

# DELTA Test Report



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**Radio parameter test of M60 according to  
FCC and IC requirements**

**Performed for GN Hearing A/S**

DANAK-1911309

Project no.: A507260-4

Page 1 of 59

10 March 2011

**DELTA**  
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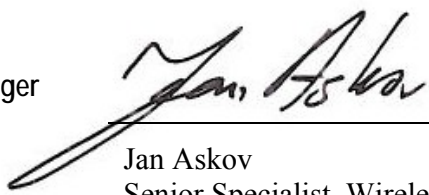
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Title	Radio parameter test of M60 according to FCC and IC requirements
Test object	M60
Report no.	DANAK-1911309
Project no.	A507260-4
Test period	16 December 2010 to 2 February 2011
Client	GN Hearing A/S Lautrupbjerg 7 2750 Ballerup Denmark Tel.: +45 45 75 11 11
Contact person	Vinnie Nørager E-mail: vnoerager@gnresound.dk
Manufacturer	GN Hearing A/S
Specifications	<ul style="list-style-type: none"><li>- FCC CFR 47 Part 15, Subpart C Specific rule part 15.249</li><li>- IC Standard RSS-210, Issue 8:2010</li><li>- IC Standard RSS-Gen, issue 3:2010</li></ul>
Results	The test objects were found to be in compliance with the specifications, as listed in Section 1
Test personnel	Jan Askov Henrik Egeberg Nielsen Claus Momme Thomsen



Date 10 March 2011

Project Manager

  
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## 1. Summary of tests

Tests SRD	Test methods	Rule Section	Results
Antenna requirement	Visual inspection IC RSS-Gen:2010	15.203 RSS-Gen, 7.1.2	Passed
Measurement of radiated emission	ANSI C63.4:2003 IC RSS-Gen:2010	15.209 RSS-210, 2.5 & A2.9	Passed
Measurement of 20 dB bandwidth	FCC CFR 47 Part 15	15.215(c)	Passed
Measurement of band edge compliance	FCC CFR 47 Part 15 ANSI C63.4:2003 IC RSS-Gen:2010	15.209(a)&15.249(d)(e) RSS-210, 2.5 & A2.9	Passed
Measurement of field strength of fundamental	ANSI C63.4:2003 IC RSS-Gen:2010	15.249(a) RSS-210, 2.5 & A2.9	Passed
Measurement of occupied bandwidth	IC RSS-Gen:2010	RSS-Gen, 4.6.1	Passed
Measurement of radiated emission, receiver	EN 300 440-1 V1.5.1:2009	RSS-Gen, 6 RSS-210, 2.5	Passed

The given result is based on a shared risk principle with respect to the measurement uncertainty.

### Conclusion

The test objects mentioned in this report meet the requirements of the standard stated below.

- FCC CFR 47 Part 15, Subpart C  
Specific rule part 15.249
- IC Standard RSS-210 Issue 8:2010
- IC Standard RSS-Gen, Issue 3:2010.

The test results relate only to the objects tested.

## 2. Test objects and auxiliary equipment

### 2.1 Test objects

#### Test object 2.1.1

Name of test object	M60
Model / type	M60
Part no.	M60
Serial no.	163
FCC ID	X26M60
IC ID	6941C-M60
Manufacturer	GN Hearing A/S
Supply voltage	1.3 VDC (Zinc Air battery)
Software version	Spurious emission firmware: Tx and Rx Delta Test App 2.0 : 09.11.10
Cycle time	0.5 ms / 1.0 ms
Comments	Supplied by external power supply or battery

#### Test object 2.1.2

Name of test object	M60
Model / type	M60
Part no.	M60
Serial no.	151
FCC ID	X26M60
IC ID	6941C-M60
Manufacturer	GN Hearing A/S
Supply voltage	1.3 VDC (Zinc Air battery)
Software version	Spurious emission firmware: Tx and Rx Delta Test App 2.0 : 09.11.10
Cycle time	0.5 ms / 1.0 ms
Comments	Supplied by external power supply or battery



### Test object 2.1.3

Name of test object	M60
Model / type	M60
Part no.	M60
Serial no.	188
FCC ID	X26M60
IC ID	6941C-M60
Manufacturer	GN Hearing A/S
Supply voltage	1.3 VDC (Zinc Air battery)
Software version	Spurious emission firmware: Tx and Rx Delta Test App 2.0 : 09.11.10
Cycle time	0.5 ms / 1.0 ms
Comments	Supplied by external power supply or battery

### Test object 2.1.4

Name of test object	M60
Model / type	M60
Part no.	M60
Serial no.	243
FCC ID	X26M60
IC ID	6941C-M60
Manufacturer	GN Hearing A/S
Supply voltage	1.3 VDC (Zinc Air battery)
Software version	Spurious emission firmware: Tx and Rx Delta Test App 2.0 : 09.11.10
Cycle time	0.5 ms / 1.0 ms
Comments	Supplied by external power supply or battery

### Test object 2.1.5

Name of test object	M60
Model / type	M60
Part no.	M60
Serial no.	172
FCC ID	X26M60
IC ID	6941C-M60
Manufacturer	GN Hearing A/S
Supply voltage	1.3 VDC (Zinc Air battery)
Software version	Spurious emission firmware: Tx and Rx Delta Test App 2.0 : 09.11.10
Cycle time	0.5 ms / 1.0 ms
Comments	Antenna replaced by SMA connector and supplied by external power supply



### 3. General test conditions

#### 3.1 Test setup during test

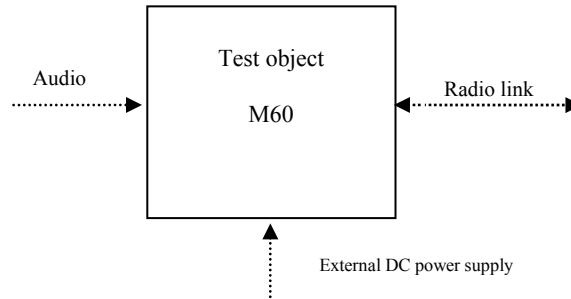


Figure 3.1.1 Block diagram of test object with external cables.

All test objects were running special test software.

During test, the test objects were in continuous Tx mode or continuous Rx mode.  
(Normal modulation, normal data packets with optimized repetition rate)

Tests were performed at three frequencies

- Low frequency: 2404 MHz
- Middle frequency: 2440 MHz
- High frequency: 2478 MHz.

During relevant tests, the battery was replaced by an external DC power supply.  
External power supply is not used under intended use.

#### **Intended use**

M60 is a hearing aid used for alleviation of hearing loss. It can receive audio signals and be configured via the radio link.



**Size of the test object:**

The test object measures 35 x 25 x 7 mm.



### 3.2 Test sequence

The tests described in this test report were performed in the following sequence:

1. Measurement of radiated emission, Rx, IC
2. Measurement of 20 dB bandwidth
3. Measurement of occupied bandwidth, IC
4. Measurement of field strength of fundamental
5. Measurement of radiated emission
6. Measurement of band edge compliance
7. Visual inspection of antenna requirement.

## 4. Test results

### 4.1 Radio specifications, receiver and transmitter

Test object	M60	Sheet	Radio-1
Type	M60	Project no.	A507260-4
Serial no.	All		
Client	GN Hearing A/S		
Specification	FCC CFR 47 Part 15, Subpart C IC standard RSS-210, Issue 8:2010 IC standard RSS-Gen, issue 3:2010		

The radio of the test object has the following specified RF parameters. The below mentioned information regarding the receiver and the transmitter is declared by the manufacturer:

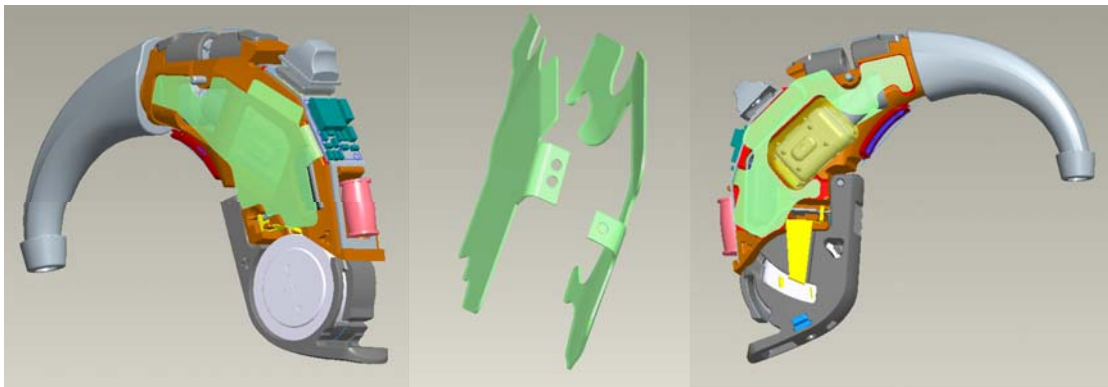
Type of equipment	:	Low power device (2400-2483.5 MHz)
Operating frequency range	:	2404 to 2478 MHz
Antenna	:	Permanently attached PCB antenna
Maximum gain	:	-5.6 dB
Transmit power, max peak	:	-6.3 dBm EIRP
Field Strength, max peak	:	89.0 dB $\mu$ V/m (28.3 mV) @ 3 meter
Power level	:	No
No of channels	:	20
Bandwidth	:	
Occupied bandwidths (99%)	:	2.173 MHz (Measured)
Necessary bandwidth	:	2.173 MHz
Channel separation	:	2 MHz
Modulation	:	GFSK
Data rate	:	2 Mbits
Duty cycle	:	10 % during normal mode
Transmit mode	:	Yes
Receive mode	:	Yes
Standby mode	:	Yes
Power supply	:	1.3 V Zinc Air battery
Specified min voltage	:	1.19 V
Specified max voltage	:	1.4 V
Temperature category	:	-20 to +55 °C.
Emission Designator	:	3M43F7E
Max. TX spurious emission, average	:	335 ( $\mu$ V/m) @ 3 meter (Field Strength)
Max. RX spurious emission, peak	:	367 ( $\mu$ V/m) @ 3 meter (Field Strength)



## 4.2 Antenna requirement

Test object	M60	Sheet	ANT-1
Type	M60	Project no.	A507260-4
Serial no.	A11	Date	22 Feb. 2010
Client	GN Hearing A/S	Initials	JAS
Specification	FCC CFR 47 Part 15, Subpart C, Section 15.203 IC Standard: RSS-Gen, Issue 3:2010, Section 7.1.2		

Test method	Visual inspection
<b>Evaluation criteria</b> Section 15.203 of the FCC rules and 7.1.2 of RSS-Gen state that the subject device must meet at least one of the following criteria: (a) Antenna must be permanently attached to the unit. (b) Antenna must use a unique type of connector to attach to the unit. (c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.	
<b>Evaluation result</b> The M60 has one permanent attached PCB antenna.	

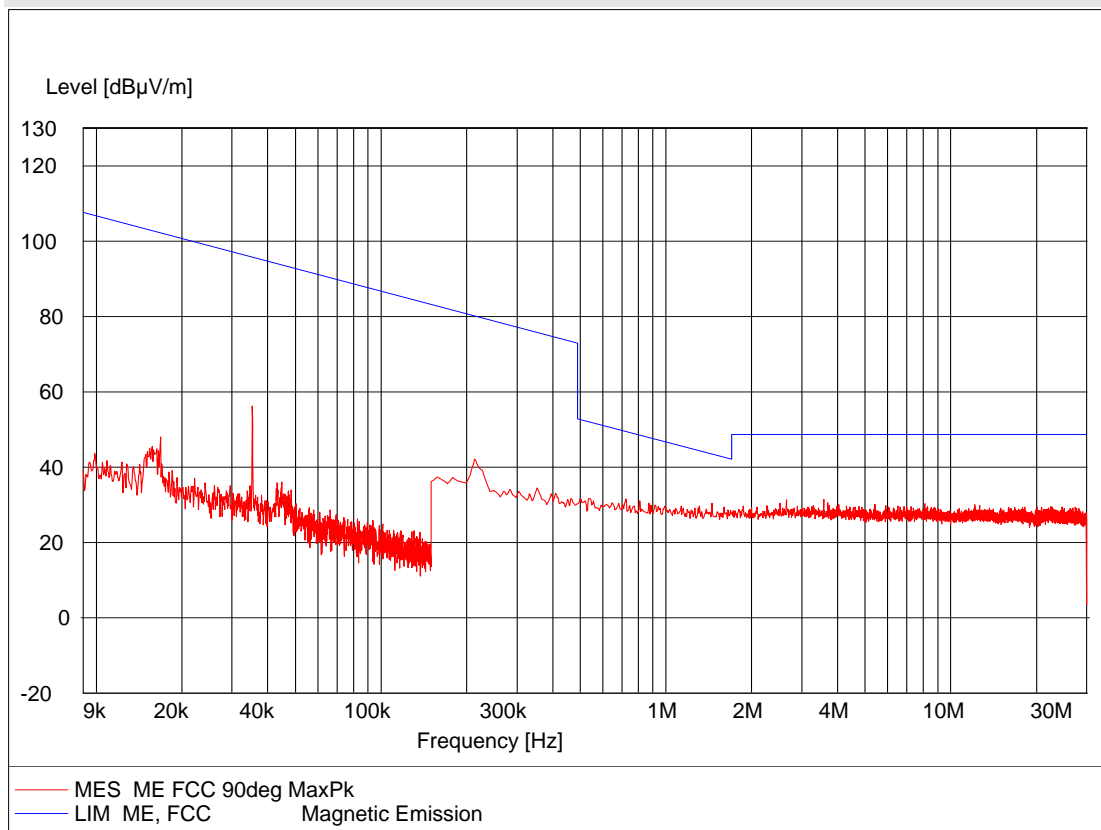


Antenna

### 4.3 Measurement of radiated emission

Test object	M60	Sheet	RE Loop-1
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	0.009-30MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Scan, Loop Antenna at 10 m, 1 m Height, Horizontal.	Humidity	35 % RH
Detector	Peak	Bandwidth	0.2/9 KHz
Test equipm.	EMI room Hørsholm 29332 29503 49600 29494	Uncertainty	4 dB

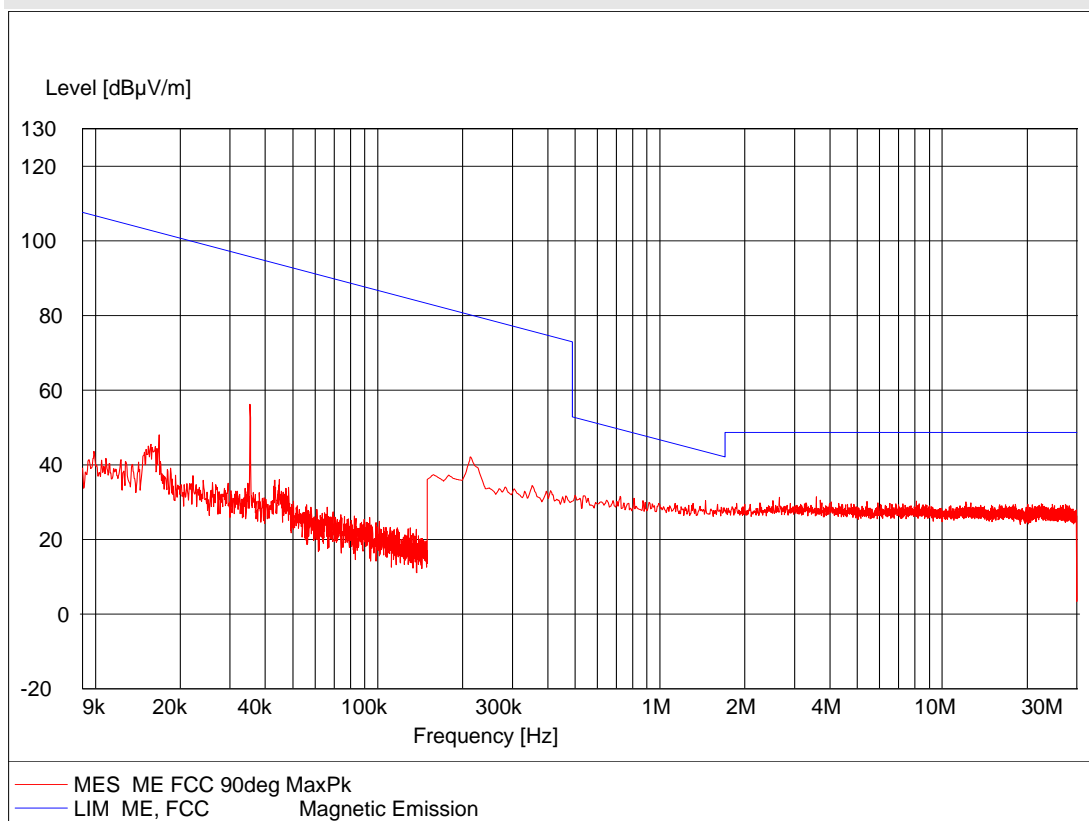


#### Comments

The limit has been extrapolated to 10 m using an extrapolation factor of 40 dB/decade as specified in § 15.31(f)(2).  $L_2 = L_1 + 40 \log_{10} (D_1/D_2)$ .

