



HAC RF TEST REPORT

No. 2011HAC00035-1

For

TCT Mobile Limited

GSM dual bands mobile phone

Cristalk US

one touch 282A

With

Hardware Version: PIO

Software Version: B17

FCCID: RAD217

Results Summary: M Category = M3

Issued Date: 2011-11-10



No. DGA-PL-114/01-02

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:

TMC Beijing, Telecommunication Metrology Center of MIIT

No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2079, Fax:+86(0)10-62304793 Email:welcomed@emcite.com. www.emcite.com

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1 Test Laboratory

1.1 Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No 52, Huayuan beilu, Haidian District, Beijing,P.R.China
Postal Code: 100191
Telephone: +86-10-62304633
Fax: +86-10-62304793

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

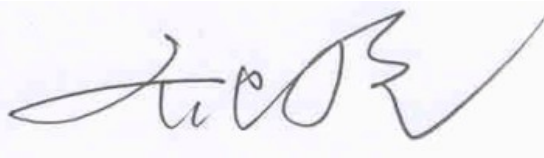
Project Leader: Qi Dianyuan
Test Engineer: Lin Hao
Testing Start Date: October 26, 2011
Testing End Date: October 26, 2011

1.4 Signature



Lin Hao

(Prepared this test report)



Qi Dianyuan

(Reviewed this test report)



Xiao Li

Deputy Director of the laboratory
(Approved this test report)

2 Client Information

2.1 Applicant Information

Company Name: TCT Mobile Limited
 Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
 Pudong Area Shanghai, P.R. China. 201203
 City: Shanghai
 Postal Code: 201203
 Country: P. R. China
 Telephone: 0086-21-61460890
 Fax: 0086-21-61460602

2.2 Manufacturer Information

Company Name: TCT Mobile Limited
 Address /Post: 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
 Pudong Area Shanghai, P.R. China. 201203
 City: Shanghai
 Postal Code: 201203
 Country: P. R. China
 Telephone: 0086-21-61460890
 Fax: 0086-21-61460602

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

3.1 About EUT

EUT Description: GSM dual bands mobile phone
 Model Name: Cristalk US
 Marketing Name: one touch 282A
 Frequency Band: GSM 850/1900

3.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	012916000020456 / 012916000020431	PIO	B17

*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	Battery	CAB31L0000C1	/	BYD

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

4 CONDUCTED OUTPUT POWER MEASUREMENT

4.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured output power should be greater and within 5% than EMI measurement.

4.2 Conducted Power

GSM 850MHZ	Conducted Power (dBm)		
	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	33.11	33.17	33.21
GSM 1900MHZ	Conducted Power (dBm)		
	Channel 810(1909.8MHz)	Channel 661(1880MHz)	Channel 512(1850.2MHz)
	30.39	30.41	30.39

5. Reference Documents

5.1 Reference 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

6 OPERATIONAL CONDITIONS DURING TEST

6.1 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.

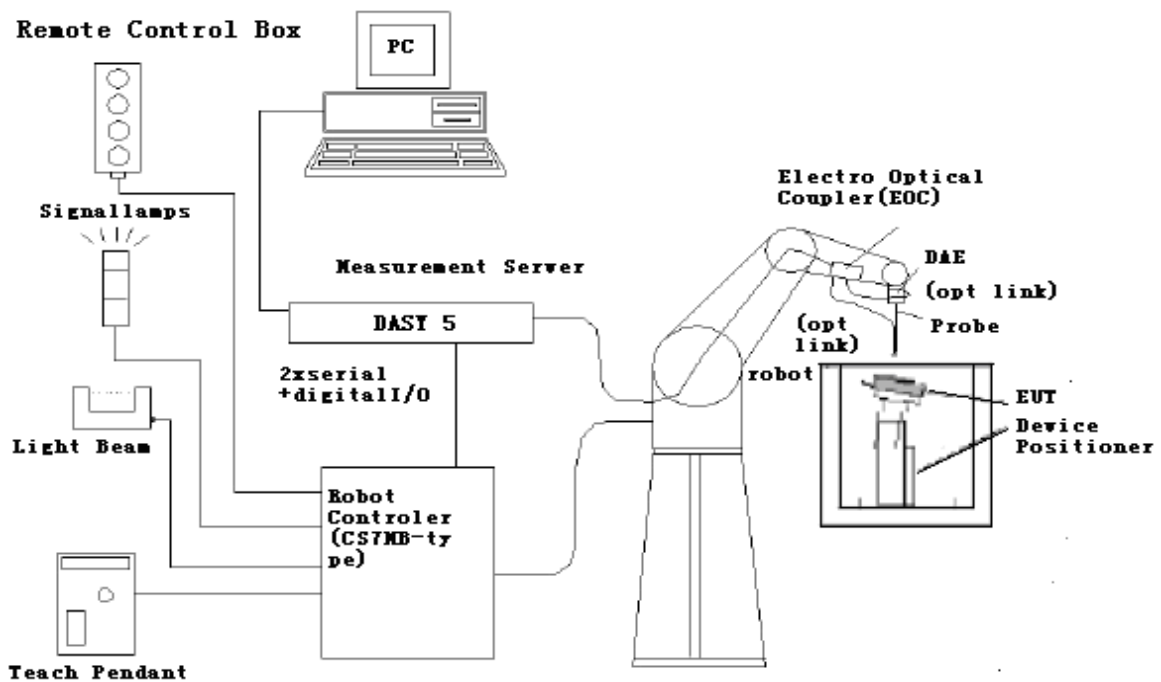


Fig. 1 HAC Test Measurement Set-up

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.

6.2 Probe Specification

6.2.1 E-Field Probe Description

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 $\pm 6.0\%$, $k=2$)
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



[ER3DV6]

Application General near-field measurements up to 6 GHz
 Field component measurements
 Fast automatic scanning in phantoms

6.2.2 H-Field Probe Description

Construction Three concentric loop sensors with 3.8 mm loop diameters
 Resistively loaded detector diodes for linear response
 Built-in shielding against static charges
 PEEK enclosure material (resistant to organic solvents,
 e.g., glycoether)



[H3DV6]

Frequency 200 MHz to 3 GHz (absolute accuracy $\pm 6.0\%$, $k=2$); Output
 linearized

Directivity ± 0.2 dB (spherical isotropy error)

Dynamic Range 10 mA/m to 2 A/m at 1 GHz

E-Field Interference < 10% at 3 GHz (for plane wave)

Dimensions Overall length: 330 mm (Tip: 40 mm)
 Tip diameter: 6 mm (Body: 12 mm)
 Distance from probe tip to dipole centers: 3 mm

Application General magnetic near-field measurements up to 3 GHz (in
 air or liquids)
 Field component measurements
 Surface current measurements
 Low interaction with the measured field

6.3 Test Arch 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 $< \pm 0.5$ dB.

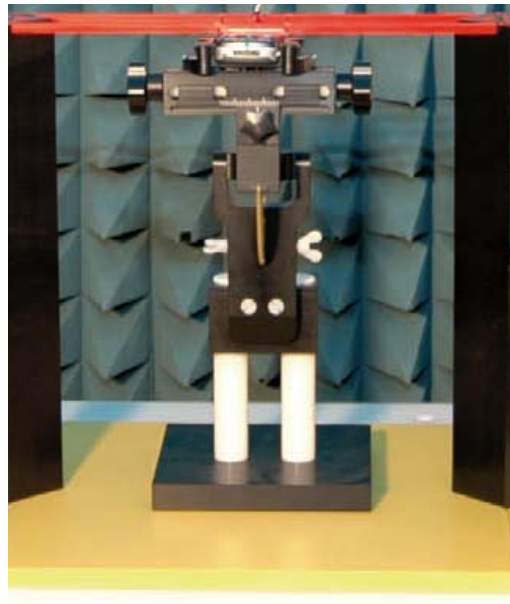


Fig. 2 HAC Phantom & Device Holder

6.4 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

7 EUT ARRANGEMENT

7.1 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.

