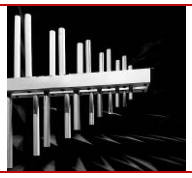
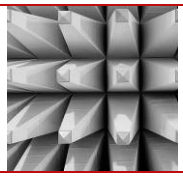




CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-3148-01-08/11

DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-01

Testing laboratory

CETECOM ICT Services GmbH
Untertuerkheimer Strasse 6 – 10
66117 Saarbruecken / Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
Internet: http://www.cetecom.com
e-mail: ict@cetecom.com

Accredited test laboratory:
The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025
DAkkS registration number: D-PL-12076-01-01

Area of Testing: Radio/Satellite Communications

Applicant

AKG Acoustics GmbH
Lemböckgasse 21-25
1230 Wien / AUSTRIA
Phone: +43-1-86654-0
Fax: +43 1 86654 1292
Contact: Erich Gärtner
e-mail: erich.gaertner@harman.com
Phone: +43 1 86654 1357

Manufacturer

VTech Communications Ltd.
23/F, Tai Ping Industrial Centre, Block 1
57 Ting Kok Road, Tai Po, N.T. / Hong Kong

Test standard/s

47 CFR Part 74	Title 47 of the Code of Federal Regulations; Chapter I Experimental radio, auxiliary, special broadcast and other program distribution services
RSS-123 Issue 2	Spectrum Management and Telecommunications Radio Standards Specification Licensed Low-Power Radio Apparatus

For further applied test standards please refer to section 3 of this test report.

Test item

Kind of test item:	**Wireless microphone**
Model name:	**CSCHTX (handheld transmitter)**
FCC ID:	**V3TCSCHTX**
IC:	**-/-**
Frequency:	**500.1MHz-530.5MHz (Band VII)** **570.1MHz-600.5MHz (Band VIII)** **600.0MHz-605.9MHz (Band IX)** **614.1MHz-630.5MHz (Band IX)** **650.1MHz-680.0MHz (Band I)**
Power supply:	**1.5 V DC by battery**
Temperature range:	**-20 °C to +55 °C**

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test performed:

cn=Jakob Reschke, o=CETECOM ICT Services GmbH, ou=RES-101109, email=Jakob.Reschke@cetecom.com, c=DE
2011.06.17 09:02:21 +02'00'

p.o.
Andreas Keller

Test report authorised:

DN: cn=Michael Berg, o=Cetecom ICT Services GmbH, ou=BER-100614, email=michael.berg@ict.cetecom.de, c=DE
Datum: 2011.06.17 09:56:09 +02'00'

Michael Berg

1 Table of contents

2 General information

2.1 Notes

The test results of this test report relate exclusively to the test item specified in this test report. 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 CETECOM ICT Services GmbH.
This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2011-03-23
Date of receipt of test item:	2011-03-23
Start of test:	2011-03-23
End of test:	2011-05-21
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Version	Test standard description
47 CFR Part 74	2009-10	Title 47 of the Code of Federal Regulations; Chapter I Experimental radio, auxiliary, special broadcast and other program distribution services
RSS-123, Issue 2	2011-02	Spectrum Management and Telecommunications Radio Standards Specification Licensed Low-Power Radio Apparatus

4 Test environment

Temperature:	T_{nom}	+22 °C	during room temperature tests
	T_{max}	+55 °C	during high temperature test
	T_{min}	-20 °C	during low temperature test
Relative humidity content:		55 %	
Air pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	1.5 V	DC by battery
	V_{max}	1.8 V	
	V_{min}	1.1 V	

5 Test item

Kind of test item	:	**Wireless microphone**
Type identification	:	**CSCHTX (handheld transmitter)**
S/N serial number	:	**3301 X 00370 (Bd VII), 3301 X 00380(Bd VIII), 3301 X 0160 (Bd IX), 3301 X 00010 (Bd I)**
HW hardware status	:	**No information provided**
SW software status	:	**No information provided**
Frequency band [MHz]	:	**500.1MHz-530.5MHz (Band VII)** **570.1MHz-600.5MHz (Band VIII)** **600.0MHz-605.9MHz (Band IX)** **614.1MHz-630.5MHz (Band IX)** **650.1MHz-680.0MHz (Band I)**
Type of modulation	:	**FM**
Number of channels	:	**No information provided**
Antenna	:	**Integrated antenna**
Power supply	:	**1.5 V DC by battery**
Temperature range	:	**-20°C to +55 °C**

6 Test laboratories sub-contracted

None

7 Summary of measurement results

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

☐ There were deviations from the technical specifications ascertained

TC Identifier	Description	Verdict	Date	Remark
RF-Testing	FCC 47 CFR § 74.861 RSS-123 Issue 2	Passed	2011-06-17	-/-

Test Specification Clause	Test Case	Temperature Conditions	Power Source Voltages	Pass	Fail	NA	NP	Results (max.)
FCC 47 CFR § 74.861 (e)(1)(ii) RSS-123 §6.2 Issue 2	Output power (radiated)	Nominal	Nominal	☒	☐	☐	☐	complies
FCC 47 CFR § 74.861 RSS-123 §7 Issue 2	Frequency stability	Nominal	Extreme	☒	☐	☐	☐	complies
		Extreme	Nominal	☒	☐	☐	☐	
FCC 47 CFR § 2.1049 § 74.861	Modulation characteristics	Nominal	Nominal	☒	☐	☐	☐	complies
FCC 47 CFR § 2.1049 § 74.861 RSS-123 §6 Issue 2	Occupied bandwidth	Nominal	Nominal	☒	☐	☐	☐	complies
FCC 47 CFR § 74.861	Unwanted radiation (spectrum mask)	Nominal	Nominal	☒	☐	☐	☐	complies
FCC 47 CFR § 74 RSS-123 Issue 2	Field strength of spurious radiation Transmitter unwanted emissions	Nominal	Nominal	☒	☐	☐	☐	complies
FCC 47 CFR § 15.209 RSS-123 Issue 2	Receiver spurious emissions (radiated)	Nominal	Nominal	☐	☐	☒	☐	complies

Note: NA = Not Applicable; NP = Not Performed

7.1 RSP100 test report cover sheet / performance test data

Test Report Number	:	1-3148-01-08/11
Equipment Model Number	:	CSCHTX (handheld transmitter)
Certification Number	:	-/-
Manufacturer (complete Address)	:	VTech Communications Ltd. 23/F, Tai Ping Industrial Centre, Block 1 57 Ting Kok Road, Tai Po, N.T. / Hong Kong
Tested to radio standards specification no.	:	RSS-123 Issue 2
Open Area Test Site IC No.	:	IC 3462C-1
Frequency Range or fixed frequency	:	500.1MHz-530.5MHz (Band VII) 570.1MHz-600.5MHz (Band VIII) 600.0MHz-605.9MHz (Band IX) 614.1MHz-630.5MHz (Band IX) 650.1MHz-680.0MHz (Band I)
Max, radiated output power [dBm]	:	500.1MHz-530.5MHz (Band VII) =15.0 570.1MHz-600.5MHz (Band VIII) =13.8 600.0MHz-605.9MHz (Band IX) =15.0 614.1MHz-630.5MHz (Band IX) =15.2 650.1MHz-680.0MHz (Band I) =13.4
Occupied bandwidth (99%-BW) [kHz]	:	500.1MHz-530.5MHz (Band VII) =132 570.1MHz-600.5MHz (Band VIII) =132 600.0MHz-605.9MHz (Band IX) =132 614.1MHz-630.5MHz (Band IX) =130 650.1MHz-680.0MHz (Band I) =132
Type of modulation	:	FM
Emission Designator (TRC-43)	:	500.1MHz-530.5MHz (Band VII) = 132kF3E 570.1MHz-600.5MHz (Band VIII) = 132kF3E 600.0MHz-605.9MHz (Band IX) = 132kF3E 614.1MHz-630.5MHz (Band IX) = 130kF3E 650.1MHz-680.0MHz (Band I) = 132kF3E
Antenna Information	:	Integrated antenna
Transmitter Spurious (worst case) [µW] :		0.76 µW/m @ 1000.2 MHz
Receiver Spurious (worst case) [µW] :		No receiver / idle mode

ATTESTATION:
DECLARATION OF COMPLIANCE:

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

Laboratory Manager:

cn=Jakob Reschke, o=CETECOM ICT Services GmbH,
ou=RES-101109, email=Jakob.Reschke@cetecom.com, c=DE
2011.06.17 09:01:58 +02'00'

2011-06-17	Andreas Keller	p.o.
Date	Name	Signature

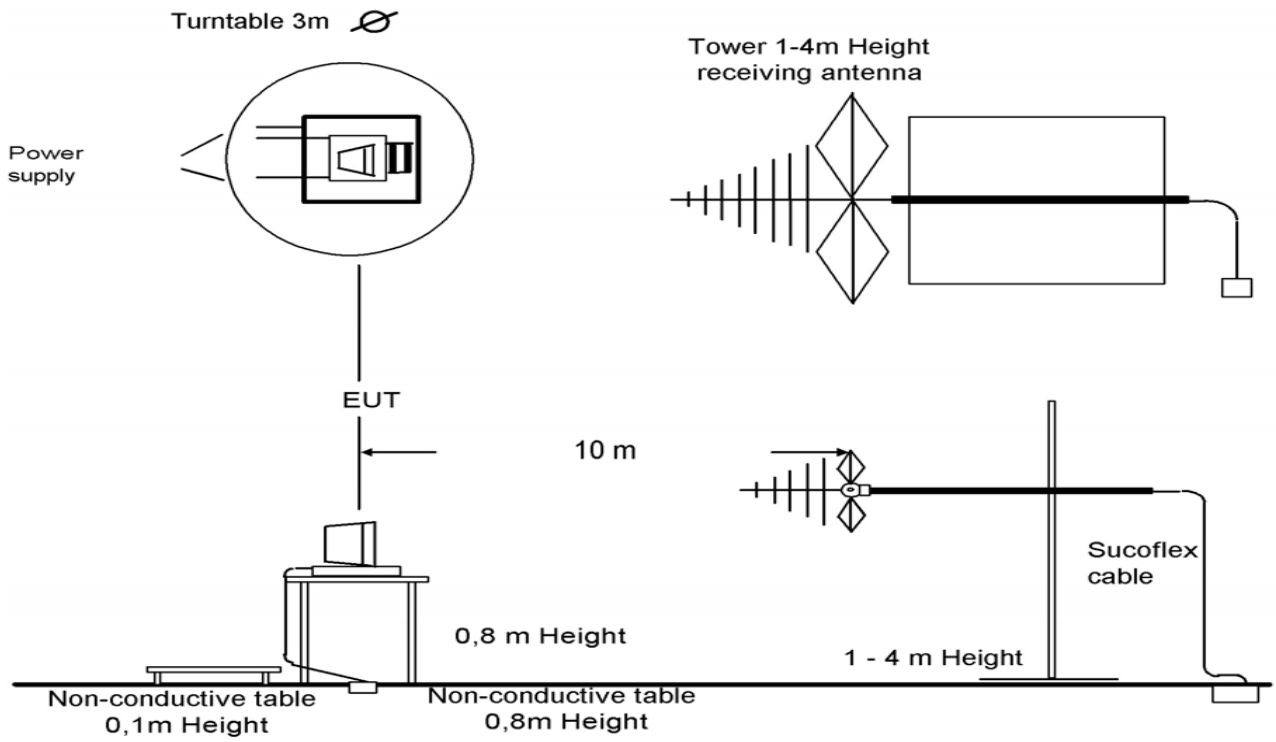
8 RF measurements

8.1 Description of test setup

8.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 25 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 confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2009 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 setups 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 analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63-4-2009 clause 4.2.
Antennas are confirmed with ANSI C63.2-1996 item 15.

Semi anechoic chamber



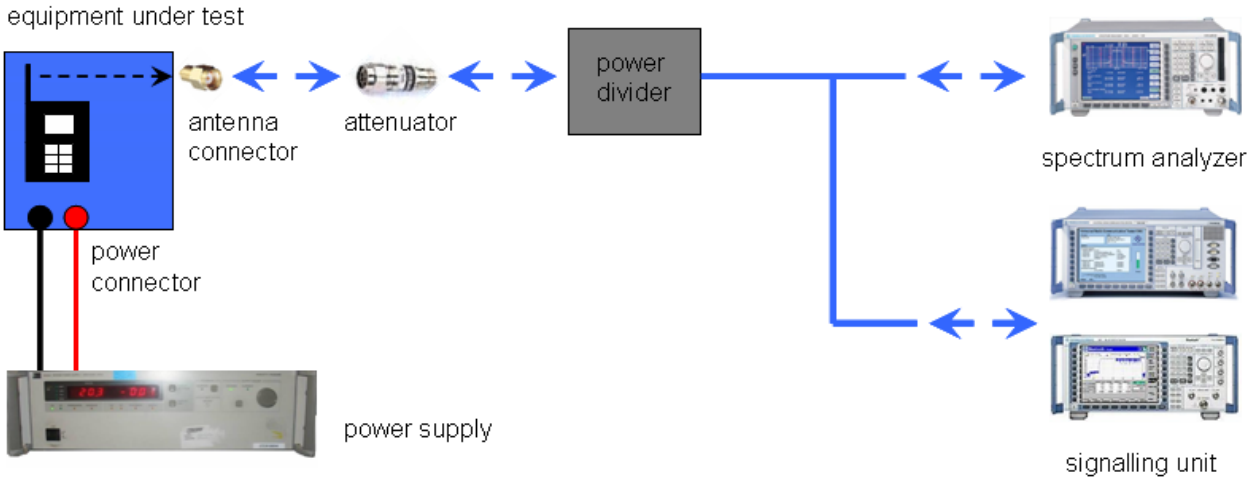
Picture 1: Diagram radiated measurements

9 kHz - 30 MHz:	active loop antenna
30 MHz – 1 GHz:	tri-log antenna
> 1 GHz:	horn antenna

The EUT is powered by an external power supply with nominal voltage. The signalling is performed from outside the chamber with a signalling unit (CMU200 or other) by air link using signalling antenna.

8.1.2 Conducted measurements

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is first 10dB attenuated before it is power divided (~6dB loss per branch). One of the signal paths is connected to the communication base Station (CMU200 or other), the other one is connected to the spectrum analyzer. The specific losses for both signal paths are first checked within a calibration. The measurement readings on the signalling unit/spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



Picture 2: Diagram conducted measurements

8.2 Additional comments

Reference documents: WMS470, User instructions (V1.00), 12/10/9100 U 11350

Special test descriptions: CSCHTX (HT470 handheld transmitter)

Configuration descriptions: None

The manufacturers declared nominal/maximal deviation: 40 kHz / 55 kHz.
The transmitter don't have any standby or idle mode.

For frequency error measurements especially connectorized samples were provided.

Output power and spurious emissions
Tested frequencies Band VII (500.1MHz-530.5MHz): 500.1MHz/515.3MHz/530.5MHz
Tested frequencies Band VIII (570.1MHz-600.5MHz): 570.1MHz/585.3MHz/600.5MHz
Tested frequencies Band IX (600.0MHz-605.9MHz): 600.0MHz/605.9MHz
Tested frequencies Band IX (614.1MHz-630.5MHz): 614.1MHz/622.25MHz/630.5MHz
Tested frequencies Band I (650.1MHz-680.0MHz): 650.1MHz/665.05MHz/680.0MHz

9 Measurement results

9.1 Output power (radiated)

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1MHz
Video bandwidth:	1MHz
Span:	ZERO
Trace-Mode:	Max. hold

Limits:

FCC	IC
47 CFR § 74.861 (e)(1)(ii)	RSS-123 §6.2 Issue 2
Maximum transmitter power	
470-608 and 614-698MHz bands - 250mW (23.98dBm)	

Result:

Band VII (500.1MHz-530.5MHz):

Frequency	Radiated output power
500.1 MHz	+15.0dBm
515.3 MHz	+14.4dBm
530.5 MHz	+14.3dBm

Band VIII (570.1MHz-600.5MHz):

Frequency	Radiated output power
570.1 MHz	+13.8dBm
585.3 MHz	+13.4dBm
600.5 MHz	+13.5dBm

Band IX (600.0MHz-605.9MHz):

Frequency	Radiated output power
600.0 MHz	+14.8dBm
605.9 MHz	+15.0dBm

Band IX (614.1MHz-630.5MHz):

Frequency	Radiated output power
614.1 MHz	+14.7dBm
622.25 MHz	+14.7dBm
630.5 MHz	+15.2dBm

Band I (650.1MHz-680.0MHz):

Frequency	Radiated output power
650.1 MHz	+13.1dBm
665.05 MHz	+12.8dBm
680.0 MHz	+13.4dBm

Result: **The result of the measurement is passed.**

9.2 Frequency stability

9.2.1 Frequency error vs. temperature

Measurement:

Measurement parameter	
Frequency counter	R&S CMTA84

Limits:

FCC	IC
47 CFR § 74.861	RSS-123 §7 Issue 2
The frequency tolerance of the transmitter shall be 0.005 percent (50ppm)	

Results:

Band VII (500.1MHz-530.5MHz):

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	515.3	-2.6 / 5
-20 °C	515.3	-0.1 / 0
-10 °C	515.3	+0.9 / 2
0 °C	515.3	+1.1 / 2
10 °C	515.3	+0.4 / 1
20 °C	515.3	-1.7 / 3
30 °C	515.3	-2.4 / 5
40 °C	515.3	-4.0 / 8
50 °C	515.3	-4.6 / 9

Band VIII (570.1MHz-600.5MHz):

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	585.3	-0.4 / 1
-20 °C	585.3	+0.7 / 1
-10 °C	585.3	+2.0 / 3
0 °C	585.3	+1.8 / 3
10 °C	585.3	+0.7 / 1
20 °C	585.3	-1.5 / 3
30 °C	585.3	-2.4 / 4
40 °C	585.3	-4.8 / 8
50 °C	585.3	-5.5 / 9

Band IX (600.0MHz-630.5MHz):

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	620.65	+0.7 / 1
-20 °C	620.65	+4.0 / 6
-10 °C	620.65	+5.2 / 8
0 °C	620.65	+5.8 / 9
10 °C	620.65	+5.6 / 9
20 °C	620.65	+3.6 / 6
30 °C	620.65	+3.5 / 6
40 °C	620.65	+2.0 / 3
50 °C	620.65	+1.3 / 2

Band I (650.1MHz-680.0MHz):

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	665.05	-8.0 / 12
-20 °C	665.05	-5.6 / 8
-10 °C	665.05	-3.8 / 6
0 °C	665.05	-3.5 / 5
10 °C	665.05	-4.2 / 6
20 °C	665.05	-6.3 / 9
30 °C	665.05	-6.8 / 10
40 °C	665.05	-7.9 / 12
50 °C	665.05	-9.4 / 14

Result: **The result of the measurement is passed.**

9.2.2 Frequency error vs. voltage

Measurement:

Measurement parameter	
Frequency counter	R&S CMTA84
Temperature	22°C

Limits:

FCC	IC
47 CFR § 74.861	RSS-123 §7 Issue 2
The frequency tolerance of the transmitter shall be 0.005 percent (50ppm)	

Results:

Band VII (500.1MHz-530.5MHz):

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
1.1 V	515.3	-1.6 / 3
1.2 V	515.3	-1.7 / 3
1.3 V	515.3	-1.7 / 3
1.4 V	515.3	-1.7 / 3
1.5 V	515.3	-1.7 / 3
1.6 V	515.3	-1.7 / 3
1.7 V	515.3	-1.7 / 3
1.8 V	515.3	-1.6 / 3

Band VIII (570.1MHz-600.5MHz):

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
1.1 V	585.3	-1.5 / 3
1.2 V	585.3	-1.5 / 3
1.3 V	585.3	-1.6 / 3
1.4 V	585.3	-1.5 / 3
1.5 V	585.3	-1.5 / 3
1.6 V	585.3	-1.5 / 3
1.7 V	585.3	-1.5 / 3
1.8 V	585.3	-1.5 / 3

Band IX (600.0MHz-630.5MHz):

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
1.1 V	620.65	+3.6 / 6
1.2 V	620.65	+3.6 / 6
1.3 V	620.65	+3.6 / 6
1.4 V	620.65	+3.6 / 6
1.5 V	620.65	+3.6 / 6
1.6 V	620.65	+3.6 / 6
1.7 V	620.65	+3.6 / 6
1.8 V	620.65	+3.6 / 6

Band I (650.1MHz-680.0MHz):

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
1.1 V	665.05	-6.3 / 9
1.2 V	665.05	-6.3 / 9
1.3 V	665.05	-6.3 / 9
1.4 V	665.05	-6.2 / 9
1.5 V	665.05	-6.3 / 9
1.6 V	665.05	-6.2 / 9
1.7 V	665.05	-6.2 / 9
1.8 V	665.05	-6.2 / 9

Result: **The result of the measurement is passed.**

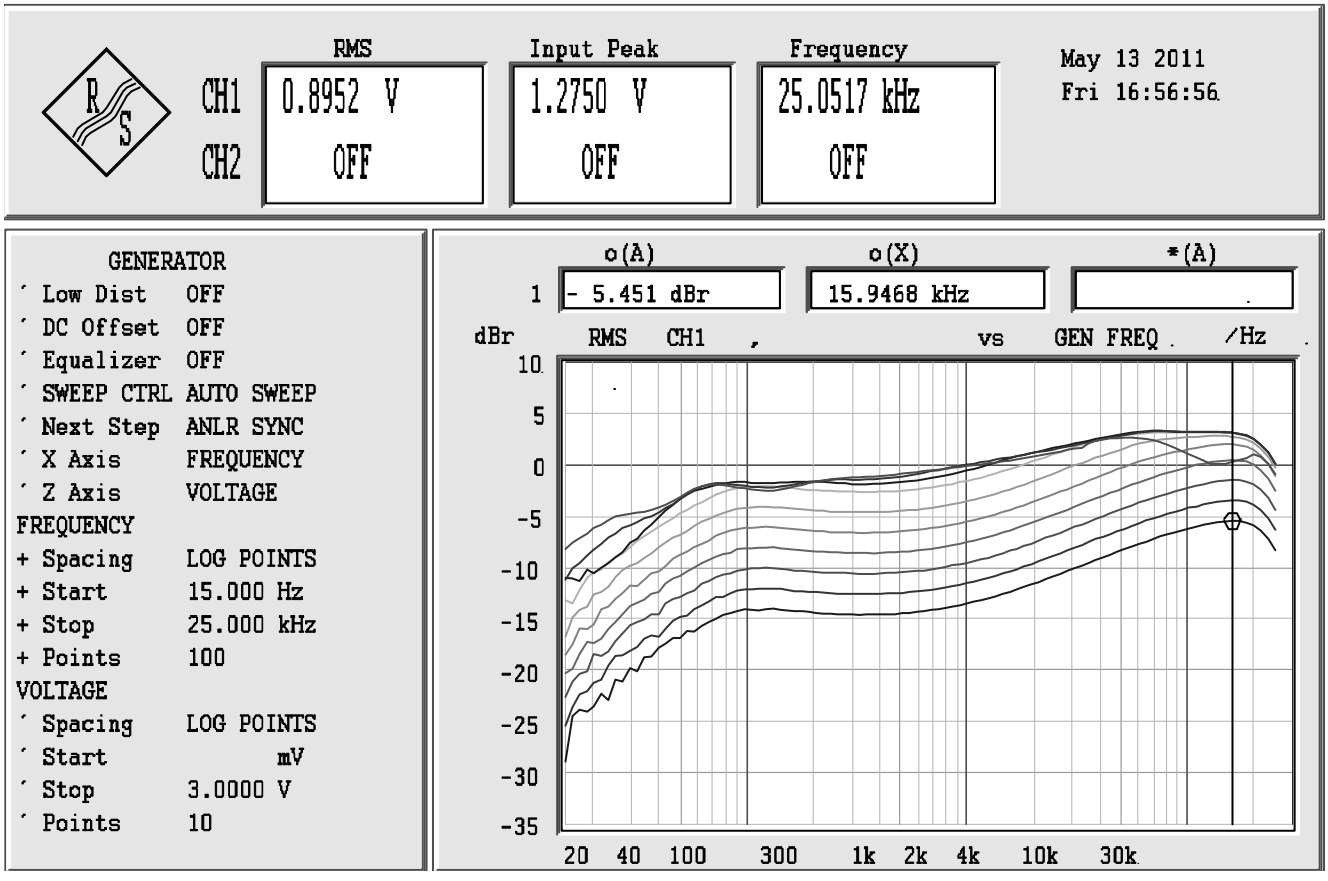
9.3 Modulation characteristics

Measurement:

FCC	IC
47 CFR § 2.1047 47 CFR § 74.861	-/-

Method of measurement:

The audio frequency responds was measured in accordance with EIA/TIA 603. The plots shows 10 curves with different modulation levels, the frequency is varied from 15 Hz to 20 kHz.
Measured conducted at microphone cartridge.



Max. deviation : 55 kHz

Result: **The result of the measurement is passed.**

9.4 Occupied bandwidth

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 kHz
Video bandwidth:	3 kHz
Span:	1 MHz
Trace-Mode:	Max. hold

Limits:

FCC	IC
47 CFR § 74.861 (e) (3)	RSS-123 §5 Issue 2
Occupied bandwidth 99%.	
The operating bandwidth shall not exceed 200 kHz	

Result:

Band VII (500.1MHz-530.5MHz):

Frequency	20dB Bandwidth
500.1 MHz	112 kHz
515.3 MHz	124 kHz
530.5 MHz	132 kHz

Band VIII (570.1MHz-600.5MHz):

Frequency	20dB Bandwidth
570.1 MHz	130 kHz
585.3 MHz	130 kHz
600.5 MHz	132 kHz

Band IX (600.0MHz-605.9MHz):

Frequency	20dB Bandwidth
600.0 MHz	132 kHz
605.9 MHz	130 kHz

Band IX (614.1MHz-630.5MHz):

Frequency	20dB Bandwidth
614.1 MHz	130 kHz
622.25 MHz	128 kHz
630.5 MHz	114 kHz

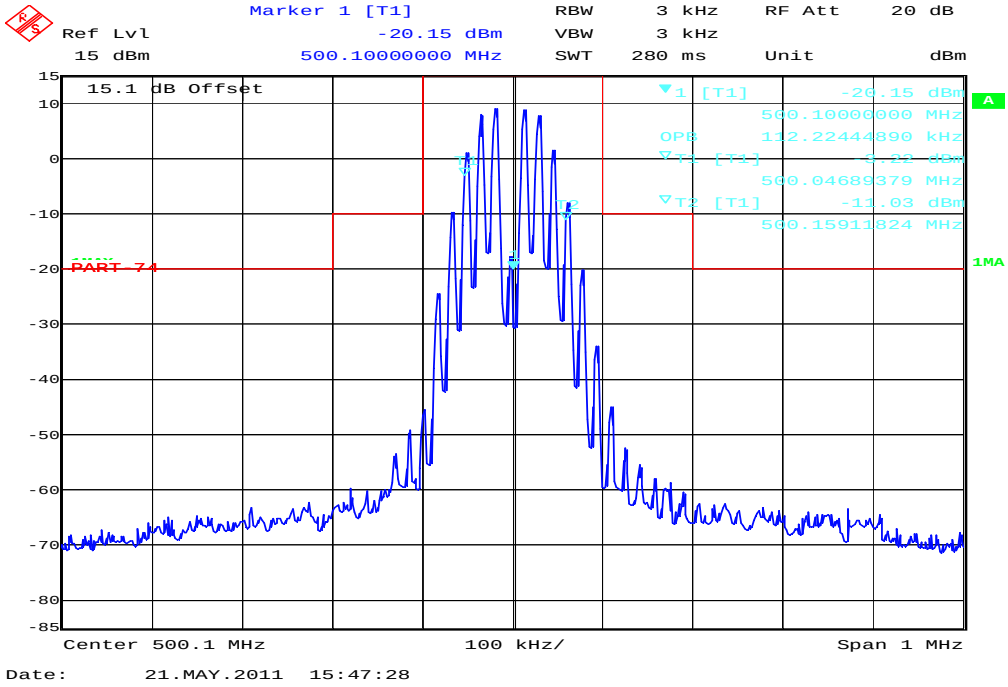
Band I (650.1MHz-680.0MHz):

Frequency	20dB Bandwidth
650.1 MHz	130 kHz
665.05 MHz	130 kHz
680.0 MHz	132 kHz

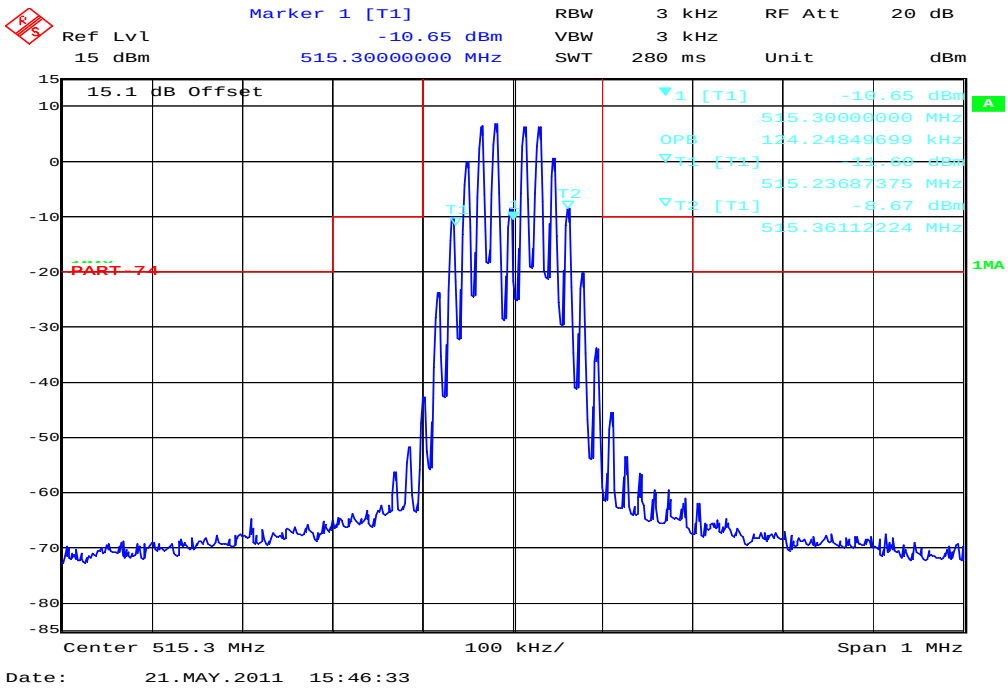
Result: **The result of the measurement is passed.**

Plots of the measurements

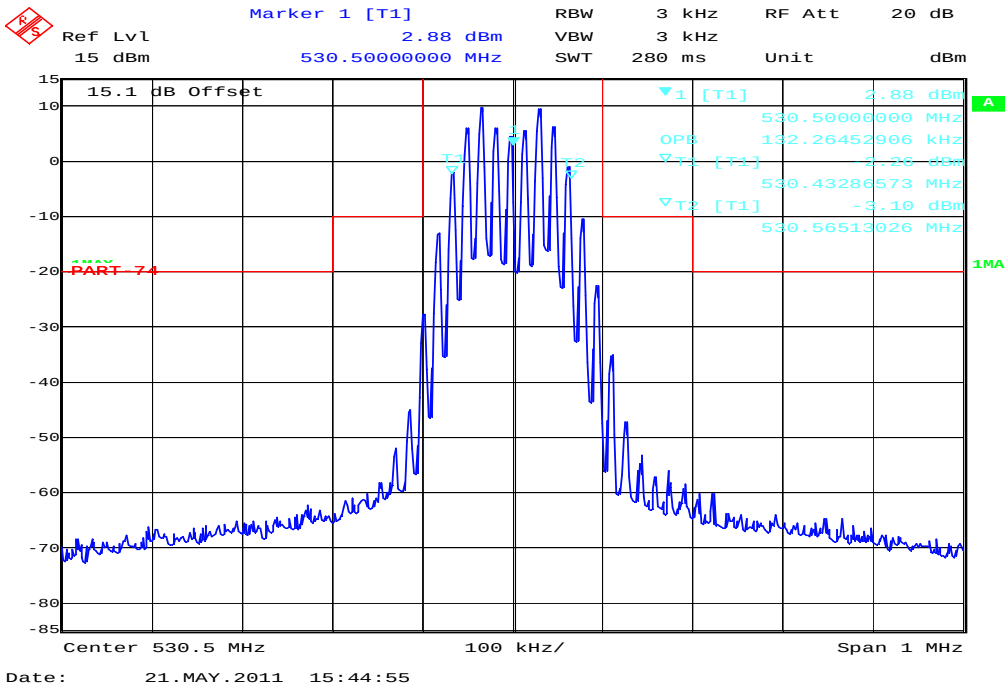
Plot 1: Band VII (500.1MHz-530.5MHz) low channel



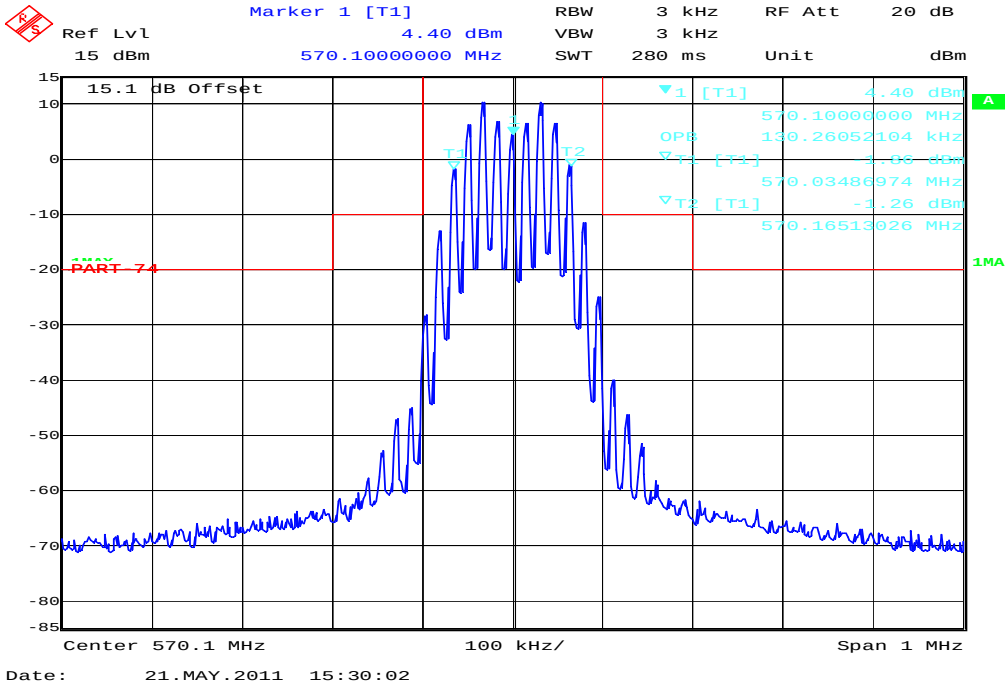
Plot 2: Band VII (500.1MHz-530.5MHz) middle channel



