

# HAC TEST REPORT

# < for T-Coil measurement>

HTC Corporation
No.23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan, R.O.C.
Pocket PC Phone
HERO200
2009.05.22
2009.06.12
2009.06.23

Standards:

# ANSI C63.19-2007

#### FCC RULE PART(S): 47 CFR PART 20.19(B) HAC RATE CATEGORY: T3 (T Category)

In the configuration tested, the EUT complied with the standards specified above.

#### Remarks:

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arbert Chang Kicky Muang Tested by : Approved by: **Ricky Huang** Robert Chang Sr. Engineer Tech Manager Date: 2009/06/22 Date: 2009/06/23

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# 1. Introduction

The purpose of the Hearing Aid Compatibility extension is to enable measurements of the near electric and magnetic fields generated by wireless communication devices in the region controlled for use by a hearing aid in accordance with ANSI-C63.19-2007

FCC has granted a request for waiver of the HAC rules in section 20.19 for dual band GSM handsets. The waiver has specific conditions, as stated in the order (FCC 05-166) and expires 1 August 2007.

The purpose of this standard is to establish categories for hearing aids and for WD (wireless communications devices) that can indicate to health care practitioners and hearing aid users which hearing aids are compatible with which WD, and to provide tests that can be used to assess the electromagnetic characteristics of hearing aids and WD and assign them to these categories. The various parameters required, in order to demonstrate compatibility and accessibility are measured. The design of the standard is such that when a hearing aid and WD achieve one of the categories specified, as measured by the methodology of this standard, the indicated performance is realized.

In order to provide for the usability of a hearing aid with a WD, several factors must be coordinated:

- a) Radio frequency (RF) measurements of the near-field electric and magnetic fields emitted by a WD to categorize these emissions for correlation with the RF immunity of a hearing aid.
- b) Magnetic field measurements of a WD emitted via the audio transducer associated with the T-coil mode of the hearing aid, for assessment of hearing aid performance.
- c) Measurements with the hearing aid and a simulation of the categorized WD T-coil emissions to assess the hearing aid RF immunity in the T-coil mode.

The WD radio frequency (RF) and audio band emissions are measured.

Hence, the following are measurements made for the WD:

- a) RF E-Field emissions
- b) RF H-Field emissions
- c) T-coil mode, magnetic signal strength in the audio band
- d) T-coil mode, magnetic signal and noise articulation index
- e) T-coil mode, magnetic signal frequency response through the audio band

Corresponding to the WD measurements, the hearing aid is measured for:

a) RF immunity in microphone mode

b) RF immunity in T-coil mode

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# SGS

# 2. Testing Laboratory

Company Name	SGS Taiwan Ltd. Electronics & Communication Laboratory	
Company address	34, Wu Kung Road, Wuku Industrial Zone Taipei county,	
	Taiwan, R.O.C.	
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Fax	+886-2-2298-0488	
Website	http://www.tw.sgs.com	

# 3. Details of Applicant

Applicant Name	HTC Corporation
Applicant Address	No.23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan, R.O.C.
Contact Person	Lois Wu
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Fax	+886-2-89126307
E-mail	lois_wu@htc.com

# 4. Description Of EUT

EUT Type	Pocket PC Phone		
FCC ID	NM8HERO200		
Model Name	HERC	HERO200	
Brand Name	НТ	НТС	
Freq. of Operation	cdma2000/EVDO on C	cdma2000/EVDO on Cellular and PCS band	
MEID Manuf. Code	A1000	A100007	
Definition	Producti	Production unit	
Channel Number (ARFCN)	1013-777	25-1175	
Maximum Output	Cellular US PCS		
Power Setting (dBm)	24.86dbm	24.9dbm	
Duty Cycle	1		

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# 5. Test Environment

Ambient Temperature	22.2° C
Relative Humidity	<60 %

# 6. System Specifications of DASY4

6.1 Measurement system Diagram for SPEAG Robotic

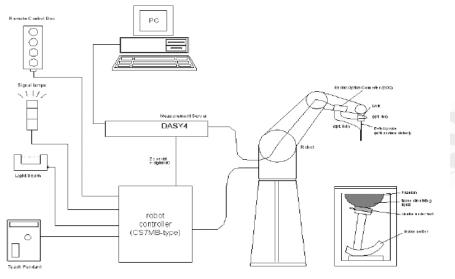


Fig 1. The SPEAG Robotic Diagram

The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A Audio Magnetic probe.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.

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- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The Test Arch SAM phantom
- The device holder for handheld mobile phones.
- Validation dipole kits allowing to validate the proper functioning of the system.

# 6.2 Audio Magnetic Probe AM1DV2

one madie mag		
Description	- Active single sensor probe for both axial	0
	and radial measurement scans	
	- Fully RF shielded, compatible with DAE,	
	with adapted probe cup	14
Dynamic Range	0.1 KHz to 20 KHz	4
Sensitivity	<-50dB A/m @ 1KHz	
Pre-Amp	40dB	
Dimensions	300X18mm	
		AM1DV2 Audio Probe

### 6.3 Test Arch

Description	Enables easy and well defined positioning of	
	the phone and validation dipoles as well as	
	simple teaching of the robot.	
Dimensions	length: 370 mm	
	width: 370 mm	
	height: 370 mm	
	5	Test Arch

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# 6.4 AMCC- Audio Magnetic Calibration Coil

Description	Allows calibration of the complete	
	measurement setup, The two horizontal	
	coils create a homogeneous magnetic field	AMCC
	in the z direction. Refer to Appendix 5 for	
	more detail on AMCC coil	
		AMCC

# 6.5 Phone Holder

Description	Supports accurate and reliable positioning of any phone Effect on near field <+/- 0.5 dB	
		Phone Holder

# 6.6 AMMI - Audio Magnetic Measurement Instrument

Description	-USB interface to PC - Probe signal digitization and power supply - Test signal generation for wireless device (via base station simulator) - Auto-calibration and interfaces to AMCC	
	for complete setup-calibration	AMMI
Data Rate	48 KHz / 24bit	
Dynamic Range	85 dB	
Dimensions:	19″ X 65 X 270mm	

# 7. Measurement Procedure

The sequence of the measurement is T-Coil testing procedure over a wireless communication device:

1) Confirm Geometry & signal check. Probe phantom alignment and check of accuracy.

