

Applicant	Kyocera
FCC ID:	V65SCP-3810
Report #:	CT-V65-20T-0609-R0

Hearing Aid Compatibility (HAC)  
T-Coil

FCC 47 CFR Part 20.19

Test Report

For

Kyocera Corporation  
c/o Kyocera Communication Inc.

Product:	Dual-Band CDMA Phone
Model:	SCP-3810

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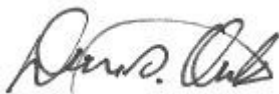
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## ATTESTATION

The tested device complies with the requirements in respect of all parameters subject to the test.  
 The test results and statements relate only to the items tested.  
 The test equipment used was suitable for the tests performed and within manufacturer's published specifications and operating parameters.  
 The test methods were consistent with the methods described in the relevant standards.

<b>Product:</b>	Dual-Band CDMA Cellular Phone with Bluetooth
<b>Model #:</b>	SCP-3180
<b>FCC ID:</b>	V65SCP-3810
<b>Tested in accordance with:</b>	FCC 47 CFR Part 20.19 ANSI C63.19-2007
<b>Test Requested by:</b>	Kyocera Corporation C/o Kyocera Communication Inc 10300 Campus Point Drive, San Diego CA 92121 USA
<b>Test performed by:</b>	Comptest Services LLC
<b>Date of Test:</b>	May 29 – May 29, 2009

### Responsible Engineer




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Don Ouk  
Test Engineer

### Reviewed and approved by:




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Tammy To  
Quality Manager

## 1 SUMMARY OF TESTING

ANSI C63.19 (2007) Section 6 T-coil				
Mode	Test	Test Results	T-Rating	Verdict
CDMA 800	Min. Axial Field Strength, dB A/m	-0.77	--	Pass
	Min. Radial Field Strength, dB A/m	-9.36	--	Pass
	Min. Signal Quality (ABM1/ABM2), dB	46.25	4	Pass
	Frequency Response @ Axial position	--	--	Pass
CDMA 1900	Min. Axial Field Strength, dB A/m	-3.74	--	Pass
	Min. Radial Field Strength, dB A/m	-10.44	--	Pass
	Min. Signal Quality (ABM1/ABM2), dB	45.63	4	Pass
	Frequency Response @ Axial position	--	--	Pass
<b>Overall T-Rating:</b>			<b>T4</b>	
<b>M-Rating*:</b>			<b>M4</b>	
<b>HAC Category Rating:</b>			<b>M4, T4</b>	

\* M-rating obtained from HAC RF report.

## 2 EQUIPMENT UNDER TEST INFORMATION

<b>Product:</b>	CDMA Mobile Phone with Bluetooth		
<b>FCC ID:</b>	V65SCP-3810		
<b>Model Number:</b>	SCP-3810		
<b>EUT Serial Number:</b>	2555		
<b>Type:</b>	[ ] Identical Prototype, [X] Pre-Production, [ ] Production		
<b>Device Category:</b>	Portable		
<b>RF Exposure Environment:</b>	General Population / Uncontrolled		
<b>Antenna:</b>	Internal	<b>Detachable:</b>	No
<b>External Input:</b>	Audio/Digital Data		
<b>Quantity:</b>	Quantity production is planned		
<b>Modes:</b>	800 CDMA	1900 CDMA	2450 BLUETOOTH
<b>TX Frequency (MHz):</b>	824 – 849	1850 - 1910	2402 – 2480
<b>Rated RF Conducted Output Power (dBm)</b>	25.0	24.5	1.0

### 3 TEST CONDITIONS

#### 3.1 Test Facilities

The test sites and measurement facilities used to collect data are located at 10300 Campus Point Drive San Diego, CA 92121, USA

#### 3.2 Ambient Conditions

All tests were performed under the following environmental conditions:	
Ambient Temperature:	23 ± 2 Degrees C
Tissue simulating liquid temperature:	22 ± 1 Degrees C
Relative Humidity (RH):	0% <RH < 80%
Atmospheric Pressure:	101.3kPa + 10 to -5 kPa

#### 3.3 RF characteristics of the test site

All HAC measurements were performed inside a shielded room that provide isolation from external EM fields, with the RF ambient at least 20 dB below the intended measurement limits.

#### 3.4 Ambient Noise of the test site

All HAC measurements were performed inside a shielded room that provide isolation from external EM fields, with the RF ambient at least 20 dB below the intended measurement limits. The test site's ambient magnetic level were determined and found to be at least 10dB below the measurement data ABM2, unless a very low level of AMB2. Measurement of the ambient level was performed for each probe orientation and results are shown in Appendix B.

### 3.5 Test Signal, Frequencies and Output Power

The device supports CDMA2000 in 1X (Phase I, Protocol revision 6) mode only. CDMA2000 1X includes TIA/EIA-95B as a subset and was approved for publishing in July 1999. It provides voice and data capabilities within a standard 1.25 MHz CDMA channel. This RF bandwidth is identical to the legacy IS-95 B system standard.

Peak and Average conducted power were measured to ensure worst case power configuration was tested:

CONFIGURATION (Full Rate)		CONDUCTED POWER (dBm)					
		CDMA 800			CDMA 1900		
		Ch1013	Ch383	Ch777	Ch25	Ch600	Ch1175
SO2	RC1	24.91	24.93	24.64	24.48	24.57	24.45
	RC3	24.89	24.94	24.66	24.48	24.53	24.46
SO3	RC1	24.92	24.95	24.70	24.47	24.53	24.48
	RC3	<b>25.06</b>	<b>25.09</b>	<b>24.80</b>	<b>24.49</b>	<b>24.58</b>	<b>24.38</b>
SO17	RC2	24.45	25.08	24.70	24.48	24.36	24.42
	RC54	24.94	25.04	24.76	24.42	24.51	24.40
SO55	RC1	24.92	24.91	24.62	24.47	24.55	24.44
	RC3	24.97	24.99	24.73	24.48	24.56	24.46
TDSO SO32	RC3 (FCH+SCH)	24.9	24.94	24.68	24.48	24.55	24.46
	RC3 (-SCH)	24.92	24.91	24.66	24.48	24.57	24.46

In all operating modes, the phone was set to rate maximum RF power level and the measurements were performed on low, mid and high channels.

The measurement system measures power drift during HAC testing by comparing E/H-field in the same location at the beginning and at the end of measurement. These records were used to monitor stability of power output during tests. Conducted RF power measurements were also performed before and after each HAC measurements to confirm the output power.

