

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 1(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Annex A: Probe sensitivity and reference signal measurement plots

T-Coil Probe

General

Mechanical

Surface Detection

Name: AM1DV3 - 3062

Type: AM1DV3

Serial number: 3062

Calibrated: ☒ 1/10/2013

Notes: Sensitivity: 0.00741 V/(A/m)

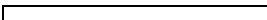
Other...

OK

Can

Internal calibration factor	2.3920 V	1.1493 V
Probe sensitivity at 1 kHz		0.007410 V/(A/m)

Figure A1: Probe calibration data for coil and probe

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 3(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

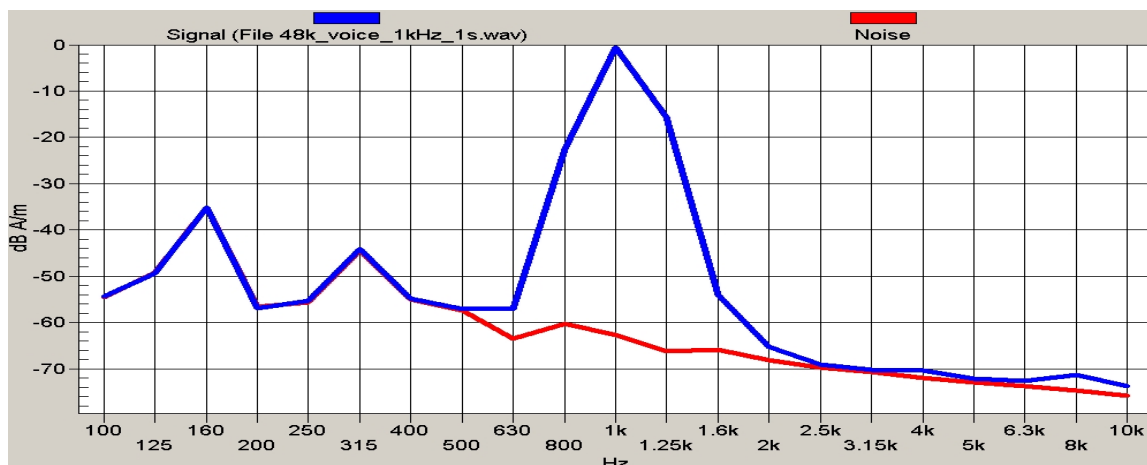


Figure A2: Reference voice 1 kHz signal and noise

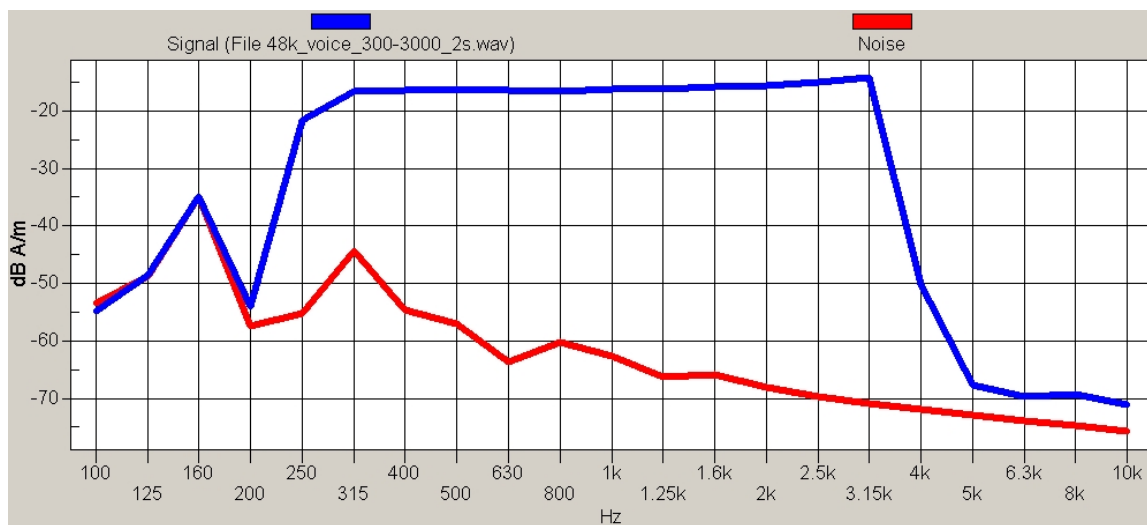


Figure A3: Reference voice simulated signal and noise

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 4(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Annex B: TMFS system validation and ambient data/plots

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 5(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

Date/Time: 5/31/2013 11:11:58 AM

Test Laboratory: RIM Testing Services

HAC T-Coil TMFS_validation_05_31_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, $\epsilon_r = 1$; $\rho = 0$ kg/m³

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

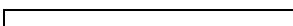
Signal Type: Off

Output Gain: 0

Measure Window Start: 2000ms

Measure Window Length: 5000ms

Device Reference Point: 0, 0, -6.3 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 6(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Cursor:

ABM = -56.02 dBA/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

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 = -55.98 dBA/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: 34.95

Measure Window Start: 0ms

Measure Window Length: 1000ms

BWC applied: 0.003 dB

Device Reference Point: 0, 0, -6.3 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 7(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Cursor:

ABM1 comp = -20.19 dBA/m

BWC Factor = 0.003 dB

Location: 0, 2, 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: 0.003 dB

Device Reference Point: 0, 0, -6.3 mm

Cursor:

ABM1 comp = -26.38 dBA/m

BWC Factor = 0.003 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 = 1.99 dB

BWC Factor = 13.16 dB

Location: 0.2, 1.1, 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

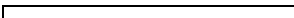
Output Gain: 86.87

Measure Window Start: 300ms

Measure Window Length: 4000ms

BWC applied: 13.16 dB

Device Reference Point: 0, 0, -6.3 mm

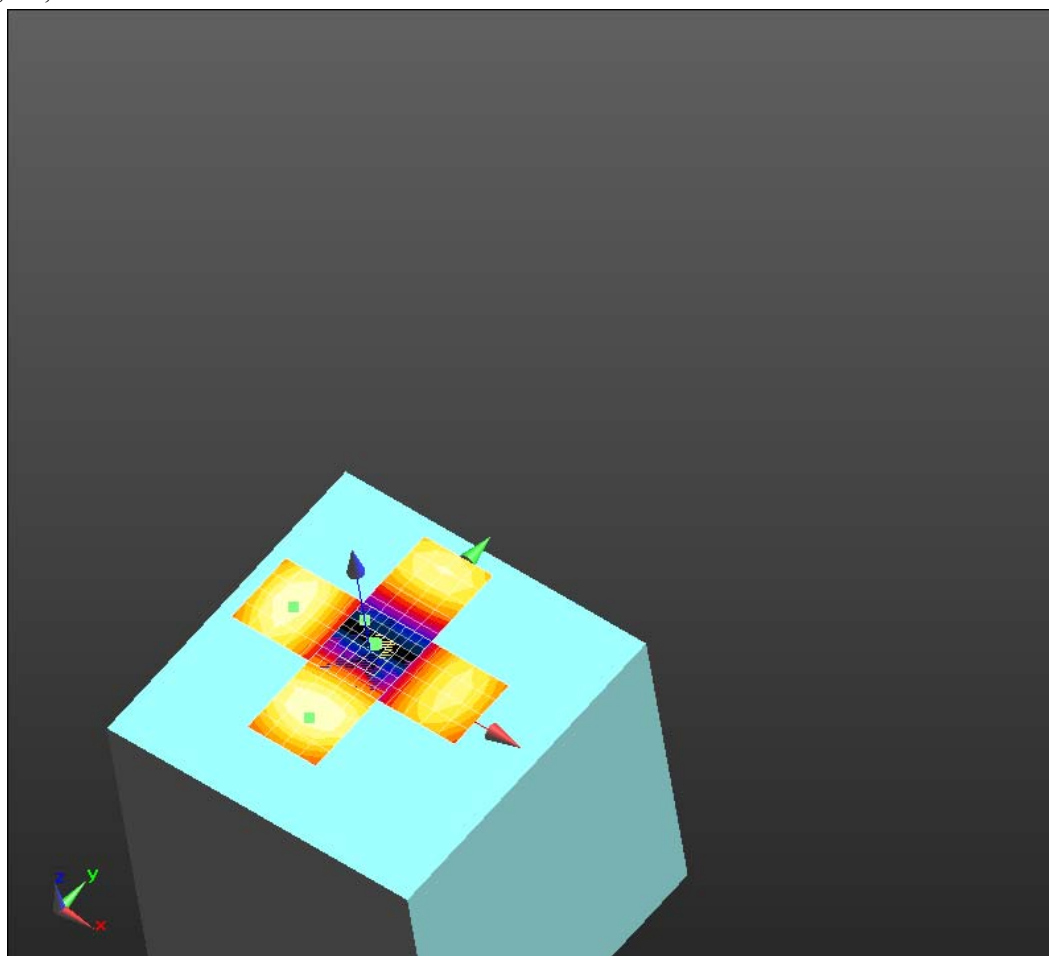
	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 8(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

Cursor:

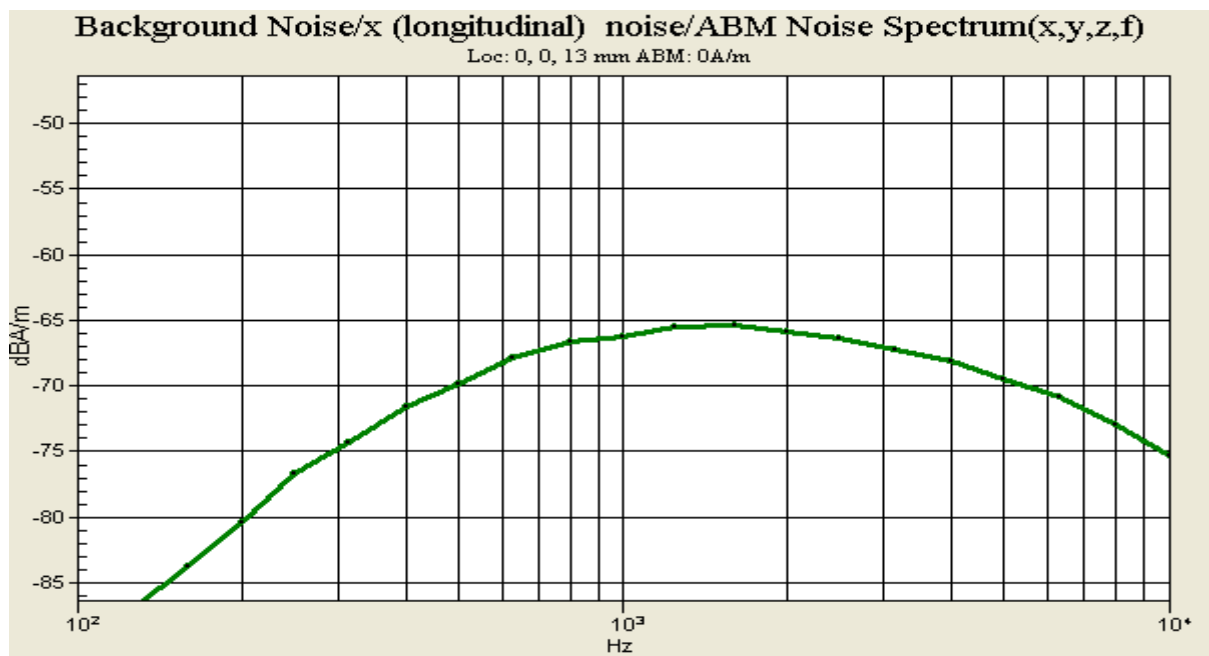
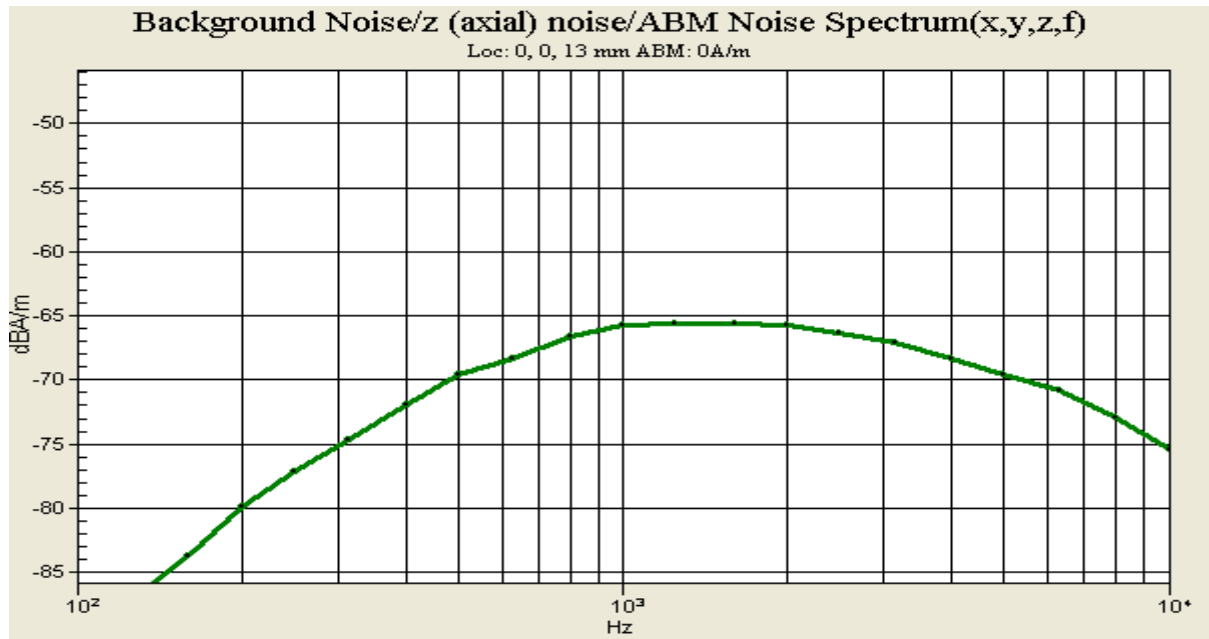
Diff = 1.98 dB

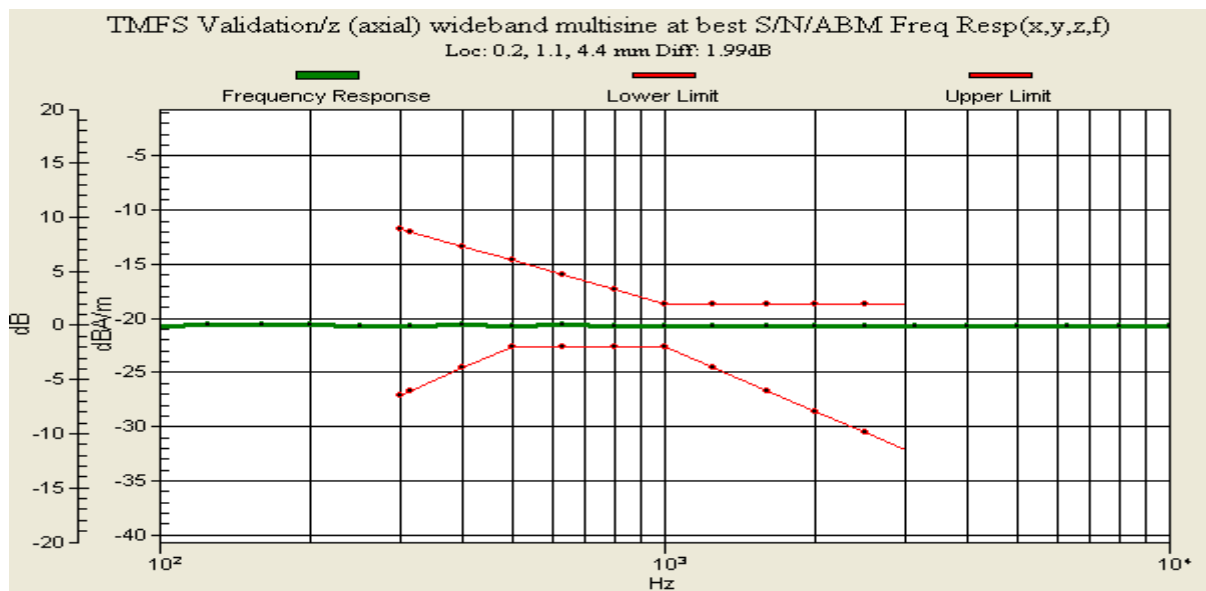
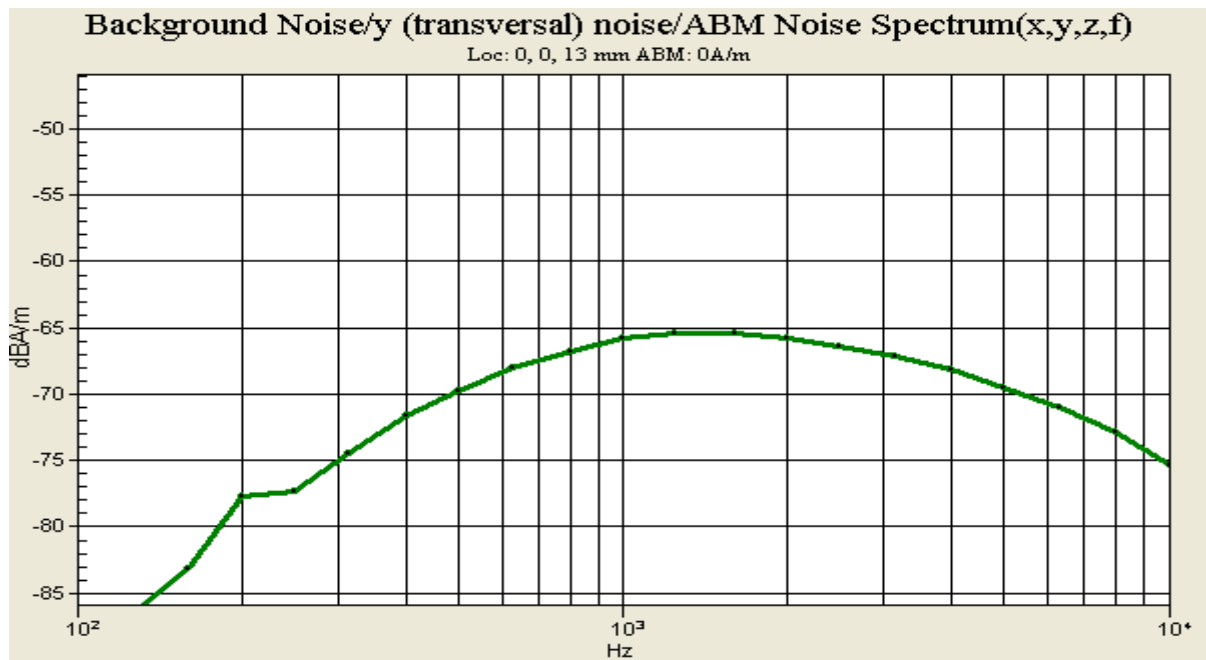
BWC Factor = 13.16 dB

