

TEST REPORT
of the accredited test laboratory

TÜV Nr.:INE-AT/FG-18/153

Applicant: StreamUnlimited Engineering GmbH
High Tech Campus Vienna
Gutheil-Schoder-Gasse 10
A-1100 Vienna

Tested Product: STREAM1832 Bluetooth / BLE / WIFI streaming module
Test report for Bluetooth part only

FCC-ID: 2AJYB-S1832

IC-ID: 20504-S1832

Manufacturer: See applicant

Output power / 12,59 mW **power supply:** 12 VDC
field strength: conducted

Frequency range: 2402 - 2480 MHz **Channel separation:** 1 MHz

Standard: FCC: 47 CFR Part 15 (October 1, 2017 edition)
RSS-247 Issue 2, February 2017

Testing Laboratory,
Inspection Body,
Certification Body,
Calibration Laboratory,
VerifizierungsstelleNotified Body 0408
IC 2932K-1Non-executive
Board of Directors:
KR DI Johann
MarihartManagement:
DI Dr. Stefan Haas
Mag. Christoph
WenningerRegistered Office:
Deutschstrasse 10
1230 Vienna/AustriaBranch Offices:
www.tuv.at/standorteCompany Register
Court / - Number:
Vienna / FN 288476 fBank Details:
IBAN
AT131200052949001066
BIC BKAUATWWIBAN
AT153100000104093282
BIC RZBAATWWVAT ATU63240488
DVR 3002476**TUV Austria Services GmbH**
Test laboratory for EMC

Supervisor of EMC-laboratory:

Ing. Wilhelm Seier



06.11.2018

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checked by:

Ing. Michael Emminger

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The results of this test report only refer to the provided equipment.

Contents

	Designation	PAGE
1.	Applicant	3
2.	Description of EUT	4
3.	Standards / Final result	5
4.	Test results	
	List of measurements according to 47 CFR 15 and RSS-247	
4.1	Test object data	6
4.2	Number of channels and channel spacing	7
4.3	20 dB Bandwidth	8-19
4.4	Maximum Peak RF Power Output (eirp)	20-23
4.5	Average time of occupancy	24-31
4.6	Out-of-band Emissions	32-43
4.7	Emissions in restricted bands	44-63
4.8	Conducted Limits	64-65
4.9	Maximum permissible exposure	66
Appendix	Designation	PAGES
1	Test equipment used	4

1. Applicant

Company: StreamUnlimited Engineering GmbH

Department: Director Systems

Address: High Tech Campus Vienna
Gutheil-Schoder-Gasse 10
A-1100 Vienna

Contact person: Mr. DI Christoph Apel

EUT received on: 05.09.2018

Tests were performed on: 05.09. till 05.11.2018

2. Description of EUT

EUT:	Bluetooth / BLE / WIFI module "STREAM1832"
Serial Number:	Prototype mounted on evaluation board
Manufacturer:	StreamUnlimited Engineering GmbH High Tech Campus Vienna Gutheil-Schoder-Gasse 10 A-1100 Vienna
Description:	StreamUnlimited Engineering GmbH provided the following configuration for the measurements: Prototype mounted on evaluation board with direct connection for conducted measurements and with antenna type of highest gain for radiated measurements
Operating mode:	The measurements were carried out at the following running states: test-firmware running, transmitting continuously
Technical data EUT:	Rated voltage: 12VDC Rated current: 150mA Rated frequency: DC Mains voltage during the tests: 12VDC
Climatic conditions in the emc laboratory:	Relative humidity: 54% Temperature: 23°C

3. Standards / Final result

Name	Title	Deviation	Result
Title 47 CFR Part 15 October 1 st 2017 edition	RADIO FREQUENCY DEVICES	none	OK
RSS-247 Issue 2, February 2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	none	OK
Result: Opinions and interpretation of testing laboratory OK: EUT passed NOK: EUT failed			

4. TEST RESULTS

4.1. TEST OBJECT DATA

General EUT Description

This Bluetooth / BLE / WIFI module is using either 2.4 GHz frequencies or 5 GHz (WIFI only). This test report is only for the Bluetooth part. See additional test reports:

INE-AT/FG-18/154 for BLE

INE-AT/FG-18/155 for 2,4 GHz WIFI and

INE-AT/FG-18/156 for 5 GHz WIFI measurement results including photodocumentation.

2.1033 (c) Technical description

2.1033 (4) Type of emission: Basic datarate: 1M19KF1D – Channel spacing 1 MHz > 2/3 of channel bandwidth - > maximum power should be 125 mW.
Enhanced datarate: 1M31F1D – Channel spacing 1 MHz > 2/3 of channel bandwidth - > maximum power should be 125 mW.

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 12,59 mW and there is no power regulation.

2.1033 (7) Maximum output power rating: 12,59 mW conducted.

2.1033 (8) DC Voltage and Current: 12V DC
maximum current consumption: 150 mA

RSS-135 This standard does not apply to:

- 1.1.(a) a receiver that scans radio frequencies for the purpose of enabling its associated transmitter to avoid transmitting in an occupied frequency but which does not have the capability of decoding the message (e.g. converting it to audio voice) contained in the radio signal

Antennas used for all radiated measurements: MOLEX '1461531100'

Worst case Spurious Emissions: 38,5 dBµV/m Quasipeak.

Tests were performed September 5th till November 5th 2018.

