MOTOROLA

FCC ID: AZ489FT5844
DECLARATION OF COMPLIANCE HAC ASSESSMENT

Motorola Florida Corporate Research Laboratory
8000 West Sunrise Blvd
Fort Lauderdale, FL. 33322

Date of Report: August 2, 2005
Report Revision: Rev. O
Report ID: FCC HAC rpt_i560_Rev O_050802

Responsible Engineer:	Mike Kanda
Date/s Tested:	7/22/05
Manufacturer/Location:	Motorola - Plantation
Sector/Group/Div.:	iDEN Subscriber
Date submitted for test:	8/01/05
DUT Description:	i560; iDEN1: 1:3 TDMA; 16 QAM 806-825; 896-902 MHz
Test TX mode(s):	1:3
Max. Power output:	iDEN - 0.640W; Pulse Average; Factory tuned
Nominal Power:	iDEN - 0.600W; Pulse Average; Factory tuned
Tx Frequency Bands:	iDEN - 806-825, 896-902 MHz
Signaling type:	TDMA: iDEN
Model(s) Tested:	H65XAN6RR4BN
Model(s) Certified:	H65XAN6RR4BN
Serial Number(s):	364KFG37GK
Rule Part(s):	20.19

Approved Applicable Accessories:
Battery(ies):
SNN5705B (750mAh Li Ion)

Max E Field emission = 78.8 V/m @ 806 MHz
Max H Field emission = 0.158 A/m @ 806 MHz
M Category = M3

Based on the information and the testing results provided herein, the undersigned certifies that when used as stated in the operating instructions supplied, said product complies with the national and international reference standards and guidelines listed in section 2.0 of this report. This report shall not be reproduced without written approval from an officially designated representative of the Motorola EME Laboratory.

The results and statements contained in this report pertain only to the device(s) evaluated.

/s/ Al Wieczorek (signed)
Al Wieczorek; Motorola iDEN Subscriber Division

Approval Date: 8/02/05

Certification Date: 8/02/05

REVISION HISTORY

Date	Revision	Comments
8/02/05	O	Initial release

1.0 Introduction and Overview

This report details the utilization, test setup, test equipment, and test results of the Hearing Aid Compatibility (HAC) measurements performed at the Motorola Corporate Research Lab for the model number H65XAN6RR4BN of FCC ID: AZ489FT5844. Measurements were performed to ensure compliance to the PC63.19-2001 rd 3.6 standard. This report demonstrates compliance for near field emissions only and not for the T-coil performance compliance.

The test results presented herein clearly demonstrate compliance FCC 47 CFR section 20.19 and with the latest version of PC63.19-2001 rd 3.6 and only reflect the performance of the stated model herein.

2.0 Near Field Compliance Criteria (Per PC63.19-2001 rd 3.6)

Category	Target Parameters		
Near Field M-Rating	AWF	E-Field Emissions Peak -V/m	H-Field Emissions Peak - A/m
M3	iDEN = 0	63.1 – 112.2	0.19 – 0.34
M4	iDEN = 0	<63.1	<0.19

3.0 Description of Device Under Test (DUT)

FCC ID: AZ489FT5844 is a digital multi-service data capable device that employs time division multiplexing transmission technology with a duty cycle ranging from 16.67% to 33.33% using 16-QAM modulation for voice transmission. This device may be used while held against the ear in voice mode. FCC ID: AZ489FT5844 is capable of operating in the 806-825 MHz and 896-902MHz bands. The rated power is 0.6 watts pulse averaged.
The maximum output is 0.640 watts pulse average as defined by the upper limit of the production line final test station. The DUT was tuned to be within 5% of the maximum rated power.

4.0 Test Equipment List

5.0

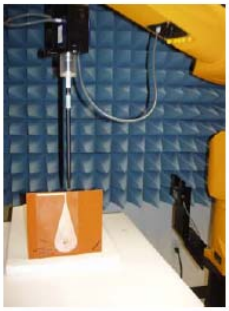
Equipment Type	Model Number	Serial Number	Calibration Due Date
HP Power Meter	HP4418B	US39251267	7/25/05
Gigatronics Power Meter	8542B	1828416	9/21/05
Gigatronics Power sensor	80422A	1821802	9/13/05
PST Power Amplifier	AR2729-10	M2K2A00	CNR
Signal Generator	HP4432B	US538330732	1/14/06
Directional Coupler (NARDA)	3020A	O4017	9/23/05
H-Field probe	H3DV6	6036	1/7/06
E-Field probe	ER3DV6R	2246	6/13/06
SPEAG	DASY4	Version 4.5 B19.2	NA
Data Acquisition Electronics (DAE)	NA	357	1/7/06

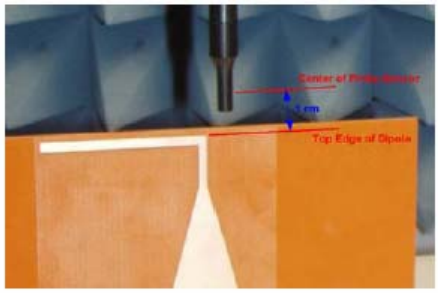
Descriptions of Measurement System

The laboratory utilizes a Dosimetric Assessment System (DASY4™) S.A.R. measurement system Version 4.5 B19.2 manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. The test system consists of a Stäubli RX90L robot, DAE3V1, ER3DV6R E-Field probe, H3DV6 H-field probe, as well as the integrated HAC extension. Please reference the SPEAG user manual and application notes for detailed probe, robot, and HAC calibration and computational procedures. Section 3.0 presents relevant test equipment information. Appendices C present the applicable calibration certificates.
The DASY4™ system is operated per the instructions in the DASY4™ Users Manual. The complete manual is available directly from SPEAG™. All measurement equipment used to assess EME HAC compliance was calibrated according to 17025 A2LA guidelines.

6.0 Measurement System Verification

The S.A.R. measurements were conducted with E and H field probes model/serial numbers ER3DV6R/SN2246 and H3DV6/SN6036. An un-modulated CW signal was used for system verification following the guidelines specified in the referenced standard. Note that the 1 cm probe to dipole separation is measured from the top surface of the dipole to the calibration reference point of the probe. The DASY4 output files of the system verification test results are included in Appendix A. The photos below depict the validation setup using a planar dipole per ANSI PC63.19 section 4.2.2.1.4. Section 6.1 summarizes the system performance check results.





6.1 System Verification Test Results

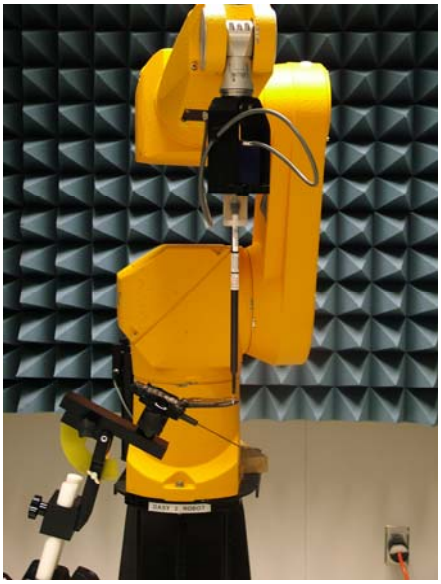
Frequency	Input power (W)	E-Field Results (V/m)	C63.19 Target (V/m)	% Deviation
813.5	0.100	221.3	224.8	-1.22
898.5	0.100	209.4	213.2	-1.64

Frequency	Input power (W)	H-Field Results (A/m)	C63.19 Target (A/m)	% Deviation
813.5	0.100	0.489	0.5139	-4.85
898.5	0.100	0.483	0.5032	-4.01

7.0 DUT Setup and Test Procedure

Test Procedure

The automated test procedure guidelines presented in PC63.19-2001 section 4.3.1.2.2 were followed in order to demonstrate HAC compliance. The photos below depict the DUT test setup. The reference grid depicts the alignment with the center of the acoustic output used for coupling to hearing aid devices. The test results using embedded test mode software with an unlighted display are presented in section 9.0.



DUT test setup with 10mm spacing

Example illustration of WD with reference grid (Not to scale)

8.0 Environmental Test Conditions

The table below presents the range and average environmental conditions during the HAC tests reported herein:

	Target	Measured
Ambient Temperature	23 ˚C +/- 5 ˚C	Within Guidelines
Relative Humidity	0 - 80 %	Within Guidelines

The EME Lab RF environment uses a Spectrum Analyzer to monitor for extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the HAC scans are repeated. Per the pretest procedures in PC63.19-2001 rd 3.6 section 4.3.1.1 footnote 13, interference from reflective objects was found not to exceed -20dB.

9.0 Test Results Summary

Table1

iDEN 800MHz band						
Freq.	**Conducted Po (W)**	**E-Field (V/m)**	**E-Field excluded cells**	**H-Field (A/m)**	**H-Field excluded cells**	**M-Rating**
806	0.640	78.8	2, 3, 6	0.158	1, 2, 3	M3
813.5	0.640	74.0	2, 3, 6	0.156	1, 2, 3	M3
821	0.640	73.2	2, 3, 6	0.150	1, 2, 3	M3
824	0.640	73.2	2, 3, 6	0.150	1, 2, 3	M3

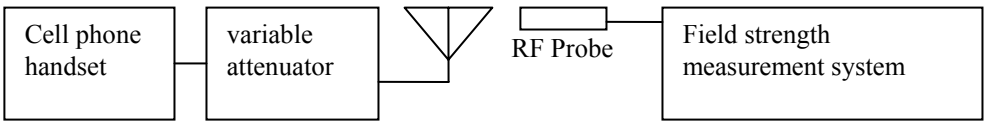
Table 2

iDEN 900MHz band						
Freq.	**Conducted Po (W)**	**E-Field (V/m)**	**E-Field excluded cells**	**H-Field (A/m)**	**H-Field excluded cells**	**M-Rating**
896	0.640	58.1	1, 2, 3	0.140	1, 2, 3	M4
898.5	0.640	60.7	1, 2, 3	0.138	1, 2, 3	M4
901	0.640	61.7	2, 3, 6	0.130	1, 2, 3	M4

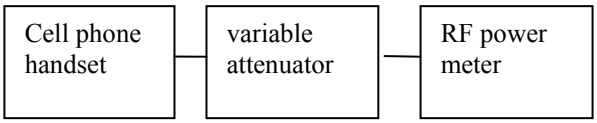
The above results reflect scaling of the measurement system's results presented in Appendix B by the modulation factors presented in section 10.0 Table 1. Reference step F in section 10. T-coil assessments were not applicable for this filing.

10.0 Probe modulation factor measurement

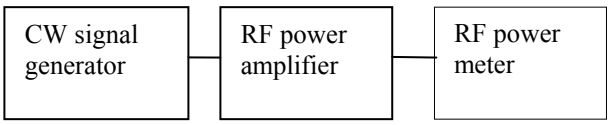
A - Per PC63.19-2001 rd 3.6 alternate measurement procedure steps 1, 2 and 3 the cellular telephone handset wireless device was set into a test mode at rated output power. For dynamic range reasons the phone was connected to the reference dipole antenna through an attenuator to assure the E-field probe reading on the field strength measurement system was in the range corresponding to a C63.19 category rating of M2, as illustrated below. The crest factor of the DASY measurement system was set equal to the TDM multiplex factor (3) and the field strength (E_{WD}) recorded in Table 1.



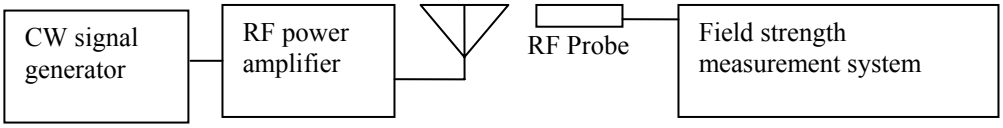
B - The phone was then disconnected from the antenna and connected to a RF power meter as illustrated below. The power meter was set to measure pulse average power over a multiple of 16 TDM pulses (Pwd) as normally done to measure handset output power. The actual output power measured without the attenuator is listed in section 9.



C - As illustrated below an unmodulated signal from a CW signal generator operating at the same frequency as the phone was amplified and applied to the RF power meter in lieu of the phone and attenuator per PC63.19-2001 rd 3.6 step 4. Per C63.19 rd 3.6 step 5 the output level of the signal generator was adjusted so the peak amplitude observed on the power meter was equal to that observed with the phone signal (Pwd) in preceding step B.



D - Per PC63.19-2001 rd step 6 the signal applied to the RF power meter was then applied to the reference dipole as shown below. The crest factor of the DASY measurement system was set to unity and the probe reading (E_{CW}) was recorded as noted in table 1.



E – The ratio of the reading in step D above (E_{CW}) divided by the reading in step B above (E_{WD}) is calculated as the probe modulation factor (PMF) and listed in Table 1.

F – PMF was then used as a calibration factor to scale the measurement system readings shown in the plots contained in Appendix B Measurement Results. The maximum scaled values so obtained to determine the category ratings for phone assessment are provided in Section 9 Test Results Summary.

G – The above procedure was repeated using a H-field RF probe.

