of Axial Isotropy Assessment: ±0.5% (k=2)

ER3DV6 SN: 2428

December 12, 2008

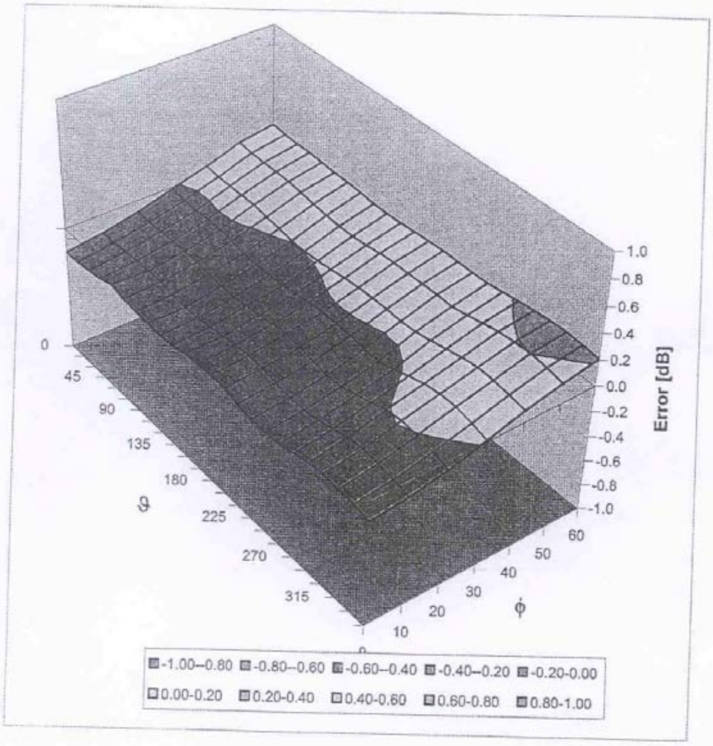
Dynamic Range f(E-field)
(Waveguide: R22, f = 1800 MHz)



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

Deviation from Isotropy

Error (φ, θ), f = 900 MHz



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

H_Probe H3DV6

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client TMC

Certificate No: H3-6260_Dec08

CALIBRATION CERTIFICATE

Object	**H3DV6-SN: 6260**
Calibration procedure(s)	**QA CAL-03.v5** **Calibration procedure for H-field probes optimized for close near field evaluations in air**
Calibration date:	**December 12, 2008**
Condition of the calibrated item	**In Tolerance**

This calibration certify 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 at an environment temperature (22±3)^{0}C and humidity<70%
Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Data (Calibrated by, Certification NO.)	Scheduled Calibration
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Reference 20 dB Attenuator	SN: S5086 (20b)	28-Mar-08 (METAS, NO. 217-00671)	Mar-09
Reference 30 dB Attenuator	SN: S5129 (30b)	7-Aug-08 (METAS, NO. 217-00720)	Aug-09
Reference Probe H3DV6	SN: 6182	1-Oct-08 (SPEAG, NO.H3-6182_Oct08)	Oct-09
DAE4	SN: 654	19-Apr-08 (SPEAG, NO. DAE4-654_Apr08)	Apr-09

Secondary Standards	ID#	Check Data (in house)	Scheduled Calibration
RF generator HP8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-08)	In house check: Oct-09

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

Issued: December 12, 2008

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

Calibration Laboratory of
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S Schweizerischer Kalibrierdienst
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Accreditation No.: SCS 108

Glossary:

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NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
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- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe H3DV6

SN: 6260

Manufactured: September 7, 2007

Calibrated: December 12, 2008

Calibrated for DASY Systems

H3DV6 SN: 6260

December 12, 2008

DASY-Parameters of Probe: H3DV6 SN: 6260

Sensitivity in Free Space

	a0	a1	a2
X	2.429E-03	8.910E-06	3.042E-05
Y	2.434E-03	4.381E-05	2.935E-05
Z	2.872E-03	3.105E-05	3.425E-05

Diode Compression

DCP X	85	mV
DCP Y	85	mV
DCP Z	85	mV

Sensor Offect (Probe Tip to Sensor Center)

