

RADIO TEST REPORT

No. 1401003-1 Ed. 2

RF performance

EQUIPMENT UNDER TEST

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

SUMMARY

Referring to the emission limits and the operating mode during the tests specified in this report the equipment complies with the requirements according to

47 CFR Part 15, Subpart C, Intentional radiators
47 CFR Part 15, Subpart B, Unintentional radiators
ICES-001, Issue 4 (June 2006)
RSS-Gen, Issue 4 (Nov 2014)
RSS-210, Issue 8 (Dec 2010)

Test methods according to ANSI C63.10-2013

Date of issue: 2015-10-16

Tested by:



Kajsa From

Approved by:



Stefan Andersson

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Revision History

Edition	Date	Description
1	2014-02-27	First release
2	2015-10-16	New edition where the test results are compared to current requirements (new edition of RSS-Gen).

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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 Single

Brand name: Gunnebo

Serial number: No serial number

Manufacturer: Gunnebo Gateway AB

Transmitter frequency range: 58 kHz

Frequency agile or hopping: ☐ Yes ☒ No

Antenna: ☒ Internal antenna ☐ External antenna

Antenna connector: ☒ None, internal antenna ☐ Yes, type

Temperature range: ☐ Category I (General): -20°C to +55°C
☐ Category II (Portable equipment): -10°C to +55°C
☐ Category III (Equipment for normal indoor use): +5°C to +35°C
☒ Other: 0°C to +55°C

Transmitter stand by mode supported: ☐ Yes ☒ No

2.2 FCC ID and IC ID

The EUT is requested to be certified with the FCC ID: L3Z210020
The EUT is requested to be certified with the IC ID: 8083A-210020

2.3 Additional hardware information about the EUT

The EUT consists of the following units:

Unit	Type	Part number	Serial number
Electronic box	AM deactivator Single	-	-
Antenna	Maxi Pad	-	-

2.4 Modification during the tests

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
ICES-001, Issue 4 (June 2006)
RSS-Gen, Issue 4 (Nov 2014)
RSS-210, Issue 8 (Dec 2010)

Test methods in:

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

3.2 Additions, deviations and exclusions from standards

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

3.3 Test site

Measurements were performed at:

Intertek Semko AB.
Torshamnsgatan 43,
P.O. Box 1103
SE-164 22 Kista

Intertek Semko AB is a FCC listed test site with site registration number 90913
Intertek Semko AB is a Industry Canada listed test facility with IC assigned code 2042G

Measurement chambers

Measurement Chamber	Type of chamber	IC Site filing #
STORA HALLEN a.k.a. BIG CHAMBER	Semi-anechoic 10m	2042G-2

3.4 Test conditions

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

Parameter	Normal	Extreme
Supplying voltage, V	120 V	102 – 138
Air temperature, °C	20 – 25	-

4 TEST SUMMARY

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

Test	Result	Section in report	Note
Standard test methods			
AC power-line conducted tests	Pass	5	
Radiated test below 30 MHz	Pass	6	
Radiated emissions measurements from 30 to 1000 MHz	Pass	7	Class A
Determination of radiated and antenna conducted emissions above 1 GHz	NA		
Frequency Stability Test	NA		
Occupied bandwidth and band-edge tests	NA	8	99 % BW
Output Power average symbol envelope power	NA		
Power Spectral Density < 40 GHz	NA		
Power Spectral Density > 40 GHz	NA		
In-situ measurements	NA		
Polar plot, main lobe and variation on radiated emissions test	NA		
Device-specific tests			
Measurement of cable locating equipment	NA		
Determining of cordless telephone handset security code	NA		
Determination of total input power	NA		
Procedure determining compliance for periodic operation [15.231, 15.240(b)]	NA		
Determining the average value of pulsed emissions per 15.35(c)	NA		
Comparison of limits per 15.231(b)(3)	NA		
Procedure to determine compliance of frequency pairing for 47 CFR 15.233(b)(2)	NA		
Determination of frequency hopping compliance per 47 CFR 15.247	NA		
Determination of digital modulation compliance per 47 CFR 15.247	NA		
Determination of peak conducted output unlicensed wireless device power [15.247(b), 15.255]	NA		
Determination of maximum conducted output power (15.247, 15-E)	NA		
Determination of MIMO compliance (2nd edition)	NA		
Determination of Smart antenna compliance (2nd edition)	NA		
Determination of antenna gains, including those emitting in multiple directions (15.247)	NA		
Determination of compliance with RF exposure limits	NA		
Millimeter wave test procedures for systems operating at 54GHz and greater	NA		
Determination of EIRP (15-F)	NA		
Determination Transmitter Etiquette FCC Part 15.255	NA		
Determination of Dynamic Frequency Selection (DFS) including Channel Move Time and In Service Monitoring	NA		
Determination of channel availability	NA		
Determination of Dynamic Frequency Selection including Channel Move Time	NA		
Determination of transmitter power control (TPC) (15-E)	NA		
Peak excursion measurement for UNII devices	NA		
Determination of UWB bandwidth	NA		
Determination of the center frequency, f_C , and highest radiated emissions, f_M (15-F)	NA		

