

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.

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

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	

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

5.1 Measurement uncertainty

Radiated emission with loop antenna, 9 kHz - 30 MHz: $\pm 3,2$ dB

Radiated disturbance electric field intensity, 30 – 1000 MHz: $\pm 4,8$ 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.
<i>Test site: Big Chamber</i>			
	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

5.3 Measurement set-up, Magnetic field strength

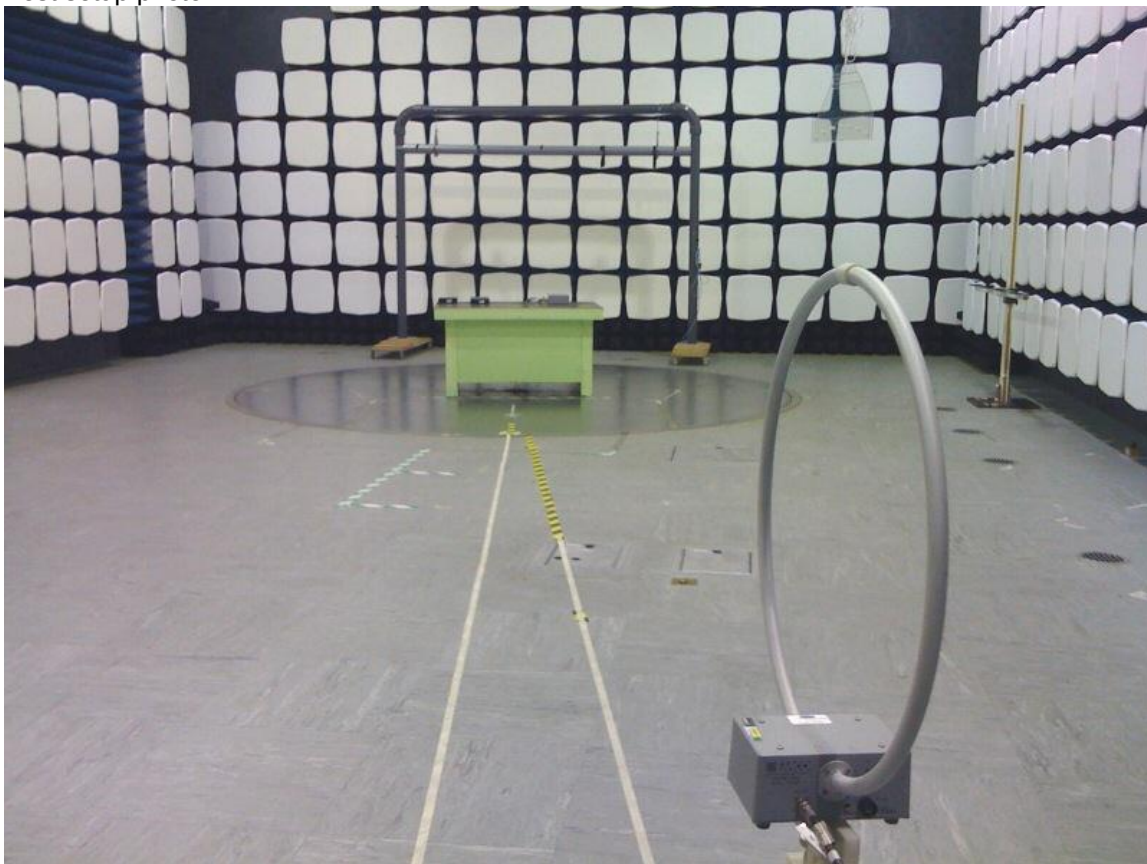
Test site: Semi-anechoic shielded chamber

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:



5.4 Measurement set-up, Electric field strength

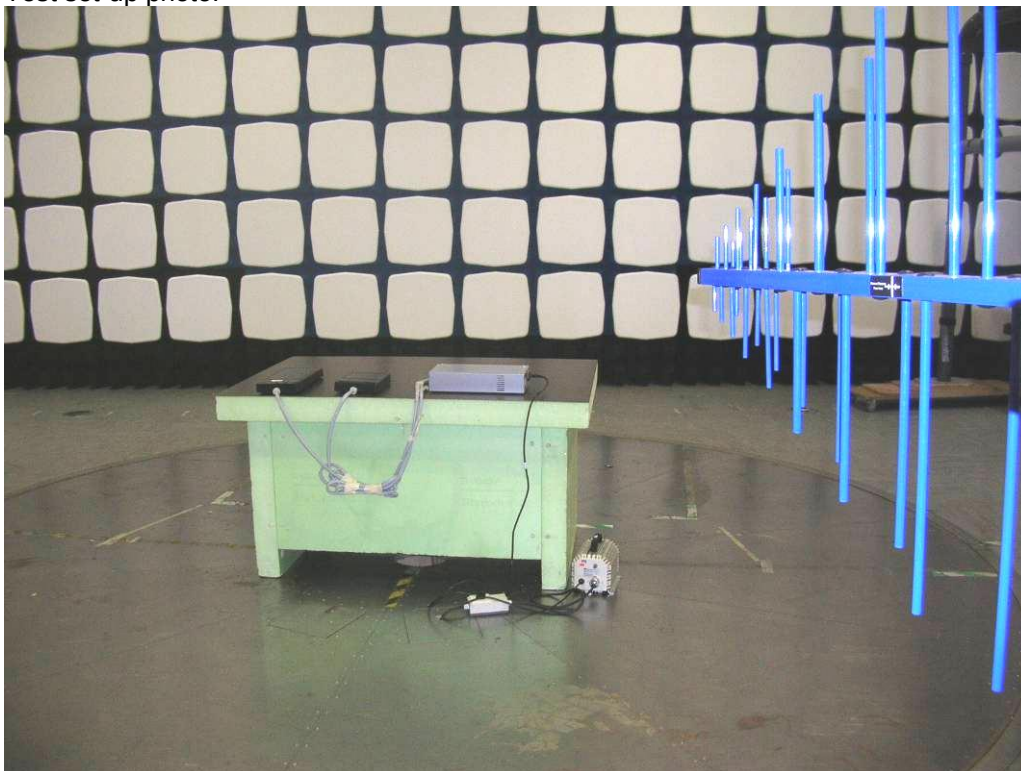
Test site: Semi-anechoic shielded chamber

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:



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, dB μ A/m, by subtracting with 51.5 dB (20*LOG(377)) since it is measured with a magnetic loop antenna.