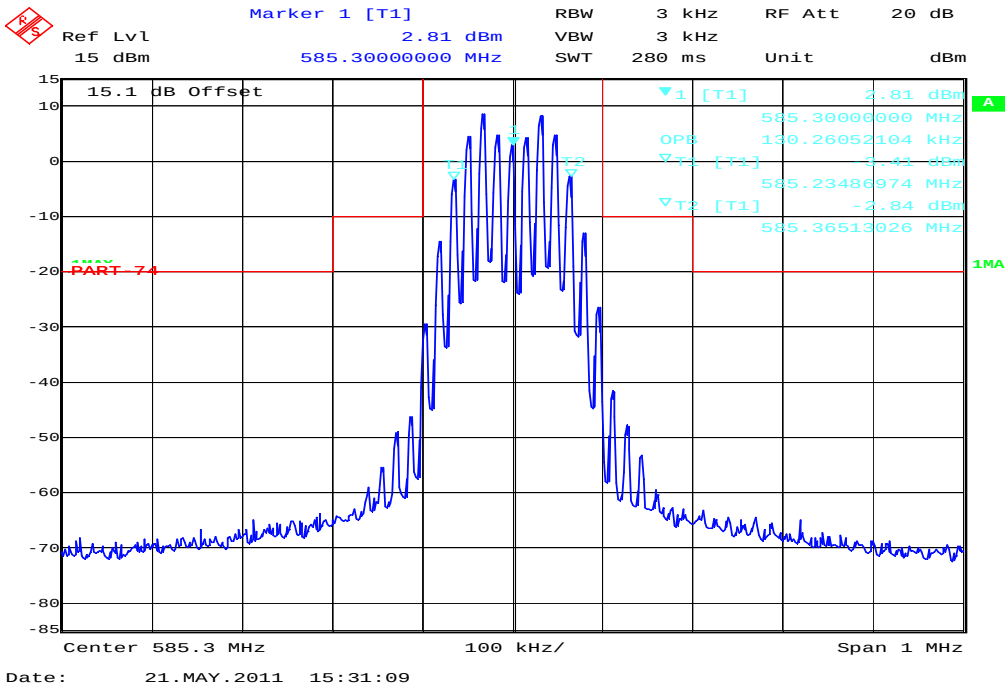
Plot 3: Band VII (500.1MHz-530.5MHz) high channel



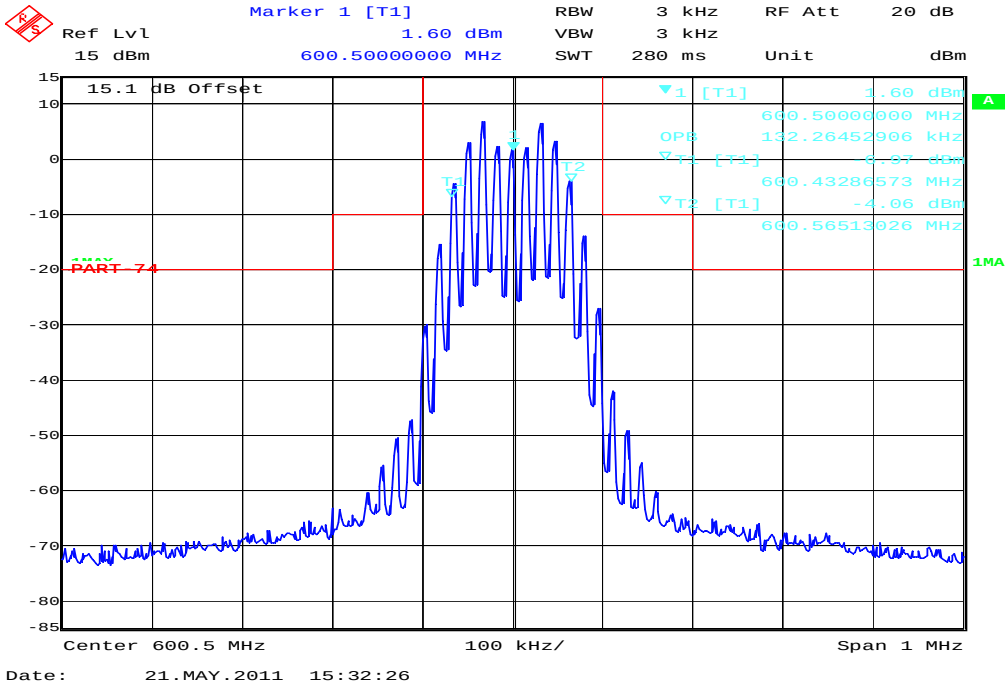
Plot 4: Band VIII (570.1MHz-600.5MHz) low channel



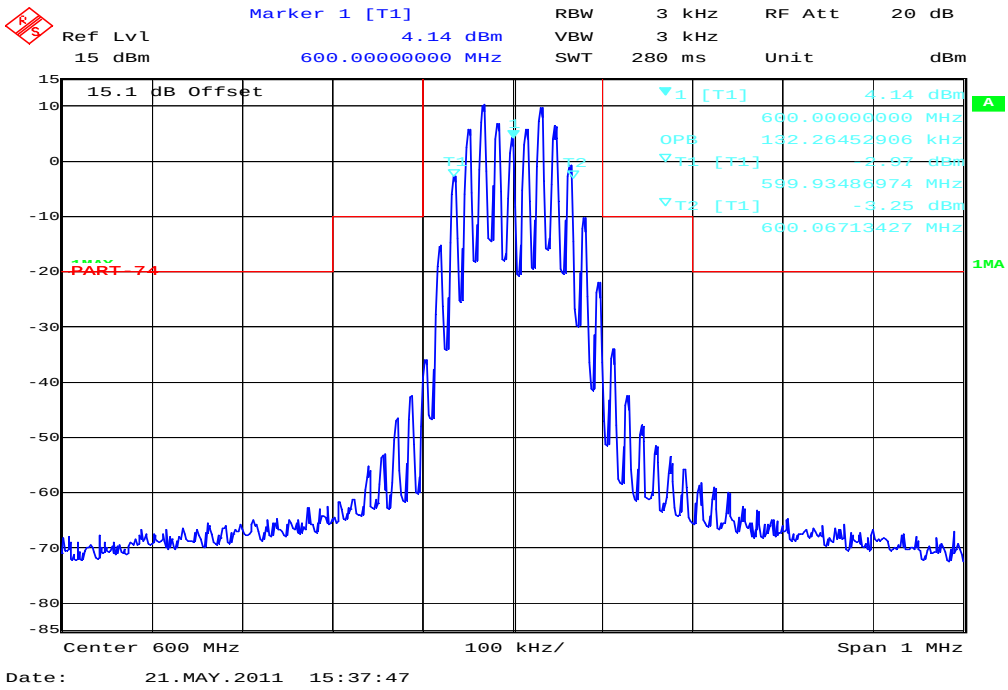
Plot 5: Band VIII (570.1MHz-600.5MHz) middle channel



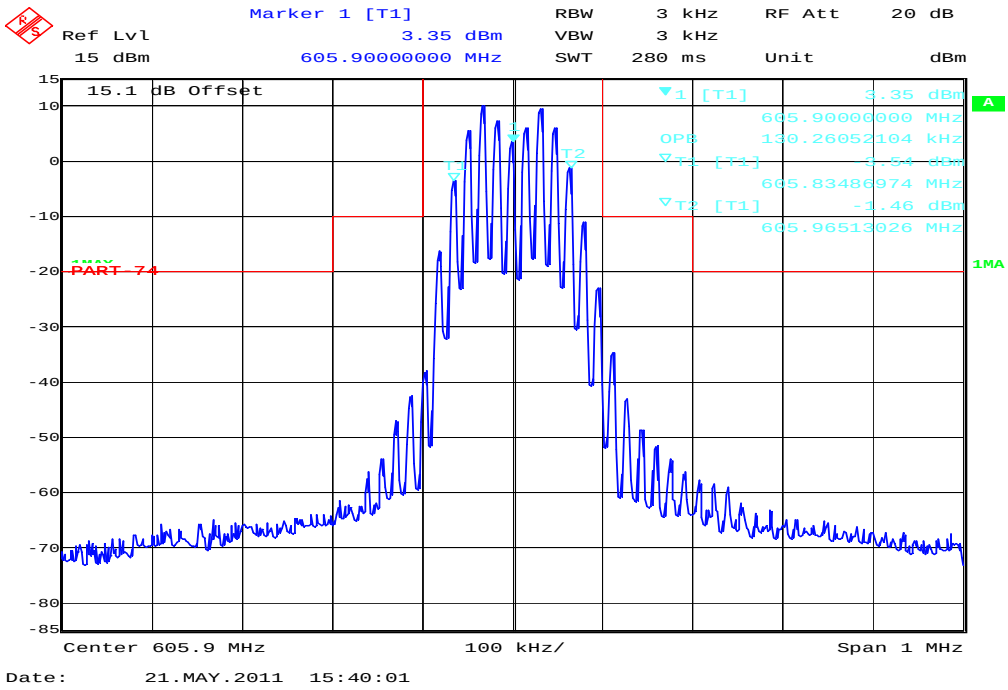
Plot 6: Band VIII (570.1MHz-600.5MHz) high channel



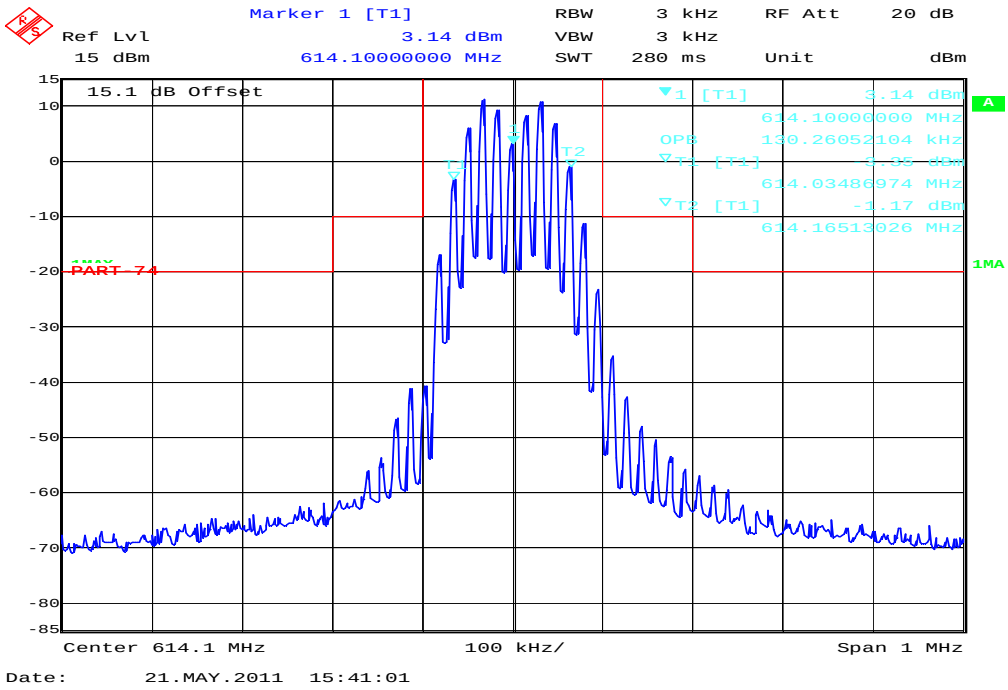
Plot 7: Band IX (600.0MHz-605.9MHz) low channel



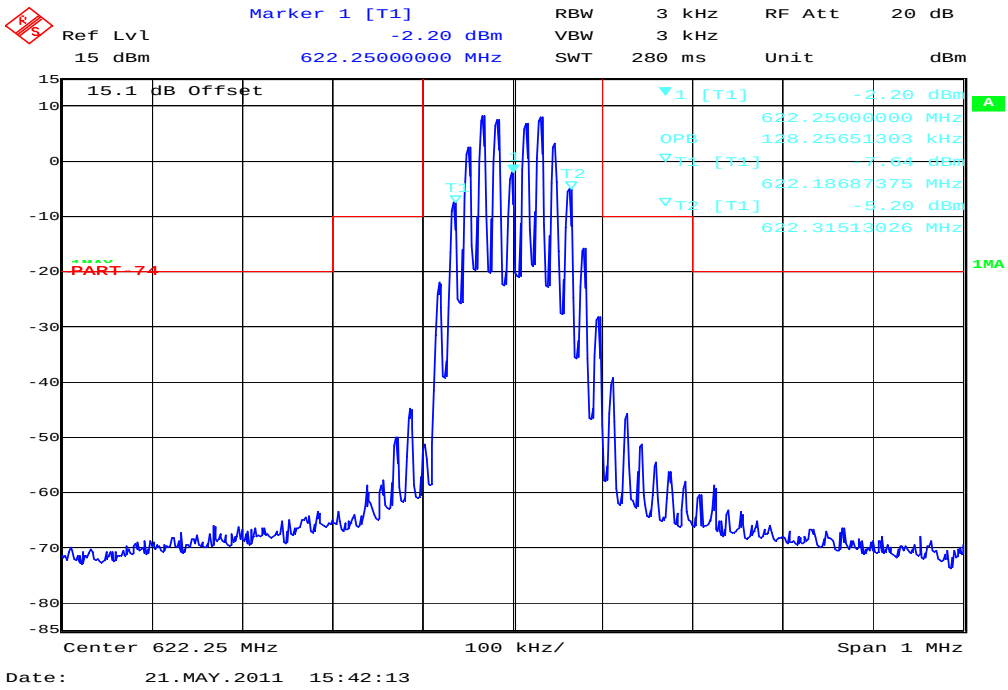
Plot 8: Band IX (600.0MHz-605.9MHz) high channel



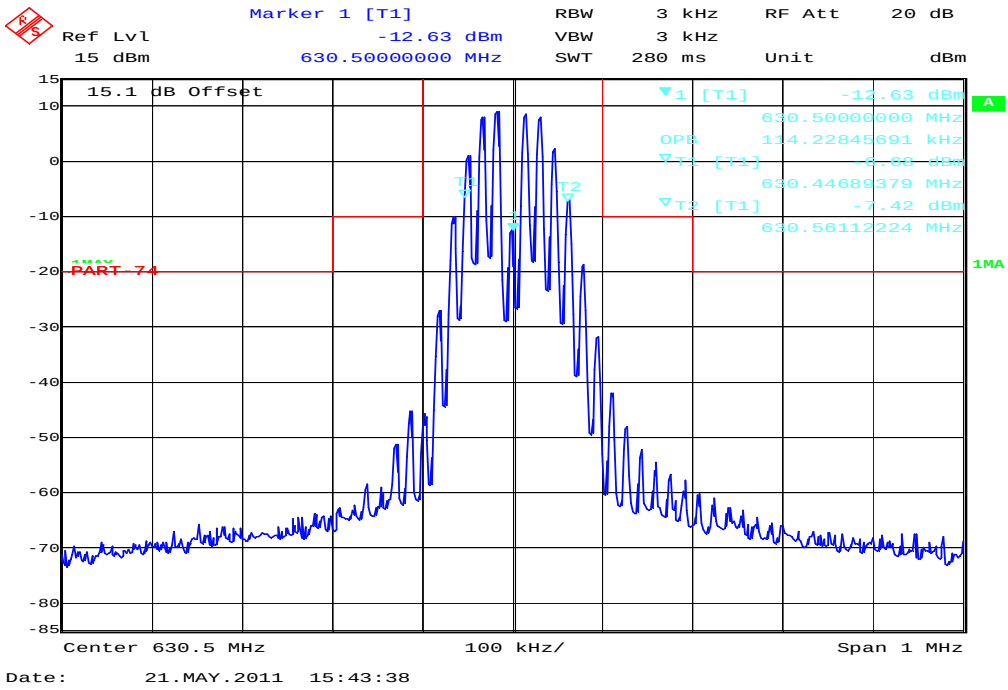
Plot 9: Band IX (614.1MHz-630.5MHz) low channel



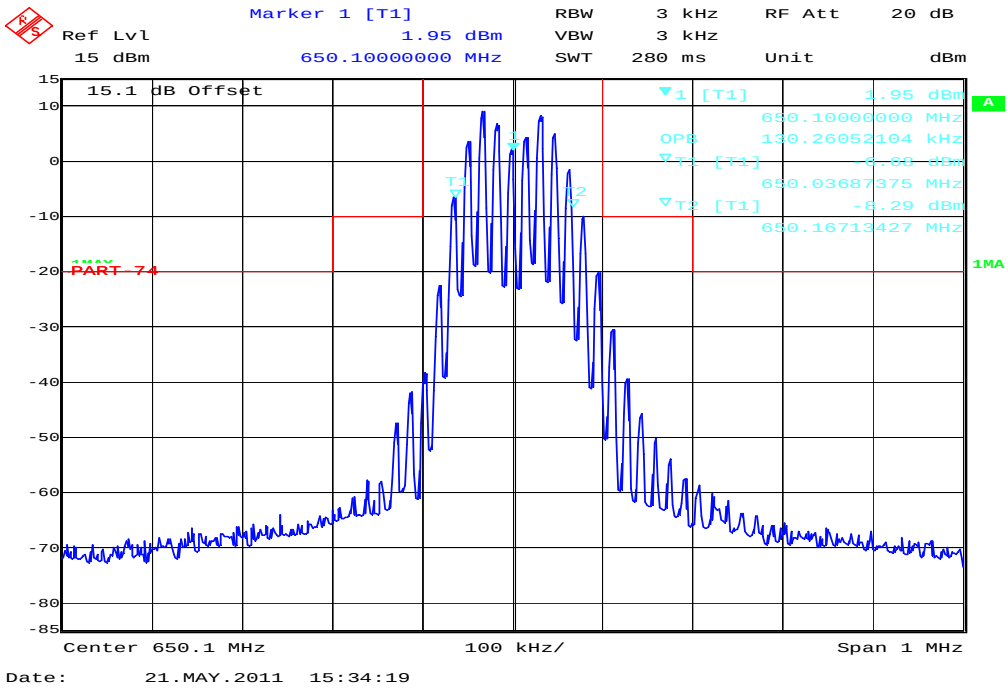
Plot 10: Band IX (614.1MHz-630.5MHz) middle channel



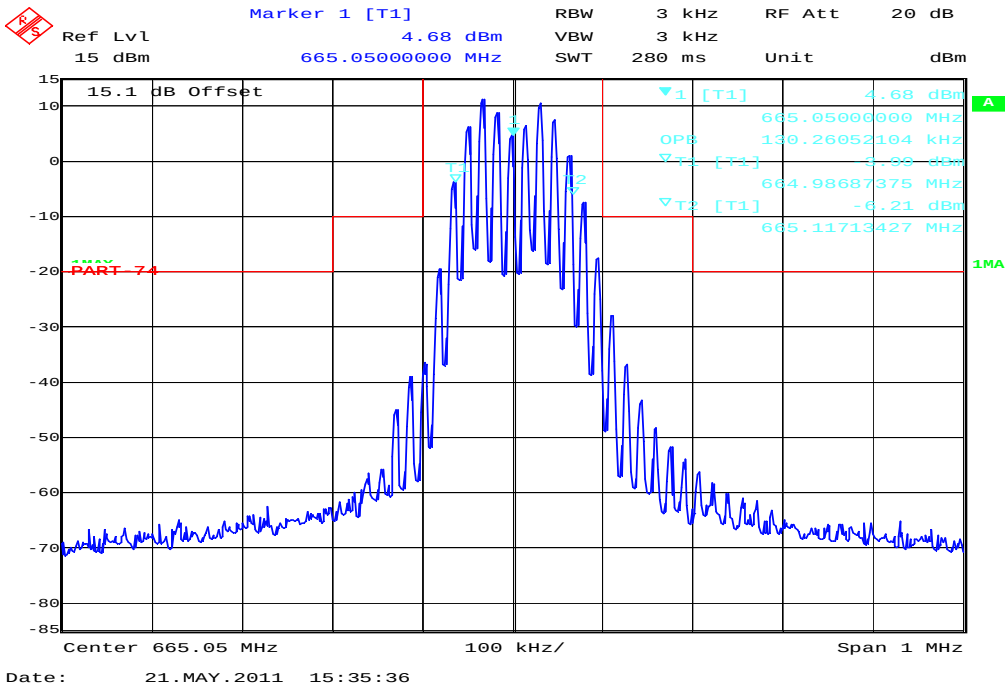
Plot 11: Band IX (614.1MHz-630.5MHz) high channel



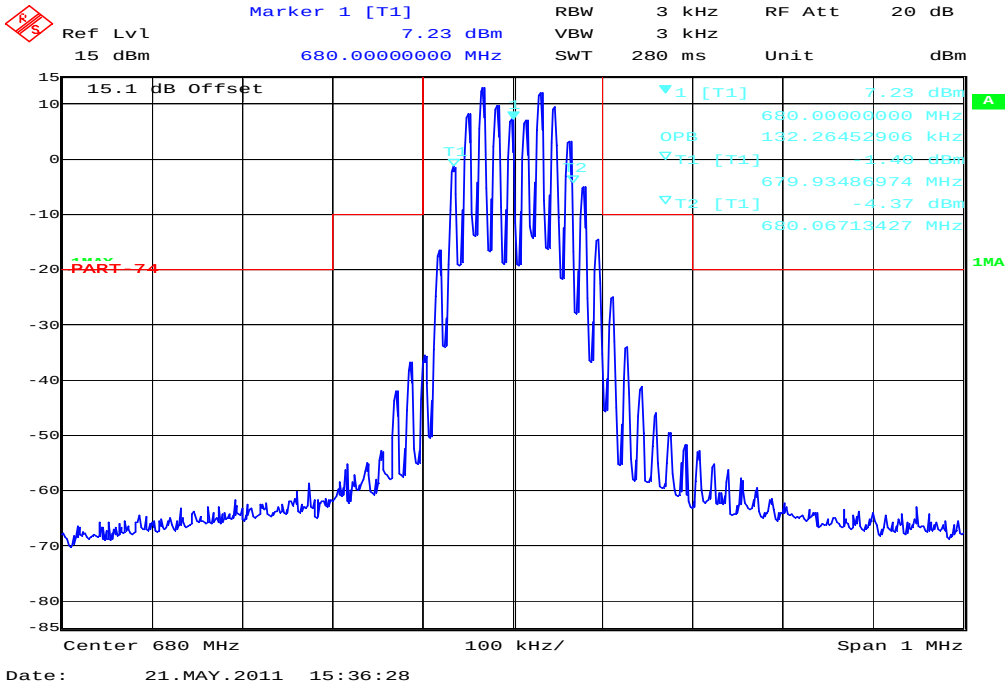
Plot 12: Band I (650.1MHz-680.0MHz) low channel



Plot 13: Band I (650.1MHz-680.0MHz) middle channel



Plot 14: Band I (650.1MHz-680.0MHz) high channel



9.5 Unwanted radiation (spectrum mask)

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3kHz
Video bandwidth:	3kHz
Span:	1MHz
Trace-Mode:	Max. hold

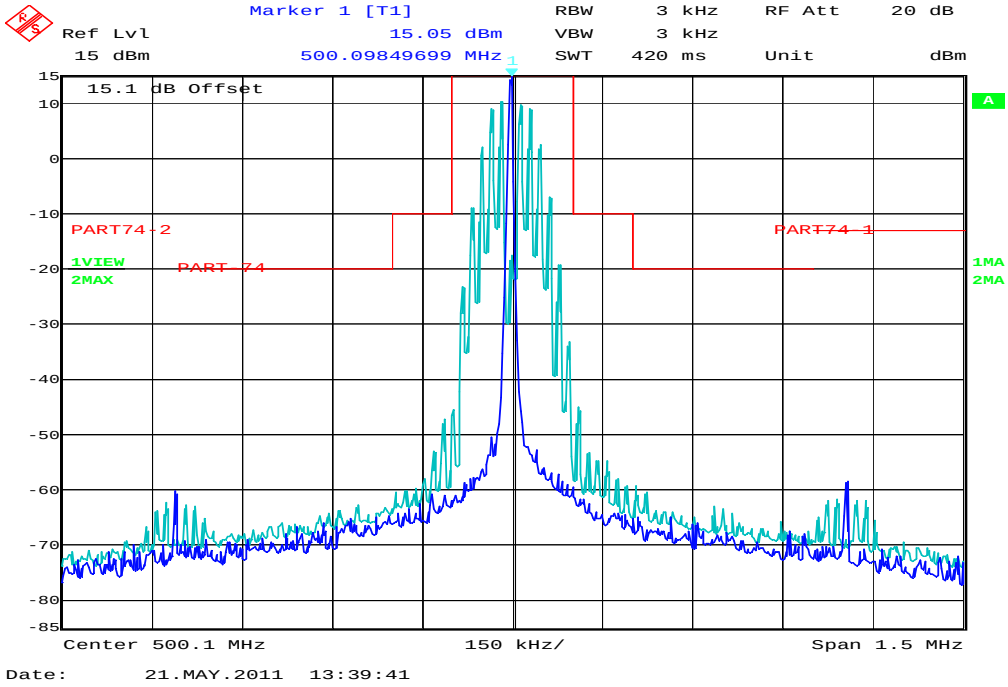
Limits:

FCC	IC
47 CFR § 74.861	RSS-123 §5.5 Issue 2
The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule: (i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB; (ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB; (iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log10 (mean output power in watts) dB.	

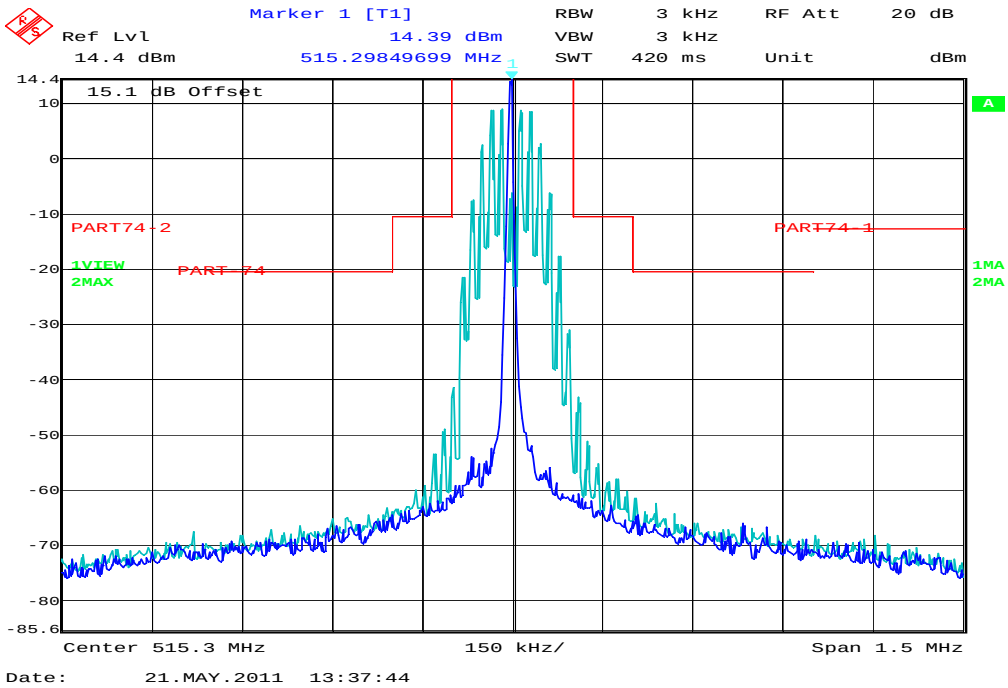
Result: **The result of the measurement is passed.**

Plots of the measurements

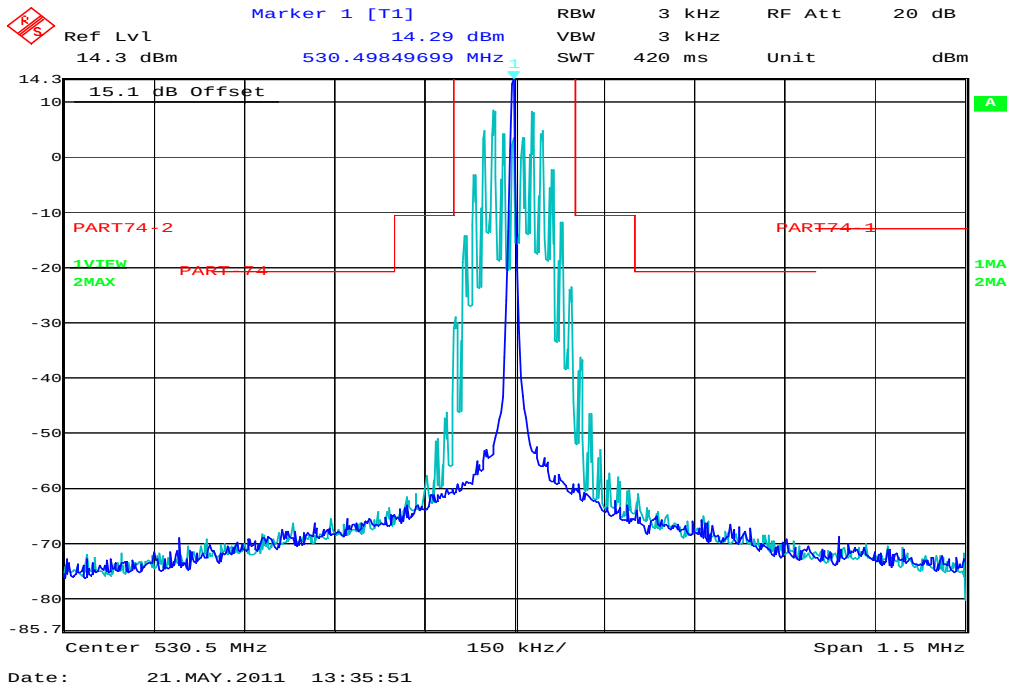
Plot 1: Band VII (500.1MHz-530.5MHz) low channel



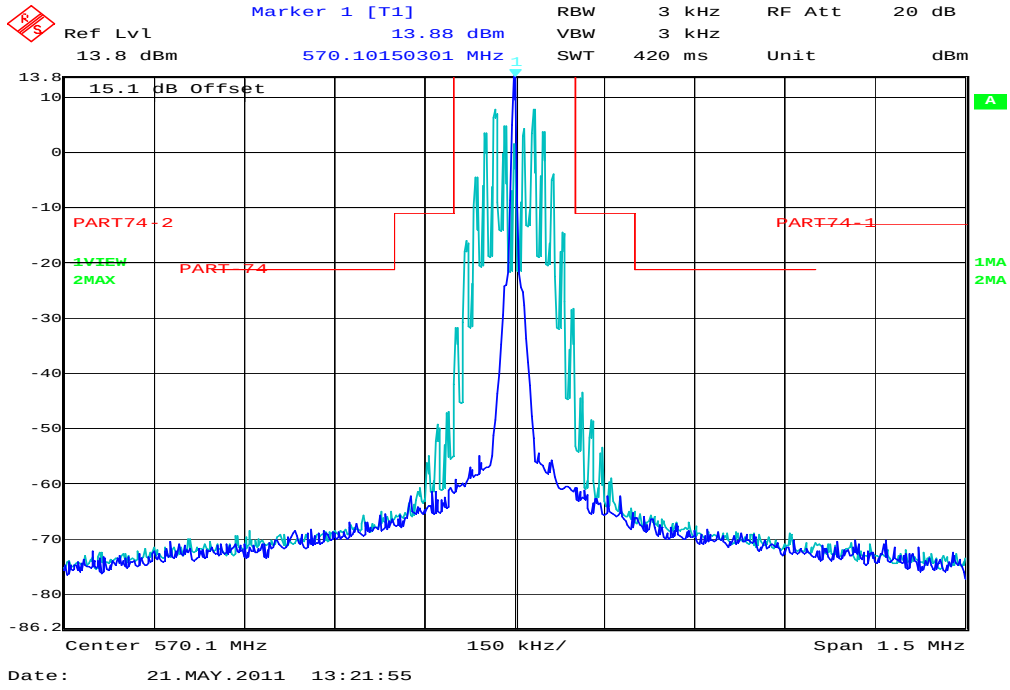
Plot 2: Band VII (500.1MHz-530.5MHz) middle channel



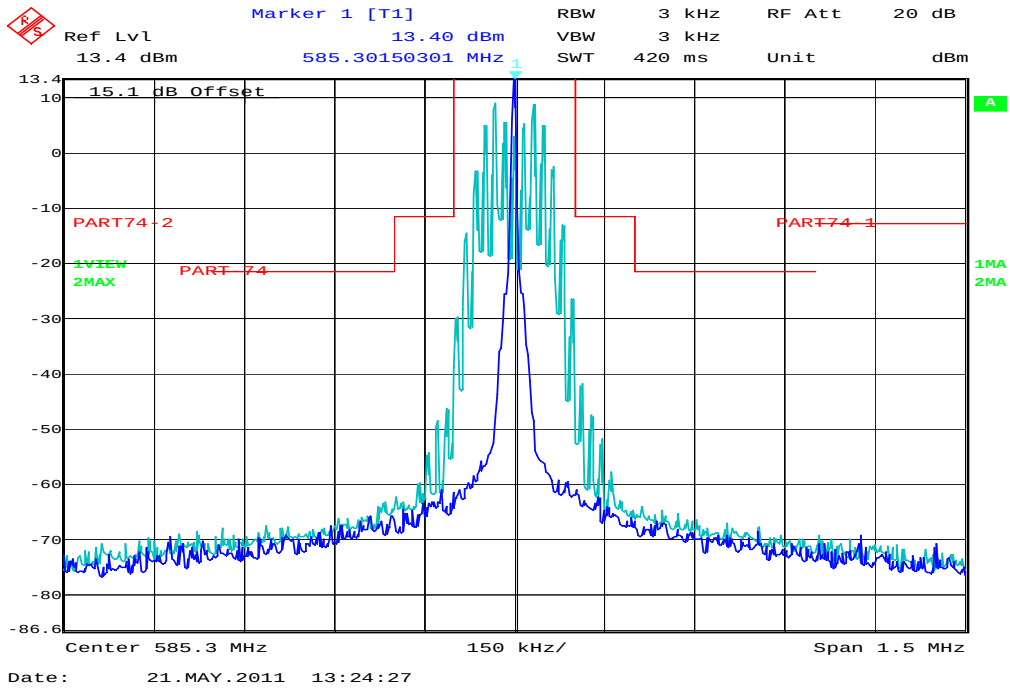
Plot 3: Band VII (500.1MHz-530.5MHz) high channel



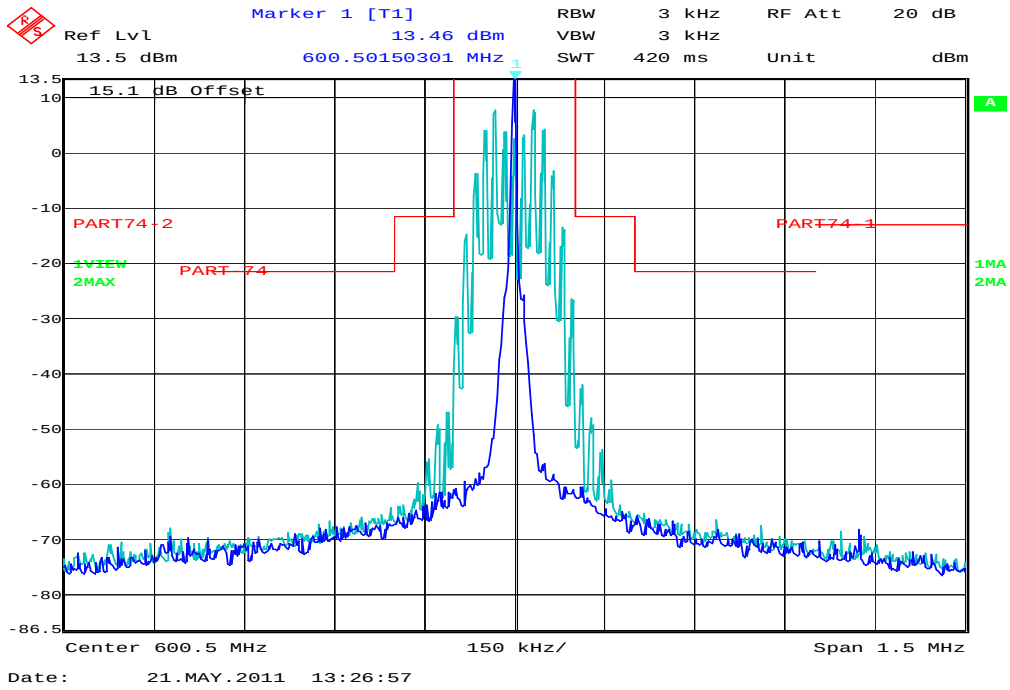
Plot 4: Band VIII (570.1MHz-600.5MHz) low channel



