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## Annex A: Probe sensitivity and reference signal measurement plots

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X: 0 🔽 Y: 3	60 🔽 mm	Roll: 0 💽 *	
	Coil	Probe	
Internal calibration	2.3946 V	1.1507 V	
Probe sensitivity a		0.007413 V/(A/m)	
		۵	

Figure A1: Probe calibration data for coil and probe

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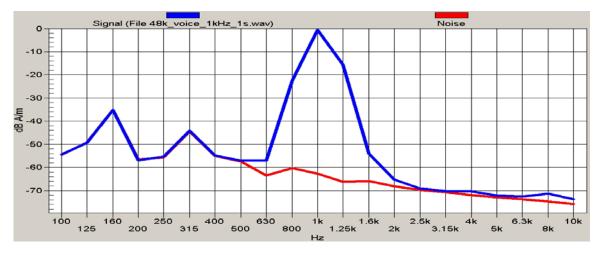


Figure A2: Reference voice 1 kHz signal and noise

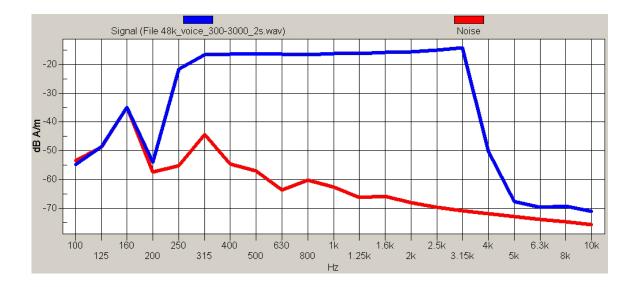


Figure A3: Reference voice simulated signal and noise

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## Annex B: TMFS system validation and ambient data/plots

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Date/Time: 6/12/2013 2:24:15 PM

Test Laboratory: RIM Testing Services

## HAC T-Coil TMFS\_validation\_06\_12\_13

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

Communication System: UID 0 - n/a, CW; Frequency: 835 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC T-Coil Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## 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 = -56.05 dBA/mLocation: 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

## 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: 34.95 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.0027 dB Device Reference Point: 0, 0, -6.3 mm

#### **Cursor:**

ABM1 comp = -20.54 dBA/m BWC Factor = 0.0027 dB Location: 0, 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: 34.95 Measure Window Start: 0ms Measure Window Length: 1000ms BWC applied: 0.0027 dB Device Reference Point: 0, 0, -6.3 mm

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**Cursor:** ABM1 comp = -25.73 dBA/m BWC Factor = 0.0027 dB Location: 0, -18, 3.7 mm

## T-Coil scan/TMFS Validation/z (axial) wideband multisine at best S/N/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: 87.87 Measure Window Start: 2000ms Measure Window Length: 5000ms BWC applied: 13.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

Diff = 1.98 dB BWC Factor = 13.16 dB Location: 0.4, 0.3, 4.4 mm

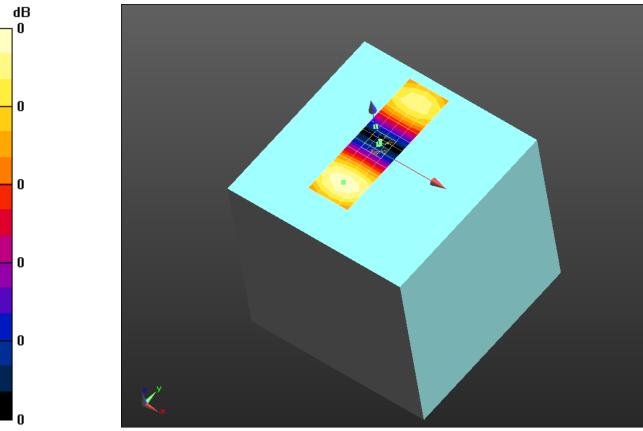
### T-Coil scan/TMFS Validation/z (axial) wideband multisine at best S/N 2/ABM

**Freq Resp(x,y,z,f) (1x1x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_multisine\_50\_10k\_10s.wav Output Gain: 86.87 Measure Window Start: 300ms Measure Window Length: 4000ms BWC applied: 13.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

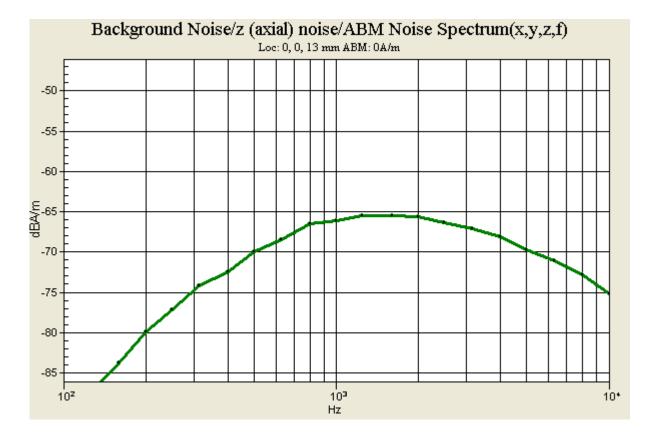
Diff = 1.99 dB BWC Factor = 13.16 dB Location: 0.3, 0.3, 5.1 mm

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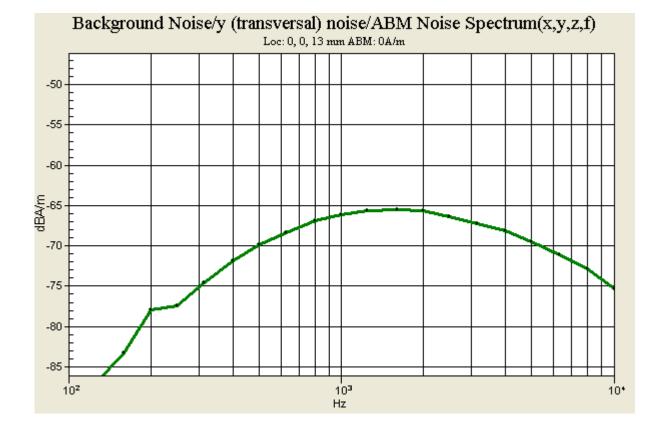


0 dB = 1.000 A/m = 0.00 dBA/m

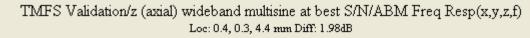
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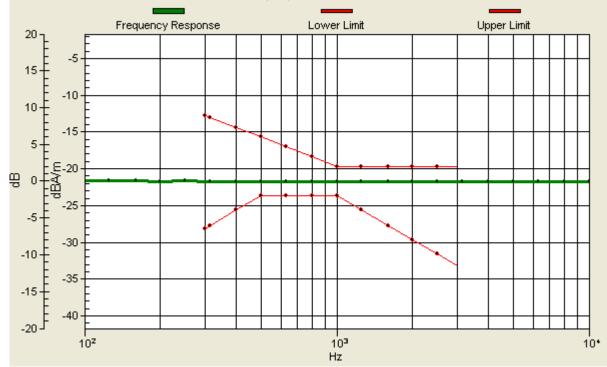
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TMFS Validation/z (axial) wideband multisine at best S/N 2/ABM Freq Resp(x,y,z,f) Loc: 0.3, 0.3, 5.1 mm Diff: 1.99dB



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## Annex C: Audio Band Magnetic measurement data and plots

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Test Laboratory: RIM Testing Services

## HAC T-Coil\_ABM\_GSM850\_Axial

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, GSM 850; Frequency: 824.2 MHz, Frequency: 836.8 MHz, Frequency: 848.8 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## T-Coil scan\_GSM850/General Scan - Low channel/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\_GSM850/General Scan - Low channel/z (axial) 2mm 8 x 8/ABM

**SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 31.12 dB ABM1 comp = 4.46 dBA/m BWC Factor = 0.16 dB Location: 5, 18, 4.4 mm

# T-Coil scan\_GSM850/General Scan - Low channel/z (axial) wideband at best S/N\_probe AM1DV2/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

#### Cursor:

Diff = 2.00 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

## T-Coil scan\_GSM850/8x8 Scan - Mid channel/z (axial) 2mm 8 x 8/ABM

**SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 31.71 dBABM1 comp = 5.39 dBA/mBWC Factor = 0.16 dBLocation: 5, 18, 4.4 mm

#### **T-Coil scan\_GSM850/8x8 Scan - Mid channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):** Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 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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## T-Coil scan\_GSM850/8x8 Scan - High channel/z (axial) 2mm 8 x 8/ABM

**SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 31.74 dB ABM1 comp = 5.35 dBA/m BWC Factor = 0.16 dB Location: 5, 18, 4.4 mm

# $T\text{-}Coil\ scan\_GSM850/8x8\ Scan\ -\ High\ channel/z\ (axial)\ wideband\ at\ best$

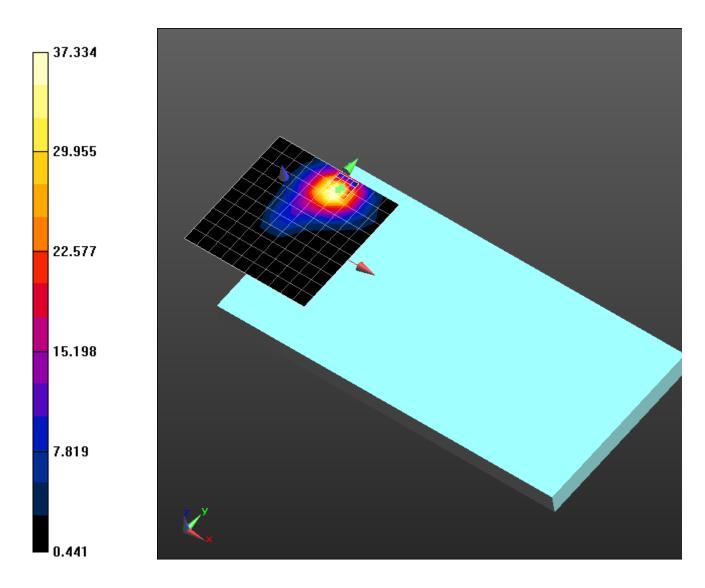
**S/N/ABM Freq Resp(x,y,z,f) (1x1x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav

Output Gain: 69.12 Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.81 dB Device Reference Point: 0, 0, -6.3 mm

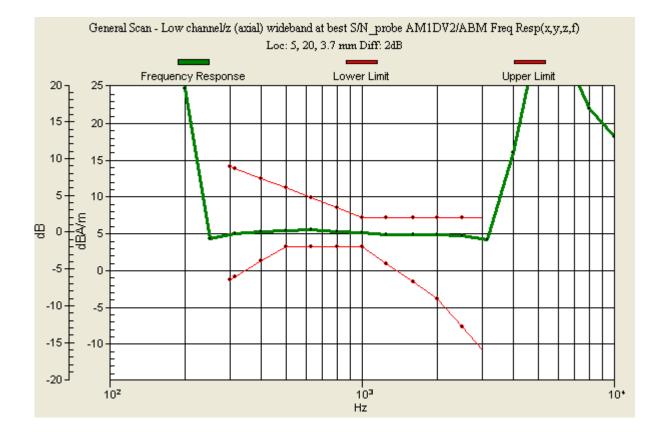
#### **Cursor:**

Diff = 2.00 dB BWC Factor = 10.81 dB Location: 5, 20, 3.7 mm

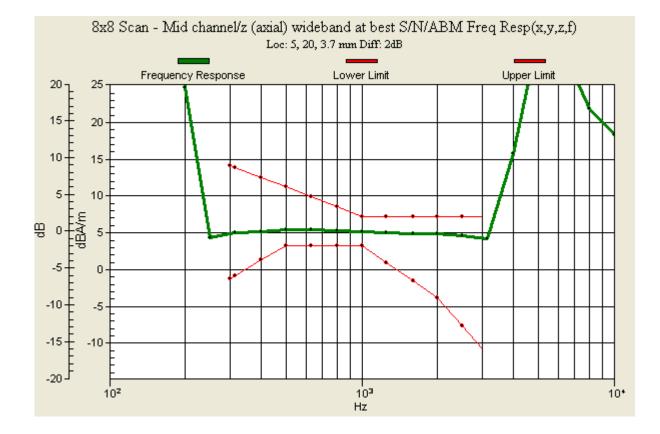
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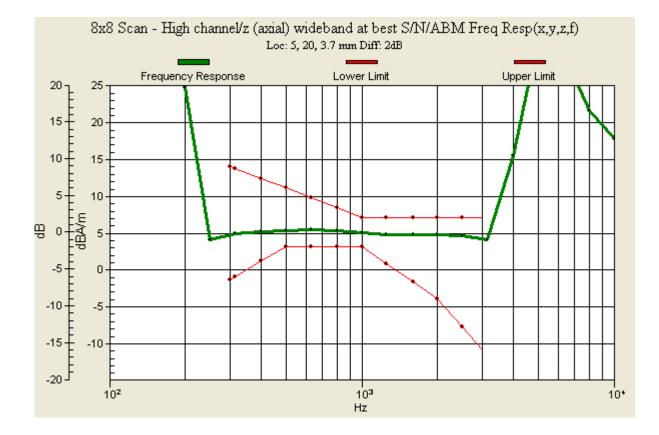
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Date/Time: 6/12/2013 5:33:17 PM

Test Laboratory: RIM Testing Services

## HAC T-Coil\_ABM\_GSM850\_Radial\_T

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, GSM 850; Frequency: 824.2 MHz, Frequency: 836.8 MHz, Frequency: 848.8 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## T-Coil scan\_GSM850/General Scan - Low channel/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

## T-Coil scan\_GSM850/General Scan - Low channel/y (transversal) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 41.71 dBABM1 comp = -5.16 dBA/mBWC Factor = 0.16 dBLocation: -2, 25, 4.4 mm

## T-Coil scan\_GSM850/8x8 Scan - Mid channel/y (transversal) 2mm 8 x 8/ABM

**SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 41.64 dB ABM1 comp = -5.12 dBA/m BWC Factor = 0.16 dBLocation: -2, 25, 4.4 mm

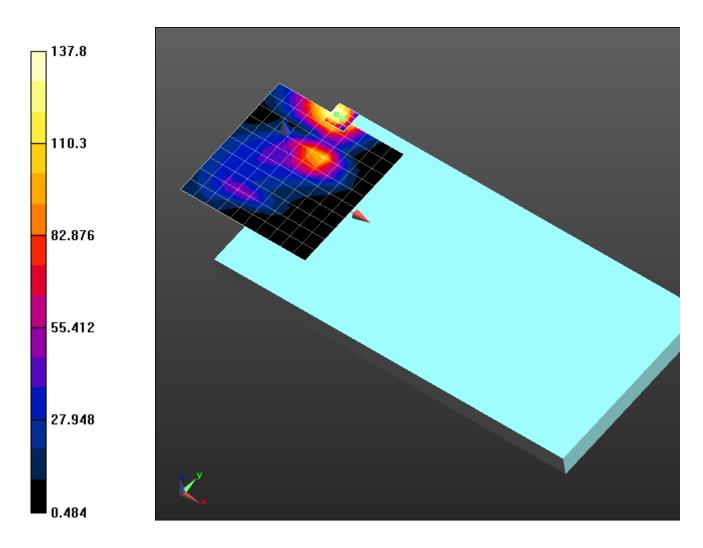
# T-Coil scan\_GSM850/8x8 Scan - High channel/y (transversal) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 41.72 dB ABM1 comp = -5.07 dBA/m BWC Factor = 0.16 dBLocation: -2, 25, 4.4 mm

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Date/Time: 6/13/2013 9:19:01 AM

Test Laboratory: RIM Testing Services

## HAC T-Coil\_ABM\_GSM 1900\_axial

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, GSM 1900; Frequency: 1850.2 MHz, Frequency: 1880 MHz, Frequency: 1909.8 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## T-Coil scan\_GSM1900/General Scan - Low channel/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\_GSM1900/General Scan - Low channel/z (axial) 2mm 8 x 8/ABM

**SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 34.63 dB ABM1 comp = 3.37 dBA/m BWC Factor = 0.16 dB Location: 5, 17, 4.4 mm

# T-Coil scan\_GSM1900/General Scan - Low channel/z (axial) wideband at

**best/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: 10.81 dB Device Reference Point: 0, 0, -6.3 mm

#### **Cursor:**

Diff = 2.00 dB BWC Factor = 10.81 dB Location: 5, 15, 3.7 mm

## T-Coil scan\_GSM1900/8x8 Scan - Mid channel/z (axial) 2mm 8 x 8/ABM

**SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 36.19 dB ABM1 comp = 3.31 dBA/m BWC Factor = 0.16 dB Location: 5, 17, 4.4 mm

# T-Coil scan\_GSM1900/8x8 Scan - Mid channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 69.12 Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

Diff = 2.00 dB BWC Factor = 10.80 dB Location: 5, 15, 3.7 mm

## T-Coil scan\_GSM1900/8x8 Scan - High channel/z (axial) 2mm 8 x 8/ABM

**SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 35.28 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

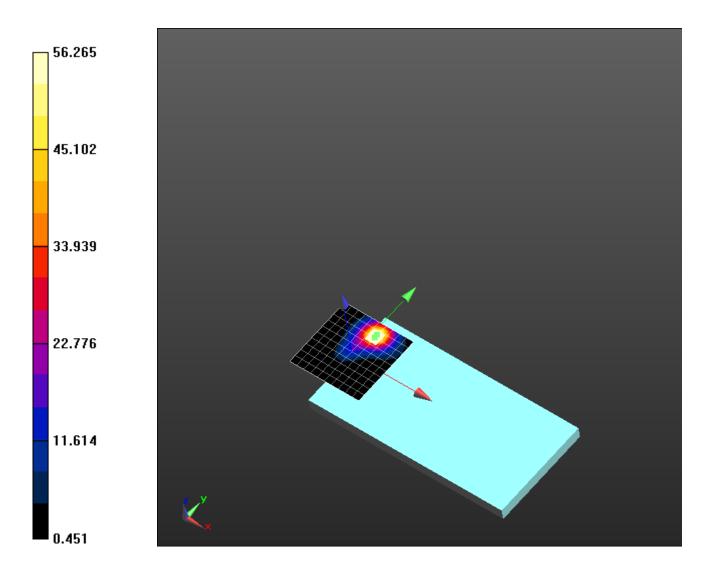
ABM1/ABM2 = 35.24 dB ABM1 comp = 3.35 dBA/m BWC Factor = 0.16 dBLocation: 5, 17, 4.4 mm