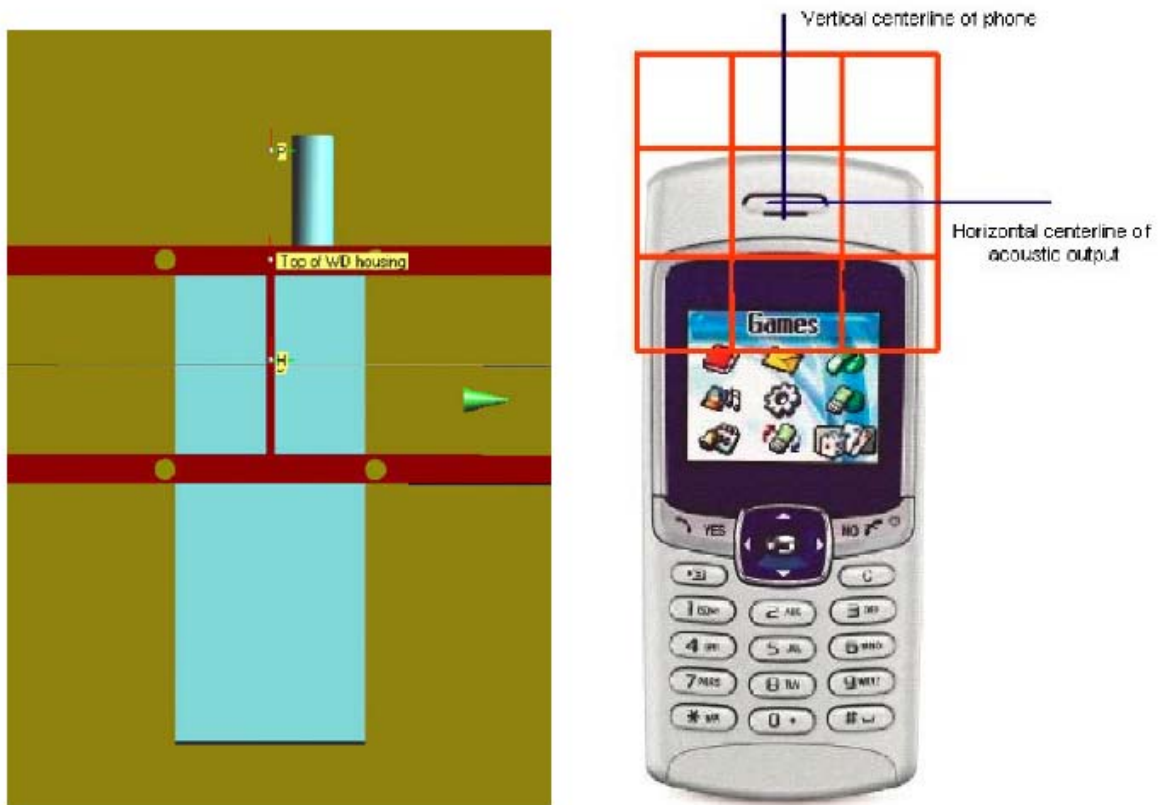


Fig. 3 WD reference and plane for RF emission measurements

8 SYSTEM VALIDATION

8.1 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.

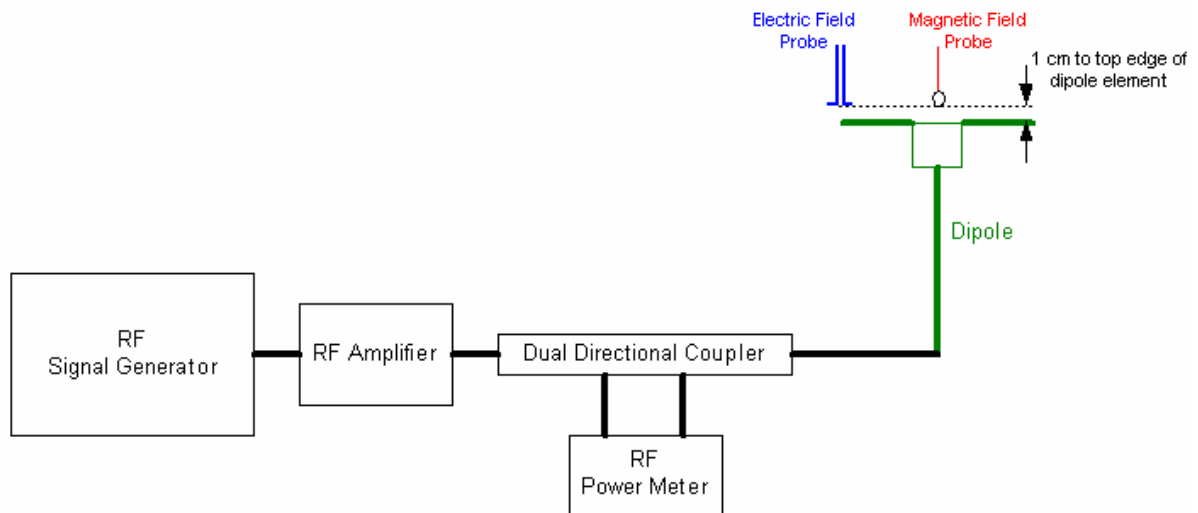


Fig. 4 Dipole Validation Setup

8.2 Validation Result

E-Field Scan							
Mode	Frequency (MHz)	Input Power (mW)	Power	Measured ¹ Value(V/m)	Target ² Value(V/m)	Deviation ³ (%)	Limit ⁴ (%)
CW	835	100		169.0	163.9	+3.11%	± 25
CW	1880	100		141.5	137.7	+2.76%	± 25
H-Field Scan							
Mode	Frequency (MHz)	Input Power (mW)	Power	Measured Value(A/m)	Target Value(A/m)	Deviation (%)	Limit (%)
CW	835	100		0.448	0.458	-2.18%	± 25
CW	1880	100		0.449	0.463	-3.02%	± 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.

9 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.

9.1 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.

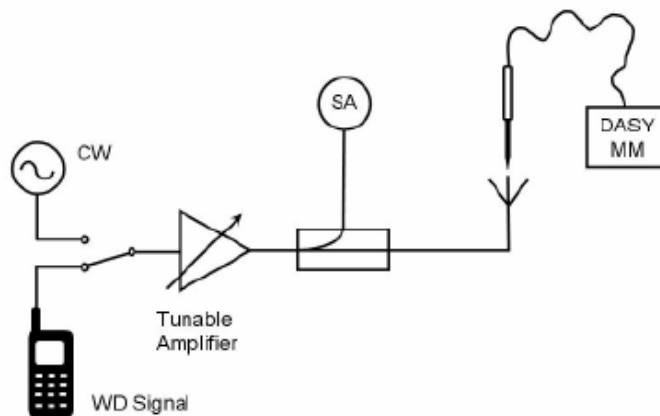


Fig. 5 Probe Modulation Factor Test Setup

9.2 Modulation Factor

9.2.1 E-Field

Frequency (MHz)	Mode	Input Power (mW)	E-Field Measured Value (V/m)	Probe Modulation Factor
835	CW	100	163.9	\
	GSM	100	60.2	2.88
1880	CW	100	137.7	\
	GSM	100	46.6	2.88

9.2.2 H-Field

Frequency (MHz)	Mode	Input Power (mW)	H-Field Measured Value (A/m)	Probe Modulation Factor
835	CW	100	0.458	\
	GSM	100	0.147	2.88
1880	CW	100	0.463	\
	GSM	100	0.143	2.88

10 RF TEST PROCEDURES

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.

11 HAC RF TEST DATA SUMMARY

11.1 Measurement Results (E-Field)

Frequency		AWF	Measured Value (V/m)	Power Drift (dB)	Category
MHz	Channel				
GSM 850					
848.8	251	-5	213.4	-0.025	M3 (see Fig B.1)
836.6	190	-5	205.1	0.000691	M3 (see Fig B.2)
824.2	128	-5	196.3	-0.015	M4 (see Fig B.3)
GSM 1900					
1909.8	810	-5	66.8	-0.052	M3 (see Fig B.4)
1880	661	-5	52.5	-0.058	M3 (see Fig B.5)
1850.2	512	-5	51.6	0.00238	M3 (see Fig B.6)

11.2 Measurement Results (H-Field)

Frequency		AWF	Measured Value (A/m)	Power Drift (dB)	Category
MHz	Channel				
GSM 850					
848.8	251	-5	0.333	0.040	M4 (see Fig B.7)
836.6	190	-5	0.311	-0.035	M4 (see Fig B.8)
824.2	128	-5	0.291	-0.021	M4 (see Fig B.9)
GSM 1900					
1909.8	810	-5	0.179	0.030	M3 (see Fig B.10)
1880	661	-5	0.134	-0.00857	M4 (see Fig B.11)
1850.2	512	-5	0.151	0.00185	M3 (see Fig B.12)

11.3 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	213.4	0.333	M3 (AWF -5 dB)	M4 (AWF -5 dB)	M3 (see Fig B.13)
GSM 1900	66.8	0.179	M3 (AWF -5 dB)	M3 (AWF -5 dB)	M3 (see Fig B.14)

12 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

13 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	

14 MAIN TEST INSTRUMENTS

Table 2: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	E-Field Probe	ER3DV6	2428	October 19, 2011	One year
02	H-Field Probe	H3DV6	6260	October 19, 2011	One year
03	HAC Dipole	CD835V3	1023	October 20, 2011	Two years
04	HAC Dipole	CD1880V3	1018	October 20, 2011	Two years
05	BTS	CMU 200	105948	August 24, 2011	One year
06	DAE	SPEAG DAE4	777	July 8, 2011	One year

15 CONCLUSION

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

END OF REPORT BODY

ANNEX A TEST LAYOUT**Picture A1: HAC RF System Layout**

ANNEX B TEST PLOTS

HAC RF E-Field GSM 850 High

Date/Time: 10/26/2011 7:41:22 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 213.4 V/m

