

HAC RF Emissions Test Report

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Measurements made by:	Janne Hirsimäki		
Tested devices:	RM-808		
FCC ID:	QMNRM-808	IC:	661X-RM808
Supplement reports:	T-Coil_RM-808_01, HAC_Photo_RM-808_03		
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	2011-10-24 to 2011-11-08
SN, HW, SW and DUT numbers of tested device	SN: 004402/13/683120/7, HW: 0150, SW: 2130.0000.8070.11390, DUT: 16013 SN: 004402/13/683090/2, HW: 0150, SW: 2130.0000.8070.11390, DUT: 16014 SN: 004402/13/683123/1, HW: 0150, SW: 2130.0000.8070.11390, DUT: 16016
Batteries used in testing	-
State of sample	Prototype unit
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

Mode	Ch / Freq [MHz]	Conducted power	Limit of E-field max. value in category M3 [V/m]	Maximum E-field value after exclusion [V/m]	Category
GSM850	128 / 824.2	32.51 dBm	149.6 – 266.1	225.6	M3 (-5dB)
WCDMA850	4175 / 835.0	23.43 dBm	199.5 – 354.8	69.7	M4 (0dB)
WCDMA1700/2100	1413 / 1732.6	23.16 dBm	63.1 – 112.2	50.8	M4 (0dB)
GSM1900	810 / 1909.8	29.75 dBm	47.3 – 84.1	83.6	M3 (-5dB)
WCDMA1900	9262 / 1852.4	23.10 dBm	63.1 – 112.2	46.5	M4 (0dB)

1.2.2 Magnetic field measurements

Mode	Ch / Freq [MHz]	Conducted power	Limit of H-field max. value in category M3 [A/m]	Maximum H-field value after exclusion [A/m]	Category
GSM850	128 / 824.2	32.51 dBm	0.45 – 0.80	0.348	M4 (-5dB)
WCDMA850	4175 / 835.0	23.43 dBm	0.60 – 1.07	0.137	M4 (0dB)
WCDMA1700/2100	1513 / 1752.6	23.32 dBm	0.19 – 0.34	0.167	M4 (0dB)
GSM1900	661 / 1880.0	29.42 dBm	0.14 – 0.25	0.249	M3 (-5dB)
WCDMA1900	9400 / 1880.0	23.20 dBm	0.19 – 0.34	0.140	M4 (0dB)

1.2.3 Overall RF emissions category of the tested device

Mode	Combined category (E- and H-fields)	Pass / Fail
GSM850	M3	Pass
WCDMA850	M4	Pass
WCDMA 1700/2100	M4	Pass
GSM1900	M3	Pass
WCDMA1900	M4	Pass
Final Category	M3	Pass

1.2.4 Maximum Drift

Maximum drift during measurements	0.26 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

Air-interface	Band (MHz)	Type	C63.19/ tested	Simultaneous Transmissions Note: not to be tested	Concurrent single transmission	Reduced power 20.19 (c) (1)	Voice Over Digital Transport (Data)
GSM	850	VO	Yes	Yes BT, WLAN	Yes: WCDMA Rated	No	NA
	1900				GPRS/EDGE, LTE, BT, WLAN Not rated	No	NA
	GPRS/EDGE	DT	NA	Yes BT, WLAN	Yes: * see note	NA*	YES
WCDMA	850 1700/2100 1900	V/D	Yes	Yes BT, WLAN	Yes: GSM Rated LTE Not Rated	No	YES
LTE	700 1700/2100	V/D	NA	Yes BT, WLAN	Yes: GSM Rated WCDMA Rated	NA*	YES
BT	2450	DT	NA	Yes GSM, GPRS/EDGE, WCDMA, LTE	NA*	NA*	NO
WLAN	2450	DT	NA	Yes GSM, GPRS/EDGE, WCDMA, LTE	NA*	NA*	YES

VO Voice CMRS/PSTN Service Only

V/D Voice CMRS/PSTN and Data Service

DT Digital Transport

*HAC Rating was not based on concurrent voice and data modes, Non current mode was found to represent worst case rating for both M and T rating.

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.

2.1 Picture of Device

See separate report HAC_Photo_RM-808_03.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature [°C]:	21.0 to 23.0
Ambient humidity [RH %]:	30 to 60

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.

The device output power was set to maximum power level for all tests; 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 lowest, middle and highest channels.

The radiated output power of the device was measured by a separate test laboratory on the same unit as used for HAC testing. The results are given in the EMC report supporting this application.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement system and components

The measurements were performed using an automated near-field scanning system, DASY5, 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	1213	12 months	2012-02
E-field Probe ER3DV6	2309	12 months	2012-05
H-field Probe H3DV6	6143	12 months	2012-05
Dipole Validation Kit, CD835V3	1004	24 months	2012-09
Dipole Validation Kit, CD1880V3	1003	24 months	2012-09
DASY52 software	Version 52.6	-	-

Additional test equipment used in testing and validation:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	SML03	101265	12 months	2012-08
Amplifier	ZHL-42 (SMA)	N072095-5	12 months	2012-08
Power Meter	NRVS	838624/032	12 months	2012-08
Power Sensor	NRV-Z32	100067	12 months	2012-08
Call Tester	CMU 200	101111	-	-

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 (www.speag.com). 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 10mm 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	168.5	0.464
	± 10% window	151.7 – 185.4	0.418 – 0.510
	2011-11-01	169.5	0.460
1880 1700/2100*	Reference result	135.1	0.458
	± 10% window	121.6 – 148.6	0.412 – 0.504
	2011-10-24	136.2	0.461
	2011-11-08	139.6	0.478

* No specific solution provided by system vendor to verify system performance on WCDMA 1700/2100 frequency band. However the frequency is in range of $1880 \pm 10\%$ in which probes (ER3DV6, H3DV6) are found practically linear according to the calibration documentation. Therefore system validation and probe modulation factor determination results of WCDMA1900 have been applied.

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 Test Positions

5.2.1 Scan area centered at the acoustic output

The device was positioned such that Device Reference plane was touching the bottom of the Test Arch. The scan is centered at the acoustic output by aligning the acoustic output with the intersection of the Test Arch's middle bar and dielectric wire.

5.3 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 15mm. 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.

5.4 Probe Modulation Factor

All raw measurements in DASY52 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. Modulation specific PMF values are included in the probe calibration parameters.

5.5 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 the 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.