Table 1 – Probe Modulation Factor (PMF) data

Probe Model-SN	MHz	Source	Field strength (V/m or A/m)	PMF
ER3DV6R - 2246	813.5	Handset	37.54	2.01
ER3DV6R - 2246	813.5	E4432B/ AR Model SW1000	75.4	
ER3DV6R - 2246	898.5	Handset	60.8	2.03
ER3DV6R - 2246	898.5	E4432B/ AR Model SW1000	29.9	
H3DV6 - 6036	813.5	Handset	0.079	1.97
H3DV6 -6036	813.5	E4432B/ AR Model SW1000	0.156	
H3DV6 – 6036	898.5	Handset	0.073	1.89
H3DV6 – 6036	898.5	E4432B/ AR Model SW1000	0.138	

11.0 Uncertainty Budget

Motorola Uncertainty Budget for E-Field HAC Testing

Error	Value (R=1)	Distribution	Div	Std Unc	Unc^2	Source
RF Reflections	5.6%	R	1.73	3.2%	0.10%	From Reflection Test 050628.xls
Probe Calibration	5.1%	N	1.00	5.1%	0.26%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Isotropy	3.6%	R	1.73	2.1%	0.04%	From averaged results from iDEN HAC Tests i730, 850, 855, 450, 560 formatted.xls
Frequency Response						
Linearity	4.7%	R	1.73	2.7%	0.07%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Boundary Effects	2.4%	R	1.73	1.4%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Sensor Displacement	16.5%	R	1.73	9.5%	0.91%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Probe Positioning accuracy	2.7%	R	1.73	1.6%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Probe Positioner	1.2%	R	1.73	0.7%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Extrapolation/Interpolation	1.0%	R	1.73	0.6%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
System Detection Limit	1.0%	R	1.73	0.6%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Readout Electronics	0.3%	N	1.00	0.3%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Integration Time	2.6%	R	1.73	1.5%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Response Time	0.8%	R	1.73	0.5%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
RF Ambient Conditions	3.0%	R	1.73	1.7%	0.03%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Vertical Device Positioning	4.7%	R	1.73	2.7%	0.07%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Lateral Device Positioning	1.0%	R	1.73	0.6%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Device Holder	1.4%	N	1.00	1.4%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Power Drift	2.9%	R	1.73	1.7%	0.03%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
			Comb Std. Uncertaint		12.7%	
			Exp Uncertainty		25.5%	

Motorola Uncertainty Budget for H-Field HAC Testing

Error	Value (R=1)	Distribution	Div	Std Unc	Unc^2	Source
RF Reflections	5.6%	R	1.73	3.2%	0.10%	From Reflection Test 050628.xls
Probe Calibration	5.1%	N	1.00	5.1%	0.26%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Isotropy	3.6%	R	1.73	2.1%	0.04%	From averaged results from iDEN HAC Tests i730, 850, 855, 450, 560 formatted.xls
Frequency Response						
Linearity	4.7%	R	1.73	2.7%	0.07%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Boundary Effects	2.4%	R	1.73	1.4%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Sensor Displacement	2.4%	R	1.73	1.4%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Probe Positioning accuracy	3.1%	R	1.73	1.8%	0.03%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Probe Positioner	0.9%	R	1.73	0.5%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Extrapolation/Interpolation	1.0%	R	1.73	0.6%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
System Detection Limit	1.0%	R	1.73	0.6%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Readout Electronics	0.3%	N	1.00	0.3%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Integration Time	2.6%	R	1.73	1.5%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Response Time	0.8%	R	1.73	0.5%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
RF Ambient Conditions	3.0%	R	1.73	1.7%	0.03%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Vertical Device Positioning	3.1%	R	1.73	1.8%	0.03%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Lateral Device Positioning	0.6%	R	1.73	0.3%	0.00%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Device Holder	1.4%	N	1.00	1.4%	0.02%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
Power Drift	2.9%	R	1.73	1.7%	0.03%	SPEAG DASY Chapter 28 Hearing Aid Extention (Draft)
			Comb Std. Uncertaint		8.4%	
			Exp Uncertainty		16.7%	

12.0 Conclusion

The highest Operational Maximum Calculated E and H field emissions results found for FCC ID: AZ489FT5844, model H65XAN6RR4BN are presented below. In accordance with FCC rule 47 CFR 2.1033(d) these test results clearly demonstrate compliance with FCC 47 CFR section 20.19 and with PC63.19-2001 rd 3.6.

Max E Field emission = 78.8 V/m @ 806 MHz
Max H Field emission = 0.158 A/m @ 806 MHz
M Category = M3

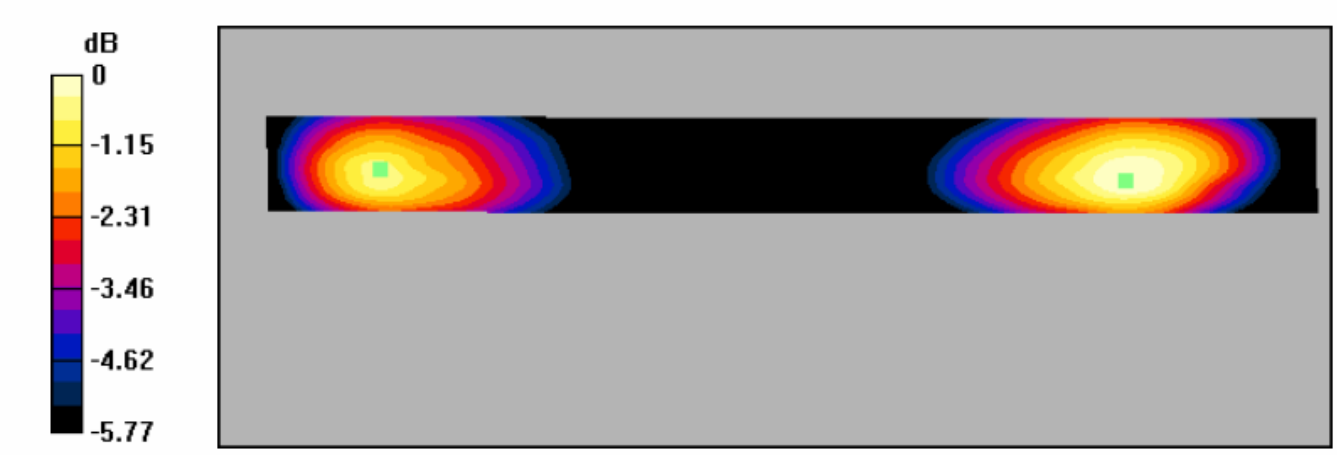
APPENDIX A
System Verification Results

Motorola Corporate Florida Research Lab
Planar Dipole
Date: 7/11/05

Comments:
813MHz E-field Validation
XFDTD Target = 224.8 V/m
Measured Results = 221.3 V/m
Delta from Target = -1.22%

HAC Procedure Notes: CW mode
Probe: ER3DV4R - SN2236, Calibrated: 1/7/2005, ConvF(1, 1, 1)
Duty Cycle: 1:1, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005

Verification/Generic Scan 2 2 (101x101x1): Measurement grid: dx=2mm, dy=2mm, dz=20mm
Maximum value of E_tot (interpolated) = 221.3 V/m

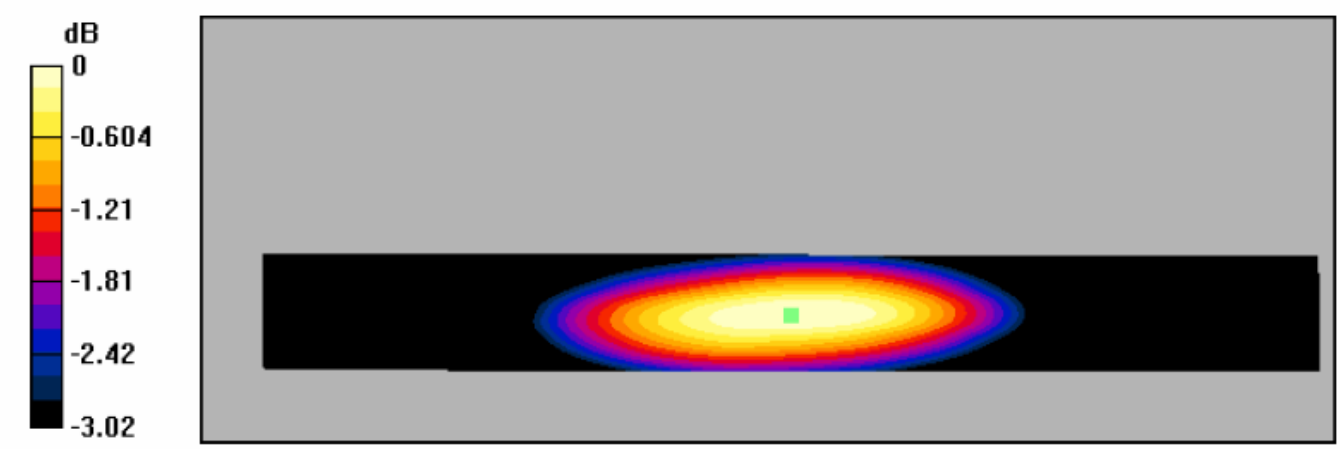


Motorola Corporate Florida Research Lab
Planar Dipole
Date: 7/11/05

Comments:
813MHz H-field Validation
XFDTD Target = 0.514 A/m
Measured Results = 0.489 A/m
Delta from Target = -4.85%

Procedure Notes: CW mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:1, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005

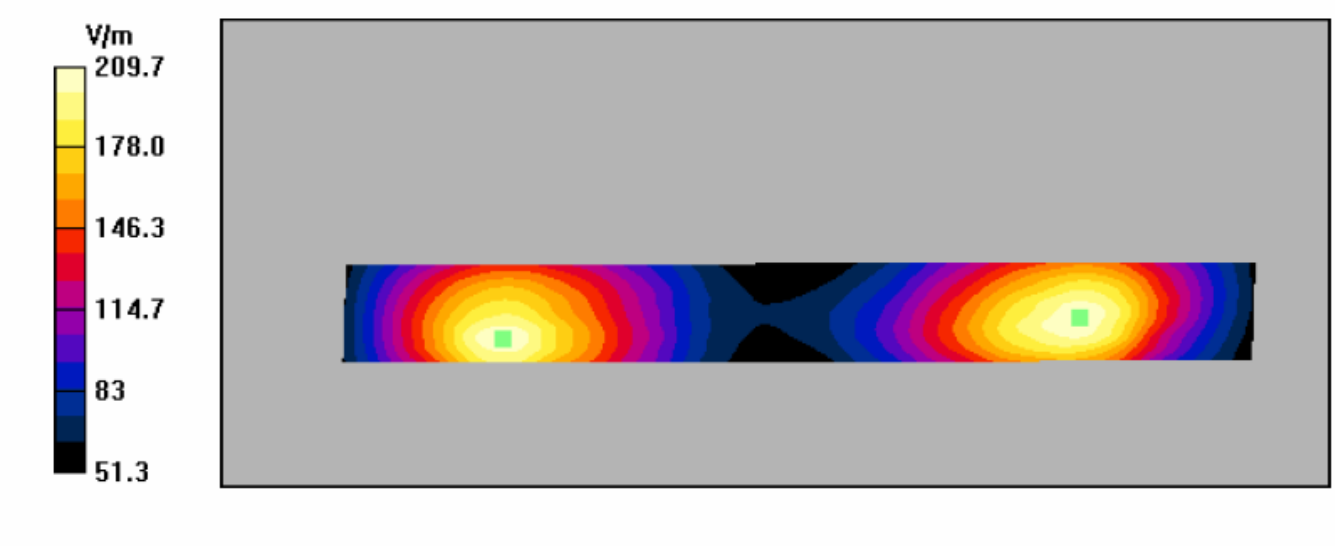
Verification/Generic Scan 2 2 (101x101x1): Measurement grid: dx=2mm, dy=2mm, dz=20mm
Maximum value of H_tot (interpolated) = 0.489 A/m



Motorola Corporate Florida Research Lab
Planar Dipole
Date: 7/11/05

Comments:
900MHz E-field Validation
XFDTD Target = 213.2 V/m
Measured Results = 209.7 V/m
Delta from Target = 4.85%

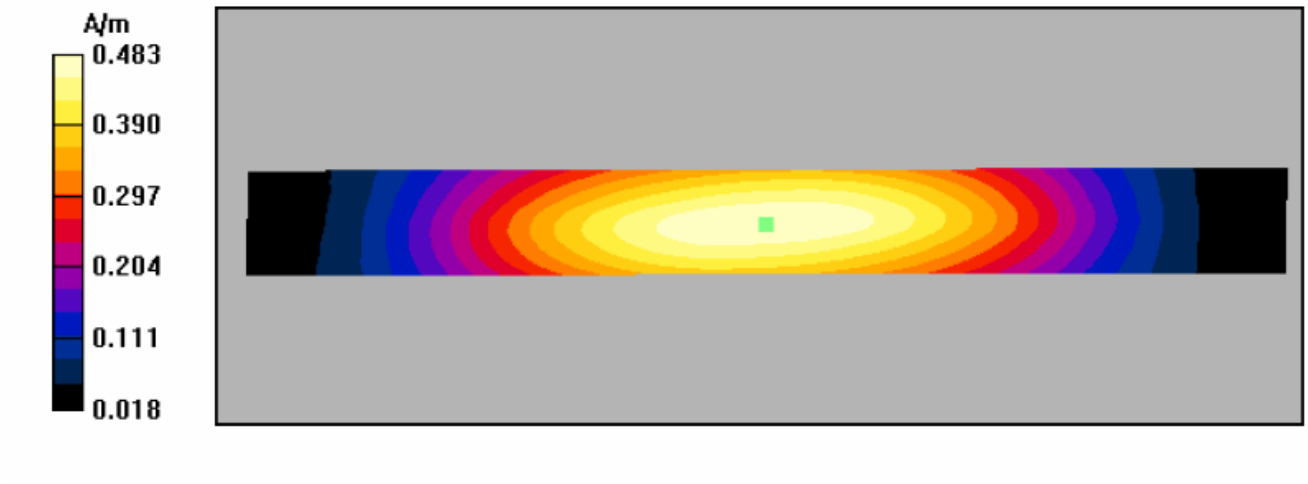
Procedure Notes: CW mode
Probe: ER3DV4R - SN2236, Calibrated: 1/7/2005, ConvF(1, 1, 1)
Duty Cycle: 1:1, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Verification/Generic Scan 2 2 (101x101x1): Measurement grid: dx=2mm, dy=2mm, dz=20mm
Maximum value of E_tot (interpolated) = 209.4 V/m



Motorola Corporate Florida Research Lab
Planar Dipole
Date: 7/11/05

Comments:
900MHz H-field Validation
XFDTD Target = 0.5032 A/m
Measured Results = 0.483 A/m
Delta from Target = -4.01%

Procedure Notes: CW mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:1, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Verification/Generic Scan 2 2 (101x101x1): Measurement grid: dx=2mm, dy=2mm, dz=20mm
Maximum value of H_tot (interpolated) = 0.483 A/m



Appendix B
Measurement Results

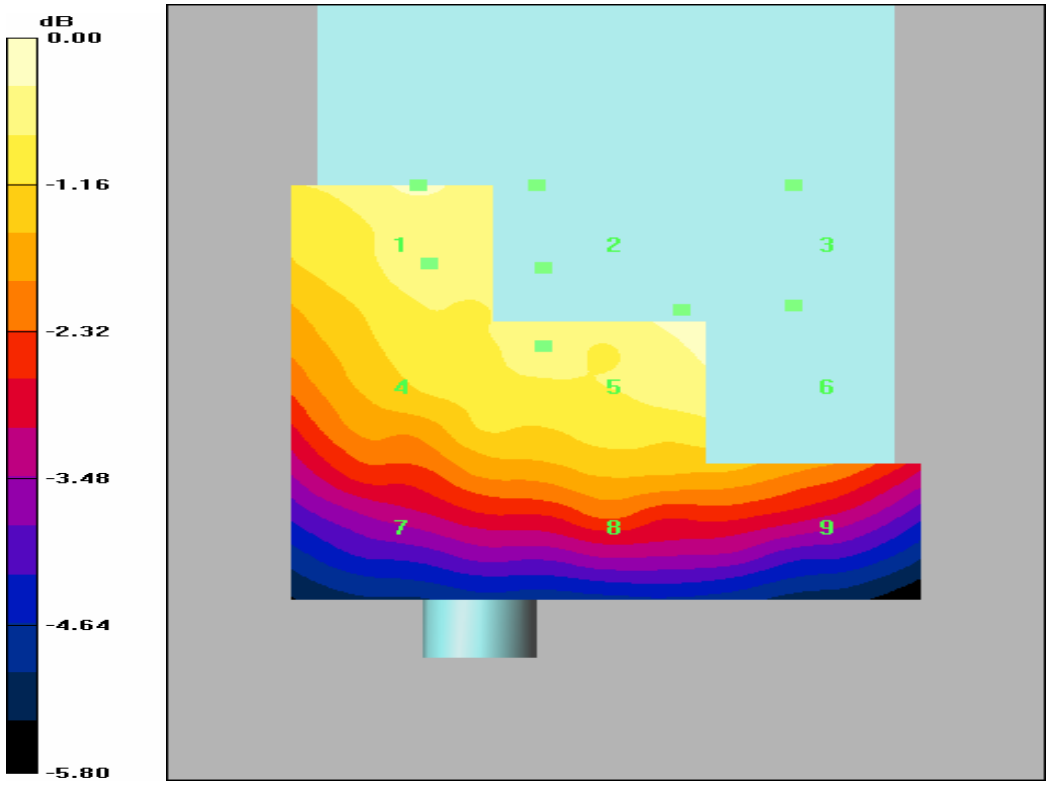
iDEN i560 E-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 806MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: ER3DV6R - SN2246, Calibrated: 6/13/2005, ConvF(1, 1, 1)
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.144dB