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- 2) Background noise measurement in the area of the WD.
- 3) Perform coarse resolution axial scan with narrow band signal. For the three orientation positions, using the optimal ABM1 point from the coarse resolution axial scan, perform fine resolution scans in the area of interest with narrow band signal.
- 4) For the three orientation positions, using the optimal SNR point from corresponding fine resolution area scans, perform point measurement with a narrowband signal – determine ABM1 and SNR. For Axial position, perform point measurement with a broadband signal – determine Frequency Response.
- 5) Speech input level is -18dbm.

# 8. System Verification

An Input Level is measured to verify that it is within +/-0.1dB from the Reference Input Level in section 6.3.2.1 of ANSI PC63.19-2007

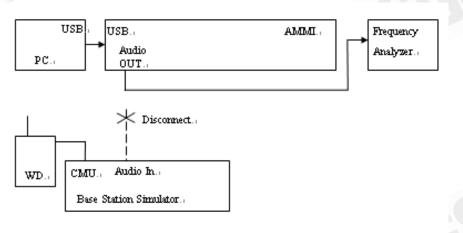


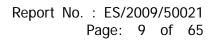
Figure 2: Signal Verification Setup

"Audio Out" of the AMMI is connected to the Bruel & Kjaar 3560C analyzer. On the analyzer, the "Input User ref" is set to the "OdBmO Input reference" value to account for CMU's inherent offset values. A signal from AMMI is initiated by running the appropriate DASY template. The template includes both broadband and narrowband signals. The signal is captured on the analyzer. The value from the analyzer is compared to the target given in 6.3.2.1 of ANSI PC63.19-2007. If it is not within +/-0.1dB, the gains setting in the DASY

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template are adjusted.

Signal Verification has been conducted on the same days as DUT measurements.

# 9. Test Standards and Limits

The measurements were performed to ensure compliance to the ANSI PC63.19-2007 standard.

The limit values please follow in Table2

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	

#### Table 2: Signal Quality Range

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# 10. Instruments List

Manufacturer	Device	Туре	Serial Number	Date Of Last Calibration
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE4 547 Jan.20.24		Jan.20.2009
Schmid & Partner Engineering AG	Software	DASY 4 V4.7 Build 80	N/A	Calibration isn't necessary
Schmid & Partner Engineering AG	Audio Magnetic 1D Field Probe	AM1DV2	1030	Apr.23.2009
Schmid & Partner Engineering AG	ammi se ums	010 AB	1028	Calibration isn't necessary
Schmid & Partner Engineering AG	AMCC SD HAC	P01 BA	1026	N/A
Schmid & Partner Engineering AG	Test Arch SD HAC	P01	1047	N/A
R&S	Radio Communication Test	CMU200	113505	Sep.03.2008

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# 11. Summary of Results

#### **Cellular Band:**

••••••							
Probe	Frequency Band	Channel	Conducted Output Power	Ambient Noise	ABM1	SNR	T-coil SNR
Position	(MHz)		(dBm)	(dB A/m)	(dB A/m)	(dB)	Rating
		1013	24.58	-40.42	-3.75	36.7	T4
Axial	Cellular	384	24.86	-39.36	-3.36	36	T4
		777	24.71	-40.95	-3.80	37.1	Τ4
		1013	24.58	-33.04	-5.90	28.2	Т3
Radial 1	Cellular	384	24.86	-28.17	-5.95	27.5	Т3
		777	24.71	-30.75	-6.38	28	Т3
		1013	24.58	-39.31	-6.73	42.6	T4
Radial 2	Cellular	384	24.86	-39.74	-6.35	41.9	T4
		777	24.71	-40.31	-6.59	41.3	Τ4
US PC	S Band:						
Probe	Frequency		Conducted	Ambient	ABM1	SNR	T-coil
Position	Band	Channel	Output Power	Noise	(dB A/m)	(dB)	SNR
1 USITION	(MHz)		(dBm)	(dB A/m)		(UD)	Rating
		25	24.41	-29.61	1.87	31.5	Τ4
Axial	US PCS	600	24.8	-29.75	3.26	33	T4
		1175	24.9	-29.71	1.53	31.2	T4
		25	24.41	-29.95	-6.85	29.6	Т3
Radial 1	US PCS	600	24.8	-35.21	-7.90	28.7	Т3
		1175	24.9	-33.26	-6.81	27.7	Т3
		25	24.41	-43.17	-7.80	39.8	T4
Radial 2	US PCS	600	24.8	-44.05	-7.42	40.3	T4

Note: The ABM1, SNR and T-coil Rating results are shown in Section 11. The delta between Ambient Noise measurement and ABM2 measurement should be greater than 10dB. However, in cases where ABM2 is very low, it is suitable for the delta to be less than 10 dB. For the three probe positions, noise spectrum plots for the highest ambient noise, indicated with bold numbers.