5.6 Category Limits

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

		Limits for RF-parameters <960MHz	
Category	AWF [dB]	E-field [V/m]	H-field [A/m]
M1	0	631.0 to 1122.0	1.91 to 3.39
	-5	473.2 to 841.4	1.43 to 2.54
M2	0	354.8 to 631.0	1.07 to 1.91
	-5	266.1 to 473.2	0.80 to 1.43
M3	0	199.5 to 354.8	0.60 to 1.07
	-5	149.6 to 266.1	0.45 to 0.80
M4	0	<199.5	<0.60
	-5	<149.6	<0.45

		Limits for RF-parameters >960MHz	
Category	AWF [dB]	E-field [V/m]	H-field [A/m]
M1	0	199.5 to 354.8	0.60 to 1.07
	-5	149.6 to 266.1	0.45 to 0.80
M2	0	112.2 to 199.5	0.34 to 0.60
	-5	84.1 to 149.6	0.25 to 0.45
M3	0	63.1 to 112.2	0.19 to 0.34
	-5	47.3 to 84.1	0.14 to 0.25
M4	0	<63.1	<0.19
	-5	<47.3	<0.14

6. MEASUREMENT UNCERTAINTY

Source of Uncertainty	Tolerance ±%	Prob. Dist.	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:

GSM850, RF emissions results

Mode	Test configuration	Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.6 MHz
GSM850	Power	32.51 dBm	32.63 dBm	32.82 dBm
	E-field [V/m]	225.6	193.3	188.3
	H-field [A/m]	0.348	0.296	0.286
	Category	M3 (-5 dB)	M3 (-5 dB)	M3 (-5 dB)

WCDMA850, RF emissions results

Mode	Test configuration	Ch 4132 826.4 MHz	Ch 4175 835.0 MHz	Ch 4233 846.6 MHz
WCDMA850	Power	23.22 dBm	23.43 dBm	23.49 dBm
	E-field [V/m]	63.2	69.7	48.4
	H-field [A/m]	0.102	0.137	0.076
	Category	M4 (0 dB)	M4 (0 dB)	M4 (0 dB)

WCDMA1700/2100, RF emissions results

Mode	Test configuration	Ch 1312 1712.4 MHz	Ch 1413 1732.6 MHz	Ch 1513 1752.6 MHz
WCDMA 1700/2100	Power	23.16 dBm	23.16 dBm	23.32 dBm
	E-field [V/m]	47.6	50.8	49.4
	H-field [A/m]	0.156	0.155	0.167
	Category	M4 (0 dB)	M4 (0 dB)	M4 (0 dB)

GSM1900, RF emissions results

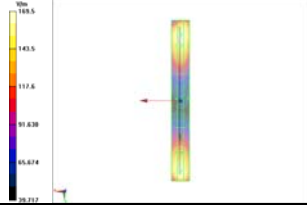
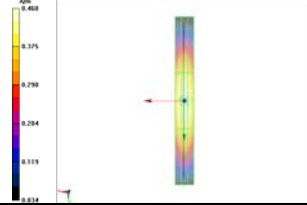
Mode	Test configuration	Ch 512 1850.2MHz	Ch 661 1880.0MHz	Ch 810 1909.8MHz
GSM1900	Power	29.68 dBm	29.42 dBm	29.75 dBm
	E-field [V/m]	82.9	81.3	83.6
	H-field [A/m]	0.249	0.249	0.248
	Category	M3 (-5 dB)	M3 (-5 dB)	M3 (-5 dB)

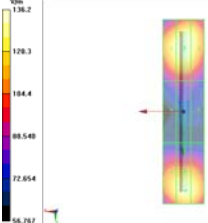
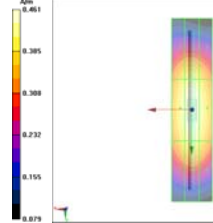
WCDMA1900, RF emissions results

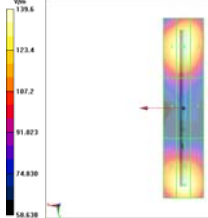
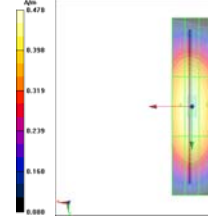
Mode	Test configuration	Ch 9262 1852.4MHz	Ch 9400 1880.0MHz	Ch 9538 1907.6MHz
WCDMA1900	Power	23.10 dBm	23.20 dBm	23.10 dBm
	E-field [V/m]	46.5	42.5	42.0
	H-field [A/m]	0.136	0.140	0.130
	Category	M4 (0 dB)	M4 (0 dB)	M4 (0 dB)

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: 2011-11-01 20:03:05 Test Laboratory: TCC Nokia Type: CD835V3; Serial: 1004					Date/Time: 2011-11-01 20:52:34 Test Laboratory: TCC Nokia Type: CD835V3; Serial: 1004				
Communication System: CW Frequency: 835 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m ³ Phantom section: RF Section DASY Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2011-05-09 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn1213; Calibrated: 2011-02-14 - Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; - Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)					Communication System: CW Frequency: 835 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m ³ Phantom section: RF Section DASY Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2011-05-10 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn1213; Calibrated: 2011-02-14 - Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; - Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)				
Dipole E-Field measurement 835MHz/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 = 169.5 V/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 107.2 V/m; Power Drift = 0.05 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)					Dipole H-Field measurement with H3DV6 835MHz/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 = 0.460 A/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.487 A/m; Power Drift = 0.05 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)				
									
Grid 1 163.3 M4	Grid 2 169.5 M4	Grid 3 166.2 M4			Grid 1 0.386 M4	Grid 2 0.404 M4	Grid 3 0.378 M4		
Grid 4 91.053 M4	Grid 5 94.018 M4	Grid 6 91.113 M4			Grid 4 0.439 M4	Grid 5 0.460 M4	Grid 6 0.434 M4		
Grid 7 161.5 M4	Grid 8 167.1 M4	Grid 9 161.0 M4			Grid 7 0.391 M4	Grid 8 0.413 M4	Grid 9 0.389 M4		

SYSTEM VALIDATION DATA 1900MHZ									
Date/Time: 2011-10-24 7:28:33 Test Laboratory: TCC Nokia Type: CD1880V3; Serial: 1003					Date/Time: 2011-10-24 7:43:42 Test Laboratory: TCC Nokia Type: CD1880V3; Serial: 1003				
Communication System: CW Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m ³ Phantom section: RF Section DASY Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2011-05-09 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn1213; Calibrated: 2011-02-14 - Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; - Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)					Communication System: CW Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m ³ Phantom section: RF Section DASY Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2011-05-10 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn1213; Calibrated: 2011-02-14 - Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; - Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)				
Dipole E-Field measurement 1880MHz/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 = 136.2 V/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 150.6 V/m; Power Drift = -0.07 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)					Dipole H-Field measurement with H3DV6 1880MHz/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 = 0.461 A/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.490 A/m; Power Drift = 0.01 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)				
									
Grid 1 131.3 M2	Grid 2 136.2 M2	Grid 3 132.8 M2			Grid 1 0.399 M2	Grid 2 0.417 M2	Grid 3 0.394 M2		
Grid 4 91.007 M3	Grid 5 93.186 M3	Grid 6 89.414 M3			Grid 4 0.440 M2	Grid 5 0.461 M2	Grid 6 0.438 M2		
Grid 7 126.8 M2	Grid 8 133.1 M2	Grid 9 131.4 M2			Grid 7 0.404 M2	Grid 8 0.426 M2	Grid 9 0.403 M2		