# T-Coil scan\_GSM1900/8x8 Scan - High channel/z (axial) wideband at best

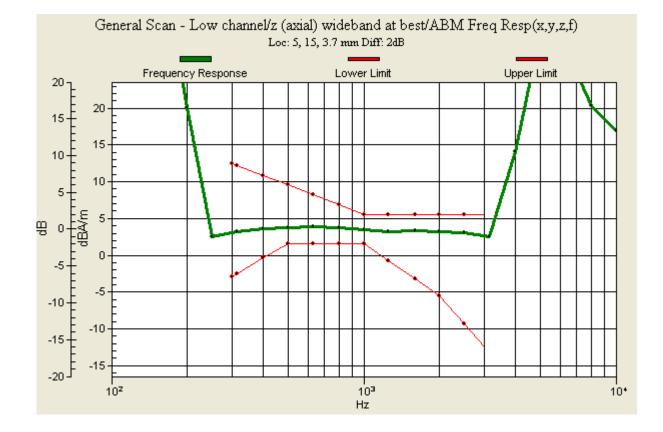
S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 69.12 Measure Window Start: 300ms Measure Window Length: 6000ms

Measure Window Length: 6000ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

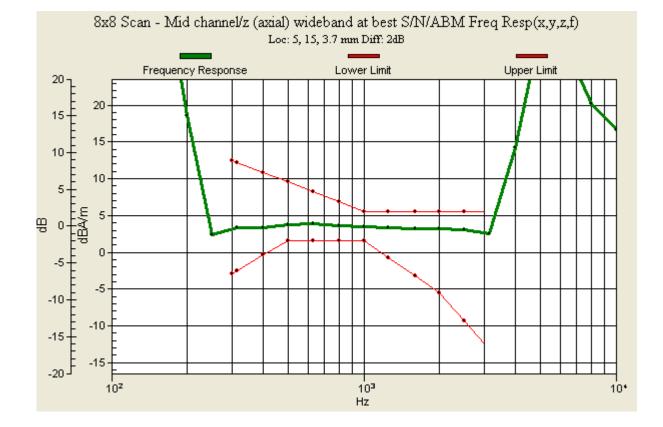
Testing Services**	Document Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RGB141LW		Page 27(104)	
Author Data Daoud Attayi	Dates of Test June 12-July 04, 2013	Report No RTS-6046-1308-33	FCC ID	B140LW



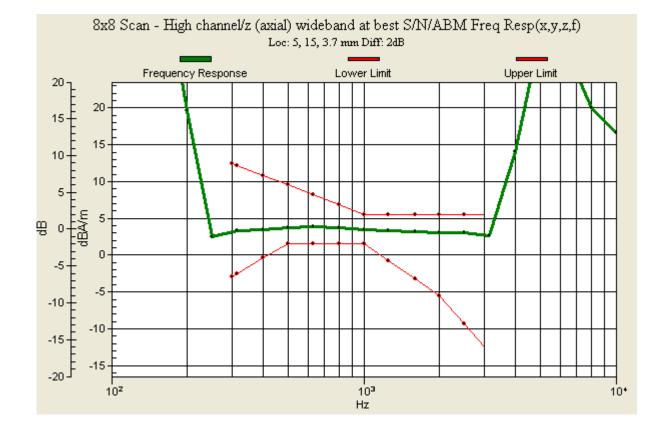
Testing Services**		ty Audio Band Magnetic (ABM) T-Coil rry® Smartphone model RGB141LW		Page 28(104)
Author Data	Dates of Test	Report No	FCC ID	B140LW
Daoud Attayi	June 12-July 04, 2013	RTS-6046-1308-33	L6ARG	



Testing Services**		udio Band Magnetic (ABM) T-Coil Smartphone model RGB141LW		Page 29(104)
Author Data Daoud Attayi	Dates of Test June 12-July 04, 2013	Report No RTS-6046-1308-33	FCC ID L6ARG	B140LW



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Daoud Attayi	June 12-July 04, 2013	RTS-6046-1308-33	L6ARG	



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Author Data	Dates of Test	Report No	FCC ID	
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Date/Time: 6/13/2013 9:32:09 AM

Test Laboratory: RIM Testing Services

## HAC T-Coil\_ABM\_GSM 1900\_radial T

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, GSM 1900; Frequency: 1850.2 MHz, Frequency: 1880 MHz, Frequency: 1909.8 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## T-Coil scan\_GSM1900/General Scan - Low channel/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\_GSM1900/General Scan - Low channel/y (transversal) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k voice 1kHz 1s.wav

Output Gain: 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 = 42.22 dB ABM1 comp = -7.87 dBA/m BWC Factor = 0.16 dB Location: -2, 27, 4.4 mm

# T-Coil scan\_GSM1900/8x8 Scan - Mid channel/y (transversal) 2mm 8 x

8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 35.28 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

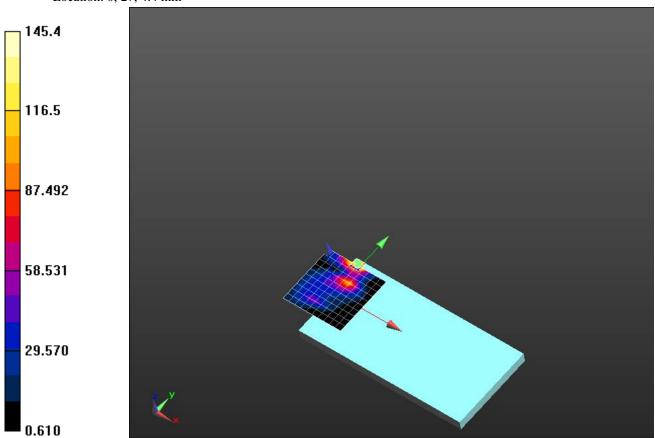
ABM1/ABM2 = 43.30 dB ABM1 comp = -6.57 dBA/m BWC Factor = 0.16 dBLocation: 0, 27, 4.4 mm

## T-Coil scan\_GSM1900/8x8 Scan - High channel/y (transversal) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 42.44 dB ABM1 comp = -6.58 dBA/m BWC Factor = 0.16 dB Location: 0, 27, 4.4 mm



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Date/Time: 6/13/2013 3:32:01 AM

Test Laboratory: RIM Testing Services

## HAC T-Coil\_ABM\_UMTS\_V\_Axial

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 826.4 MHz, Frequency: 836.4 MHz, Frequency: 846.6 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## T-Coil scan\_UMTS\_Band\_V/General Scan - Low channel/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\_UMTS\_Band\_V/General Scan - Low channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k voice 1kHz 1s.wav

Output Gain: 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 = 53.78 dB ABM1 comp = 2.37 dBA/m BWC Factor = 0.16 dBLocation: 3, 18, 4.4 mm

### T-Coil scan\_UMTS\_Band\_V/General Scan - Low channel/z (axial) wideband at best S/N probe AM1DV2/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

#### Cursor:

Diff = 2.00 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

## T-Coil scan\_UMTS\_Band\_V/8x8 Scan - Mid channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 53.63 dB ABM1 comp = 1.68 dBA/m BWC Factor = 0.16 dB Location: 3, 20, 4.4 mm

# T-Coil scan\_UMTS\_Band\_V/8x8 Scan - Mid channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 69.12 Measure Window Start: 300ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

# T-Coil scan\_UMTS\_Band\_V/8x8 Scan - High channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav

Output Gain: 35.28 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

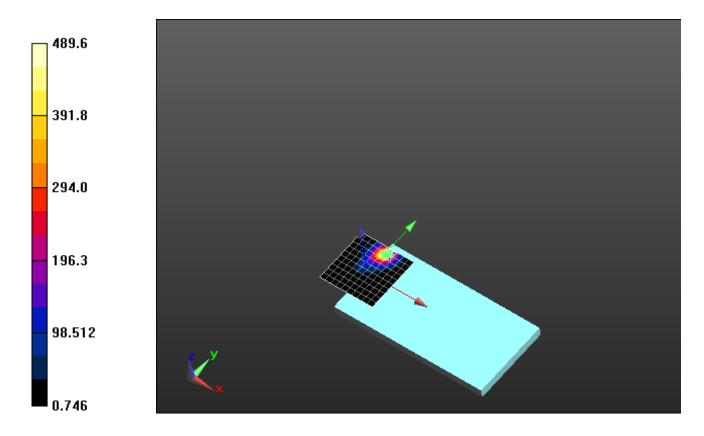
#### Cursor:

ABM1/ABM2 = 53.67 dB ABM1 comp = 2.40 dBA/m BWC Factor = 0.16 dBLocation: 3, 18, 4.4 mm

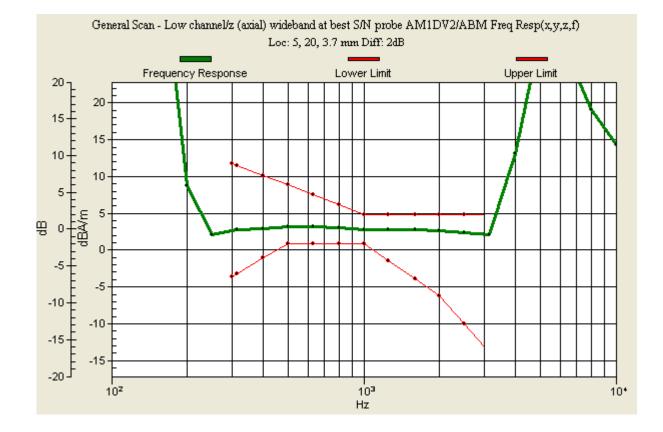
# T-Coil scan\_UMTS\_Band\_V/8x8 Scan - High channel/z (axial) wideband at best S/N 2/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