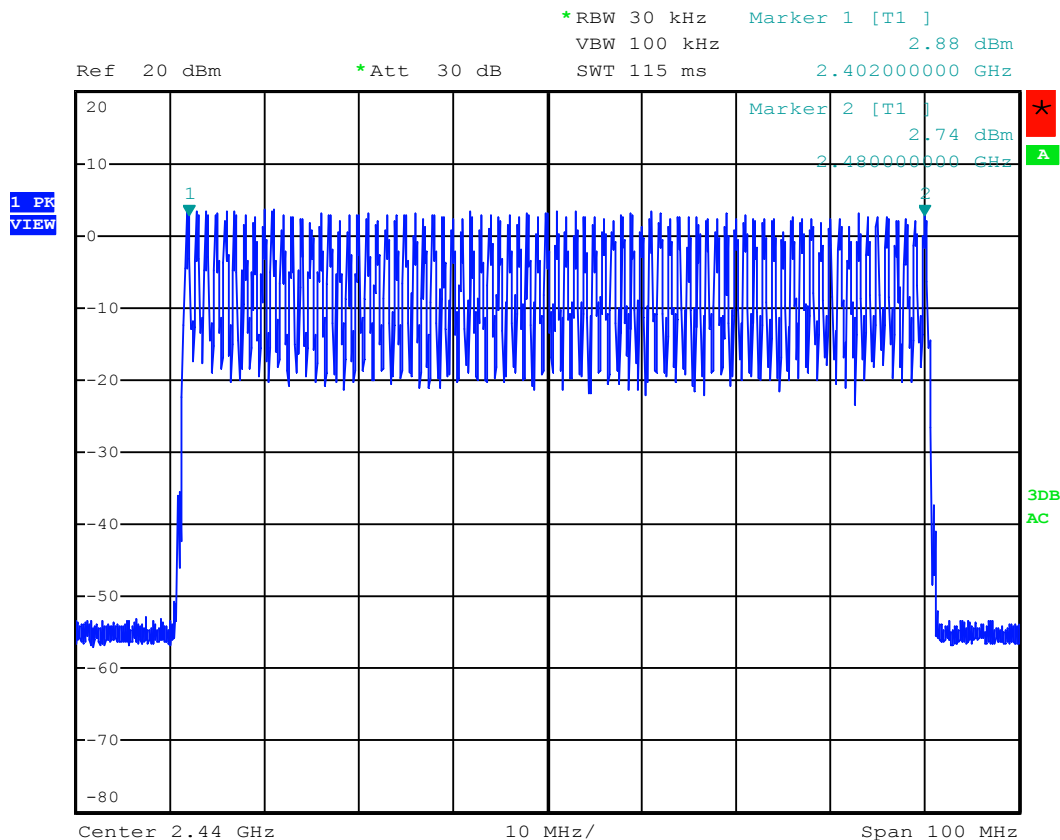
4.2. Number of channels and channel spacing

§ 15.247 (a) (1)
5.1 (2) (4)

Mode: Bluetooth

Conducted Measurement

Rated output power: 12,59 mW



Date: 19.SEP.2018 16:35:52

There are 79 Channels used, starting at 2402 till 2480 each spaced by 1 MHz channel spacing.

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(4)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