SYSTEM VALIDATION DATA 1900MHZ			
Date/Time: 2011-11-08 9:44:49 Test Laboratory: TCC Nokia Type: CD1880V3; Serial: 1003		Date/Time: 2011-11-08 11:40:41 Test Laboratory: TCC Nokia Type: CD1880V3; Serial: 1003	
Communication System: CW Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m ³ Phantom section: RF Section DASY Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2011-05-09 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn1213; Calibrated: 2011-02-14 - Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; - Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)		Communication System: CW Frequency: 1880 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: Not Specified Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m ³ Phantom section: RF Section DASY Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2011-05-10 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn1213; Calibrated: 2011-02-14 - Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; - Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)	
Dipole E-Field measurement 1880MHz/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 = 139.6 V/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 157.1 V/m; Power Drift = 0.03 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)		Dipole H-Field measurement with H3DV6 1880MHz/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 = 0.478 A/m Probe Modulation Factor = 1.000 Device Reference Point: 0, 0, -6.3 mm Reference Value = 0.503 A/m; Power Drift = 0.06 dB Hearing Aid Near-Field Category: M2 (AWF 0 dB)	
			
Grid 1 135.9 M2	Grid 2 139.6 M2	Grid 3 134.6 M2	
Grid 4 95.717 M3	Grid 5 97.260 M3	Grid 6 92.176 M3	
Grid 7 134.0 M2	Grid 8 139.5 M2	Grid 9 136.3 M2	
Grid 1 0.410 M2	Grid 2 0.424 M2	Grid 3 0.397 M2	
Grid 4 0.461 M2	Grid 5 0.478 M2	Grid 6 0.449 M2	
Grid 7 0.427 M2	Grid 8 0.445 M2	Grid 9 0.416 M2	

APPENDIX B: MEASUREMENT SCANS

Date/Time: 2011-11-01 20:36:49, Date/Time: 2011-11-01 21:08:39

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: GSM-FDD (TDMA, GMSK)

Frequency: 824.2 MHz; Duty Cycle: 1:8.31764

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, - Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - GSM850 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 225.6 V/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 98.812 V/m; Power Drift = 0.02 dB

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

Device H-Field measurement/H Scan - GSM850 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.348 A/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.088 A/m; Power Drift = -0.0063 dB

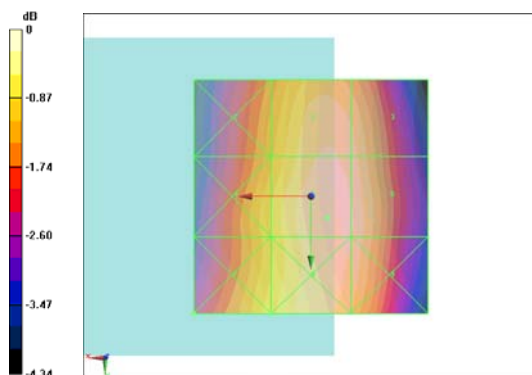
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1 196.1 M3	Grid 2 219.3 M3	Grid 3 214.4 M3
Grid 4 205.5 M3	Grid 5 225.6 M3	Grid 6 219.9 M3
Grid 7 209.1 M3	Grid 8 224.2 M3	Grid 9 218.6 M3

Peak H-field in A/m

Grid 1 0.432 M4	Grid 2 0.315 M4	Grid 3 0.193 M4
Grid 4 0.414 M4	Grid 5 0.312 M4	Grid 6 0.205 M4
Grid 7 0.463 M3	Grid 8 0.348 M4	Grid 9 0.234 M4



Date/Time: 2011-11-01 20:31:53, Date/Time: 2011-11-01 21:03:44

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: GSM-FDD (TDMA, GMSK)

Frequency: 836.6 MHz; Duty Cycle: 1:8.31764

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - GSM850 - Middle/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 193.3 V/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 84.064 V/m; Power Drift = -0.01 dB

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

Device H-Field measurement/H Scan - GSM850 - Middle/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.296 A/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.074 A/m; Power Drift = -0.08 dB

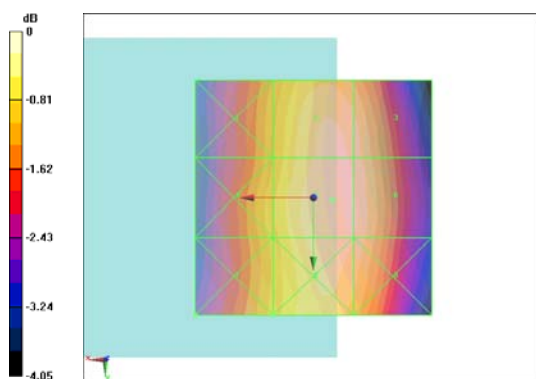
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1 170.7 M3	Grid 2 190.3 M3	Grid 3 185.5 M3
Grid 4 175.5 M3	Grid 5 193.3 M3	Grid 6 188.9 M3
Grid 7 173.4 M3	Grid 8 191.7 M3	Grid 9 187.3 M3

Peak H-field in A/m

Grid 1 0.376 M4	Grid 2 0.270 M4	Grid 3 0.160 M4
Grid 4 0.350 M4	Grid 5 0.261 M4	Grid 6 0.171 M4
Grid 7 0.393 M4	Grid 8 0.296 M4	Grid 9 0.201 M4



Date/Time: 2011-11-01 20:42:03, Date/Time: 2011-11-01 21:13:46
Test Laboratory: TCC Nokia
Type: RM-808; Serial: 004402/13/683120/7

Communication System: GSM-FDD (TDMA, GMSK)
Frequency: 848.6 MHz; Duty Cycle: 1:8.31764
Medium: Air;
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m³
Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - GSM850 - High/Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 188.3 V/m
Probe Modulation Factor = 2.877
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 82.123 V/m; Power Drift = -0.26 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Device H-Field measurement/H Scan - GSM850 - High/Hearing Aid Compatibility Test (101x101x1):

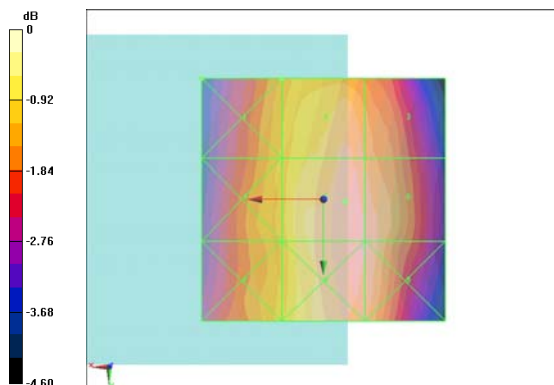
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.286 A/m
Probe Modulation Factor = 2.877
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.072 A/m; Power Drift = -0.02 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)

