Accredited testing-laboratory

DAR registration number: DAT-P-176/94-D1

Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97

Recognized by the Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: 3463A-1 (IC)
Certification ID: DE 0001
Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

Test report no.	**:**	**2-4782-01-06/07**
Type identification	**:**	**PT450**
Applicant	**:**	**AKG Acoustics GmbH**
FCC ID	**:**	**V3TPT450**
IC Certification No	**:**	**-/-**
Test standards	**:**	**47 CFR Part 74**

Table of contents

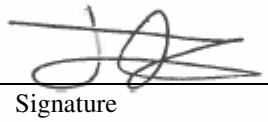
1 General information

1.1 Notes

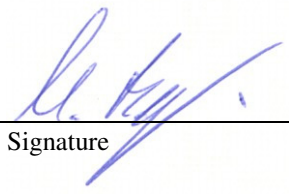
The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test laboratory manager:

2008-08-14	**Stefan Bös**	
Date	Name	Signature

2008-08-14	**Thomas Leschaeve**	
Date	Name	Signature

Technical responsibility for area of testing:

2008-08-14	**Michael Berg**	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
e-mail: info@ICT.cetecom.de
Internet: http://www.cetecom-ict.de

State of accreditation: **The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025**
DAR registration number: DAT-P-176/94-D1

Accredited by: **Federal Motor Transport Authority (KBA)**
DAR registration number: KBA-P 00070-97

Testing location, if different from CETECOM ICT Services GmbH:

Name :
Street :
Town :
Country :
Phone :
Fax :

1.3 Details of applicant

Name:	**AKG Acoustics GmbH**
Street:	**Lemböckgasse 21-25**
Town:	**1230 Wien**
Country:	**Österreich**
Telephone:	**+43-1-86654-0**
Fax:	**+43 1 86654 91350**
Contact:	**Herrn Peter Tiefenthaler**
E-mail:	**TiefenthalerP@AKG.com**
Telephone:	**+43 1 86654-1350**

1.4 Application details

Date of receipt of order:	**2008-07-04**
Date of receipt of test item:	**2008-07-14**
Date of start test:	**2008-07-14**
Date of end test:	**2008-08-08**
Persons(s) who have been present during the test:	**-/-**

2 Test standard/s:

47 CFR Part 74	**2006-10**	**Title 47 of the Code of Federal Regulations; Chapter I-Federal Communications Commission** **Experimental radio, auxiliary, special broadcast and other program distribution services**

3 Technical tests

3.1 Details of manufacturer

Name:	**AKG Acoustics GmbH**
Street:	**Lemböckgasse 21-25**
Town:	**1230 Wien**
Country:	**Österreich**

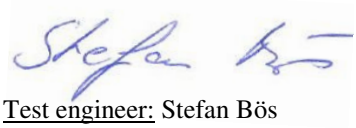
3.1.1 Test item and additional EUT information for IC Canada (appendix 2)

Kind of test item:	**Wireless Microphone System**
Type identification:	**PT450**
Open Area Test Site Industry Canada Number:	**IC 3463A-1**
S/N serial number:	**00203 (Bd. VII)** **00220 (Bd. VIII)**
HW hardware status:	**-**
SW software status:	**-**
Frequency Band [MHz]:	**500.100 MHz – 530.000 MHz** **570.000 MHz – 600.000 MHz**
Number of Channels:	**1196**
Measured Channels	
Channel 1:	**500.10 MHz**
Channel 2:	**515.00 MHz**
Channel 3:	**530.00 MHz**
Channel 4:	**570.00 MHz**
Channel 5:	**585.00 MHz**
Channel 6:	**600.00 MHz**
RF: Power [W] (max):	**Rad. EIRP: 65.3 mW**
Type of Modulation:	**FM**
Antenna Type:	**Rod antenna**
Power Supply:	**1.5 V DC by power supply / battery**
Temperature Range:	**-30 °C to +55 °C**
Occupied Bandwidth (99% BW) [kHz]:	**max. 200**
Transmitter Spurious (worst case) [dBµV]:	**48.8**
IC Registration Number:	**-**
FCC ID:	**V3TPT450**
IC Standards:	**RSS-123 Issue 1, Rev. 2 November 6, 1999**

ATTESTATION:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Test engineer: Stefan Bös Date: 2008-08-14

3.1.2 Description of the test

In this report we tested only the radiated emissions of the sample.

All tests were done in accordance with the EIA/TIA 603.
The substitution method (TIA/EIA 603) was used.
This products fulfils also the requirements for CANADA RSS-123

3.1.3 EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
Op. 0	Normal mode	Normal temperature and power source conditions
Op. 1		low temperature, low power source conditions
Op. 2		low temperature, high power source conditions
Op. 3		high temperature, low power source conditions
Op. 4		high temperature, high power source conditions

*) EUT operating mode no. is used to simplify the test plan

3.1.4 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T_{nom}	°C	**25**
Nominal Humidity	H_{nom}	%	**42**
Nominal Power Source	V_{nom}	V	**1.5**

Type of power source: **DC by power supply / battery**

Deviations from these values are reported in chapter 2

4 Summary of Measurement Results and list of all performed test cases

☒ **No deviations from the technical specifications were ascertained**

☐ There were deviations from the technical specifications ascertained

Section in this Report	Test Name	Verdict
5.1	RF Power Output	passed
5.2	Frequency Stability vs. Voltage	passed
5.3	Frequency Stability vs Temperature	passed
5.4	Characteristics of the Audio Modulation Circuitry	passed
5.5	Occupied Bandwidth	passed
5.6	Emission mask	passed
5.7	Radiated Emissions	passed
5.7.1	Plots of the measurements	passed
5.8	FCC Part 15 Subpart B	passed
5.9	Spurious Radiation Radiated	passed
5.9.1	Results of the measurements	passed
5.10	Spurious Conducted	Not applicable!
5.10.1	Results of the measurements	Not applicable!

5 Measurements and results

5.1 Output Power (radiated) FCC Rule Part 74.861 (e)(1)(ii)

Method of measurement:

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method

(a) The measurements was performed with full rf output power and modulation.

(b) Test was performed at listed 3m test site (listed with FCC, IC).

(c) The transmitter under test was placed at the specified height on a non-conducting turntable (80 cm height)

(d) The BICONILOG antenna (20 MHz to 1 GHz) or HORN antenna (1 GHz to 18 GHz) was used for measuring.

(e) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(f) Set the EMI Receiver and #2 as follows:
Centre Frequency: test frequency
Resolution BW: 100 kHz
Video BW: same
Detector Mode: positive
Average: off
Span: 3 x the signal bandwidth

(g) The test antenna was lowered or raised from 1 to 4 meters until the maximum signal level was detected.

(h) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.

(i) The test antenna was lowered or raised again from 1 to 4 meters until a maximum was obtained. This level was recorded.

(j) The recorded reading was corrected to the true field strength level by adding the antenna factor, cable loss and subtracting the pre-amplifier gain.

(k) The above steps were repeated with both transmitters' antenna and test receiving antenna placed in vertical and horizontal polarization. Both readings with the antennas placed in vertical and horizontal polarization shall be recorded.

(l) Repeat for all different test signal frequencies

Measuring the EIRP of Spurious/Harmonic Emissions using Substitution Method:

(a) Set the EMI Receiver (for measuring E-Field) and Receiver #2 (for measuring EIRP) as follows:

Centre Frequency	: equal to the signal source
Resolution BW	: 10 kHz
Video BW	: same
Detector Mode	: positive
Average	: off
Span	: 3 x the signal bandwidth

(b) Load an appropriate correction factors file in EMI Receiver for correcting the field strength reading level
Total Correction Factor recorded in the EMI Receiver = Cable Loss + Antenna Factor
E (dBuV/m) = Reading (dBuV) + Total Correction Factor (dB/m)

(c) Select the frequency and E-field levels for ERP/EIRP measurements.

(d) Substitute the EUT by a signal generator and one of the following transmitting antennas (substitution antenna):
.DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz}.

(e) Mount the transmitting antenna at 1.5 meter high from the ground plane.

(f) Use one of the following antenna as a receiving antenna: .DIPOLE antenna for frequency from 30-1000 MHz or .HORN antenna for frequency above 1 GHz }.

(g) If the DIPOLE antenna is used, tune its elements to the frequency as specified in the calibration manual.

(h) Adjust both transmitting and receiving antenna in a VERTICAL polarization.

(i) Tune the EMI Receivers to the test frequency.
(j) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(k) The transmitter was rotated through 360 o about a vertical axis until a higher maximum signal was received.

(l) Lower or raise the test antenna from 1 to 4 meters until the maximum signal level was detected.

(m) Adjust input signal to the substitution antenna until an equal or a known related level to that detected from the transmitter was obtained in the test receiver.

(n) Record the power level read from the Average Power Meter and calculates the ERP/EIRP as follows:
P = P1 - L1 = (P2 + L2) – L1 = P3 + A + L2 - L1
EIRP = P + G1 = P3 + L2 - L1 + A + G1
ERP = EIRP – 2.15 dB
Total Correction factor in EMI Receiver # 2 = L2 – L1 + G1
Where: P: Actual RF Power fed into the substitution antenna port after corrected.
P1: Power output from the signal generator
P2: Power measured at attenuator A input
P3: Power reading on the Average Power Meter
EIRP: EIRP after correction
ERP: ERP after correction

(o) Adjust both transmitting and receiving antenna in a HORIZONTAL polarization, then repeat step (k) to (o)

(p) Repeat step (d) to (o) for different test frequency

(q) Repeat steps (c) to (j) with the substitution antenna oriented in horizontal polarization.

(r) Actual gain of the EUT's antenna is the difference of the measured EIRP and measured RF power at the RF port. Correct the antenna gain if necessary.

Results:

TEST CONDITIONS		TRANSMITTER ERP (dBm)					
Frequency (MHz)		500.10 MHz	515.00 MHz	530.00 MHz	570.00 MHz	585.00 MHz	600.00 MHz
T_{nom} °C	V_{nom} V	17.27	17.60	16.64	16.90	**18.15**	17.34
Measurement uncertainty		±0.5dB					

Sample calculation:

Freg.	SA Reading	SG Setting	Ant. gain	Dipol gain	Cable loss	ERP Result	ERP Result		
MHz	dBµV	dBm	dBi	dBi	dB	dBm	mW		
758.0	108.5	13.9	-	0.0	2.9	11.0	12.6		

ERP = SG (dBm) - Cable Loss (dB) + Ant. gain (dBi)

LIMIT **FCC Rule Part 74.861**

Frequency range MHz	Power level
54-72, 76-88, 174-216	50 mW / 16.99 dBm
470-608, 614-806	250 mW / 23.98 dBm

5.2 AFC Frequency Error vs. Voltage FCC Rule Part 74.861

Method of measurement:

The EUT was fixed in test fixture to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by means of a spectrum analyzer.

The input voltage was varied in a range from 85 % to 115% and the maximum change in frequency was noted within one minute.

500.1 MHz

Voltage (V)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
1.275	-4.6	-0.00092	-9.2
1.5	-2.8	-0.00056	-5.6
1.725	-4.1	-0.00082	-8.2

515.0 MHz

Voltage (V)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
1.275	-3.8	-0.00074	-7.4
1.5	-3.5	-0.00068	-6.8
1.725	-3.8	-0.00074	-7.4

530.0 MHz

Voltage (V)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
1.275	-4.2	-0.00079	-7.9
1.5	-3.0	-0.00057	-5.7
1.725	-3.3	-0.00062	-6.2

570.0 MHz

Voltage (V)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
1.275	-5.9	-0.00104	-10.4
1.5	-5.2	-0.00091	-9.1
1.725	-6.7	-0.00118	-11.8

585.0 MHz

Voltage (V)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
1.275	-6.3	-0.00108	-10.8
1.5	-4.2	-0.00072	-7.2
1.725	-6.3	-0.00108	-10.8

600.0 MHz

Voltage (V)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
1.275	-5.2	-0.00087	-8.7
1.5	-4.7	-0.00078	-7.8
1.725	-5.3	-0.00088	-8.8

LIMIT **FCC Rule Part 74.861(4)**

The frequency tolerance of the transmitter shall be 0.005 percent

5.3 AFC Frequency Error vs. Temperature FCC Rule Part 74.861

Method of measurement:

The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the un-modulated carrier was measured by means of a spectrum analyzer. With all power removed, the temperature was decreased to –30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency error was noted within one minute. The temperature tests were performed for each frequency range on one channel.

500.1 MHz

TEMPERATURE (°C)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
-30	-5.0	-0.00100	-10.0
-20	-4.8	-0.00096	-9.6
-10	-3.5	-0.00070	-7.0
±0.0	-3.3	-0.00066	-6.6
+10	-2.9	-0.00058	-5.8
+20	-2.8	-0.00056	-5.6
+30	-3.0	-0.00060	-6.0
+40	-3.5	-0.00070	-7.0
+50	-4.3	-0.00086	-8.6

515.0 MHz

TEMPERATURE (°C)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
-30	-6.1	-0.00118	-11.8
-20	-4.9	-0.00095	-9.5
-10	-5.1	-0.00099	-9.9
±0,0	-4.4	-0.00085	-8.5
+10	-2.7	-0.00052	-5.2
+20	-3.5	-0.00068	-6.8
+30	-2.7	-0.00052	-5.2
+40	-3.8	-0.00074	-7.4
+50	-4.0	-0.00078	-7.8

530.0 MHz

TEMPERATURE (°C)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
-30	-6.0	-0.00113	-11.3
-20	-5.4	-0.00102	-10.2
-10	-3.8	-0.00072	-7.2
±0,0	-3.2	-0.00060	-6.0
+10	-2.8	-0.00053	-5.3
+20	-3.0	-0.00057	-5.7
+30	-2.6	-0.00049	-4.9
+40	-3.6	-0.00068	-6.8
+50	-3.2	-0.00060	-6.0

570.0 MHz

TEMPERATURE (°C)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
-30	-8.3	-0.00146	-14.6
-20	-7.0	-0.00123	-12.3
-10	-5.6	-0.00098	-9.8
±0.0	-4.9	-0.00086	-8.6
+10	-5.1	-0.00089	-8.9
+20	-5.2	-0.00091	-9.1
+30	-5.1	-0.00089	-8.9
+40	-5.8	-0.00102	-10.2
+50	-6.4	-0.00112	-11.2

585.0 MHz

TEMPERATURE (°C)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
-30	-6.2	-0.00106	-10.6
-20	-6.5	-0.00111	-11.1
-10	-4.0	-0.00068	-6.8
±0.0	-3.4	-0.00058	-5.8
+10	-3.8	-0.00065	-6.5
+20	-4.2	-0.00072	-7.2
+30	-6.9	-0.00118	-11.8
+40	-6.3	-0.00108	-10.8
+50	-6.0	-0.00103	-10.3

600.0 MHz

TEMPERATURE (°C)	Frequency Error (kHz)	Frequency Error (%)	Frequency Error (ppm)
-30	-6.5	-0.00108	-10.8
-20	-5.5	-0.00092	-9.2
-10	-5.5	-0.00092	-9.2
±0.0	-5.7	-0.00095	-9.5
+10	-5.3	-0.00088	-8.8
+20	-4.7	-0.00078	-7.8
+30	-3.9	-0.00065	-6.5
+40	-7.5	-0.00125	-12.5
+50	-8.3	-0.00138	-13.8

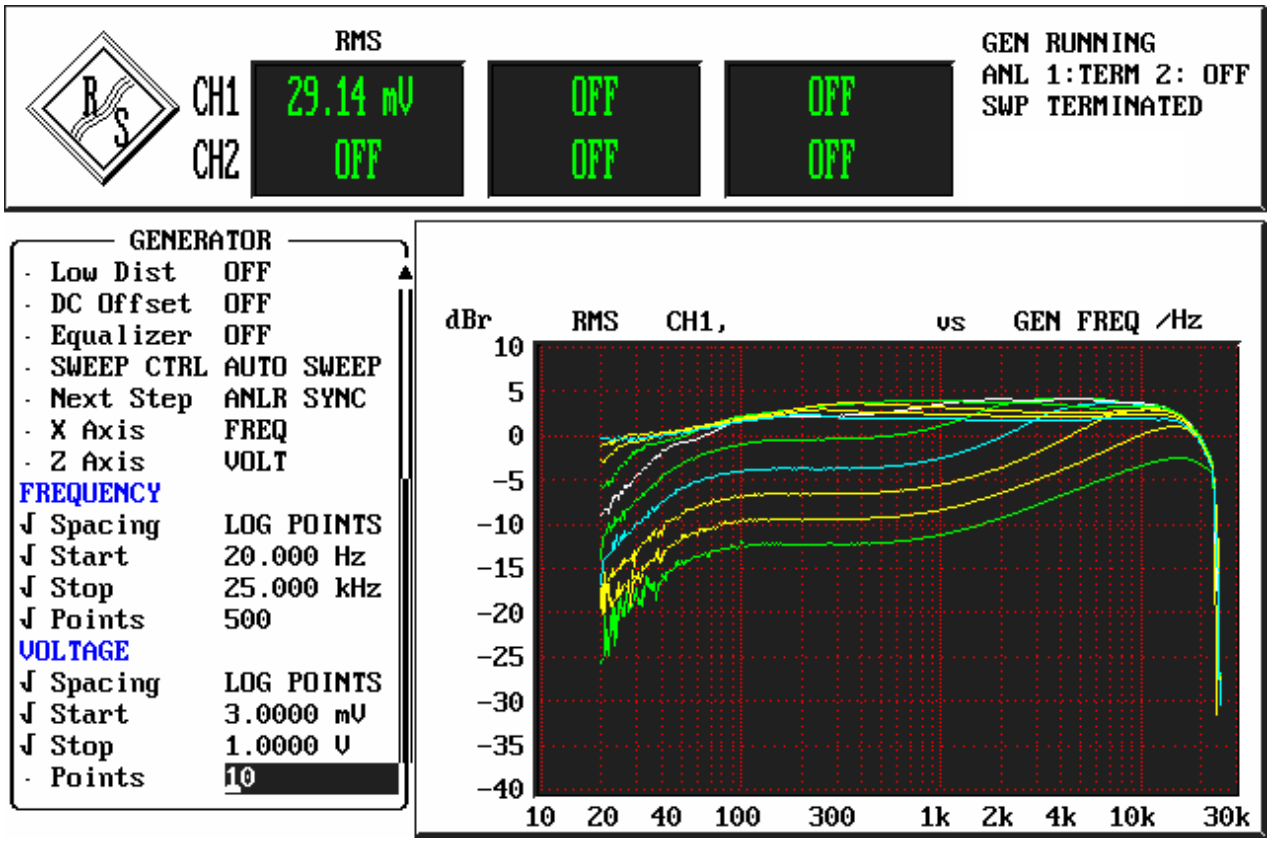
LIMIT **FCC Rule Part 74.861**

The frequency tolerance of the transmitter shall be 0.005 percent

5.4 Characteristics of the Audio Modulation Circuitry FCC Rule Part 74 .861(e3)

Method of measurement:

The audio frequency responds was measured in accordance with EIA/TIA 603.
The plots shows 10 curves with different modulation levels, starting from 3.0mV to 1000 mV (30%+20 dB Modulation), the frequency is varied from 20 Hz to 25 kHz.



Max. measured frequency deviation : 64.1 kHz

This measurement is valid for all channels

Limit: max Deviation ±75kHz

5.5 Occupied Bandwidth FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049

Test method:

The audio frequency responds was measured in accordance with EIA/TIA 603.

Data in the plots show that all sidebands between 50 & 100% for the authorized bandwidth are attenuated by at least 25dB. From 100 to 250% of the authorize3d bandwidth they are attenuated by at least 35dB and beyond 250% 43 log(Po) dB. The plot shows the transmitter modulated with 15000 Hz (the highest modulation frequency), adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the un-modulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth plots follow.

