DAT-PL-162/04-01

TESTING
No. L0570

TEST REPORT

REPORT NUMBER: I10GC0567-HAC-Tcoil

ON

Type of Equipment:	GSM/GPRS/EGPRS mobile phone
Type of Designation:	Sonim XP3300-A-R1
Type Number:	P25C005AA
Manufacturer:	Sonim Technologies, Inc

ACCORDING TO

ANSI C63.19-2007 American National Standard Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids, T-coil section

China Telecommunication Technology Labs.

Month date, year
Nov 22, 2010

Signature

He Guili
Director

FCC ID	WYPP25C005AA
IC ID:	8090A-P25C005AA

Test Firm Name:	China Telecommunication Technology Labs
FCC Registration Number:	840587
IC number:	8426A

Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with ANSI C63.19-2007 T3 requirements. The sample tested was found to comply with the requirements defined in the applied rules.

Table of Contents

1. General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with the requirements of ANSI C63.19-2007 T3 requirements.

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

The following deviations from, additions to, or exclusions from the test specifications have been made. See Annex D.

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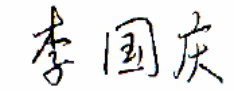
1.2 Testers

Name: Li Guoqing

Position: Engineer

Department: Department of EMC test

Signature: 

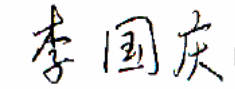
Editor of this test report:

Name: Li Guoqing

Position: Engineer

Department: Department of EMC test

Date: 2010-11-22

Signature: 

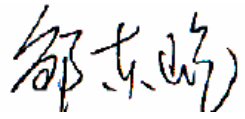
Technical responsibility for testing:

Name: Zou Dongyi

Position: Manager

Department: Department of EMC test

Date: 2010-11-22

Signature: 

1.3 Testing Laboratory information

1.3.1 Location

Name:	China Telecommunication Technology Labs.
Address:	No. 11, Yue Tan Nan Jie, Xi Cheng District, BEIJING P. R. CHINA, 100045
Tel:	+86 10 68094053
Fax:	+86 10 68011404
Email:	emc@chinattl.com

1.3.2 Details of accreditation status

Accredited by:	China National Accreditation Service for Conformity Assessment (CNAS)
Registration number:	CNAS Registration No. CNAS L0570
Standard:	ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name:	------
Address:	------

1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name:	Sonim Technologies, Inc
Address	1875 S. Grant Street, Suite 800 San Mateo, CA 94402
Country:	United States
Telephone:	+1 650 504 4411
Fax:	+1 650 378 8190
Contact:	Jasen Kolev
Telephone:	+1 650 504 4411
Email	jasen@sonimtech.com

1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name:	--
Address:	--

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name:	--
Address:	--

2 Test Item

2.1 General Information

Manufacturer:	Sonim Technologies, Inc
Model Name:	Sonim XP3300-A-R1
Type Number:	P25C005AA
Product Name	GSM/GPRS/EGPRS mobile phone
Serial Number:	001080000240078
Production Status:	Product
Receipt date of test item:	2010-11-01

2.2 Outline of EUT

EUT is a cellular and PCS band GSM mobile phone, supporting GPRS and EGPRS with multi-time of class 12.

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	handset	Sonim Technologies, Inc	Sonim XP3300-A-R1	001080000240078	--
B	adapter	Dee Van Enterprises Co., Ltd.	DSA-3RNA-05 FUS 050065	--	--
C	battery	Sunwoda Electronic Co., Ltd.	XP-0001100	WD1005001383	--
D	Earphone	MINAMI ACOUSTICS LIMITED	ME-816B5-C	--	--

2.5 Other Information

Version of hardware and software:

HW Version: A

SW Version: S3001_V07_2

Adaptor information:

Input: 100-240VAC 0.3A

Output: 5.0V 0.65A

Battery information: 1750mAh Nominal Voltage: 3.7V

2.6 EUT Photographs

Face view

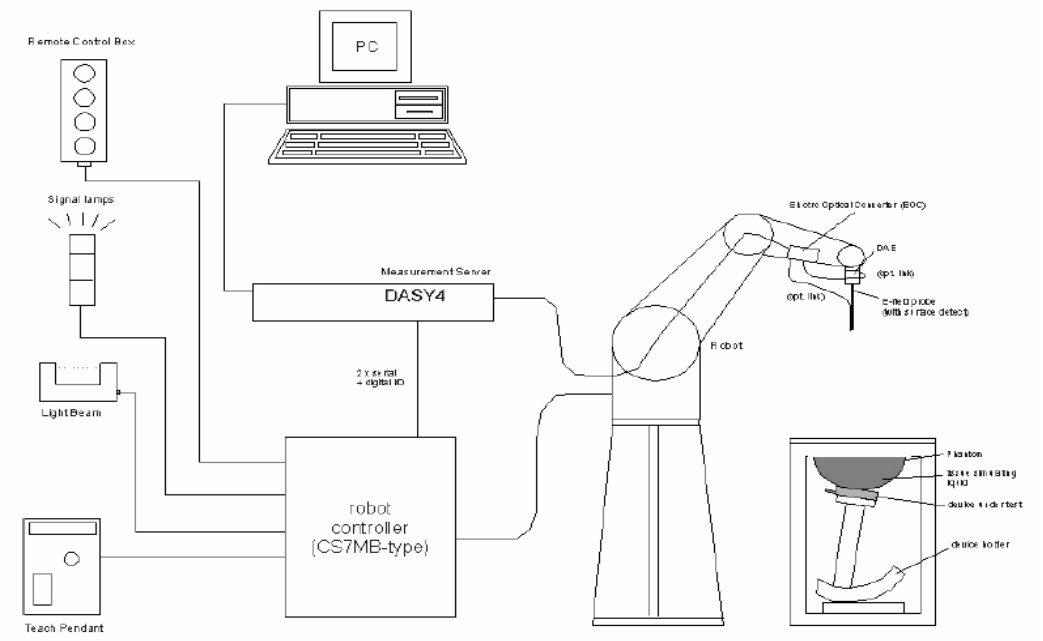
Back view

3 Test Configurations

3.1 HAC Measurement System

All measurements were performed using the automated near-field scanning system, DASY5, from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision industrial robot which positions the probes with a positional repeatability of better than 0.02mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit.

A cell controller system containing the power supply, robot controller, teach pendant (Joystick) and remote control, is used to drive the robot motors. The PC consists of the Intel ® Core ™ 2 Duo CPU E6750 @ 2.66 GHzwith Windows XP SP3 system and HAC Measurement Software DASY5, 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) performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc., which is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical signal to digital electric signal of the DAE and transfers data to the PC plug-in card.

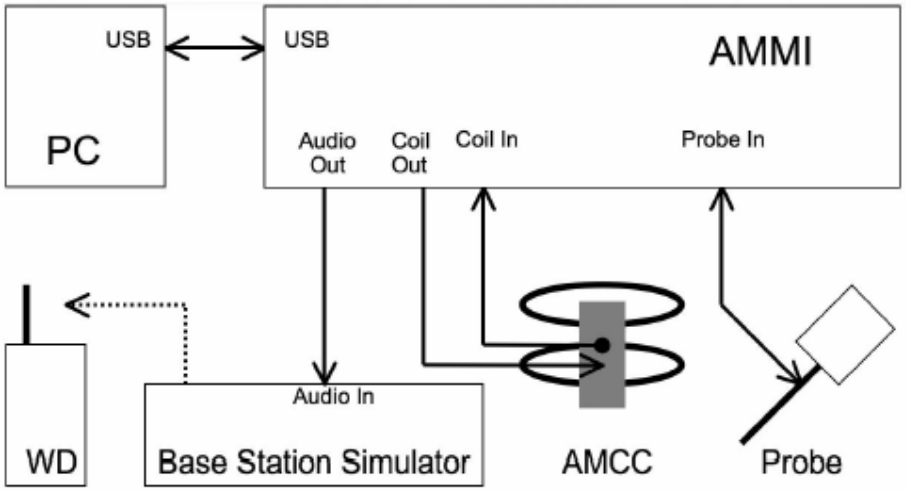


Demonstration of measurement system setup

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.

T-Coil setup with HAC Test Arch and AMCC

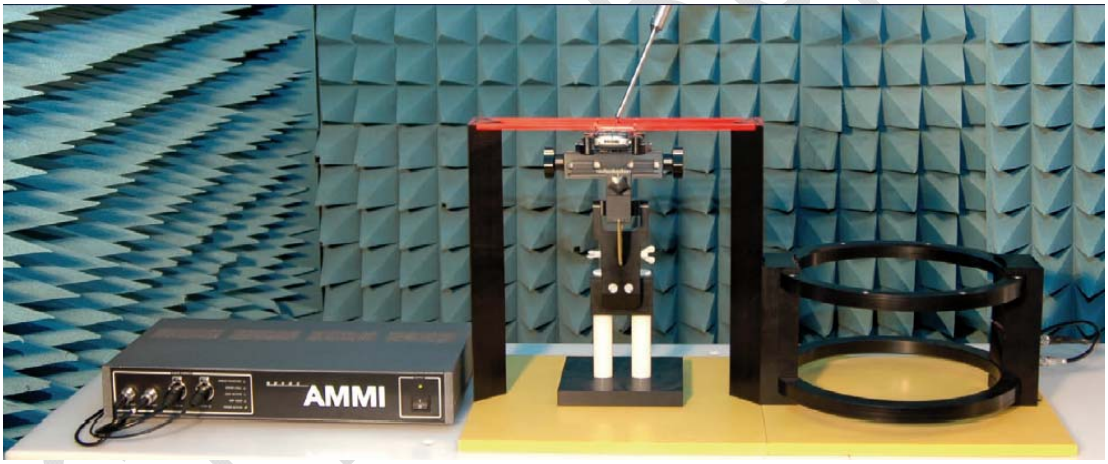


T-Coil setup cabling

3.2 HAC Measurement System Specifications

Item	Description
Test Arch	
function:	enables easy and well defined positioning of the phone and calibration dipoles as well as simple teaching of the robot
dimensions:	370 mm x 370 mm x 375 mm
Device Holder	
function:	supports accurate positioning of any phone
effect on near-field:	<+/- 0.5dB
Broadband Calibration Dipoles CD835 / CD1880 / CD 2450 including holder and transportation box	
frequency bands:	800 - 960 / 1710 - 2000 / 2250 - 2650 MHz
return loss:	>15 / >18 / >18 dB over frequency band
calibrated at:	835 / 1880 / 2450 MHz (return loss >20 dB)
Audio Magnetic Field Probe AM1D	
frequency range:	0.1 - 20 kHz (RF sensitivity <-100 dB, fully RF shielded)
sensitivity:	<-50 dB A/m @ 1 kHz
pre-amplifier:	40 dB, symmetric
dimensions:	tip diameter / length: 6 / 290 mm, sensor according to ANSI-PC63.19
Audio Magnetic Measurement Instrument (AMMI)	
sampling rate:	48 kHz / 24 bit
dynamic range:	85 dB
test signal generation:	user selectable and predefined (via PC)
calibration:	auto-calibration / full system calibration using AMCC with monitor output
dimensions:	482 x 65 x 270 mm
Helmholtz Calibration Coil (AMCC)	
Dimensions:	370 x 370 x 196 mm, according to ANSI-PC63.19
HAC Extension Software for DASY5	
precise teaching:	easy teaching with adaptive distance verification
measurement area:	flexible selection of measurement area, predefined according to ANSI-PC63.19
RF evaluation:	automatic exclusion of high-level areas
ABM evaluation:	spectral processing, filtering, weighting and evaluation according to ANSI-PC63.19

Item	Description
report:	documentation ready for compliance report
Isotropic H-Field Probe H3D	
frequency band:	200 - 3000 MHz (free space)
dynamic range:	10 mA/m to 2 A/m at 1 GHz
linearity:	± 0.2 dB (100 MHz to 3 GHz)
directivity:	± 0.25 dB (spherical isotropy error)
dimensions:	tip diameter / length: 6 / 330 mm
Isotropic E-Field Probe ER3D	
frequency:	100 - 6000 MHz
dynamic range:	2 V/m to > 1000 V/m
linearity:	± 0.2 dB (100 MHz to 6 GHz)
directivity:	± 0.2 dB in air (rotation around probe axis), ± 0.4 dB in air (rotation normal to probe axis)
dimensions:	tip diameter / length: 8 / 330 mm



3.3 Test Equipments List

ITEM	TYPE	S/N	CALIBRATION DATE	DUE DATE
Audio Magnetic 1D Field Probe	AM1DV2	1065	2010-05-25	2011-05-24
Audio Magnetic Calibration Coil	AMCC	1062	NA	NA
Audio Magnetic	AMMI	1063	NA	NA

ITEM	TYPE	S/N	CALIBRATION DATE	DUE DATE
Measuring Instrument				
DAE	DAE4	797	2009-11-26	2010-11-25
HAC Test Arch	NA	1086	NA	NA
Radio Communication Analyzer	CMU200	1100000802	2010-06-01	2011-05-31
Measurement Software	DASY5	NA	NA	NA
Post-processing Software	Semcad	NA	NA	NA

3.4 Test Condition

Specifications ANSI C63.19-2007
Date of Tests from 2010-11-02 to 2010-11-03
Operation Mode TX at the highest output peak power level
Method of measurement: ANSI C63.19-2007

Date:	Ambient Temperature (℃)	Ambient Humidity (%)
	20~~25	30~~70
2010-11-15	22.3	32

3.5 EUT Setup

3.5.1 T-Coil measurement points and reference plane

Following figures illustrate the three standard probe orientations. Position 1 is the axial orientation (z axis), orientation 2 (y axis) is radial transversal orientation, and orientation 3 (x axis) is radial longitudinal orientation. The space between the measurement positions is not fixed. It is recommended that a scan of the WD be done for each probe coil orientation and that the maximum level recorded be used as the reading for that orientation of the probe coil.

1) The reference plane is the planar area that contains the highest point in the area of the phone that normally rests against the user's ear. It is parallel to the centerline of the receiver area of the phone and is defined by the points of the receiver-end of the WD handset, which, in normal handset use, rest against the ear.

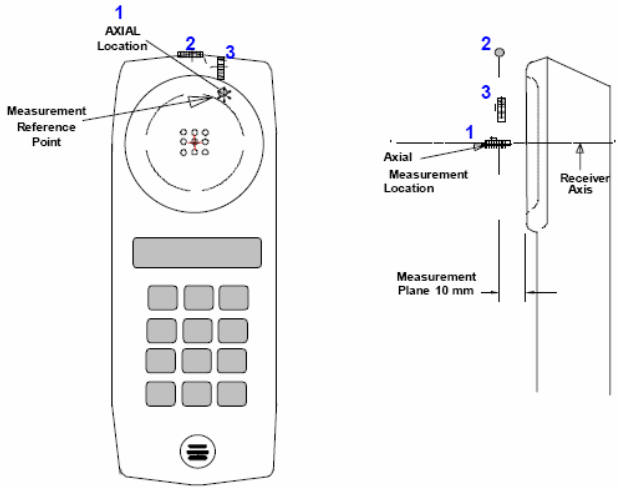
2) The measurement plane is parallel to, and 10 mm in front of, the reference plane.

3) The reference axis is normal to the reference plane and passes through the center of the receiver speaker section (or the center of the hole array); or may be centered on a secondary inductive source. The actual location of the measurement point shall be noted in the test report as the measurement reference point.

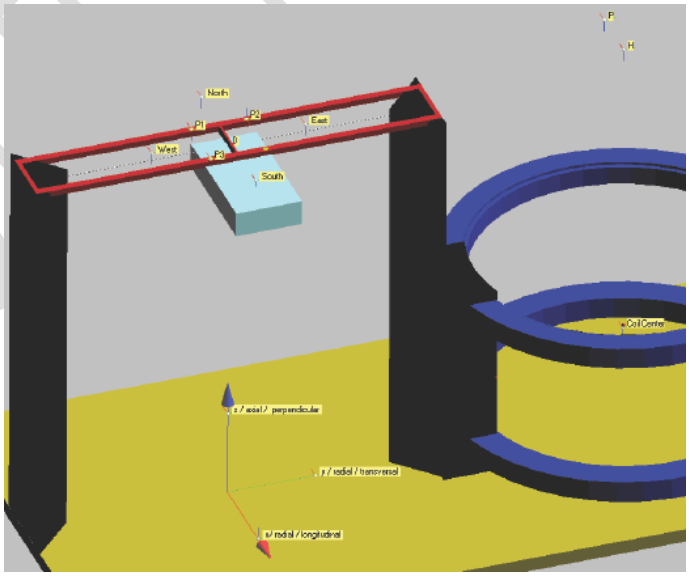
4) The measurement points may be located where the axial and radial field intensity measurements are optimum with regard to the requirements. However, the measurement points should be near the acoustic output of the WD and shall be located in the same half of the phone as the WD receiver. In a WD handset with a centered receiver and a circularly symmetrical magnetic field, the measurement axis and the reference axis would coincide.

5) The relative spacing of each measurement orientation is not fixed. The axial and two radial orientations should be chosen to select the optimal position.

6) The measurement point for the axial position is located 10 mm from the reference plane on the measurement axis. The actual location of the measurement point shall be noted in test reports and designated as the measurement reference point.