NA = Not Applicable

5 AC LINE CONDUCTED EMISSION, 150 KHZ TO 30 MHZ

Date of test:	2014-01-23	Test location:	EMC Center
EUT Serial:	No serial	Ambient temp.	23 °C
Tested by:	Kajsa From	Relative humidity	12 %
Test result:	Pass	Margin:	20.2 dB

5.1 Requirement

Reference: FCC §15.107, Class B limit
FCC §15.207
RSS-Gen Table 3

Frequency MHz	Quasi-peak Limit dB μ V	Average Limit dB μ V
0.15 – 0.5	66 – 56	56 – 46
0.5 – 1.6	56	46
1.6 – 30	60	50

5.2 Test setup details

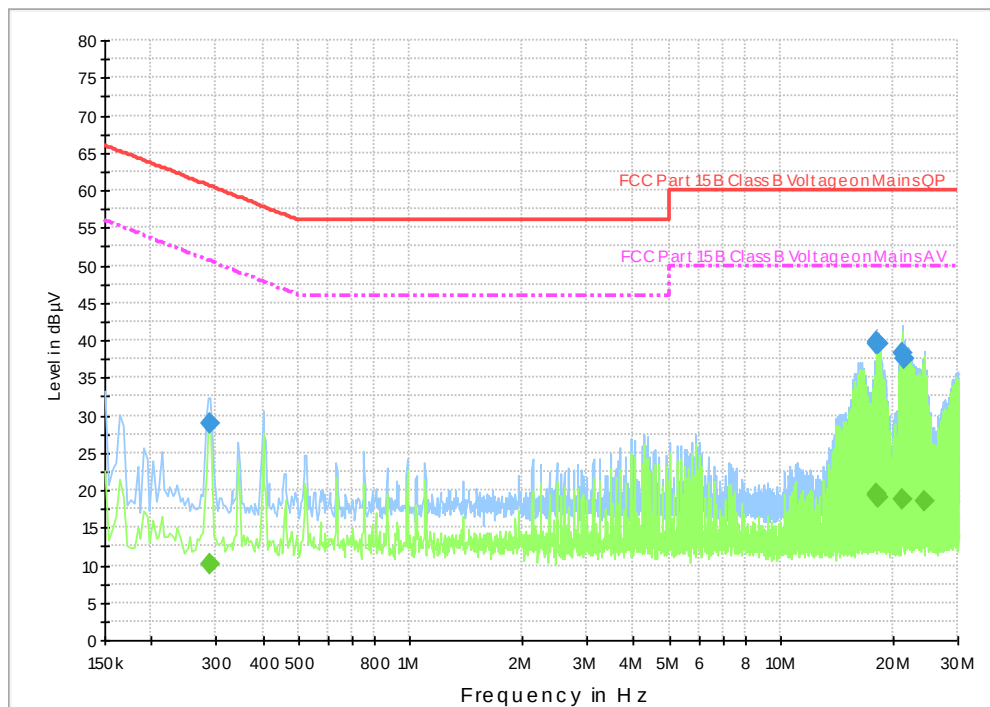
The mains terminal disturbance voltage was measured with the EUT was placed on a wooden board, 0.8 m above the horizontal ground plane and 0.4 m from the vertical ground plane. The EUT was connected to an artificial mains network (AMN). The AMN was 0.8 m from EUT. Amplitude measurements were performed with a quasi-peak detector. The EUT was supplied by 120 VAC (60 Hz) during the test. Measurements are made both without and including the tag.

Test set-up photos:



5.3 Test data

Overview sweeps performed with peak and average detectors.



