

TEST REPORT

Test report no.: 1-3823/11-03-03-B



Deutsche
Akkreditierungsstelle
D-PL-12076-01-01

Testing laboratory

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Accredited Testing Laboratory:

The testing laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025 (2005) by the Deutsche Akkreditierungsstelle GmbH (DAkkS). The accreditation is valid for the scope of testing procedures as stated in the accreditation certificate with the registration number: D-PL-12076-01-01
Area of Testing: Radio/Satellite Communications

Applicant

Sennheiser electronic GmbH & Co. KG
Am Labor 1
30900 Wedemark / GERMANY
Phone: +49 5130 600-0
Fax: +49 5130 600-574
Contact: Volker Bartsch
e-mail: volker.bartsch@sennheiser.com
Phone: +49 5130 600-465

Manufacturer

Sennheiser electronic GmbH & Co. KG
Am Labor 1
30900 Wedemark / GERMANY

Test standard/s

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

RSS - 123 Issue 1 Spectrum Management and Telecommunications Policy - Radio Standards
Rev. 2 Specification
Low Power Licensed Radiocommunication Devices

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

Test Item

Kind of test item: UHF Transmitter
Model name: SKM 9000
FCC ID: DMOSKM9000
IC: 2099A-SKM9000
Frequency [MHz]: 470.10 MHz to 607.90 MHz
614.10 MHz to 697.90 MHz
Technology tested: Digital audio transmission
Antenna: Internal antenna
Power Supply: 3.7 V DC by Li-Ion battery
Temperature Range: -30°C to +50 °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 report authorised:

Stefan BöS
Senior Testing Manager

Test performed:

p. o.

Andreas Luckenbill

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2 General information

2.1 Notes and disclaimer

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 generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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2.2 Application details

Date of receipt of order:	2011-10-13
Date of receipt of test item:	2012-02-06
Start of test:	2012-02-06
End of test:	2012-02-22
Person(s) present during the test:	-/-

3 Test standard/s

Test standard	Date	Test standard description
47 CFR Part 74	2010-10	Title 47 of the Code of Federal Regulations; Chapter I Part 74 - Experimental radio, auxiliary. special broadcast and other program distribution services
RSS - 123 Issue 1 Rev. 2	2000-03	Spectrum Management and Telecommunications Policy - Radio Standards Specification Low Power Licensed Radiocommunication Devices

4 Test environment

Temperature:	T_{nom}	+22 °C during room temperature tests
	T_{max}	+50 °C during high temperature tests
	T_{min}	-30 °C during low temperature tests
Relative humidity content:		30 %
Barometric pressure:		not relevant for this kind of testing
Power supply:	V_{nom}	3.7 V DC by Li-Ion battery
	V_{max}	3.8 V
	V_{min}	2.7 V

5 Test item

Kind of test item	:	UHF Transmitter
Type identification	:	SKM 9000
S/N serial number	:	Rad. 1351100113, 1351100135, 1351100173
HW hardware status	:	No information available!
SW software status	:	No information available!
Frequency band [MHz]	:	Used frequency band 470.00 MHz to 608.00 MHz 614.00 MHz to 698.00 MHz Available variations & Tested channels: A1-A4: 470.1 MHz - 558.0 MHz A5-A8: 550.0 MHz - 607.9 MHz, 614.1 MHz - 638.0 MHz B1-B4: 630.0 MHz - 697.9 MHz
Type of radio transmission	:	Modulated carrier
Use of frequency spectrum	:	
Type of modulation	:	Pi / 4 QPSK; 64 DAPSK
Antenna	:	Internal antenna
Power supply	:	3.7 V DC by Li-Ion battery
Temperature range	:	-30°C to +50 °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	pass	2012-08-21	-/-

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	☐	☐	☒	☐	-/-

Note: NA = Not Applicable; NP = Not Performed

7.1 RSP100 test report cover sheet / performance test data

Test Report Number	:	1-3823/11-03-03-B
Equipment Model Number	:	SKM 9000
Certification Number	:	2099A-SKM9000
Manufacturer (complete Address)	:	Sennheiser electronic GmbH & Co. KG Am Labor 1 30900 Wedemark / GERMANY
Tested to radio standards specification no.	:	RSS-123 Issue 2
Open Area Test Site IC No.	:	IC 3462C-1
Frequency Range or fixed frequency	:	Used frequency band 470.00 MHz to 608.00 MHz 614.00 MHz to 698.00 MHz Available variations & Tested channels: A1-A4: 470.1 MHz - 558.0 MHz A5-A8: 550.0 MHz - 607.9 MHz, 614.1 MHz - 638.0 MHz B1-B4: 630.0 MHz - 697.9 MHz
Field Strength [Watt] (at which distance)	:	51.40 mW
Occupied bandwidth (99%-BW)	:	171 kHz
Type of modulation	:	Pi / 4 QPSK; 64 DAPSK
Emission Designator (TRC-43)	:	171KF1W
Antenna Information	:	Internal antenna
Transmitter Spurious (worst case)	:	63.10 nW (noise floor)
Receiver Spurious (worst case)	:	No receiver integrated!

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:

2012-08-21

Date

Andreas Luckenbill

Name



Signature

8 RF measurements

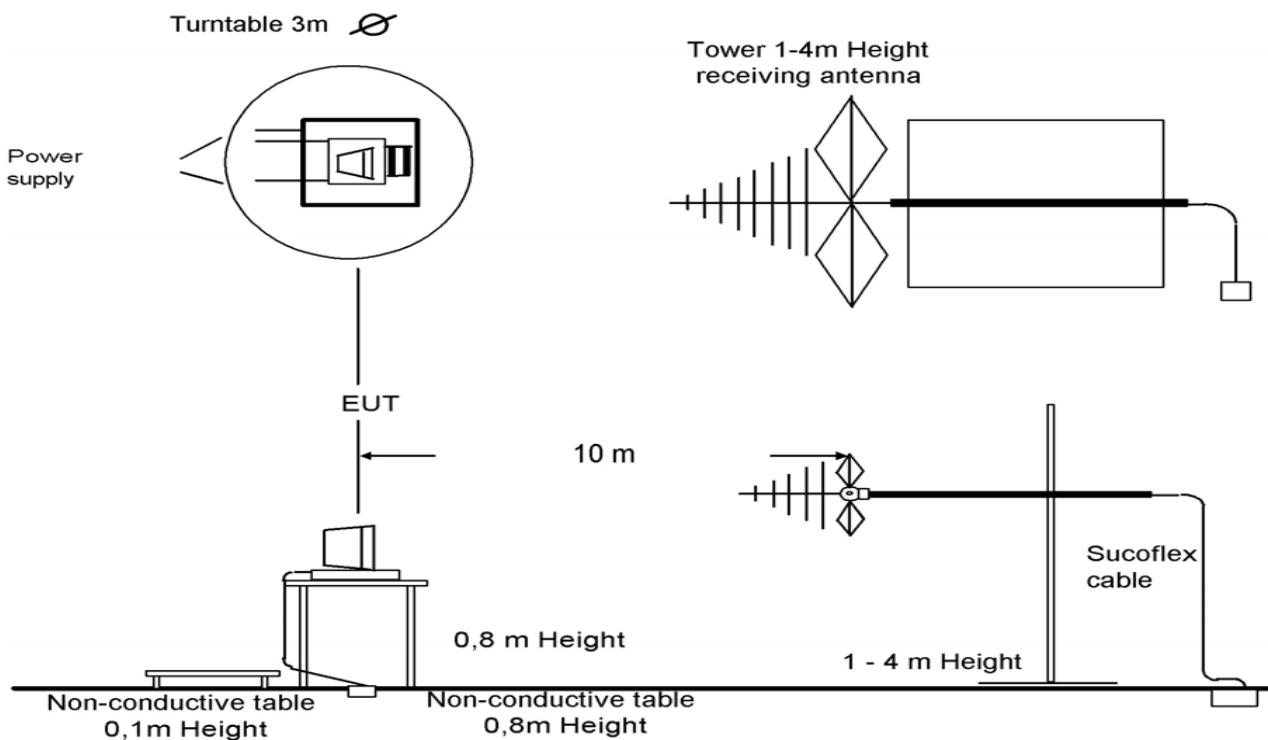
8.1 Description of test setup

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



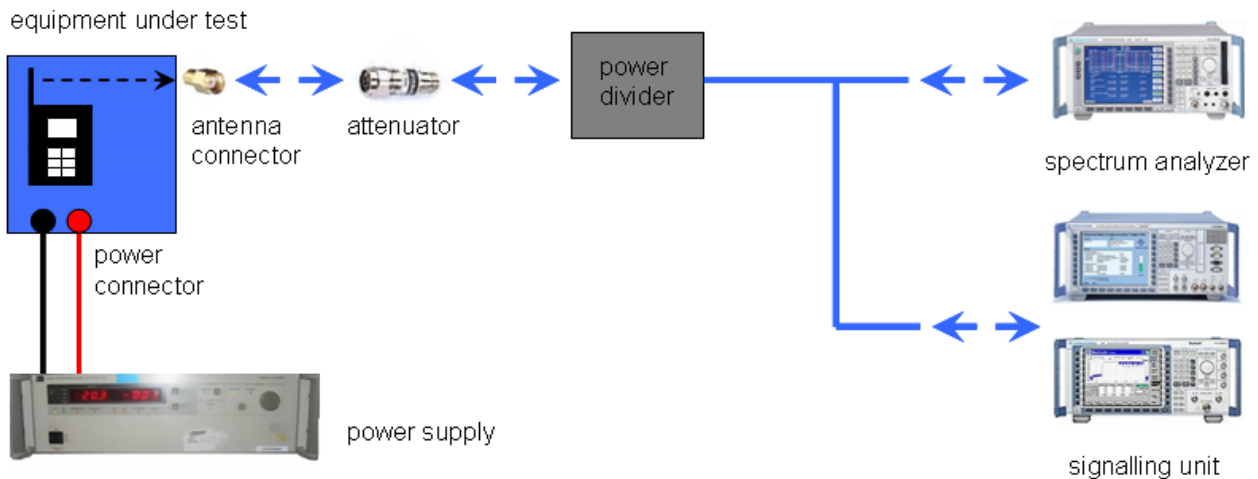
Picture 1: Diagram radiated measurements

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: None

Special test descriptions: None

Configuration descriptions: None

3 variations with different frequency ranges available:

A1-A4: 470.1 MHz - 558.0 MHz

A5-A8: 550.0 MHz - 607.9 MHz, 614.1 MHz - 638.0 MHz

B1-B4: 630.0 MHz - 697.9 MHz

9 Measurement results

9.1 Output power (radiated)

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	300 kHz
Video bandwidth:	300 kHz
Span:	1 MHz
Trace-Mode:	Max. hold

Limits:

FCC	IC
47 CFR § 74.861 (e)(1)(ii)	RSS-123 §6.2 Issue 2
Maximum transmitter power	
No limitation. If radiated output power is under 23.98 dBm no SAR is needed.	

Result:

Frequency	Radiated output power (ERP)
470.100 MHz	14.43 dBm
539.000 MHz	16.14 dBm
607.900 MHz	17.11 dBm
614.100 MHz	17.05 dBm
656.000 MHz	14.75 dBm
697.900 MHz	15.35 dBm

Result: The result of the measurement is passed.

9.2 Frequency stability

9.2.1 Frequency error vs. temperature

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 Hz
Video bandwidth:	100 Hz
Span:	1 kHz
Trace-Mode:	Max. hold
Voltage (nominal):	3.7 V

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: low band - low channel

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	470.0995	-1.06
-20 °C	470.0995	-1.06
-10 °C	470.1000	0.00
0 °C	470.1005	1.06
10 °C	470.1010	2.13
20 °C	470.1015	3.19
30 °C	470.1015	3.19
40 °C	470.1015	3.19
50 °C	470.1020	4.25

Results: low - middle channel

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	538.99975	-0.46
-20 °C	538.99975	-0.46
-10 °C	538.99975	-0.46
0 °C	539.00000	0.00
10 °C	538.99900	-1.86
20 °C	539.00050	0.93
30 °C	539.00075	1.39
40 °C	539.00025	0.46
50 °C	538.99950	-0.93

Results: low- high channel

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	607.90000	0.00
-20 °C	607.90070	1.15
-10 °C	607.90070	1.15
0 °C	607.90045	0.74
10 °C	607.90025	0.41
20 °C	607.90000	0.00
30 °C	607.90000	0.00
40 °C	607.90025	0.41
50 °C	607.90000	0.00

Results: high band - low channel

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	614.09980	-0.33
-20 °C	614.10000	0.00
-10 °C	614.10050	0.81
0 °C	614.10050	0.81
10 °C	614.10050	0.81
20 °C	614.10025	0.41
30 °C	614.10025	0.41
40 °C	614.10000	0.00
50 °C	614.09975	-0.41

Results: high band - middle channel

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	655.99895	-1.60
-20 °C	655.99975	-0.38
-10 °C	656.00025	0.38
0 °C	656.00000	0.00
10 °C	656.00050	0.76
20 °C	655.99975	-0.38
30 °C	656.00050	0.76
40 °C	656.00000	0.00
50 °C	656.00050	0.76

Results: high band - high channel

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	697.8990	-1.43
-20 °C	697.8995	-0.72
-10 °C	697.9005	0.72
0 °C	697.9005	0.72
10 °C	697.9015	2.15
20 °C	697.9020	2.87
30 °C	697.9020	2.87
40 °C	697.9020	2.87
50 °C	697.9015	2.15

Result: The result of the measurement is passed.

9.2.2 Frequency error vs. voltage

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	1kHz
Video bandwidth:	1kHz
Span:	240 kHz
Trace-Mode:	Max. hold
Temperature:	20 °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: low band - low channel

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.7 V	470.0998	-0.53
2.8 V	470.0998	-0.53
2.9 V	470.1000	0.00
3.0 V	470.0995	-1.06
3.2 V	470.0998	-0.53
3.3 V	470.1000	0.00
3.4 V	470.1003	0.64
3.5 V	470.1000	0.00
3.6 V	470.0996	-0.85
3.7 V	470.1000	0.00
3.8 V	470.1000	0.00

Results: low band - middle channel

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.7 V	538.9998	-0.37
2.8 V	538.9996	-0.74
2.9 V	538.9998	-0.37
3.0 V	539.0000	0.00
3.2 V	539.0002	0.37
3.3 V	538.9998	-0.37
3.4 V	538.9998	-0.37
3.5 V	539.0000	0.00
3.6 V	538.9998	-0.37
3.7 V	539.0000	0.00
3.8 V	539.0002	0.37

Results: low band - high channel

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.7 V	607.90000	0.00
2.8 V	607.90025	0.41
2.9 V	607.90025	0.41
3.0 V	607.90050	0.82
3.2 V	607.90000	0.00
3.3 V	607.90000	0.00
3.4 V	607.90025	0.41
3.5 V	607.90000	0.00
3.6 V	607.89975	-0.14
3.7 V	607.90000	0.00
3.8 V	607.90000	0.00

Results: high band - low channel

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.7 V	614.10000	0.00
2.8 V	614.10000	0.00
2.9 V	614.09975	-0.41
3.0 V	614.10000	0.00
3.2 V	614.09975	-0.41
3.3 V	614.09975	-0.41
3.4 V	614.10000	0.00
3.5 V	614.09955	-0.73
3.6 V	614.09955	-0.73
3.7 V	614.09955	-0.73
3.8 V	614.09980	-0.33

Results: high band - middle channel

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.7 V	656.0003	0.38
2.8 V	656.0000	0.00
2.9 V	656.0002	0.31
3.0 V	655.9998	-0.38
3.2 V	656.0005	0.76
3.3 V	656.0000	0.00
3.4 V	656.0000	0.00
3.5 V	656.0002	0.31
3.6 V	656.0000	0.00
3.7 V	656.0000	0.00
3.8 V	656.0007	1.07

Results: high band - high channel

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.7 V	697.9000	0.00
2.8 V	697.9002	0.29
2.9 V	697.9005	0.65
3.0 V	697.8998	-0.29
3.2 V	697.8998	-0.29
3.3 V	697.9000	0.00
3.4 V	697.9002	0.29
3.5 V	697.9000	0.00
3.6 V	697.9000	0.00
3.7 V	697.8998	-0.29
3.8 V	697.9000	0.00

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

9.3 Modulation characteristics

Due to digital systems - not applicable!

