RADIO TEST REPORT

No. 908455-2 Ed. 3

RF Performance

EQUIPMENT UNDER TEST

Equipment:	AM deactivator
Type / model:	AM deactivator Dual
Manufacturer:	Gunnebo Gateway AB
Tested by request of:	Gunnebo Gateway AB

SUMMARY

All selected test cases specified in this report comply with the requirements according to the following standards:

47 CFR Part 15, Subpart C, Intentional radiators
47 CFR Part 15, Subpart B, Unintentional radiators
RSS-Gen, Issue 4 (Nov 2014)
RSS-210, Issue 8 (Dec 2010)

Industry Canada listed test facility No. IC 2042G-1

Date of issue: 2015-10-16

Tested by: Kajsa From

Approved by: Stefan Andersson

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Revision History

Edition	Date	Description
1	2009-09-29	First release
2	2014-02-27	Section 7, Occupied 99% bandwidth test is added. Carrier field strength for supply voltage variations is added to section 5.6
3	2015-10-16	New edition where the test results are compared to current requirements (new edition of RSS-Gen). Update is made under project number 1401003.

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1. CLIENT INFORMATION

The EUT has been tested by request of

Company:	Gunnebo Gateway AB Skogsvaktaregatan 3 591 62 Motala SWEDEN
Name of contact:	Claes Kemmer

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT according to the manufacturer/client declaration

Equipment:	AM deactivator
Type / Model:	AM deactivator Dual
Brand name:	Gunnebo
Serial number:	Unmarked
Manufacturer:	Gunnebo Gateway AB
Rating/Supplying voltage:	120 V AC, 60 Hz
External antenna connector:	No
Operating temperature range:	0 to +55 °C
Frequency range:	58 kHz
Number of channels:	1
Stand by mode supported:	No

2.2 Modifications during the test

No modifications have been made during the tests.

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3. TEST SPECIFICATIONS

3.1 Standards

47 CFR Part 15, Subpart C, Intentional radiators
47 CFR Part 15, Subpart B, Unintentional radiators
RSS-Gen, Issue 4 (Nov 2014)
RSS-210, Issue 8 (Dec 2010)

Measurements methods according to ANSI C63.10-2013

3.2 Additions, deviations and exclusions from standards

No additions, deviations or exclusions have been made from standards.

3.3 Test set-up

Measurement set-up for radiated spurious emissions test is described in corresponding section.
Measurement set-up for conducted emissions test is described in corresponding section.

3.4 Test conditions

If not additionally specified, the tests were performed under the following environmental conditions:

Parameter	Normal
Supplying voltage	120 V AC, 60 Hz
Air temperature	23 °C

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4. TEST SUMMARY

The results in this report apply only to the sample tested.

FCC reference	IC reference	Test	Result	Note
15.209	RSS-210 2.5 RSS-Gen Table 5	Radiated emission	PASS	
15.207	RSS-Gen Table 3	Conducted emission	PASS	
-	RSS GEN 4.6.1	99 % band width	PASS	

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5. RADIATED EMISSION IN THE FREQUENCY RANGE 9 KHZ – 1000 MHZ

5.1 Measurement uncertainty

Radiated emission with loop antenna, 9 kHz - 30 MHz: ± 3,2 dB

Radiated disturbance electric field intensity, 30 – 1000 MHz: ± 4,8 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.

Measurement uncertainty is calculated in accordance with EA-4/02-1997.
The measurement uncertainty is given with a confidence of 95%.

5.2 Test equipment

Equipment	Manufacturer	Type	SEMKO No.
Test site: Big Chamber			
	30300		
Software:	Rohde & Schwarz	EMC32	
Measurement receiver:	Rohde & Schwarz	ESU-8	12866
Antenna:			
Bilog	Chase	CBL6111B	12474
Antenna Loop	EMCO	6502	4070
Transformer	Tufvassons	AFM-1500	30317

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5.3 Measurement set-up, Magnetic field strength