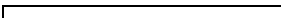
Location: 0.2, 1.1, 5.1 mm

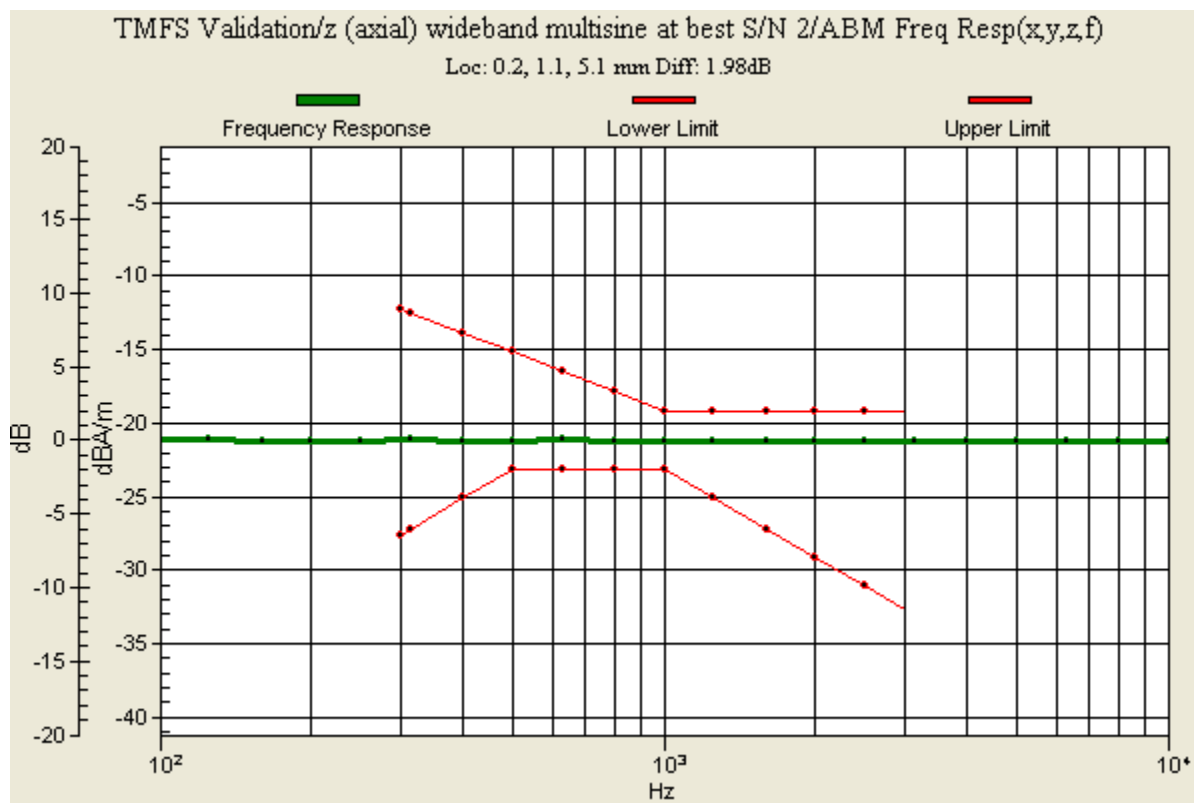


0 dB = 1.000 A/m = 0.00 dBA/m





	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 11(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 12(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Annex C: Audio Band Magnetic measurement data and plots

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 13(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Date/Time: 6/5/2013 10:58:45 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_GSM850_Axial

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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, $\epsilon_r = 1$; $\rho = 0$ kg/m³

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

	Document		Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		14(76)
Author Data	Dates of Test	Report No	FCC ID
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW

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

Cursor:

ABM1/ABM2 = 36.06 dB

ABM1 comp = 3.86 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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 15(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Cursor:

ABM1/ABM2 = 36.23 dB
ABM1 comp = 3.83 dBA/m
BWC Factor = 0.16 dB
Location: 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

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 = 36.54 dB
ABM1 comp = 3.83 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 4.4 mm

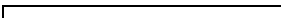
T-Coil scan_GSM850/8x8 Scan - High channel/z (axial) wideband at best

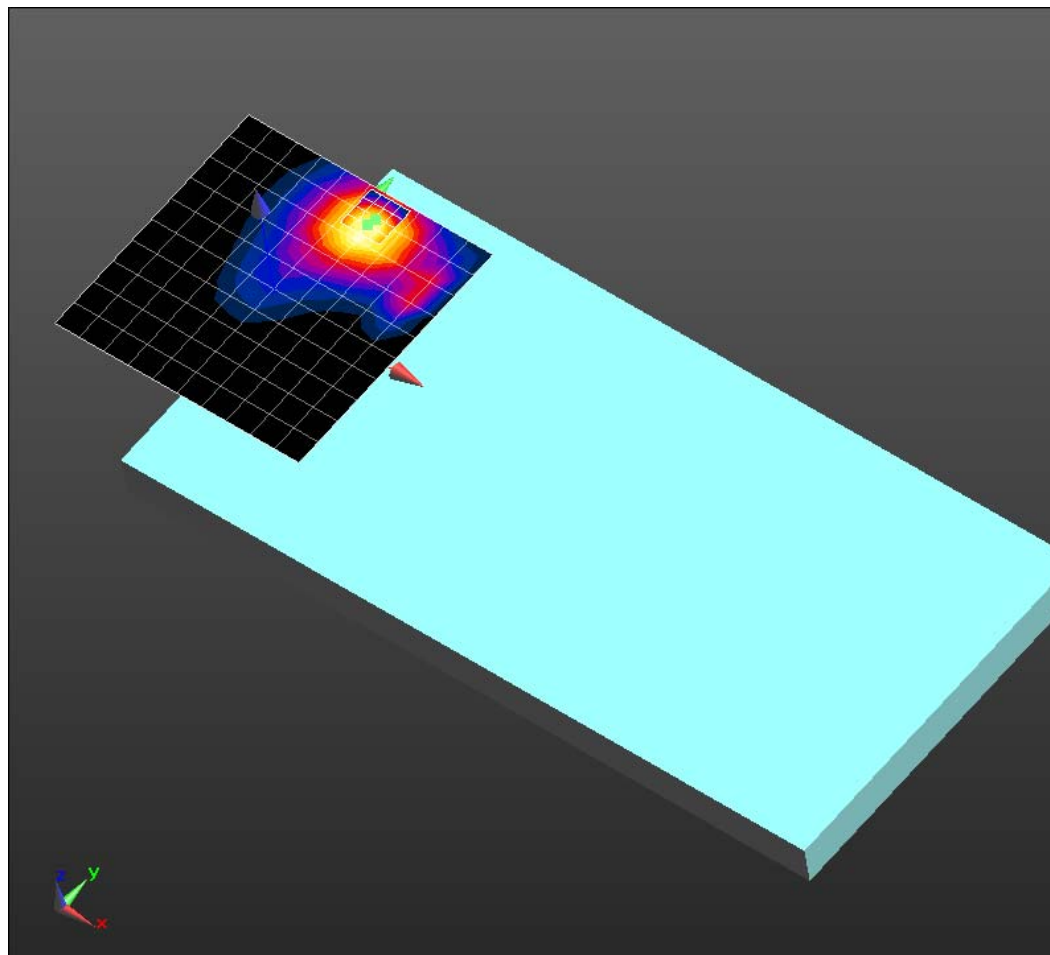
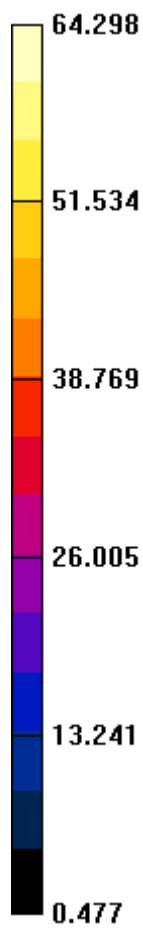
S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

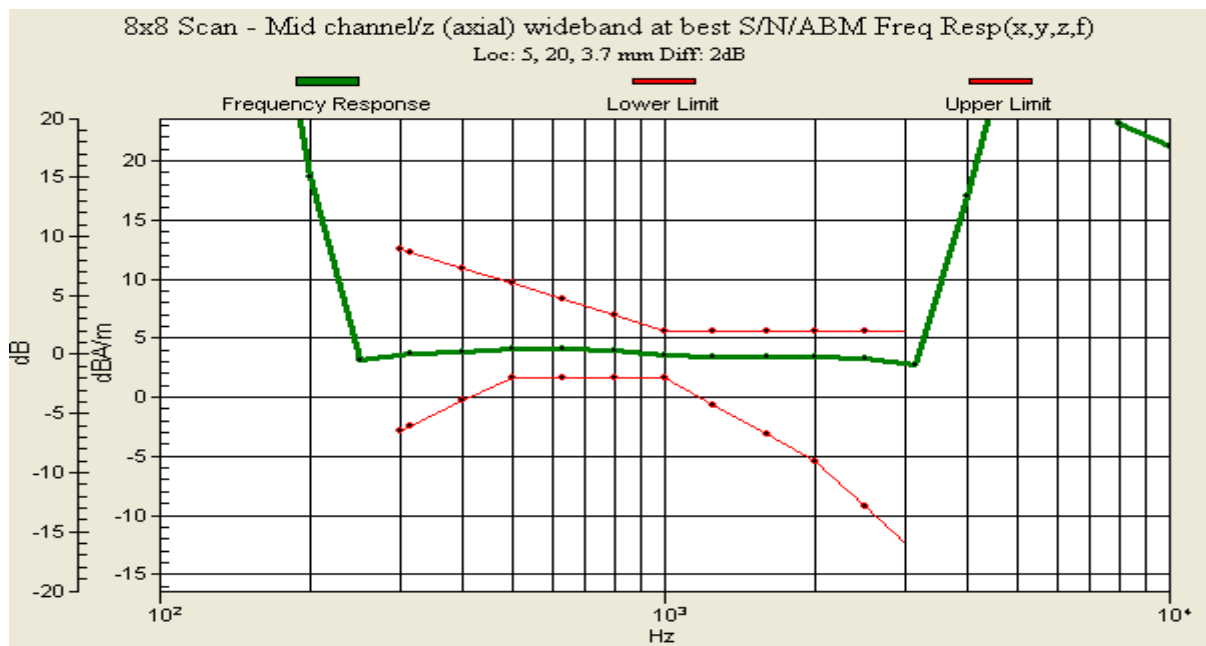
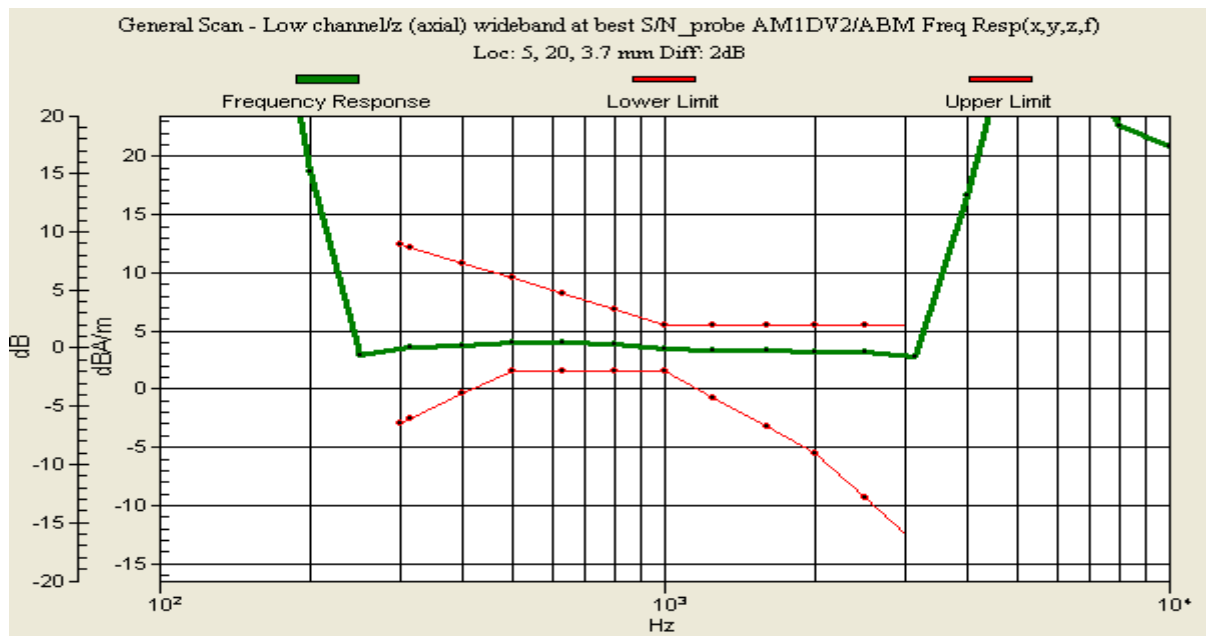
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.81 dB
Device Reference Point: 0, 0, -6.3 mm