-39.4

--8.15

41

Τ4

24.9

1175

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# 12. Measurement Data

Date/Time: 2009/6/12 01:32:45

# T-Coil\_Cellular\_CH1013

### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 824.7 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\varepsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

**DASY4** Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Scans/z (axial) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = 2.66 dB A/mBWC Factor = 0.158027 dBLocation: 0, 0, 363.7 mm

### Scans/z (axial) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms

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Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = -0.192 dB A/m BWC Factor = 0.158027 dBLocation: 4.3, -2, 363.7 mm

# Scans/z (axial) wideband at best S/N/ABM Signal(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k voice 300-3000 2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = -3.75 dB A/m BWC Factor = 10.8 dB Location: 8.3, -2, 363.7 mm

### Scans/z (axial) wideband at best S/N/ABM SNR(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 36.7 dBABM1 comp = -3.75 dB A/m BWC Factor = 10.8 dB Location: 8.3, -2, 363.7 mm

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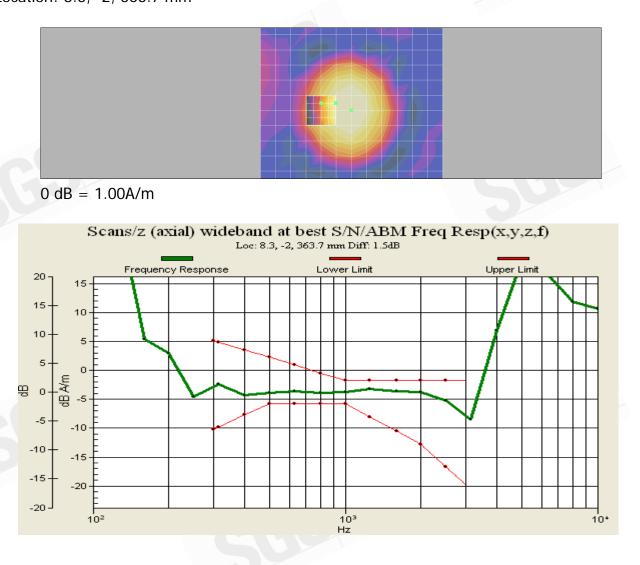
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# Scans/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: Diff = 1.50 dBBWC Factor = 10.8 dB Location: 8.3, -2, 363.7 mm



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# T-Coil\_Cellular\_CH1013

#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 824.7 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

**DASY4** Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

# Scans/x (longitudinal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -7.07 dB A/m BWC Factor = 0.158027 dBLocation: 8.3, 0, 363.7 mm

### Scans/x (longitudinal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor:

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ABM1 comp = -5.90 dB A/m BWC Factor = 0.158027 dB Location: -8.5, 4, 363.7 mm

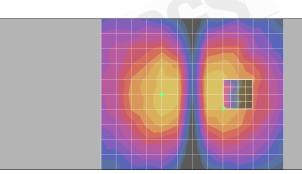
# Scans/x (longitudinal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 28.2 dB ABM1 comp = -5.90 dB A/m BWC Factor = 0.158027 dB Location: -8.5, 4, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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# T-Coil\_Cellular\_CH1013

#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 824.7 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

**DASY4** Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

# Scans/y (transversal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -6.86 dB A/mBWC Factor = 0.158027 dBLocation: 0, 8.3, 363.7 mm

### Scans/y (transversal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k voice 1kHz 1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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#### Cursor:

ABM1 comp = -6.73 dB A/m BWC Factor = 0.158027 dBLocation: -0.2, -6.3, 363.7 mm

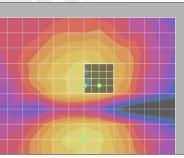
# Scans/y (transversal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 42.6 dBABM1 comp = -7.85 dB A/m BWC Factor = 0.158027 dBLocation: -4.2, -6.3, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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Date/Time: 2009/6/12 02:59:39

# T-Coil\_Cellular\_CH384

#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 836.52 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

# Scans/z (axial) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = 1.63 dB A/m BWC Factor = 0.158027 dB Location: 0, 0, 363.7 mm

#### Scans/z (axial) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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#### Cursor:

ABM1 comp = 0.566 dB A/mBWC Factor = 0.158027 dB Location: 4.3, 0, 363.7 mm

# Scans/z (axial) wideband at best S/N/ABM Signal(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = -3.36 dB A/m BWC Factor = 10.8 dB Location: 8.4, 0, 363.7 mm

### Scans/z (axial) wideband at best S/N/ABM SNR(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 36.0 dBABM1 comp = -3.36 dB A/m BWC Factor = 10.8 dB Location: 8.4, 0, 363.7 mm

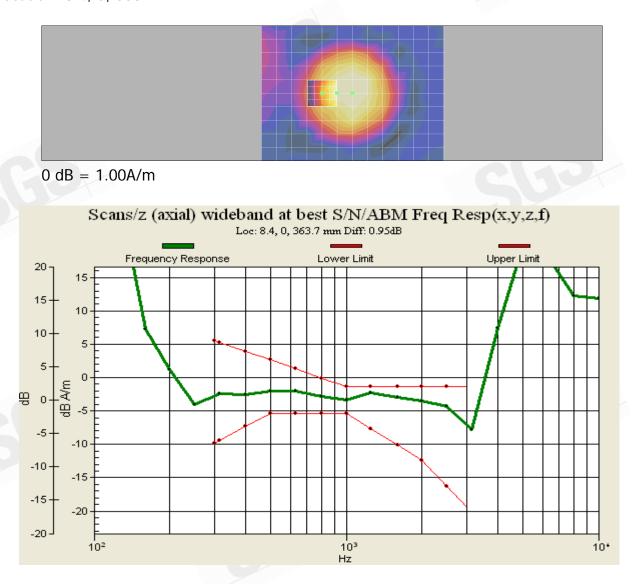
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# Scans/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: Diff = 0.954 dBBWC Factor = 10.8 dB Location: 8.4, 0, 363.7 mm