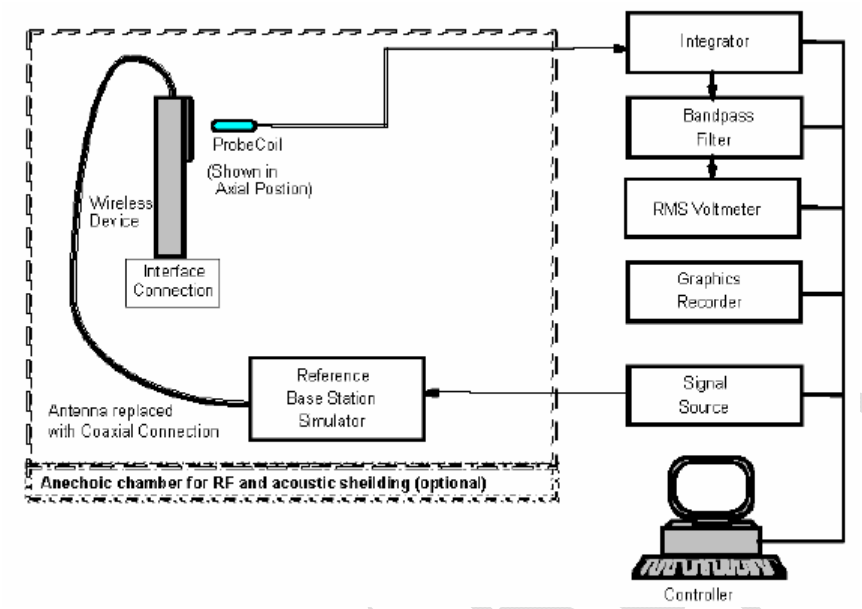
T-coil Measurement Reference Plane



Phantom and Coordinate System

3.5.2 Measurement Setup

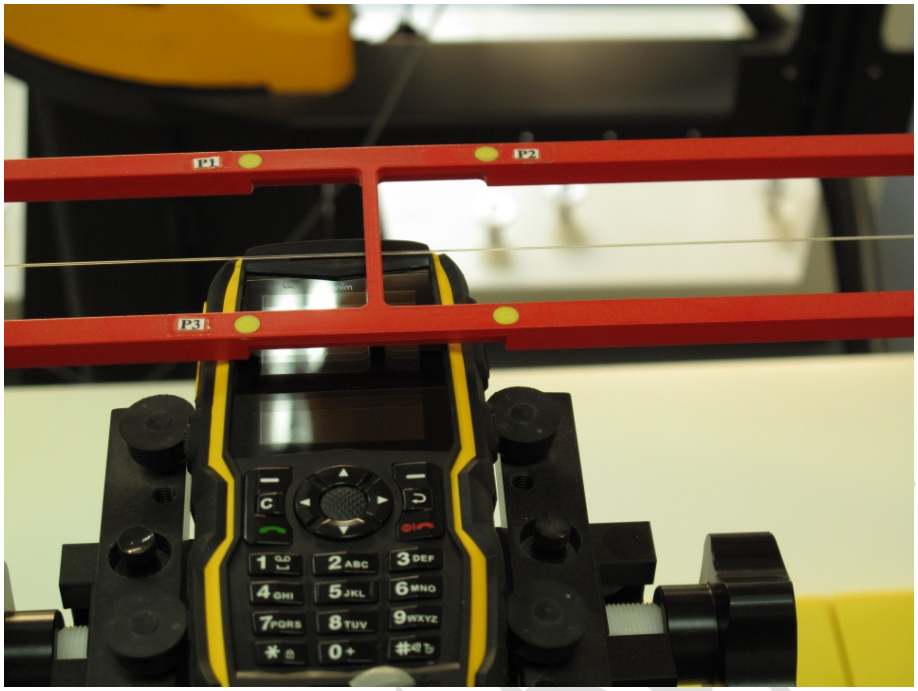
The following figures show the T-coil measurement setup.



Measurement Setup

3.5.3 EUT Setup photos

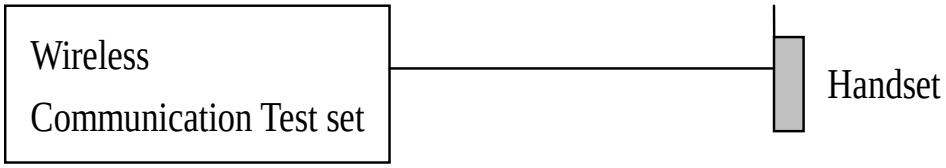
EUT Receiver Position



EUT Setup

3.6 EUT Power

The output power measurement test setup is demonstrated as following figure.



Demonstration of Conducted power measurement

The power control level settings and measurement value are as following table.

Conducted Power Measurement

System and Channel	PCL	Power (dBm)
GSM850 Ch128	5	31.23
GSM850 Ch190	5	31.40
GSM850 Ch251	5	31.34
PCS1900 Ch512	0	29.09
PCS1900 Ch661	0	27.85
PCS1900 Ch810	0	28.71

4 Test Results

4.1 Performance Requirements and Category Regulations

Three quantities are measured and evaluated to rate the WD with T-coil function:
(1) The first is the field intensity of the desired signal at the center of the audio band.
(2) The second is the frequency response of the desired signal measured across the audio band.
(3) The third is the signal quality, which is defined as the difference between the desired and undesired magnetic field levels.

4.1.1 T-Coil coupling field intensity

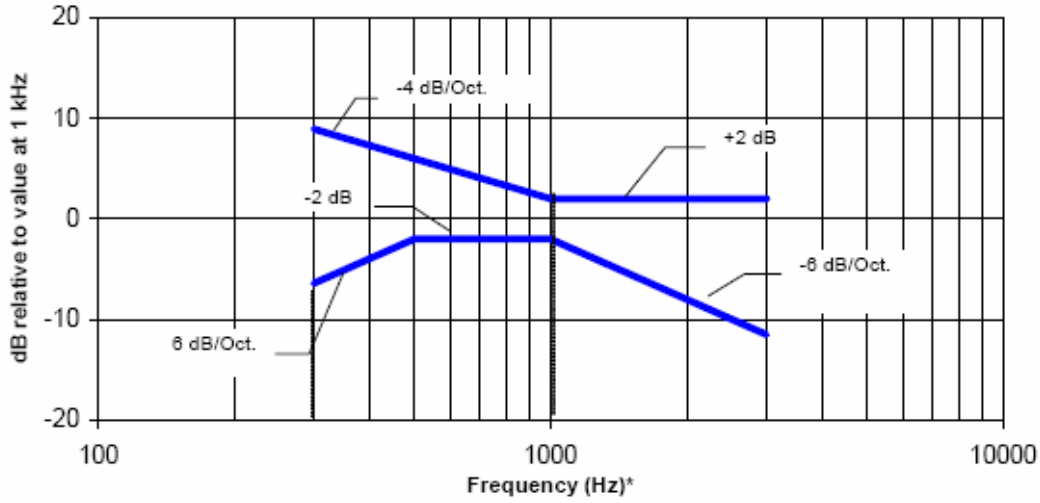
When measured as specified in ANSI C63.19-2007, the T-Coil signal shall be ≥ -18 dB (A/m) at 1 kHz, in a 1/3 octave band filter for all orientations. These measurements shall be made with the WD operating at a reference input level as following table:

Standard	Technology	Input (dBm0)
TIA/EIA/IS 2000	CDMA	–18
TIA/EIA-136	TDMA (50 Hz)	–18
J-STD-007	GSM (217)	–16
T1/T1P1/3GPP [a]	UMTS (WCDMA)	–16
iDEN	TDMA (22 Hz and 11 Hz)	–18

Reference Input Levels

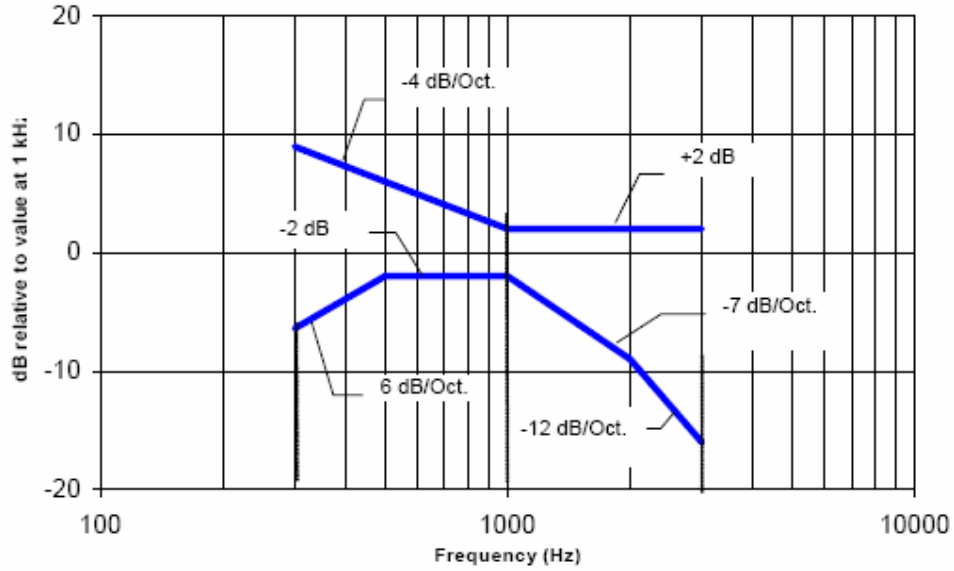
4.1.2 Frequency Response

The frequency response of the axial component of the magnetic field, measured in 1/3 octave bands, shall follow the response curve specified in following pictures, over the frequency range 300 Hz to 3000 Hz. These response curves are for true field strength measurements of the T-Coil signal. Thus the 6 dB/octave probe response has been corrected from the raw readings.



NOTE—Frequency response is between 300 Hz and 3000 Hz.

Magnetic field frequency response for WDs
with a field ≤ –15 dB (A/m) at 1 kHz



NOTE—Frequency response is between 300 Hz and 3000 Hz.

Magnetic field frequency response for WDs
with a field that exceeds –15 dB(A/m) at 1 kHz

4.1.3 Signal Quality

This part provides the signal quality requirement for the intended T-Coil signal from a WD. Only the RF immunity of the hearing aid is measured in T-Coil mode. It is assumed that a hearing aid can have no immunity to an interference signal in the audio band, which is the intended reception band for this mode. So, the only criteria that can be measured is the RF immunity in T-Coil mode. This is measured using the same procedure as for the audio coupling mode and at the same levels. The worst signal quality of the three T-Coil signal measurements shall be used to determine the T-Coil mode category per following table.

Category	Telephone parameters WD signal quality [(signal + noise)-to-noise ratio in decibels]
Category T1	0 dB to 10 dB
Category T2	10 dB to 20 dB
Category T3	20 dB to 30 dB
Category T4	> 30 dB

T-Coil signal quality categories

4.2 Articulation weighting factor (AWF)

The following AWF factors shall be used for the standard transmission protocols.

Standard	Technology	AWF (dB)
TIA/EIA/IS-2000	CDMA	0
TIA/EIA-136	TDMA (50 Hz)	0
J-STD-007	GSM (217)	–5
T1/T1P1/3GPP	UMTS (WCDMA)	0
iDEN	TDMA (22 Hz and 11 Hz)	0

AWF

4.3 General Conclusions

The EUT complies with the T-Coil coupling field intensity requirements.
The EUT complies with the Frequency Response requirements.
The EUT complies with the category T3.

Note:
All measurements are traceable to national standards.

5 T-coil Measurements

5.1 Test Procedures

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

1) Geometry and signal check: system probe alignment, proper operation of the field probe, probe measurement system, other instrumentation, and the positioning system was confirmed. A surface calibration was performed before each setup change to ensure repeatable spacing and proper maintenance of the measurement plane using the test Arch.

2) Set the reference drive level of signal voice defined in C63.19 per 6.3.2.1.

3) The ambient and test system background noise (dB A/m) was measured as well as ABM2 over the full measurement. The maximum noise level must be at least 10dB below the limit of C63.19 per 7.3.2. 4) The DUT was positioned in its intended test position, acoustic output point of the device perpendicular to the field probe.

5) The DUT operation for maximum rated RF output power was configured and connected by using of coaxial cable connection to the base station simulator at the test channel and other normal operating parameters as intended for the test. The battery was ensured to be fully charged before each test. The center sub-grid was centered over the center of the acoustic output (also audio band magnetic output, if applicable). The DUT audio output was positioned tangent (as physically possible) to the measurement plane.

6) The DUT's RF emission field was eliminated from T-coil results by using a well RF-shielding of the probe, AM1D, and by using of coaxial cable connection to a Base Station Simulator. One test channel was pre-measurement to avoid this possibility.

7) Determined the optimal measurement locations for the DUT by following the three steps, coarse resolution scan, fine resolution scans, and point measurement, as described in C63.19 per 6.3.4.4. At each measurement locations, samples in the measurement window duration were evaluated to get ABM1 and the signal spectrum. The noise measurement was performed after the scan with the signal, the same happened, just with the voice signal switched off. The ABM2 was calculated from this second scan.

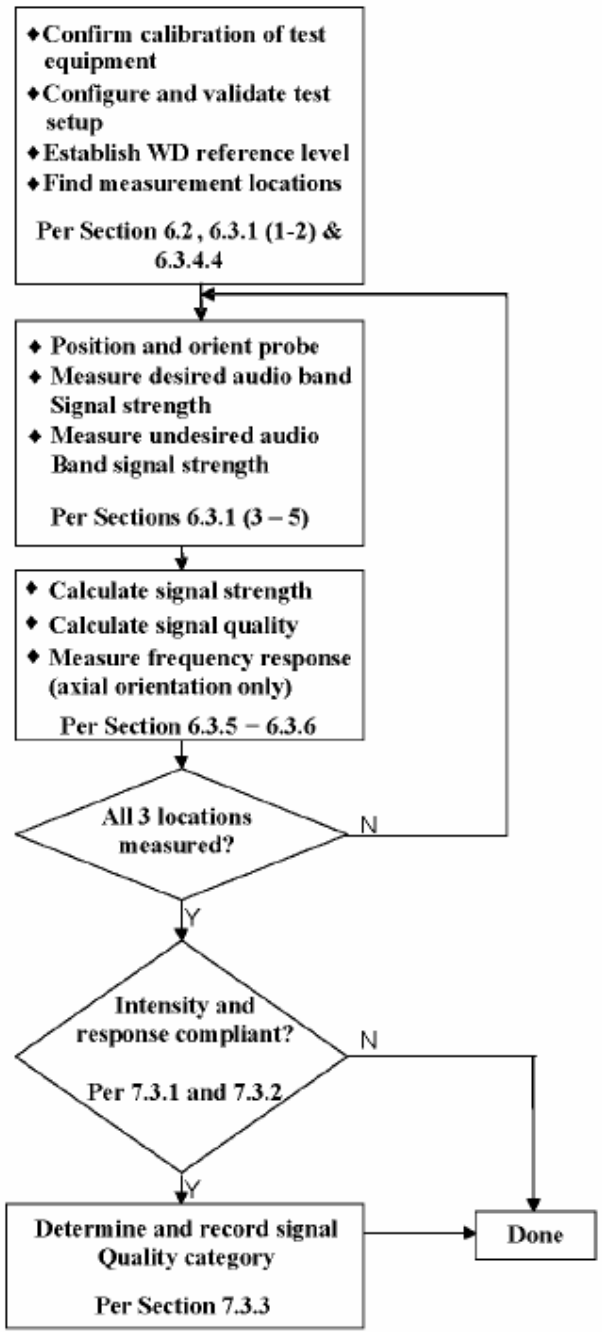
8) All results resulting from a measurement point in a T-Coil job were calculated from the signal samples during this window interval. ABM values were averaged over the sequence of these samples.

9) At an optimal point measurement, the SNR (ABM1/ABM2) was

calculated for axial, radial transverse and radial longitudinal orientation, and the frequency response was measured in axial axis.

10) Corrected for the frequency response after the DUT measurement since the DASY5 system had known the spectrum of the input signal by using a reference job.

11) In SEMCAD post-processing software, the spectral points are in addition scaled with the high-pass (half-band) and the A-weighting, bandwidth compensated factor (BWC) and those results are final as shown in this report.