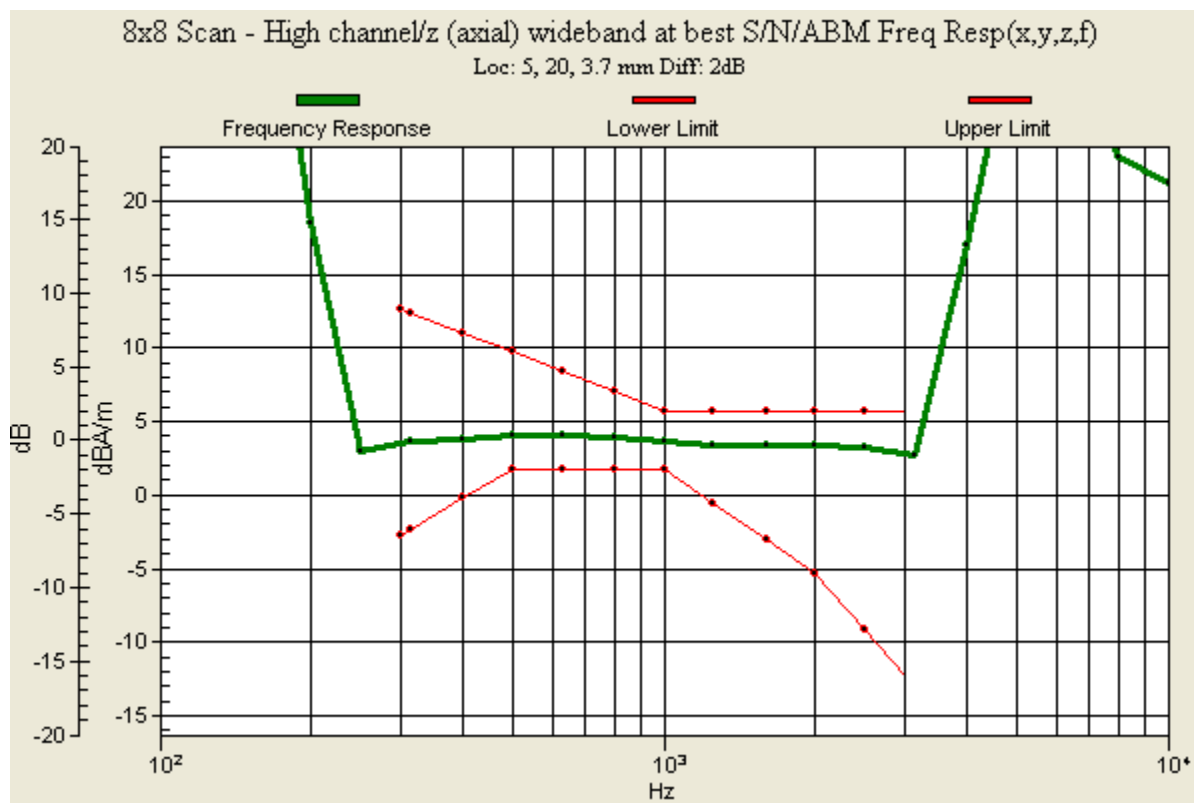
Cursor:

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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 16(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW







	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 19(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Date/Time: 6/5/2013 11:14:02 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_GSM850_Radial_T

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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, $\epsilon_r = 1$; $\rho = 0$ kg/m³

Phantom section: TCoil Section

Measurement Standard: DASYS (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
- DASYS 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

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			20(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Cursor:

ABM1/ABM2 = 46.32 dB
ABM1 comp = -5.60 dBA/m
BWC Factor = 0.16 dB
Location: 7, 7, 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:

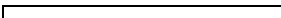
ABM1/ABM2 = 45.88 dB
ABM1 comp = -5.60 dBA/m
BWC Factor = 0.16 dB
Location: 7, 7, 4.4 mm

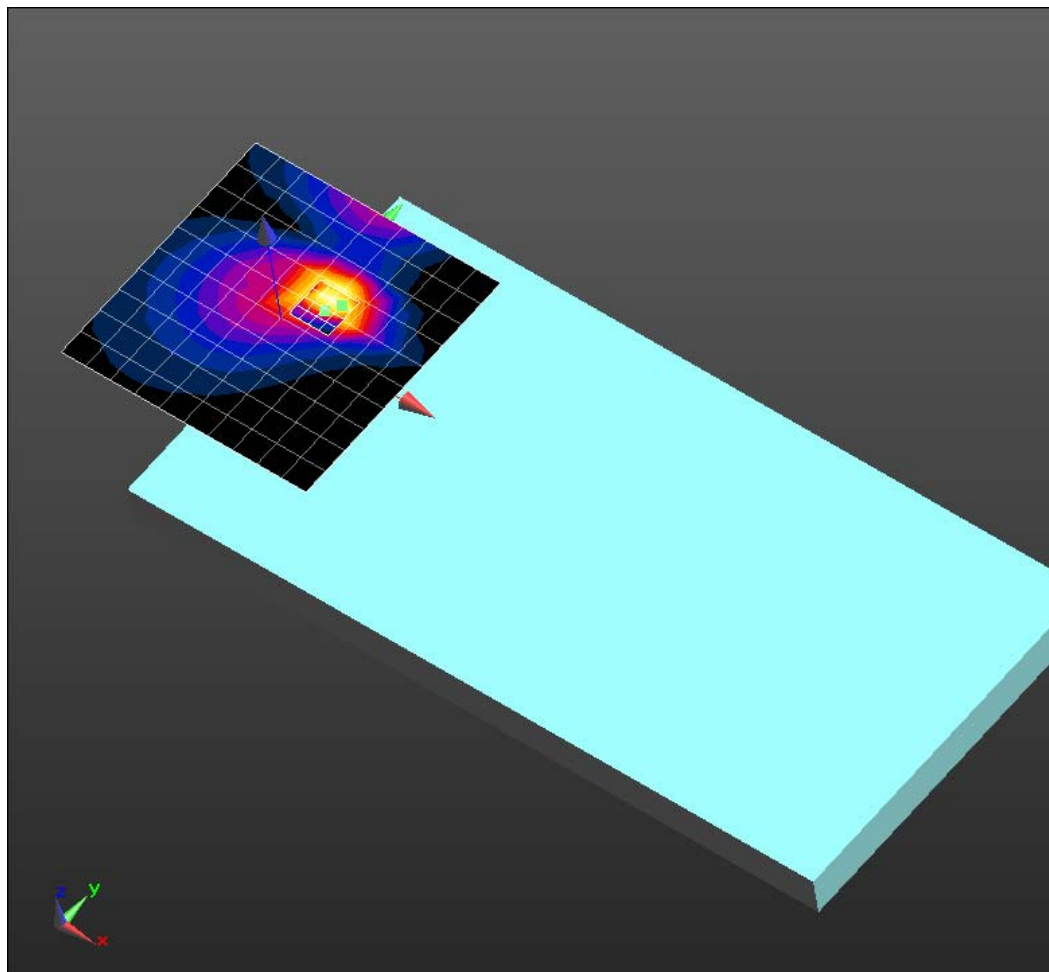
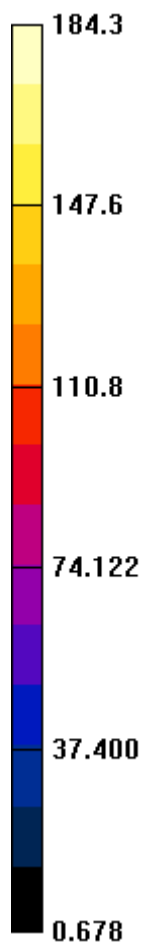
T-Coil scan_GSM850/8x8 Scan - High channel/y (transversal) 2mm 8 x

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 = 46.57 dB
ABM1 comp = -5.68 dBA/m
BWC Factor = 0.16 dB
Location: 7, 7, 4.4 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 21(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			22(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Date/Time: 6/5/2013 12:46:56 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_GSM_1900_Axial

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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, $\epsilon_r = 1$; $\rho = 0$ kg/m³

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_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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 23(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

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 = 39.87 dB

ABM1 comp = 2.67 dBA/m

BWC Factor = 0.16 dB

Location: 5, 18, 4.4 mm

T-Coil scan_GSM1900/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_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

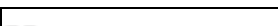
Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 24(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

Cursor:

ABM1/ABM2 = 39.97 dB
ABM1 comp = 2.59 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 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

T-Coil scan_GSM1900/8x8 Scan - High channel/z (axial) 2mm 8 x 8/ABM

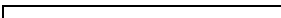
SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

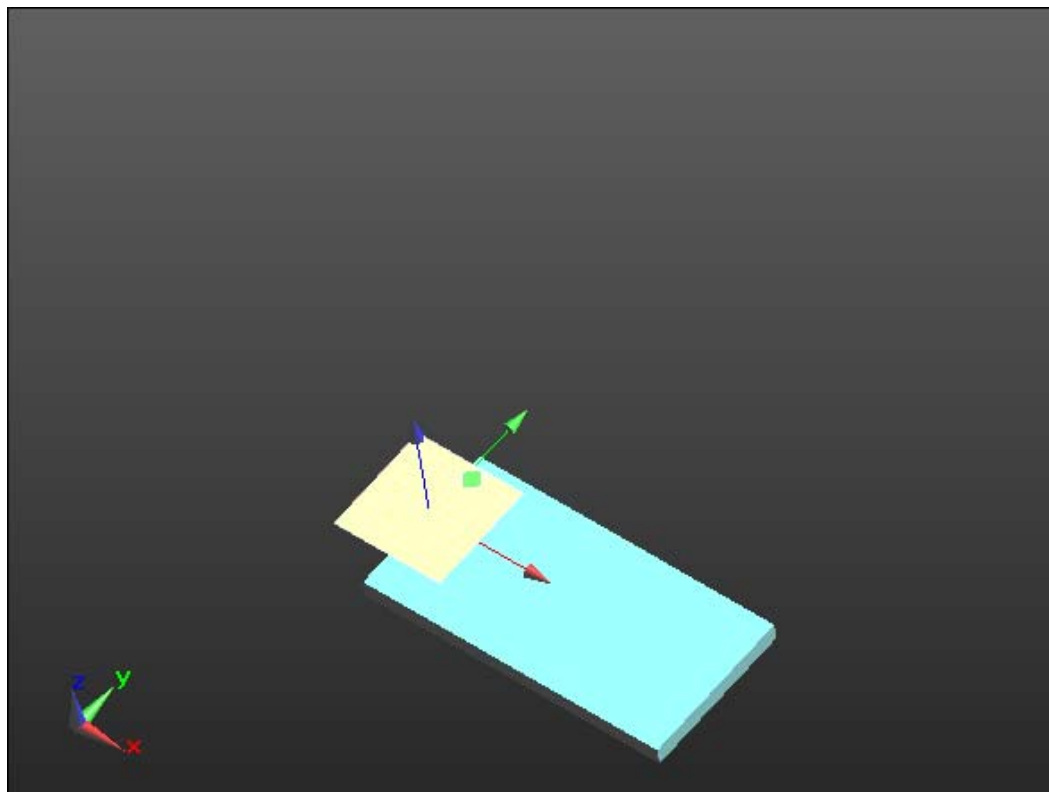
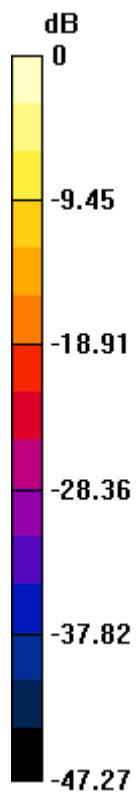
Cursor:

ABM1/ABM2 = 39.92 dB
ABM1 comp = 2.65 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 4.4 mm

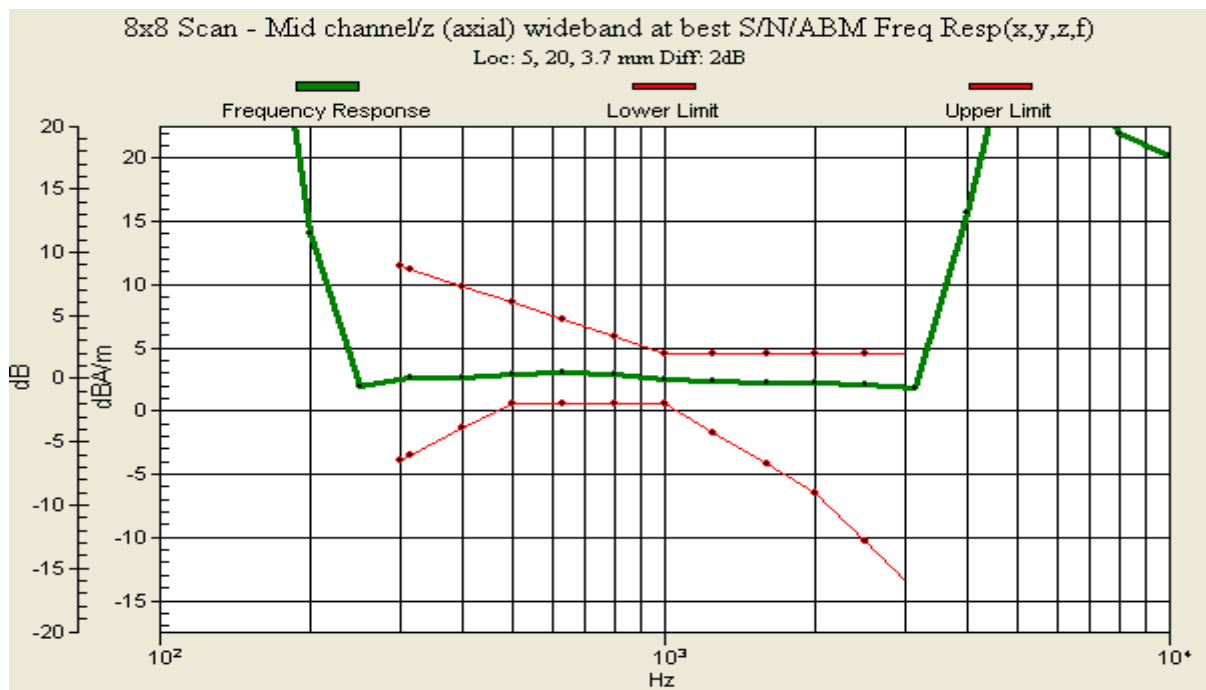
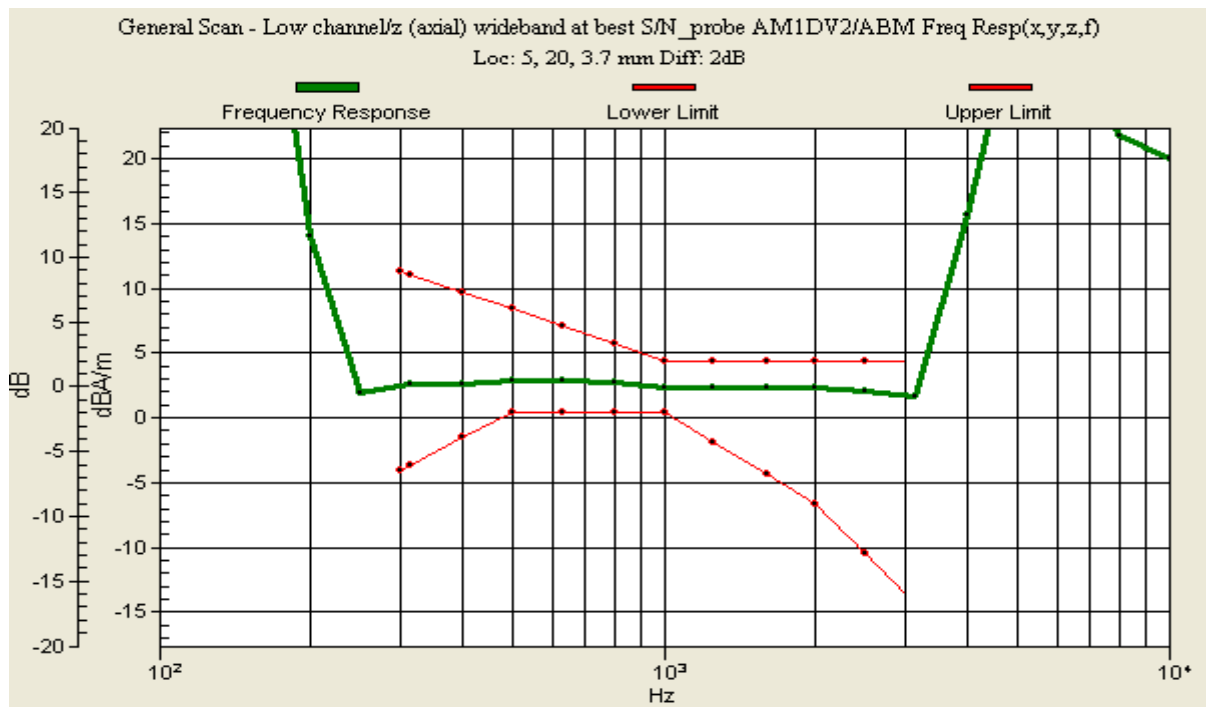
T-Coil scan_GSM1900/8x8 Scan - High channel/z (axial) wideband at best