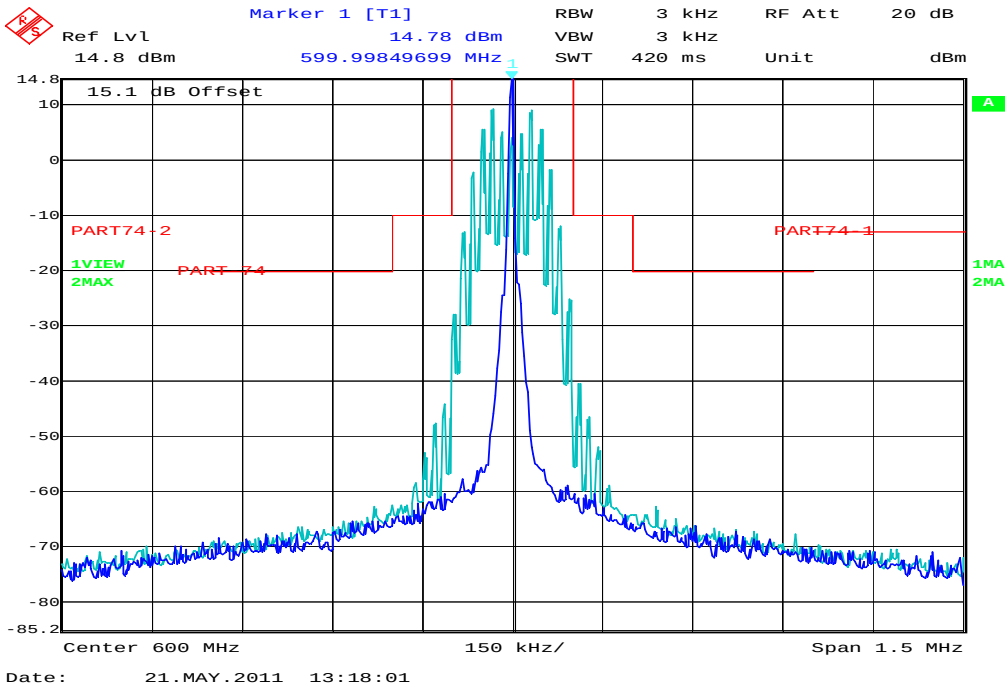
Plot 5: Band VIII (570.1MHz-600.5MHz) middle channel



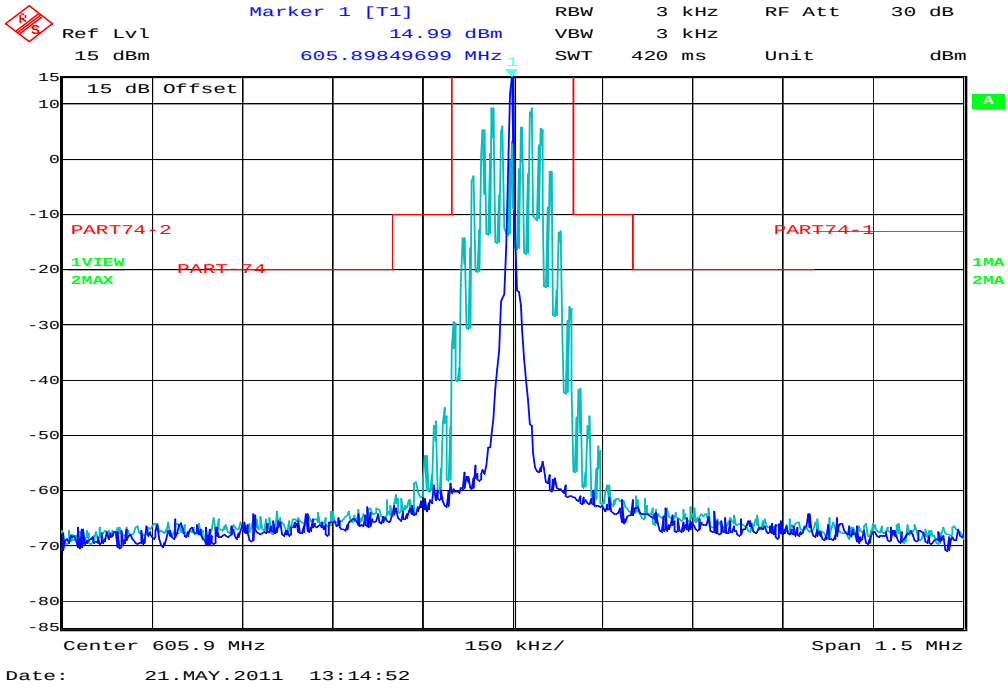
Plot 6: Band VIII (570.1MHz-600.5MHz) high channel



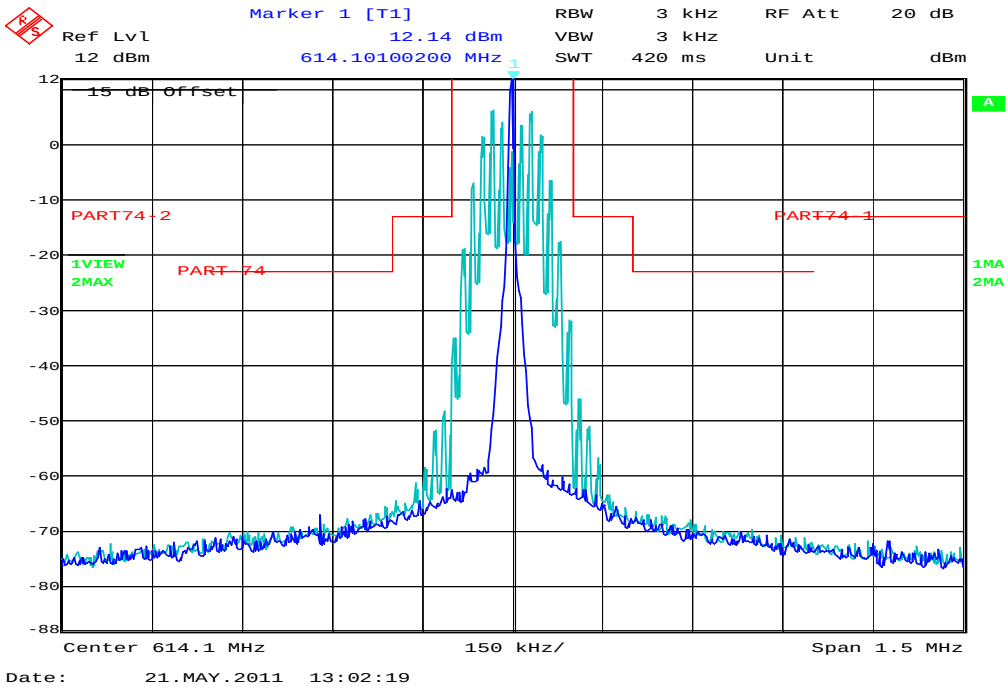
Plot 7: Band IX (600.0MHz-605.9MHz) low channel



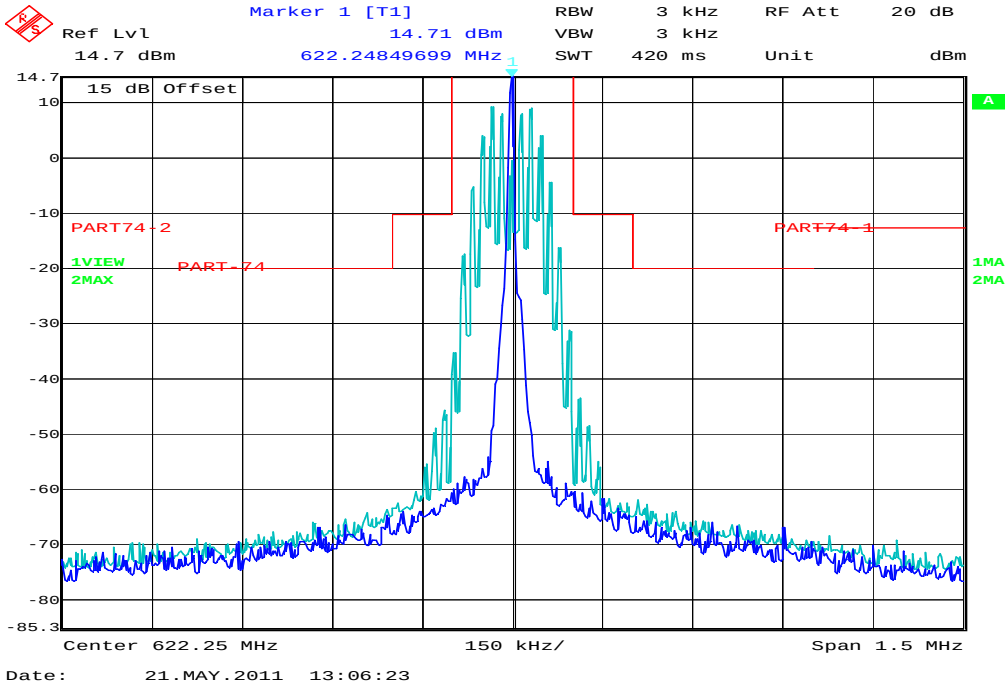
Plot 8: Band IX (600.0MHz-605.9MHz) high channel



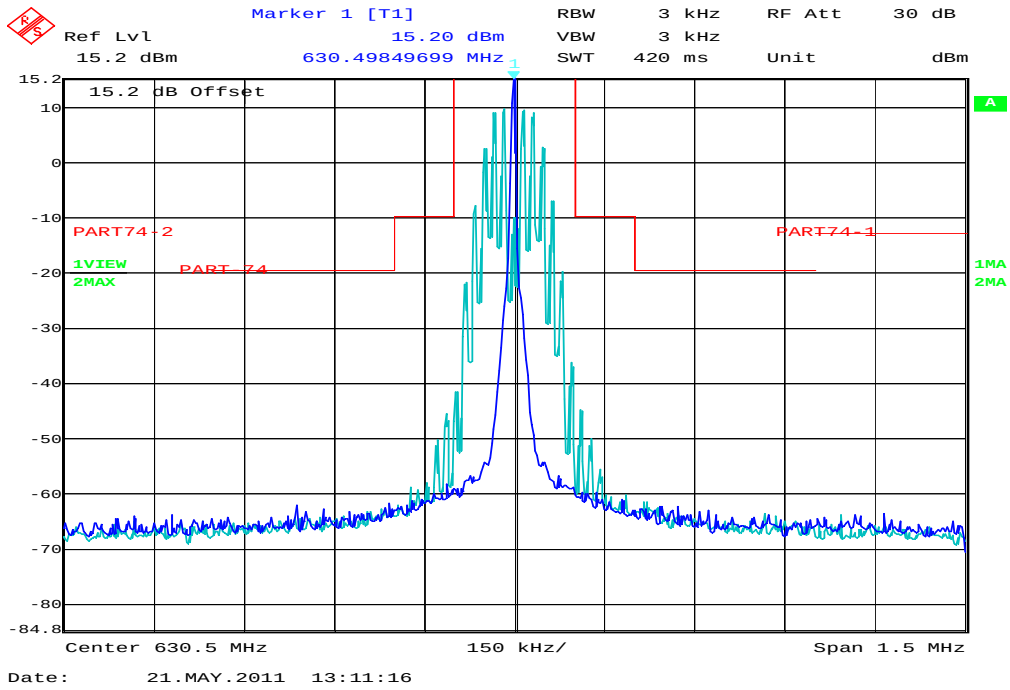
Plot 9: Band IX (614.1MHz-630.5MHz) low channel



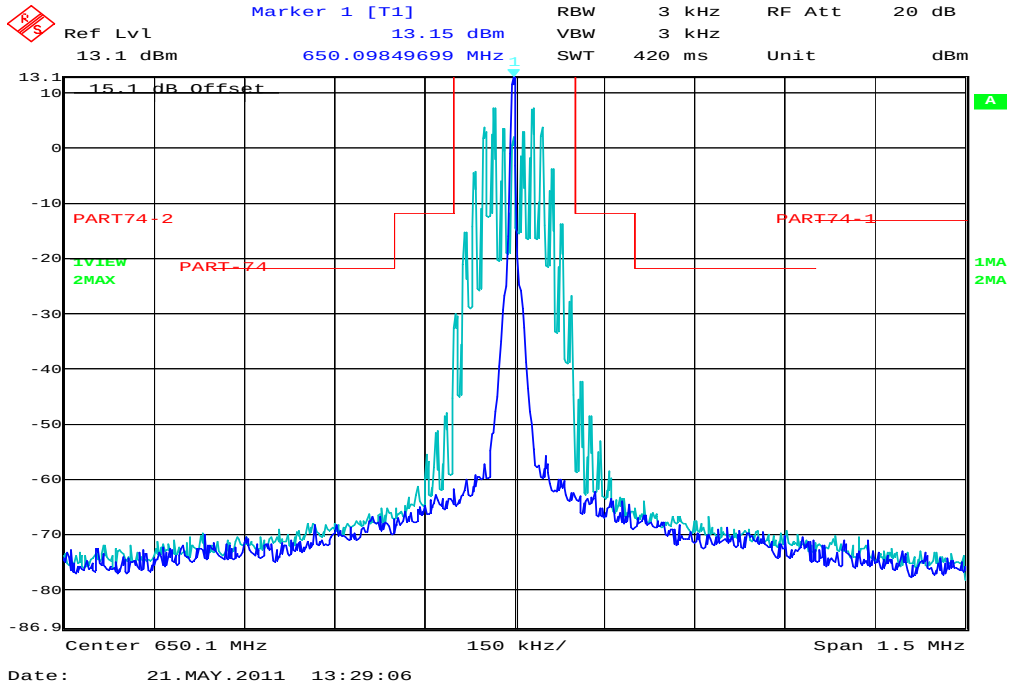
Plot 10: Band IX (614.1MHz-630.5MHz) middle channel



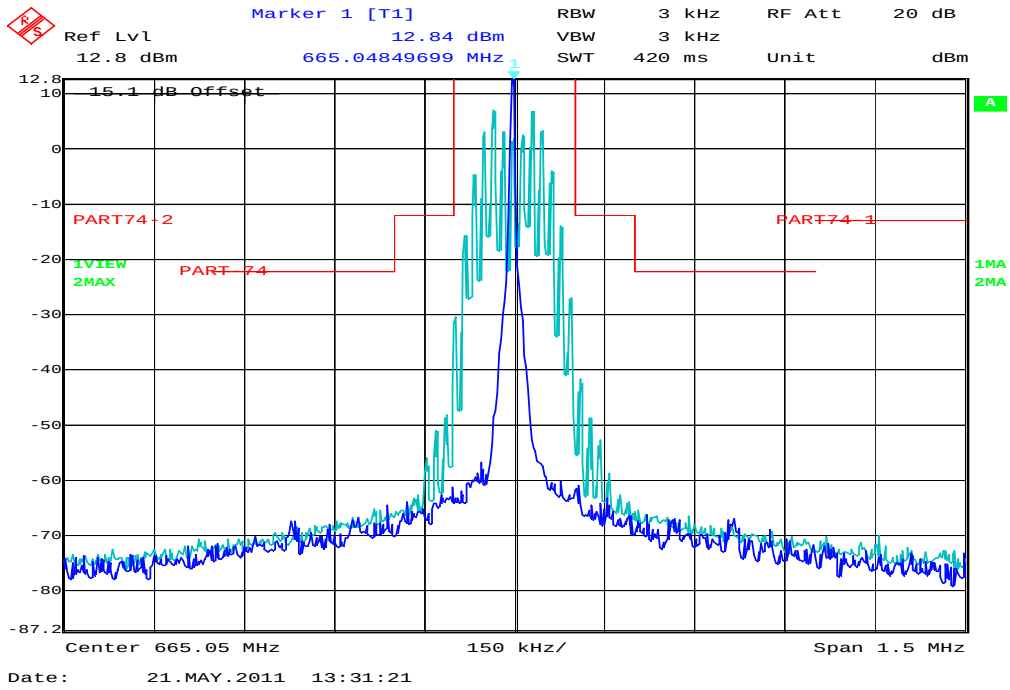
Plot 11: Band IX (614.1MHz-630.5MHz) high channel



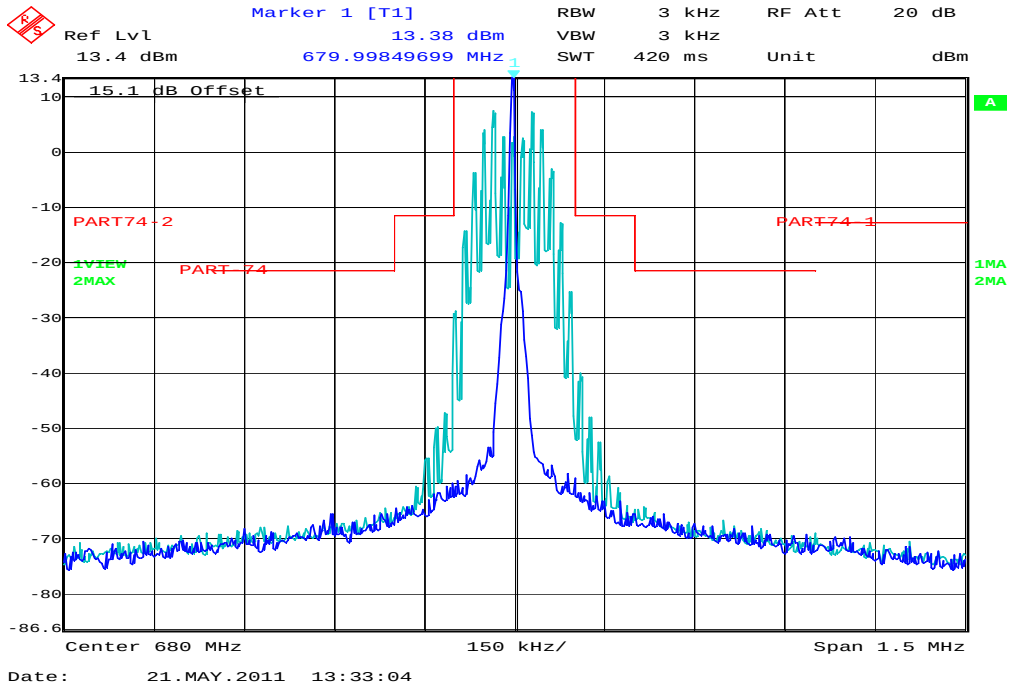
Plot 12: Band I (650.1MHz-680.0MHz) low channel



Plot 13: Band I (650.1MHz-680.0MHz) middle channel



Plot 14: Band I (650.1MHz-680.0MHz) high channel



9.6 Field strength of spurious radiation.

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	f < 1 GHz : 100 kHz f ≥ 1GHz : 1 MHz
Video bandwidth:	f < 1 GHz : 100 kHz f ≥ 1GHz : 1 MHz
Span:	-/-
Trace-Mode:	Max. hold

Limits:

FCC	IC
Emissions for LPRS transmitters operating on standard band channels (25 kHz) shall be attenuated below the unmodulated carrier in accordance with the following: Emissions 12.5 kHz to 22.5 kHz away from the channel center frequency: at least 30 dB; and emissions more than 22.5 kHz away from the channel center frequency: **FCC:** at least 43 + 10log(carrier power in watts) dB **IC:** at least 55 + 10log(carrier power in watts) dB.	

Result:

Band VII (500.1MHz-530.5MHz):

SPURIOUS EMISSIONS LEVEL (dBm)								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
			All detected peaks are more than 20dB below the spurious limit *			All detected peaks are more than 20dB below the spurious limit *		
1000.2	PK	-31.2	1030.6	PK	-40.4	1061.0	PK	-51.8
2000.4	PK	-41.5	2061.1	PK	-43.1	3182.9	PK	-45.9
2500.5	PK	-44.4	4637.2	PK	-41.1	5835.4	PK	-37.6
4000.6	PK	-46.7						
Measurement uncertainty ± 3 dB								

* highest peaks stated

Band VIII (570.1MHz-600.5MHz):

SPURIOUS EMISSIONS LEVEL (dBm)								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
			All detected peaks are more than 20dB below the spurious limit			All detected peaks are more than 20dB below the spurious limit *		
2280.5	PK	-44.9				2402.0	PK	-41.6
2850.5	PK	-43.0				4804.0	PK	-43.5
4560.8	PK	-40.0				5404.5	PK	-39.1
5701.0	PK	-32.5						
6841.6	PK	-41.2						
Measurement uncertainty ± 3 dB								

* highest peaks stated

Band IX (600.0MHz-605.9MHz):

SPURIOUS EMISSIONS LEVEL (dBm)								
Lowest channel			-/-			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
All detected peaks are more than 20dB below the spurious limit *						All detected peaks are more than 20dB below the spurious limit *		
2400.0	PK	-42.2				4847.2	PK	-42.3
5400.0	PK	-35.3				5453.0	PK	-33.9
6600.0	PK	-39.8				6665.1	PK	-41.5
Measurement uncertainty ± 3 dB								

* highest peaks stated

Band IX (614.1MHz-630.5MHz):

SPURIOUS EMISSIONS LEVEL (dBm)								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
All detected peaks are more than 20dB below the spurious limit *			All detected peaks are more than 20dB below the spurious limit *			All detected peaks are more than 20dB below the spurious limit *		
4912.8	PK	-40.50	3111.3	PK	-45.7	3783.0	PK	-45.7
5526.9	PK	-34.67	4355.8	PK	-42.0	4413.6	PK	-40.9
6755.1	PK	-42.00	8089.3	PK	-40.2	5674.7	PK	-34.8
Measurement uncertainty ± 3 dB								

* highest peaks stated

Band I (650.1MHz-680.0MHz):

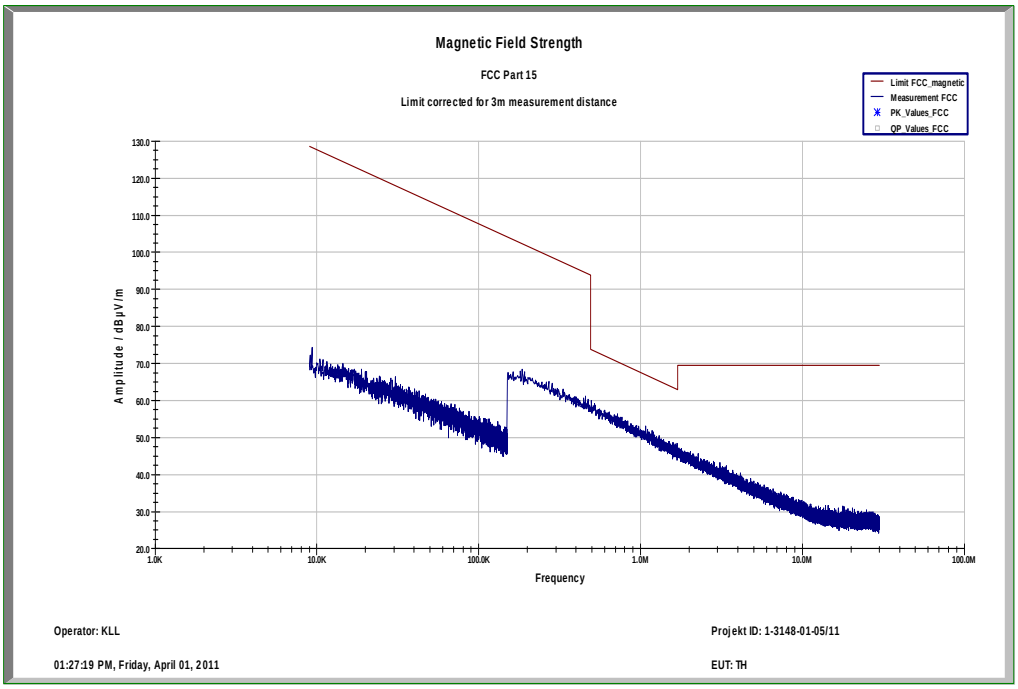
SPURIOUS EMISSIONS LEVEL (dBm)								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
All detected peaks are more than 20dB below the spurious limit *			All detected peaks are more than 20dB below the spurious limit *			All detected peaks are more than 20dB below the spurious limit *		
3900.6	PK	-44.9	3990.2	PK	-43.8	4760.0	PK	-38.5
4500.7	PK	-41.6	4655.3	PK	-38.2	5440.0	PK	-34.9
7151.2	PK	-41.7	5320.4	PK	-39.4	6800.0	PK	-41.4
Measurement uncertainty ± 3 dB								

* highest peaks stated

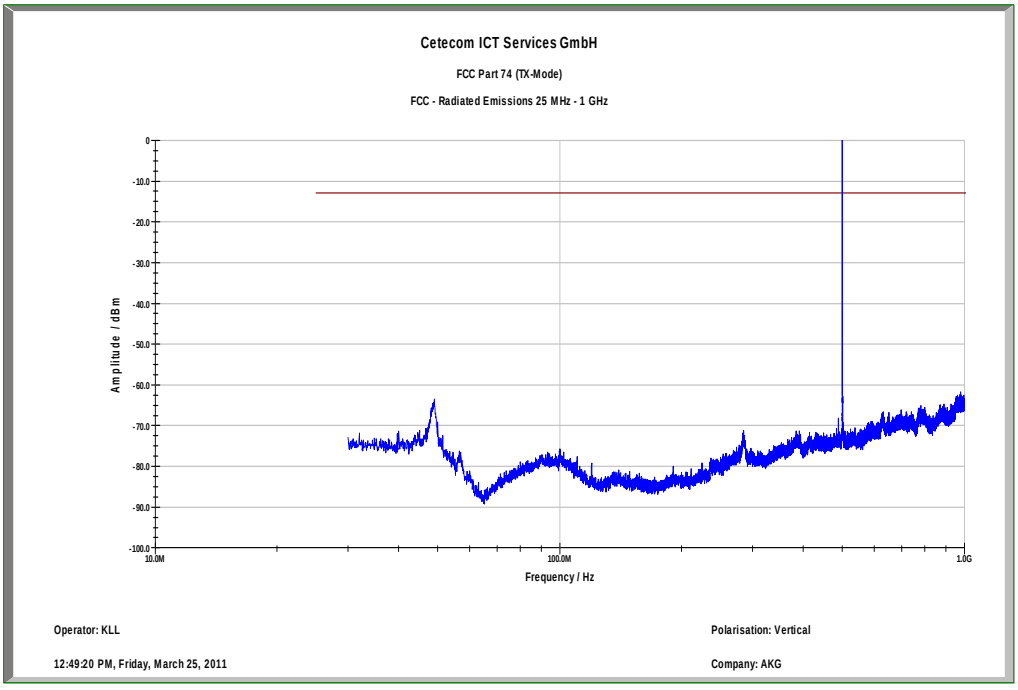
Result: **The result of the measurement is passed.**

Plots of the measurements:

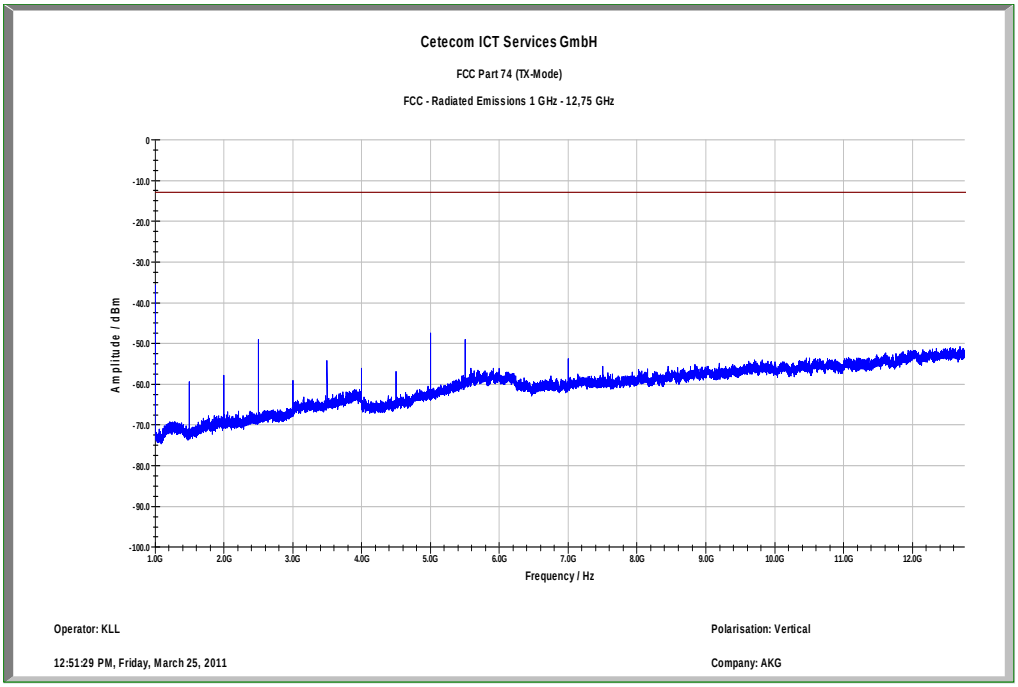
Plot 1: Band VII (500.1MHz-530.5MHz) low channel, <30MHz



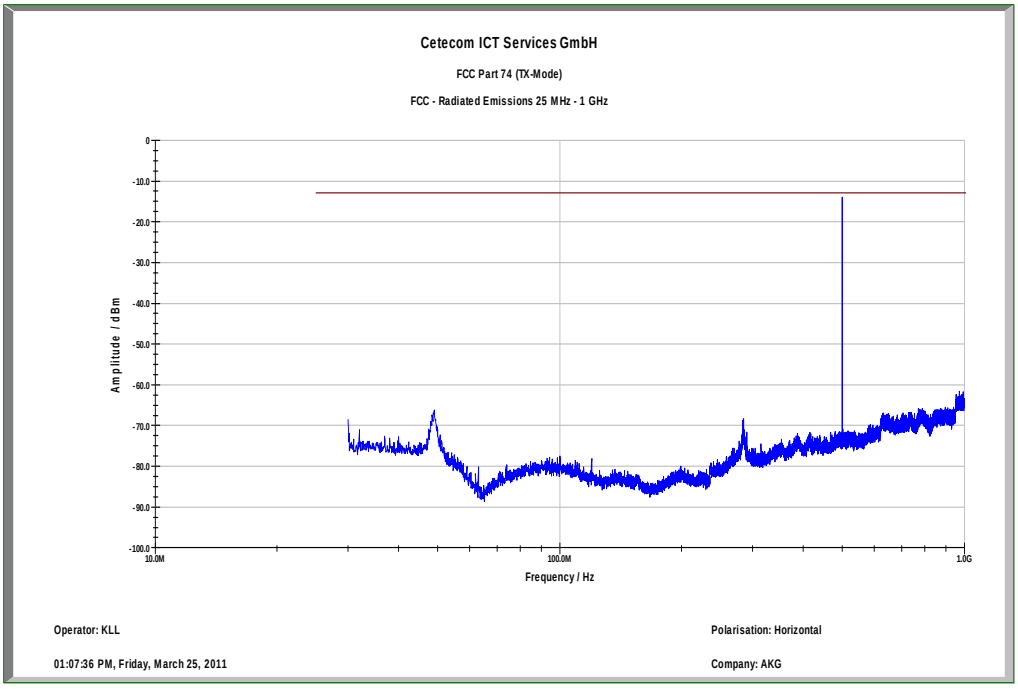
Plot 2: Band VII (500.1MHz-530.5MHz) low channel, 30 MHz – 1 GHz, antenna vertical



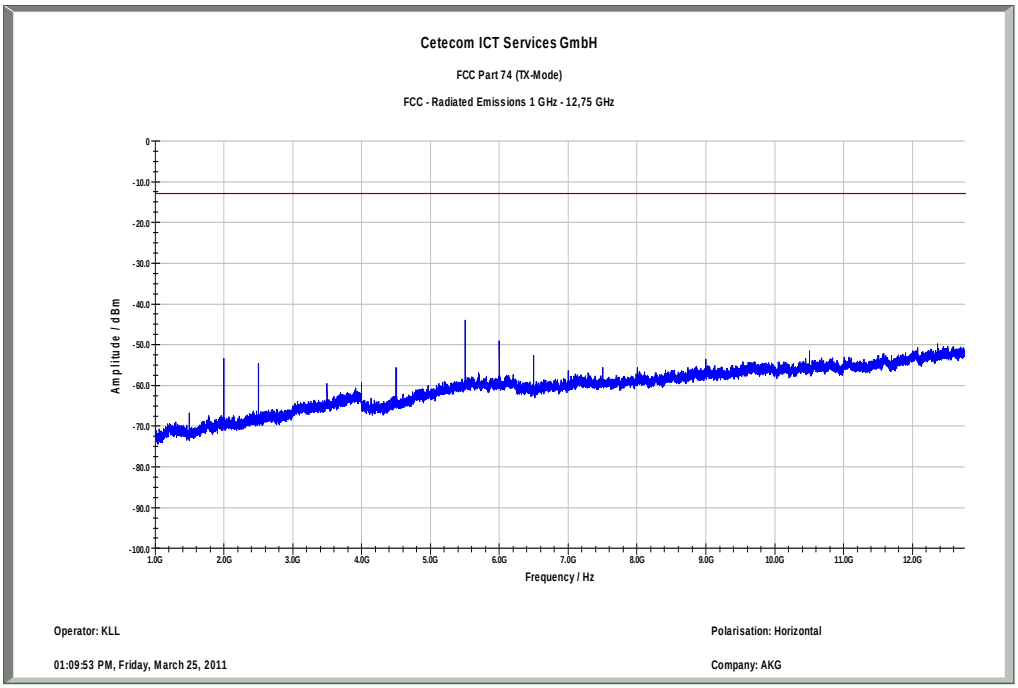
Plot 3: Band VII (500.1MHz-530.5MHz) low channel, 1 GHz – 12.75 GHz, antenna vertical



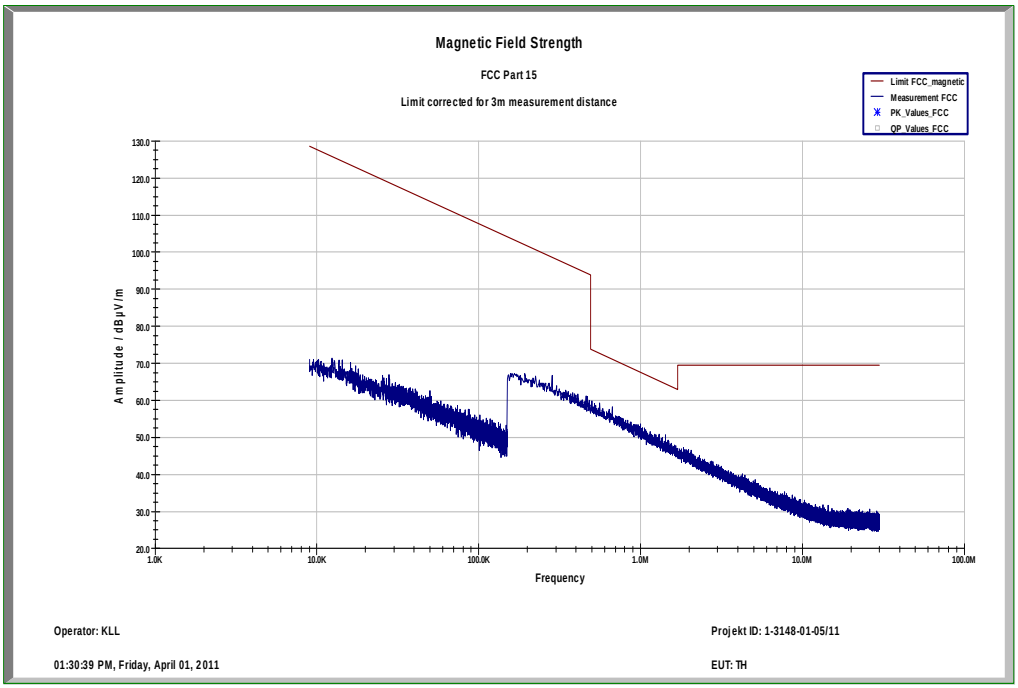
Plot 4: Band VII (500.1MHz-530.5MHz) low channel, 30 MHz – 1 GHz, antenna horizontal



