

APPENDIX 2 : HAC Measurement data

1. E-Filed measurement data (GSM 850)

E-Filed / PV300 / GSM850 / 824.2MHz

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 121.2 V/m

Probe Modulation Factor = 2.91

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 49.2 V/m; Power Drift = 0.128 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
125.4 M4	126.0 M4	118.6 M4
Grid 4	Grid 5	Grid 6
118.4 M4	121.2 M4	118.2 M4
Grid 7	Grid 8	Grid 9
104.6 M4	109.2 M4	107.1 M4

Cursor:

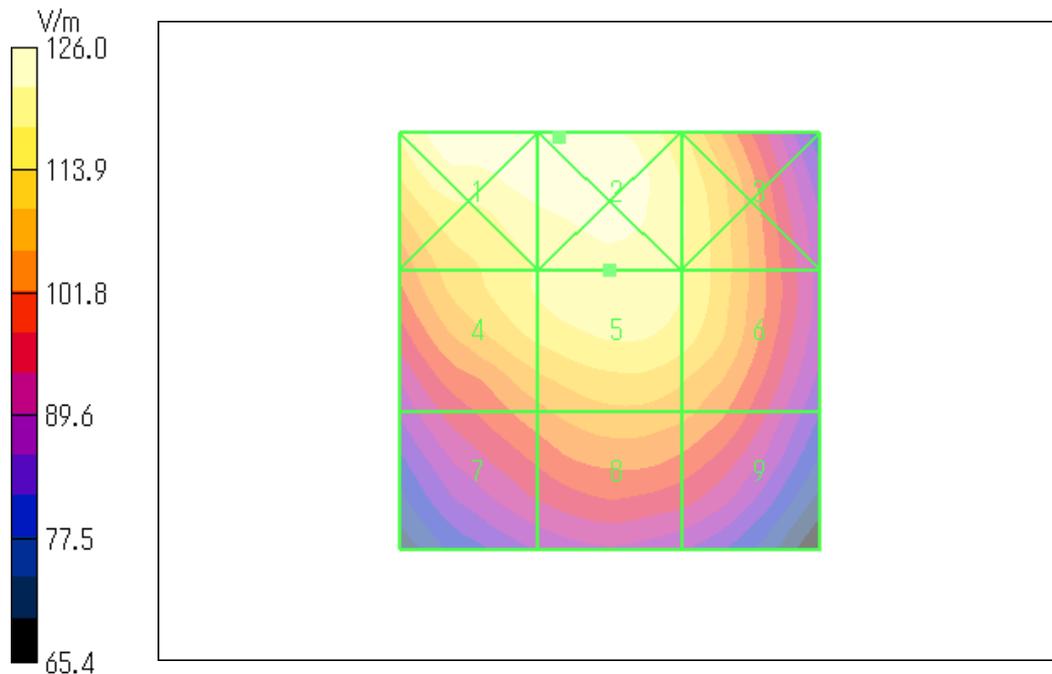
Total = 126.0 V/m

E Category: M4

Location: 6, -24.5, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / GSM850 / 836.6MHz

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 148.5 V/m

Probe Modulation Factor = 2.95

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 59.3 V/m; Power Drift = 0.128 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
152.0 M3	152.7 M3	145.6 M4
Grid 4	Grid 5	Grid 6
143.4 M4	148.5 M4	145.5 M4
Grid 7	Grid 8	Grid 9
124.3 M4	131.5 M4	129.7 M4

Cursor:

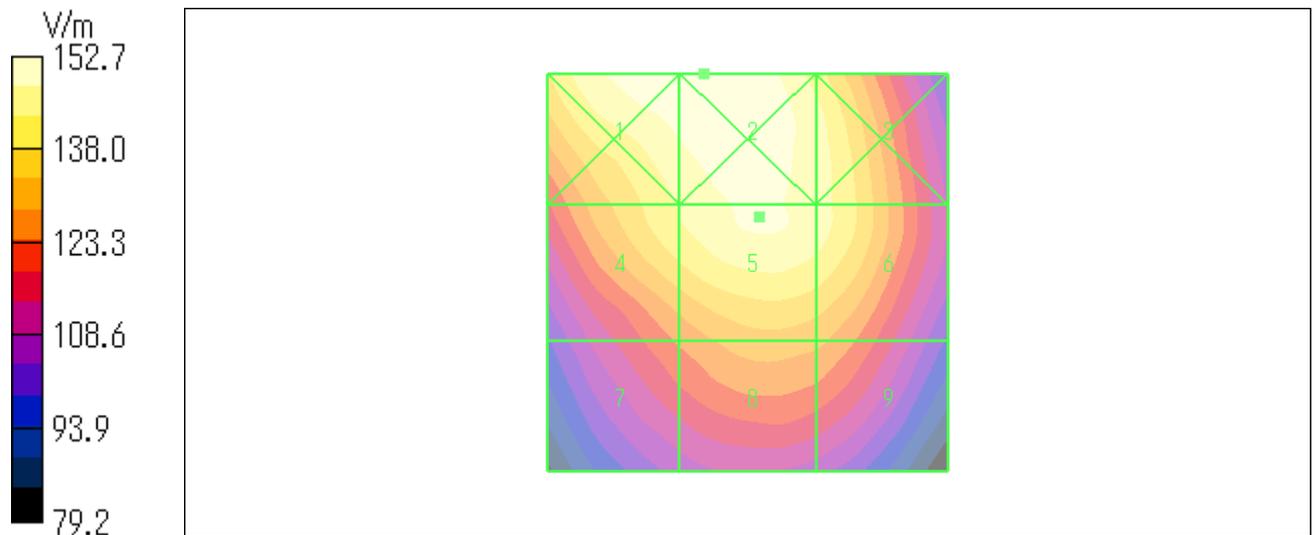
Total = 152.7 V/m

E Category: M3

Location: 5.5, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / GSM850 / 848.8MHz

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 121.0 V/m

Probe Modulation Factor = 2.91

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 47.1 V/m; Power Drift = 0.142 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
130.6 M4	130.8 M4	121.0 M4
Grid 4	Grid 5	Grid 6
117.2 M4	121.0 M4	118.8 M4
Grid 7	Grid 8	Grid 9
96.5 M4	103.9 M4	102.9 M4

Cursor:

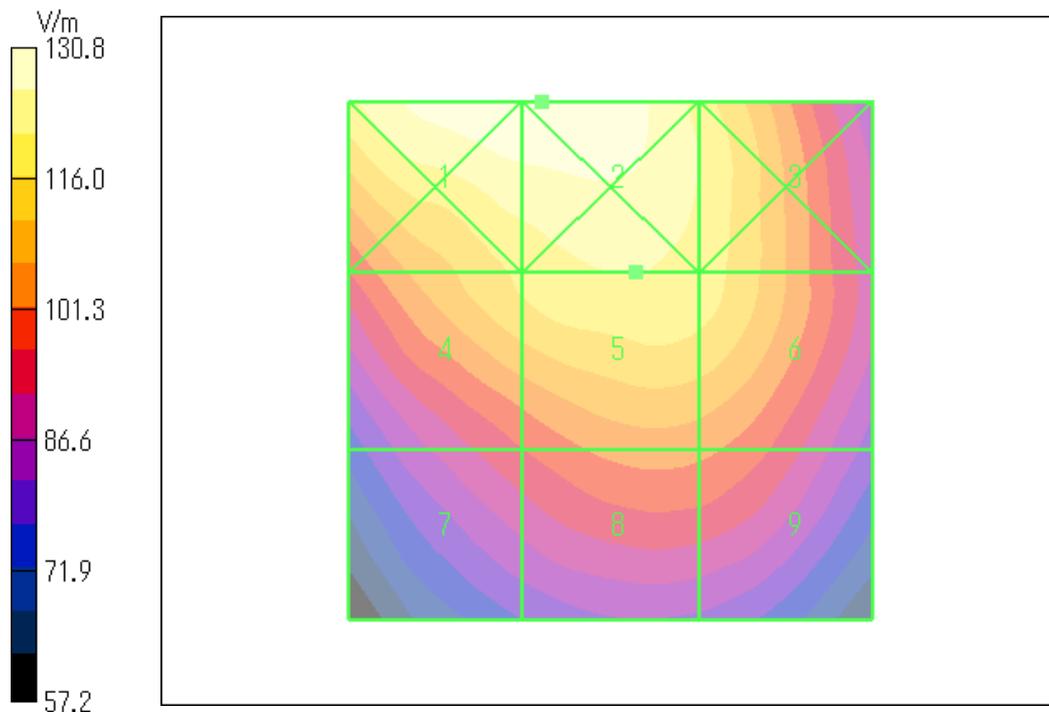
Total = 130.8 V/m

E Category: M4

Location: 6.5, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / GSM850 / 824.2MHz with BT active

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 120.9 V/m

Probe Modulation Factor = 2.91

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 49.1 V/m; Power Drift = 0.119 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1 125.8 M4	Grid 2 125.6 M4	Grid 3 117.0 M4
Grid 4 118.6 M4	Grid 5 120.9 M4	Grid 6 117.1 M4
Grid 7 104.8 M4	Grid 8 108.7 M4	Grid 9 106.1 M4

Cursor:

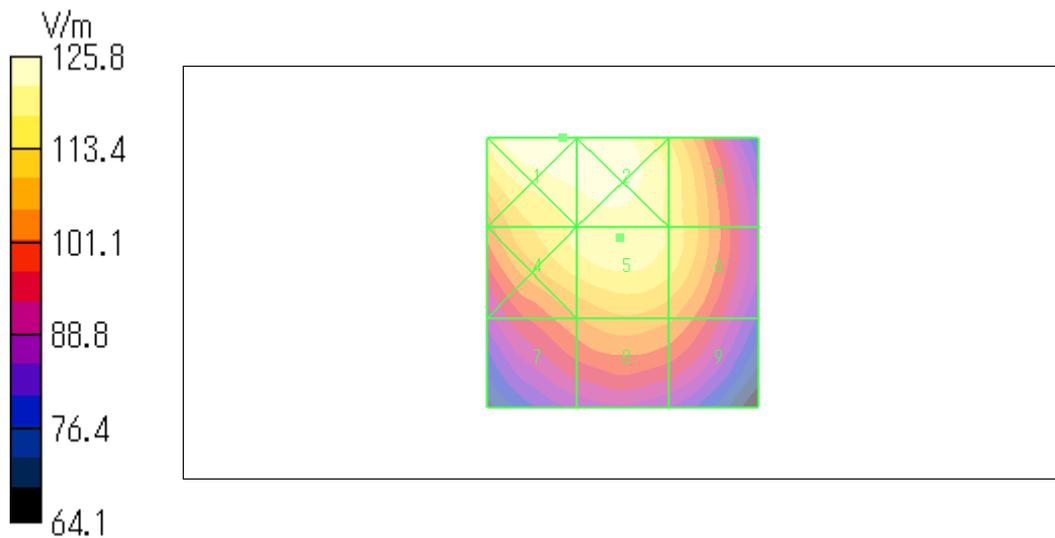
Total = 125.8 V/m

E Category: M4

Location: 11, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / GSM850 / 836.6MHz with BT active

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 148.1 V/m

Probe Modulation Factor = 2.95

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 58.9 V/m; Power Drift = 0.154 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1 152.0 M3	Grid 2 152.2 M3	Grid 3 144.1 M4
Grid 4 143.7 M4	Grid 5 148.1 M4	Grid 6 144.0 M4
Grid 7 124.4 M4	Grid 8 130.5 M4	Grid 9 127.9 M4

Cursor:

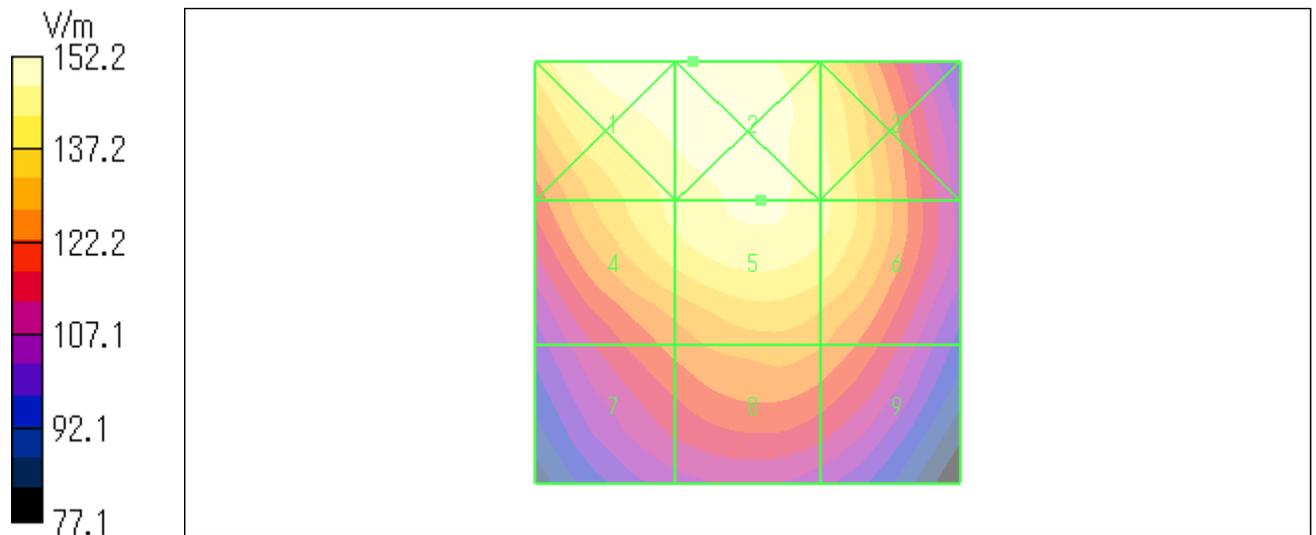
Total = 152.2 V/m

E Category: M3

Location: 6.5, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / GSM850 / 848.8MHz with BT active

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 120.4 V/m

Probe Modulation Factor = 2.91

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 46.8 V/m; Power Drift = 0.195 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
130.6 M4	130.7 M4	119.9 M4
Grid 4	Grid 5	Grid 6
117.5 M4	120.4 M4	117.6 M4
Grid 7	Grid 8	Grid 9
97.0 M4	103.3 M4	102.1 M4

Cursor:

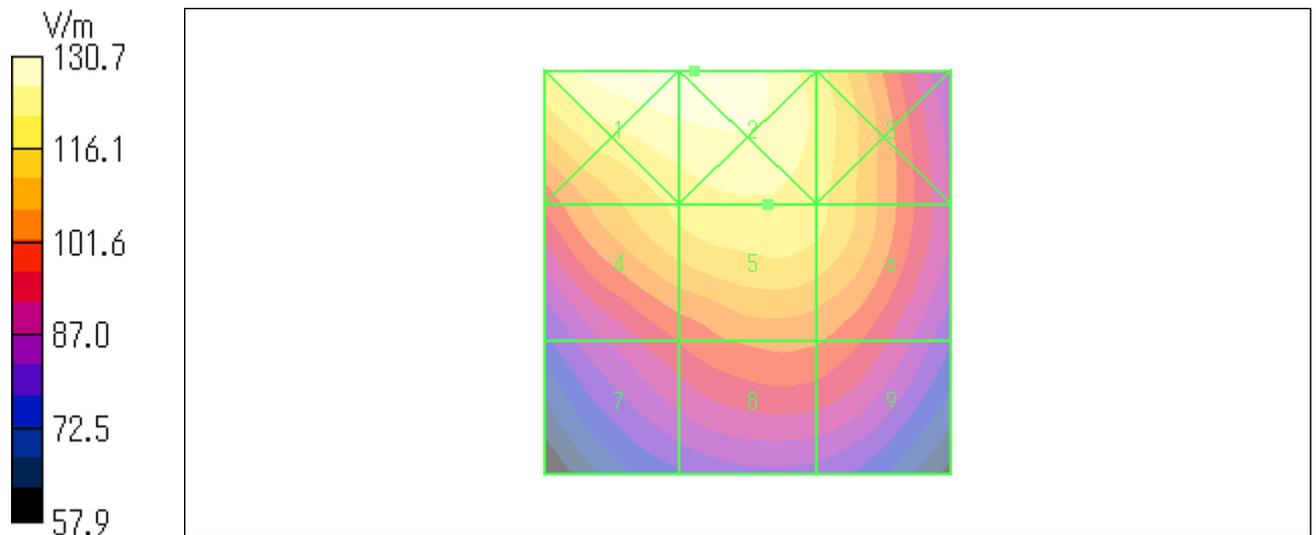
Total = 130.7 V/m

E Category: M4

Location: 6.5, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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2. E-Filed measurement data (PCS1900)

E-Filed / PV300 / PCS1900 / 1850.2MHz

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 47.8 V/m

Probe Modulation Factor = 2.87

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 7.94 V/m; Power Drift = 0.004 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1 46.8 M4	Grid 2 47.8 M3	Grid 3 46.8 M4
Grid 4 37.6 M4	Grid 5 35.5 M4	Grid 6 37.6 M4
Grid 7 58.8 M3	Grid 8 50.0 M3	Grid 9 42.1 M4

Cursor:

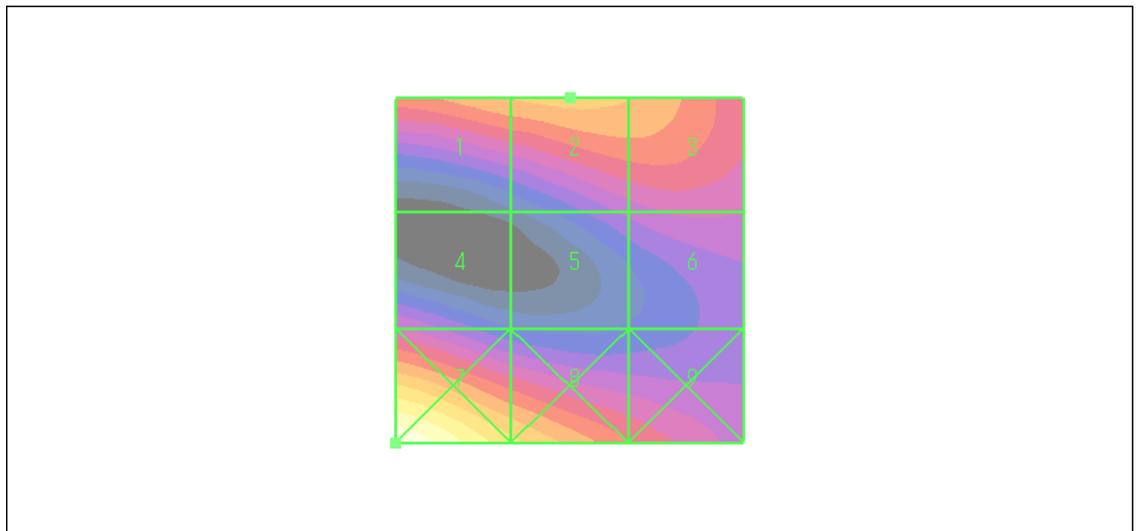
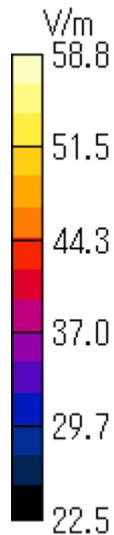
Total = 58.8 V/m