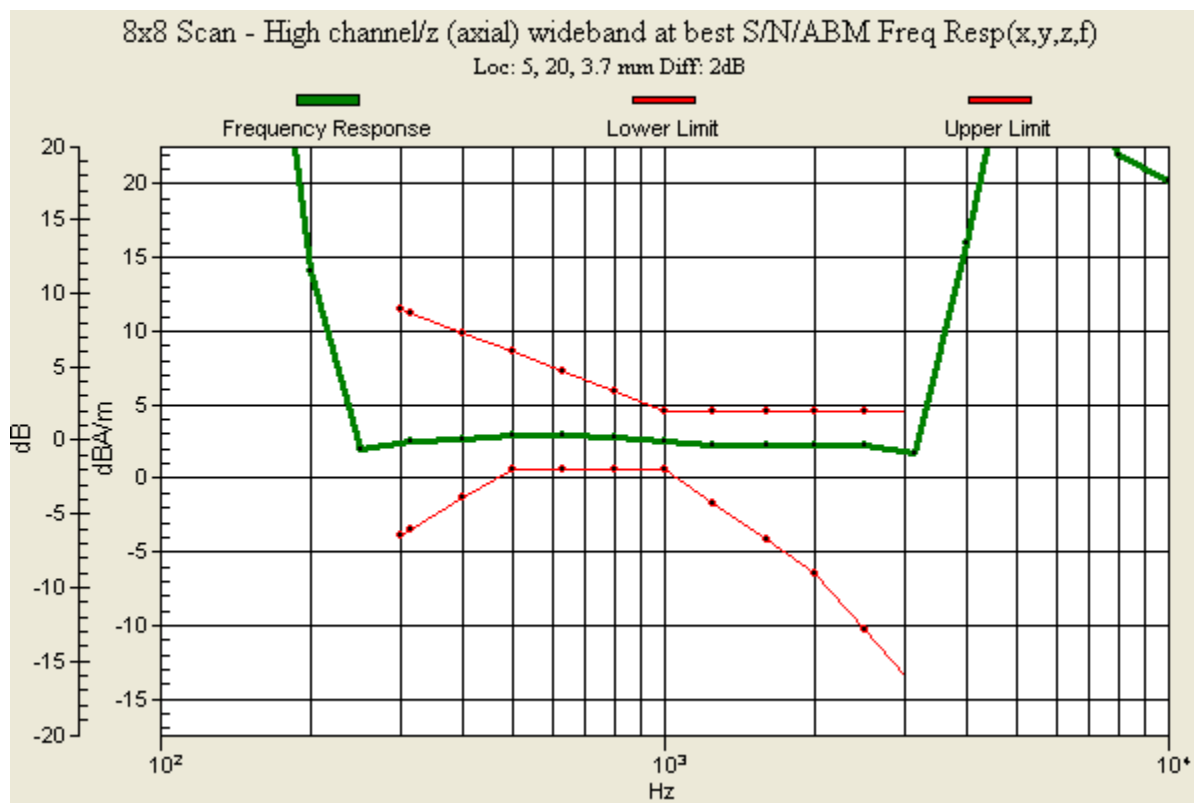
S/N/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 25(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



0 dB = 1.000 = 0.00 dB





	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			28(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Date/Time: 6/5/2013 1:00:05 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_GSM_1900_Radial-T

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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, $\epsilon_r = 1$; $\rho = 0$ kg/m³

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_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

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

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			29(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Cursor:

ABM1/ABM2 = 46.37 dB
ABM1 comp = -6.70 dBA/m
BWC Factor = 0.16 dB
Location: 7, 7, 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:

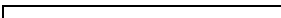
ABM1/ABM2 = 46.44 dB
ABM1 comp = -6.76 dBA/m
BWC Factor = 0.16 dB
Location: 7, 7, 4.4 mm

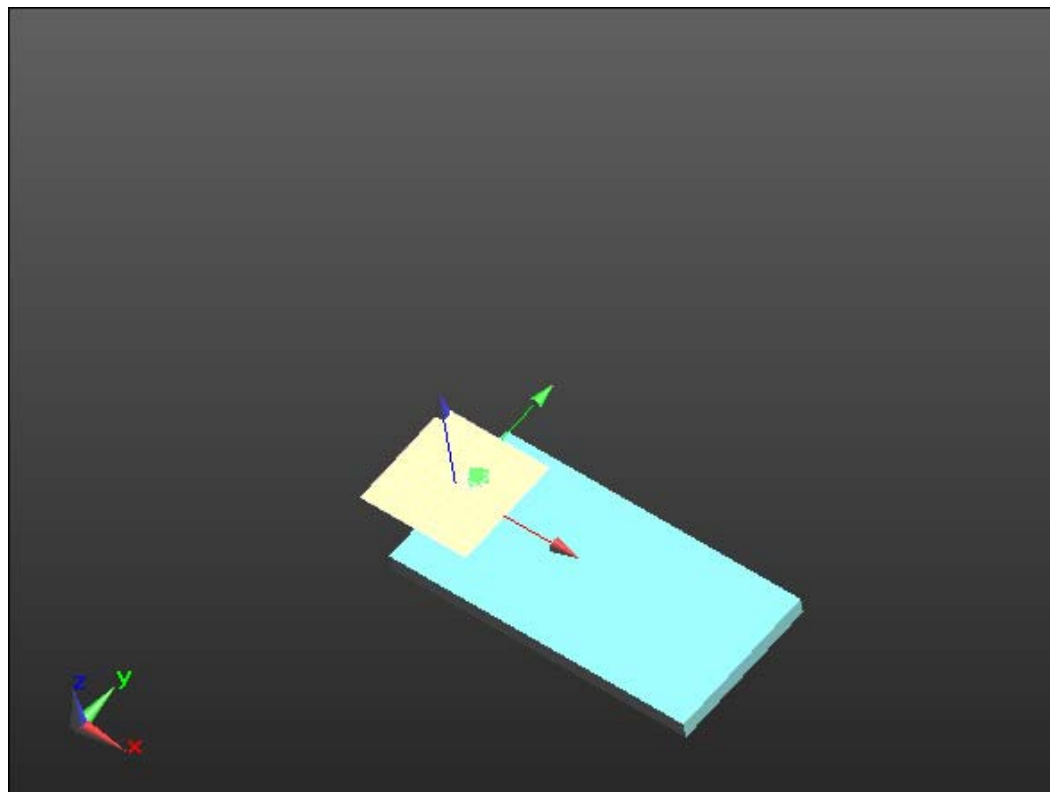
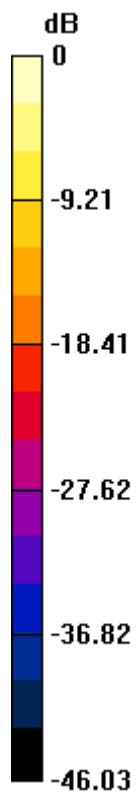
T-Coil scan_GSM1900/8x8 Scan - High channel/y (transversal) 2mm 8 x 8/ABM SNR(x,y,z) (5x5x1): Measurement grid: dx=10mm, dy=10mm

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

Cursor:

ABM1/ABM2 = 46.36 dB
ABM1 comp = -7.07 dBA/m
BWC Factor = 0.16 dB
Location: 5, 7, 4.4 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 30(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



0 dB = 1.000 = 0.00 dB

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 31(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33
		FCC ID L6ARFV120LW	

Date/Time: 6/5/2013 1:40:38 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_V_Axial

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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/m³

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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 32(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

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 = 56.11 dB

ABM1 comp = 3.41 dBA/m

BWC Factor = 0.16 dB

Location: 5, 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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 33(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Cursor:

ABM1/ABM2 = 56.23 dB
ABM1 comp = 3.43 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 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
Measure Window Length: 6000ms
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

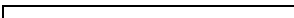
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

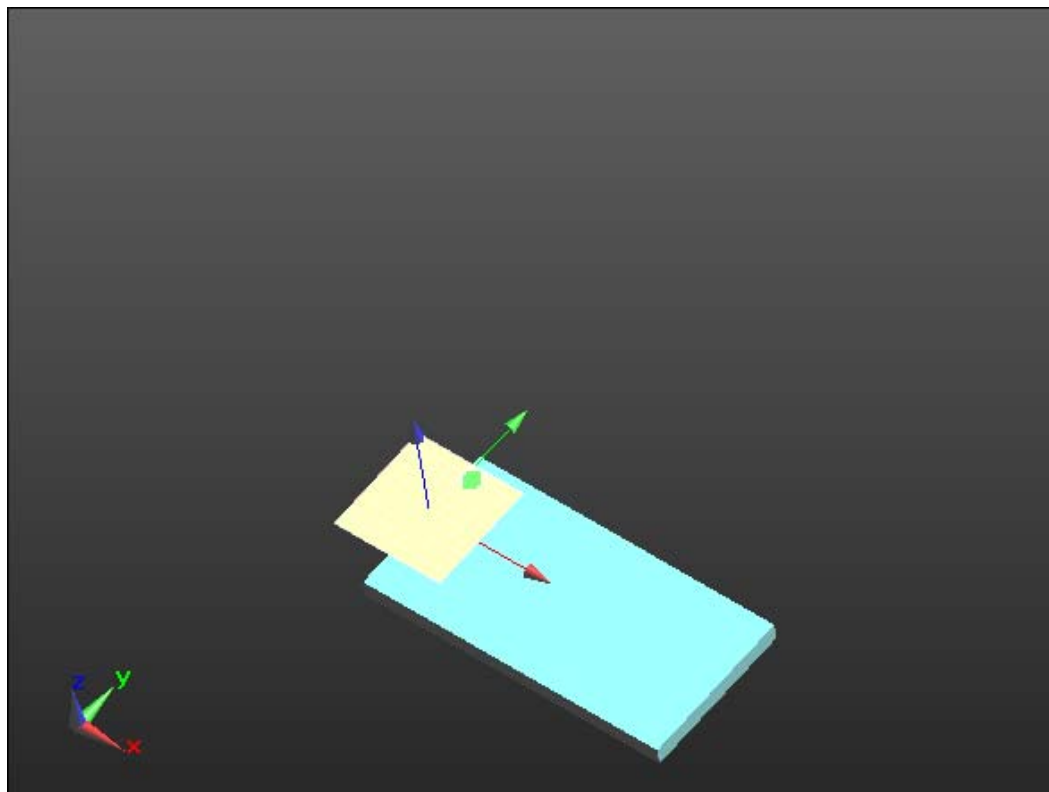
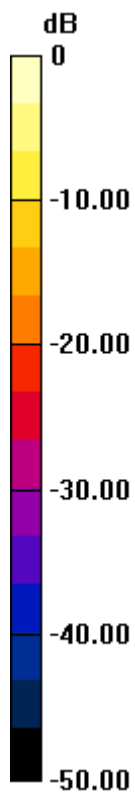
Cursor:

ABM1/ABM2 = 55.99 dB
ABM1 comp = 3.40 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 4.4 mm

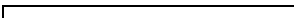
T-Coil scan_UMTS_Band_V/8x8 Scan - High channel/z (axial) wideband at best S/N 2/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

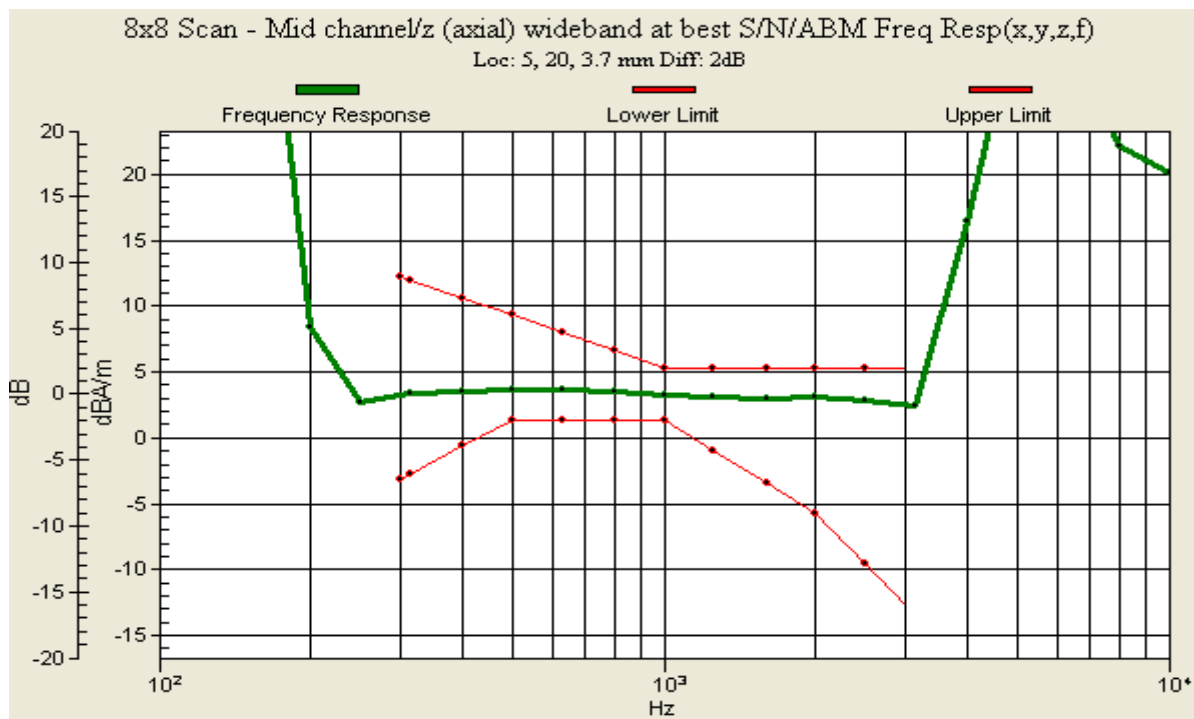
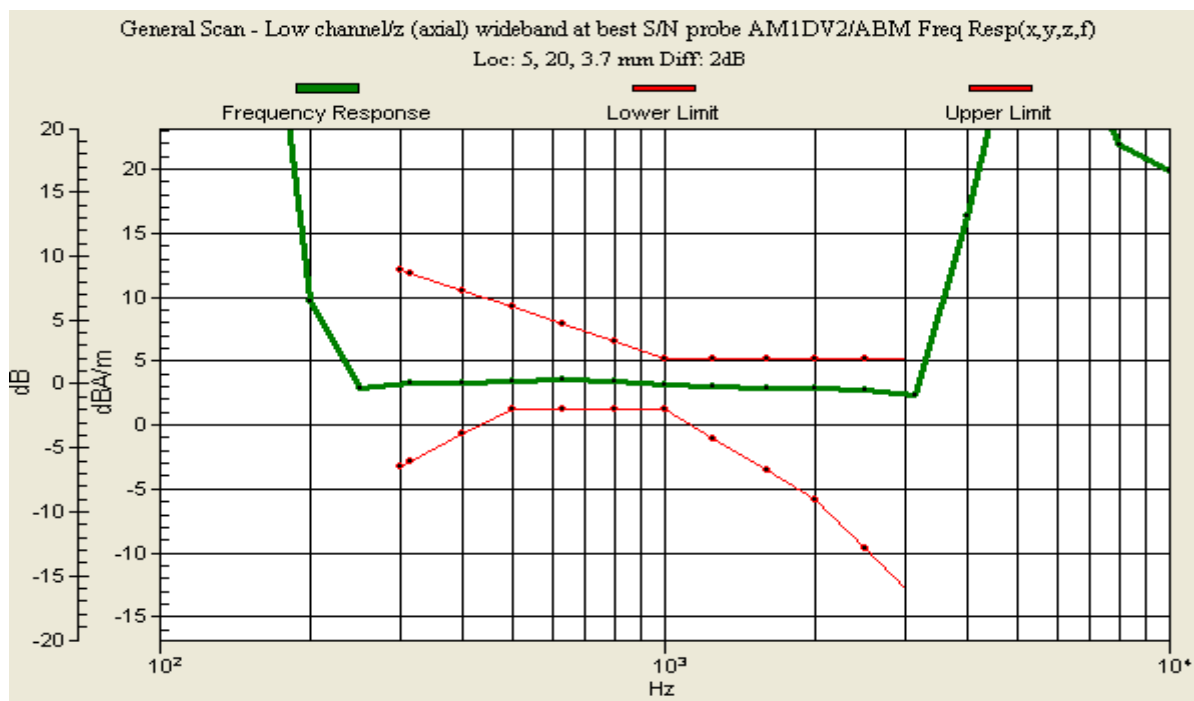
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

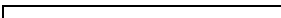
	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 34(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

