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Annex A: Measurement data and plots

A.1 Spectrum analyser plots: CDMA, CW, 80%AM, signals

Author Data
Andrew Becker

Dates of Test
Feb. 29 & March 1-22, 2012

Report No
RTS-5994-1203-81

FCC ID
L6ARFD30CW



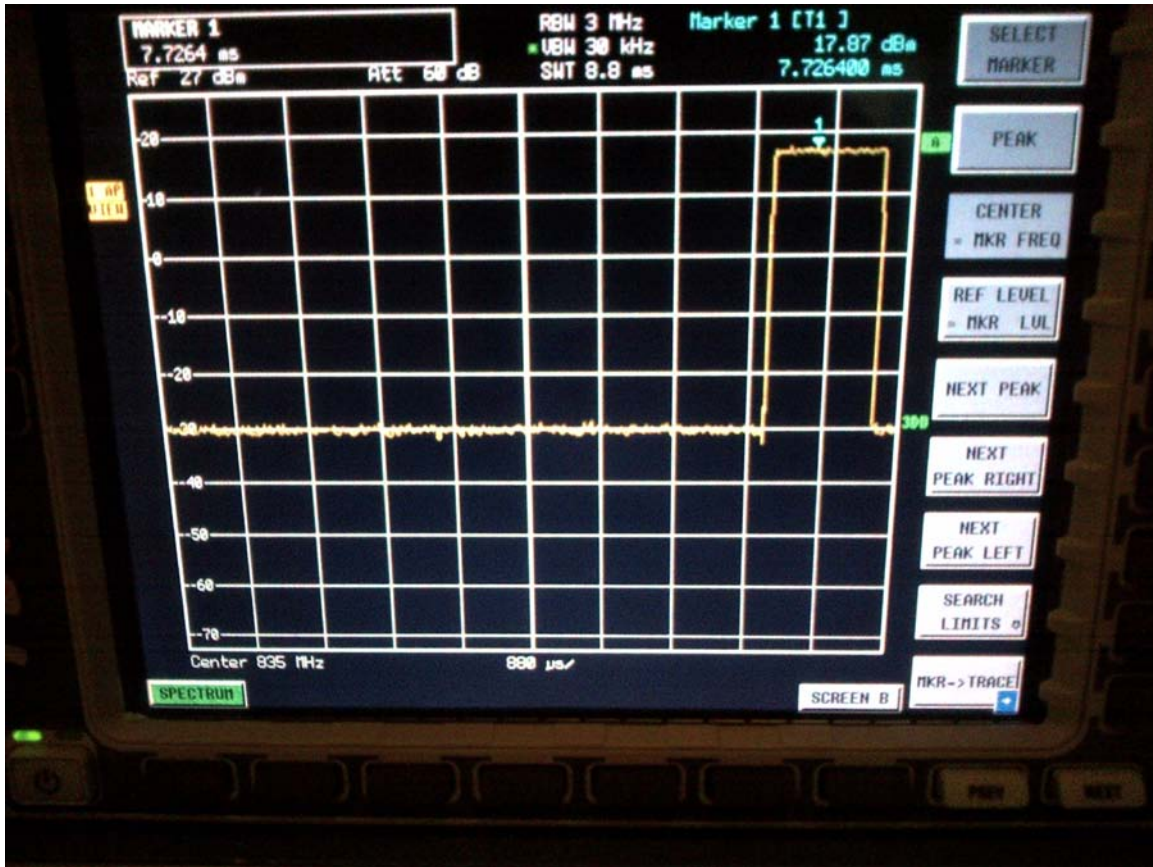
CDMA 835 MHz (BC0)

Author Data
Andrew Becker


Dates of Test
Feb. 29 & March 1-22, 2012

Report No
RTS-5994-1203-81

FCC ID
L6ARFD30CW



CDMA 835 MHz (BC0) 1/8th

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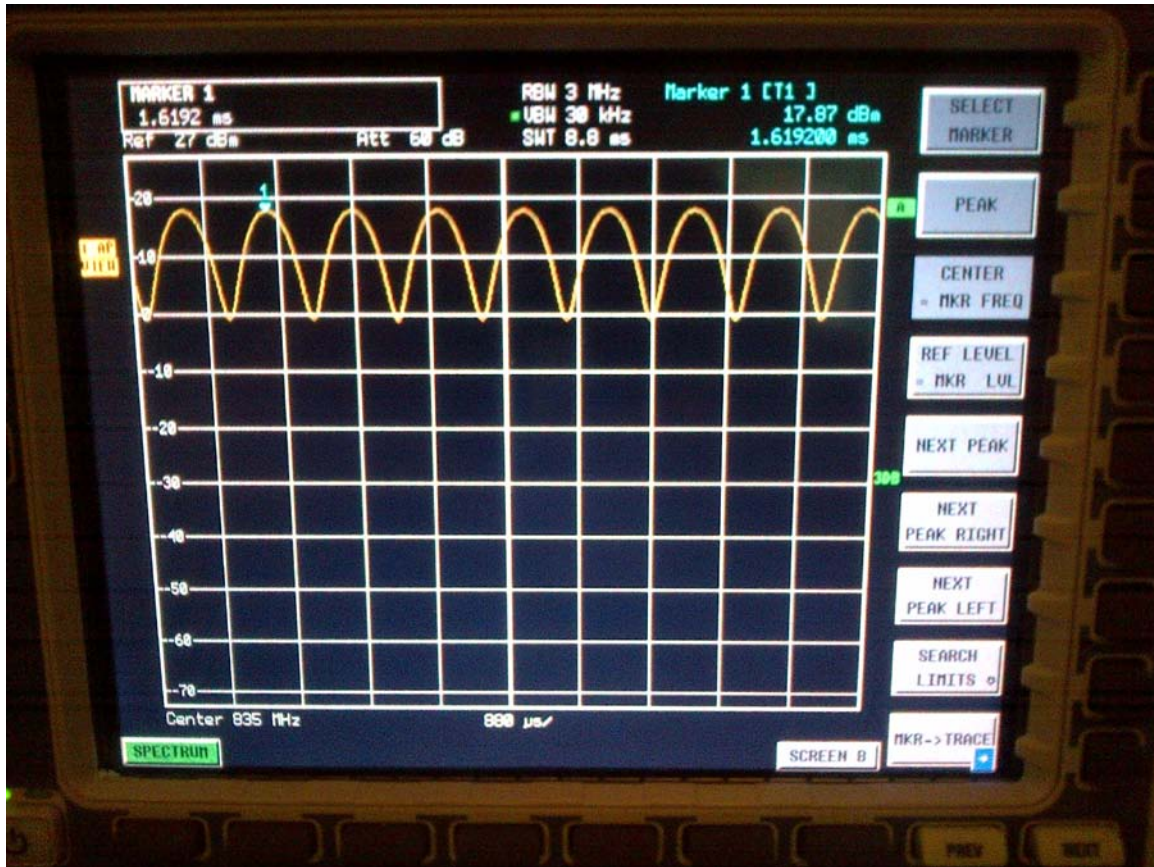
CW 835 MHz

Author Data
Andrew Becker


Dates of Test
Feb. 29 & March 1-22, 2012

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AM 80% 835 MHz

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A.2 Dipole validation and probe modulation factor plots

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Test Laboratory: RIM Testing Services

HAC RF_E-Field_PMF_CDMA835 MHz_02_29_12

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

Communication System: CDMA 850, Communication System: CDMA 850 1/8th,
Communication System: CW, Communication System: AM 80%; Frequency: 835 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 1/9/2012
- Sensor-Surface: (Fix Surface), $z = 4.7$
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole E-Field measurement/E Scan - CDMA FR 835_PMF/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 79.95 V/m; Power Drift = -0.18 dB

PMR not calibrated. PMF = 1.000 is applied.

E-field emissions = 118.9 V/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled E-field

Grid 1 M4 104.7 V/m	Grid 2 M4 108.7 V/m	Grid 3 M4 107.6 V/m
Grid 4 M4 56.56 V/m	Grid 5 M4 57.99 V/m	Grid 6 M4 56.06 V/m
Grid 7 M4 112.0 V/m	Grid 8 M4 118.9 V/m	Grid 9 M4 116.1 V/m

Cursor:

Total = 118.9 V/m

E Category: M4

Location: -0.5, 79, 4.7 mm

Dipole E-Field measurement/E Scan - CDMA 1/8th 835_PMF 2/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 30.10 V/m; Power Drift = 0.23 dB


PMR not calibrated. PMF = 1.000 is applied.

E-field emissions = 43.21 V/m

Near-field category: **M4 (AWF 0 dB)**

PMF scaled E-field

Grid 1 M4 39.00 V/m	Grid 2 M4 41.81 V/m	Grid 3 M4 39.31 V/m
Grid 4 M4 20.47 V/m	Grid 5 M4 22.99 V/m	Grid 6 M4 20.34 V/m
Grid 7 M4 41.05 V/m	Grid 8 M4 43.21 V/m	Grid 9 M4 42.62 V/m

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Cursor:

Total = 43.214 V/m

E Category: M4

Location: -0.5, 84, 4.7 mm

Dipole E-Field measurement/E Scan - CW 835_PMF/Hearing Aid

Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 82.56 V/m; Power Drift = -0.07 dB

PMR not calibrated. PMF = 1.000 is applied.

E-field emissions = 125.5 V/m

Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

Grid 1 M4 110.7 V/m	Grid 2 M4 114.9 V/m	Grid 3 M4 113.7 V/m
Grid 4 M4 60.24 V/m	Grid 5 M4 61.44 V/m	Grid 6 M4 59.31 V/m
Grid 7 M4 119.5 V/m	Grid 8 M4 125.5 V/m	Grid 9 M4 122.3 V/m

Cursor:

Total = 125.5 V/m

E Category: M4

Location: -0.5, 79, 4.7 mm

Dipole E-Field measurement/E Scan - AM80%_ 835_PMF/Hearing Aid

Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 51.22 V/m; Power Drift = 0.06 dB

PMR not calibrated. PMF = 1.000 is applied.

