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| | Author Data Daoud Attayi | Dates of Test June 19-28, 2012 | Report No RTS-5992-1207-36 |

Annex A: Probe sensitivity and reference signal measurement plots

Author Data
Daoud Attayi

Dates of Test
June 19-28, 2012

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FCC ID
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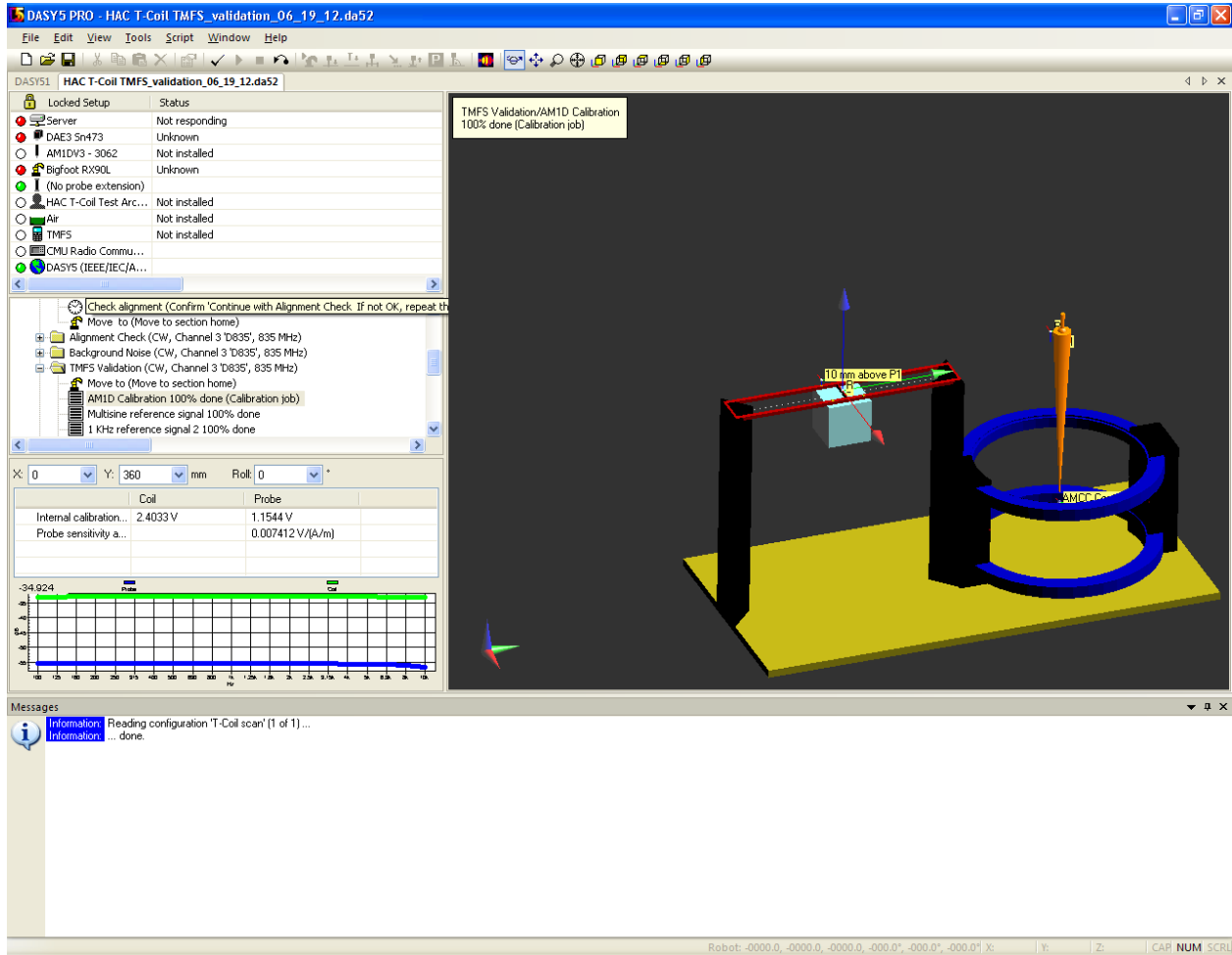


Figure A1: Probe calibration data for coil and probe

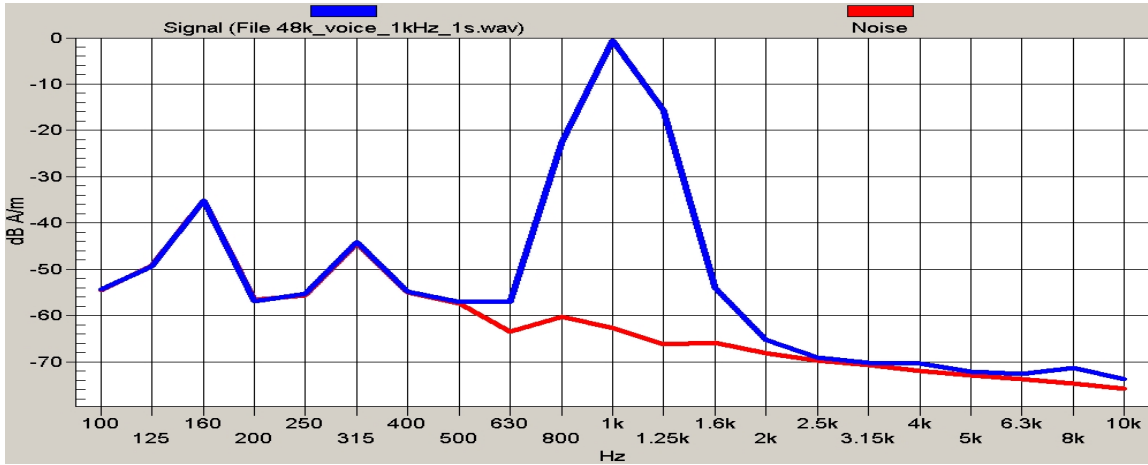


Figure A2: Reference voice 1 kHz signal and noise

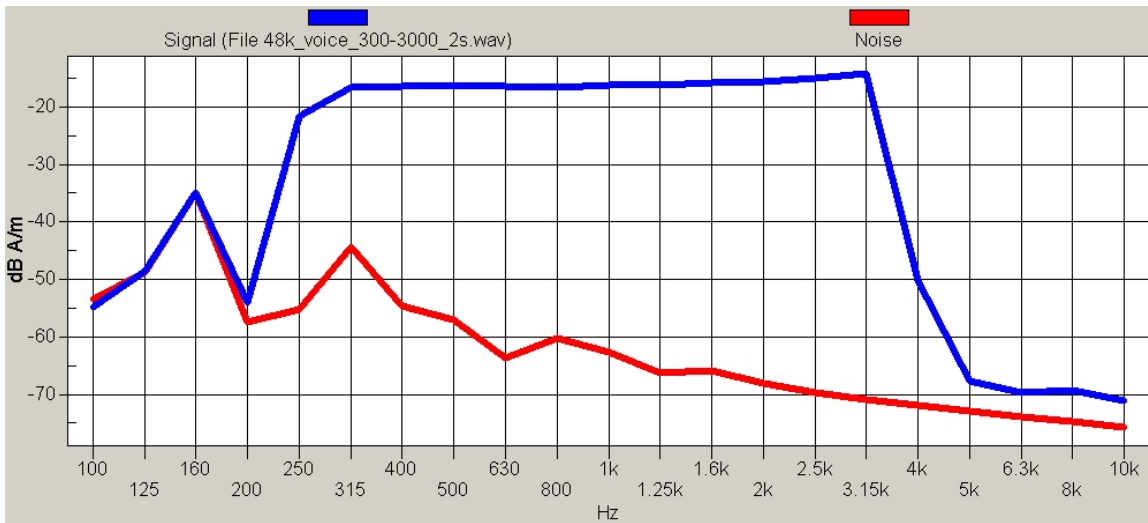




Figure A3: Reference voice simulated signal and noise

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Annex B: TMFS system validation and ambient data/plots

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Date/Time: 6/19/2012 7:38:31 AM

Test Laboratory: RIM Testing Services

HAC T-Coil TMFS_validation_06_19_12

DUT: TMFS; Type: TMFS-1; Serial: 1003

Communication System: CW; Frequency: 835 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS2 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/Background Noise/z (axial) noise/ABM Noise Spectrum(x,y,z,f) (1x1x1):

Measurement grid: dx=10mm, dy=10mm


Signal Type: Off

Output Gain: 0

Measure Window Start: 2000ms

Measure Window Length: 5000ms

Device Reference Point: 0, 0, -6.3 mm

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Cursor:

ABM = -56.04 dB A/m
Location: 0, 0, 13 mm

T-Coil scan/Background Noise/x (longitudinal) noise/ABM Noise Spectrum(x,y,z,f) (1x1x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Off
Output Gain: 0
Measure Window Start: 2000ms
Measure Window Length: 5000ms
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM = -55.99 dB A/m
Location: 0, 0, 13 mm

T-Coil scan/Background Noise/y (transversal) noise/ABM Noise Spectrum(x,y,z,f) (1x1x1):


Measurement grid: dx=10mm, dy=10mm
Signal Type: Off
Output Gain: 0
Measure Window Start: 2000ms
Measure Window Length: 5000ms
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM = -56.00 dB A/m
Location: 0, 0, 13 mm

T-Coil scan/TMFS Validation/z (axial) 8 x 8 step 2/ABM Signal(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: 1 kHz Sine
Output Gain: 35.05
Measure Window Start: 0ms
Measure Window Length: 1000ms
BWC applied: 0.003 dB
Device Reference Point: 0, 0, -6.3 mm

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Cursor:

ABM1 comp = -20.42 dB A/m
 BWC Factor = 0.003 dB
 Location: 0, 0, 3.7 mm

T-Coil scan/TMFS Validation/x (longitudinal) 52 x 16 step 4/ABM Signal(x,y,z) (14x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: 1 kHz Sine
 Output Gain: 35.05
 Measure Window Start: 0ms
 Measure Window Length: 1000ms
 BWC applied: 0.003 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 comp = -25.98 dB A/m
 BWC Factor = 0.003 dB
 Location: -18, 0, 3.7 mm

T-Coil scan/TMFS Validation/y (transversal) 16 x 52 step 4/ABM Signal(x,y,z) (5x14x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: 1 kHz Sine
 Output Gain: 35.05
 Measure Window Start: 0ms
 Measure Window Length: 1000ms
 BWC applied: 0.003 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 comp = -25.84 dB A/m
 BWC Factor = 0.003 dB
 Location: 0, -18, 3.7 mm

T-Coil scan/TMFS Validation/z (axial) at center 100% gain/ABM Freq Resp(x,y,z,f) (1x1x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_multisine_50_10k_10s.wav
 Output Gain: 87.2
 Measure Window Start: 2000ms
 Measure Window Length: 5000ms
 BWC applied: 13.16 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

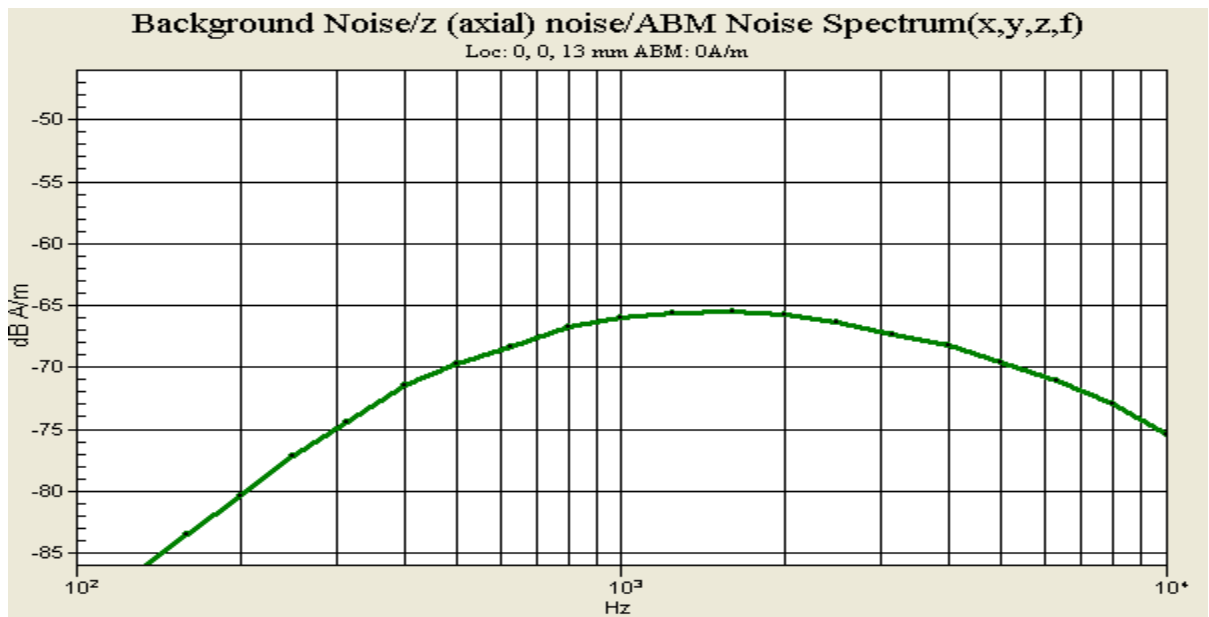
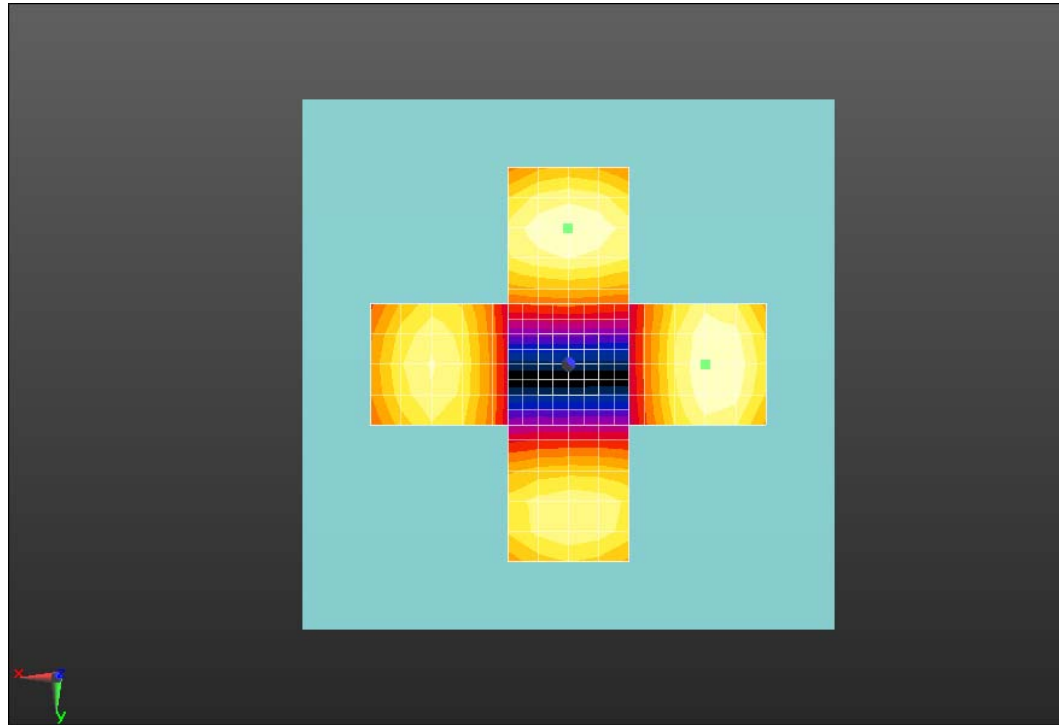
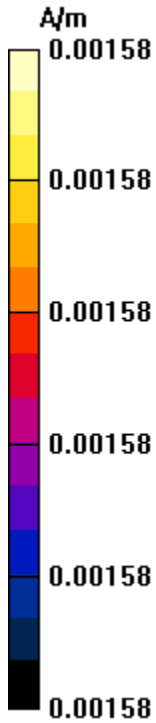
Diff = 2.00 dB
 BWC Factor = 13.16 dB
 Location: 0, 0, 3.7 mm

