

HAC RF Emissions Test Report

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Measurements made by:	Heikki Kuusela		
Tested devices:	RM-511		
FCC ID:	PPIRM-511	IC:	661U-RM511
Supplement reports:	T-Coil_RM-511_02, HAC_Photo_RM-511_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	2009-07-28
SN, HW, SW and DUT numbers of tested device	SN: 004401/10/783130/3, HW: 0355, SW: 3.08, DUT: 13994
Batteries used in testing	BL-4S, DUT: 13995, 13996, 13997
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

Band & Mode	Ch / Freq. [MHz]	Radiated power	Limit of E-field max. value in category M3 [V/m]	Maximum E-field value after exclusion [V/m]	Category
GSM850	190 / 836.6	25.8 dBm ERP	149.6 – 266.1	149.1	M4 (-5dB)
WCDMA 1700/2100	1413 / 1732.4	22.2 dBm EIRP	63.1 – 112.2	25.1	M4 (0dB)
GSM1900	512 / 1850.2	26.4 dBm EIRP	47.3 – 84.1	51.3	M3 (-5dB)

1.2.2 Magnetic field measurements

Band & Mode	Ch / Freq. [MHz]	Radiated power	Limit of H-field max. value in category M3 [A/m]	Maximum H-field value after exclusion [A/m]	Category
GSM850	190 / 836.6	25.8 dBm ERP	0.45 – 0.80	0.298	M4 (-5dB)
WCDMA 1700/2100	1413 / 1732.4	22.2 dBm EIRP	0.19 – 0.34	0.068	M4 (0dB)
GSM1900	512 / 1850.2	26.4 dBm EIRP	0.14 – 0.25	0.140	M4 (-5dB)

1.2.3 Overall RF emissions category of the tested device

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

1.2.4 Maximum Drift

Maximum drift during measurements	0.49 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 1900	GMSK	1/8	824 – 849 1850 – 1910
WCDMA	1700/2100 (Band IV)	QPSK	1	1712 – 1753

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-511_03.

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature [°C]:	20.3 to 21.2
Ambient humidity [RH %]:	52 to 59

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 lowest, middle and highest channels.

The radiated output power of the device was measured by a separate test laboratory on the same unit(s) as used for HAC testing.

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	728	12 months	2010-02
E-field Probe ER3DV6	2309	12 months	2009-11
H-field Probe H3DV6	6143	12 months	2009-11
Dipole Validation Kit, CD835V3	1005	24 months	2010-11
Dipole Validation Kit, CD1880V3	1004	24 months	2010-11
DASY4 software	Version 4.7	-	-

Additional test equipment used in testing and validation:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	SML03	101265	12 months	2009-08
Amplifier	ZHL-42 (SMA)	N072095-5	12 months	2009-08
Power Meter	NRVS	849305/028	12 months	2009-08
Power Sensor	NRV-Z32	839176/020	12 months	2009-08
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 (<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	164.1	0.441
	± 10% window	147.7 – 180.5	0.397 – 0.485
	2009-07-27	163.9	0.470
1880 1700/2100*	Reference result	137.9	0.461
	± 10% window	124.1 – 151.7	0.415 – 0.507
	2009-07-27	138.9	0.470

* 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±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 1cm. 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 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.

5.5 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").

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:

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

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

Modulation factors, GSM

f [MHz]	P_{max} [dBm]	E-field [V/m] Probe SN: 2309		H-field [A/m] Probe SN: 6143		PMF E-field	PMF H-field
		CW	GSM	CW	GSM		
835.0	20	107.4	38.2	0.503	0.186	2.81	2.70
1880.0	20	161.4	56.9	0.519	0.232	2.84	2.24

Modulation factors, WCDMA

f [MHz]	P_{max} [dBm]	E-field [V/m] Probe SN: 2309		H-field [A/m] Probe SN: 6143		PMF E-field	PMF H-field
		CW	WCDMA	CW	WCDMA		
1732.4*	-					0.75	0.71
1880.0	17	44.3	59.0	0.161	0.226	0.75	0.71

* See table 'System Validation, H-field and E-field' in section 4.2 Validation of the System

5.6 Slot Averaged Calculation Method

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

5.7 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).

5.8 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 ±%	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:

GSM850, RF emissions results

Mode	Option	Test configuration	Ch 128 824.2 MHz	Ch 190 836.6 MHz	Ch 251 848.8 MHz
GSM850	Flip open	Power	25.5 dBm	25.8 dBm	26.3 dBm
		E-field [V/m]	133.6	149.1	142.8
		H-field [A/m]	0.263	0.298	0.279
		Category	M4 (-5 dB)	M4 (-5 dB)	M4 (-5 dB)

WCDMA1700/2100, RF emissions results

Mode	Option	Test configuration	Ch 1312 1712.4 MHz	Ch 1413 1732.4 MHz	Ch 1513 1752.6 MHz
WCDMA 1700/2100	Flip open	Power	21.8 dBm	22.2 dBm	21.8 dBm
		E-field [V/m]	20.6	25.1	20.8
		H-field [A/m]	0.053	0.068	0.056
		Category	M4 (0 dB)	M4 (0 dB)	M4 (0 dB)