E in V/m (Time averaged)

Grid 1 **39.2**	Grid 2 **39.3**	Grid 3 **40.4**
Grid 4 **37**	Grid 5 **39.1**	Grid 6 **40.3**
Grid 7 **33.5**	Grid 8 **34.8**	Grid 9 **34.5**



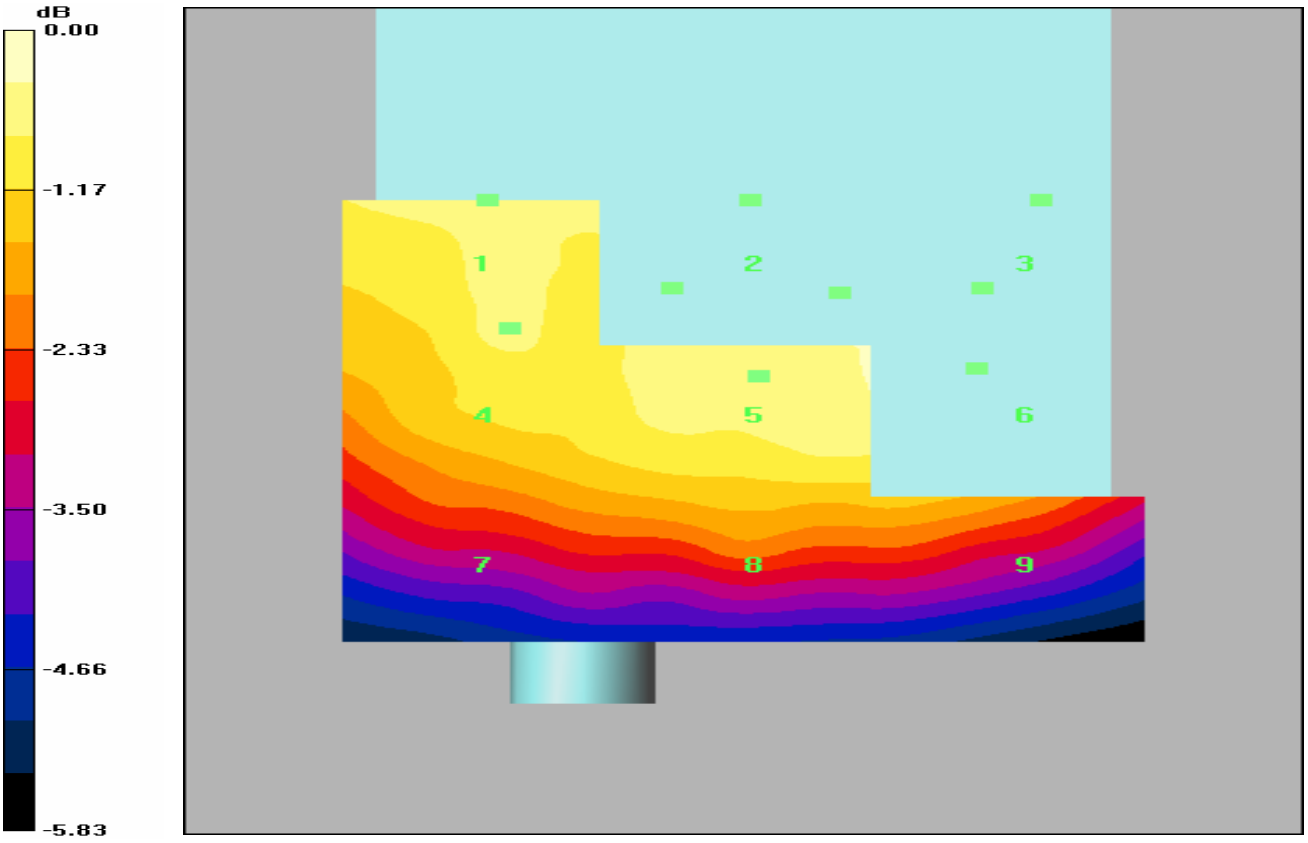
iDEN i560 E-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 813MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: ER3DV6R - SN2246, Calibrated: 6/13/2005, ConvF(1, 1, 1)
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = 0.0266dB

E in V/m (Time averaged)

Grid 1 **36**	Grid 2 **37.3**	Grid 3 **38.4**
Grid 4 **35.3**	Grid 5 **36.8**	Grid 6 **38.1**
Grid 7 **31.8**	Grid 8 **33**	Grid 9 **32.9**



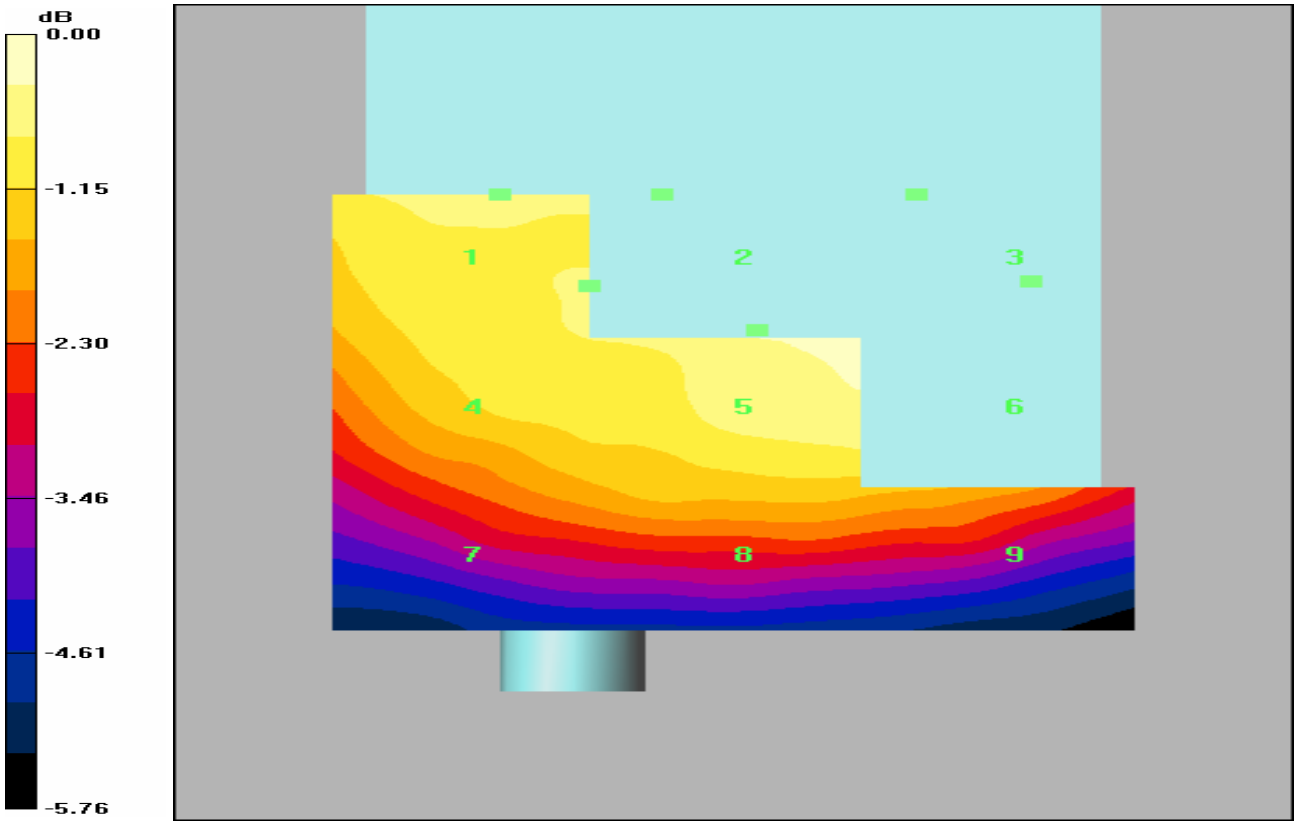
iDEN i560 E-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 821MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: ER3DV6R - SN2246, Calibrated: 6/13/2005, ConvF(1, 1, 1)
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.115dB

E in V/m (Time averaged)

Grid 1 **34.6**	Grid 2 **36.4**	Grid 3 **37.4**
Grid 4 **34.5**	Grid 5 **36.4**	Grid 6 **37.6**
Grid 7 **31.6**	Grid 8 **33.3**	Grid 9 **33**



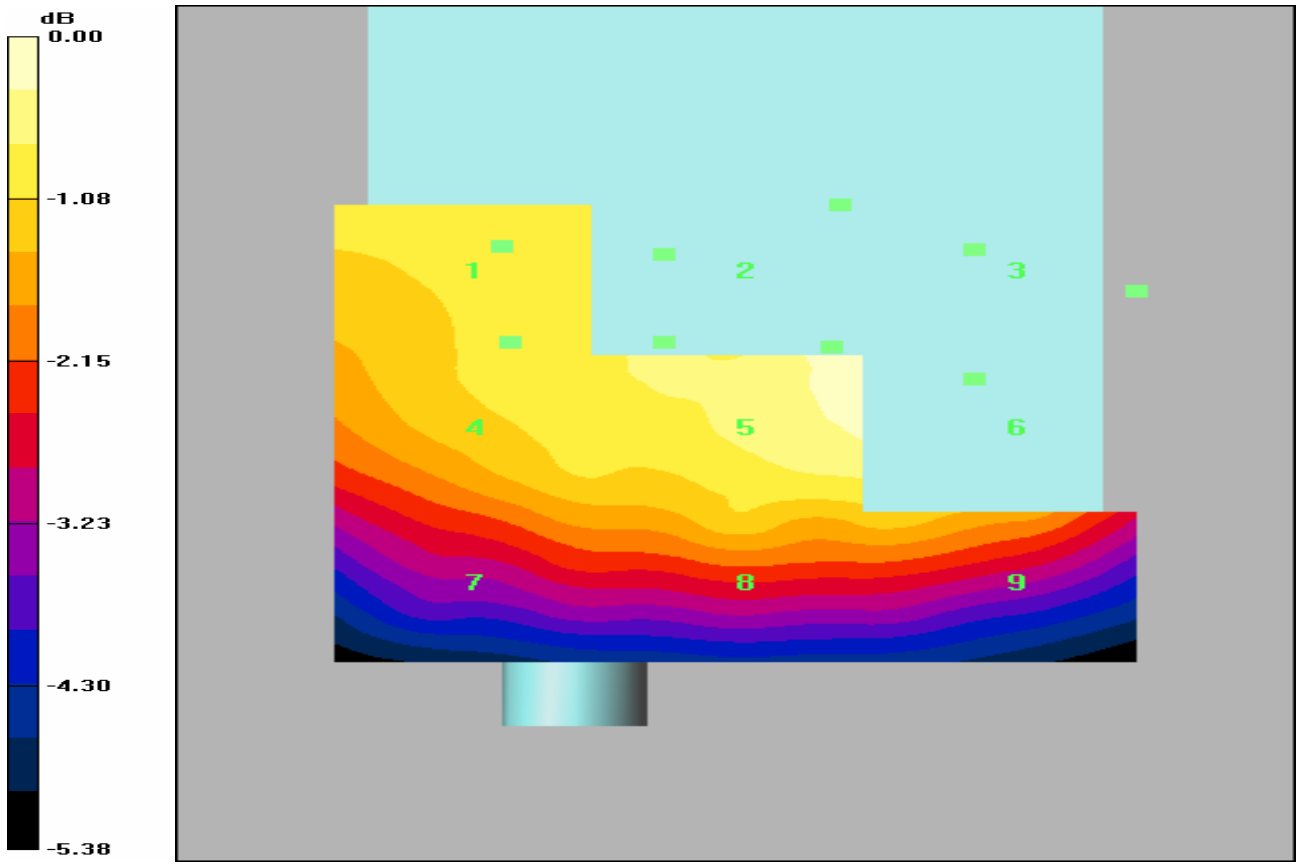
iDEN i560 E-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 824MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: ER3DV6R - SN2246, Calibrated: 6/13/2005, ConvF(1, 1, 1)
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = 0.0813 dB

E in V/m (Time averaged)

Grid 1 **34.6**	Grid 2 **36.4**	Grid 3 **37.4**
Grid 4 **34.5**	Grid 5 **36.4**	Grid 6 **37.6**
Grid 7 **31.6**	Grid 8 **33.3**	Grid 9 **33**