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

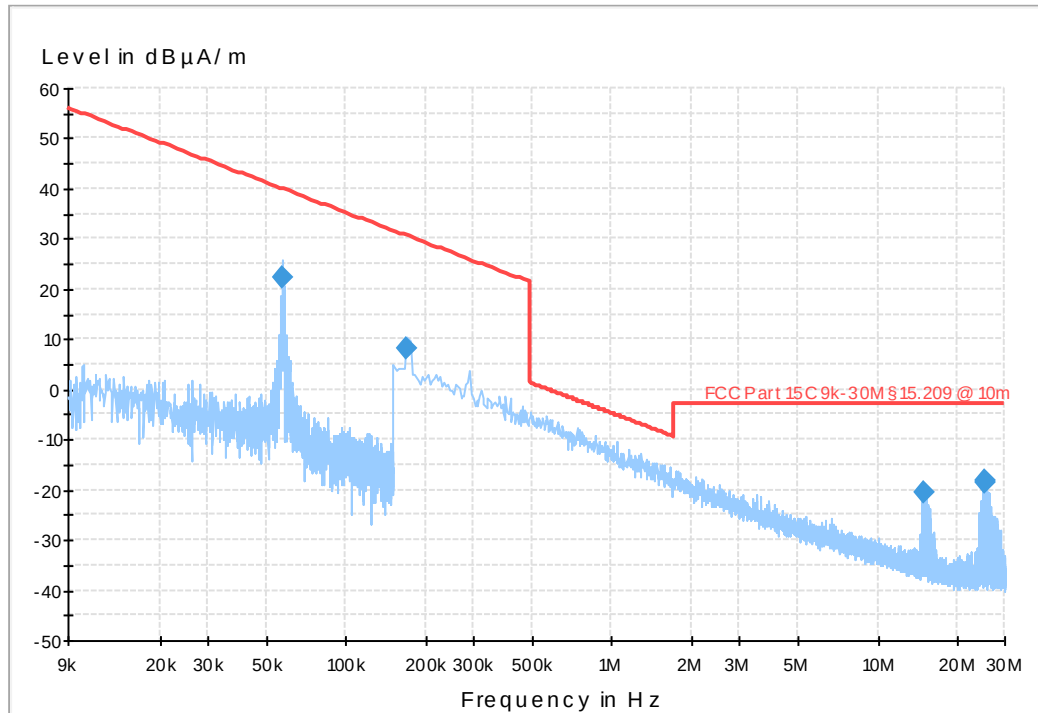
5.6 Test protocol

Semi-anechoic shielded chamber

Date of test: 2009-09-09

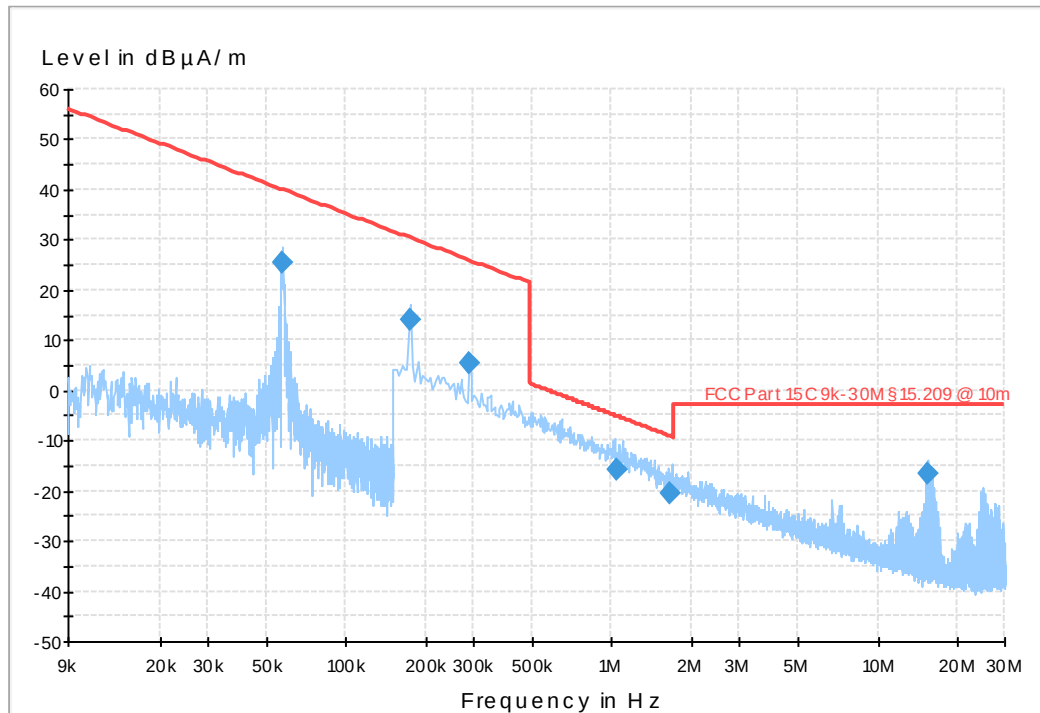
Magnetic field strength preview, max peak at a distance of 10 m, antenna in x-position

