

HAC RF Emissions Test Report

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Tested devices:	RM-391 (Hearing aid mode)		
FCC ID:	QTLRM-391		
Supplement reports:	Salo_HAC_0749_04		
Testing has been carried out in accordance with:	ANSI C63.19-2006 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	2007-11-29 to 2007-11-30
SN, HW, SW and DUT numbers of tested device	SN: 001004/00/261411/4, HW: 0424, SW: Pt06w47_07w46_fam, DUT: 12371
Batteries used in testing	BL-4B, EUT: 12355, 12356
State of sample	Prototype unit
Notes	AWF = -5

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]	Limit of E-field max. value in category M3 [V/m]	Maximum E-field value after exclusion [V/m]	Category
GSM850	251/848.8	149.6 – 266.1	172.7	M3 (-5dB)
GSM1900	512/1850.2	47.3 – 84.1	73.3	M3 (-5dB)

1.2.2 Magnetic field measurements

Band & Mode	Ch / Freq. [MHz]	Limit of H-field max. value in category M3 [A/m]	Maximum H-field value after exclusion [A/m]	Category
GSM850	251/848.8	0.45 – 0.80	0.209	M4 (-5dB)
GSM1900	512/1850.2	0.14 – 0.25	0.150	M3 (-5dB)

1.2.3 Overall RF emissions category of the tested device

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

1.2.4 Maximum Drift

Maximum drift during measurements	0.12 dB
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1.2.5 Measurement Uncertainty

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

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

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

2.1 Picture of Device



Flip closed



Flip open

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature [°C]:	20.4 to 22.2
Ambient humidity [RH %]:	31 to 39

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 measurements were performed on low, middle and high channels.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement system and components

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

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE 4	555	12 months	2008-03
E-field Probe ER3DV6	2333	12 months	2008-02
H-field Probe H3DV6	6053	12 months	2008-02
Dipole Validation Kit, CD835V3	1004	24 months	2009-02
Dipole Validation Kit, CD1880V3	1003	24 months	2009-02

Additional test equipment used in testing and validation:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	SML03	101265	12 months	2008-07
Amplifier	ZHL-42 (SMA)	N072095-5	12 months	2008-07
Power Meter	NRVS	849305/028	12 months	2008-07
Power Sensor	NRV-Z32	839176/020	12 months	2008-07
Radio Communication Tester	CMU 200	101111	12 months	2008-07

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	160.0	0.452
	± 10% window	144.0 – 176.0	0.406 – 0.497
	2007-11-29	175.4	0.497
1880	Reference result	128.8	0.452
	± 10% window	115.9 – 141.7	0.406 – 0.497
	YYYY-MM-DD	135.8	0.435

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.



Photo of the device positioned under Test Arch

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 [dBm]	E-field [V/m] Probe SN: 2333		H-field [A/m] Probe SN: 6053		PMF E-field	PMF H-field
		CW	GSM	CW	GSM		
835.0	20	95.6	33.9	0.452	0.173	2.82	2.61
1880.0	20	136.3	48.4	0.506	0.249	2.82	2.03

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 – 2006.

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

6. MEASUREMENT UNCERTAINTY

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

7. RESULTS

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

GSM850, E and H RF emissions results

Mode	Flip option	Test configuration	Ch 128 824.2MHz	Ch 190 836.6MHz	Ch 251 848.8MHz
GSM850	Flip open	E-field [V/M]	140.1	168.7	172.7
		H-field [A/m]	0.159	0.206	0.209
		Category	M4 (-5dB)	M3 (-5dB)	M3 (-5dB)

GSM1900, E and H RF emissions results

Mode	Flip option	Test configuration	Ch 512 1850.2MHz	Ch 661 1880.0MHz	Ch 810 1909.8MHz
GSM1900	Flip open	E-field [V/M]	73.3	53.5	56.5
		H-field [A/m]	0.150	0.114	0.138
		Category	M3 (-5dB)	M3 (-5dB)	M3 (-5dB)