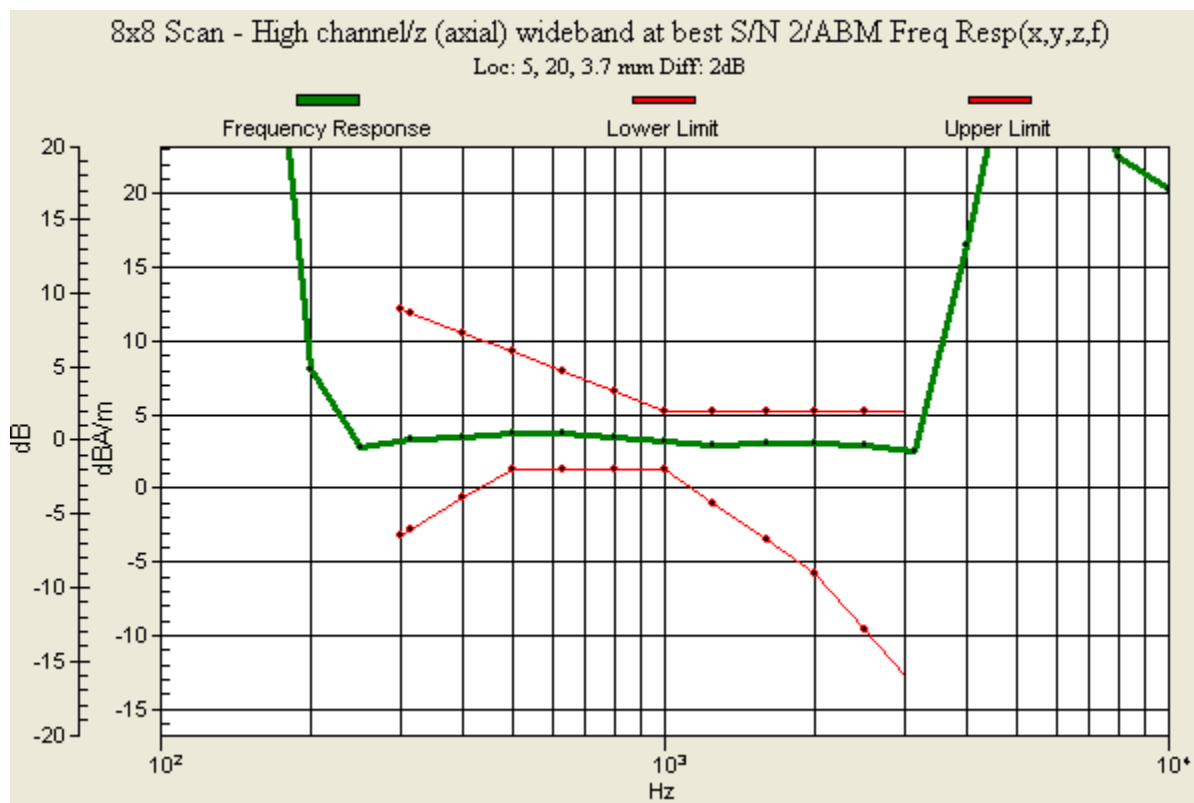


0 dB = 1.000 = 0.00 dB

	Document		Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		35(76)
Author Data	Dates of Test	Report No	FCC ID
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 36(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 37(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Date/Time: 6/5/2013 1:53:47 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_V_Radial-T

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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/m³

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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 38(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

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

Cursor:

ABM1/ABM2 = 49.84 dB

ABM1 comp = -4.98 dBA/m

BWC Factor = 0.16 dB

Location: 3, 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 = 50.24 dB

ABM1 comp = -4.50 dBA/m

BWC Factor = 0.16 dB

Location: 5, 25, 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

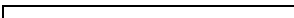
Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 39(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

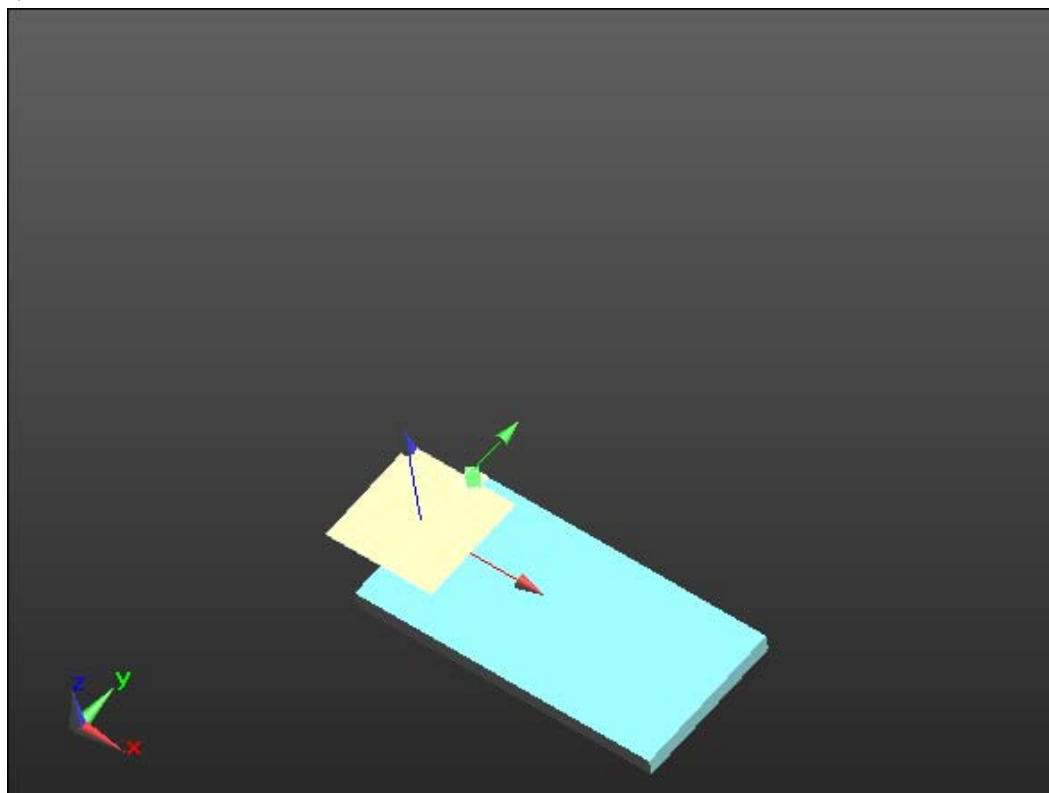
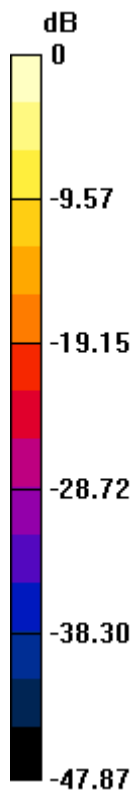
Cursor:

ABM1/ABM2 = 50.10 dB

ABM1 comp = -4.53 dBA/m

BWC Factor = 0.16 dB

Location: 5, 25, 4.4 mm



0 dB = 1.000 = 0.00 dB

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			40(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Date/Time: 6/6/2013 1:17:28 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_IV_Axial

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

Communication System: UID 0 - n/a, WCDMA FDD IV; Frequency: 1712.4 MHz, Frequency: 1732.6 MHz, Frequency: 1752.6 MHz

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

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_IV/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

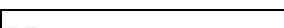
Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 41(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

T-Coil scan_UMTS_Band_IV/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 = 56.81 dB

ABM1 comp = 4.12 dBA/m

BWC Factor = 0.16 dB

Location: 5, 18, 4.4 mm

T-Coil scan_UMTS_Band_IV/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_IV/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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 42(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Cursor:

ABM1/ABM2 = 56.37 dB
ABM1 comp = 4.09 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 4.4 mm

T-Coil scan_UMTS_Band_IV/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

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

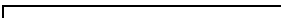
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

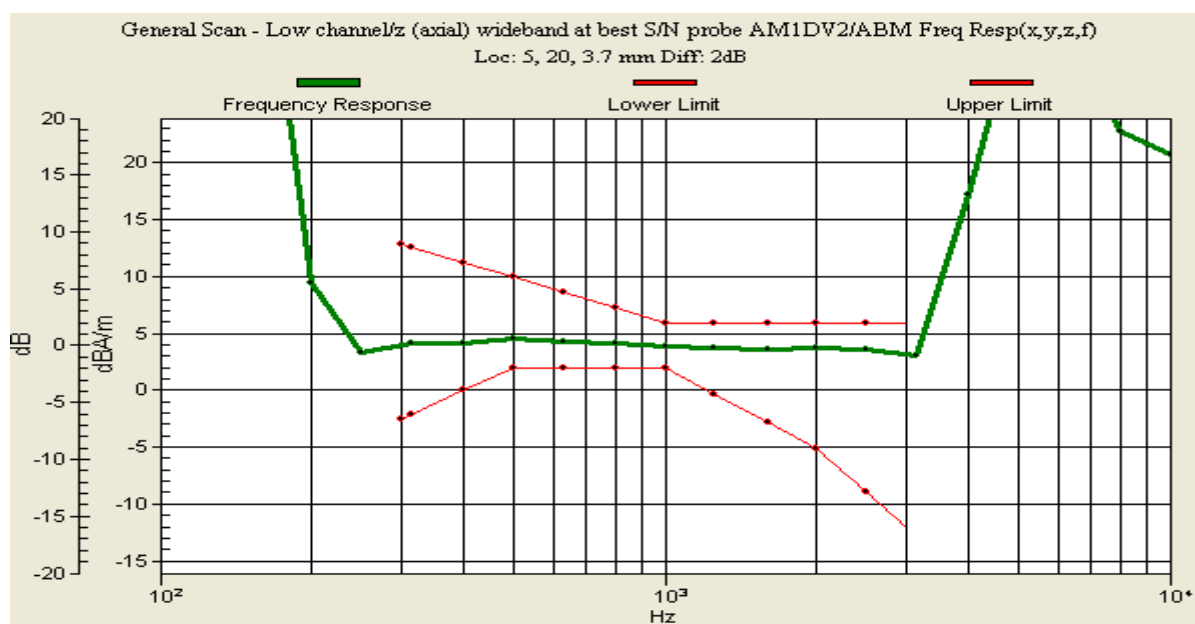
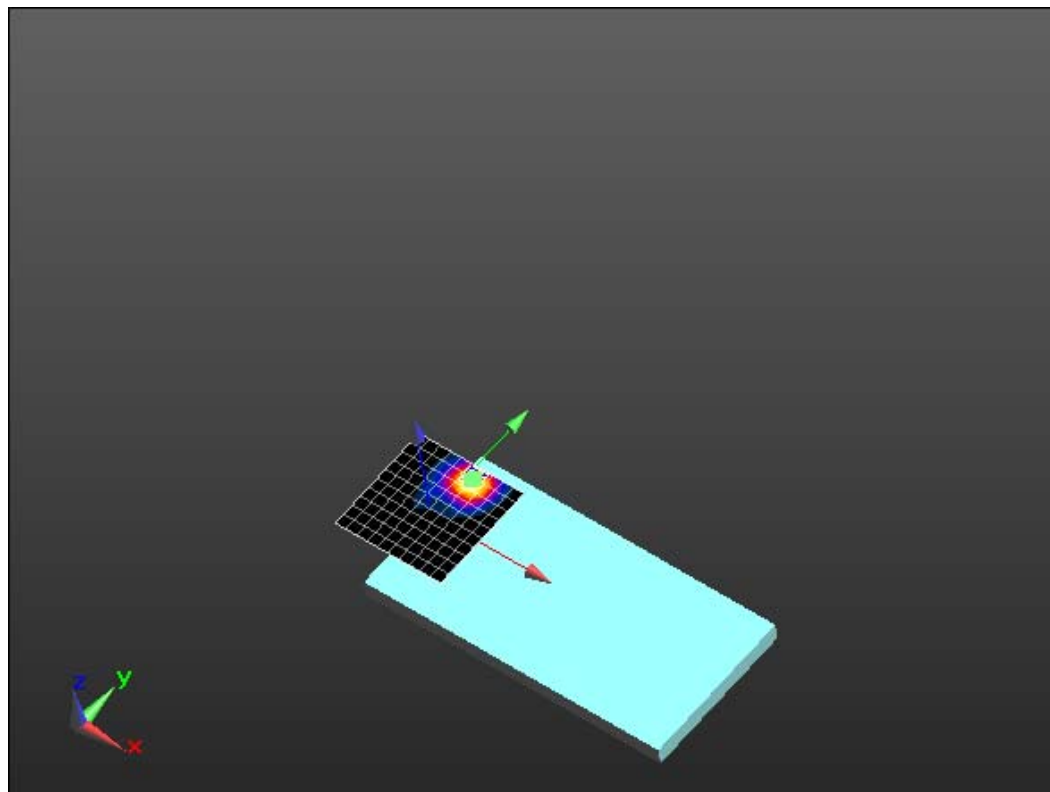
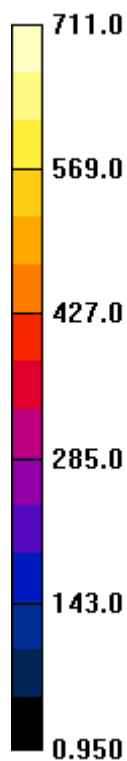
Cursor:

ABM1/ABM2 = 56.41 dB
ABM1 comp = 4.10 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 4.4 mm

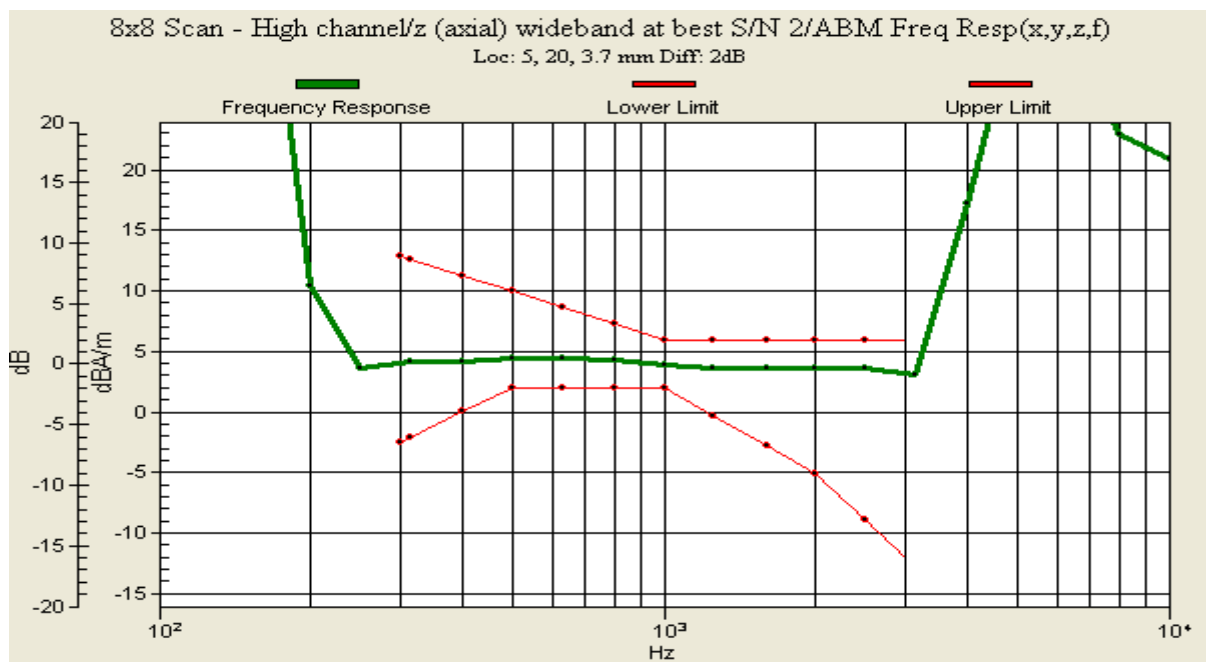
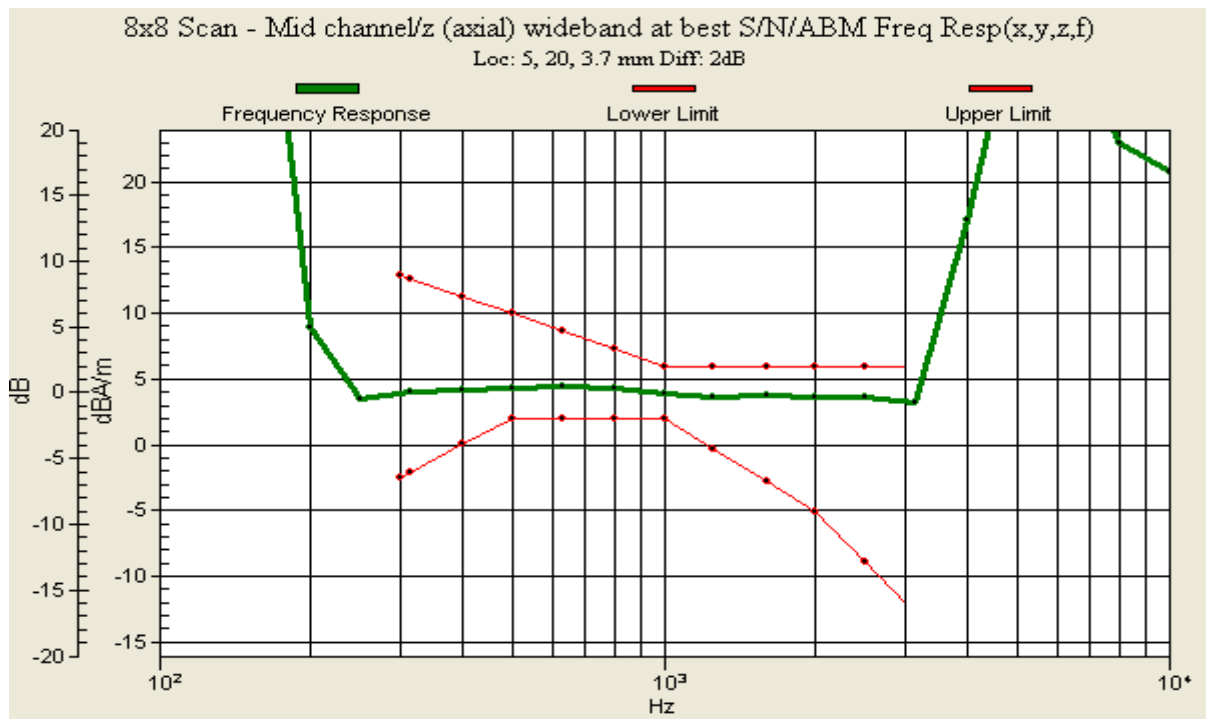
T-Coil scan_UMTS_Band_IV/8x8 Scan - High channel/z (axial) wideband at best S/N 2/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 43(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