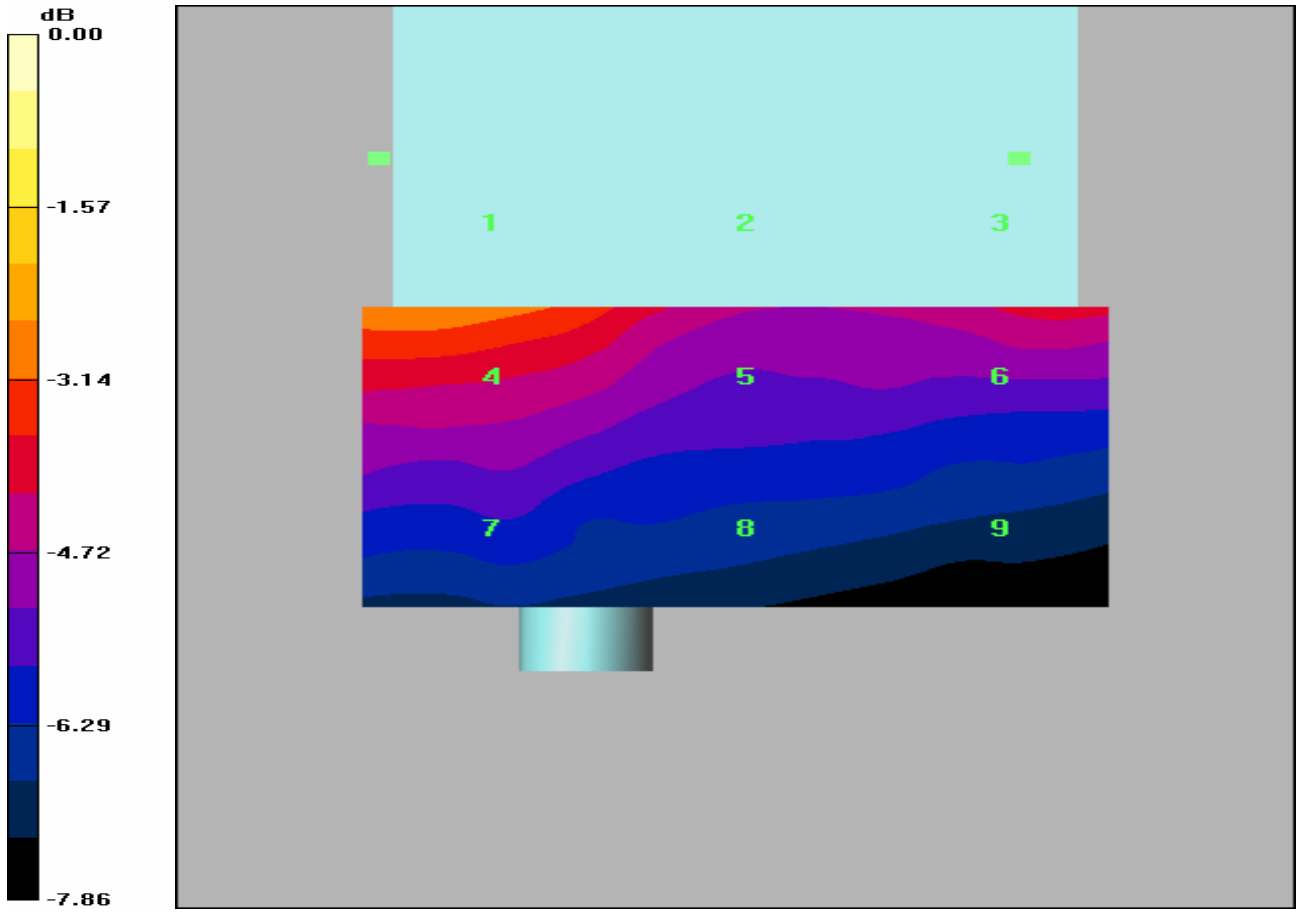
iDEN i560 H-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 806MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.248 dB

H in A/m (Time averaged)

Grid 1 **0.11**	Grid 2 **0.098**	Grid 3 **0.097**
Grid 4 **0.08**	Grid 5 **0.073**	Grid 6 **0.07**
Grid 7 **0.062**	Grid 8 **0.058**	Grid 9 **0.056**



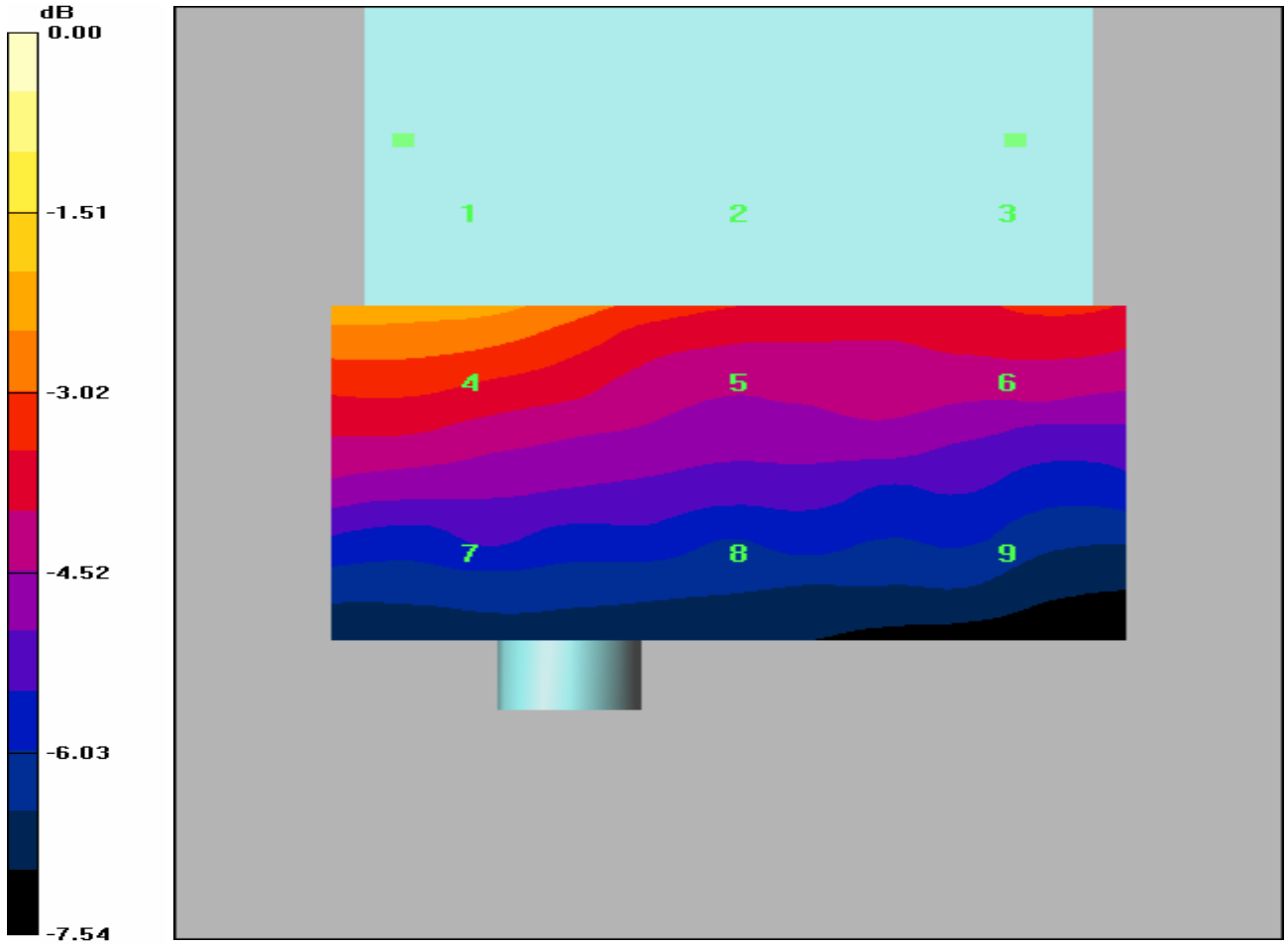
iDEN i560 H-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 813MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.182 dB

H in A/m (Time averaged)

Grid 1 **0.102**	Grid 2 **0.095**	Grid 3 **0.089**
Grid 4 **0.079**	Grid 5 **0.073**	Grid 6 **0.069**
Grid 7 **0.061**	Grid 8 **0.058**	Grid 9 **0.055**



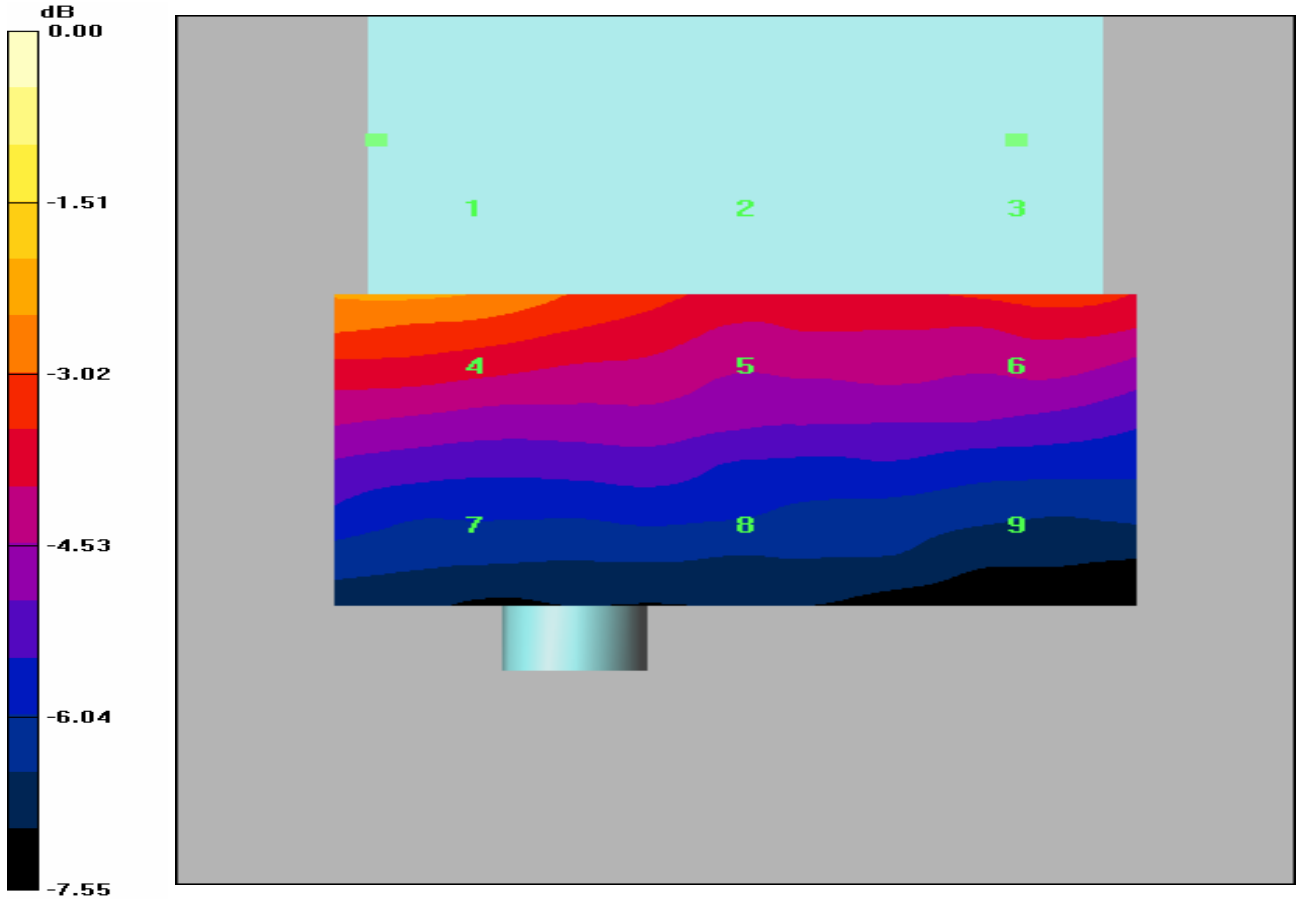
iDEN i560 H-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 821MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.0609 dB

H in A/m (Time averaged)

Grid 1 **0.1**	Grid 2 **0.093**	Grid 3 **0.09**
Grid 4 **0.076**	Grid 5 **0.07**	Grid 6 **0.069**
Grid 7 **0.057**	Grid 8 **0.056**	Grid 9 **0.054**



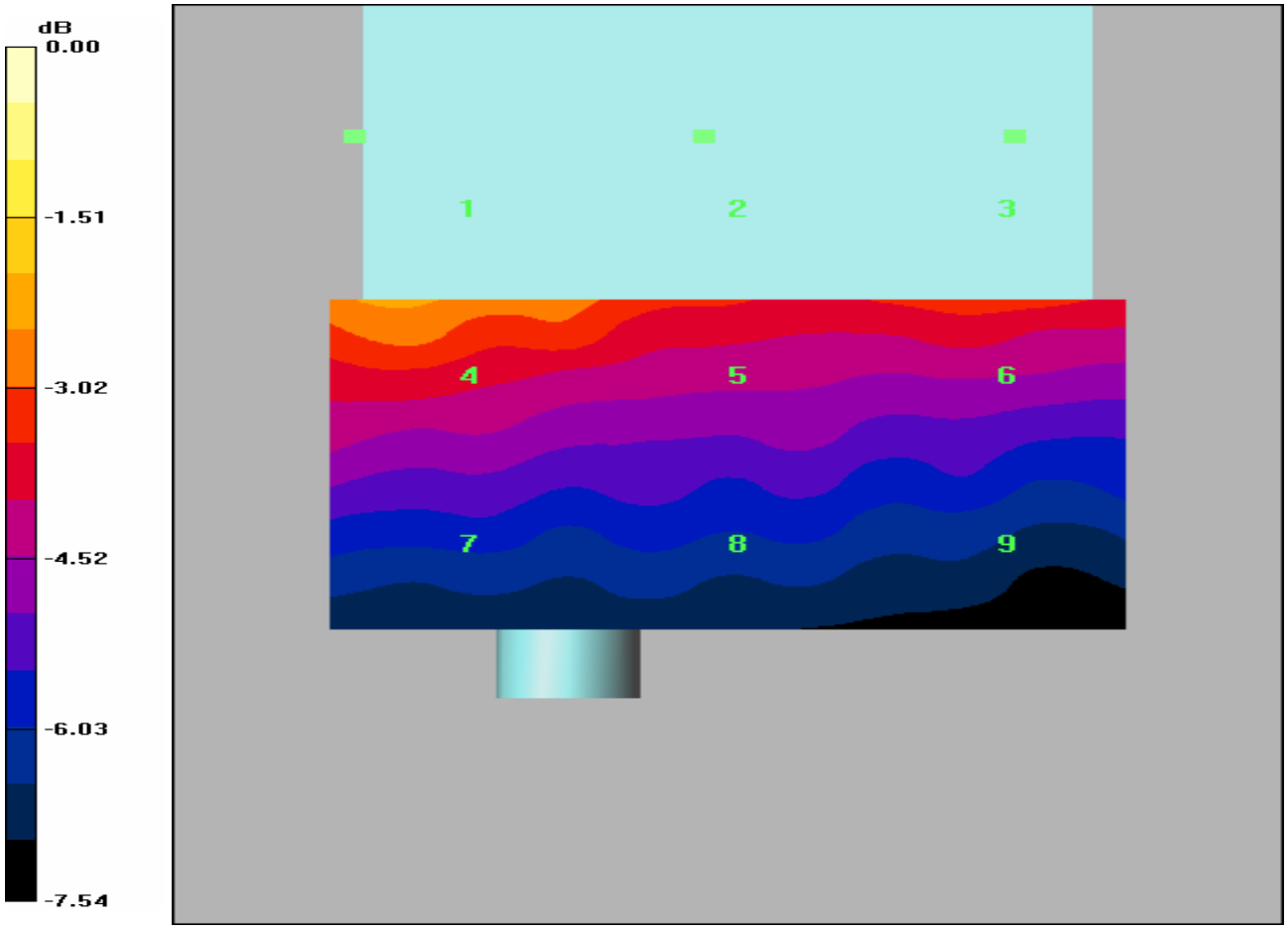
iDEN i560 H-Field 800MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 824MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = 0.105 dB

H in A/m (Time averaged)

Grid 1 **0.1**	Grid 2 **0.094**	Grid 3 **0.092**
Grid 4 **0.076**	Grid 5 **0.071**	Grid 6 **0.068**
Grid 7 **0.058**	Grid 8 **0.056**	Grid 9 **0.053**