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: 2007-11-29 12:55:47

Test Laboratory: TCC Nokia

Type: D835V3; Serial: 1004

Date/Time: 2007-11-29 12:23:04

Test Laboratory: TCC Nokia

Type: D835V3; 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, $\epsilon_r = 1$; $\rho = 1000$ kg/m³

Phantom section: E Dipole Section

Communication System: CW

Frequency: 835 MHz; Duty Cycle: 1:1

Medium: Air; Medium Notes: Not Specified

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

Phantom section: H Dipole Section

DASY4 Configuration:

- Probe: ER3DV6 - SN2333; Probe Notes:

- ConvF(1, 1, 1); Calibrated: 2007-02-13

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn555; Calibrated: 2007-03-15

- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW:

SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: H3DV6 - SN6053; Probe Notes:

- ; Calibrated: 2007-02-13

- Sensor-Surface: (Fix Surface)

- Electronics: DAE4 Sn555; Calibrated: 2007-03-15

- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;

- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW:

SEMCAD, V1.8 Build 176

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

Maximum value of peak Total field = 182.4 V/m

Probe Modulation Factor = 1.00

Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 104.2 V/m; Power Drift = -0.017 dB

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

H Scan - H3DV6 probe center 10mm above CD835 Dipole/Hearing Aid Compatibility Test (41x361x1):

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

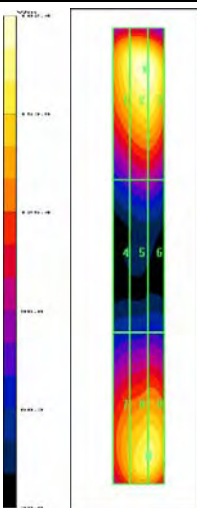
Maximum value of peak Total field = 0.497 A/m

Probe Modulation Factor = 1.00

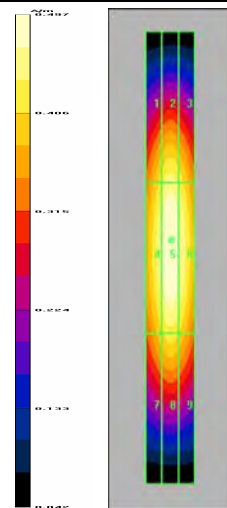
Device Reference Point: 0.000, 0.000, 354.7 mm

Reference Value = 0.529 A/m; Power Drift = 0.008 dB

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



Grid 1	Grid 2	Grid 3
168.2 M4	182.4 M4	182.3 M4
Grid 4	Grid 5	Grid 6
87.7 M4	97.7 M4	97.7 M4
Grid 7	Grid 8	Grid 9
149.4 M4	168.0 M4	168.3 M4



Grid 1	Grid 2	Grid 3
0.422 M4	0.452 M4	0.431 M4
Grid 4	Grid 5	Grid 6
0.465 M4	0.497 M4	0.476 M4
Grid 7	Grid 8	Grid 9
0.399 M4	0.426 M4	0.407 M4

SYSTEM VALIDATION DATA 1900MHZ

Date/Time: 2007-11-29 13:11:51
Test Laboratory: TCC Nokia
Type: CD1880V3; Serial: 1003

Date/Time: 2007-11-29 12:02:30
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, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Dipole Section

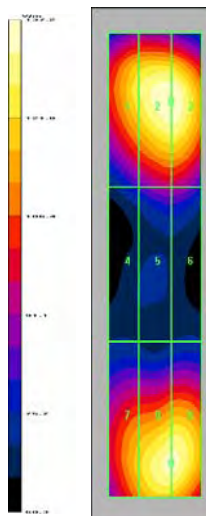
Communication System: CW
Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Dipole Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2333; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