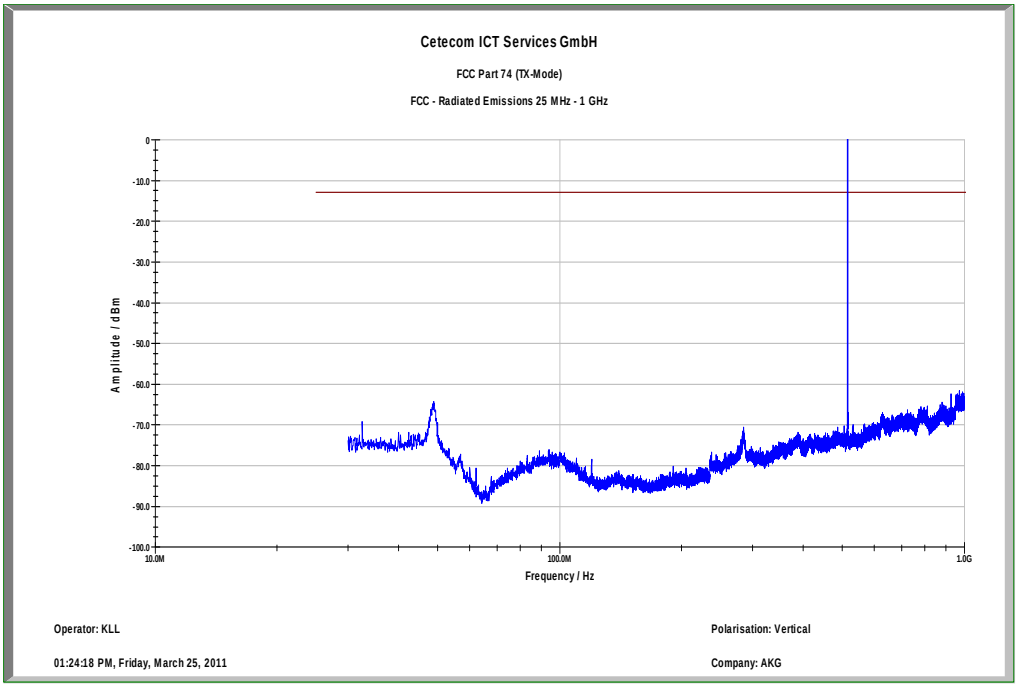
Plot 5: Band VII (500.1MHz-530.5MHz) low channel, 1 GHz – 12.75 GHz, antenna horizontal



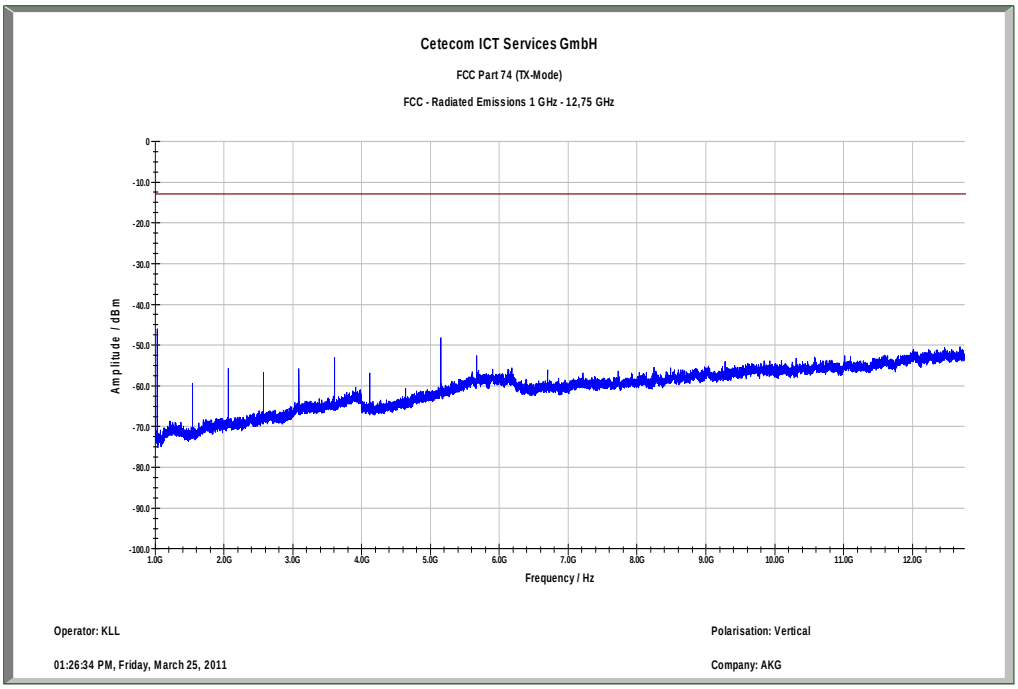
Plot 6: Band VII (500.1MHz-530.5MHz) middle channel, <30MHz



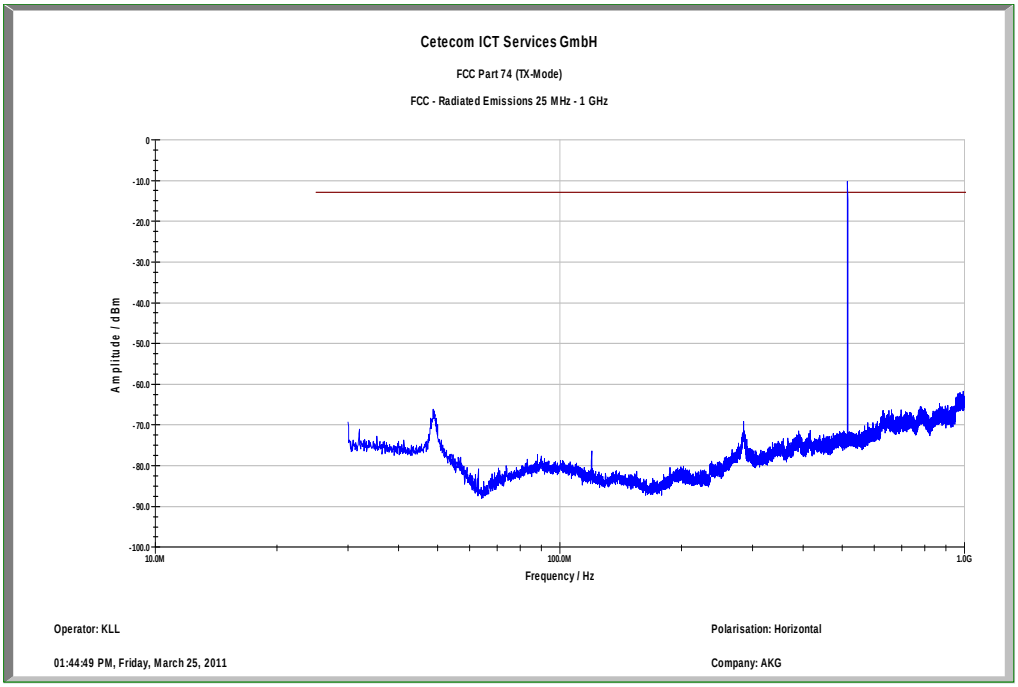
Plot 7: Band VII (500.1MHz-530.5MHz) middle channel, 30 MHz – 1 GHz, antenna vertical



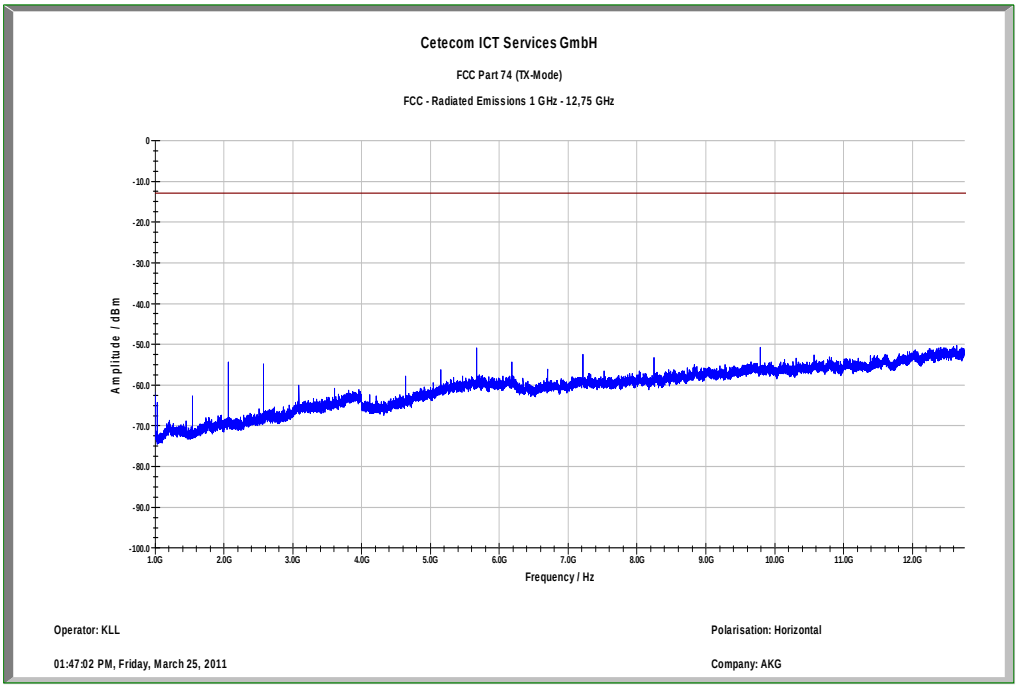
Plot 8: Band VII (500.1MHz-530.5MHz) middle channel, 1 GHz – 12.75 GHz, antenna vertical



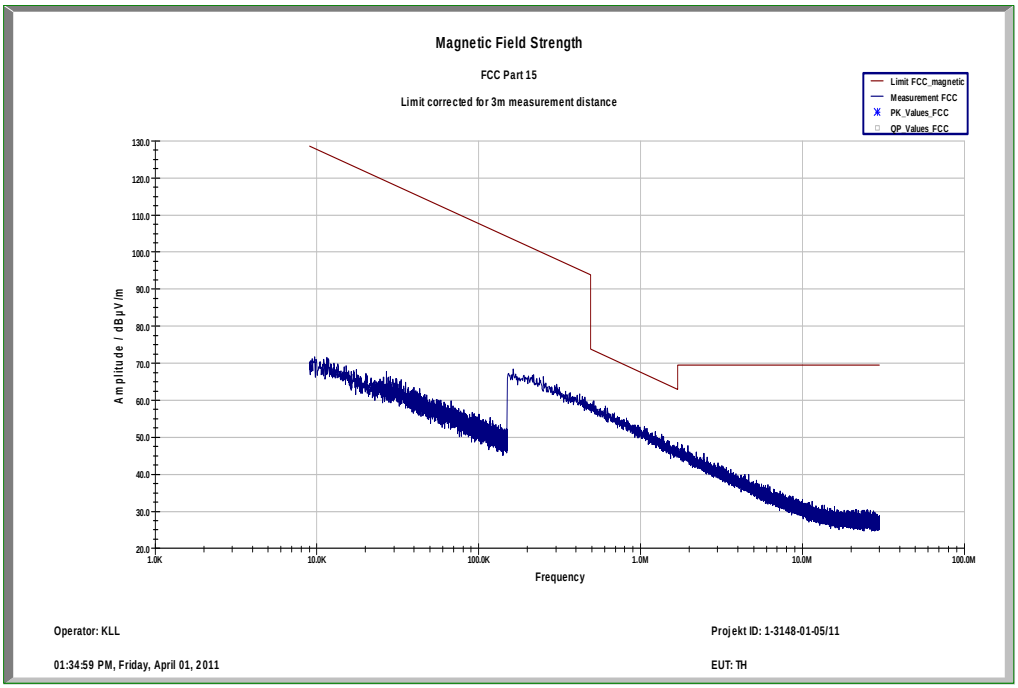
Plot 9: Band VII (500.1MHz-530.5MHz) middle channel, 30 MHz – 1 GHz, antenna horizontal



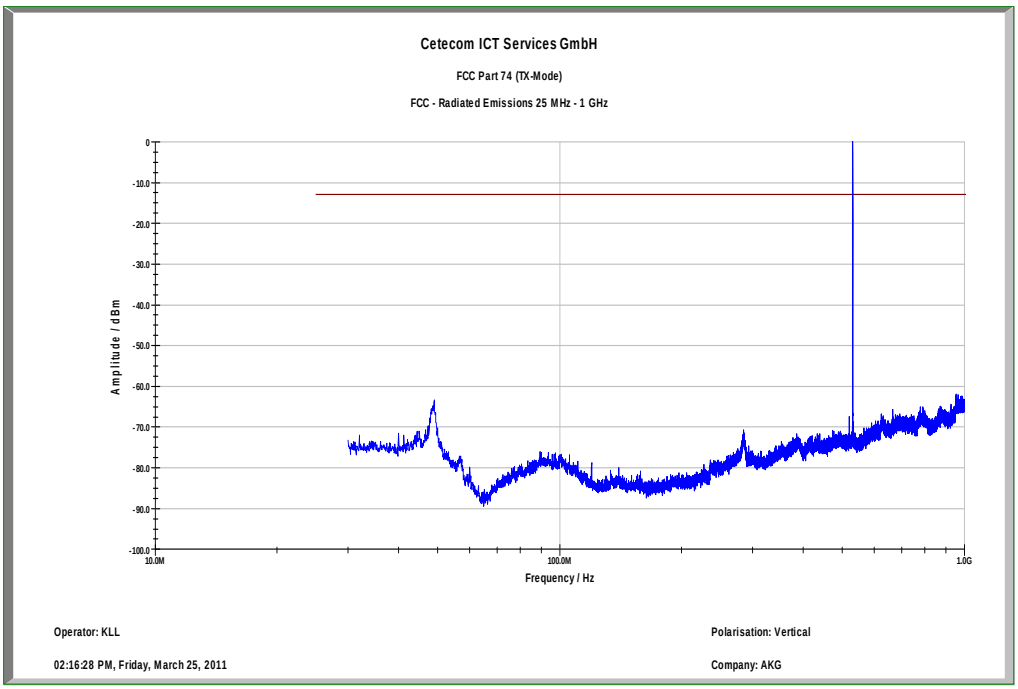
Plot 10: Band VII (500.1MHz-530.5MHz) middle channel, 1 GHz – 12.75 GHz, antenna horizontal



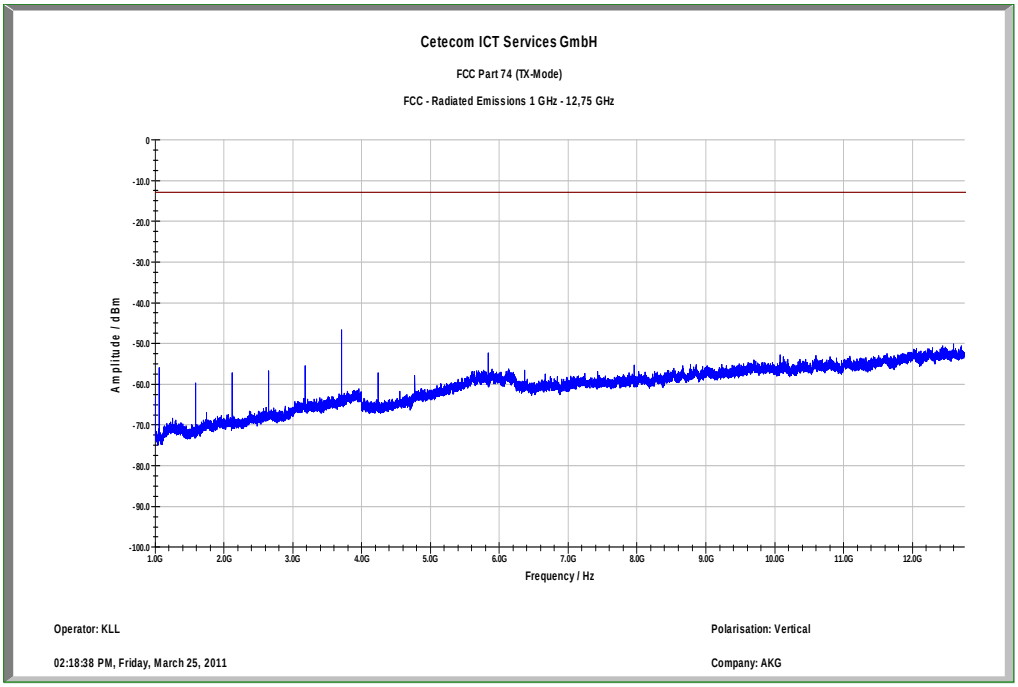
Plot 11: Band VII (500.1MHz-530.5MHz) high channel, <30MHz



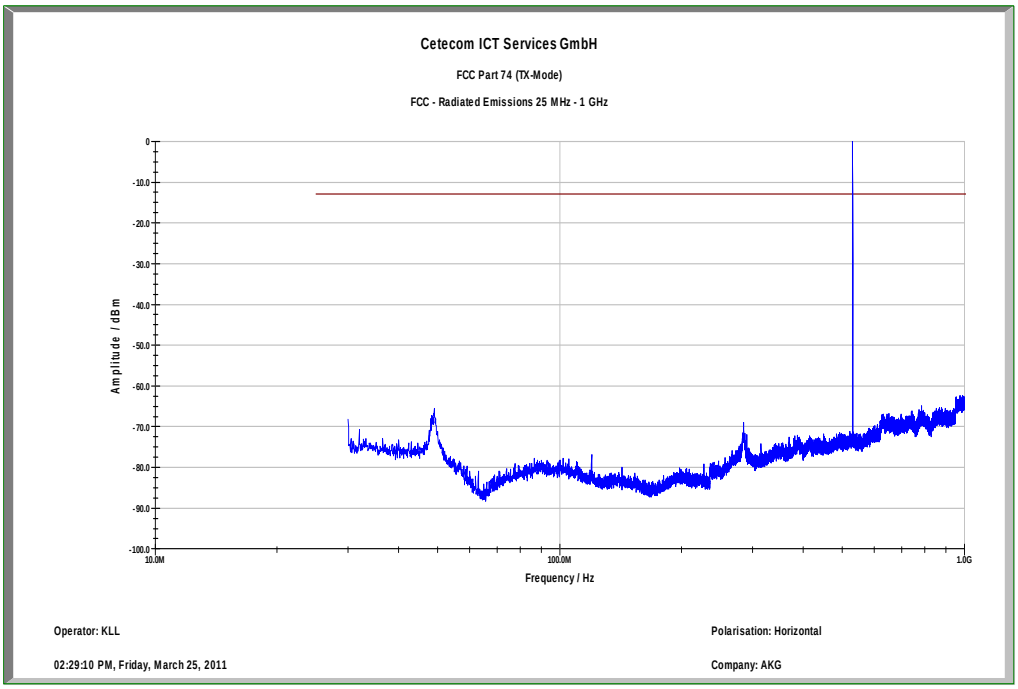
Plot 12: Band VII (500.1MHz-530.5MHz) high channel, 30 MHz – 1 GHz, antenna vertical



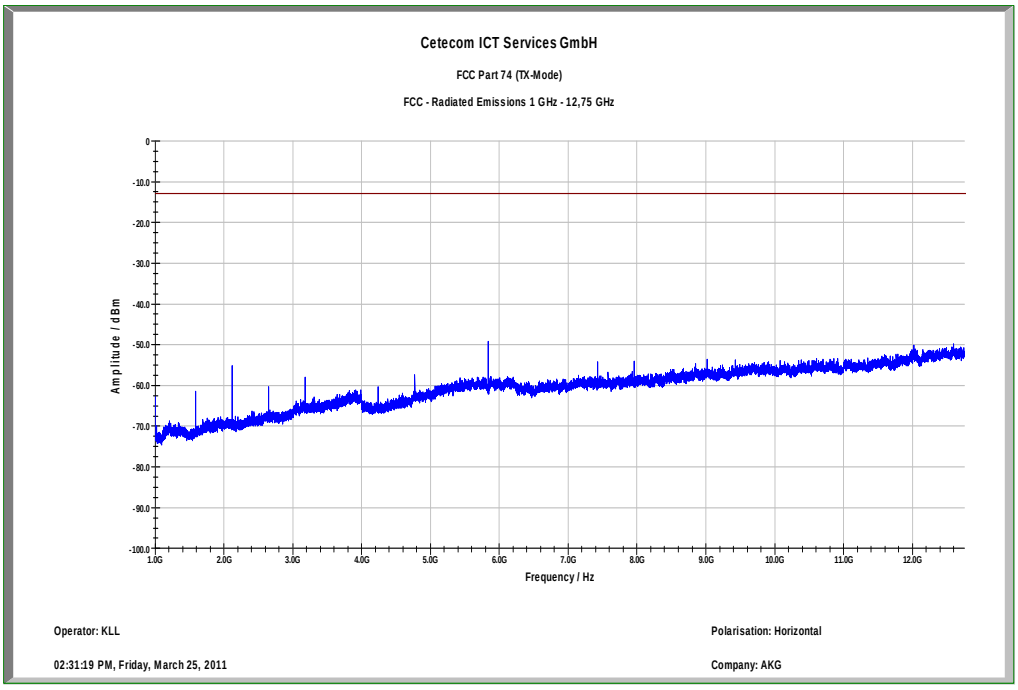
Plot 13: Band VII (500.1MHz-530.5MHz) high channel, 1 GHz – 12.75 GHz, antenna vertical



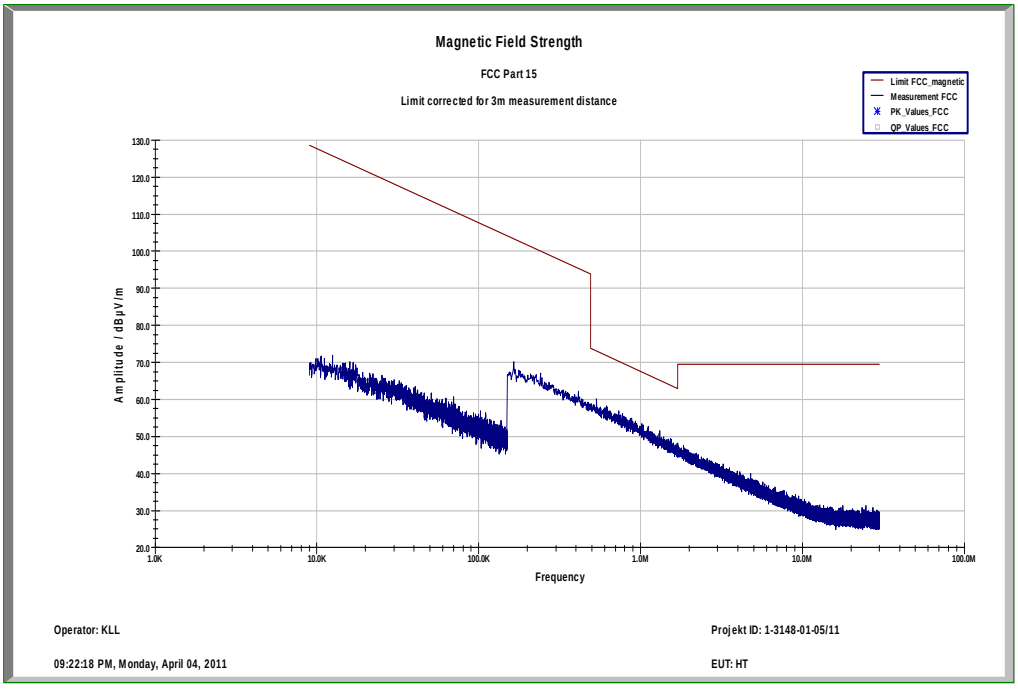
Plot 14: Band VII (500.1MHz-530.5MHz) high channel, 30 MHz – 1 GHz, antenna horizontal



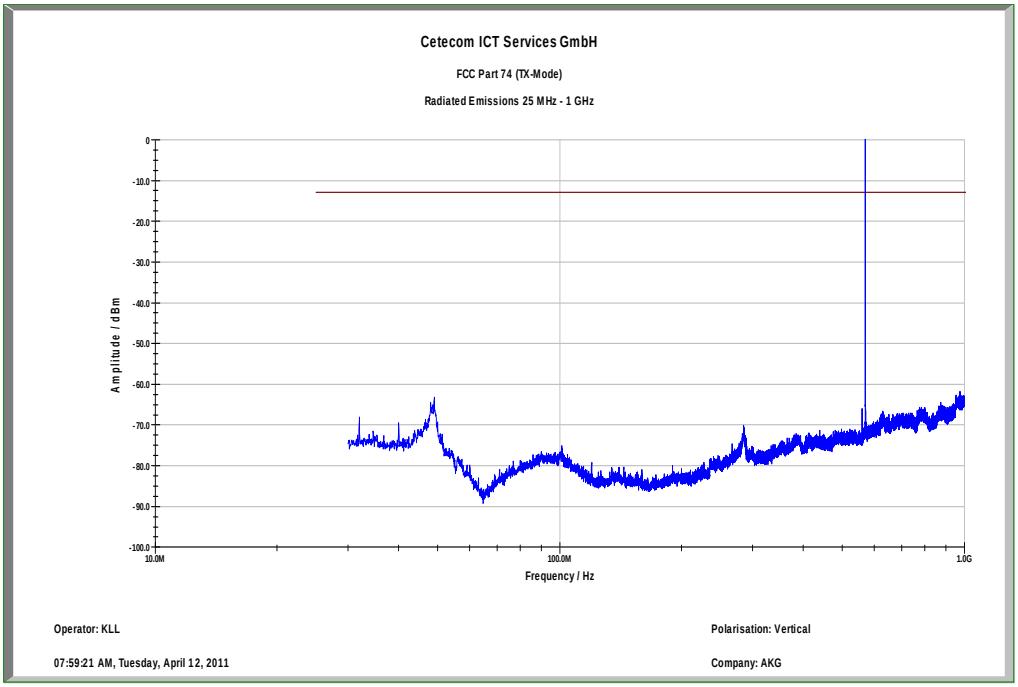
Plot 15: Band VII (500.1MHz-530.5MHz) high channel, 1 GHz – 12.75 GHz, antenna horizontal



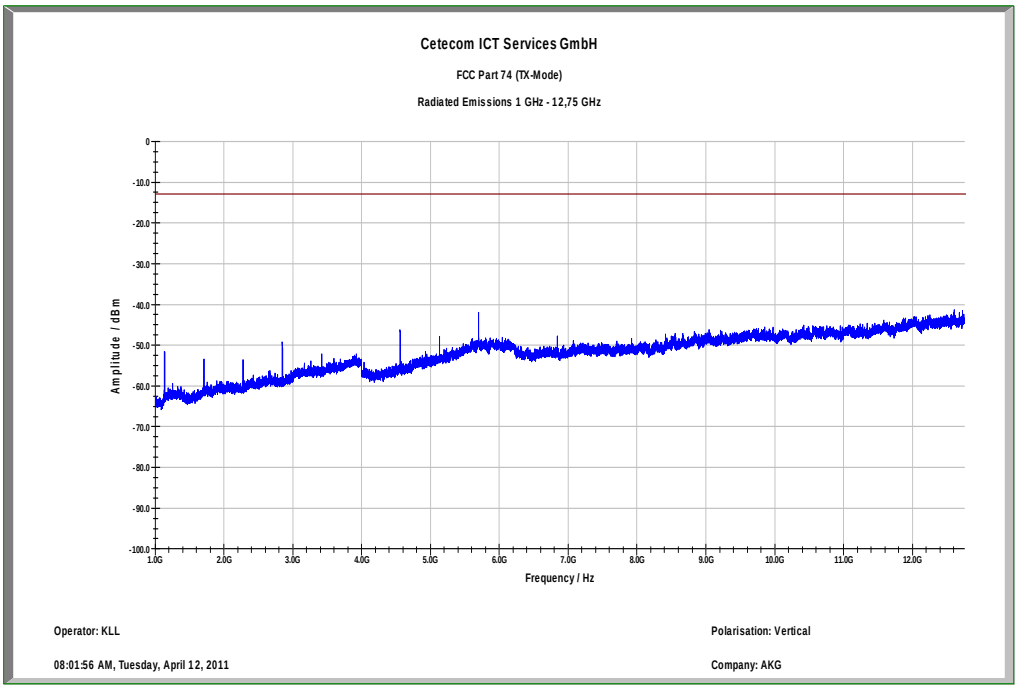
Plot 16: Band VIII (570.1MHz-600.5MHz) low channel, <30MHz



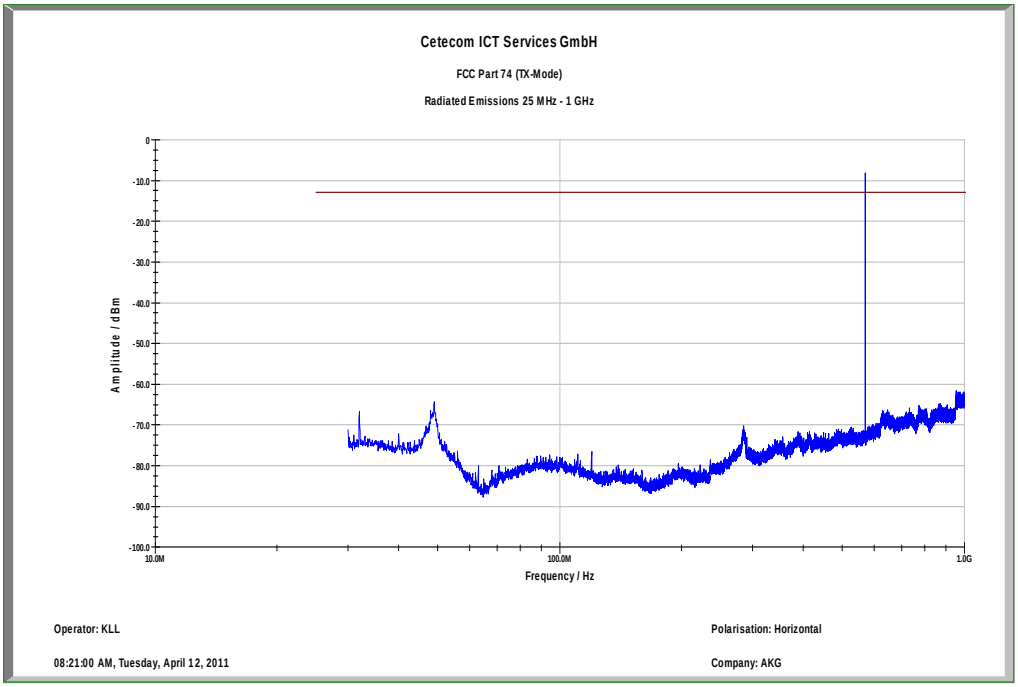
Plot 17: Band VIII (570.1MHz-600.5MHz) low channel, 30 MHz – 1 GHz, antenna vertical



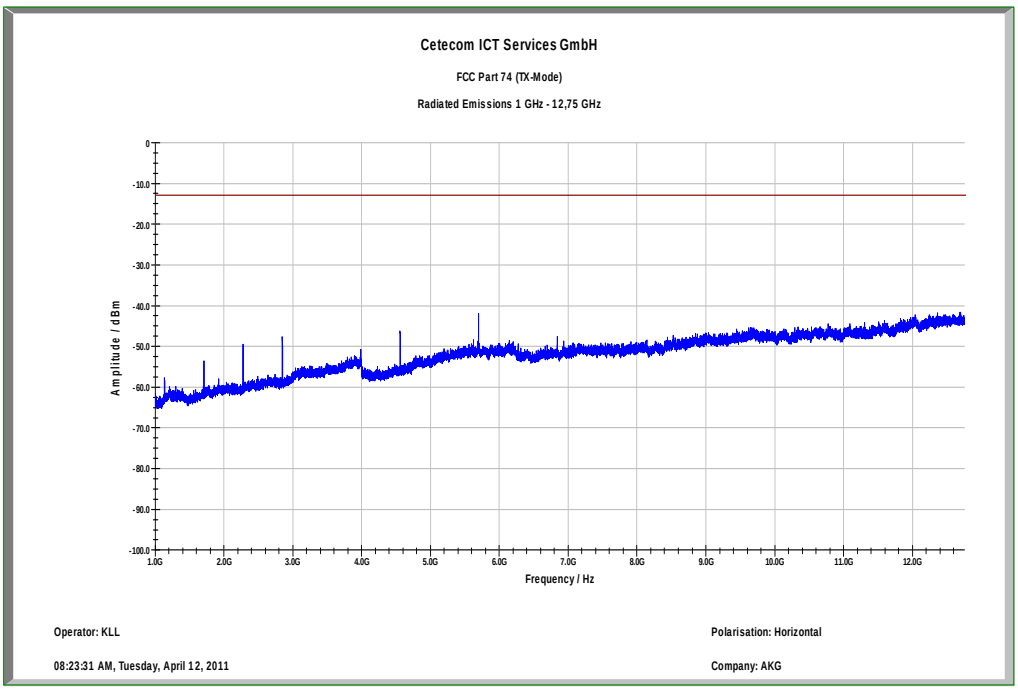
Plot 18: Band VIII (570.1MHz-600.5MHz) low channel, 1 GHz – 12.75 GHz, antenna vertical



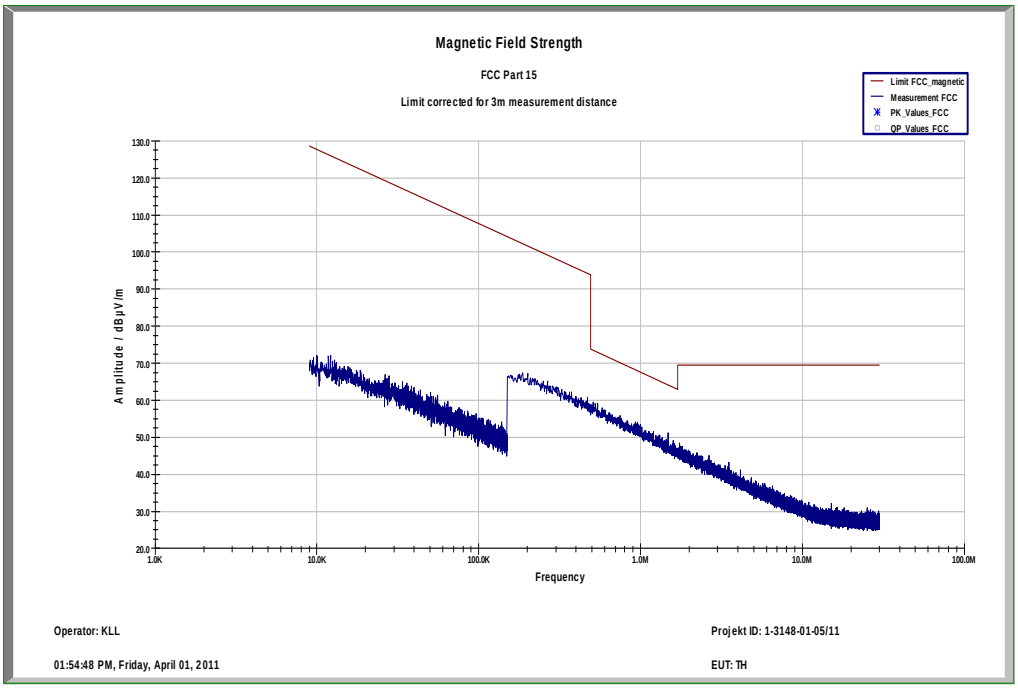
Plot 19: Band VIII (570.1MHz-600.5MHz) low channel, 30 MHz – 1 GHz, antenna horizontal



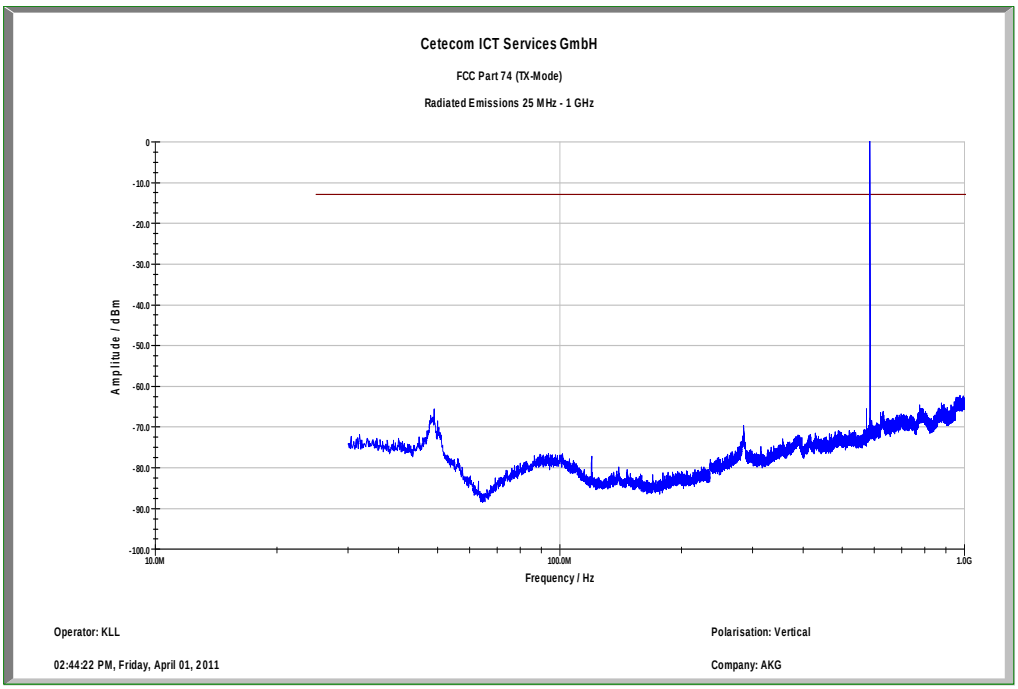
Plot 20: Band VIII (570.1MHz-600.5MHz) low channel, 1 GHz – 12.75 GHz, antenna horizontal