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



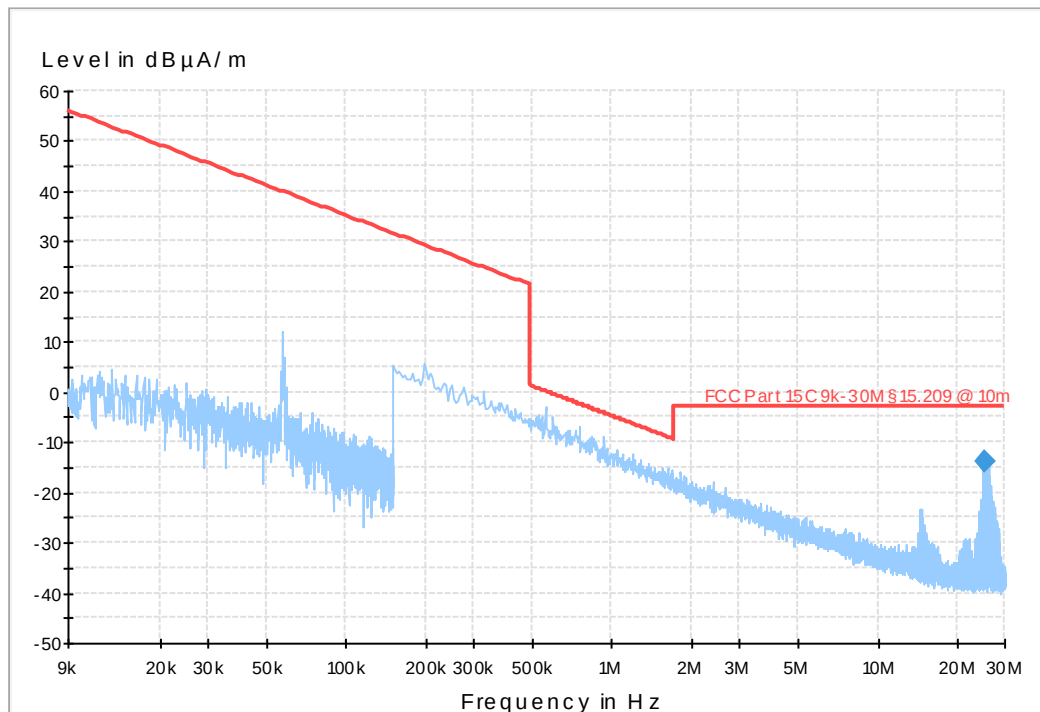
Magnetic field strength preview, max peak at a distance of 10 m, antenna in y-position

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



Magnetic field strength						
Frequency [MHz]	RBW [kHz]	Measured level		Limit		Note
		Peak dB μ A/m	QP / AV dB μ A/m	Peak dB μ A/m	QP / AV dB μ A/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 [dB μ A/m] = Analyser reading [dB μ V] + 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.

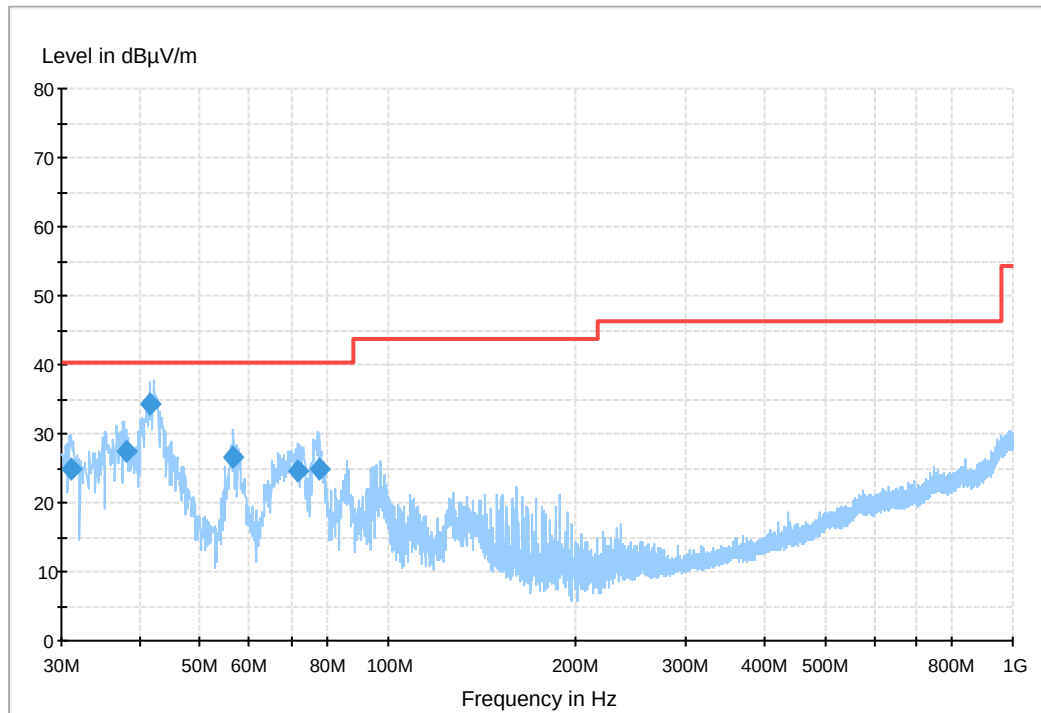
Date of test: 2014-01-27

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

Fulfil requirements: Yes

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 [kHz]	Measured level		Limit		Note
		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