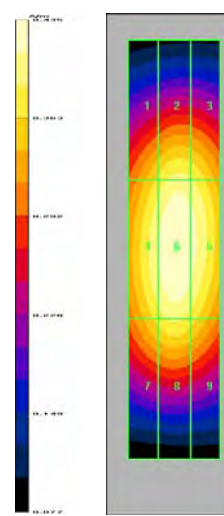
DASY4 Configuration:
- Probe: H3DV6 - SN6053; Probe Notes:
- ; Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 137.2 V/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 145.6 V/m; Power Drift = 0.002 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)

H Scan - H3DV6 probe center 10mm above CD1880 Dipole/Hearing Aid Compatibility Test (41x181x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.435 A/m
Probe Modulation Factor = 1.00
Device Reference Point: 0.000, 0.000, 354.7 mm
Reference Value = 0.459 A/m; Power Drift = 0.000 dB
Hearing Aid Near-Field Category: M2 (AWF 0 dB)



Grid 1	Grid 2	Grid 3
126.8 M2	137.2 M2	137.2 M2
Grid 4	Grid 5	Grid 6
82.5 M3	93.0 M3	93.0 M3
Grid 7	Grid 8	Grid 9
120.6 M2	134.4 M2	134.4 M2



Grid 1	Grid 2	Grid 3
0.370 M2	0.398 M2	0.390 M2
Grid 4	Grid 5	Grid 6
0.410 M2	0.435 M2	0.422 M2
Grid 7	Grid 8	Grid 9
0.373 M2	0.391 M2	0.375 M2

APPENDIX B: MEASUREMENT SCANS

MEASUREMENT DATA GSM850, CHANNEL LOW (824.2 MHz)

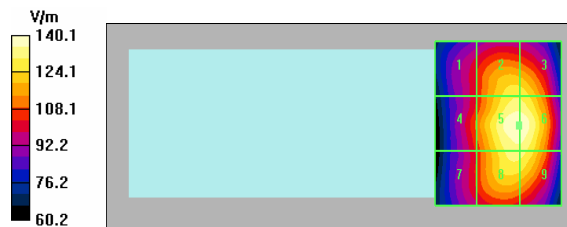
Date/Time: 2007-11-29 18:02:02
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Communication System: GSM850 (ER3DV6)
Frequency: 824.2 MHz; Duty Cycle: 1:7.95
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2333; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, low/Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 140.1 V/m
Probe Modulation Factor = 2.82
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 51.6 V/m; Power Drift = -0.055 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
103.9 M4	128.8 M4	128.6 M4
Grid 4	Grid 5	Grid 6
110.3 M4	140.1 M4	140.1 M4
Grid 7	Grid 8	Grid 9
104.9 M4	132.7 M4	132.3 M4

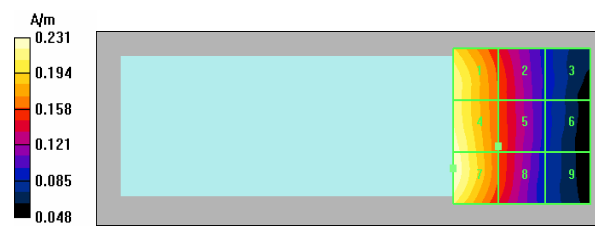
Date/Time: 2007-11-30 10:53:56
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Communication System: GSM850 (H3DV6)
Frequency: 824.2 MHz; Duty Cycle: 1:6.79
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: H3DV6 - SN6053; Probe Notes:
- ; Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

H Scan - H3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, Low/Hearing Aid Compatibility Test (101x101x1):

Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.231 A/m
Probe Modulation Factor = 2.61
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.049 A/m; Power Drift = 0.003 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.217 M4	0.157 M4	0.095 M4
Grid 4	Grid 5	Grid 6
0.229 M4	0.159 M4	0.093 M4
Grid 7	Grid 8	Grid 9
0.231 M4	0.159 M4	0.089 M4

MEASUREMENT DATA GSM850, CHANNEL MIDDLE (836.6 MHz)

Date/Time: 2007-11-29 17:53:50
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Date/Time: 2007-11-30 10:42:17
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