Peak E-field in V/m

Grid 1 165.3 M3	Grid 2 183.3 M3	Grid 3 174.8 M3
Grid 4 167.5 M3	Grid 5 188.3 M3	Grid 6 182.7 M3
Grid 7 167.4 M3	Grid 8 187.5 M3	Grid 9 182.9 M3

Peak H-field in A/m

Grid 1 0.390 M4	Grid 2 0.286 M4	Grid 3 0.181 M4
Grid 4 0.348 M4	Grid 5 0.258 M4	Grid 6 0.160 M4
Grid 7 0.363 M4	Grid 8 0.265 M4	Grid 9 0.167 M4



Date/Time: 2011-11-01 20:19:19, Date/Time: 2011-11-01 21:25:33

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: UMTS-FDD (WCDMA)

Frequency: 826.4 MHz; Duty Cycle: 1:2.18776

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA5 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 63.233 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 76.896 V/m; Power Drift = 0.04 dB

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

Device H-Field measurement/H Scan - WCDMA5 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.102 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.070 A/m; Power Drift = -4.1e-005 dB

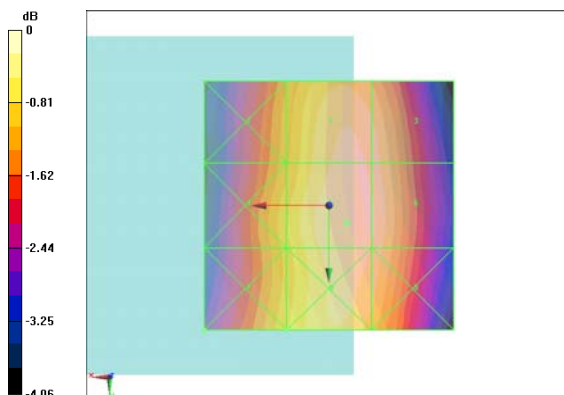
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 55.504 M4	Grid 2 62.033 M4	Grid 3 60.672 M4
Grid 4 57.381 M4	Grid 5 63.233 M4	Grid 6 61.663 M4
Grid 7 57.475 M4	Grid 8 62.667 M4	Grid 9 61.157 M4

Peak H-field in A/m

Grid 1 0.127 M4	Grid 2 0.090 M4	Grid 3 0.054 M4
Grid 4 0.120 M4	Grid 5 0.090 M4	Grid 6 0.060 M4
Grid 7 0.134 M4	Grid 8 0.102 M4	Grid 9 0.070 M4



Date/Time: 2011-11-01 20:13:24, Date/Time: 2011-11-01 21:19:48

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: UMTS-FDD (WCDMA)

Frequency: 835 MHz; Duty Cycle: 1:2.18776

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA5 - Middle/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 69.723 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 83.600 V/m; Power Drift = 0.04 dB

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

Device H-Field measurement/H Scan - WCDMA5 - Middle/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.137 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.074 A/m; Power Drift = 0.02 dB

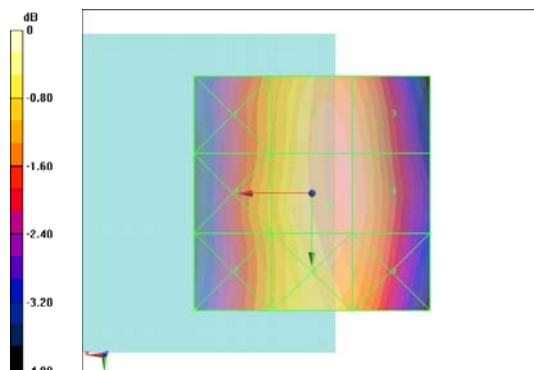
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 60.958 M4	Grid 2 68.810 M4	Grid 3 67.290 M4
Grid 4 62.475 M4	Grid 5 69.723 M4	Grid 6 68.083 M4
Grid 7 61.552 M4	Grid 8 68.802 M4	Grid 9 67.312 M4

Peak H-field in A/m

Grid 1 0.137 M4	Grid 2 0.097 M4	Grid 3 0.058 M4
Grid 4 0.128 M4	Grid 5 0.095 M4	Grid 6 0.062 M4
Grid 7 0.143 M4	Grid 8 0.109 M4	Grid 9 0.075 M4



Date/Time: 2011-11-01 20:25:15, Date/Time: 2011-11-01 21:31:16

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: UMTS-FDD (WCDMA)

Frequency: 846.6 MHz; Duty Cycle: 1:2.18776

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA5 - High/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 48.380 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 57.168 V/m; Power Drift = 0.06 dB

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

Device H-Field measurement/H Scan - WCDMA5 - High/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.076 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.054 A/m; Power Drift = 0.02 dB

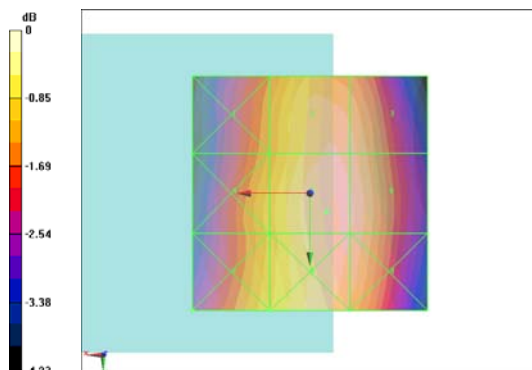
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 41.562 M4	Grid 2 47.074 M4	Grid 3 46.123 M4
Grid 4 43.427 M4	Grid 5 48.380 M4	Grid 6 47.219 M4
Grid 7 43.911 M4	Grid 8 48.002 M4	Grid 9 46.918 M4

Peak H-field in A/m

Grid 1 0.097 M4	Grid 2 0.071 M4	Grid 3 0.043 M4
Grid 4 0.091 M4	Grid 5 0.069 M4	Grid 6 0.044 M4
Grid 7 0.100 M4	Grid 8 0.076 M4	Grid 9 0.050 M4



Date/Time: 2011-10-24 12:17:08, Date/Time: 2011-10-24 11:38:29

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: UMTS-FDD (WCDMA)

Frequency: 1712.4 MHz; Duty Cycle: 1:2.18776

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA4 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 46.747 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 42.181 V/m; Power Drift = -0.05 dB

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

Device H-Field measurement/H Scan - WCDMA4 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.156 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.131 A/m; Power Drift = -0.05 dB

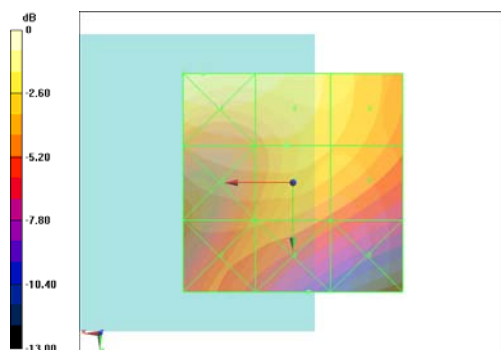
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 46.747 M4	Grid 2 43.701 M4	Grid 3 42.022 M4
Grid 4 30.348 M4	Grid 5 45.526 M4	Grid 6 45.529 M4
Grid 7 42.682 M4	Grid 8 51.870 M4	Grid 9 50.644 M4