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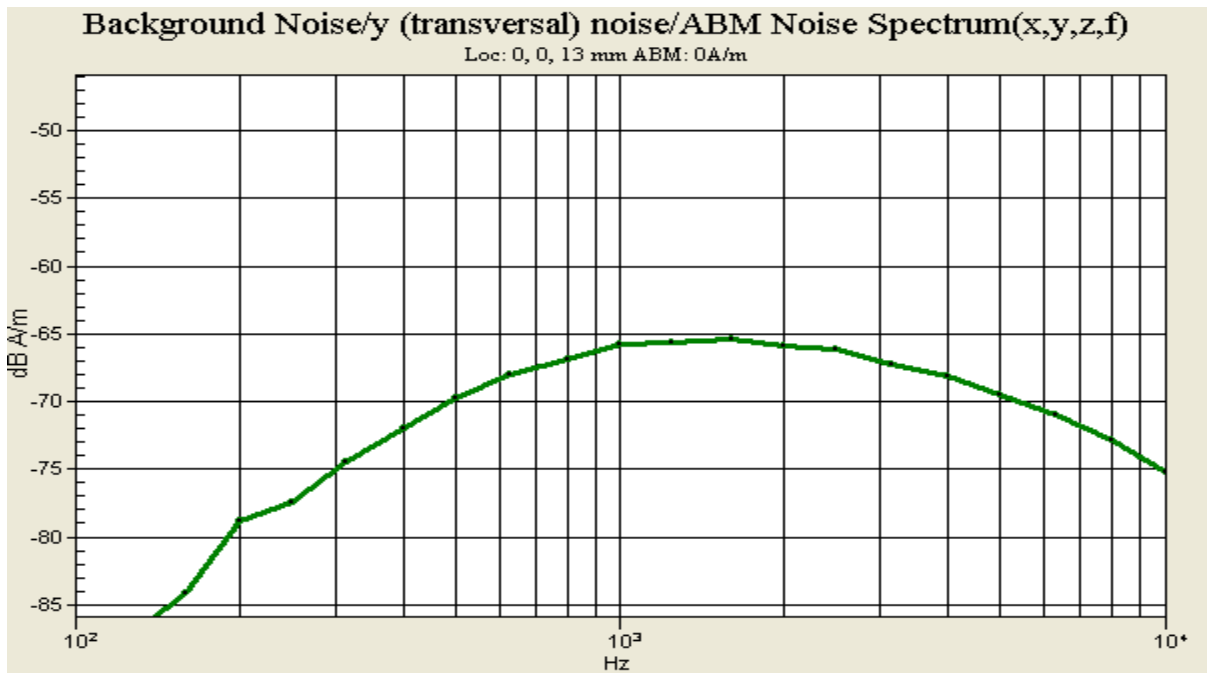
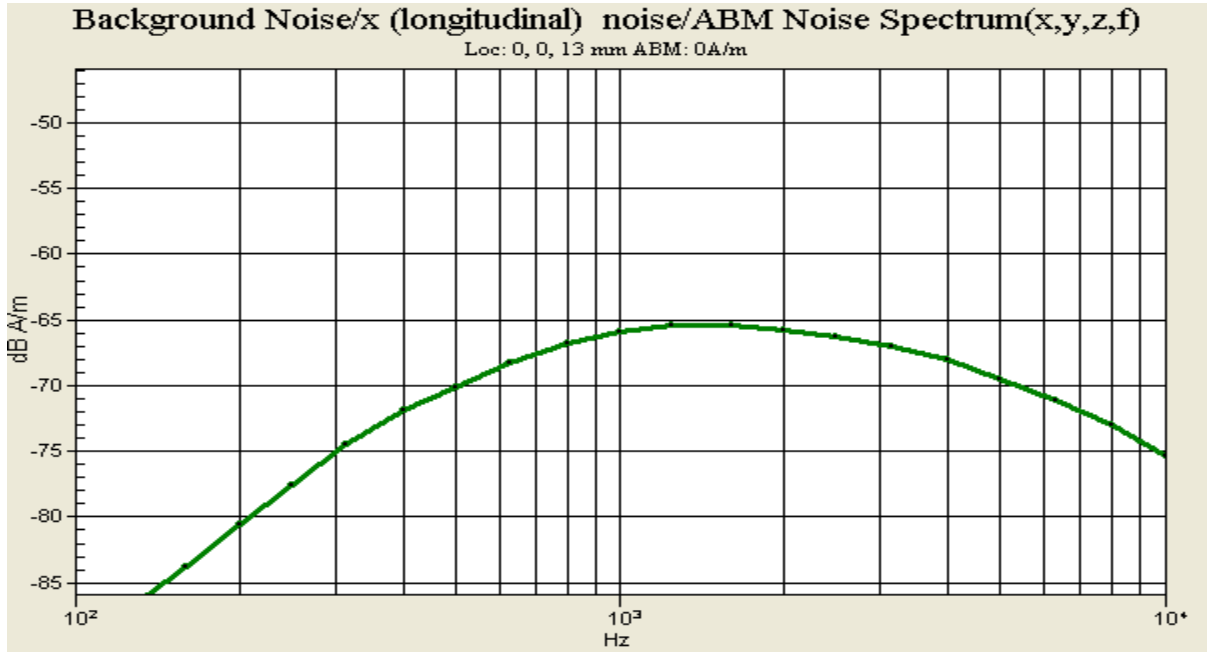


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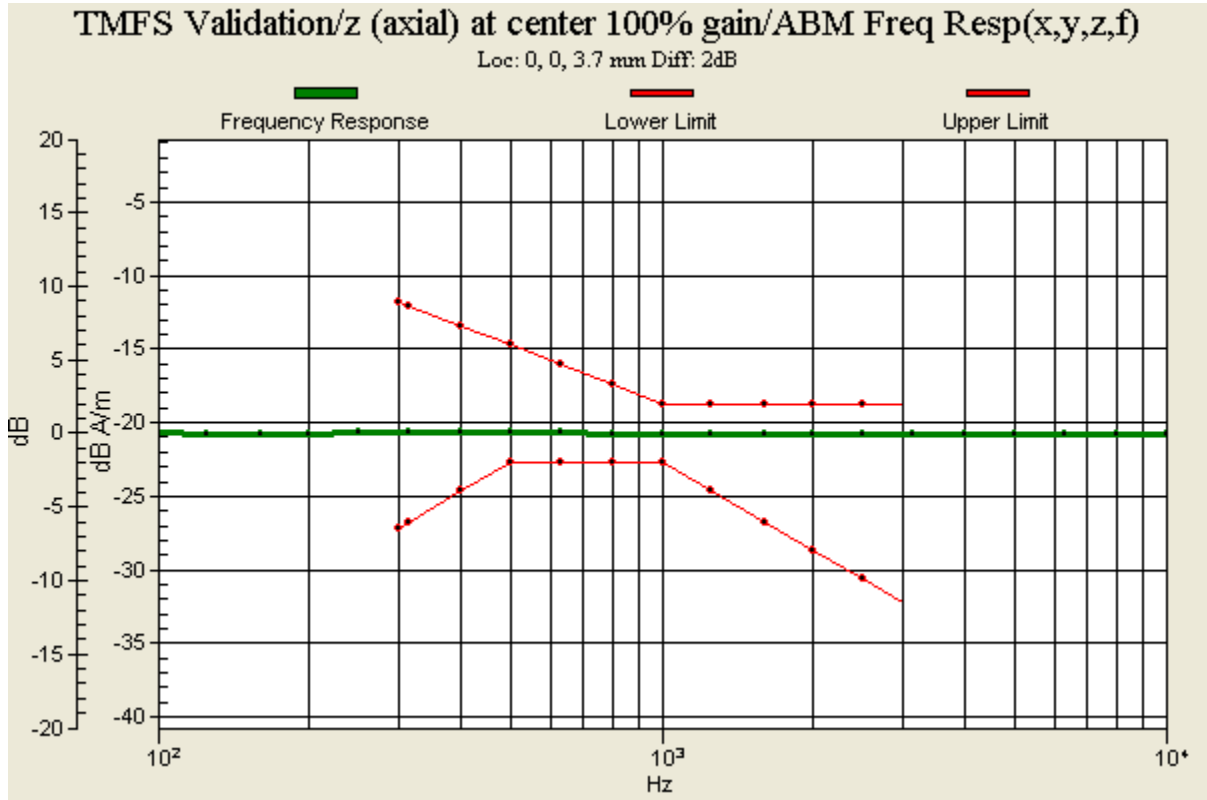



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Annex C: Audio Band Magnetic measurement data and plots

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Date/Time: 6/28/2012 6:05:10 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_GSM850_Axial

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: GSM 850; Frequency: 824.2 MHz, Frequency: 836.8 MHz, Frequency: 848.8 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS2 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/z (axial) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav

Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

T-Coil scan/General Scans 2/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) Low Chan_ (5x5x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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Cursor:

ABM1/ABM2 = 41.89 dB
 ABM1 comp = 12.07 dB A/m
 BWC Factor = 0.16 dB
 Location: -5, -5, 4.4 mm

T-Coil scan/General Scans 2/z (axial) wideband at best S/N 2/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: 69.12
 Measure Window Start: 300ms
 Measure Window Length: 6000ms
 BWC applied: 10.80 dB
 Device Reference Point: 0, 0, -6.3 mm

T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) Mid Chan (5x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
 Output Gain: 35.28
 Measure Window Start: 300ms
 Measure Window Length: 1000ms
 BWC applied: 0.16 dB
 Device Reference Point: 0, 0, -6.3 mm


Cursor:

ABM1/ABM2 = 41.46 dB
 ABM1 comp = 11.89 dB A/m
 BWC Factor = 0.16 dB
 Location: -5, -5, 4.4 mm

T-Coil scan/General Scans 2 2/z (axial) wideband at best S/N 2/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: 69.12
 Measure Window Start: 2000ms
 Measure Window Length: 4000ms
 BWC applied: 10.81 dB
 Device Reference Point: 0, 0, -6.3 mm

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T-Coil scan/General Scans 2 2 2/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) High Chan (5x5x1):

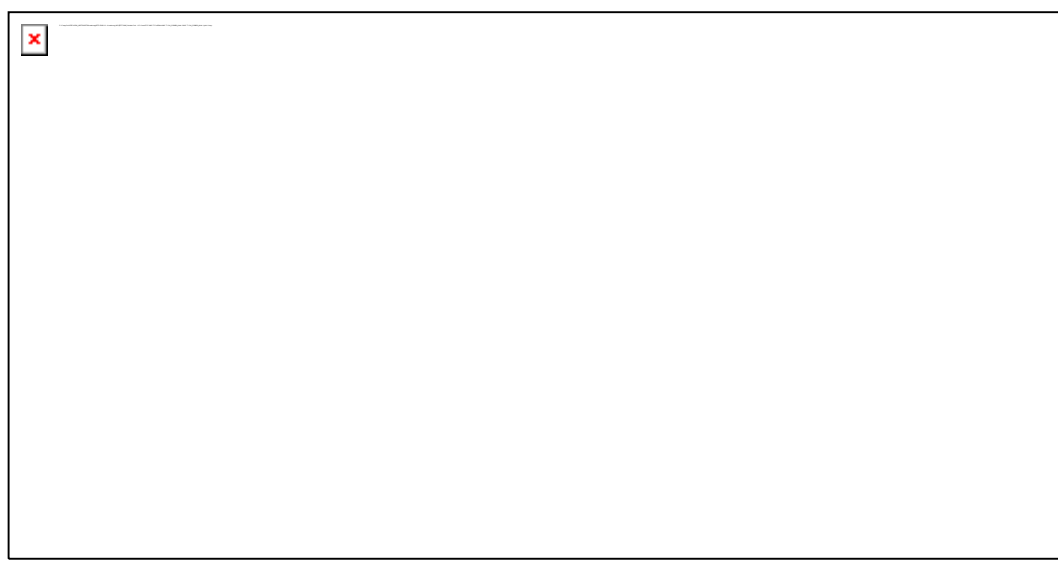
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 41.88 dB
ABM1 comp = 12.05 dB A/m
BWC Factor = 0.16 dB
Location: -5, -5, 4.4 mm

T-Coil scan/General Scans 2 2 2/z (axial) wideband at best S/N 2 2/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: 69.12
Measure Window Start: 300ms
Measure Window Length: 2000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm





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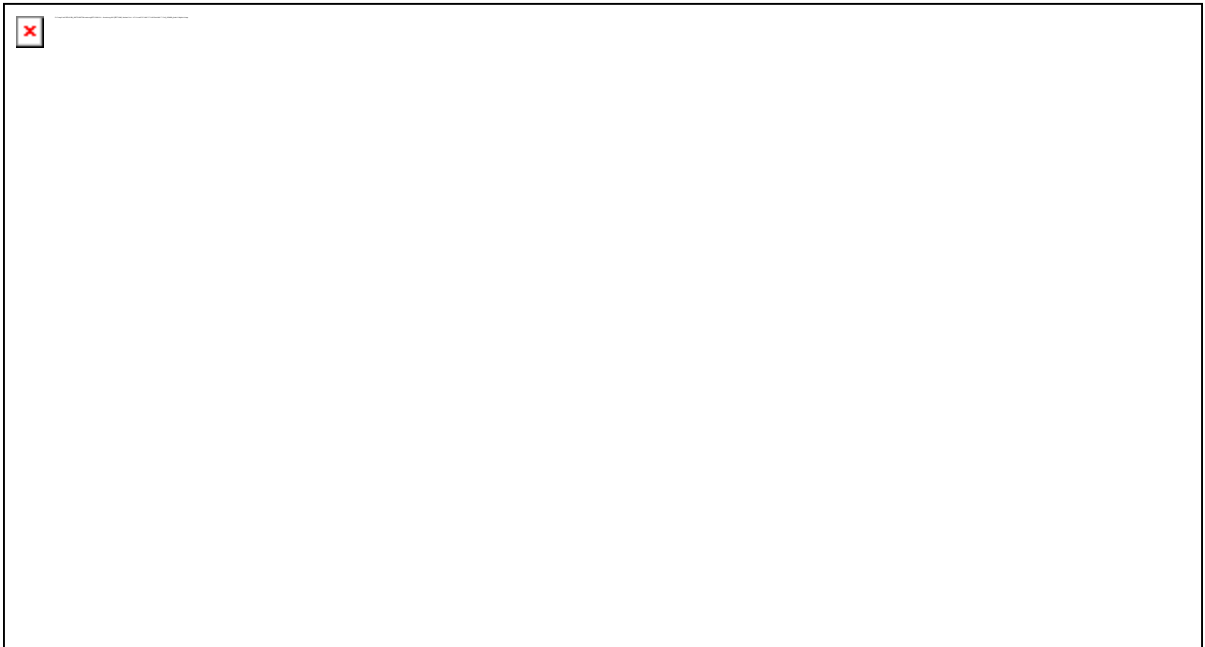
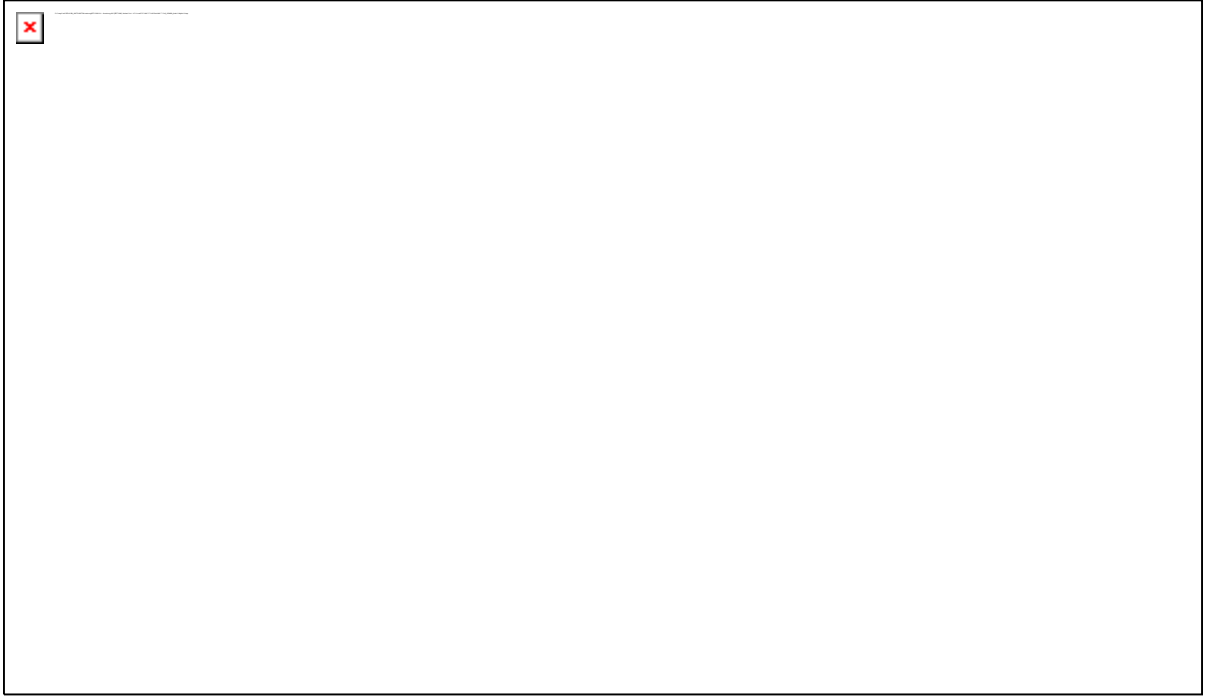
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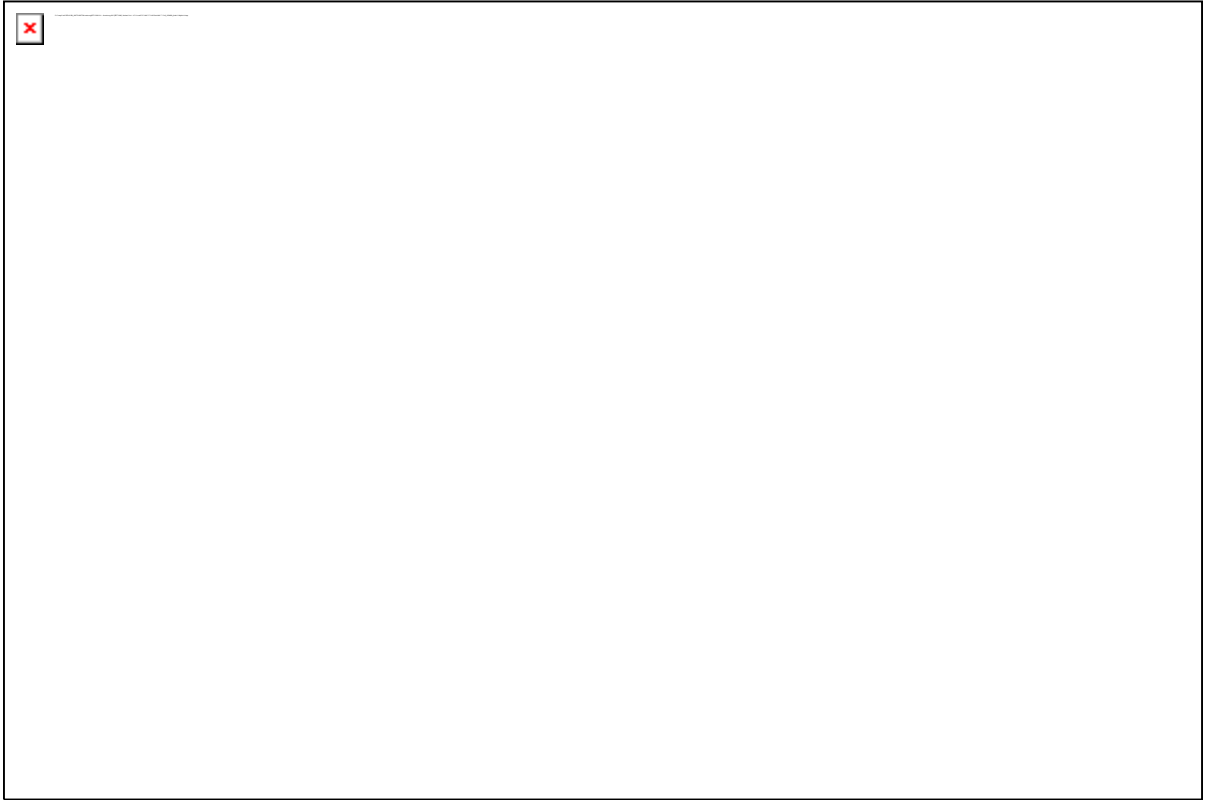
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Date/Time: 6/28/2012 6:18:36 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_GSM850_Radial_L