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#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 836.52 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Scans/x (longitudinal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -5.90 dB A/m BWC Factor = 0.158027 dB Location: -8.3, 0, 363.7 mm

### Scans/x (longitudinal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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#### Cursor:

ABM1 comp = -5.95 dB A/m BWC Factor = 0.158027 dBLocation: -6.3, -4, 363.7 mm

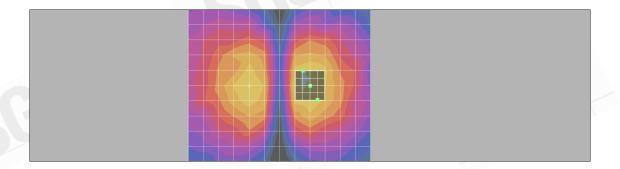
# Scans/x (longitudinal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 27.5 dBABM1 comp = -7.40 dB A/m BWC Factor = 0.158027 dBLocation: -10.3, 4, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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# T-Coil\_Cellular\_CH384

#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 836.52 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\varepsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

**DASY4** Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

# Scans/y (transversal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -6.48 dB A/mBWC Factor = 0.158027 dB Location: 0, -8.3, 363.7 mm

#### Scans/y (transversal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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#### Cursor:

ABM1 comp = -6.35 dB A/m BWC Factor = 0.158027 dBLocation: -0.2, -8.3, 363.7 mm

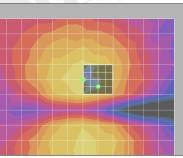
# Scans/y (transversal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

	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	

#### Cursor:

ABM1/ABM2 = 41.9 dBABM1 comp = -8.37 dB A/m BWC Factor = 0.158027 dBLocation: -4.2, -6.3, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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Date/Time: 2009/6/12 04:06:38

# T-Coil\_Cellular\_CH777

#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 848.31 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\varepsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

#### **DASY4** Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Scans/z (axial) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.159988 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### **Cursor**:

ABM1 comp = 1.75 dB A/m BWC Factor = 0.159988 dB Location: 0, 4.2, 363.7 mm

### Scans/z (axial) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.159988 dB

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Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = -0.754 dB A/m BWC Factor = 0.159988 dB Location: 4.3, 0, 363.7 mm

# Scans/z (axial) wideband at best S/N/ABM Signal(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = -3.80 dB A/mBWC Factor = 10.8 dB Location: 8.3, -2, 363.7 mm

# Scans/z (axial) wideband at best S/N/ABM SNR(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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

#### Cursor:

ABM1/ABM2 = 37.1 dBABM1 comp = -3.80 dB A/mBWC Factor = 10.8 dB Location: 8.3, -2, 363.7 mm

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

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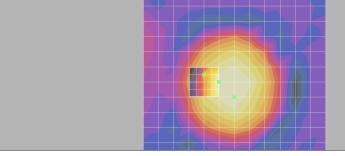
> 台灣檢驗科技股份有限公司 t (886-2) 2299-3279

No.134. Wu Kung Road. Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號

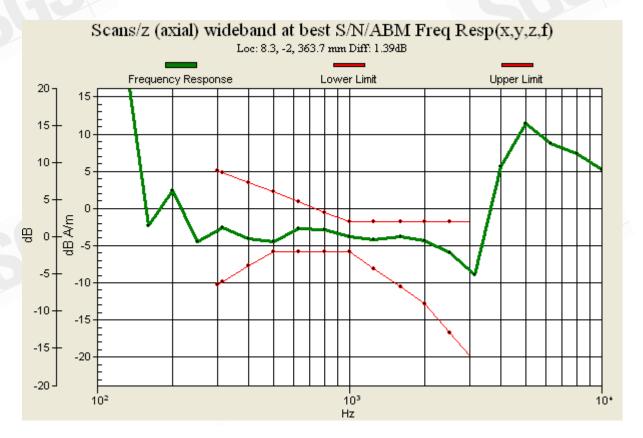
f (886-2) 2298-0488



Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: Diff = 1.39 dBBWC Factor = 10.8 dB Location: 8.3, -2, 363.7 mm



 $0 \, dB = 1.00 \, A/m$ 



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#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 848.31 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Scans/x (longitudinal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.159988 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -6.38 dB A/m BWC Factor = 0.159988 dB Location: -8.3, 0, 363.7 mm

### Scans/x (longitudinal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.159988 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -6.38 dB A/m BWC Factor = 0.159988 dB Location: -8.3, 4.2, 363.7 mm

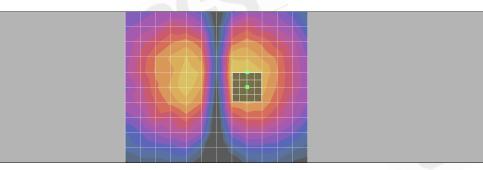
# Scans/x (longitudinal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.159988 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 28.0 dBABM1 comp = -6.38 dB A/m BWC Factor = 0.159988 dB Location: -8.3, 4.2, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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#### DUT: HERO200;

Communication System: CDMA\_850; Frequency: 848.31 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Scans/y (transversal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.159988 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -7.25 dB A/m BWC Factor = 0.159988 dB Location: 0, -8.3, 363.7 mm

#### Scans/y (transversal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.159988 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -6.59 dB A/m BWC Factor = 0.159988 dB Location: -0.2, -6.3, 363.7 mm

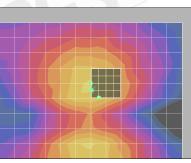
# Scans/y (transversal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.159988 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 41.3 dB ABM1 comp = -8.05 dB A/m BWC Factor = 0.159988 dB Location: -2.2, -4.3, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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Date/Time: 2009/6/12 05:39:17