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

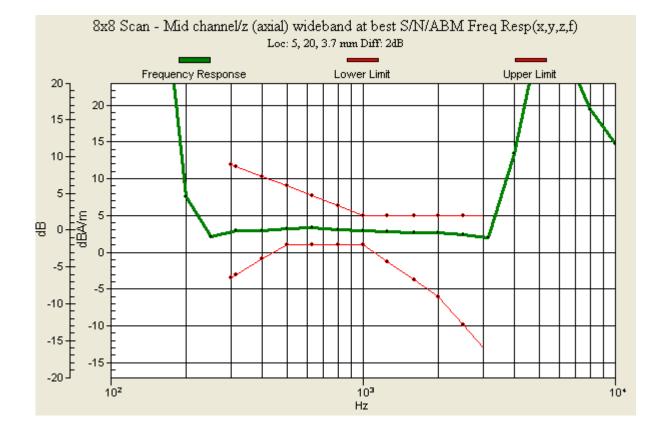
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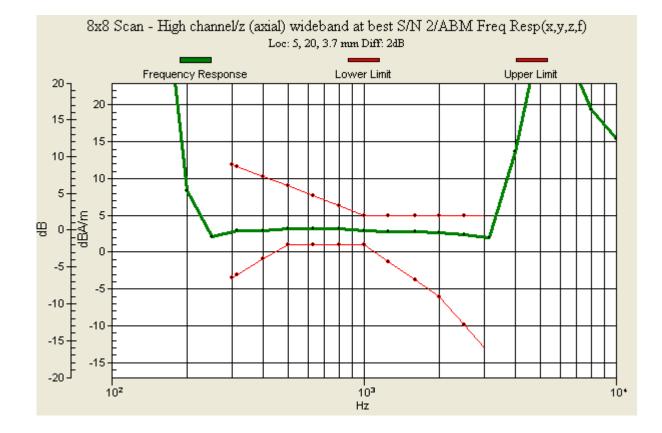
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Daoud Attayi	June 12-July 04, 2013	RTS-6046-1308-33	L6ARGE	3140LW

Date/Time: 6/13/2013 3:45:06 AM

Test Laboratory: RIM Testing Services

### HAC T-Coil\_ABM\_UMTS\_V\_Radial-T

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 826.4 MHz, Frequency: 836.4 MHz, Frequency: 846.6 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

**T-Coil scan\_UMTS\_Band\_V/General Scan - Low channel/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

## T-Coil scan\_UMTS\_Band\_V/General Scan - Low channel/y (transversal)

**2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 48.18 dBABM1 comp = -5.15 dBA/mBWC Factor = 0.16 dBLocation: 5, 27, 4.4 mm

# T-Coil scan\_UMTS\_Band\_V/8x8 Scan - Mid channel/y (transversal) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 48.03 dB ABM1 comp = -5.52 dBA/m BWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

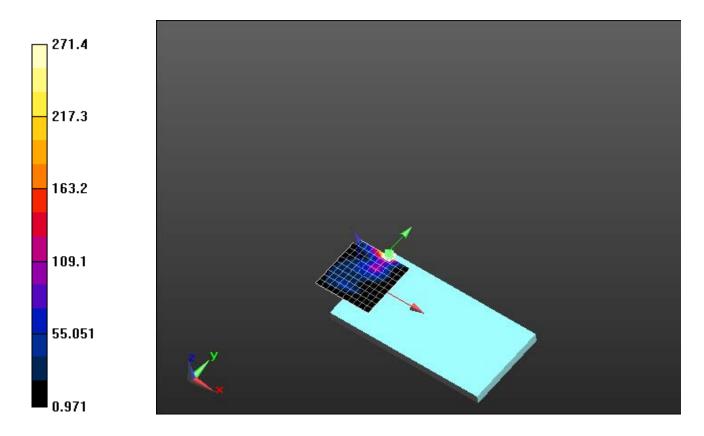
# T-Coil scan\_UMTS\_Band\_V/8x8 Scan - High channel/y (transversal) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 48.00 dB ABM1 comp = -5.56 dBA/m BWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

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	Hearing Aid Compatibility A Test Report for BlackBerry®	Hearing Aid Compatibility Audio Band Magnetic (ABM Test Report for BlackBerry® Smartphone model RGB1	Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RGB141LW

Date/Time: 6/13/2013 2:34:41 AM

Test Laboratory: RIM Testing Services

### HAC T-Coil\_ABM\_UMTS\_II\_Axial

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD II; Frequency: 1852.4 MHz, Frequency: 1880 MHz, Frequency: 1907.6 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: Not Specified
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

### T-Coil scan\_UMTS\_Band\_II/General Scan - Low channel/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\_UMTS\_Band\_II/General Scan - Low channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 54.19 dB ABM1 comp = 2.72 dBA/m BWC Factor = 0.16 dBLocation: 3, 18, 4.4 mm

# T-Coil scan\_UMTS\_Band\_II/General Scan - Low channel/z (axial) wideband at best S/N\_probe AM1DV2/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

#### Cursor:

Diff = 2.00 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

# T-Coil scan\_UMTS\_Band\_II/8x8 Scan - Mid channel/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 53.91 dB ABM1 comp = 2.64 dBA/m BWC Factor = 0.16 dB Location: 3, 18, 4.4 mm

#### **T-Coil scan\_UMTS\_Band\_II/8x8 Scan - Mid channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):** Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 69.12 Measure Window Start: 300ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

## T-Coil scan\_UMTS\_Band\_II/8x8 Scan - High channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav

Output Gain: 35.28 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

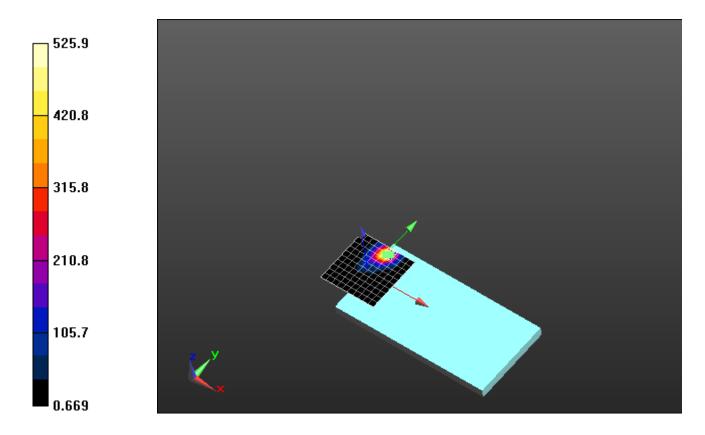
#### Cursor:

ABM1/ABM2 = 53.88 dBABM1 comp = 2.63 dBA/mBWC Factor = 0.16 dBLocation: 3, 18, 4.4 mm

# T-Coil scan\_UMTS\_Band\_II/8x8 Scan - High channel/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

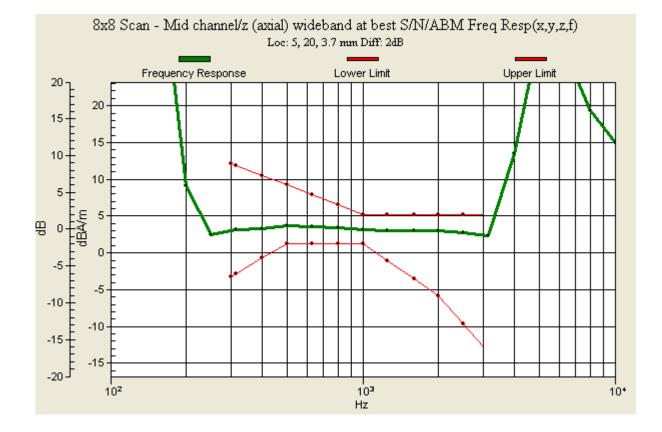
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Daoud Attayi	June 12-July 04, 2013	RTS-6046-1308-33	L6ARG	B140LW



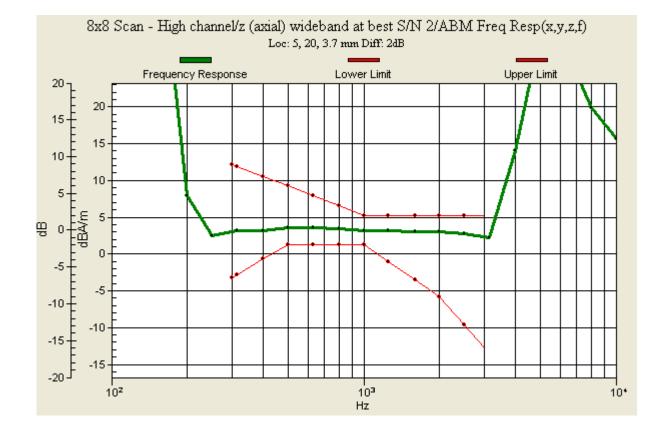
Testing Services**		Audio Band Magnetic (ABM) T-Coil Smartphone model RGB141LW		Page 48(104)
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Dates of Test	Report No RTS-60/6-1308-33		B140I W
	Hearing Aid Compatibility A Test Report for BlackBerry®	Hearing Aid Compatibility Audio Band Magnetic (ABM Test Report for BlackBerry® Smartphone model RGB1	Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil         Test Report for BlackBerry® Smartphone model RGB141LW         Dates of Test       Report No         FCC ID

Date/Time: 6/13/2013 2:47:47 AM

Test Laboratory: RIM Testing Services

### HAC T-Coil\_ABM\_UMTS\_II\_Radial-T

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD II; Frequency: 1852.4 MHz, Frequency: 1880 MHz, Frequency: 1907.6 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: Not Specified
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# **T-Coil scan\_UMTS\_Band\_II/General Scan - Low channel/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\_UMTS\_Band\_II/General Scan - Low channel/y (transversal)