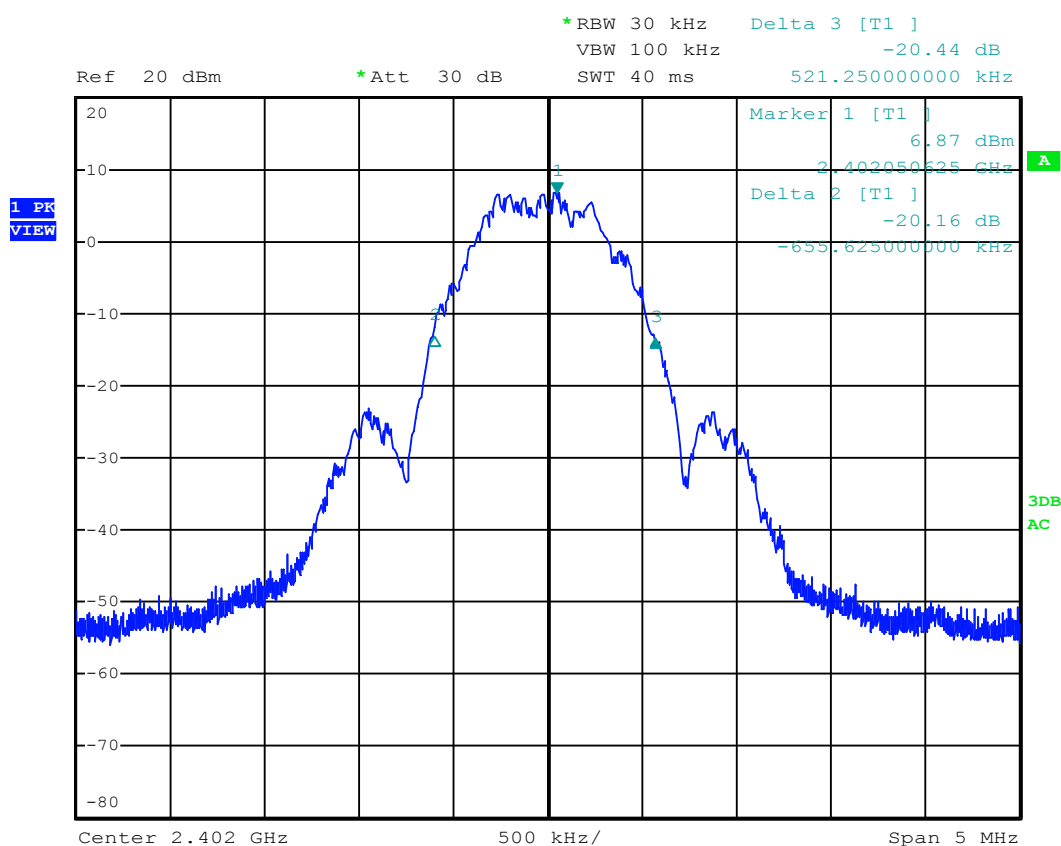
Test Equipment used: NT-203/1

4.3. 20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2402 MHz – Antenna 1



Date: 19.SEP.2018 16:56:46

20dB Bandwidth: 1177 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

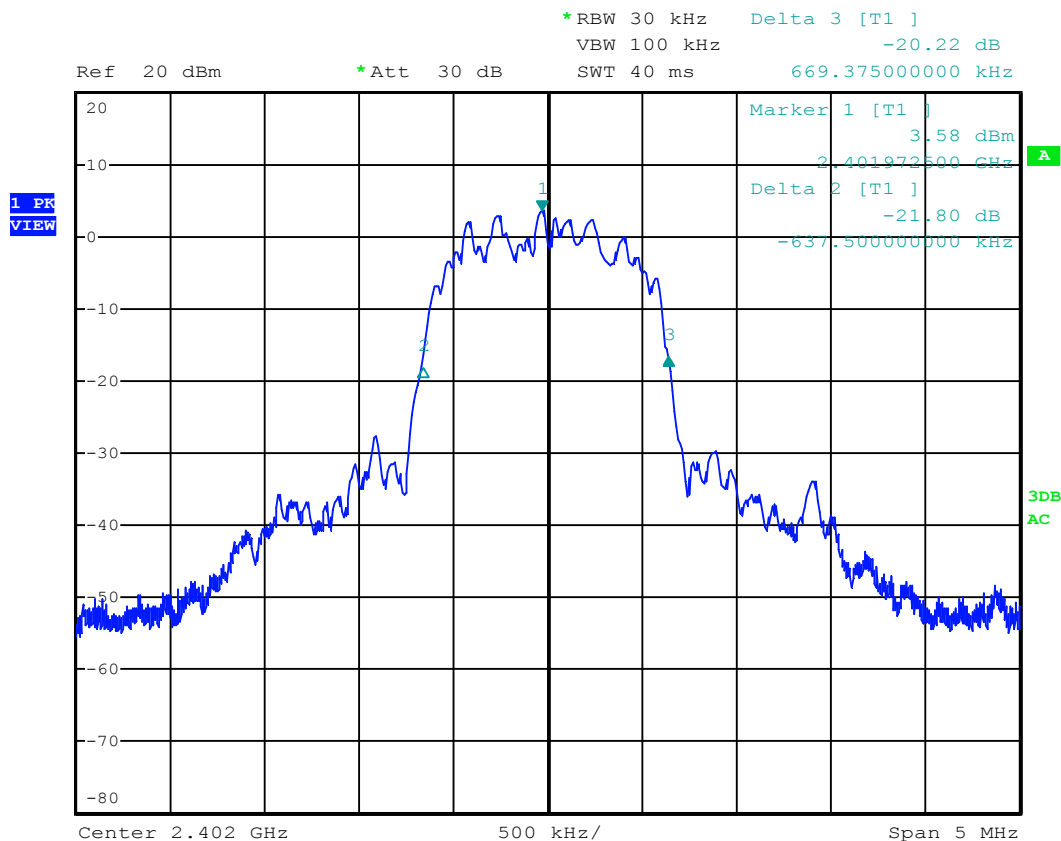
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2402 MHz – Antenna 1



Date: 19.SEP.2018 16:58:44

20dB Bandwidth: 1307 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

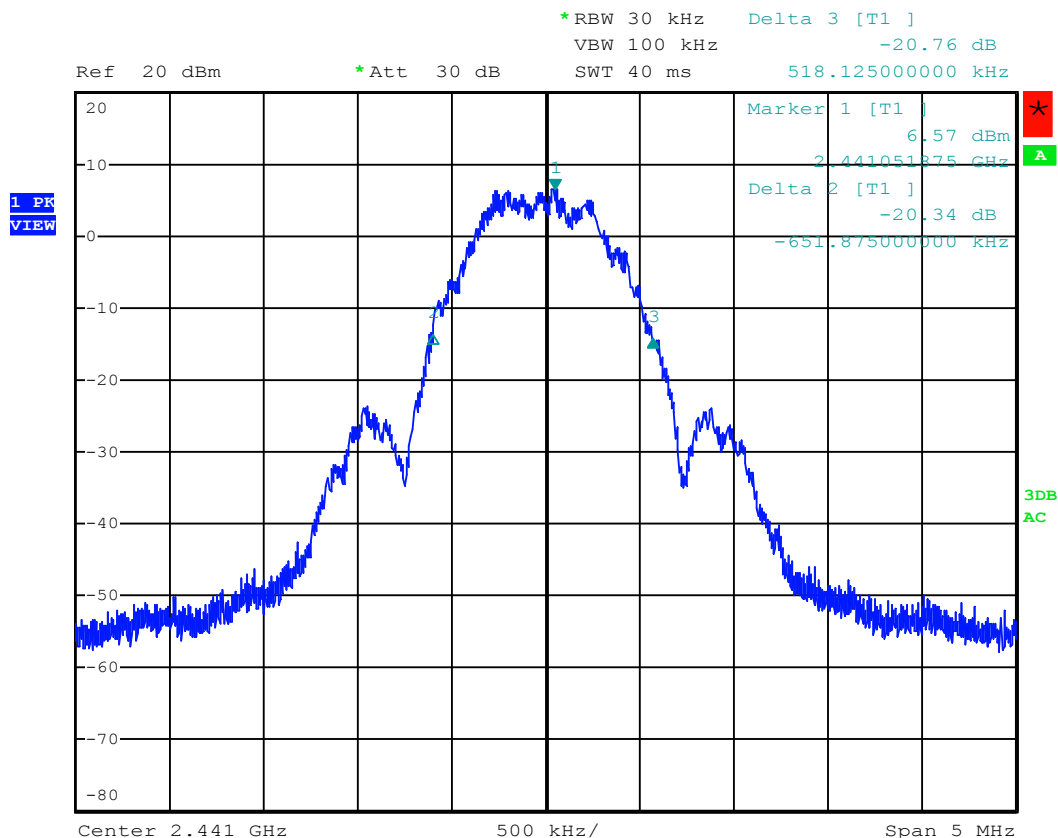
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2441 MHz – Antenna 1