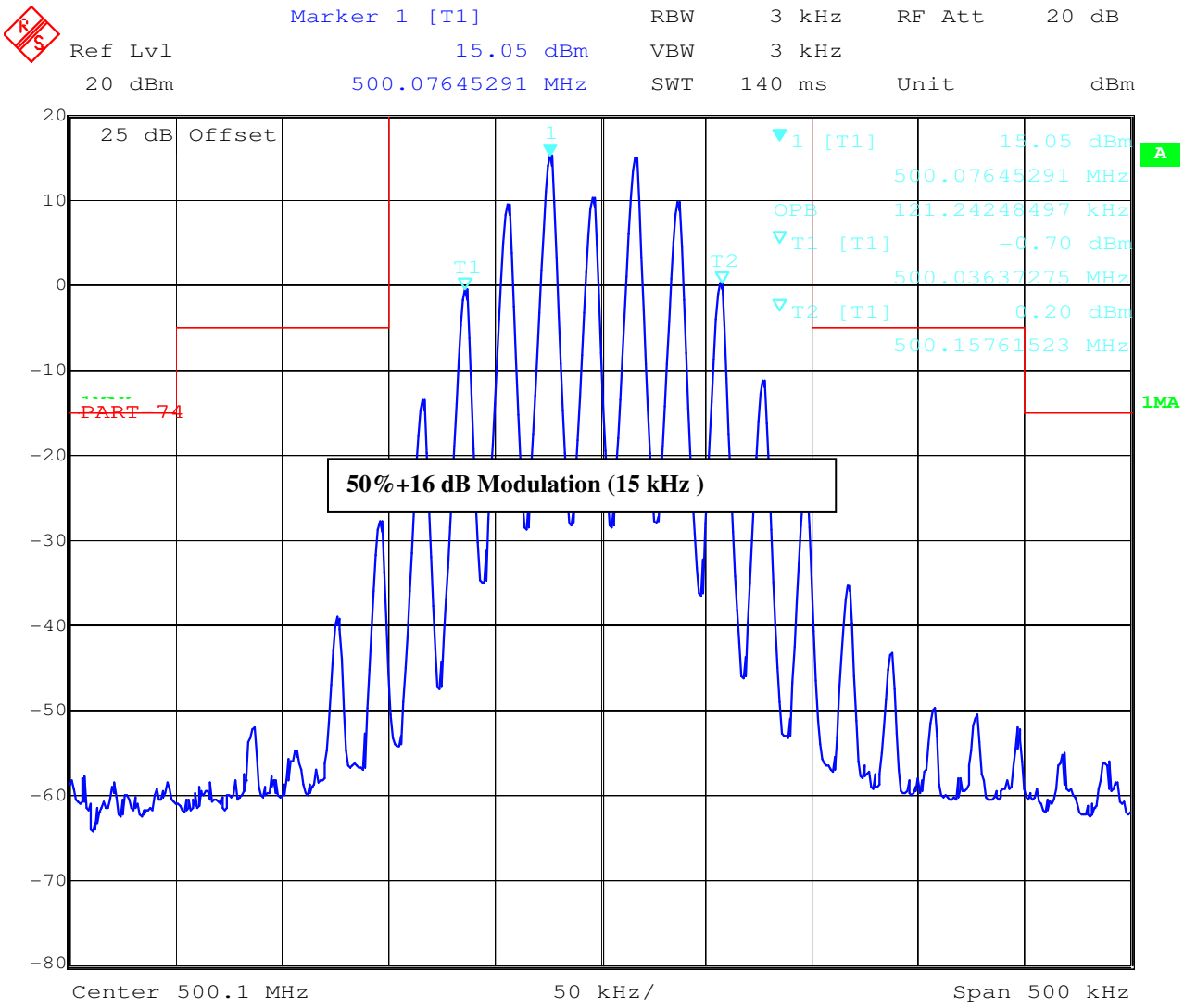
TEST CONDITIONS		OCCUPIED BANDWIDTH (kHz)					
Frequency (MHz)		**MHz**	**MHz**	**MHz**	**MHz**	**MHz**	**MHz**
T_{nom} °C	V_{nom} V	121.2	123.2	126.0	124.2	125.3	**128.2**
max. Deviation (FM)		64.1 kHz					
Measurement uncertainty		±0.5%					

Limits **FCC Rule Part 74.861(e)(5)**

The operating bandwidth shall not exceed 200 kHz

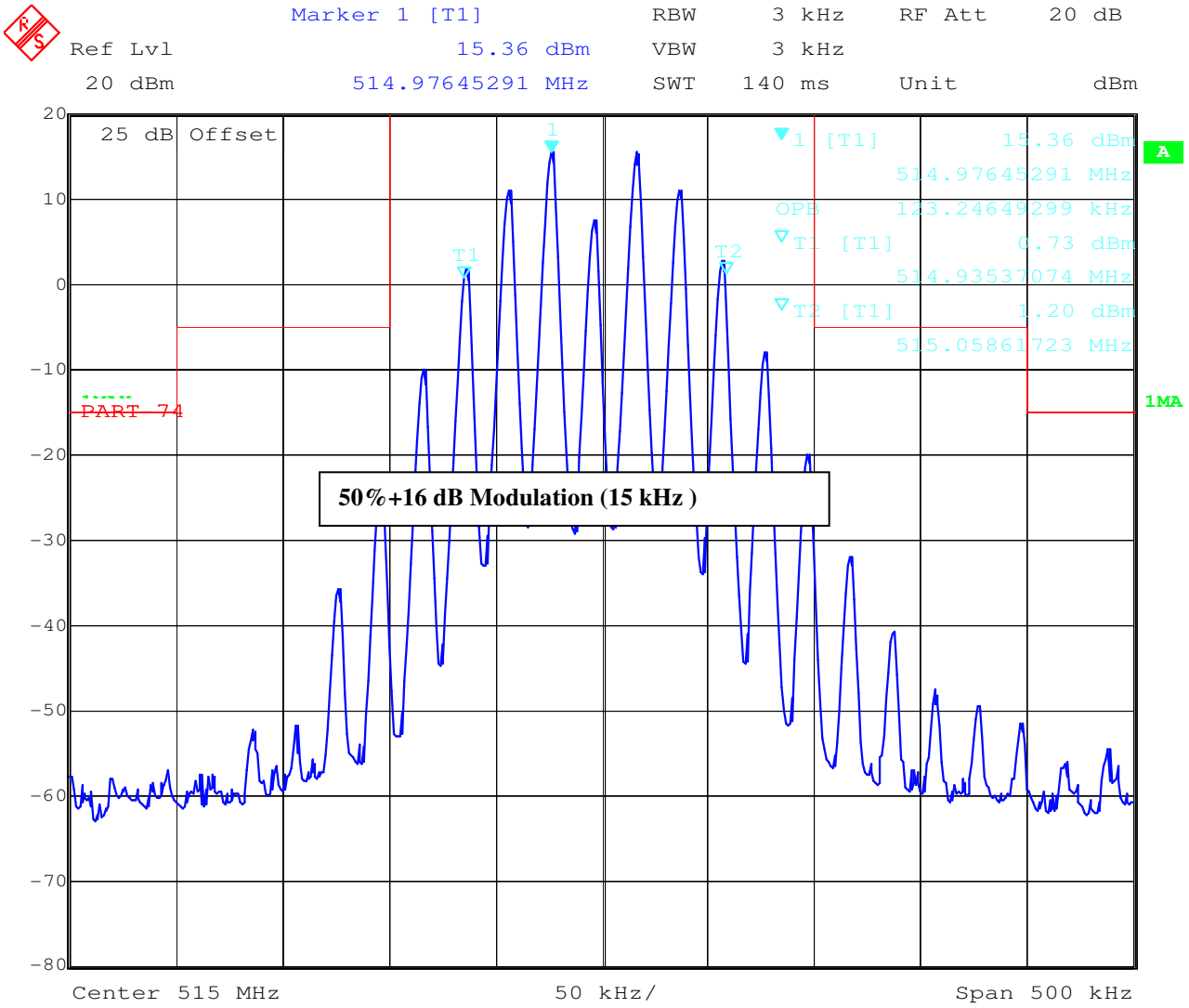
OCCUPIED BANDWIDTH **FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.989**

Frequency: 500.1 MHz / max. deviation: ± 60.6 kHz (Limit ± 75 kHz)



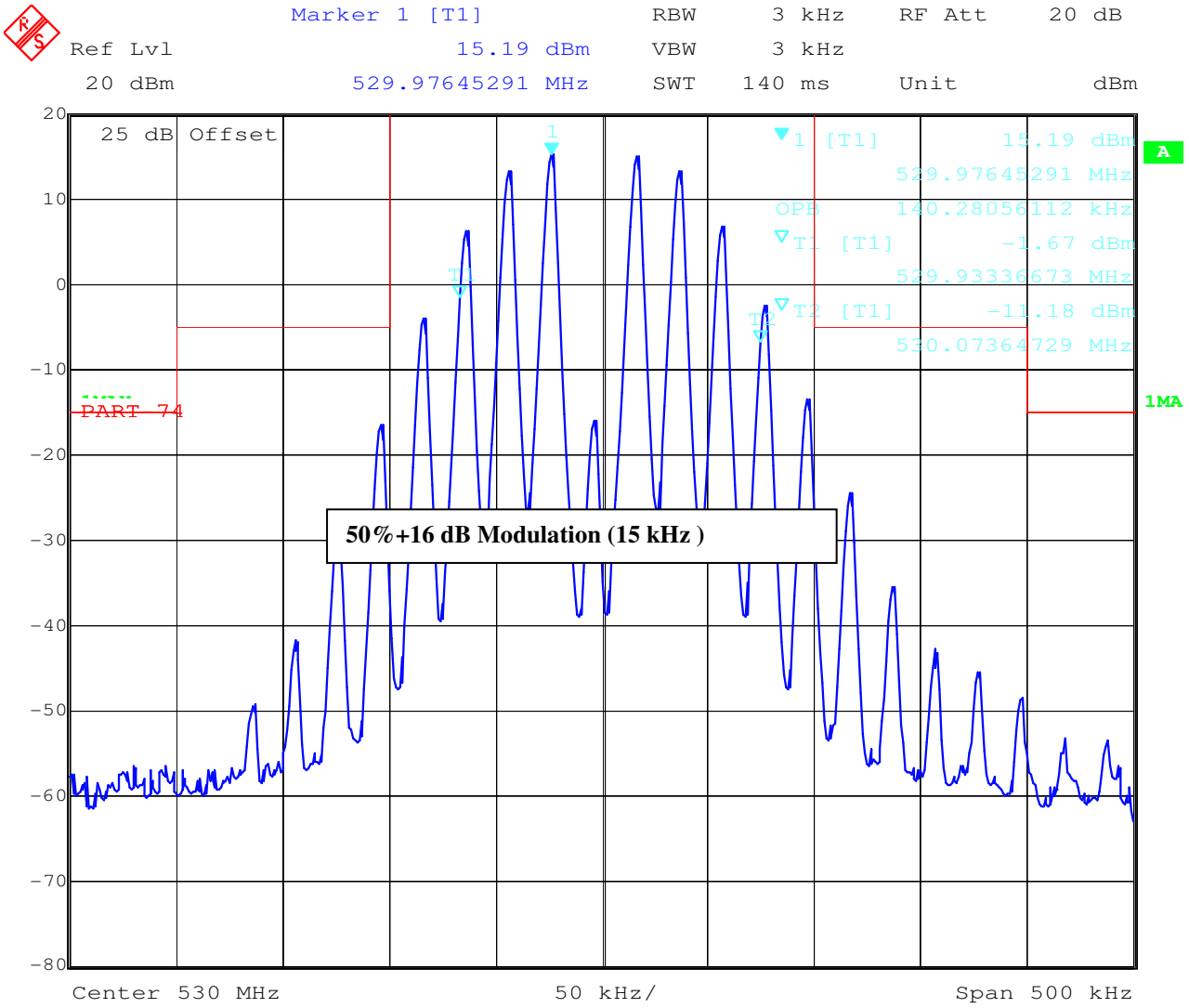
OCCUPIED BANDWIDTH **FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049**

Frequency: 515 MHz / max. deviation : ± 61.6 kHz (Limit ± 75 kHz)



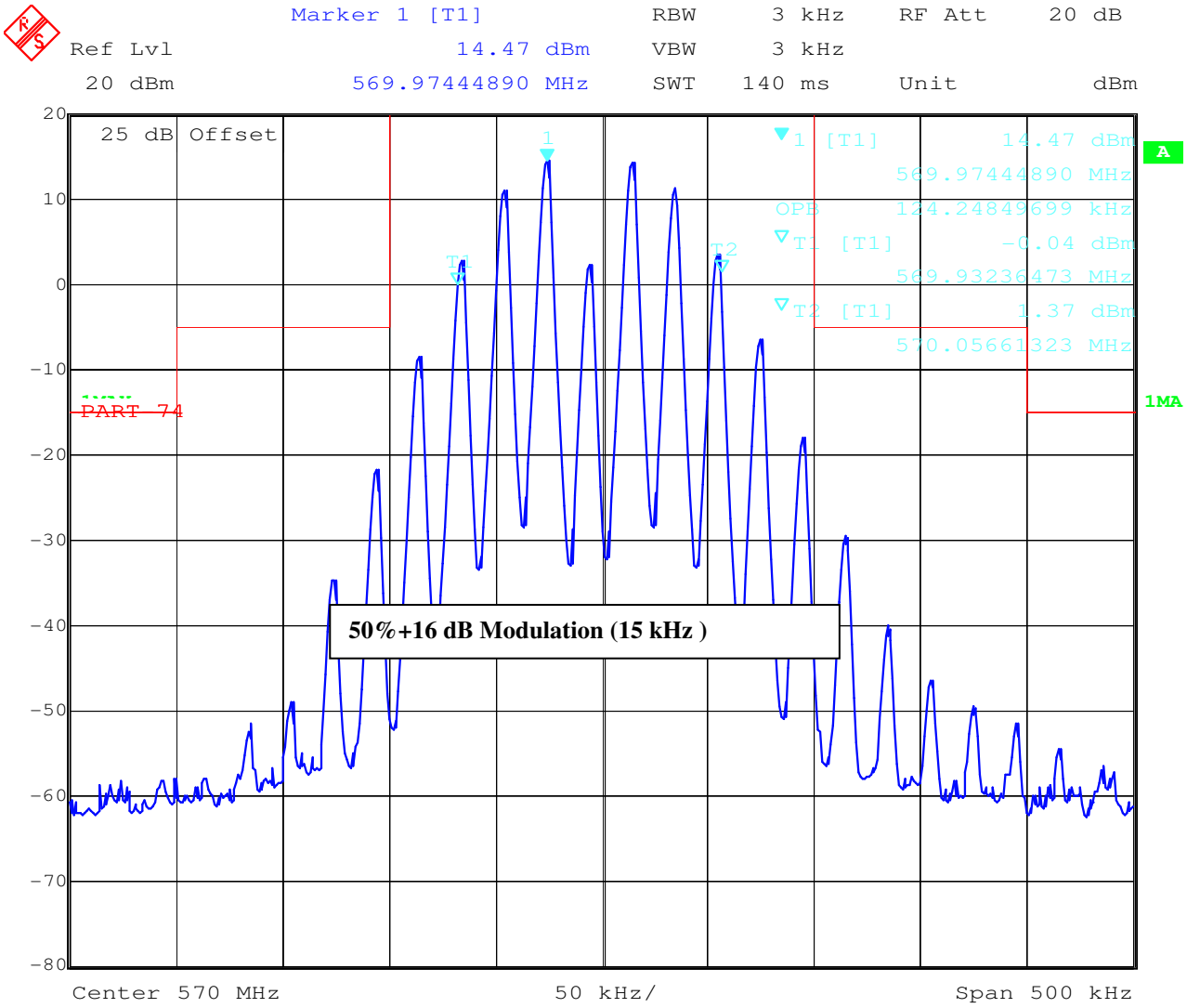
OCCUPIED BANDWIDTH **FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049**

Frequency: 530 MHz / max. deviation : ± 63.0 kHz (Limit ± 75 kHz)



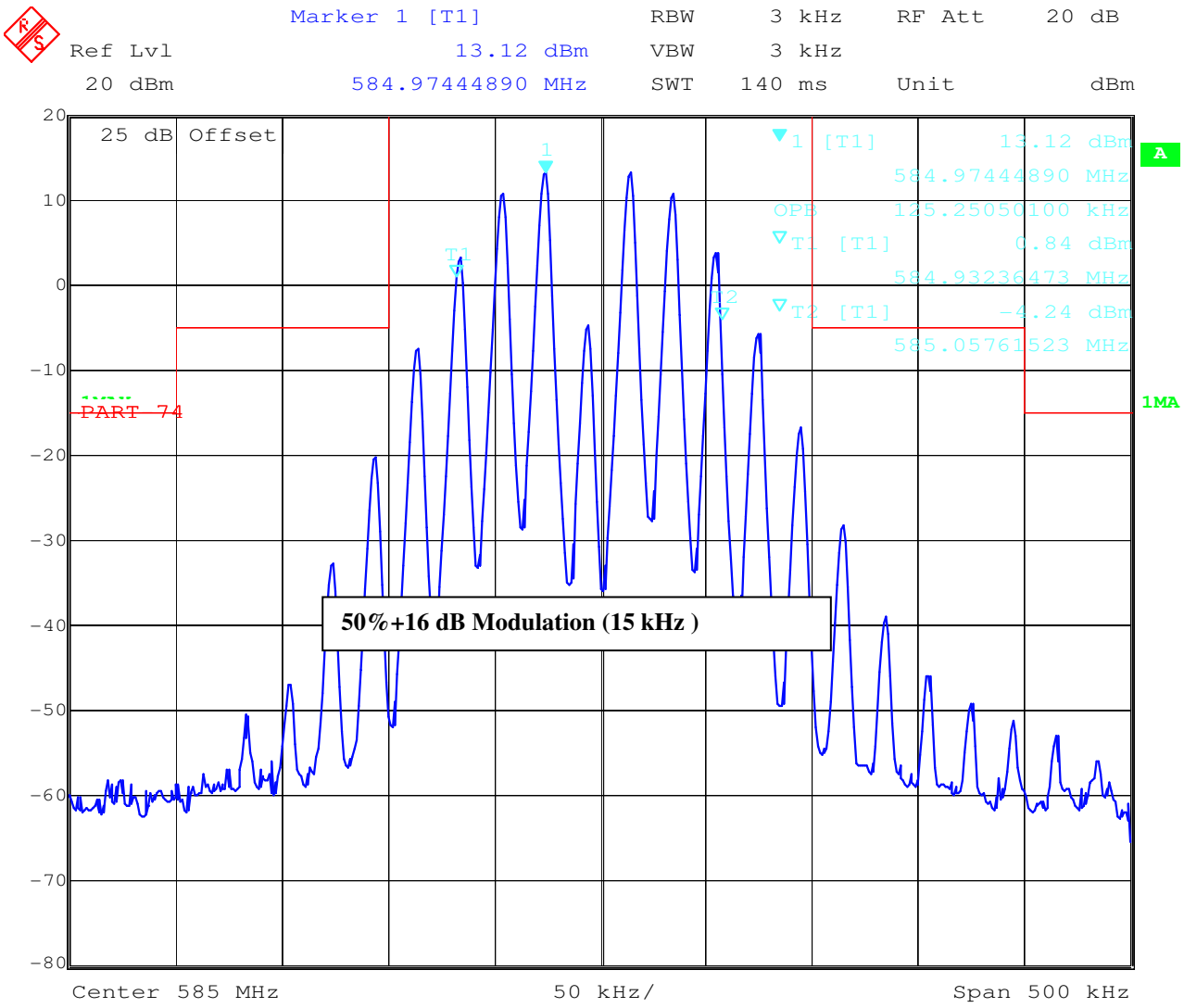
OCCUPIED BANDWIDTH **FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.989**

Frequency: 570 MHz / max. deviation : ± 62.1 kHz (Limit ± 75 kHz)



