

RADIO TEST REPORT

No. 1713337STO-002, Ed. 2

RF Performance

EQUIPMENT UNDER TEST

Equipment: Bluetooth Low Energy radio module
Type/Model: BLEM
Manufacturer: Husqvarna AB
Tested by request of: Husqvarna AB

SUMMARY

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

47 CFR Part 15 (2018): Subpart C: Intentional radiators. Section 15.247

47 CFR Part 15 (2018): Subpart B: Unintentional radiators

RSS-GEN Issue 5 (2018): General requirements for compliance of radio apparatus (2018)

RSS-247 Issue 2 (2017): Digital Transmission Systems (DTSSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

For details, see clause 2 – 4.

Date of issue: 2019-10-27

Tested by:


Robert Hietala

Approved by:


Matti Virkki

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Revision History

Edition	Date	Description	Changes
1	2018-04-24	First release	--
2	2019-10-27	Second release	Updated type/model from Volter to BLEM and RSS-GEN issue 4 to RSS-GEN Issue 5.

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1 CLIENT INFORMATION

The EUT has been tested by request of

Company Husqvarna AB
Jons väg 19
433 75 Jonsered
Sweden

Name of contact Tero Borg
Phone +46 31 94 91 65

2 EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment: Bluetooth Low Energy radio module
Type/Model: BLEM
Brand name: Husqvarna
Serial number: INTERTEK01 and INTERTEK02
Manufacturer: Husqvarna AB
Transmitter frequency range: 2400 – 2483,5 MHz
Receiver frequency range: 2400 – 2483,5 MHz
Frequency agile or hopping: ☐ Yes ☒ No
Antenna: ☒ Internal antenna ☐ External antenna
Antenna connector: ☒ None, internal antenna ☐ Yes
Antenna gain: 0 dBi
Rating RF output power: 2.4 dBm (measured conducted)
Type of modulation: GFSK
Temperature range: -30°C to +85°C
Transmitter standby mode supported: ☒ Yes ☐ No

2.2 Additional information about the EUT

The EUT consists of the following units:

Unit	Type	Serial number	Comment
Unit 1	Radio module	INTERTEK01	Integrated antenna
Unit 2	Radio module	INTERTEK02	Fitted with temporary SMA connector

During the tests the EUT supported following software:

Software	Version	Comment
Nordic Semiconductor ASA – nRFgo Studio	1.21.2.10	Used to program the EUT

2.3 Peripheral equipment

Peripheral equipment is equipment needed for correct operation of the EUT, but not included as part of the testing and evaluation of the EUT.

Equipment	Type / Model	Manufacturer	Serial no.
Laptop computer	T440s	Lenovo	--
USB hub	UH-400	i-rocks	010833

2.4 Test signals and operation modes

During all tests the EUT was transmitting a continuous stream of pseudorandom data (PRBS9) with a payload of 37 bytes, with a duty cycle of approximately 66 %.

2.5 Modifications made to improve EMC-characteristics

No modifications have been made during the tests.

3 TEST SPECIFICATIONS

3.1 Standards

Requirements:

47 CFR Part 15 (2017): Subpart C: Intentional radiators. Section 15.247

47 CFR Part 15 (2017): Subpart B: Unintentional radiators

RSS-GEN Issue 5 (2018): General requirements for compliance of radio apparatus (2018).

RSS-247 Issue 2 (2017): Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

Test methods:

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

3.2 Additions, deviations and exclusions from standards and accreditation

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

3.3 Test site

Measurements were performed at:

Intertek Semko AB
Torshamnsgatan 43
Box 1103
SE-164 22 Kista

Intertek Semko AB is an FCC listed test site with site registration number 90913.

Intertek Semko AB is an FCC accredited conformity assessment body with designation number SE0002.

Intertek Semko AB is an Industry Canada listed test facility with IC assigned code 2042G.

Intertek Semko AB is an ISED recognized wireless testing laboratory with CAB identifier SE0003.

Measurement chambers

Measurement Chamber	Type of chamber	IC Site filing #
BJÖRKHALLEN	Semi-anechoic 3 m	2042G-1
Radiohallen	Fully-anechoic 3 m	2042G-4

4 TEST SUMMARY

The results in this report apply only to sample tested:

Requirement	Description	Result
FCC §15.203 RSS-GEN 8.3	Antenna requirement	PASS
	The EUT has integrated non detachable antenna which can't be removed without breaking the EUT.	
FCC §15.207, 15.107 RSS-GEN 8.8 table 3	Conducted continuous emission in the frequency range 150 kHz to 30 MHz, AC Power input port	PASS
	The margin to the limit was at least 10 dB.	
FCC §15.247 (b)(4) RSS-247 5.4(4), 5.4(5)	Field strength of fundamental and antenna gain	PASS
	The EUT complies with the limits. Antenna gain is less than 6 dBi.	
FCC §15.247 (d), 15.209(a) RSS-GEN 8.9 RSS-247 5.5	Radiated emission of electromagnetic fields in the frequency range 30 – 1000 MHz	PASS
	The EUT complies with the limits. The margin to the limit was at least 6.6 dB at 31.864 MHz. See clause 6.4 – 6.5.	
FCC §15.247(d), 15.209(a) RSS-GEN 8.9 RSS-247 5.5	Radiated emission of electromagnetic fields in the frequency range above 1 GHz	PASS
	The EUT complies with the limits. The margin to the limit was at least 5.1 dB at 4878.0 MHz. See clause 6.6 – 6.7.	
FCC §15.247(a)(2) RSS-GEN 6.7 RSS-247 5.2(1)	Occupied bandwidth	PASS
	The EUT complies with the limits. The margin to the limit is at least 242.6 kHz See clause 9.4.	
FCC §15.247(b) RSS-247 5.4(4)	Conducted output power	PASS
	The EUT complies with the limits. The margin to the limit was at least 10 dB. See clause 8.4.	
FCC §15.247(e) RSS-247 5.2(2)	Peak power spectral density	PASS
	The EUT complies with the limits. The margin to the limit was at least 10 dB. See clause 11.4.	
FCC §15.247(e) RSS-247 5.5	Band edge	PASS
	The EUT complies with the limits. The margin to the limit was at least 10 dB. See clause 7.4.	

5 CONDUCTED CONTINUOUS DISTURBANCES IN THE FREQUENCY-RANGE 0.15 TO 30 MHZ

Date of test:	2018-04-23	Test location:	BUR 1
EUT Serial:	INTERTEK01	Ambient temp:	23 °C
Tested by:	Robert Hietala	Relative humidity:	23 %
Test result:	Pass	Margin:	> 10 dB

5.1 Test set-up and test procedure

The test method is in accordance with ANSI C63.10-2013 section 6.2.

The EUT was connected to the power via Artificial Mains Networks AMN.

The EUT was placed on an insulating support 0.8 m above the floor, 0.4 m from the vertical reference ground plane (RGP) and 0.8 m from the AMN/ISN.

During the test the EUT was in TX mode on high channel.

5.2 Requirement

Limits for conducted emission from AC mains

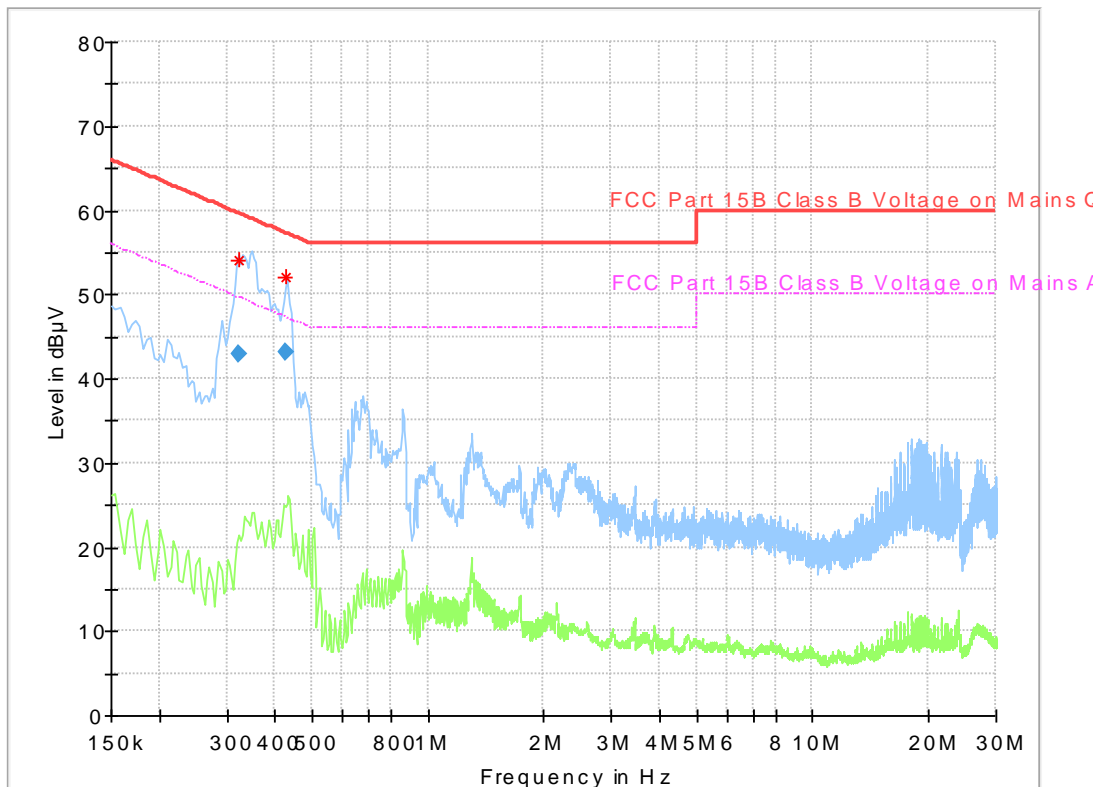
The EUT shall meet the limits for the standards.

Reference: 47 CFR §15.207

RSS-GEN, section 8.8 table 4

Frequency range [MHz]	Limits [dBμV]	
	Quasi-Peak	Average
0.15 – 0.50	66 – 56	56 – 46
0.50 – 5.00	56	46
5.00 – 30.0	60	50

5.3 Test results



Diagram, Peak and Average overview sweep

Measurement results, Quasi-peak

Frequency [MHz]	Level [dBµV]	Limit [dBµV]	Line L/N	Margin [dB]
0,321	43,0	59,7	N	16,7
0,429	43,1	57,3	N	14,1

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

All other measured disturbances have a margin of more than 20 dB to the limits.

6 RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHz TO 26.5 GHz

Date of test:	2018-04-19	Test location:	Björkhallen, Radiohallen
EUT Serial:	INTERTEK01	Ambient temp:	21 °C
Tested by:	Robert Hietala	Relative humidity:	13 %
Test result:	Pass	Margin:	5.1 dB

6.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2013.

The EUT was set up in order to emit maximum disturbances.

30 – 1000 MHz: The EUT was placed on an insulating support 0.8 m above the turntable which is part of the reference ground plane.

1 – 26.5 GHz: The EUT was placed 1.5 m above the floor on a positioner which allows the EUT to rotate freely around its X and Y axis.

Overview sweeps were performed with the measurement receiver in max-hold mode and the peak detector activated in the frequency-range 30 – 1000 MHz. Above 1 GHz additionally the average detector was activated.

6.2 Test conditions

Test set-up:

Test receiver set-up:

Preview test:

Final test:

EUT height above ground plane:

Measuring distance:

Measuring angle:

Antenna

Height above ground plane:

Polarisation:

Type:

30 MHz to 1000 MHz

Peak, RBW 120 kHz VBW 1 MHz

Quasi-Peak, RBW 120 kHz VBW 1 MHz

0.8 m

3 m

0 – 359°

1 – 4 m

Vertical and Horizontal

Bilog

Test set-up:

Test receiver set-up:

Preview test:

Final test:

EUT height above ground plane:

Measuring distance:

Measuring angle:

Antenna

Height above ground plane:

Polarisation:

Type:

Antenna tilt:

1 GHz – 26.5 GHz

Peak, RBW 1 MHz VBW 3 MHz

Average, RBW 1 MHz VBW 3 MHz

Peak, RBW 1 MHz VBW 3 MHz

Average RBW 1 MHz VBW 3 MHz

1.5 m

3 m

0 – 359°

1 – 4 m

Vertical and Horizontal

Horn

The EUT is rotated around its axis as described in ANSI C63.10 (2013) clause 6.6.5.