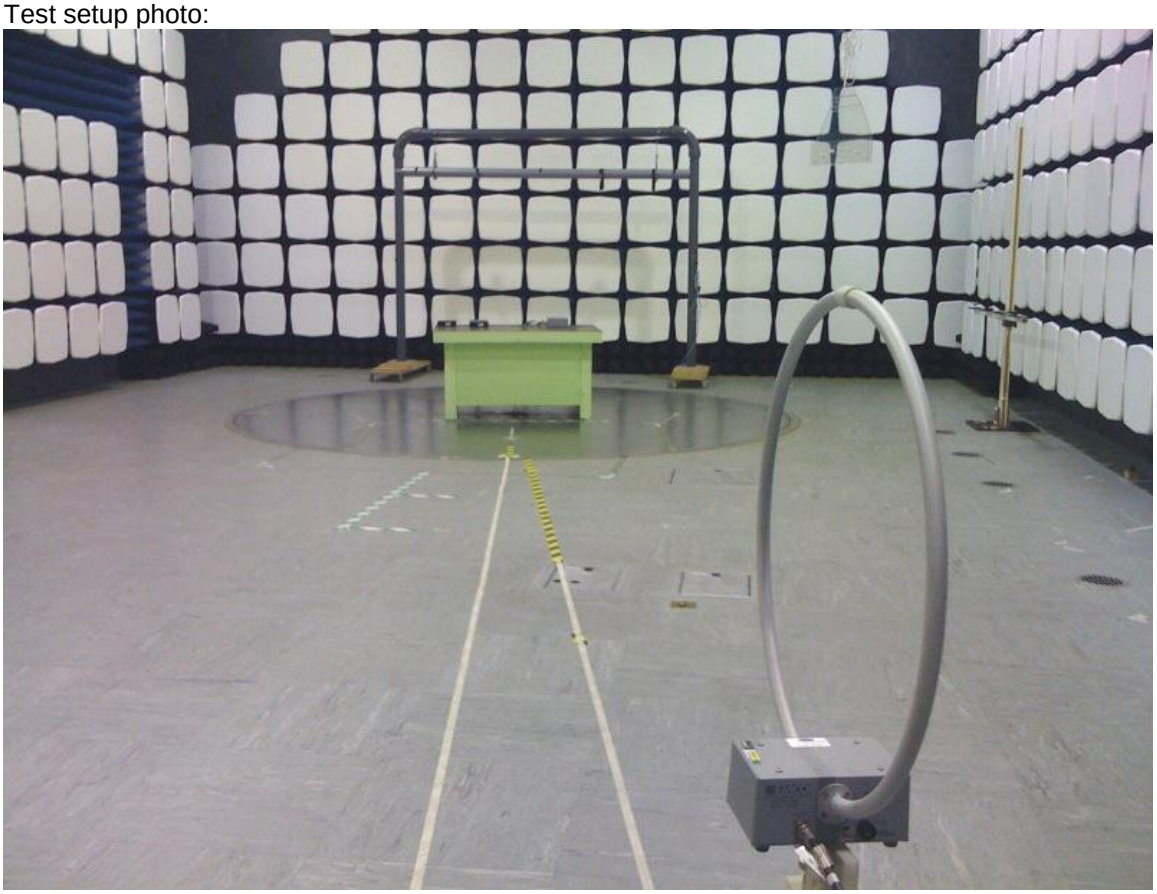
Test site: Semi-anechoic shielded chamber

The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 10 m and the EUT was placed on plastic table, 0.8 m above the reference ground plane. The specified test mode was enabled. Test set-up photo is given below.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1 m above the floor. The antenna was placed in three orthogonal directions. The measurements were repeated with the EUT rotated in 90-degree steps.

At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out.

Test setup photo:



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5.4 Measurement set-up, Electric field strength

