

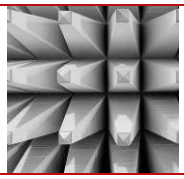

CETECOM™
CETECOM ICT Services
consulting - testing - certification

TEST REPORT

Test report no.: 1-4927/12-01-02

ilac-MRA 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 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 Rev. 2	Spectrum Management and Telecommunications Policy - Radio Standards 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:	**Pocket transmitter**
Model name:	**SK2250**
FCC ID:	**DMOSK2250**
IC:	**2099A-SK2250**
Frequency:	516.0 MHz to 607.9 MHz 614.1 MHz to 697.9 MHz
Technology tested:	Audio transmitter
Antenna:	SMA rod antenna
Power Supply:	3.0 V DC by 2 x 1.5 V (AA) 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:

cn=Marco Bertolino, o=CETECOM ICT Services GmbH, ou=BTL-100826, email=marco.bertolino@cetecom.com, c=DE
2012.07.17 11:03:36 +02'00'

Marco Bertolino
Testing Manager

Test performed:

cn=Stefan Boes, o=CETECOM ICT Services GmbH, ou=BOE-111011, email=Stefan.Boes@cetecom.com, c=DE
2012.07.17 15:07:48 +02'00'

Stefan Bös
Senior Testing Manager

1 Table of contents

2 General information

2.1 Notes and disclaimer

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2.2 Application details

Date of receipt of order:	2012-06-27
Date of receipt of test item:	2012-06-25
Start of test:	2012-06-25
End of test:	2012-07-16
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:		53 %	
Barometric pressure:		not relevant for this kind of testing	
Power supply:	V_{nom}	3.0 V	DC by 2 x 1.5 V (AA) Battery
	V_{max}	3.4 V	
	V_{min}	2.4 V	

5 Test item

Kind of test item	**:**	**Pocket transmitter**
Type identification	**:**	**SK2250**
S/N serial number	**:**	**Freq.-Range AW: 1282100000** **Freq.-Range GW: 1282100001** **Freq.-Range BW: 1282100002**
HW hardware status	**:**	**Not specified**
SW software status	**:**	**Not specified**
Frequency band [MHz]	**:**	**516.0 MHz to 607.9 MHz** **614.1 MHz to 697.9 MHz** **Freq.-Range AW: 516 MHz to 558 MHz** **Freq.-Range GW: 558 MHz to 626 MHz (608 MHz to 614 MHz blocked)** **Freq.-Range BW: 626 MHz to 697.9 MHz**
Type of radio transmission **Use of frequency spectrum**	**:** **:**	**Single carrier**
Type of modulation	**:**	**Broadband FM**
Number of channels	**:**	**516 MHz to 558 MHz in 25 kHz steps (AW)** **558 MHz to 607.9 MHz in 25 kHz steps (GW)** **614.1 MHz to 626 MHz in 25 kHz steps (GW)** **626 MHz to 697.9 MHz in 25 kHz steps (BW)**
Antenna	**:**	**SMA rod antenna**
Power supply	**:**	**3.0 V DC by 2 x 1.5 V (AA) 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	Passed	2012-07-17	-/-

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	☐	☐	☒	☐	-/-

Note: NA = Not Applicable; NP = Not Performed

7.1 RSP100 test report cover sheet / performance test data

Test Report Number	:	**1-4927/12-01-02**
Equipment Model Number	:	**SK2250**
Certification Number	:	**2099A-SK2250**
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	:	**516.0 MHz to 607.9 MHz 614.1 MHz to 697.9 MHz**
RF power max [mW]	:	**201 mW (AW) 205 mW (GW) 223 mW (BW)**
Occupied bandwidth (99%-BW) [kHz]	:	**101 kHz**
Type of modulation	:	**Broadband FM**
Emission Designator (TRC-43)	:	**101KF1D**
Antenna Information	:	**SMA rod antenna**
Transmitter Spurious (worst case) [dBm]	:	**-47.2 dBm @ 6979 MHz**
Receiver Spurious (worst case) [µV/m @ 3m]	:	**Not implemented!**

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:

2012-07-17	Stefan Bös	
Date	Name	Signature

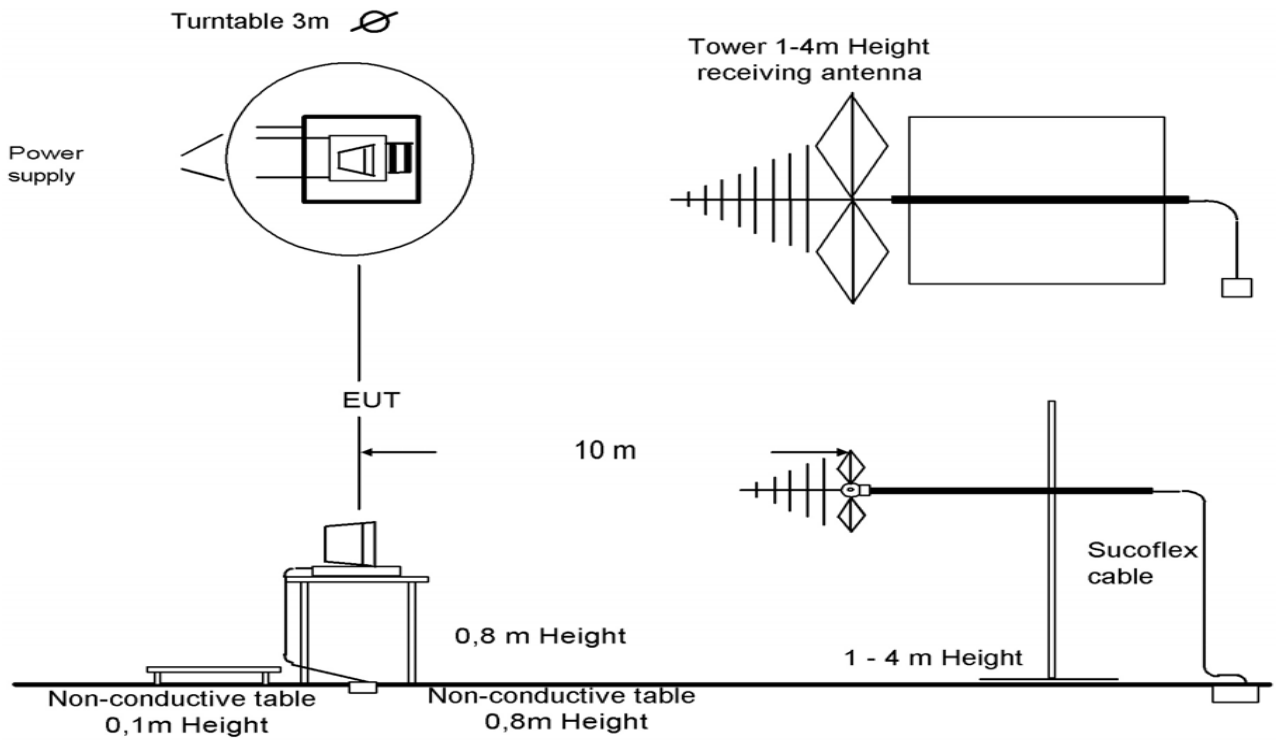
8 RF measurements

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



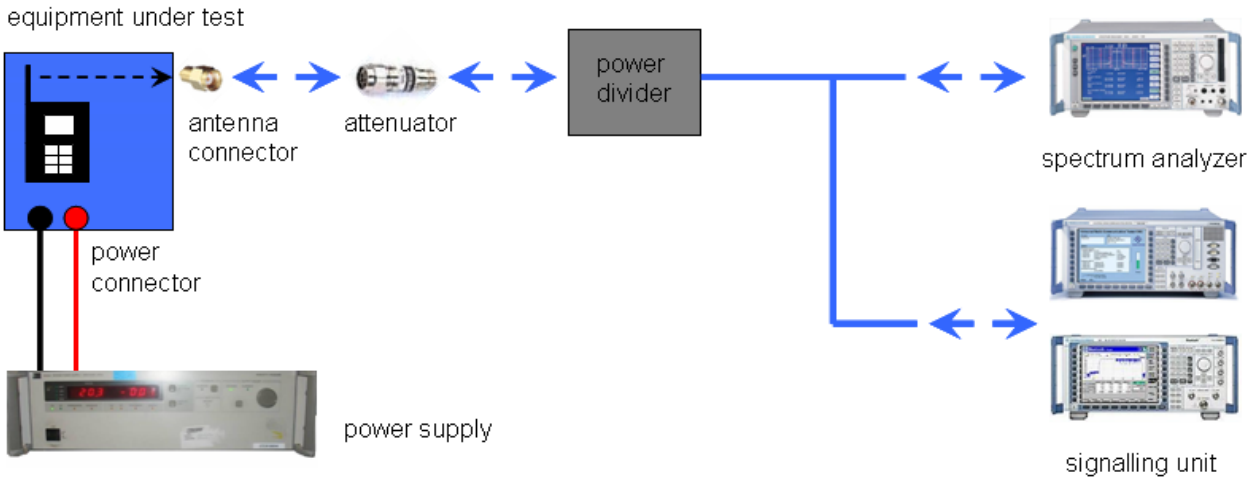
Picture 1: Diagram radiated measurements

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: None

Special test descriptions: None

Configuration descriptions: None

9 Measurement results

9.1 Output power (radiated)

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3 MHz
Video bandwidth:	3 MHz
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	
470-608 and 614-698MHz bands - 250mW (23.98 dBm)	

Result:

Frequency (channel)	Radiated output power
516.0 MHz (AW)	21.68 dBm
558.0 MHz (AW)	23.03 dBm
607.9 MHz (GW)	23.11 dBm
614.1 MHz (GW)	22.86 dBm
626.0 MHz (BW)	23.48 dBm
697.9 MHz (BW)	22.25 dBm

Result: **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):	3.0 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: 516 MHz

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	515.9967	-3.3 / -6.4
-20 °C	515.9975	-2.5 / -4.8
-10 °C	515.9981	-1.9 / -3.7
0 °C	515.9988	-1.2 / -2.3
10 °C	515.9991	-0.9 / -1.7
20 °C	515.9991	-0.9 / -1.7
30 °C	515.9992	-0.8 / -1.6
40 °C	515.9989	-1.1 / -2.1
50 °C	515.9987	-1.3 / -2.5

Results: 558 MHz

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	557.9969	-3.1 / -5.6
-20 °C	557.9977	-2.3 / -4.1
-10 °C	557.9982	-1.8 / -3.2
0 °C	557.9988	-1.2 / -2.2
10 °C	557.9992	-0.8 / -1.4
20 °C	557.9992	-0.8 / -1.4
30 °C	557.9994	-0.6 / -1.1
40 °C	557.9991	-0.9 / -1.6
50 °C	557.9990	-1.0 / -1.8

Results: 607.9 MHz

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	607.8970	-3.0 / -4.9
-20 °C	607.8976	-2.4 / -3.9
-10 °C	607.8981	-1.9 / -3.1
0 °C	607.8986	-1.4 / -2.3
10 °C	607.8989	-1.1 / -1.8
20 °C	607.8990	-1.0 / -1.6
30 °C	607.8988	-1.2 / -2.0
40 °C	607.8986	-1.4 / -2.3
50 °C	607.8985	-1.5/ -2.5

Results: 614.1 MHz

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	614.0963	-3.7 / -6.0
-20 °C	614.0972	-2.8 / -4.6
-10 °C	614.0975	-2.5 / -4.1
0 °C	614.0980	-2.0 / -3.3
10 °C	614.0986	-1.4 / -2.3
20 °C	614.0988	-1.2 / -2.0
30 °C	614.0986	-1.4 / -2.3
40 °C	614.0984	-1.6 / -2.6
50 °C	614.0981	-1.9 / -3.1

Results: 626 MHz

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	625.9962	-3.8 / -6.1
-20 °C	625.9974	-2.6 / -4.2
-10 °C	625.9984	-1.6 / -2.6
0 °C	625.9989	-1.1 / -1.8
10 °C	625.9995	-0.5 / -0.8
20 °C	625.9996	-0.4 / -0.6
30 °C	625.9994	-0.6 / -1.0
40 °C	625.9993	-0.7 / -1.1
50 °C	625.9991	-0.9 / -1.4

Results: 697.9 MHz

Temperature	Frequency (MHz)	Deviation (kHz / ppm)
-30 °C	697.8955	-4.5 / -6.4
-20 °C	697.8961	-3.9 / -5.6
-10 °C	697.8969	-3.1 / -4.4
0 °C	697.8974	-2.6 / -3.7
10 °C	697.8977	-2.3 / -3.3
20 °C	697.8983	-1.7 / -2.4
30 °C	697.8984	-1.6 / -2.3
40 °C	697.8980	-2.0 / -2.9
50 °C	697.8978	-2.2 / -3.2

Result: **Passed**

9.2.2 Frequency error vs. voltage

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	100 Hz
Video bandwidth:	100 Hz
Span:	1 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: 516 MHz

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.4 V	515. 9991	-0.9 / -1.7
2.5 V	515. 9991	-0.9 / -1.7
2.6 V	515. 9991	-0.9 / -1.7
2.7 V	515. 9991	-0.9 / -1.7
2.8 V	515.9991	-0.9 / -1.7
2.9 V	515.9991	-0.9 / -1.7
3.0 V	515. 9991	-0.9 / -1.7
3.1 V	515. 9991	-0.9 / -1.7
3.2 V	515. 9991	-0.9 / -1.7
3.3 V	515. 9991	-0.9 / -1.7
3.4 V	515. 9991	-0.9 / -1.7

Results: 558 MHz

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.4 V	557. 9992	-0.8 / -1.4
2.5 V	557. 9992	-0.8 / -1.4
2.6 V	557. 9992	-0.8 / -1.4
2.7 V	557. 9992	-0.8 / -1.4
2.8 V	557. 9992	-0.8 / -1.4
2.9 V	557. 9992	-0.8 / -1.4
3.0 V	557. 9992	-0.8 / -1.4
3.1 V	557. 9992	-0.8 / -1.4
3.2 V	557. 9992	-0.8 / -1.4
3.3 V	557. 9992	-0.8 / -1.4
3.4 V	557. 9992	-0.8 / -1.4

Results: 607.9 MHz

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.4 V	607.8990	-1.0 / -1.6
2.5 V	607.8990	-1.0 / -1.6
2.6 V	607.8990	-1.0 / -1.6
2.7 V	607.8990	-1.0 / -1.6
2.8 V	607.8990	-1.0 / -1.6
2.9 V	607.8990	-1.0 / -1.6
3.0 V	607.8990	-1.0 / -1.6
3.1 V	607.8990	-1.0 / -1.6
3.2 V	607.8990	-1.0 / -1.6
3.3 V	607.8990	-1.0 / -1.6
3.4 V	607.8990	-1.0 / -1.6

Results: 614.1 MHz

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.4 V	614.0988	-1.2 / -2.0
2.5 V	614.0988	-1.2 / -2.0
2.6 V	614.0988	-1.2 / -2.0
2.7 V	614.0988	-1.2 / -2.0
2.8 V	614.0988	-1.2 / -2.0
2.9 V	614.0988	-1.2 / -2.0
3.0 V	614.0988	-1.2 / -2.0
3.1 V	614.0988	-1.2 / -2.0
3.2 V	614.0988	-1.2 / -2.0
3.3 V	614.0988	-1.2 / -2.0
3.4 V	614.0988	-1.2 / -2.0

Results: 626 MHz

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.4 V	625.9996	-0.4 / -0.6
2.5 V	625.9996	-0.4 / -0.6
2.6 V	625.9996	-0.4 / -0.6
2.7 V	625.9996	-0.4 / -0.6
2.8 V	625.9996	-0.4 / -0.6
2.9 V	625.9996	-0.4 / -0.6
3.0 V	625.9996	-0.4 / -0.6
3.1 V	625.9996	-0.4 / -0.6
3.2 V	625.9996	-0.4 / -0.6
3.3 V	625.9996	-0.4 / -0.6
3.4 V	625.9996	-0.4 / -0.6

Results: 697.9 MHz

Voltage	Frequency (MHz)	Deviation (kHz / ppm)
2.4 V	697.8983	-1.7 / -2.4
2.5 V	697.8983	-1.7 / -2.4
2.6 V	697.8983	-1.7 / -2.4
2.7 V	697.8983	-1.7 / -2.4
2.8 V	697.8983	-1.7 / -2.4
2.9 V	697.8983	-1.7 / -2.4
3.0 V	697.8983	-1.7 / -2.4
3.1 V	697.8983	-1.7 / -2.4
3.2 V	697.8983	-1.7 / -2.4
3.3 V	697.8983	-1.7 / -2.4
3.4 V	697.8983	-1.7 / -2.4

Result: Passed

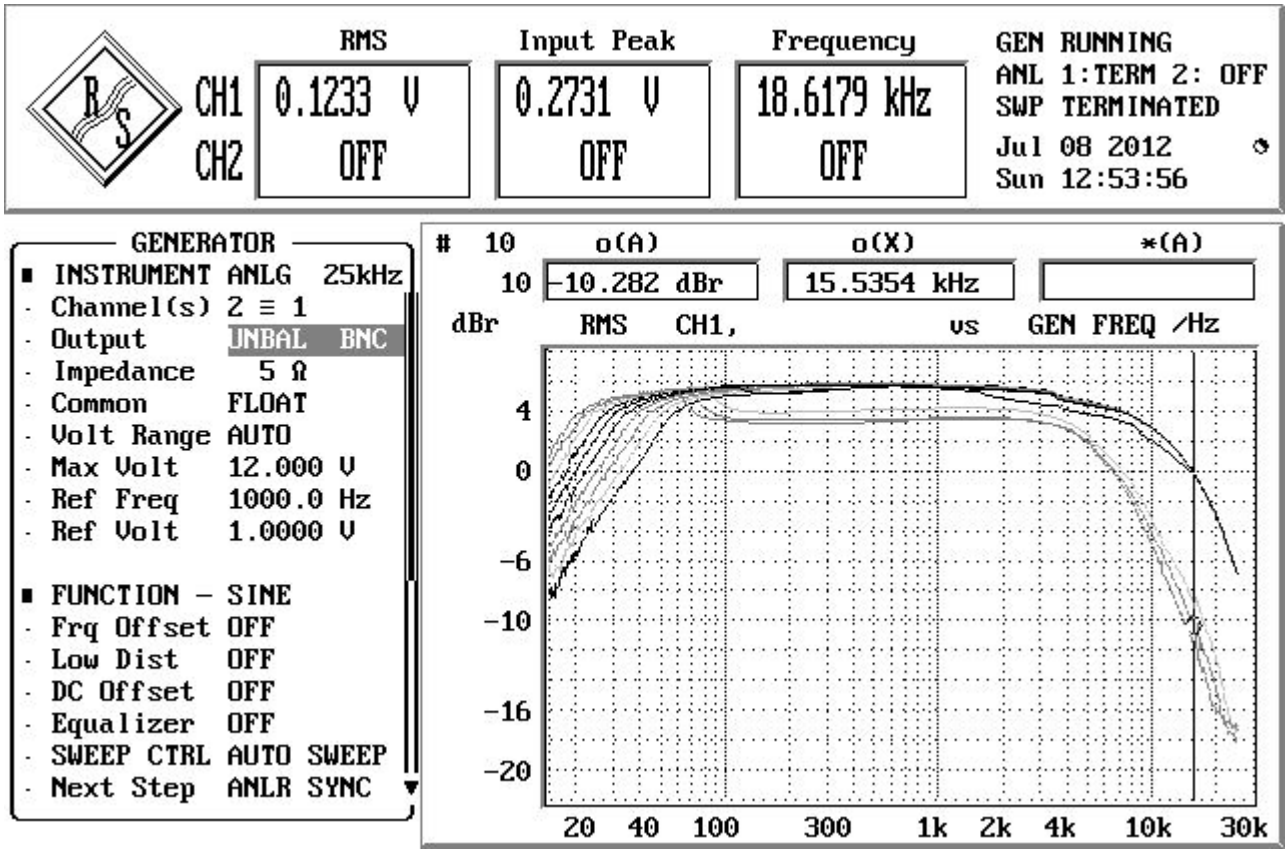
9.3 Modulation characteristics

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 20 Hz to 25 kHz.