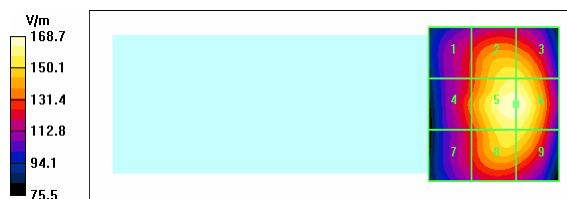
Communication System: GSM850 (ER3DV6)
Frequency: 836.6 MHz; Duty Cycle: 1:7.95
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: GSM850 (H3DV6)
Frequency: 836.6 MHz; Duty Cycle: 1:6.79
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2333; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

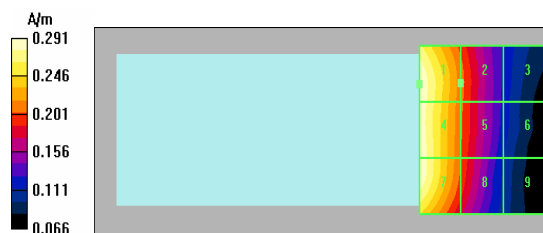
DASY4 Configuration:
- Probe: H3DV6 - SN6053; Probe Notes:
- ; Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, mid/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 168.7 V/m
Probe Modulation Factor = 2.82
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 62.7 V/m; Power Drift = -0.121 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
128.3 M4	156.0 M3	155.7 M3
Grid 4	Grid 5	Grid 6
136.0 M4	168.7 M3	168.7 M3
Grid 7	Grid 8	Grid 9
127.6 M4	157.2 M3	156.9 M3

H Scan - H3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, mid/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.291 A/m
Probe Modulation Factor = 2.61
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.063 A/m; Power Drift = -0.079 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.291 M4	0.208 M4	0.125 M4
Grid 4	Grid 5	Grid 6
0.290 M4	0.206 M4	0.122 M4
Grid 7	Grid 8	Grid 9
0.290 M4	0.201 M4	0.112 M4

MEASUREMENT DATA GSM850, CHANNEL HIGH (848.8 MHz)

Date/Time: 2007-11-29 17:57:53
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Date/Time: 2007-11-30 10:50:25
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

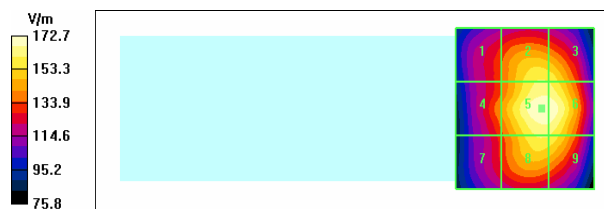
Communication System: GSM850 (ER3DV6)
Frequency: 848.8 MHz; Duty Cycle: 1:7.95
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: GSM850 (H3DV6)
Frequency: 848.8 MHz; Duty Cycle: 1:6.79
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2333; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: H3DV6 - SN6053; Probe Notes:
- ; Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, high/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 172.7 V/m
Probe Modulation Factor = 2.82
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 64.5 V/m; Power Drift = -0.051 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
134.1 M4	160.6 M3	159.7 M3
Grid 4	Grid 5	Grid 6
141.9 M4	172.7 M3	172.5 M3
Grid 7	Grid 8	Grid 9
131.9 M4	160.9 M3	160.1 M3

H Scan - H3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, High/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.303 A/m
Probe Modulation Factor = 2.61
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.062 A/m; Power Drift = 0.006 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.303 M4	0.214 M4	0.130 M4
Grid 4	Grid 5	Grid 6
0.300 M4	0.209 M4	0.122 M4
Grid 7	Grid 8	Grid 9
0.293 M4	0.197 M4	0.103 M4

MEASUREMENT DATA GSM1900, CHANNEL LOW (1850.2 MHz)

Date/Time: 2007-11-29 17:16:52
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Date/Time: 2007-11-30 11:36:34
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