9.4 Occupied bandwidth

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 kHz
Video bandwidth:	3 kHz
Span:	500 kHz
Trace-Mode:	Max. hold

Limits:

FCC	IC
47 CFR § 74.861	RSS-123 §6 Issue 2
Occupied bandwidth 99%. Other than single sideband or independent sideband transmitters - when modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulating circuit.	
The operating bandwidth shall not exceed 200 kHz	

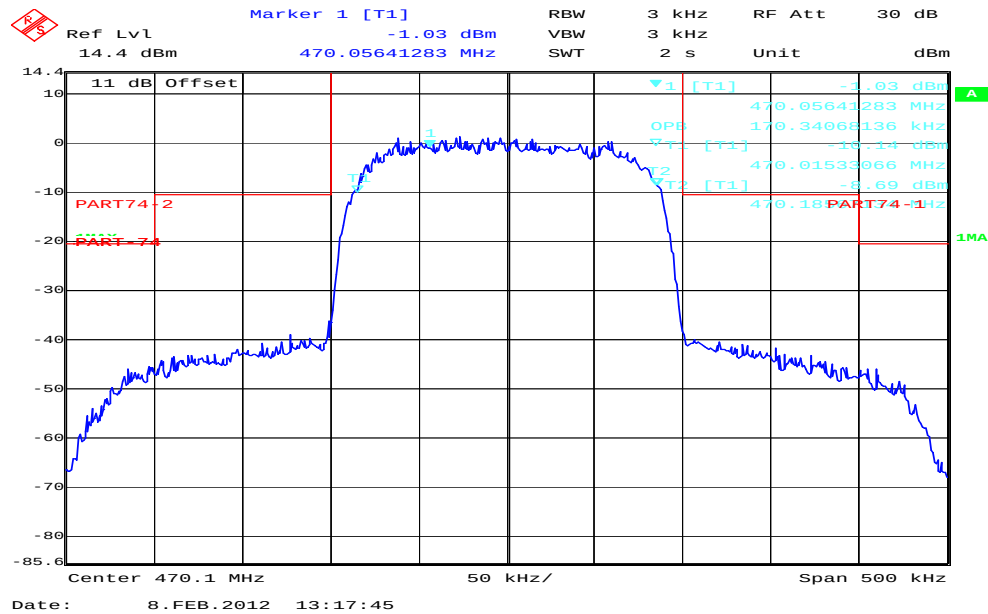
Result:

Frequency (channel)	20dB Bandwidth
470.1 MHz	170 kHz
539.0 MHz	171 kHz
607.9 MHz	170 kHz
614.1 MHz	170 kHz
659.0 MHz	171 kHz
697.9 MHz	170 kHz

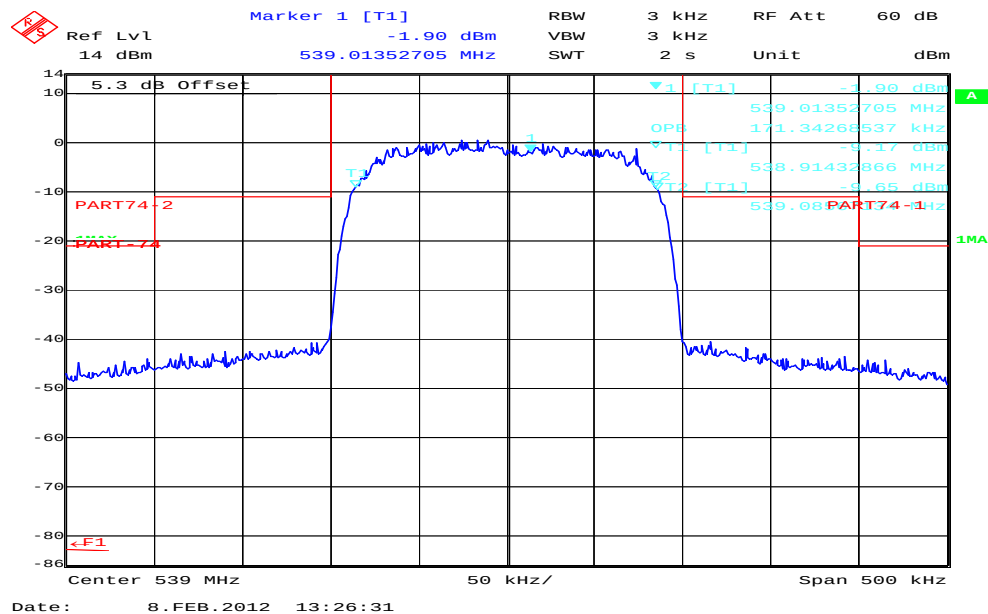
Result: The result of the measurement is passed.

Plots of the measurements

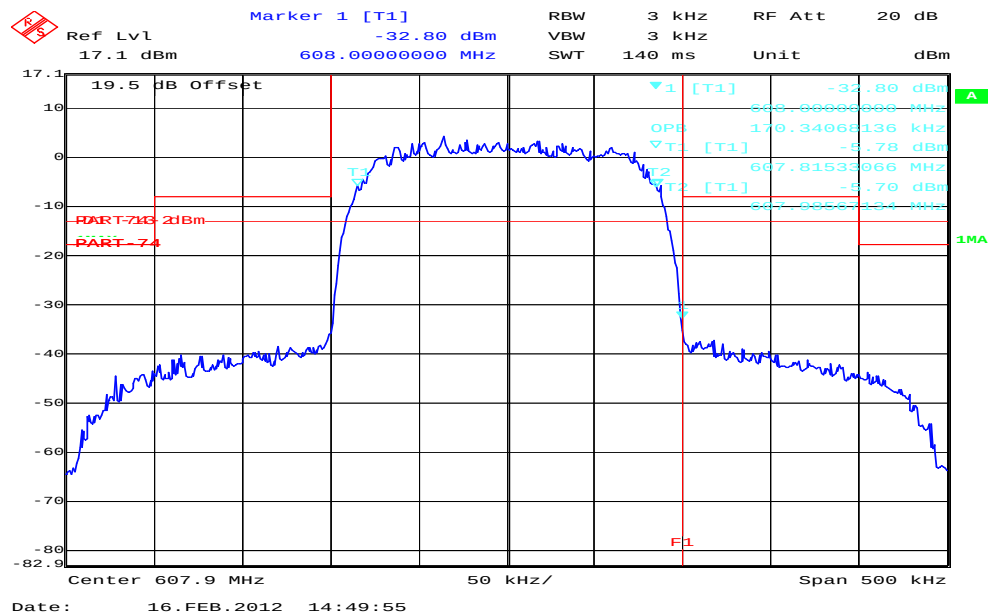
Plot 1: low band - low channel



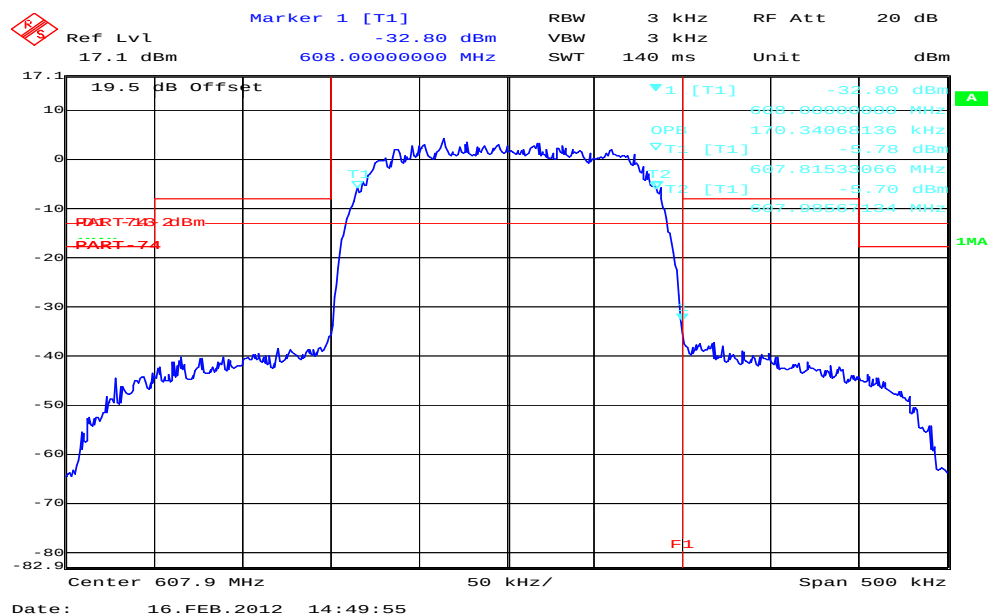
Plot 2: low band - middle channel



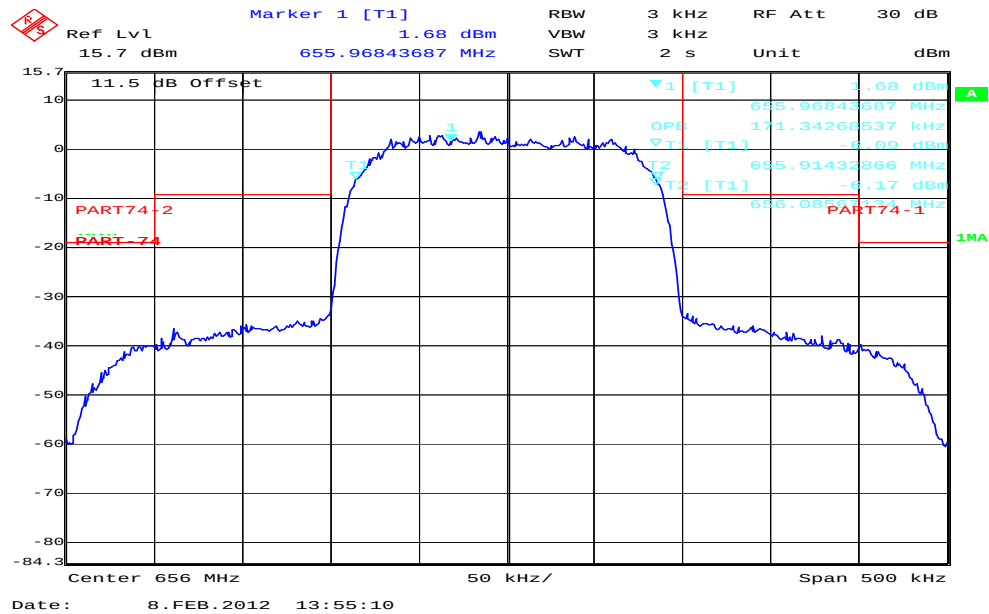
Plot 3: low band - high channel



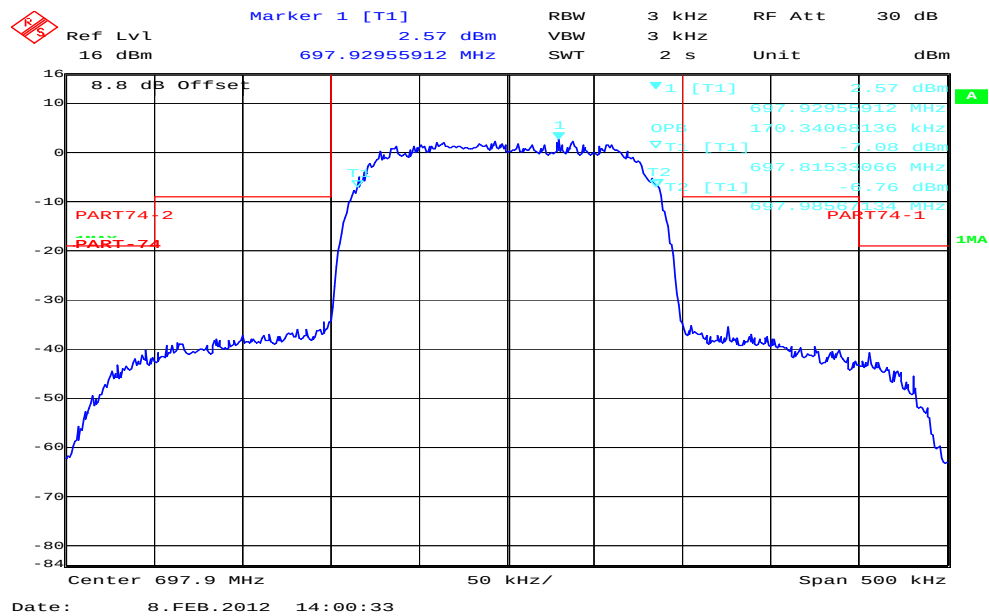
Plot 4: high band - low channel



Plot 5: high band - middle channel



Plot 6: high band - high channel



9.5 Unwanted radiation (spectrum mask)

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3kHz
Video bandwidth:	3kHz
Span:	1.5 MHz
Trace-Mode:	Max. hold

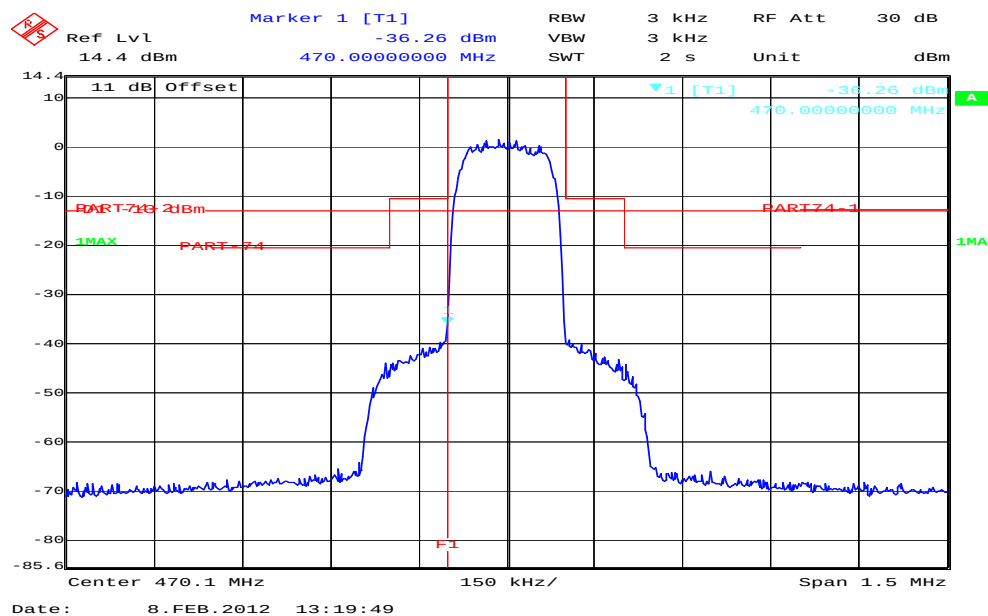
Limits:

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 $43+10\log_{10}$ (mean output power in watts) dB.	

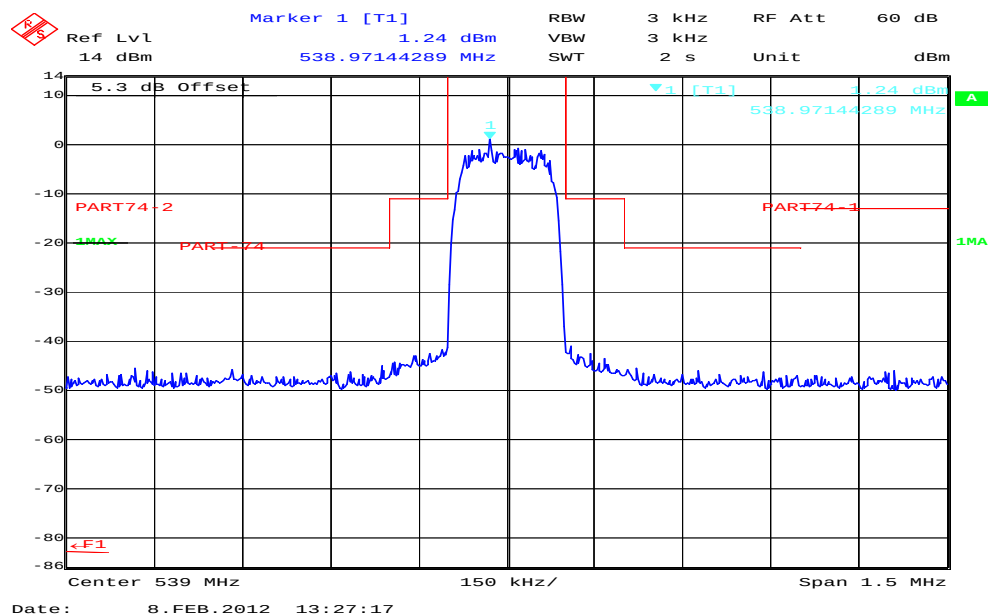
Result: The result of the measurement is passed.