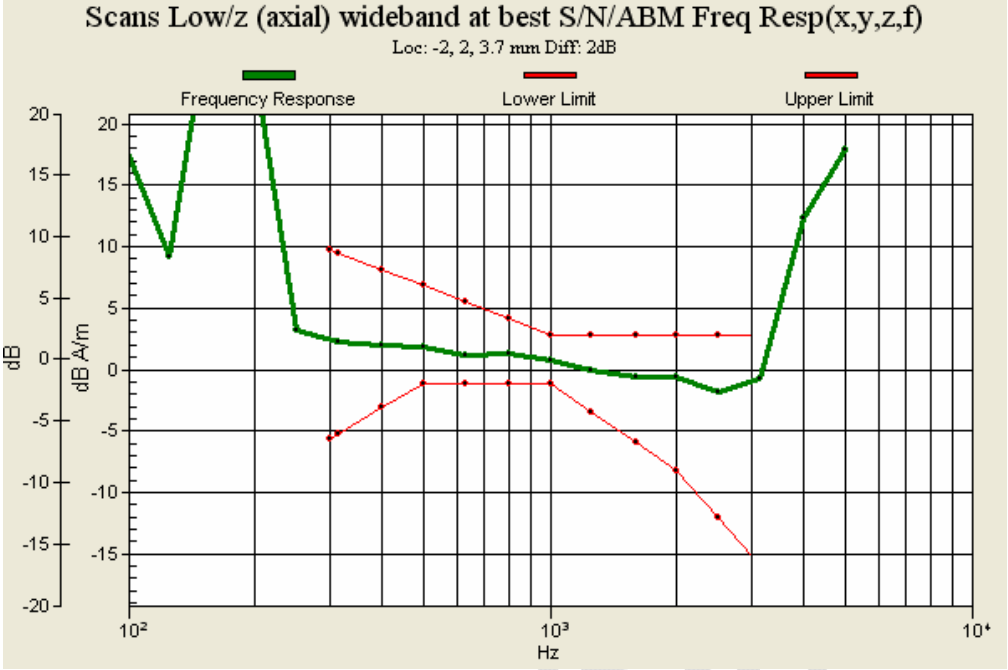
7.2 T-coil Measurement Data

7.2.1 T-Coil coupling field intensity

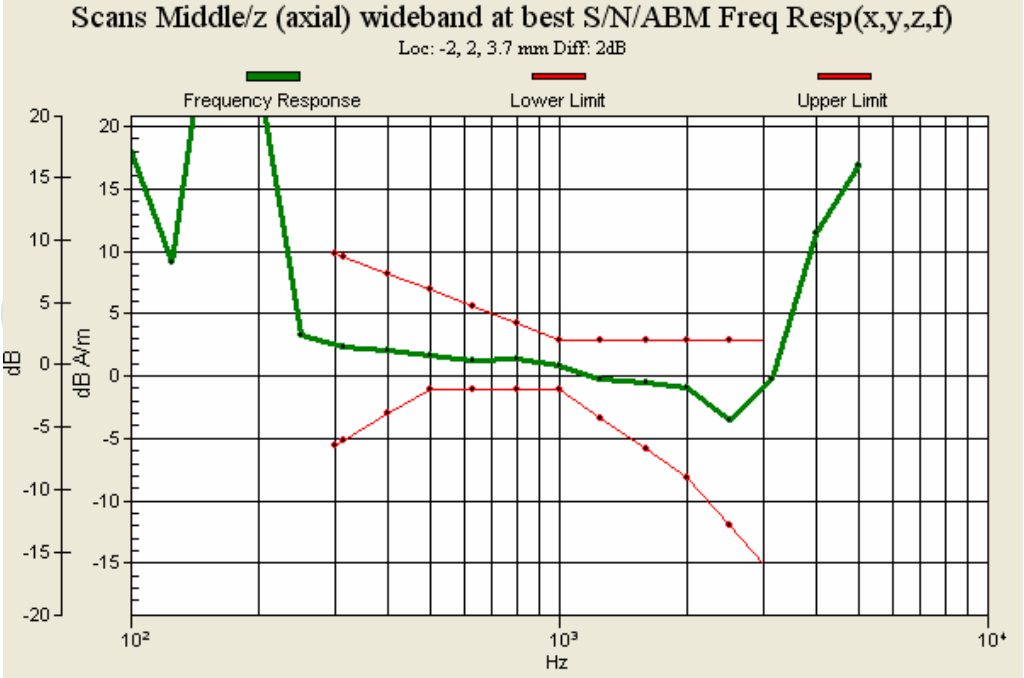
Channel	Minimum Limits (dB A/m)	Radial longitudinal (x axis) field intensity (dB A/m)	Radial transversal (y axis) field intensity (dB A/m)	Axial (z axis) field intensity (dB A/m)	Results
GSM850 ch128	-18	-5.73	-5.95	1.89	Pass
GSM850 ch190	-18	-5.82	-6.00	1.93	Pass
GSM850 ch251	-18	-5.92	-6.26	1.73	Pass
PCS1900 ch512	-18	-5.35	-5.68	2.35	Pass
PCS1900 ch661	-18	-5.49	-5.86	2.29	Pass
PCS1900 ch810	-18	-5.38	-5.91	2.24	Pass

7.2.2 Frequency Response

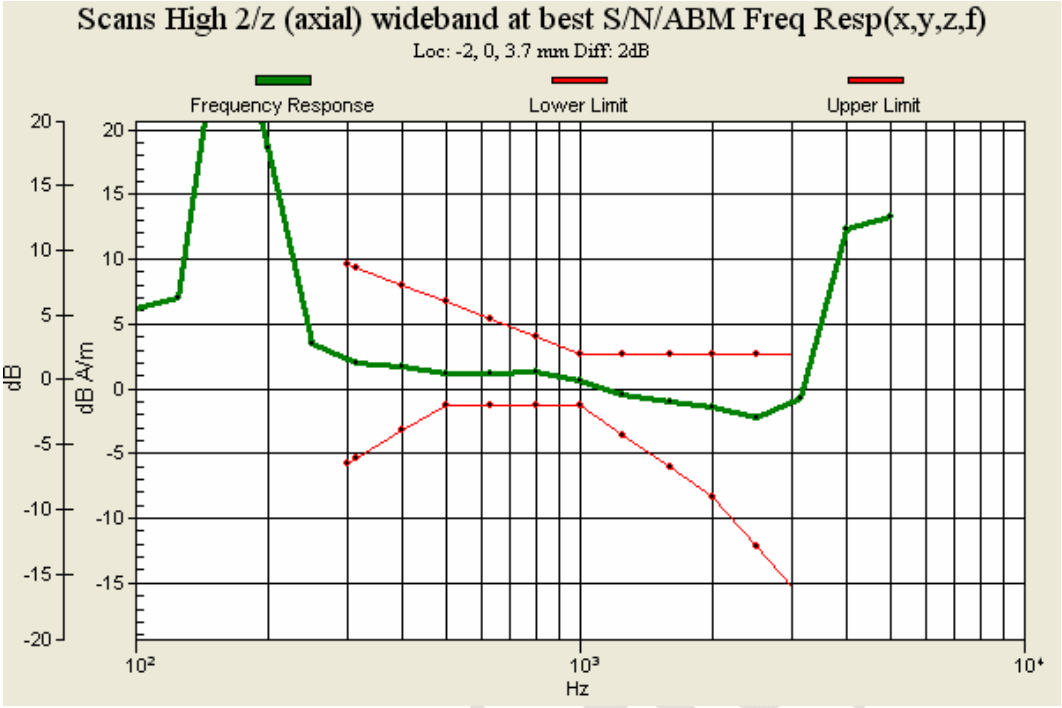
Channel	Results
GSM850 ch128	Pass
GSM850 ch190	Pass
GSM850 ch251	Pass
PCS1900 ch512	Pass
PCS1900 ch661	Pass
PCS1900 ch810	Pass



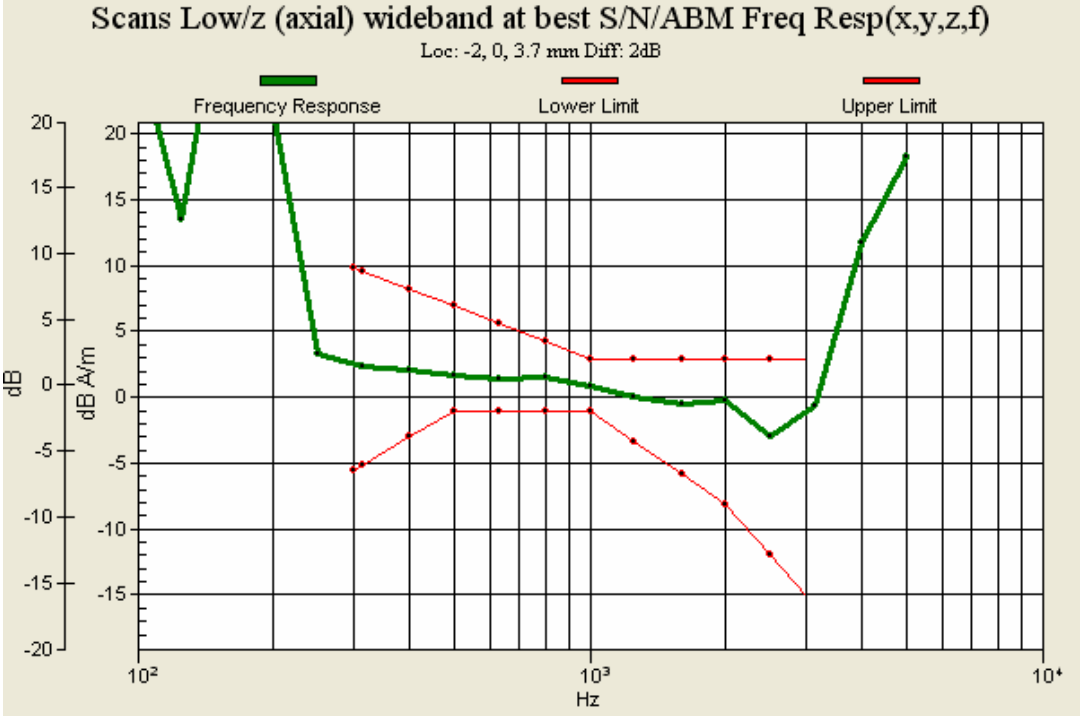
GSM850 ch128



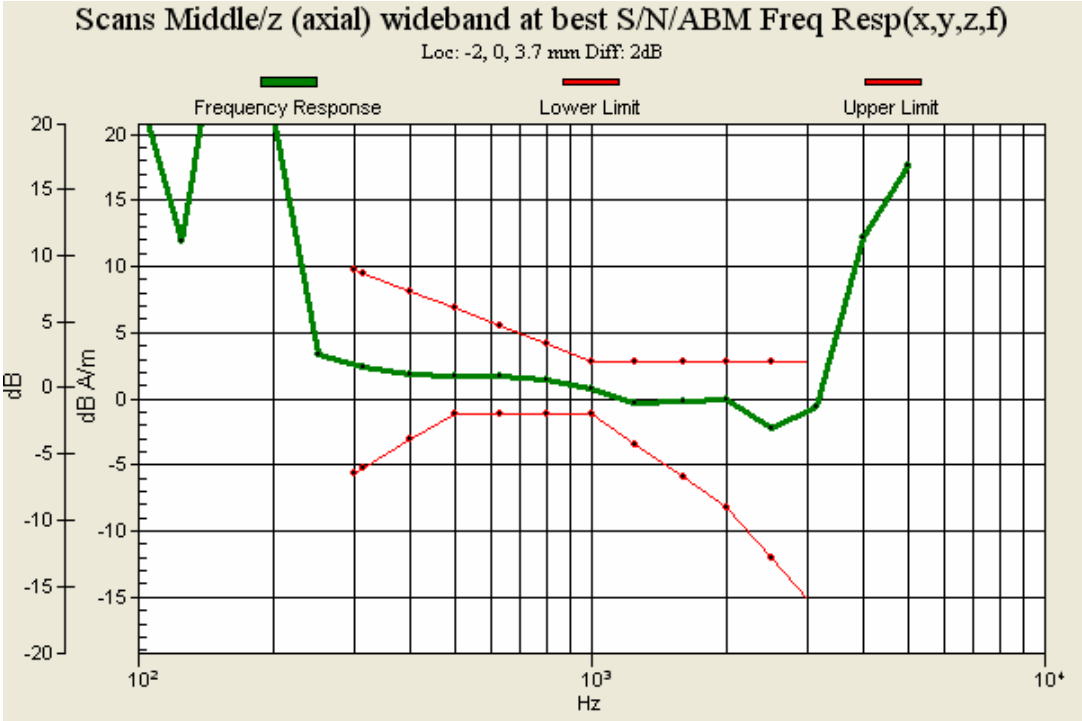
GSM850 ch190



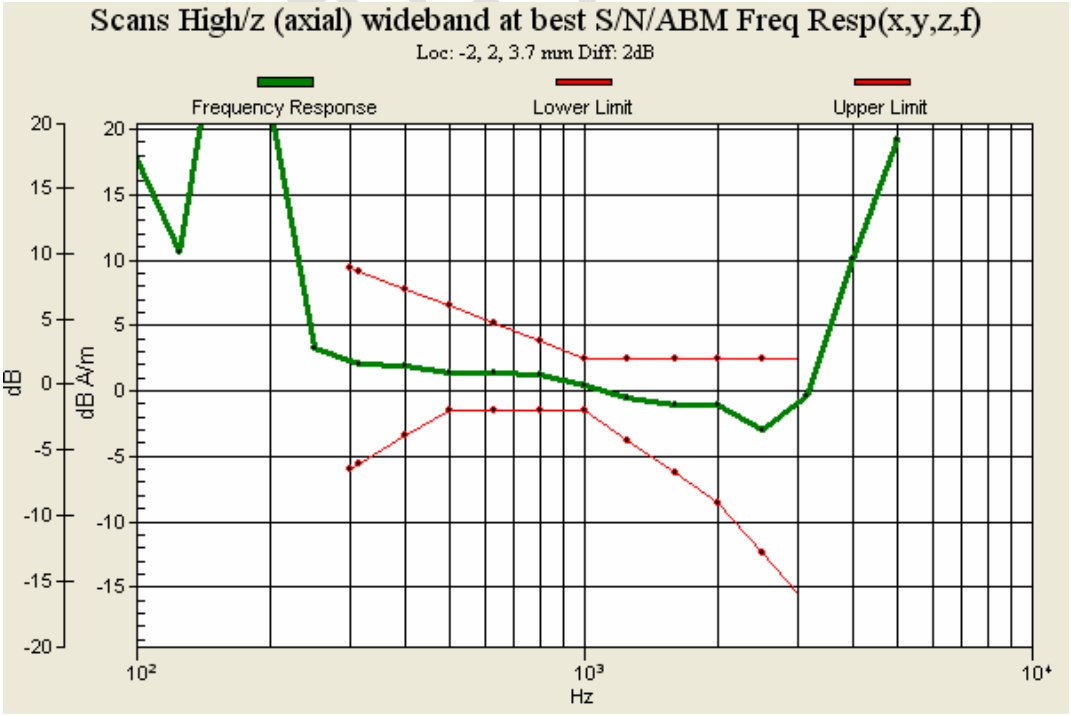
GSM850 ch251



PCS1900 512



PCS1900 661



PCS1900 810

7.2.3 Signal Quality

Channel	SNR (dB)			T Category
	Radial longitudinal (x axis)	Radial transversal (y axis)	Axial (z axis)	
GSM850 ch128	21.2	33.0	27.3	T3
GSM850 ch190	22.1	33.9	27.9	T3
GSM850 ch251	22.8	34.4	28.4	T3
PCS1900 ch512	26.7	39.3	32.1	T3
PCS1900 ch661	26.8	39.8	32.1	T3
PCS1900 ch810	26.0	39.2	31.6	T3

7.3 Measurement uncertainty

Error Description	Unc. value, ±%	Prob. Dist.	Div.	c_i ABM1	c_i ABM2	Std.Unc ABM1 ±%	Std.Unc. ABM2 ±%
Probe Sensitivity							
Reference Level	3.0	N	1	1	1	3.0	3.0
AMCC Geometry	0.4	R	$\sqrt{3}$	1	1	0.2	0.2
AMCC Current	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Probe Positioning during Calibr.	0.1	R	$\sqrt{3}$	1	1	0.1	0.1
Noise Contribution	0.7	R	$\sqrt{3}$	0.0143	1	0.0	0.4
Frequency Slope	5.9	R	$\sqrt{3}$	0.1	1.0	0.3	3.5
Probe System							
Repeatability / Drift	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Linearity / Dynamic Range	0.6	R	$\sqrt{3}$	1	1	0.4	0.4
Acoustic Noise	1.0	R	$\sqrt{3}$	0.1	1	0.1	0.6
Probe Angle	2.3	R	$\sqrt{3}$	1	1	1.4	1.4
Spectral Processing	0.9	R	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	0.6	N	1	1	5	0.6	3.0
Field Disturbation	0.2	R	$\sqrt{3}$	1	1	0.1	0.1
Test Signal							
Ref Signal Spectral Response	0.6	R	$\sqrt{3}$	1	1	0.0	0.4
Positioning							
Probe Positioning	1.9	R	$\sqrt{3}$	1	1	1.1	1.1
Phantom Thickness	0.9	R	$\sqrt{3}$	1	1	0.5	0.5
DUT Positioning	1.9	R	$\sqrt{3}$	1	1	1.1	1.1
External Contributions							
RF Interference	0.0	R	$\sqrt{3}$	1	0.3	0.0	0.0
Test Signal Variation	2.0	R	$\sqrt{3}$	1	1	1.2	1.2
Combined Std Uncertainty							
Expanded Std Uncertainty (ABM Field)						±4.1%	±6.1%
Expanded Std Uncertainty						**±8.1%**	**±12.3%**

ANNEX A Photographs

Picture 1 test layout

ANNEX B Graphical Results

B.1 GSM850 low channel, x axis

Test Laboratory: CTTL

HAC_Tcoil_850_Low_x

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Low / x (longitudinal) fine 3mm 42 x 6 / ABM Interpolated SNR(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158965 dB
Device Reference Point: 0, 0, -6.3 mm