# T-Coil\_US PCS\_CH25

#### DUT: HERO200;

Communication System: CDMA2000; Frequency: 1851.25 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\varepsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

#### **DASY4** Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Scans/z (axial) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### **Cursor**:

ABM1 comp = -0.632 dB A/m BWC Factor = 0.158027 dB Location: 0, 4.2, 363.7 mm

### Scans/z (axial) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB

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Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = 1.05 dB A/mBWC Factor = 0.158027 dB Location: 0.2, 2, 363.7 mm

# Scans/z (axial) wideband at best S/N/ABM Signal(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = 1.87 dB A/mBWC Factor = 10.8 dB Location: 2.2, 0, 363.7 mm

# Scans/z (axial) wideband at best S/N/ABM SNR(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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	

#### Cursor:

ABM1/ABM2 = 31.5 dBABM1 comp = 1.87 dB A/mBWC Factor = 10.8 dB Location: 2.2, 0, 363.7 mm

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

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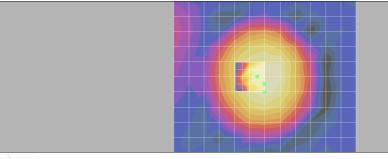
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> 台灣檢驗科技股份有限公司 t (886-2) 2299-3279

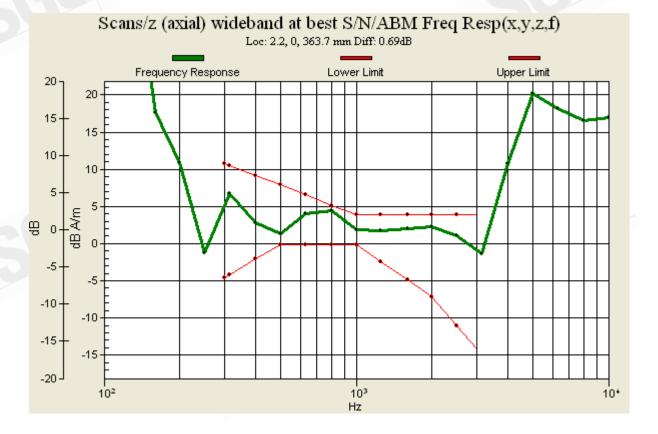
No.134. Wu Kung Road. Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 f (886-2) 2298-0488 www.tw.sgs.com



Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: Diff = 0.691 dBBWC Factor = 10.8 dB Location: 2.2, 0, 363.7 mm



 $0 \, dB = 1.00 \, A/m$ 



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No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 f (886-2) 2298-0488 t (886-2) 2299-3279



#### DUT: HERO200;

Communication System: CDMA2000; Frequency: 1851.25 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Scans/x (longitudinal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -7.85 dB A/m BWC Factor = 0.158027 dB Location: -8.3, 0, 363.7 mm

### Scans/x (longitudinal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -6.85 dB A/m BWC Factor = 0.158027 dBLocation: -10.3, -2, 363.7 mm

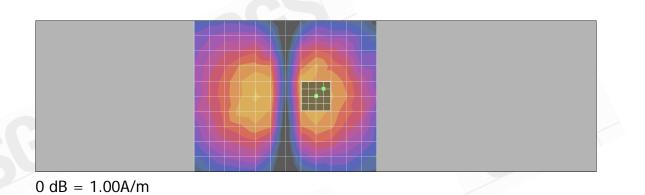
# Scans/x (longitudinal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 29.6 dBABM1 comp = -6.85 dB A/m BWC Factor = 0.158027 dB Location: -10.3, -2, 363.7 mm



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Communication System: CDMA2000; Frequency: 1851.25 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

#### Scans/y (transversal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -8.24 dB A/m BWC Factor = 0.158027 dB Location: 0, -8.3, 363.7 mm

#### Scans/y (transversal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -7.80 dB A/m BWC Factor = 0.158027 dBLocation: -0.2, -6.3, 363.7 mm

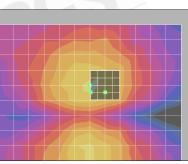
# Scans/y (transversal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 39.8 dBABM1 comp = -9.83 dB A/m BWC Factor = 0.158027 dB Location: -4.2, -6.3, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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Date/Time: 2009/6/12 07:21:20

# T-Coil\_US PCS\_CH600

#### DUT: HERO200;

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\varepsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

**DASY4** Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

# Scans/z (axial) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -0.382 dB A/m BWC Factor = 0.158027 dB Location: 0, 0, 363.7 mm

#### Scans/z (axial) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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#### Cursor:

ABM1 comp = 1.14 dB A/mBWC Factor = 0.158027 dB Location: 0.2, -2, 363.7 mm

## Scans/z (axial) wideband at best S/N/ABM Signal(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = 3.26 dB A/mBWC Factor = 10.8 dB Location: 2.2, -2, 363.7 mm

#### Scans/z (axial) wideband at best S/N/ABM SNR(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 33.0 dBABM1 comp = 3.26 dB A/mBWC Factor = 10.8 dB Location: 2.2, -2, 363.7 mm

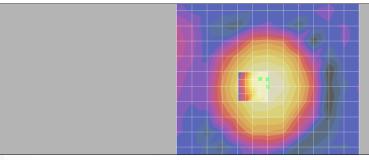
#### Scans/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