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	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 45(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33
		FCC ID L6ARFV120LW	

Date/Time: 6/6/2013 1:30:35 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_IV_Radial-T

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

Communication System: UID 0 - n/a, WCDMA FDD IV; Frequency: 1712.4 MHz, Frequency: 1732.6 MHz, Frequency: 1752.6 MHz

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

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_IV/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

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			46(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

T-Coil scan_UMTS_Band_IV/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 = 50.56 dB

ABM1 comp = -4.08 dBA/m

BWC Factor = 0.16 dB

Location: 5, 27, 4.4 mm

T-Coil scan_UMTS_Band_IV/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 = 50.37 dB

ABM1 comp = -4.61 dBA/m

BWC Factor = 0.16 dB

Location: 3, 27, 4.4 mm

T-Coil scan_UMTS_Band_IV/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

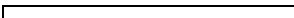
Output Gain: 35.28

Measure Window Start: 300ms

Measure Window Length: 1000ms

BWC applied: 0.16 dB

Device Reference Point: 0, 0, -6.3 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 47(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33
		FCC ID L6ARFV120LW	

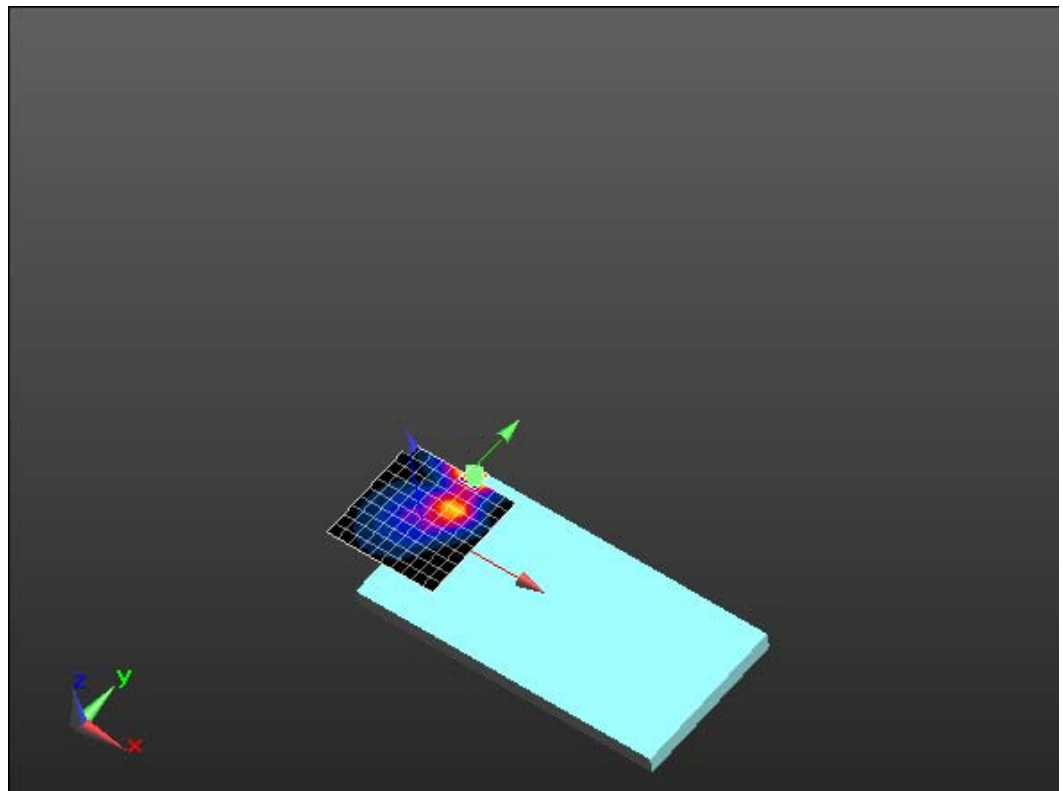
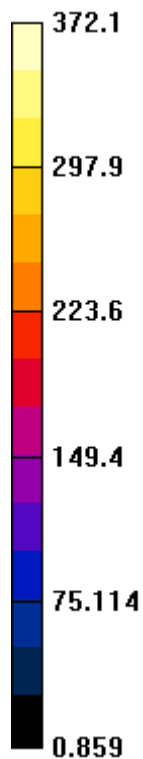
Cursor:

ABM1/ABM2 = 50.48 dB

ABM1 comp = -4.23 dBA/m

BWC Factor = 0.16 dB

Location: 5, 25, 4.4 mm



	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			48(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Date/Time: 6/5/2013 2:54:05 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_II_Axial

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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, $\epsilon_r = 1$; $\rho = 0$ kg/m³

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_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

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			49(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

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 = 55.93 dB

ABM1 comp = 3.39 dBA/m

BWC Factor = 0.16 dB

Location: 5, 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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 50(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Cursor:

ABM1/ABM2 = 55.84 dB
ABM1 comp = 3.33 dBA/m
BWC Factor = 0.16 dB
Location: 5, 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
Measure Window Length: 6000ms
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

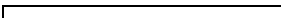
Signal Type: Audio File (.wav) 48k_voice_1kHz_1s.wav
Output Gain: 35.28
Measure Window Start: 300ms
Measure Window Length: 1000ms
BWC applied: 0.16 dB
Device Reference Point: 0, 0, -6.3 mm

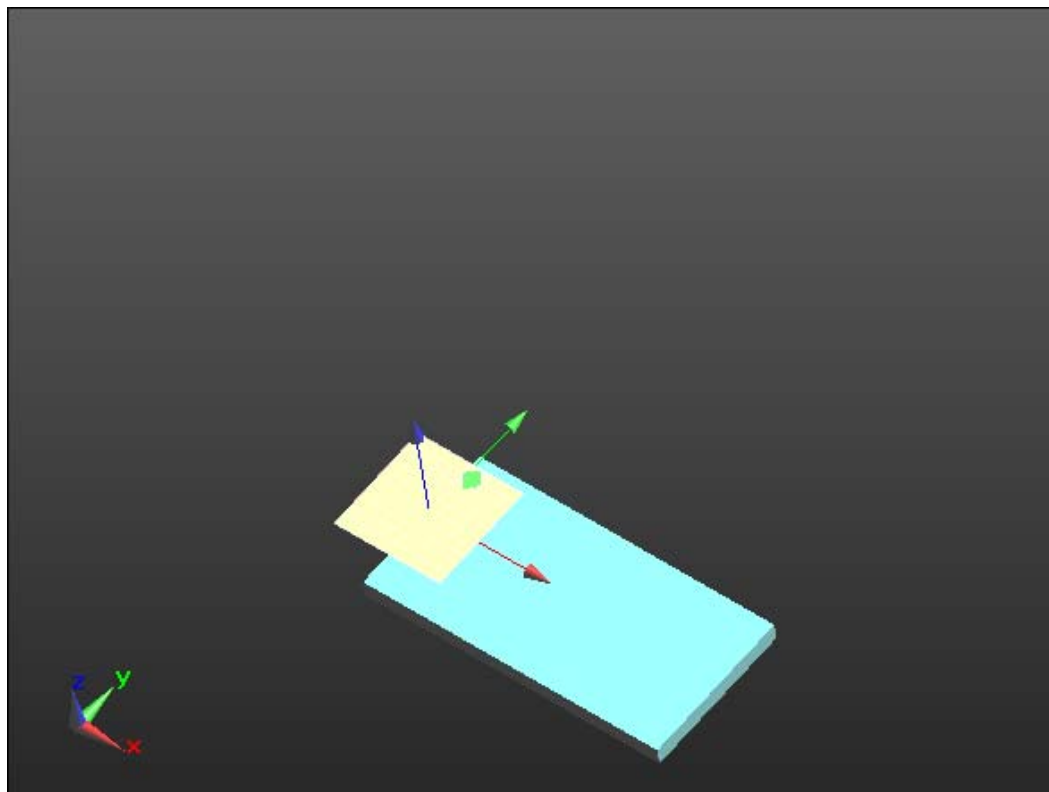
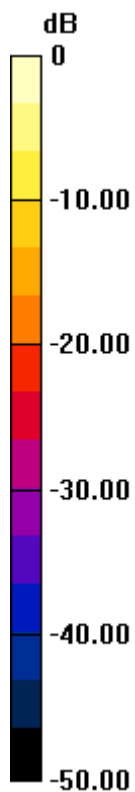
Cursor:

ABM1/ABM2 = 55.85 dB
ABM1 comp = 3.36 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 4.4 mm

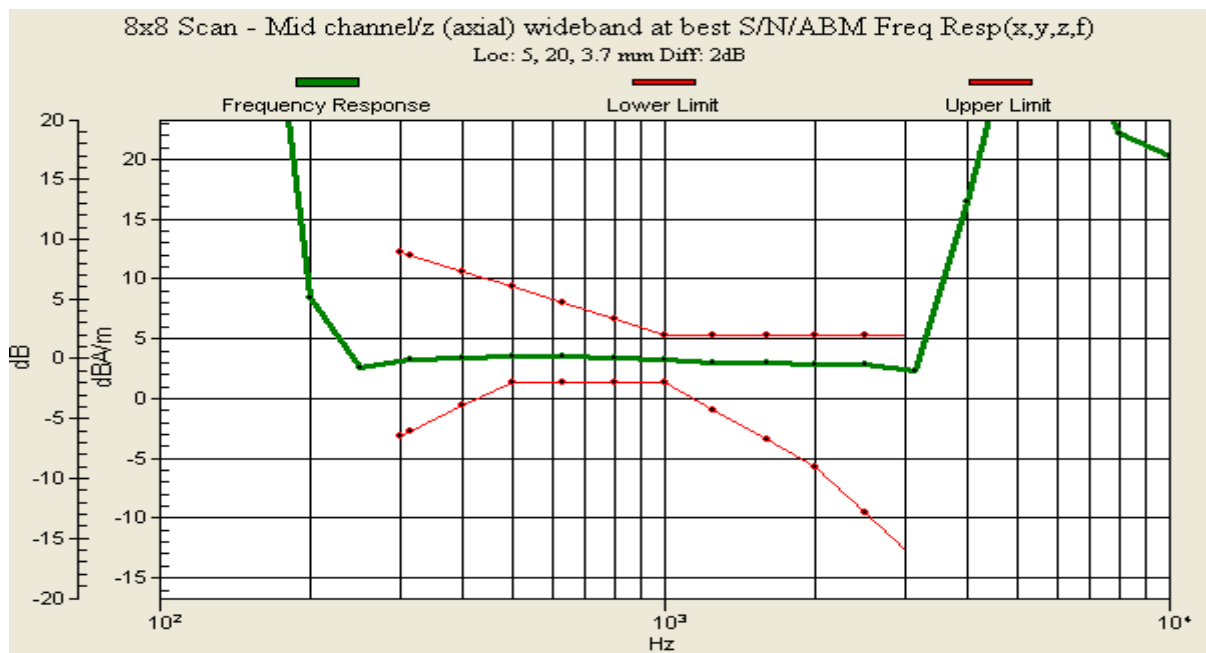
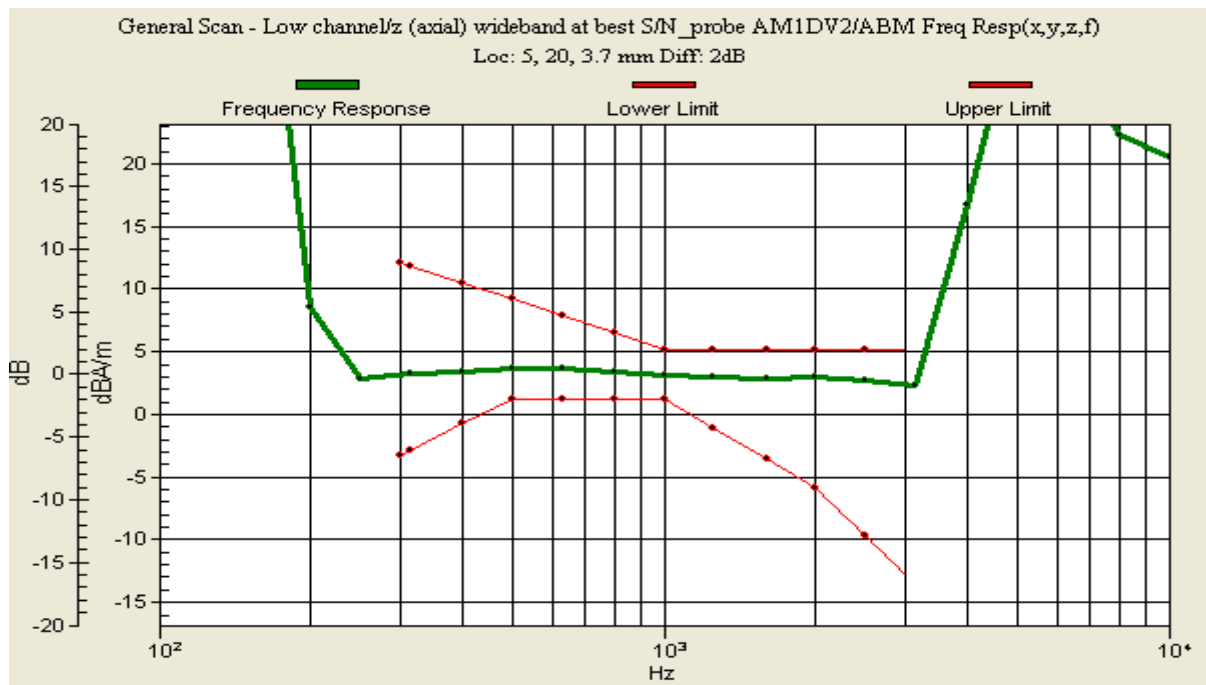
T-Coil scan_UMTS_Band_II/8x8 Scan - High channel/z (axial) wideband at best S/N 2/ABM Freq Resp(x,y,z,f) (1x1x1): Measurement grid: dx=10mm, dy=10mm

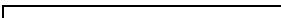
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

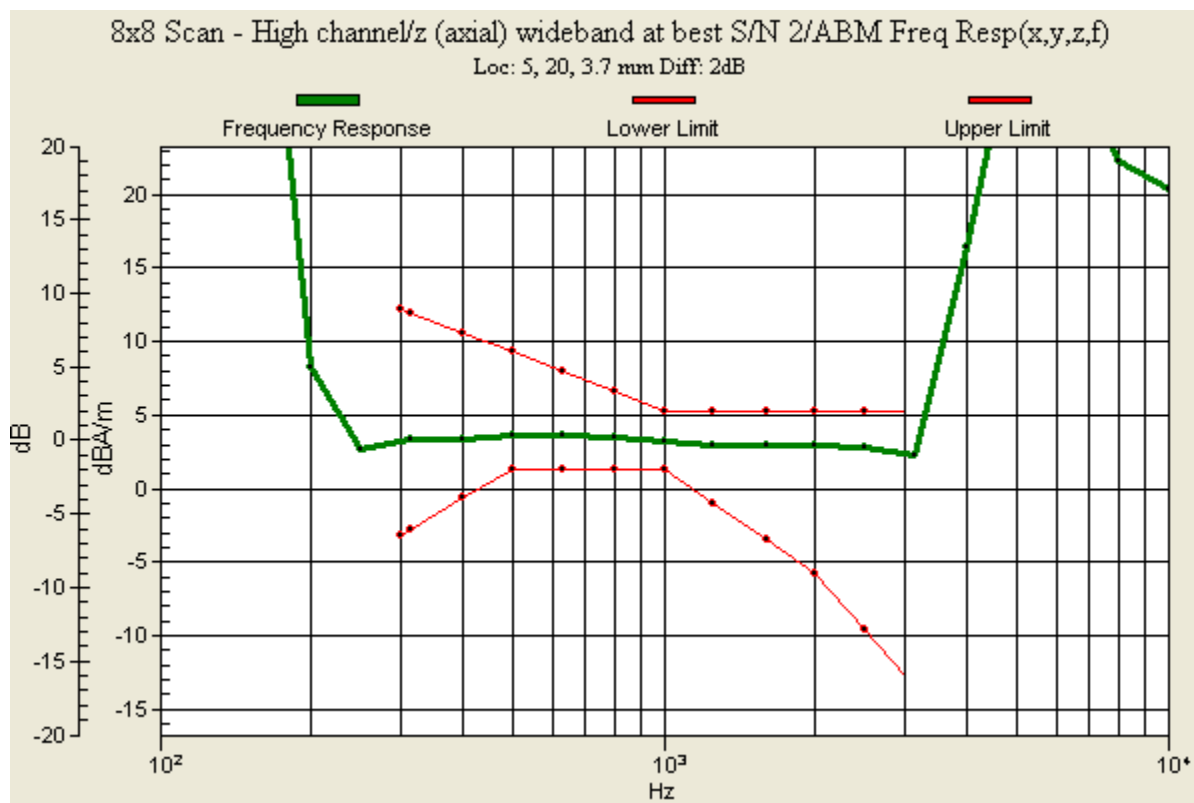
	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 51(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