E-field emissions = 78.06 V/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled E-field

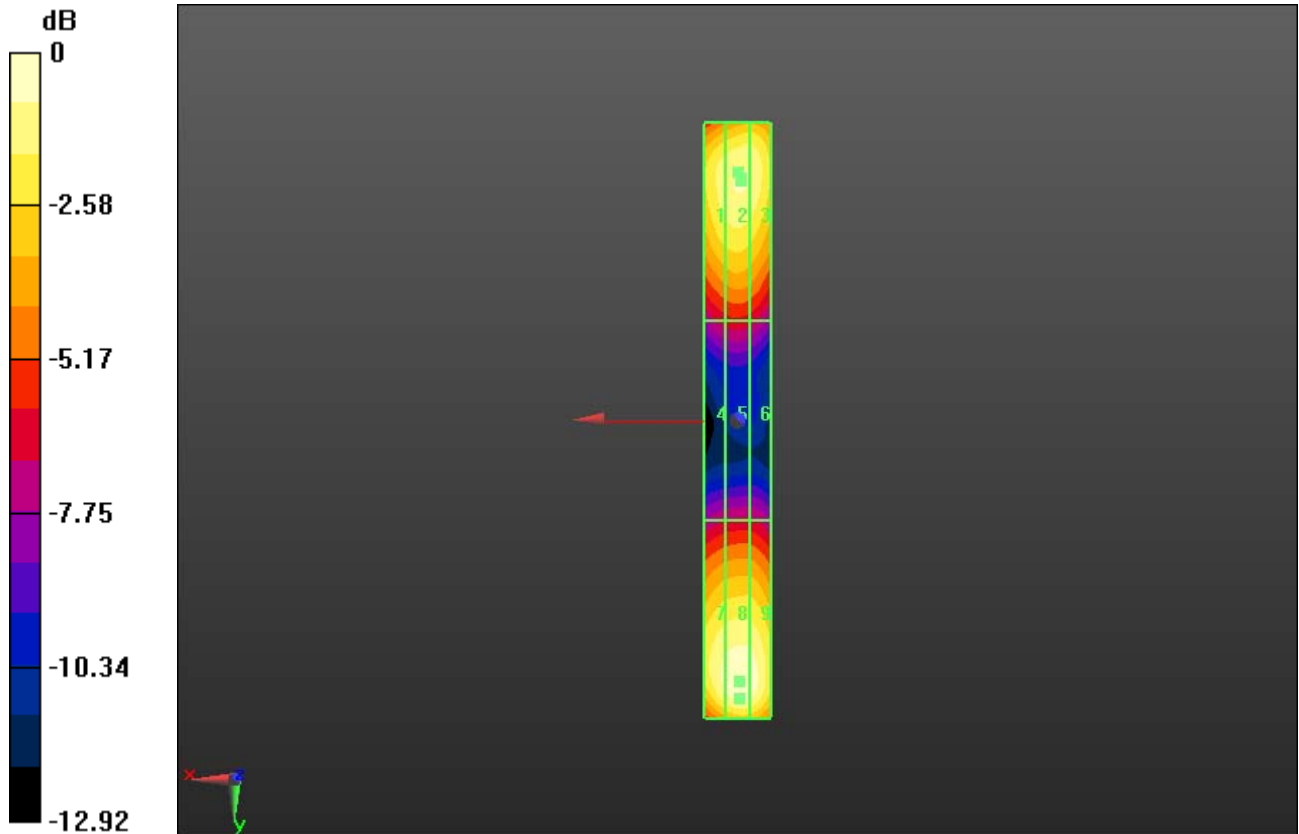
Grid 1 M4 69.60 V/m	Grid 2 M4 71.98 V/m	Grid 3 M4 71.35 V/m
Grid 4 M4 38.16 V/m	Grid 5 M4 38.79 V/m	Grid 6 M4 37.51 V/m
Grid 7 M4 74.44 V/m	Grid 8 M4 78.06 V/m	Grid 9 M4 76.37 V/m

Cursor:


Total = 78.060 V/m

E Category: M4

Location: -0.5, 79, 4.7 mm



0 dB = 118.9V/m = 41.50 dB V/m

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Test Laboratory: RIM Testing Services

HAC RF_E-Field_validation_835 MHz_02_29_12

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

Communication System: CW; Frequency: 835 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 1/9/2012
- Sensor-Surface: (Fix Surface), $z = 4.7$
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole E-Field measurement/E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid

Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 116.9 V/m; Power Drift = -0.40 dB

PMR not calibrated. PMF = 1.000 is applied.

E-field emissions = 170.2 V/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled E-field

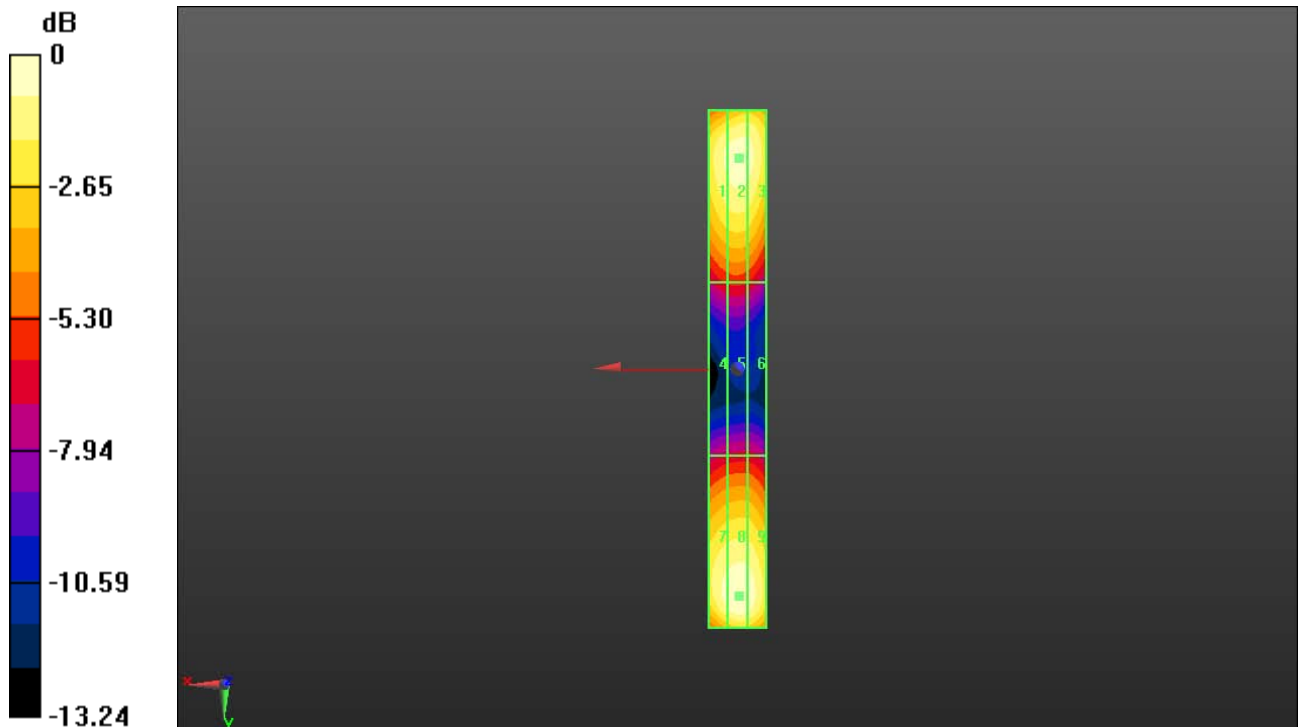
Grid 1 M4 157.8 V/m	Grid 2 M4 162.9 V/m	Grid 3 M4 160.4 V/m
Grid 4 M4 85.01 V/m	Grid 5 M4 86.87 V/m	Grid 6 M4 83.55 V/m
Grid 7 M4 162.0 V/m	Grid 8 M4 170.2 V/m	Grid 9 M4 166.3 V/m

Cursor:


Total = 170.2 V/m

E Category: M4

Location: -0.5, 79, 4.7 mm



$0 \text{ dB} = 170.2 \text{ V/m} = 44.62 \text{ dB V/m}$

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Date/Time: 3/21/2012 12:34:16 PM

Test Laboratory: RIM Testing Services

HAC RF_E-Field_validation_835 MHz_03_21_12

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

Communication System: CW; Frequency: 835 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 1/9/2012
- Sensor-Surface: (Fix Surface), $z = 4.7$
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole E-Field measurement/E Scan - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid

Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 109.3 V/m; Power Drift = -0.08 dB

PMR not calibrated. PMF = 1.000 is applied.