GSM1900, RF emissions results

Mode	Option	Test configuration	Ch 512 1850.2MHz	Ch 661 1880.0MHz	Ch 810 1909.8MHz
GSM1900	Flip open	Power	26.4 dBm	25.4 dBm	24.1 dBm
		E-field [V/m]	51.3	46.3	49.9
		H-field [A/m]	0.140	0.125	0.129
		Category	M3 (-5 dB)	M4 (-5 dB)	M3 (-5 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: 2009-07-27 12:46:46 Test Laboratory: TCC Nokia Type: CD835V3; Serial: 1005	Date/Time: 2009-07-27 13:18:12 Test Laboratory: TCC Nokia Type: CD835V3; Serial: 1005																		
Communication System: CW835 Frequency: 835 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: E Dipole Section	Communication System: CW835 Frequency: 835 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Dipole Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																		
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 = 163.9 V/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 108.0 V/m; Power Drift = 0.015 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB) 163.9 139.0 114.0 89.1 64.1 39.2 <table><tr><td>Grid 1 159.8 M4</td><td>Grid 2 163.9 M4</td><td>Grid 3 159.9 M4</td></tr><tr><td>Grid 4 88.1 M4</td><td>Grid 5 90.6 M4</td><td>Grid 6 88.0 M4</td></tr><tr><td>Grid 7 158.2 M4</td><td>Grid 8 163.4 M4</td><td>Grid 9 155.9 M4</td></tr></table>	Grid 1 159.8 M4	Grid 2 163.9 M4	Grid 3 159.9 M4	Grid 4 88.1 M4	Grid 5 90.6 M4	Grid 6 88.0 M4	Grid 7 158.2 M4	Grid 8 163.4 M4	Grid 9 155.9 M4	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 = 0.470 A/m Probe Modulation Factor = 1.00 Device Reference Point: 0.000, 0.000, 354.7 mm Reference Value = 0.498 A/m; Power Drift = 0.008 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB) 0.470 0.385 0.300 0.214 0.129 0.044 <table><tr><td>Grid 1 0.384 M4</td><td>Grid 2 0.411 M4</td><td>Grid 3 0.395 M4</td></tr><tr><td>Grid 4 0.442 M4</td><td>Grid 5 0.470 M4</td><td>Grid 6 0.450 M4</td></tr><tr><td>Grid 7 0.389 M4</td><td>Grid 8 0.413 M4</td><td>Grid 9 0.391 M4</td></tr></table>	Grid 1 0.384 M4	Grid 2 0.411 M4	Grid 3 0.395 M4	Grid 4 0.442 M4	Grid 5 0.470 M4	Grid 6 0.450 M4	Grid 7 0.389 M4	Grid 8 0.413 M4	Grid 9 0.391 M4
Grid 1 159.8 M4	Grid 2 163.9 M4	Grid 3 159.9 M4																	
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Grid 1 0.384 M4	Grid 2 0.411 M4	Grid 3 0.395 M4																	
Grid 4 0.442 M4	Grid 5 0.470 M4	Grid 6 0.450 M4																	
Grid 7 0.389 M4	Grid 8 0.413 M4	Grid 9 0.391 M4																	

SYSTEM VALIDATION DATA 1900MHz

Date/Time: 2009-07-27 12:57:22
Test Laboratory: TCC Nokia
Type: CD1880V3; Serial: 1004

Date/Time: 2009-07-27 13:10:46
Test Laboratory: TCC Nokia
Type: CD1880V3; Serial: 1004

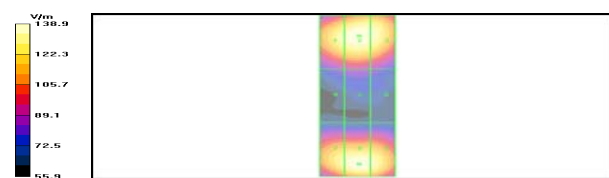
Communication System: CW1880
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: -
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Dipole Section

Communication System: CW1880
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: -
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Dipole Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2309
- ConvF(1, 1, 1); Calibrated: 2008-11-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn728; Calibrated: 2009-02-09
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: -
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

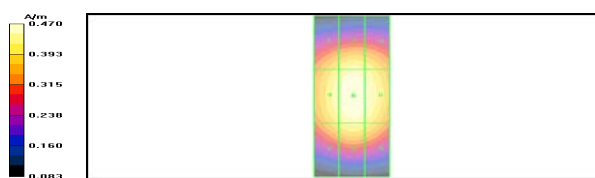
DASY4 Configuration:
- Probe: H3DV6 - SN6143
- ; Calibrated: 2008-11-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn728; Calibrated: 2009-02-09
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: -
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

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 = 138.9 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 155.4 V/m; Power Drift = 0.003 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
133.1	137.9	136.0
M2	M2	M2
Grid 4	Grid 5	Grid 6
86.9	89.8	86.5
M3	M3	M3
Grid 7	Grid 8	Grid 9
131.6	138.9	135.8
M2	M2	M2

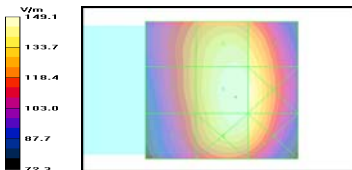
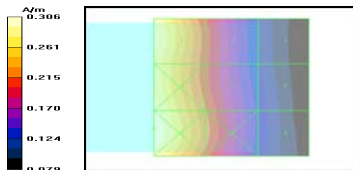
H Scan - H3DV6 - measurement distance from the probe sensor center to CD1880 Dipole = 10mm/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.470 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 0.496 A/m; Power Drift = 0.007 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

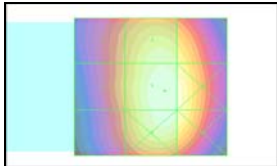
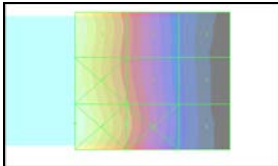


Grid 1	Grid 2	Grid 3
0.406	0.434	0.421
M2	M2	M2
Grid 4	Grid 5	Grid 6
0.440	0.470	0.454
M2	M2	M2
Grid 7	Grid 8	Grid 9
0.401	0.430	0.414
M2	M2	M2