Max. measured frequency deviation: 75 kHz

This measurement is valid for all channels.

Limit: max. Deviation ±75 kHz

Result: **Passed**

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	

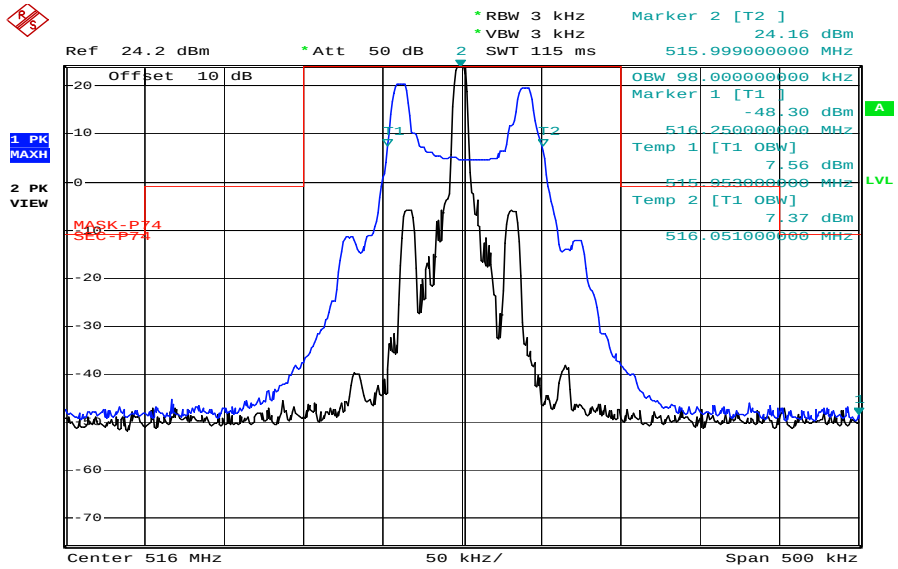
Result:

Frequency (channel)	20dB Bandwidth
516.0 MHz	98 kHz
558.0 MHz	98 kHz
607.9 MHz	100 kHz
614.1 MHz	99 kHz
626.0 MHz	101 kHz
697.9 MHz	101 kHz

Result: **Passed**

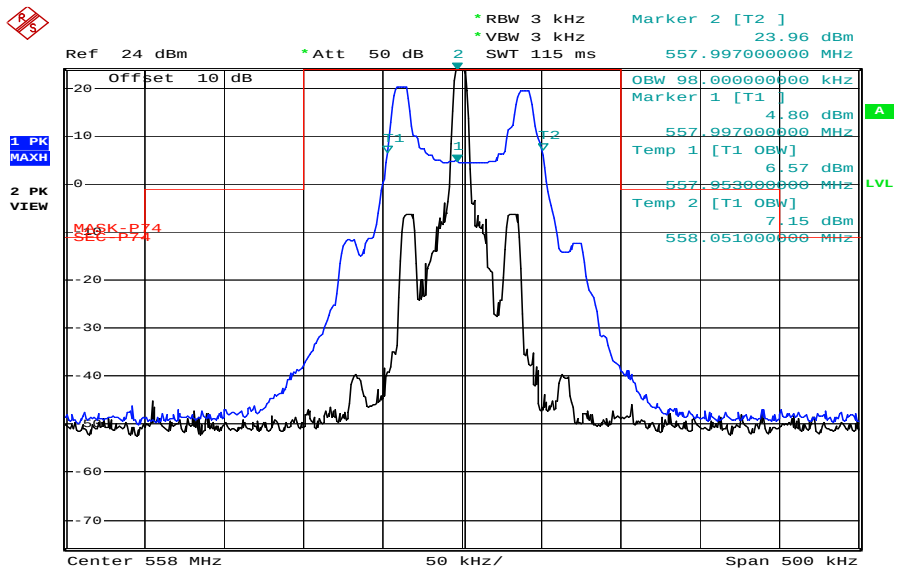
Plots of the measurements

Plot 1: 516.0 MHz



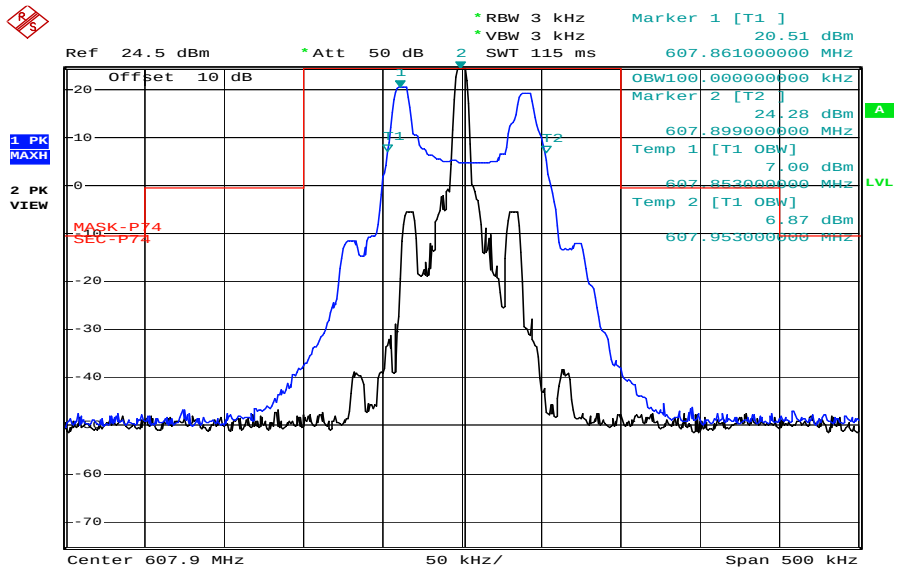
Date: 12.JUL.2012 10:18:50

Plot 2: 558.0 MHz



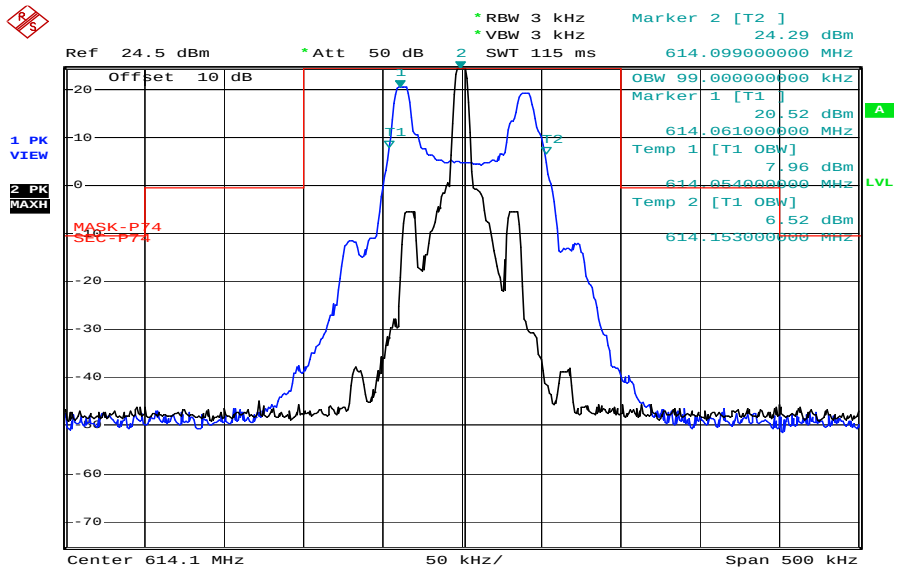
Date: 12.JUL.2012 10:15:19

Plot 3: 607.9 MHz



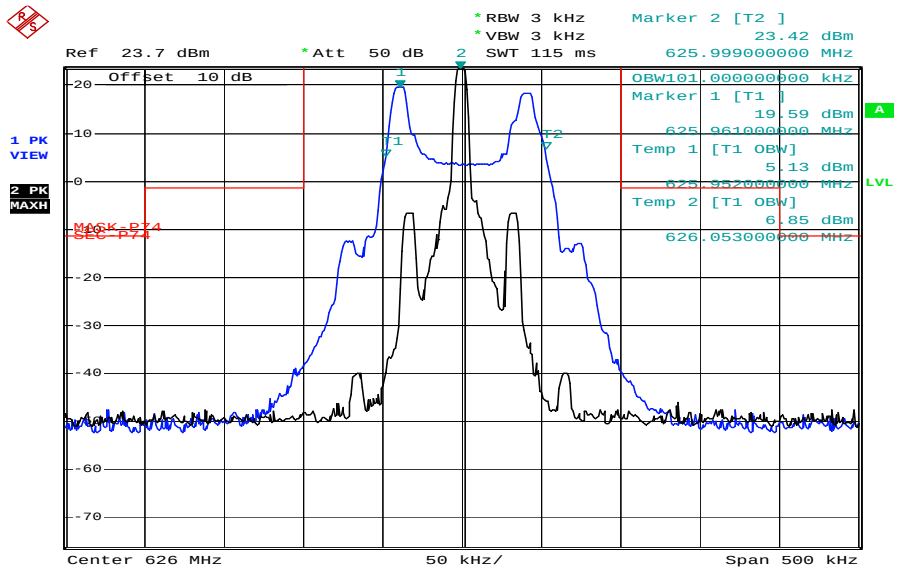
Date: 12.JUL.2012 11:14:34

Plot 4: 614.1 MHz



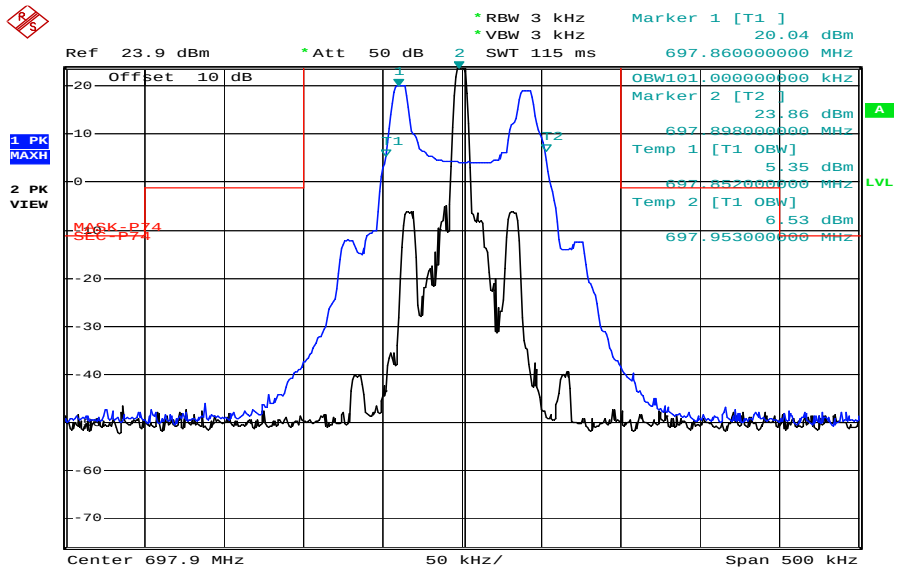
Date: 12.JUL.2012 11:13:06

Plot 5: 626.0 MHz



Date: 12.JUL.2012 11:20:06

Plot 6: 697.9 MHz



Date: 12.JUL.2012 11:22:01

9.5 Unwanted radiation (spectrum mask)

Measurement:

Measurement parameter	
Detector:	Peak
Sweep time:	Auto
Resolution bandwidth:	3kHz
Video bandwidth:	3kHz
Span:	1500 kHz
Trace-Mode:	Max. hold

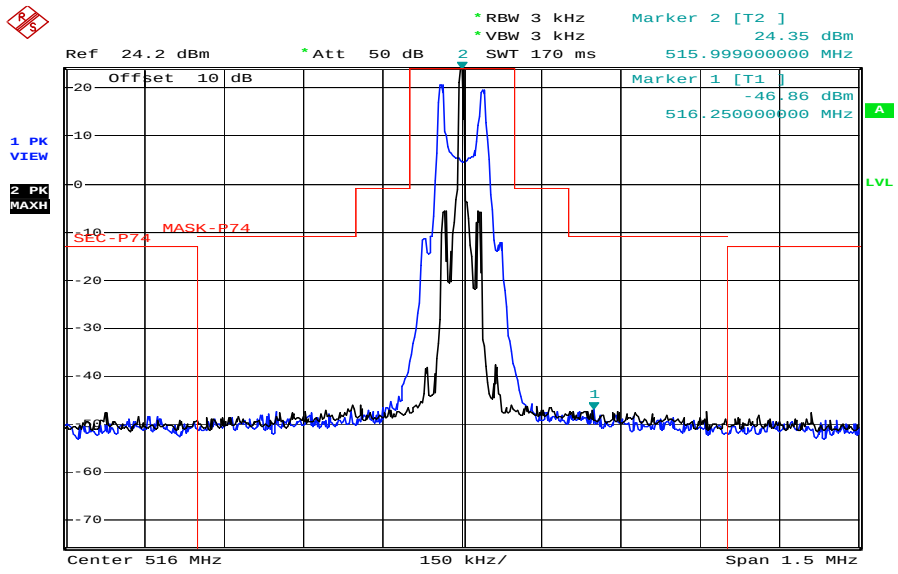
Limits:

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: **Passed**

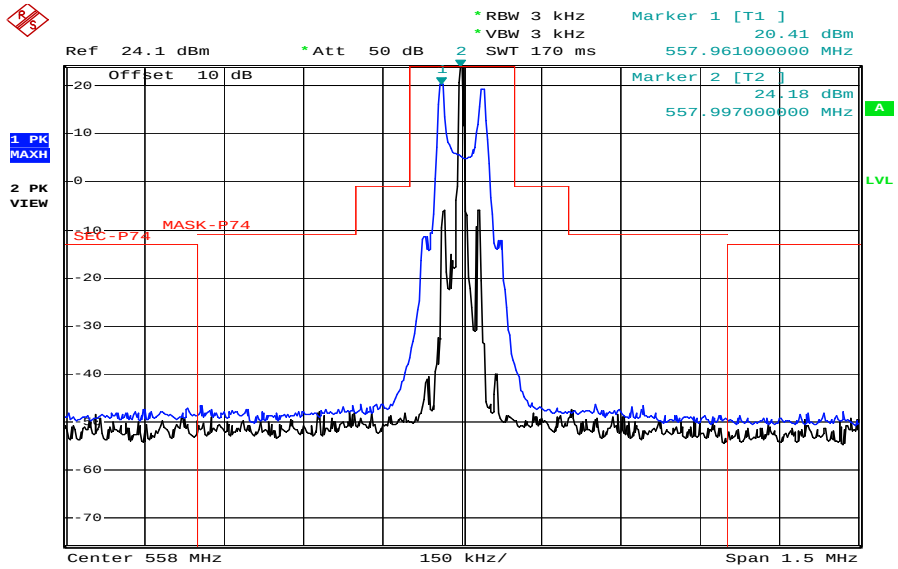
Plots of the measurements

Plot 1: 516.0 MHz



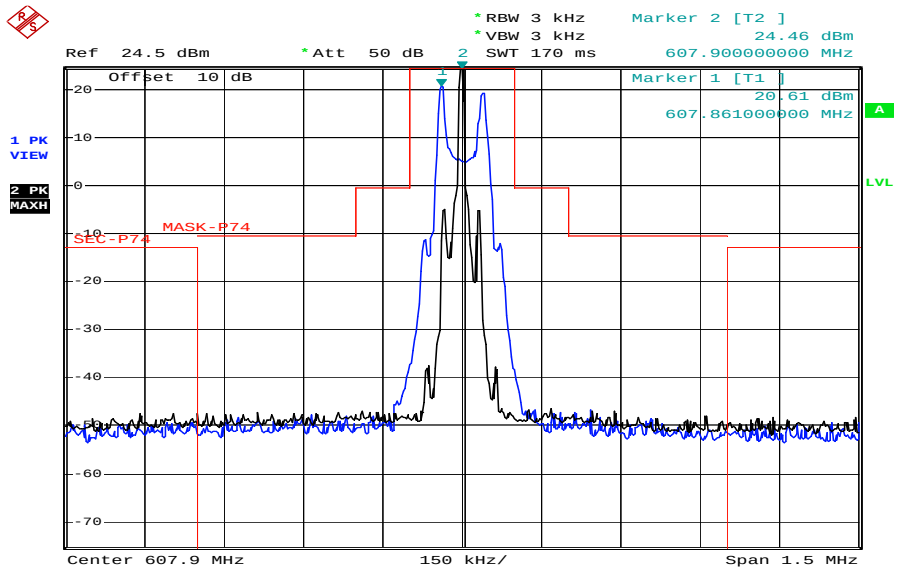
Date: 12.JUL.2012 10:21:29

Plot 2: 558.0 MHz



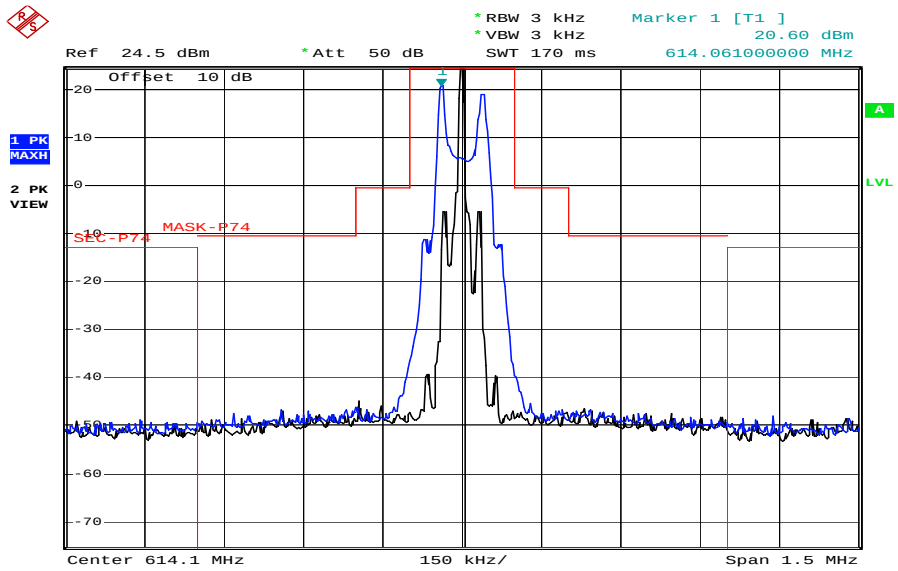
Date: 12.JUL.2012 10:29:17

Plot 3: 607.9 MHz



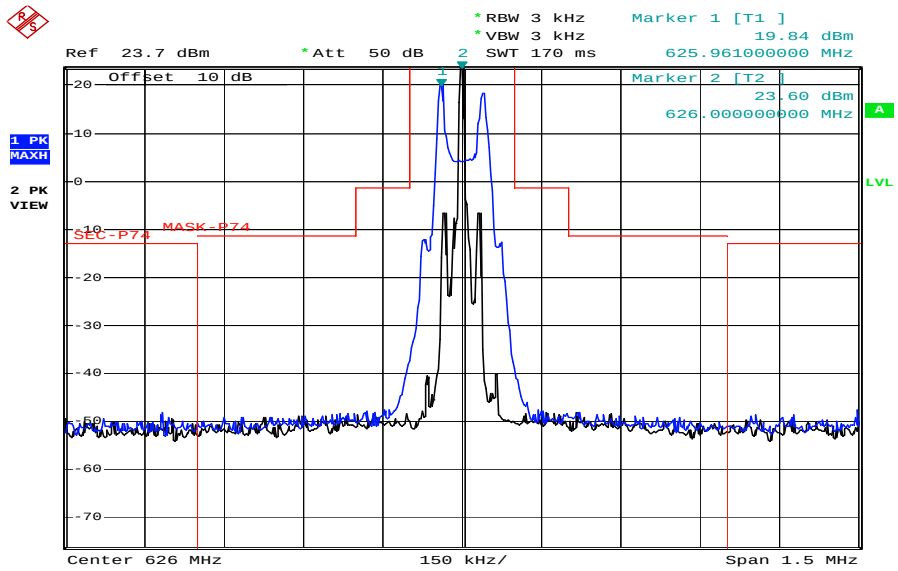
Date: 12.JUL.2012 11:16:06

Plot 4: 614.1 MHz



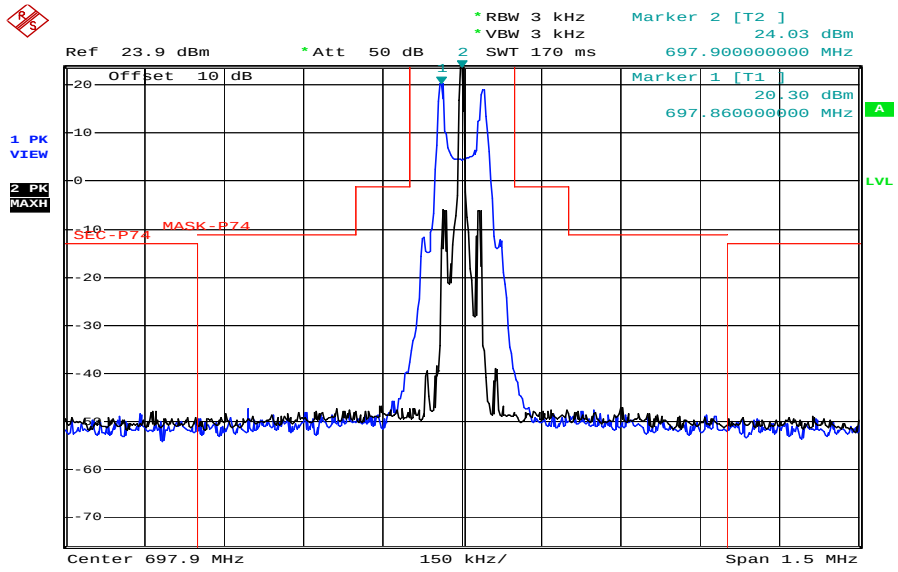
Date: 12.JUL.2012 11:10:51

Plot 5: 626.0 MHz



Date: 12.JUL.2012 11:18:50

Plot 6: 697.9 MHz



Date: 12.JUL.2012 11:23:03

9.6 Spurious Emissions

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:

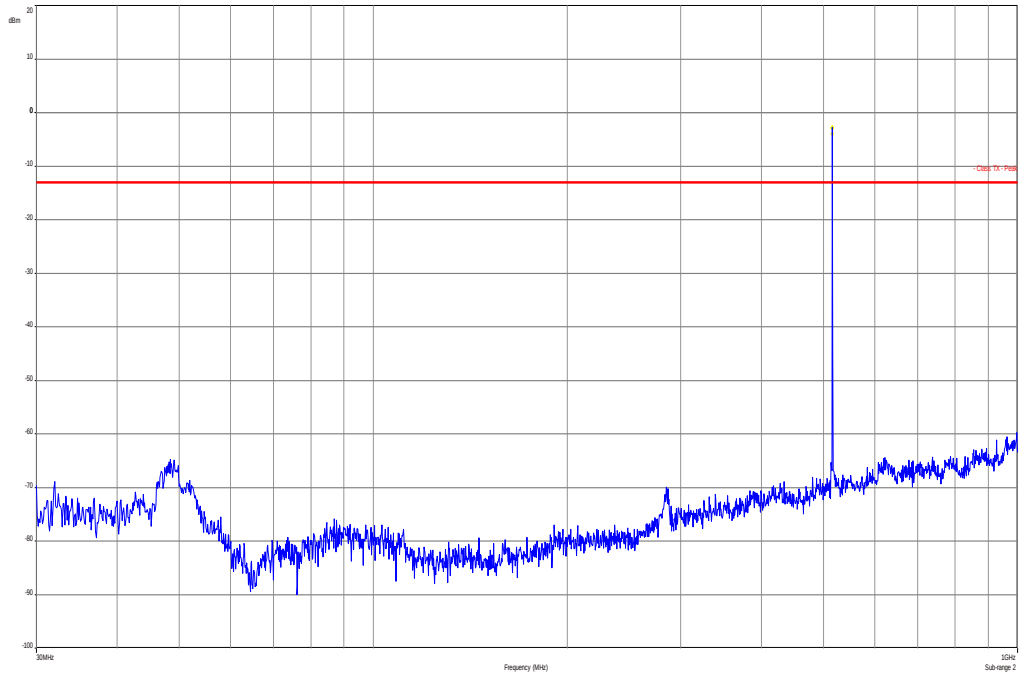
FCC	IC
Emissions for LPRS transmitters operating on standard band channels (25 kHz) shall be attenuated below the unmodulated carrier in accordance with the following: Emissions 12.5 kHz to 22.5 kHz away from the channel center frequency: at least 30 dB; and emissions more than 22.5 kHz away from the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

SPURIOUS EMISSIONS LEVEL (dBm)								
516.0 MHz			558.0 MHz			607.9 MHz		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
No critical peaks found.			No critical peaks found.			No critical peaks found.		
614.1 MHz			626.0 MHz			697.9 MHz		
Frequency	Detector	Level	Frequency	Detector	Level	Frequency	Detector	Level
No critical peaks found.			No critical peaks found.			No critical peaks found.		
Measurement uncertainty ± 3 dB								