E-field emissions = 166.3 V/m

Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

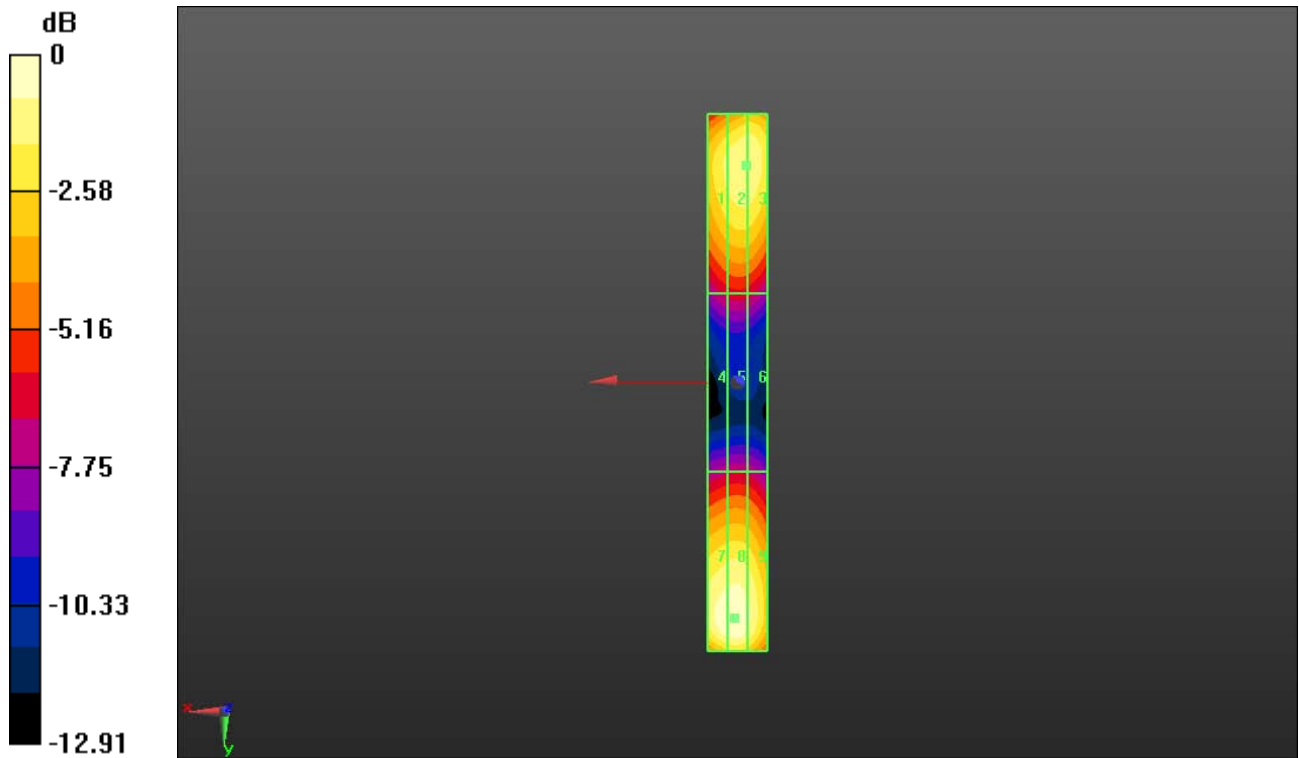
Grid 1 M4 140.4 V/m	Grid 2 M4 150.3 V/m	Grid 3 M4 150.2 V/m
Grid 4 M4 78.49 V/m	Grid 5 M4 80.94 V/m	Grid 6 M4 79.09 V/m
Grid 7 M4 163.8 V/m	Grid 8 M4 166.3 V/m	Grid 9 M4 154.6 V/m

Cursor:


Total = 166.3 V/m

E Category: M4

Location: 1, 79, 4.7 mm



0 dB = 166.3V/m = 44.42 dB V/m

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Test Laboratory: RIM Testing Services

HAC RF_H-Field_PMF_CDMA835 MHz_02_29_12

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

Communication System: CDMA 850, Communication System: CDMA 850 1/8th,
Communication System: CW, Communication System: AM 80%; Frequency: 835 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 11/8/2011
- Sensor-Surface: (Fix Surface), $z = 4.7$
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole H-Field measurement with H3DV6 probe/H Scan - CDMA FR 835_PMF/Hearing Aid Compatibility Test (41x181x1): Measurement grid:

$dx=5\text{mm}$, $dy=5\text{mm}$


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.37 V/m; Power Drift = 0.11 dB

PMR not calibrated. PMF = 1.000 is applied.

H-field emissions = 0.34 A/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled H-field

Grid 1 M4 0.32 A/m	Grid 2 M4 0.33 A/m	Grid 3 M4 0.32 A/m
Grid 4 M4 0.33 A/m	Grid 5 M4 0.34 A/m	Grid 6 M4 0.33 A/m
Grid 7 M4 0.32 A/m	Grid 8 M4 0.34 A/m	Grid 9 M4 0.32 A/m

Cursor:

Total = 0.344 A/m

H Category: M4

Location: 0, 1.5, 4.7 mm

Dipole H-Field measurement with H3DV6 probe/H Scan - CDMA 1/8th 835_PMF 2/Hearing Aid Compatibility Test (41x181x1): Measurement grid:

dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.13 V/m; Power Drift = 0.09 dB


PMR not calibrated. PMF = 1.000 is applied.

H-field emissions = 0.13 A/m

Near-field category: **M4 (AWF 0 dB)**

PMF scaled H-field

Grid 1 M4 0.12 A/m	Grid 2 M4 0.12 A/m	Grid 3 M4 0.12 A/m
Grid 4 M4 0.13 A/m	Grid 5 M4 0.13 A/m	Grid 6 M4 0.12 A/m
Grid 7 M4 0.12 A/m	Grid 8 M4 0.13 A/m	Grid 9 M4 0.12 A/m

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Cursor:

Total = 0.134 A/m
H Category: M4
Location: 0, 0, 4.7 mm

Dipole H-Field measurement with H3DV6 probe/H Scan - CW

835_PMF/Hearing Aid Compatibility Test (41x181x1): Measurement grid:

dx=5mm, dy=5mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.39 V/m; Power Drift = 0.08 dB
PMR not calibrated. PMF = 1.000 is applied.
H-field emissions = 0.35 A/m

Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

Grid 1 M4 0.32 A/m	Grid 2 M4 0.34 A/m	Grid 3 M4 0.32 A/m
Grid 4 M4 0.34 A/m	Grid 5 M4 0.35 A/m	Grid 6 M4 0.33 A/m
Grid 7 M4 0.33 A/m	Grid 8 M4 0.35 A/m	Grid 9 M4 0.33 A/m

Cursor:

Total = 0.355 A/m
H Category: M4
Location: 0, 5, 4.7 mm

Dipole H-Field measurement with H3DV6 probe/H Scan -

AM80%_PMF/Hearing Aid Compatibility Test (41x181x1): Measurement grid:

dx=5mm, dy=5mm
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.24 V/m; Power Drift = -0.02 dB
PMR not calibrated. PMF = 1.000 is applied.
H-field emissions = 0.23 A/m

Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

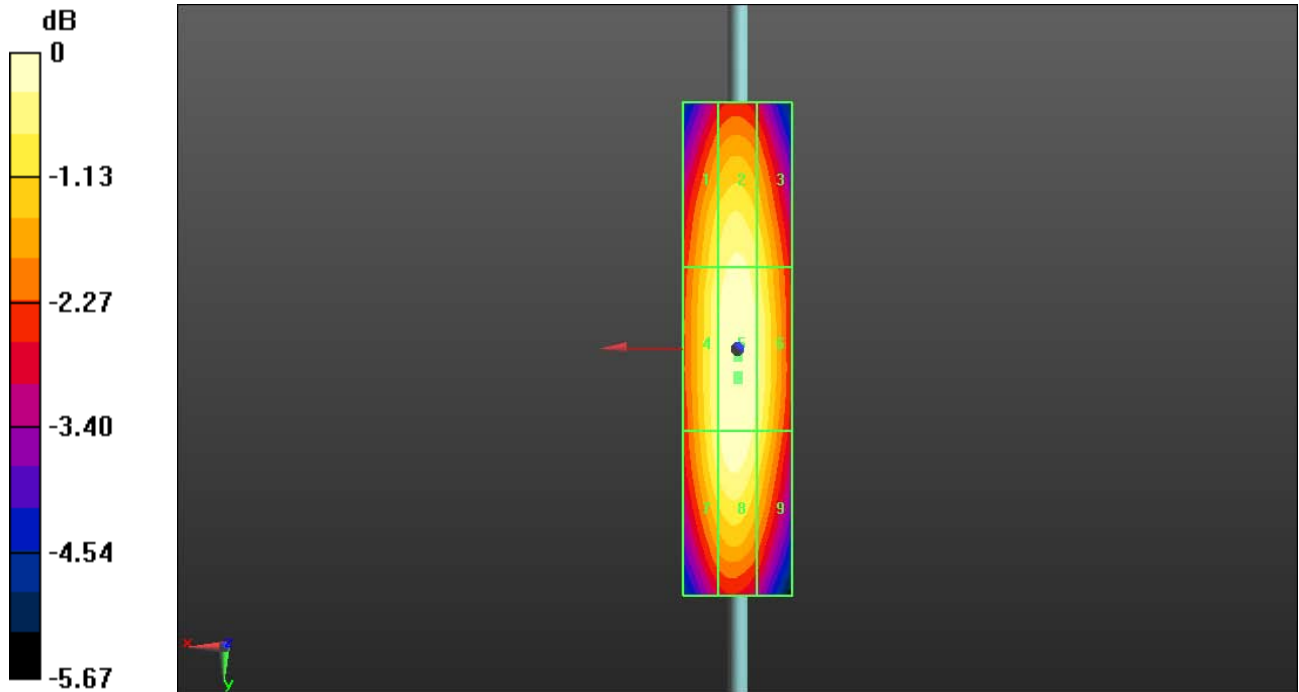
Grid 1 M4 0.20 A/m	Grid 2 M4 0.21 A/m	Grid 3 M4 0.20 A/m
Grid 4 M4 0.21 A/m	Grid 5 M4 0.23 A/m	Grid 6 M4 0.22 A/m
Grid 7 M4 0.21 A/m	Grid 8 M4 0.22 A/m	Grid 9 M4 0.21 A/m

Cursor:


Total = 0.227 A/m

H Category: M4

Location: 0, 5.5, 4.7 mm



0 dB = 0.340A/m = -9.37 dB A/m

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Test Laboratory: RIM Testing Services

HAC RF_H-Field_validation_835 MHz_02_29_12

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

Communication System: CW; Frequency: 835 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 11/8/2011
- Sensor-Surface: (Fix Surface), $z = 4.7$
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole H-Field measurement with H3DV6 probe/H Scan -

measurement distance from the probe sensor center to CD835 Dipole

= 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid:

$dx=5mm, dy=5mm$

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.50 V/m; Power Drift = 0.20 dB

PMR not calibrated. PMF = 1.000 is applied.