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: GSM 850; Frequency: 824.2 MHz, Frequency: 836.8 MHz, Frequency: 848.8 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS2 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/x (longitudinal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav

Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

T-Coil scan/General Scans 2/x (longitudinal) 2mm 8 x 8/ABM_Low Chan_SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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Cursor:

ABM1/ABM2 = 33.14 dB
 ABM1 comp = 5.64 dB A/m
 BWC Factor = 0.16 dB
 Location: -12, -5, 4.4 mm

T-Coil scan/General Scans 2 2/x (longitudinal) 2mm 8 x 8/ABM_Mid Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
 Output Gain: 35.28
 Measure Window Start: 300ms
 Measure Window Length: 1000ms
 BWC applied: 0.16 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 32.88 dB
 ABM1 comp = 5.33 dB A/m
 BWC Factor = 0.16 dB
 Location: -12, -7, 4.4 mm

T-Coil scan/General Scans 2 2/x (longitudinal) 2mm 8 x 8/ABM_High Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
 Output Gain: 35.28
 Measure Window Start: 300ms
 Measure Window Length: 1000ms
 BWC applied: 0.16 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 33.13 dB
 ABM1 comp = 5.28 dB A/m
 BWC Factor = 0.16 dB
 Location: -12, -7, 4.4 mm



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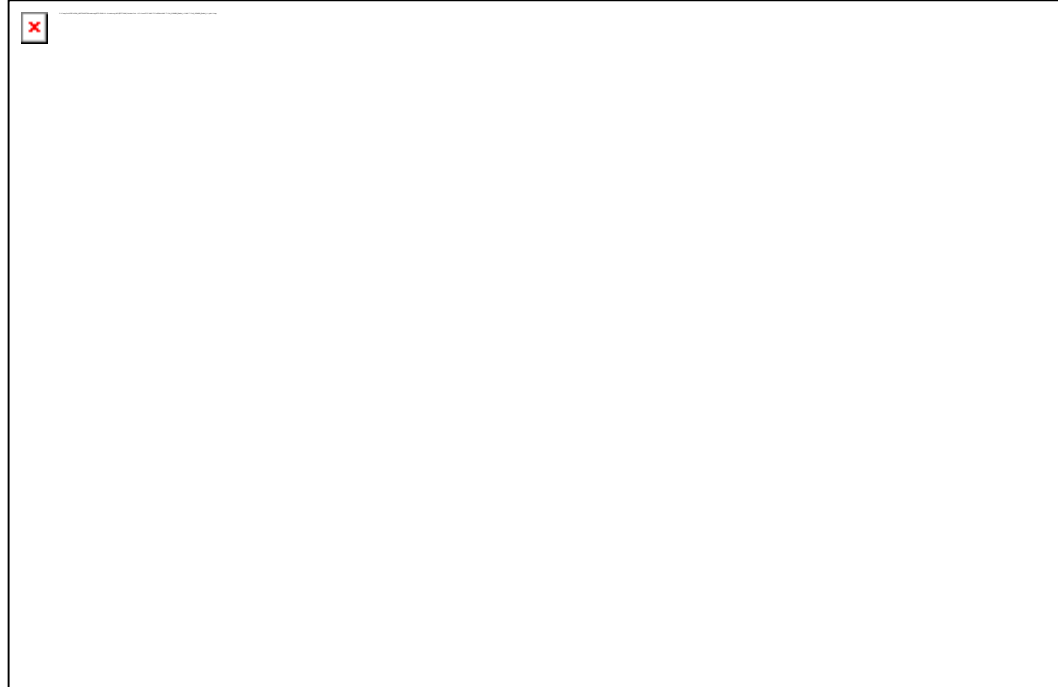
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Date/Time: 6/28/2012 6:32:05 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_GSM850_Radial_T

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: GSM 850; Frequency: 824.2 MHz, Frequency: 836.8 MHz, Frequency: 848.8 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/y (transversal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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T-Coil scan/General Scans 2/y (transversal) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 51.72 dB
ABM1 comp = 5.25 dB A/m
BWC Factor = 0.16 dB
Location: -7, 3, 4.4 mm

T-Coil scan/General Scans 2 2/y (transversal) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 51.74 dB
ABM1 comp = 5.23 dB A/m
BWC Factor = 0.16 dB
Location: -7, 3, 4.4 mm

T-Coil scan/General Scans 2 2 2/y (transversal) 2mm 8 x 8/ABM_High Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 51.76 dB
ABM1 comp = 5.90 dB A/m
BWC Factor = 0.16 dB
Location: -5, 3, 4.4 mm



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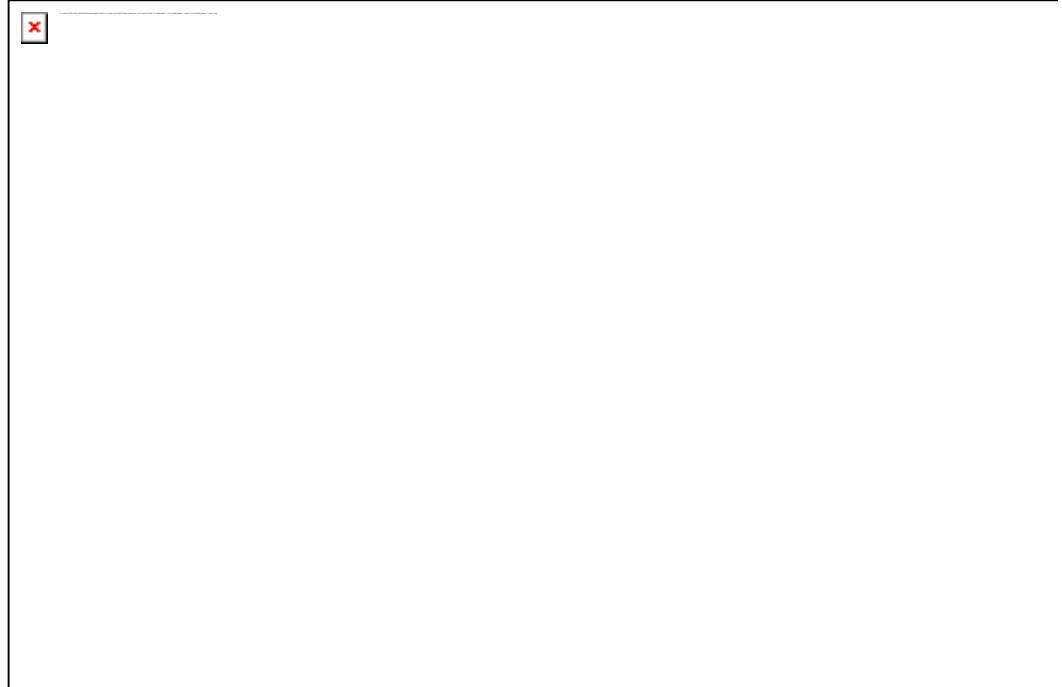
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Date/Time: 6/28/2012 7:17:59 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_GSM1900_Axial

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: GSM 1900; Frequency: 1850.2 MHz, Frequency: 1880 MHz, Frequency: 1909.8 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/z (axial) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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**T-Coil scan/General Scans 2/z (axial) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 47.36 dB
ABM1 comp = 12.06 dB A/m
BWC Factor = 0.16 dB
Location: -5, -5, 4.4 mm

**T-Coil scan/General Scans 2/z (axial) wideband at best S/N 2/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: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

**T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 47.55 dB
ABM1 comp = 12.01 dB A/m
BWC Factor = 0.16 dB
Location: -5, -5, 4.4 mm

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T-Coil scan/General Scans 2 2 2/z (axial) 2mm 8 x 8/ABM_High Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 47.42 dB
ABM1 comp = 12.06 dB A/m
BWC Factor = 0.16 dB
Location: -5, -5, 4.4 mm

T-Coil scan/General Scans 2 2 2/z (axial) wideband at best S/N 2 2/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: 69.12
Measure Window Start: 300ms
Measure Window Length: 2000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm



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**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
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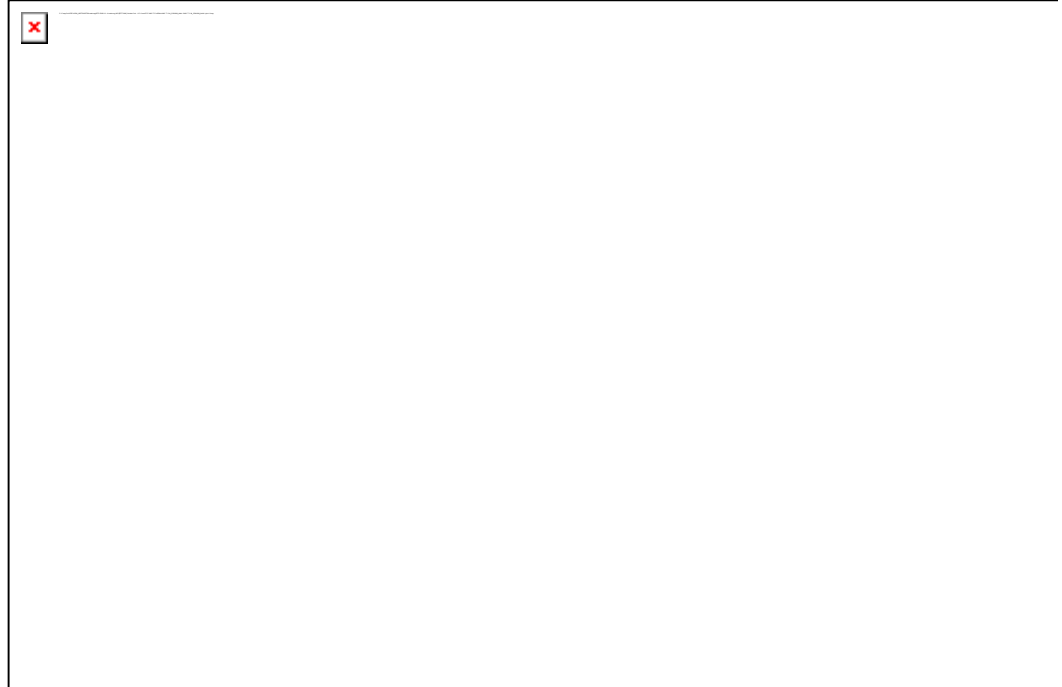
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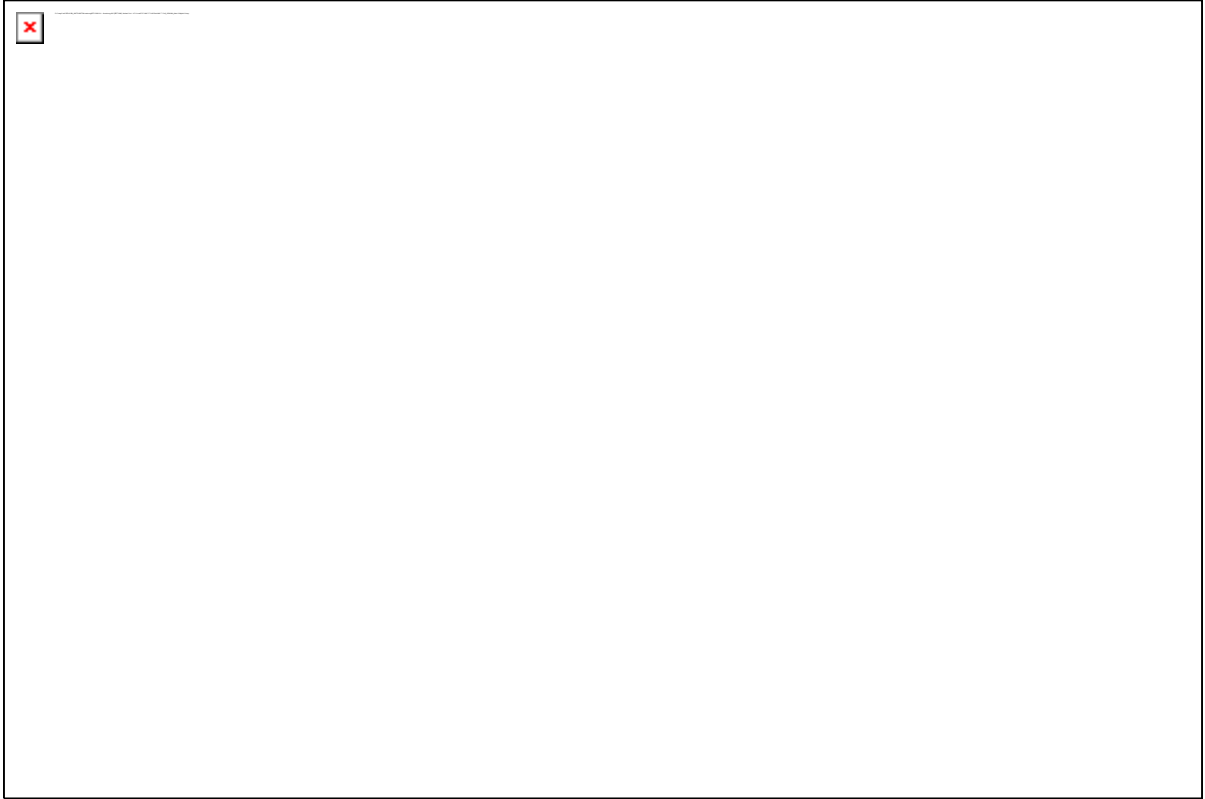
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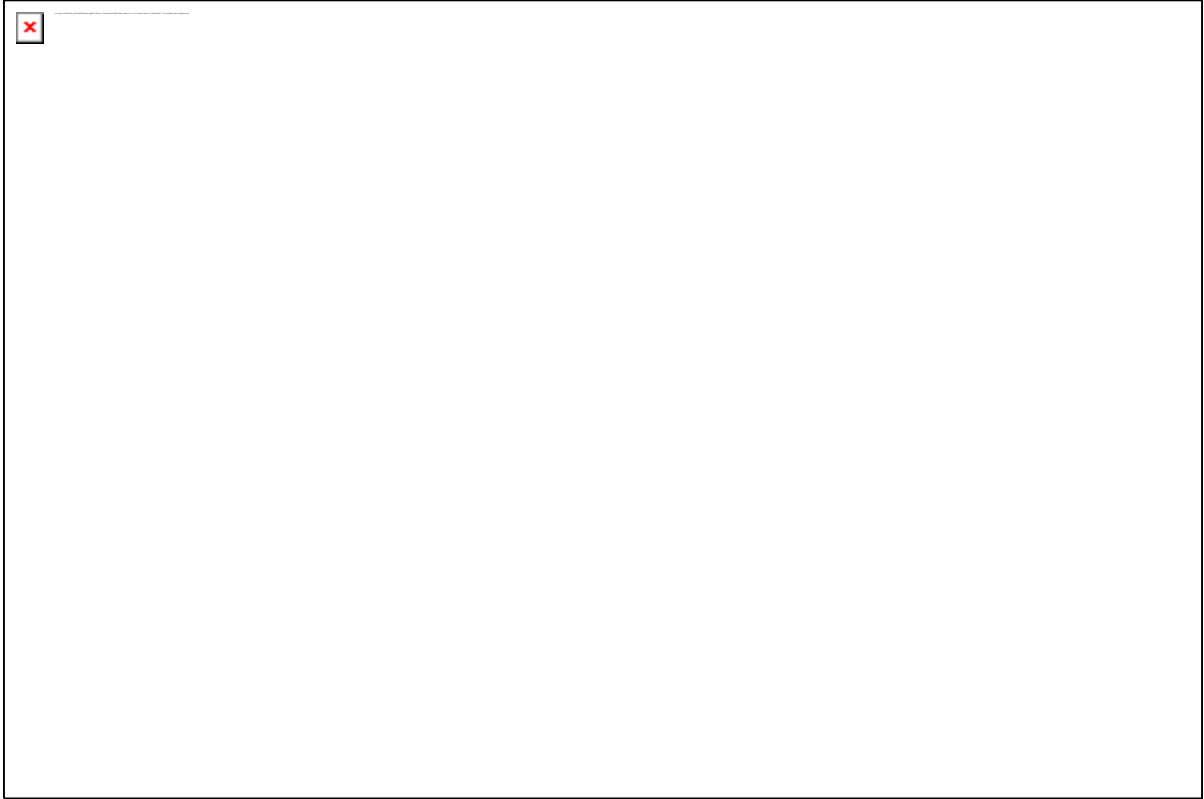
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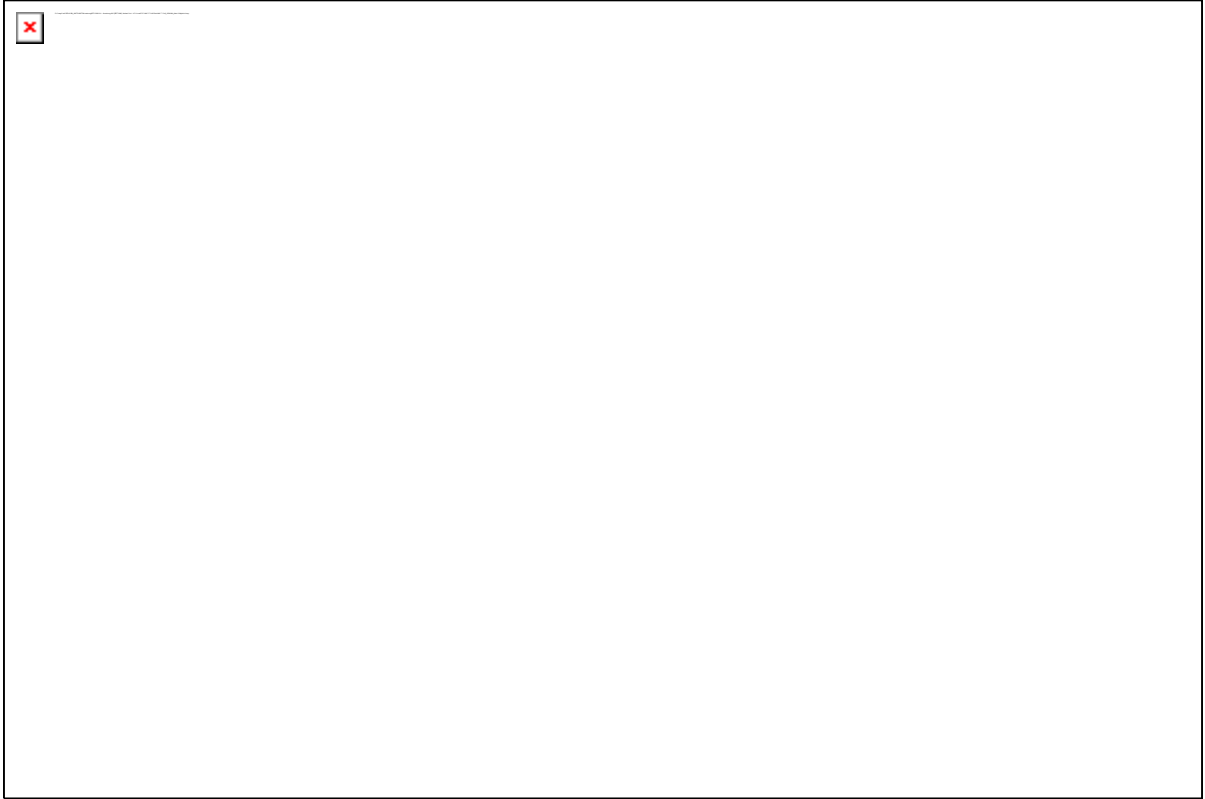
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Date/Time: 6/28/2012 7:31:18 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_GSM1900_Radial_L