X	3.0	mm
Y	3.0	mm
Z	3.0	mm

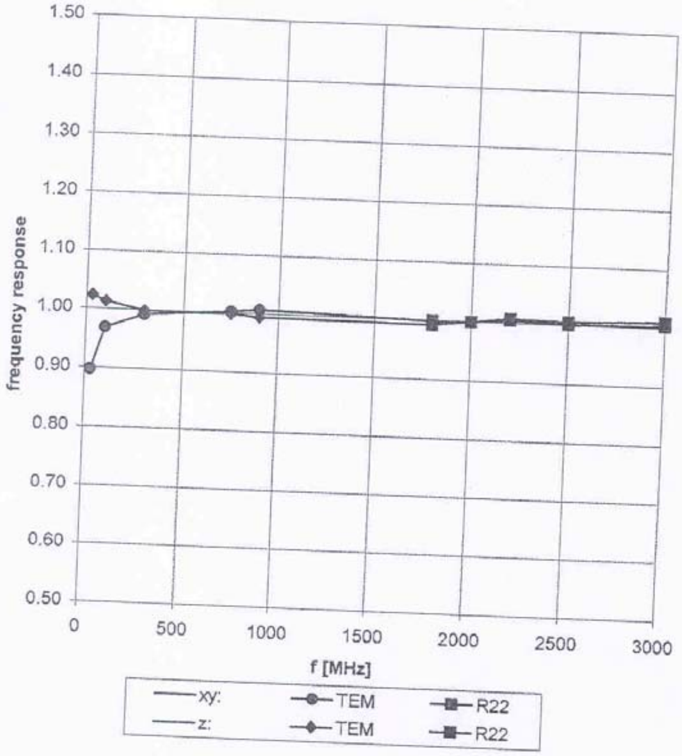
Connector Angle -325 °

H3DV6 SN: 6260

December 12, 2008

Frequency Response of H-Field

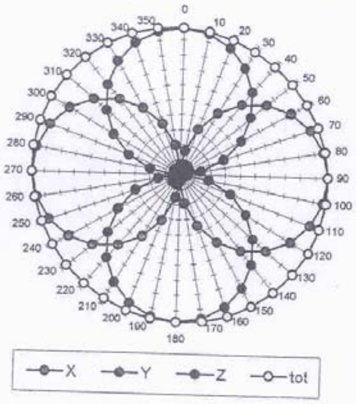
(TEM-Cell:ifi110, Waveguide R22)



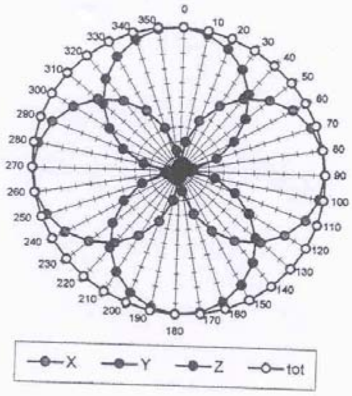
Uncertainty of Frequency Response of E-field: ±6.3% (k=2)