Peak H-field in A/m

Grid 1 0.164 M4	Grid 2 0.156 M4	Grid 3 0.137 M4
Grid 4 0.137 M4	Grid 5 0.137 M4	Grid 6 0.130 M4
Grid 7 0.115 M4	Grid 8 0.114 M4	Grid 9 0.102 M4



Date/Time: 2011-10-24 12:07:42, Date/Time: 2011-10-24 11:51:34

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: UMTS-FDD (WCDMA)

Frequency: 1732.6 MHz; Duty Cycle: 1:2.18776

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA4 - Middle/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 50.797 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 41.913 V/m; Power Drift = -0.01 dB

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

Device H-Field measurement/H Scan - WCDMA4 - Middle/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.155 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.133 A/m; Power Drift = -0.04 dB

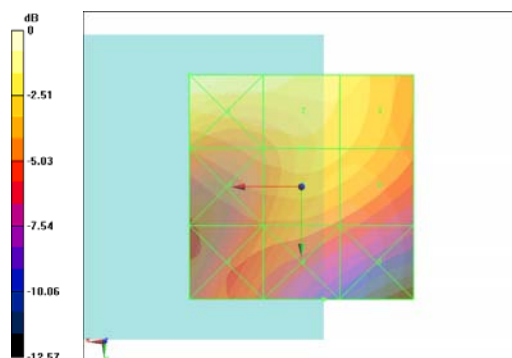
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 50.797 M4	Grid 2 44.960 M4	Grid 3 43.289 M4
Grid 4 29.933 M4	Grid 5 47.360 M4	Grid 6 47.462 M4
Grid 7 43.200 M4	Grid 8 54.149 M4	Grid 9 53.325 M4

Peak H-field in A/m

Grid 1 0.160 M4	Grid 2 0.155 M4	Grid 3 0.140 M4
Grid 4 0.135 M4	Grid 5 0.138 M4	Grid 6 0.134 M4
Grid 7 0.114 M4	Grid 8 0.114 M4	Grid 9 0.106 M4



Date/Time: 2011-10-24 12:25:21, Date/Time: 2011-10-24 11:45:27

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683120/7

Communication System: UMTS-FDD (WCDMA)

Frequency: 1752.6 MHz; Duty Cycle: 1:2.18776

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA4 - High/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 49.421 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 44.291 V/m; Power Drift = 0.06 dB

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

Device H-Field measurement/H Scan - WCDMA4 - High/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.167 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.140 A/m; Power Drift = 0.12 dB

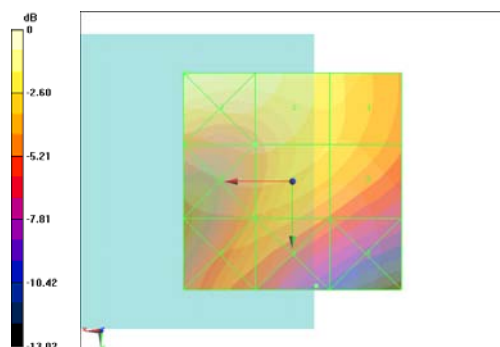
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 49.421 M4	Grid 2 45.310 M4	Grid 3 43.369 M4
Grid 4 31.443 M4	Grid 5 48.316 M4	Grid 6 48.385 M4
Grid 7 43.517 M4	Grid 8 53.804 M4	Grid 9 53.241 M4

Peak H-field in A/m

Grid 1 0.175 M4	Grid 2 0.167 M4	Grid 3 0.142 M4
Grid 4 0.149 M4	Grid 5 0.149 M4	Grid 6 0.138 M4
Grid 7 0.126 M4	Grid 8 0.126 M4	Grid 9 0.108 M4



Date/Time: 2011-11-08 10:11:12, Date/Time: 2011-11-08 12:53:23

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683090/2

Communication System: GSM-FDD (TDMA, GMSK)

Frequency: 1850.2 MHz; Duty Cycle: 1:8.31764

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - GSM1900 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 82.907 V/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 27.755 V/m; Power Drift = -0.0076 dB

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

Device H-Field measurement/H Scan - GSM1900 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.249 A/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.079 A/m; Power Drift = -0.03 dB

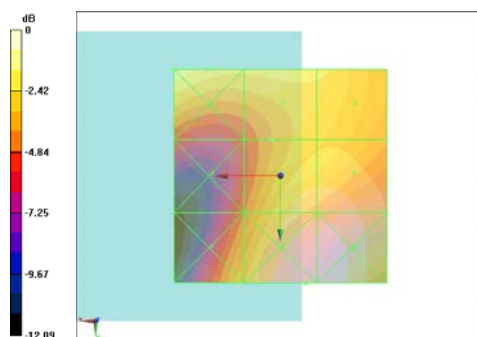
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1 82.907 M3	Grid 2 73.072 M3	Grid 3 71.587 M3
Grid 4 53.229 M3	Grid 5 82.455 M3	Grid 6 82.537 M3
Grid 7 70.188 M3	Grid 8 92.227 M2	Grid 9 91.456 M2

Peak H-field in A/m

Grid 1 0.255 M2	Grid 2 0.249 M3	Grid 3 0.224 M3
Grid 4 0.217 M3	Grid 5 0.219 M3	Grid 6 0.210 M3
Grid 7 0.206 M3	Grid 8 0.188 M3	Grid 9 0.163 M3



Date/Time: 2011-11-08 10:03:46, Date/Time: 2011-11-08 12:09:25

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683090/2

Communication System: GSM-FDD (TDMA, GMSK)

Frequency: 1880 MHz; Duty Cycle: 1:8.31764

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - GSM1900 - Middle /Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 81.345 V/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 27.275 V/m; Power Drift = -0.11 dB

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

Device H-Field measurement/H Scan - GSM1900 - Middle/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.249 A/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.078 A/m; Power Drift = 0.06 dB

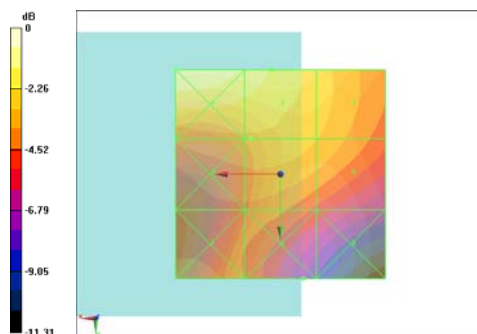
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1 79.331 M3	Grid 2 81.345 M3	Grid 3 76.566 M3
Grid 4 53.276 M3	Grid 5 77.132 M3	Grid 6 77.132 M3
Grid 7 67.735 M3	Grid 8 88.469 M2	Grid 9 87.149 M2