Date: 19.SEP.2018 17:00:19

20dB Bandwidth: 1170 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

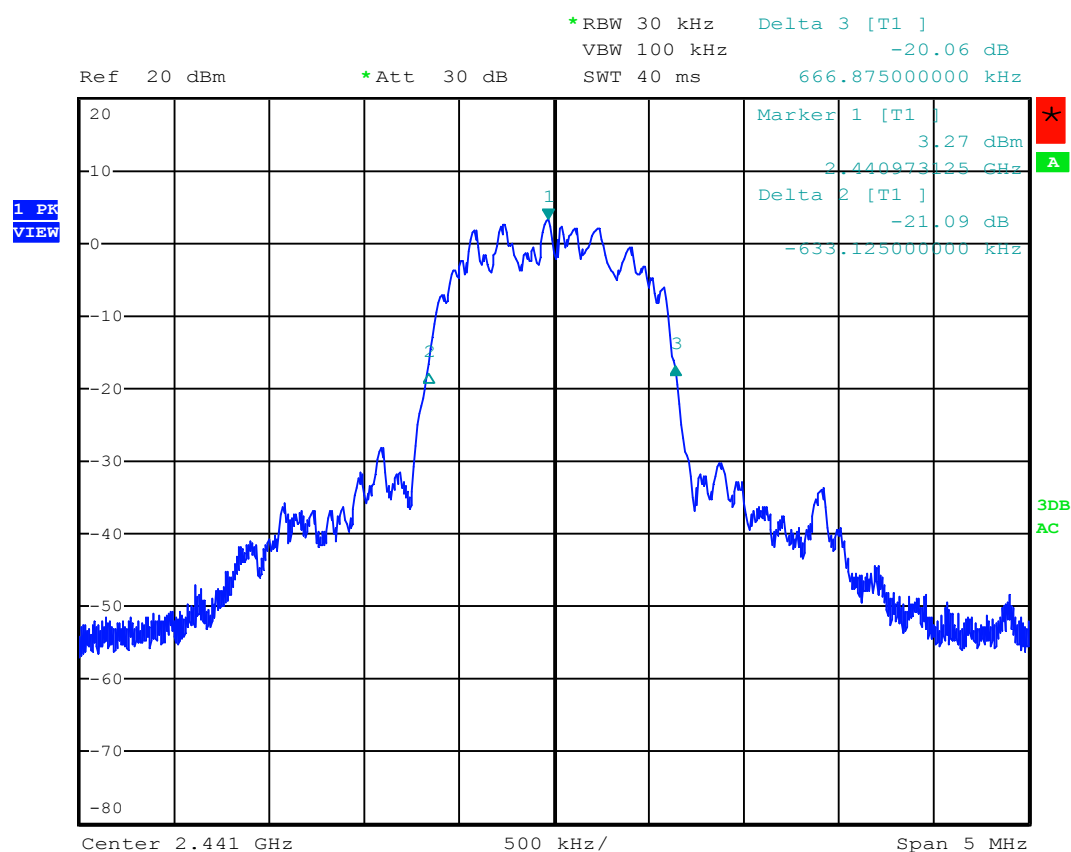
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2441 MHz – Antenna 1



Date: 19.SEP.2018 17:01:17

20dB Bandwidth: 1300 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

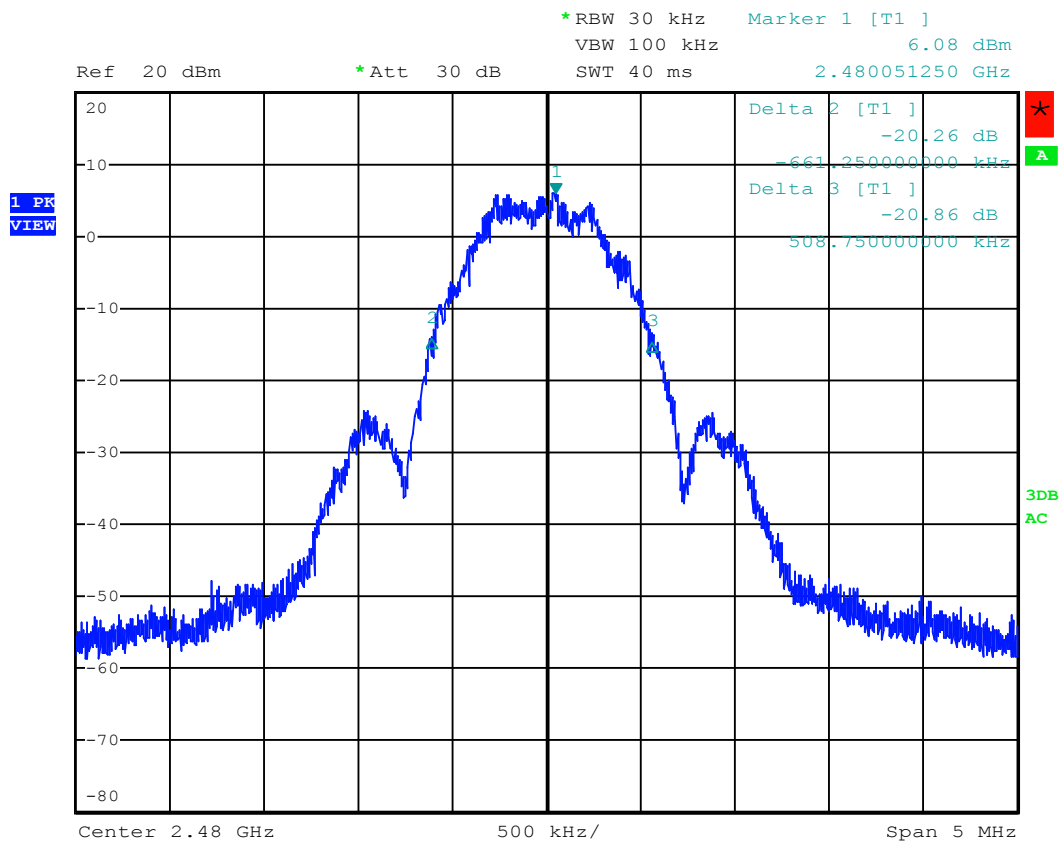
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2480 MHz – Antenna 1