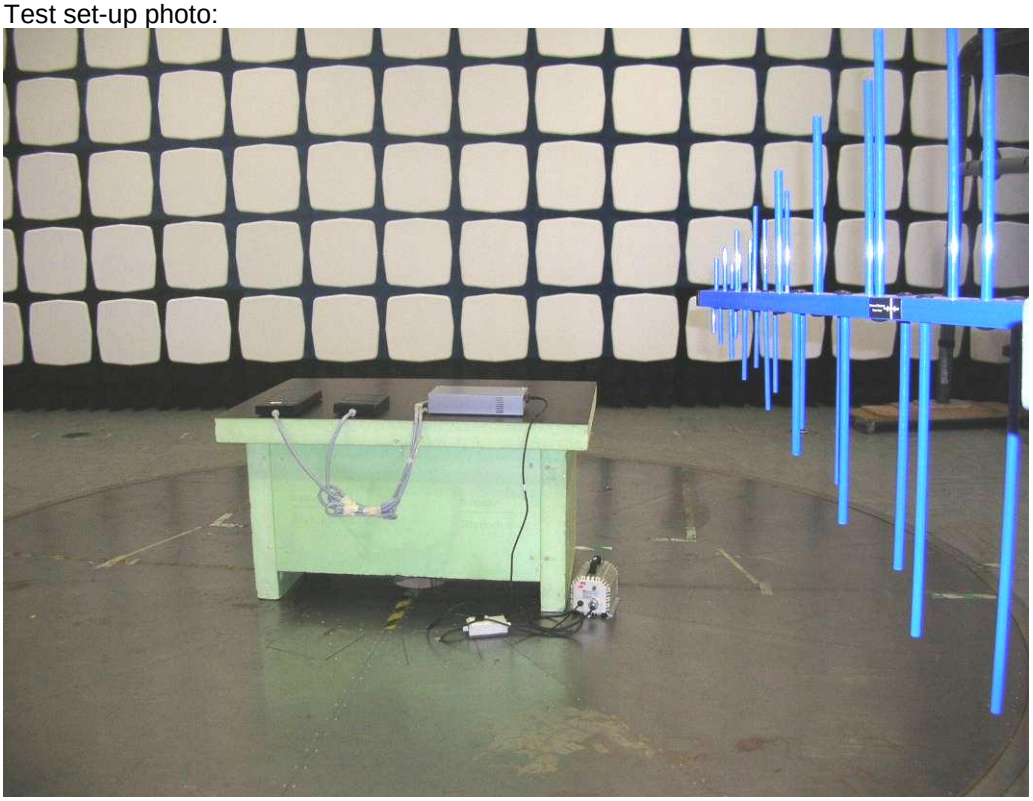
Test site: Semi-anechoic shielded chamber

The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 3 m and the EUT was placed on a plastic table, 0.8 m above the reference ground plane. The specified test mode was enabled. Test set-up photo is given below.

An overview sweep with peak detection of the electric field intensity was performed with the measurement receiver in max-hold and with the antenna placed 1,5 , 2,5 , and 3,5 m above the floor. The measurements were repeated with the EUT rotated in 90-degree steps.

At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out.

Test set-up photo:



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5.5 Limits

The limits in FCC 47 CFR § 15.209 below 30 MHz are given for different measurement distances. The limits below 30 MHz are converted to 10 m by using the extrapolation factor 40 dB/decade (according to §15.31)

The field strength limits below 30Mhz are converted to magnetic field units, dBμA/m, by subtracting with 51.5 dB (20*LOG(377)) since it is measured with a magnetic loop antenna.

Frequency (MHz)	Field strength (dBμV/m)	Field strength (dBμA/m)	Measurement distance (m)
0.009 – 0.490	107.6 – 72.9	56.1 – 21.4	10
0.490 – 1.705	52.9 – 42.1	1.4 – -9.4	10
1.705 – 30.0	48.6	-2.9	10

Frequency (MHz)	Field strength (dBμV/m)	Measurement distance (m)
30 – 88	40.0	3
88 – 216	43.5	3
216 – 960	46.0	3
960 –	54.0	3