Peak H-field in A/m

Grid 1 0.274 M2	Grid 2 0.249 M3	Grid 3 0.214 M3
Grid 4 0.218 M3	Grid 5 0.218 M3	Grid 6 0.207 M3
Grid 7 0.203 M3	Grid 8 0.189 M3	Grid 9 0.166 M3



Date/Time: 2011-11-08 10:18:43, Date/Time: 2011-11-08 12:31:16

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683090/2

Communication System: GSM-FDD (TDMA, GMSK)

Frequency: 1909.8 MHz; Duty Cycle: 1:8.31764

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - GSM1900 - High/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 83.590 V/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 26.092 V/m; Power Drift = -0.0079 dB

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

Device H-Field measurement/H Scan - GSM1900 - High/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.248 A/m

Probe Modulation Factor = 2.877

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.077 A/m; Power Drift = -0.06 dB

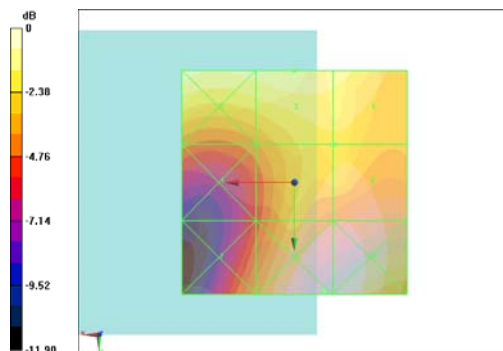
Hearing Aid Near-Field Category: M3 (AWF -5 dB)

Peak E-field in V/m

Grid 1 80.228 M3	Grid 2 83.590 M3	Grid 3 80.343 M3
Grid 4 52.644 M3	Grid 5 76.232 M3	Grid 6 76.480 M3
Grid 7 61.608 M3	Grid 8 83.833 M3	Grid 9 83.455 M3

Peak H-field in A/m

Grid 1 0.280 M2	Grid 2 0.248 M3	Grid 3 0.232 M3
Grid 4 0.208 M3	Grid 5 0.220 M3	Grid 6 0.221 M3
Grid 7 0.189 M3	Grid 8 0.189 M3	Grid 9 0.165 M3



Date/Time: 2011-11-08 10:44:50, Date/Time: 2011-11-08 13:27:07

Test Laboratory: TCC Nokia

Type: RM-808; Serial: 004402/13/683123/1

Communication System: UMTS-FDD (WCDMA)

Frequency: 1852.4 MHz; Duty Cycle: 1:2.18776

Medium: Air;

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

Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA2 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 46.529 V/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 40.792 V/m; Power Drift = -0.10 dB

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

Device H-Field measurement/H Scan - WCDMA2 - Low/Hearing Aid Compatibility Test (101x101x1):

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

Maximum value of peak Total field = 0.136 A/m

Probe Modulation Factor = 1.040

Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.122 A/m; Power Drift = 0.19 dB

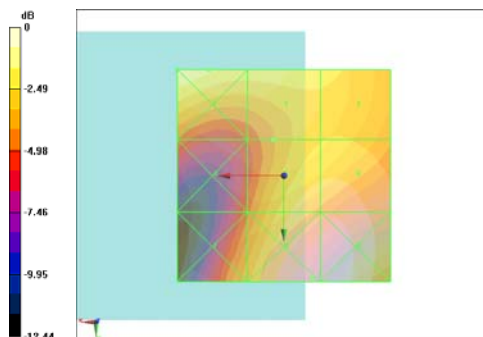
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 46.529 M4	Grid 2 39.763 M4	Grid 3 38.581 M4
Grid 4 27.659 M4	Grid 5 44.433 M4	Grid 6 44.556 M4
Grid 7 36.443 M4	Grid 8 49.312 M4	Grid 9 49.074 M4

Peak H-field in A/m

Grid 1 0.140 M4	Grid 2 0.136 M4	Grid 3 0.124 M4
Grid 4 0.121 M4	Grid 5 0.124 M4	Grid 6 0.118 M4
Grid 7 0.112 M4	Grid 8 0.107 M4	Grid 9 0.093 M4



Date/Time: 2011-11-08 10:34:48, Date/Time: 2011-11-08 13:19:23

Test Laboratory: TCC Nokia
Type: RM-808; Serial: 004402/13/683123/1

Communication System: UMTS-FDD (WCDMA)
Frequency: 1880 MHz; Duty Cycle: 1:2.18776
Medium: Air;
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m³
Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA2 - Middle/Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 42.533 V/m
Probe Modulation Factor = 1.040
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 40.494 V/m; Power Drift = -0.03 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Device H-Field measurement/H Scan - WCDMA2 - Middle/Hearing Aid Compatibility Test (101x101x1):

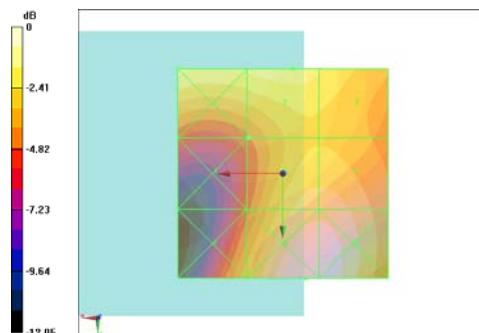
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.140 A/m
Probe Modulation Factor = 1.040
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.125 A/m; Power Drift = -0.06 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 41.537 M4	Grid 2 42.533 M4	Grid 3 40.733 M4
Grid 4 27.197 M4	Grid 5 42.516 M4	Grid 6 42.516 M4
Grid 7 35.939 M4	Grid 8 48.096 M4	Grid 9 47.514 M4

Peak H-field in A/m

Grid 1 0.151 M4	Grid 2 0.140 M4	Grid 3 0.120 M4
Grid 4 0.124 M4	Grid 5 0.124 M4	Grid 6 0.116 M4
Grid 7 0.113 M4	Grid 8 0.109 M4	Grid 9 0.094 M4



Date/Time: 2011-11-08 11:01:06, Date/Time: 2011-11-08 13:34:01

Test Laboratory: TCC Nokia
Type: RM-808; Serial: 004402/13/683123/1

Communication System: UMTS-FDD (WCDMA)
Frequency: 1907.6 MHz; Duty Cycle: 1:2.18776
Medium: Air;
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 0$ kg/m³
Phantom section: RF Section

DASY Configuration:

- Probe: ER3DV6 - SN2309, Probe: H3DV6 - SN6143
- ConvF(1, 1, 1); Calibrated: 2011-05-09, Calibrated: 2011-05-10
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn1213; Calibrated: 2011-02-14
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA;
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Device E-Field measurement/E Scan - WCDMA2 - High/Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 41.975 V/m
Probe Modulation Factor = 1.040
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 36.374 V/m; Power Drift = -0.0046 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Device H-Field measurement/H Scan - WCDMA2 - High/Hearing Aid Compatibility Test (101x101x1):