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: GSM 1900; Frequency: 1850.2 MHz, Frequency: 1880 MHz, Frequency: 1909.8 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS2 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/x (longitudinal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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T-Coil scan/General Scans 2/x (longitudinal) 2mm 8 x 8/ABM_Low Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 38.25 dB
ABM1 comp = 5.55 dB A/m
BWC Factor = 0.16 dB
Location: -12, -7, 4.4 mm

T-Coil scan/General Scans 2 2/x (longitudinal) 2mm 8 x 8/ABM_Mid Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 38.42 dB
ABM1 comp = 5.34 dB A/m
BWC Factor = 0.16 dB
Location: -12, -7, 4.4 mm

T-Coil scan/General Scans 2 2 2/x (longitudinal) 2mm 8 x 8/ABM_High Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 38.19 dB
ABM1 comp = 5.62 dB A/m
BWC Factor = 0.16 dB
Location: -12, -5, 4.4 mm



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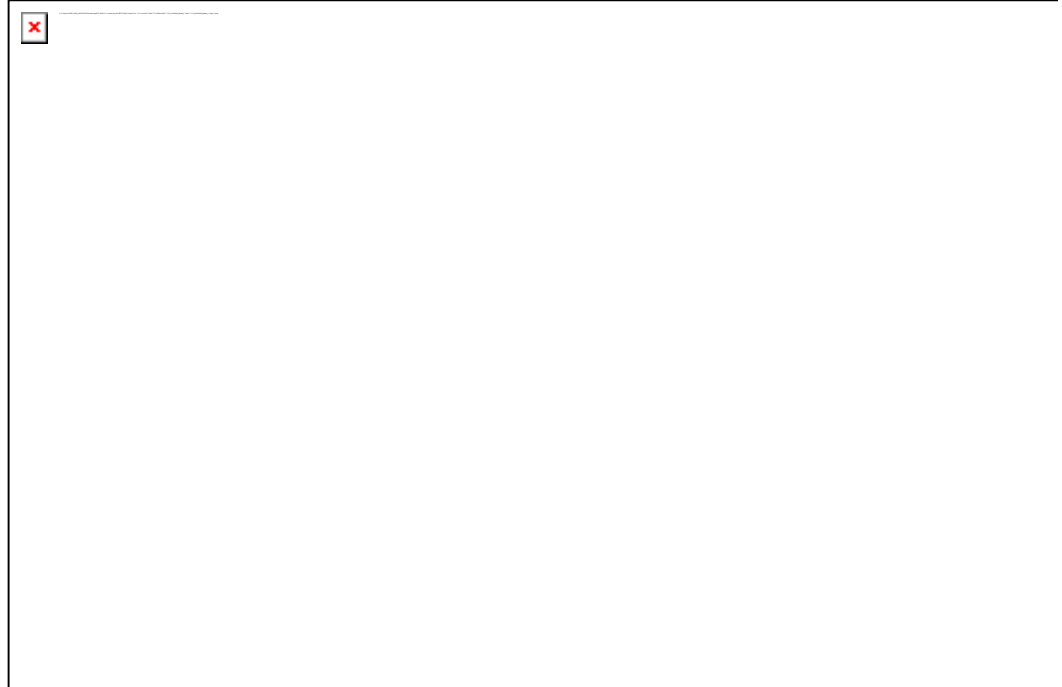
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Date/Time: 6/28/2012 7:44:38 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_GSM1900_Radial_T

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: GSM 1900; Frequency: 1850.2 MHz, Frequency: 1880 MHz, Frequency: 1909.8 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/y (transversal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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T-Coil scan/General Scans 2/y (transversal) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 55.61 dB
ABM1 comp = 5.38 dB A/m
BWC Factor = 0.16 dB
Location: -7, 3, 4.4 mm

T-Coil scan/General Scans 2 2/y (transversal) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 55.71 dB
ABM1 comp = 5.41 dB A/m
BWC Factor = 0.16 dB
Location: -7, 3, 4.4 mm

T-Coil scan/General Scans 2 2 2/y (transversal) 2mm 8 x 8/ABM_High Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 55.72 dB
ABM1 comp = 6.04 dB A/m
BWC Factor = 0.16 dB
Location: -5, 3, 4.4 mm



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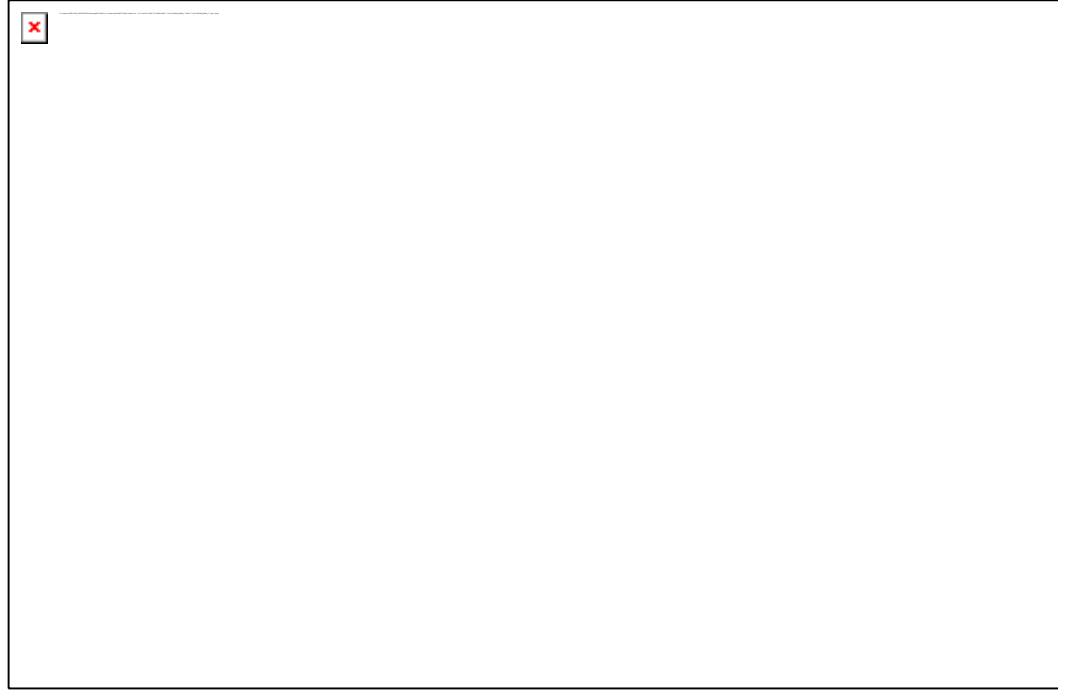
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Date/Time: 6/28/2012 9:27:12 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_V_Axial

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD V; Frequency: 826.4 MHz, Frequency: 836.4 MHz, Frequency: 846.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/z (axial) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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**T-Coil scan/General Scans 2/z (axial) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:


ABM1/ABM2 = 65.08 dB
ABM1 comp = 11.51 dB A/m
BWC Factor = 0.16 dB
Location: -5, -7, 4.4 mm

**T-Coil scan/General Scans 2/z (axial) wideband at best S/N 2/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: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

**T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

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Cursor:

ABM1/ABM2 = 65.44 dB
 ABM1 comp = 11.29 dB A/m
 BWC Factor = 0.16 dB
 Location: -5, -7, 4.4 mm

T-Coil scan/General Scans 2 2/z (axial) wideband at best S/N 2/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: 69.12
 Measure Window Start: 2000ms
 Measure Window Length: 4000ms
 BWC applied: 10.80 dB
 Device Reference Point: 0, 0, -6.3 mm

T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM_High Chan_

SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
 Output Gain: 35.28
 Measure Window Start: 300ms
 Measure Window Length: 1000ms
 BWC applied: 0.16 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 65.66 dB
 ABM1 comp = 11.52 dB A/m
 BWC Factor = 0.16 dB
 Location: -5, -7, 4.4 mm

T-Coil scan/General Scans 2 2/z (axial) wideband at best S/N 2 2/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: 69.12
 Measure Window Start: 300ms
 Measure Window Length: 6000ms
 BWC applied: 10.80 dB
 Device Reference Point: 0, 0, -6.3 mm