During tests, the EUT was put in in-call mode and controlled by a CDMA simulator to generate the required signal and power:

Protocol:	6 (IS-2000)
Radio Configuration:	3
Power Control:	All Up Bits
Service Option:	3
Vocoder:	8K Enhanced (low)
Data Rate:	Full

### 3.6 EUT Operating Conditions

The EUT was tested with the follow configurations and conditions, if applicable:

- |                                     |  |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | Fully charged standard battery as supplied with the handset          |
| <input checked="" type="checkbox"/> | Open configurations, at ear use position <sup>1</sup>                |
| <input type="checkbox"/>            | Both retracted and extended antenna positions                        |
| <input checked="" type="checkbox"/> | Back-light always ON   |
| <input checked="" type="checkbox"/> | LCD Contrast High  |
| <input type="checkbox"/>            | Simultaneous transmission with Bluetooth transmitter ON <sup>2</sup> |
| <input checked="" type="checkbox"/> | Receiver volume setting at maximum                                   |
| <input checked="" type="checkbox"/> | Microphone muted   |

**Note**

1: This phone has only one configuration for ear usage

2: The Bluetooth transmitter was not enable during tests, since the intended use of the CDMA transmitter does not include support simultaneous operation when held to ear.

## 4 DESCRIPTION OF TEST EQUIPMENT

### 4.1 Test Equipment Used

Below is a list of the calibrated equipment used for the measurements.

*The calibration certificates of Probe and Helmholtz Coil are attached in Appendix A.*

Description	Manufacturer	Model Number	Serial Number	Cal Due Date
Power Meter	Giga-tronics	8541C	1831306	07/16/09
Radio Communication Tester	Rohde & Schwarz	CMU200	101328	04/02/10
Data Acquisition	Speag	DAE4	530	04/15/10
Audio Band Magnetic Probe	Speag	AM1DV2	1045	09/18/09
Audio Band Magnetic Measuring Instrument	Speag	AMMI	1035	N/A
Helmholtz Coil	Speag	AMCC	1001	N/A
Test Arch	Speag	HAC	1015	N/A

## 4.2 T-Coil Measurement System

The measurements were performed with Dasy4 automated near-field scanning system comprised of high precision robot, robot controller, computer, Magnetic probe, probe alignment sensor, non-conductive phone positioner, Test Arch and software extension. Figure 5.2 show the setup and cabling. The overall expanded uncertainty (K=2) of the measurement system is  $\pm 12.3\%$ . The measurement uncertainty budget is given in section 6.



Figure 4.2a T-Coil setup with Helmholtz Coil

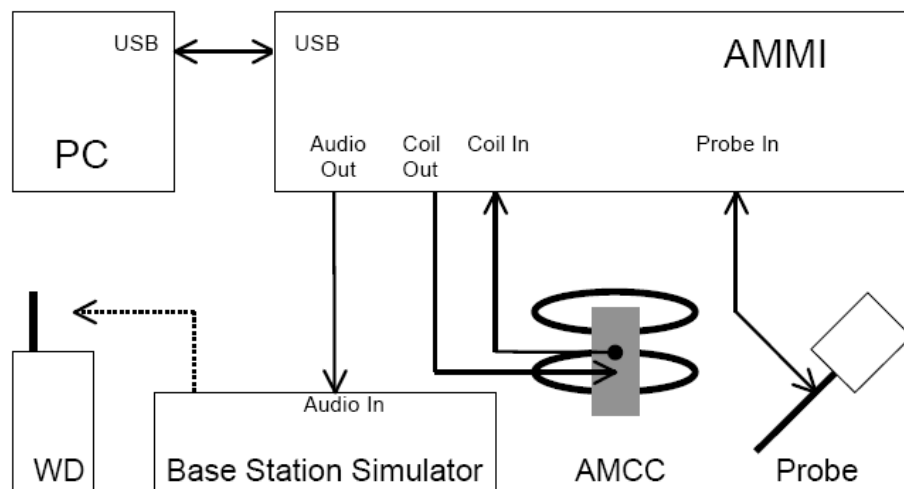


Figure 4.2b Setup Cabling





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### 4.3 Audio Magnetic Probe

<b>Model:</b>	▪ AM1D
<b>Application:</b>	▪ Active single sensor probe for both axial and radial measurement scans
<b>Construction:</b>	<ul style="list-style-type: none"> <li>▪ Fully RF shielded</li> <li>▪ Rounded tip of 6 mm diameter incorporating a pickup coil with its center offset 3mm from the tip and the sides</li> <li>▪ Compatible with DAE, with adapted probe cup</li> </ul>
<b>Frequency Response:</b>	▪ $\pm 0.5$ dB of ideal differentiator from 100 Hz to 10 kHz
<b>Linearity:</b>	▪ < 0.1 dB from 5 dB below limitation to 16 dB above noise level
<b>Dynamic Range:</b>	▪ Max 21 dB A/m @ 1 kHz, Noise level typ. -70 dB A/m @ 1kHz, ABM2 typ. -60 dB A/m
<b>Sensitivity:</b>	▪ Typ. -24 dBV / A./m @ 1kHz at probe output
<b>RF Shielding:</b>	▪ Immunity to AM (1 kHz, 80%) modulation RF signal

### 4.4 Audio Magnetic Measuring Instrument (AMMI)

<b>Model:</b>	▪ AMMI
<b>Application:</b>	AMMI is a desktop 19-inch unit containing a sampling unit, a waveform generator for test and calibration signals and a USB interface.
<b>Connection:</b>	<p>Front connectors</p> <ul style="list-style-type: none"> <li>▪ Audio Out - audio signal to the base station simulator</li> <li>▪ Coil Out - test and calibration signal to the AMCC</li> <li>▪ Coil In - monitor signal from the AMCC BNO connector</li> <li>▪ Probe In - probe signal</li> </ul>

### 4.5 Audio Magnetic Calibration Coil (AMCC)

<b>Model:</b>	▪ AMCC
<b>Application:</b>	The Audio Magnetic Calibration coil is a Helmholtz Coil designed according to ANSI C63.19-2006 section D.9, for calibration of the AM1D probe. The two horizontal coils generate a homogeneous magnetic field in the z direction. The DC input resistance is adjusted to approximately 50 Ohm by a series resistor, and a shunt resistor of 10 Ohm allows monitoring the current with a scale of 1:10.
<b>Connection:</b>	<ul style="list-style-type: none"> <li>• Coil In</li> <li>• Coil Monitor</li> </ul>

## 5 SYSTEM VALIDATION & CALIBRATION

At the beginning of the HAC T-coil measurement, a 3-phase calibration was performed per Speag instruction to ensure accurate measurement of the voltages and ABM field. Reference input level was also validated and calibrated per C63.19.

### 5.1 Input Channel Calibration

Phase 1: The AMMI audio output was switched off, and a 200 mV<sub>pp</sub> symmetric rectangular signal of 1 kHz was generated and internally connected directly to both channels of the sampling unit (coil in, probe in).

Phase 2: The AMMI audio output was off, and a 20 mV<sub>pp</sub> symmetric 100 Hz signal was internally connected.

The signals during phases 1 and 2 were available at the output on the rear panel of the AMMI. The output must however not be loaded in order not to influence the calibration. After the first two phases, the two input channels were both calibrated for absolute measurements of voltages. The resulting factors were displayed above the multimeter window.

After phases 1 and 2, the input channels were calibrated to measure exact voltages.