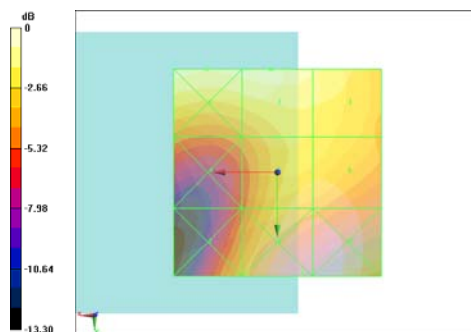
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.130 A/m
Probe Modulation Factor = 1.040
Device Reference Point: 0, 0, -6.3 mm
Reference Value = 0.119 A/m; Power Drift = 0.0093 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

Peak E-field in V/m

Grid 1 41.499 M4	Grid 2 41.975 M4	Grid 3 39.676 M4
Grid 4 25.620 M4	Grid 5 37.808 M4	Grid 6 37.887 M4
Grid 7 31.734 M4	Grid 8 43.176 M4	Grid 9 42.911 M4

Peak H-field in A/m

Grid 1 0.134 M4	Grid 2 0.130 M4	Grid 3 0.116 M4
Grid 4 0.113 M4	Grid 5 0.117 M4	Grid 6 0.114 M4
Grid 7 0.100 M4	Grid 8 0.099 M4	Grid 9 0.092 M4



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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **Nokia Salo TCC**

Certificate No: **ER3-2309_May11**

CALIBRATION CERTIFICATE

Object **ER3DV6 - SN:2309**

Calibration procedure(s) **QA CAL-02.v6, QA CAL-25.v3**
Calibration procedure for E-field probes optimized for close near field evaluations in air

Calibration date: **May 9, 2011**

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 $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ER3DV6	SN: 2328	4-Oct-10 (No. ER3-2328_Oct10)	Oct-11
DAE4	SN: 789	6-Apr-11 (No. DAE4-789_Apr11)	Apr-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by:	Name Jeton Kastrati	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: May 13, 2011

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

DASY/EASY - Parameters of Probe: ER3DV6 - SN:2309

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$)	1.66	1.48	1.83	$\pm 10.1 \%$
DCP (mV) ^B	98.1	99.1	99.0	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	109.7	$\pm 2.5 \%$
			Y	0.00	0.00	1.00	109.3	
			Z	0.00	0.00	1.00	108.2	
10011	UMTS-FDD (WCDMA)	3.40	X	3.51	65.7	18.4	118.7	$\pm 2.2 \%$
			Y	3.47	65.6	18.3	118.0	
			Z	3.51	65.9	18.5	116.9	
10021	GSM-FDD (TDMA, GMSK)	9.20	X	25.16	99.6	29.3	105.6	$\pm 1.7 \%$
			Y	17.15	99.7	28.7	114.7	
			Z	24.30	99.7	29.1	98.7	

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

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Client **Nokia Salo TCC**

Certificate No: **H3-6143_May11**

CALIBRATION CERTIFICATE

Object **H3DV6 - SN:6143**

Calibration procedure(s) **QA CAL-03.v6, QA CAL-25.v3
Calibration procedure for H-field probes optimized for close near field
evaluations in air**

Calibration date: **May 10, 2011**

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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe H3DV6	SN: 6182	4-Oct-10 (No. H3-6182_Oct10)	Oct-11
DAE4	SN: 789	6-Apr-11 (No. DAE4-789_Apr11)	Apr-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: May 10, 2011

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

DASY/EASY - Parameters of Probe: H3DV6 - SN:6143

Basic Calibration Parameters

		Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (A/m / $\sqrt{(mV)}$)	a0	2.64E-003	2.68E-003	3.05E-003	$\pm 5.1 \%$
Norm (A/m / $\sqrt{(mV)}$)	a1	-1.59E-004	-1.23E-004	-1.80E-004	$\pm 5.1 \%$
Norm (A/m / $\sqrt{(mV)}$)	a2	-1.19E-005	2.64E-005	2.48E-005	$\pm 5.1 \%$
DCP (mV) ^B		91.4	91.5	94.2	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	104.0	$\pm 2.7 \%$
			Y	0.00	0.00	1.00	135.4	
			Z	0.00	0.00	1.00	130.8	
10011	UMTS-FDD (WCDMA)	3.40	X	3.42	64.2	17.4	113.5	$\pm 0.7 \%$
			Y	3.59	65.3	18.0	149.4	
			Z	3.69	66.2	18.7	145.3	
10021	GSM-FDD (TDMA, GMSK)	9.20	X	12.97	78.6	26.3	142.8	$\pm 3.3 \%$
			Y	14.11	79.6	26.8	151.3	
			Z	9.24	85.1	26.1	120.9	

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

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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



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 Salo TCC**

Certificate No: **CD835V3-1004_Sep10**

CALIBRATION CERTIFICATE

Object **CD835V3 - SN: 1004**

Calibration procedure(s) **QA CAL-20.v5**
Calibration procedure for dipoles in air

Calibration date: **September 15, 2010**

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	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	22-Jan-10 (No. DAE4-781_Jan10)	Jan-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct-10
RF generator E4433B	MY 41000675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

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

Approved by: **Fin Bomholt** **Technical Director**

Issued: September 16, 2010

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

3.3.3 DASY4 H-field Result

Date/Time: 14.09.2010 10:52:58

Test Laboratory: SPEAG Lab2

HAC RF_CD835_1004_H_100914_CL

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1004

Communication System: CW; Communication System Band: CD835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole H-Field measurement @ 835MHz/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 = 0.464 A/m

Probe Modulation Factor = 1

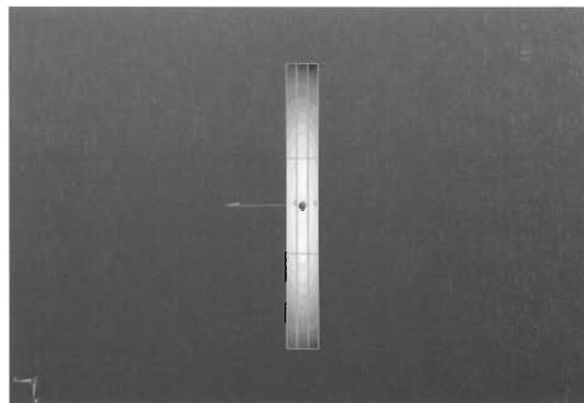
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.495 A/m; Power Drift = -0.032 dB

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

Peak H-field in A/m

Grid 1 0.383 M4	Grid 2 0.403 M4	Grid 3 0.383 M4
Grid 4 0.441 M4	Grid 5 0.464 M4	Grid 6 0.439 M4
Grid 7 0.396 M4	Grid 8 0.418 M4	Grid 9 0.393 M4