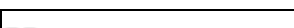


0 dB = 1.000 = 0.00 dB



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 53(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 54(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Date/Time: 6/5/2013 3:07:12 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_II_Radial-T

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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, $\epsilon_r = 1$; $\rho = 0$ kg/m³

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_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

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			55(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

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 = 49.91 dB

ABM1 comp = -4.53 dBA/m

BWC Factor = 0.16 dB

Location: 5, 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 = 49.93 dB

ABM1 comp = -4.53 dBA/m

BWC Factor = 0.16 dB

Location: 5, 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

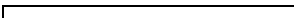
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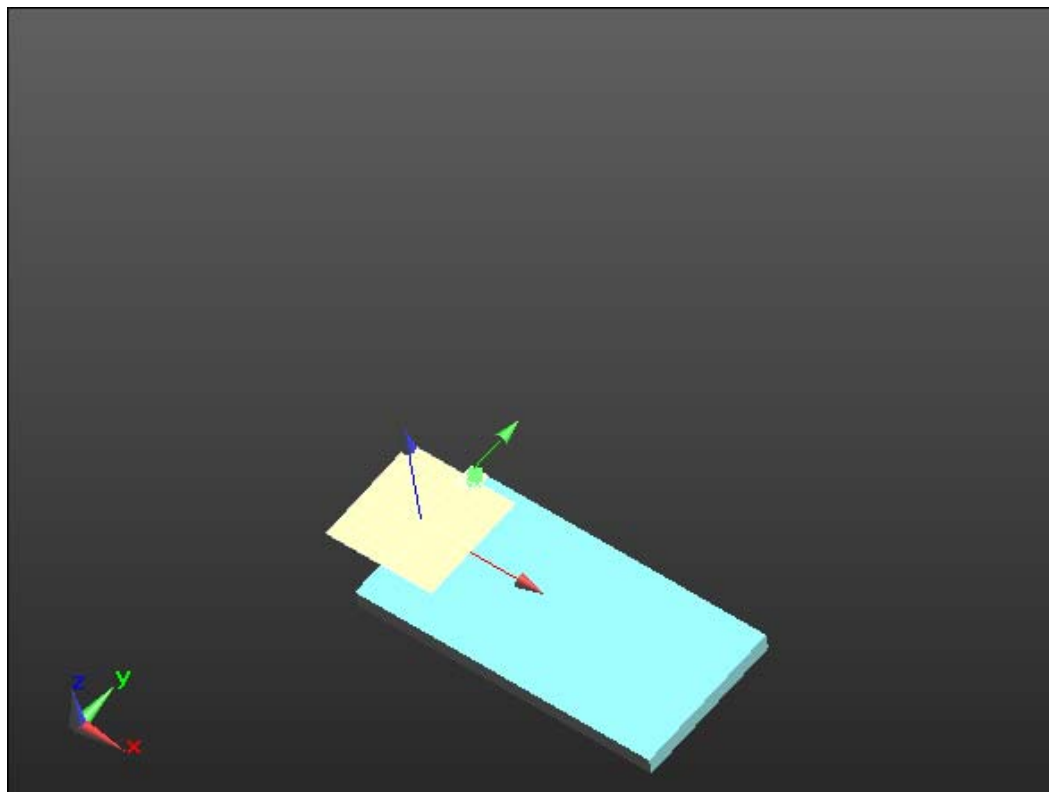
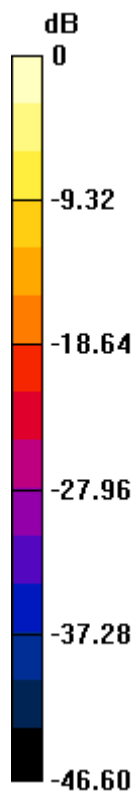
ABM1/ABM2 = 49.93 dB

ABM1 comp = -4.58 dBA/m

BWC Factor = 0.16 dB

Location: 5, 27, 4.4 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 56(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	



0 dB = 1.000 = 0.00 dB

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			57(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Date/Time: 6/5/2013 4:20:00 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_Band_V_&_802.11b_Axial

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 826.4 MHz

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

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/802.11b Enabled: 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_UMTS_Band_V/802.11b Enabled: 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

	Document			Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			58(76)
Author Data	Dates of Test	Report No	FCC ID	
Daoud Attayi	May 31- June 06, 2013	RTS-6046-1310-33	L6ARFV120LW	

Cursor:

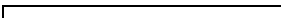
ABM1/ABM2 = 57.01 dB
ABM1 comp = 4.42 dBA/m
BWC Factor = 0.16 dB
Location: 5, 18, 4.4 mm

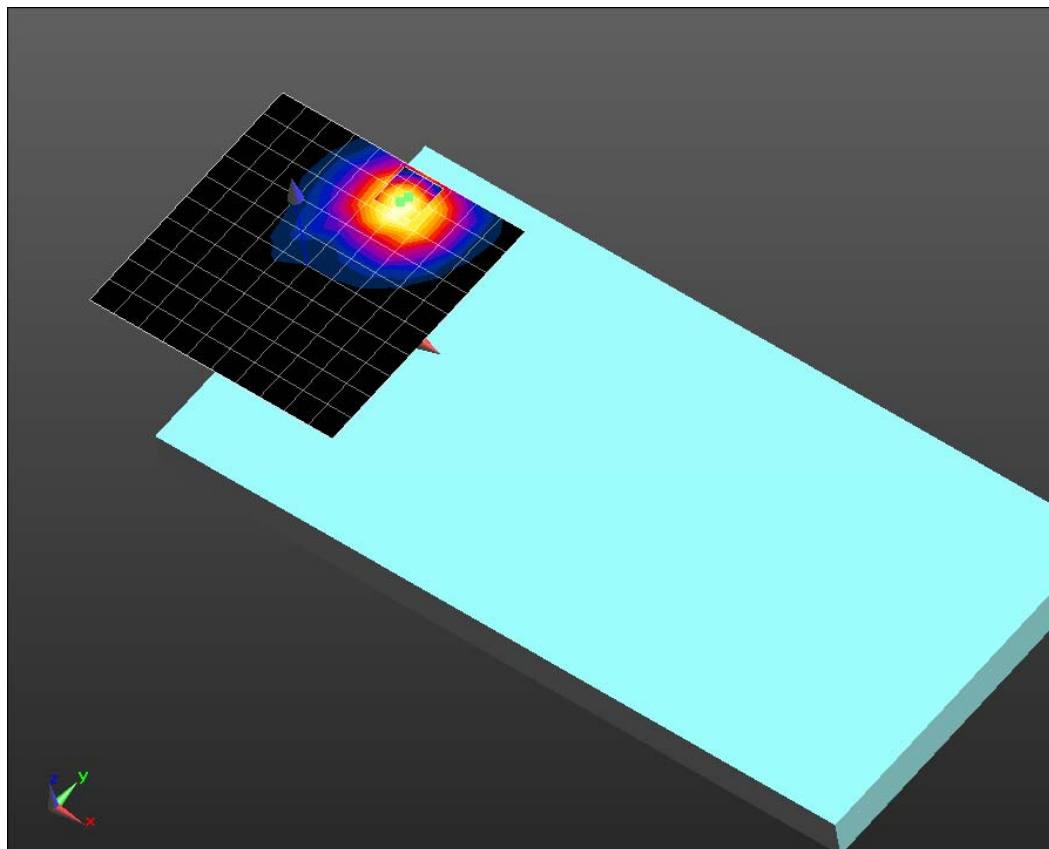
T-Coil scan_UMTS_Band_V/802.11b Enabled: General Scan - Low channel/z (axial) wideband at best S/N probe AM1DV2/ABM Freq Resp(x,y,z,f) (1x1x1):

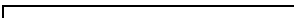
Measurement grid: dx=10mm, dy=10mm
Signal Type: Audio File (.wav) 48k_voice_300-3000_2s.wav
Output Gain: 69.12
Measure Window Start: 300ms
Measure Window Length: 6000ms
BWC applied: 10.80 dB
Device Reference Point: 0, 0, -6.3 mm

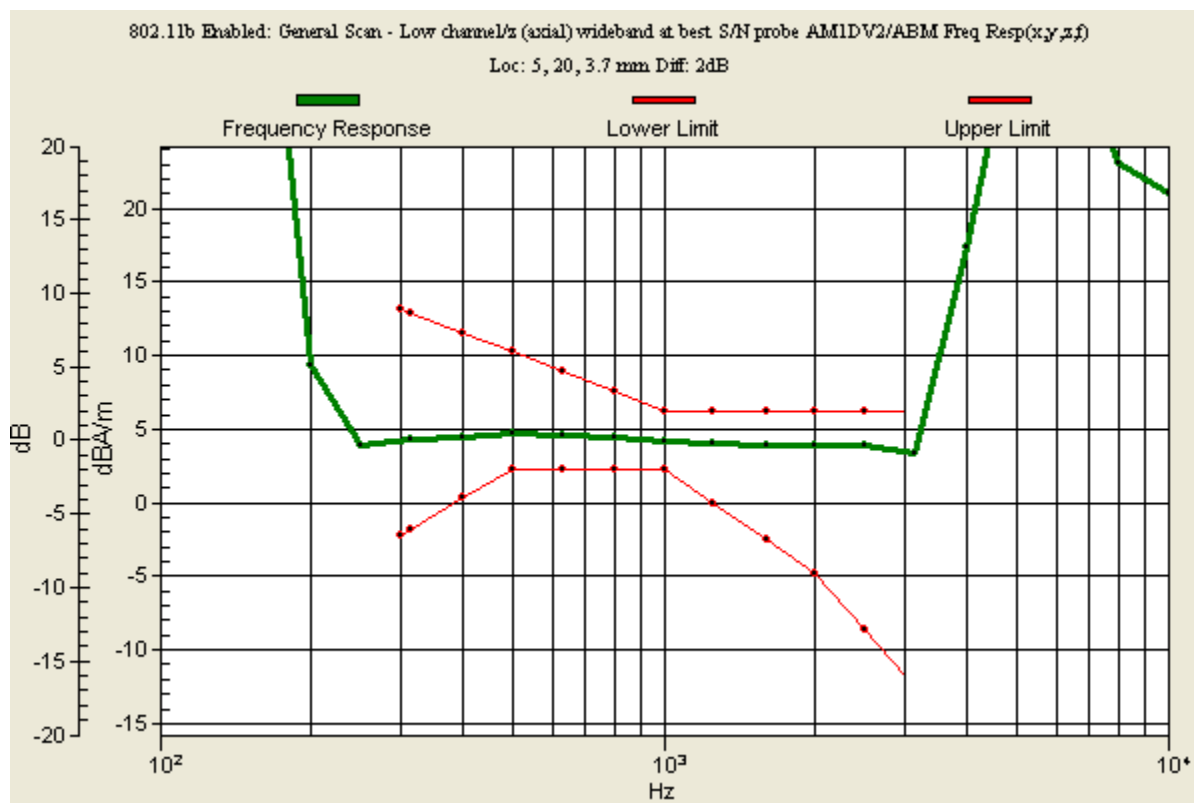
Cursor:

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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 59(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 60(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 61(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33
		FCC ID L6ARFV120LW	

Date/Time: 6/5/2013 4:33:05 PM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_Band_V_&_802.11b_Radial_L

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

Communication System: UID 0 - n/a, WCDMA FDD V; Frequency: 826.4 MHz

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

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/802.11b Enabled: 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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 62(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

T-Coil scan_UMTS_Band_V/802.11b Enabled: 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

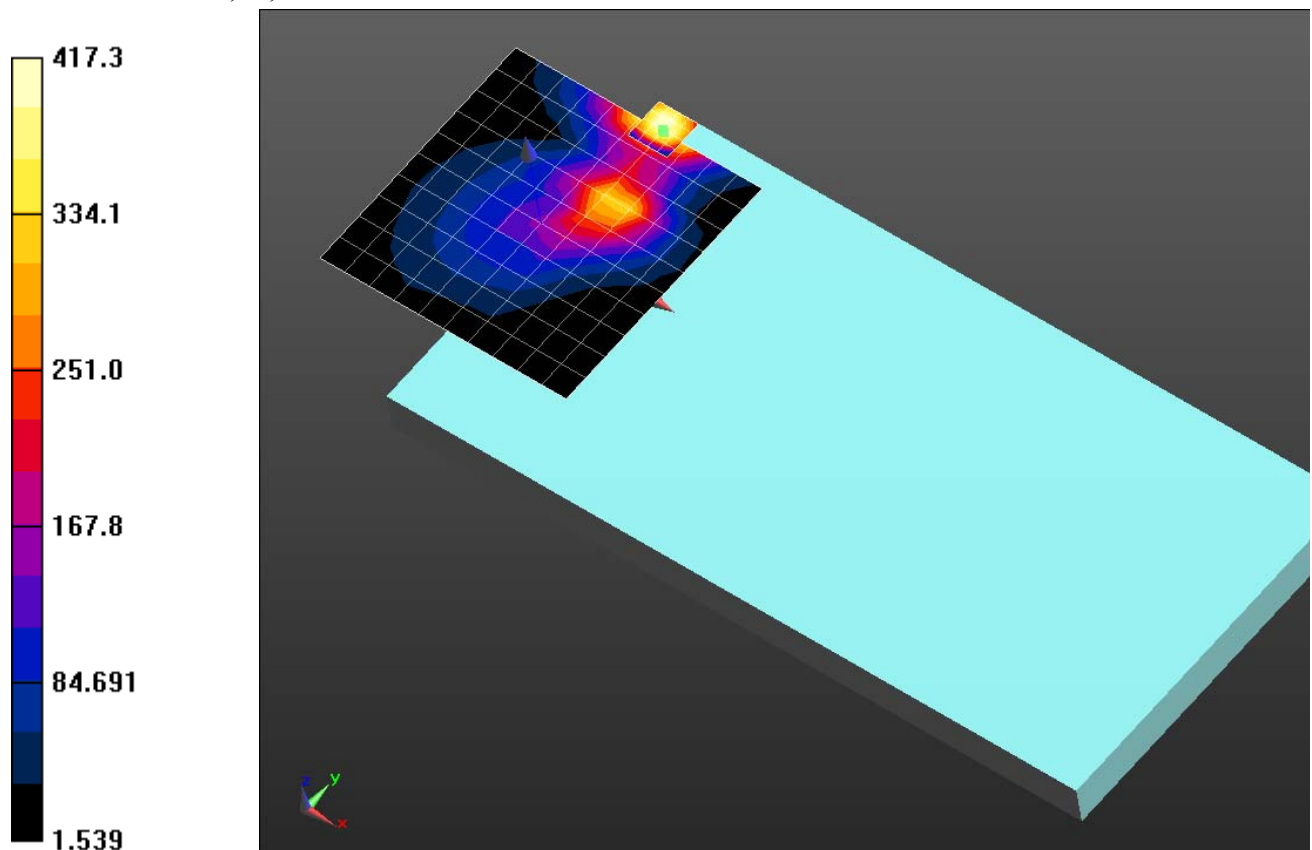
Cursor:

ABM1/ABM2 = 51.24 dB

ABM1 comp = -3.40 dBA/m

BWC Factor = 0.16 dB

Location: 5, 25, 4.4 mm



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 63(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Date/Time: 6/6/2013 2:51:48 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_V+Wifi_802.11a_Axial

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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/m³

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/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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 64(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

Cursor:

ABM1/ABM2 = 57.20 dB

ABM1 comp = 4.52 dBA/m

BWC Factor = 0.16 dB

Location: 7, 17, 4.4 mm

T-Coil scan_UMTS_Band_V with Wifi/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