Test object	M60	Sheet	RE Loop-2
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	0.009-30MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Scan, Loop Antenna at 10 m, 1 m Height, 90 deg.	Humidity	35 % RH
Detector	Peak	Bandwidth	0.2/9 KHz
Test equipm.	EMI room Hørsholm 29332 29503 49600 29494	Uncertainty	4 dB

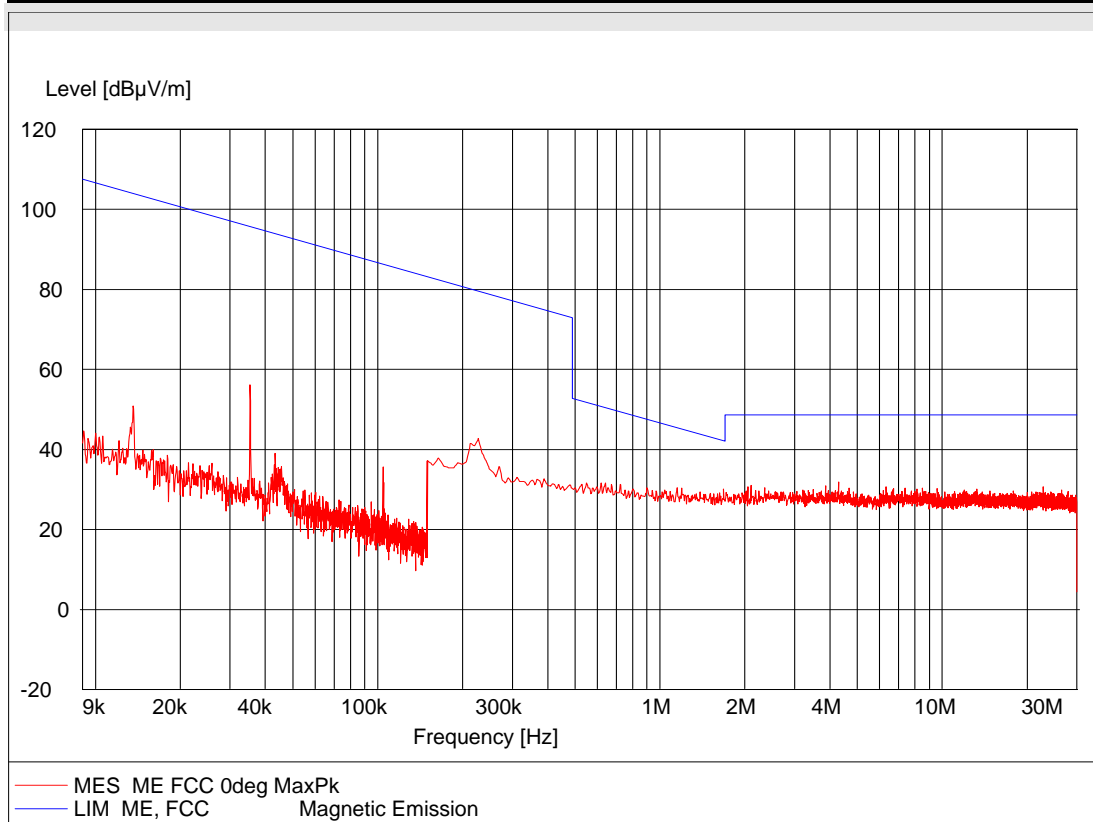


#### Comments

The limit has been extrapolated to 10 m using an extrapolation factor of 40 dB/decade as specified in § 15.31(f)(2).  $L_2 = L_1 + 40 \log_{10} (D_1/D_2)$ .

Test object	M60	Sheet	RE Loop-3
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	0.009-30MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Scan, Loop Antenna at 10 m, 1 m Height, 0 deg.	Humidity	35 % RH
Detector	Peak	Bandwidth	0.2/9 KHz
Test equipm.	EMI room Hørsholm 29332 29503 49600 29494	Uncertainty	4 dB



#### Comments

The limit has been extrapolated to 10 m using an extrapolation factor of 40 dB/decade as specified in § 15.31(f)(2).  $L_2 = L_1 + 40 \log_{10} (D_1/D_2)$ .

Test frequency	2440 MHz
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Test result	The measured field strengths are more then 15 dB below the limit
Compliant	Yes
Comments	Measurement performed in a shielded room

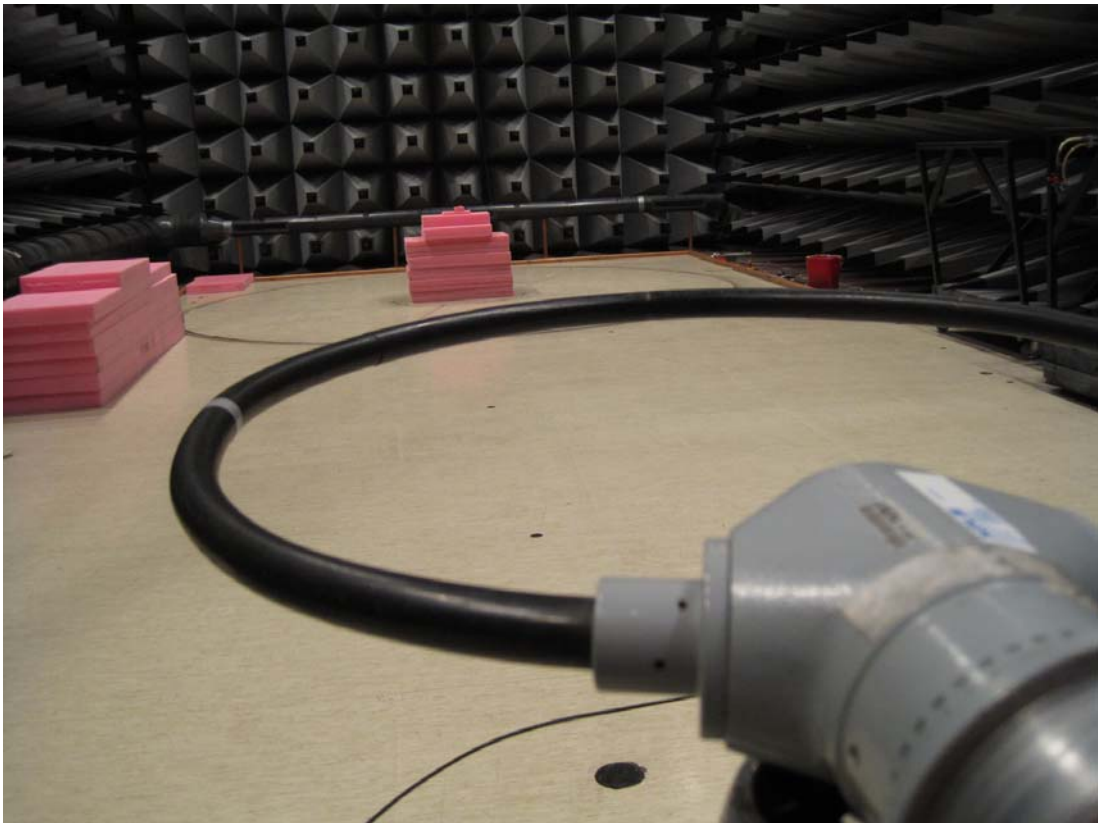


Photo 4.3.1 Test setup regarding measurement of radiated emission.

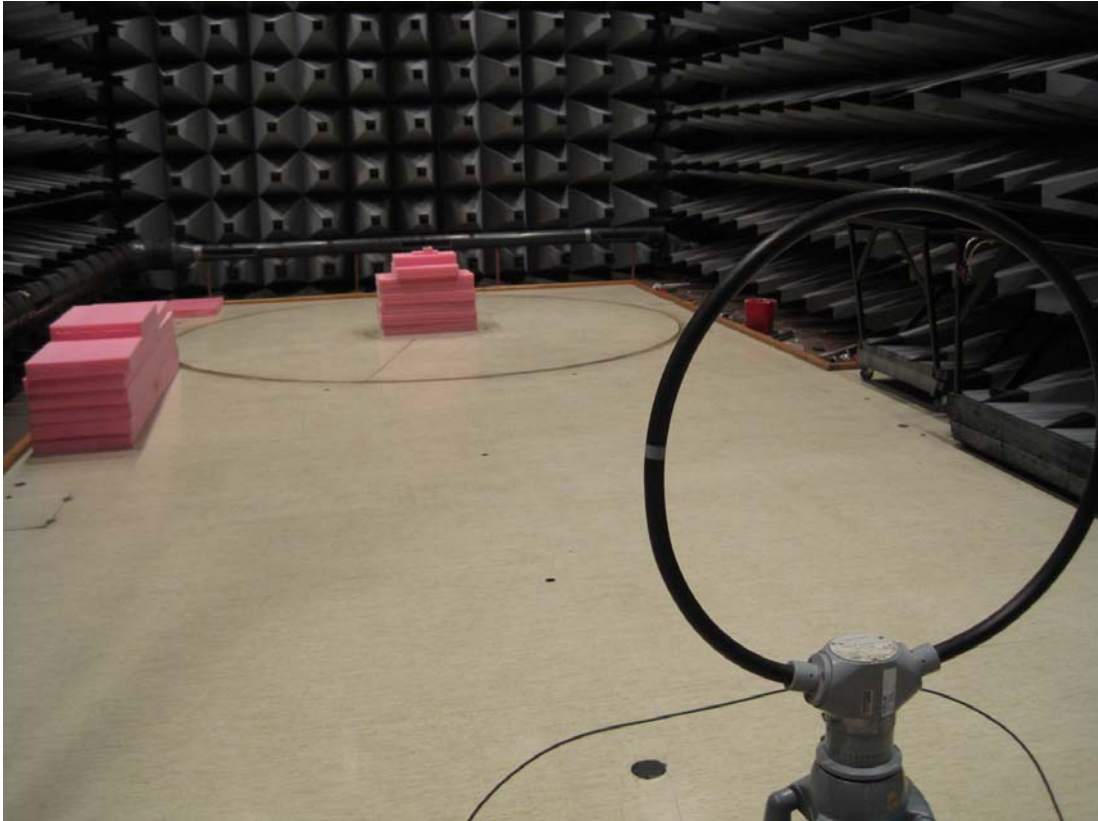


Photo 4.3.2 Test setup regarding measurement of radiated emission.

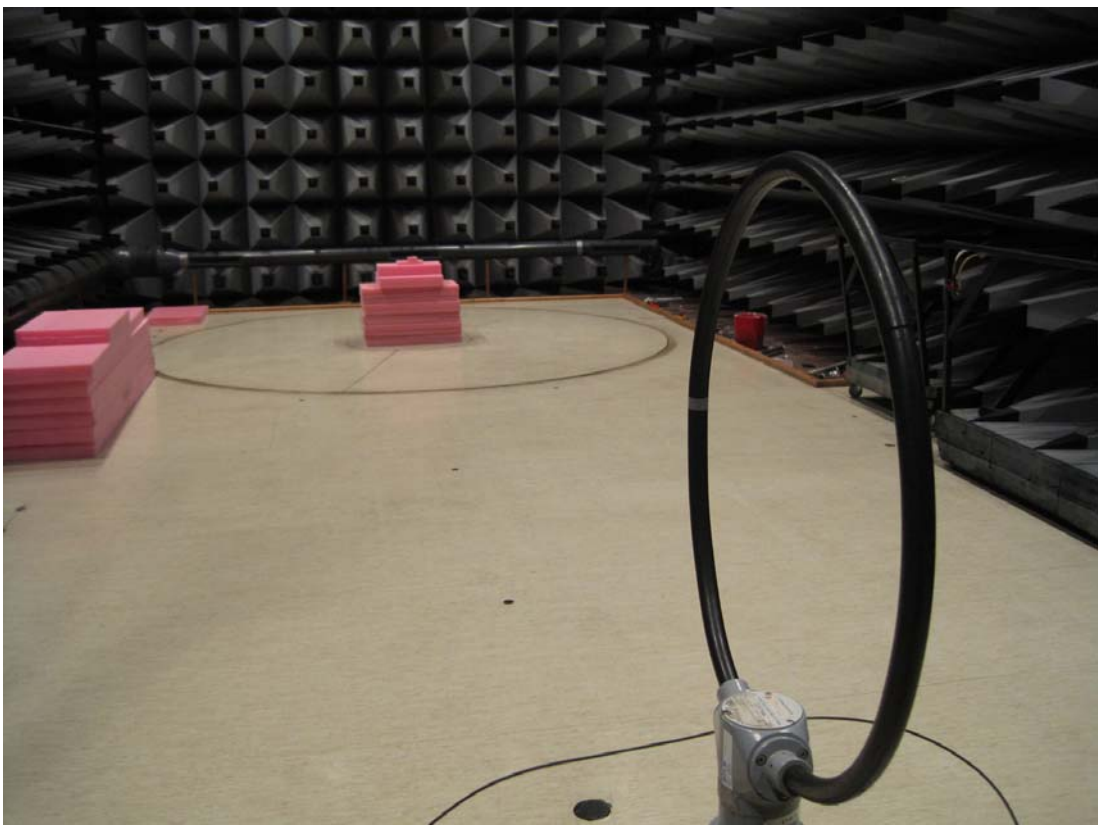
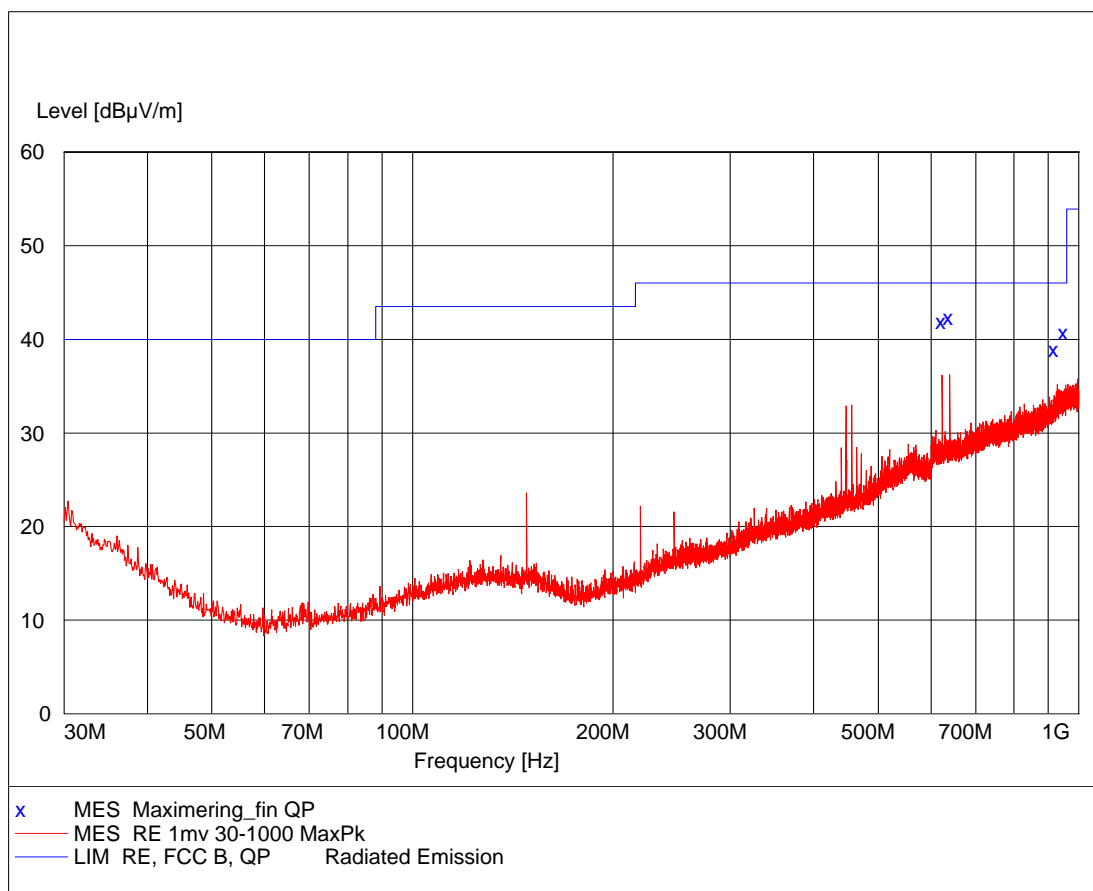


Photo 4.3.3 Test setup regarding measurement of radiated emission.