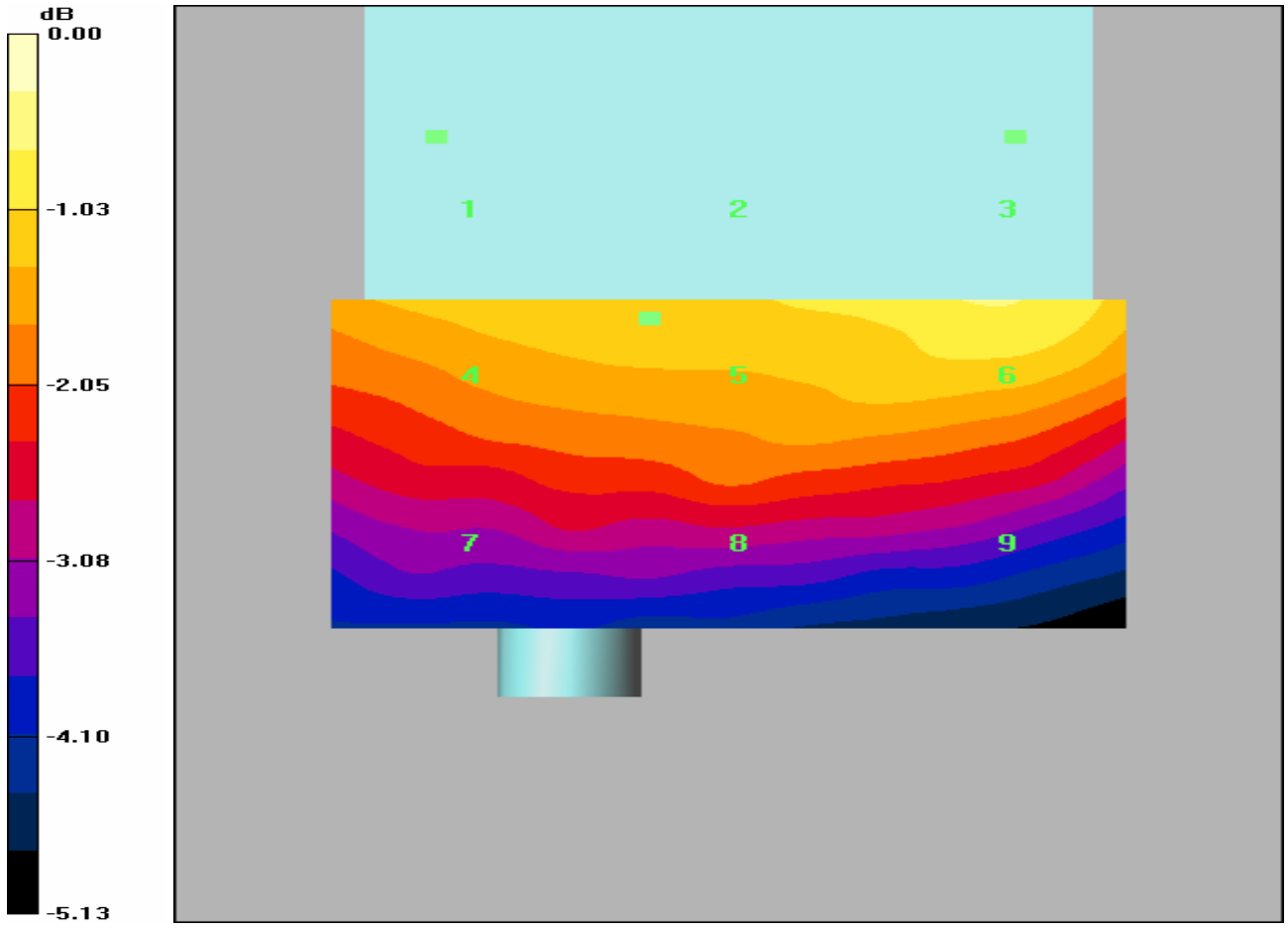
iDEN i560 E-Field 900MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 896MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: ER3DV6R - SN2246, Calibrated: 6/13/2005, ConvF(1, 1, 1)
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.0368 dB

E in V/m (Time averaged)

Grid 1 **30.9**	Grid 2 **30.2**	Grid 3 **30.7**
Grid 4 **27.1**	Grid 5 **27.8**	Grid 6 **28.6**
Grid 7 **24.2**	Grid 8 **25**	Grid 9 **24.4**



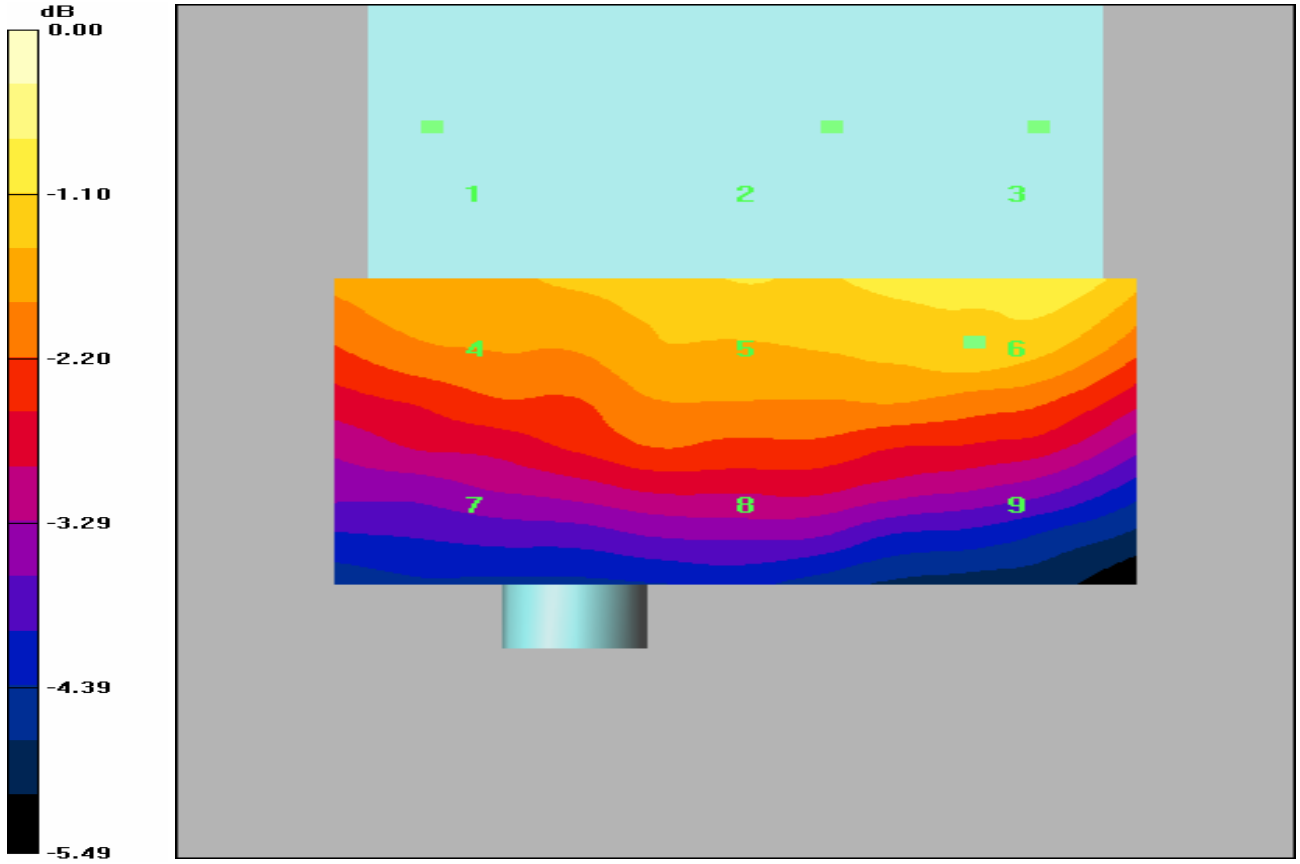
iDEN i560 E-Field 900MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 898.5MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: ER3DV6R - SN2246, Calibrated: 6/13/2005, ConvF(1, 1, 1)
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.290 dB

E in V/m (Time averaged)

Grid 1 **32**	Grid 2 **31.2**	Grid 3 **32.8**
Grid 4 **28.1**	Grid 5 **29.1**	Grid 6 **29.9**
Grid 7 **25.1**	Grid 8 **25.9**	Grid 9 **25.2**



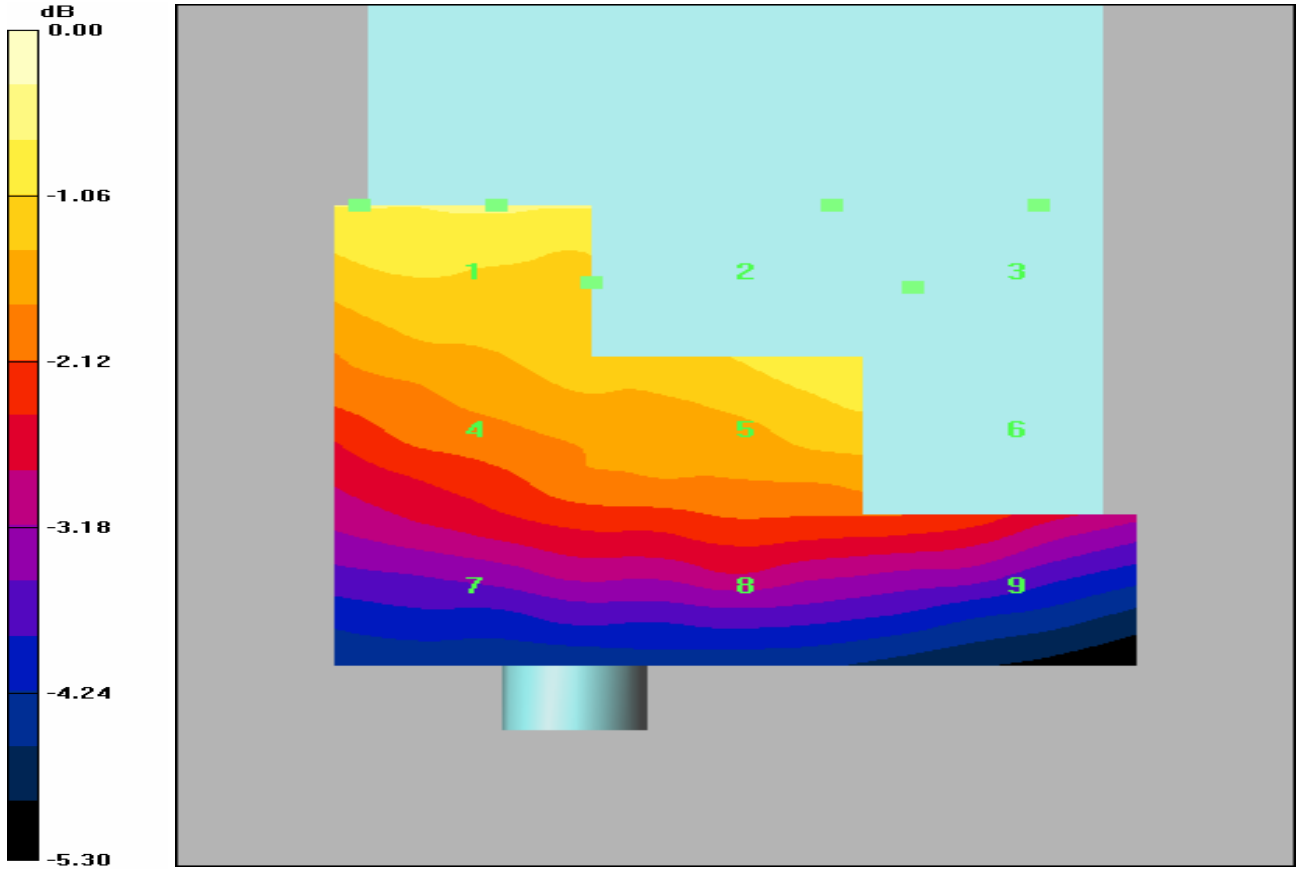
iDEN i560 E-Field 900MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 901MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: ER3DV6R - SN2246, Calibrated: 6/13/2005, ConvF(1, 1, 1)
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1000$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = 0.257 dB

E in V/m (Time averaged)

Grid 1 **30.4**	Grid 2 **31.2**	Grid 3 **32.7**
Grid 4 **28.2**	Grid 5 **29.9**	Grid 6 **30.7**
Grid 7 **25.3**	Grid 8 **25.8**	Grid 9 **25.8**



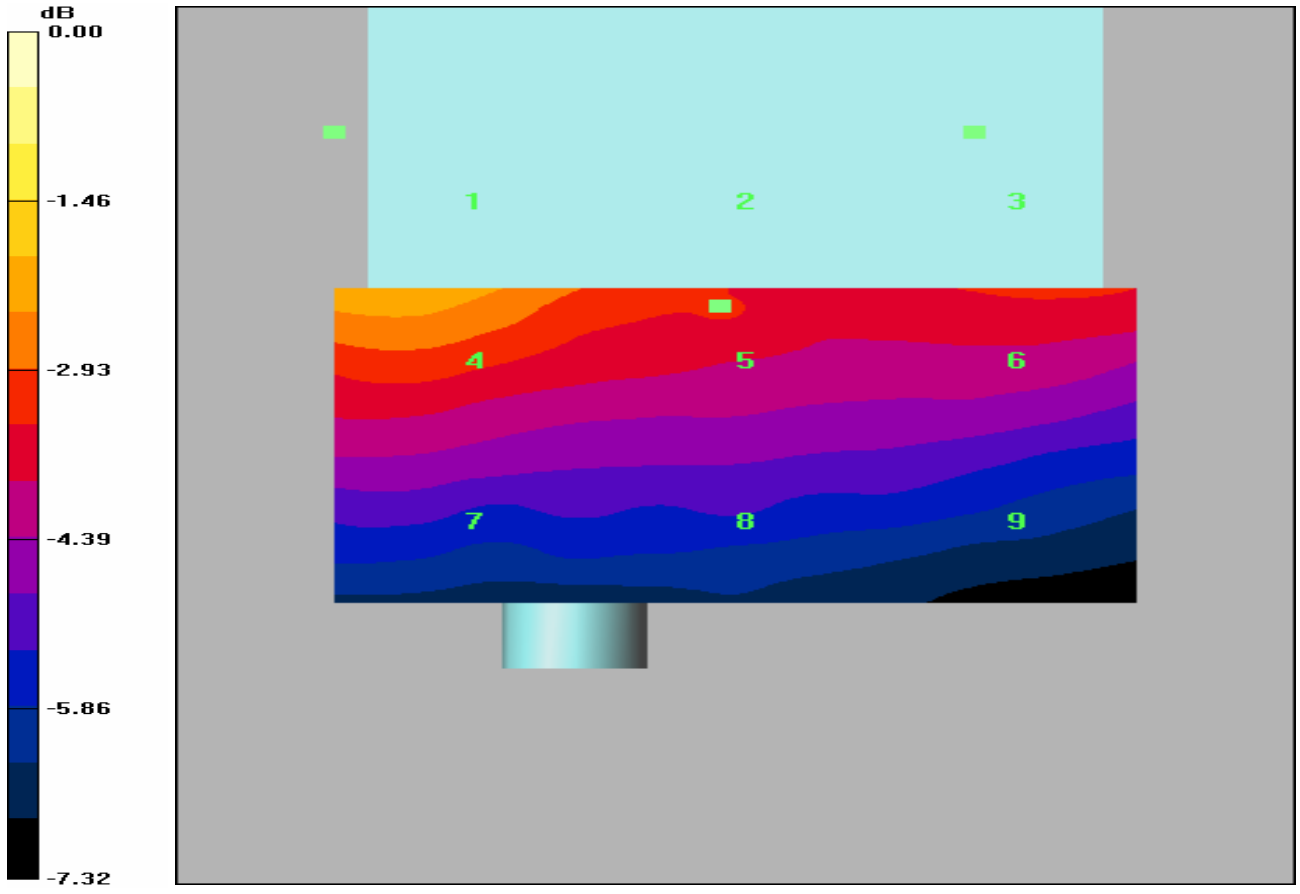
iDEN i560 H-Field 900MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 896MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.138 dB