APPENDIX B: MEASUREMENT SCANS

MEASUREMENT DATA GSM850, CHANNEL LOW (824.2 MHz)																																																							
Date/Time: 2009-07-28 10:29:16 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3	Date/Time: 2009-07-28 09:15:07 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3																																																						
Communication System: GSM850 (ER3DV6) Frequency: 824.2 MHz; Duty Cycle: 1:7.9 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: E Device Section	Communication System: GSM850 (H3DV6) Frequency: 824.2 MHz; Duty Cycle: 1:7.28 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Device Section																																																						
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																																																						
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 = 133.6 V/m Probe Modulation Factor = 2.81 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 63.6 V/m; Power Drift = -0.043 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB) V/m 133.6 119.7 105.8 91.8 77.9 64.0 <table><tr><td>Grid 1</td><td>Grid 2</td><td>Grid 3</td></tr><tr><td>116.0</td><td>130.6</td><td>127.0</td></tr><tr><td>M4</td><td>M4</td><td>M4</td></tr><tr><td>Grid 4</td><td>Grid 5</td><td>Grid 6</td></tr><tr><td>116.7</td><td>133.6</td><td>130.6</td></tr><tr><td>M4</td><td>M4</td><td>M4</td></tr><tr><td>Grid 7</td><td>Grid 8</td><td>Grid 9</td></tr><tr><td>112.2</td><td>131.9</td><td>128.6</td></tr><tr><td>M4</td><td>M4</td><td>M4</td></tr></table>	Grid 1	Grid 2	Grid 3	116.0	130.6	127.0	M4	M4	M4	Grid 4	Grid 5	Grid 6	116.7	133.6	130.6	M4	M4	M4	Grid 7	Grid 8	Grid 9	112.2	131.9	128.6	M4	M4	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 = 0.263 A/m Probe Modulation Factor = 2.70 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.060 A/m; Power Drift = -0.055 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB) A/m 0.263 0.245 0.201 0.158 0.114 0.070 <table><tr><td>Grid 1</td><td>Grid 2</td><td>Grid 3</td></tr><tr><td>0.263</td><td>0.187</td><td>0.116</td></tr><tr><td>M4</td><td>M4</td><td>M4</td></tr><tr><td>Grid 4</td><td>Grid 5</td><td>Grid 6</td></tr><tr><td>0.274</td><td>0.202</td><td>0.131</td></tr><tr><td>M4</td><td>M4</td><td>M4</td></tr><tr><td>Grid 7</td><td>Grid 8</td><td>Grid 9</td></tr><tr><td>0.289</td><td>0.212</td><td>0.135</td></tr><tr><td>M4</td><td>M4</td><td>M4</td></tr></table>	Grid 1	Grid 2	Grid 3	0.263	0.187	0.116	M4	M4	M4	Grid 4	Grid 5	Grid 6	0.274	0.202	0.131	M4	M4	M4	Grid 7	Grid 8	Grid 9	0.289	0.212	0.135	M4	M4	M4
Grid 1	Grid 2	Grid 3																																																					
116.0	130.6	127.0																																																					
M4	M4	M4																																																					
Grid 4	Grid 5	Grid 6																																																					
116.7	133.6	130.6																																																					
M4	M4	M4																																																					
Grid 7	Grid 8	Grid 9																																																					
112.2	131.9	128.6																																																					
M4	M4	M4																																																					
Grid 1	Grid 2	Grid 3																																																					
0.263	0.187	0.116																																																					
M4	M4	M4																																																					
Grid 4	Grid 5	Grid 6																																																					
0.274	0.202	0.131																																																					
M4	M4	M4																																																					
Grid 7	Grid 8	Grid 9																																																					
0.289	0.212	0.135																																																					
M4	M4	M4																																																					

MEASUREMENT DATA GSM850, CHANNEL MIDDLE (836.6 MHz)																			
Date/Time: 2009-07-28 10:18:09 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3	Date/Time: 2009-07-28 09:05:10 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3																		
Communication System: GSM850 (ER3DV6) Frequency: 836.6 MHz; Duty Cycle: 1:7.9 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: E Device Section	Communication System: GSM850 (H3DV6) Frequency: 836.6 MHz; Duty Cycle: 1:7.28 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Device Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																		
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 = 149.1 V/m Probe Modulation Factor = 2.81 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 70.8 V/m; Power Drift = -0.204 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB)  <table><tr><td>Grid 1 128.4 M4</td><td>Grid 2 145.2 M4</td><td>Grid 3 141.9 M4</td></tr><tr><td>Grid 4 128.7 M4</td><td>Grid 5 149.1 M4</td><td>Grid 6 146.5 M4</td></tr><tr><td>Grid 7 124.2 M4</td><td>Grid 8 147.2 M4</td><td>Grid 9 143.9 M4</td></tr></table>	Grid 1 128.4 M4	Grid 2 145.2 M4	Grid 3 141.9 M4	Grid 4 128.7 M4	Grid 5 149.1 M4	Grid 6 146.5 M4	Grid 7 124.2 M4	Grid 8 147.2 M4	Grid 9 143.9 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 = 0.298 A/m Probe Modulation Factor = 2.70 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.066 A/m; Power Drift = -0.227 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB)  <table><tr><td>Grid 1 0.298 M4</td><td>Grid 2 0.210 M4</td><td>Grid 3 0.128 M4</td></tr><tr><td>Grid 4 0.299 M4</td><td>Grid 5 0.218 M4</td><td>Grid 6 0.137 M4</td></tr><tr><td>Grid 7 0.306 M4</td><td>Grid 8 0.224 M4</td><td>Grid 9 0.138 M4</td></tr></table>	Grid 1 0.298 M4	Grid 2 0.210 M4	Grid 3 0.128 M4	Grid 4 0.299 M4	Grid 5 0.218 M4	Grid 6 0.137 M4	Grid 7 0.306 M4	Grid 8 0.224 M4	Grid 9 0.138 M4
Grid 1 128.4 M4	Grid 2 145.2 M4	Grid 3 141.9 M4																	
Grid 4 128.7 M4	Grid 5 149.1 M4	Grid 6 146.5 M4																	
Grid 7 124.2 M4	Grid 8 147.2 M4	Grid 9 143.9 M4																	
Grid 1 0.298 M4	Grid 2 0.210 M4	Grid 3 0.128 M4																	
Grid 4 0.299 M4	Grid 5 0.218 M4	Grid 6 0.137 M4																	
Grid 7 0.306 M4	Grid 8 0.224 M4	Grid 9 0.138 M4																	