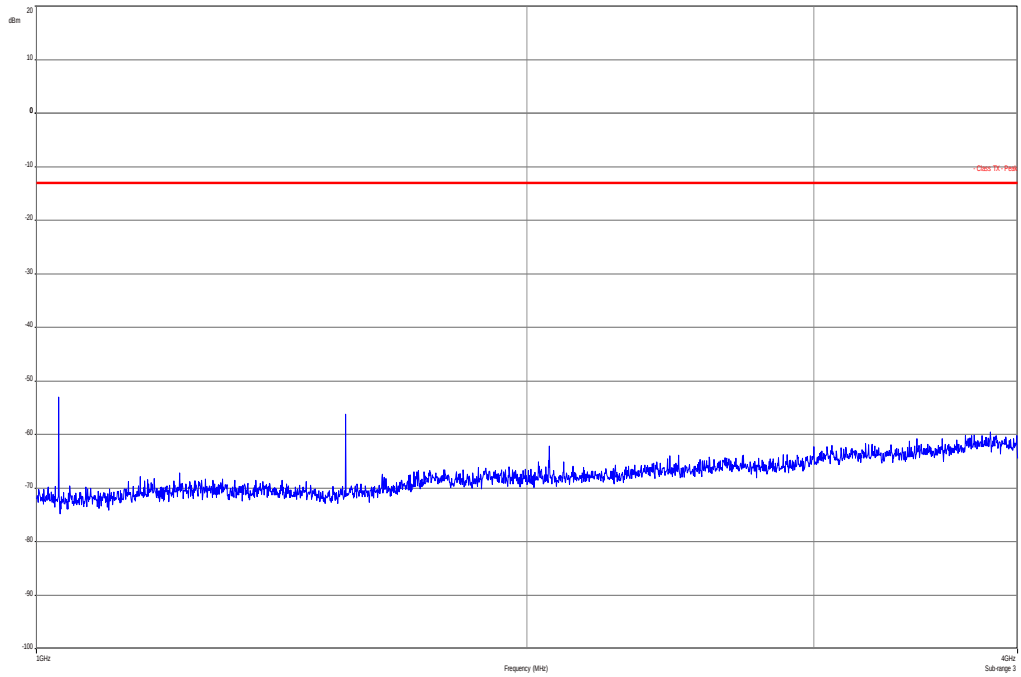
Result: **Passed**

Plots of the measurements

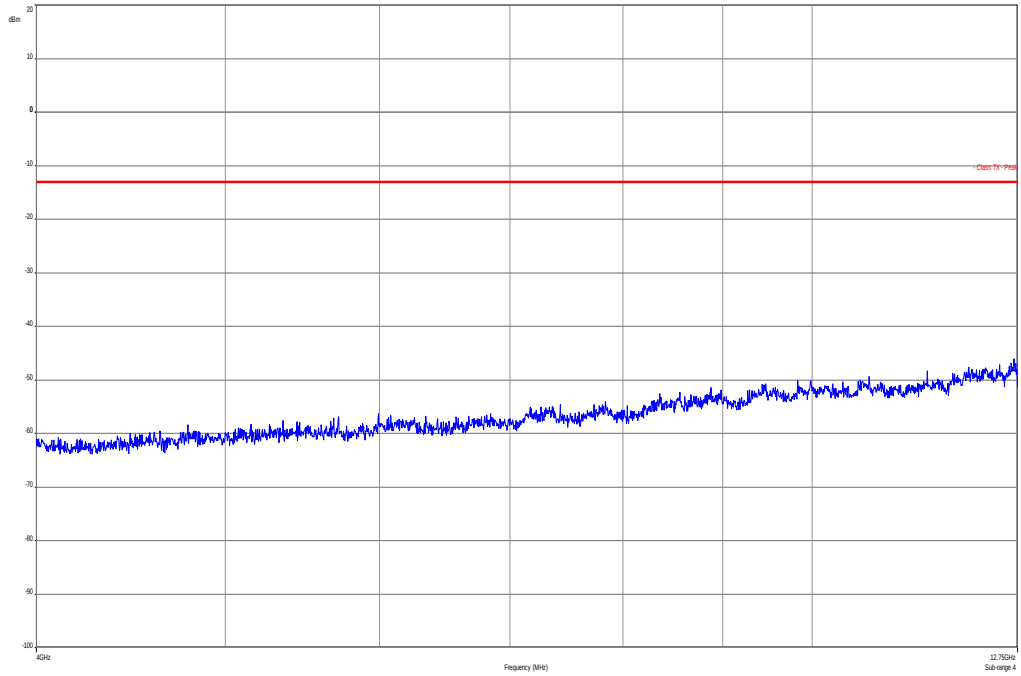
Plot 1: 30 MHz – 1 GHz, 516.0 MHz



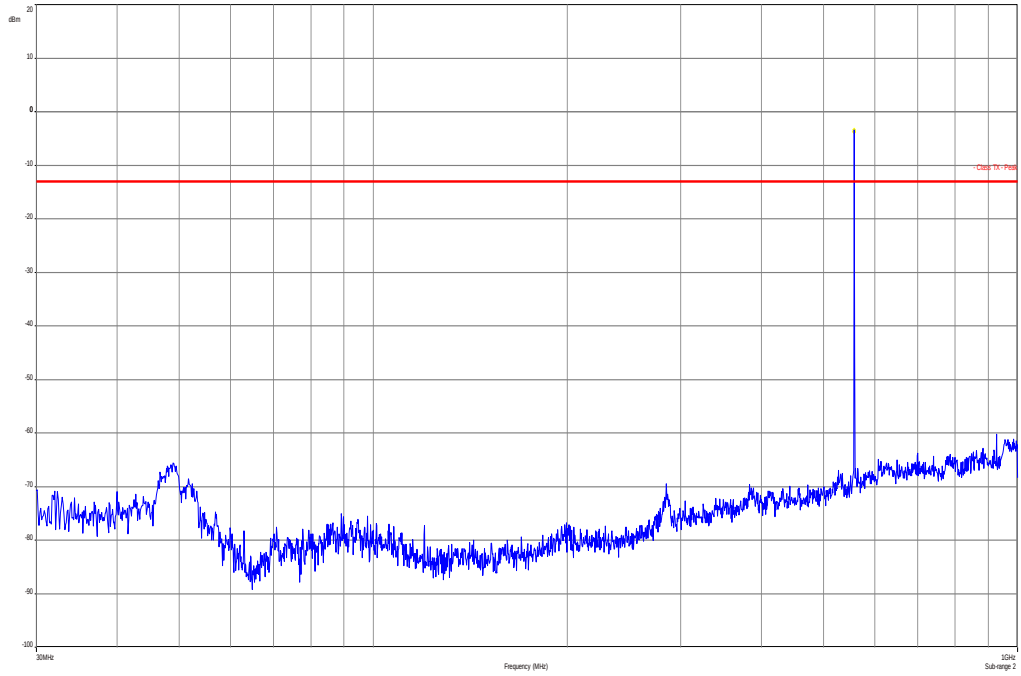
Plot 2: 1 GHz – 4 GHz, 516.0 MHz



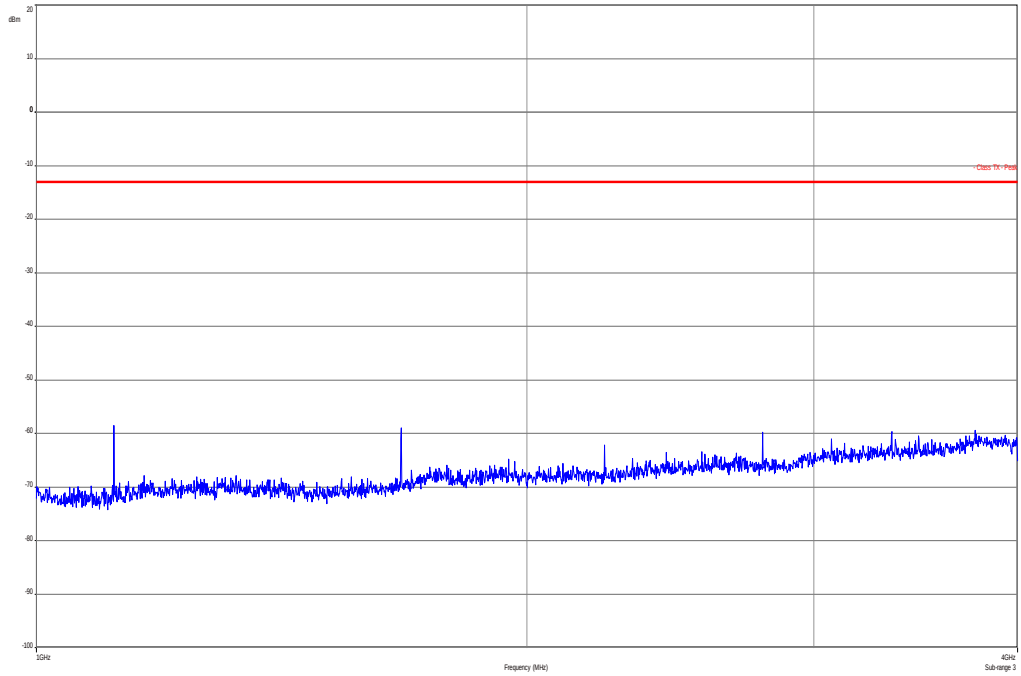
Plot 3: 4 GHz – 12.75 GHz, 516.0 MHz



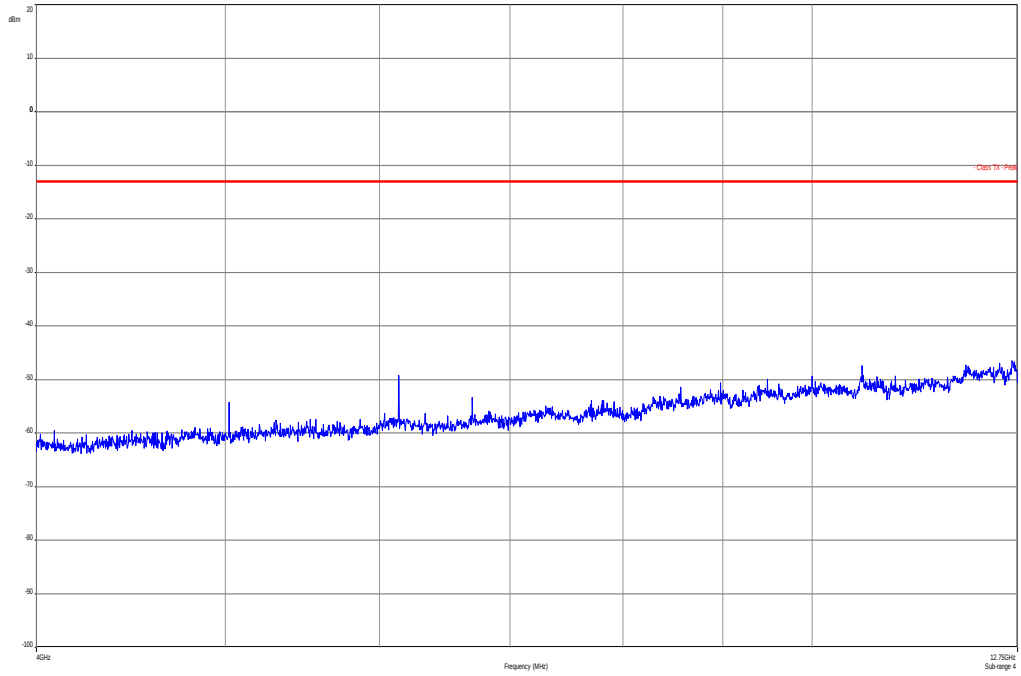
Plot 4: 30 MHz – 1 GHz, 558.0 MHz



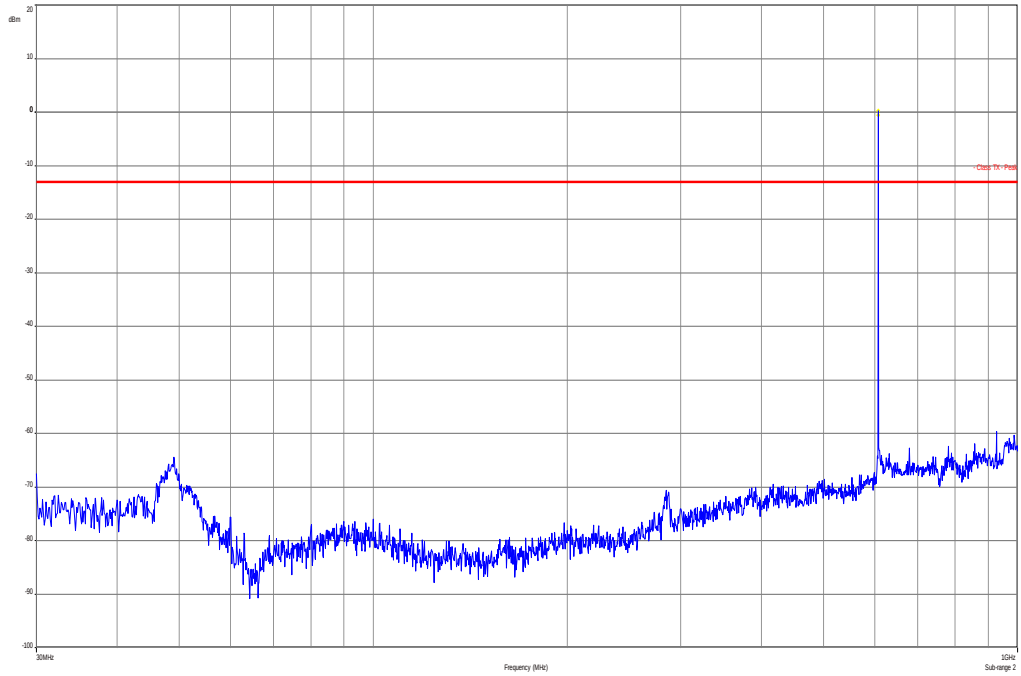
Plot 5: 1 GHz – 4 GHz, 558.0 MHz



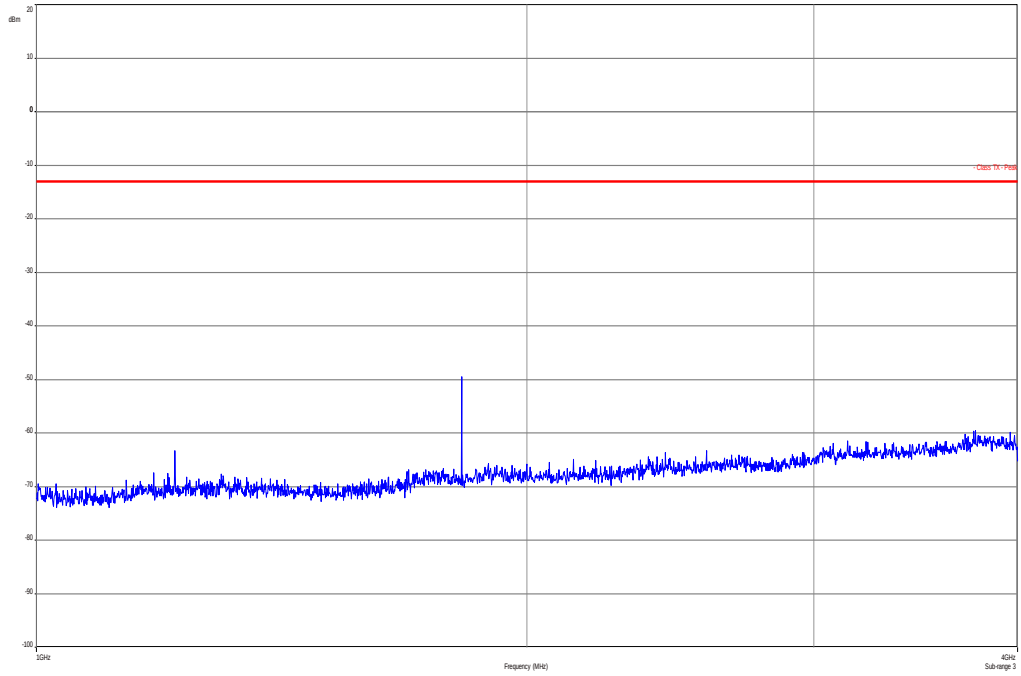
Plot 6: 4 GHz – 12.75 GHz, 558.0 MHz



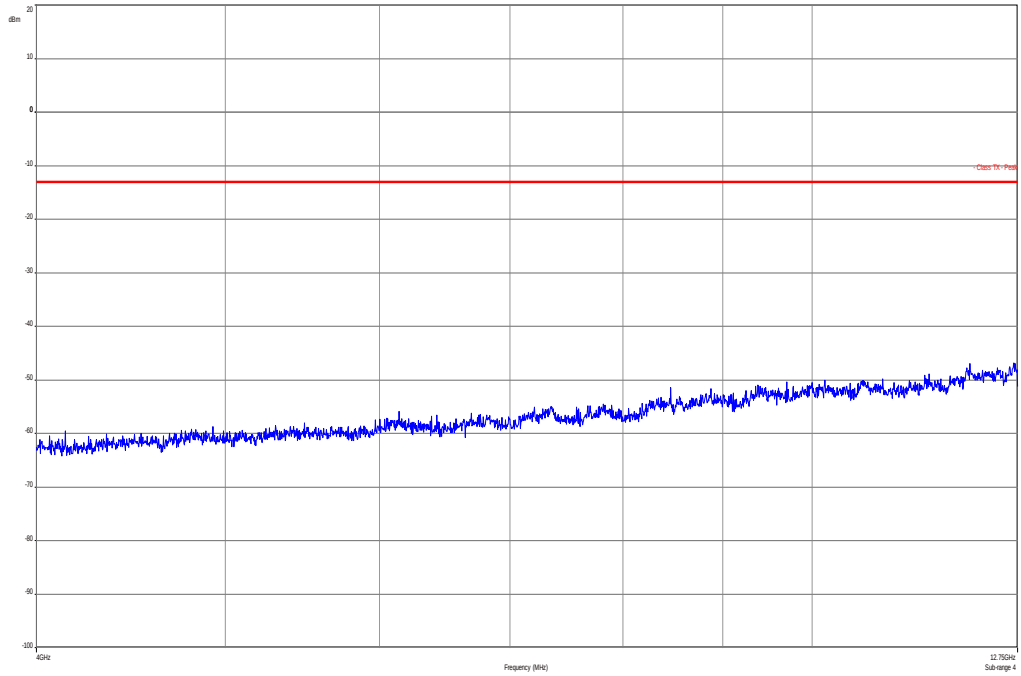
Plot 7: 30 MHz – 1 GHz, 607.9 MHz



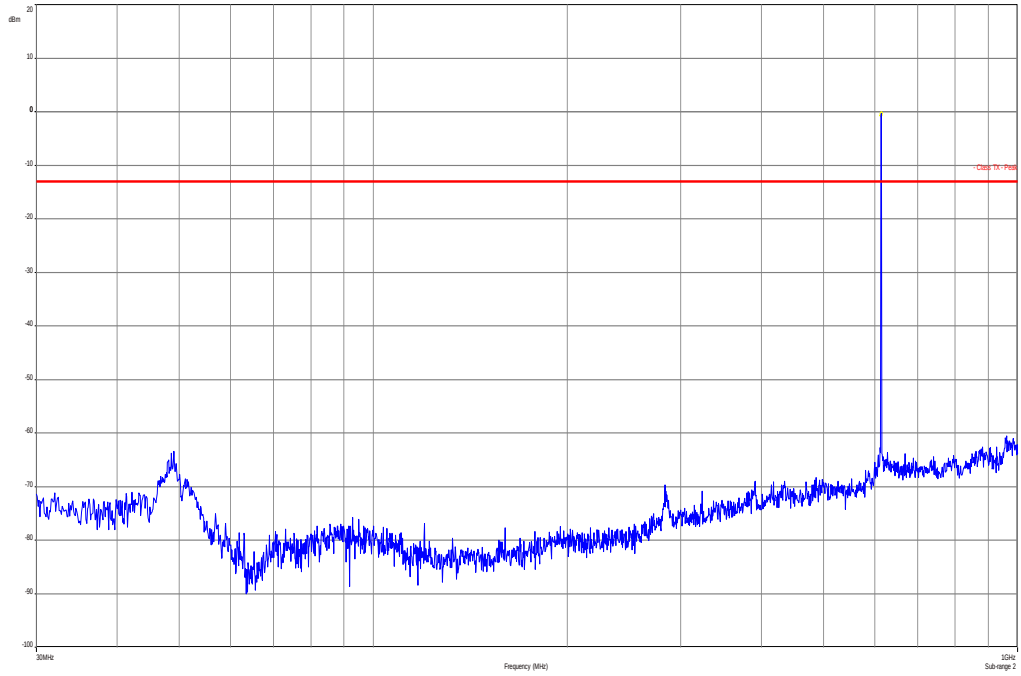
Plot 8: 1 GHz – 4 GHz, 607.9 MHz



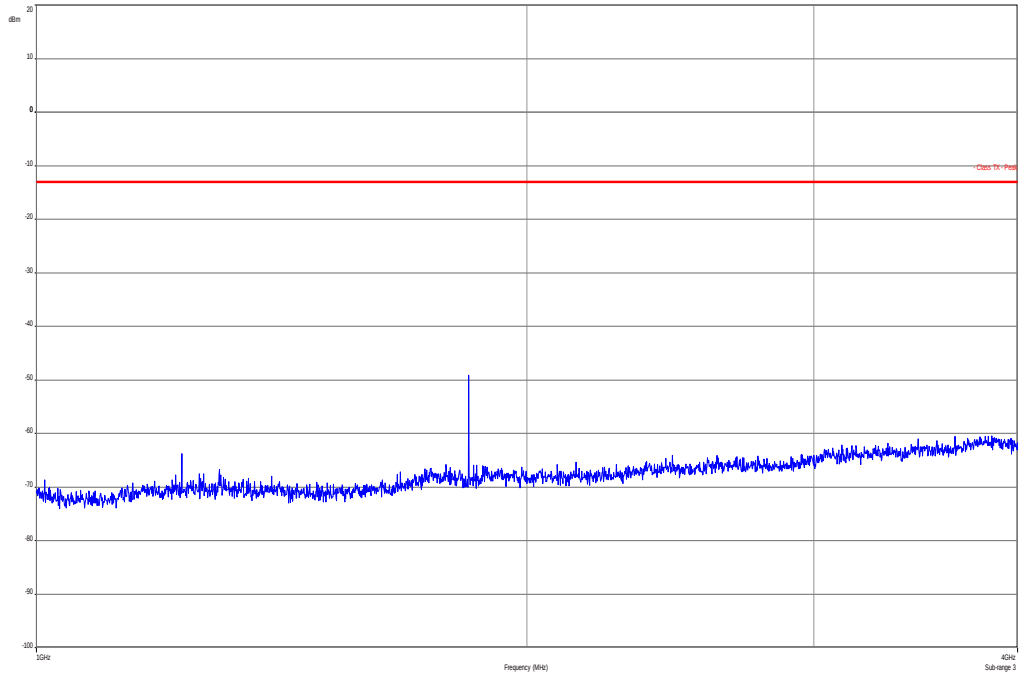
Plot 9: 4 GHz – 12.75 GHz, 607.9 MHz



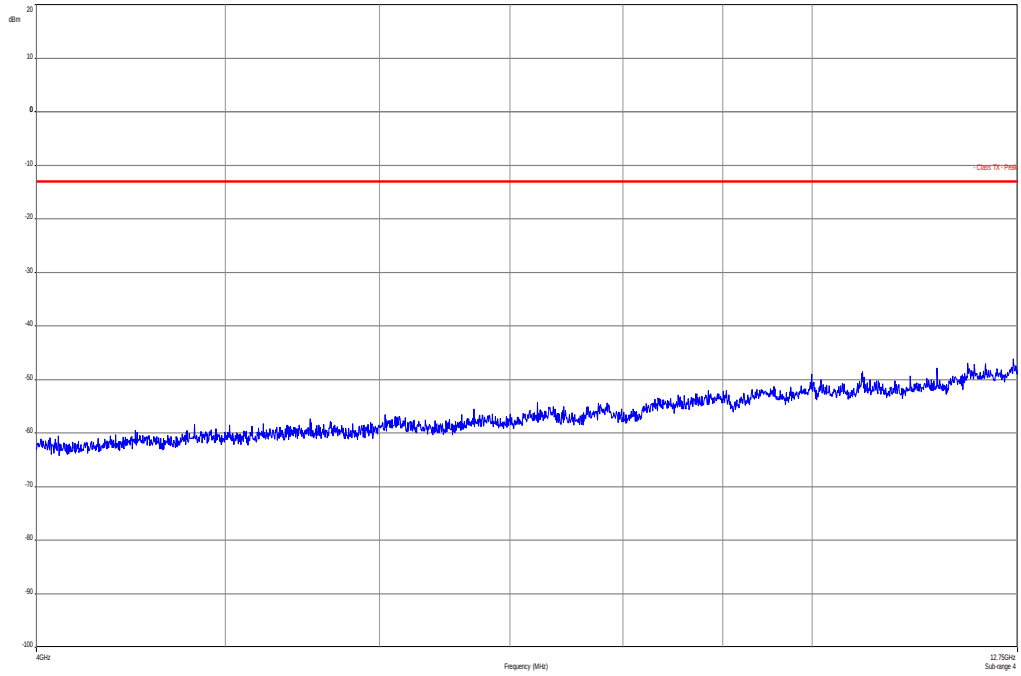
Plot 10: 30 MHz – 1 GHz, 614.1 MHz



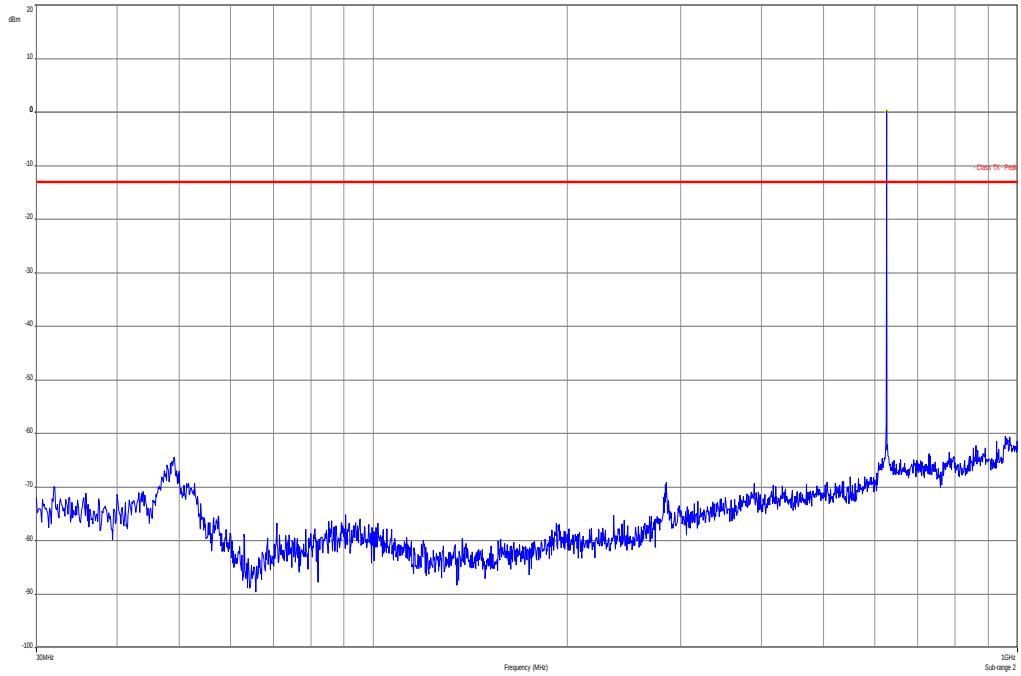
Plot 11: 1 GHz – 4 GHz, 614.1 MHz



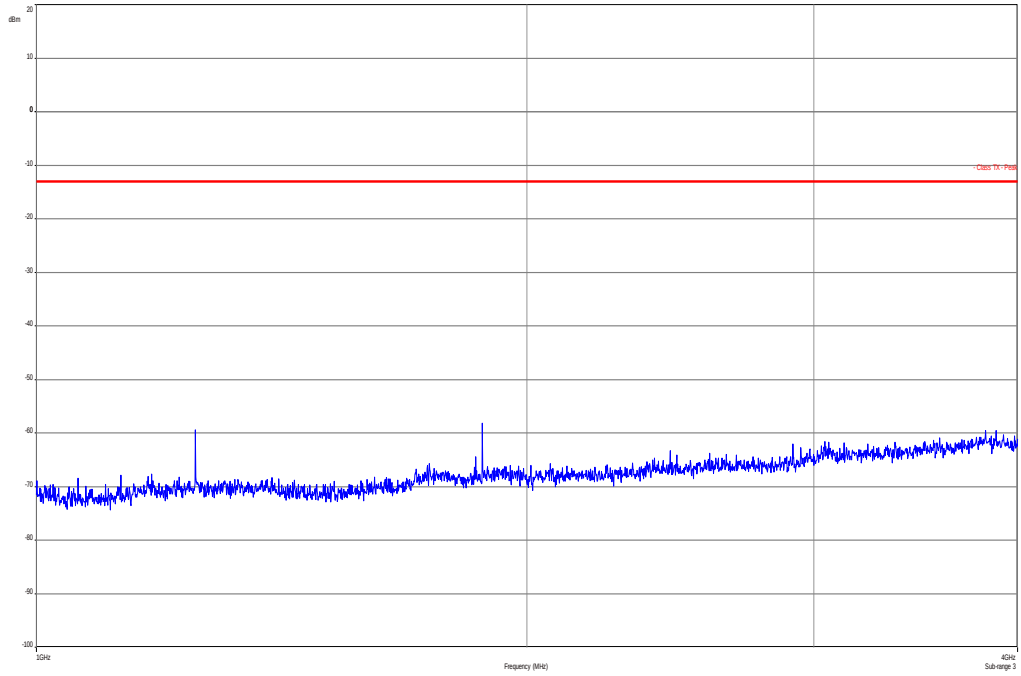
Plot 12: 4 GHz – 12.75 GHz, 614.1 MHz



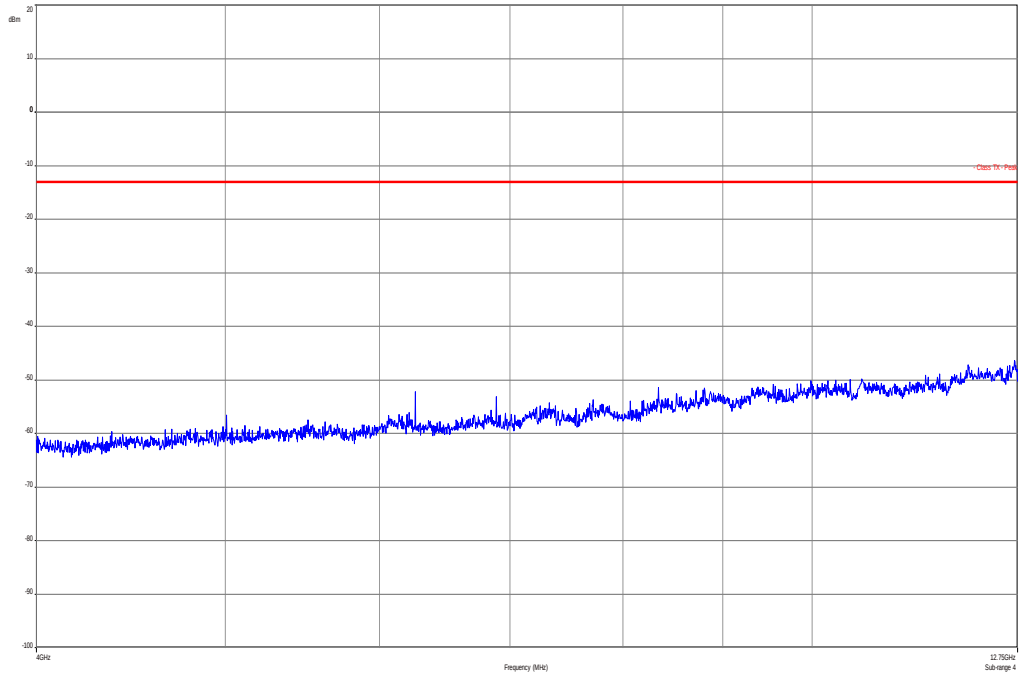
Plot 13: 30 MHz – 1 GHz, 626.0 MHz



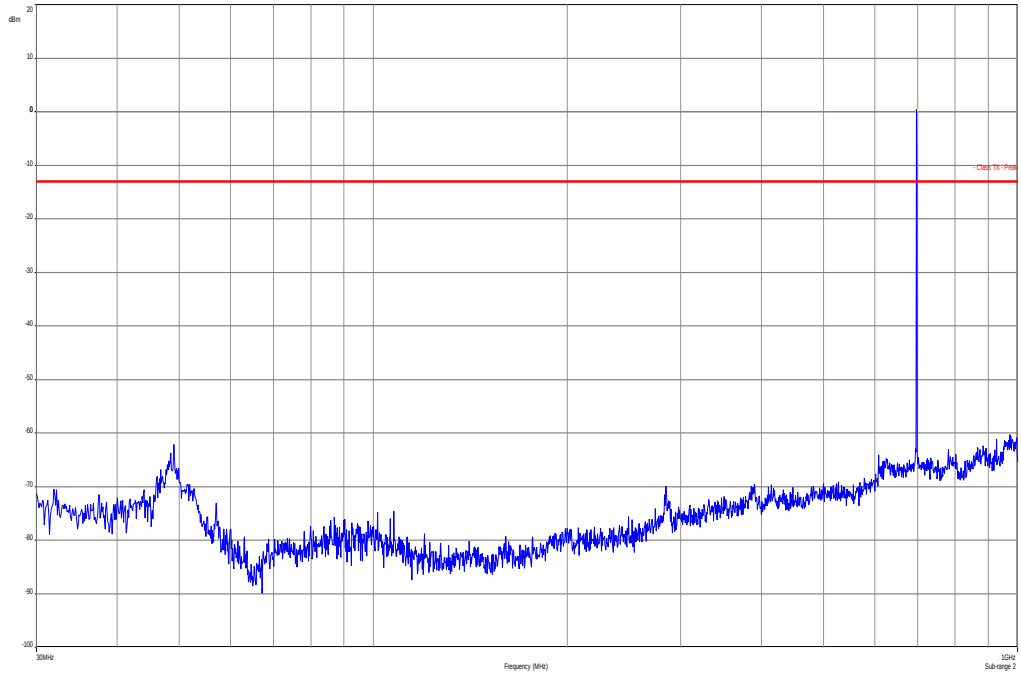
Plot 14: 1 GHz – 4 GHz, 626.0 MHz



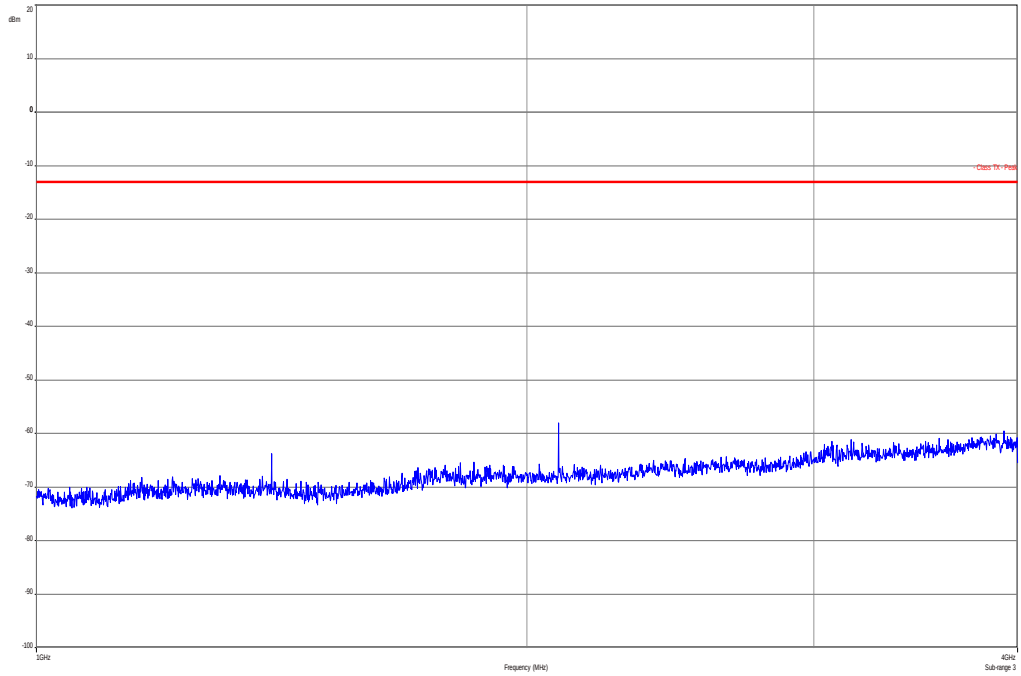
Plot 15: 4 GHz – 12.75 GHz, 626.0 MHz



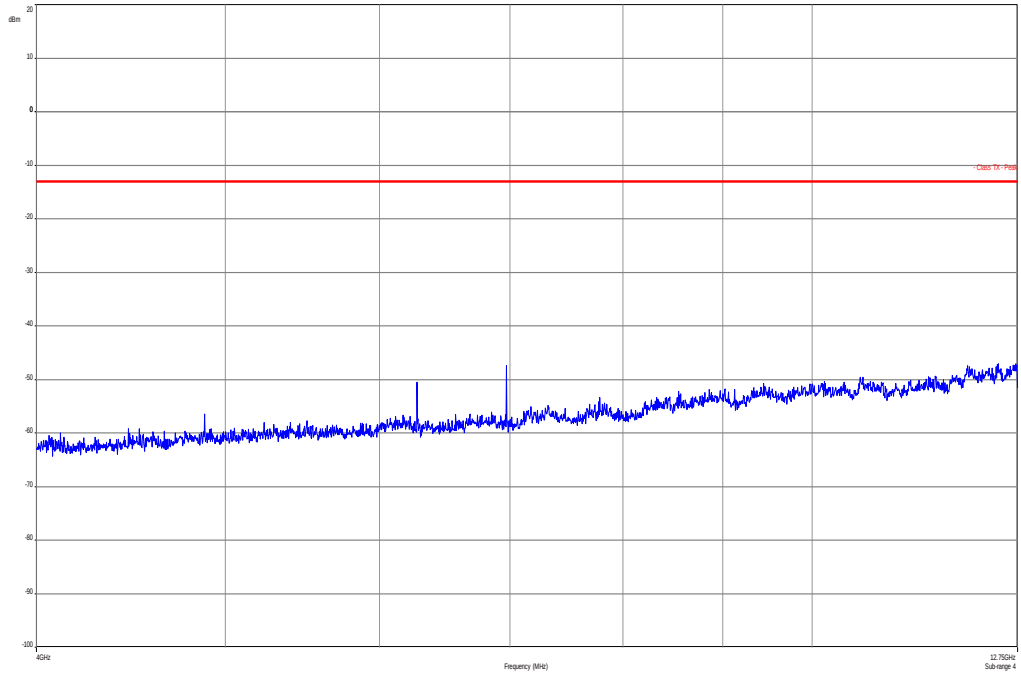
Plot 16: 30 MHz – 1 GHz, 697.9 MHz



Plot 17: 1 GHz – 4 GHz, 697.9 MHz



Plot 18: 4 GHz – 12.75 GHz, 697.9 MHz



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	12.01.2012	12.01.2015
3	n. a.	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	8812-3088	300001032	vlKl!	11.05.2011	11.05.2013
4	n. a.	Active Loop Antenna	6502	EMCO	2210	300001015	ne		
5	n. a.	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev		
6	Spec.A. 2_2e	System rack for EMI measurement solution	85900	HP I.V.	*	300000222	ne		
7	9	Artificial Mains 9 kHz to 30 MHz	ESH3-Z5	R&S	828576/020	300001210	Ve	06.01.2012	06.01.2014
8	n. a.	Relais Matrix	3488A	HP Meßtechnik	2719A15013	300001156	ne		
9	n. a.	Relais Matrix	PSU	R&S	890167/024	300001168	ne		
10	n. a.	Isolating Transformer	RT5A	Grundig	9242	300001263	ne		
11	n. a.	Three-Way Power Splitter, 50 Ohm	11850C	HP Meßtechnik		300000997	ne		
12	n. a.	Switch / Control Unit	3488A	HP	2605e08770	300001443	ne		