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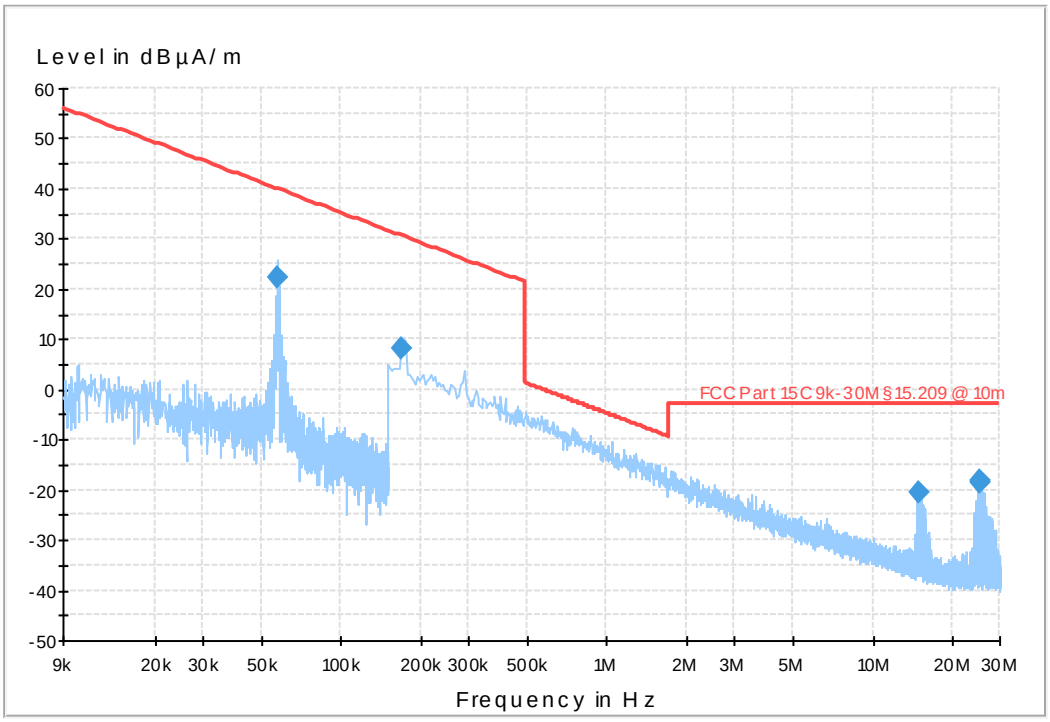
5.6 Test protocol

Semi-anechoic shielded chamber

Date of test: 2009-09-09

Magnetic field strength preview, max peak at a distance of 10 m, antenna in x-position



