

HAC RF Emissions Test Report

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Measurements made by:	Julian Kim		
Tested devices:	RM-455 (Hearing aid mode active)		
FCC ID:	QMNRM-455	IC:	661X-RM455
Supplement reports:	SD_HAC_0849_07, SD_HAC_0849_08		
Testing has been carried out in accordance with:	ANSI C63.19-2007 American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids		
Documentation:	The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.		
Test results:	The tested device complies with the requirements in respect of all parameters subject to the test. The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.		

Date and signatures:

For the contents:

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1. SUMMARY OF HAC RF EMISSION TEST REPORT

1.1 Test Details

Period of test	2008-12-04 to 2008-12-05
SN, HW, SW and DUT numbers of tested device	SN: 004401/10/307247/2, HWID: 0310, SW: b14.05, DUT: 3107
Batteries used in testing	BP-6MT, DUT: 3108, 3109
State of sample	Prototype
Notes	AWF = -5 for GSM, 0 for WCDMA

1.2 Maximum Results

The maximum measured HAC RF emissions values and categories for electric and magnetic fields are given in section 1.2.1 and 1.2.2 respectively.

1.2.1 Electric field measurements

Band & Mode	Ch / Freq. [MHz]	Radiated power	Limit of E-field max. value in category M3 [V/m]	Max E-field value after exclusion [V/m]	Category
GSM850	190 / 836.6	30.0 dBm ERP	149.6 – 266.1	213	M3 (-5dB)
WCDMA850	4175 / 835.0	19.7 dBm ERP	199.5 – 354.8	71.1	M4 (0dB)
GSM1900	661 / 1880.0	28.9 dBm EIRP	47.3 – 84.1	68.7	M3 (-5dB)
WCDMA1900	9262 / 1852.4	22.8 dBm EIRP	63.1 – 112.2	26.4	M4 (0dB)

1.2.2 Magnetic field measurements

Band & Mode	Ch / Freq. [MHz]	Radiated power	Limit of H-field max. value in category M3 [A/m]	Max H-field value after exclusion [A/m]	Category
GSM850	128 / 824.2	30.2 dBm ERP	0.45 – 0.80	0.30	M4 (-5dB)
WCDMA850	4132 / 826.4	19.1 dBm ERP	0.60 – 1.07	0.09	M4 (0dB)
GSM1900	512 / 1850.2	30.2 dBm EIRP	0.14 – 0.25	0.20	M3 (-5dB)
WCDMA1900	9262 / 1852.4	22.8 dBm EIRP	0.19 – 0.34	0.07	M4 (0dB)

1.2.3 Overall RF emissions category of the tested device

Band & Mode	Combined category (E- and H-fields)	Pass / Fail
GSM850	M3	Pass
WCDMA850	M4	Pass
GSM1900	M3	Pass
WCDMA1900	M4	Pass
Final Category	M3	Pass

1.2.4 Maximum Drift

Maximum drift during measurements	0.28 dB
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1.2.5 Measurement Uncertainty

Extended Uncertainty (k=2) 95%, E-field	14.7 %
Extended Uncertainty (k=2) 95%, H-field	10.9 %

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

Modes of Operation	Bands	Modulation Mode	Duty Cycle	Transmitter Frequency Range (MHz)
GSM	850	GMSK	1/8	824 – 849
GSM	1900	GMSK	1/8	1850 – 1910
WCDMA	850		1	826 – 847
WCDMA	1900		1	1852 - 1908

Outside of USA the transmitter of the device is capable of operating also in 900MHz, 1800MHz and 2100MHz bands, which are not part of this filing.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature [°C]:	21 to 23
Ambient humidity [RH %]:	30 to 55

3.2 Test Signal, Frequencies, and Output Power

The transmitter of the device was put into operation by using a call tester. Communications between the device and the call tester were established by air link.

For all tests the device output power was set to maximum power level; a fully charged battery was used for every test sequence.

The transmission mode of the device in WCDMA HAC RF emission tests was configured to 12.2kbps RMC with all TPC bits set as “1”.

The measurements were performed on low, middle and high channels.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement system and components

The measurements were performed using an automated near-field scanning system, DASY 4, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland.
The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE 4	858	12 months	2009-06
E-field Probe ER3DV6	2326	12 months	2009-06
H-field Probe H3DV6	6058	12 months	2009-04
Dipole Validation Kit, CD835V3	1032	24 months	2010-06
Dipole Validation Kit, CD1880V3	1025	24 months	2010-06

Additional test equipment used in testing and validation:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	E4432B	US40053677	12 months	2009-10
Amplifier	AS0825-20L	1009777	-	-
Power Meter	E4417A	GB41290918	12 months	2009-01
Power Sensor	E9327A	US40440896	12 months	2009-04
Radio Communication Tester	CMU 200	105428	12 months	2009-10

4.1.1 Isotropic E-field probe ER3DV6

Construction	One dipole parallel, two dipoles normal to probe axis Built-in shielding against static charges PEEK enclosure material
Frequency	In air 100 MHz to >6 GHz; 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 length: 16 mm Body diameter: 12 mm Tip diameter: 8 mm
Application	Distance from probe tip to nearest point of dipole: 1.25 mm General near-field measurements up to 6 GHz Field component measurements Fast automatic scanning in phantoms

4.1.2 Isotropic H-field probe H3DV6

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
Frequency	200 MHz to 3 GHz; Output linearized (absolute accuracy $\pm 6.0\%$, $k=2$)
Directivity	± 0.25 dB (spherical isotropy error)
Dynamic Range	10 mA/m to 2 A/m at 1 GHz
Dimensions	Overall length: 330 mm Tip length: 40 mm Body diameter: 12 mm Tip diameter: 6 mm
Application	Distance from probe tip to nearest point of dipole: 1.1 mm General magnetic near-field measurements up to 3 GHz Field component measurements, surface current measurements Measurements in air or liquids, low interaction

4.1.3 Device Holder

The Device Holder and Test Arch are manufactured by Speag (<http://www.dasy4.com/hac>). Test arch is used for all tests i.e. for both validation testing and device testing. The holder and test arch conforms to the requirements of ANSI C63.19.

The SPEAG device holder (see Section 5.1) was used to position the test device in all tests.

4.2 Validation of the System

The manufacturer calibrates the probes annually. Validation measurements are made regularly using the dipole validation kit. The power level used by manufacturer in dipole calibration is supplied to the dipole antenna. The antenna is scanned at 1.0cm distance between top surface of the dipole and calibration point of the probe.

System Validation, H-field and E-field

f [MHz]	Description	E-field [V/m]	H-field [A/m]
835	Reference result	156.9	0.445
	± 10% window	141.2 – 172.6	0.401 – 0.490
	2008-12-04	155.8	0.449
1880	Reference result	141.5	0.472
	± 10% window	127.4 – 155.7	0.425 – 0.519
	2008-12-05	146.9	0.474

Plots of the system validation scans are given in Appendix A.

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Test Arch and Device Holder

The test device was placed in the Device Holder (illustrated below) that is supplied by SPEAG. Using this positioner the tested device is positioned under Test Arch.