H-field emissions = 0.47 A/m

Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

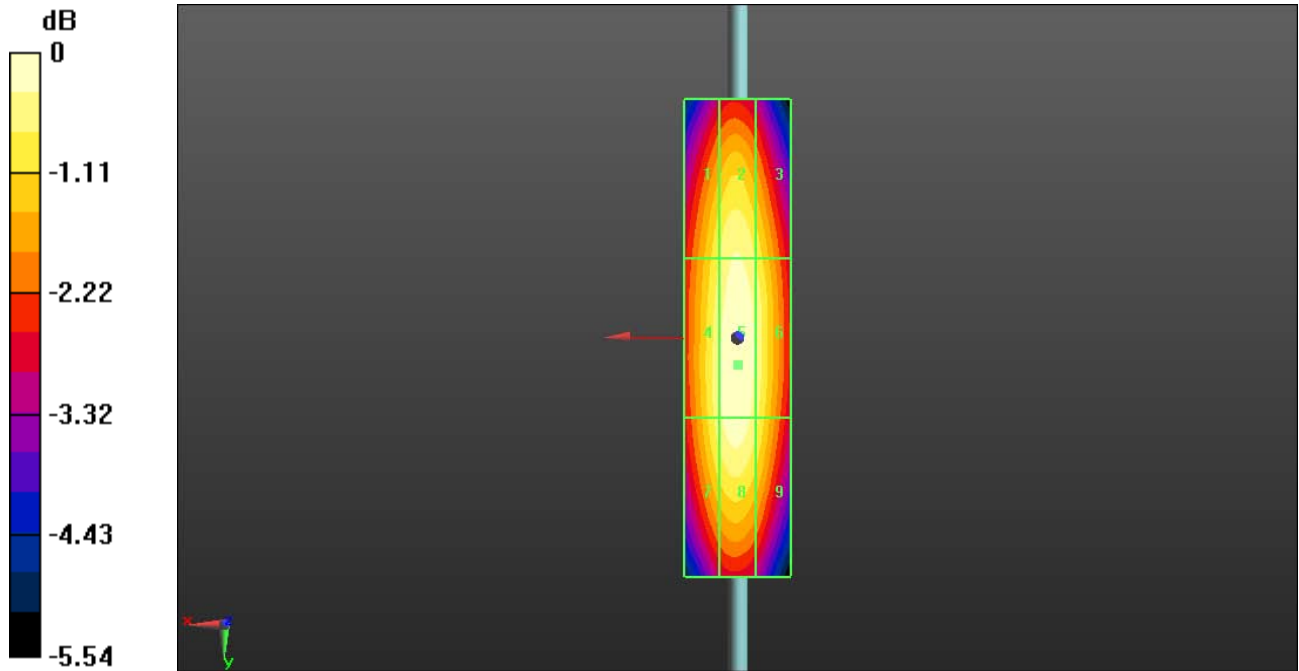
Grid 1 M4 0.43 A/m	Grid 2 M4 0.45 A/m	Grid 3 M4 0.43 A/m
Grid 4 M4 0.45 A/m	Grid 5 M4 0.47 A/m	Grid 6 M4 0.45 A/m
Grid 7 M4 0.44 A/m	Grid 8 M4 0.46 A/m	Grid 9 M4 0.44 A/m

Cursor:


Total = 0.471 A/m

H Category: M4

Location: 0, 5, 4.7 mm



0 dB = 0.470A/m = -6.56 dB A/m

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Date/Time: 3/21/2012 3:05:01 PM

Test Laboratory: RIM Testing Services

HAC RF_H-Field_validation_835 MHz_03_21_12

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1011

Communication System: CW; Frequency: 835 MHz

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

Phantom section: RF Section

Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 11/8/2011
- Sensor-Surface: (Fix Surface), $z = 4.7$
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS5 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole H-Field measurement with H3DV6 probe/H Scan -

measurement distance from the probe sensor center to CD835 Dipole

= 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid:

$dx=5\text{mm}$, $dy=5\text{mm}$

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.52 V/m; Power Drift = 0.04 dB

PMR not calibrated. PMF = 1.000 is applied.

H-field emissions = 0.49 A/m

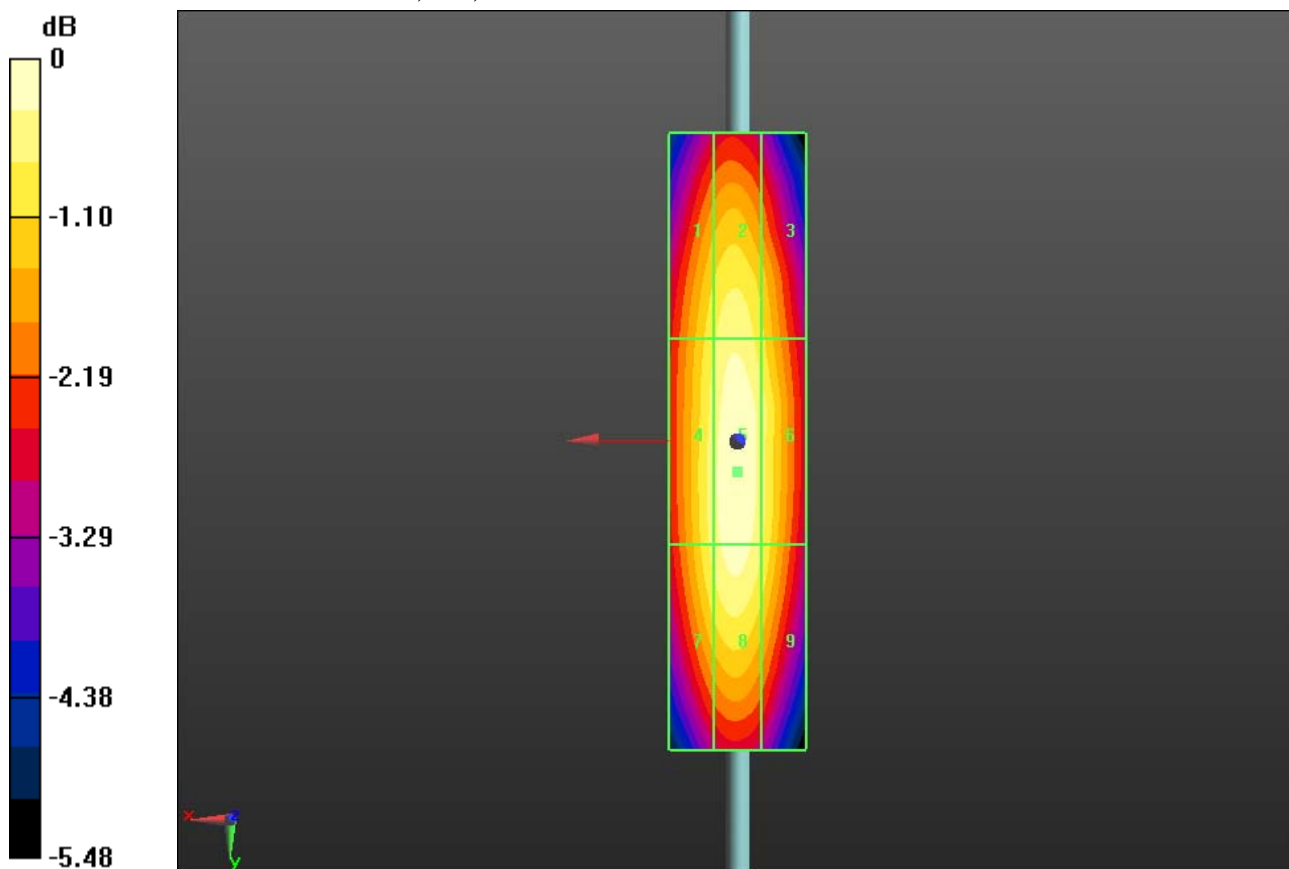
Near-field category: M4 (AWF 0 dB)

PMF scaled H-field


Grid 1 M4 0.45 A/m	Grid 2 M4 0.47 A/m	Grid 3 M4 0.44 A/m
Grid 4 M4 0.46 A/m	Grid 5 M4 0.49 A/m	Grid 6 M4 0.46 A/m
Grid 7 M4 0.46 A/m	Grid 8 M4 0.48 A/m	Grid 9 M4 0.45 A/m

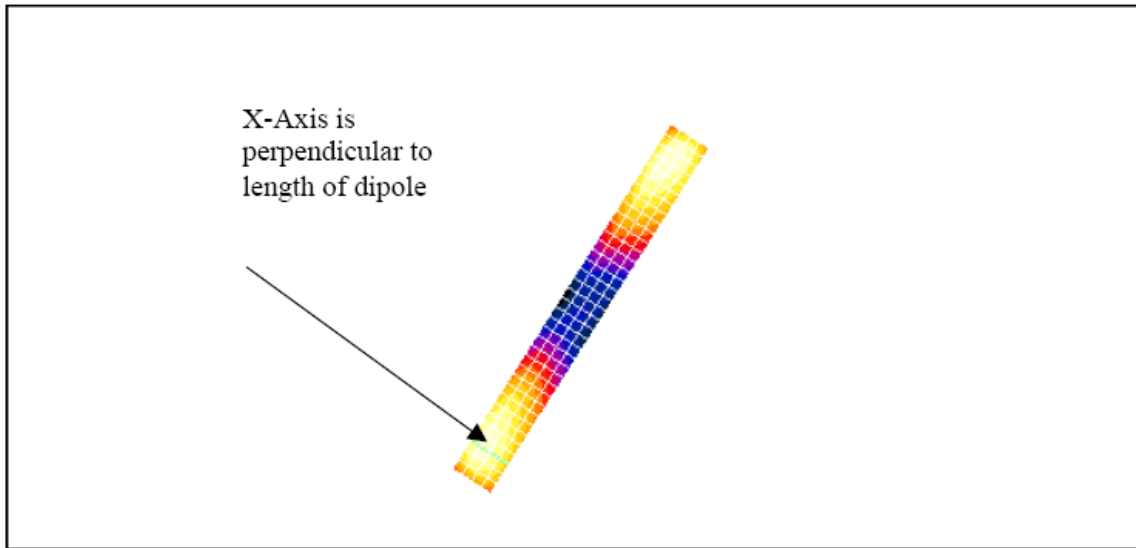
Cursor:

Total = 0.488 A/m
 H Category: M4
 Location: 0, 4.5, 4.7 mm



0 dB = 0.490A/m = -6.20 dB A/m


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The green line in this figure shows the axis along which the points lie.