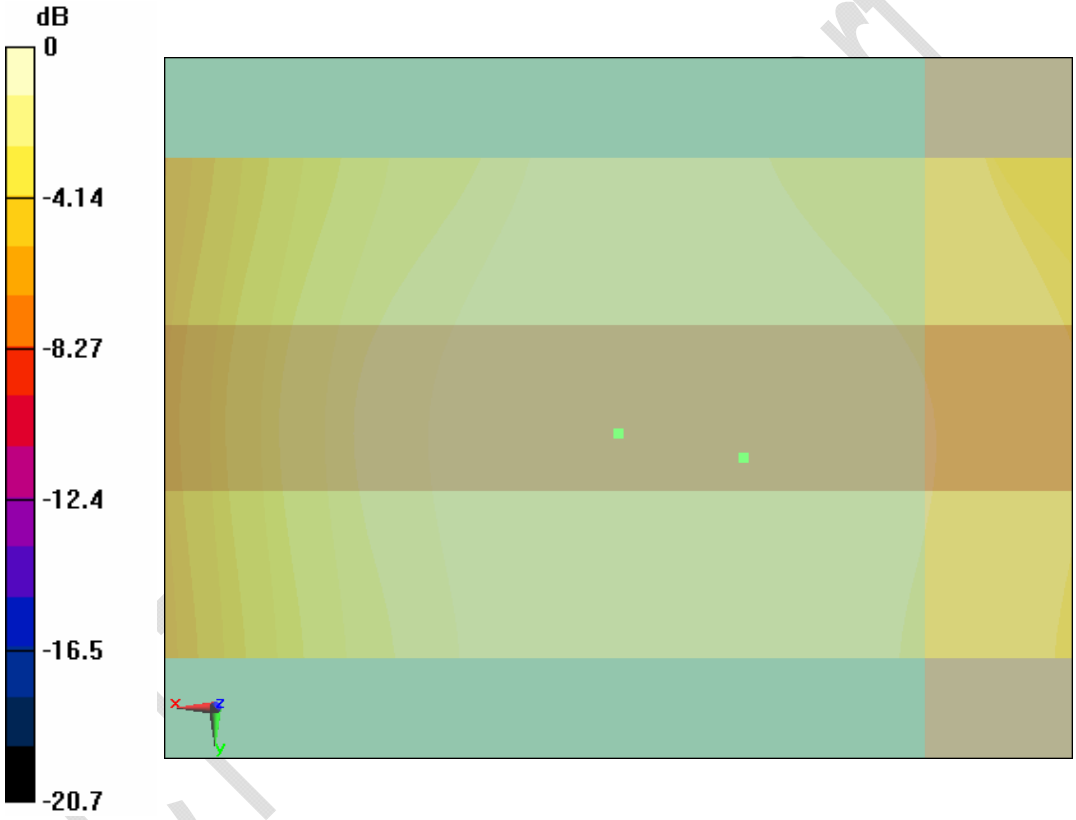
Cursor:
ABM1/ABM2 = 21.2 dB
ABM1 comp = -5.96 dB A/m
BWC Factor = 0.158965 dB
Location: -9.8, 0.6, 3.7 mm

Scans Low / x (longitudinal) fine 3mm 42 x 6 / ABM Interpolated Signal(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158965 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.73 dB A/m
BWC Factor = 0.158965 dB
Location: -8.3, 0.3, 3.7 mm



0 dB = 11.5

B.2 GSM850 low channel, y axis

Test Laboratory: CTTL

HAC_Tcoil_850_Low_y

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Low / y (transversal) fine 3mm 6 x 42 / ABM Interpolated SNR(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158965 dB
Device Reference Point: 0, 0, -6.3 mm

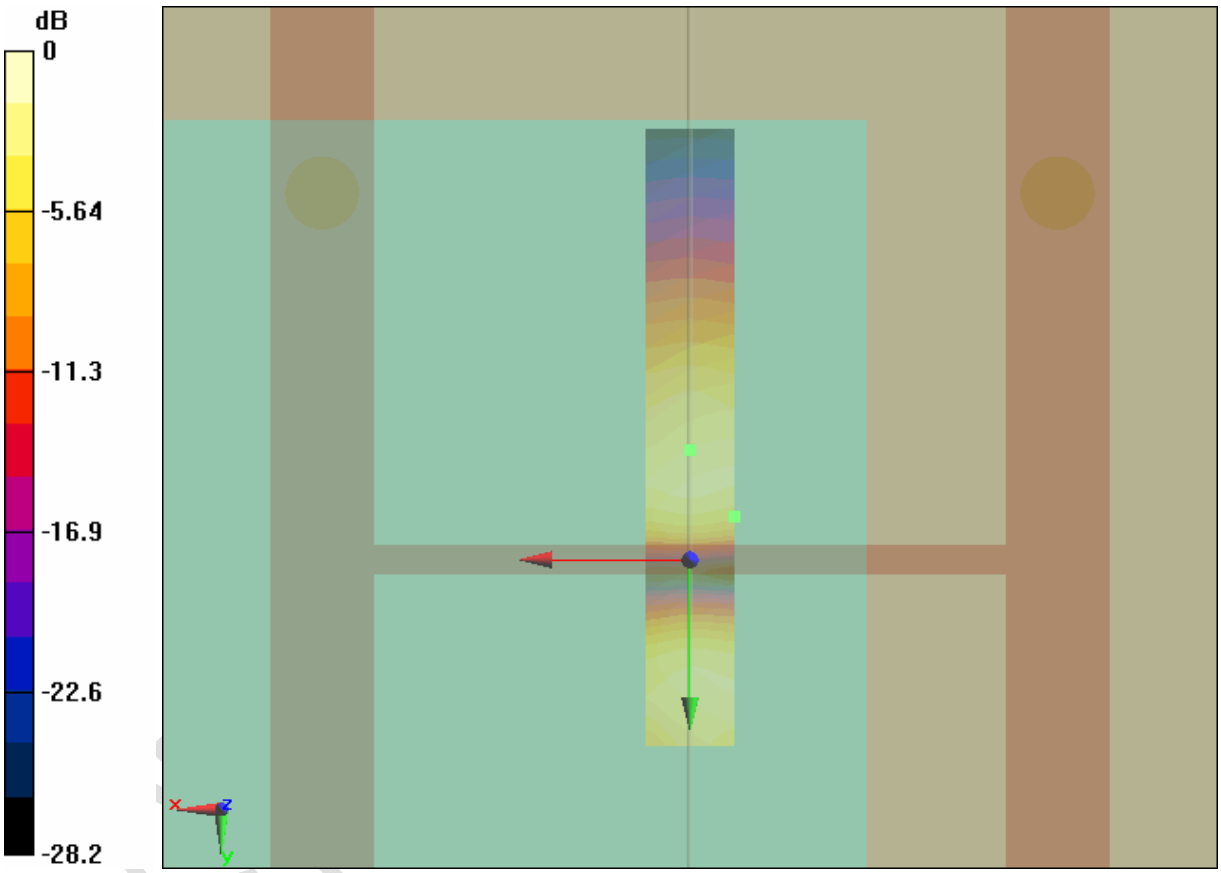
Cursor:
ABM1/ABM2 = 33 dB
ABM1 comp = -9.35 dB A/m
BWC Factor = 0.158965 dB
Location: -3, -2.9, 3.7 mm

Scans Low / y (transversal) fine 3mm 6 x 42 / ABM Interpolated Signal(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158965 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.95 dB A/m
BWC Factor = 0.158965 dB
Location: 0, -7.4, 3.7 mm



0 dB = 44.7

B.3 GSM850 low channel, z axis

Test Laboratory: CTTL

HAC_Tcoil_850_Low_z

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Low/z (axial) fine 2mm 8 x 8/ABM Interpolated SNR(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158965 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
ABM1/ABM2 = 27.3 dB
ABM1 comp = 1.53 dB A/m
BWC Factor = 0.158965 dB
Location: -2, 1, 3.7 mm

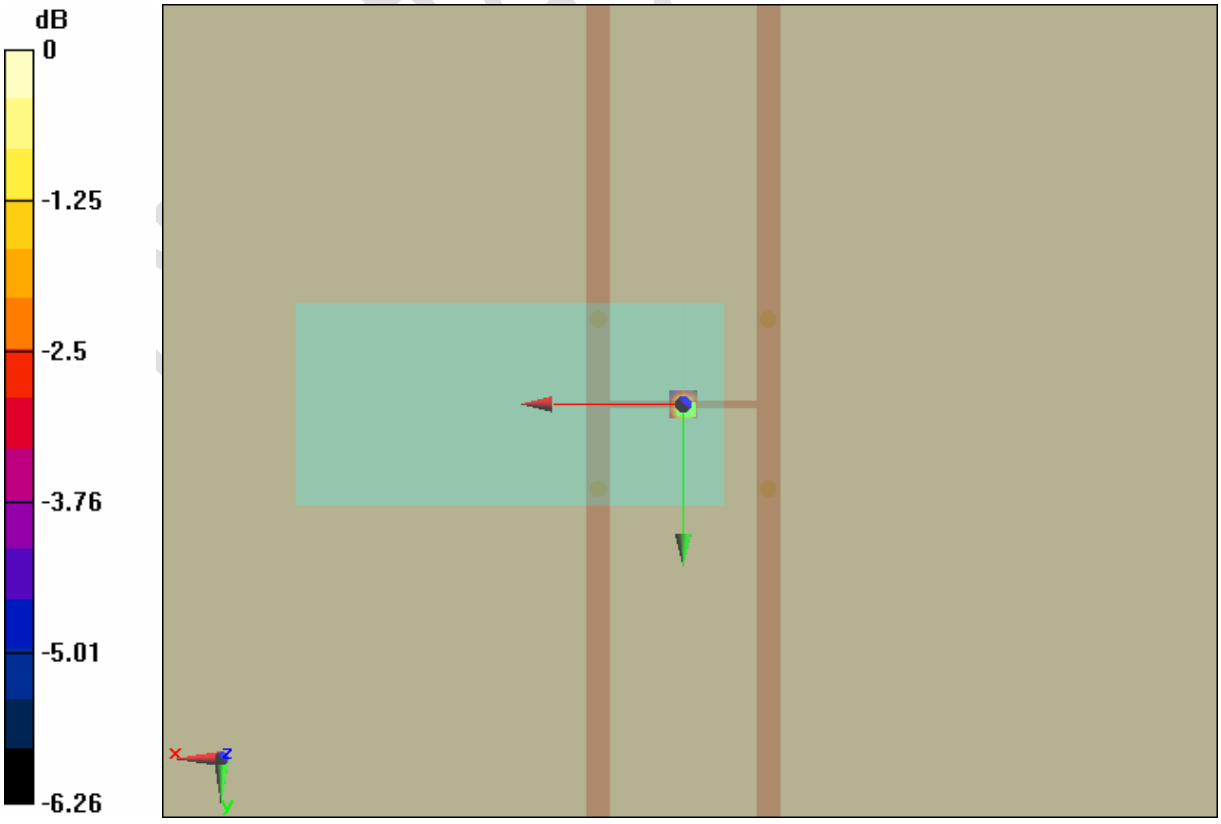
Scans Low/z (axial) fine 2mm 8 x 8/ABM Interpolated Signal(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158965 dB
Device Reference Point: 0, 0, -6.3 mm

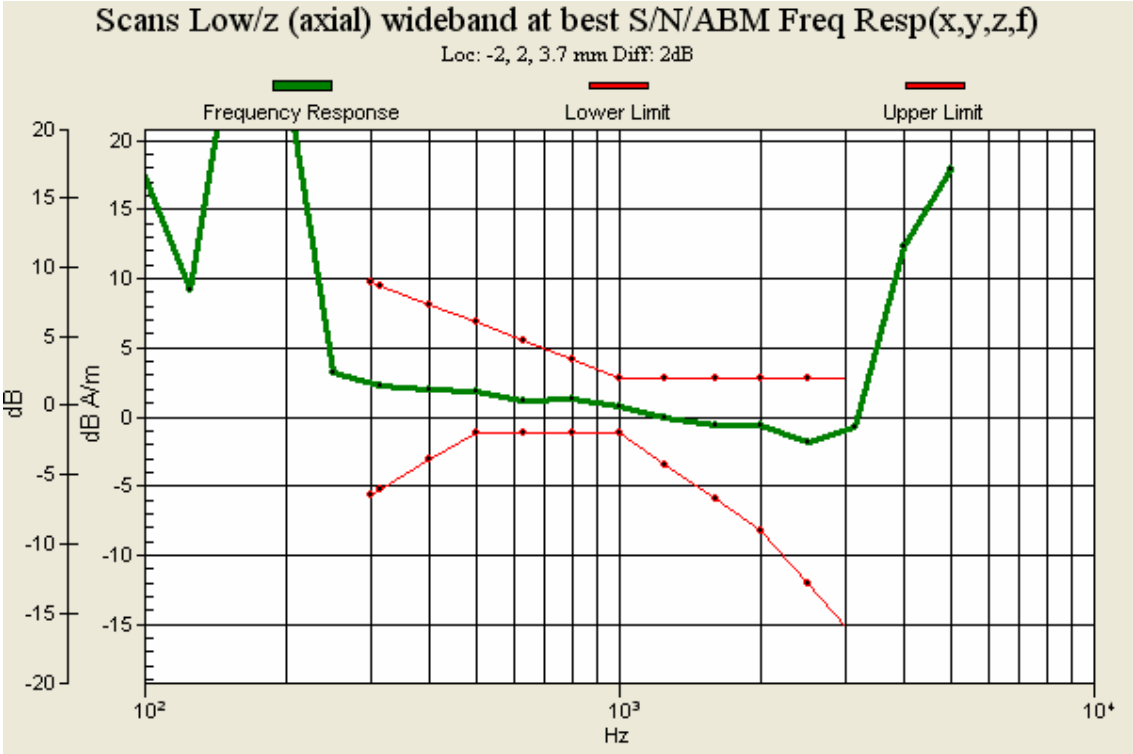
Cursor:
ABM1 = 1.89 dB A/m
BWC Factor = 0.158965 dB
Location: 0, 1.6, 3.7 mm

Scans Low / z (axial) wideband at best S / N / ABM Freq Resp(x,y,z,f) (1x1x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 73.95
Measure Window Start: 0ms
Measure Window Length: 2000ms
BWC applied: 10.8 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
Diff = 2 dB
BWC Factor = 10.8 dB
Location: -2, 2, 3.7 mm



0 dB = 23.1



B.4 GSM850 middle channel, x axis

Test Laboratory: CTTL

HAC_Tcoil_850_Middle_x

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Middle/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated SNR(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

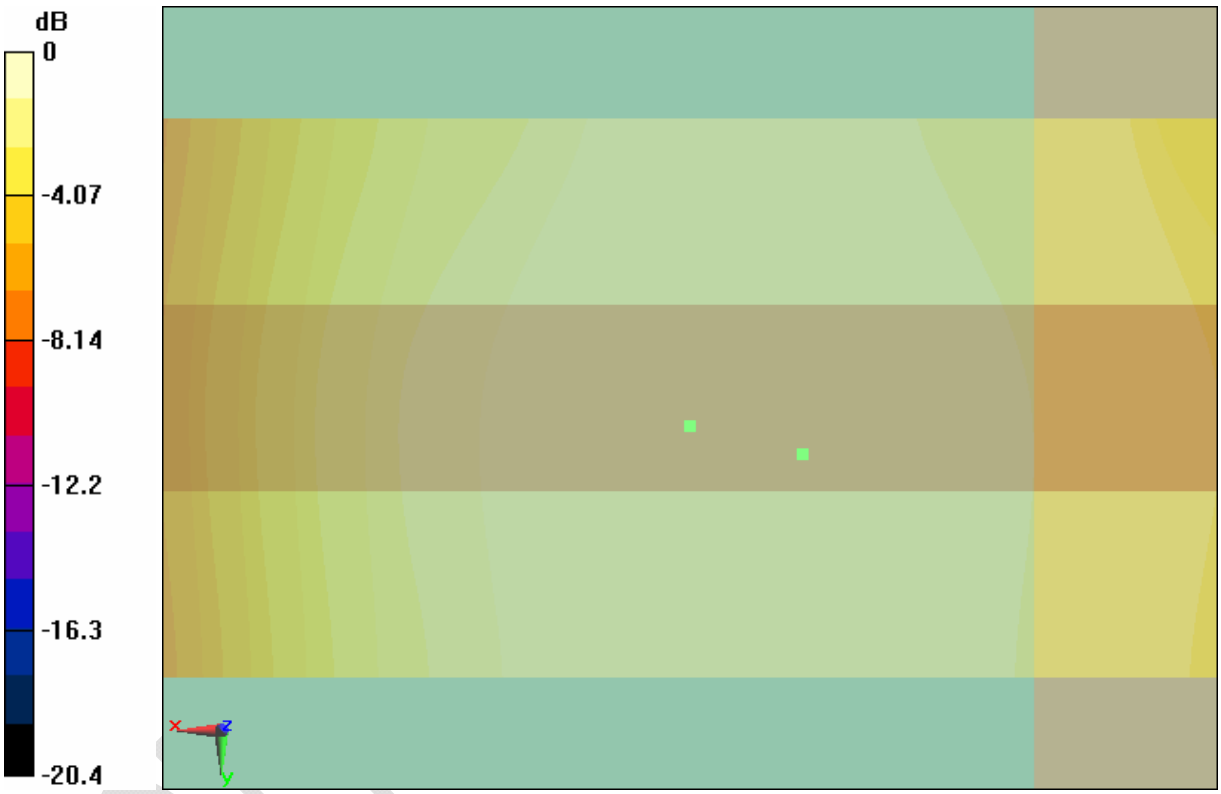
Cursor:
ABM1/ABM2 = 22.1 dB
ABM1 comp = -6 dB A/m
BWC Factor = 0.158027 dB
Location: -9.5, 0.6, 3.7 mm

Scans Middle/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated Signal(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.82 dB A/m
BWC Factor = 0.158027 dB
Location: -8.3, 0.3, 3.7 mm



0 dB = 12.8

B.5 GSM850 middle channel, y axis

Test Laboratory: CTTL

HAC_Tcoil_850_Middle_y

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Middle/y (transversal) fine 3mm 6 x 42/ABM Interpolated SNR(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