Device holder and Test Arch supplied by SPEAG

5.2 Scan Procedures

Near field scans of 5cm x 5cm were used for determination of the field distribution. Measurement plane distance from WD reference plane is 1.5cm. Scans were performed for both E- and H-field using appropriate probe. DASY software divides detected values into 3 x 3 sub grids as described in the C63.19 standard.

5.3 Scan area centered at the maximum magnetic T-coil coupling

Scanning centered at the maximum magnetic T-coil coupling was not applicable for the tested device.

5.4 Probe Modulation Factor

All raw measurements in DASY4 system are presented as RMS values. The measurement software then applies Probe Modulation Factor (PMF) to convert readings to "slot averaged" peak values as required by C63.19 standard.

Therefore PMF was assessed as described in C63.19 standard along with Speag's Application Note (AN_Hearing_Aid_Compatibility.pdf, section 28.8, "Definition / Determination of the Probe Modulation Factor") and 061117a_TN_HAC_PMF_Predefined_Files.pdf.

Modulation factors, GSM

f [MHz]	p [dBm]	E-field [V/m] Probe SN: 2326		H-field [A/m] Probe SN: 6058		PMF E-field	PMF H-field
		CW	GSM	CW	GSM		
835.0	20	124.0	45.8	0.537	0.204	2.71	2.63
1880.0	20	139.2	49.0	0.506	0.248	2.84	2.04

Modulation factors, WCDMA

f [MHz]	p [dBm]	E-field [V/m] Probe SN: 2326		H-field [A/m] Probe SN: 6058		PMF E-field	PMF H-field
		CW	WCDMA	CW	WCDMA		
835.0	17	94.2	119.2	0.380	0.523	0.79	0.73
1880.0	17	93.1	116.4	0.312	0.528	0.80	0.59

Observed Modulation Factor:

$$PMF_{(E)} = E\text{-field}_{(CW)} / E\text{-field}_{(Modulated)}$$

$$PMF_{(H)} = H\text{-field}_{(CW)} / H\text{-field}_{(Modulated)}$$

Observed Crest Factor:

$$CF_{(E)} = (PMF_{(E)})^2$$

$$CF_{(H)} = (PMF_{(H)})^2$$

5.5 Slot Averaged Calculation Method

The slot-averaged values for the every measured signal type were calculated using observed duty cycles.

5.6 Sub-grid Exclusion

The measurement grid defined in C63.19 consists of 9 evenly sized blocks, which are used to define permissible exclusion areas. For both E- and H-field measurements three contiguous blocks may be excluded from the measurements except center block may never be excluded. There must be 4 blocks left that are common for both E- and H-field measurements, so maximum of 5 different blocks can be excluded (e.g. 3 blocks excluded from E-field and 2 blocks from H-field).

5.7 Category Limits

From remaining maximum values after exclusion process, Hearing Aid M-category is defined according to the category limits of C63.19 –2007.

Category	AWF [dB]	Limits for RF-parameters <960MHz				Limits for RF-parameters >960MHz			
		E-field [V/m]		H-field [A/m]		E-field [V/m]		H-field [A/m]	
		Min	Max	Min	Max	Min	Max	Min	Max
M1	0	631.0	1122.0	1.91	3.39	199.5	354.8	0.60	1.07
M1	-5	473.2	841.4	1.43	2.54	149.6	266.1	0.45	0.80
M2	0	354.8	631.0	1.07	1.91	112.2	199.5	0.34	0.60
M2	-5	266.1	473.2	0.80	1.43	84.1	149.6	0.25	0.45
M3	0	199.5	354.8	0.60	1.07	63.1	112.2	0.19	0.34
M3	-5	149.6	266.1	0.45	0.80	47.3	84.1	0.14	0.25
M4	0		<199.5		<0.60		<63.1		<0.19
M4	-5		<149.6		<0.45		<47.3		<0.14

6. MEASUREMENT UNCERTAINTY

Source of Uncertainty	Tolerance ±%	Probability Distribution	Div.	ci E	ci H	Standard Uncertainty ±%, E	Standard Uncertainty ±%, H	Remark
MEASUREMENT SYSTEM								
Probe Calibration	5.1	N	1	1	1	5.1	5.1	
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7	
Sensor Displacement	16.5	R	√3	1	0.145	9.5	1.4	
Boundary Effect	2.4	R	√3	1	1	1.4	1.4	
Linearity	4.7	R	√3	1	1	2.7	2.7	SAR
Scaling to Peak Envelope Power	2.0	R	√3	1	1	1.2	1.2	
System Detection Limit	1.0	R	√3	1	1	0.6	0.6	
Readout Electronics	0.3	N	1	1	1	0.3	0.3	SAR
Response Time	0.8	R	√3	1	1	0.5	0.5	
Integration Time	2.6	R	√3	1	1	1.5	1.5	SAR
RF Ambient Conditions	3.0	R	√3	1	1	1.7	1.7	SAR
RF Reflections	12.0	R	√3	1	1	6.9	6.9	
Probe Positioner	1.2	R	√3	1	0.67	0.7	0.5	
Probe Positioning	4.7	R	√3	1	0.67	2.7	1.8	
Extrapolation and Interpolation	1.0	R	√3	1	1	0.6	0.6	SAR
TEST SAMPLE RELATED								
Device Positioning Vertical	4.7	R	√3	1	0.67	2.7	1.8	
Device Positioning Lateral	1.0	R	√3	1	1	0.6	0.6	
Device Holder and Test Arch	2.4	R	√3	1	1	1.4	1.4	
Power Drift	5.0	R	√3	1	1	2.9	2.9	SAR
TEST ARCH AND SETUP RELATED								
Test Arch Thickness	2.4	R	√3	1	0.67	1.4	0.9	
COMBINED STANDARD UNCERTAINTY						14.7	10.9	
Expanded Uncertainty on Power						29.4	21.8	
Expanded Uncertainty on Field						14.7	10.9	

7. RESULTS

The calculated maximum field values for the test device are tabulated below:

850MHz RF emissions test results

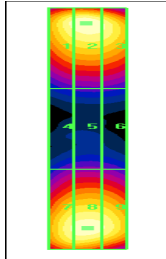
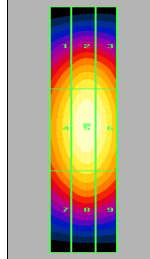
Option used	Test configuration	Ch 128 824.2MHz	Ch 190 836.6MHz	Ch 251 848.8MHz
GSM850	Power	30.2 dBm	30.0 dBm	30.1 dBm
Flip open	E-field [V/M]	187	213	198
	H-field [A/m]	0.295	0.278	0.283
	Category	M3 (-5dB)	M3 (-5dB)	M3 (-5dB)
Option used	Test configuration	Ch 4132 826.4MHz	Ch 4175 835.0MHz	Ch 4233 846.6MHz
WCDMA850	Power	19.1 dBm	19.7 dBm	20.1 dBm
Flip open	E-field [V/M]	65.0	71.1	65.6
	H-field [A/m]	0.093	0.088	0.085
	Category	M4 (0dB)	M4 (0dB)	M4 (0dB)

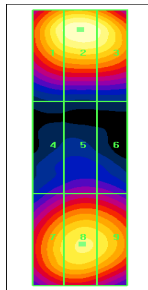
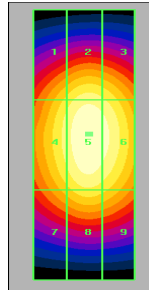
1900MHz RF emissions test results

Option used	Test configuration	Ch 512 1850.2MHz	Ch 661 1880.0MHz	Ch 810 1909.8MHz
GSM 1900	Power	30.2 dBm	28.9 dBm	30.0 dBm
Flip open	E-field [V/M]	66.9	68.7	62.3
	H-field [A/m]	0.201	0.181	0.185
	Category	M3 (-5dB)	M3 (-5dB)	M3 (-5dB)
Option used	Test configuration	Ch 9262 1852.4MHz	Ch 9400 1880.0MHz	Ch 9538 1907.6MHz
WCDMA 1900	Power	22.8 dBm	22.6 dBm	22.0 dBm
Flip open	E-field [V/M]	26.4	26.1	24.5
	H-field [A/m]	0.071	0.065	0.067
	Category	M4 (0dB)	M4 (0dB)	M4 (0dB)

Plots of the measurement scans are shown in **Appendix B**. Excluded cells are colored orange.