## 5.2 Probe Calibration

Phase 3: a multisine signal covering each third-octave band from 50 Hz to 5 kHz was generated and applied to both audio outputs. The probe was positioned in the center of the AMCC (user point “coil center”) and aligned in the z-direction, the field orientation of the AMCC. The Coil In channel was measuring the voltage over the AMCC internal shunt, which was proportional to the magnetic field in the AMCC. At the same time, the probe in channel samples the amplified signal picked up by the probe coil. The ratio of the two voltages – in each third-octave filter – leads to the calibration factor of the probe over the frequency band of interest for the spectral representation.

The calibration result is shown in Appendix C. The internal calibration factors of the coil and probe channel are listed. The graphics represent the values (applying the calibration factors from the previous steps) for the probe and coil channel in dB V for each third-octave filter from 100 Hz to 5 kHz. The single values are interconnected with a blue line for the probe and a green line for the coil channel.

The probe sensitivity in V / (A/m) at 1 kHz is calculated from the values in the chart. -20 dBV in the coil channel corresponds approx. to 1 A/m. For the AM1DV2 probe, the lines typically cross at 1.5 kHz and a level of -28 dBV.

Calibration Factors	Measured Value
Probe Sensitivity, V/(A/m)	0.0659618
Probe calibration factor, V	1.13248
Coil calibration factor, V	2.32688

### 5.3 Reference Input Level

ANSI C63.19 requires the use of reference input level of  $-18\text{dBm}_0$  that correlate to a normal speech input level for CDMA air interface. In order to create the correct level the CMU200 audio codec and the AMMI output were calibrated.

#### 5.3.1 CMU200 Audio Codec Calibration

The CMU200  $0\text{dBm}_0$  input reference was determined utilizing the build-in functions of “Decoder Cal” and “Encoder Cal”. The verification results are shown in the table 6.3a below. All the measured parameters were within the specification.

<b>Equipment:</b>	CMU200 (S/N: 101328)	
<b>Test Date:</b>	April 17, 2009	
<b>Item</b>	<b>Description</b>	<b>Level</b>
①	Decoder Cal Value (dBV)	-2.53
②	Encoder Cal Value w/ AMMI gain = 10 (dBV)	-20.08
③	C63.19 CDMA Reference Input Level (dBm <sub>0</sub> )	-18
④	CMU200 $0\text{dBm}_0$ Input Reference Value (dBV)	3.14
⑤	Desired signal level for $-18\text{dBm}_0$	-23.67
⑥	AMMI “Gain” factor	<b>-20.48</b>
⑦	AMMI output required to generate a signal level in ⑤	-2.53

Where ⑤ = ③ - ④ + ①; ⑥ = ⑤ - ② (linear)

Table 5.3a Reference Input Level

#### 5.3.2 AMMI Signal Verification

Verification of AMMI output level was performed within 24 hours of the compliance measurement. The measured results are showed in Table 5.3b

Date	Measured AMMI Output (dBm <sub>0</sub> )	Target Reference Input (dBm <sub>0</sub> )	Delta (dB)
05/28/09	-20.4825	-20.48	<b>0.0025</b>

Table 5.3b Measured Output Level

## 6 DESCRIPTION OF TEST PROCEDURE

The device was positioned and setup according to ANSI C63.19-2006. Figure 6.0 shows the T-Coil Signal measurement flowchart:

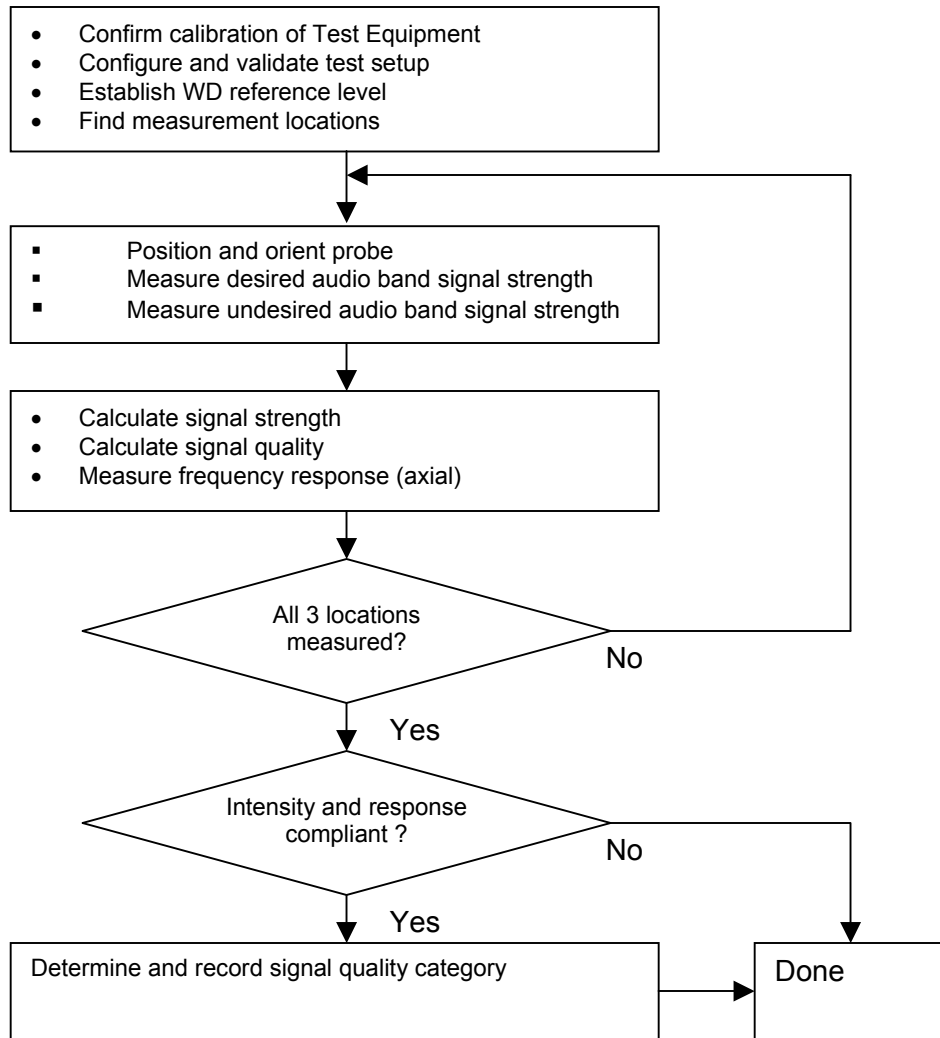


Figure 6.0 T-Coil measurement flowchart

## 6.1 Test Positions

The device was placed on a non-conductive phone positioner under the Test Arch. The acoustic output of the EUT was aligned with the center point of the area formed by the dielectric wire and the middle bar of the arch's top frame. Please refer to Appendix E for the test setup photos.

## 6.2 Audio Signals

During tests signal was fed to the EUT via communication Test set. Proper gain setting was used in software to ensure correct signal level fed to communication test set speech input.