H in A/m (Time averaged)

Grid 1 **0.095**	Grid 2 **0.086**	Grid 3 **0.083**
Grid 4 **0.074**	Grid 5 **0.067**	Grid 6 **0.065**
Grid 7 **0.058**	Grid 8 **0.056**	Grid 9 **0.054**



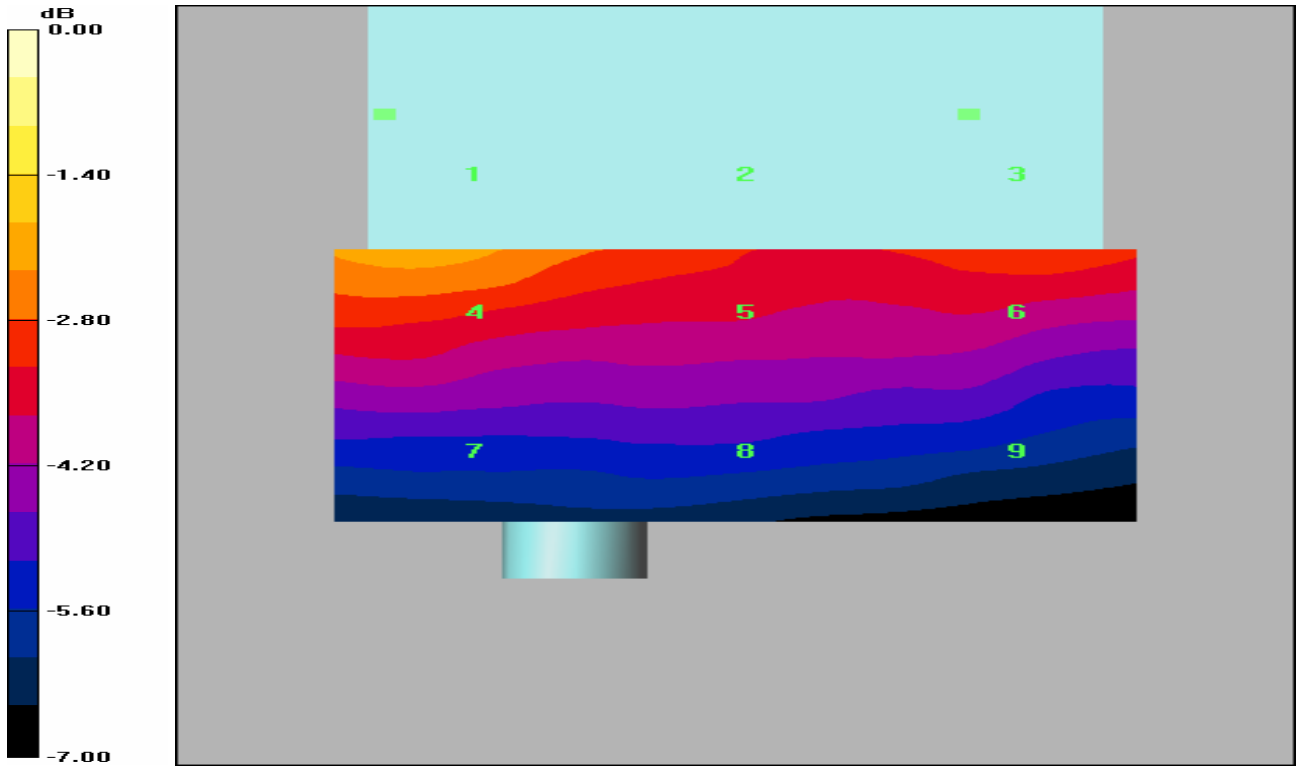
iDEN i560 H-Field 900MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 898.5MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.384 dB

H in A/m (Time averaged)

Grid 1 **0.093**	Grid 2 **0.086**	Grid 3 **0.084**
Grid 4 **0.073**	Grid 5 **0.068**	Grid 6 **0.067**
Grid 7 **0.057**	Grid 8 **0.056**	Grid 9 **0.055**



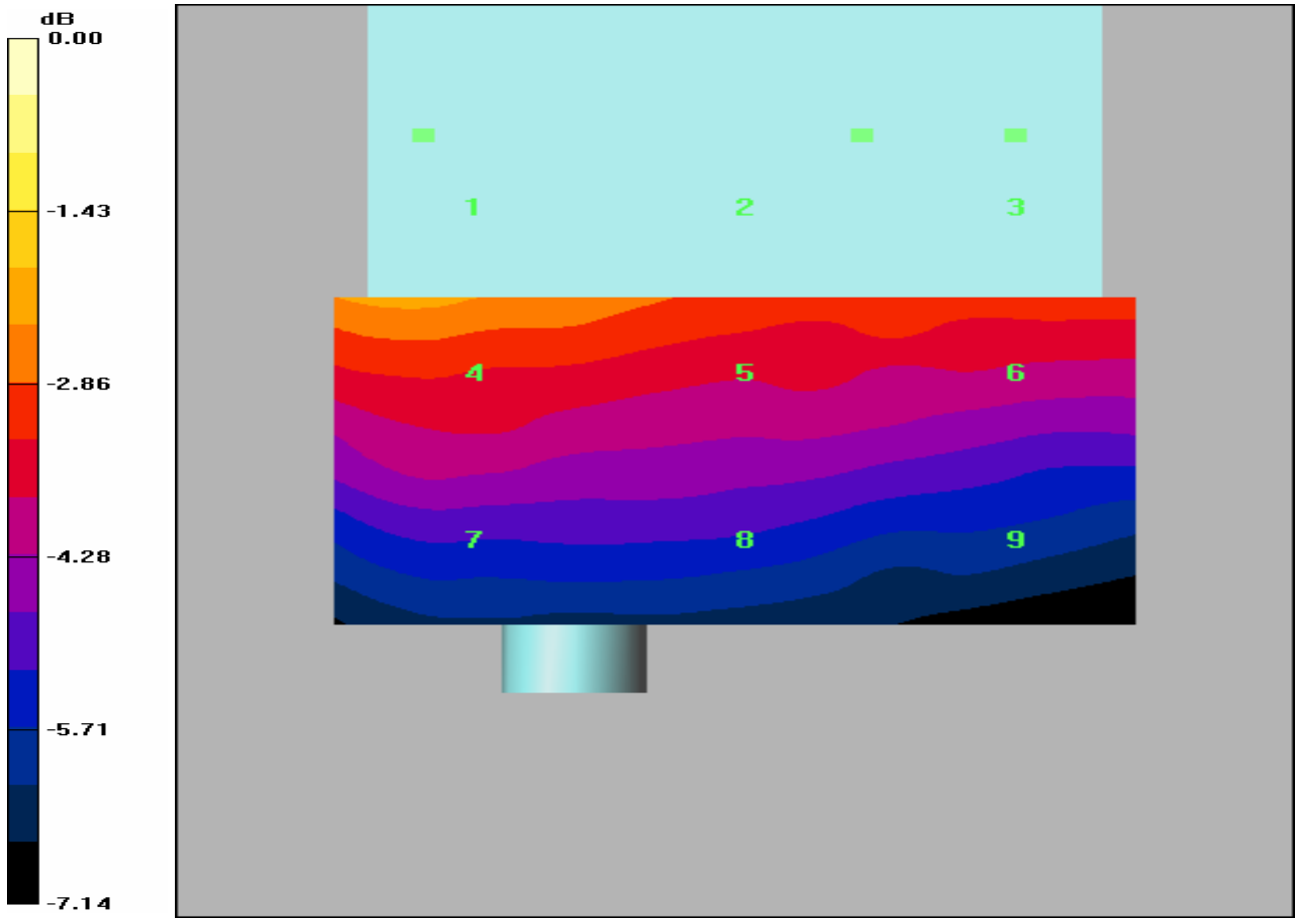
iDEN i560 H-Field 900MHz band HAC assessment
Date: 7/14/05

SN 364KFG37GK
Frequency = 901MHz
TX Pwr = 640mW

Procedure Notes: 3:1 transmission mode
Probe: H3DV6 - SN6036, Calibrated: 1/7/2005,
Duty Cycle: 1:3, Medium: Air, Medium parameters used: $\sigma = 0$; mho/m, $\varepsilon_r = 1$; $\rho = 1$ kg/m3
Electronics: DAE3 Sn357, Calibrated: 1/6/2005
Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm, dz=5mm
Drift = -0.280 dB

H in A/m (Time averaged)

Grid 1 **0.088**	Grid 2 **0.082**	Grid 3 **0.079**
Grid 4 **0.069**	Grid 5 **0.065**	Grid 6 **0.062**
Grid 7 **0.055**	Grid 8 **0.053**	Grid 9 **0.051**



Appendix C
Probe Calibration Certificate

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

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

Accredited by the Swiss Federal Office of Metrology and Accreditation
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 **Motorola MFRL**

Certificate No: ER3-2246_Jun05

CALIBRATION CERTIFICATE

Object ER3DV6R - SN:2246

Calibration procedure(s) QA CAL-02.v4
Calibration procedure for E-field probes optimized for close near field evaluations in air

Calibration date: June 13, 2005

Condition of the calibrated item In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe ER3DV6	SN: 2328	6-Oct-04 (SPEAG, No. ER3-2328_Oct04)	Oct-05
DAE4	SN: 617	19-Jan-05 (SPEAG, No. DAE4-617_Jan05)	Jan-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 13, 2005

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

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Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

NORMx,y,z	sensitivity in free space
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-1996, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 for XY sensors and ϑ = 90 for Z sensor (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart).
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

DASY - Parameters of Probe: ER3DV6R SN:2246

Sensitivity in Free Space [μV/(V/m)^2]

NormX	**3.75** ± 10.1 % (k=2)
NormY	**3.87** ± 10.1 % (k=2)
NormZ	**5.75** ± 10.1 % (k=2)

Diode Compression[A]

DCP X	**94** mV
DCP Y	**94** mV
DCP Z	**94** mV

Frequency Correction

X	**0.0**
Y	**0.0**
Z	**0.0**

Sensor Offset (Probe Tip to Sensor Center)

X	**2.5** mm
Y	**2.5** mm
Z	**2.5** mm

Connector Angle **221** °

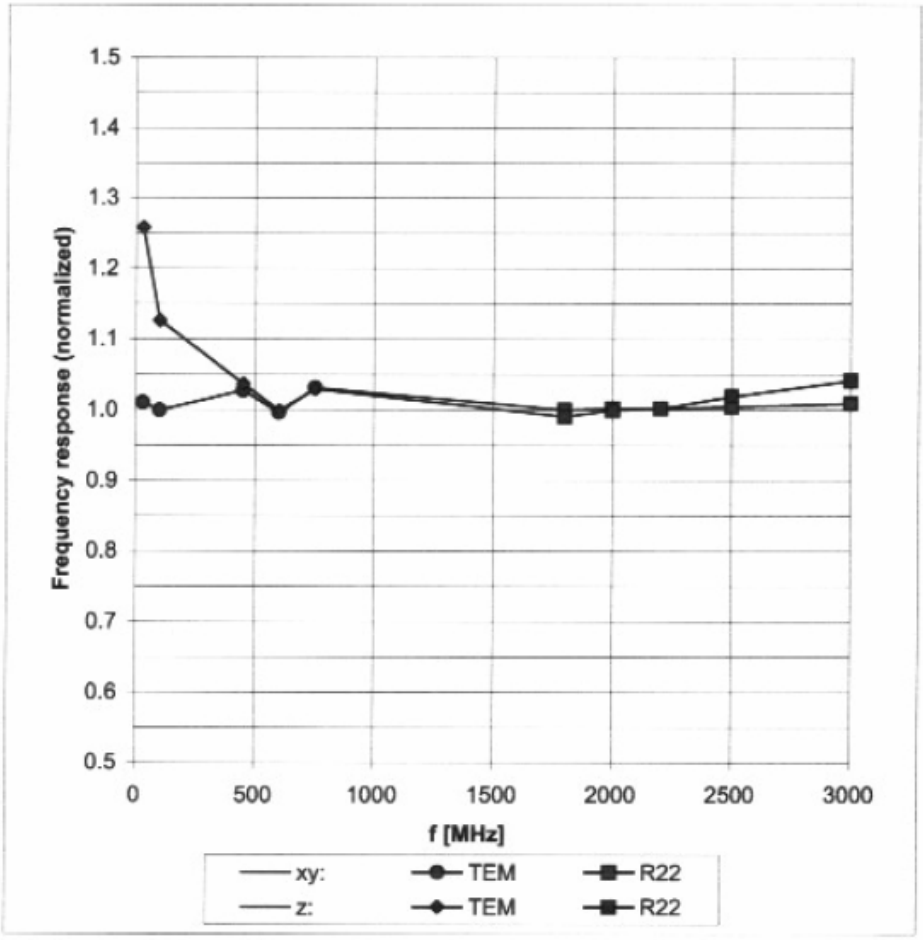
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] numerical linearization parameter: uncertainty not required

ER3DV6R SN:2246 June 13, 2005

Frequency Response of E-Field

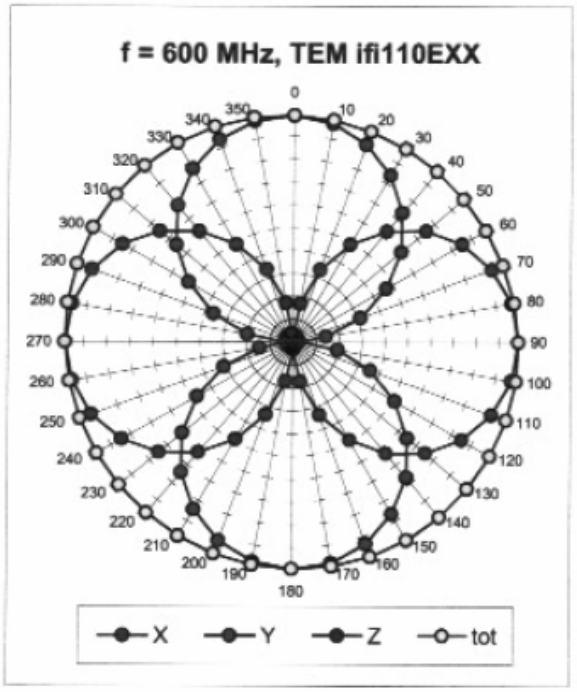
(TEM-Cell:ifi110 EXX, Waveguide R22)