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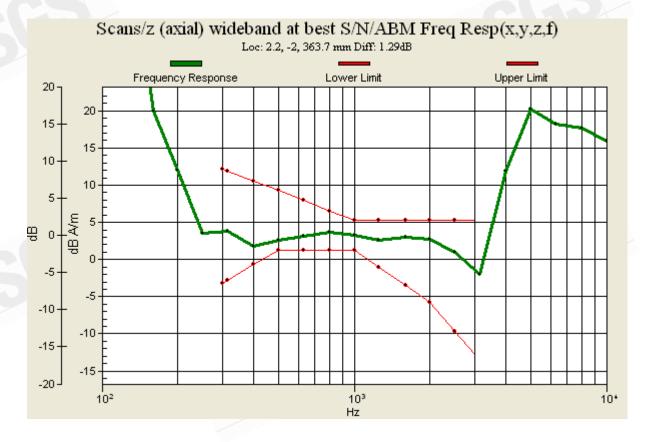
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Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: Diff = 1.29 dBBWC Factor = 10.8 dB Location: 2.2, -2, 363.7 mm



 $0 \, dB = 1.00 \, A/m$ 



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No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 Faiwan Ltd. t (886-2) 2299-3279 f (886-2) 2298-0488 www.tw.sgs.com



Communication System: CDMA2000; Frequency: 1880 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

#### Scans/x (longitudinal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -7.23 dB A/m BWC Factor = 0.158027 dB Location: -8.3, 0, 363.7 mm

#### Scans/x (longitudinal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -7.90 dB A/m BWC Factor = 0.158027 dB Location: -8.5, -0.2, 363.7 mm

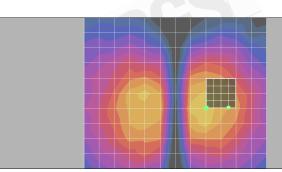
# Scans/x (longitudinal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

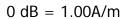
Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 28.7 dB ABM1 comp = -10.2 dB A/m BWC Factor = 0.158027 dB Location: -14.5, -0.2, 363.7 mm





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Communication System: CDMA2000; Frequency: 1880 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

#### Scans/y (transversal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -8.36 dB A/m BWC Factor = 0.158027 dB Location: 0, 8.3, 363.7 mm

#### Scans/y (transversal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -7.42 dB A/m BWC Factor = 0.158027 dBLocation: -0.2, -8.3, 363.7 mm

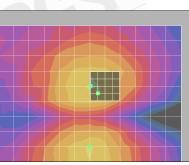
# Scans/y (transversal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 40.3 dBABM1 comp = -8.32 dB A/m BWC Factor = 0.158027 dB Location: -2.2, -6.3, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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Date/Time: 2009/6/12 09:11:34

# T-Coil\_US PCS\_CH1175

#### DUT: HERO200;

Communication System: CDMA2000; Frequency: 1908.75 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

# Scans/z (axial) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = 1.66 dB A/m BWC Factor = 0.158027 dB Location: 0, 0, 363.7 mm

#### Scans/z (axial) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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#### Cursor:

ABM1 comp = 0.993 dB A/m BWC Factor = 0.158027 dB Location: 0, 2, 363.7 mm

# Scans/z (axial) wideband at best S/N/ABM Signal(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mmSignal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm Cursor: ABM1 comp = 1.53 dB A/m BWC Factor = 10.8 dB

Location: 4, 2, 363.7 mm

### Scans/z (axial) wideband at best S/N/ABM SNR(x,y,z) (1x1x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 31.2 dBABM1 comp = 1.53 dB A/mBWC Factor = 10.8 dB Location: 4, 2, 363.7 mm

#### Scans/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

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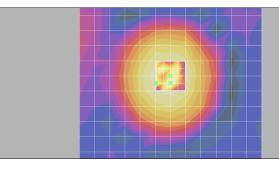
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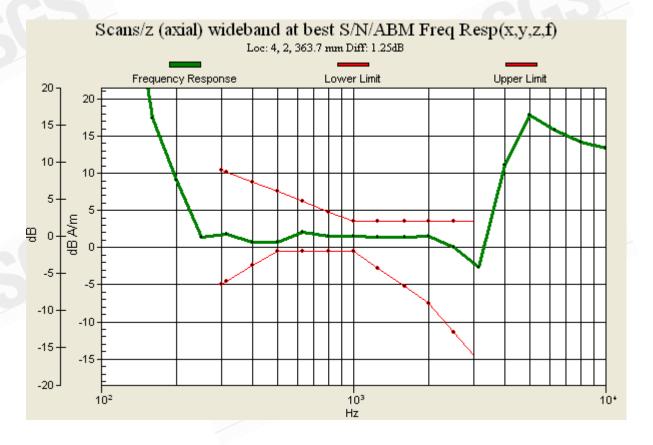
No.134. Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan /台北縣五股工業區五工路 134 號 f (886-2) 2298-0488



Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 63.613 Measure Window Start: Oms Measure Window Length: 2000ms BWC applied: 10.8 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor**: Diff = 1.25 dBBWC Factor = 10.8 dB Location: 4, 2, 363.7 mm



 $0 \, dB = 1.00 \, A/m$ 



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Communication System: CDMA2000; Frequency: 1908.75 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

DASY4 Configuration:

- Probe: AM1DV2 1030; ; Calibrated: 2009/4/23
- Sensor-Surface: 0mm (Fix Surface)
- Electronics: DAE4 Sn547; Calibrated: 2009/1/20
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

#### Scans/x (longitudinal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -8.11 dB A/m BWC Factor = 0.158027 dB Location: -8.3, 0, 363.7 mm

#### Scans/x (longitudinal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -6.81 dB A/m BWC Factor = 0.158027 dB Location: -8.5, 0.2, 363.7 mm

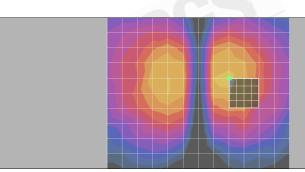
# Scans/x (longitudinal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

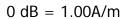
Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 27.7 dB ABM1 comp = -6.81 dB A/m BWC Factor = 0.158027 dB Location: -8.5, 0.2, 363.7 mm