The following audio signals were pre-defined by DASY4 and used for calibration and measurements:

**1.025 kHz sine wave (duration 10 s):** used alternatively instead of 1 kHz, according to ANSI C63.19 section 6.3.1 step 2, if the internal 1.0 kHz signal would cause interferences inside the WD. The bandwidth is suited for signal quality or signal level measurements if not suppressed in the WD codec. Peak to RMS ratio: 3.0 dB. The spectrum is shown in a practical measurement in fig. 6.2a.

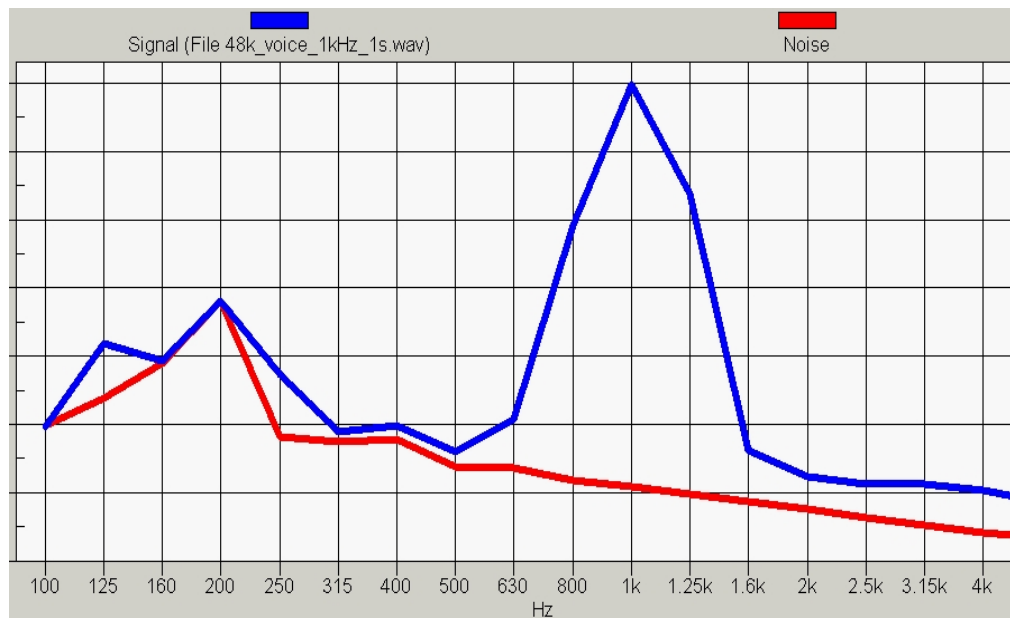


Figure 6.2a 1.0 kHz Voice signal spectrum

**Multisine signal 50 Hz – 5 kHz (duration 10 s):** Signal with carrier centered in each third-octave band, as used during the calibration. Suited for frequency response measurements. Peak to RMS ratio: 11.1 dB.

**48k\_voice\_300-3000** (duration 2 s): The signal is voice like and has been processed to have a duration of 2 seconds for fast measurement. At the same time, it has a flat spectrum across all third-octave band filters between 300 Hz to 3 kHz and is vanishing at the beginning and end in order to allow longer measurement sequences without transients. It has bandwidth sufficient for frequency response measurements. The spectrum is shown in a practical measurement in fig. 6.2b. The measurement window length of this signal must be set to a multiple of 2 s in order to integrate over the full voice sample. Peak to RMS ratio: 21.6 dB.

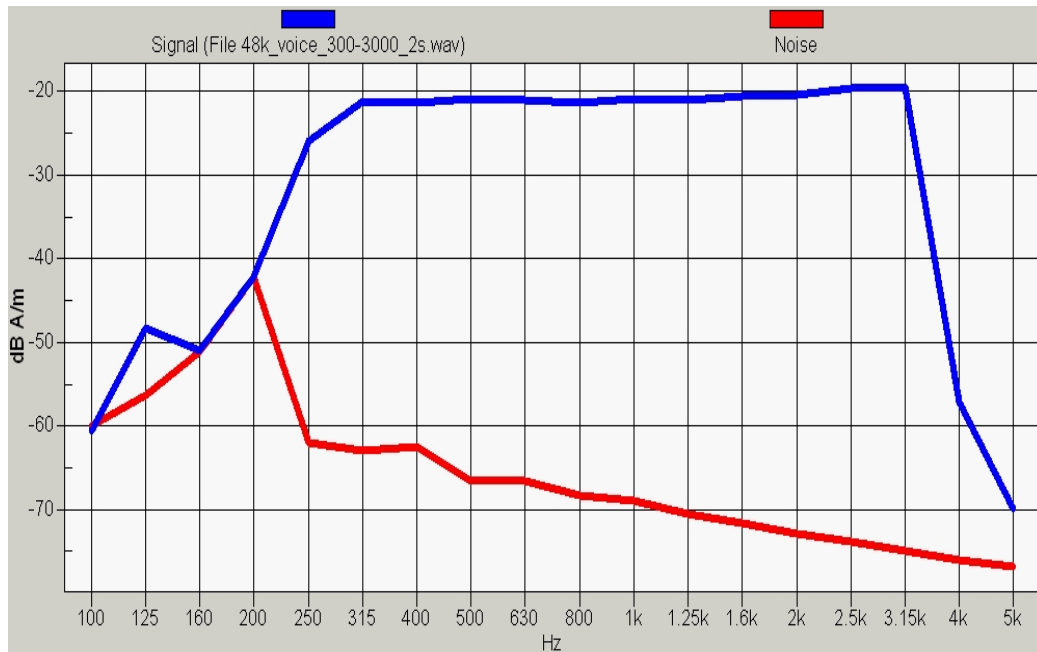
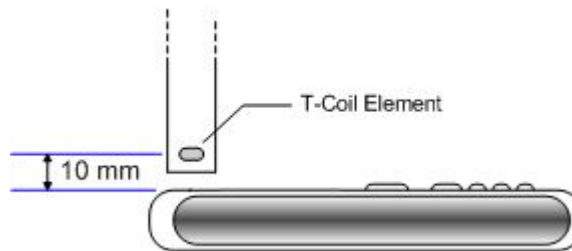


Figure 6.2b Boardband signal spectrum

## 6.3 Scan Procedures

### 6.3.1 Signal Strength and SNR

- A 50mm x 50mm (10mm step) coarse axial scan was performed to search for the “optimal points” and spatial distribution of ABM1.
- Base on the coarse scan results, a 16mm x 16mm (4mm step) point scan in axial, a 24mmx16mm (4mm step) point scan in radial\_L, and a 16mmx24mm (4mm step) point scan in radial-T coil orientation were performed for both ABM1and ABM2.



### 6.3.2 Frequency Response

Base on the coarse axial scan results, a point axial scan was performed.



## 7 DESCRIPTION OF TEST PROCEDURE

Table 7.1 shows the uncertainty budget for HAC Audio Band Magnetic Field (AMB) assessment according to ANSI C63.19-2006. The budget is valid for the DASY4 system and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be smaller.