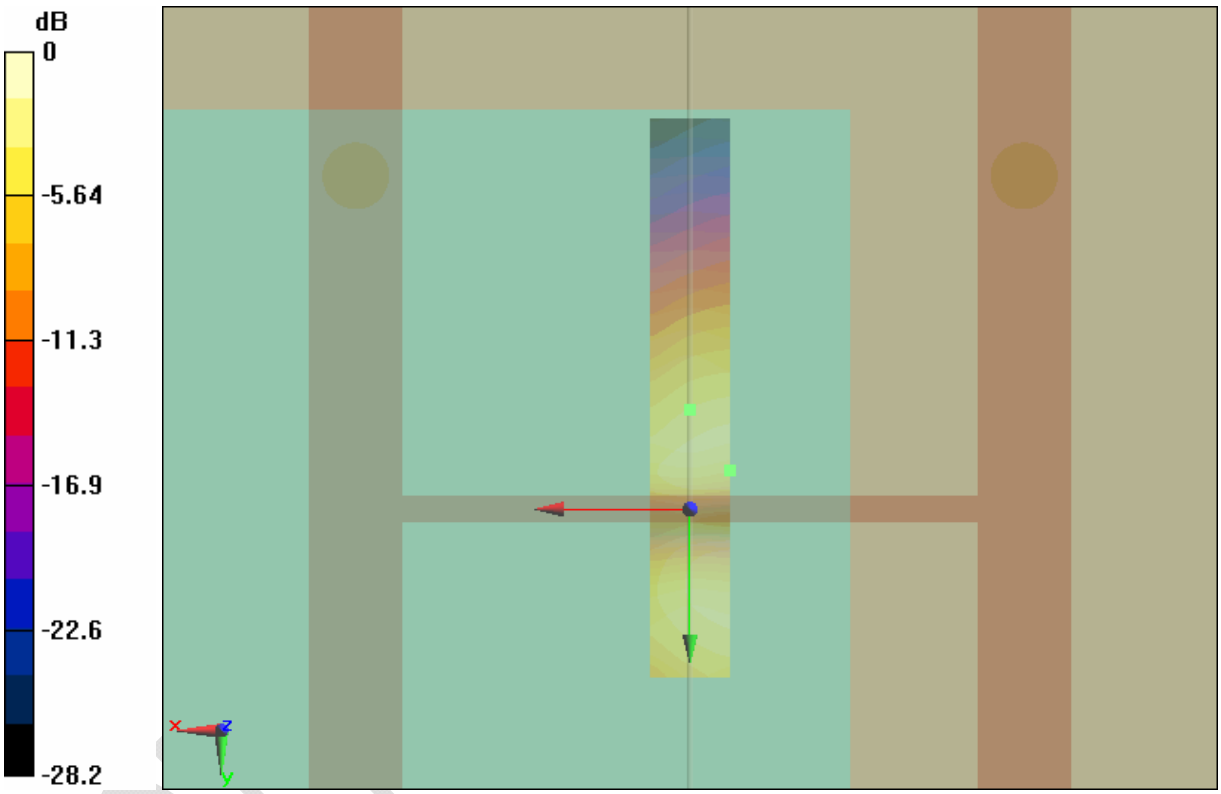
Cursor:
ABM1/ABM2 = 33.9 dB
ABM1 comp = -9.56 dB A/m
BWC Factor = 0.158027 dB
Location: -3, -2.9, 3.7 mm

Scans Middle/y (transversal) fine 3mm 6 x 42/ABM Interpolated Signal(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -6 dB A/m
BWC Factor = 0.158027 dB
Location: 0, -7.4, 3.7 mm



0 dB = 49.4

B.6 GSM850 middle channel, z axis

Test Laboratory: CTTL

HAC_Tcoil_850_Middle_z

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

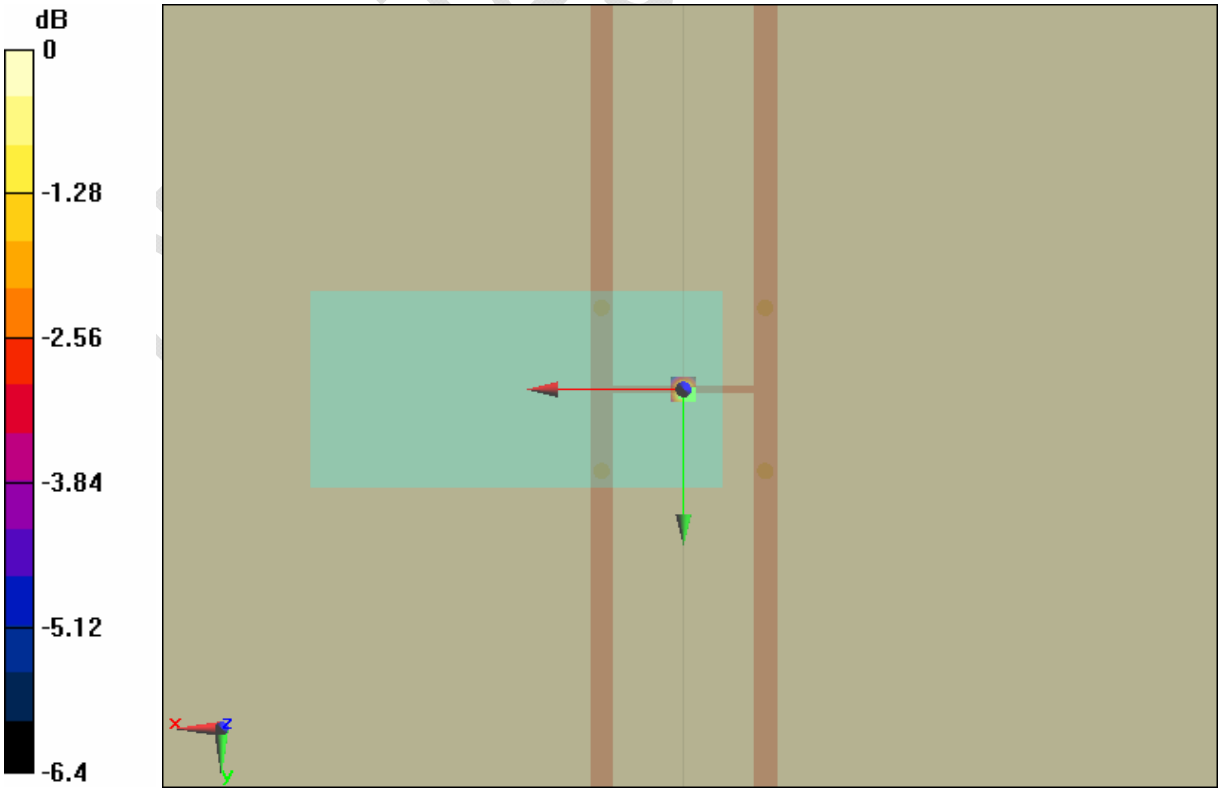
Scans Middle/z (axial) fine 2mm 8 x 8/ABM Interpolated SNR(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
ABM1/ABM2 = 27.9 dB
ABM1 comp = 1.45 dB A/m
BWC Factor = 0.158027 dB
Location: -2, 1, 3.7 mm

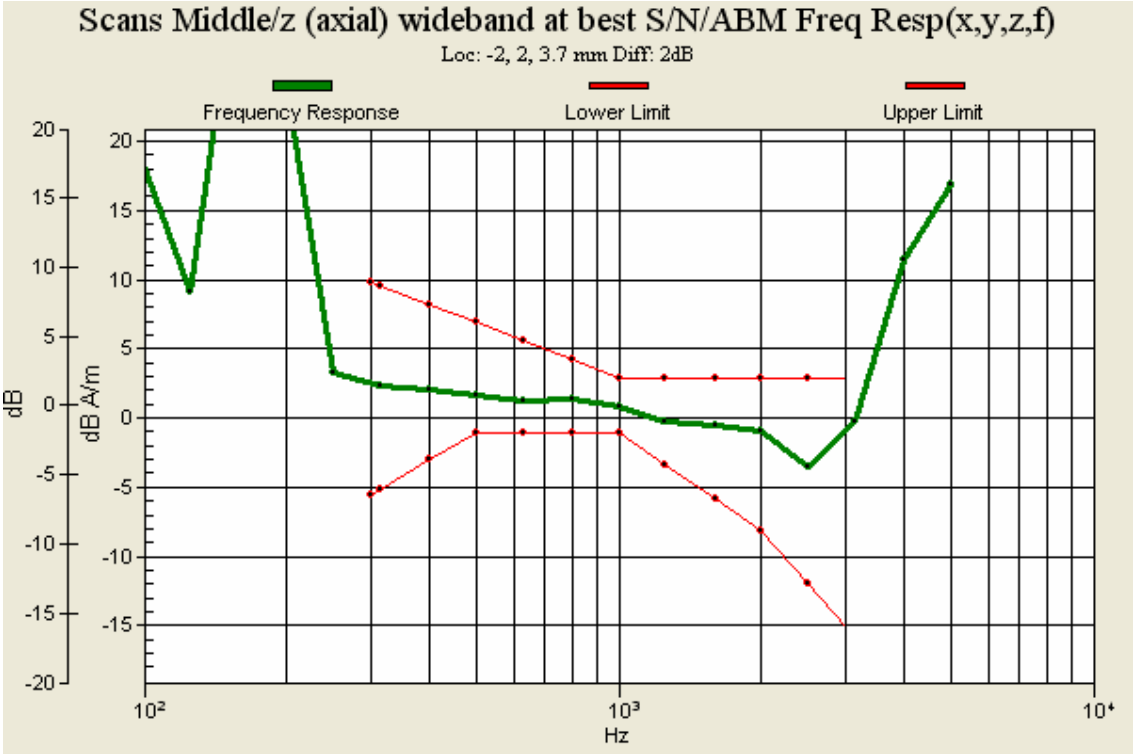
Scans Middle/z (axial) fine 2mm 8 x 8/ABM Interpolated Signal(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm
Cursor:
ABM1 = 1.93 dB A/m
BWC Factor = 0.158027 dB
Location: 0, 1, 3.7 mm

Scans Middle/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 73.95
Measure Window Start: 0ms
Measure Window Length: 2000ms
BWC applied: 10.8 dB
Device Reference Point: 0, 0, -6.3 mm
Cursor:
Diff = 2 dB
BWC Factor = 10.8 dB
Location: -2, 2, 3.7 mm



0 dB = 24.9


Scans Middle/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: -2, 2, 3.7 mm Diff: 2dB
Frequency Response
Lower Limit
Upper Limit
dB
dB A/m
Hz
20
15
10
5
0
-5
-10
-15
-20
10²
10³
10⁴

B.7 GSM850 high channel, x axis

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans High 2/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated SNR(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
ABM1/ABM2 = 22.8 dB
ABM1 comp = -6.17 dB A/m
BWC Factor = 0.158027 dB
Location: -10.1, 0.3, 3.7 mm

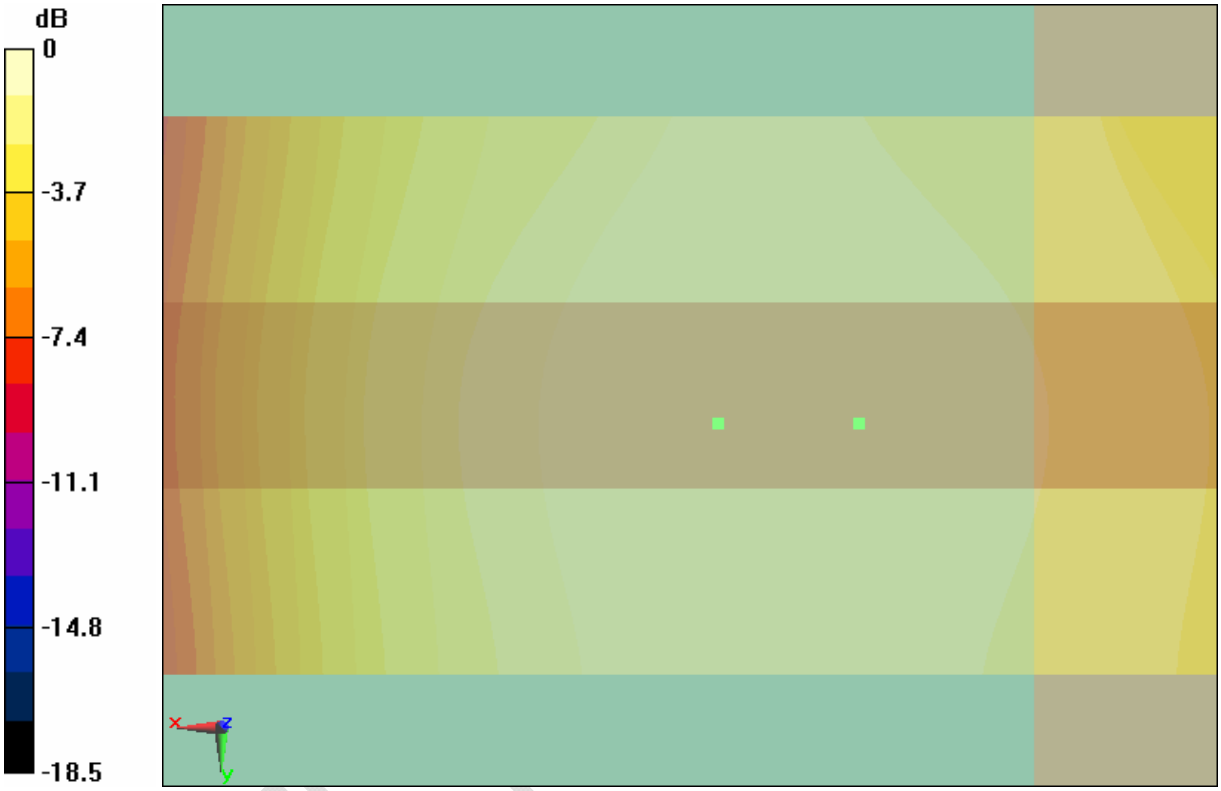
Scans High 2/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated Signal(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.92 dB A/m

BWC Factor = 0.158027 dB

Location: -8.6, 0.3, 3.7 mm



0 dB = 13.9

B.8 GSM850 high channel, y axis

Test Laboratory: CTTL

HAC_Tcoil_850_High_y

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans High 2/y (transversal) fine 3mm 6 x 42/ABM Interpolated SNR(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

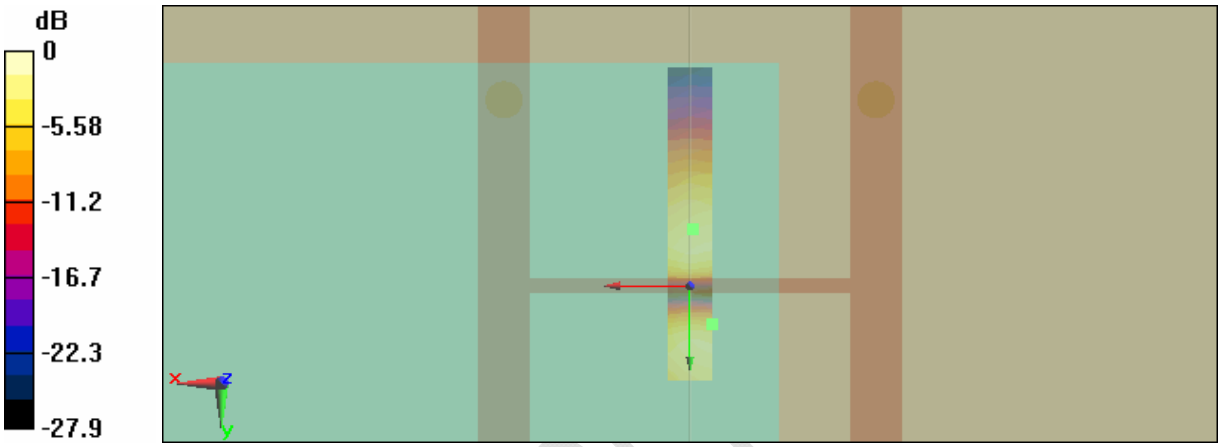
Cursor:
ABM1/ABM2 = 34.4 dB
ABM1 comp = -10.4 dB A/m
BWC Factor = 0.158027 dB
Location: -3, 5.2, 3.7 mm

Scans High 2/y (transversal) fine 3mm 6 x 42/ABM Interpolated Signal(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -6.26 dB A/m
BWC Factor = 0.158027 dB
Location: -0.3, -7.7, 3.7 mm



0 dB = 52.5

B.9 GSM850 high channel, z axis

Test Laboratory: CTTL

HAC_Tcoil_850_High_z

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

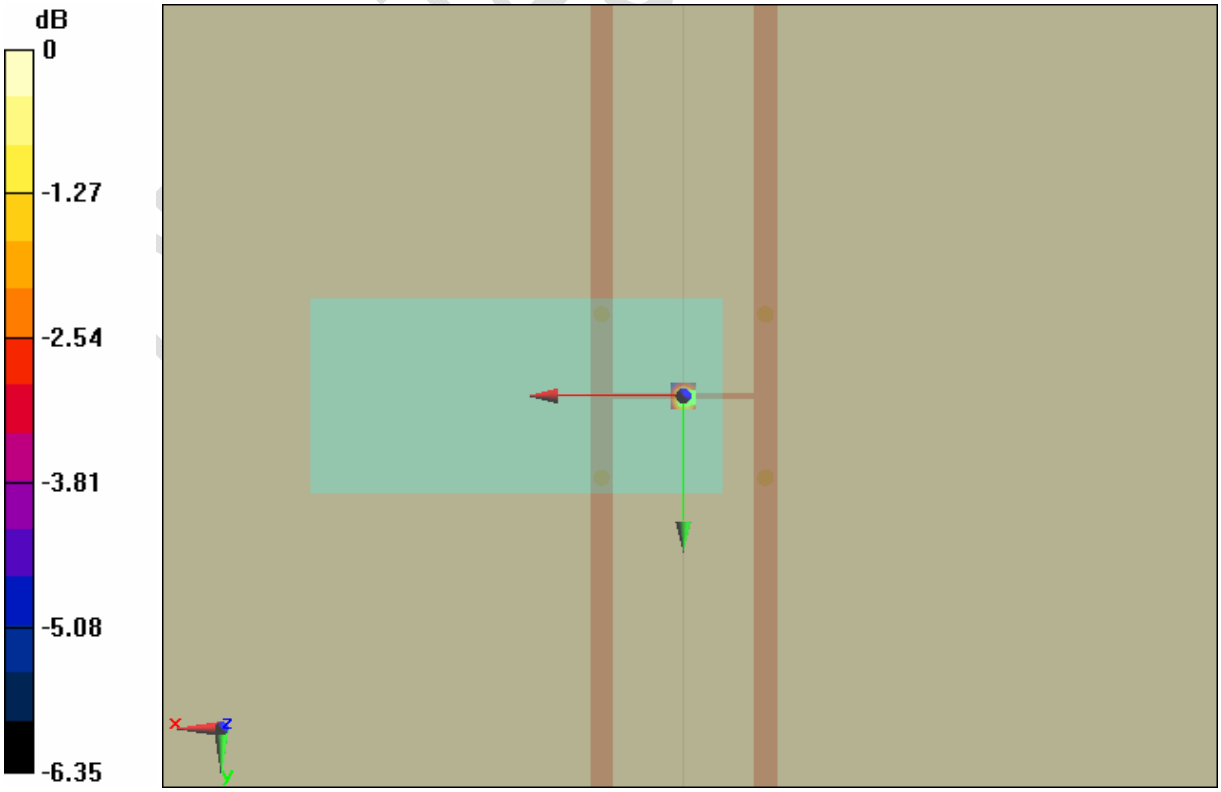
Scans High 2/z (axial) fine 2mm 8 x 8/ABM Interpolated SNR(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
ABM1/ABM2 = 28.4 dB
ABM1 comp = 1.34 dB A/m
BWC Factor = 0.158027 dB
Location: -2.2, 0.8, 3.7 mm