Plots of the measurements

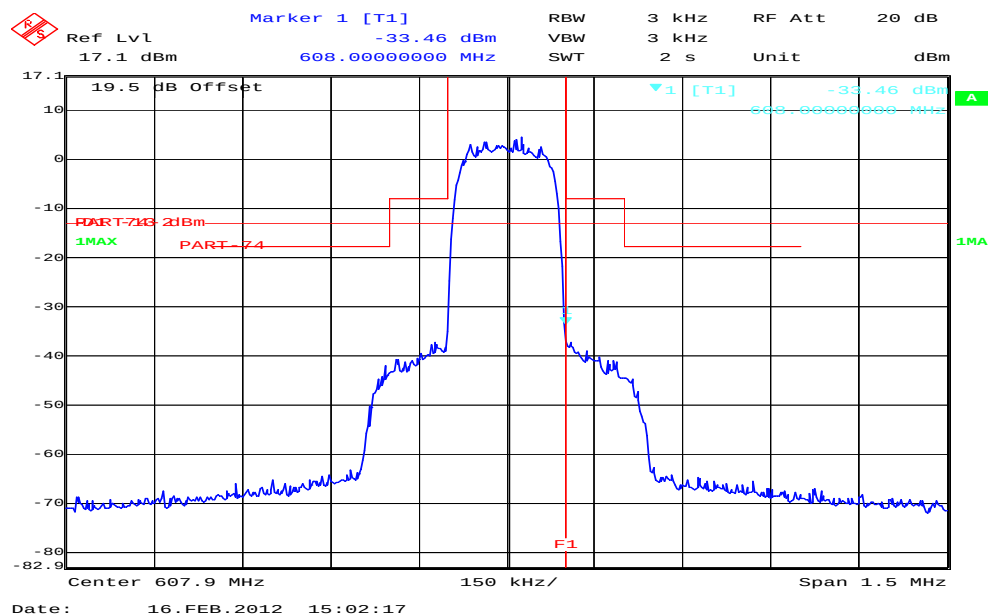
Plot 1: low band - low channel



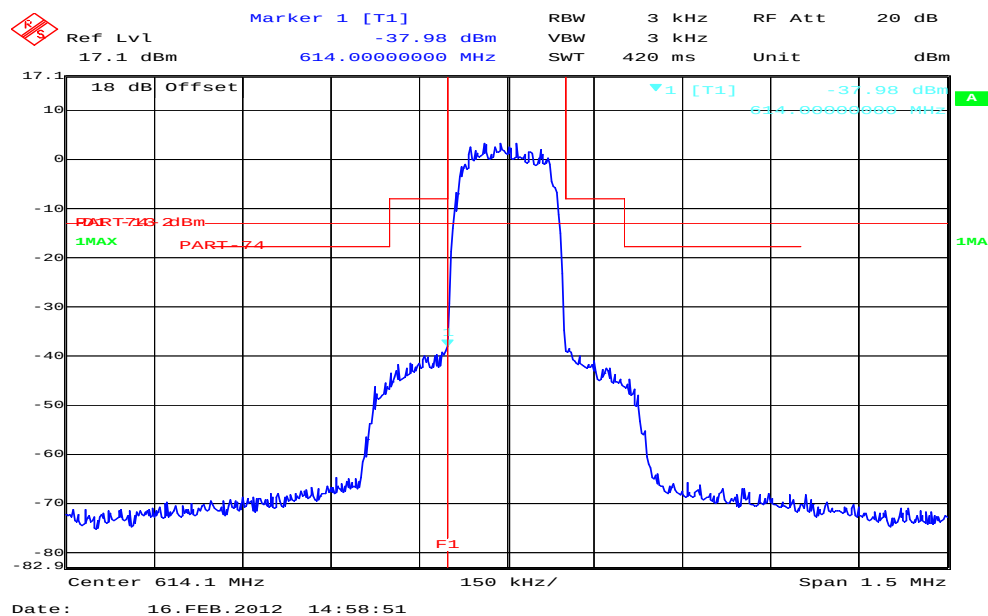
Plot 2: low band - middle channel



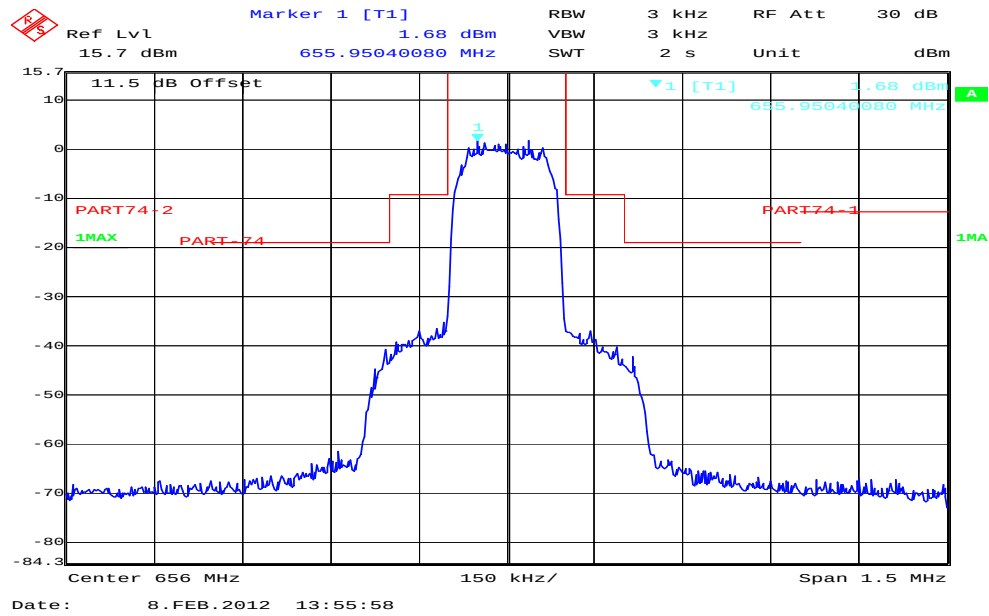
Plot 3: low band - high channel



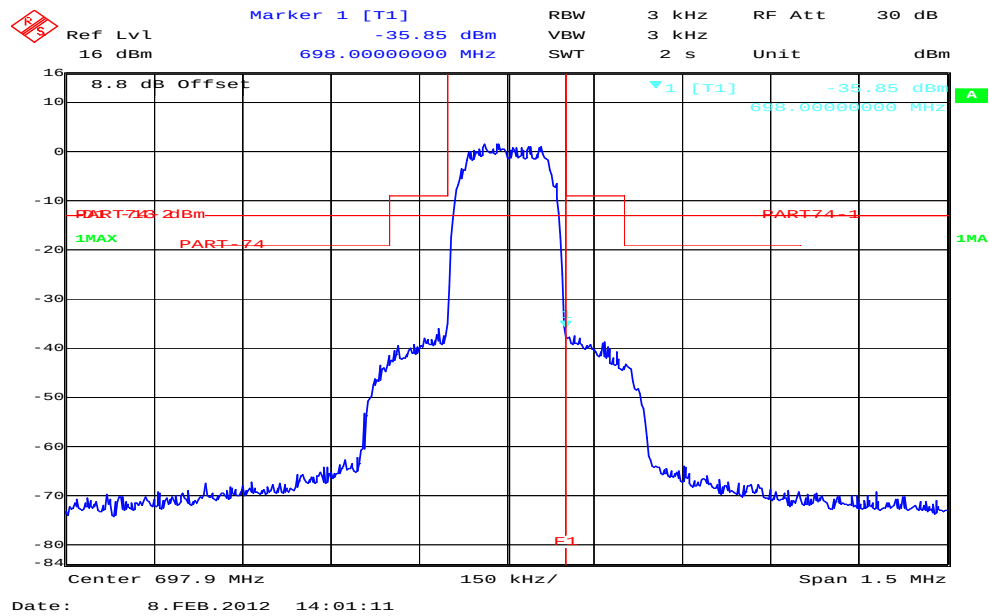
Plot 4: high band - low channel



Plot 5: high band - middle channel



Plot 6: high band - 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 + 10 log (carrier power in watts) dB IC: at least 55 + 10 log (carrier power in watts) dB.	

Low band – 470 MHz to 608 MHz

SPURIOUS EMISSIONS LEVEL (dBm)								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
No critical peaks detected!			No critical peaks detected!			No critical peaks detected!		
Measurement uncertainty ± 3 dB								

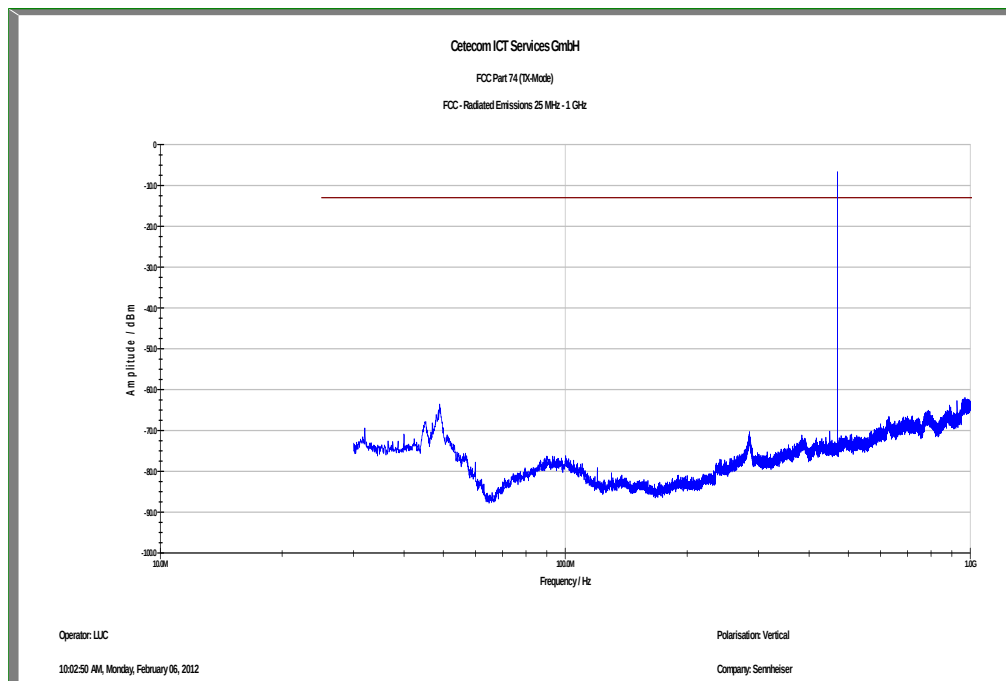
High band – 614 MHz to 698 MHz

SPURIOUS EMISSIONS LEVEL (dBm)								
Lowest channel			Middle channel			Highest channel		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
No critical peaks detected!			No critical peaks detected!			No critical peaks detected!		
Measurement uncertainty ± 3 dB								

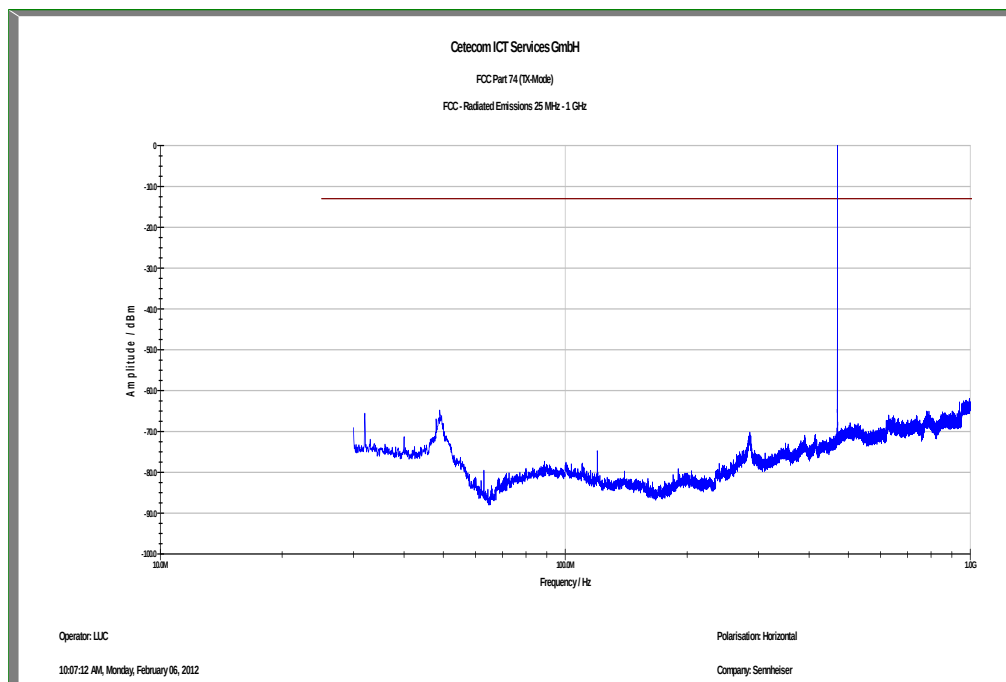
Result: The result of the measurement is passed.

Plots: low band

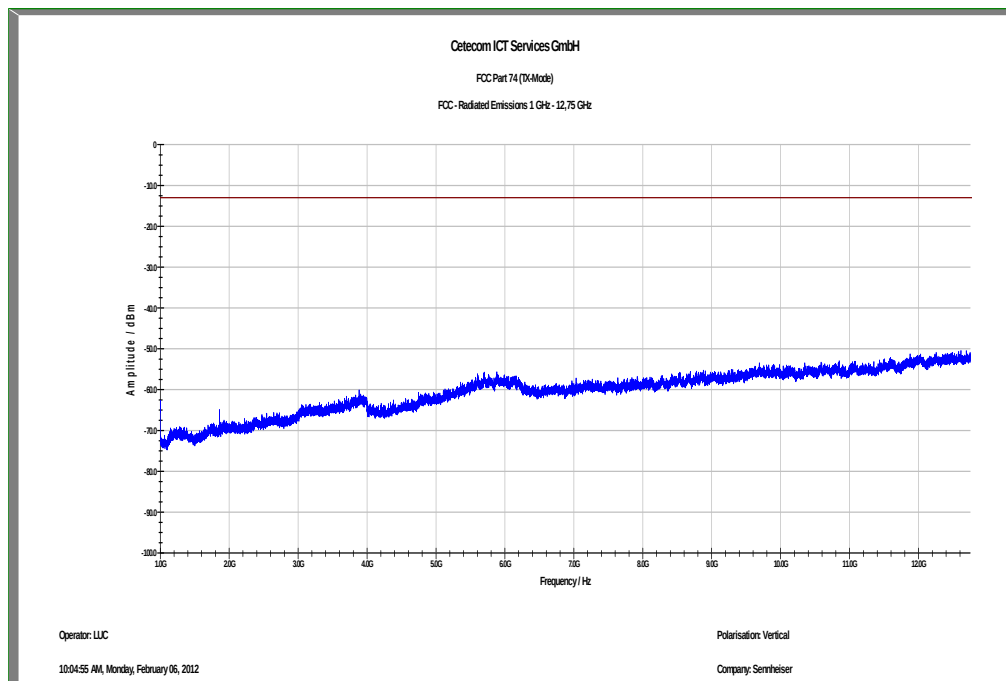
Plot 1: 30 MHz – 1 GHz, low channel, antenna vertical



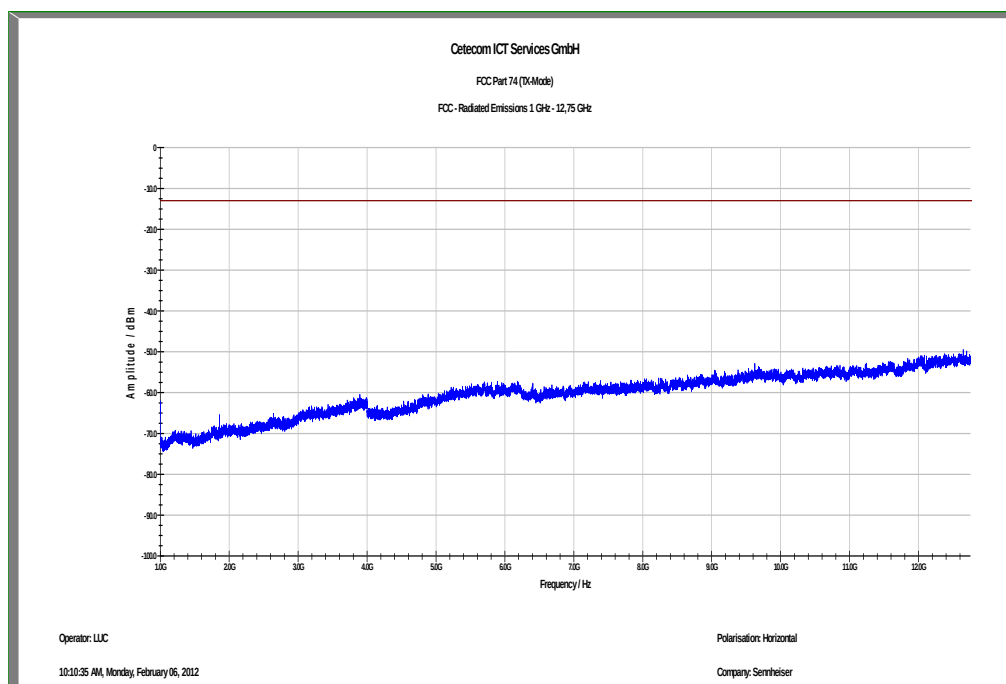
Plot 2: 30 MHz – 1 GHz, low channel, antenna horizontal



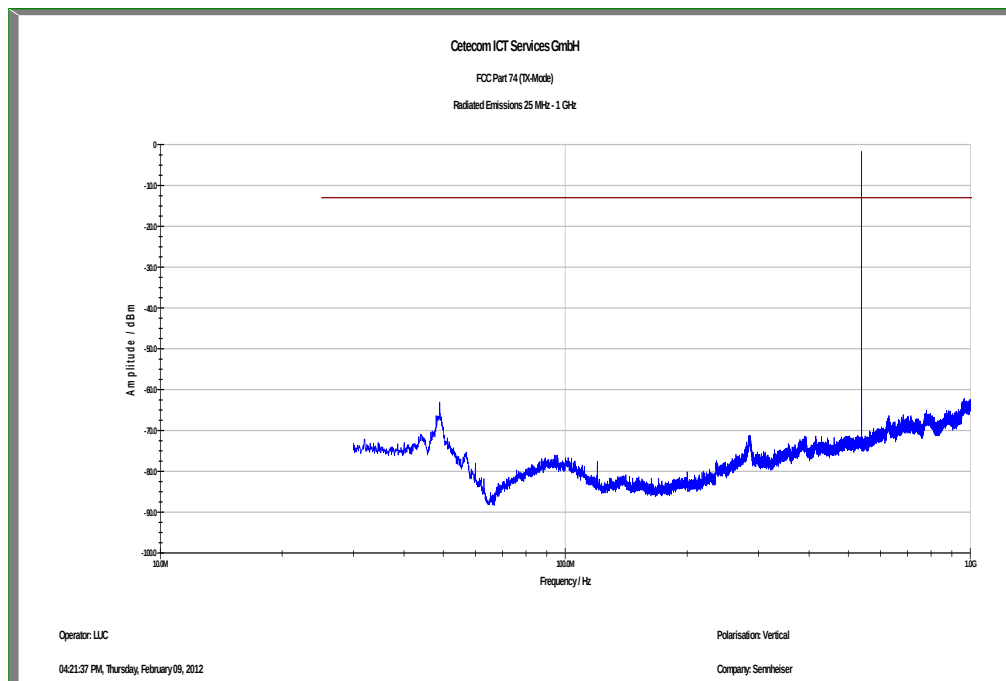
Plot 3: 1 GHz – 12.75 GHz, low channel, antenna vertical