APPENDIX A: SYSTEM VALIDATION SCANS

SYSTEM VALIDATION DATA 850MHz																				
Date/Time: 2008-12-04 14:42:52 Test Laboratory: TCC Nokia Type: D835V3; Serial: 1032		Date/Time: 2008-12-04 11:58:22 Test Laboratory: TCC Nokia Type: D835V3; Serial: 1032																		
Communication System: CW835 Frequency: 835 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m ³ Phantom section: E Dipole Section		Communication System: CW835 Frequency: 835 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m ³ Phantom section: H Dipole Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2326; Probe Notes: - ConvF(1, 1, 1); Calibrated: 2008-06-19 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176		DASY4 Configuration: - Probe: H3DV6 - SN6058; Probe Notes: - ; Calibrated: 2008-04-11 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176																		
E Scan - ER3DV6 - 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 = 155.8 V/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 113.0 V/m; Power Drift = -0.009 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)		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 = 0.449 A/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 0.478 A/m; Power Drift = -0.031 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)																		
																				
<table><tr><td>Grid 1 144.4 M4</td><td>Grid 2 155.8 M4</td><td>Grid 3 154.4 M4</td></tr><tr><td>Grid 4 80.1 M4</td><td>Grid 5 84.1 M4</td><td>Grid 6 83.5 M4</td></tr><tr><td>Grid 7 134.7 M4</td><td>Grid 8 138.8 M4</td><td>Grid 9 137.1 M4</td></tr></table>		Grid 1 144.4 M4	Grid 2 155.8 M4	Grid 3 154.4 M4	Grid 4 80.1 M4	Grid 5 84.1 M4	Grid 6 83.5 M4	Grid 7 134.7 M4	Grid 8 138.8 M4	Grid 9 137.1 M4	<table><tr><td>Grid 1 0.357 M4</td><td>Grid 2 0.384 M4</td><td>Grid 3 0.373 M4</td></tr><tr><td>Grid 4 0.414 M4</td><td>Grid 5 0.449 M4</td><td>Grid 6 0.434 M4</td></tr><tr><td>Grid 7 0.357 M4</td><td>Grid 8 0.387 M4</td><td>Grid 9 0.375 M4</td></tr></table>	Grid 1 0.357 M4	Grid 2 0.384 M4	Grid 3 0.373 M4	Grid 4 0.414 M4	Grid 5 0.449 M4	Grid 6 0.434 M4	Grid 7 0.357 M4	Grid 8 0.387 M4	Grid 9 0.375 M4
Grid 1 144.4 M4	Grid 2 155.8 M4	Grid 3 154.4 M4																		
Grid 4 80.1 M4	Grid 5 84.1 M4	Grid 6 83.5 M4																		
Grid 7 134.7 M4	Grid 8 138.8 M4	Grid 9 137.1 M4																		
Grid 1 0.357 M4	Grid 2 0.384 M4	Grid 3 0.373 M4																		
Grid 4 0.414 M4	Grid 5 0.449 M4	Grid 6 0.434 M4																		
Grid 7 0.357 M4	Grid 8 0.387 M4	Grid 9 0.375 M4																		

SYSTEM VALIDATION DATA 1900MHz																				
Date/Time: 2008-12-05 10:42:34 Test Laboratory: TCC Nokia Type: CD1880V3; Serial: 1025		Date/Time: 2008-12-05 12:08:19 Test Laboratory: TCC Nokia Type: CD1880V3; Serial: 1025																		
Communication System: CW1880 Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m ³ Phantom section: E Dipole Section		Communication System: CW1880 Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m ³ Phantom section: H Dipole Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2326; Probe Notes: - ConvF(1, 1, 1); Calibrated: 2008-06-19 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176		DASY4 Configuration: - Probe: H3DV6 - SN6058; Probe Notes: - ; Calibrated: 2008-04-11 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176																		
E Scan - ER3DV6 - 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 = 146.9 V/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 152.5 V/m; Power Drift = 0.019 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)		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 = 0.474 A/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 0.496 A/m; Power Drift = 0.035 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)																		
																				
<table><tr><td>Grid 1 127.4 M2</td><td>Grid 2 132.1 M2</td><td>Grid 3 129.7 M2</td></tr><tr><td>Grid 4 88.8 M3</td><td>Grid 5 95.5 M3</td><td>Grid 6 94.8 M3</td></tr><tr><td>Grid 7 138.9 M2</td><td>Grid 8 146.9 M2</td><td>Grid 9 145.3 M2</td></tr></table>		Grid 1 127.4 M2	Grid 2 132.1 M2	Grid 3 129.7 M2	Grid 4 88.8 M3	Grid 5 95.5 M3	Grid 6 94.8 M3	Grid 7 138.9 M2	Grid 8 146.9 M2	Grid 9 145.3 M2	<table><tr><td>Grid 1 0.397 M2</td><td>Grid 2 0.428 M2</td><td>Grid 3 0.419 M2</td></tr><tr><td>Grid 4 0.442 M2</td><td>Grid 5 0.474 M2</td><td>Grid 6 0.463 M2</td></tr><tr><td>Grid 7 0.410 M2</td><td>Grid 8 0.441 M2</td><td>Grid 9 0.429 M2</td></tr></table>	Grid 1 0.397 M2	Grid 2 0.428 M2	Grid 3 0.419 M2	Grid 4 0.442 M2	Grid 5 0.474 M2	Grid 6 0.463 M2	Grid 7 0.410 M2	Grid 8 0.441 M2	Grid 9 0.429 M2
Grid 1 127.4 M2	Grid 2 132.1 M2	Grid 3 129.7 M2																		
Grid 4 88.8 M3	Grid 5 95.5 M3	Grid 6 94.8 M3																		
Grid 7 138.9 M2	Grid 8 146.9 M2	Grid 9 145.3 M2																		
Grid 1 0.397 M2	Grid 2 0.428 M2	Grid 3 0.419 M2																		
Grid 4 0.442 M2	Grid 5 0.474 M2	Grid 6 0.463 M2																		
Grid 7 0.410 M2	Grid 8 0.441 M2	Grid 9 0.429 M2																		