Receiving Pattern (Φ), θ =90°

f=300 MHz, TEM ifi110EXX

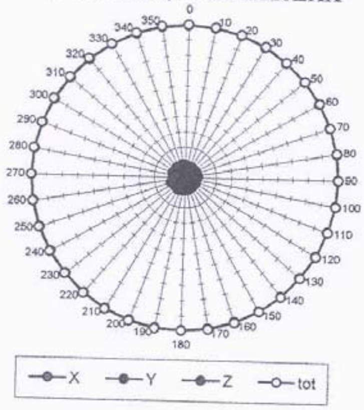


f=2500 MHz, WG R22

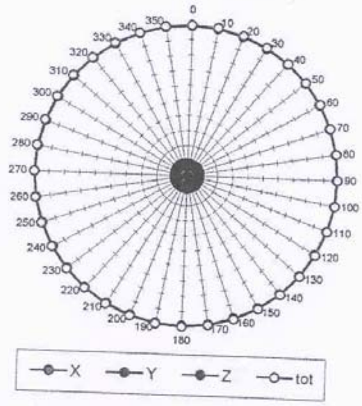


Receiving Pattern (Φ), θ =0°

f=300 MHz, TEM ifi110EXX



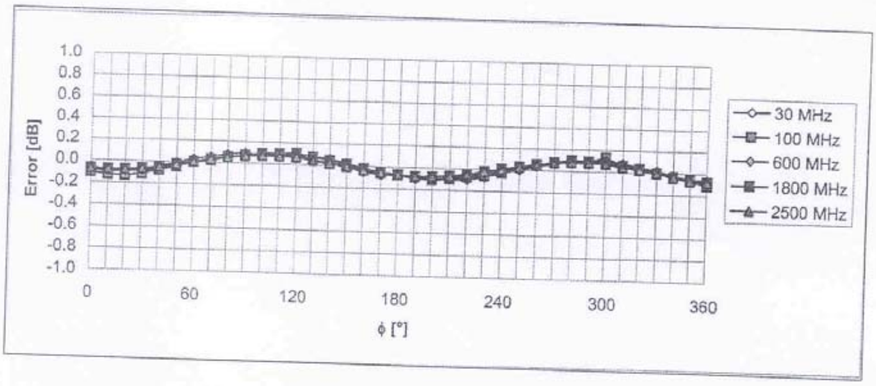
f=2500 MHz, WG R22



H3DV6 SN: 6260

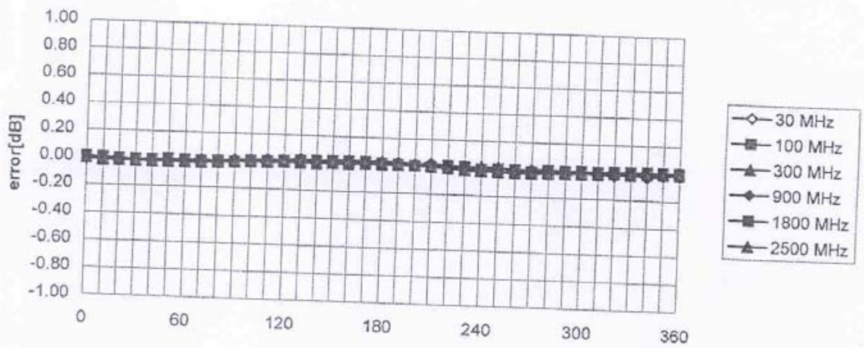
December 12, 2008

Receiving Pattern (Φ), θ =90°



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

Receiving Pattern (Φ), θ =0°

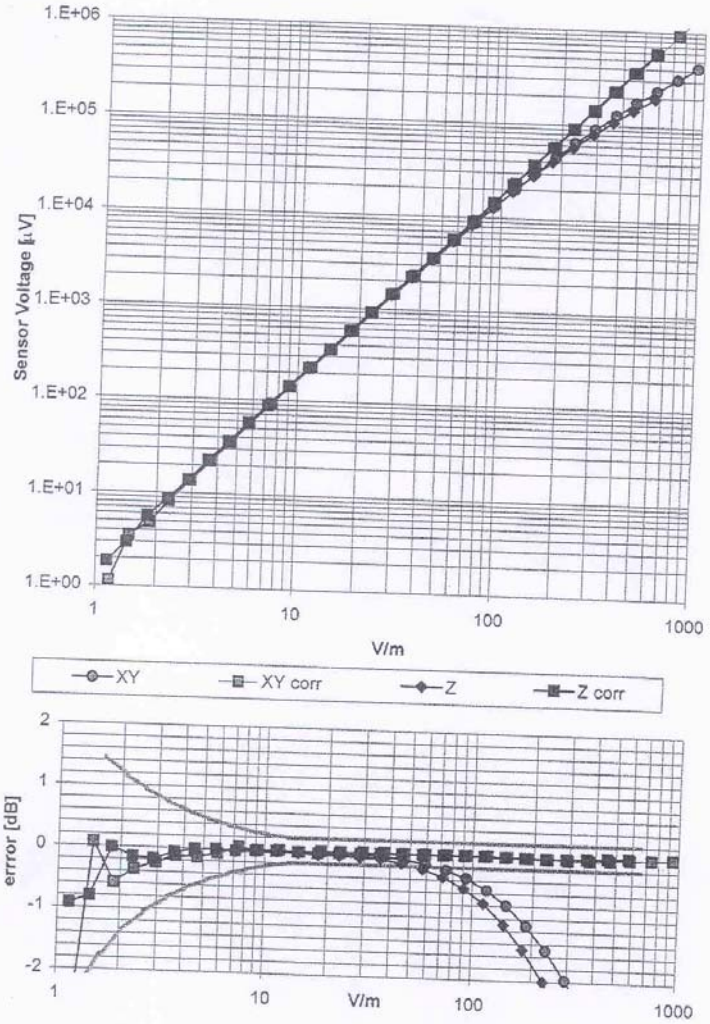


Uncertainty of Axial Isotropy Assessment: ±0.5% (k=2)

H3DV6 SN: 6260

December 12, 2008

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



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

Certificate No: H3-6260_Dec08