Date: 19.SEP.2018 17:02:41

20dB Bandwidth: 1170 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

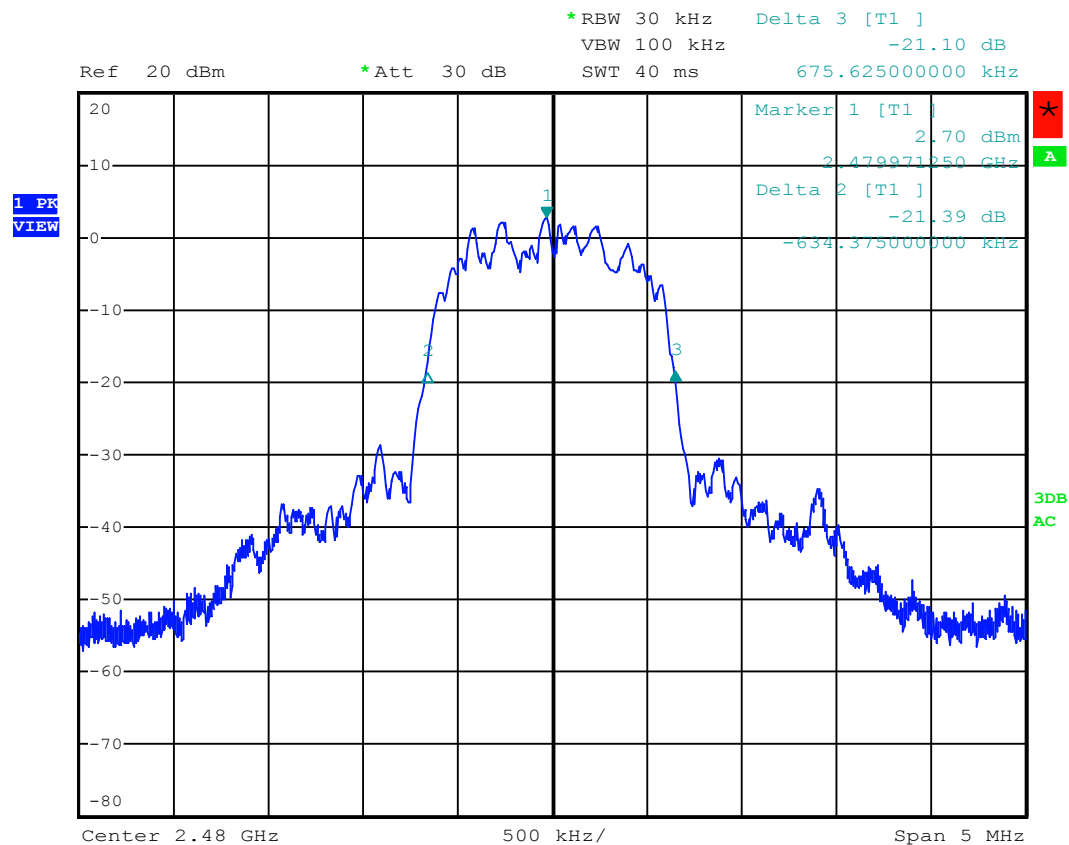
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2480 MHz – Antenna 1



Date: 19.SEP.2018 17:03:55

20dB Bandwidth: 1310 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

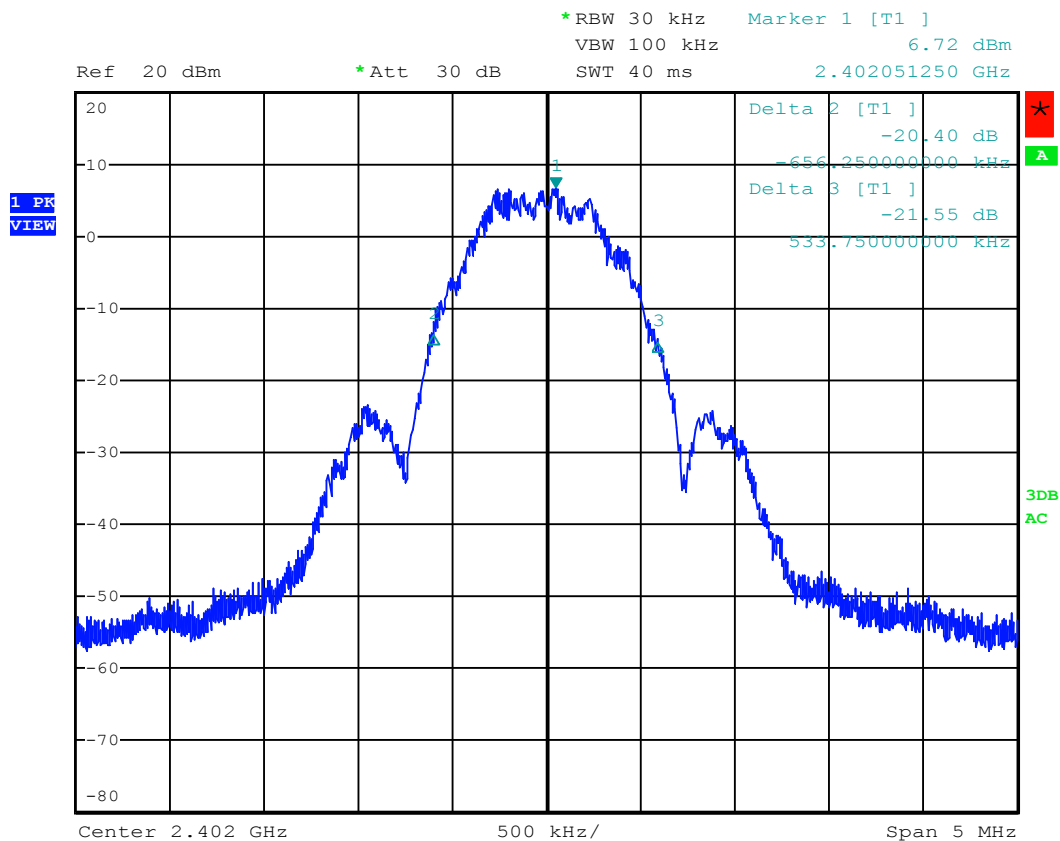
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2402 MHz – Antenna 2