Quasi-Peak			
Frequency MHz	Disturbance level dBµV	Limit dBµV	Margin dB
0.288	29.0	60.6	31.6
18.061	39.5	60.0	20.5
18.177	39.8	60.0	20.2
18.291	39.5	60.0	20.5
21.233	38.4	60.0	21.6
21.465	37.5	60.0	22.5

Average			
Frequency MHz	Disturbance level dBµV	Limit dBµV	Margin dB
0.289	10.1	50.6	40.5
18.061	19.3	50.0	30.7
18.176	19.5	50.0	30.5
18.291	19.1	50.0	30.9
21.234	18.7	50.0	31.3

Measured level [dBµV] = Analyser reading [dBµV] + cable loss [dB] + LISN insertion loss [dB]

5.4 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Cal. due date
Measurement software	Rohde & Schwarz	EMC32 v8.51.0	--	--
Receiver	Rohde & Schwarz	ESCI	31686	07-2014
AMN / LISN	Rohde & Schwarz	ESH3-Z5	2727	07-2014
Puls limiter	Rohde & Schwarz	ESH3-Z2	32523	01-2013
Generator	Hewlett-Packard	6842A	12448	11-2014

6 RADIATED TEST BELOW 30 MHZ

Date of test:	2014-01-27	Test location:	Big Chamber
EUT Serial:	No serial	Ambient temp.	21 °C
Tested by:	Kajsa From	Relative humidity	17 %
Test result:	Pass	Margin:	7.6 dB

6.1 Requirement

Reference: FCC §15.209, RSS-210 2.5, RSS-Gen Table 5

The limits 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

6.2 Test setup details

The radiated disturbance magnetic field intensity was measured in a semi-anechoic chamber at a distance of 10 m. Test set-up photos are 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 two orthogonal directions. The measurements were repeated with the EUT rotated in 90-degree steps.

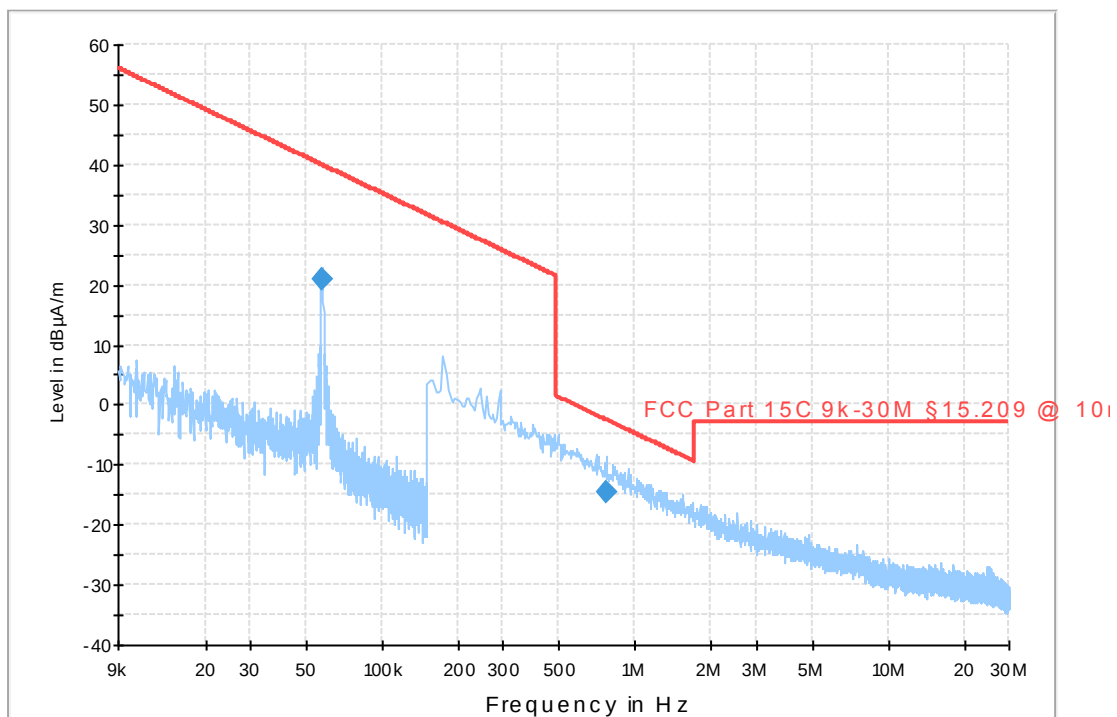
At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out.