6.3 Requirements

Within restricted bands and receive mode:

Reference: CFR 47 §15.209, §15.109, RSS-Gen section 8.9

Field strength of emissions must comply with limits shown in table below

Frequency range [MHz]	Field strength at 3 m (dB μ V/m)	Field strength at 10 m (dB μ V/m)	Detector (dB μ V/m)
30 – 88	40.0	29.5	Quasi Peak
88 – 216	43.5	33.0	Quasi Peak
216 – 960	46.0	35.5	Quasi Peak
960 – 1000	54.0	43.5	Quasi Peak
Above 1000	54.0 / 74.0	43.5 / 63.5	Average / Peak

The values for 10 m measuring distance are calculated by subtracting 10.5 dB from the 3 m limit. (i.e. an extrapolation factor of 20 dB/decade according to CFR 47 §15.31(f)(1))

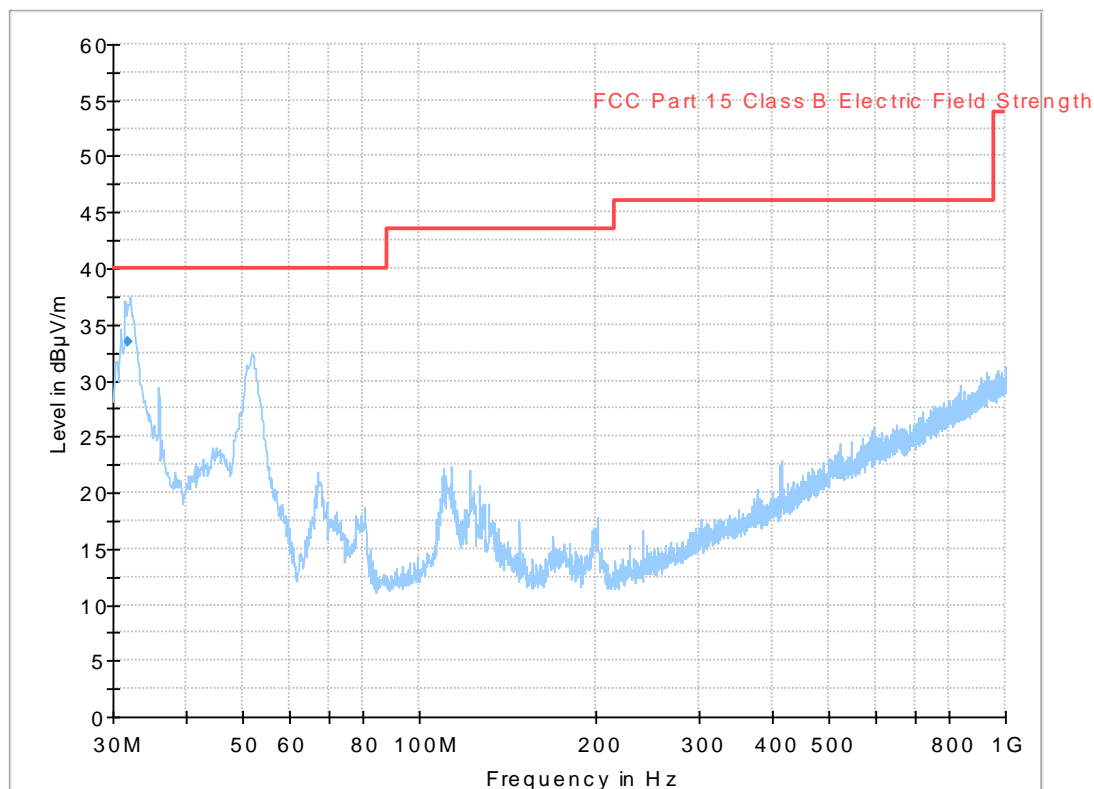
Outside the restricted bands:

Reference: CFR 47 §15.247(d), RSS-247 5.5,

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

6.4 Test results 30 MHz – 1000 MHz, TX

Full Spectrum



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance. TX high channel.

Measurement results, Quasi Peak

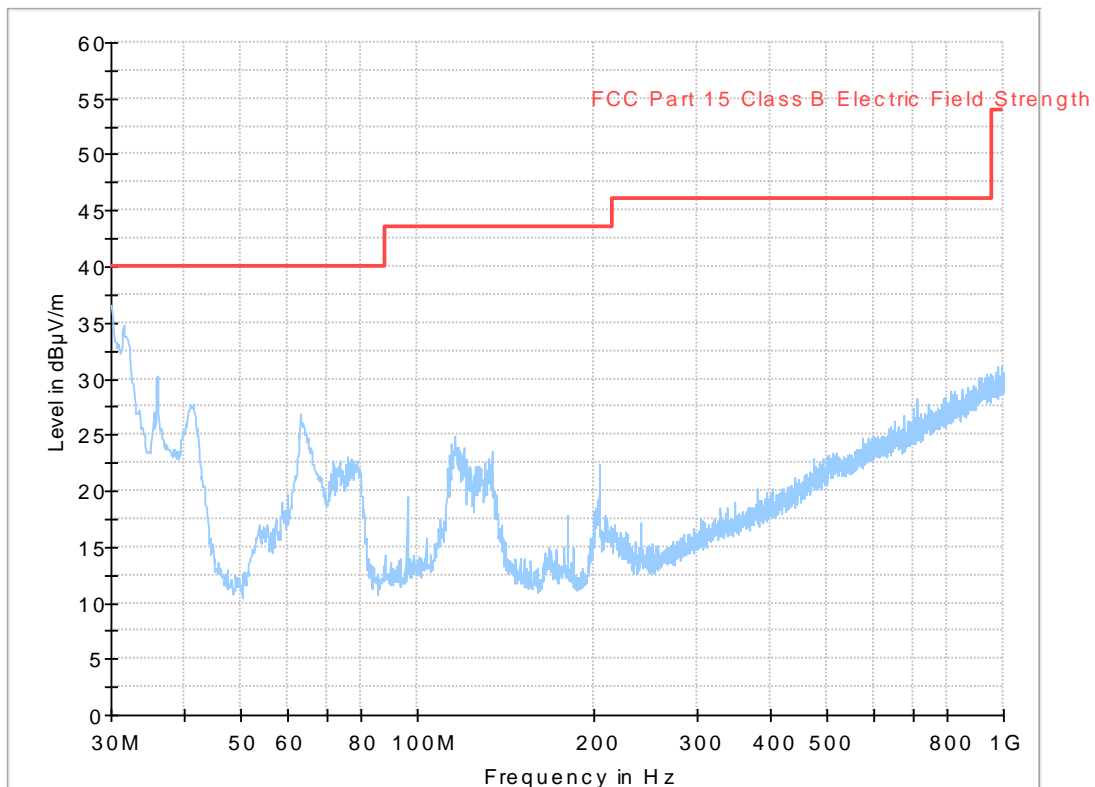
Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Polarization H/V	Margin [dB]
31.864	33.4	40.0	V	6.6

All other measured disturbances have a margin of more than 20 dB to the limits.

Result [dBμV/m] = Analyser reading [dBμV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

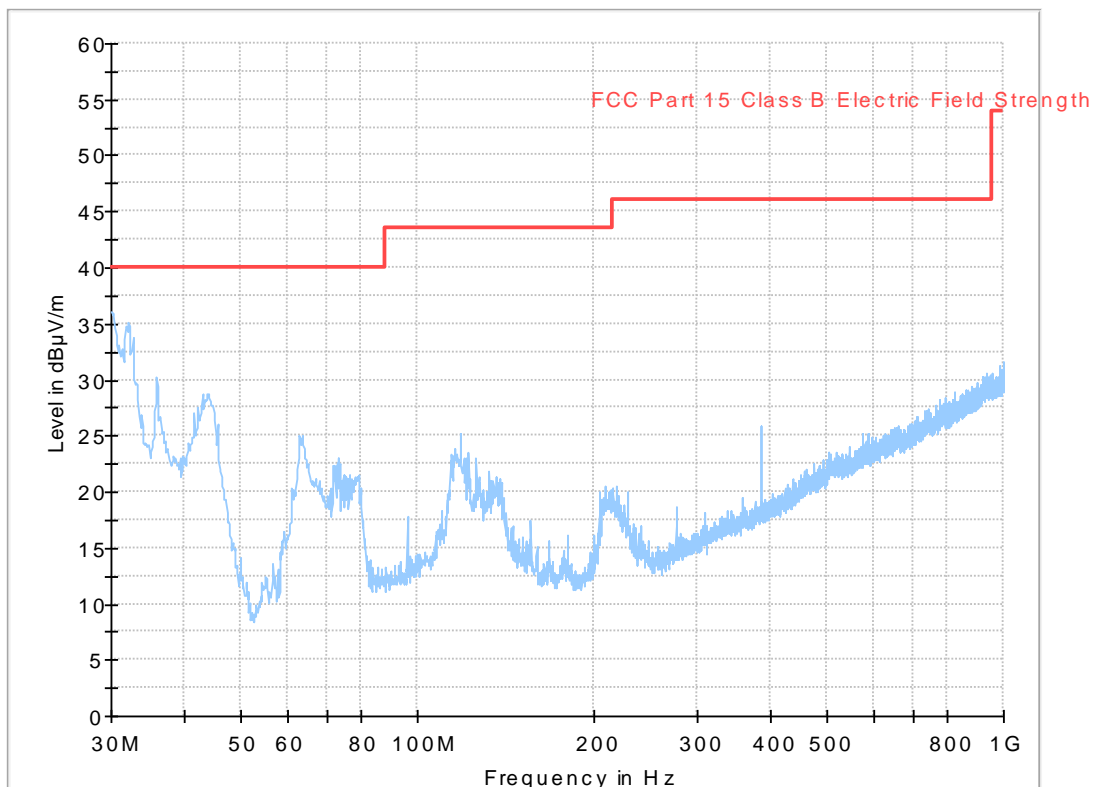
6.5 Test results 30 MHz – 1000 MHz, RX

Full Spectrum



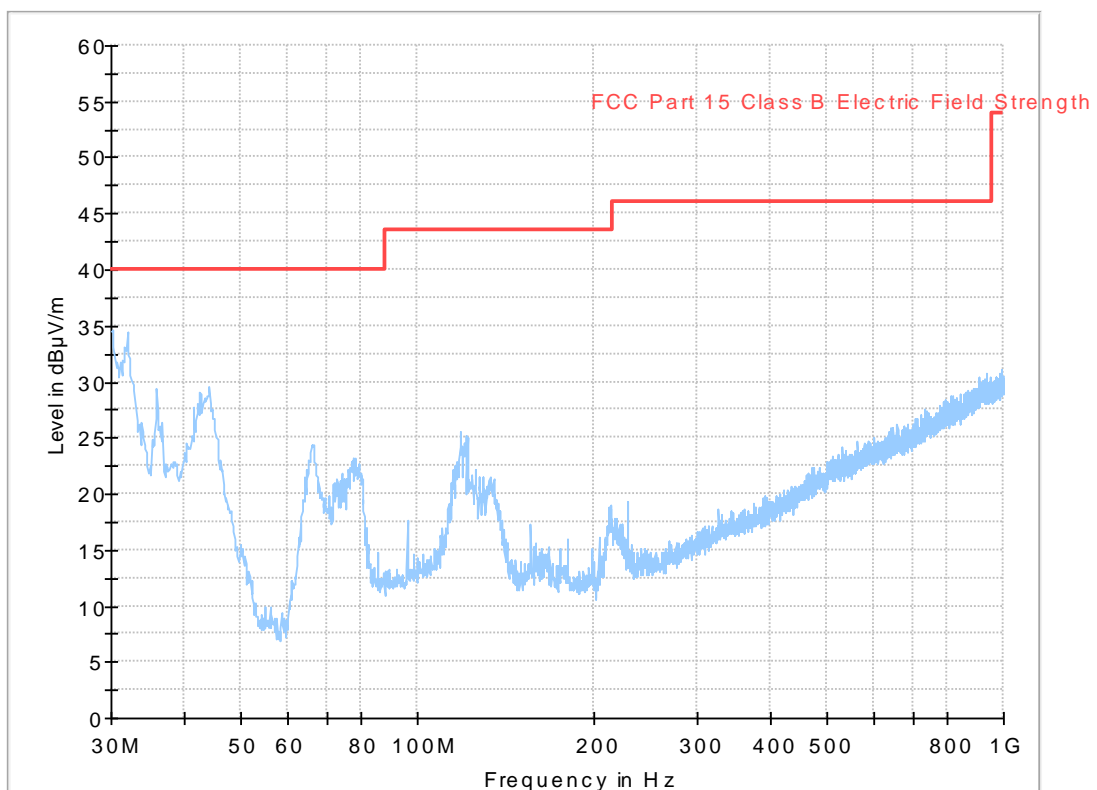
Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance. RX low channel.