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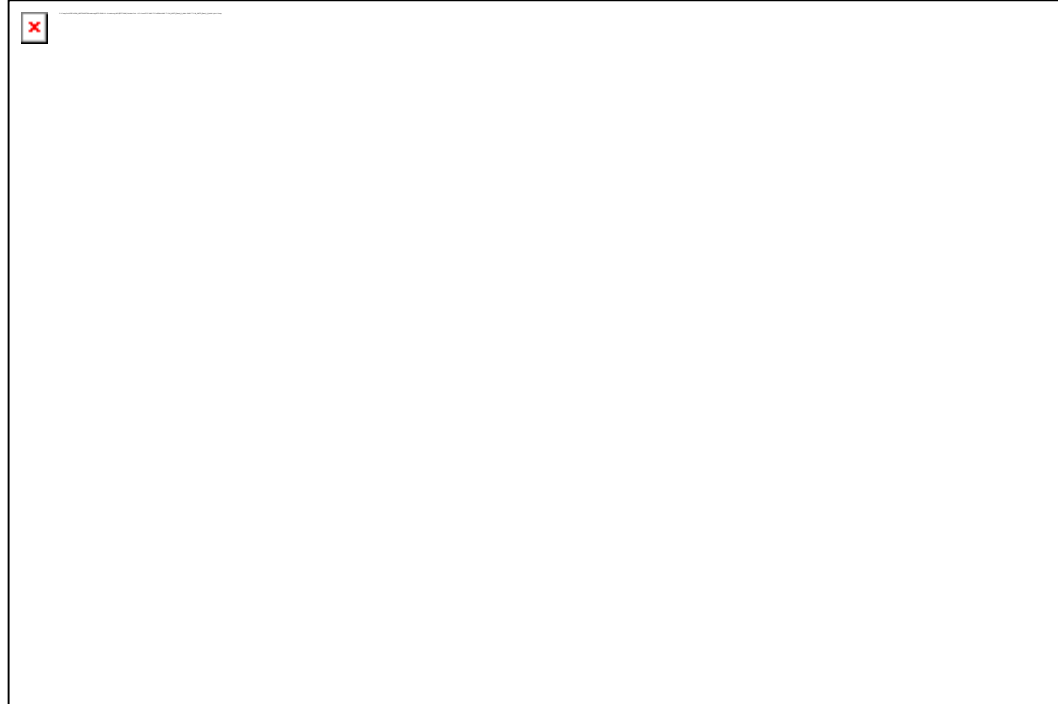
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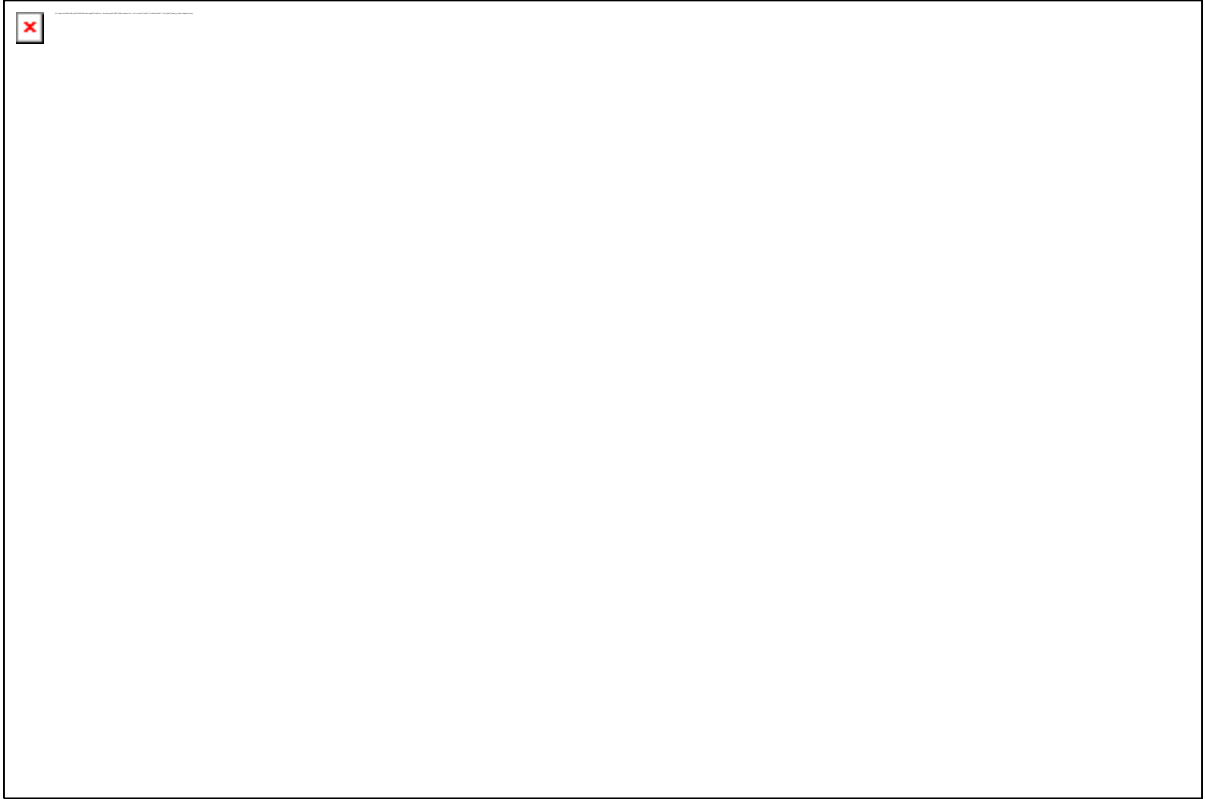
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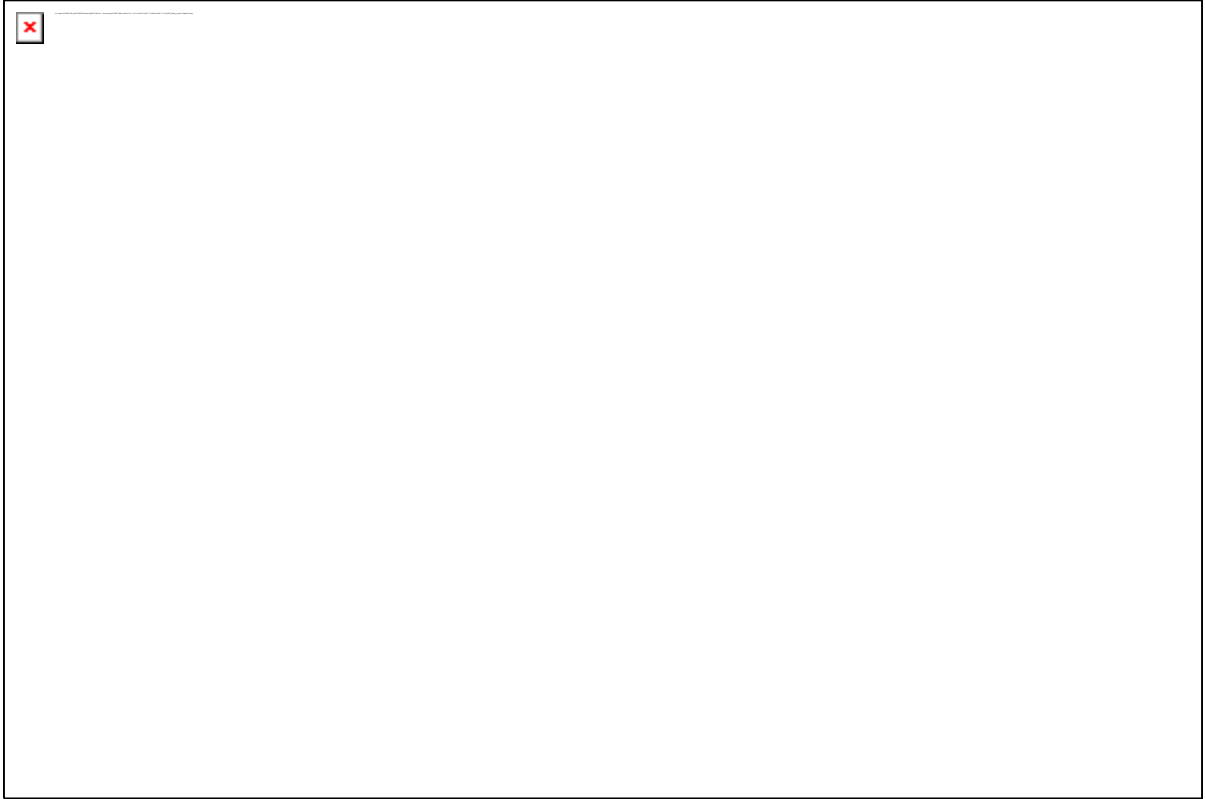
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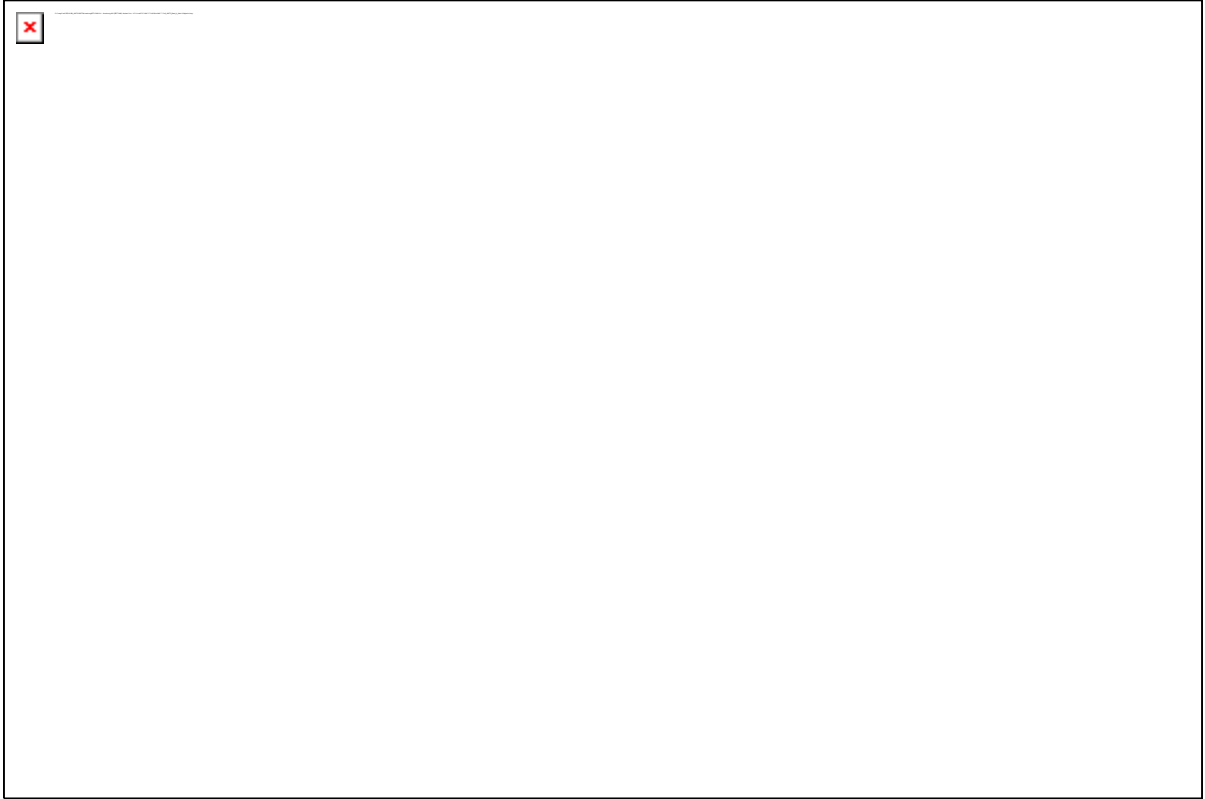
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Date/Time: 6/28/2012 9:40:31 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_V_Radial_L

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD V; Frequency: 826.4 MHz, Frequency: 836.4 MHz, Frequency: 846.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS2 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/x (longitudinal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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T-Coil scan/General Scans 2/x (longitudinal) 2mm 8 x 8/ABM_Low Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 59.54 dB
ABM1 comp = 5.32 dB A/m
BWC Factor = 0.16 dB
Location: -10, -5, 4.4 mm

T-Coil scan/General Scans 2 2/x (longitudinal) 2mm 8 x 8/ABM_Mid Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 59.55 dB
ABM1 comp = 5.15 dB A/m
BWC Factor = 0.16 dB
Location: -10, -5, 4.4 mm

T-Coil scan/General Scans 2 2 2/x (longitudinal) 2mm 8 x 8/ABM_High Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 59.35 dB
ABM1 comp = 4.98 dB A/m
BWC Factor = 0.16 dB
Location: -10, -5, 4.4 mm



Document
**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
Test Report for BlackBerry® Smartphone model RFE71UW**

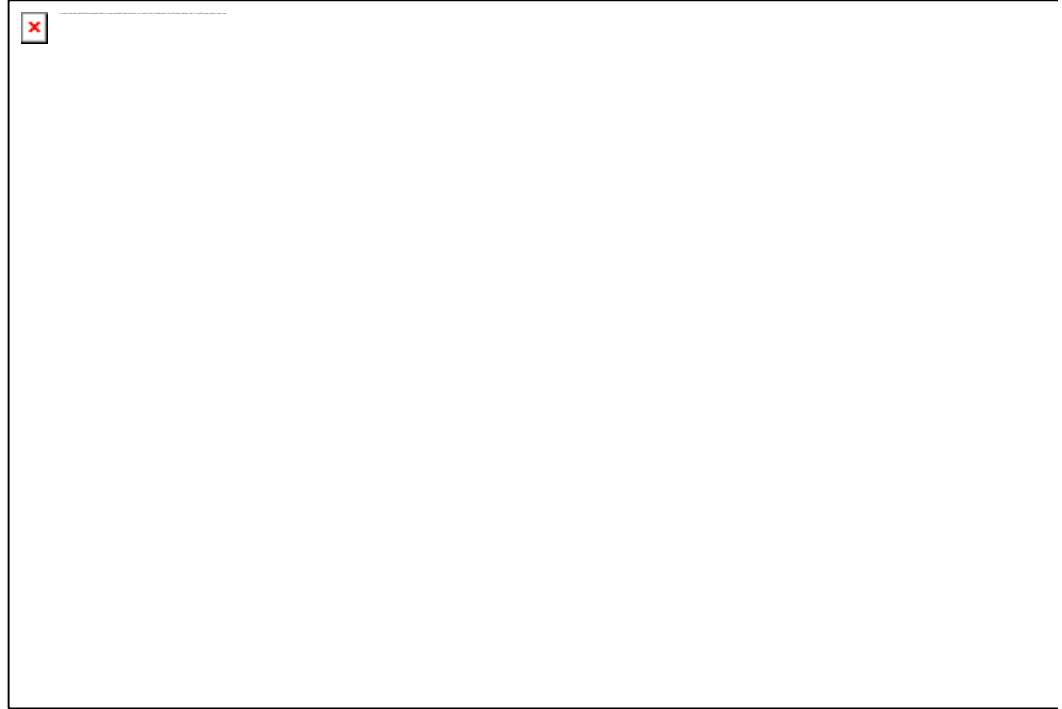
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Author Data
Daoud Attayi

Dates of Test
June 19-28, 2012

Report No
RTS-5992-1207-36

FCC ID
L6ARFE70UW



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| | Author Data Daoud Attayi | Dates of Test June 19-28, 2012 | Report No RTS-5992-1207-36 |

Date/Time: 6/28/2012 9:53:54 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_V_Radial_T

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD V; Frequency: 826.4 MHz, Frequency: 836.4 MHz, Frequency: 846.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/y (transversal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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T-Coil scan/General Scans 2/y (transversal) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 60.45 dB
ABM1 comp = 6.56 dB A/m
BWC Factor = 0.16 dB
Location: -5, -15, 4.4 mm

T-Coil scan/General Scans 2 2/y (transversal) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 60.40 dB
ABM1 comp = 6.48 dB A/m
BWC Factor = 0.16 dB
Location: -5, -15, 4.4 mm

T-Coil scan/General Scans 2 2 2/y (transversal) 2mm 8 x 8/ABM_High Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 60.43 dB
ABM1 comp = 6.72 dB A/m
BWC Factor = 0.16 dB
Location: -5, -13, 4.4 mm



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**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
Test Report for BlackBerry® Smartphone model RFE71UW**

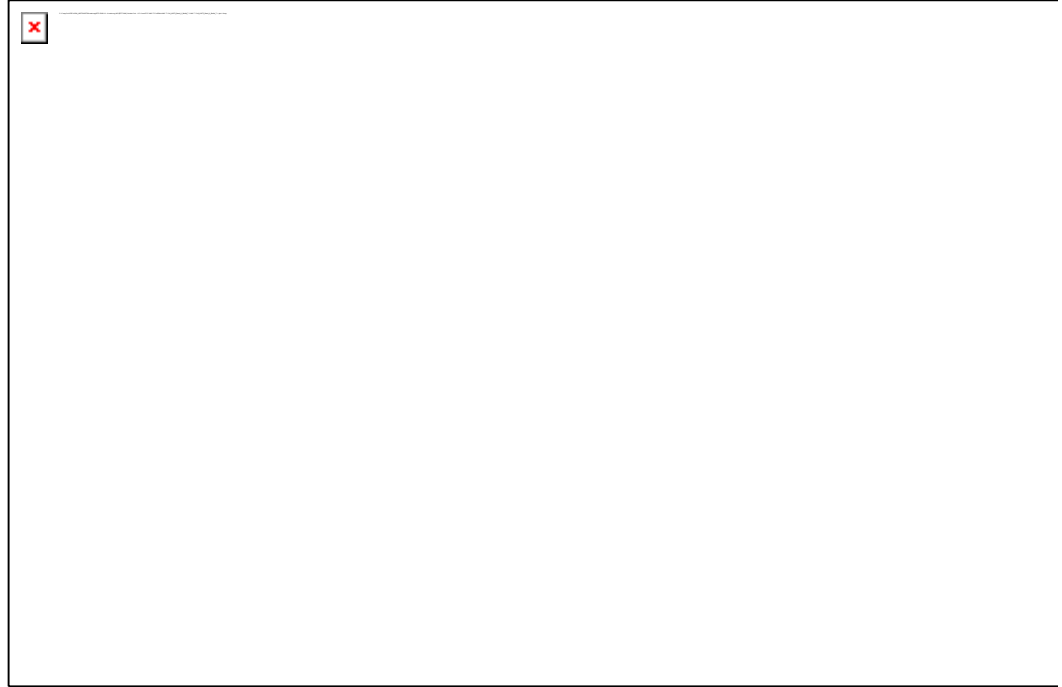
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Daoud Attayi

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Date/Time: 6/28/2012 11:29:39 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_IV_Axial

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD IV; Frequency: 1712.4 MHz, Frequency: 1732.6 MHz, Frequency: 1752.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/z (axial) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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**T-Coil scan/General Scans 2/z (axial) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:


ABM1/ABM2 = 65.36 dB
ABM1 comp = 11.30 dB A/m
BWC Factor = 0.16 dB
Location: -5, -5, 4.4 mm

**T-Coil scan/General Scans 2/z (axial) wideband at best S/N 2/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: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

**T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

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Cursor:

ABM1/ABM2 = 65.03 dB
ABM1 comp = 10.95 dB A/m
BWC Factor = 0.16 dB
Location: -5, -7, 4.4 mm

T-Coil scan/General Scans 2 2/z (axial) wideband at best S/N 2/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: 69.12
Measure Window Start: 2000ms
Measure Window Length: 4000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM_High Chan_

SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 64.92 dB
ABM1 comp = 10.81 dB A/m
BWC Factor = 0.16 dB
Location: -5, -7, 4.4 mm

T-Coil scan/General Scans 2 2/z (axial) wideband at best S/N 2 2/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: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm



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**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
Test Report for BlackBerry® Smartphone model RFE71UW**