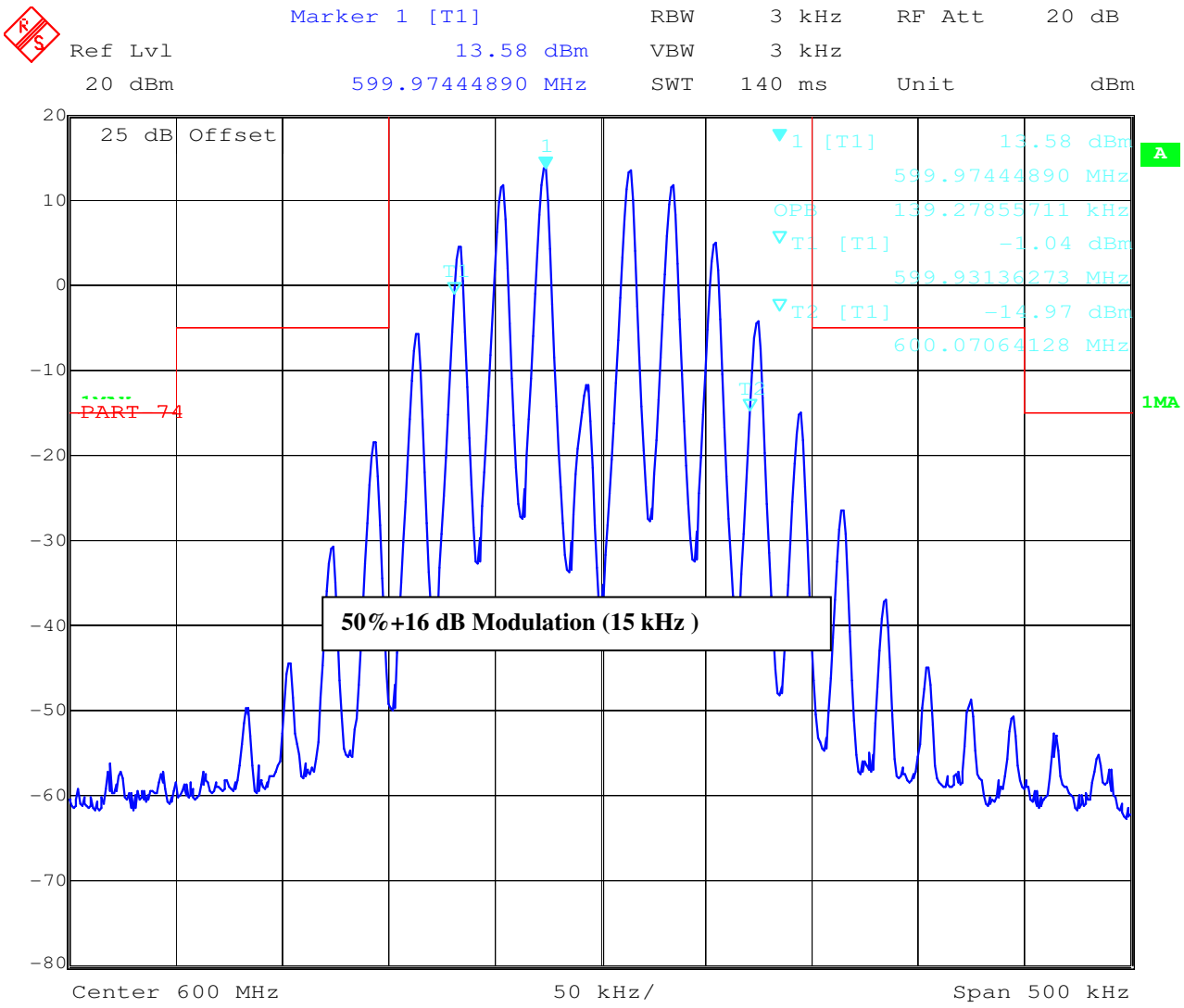
OCCUPIED BANDWIDTH **FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049**

Frequency: 585 MHz / max. deviation : ± 62.6 kHz (Limit ± 75 kHz)



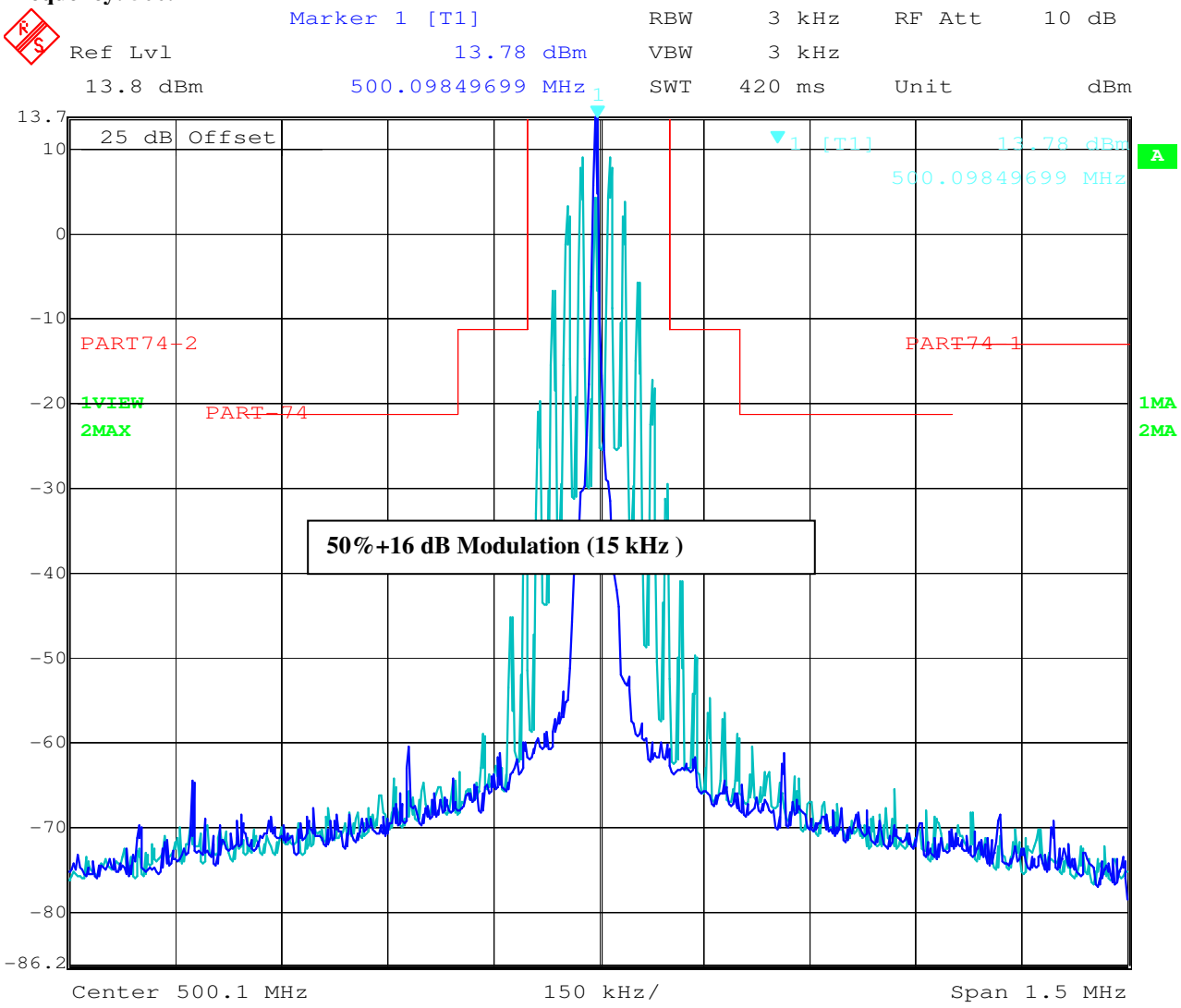
OCCUPIED BANDWIDTH **FCC Rule Part 74.861(e)(3), (5)/ Sec. 2.1049**

Frequency: 600 MHz / max. deviation : ± 64.1 kHz (Limit ± 75 kHz)



5.6 Emission mask FCC 74 861(e)(6)

Frequency: 500.1 MHz

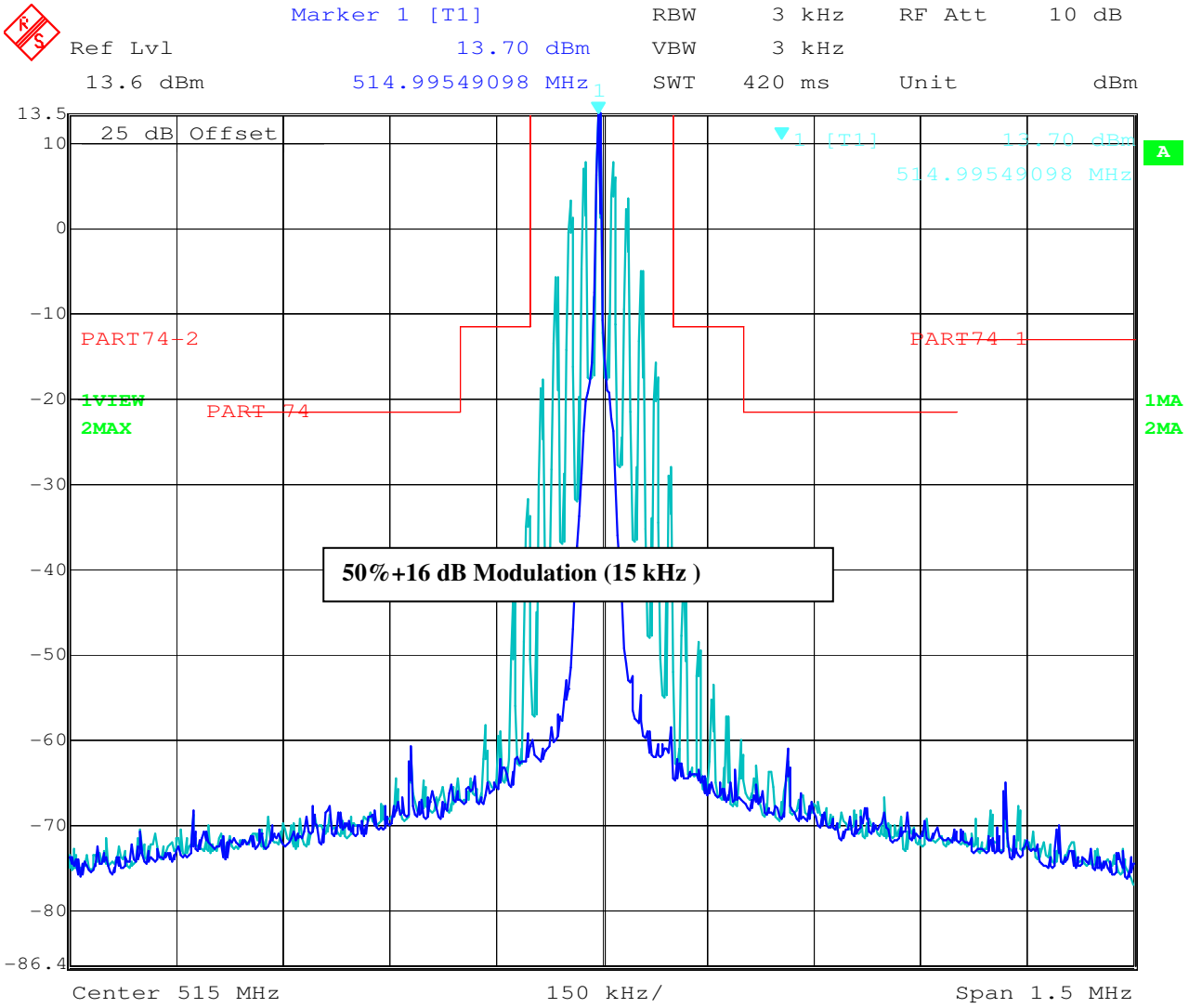


Limits **FCC Rule Part 74.861(e)(6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$(mean output power in watts) dB below the mean output power

Emission mask **FCC 74 861(e)(6)**

Frequency: 515 MHz

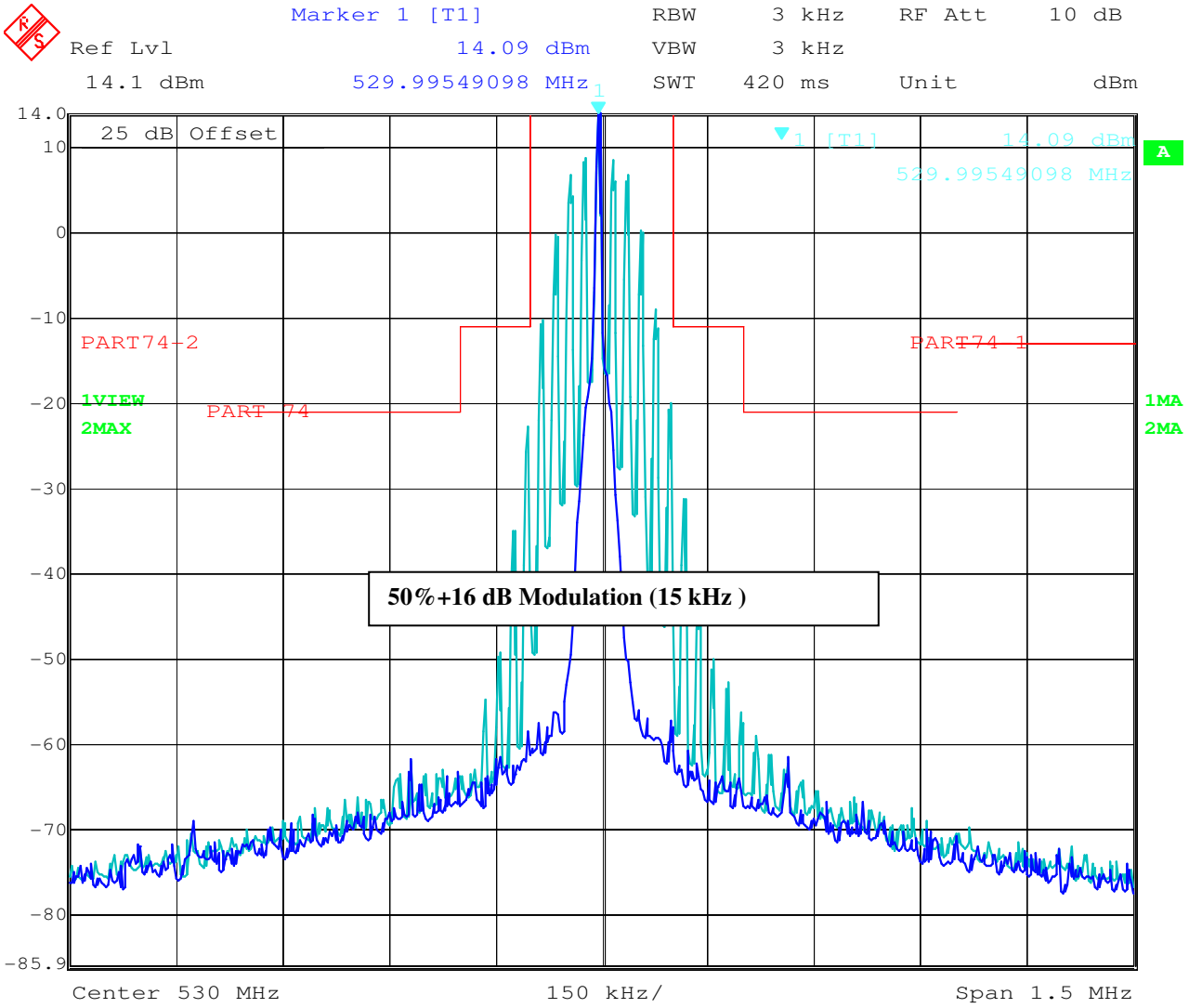


Limits **FCC Rule Part 74.861(e)(6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$(mean output power in watts) dB below the mean output power

Emission mask **FCC 74 861(e)(6)**

Frequency: 530 MHz

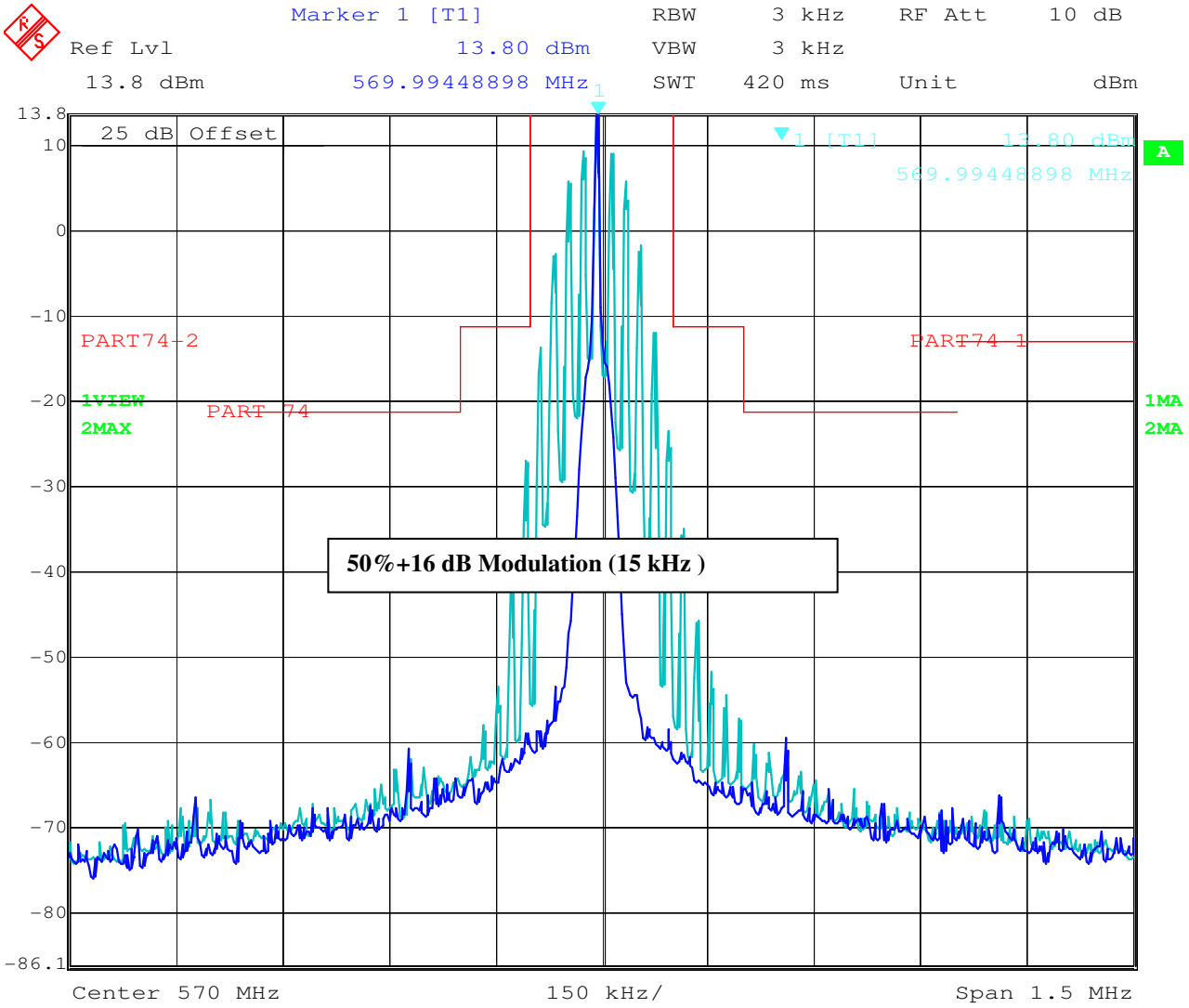


Limits **FCC Rule Part 74.861(e)(6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$(mean output power in watts) dB below the mean output power