Uncertainty Description	Uncert. Value (± %)	Prob. Dist.	Div.	C <sub>i</sub> (ABM1)	C <sub>i</sub> (ABM2)	Stand. Uncert (ABM1) (±%)	Stand. Uncert (ABM2) (±%)
<b>PROBE SENSITIVITY</b>							
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	0.4
Frequency slope	5.9	R	1.7	1	1	0.3	3.5
<b>PROBE SYSTEM</b>							
Repeatability / Drift	1.0	R	1.7	1	1	0.6	0.6
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	0.6
Probe angle	2.3	R	1.7	1	1	1.4	1.4
Spectral processing	0.9	R	1.7	1	1	0.5	0.5
Integration time	0.6	N	1.0	1	5	0.6	3.0
Field distribution	0.2	R	1.7	1	1	0.1	0.1
<b>TEST SIGNAL</b>							
Reference signal spectral response	0.6	R	1.7	0	1	0	0.4
<b>POSITIONING</b>							
Probe positioning	1.9	R	1.7	1	1	1.1	1.1
Phantom thickness	0.9	R	1.7	1	1	0.5	0.5
DUT positioning	1.9	R	1.7	1	1	1.1	1.1
<b>EXTERNAL CONTRIBUTIONS</b>							
RF interference	0	R	1.7	1	1	0	0
Test signal variation	2.0	R	1.7	1	1	1.2	1.2
<b>COMBINED UNCERTAINTY</b>							
<b>Combined Standard Uncertainty (ABM):</b>						<b>4.1</b>	<b>6.1</b>
<b>Extended Standard Uncertainty (k=2) [%]:</b>						<b>8.1</b>	<b>12.3</b>

N: Normal  
 R: Rectangular

Table 7.1 Worst-Case uncertainty budget for HAC ABM assessment

## 8 T-COIL REQUIREMENTS AND CATEGORY

### 8.1 RF Emissions

EUT has to fulfill RF emission requirements at the axial measurement location.

### 8.2 Axial Field Intensity

Table 8.2 shows the minimum limits for ABM1 field intensity:

Component	ABN1 Magnetic Field dB(A/m)	Condition
Axial (z)	≥-18	1 kHz, in 1/3 octave band filter
Radial (x, y)	≥-18	

Table 8.2 ABM1 Intensity Requirements

### 8.3 Signal Quality

Table 8.3 provides the signal quality requirement for the intended T-Coil signal from a Wireless Device. The worst Signal Quality of the axial and radial components of the magnetic field was used to determine the T-Coil category.

Category	Signal Quality (Signal+Noise to Noise) [dB]
T1	0 to 10
T2	10 to 20
T3	20 to 30
T4	> 30
AWF=0	

Table 8.3 T-coil Signal Quality Categories

## 8.4 Frequency Response

The frequency response of the axial component must follow the frequency curve specified in ANSI C63.19-2007 section 7.3.2, over the frequency range 300-3000 Hz (Figure 8.4).

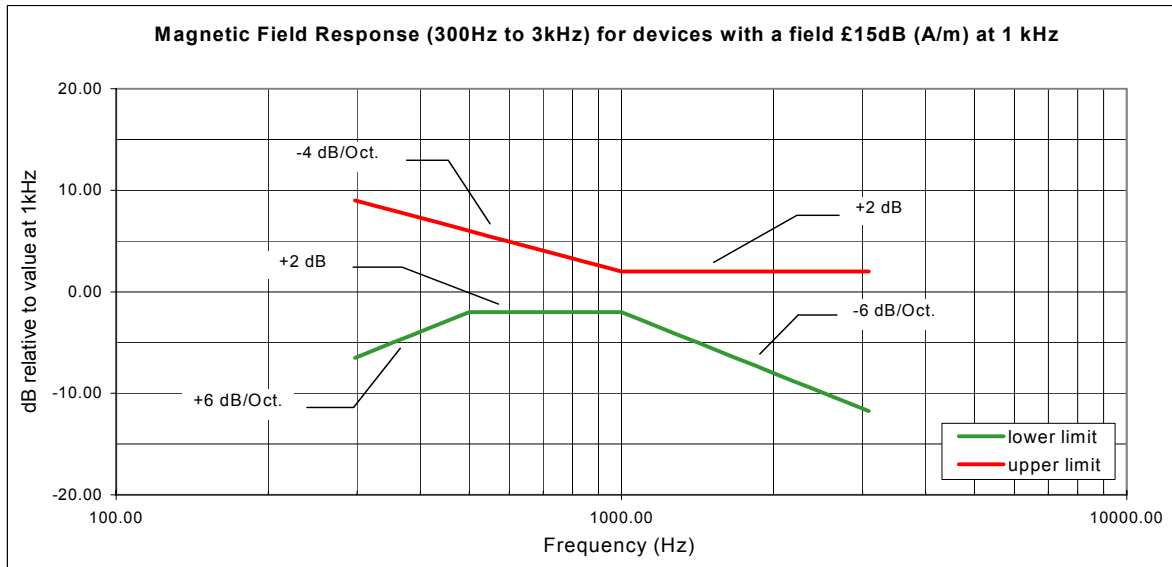


Figure 8.4a Magnetic Field Response (300Hz to 3kHz) for devices with a field  $\leq 15$ dB (A/m) at 1 kHz

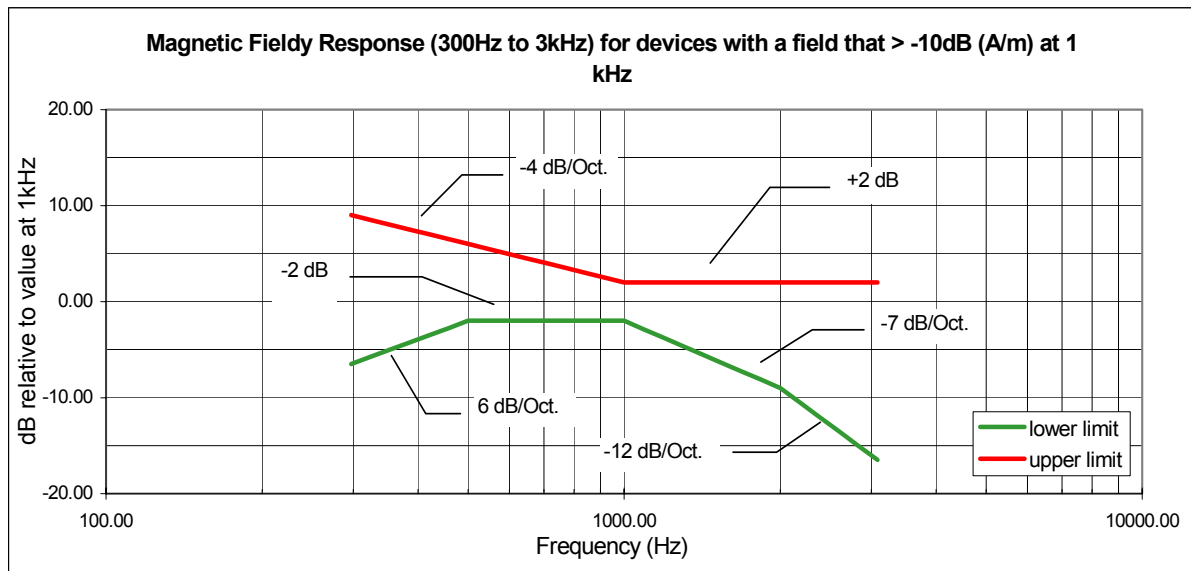


Figure 8.4b Magnetic Field Response (300Hz to 3kHz) for devices with a field that  $> -15$ dB (A/m) at 1 kHz