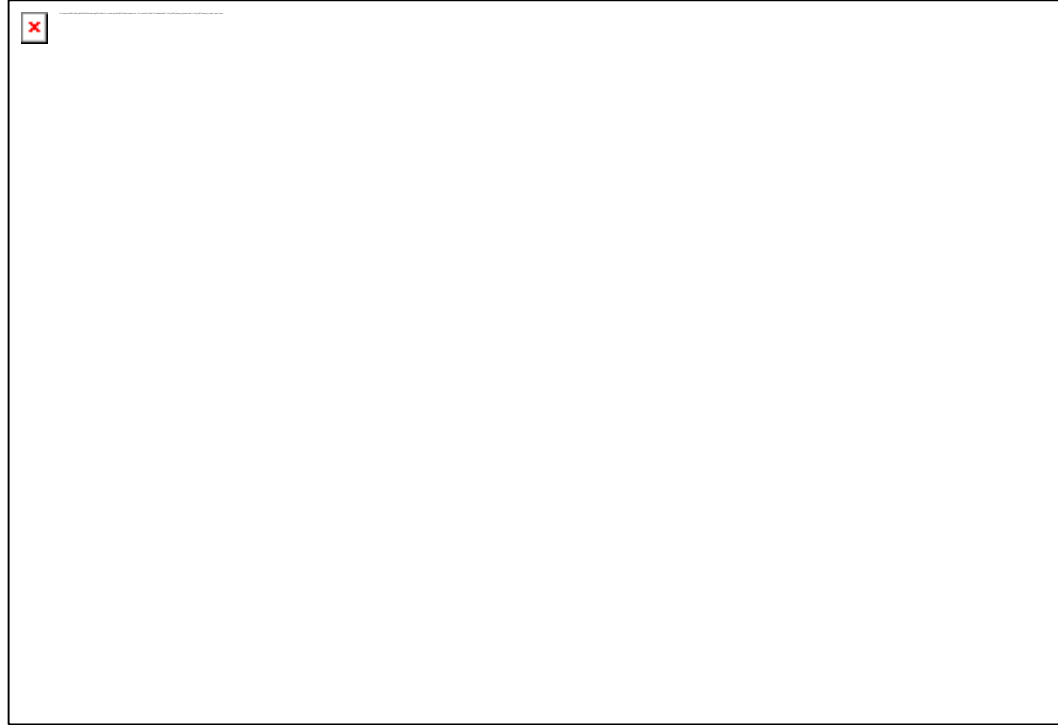
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**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
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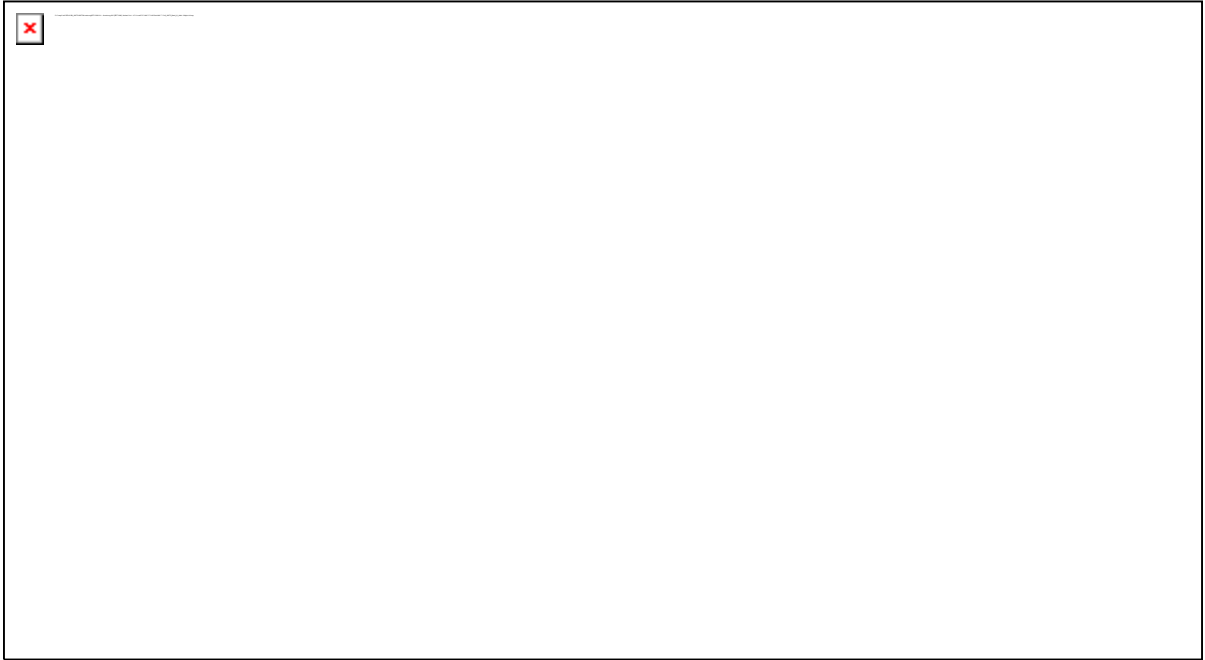
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**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
Test Report for BlackBerry® Smartphone model RFE71UW**

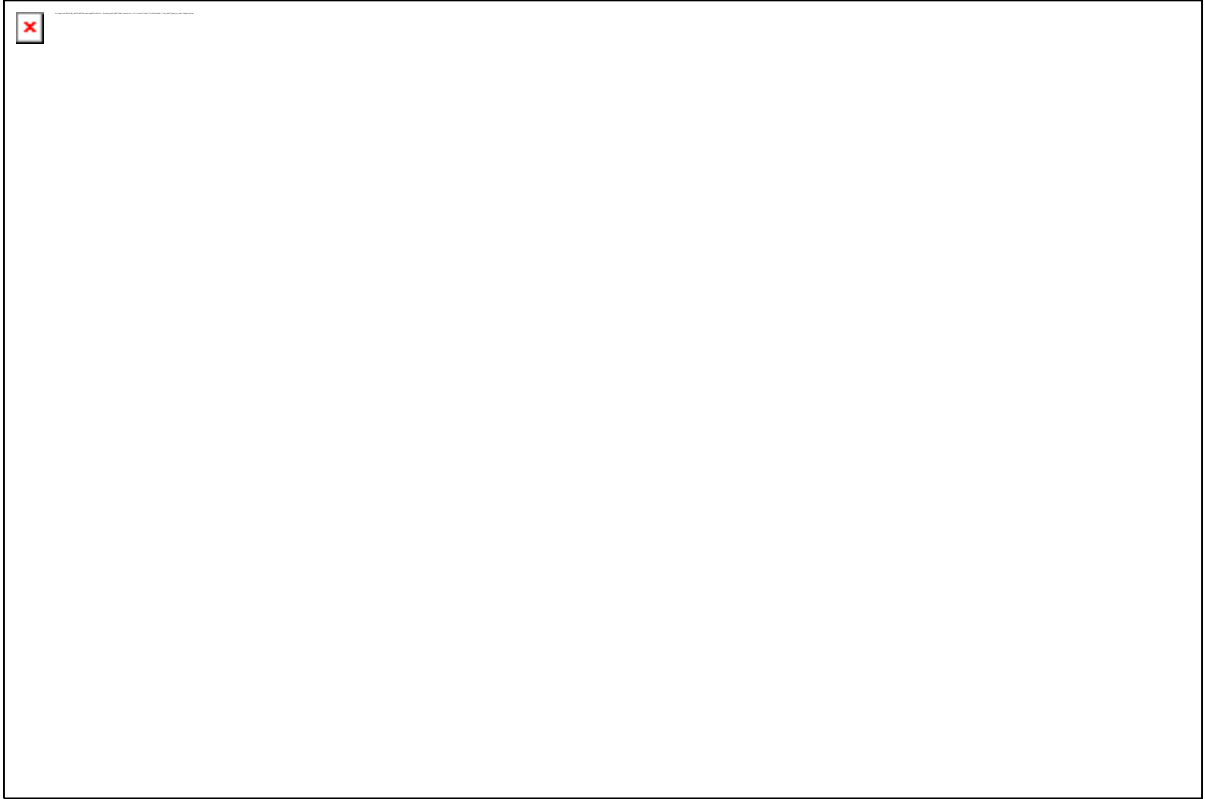
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Author Data
Daoud Attayi

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| | Author Data Daoud Attayi | Dates of Test June 19-28, 2012 | Report No RTS-5992-1207-36 |

Date/Time: 6/28/2012 11:42:59 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_IV_Radial_L

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD IV; Frequency: 1712.4 MHz, Frequency: 1732.6 MHz, Frequency: 1752.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS2 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/x (longitudinal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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|---|---|---|---|
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T-Coil scan/General Scans 2/x (longitudinal) 2mm 8 x 8/ABM_Low Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 59.24 dB
ABM1 comp = 4.97 dB A/m
BWC Factor = 0.16 dB
Location: -10, -5, 4.4 mm

T-Coil scan/General Scans 2 2/x (longitudinal) 2mm 8 x 8/ABM_Mid Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 58.95 dB
ABM1 comp = 4.74 dB A/m
BWC Factor = 0.16 dB
Location: -10, -5, 4.4 mm

T-Coil scan/General Scans 2 2 2/x (longitudinal) 2mm 8 x 8/ABM_High Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 59.04 dB
ABM1 comp = 4.61 dB A/m
BWC Factor = 0.16 dB
Location: -10, -5, 4.4 mm



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**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
Test Report for BlackBerry® Smartphone model RFE71UW**

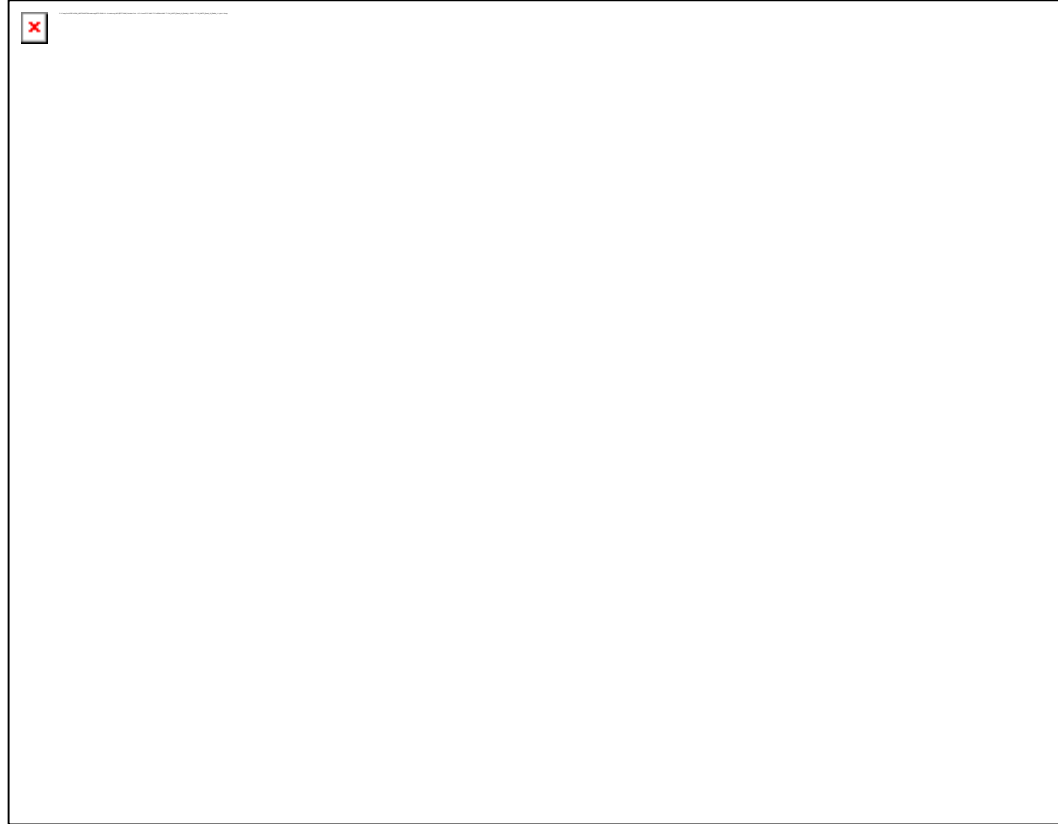
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Author Data
Daoud Attayi

Dates of Test
June 19-28, 2012

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Date/Time: 6/28/2012 11:56:22 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_IV_Radial_T

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD IV; Frequency: 1712.4 MHz, Frequency: 1732.6 MHz, Frequency: 1752.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/y (transversal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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T-Coil scan/General Scans 2/y (transversal) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 60.20 dB
ABM1 comp = 6.39 dB A/m
BWC Factor = 0.16 dB
Location: -5, -13, 4.4 mm

T-Coil scan/General Scans 2 2/y (transversal) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 60.26 dB
ABM1 comp = 6.45 dB A/m
BWC Factor = 0.16 dB
Location: -5, -13, 4.4 mm

T-Coil scan/General Scans 2 2 2/y (transversal) 2mm 8 x 8/ABM_High Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 60.18 dB
ABM1 comp = 6.33 dB A/m
BWC Factor = 0.16 dB
Location: -5, -13, 4.4 mm



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**Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil
Test Report for BlackBerry® Smartphone model RFE71UW**

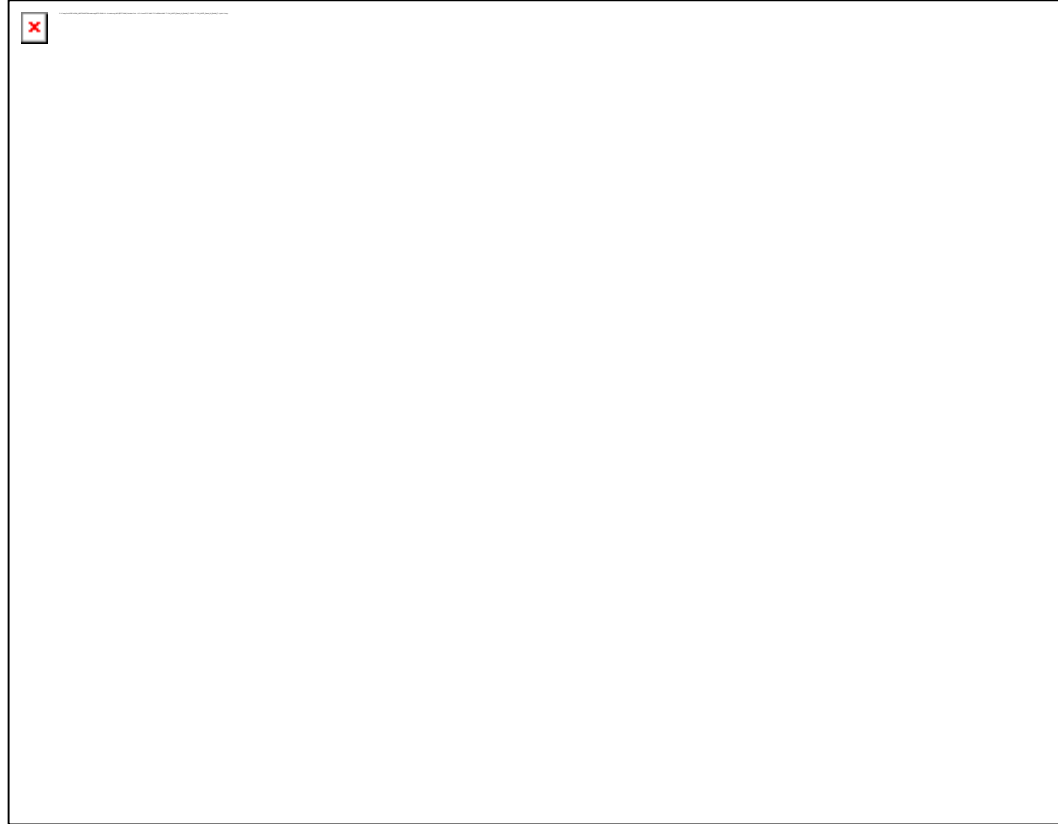
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Author Data
Daoud Attayi

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Date/Time: 6/29/2012 12:48:57 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_II_Axial

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD II; Frequency: 1852.4 MHz, Frequency: 1880 MHz, Frequency: 1907.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/z (axial) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

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**T-Coil scan/General Scans 2/z (axial) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:


ABM1/ABM2 = 56.47 dB
ABM1 comp = 11.37 dB A/m
BWC Factor = 0.16 dB
Location: -5, -7, 4.4 mm

**T-Coil scan/General Scans 2/z (axial) wideband at best S/N 2/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: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

**T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):**

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

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Cursor:

ABM1/ABM2 = 56.27 dB
 ABM1 comp = 10.47 dB A/m
 BWC Factor = 0.16 dB
 Location: -7, -7, 4.4 mm

T-Coil scan/General Scans 2 2/z (axial) wideband at best S/N 2/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: 69.12
 Measure Window Start: 2000ms
 Measure Window Length: 4000ms
 BWC applied: 10.80 dB
 Device Reference Point: 0, 0, -6.3 mm

T-Coil scan/General Scans 2 2/z (axial) 2mm 8 x 8/ABM_High Chan_

SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
 Output Gain: 35.28
 Measure Window Start: 300ms
 Measure Window Length: 1000ms
 BWC applied: 0.16 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 55.29 dB
 ABM1 comp = 10.65 dB A/m
 BWC Factor = 0.16 dB
 Location: -7, -7, 4.4 mm

T-Coil scan/General Scans 2 2/z (axial) wideband at best S/N 2 2/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: 69.12
 Measure Window Start: 300ms
 Measure Window Length: 6000ms
 BWC applied: 10.80 dB
 Device Reference Point: 0, 0, -6.3 mm