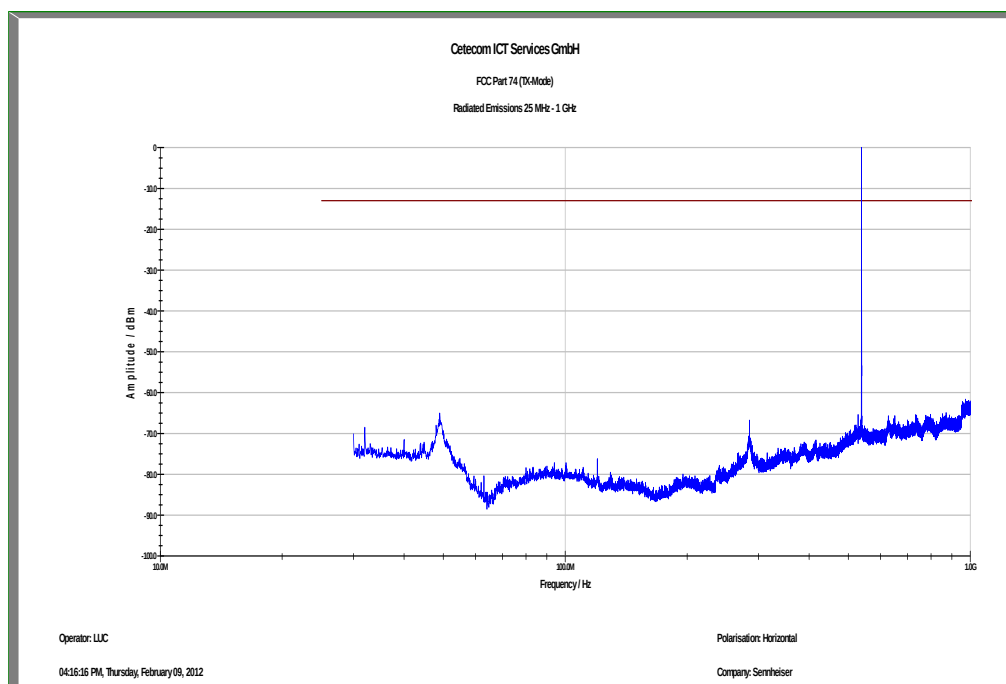
Plot 4: 1 GHz – 12.75 GHz, low channel, antenna horizontal



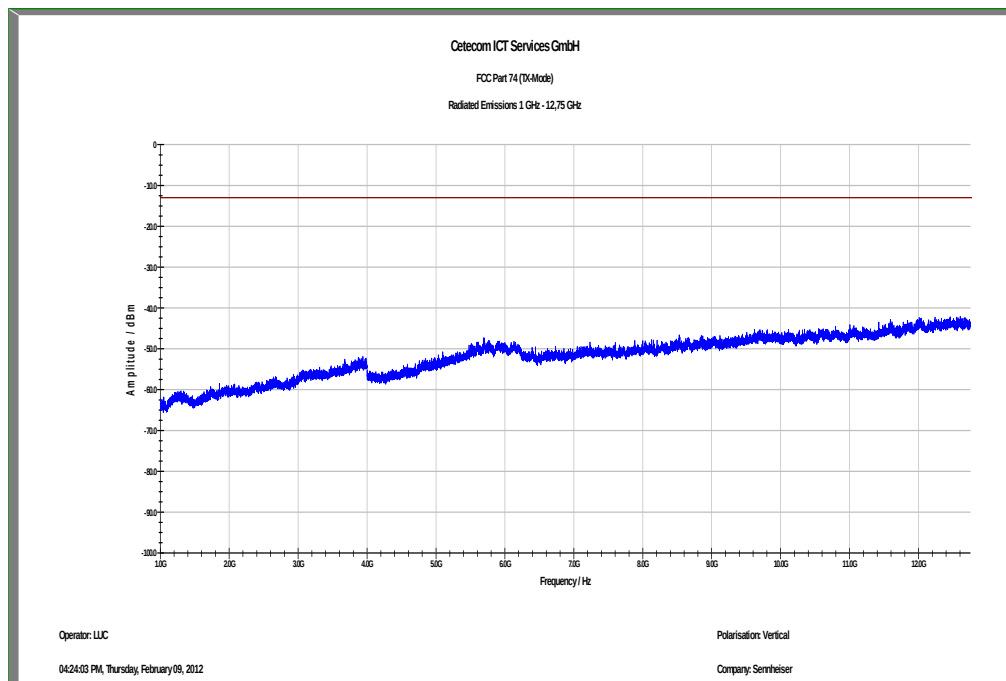
Plot 5: 30 MHz – 1 GHz, middle channel, antenna vertical



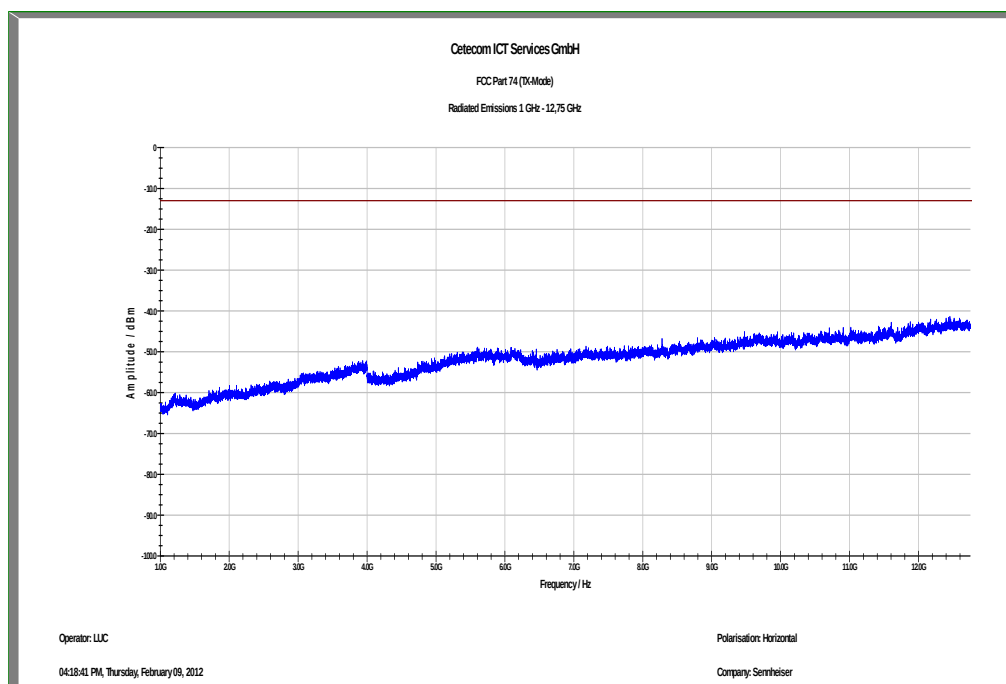
Plot 6: 30 MHz – 1 GHz, middle channel, antenna horizontal



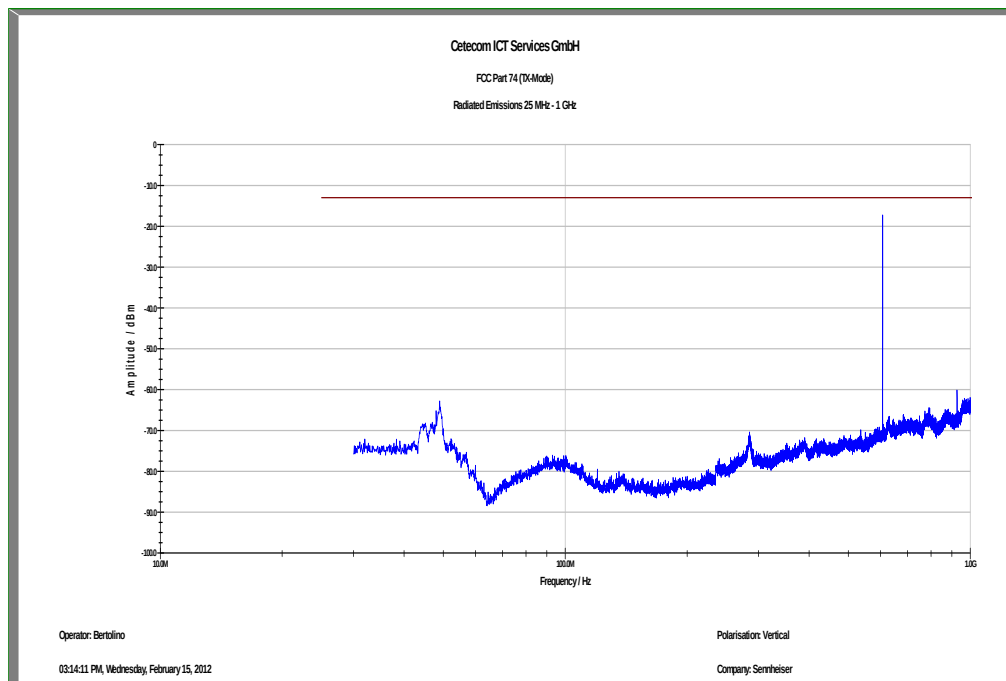
Plot 7: 1 GHz – 12.75 GHz, middle channel, antenna vertical



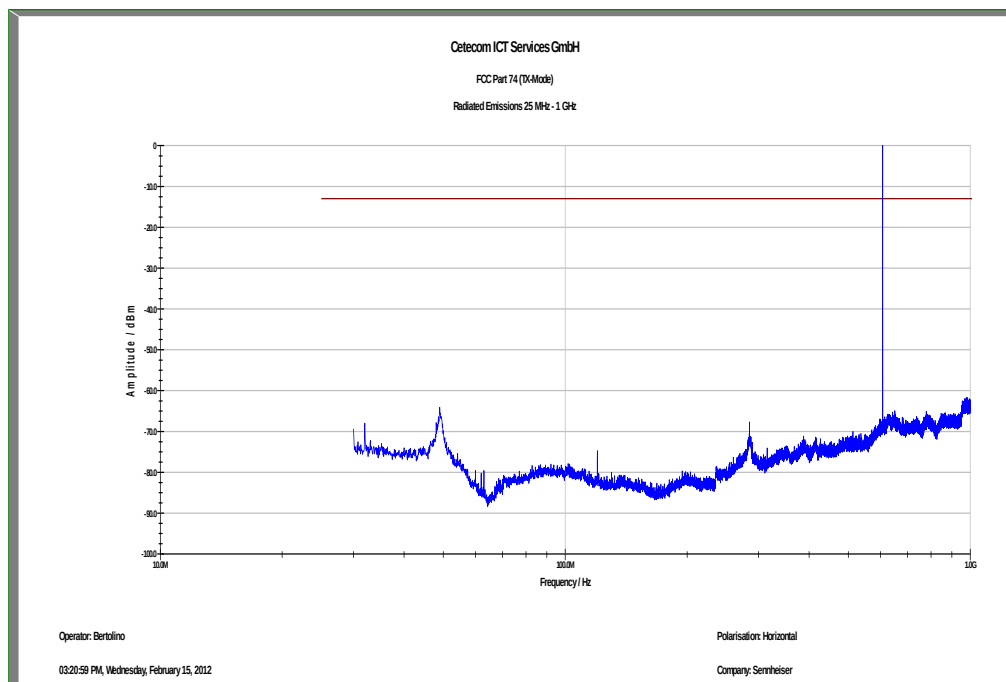
Plot 8: 1 GHz – 12.75 GHz, middle channel, antenna horizontal



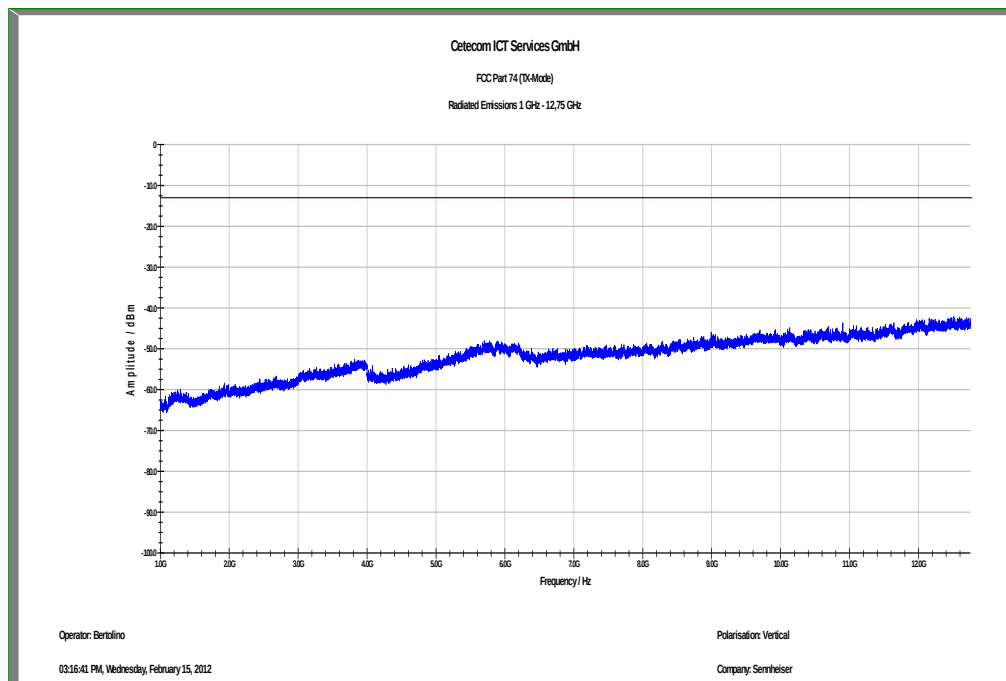
Plot 9: 30 MHz – 1 GHz, high channel, antenna vertical



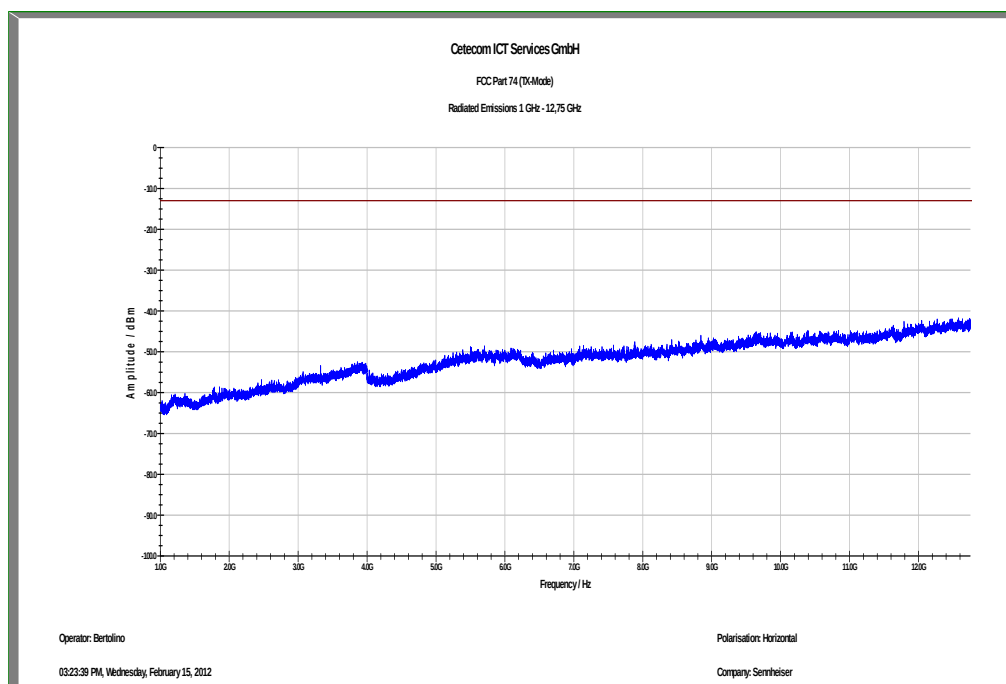
Plot 10: 30 MHz – 1 GHz, high channel, antenna horizontal