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Communication System: CDMA2000; Frequency: 1908.75 MHz;Duty Cycle: 1:1 Medium: Air Medium parameters used:  $\sigma = 0$  mho/m,  $\epsilon_r = 1$ ;  $\rho = 1$  kg/m<sup>3</sup> Phantom section: AMB with Coil Section

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- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 100x
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

#### Scans/y (transversal) 4.2mm 50 x 50/ABM Signal(x,y,z) (13x13x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

#### Cursor:

ABM1 comp = -7.35 dB A/m BWC Factor = 0.158027 dB Location: 0, -8.3, 363.7 mm

#### Scans/y (transversal) fine 2mm 8 x 8/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm **Cursor:** 

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ABM1 comp = -8.15 dB A/m BWC Factor = 0.158027 dBLocation: 0, -6.3, 363.7 mm

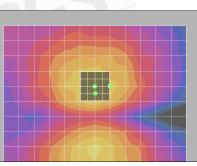
# Scans/y (transversal) fine 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 32.4816 Measure Window Start: Oms Measure Window Length: 1000ms BWC applied: 0.158027 dB Device Reference Point: 0.000, 0.000, 353.7 mm

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			

#### Cursor:

ABM1/ABM2 = 41.0 dBABM1 comp = -9.08 dB A/mBWC Factor = 0.158027 dB Location: -4, -8.3, 363.7 mm



#### $0 \, dB = 1.00 \, A/m$

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Report No. : ES/2009/50021 Page: 54 of 65

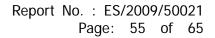
# SGS 13. Probe Calibration certificate

Schmid & Partner Engineering AG Reughausstrasse 43, 8004 Zurich,	of Switzerland	ICC MRA	S Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servico svizzero di taratura S Swiss Calibration Service
Accredited by the Swiss Accreditation The Swiss Accreditation Service i Multilateral Agreement for the rec	s one of the signatories	to the EA	ation No.: SCS 108
Client SGS (Auden)		Certifica	te No: DAE4-547_Jan09
CALIBRATION C			
Object	DAE4 - SD 000 D	04 BJ - SN: 547	
Calibration procedure(s)	QA CAL-06.v12 Calibration proceed	lure for the data acquisition	electronics (DAE)
Calibration date:	January 19, 2009		
Condition of the calibrated item	In Tolerance		
The measurements and the uncertain	ainties with confidence pro	nal standards, which realize the physic obability are given on the following pag facility: environment temperature (22	es and are part of the certificate.
The measurements and the uncertain	ainties with confidence pro	obability are given on the following pag	es and are part of the certificate. ± 3)°C and humidity < 70%.
The measurements and the uncerta All calibrations have been conducte Calibration Equipment used (M&TE Primary Standards	ainties with confidence pro- ed in the closed laboratory critical for calibration)	bability are given on the following pag facility: environment temperature (22 Cal Date (Certificate No.)	es and are part of the certificate. ± 3)°C and humidity < 70%. Scheduled Calibration
The measurements and the uncerta All calibrations have been conducte Calibration Equipment used (M&TE	ainties with confidence pro- ed in the closed laboratory critical for calibration)	obability are given on the following pag	es and are part of the certificate. ± 3)°C and humidity < 70%.
The measurements and the uncert All calibrations have been conducte Calibration Equipment used (M&TE Primary Standards Fluke Process Calibrator Type 702	ainties with confidence provided in the closed laboratory critical for calibration) ID # SN: 6295803	cal Date (Certificate No.) 30-Sep-08 (No: 7673)	es and are part of the certificate. ± 3)°C and humidity < 70%. Scheduled Calibration Sep-09
The measurements and the uncert All calibrations have been conducte Calibration Equipment used (M&TE Primary Standards Fluke Process Calibrator Type 702 Keithley Multimeter Type 2001	ainties with confidence provide in the closed laboratory critical for calibration)	Cal Date (Certificate No.) 30-Sep-08 (No: 7670)	es and are part of the certificate. ± 3)°C and humidity < 70%. <u>Scheduled Calibration</u> Sep-09 Sep-09
The measurements and the uncert All calibrations have been conducte Calibration Equipment used (M&TE Primary Standards Fluke Process Calibrator Type 702 Keithley Multimeter Type 2001 Secondary Standards	ainties with confidence pro- ed in the closed laboratory critical for calibration) ID # SN: 6295803 SN: 0810278 ID # SE UMS 006 AB 1004	Dabeliity are given on the following page         facility: environment temperature (22         Cal Date (Certificate No.)         30-Sep-08 (No: 7673)         30-Sep-08 (No: 7670)         Check Date (in house)         06-Jun-08 (in house check)	es and are part of the certificate. ± 3)*C and humidity < 70%. <u>Scheduled Calibration</u> Sep-09 Sep-09 <u>Scheduled Check</u> In house check: Jun-09
The measurements and the uncert All calibrations have been conducte Calibration Equipment used (M&TE Primary Standards Fluke Process Calibrator Type 702 Keithley Multimeter Type 2001 Secondary Standards	ainties with confidence provide in the closed laboratory critical for calibration)	Cal Date (Certificate No.) 30-Sep-08 (No: 7673) 30-Sep-08 (No: 7670) Check Date (in house)	es and are part of the certificate. ± 3)°C and humidity < 70%. <u>Scheduled Calibration</u> Sep-09 Sep-09 <u>Scheduled Check</u> In house check: Jun-09 Signature
The measurements and the uncerta All calibrations have been conducts Calibration Equipment used (M&TE Primary Standards Fluke Process Calibrator Type 702 Keithley Multimeter Type 2001 Secondary Standards Calibrator Box V1.1	ainties with confidence proved in the closed laboratory critical for calibration)          ID #         SN: 6295803         SN: 0810278         ID #         SE UMS 006 AB 1004	Cal Date (Certificate No.) 30-Sep-08 (No: 7673) 30-Sep-08 (No: 7670) Check Date (in house) 06-Jun-08 (in house check)	es and are part of the certificate. ± 3)°C and humidity < 70%. <u>Scheduled Calibration</u> Sep-09 <u>Scheduled Check</u> In house check: Jun-09 Signature D. Hen.
The measurements and the uncert All calibrations have been conducts Calibration Equipment used (M&TE Primary Standards Fluke Process Calibrator Type 702 Keithley Multimeter Type 2001 Secondary Standards Calibrator Box V1.1	ainties with confidence proved in the closed laboratory critical for calibration)          ID #         SN: 6295803         SN: 0810278         ID #         SE UMS 006 AB 1004	Cal Date (Certificate No.) 30-Sep-08 (No: 7673) 30-Sep-08 (No: 7670) Check Date (in house) 06-Jun-08 (in house check)	es and are part of the certificate. ± 3)°C and humidity < 70%. <u>Scheduled Calibration</u> Sep-09 Sep-09 <u>Scheduled Check</u> In house check: Jun-09 Signature