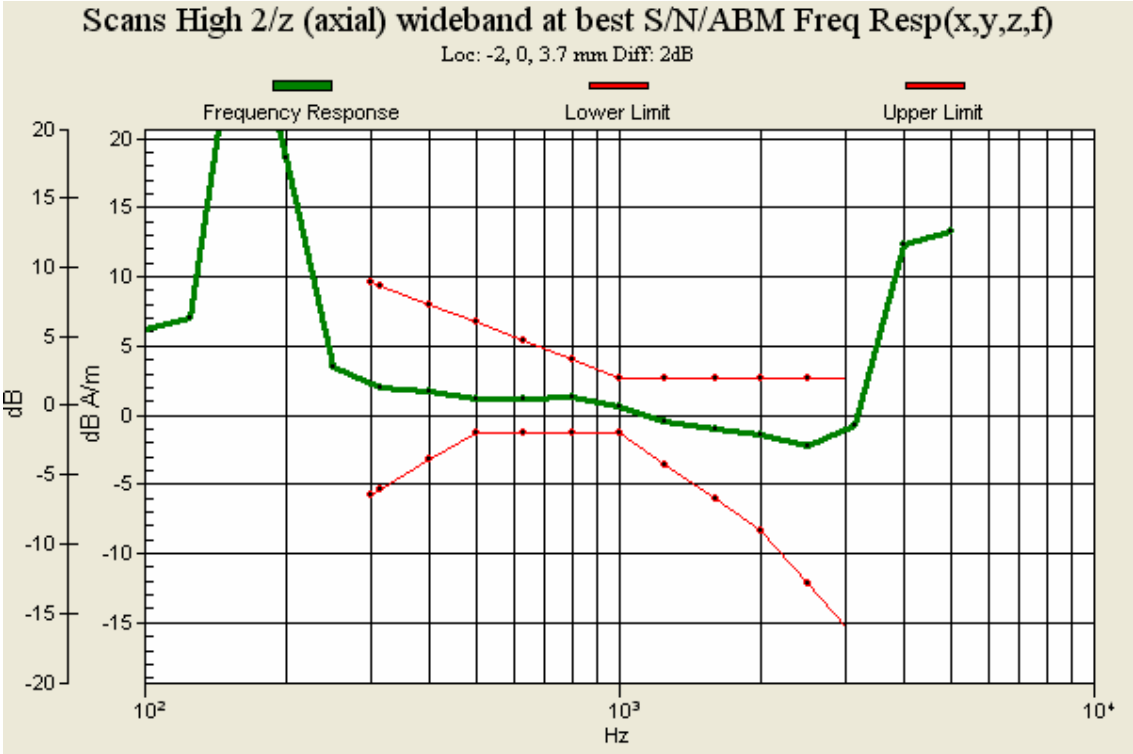
Scans High 2/z (axial) fine 2mm 8 x 8/ABM Interpolated Signal(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm
Cursor:
ABM1 = 1.73 dB A/m
BWC Factor = 0.158027 dB
Location: 0, 1.4, 3.7 mm

Scans High 2/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 73.95
Measure Window Start: 0ms
Measure Window Length: 2000ms
BWC applied: 10.8 dB
Device Reference Point: 0, 0, -6.3 mm
Cursor:
Diff = 2 dB
BWC Factor = 10.8 dB
Location: -2, 0, 3.7 mm



0 dB = 26.3


Scans High 2/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: -2, 0, 3.7 mm Diff: 2dB
Frequency Response
Lower Limit
Upper Limit
dB
dB A/m
Hz
20
15
10
5
0
-5
-10
-15
-20
10²
10³
10⁴

B.10 PCS1900 low channel, x axis

Test Laboratory: CTTL

HAC_TCoil_1900_Low_x

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Low/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated SNR(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

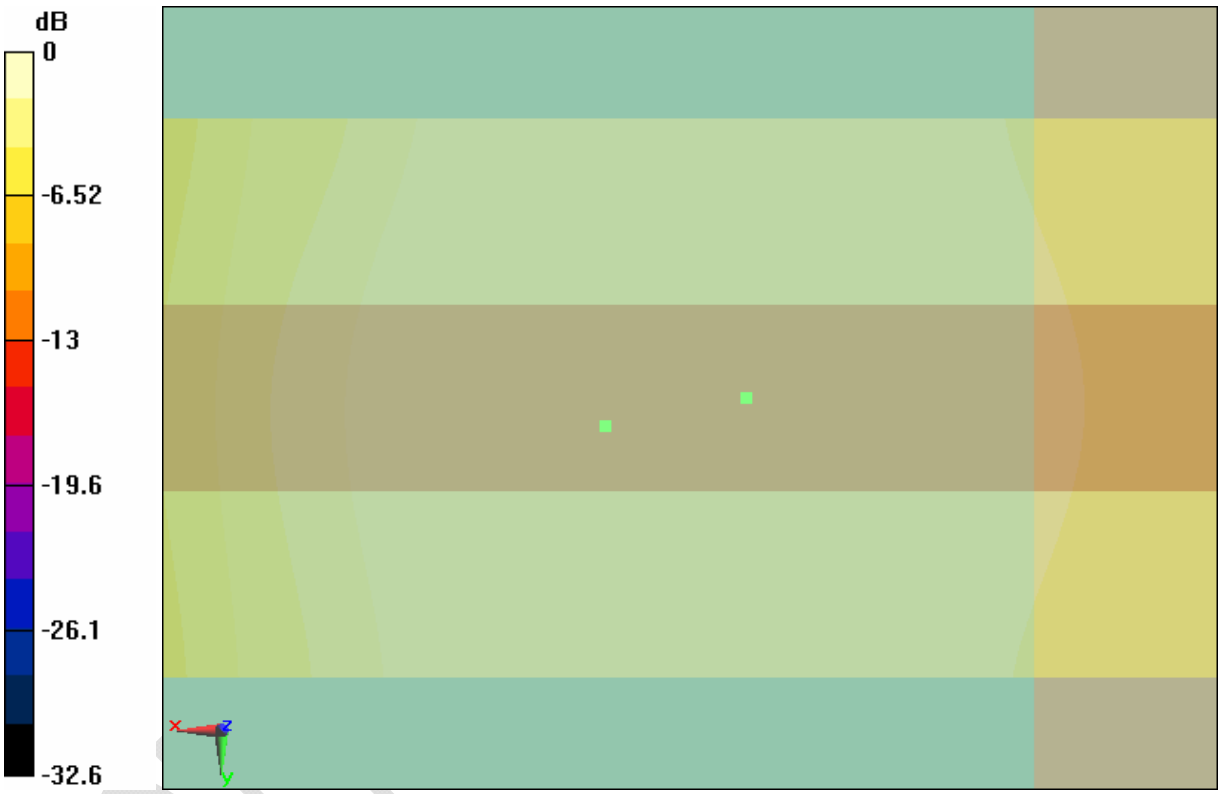
Cursor:
ABM1/ABM2 = 26.7 dB
ABM1 comp = -5.51 dB A/m
BWC Factor = 0.158027 dB
Location: -8.9, 0, 3.7 mm

Scans Low/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated Signal(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.35 dB A/m
BWC Factor = 0.158027 dB
Location: -7.4, 0.3, 3.7 mm



0 dB = 21.6

B.11 PCS1900 low channel, y axis

Test Laboratory: CTTL

HAC_TCoil_1900_Low_y

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Low/y (transversal) fine 3mm 6 x 42/ABM Interpolated SNR(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

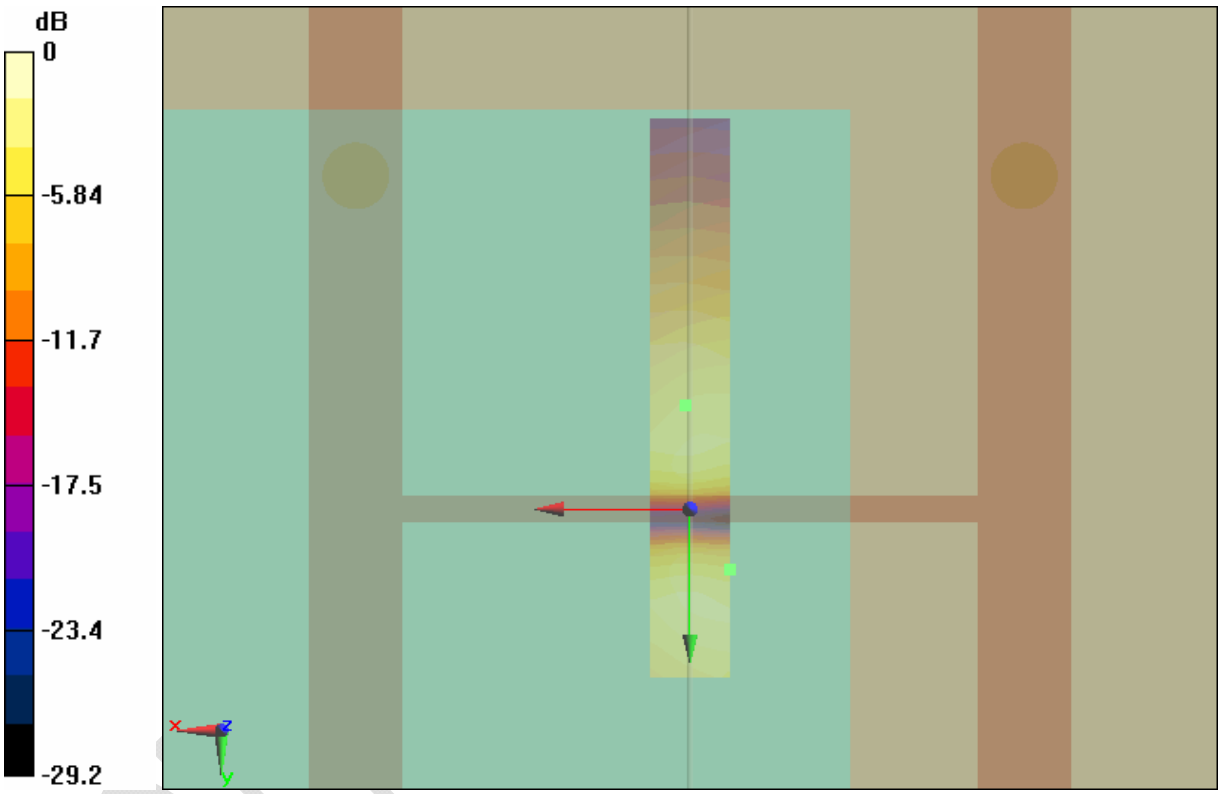
Cursor:
ABM1/ABM2 = 39.3 dB
ABM1 comp = -10.7 dB A/m
BWC Factor = 0.158027 dB
Location: -3, 4.6, 3.7 mm

Scans Low/y (transversal) fine 3mm 6 x 42/ABM Interpolated Signal(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.68 dB A/m
BWC Factor = 0.158027 dB
Location: 0.3, -7.7, 3.7 mm



0 dB = 92.5

B.12 PCS1900 low channel, z axis

Test Laboratory: CTTL

HAC_TCoil_1900_Low_z

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Low/z (axial) fine 2mm 8 x 8/ABM Interpolated SNR(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
ABM1/ABM2 = 32.1 dB
ABM1 comp = 1.84 dB A/m
BWC Factor = 0.158027 dB
Location: -1.4, 0.6, 3.7 mm

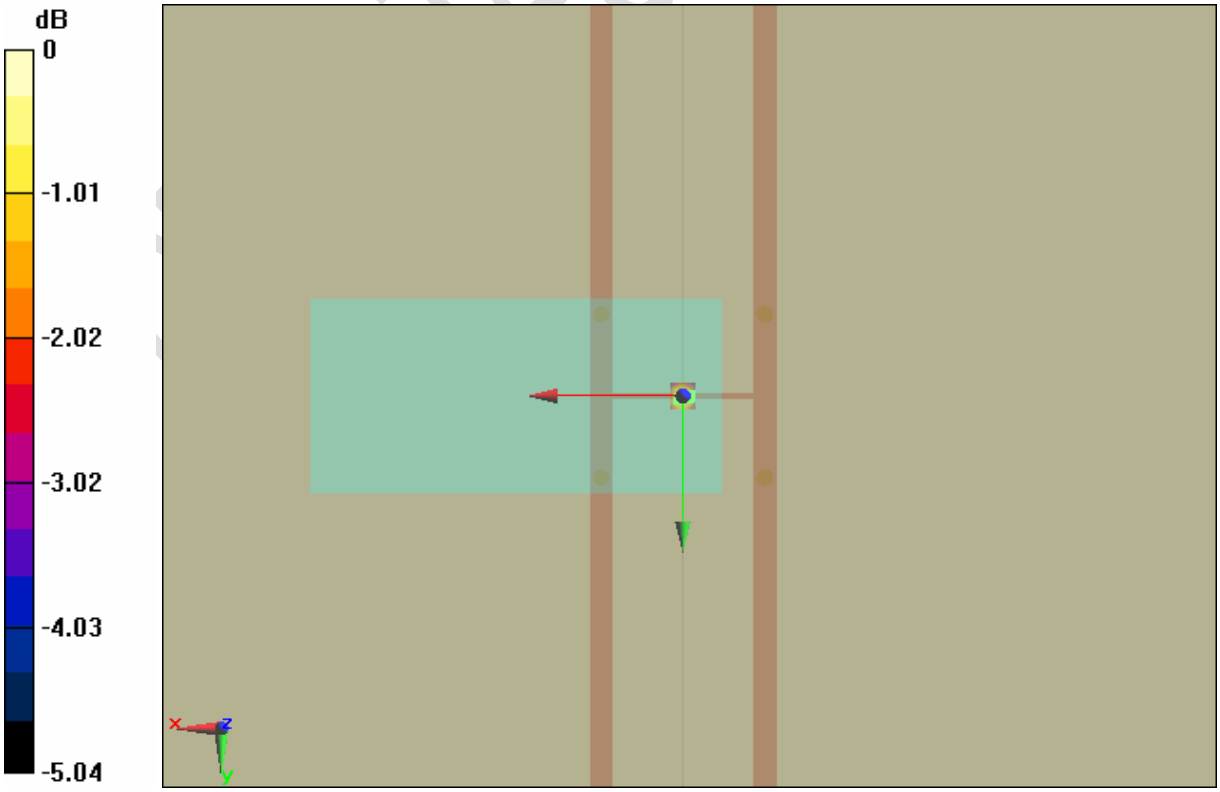
Scans Low/z (axial) fine 2mm 8 x 8/ABM Interpolated Signal(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

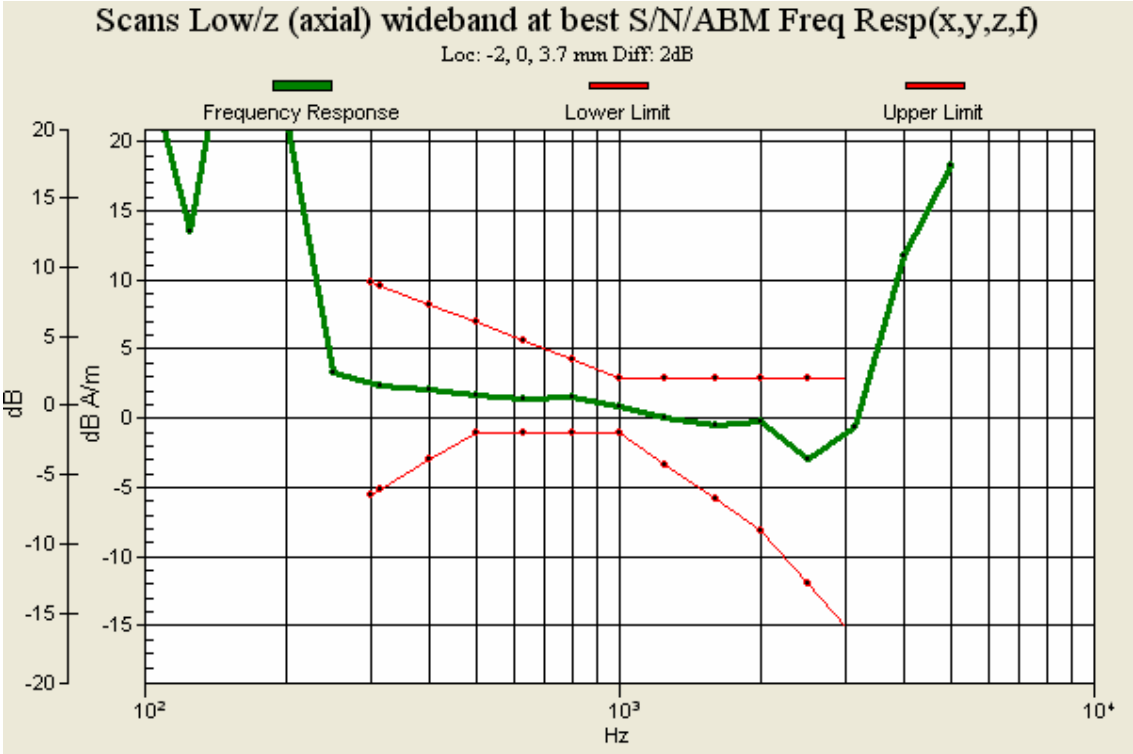
Cursor:
ABM1 = 2.35 dB A/m
BWC Factor = 0.158027 dB
Location: 1.2, 0.8, 3.7 mm