Emission mask **FCC 74 861(e)(6)**

Frequency: 570 MHz

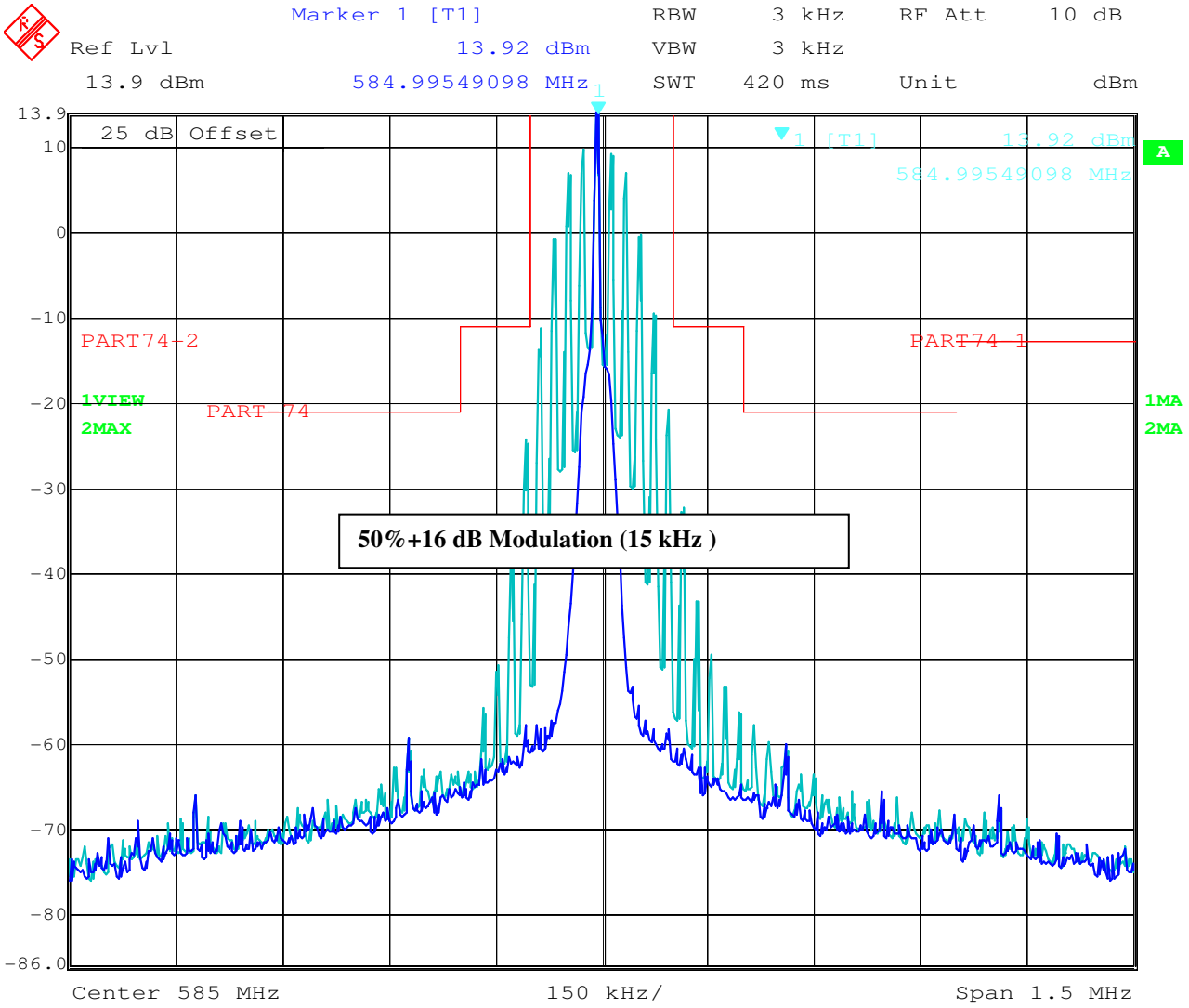


Limits **FCC Rule Part 74.861(e)(6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$(mean output power in watts) dB below the mean output power

Emission mask **FCC 74 861(e)(6)**

Frequency: 585 MHz

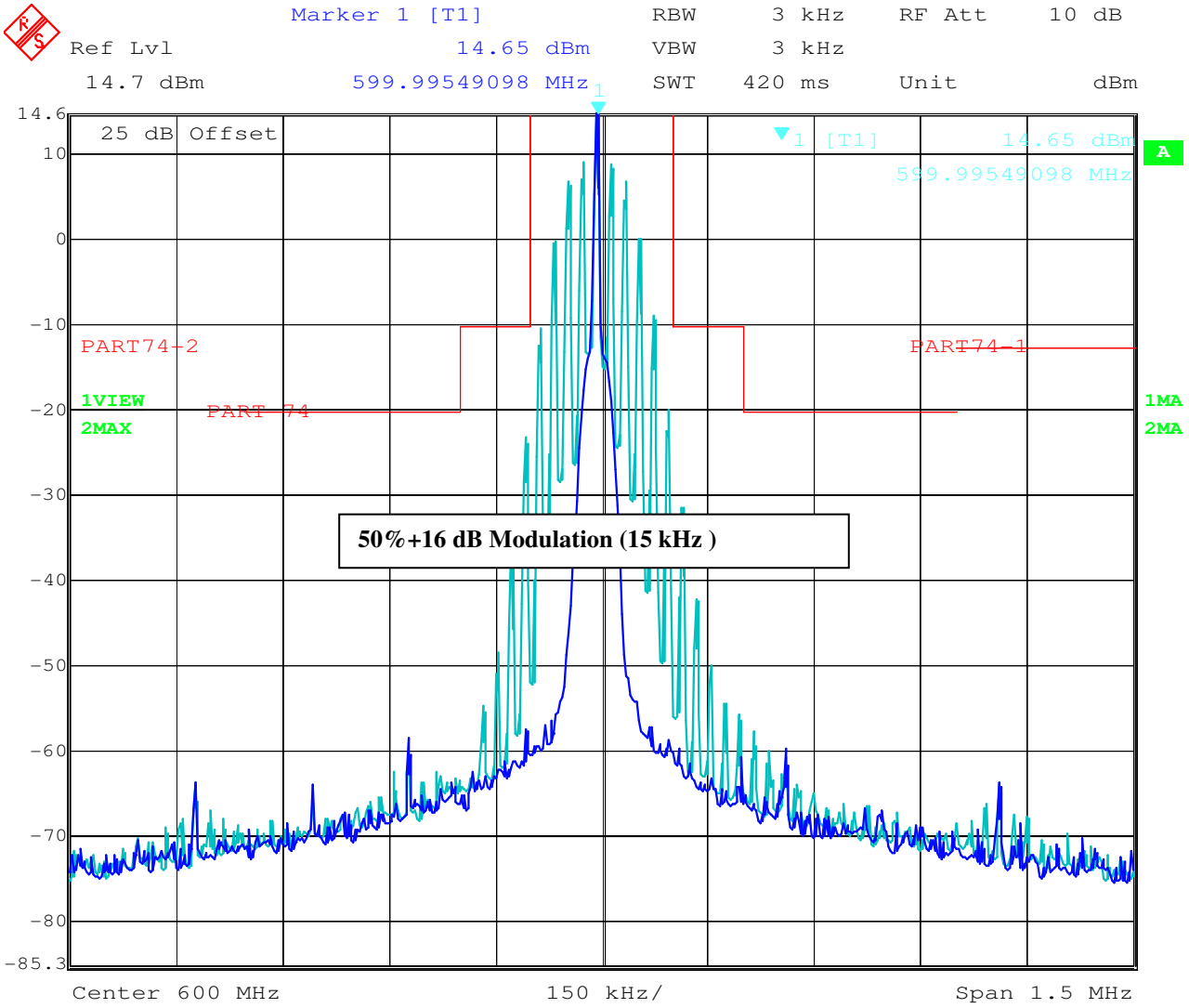


Limits **FCC Rule Part 74.861(e)(6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$(mean output power in watts) dB below the mean output power

Emission mask **FCC 74 861(e)(6)**

Frequency: 600 MHz



Limits **FCC Rule Part 74.861(e)(6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$(mean output power in watts) dB below the mean output power

5.7 Radiated Emissions FCC Rule Part 74 subpart H

Test procedure

1). on a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.

2). the test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the frequency of the transmitter.

3). the output of the test antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.

4). the transmitter shall be switched on, if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.

5). the test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.

6). the transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7). the test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.

8). the maximum signal level detected by the measuring receiver shall be noted.

9). the transmitter shall be replaced by a substitution antenna (tuned dipole for f less than 1GHz and horn for frequency higher than 1GHz).

10). the substitution antenna shall be oriented for vertical polarization and the length (if a dipole antenna is used) of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.

11). the substitution antenna shall be connected to a calibrated signal generator.

12). If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

13). the test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

14). the input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.

15). the input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.

16). the measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

17). the measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

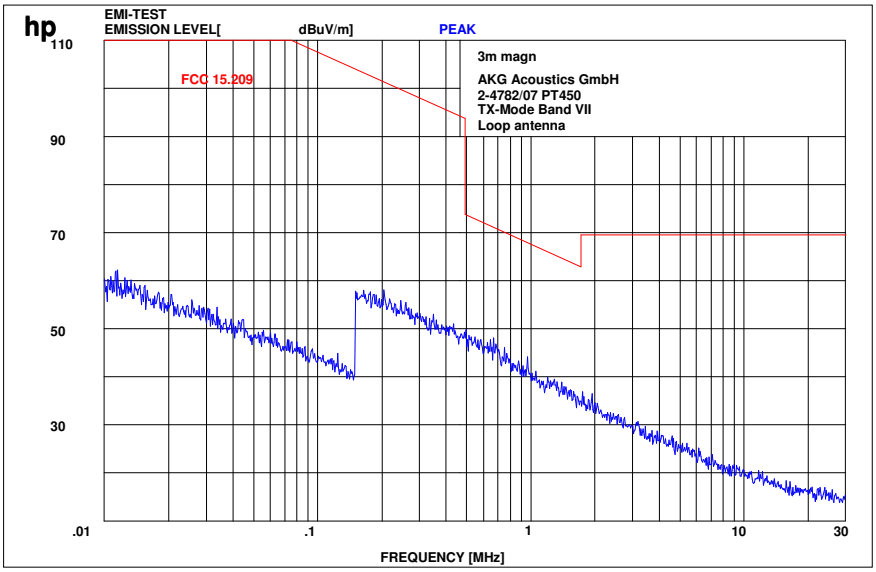
18). Repeat above substitution measurement procedure for fundamental and all harmonica emissions.

5.7.1 Plots of the measurements

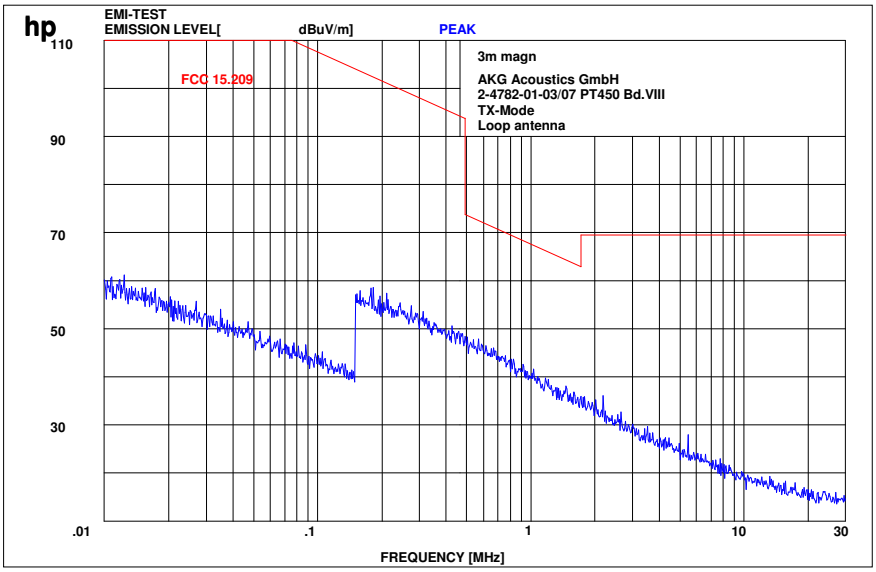
RADIATED EMISSIONS FCC Rule Part 74 subpart H

Part 15.209 Magnetics

Plot 1: 0.01 – 30 MHz, magnetic, Band VII

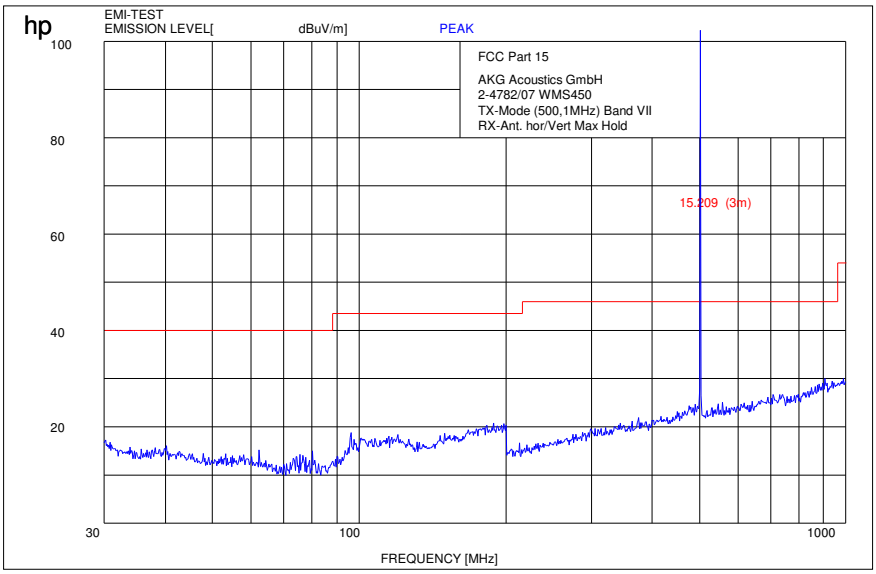


Plot 2: 0.01 – 30 MHz, magnetic, Band VIII

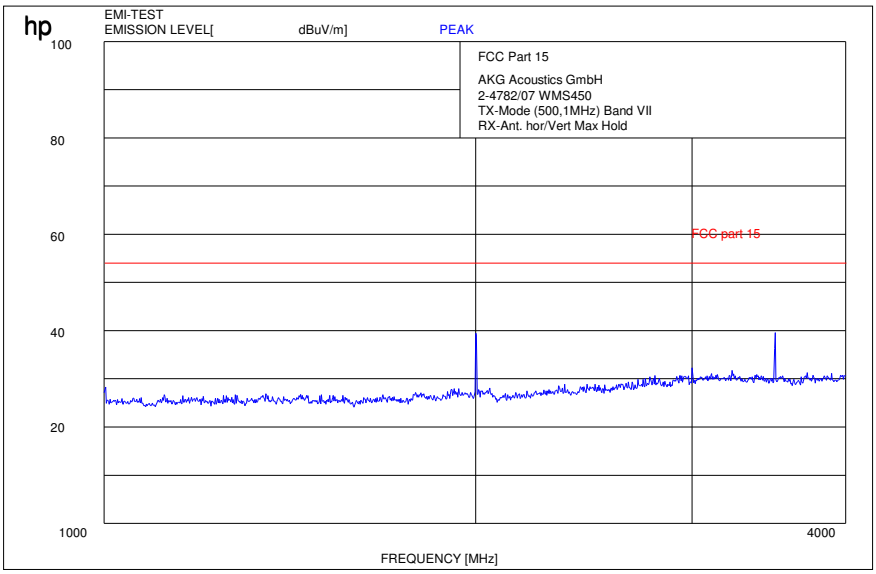


RADIATED EMISSIONS FCC Rule Part 74 subpart H

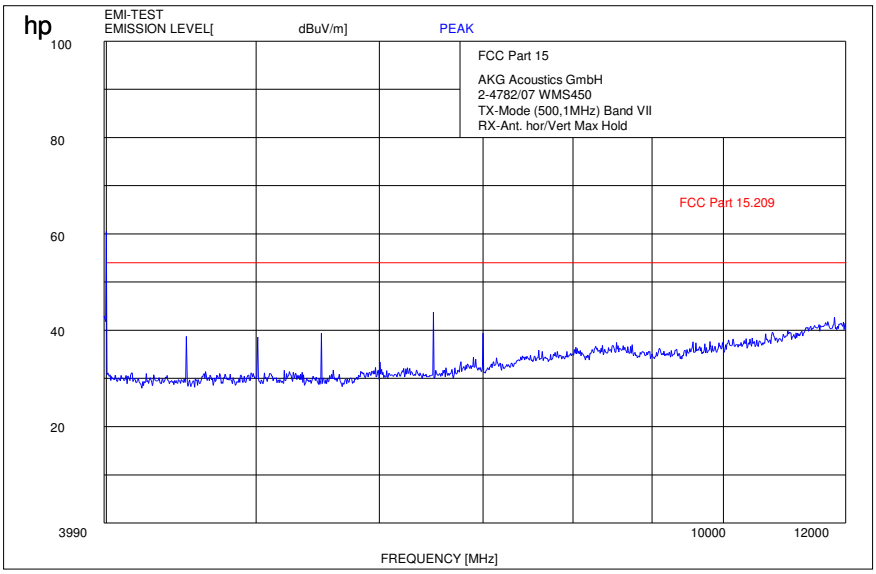
Plot 1: 30 MHz – 1GHz, Band VII, low channel 500.10 MHz



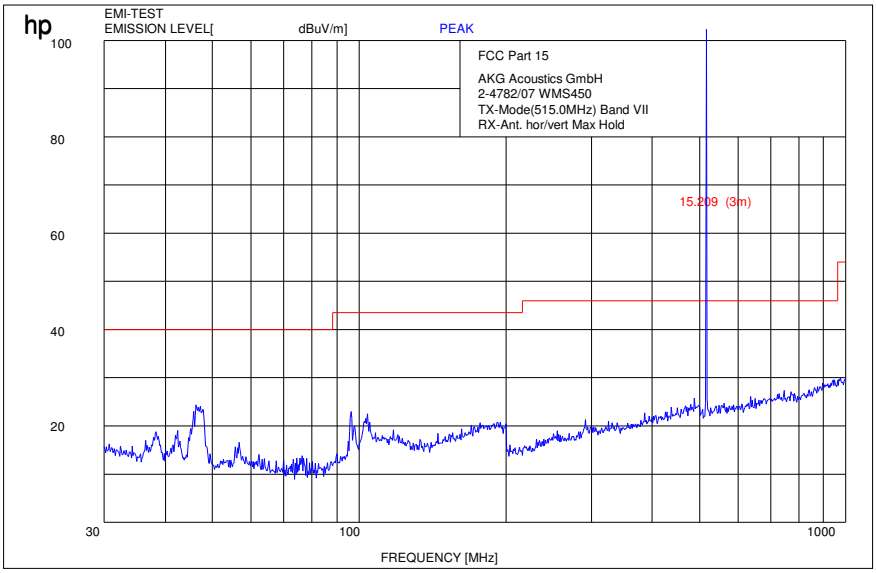
Plot 2: 1 GHz – 4GHz, Band VII, low channel 500.10 MHz