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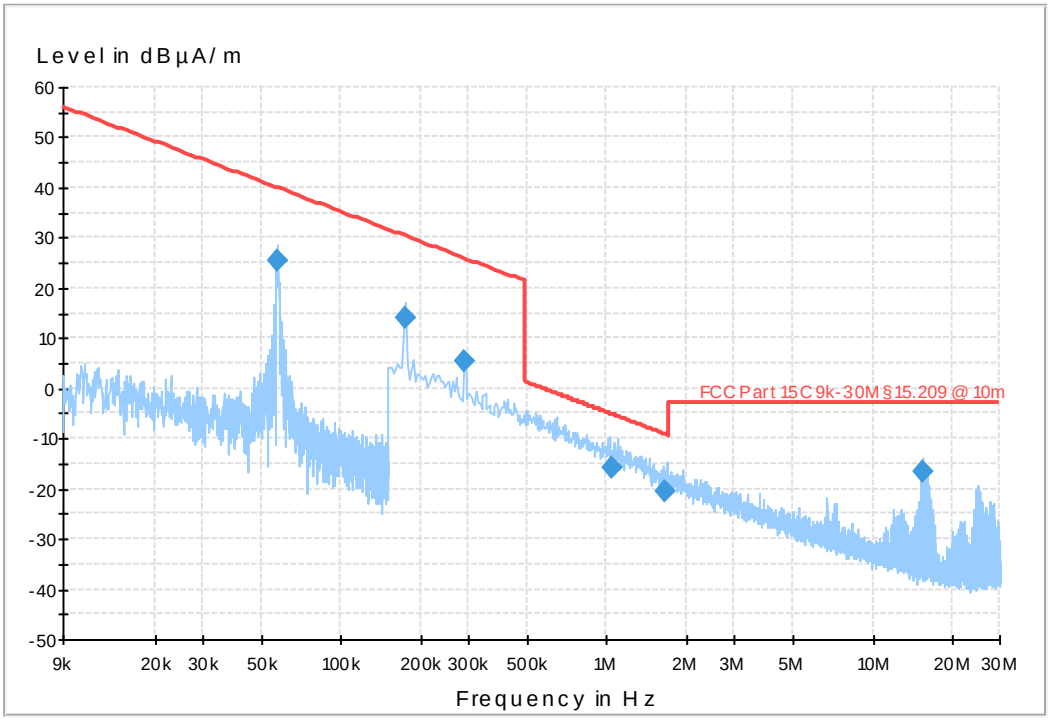
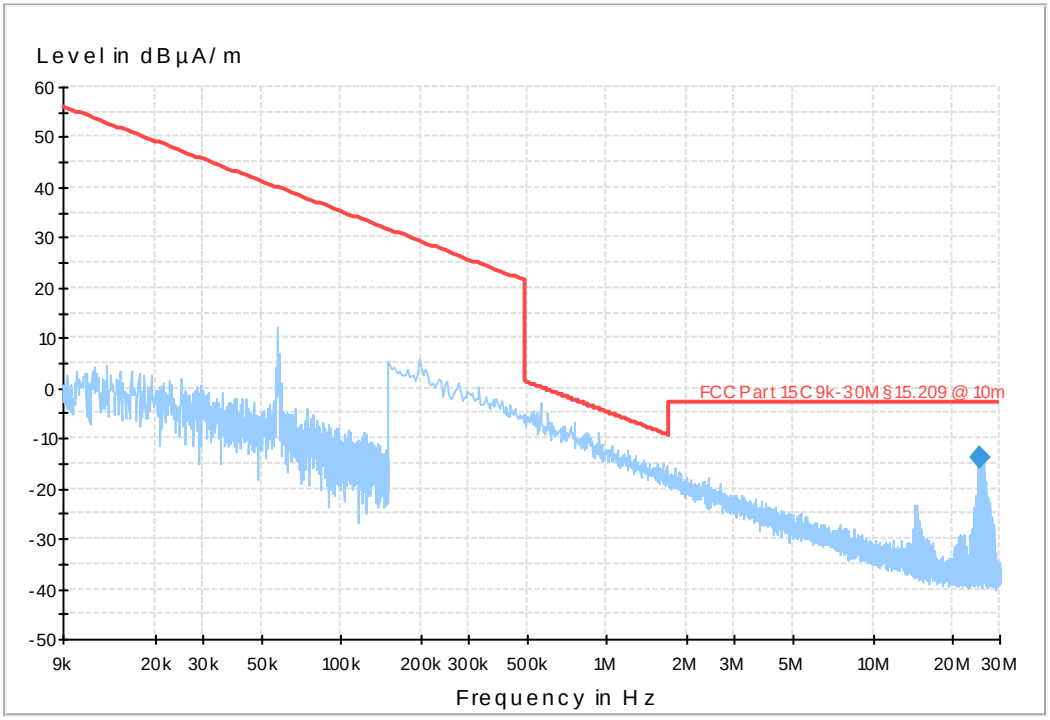
Magnetic field strength preview, max peak at a distance of 10 m, antenna in y-position

Copy (2) of Radio EN300330 H-field 9kHz - 30MHz



Magnetic field strength preview, max peak at a distance of 10 m, antenna in z-position

Copy (2) of Radio EN300330 H-field 9kHz - 30MHz



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Magnetic field strength						
Frequency [MHz]	RBW [kHz]	Measured level		Limit		Note
		Peak dBµA/m	QP / AV dBµA/m	Peak dBµA/m	QP / AV dBµA/m	
0.0578	0.2	-	25.4	-	40.0	Carrier
0.1740	9	-	14.0	-	30.4	
0.2890	9	-	5.4	-	26.0	
1.053	9	-	-15.9	-	-5.2	
1.665	9	-	-20.4	-	-9.2	
15.461	9	-	-16.5	-	-2.9	
25.213	9	-	-13.8	-	-2.9	

Example calculation:
Measured level [dBµA/m] = Analyser reading [dBµV] + cable loss [dB] + antenna factor [1/m] – 51.5 [dB]

The field strength from the carrier shall not exceed the limits when the supply voltage is varied between 85% and 115% of nominal voltage.