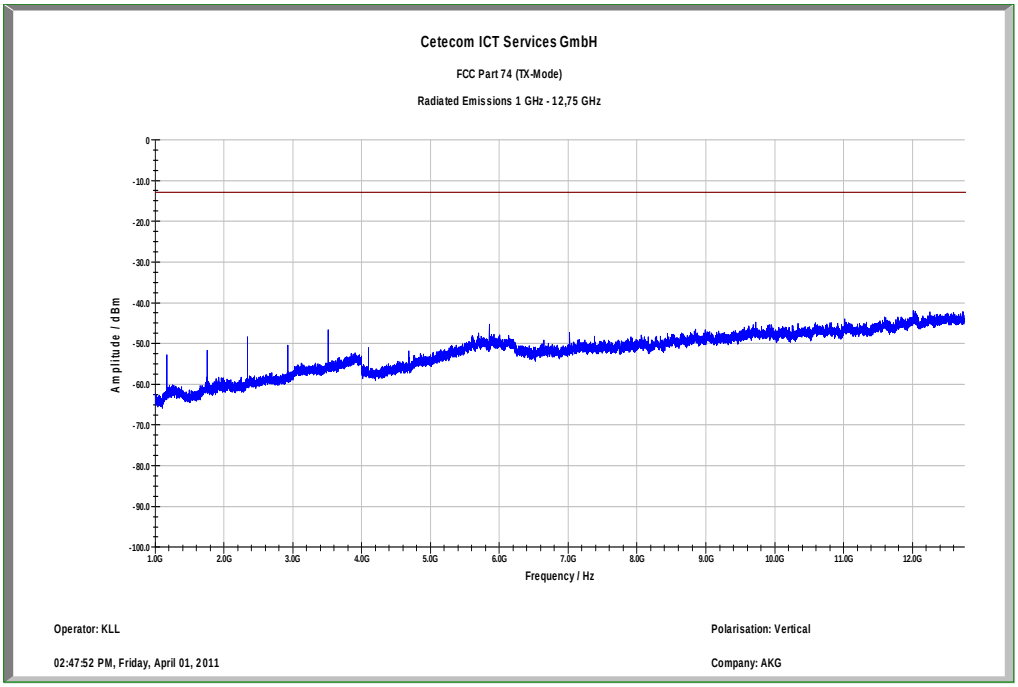
Plot 21: Band VIII (570.1MHz-600.5MHz) middle channel, <30MHz



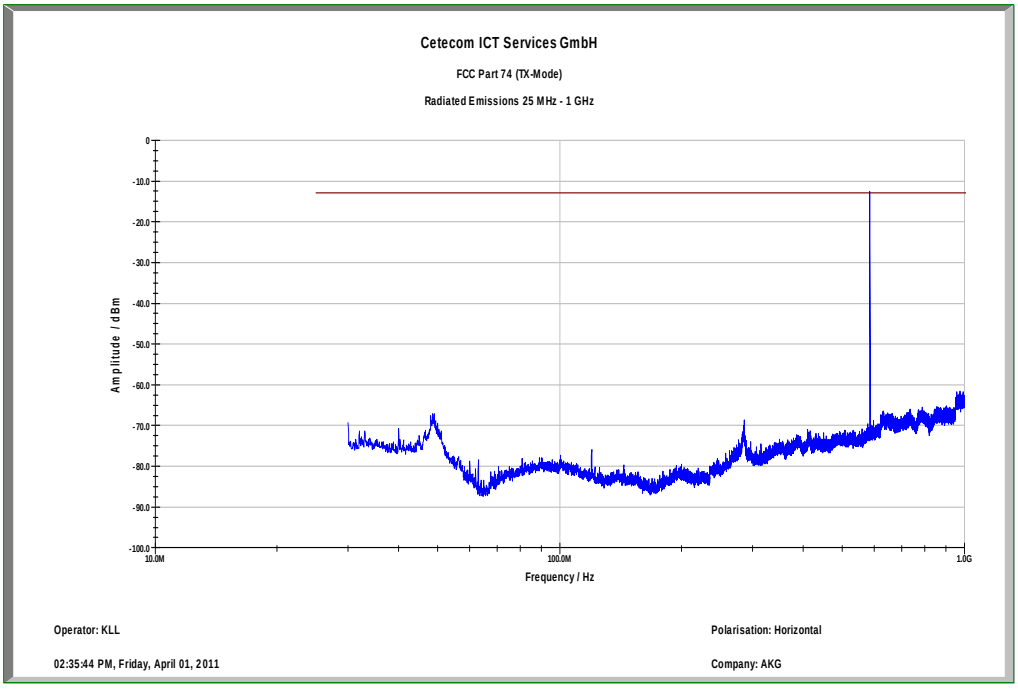
Plot 22: Band VIII (570.1MHz-600.5MHz) middle channel, 30 MHz – 1 GHz, antenna vertical



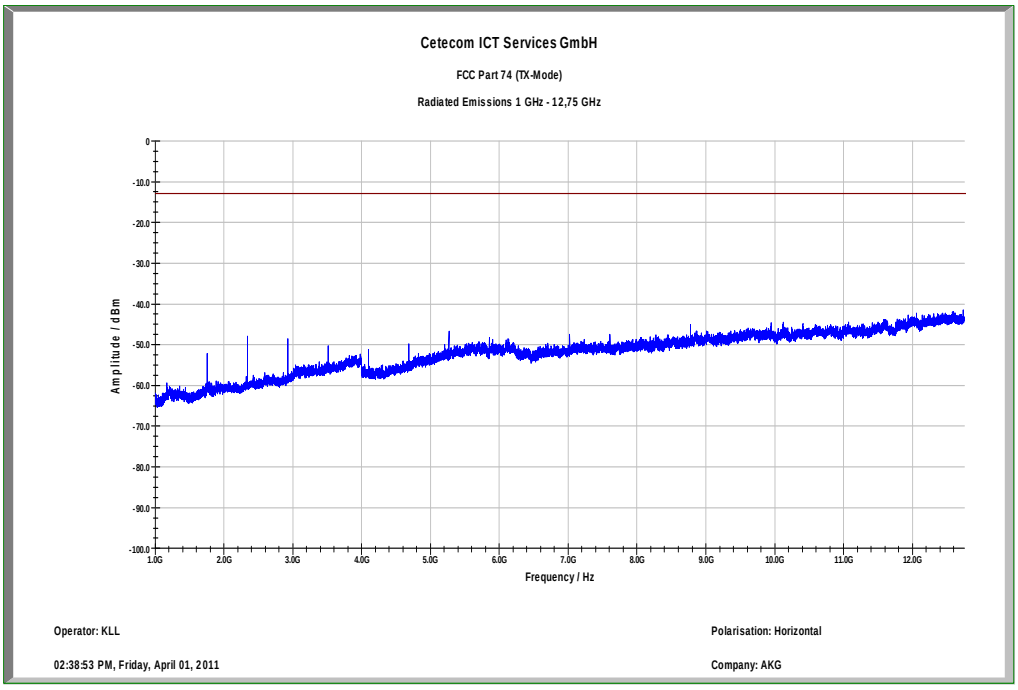
Plot 23: Band VIII (570.1MHz-600.5MHz) middle channel, 1 GHz – 12.75 GHz, antenna vertical



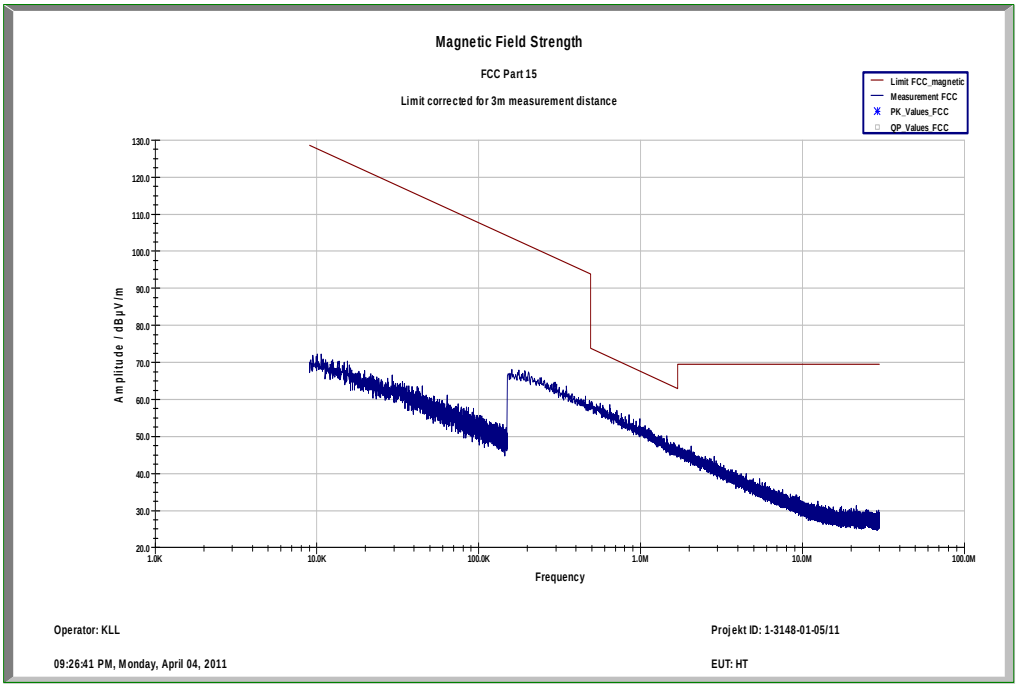
Plot 24: Band VIII (570.1MHz-600.5MHz) middle channel, 30 MHz – 1 GHz, antenna horizontal



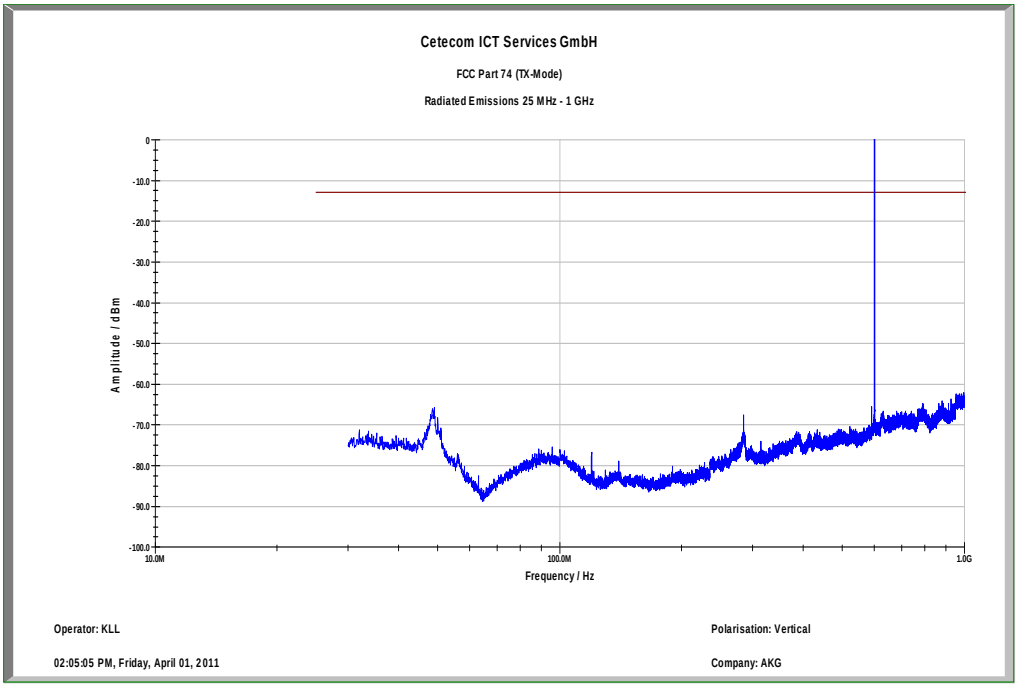
Plot 25: Band VIII (570.1MHz-600.5MHz) middle channel, 1 GHz – 12.75 GHz, antenna horizontal



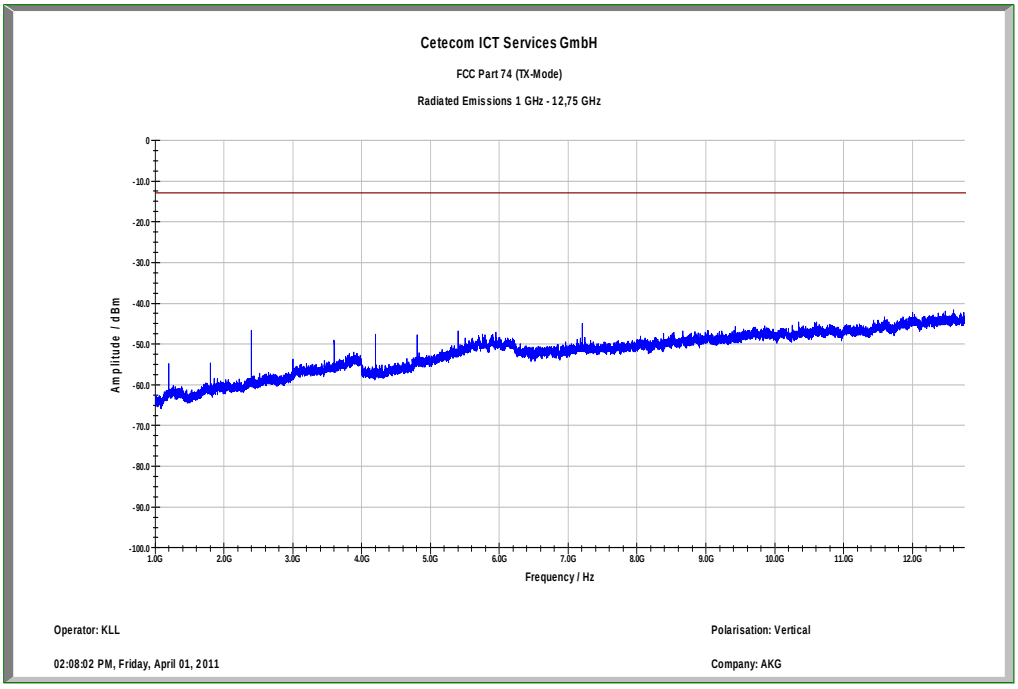
Plot 26: Band VIII (570.1MHz-600.5MHz) high channel, <30MHz



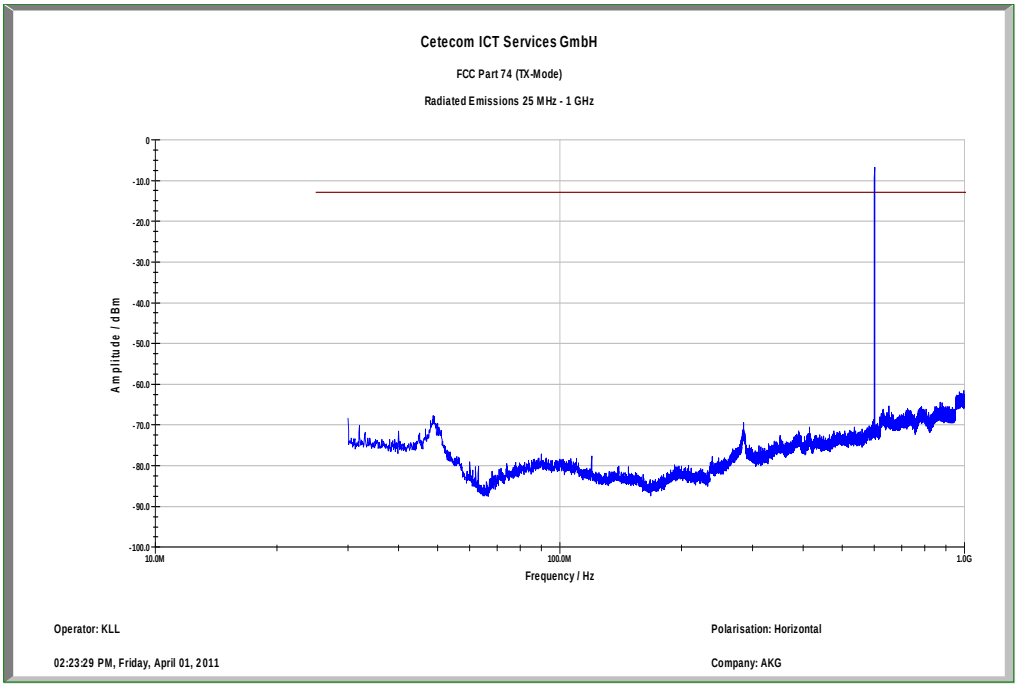
Plot 27: Band VIII (570.1MHz-600.5MHz) high channel, 30 MHz – 1 GHz, antenna vertical



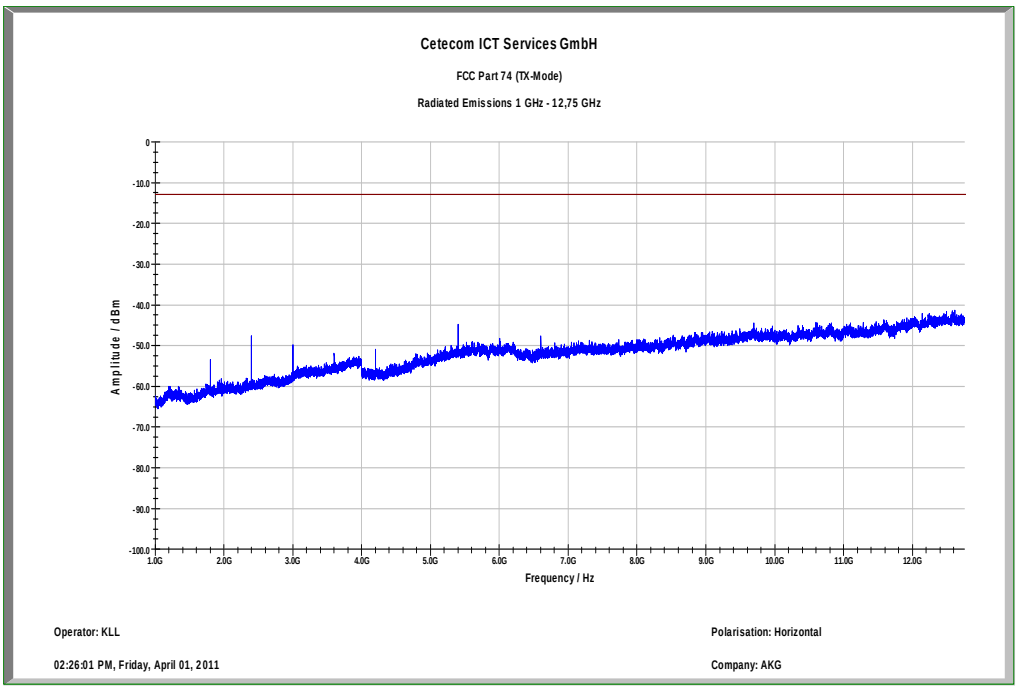
Plot 28: Band VIII (570.1MHz-600.5MHz) high channel, 1 GHz – 12.75 GHz, antenna vertical



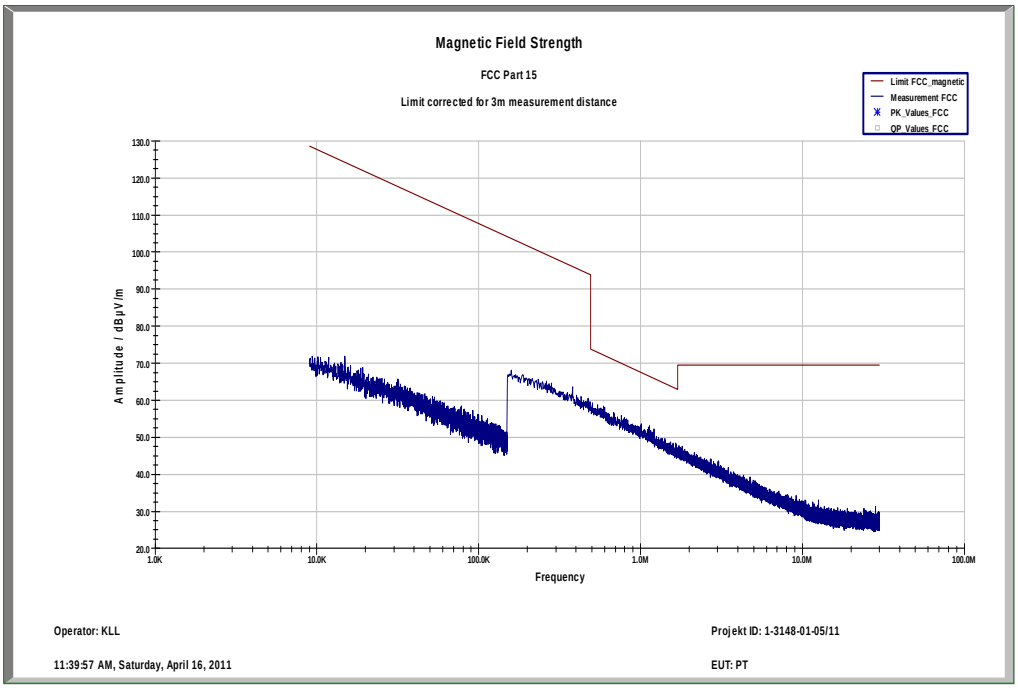
Plot 29: Band VIII (570.1MHz-600.5MHz) high channel, 30 MHz – 1 GHz, antenna horizontal



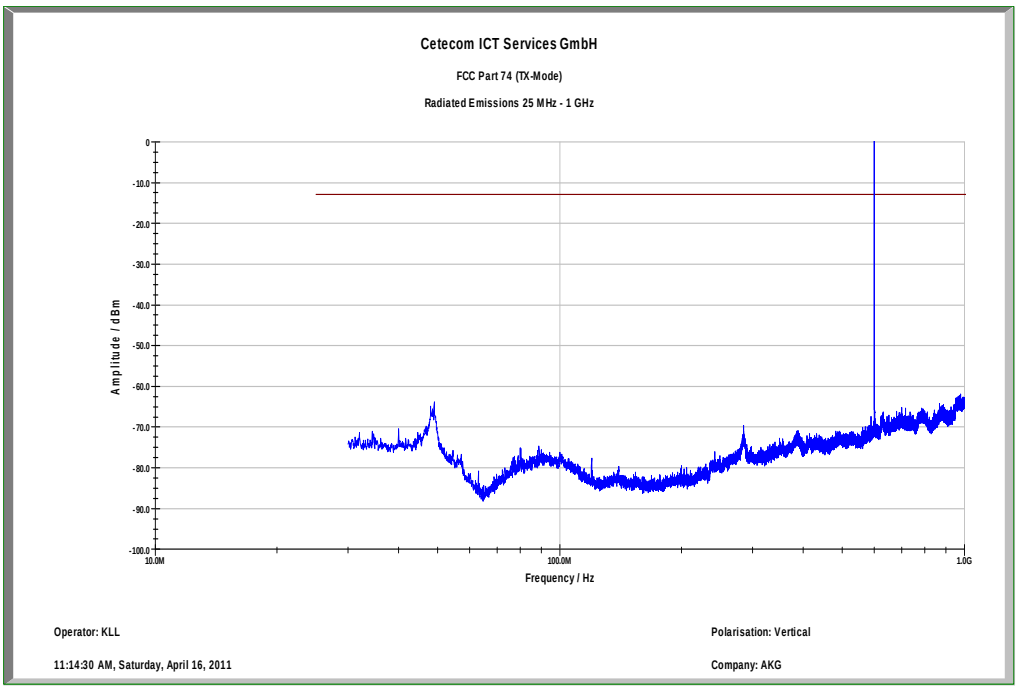
Plot 30: Band VIII (570.1MHz-600.5MHz) high channel, 1 GHz – 12.75 GHz, antenna horizontal



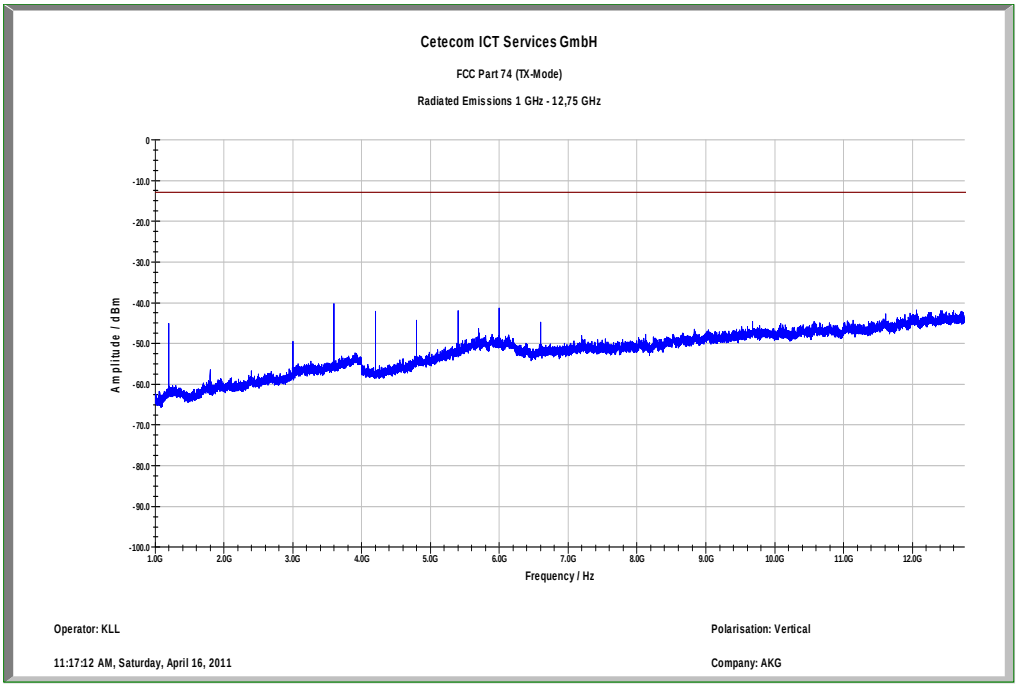
Plot 31: Band IX (600.0MHz-605.9MHz) low channel, <30MHz



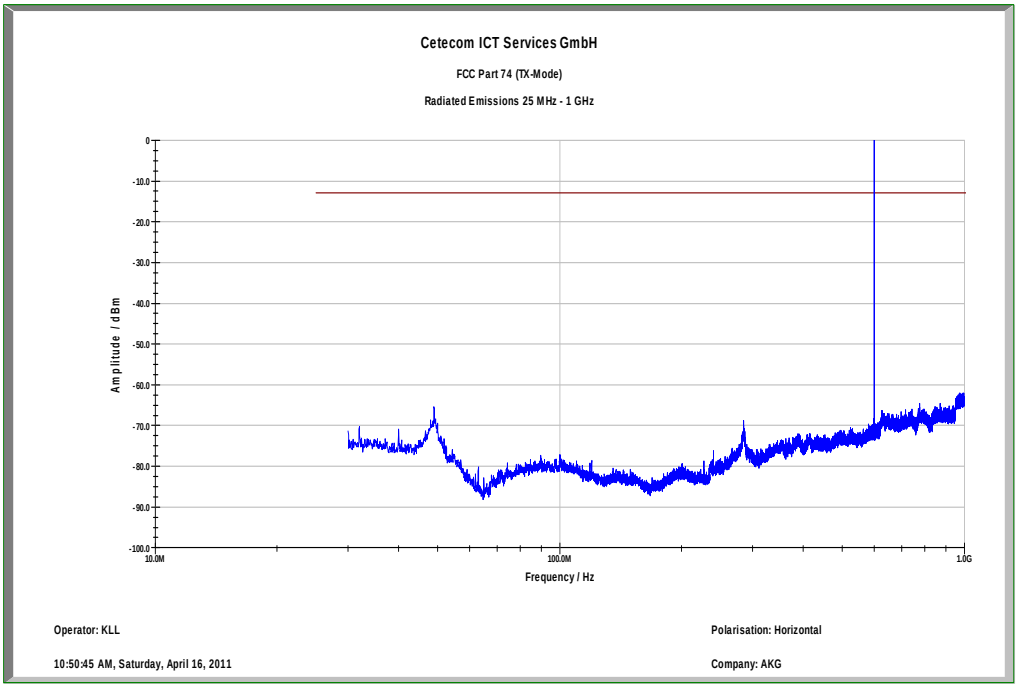
Plot 32: Band IX (600.0MHz-605.9MHz) low channel, 30 MHz – 1 GHz, antenna vertical



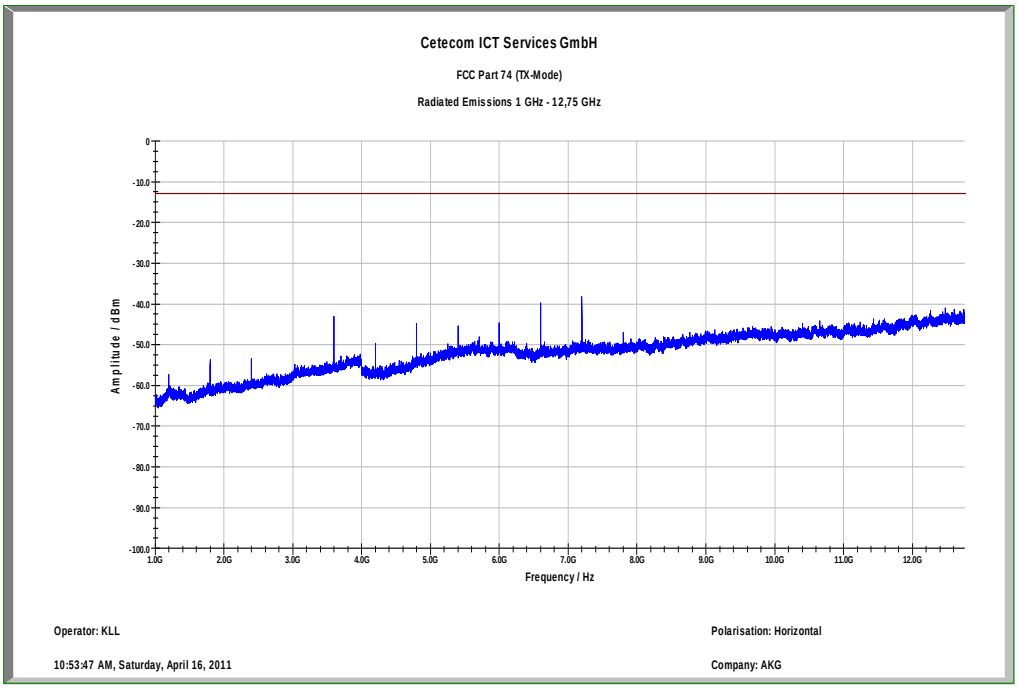
Plot 33: Band IX (600.0MHz-605.9MHz) low channel, 1 GHz – 12.75 GHz, antenna vertical



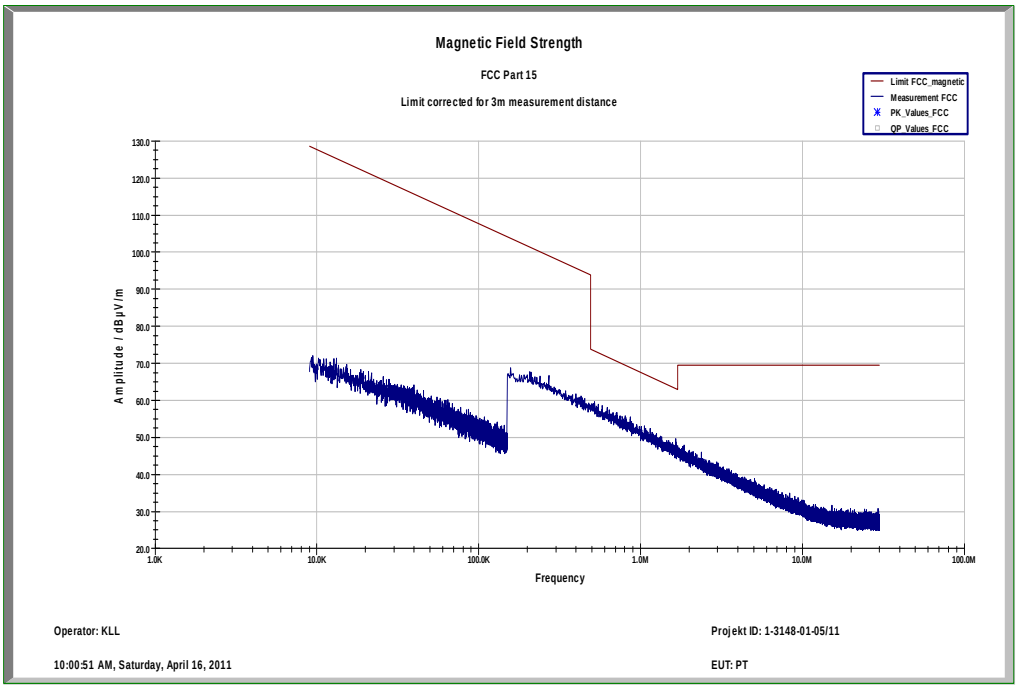
Plot 34: Band IX (600.0MHz-605.9MHz) low channel, 30 MHz – 1 GHz, antenna horizontal



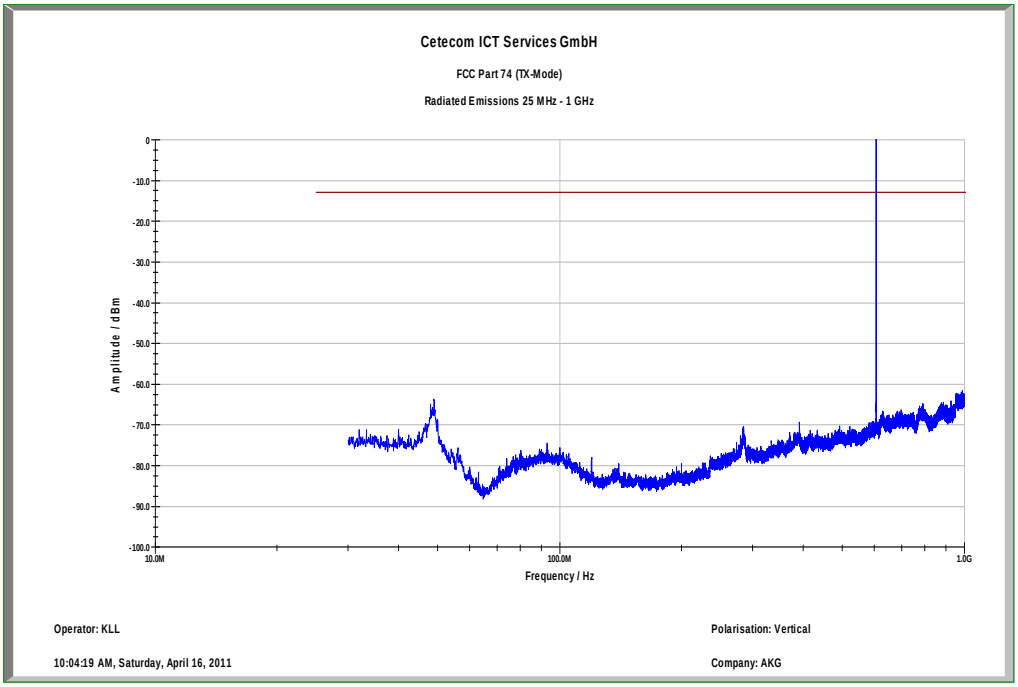
Plot 35: Band IX (600.0MHz-605.9MHz) low channel, 1 GHz – 12.75 GHz, antenna horizontal