Comparison of 5mm and 2mm step sizes

An additional set of measurements was taken: dipole validations were performed using 5mm and 2mm step sizes. The delta between the two readings is insignificant for both field types (< 0.4% for E and 0% for H), demonstrating that 5mm is sufficient. The plots follow.

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Date/Time: 14/07/2005 11:35:24 AM

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Date/Time: 14/07/2005 11:35:24 AM

Lab: RIM Testing Services (RTS)

Dipole Validation 1880 MHz_E-Field 07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
 Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2285; ConvF(1, 1, 1); Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

Measurement grid: dx=5mm, dy=5mm
 Maximum value of Total (measured) = 134.8 V/m

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm
 Maximum value of Total field (slot averaged) = 131.0 V/m


Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
123.2	138.1	138.4	123.2	138.1	138.4
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
80.9	92.3	92.2	80.9	92.3	92.2
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
119.8	131.0	130.7	119.8	131.0	130.7

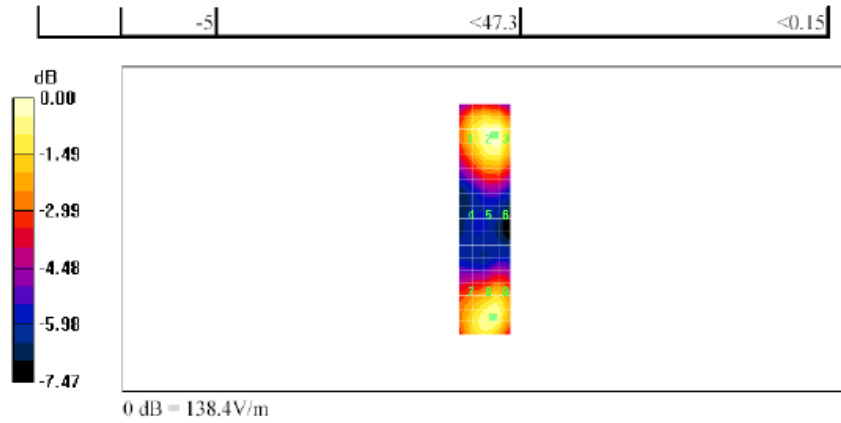
Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

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	Author Data Andrew Becker	Dates of Test Feb. 29 & March 1-22, 2012	Report No RTS-5994-1203-81

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Andrew Becker	Feb. 29 & March 1-22, 2012	RTS-5994-1203-81	L6ARFD30CW

Date/Time: 14/07/2005 11:44:51 AM

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Date/Time: 14/07/2005 11:44:51 AM

Lab: RIM Testing Services (RTS)

Dipole Validation 1880 MHz_2mm step_E-Field 07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
 Phantom section: H Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2285; ConvF(1, 1, 1); Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (11x46x1):

Measurement grid: dx=2mm, dy=2mm
 Maximum value of Total (measured) = 138.0 V/m

E Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (101x451x1):


Measurement grid: dx=2mm, dy=2mm
 Maximum value of Total field (slot averaged) = 131.2 V/m
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

E in V/m (Time averaged) E in V/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
123.1	138.6	138.6	123.1	138.6	138.6
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
81.4	92.1	91.6	81.4	92.1	91.6
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
121.3	131.2	131.0	121.3	131.2	131.0

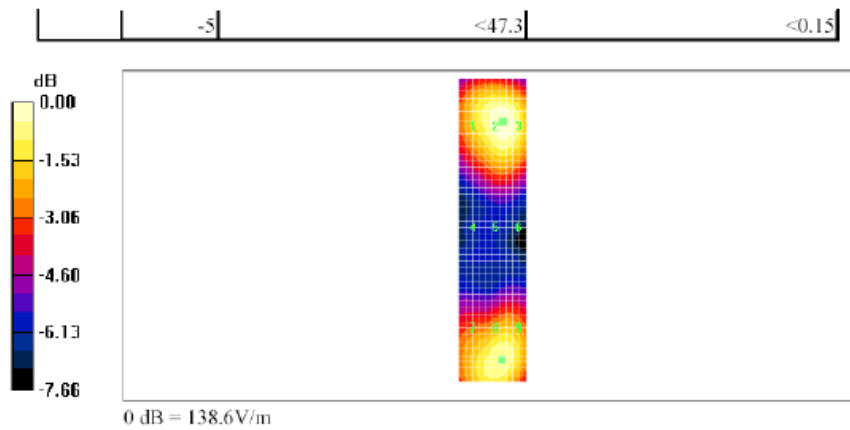
Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

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Date/Time: 14/07/2005 12:43:02 PM

Lab: RIM Testing Services (RTS)

HAC_H_Dipole_CW 1880_5 mm step_07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1

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

Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (5x19x1):

Measurement grid: dx=5mm, dy=5mm

Maximum value of Total (measured) = 0.406 A/m

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (41x181x1):

Measurement grid: dx=5mm, dy=5mm

Maximum value of Total field (slot averaged) = 0.406 A/m

Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.342	0.359	0.344	0.342	0.359	0.344
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.389	0.406	0.389	0.389	0.406	0.389
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.363	0.378	0.363	0.363	0.378	0.363

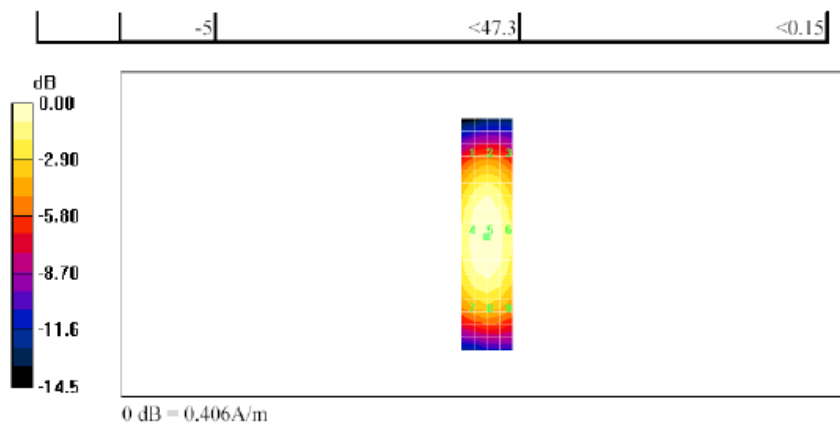
Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

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Date/Time: 14/07/2005 12:53:40 PM

Lab: RIM Testing Services (RTS)

HAC_H_Dipole_CW 1880_2 mm step_07_14_05

DUT: HAC Dipole 1880 MHz; Type: CD1880V3

Communication System: CW; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
 Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 10/12/2004
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: (Fix Surface)
- Electronics: DAE3 Sn472; Calibrated: 03/01/2005
- Phantom: HAC Test Arch; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (11x46x1):

Measurement grid: dx=2mm, dy=2mm
 Maximum value of Total (measured) = 0.406 A/m

H Scan 10mm above CD 1880 MHz/Hearing Aid Compatibility Test (101x451x1):

Measurement grid: dx=2mm, dy=2mm
 Maximum value of Total field (slot averaged) = 0.406 A/m

Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H in A/m (Time averaged) H in A/m (Slot averaged)

Grid 1	Grid 2	Grid 3	Grid 1	Grid 2	Grid 3
0.347	0.361	0.348	0.347	0.361	0.348
Grid 4	Grid 5	Grid 6	Grid 4	Grid 5	Grid 6
0.394	0.406	0.391	0.394	0.406	0.391
Grid 7	Grid 8	Grid 9	Grid 7	Grid 8	Grid 9
0.367	0.380	0.365	0.367	0.380	0.365

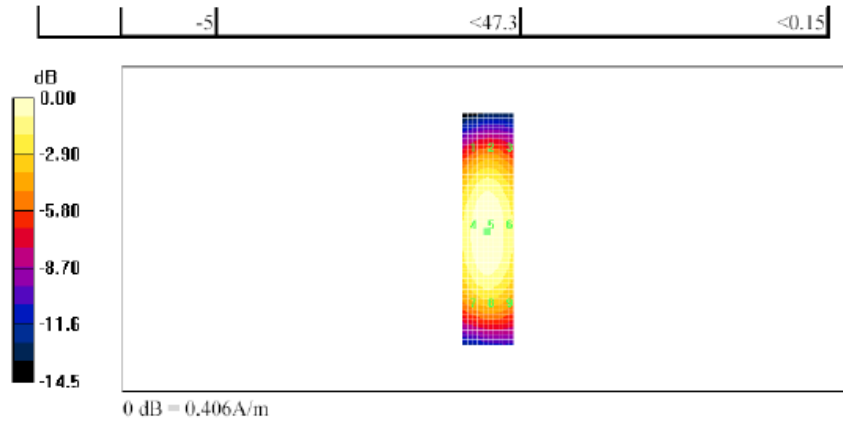
Category	AWF (dB)	Limits for E-Field Emissions (V/m)	Limits for H-Field Emissions (A/m)
M1	0	199.5 - 354.8	0.6 - 1.07
	-5	149.6 - 266.1	0.45 - 0.8
M2	0	112.2 - 199.5	0.34 - 0.6
	-5	84.1 - 149.6	0.25 - 0.45
M3	0	63.1 - 112.2	0.19 - 0.34
	-5	47.3 - 84.1	0.15 - 0.25
M4	0	<63.1	<0.19

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A.3 RF emissions plots

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Andrew Becker	Feb. 29 & March 1-22, 2012	RTS-5994-1203-81	L6ARFD30CW

Date/Time: 3/22/2012 9:42:45 AM

Test Laboratory: RIM Testing Services

HAC RF_E-Field_CDMA800

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 297ECFF9

Communication System: CDMA 800; Frequency: 817.9 MHz, Frequency: 820.5 MHz, Frequency: 823.1 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 1/9/2012
- Sensor-Surface: (Fix Surface), z = 8.7
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Device E-Field measurement with ER probe/E Scan - ER3D - 2007:

15 mm from Probe Center to Device_Low_Chan/Hearing Aid

Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 111.3 V/m; Power Drift = -0.06 dB

PMR not calibrated. PMF = 1.060 is applied.