Full Spectrum



Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance. RX middle channel.

Full Spectrum

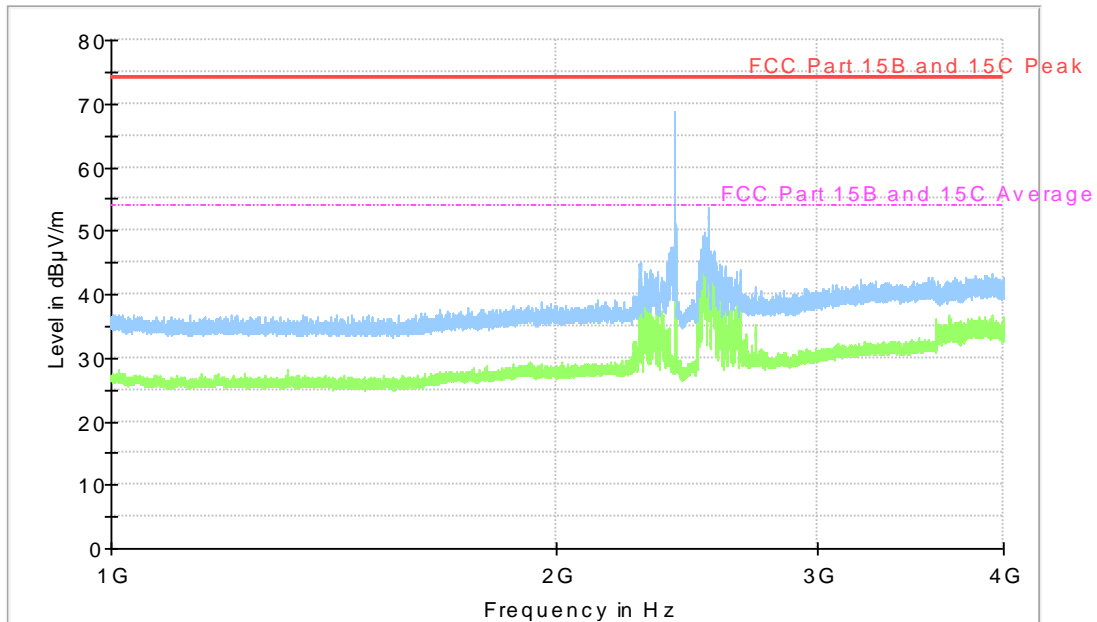


Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance. RX high channel.

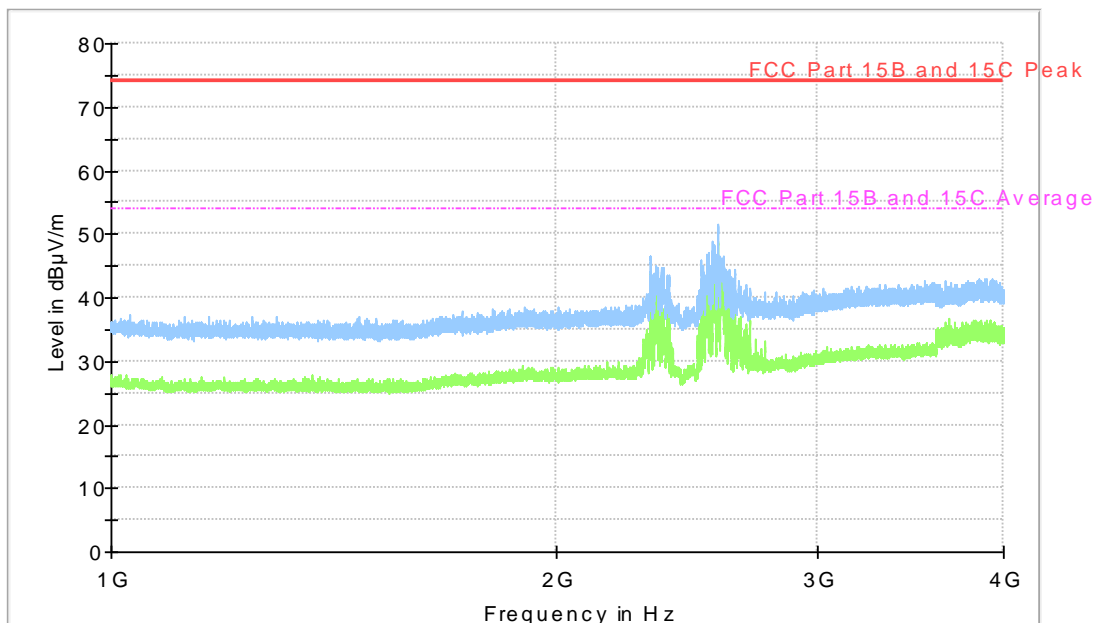
Measurement results, Quasi Peak

No emissions are found above noise floor or closer than 20 dB from limit.

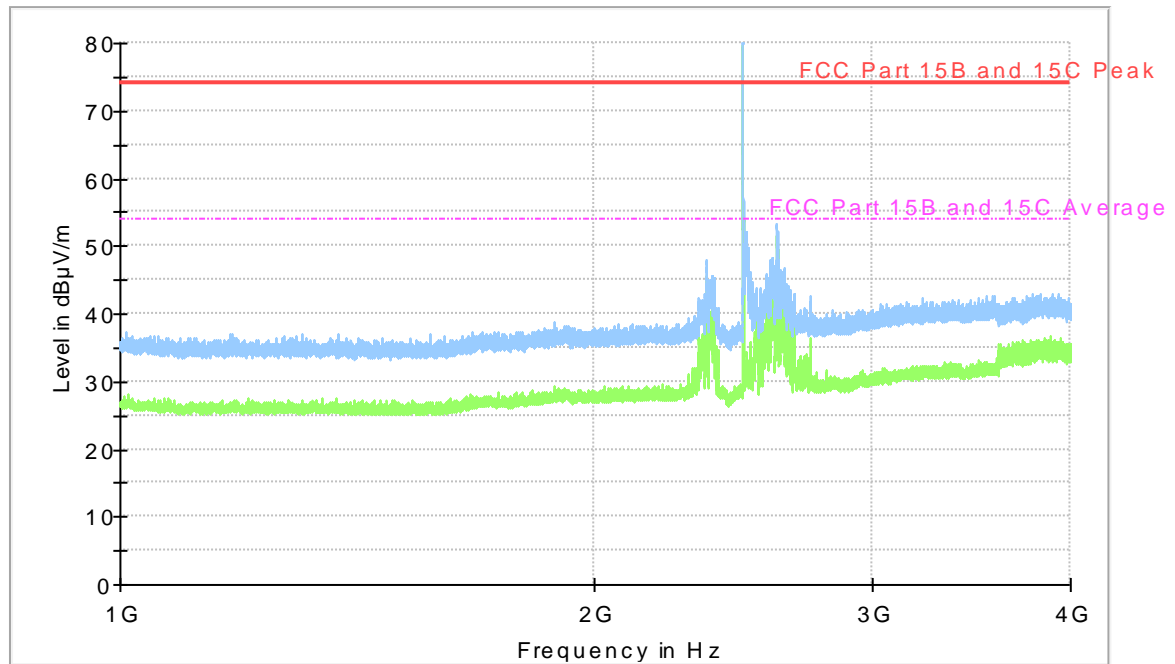
6.6 Test results 1 GHz – 26.5 GHz, TX



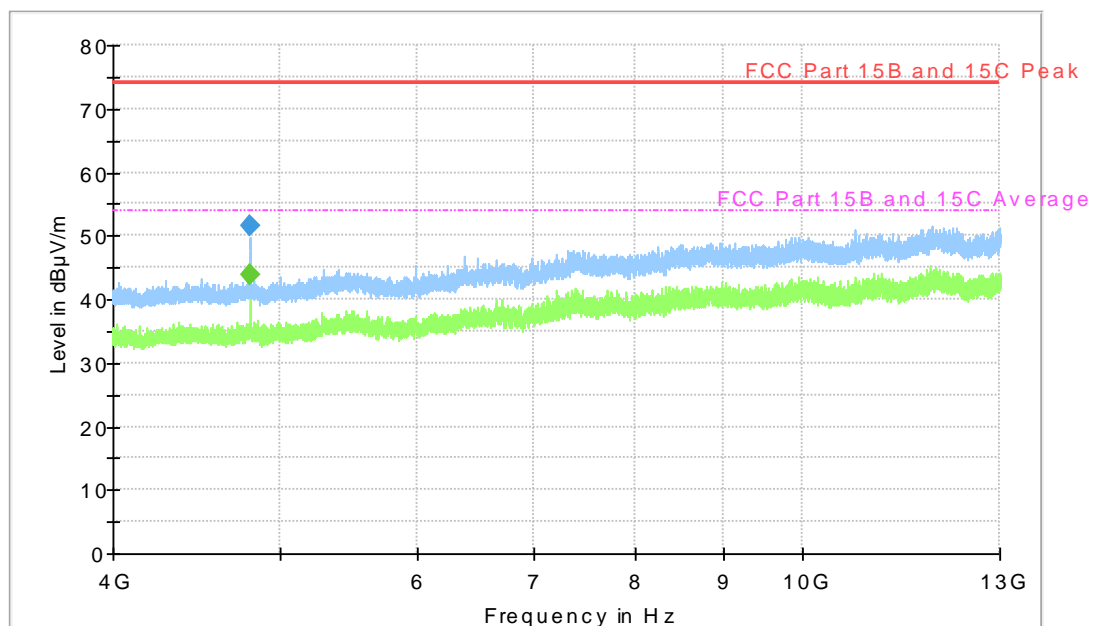
Diagram, Peak overview sweep, 1– 4 GHz at 3 m distance. TX low channel. Carrier is attenuated by band rejection filter K&L 6N45-2450/T 100-0/0.