Date of test: 2014-01-27

Voltage	Transmitter power (relative)
120 V	0 dB
102 V	-1.6 dB
138 V	+1.2 dB

Fulfil requirements: Yes

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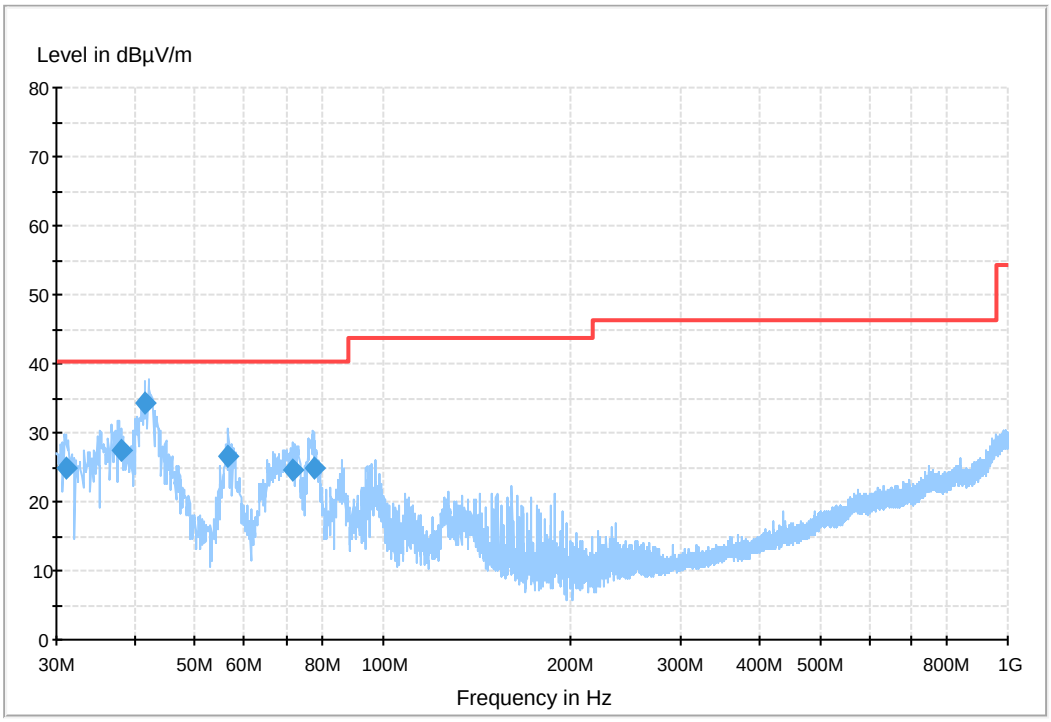
Electric field strength preview, max peak at a distance of 3 m

FCC 30 - 1000 MHz FCC class B 3m



Electric field strength						
Frequency	RBW	Measured level		Limit		Note
	[kHz]	Peak dB(µV/m)	QP / AV dB(µV/m)	Peak dB(µV/m)	QP / AV dB(µV/m)	
31.064	120		24.8		40.0	
38.022	120		27.5		40.0	
41.708	120		34.3		40.0	
56.246	120		26.6		40.0	
71.602	120		24.5		40.0	
77.391	120		24.9		40.0	

Example calculation:
Measured level [dBµV/m] = Analyser reading [dBµV] + cable loss [dB] – preamplifier gain [dB] + antenna factor [1/m]

Fulfil requirements: Yes

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6. CONDUCTED DISTURBANCE VOLTAGE IN THE FREQUENCY RANGE 0,15 - 30 MHZ

6.1 Measurement uncertainty

Conducted disturbance voltage, quasi-peak detection: ±3,6 dB

The measurement uncertainty describes the overall uncertainty of the given measured value during operation of the EUT.

Measurement uncertainty is calculated in accordance with EA-4/02-1997.
The measurement uncertainty is given with a confidence of 95%.

6.2 Test equipment

Test site:	FCC		
Equipment	Manufacturer	Type	SEMKO No.
Software:	Rohde & Schwarz	ES-K1 V1.60	
Measurement receiver:	Rohde & Schwarz	ESHS 30	4946
Artificial mains network:	Rohde & Schwarz	ESH3-Z5	2727
Transformer	Tufvassons	AFM-1500	375