Scans Low / z (axial) wideband at best S / N / ABM Freq Resp(x,y,z,f) (1x1x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 73.95
Measure Window Start: 0ms
Measure Window Length: 2000ms
BWC applied: 10.8 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
Diff = 2 dB
BWC Factor = 10.8 dB
Location: -2, 0, 3.7 mm



0 dB = 40.3


Scans Low/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: -2, 0, 3.7 mm Diff: 2dB
Frequency Response
Lower Limit
Upper Limit
dB
dB A/m
Hz

B.13 PCS1900 middle channel, x axis

Test Laboratory: CTTL

HAC_TCoil_1900_Middle_x

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Middle/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated SNR(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

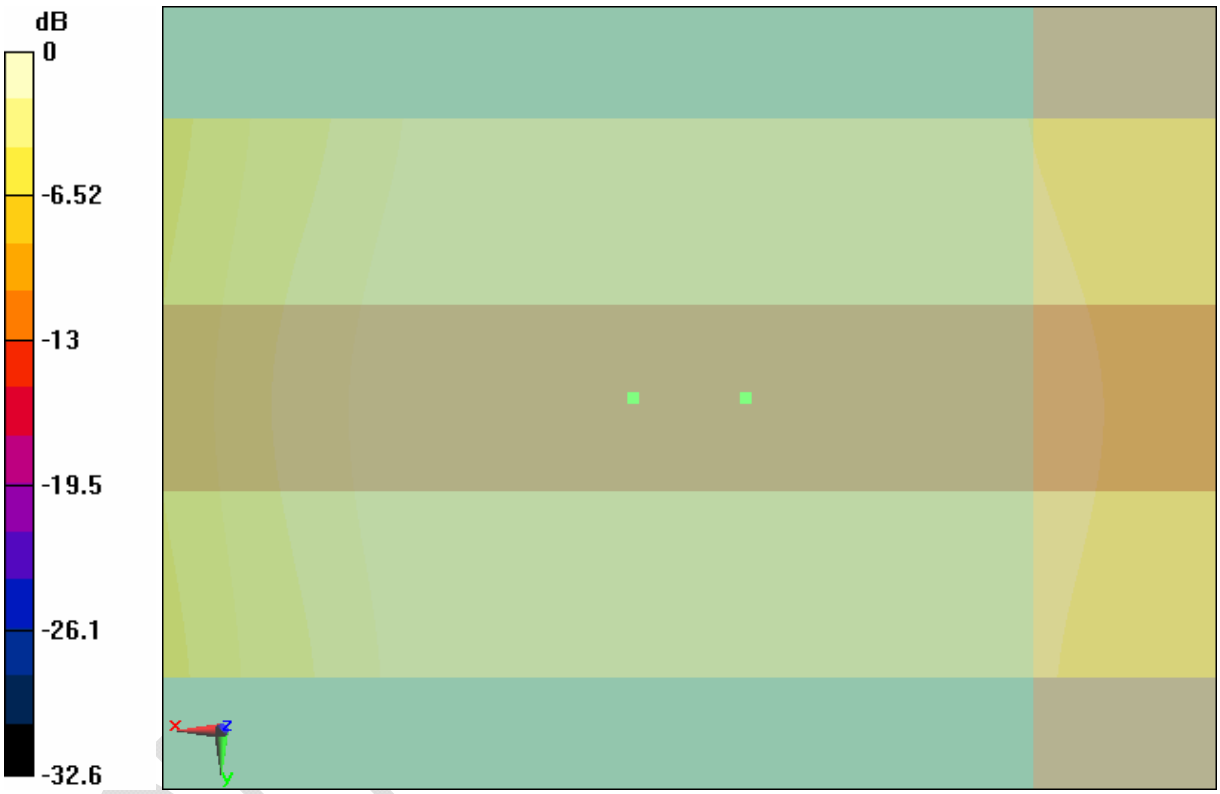
Cursor:
ABM1/ABM2 = 26.8 dB
ABM1 comp = -5.61 dB A/m
BWC Factor = 0.158027 dB
Location: -8.9, 0, 3.7 mm

Scans Middle/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated Signal(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.49 dB A/m
BWC Factor = 0.158027 dB
Location: -7.7, 0, 3.7 mm



0 dB = 21.8

B.14 PCS1900 middle channel, y axis

Test Laboratory: CTTL

HAC_TCoil_1900_Middle_y

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans Middle/y (transversal) fine 3mm 6 x 42/ABM Interpolated SNR(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

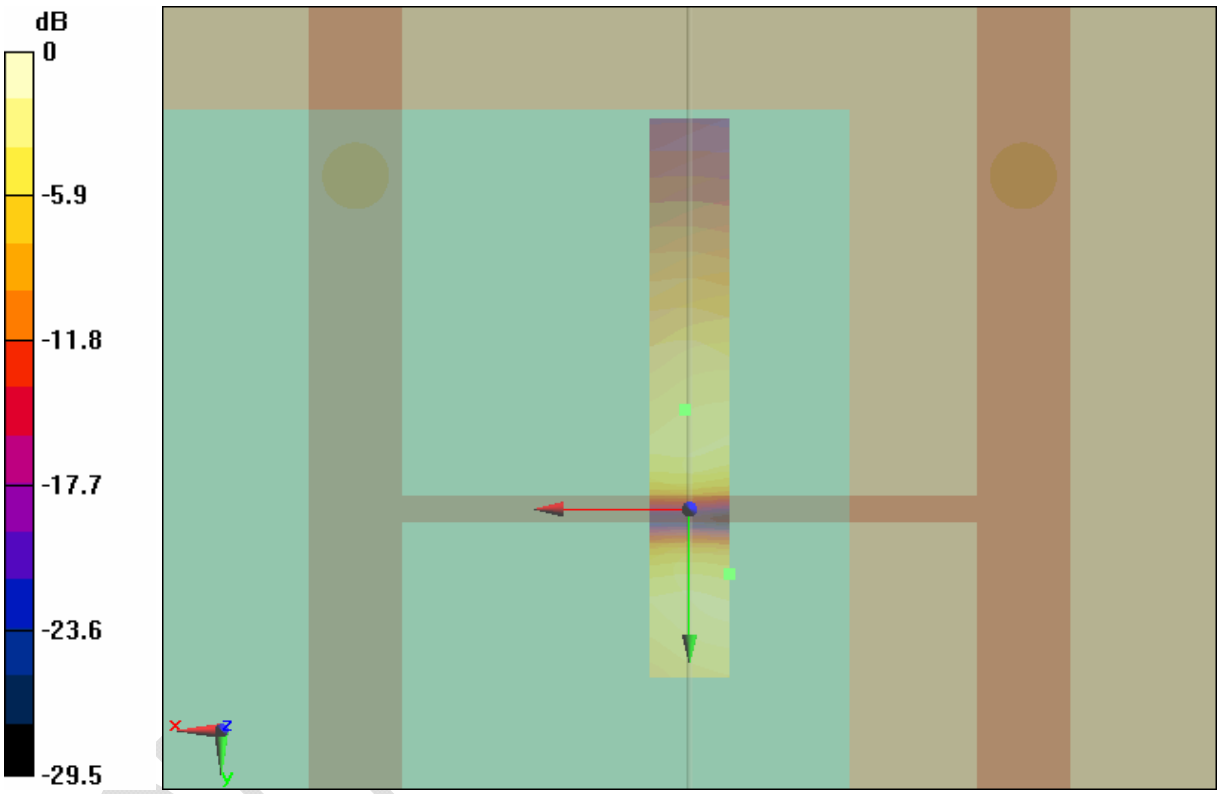
Cursor:
ABM1/ABM2 = 39.8 dB
ABM1 comp = -10.1 dB A/m
BWC Factor = 0.158027 dB
Location: -3, 4.9, 3.7 mm

Scans Middle/y (transversal) fine 3mm 6 x 42/ABM Interpolated Signal(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.86 dB A/m
BWC Factor = 0.158027 dB
Location: 0.3, -7.4, 3.7 mm



0 dB = 97.5

B.15 PCS1900 middle channel, z axis

Test Laboratory: CTTL

HAC_TCoil_1900_Middle_z

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

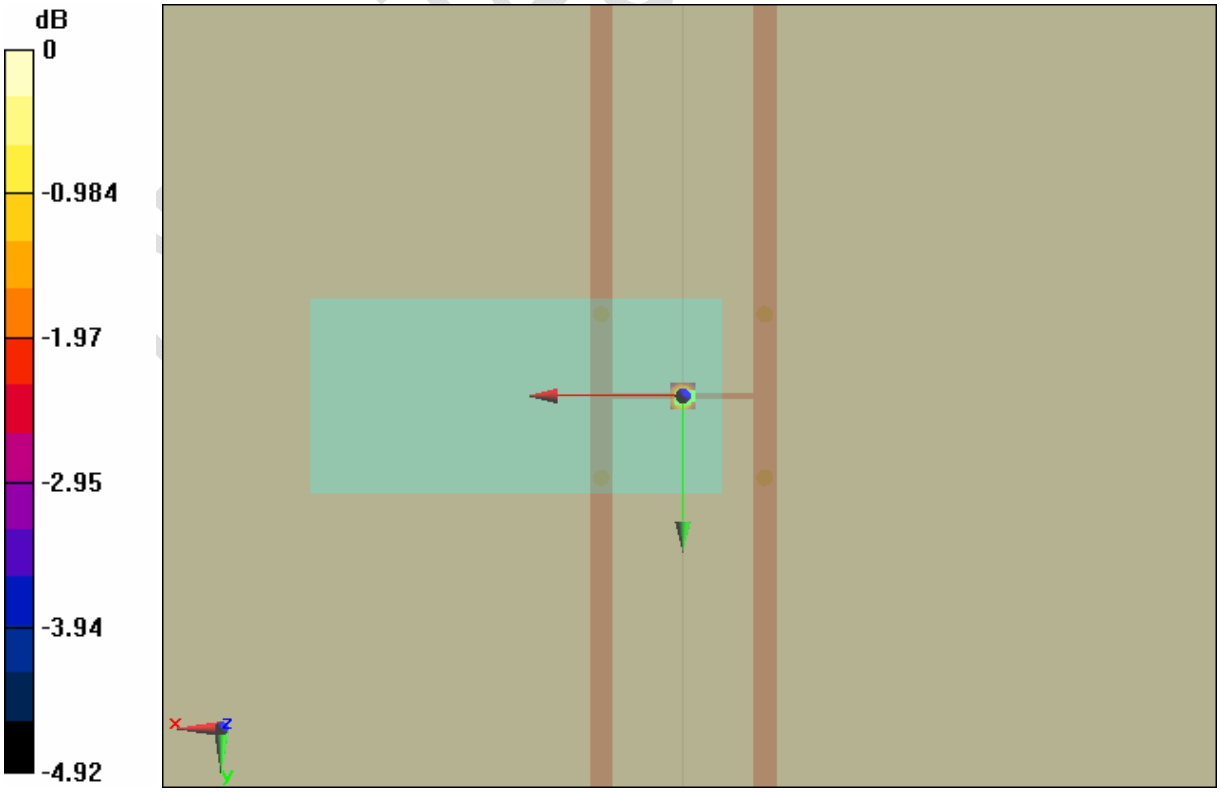
Scans Middle/z (axial) fine 2mm 8 x 8/ABM Interpolated SNR(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
ABM1/ABM2 = 32.1 dB
ABM1 comp = 2 dB A/m
BWC Factor = 0.158027 dB
Location: -0.8, 1, 3.7 mm

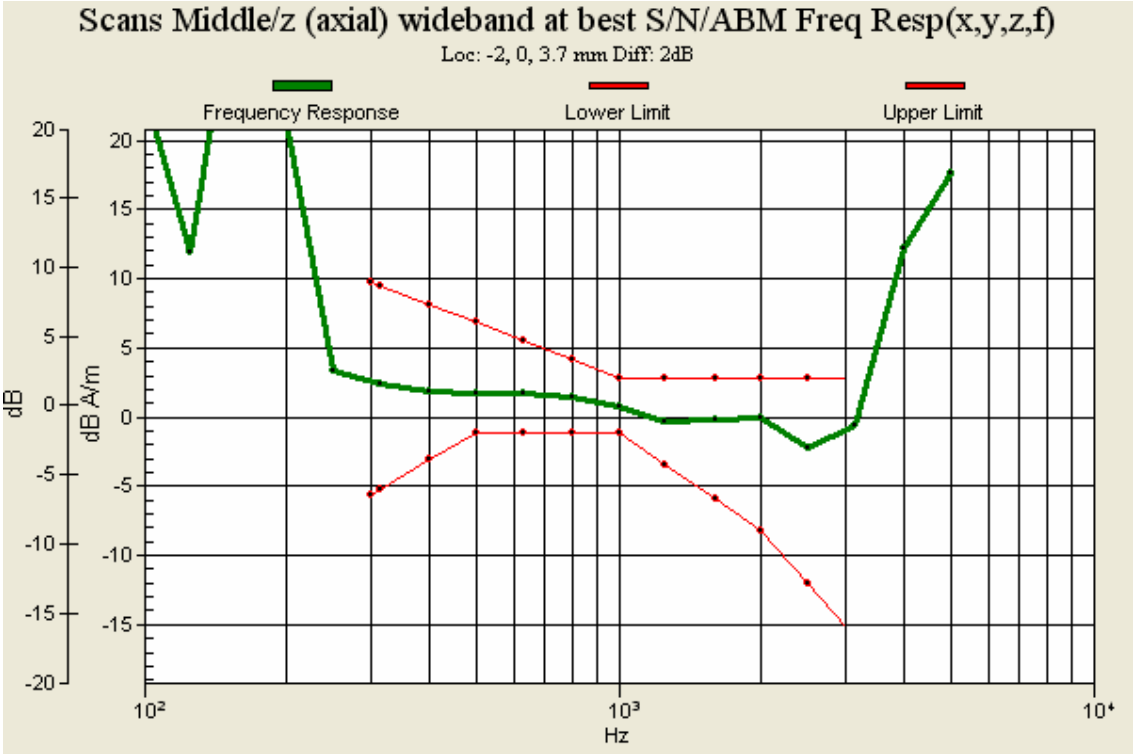
Scans Middle/z (axial) fine 2mm 8 x 8/ABM Interpolated Signal(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm
Cursor:
ABM1 = 2.29 dB A/m
BWC Factor = 0.158027 dB
Location: 0.6, 0.8, 3.7 mm

Scans Middle/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 73.95
Measure Window Start: 0ms
Measure Window Length: 2000ms
BWC applied: 10.8 dB
Device Reference Point: 0, 0, -6.3 mm
Cursor:
Diff = 2 dB
BWC Factor = 10.8 dB
Location: -2, 0, 3.7 mm



0 dB = 40.1



B.16 PCS1900 high channel, x axis

Test Laboratory: CTTL

HAC_TCoil_1900_High_x

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans High/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated SNR(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

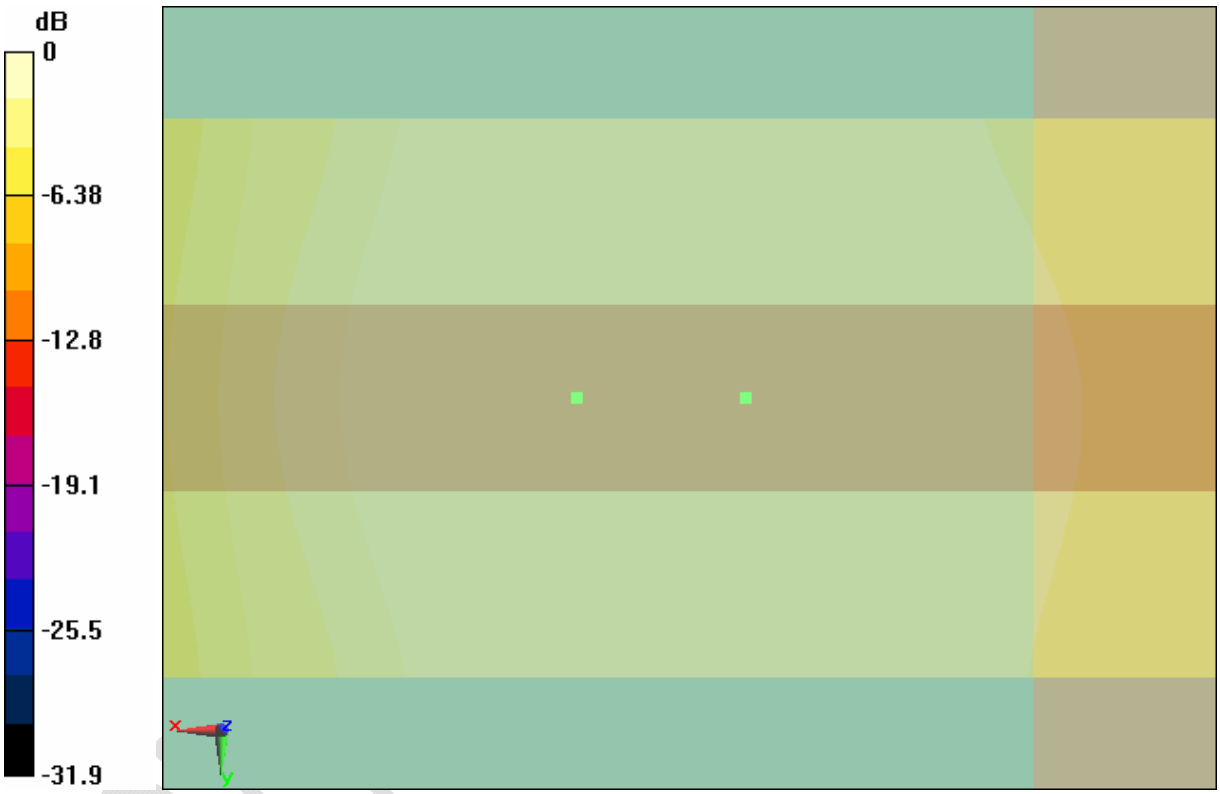
Cursor:
ABM1/ABM2 = 26 dB
ABM1 comp = -5.56 dB A/m
BWC Factor = 0.158027 dB
Location: -8.9, 0, 3.7 mm