E-field emissions = 91.37 V/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled E-field

Grid 1 M4 77.64 V/m	Grid 2 M4 88.97 V/m	Grid 3 M4 88.33 V/m
Grid 4 M4 80.36 V/m	Grid 5 M4 91.37 V/m	Grid 6 M4 90.64 V/m
Grid 7 M4 80.61 V/m	Grid 8 M4 90.10 V/m	Grid 9 M4 89.27 V/m

Cursor:

Total = 91.365 V/m

E Category: M4

Location: -5, 3, 8.7 mm

Device E-Field measurement with ER probe/E Scan - ER3D - 2007:

15 mm from Probe Center to the Device_Mid_Chan/Hearing Aid

Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 96.23 V/m; Power Drift = 0.01 dB

PMR not calibrated. PMF = 1.060 is applied.

E-field emissions = 79.36 V/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled E-field

Grid 1 M4 68.19 V/m	Grid 2 M4 76.00 V/m	Grid 3 M4 75.36 V/m
Grid 4 M4 71.22 V/m	Grid 5 M4 79.36 V/m	Grid 6 M4 78.42 V/m
Grid 7 M4 73.01 V/m	Grid 8 M4 78.80 V/m	Grid 9 M4 77.81 V/m

Cursor:

Total = 79.359 V/m

E Category: M4

Location: -4.5, 4.5, 8.7 mm

Device E-Field measurement with ER probe/E Scan - ER3D - 2007:

15 mm from Probe Center to the Device_High_Chan/Hearing Aid

Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 98.85 V/m; Power Drift = 0.01 dB

PMR not calibrated. PMF = 1.060 is applied.

E-field emissions = 82.03 V/m

Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

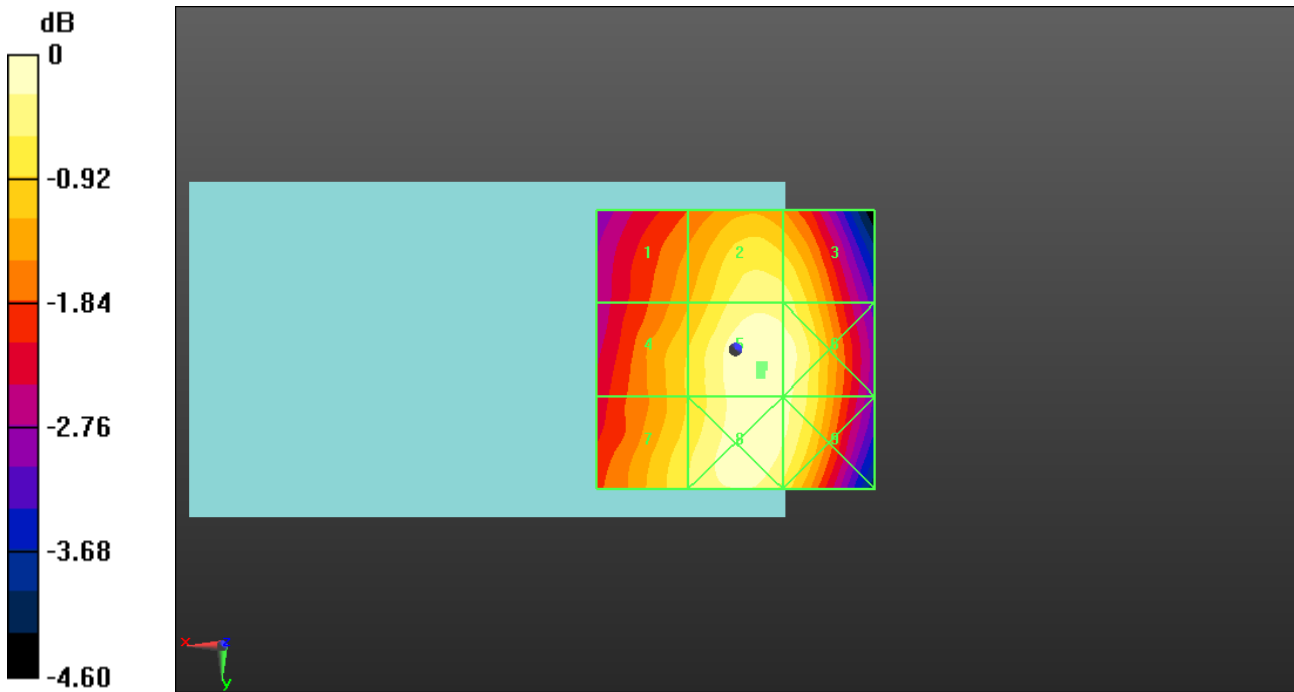
Grid 1 M4 70.00 V/m	Grid 2 M4 78.16 V/m	Grid 3 M4 77.43 V/m
Grid 4 M4 73.53 V/m	Grid 5 M4 82.03 V/m	Grid 6 M4 81.15 V/m
Grid 7 M4 75.80 V/m	Grid 8 M4 81.77 V/m	Grid 9 M4 80.37 V/m

Cursor:


Total = 82.025 V/m

E Category: M4

Location: -4.5, 3, 8.7 mm



0 dB = 91.370V/m = 39.22 dB V/m

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Andrew Becker	Feb. 29 & March 1-22, 2012	RTS-5994-1203-81	L6ARFD30CW

Date/Time: 3/22/2012 10:30:36 AM

Test Laboratory: RIM Testing Services

HAC RF_E-Field_CDMA800_1/8th

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 297ECFF9

Communication System: CDMA 800 1/8 th; Frequency: 817.9 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 1/9/2012
- Sensor-Surface: (Fix Surface), z = 8.7
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Device E-Field measurement with ER probe/E Scan - ER3D - 2007:

15 mm from Probe Center to the Device_1/8th/Hearing Aid

Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 39.47 V/m; Power Drift = 0.04 dB

PMR not calibrated. PMF = 2.901 is applied.

E-field emissions = 89.34 V/m

Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

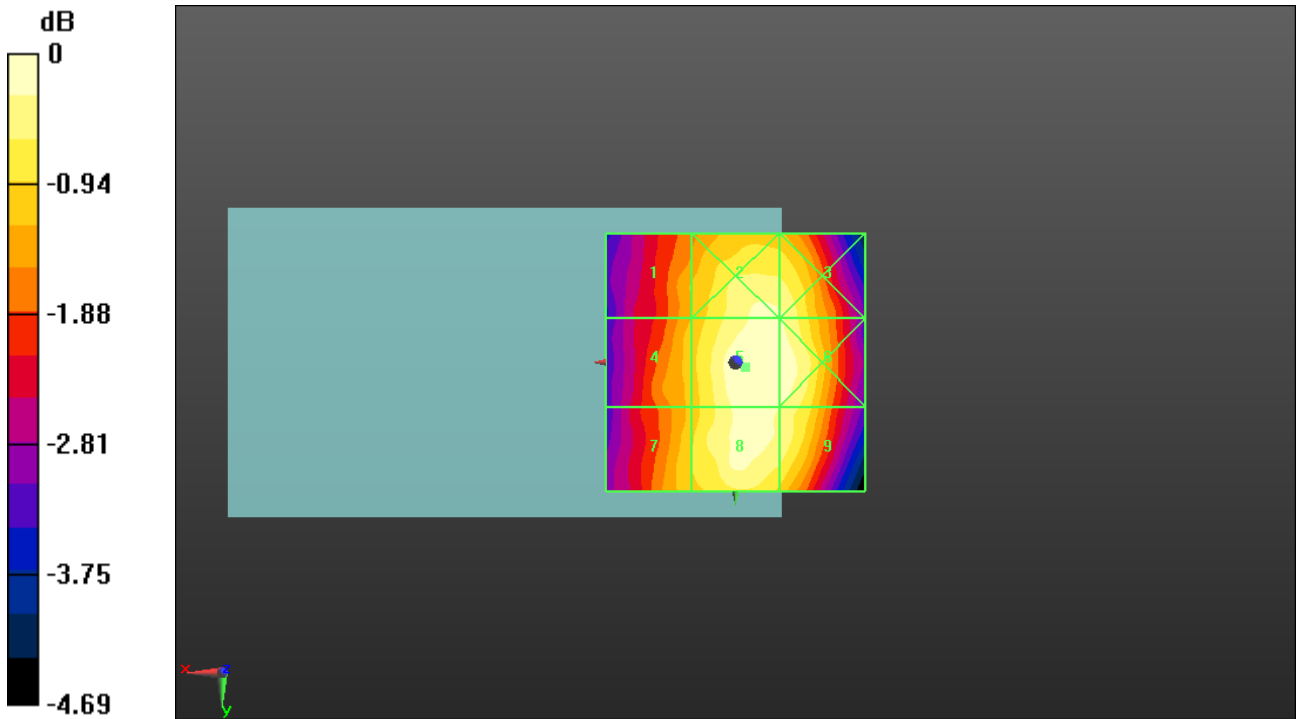
Grid 1 M4 77.68 V/m	Grid 2 M4 87.25 V/m	Grid 3 M4 86.63 V/m
Grid 4 M4 79.27 V/m	Grid 5 M4 89.34 V/m	Grid 6 M4 88.72 V/m
Grid 7 M4 80.29 V/m	Grid 8 M4 87.53 V/m	Grid 9 M4 86.22 V/m

Cursor:


Total = 89.336 V/m

E Category: M4

Location: -2, 1, 8.7 mm



0 dB = 89.340V/m = 39.02 dB V/m

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Date/Time: 3/22/2012 10:36:40 AM

Test Laboratory: RIM Testing Services

HAC RF_E-Field_CDMA800_Telecoil

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 297ECFF9

Communication System: CDMA 800; Frequency: 817.9 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: ER3DV6 - SN2286; ConvF(1, 1, 1); Calibrated: 1/9/2012
- Sensor-Surface: (Fix Surface), z = 8.7
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Device E-Field measurement with ER probe/E Scan - ER3D - 2007:

15 mm from Probe Center to the Device_Telecoil/Hearing Aid

Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 109.3 V/m; Power Drift = 0.05 dB

PMR not calibrated. PMF = 1.060 is applied.