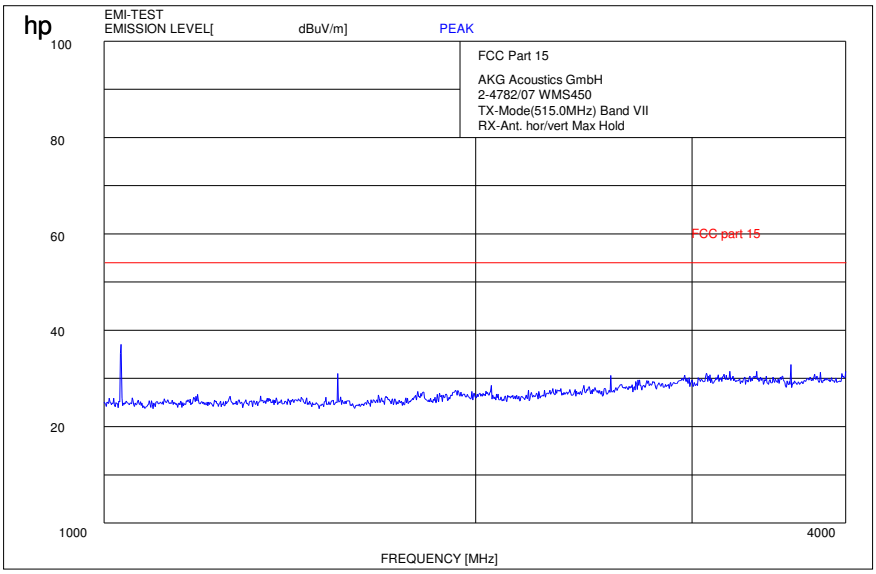
Plot 3: 4 GHz – 12 GHz, Band VII, low channel 500.10 MHz



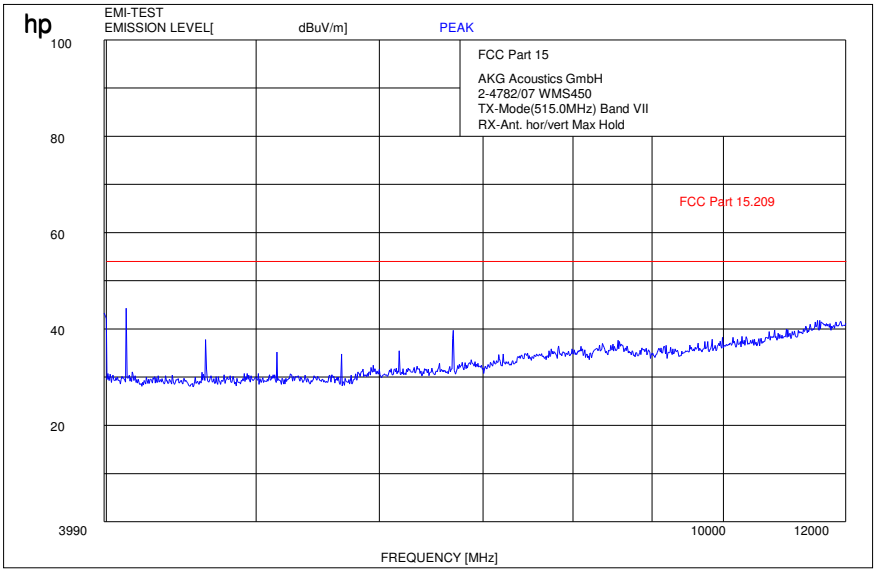
Plot 4: 30 MHz – 1GHz, Band VII, mid channel 515.00 MHz



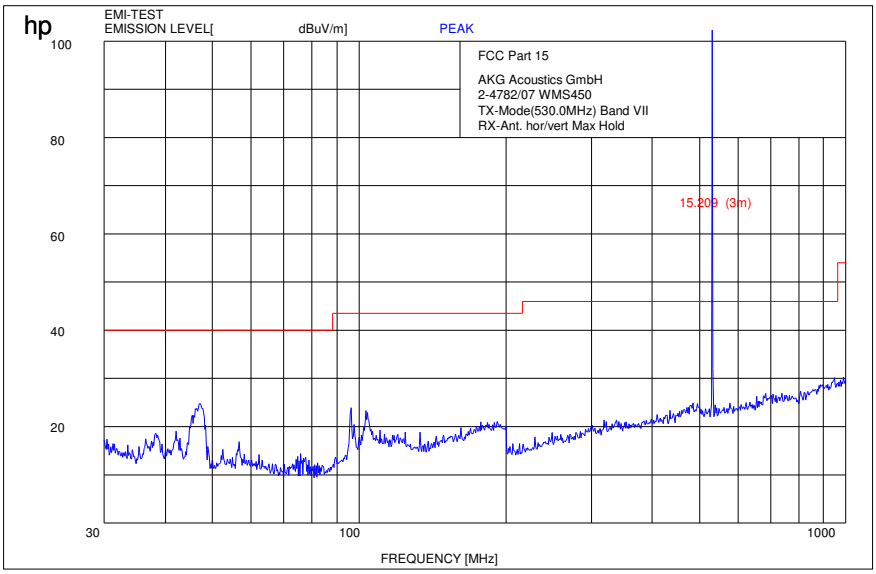
Plot 5: 1 GHz – 4GHz, Band VII, mid channel 515.00 MHz



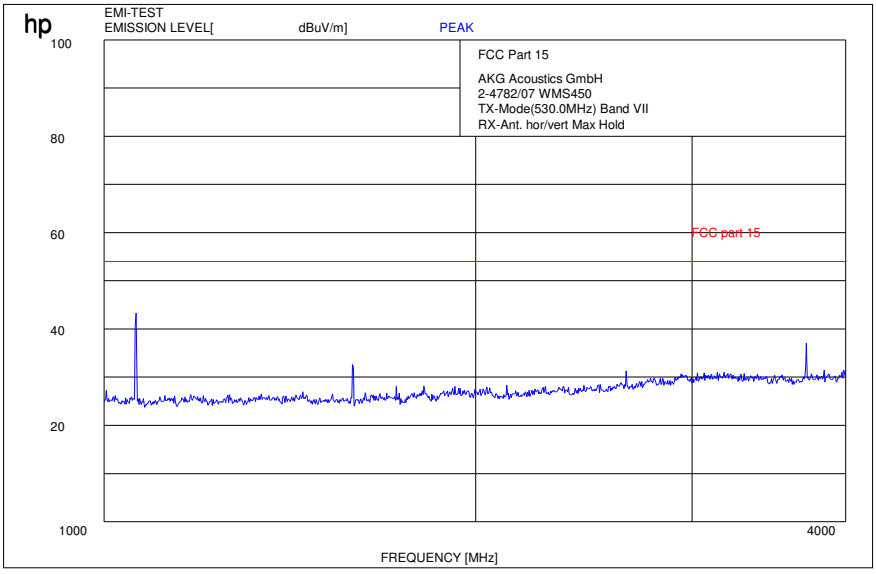
Plot 6: 4 GHz – 12 GHz, Band VII, mid channel 515.00 MHz



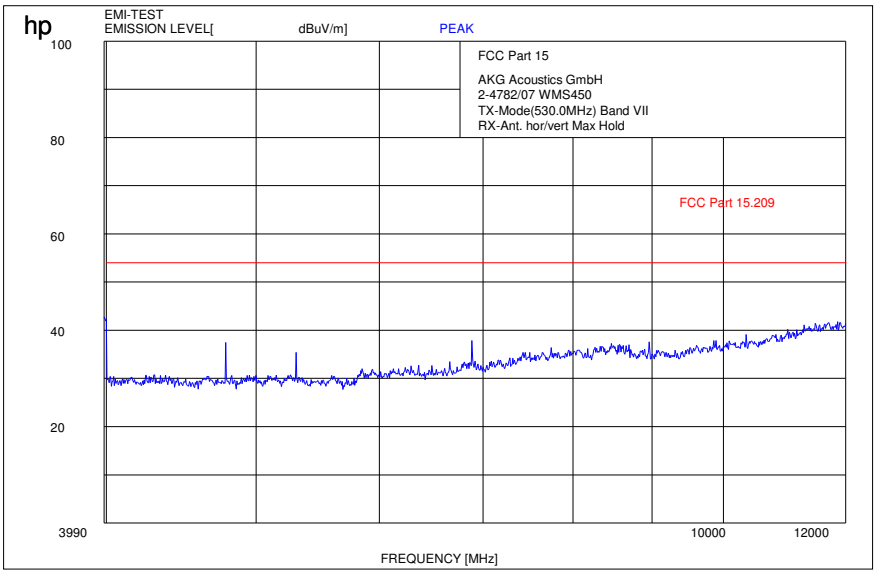
Plot 7: 30 MHz – 1GHz, Band VII, high channel 530.00 MHz



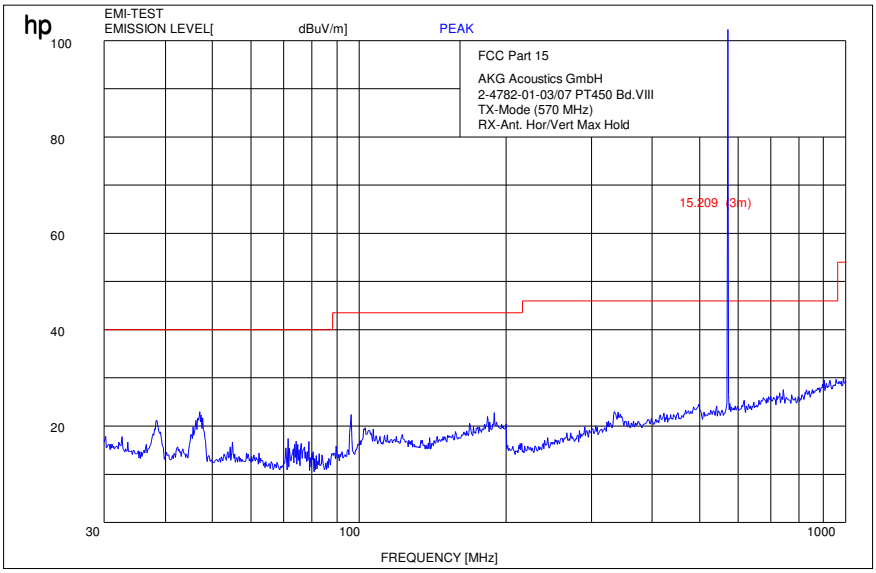
Plot 8: 1 GHz – 4GHz, Band VII, high channel 530.00 MHz



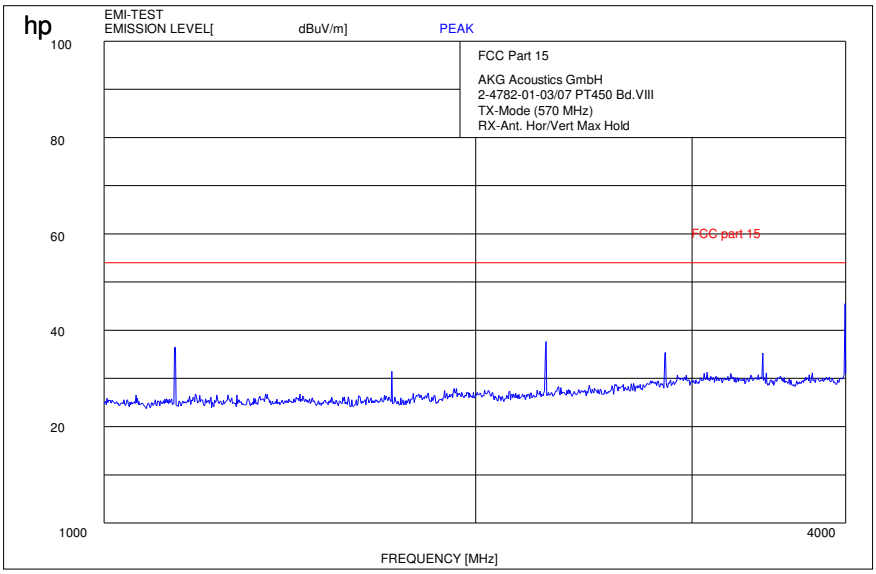
Plot 9: 4 GHz – 12 GHz, Band VII, high channel 530.00 MHz



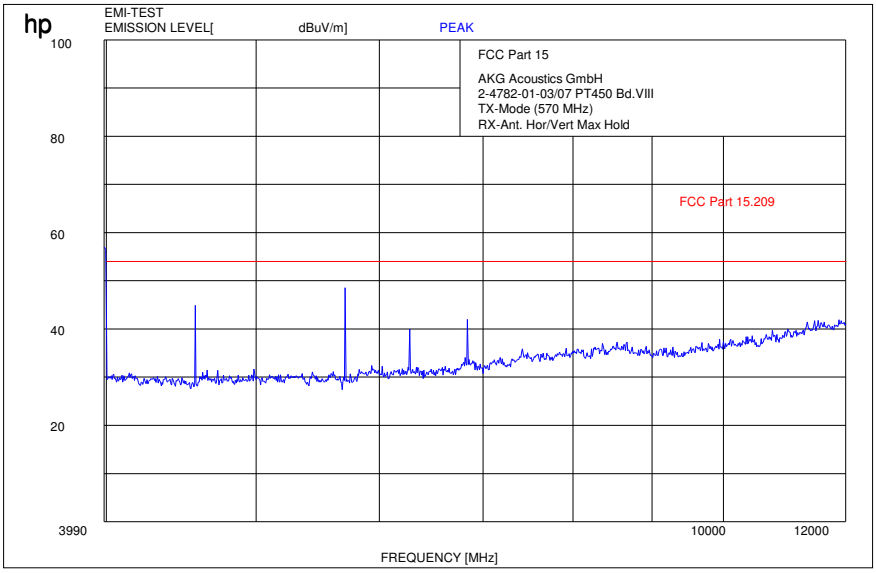
Plot 10: 30 MHz – 1GHz, Band VIII, low channel 570.00 MHz



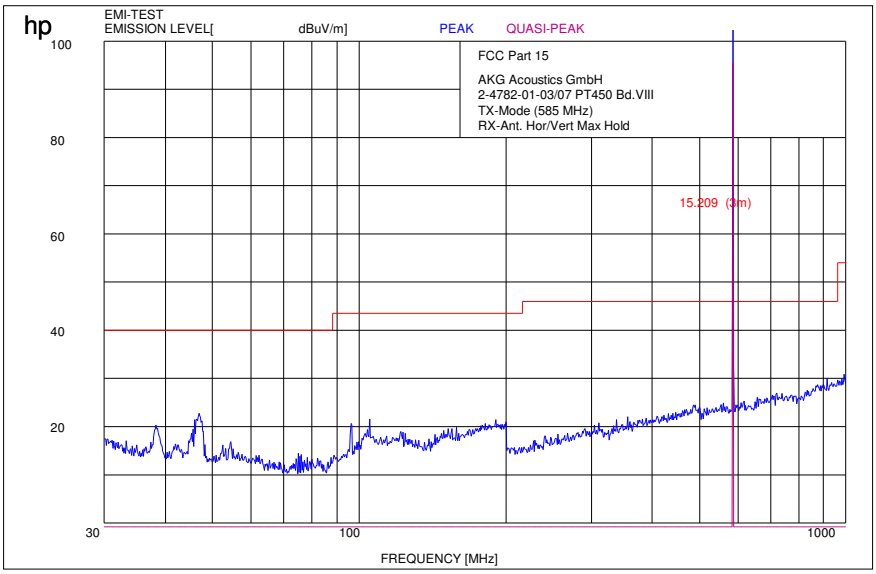
Plot 11: 1 GHz – 4GHz, Band VIII, low channel 570.00 MHz



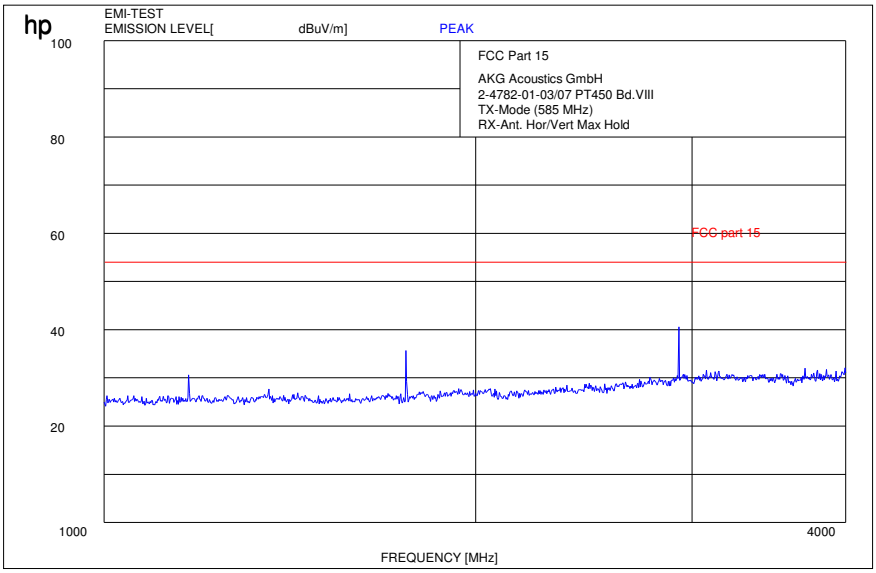
Plot 12: 4 GHz – 12 GHz, Band VIII, low channel 570.00 MHz



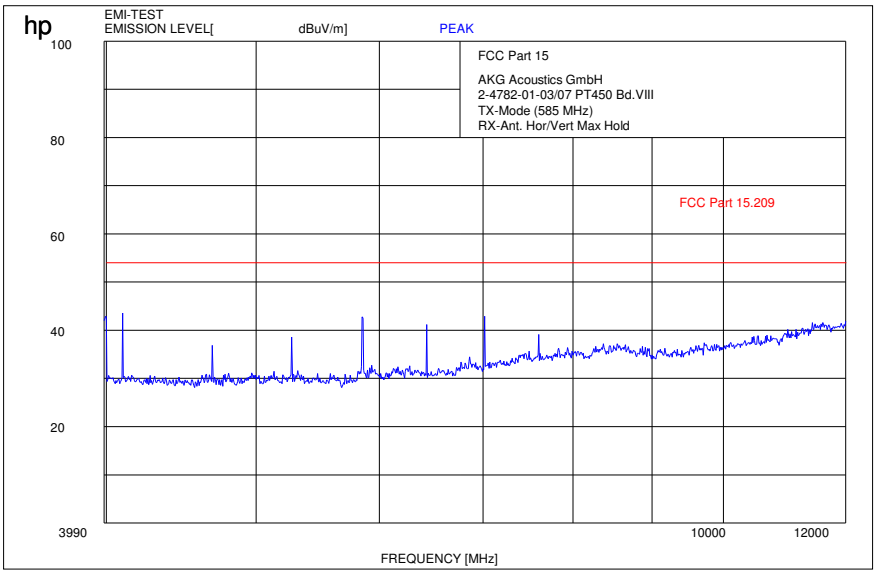
Plot 13: 30 MHz – 1GHz, Band VIII, mid channel 585.00 MHz



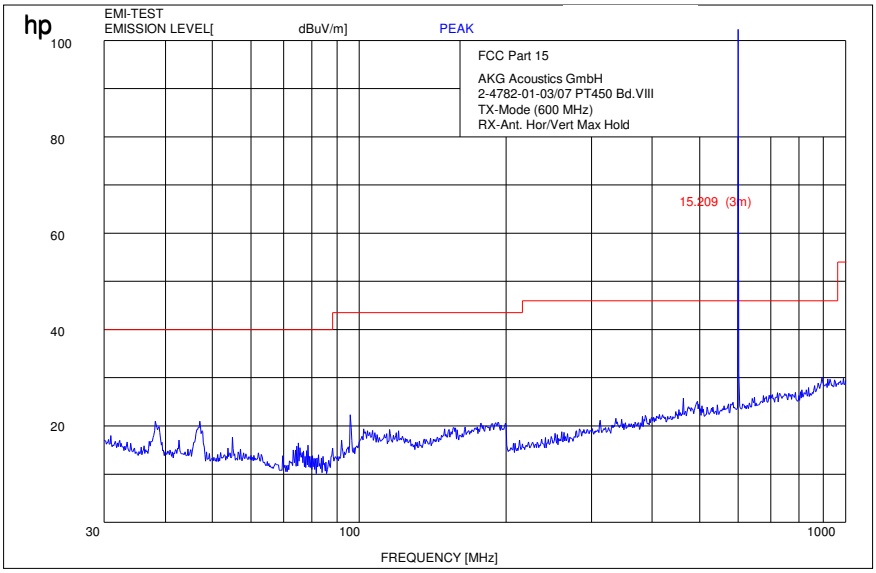
Plot 14: 1 GHz – 4GHz, Band VIII, mid channel 585.00 MHz