MEASUREMENT DATA GSM850, CHANNEL HIGH (848.8 MHz)																			
Date/Time: 2009-07-28 10:23:27 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3	Date/Time: 2009-07-28 09:10:13 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3																		
Communication System: GSM850 (ER3DV6) Frequency: 848.8 MHz; Duty Cycle: 1:7.9 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³ Phantom section: E Device Section	Communication System: GSM850 (H3DV6) Frequency: 848.8 MHz; Duty Cycle: 1:7.28 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³ Phantom section: H Device Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																		
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 = 142.8 V/m Probe Modulation Factor = 2.81 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 67.0 V/m; Power Drift = -0.068 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB) V/m 142.8 120.1 113.4 98.6 83.9 69.2  <table><tr><td>Grid 1 120.3 M4</td><td>Grid 2 137.5 M4</td><td>Grid 3 134.7 M4</td></tr><tr><td>Grid 4 122.2 M4</td><td>Grid 5 142.8 M4</td><td>Grid 6 140.7 M4</td></tr><tr><td>Grid 7 118.2 M4</td><td>Grid 8 142.3 M4</td><td>Grid 9 139.7 M4</td></tr></table>	Grid 1 120.3 M4	Grid 2 137.5 M4	Grid 3 134.7 M4	Grid 4 122.2 M4	Grid 5 142.8 M4	Grid 6 140.7 M4	Grid 7 118.2 M4	Grid 8 142.3 M4	Grid 9 139.7 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 = 0.279 A/m Probe Modulation Factor = 2.70 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.061 A/m; Power Drift = -0.008 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB) A/m 0.289 0.246 0.202 0.159 0.115 0.072  <table><tr><td>Grid 1 0.279 M4</td><td>Grid 2 0.199 M4</td><td>Grid 3 0.121 M4</td></tr><tr><td>Grid 4 0.280 M4</td><td>Grid 5 0.205 M4</td><td>Grid 6 0.125 M4</td></tr><tr><td>Grid 7 0.289 M4</td><td>Grid 8 0.211 M4</td><td>Grid 9 0.127 M4</td></tr></table>	Grid 1 0.279 M4	Grid 2 0.199 M4	Grid 3 0.121 M4	Grid 4 0.280 M4	Grid 5 0.205 M4	Grid 6 0.125 M4	Grid 7 0.289 M4	Grid 8 0.211 M4	Grid 9 0.127 M4
Grid 1 120.3 M4	Grid 2 137.5 M4	Grid 3 134.7 M4																	
Grid 4 122.2 M4	Grid 5 142.8 M4	Grid 6 140.7 M4																	
Grid 7 118.2 M4	Grid 8 142.3 M4	Grid 9 139.7 M4																	
Grid 1 0.279 M4	Grid 2 0.199 M4	Grid 3 0.121 M4																	
Grid 4 0.280 M4	Grid 5 0.205 M4	Grid 6 0.125 M4																	
Grid 7 0.289 M4	Grid 8 0.211 M4	Grid 9 0.127 M4																	

MEASUREMENT DATA WCDMA1700/2100, CHANNEL LOW (1712.4MHz)

Date/Time: 2009-07-28 12:08:27
Test Laboratory: TCC Nokia
Type: RM-511; Serial: 004401/10/783130/3

Date/Time: 2009-07-28 09:58:23
Test Laboratory: TCC Nokia
Type: RM-511; Serial: 004401/10/783130/3

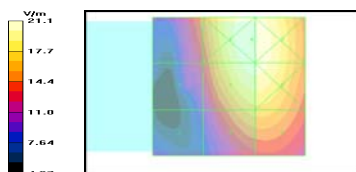
Communication System: WCDMA1700/2100
Frequency: 1712.4 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: -
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: WCDMA1700/2100
Frequency: 1712.4 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: -
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2309
- ConvF(1, 1, 1); Calibrated: 2008-11-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn728; Calibrated: 2009-02-09
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial:
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

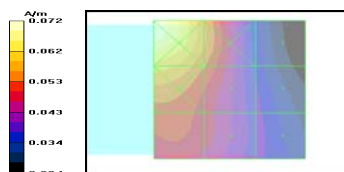
DASY4 Configuration:
- Probe: H3DV6 - SN6143
- ; Calibrated: 2008-11-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn728; Calibrated: 2009-02-09
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial:
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

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 = 20.6 V/m
Probe Modulation Factor = 0.750
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 32.1 V/m; Power Drift = -0.447 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

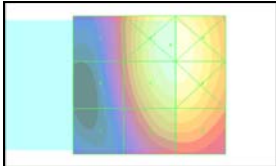
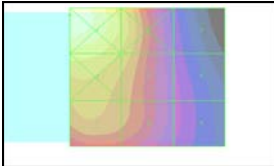


Grid 1 15.1 M4	Grid 2 21.1 M4	Grid 3 21.1 M4
Grid 4 13.1 M4	Grid 5 20.6 M4	Grid 6 20.6 M4
Grid 7 9.80 M4	Grid 8 17.2 M4	Grid 9 17.3 M4

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 = 0.053 A/m
Probe Modulation Factor = 0.710
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.070 A/m; Power Drift = -0.406 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1 0.072 M4	Grid 2 0.057 M4	Grid 3 0.036 M4
Grid 4 0.061 M4	Grid 5 0.053 M4	Grid 6 0.038 M4
Grid 7 0.052 M4	Grid 8 0.048 M4	Grid 9 0.039 M4