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

SGS



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

Accreditation No.: SCS 108

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

Certificate No: AM1DV2-1030\_Apr09

Object	AM1DV2 - SN: 1030			
Calibration procedure(s)	QA CAL-24.v2 Calibration procedure for AM1D magnetic field probes and TMFS in the audio range			
Calibration date:	April 23, 2009			
Condition of the calibrated item	In Tolerance			
The measurements and the unce	ertainties with confidenc	national standards, which realize the physical unit re probability are given on the following pages an atory facility: environment temperature $(22 \pm 3)^{\circ}$ C	d are part of the certificate.	
Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	
Keithley Multimeter Type 2001 Reference Probe AM1DV2 DAE4	SN: 0810278 SN: 1008 SN: 781	30-Sep-08 (No: 7670) 12-Jan-09 (No. AM1D-1008_Jan09) 20-Feb-09 (No. DAE4-781_Feb09)	Sep-09 Jan-10 Feb-10	
Secondary Standards	ID #	Check Date (in house)	Scheduled Check	
AMCC	1050	15-Aug-08 (in house check Aug-08)	Aug-09	
Calibrated by:	Name Mike Meili	Function RF Technician	Signature	
Calibrated by: Approved by:		RF Technician	Signature N. V. E. K.	

Certificate No: AM1D-1030\_Apr09

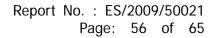
Page 1 of 3

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#### References

SG

- ANSI C63.19-2007 [1]
- 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 The single sensor in the probe is arranged in a till angle allowing measurement of 5 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 to faudio magnetic fields in the close vicinity of RF emitting wireless devices become to faudio 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 5 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.

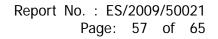
Certificate No: AM1D-1030\_Apr09

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# SGS

#### AM1D probe identification and configuration data

Item	AM1DV2 Audio Magnetic 1D Field Probe	
Type No	SP AM1 001 AE	
Serial No	1030	

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	Jul-2006	
Last calibration date	April 16, 2008	

#### Calibration data

Connector rotation angle	(in DASY system)	251.3 °	+/- 3.6 ° (k=2)
Sensor angle	(in DASY system)	-0.11 °	+/- 0.5 ° (k=2)
Sensitivity at 1 kHz	(in DASY system)	0.0648 V / (A/m)	+/- 2.2 % (k=2)

Certificate No: AM1D-1030\_Apr09

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# **14 Uncertainty Analysis**

Error Description	Uncertainty value [%]	Prob. Dist.	Div.	c ABM1	c ABM2	Std. Unc. ABM1 [%]	Std. Unc. ABM2 [%]
PROBE SENSITIVITY							
Reference level	3.0	N	1.0	1	1	3.0	3.0
AMCC geometry	0.4	R	1.7	1	1	0.2	.0.2
AMCC current	0.6	R	1.7	1	1	0.4	0.4
Probe positioning during calibration	0.1	R	1.7	1	1	0.1	0.1
Noise contribution	0.7	R	1.7	0.0143	1	0.0	0.4
Frequency slope	5.9	R	1.7	0.1	1.0	0.3	3.5
PROBE SYSTEM				1			
Repeatability / Drift	1.0	R	1.7	1	1	0.6	0.0
Linearity / Dynamic range	0.6	R	1.7	1	1	0.4	0.4
Acoustic noise	1.0	R	1.7	0.1	1	0.1	0.0
Probe angle	2.3	R	1.7	1	1	1.4	1.4
Spectral processing	0.9	R	1.7	- 1	1	0.5	0
Integration time	0.6	N	1.0	1	5	0.6	3.0
Field disturbation	0.2	R	1.7	1	1	0.1	0.1
TEST SIGNAL					-		
Reference signal spectral response	0.6	R	1.7	0	1	0.0	0.4
POSITIONING							1
Probe positioning	1.9	R	1.7	1	1	1.1	1.
Phantomthickness	0.9	R	1.7	1	1	0.5	0.,
DUT positioning	1.9	R	1.7	1	1	1.1	1.
EXTERNAL CONTRIBUTIONS							
RF interference	0.0	R	1.7	1	1	0.0	0.0
Test signal variation	2.0	R	1.7	1	1	1.2	1.3
COMBINED UNCERTAINTY		1					
Combined Std. uncertainty (ABM field)						4.1	6.1
Expanded Std. uncertainty [%]						8.1	12.3

Table 18.1 Uncertainty of audio band magnetic measurements

# End of 1<sup>st</sup> part of report

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