Test object	M60	Sheet	RE_Spur-1
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Pre-scan, Antenna at 3 m, 1 m height, vert. pol.	Humidity	34 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB

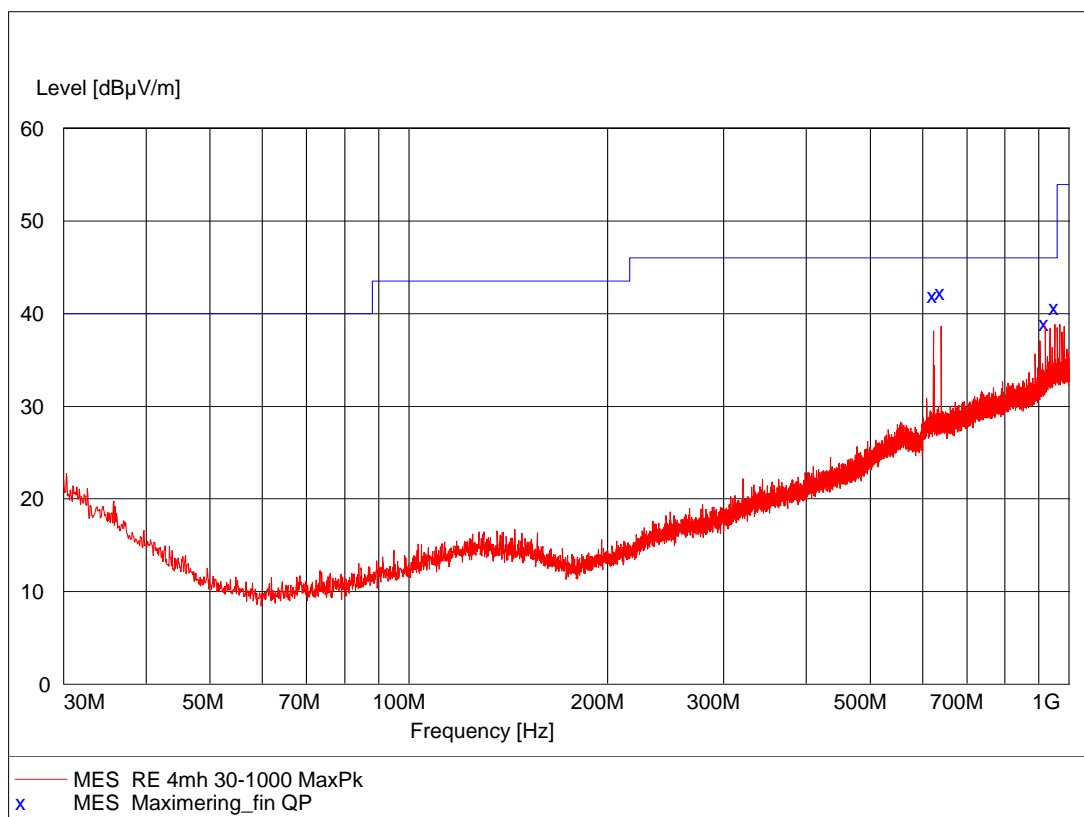


Comments

Continuous Tx - normal modulation - hopping off

Test object	M60	Sheet	RE_Spur-2
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Pre-scan, Antenna at 3 m, 3 m height, hor. pol.	Humidity	34 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB



Comments

Continuous Tx - normal modulation - hopping off

Test object	M60	Sheet	RE_Spur-3
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Peak search ant. at 3 m, height: 1-4 m, v/h pol.	Humidity	34 % RH
Detector	Quasi peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB

MEASUREMENT RESULT: "Maximering\_fin QP"

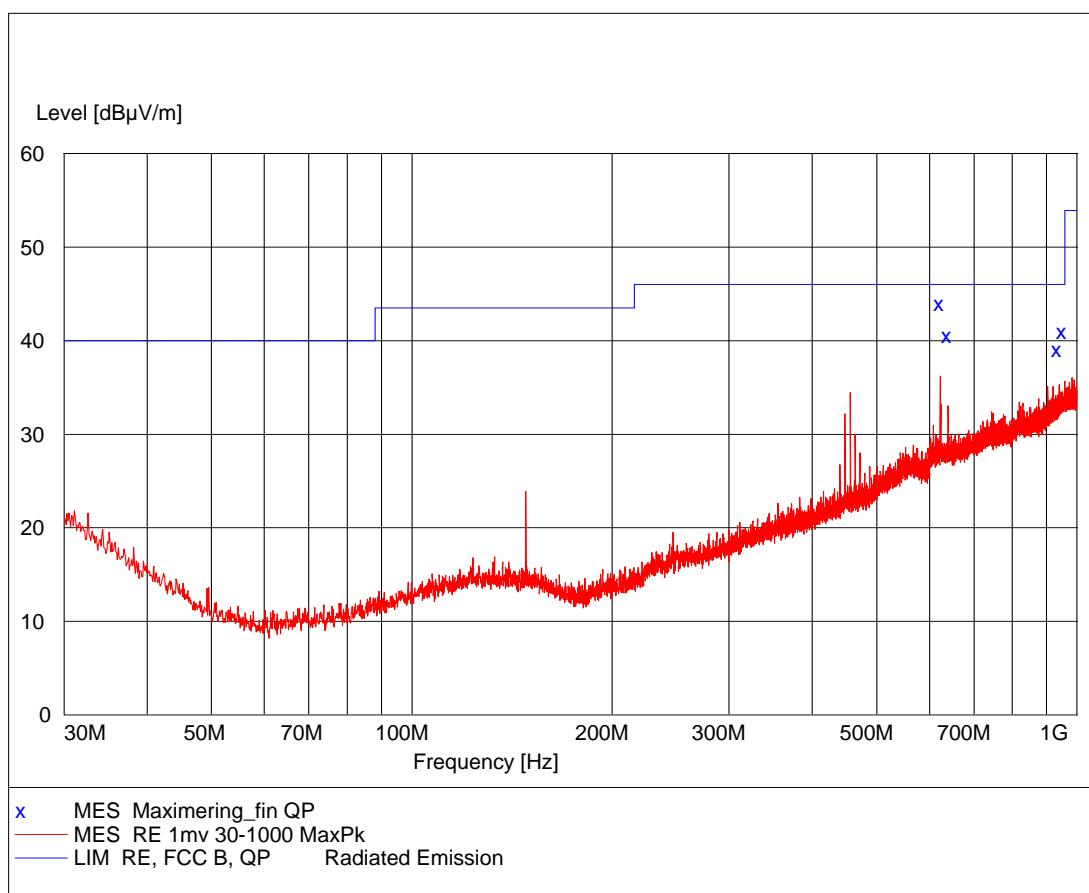
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
624.000000	41.90	23.9	46.0	4.1	144.0	323.00	HORIZONTAL
640.000000	42.30	24.1	46.0	3.7	129.0	167.00	HORIZONTAL
920.000000	38.90	28.4	46.0	7.1	156.0	15.00	HORIZONTAL
952.000000	40.70	29.3	46.0	5.3	158.0	1.00	HORIZONTAL

Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test frequency	2404 MHz
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC.



Test object	M60	Sheet	RE_Spur-4
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

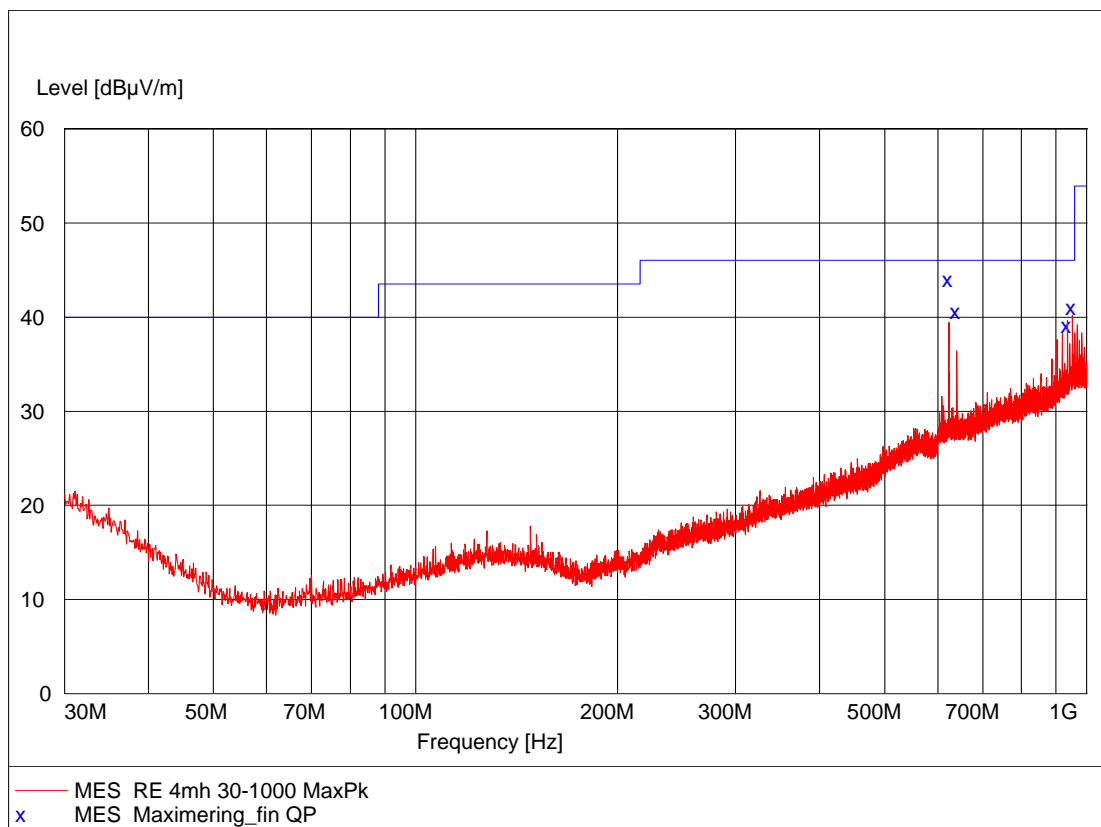
Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Pre-scan, Antenna at 3 m, 1 m height, vert. pol.	Humidity	34 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB



Comments Continuous Tx - normal modulation - hopping off

Test object	M60	Sheet	RE_Spur-5
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Pre-scan, Antenna at 3 m, 3 m height, hor. pol.	Humidity	34 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB



Comments Continuous Tx - normal modulation - hopping off



Test object	M60	Sheet	RE_Spur-6
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Peak search ant. at 3 m, height: 1-4 m, v/h pol.	Humidity	34 % RH
Detector	Quasi peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB

MEASUREMENT RESULT: "Maximering\_fin QP"

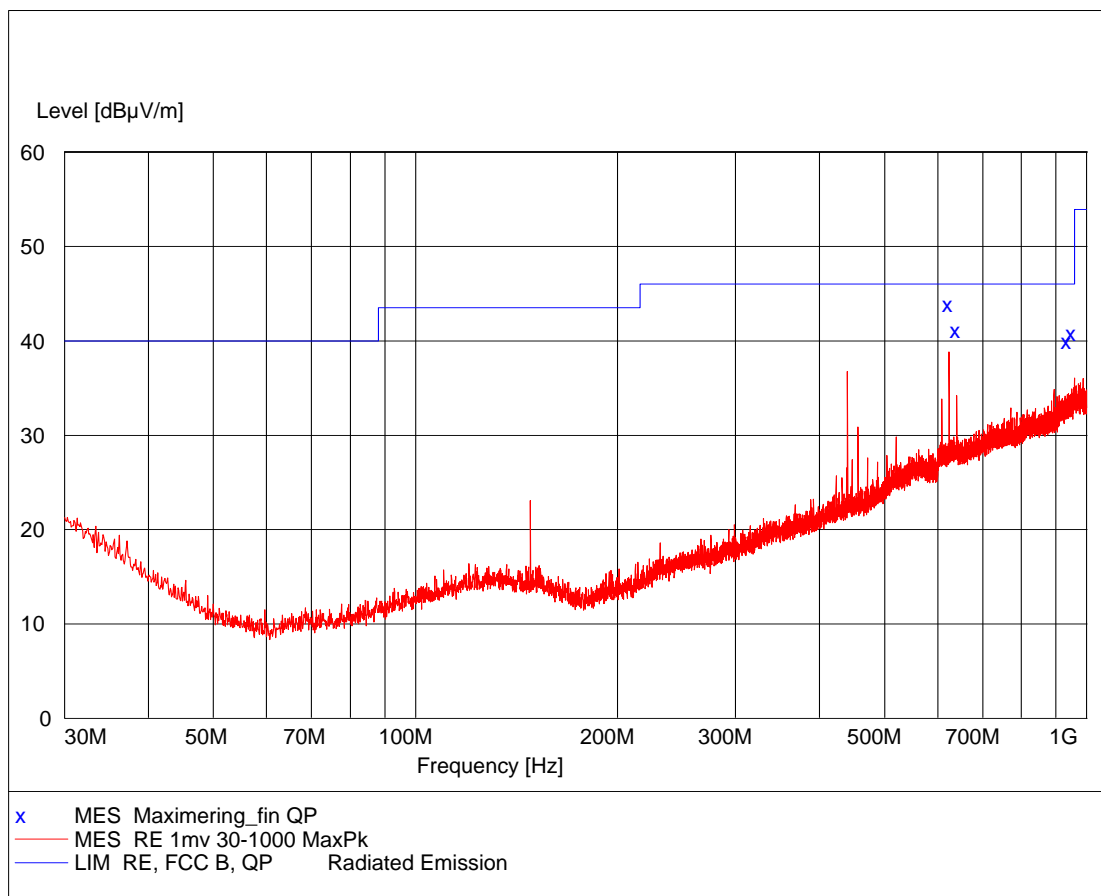
Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
624.000000	44.00	23.9	46.0	2.0	130.0	158.00	HORIZONTAL
640.000000	40.60	24.1	46.0	5.4	128.0	168.00	HORIZONTAL
936.000000	39.10	29.0	46.0	6.9	154.0	21.00	HORIZONTAL
952.000000	41.00	29.3	46.0	5.0	156.0	9.00	HORIZONTAL

Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test frequency	2440 MHz
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC



Test object	M60	Sheet	RE_Spur-7
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Pre-scan, Antenna at 3 m, 1 m height, vert. pol.	Humidity	34 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB

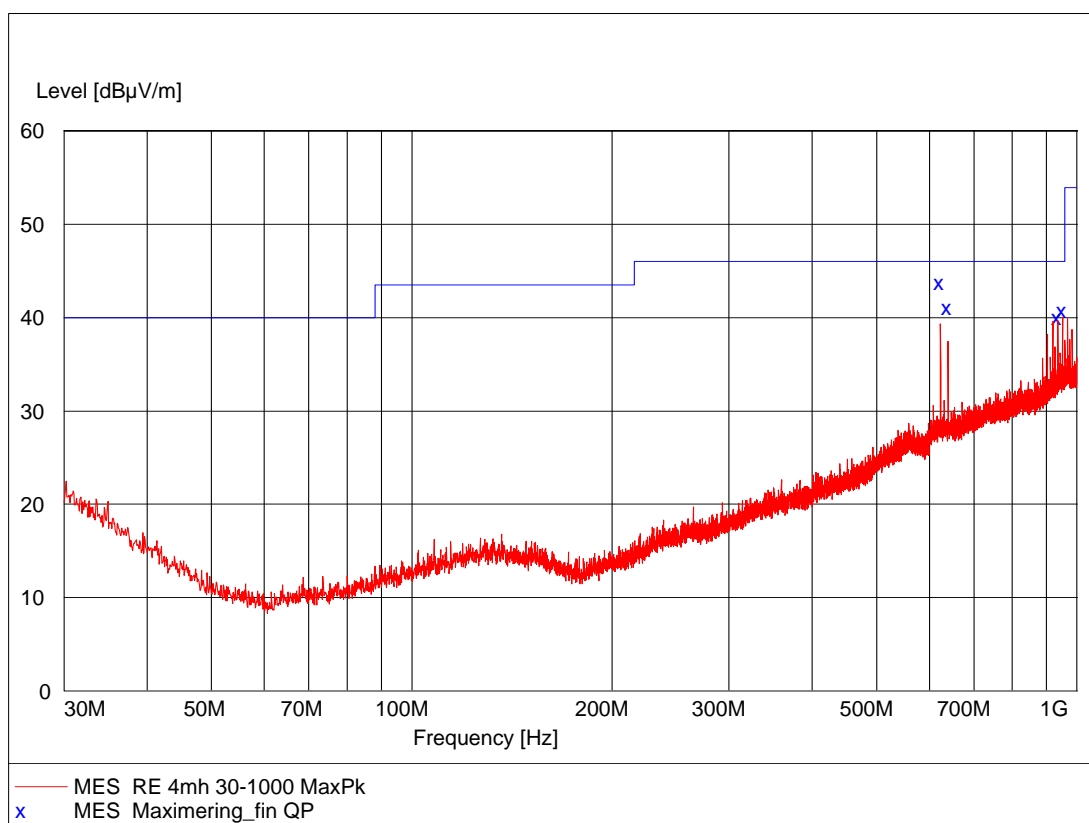


Comments Continuous Tx - normal modulation - hopping off



Test object	M60	Sheet	RE_Spur-8
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Pre-scan, Antenna at 3 m, 3 m height, hor. pol.	Humidity	34 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB



Comments Continuous Tx - normal modulation - hopping off



Test object	M60	Sheet	RE_Spur-9
Type	M60	Project no.	A507260-4
Serial no.	163	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	30-1000 MHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Peak search ant. at 3 m, height: 1-4 m, v/h pol.	Humidity	34 % RH
Detector	Quasi peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB

MEASUREMENT RESULT: "Maximering\_fin QP"

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
624.000000	43.80	23.9	46.0	2.2	128.0	147.00	HORIZONTAL
640.000000	41.10	24.1	46.0	4.9	130.0	167.00	HORIZONTAL
936.000000	40.00	29.0	46.0	6.0	156.0	9.00	HORIZONTAL
952.000000	40.80	29.3	46.0	5.2	141.0	8.00	HORIZONTAL

Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test frequency	2478 MHz
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC



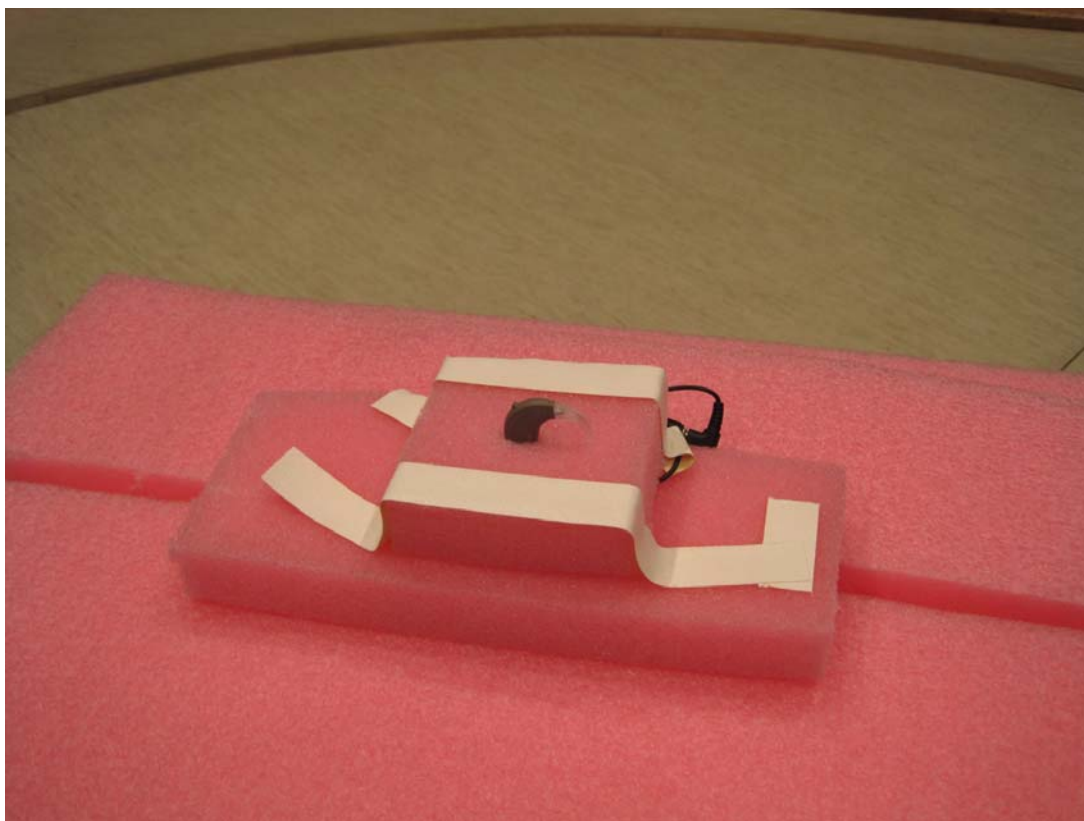


Photo 4.3.4 Test setup regarding measurement of radiated emission.

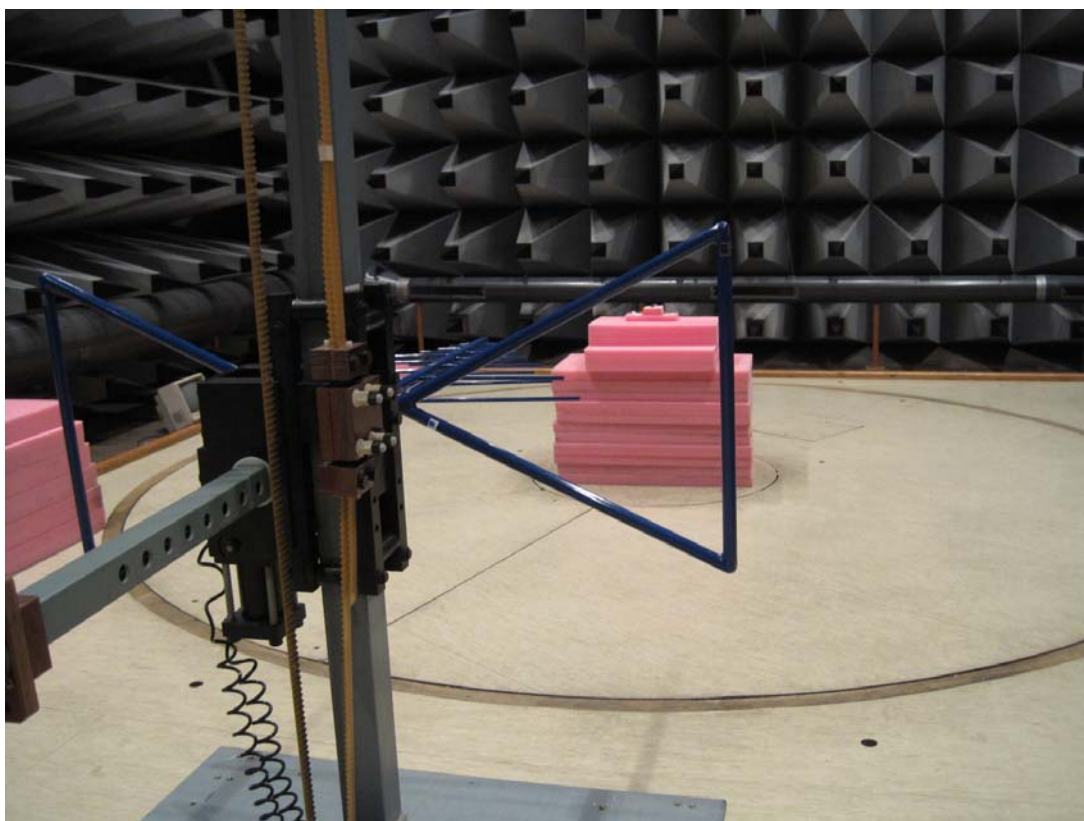
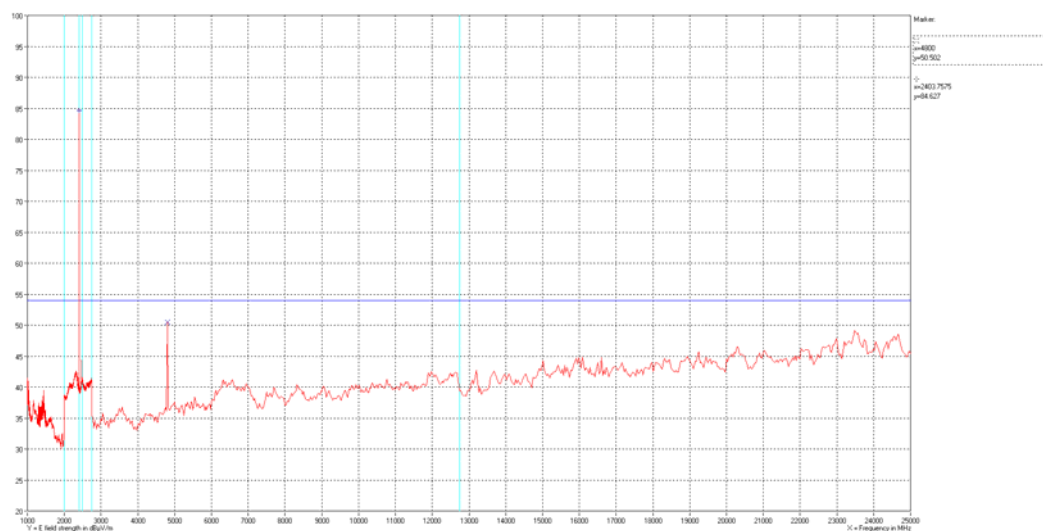


Photo 4.3.5 Test setup regarding measurement of radiated emission.



Test object	M60	Sheet	RE_Spur-10
Type	M60	Project no.	A507260-4
Serial no.	188	Date	16 Dec. 2010
Client	GN Hearing A/S	Initials	CMT
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	1 –25 GHz

Test method	ANSI C63.4:2003	Temperature	21°C
Characteristics	Complete search, Antenna distance 3 m.	Humidity	22 % RH
Detector	Peak for 1 GHz to 25 GHz	Bandwidth	1 MHz
Test equipm.	EMI room Hørsholm 49600 49624 49625 49183 49299	Uncertainty	4.9 dB



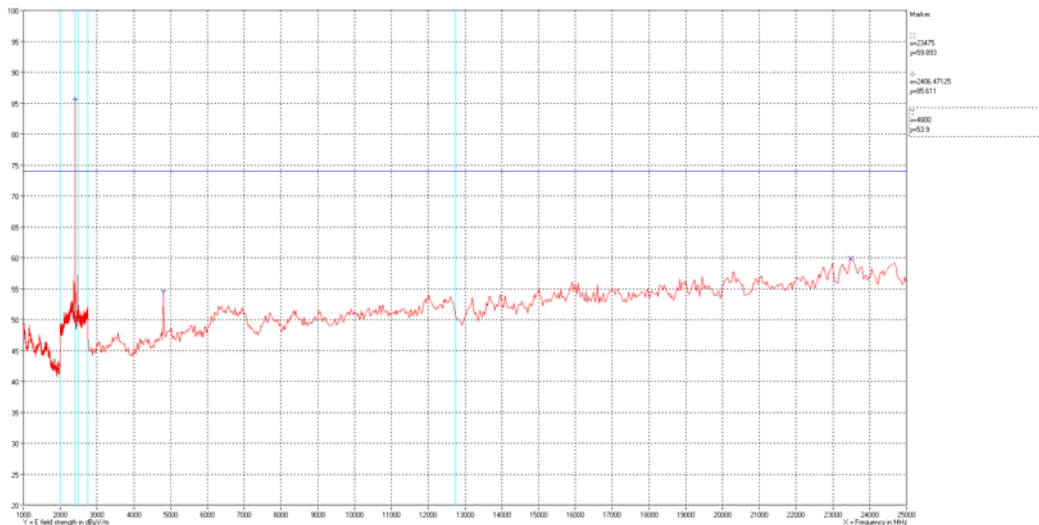
Polarization

Vertical and horizontal average measurements

Comments

Continuous Tx - normal modulation - hopping off

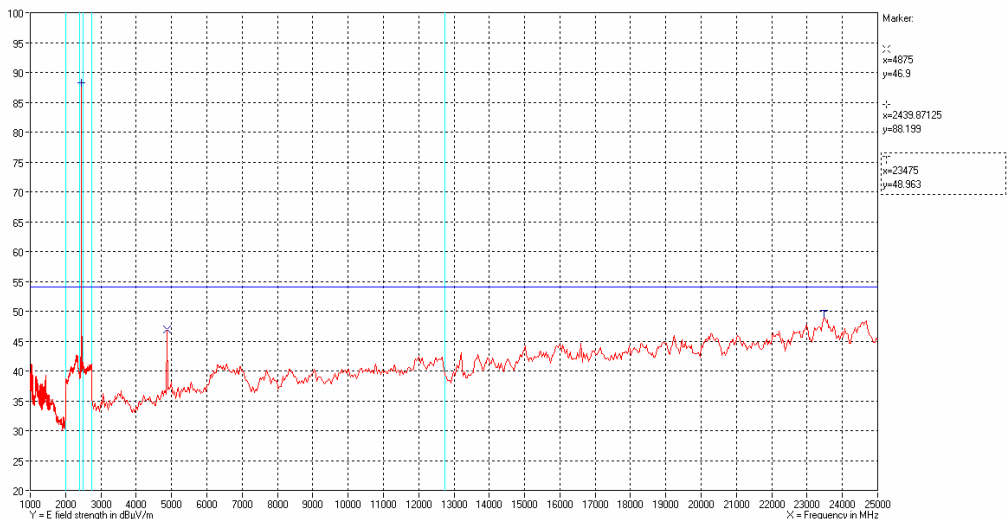




Polarization	Vertical and horizontal peak measurements
Comments	Continuous Tx - normal modulation - hopping off
Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test frequency	2404 MHz
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC

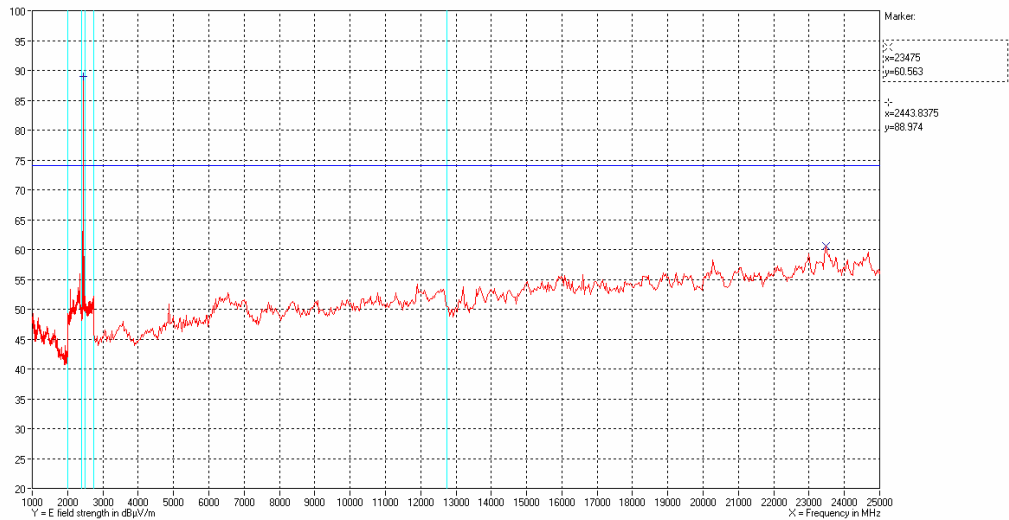


Test object	M60	Sheet	RE_Spur-11
Type	M60	Project no.	A507260-4
Serial no.	188	Date	17 Dec. 2010
Client	GN Hearing A/S	Initials	JAS
Specification	FCC CFR 47 Part 15, Subpart C IC Standard RSS-210, Issue 8:2010 IC Standard RSS-Gen, Issue 3:2010	Frequency	1–25 GHz
Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Complete search, Antenna distance 3 m.	Humidity	35 % RH
Detector	Peak for 1GHz to 25 GHz	Bandwidth	1 MHz
Test equipm.	EMI room Hørsholm 49600 49624 49625 49183 49299	Uncertainty	4.9 dB



Polarization	Vertical and horizontal average measurements
Comments	Continuous Tx - normal modulation - hopping off



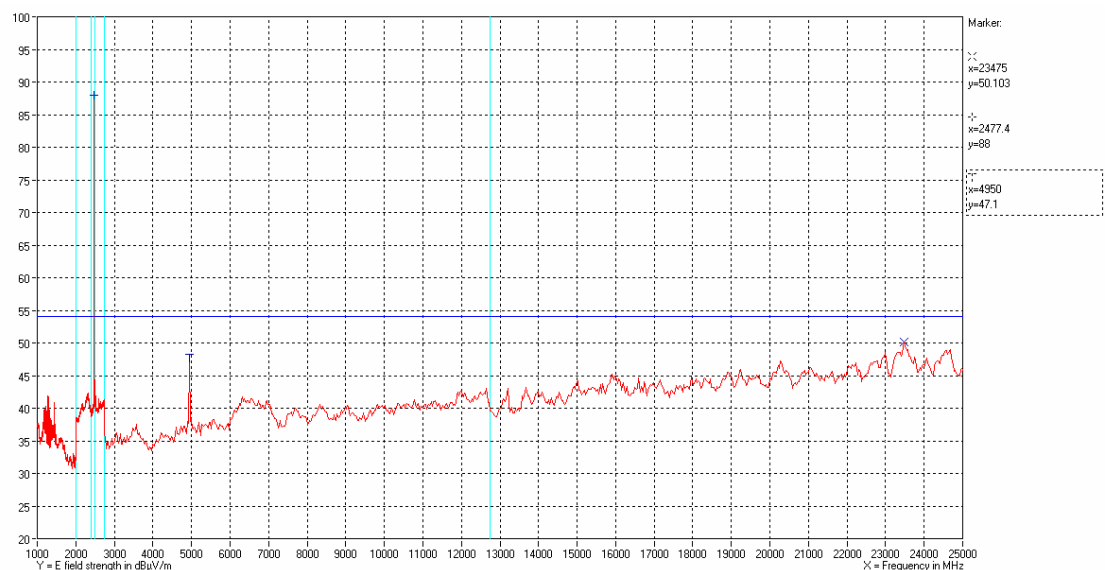


Polarization	Vertical and horizontal peak measurements
Comments	Continuous Tx - normal modulation - hopping off
Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test frequency	2440 MHz
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC



Test object	M60	Sheet	RE_Spur-12
Type	M60	Project no.	A507260-4
Serial no.	243	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	FCC CFR 47 Part 15, Subpart C IC standard RSS-210, Issue 8:2010 IC standard RSS-Gen, Issue 3:2010	Frequency	1 GHz–25GHz

Test method	ANSI C63.4:2003	Temperature	18 °C
Characteristics	Complete search, Antenna distance 3 m.	Humidity	35 % RH
Detector	Peak for 1GHz to 25 GHz	Bandwidth	1 MHz
Test equipm.	EMI room Hørsholm 49600 49624 49625 49183 49299	Uncertainty	4.9 dB



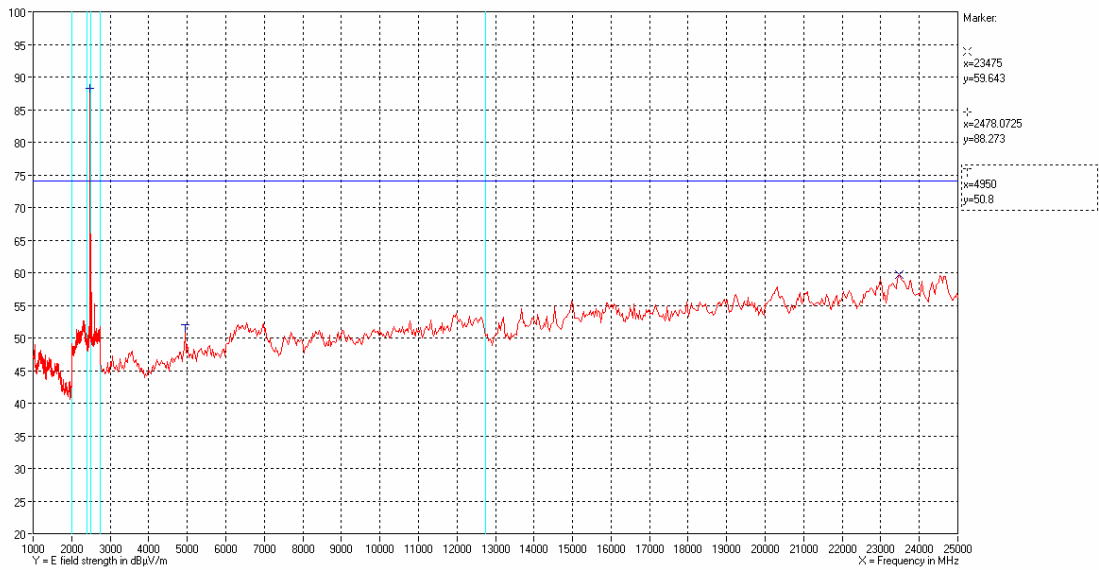
Polarization

Vertical and horizontal average measurements

Comments

Continuous Tx - normal modulation - hopping off





Polarization	Vertical and horizontal peak measurements
Comments	Continuous Tx - normal modulation - hopping off
Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test frequency	2478 MHz
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC



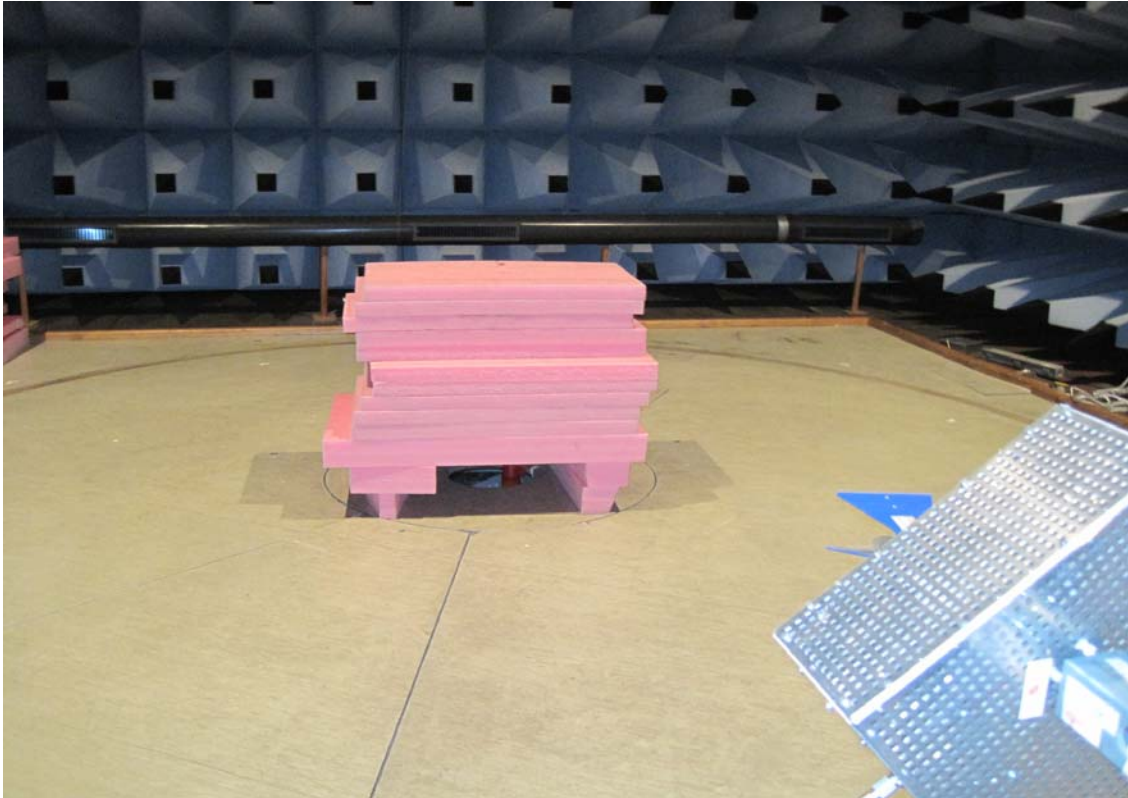


Photo 4.3.6 Test setup regarding measurement of radiated emission.



Photo 4.3.7 Test setup regarding measurement of radiated emission.



#### 4.4 Measurement of field strength of fundamental

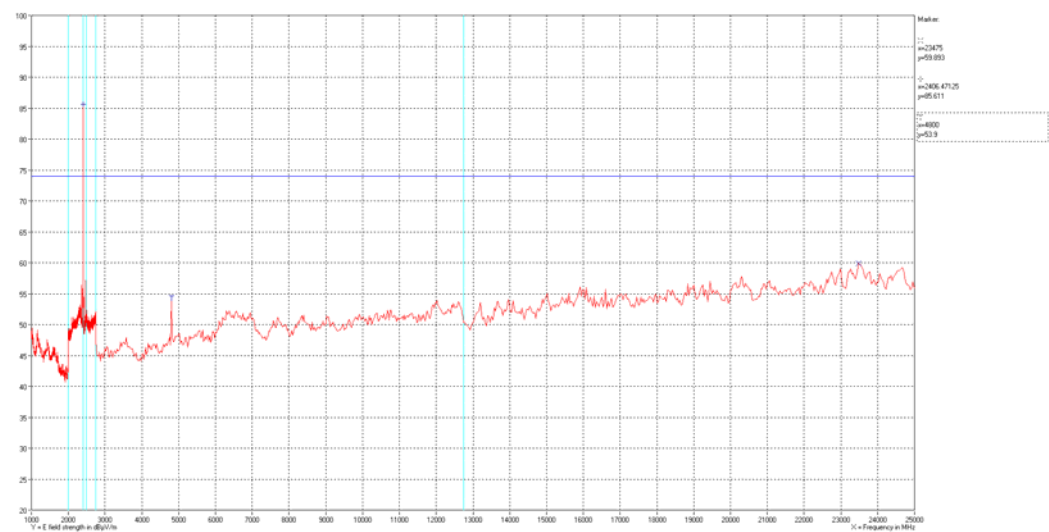
Test object	Combination of 2.1.3: M60 2.1.4: M60	Sheet	RE_Spur-13
Type	See section 2	Project no.	A507260-4
Serial no.	See section 2	Date	See section 4.4
Client	GN Hearing A/S	Initials	See section 4.4
Specification	FCC CFR 47 Part 15, Subpart C, Section 15.249(a) IC standard RSS-210, Issue 8:2010, Section 2.5 & A2.9	Frequency	1–25 GHz

Test method	ANSI C63.4:2003	Temperature	See section 4.4
Characteristics	Complete search, Antenna distance 3 m.	Humidity	See section 4.4
Detector	Peak for 1 GHz to 25 GHz	Bandwidth	1 MHz
Test equipm.	EMI room Hørsholm 49600 49624 49625 49183 49299	Uncertainty	4.9 dB

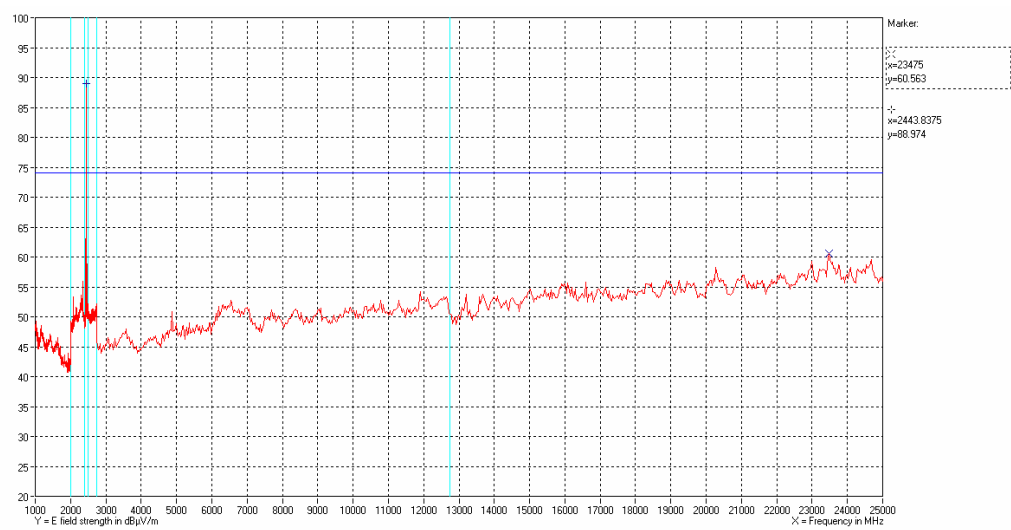
Operating frequency	Peak Measurement	PACF	Corrected average	Limit	Comment
2404	85.5	-	-	94	Passed
2440	89.0	-	-	94	Passed
2478	88.3	-	-	94	Passed
MHz	dBµV/m	dB	dBµV/m	dBµV/m	
Note:					

Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC



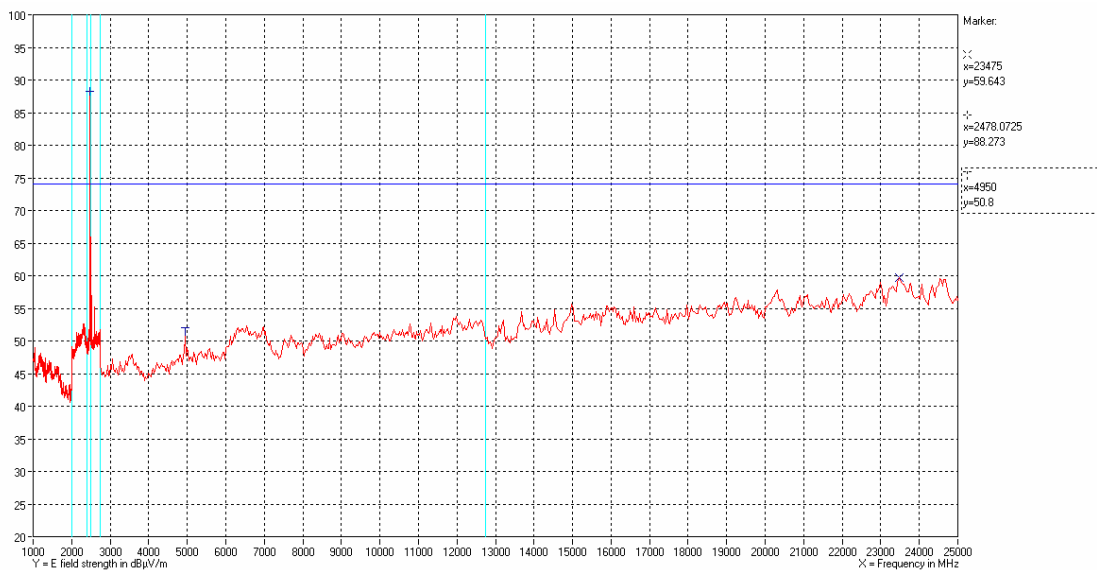


Comments 2404 MHz



Comments 2440 MHz





Comments

2478 MHz



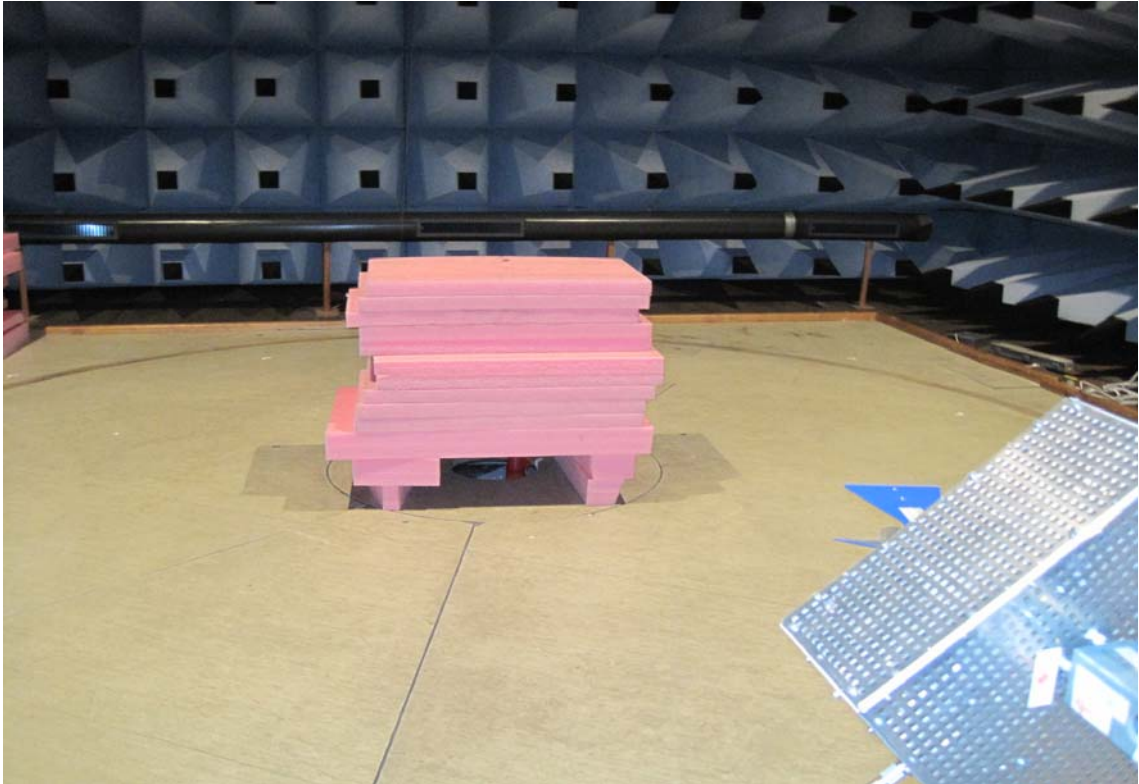


Photo 4.4.1 Test setup regarding measurement of field strength of fundamental.



Photo 4.4.2 Test setup regarding measurement of field strength of fundamental.