APPENDIX B: MEASUREMENT SCANS

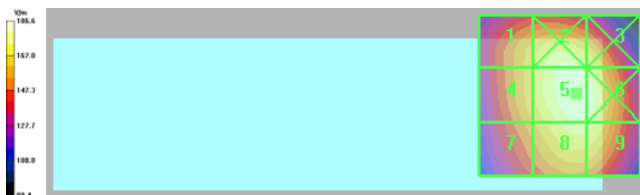
MEASUREMENT DATA GSM850, CHANNEL LOW (824.2 MHz)

Date/Time: 2008-12-04 15:30:45
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: GSM850 (ER3DV6)
Frequency: 824.2 MHz; Duty Cycle: 1:7.34
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 186.6 V/m
Probe Modulation Factor = 2.71
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 84.5 V/m; Power Drift = -0.091 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



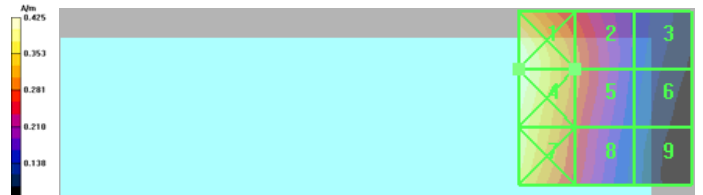
Grid 1	Grid 2	Grid 3
165.8 M3	182.4 M3	177.4 M3
Grid 4	Grid 5	Grid 6
166.1 M3	186.6 M3	184.2 M3
Grid 7	Grid 8	Grid 9
159.3 M3	178.9 M3	177.8 M3

Date/Time: 2008-12-04 12:58:37
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: GSM850 (H3DV6)
Frequency: 824.2 MHz; Duty Cycle: 1:8.29
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: H3DV6 - SN6058
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.425 A/m
Probe Modulation Factor = 2.63
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.079 A/m; Power Drift = -0.009 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.425 M4	0.295 M4	0.159 M4
Grid 4	Grid 5	Grid 6
0.425 M4	0.295 M4	0.155 M4
Grid 7	Grid 8	Grid 9
0.401 M4	0.270 M4	0.139 M4

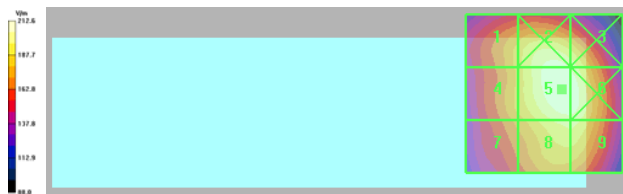
MEASUREMENT DATA GSM850, CHANNEL MIDDLE (836.6 MHz)

Date/Time: 2008-12-04 15:18:20
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: GSM850 (ER3DV6)
Frequency: 836.6 MHz; Duty Cycle: 1:7.34
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Mid/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 212.6 V/m
Probe Modulation Factor = 2.71
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 81.5 V/m; Power Drift = -0.145 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



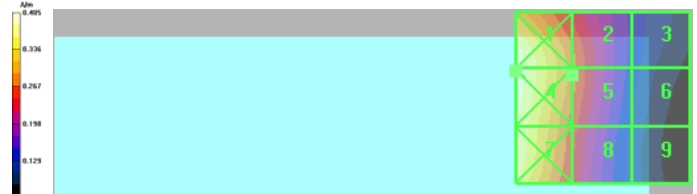
Grid 1	Grid 2	Grid 3
183.3 M3	208.5 M3	202.5 M3
Grid 4	Grid 5	Grid 6
182.9 M3	212.6 M3	210.9 M3
Grid 7	Grid 8	Grid 9
175.0 M3	200.4 M3	200.3 M3

Date/Time: 2008-12-04 12:45:14
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: GSM850 (H3DV6)
Frequency: 836.6 MHz; Duty Cycle: 1:8.29
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: H3DV6 - SN6058
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, mid/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.405 A/m
Probe Modulation Factor = 2.63
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.075 A/m; Power Drift = 0.054 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.405 M4	0.277 M4	0.148 M4
Grid 4	Grid 5	Grid 6
0.405 M4	0.278 M4	0.143 M4
Grid 7	Grid 8	Grid 9
0.387 M4	0.256 M4	0.127 M4

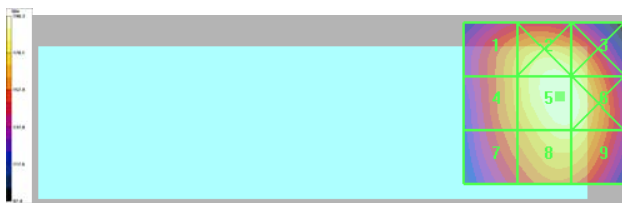
MEASUREMENT DATA GSM850, CHANNEL HIGH (848.8 MHz)

Date/Time: 2008-12-04 15:24:33
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: GSM850 (ER3DV6)
Frequency: 848.8 MHz; Duty Cycle: 1:7.34
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, High/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 198.3 V/m
Probe Modulation Factor = 2.71
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 86.5 V/m; Power Drift = 0.028 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
175.5 M3	194.6 M3	190.3 M3
Grid 4	Grid 5	Grid 6
175.5 M3	198.3 M3	196.4 M3
Grid 7	Grid 8	Grid 9
167.5 M3	188.8 M3	188.3 M3

Date/Time: 2008-12-04 12:52:01
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: GSM850 (H3DV6)
Frequency: 848.8 MHz; Duty Cycle: 1:8.29
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: H3DV6 - SN6058
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, high/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.407 A/m
Probe Modulation Factor = 2.63
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.080 A/m; Power Drift = 0.0006 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.406 M4	0.283 M4	0.165 M4
Grid 4	Grid 5	Grid 6
0.407 M4	0.283 M4	0.154 M4
Grid 7	Grid 8	Grid 9
0.395 M4	0.264 M4	0.133 M4

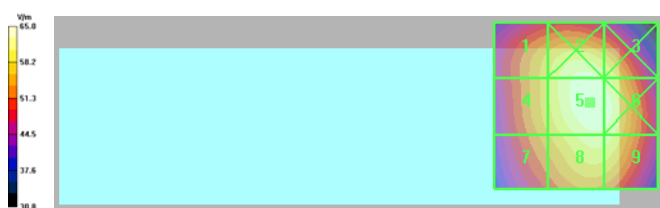
MEASUREMENT DATA WCDMA850, CHANNEL LOW (826.4 MHz)

Date/Time: 2008-12-04 15:52:03
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: WCDMA850
Frequency: 826.4 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 65.02 V/m
Probe Modulation Factor = 0.79
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 100.6 V/m; Power Drift = -0.039 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



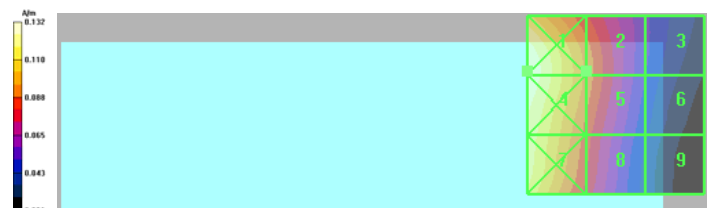
Grid 1	Grid 2	Grid 3
57.9 M4	63.7 M4	61.9 M4
Grid 4	Grid 5	Grid 6
57.9 M4	65.0 M4	64.3 M4
Grid 7	Grid 8	Grid 9
55.7 M4	62.3 M4	62.1 M4