Date: 19.SEP.2018 17:35:56

20dB Bandwidth: 1190 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

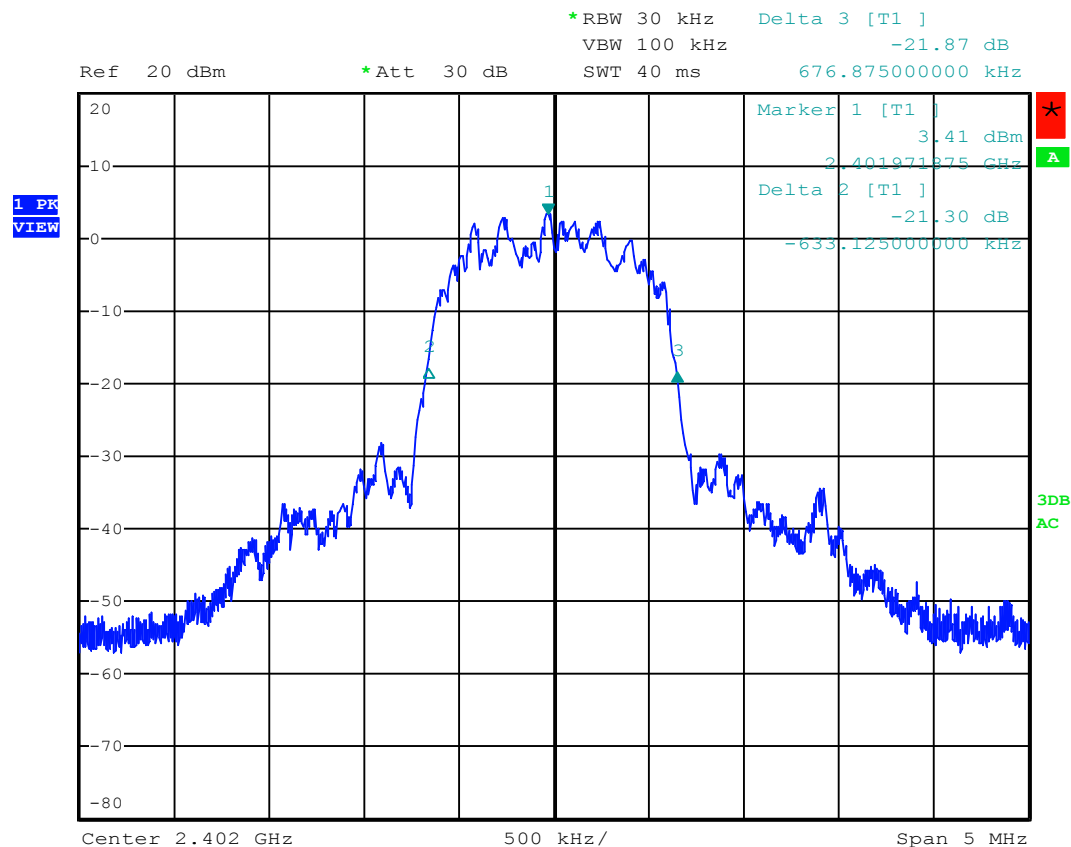
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2402 MHz – Antenna 2



Date: 19.SEP.2018 17:37:00

20dB Bandwidth: 1310 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

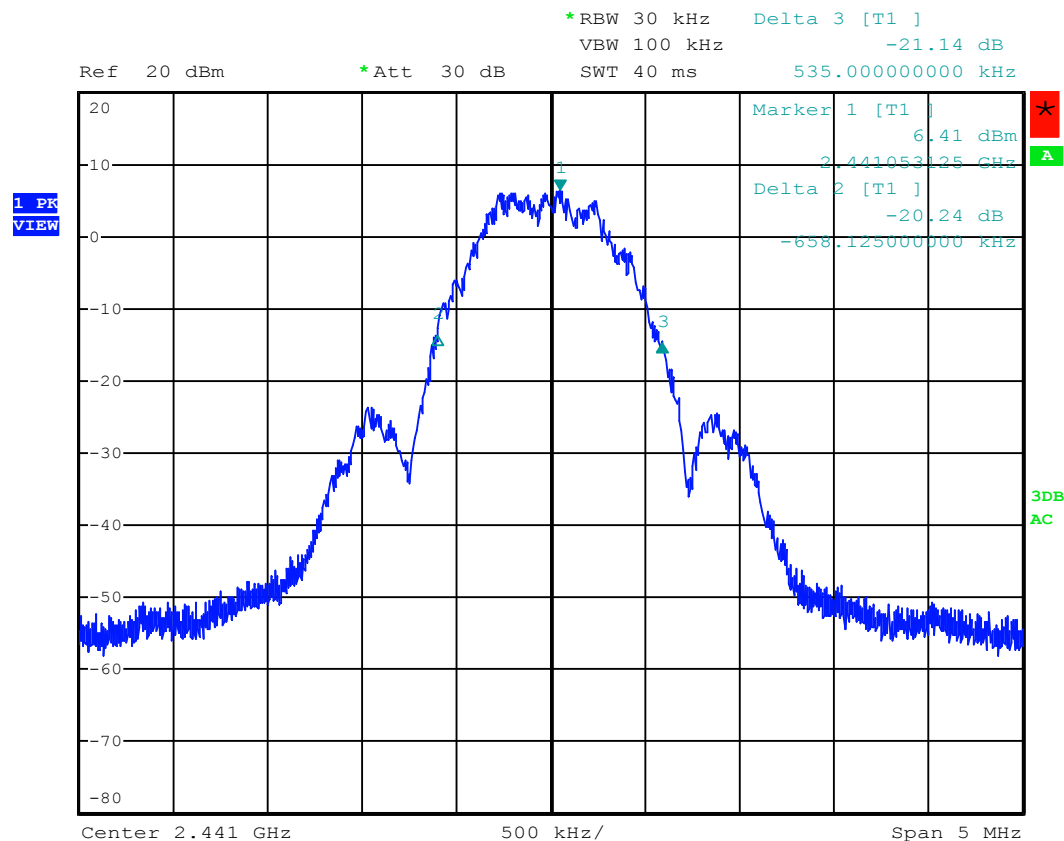
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2441 MHz – Antenna 2