**2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 48.35 dBABM1 comp = -5.22 dBA/mBWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

## T-Coil scan\_UMTS\_Band\_II/8x8 Scan - Mid channel/y (transversal) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 48.32 dB ABM1 comp = -5.30 dBA/m BWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

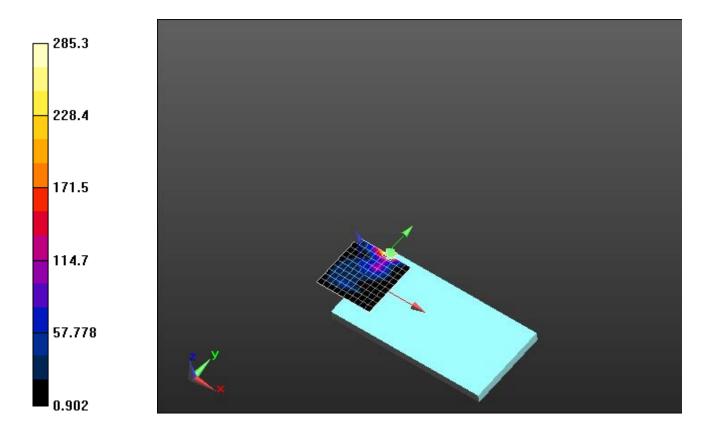
## T-Coil scan\_UMTS\_Band\_II/8x8 Scan - High channel/y (transversal) 2mm 8

x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 48.24 dBABM1 comp = -4.96 dBA/mBWC Factor = 0.16 dBLocation: 5, 27, 4.4 mm

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Date/Time: 6/13/2013 9:00:37 PM

Test Laboratory: RIM Testing Services

### HAC T-Coil\_ABM\_CDMA850\_Axial

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, CDMA 850 1/8th Rate; Frequency: 824.7 MHz, Frequency: 836.52 MHz, Frequency: 848.52 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

T-Coil scan\_CDMA850\_BC0/General Scan - Low channel/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: 28.03 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\_CDMA850\_BC0/General Scan - Low channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### **Cursor:**

ABM1/ABM2 = 43.32 dBABM1 comp = -3.26 dBA/mBWC Factor = 0.16 dBLocation: 3, 18, 4.4 mm

## T-Coil scan\_CDMA850\_BC0/General Scan - Low channel/z (axial) wideband

**at best/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: 54.9 Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.80 dB

Device Reference Point: 0, 0, -6.3 mm

#### **Cursor:**

Diff = 1.60 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

# T-Coil scan\_CDMA850\_BC0/8x8 Scan - Mid channel/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

6/ADIVI SIVA(x,y,z) (SXSXI). Measurement grid: 6 Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 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 = 45.34 dBABM1 comp = -0.82 dBA/mBWC Factor = 0.16 dBLocation: 5, 18, 4.4 mm

#### **T-Coil scan\_CDMA850\_BC0/8x8 Scan - Mid channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):** Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 54.9 Measure Window Start: 300ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

Diff = 1.37 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

# T-Coil scan\_CDMA850\_BC0/8x8 Scan - High channel/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

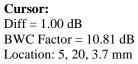
#### Cursor:

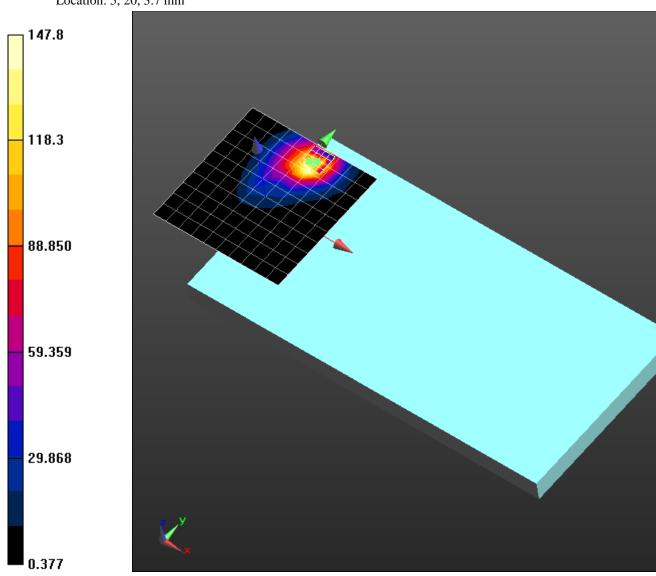
ABM1/ABM2 = 44.20 dB ABM1 comp = -2.49 dBA/m BWC Factor = 0.16 dBLocation: 3, 18, 4.4 mm

# T-Coil scan\_CDMA850\_BC0/8x8 Scan - High channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

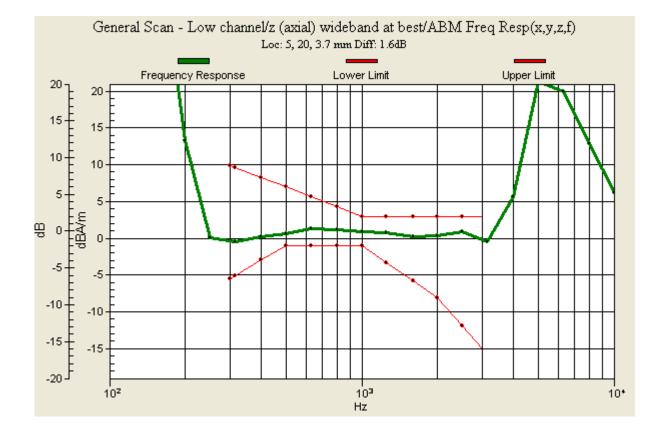
Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 54.9 Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.81 dB Device Reference Point: 0, 0, -6.3 mm

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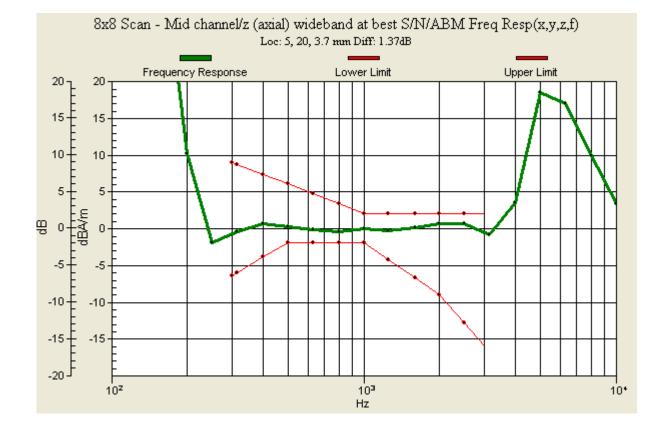




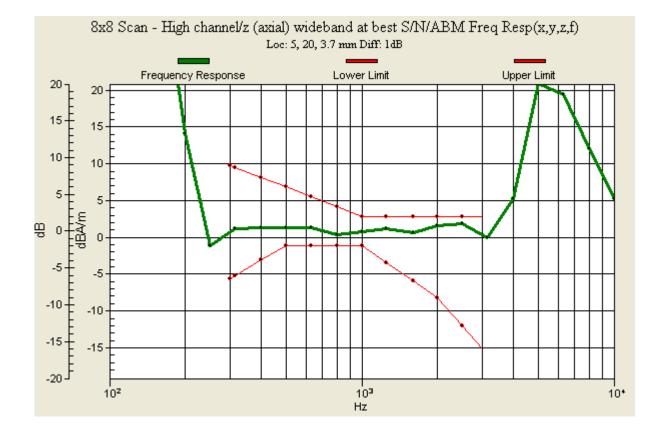
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Test Laboratory: RIM Testing Services

### HAC T-Coil\_ABM\_CDMA850\_Radial\_T

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, CDMA 850 1/8th Rate; Frequency: 824.7 MHz, Frequency: 836.52 MHz, Frequency: 848.52 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# **T-Coil scan\_CDMA850\_BC0/General Scan - Low channel/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: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

## T-Coil scan\_CDMA850\_BC0/General Scan - Low channel/y (transversal) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 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 = 41.63 dB ABM1 comp = -10.82 dBA/m BWC Factor = 0.16 dB Location: 3, 25, 4.4 mm

## T-Coil scan\_CDMA850\_BC0/8x8 Scan - Mid channel/y (transversal) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

ABM1/ABM2 = 42.26 dB ABM1 comp = -10.51 dBA/m BWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

## T-Coil scan\_CDMA850\_BC0/8x8 Scan - High channel/y (transversal) 2mm 8

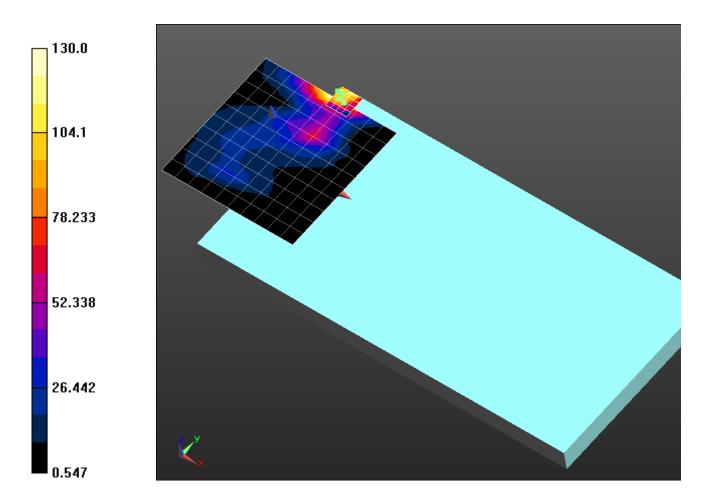
**x 8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### **Cursor:**