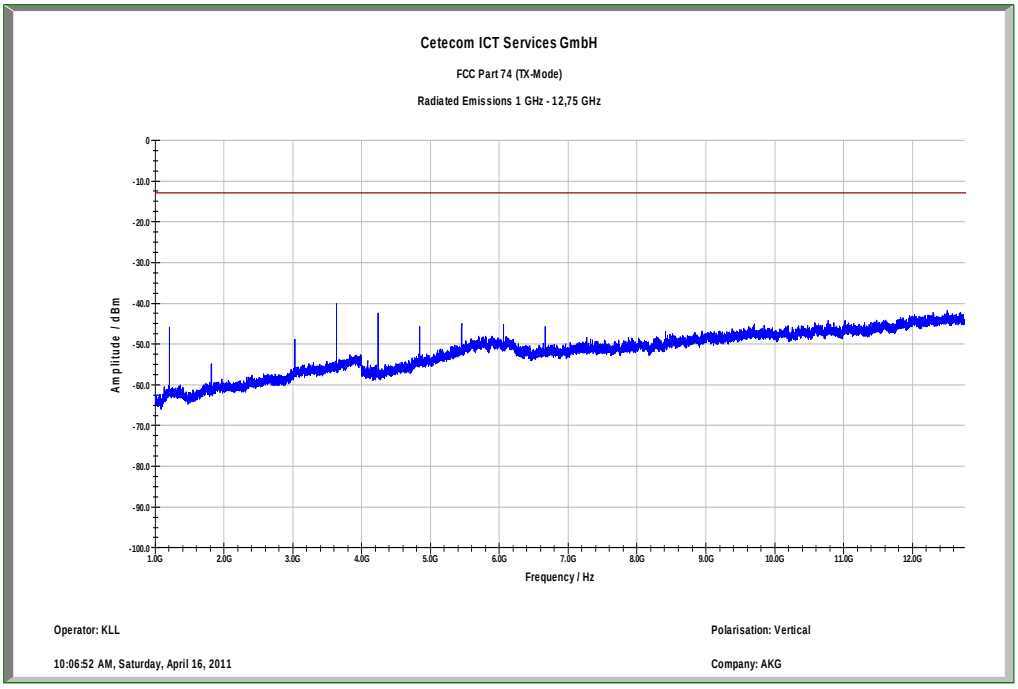
Plot 36: Band IX (600.0MHz-605.9MHz) high channel, <30MHz



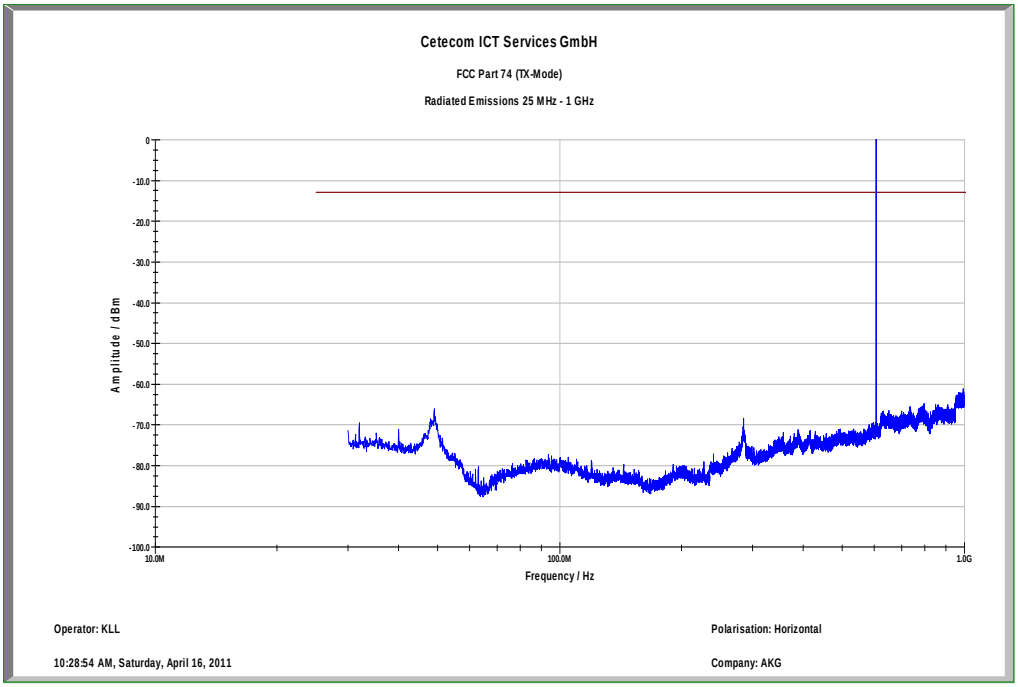
Plot 37: Band IX (600.0MHz-605.9MHz) high channel, 30 MHz – 1 GHz, antenna vertical



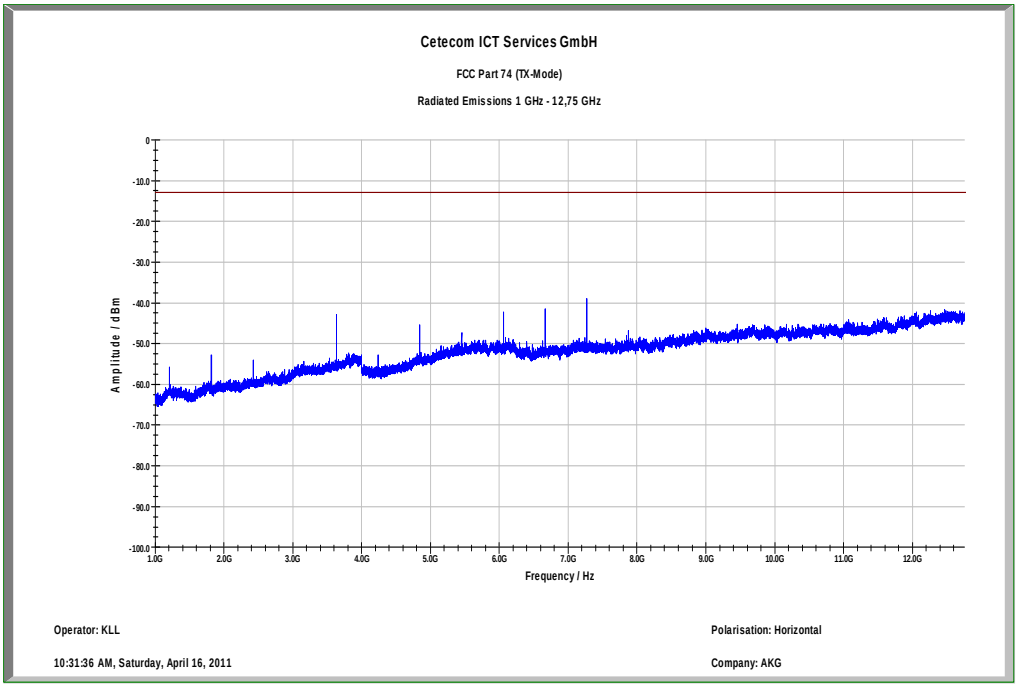
Plot 38: Band IX (600.0MHz-605.9MHz) high channel, 1 GHz – 12.75 GHz, antenna vertical



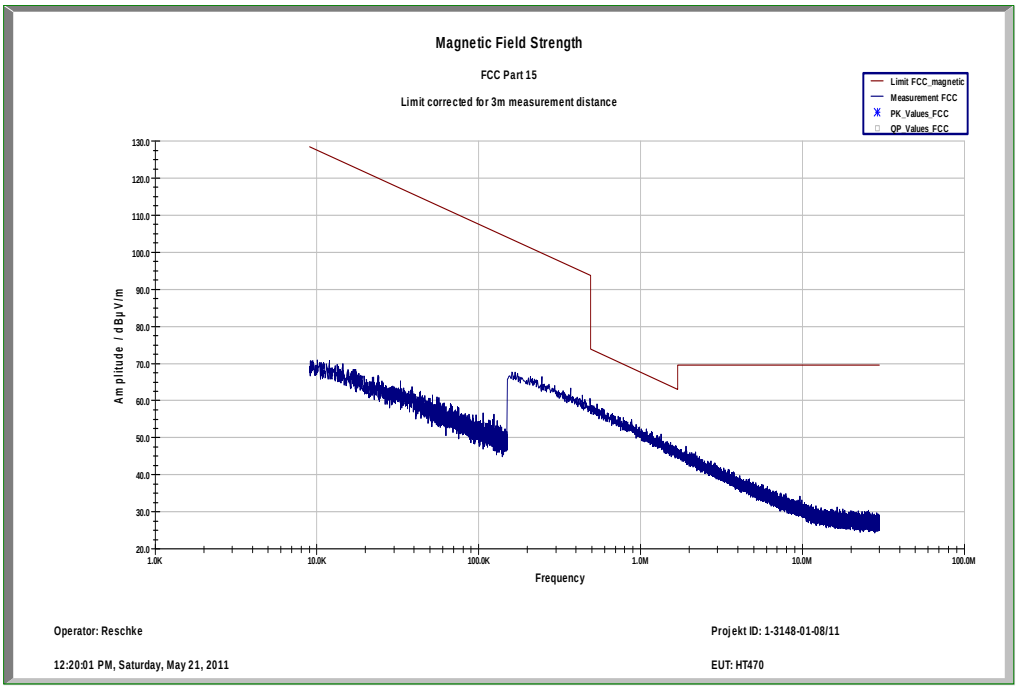
Plot 39: Band IX (600.0MHz-605.9MHz) high channel, 30 MHz – 1 GHz, antenna horizontal



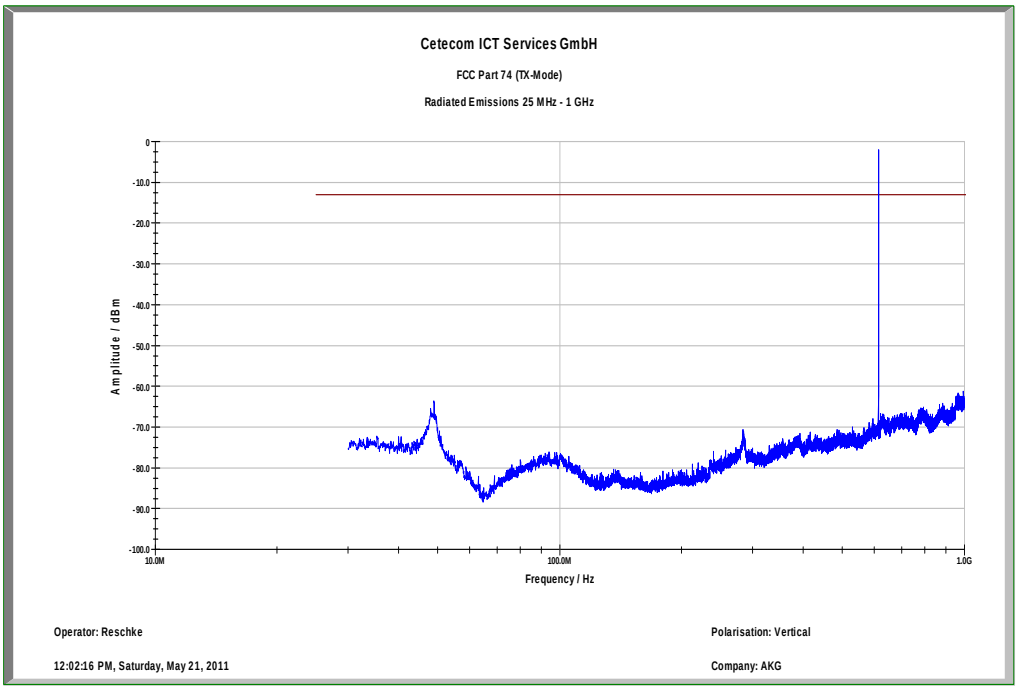
Plot 40: Band IX (600.0MHz-605.9MHz) high channel, 1 GHz – 12.75 GHz, antenna horizontal



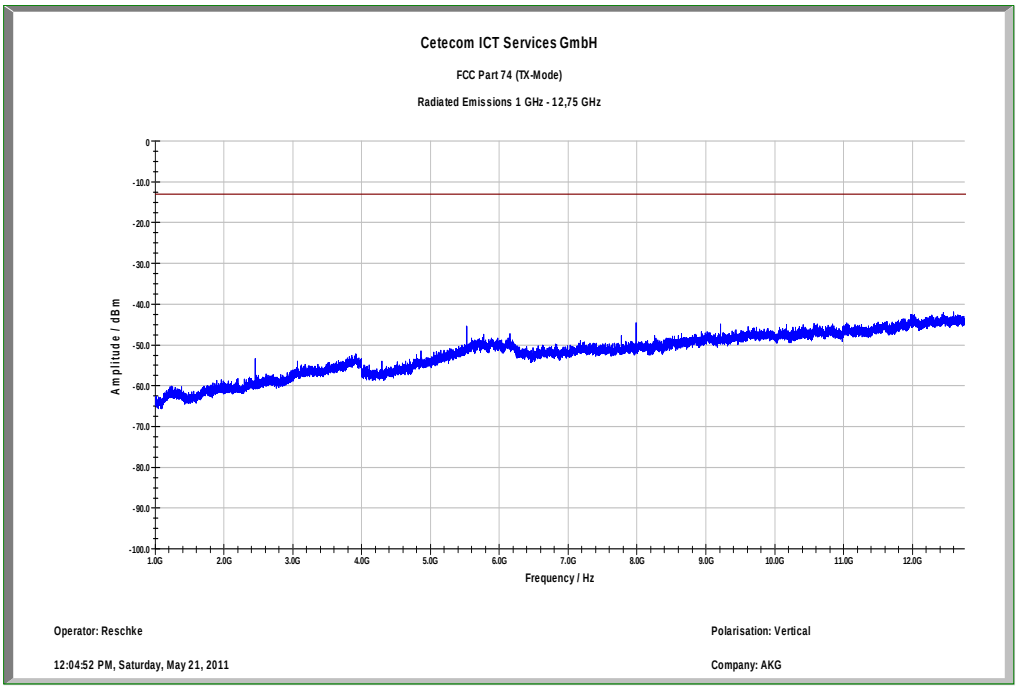
Plot 41: Band IX (614.1MHz-630.5MHz) low channel, <30MHz



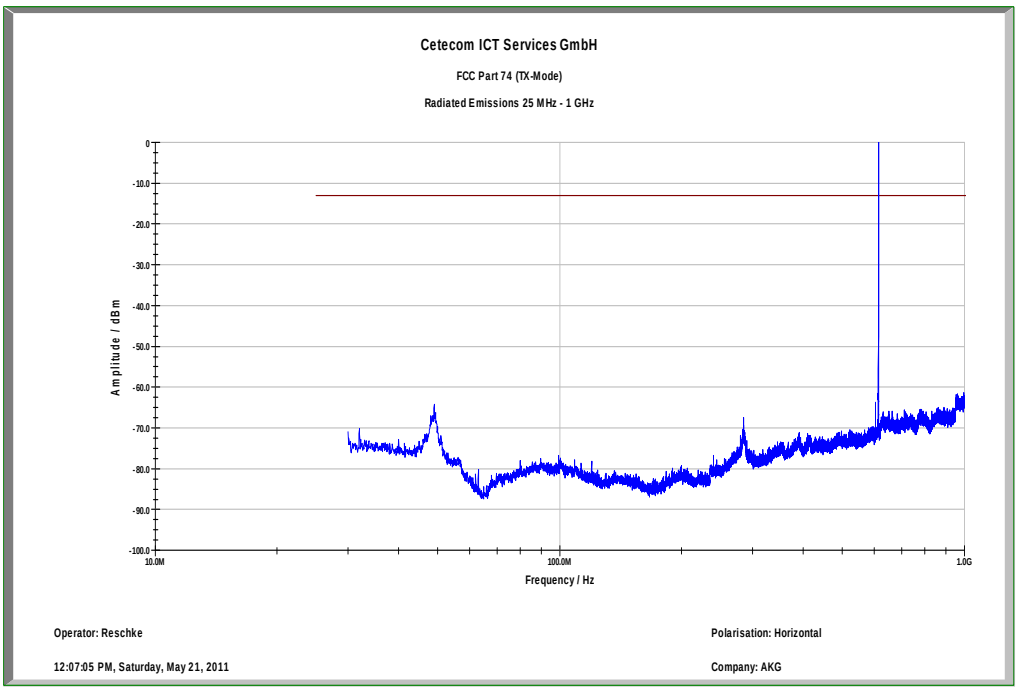
Plot 42: Band IX (614.1MHz-630.5MHz) low channel, 30 MHz – 1 GHz, antenna vertical



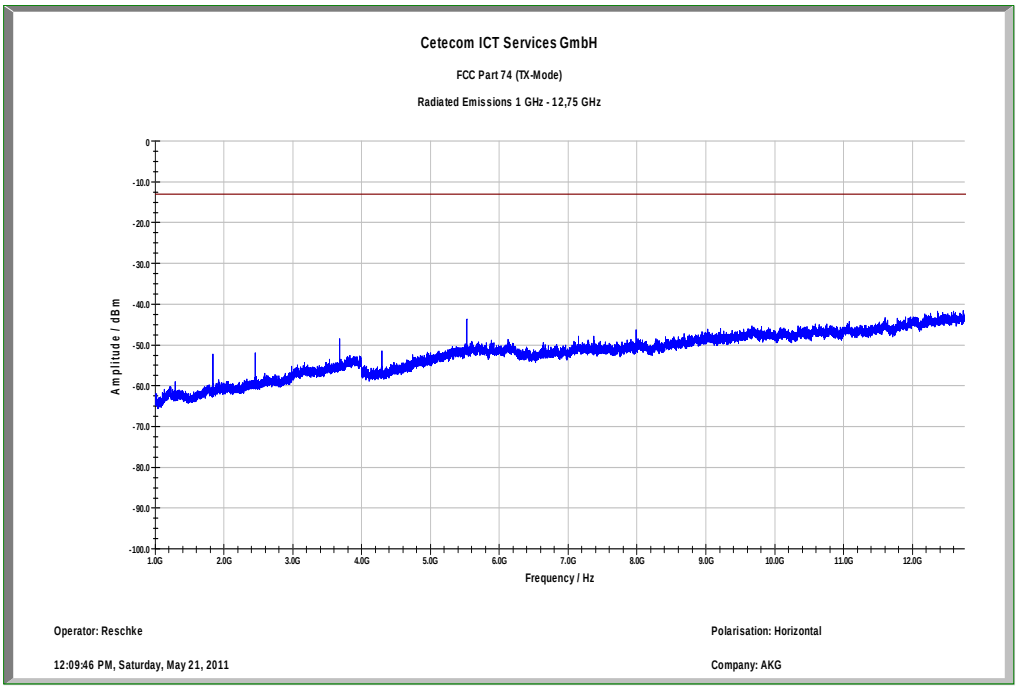
Plot 43: Band IX (614.1MHz-630.5MHz) low channel, 1 GHz – 12.75 GHz, antenna vertical



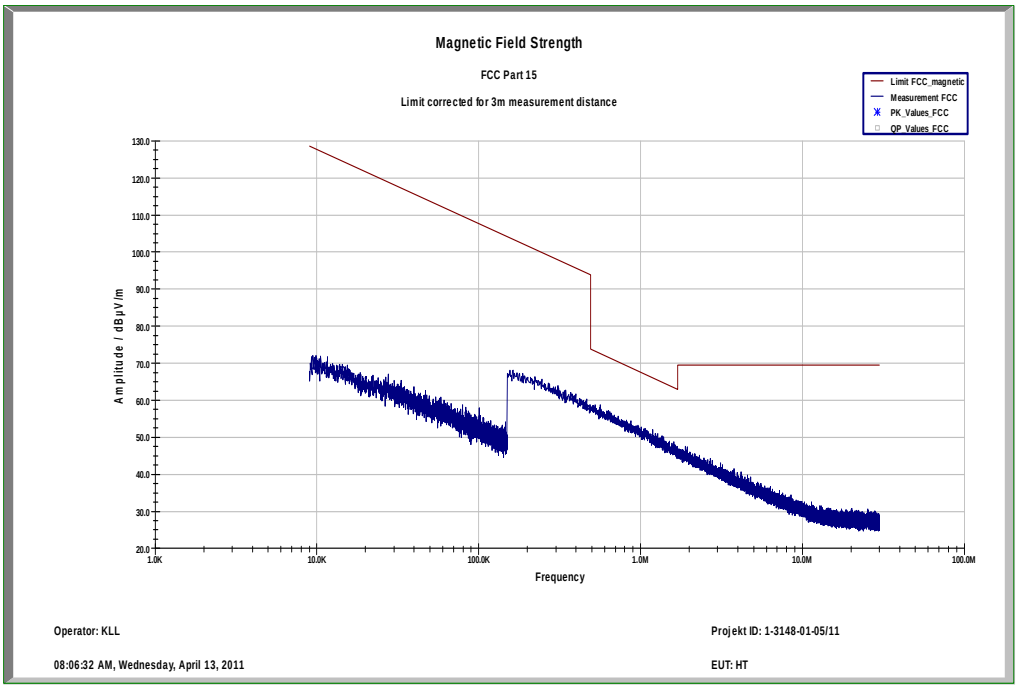
Plot 44: Band IX (614.1MHz-630.5MHz) low channel, 30 MHz – 1 GHz, antenna horizontal



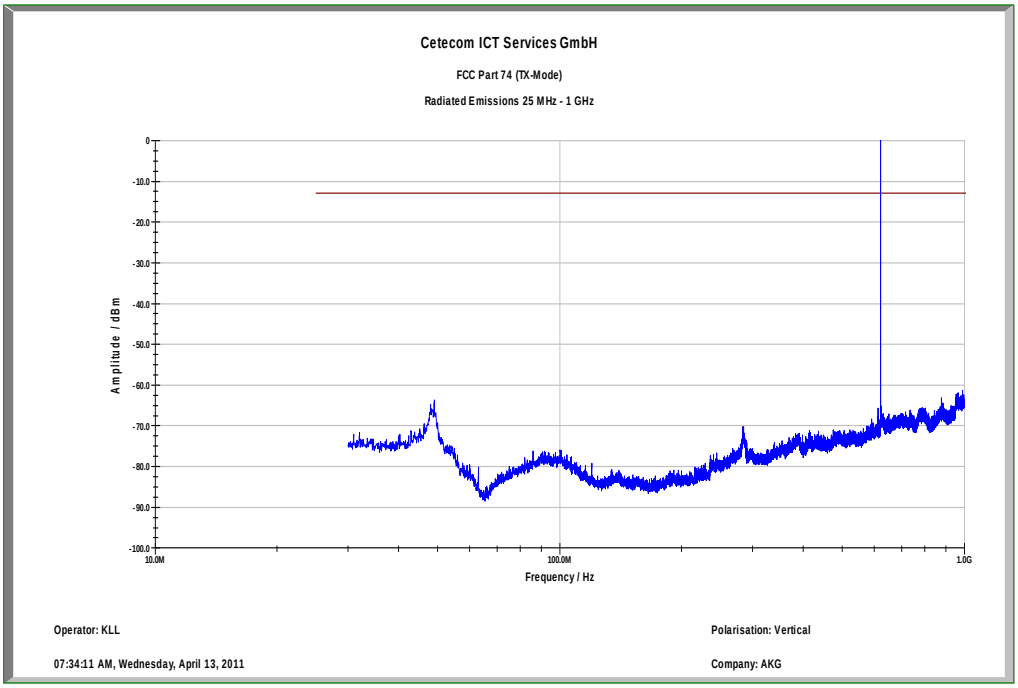
Plot 45: Band IX (614.1MHz-630.5MHz) low channel, 1 GHz – 12.75 GHz, antenna horizontal



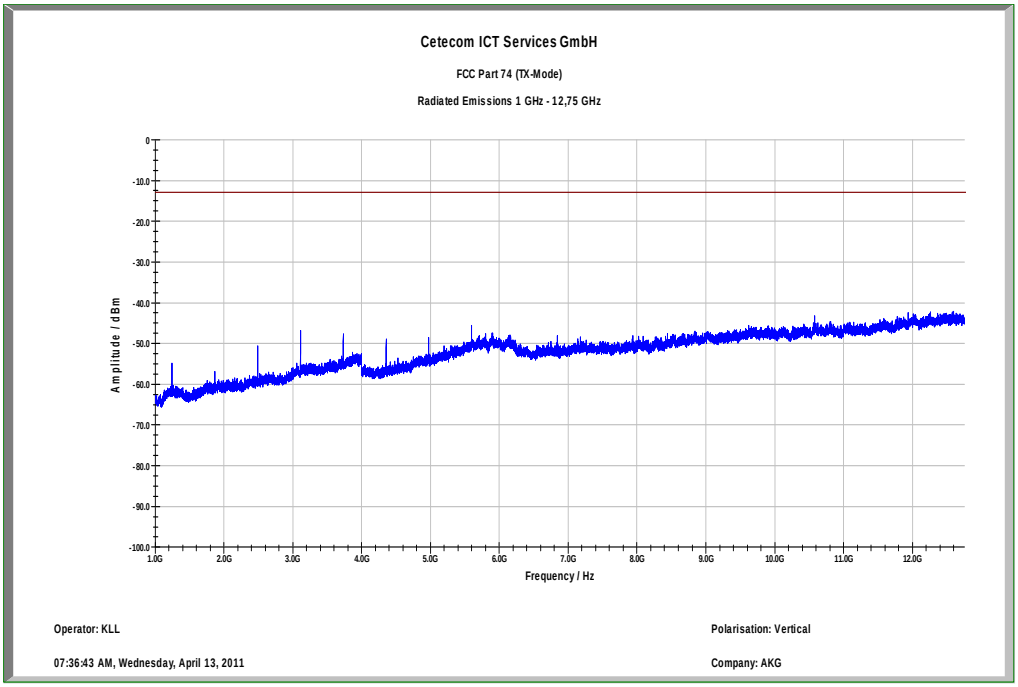
Plot 46: Band IX (614.1MHz-630.5MHz) middle channel, <30MHz



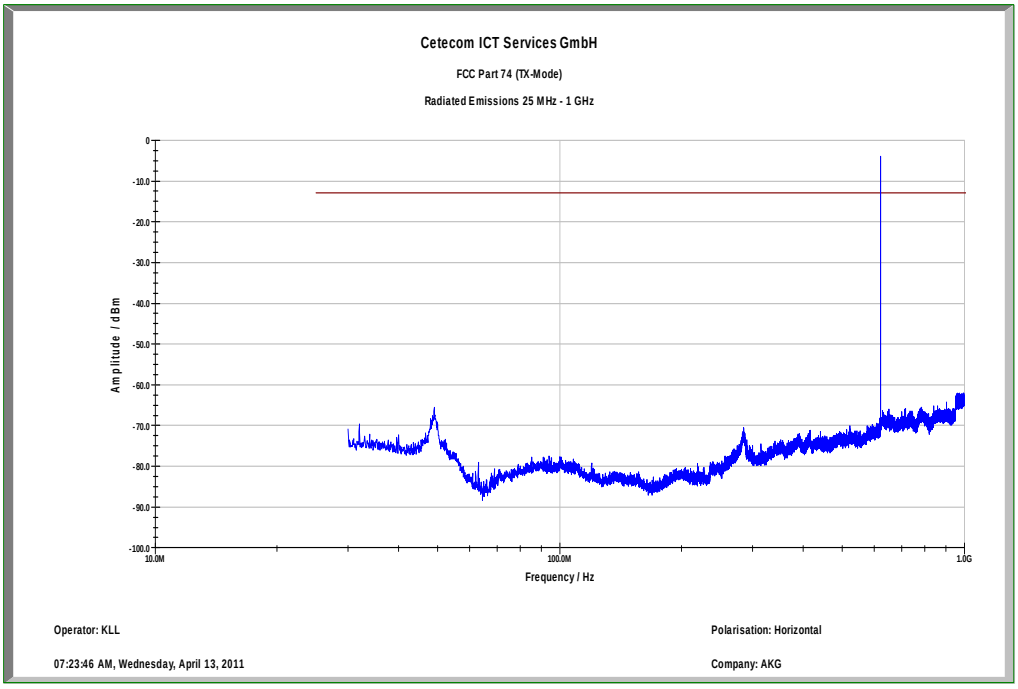
Plot 47: Band IX (614.1MHz-630.5MHz) middle channel, 30 MHz – 1 GHz, antenna vertical



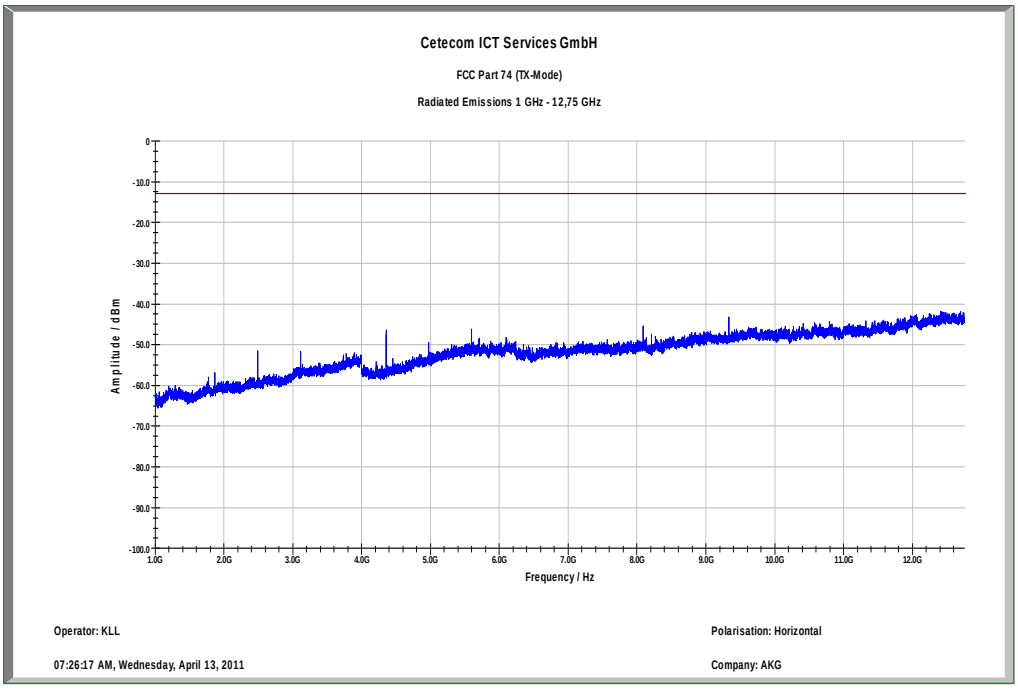
Plot 48: Band IX (614.1MHz-630.5MHz) middle channel, 1 GHz – 12.75 GHz, antenna vertical



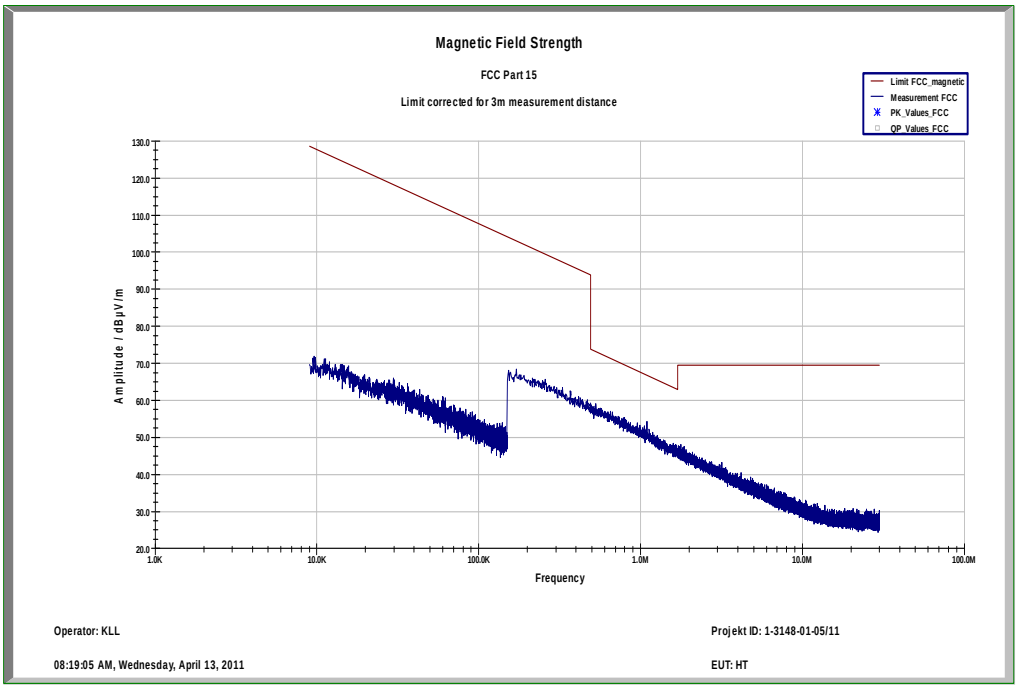
Plot 49: Band IX (614.1MHz-630.5MHz) middle channel, 30 MHz – 1 GHz, antenna horizontal



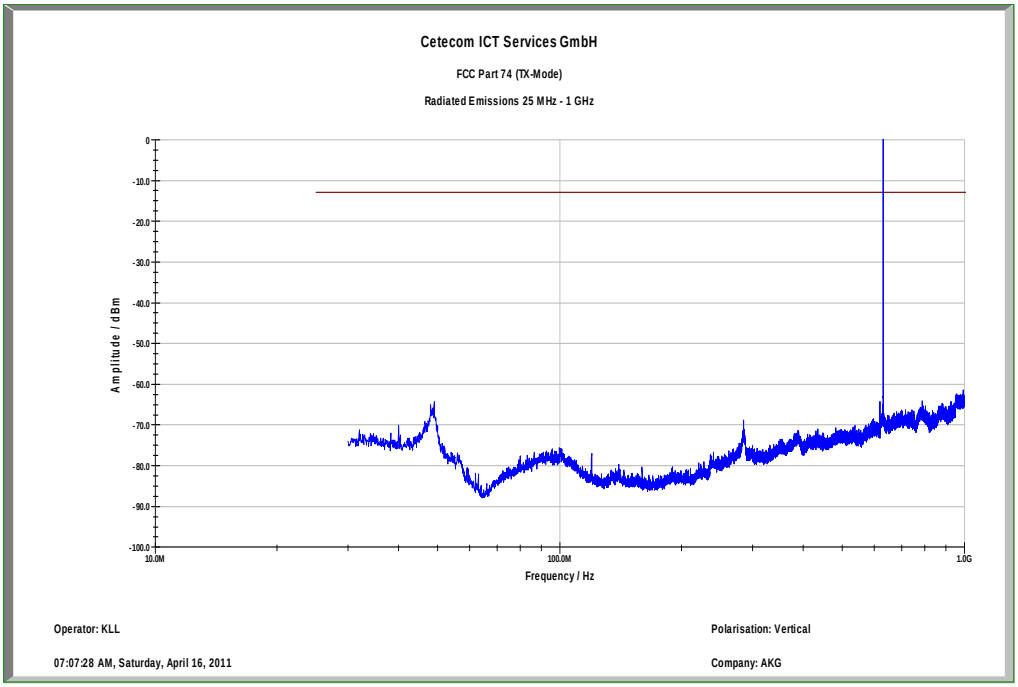
Plot 50: Band IX (614.1MHz-630.5MHz) middle channel, 1 GHz – 12.75 GHz, antenna horizontal