0 dB = 0.464A/m

3.3.2 DASY4 E-field Result

Date/Time: 15.09.2010 16:00:54

Test Laboratory: SPEAG Lab2

HAC RF_CD835_1004_E_100914_CL

DUT: HAC-Dipole 835 MHz; Type: CD835V3; Serial: 1004

Communication System: CW; Communication System Band: CD835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole E-Field measurement @ 835MHz/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 = 168.5 V/m

Probe Modulation Factor = 1

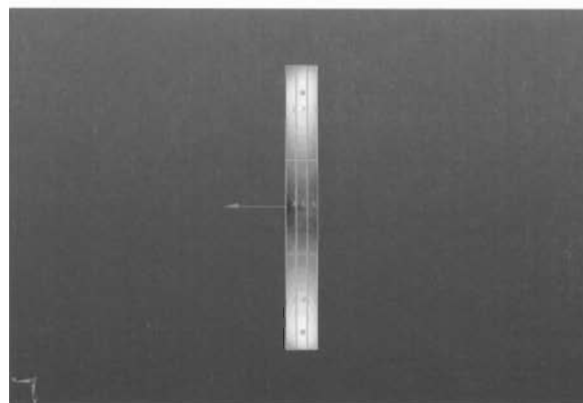
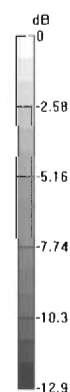
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 108.8 V/m; Power Drift = 0.00473 dB

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

Peak E-field in V/m

Grid 1 162.6 M4	Grid 2 168.5 M4	Grid 3 165.2 M4
Grid 4 87.8 M4	Grid 5 91.1 M4	Grid 6 89.2 M4
Grid 7 160.2 M4	Grid 8 167.7 M4	Grid 9 164.6 M4



0 dB = 168.5V/m



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 Salo TCC**

Certificate No: **CD1880V3-1003_Sep10**

CALIBRATION CERTIFICATE

Object **CD1880V3 - SN: 1003**

Calibration procedure(s) **QA CAL-20.v5**
Calibration procedure for dipoles in air

Calibration date: **September 15, 2010**

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	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Probe ER3DV6	SN: 2336	30-Dec-09 (No. ER3-2336_Dec09)	Dec-10
Probe H3DV6	SN: 6065	30-Dec-09 (No. H3-6065_Dec09)	Dec-10
DAE4	SN: 781	22-Jan-10 (No. DAE4-781_Jan10)	Jan-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter Agilent 4419B	SN: GB42420191	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482H	SN: 3318A09450	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Power sensor HP 8482A	SN: US37295597	09-Oct-09 (in house check Oct-09)	In house check: Oct-10
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct-10
RF generator E4433B	MY 41000675	03-Nov-04 (in house check Oct-09)	In house check: Oct-11

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

Approved by: **Fin Bornholt** **Technical Director**

Issued: September 16, 2010

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: 14.09.2010 14:40:22

Test Laboratory: SPEAG Lab2

HAC_RF_CD1880_1003_E_100914_CL

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1003

Communication System: CW; Communication System Band: CD1880 (1880.0 MHz); Frequency: 1880 MHz;

Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: H3DV6 - SN6065; ; Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole H-Field measurement @ 1880MHz/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 = 0.458 A/m

Probe Modulation Factor = 1

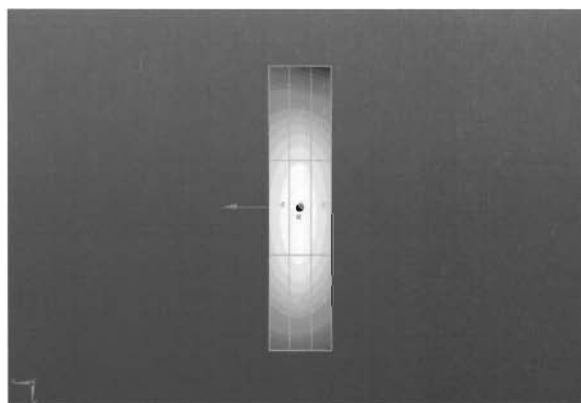
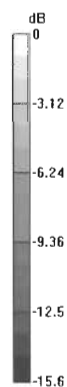
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 0.486 A/m; Power Drift = -0.017 dB

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

Peak H-field in A/m

Grid 1 0.386 M2	Grid 2 0.402 M2	Grid 3 0.381 M2
Grid 4 0.441 M2	Grid 5 0.458 M2	Grid 6 0.431 M2
Grid 7 0.409 M2	Grid 8 0.426 M2	Grid 9 0.397 M2



0 dB = 0.458A/m

3.3.3 DASY4 E-Field Result

Date/Time: 15.09.2010 13:51:38

Test Laboratory: SPEAG Lab2

HAC_RF_CD1880_1003_E_100914_CL

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1003

Communication System: CW; Communication System Band: CD1880 (1880.0 MHz); Frequency: 1880 MHz;

Communication System PAR: 0 dB

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

Phantom section: RF Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ER3DV6 - SN2336; ConvF(1, 1, 1); Calibrated: 30.12.2009
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn781; Calibrated: 22.01.2010
- Phantom: HAC Test Arch with AMCC; Type: SD HAC P01 BA; Serial: 1070
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Dipole E-Field measurement @ 1880MHz/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 = 135.1 V/m

Probe Modulation Factor = 1

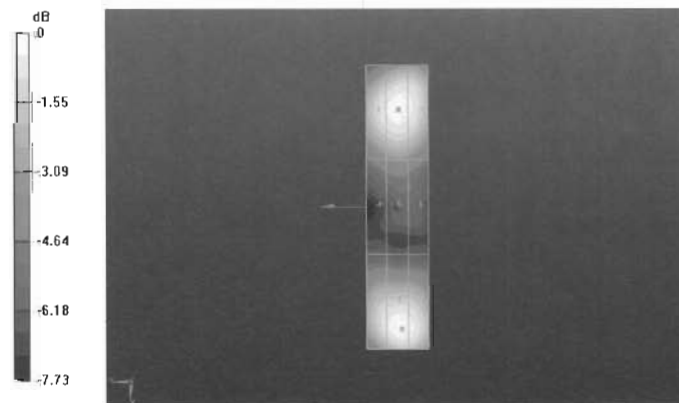
Device Reference Point: 0, 0, -6.3 mm

Reference Value = 151.2 V/m; Power Drift = -0.00243 dB

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

Peak E-field in V/m

Grid 1 127.2 M2	Grid 2 132.4 M2	Grid 3 131.0 M2
Grid 4 90.1 M3	Grid 5 93.3 M3	Grid 6 91 M3
Grid 7 126.6 M2	Grid 8 135.1 M2	Grid 9 133.8 M2



0 dB = 135.1V/m