Date/Time: 2008-12-04 13:24:35
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: WCDMA850
Frequency: 826.4 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: H3DV6 - SN6058
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.132 A/m
Probe Modulation Factor = 0.73
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.092 A/m; Power Drift = -0.048 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
0.132 M4	0.093 M4	0.053 M4
Grid 4	Grid 5	Grid 6
0.132 M4	0.093 M4	0.051 M4
Grid 7	Grid 8	Grid 9
0.122 M4	0.085 M4	0.044 M4

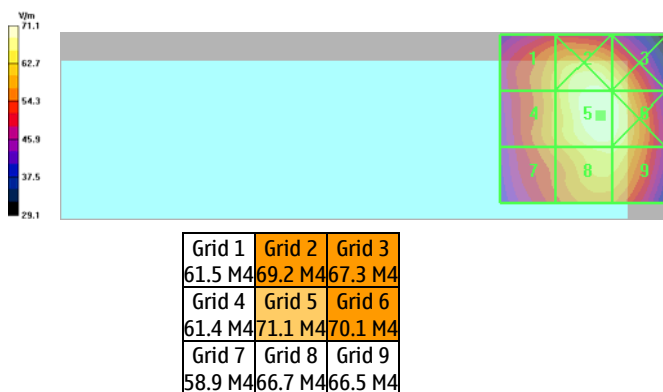
MEASUREMENT DATA WCDMA850, CHANNEL MIDDLE (835 MHz)

Date/Time: 2008-12-04 15:57:30
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: WCDMA850
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Mid/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 71.12 V/m
Probe Modulation Factor = 0.79
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 93.0 V/m; Power Drift = -0.123 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

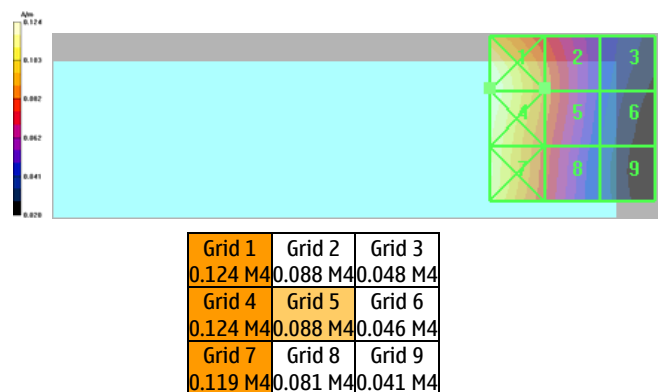


Date/Time: 2008-12-04 13:12:30
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: WCDMA850
Frequency: 835 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: H3DV6 - SN6058
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, mid/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.124 A/m
Probe Modulation Factor = 0.73
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.087 A/m; Power Drift = -0.223 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



MEASUREMENT DATA WCDMA850, CHANNEL HIGH (846.6 MHz)

Date/Time: 2008-12-04 15:46:16
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Date/Time: 2008-12-04 13:18:36
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

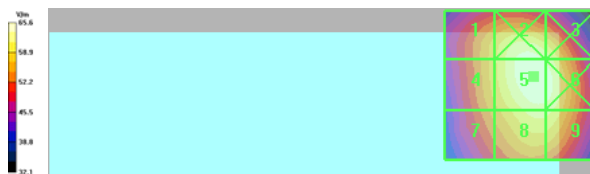
Communication System: WCDMA850
Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: WCDMA850
Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: H3DV6 - SN6058
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 65.57 V/m
Probe Modulation Factor = 0.79
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 99.6 V/m; Power Drift = -0.067 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
58.4 M4	64.6 M4	63.1 M4
Grid 4	Grid 5	Grid 6
58.4 M4	65.6 M4	64.9 M4
Grid 7	Grid 8	Grid 9
55.7 M4	62.3 M4	62.1 M4

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, high/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.121 A/m
Probe Modulation Factor = 0.73
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.087 A/m; Power Drift = 0.055 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
0.121 M4	0.085 M4	0.050 M4
Grid 4	Grid 5	Grid 6
0.121 M4	0.085 M4	0.047 M4
Grid 7	Grid 8	Grid 9
0.115 M4	0.079 M4	0.041 M4

MEASUREMENT DATA GSM1900, CHANNEL LOW (1850.2 MHz)

Date/Time: 2008-12-05 11:18:01
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Date/Time: 2008-12-05 13:22:31
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

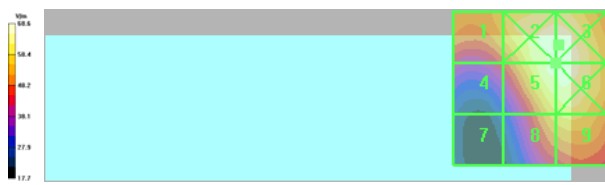
Communication System: GSM1900 (ER3DV6)
Frequency: 1850.2 MHz; Duty Cycle: 1:7.73
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: GSM1900 (H3DV6)
Frequency: 1850.2 MHz; Duty Cycle: 1:6.5
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: H3DV6 - SN6058
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 68.59 V/m
Probe Modulation Factor = 2.84
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 20.6 V/m; Power Drift = 0.202 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



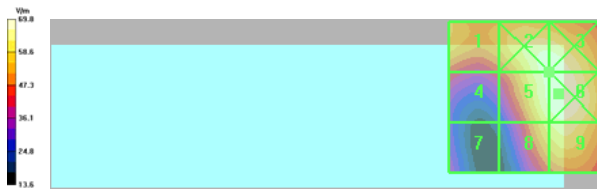
Grid 1	Grid 2	Grid 3
57.9 M3	68.5 M3	68.6 M3
Grid 4	Grid 5	Grid 6
46.5 M4	66.9 M3	67.4 M3
Grid 7	Grid 8	Grid 9
27.9 M4	57.4 M3	59.7 M3

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.239 A/m
Probe Modulation Factor = 2.04
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.069 A/m; Power Drift = 0.249 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

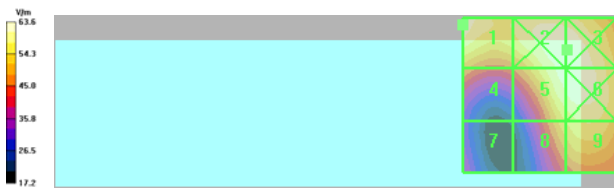


Grid 1	Grid 2	Grid 3
0.239 M3	0.207 M3	0.135 M4
Grid 4	Grid 5	Grid 6
0.224 M3	0.201 M3	0.133 M4
Grid 7	Grid 8	Grid 9
0.161 M3	0.153 M3	0.116 M4

MEASUREMENT DATA GSM1900, CHANNEL MIDDLE (1880 MHz)