Date: 19.SEP.2018 17:38:02

20dB Bandwidth: 1193 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

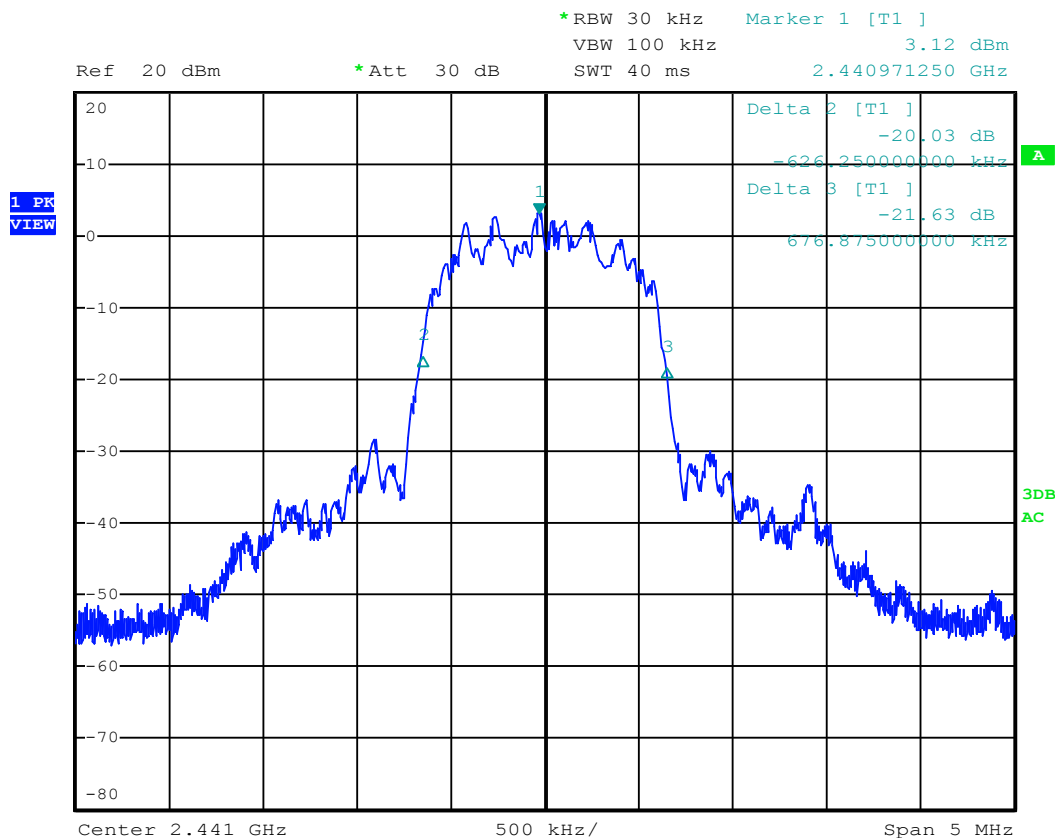
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2441 MHz – Antenna 2



Date: 19.SEP.2018 17:38:59

20dB Bandwidth: 1303 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

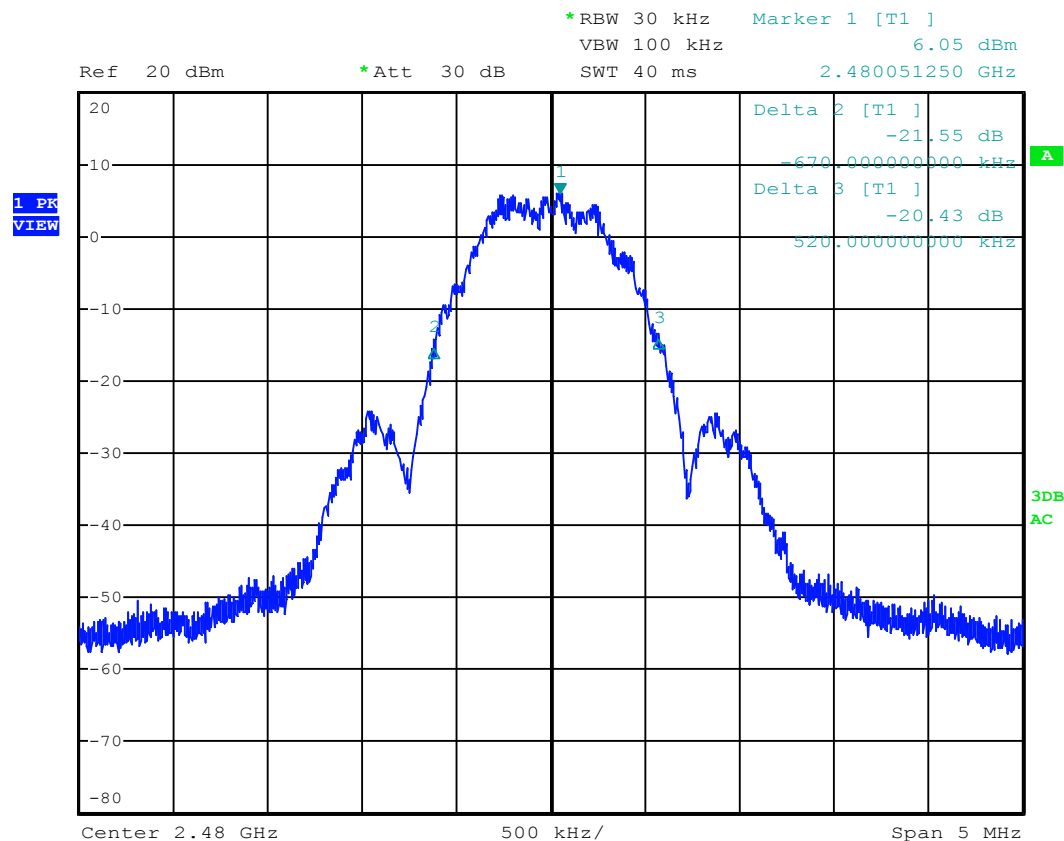
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2480 MHz – Antenna 2