Probe Modulation Factor = 2.88

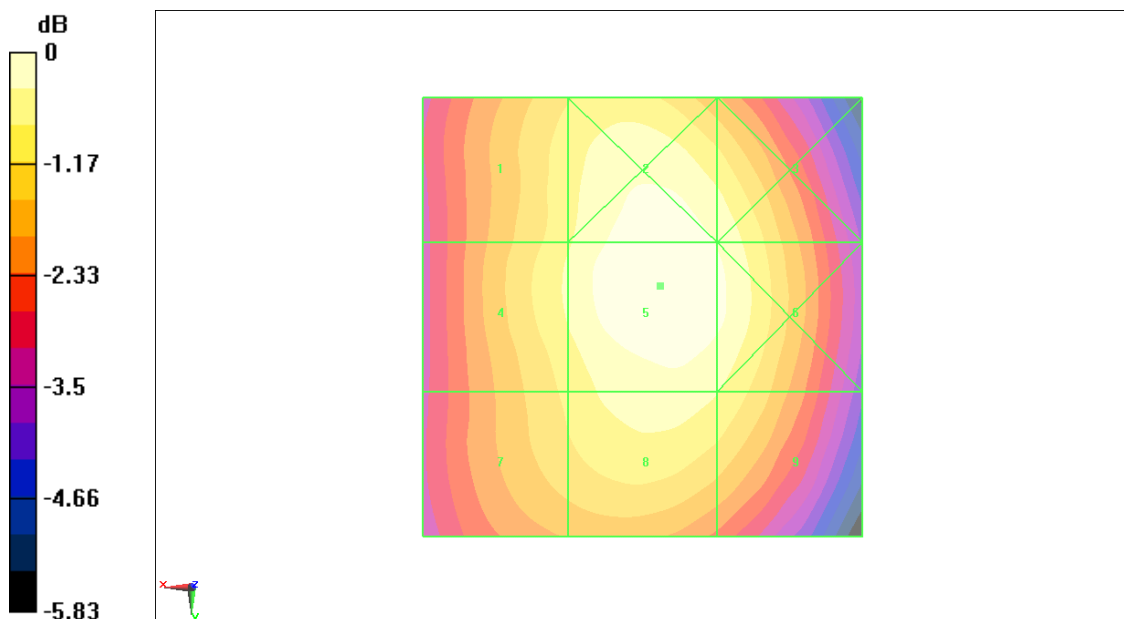
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 97.8 V/m; Power Drift = -0.025 dB

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

Peak E-field in V/m

Grid 1 193.9 M3	Grid 2 209.9 M3	Grid 3 203.4 M3
Grid 4 196.9 M3	Grid 5 213.4 M3	Grid 6 206.6 M3
Grid 7 188.9 M3	Grid 8 200.6 M3	Grid 9 195.6 M3



0 dB = 213.4V/m

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

HAC RF E-Field GSM 850 Middle

Date/Time: 10/26/2011 7:46:51 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 205.1 V/m

Probe Modulation Factor = 2.88

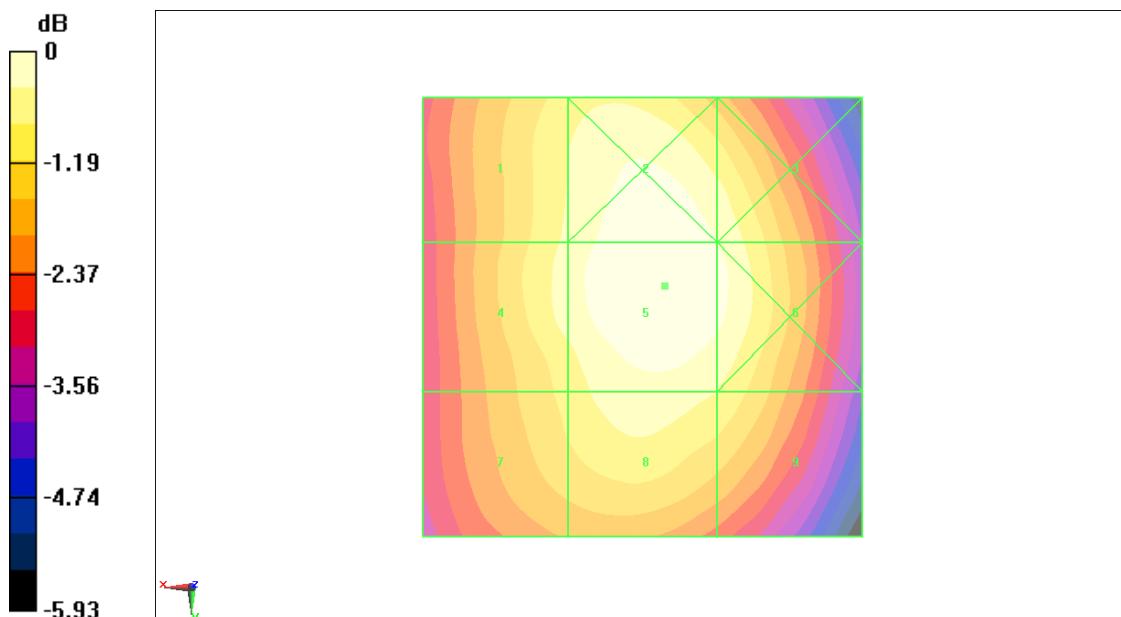
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 94.5 V/m; Power Drift = 0.000691 dB

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

Peak E-field in V/m

Grid 1 189.5 M3	Grid 2 203.0 M3	Grid 3 196.0 M3
Grid 4 191.7 M3	Grid 5 205.1 M3	Grid 6 199.1 M3
Grid 7 182.1 M3	Grid 8 193.5 M3	Grid 9 187.0 M3



0 dB = 205.1V/m

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

HAC RF E-Field GSM 850 Low

Date/Time: 10/26/2011 7:52:20 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 196.3 V/m

Probe Modulation Factor = 2.88

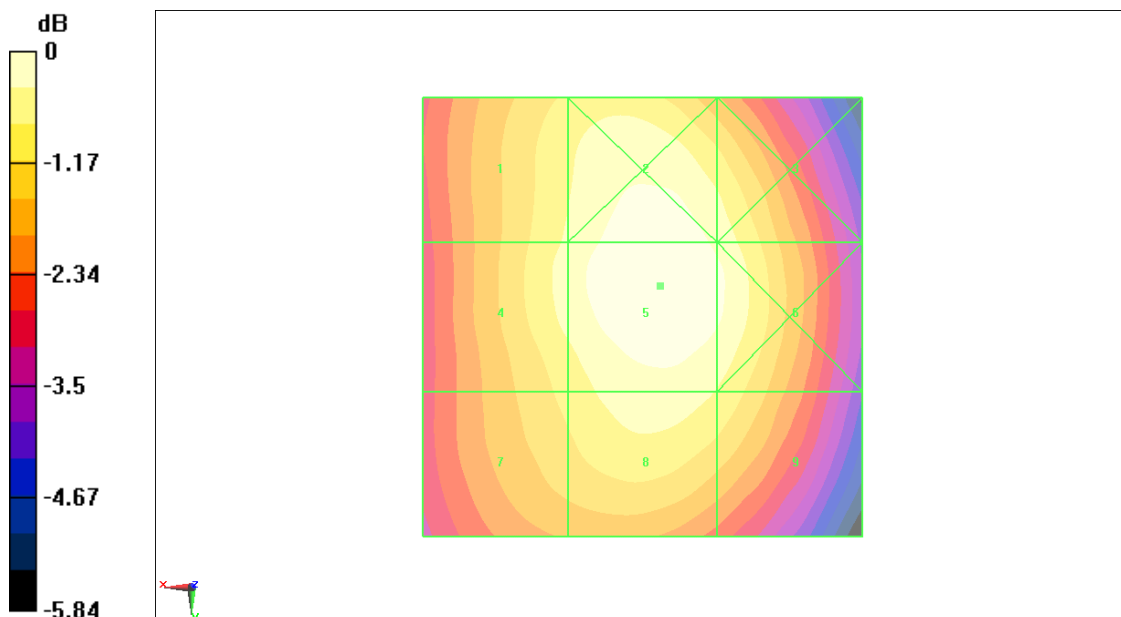
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 90.3 V/m; Power Drift = -0.015 dB

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

Peak E-field in V/m

Grid 1 181.2 M3	Grid 2 193.1 M3	Grid 3 185.8 M3
Grid 4 183.5 M3	Grid 5 196.3 M3	Grid 6 189.7 M3
Grid 7 174.4 M3	Grid 8 184.7 M3	Grid 9 179.0 M3



0 dB = 196.3V/m

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

HAC RF E-Field GSM 1900 High

Date/Time: 10/26/2011 7:24:26 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 66.8 V/m