Test setup photos:

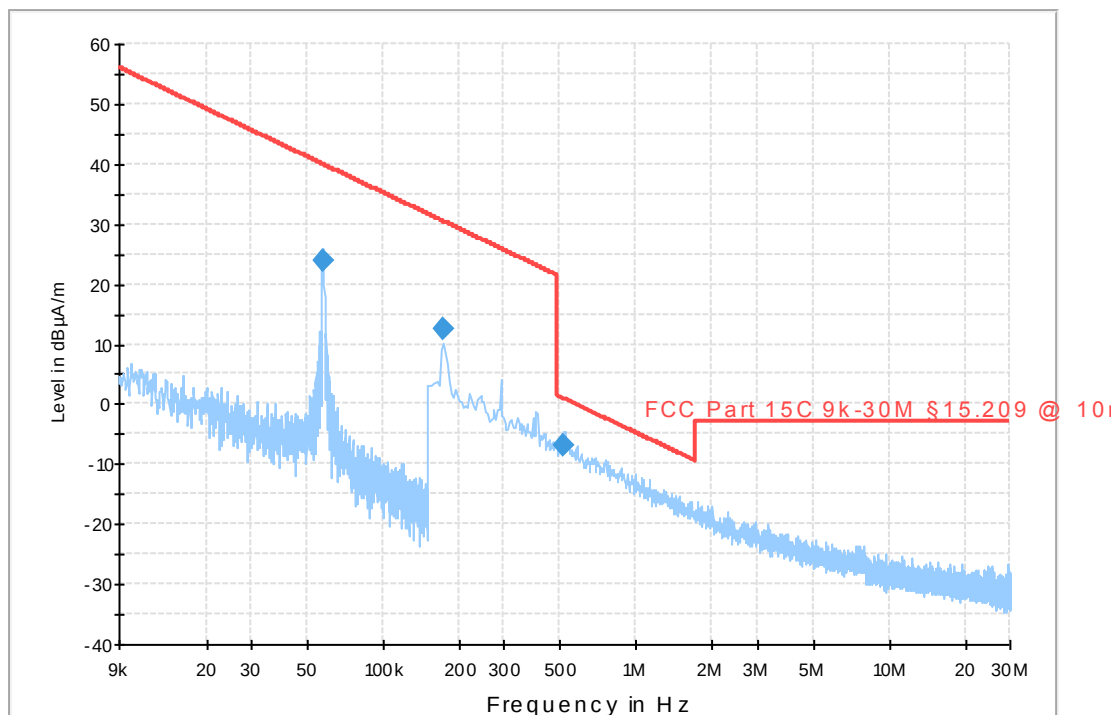


6.3 Test data

Overview sweep performed with peak detector at a distance of 10 m, antenna in x-position.



Overview sweep performed with peak detector at a distance of 10 m, antenna in y-position.



Frequency MHz	Disturbance Level dBμA/m	RBW kHz	Detector QP / AVG / Peak	Measurement distance m	Limit dBμA/m	Margin dB
0.0578	15.9	0.200	AVG	10	40.0	24.1
0.174	-3.0	0.200	AVG	10	30.4	33.4
0.517	-6.7	9.000	QP	10	0.9	7.6
0.773	-14.7	9.000	QP	10	-2.5	12.2

Measured level [dBμA/m] = Analyser reading [dBμV] + cable loss [dB] + antenna factor [dB(S/m)]

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

Voltage	Transmitter power (relative)
120 V	0 dB
102 V	-1.5 dB
138 V	+ 1.3 dB

6.4 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Cal. due date
Measurement software	Rohde & Schwarz	EMC 32 v8.51.0	--	--
Receiver	Rohde & Schwarz	ESU 8	12866	04-2014
Loop antenna	EMCO	6502	8853	08-2015
Pulse limiter	Rohde & Schwarz	ESH3-Z2	32454	07-2014

7 RADIATED EMISSIONS MEASUREMENTS FROM 30 MHZ TO 1000MHZ

Date of test:	2014-01-27	Test location:	Big Chamber
EUT Serial:	-	Ambient temp.	21 °C
Tested by:	Kajsa From	Relative humidity	19 %
Test result:	Pass	Margin:	9.3 dB

7.1 Requirement

Reference: FCC §15.109, Class A equipment

Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance (m)
30 – 88	49.5	3
88 – 216	54.0	3
216 – 960	56.9	3
960 –	60.0	3

Reference: ICES-001, Class A

Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance (m)
30 – 230	50.5	3
230 – 1000	57.5	3

The limits for Class A equipment are given for 10 m measurement distances. The limits are converted to 3 m by using the extrapolation factor 20 dB/decade (according to FCC §15.31)

7.2 Test setup details

The radiated disturbance electric field intensity was measured in a semi-anechoic chamber at a distance of 3 m. 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.