MEASUREMENT DATA WCDMA1700/2100, CHANNEL MIDDLE (1732.4MHz)																			
Date/Time: 2009-07-28 11:50:23 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3	Date/Time: 2009-07-28 09:48:34 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3																		
Communication System: WCDMA1700/2100 Frequency: 1732.4 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m ³ Phantom section: E Device Section	Communication System: WCDMA1700/2100 Frequency: 1732.4 MHz; Duty Cycle: 1:1 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m ³ Phantom section: H Device Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																		
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 = 25.1 V/m Probe Modulation Factor = 0.750 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 40.7 V/m; Power Drift = -0.298 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)	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 = 0.068 A/m Probe Modulation Factor = 0.710 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.089 A/m; Power Drift = -0.369 dB Hearing Aid Near-Field Category: M4 (AWF 0 dB)																		
V/m 25.4 21.0 16.5 12.1 7.66 3.22  <table><tr><td>Grid 1 15.9 M4</td><td>Grid 2 25.4 M4</td><td>Grid 3 25.3 M4</td></tr><tr><td>Grid 4 15.5 M4</td><td>Grid 5 25.1 M4</td><td>Grid 6 25.1 M4</td></tr><tr><td>Grid 7 12.3 M4</td><td>Grid 8 21.3 M4</td><td>Grid 9 21.3 M4</td></tr></table>	Grid 1 15.9 M4	Grid 2 25.4 M4	Grid 3 25.3 M4	Grid 4 15.5 M4	Grid 5 25.1 M4	Grid 6 25.1 M4	Grid 7 12.3 M4	Grid 8 21.3 M4	Grid 9 21.3 M4	A/m 0.082 0.072 0.062 0.051 0.041 0.031  <table><tr><td>Grid 1 0.082 M4</td><td>Grid 2 0.071 M4</td><td>Grid 3 0.048 M4</td></tr><tr><td>Grid 4 0.074 M4</td><td>Grid 5 0.068 M4</td><td>Grid 6 0.050 M4</td></tr><tr><td>Grid 7 0.067 M4</td><td>Grid 8 0.063 M4</td><td>Grid 9 0.050 M4</td></tr></table>	Grid 1 0.082 M4	Grid 2 0.071 M4	Grid 3 0.048 M4	Grid 4 0.074 M4	Grid 5 0.068 M4	Grid 6 0.050 M4	Grid 7 0.067 M4	Grid 8 0.063 M4	Grid 9 0.050 M4
Grid 1 15.9 M4	Grid 2 25.4 M4	Grid 3 25.3 M4																	
Grid 4 15.5 M4	Grid 5 25.1 M4	Grid 6 25.1 M4																	
Grid 7 12.3 M4	Grid 8 21.3 M4	Grid 9 21.3 M4																	
Grid 1 0.082 M4	Grid 2 0.071 M4	Grid 3 0.048 M4																	
Grid 4 0.074 M4	Grid 5 0.068 M4	Grid 6 0.050 M4																	
Grid 7 0.067 M4	Grid 8 0.063 M4	Grid 9 0.050 M4																	

MEASUREMENT DATA WCDMA1700/2100, CHANNEL HIGH (1752.6MHz)

Date/Time: 2009-07-28 12:00:57
Test Laboratory: TCC Nokia
Type: RM-511; Serial: 004401/10/783130/3

Date/Time: 2009-07-28 09:53:32
Test Laboratory: TCC Nokia
Type: RM-511; Serial: 004401/10/783130/3

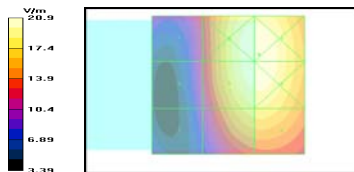
Communication System: WCDMA1700/2100
Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: -
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: WCDMA1700/2100
Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: -
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2309
- ConvF(1, 1, 1); Calibrated: 2008-11-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn728; Calibrated: 2009-02-09
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial:
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: H3DV6 - SN6143
- ; Calibrated: 2008-11-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn728; Calibrated: 2009-02-09
- Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial:
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184

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 = 20.8 V/m
Probe Modulation Factor = 0.750
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 31.8 V/m; Power Drift = -0.303 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)

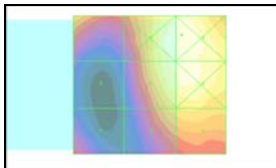
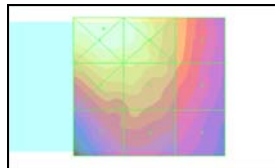


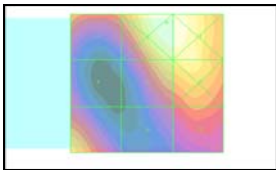
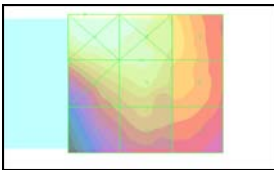
Grid 1	Grid 2	Grid 3
12.2	20.8	20.9
M4	M4	M4
Grid 4	Grid 5	Grid 6
11.6	20.8	20.9
M4	M4	M4
Grid 7	Grid 8	Grid 9
9.95	18.3	18.4
M4	M4	M4

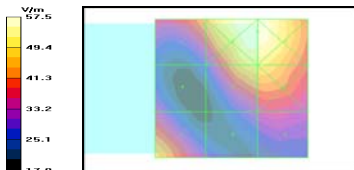
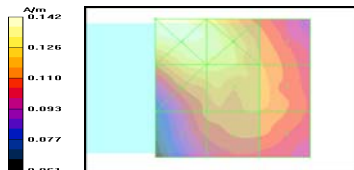
H Scan - H3DV6 - measurement distance, sensor center to the Device = 15mm, high/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.056 A/m
Probe Modulation Factor = 0.710
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.071 A/m; Power Drift = -0.488 dB
Hearing Aid Near-Field Category: M4 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
0.072	0.062	0.042
M4	M4	M4
Grid 4	Grid 5	Grid 6
0.061	0.056	0.040
M4	M4	M4
Grid 7	Grid 8	Grid 9
0.052	0.049	0.039
M4	M4	M4