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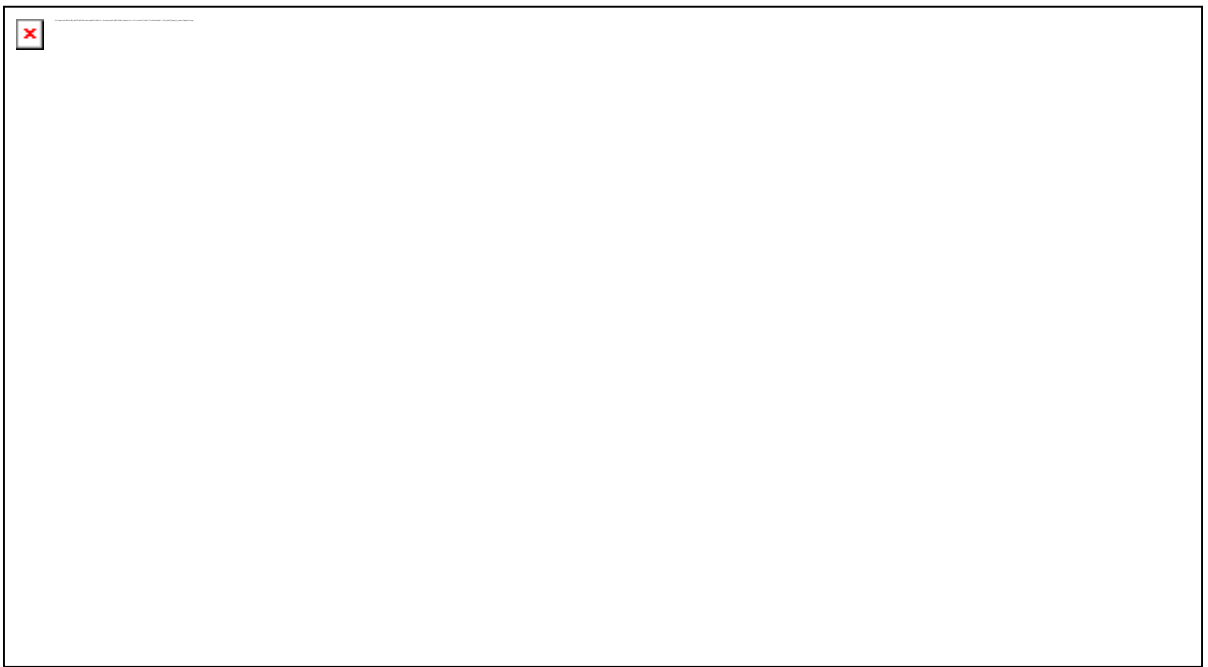
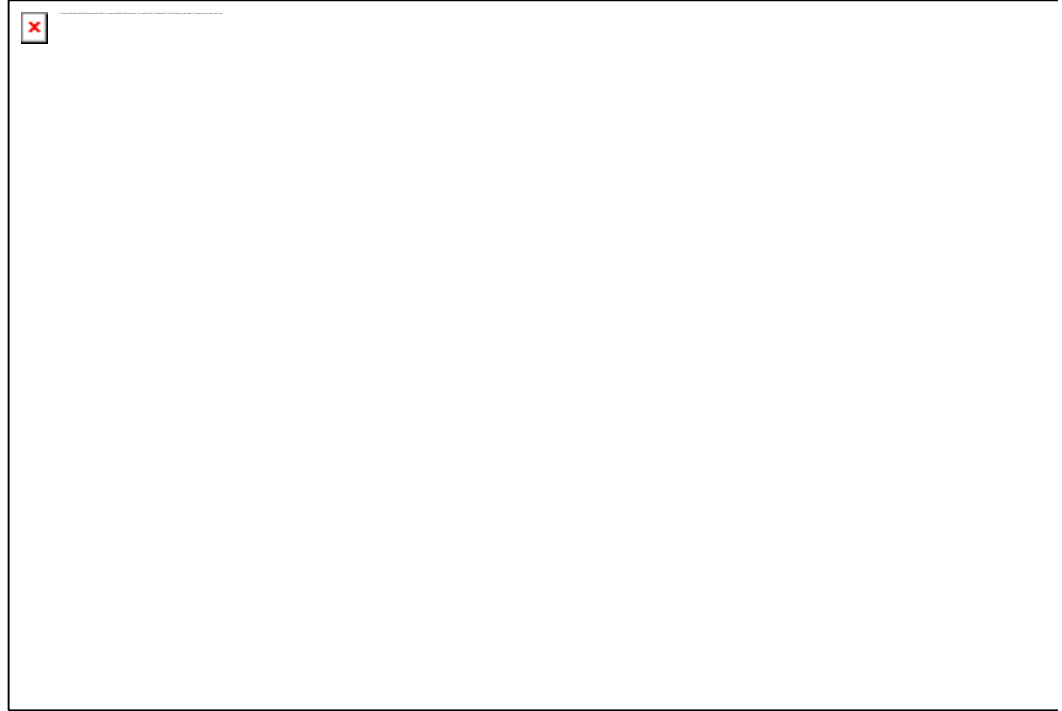
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Author Data
Daoud Attayi

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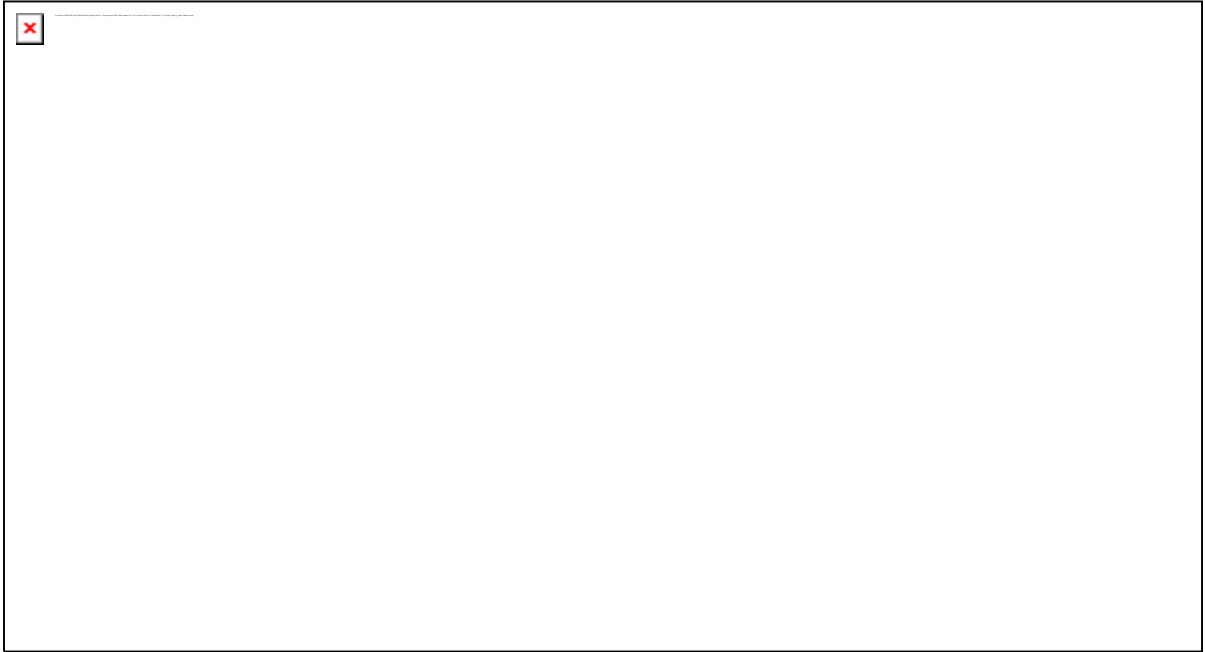
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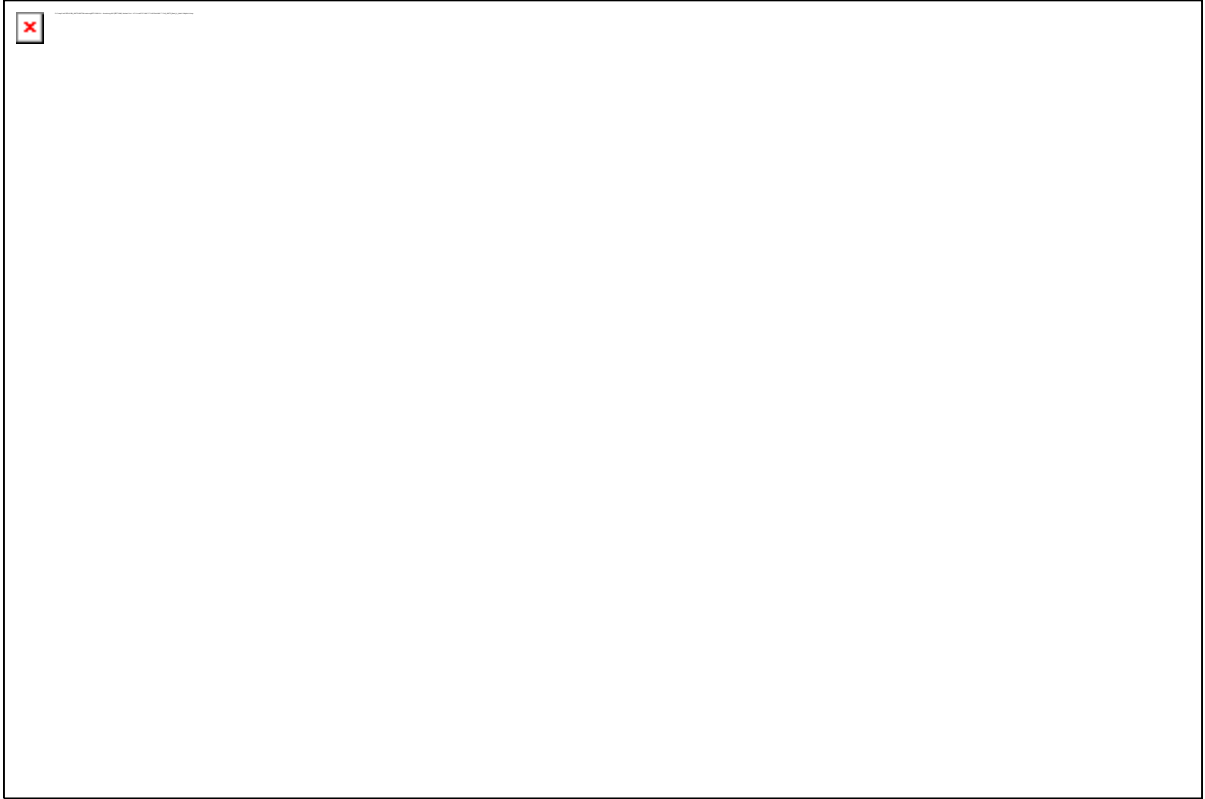
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Date/Time: 6/29/2012 1:02:22 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_II_Radial_L

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD II; Frequency: 1852.4 MHz, Frequency: 1880 MHz, Frequency: 1907.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS2 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/x (longitudinal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav

Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

T-Coil scan/General Scans 2/x (longitudinal) 2mm 8 x 8/ABM_Low Chan_SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

| | | | |
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Cursor:

ABM1/ABM2 = 54.91 dB
 ABM1 comp = 4.55 dB A/m
 BWC Factor = 0.16 dB
 Location: -12, -7, 4.4 mm

T-Coil scan/General Scans 2 2/x (longitudinal) 2mm 8 x 8/ABM_Mid Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
 Output Gain: 35.28
 Measure Window Start: 300ms
 Measure Window Length: 1000ms
 BWC applied: 0.16 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 54.61 dB
 ABM1 comp = 4.53 dB A/m
 BWC Factor = 0.16 dB
 Location: -12, -7, 4.4 mm

T-Coil scan/General Scans 2 2/x (longitudinal) 2mm 8 x 8/ABM_High Chan_ SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
 Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
 Output Gain: 35.28
 Measure Window Start: 300ms
 Measure Window Length: 1000ms
 BWC applied: 0.16 dB
 Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 54.91 dB
 ABM1 comp = 4.70 dB A/m
 BWC Factor = 0.16 dB
 Location: -10, -7, 4.4 mm



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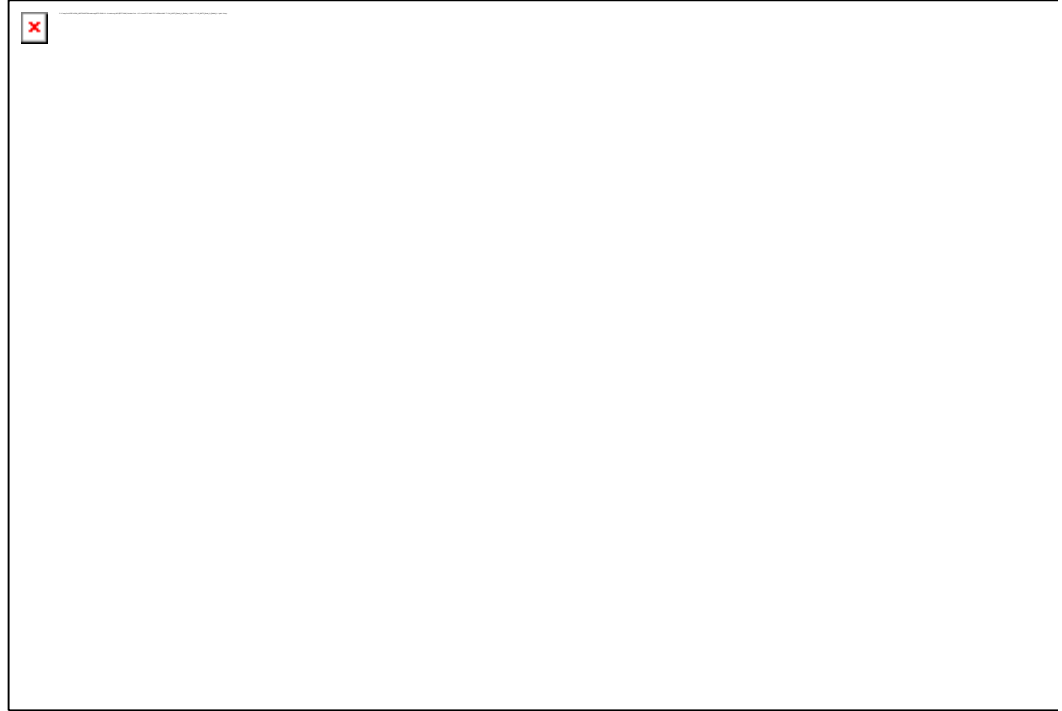
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Date/Time: 6/29/2012 1:15:51 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_UMTS_Band_II_Radial_T

DUT: BlackBerry; Type: Sample; Serial: 2A211570

Communication System: WCDMA FDD II; Frequency: 1852.4 MHz, Frequency: 1880 MHz, Frequency: 1907.6 MHz

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

Phantom section: TCoil Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

T-Coil scan/General Scans 2/y (transversal) 5.0mm 50 x 50/ABM SNR(x,y,z) (11x11x1):

Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav


Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

| | | | |
|---|---|---|---|
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T-Coil scan/General Scans 2/y (transversal) 2mm 8 x 8/ABM_Low Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 58.73 dB
ABM1 comp = 5.72 dB A/m
BWC Factor = 0.16 dB
Location: -5, 2, 4.4 mm

T-Coil scan/General Scans 2 2/y (transversal) 2mm 8 x 8/ABM_Mid Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 58.45 dB
ABM1 comp = 4.84 dB A/m
BWC Factor = 0.16 dB
Location: -7, 2, 4.4 mm

T-Coil scan/General Scans 2 2 2/y (transversal) 2mm 8 x 8/ABM_High Chan_
SNR(x,y,z) (5x5x1):

Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1/ABM2 = 58.52 dB
ABM1 comp = 5.63 dB A/m
BWC Factor = 0.16 dB
Location: -5, 2, 4.4 mm