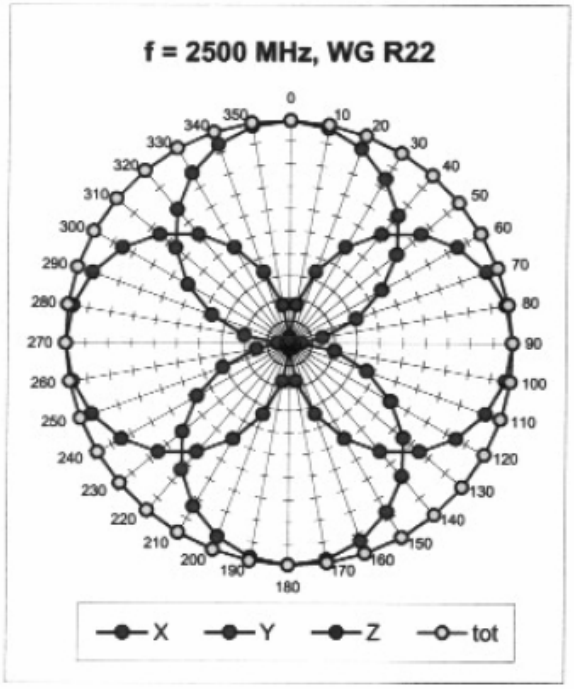


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

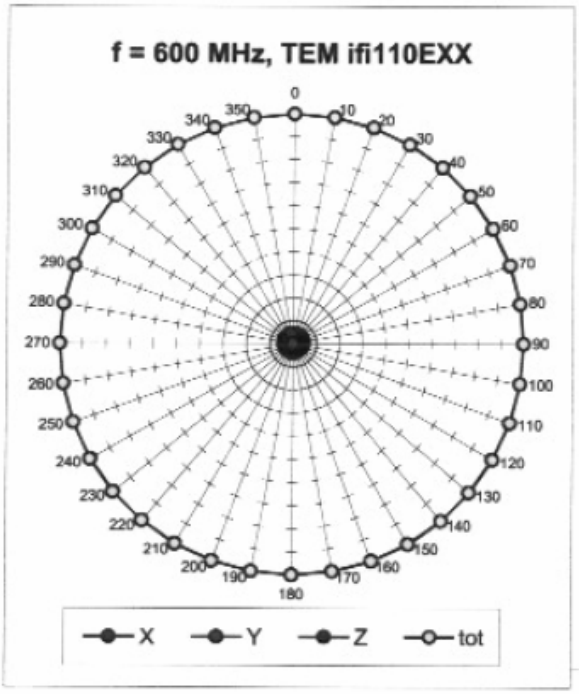
ER3DV6R SN:2246 June 13, 2005

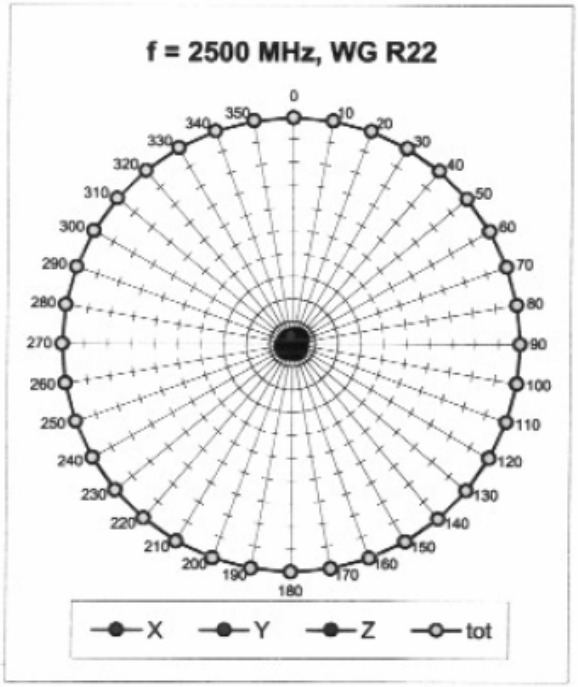
Receiving Pattern (ϕ), ϑ = 0°





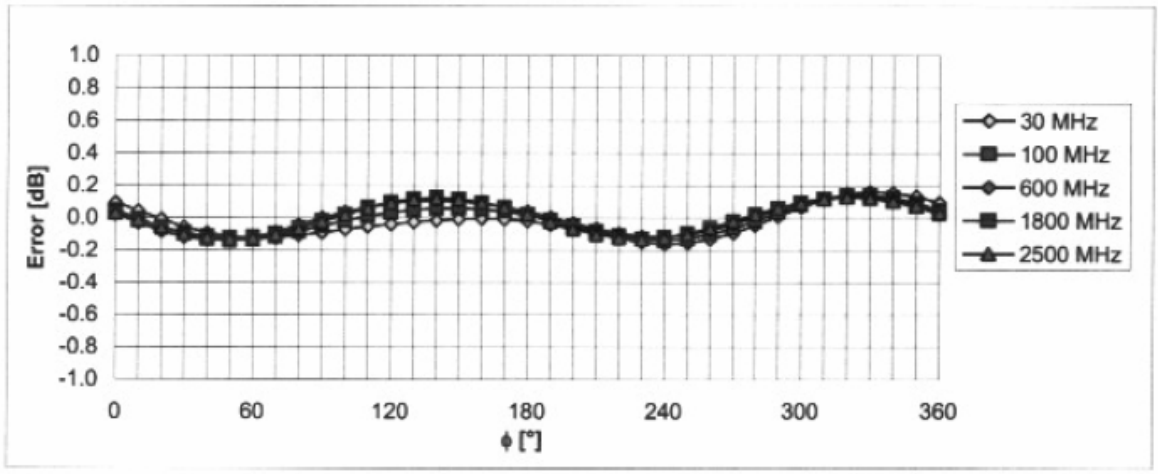
Receiving Pattern (ϕ), ϑ = 90°





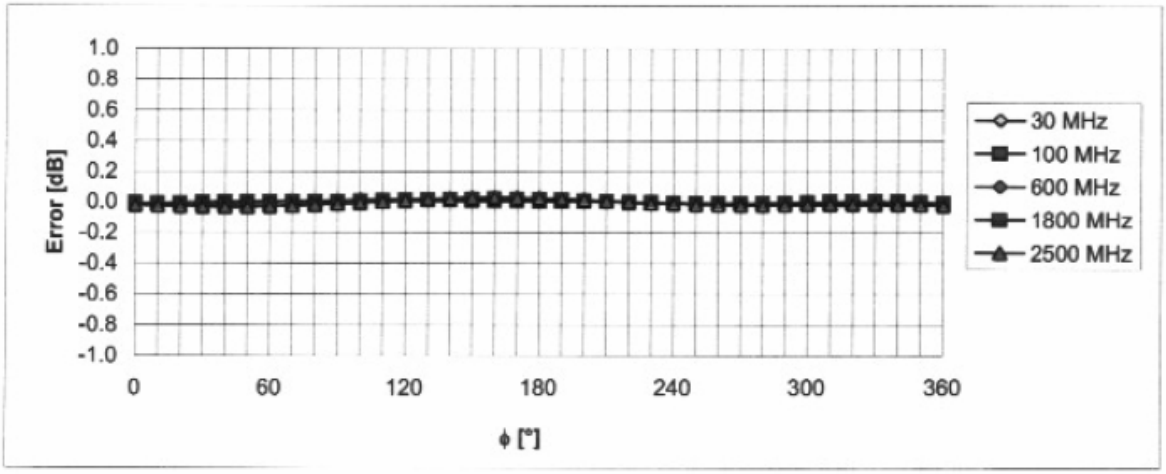
ER3DV6R SN:2246 June 13, 2005

Receiving Pattern (ϕ), ϑ = 0°



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

Receiving Pattern (ϕ), ϑ = 90°

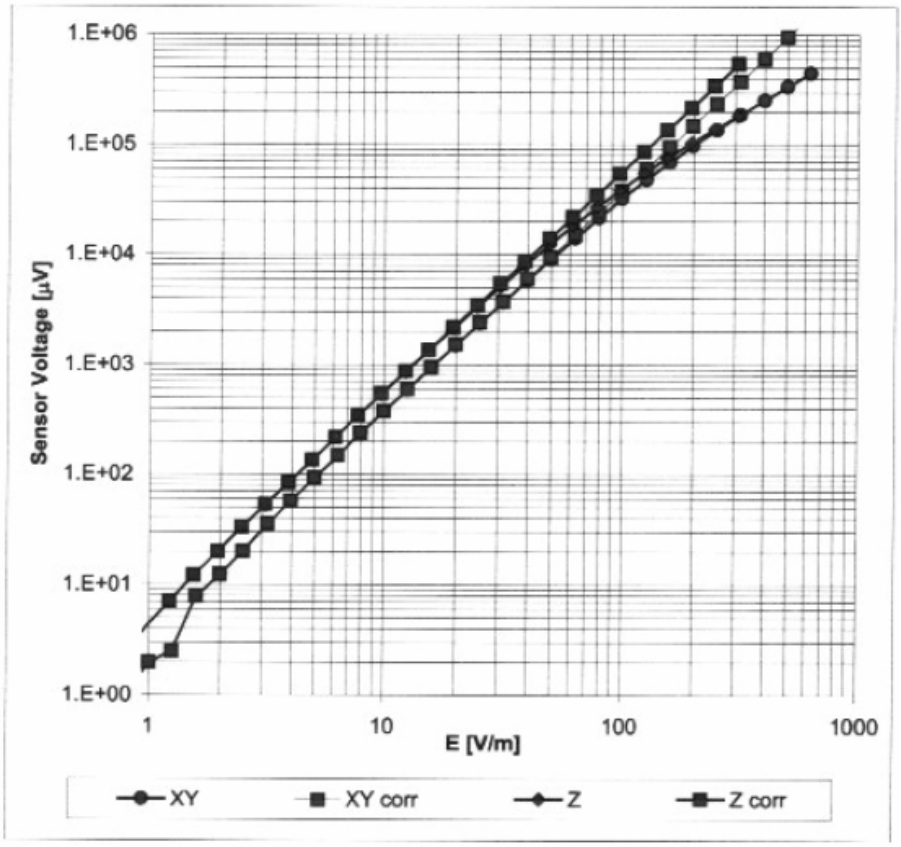


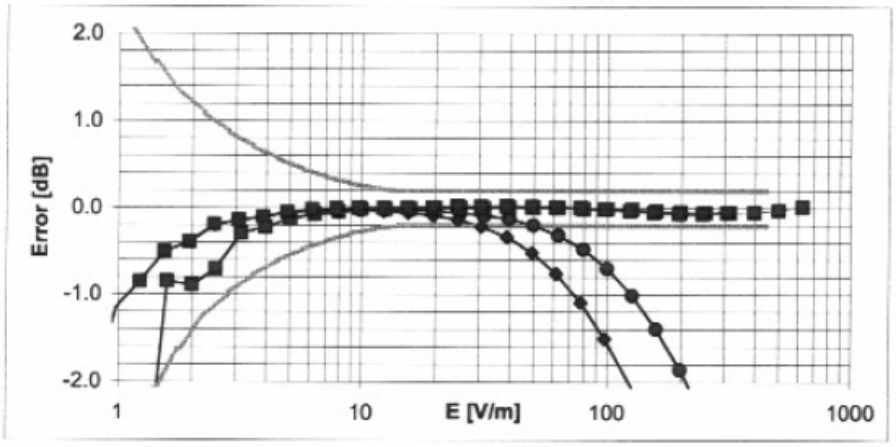
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ER3DV6R SN:2246 June 13, 2005

Dynamic Range f(E-field)

(Waveguide R22, f = 1800 MHz)





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

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

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Accreditation No.: SCS 108

Client **Motorola CGISS**

Certificate No: **H3-6036_Jan05**

CALIBRATION CERTIFICATE

Object	H3DV6 - SN:6036
Calibration procedure(s)	QA CAL-03.v4 Calibration procedure for H-field probes optimized for close near field evaluations in air
Calibration date:	January 7, 2005
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	5-May-04 (METAS, No. 251-00388)	May-05
Power sensor E4412A	MY41495277	5-May-04 (METAS, No. 251-00388)	May-05
Reference 3 dB Attenuator	SN: S5054 (3c)	10-Aug-04 (METAS, No. 251-00403)	Aug-05
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-04 (METAS, No. 251-00389)	May-05
Reference 30 dB Attenuator	SN: S5129 (30b)	10-Aug-04 (METAS, No. 251-00404)	Aug-05
Reference Probe H3DV6	SN: 6182	6-Oct-04 (SPEAG, No. H3-6182_Oct04)	Oct-05
DAE4	SN: 617	29-Sep-04 (SPEAG, No. DAE4-617_Sep04)	Sep-05

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Dec-03)	In house check: Dec-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-04)	In house check: Nov 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 13, 2005

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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Glossary:

NORMx,y,z	sensitivity in free space
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., $\vartheta = 0$ is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1309-1996, " IEEE Standard for calibration of electromagnetic field sensors and probes, excluding antennas, from 9 kHz to 40 GHz", 1996.

Methods Applied and Interpretation of Parameters:

- *X,Y,Z_a0a1a2:* Assessed for E-field polarization $\vartheta = 90$ for XY sensors and $\vartheta = 0$ for Z sensor ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide).
- *X,Y,Z(f)_a0a1a2= X,Y,Z_a0a1a2* frequency_response* (see Frequency Response Chart).
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency.
- *Spherical isotropy (3D deviation from isotropy)*: in a locally homogeneous field realized using an open waveguide setup.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *X_a0a1a2* (no uncertainty required).

