

# RADIO TEST REPORT

No. 1812896STO-002, Ed. 1

## RF Performance

### EQUIPMENT UNDER TEST

Equipment: INTELLi light radio module  
Type/Model: 19-318  
Manufacturer: Tyri Sweden AB  
Tested by request of: Tyri Sweden 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: Subpart C: Intentional radiators. Section 15.247

47 CFR Part 15 : Subpart B: Unintentional radiators

RSS-GEN Issue 5 (2018): General requirements of 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

For details, see clause 2 – 4.

Date of issue: 2018-09-28

Tested by:

*Per Larsson*  
Per Larsson

Approved by:

*Matti Virkki*  
Matti Virkki

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**Revision History**

Edition	Date	Description	Changes
1	2018-09-28	First release	

## CONTENTS

	Page
1 Client Information .....	5
2 Equipment under test (EUT).....	5
2.1 Identification of the EUT.....	5
2.2 Additional information about the EUT .....	6
2.3 Peripheral equipment.....	6
2.4 Test signals and operation modes .....	6
2.5 Modifications made to improve EMC-characteristics .....	6
3 Test Specifications .....	7
3.1 Standards .....	7
3.2 Additions, deviations and exclusions from standards and accreditation .....	7
3.3 Test site.....	7
4 Test Summary .....	8
5 Field strength of fundamental and radiated Band Edge.....	9
5.1 Test set-up and test procedure. ....	9
5.2 Test conditions .....	9
5.3 Requirement.....	10
5.4 Test results.....	10
6 Radiated rf Emission in the frequency-range 30 MHz to 26.5 GHz .....	11
6.1 Test set-up and test procedure. ....	11
6.2 Test conditions .....	11
6.3 Requirements.....	12
6.4 Test results 30 MHz – 1000 MHz, TX .....	12
6.5 Test results 1 GHz – 26.5 GHz, TX .....	14
6.6 Test results 1 GHz – 26,5 GHz, RX .....	20
7 Conducted band edge measurement.....	25
7.1 Test set-up and test procedure. ....	25
7.2 Test conditions .....	25
7.3 Requirement.....	25
7.4 Test results.....	26
8 Peak conducted output power.....	27
8.1 Test set-up and test procedure. ....	27
8.2 Test conditions .....	27
8.3 Requirements.....	27
8.4 Test results.....	27
9 Occupied 6 dB bandwidth .....	29
9.1 Test set-up and test procedure. ....	29
9.2 Test conditions .....	29
9.3 Requirements.....	29
9.4 Test results.....	29
10 99 % bandwidth .....	31
10.1 Test set-up and test procedure. ....	31
10.2 Test conditions .....	31
10.3 Test results.....	31
11 Peak power spectral density .....	33
11.1 Test set-up and test procedure. ....	33
11.2 Test conditions .....	33
11.3 Requirements.....	33
11.4 Test results.....	33
12 Test equipment.....	35

13 Measurement uncertainty .....	35
14 Test set up and EUT photos.....	36

## 1 CLIENT INFORMATION

The EUT has been tested by request of

Company	Tyri Sweden AB Aröds Industriväg 78 422 43 Hisings Backa Sweden
Name of contact	Magnus Eriksson Phone +46 703 35 65 10
Client observer	Magnus Eriksson

## 2 EQUIPMENT UNDER TEST (EUT)

### 2.1 Identification of the EUT

Equipment:	INTELLi light radio module
Type/Model:	19-318
Brand name:	Tyri Sweden AB
Serial number:	No visible serial number
Manufacturer:	Tyri Sweden AB

Transmitter frequency range: 2402 – 2480 MHz

Receiver frequency range: 2402 – 2480 MHz

Frequency agile or hopping:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Antenna:	<input checked="" type="checkbox"/> Internal antenna	<input type="checkbox"/> External antenna
Antenna connector:	<input checked="" type="checkbox"/> None, internal antenna	<input type="checkbox"/> Yes
Antenna gain:	2.5 dBi	
Rating RF output power:	4 dBm (measured conducted)	
Type of modulation:	O-QPSK	
Temperature range:	<input type="checkbox"/> Category I (General): -20°C to +55°C <input type="checkbox"/> Category II (Portable equipment): -10°C to +55°C <input type="checkbox"/> Category III (Equipment for normal indoor use): +5°C to +35°C <input checked="" type="checkbox"/> Other: <-40°C to +80°C	
Transmitter stand by mode supported:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

## 2.2 Additional information about the EUT

The EUT consists of the following units:

Unit	Type	Part number	Serial number
INTELLi light radio module	19-318	Not known	No visible

During the tests the EUT supported following software:

Software	Version	Comment
PIR-EMC-DTM	-	-

The EUT was tested with the following cables:

Port:	Type:	Length: [m]	Specifications:
DC input	5 V	1.5	Two-core

## 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
USB to serial	FTD1232	Not known

## 2.4 Test signals and operation modes

Continuous signal with BLE modulation

## 2.5 Modifications made to improve EMC-characteristics

No modifications were made.

### 3 TEST SPECIFICATIONS

#### 3.1 Standards

Requirements:

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

47 CFR Part 15: Subpart B: Unintentional radiators

RSS-GEN Issue 5 (2018): General requirements of 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,  
P.O. Box 1103  
SE-164 22 Kista

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

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

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

Measurement chambers

Measurement Chamber	Type of chamber	IC Site filing #
Radio chamber 3mFAC	Radio chamber 3mFAC	2042G-4
5 m CHAMBER	Semi-anechoic 5 m	2042G-3

#### 4 TEST SUMMARY

The results in this report apply only to sample tested:

Requirement	Description	Result
FCC §15.203 RSS-GEN 8.3	<b>Antenna requirement</b>	<b>PASS</b>
	The EUT has integrated non detachable antenna which can't be remove without breaking the EUT.	
FCC §15.207, 15.107 RSS-GEN 8.8 table 3	<b>Conducted continuous emission in the frequency range 150 kHz to 30 MHz, AC Power input port</b>	<b>NA</b>
	Battery operated equipment.	
FCC §15.247 (b)(4) RSS-247 5.4(4), 5.4(5)	<b>Field strength of fundamental and antenna gain</b>	<b>PASS</b>
	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	<b>Radiated emission of electromagnetic fields in the frequency range 30 – 1000 MHz</b>	<b>PASS</b>
	The EUT complies with the limits. The margin to the limit was more than 20 dB.  See clause 6.4 – 6.5.	
FCC §15.247(d), 15.209(a) RSS-GEN 8.9 RSS-247 5.5	<b>Radiated emission of electromagnetic fields in the frequency range above 1 GHz</b>	<b>PASS</b>
	The EUT complies with the limits. The margin to the limit was more than 20 dB. See clause 6.6 – 6.7.	
FCC §15.247(a)(2) RSS-GEN 6.6 RSS-247 5.2(1)	<b>Occupied bandwidth</b>	<b>PASS</b>
	The EUT complies with the limits. The margin to the limit is at least 0.232 MHz See clause 9.4 and 10.	
FCC §15.247(b) RSS-247 5.4(4)	<b>Conducted output power</b>	<b>PASS</b>
	The EUT complies with the limits. The margin to the limit was more than 10 dB. See clause 8.4.	
FCC §15.247(e) RSS-247 5.2(2)	<b>Peak power spectral density</b>	<b>PASS</b>
	The EUT complies with the limits. The margin to the limit was more than 8 dB. See clause 11.4.	
FCC §15.247(e) RSS-247 5.5	<b>Band edge</b>	<b>PASS</b>
	The EUT complies with the limits. The margin to the limit was more than 20 dB. See clause 5.4.	



## 5 RADIATED BAND EDGE

<b>Date of test:</b>	2018-09-11	<b>Test location:</b>	Radio hallen
<b>EUT Serial:</b>	TK-018	<b>Ambient temp:</b>	22 °C
<b>Tested by:</b>	PLA	<b>Relative humidity:</b>	55 %
<b>Test result:</b>	Pass	<b>Margin:</b>	>20 dB

### 5.1 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.

The EUT was placed on an insulating support 1.5 m above the turntable which is part of the reference ground plane.

Overview sweeps were performed with the measurement receiver in max-hold mode and the peak and average detector was activated.

Portable device: Pre scan was made in three orthogonal EUT orientations.

EUT was evaluated in three orthogonal orientations.

### 5.2 Test conditions

#### Test set-up:

Test receiver set-up:

Preview test:

Final test:

MHz. VBW 3 MHz

Measuring distance:

Measuring angle:

Antenna

Height above ground plane:

Polarisation:

Type:

Antenna tilt:

#### 1 GHz –4 GHz

Peak,

RBW 1 MHz

VBW 3 MHz

Peak,

RBW 1 MHz

VBW 3 MHz

Average

Peak value + 20 x LOG (Duty cycle) / RBW 1

3 m

0 – 359°

1 – 4 m

Vertical and Horizontal

Horn

Activated

### 5.3 Requirement

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.

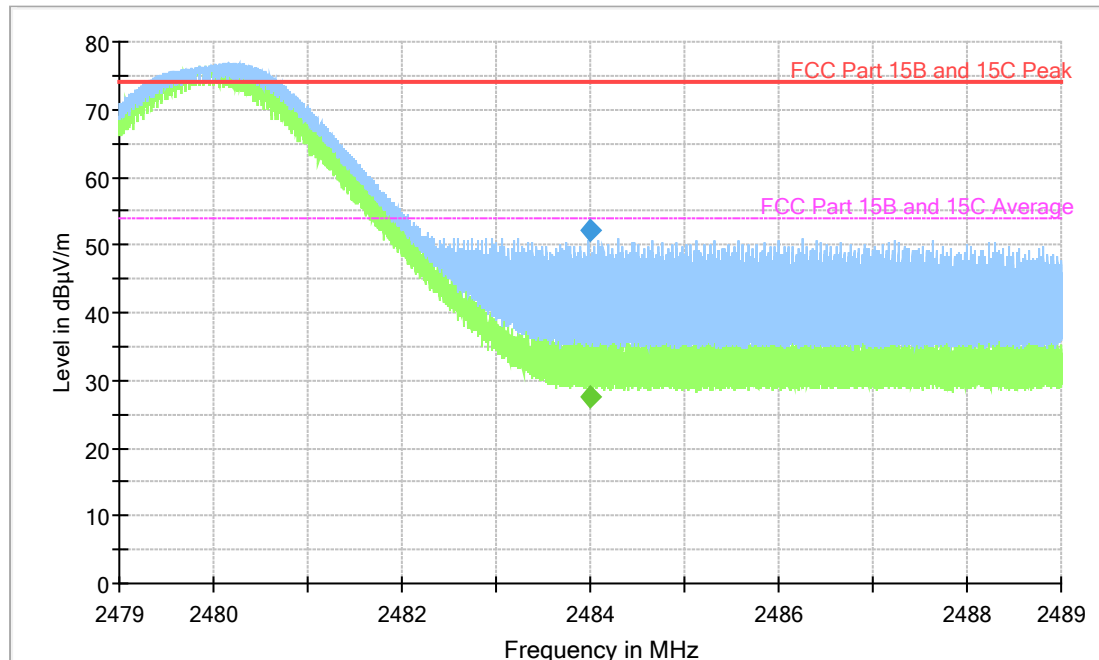
Within restricted bands:

Reference: CFR 47 §15.209, 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 (dBμV/m)	Field strength at 10 m (dBμV/m)	Detector (dBμV/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

### 5.4 Test results



Upper band edge sweep

## 6 RADIATED RF EMISSION IN THE FREQUENCY-RANGE 30 MHZ TO 26.5 GHZ

<b>Date of test:</b>	2018-09-11	<b>Test location:</b>	Radio hallen
<b>EUT Serial:</b>	TK-018	<b>Ambient temp:</b>	22 °C
<b>Tested by:</b>	PLA	<b>Relative humidity:</b>	55 %
<b>Test result:</b>	Pass	<b>Margin:</b>	>20 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.

The EUT was placed on an insulating support 0.8 and 1.5 m above the turntable which is part of the reference ground plane.

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.

Portable device: Pre scan was made in three orthogonal EUT orientations.

### 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:

MHz VBW 3 MHz

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

Peak value + 20 x LOG (Duty cycle) / RBW 1

1.5 m

3 m

0 – 359°

1 – 4 m

Vertical and Horizontal

Horn

Activated

### 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 $\mu$ V/m)	Field strength at 10 m (dB $\mu$ V/m)	Detector (dB $\mu$ 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

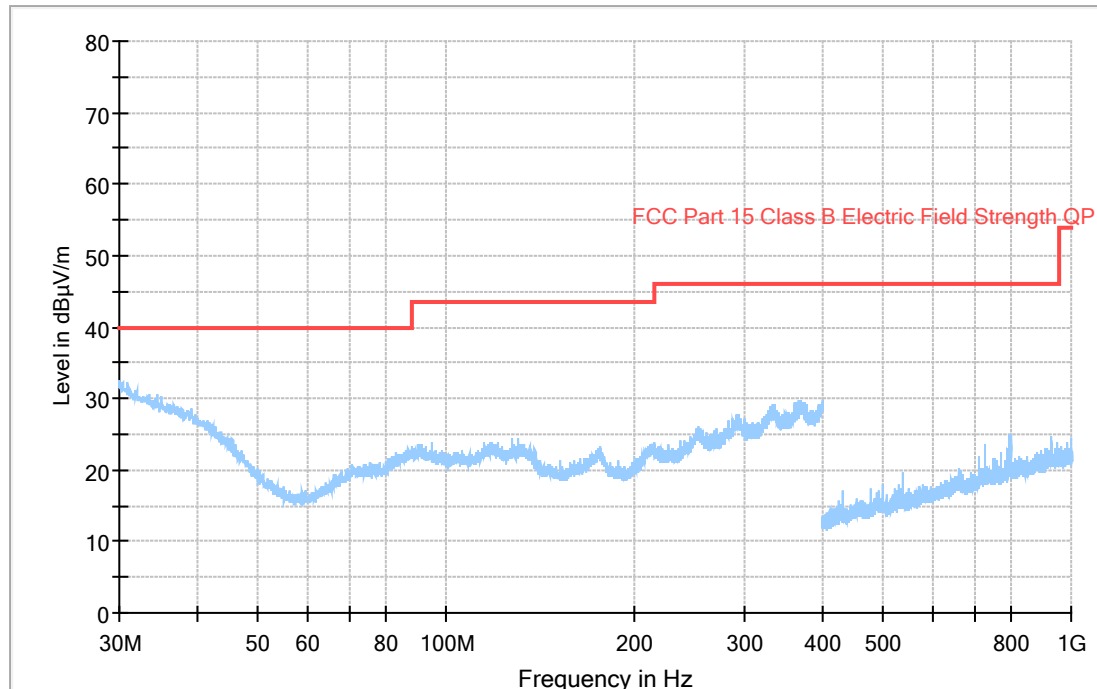
The values for 10 m measuring distance are calculated by subtracting 10.5 dB from the 3 m limit. (i.e. an extrapolation factor of 20 dB/decade according to CFR 47 §15.31(f)(1))

Outside the restricted bands:

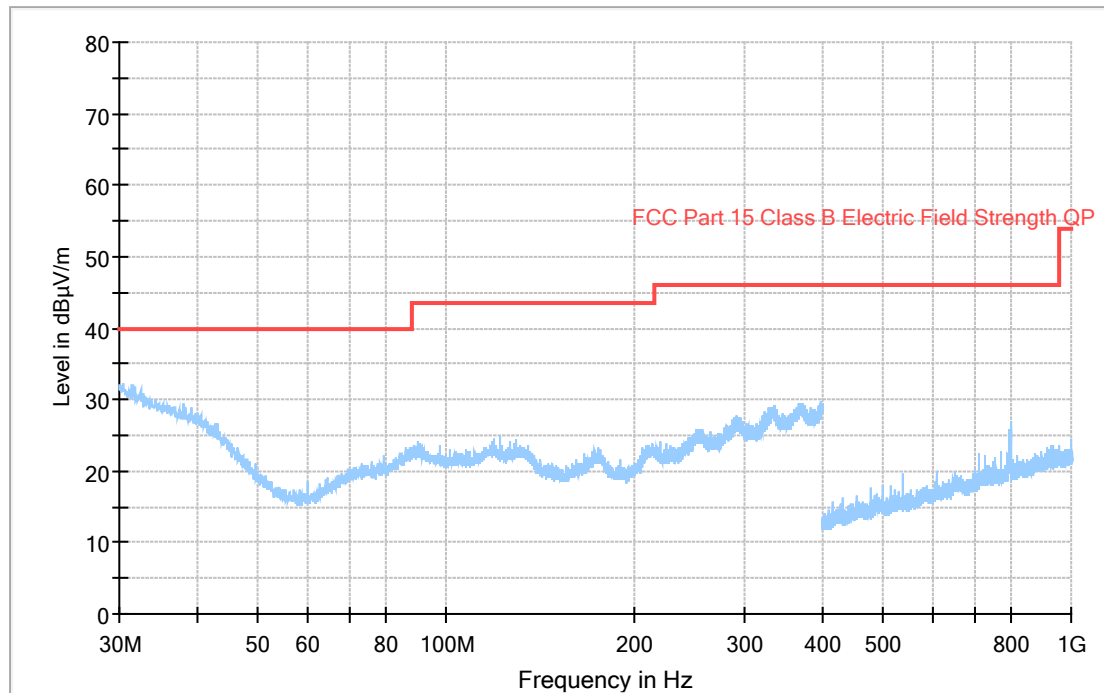
Reference: CFR 47 §15.247(d), RSS-247 5.5,

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.

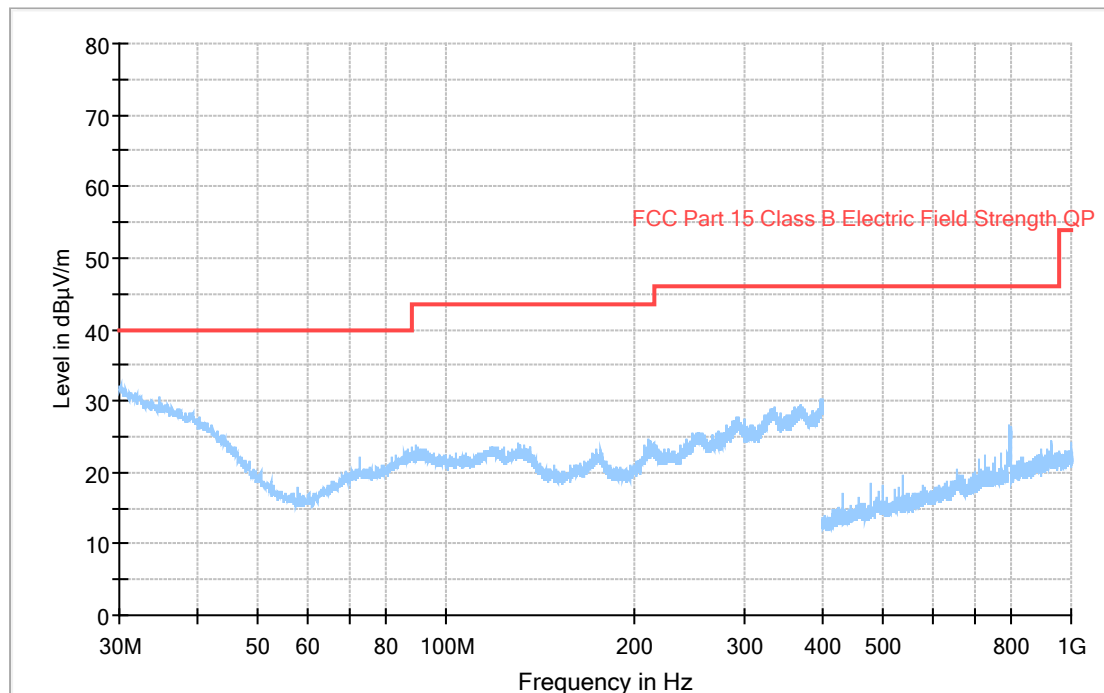
### 6.4 Test results 30 MHz – 1000 MHz, TX



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



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



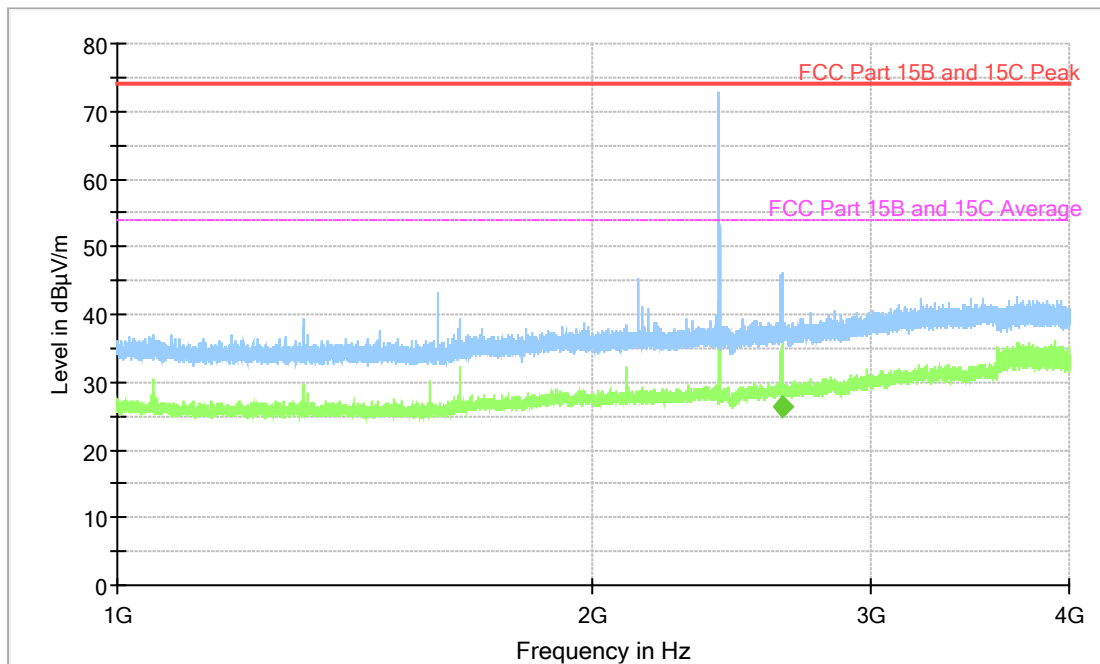
Diagram, Peak overview sweep, 30 – 1000 MHz at 3 m distance. TX top channel, EUT horizontal

### Measurement results, Quasi Peak

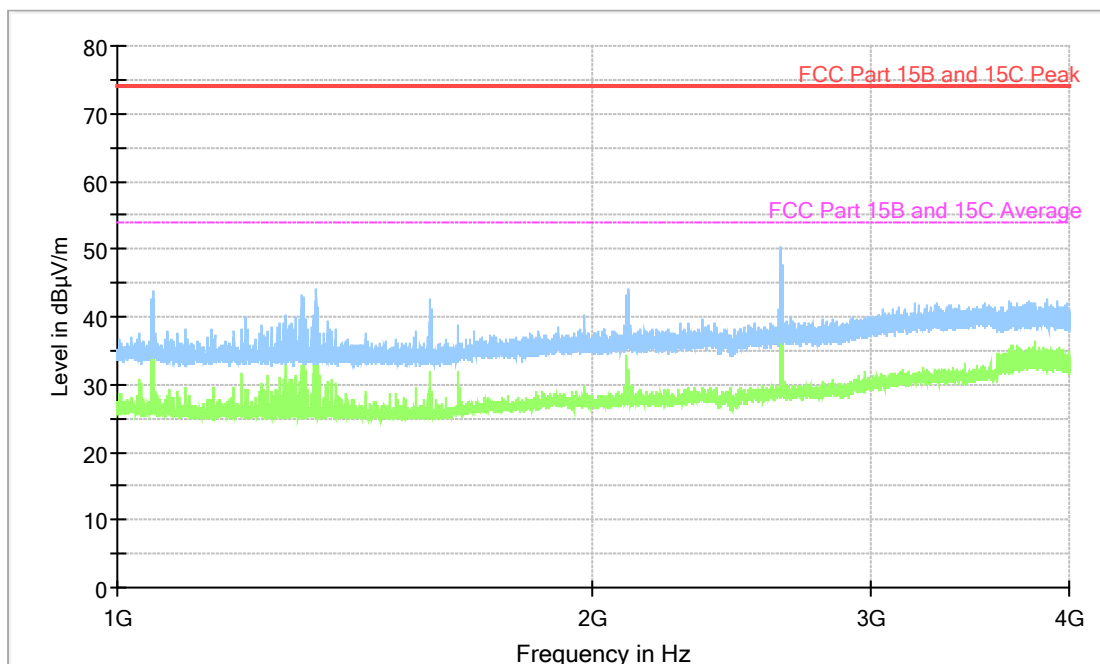
No emissions are found above noise floor or closer than 20 dB from limit.

**Note, disturber att 800 MHz does not belong to the EUT**

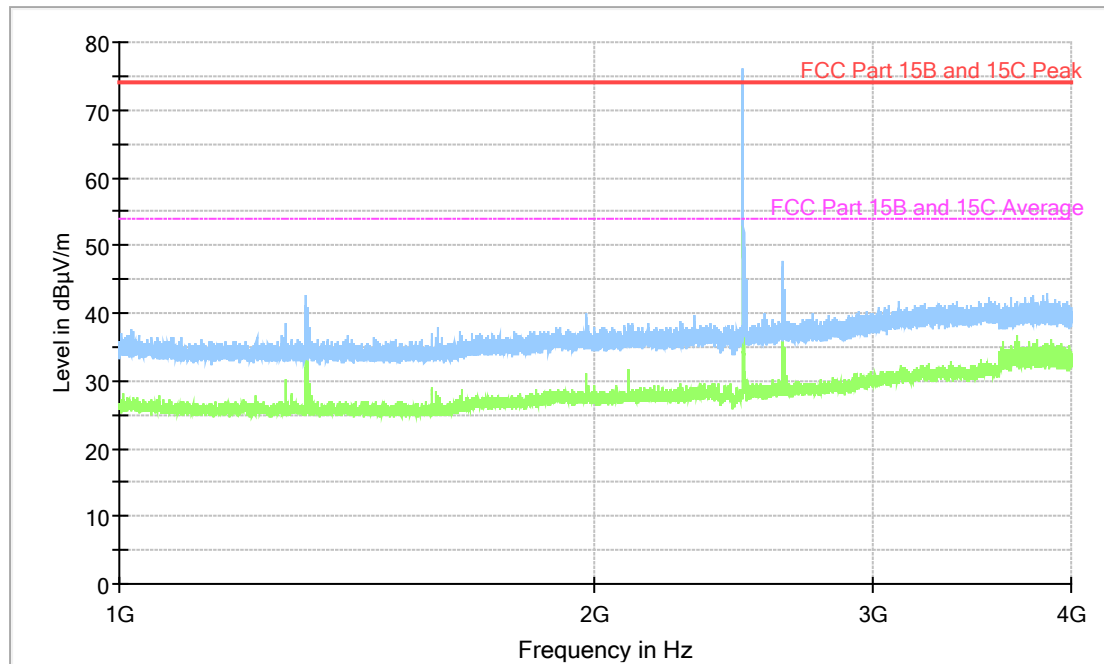
## 6.5 Test results 1 GHz – 26.5 GHz, TX



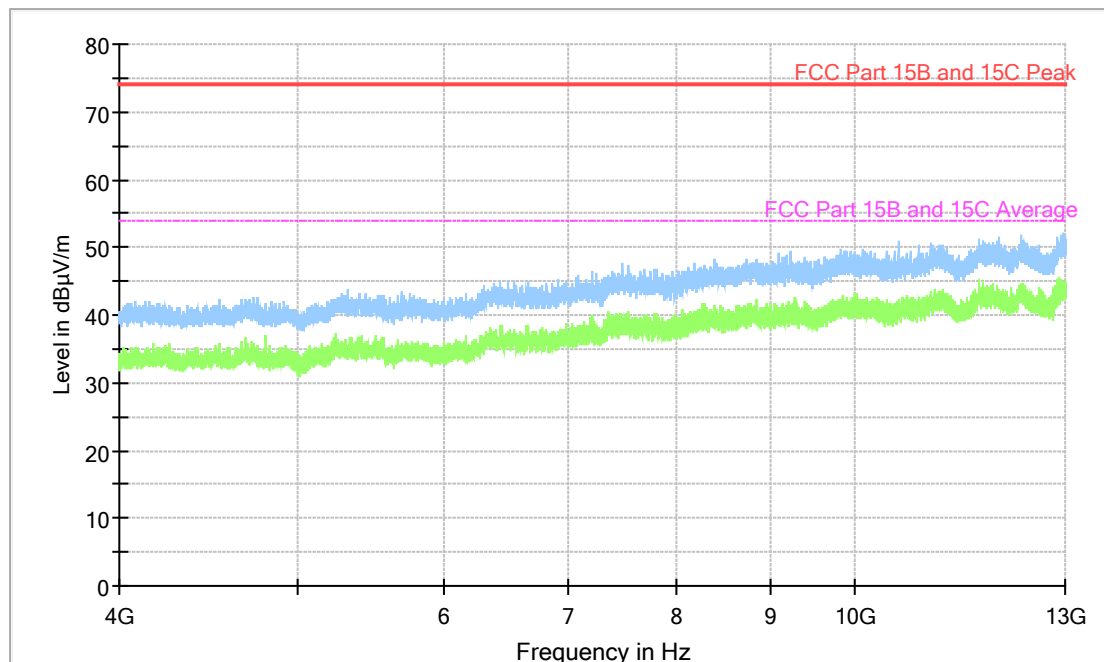
Diagram, Peak overview sweep, 1– 4 GHz at 3 m distance. TX low channel,. Carrier is attenuated by band rejection filter K&L 6N45-2450/T 100-0/0.



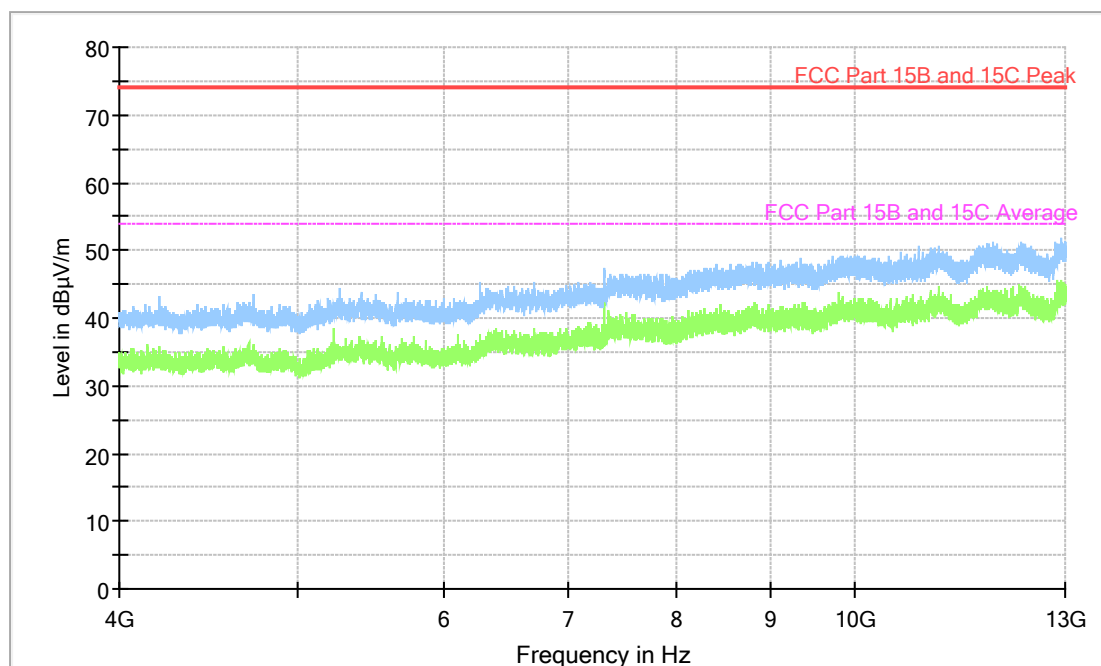
Diagram, Peak overview sweep, 1– 4 GHz at 3 m distance. TX mid channel,. Carrier is attenuated by band rejection filter K&L 6N45-2450/T 100-0/0.



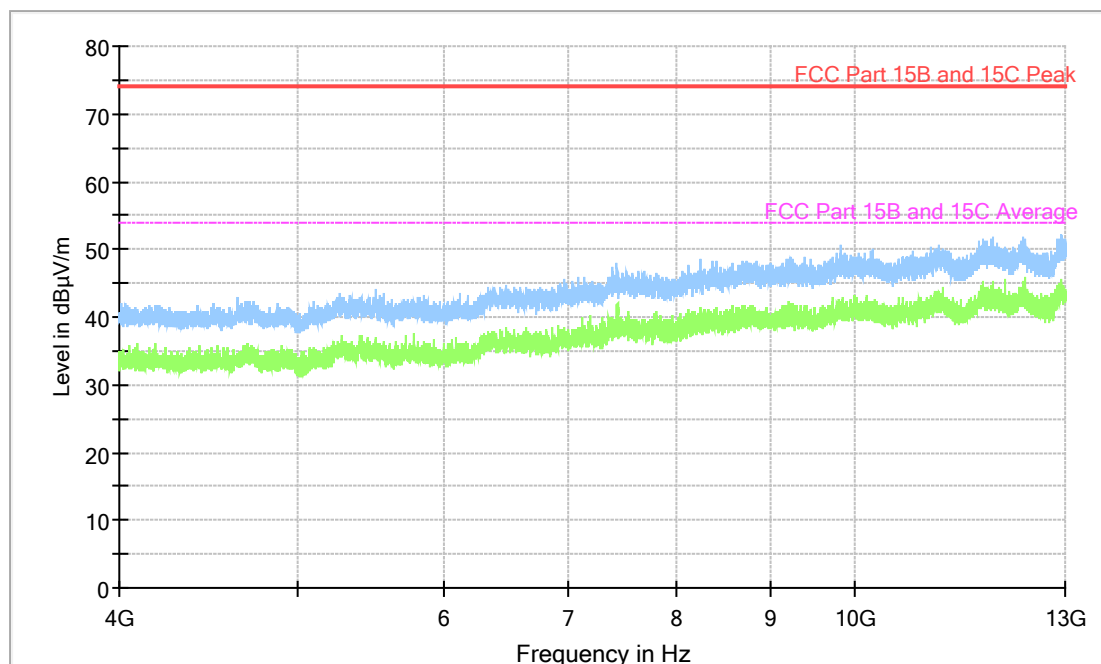
Diagram, Peak overview sweep, 1– 4 GHz at 3 m distance. TX top channel,. Carrier is attenuated by band rejection filter K&L 6N45-2450/T 100-0/0.



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.



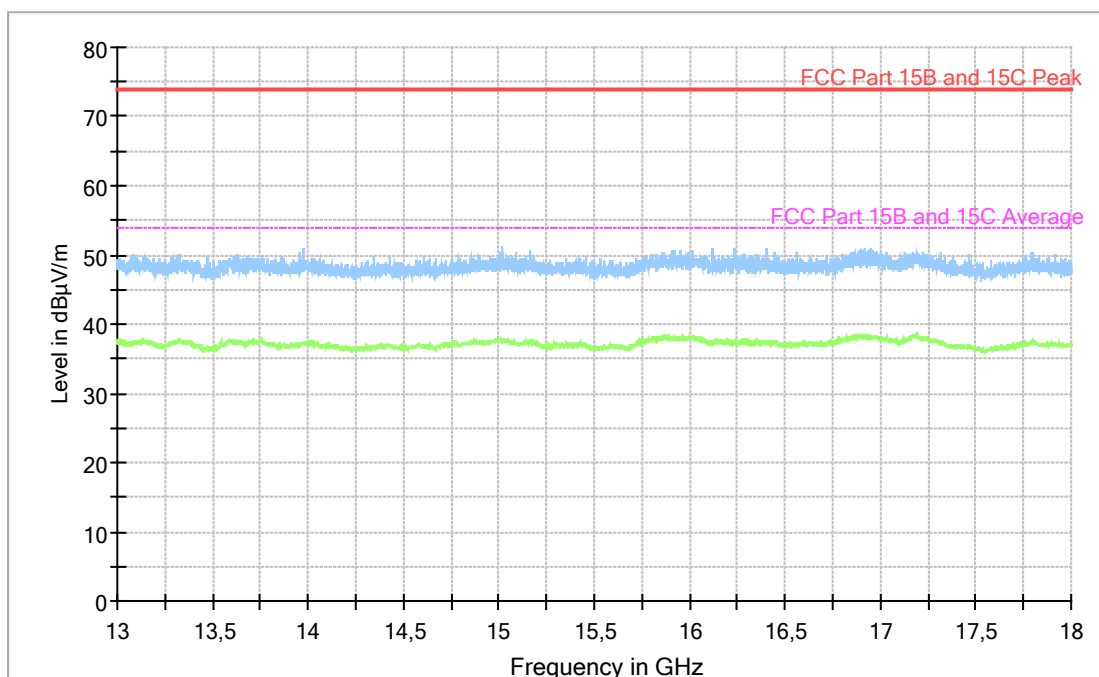
Diagram, Peak overview sweep, 4– 13 GHz at 3 m distance. TX mid channel. Emissions below 4000 MHz are attenuated by high-pass filter K&L 4410-X4500/18000-0.



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

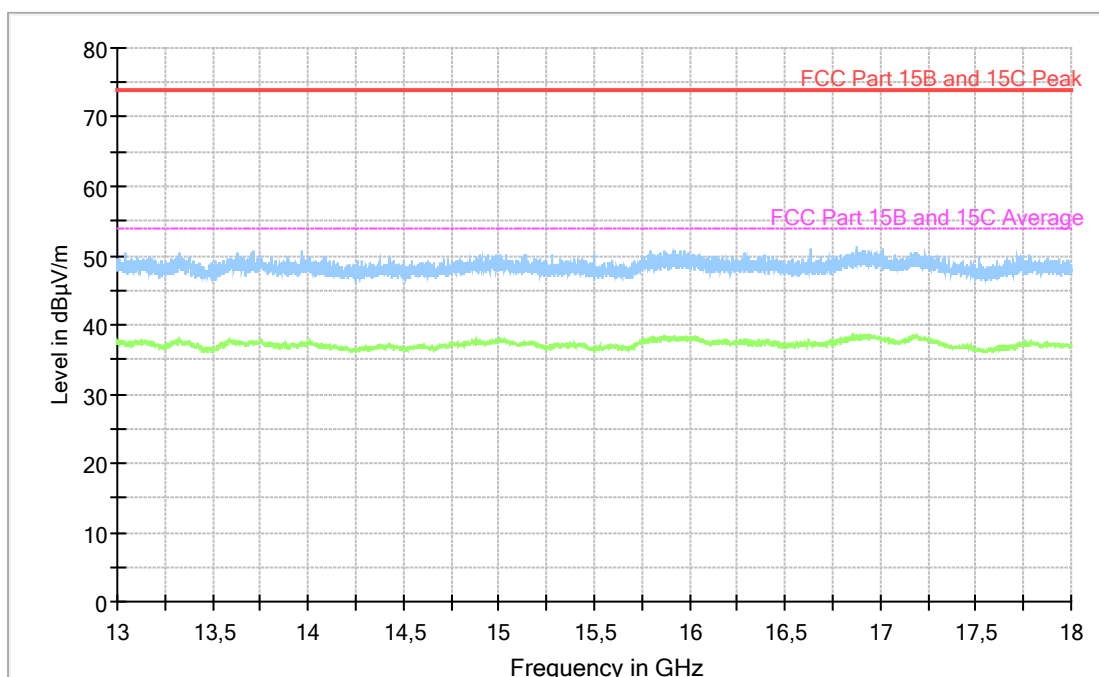


Full Spectrum



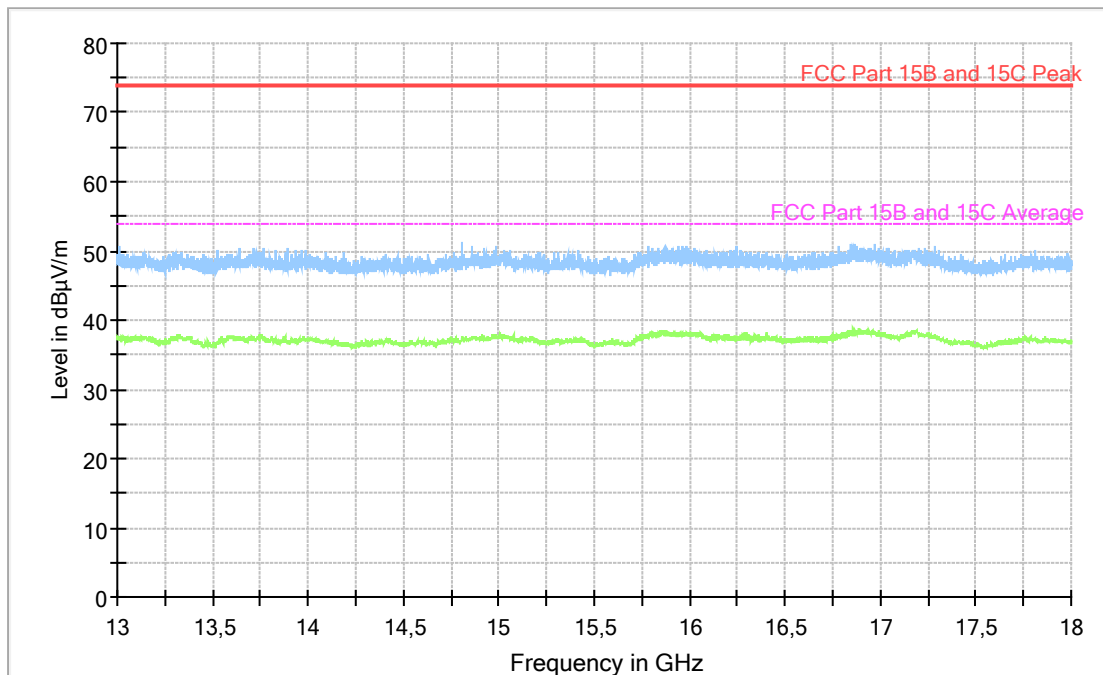
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. TX low channel

Full Spectrum



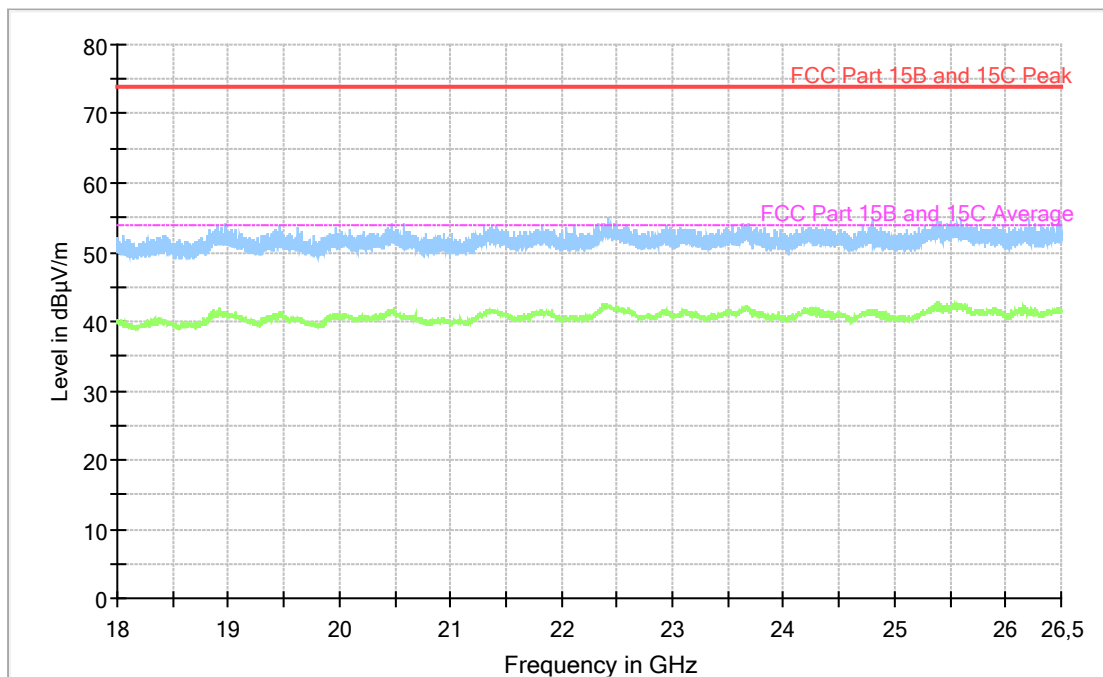
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. TX mid channel

Full Spectrum



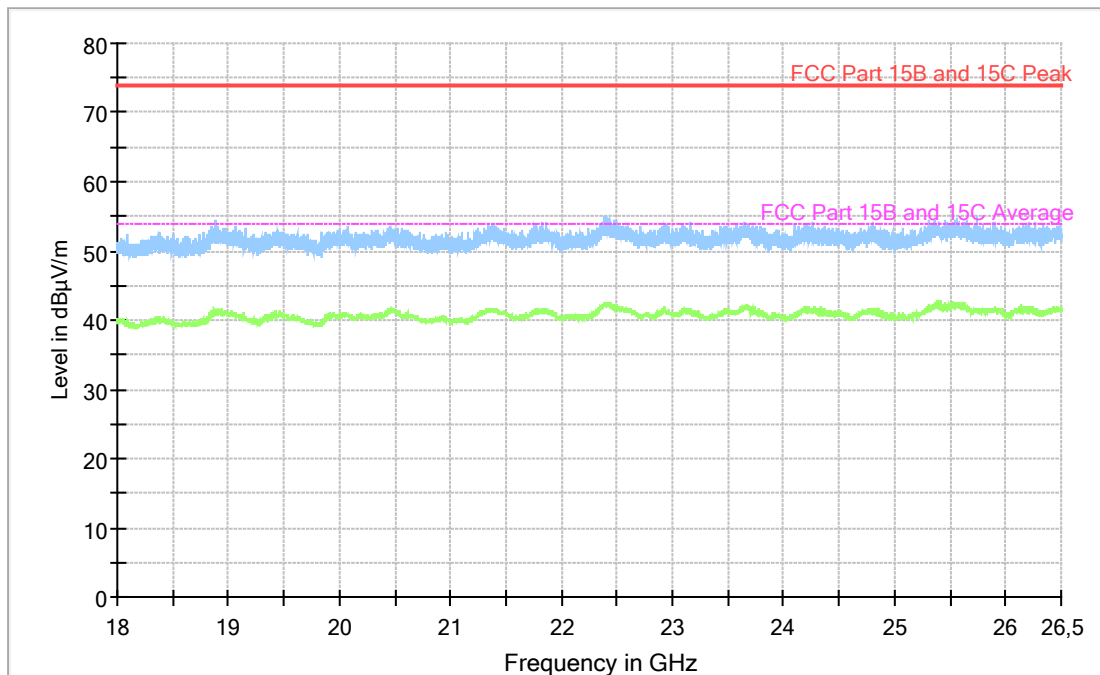
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. TX top channel

Full Spectrum



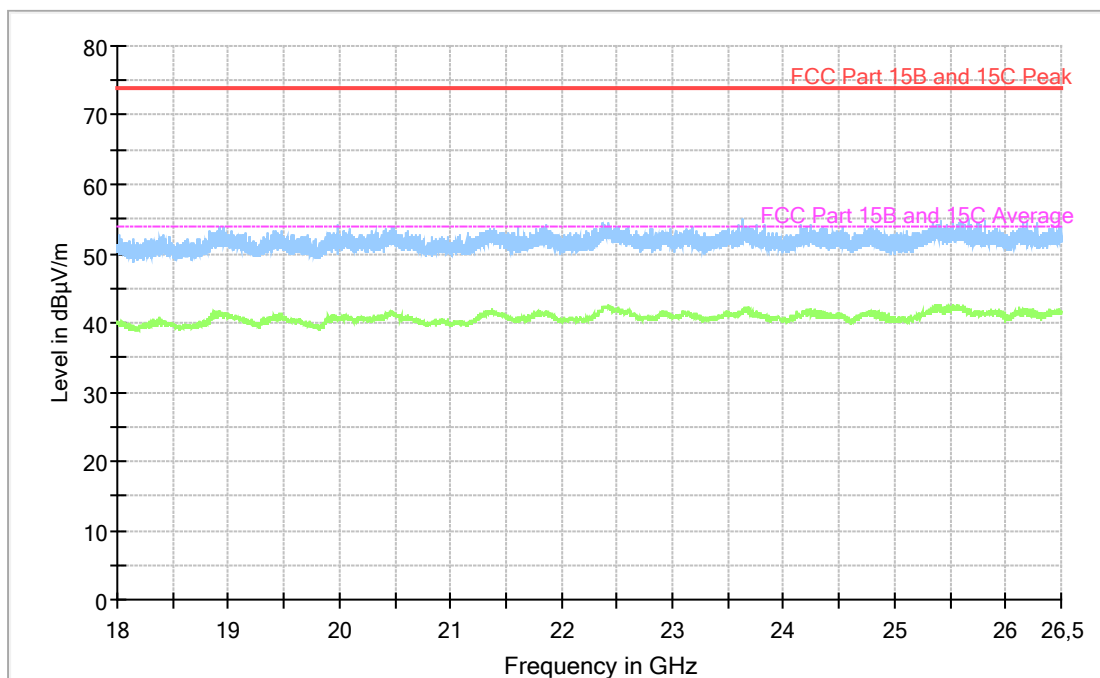
Diagram, Peak overview sweep, 18 – 26.5GHz at 3 m distance. TX low channel

Full Spectrum



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

Full Spectrum

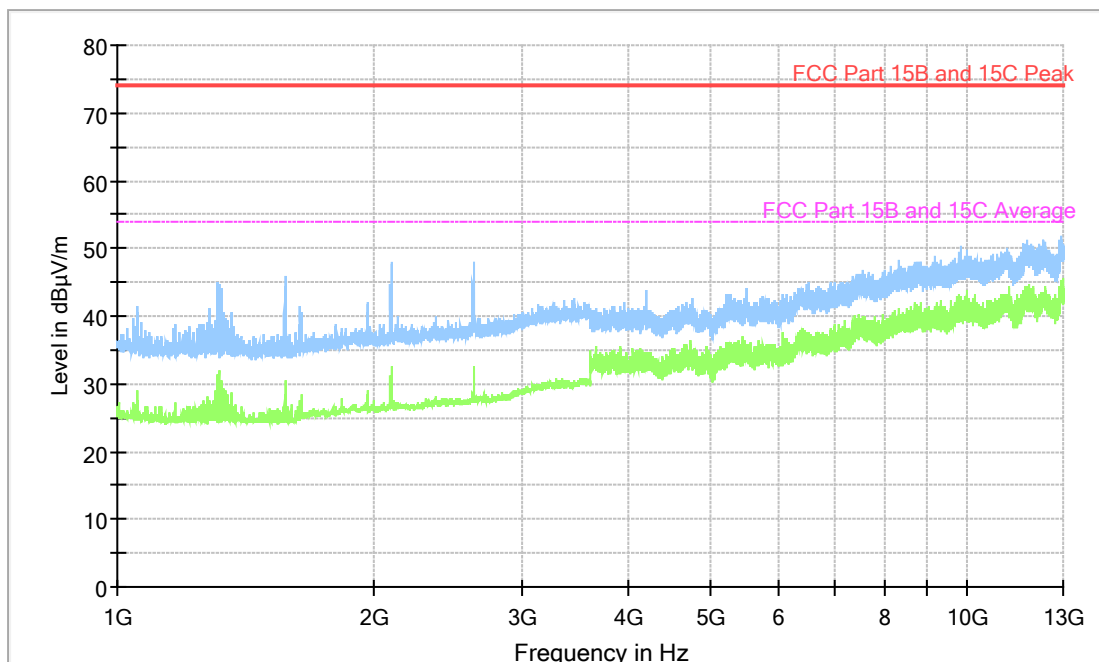


Diagram, Peak overview sweep, 18 – 26.5GHz at 3 m distance. TX top channel

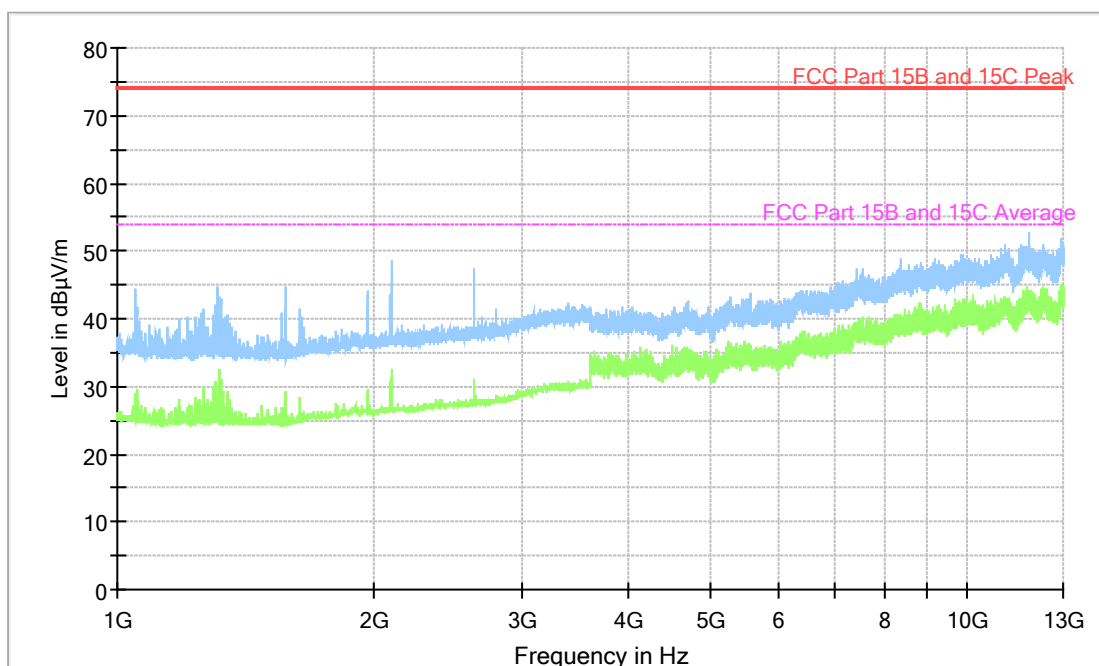
All disturbances have a margin of more than 20 dB to the limits.

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

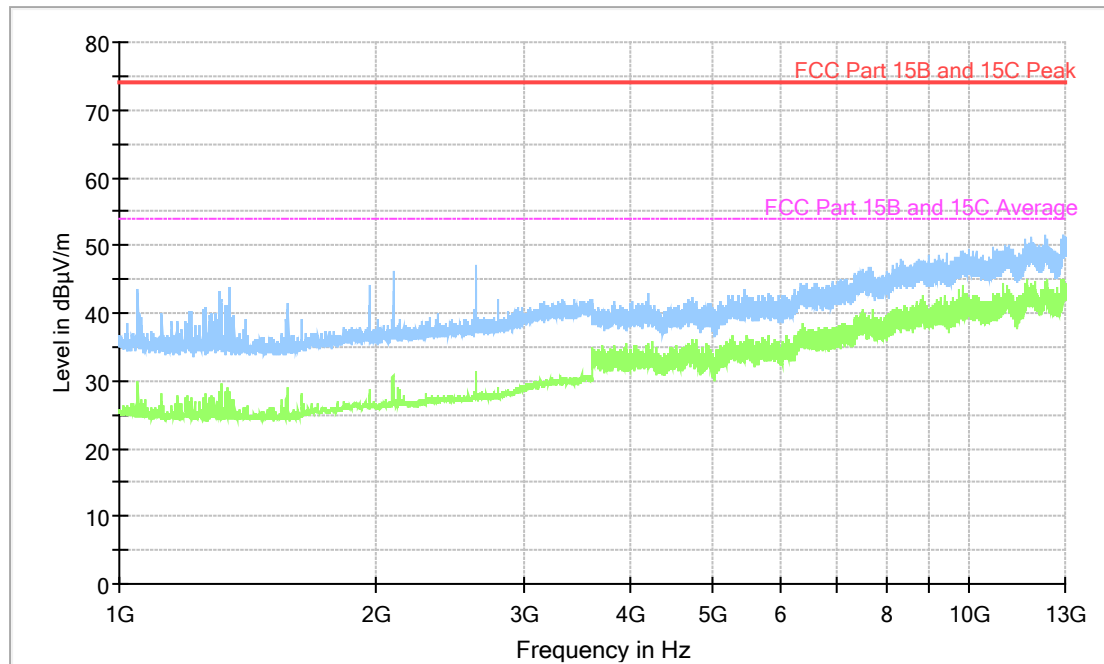
## 6.6 Test results 1 GHz – 26,5 GHz, RX



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

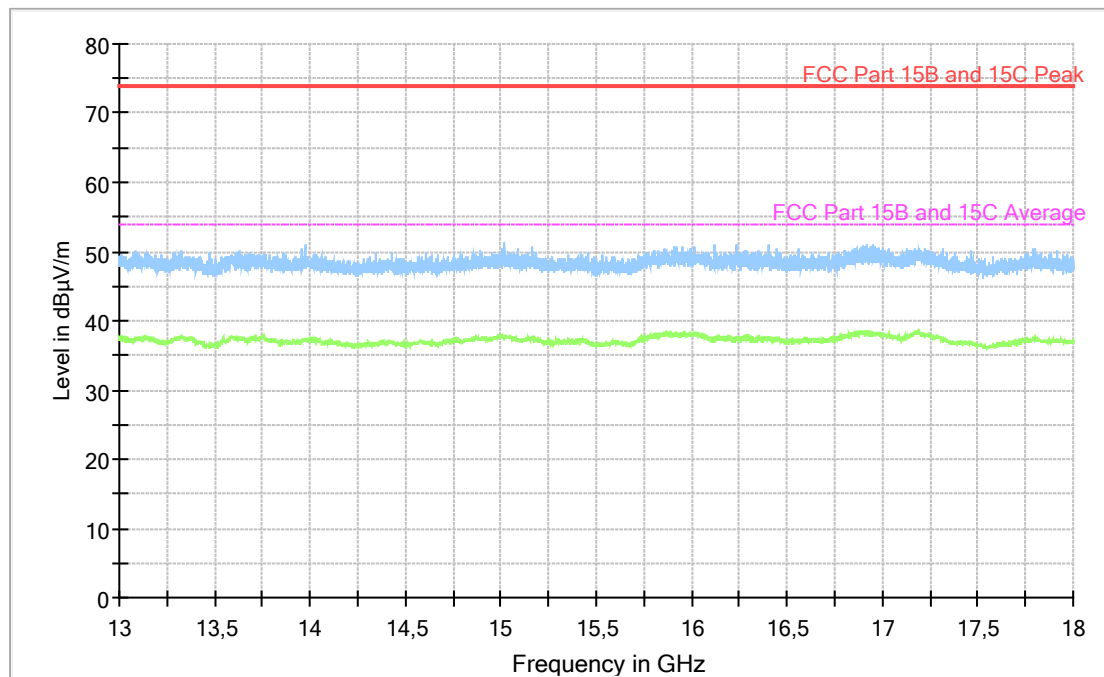


Diagram, Peak overview sweep, 1– 13 GHz at 3 m distance. RX mid channel



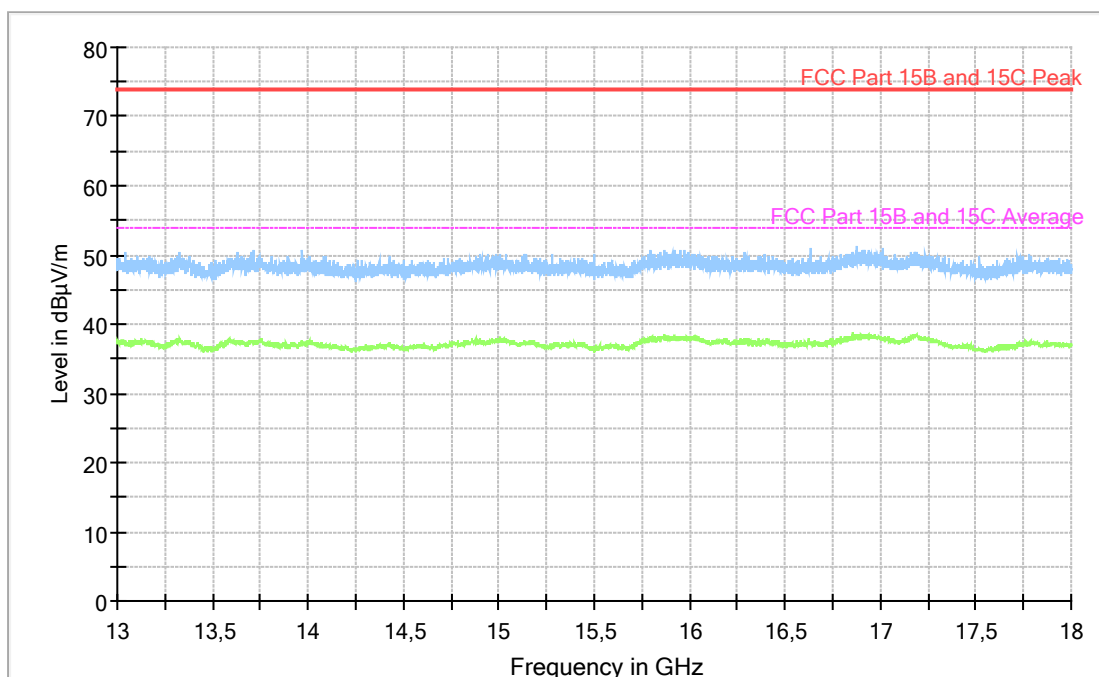
Diagram, Peak overview sweep, 1– 13 GHz at 3 m distance. RX top channel

Full Spectrum



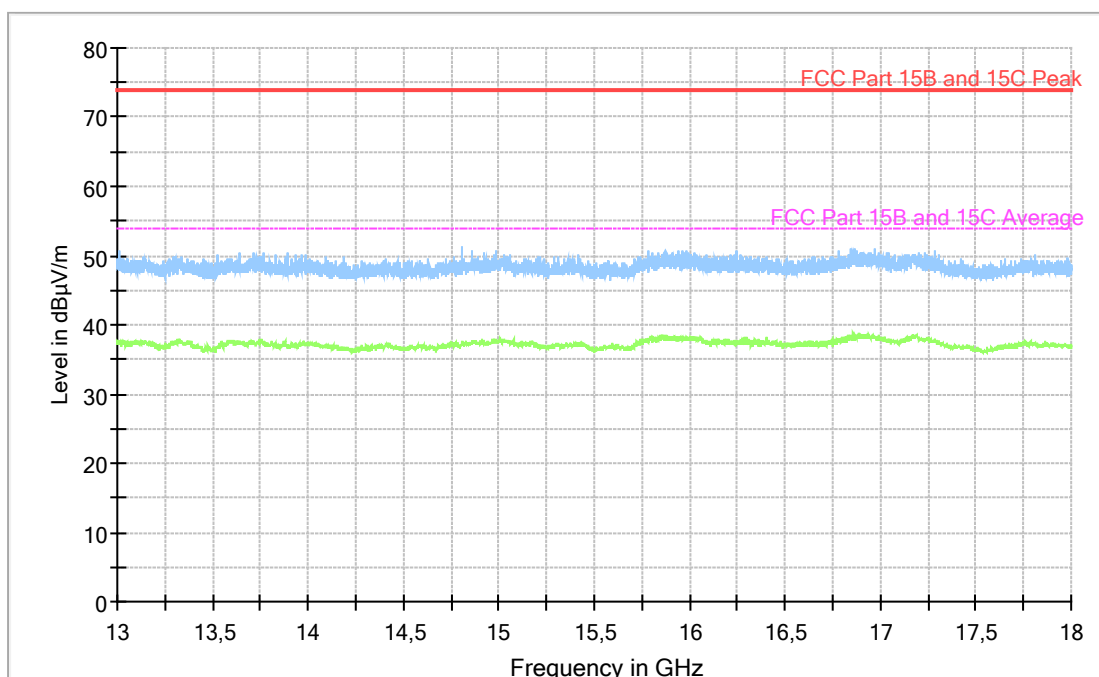
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. RX low channel

Full Spectrum



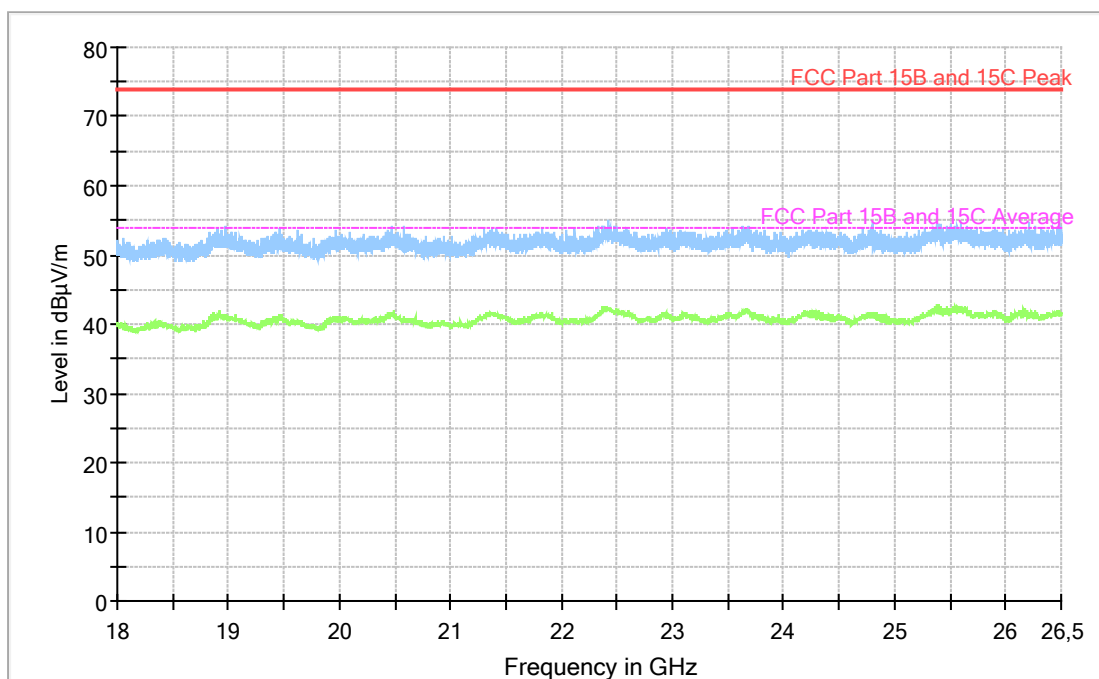
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. RX mid channel

Full Spectrum



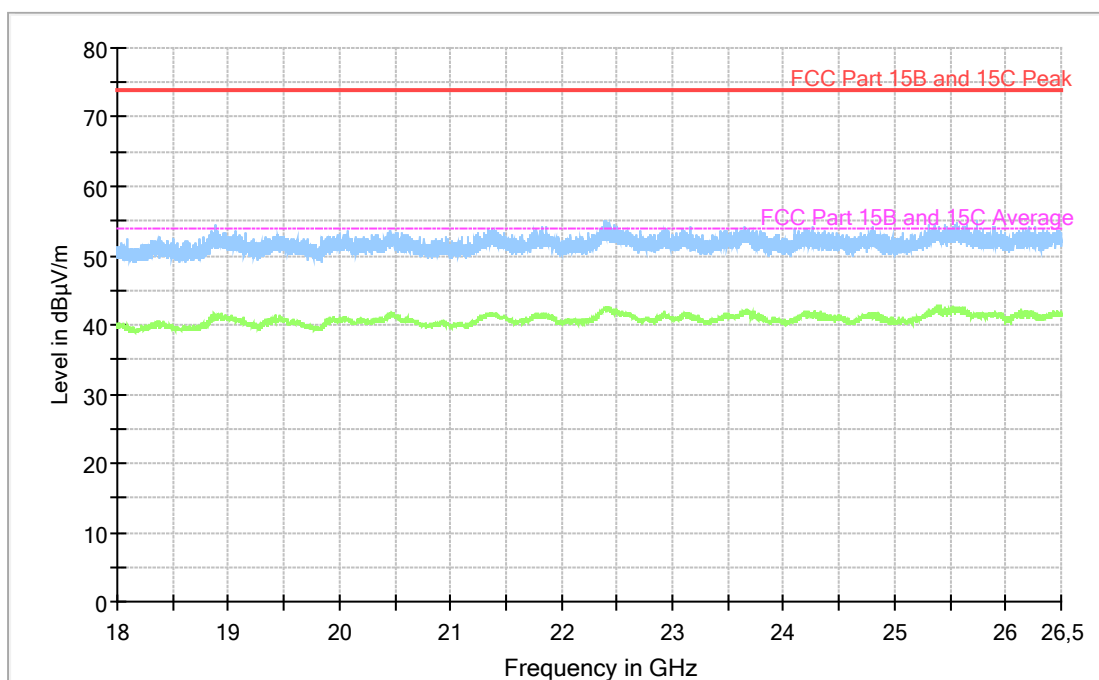
Diagram, Peak overview sweep, 13 – 18 GHz at 3 m distance. RX top channel

Full Spectrum



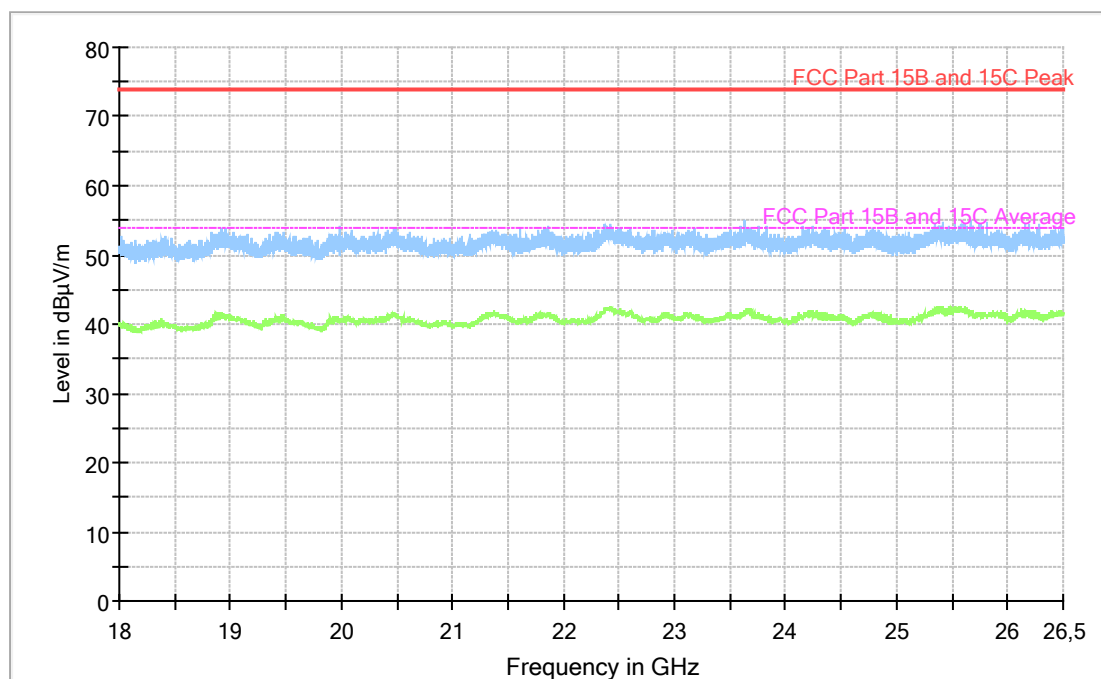
Diagram, Peak overview sweep, 18 -26.5 GHz at 3 m distance. RX low channel

Full Spectrum



Diagram, Peak overview sweep, 18 -26.5 GHz at 3 m distance. RX mid channel

Full Spectrum



Diagram, Peak overview sweep, 18 - 26.5 GHz at 3 m distance. RX top channel

All 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]



## 7 CONDUCTED BAND EDGE MEASUREMENT

<b>Date of test:</b>	2018-09-19	<b>Test location:</b>	Radio
<b>EUT Serial:</b>	TK-015	<b>Ambient temp:</b>	21 °C
<b>Tested by:</b>	PLA	<b>Relative humidity:</b>	55 %
<b>Test result:</b>	Pass	<b>Margin:</b>	>20 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

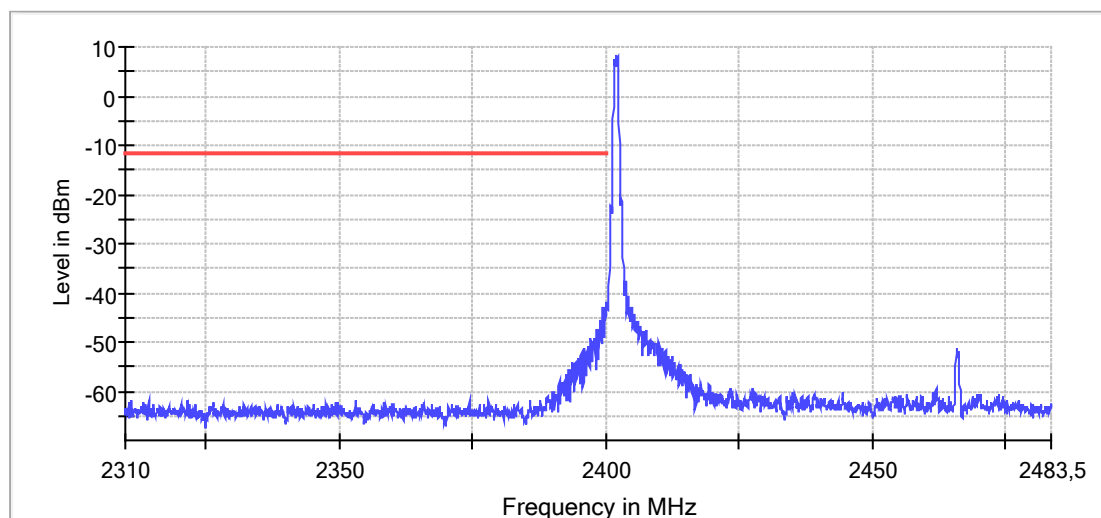
Detector: Peak,  
 RBW: 100 kHz  
 VBW: 300 kHz  
 Span: 83,5 MHz

### 7.3 Requirement

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

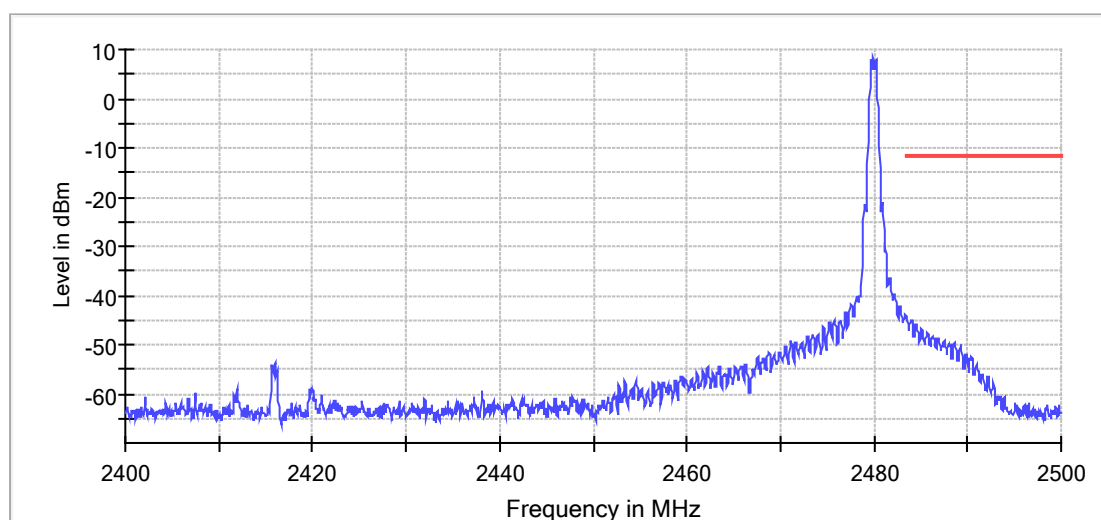
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either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

## 7.4 Test results



— Limit — Sum Level × Fail

Screenshot: Lower band edge sweep, single channel



— Limit — Sum Level × Fail

Screenshot: Upper band edge sweep, single channel

### Test results

Band edge	Delta [dBc]	Limit [dBc]	Margin [dB]
Lower	39,6	20.0	>20.0
Upper	53,5	20.0	>20.0

## 8 PEAK CONDUCTED OUTPUT POWER

<b>Date of test:</b>	2018-09-19	<b>Test location:</b>	Radio
<b>EUT Serial:</b>	TK-015	<b>Ambient temp:</b>	21 °C
<b>Tested by:</b>	PLA	<b>Relative humidity:</b>	55 %
<b>Test result:</b>	Pass	<b>Margin:</b>	>10 dB

### 8.1 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.

### 8.2 Test conditions

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

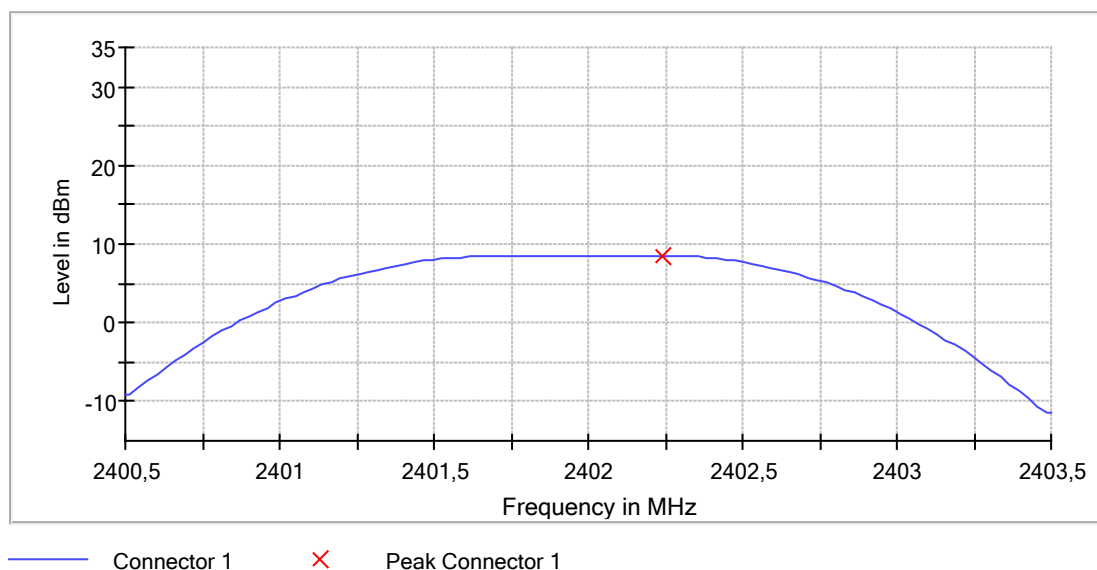
The EUT was set up in order to emit maximum disturbances.

### 8.3 Requirements

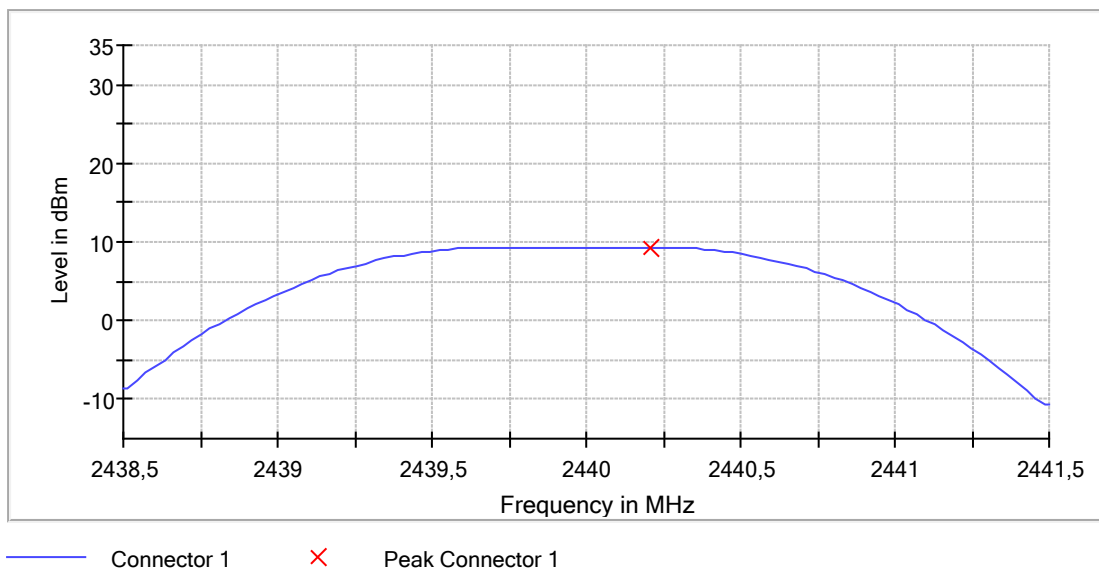
Reference: CFR 47§15.247(b)(3), RSS-247 5.4

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.

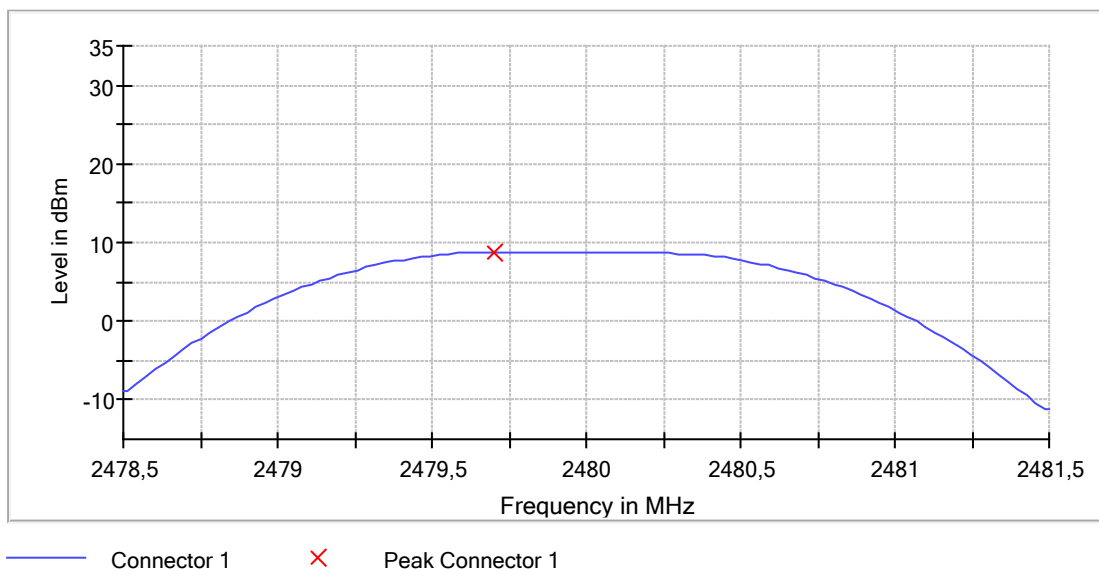
### 8.4 Test results



**Screenshot: Output power, low channel**



**Screenshot: Output power, middle channel**



**Screenshot: Output power, high channel**

**Test result**

Channel [MHz]	Output power [dBm]
2402	8,6
2440	9,3
2480	8,7

## 9 OCCUPIED 6 DB BANDWIDTH

<b>Date of test:</b>	2018-09-19	<b>Test location:</b>	Radio
<b>EUT Serial:</b>	TK-015	<b>Ambient temp:</b>	21 °C
<b>Tested by:</b>	PLA	<b>Relative humidity:</b>	55 %
<b>Test result:</b>	Pass	<b>Margin:</b>	0.232 MHz

### 9.1 Test set-up and test procedure.

The test method is in accordance with ANSI C63.10-2013 section 6.9.2.

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

### 9.2 Test conditions

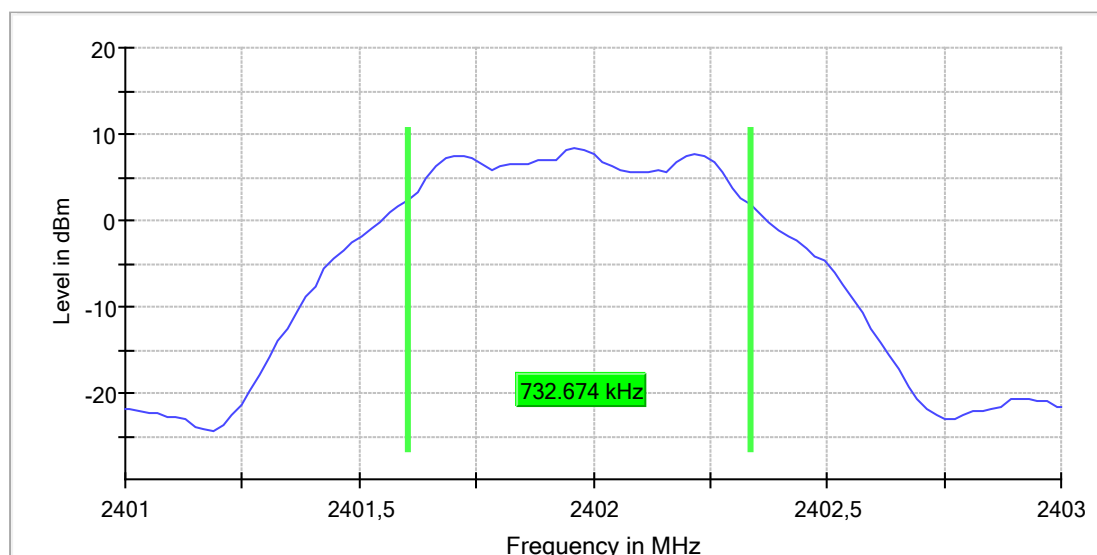
Detector: Peak,  
 RBW: 100 kHz  
 VBW: 3 x RBW  
 Span: >1,5 x OBW

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

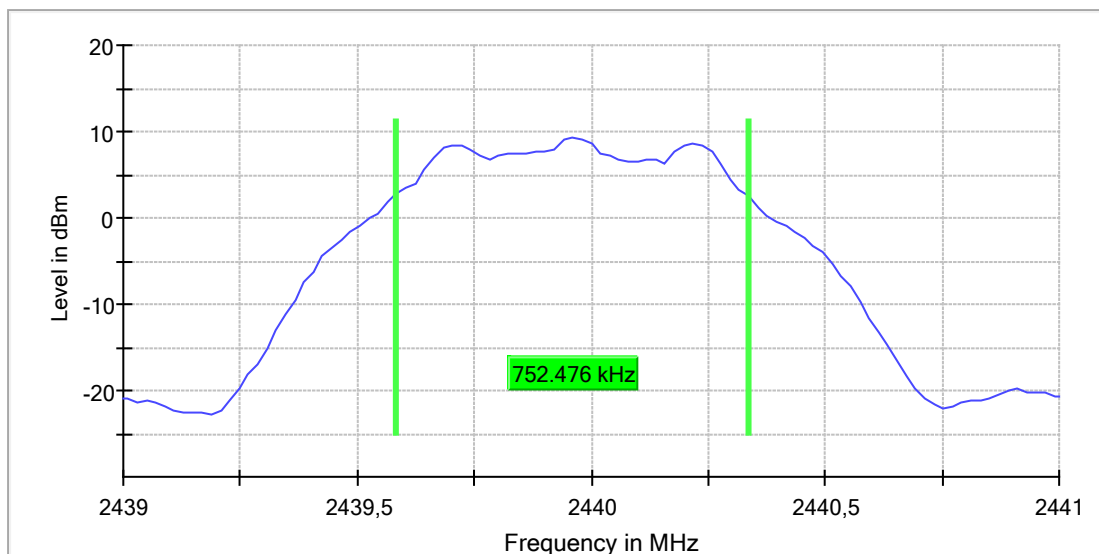
### 9.3 Requirements

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

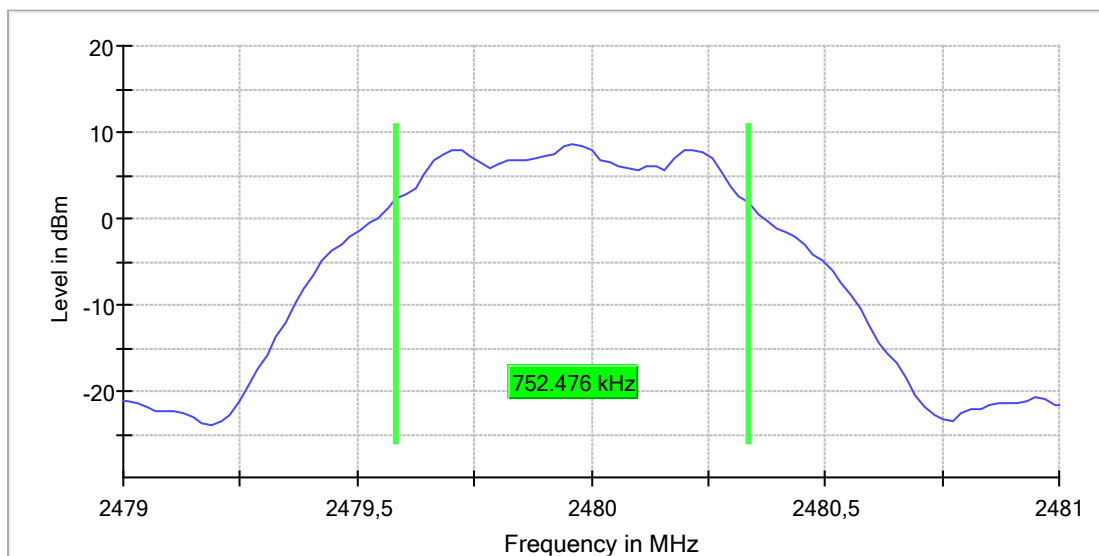
### 9.4 Test results



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 [MHz]
2402	0.732
2440	0.752
2480	0.752

## 10 99 % BANDWIDTH

<b>Date of test:</b>	2018-09-19	<b>Test location:</b>	Radio
<b>EUT Serial:</b>	TK-015	<b>Ambient temp:</b>	21 °C
<b>Tested by:</b>	PLA	<b>Relative humidity:</b>	55 %
<b>Test result:</b>	Pass	<b>Margin:</b>	-

### 10.1 Test set-up and test procedure.

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

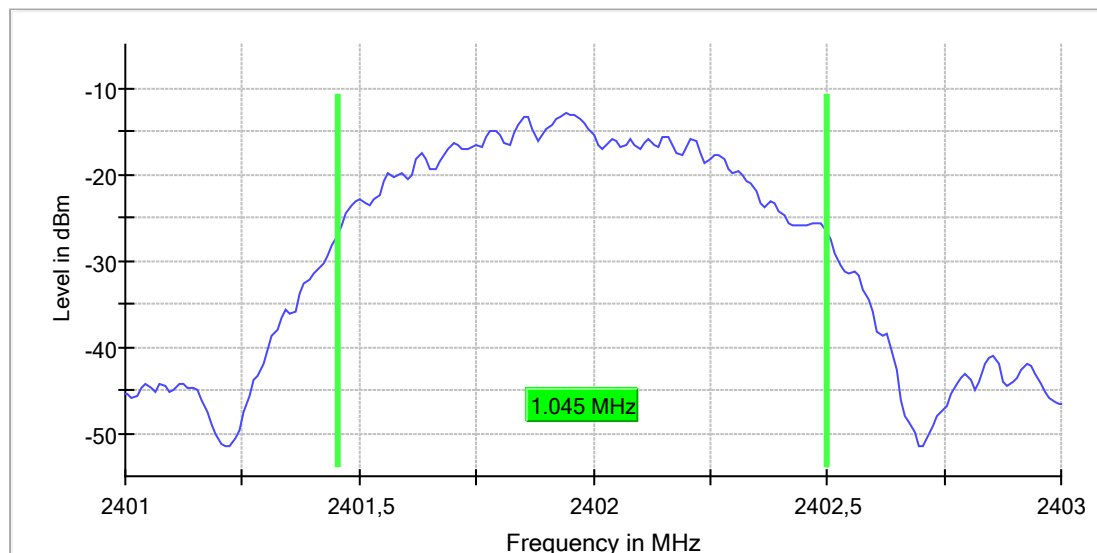
The EUT was connected to spectrum analyser via rf-cable and attenuator. Spectrum analyser with occupied bandwidth measurement function is used to determine the occupied bandwidth.

### 10.2 Test conditions

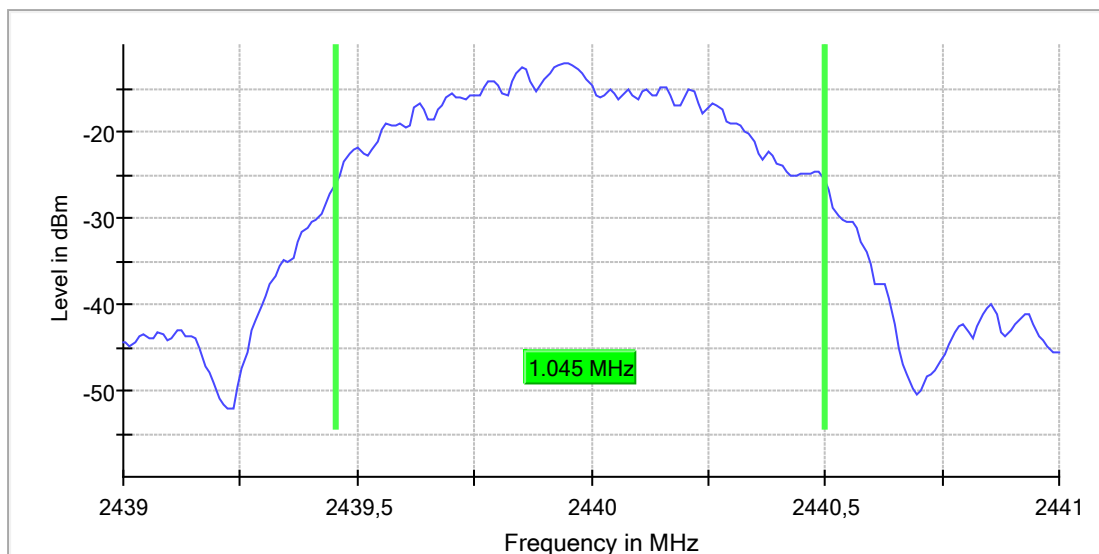
Detector: Peak,  
 RBW: 1 – 5 % of OBW  
 VBW: 3 x RBW

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

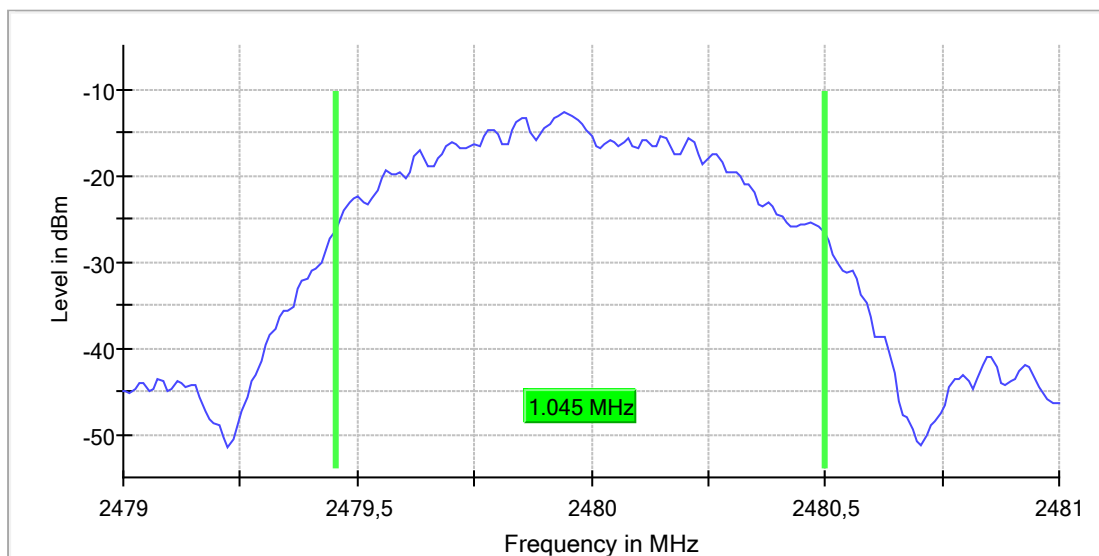
### 10.3 Test results



Screenshot: 99 % bandwidth Measurement, low channel



Screenshot: 99 % bandwidth Measurement, middle channel



Screenshot: 99 % bandwidth Measurement, high channel

#### Test result

Channel [MHz]	99 % BW [MHz]
2402	1.045
2440	1.045
2480	1.045



## 11 PEAK POWER SPECTRAL DENSITY

<b>Date of test:</b>	2018-09-19	<b>Test location:</b>	Radio
<b>EUT number:</b>	TK-015	<b>Ambient temp:</b>	21 °C
<b>Tested by:</b>	PLA	<b>Relative humidity:</b>	55 %
<b>Test result:</b>	Pass	<b>Margin:</b>	>8 dB

### 11.1 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.

### 11.2 Test conditions

Detector: Peak,  
 RBW: 3 kHz  
 VBW: >3 x RBW  
 Span: 1.5 x 6 dB bandwidth

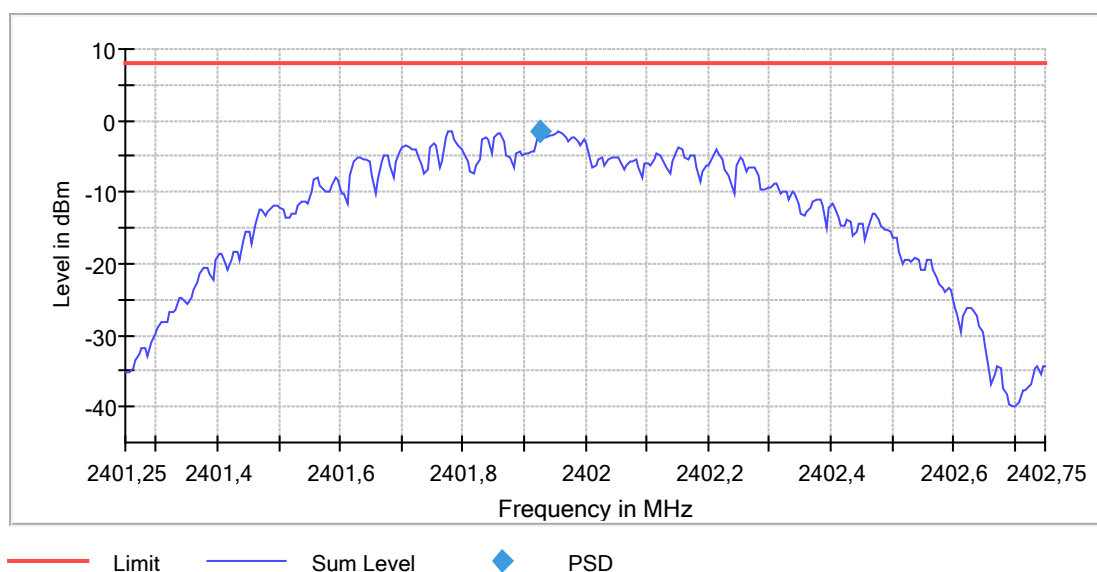
The EUT was set up in order to emit maximum disturbances.

### 11.3 Requirements

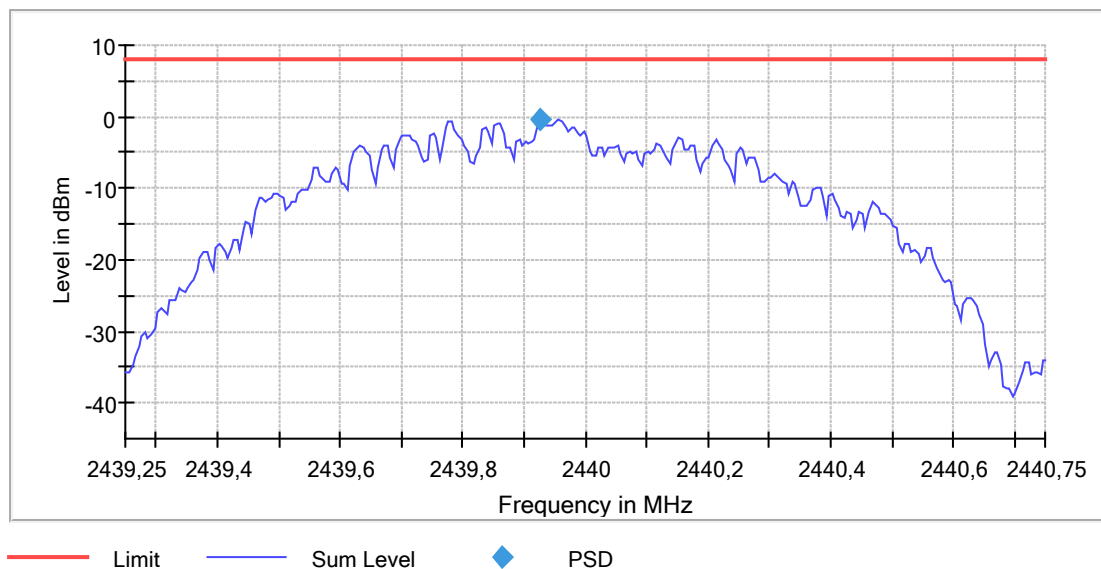
Reference: CFR 47§15.247(3), RSS-247 5.2(A)

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.

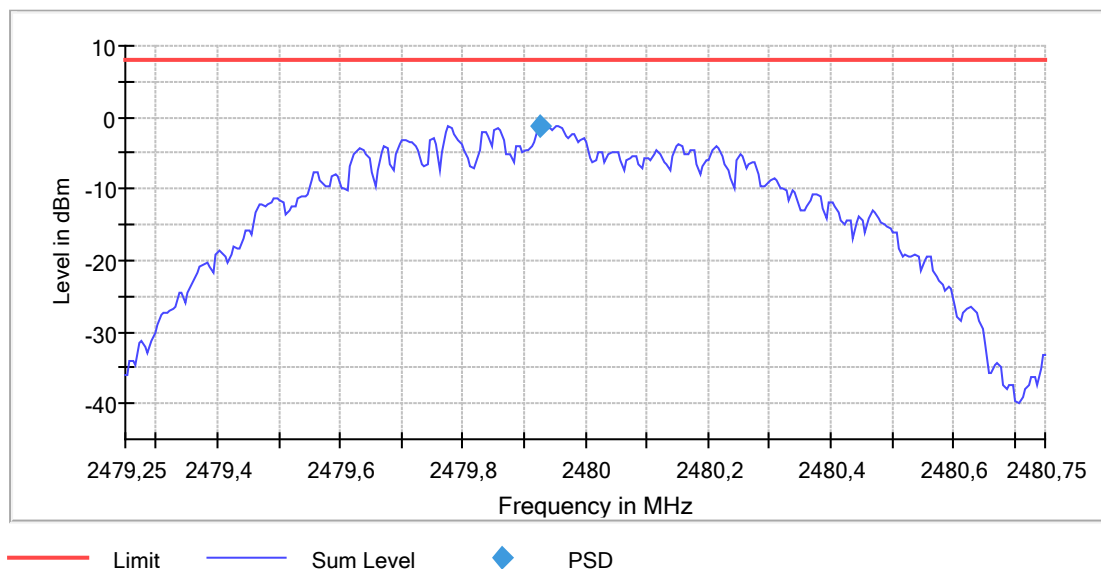
### 11.4 Test results



**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/3kHz]
2402	-1.4
2445	-0.5
2480	-1.1

## 12 TEST EQUIPMENT

### 5m SAC

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - 10	--	--	--
Receiver	Rohde & Schwarz	ESW44	33950	Aug-2018	1 year
Antenna	Rohde & Schwarz	HL562	32310	April-2018	3 years
Coaxial cable	Rosenberger	FP1	39053	Mars-2018	1 year

### Wireless Center and 3m FAC

Equipment type	Manufacturer	Model	Inv. No.	Last Cal. date	Cal. interval
Measurement software	Rohde & Schwarz	EMC32 - Version 10	--	--	--
Signal analyzer	Rohde & Schwarz	ESU 40	13178	July-2018	1 year
Measurement cable	Huber + Suhner	Sucoflex 104 PE	39138	July-2018	1 year
Measurement cable	Huber + Suhner	Sucoflex 104	5191	July-2018	1 year
Measurement cable	Huber + Suhner	Sucoflex 104	39119	July-2018	1 year
Horn antenna	EMCO	3115	4628	Nov-2015	3 years
Pre amplifier	Sangus	00101400-23-10P -6-S ; AFS44-12002400-32-10P -44	12335	July-2018	1 year
Horn antenna	EMCO	3160-08	30099	Oct-2016	3 years
Horn antenna	EMCO	3160-09	30101	Oct-2016	3 years
2,4 GHz band reject filter:	K&L MICROWAVE INC	6N45-2450/T100-0/0	12389	Mars-2018	1 year
4 GHz high pass filter	K&L MICROWAVE INC	4410-X4500/18000-0/0	5133	July-2018	1 year

## 13 MEASUREMENT UNCERTAINTY

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

Measurement uncertainty for radiated disturbance

Uncertainty for the frequency range 30 to 1000 MHz at 3 m	$\pm 5.1$ dB
Uncertainty for the frequency range 30 to 1000 MHz at 10 m	$\pm 5.0$ dB
Uncertainty for the frequency range 1.0 to 18 GHz at 3 m	$\pm 4.7$ dB
Uncertainty for the frequency range 18 to 26 GHz at 3 m	$\pm 4.8$ dB
Uncertainty for the frequency range 26 to 40 GHz at 3 m	$\pm 5.7$ 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 1812896STO-003 Annex 1.

Test set up photos are in separate document 1812896STO-004 Annex 2.