E-field emissions = 92.07 V/m

Near-field category: M4 (AWF 0 dB)

PMF scaled E-field

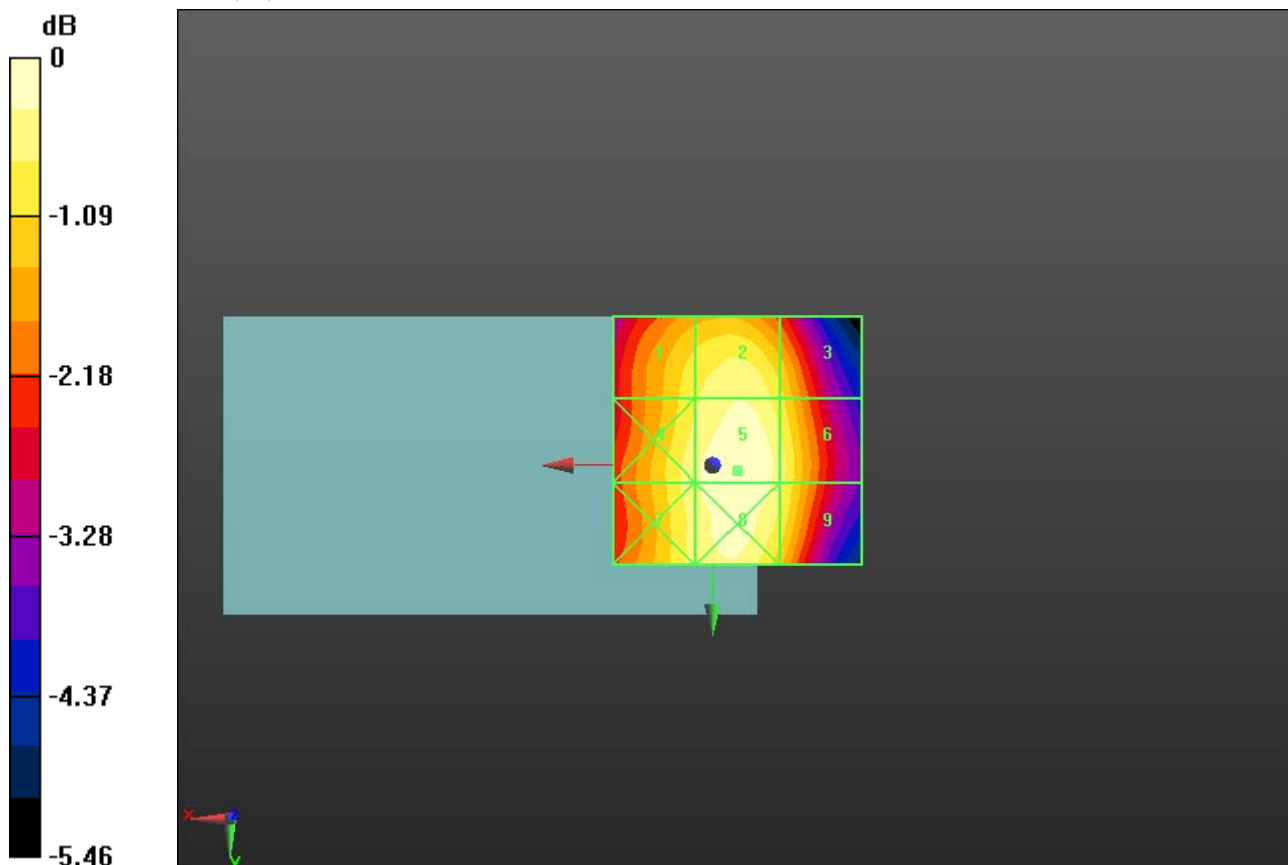
Grid 1 M4 84.19 V/m	Grid 2 M4 88.22 V/m	Grid 3 M4 82.47 V/m
Grid 4 M4 87.53 V/m	Grid 5 M4 92.07 V/m	Grid 6 M4 86.65 V/m
Grid 7 M4 87.50 V/m	Grid 8 M4 91.81 V/m	Grid 9 M4 85.91 V/m

Cursor:


Total = 92.075 V/m

E Category: M4

Location: -5, 1, 8.7 mm



0 dB = 92.070V/m = 39.28 dB V/m

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Andrew Becker	Feb. 29 & March 1-22, 2012	RTS-5994-1203-81	L6ARFD30CW

Date/Time: 3/22/2012 10:59:07 AM

Test Laboratory: RIM Testing Services

HAC RF_H-Field_CDMA800

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 297ECFF9

Communication System: CDMA 800; Frequency: 817.9 MHz, Frequency: 820.5 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 11/8/2011
- Sensor-Surface: (Fix Surface), $z = 8.7$
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Device H-Field measurement with H3DV6 probe/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device_low_chan/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.04 V/m; Power Drift = 9.12 dB

PMR not calibrated. PMF = 1.030 is applied.

H-field emissions = 0.20 A/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled H-field

Grid 1 M4 0.20 A/m	Grid 2 M4 0.13 A/m	Grid 3 M4 0.08 A/m
Grid 4 M4 0.20 A/m	Grid 5 M4 0.14 A/m	Grid 6 M4 0.09 A/m
Grid 7 M4 0.20 A/m	Grid 8 M4 0.15 A/m	Grid 9 M4 0.10 A/m

Cursor:

Total = 0.199 A/m

H Category: M4

Location: 25, 23, 8.7 mm

Device H-Field measurement with H3DV6 probe/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device_mid_chan/Hearing Aid

Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm


Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.09 V/m; Power Drift = -0.04 dB

PMR not calibrated. PMF = 1.030 is applied.

H-field emissions = 0.16 A/m

Near-field category: M4 (AWF 0 dB)

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PMF scaled H-field

Grid 1 M4 0.16 A/m	Grid 2 M4 0.11 A/m	Grid 3 M4 0.07 A/m
Grid 4 M4 0.16 A/m	Grid 5 M4 0.12 A/m	Grid 6 M4 0.08 A/m
Grid 7 M4 0.17 A/m	Grid 8 M4 0.13 A/m	Grid 9 M4 0.08 A/m

Cursor:

Total = 0.174 A/m

H Category: M4

Location: 25, 25, 8.7 mm

Device H-Field measurement with H3DV6 probe/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device_high_chan/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.09 V/m; Power Drift = 0.12 dB

PMR not calibrated. PMF = 1.030 is applied.

H-field emissions = 0.16 A/m

Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

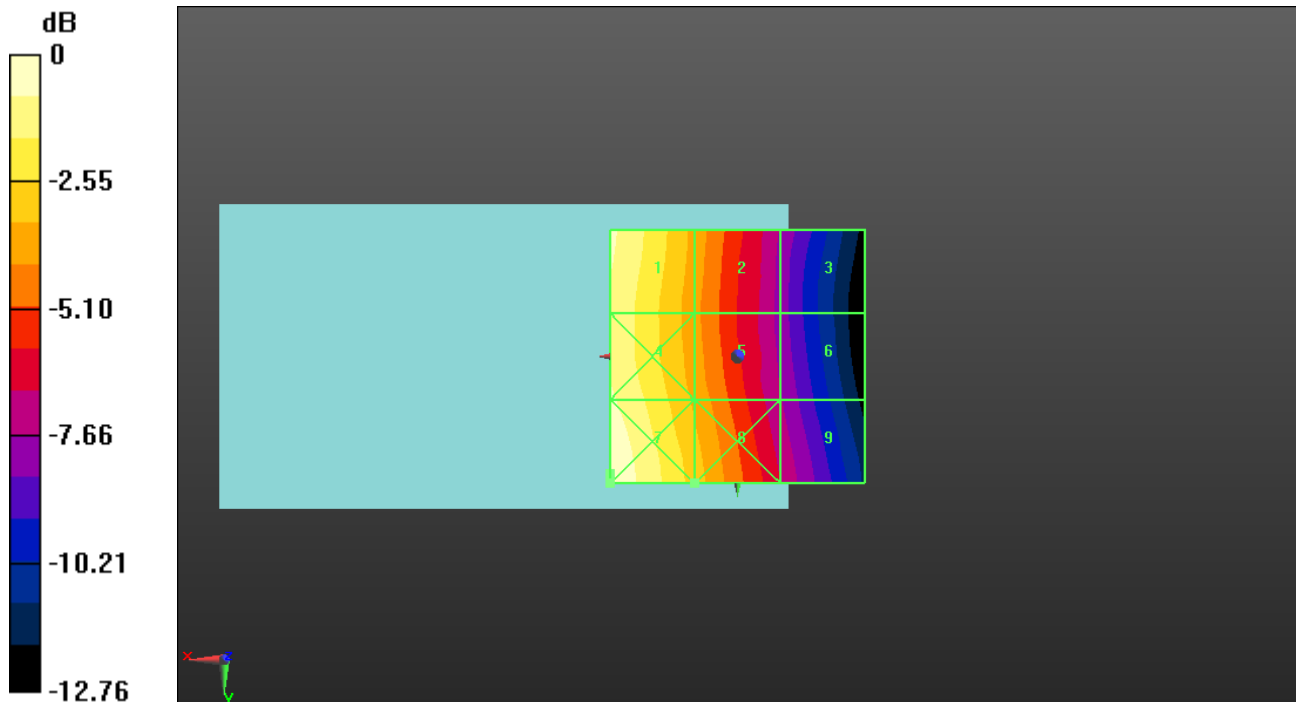
Grid 1 M4 0.16 A/m	Grid 2 M4 0.11 A/m	Grid 3 M4 0.07 A/m
Grid 4 M4 0.16 A/m	Grid 5 M4 0.11 A/m	Grid 6 M4 0.07 A/m
Grid 7 M4 0.17 A/m	Grid 8 M4 0.12 A/m	Grid 9 M4 0.08 A/m

Cursor:


Total = 0.168 A/m

H Category: M4

Location: 25, 25, 8.7 mm



0 dB = 0.200A/m = -13.98 dB A/m

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	Annex A to Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RFD31CW		45 (48)
Author Data	Dates of Test	Report No	FCC ID
Andrew Becker	Feb. 29 & March 1-22, 2012	RTS-5994-1203-81	L6ARFD30CW

Date/Time: 3/22/2012 11:38:33 AM

Test Laboratory: RIM Testing Services

HAC RF_H-Field_CDMA800_1/8th

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 297ECFF9

Communication System: CDMA 800 1/8 th; Frequency: 817.9 MHz

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

Phantom section: RF Section

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

DASY Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 11/8/2011
- Sensor-Surface: (Fix Surface), z = 8.7
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS 52.8.0(692); SEMCAD X 14.6.4(4989)

Device H-Field measurement with H3DV6 probe/H Scan - H3DV6 - 2007: 15 mm from Probe Center to the Device_1/8th/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.04 V/m; Power Drift = 1.40 dB

PMR not calibrated. PMF = 2.648 is applied.