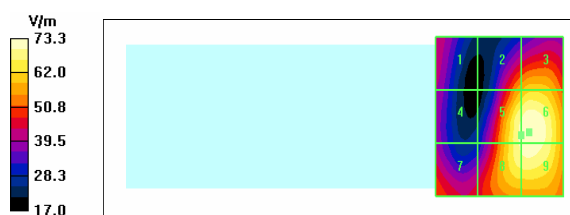
Communication System: GSM1900 (ER3DV6)
Frequency: 1850.2 MHz; Duty Cycle: 1:7.92
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: GSM1900 (H3DV6)
Frequency: 1850.2 MHz; Duty Cycle: 1:4.13
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2333; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

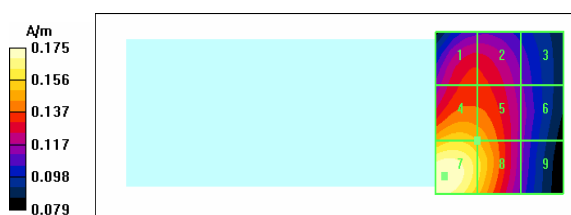
DASY4 Configuration:
- Probe: H3DV6 - SN6053; Probe Notes:
- ; Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, low/Hearing Aid Compatibility Test (101x101x1):
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 73.3 V/m
Probe Modulation Factor = 2.82
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 19.3 V/m; Power Drift = -0.015 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
42.2 M4	57.8 M3	61.1 M3
Grid 4	Grid 5	Grid 6
39.9 M4	71.0 M3	73.3 M3
Grid 7	Grid 8	Grid 9
51.3 M3	70.6 M3	72.4 M3

H Scan - H3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, Low/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.175 A/m
Probe Modulation Factor = 2.03
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.066 A/m; Power Drift = 0.044 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.133 M4	0.133 M4	0.113 M4
Grid 4	Grid 5	Grid 6
0.155 M3	0.150 M3	0.116 M4
Grid 7	Grid 8	Grid 9
0.175 M3	0.159 M3	0.114 M4

MEASUREMENT DATA GSM1900, CHANNEL MIDDLE (1880 MHz)

Date/Time: 2007-11-29 17:08:01
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Date/Time: 2007-11-30 11:10:14
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

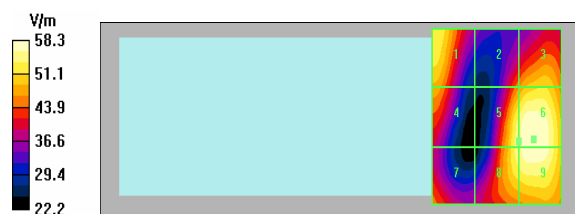
Communication System: GSM1900 (ER3DV6)
Frequency: 1880 MHz; Duty Cycle: 1:7.92
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

Communication System: GSM1900 (H3DV6)
Frequency: 1880 MHz; Duty Cycle: 1:4.13
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2333; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

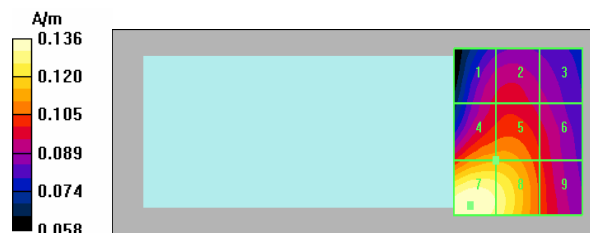
DASY4 Configuration:
- Probe: H3DV6 - SN6053; Probe Notes:
- ; Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, mid/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 58.3 V/m
Probe Modulation Factor = 2.82
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 14.0 V/m; Power Drift = -0.036 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
53.5 M3	45.8 M4	51.2 M3
Grid 4	Grid 5	Grid 6
48.2 M3	55.2 M3	58.3 M3
Grid 7	Grid 8	Grid 9
45.6 M4	55.1 M3	58.0 M3

H Scan - H3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, mid/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 0.136 A/m
Probe Modulation Factor = 2.03
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.052 A/m; Power Drift = 0.001 dB
Hearing Aid Near-Field Category: M4 (AWF -5 dB)