Plot 11: 1 GHz – 12.75 GHz, high channel, antenna vertical

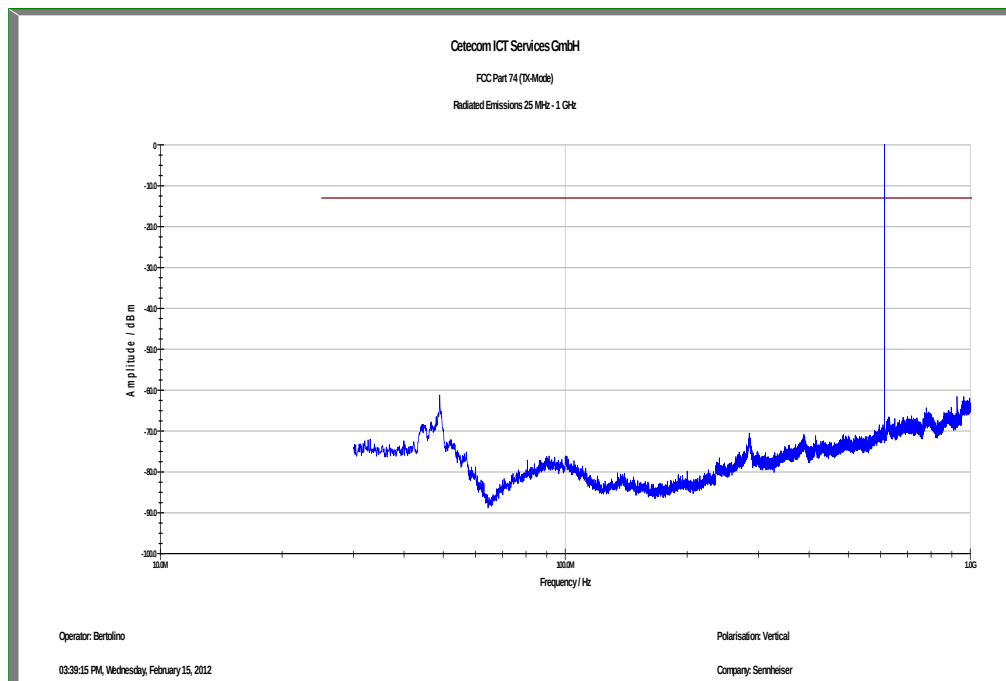


Plot 12: 1 GHz – 12.75 GHz, high channel, antenna horizontal

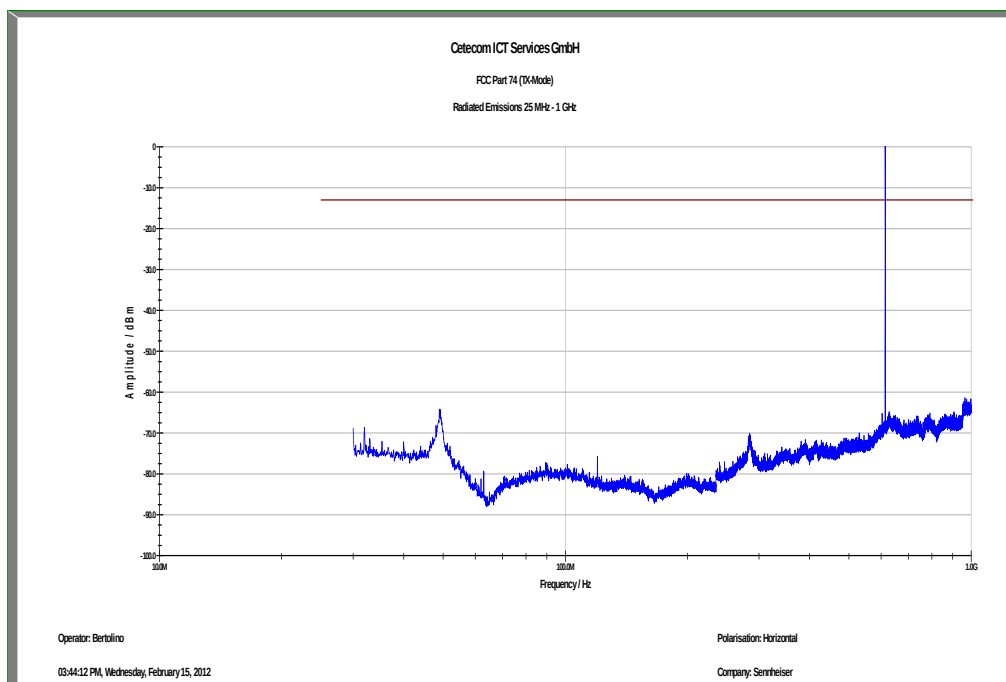


Plots: high band

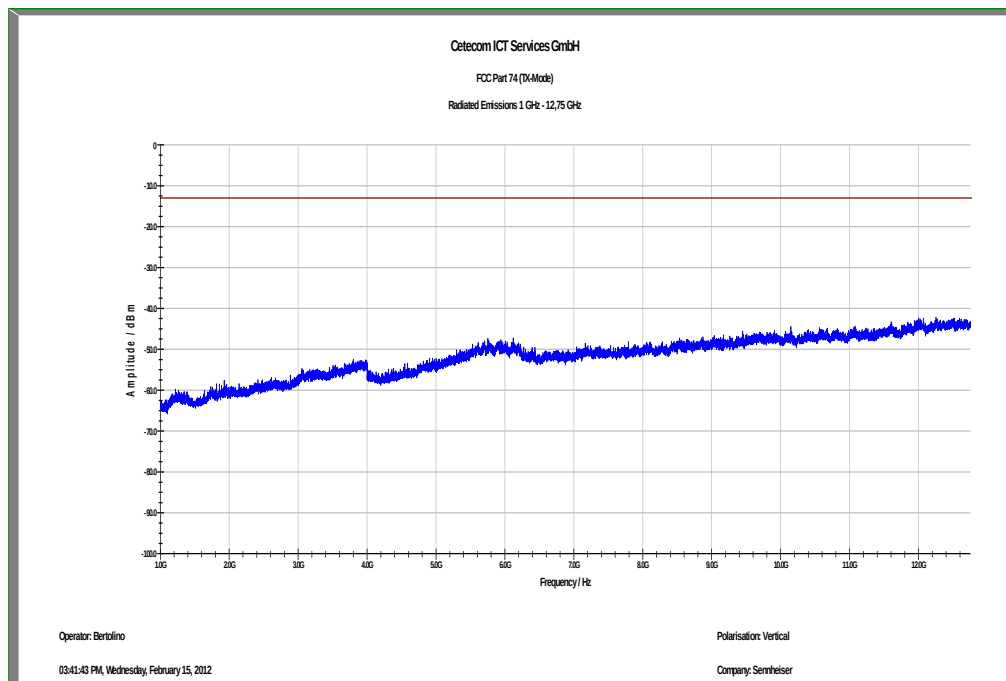
Plot 1: 30 MHz – 1 GHz, low channel, antenna vertical



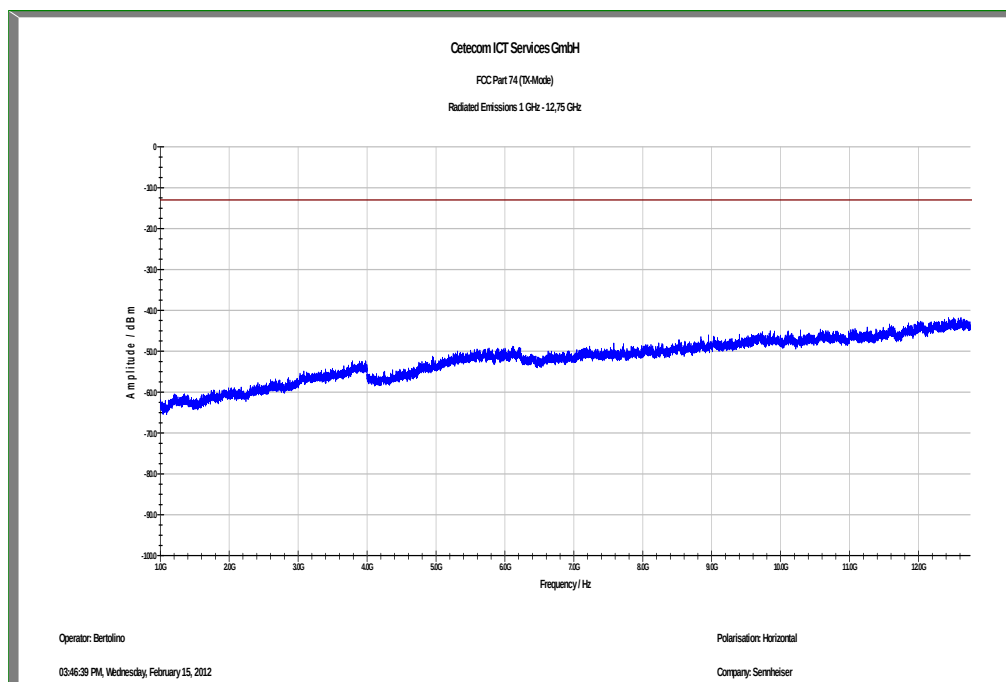
Plot 2: 30 MHz – 1 GHz, low channel, antenna horizontal



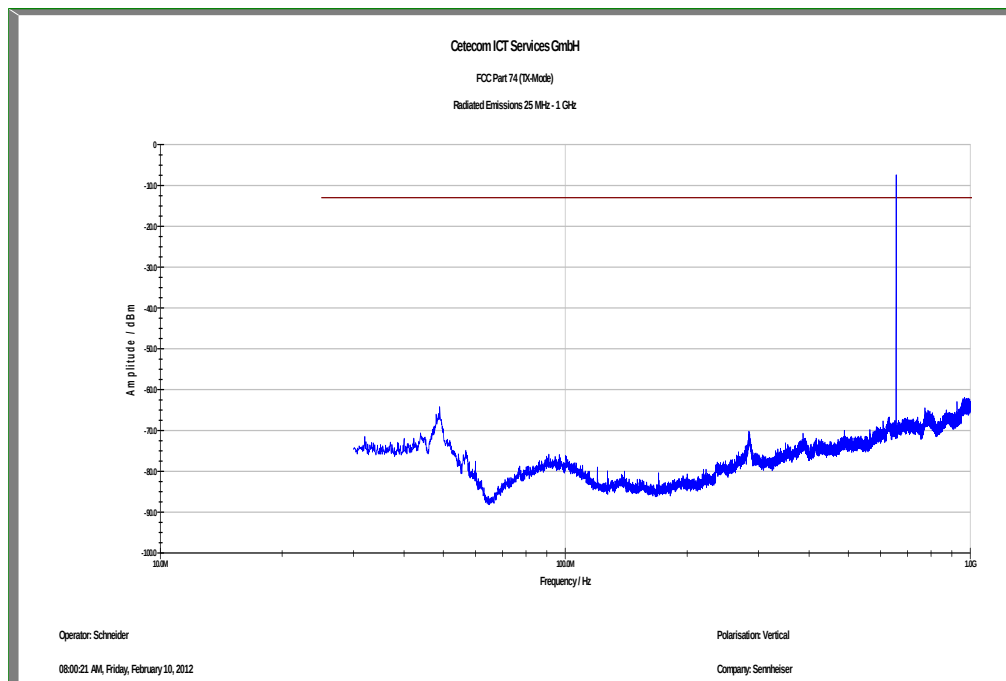
Plot 3: 1 GHz – 12.75 GHz, low channel, antenna vertical



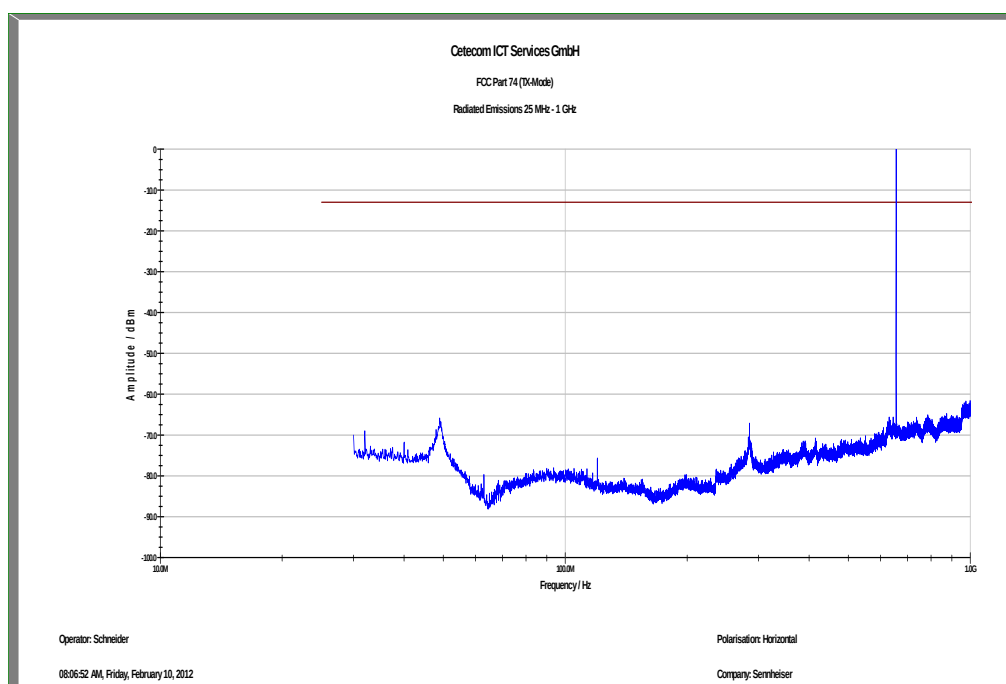
Plot 4: 1 GHz – 12.75 GHz, low channel, antenna horizontal



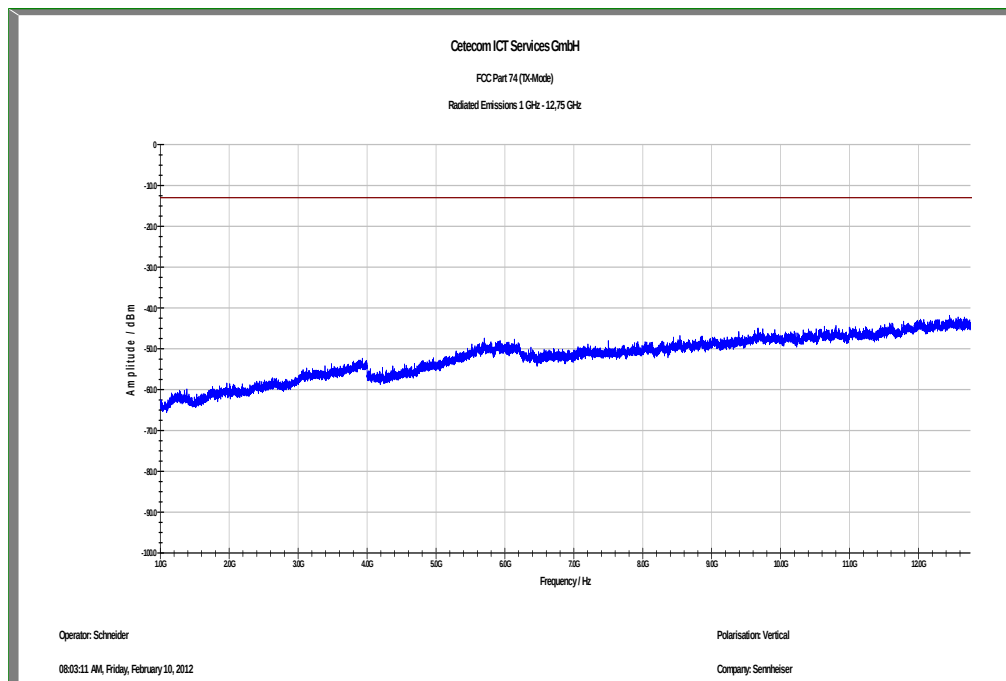
Plot 5: 30 MHz – 1 GHz, middle channel, antenna vertical



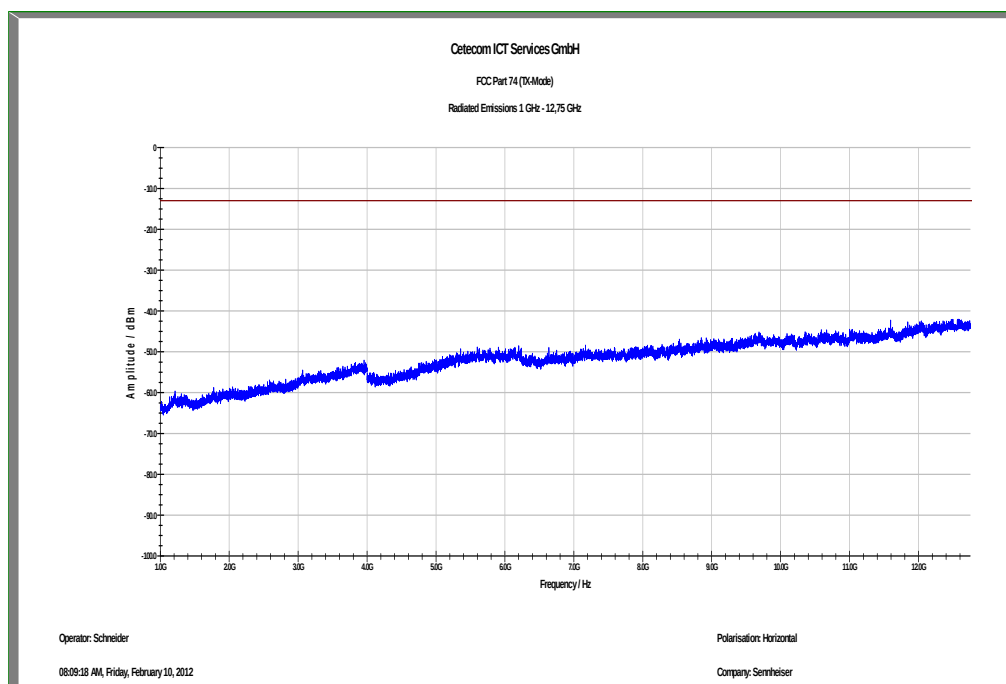
Plot 6: 30 MHz – 1 GHz, middle channel, antenna horizontal