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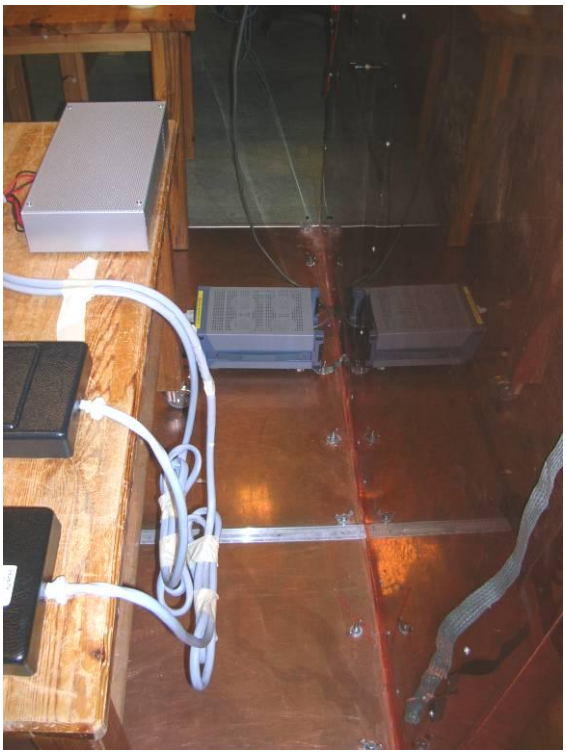
6.3 Measurement set-up

The mains terminal disturbance voltage was measured with the EUT was placed on a wooden board, 0.8 m above the horizontal ground plane and 0,4 m from the vertical ground plane. The EUT was connected to an artificial mains network (AMN). The AMN was placed on the horizontal ground plane. Amplitude measurements were performed with a quasi-peak and average detector. The EUT was supplied by 120 VAC (60 Hz) during the test.

Test set-up photo:



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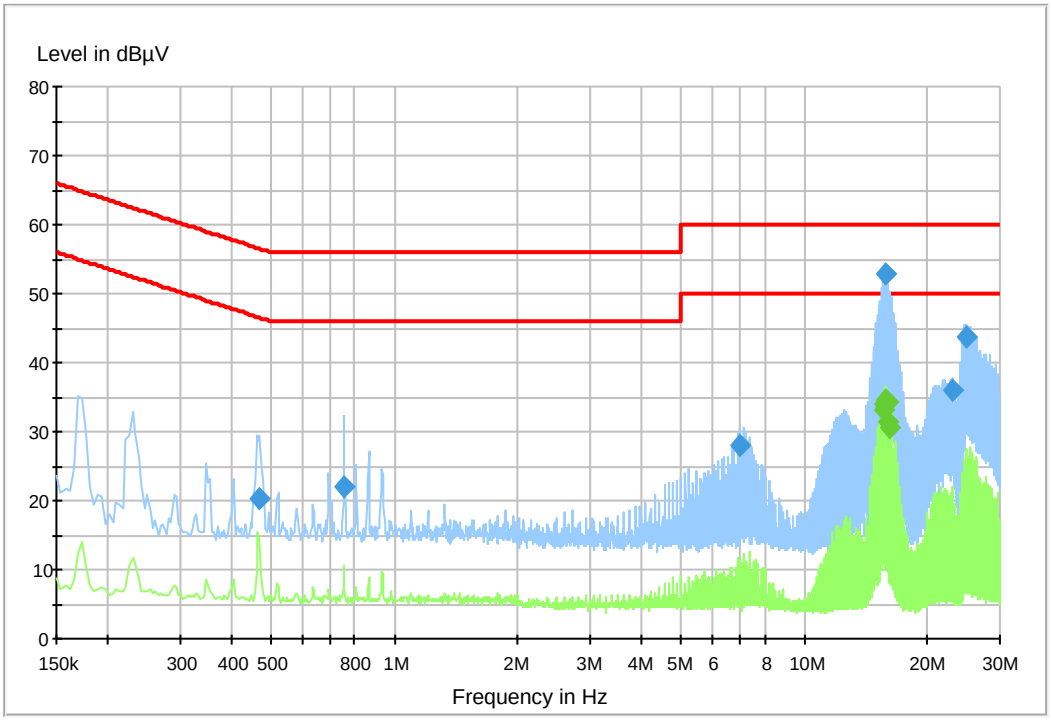
Overview sweeps performed with peak and average detectors