Grid 1	Grid 2	Grid 3
0.096 M4	0.098 M4	0.092 M4
Grid 4	Grid 5	Grid 6
0.114 M4	0.114 M4	0.101 M4
Grid 7	Grid 8	Grid 9
0.136 M4	0.130 M4	0.104 M4

MEASUREMENT DATA GSM1900, CHANNEL HIGH (1909.8 MHz)

Date/Time: 2007-11-29 17:12:07
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Date/Time: 2007-11-30 11:17:10
Test Laboratory: TCC Nokia
Type: RM-391; Serial: 001004/00/261411/4

Communication System: GSM1900 (ER3DV6)
Frequency: 1909.8 MHz; Duty Cycle: 1:7.92
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1000$ kg/m³
Phantom section: E Device Section

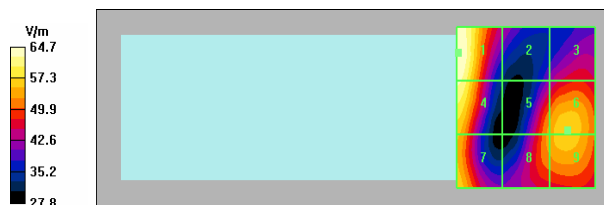
Communication System: GSM1900 (H3DV6)
Frequency: 1909.8 MHz; Duty Cycle: 1:4.13
Medium: Air; Medium Notes: Not Specified
Medium parameters used: $\sigma = 0$ mho/m, $\epsilon_r = 1$; $\rho = 1$ kg/m³
Phantom section: H Device Section

DASY4 Configuration:
- Probe: ER3DV6 - SN2333; Probe Notes:
- ConvF(1, 1, 1); Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: H3DV6 - SN6053; Probe Notes:
- ; Calibrated: 2007-02-13
- Sensor-Surface: (Fix Surface)
- Electronics: DAE4 Sn555; Calibrated: 2007-03-15
- Phantom: HAC Test Arch 4.6; Type: SD HAC P01 BA; Serial: 1004
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 176

E Scan - ER3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, high/Hearing Aid Compatibility Test (101x101x1):

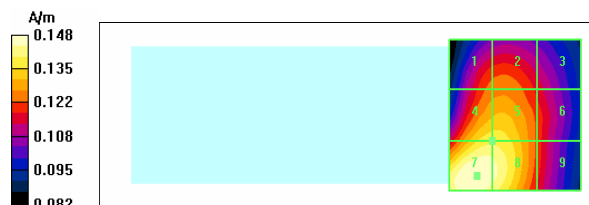
Measurement grid: dx=5mm, dy=5mm
Maximum value of peak Total field = 64.7 V/m
Probe Modulation Factor = 2.82
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 12.6 V/m; Power Drift = 0.032 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1 64.7 M3	Grid 2 43.4 M4	Grid 3 47.5 M3
Grid 4 62.9 M3	Grid 5 53.5 M3	Grid 6 56.5 M3
Grid 7 57.8 M3	Grid 8 53.5 M3	Grid 9 56.3 M3

H Scan - H3DV6 - measurement distance from the closest probe sensor part to the Device = 10mm, High/Hearing Aid Compatibility Test (101x101x1): Measurement grid: dx=5mm, dy=5mm

Maximum value of peak Total field = 0.148 A/m
Probe Modulation Factor = 2.03
Device Reference Point: 0.000, 0.000, 353.7 mm
Reference Value = 0.066 A/m; Power Drift = -0.077 dB
Hearing Aid Near-Field Category: M3 (AWF -5 dB)



Grid 1 0.124 M4	Grid 2 0.125 M4	Grid 3 0.116 M4
Grid 4 0.138 M4	Grid 5 0.138 M4	Grid 6 0.120 M4
Grid 7 0.148 M3	Grid 8 0.145 M3	Grid 9 0.120 M4