## 9 T-COIL TEST RESULTS

### 9.1 Field Strength and Signal Quality

ANSI C63.19 (2007) Section 6 T-coil Field Strength and Signal Quality							
Band	Ch.	Probe Position	Ambient Noise dB A/m	ABM1 dB A/m	ABM2 dB A/m	Signal Quality dB	T- Rating
CDMA 800	1013	Axial (z)	-59.67	0.65	-53.29	53.94	4
		Radial_L (x)	-55.64	-7.70	-55.73	48.03	4
		Radial_T (y)	-58.83	<b>-7.76</b>	<b>-54.00</b>	<b>46.25</b>	<b>4</b>
	383	Axial (z)	-59.67	-0.77	-54.65	53.88	4
		Radial_L (x)	-55.64	-9.36	-55.73	46.37	4
		Radial_T (y)	-58.83	-6.69	-56.67	49.98	4
	777	Axial (z)	-59.67	1.05	-53.73	54.77	4
		Radial_L (x)	-55.64	-7.15	-55.48	48.33	4
		Radial_T (y)	-58.83	-6.86	-56.65	49.79	4
CDMA 1900	25	Axial (z)	-59.65	1.11	-53.51	54.62	4
		Radial_L (x)	-55.62	-8.11	-54.82	46.71	4
		Radial_T (y)	-58.80	-7.53	-57.15	49.62	4
	600	Axial (z)	-59.65	0.33	-54.02	54.35	4
		Radial_L (x)	-55.62	-9.70	-55.38	45.68	4
		Radial_T (y)	-58.80	-8.74	-56.84	48.10	4
	1175	Axial (z)	-59.65	-3.74	-53.99	50.25	4
		Radial_L (x)	-55.62	<b>-9.27</b>	<b>-54.90</b>	<b>45.63</b>	<b>4</b>
		Radial_T (y)	-58.80	-10.44	-56.67	46.23	4

Note:

- Signal Quality = ABM1/ABM2
- Bold Number = worst case at each frequency band
- Data plots are showed in Appendix D

### 9.2 Frequency Response

ANSI C63.19 (2007) Section 6 T-coil Frequency Response			
Mode	Probe Position	Signal Type	Result
CDMA 800	Axial	Voice	Pass
CDMA 1900	Axial	Voice	Pass

Figure 9.2 show the frequency response of the axial component of the magnetic field.