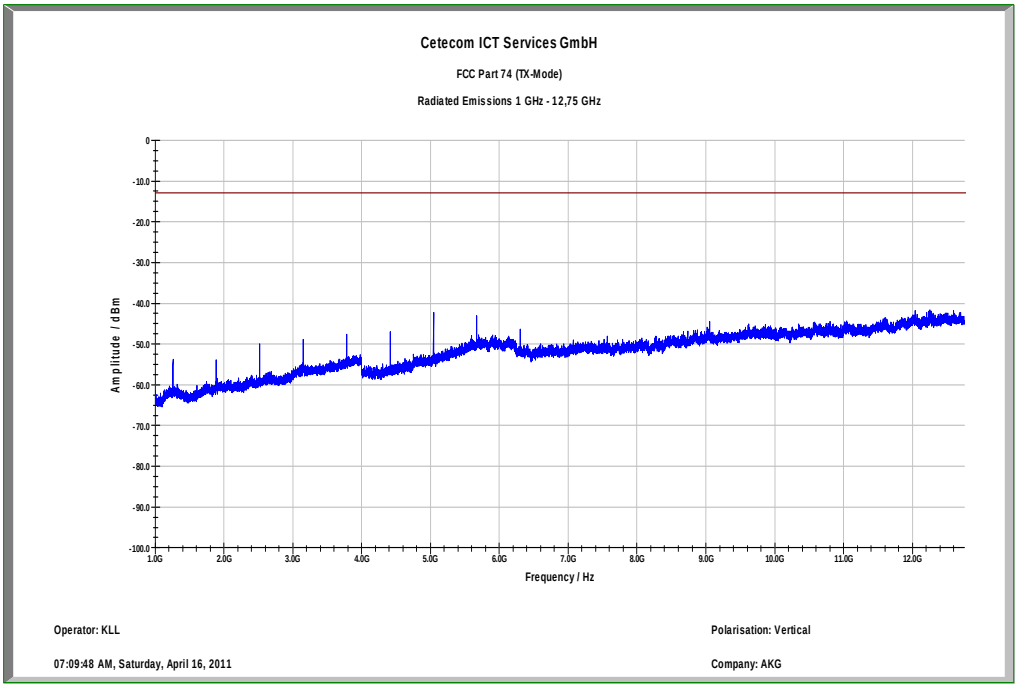
Plot 51: Band IX (614.1MHz-630.5MHz) high channel, <30MHz



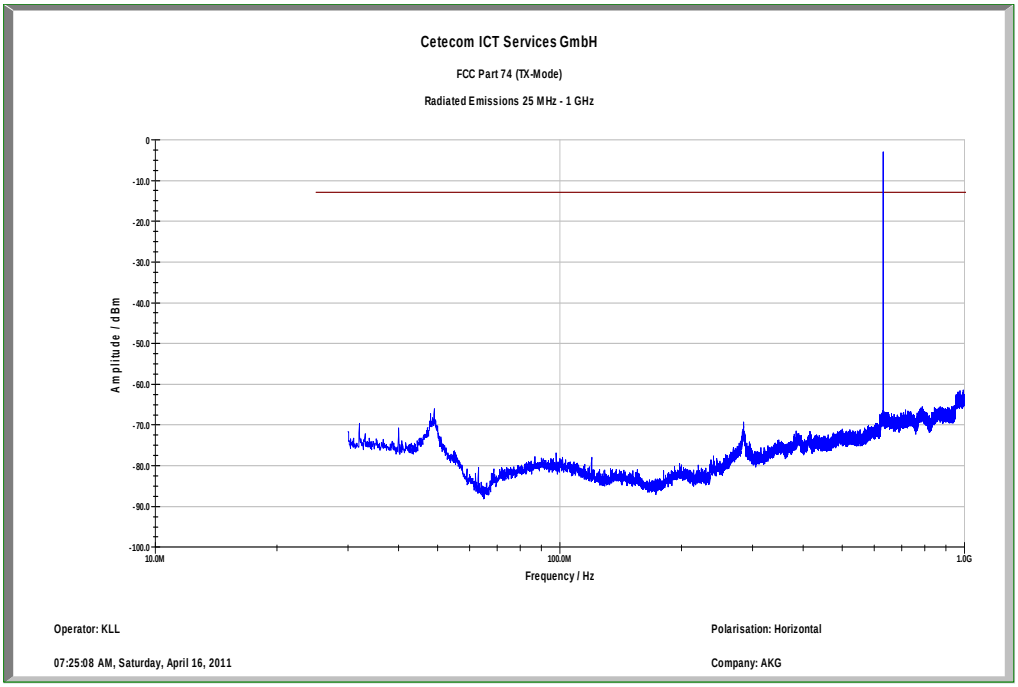
Plot 52: Band IX (614.1MHz-630.5MHz) high channel, 30 MHz – 1 GHz, antenna vertical



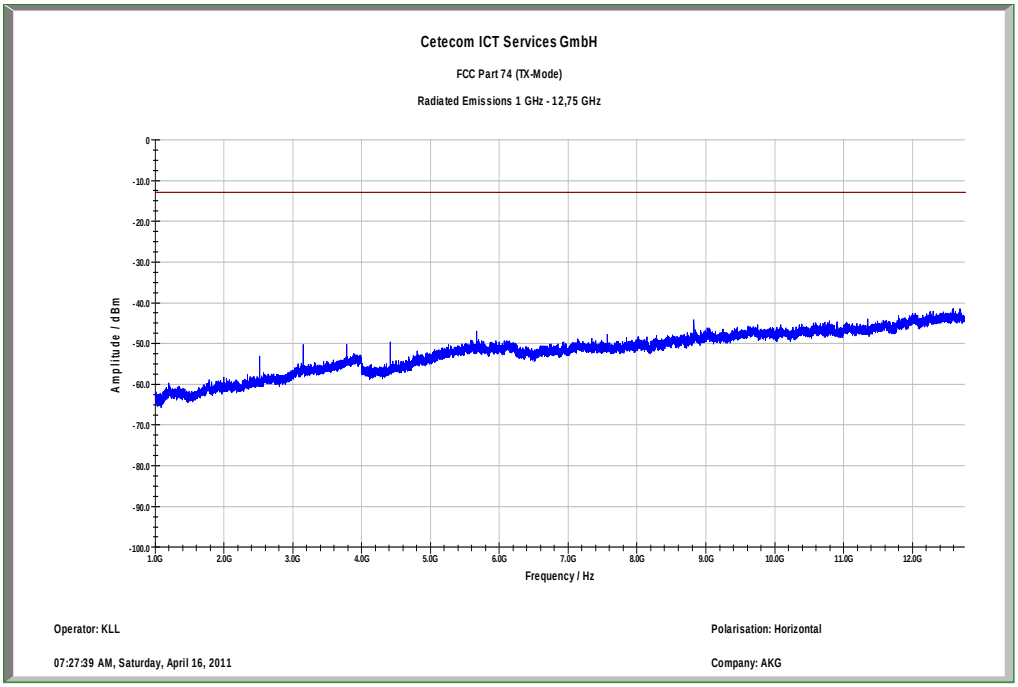
Plot 53: Band IX (614.1MHz-630.5MHz) high channel, 1 GHz – 12.75 GHz, antenna vertical



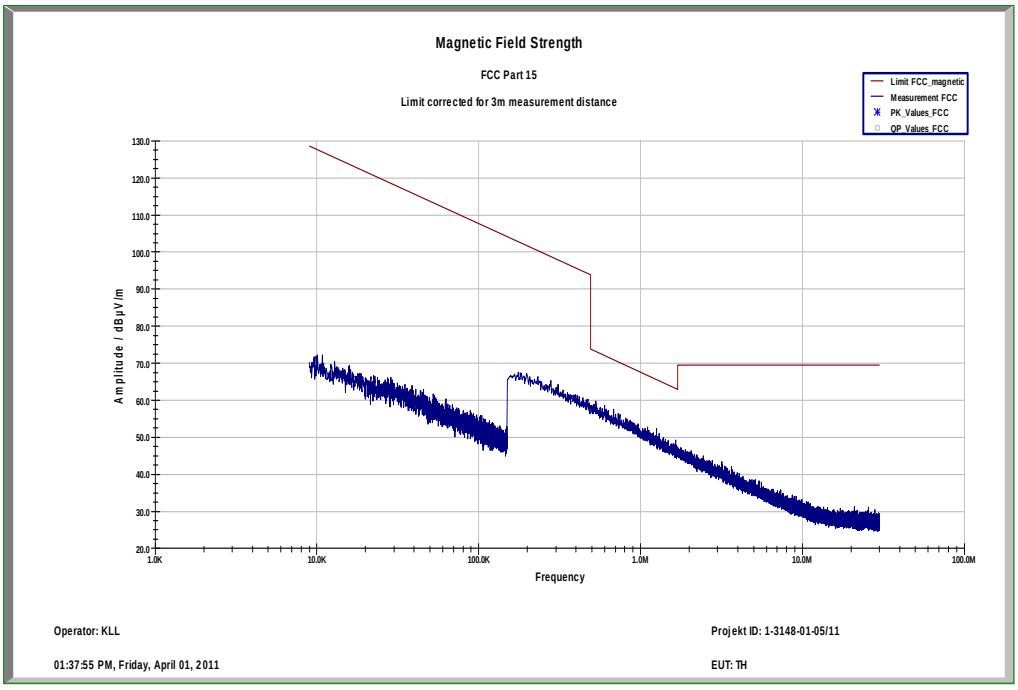
Plot 54: Band IX (614.1MHz-630.5MHz) high channel, 30 MHz – 1 GHz, antenna horizontal



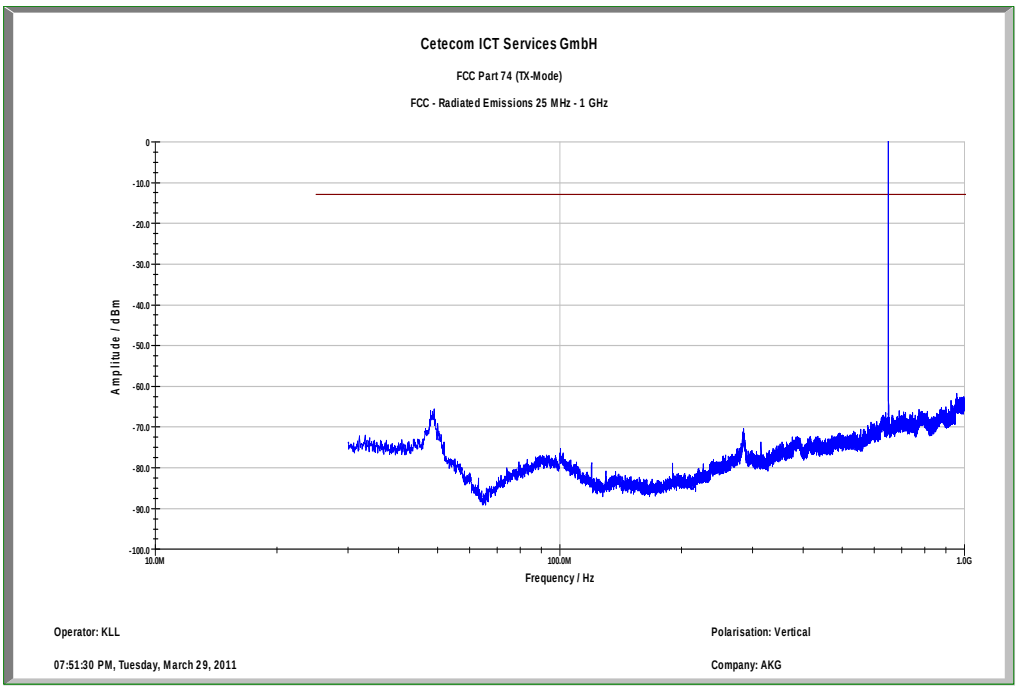
Plot 55: Band IX (614.1MHz-630.5MHz) high channel, 1 GHz – 12.75 GHz, antenna horizontal



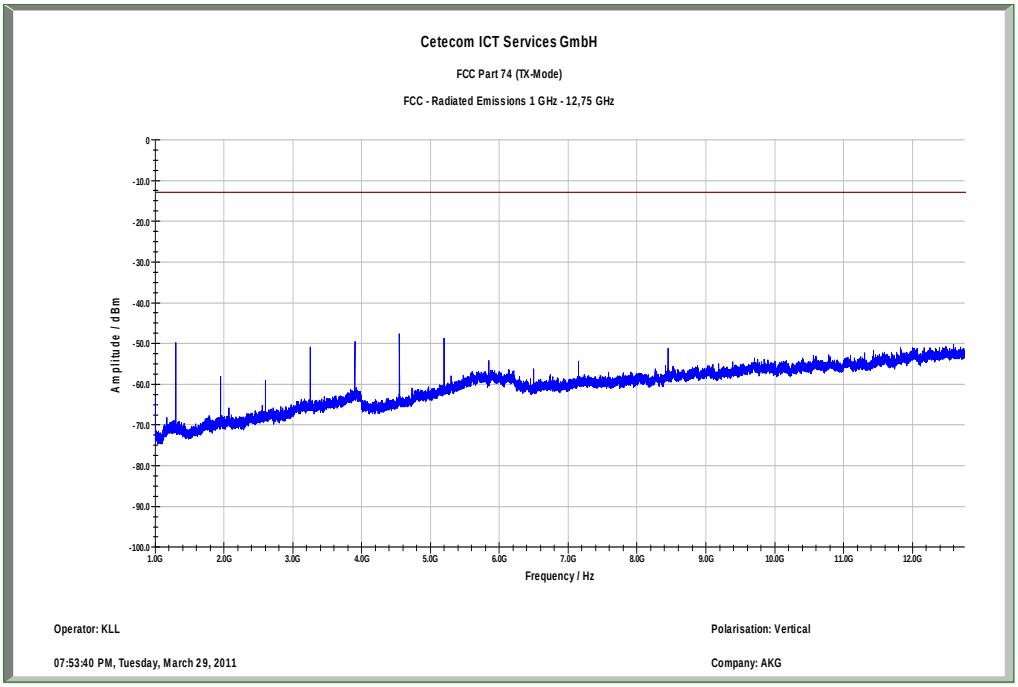
Plot 56: Band I (650.1MHz-680.0MHz) low channel, <30MHz



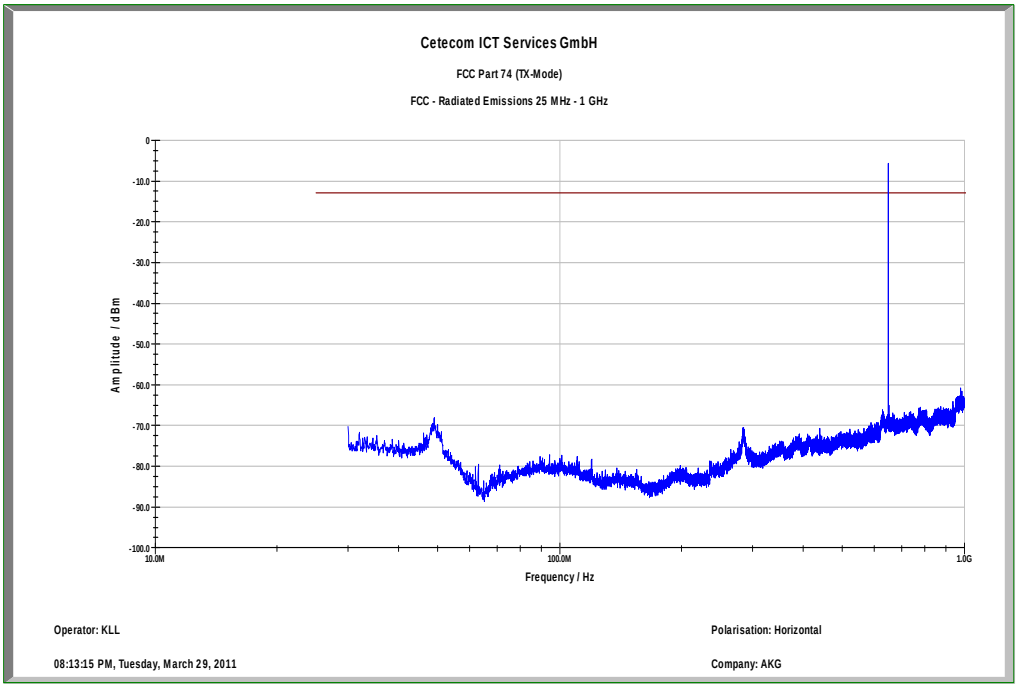
Plot 57: Band I (650.1MHz-680.0MHz) low channel, 30 MHz – 1 GHz, antenna vertical



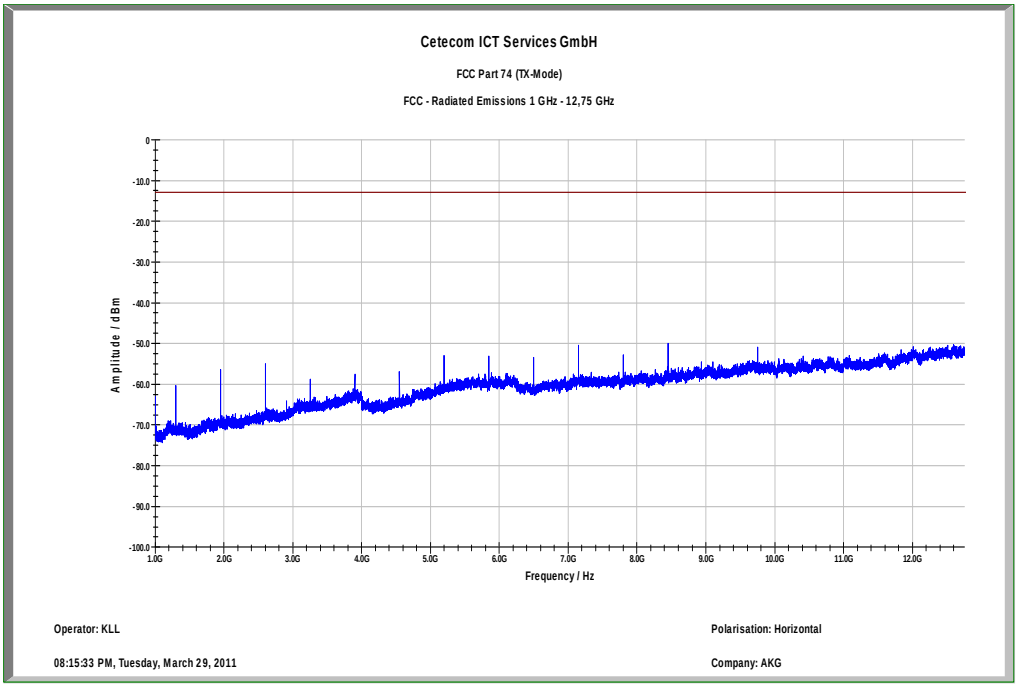
Plot 58: Band I (650.1MHz-680.0MHz) low channel, 1 GHz – 12.75 GHz, antenna vertical



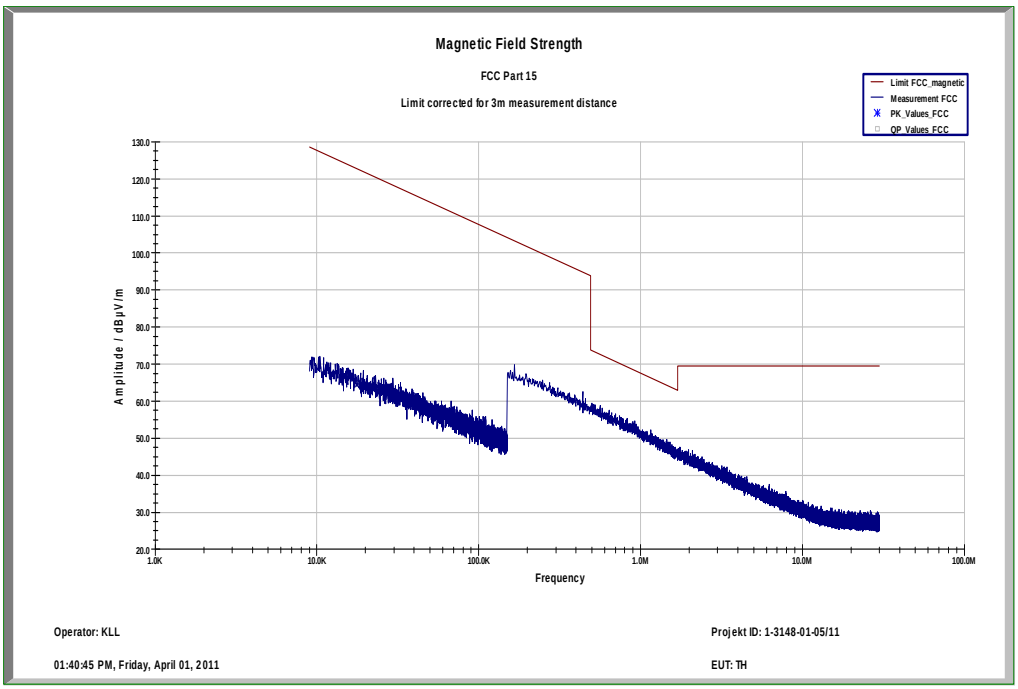
Plot 59: Band I (650.1MHz-680.0MHz) low channel, 30 MHz – 1 GHz, antenna horizontal



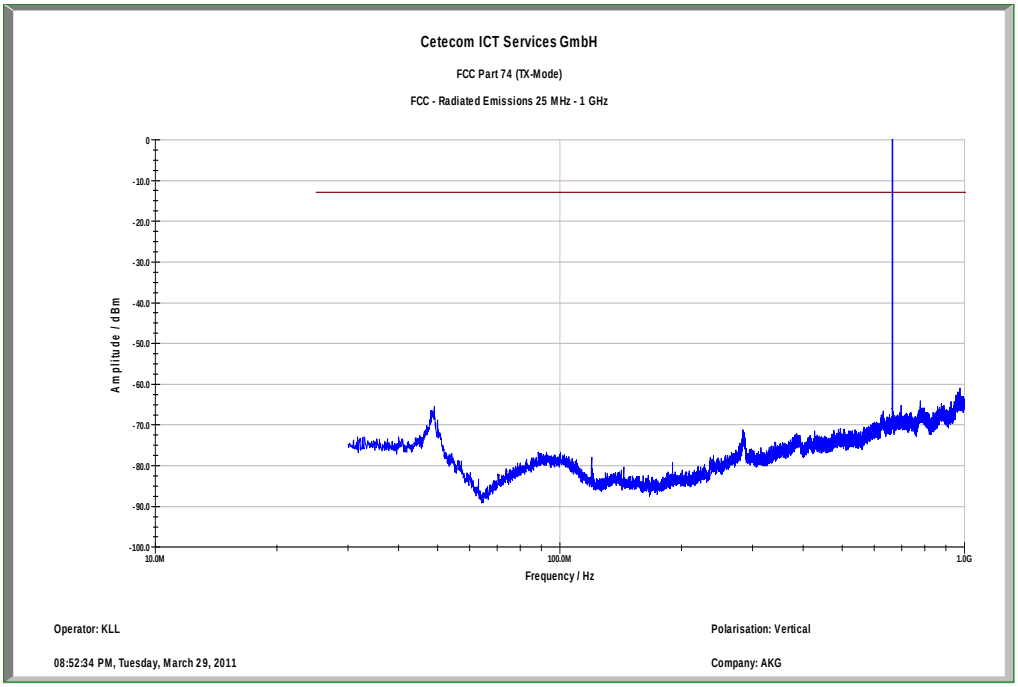
Plot 60: Band I (650.1MHz-680.0MHz) low channel, 1 GHz – 12.75 GHz, antenna horizontal



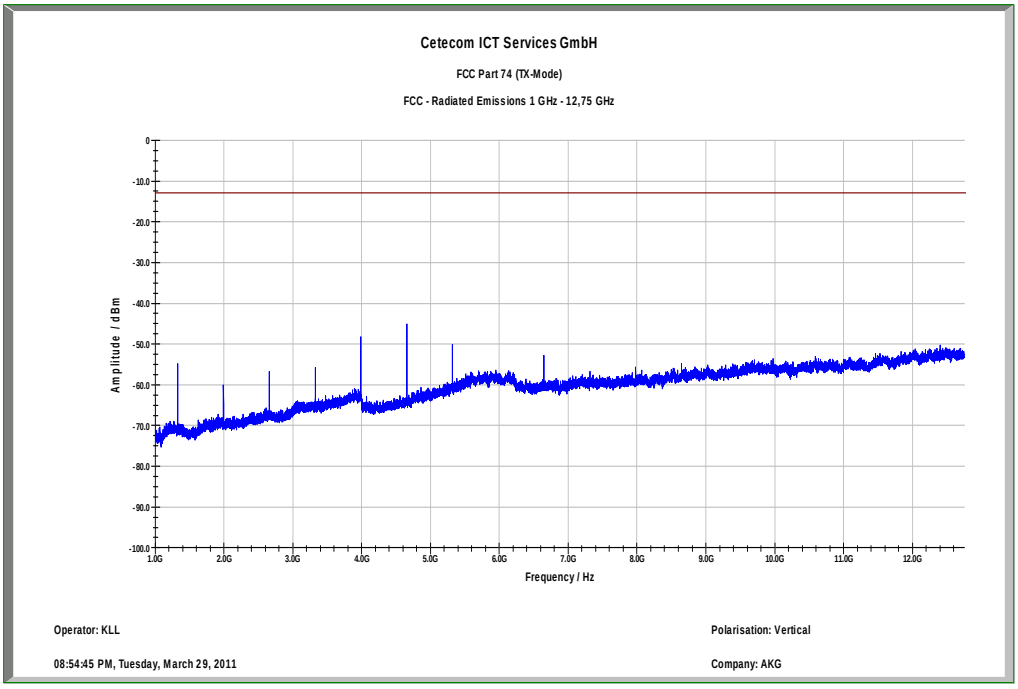
Plot 61: Band I (650.1MHz-680.0MHz) middle channel, <30MHz



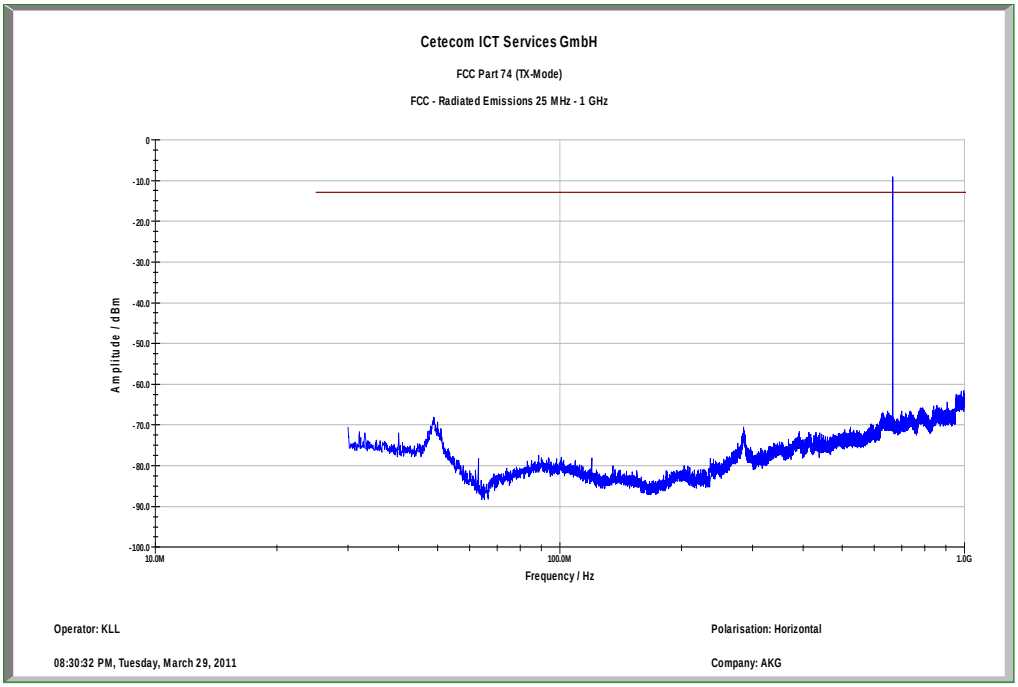
Plot 62: Band I (650.1MHz-680.0MHz) middle channel, 30 MHz – 1 GHz, antenna vertical



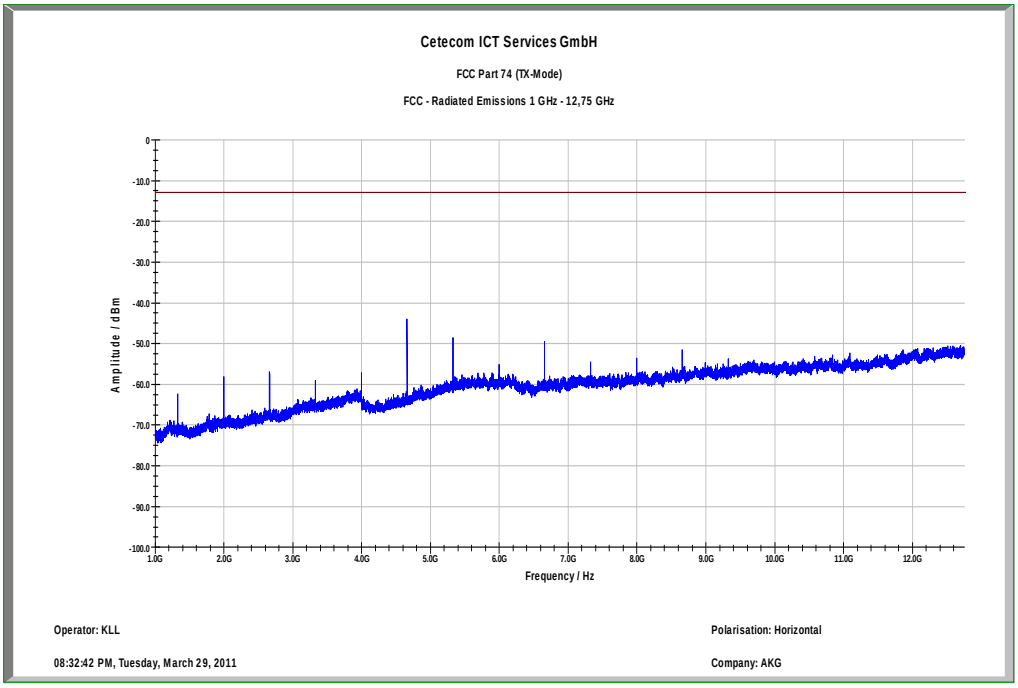
Plot 63: Band I (650.1MHz-680.0MHz) middle channel, 1 GHz – 12.75 GHz, antenna vertical



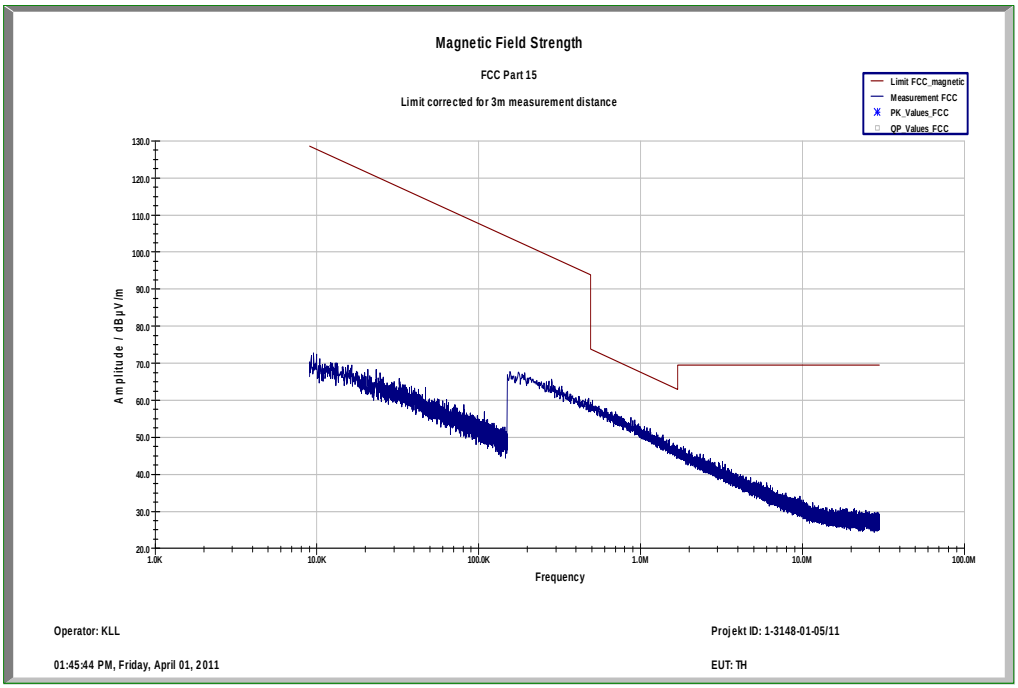
Plot 64: Band I (650.1MHz-680.0MHz) middle channel, 30 MHz – 1 GHz, antenna horizontal



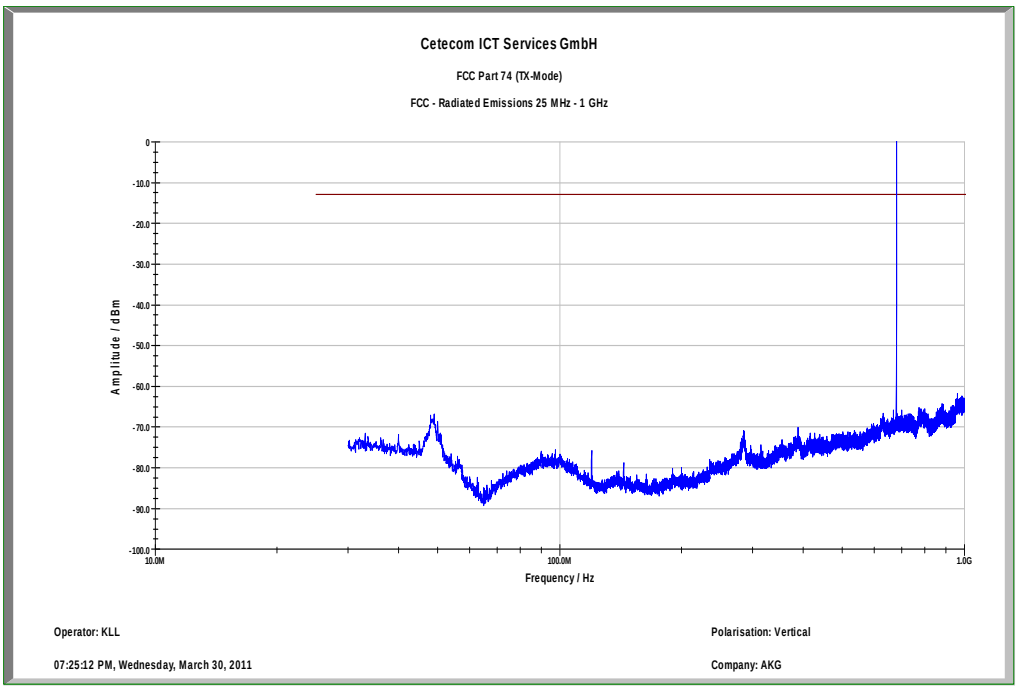
Plot 65: Band I (650.1MHz-680.0MHz) middle channel, 1 GHz – 12.75 GHz, antenna horizontal