H-field emissions = 0.21 A/m

Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

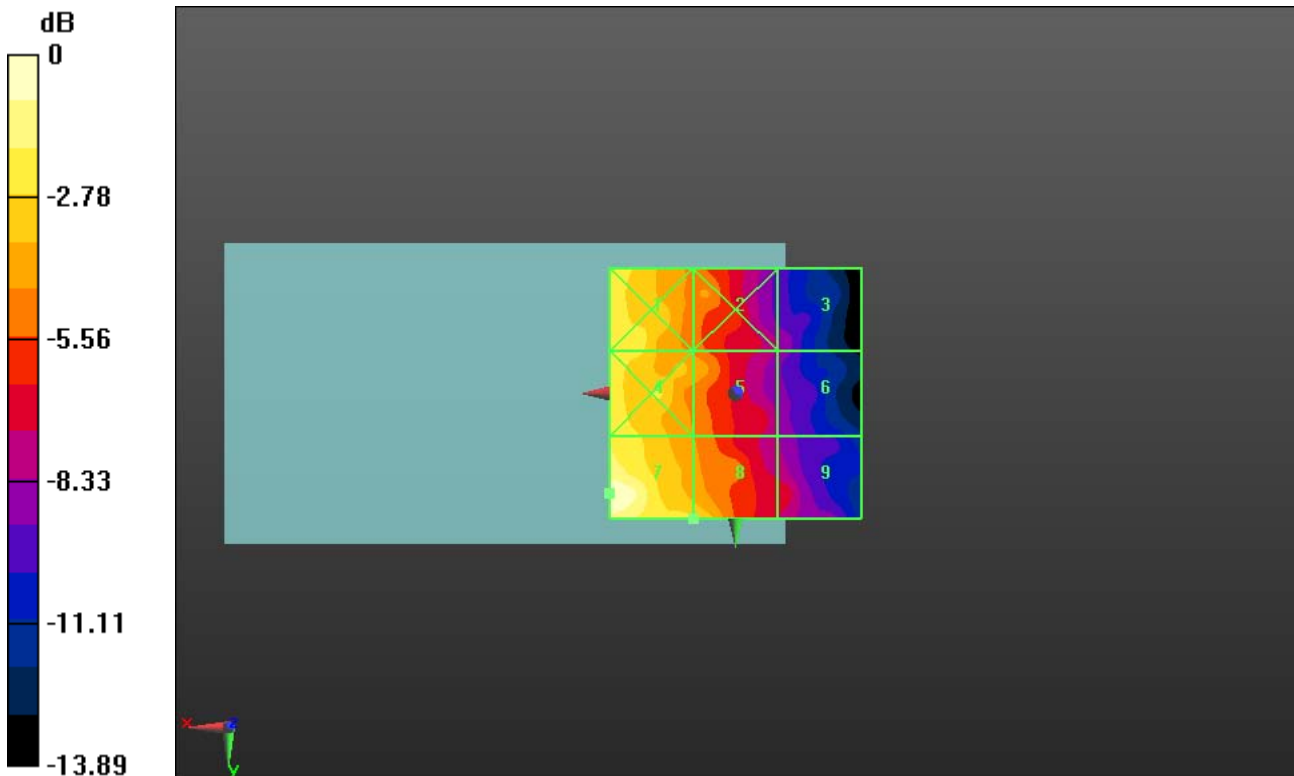
Grid 1 M4 0.17 A/m	Grid 2 M4 0.12 A/m	Grid 3 M4 0.08 A/m
Grid 4 M4 0.17 A/m	Grid 5 M4 0.13 A/m	Grid 6 M4 0.08 A/m
Grid 7 M4 0.21 A/m	Grid 8 M4 0.16 A/m	Grid 9 M4 0.10 A/m

Cursor:


Total = 0.206 A/m

H Category: M4

Location: 25, 20, 8.7 mm



0 dB = 0.210A/m = -13.56 dB A/m

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	Annex A to Hearing Aid Compatibility RF Emissions Test Report for the BlackBerry® Smartphone model RFD31CW		47 (48)
Author Data	Dates of Test	Report No	FCC ID
Andrew Becker	Feb. 29 & March 1-22, 2012	RTS-5994-1203-81	L6ARFD30CW

Date/Time: 3/22/2012 11:49:24 AM

Test Laboratory: RIM Testing Services

HAC RF_H-Field_CDMA800_Telecoil

DUT: BlackBerry Smartphone; Type: Sample ; Serial: 297ECFF9

Communication System: CDMA 800 1/8 th; Frequency: 817.9 MHz

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

Phantom section: RF Section

Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: H3DV6 - SN6105; ; Calibrated: 11/8/2011
- Sensor-Surface: (Fix Surface), z = 8.7
- Electronics: DAE3 Sn473; Calibrated: 1/13/2012
- Phantom: HAC RF Test Arch with AMCC; Type: SD HAC P01 BA; Serial: **Not Specified**
- DASYS5 52.8.0(692); SEMCAD X 14.6.4(4989)

Device H-Field measurement with H3DV6 probe/H Scan - H3DV6 -

2007: 15 mm from Probe Center to the

Device_Centre_Telecoil/Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.04 V/m; Power Drift = -0.07 dB

PMR not calibrated. PMF = 2.648 is applied.

H-field emissions = 0.12 A/m

Near-field category: M4 (AWF 0 dB)

PMF scaled H-field

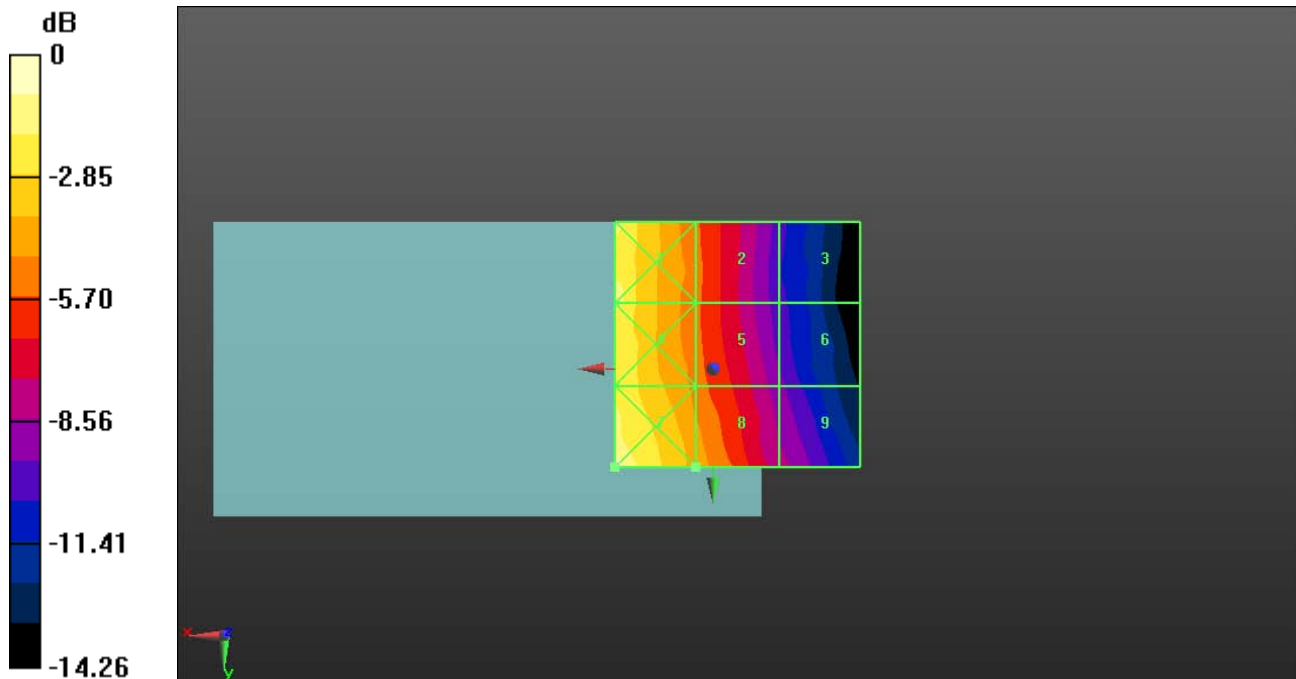
Grid 1 M4 0.17 A/m	Grid 2 M4 0.10 A/m	Grid 3 M4 0.06 A/m
Grid 4 M4 0.16 A/m	Grid 5 M4 0.11 A/m	Grid 6 M4 0.07 A/m
Grid 7 M4 0.19 A/m	Grid 8 M4 0.12 A/m	Grid 9 M4 0.08 A/m

Cursor:

Total = 0.187 A/m

H Category: M4

Location: 20, 20, 8.7 mm



0 dB = 0.190A/m = -14.42 dB A/m