13	n. a.	Amplifier	js42-00502650-28-5a	Parzich GMBH	928979	300003143	ne		
14	n. a.	Band Reject filter	WRCG1855/1910-1835/1925-40/8SS	Wainwright	7	300003350	ev		
15	n. a.	Band Reject filter	WRCG2400/2483-2375/2505-50/10SS	Wainwright	11	300003351	ev		
16	n. a.	TILE-Software Emission	Quantum Change, Modell TILE-ICS/FULL	EMCO	none	300003451	ne		
17	n. a.	Highpass Filter	WHKX2.9/18G-12SS	Wainwright	1	300003492	ev		
18	n. a.	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev		
19	n. a.	Highpass Filter	WHKX7.0/18G-8SS	Wainwright	18	300003789	ne		
20	n. a.	MXG Microwave Analog Signal Generator	N5183A	Agilent Technologies	MY47420220	300003813	k	13.09.2010	13.09.2012
21	n. a.	RF Filter Section 9kHz - 1GHz	N9039A	Agilent Technologies	MY48260003	300003825	vk	08.09.2010	
22	n. a.	TRILOG Broadband	VULB9163	Schwarzbeck	371	300003854	vlKl!	14.10.2011	14.10.2014

		Test-Antenna 30 MHz - 3 GHz							
23	n. a.	MXE EMI Receiver 20 Hz bis 26,5 GHz	N9038A	Agilent Technologies	MY51210197	300004405	k	19.12.2011	19.12.2012
24	19	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9107-3697	300001605	Ve	19.10.2010	19.10.2012
25	n. a.	Isolating Transformer	913501	Erfi		300001205	ne		
26	4	Radiocom. Analyzer	CMTA 54	R&S	894043/010	300001175	NK!	06.06.2007	
27	9	Signal Generator 0.1-4320 MHz, AM/FM/PHIM/Puls Mod.	SMHU	R&S	894055/005	300001190	Ve	05.01.2010	05.01.2013
28	10	Signal Generator 0.1-2000 MHz	SMH	R&S	864219/033	300001410	Ve	18.08.2010	18.08.2013
29	n. a.	DC Power Supply 0 – 32V	1108-32	Heiden	001802	300001383	Ve	23.06.2010	23.06.2013
30	n. a.	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP Meßtechnik	2920A04590	300001041	Ve	12.01.2012	12.01.2015
31	n. a.	Temperature Test Chamber	VT 4002	Heraeus Voetsch	521/83761	300002326	Ve	20.09.2011	20.09.2013
32	n. a.	Audio Analyzer 2Hz - 300 kHz	UPD	R&S	841074/009	300001236	k	11.01.2012	11.01.2014
33	n. a.	Signal Analyzer 20Hz-26,5GHz-150 to + 30 DBM	FSiQ26	R&S	835111/0004	300002678	Ve	04.11.2010	04.11.2012
34	n. a.	Temperature Test Chamber	T-40/50	CTS GmbH	064023	300003540	vlKl!	20.09.2011	20.09.2013

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

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:

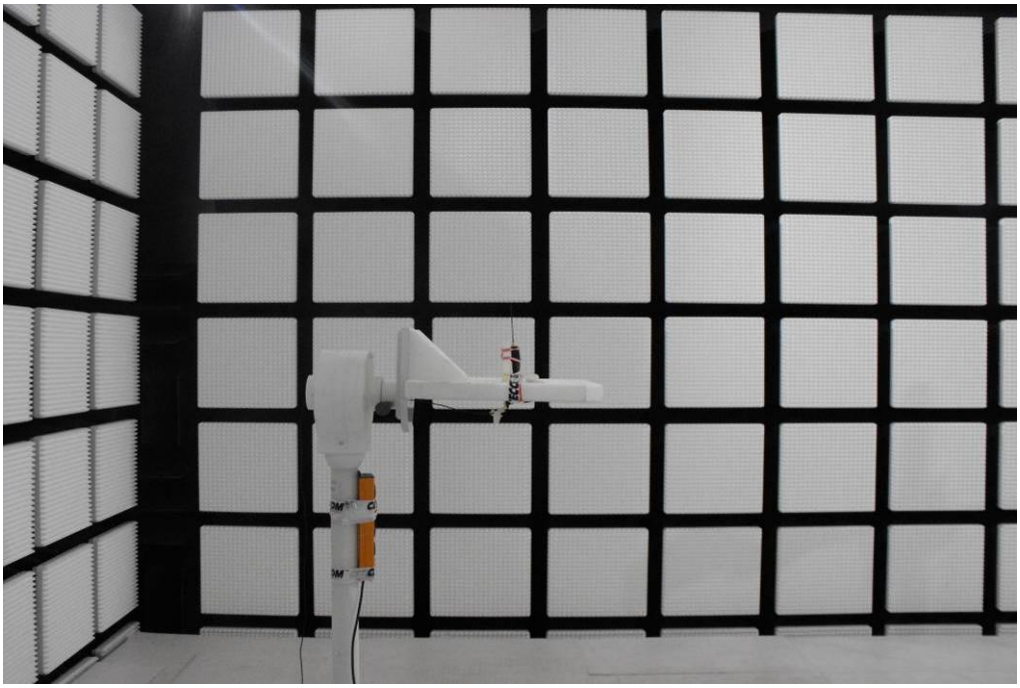


Photo 2:

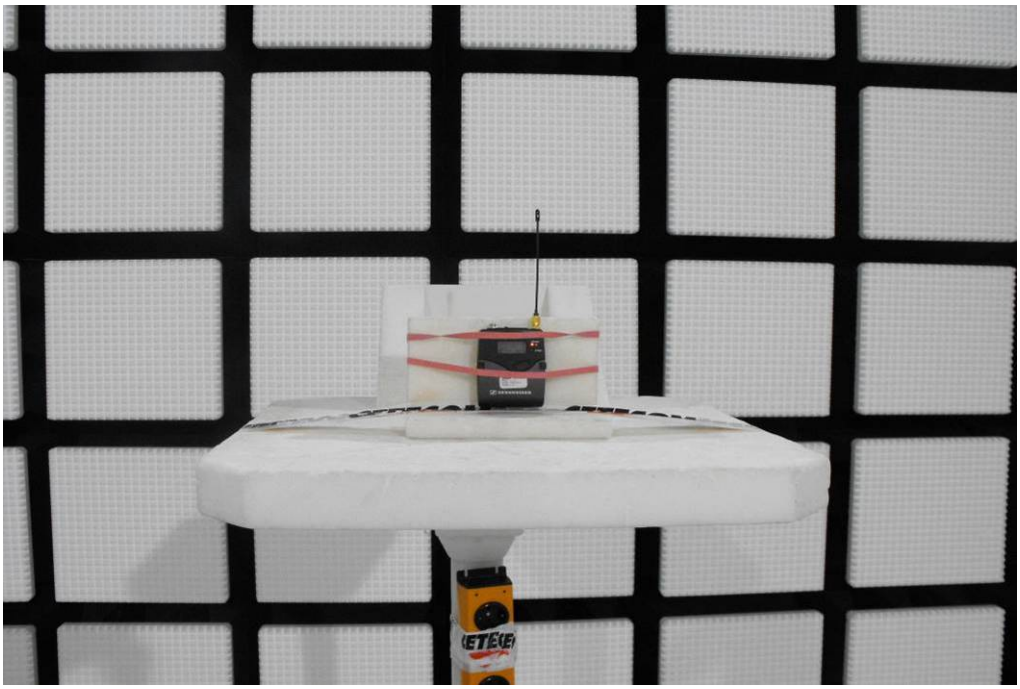


Photo 3:

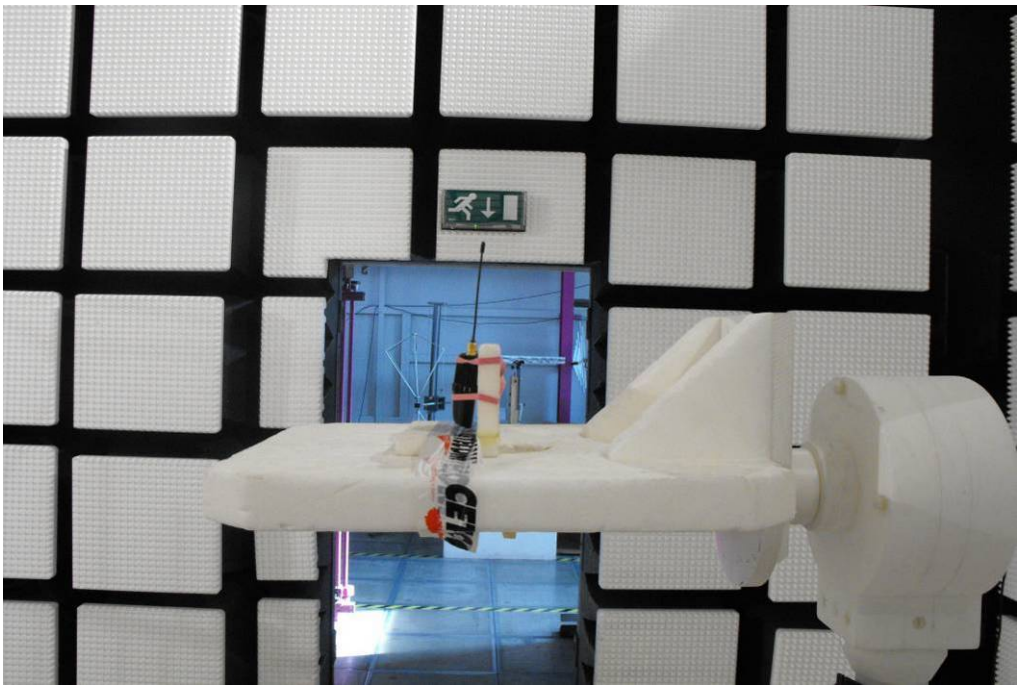


Photo 4:

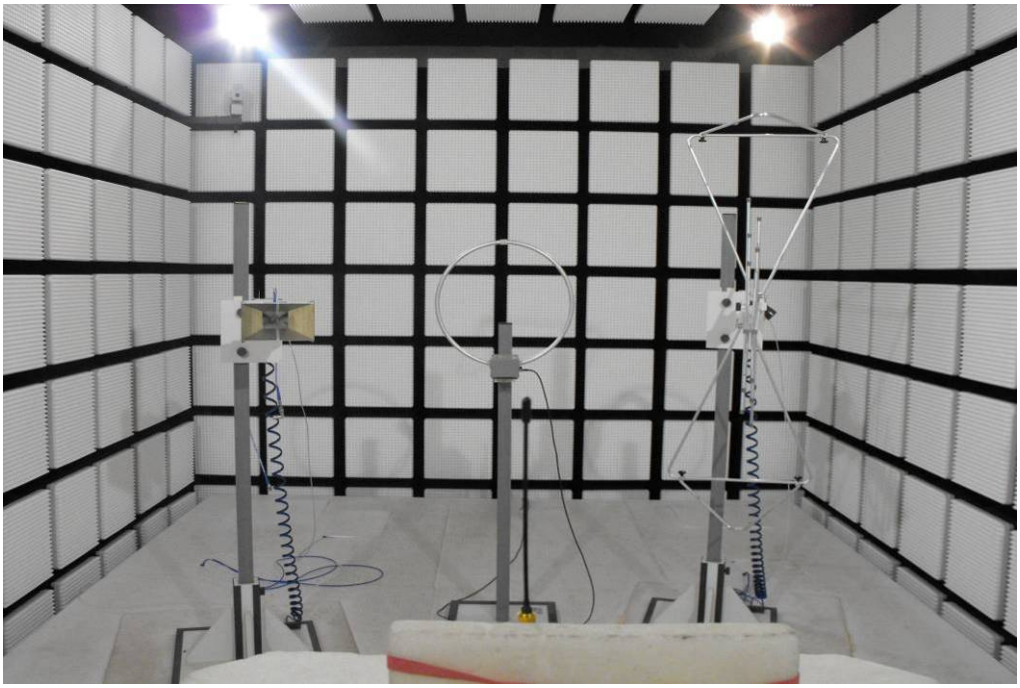
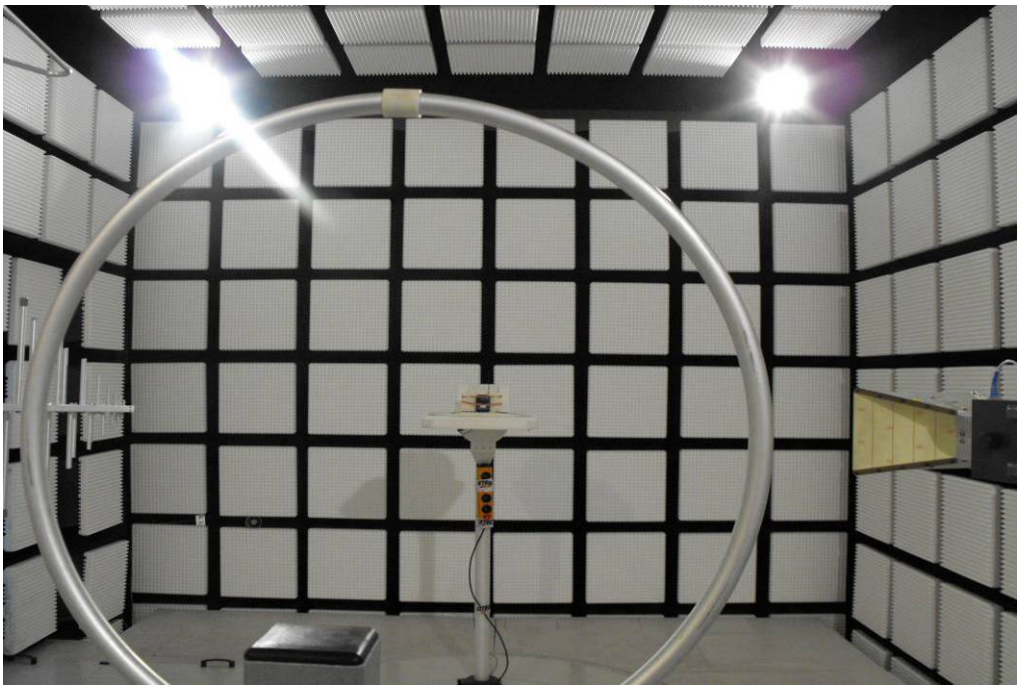


Photo 5:



Annex B External photographs of the EUT

Photo documentation:

Photo 1:

Photo 2:

Photo 3: (AW)

Photo 4: (AW)

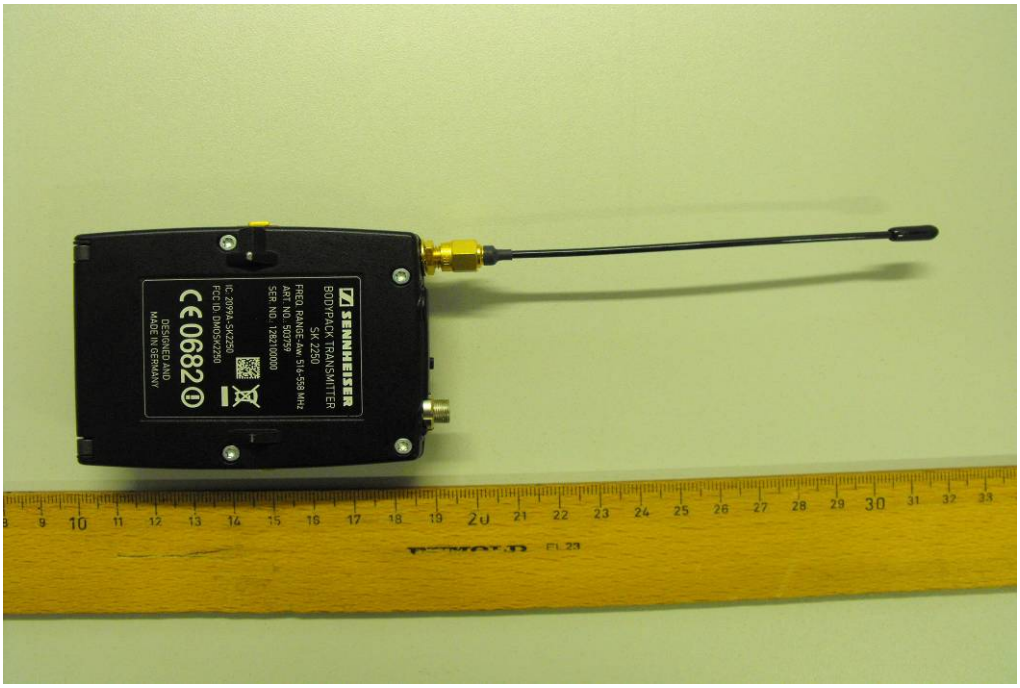


Photo 5: (AW)

Photo 6:

Photo 7:

Photo 8: (Antenna AW)

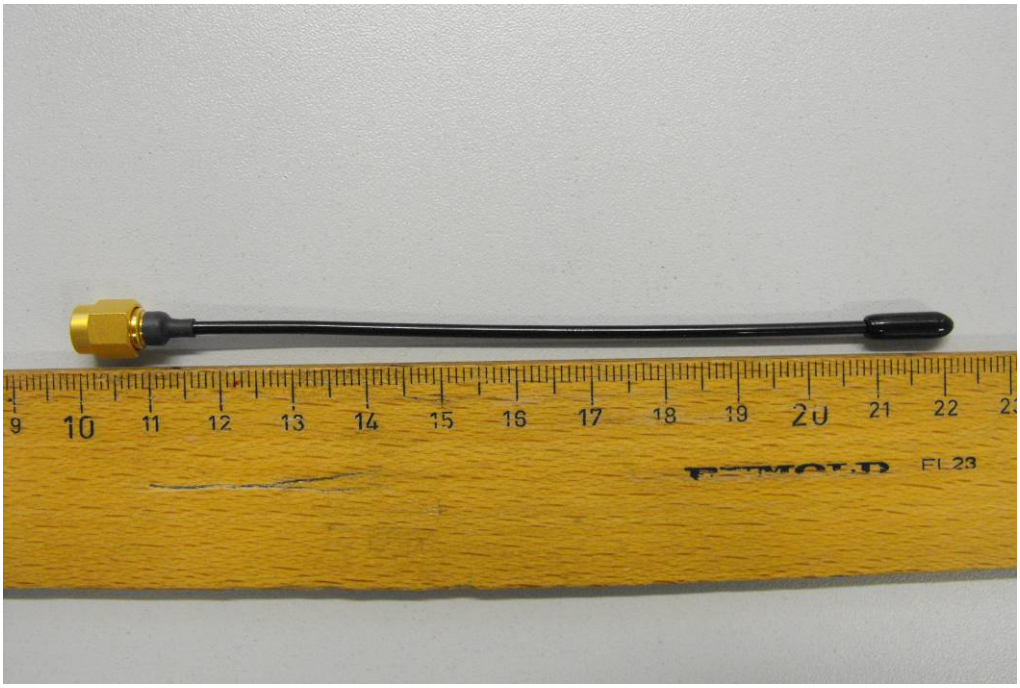


Photo 9: (GW)

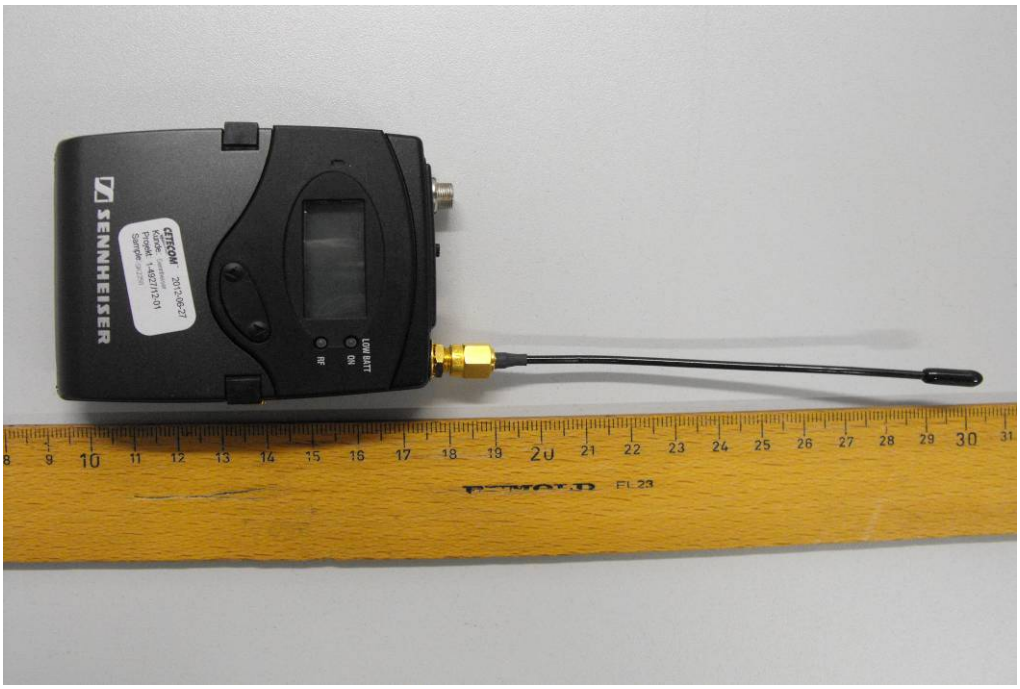


Photo 10: (GW)

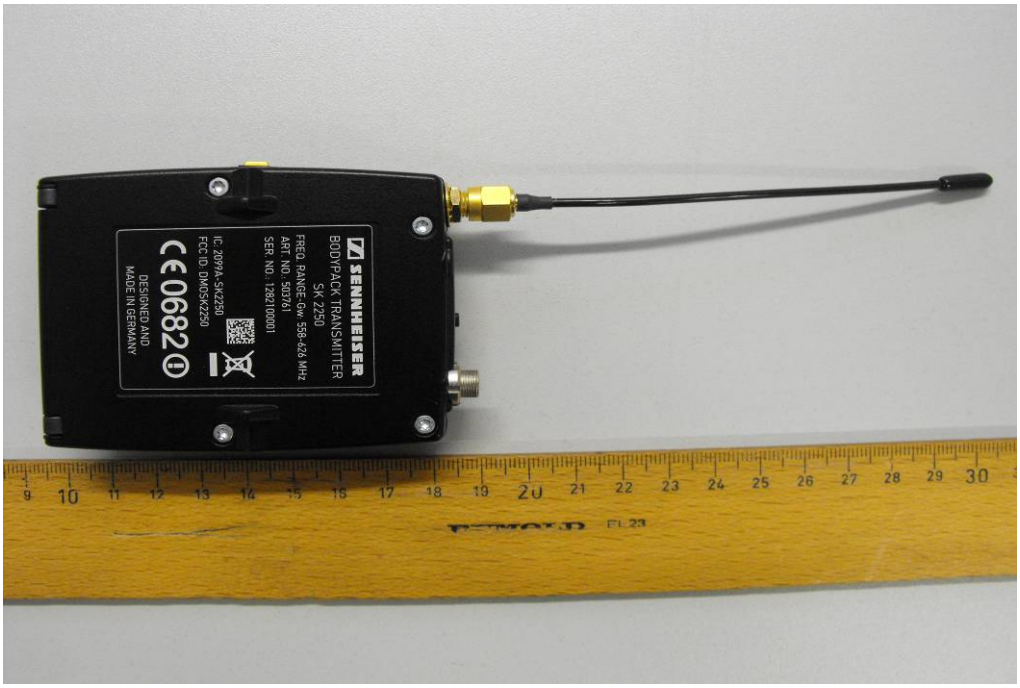


Photo 11: (GW)

Photo 12: (Antenna GW)

Photo 13: (BW)

Photo 14: (BW)

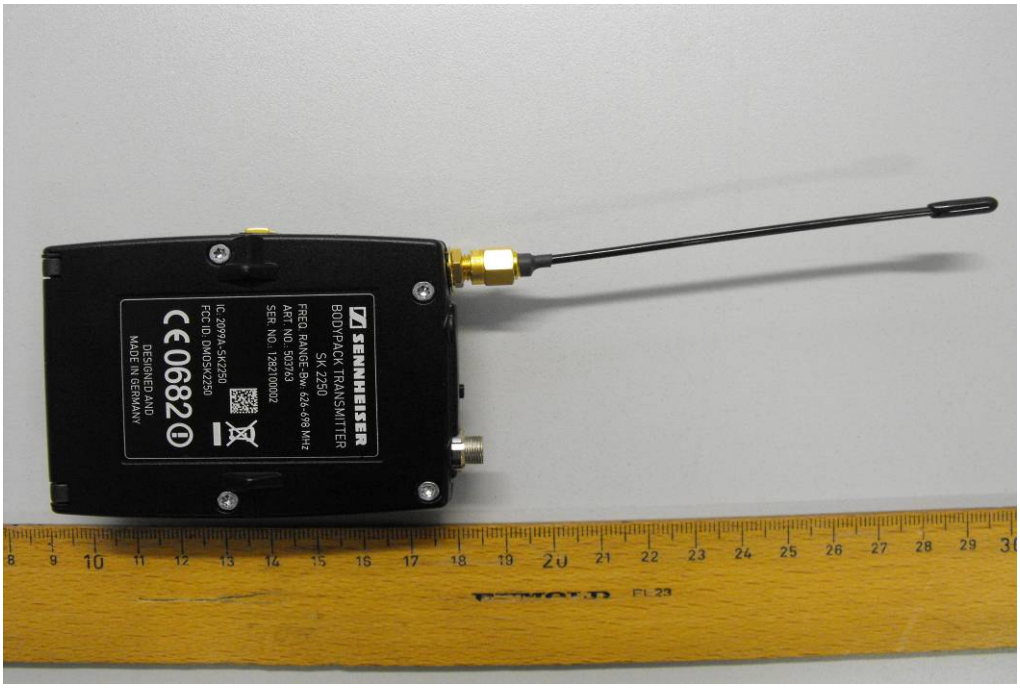
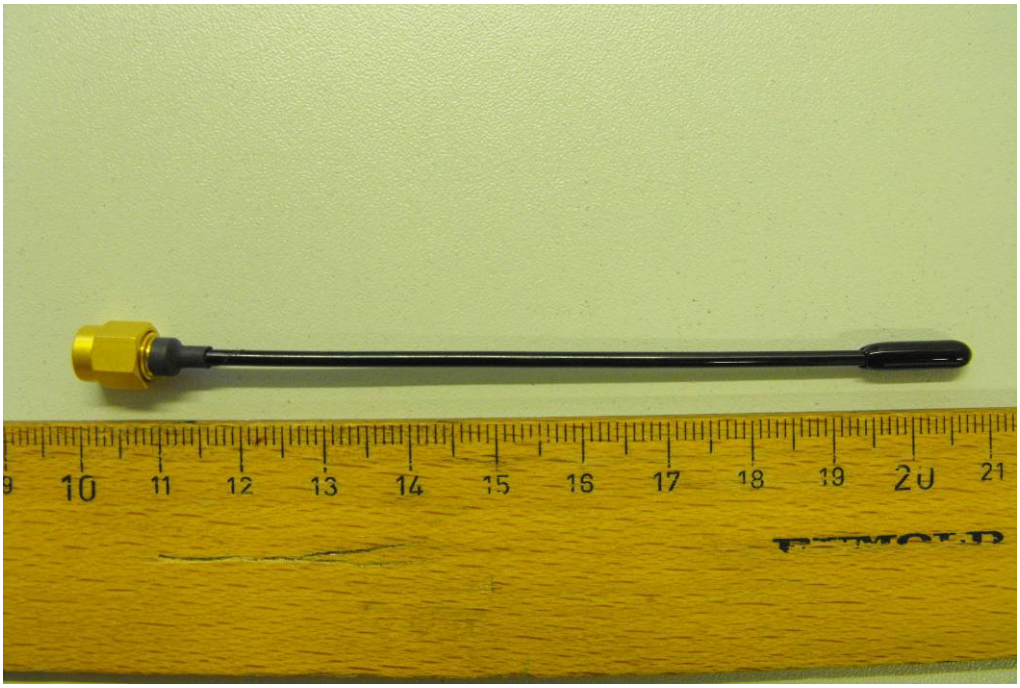