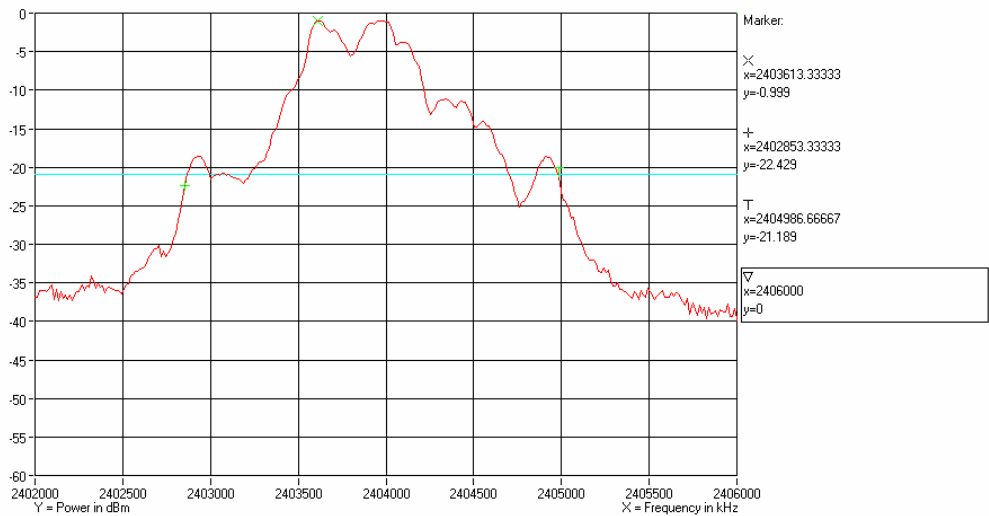
#### 4.5 Measurement of 20 dB bandwidth

Test object	M60	Sheet	PROF-1
Type	M60	Project no.	A507260-4
Serial no.	172	Date	11 Jan. 2011
Client	GN Hearing A/S	Initials	JAS
Specification	FCC CFR 47 Part 15, Subpart C, Section 15.215(c)		

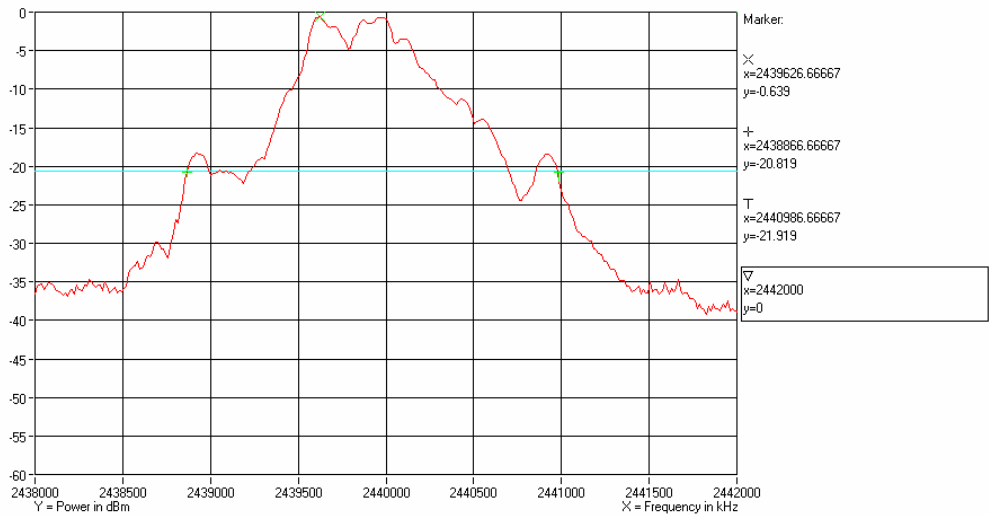
Test method	ANSI C63.4:2003		
Characteristics	Temperature: 22 °C. Test voltage: External power supply at 1.3 VDC		
Test equipm.	Climatic chamber 49184 49550 49299		Uncertainty: 10 kHz
SA Settings	RBW:100 kHz VBW:300 kHz SPAN:4 MHz DET:Peak CF:Operating freq. Trace:Max hold		
Operating frequency	Low frequency	High frequency	Comment
2404	2402.853	2404.987	-
2440	2438.867	2440.987	-
2478	2476.893	2479.000	-
MHz	MHz	MHz	
	Measured	Limit	Comment
Lowest frequency	2402.853	2400.00	Passed
Highest frequency	2479.000	2483.50	Passed
	MHz	MHz	

Band edge criteria	20 dB bandwidth
Test result	The measured 20 dB bandwidth was within limit designated in 15.215(c)
Compliant	Yes
Test Port	Conducted - SMA connector
Test mode	Continuous Tx - normal modulation - hopping off
Comments	Corrected for cable loss from test object to measurement instrument. (3.9 dBm)



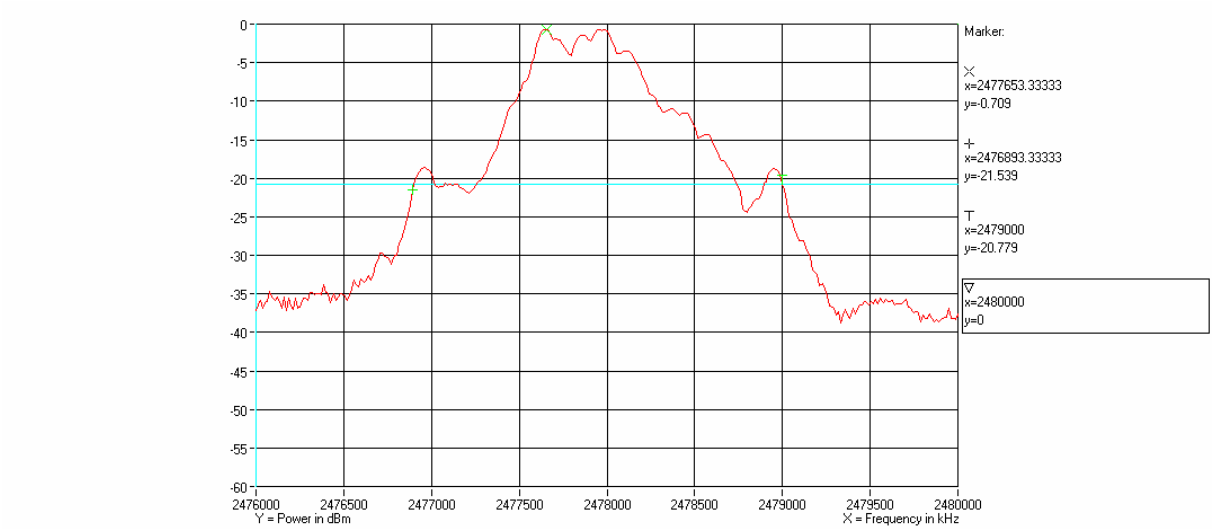


Comments 2404 MHz



Comments 2440 MHz





Comments 2478 MHz





Photo 4.5.1 Test setup regarding measurement of 20 dB bandwidth.



Photo 4.5.2 Test setup regarding measurement of 20 dB bandwidth.



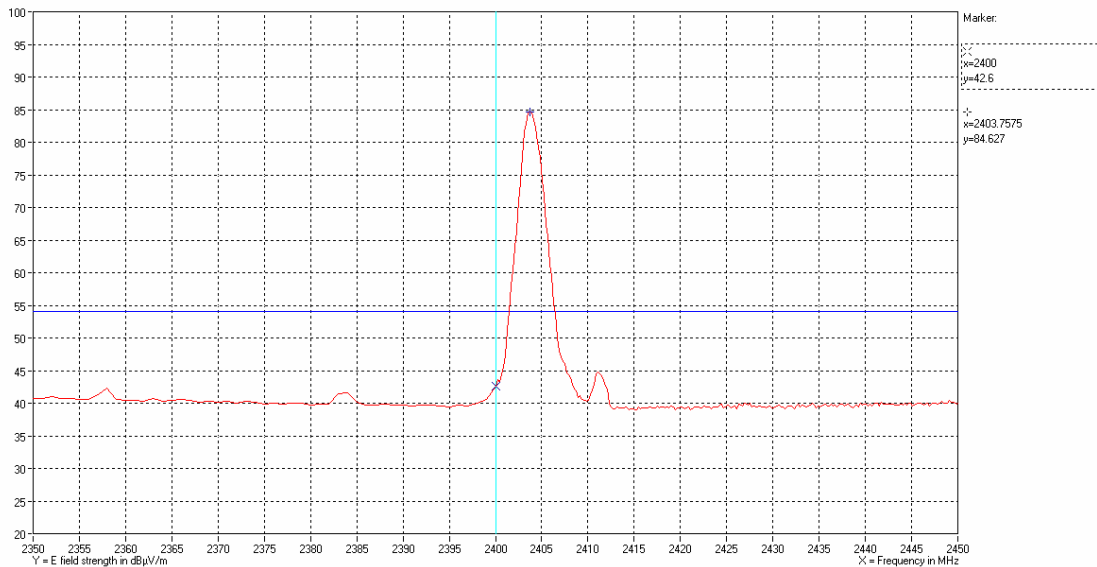
#### 4.6 Measurement of band edge compliance

Test object	Combination of 2.1.3: M60 2.1.4: M60	Sheet	PROF-2
Type	See section 2	Project no.	A507260-4
Serial no.	See section 2	Date	See section 4.4
Client	GN Hearing A/S	Initials	See section 4.4
Specification	FCC CFR 47 Part 15, Subpart C, Section 15.249(d)(e) IC Standard RSS-210, Issue 8:2010, Section 2.5 & A2.9	Frequency	1–25 GHz

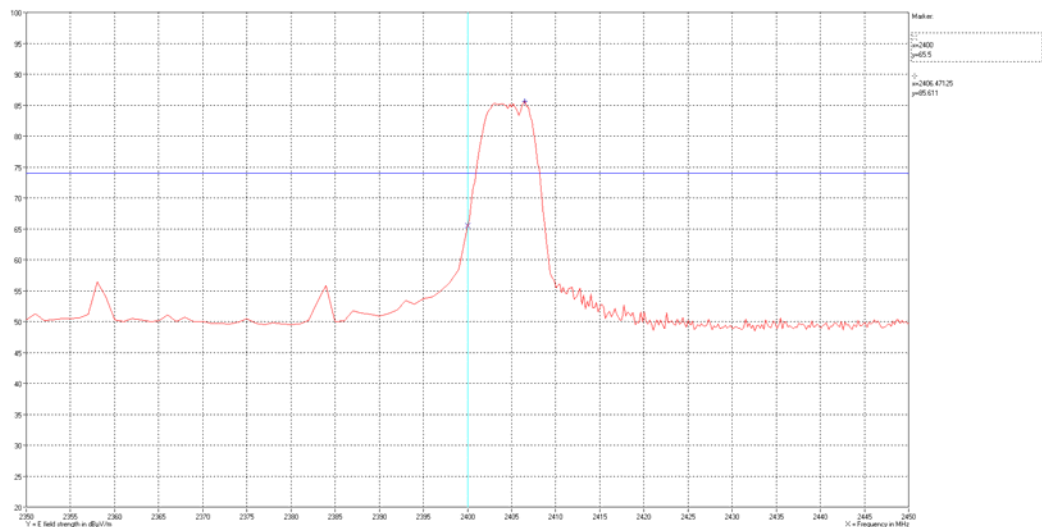
Test method	ANSI C63.4:2003			Temperature	See
Characteristics	Complete search, Antenna distance 3 m.			Humidity	section 4.4
Detector	Peak for 1 GHz to 25 GHz			Bandwidth	1 MHz
Test equipm.	EMI room Hørsholm 49600 49624 49625 49183 49299			Uncertainty:	4.9 dB
SA Settings	RBW:1000 kHz VBW:1000 kHz SPAN:100 MHz DET:Peak CF:2400/2450MHz Trace:Max hold				
Band Edge frequency	Operating frequency	Average / Peak	Measured Band Edge field strengths	Limit at Band Edge	Comment
2400	2404	Average	42.6	54	Passed
2400	2404	Peak	65.5	74	Passed
2483.5	2478	Average	43.0	54	Passed
2483.5	2478	Peak	60.9	74	Passed
MHz	MHz	-	dBµV/m	dBµV/m	-

Test result	The measured field strengths at band edge are below the limit.
Test Port	Enclosure
Test mode	Continuous Tx - normal modulation - hopping off
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. Test voltage: External power supply at 1.3 V DC



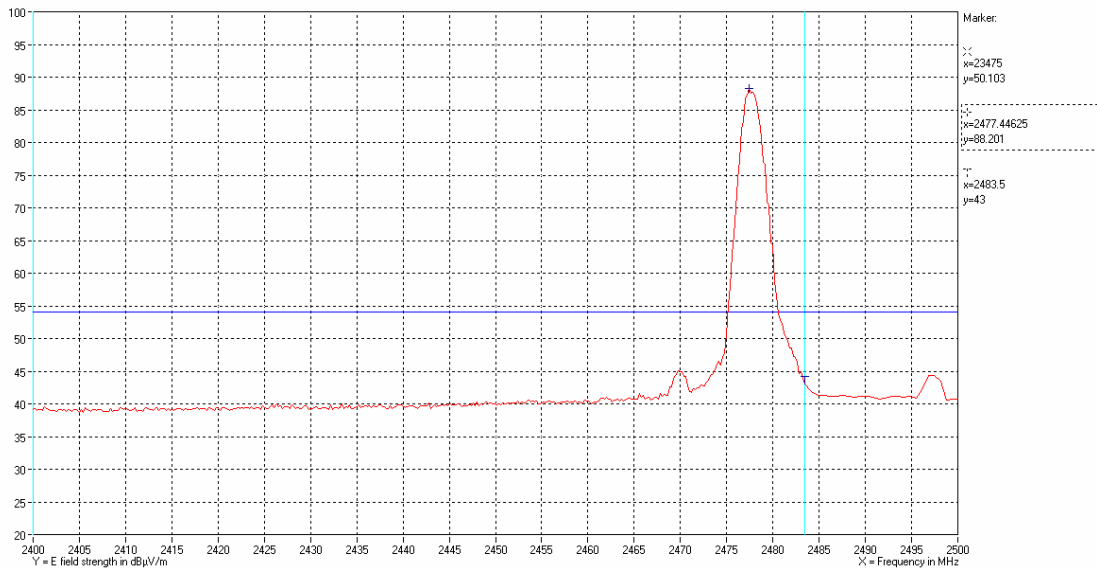


Comments 2404 MHz, Conducted average measurements

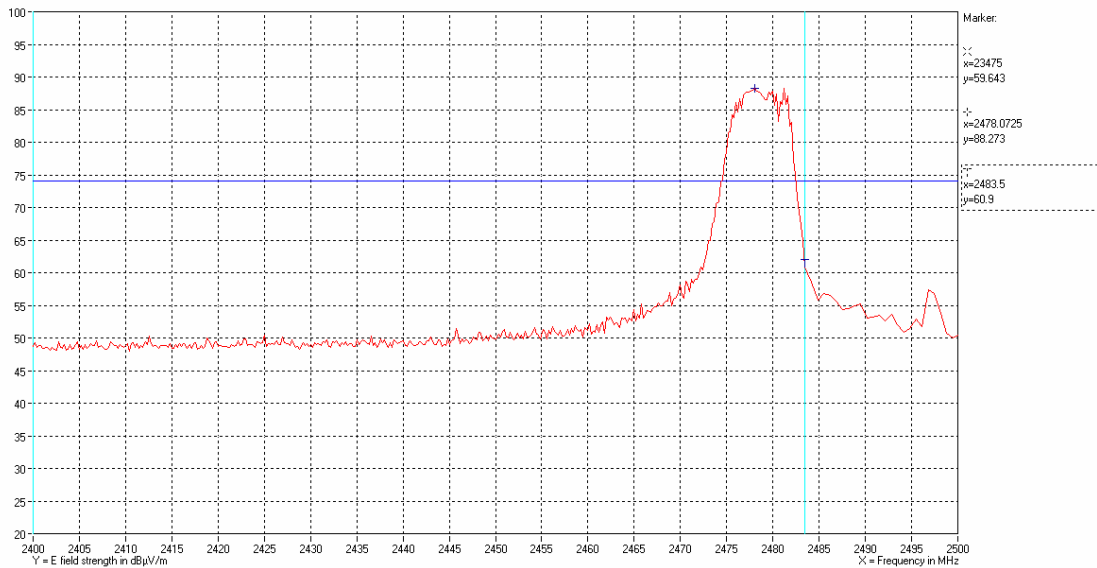


Comments 2404 MHz, Conducted peak measurements





Comments                      2478 MHz, Conducted average measurements



Comments                      2478 MHz, Conducted peak measurements



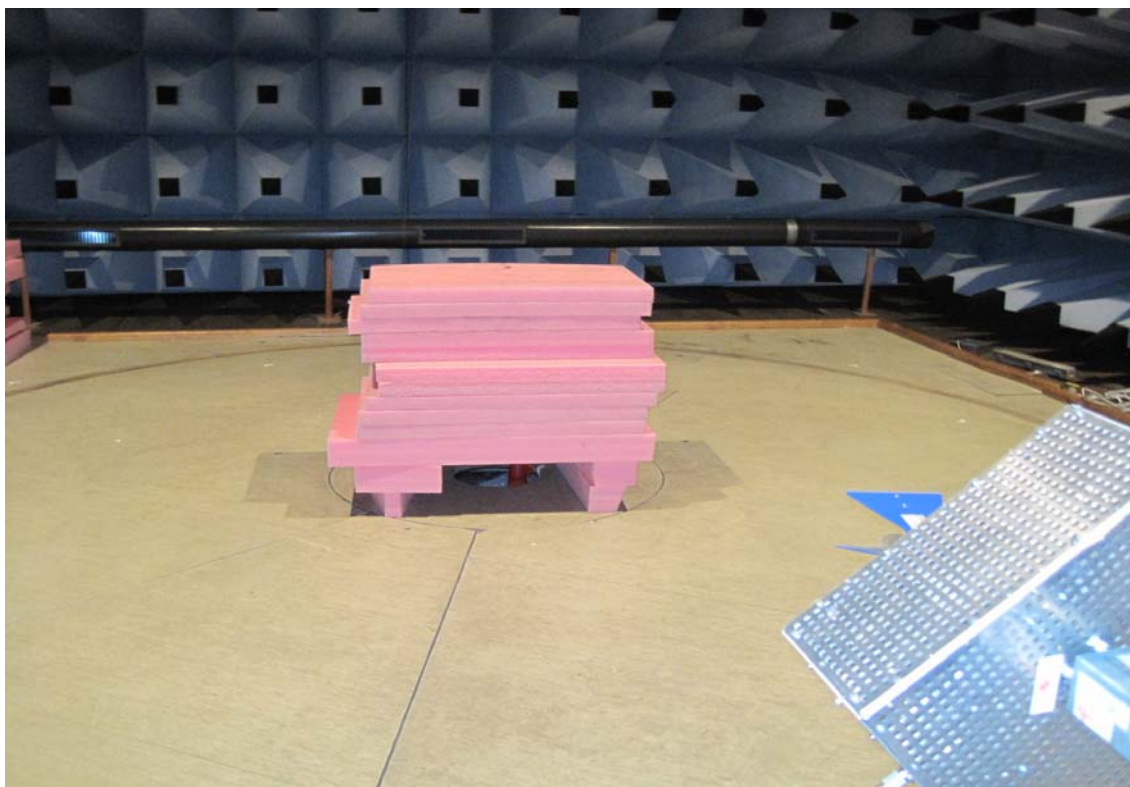


Photo 4.6.1 Test setup regarding measurement of band edge compliance.