6.4 Test protocol

Date of test: 2009-09-09

Frequency /MHz	Quasi-Peak Disturbance Level /dB(µV)	Quasi-Peak Permitted limit /dB(µV)
0.470	20.3	56.5
0.754	22.1	56.0
6.982	28.0	60.0
15.810	52.9	60.0
22.906	36.0	60.0
24.754	43.7	60.0

Frequency /MHz	Average Disturbance Level /dB(µV)	Average Permitted limit /dB(µV)
15.578	33.0	50.0
15.694	34.0	50.0
15.810	34.7	50.0
15.926	34.2	50.0
16.038	31.5	50.0
16.158	30.7	50.0

Fulfil requirements: Yes

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7. OCCUPIED 99% BANDWIDTH TEST

7.1 Test equipment

Equipment	Manufacturer	Type	SEMKO No.
Test site: Big Chamber			
		30300	
Measurement receiver:	Rohde & Schwarz	ESU-8	12866
Antenna: Antenna Loop	EMCO	6502	4070

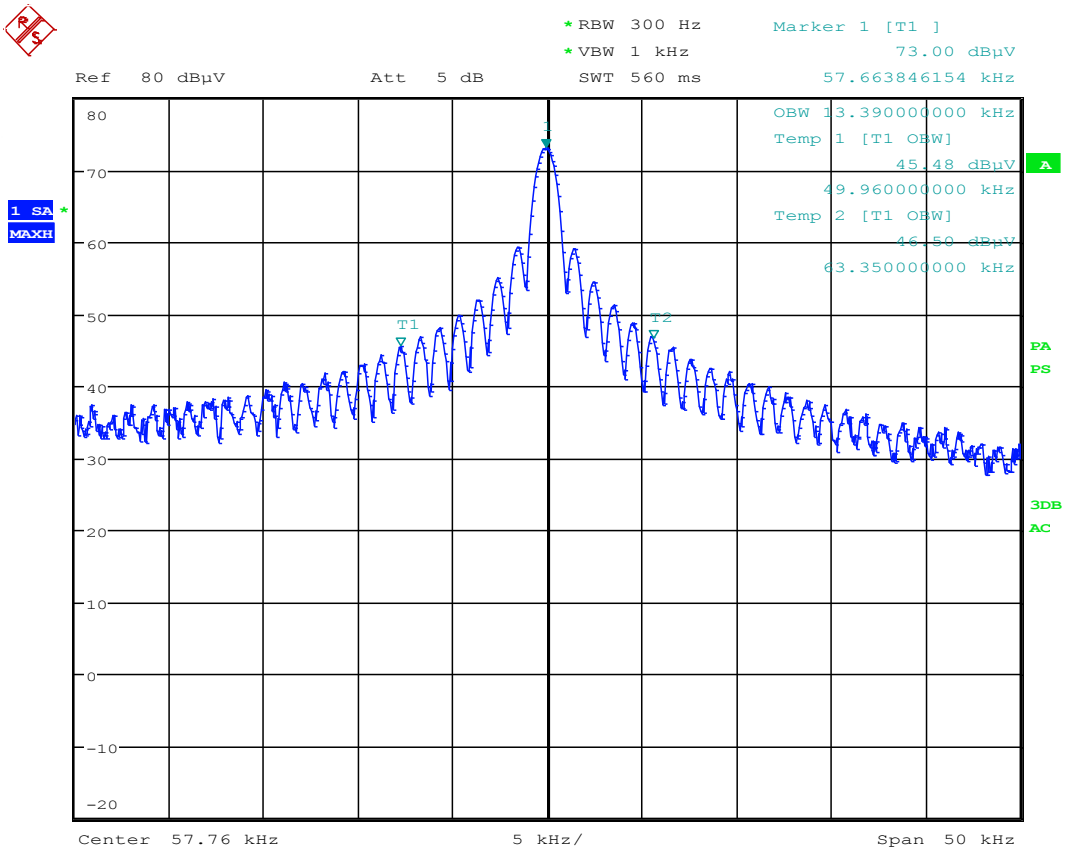
7.2 Measurement set-up

Signal analyser's power bandwidth function was used to calculate 99% bandwidth

7.3 Test protocol

Date of test: 2014-01-27

99% BW = 13.4 kHz



Date: 27.JAN.2014 13:52:03

Fulfil requirements: Yes

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8. PHOTOS OF THE EUT

EUT

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