Photo 15: (BW)

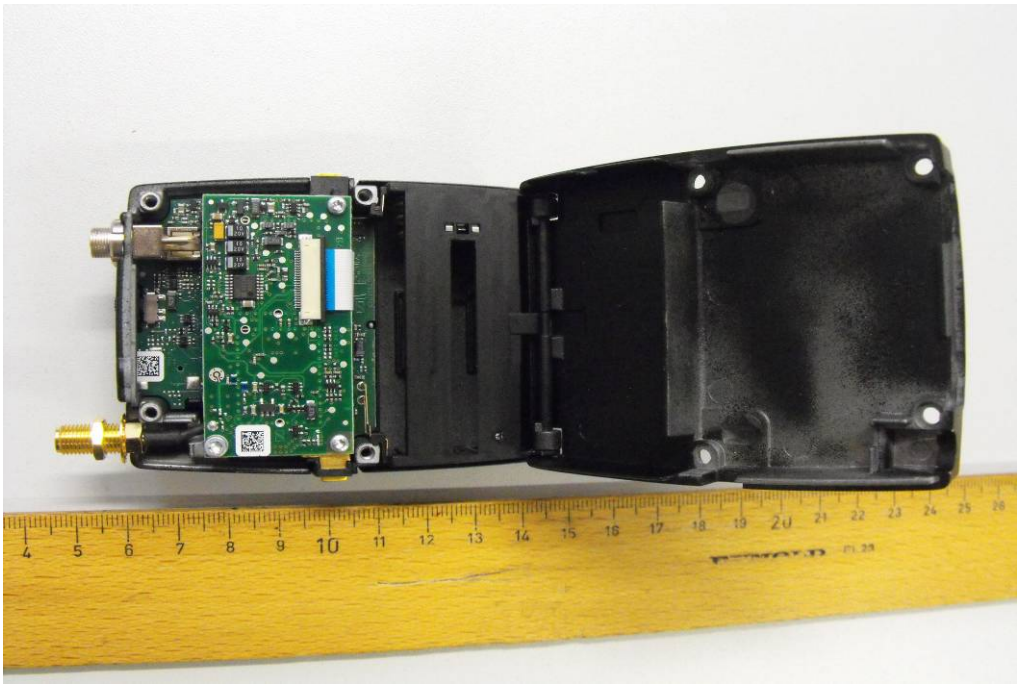
Photo 16: (Antenna BW)



Annex C Internal photographs of the EUT

Photo documentation:

Photo 1:



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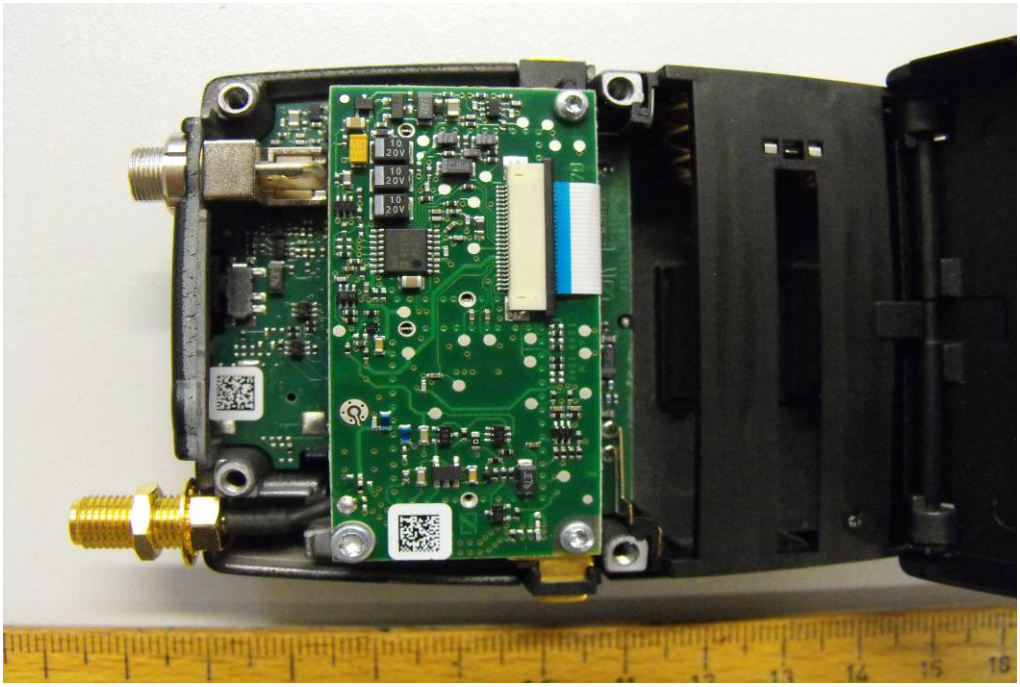

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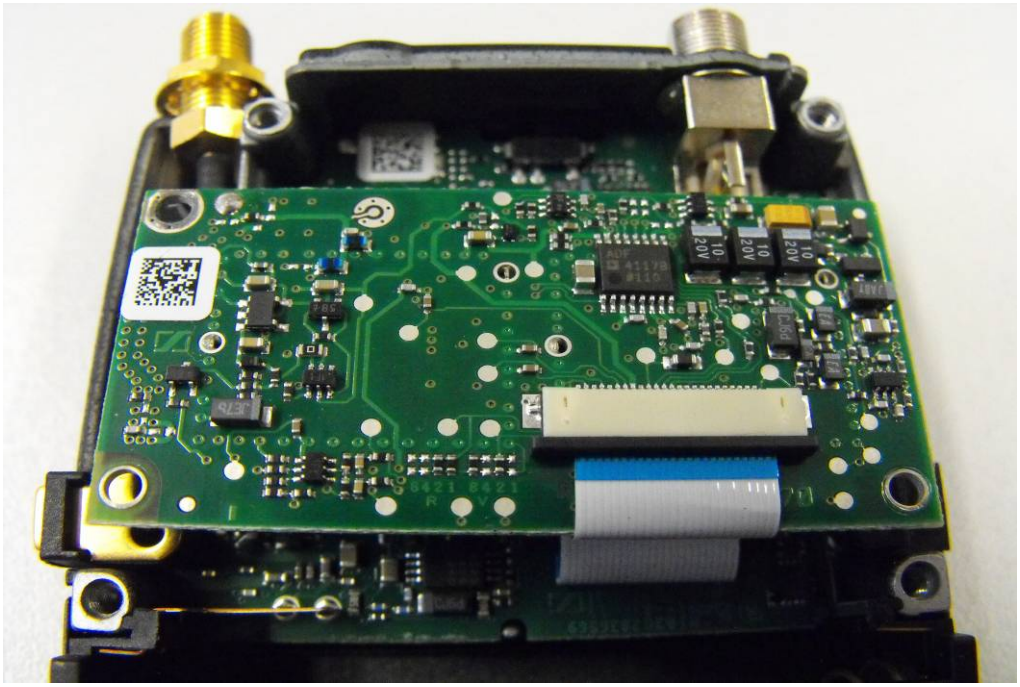

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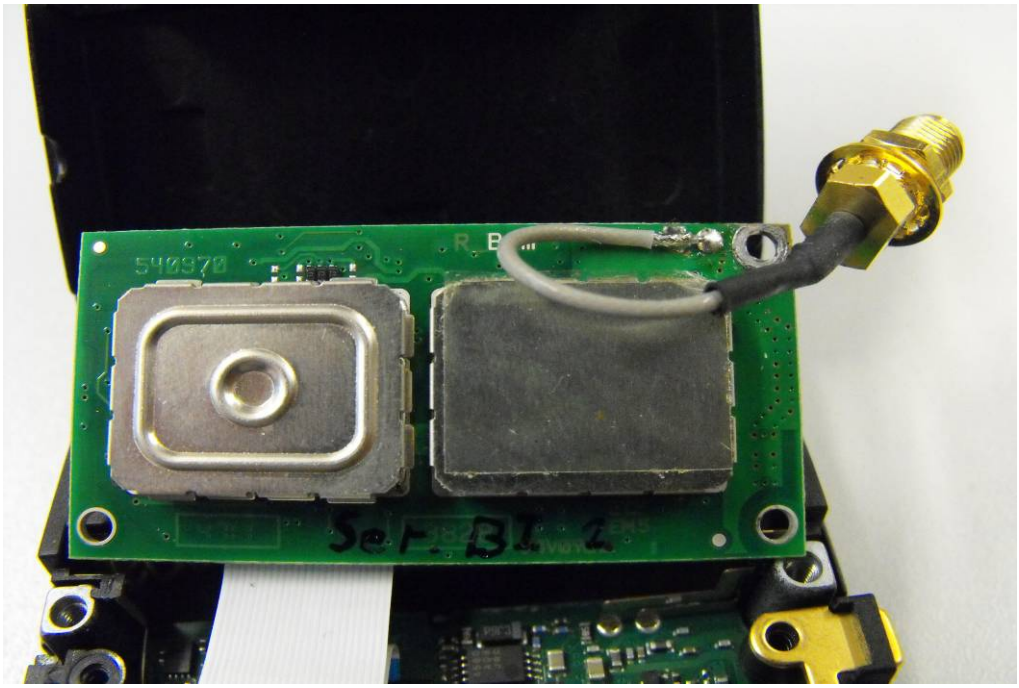

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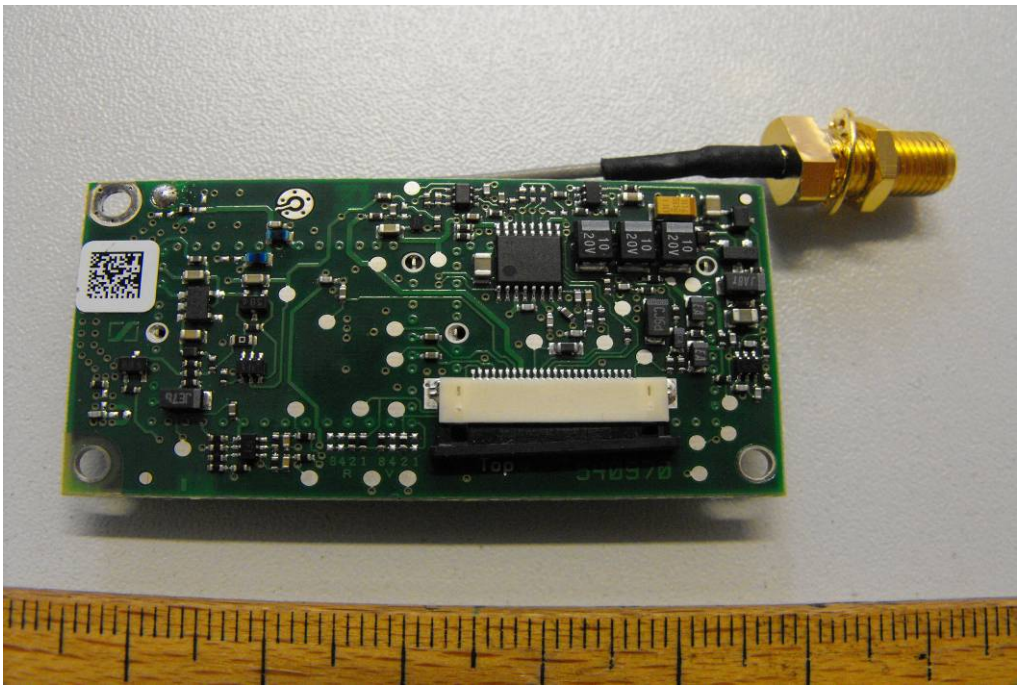

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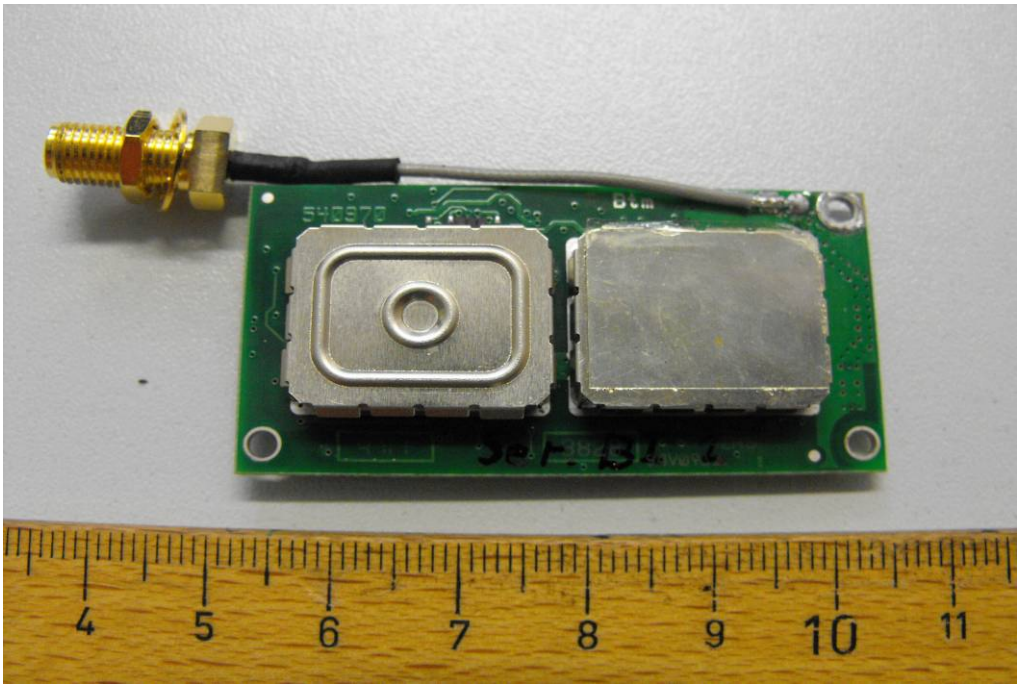

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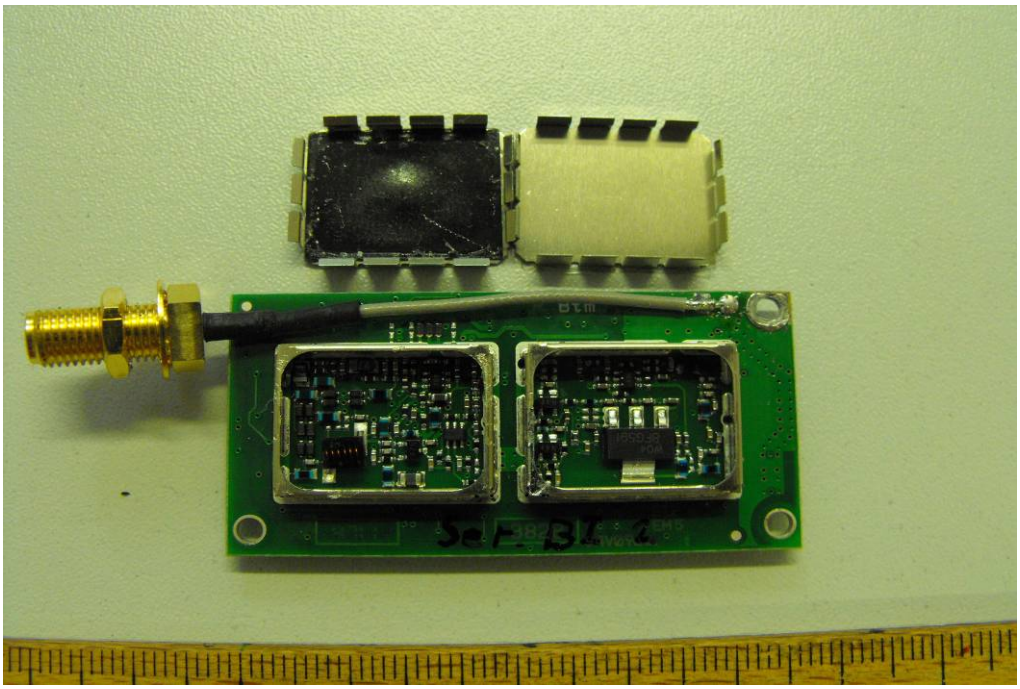