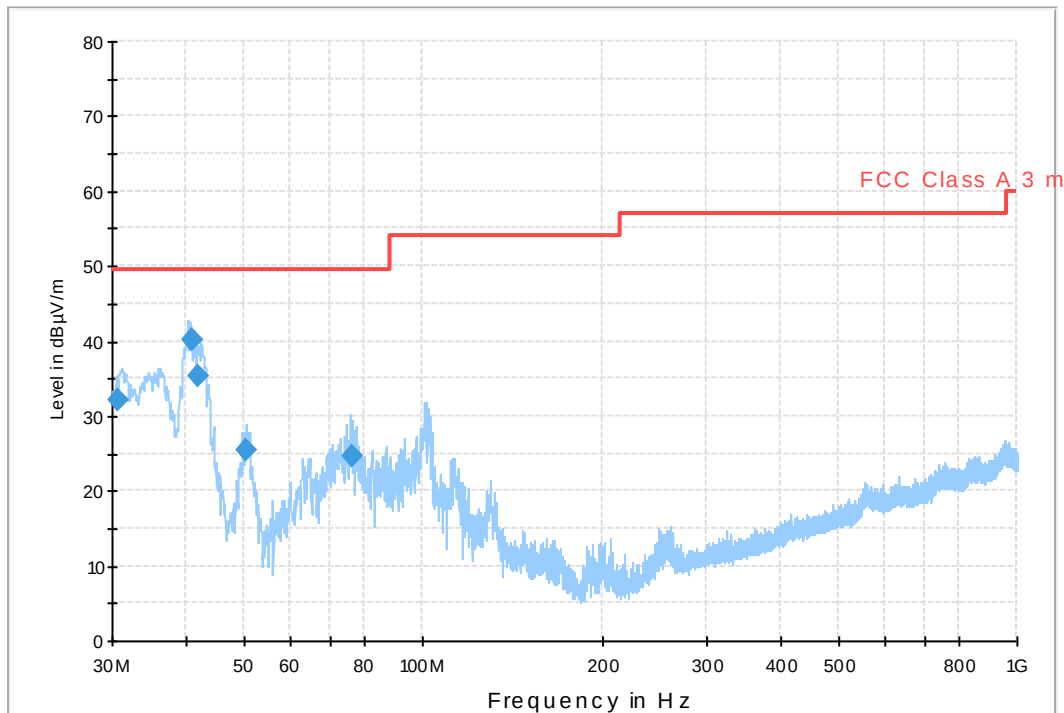
At the frequencies where high disturbance levels were found a search for max disturbance level was performed. With the EUT and antenna in the worst-case configuration new measurements were carried out.

Test set-up photo:



7.3 Test data

Overview sweeps performed with peak detector.



Freq. MHz	Disturbance Level dBμV/m	RBW kHz	Detector QP / AVG / Peak	FCC Limit dBμV/m	IC Limit dBμV/m	Pol.	Azimuth deg	Antenna height cm	Margin (FCC) dB
30.803	32.2	120	QP	49.5	50.5	V	244	100.0	17.3
40.896	40.2	120	QP	49.5	50.5	V	188	100.0	9.3
40.920	40.2	120	QP	49.5	50.5	V	215	100.0	9.3
41.859	35.2	120	QP	49.5	50.5	V	152	100.0	14.3
50.349	25.4	120	QP	49.5	50.5	V	172	100.0	24.1
76.032	24.7	120	QP	49.5	50.5	V	253	100.0	24.8

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

7.4 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Cal. due date
Measurement software	Rohde & Schwarz	EMC 32	--	--
Receiver	Rohde & Schwarz	ESU 8	12866	07-2014
Logperiodic antenna	Chase	CBL 6111A	971	09-2015
Preamplifier	Semko	AM-1331	7992	07-2014