E Category: M3

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / PCS1900 / 1880.0MHz

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 54.9 V/m

Probe Modulation Factor = 2.87

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 7.67 V/m; Power Drift = -0.005 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1 52.5 M3	Grid 2 54.9 M3	Grid 3 54.3 M3
Grid 4 38.5 M4	Grid 5 37.6 M4	Grid 6 40.9 M4
Grid 7 60.8 M3	Grid 8 52.6 M3	Grid 9 43.1 M4

Cursor:

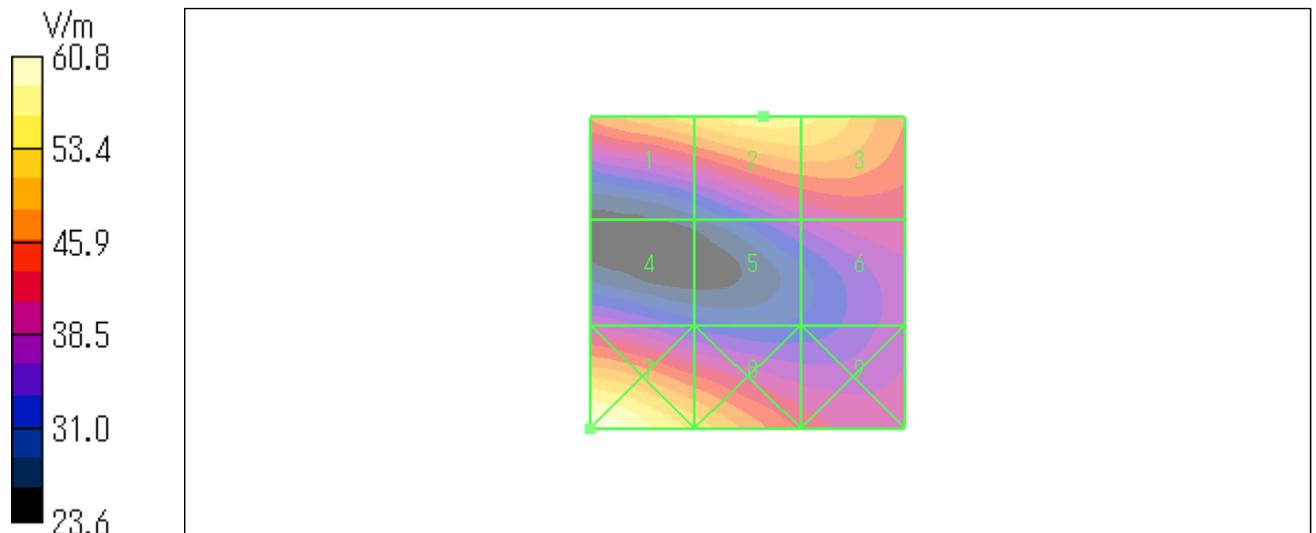
Total = 60.8 V/m

E Category: M3

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / PCS1900 / 1909.8MHz

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 55.6 V/m

Probe Modulation Factor = 2.87

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 8.70 V/m; Power Drift = 0.070 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
58.2 M3	59.9 M3	56.5 M3
Grid 4	Grid 5	Grid 6
35.2 M4	38.5 M4	39.5 M4
Grid 7	Grid 8	Grid 9
55.6 M3	55.4 M3	45.5 M4

Cursor:

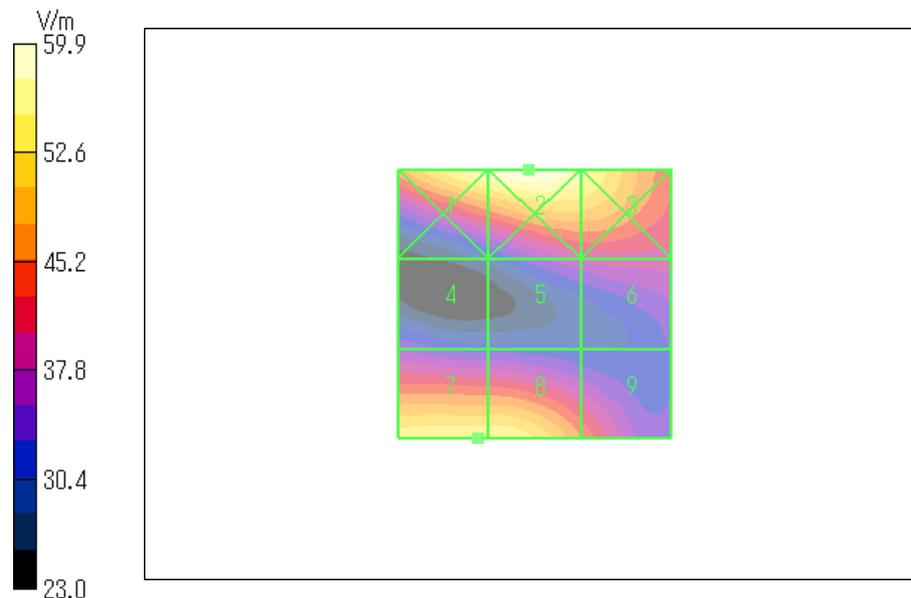
Total = 59.9 V/m

E Category: M3

Location: 1, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / PCS1900 / 1850.2MHz with BT active

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 49.1 V/m

Probe Modulation Factor = 2.87

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 7.96 V/m; Power Drift = 0.028 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
48.4 M3	49.1 M3	48.2 M3
Grid 4	Grid 5	Grid 6
38.2 M4	36.1 M4	38.6 M4
Grid 7	Grid 8	Grid 9
60.1 M3	51.1 M3	43.6 M4

Cursor:

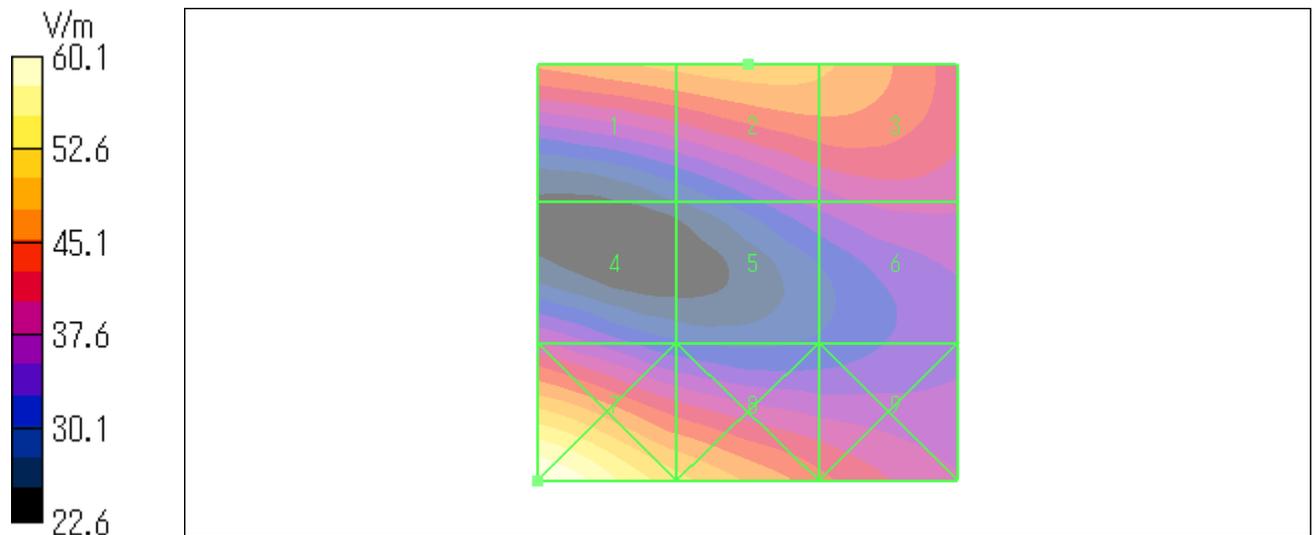
Total = 60.1 V/m

E Category: M3

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / PCS1900 / 1880.0MHz with BT active

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 55.6 V/m

Probe Modulation Factor = 2.87

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 7.78 V/m; Power Drift = -0.113 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
52.7 M3	55.6 M3	55.1 M3
Grid 4	Grid 5	Grid 6
39.1 M4	37.5 M4	41.9 M4
Grid 7	Grid 8	Grid 9
62.2 M3	54.2 M3	45.0 M4

Cursor:

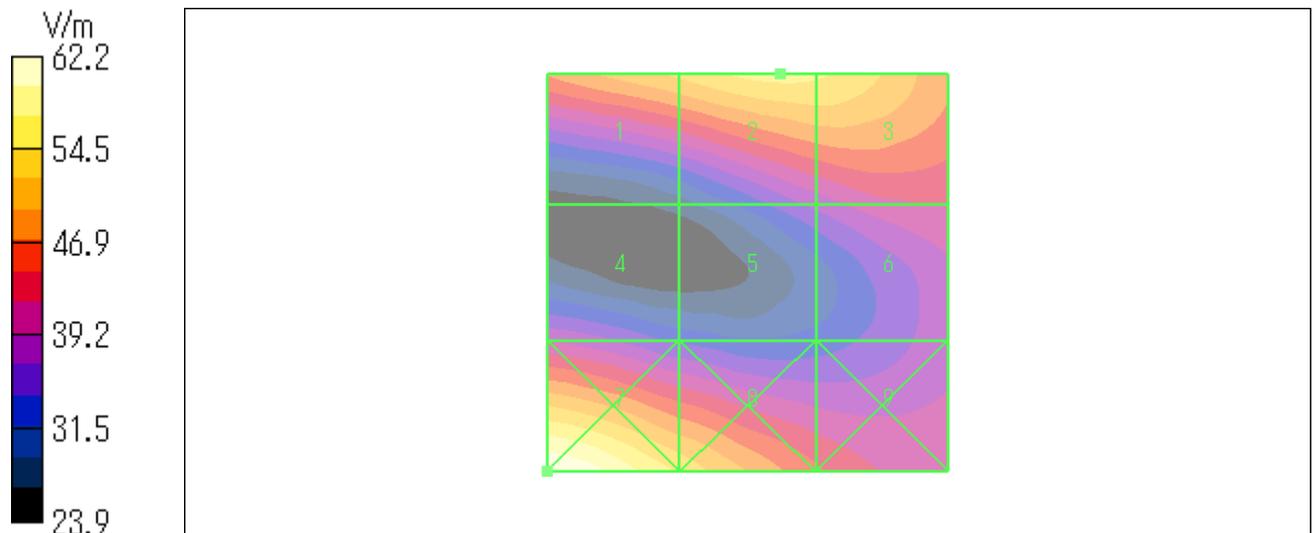
Total = 62.2 V/m

E Category: M3

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / PCS1900 / 1909.8MHz with BT active

Duty Cycle: 1:8.3

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 56.6 V/m

Probe Modulation Factor = 2.87

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 8.76 V/m; Power Drift = -0.002 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
59.6 M3	61.5 M3	58.1 M3
Grid 4	Grid 5	Grid 6
34.9 M4	39.2 M4	40.3 M4
Grid 7	Grid 8	Grid 9
56.6 M3	56.5 M3	47.6 M3

Cursor:

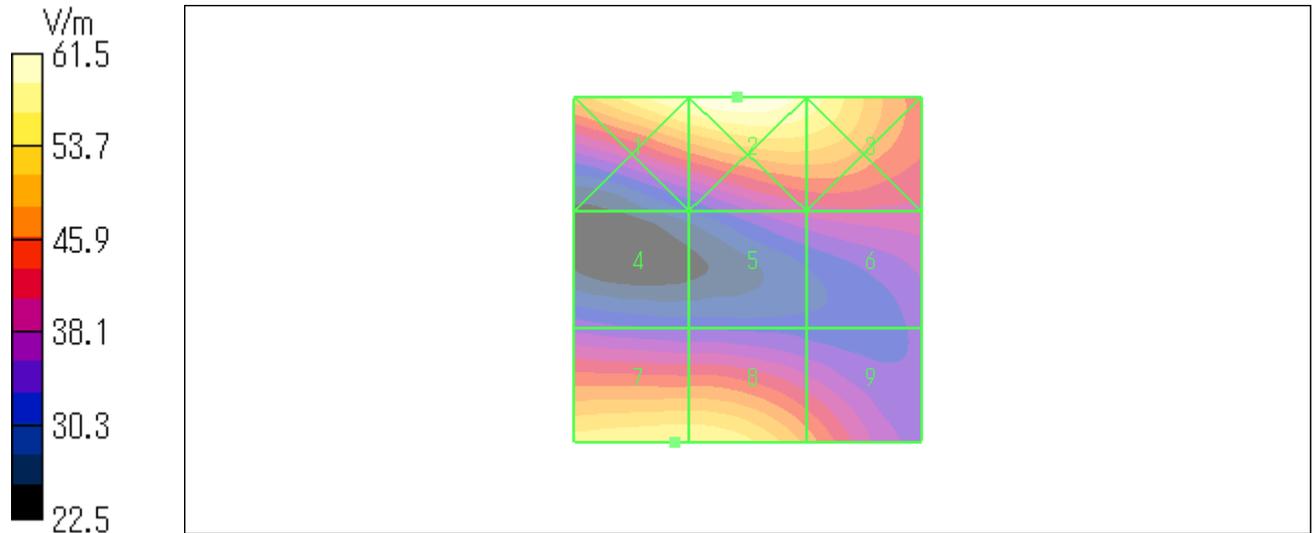
Total = 61.5 V/m

E Category: M3

Location: 1.5, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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3. E-Filed measurement data (WCDMA IV)

E-Filed / PV300 / WCDMA IV band / 1712.4MHz / RMC12.2k mode

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 29.9 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 18.8 V/m; Power Drift = 0.210 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
33.6 M4	34.7 M4	33.8 M4
Grid 4	Grid 5	Grid 6
20.6 M4	26.3 M4	26.9 M4
Grid 7	Grid 8	Grid 9
29.9 M4	23.4 M4	21.1 M4

Cursor:

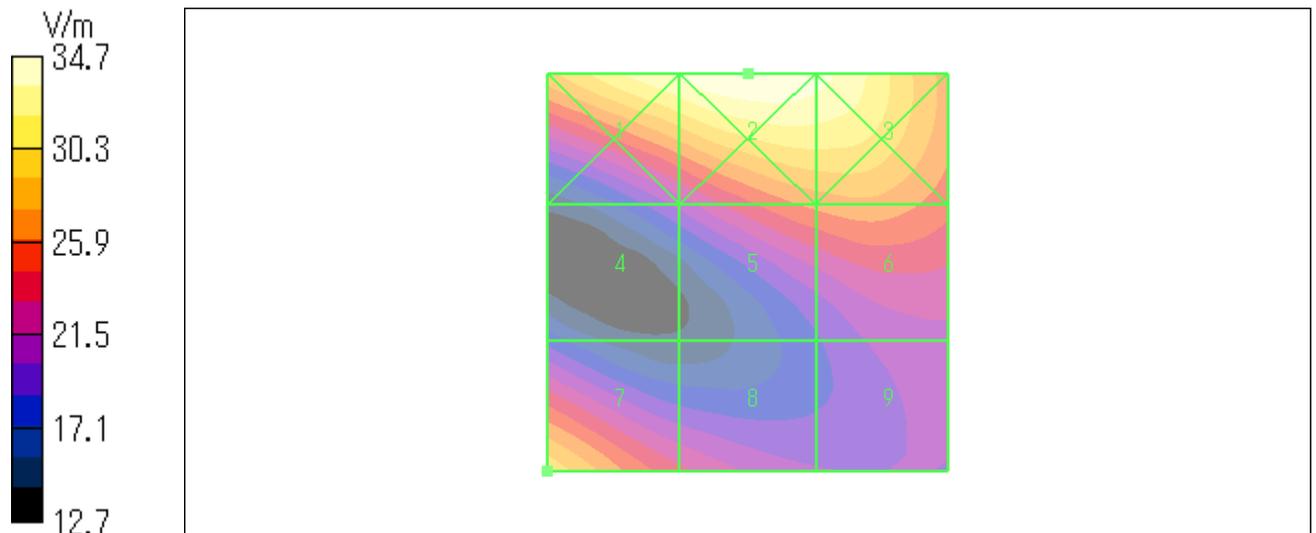
Total = 34.7 V/m

E Category: M4

Location: 0, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / WCDMA IV band / 1732.6MHz / RMC12.2k mode

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 28.2 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 16.0 V/m; Power Drift = 0.208 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
26.4 M4	28.2 M4	28.0 M4
Grid 4	Grid 5	Grid 6
18.7 M4	23.1 M4	23.9 M4
Grid 7	Grid 8	Grid 9
29.3 M4	21.4 M4	20.3 M4

Cursor:

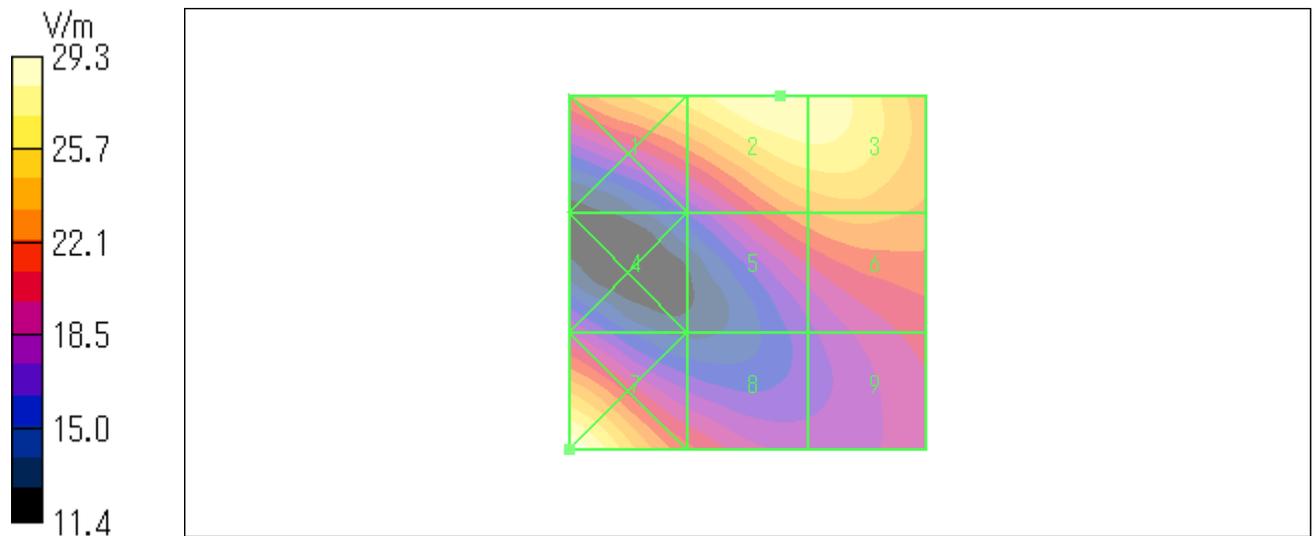
Total = 29.3 V/m

E Category: M4

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / WCDMA IV band / 1752.6MHz / RMC12.2k mode

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 29.6 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 15.4 V/m; Power Drift = 0.157 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
28.1 M4	29.6 M4	29.3 M4
Grid 4	Grid 5	Grid 6
21.1 M4	23.3 M4	24.4 M4
Grid 7	Grid 8	Grid 9
32.3 M4	23.4 M4	19.2 M4

Cursor:

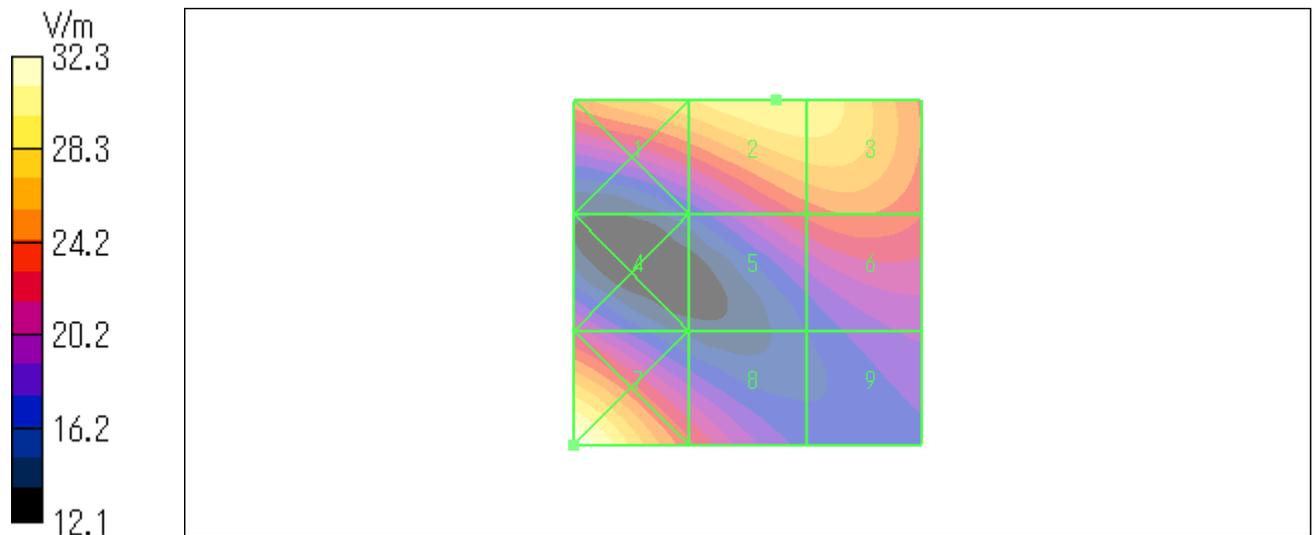
Total = 32.3 V/m

E Category: M4

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / WCDMA IV band / 1712.4 MHz / AMR mode

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 30.1 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 19.6 V/m; Power Drift = 0.028 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
33.9 M4	34.8 M4	33.8 M4
Grid 4	Grid 5	Grid 6
20.8 M4	26.5 M4	27.4 M4
Grid 7	Grid 8	Grid 9
30.1 M4	23.7 M4	21.5 M4

Cursor:

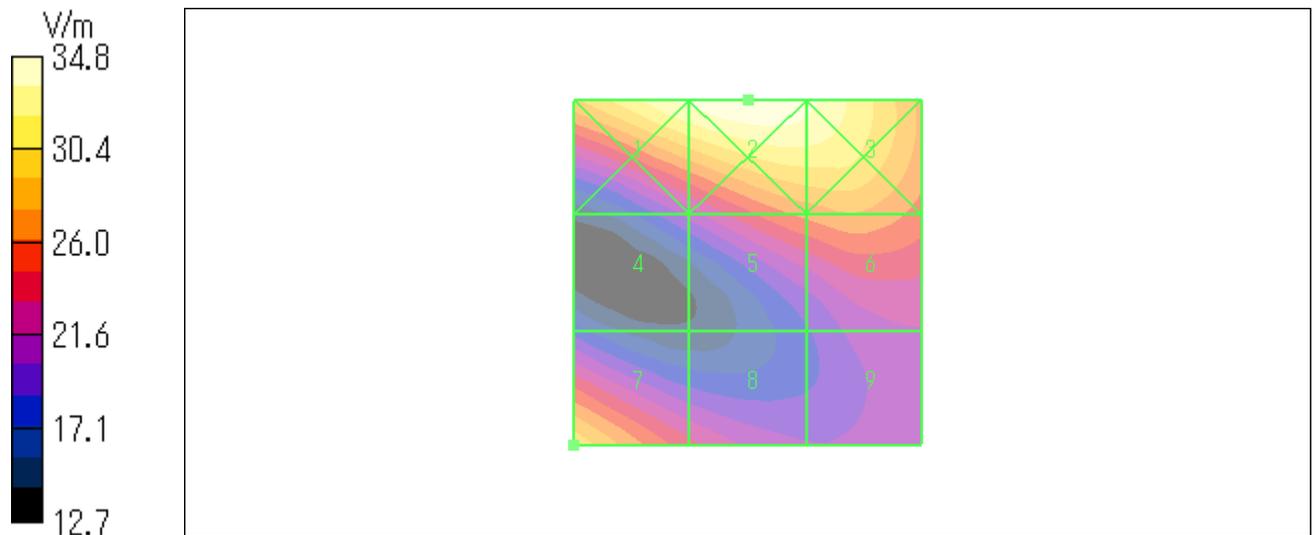
Total = 34.8 V/m

E Category: M4

Location: 0, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / WCDMA IV band / 1712.4MHz (RMC12.2k mode) with BT active

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 30.9 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 18.5 V/m; Power Drift = 0.206 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
34.7 M4	35.7 M4	34.7 M4
Grid 4	Grid 5	Grid 6
20.8 M4	26.5 M4	27.0 M4
Grid 7	Grid 8	Grid 9
30.9 M4	24.8 M4	21.5 M4

Cursor:

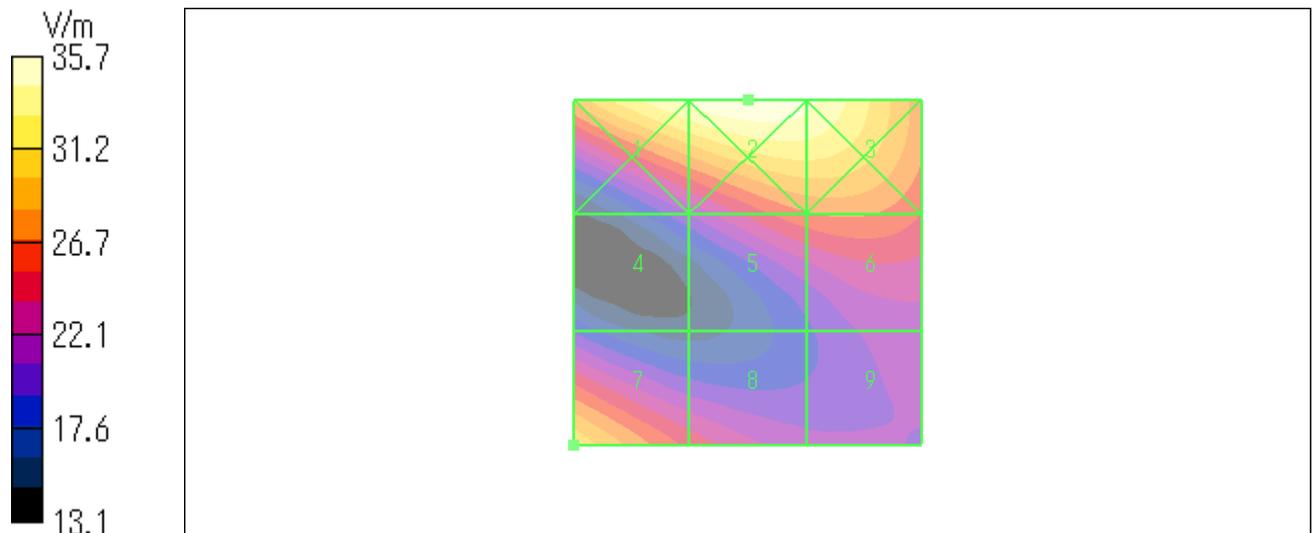
Total = 35.7 V/m

E Category: M4

Location: 0, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / WCDMA IV band / 1732.6MHz (RMC12.2k mode) with BT active

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 29.7 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 16.4 V/m; Power Drift = 0.197 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 27.7 M4	Grid 2 29.7 M4	Grid 3 29.5 M4
Grid 4 20.2 M4	Grid 5 23.8 M4	Grid 6 24.9 M4
Grid 7 30.9 M4	Grid 8 22.8 M4	Grid 9 21.2 M4

Cursor:

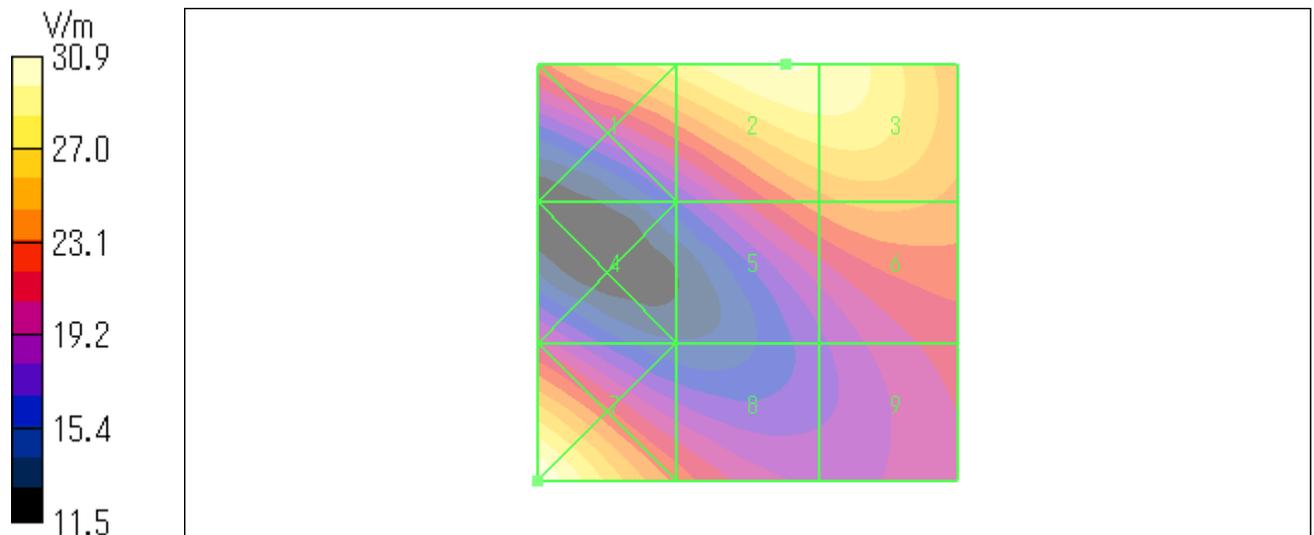
Total = 30.9 V/m

E Category: M4

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / WCDMA IV band / 1732.6MHz (RMC12.2k mode) with BT active

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 30.4 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 15.4 V/m; Power Drift = -0.005 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
28.7 M4	30.4 M4	30.1 M4
Grid 4	Grid 5	Grid 6
22.6 M4	23.4 M4	24.7 M4
Grid 7	Grid 8	Grid 9
34.0 M4	24.3 M4	19.6 M4

Cursor:

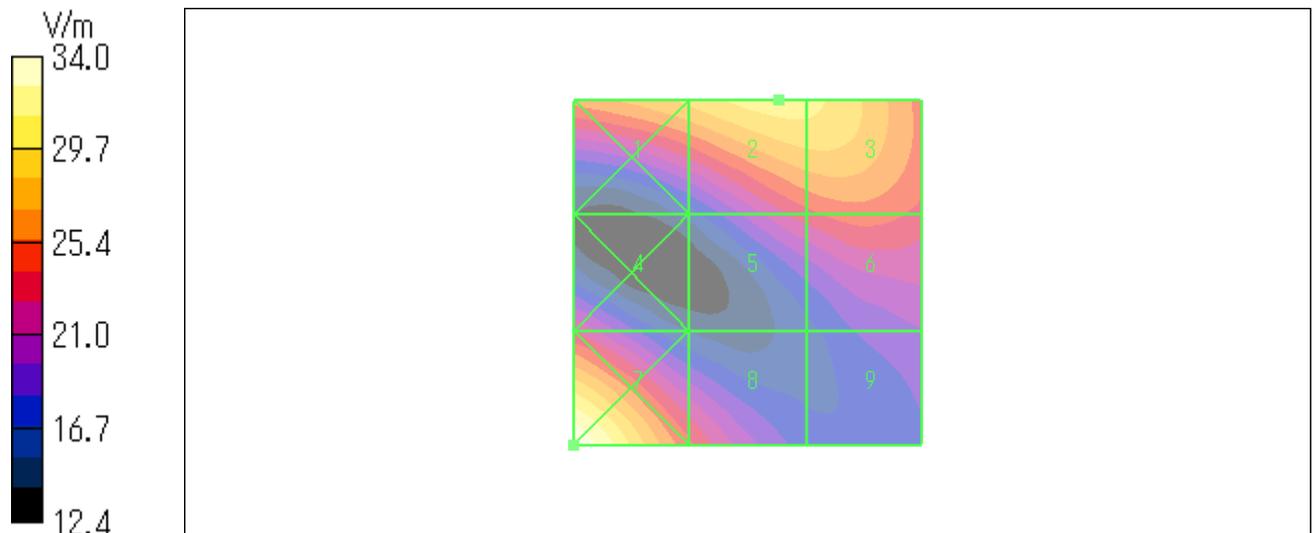
Total = 34.0 V/m

E Category: M4

Location: 25, 25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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E-Filed / PV300 / WCDMA IV band / 1712.4MHz (AMR mode) with BT active

WCDMA IV Lch AMR +BT ON

Duty Cycle: 1:1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Device Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 30.9 V/m

Probe Modulation Factor = 0.940

Device Reference Point: 0.000, 0.000, 353.7 mm

Reference Value = 17.8 V/m; Power Drift = 0.195 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1	Grid 2	Grid 3
34.7 M4	35.6 M4	34.9 M4
Grid 4	Grid 5	Grid 6
20.8 M4	26.8 M4	27.2 M4
Grid 7	Grid 8	Grid 9
30.9 M4	24.8 M4	21.6 M4

Cursor:

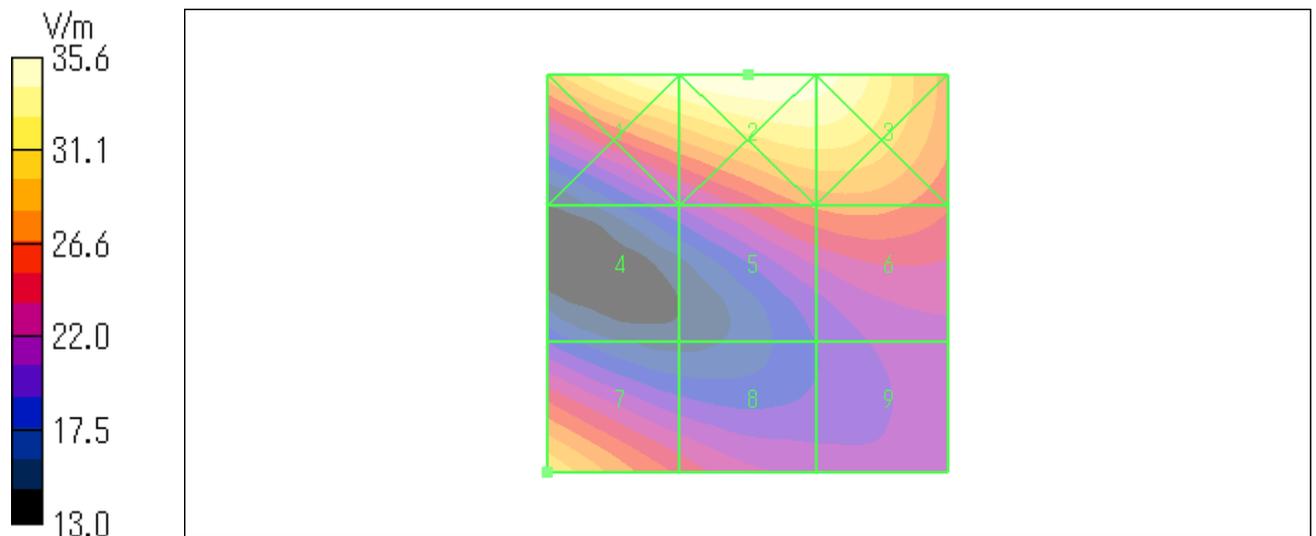
Total = 35.6 V/m

E Category: M4

Location: 0, -25, 368.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



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4. H-Filed measurement data (GSM 850)

H-filed / PV300 / GSM850 / 824.2MHz

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement discance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.207 A/m

Probe Modulation Factor = 2.94

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.063 A/m; Power Drift = -0.033 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1 0.227 M4	Grid 2 0.167 M4	Grid 3 0.116 M4
Grid 4 0.250 M4	Grid 5 0.189 M4	Grid 6 0.138 M4
Grid 7 0.268 M4	Grid 8 0.207 M4	Grid 9 0.151 M4

Cursor:

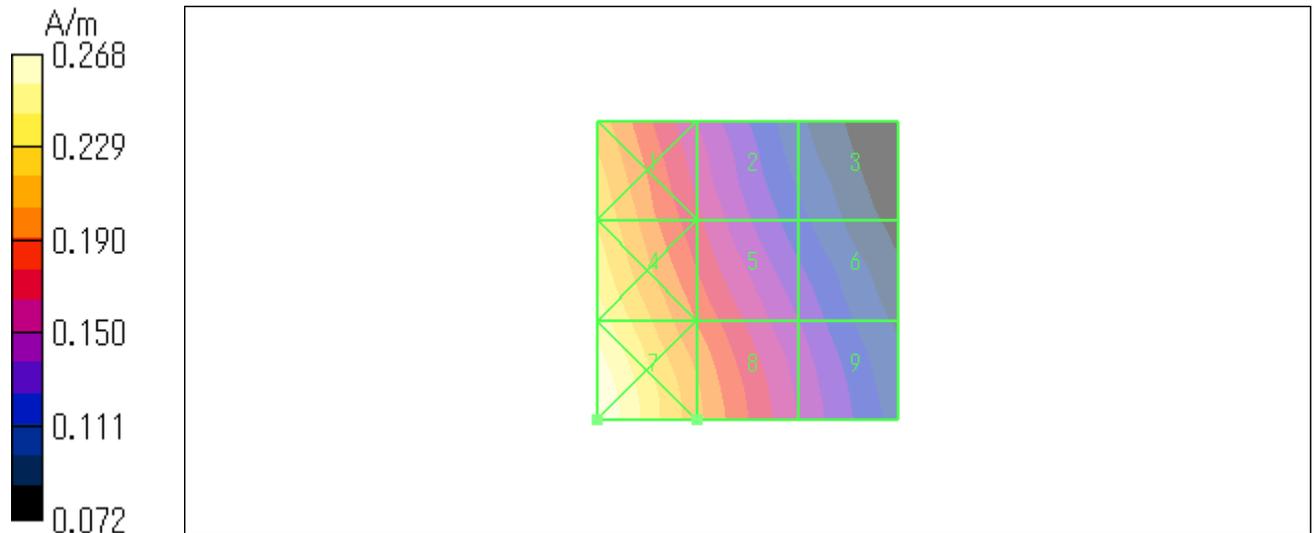
Total = 0.268 A/m

H Category: M4

Location: 25, 25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / GSM850 / 836.6MHz

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.260 A/m

Probe Modulation Factor = 2.94

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.071 A/m; Power Drift = 0.061 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1 0.309 M4	Grid 2 0.215 M4	Grid 3 0.128 M4
Grid 4 0.337 M4	Grid 5 0.242 M4	Grid 6 0.153 M4
Grid 7 0.358 M4	Grid 8 0.260 M4	Grid 9 0.167 M4

Cursor:

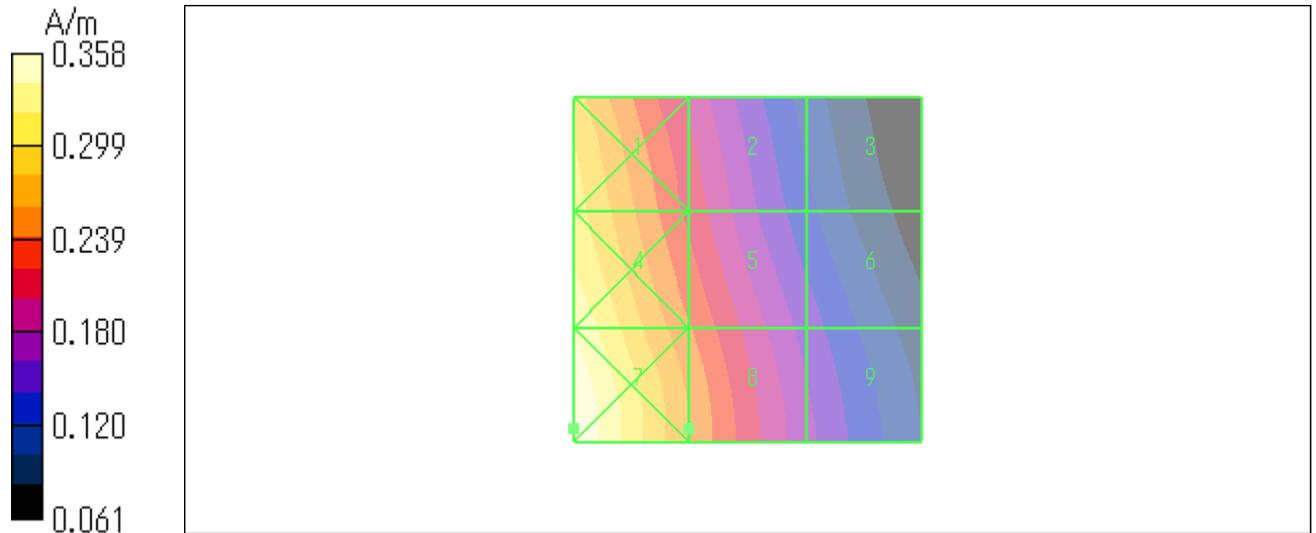
Total = 0.358 A/m

H Category: M4

Location: 25, 23, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / GSM850 / 848.8MHz

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.213 A/m

Probe Modulation Factor = 2.94

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.073 A/m; Power Drift = -0.147 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1 0.264 M4	Grid 2 0.190 M4	Grid 3 0.123 M4
Grid 4 0.273 M4	Grid 5 0.206 M4	Grid 6 0.142 M4
Grid 7 0.279 M4	Grid 8 0.213 M4	Grid 9 0.151 M4

Cursor:

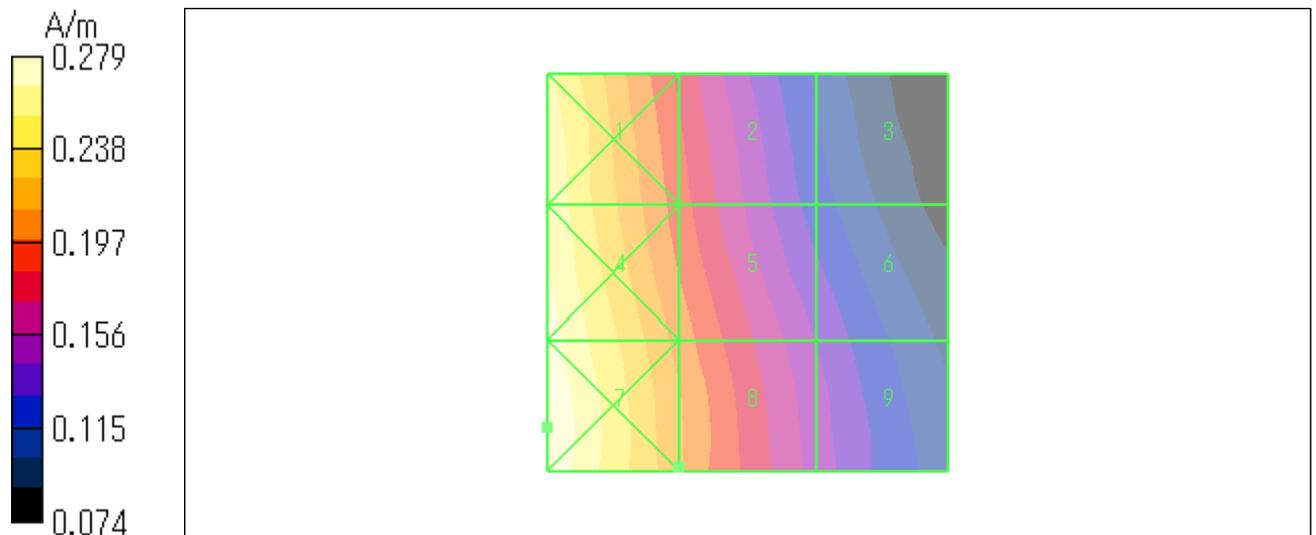
Total = 0.279 A/m

H Category: M4

Location: 25, 19.5, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / GSM850 / 824.2MHz with BT active

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.207 A/m

Probe Modulation Factor = 2.94

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.062 A/m; Power Drift = 0.000 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1 0.229 M4	Grid 2 0.168 M4	Grid 3 0.117 M4
Grid 4 0.252 M4	Grid 5 0.191 M4	Grid 6 0.138 M4
Grid 7 0.270 M4	Grid 8 0.207 M4	Grid 9 0.151 M4

Cursor:

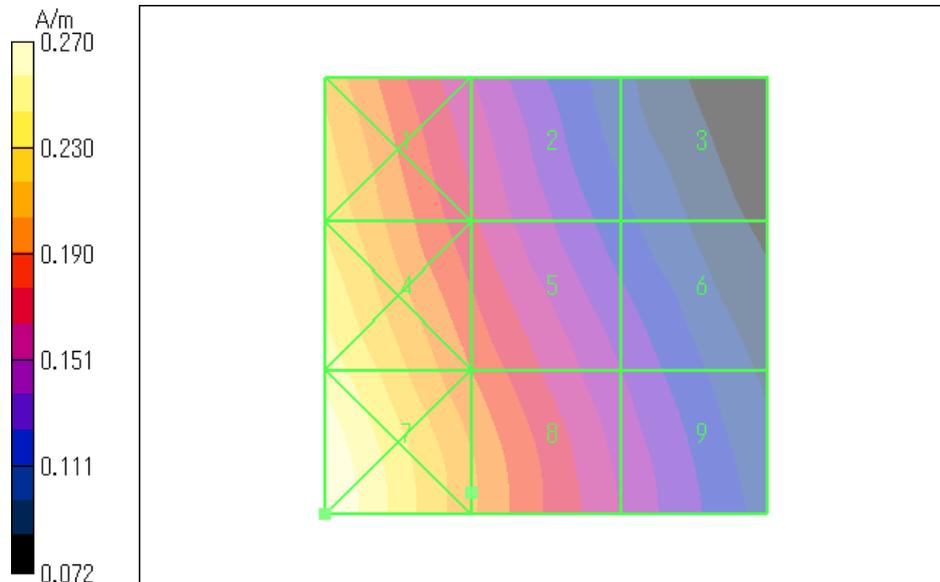
Total = 0.270 A/m

H Category: M4

Location: 25, 25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / GSM850 / 836.6MHz with BT active

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.274 A/m

Probe Modulation Factor = 2.94

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.076 A/m; Power Drift = 0.152 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1 0.314 M4	Grid 2 0.225 M4	Grid 3 0.136 M4
Grid 4 0.343 M4	Grid 5 0.254 M4	Grid 6 0.164 M4
Grid 7 0.365 M4	Grid 8 0.274 M4	Grid 9 0.181 M4

Cursor:

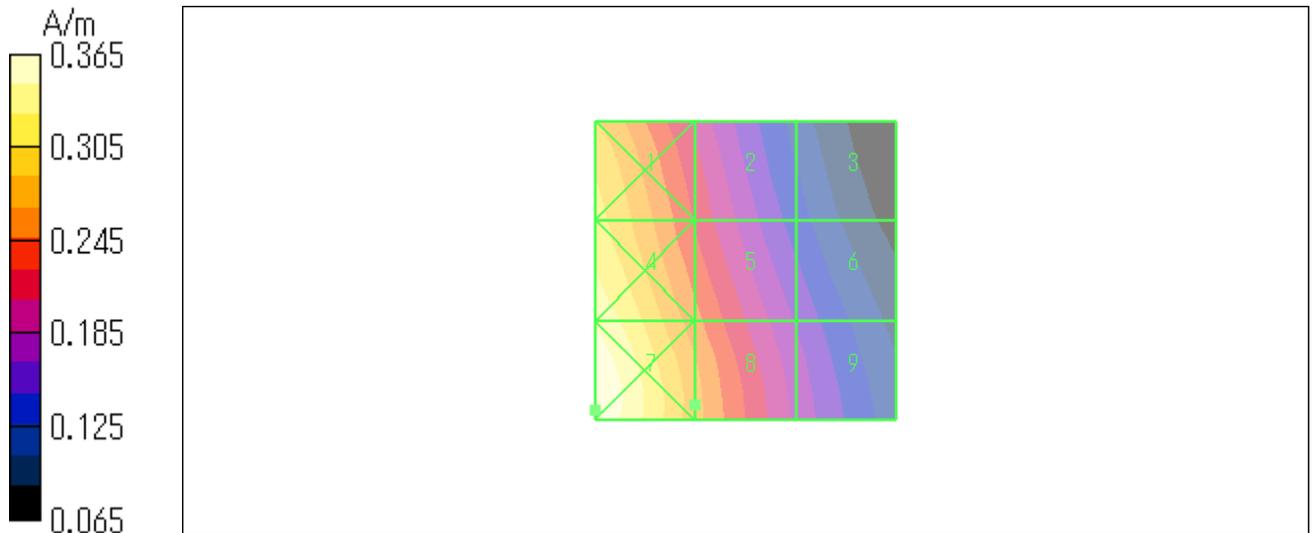
Total = 0.365 A/m

H Category: M4

Location: 25, 23.5, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / GSM850 / 848.8MHz with BT active

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.216 A/m

Probe Modulation Factor = 2.94

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.064 A/m; Power Drift = -0.029 dB

Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak H-field in A/m

Grid 1 0.268 M4	Grid 2 0.191 M4	Grid 3 0.119 M4
Grid 4 0.276 M4	Grid 5 0.206 M4	Grid 6 0.138 M4
Grid 7 0.283 M4	Grid 8 0.216 M4	Grid 9 0.150 M4

Cursor:

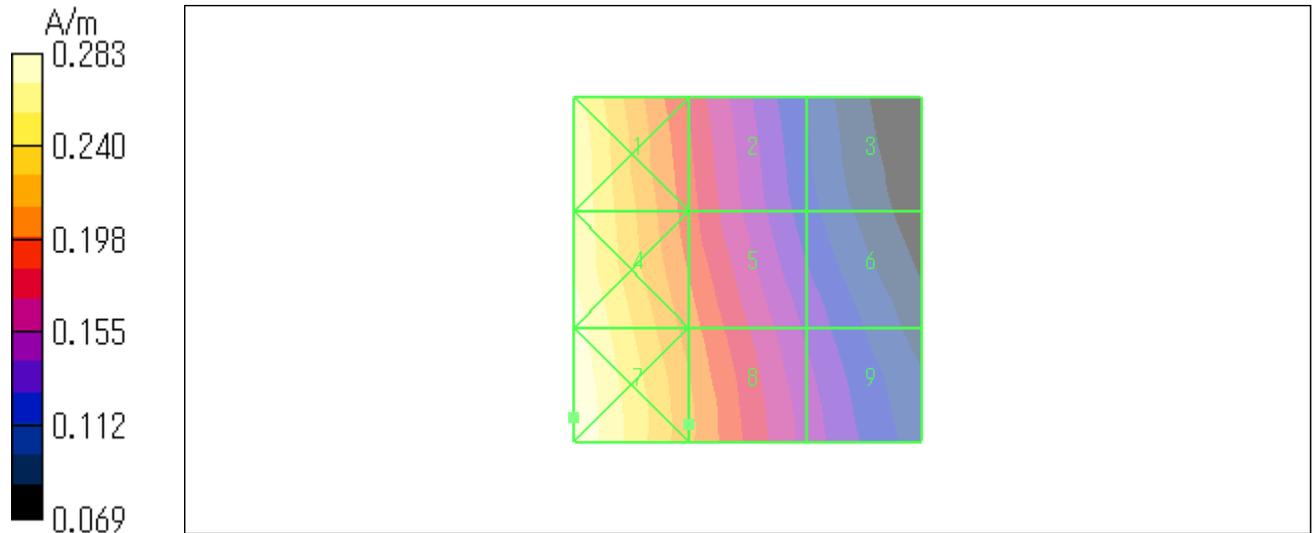
Total = 0.283 A/m

H Category: M4

Location: 25, 21.5, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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5. H-Filed measurement data (PCS1900)

H-filed / PV300 / PCS1900 / 1850.2MHz

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.155 A/m

Probe Modulation Factor = 2.92

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.042 A/m; Power Drift = -0.001 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.157 M3	0.143 M3	0.143 M3
Grid 4	Grid 5	Grid 6
0.139 M4	0.153 M3	0.155 M3
Grid 7	Grid 8	Grid 9
0.137 M4	0.153 M3	0.155 M3

Cursor:

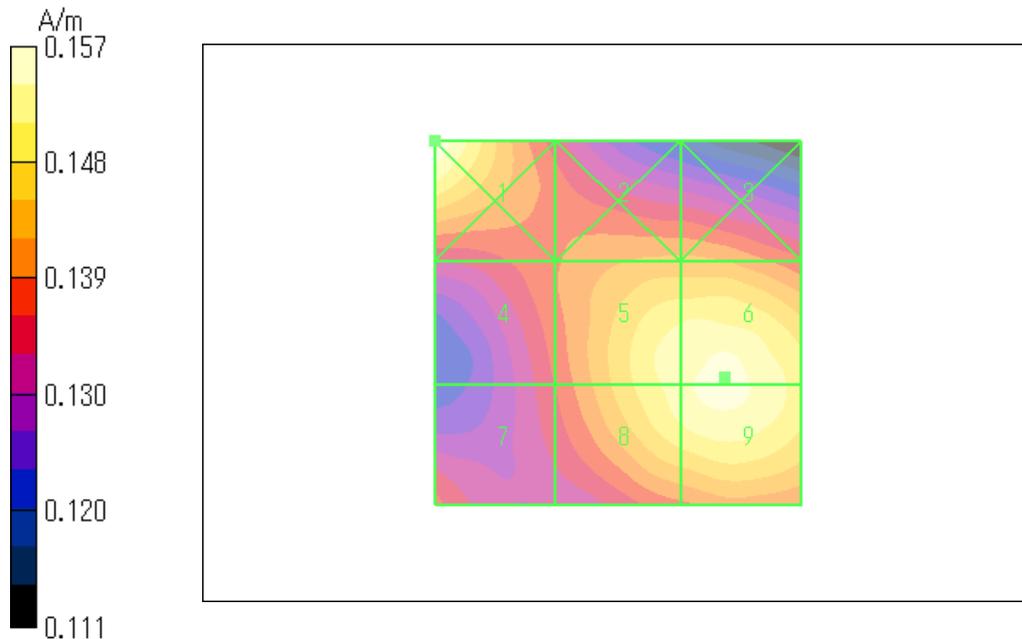
Total = 0.157 A/m

H Category: M3

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / PCS1900 / 1880.0MHz

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.174 A/m

Probe Modulation Factor = 2.92

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.045 A/m; Power Drift = 0.039 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.158 M3	0.166 M3	0.167 M3
Grid 4	Grid 5	Grid 6
0.150 M3	0.174 M3	0.177 M3
Grid 7	Grid 8	Grid 9
0.148 M3	0.173 M3	0.176 M3

Cursor:

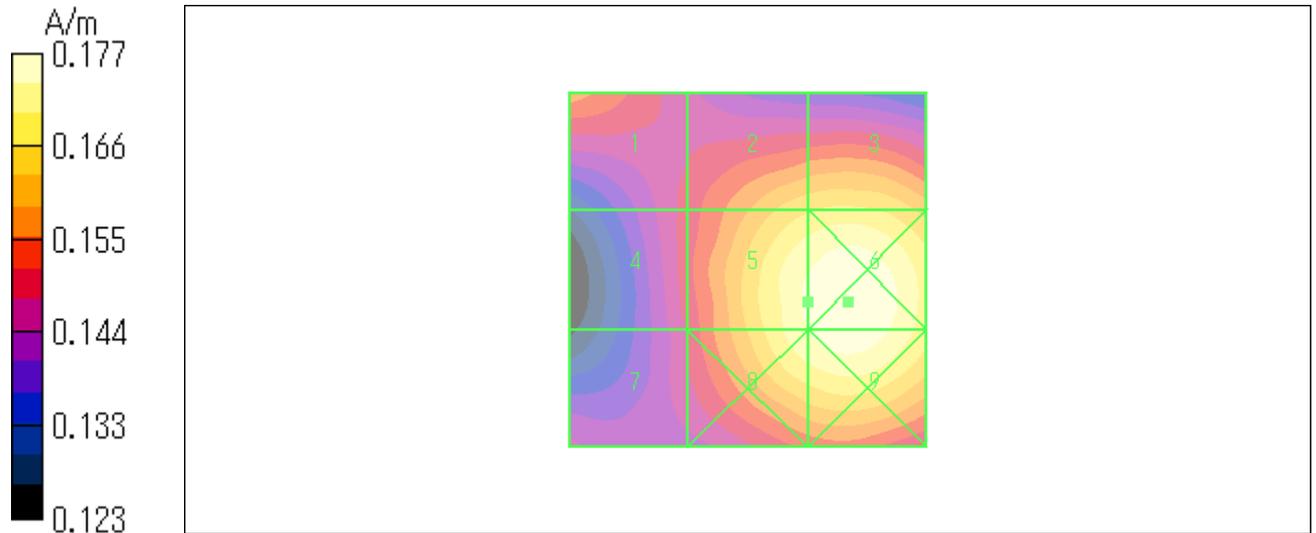
Total = 0.177 A/m

H Category: M3

Location: -14, 4.5, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / PCS1900 / 1909.8MHz

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.182 A/m

Probe Modulation Factor = 2.92

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.043 A/m; Power Drift = -0.035 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.185 M3	0.167 M3	0.169 M3
Grid 4	Grid 5	Grid 6
0.144 M3	0.177 M3	0.182 M3
Grid 7	Grid 8	Grid 9
0.170 M3	0.175 M3	0.180 M3

Cursor:

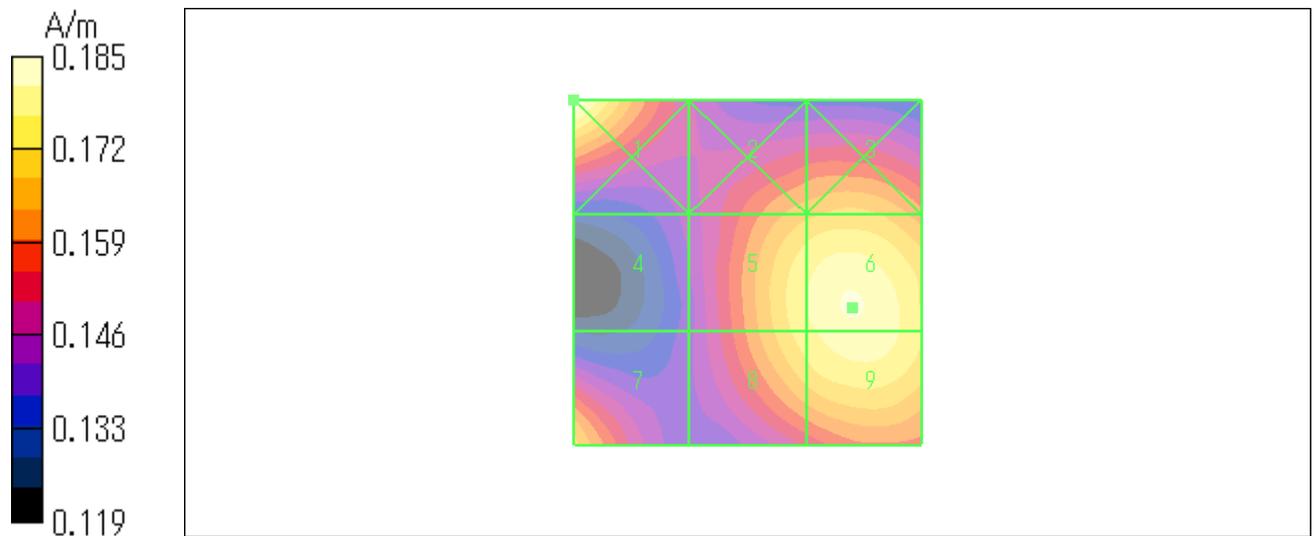
Total = 0.185 A/m

H Category: M3

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / PCS1900 / 1850.2MHz with BT active

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.158 A/m

Probe Modulation Factor = 2.92

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.044 A/m; Power Drift = 0.017 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.160 M3	0.146 M3	0.146 M3
Grid 4	Grid 5	Grid 6
0.143 M3	0.157 M3	0.158 M3
Grid 7	Grid 8	Grid 9
0.144 M3	0.156 M3	0.158 M3

Cursor:

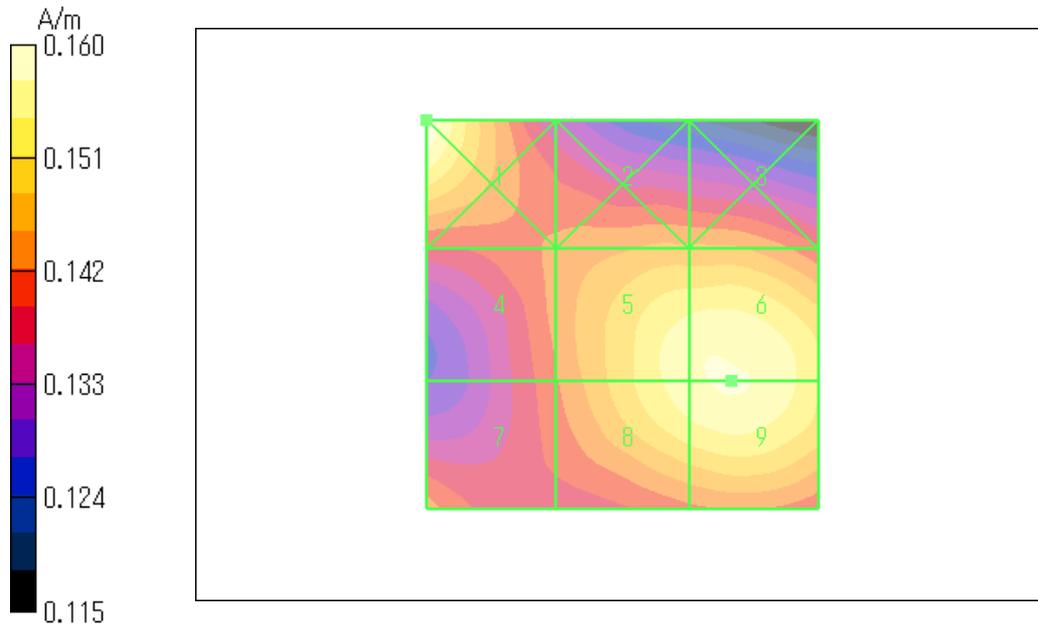
Total = 0.160 A/m

H Category: M3

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / PCS1900 / 1880.0MHz with BT active

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.174 A/m

Probe Modulation Factor = 2.92

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.045 A/m; Power Drift = 0.000 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.162 M3	0.168 M3	0.170 M3
Grid 4	Grid 5	Grid 6
0.151 M3	0.174 M3	0.177 M3
Grid 7	Grid 8	Grid 9
0.149 M3	0.172 M3	0.175 M3

Cursor:

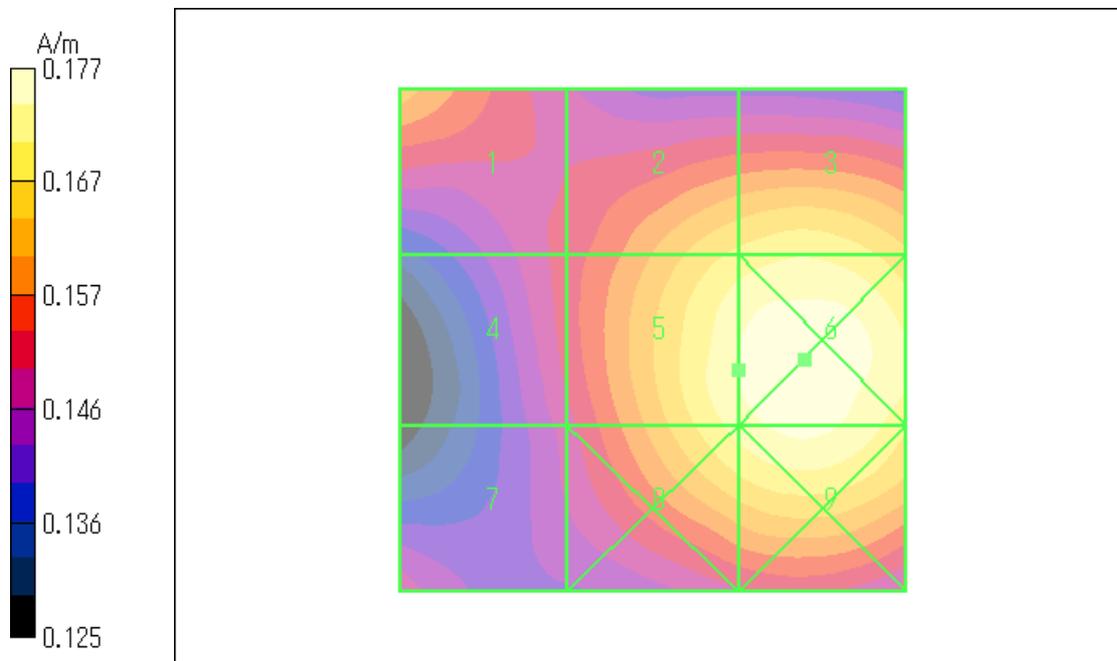
Total = 0.177 A/m

H Category: M3

Location: -15, 2, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / PCS1900 / 1909.8MHz with BT active

Duty Cycle: 1:8.3

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.186 A/m

Probe Modulation Factor = 2.92

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.045 A/m; Power Drift = -0.044 dB

Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.191 M3	0.173 M3	0.176 M3
Grid 4	Grid 5	Grid 6
0.148 M3	0.181 M3	0.186 M3
Grid 7	Grid 8	Grid 9
0.180 M3	0.179 M3	0.184 M3

Cursor:

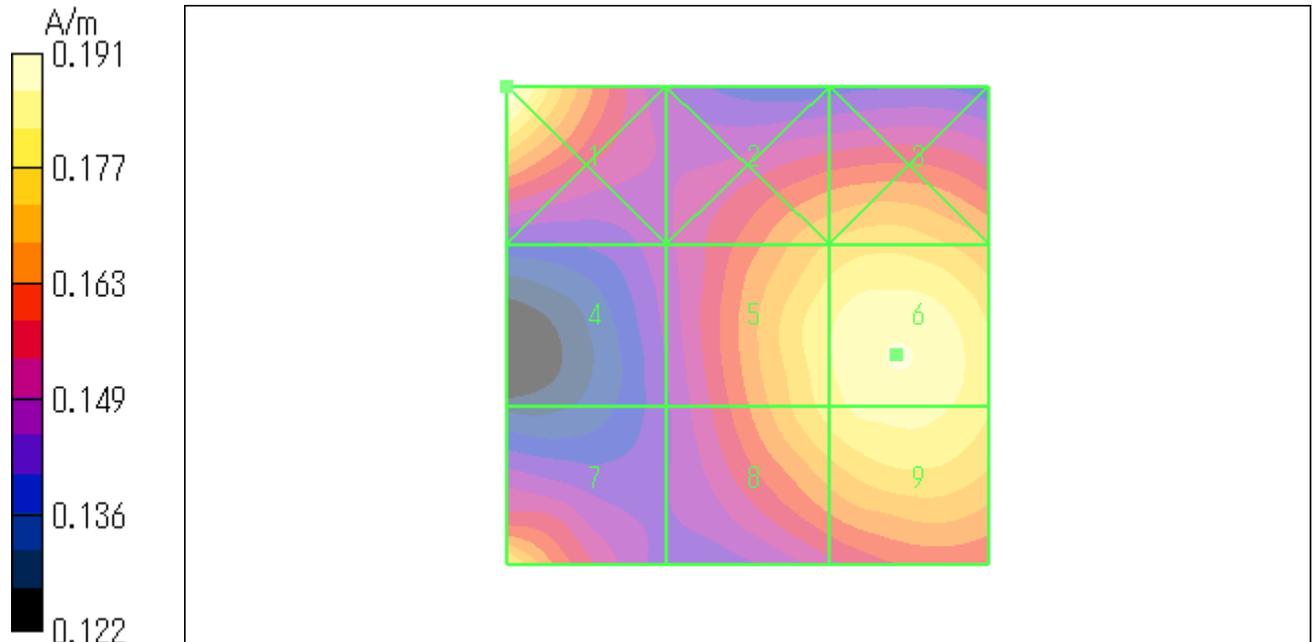
Total = 0.191 A/m

H Category: M3

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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6. H-Filed measurement data (WCDMA IV)

H-filed / PV300 / WCDMA IV band / 1712.4MHz / RMC12.2k mode

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.092 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.077 A/m; Power Drift = -0.038 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 0.099 M4	Grid 2 0.088 M4	Grid 3 0.084 M4
Grid 4 0.090 M4	Grid 5 0.092 M4	Grid 6 0.092 M4
Grid 7 0.089 M4	Grid 8 0.092 M4	Grid 9 0.092 M4

Cursor:

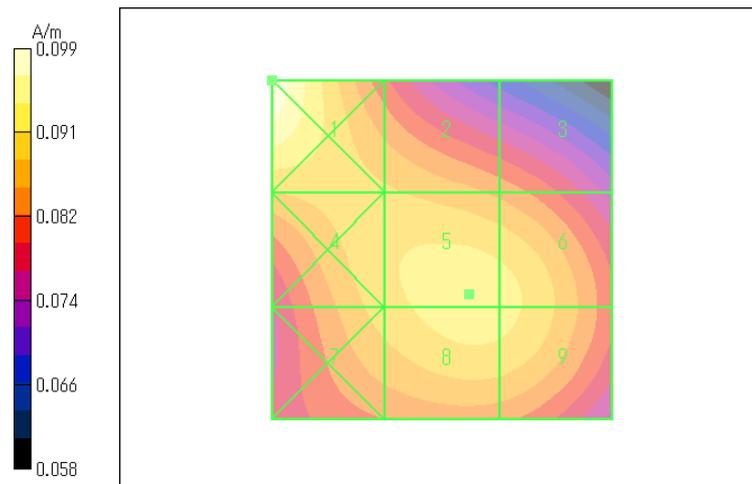
Total = 0.099 A/m

H Category: M4

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / WCDMA IV band / 1732.6MHz / RMC12.2k mode

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.084 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.076 A/m; Power Drift = 0.030 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 0.089 M4	Grid 2 0.081 M4	Grid 3 0.075 M4
Grid 4 0.083 M4	Grid 5 0.084 M4	Grid 6 0.083 M4
Grid 7 0.082 M4	Grid 8 0.084 M4	Grid 9 0.083 M4

Cursor:

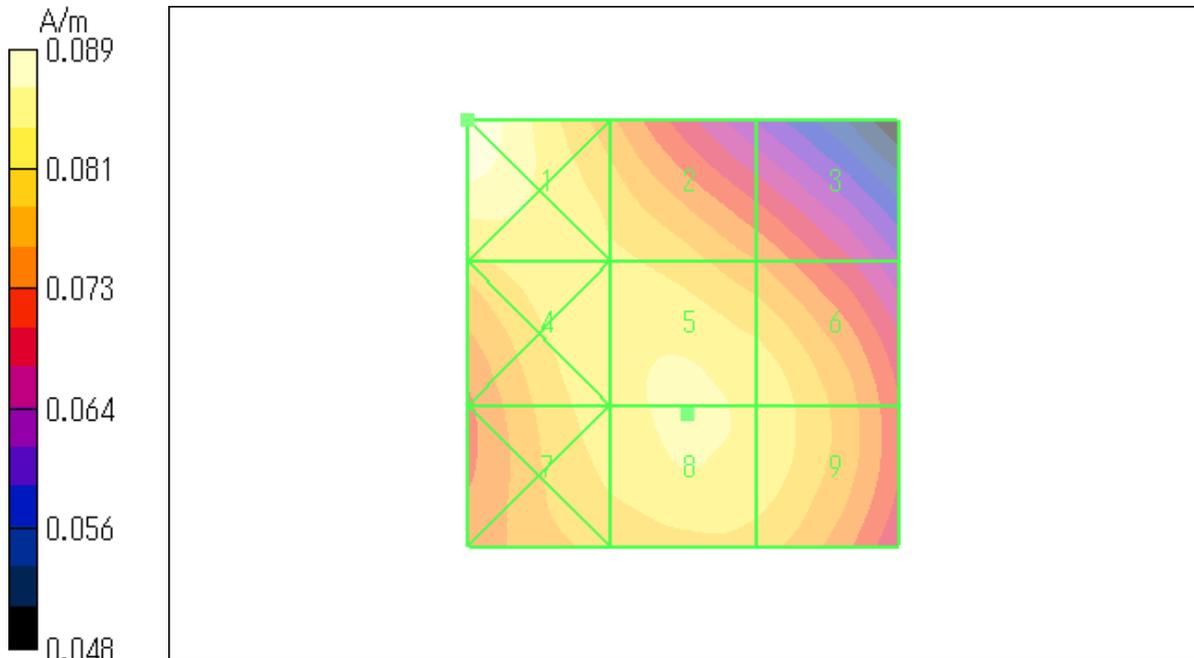
Total = 0.089 A/m

H Category: M4

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / WCDMA IV band / 1752.6MHz / RMC12.2k mode

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.096 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.077 A/m; Power Drift = 0.072 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 0.092 M4	Grid 2 0.092 M4	Grid 3 0.088 M4
Grid 4 0.094 M4	Grid 5 0.096 M4	Grid 6 0.096 M4
Grid 7 0.092 M4	Grid 8 0.096 M4	Grid 9 0.095 M4

Cursor:

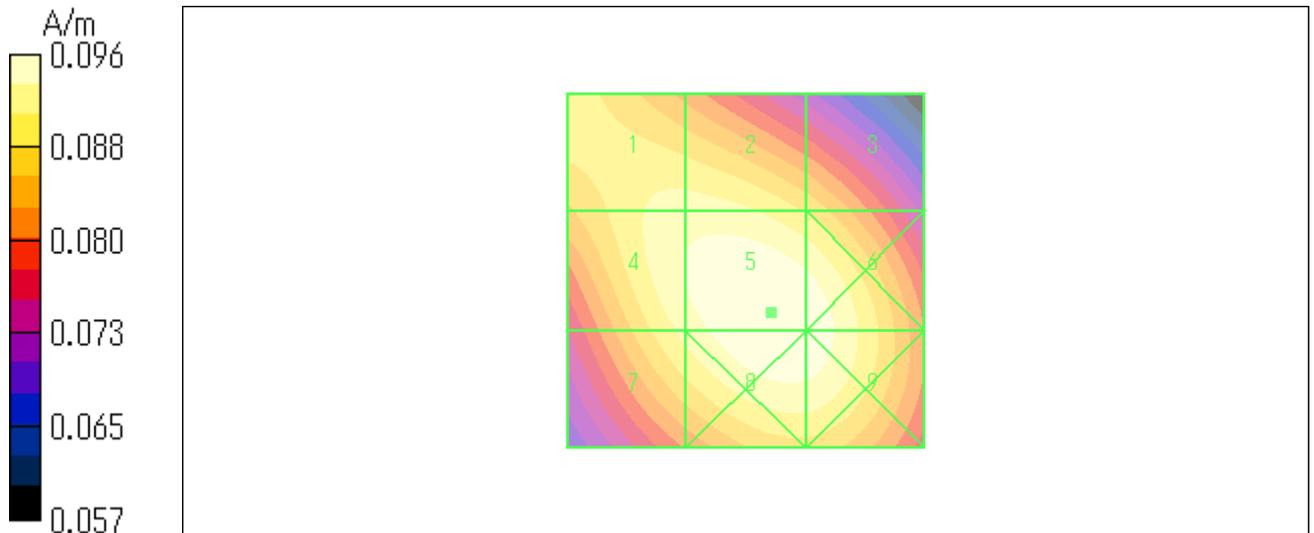
Total = 0.096 A/m

H Category: M4

Location: -3.5, 6, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / WCDMA IV band / 1752.6MHz / AMR mode

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.091 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.075 A/m; Power Drift = 0.032 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 0.087 M4	Grid 2 0.088 M4	Grid 3 0.084 M4
Grid 4 0.088 M4	Grid 5 0.091 M4	Grid 6 0.091 M4
Grid 7 0.087 M4	Grid 8 0.091 M4	Grid 9 0.091 M4

Cursor:

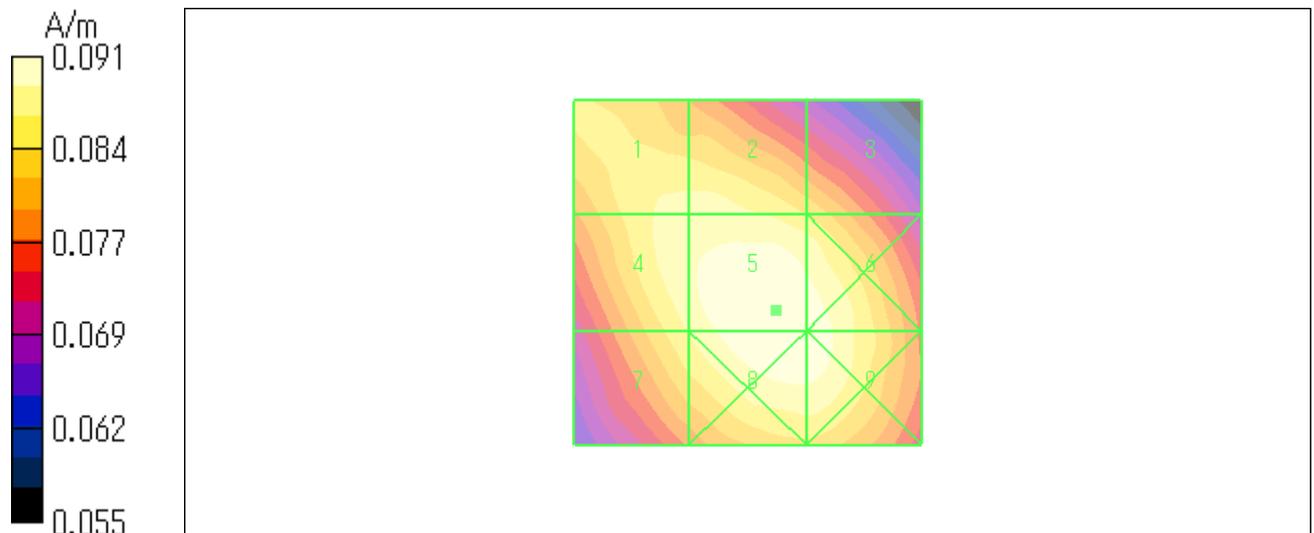
Total = 0.091 A/m

H Category: M4

Location: -4, 5.5, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / WCDMA IV band / 1712.4MHz (RMC12.2k mode) with BT active

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.093 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.077 A/m; Power Drift = -0.060 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 0.098 M4	Grid 2 0.088 M4	Grid 3 0.085 M4
Grid 4 0.090 M4	Grid 5 0.093 M4	Grid 6 0.093 M4
Grid 7 0.089 M4	Grid 8 0.093 M4	Grid 9 0.093 M4

Cursor:

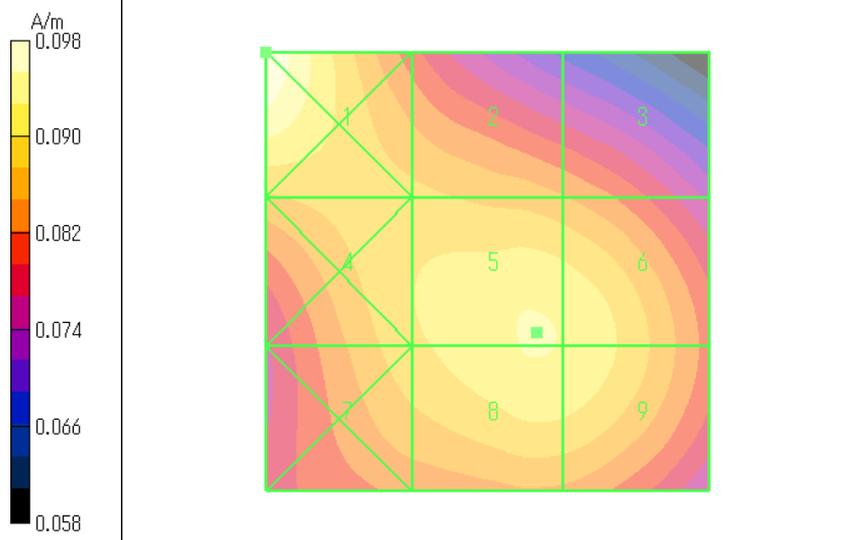
Total = 0.098 A/m

H Category: M4

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / WCDMA IV band / 1732.6MHz (RMC12.2k mode) with BT active

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.085 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.077 A/m; Power Drift = 0.009 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 0.091 M4	Grid 2 0.083 M4	Grid 3 0.075 M4
Grid 4 0.083 M4	Grid 5 0.085 M4	Grid 6 0.083 M4
Grid 7 0.083 M4	Grid 8 0.085 M4	Grid 9 0.084 M4

Cursor:

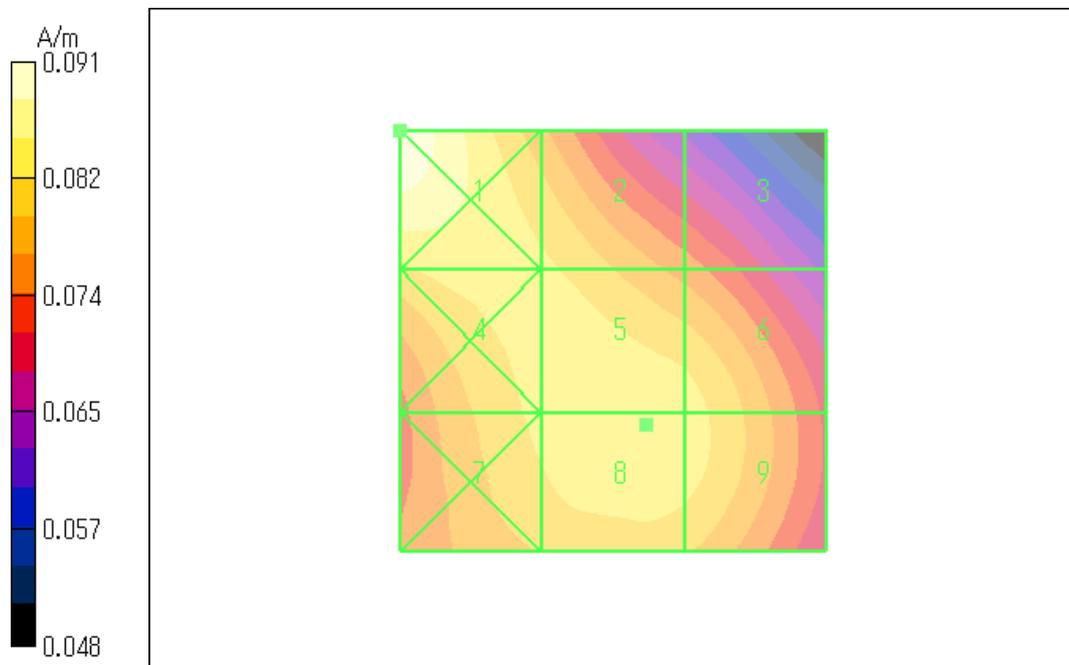
Total = 0.091 A/m

H Category: M4

Location: 25, -25, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / WCDMA IV band / 1752.6MHz (RMC12.2k mode) with BT active

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.096 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.077 A/m; Power Drift = 0.018 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.091 M4	0.091 M4	0.087 M4
Grid 4	Grid 5	Grid 6
0.093 M4	0.096 M4	0.095 M4
Grid 7	Grid 8	Grid 9
0.091 M4	0.096 M4	0.095 M4

Cursor:

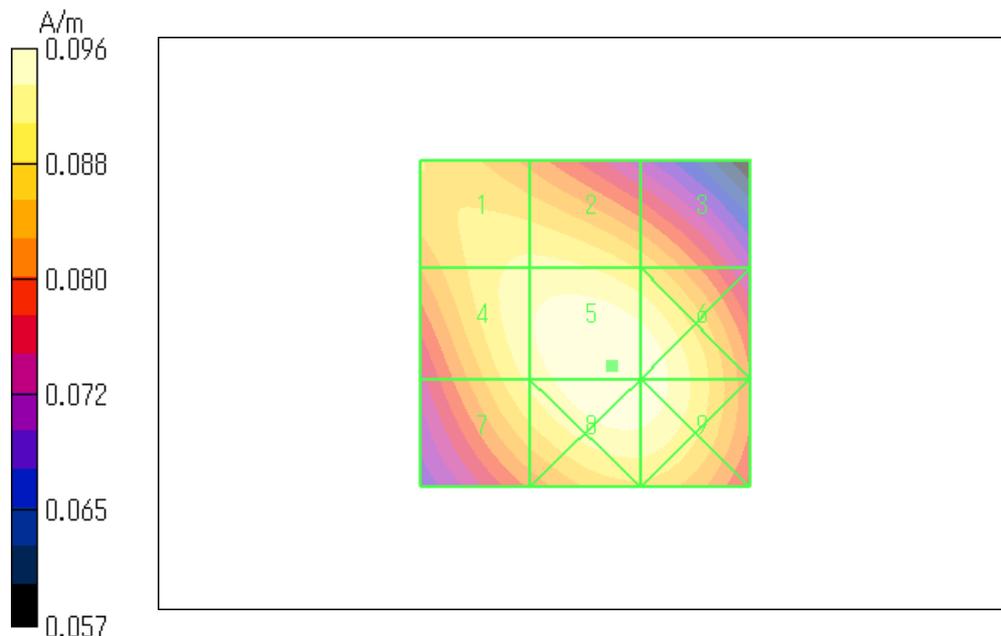
Total = 0.096 A/m

H Category: M4

Location: -4, 6.5, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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H-filed / PV300 / WCDMA IV band / 1752.6MHz (AMR mode) with BT active

Duty Cycle: 1:1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to the Device = 15mm/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.094 A/m

Probe Modulation Factor = 0.980

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.077 A/m; Power Drift = 0.064 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.091 M4	0.091 M4	0.088 M4
Grid 4	Grid 5	Grid 6
0.092 M4	0.094 M4	0.094 M4
Grid 7	Grid 8	Grid 9
0.089 M4	0.094 M4	0.094 M4

Cursor:

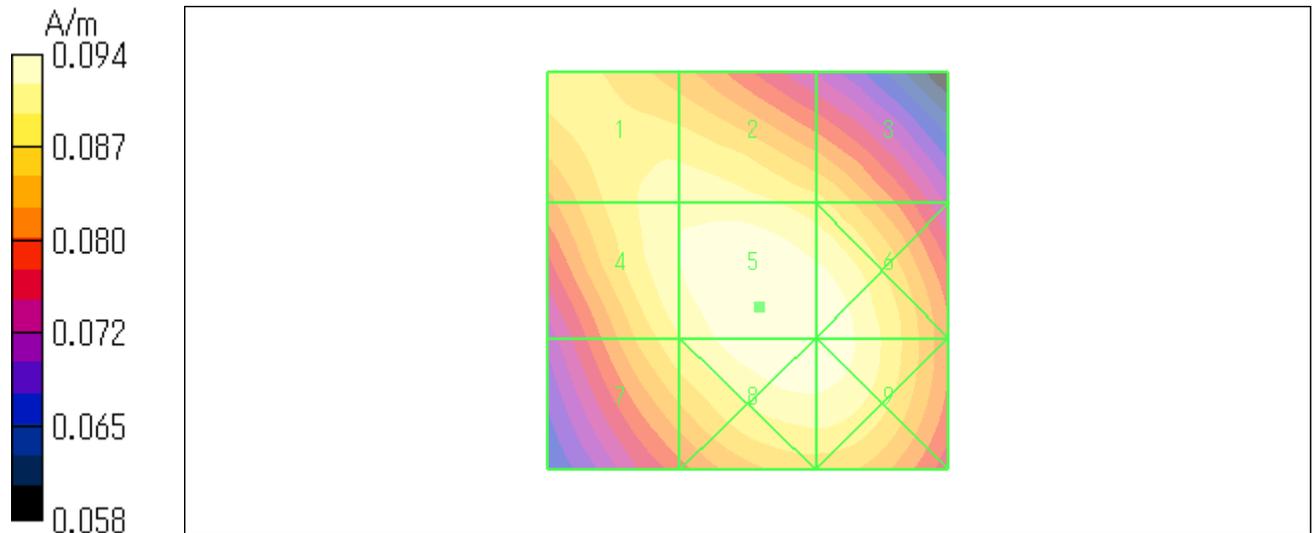
Total = 0.094 A/m

H Category: M4

Location: -1.5, 4.5, 370.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



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APPENDIX 3 : Test instruments

1. Equipment used

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPM-01	Power Meter	Agilent	E4417A	GB41290639	HAC	2008/02/06 * 12
MPSE-01	Power Sensor	Agilent	E9300B	US40010300	HAC	2008/02/04 * 12
MPSE-03	Power sensor	Agilent	E9327A	US40440576	HAC	2008/02/09 * 12
MAT-15	Attenuator(30dB)	Agilent	8498A	US40010300	HAC	2008/02/21 * 12
MSG-10	Signal Generator	Agilent	N5181A	MY47421098	HAC	2008/06/16 * 12
MRFA-02	RF Power Amplifier	OPHIR	5056F	1005	HAC	2008/07/01 * 12
MHDC-11	Dual Directional Coupler	Hewlett Packard	778D	16605	HAC	Pre Check
MHDC-12	Dual Directional Coupler	Hewlett Packard	772D	2839A0016	HAC	Pre Check
MPB-04	Isotropic E-Field Probe	Schmid&Partner Engineering AG	ER3DV6	2427	HAC	2008/12/15 * 12
MPB-05	3-Dimensional H-Field Probe	Schmid&Partner Engineering AG	HR3DV6	6259	HAC	2008/12/16 * 12
MDAE-01	Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE3 V1	509	HAC	2008/07/10 * 12
MSTW-16	DASY4	Schmid&Partner Engineering AG	DASY4 V4.7 Build71	-	HAC	-
MDA-16	Dipole Antenna	Schmid&Partner Engineering AG	CD835V3	1087	HAC	2007/12/07 * 24
MDA-17	Dipole Antenna	Schmid&Partner Engineering AG	CD1880V3	1088	HAC	2007/12/12 * 24
MPH-01	Teat Arch Phantom	Schmid&Partner Engineering AG	Teat Arch Phantom		HAC	Pre Check
MPS-01	SAM Phantom	Schmid&Partner Engineering AG	SAM Twin Phantom V4.0	1196	HAC	Pre Check
MPF-01	Flat Phantom	Schmid&Partner Engineering AG	2.0mm Flat Phantom V4.3L	1005	HAC	Pre Check
MOS-05	Thermo-Hygrometer	Custom	CTH-190	810201	HAC	2008/04/03 * 12
MOS-10	Digital thermometer	HANNA	Checktemp-2	MOS-10	HAC	2009/01/15 * 12
MBM-12	Barometer	Sunoh	SBR121	873	HAC	2007/12/27 * 36

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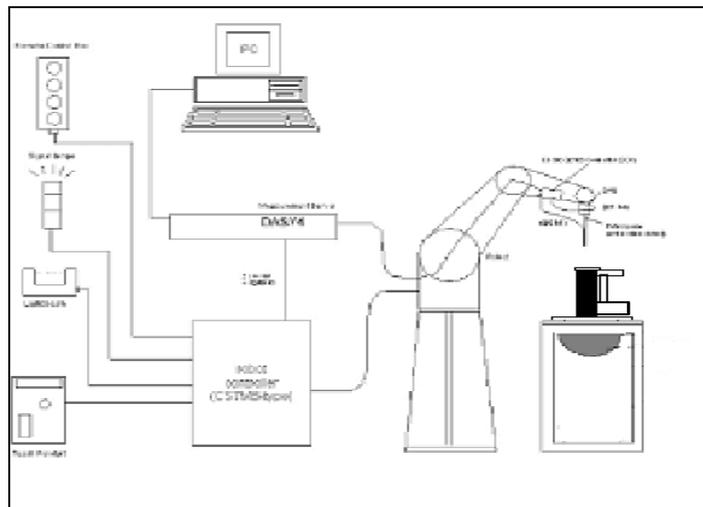
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2. Configuration and peripherals



The DASY4 system for performing compliance tests consist of the following items:

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software.
An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid.
The probe is equipped with an optical surface detector system.
3. A data acquisition electronic (DAE), which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
4. The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection.
The EOC is connected to the measurement server.
5. The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
6. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
7. A computer operating Windows 2000.
8. DASY4 software.
9. Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.
10. The Test Arch Phantom for enables easy defined positioning of the phone and validation.
11. The device holder for handheld mobile phones.
12. Tissue simulating liquid mixed according to the given recipes.
13. Validation dipole kits allowing to validate the proper functioning of the system.

3. System components

3.2.1 ER3DV6

<Isotropic E-Field Probe for General Near-Field Measurements>

Construction : One dipole parallel, two dipoles normal to probe axis
Built-in shielding against static charges PEEK enclosure material

Calibration : In air from 100 MHz to 3.0 GHz
(absolute accuracy $\pm 6.0\%$, $k=2$)

Frequency : 40 MHz to > 6 GHz (can be extended to < 20 MHz)
Linearity: ± 0.2 dB (100 MHz to 3 GHz)

Directivity : ± 0.2 dB in air (rotation around probe axis)
 ± 0.4 dB in air (rotation normal to probe axis)

Dynamic Range : 2 V/m to > 1000 V/m; Linearity: ± 0.2 dB

Dimensions : Overall length: 330 mm (Tip: 16 mm)
Tip diameter: 8 mm (Body: 12 mm)
Distance from probe tip to dipole centers: 2.5 mm

Application : General near-field measurements up to 6 GHz
Field component measurements
Fast automatic scanning in phantoms



E-Field Probe (ER3DV6)

3.2.2 H3DV6

<3-Dimensional H-Field Probe for Small Band Applications>

Construction : Three concentric loop sensors with 3.8 mm loop diameters
Resistively loaded detector diodes for linear response Built-in
shielding against static charges PEEK enclosure material
(resistant to organic solvents, e.g., glycoether)

Frequency : 200 MHz to 3 GHz
(absolute accuracy $\pm 6.0\%$, $k=2$); Output linearized

Directivity : ± 0.2 dB (spherical isotropy error)

Dynamic Range : 10 mA/m to 2 A/m at 1 GHz

E-Field Interference : < 10% at 3 GHz (for plane wave)

Dimensions : Overall length: 330 mm (Tip: 40 mm) Tip diameter: 6 mm (Body: 12 mm)
Distance from probe tip to dipole centers: 3 mm

Application : General magnetic near-field measurements up to 3 GHz (in air or liquids)
Field component measurements
Surface current measurements
Low interaction with the measured field

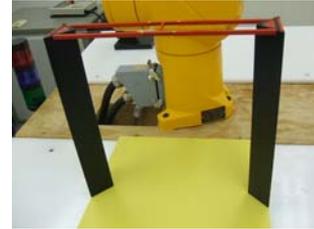


H-Field Probe (H3DV6)

Teat Arch Phantom

: Enables easy and well defined positioning of the phone and validation dipoles as well as simple teaching of the robot.

Dimensions : 370 x 370 x 370 mm



Phone Positioner

: Supports accurate and reliable positioning of any phone.

Effect on near field $\pm 0.5\text{ dB}$



4. Test system specifications

Robot RX60L

Number of Axes	:	6
Payload	:	1.6 kg
Reach	:	800mm
Repeatability	:	+/-0.025mm
Control Unit	:	CS7M
Programming Language	:	V+
Manufacture	:	Stäubli Unimation Corp. Robot Model: RX60

DASY4 Measurement server

Features	:	166MHz low power Pentium MMX 32MB chipdisk and 64MB RAM Serial link to DAE (with watchdog supervision) 16 Bit A/D converter for surface detection system Two serial links to robot (one for real-time communication which is supervised by watchdog) Ethernet link to PC (with watchdog supervision) Emergency stop relay for robot safety chain Two expansion slots for future applications
Manufacture	:	Schimid & Partner Engineering AG

Data Acquisition Electronic (DAE)

Features	:	Signal amplifier, multiplexer, A/D converter and control logic Serial optical link for communication with DASY4 embedded system (fully remote controlled) 2 step probe touch detector for mechanical surface detection and emergency robot stop (not in -R version)
Measurement Range	:	1 μ V to > 200 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset voltage	:	< 1 μ V (with auto zero)
Input Resistance	:	200 M Ω
Battery Power	:	> 10 h of operation (with two 9 V battery)
Dimension	:	60 x 60 x 68 mm
Manufacture	:	Schimid & Partner Engineering AG

5. System validation data

The target values were made into the calibration values of SPEAG. And the validation results of 835MHz (E/H Filed) & 1880MHz (E/H Filed) checked that it was within +/-10% as compared with the calibration values of SPEAG. The validation results are in the table below.