MEASUREMENT DATA GSM1900, CHANNEL LOW (1850.2 MHz)																			
Date/Time: 2009-07-28 11:39:23 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3	Date/Time: 2009-07-28 09:35:26 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3																		
Communication System: GSM1900 (ER3DV6) Frequency: 1850.2 MHz; Duty Cycle: 1:8.05 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m ³ Phantom section: E Device Section	Communication System: GSM1900 (H3DV6) Frequency: 1850.2 MHz; Duty Cycle: 1:5.01 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m ³ Phantom section: H Device Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																		
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 = 51.3 V/m Probe Modulation Factor = 2.84 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 18.0 V/m; Power Drift = 0.346 dB Hearing Aid Near-Field Category: M3 (AWF -5 dB)	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 = 0.140 A/m Probe Modulation Factor = 2.24 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.060 A/m; Power Drift = 0.068 dB Hearing Aid Near-Field Category: M3 (AWF -5 dB)																		
V/m 52.6 45.1 37.6 30.0 22.5 15.0  <table><tr><td>Grid 1 43.2 M4</td><td>Grid 2 52.2 M3</td><td>Grid 3 52.6 M3</td></tr><tr><td>Grid 4 28.6 M4</td><td>Grid 5 51.3 M3</td><td>Grid 6 51.9 M3</td></tr><tr><td>Grid 7 33.4 M4</td><td>Grid 8 44.2 M4</td><td>Grid 9 45.6 M4</td></tr></table>	Grid 1 43.2 M4	Grid 2 52.2 M3	Grid 3 52.6 M3	Grid 4 28.6 M4	Grid 5 51.3 M3	Grid 6 51.9 M3	Grid 7 33.4 M4	Grid 8 44.2 M4	Grid 9 45.6 M4	A/m 0.158 0.139 0.120 0.100 0.081 0.062  <table><tr><td>Grid 1 0.158 M3</td><td>Grid 2 0.154 M3</td><td>Grid 3 0.127 M4</td></tr><tr><td>Grid 4 0.143 M3</td><td>Grid 5 0.140 M3</td><td>Grid 6 0.123 M4</td></tr><tr><td>Grid 7 0.117 M4</td><td>Grid 8 0.122 M4</td><td>Grid 9 0.110 M4</td></tr></table>	Grid 1 0.158 M3	Grid 2 0.154 M3	Grid 3 0.127 M4	Grid 4 0.143 M3	Grid 5 0.140 M3	Grid 6 0.123 M4	Grid 7 0.117 M4	Grid 8 0.122 M4	Grid 9 0.110 M4
Grid 1 43.2 M4	Grid 2 52.2 M3	Grid 3 52.6 M3																	
Grid 4 28.6 M4	Grid 5 51.3 M3	Grid 6 51.9 M3																	
Grid 7 33.4 M4	Grid 8 44.2 M4	Grid 9 45.6 M4																	
Grid 1 0.158 M3	Grid 2 0.154 M3	Grid 3 0.127 M4																	
Grid 4 0.143 M3	Grid 5 0.140 M3	Grid 6 0.123 M4																	
Grid 7 0.117 M4	Grid 8 0.122 M4	Grid 9 0.110 M4																	

MEASUREMENT DATA GSM1900, CHANNEL MIDDLE (1880 MHz)																			
Date/Time: 2009-07-28 11:29:24 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3	Date/Time: 2009-07-28 09:25:03 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3																		
Communication System: GSM1900 (ER3DV6) Frequency: 1880 MHz; Duty Cycle: 1:8.05 Medium: Air; Medium Notes: - Medium parameters used: σ = 0 mho/m, ε _r = 1; ρ = 1000 kg/m³ Phantom section: E Device Section	Communication System: GSM1900 (H3DV6) Frequency: 1880 MHz; Duty Cycle: 1:5.01 Medium: Air; Medium Notes: - Medium parameters used: σ = 0 mho/m, ε _r = 1; ρ = 1 kg/m³ Phantom section: H Device Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																		
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 = 46.3 V/m Probe Modulation Factor = 2.84 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 14.4 V/m; Power Drift = 0.023 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB)	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 = 0.125 A/m Probe Modulation Factor = 2.24 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.053 A/m; Power Drift = 0.257 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB)																		
V/m 51.8 44.6 37.5 30.3 23.2 16.0  <table><tr><td>Grid 1 40.2 M4</td><td>Grid 2 51.8 M3</td><td>Grid 3 51.3 M3</td></tr><tr><td>Grid 4 32.4 M4</td><td>Grid 5 46.3 M4</td><td>Grid 6 47.8 M3</td></tr><tr><td>Grid 7 43.6 M4</td><td>Grid 8 33.7 M4</td><td>Grid 9 38.1 M4</td></tr></table>	Grid 1 40.2 M4	Grid 2 51.8 M3	Grid 3 51.3 M3	Grid 4 32.4 M4	Grid 5 46.3 M4	Grid 6 47.8 M3	Grid 7 43.6 M4	Grid 8 33.7 M4	Grid 9 38.1 M4	A/m 0.134 0.117 0.099 0.082 0.064 0.047  <table><tr><td>Grid 1 0.134 M4</td><td>Grid 2 0.133 M4</td><td>Grid 3 0.117 M4</td></tr><tr><td>Grid 4 0.124 M4</td><td>Grid 5 0.125 M4</td><td>Grid 6 0.113 M4</td></tr><tr><td>Grid 7 0.101 M4</td><td>Grid 8 0.109 M4</td><td>Grid 9 0.103 M4</td></tr></table>	Grid 1 0.134 M4	Grid 2 0.133 M4	Grid 3 0.117 M4	Grid 4 0.124 M4	Grid 5 0.125 M4	Grid 6 0.113 M4	Grid 7 0.101 M4	Grid 8 0.109 M4	Grid 9 0.103 M4
Grid 1 40.2 M4	Grid 2 51.8 M3	Grid 3 51.3 M3																	
Grid 4 32.4 M4	Grid 5 46.3 M4	Grid 6 47.8 M3																	
Grid 7 43.6 M4	Grid 8 33.7 M4	Grid 9 38.1 M4																	
Grid 1 0.134 M4	Grid 2 0.133 M4	Grid 3 0.117 M4																	
Grid 4 0.124 M4	Grid 5 0.125 M4	Grid 6 0.113 M4																	
Grid 7 0.101 M4	Grid 8 0.109 M4	Grid 9 0.103 M4																	