8 OCCUPIED 99% BANDWIDTH TEST

Date of test:	2014-01-27	Test location:	Big Chamber
EUT Serial:	-	Ambient temp.	21 °C
Tested by:	Kajsa From	Relative humidity	17 %
Test result:	Pass	Margin:	-

8.1 Requirement

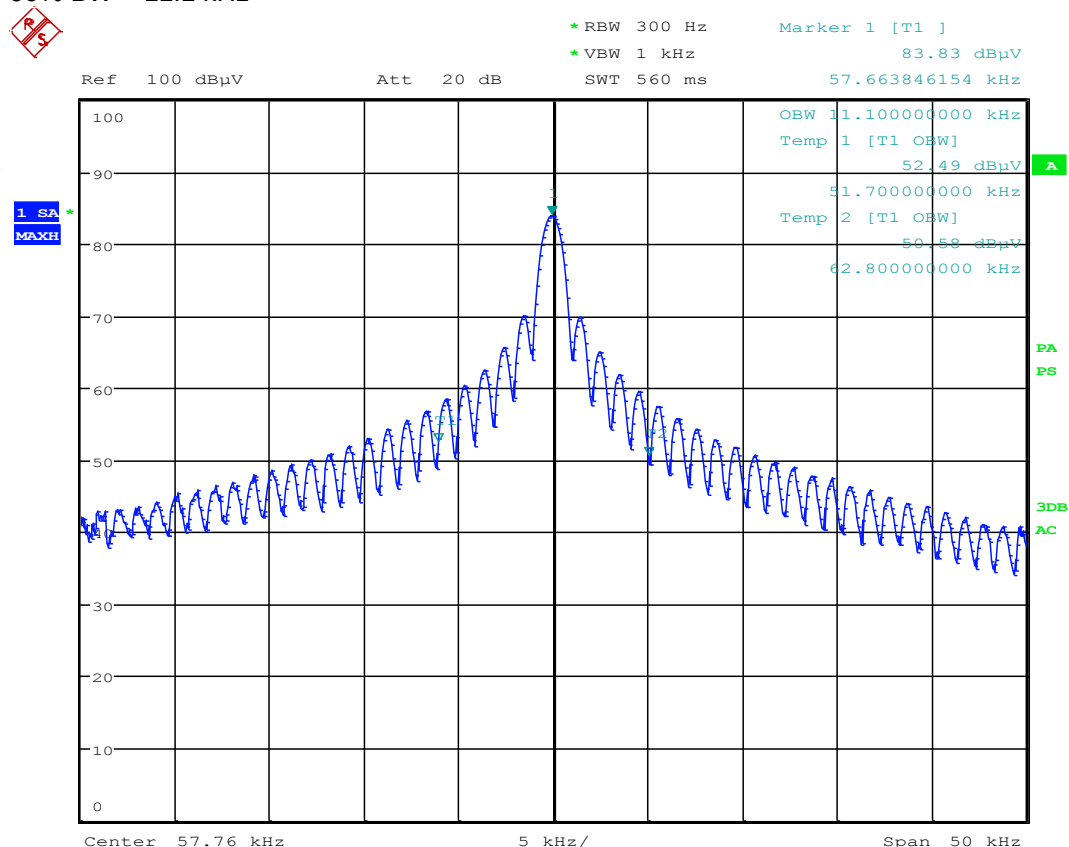
Reference: RSS GEN 6.6

8.2 Test setup details

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

8.3 Test data

99% BW = 11.1 kHz



Date: 27.JAN.2014 13:15:52

8.4 Test equipment

Equipment type	Manufacturer	Model	Inv. No.	Cal. due date
Receiver	Rohde & Schwarz	ESU 8	12866	07-2014
Loop antenna	EMCO	6502	8853	08-2015
Pulse limiter	Rohde & Schwarz	ESH3-Z2	32454	07-2014

Fulfil requirements: Yes

9 UNCERTAINTIES SUMMARY

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% ($k=2$).

Radiated disturbance, field strength, 30 MHz - 1000 MHz

30 to 300 MHz at 10 m

$\pm 4,6$ dB

200 to 1000 MHz at 10 m

$\pm 4,6$ dB

Radiated emission with loop antenna, magnetic field, 9 kHz - 30 MHz

$\pm 3,2$ dB

10 PHOTO OF THE EUT

Electronic box



Antenna



Labels on box