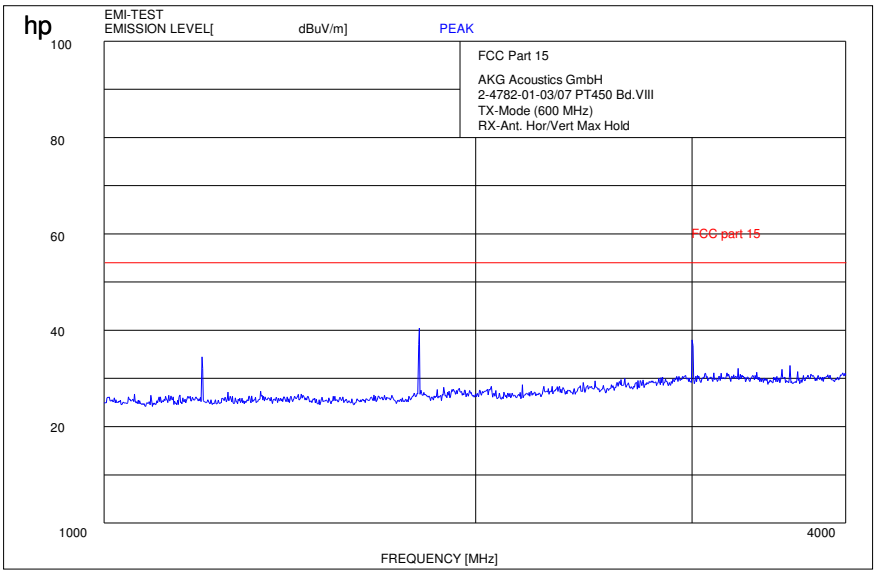
Plot 15: 4 GHz – 12 GHz, Band VIII, mid channel 585.00 MHz



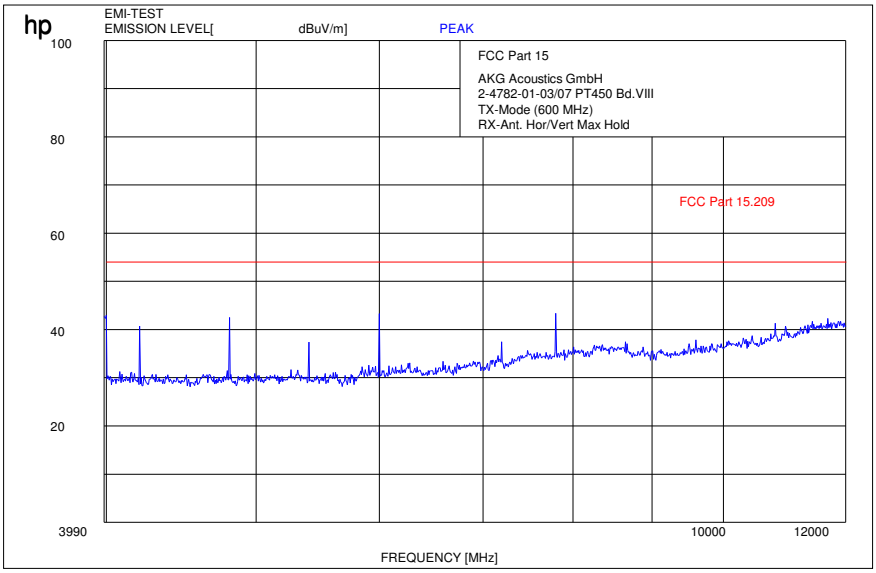
Plot 16: 30 MHz – 1GHz, Band VIII, high channel 600.00 MHz



Plot 17: 1 GHz – 4GHz, Band VIII, high channel 600.00 MHz



Plot 18: 4 GHz – 12 GHz, Band VIII, high channel 600.00 MHz



Limits **FCC Rule Part 74.861(e)(6)**

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 $\log_{10}$(mean output power in watts) dB below the mean output power

5.8 FCC Part 15 Subpart B

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas are conforming to specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2001 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2001 clause 4.2.
Antennas are conforming to ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.
30 MHz - 200 MHz: Quasi Peak measurement, 120 KHz Bandwidth, biconical antenna
200MHz - 1GHz: Quasi Peak measurement, 120 KHz Bandwidth, log periodic antenna
>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.35, 15.209.

The product fulfils also the requirements for CANADA RSS-210

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

FINAL VERDICT: PASS

5.9 Spurious Radiation Radiated § 15.109

5.9.1 Results of the measurements

SPURIOUS EMISSIONS LEVEL (µV/m)								
500.10 MHz			**515.00 MHz**			**530.00 MHz**		
f (MHz)	Detector	Level (dBµV/m)	f (MHz)	Detector	Level (dBµV/m)	f (MHz)	Detector	Level (dBµV/m)
2000.4	Pk	42.9	4120	Pk	44.3	1060	Pk	43.3
570.00 MHz			**585.00 MHz**			**600.00 MHz**		
3990	Pk	45.5	2925	Pk	40.6	1800	Pk	40.5
4560	Pk	44.9	4095	Pk	43.6	4200	Pk	40.7
5700	Pk	48.6	5850	Pk	42.8	4800	Pk	42.5
6270	Pk	40.0	6435	Pk	41.2	6000	Pk	43.3
6840	Pk	42.0	7020	Pk	42.9	7800	Pk	43.4
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz
H = Horizontal; V= Vertical

Measurement distance see table

Limits **SUBCLAUSE § 15.109**

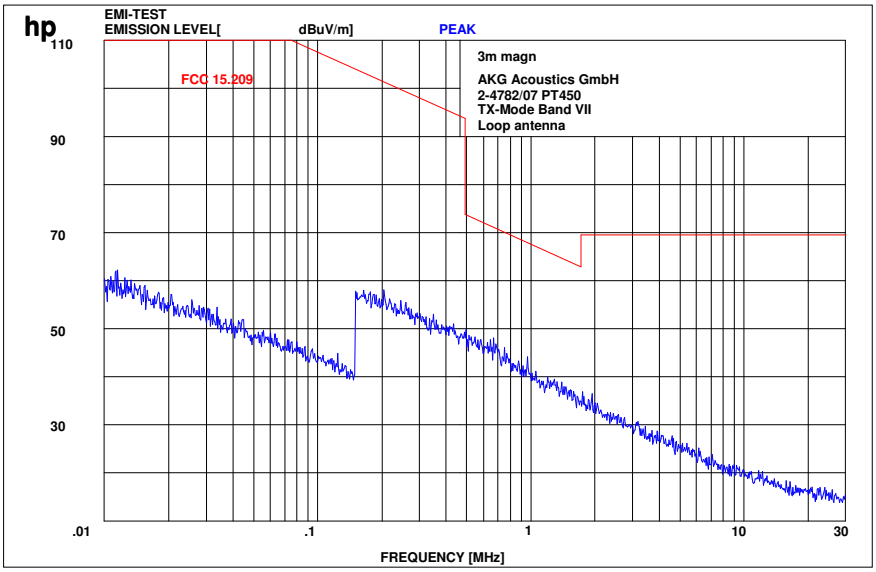
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dBµV/m	30
30 - 88	100 / 40 dBµV/m	3
88 - 216	150 / 43.5 dBµV/m	3
216 - 960	200 / 46 dBµV/m	3
above 960	500 / 54 dBµV/m	3

5.9.2 Plots of the measurements

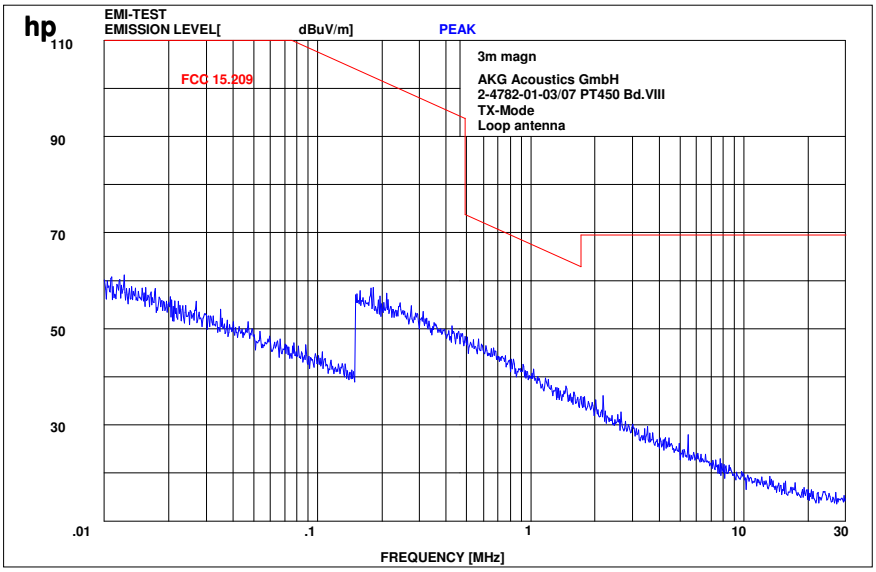
RADIATED EMISSIONS FCC Rule Part 74 subpart H

Part 15.209 Magnetics

Plot 1: 0.01 – 30 MHz, magnetic, Band VII

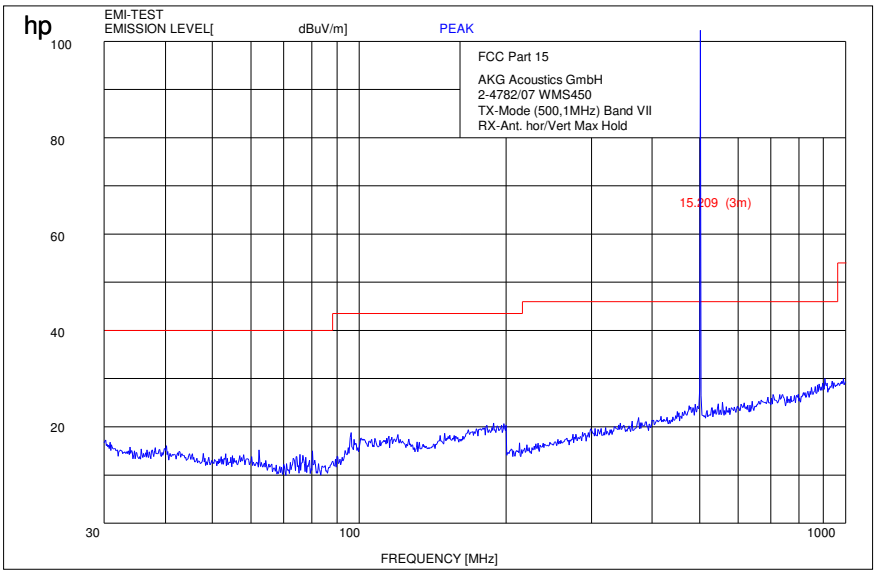


Plot 2: 0.01 – 30 MHz, magnetic, Band VIII

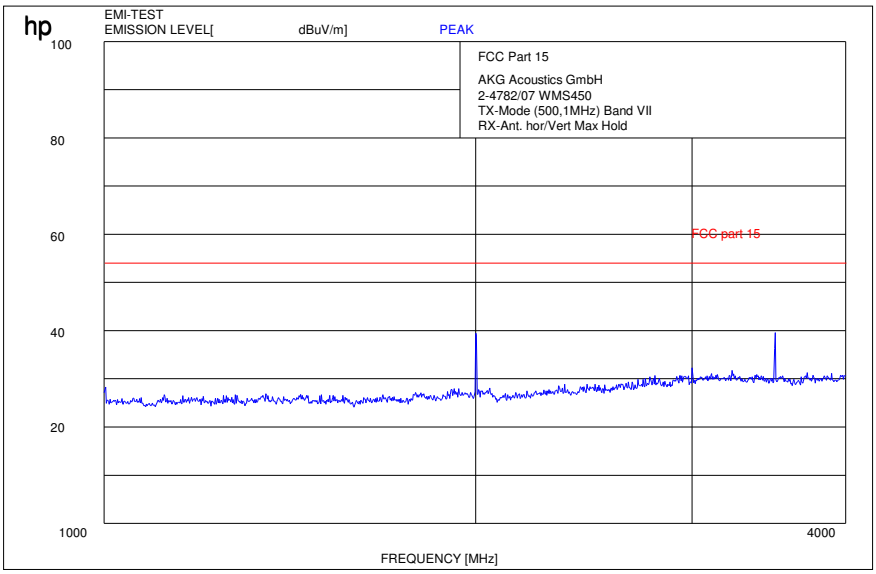


RADIATED EMISSIONS FCC Rule Part 74 subpart H

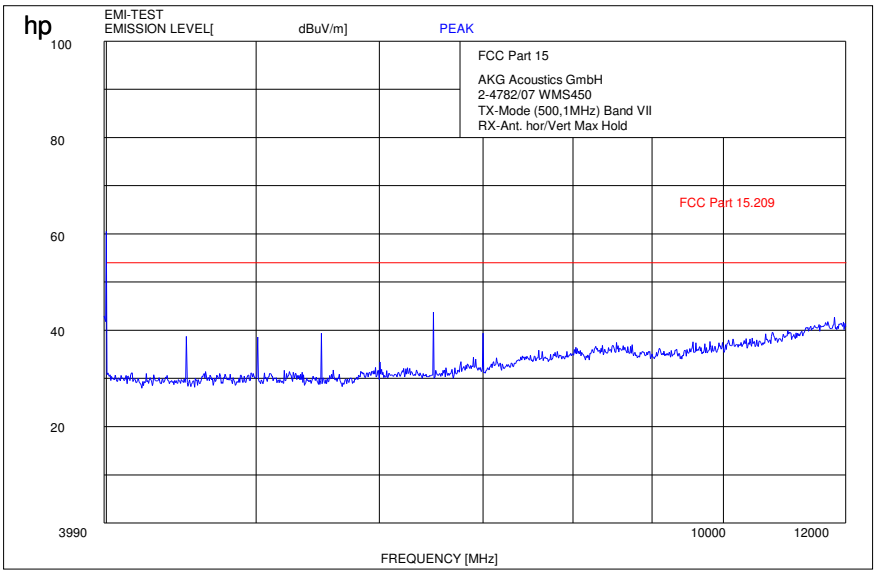
Plot 1: 30 MHz – 1GHz, Band VII, low channel 500.10 MHz



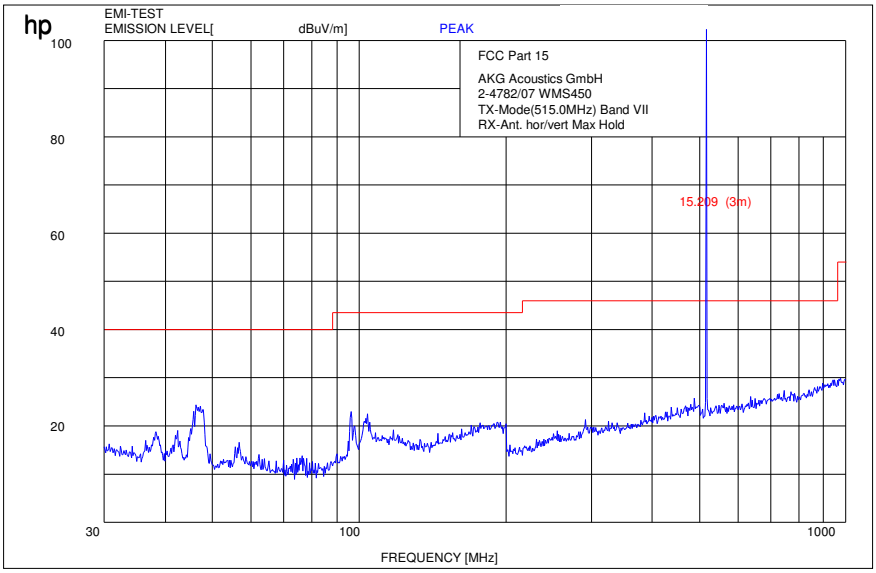
Plot 2: 1 GHz – 4GHz, Band VII, low channel 500.10 MHz



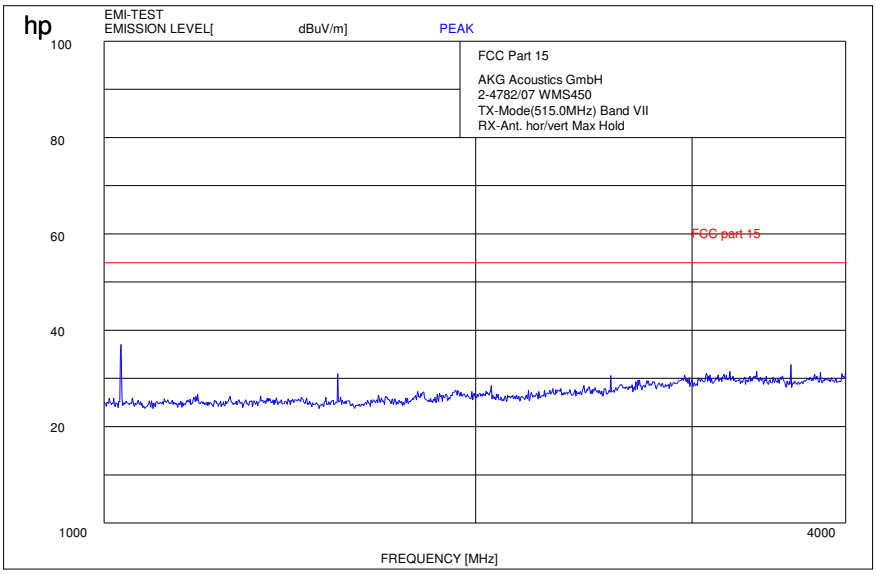
Plot 3: 4 GHz – 12 GHz, Band VII, low channel 500.10 MHz



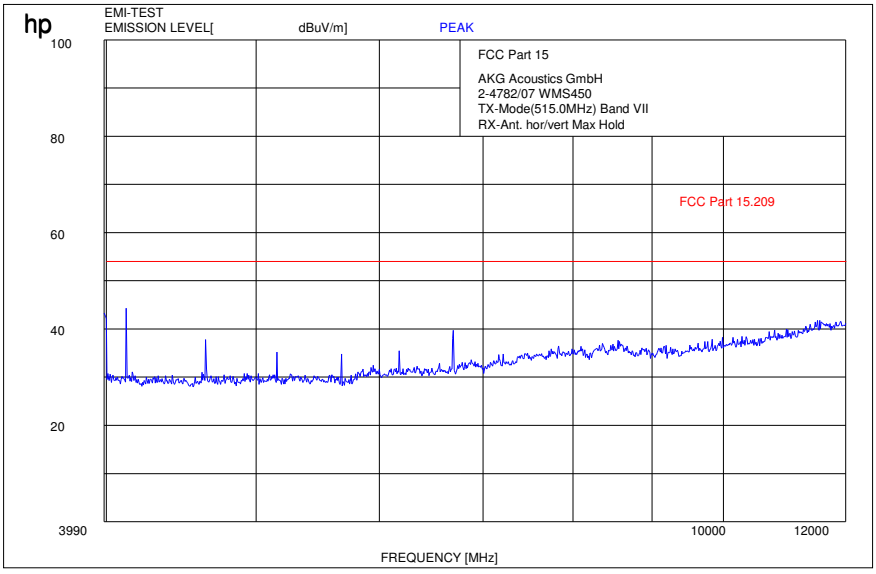
Plot 4: 30 MHz – 1GHz, Band VII, mid channel 515.00 MHz