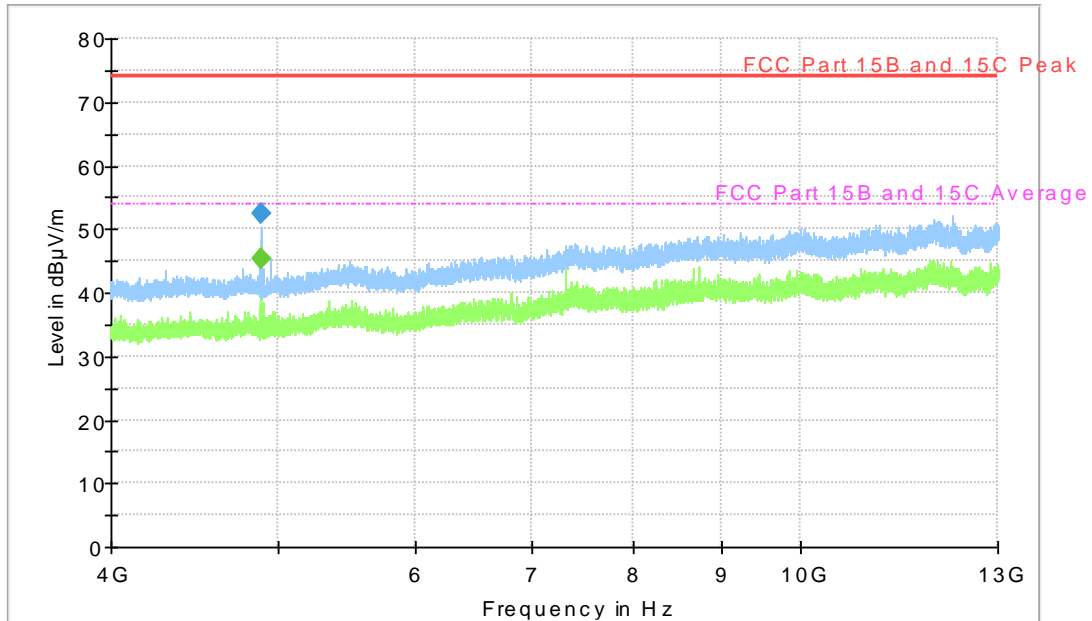
Diagram, Peak overview sweep, 1– 4 GHz at 3 m distance. TX mid channel. Carrier is attenuated by band rejection filter K&L 6N45-2450/T 100-0/0.



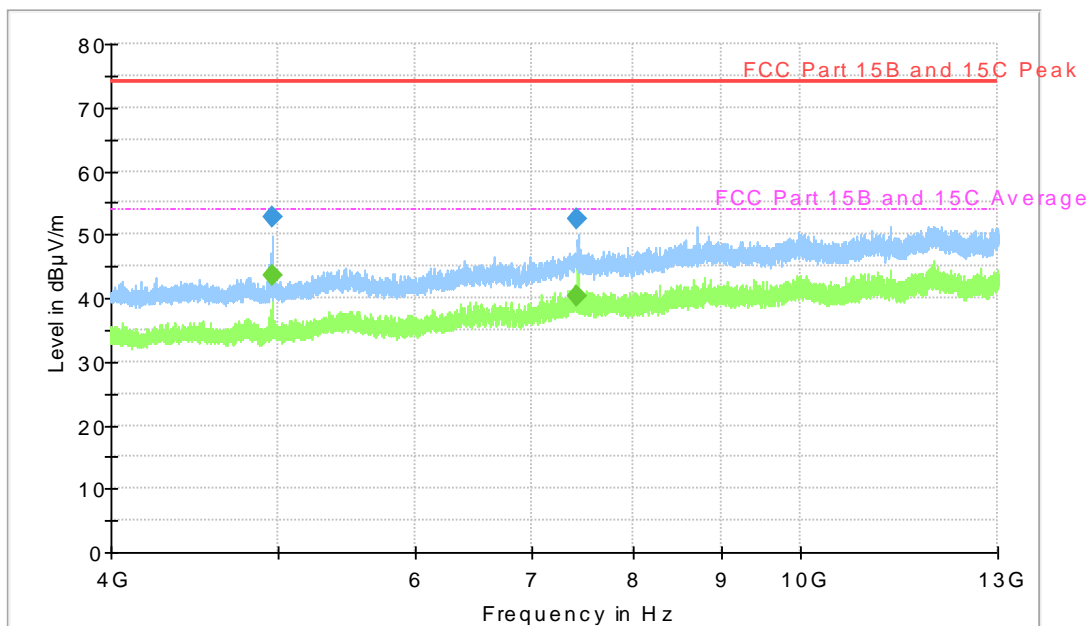
Diagram, Peak overview sweep, 1– 4 GHz at 3 m distance. TX high channel. Carrier is attenuated by band rejection filter K&L 6N45-2450/T 100-0/0.



Diagram, Peak overview sweep, 4– 13 GHz at 3 m distance. TX low channel. Emissions below 4000 MHz are attenuated by high-pass filter K&L 4410-X4500/18000-0.

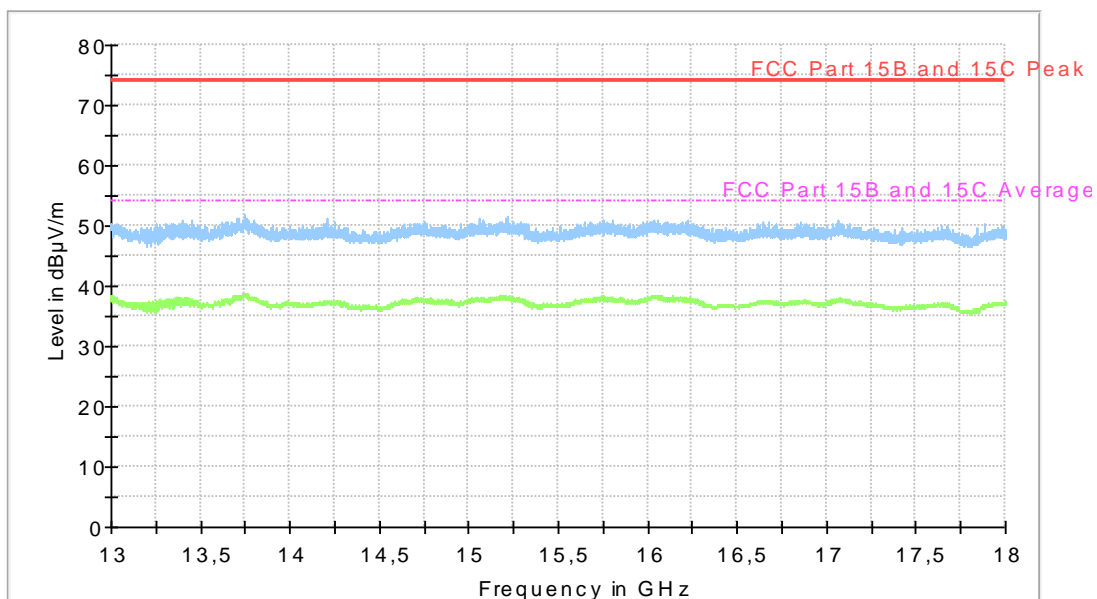


Diagram, Peak overview sweep, 4– 13 GHz at 3 m distance. TX mid channel. Emissions below 4000 MHz are attenuated by high-pass filter K&L 4410-X4500/18000-0.



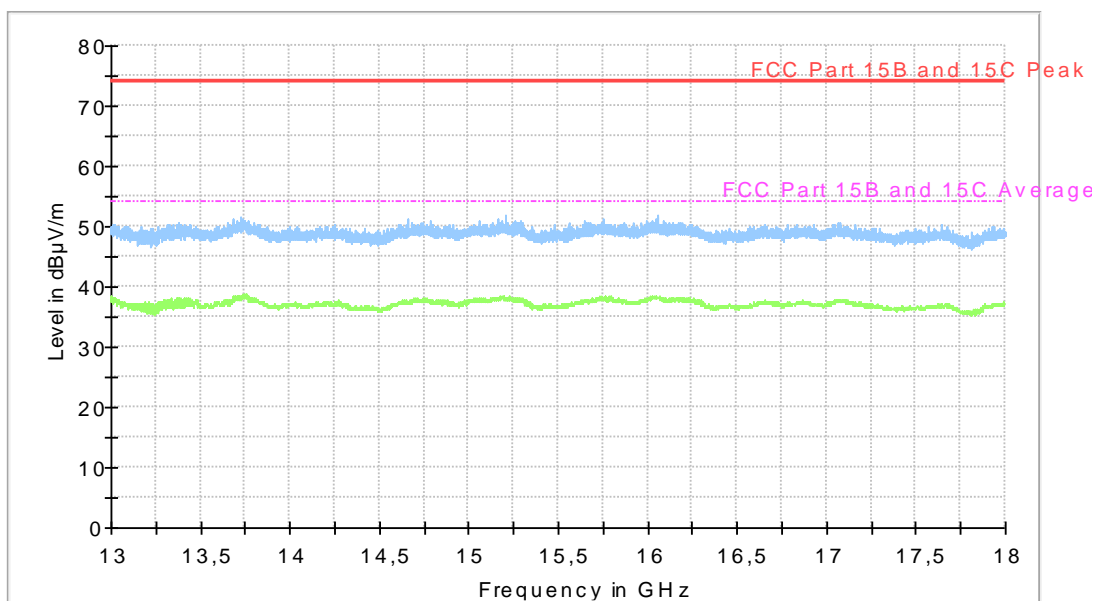
Diagram, Peak overview sweep, 4– 13 GHz at 3 m distance. TX high channel. Emissions below 4000 MHz are attenuated by high-pass filter K&L 4410-X4500/18000-0.

Full Spectrum



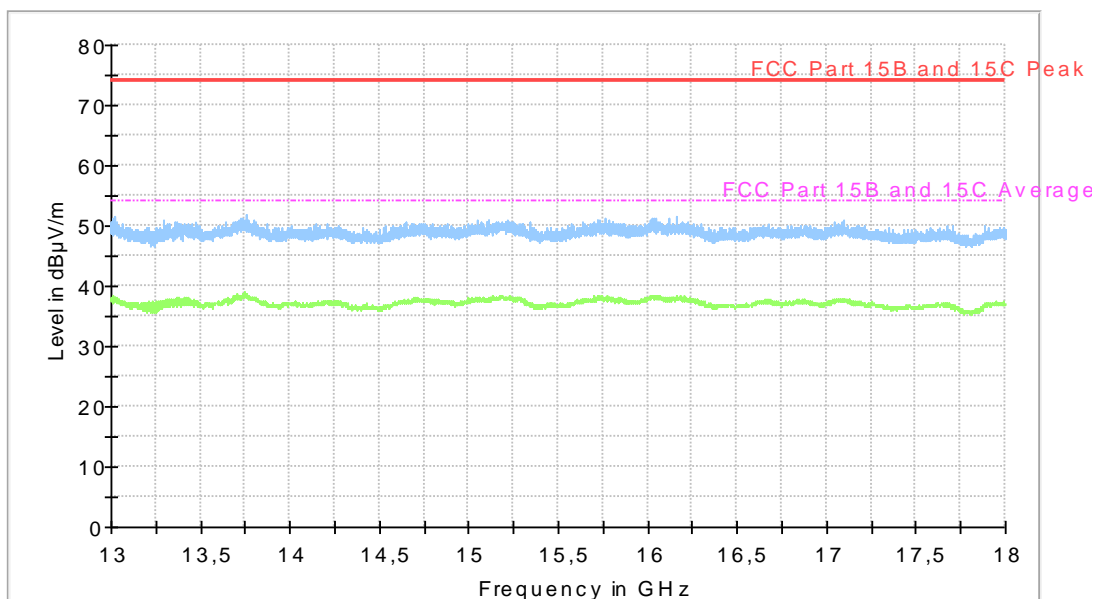
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. TX low channel