Frequency : **835MHz**
Ambient temperature (deg.c.) : **23.5(5-Jan), 23.0(6-Jan)**
Relative Humidity (%) : **37(5-Jan), 32(6-Jan)**
Dipole : **CD835V3 SN:1087**
Power : **100mW**

835MHz SYSTEM PERFORMANCE CHECK				
Date	E-Filed *1		Deviation	Limit
	Target	Measured		
5-Jan	162.25	168.55	3.9	+/-10
Date	H-Filed *2		Deviation	Limit
	Target*1	Measured		
6-Jan	0.446	0.432	-3.1	+/-10

Frequency : **1880MHz**
Ambient temperature (deg.c.) : **23.5(5-Jan), 23.0(6-Jan)**
Relative Humidity (%) : **37(5-Jan), 32(6-Jan)**
Dipole : **CD1880V3 SN:1088**
Power : **100mW**

1880MHz SYSTEM PERFORMANCE CHECK				
Date	E-Filed *1		Deviation	Limit
	Target*1	Measured		
5-Jan	135.45	142.20	5.0	+/-10
Date	H-Filed*2		Deviation	Limit
	Target*1	Measured		
6-Jan	0.474	0.433	-8.6	+/-10

Note:

*1: The value to compared to the calibration data is the average of the two maximum in the subgrids 2 and 8.
<835MHz>

Target (Dipole): (subg2+subg8)/2 =(163.0+161.5)/2

Measure: (subg2+subg8)/2 =(165.1+172.0)/2

<1880MHz>

Target (Dipole): (subg2+subg8)/2 =(134.1+136.8)/2

Measure: (subg2+subg8)/2 =(144.9+139.5)/2

*2: The value to compared to the calibration data is maximum in the subgrids 5

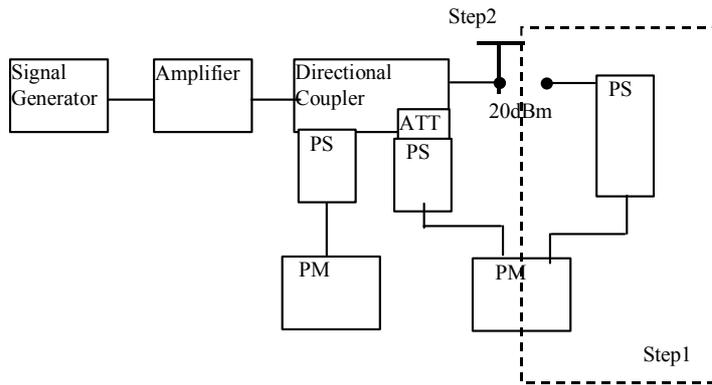
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Step1: Setup for desired input power to dipole antenna

Step2: Setup to dipole antenna

6. E-Filed Validation Measurement data

E-Filed 835MHz System Validation / Forward Conducted Power : 100mW

Dipole 835 MHz; Type: CD835V3; Serial: 1087

Communication System: CW; Frequency: 835 MHz; Crest factor: 1

Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 172.0 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 129.5 V/m; Power Drift = -0.044 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 160.4 M4	Grid 2 165.1 M4	Grid 3 154.5 M4
Grid 4 86.2 M4	Grid 5 93.3 M4	Grid 6 90.0 M4
Grid 7 156.8 M4	Grid 8 172.0 M4	Grid 9 166.4 M4

Cursor:

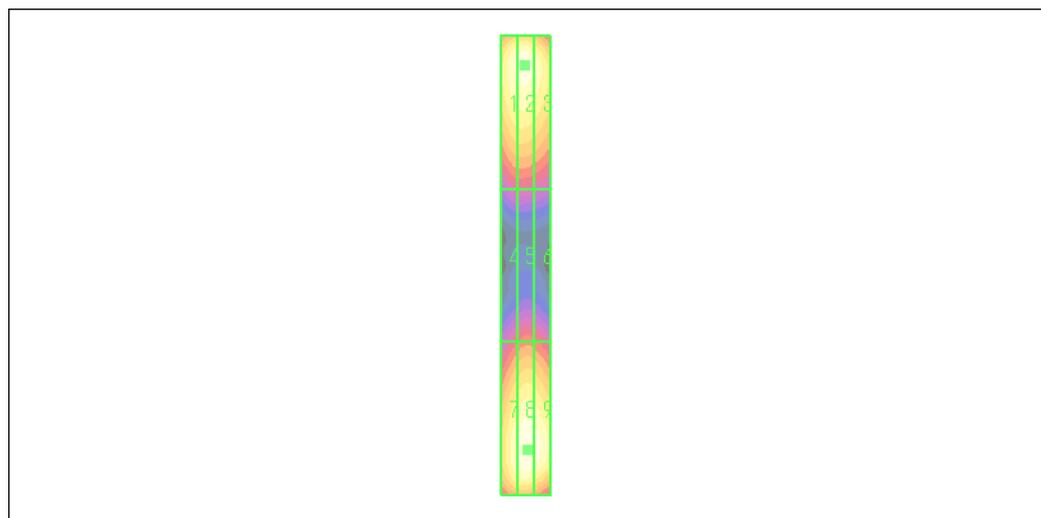
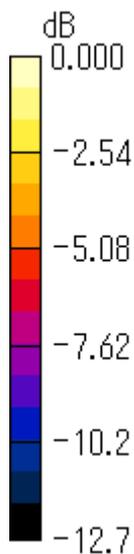
Total = 172.0 V/m

E Category: M4

Location: -1, 72.5, 364.7 mm

Test Date = 01/05/09

Ambient Temperature = 23.5 degree.c



0 dB = 172.0V/m

E-Filed 1880MHz System Validation / Forward Conducted Power : 100mW

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Dipole 1880MHz; Type: CD1880V3; Serial: 1088

Communication System: CW; Frequency: 1880 MHz; Crest factor: 1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Dipole Section
DASY4 Configuration:
- Probe: ER3DV6 - SN2427; ConvF(1, 1, 1); Calibrated: 2008/12/15
- Sensor-Surface: (Fix Surface)
- Phantom: HAC Test Arch 4.6
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm

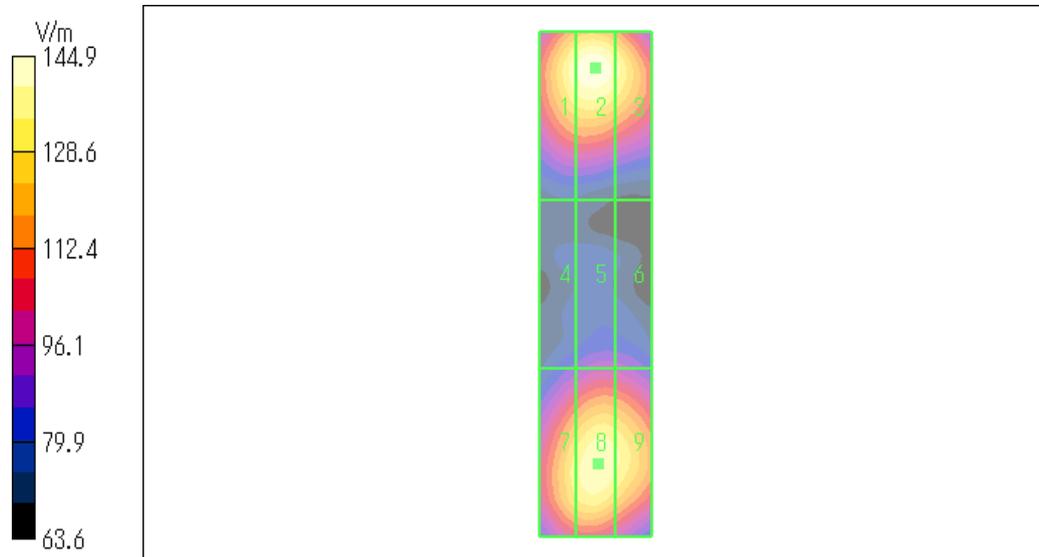
Maximum value of peak Total field = 144.9 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 143.9 V/m; Power Drift = -0.043 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak E-field in V/m

Grid 1 139.3 M2	Grid 2 144.9 M2	Grid 3 137.3 M2
Grid 4 88.1 M3	Grid 5 95.0 M3	Grid 6 94.3 M3
Grid 7 132.3 M2	Grid 8 139.5 M2	Grid 9 135.8 M2

Cursor:

Total = 144.9 V/m
E Category: M2
Location: 0, -38.5, 364.7 mm
Test Date = 01/05/09
Ambient Temperature = 23.5degree.c



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7. H-Filed Validation Measurement data

HE-Filed 835MHz System Validation / Forward Conducted Power : 100mW

Dipole 835 MHz; Type: CD835V3; Serial: 1087

Communication System: CW; Frequency: 835 MHz; Crest factor: 1

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

Phantom section: E Dipole Section

DASY4 Configuration:

- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16

- Sensor-Surface: (Fix Surface)

- Phantom: HAC Test Arch 4.6

- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to CD835 Dipole = 10mm/Hearing Aid Compatibility Test

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

Maximum value of peak Total field = 0.432 A/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.390 A/m; Power Drift = 0.016 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1 0.344 M4	Grid 2 0.363 M4	Grid 3 0.354 M4
Grid 4 0.404 M4	Grid 5 0.432 M4	Grid 6 0.422 M4
Grid 7 0.363 M4	Grid 8 0.393 M4	Grid 9 0.384 M4

Cursor:

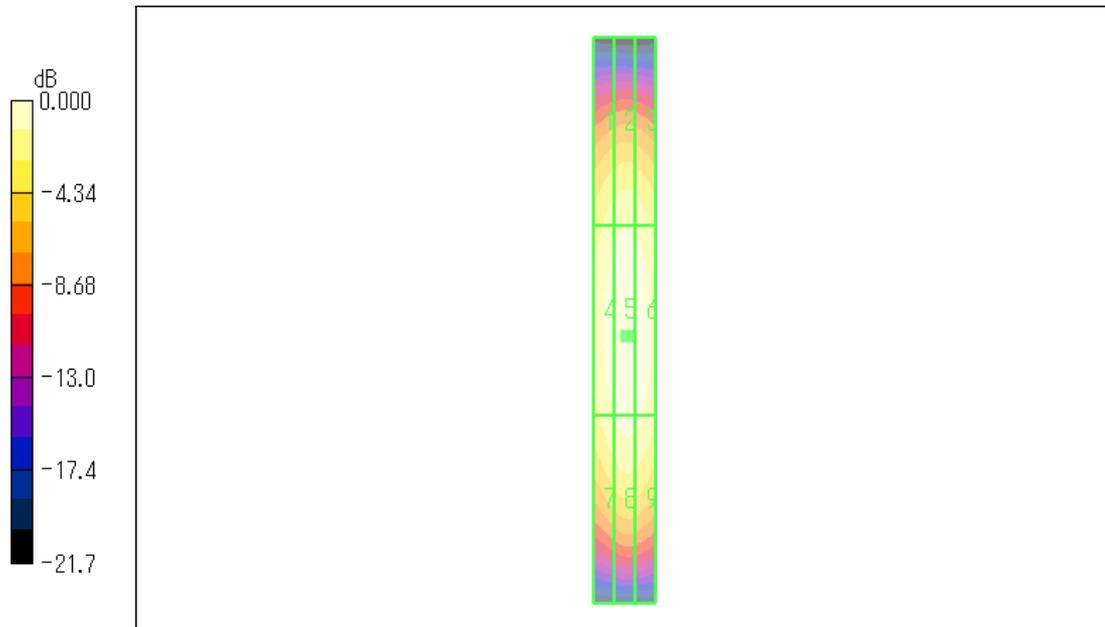
Total = 0.432 A/m

H Category: M4

Location: -1, 5, 365.2 mm

Test Date = 01/06/09

Ambient Temperature = 23.0 degree.c



H-Filed 1880MHz System Validation / Forward Conducted Power : 100mW

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Dipole 1880MHz; Type: CD1880V3; Serial: 1088

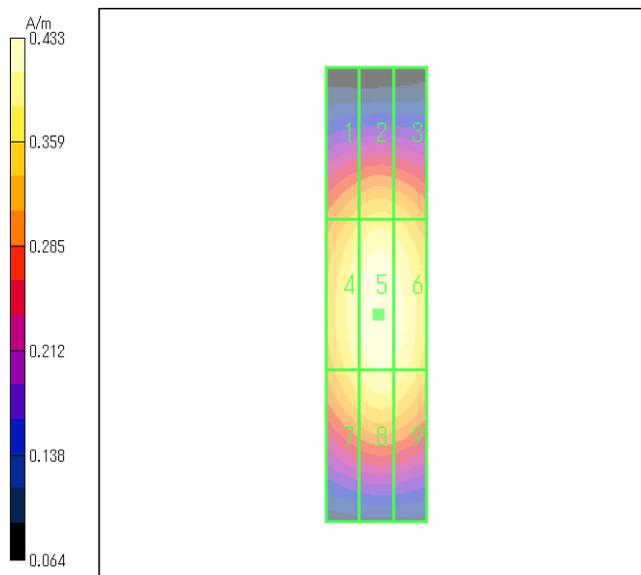
Communication System: CW; Frequency: 1880 MHz; Crest factor: 1
Medium: Air Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: E Dipole Section
DASY4 Configuration:
- Probe: H3DV6 - SN6259; ; Calibrated: 2008/12/16
- Sensor-Surface: (Fix Surface)
- Phantom: HAC Test Arch 4.6
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - H3DV6 - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test
(41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.433 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 0.166 A/m; Power Drift = -0.014 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.351 M2	0.371 M2	0.362 M2
Grid 4	Grid 5	Grid 6
0.410 M2	0.433 M2	0.423 M2
Grid 7	Grid 8	Grid 9
0.387 M2	0.411 M2	0.402 M2

Cursor:
Total = 0.433 A/m
H Category: M2
Location: -0.5, 4, 365.2 mm
Test Date = 01/06/09
Ambient Temperature = 23.0 degree.c



8. Validation uncertainty

The uncertainty budget has been determined for the DASY4 measurement system according to the SPEAG documents[2]and is given in the following Table.

Error Description	Uncertainty value \pm %	Probability distribution	divisor	(ci) E	(ci) H	Standard Uncertainty E	Standard Uncertainty H
Measurement System							
Probe calibration	± 5.1	Normal	1	1	1	± 5.1	± 5.1
Axial isotropy of the probe	± 4.7	Rectangular	$\sqrt{3}$	1	1	± 2.7	± 2.7
Sensor Displacement	± 16.5	Rectangular	$\sqrt{3}$	1	0.145	± 9.5	± 1.4
Boundary effects	± 2.4	Rectangular	$\sqrt{3}$	1	1	± 1.4	± 1.4
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	1	± 2.7	± 2.7
Scaling to Peak Envelope Power	± 0	Rectangular	$\sqrt{3}$	1	1	± 0	± 0
System Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	1	± 0.6	± 0.6
Readout electronics	± 0.3	Normal	1	1	1	± 0.3	± 0.3
Response time	± 0	Rectangular	$\sqrt{3}$	1	1	± 0	± 0
Integration time	± 0	Rectangular	$\sqrt{3}$	1	1	± 0	± 0
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	1	± 1.7	± 1.7
RF ambient Reflections	± 6.0	Rectangular	$\sqrt{3}$	1	1	± 6.9	± 6.9
Probe Positioner	± 1.2	Rectangular	$\sqrt{3}$	1	0.67	± 0.7	± 0.5
Probe positioning	± 4.7	Rectangular	$\sqrt{3}$	1	0.67	± 2.7	± 1.8
Extrap.and Interpolation	± 1.0	Rectangular	$\sqrt{3}$	1	1	± 0.6	± 0.6
Dipole Related							
Distance Dipole-Scanning Plane	± 5.2	Rectangular	$\sqrt{3}$	1	0.3	± 3.0	± 0.9
Input Power	± 4.7	Normal	1	1	1	± 4.7	± 4.7
							± 4.8
Combined Standard Uncertainty						± 13.7	± 9.3
Expanded Std. Uncertainty on Power(k=2)						± 27.4	± 18.6
Expanded Std. Uncertainty on Filed(k=1)						± 13.7	± 9.3

9. System Validation Dipole (CD835V3,S/N: 1087)

**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zoughausstrasse 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 **UL Japan (MTT)**

Certificate No: **CD835V3-1087_Dec07**

CALIBRATION CERTIFICATE

Object **CD835V3 - SN: 1087**

Calibration procedure(s) **QA-CAL-20.v4
Calibration procedure for dipoles in air**

Calibration date: **December 7, 2007**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Probe ER3DV6	SN: 2336	27-Dec-06 (SPEAG, No. ER3-2336_Dec06)	Dec-07
Probe H3DV6	SN: 6065	27-Dec-06 (SPEAG, No. H3-6065_Dec06)	Dec-07
DAE4	SN: 781	2-Oct-07 (SPEAG, No. DAE4-781_Oct07)	Oct-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB42420191	11-May-05 (SPEAG, in house check Oct -07)	In house check: Nov-08
Power sensor HP 8482A	US37295597	11-May-05 (SPEAG, in house check Oct -07)	In house check: Nov-08
Power sensor HP 8482H	3318A09450	08-Jan-02 (SPEAG, in house check Oct -07)	In house check: Nov-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Nov-09
RF generator E4433B	MY 41310391	22-Nov-04 (SPEAG, in house check Oct-07)	In house check: Nov-09

Calibrated by: **Name: Mike Meit, Function: Laboratory Technician, Signature: [Signature]**

Approved by: **Name: Fin Bornholt, Function: Technical Director, Signature: [Signature]**

Issued: December 13, 2007

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

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



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Accreditation No.: **SCS 108**

References

- [1] ANSI-C63.19-2006
American National Standard for Methods of Measurement of Compatibility between Wireless
Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- *Coordinate System:* y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with standard [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- *Measurement Conditions:* Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- *Antenna Positioning:* The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY4 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- *Feed Point Impedance and Return Loss:* These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminating by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- *E-field distribution:* E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- *H-field distribution:* H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

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1 Measurement Conditions

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

DASY Version	DASY4	V4.7 B55
DASY PP Version	SEMCAD	V1.8 B176
Phantom	HAC Test Arch	SD HAC P01 BA, #1070
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 180 mm
Frequency	835 MHz \pm 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	interpolated maximum
Maximum measured	100 mW forward power	0.446 A/m

Uncertainty for H-field measurement: 8.2% (k=2)

E-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured above high end-	100 mW forward power	163.0 V/m
Maximum measured above low end	100 mW forward power	161.5 V/m
Averaged maximum above arm	100 mW forward power	162.3 V/m

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
800 MHz	16.9 dB	(44.6 - j12.5) Ohm
835 MHz	27.9 dB	(47.9 + j3.3) Ohm
900 MHz	16.5 dB	(58.1 - j14.1) Ohm
950 MHz	24.2 dB	(45.5 + j3.8) Ohm
960 MHz	18.6 dB	(49.4 + j11.7) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

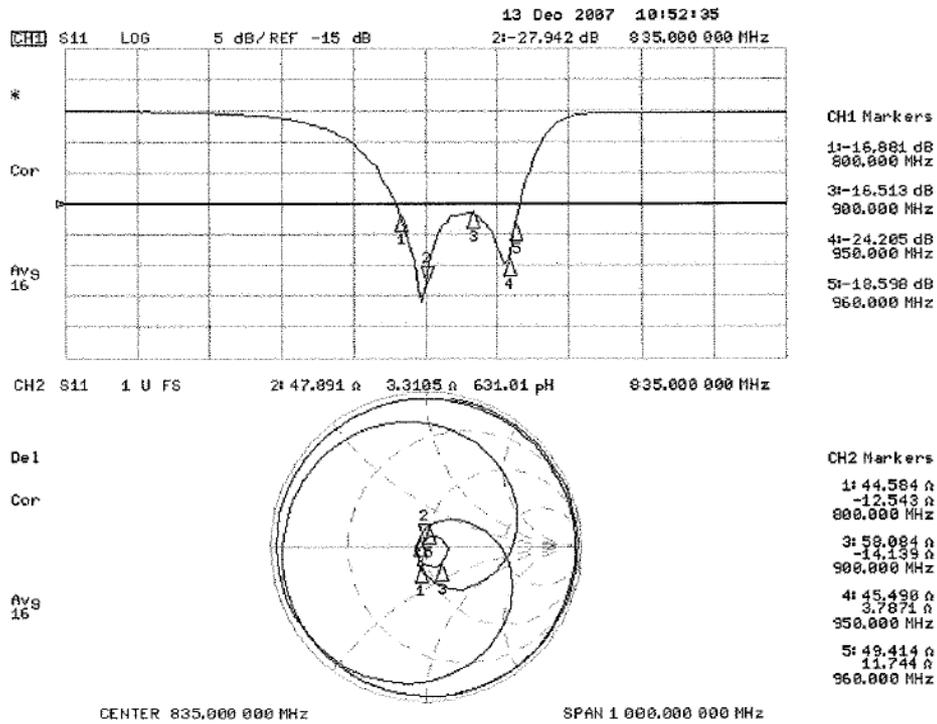
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



Test Laboratory: SPEAG Lab 2

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1087

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

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

Phantom section: H Dipole Section

Measurement Standard: DASYS4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6065; Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASYS4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - Sensor Center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):

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

Maximum value of peak Total field = 0.446 A/m

Probe Modulation Factor = 1.00

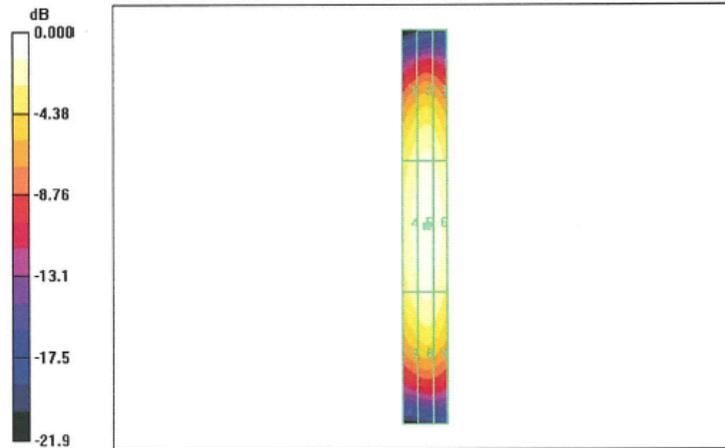
Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.473 A/m; Power Drift = 0.007 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak H-field in A/m

Grid 1	Grid 2	Grid 3
0.366 M4	0.397 M4	0.382 M4
Grid 4	Grid 5	Grid 6
0.413 M4	0.446 M4	0.429 M4
Grid 7	Grid 8	Grid 9
0.365 M4	0.392 M4	0.376 M4



0 dB = 0.446A/m

3.3.3 DASYS4 E-Field result

Date/Time: 07.12.2007 15:20:49

Test Laboratory: SPEAG Lab 2

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1087

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Dipole Section

Measurement Standard: DASYS4 (High Precision Assessment)

DASYS4 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASYS4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - Sensor Center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):

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

Maximum value of peak Total field = 163.0 V/m

Probe Modulation Factor = 1.00

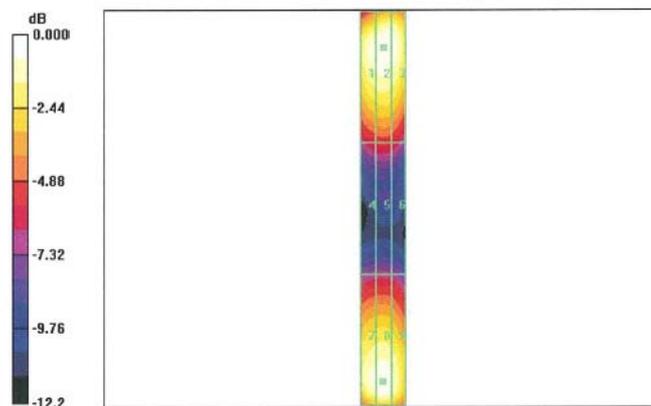
Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 105.0 V/m; Power Drift = 0.000 dB

Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 158.5 M4	Grid 2 163.0 M4	Grid 3 159.3 M4
Grid 4 85.7 M4	Grid 5 88.0 M4	Grid 6 85.5 M4
Grid 7 157.4 M4	Grid 8 161.5 M4	Grid 9 153.1 M4



0 dB = 163.0V/m

10. System Validation Dipole (CD1880V3,S/N: 1088)

Calibration Laboratory of
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Accreditation No.: SCS 108

Client **UL Japan (MTT)**

Certificate No: **CD1880V3-1088_Dec07**

CALIBRATION CERTIFICATE

Object: **CD1880V3 - SN: 1088**

Calibration procedure(s): **QA-CAL-20.v4
 Calibration procedure for dipoles in air**

Calibration date: **December 12, 2007**

Condition of the calibrated item: **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Probe ER3DV6	SN: 2336	27-Dec-06 (SPEAG, No. ER3-2336_Dec06)	Dec-07
Probe H3DV6	SN: 6065	27-Dec-06 (SPEAG, No. H3-6065_Dec06)	Dec-07
DAE4	SN: 781	2-Oct-07 (SPEAG, No. DAE4-781_Oct07)	Oct-08
Secondary Standards	ID #	Check Date (In house)	Scheduled Check
Power meter EPM-4419B	GB42420191	11-May-05 (SPEAG, in house check Oct-07)	In house check: Nov-08
Power sensor HP 8482A	US37295597	11-May-05 (SPEAG, in house check Oct-07)	In house check: Nov-08
Power sensor HP 8482H	3318A09450	08-Jan-02 (SPEAG, in house check Oct-07)	In house check: Nov-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Nov-09
RF generator E4433B	MY 41310391	22-Nov-04 (SPEAG, in house check Oct-07)	In house check: Nov-09

Calibrated by: **Mike Meili** (Name), **Laboratory Technician** (Function), *[Signature]* (Signature)

Approved by: **Flin Bomholt** (Name), **Technical Director** (Function), *[Signature]* (Signature)

Issued: December 13, 2007

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

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Accreditation No.: **SCS 108**

Client **UL Japan (MTT)**

Certificate No: **CD1880V3-1088_Dec07**

CALIBRATION CERTIFICATE

Object **GD1880V3 - SN: 1088**

Calibration procedure(s) **QA-CAL-20.v4
 Calibration procedure for dipoles in air**

Calibration date: **December 12, 2007**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
 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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Probe ER3DV6	SN: 2336	27-Dec-06 (SPEAG, No. ER3-2336_Dec06)	Dec-07
Probe H3DV6	SN: 6065	27-Dec-06 (SPEAG, No. H3-6065_Dec06)	Dec-07
DAE4	SN: 781	2-Oct-07 (SPEAG, No. DAE4-781_Oct07)	Oct-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB42420191	11-May-05 (SPEAG, in house check Oct-07)	In house check: Nov-08
Power sensor HP 8482A	US37295597	11-May-05 (SPEAG, in house check Oct-07)	In house check: Nov-08
Power sensor HP 8482H	3318A09450	08-Jan-02 (SPEAG, in house check Oct-07)	In house check: Nov-08
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Nov-09
RF generator E4433B	MY 41310391	22-Nov-04 (SPEAG, in house check Oct-07)	In house check: Nov-09

Calibrated by: **Name: Mike Meiji, Function: Laboratory Technician, Signature: [Signature]**

Approved by: **Name: Fin Bomholt, Function: Technical Director, Signature: [Signature]**

Issued: December 13, 2007

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Accreditation No.: **SCS 108**

References

- [1] ANSI-C63.19-2006
American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids.

Methods Applied and Interpretation of Parameters:

- *Coordinate System:* y-axis is in the direction of the dipole arms. z-axis is from the basis of the antenna (mounted on the table) towards its feed point between the two dipole arms. x-axis is normal to the other axes. In coincidence with standard [1], the measurement planes (probe sensor center) are selected to be at a distance of 10 mm above the top edge of the dipole arms.
- *Measurement Conditions:* Further details are available from the hardcopies at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated. The forward power to the dipole connector is set with a calibrated power meter connected and monitored with an auxiliary power meter connected to a directional coupler. While the dipole under test is connected, the forward power is adjusted to the same level.
- *Antenna Positioning:* The dipole is mounted on a HAC Test Arch phantom using the matching dipole positioner with the arms horizontal and the feeding cable coming from the floor. The measurements are performed in a shielded room with absorbers around the setup to reduce the reflections. It is verified before the mounting of the dipole under the Test Arch phantom, that its arms are perfectly in a line. It is installed on the HAC dipole positioner with its arms parallel below the dielectric reference wire and able to move elastically in vertical direction without changing its relative position to the top center of the Test Arch phantom. The vertical distance to the probe is adjusted after dipole mounting with a DASY4 Surface Check job. Before the measurement, the distance between phantom surface and probe tip is verified. The proper measurement distance is selected by choosing the matching section of the HAC Test Arch phantom with the proper device reference point (upper surface of the dipole) and the matching grid reference point (tip of the probe) considering the probe sensor offset. The vertical distance to the probe is essential for the accuracy.
- *Feed Point Impedance and Return Loss:* These parameters are measured using a HP 8753E Vector Network Analyzer. The impedance is specified at the SMA connector of the dipole. The influence of reflections was eliminated by applying the averaging function while moving the dipole in the air, at least 70cm away from any obstacles.
- *E-field distribution:* E field is measured in the x-y-plane with an isotropic ER3D-field probe with 100 mW forward power to the antenna feed point. In accordance with [1], the scan area is 20mm wide, its length exceeds the dipole arm length (180 or 90mm). The sensor center is 10 mm (in z) above the top of the dipole arms. Two 3D maxima are available near the end of the dipole arms. Assuming the dipole arms are perfectly in one line, the average of these two maxima (in subgrid 2 and subgrid 8) is determined to compensate for any non-parallelity to the measurement plane as well as the sensor displacement. The E-field value stated as calibration value represents the maximum of the interpolated 3D-E-field, 10mm above the dipole surface.
- *H-field distribution:* H-field is measured with an isotropic H-field probe with 100mW forward power to the antenna feed point, in the x-y-plane. The scan area and sensor distance is equivalent to the E-field scan. The maximum of the field is available at the center (subgrid 5) above the feed point. The H-field value stated as calibration value represents the maximum of the interpolated H-field, 10mm above the dipole surface at the feed point.

1 Measurement Conditions

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

DASY Version	DASY4	V4.7 B55
DASY PP Version	SEMCAD	V1.8 B176
Phantom	HAC Test Arch	SD HAC P01 BA, #1070
Distance Dipole Top - Probe Center	10 mm	
Scan resolution	dx, dy = 5 mm	area = 20 x 90 mm
Frequency	1880 MHz ± 1 MHz	
Forward power at dipole connector	20.0 dBm = 100mW	
Input power drift	< 0.05 dB	

2 Maximum Field values

H-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured	100 mW forward power	0.474 A/m

Uncertainty for H-field measurement: 8.2% (k=2)

E-field 10 mm above dipole surface	condition	Interpolated maximum
Maximum measured above high end	100 mW forward power	136.8 V/m
Maximum measured above low end	100 mW forward power	134.1 V/m
Averaged maximum above arm	100 mW forward power	135.5 V/m

Uncertainty for E-field measurement: 12.8% (k=2)

3 Appendix

3.1 Antenna Parameters

Frequency	Return Loss	Impedance
1710 MHz	19.7 dB	(46.9 + j9.6) Ohm
1880 MHz	20.7 dB	(49.7 + j9.2) Ohm
1900 MHz	21.5 dB	(52.5 + j8.3) Ohm
1950 MHz	30.1 dB	(53.2 + j0.0) Ohm
2000 MHz	20.3 dB	(41.2 + j0.5) Ohm

3.2 Antenna Design and Handling

The calibration dipole has a symmetric geometry with a built-in two stub matching network, which leads to the enhanced bandwidth.

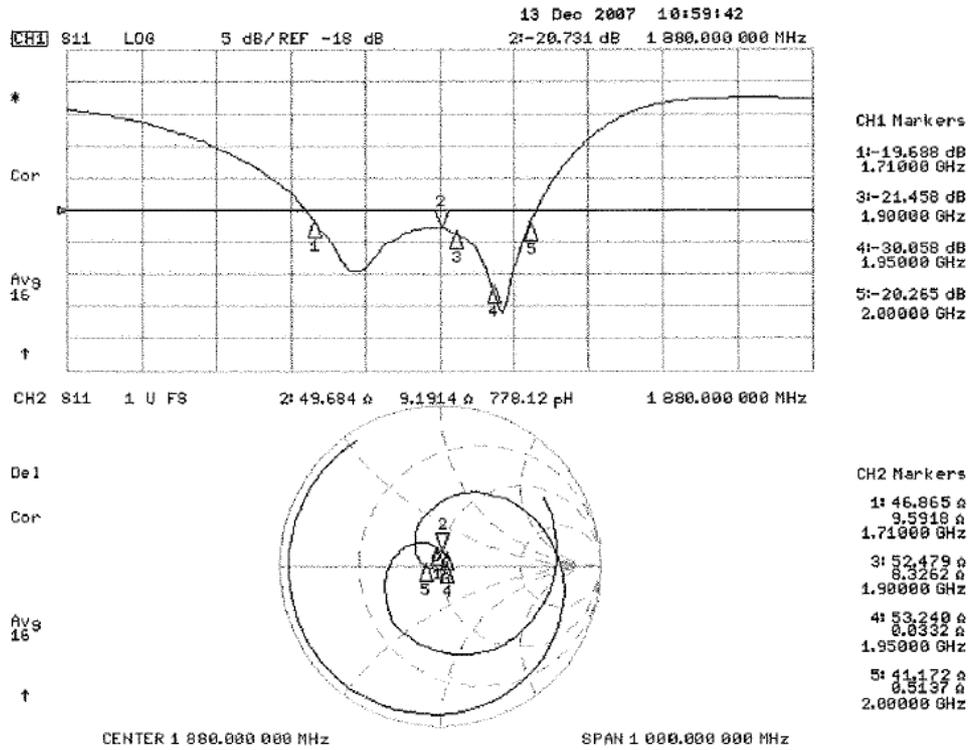
The dipole is built of standard semirigid coaxial cable. The internal matching line is open ended. The antenna is therefore open for DC signals.

Do not apply force to dipole arms, as they are liable to bend. The soldered connections near the feedpoint may be damaged. After excessive mechanical stress or overheating, check the impedance characteristics to ensure that the internal matching network is not affected.

After long term use with 40W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

3.3 Measurement Sheets

3.3.1 Return Loss and Smith Chart



3.3.2 DASY4 H-Field Result

Date/Time: 12.12.2007 11:08:10

Test Laboratory: SPEAG Lab 2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1088

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

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

Phantom section: H Dipole Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6065; Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of peak Total field = 0.474 A/m

Probe Modulation Factor = 1.00

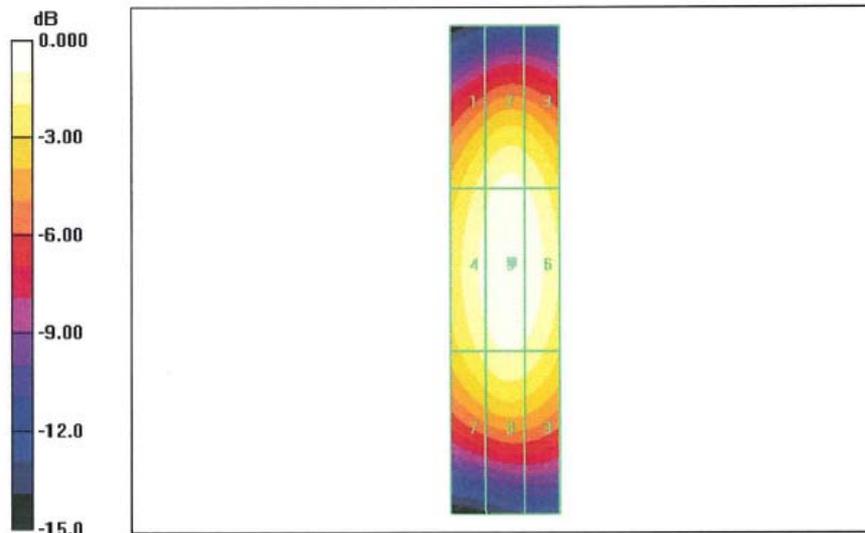
Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.500 A/m; Power Drift = -0.010 dB

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

Peak H-field in A/m

Grid 1 0.403 M2	Grid 2 0.441 M2	Grid 3 0.427 M2
Grid 4 0.439 M2	Grid 5 0.474 M2	Grid 6 0.461 M2
Grid 7 0.394 M2	Grid 8 0.425 M2	Grid 9 0.412 M2



0 dB = 0.474A/m

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3.3.2 DASY4 E-Field Result

Date/Time: 07.12.2007 17:54:02

Test Laboratory: SPEAG Lab 2

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1088

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

Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Dipole Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 27.12.2006
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with Coil; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - Sensor Center 10mm above CD1880V3 Dipole/Hearing Aid Compatibility Test (41x181x1):

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

Maximum value of peak Total field = 136.8 V/m

Probe Modulation Factor = 1.00

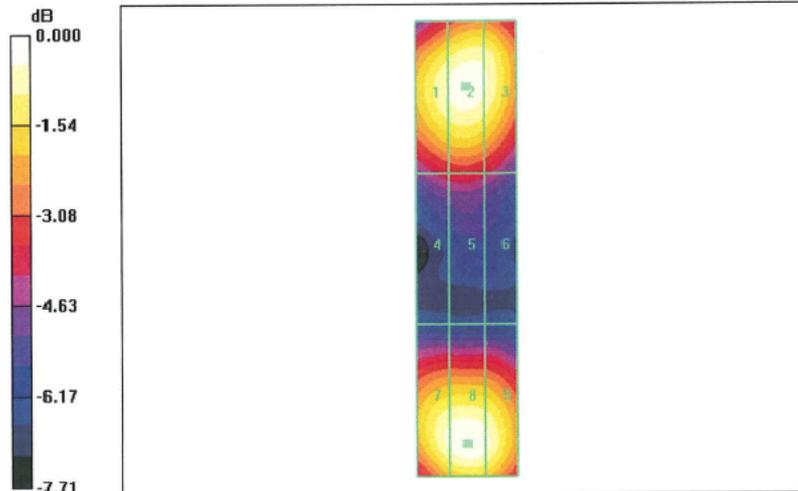
Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 154.2 V/m; Power Drift = 0.008 dB

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

Peak E-field in V/m

Grid 1 129.8 M2	Grid 2 134.1 M2	Grid 3 130.6 M2
Grid 4 89.5 M3	Grid 5 91.5 M3	Grid 6 87.4 M3
Grid 7 131.8 M2	Grid 8 136.8 M2	Grid 9 132.0 M2



0 dB = 136.8V/m