ABM1/ABM2 = 42.12 dB ABM1 comp = -11.21 dBA/m BWC Factor = 0.16 dBLocation: 1, 27, 4.4 mm

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	Hearing Aid Compatibility A Test Report for BlackBerry®	Hearing Aid Compatibility Audio Band Magnetic (ABM Test Report for BlackBerry® Smartphone model RGB1	Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RGB141LW

Date/Time: 6/13/2013 3:54:39 PM

Test Laboratory: RIM Testing Services

### HAC T-Coil\_ABM\_CDMA 1900\_axial

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, CDMA 1900 1/8th Rate; Frequency: 1851.25 MHz, Frequency: 1880 MHz, Frequency: 1908.5 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

### T-Coil scan\_CDMA1900\_BC1/General Scan - Low channel/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: 28.03 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\_CDMA1900\_BC1/General Scan - Low channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

ABM1/ABM2 = 42.07 dBABM1 comp = -3.37 dBA/mBWC Factor = 0.16 dBLocation: 5, 20, 4.4 mm

# T-Coil scan\_CDMA1900\_BC1/General Scan - Low channel/z (axial) wideband at best S/N\_probe AM1DV2/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: 54.9 Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

Diff = 1.21 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

#### T-Coil scan\_CDMA1900\_BC1/8x8 Scan - Mid channel/z (axial) 2mm 8 x 8/APM SNP(x y z) (5y5y1)

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 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 = 42.79 dBABM1 comp = -2.15 dBA/mBWC Factor = 0.16 dBLocation: 5, 16, 4.4 mm

# T-Coil scan\_CDMA1900\_BC1/8x8 Scan - Mid channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 54.9 Measure Window Start: 300ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

Diff = 1.38 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

# T-Coil scan\_CDMA1900\_BC1/8x8 Scan - High channel/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

O/ADIVI SINK(X,Y,Z) (SXSXI): Measurement grid: dx=10mm, dy= Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

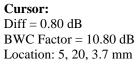
#### Cursor:

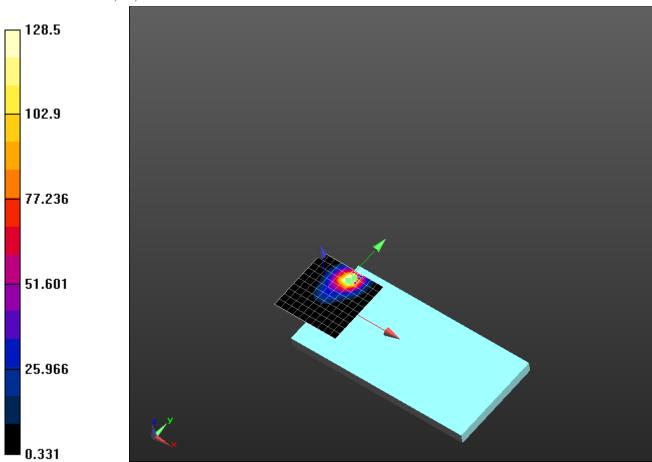
ABM1/ABM2 = 42.61 dBABM1 comp = -3.40 dBA/mBWC Factor = 0.16 dBLocation: 3, 16, 4.4 mm

# T-Coil scan\_CDMA1900\_BC1/8x8 Scan - High channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 54.9 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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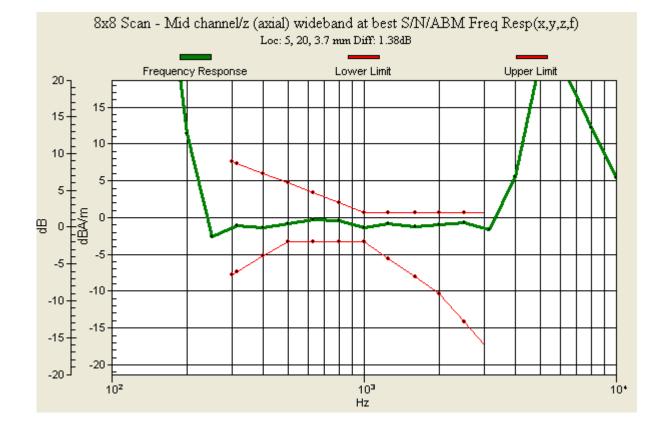




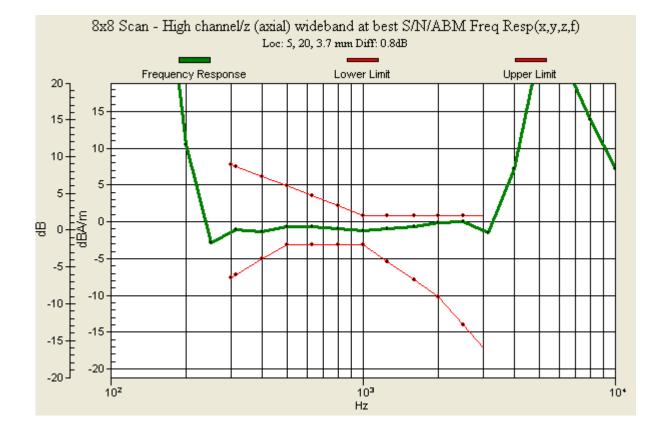
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Date/Time: 6/13/2013 4:07:44 PM

Test Laboratory: RIM Testing Services

### HAC T-Coil\_ABM\_CDMA 1900\_radial T

#### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, CDMA 1900 1/8th Rate; Frequency: 1851.25 MHz, Frequency: 1880 MHz, Frequency: 1908.5 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

## T-Coil scan\_CDMA1900\_BC1/General Scan - Low channel/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: 28.03 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\_CDMA1900\_BC1/General Scan - Low channel/y (transversal)

**2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

ABM1/ABM2 = 41.60 dB ABM1 comp = -10.10 dBA/m BWC Factor = 0.16 dBLocation: 4, 27, 4.4 mm

## T-Coil scan\_CDMA1900\_BC1/8x8 Scan - Mid channel/y (transversal) 2mm 8

x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

ABM1/ABM2 = 41.00 dB ABM1 comp = -12.04 dBA/m BWC Factor = 0.16 dBLocation: 0, 25, 4.4 mm

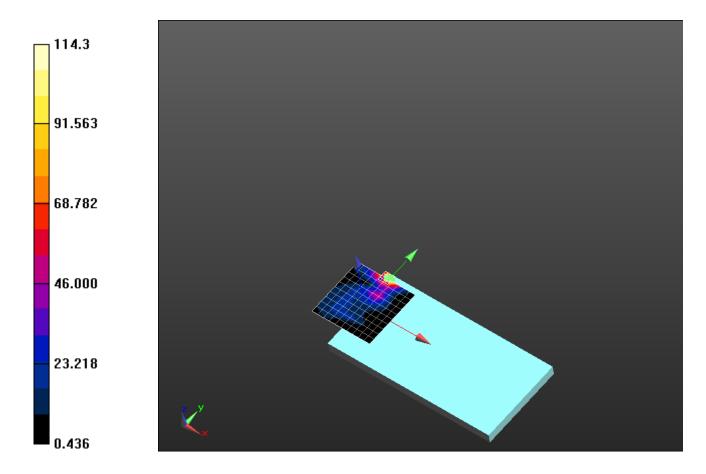
## T-Coil scan\_CDMA1900\_BC1/8x8 Scan - High channel/y (transversal) 2mm 8

x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

#### Cursor:

ABM1/ABM2 = 41.08 dB ABM1 comp = -11.33 dBA/m BWC Factor = 0.16 dB Location: 2, 27, 4.4 mm

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Author Data Daoud Attayi	Dates of Test June 12-July 04, 2013	Report No RTS-6046-1308-33	FCC ID	3140LW

Date/Time: 7/4/2013 1:02:06 AM

Test Laboratory: RIM Testing Services

## HAC T-Coil\_ABM\_CDMA800\_Axial

### DUT: BlackBerry Smartphone; Type: Sample ; Serial: XXXX

Communication System: UID 0 - n/a, CDMA 800 1/8th Rate; Frequency: 817.9 MHz, Frequency: 820.5 MHz, Frequency: 823.1 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# T-Coil scan\_CDMA800\_BC10/General Scan - Low channel/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: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

# T-Coil scan\_CDMA800\_BC10/General Scan - Low channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 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 = 44.64 dB ABM1 comp = -0.53 dBA/m BWC Factor = 0.16 dB Location: 5, 20, 4.4 mm

# T-Coil scan\_CDMA800\_BC10/General Scan - Low channel/z (axial) wideband at best/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: 54.9 Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

### Cursor:

Diff = 1.85 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

# T-Coil scan\_CDMA800\_BC10/8x8 Scan - Mid channel/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

### **Cursor:**

ABM1/ABM2 = 46.03 dBABM1 comp = -0.47 dBA/mBWC Factor = 0.16 dBLocation: 5, 20, 4.4 mm

### **T-Coil scan\_CDMA800\_BC10/8x8 Scan - Mid channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1):** Measurement grid: dx=10mm, dy=10mm

Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 54.9

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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**Cursor:** Diff = 0.78 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

# T-Coil scan\_CDMA800\_BC10/8x8 Scan - High channel/z (axial) 2mm 8 x

**8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

### Cursor:

ABM1/ABM2 = 46.29 dB ABM1 comp = -0.13 dBA/m BWC Factor = 0.16 dBLocation: 5, 18, 4.4 mm