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

6.1 Measurement uncertainty

Conducted disturbance voltage, quasi-peak detection: $\pm 3,6$ 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%.

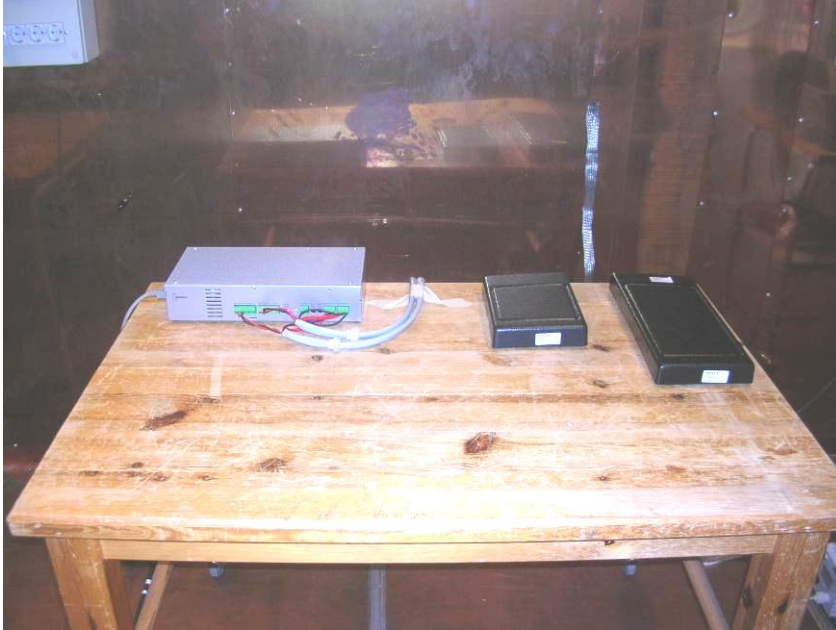
6.2 Test equipment

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

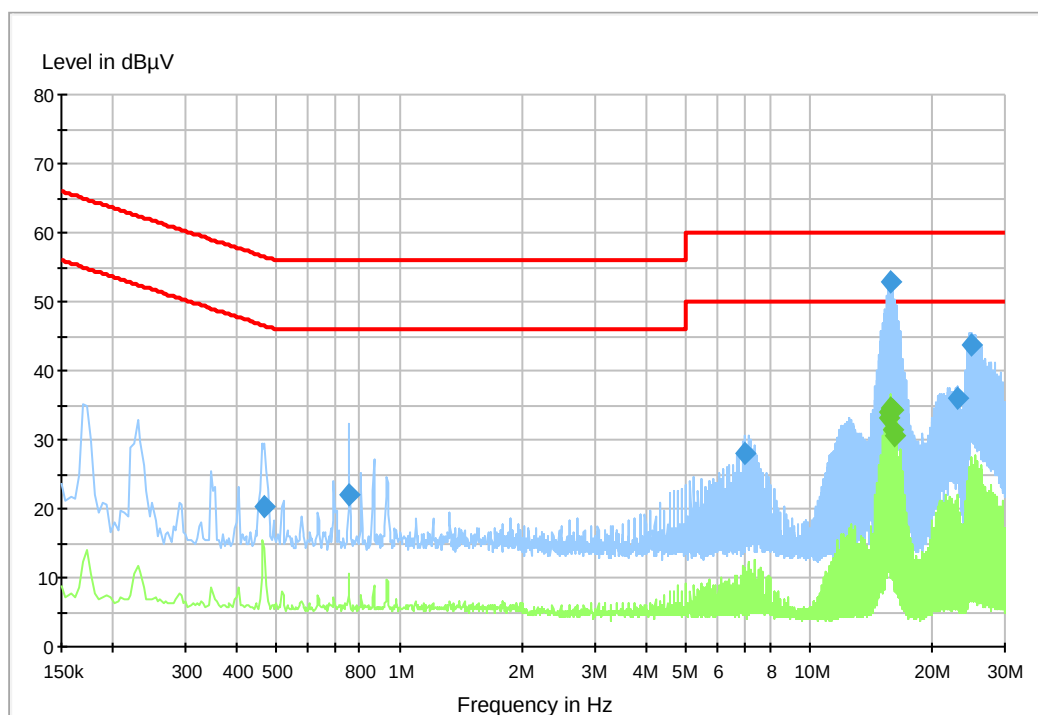
6.3 Measurement set-up

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:



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)	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)	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

7. OCCUPIED 99% BANDWIDTH TEST

7.1 Test equipment

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

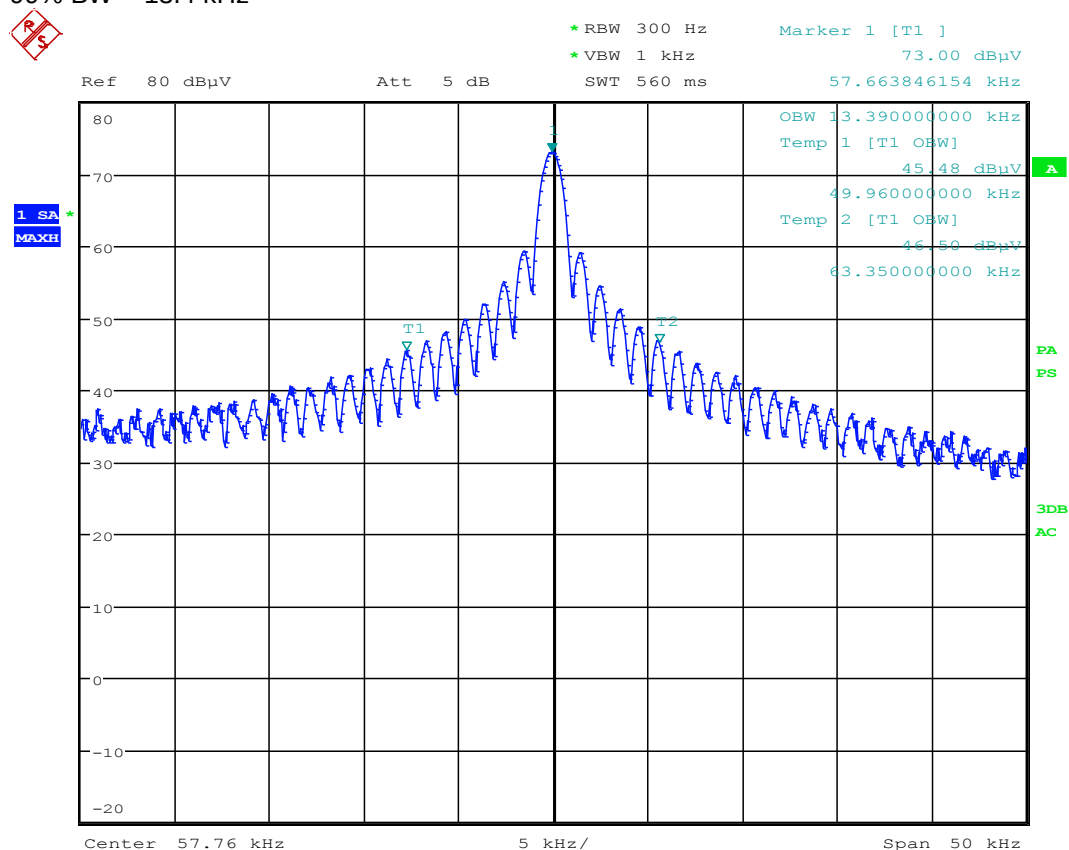
7.2 Measurement set-up

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

8. PHOTOS OF THE EUT

EUT