Probe Modulation Factor = 2.88

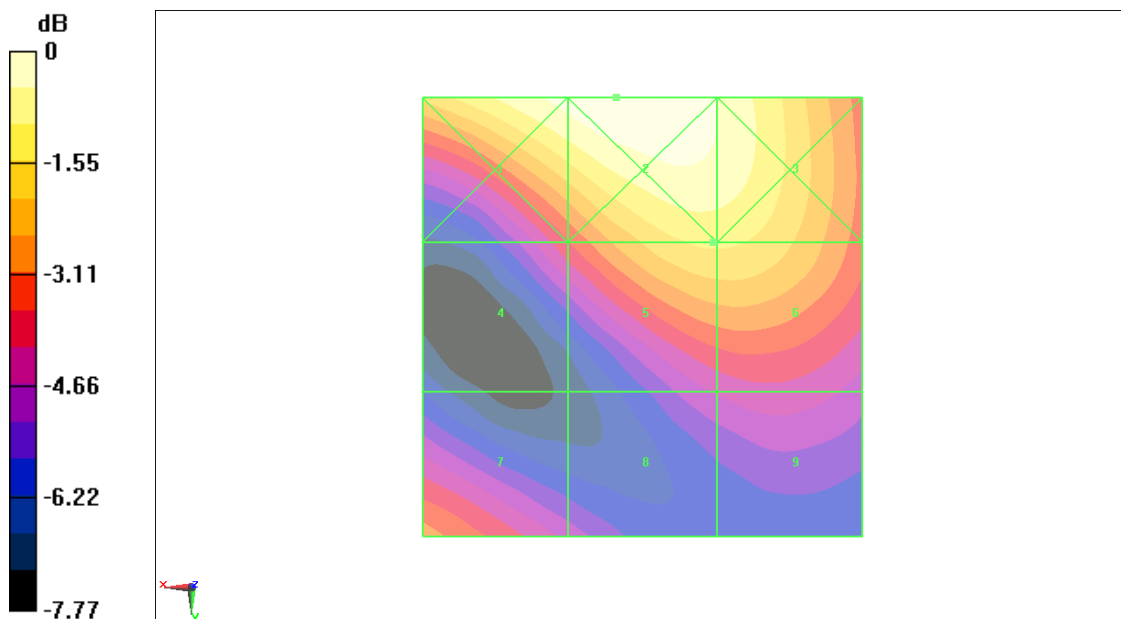
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 19.1 V/m; Power Drift = -0.052 dB

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

Peak E-field in V/m

Grid 1 76.3 M3	Grid 2 79 M3	Grid 3 74.5 M3
Grid 4 51.8 M3	Grid 5 66.8 M3	Grid 6 66.8 M3
Grid 7 56.9 M3	Grid 8 46.7 M4	Grid 9 48.4 M3



0 dB = 79V/m

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

HAC RF E-Field GSM 1900 Middle

Date/Time: 10/26/2011 7:29:48 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 52.5 V/m

Probe Modulation Factor = 2.88

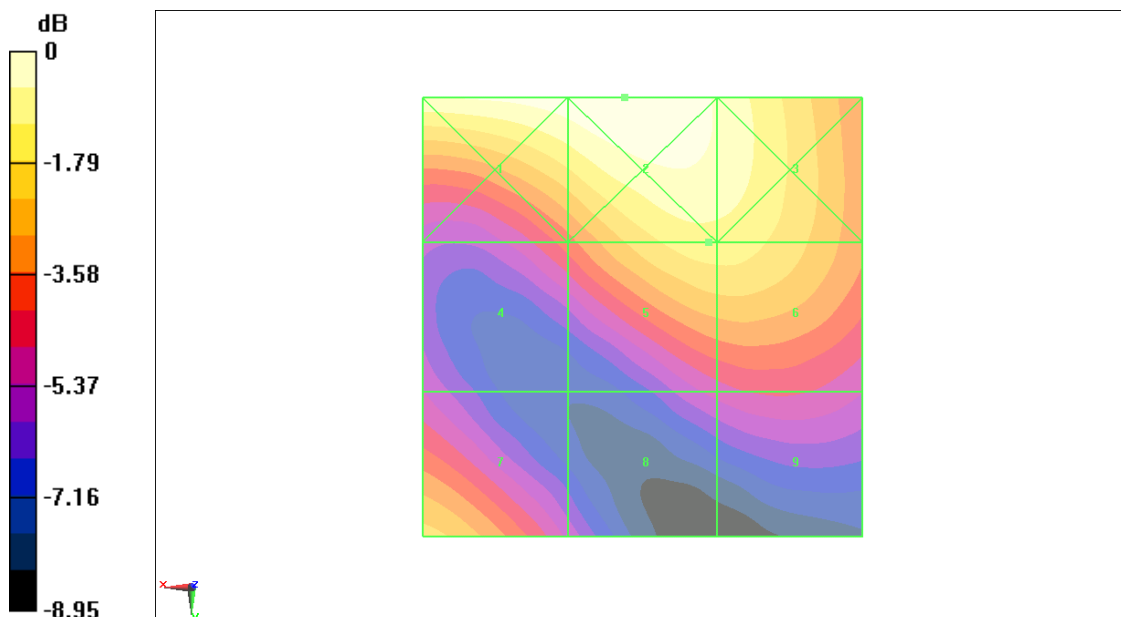
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 14.3 V/m; Power Drift = -0.058 dB

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

Peak E-field in V/m

Grid 1 60.6 M3	Grid 2 62.1 M3	Grid 3 57.6 M3
Grid 4 39.9 M4	Grid 5 52.5 M3	Grid 6 52.4 M3
Grid 7 48.5 M3	Grid 8 34.6 M4	Grid 9 36.4 M4



0 dB = 62.1V/m

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

HAC RF E-Field GSM 1900 Low

Date/Time: 10/26/2011 7:35:20 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 51.6 V/m

Probe Modulation Factor = 2.88

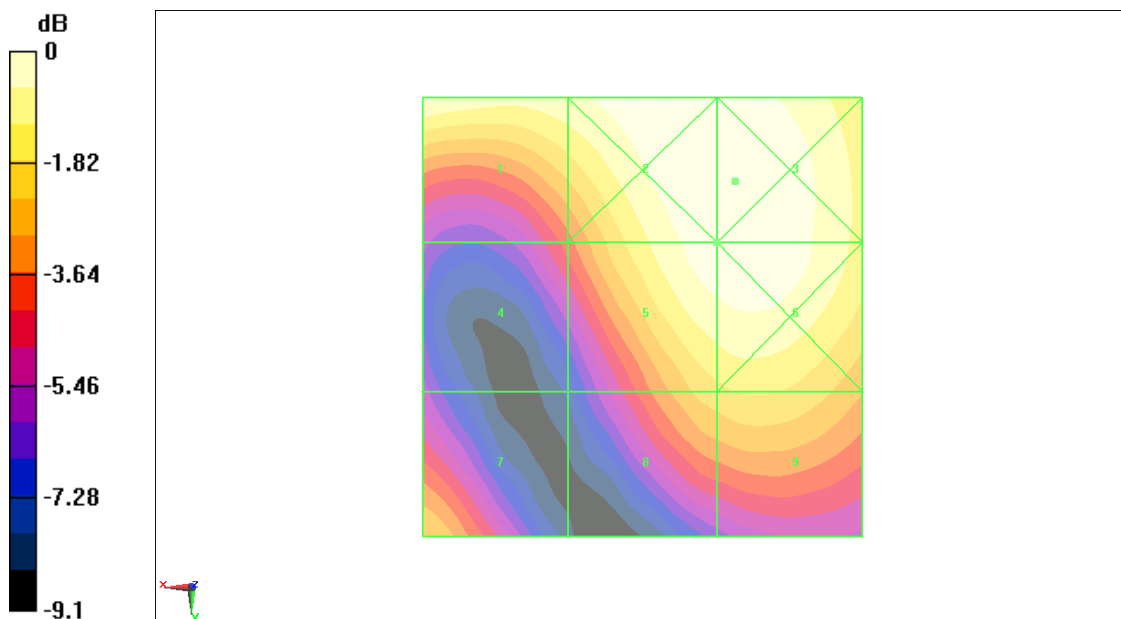
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 17.4 V/m; Power Drift = 0.00238 dB

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

Peak E-field in V/m

Grid 1 50.6 M3	Grid 2 52.6 M3	Grid 3 52.8 M3
Grid 4 33.7 M4	Grid 5 51.6 M3	Grid 6 52.3 M3
Grid 7 40.1 M4	Grid 8 42 M4	Grid 9 43.2 M4



0 dB = 52.8V/m

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

HAC RF H-Field GSM 850 High

Date/Time: 10/26/2011 6:04:00 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 0.333 A/m