Photo 4.6.2 Test setup regarding measurement of band edge compliance.

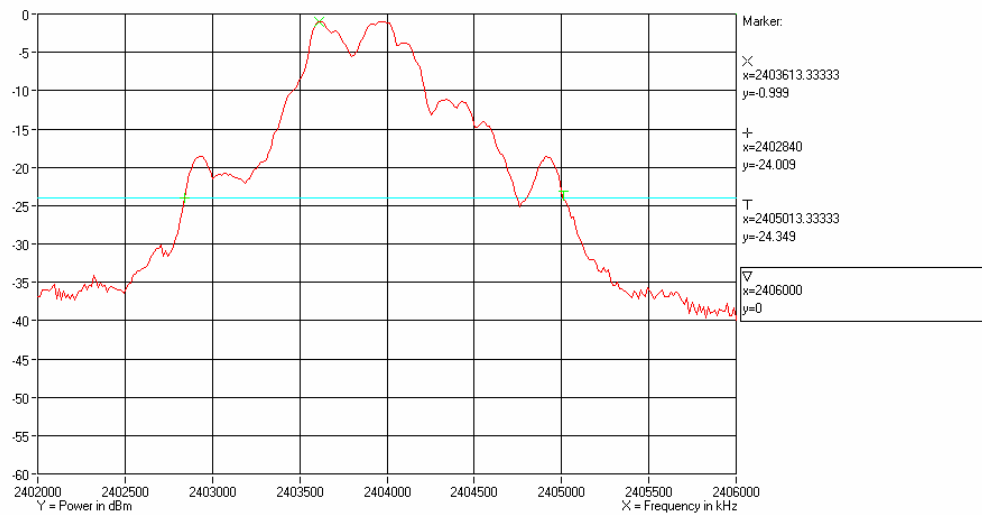


#### 4.7 Measurement of occupied bandwidth, IC

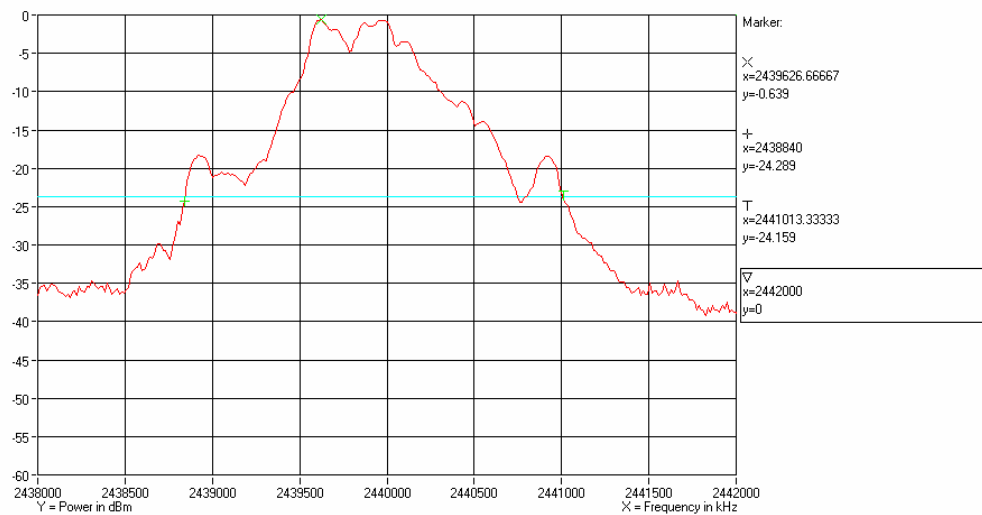
Test object	M60	Sheet	PROF-3
Type	M60	Project no.	A507260-4
Serial no.	172	Date	11 Jan. 2011
Client	GN Hearing A/S	Initials	JAS
Specification	IC Standard RSS-Gen, Issue 3:2010 - Section 4.6.1		

Test method	IC Standard RSS-Gen, Issue 3:2010 - Section 4.6.1		
Characteristics	Temperature: 22 °C. Test voltage: External power supply at 1.3 VDC		
Test equipm.	Climatic chamber 49184 49550 49299		Uncertainty: 10 kHz
SA Settings	RBW:100kHz VBW:300kHz SPAN:4MHz DET:Peak CF:Operating freq. Trace:Max hold		
Operating frequency	Low frequency	High frequency	Measured 99% emission bandwidth
2404	2402.840	2405.013	2.173
2440	2438.840	2441.013	2.173
2478	2476.867	2479.040	2.173
MHz	MHz	MHz	MHz
Note:			

Band edge criteria	Measured 99% emission bandwidth
Test Port	Conducted - SMA connector
Test mode	Continuous Tx - normal modulation - hopping off
Comments	Corrected for cable loss from test object to measurement instrument. (3.9 dBm)

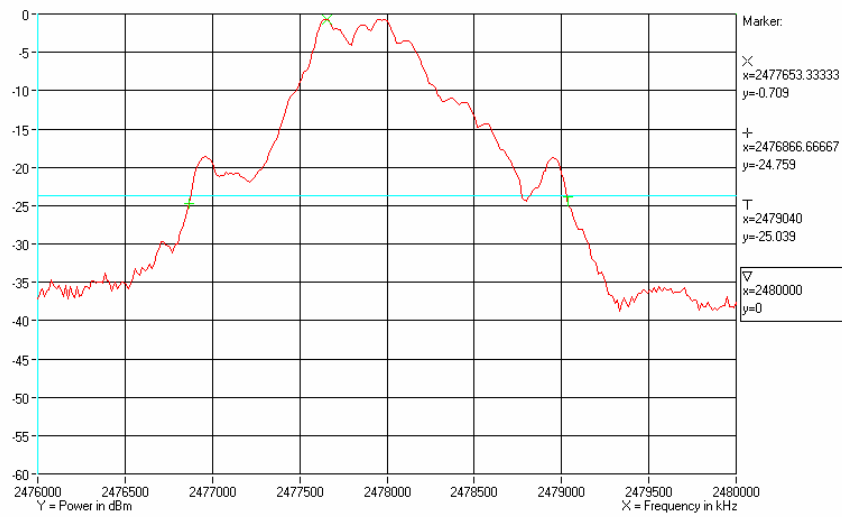


Comments 2404 MHz



Comments 2440 MHz





Comments

2478 MHz





Photo 4.7.1 Test setup regarding measurement of occupied bandwidth, IC.

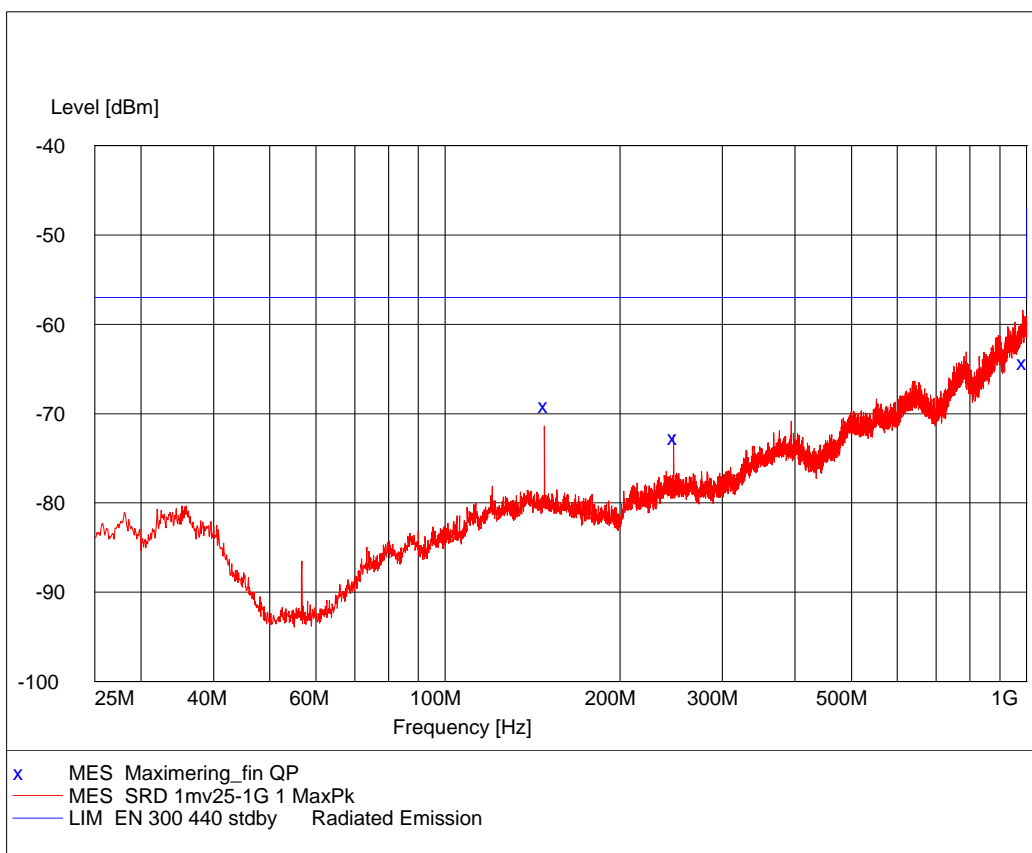


Photo 4.7.2 Test setup regarding measurement of occupied bandwidth, IC.

#### 4.8 Measurement of radiated emission, Rx, IC

Test object	Combination of 2.1.2: M60 2.1.4: M60	Sheet	RE_Spur-14
Type	See section 2	Project no.	A507260-4
Serial no.	See section 2	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	IC Standard RSS-210, Issue 8:2010, 2.5 IC Standard RSS-Gen, issue 3:2010, 6	Frequency	25MHz-1GHz

Test method	EN 300 440-1 V1.5.1:2009	Temperature	19 °C
Characteristics	Pre-scan, Antenna at 10 m, 1 m height, vert. pol.	Humidity	33 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299 29499	Uncertainty	4.9 dB



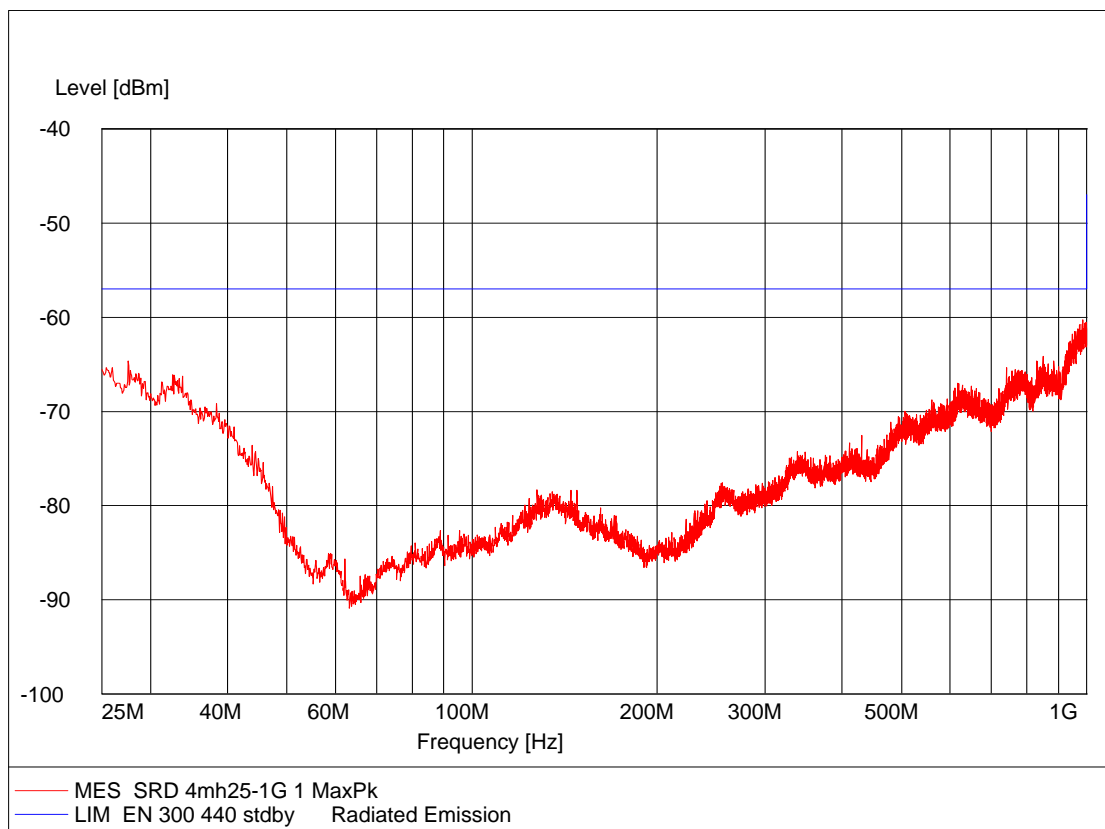
Comments

Continuous Rx & Tx standby - normal modulation -  
hopping between lowest and highest operating freq.



Test object	Combination of 2.1.2: M60 2.1.4: M60	Sheet	RE_Spur-15
Type	See section 2	Project no.	A507260-4
Serial no.	See section 2	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	IC Standard RSS-210, Issue 8:2010, 2.5 IC Standard RSS-Gen, issue 3:2010, 6	Frequency	25MHz-1GHz

Test method	EN 300 440-1 V1.5.1:2009	Temperature	19 °C
Characteristics	Pre-scan, Antenna at 10 m, 4 m height, hor. pol.	Humidity	33 % RH
Detector	Peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299 29499	Uncertainty	4.9 dB



Comments

Continuous Rx & Tx standby - normal modulation -  
hopping between lowest and highest operating freq.

Test object	Combination of 2.1.2: M60 2.1.4: M60	Sheet	RE_Spur-16
Type	See section 2	Project no.	A507260-4
Serial no.	See section 2	Date	2 Feb. 2011
Client	GN Hearing A/S	Initials	HEN
Specification	IC Standard RSS-210, Issue 8:2010, 2.5 IC Standard RSS-Gen, issue 3:2010, 6	Frequency	25MHz-1GHz

Test method	EN 300 440-1 V1.5.1:2009	Temperature	°C
Characteristics	Peak search ant. at 10 m, height: 1-4 m, v/h pol.	Humidity	% RH
Detector	Quasi peak	Bandwidth	120 kHz
Test equipm.	EMI room Hørsholm 49600 29797 29861 49183 49299	Uncertainty	4.9 dB

MEASUREMENT RESULT: "Maximering\_fin QP"

Frequency MHz	Level dBm	Transd dB	Limit dBm	Margin dB	Height cm	Azimuth deg	Polarisation
148.260000	-69.10	-94.8	-57.0	12.1	101.0	7.00	VER
247.100000	-72.70	-93.3	-57.0	15.7	101.0	149.00	VER
986.100000	-64.30	-77.2	-57.0	7.3	114.0	303.00	VER

Test result	The measured field strengths are below the limit
Polarization	Horizontal and vertical
Test Port	Enclosure
Test frequency	2404 MHz / 2478 MHz
Test mode	Continuous Rx & Tx standby - normal modulation - hopping between lowest and highest operating freq.
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height, and antenna polarisation. The radiated substitution test method of EN 300 440 was used to demonstrate compliance with the limits for RSS-Gen, Section 6





Photo 4.8.1 Test setup regarding measurement of radiated emission, Rx, IC.