MEASUREMENT DATA GSM1900, CHANNEL HIGH (1909.8 MHz)																			
Date/Time: 2009-07-28 11:34:36 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3	Date/Time: 2009-07-28 09:29:53 Test Laboratory: TCC Nokia Type: RM-511; Serial: 004401/10/783130/3																		
Communication System: GSM1900 (ER3DV6) Frequency: 1909.8 MHz; Duty Cycle: 1:8.05 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m ³ Phantom section: E Device Section	Communication System: GSM1900 (H3DV6) Frequency: 1909.8 MHz; Duty Cycle: 1:5.01 Medium: Air; Medium Notes: - Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m ³ Phantom section: H Device Section																		
DASY4 Configuration: - Probe: ER3DV6 - SN2309 - ConvF(1, 1, 1); Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184	DASY4 Configuration: - Probe: H3DV6 - SN6143 - ; Calibrated: 2008-11-13 - Sensor-Surface: (Fix Surface) - Electronics: DAE4 Sn728; Calibrated: 2009-02-09 - Phantom: HAC Test Arch; Type: SD HAC P01 BA; Serial: - Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 184																		
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 = 49.9 V/m Probe Modulation Factor = 2.84 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 15.9 V/m; Power Drift = -0.362 dB Hearing Aid Near-Field Category: M3 (AWF -5 dB)  <table><tr><td>Grid 1 44.9 M4</td><td>Grid 2 57.5 M3</td><td>Grid 3 57.5 M3</td></tr><tr><td>Grid 4 34.0 M4</td><td>Grid 5 49.9 M3</td><td>Grid 6 49.9 M3</td></tr><tr><td>Grid 7 48.6 M3</td><td>Grid 8 33.2 M4</td><td>Grid 9 35.3 M4</td></tr></table>	Grid 1 44.9 M4	Grid 2 57.5 M3	Grid 3 57.5 M3	Grid 4 34.0 M4	Grid 5 49.9 M3	Grid 6 49.9 M3	Grid 7 48.6 M3	Grid 8 33.2 M4	Grid 9 35.3 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 = 0.129 A/m Probe Modulation Factor = 2.24 Device Reference Point: 0.000, 0.000, 353.7 mm Reference Value = 0.061 A/m; Power Drift = -0.172 dB Hearing Aid Near-Field Category: M4 (AWF -5 dB)  <table><tr><td>Grid 1 0.142 M3</td><td>Grid 2 0.136 M4</td><td>Grid 3 0.116 M4</td></tr><tr><td>Grid 4 0.129 M4</td><td>Grid 5 0.129 M4</td><td>Grid 6 0.119 M4</td></tr><tr><td>Grid 7 0.111 M4</td><td>Grid 8 0.115 M4</td><td>Grid 9 0.115 M4</td></tr></table>	Grid 1 0.142 M3	Grid 2 0.136 M4	Grid 3 0.116 M4	Grid 4 0.129 M4	Grid 5 0.129 M4	Grid 6 0.119 M4	Grid 7 0.111 M4	Grid 8 0.115 M4	Grid 9 0.115 M4
Grid 1 44.9 M4	Grid 2 57.5 M3	Grid 3 57.5 M3																	
Grid 4 34.0 M4	Grid 5 49.9 M3	Grid 6 49.9 M3																	
Grid 7 48.6 M3	Grid 8 33.2 M4	Grid 9 35.3 M4																	
Grid 1 0.142 M3	Grid 2 0.136 M4	Grid 3 0.116 M4																	
Grid 4 0.129 M4	Grid 5 0.129 M4	Grid 6 0.119 M4																	
Grid 7 0.111 M4	Grid 8 0.115 M4	Grid 9 0.115 M4																	

APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION 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: **ER3-2309_Nov08**

CALIBRATION CERTIFICATE

Object **ER3DV6 - SN:2309**

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

Calibration date: **November 13, 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)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ER3DV6	SN: 2328	1-Oct-08 (No. ER3-2328_Oct08)	Oct-09
DAE4	SN: 789	5-Dec-07 (No. DAE4-789_Dec07)	Dec-08

Secondary Standards	D #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642L01700	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-08)	In house check: Oct-09

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

Issued: November 13, 2008

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



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: H3-6143_Nov08

CALIBRATION CERTIFICATE

Object H3DV6 - SN:6143

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

Calibration date: November 13, 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)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe H3DV6	SN: 6182	1-Oct-08 (No. H3-6182_Oct08)	Oct-09
DAE4	SN: 789	5-Dec-07 (No. DAE4-789_Dec07)	Dec-08
Secondary Standards	D #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	JS3642U01700	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-08)	In house check: Oct-09

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

Issued: November 13, 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)



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: **CD835V3-1005_Nov08**

CALIBRATION CERTIFICATE

Object	CD835V3 - SN: 1005
Calibration procedure(s)	QA CAL-20.v4 Calibration procedure for dipoles in air
Calibration date:	November 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)
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	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
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	03-Oct-08 (No. DAE4-781_Oct08)	Oct-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB42420191	11-May-05 (in house check Oct-07)	In house check: Oct-09
Power sensor HP 8482A	US37295597	11-May-05 (in house check Oct-07)	In house check: Oct-09
Power sensor HP 8482H	3318A09450	08-Jan-02 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09
RF generator E4433B	MY 41310391	03-Nov-04 (in house check Oct-07)	In house check: Oct-09

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

Issued: November 13, 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: 11.11.2008 08:45:34

Test Laboratory: SPEAG Lab 2

H_CD835_1005_081111

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1005

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: 03.10.2008
- 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 = 0.441 A/m

Probe Modulation Factor = 1.00

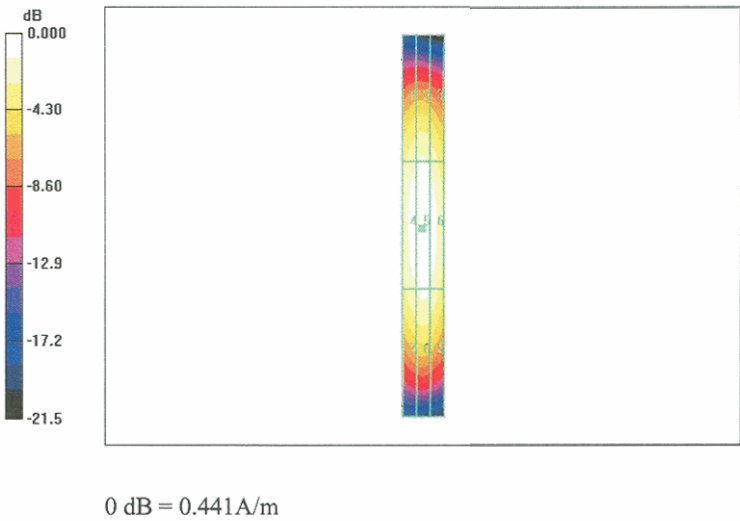
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.467 A/m; Power Drift = 0.006 dB

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

Peak H-field in A/m

Grid 1 0.370 M4	Grid 2 0.385 M4	Grid 3 0.358 M4
Grid 4 0.423 M4	Grid 5 0.441 M4	Grid 6 0.412 M4
Grid 7 0.376 M4	Grid 8 0.394 M4	Grid 9 0.368 M4