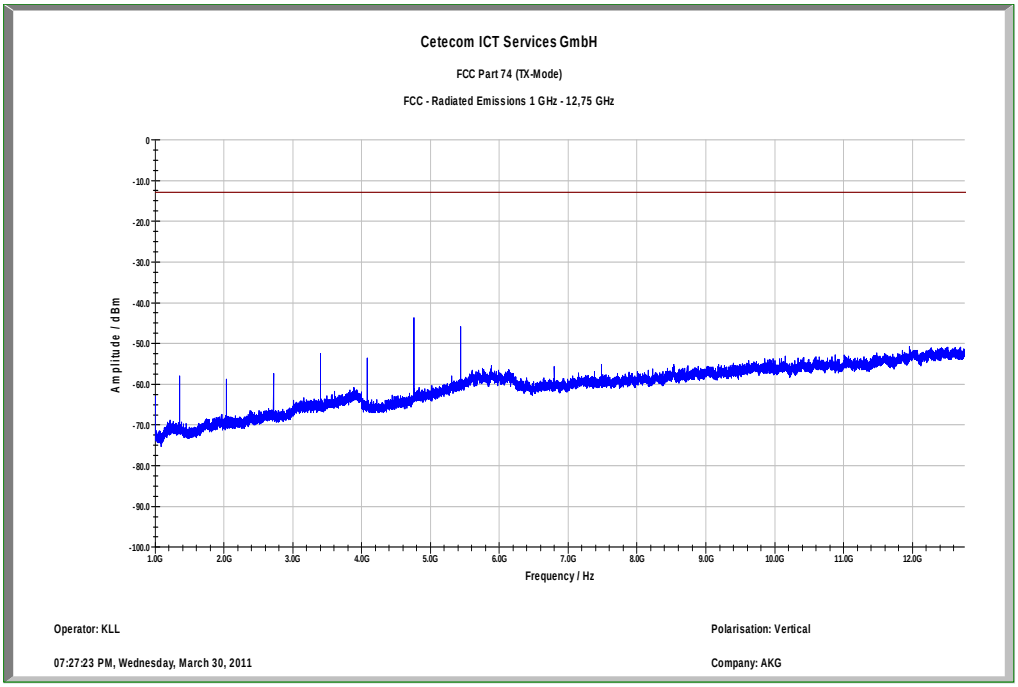
Plot 66: Band I (650.1MHz-680.0MHz) high channel, <30MHz



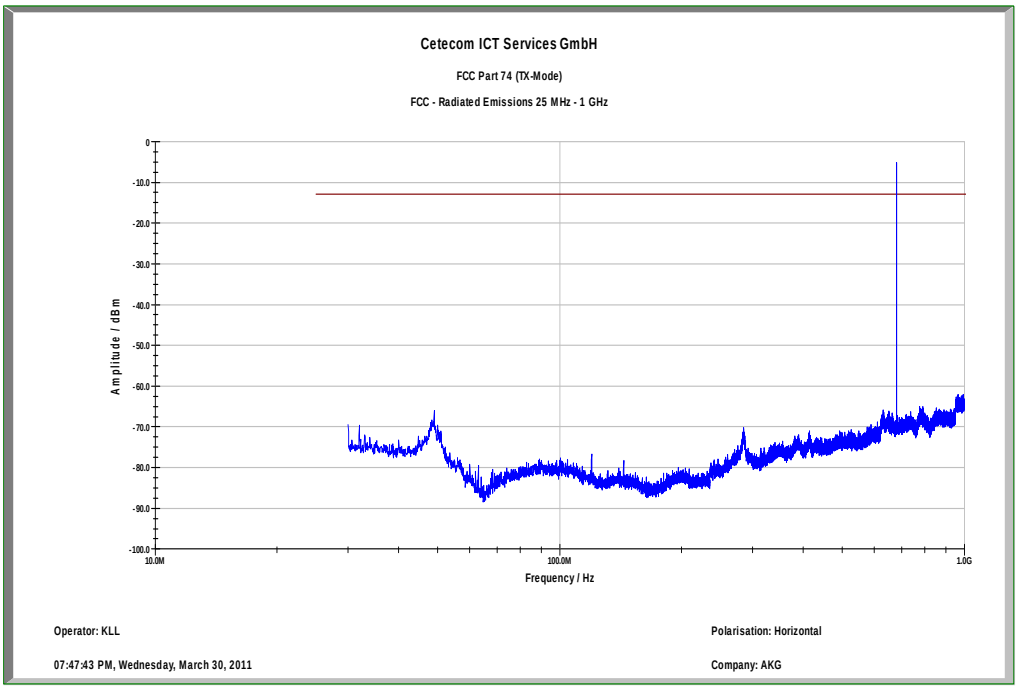
Plot 67: Band I (650.1MHz-680.0MHz) high channel, 30 MHz – 1 GHz, antenna vertical



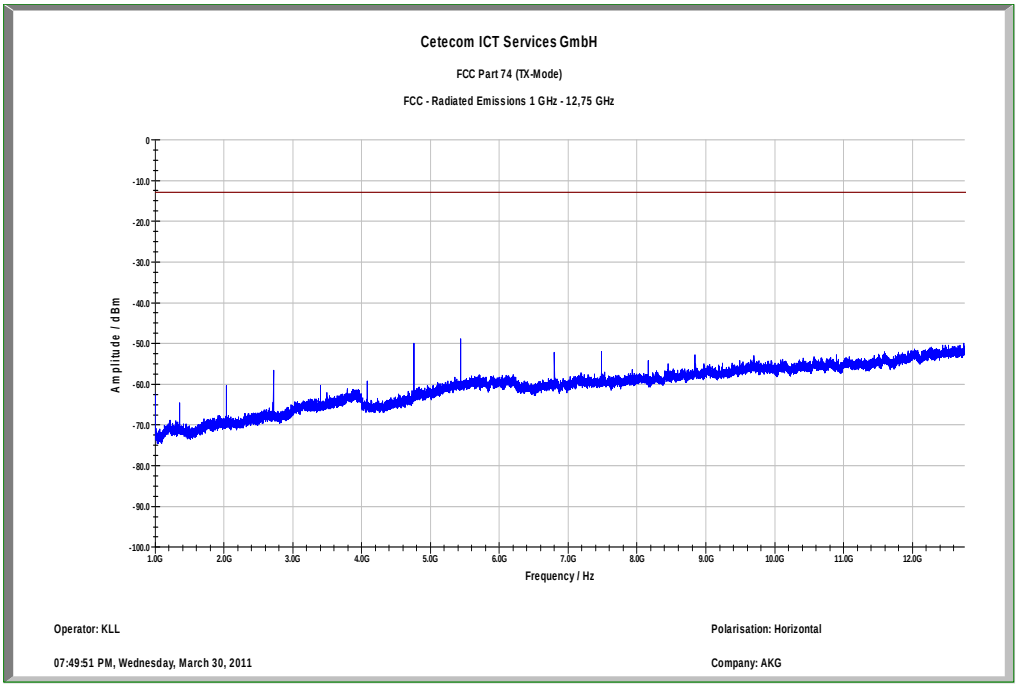
Plot 68: Band I (650.1MHz-680.0MHz) high channel, 1 GHz – 12.75 GHz, antenna vertical



Plot 69: Band I (650.1MHz-680.0MHz) high channel, 30 MHz – 1 GHz, antenna horizontal



Plot 70: Band I (650.1MHz-680.0MHz) high channel, 1 GHz – 12.75 GHz, antenna horizontal



9.7 Receiver spurious emissions (radiated)

Not applicable

10 Test equipment and ancillaries used for tests

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, rf-generating and signalling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Labor/Item).

No.	Lab / Item	Equipment	Type	Manufact.	Serial No.	INV. No Cetecom	Kind of Calibration	Last Calibration	Next Calibration
1	n. a.	Isolating Transformer	RT5A	Grundig	8041	300001626	g		
2	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2818A03450	300001040	Ve	08.01.2009	08.01.2012
3	n. a.	Coaxial Attenuator 30dB/500W	8325	Bird	1530	300001595	ev		
4	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vIKI!	05.03.2009	05.09.2011
5	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
6	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
7	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
8	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2010	06.01.2012
9	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
10	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
11	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
12	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
13	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
14	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
15	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
16	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
17	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
18	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
19	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
20	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
21	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
22	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	13.09.2010	13.09.2012
23	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vIKI!	08.09.2010	08.09.2012
24	n. a.	TRILOG Broadband Test-Antenna	VULB9163	Schwarzbeck	371	300003854	vIKI!	17.12.2008	17.12.2011

		30 MHz - 3 GHz							
25	2	Radiocom. Analyzer	CMTA 84	R&S	894199/012	300001176	vlKl!	20.01.2010	20.01.2012
26	n. a.	DC Power Supply 0 – 32V	1108-32	Heiden	001802	300001383	Ve	23.06.2010	23.06.2013
27	n. a.	Audio Analyzer 2Hz - 300 kHz	UPD	R&S	841074/009	300001236	k	08.01.2010	08.01.2012
28	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSiQ26	R&S	835111/0004	300002678	Ve	04.11.2010	04.11.2012
29	n. a.	Temperature Test Chamber	T-40/50	CTS GmbH	064023	300003540	vlKl!	04.06.2009	04.06.2011

Agenda: Kind of Calibration

k	calibration / calibrated	EK	limited calibration
ne	not required (k, ev, izw, zw not required)	zw	cyclical maintenance (external cyclical maintenance)
ev	periodic self verification	izw	internal cyclical maintenance
Ve	long-term stability recognized	g	blocked for accredited testing
vlkl!	Attention: extended calibration interval		
NK!	Attention: not calibrated	*)	next calibration ordered / currently in progress

Annex A Photographs of the test setup

Photo documentation:

Photo 1:

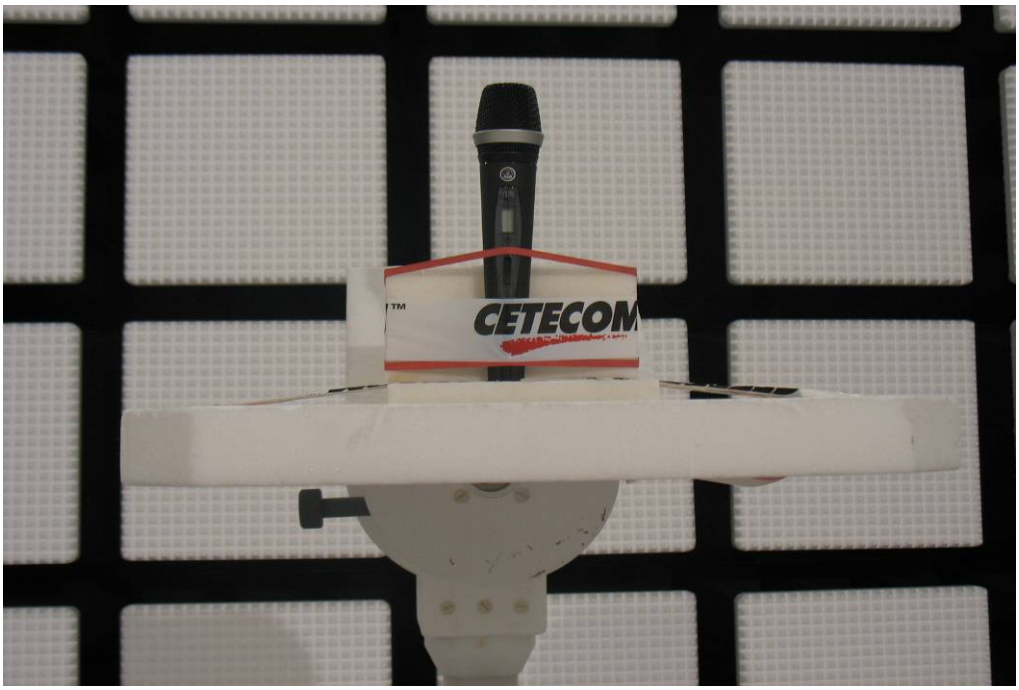
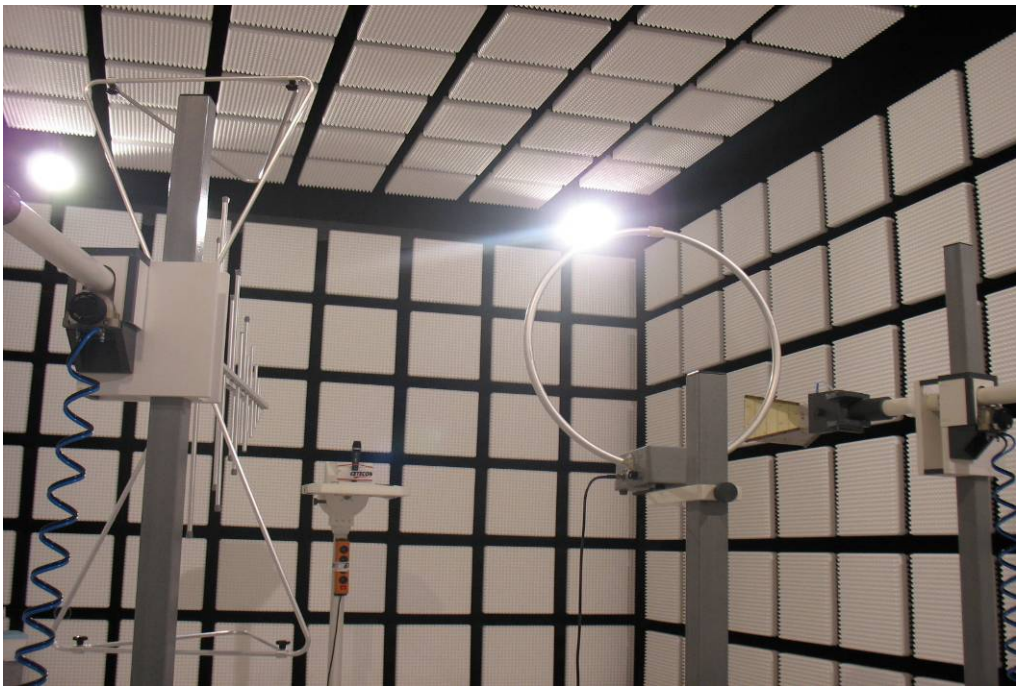


Photo 2:

Photo 3:



Annex B External photographs of the EUT

Photo documentation:

Photo 1:

Photo 2:

Photo 3:

Photo 4:

Annex C Internal photographs of the EUT

Photo documentation:

Photo 1:

Photo 2:

Photo 3:

Photo 4:

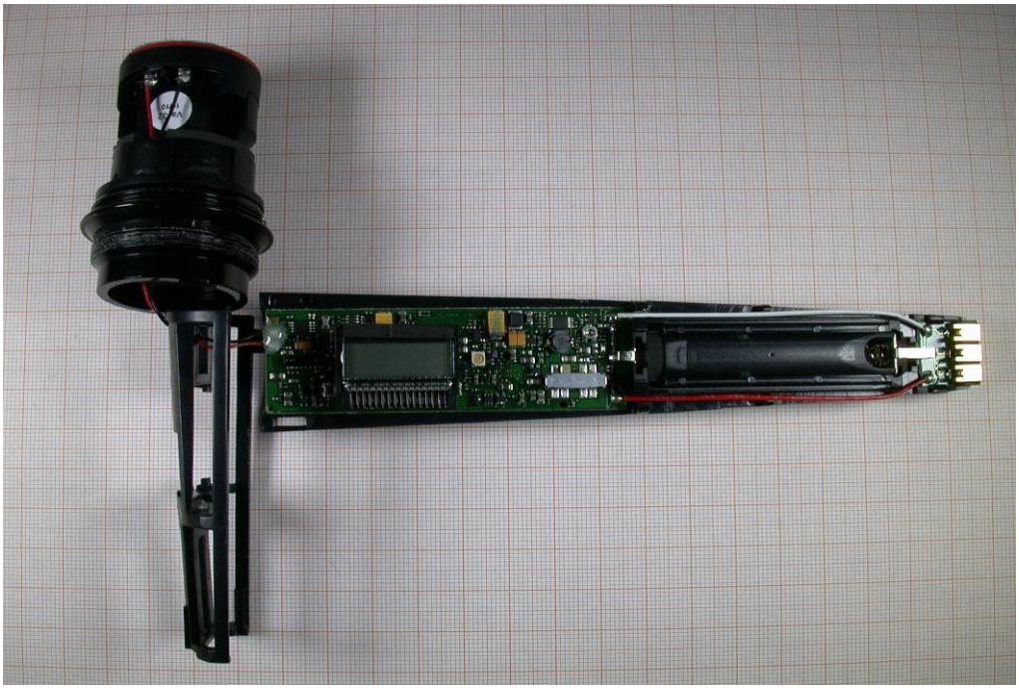


Photo 5:

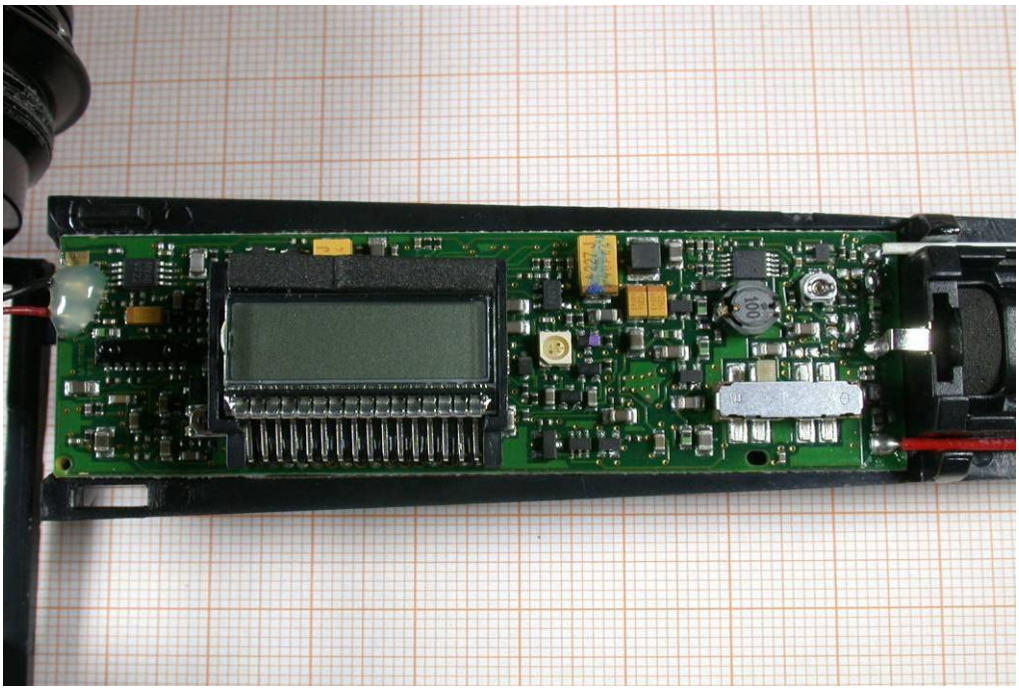


Photo 6:

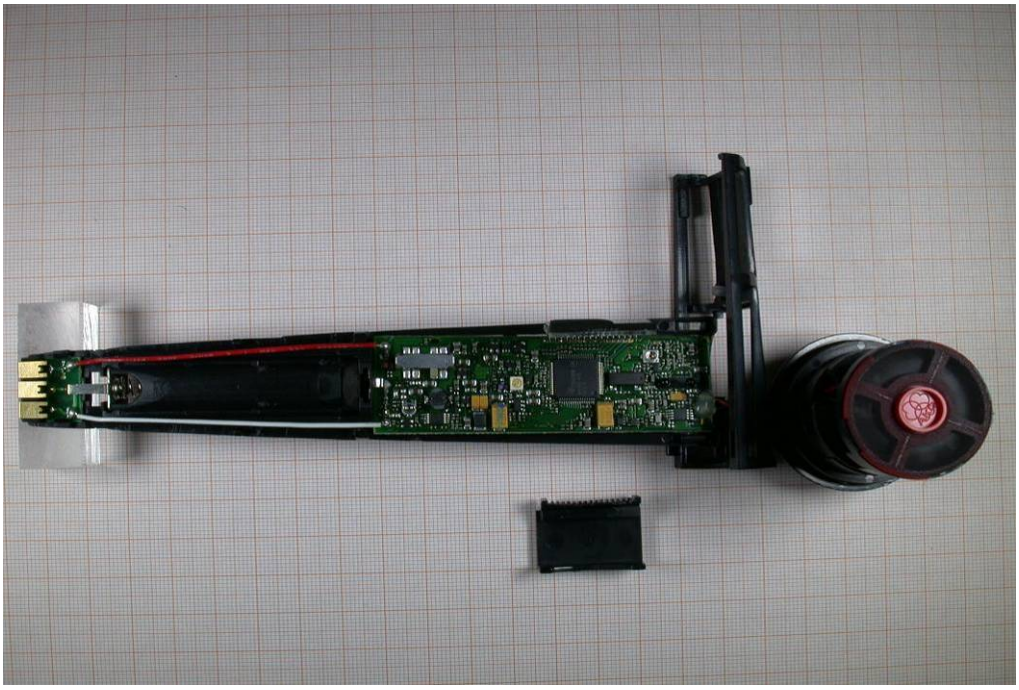


Photo 7:

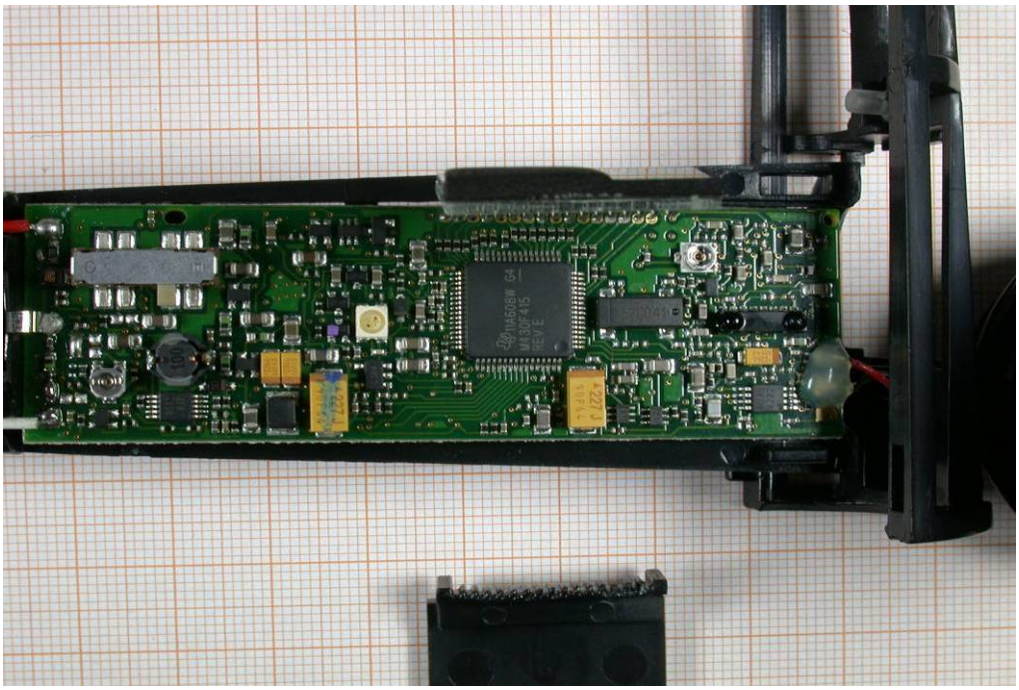


Photo 8:

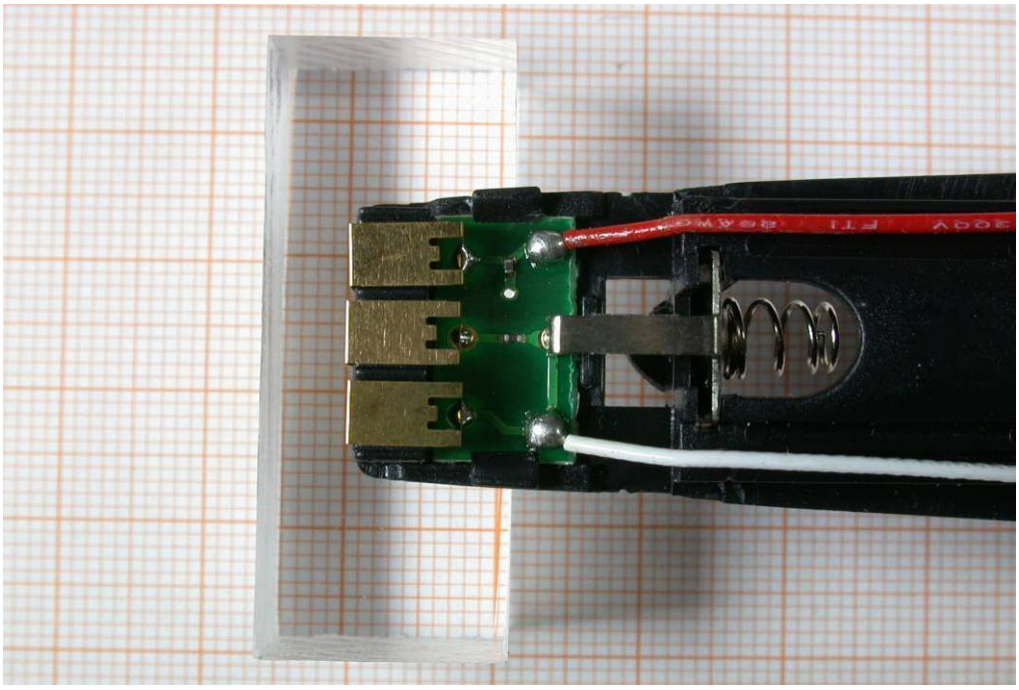


Photo 9:

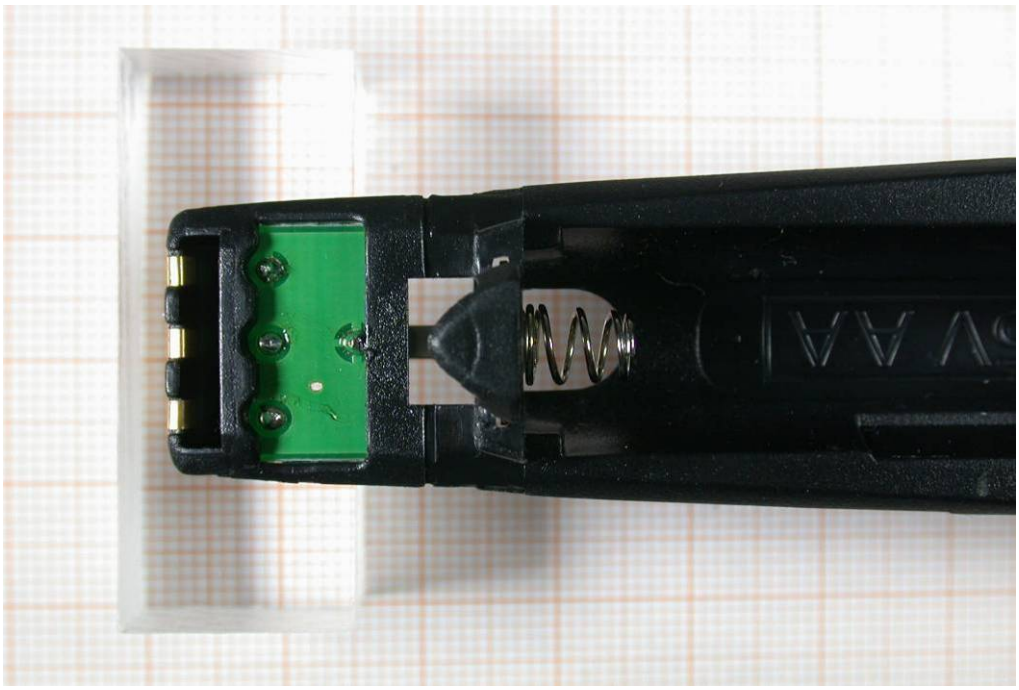


Photo 10:

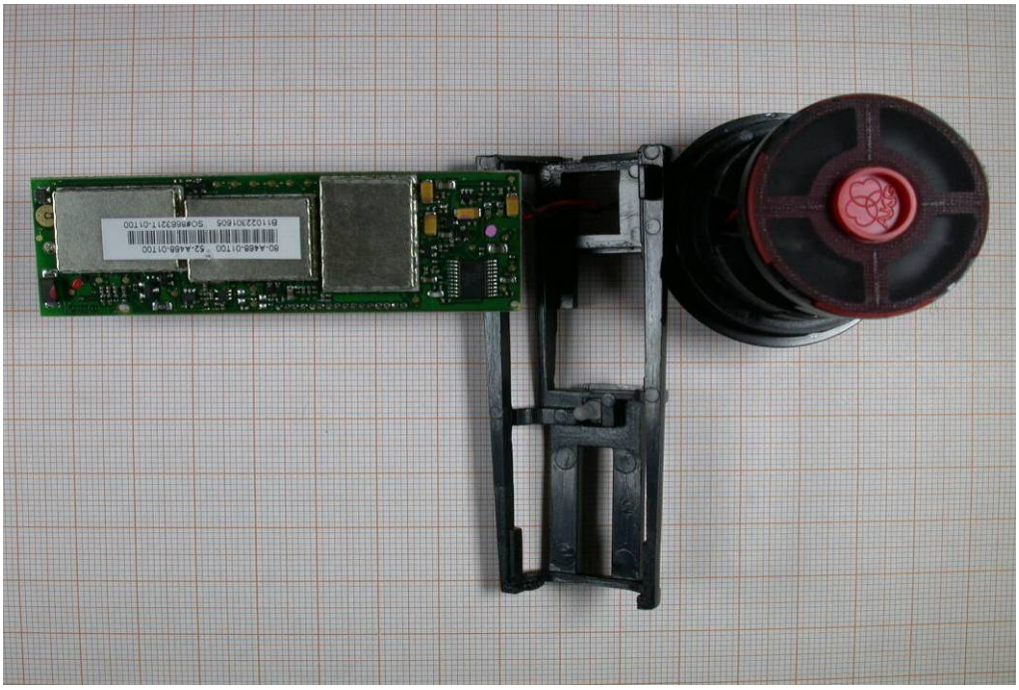


Photo 11:

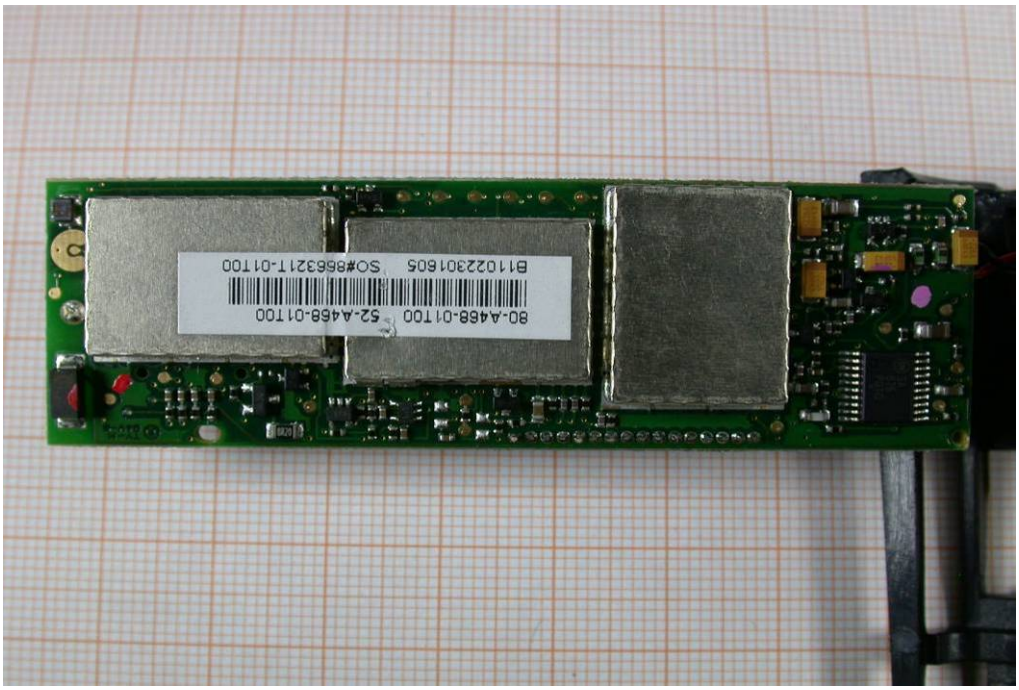


Photo 12:

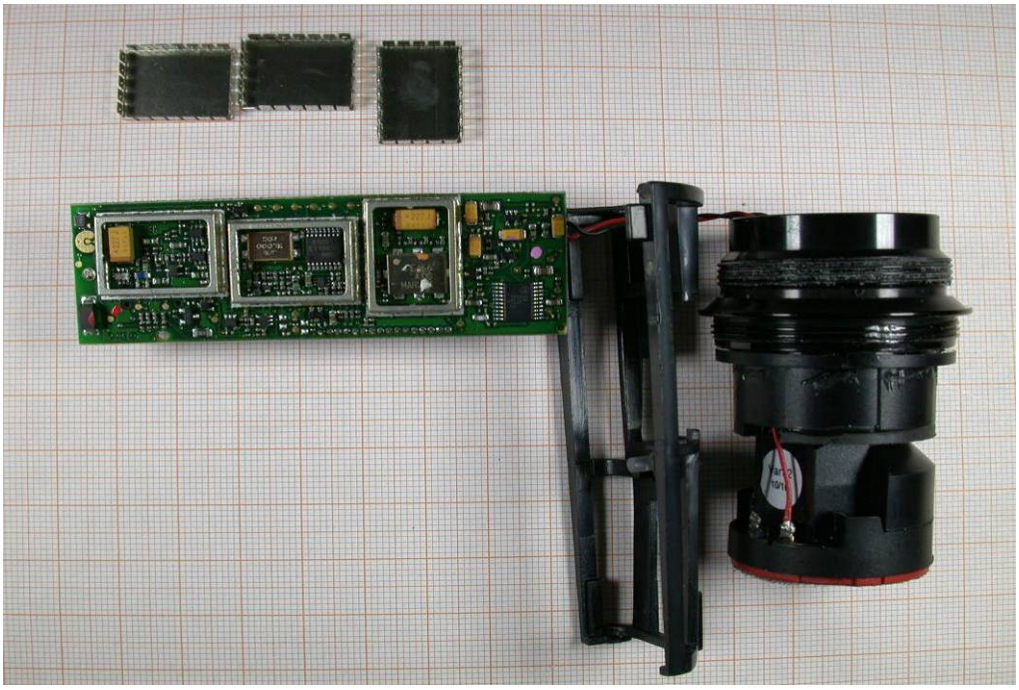
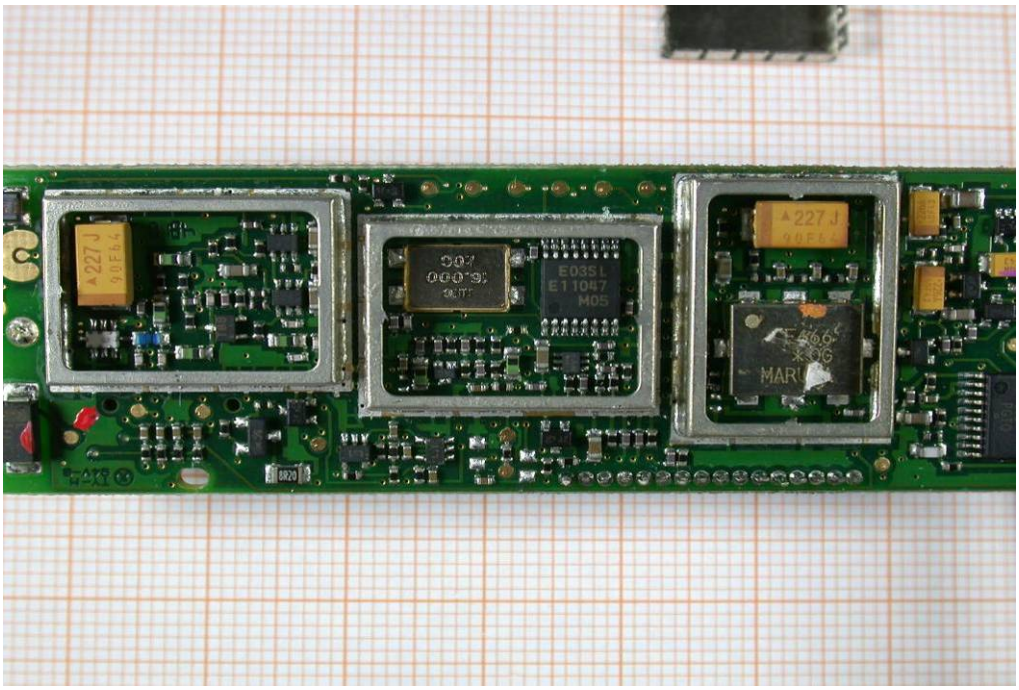


Photo 13:



Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2011-06-16

Annex E Further information

Glossary

DUT - Device under Test
EMC - Electromagnetic Compatibility
EUT - Equipment under Test
FCC - Federal Communication Commission
FCC ID - Company Identifier at FCC
HW - Hardware
IC - Industry Canada
Inv. No. - Inventory number
N/A - not applicable
S/N - Serial Number
SW - Software