Date/Time: 2008-12-05 11:04:46 Test Laboratory: TCC Nokia Type: RM-455; Serial: 004401/10/307247/2	Date/Time: 2008-12-05 13:03:33 Test Laboratory: TCC Nokia Type: RM-455; Serial: 004401/10/307247/2																																				
Communication System: GSM1900 (ER3DV6) Frequency: 1880 MHz; Duty Cycle: 1:7.73 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: E Device Section	Communication System: GSM1900 (H3DV6) Frequency: 1880 MHz; Duty Cycle: 1:6.5 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Device Section																																				
DASY4 Configuration: - Probe: ER3DV6 - SN2326 - ConvF(1, 1, 1); Calibrated: 2008-06-19 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176	DASY4 Configuration: - Probe: H3DV6 - SN6058 - ; Calibrated: 2008-04-11 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176																																				
E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Mid/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 69.8 V/m Probe Modulation Factor = 2.84 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 19.2 V/m; Power Drift = -0.004 dB Hearing Aid Near-Field Category: M3 (AWF -5 dB)  <table><tr><td>Grid 1</td><td>Grid 2</td><td>Grid 3</td></tr><tr><td>60.0 M3</td><td>68.7 M3</td><td>69.2 M3</td></tr><tr><td>Grid 4</td><td>Grid 5</td><td>Grid 6</td></tr><tr><td>45.7 M4</td><td>68.7 M3</td><td>69.8 M3</td></tr><tr><td>Grid 7</td><td>Grid 8</td><td>Grid 9</td></tr><tr><td>35.5 M4</td><td>62.2 M3</td><td>65.2 M3</td></tr></table>	Grid 1	Grid 2	Grid 3	60.0 M3	68.7 M3	69.2 M3	Grid 4	Grid 5	Grid 6	45.7 M4	68.7 M3	69.8 M3	Grid 7	Grid 8	Grid 9	35.5 M4	62.2 M3	65.2 M3	H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, mid/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.207 A/m Probe Modulation Factor = 2.04 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.071 A/m; Power Drift = 0.058 dB Hearing Aid Near-Field Category: M3 (AWF -5 dB)  <table><tr><td>Grid 1</td><td>Grid 2</td><td>Grid 3</td></tr><tr><td>0.207 M3</td><td>0.184 M3</td><td>0.127 M4</td></tr><tr><td>Grid 4</td><td>Grid 5</td><td>Grid 6</td></tr><tr><td>0.204 M3</td><td>0.181 M3</td><td>0.126 M4</td></tr><tr><td>Grid 7</td><td>Grid 8</td><td>Grid 9</td></tr><tr><td>0.164 M3</td><td>0.156 M3</td><td>0.119 M4</td></tr></table>	Grid 1	Grid 2	Grid 3	0.207 M3	0.184 M3	0.127 M4	Grid 4	Grid 5	Grid 6	0.204 M3	0.181 M3	0.126 M4	Grid 7	Grid 8	Grid 9	0.164 M3	0.156 M3	0.119 M4
Grid 1	Grid 2	Grid 3																																			
60.0 M3	68.7 M3	69.2 M3																																			
Grid 4	Grid 5	Grid 6																																			
45.7 M4	68.7 M3	69.8 M3																																			
Grid 7	Grid 8	Grid 9																																			
35.5 M4	62.2 M3	65.2 M3																																			
Grid 1	Grid 2	Grid 3																																			
0.207 M3	0.184 M3	0.127 M4																																			
Grid 4	Grid 5	Grid 6																																			
0.204 M3	0.181 M3	0.126 M4																																			
Grid 7	Grid 8	Grid 9																																			
0.164 M3	0.156 M3	0.119 M4																																			

MEASUREMENT DATA GSM1900, CHANNEL HIGH (1909.8 MHz)

Date/Time: 2008-12-05 11:10:53 Test Laboratory: TCC Nokia Type: RM-455; Serial: 004401/10/307247/2	Date/Time: 2008-12-05 13:10:12 Test Laboratory: TCC Nokia Type: RM-455; Serial: 004401/10/307247/2																																				
Communication System: GSM1900 (ER3DV6) Frequency: 1909.8 MHz; Duty Cycle: 1:7.73 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: E Device Section	Communication System: GSM1900 (H3DV6) Frequency: 1909.8 MHz; Duty Cycle: 1:6.5 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Device Section																																				
DASY4 Configuration: - Probe: ER3DV6 - SN2326 - ConvF(1, 1, 1); Calibrated: 2008-06-19 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176	DASY4 Configuration: - Probe: H3DV6 - SN6058 - ; Calibrated: 2008-04-11 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn858; Calibrated: 2008-06-12 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified - Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176																																				
E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 63.6 V/m Probe Modulation Factor = 2.84 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 19.1 V/m; Power Drift = 0.085 dB Hearing Aid Near-Field Category: M3 (AWF -5 dB)  <table><tr><td>Grid 1</td><td>Grid 2</td><td>Grid 3</td></tr><tr><td>62.5 M3</td><td>63.6 M3</td><td>63.6 M3</td></tr><tr><td>Grid 4</td><td>Grid 5</td><td>Grid 6</td></tr><tr><td>49.6 M3</td><td>62.3 M3</td><td>63.2 M3</td></tr><tr><td>Grid 7</td><td>Grid 8</td><td>Grid 9</td></tr><tr><td>36.9 M4</td><td>54.5 M3</td><td>57.8 M3</td></tr></table>	Grid 1	Grid 2	Grid 3	62.5 M3	63.6 M3	63.6 M3	Grid 4	Grid 5	Grid 6	49.6 M3	62.3 M3	63.2 M3	Grid 7	Grid 8	Grid 9	36.9 M4	54.5 M3	57.8 M3	H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, high/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm Maximum value of peak Total field = 0.20 A/m Probe Modulation Factor = 2.04 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.076 A/m; Power Drift = 0.280 dB Hearing Aid Near-Field Category: M3 (AWF -5 dB)  <table><tr><td>Grid 1</td><td>Grid 2</td><td>Grid 3</td></tr><tr><td>0.200 M3</td><td>0.190 M3</td><td>0.139 M4</td></tr><tr><td>Grid 4</td><td>Grid 5</td><td>Grid 6</td></tr><tr><td>0.197 M3</td><td>0.185 M3</td><td>0.139 M4</td></tr><tr><td>Grid 7</td><td>Grid 8</td><td>Grid 9</td></tr><tr><td>0.162 M3</td><td>0.158 M3</td><td>0.127 M4</td></tr></table>	Grid 1	Grid 2	Grid 3	0.200 M3	0.190 M3	0.139 M4	Grid 4	Grid 5	Grid 6	0.197 M3	0.185 M3	0.139 M4	Grid 7	Grid 8	Grid 9	0.162 M3	0.158 M3	0.127 M4
Grid 1	Grid 2	Grid 3																																			
62.5 M3	63.6 M3	63.6 M3																																			
Grid 4	Grid 5	Grid 6																																			
49.6 M3	62.3 M3	63.2 M3																																			
Grid 7	Grid 8	Grid 9																																			
36.9 M4	54.5 M3	57.8 M3																																			
Grid 1	Grid 2	Grid 3																																			
0.200 M3	0.190 M3	0.139 M4																																			
Grid 4	Grid 5	Grid 6																																			
0.197 M3	0.185 M3	0.139 M4																																			
Grid 7	Grid 8	Grid 9																																			
0.162 M3	0.158 M3	0.127 M4																																			

MEASUREMENT DATA WCDMA1900, CHANNEL LOW (1852.4MHz)

Date/Time: 2008-12-05 11:43:40
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Date/Time: 2008-12-05 12:44:40
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: WCDMA1900
Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: WCDMA1900
Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