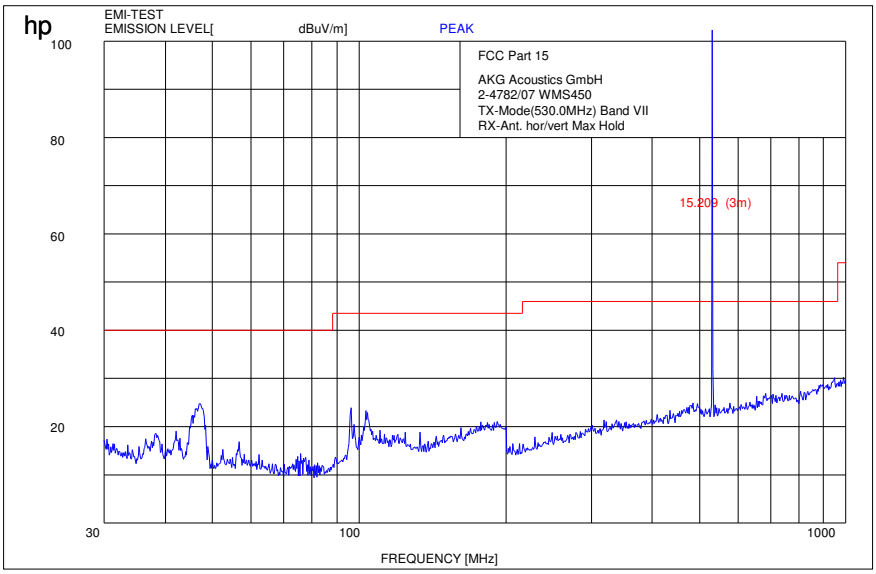
Plot 5: 1 GHz – 4GHz, Band VII, mid channel 515.00 MHz



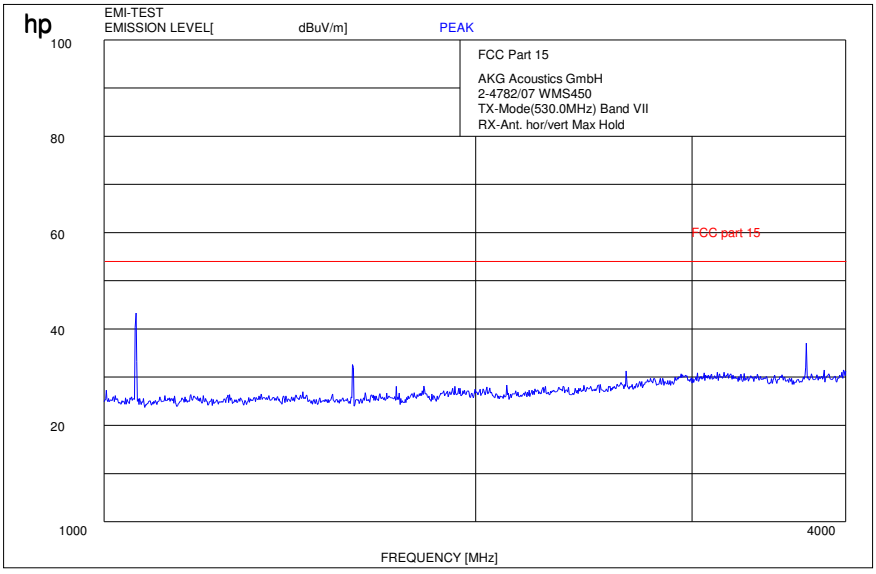
Plot 6: 4 GHz – 12 GHz, Band VII, mid channel 515.00 MHz



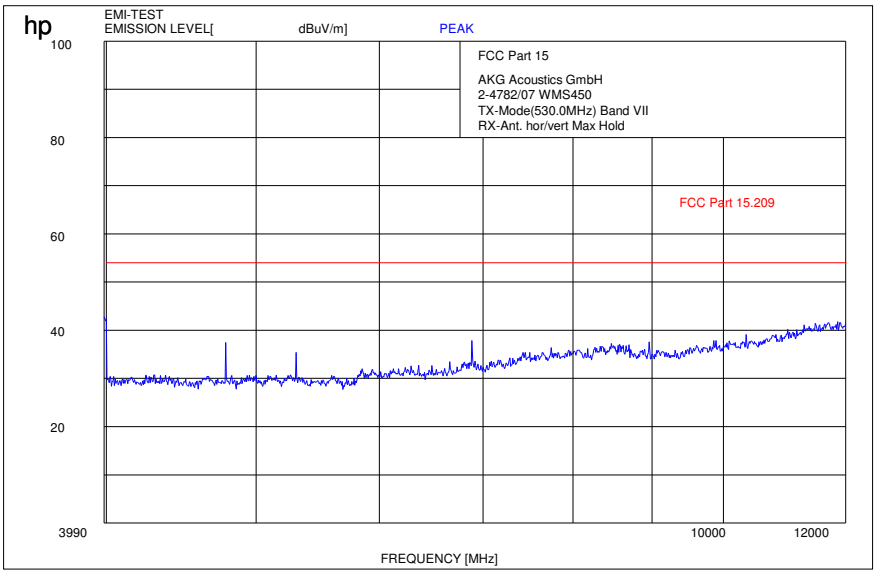
Plot 7: 30 MHz – 1GHz, Band VII, high channel 530.00 MHz



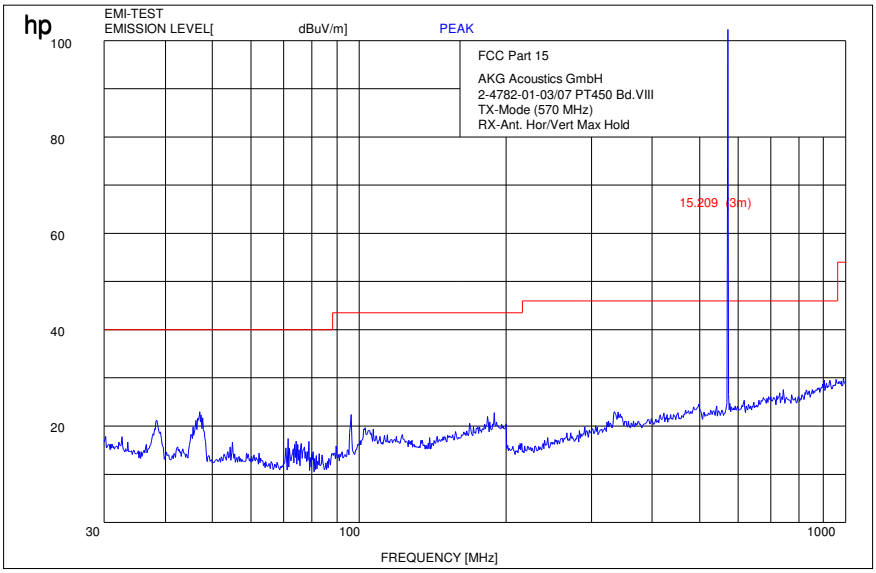
Plot 8: 1 GHz – 4GHz, Band VII, high channel 530.00 MHz



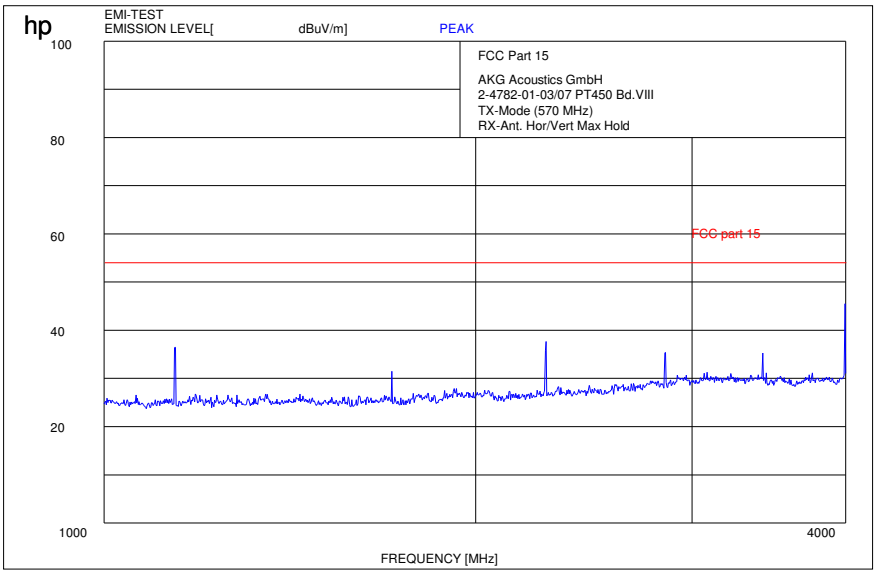
Plot 9: 4 GHz – 12 GHz, Band VII, high channel 530.00 MHz



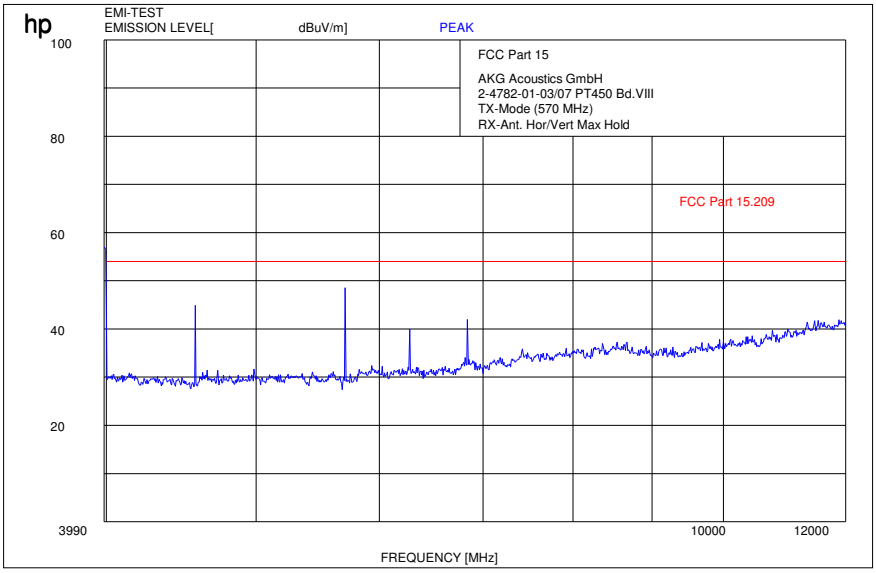
Plot 10: 30 MHz – 1GHz, Band VIII, low channel 570.00 MHz



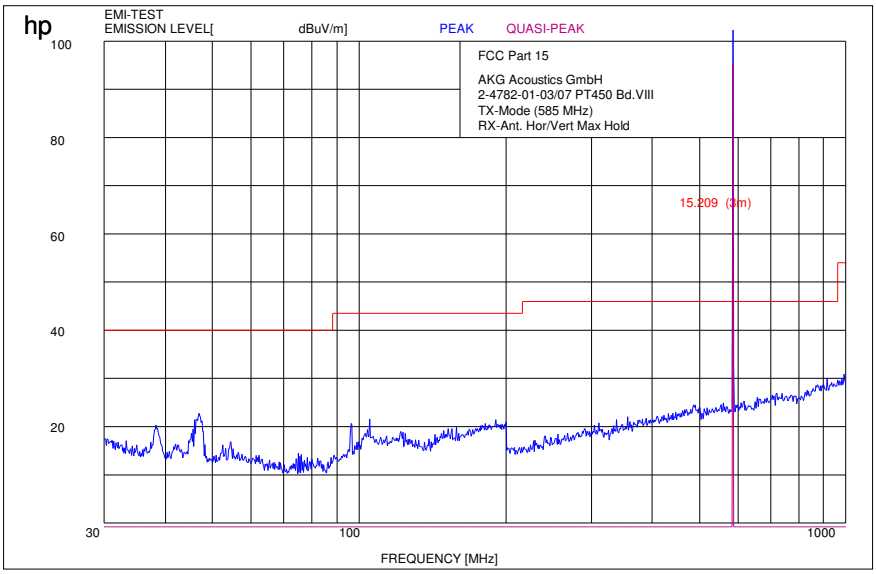
Plot 11: 1 GHz – 4GHz, Band VIII, low channel 570.00 MHz



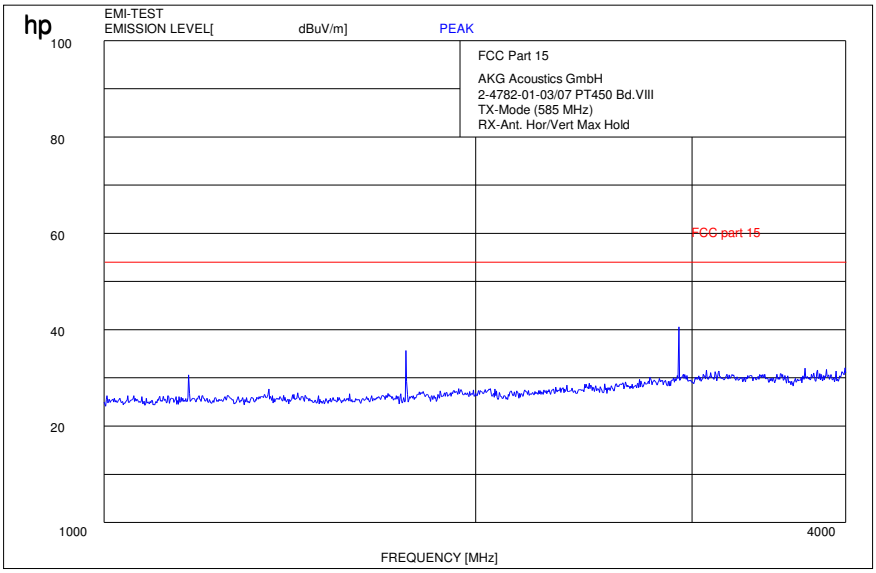
Plot 12: 4 GHz – 12 GHz, Band VIII, low channel 570.00 MHz



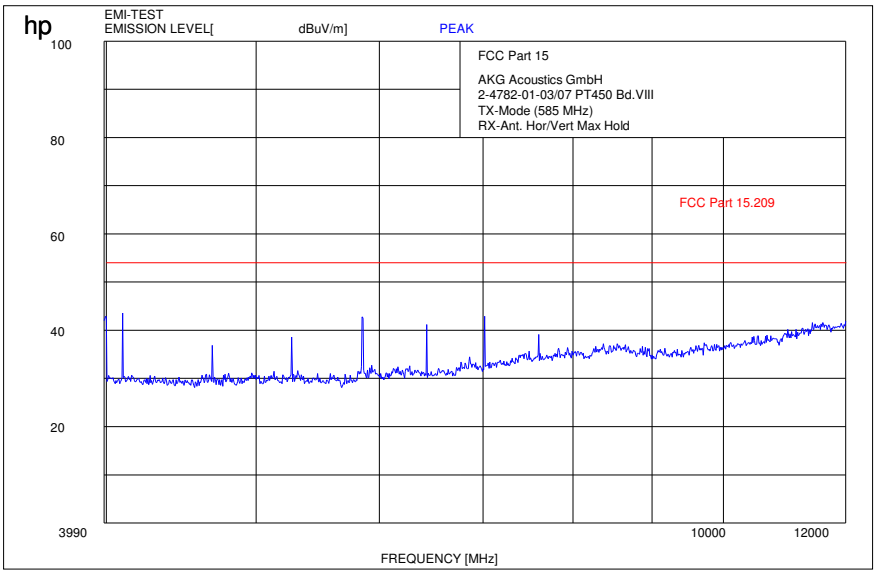
Plot 13: 30 MHz – 1GHz, Band VIII, mid channel 585.00 MHz



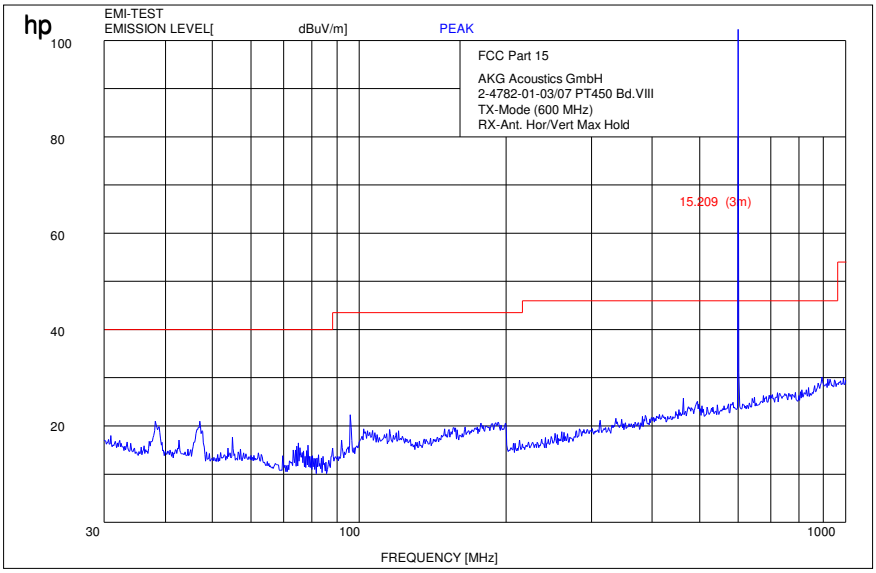
Plot 14: 1 GHz – 4GHz, Band VIII, mid channel 585.00 MHz



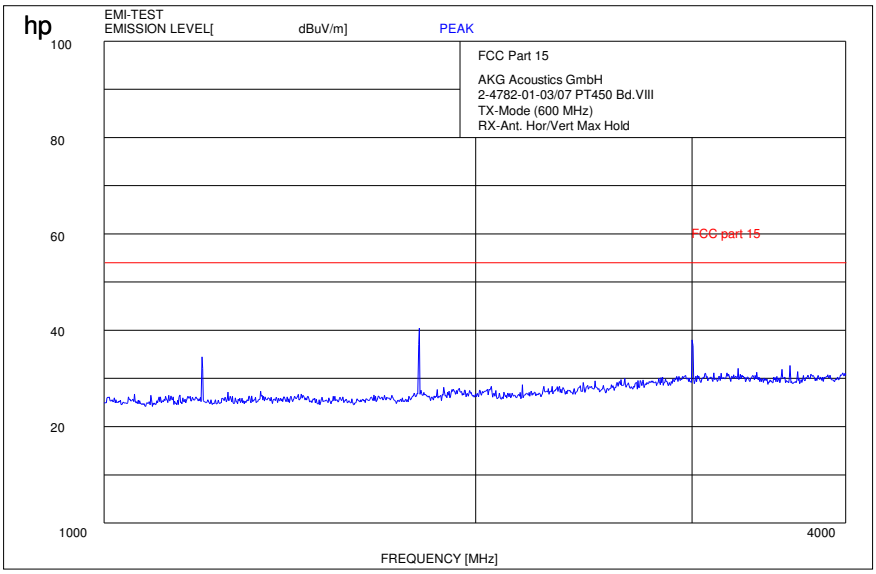
Plot 15: 4 GHz – 12 GHz, Band VIII, mid channel 585.00 MHz



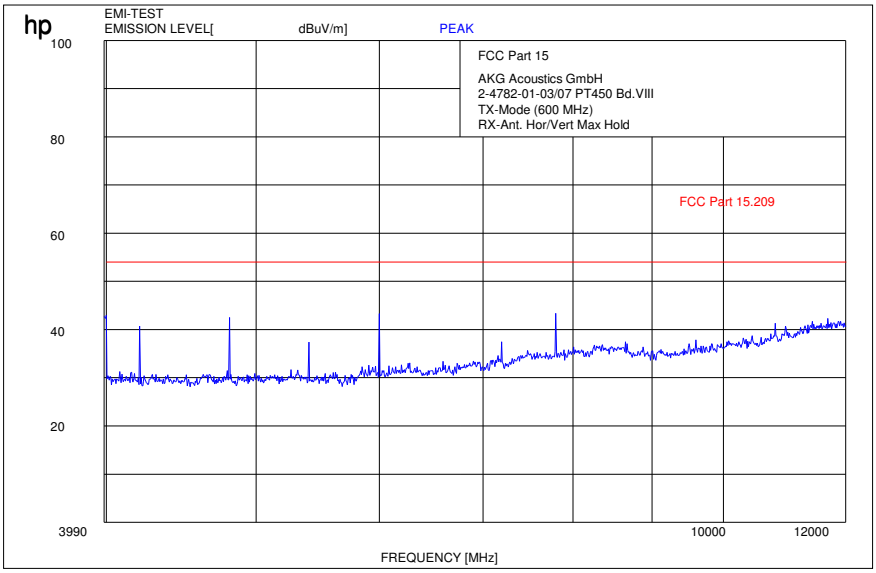
Plot 16: 30 MHz – 1GHz, Band VIII, high channel 600.00 MHz



Plot 17: 1 GHz – 4GHz, Band VIII, high channel 600.00 MHz



Plot 18: 4 GHz – 12 GHz, Band VIII, high channel 600.00 MHz



5.10 Spurious Conducted § 15.111

5.10.1 Results of the measurements

Not applicable! **No external connector available.**

SPURIOUS EMISSIONS LEVEL (nW)								
MHz			**MHz**			**MHz**		
f (MHz)	Detector	Level (nW)	f (MHz)	Detector	Level (nW)	f (MHz)	Detector	Level (nW)
--	**--**	**--**	--	--	--	--	--	--
MHz			**MHz**			**MHz**		
--	**--**	**--**	--	--	--	--	--	--
Measurement uncertainty			±3 dB					

RBW/VBW: 100 kHz
Measurement distance see table

Limits **SUBCLAUSE § 15.111**

Frequency (MHz)	Power
0.009 – 5000	2 nW

5.10.2 Plots of the measurements § 15.107/207

Conducted Receiver Spurious emission
Valid for all channels

Not applicable!