Test Laboratory: SPEAG Lab 2

E_CD835_1005_081111

DUT: HAC-Dipole 835 MHz; Type: D835V3; Serial: 1005

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: 03.10.2008
- 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

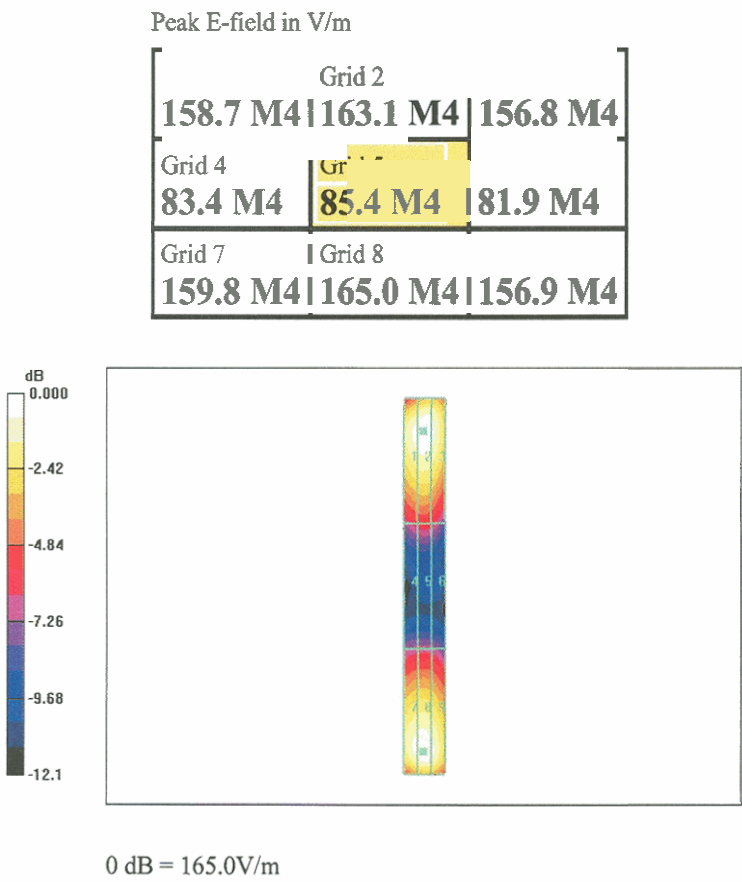
Maximum value of peak Total field = 165.0 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 107.1 V/m; Power Drift = -0.020 dB

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





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: **CD1880V3-1004_Nov08**

CALIBRATION CERTIFICATE

Object	CD1880V3 - SN: 1004
Calibration procedure(s)	QA CAL-20.v4 Calibration procedure for dipoles in air
Calibration date:	November 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).
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	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
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	03-Oct-08 (No. DAE4-781_Oct08)	Oct-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-4419B	GB42420191	11-May-05 (in house check Oct-07)	In house check: Oct-09
Power sensor HP 8482A	US37295597	11-May-05 (in house check Oct-07)	In house check: Oct-09
Power sensor HP 8482H	3318A09450	08-Jan-02 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09
RF generator E4433B	MY 41310391	22-Nov-04 (in house check Oct-07)	In house check: Oct-09

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

Issued: November 13, 2008

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

Test Laboratory: SPEAG Lab 2

H_CD1880_1004_081111

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1004

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: 03.10.2008
- 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 CD1880 Dipole = 10mm 2/Hearing Aid

Compatibility Test (41x181x1):

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

Maximum value of peak Total field = 0.461 A/m

Probe Modulation Factor = 1.00

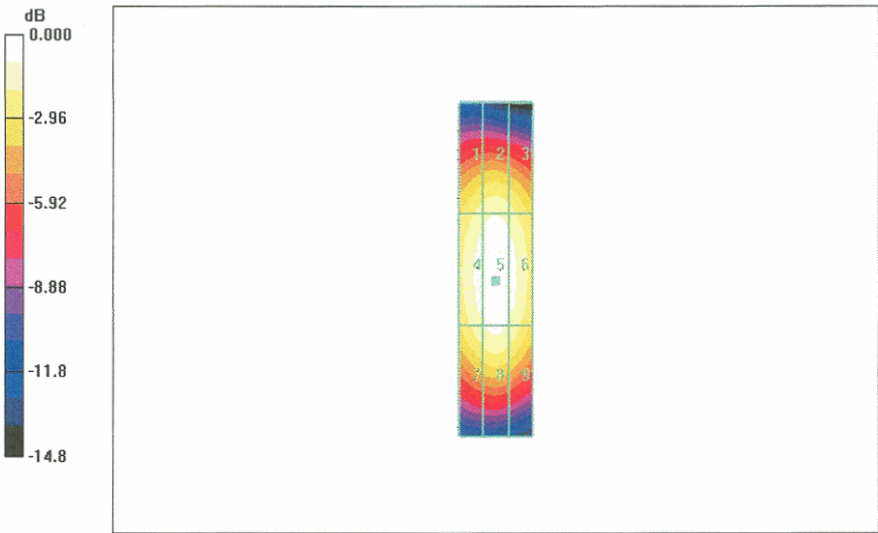
Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 0.488 A/m; Power Drift = -0.018 dB

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

Peak H-field in A/m

Grid 1 0.394 M2	Grid 2 0.410 M2	Grid 3 0.390 M2
Grid 4 0.442 M2	Grid 5 0.461 M2	Grid 6 0.438 M2
Grid 7 0.409 M2	Grid 8 0.430 M2	Grid 9 0.406 M2



0 dB = 0.461A/m

3.3.2 DASY4 E-Field Result

Date/Time: 11.11.2008 12:54:31

Test Laboratory: SPEAG Lab 2

E_CD1880_1004_081111

DUT: HAC Dipole 1880 MHz; Type: CD1880V3; Serial: 1004

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: 03.10.2008
- 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 = 138.8 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, -6.30 mm

Reference Value = 157.2 V/m; Power Drift = -0.005 dB

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

Peak E-field in V/m

131.1 M2 136.9 M2 133.9 M2		
Grid 4 89.6 M3	5 92.1 M3	Grid 6 88.3 M3
Grid 7 133.8 M2	Grid 8 138.8 M2	Grid 9 133.2 M2