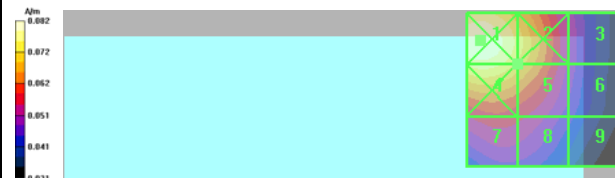
DASY4 Configuration:
- Probe: H3DV6 - SN6058; Probe Notes:
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 27.03 V/m
Probe Modulation Factor = 0.80
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 27.4 V/m; Power Drift = 0.010 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
22.4 M4	27 M4	27 M4
Grid 4	Grid 5	Grid 6
17.9 M4	26.4 M4	26.7 M4
Grid 7	Grid 8	Grid 9
11.6 M4	21.8 M4	22.8 M4

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, Low/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.082 A/m
Probe Modulation Factor = 0.59
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.091 A/m; Power Drift = 0.148 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
0.082 M4	0.074 M4	0.051 M4
Grid 4	Grid 5	Grid 6
0.077 M4	0.071 M4	0.051 M4
Grid 7	Grid 8	Grid 9
0.058 M4	0.056 M4	0.046 M4

MEASUREMENT DATA WCDMA1900, CHANNEL MIDDLE (1880MHz)

Date/Time: 2008-12-05 11:49:01
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Date/Time: 2008-12-05 12:31:42
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

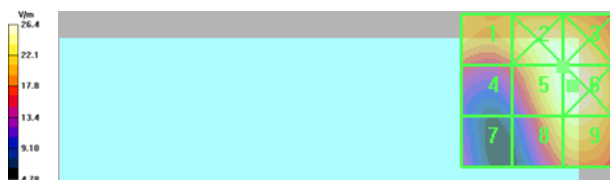
Communication System: WCDMA1900
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: WCDMA1900
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: H3DV6 - SN6058; Probe Notes:
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, Mid/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 26.4 V/m
Probe Modulation Factor = 0.80
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 26.1 V/m; Power Drift = -0.087 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
22.4 M4	26.1 M4	26.2 M4
Grid 4	Grid 5	Grid 6
17.4 M4	26.1 M4	26.4 M4
Grid 7	Grid 8	Grid 9
13.4 M4	23.7 M4	24.5 M4

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, mid/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.072 A/m
Probe Modulation Factor = 0.59
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.090 A/m; Power Drift = -0.108 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
0.072 M4	0.066 M4	0.047 M4
Grid 4	Grid 5	Grid 6
0.070 M4	0.065 M4	0.047 M4
Grid 7	Grid 8	Grid 9
0.056 M4	0.055 M4	0.044 M4

MEASUREMENT DATA WCDMA1900, CHANNEL HIGH (1907.6MHz)

Date/Time: 2008-12-05 11:37:56
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Date/Time: 2008-12-05 12:37:25
Test Laboratory: TCC Nokia
Type: RM-455; Serial: 004401/10/307247/2

Communication System: WCDMA1900
Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: WCDMA1900
Frequency: 1907.6 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2326; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2008-06-19
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

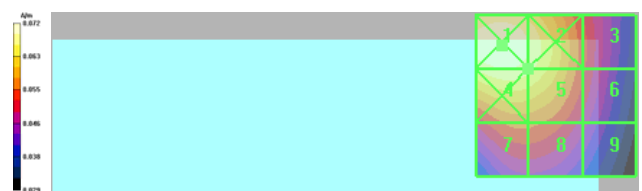
DASY4 Configuration:
- Probe: H3DV6 - SN6058; Probe Notes:
- ; Calibrated: 2008-04-11
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn858; Calibrated: 2008-06-12
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: Not Specified
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance, sensor center to the Device = 15mm, High/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 24.8 V/m
Probe Modulation Factor = 0.80
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 26.9 V/m; Power Drift = -0.057 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
24.4 M4	24.6 M4	24.8 M4
Grid 4	Grid 5	Grid 6
19.1 M4	24.5 M4	24.8 M4
Grid 7	Grid 8	Grid 9
13.0 M4	21.7 M4	23.0 M4

H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, high/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.072 A/m
Probe Modulation Factor = 0.59
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.099 A/m; Power Drift = -0.105 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
0.072 M4	0.069 M4	0.054 M4
Grid 4	Grid 5	Grid 6
0.069 M4	0.067 M4	0.053 M4
Grid 7	Grid 8	Grid 9
0.056 M4	0.056 M4	0.048 M4

APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

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



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

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

Accreditation No.: **SCS 108**

Client **Nokia SD TCC**

Certificate No: **ER3-2326_Jun08**

CALIBRATION CERTIFICATE

Object **ER3DV6 - SN:2326**

Calibration procedure(s) **QA CAL-02.v5
Calibration procedure for E-field probes optimized for close near field
evaluations in air**

Calibration date: **June 19, 2008**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (No. 217-00720)	Aug-08
Reference Probe ER3DV6	SN: 2328	2-Oct-07 (No. ER3-2328_Oct07)	Oct-08
DAE4	SN: 654	24-Apr-08 (No. DAE4-654_Apr08)	Apr-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: June 19, 2008

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

Certificate No: ER3-2326_Jun08

Page 1 of 9

HAC RF Emissions Report
SD_HAC_0849_06
Applicant: Nokia Corporation

Type: RM-455

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



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

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

Accreditation No.: **SCS 108**

Client **Nokia SD TCC**

Certificate No: **H3-6058_Apr08**

CALIBRATION CERTIFICATE

Object **H3DV6 - SN:6058**

Calibration procedure(s) **QA CAL-03.v5**
Calibration procedure for H-field probes optimized for close near field
evaluations in air

Calibration date: **April 11, 2008**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (No. 217-00719)	Aug-08
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (No. 217-00720)	Aug-08
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 654	20-Apr-07 (No. DAE4-654_Apr07)	Apr-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

Calibrated by: **Katja Pokovic** **Technical Manager** 

Approved by: **Niels Kuster** **Quality Manager** 

Issued: April 11, 2008

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

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

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



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

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

Accreditation No.: **SCS 108**

Client **Nokia SD TCC**

Certificate No: **CD835V3-1032_Jun08**

CALIBRATION CERTIFICATE

Object **CD835V3 - SN: 1032**

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

Calibration date: **June 24, 2008**

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 (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Probe ER3DV6	SN: 2336	31-Dec-07 (No. ER3-2336_Dec07)	Dec-08
Probe H3DV6	SN: 6065	31-Dec-07 (No. H3-6065_Dec07)	Dec-08
DAE4	SN: 781	2-Oct-07 (No. DAE4-781_Oct07)	Oct-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08
Power sensor HP 8482A	US37295597	11-May-05 (in house check Oct -07)	In house check: Oct-08
Power sensor HP 8482H	3318A09450	08-Jan-02 (in house check Oct -07)	In house check: Oct-08
Power meter EPM-4419B	GB42420191	11-May-05 (in house check Oct -07)	In house check: Oct-08
RF generator E4433B	MY 41310391	22-Nov-04 (in house check Oct-07)	In house check: Oct-09

Calibrated by: **Claudio Leubler** **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** **Technical Manager**