# T-Coil scan\_CDMA800\_BC10/8x8 Scan - High channel/z (axial) wideband at best S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

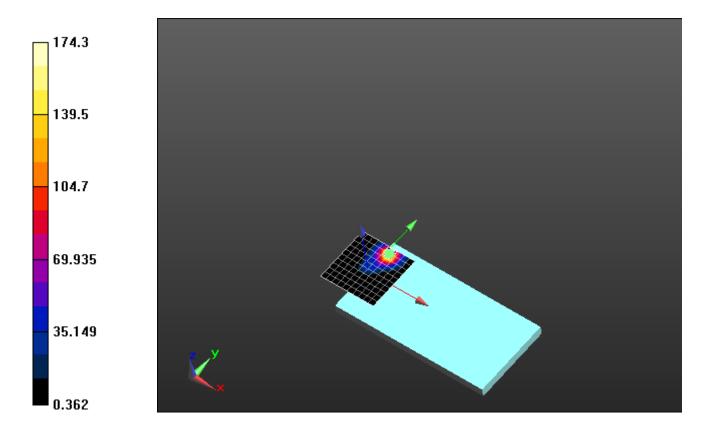
Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 54.9

Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

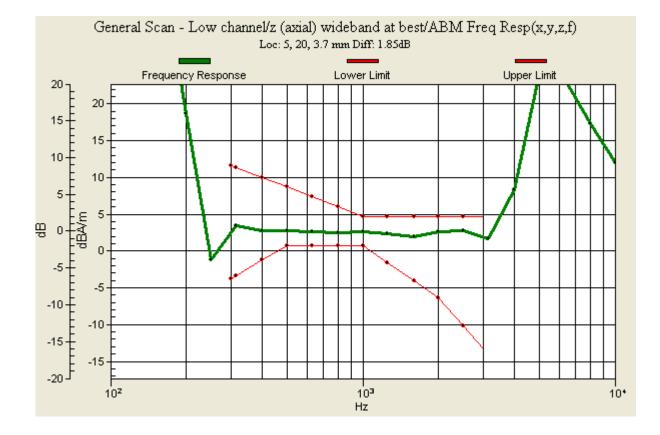
### **Cursor:**

Diff = 1.70 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

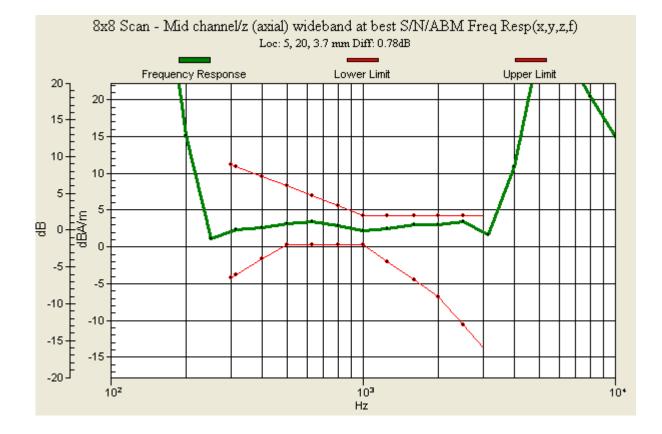
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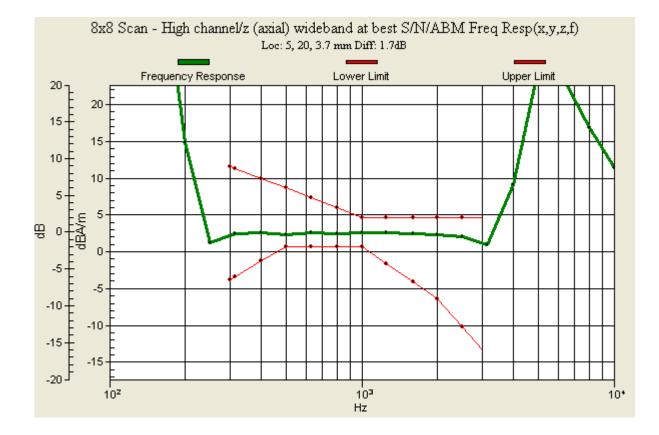
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Date/Time: 7/4/2013 1:15:14 AM

Test Laboratory: RIM Testing Services

# HAC T-Coil\_ABM\_CDMA800\_Radial-T

### DUT: BlackBerry Smartphone; Type: Sample ; Serial: XXXX

Communication System: UID 0 - n/a, CDMA 800 1/8th Rate; Frequency: 817.9 MHz, Frequency: 820.5 MHz, Frequency: 823.1 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/10/2013
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# T-Coil scan\_CDMA800\_BC10/General Scan - Low channel/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: 28.03 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\_CDMA800\_BC10/General Scan - Low channel/y (transversal)

**2mm 8 x 8/ABM SNR(x,y,z) (5x5x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

### Cursor:

ABM1/ABM2 = 43.70 dBABM1 comp = -8.85 dBA/mBWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

# T-Coil scan\_CDMA800\_BC10/8x8 Scan - Mid channel/y (transversal) 2mm 8

x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

### Cursor:

ABM1/ABM2 = 44.05 dB ABM1 comp = -8.63 dBA/m BWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

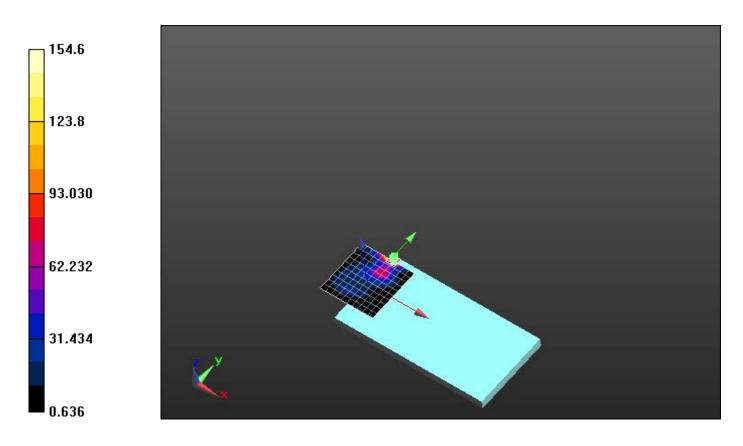
# T-Coil scan\_CDMA800\_BC10/8x8 Scan - High channel/y (transversal) 2mm 8

x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 28.03 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

### Cursor:

ABM1/ABM2 = 44.11 dB ABM1 comp = -9.01 dBA/m BWC Factor = 0.16 dBLocation: 3, 29, 4.4 mm

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Date/Time: 6/13/2013 11:10:15 AM

Test Laboratory: RIM Testing Services

## HAC T-Coil\_ABM\_UMTS band V+802.11b\_axial

### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 836.4 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\varepsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 b/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\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 b/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid:

dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 35.28 Measure Window Start: 300ms Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

### **Cursor:**

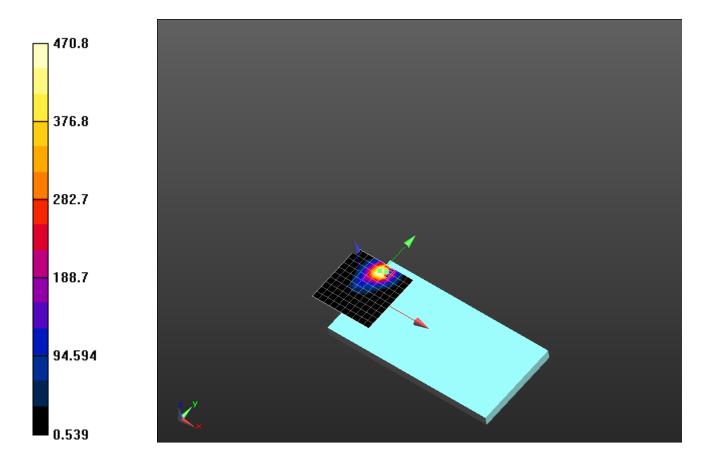
ABM1/ABM2 = 53.81 dB ABM1 comp = 0.78 dBA/m BWC Factor = 0.16 dBLocation: 1, 18, 4.4 mm

## T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 b/z (axial) wideband at best S/N probe AM1DV2/ABM Freq

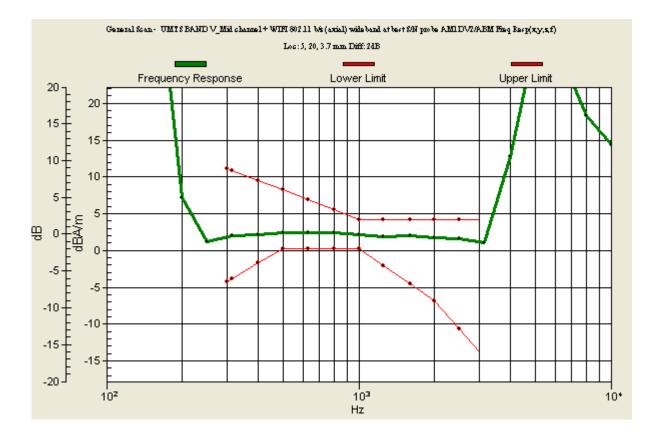
**Resp(x,y,z,f) (1x1x1):** Measurement grid: dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_300-3000\_2s.wav Output Gain: 69.12 Measure Window Start: 300ms Measure Window Length: 6000ms BWC applied: 10.80 dB Device Reference Point: 0, 0, -6.3 mm