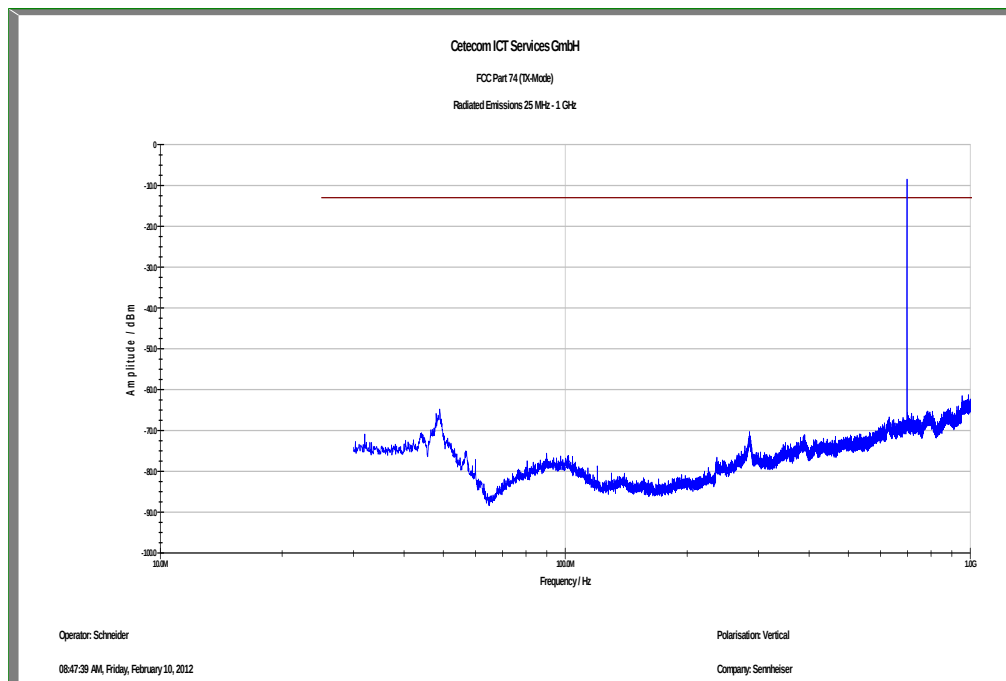
Plot 7: 1 GHz – 12.75 GHz, middle channel, antenna vertical



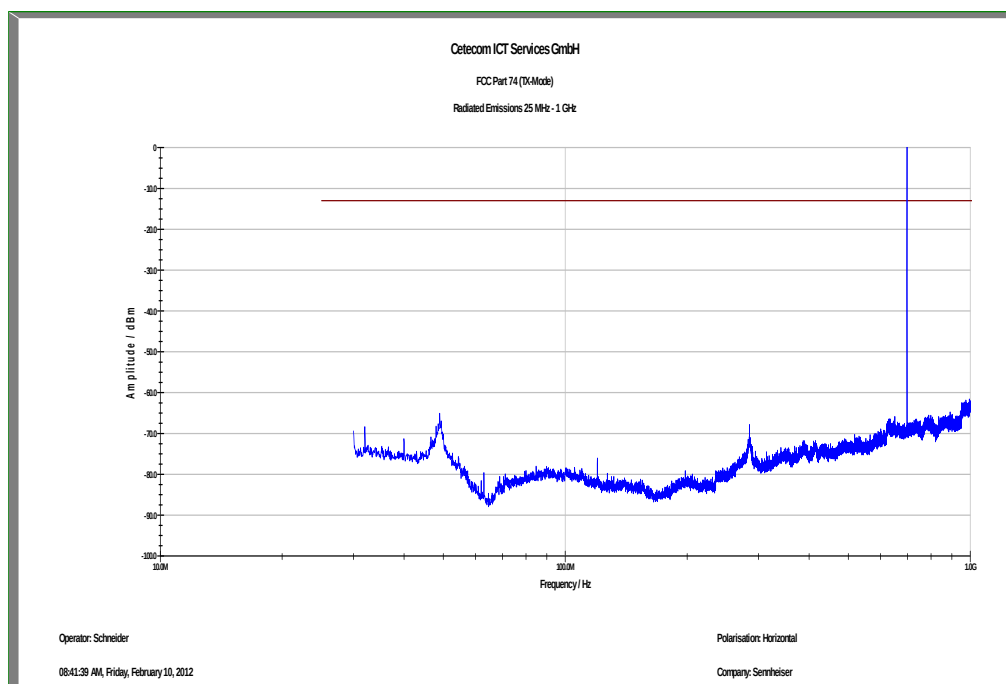
Plot 8: 1 GHz – 12.75 GHz, middle channel, antenna horizontal



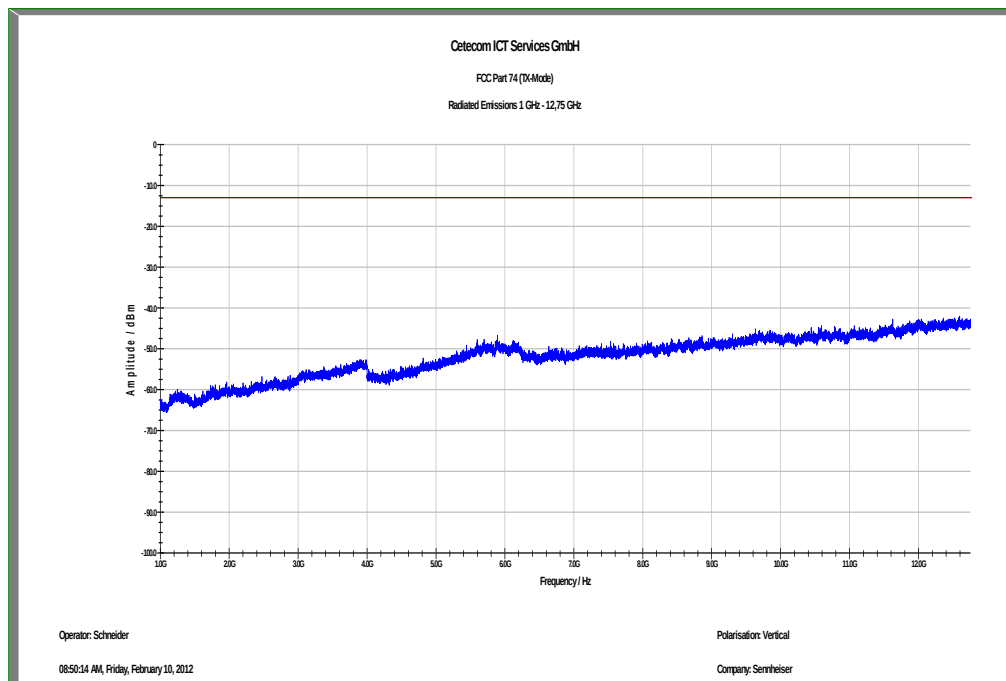
Plot 9: 30 MHz – 1 GHz, high channel, antenna vertical



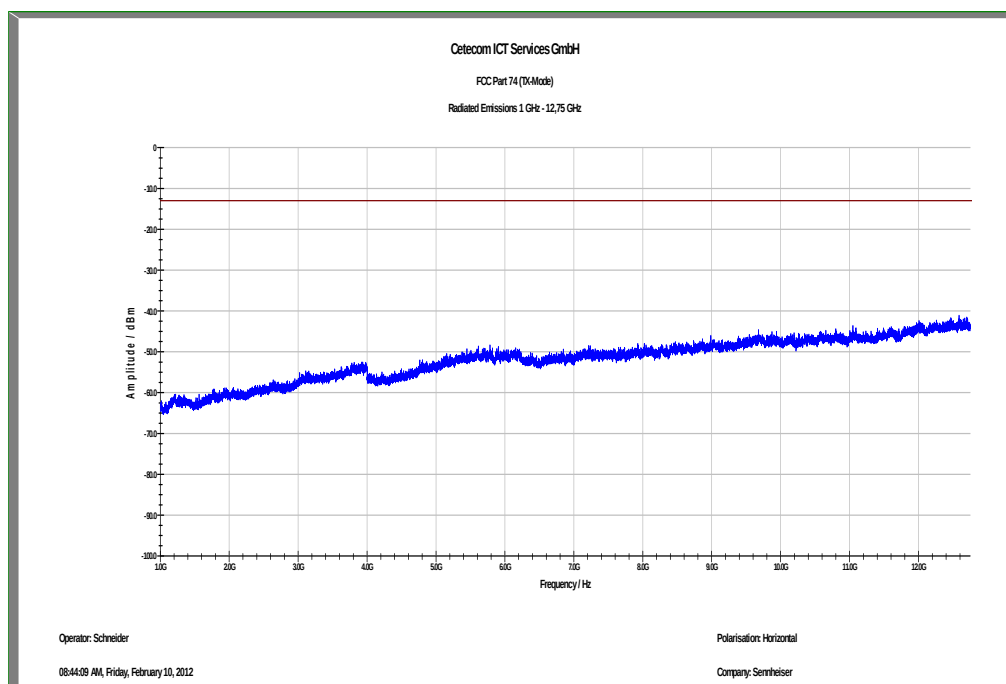
Plot 10: 30 MHz – 1 GHz, high channel, antenna horizontal



Plot 11: 1 GHz – 12.75 GHz, high channel, antenna vertical



Plot 12: 1 GHz – 12.75 GHz, high channel, 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.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vKI!	11.05.2011	11.05.2013
2	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
3	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996		23.03.2009	
4	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
5	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
6	n. a.	Three-Way Power Splitter. 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
7	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
8	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
9	n. a.	TILE-Software Emission	Quantum Change. Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
10	n. a.	PSA Spectrum Analyzer 3 Hz - 26.5 GHz	E4440A	Agilent Technologies	MY48250080	300003812	k	08.09.2010	08.09.2012
11	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vKI!	08.09.2010	08.09.2012
12	n. a.	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck	371	300003854	vKI!	14.10.2011	14.10.2014
13	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/84193	300003889	vKI!	20.09.2011	20.09.2013
14	4	Radiocom. Analyzer	CMTA 54	R&S	894043/010	300001175	NK!	06.06.2007	
15	9	Signal Generator 0.1-4320 MHz. AM/FM/PHM/Puls Mod.	SMHU	R&S	894055/005	300001190	Ve	05.01.2010	05.01.2013
16	n. a.	DC Power Supply 0 – 32V	1108-32	Heiden	001802	300001383	Ve	23.06.2010	23.06.2013
17	n. a.	Audio Analyzer 2Hz - 300 kHz	UPD	R&S	841074/009	300001236	k	11.01.2012	11.01.2014
18	n. a.	Signal Analyzer 20Hz-26.5GHz-150 to + 30 DBM	FSIQ26	R&S	835111/0004	300002678	Ve	04.11.2010	04.11.2012
19	n. a.	Spectrum Analyzer 20 Hz - 50 GHz	FSU50	R&S	200012	300003443	ve	01.07.2010	01.07.2012

Agenda: Kind of Calibration

k calibration / calibrated
 ne not required (k. ev. izw. zw not required)
 ev periodic self verification
 Ve long-term stability recognized
 vKI! Attention: extended calibration interval
 NK! Attention: not calibrated

EK limited calibration
 zw cyclical maintenance (external cyclical maintenance)
 izw internal cyclical maintenance
 g blocked for accredited testing
 *) next calibration ordered / currently in progress

11 Observations

No observations exceeding those reported with the single test cases have been made.

Annex A Photographs of the test setup

Photo documentation:

Photo 1:

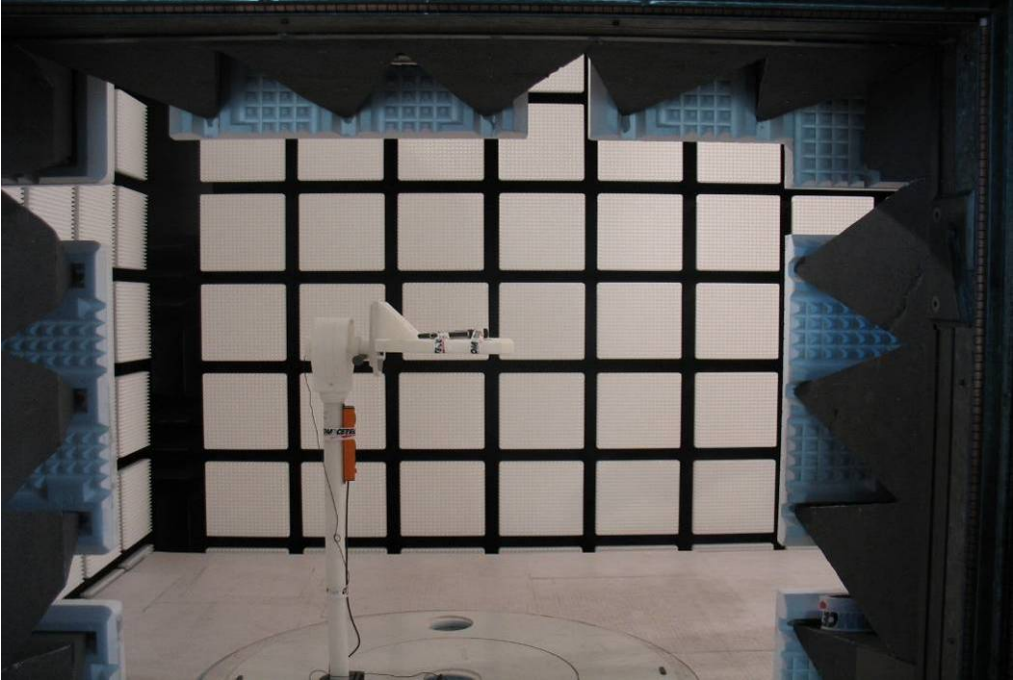


Photo 2:

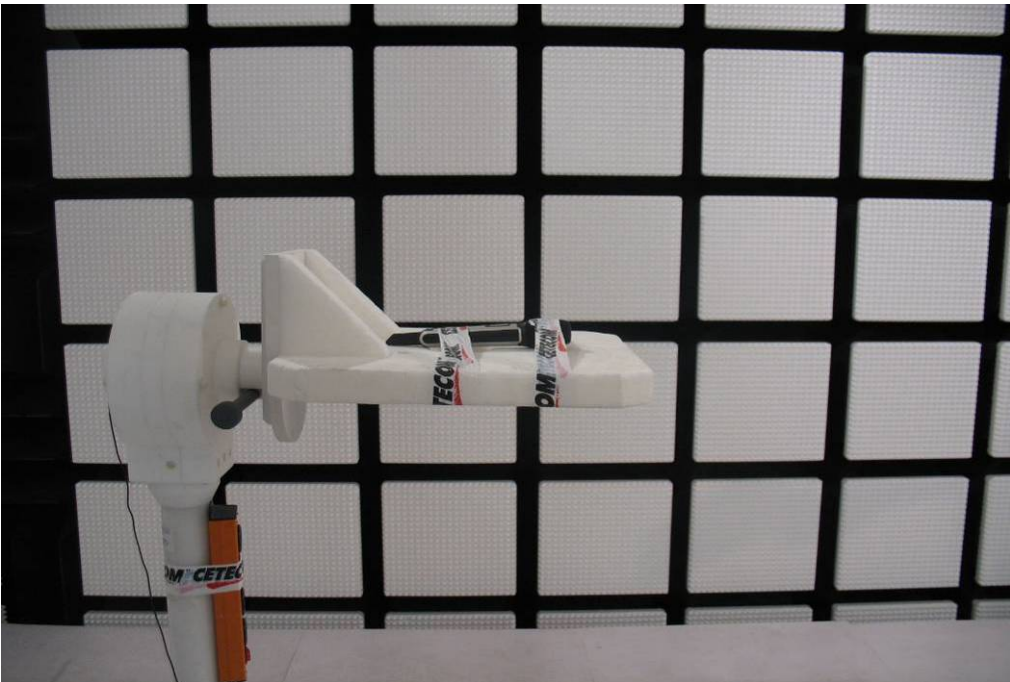


Photo 3:



Photo 4:



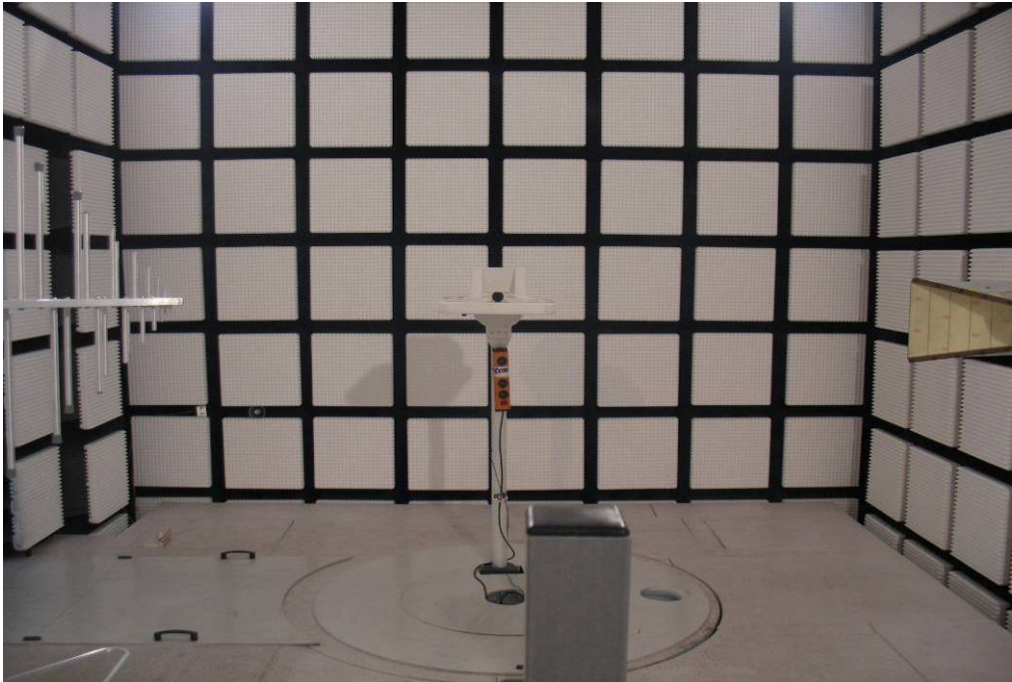
Photo 5:



Photo 6:



Photo 7:



Annex B External photographs of the EUT

Photo documentation:

Photo 1:



Photo 2:



Annex C Internal photographs of the EUT

Photo documentation:

Photo 1:



Photo 2:



Photo 3:



Photo 4:

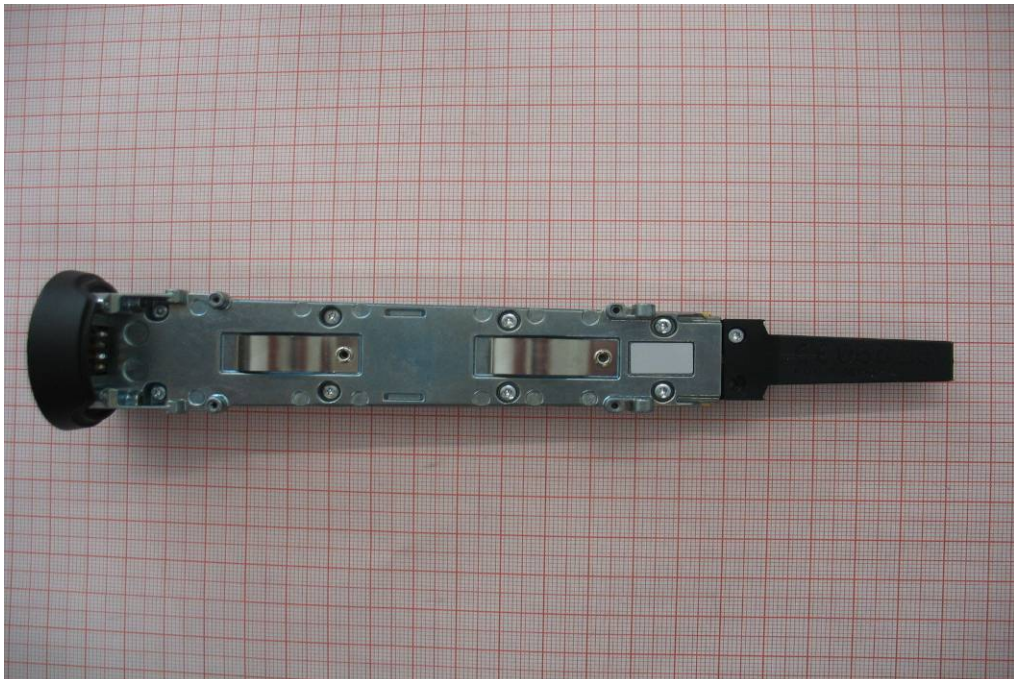


Photo 5:



Photo 6:

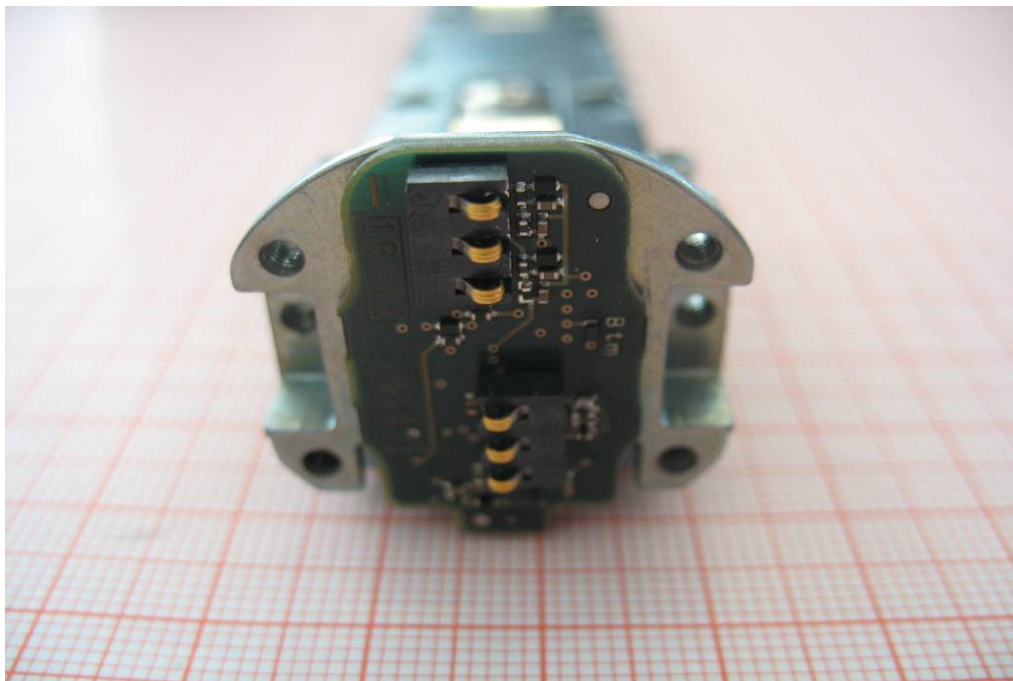


Photo 7:



Photo 8:

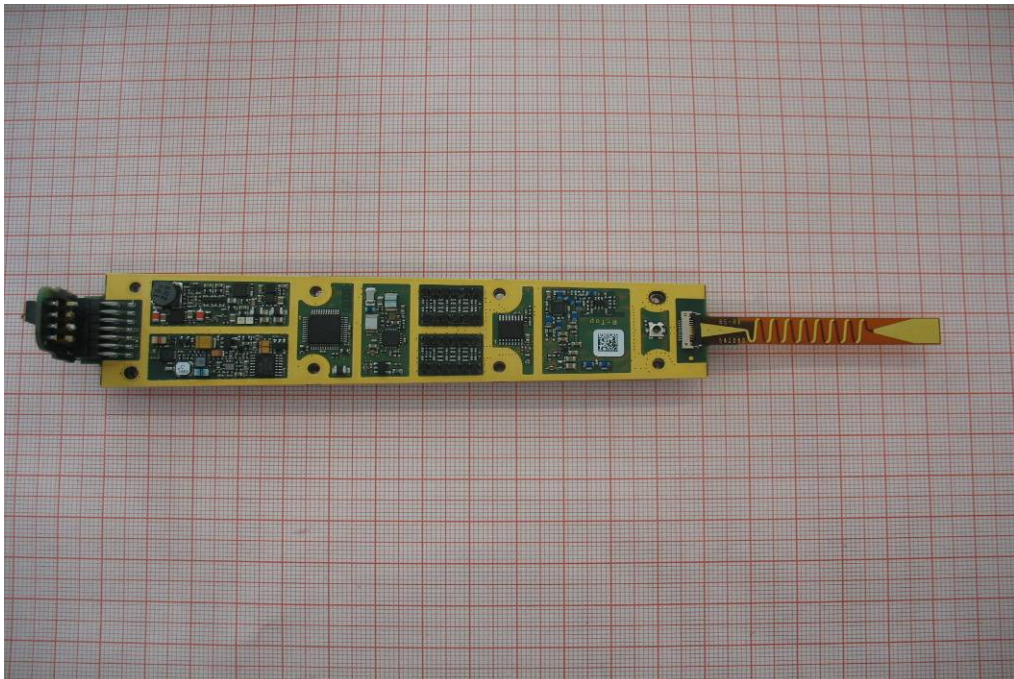


Photo 9:

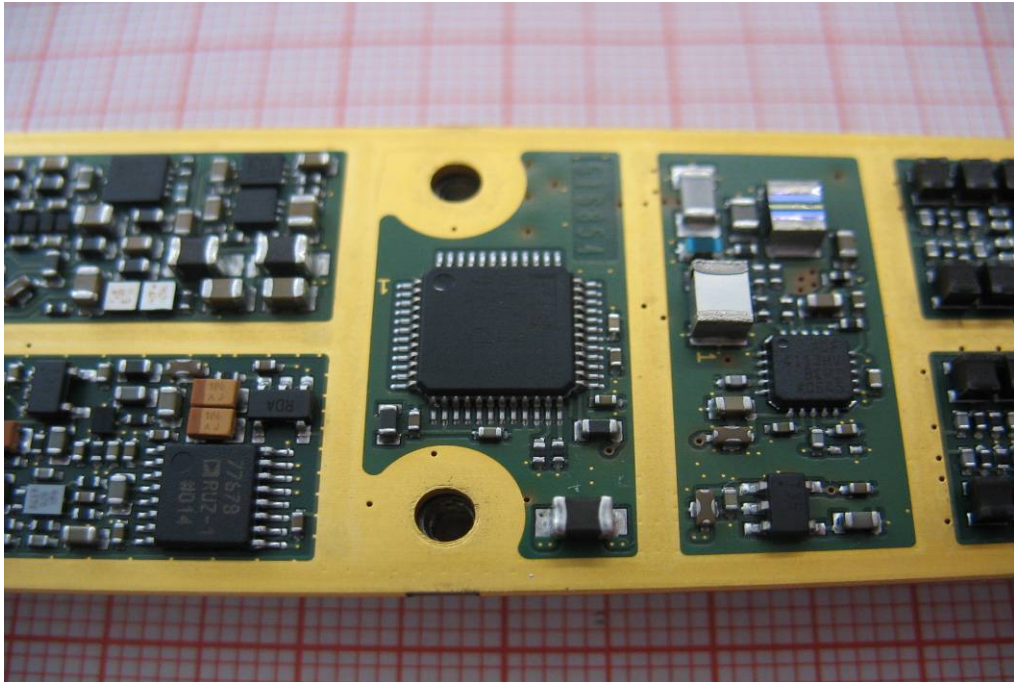


Photo 10:

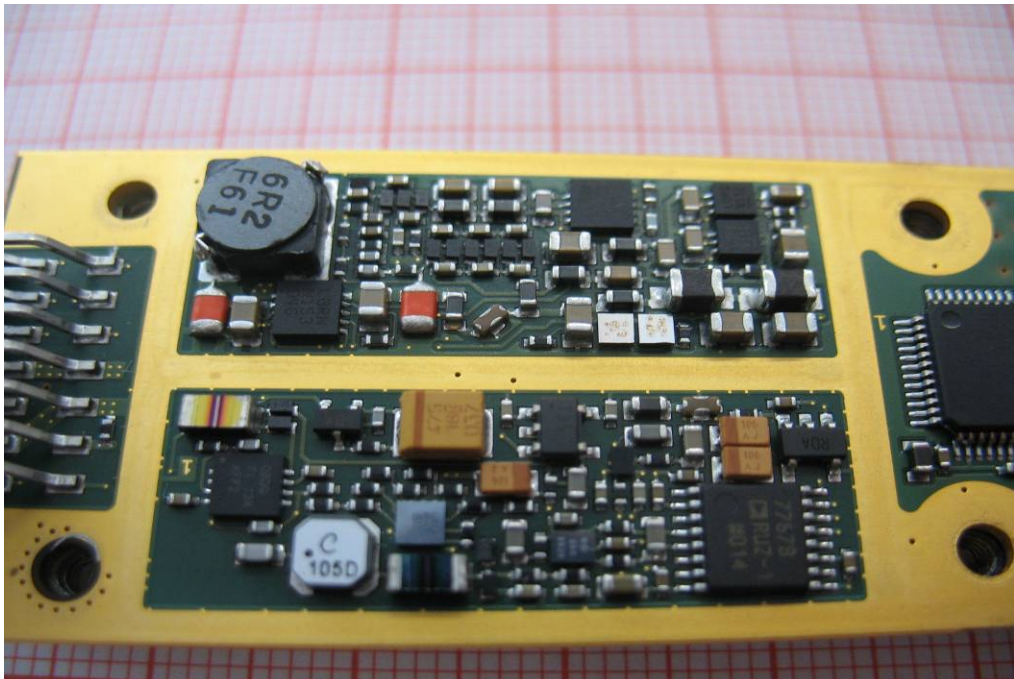


Photo 11:

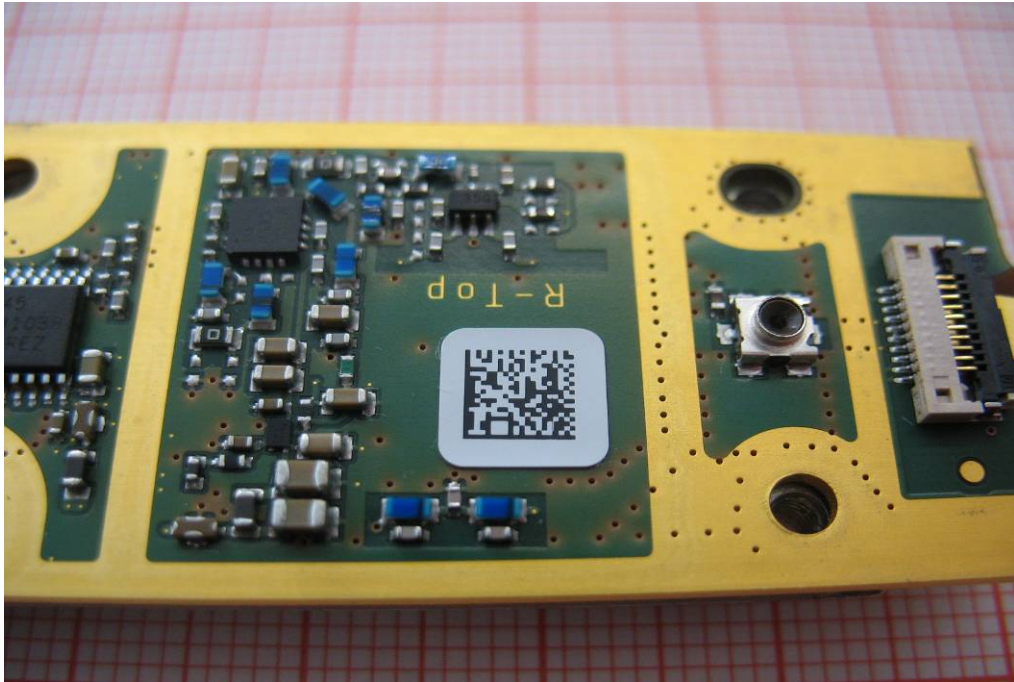


Photo 12:

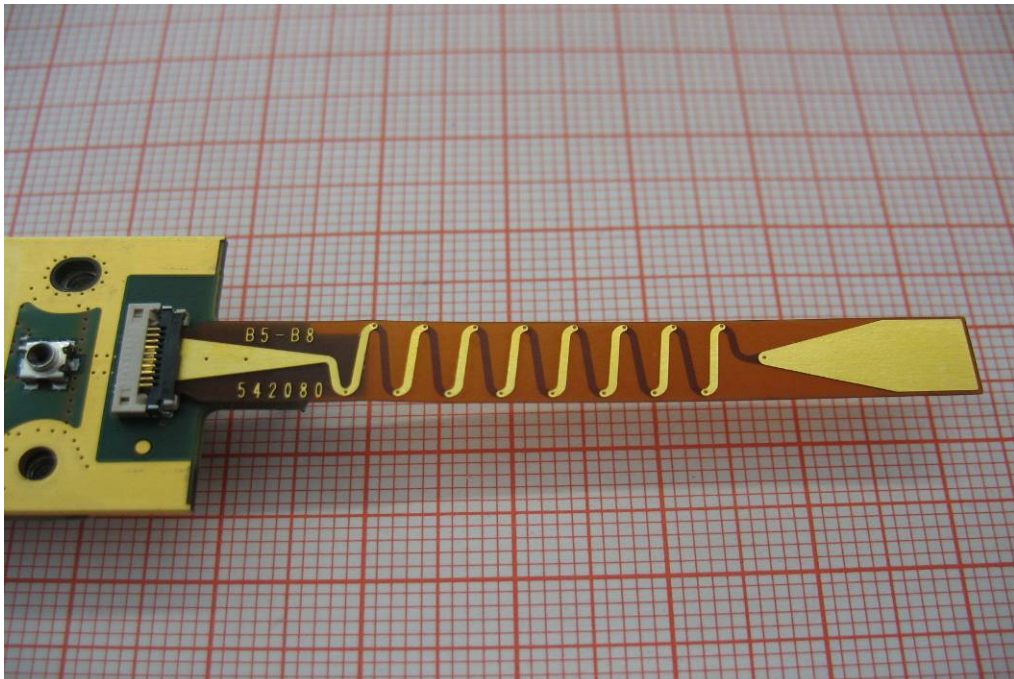


Photo 13:

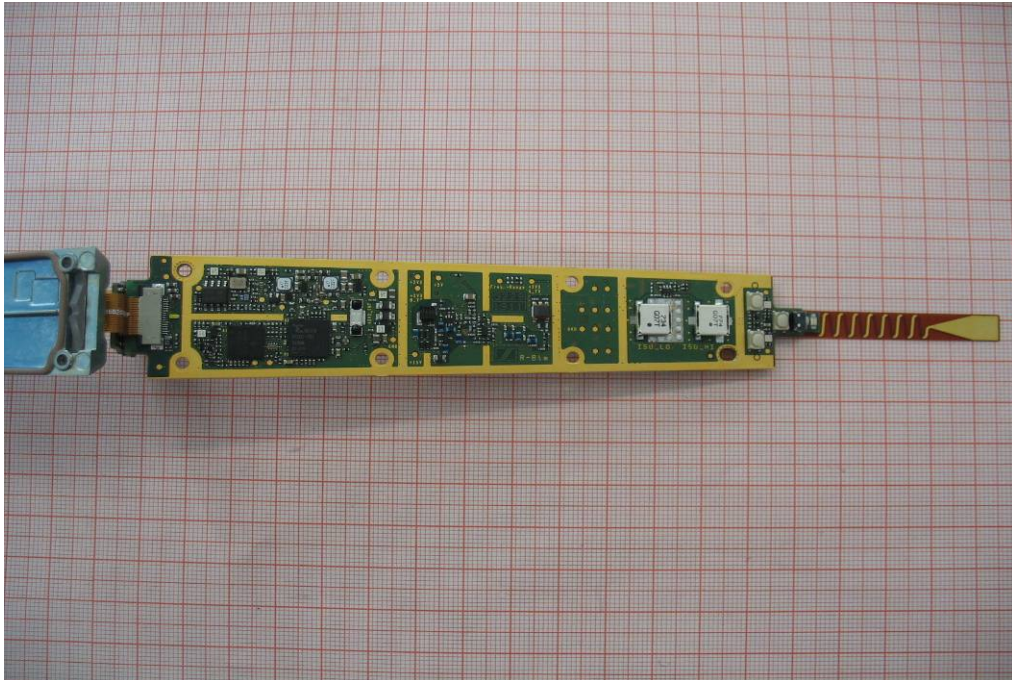


Photo 14:

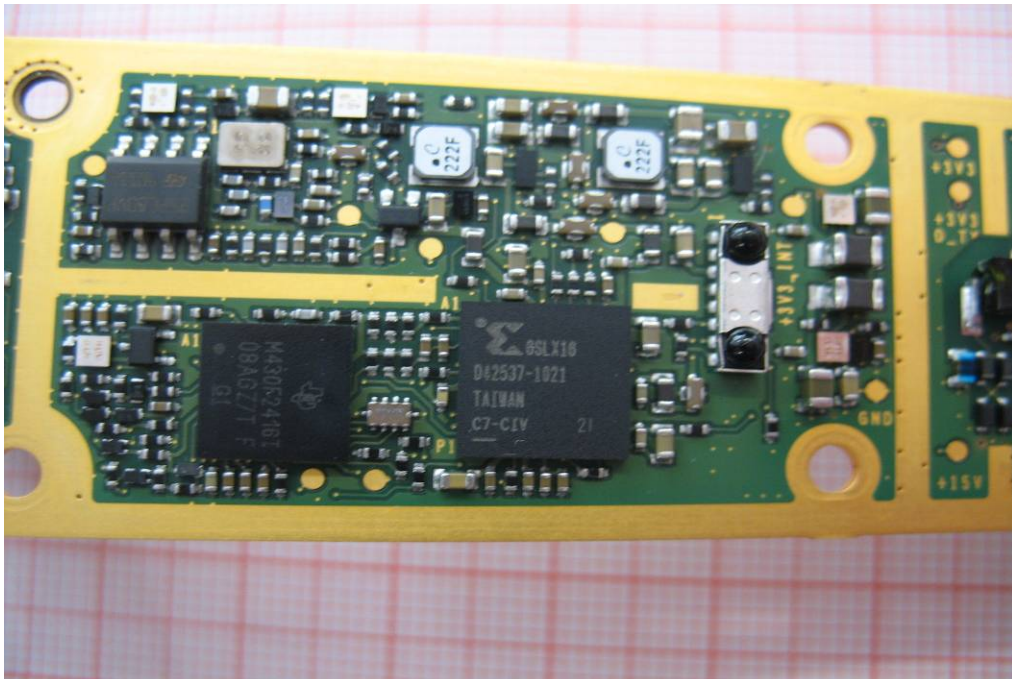


Photo 15:

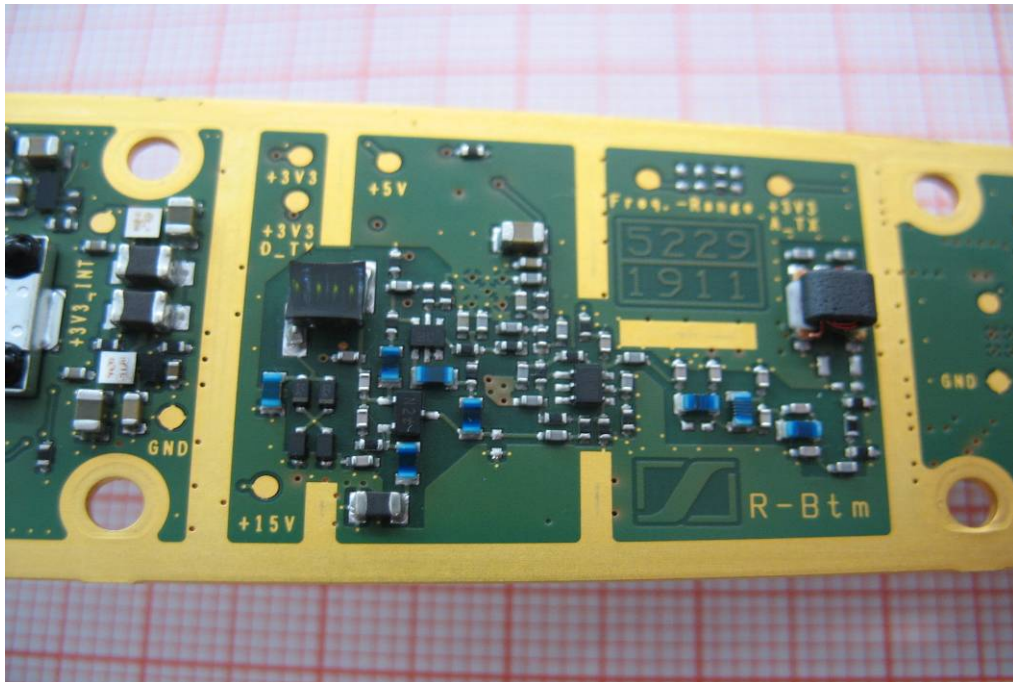


Photo 16:

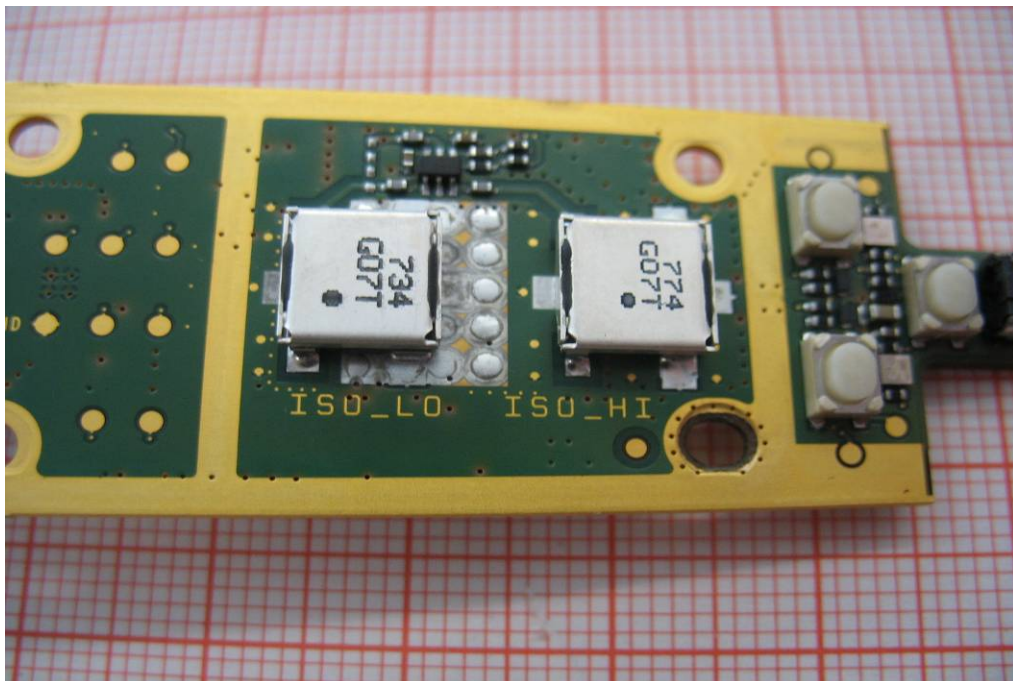


Photo 17:

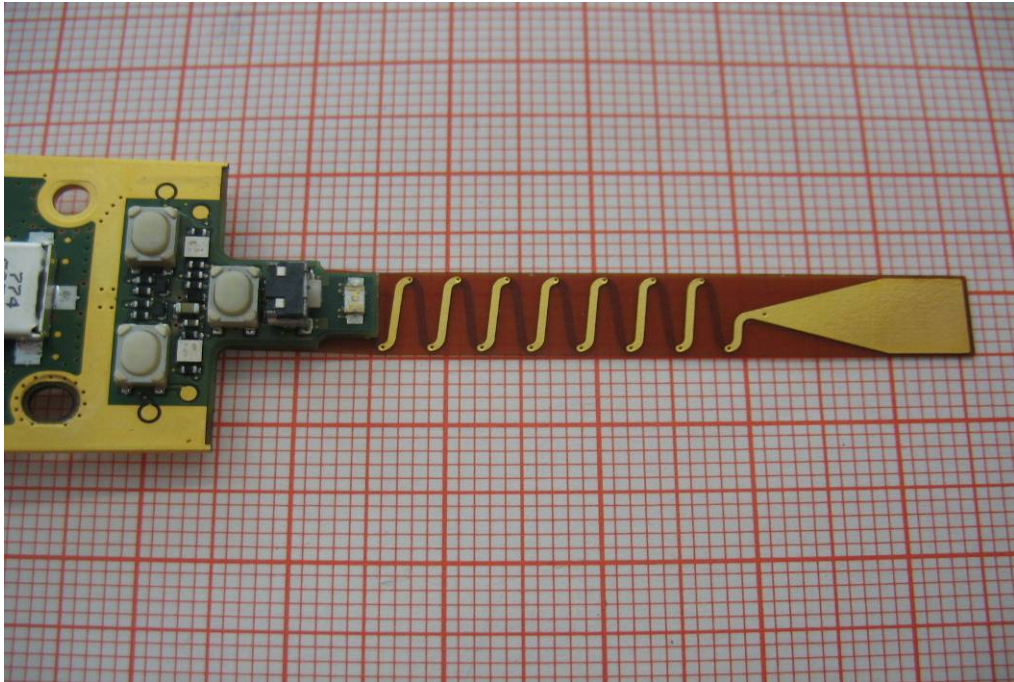


Photo 18:

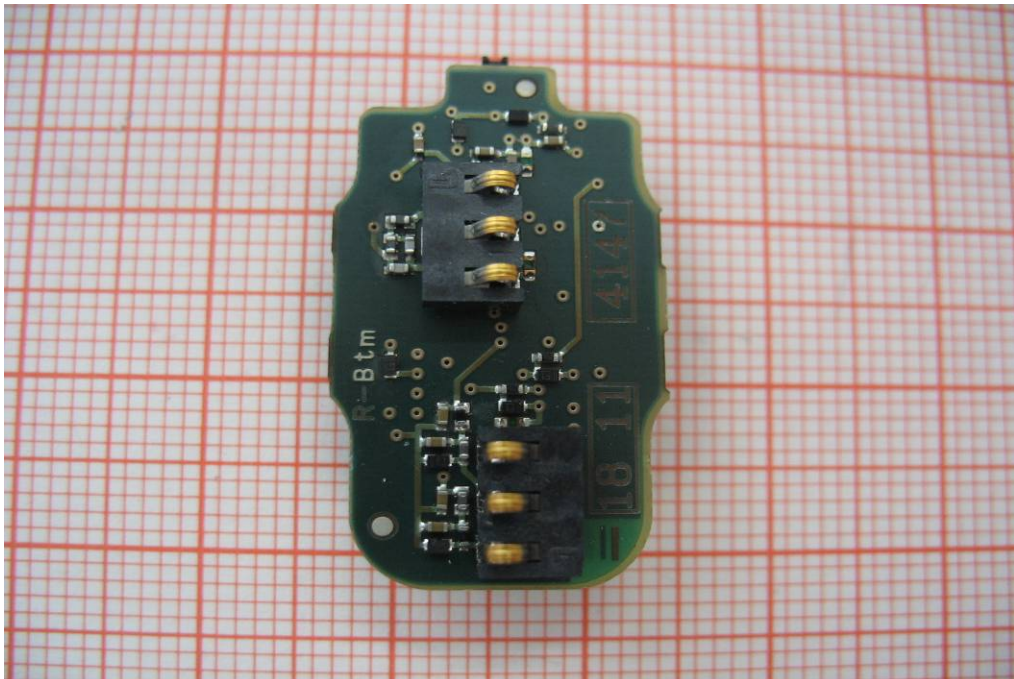
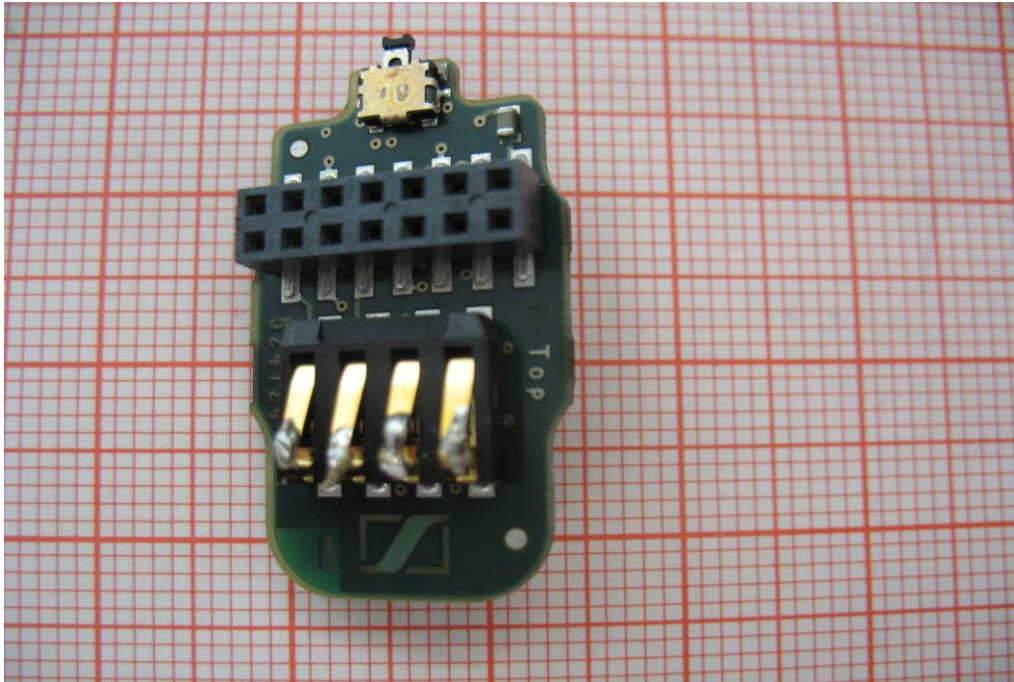


Photo 19:



Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2012-02-22
-A	Editorial changes	2012-08-17
-B	New frequency range	2012-08-21

Annex E Further information**Glossary**

AVG	-	Average
DUT	-	Device under test
EMC	-	Electromagnetic Compatibility
EN	-	European Standard
EUT	-	Equipment under test
ETSI	-	European Telecommunications Standard Institute
FCC	-	Federal Communication Commission
FCC ID	-	Company Identifier at FCC
HW	-	Hardware
IC	-	Industry Canada
Inv. No.	-	Inventory number
N/A	-	Not applicable
PP	-	Positive peak
QP	-	Quasi peak
S/N	-	Serial number
SW	-	Software

Annex F Accreditation Certificate



Front side of certificate



Back side of certificate

Note:

The current certificate including annex is published on our website (see link below) or may be received from CETECOM ICT Services on request.

http://www.cetecom.com/fileadmin/de/CETECOM_D_Saarbruecken/accreditations_Jan_2010/DAKKS_Akkredi_Urk_EN17025-En_incl_Annex.pdf