Issued: June 25, 2008

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

3.3.2 DASY4 H-field result

Date/Time: 24.06.2008 10:01:50

Test Laboratory: SPEAG Lab 2

H_CD835_1032_080624

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1032

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: RF Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - 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 = 0.445 A/m

Probe Modulation Factor = 1.00

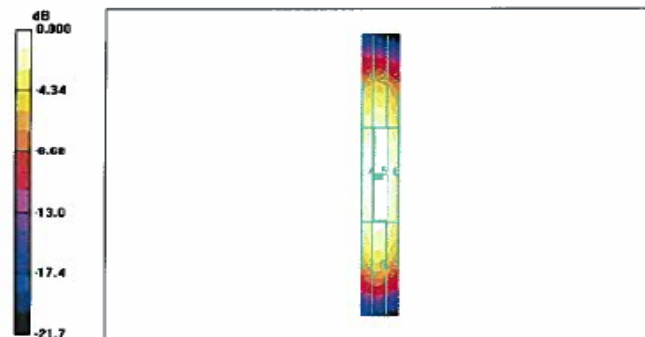
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.468 A/m; Power Drift = 0.016 dB

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

Peak H-field in A/m

Grid 1 0.378 M4	Grid 2 0.385 M4	Grid 3 0.348 M4
Grid 4 0.433 M4	Grid 5 0.445 M4	Grid 6 0.405 M4
Grid 7 0.387 M4	Grid 8 0.402 M4	Grid 9 0.367 M4



0 dB = 0.445A/m

3.3.3 DASY4 E-field result

Date/Time: 24.06.2008 15:15:52

Test Laboratory: SPEAG Lab 2

E_CD835_1032_080624

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1032

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: RF Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - 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 = 156.9 V/m

Probe Modulation Factor = 1.00

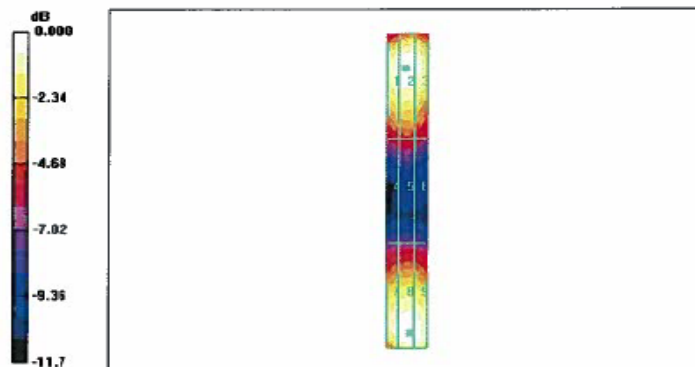
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 100.9 V/m; Power Drift = -0.014 dB

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

Peak E-field in V/m

Grid 1 150.7 M4	Grid 2 154.1 M4	Grid 3 147.8 M4
Grid 4 87.2 M4	Grid 5 89.3 M4	Grid 6 86.7 M4
Grid 7 149.4 M4	Grid 8 156.9 M4	Grid 9 155.3 M4



0 dB = 156.9V/m

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



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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 **Nokia SD TCC**

Certificate No: **CD1880V3-1025_Jun08**

CALIBRATION CERTIFICATE

Object **CD1880V3 - SN: 1025**

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

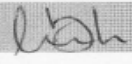
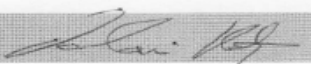
Calibration date: **June 24, 2008**

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 (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Probe ER3DV6	SN: 2336	31-Dec-07 (No. ER3-2336_Dec07)	Dec-08
Probe H3DV6	SN: 6065	31-Dec-07 (No. H3-6065_Dec07)	Dec-08
DAE4	SN: 781	2-Oct-07 (No. DAE4-781_Oct07)	Oct-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08
Power sensor HP 8482A	US37295597	11-May-05 (in house check Oct -07)	In house check: Oct-08
Power sensor HP 8482H	3318A09450	08-Jan-02 (in house check Oct -07)	In house check: Oct-08
Power meter EPM-4419B	GB42420191	11-May-05 (in house check Oct -07)	In house check: Oct-08
RF generator E4433B	MY 41310391	22-Nov-04 (in house check Oct-07)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 25, 2008

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

3.3.2 DASY4 H-Field Result

Date/Time: 24.06.2008 10:51:01

Test Laboratory: SPEAG Lab 2

H_CD1880_1025_080624

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1025

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: RF Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with AMCC; Type: SJ HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

H Scan - 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 = 0.472 A/m

Probe Modulation Factor = 1.00

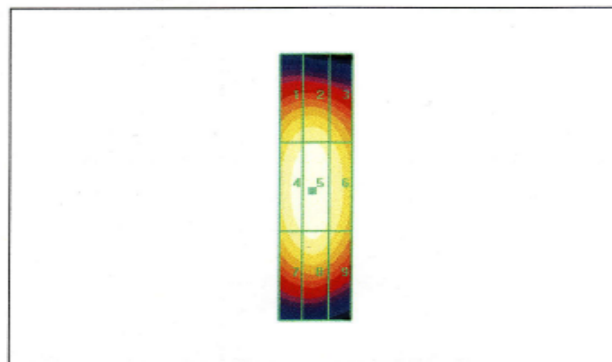
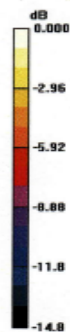
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.497 A/m; Power Drift = -0.018 dB

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

Peak H-field in A/m

Grid 1 0.414 M2	Grid 2 0.423 M2	Grid 3 0.389 M2
Grid 4 0.460 M2	Grid 5 0.472 M2	Grid 6 0.434 M2
Grid 7 0.426 M2	Grid 8 0.440 M2	Grid 9 0.402 M2



0 dB = 0.472A/m

3.3.2 DASY4 E-Field Result

Date/Time: 24.06.2008 13:02:57

Test Laboratory: SPEAG Lab 2

E_CD1880_1025_080624

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1025

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: RF Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 31.12.2007
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 02.10.2007
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

E Scan - 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 = 141.5 V/m

Probe Modulation Factor = 1.00

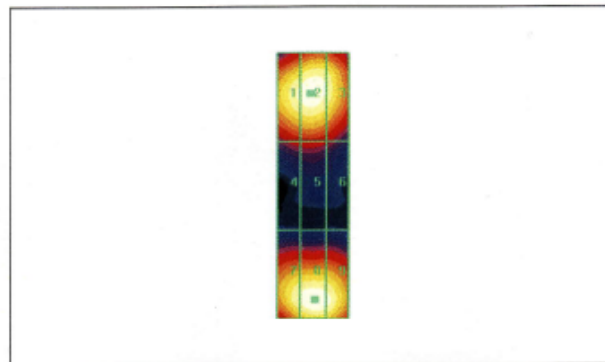
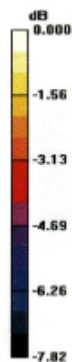
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 162.6 V/m; Power Drift = -0.023 dB

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

Peak E-field in V/m

Grid 1 135.7 M2	Grid 2 139.6 M2	Grid 3 133.0 M2
Grid 4 94.4 M3	Grid 5 96.3 M3	Grid 6 90.8 M3
Grid 7 135.1 M2	Grid 8 141.5 M2	Grid 9 138.2 M2



0 dB = 141.5V/m