Full Spectrum



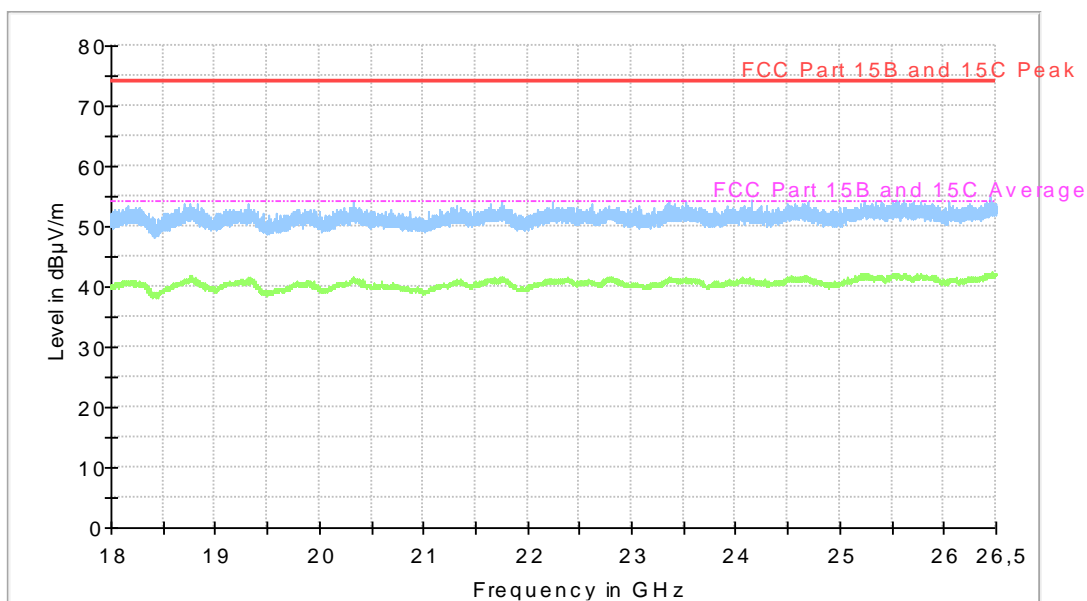
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. TX middle channel

Full Spectrum



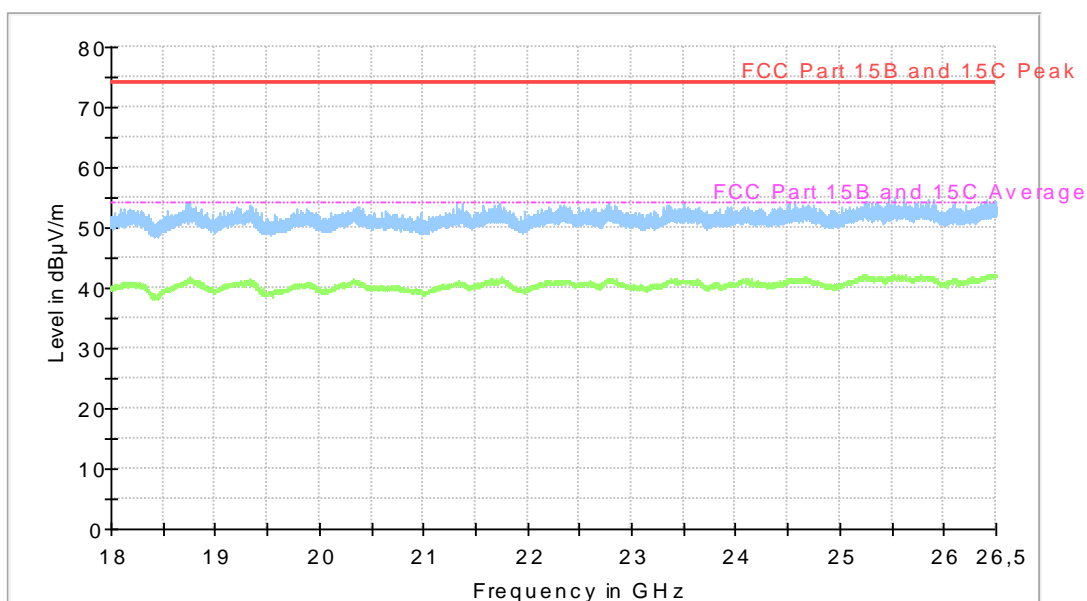
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. TX high channel

Full Spectrum



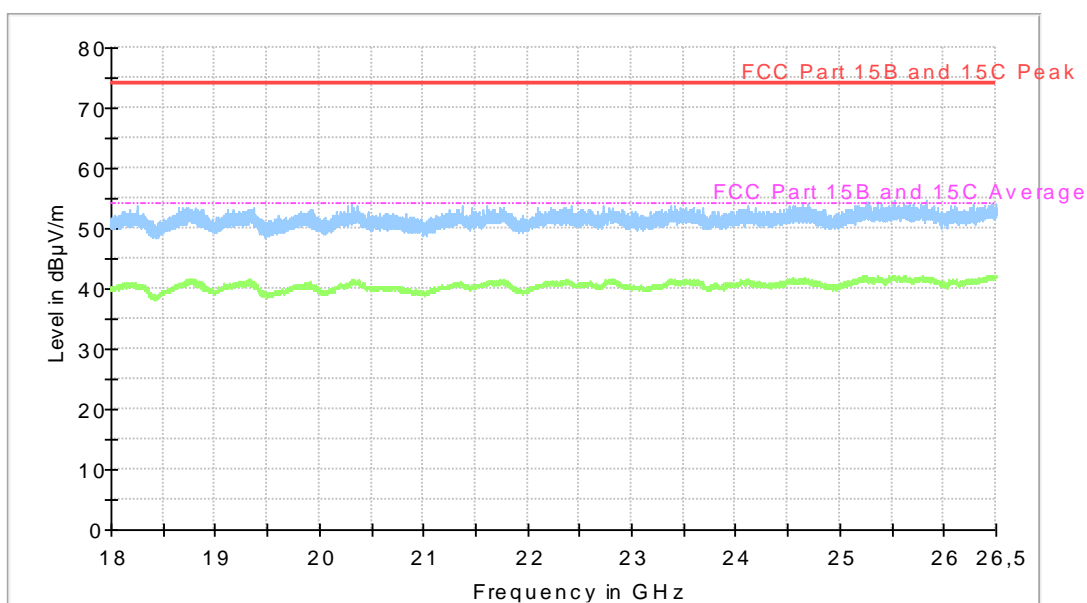
Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX low channel

Full Spectrum



Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX middle channel

Full Spectrum



Diagram, Peak overview sweep, 18 – 26.5 GHz at 3 m distance. TX high channel

Measurement results, Peak, TX low channel

Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4804.3	51.6	47.0	80.0	V	22.4

Measurement results, Average, TX low channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4803.7	44.0	54.0	90.0	H	10.0

Measurement results, Peak, TX middle channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4879.8	52.4	74.0	82.0	V	21.6

Measurement results, Average, TX middle channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4880.2	45.3	54.0	90.0	V	8.7

Measurement results, Peak, TX high channel

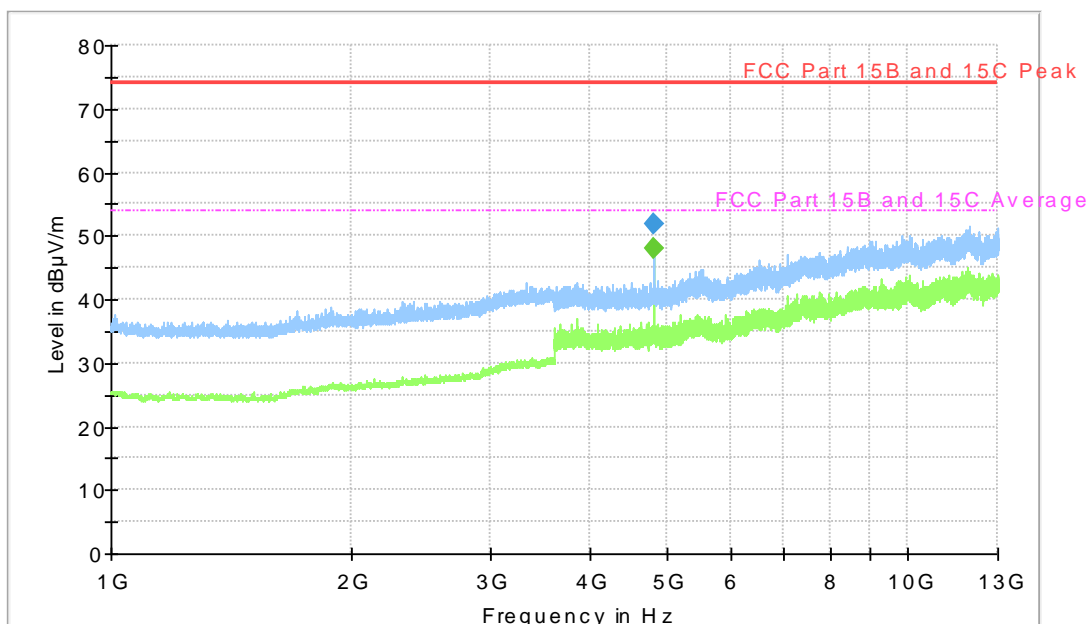
Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
2484.0	61.6	74.0	120.0	V	12.4
4959.9	52.8	74.0	93.0	V	21.2
7439.4	52.6	74.0	115.0	V	21.4

Measurement results, Average, TX high channel

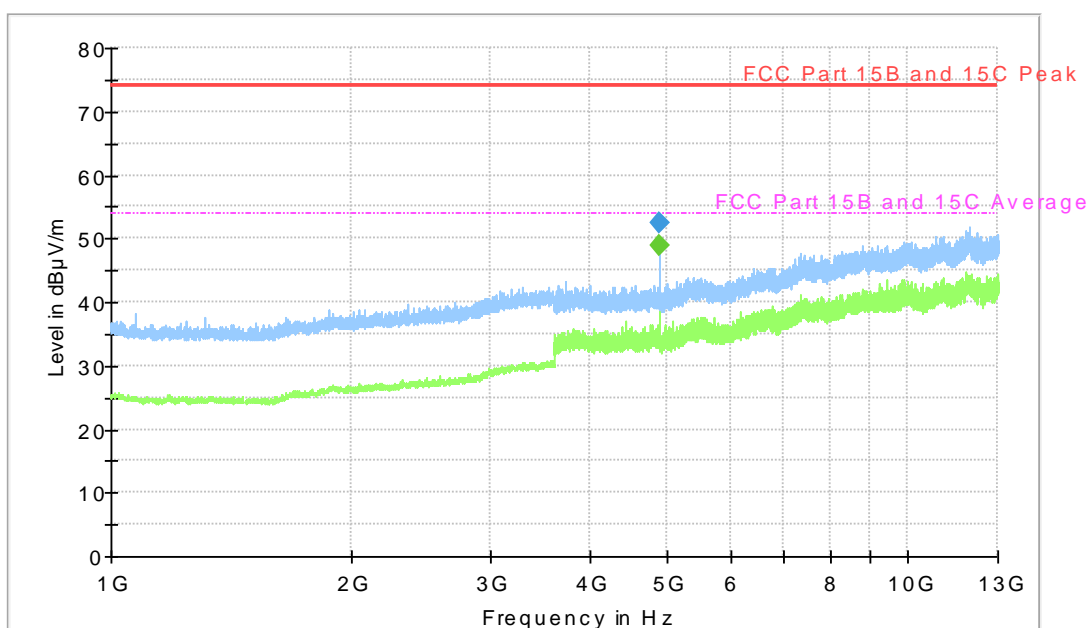
Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
2484.0	46.0	54.0	120.0	V	8.0
4960.0	43.6	54.0	90.0	V	10.4
7439.2	40.4	54.0	120.0	V	13.6

Result [dBμV/m] = Analyser reading [dBμV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

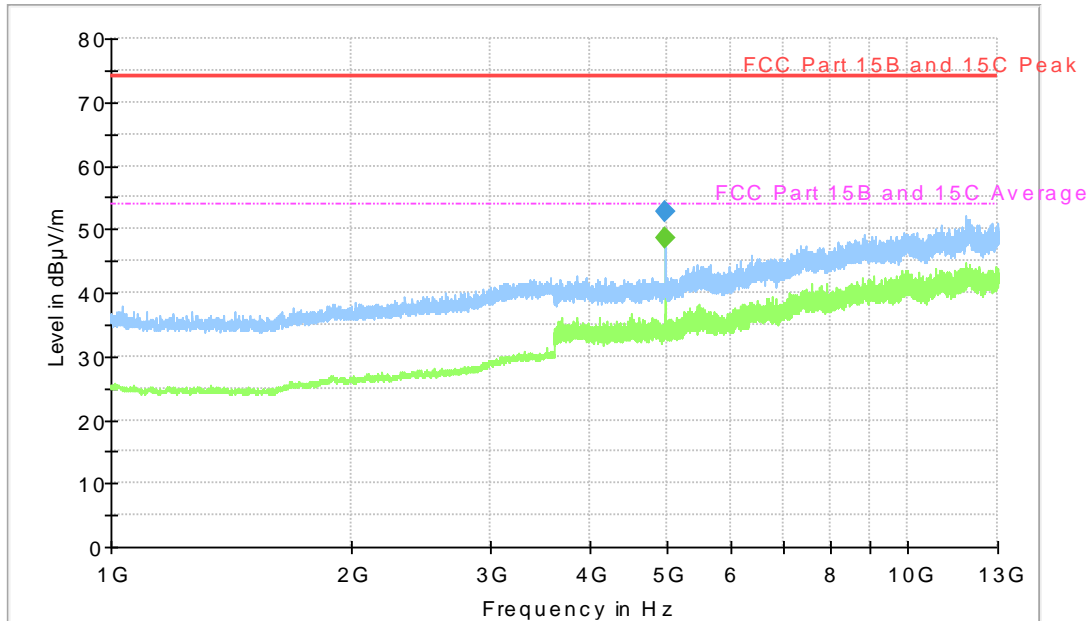
6.7 Test results 1 GHz – 13 GHz, RX



Diagram, Peak overview sweep, 1– 13 GHz at 3 m distance. RX low channel



Diagram, Peak overview sweep, 1– 13 GHz at 3 m distance. RX middle channel



Diagram, Peak overview sweep, 1– 13 GHz at 3 m distance. RX high channel

Measurement results, Peak, RX low channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4801.9	51.9	74.0	85.0	V	22.1

Measurement results, Average, RX low channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4802.0	47.9	54.0	90.0	V	6.1

Measurement results, Peak, RX middle channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4877.9	52.3	74.0	97.0	V	21.7

Measurement results, Average, RX middle channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4878.0	48.9	54.0	90.0	V	5.1

Measurement results, Peak, RX high channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4957.9	52.8	74.0	98.0	V	21.2

Measurement results, Average, RX high channel

Frequency [MHz]	Level [dBμV/m]	Limit [dBμV/m]	Elevation [Degree]	Polarization H/V	Margin [dB]
4958.0	48.5	54.0	90.0	V	5.5

Result [dBμV/m] = Analyser reading [dBμV] + Antenna factor [1/m] - Amplifier gain [dB] + Cable loss [dB]

7 CONDUCTED BAND EDGE MEASUREMENT

Date of test:	2018-03-26	Test location:	Wireless Center
EUT Serial:	INTERTEK02	Ambient temp:	22 °C
Tested by:	Robert Hietala	Relative humidity:	19 %
Test result:	Pass	Margin:	8.0 dB

7.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2013 section 6.10.4.

The EUT was connected to spectrum analyser via rf-cable and attenuator.

The EUT was set up in order to emit maximum disturbances.

7.2 Test conditions

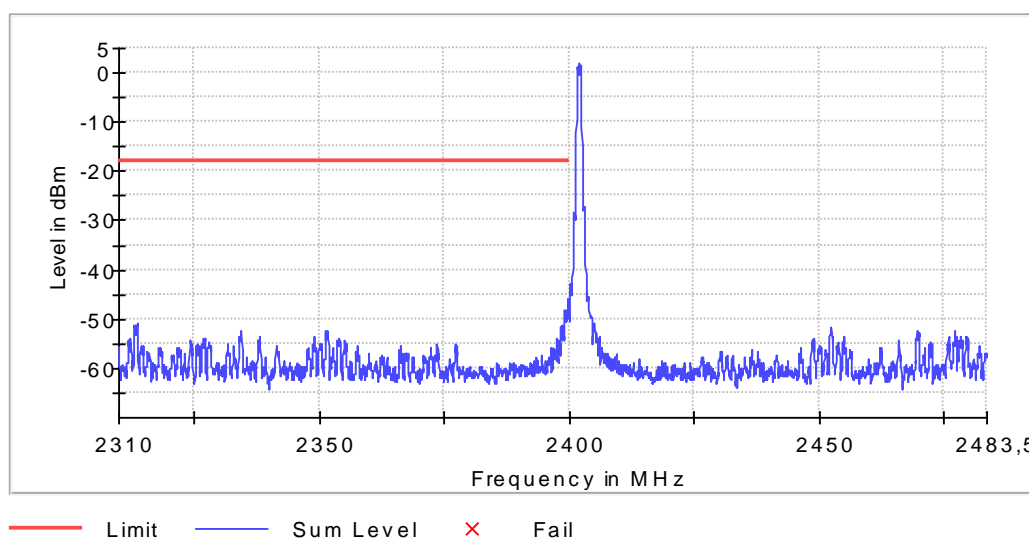
Detector: Peak,
 RBW: 100 kHz
 VBW: 300 kHz
 Span: 90 MHz

7.3 Requirement

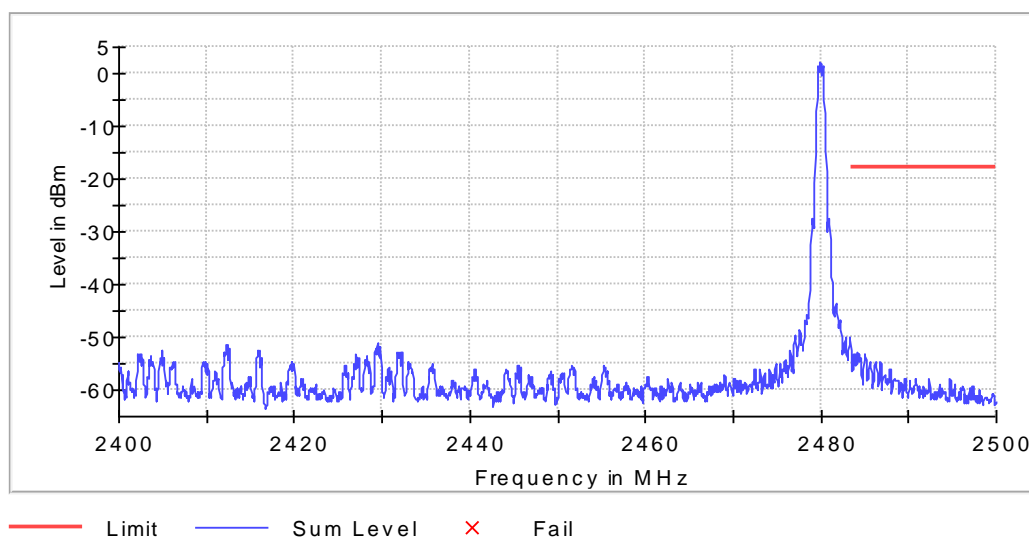
Reference: CFR 47 §15.247(d), RSS-247 5.5,

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

7.4 Test results



Screenshot: Lower band edge sweep, single channel



Screenshot: Upper band edge sweep, single channel

Test results

Band edge	Delta [dBc]	Limit [dBc]	Margin [dB]
Lower	48.0	20.0	28.0
Upper	55.2	20.0	35.2

8 PEAK CONDUCTED OUTPUT POWER

Date of test:	2018-03-26	Test location:	Wireless Center
EUT Serial:	INTERTEK02	Ambient temp:	22 °C
Tested by:	Robert Hietala	Relative humidity:	19 %
Test result:	Pass	Margin:	> 10 dB

8.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2013 section 11.9.1.1.

The EUT was connected to spectrum analyser via rf-cable and attenuator.

8.2 Test conditions

Detector: Peak,
 RBW: >OBW
 VBW: 3 x RBW
 Span: >3 x OBW

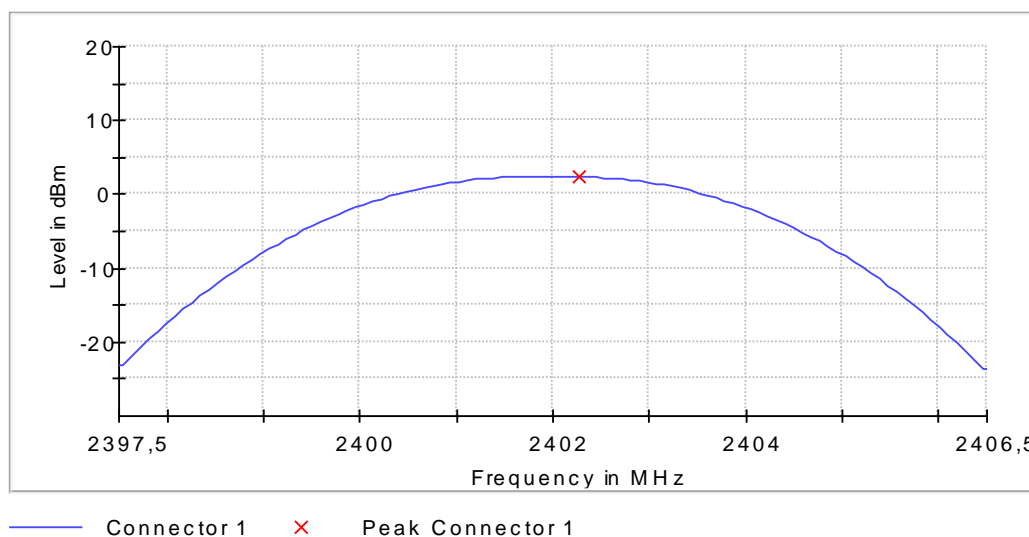
The EUT was set up in order to emit maximum disturbances.

8.3 Requirements

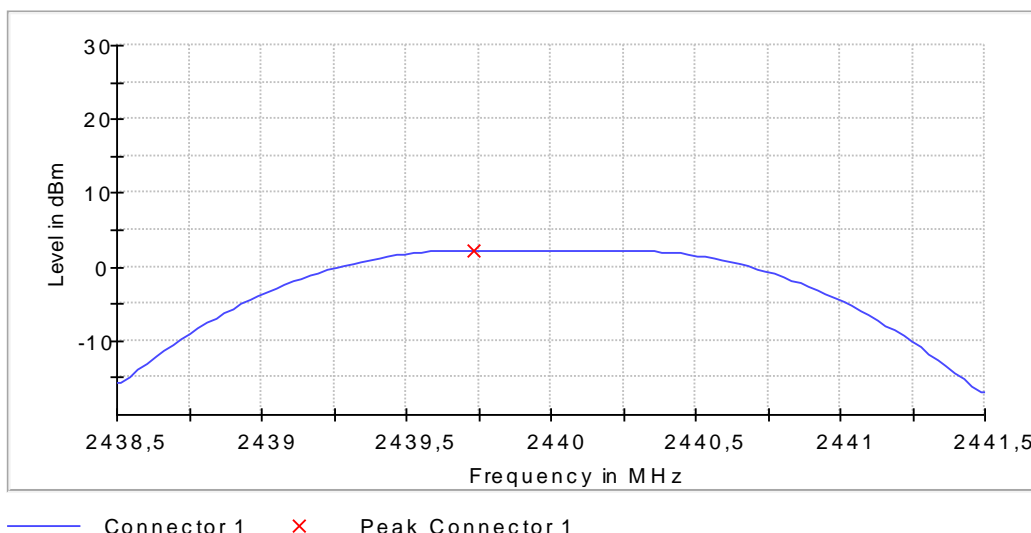
Reference: CFR 47§15.247(b)(3), RSS-247 5.4

For DTSSs employing digital modulation techniques operating in the bands 902 – 128 MHz, 2400 – 2483.5 MHz and 5725 – 5850 MHz, the maximum peak conducted output power shall not exceed 1W.

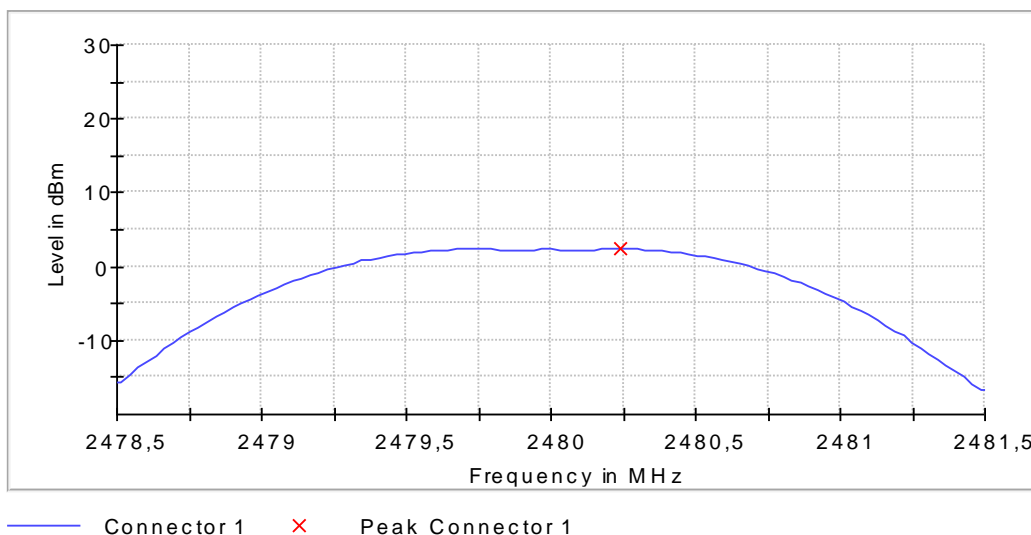
8.4 Test results



Screenshot: Output power, low channel



Screenshot: Output power, middle channel



Screenshot: Output power, high channel

Test result

Channel [MHz]	Output power [dBm]
2402	2.4
2445	2.3
2480	2.4

9 OCCUPIED 6 DB BANDWIDTH

Date of test:	2018-03-26	Test location:	Wireless Center
EUT Serial:	INTERTEK02	Ambient temp:	22 °C
Tested by:	Robert Hietala	Relative humidity:	19 %
Test result:	Pass	Margin:	242.6 kHz

9.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2013 section 11.8.1.

The EUT was connected to spectrum analyser via rf-cable and attenuator.

9.2 Test conditions

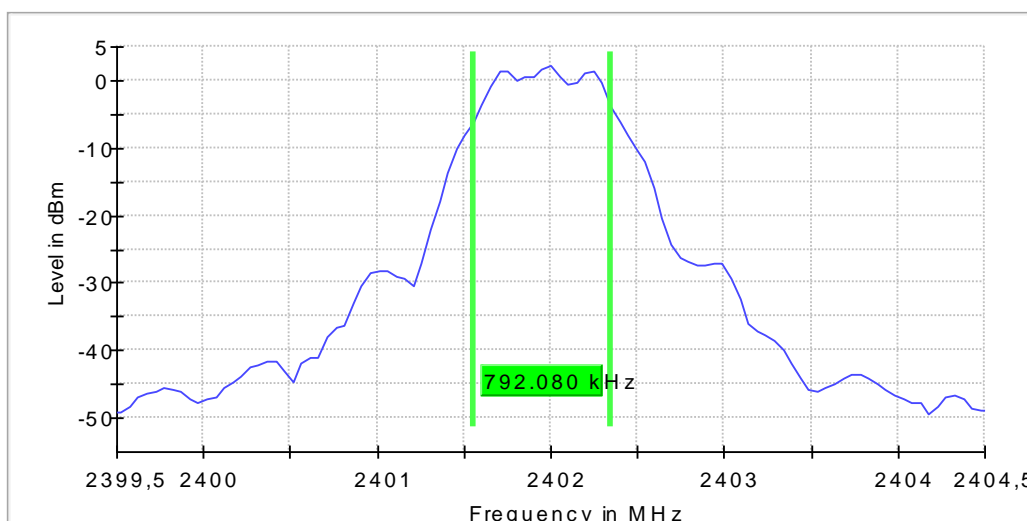
Detector: Peak,
 RBW: 100 kHz
 VBW: 3 x RBW
 Span: >1,5 x OBW

The EUT was set up in order to emit maximum disturbances.

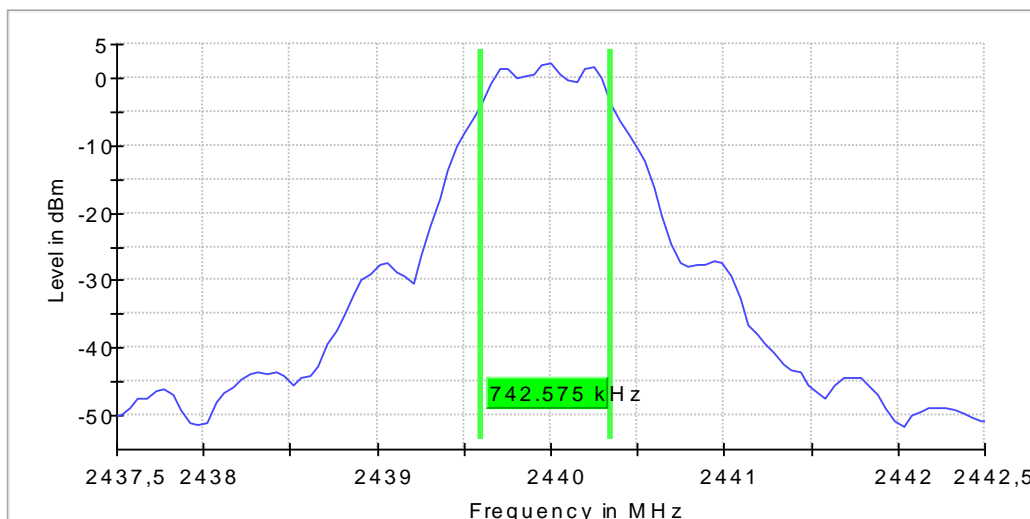
9.3 Requirements

Reference: CFR 47§15.247(a)(2), RSS-247 5.2(1)
 The minimum 6 dB bandwidth shall be 500 kHz.

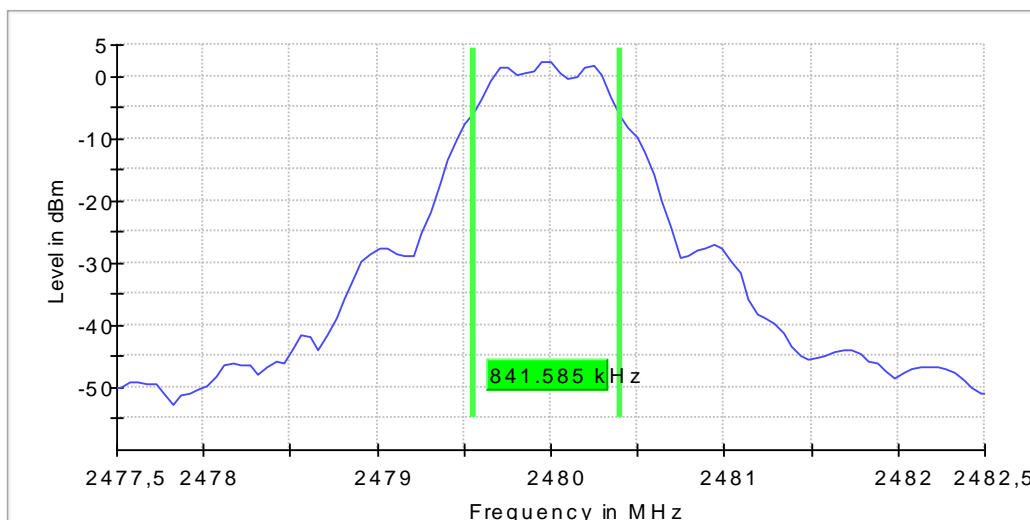
9.4 Test results



Screenshot: Occupied 6 dB bandwidth Measurement, low channel



Screenshot: Occupied 6 dB bandwidth Measurement, middle channel



Screenshot: Occupied 6 dB bandwidth Measurement, high channel

Test result

Channel [MHz]	6 dB BW [kHz]
2402	792.1
2440	742.6
2480	841.6

10 99 % BANDWIDTH

Date of test:	2018-04-09	Test location:	Wireless Center
EUT Serial:	INTERTEK 02	Ambient temp:	22 °C
Tested by:	Robert Hietala	Relative humidity:	29 %
Test result:	Pass	Margin:	N/A

10.1 Test set-up and test procedure.

The test method is in accordance with RSS-GEN section 6.7.

The EUT was connected to spectrum analyser via rf-cable and attenuator. Spectrum analyser with occupied bandwidth measurement function is used to determine the occupied bandwidth.

10.2 Test conditions

Detector: Peak,
 RBW: 1 – 5 % of OBW
 VBW: 3 x RBW

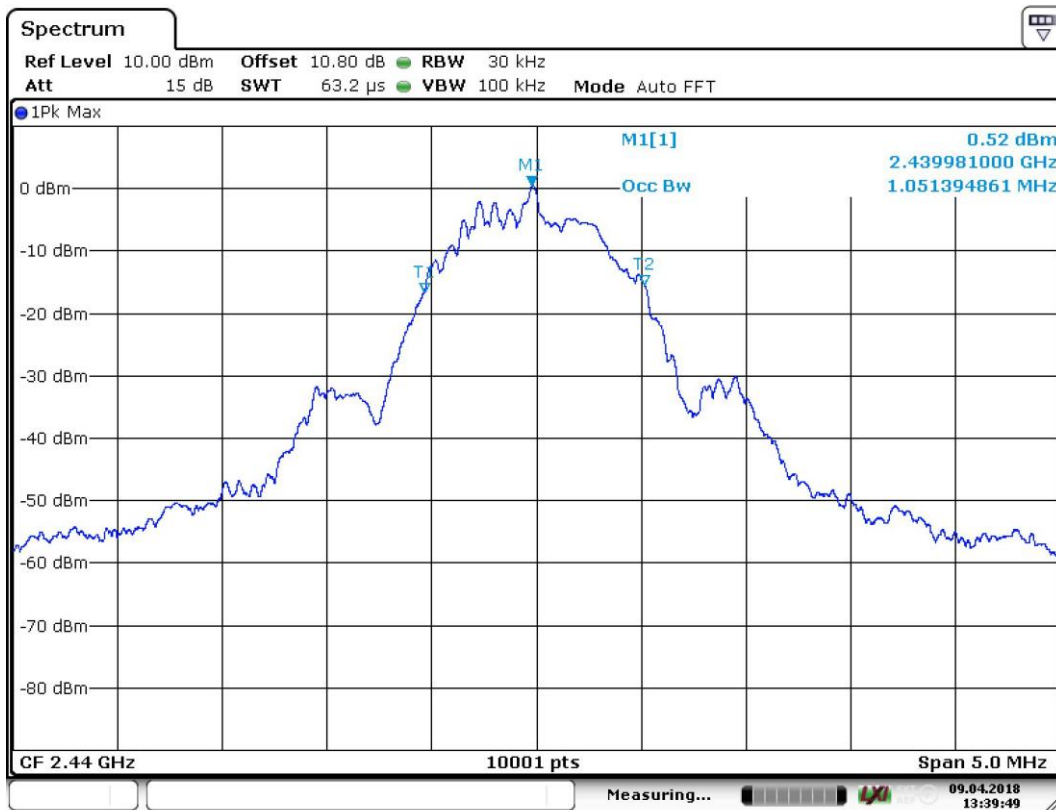
The EUT was set up in order to emit maximum disturbances.