Applicant	Kyocera
FCC ID:	V65SCP-3810
Report #:	CT-V65-20T-0609-R0

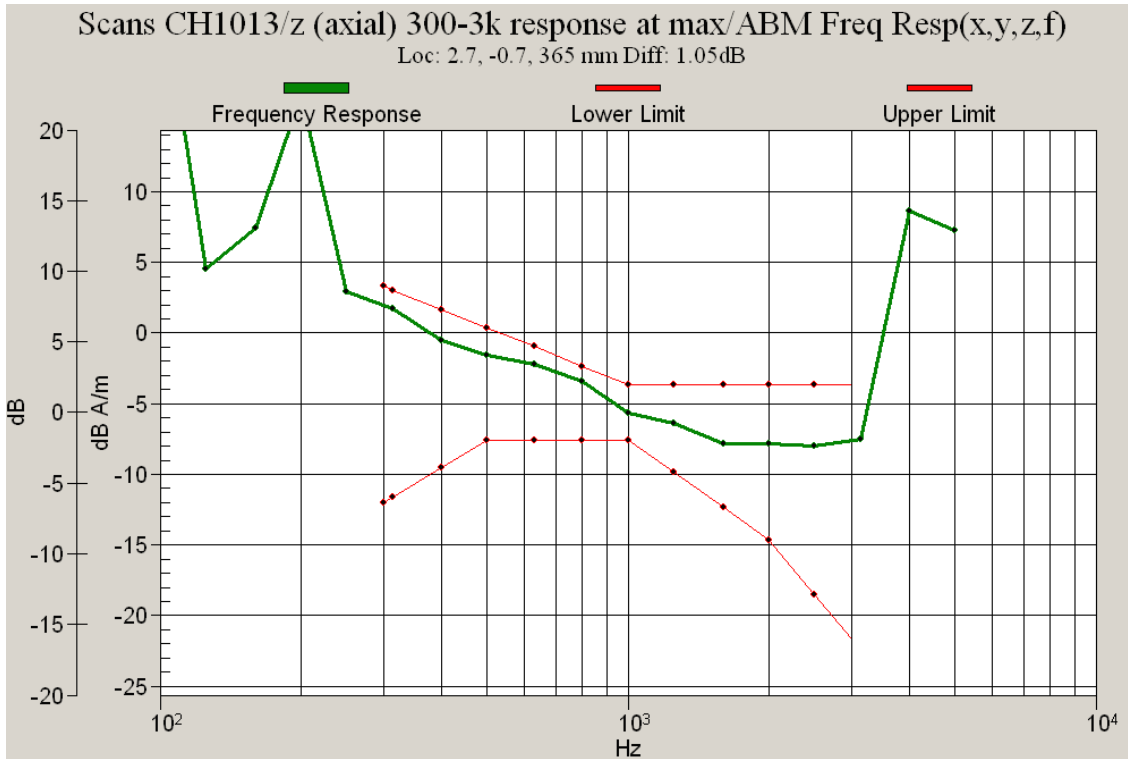


Figure 9.2a CDMA 800 Frequency Response

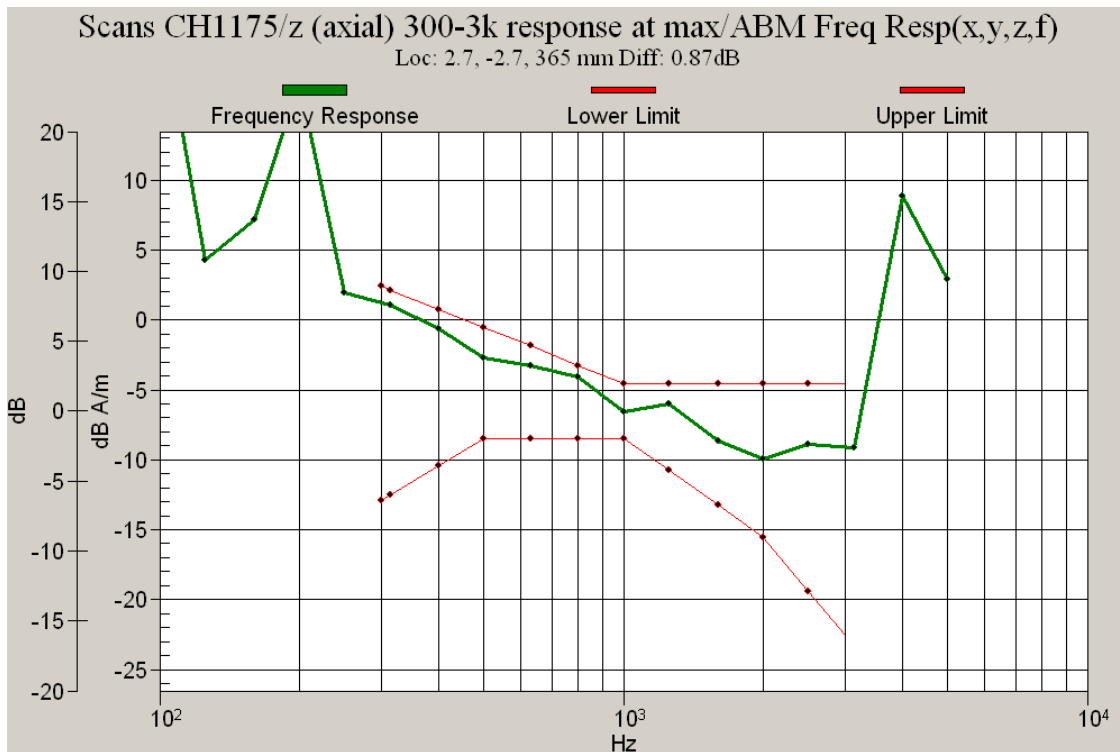
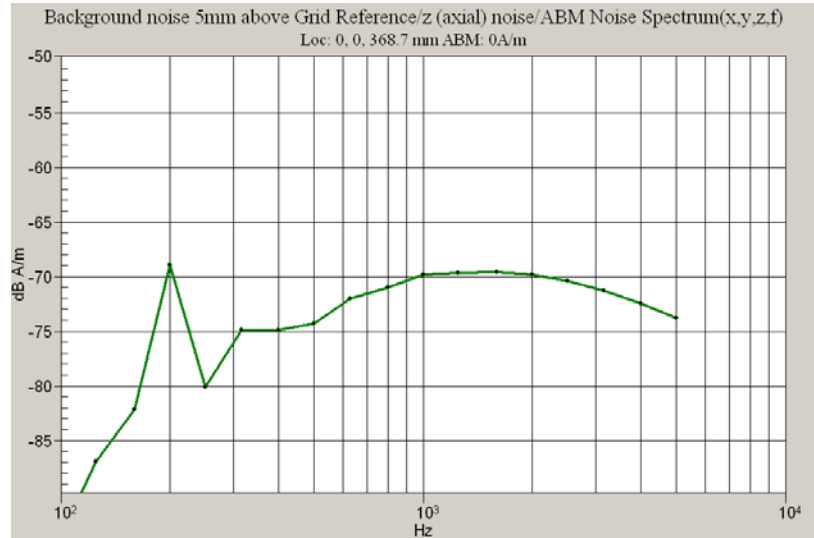


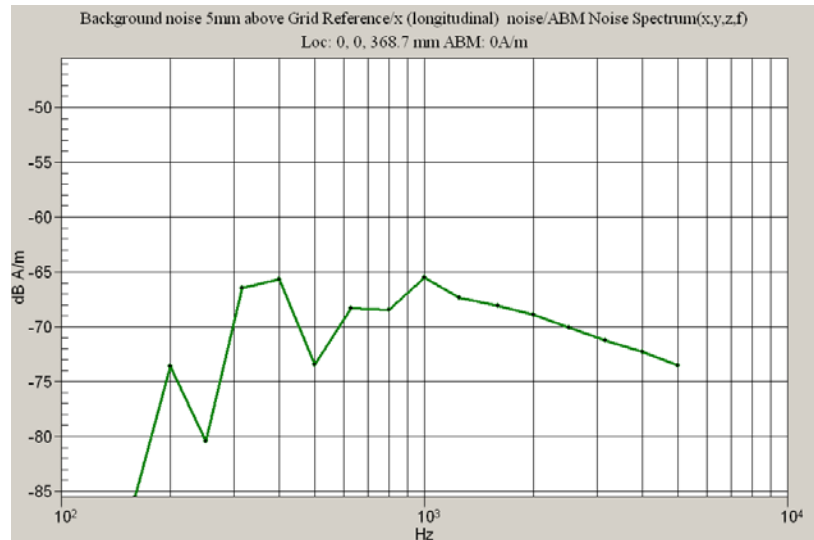
Figure 9.2b CDMA 1900 Frequency Response

**10 APPENDIX A1: AMBIENT NOISE PLOTS, 800 MHZ**

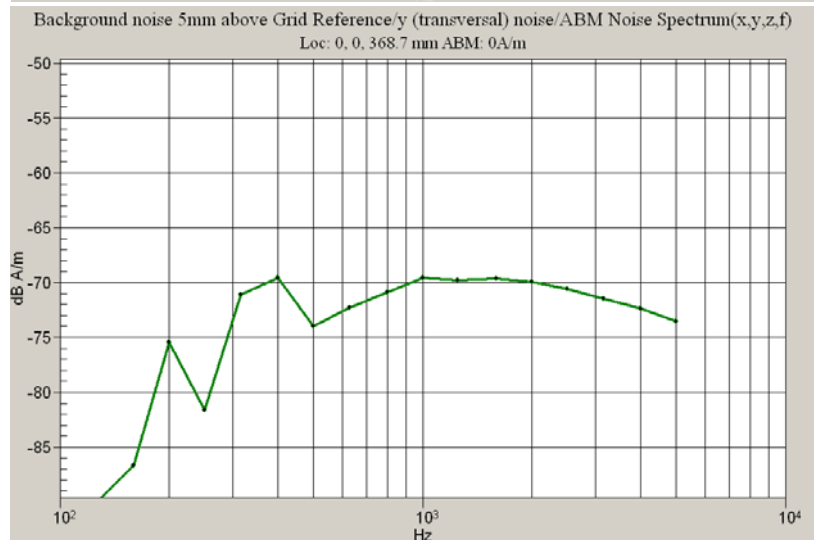
Ambient Noise Spectrum Plot: Axial (z)



Ambient Noise Spectrum Plot:  
Radial Longitudinal (x)