Probe Modulation Factor = 2.88

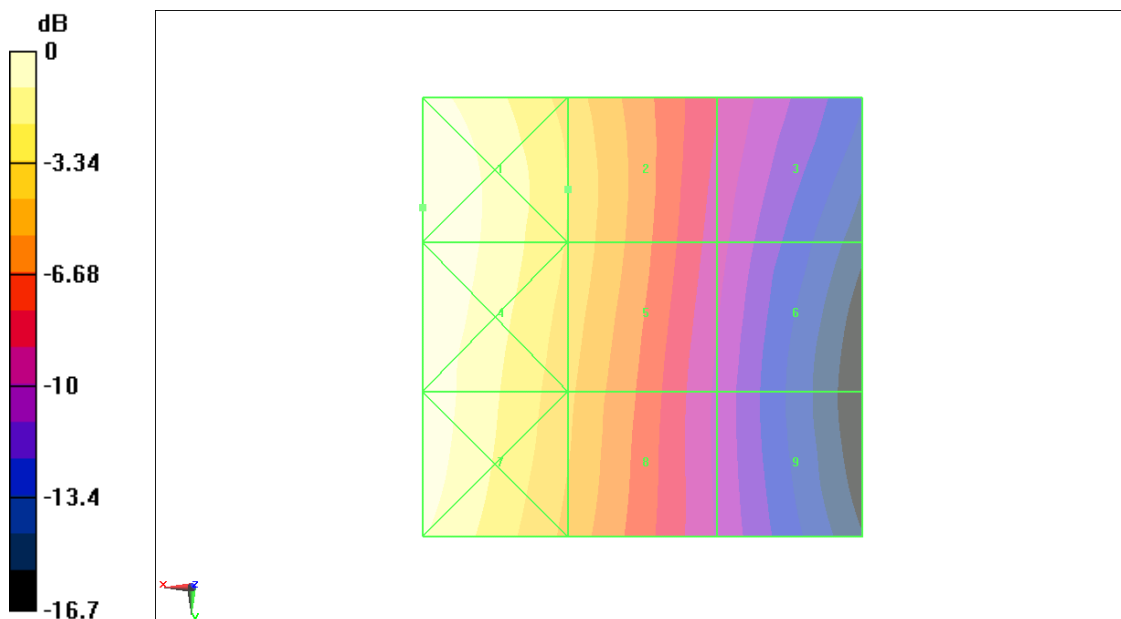
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.083 A/m; Power Drift = 0.040 dB

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

Peak H-field in A/m

Grid 1 0.488 M3	Grid 2 0.333 M4	Grid 3 0.177 M4
Grid 4 0.486 M3	Grid 5 0.329 M4	Grid 6 0.163 M4
Grid 7 0.465 M3	Grid 8 0.302 M4	Grid 9 0.153 M4



0 dB = 0.488A/m

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

HAC RF H-Field GSM 850 Middle

Date/Time: 10/26/2011 6:09:29 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 0.311 A/m

Probe Modulation Factor = 2.88

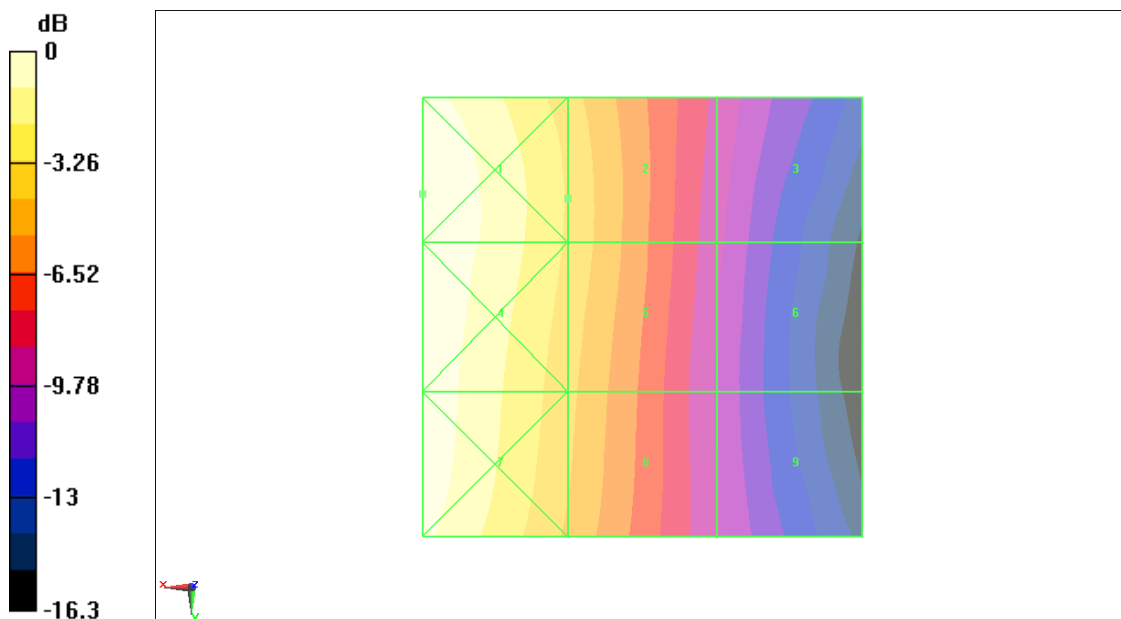
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.079 A/m; Power Drift = -0.035 dB

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

Peak H-field in A/m

Grid 1 0.458 M3	Grid 2 0.311 M4	Grid 3 0.163 M4
Grid 4 0.454 M3	Grid 5 0.309 M4	Grid 6 0.154 M4
Grid 7 0.437 M4	Grid 8 0.289 M4	Grid 9 0.151 M4



0 dB = 0.458A/m

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

HAC RF H-Field GSM 850 Low

Date/Time: 10/26/2011 6:14:55 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 0.291 A/m

Probe Modulation Factor = 2.88

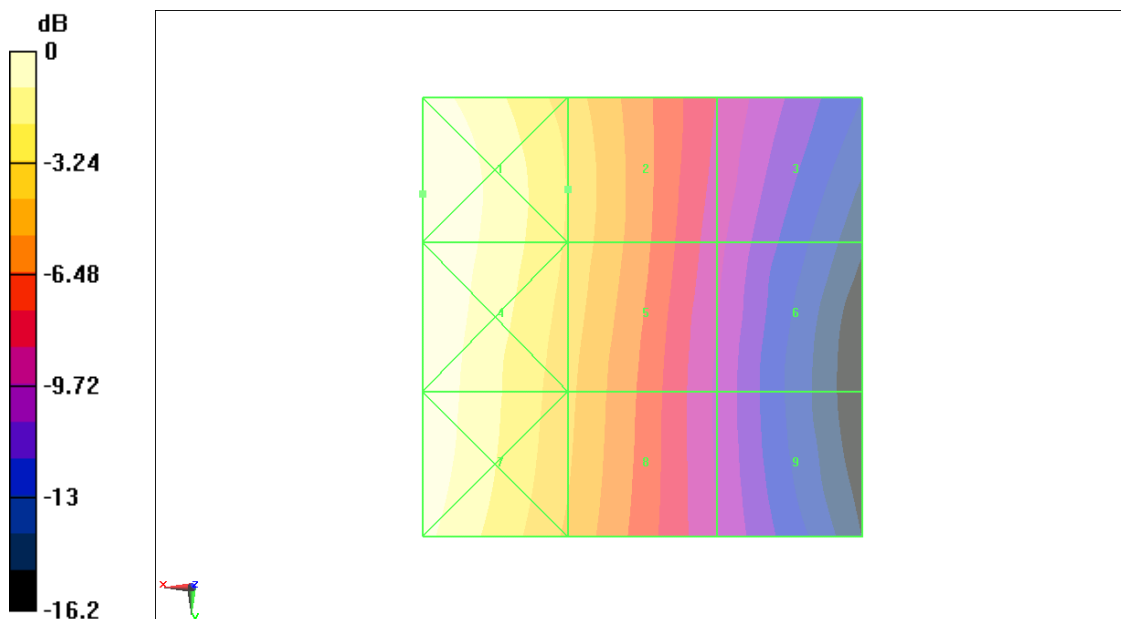
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.074 A/m; Power Drift = -0.021 dB

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

Peak H-field in A/m

Grid 1 0.425 M4	Grid 2 0.291 M4	Grid 3 0.157 M4
Grid 4 0.422 M4	Grid 5 0.288 M4	Grid 6 0.145 M4
Grid 7 0.409 M4	Grid 8 0.268 M4	Grid 9 0.140 M4



0 dB = 0.425A/m

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

HAC RF H-Field GSM 1900 High

Date/Time: 10/26/2011 6:21:43 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 0.179 A/m

Probe Modulation Factor = 2.88

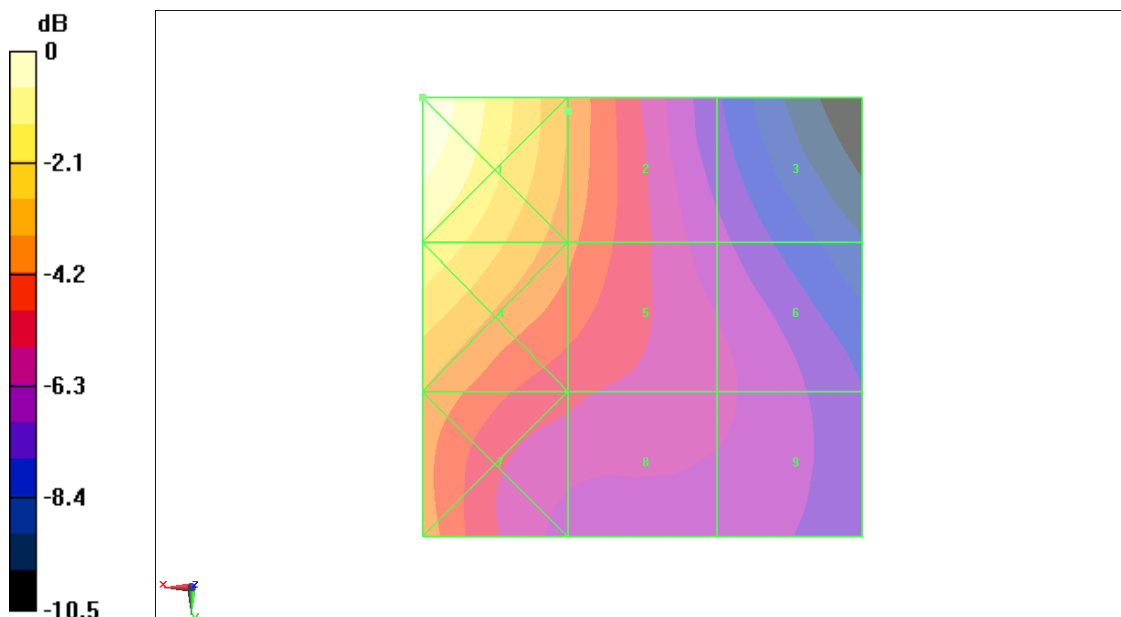
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.050 A/m; Power Drift = 0.030 dB