> **Cursor:** Diff = 2.00 dB BWC Factor = 10.80 dB Location: 5, 20, 3.7 mm

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Daoud Attayi	June 12-July 04, 2013	RTS-6046-1308-33	3 L6ARGB140LW	



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Dates of Test	Report No PTS_60/6_1308_33		B140I W
	Hearing Aid Compatibility A Test Report for BlackBerry®	Hearing Aid Compatibility Audio Band Magnetic (ABM Test Report for BlackBerry® Smartphone model RGB1 Dates of Test Report No	Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RGB141LW

Date/Time: 6/13/2013 11:23:20 AM

Test Laboratory: RIM Testing Services

# HAC T-Coil\_ABM\_UMTS band V+802.11b\_Radial T

### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 836.4 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 b/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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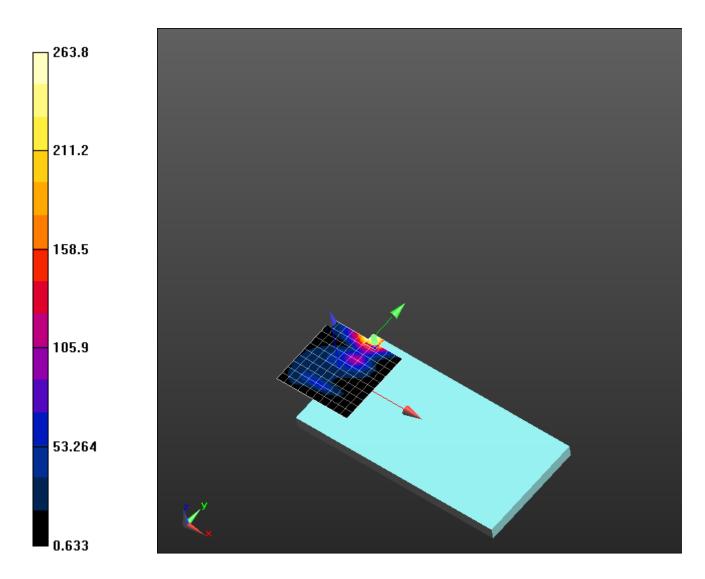
# T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 b/y (transversal) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm,

dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 47.84 dBABM1 comp = -5.92 dBA/mBWC Factor = 0.16 dBLocation: 3, 27, 4.4 mm

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Date/Time: 6/13/2013 12:08:29 PM

Test Laboratory: RIM Testing Services

# HAC T-Coil\_ABM\_UMTS band V+802.11a\_axial

### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 836.4 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 a/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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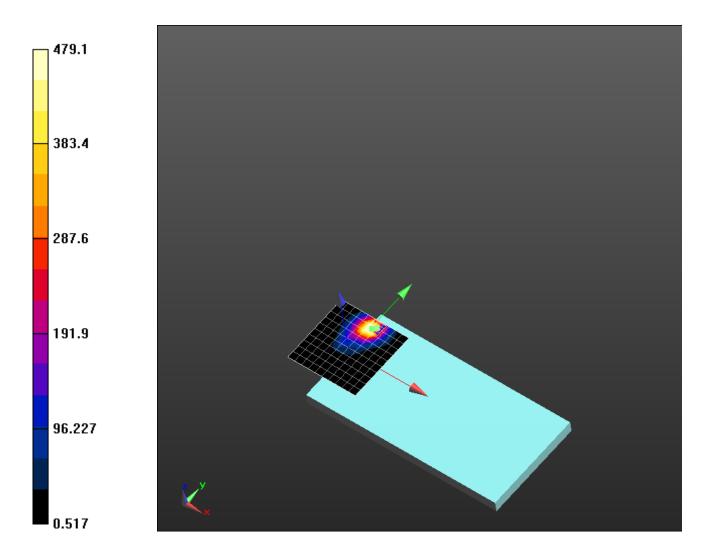
# T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 a/z (axial) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid:

dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 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 = 53.70 dBABM1 comp = 1.96 dBA/mBWC Factor = 0.16 dBLocation: 3, 18, 4.4 mm

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Date/Time: 6/13/2013 12:21:33 PM

Test Laboratory: RIM Testing Services

# HAC T-Coil\_ABM\_UMTS band V+802.11a\_radial T

### DUT: BlackBerry Smartphone; Type: Sample ; Serial: 333E286B

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 836.4 MHz Medium parameters used:  $\sigma = 0$  S/m,  $\epsilon_r = 1$ ;  $\rho = 0$  kg/m<sup>3</sup> Phantom section: TCoil Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: AM1DV3 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA;
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

# T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 a/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

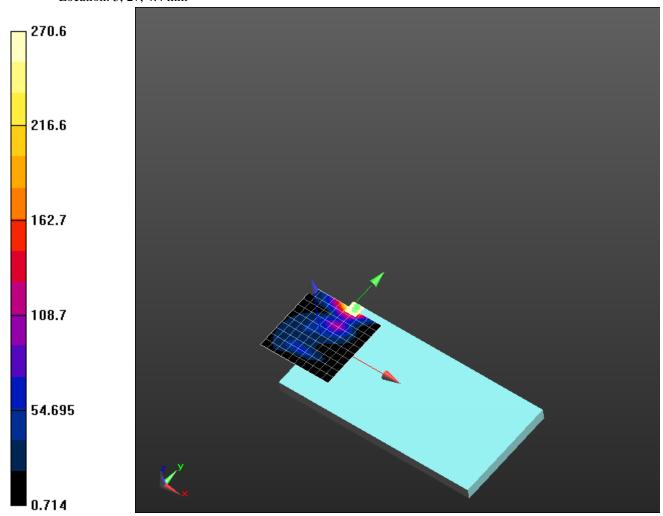
# T-Coil scan\_UMTS\_Band\_V with Wifi/General Scan - UMTS BAND V\_Mid channel + WIFI 802.11 a/y (transversal) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid:

dx=10mm, dy=10mm Signal Type: Audio File (.wav) 48k\_voice\_1kHz\_1s.wav Output Gain: 35.28 Measure Window Start: 300ms

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Measure Window Length: 1000ms BWC applied: 0.16 dB Device Reference Point: 0, 0, -6.3 mm

> Cursor: ABM1/ABM2 = 47.82 dBABM1 comp = -5.61 dBA/mBWC Factor = 0.16 dBLocation: 5, 27, 4.4 mm



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# Annex D: Probe/TMFS calibration certificate

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<sup>hor Data</sup> aoud Attayi		Dates of Test June 12-July	04, 2013		<sup>port No</sup> TS-6046-1308	3-33	FCC ID L6ARG	B140LW
	Schmid Engin	tion Laboratory I & Partner lecring AG strasse 43, 8004 Zurich,			R BRATE	C Set S Set	hweizerischer K rvice suisse d'ét rvizio svizzero d riss Calibration S	alonnage i taratura
		d by the Swiss Accredit Accreditation Service		ries to the EA	Accred	litation No.:	SCS 108	
	Multilaten	al Agreement for the rec	ognition of calibrati	on certificates				
	Client	RTS (RIM Testin	ng Services)		Certific	ate No: Al	M1DV3-3062	2_Jan13
		the second s						
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This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Calibrated by:

Approved by:

Certificate No: AM1D-3062\_Jan13

Function

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Laboratory Technician

Deputy Technical Manager

Signature

6200

Issued: January 10, 2013

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#### References

- 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.

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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	January 12, 2012

#### Calibration data

Connector rotation angle	(in DASY system)	61.0 °	+/- 3.6 ° (k=2)
Sensor angle	(in DASY system)	0.25 °	+/- 0.5 ° (k=2)
Sensitivity at 1 kHz	(in DASY system)	0.00741 V / (A/m)	+/- 2.2 % (k=2)

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

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#### References

- 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. 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).
- 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].



North





East



South

West

Fig. 1 TMFS scanning measurement configurations

- 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.

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#### 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

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### 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

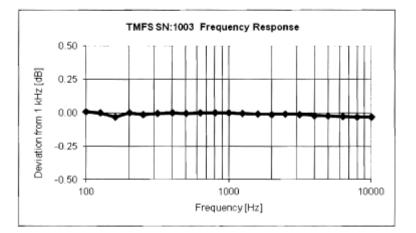


Fig. 2 Frequency response 100 to 10'000 Hz

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### 4.2 Field plots

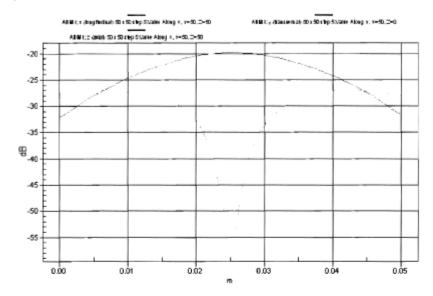


Fig. 3: Typical 2D field plots for x (red), y (green) and z (blue) components

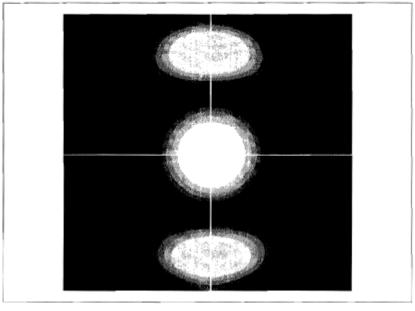


Fig. 4: Superponed field plots of z (axial), x and y radial magnetic field, 50 x 50 mm, individual scaling: white = max. field level, black = -4dB below max. The lines show the position of the 2D field plot of figure 3.

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