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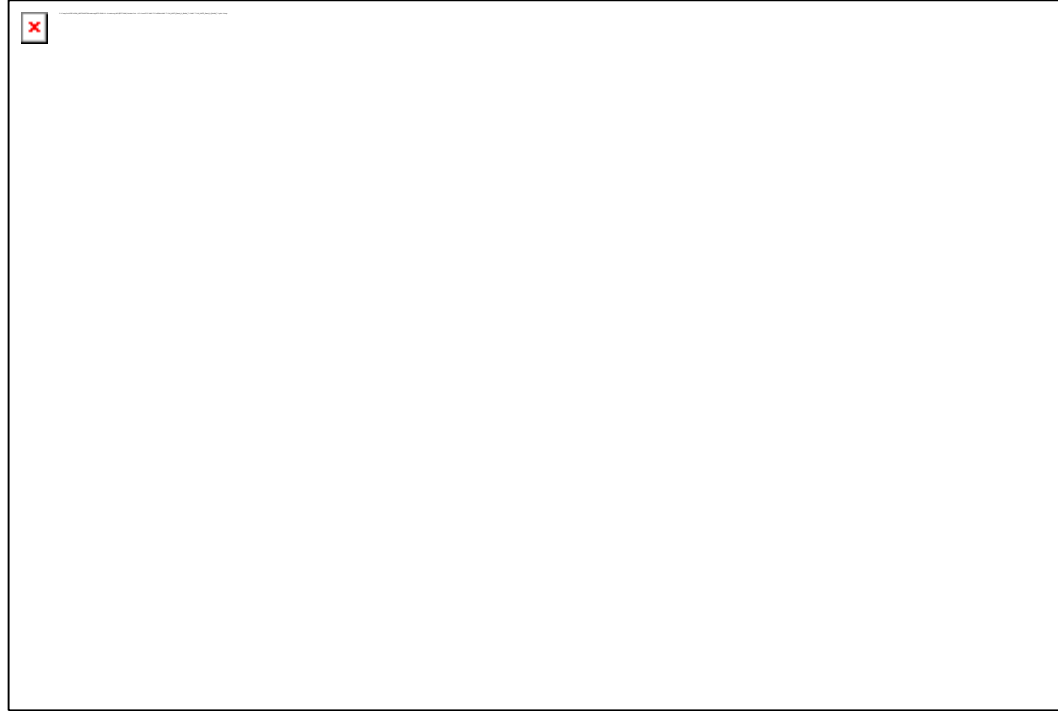
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Annex D: Probe/TMFS calibration certificate

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



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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

Accreditation No.: **SCS 108**

Client **RTS (RIM Testing Services)**

Certificate No: **AM1DV3-3062_Jan12**

CALIBRATION CERTIFICATE

Object **AM1DV3 - SN: 3062**

Calibration procedure(s) **QA CAL-24.v3
Calibration procedure for AM1D magnetic field probes and TMFS in the
audio range**

Calibration date: **January 12, 2012**

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

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


Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|-------------------------------|-------------|-----------------------------------|-----------------------|
| Keithley Multimeter Type 2001 | SN: 0810278 | 28-Sep-11 (No:11450) | Sep-12 |
| Reference Probe AM1DV3 | SN: 3000 | 17-Aug-11 (No. AM1D-3000_Aug11) | Aug-12 |
| DAE4 | SN: 781 | 20-Apr-11 (No. DAE4-781_Apr11) | Apr-12 |
| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
| AMCC | 1050 | 12-Oct-11 (in house check Oct-11) | Oct-13 |

Calibrated by: **Name: Dimce Iliev, Function: Laboratory Technician, Signature: [Signature]**
Approved by: **Name: Katja Pokovic, Function: Technical Manager, Signature: [Signature]**

Issued: January 13, 2012

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

| | | | |
|---|---|--|--------------------------------------|
|  | Document Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFE71UW | | Page 75(81) |
| | Author Data Daoud Attayi | Dates of Test June 19-28, 2012 | Report No RTS-5992-1207-36 |

References

- [1] ANSI C63.19-2007
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.
- [2] DASY5 manual, Chapter: Hearing Aid Compatibility (HAC) T-Coil Extension

Description of the AM1D probe

The AM1D Audio Magnetic Field Probe is a fully shielded magnetic field probe for the frequency range from 100 Hz to 20 kHz. The pickup coil is compliant with the dimensional requirements of [1]. The probe includes a symmetric low noise amplifier for the signal available at the shielded 3 pin connector at the side. Power is supplied via the same connector (phantom power supply) and monitored via the LED near the connector. The 7 pin connector at the end of the probe does not carry any signals, but determines the angle of the sensor when mounted on the DAE. The probe supports mechanical detection of the surface.

The single sensor in the probe is arranged in a tilt angle allowing measurement of 3 orthogonal field components when rotating the probe by 120° around its axis. It is aligned with the perpendicular component of the field, if the probe axis is tilted nominally 35.3° above the measurement plane, using the connector rotation and sensor angle stated below.

The probe is fully RF shielded when operated with the matching signal cable (shielded) and allows measurement of audio magnetic fields in the close vicinity of RF emitting wireless devices according to [1] without additional shielding.

Handling of the item

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

Methods Applied and Interpretation of Parameters

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

Author Data
Daoud Attayi

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AM1D probe identification and configuration data


| | |
|-----------|---|
| Item | AM1DV3 Audio Magnetic 1D Field Probe |
| Type No | SP AM1 001 BA |
| Serial No | 3062 |

| | |
|--------------------|------------------------------------|
| Overall length | 296 mm |
| Tip diameter | 6.0 mm (at the tip) |
| Sensor offset | 3.0 mm (centre of sensor from tip) |
| Internal Amplifier | 20 dB |

| | |
|-----------------------|--|
| Manufacturer / Origin | Schmid & Partner Engineering AG, Zürich, Switzerland |
| Manufacturing date | October 30, 2008 |
| Last calibration date | April 07, 2011 |

Calibration data

| | | | |
|--------------------------|------------------|--------------------------|-----------------|
| Connector rotation angle | (in DASY system) | 61.0 ° | +/- 3.6 ° (k=2) |
| Sensor angle | (in DASY system) | 0.18 ° | +/- 0.5 ° (k=2) |
| Sensitivity at 1 kHz | (in DASY system) | 0.00741 V / (A/m) | +/- 2.2 % (k=2) |

| | | | |
|---|---|--|--------------------------------------|
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**Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Client **RTS (RIM Testing Services)**

Certificate No: **TMFS_1003_Nov11**

CALIBRATION CERTIFICATE

Object / Identification **TMFS – SN: 1003**



Calibration procedure(s) **QA CAL-24.v2
Calibration procedure for AM1D magnetic field probes and TMFS in the
audio range**

Calibration date **November 30, 2011**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The calibrations have been conducted in the R&D laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Calibrated by, Certificate No.) | Scheduled Calibration |
|---------------------------------|-------------|---|-----------------------------|
| Keithley Multimeter Type 2001 | SN: 0810278 | 28-Sep-11 (No: 11450) | Sep-12 |
| Secondary Standards | ID # | Cal / Check Date | Scheduled Calibration Check |
| AMCC | 1050 | 12-Oct-11 (in house check Oct-11) | Oct-13 |
| Reference Probe AM1DV2 | SN: 1008 | 18-Jan-11 (No. AM1D-1008_Jan11) | Jan-12 |
| AMMI Audio Measuring Instrument | 1082 | 20-Sep-10 (in house check Sep-10) | Sep-12 |
| Agilent WF Generator 33120A | MY40005266 | 12-Oct-11 (in house check Oct-11) | Oct-13 |

Calibrated by: **Claudio Leubler** Name: Claudio Leubler Function: Laboratory Technician Signature: 
Approved by: **Fin Bornholt** Name: Fin Bornholt R&D Director Signature: 

Issued: December 5, 2011

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

References

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

Methods Applied and Interpretation of Parameters

- **Coordinate System:** The TMFS is mounted underneath the HAC Test Arch touching equivalently to a wireless device according to [2] 29.2.2.: In "North" orientation, the TMFS signal connector is directed to the north, with x and y axes of TMFS and Test arch coinciding (see fig. 1). The rotational symmetry axis of the TMFS is aligned to the center of the HAC test Arch. For East, South and West configuration, the TMFS has been rotated clockwise in steps of 90°, so the connector looks into the specified direction. The evaluation of the radial direction is referenced to the device orientation (x equivalent to South direction).

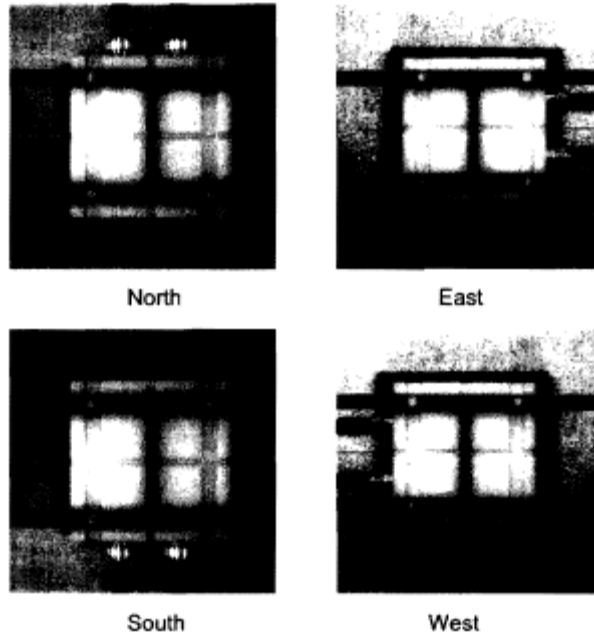


Fig. 1 TMFS scanning measurement configurations

- **Measurement Plane:** In coincidence with standard [1], the measurement plane (probe sensor center) is selected to be at a distance of 10 mm above the the surface of the TMFS touching the frame. The 50 x 50 mm scan area is aligned to the center of the unit. The scanning plane is verified to be parallel to the phantom frame before the measurements using the predefined "Geometry and signal check" procedure according to the predefined procedures described in [2].

- **Measurement Conditions:** Calibration of AM1D probe and AMMI are according to [2]. The 1 kHz sine signal for the level measurement is supplied from an external, independent generator via a BNC cable to TMFS IN and monitored at TMFS OUT with an independent RMS voltmeter or Audio Analyzer. The level is set to 0.5 Vrms and monitored during the scans.
- For the *frequency response*, a higher suppression of the background ambient magnetic field over the full frequency range was achieved by placing the TMFS in a magnetically shielded box. The AM1D probe was fixed without robot positioner near the axial maximum for this measurement. The background noise suppression was typ. 30 dB at 100 Hz (minimum) and 42 dB at 1 kHz. The predefined multisine signal (48k_multisine_50-10000_10s.wav) was used and evaluated in the third-octave bands from 100 Hz to 10000 Hz.

1 Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|------------------------|--|
| DASY Version | DASY5 | V52.6.2 (482) |
| DASY PP Version | SEMCAD | V14.4.5 (3634) |
| Phantom | HAC Test Arch | SD HAC P01 BA, #1002 |
| Distance TMFS Top - Probe Centre | 10 mm | |
| Scan resolution | dx, dy = 5 mm | area = 50 x 50 mm |
| Frequency | for field scans | 1 kHz |
| Signal level to TMFS | for field scans | 500 mV RMS |
| Signal | for frequency response | multisine signal 50-10000 Hz, each third-octave band |

Table 1: System configuration

2 Axial Maximum Field

| Configuration | East | South | West | North | Subset Average | Average |
|-----------------------------|--------|--------|--------|--------|----------------|---------------|
| Axial Max | -20.36 | -20.35 | -20.38 | -20.35 | | -20.36 |
| TMFS Y Axis 1st Max | -26.11 | -26.06 | -26.11 | -26.07 | | |
| TMFS Y Axis 2nd Max | -26.15 | -26.15 | -26.29 | -26.16 | | |
| Longitudinal Max Avg | -26.13 | -26.11 | -26.20 | -26.12 | -26.14 | |
| TMFS X Axis 1st Max | -25.95 | -25.99 | -26.02 | -25.94 | | |
| TMFS X Axis 2nd Max | -25.91 | -25.89 | -25.95 | -25.95 | | |
| Transversal Max Avg | -25.93 | -25.94 | -25.99 | -25.95 | -25.95 | |
| Radial Max | | | -26.09 | | | -26.04 |

Table 2: Axial and radial field maxima measured with probe center at 10mm distance in dB A/m

The maximum was calculated as the average from the values measured in the 4 orientations listed in table 2.

Axial Maximum -20.36 dB A/m (+/- 0.33dB, k=2)

3 Radial Maximum Field

In addition, the average from the 16 maxima of the radial field listed in table 2 (measured at 10mm) was calculated:

Radial Maximum -26.04 dB A/m

4 Appendix

4.1 Frequency response

Max. deviation measured, relative to 1 kHz: **min. -0.03, max. 0.01 dB**

| Frequency [Hz] | Response [dB] |
|----------------|---------------|
| 100 | 0.01 |
| 125 | 0.00 |
| 160 | -0.03 |
| 200 | 0.00 |
| 250 | -0.01 |
| 315 | 0.00 |
| 400 | 0.00 |
| 500 | 0.00 |
| 630 | 0.00 |
| 800 | 0.00 |
| 1000 | 0.00 |
| 1250 | -0.01 |
| 1600 | -0.01 |
| 2000 | -0.01 |
| 2500 | -0.01 |
| 3150 | -0.01 |
| 4000 | -0.02 |
| 5000 | -0.02 |
| 6300 | -0.03 |
| 8000 | -0.03 |
| 10000 | -0.03 |

Table 3: Frequency response

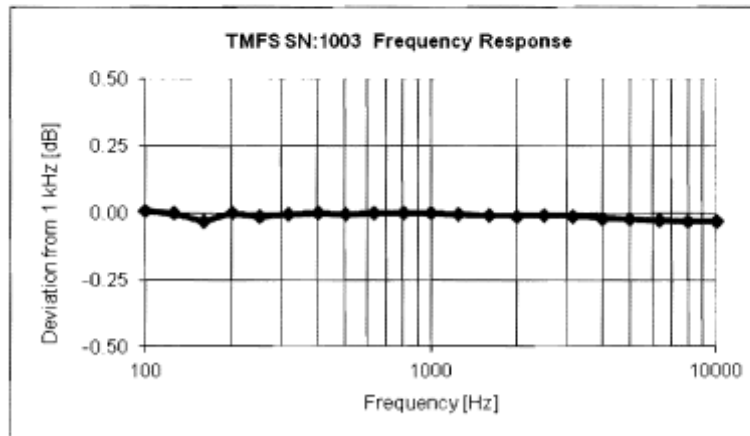


Fig. 2 Frequency response 100 to 10'000 Hz

4.2 Field plots

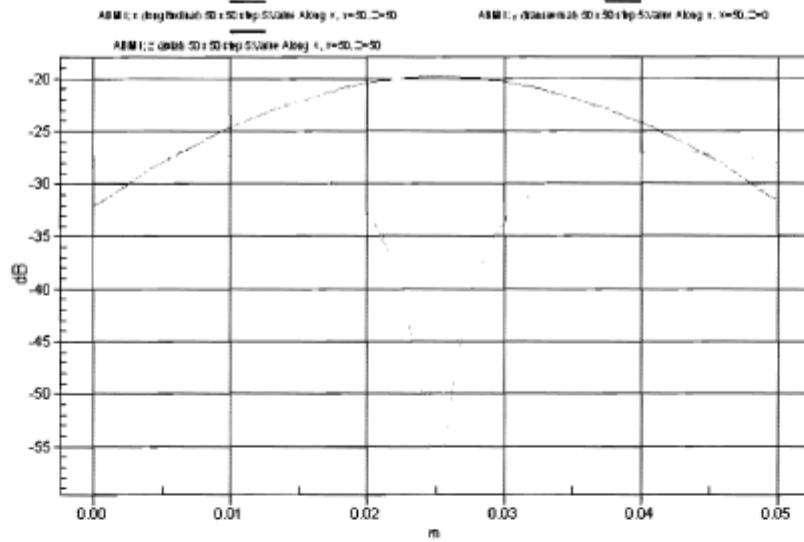


Fig. 3: Typical 2D field plots for x (red), y (green) and z (blue) components

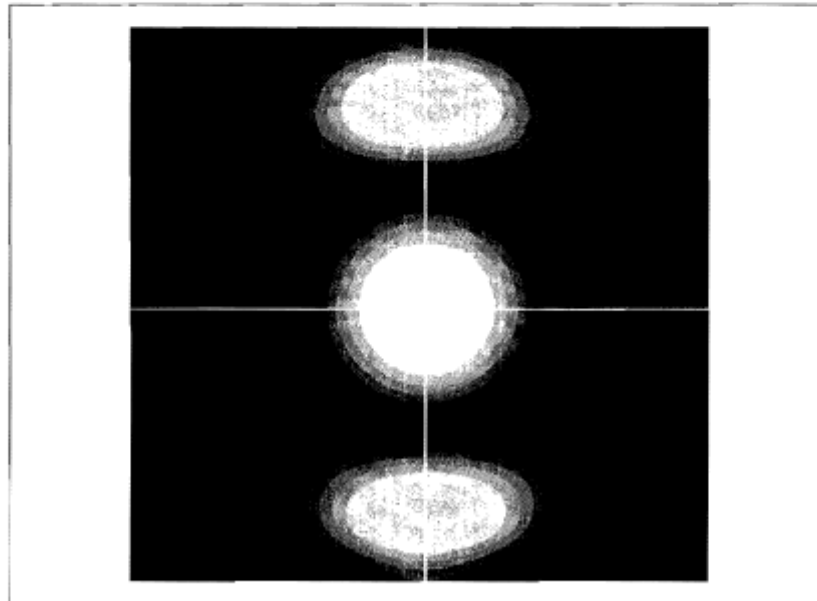


Fig. 4: Superposed field plots of z (axial), x and y radial magnetic field, 50 x 50 mm, individual scaling: white = max. field level, black = -4dB below max. The lines show the position of the 2D field plot of figure 3.