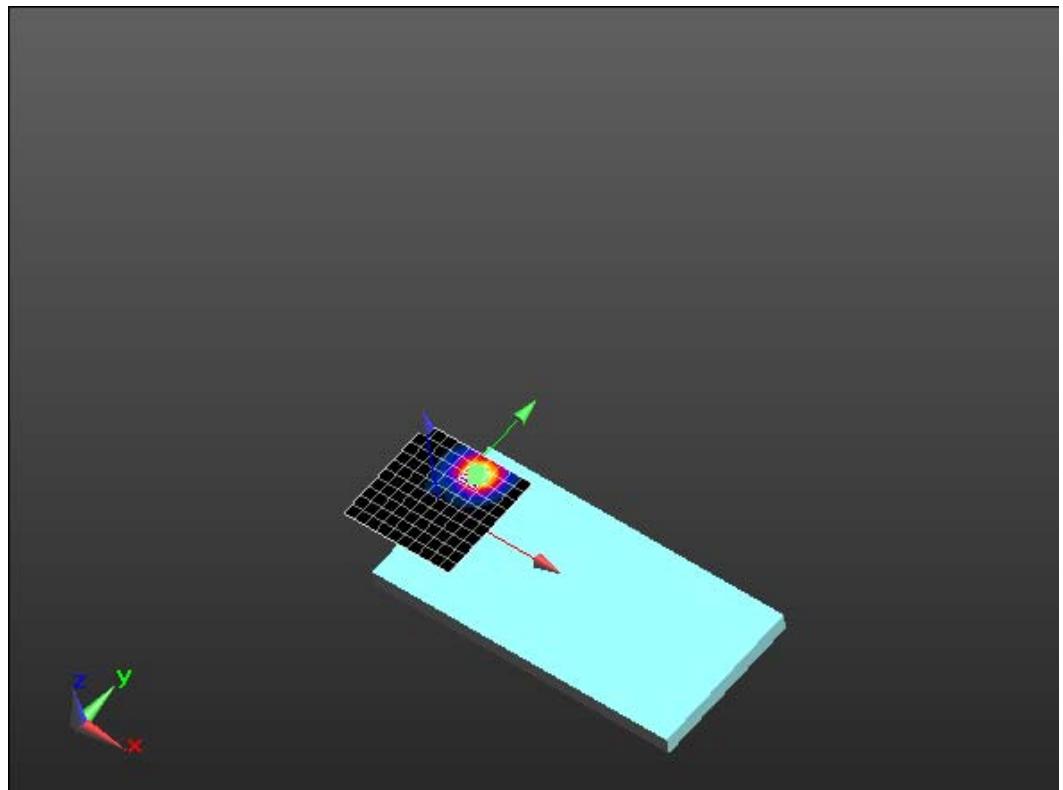
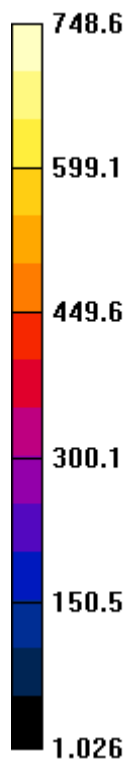
Output Gain: 69.12

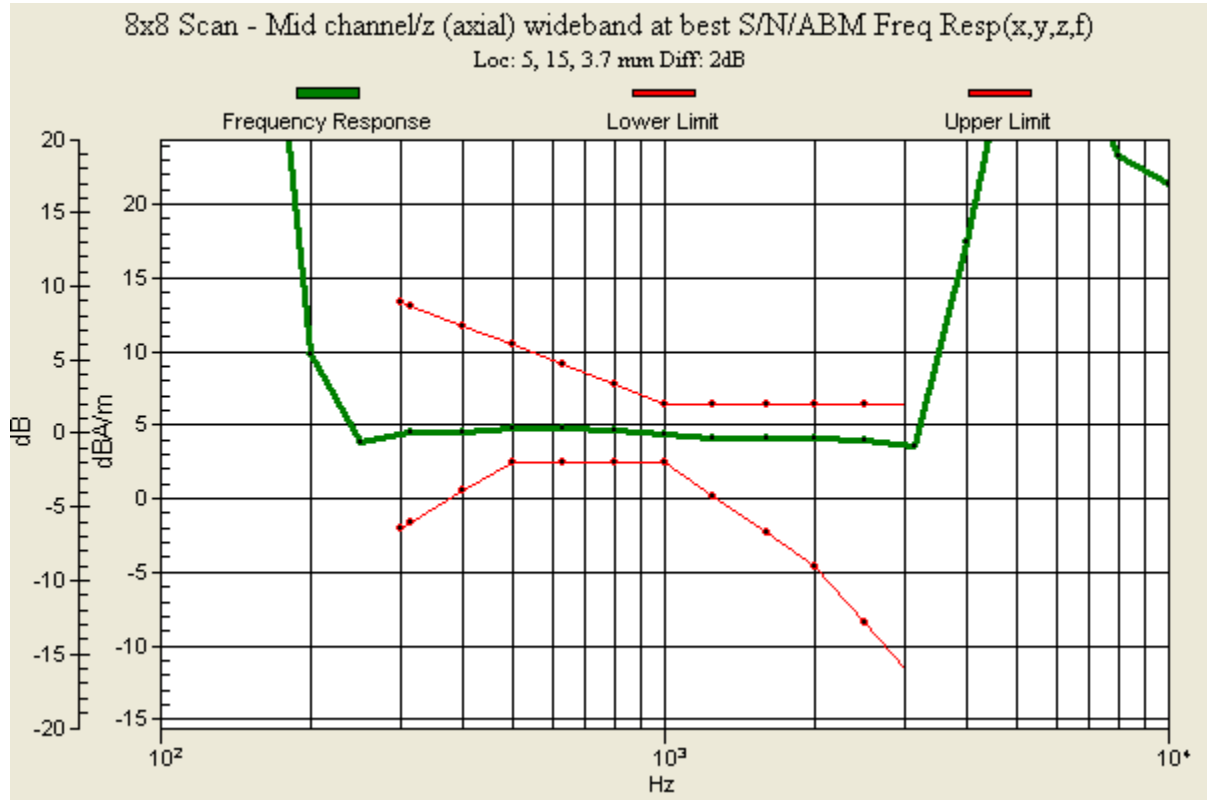
Measure Window Start: 300ms

Measure Window Length: 6000ms

BWC applied: 10.80 dB

Device Reference Point: 0, 0, -6.3 mm





	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 66(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33
		FCC ID L6ARFV120LW	

Date/Time: 6/6/2013 3:03:54 AM

Test Laboratory: RIM Testing Services

HAC T-Coil_ABM_UMTS_V+Wifi_802.11a_Radial-T

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 2FFFE9B6

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/m³

Phantom section: TCoil Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

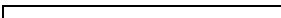
DASY Configuration:

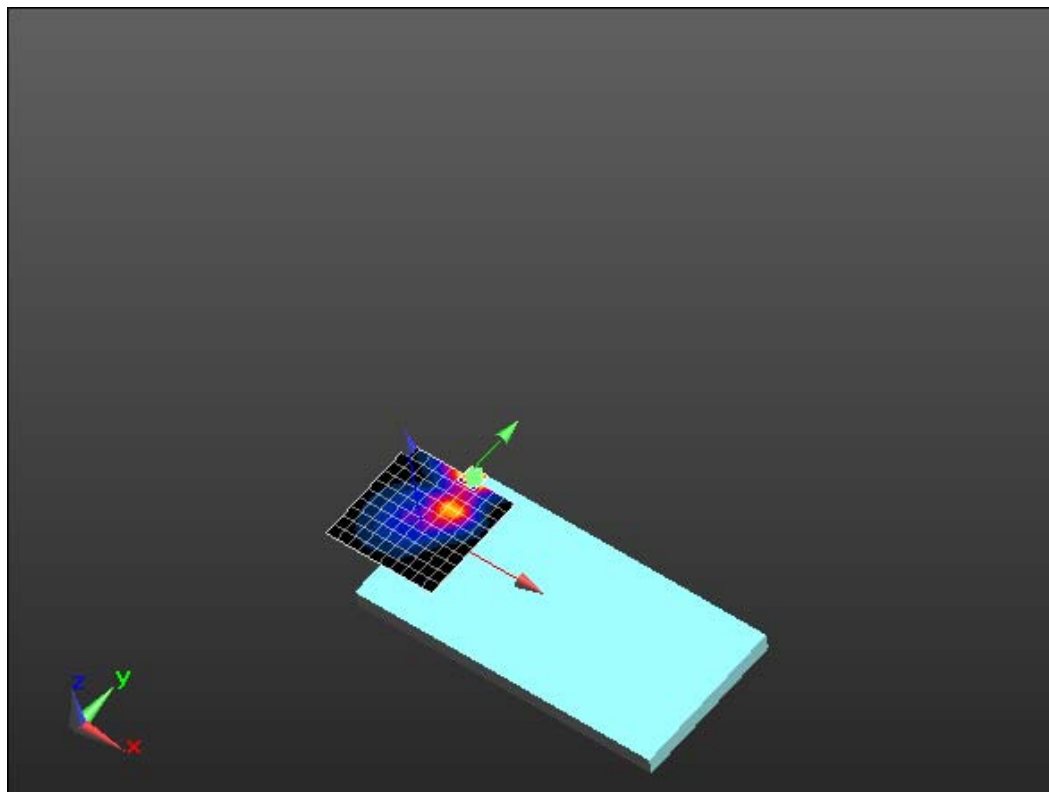
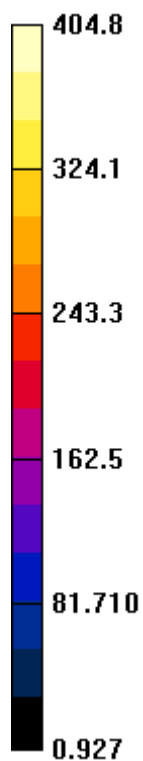
- Probe: AM1DV3 - 3062; ; Calibrated: 1/12/2012
- Sensor-Surface: 0mm (Fix Surface), z = 3.0
- Electronics: DAE4 Sn881; Calibrated: 1/14/2013
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA
- DASY52 52.8.6(1115); SEMCAD X 14.6.9(7117)

T-Coil scan_UMTS_Band_V with Wifi/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 = 51.05 dB
ABM1 comp = -3.59 dBA/m
BWC Factor = 0.16 dB
Location: 5, 27, 4.4 mm

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 67(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW



	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 68(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

Annex D: Probe/TMFS calibration certificate

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 69(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33

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



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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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: AM1DV3-3062_Jan13

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 10, 2013		
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	02-Oct-12 (No:12726)	Oct-13
Reference Probe AM1DV2	SN: 1008	10-Jan-13 (No. AM1D-1008_Jan13)	Jan-14
DAE4	SN: 781	29-May-12 (No. DAE4-781_May12)	May-13
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
AMCC	1050	12-Oct-11 (in house check Oct-11)	Oct-13
AMMI Audio Measuring Instrument	1062	26-Sep-12 (in house check Sep-12)	Sep-14
Calibrated by:	Name Dince Iliev	Function Laboratory Technician	Signature 
Approved by:	Fin Bornholt	Deputy Technical Manager	
			Issued: January 10, 2013
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Certificate No: AM1D-3062_Jan13

Page 1 of 3

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	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 70(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

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.

	Document		Page
	Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		71(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

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%.

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 72(76)
	Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33

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



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

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

Accreditation No.: **SCS 108**

Client **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	1052	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: **Name** **Function** **Signature**
Claudio Leubler **Laboratory Technician** 
 Approved by: **Fin Bornholt** **R&D Director** 

Issued: December 5, 2011

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Certificate No: **TMFS_1003_Nov11**

Page 1 of 5

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	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 73(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

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).



North



East



South

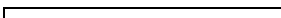


West

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.

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW			Page 74(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW	

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

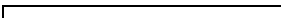
The maximum was calculated as the average from the values measured in the 4 orientations listed in table 2.

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

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 75(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

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

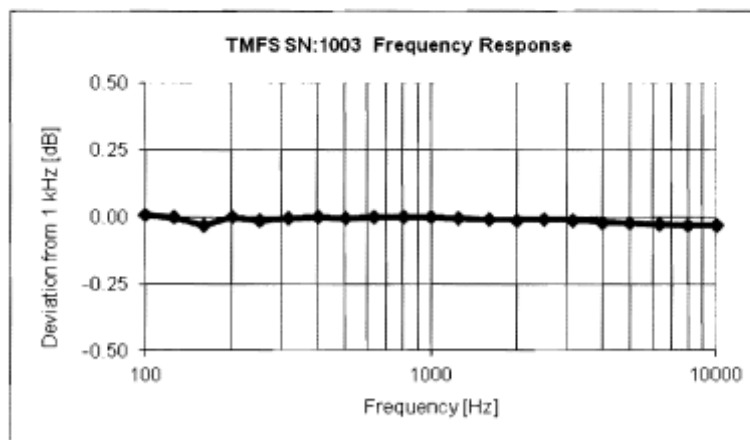
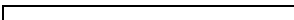


Fig. 2 Frequency response 100 to 10'000 Hz

	Document Annex A-D, Hearing Aid Compatibility Audio Band Magnetic (ABM) T-Coil Test Report for BlackBerry® Smartphone model RFV121LW		Page 76(76)
Author Data Daoud Attayi	Dates of Test May 31- June 06, 2013	Report No RTS-6046-1310-33	FCC ID L6ARFV120LW

4.2 Field plots

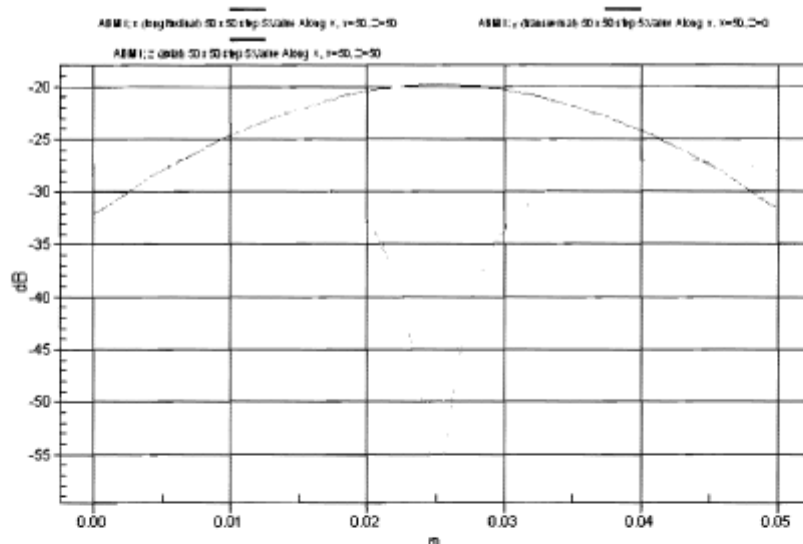


Fig. 3: Typical 2D field plots for x (red), y (green) and z (blue) components

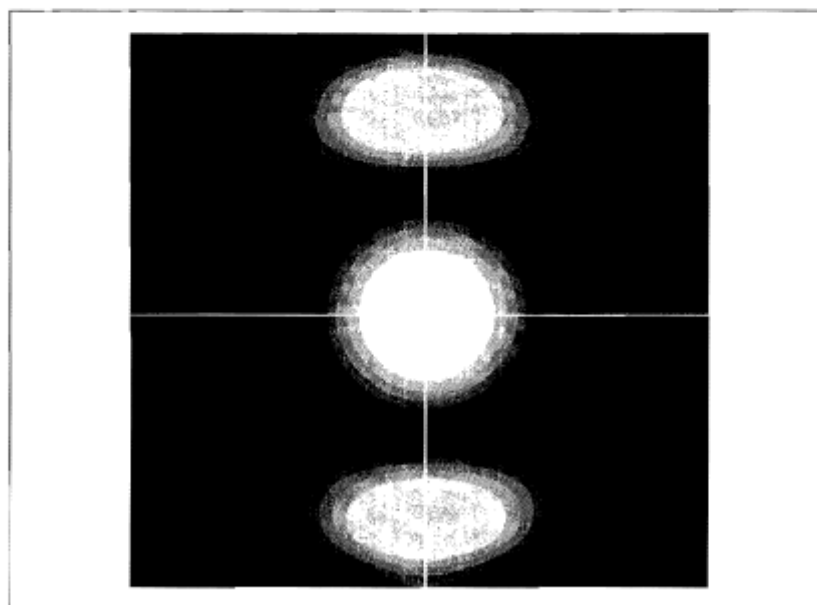


Fig. 4: Superposed field plots of z (axial), x and y radial magnetic field, 50 x 50 mm, individual scaling: white = max. field level, black = -4dB below max. The lines show the position of the 2D field plot of figure 3.