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DASY - Parameters of Probe: H3DV6 SN:6036

Sensitivity in Free Space [A/m / √(μV)]

	a0	a1	a2
X	**2.652E-03**	**1.271E-5**	**-3.893E-5** ± 5.1 % (k=2)
Y	**2.689E-03**	**1.106E-5**	**-5.700E-5** ± 5.1 % (k=2)
Z	**3.056E-03**	**-2.728E-5**	**-5.504E-5** ± 5.1 % (k=2)

Diode Compression[1]

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

Sensor Offset (Probe Tip to Sensor Center)

X	**3.0** mm
Y	**3.0** mm
Z	**3.0** mm

Connector Angle **133** °

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

[1] numerical linearization parameter: uncertainty not required

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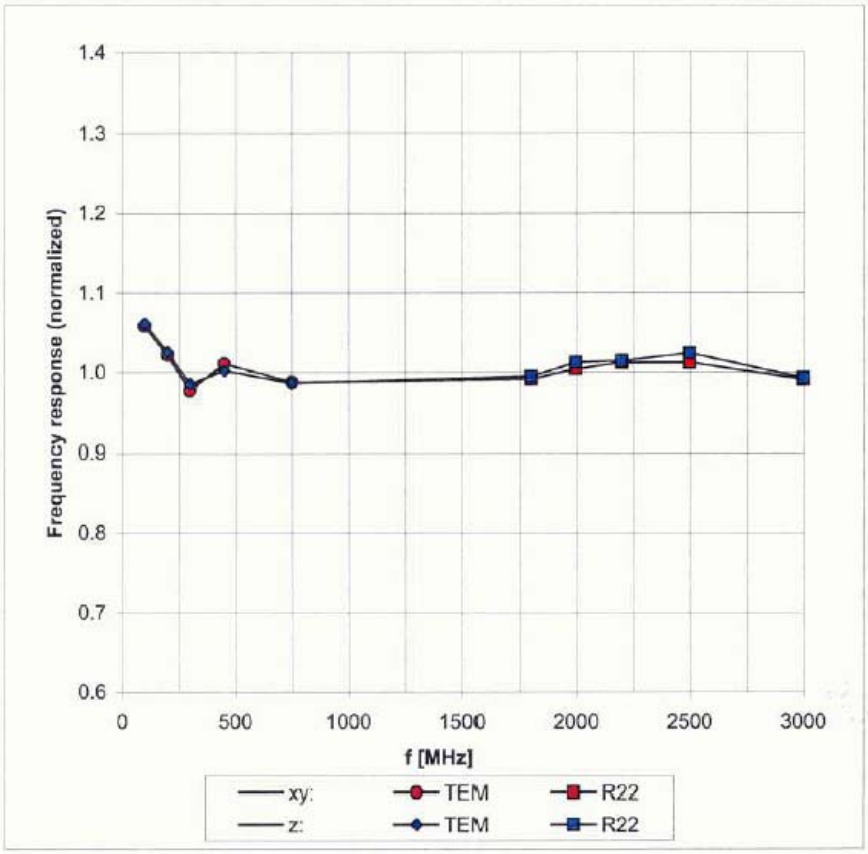
Frequency Response of H-Field

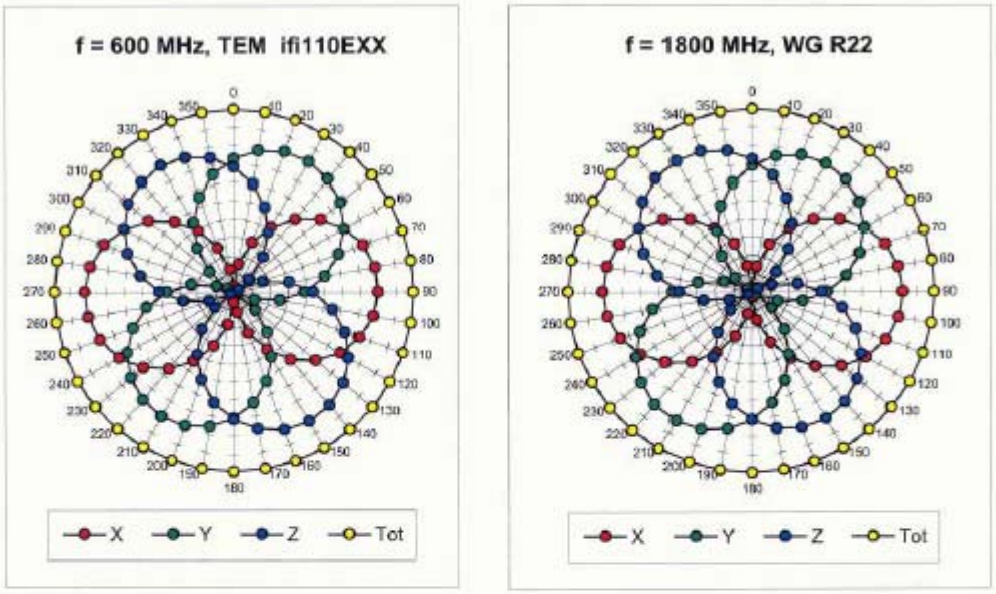
(TEM-Cell:ifi110, Waveguide R22)

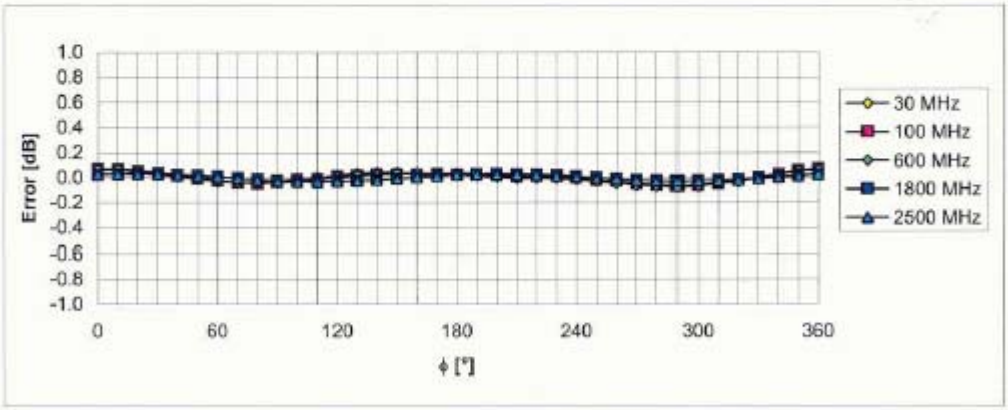


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6 SN:1383 February 24, 2005

Receiving Pattern (ϕ), ϑ = 0°





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

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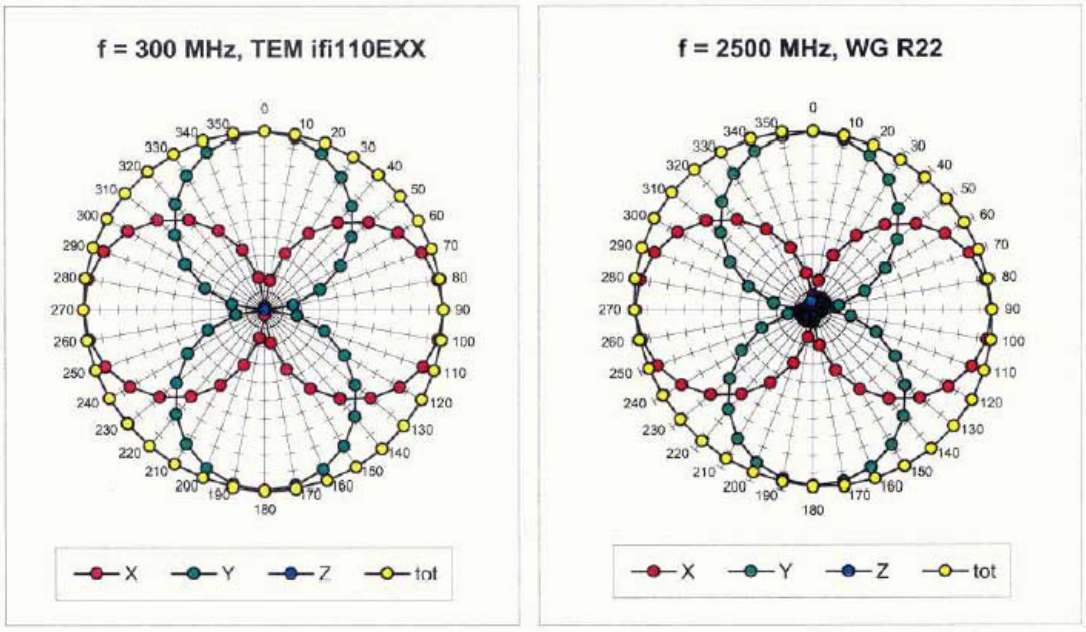
Receiving Pattern (ϕ), ϑ = 90°



Receiving Pattern (ϕ), ϑ = 0°

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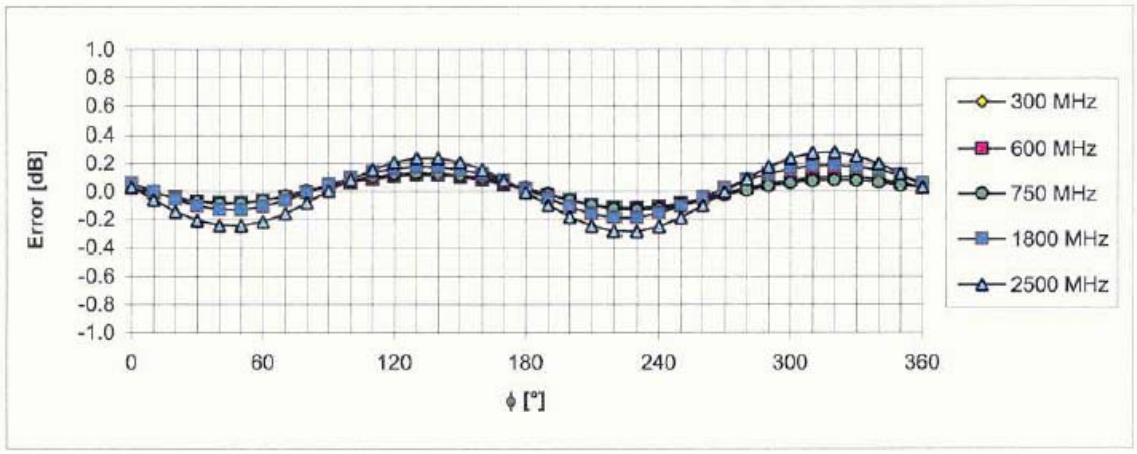
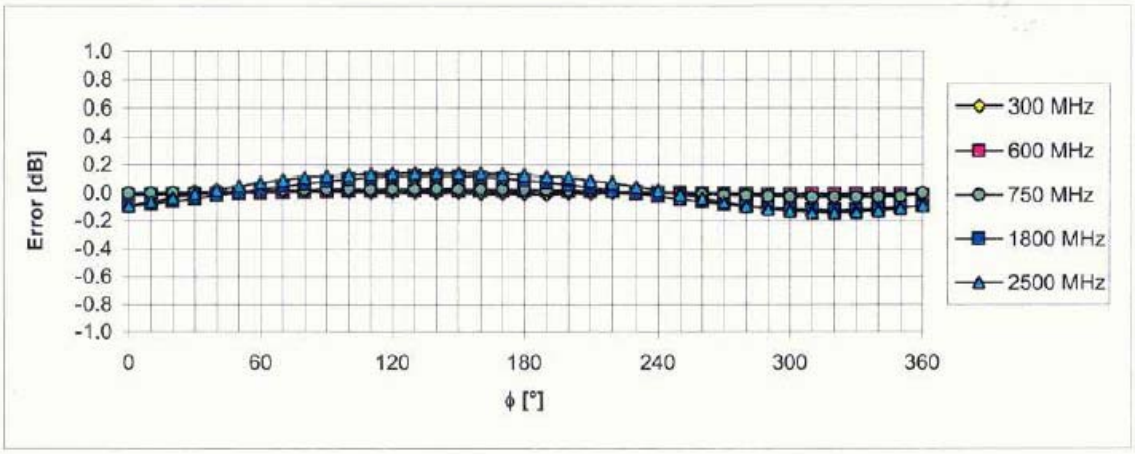
Receiving Pattern (ϕ), ϑ = 90°



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

Receiving Pattern (ϕ), ϑ = 0°



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

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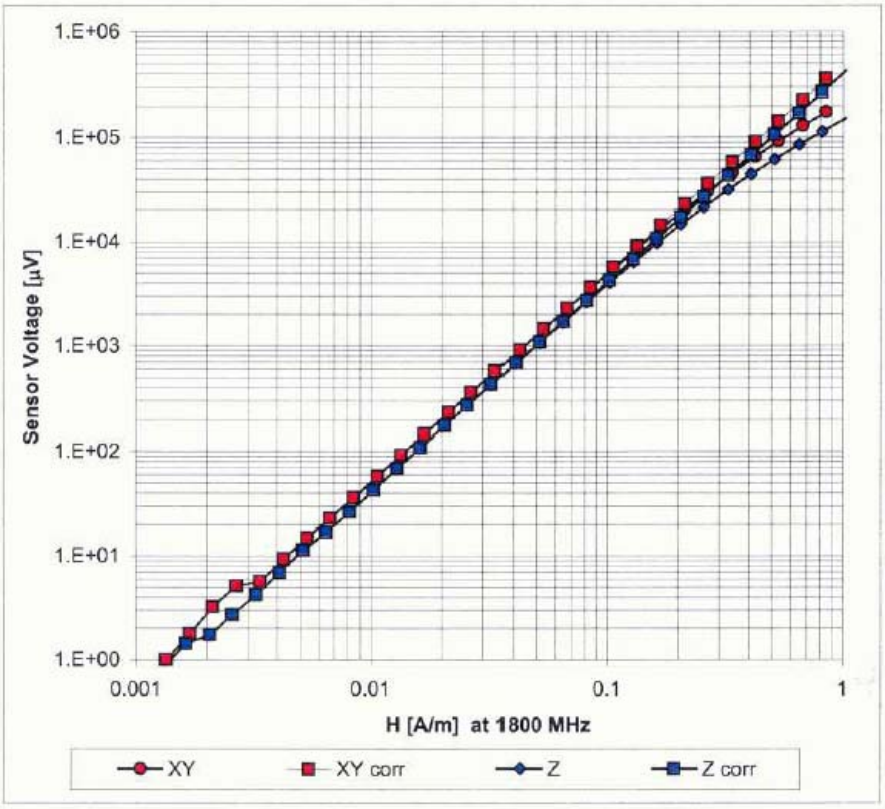
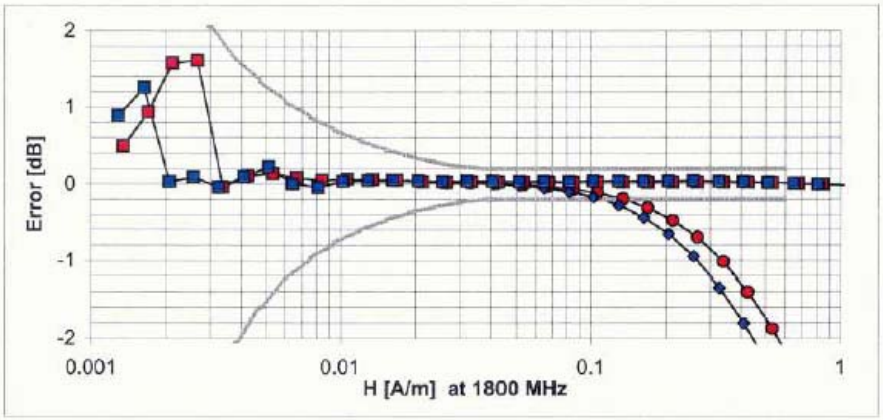
Dynamic Range f(H-field)

(Waveguide R22, f = 1800 MHz)





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