Scans High/x (longitudinal) fine 3mm 42 x 6/ABM Interpolated Signal(x,y,z) (141x21x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.38 dB A/m
BWC Factor = 0.158027 dB
Location: -7.1, 0, 3.7 mm



0 dB = 20

B.17 PCS1900 high channel, y axis

Test Laboratory: CTTL

HAC_TCoil_1900_High_y

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans High/y (transversal) fine 3mm 6 x 42/ABM Interpolated SNR(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

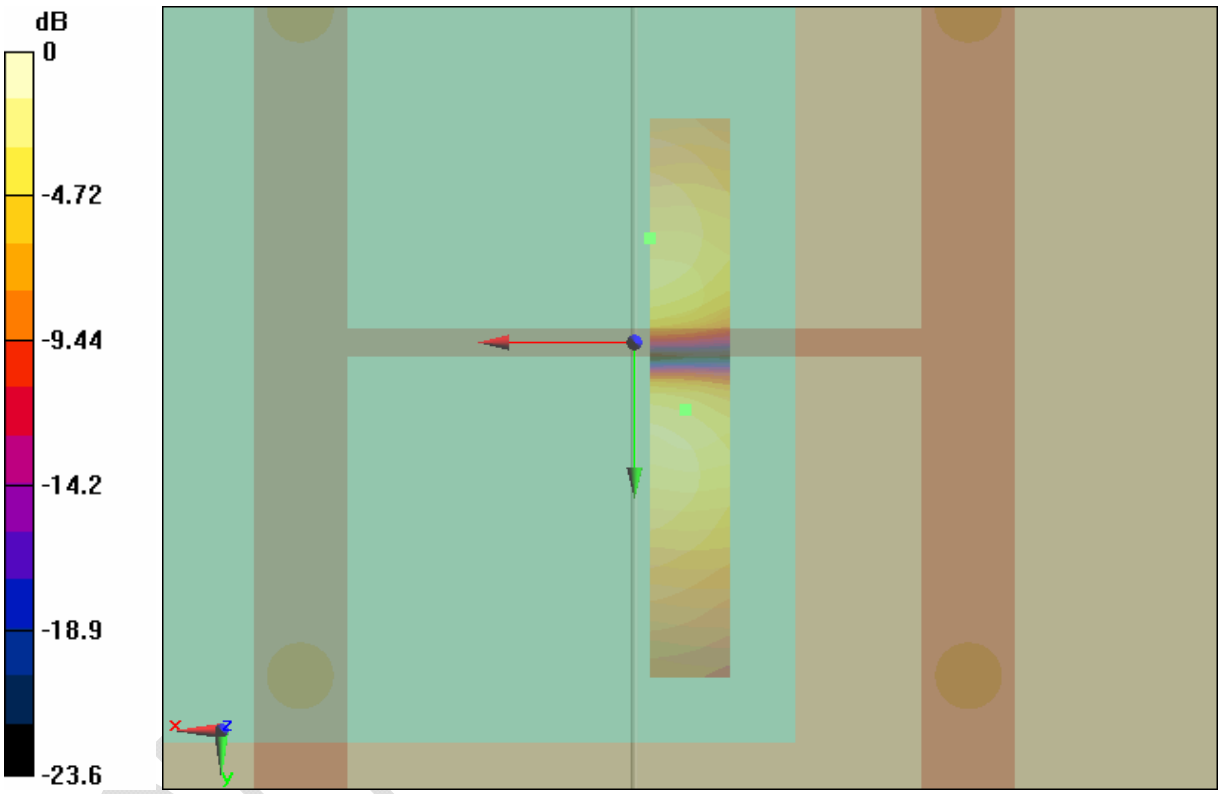
Cursor:
ABM1/ABM2 = 39.2 dB
ABM1 comp = -10.3 dB A/m
BWC Factor = 0.158027 dB
Location: -3.9, 5.1, 3.7 mm

Scans High/y (transversal) fine 3mm 6 x 42/ABM Interpolated Signal(x,y,z) (21x141x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 = -5.91 dB A/m
BWC Factor = 0.158027 dB
Location: -1.2, -7.8, 3.7 mm



0 dB = 90.9

B.18 PCS1900 high channel, z axis

Test Laboratory: CTTL

HAC_TCoil_1900_High_z

DUT: SONIM XP 3300-A; Type: SONIM XP 3300-A; Serial: --

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: σ = 0 mho/m, ε_r = 1; ρ = 1 kg/m^3
Phantom section: TCoil Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY4 Configuration:

- Probe: AM1DV2 - 1065; ; Calibrated: 2010-5-25
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn797; Calibrated: 2009-11-26
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: --
- Measurement SW: DASY5, V5.0 Build 119; SEMCAD X Version 13.2 Build 87

Scans High/z (axial) fine 2mm 8 x 8/ABM Interpolated SNR(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:
ABM1/ABM2 = 31.6 dB
ABM1 comp = 1.81 dB A/m
BWC Factor = 0.158027 dB
Location: -1.4, 1, 3.7 mm

Scans High/z (axial) fine 2mm 8 x 8/ABM Interpolated Signal(x,y,z) (41x41x1):
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 37.76

Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.158027 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

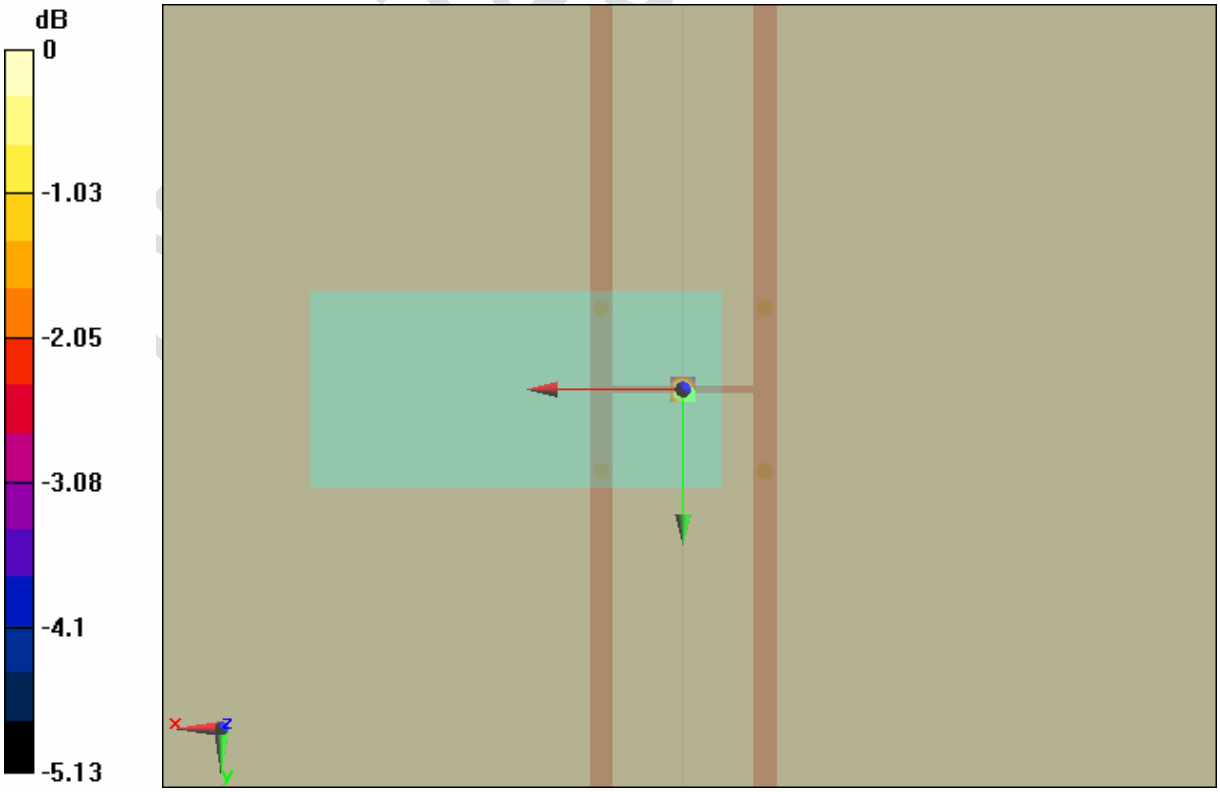
ABM1 = 2.24 dB A/m
BWC Factor = 0.158027 dB
Location: 0.8, 0.8, 3.7 mm

Scans High/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):

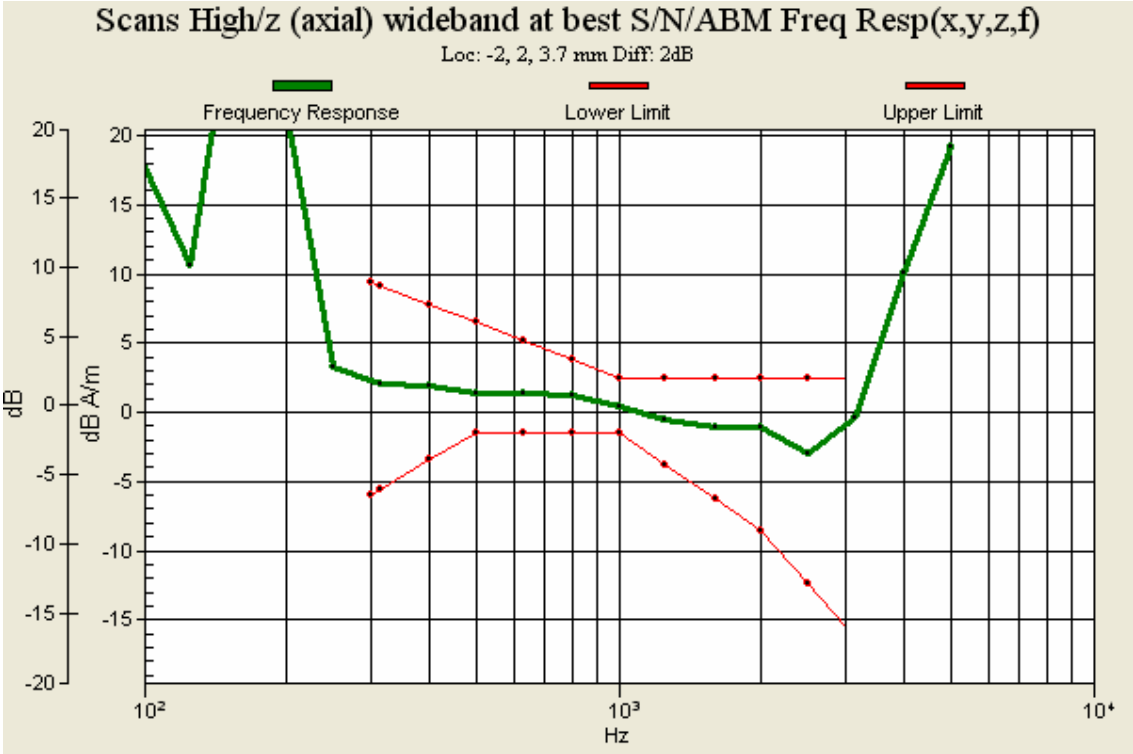
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 73.95
Measure Window Start: 0ms
Measure Window Length: 2000ms
BWC applied: 10.8 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

Diff = 2 dB
BWC Factor = 10.8 dB
Location: -2, 2, 3.7 mm



0 dB = 37.9


Scans High/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f)
Loc: -2, 2, 3.7 mm Diff: 2dB
Frequency Response
Lower Limit
Upper Limit
dB
dB A/m
Hz
20
15
10
5
0
-5
-10
-15
-20
10²
10³
10⁴

ANNEX C Probes Calibration Certificates

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

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

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 CTTL

Certificate No: AM1DV2-1065_May10

CALIBRATION CERTIFICATE

Object	AM1DV2 - SN: 1065
Calibration procedure(s)	QA CAL-24.v2 Calibration procedure for AM1D magnetic field probes and TMFS in the audio range
Calibration date:	May 25, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	1-Oct-09 (No: 9055)	Oct-10
Reference Probe AM1DV2	SN: 1008	21-Jan-10 (No. AM1D-1008_Jan10)	Jan-11
DAE4	SN: 781	22-Jan-10 (No. DAE4-781_Jan10)	Jan-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
AMCC	1050	15-Oct-09 (in house check Oct-09)	Oct-10

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	M. Meili
Approved by:	Fin Bomholt	R&D Director	F. Bomholt

Issued: May 25, 2010

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

Certificate No: AM1D-1065_May10 Page 1 of 3

References

[1] ANSI C63.19-2007
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
[2] DASY4 manual, Chapter: Hearing Aid Compatibility (HAC) T-Coil Extension

Description of the AM1D probe

The AM1D Audio Magnetic Field Probe is a fully shielded magnetic field probe for the frequency range from 100 Hz to 20 kHz. The pickup coil is compliant with the dimensional requirements of [1]. The probe includes a symmetric low noise amplifier for the signal available at the shielded 3 pin connector at the side. Power is supplied via the same connector (phantom power supply) and monitored via the LED near the connector. The 7 pin connector at the end of the probe does not carry any signals, but determines the angle of the sensor when mounted on the DAE. The probe supports mechanical detection of the surface.
The single sensor in the probe is arranged in a tilt angle allowing measurement of 3 orthogonal field components when rotating the probe by 120° around its axis. It is aligned with the perpendicular component of the field, if the probe axis is tilted nominally 35.3° above the measurement plane, using the connector rotation and sensor angle stated below.
The probe is fully RF shielded when operated with the matching signal cable (shielded) and allows measurement of audio magnetic fields in the close vicinity of RF emitting wireless devices according to [1] without additional shielding.

Handling of the item

The probe is manufactured from stainless steel. In order to maintain the performance and calibration of the probe, it must not be opened. The probe is designed for operation in air and shall not be exposed to humidity or liquids. For proper operation of the surface detection and emergency stop functions in a DASY system, the probe must be operated with the special probe cup provided (larger diameter).

Methods Applied and Interpretation of Parameters

- *Coordinate System:* The AM1D probe is mounted in the DASY system for operation with a HAC Test Arch phantom with AMCC Helmholtz calibration coil according to [2], with the tip pointing to "southwest" orientation.
- *Functional Test:* The functional test preceding calibration includes test of
  Noise level
  RF immunity (1kHz AM modulated signal). The shield of the probe cable must be well connected.
  Frequency response verification from 100 Hz to 10 kHz.
- *Connector Rotation:* The connector at the end of the probe does not carry any signals and is used for fixation to the DAE only. The probe is operated in the center of the AMCC Helmholtz coil using a 1 kHz magnetic field signal. Its angle is determined from the two minima at nominally +120° and –120° rotation, so the sensor in the tip of the probe is aligned to the vertical plane in z-direction, corresponding to the field maximum in the AMCC Helmholtz calibration coil.
- *Sensor Angle:* The sensor tilting in the vertical plane from the ideal vertical direction is determined from the two minima at nominally +120° and –120°. DASY system uses this angle to align the sensor for radial measurements to the x and y axis in the horizontal plane.
- *Sensitivity:* With the probe sensor aligned to the z-field in the AMCC, the output of the probe is compared to the magnetic field in the AMCC at 1 kHz. The field in the AMCC Helmholtz coil is given by the geometry and the current through the coil, which is monitored on the precision shunt resistor of the coil.

AM1D probe identification and configuration data

Item	**AM1DV2** Audio Magnetic 1D Field Probe
Type No	SP AM1 001 AF
Serial No	**1065**

Overall length	296 mm
Tip diameter	6.0 mm (at the tip)
Sensor offset	3.0 mm (centre of sensor from tip)
Internal Amplifier	40 dB

Manufacturer / Origin	Schmid & Partner Engineering AG, Zurich, Switzerland
Manufacturing date	Nov-2007
Last calibration date	April 23, 2009

Calibration data

Connector rotation angle	(in DASY system)	**309.4** °	+/- 3.6 ° (k=2)
Sensor angle	(in DASY system)	**0.33** °	+/- 0.5 ° (k=2)
Sensitivity at 1 kHz	(in DASY system)	**0.0662 V / (A/m)**	+/- 2.2 % (k=2)

Certificate No: AM1D-1065_May10 Page 3 of 3

ANNEX D Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

The End of this Report