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

Peak H-field in A/m

Grid 1 0.269 M2	Grid 2 0.179 M3	Grid 3 0.124 M4
Grid 4 0.227 M3	Grid 5 0.170 M3	Grid 6 0.133 M4
Grid 7 0.180 M3	Grid 8 0.145 M3	Grid 9 0.133 M4



0 dB = 0.269A/m

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

HAC RF H-Field GSM 1900 Middle

Date/Time: 10/26/2011 6:27:29 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 0.134 A/m

Probe Modulation Factor = 2.88

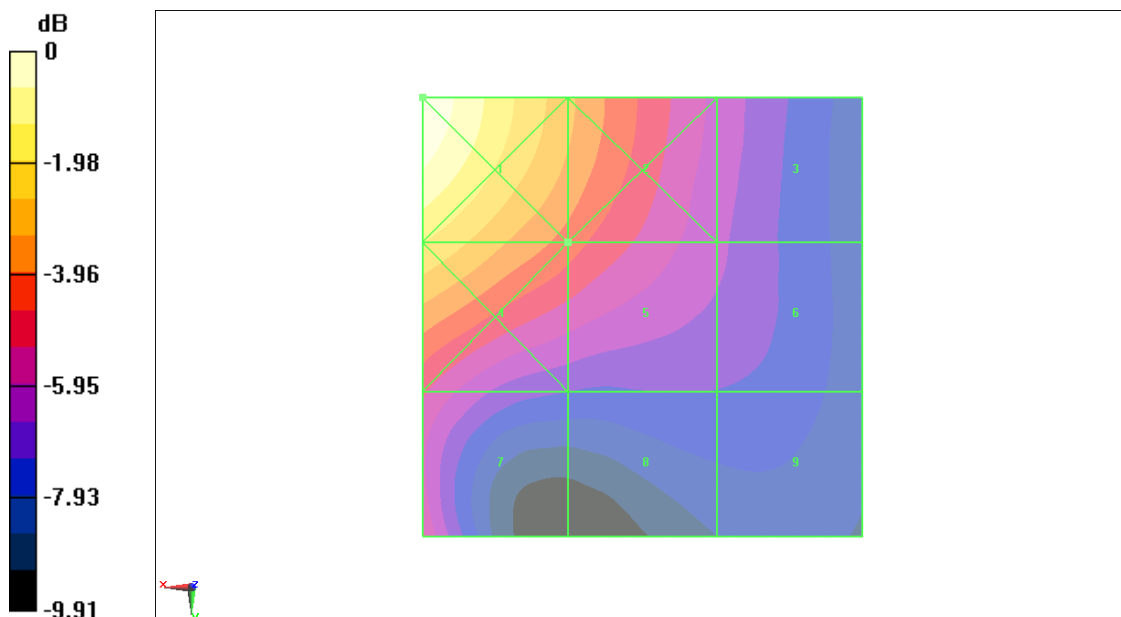
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.039 A/m; Power Drift = -0.00857 dB

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

Peak H-field in A/m

Grid 1 0.219 M3	Grid 2 0.153 M3	Grid 3 0.108 M4
Grid 4 0.175 M3	Grid 5 0.134 M4	Grid 6 0.105 M4
Grid 7 0.122 M4	Grid 8 0.095 M4	Grid 9 0.095 M4



0 dB = 0.219A/m

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

HAC RF H-Field GSM 1900 Low

Date/Time: 10/26/2011 7:02:40 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 0.151 A/m

Probe Modulation Factor = 2.88

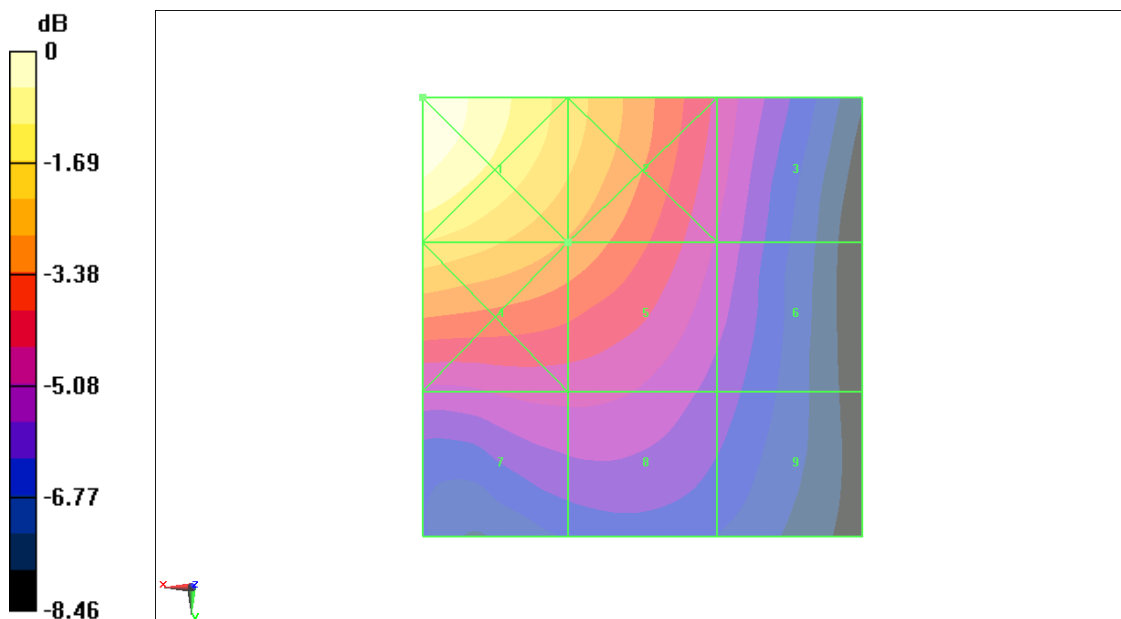
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.046 A/m; Power Drift = 0.00185 dB

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

Peak H-field in A/m

Grid 1 0.210 M3	Grid 2 0.168 M3	Grid 3 0.124 M4
Grid 4 0.173 M3	Grid 5 0.151 M3	Grid 6 0.117 M4
Grid 7 0.120 M4	Grid 8 0.120 M4	Grid 9 0.107 M4



0 dB = 0.210A/m

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

Total M-rating of GSM 850 MHz Band

Date/Time: 10/26/2011 7:41:22 PM, Date/Time: 10/26/2011 6:04:00 PM

Electronics: DAE4 Sn777

Medium: Air

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

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 - SN2428Probe: H3DV6 - SN6260;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 = 213.4 V/m

Probe Modulation Factor = 2.88

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 97.8 V/m; Power Drift = -0.025 dB

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

Peak E-field in V/m

Grid 1 193.9 M3	Grid 2 209.9 M3	Grid 3 203.4 M3
Grid 4 196.9 M3	Grid 5 213.4 M3	Grid 6 206.6 M3
Grid 7 188.9 M3	Grid 8 200.6 M3	Grid 9 195.6 M3