Plot 1:

Limits **SUBCLAUSE § 15.111**

Frequency (MHz)	Power
0.009 – 5000	2 nW

6 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.
Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.
All used devices are connected with a 10 MHz external reference.
According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

Anechoic chamber C:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Anechoic chamber	MWB	87400/02	300000996	Monthly verification		
2	System-Rack 85900	HP I.V.	*	300000222	n.a.		
3	Measurement System 1						
4	Spektrum Analyzer 8566B	HP	2747A05306	300001000	05.10.2006	24	05.10.2008
5	Spektrum Analyzer Display 85662A	HP	2816A16541	300002297	05.10.2006	24	05.10.2008
6	Quasi-Peak-Adapter 85650A	HP	2811A01131	300000999	05.10.2006	24	05.10.2008
7	RF-Preselector 85685A	HP	2837A00779	300000218	08.11.2006	24	08.11.2008
8	PC Vectra VL	HP		300001688	n.a.		
9	Software EMI	HP		300000983	n.a.		
10	Measurement System 2						
11	FSP 30	R&S	100623	ICT 300003464	05.10.2007	24	15.10.2009
12	PC	F+W			n.a.		
13	TILE	TILE			n.a.		
14	Biconical antenna	EMCO	S/N: 860 942/003		Monthly verification (System cal.)		
15	Log. Period. Antenna 3146	EMCO	2130	300001603	Monthly verification (System cal.)		
16	Double Ridged Antenna HP 3115P	EMCO	3088	300001032	Monthly verification (System cal.)		
17	Active Loop Antenna 6502	EMCO	2210	300001015	Monthly verification (System cal.)		
18	Power Supply 6032A	HP	2818A03450	300001040	12.05.2007	36	12.05.2010
19	Busisolator	Kontron		300001056	n.a.		
20	Leitungsteiler 11850C	HP		300000997	Monthly verification (System cal.)		
21	Power attenuator 8325	Byrd	1530	300001595	Monthly verification (System cal.)		
22	Band reject filter WRCG1855/1910	Wainwright	7	300003350	Monthly verification (System cal.)		
23	Band reject filter WRCG2400/2483	Wainwright	11	300003351	Monthly verification (System cal.)		

System Rack Room 005 :

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	FSP 30	R&S		300003575	02.04.2007	24	02.04.2009
2	CBT	R&S	100313	300003516	24.10.2006	24	24.10.2008
3	Switch Matrix	HP		300000929	n.a.		
4	Power Supply	HP	3041A00544	300002270	13.05.2007	36	13.05.2010
5	Signal Generator	R&S	836206/0092	300002680	30.05.2007	36	30.05.2010

Climatic Box:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Climatic box VT 4002	Heraeus Vötsch	58566046820010	300003019	11.05.2007	24	11.05.2009
2	Climatic box CTS T-40/50	CTS	064023	300003540	03.01.2007	24	03.01.2009

SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	3000002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	3000002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	3000002681	n.a.		
4	19'' Monitor		22759020-ED	3000002681	n.a.		
5	Mouse		LZE 0095/6639	3000002681	n.a.		
6	Keyboard		G00013834L461	3000002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681-0005	01.08.2006	24	01.08.2008
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681-0002	01.08.2006	36	01.08.2009
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	3000002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681	s.No.10		
14	Fast CPU SM-B50	R&S	To 10	3000002681	s.No.10		
15	FM Modulator SM-B5	R&S	835676/033	3000002681	s.No.10		
16	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681-0001	01.08.2006	36	01.08.2009
17	Modulation Coder SMIQ-B20	R&S	To 16	3000002681	s.No.16		
18	Data Generator SMIQ-B11	R&S	To 16	3000002681	s.No.16		
19	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681	s.No.16		
20	Fast CPU SM-B50	R&S	To 16	3000002681	s.No.16		
21	FM Modulator SM-B5	R&S	836061/022	3000002681	s.No.16		
22	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681-0003	01.08.2006	36	01.08.2009
23	Attenuator SMP-B15	R&S	835136/014	3000002681	S.No.22		
24	RF Rear Connection SMP-B19	R&S	834745/007	3000002681	S.No.22		
25	Power Meter NRVD	R&S	835430/044	3000002681-0004	01.08.2006	24	01.08.2008
26	Power Sensor NRVD-Z1	R&S	833894/012	3000002681-0013	01.08.2006	24	01.08.2008
27	Power Sensor NRVD-Z1	R&S	833894/011	3000002681-0010	01.08.2006	24	01.08.2008
28	Rubidium Standard RUB	R&S		3000002681-0009	01.08.2006	24	01.08.2008
29	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681-0006	01.08.2006	24	01.08.2008
30	Laser Printer HP Deskjet 2100	HP	N/A	3000002681-0011	n.a.		
31	19'' Rack	R&S	11138363000004	3000002681	n.a.		
32	RF-cable set	R&S	N/A	3000002681	n.a.		
33	IEEE-cables	R&S	N/A	3000002681	n.a.		
34	Sampling System FSIQ-B70	R&S	835355/009	3000002681	s.No.7		
35	RSP programmable attenuator	R&S	834500/010	3000002681-0007	01.08.2006	24	01.08.2008
36	Signalling Unit	R&S	838312/011	3000002681	n.a.		
37	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681			
39	Power Splitter 6005-3	Inmet Corp.	none	300002841	23.12.2006	24	23.12.2008

40	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		
41	CBT32 with EDR Signalling Unit	R&S					
42	Coupling unit	Narda	N/A	--	n.a.		
43	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
44	RF-cable set	R&S	N/A	different	n.a.		
45	IEEE-cables	R&S	N/A	--	n.a.		

Note: 3000002681-00xx inventoried as a system

SRD Laboratory Room 005:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Spektrum Analyzer 8566B	HP	2747A05275	300000219	08.11.2006	24	08.11.2008
2	Spektrum Analyzer Display 85662A	HP	2816A16497	300001690	08.11.2006	24	08.11.2008
3	Quasi-Peak-Adapter 85650A	HP	2811A01135	300000216	08.11.2006	24	08.11.2008
4	Power Supply	Heiden	003202	300001187	12.05.2007	36	12.05.2010
5	Power Supply	Heiden	1701	300001392	12.05.2007	36	12.05.2010

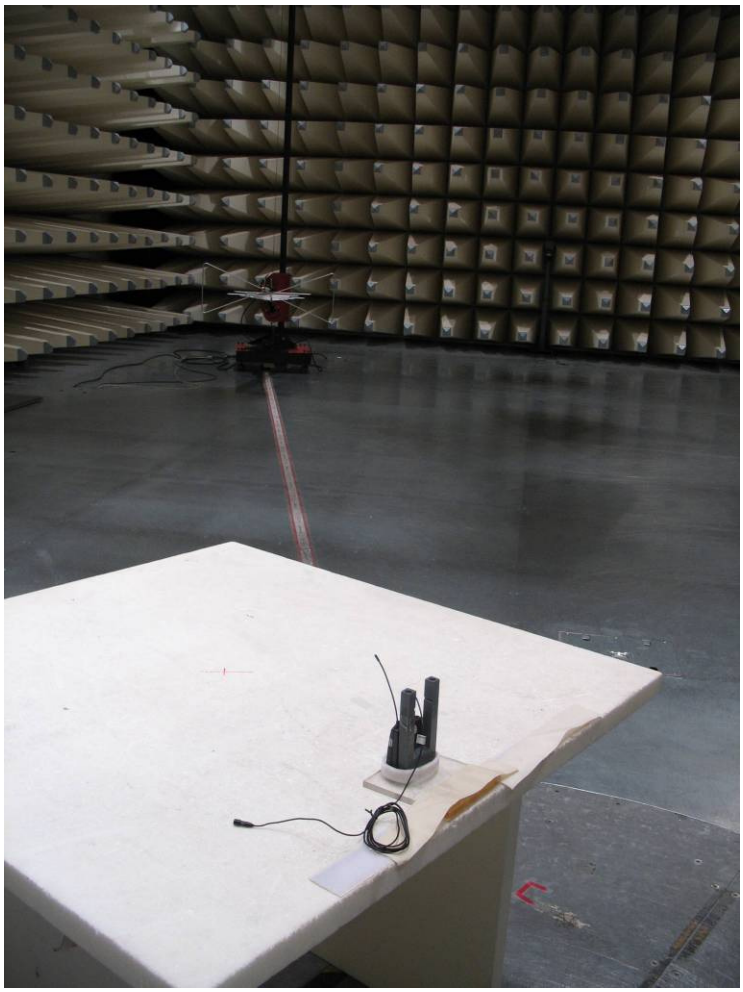
Anechoic chamber F:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna	9163-295	-/-	-/-	30.04.2008	24	30.04.2010
3	Amplifier - 0518C-138	Veritech Micro-wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2009	24	31.01.2009
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-

7 Photographs of the Test Set-up

Photo 1:

Photo 2:



8 Photographs of the EUT

Photo 1:

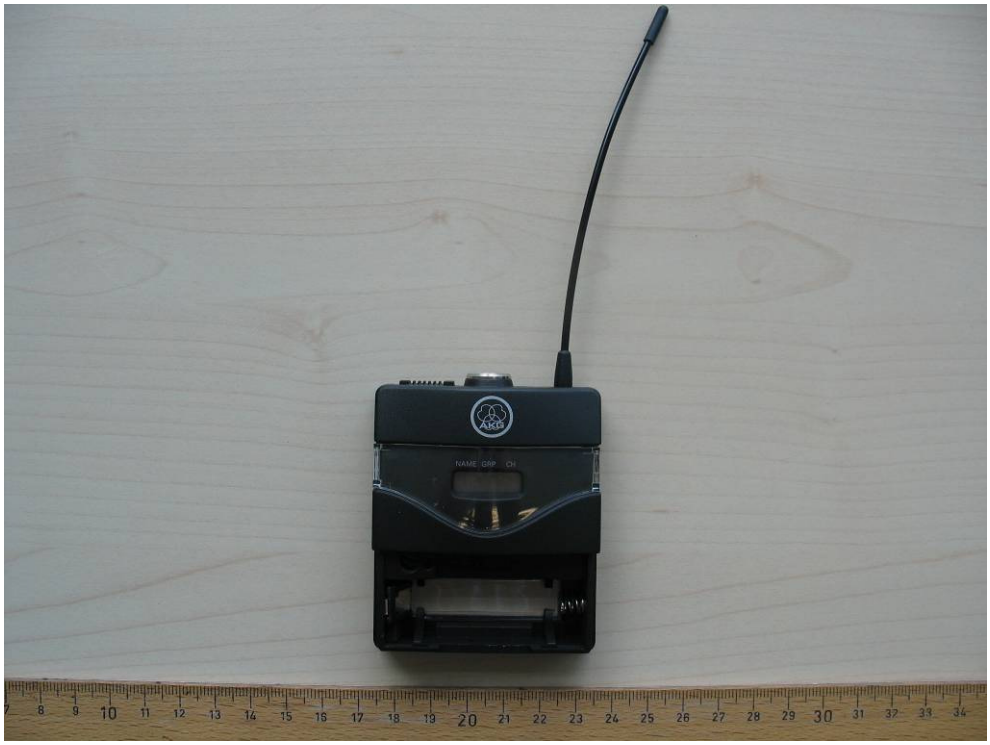


Photo 2:

Photo 3:

Photo 4:

Photo 5:

Photo 6:

Photo 7:

Photo 8:

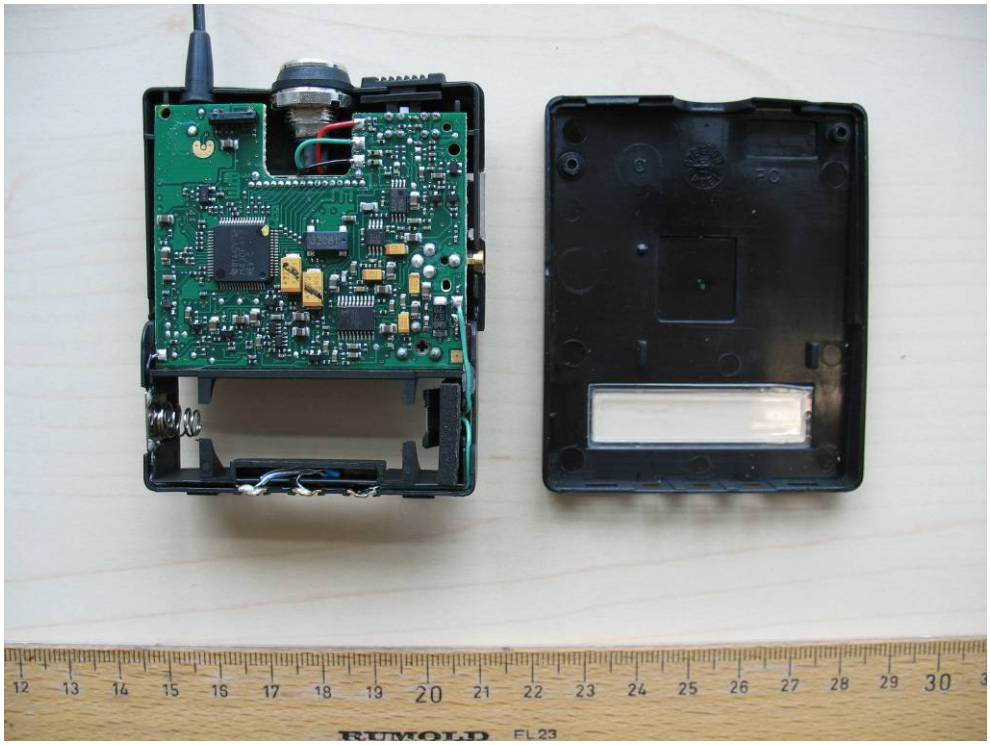


Photo 9:

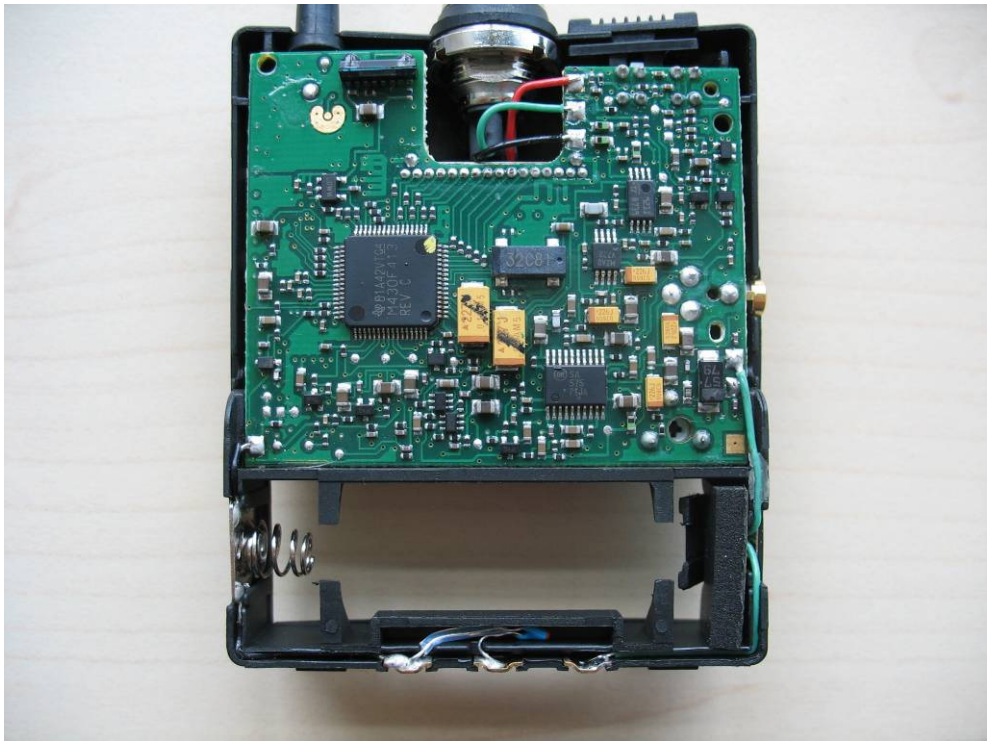


Photo 10:

Photo 11:

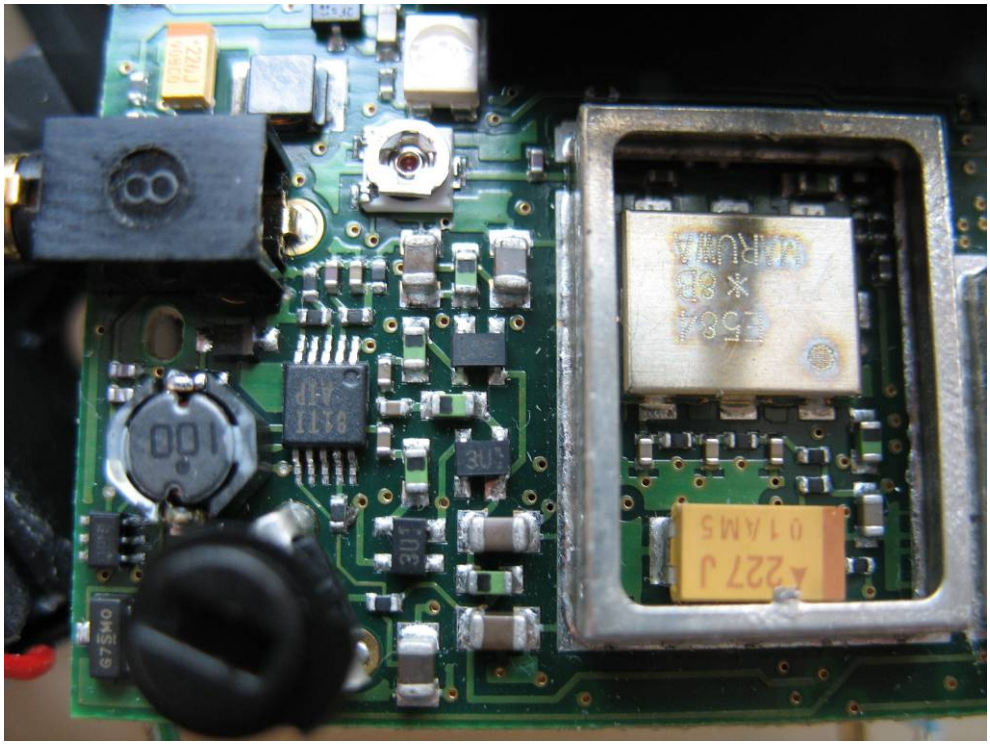


Photo 12: