

TEST REPORT

of the accredited test laboratory

TÜV Nr.:INE-AT/FG-21/195

Applicant: YUNEX GmbH
Otto-Hahn-Ring 6
D-81739 München

Product: ITS Radiocommunications equipment 'RSU2X'
Bluetooth/WLAN tests only

Manufacturer: see above

Output power Various **power supply:** See page 4
(see page 6 and 7)

Frequency range: Various **Channel** Various (see
(see page 6 and 7) **separation:** page 6 and 7)

Accredited Standards: FCC: 47 CFR Part 15 (eCFR 02.12.2021);

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Inspection Body,
Certification Body,
Calibration Laboratory,
Verifizierungsstelle**Notified Body 0408****Non-executive
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IBAN
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DVR 3002476**TÜV AUSTRIA SERVICES GMBH**
Test laboratory for EMC

Ing. Michael Emminger

**examined by / Testing
Laboratory
TÜV AUSTRIA SERVICES
GMBH**

17.12.2021

Ing. Wilhelm Seier

**approved by / Testing
Laboratory
TÜV AUSTRIA SERVICES
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The results of this test report only refer to the provided equipment.

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1. Applicant

Company: YUNEX GmbH

Department: ---

Address: Otto-Hahn-Ring 6; D- 81739 München

Contact person: Mr. Thomas Jatschka

EUT received on: 02.12.2021

Tests were performed on: 02.12. – 03.12.2021

2. Description of EUT

EUT: ITS Radiocommunications equipment 'RSU2X'

Manufacturer: YUNEX GmbH
Otto-Hahn-Ring 6
D- 81739 München

Description: YUNEX GmbH provided the following configuration for the measurements:

Prototype – PoE powered, case earthed

Operating mode: The measurements were carried out at the following running states:
Transmitting Bluetooth/BLE/WLAN (see page 6 and 7)

Technical data EUT: Rated voltage: 48 VDC
Rated current: 1,5A
Rated frequency: DC

Mains voltage during the tests: Power over Ethernet (PoE)

Climatic conditions in the emc laboratory: Relative humidity: 27%
Temperature: 24°C

3. Standards / Final result

Name	Title	Deviation	Result
FCC: 47 CFR Part 15 (eCFR 02.12.2021)	RADIO FREQUENCY DEVICES	*)	OK
Result: Opinions and interpretation of testing laboratory OK: EUT passed NOK: EUT failed			

*) Only limited measurements were performed, see detailed description on page 6 and 7.

4. Test results

4.1 TEST OBJECT DATA

This Radio Equipment incorporates various transceiver modules. This test report is only for the Bluetooth/BLE/WLAN part of the radio equipment.

Bluetooth/BLE/WLAN capability is realised through an FCC certified module with FCC-ID: VPYLBEE5HY1MW.

However, the grant conditions for this module are not totally met, because a different antenna type is in use. According to a KDB-Inquiry Tracking Number 372095, only limited tests will be performed:

1. EIRP measurements
2. Radiated spurious emissions including band edge requirements and restricted band requirements
3. Power Spectral Density

According to manufacturer's declaration WLAN operation in UNII bands is permanently blocked (in fact the antenna is not designed for 5 GHz operation anyway), and therefore only Bluetooth, BLE and WLAN operation in the 2,4 GHz band was tested.

2.1033 (c) Technical description Bluetooth:

2.1033 (4) Type of emission: Basic datarate – Channel spacing 1 MHz
 Enhanced datarate – Channel spacing 1 MHz

2.1033 (5) Frequency range: 2402 to 2480 MHz (channel center frequencies).

2.1033 (6) Power range and Controls: The maximum peak output power is 6,61 mW for BDR and 3,72 mW for EDR and there is no power regulation.

2.1033 (7) Maximum output power rating: 6,61 mW for BDR and 3,72 mW for EDR.

2.1033 (8) DC Voltage and Current: 48V DC
 maximum current consumption: 1500 mA

2.1033 (c) Technical description – Bluetooth Low Energy

2.1033 (4) Type of emission: BLE – Channel spacing 2 MHz

2.1033 (5) Frequency range: 2402 to 2480 MHz (channel center frequencies).

2.1033 (6) Power range and Controls: The maximum peak output power is 5,75 mW and there is no power regulation.

2.1033 (7) Maximum output power rating: 5,75 mW.

2.1033 (8) DC Voltage and Current: 48V DC
maximum current consumption: 1500 mA

2.1033 (c) Technical description

2.1033 (4) Type of emission:
802.11 standards DSSS and OFDM

2.1033 (5) Frequency range:
2412 till 2462 MHz (channel center frequencies) in 5 MHz steps resulting in 11 Channels (DSSS and OFDM channels)

2.1033 (6) Power range and Controls: The maximum peak output power is 72,44 mW and there is no power regulation.

2.1033 (7) Maximum output power rating: 72,44 mW.

2.1033 (8) DC Voltage and Current: 48V DC
maximum current consumption: 1500 mA

Tests were performed December 1st and 2nd 2021.

4.2 Maximum Peak RF Power Output (EIRP)

§ 15.247(b)(1)

Radiated Measurement – Mode: Bluetooth BDR

Rated output power: 6,61 mW

Test conditions		Transmitter power (mW)		
		2402 MHz	2441 MHz	2480 MHz
T _{nom} (24) °C	V _{nom} (48) V	5,01	6,61	5,25
Maximum deviation from rated output power under normal test conditions (dB)		-1,2	0	-1,0
Measurement uncertainty		± 0,75 dB		

LIMIT SUBCLAUSE 15.247(b)(1)

Under normal test conditons	1W conducted (4W eirp)
-----------------------------	------------------------

Test Equipment used: EMV-100; EMV-110; EMV-200/1

Maximum Peak RF Power Output (EIRP)

§ 15.247(b)(1)

Radiated Measurement – Mode: Bluetooth EDR

Rated output power: 3,72 mW

Test conditions		Transmitter power (mW)		
		2402 MHz	2441 MHz	2480 MHz
T _{nom} (24) °C	V _{nom} (48) V	3,02	3,72	2,82
Maximum deviation from rated output power under normal test conditions (dB)		-0,9	0	-1,2
Measurement uncertainty		± 0,75 dB		

LIMIT

SUBCLAUSE 15.247(b)(1)

Under normal test conditons	1W conducted (4W eirp)
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Test Equipment used: EMV-100; EMV-110; EMV-200/1

Maximum Peak RF Power Output (EIRP)

§ 15.247(b)(3)

Radiated Measurement – Mode: Bluetooth Low Energy

Rated output power: 5,75 mW

Test conditions		Transmitter power (mW)		
		2402 MHz	2440 MHz	2480 MHz
T _{nom} (24) °C	V _{nom} (5) V	4,47	5,75	4,27
Maximum deviation from rated output power under normal test conditions (dB)		-1,1	0	-1,3
Measurement uncertainty		± 0,75 dB		

LIMIT

SUBCLAUSE 15.247(b)(3)

Under normal test conditons	1W conducted (4W eirp)
-----------------------------	------------------------

Test Equipment used: EMV-100; EMV-110; EMV-200/1

Maximum Peak RF Power Output (EIRP)

§ 15.247(b)(3)

Radiated Measurement

Rated output power: 72,44 mW

Test conditions		Transmitter power (mW)		
		2412 MHz	2437 MHz	2462 MHz
T _{nom} (24)°C	DSSS	61,66	64,57	72,44
	OFDM – lowest data rate	22,39	56,23	27,54
	OFDM – highest data rate	20,89	22,39	23,99
Measurement uncertainty		± 0,75 dB		

LIMIT

SUBCLAUSE 15.247(b)(3)

Under normal test conditons	1W conducted (4W eirp)
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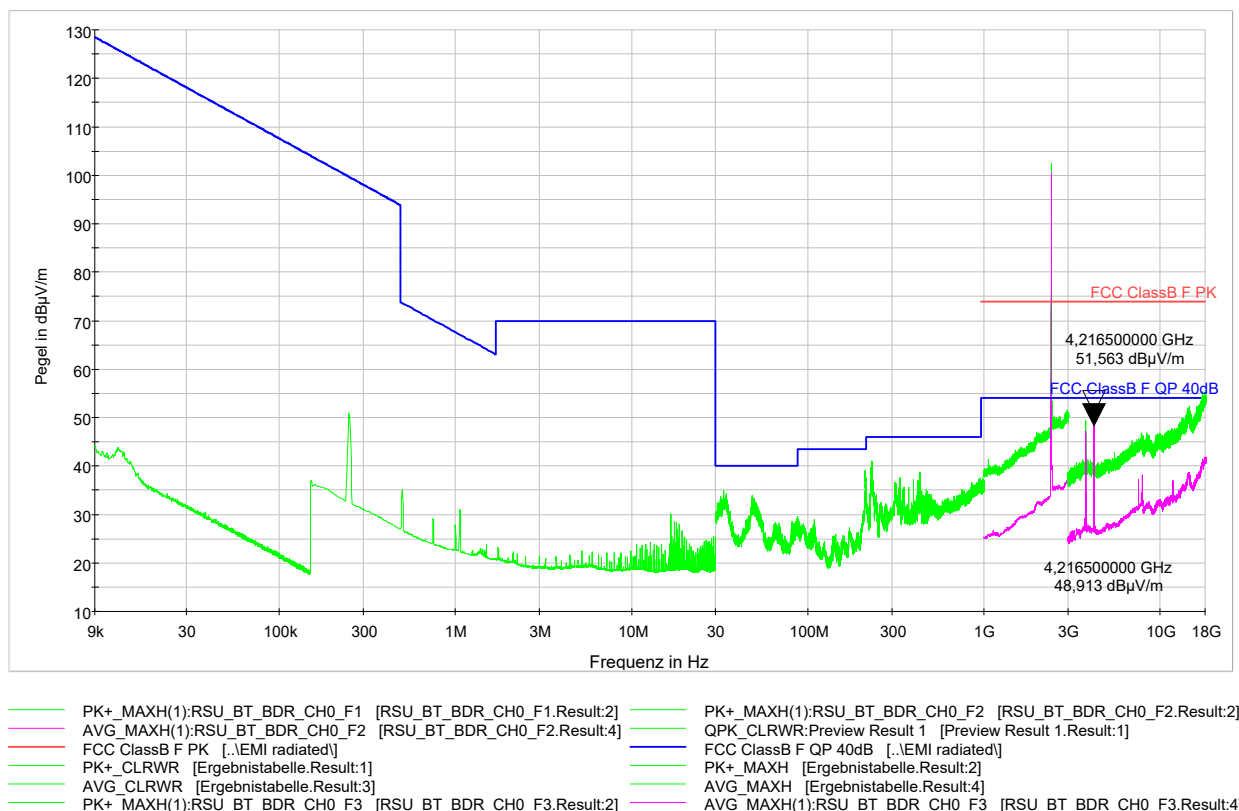
Test Equipment used: EMV-100; EMV-110; EMV-200/1

4.3. Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth BDR – Channel 0 – 2402 MHz



Worst case emission: Average @ 4216,5 MHz: 48,9 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

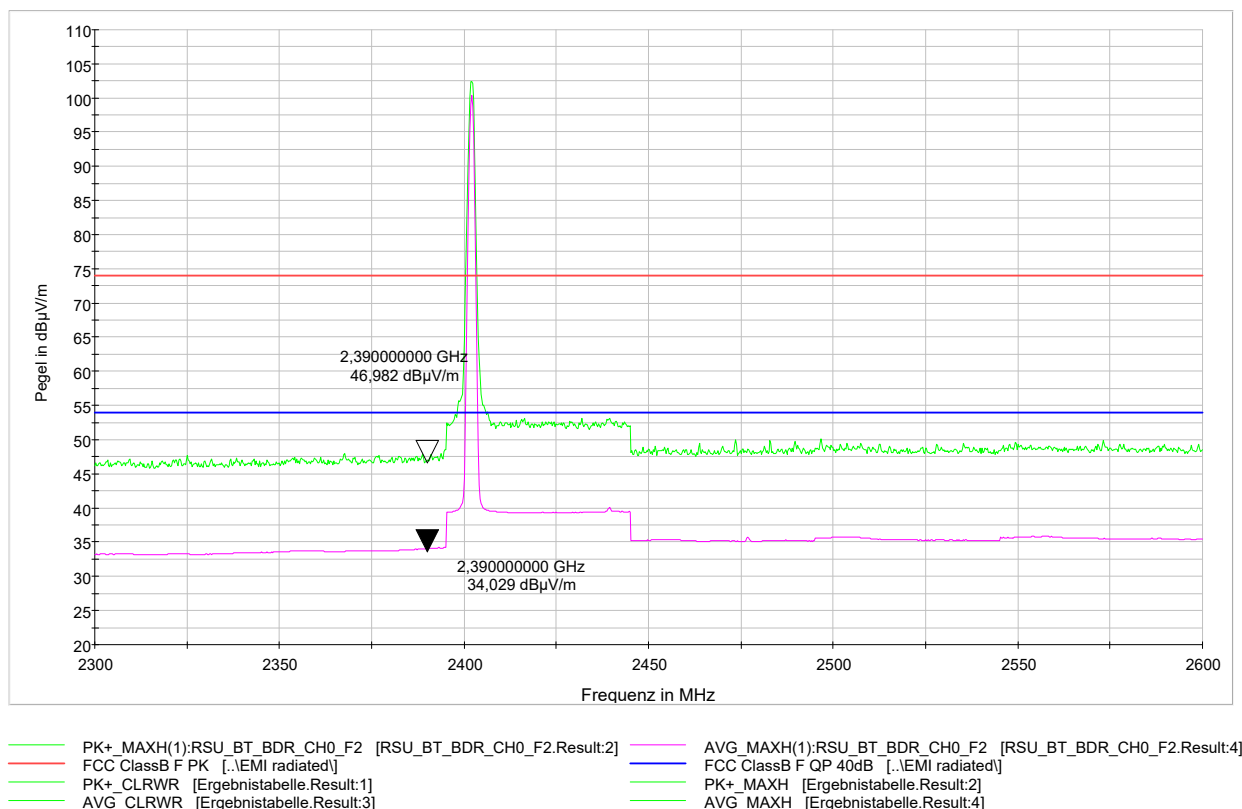
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: Bluetooth BDR – CH 0: 2402 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

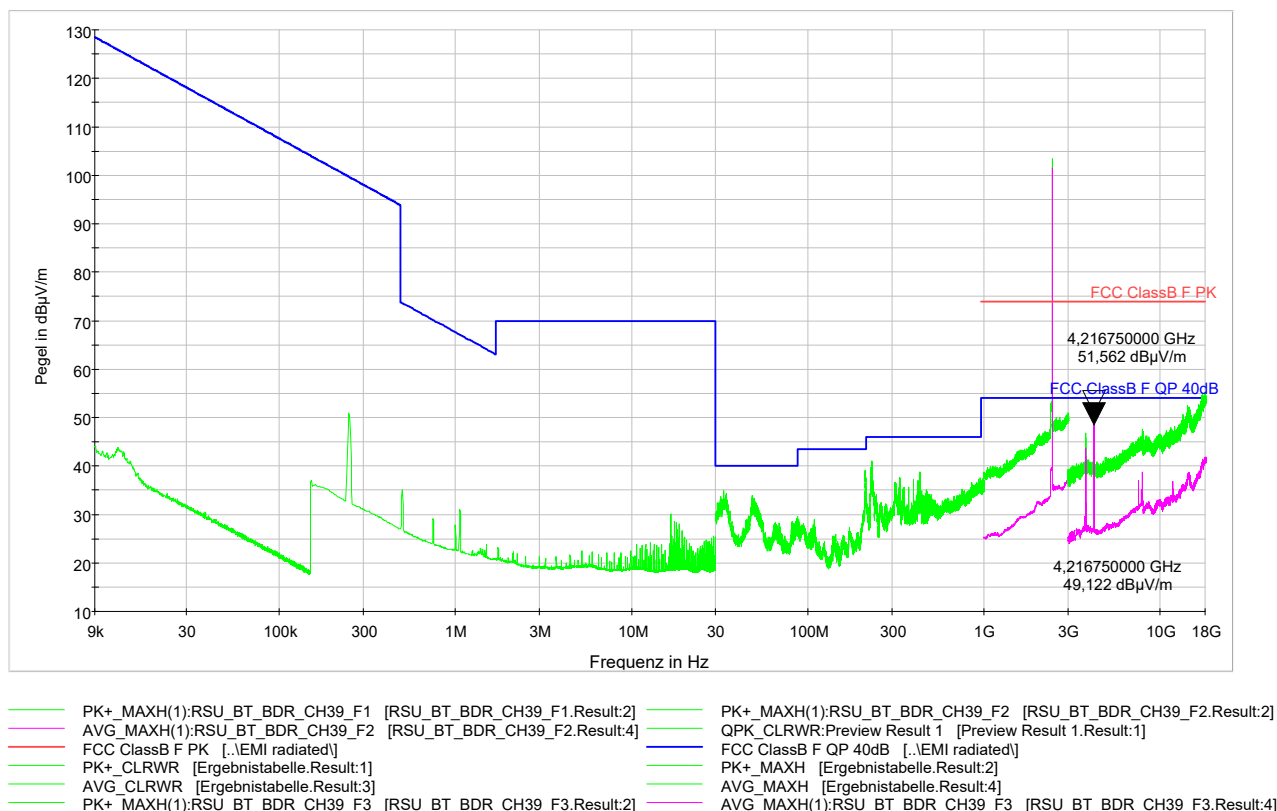
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth BDR – Channel 39 – 2441 MHz



Worst case emission: Average @ 4216,75 MHz: 49,1 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

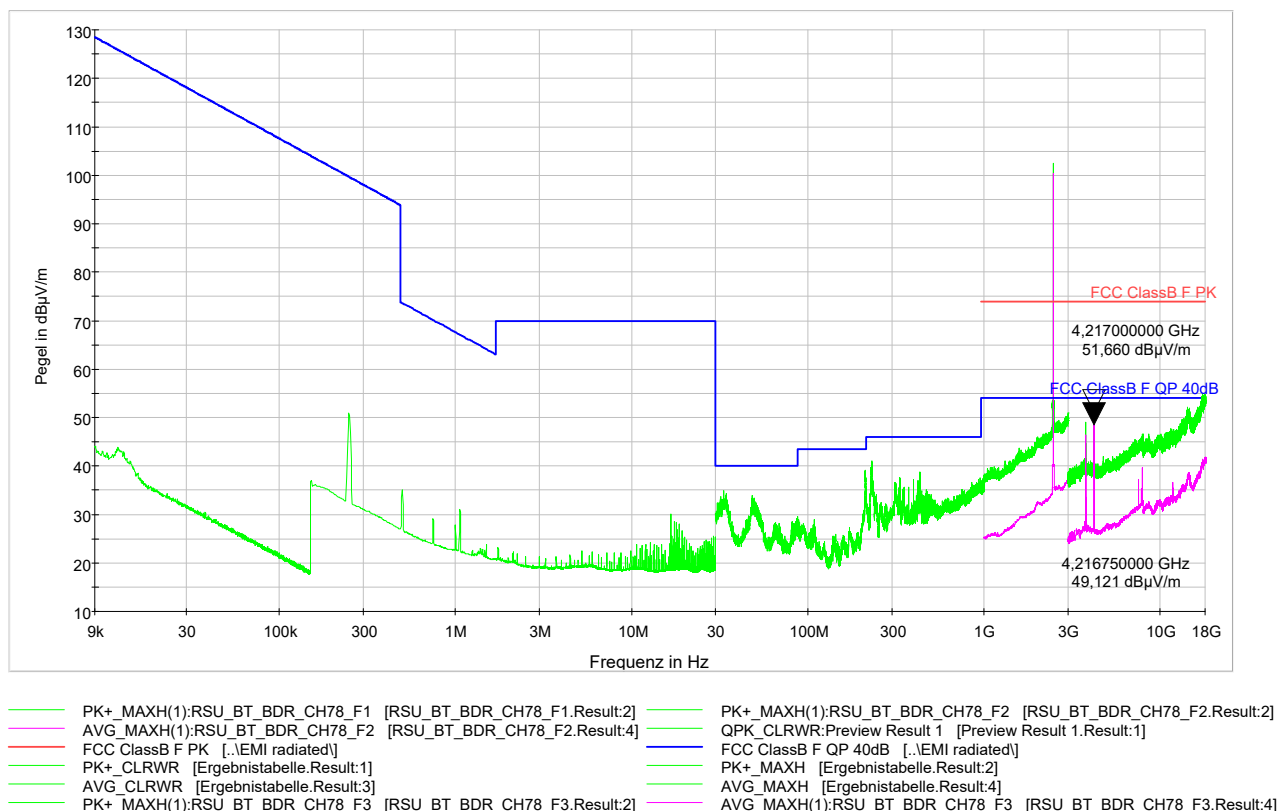
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth BDR – Channel 78 – 2480 MHz



Worst case emission: Average @ 4216,75 MHz: 49,1 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

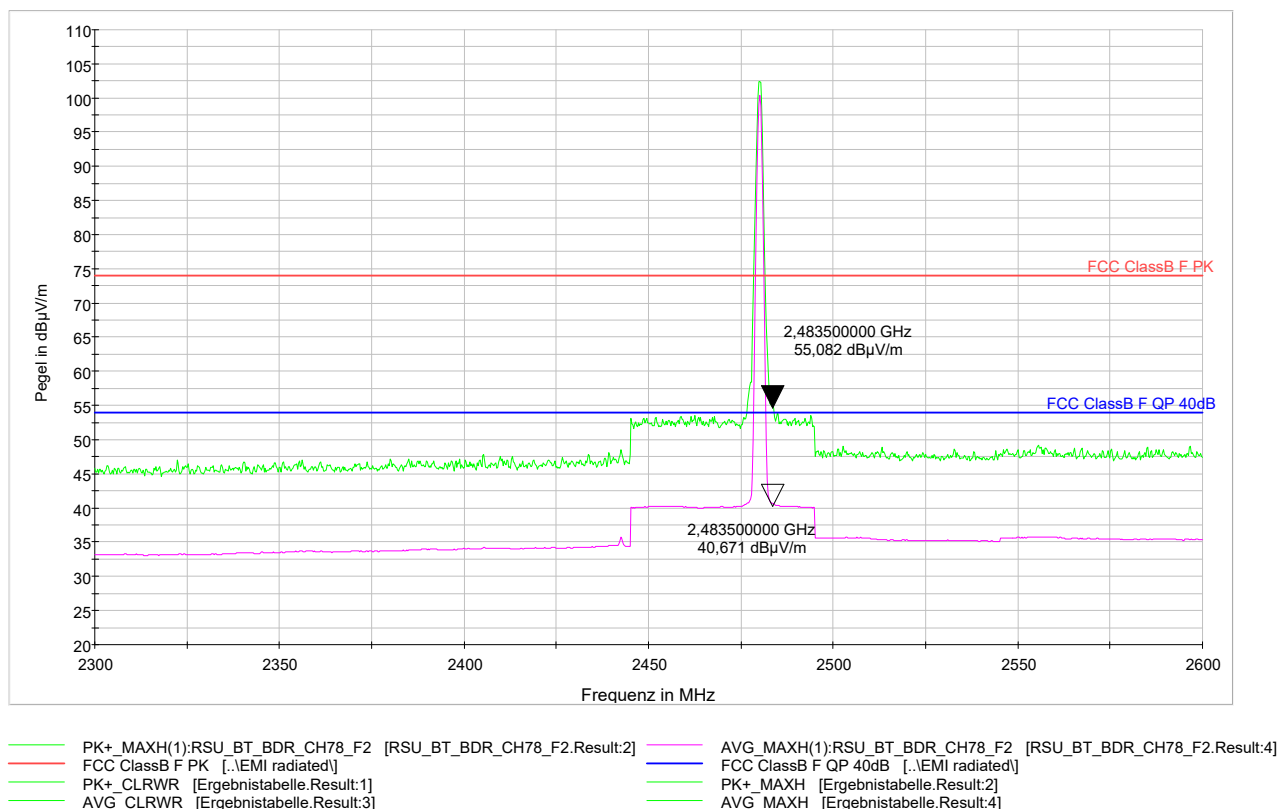
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: Bluetooth BDR – CH 78: 2480 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

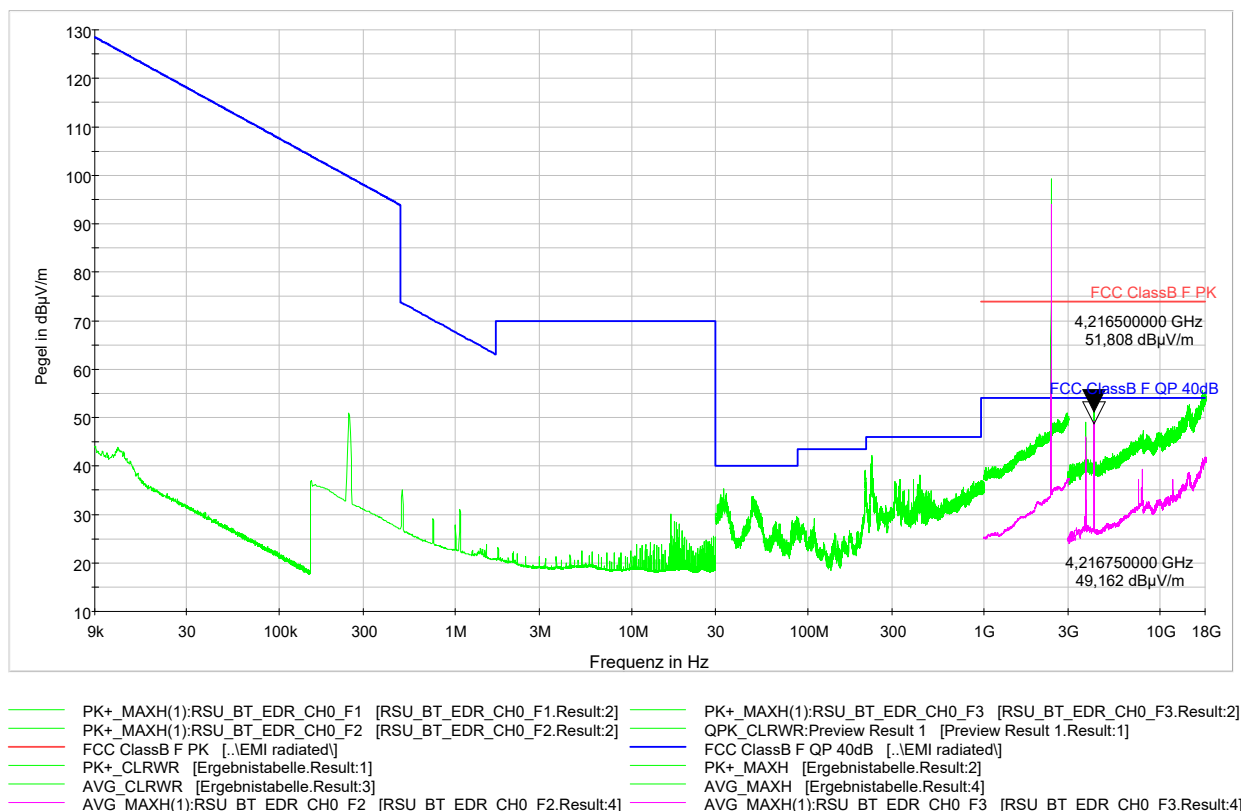
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth EDR – Channel 0 – 2402 MHz



Worst case emission: Average @ 4216,75 MHz: 49,2 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

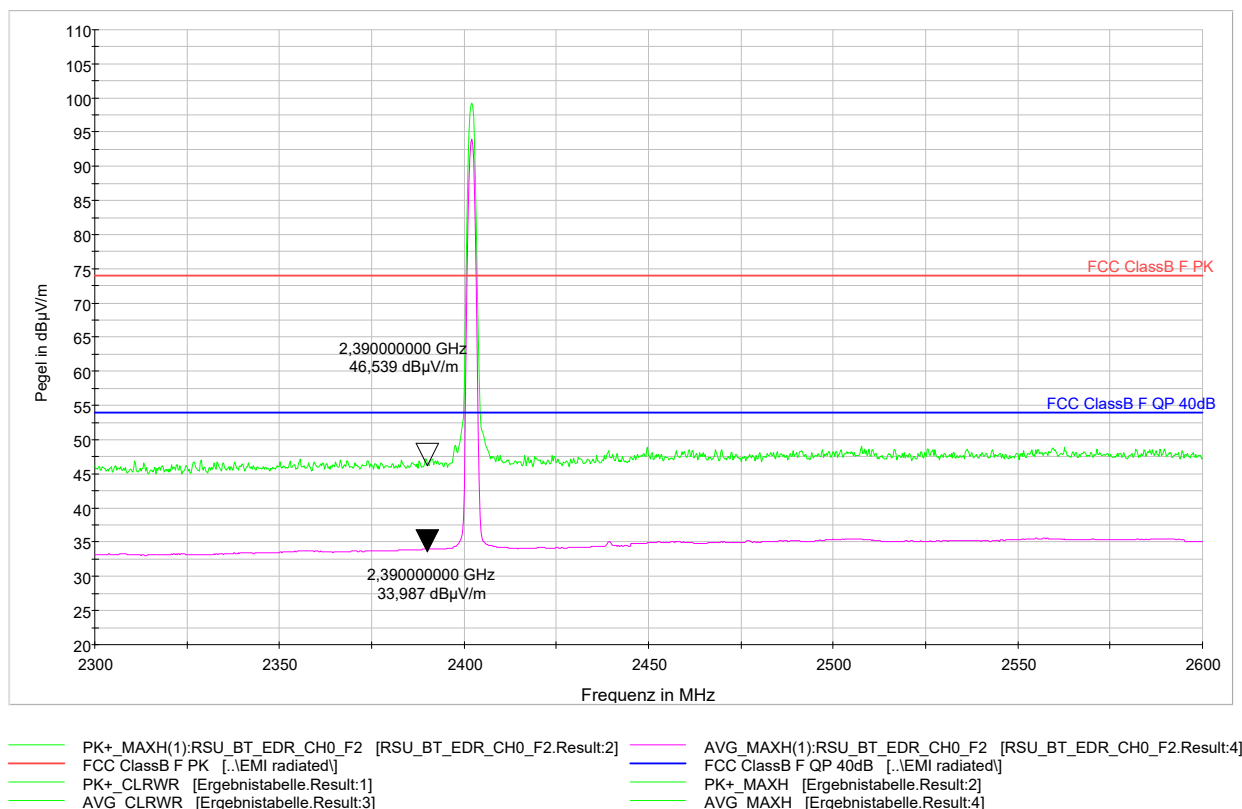
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: Bluetooth EDR – CH 0: 2402 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

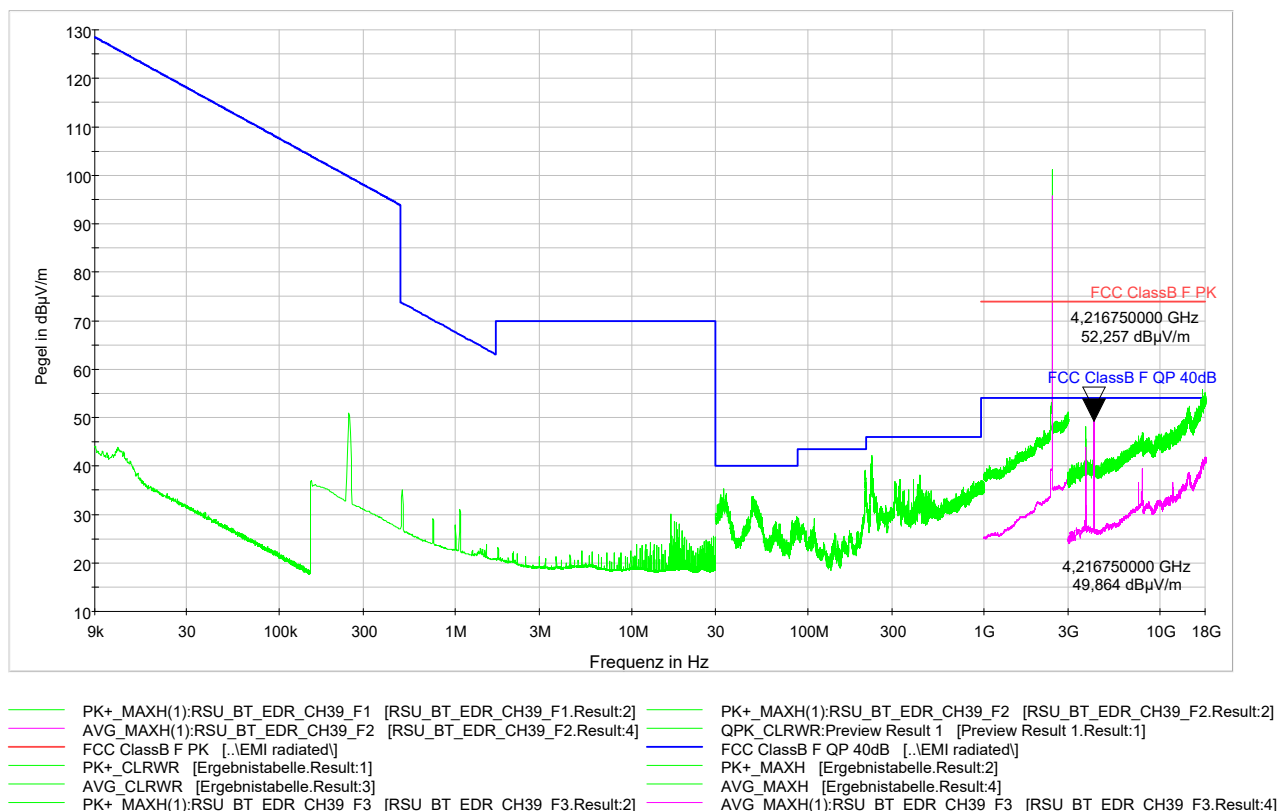
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth EDR – Channel 39 – 2441 MHz



Worst case emission: Average @ 4216,75 MHz: 49,9 dBμV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

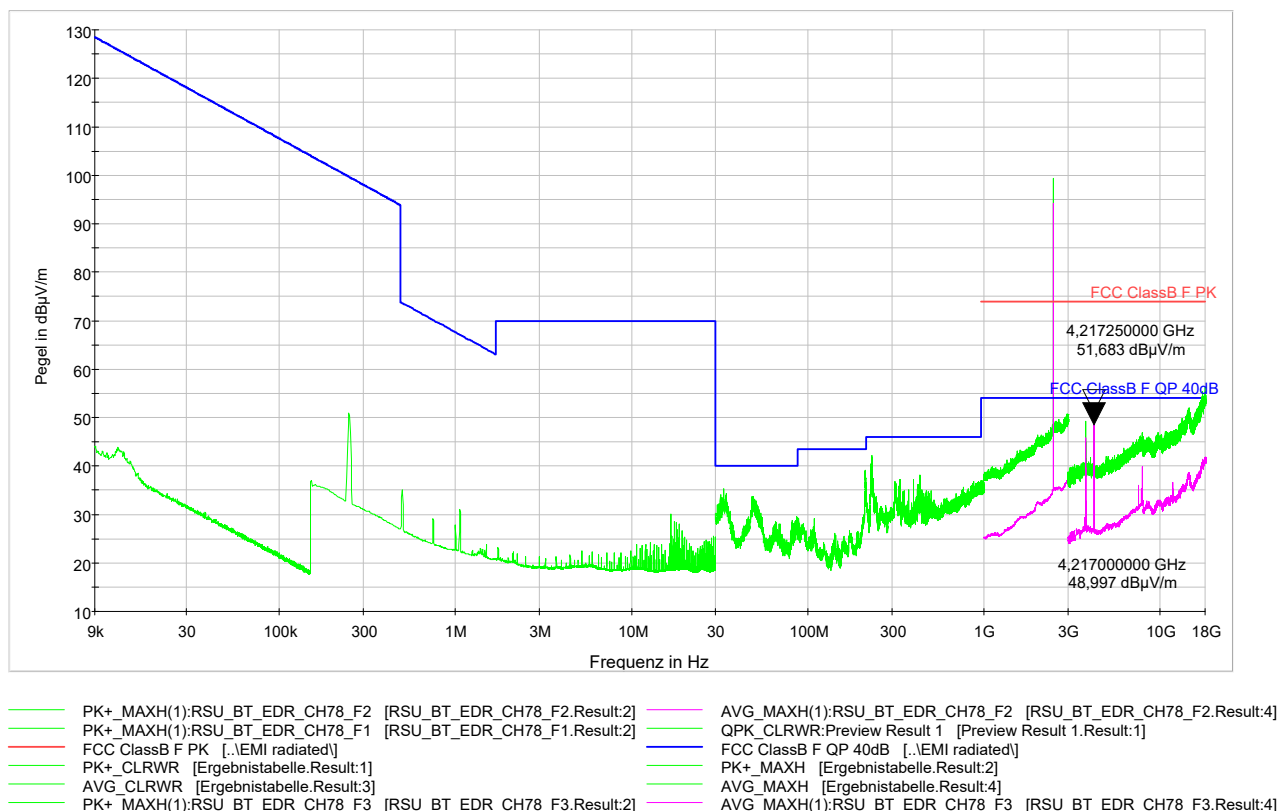
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth EDR – Channel 78 – 2480 MHz



Worst case emission: Average @ 4217,0 MHz: 49,0 dBμV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

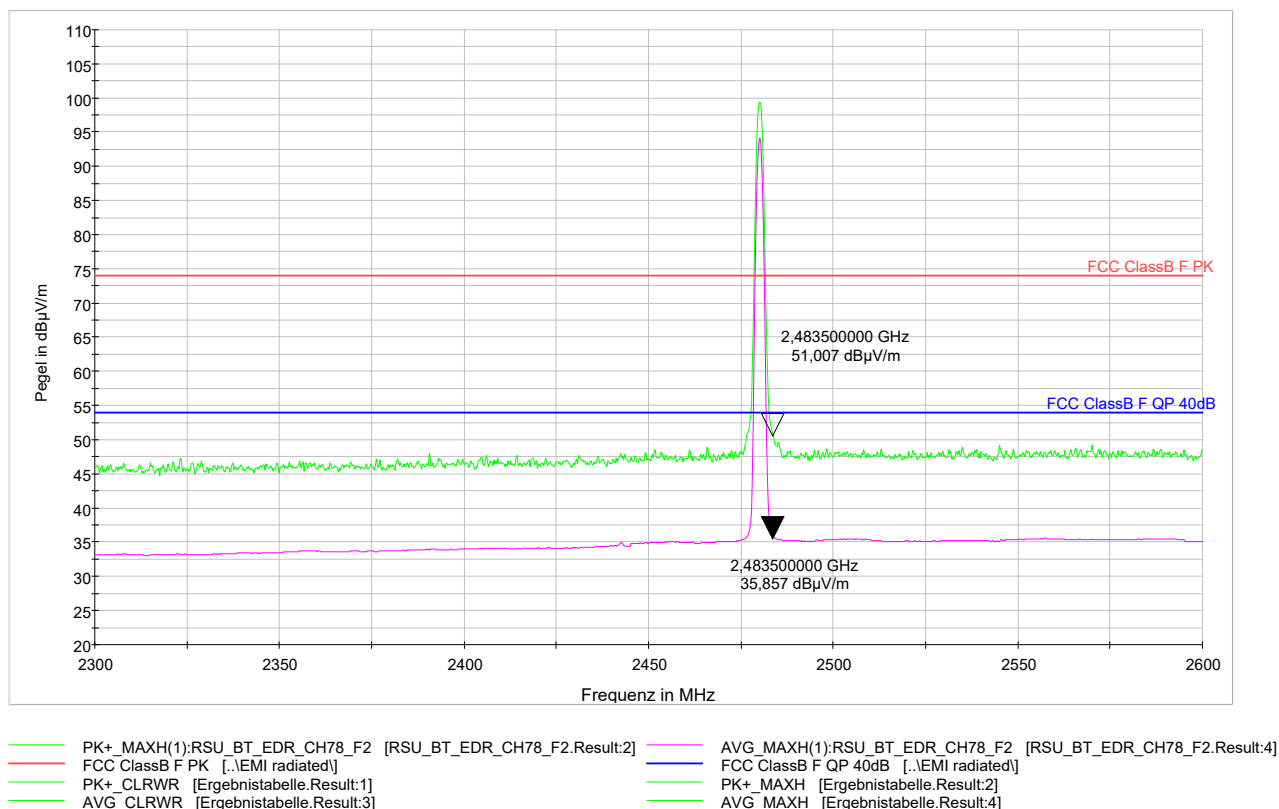
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: Bluetooth EDR – CH 78: 2480 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

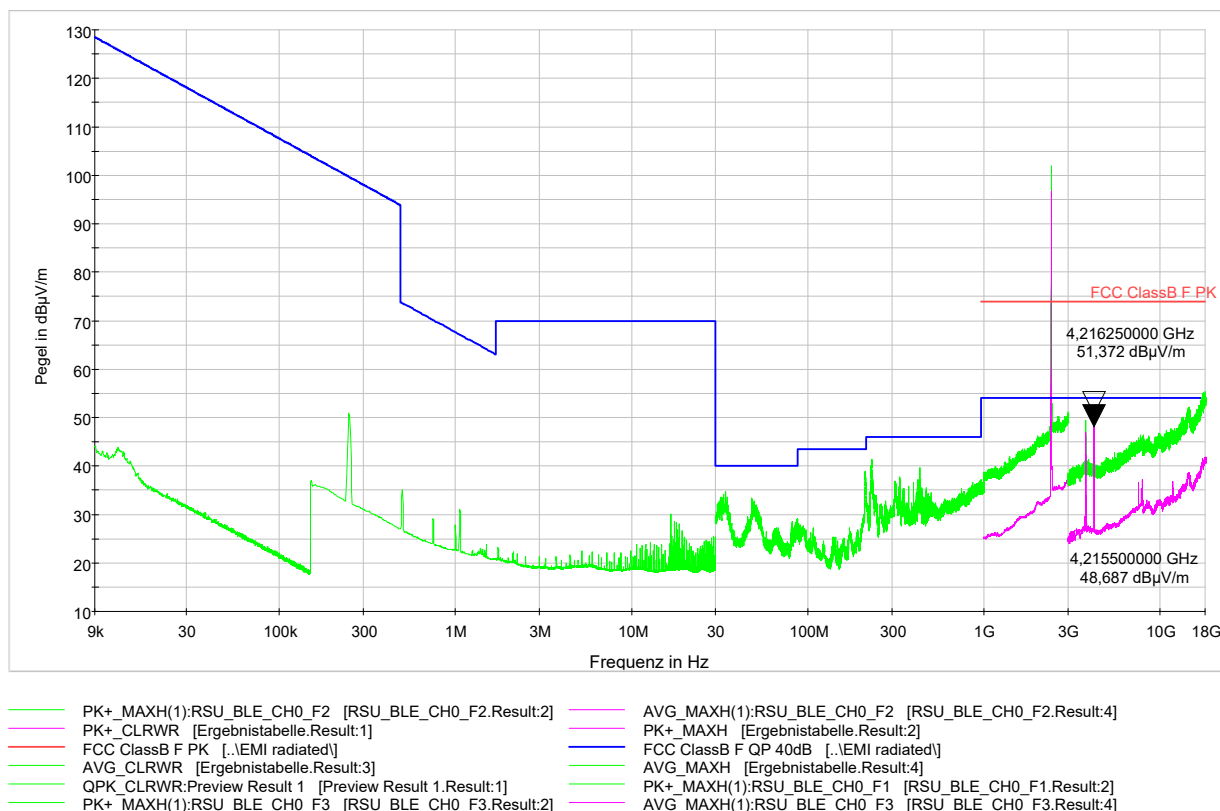
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth Low Energy – Channel 0 – 2402 MHz



Worst case emission: Average @ 4215,5 MHz: 48,7 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

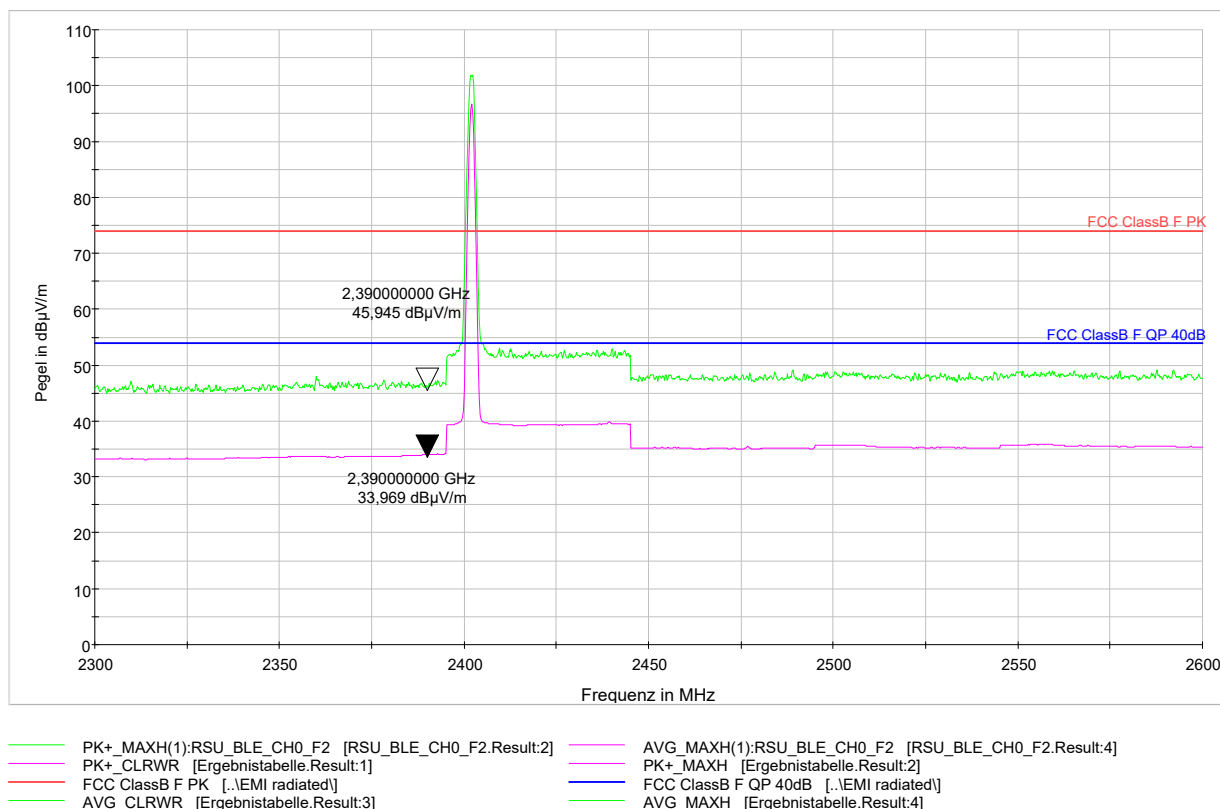
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: Bluetooth Low Energy – CH 0: 2402 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

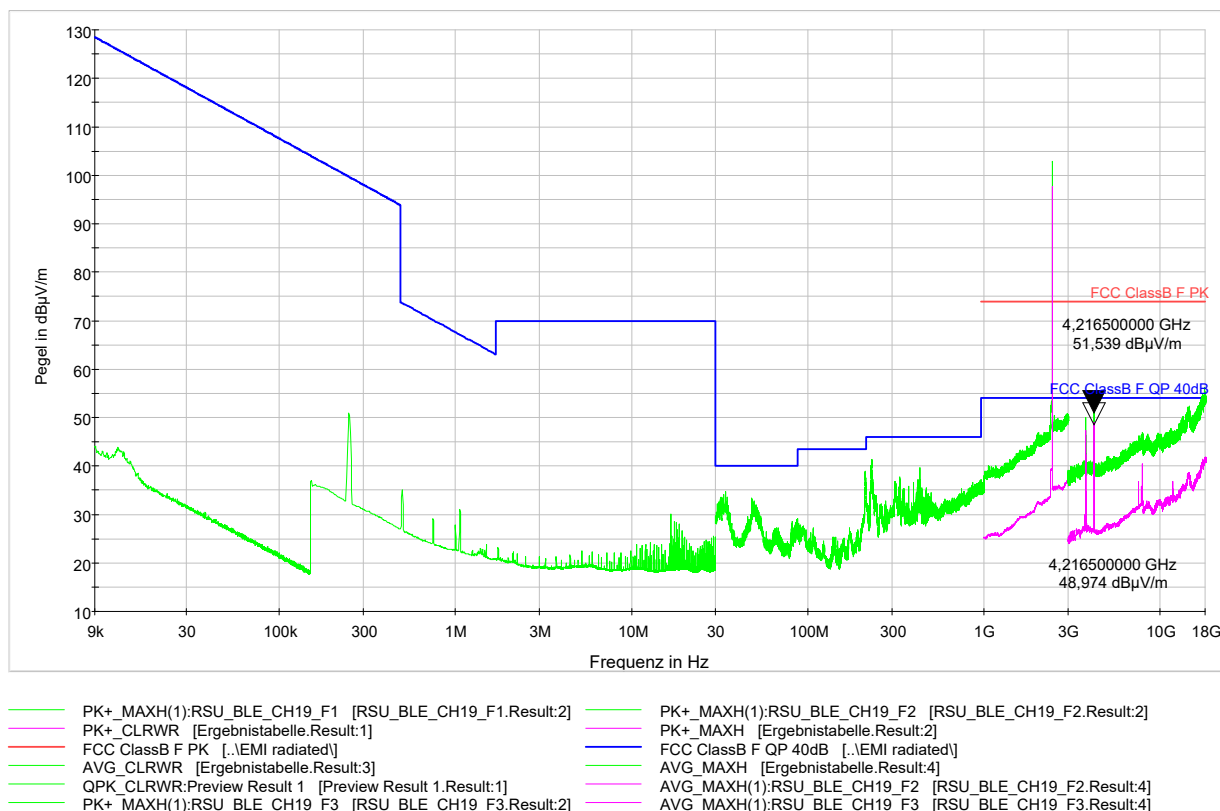
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth Low Energy – Channel 19 – 2440 MHz



Worst case emission: Average @ 4216,5 MHz: 49,0 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

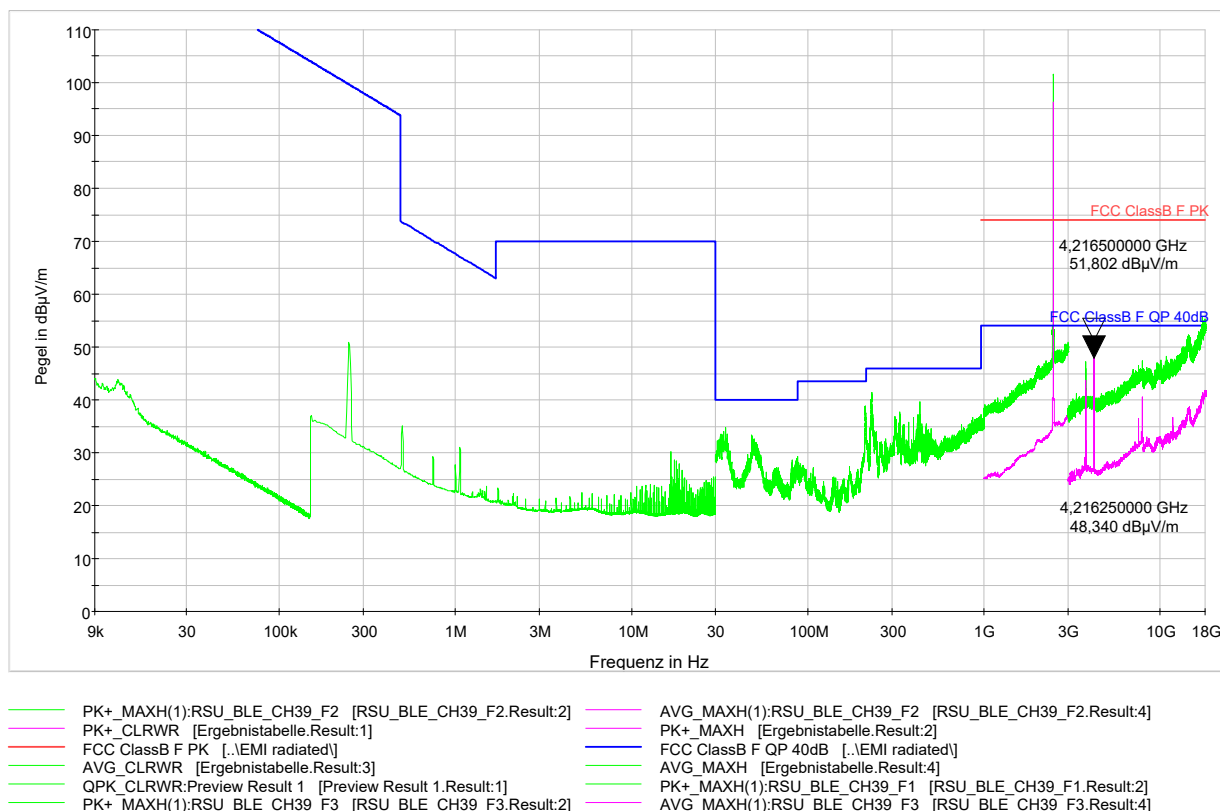
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: Bluetooth Low Energy – Channel 39 – 2480 MHz



Worst case emission: Average @ 4216,25 MHz: 48,3 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

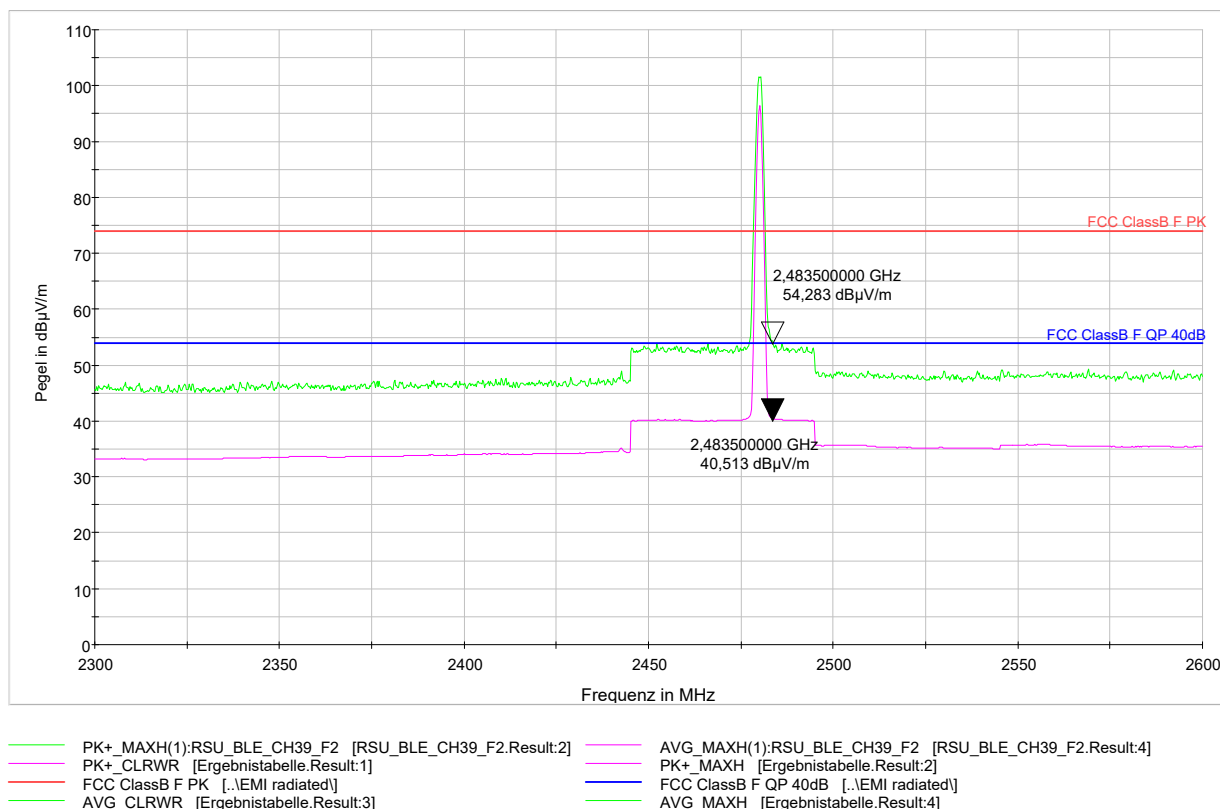
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: Bluetooth Low Energy – CH 78: 2480 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

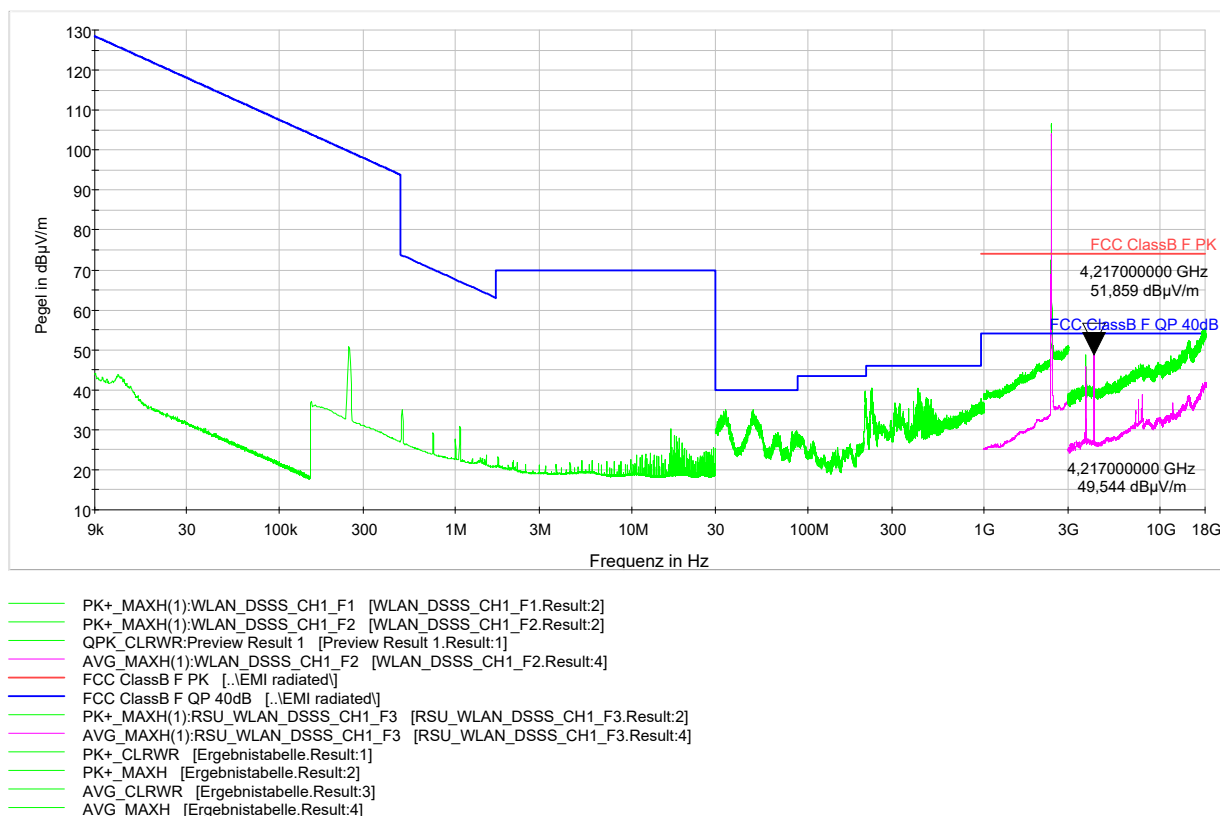
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN DSSS – Channel 1 – 2412 MHz



Worst case emission: Average @ 4217,0 MHz: 49,5 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

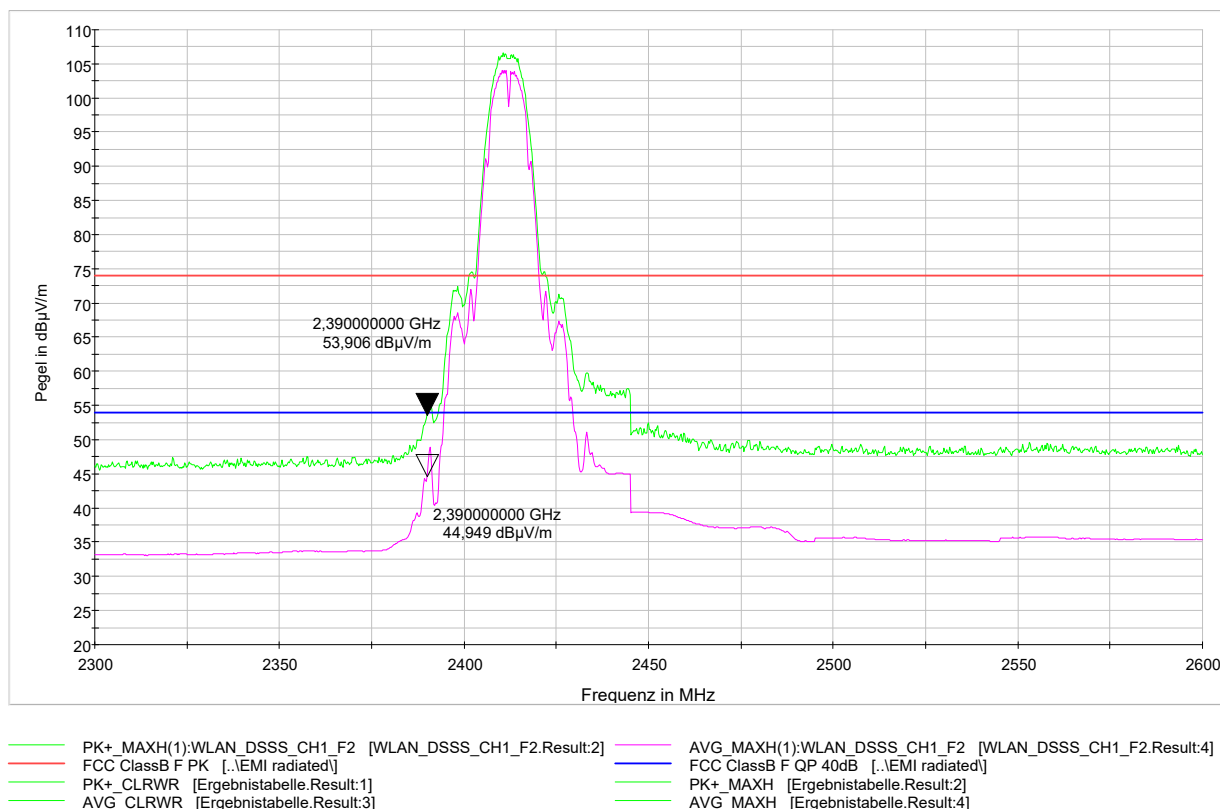
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: WLAN DSSS – Channel 1 – 2412 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

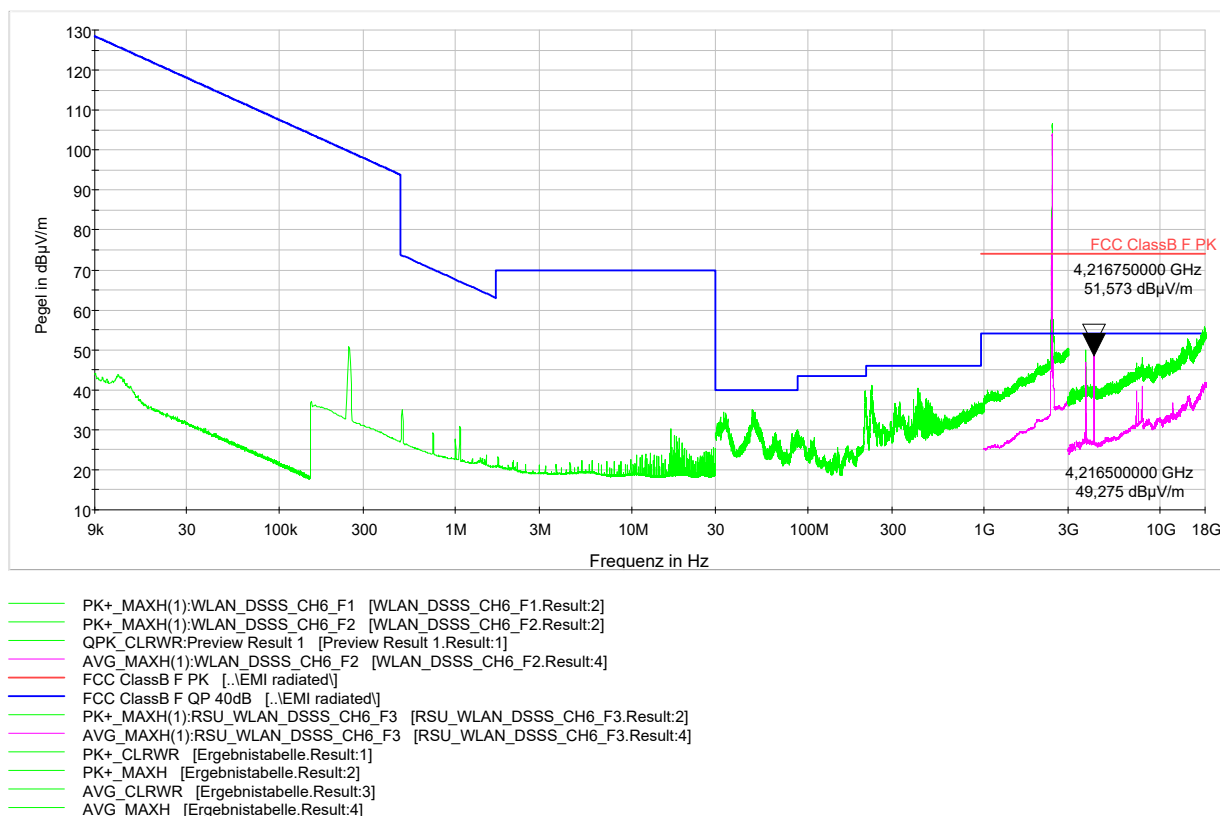
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN DSSS – Channel 6 – 2437 MHz



Worst case emission: Average @ 4216,5 MHz: 49,3 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

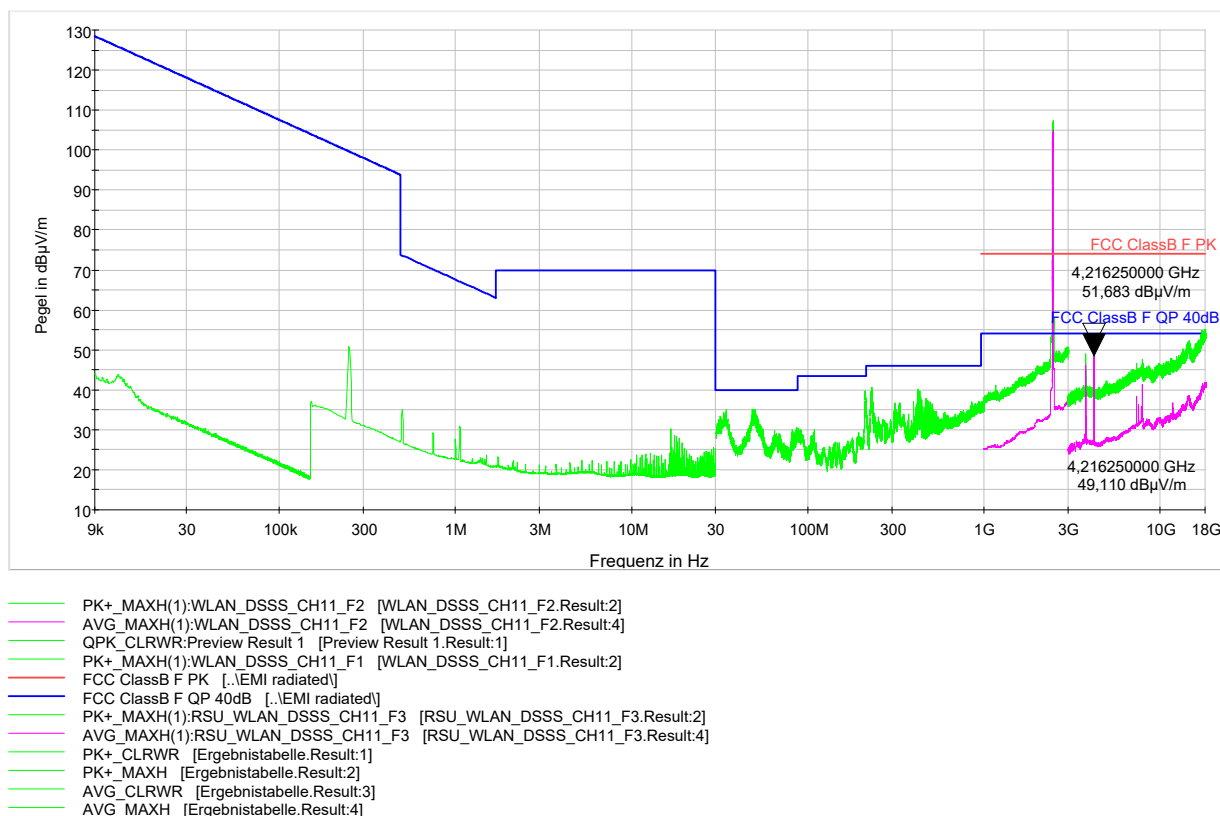
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN DSSS – Channel 11 – 2462 MHz



Worst case emission: Average @ 4216,25 MHz: 49,1 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

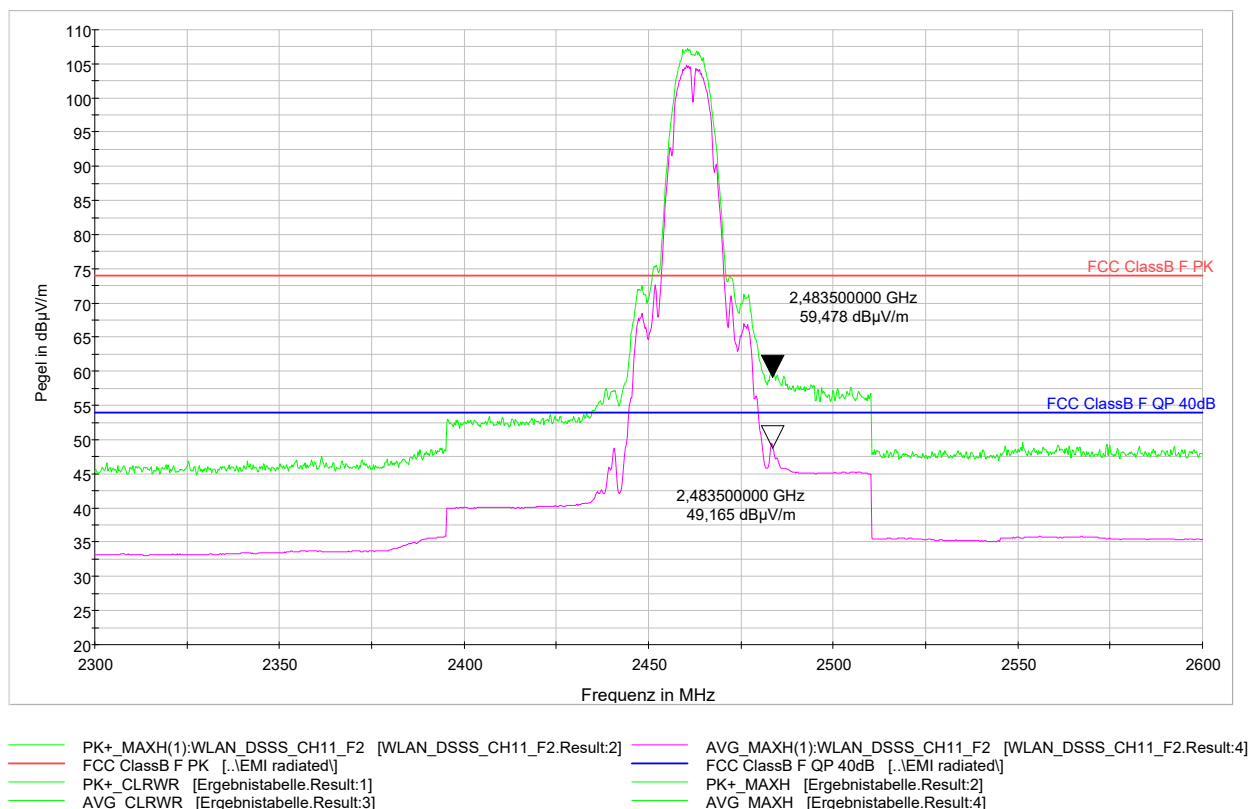
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: WLAN DSSS – Channel 11 – 2462 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

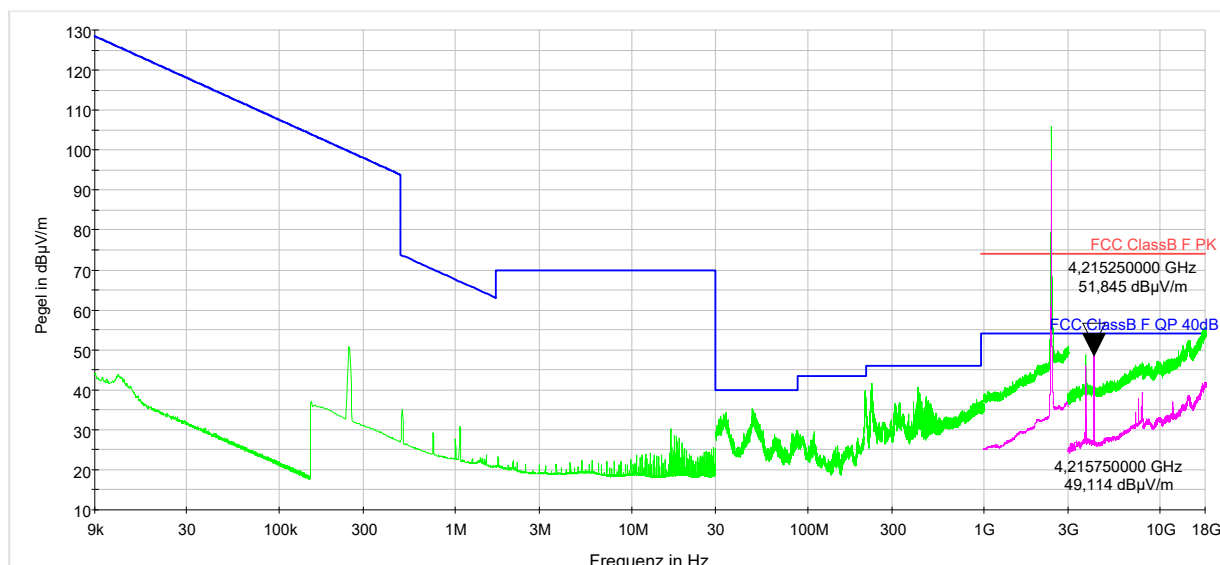
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN OFDM – lowest data rate – Channel 1 – 2412 MHz



QPK_CLRWR:Preview Result 1 [Preview Result 1.Result:1]
 PK+ MAXH(1):RSU_WLAN_OFDM_min_CH1_F1 [RSU_WLAN_OFDM_min_CH1_F1.Result:2]
 PK+ CLRWR [Ergebnistabelle.Result:1]
 PK+ MAXH [Ergebnistabelle.Result:2]
 FCC ClassB F PK [..IEMI radiated]
 FCC ClassB F QP 40dB [..IEMI radiated]
 AVG_CLRWR [Ergebnistabelle.Result:3]
 AVG_MAXH [Ergebnistabelle.Result:4]
 PK+ MAXH(1):RSU_WLAN_OFDM_min_CH1_F2 [RSU_WLAN_OFDM_min_CH1_F2.Result:2]
 AVG_MAXH(1):RSU_WLAN_OFDM_min_CH1_F2 [RSU_WLAN_OFDM_min_CH1_F2.Result:4]
 PK+ MAXH(1):RSU_WLAN_OFDM_min_CH1_F3 [RSU_WLAN_OFDM_min_CH1_F3.Result:2]
 AVG_MAXH(1):RSU_WLAN_OFDM_min_CH1_F3 [RSU_WLAN_OFDM_min_CH1_F3.Result:4]

Worst case emission: Average @ 4215,75 MHz: 49,1 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

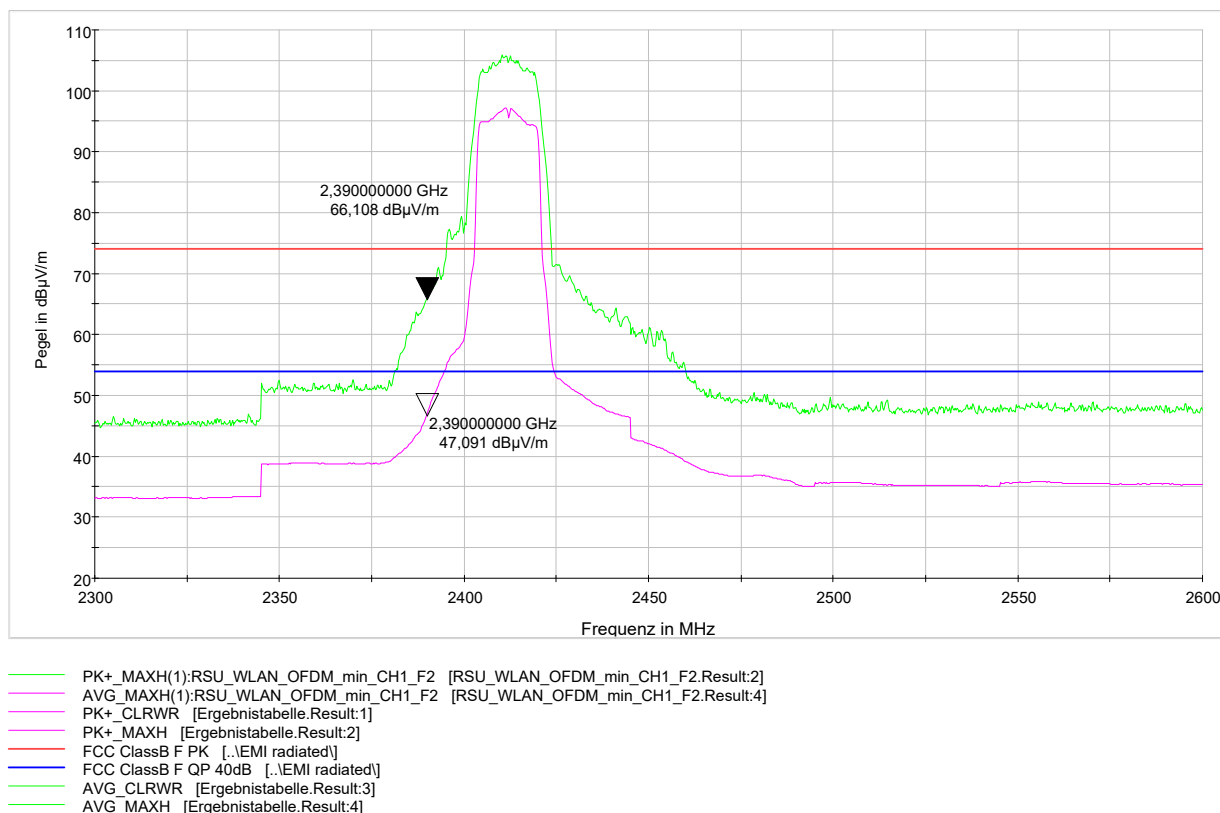
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: WLAN OFDM – lowest data rate – Channel 1 – 2412 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

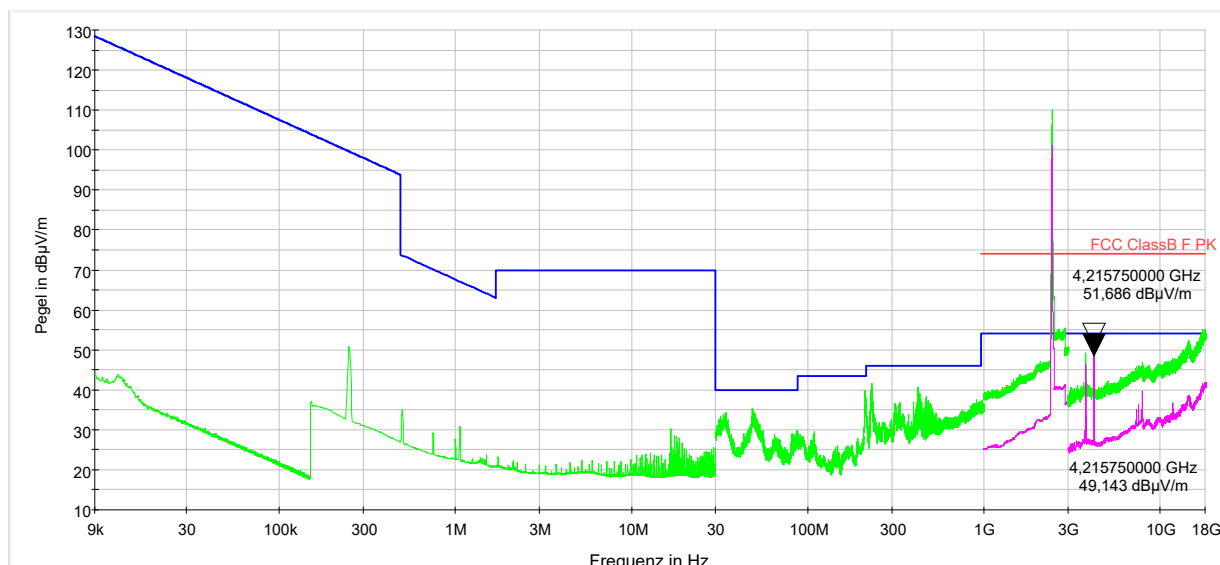
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN OFDM – lowest data rate – Channel 6 – 2437 MHz



QPK_CLRWR:Preview Result 1 [Preview Result 1.Result:1]
 PK+ MAXH(1):RSU_WLAN_OFDM_min_CH6_F1 [RSU_WLAN_OFDM_min_CH6_F1.Result:2]
 PK+ CLRWR [Ergebnistabelle.Result:1]
 PK+ MAXH [Ergebnistabelle.Result:2]
 FCC ClassB F PK [..IEMI radiated]
 FCC ClassB F QP 40dB [..IEMI radiated]
 AVG_CLRWR [Ergebnistabelle.Result:3]
 AVG_MAXH [Ergebnistabelle.Result:4]
 PK+ MAXH(1):RSU_WLAN_OFDM_min_CH6_F2 [RSU_WLAN_OFDM_min_CH6_F2.Result:2]
 AVG_MAXH(1):RSU_WLAN_OFDM_min_CH6_F2 [RSU_WLAN_OFDM_min_CH6_F2.Result:4]
 PK+ MAXH(1):RSU_WLAN_OFDM_min_CH6_F3 [RSU_WLAN_OFDM_min_CH6_F3.Result:2]
 AVG_MAXH(1):RSU_WLAN_OFDM_min_CH6_F3 [RSU_WLAN_OFDM_min_CH6_F3.Result:4]

Worst case emission: Average @ 4215,75 MHz: 49,1 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

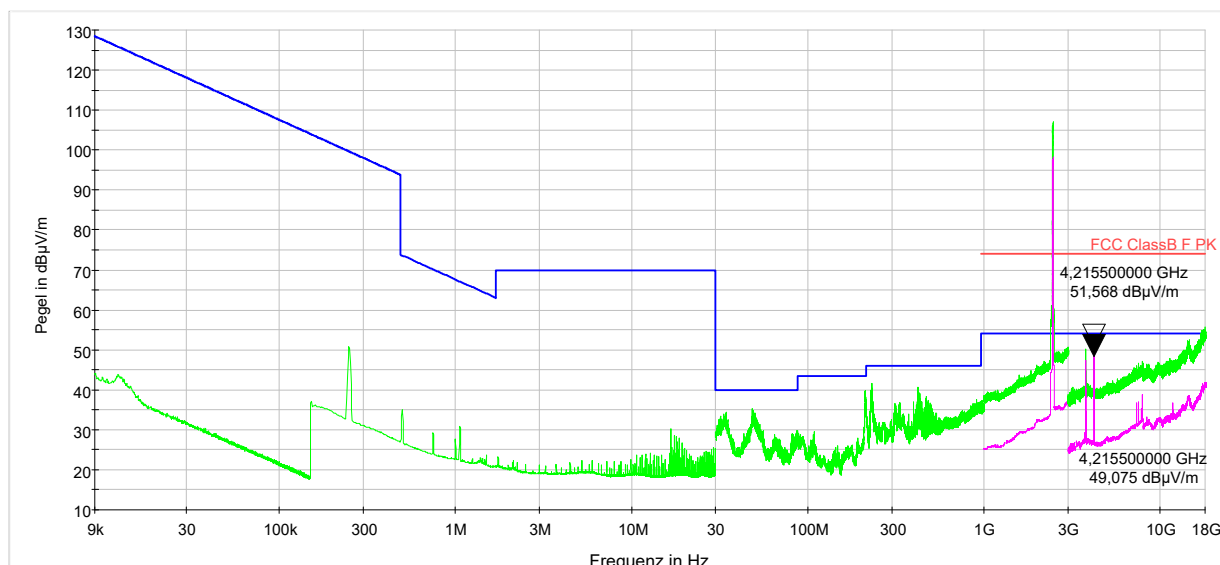
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN OFDM – lowest data rate – Channel 11 – 2462 MHz



QPK_CLRWR:Preview Result 1 [Preview Result 1.Result:1]
PK+ MAXH(1):RSU_WLAN_OFDM_min_CH11_F1 [RSU_WLAN_OFDM_min_CH11_F1.Result:2]
PK+ CLRWR [Ergebnistabelle.Result:1]
PK+ MAXH [Ergebnistabelle.Result:2]
FCC ClassB F PK [..IEMI radiated]
FCC ClassB F QP 40dB [..IEMI radiated]
AVG_CLRWR [Ergebnistabelle.Result:3]
AVG_MAXH [Ergebnistabelle.Result:4]
PK+ MAXH(1):RSU_WLAN_OFDM_min_CH11_F2 [RSU_WLAN_OFDM_min_CH11_F2.Result:2]
AVG_MAXH(1):RSU_WLAN_OFDM_min_CH11_F2 [RSU_WLAN_OFDM_min_CH11_F2.Result:4]
PK+ MAXH(1):RSU_WLAN_OFDM_min_CH11_F3 [RSU_WLAN_OFDM_min_CH11_F3.Result:2]
AVG_MAXH(1):RSU_WLAN_OFDM_min_CH11_F3 [RSU_WLAN_OFDM_min_CH11_F3.Result:4]

Worst case emission: Average @ 4215,5 MHz: 49,1 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

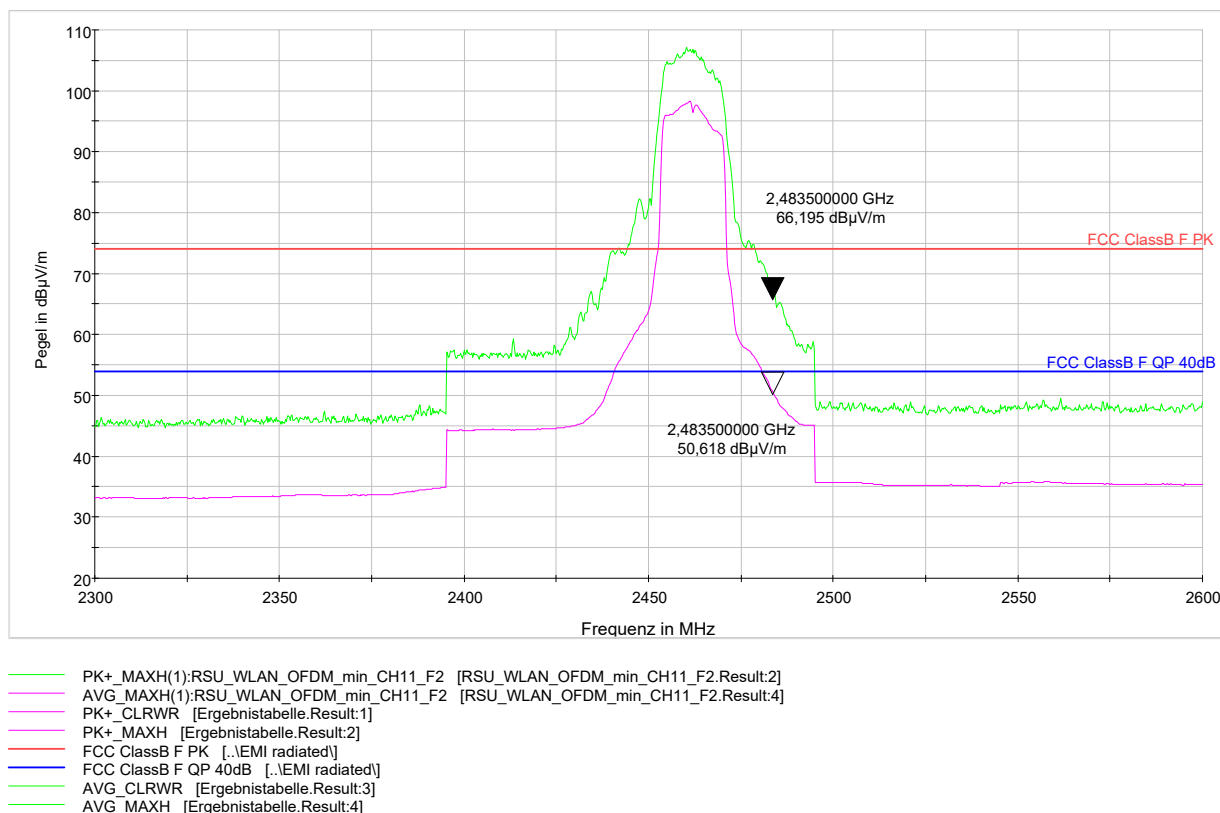
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: WLAN OFDM – lowest data rate – Channel 11 – 2462 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

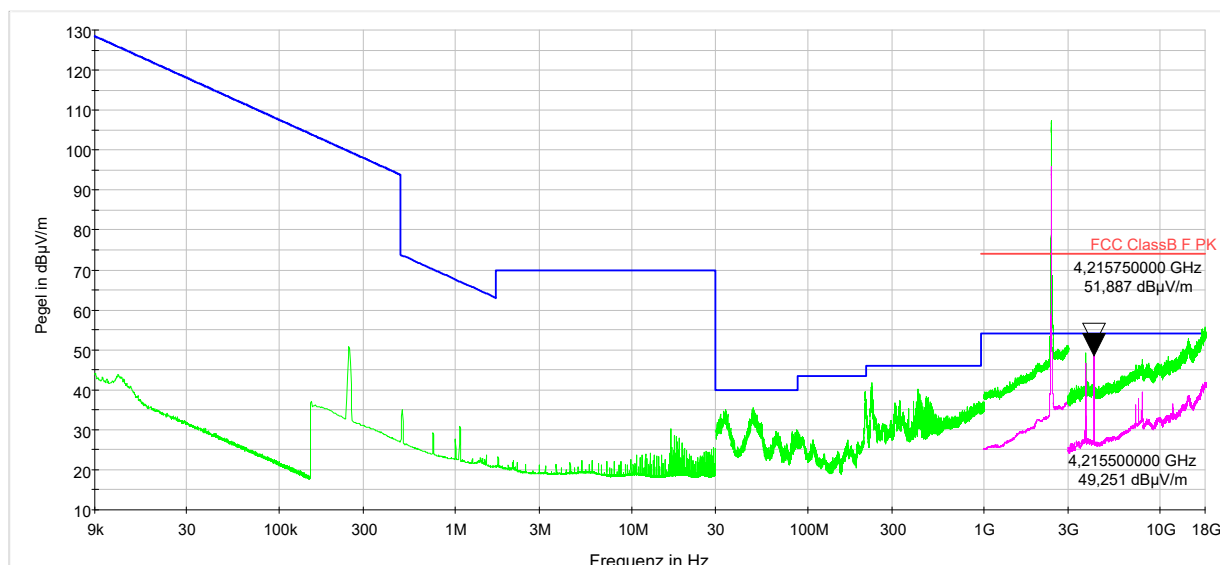
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN OFDM – highest data rate – Channel 1 – 2412 MHz



PK+ MAXH(1):RSU_WLAN_OFDM_max_CH1_F1 [RSU_WLAN_OFDM_max_CH1_F1.Result:2]
 PK+ MAXH(1):RSU_WLAN_OFDM_max_CH1_F2 [RSU_WLAN_OFDM_max_CH1_F2.Result:2]
 PK+ CLRWR [Ergebnistabelle.Result:1]
 PK+ MAXH [Ergebnistabelle.Result:2]
 FCC ClassB F PK [..EMI radiated]
 FCC ClassB F QP 40dB [..EMI radiated]
 AVG CLRWR [Ergebnistabelle.Result:3]
 AVG MAXH [Ergebnistabelle.Result:4]
 AVG MAXH(1):RSU_WLAN_OFDM_max_CH1_F2 [RSU_WLAN_OFDM_max_CH1_F2.Result:4]
 QPK CLRWR:Preview Result 1 [Preview Result 1.Result:1]
 PK+ MAXH(1):RSU_WLAN_OFDM_max_CH1_F3 [RSU_WLAN_OFDM_max_CH1_F3.Result:2]
 AVG MAXH(1):RSU_WLAN_OFDM_max_CH1_F3 [RSU_WLAN_OFDM_max_CH1_F3.Result:4]

Worst case emission: Average @ 4215,5 MHz: 49,3 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

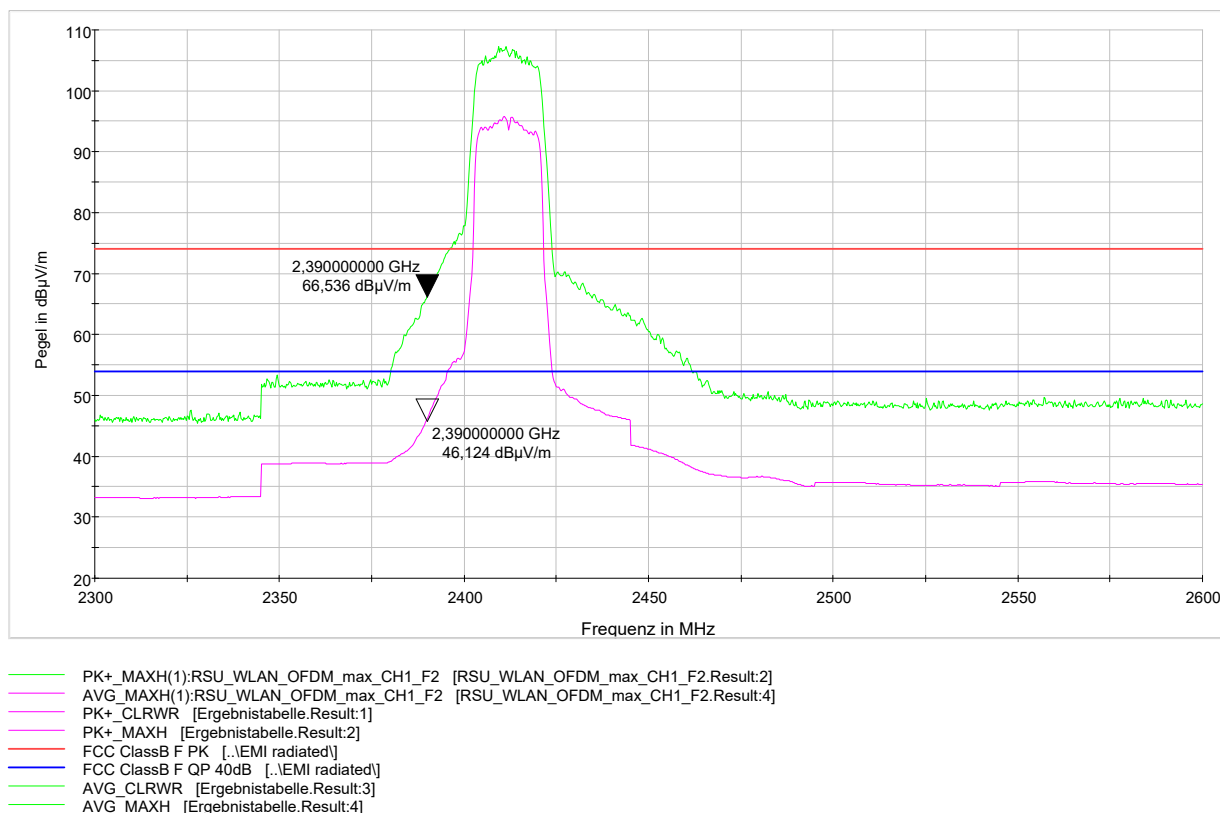
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: WLAN OFDM – highest data rate – Channel 1 – 2412 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

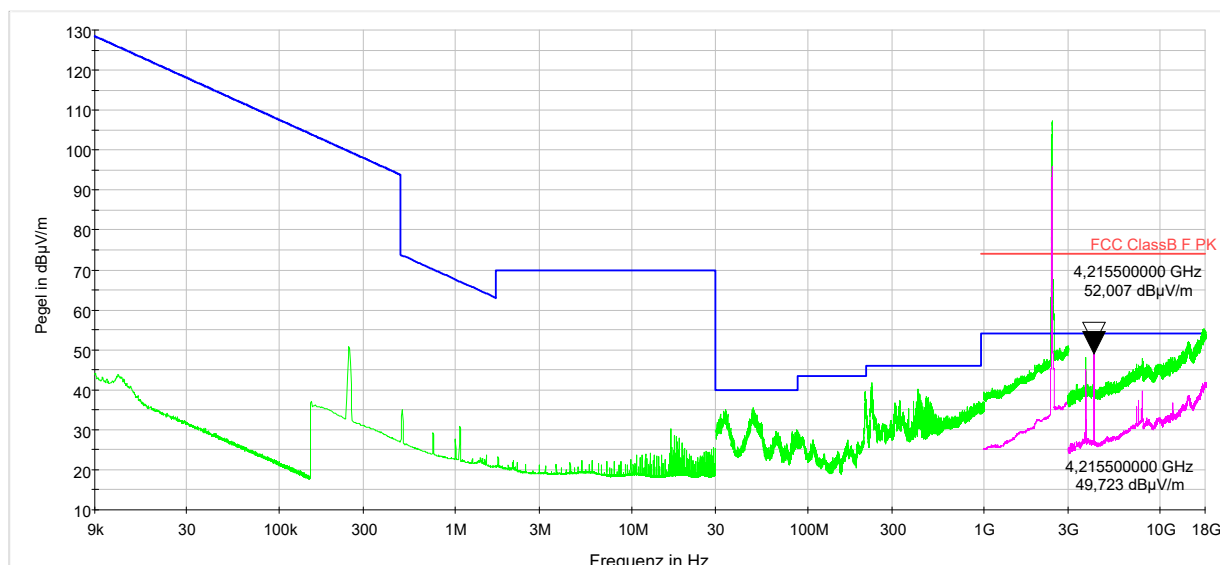
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN OFDM – highest data rate – Channel 6 – 2437 MHz



PK+ _MAXH(1):RSU_WLAN_OFDM_max_CH6_F1 [RSU_WLAN_OFDM_max_CH6_F1.Result:2]
 PK+ _MAXH(1):RSU_WLAN_OFDM_max_CH6_F2 [RSU_WLAN_OFDM_max_CH6_F2.Result:2]
 PK+ _CLRWR [Ergebnistabelle.Result:1]
 PK+ _MAXH [Ergebnistabelle.Result:2]
 FCC ClassB F PK [..IEMI radiated]
 FCC ClassB F QP 40dB [..IEMI radiated]
 AVG _CLRWR [Ergebnistabelle.Result:3]
 AVG _MAXH [Ergebnistabelle.Result:4]
 AVG _MAXH(1):RSU_WLAN_OFDM_max_CH6_F2 [RSU_WLAN_OFDM_max_CH6_F2.Result:4]
 QPK _CLRWR:Preview Result 1 [Preview Result 1.Result:1]
 PK+ _MAXH(1):RSU_WLAN_OFDM_max_CH6_F3 [RSU_WLAN_OFDM_max_CH6_F3.Result:2]
 AVG _MAXH(1):RSU_WLAN_OFDM_max_CH6_F3 [RSU_WLAN_OFDM_max_CH6_F3.Result:4]

Worst case emission: Average @ 4215,5 MHz: 49,7 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

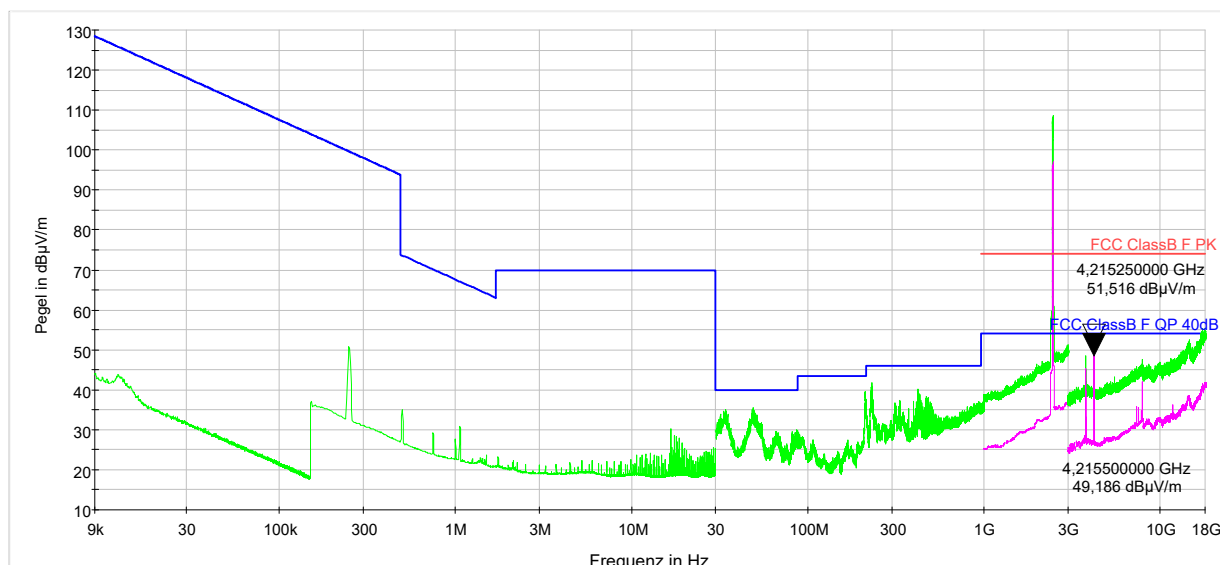
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement radiated with Peak-Detector (green line) and Average detector (magenta line):

Mode: WLAN OFDM – highest data rate – Channel 11 – 2462 MHz



PK+ _MAXH(1):RSU_WLAN_OFDM_max_CH11_F2 [RSU_WLAN_OFDM_max_CH11_F2.Result:2]
 AVG _MAXH(1):RSU_WLAN_OFDM_max_CH11_F2 [RSU_WLAN_OFDM_max_CH11_F2.Result:4]
 PK+ _CLRWR [Ergebnistabelle.Result:1]
 PK+ _MAXH [Ergebnistabelle.Result:2]
 FCC ClassB F PK [..IEMI radiated]
 FCC ClassB F QP 40dB [..IEMI radiated]
 AVG _CLRWR [Ergebnistabelle.Result:3]
 AVG _MAXH [Ergebnistabelle.Result:4]
 PK+ _MAXH(1):RSU_WLAN_OFDM_max_CH11_F1 [RSU_WLAN_OFDM_max_CH11_F1.Result:2]
 QPK _CLRWR:Preview Result 1 [Preview Result 1.Result:1]
 PK+ _MAXH(1):RSU_WLAN_OFDM_max_CH11_F3 [RSU_WLAN_OFDM_max_CH11_F3.Result:2]
 AVG _MAXH(1):RSU_WLAN_OFDM_max_CH11_F3 [RSU_WLAN_OFDM_max_CH11_F3.Result:4]

Worst case emission: Average @ 4215,5 MHz: 49,2 dBµV/m

Remark: Although the measurement above ends at 18 GHz, all measurements were performed up to the tenth harmonics of the transmitter frequency and no emission above noise level was found.

LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

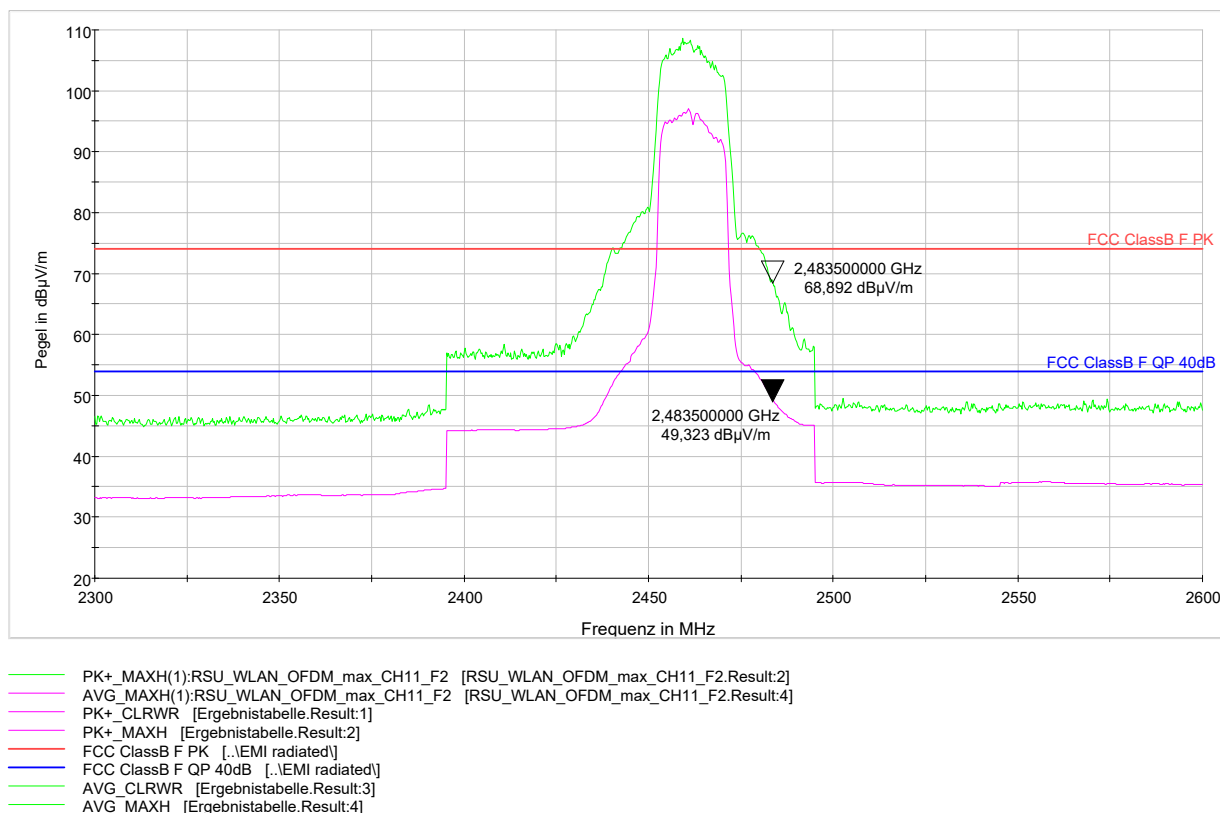
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112;
EMV-114; EMV-200/1; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands

§ 15.209(a)

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: WLAN OFDM – highest data rate – Channel 11 – 2462 MHz



LIMIT

SUBCLAUSE 15.209(a)

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

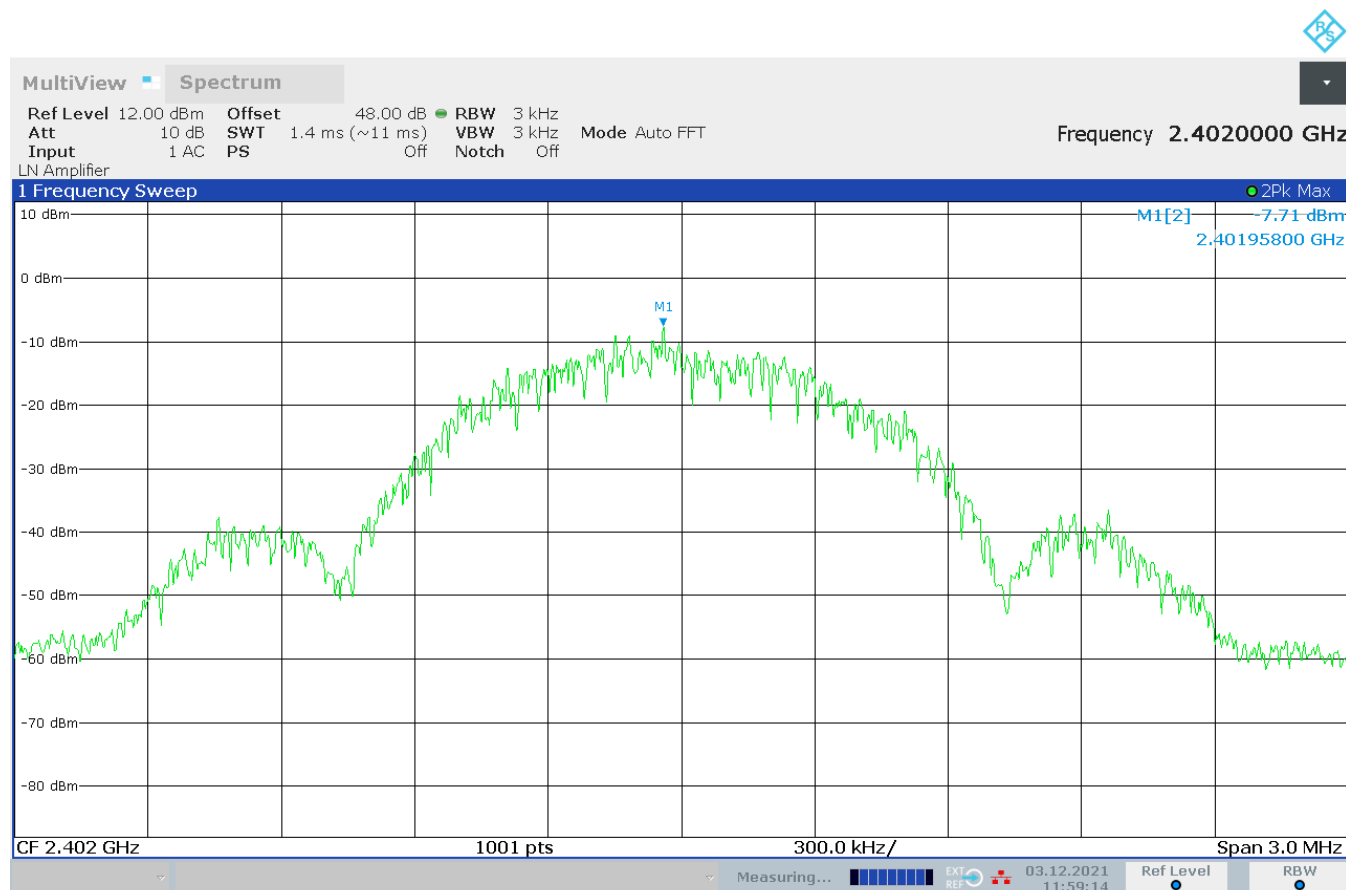
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200/1

4.4. Power spectral density

§ 15.247(e)

Radiated Measurement – Bluetooth Low Energy

Rated output power: 5,75 mW Channel 0 (2402 MHz center frequency)



11:59:15 03.12.2021

Power Spectral density: -7,71 dBm @ 2401,958 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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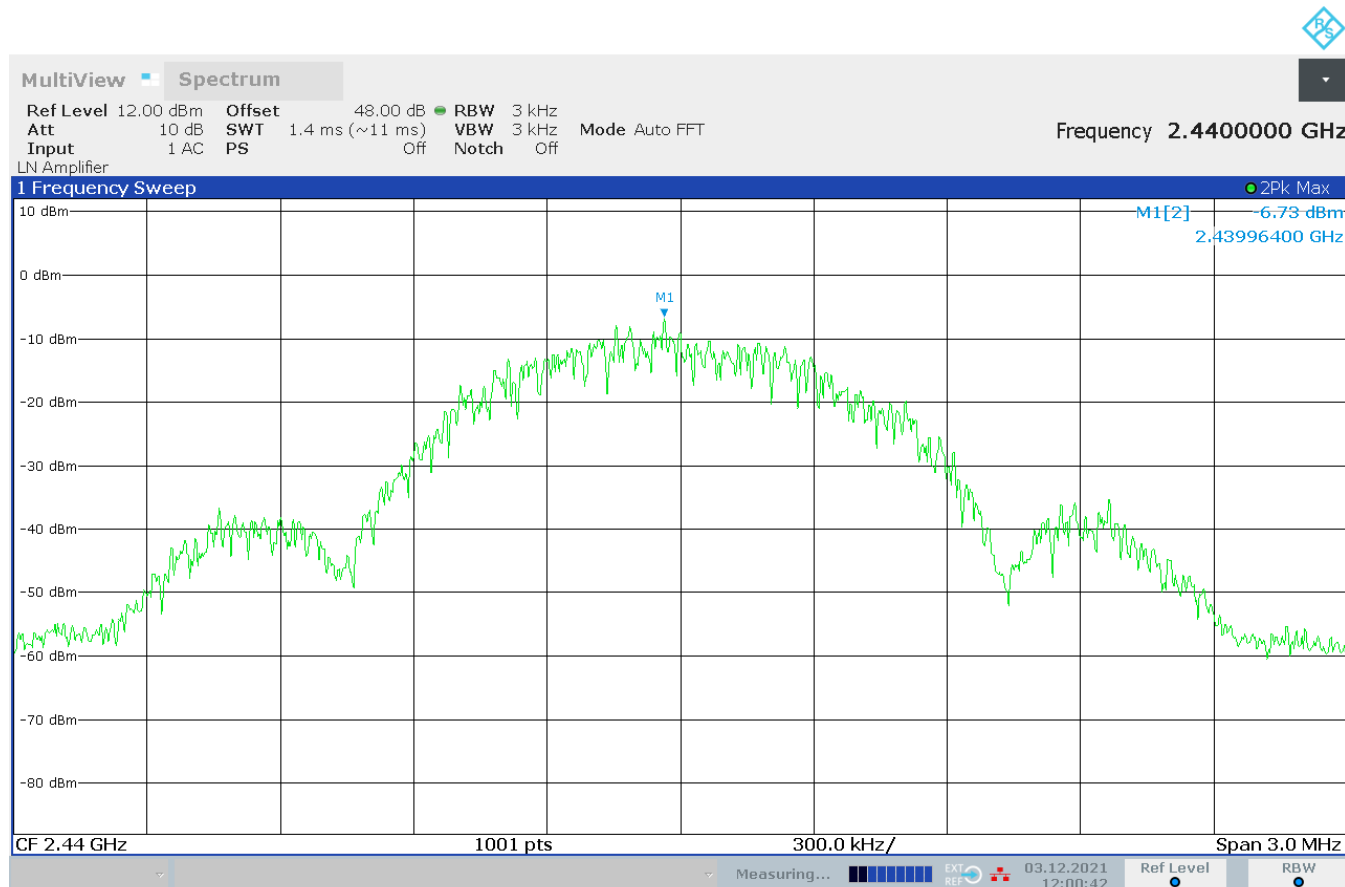
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – Bluetooth Low Energy

Rated output power: 5,75 mW Channel 19 (2440 MHz center frequency)



12:00:43 03.12.2021

Power Spectral density: -6,73 dBm @ 2439,964 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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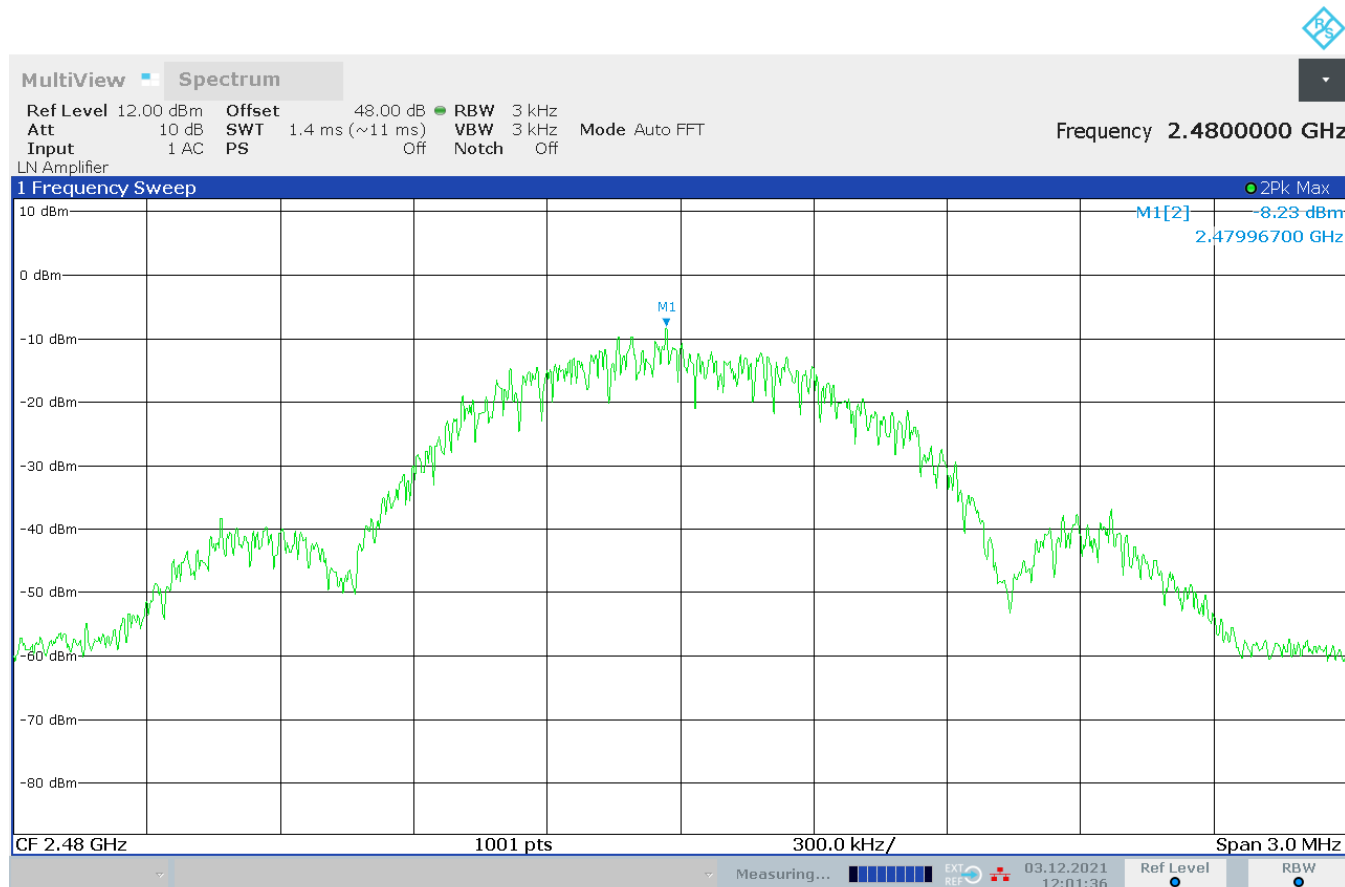
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – Bluetooth Low Energy

Rated output power: 5,75 mW Channel 39 (2480 MHz center frequency)



12:01:36 03.12.2021

Power Spectral density: -8,23 dBm @ 2479,967 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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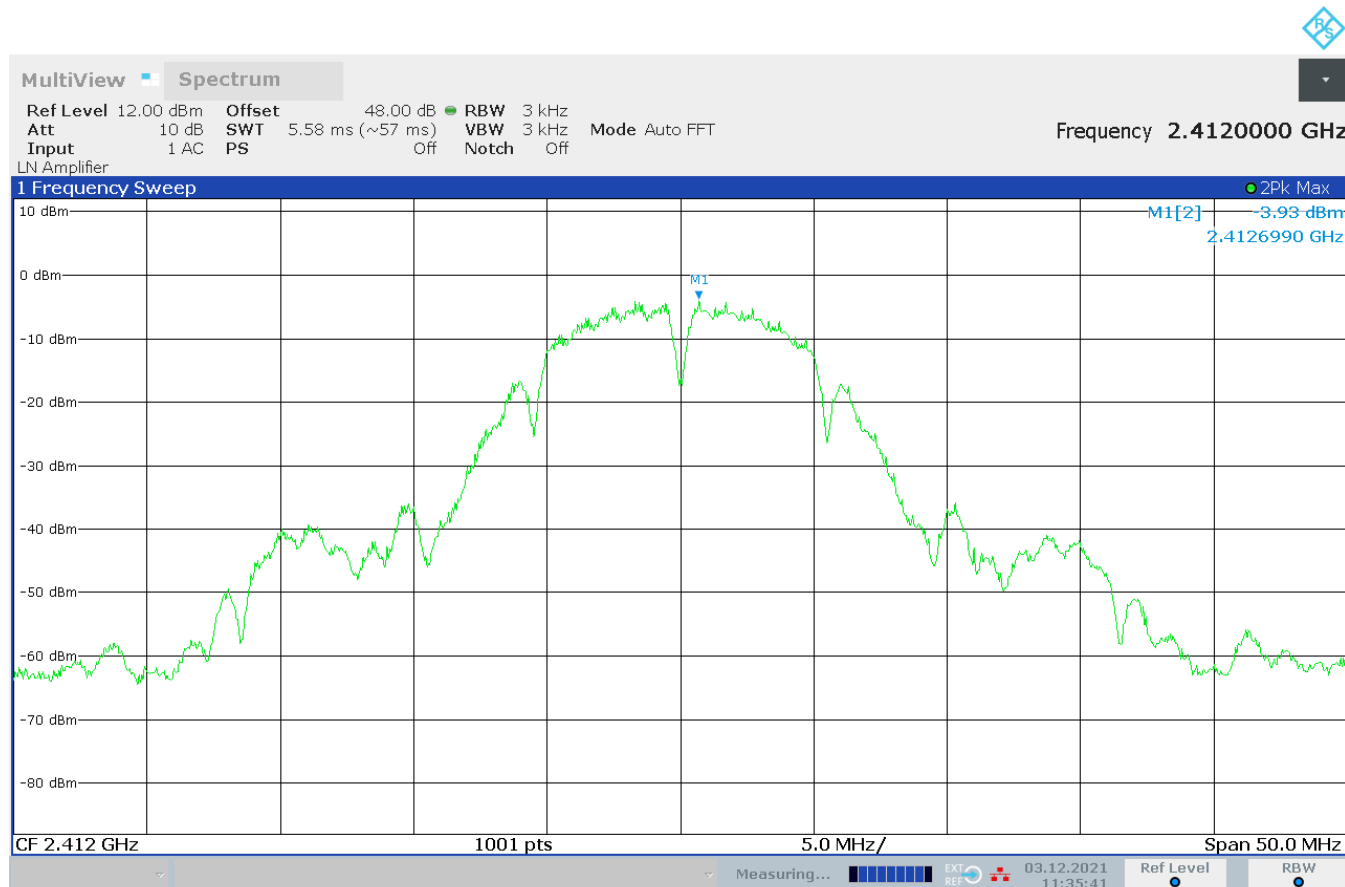
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN DSSS

Rated output power: 72,44 mW Channel 1 (2412 MHz center frequency)



11:35:41 03.12.2021

Power Spectral density: -3,93 dBm @ 2412,699 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN DSSS

Rated output power: 72,44 mW Channel 6 (2437 MHz center frequency)



11:34:55 03.12.2021

Power Spectral density: -3,81 dBm @ 2437,899 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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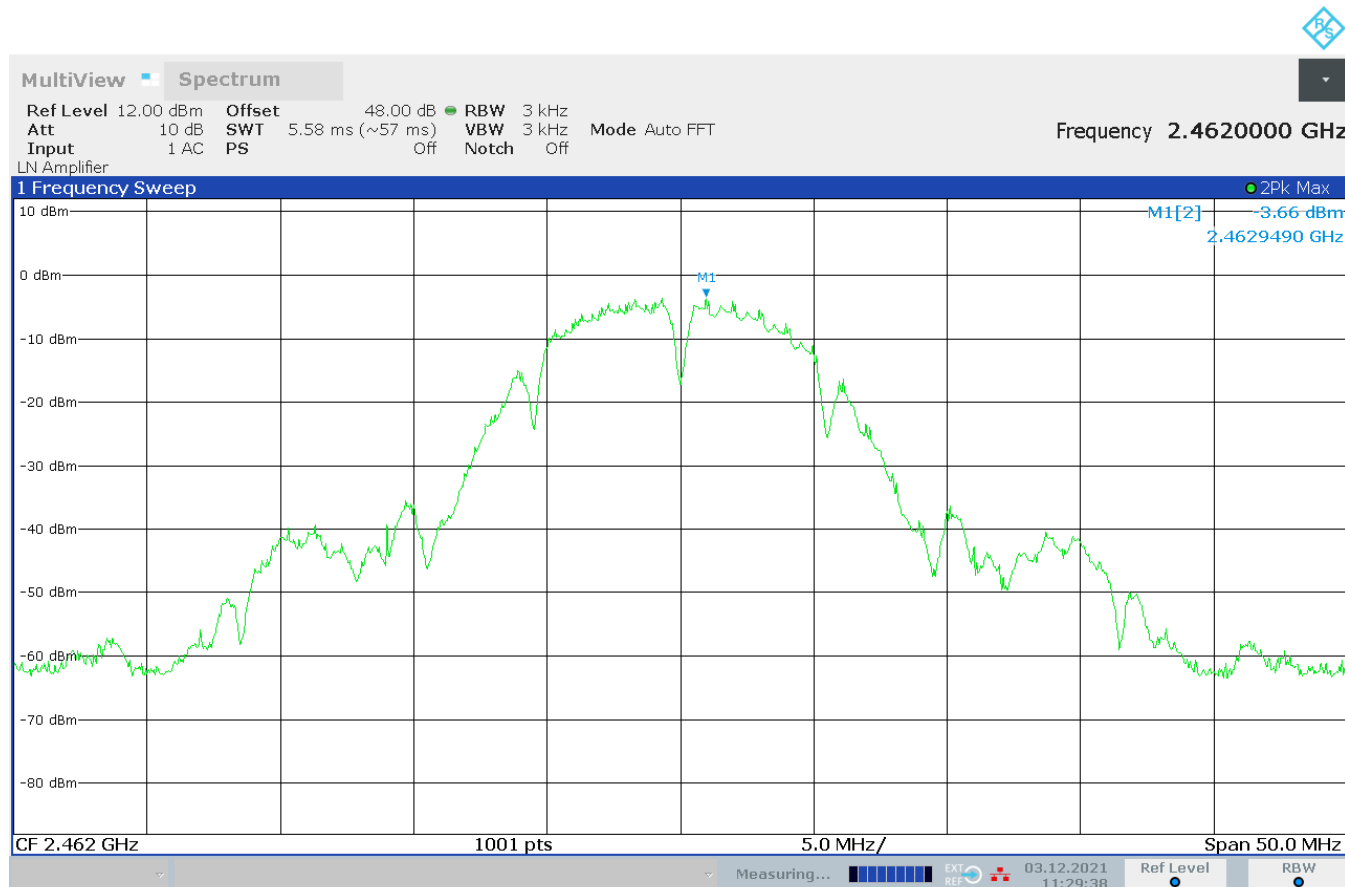
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN DSSS

Rated output power: 72,44 mW Channel 11 (2462 MHz center frequency)



11:29:38 03.12.2021

Power Spectral density: -3,66 dBm @ 2462,949 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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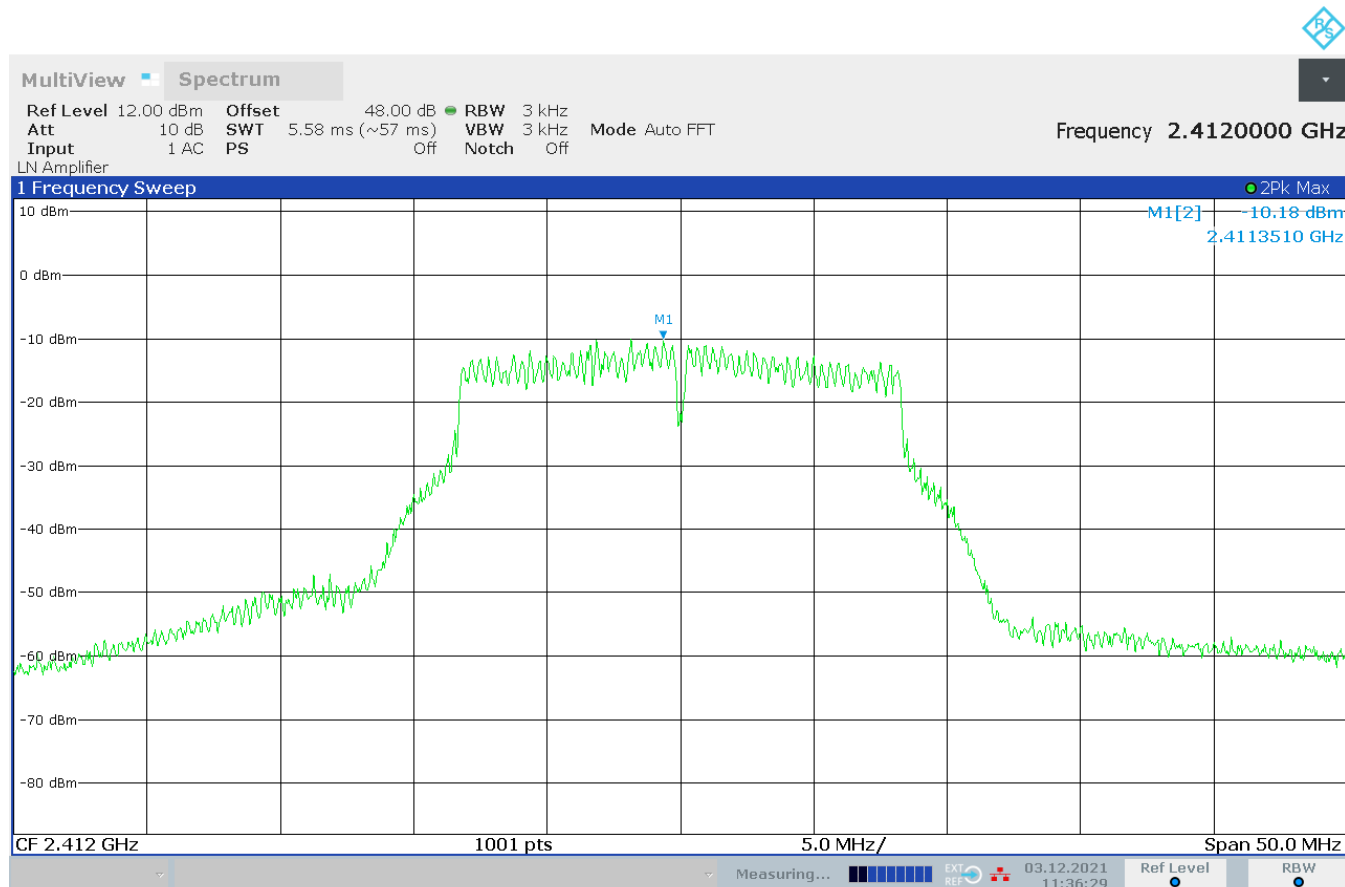
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN OFDM – lowest data rate

Rated output power: 72,44 mW Channel 1 (2412 MHz center frequency)



11:36:30 03.12.2021

Power Spectral density: -10,18 dBm @ 2411,351 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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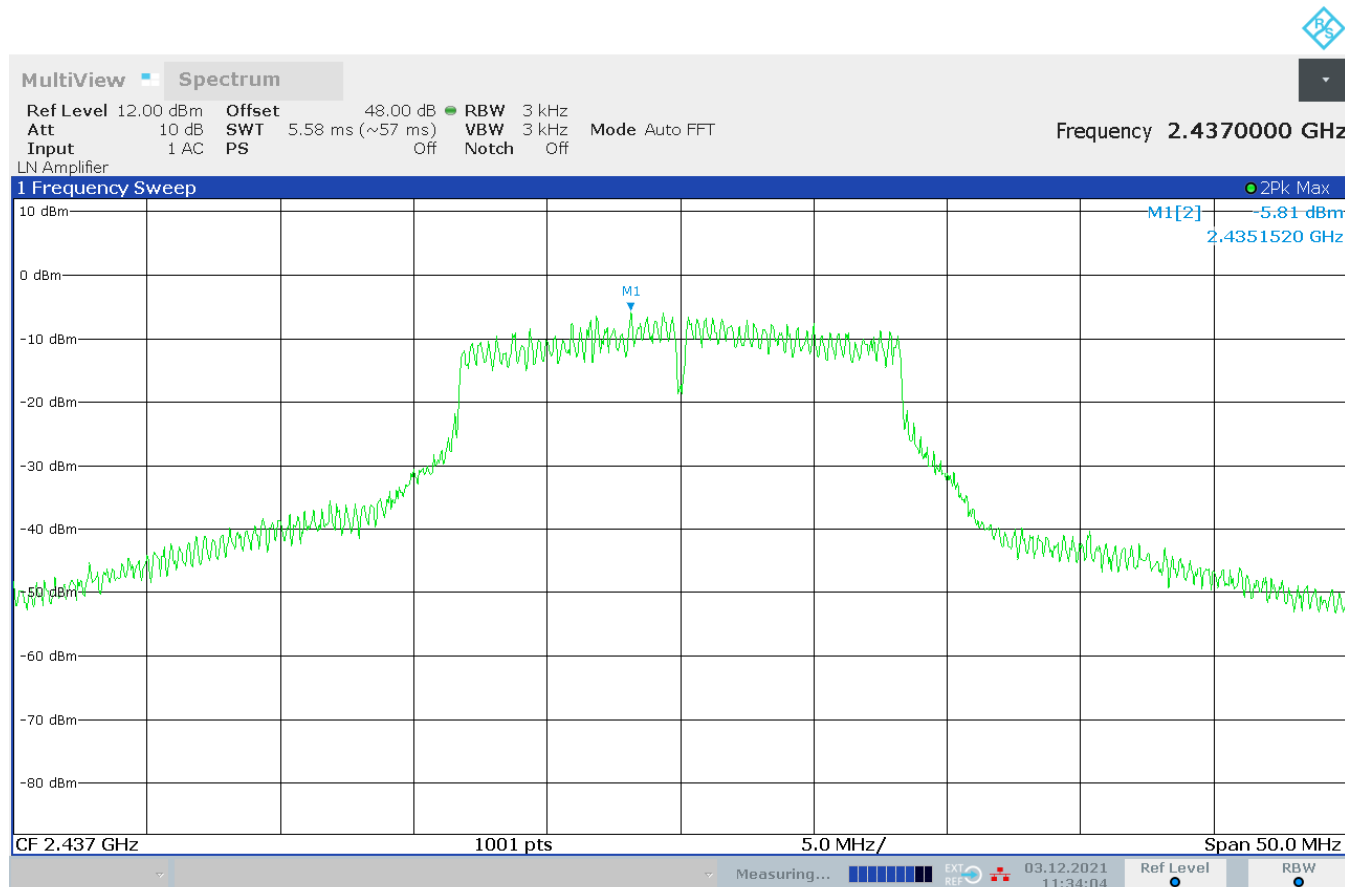
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN OFDM – lowest data rate

Rated output power: 72,44 mW Channel 6 (2437 MHz center frequency)



11:34:04 03.12.2021

Power Spectral density: -5,81 dBm @ 2435,152 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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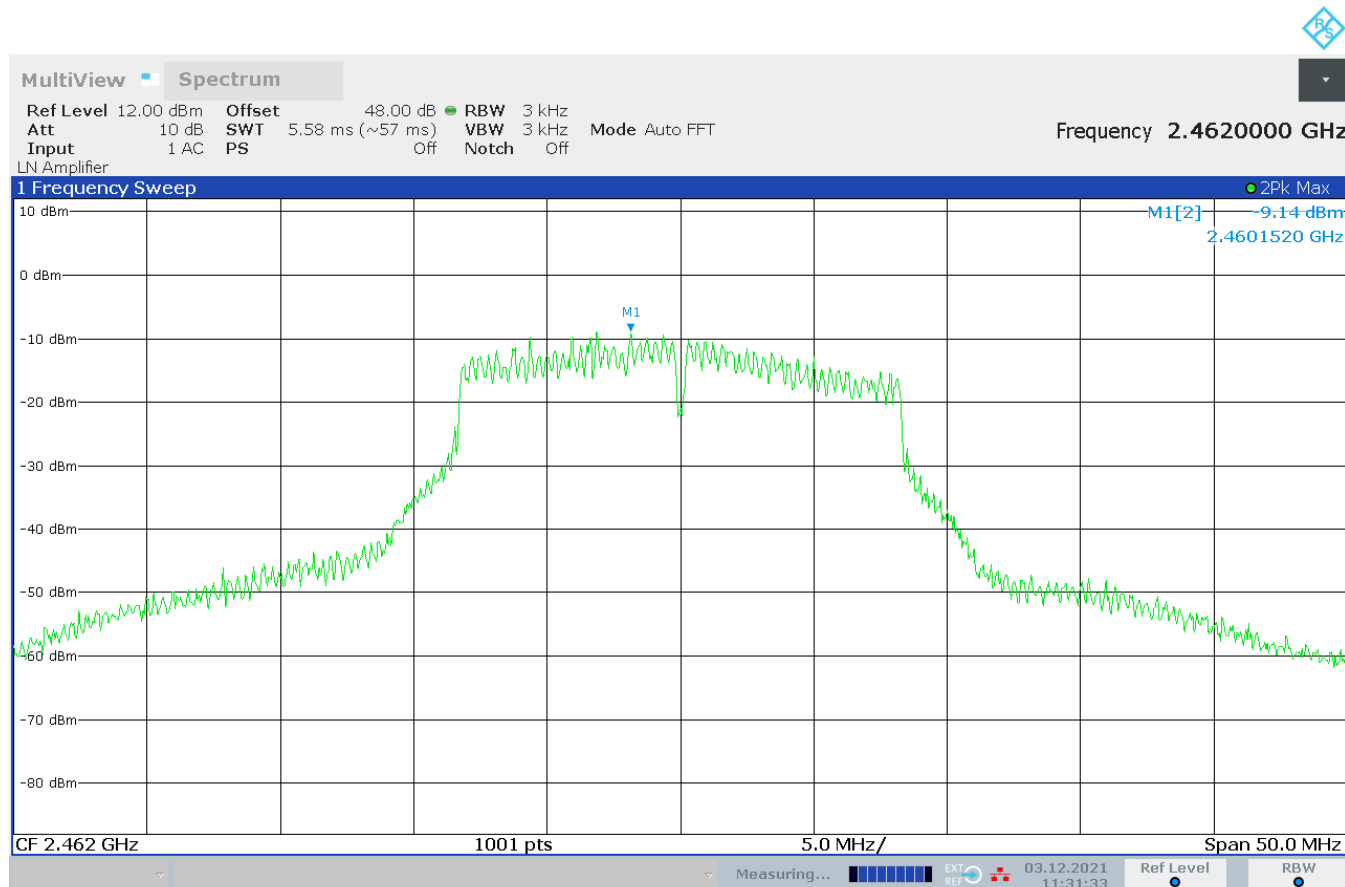
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN OFDM – lowest data rate

Rated output power: 72,44 mW Channel 11 (2462 MHz center frequency)



11:31:34 03.12.2021

Power Spectral density: -9,14 dBm @ 2460,152 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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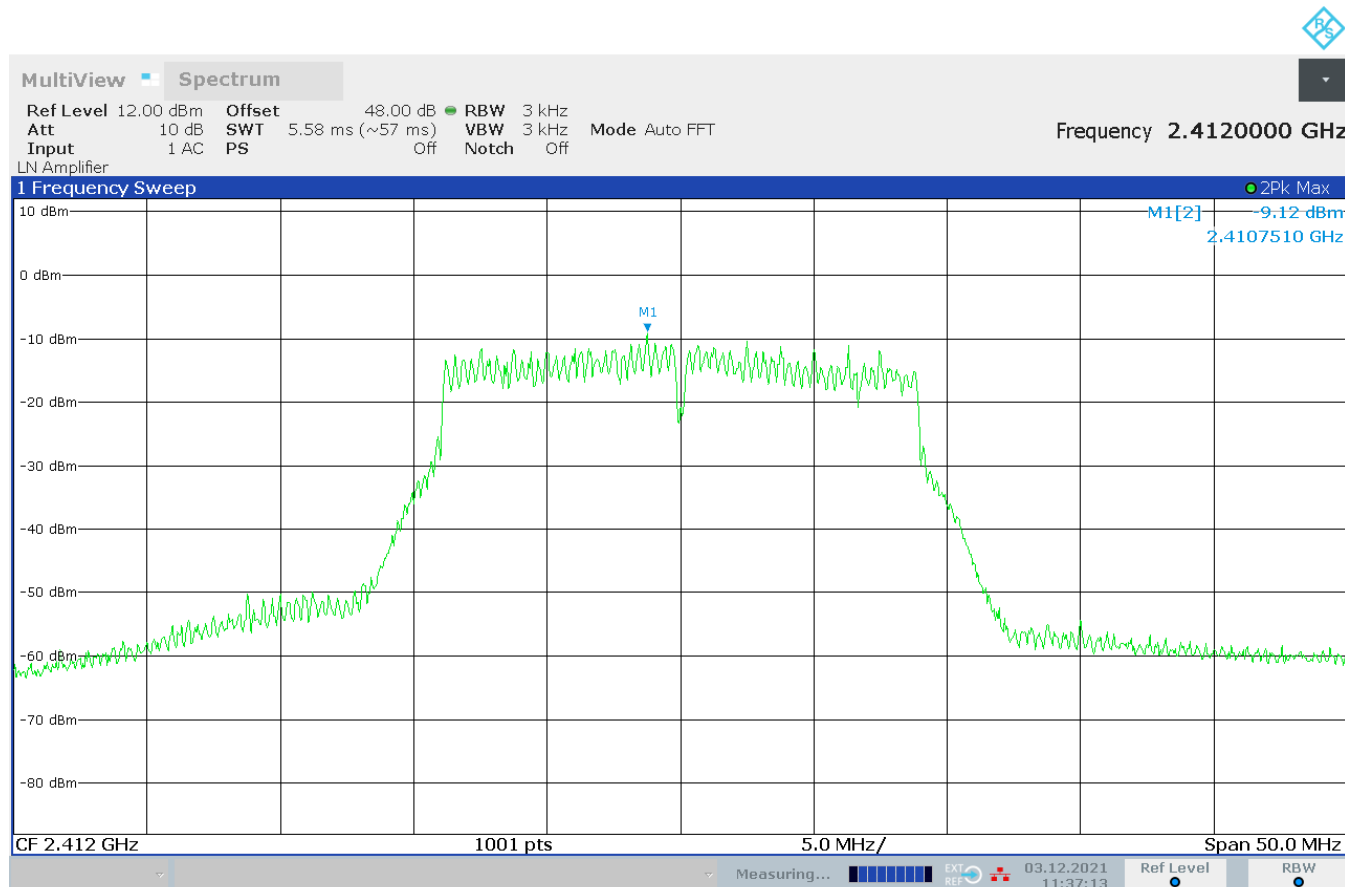
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN OFDM – highest data rate

Rated output power: 72,44 mW Channel 1 (2412 MHz center frequency)



11:37:14 03.12.2021

Power Spectral density: -9,12 dBm @ 2410,751 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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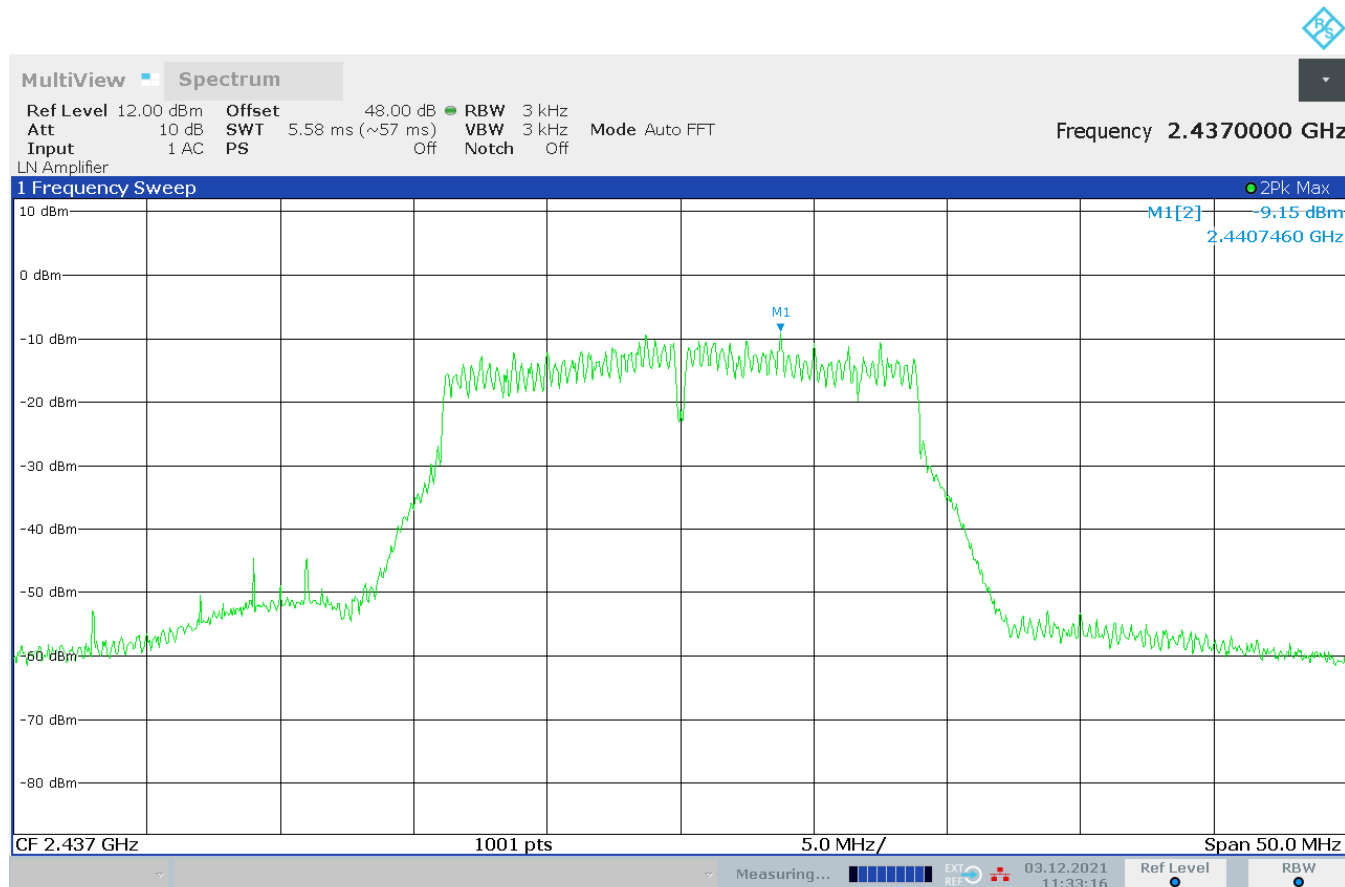
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN OFDM – highest data rate

Rated output power: 72,44 mW Channel 6 (2437 MHz center frequency)



11:33:17 03.12.2021

Power Spectral density: -9,15 dBm @ 2440,746 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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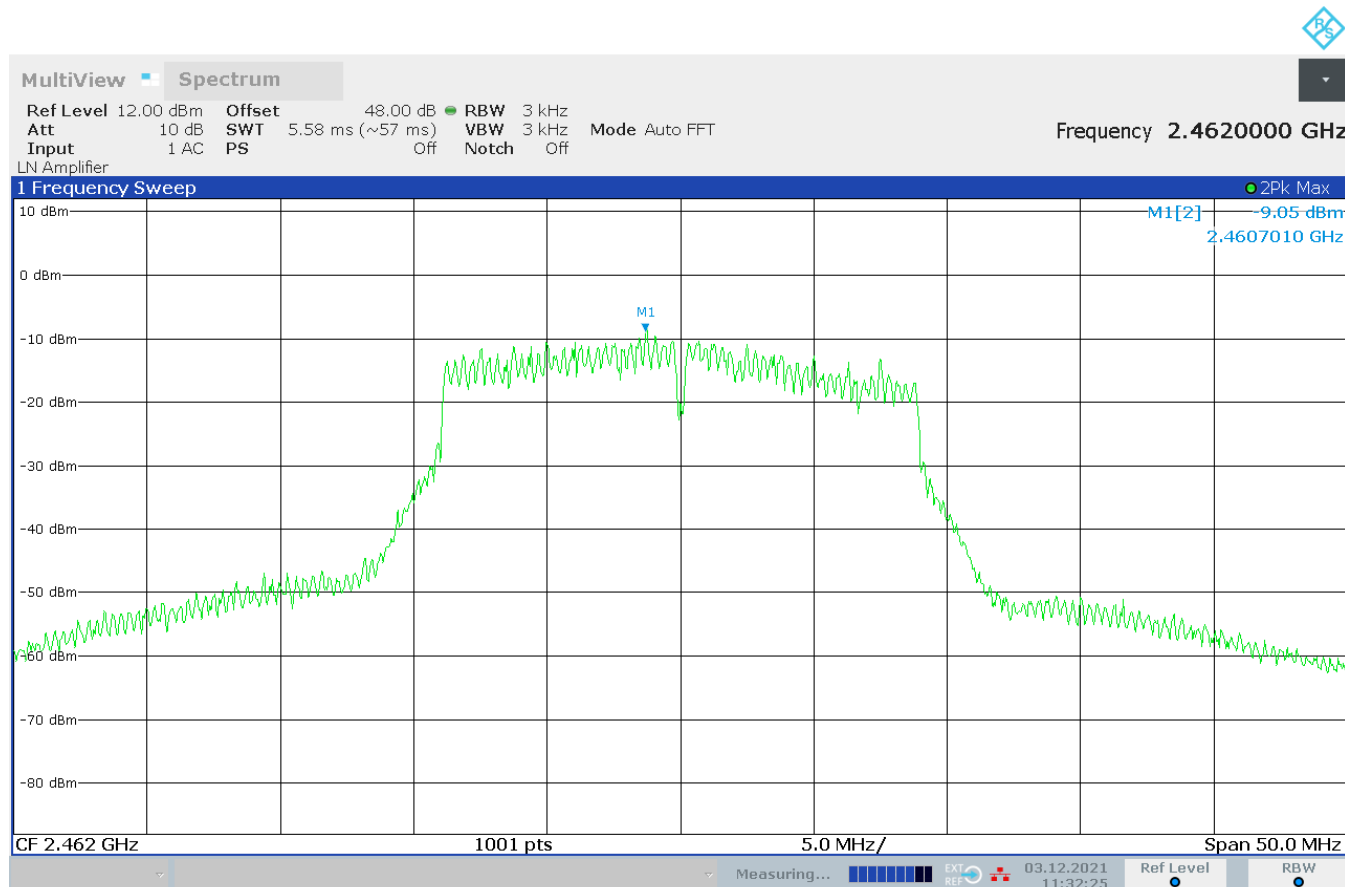
Test Equipment used: EMV-100; EMV-110; EMV-200/1

Power spectral density

§ 15.247(e)

Radiated Measurement – WLAN OFDM – highest data rate

Rated output power: 72,44 mW Channel 11 (2462 MHz center frequency)



11:32:25 03.12.2021

Power Spectral density: -9,05 dBm @ 2460,701 MHz

LIMIT SUBCLAUSE 15.247(e)

Under normal test conditons	+8dBm in any 3 kHz band
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Test Equipment used: EMV-100; EMV-110; EMV-200/1

Appendix 1

Test equipment used

☐	Anechoic Chamber with 3m measurement distance	NT-100	☐	Power quality analyzer Fluke 1760 (complete set)	NT-160 - NT-173
☐	Stripline according to ISO 11452-5	NT-108	☐	Spectrum analyzer – FSP7 9 kHz – 7 GHz	NT-200
☐	MA4000 - Antenna mast 1 - 4 m height	NT-110/1	☐	ESCI - Test receiver 9 kHz - 7 GHz	NT-203/1
☐	DS - Turntable 0 - 400 ° Azimuth	NT-111/1	☐	ESR – Test receiver 20 Hz – 26,5 GHz	NT-207/1
☐	CO3000 Controller Mast+Turntable	NT-112/1	☐	Digital Radio Tester CMW500	NT-208/1
☐	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	☐	Noise-gen., ITU-R 559-2 20 Hz – 20 kHz	NT-209
☐	FMZB1513 - Loop Antenna 9 kHz - 30 MHz	NT-122/1	☐	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
☐	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	☐	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
☐	3121C - Dipole Antenna 28 - 1000 MHz	NT-124	☐	Digital Radio Tester Aeroflex 3920	NT-212/1
☐	3115 - Horn Antenna 1 - 18 GHz (immunity)	NT-125	☐	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
☐	3116 - Horn Antenna 18 - 40 GHz	NT-126	☐	RubiSource T&M Timing reference	NT-216
☐	SAS-200/543 - Bicon. Antenna 20 MHz - 300 MHz	NT-127	☐	Radiocommunication analyzer SWR 1180 MD	NT-217
☐	AT-1080 - Log. Per. Antenna 80 - 1000 MHz	NT-128	☐	Mixer M19HWD 40 GHz – 60 GHz	NT-218
☐	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-129	☐	Mixer M12HWD 60 GHz – 90 GHz	NT-219
☐	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-130	☐	DSO9104 Digital scope	NT-220/1
☐	3146 - Log. Per. Antenna 200 – 1000 MHz	NT-131	☐	TPS 2014 Digital scope	NT-222
☐	VULB 9163 Trilog Antenna 30 – 3000 MHz	NT-131/1	☐	Artificial Ear according to IEC 60318	NT-224
☐	Loop Antenna H-Field	NT-132	☐	1 kHz Sound calibrator	NT-225
☐	Horn Antenna 500 MHz - 2900 MHz	NT-133	☐	SRM-3006 Spectrum analyzer	NT-233/1a
☐	Horn Antenna 500 MHz - 6000 MHz	NT-133/1	☐	E-field probe SRM 75 MHz – 3 GHz	NT-234
☐	Log. per. Antenna 800 MHz - 2500 MHz	NT-134	☐	Field Meter NBM-500 incl. E- and H-Field probes	NT-240a-e
☐	Log. per. Antenna 800 MHz - 2500 MHz	NT-135	☐	Magnetometer HP-01	NT-241/1
☐	BiConiLog Antenna 26 MHz – 2000 MHz	NT-137	☐	EFA-3 H-field- / E-field probe	NT-243
☐	Conical Dipol Antenna PCD8250	NT-138	☐	EHP-50F H-field- / E-field probe	NT-243/1
☐	HF 906 - Horn Antenna 1 - 18 GHz (emission)	NT-139	☐	Field Meter EMR-200 100 kHz – 3 GHz	NT-244
☐	HZ-1 Antenna tripod	NT-150	☐	E-field probe 100 kHz – 3 GHz	NT-245
☐	BN 1500 Antenna tripod	NT-151	☐	H-field probe 300 kHz – 30 MHz	NT-246
☐	Ant. tripod for EN61000-4-3 Model TP1000A	NT-156			

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☐ E-field probe 3 MHz – 18 GHz	NT-247	☐ Prana N-MT 500 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332/1
☐ H-field probe 27 MHz – 1 GHz	NT-248	☐ AS0102-65R - RF-Amplifier 1 GHz - 2 GHz	NT-333
☐ ELT-400 1 Hz – 400 kHz	NT-249	☐ APA01 – RF-Amplifier 0,5 GHz – 2,5 GHz	NT-334
☐ MDS 21 - Absorbing clamp 30 - 1000 MHz	NT-250	☐ Preamplifier 1 GHz - 4 GHz	NT-335
☐ FCC-203I EM Injection clamp	NT-251	☐ Preamplifier for GPS MKU 152 A	NT-336
☐ FCC-203I-DCN Ferrite decoupling network	NT-252	☐ Preamplifier 1 GHz – 18 GHz	NT-337/1
☐ PR50 Current Probe	NT-253	☐ DC Block 10 MHz – 18 GHz Model 8048	NT-338
☐ i310s Current Probe	NT-254/1	☐ 2-97201 Electronic load	NT-341
☐ Fluke 87 V True RMS Multimeter	NT-260	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-344
☐ Model 2000 Digital Multimeter	NT-261	☐ TSX3510P - Power supply 0-30 V / 0 - 10 A	NT-345
☐ Fluke 87 V Digital Multimeter	NT-262/1	☐ VDS 200 Mobil-impuls-generator	NT-350
☐ ESH2-Z5-U1 Artificial mains network 4x25A	NT-300	☐ LD 200 Mobil-impuls-generator	NT-351
☐ ESH3-Z5-U1 Artificial mains network 2x10A	NT-301	☐ MPG 200 Mobil-Impuls-Generators	NT-352
☐ ESH3-Z6-U1 Artificial mains network 1x100A	NT-302	☐ EFT 200 Mobil-impuls-generator	NT-353
☐ ESH3-Z6-U1 Artificial mains network 1x100A	NT-302a	☐ AN 200 S1 Artificial Network	NT-354
☐ EZ10 T-Artificial Network	NT-305	☐ FP-EFT 32M 3 ph. Coupling filter (Burst)	NT-400/1
☐ SMG - Signal generator 0,1 - 1000 MHz	NT-310	☐ PHE 4500 - Mains impedance network	NT-401
☐ SMA100A - Signal generator 9 kHz - 6 GHz	NT-310/1	☐ IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐ RefRad Reference generator	NT-312	☐ TK 9421 High Power Volt. Probe 150 kHz - 30 MHz	NT-409
☐ SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	☐ ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐ 40 MHz Arbitrary Generator TGA1241	NT-315	☐ IP 4 - Capacitive clamp (Burst)	NT-411
☐ Artificial mains network NSLK 8127-PLC	NT-316	☐ Highpass-Filter 100 MHz – 3 GHz	NT-412
☐ PSURGE 4.1 Surge generator	NT-324	☐ Highpass-Filter 600 MHz – 4 GHz	NT-413
☐ IMU4000 Immunity test system	NT-325/1	☐ Highpass-Filter 1250 MHz – 4 GHz	NT-414
☐ VCS 500-M6 Surge-Generator	NT-326	☐ Highpass-Filter 1800 MHz – 16 GHz	NT-415
☐ Oscillatory Wave Simulator incl. Coupling networks	NT-328a+b+c		
☐ BTA-250 - RF-Amplifier 9 kHz - 220 MHz / 250 W	NT-330		
☐ T82-50 RF-Amplifier 2 GHz – 8 GHz	NT-331		

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☐	RF-Attenuator 10 dB DC – 18 GHz / 50 W	NT-417/1	☐	FCC-801-T4 Coupling decoupling network	NT-463
☐	RF-Attenuator 6 dB DC – 18 GHz / 50 W	NT-418	☐	FCC-801-C1 Coupling decoupling network	NT-464
☐	RF-Attenuator 3 dB DC – 18 GHz / 50 W	NT-419	☐	SW 9605 - Current probe 150 kHz – 30 MHz	NT-465/1
☐	RF-Attenuator 20 dB DC - 1000 MHz / 25 W	NT-421	☐	95242-1 – Current probe 1 MHz – 400 MHz	NT-468
☐	RF-Attenuator 30 dB DC - 1000 MHz / 1 W	NT-423	☐	94106-1L-1 – Current probe 100 kHz – 450 MHz	NT-471
☐	RF-Attenuator 30 dB	NT-424	☐	WHKX12-2700-3000-18000 3 GHz Highpass filter	NT-472
☐	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-425	☐	WHKX10-3870-4500-18000 4,5 GHz Highpass filter	NT-473
☐	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-426	☐	GA 1240 Power amplifier according to EN 61000-4-16	NT-480
☐	RF-Attenuator 6 dB	NT-428	☐	Coupling networks according to EN 61000-4-16	NT-481 - NT-483
☐	RF-Attenuator 0 dB - 81 dB	NT-429	☐	Van der Hoofden Test Head	NT-484
☐	WRU 27 - Band blocking 27 MHz	NT-430	☐	WRCJV12-5820-5850-5950-5980 5,9 GHz Band Reject Filter	NT-490
☐	WHJ450C9 AA - High pass 450 MHz	NT-431	☐	WHKX10-5670-6300-18000 6 GHz Highpass filter	NT-491
☐	WHJ250C9 AA - High pass 250 MHz	NT-432	☐	WHK12-935-1000-7000 1 GHz Highpass filter	NT-492
☐	RF-Load 150 W	NT-433	☐	EMC Video/Audiosystem	NT-511/1
☐	Impedance transducer 1:4 ; 1:9 ; 1:16	NT-435	☐	ES-K1 Version 1.71 SP2 Test software	NT-520
☐	RF-Attenuator DC – 18 GHz 6 dB	NT-436	☐	EMC32 Version 10.60.20 Test software	NT-520/1
☐	RF-Attenuator DC – 18 GHz 6 dB	NT-437	☐	SRM-TS Version 1.3 software for SRM-3000	NT-522
☐	RF-Attenuator DC – 18 GHz 10 dB	NT-438	☐	SRM-TS Version 1.3.1 software for SRM-3006	NT-522/1
☐	RF-Attenuator DC – 18 GHz 20 dB	NT-439	☐	Spitzenberger und Spies Test software V4.1	NT-525
☐	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	☐	Vertical coupling plane (ESD)	NT-531
☐	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	☐	Test cable #4 for EN 61000-4-6	NT-553
☐	Power Divider 6 dB/1 W/50 Ohm	NT-443	☐	Test cable #3 for conducted emission	NT-554
☐	Directional coupler 0,1 MHz – 70 MHz	NT-444	☐	Test cable #5+#6 ESD-cable (2x470k)	NT-555 + NT-556
☐	Directional coupler 0,1 MHz – 70 MHz	NT-445	☐	Test cable #8 Sucoflex 104EA	NT-559
☐	Tube imitations according to EN 55015	NT-450	☐	Test cable #9 (for outdoor measurements)	NT-580
☐	FCC-801-M3-16A Coupling decoupling network	NT-458	☐	Test cable #10 (for outdoor measurements)	NT-581
☐	FCC-801-M2-50A Coupling decoupling network	NT-459	☐	Test cable #13 Sucoflex 104PE	NT-584
☐	FCC-801-M5-25 Coupling decoupling network	NT-460	☐	Test cable #21 for SRM-3000	NT-592
☐	FCC-801-AF10 Coupling decoupling network	NT-461	☐	Shield chamber	NT-600
☐	FCC-801-S25 Coupling decoupling network	NT-462	☐	Climatic chamber	M-1200

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Test equipment used

☐	Anechoic Chamber 3 m / 5 m measuring distance	EMV-100	☐	HF- Amplifier 9 kHz-225 MHz BBL200	EMV-300/1	Division: Industry & Energy
☐	Turntable 6 m diameter	EMV-101	☐	HF- Amplifier 80 -1000 MHz BBA150	EMV-301	Department: FG
☐	Antenna mast + controller	EMV-102+ EMV-103	☐	HF- Amplifier 0,8 - 6 GHz BBA150	EMV-302	Test report number: INE-AT/FG-21/195
☐	EMC Video/Audiosystem	EMV-104	☐	High Power Ant. 20-200 MHz HPBA-2510	EMV-303/1	Page: 4 of 5
☐	EMC Software EMC32 Version 10.60.20	EMV-105	☐	High Power Ant. 20-200 MHz S12018-21	EMV-303/2	Date: 17.12.2021
☐	Hornantenna 1 – 18 GHz HF 907	EMV-110	☐	Log.per Antenna 80-2700 MHz STLP 9128 E special	EMV-304	
☐	Antennapre.amp. 1 – 18 GHz ERZ-LNA0200-1800-30-2	EMV-111	☐	Log.per Antenna 0,7 – 9 GHz STLP9149	EMV-305	
☐	Trilog Antenna 30-3000 MHz VULB9163	EMV-112	☐	HF- Amplifier 9 kHz-250 MHz BBA150 (low noise)	EMV-306	
☐	Monopol 9 kHz – 30 MHz VAMP 9243	EMV-113	☐	ISO11451-2 TLS 10 kHz – 30 MHz	EMV-307	
☐	Antennapre.amp 18 – 40 GHz BBV 9721	EMV-114	☐	Load Dump Generator LD 200N	EMV-350	
☐	Hornantenna 200 – 2000 MHz AH-220	EMV-115	☐	Ultra Compact Symulator UCS 200N100	EMV-351	
☐	DC Artificial Network PVDC 8300	EMV-150	☐	Automotive Power fail module PFM 200N100.1	EMV-352	
☐	AC Artificial Network NNLK 8121 RC	EMV-151	☐	Voltage Drop Symulator VDS 200Q100	EMV-353	
☐	EMI Receiver ESW44	EMV-200/1	☐	Arb. Generator AutoWave	EMV-354	
☐	Signalgenerator 9 kHz – 40 GHz N5173B	EMV-201	☐	Ultra Compact Symulator UCS 500N7	EMV-355	
☐	GPS Frequency normal B-88	EMV-202	☐	Coupling decoupling network CNI 503B7 / 32 A	EMV-356	
☐	DC Power supply N5745A	EMV-203	☐	Coupling decoupling network CNI 503B7 / 63 A	EMV-357	
☐	Spektrum Analyzator FSV40	EMV-205	☐	Telecom Surge Generator TSurge 7	EMV-358	
☐	Thd Multimeter Model 2015	EMV-206	☐	Coupling decoupling network CNI 508N2	EMV-359	
☐	Poweramplifier PAS15000	EMV- 207/abc	☐	Coupling decoupling network CNV 504N2.2	EMV-360	
☐	Inrush Current Source	EMV- 208/abc	☐	Immunity generator NSG4060/NSG4060-1	EMV-361	
☐	Arb.-generator Sycore	EMV-209	☐	Coupling network CDND M316-2	EMV-362	
☐	Harmonics/Flicker analyzer ARS 16/3	EMV-210	☐	Coupling network CT419-5	EMV-363	
☐	Power Supply Regatron AC	EMV-214	☐	ESD Generator NSG 437	EMV-364	
☐	Power Supply Regatron DC	EMV-215	☐	Pulse Limiter VTSD 9561-F BNC	EMV-405	
☐	Harmonics/Flicker analyser Zimmer	EMV-216	☐	Transient emission BSM200N40+BS200N100	EMV- 450+451	
☐	Flicker Impedanz Newtons4th 753	EMV-218	☐	Cap. Coupling Clamp HFK	EMV-455	
☐	Comemso	EMV-219	☐	Mag. Field System MS100N+MC26100+MC2630	EMV- 456-458	

Appendix 1 (continued)

Test equipment used

☐	Coupling network CDN M2-100A	EMV-459
☐	Coupling network CDN M3-32A	EMV-460
☐	Coupling network CDN M5-100A	EMV-461
☐	Current Clamp CIP 9136A	EMV-462
☐	DC Artificial Network HV-AN 150	EMV-464+465
☐	Coupling Clamp EM 101	EMV-466
☐	Decoupling Clamp FTC 101	EMV-467
☐	Power attenuator 10 dB / 250 Watt	EMV-469/2
☐	HV AMN NNHV 8123 800A	EMV-472
☐	HV AMN NNHV 8123 800A	EMV-473

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