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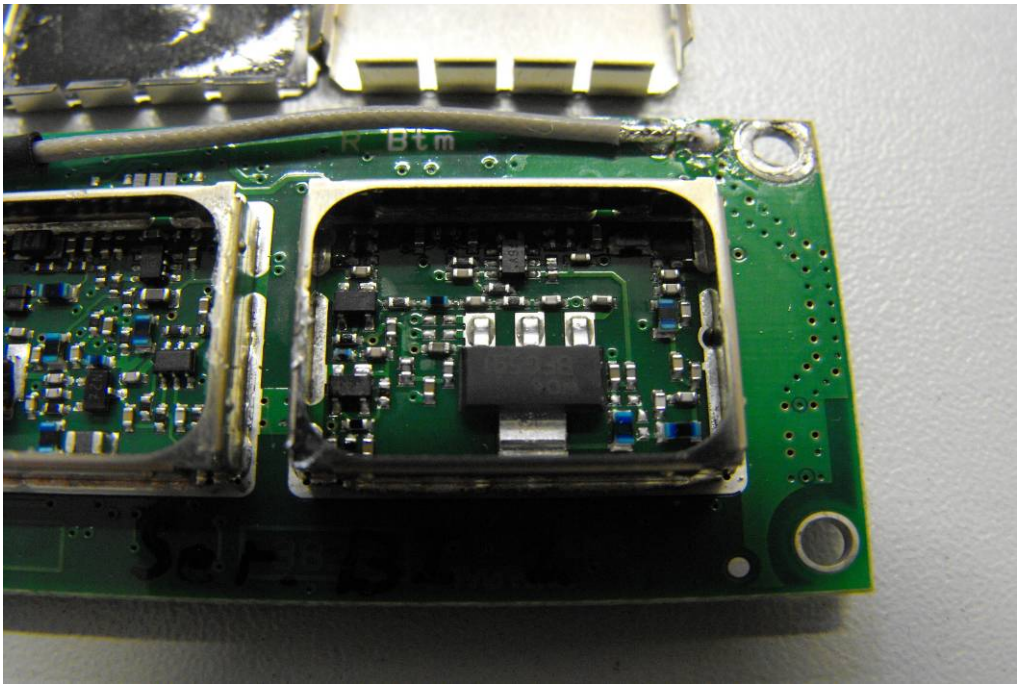

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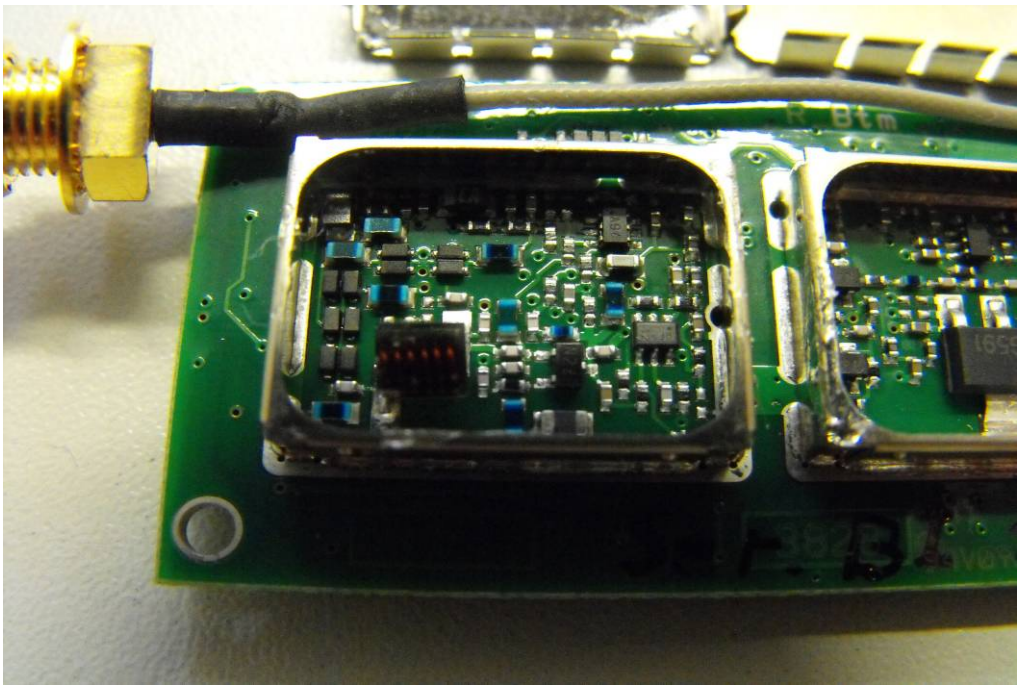

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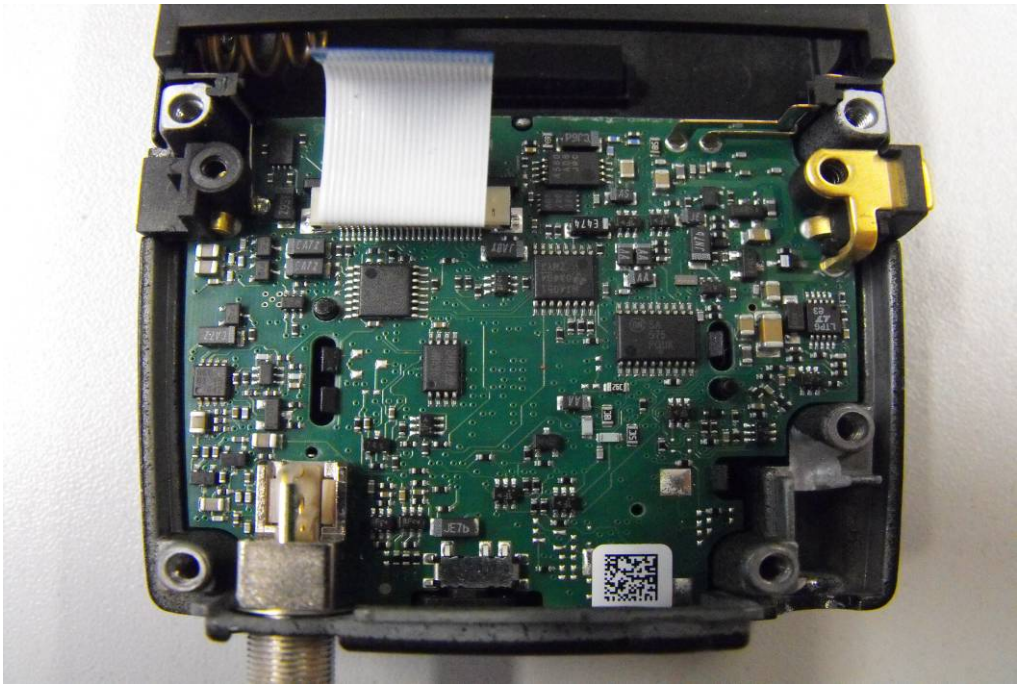

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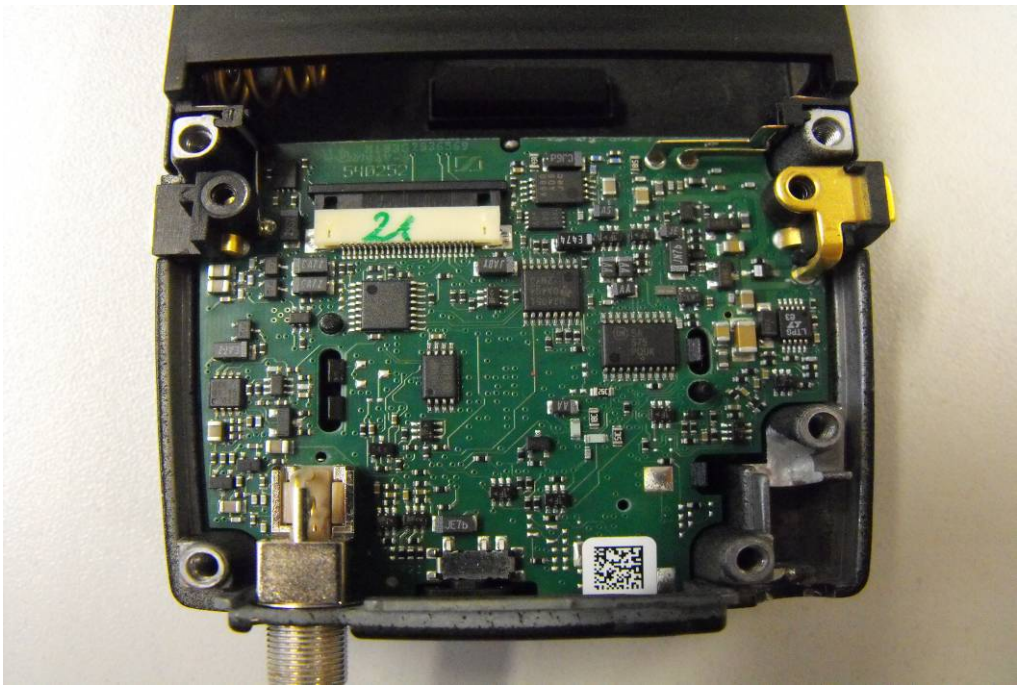

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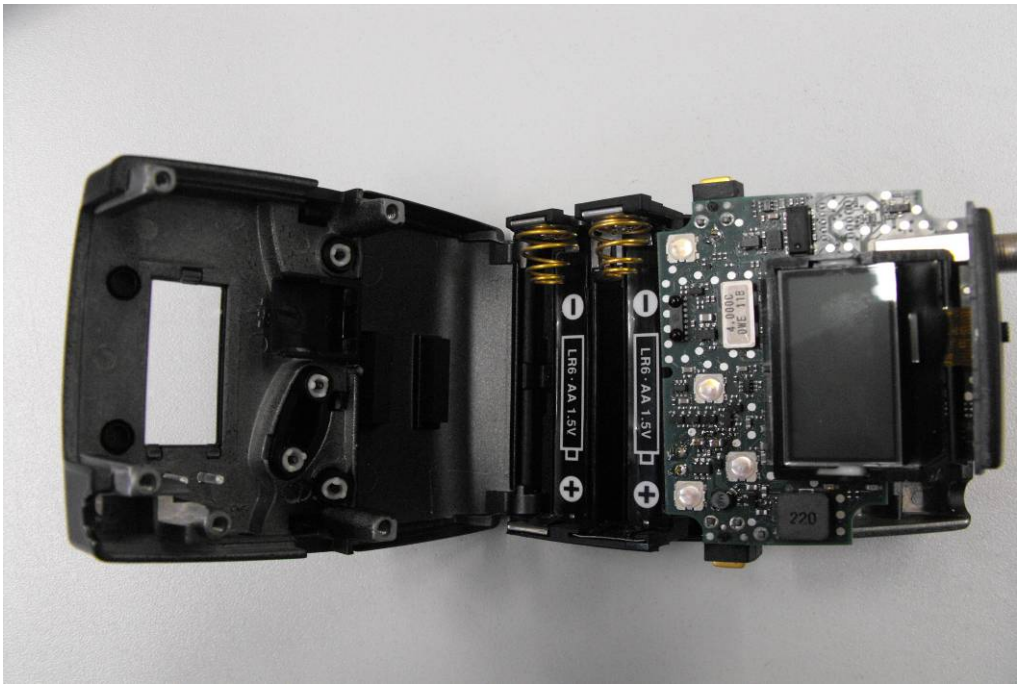

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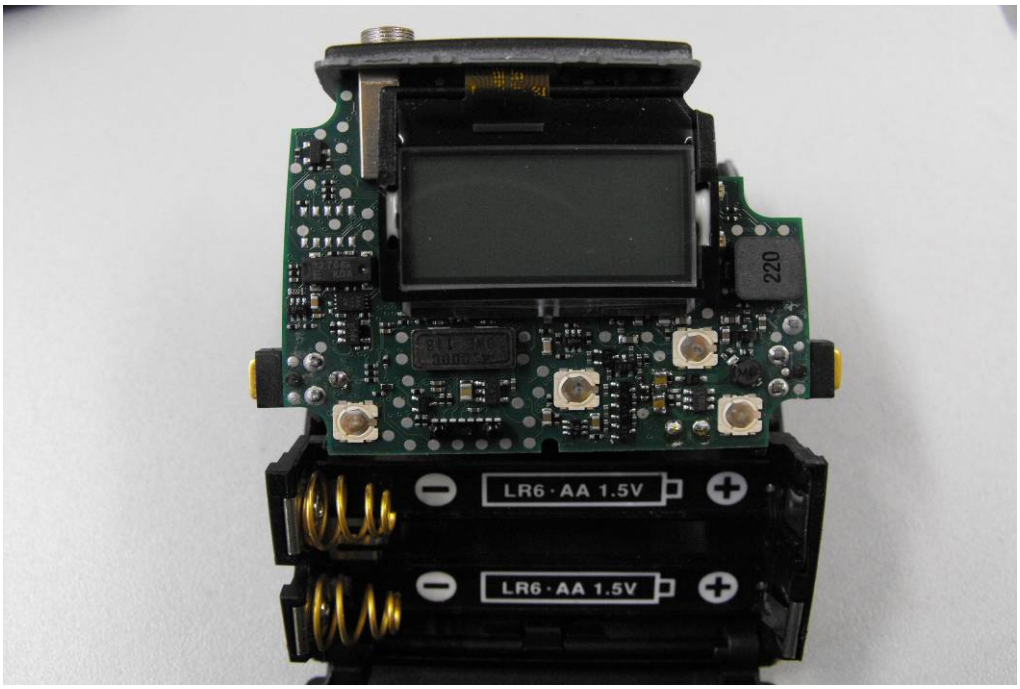

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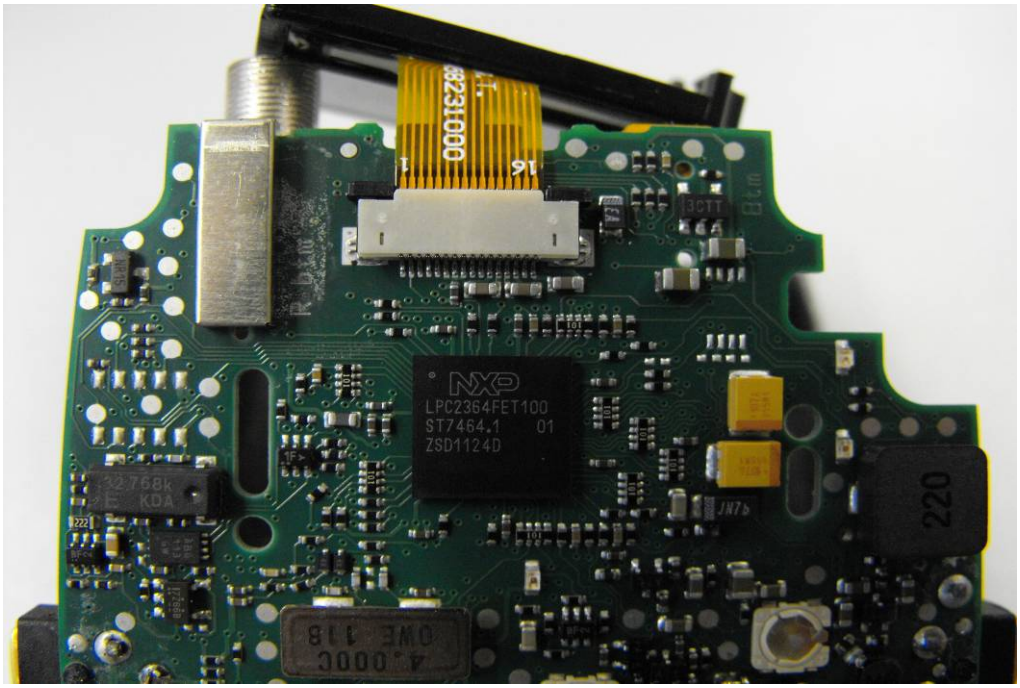

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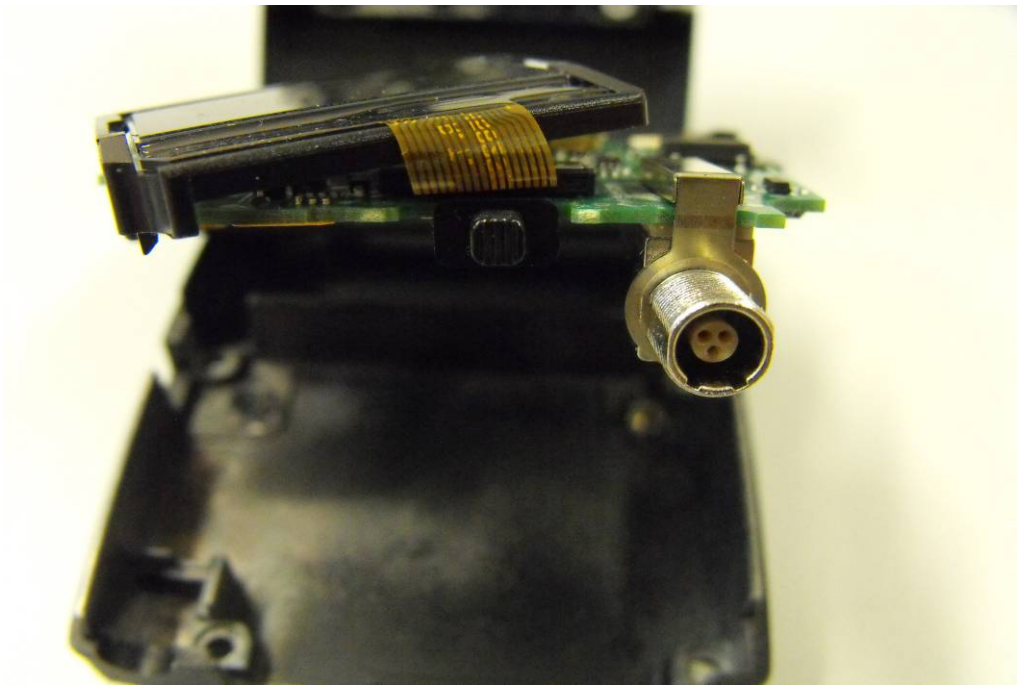

Annex D Document history

Version	Applied changes	Date of release
1.0	Initial release	2012-07-17

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

DAkkS Deutsche Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH
German Accreditation Body

Entrusted according to Section 8 subsection1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV
Signatory to the Multilateral Agreements of
EA, ILAC and IAF for Mutual Recognition

Accreditation

The Deutsche Akkreditierungsstelle GmbH (German Accreditation Body) attests that the testing laboratory

CETECOM ICT Services GmbH
Untertürkheimer Straße 6-10
66117 Saarbrücken

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

Wired communications and DECT
Acoustic
Radio
Shirt Range Devices (SRD)
RFID
WiMax and Richtfunk
Mobile radio (GSM / DCS), Over the Air (OTA) Performance
Electromagnetic Compatibility (EMC) incl. Automotive
Product safety
SAR and Hearing Aid Compatibility (HAC)
Environmental simulation
Smart Card Terminals
Bluetooth
Wi-Fi-Services

The accreditation certificate shall only apply in connection with the notice of accreditation of 13.04.2011 with the accreditation number D-PL-12076-01 and is valid until 03.09.2014. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 82 pages.

Registration number of the certificate: **D-PL-12076-01-01**

Frankfurt am Main, 13.04.2011

Dipl.-Ing. (FH) Horst Egner
Head of Division 2

This document is a translation. The definitive version is the original German accreditation certificate.

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Gartenstraße 6
60594 Frankfurt am Main

Office Braunschweig
Bundesallee 100
38116 Braunschweig

The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkkS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkkS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

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