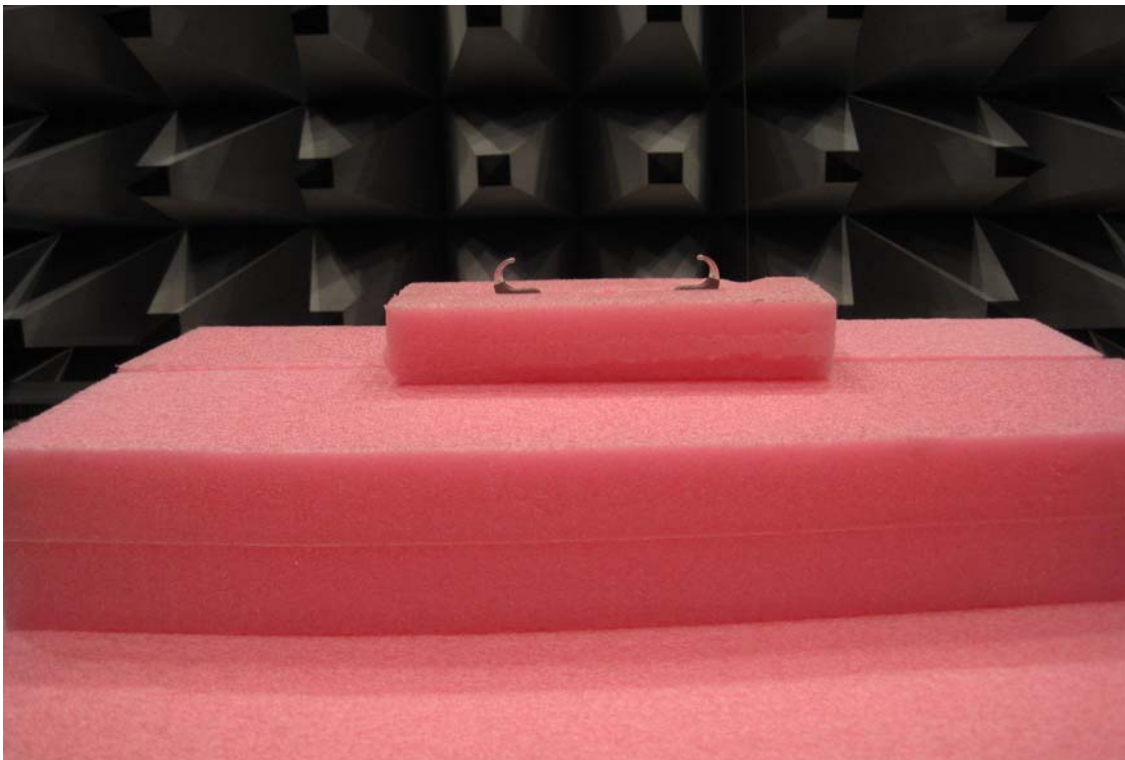
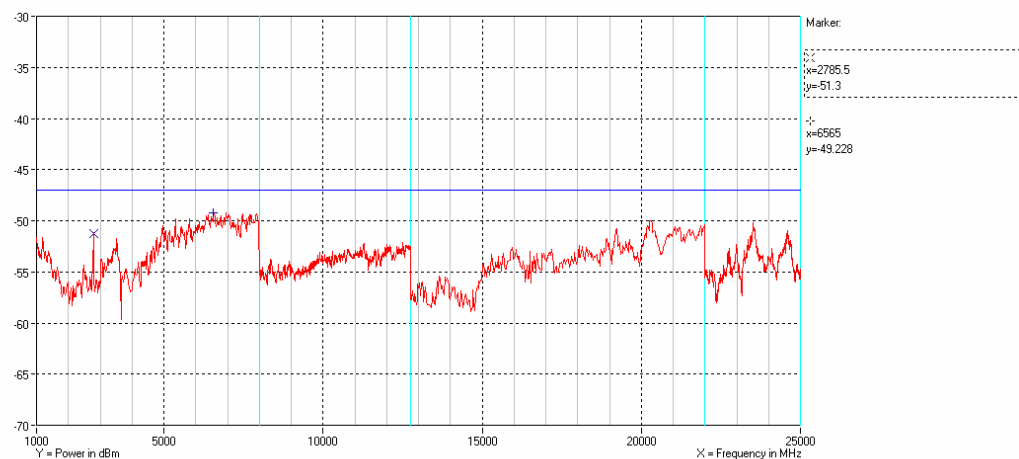


Photo 4.8.2 Test setup regarding measurement of RX radiated emission, Rx, IC.



Test object	Combination of 2.1.2: M60 2.1.4: M60	Sheet	RE_Spur-17
Type	See section 2	Project no.	A507260-4
Serial no.	See section 2	Date	14 Dec. 2010
Client	GN Hearing A/S	Initials	CMT
Specification	IC Standard RSS-210, Issue 8:2010, 2.5 IC Standard RSS-Gen, issue 3:2010, 6	Frequency	1GHz–25GHz

Test method	EN 300 440-1 V1.5.1:2009	Temperature	20 °C
Characteristics	Complete search, Antenna distance 3 m.	Humidity	20 % RH
Detector	Peak for 1 GHz to 8 GHz	Bandwidth	1 MHz
Detector	Peak for 8 GHz to 12.75 GHz	Bandwidth	300 kHz
Detector	Peak for 12.75 GHz to 20 GHz	Bandwidth	100 kHz
Detector	Peak for 20 GHz to 25 GHz	Bandwidth	30 KHz
Test equipm.	EMI room Hørsholm 49600 49624 49625 49183 49299	Uncertainty	4.9 dB

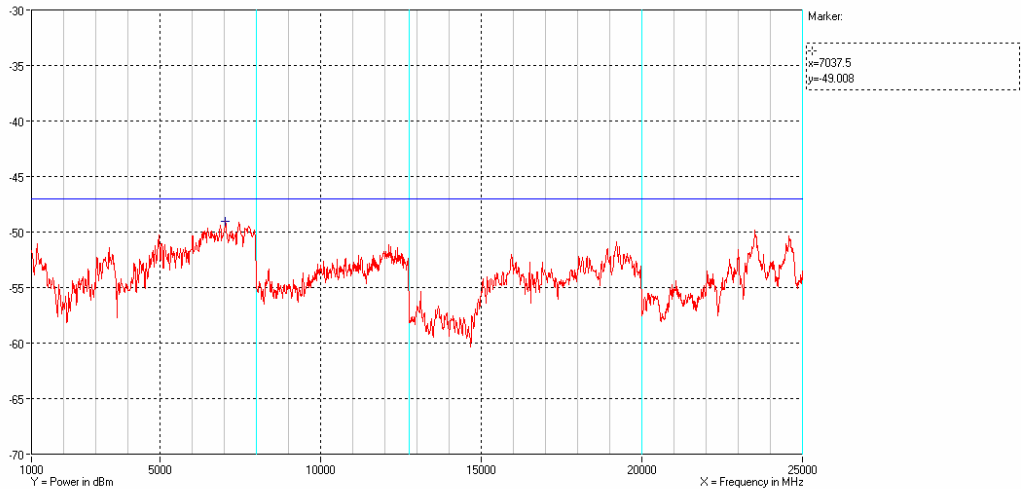


Polarization

Horizontal peak measurements

Comments

Continuous Rx & Tx standby - normal modulation -  
hopping between lowest and highest operating freq.



Polarization	Vertical peak measurements
Comments	Continuous Rx & Tx standby - normal modulation - hopping between lowest and highest operating freq.
Test result	The measured field strengths are below the limit
Test Port	Enclosure
Test frequency	2404 MHz / 2478 MHz
Test mode	Continuous Rx and Tx standby - normal modulation - hopping between lowest and highest operating freq.
Condition	Normal
Compliant	Yes
Comments	Final maximal measurements by variation of turntable azimuth, antenna height and antenna polarization. The radiated substitution test method of EN 300 440 was used to demonstrate compliance with the limits for RSS-Gen, Section 6



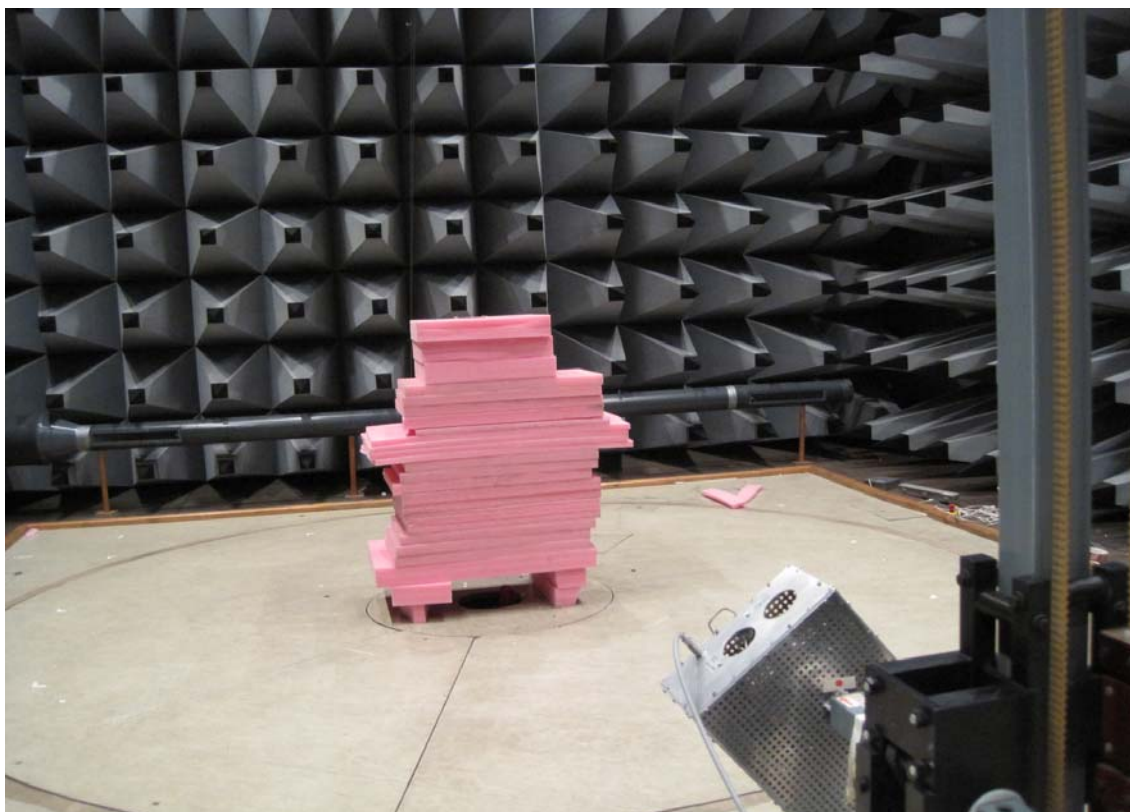


Photo 4.8.3 Test setup regarding measurement of radiated emission, Rx, IC.

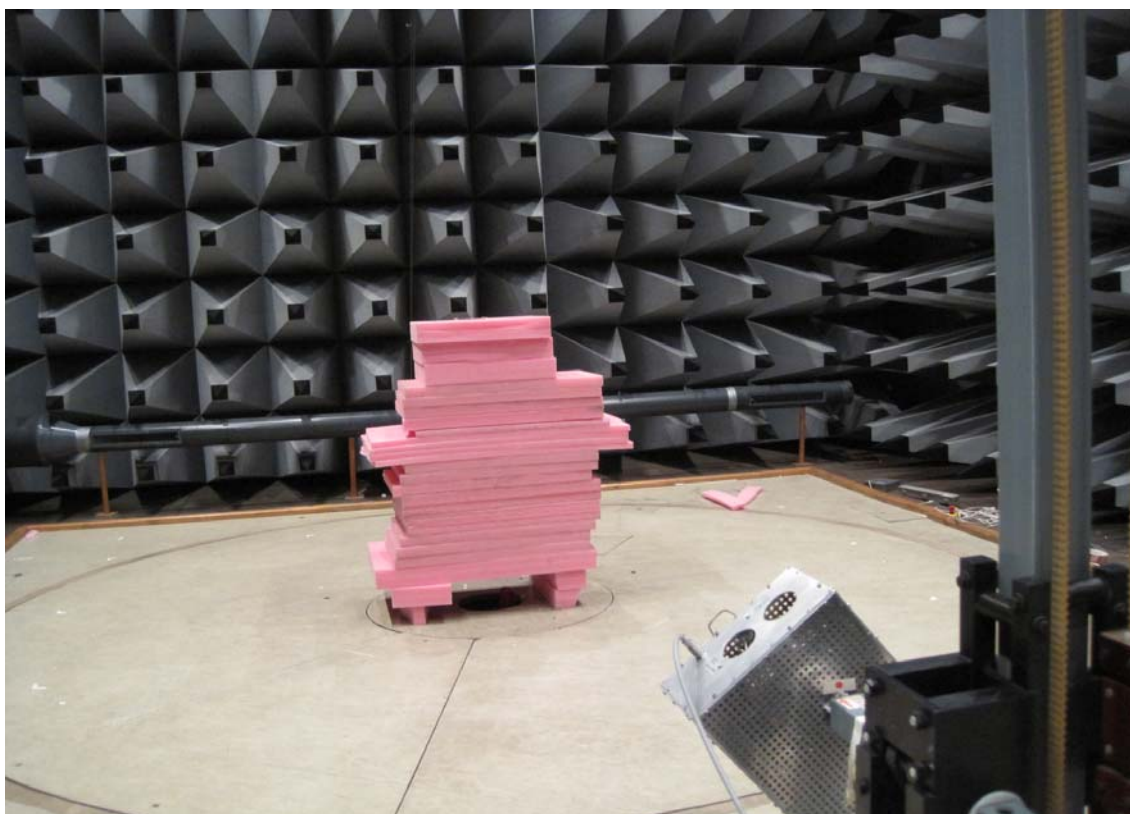


Photo 4.8.4 Test setup regarding measurement of radiated emission, Rx, IC.



## 5. National registrations and accreditations

### 5.1 DANAK Accreditation

**Organization:** Danish Accreditation and Metrology Fund - DANAK, see [www.danak.dk](http://www.danak.dk) and [www.ilac.org](http://www.ilac.org)

**Registration Number:** 19

**Area Number:** C

DANAK is part of ILAC (International Laboratory Accreditation Cooperation) including its MRA (Mutual Recognition Arrangement). The MRA includes the Australian NATA and Canadian SCC.

CISPR 22 is equivalent to AS/NZS CISPR 22, and therefore this report can be used for applying the **Australian C-Tick mark** for IT equipment, when this test has been passed.

CISPR 22:2002 is equivalent to ICES-003:2004, and therefore this report can be used for approval in Canada for IT equipment, when this test has been passed.

### 5.2 FCC Registrations

**Organization:** Federal Communications Commission, USA

**Registration Number:** 90529

**Facilities:** OATS Hørsholm (EMC-0)  
EMC room 2 Hørsholm (EMC-2)  
EMC room 3 Hørsholm (EMC-3)  
EMC room 4 Hørsholm (EMC-4)  
EMI room Hørsholm (EMC-5)



### 5.3 VCCI Registrations

**Organization:** Voluntary Control Council for Interference by Information Technology, Japan

**Member Number:** 910

**Facilities:**

OATS Hørsholm (EMC-0):	R-691
EMC room 2 Hørsholm (EMC-2):	C-707, T-246 and T-1547
EMC room 3 Hørsholm (EMC-3):	C-2532, T-247 and T-1548
EMC room 4 Hørsholm (EMC-4):	C-2533, T-248 and T-1549
EMI room Hørsholm (EMC-5):	R-1180, C-706, T-249 and T-1550

### 5.4 IC Registrations

**Organization:** Industry Canada, Certification and Engineering Bureau

**Registration Number:** IC4187A-5

**Facilities:** EMI room Hørsholm (EMC-5)



## 6. List of instruments

No.	Description	Manufacturer	Type No.
29332	ACTIVE LOOP ANTENNA	ROHDE & SCHWARZ	HFH-Z2
29494	MICROWAVE CABLE, FIXED ROOM 1 CABLE	SUHNER	SUCOFLEX 104
29499	BROADBAND RF PREAMPLIFIER	EC/MTS TELEME-TER	TVV 711
29503	LOOP ANTENNA CHECK GENERATOR	EC	PTJ
29797	BILOG ANTENNA, 30-2000 MHz	CHASE ELECTRICS LTD	CBL 6111A
29861	EMI-SOFTWARE VER. 1.60	ROHDE & SCHWARZ	ES-K1, PART: 1026.6790.02
49183	POWER SUPPLY	TTI	PL 320
49184	POWER SUPPLY	TTI	CPX200
49299	DIGITAL MULTIMETER	Fluke	87-4
49550	SIGNAL ANALYZER	ROHDE & SCHWARZ	FSQ8
49600	SPECTRUM ANALYZER / MEASUREMENT RECEIVER	ROHDE & SCHWARZ	ESU40
49624	DUAL RIDGE HORN ANTENNA – 1GHz – 26 GHz (2 GHz – 32 GHz)	SATIMO	SH2000
49625	SRD COAX SWITCH MATRIX USED IN 1 GHz – 26 GHz SRD ANTENNASYSTEM	DELTA	COAX SWITCH MATRIX