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 = 0.333 A/m

Probe Modulation Factor = 2.88

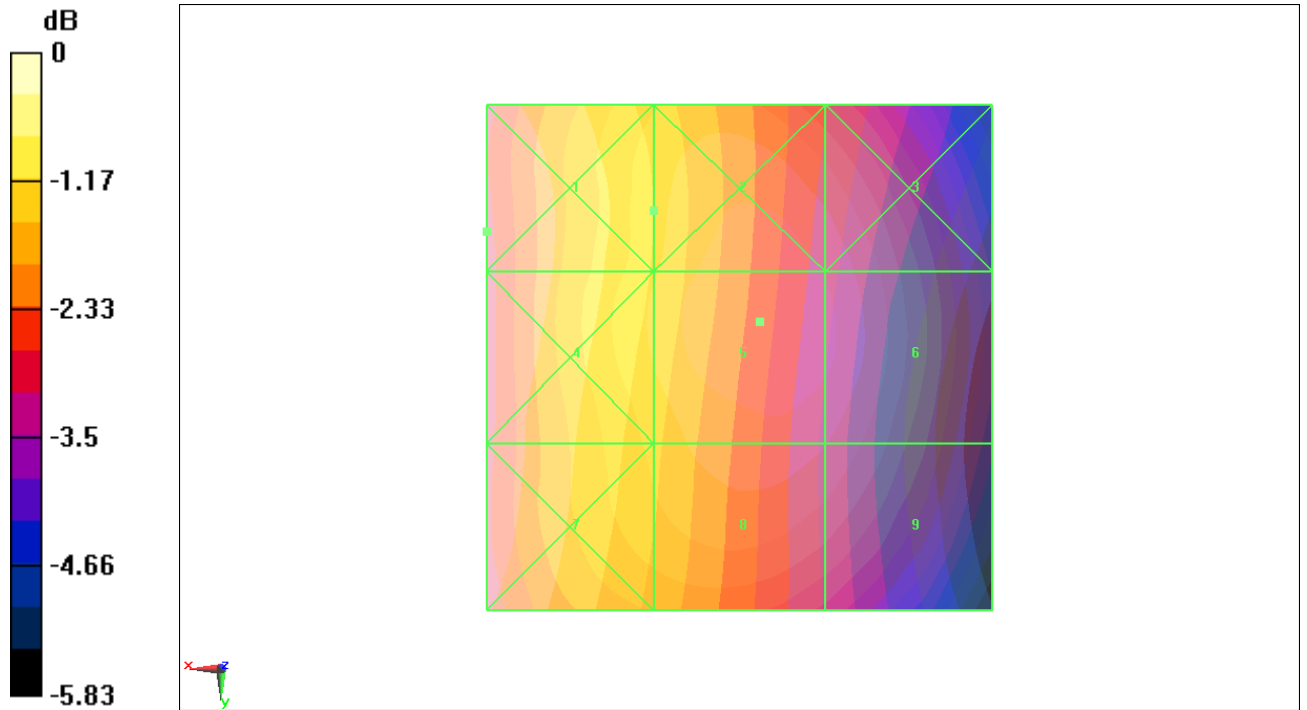
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.083 A/m; Power Drift = 0.040 dB

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

Peak H-field in A/m

Grid 1 0.488 M3	Grid 2 0.333 M4	Grid 3 0.177 M4
Grid 4 0.486 M3	Grid 5 0.329 M4	Grid 6 0.163 M4
Grid 7 0.465 M3	Grid 8 0.302 M4	Grid 9 0.153 M4



0 dB = 213.4V/m

RF RESULTS AND M-RATING	E-Field M Rating	M3 (AWF -5 dB)
	H-Field M Rating	M4 (AWF -5 dB)
	Total M Rating	M3

Fig B.13 Total M-rating of GSM 850

Total M-rating of GSM 1900 MHz Band

Date/Time: 10/26/2011 7:24:26 PM, Date/Time: 10/26/2011 6:21:43 PM

Electronics: DAE4 Sn777

Medium: Air

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

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

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

Probe: ER3DV6 - SN2428Probe: H3DV6 - SN6260;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 = 66.8 V/m

Probe Modulation Factor = 2.88

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 19.1 V/m; Power Drift = -0.052 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
76.3 M3	79 M3	74.5 M3
Grid 4	Grid 5	Grid 6
51.8 M3	66.8 M3	66.8 M3
Grid 7	Grid 8	Grid 9
56.9 M3	46.7 M4	48.4 M3

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 = 0.179 A/m

Probe Modulation Factor = 2.88

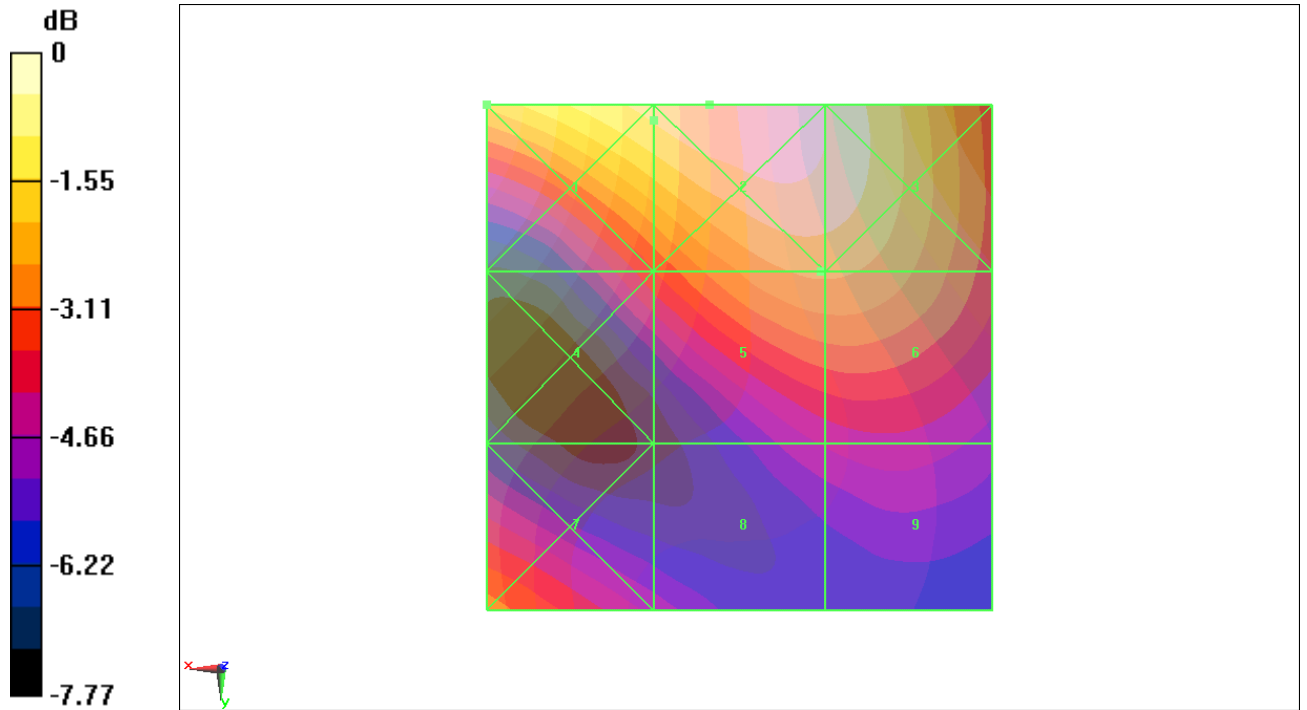
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.050 A/m; Power Drift = 0.030 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.269 M2	0.179 M3	0.124 M4
Grid 4	Grid 5	Grid 6
0.227 M3	0.170 M3	0.133 M4
Grid 7	Grid 8	Grid 9
0.180 M3	0.145 M3	0.133 M4



0 dB = 79V/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: 10/26/2011 8:29:45 AM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ 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 = 169.0 V/m

Probe Modulation Factor = 1

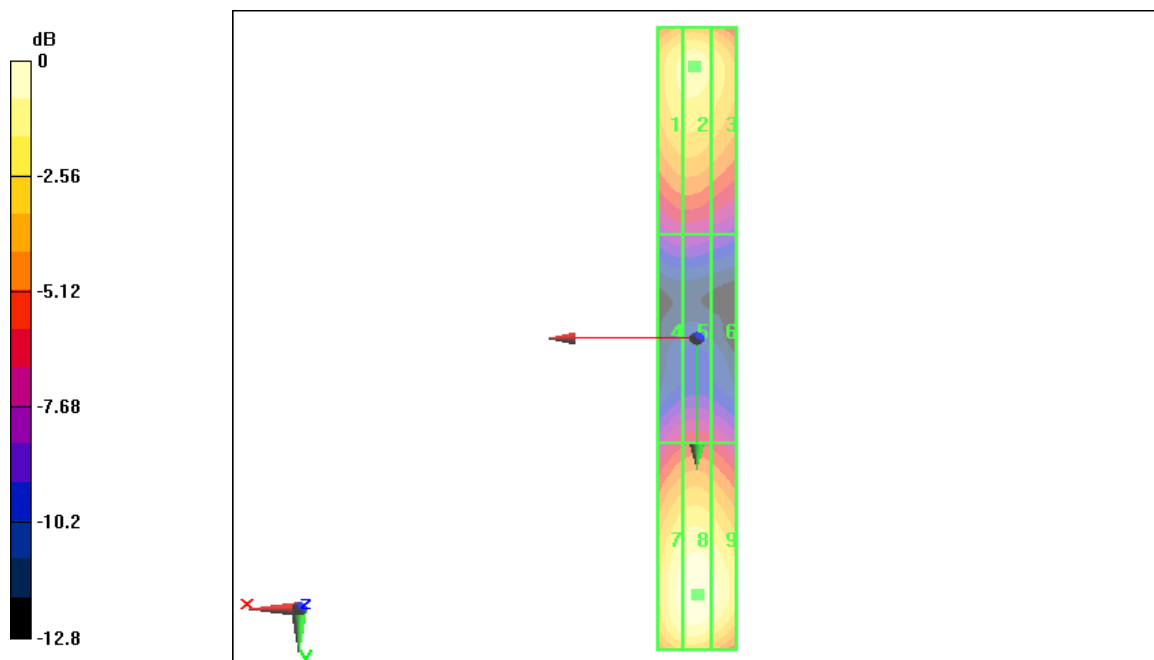
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 120.4 V/m; Power Drift = 0.057 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
144.3 M4	146.4 M4	138.8 M4
Grid 4	Grid 5	Grid 6
80.8 M4	83.3 M4	79.6 M4
Grid 7	Grid 8	Grid 9
161.6 M4	169.0 M4	161.1 M4