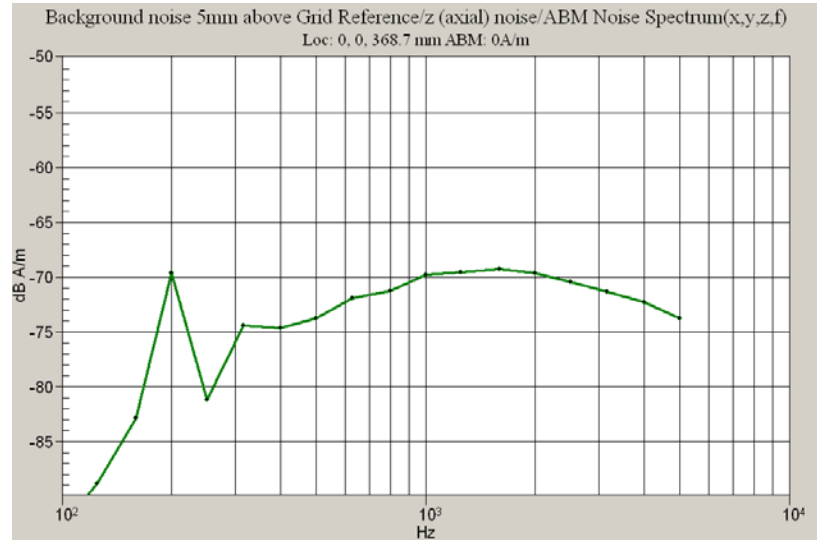


Ambient Noise Spectrum Plot:  
Radial Transversal (y)

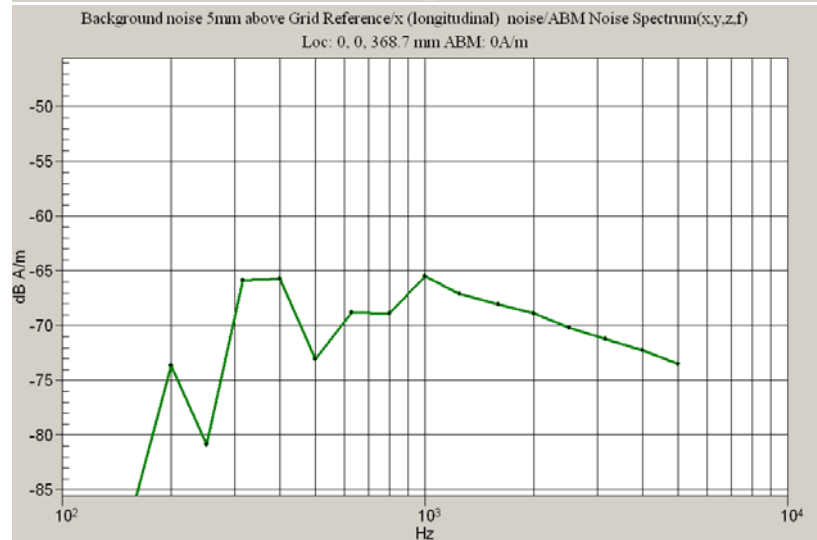


**11 APPENDIX A2: AMBIENT NOISE PLOTS, 1900 MHZ**

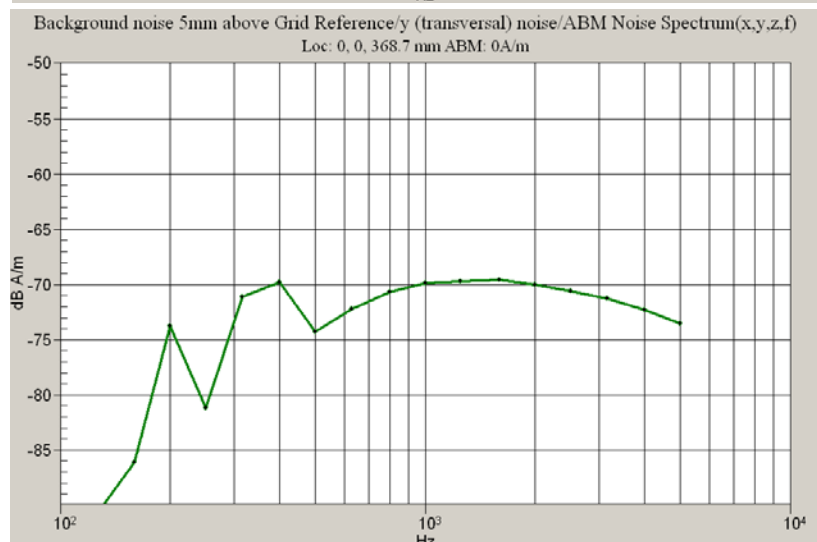
Ambient Noise Spectrum Plot Axial (z)



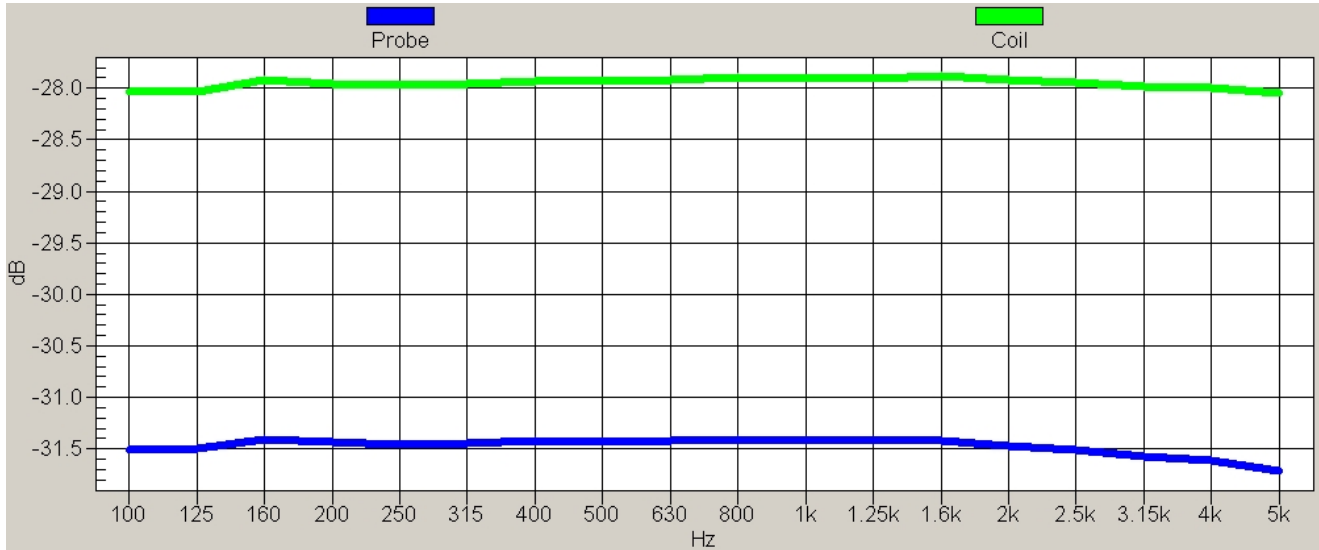
Ambient Noise Spectrum Plot Radial\_Longitudinal (x)



Ambient Noise Spectrum Plot Radial\_Transversal (y)



**12 APPENDIX B: SYSTEM CALIBRATION RESULTS**



**13 APPENDIX C: ABM AND SNR TEST RESULTS/PLOTS**

(See attachment)

**14 APPENDIX D: PROBE CALIBRATION CERTIFICATE**

(See attachment)

**15 APPENDIX E: PHOTO TEST SETUP**

(See attachment)