10.3 Test results



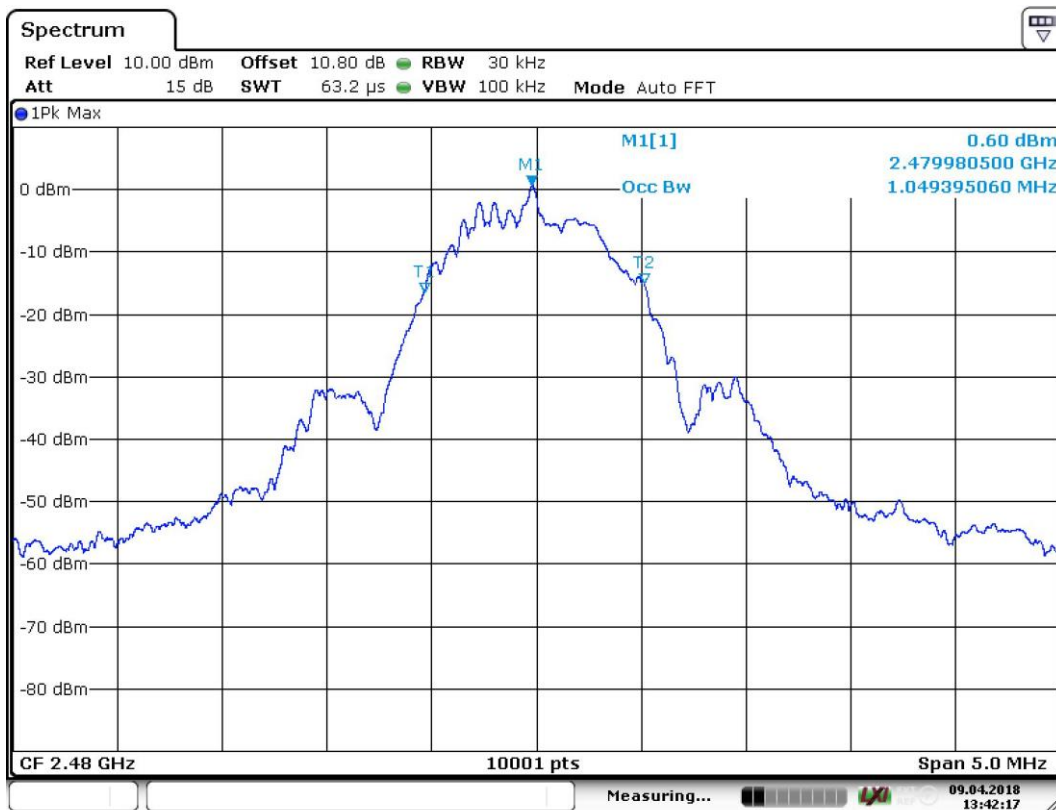
Date: 9.APR.2018 13:37:52

Screenshot: 99 % bandwidth Measurement, low channel



Date: 9.APR.2018 13:39:50

Screenshot: 99 % bandwidth Measurement, middle channel



Date: 9.APR.2018 13:42:18

Screenshot: 99 % bandwidth Measurement, high channel

Test result

Channel [MHz]	99 % BW [MHz]
2402	1.05
2440	1.05
2480	1.05

11 PEAK POWER SPECTRAL DENSITY

Date of test:	2018-03-26	Test location:	Wireless Center
EUT number:	INTERTEK02	Ambient temp:	22 °C
Tested by:	Robert Hietala	Relative humidity:	19 %
Test result:	Pass	Margin:	> 10 dB

11.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2013 section 11.10.2.

The EUT was connected to spectrum analyser via rf-cable and attenuator.

11.2 Test conditions

Detector: Peak,
 RBW: 10 kHz
 VBW: >3 x RBW
 Span: 3.75 MHz

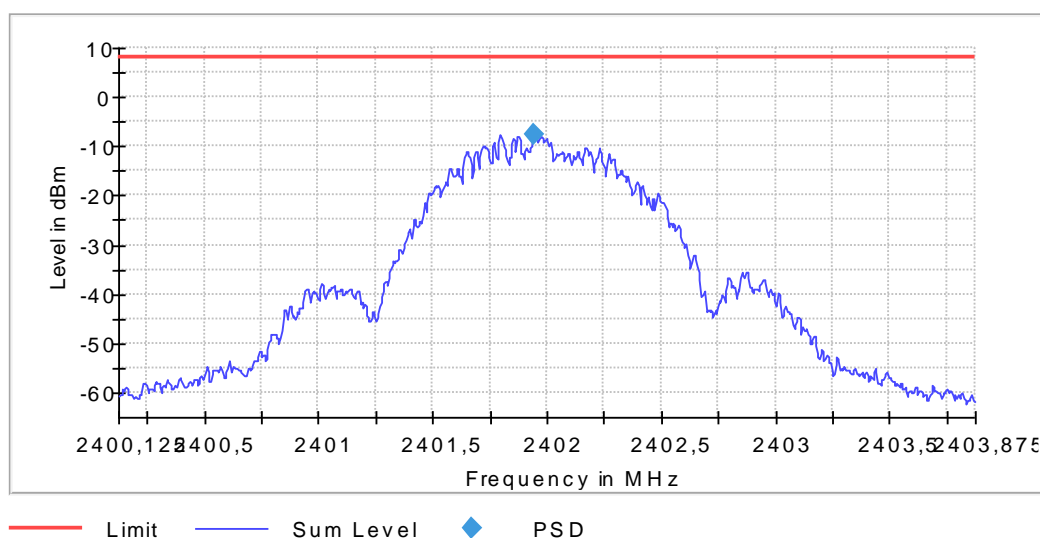
The EUT was set up in order to emit maximum disturbances.

11.3 Requirements

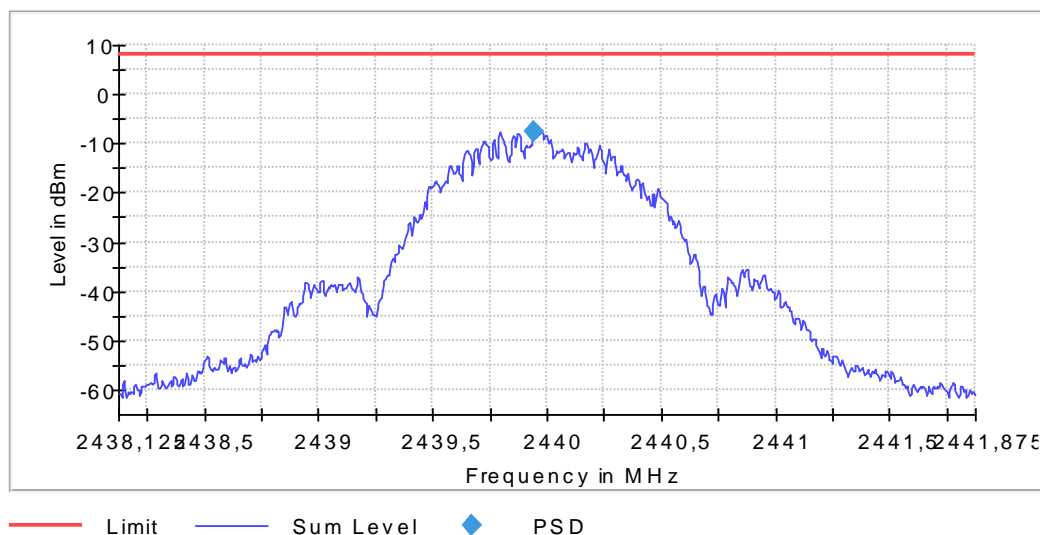
Reference: CFR 47§15.247(3), RSS-247 5.2(2)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

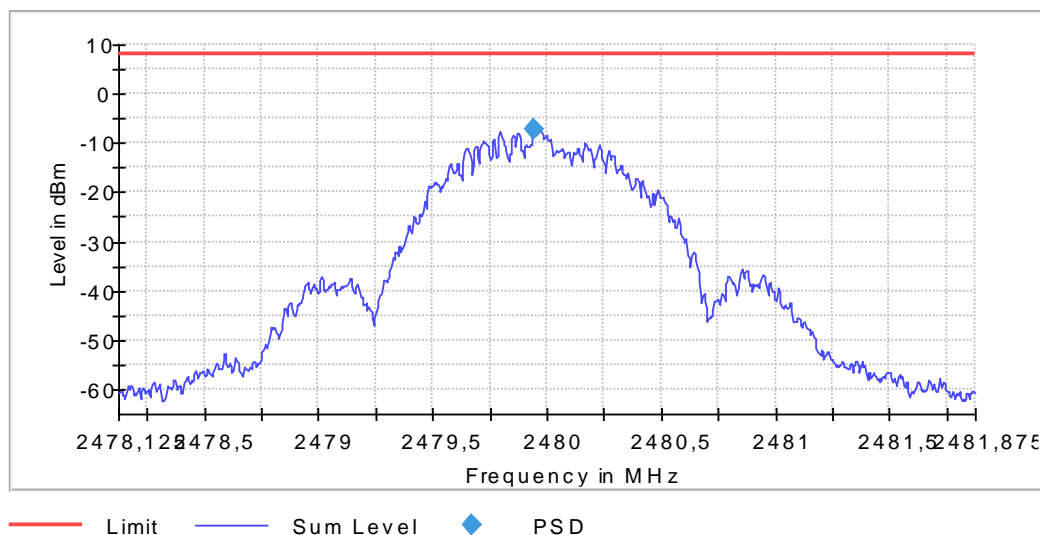
11.4 Test results



Screenshot: Peak power spectral density, low channel



Screenshot: Peak power spectral density, middle channel



Screenshot: Peak power spectral density, high channel

Test result

Channel [MHz]	PSD [dBm/10kHz]
2402	-7.5
2440	-7.5
2480	-7.4

12 TEST EQUIPMENT

Conducted emission test site BUR 1

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - V9.26.01	--	--	--
Receiver	Rohde & Schwarz	ESCI3	12741	07-2017	1 year
AMN / LISN	Rohde & Schwarz	ESH3-Z5	5875	07-2017	1 year

Björkhallen

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - V9.12.10	--	--	--
Receiver	Rohde & Schwarz	ESIB 26	32288	07-2017	1 year
BiLog antenna	Rohde & Schwarz	HL562	30711	01-2018	3 years

Radiohallen

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - V10.35.1	--	--	--
Receiver	Rohde & Schwarz	ESU 40	13178	01-2018	1 year
Horn antenna	EMCO	3115	4628	11-2015	3 years
Pre amplifier	Sangus	AFS6-00101400-23-10P -6-S AFS44-12002400-32-10P -44	12335	07-2017	1 year
Horn antenna	EMCO	3160-08	30099	10-2016	3 years
Horn antenna	EMCO	3160-09	30101	10-2016	3 years
Signal analyzer:	Rohde & Schwarz	FSV 30	32594	07-2017	1 year
Signal generator:	Rohde & Schwarz	SMB100A	32592	07-2017	1 year
2,4 GHz band reject filter:	K&L MICROWAVE INC	6N45-2450/T100-0/0	12389	03-2018	1 year
4 GHz high pass filter	K&L MICROWAVE INC	4410-X4500/18000-0/0	5133	08-2017	1 year
Temperature chamber:	Vötsch	VC4018	12282	10-2017	1 year
20 dB Attenuator:	Huber+Suhner	5920_N-50-010/199_NE	32697	04-2018	1 year
Power splitter	ET Industries	D-0518-2	33756	--	--

13 MEASUREMENT UNCERTAINTY

Continuous conducted disturbances with AMN in the frequency range 9 kHz to 30 MHz ± 3.7 dB

Measurement uncertainty for radiated disturbance

Uncertainty for the frequency range 30 to 1000 MHz at 3 m	± 5.1 dB
Uncertainty for the frequency range 30 to 1000 MHz at 10 m	± 5.0 dB
Uncertainty for the frequency range 1.0 to 18 GHz at 3 m	± 4.7 dB
Uncertainty for the frequency range 18 to 26 GHz at 3 m	± 4.8 dB
Uncertainty for the frequency range 26 to 40 GHz at 3 m	± 5.7 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2:2011.

The measurement uncertainty is given with a confidence of 95 %.

14 TEST SET UP AND EUT PHOTOS

EUT photos are in separate document 1713337STO-002 Annex 1.

Test set up photos are in separate document 1713337STO-002 Annex 2.