0 dB = 169.0V/m

H SCAN of Dipole 835 MHz

Date/Time: 10/26/2011 8:47:29 AM

Electronics: DAE4 Sn777

Medium: Air

Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ 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 = 0.448 A/m

Probe Modulation Factor = 1

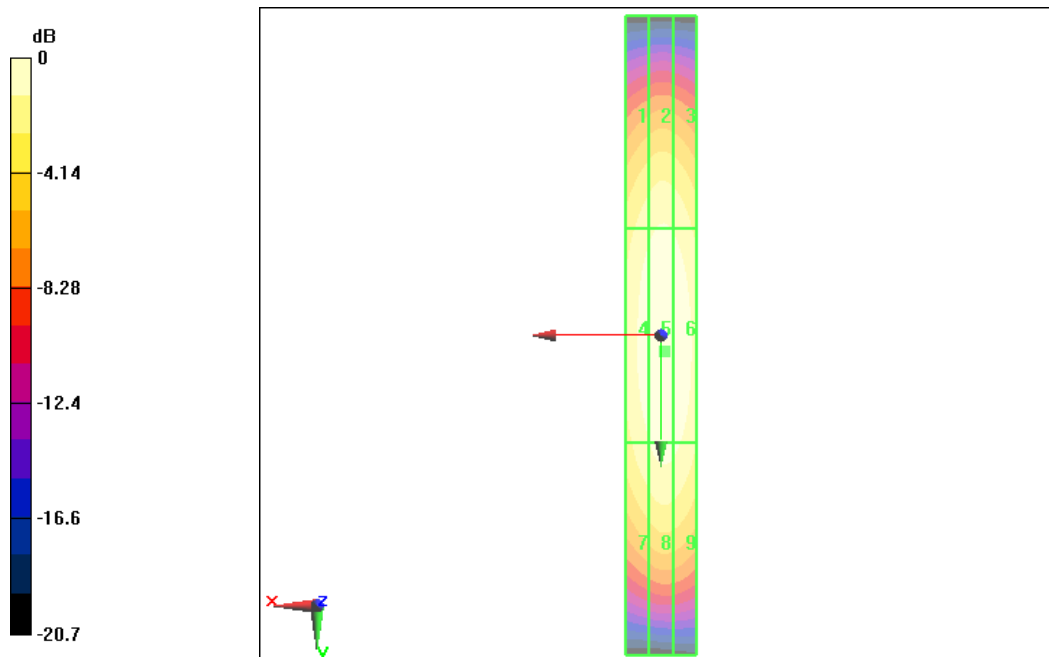
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.472 A/m; Power Drift = -0.061 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.362 M4	0.387 M4	0.373 M4
Grid 4	Grid 5	Grid 6
0.422 M4	0.448 M4	0.433 M4
Grid 7	Grid 8	Grid 9
0.370 M4	0.398 M4	0.391 M4



0 dB = 0.448A/m

E SCAN of Dipole 1880 MHz

Date/Time: 10/26/2011 9:12:36 AM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 141.5 V/m

Probe Modulation Factor = 1

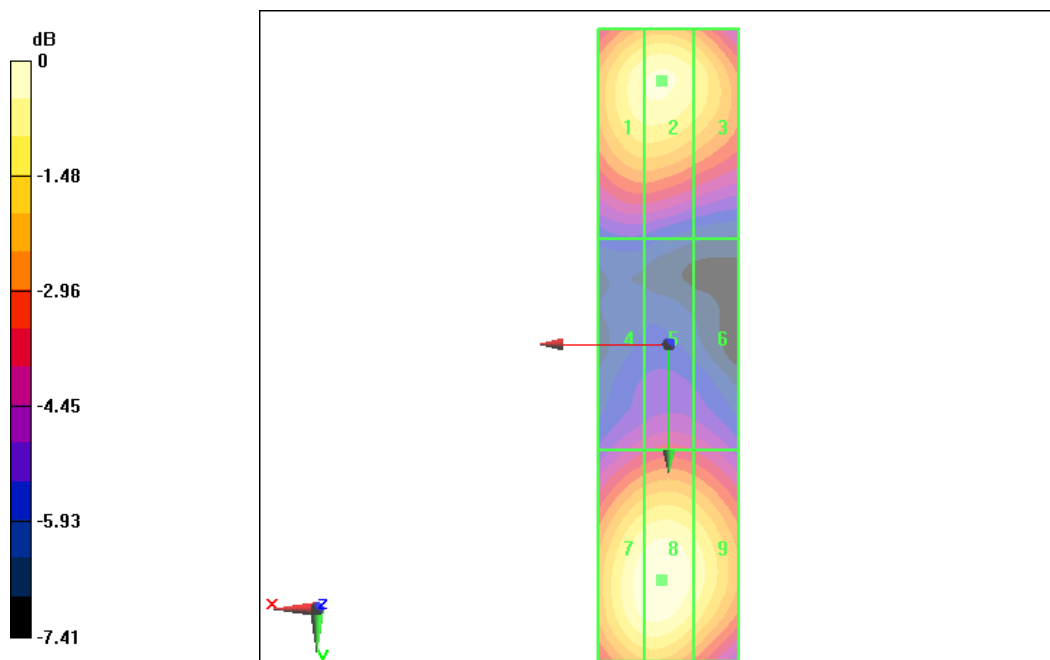
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 146.4 V/m; Power Drift = -0.085 dB

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

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
132.4 M2	132.2 M2	127.1 M2
Grid 4	Grid 5	Grid 6
90.4 M3	92.2 M3	90.0 M3
Grid 7	Grid 8	Grid 9
138.2 M2	141.5 M2	132.3 M2



0 dB = 141.5V/m

H SCAN of Dipole 1880 MHz

Date/Time: 10/26/2011 9:34:28 AM

Electronics: DAE4 Sn777

Medium: Air

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

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 = 0.449 A/m

Probe Modulation Factor = 1

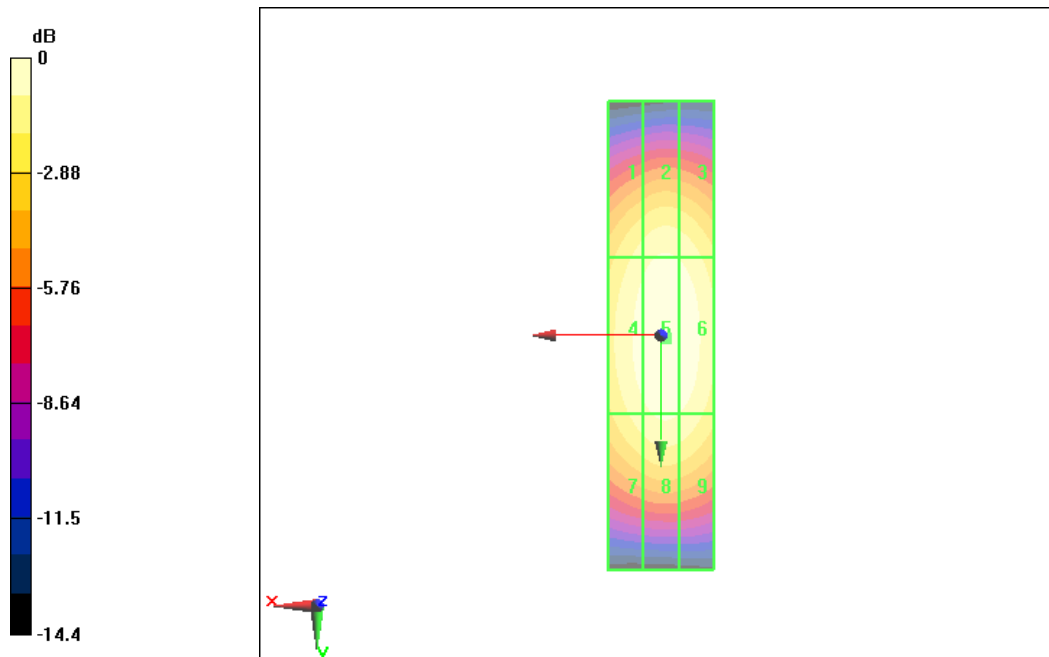
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.461 A/m; Power Drift = 0.049 dB

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

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.368 M2	0.391 M2	0.380 M2
Grid 4	Grid 5	Grid 6
0.413 M2	0.449 M2	0.419 M2
Grid 7	Grid 8	Grid 9
0.373 M2	0.399 M2	0.391 M2



0 dB = 0.449A/m