Date: 19.SEP.2018 17:40:21

20dB Bandwidth: 1190 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

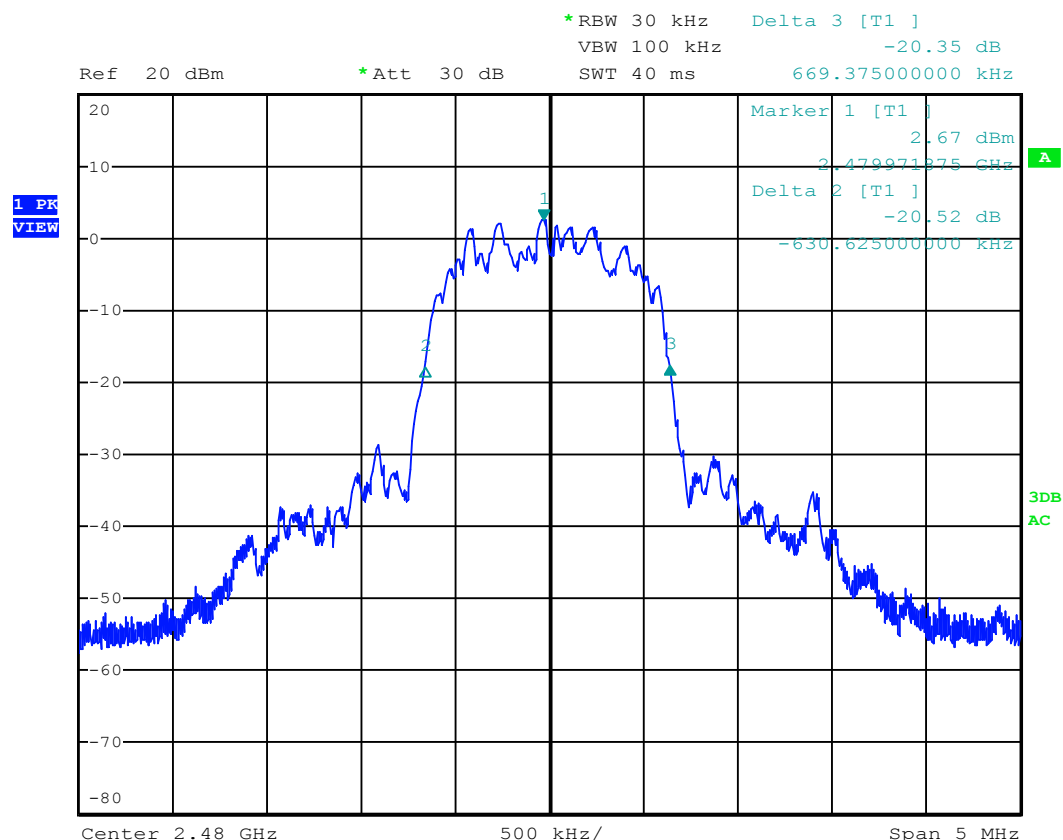
Test Equipment used: NT-203/1

20dB Bandwidth

§ 15.247 (a) (1)
5.1 (2)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2480 MHz – Antenna 2



Date: 19.SEP.2018 17:41:07

20dB Bandwidth: 1300 kHz

LIMIT SUBCLAUSE 15.247(a) (1) – 5.1(2)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

Test Equipment used: NT-203/1

4.4. Maximum Peak RF Power Output (EIRP)

§ 15.247(b)(1)
5.4(2)

Conducted Measurement – Antenna 1 – Mode: Bluetooth BDR

Rated output power: 12,59 mW

Test conditions		Transmitter power (mW)		
		2402 MHz	2441 MHz	2480 MHz
T _{nom} (23) °C	V _{nom} (5) V	12,59	12,02	10,23
Maximum deviation from rated output power under normal test conditions (dB)				
Measurement uncertainty		± 0,75 dB		

LIMIT SUBCLAUSE 15.247(b)(1) – 5.4(2)

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

Maximum Antenna Gain: 6dBi, eirp can be calculated by multiplying conducted value with factor 4.

Test Equipment used: EMV-205

Maximum Peak RF Power Output (EIRP)

**§ 15.247(b)(1)
5.4(2)**

Conducted Measurement – Antenna 1 – Mode: Bluetooth EDR

Rated output power: 12,59 mW

Test conditions		Transmitter power (mW)		
		2402 MHz	2441 MHz	2480 MHz
T _{nom} (23) °C	V _{nom} (5) V	6,31	5,89	5,62
Maximum deviation from rated output power under normal test conditions (dB)				
Measurement uncertainty		± 0,75 dB		

LIMIT SUBCLAUSE 15.247(b)(1) – 5.4(2)

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

Maximum Antenna Gain: 6dBi, eirp can be calculated by multiplying conducted value with factor 4.

Test Equipment used: EMV-205

Maximum Peak RF Power Output (EIRP)

**§ 15.247(b)(1)
5.4(2)**

Conducted Measurement – Antenna 2 – Mode: Bluetooth BDR

Rated output power: 12,59 mW

Test conditions		Transmitter power (mW)		
		2402 MHz	2441 MHz	2480 MHz
T _{nom} (23) °C	V _{nom} (5) V	12,59	12,02	10,23
Maximum deviation from rated output power under normal test conditions (dB)				
Measurement uncertainty		± 0,75 dB		

LIMIT SUBCLAUSE 15.247(b)(1) – 5.4(2)

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

Maximum Antenna Gain: 6dBi, eirp can be calculated by multiplying conducted value with factor 4.

Test Equipment used: EMV-205

Maximum Peak RF Power Output (EIRP)

**§ 15.247(b)(1)
5.4(2)**

Conducted Measurement – Antenna 2 – Mode: Bluetooth EDR

Rated output power: 12,59 mW

Test conditions		Transmitter power (mW)		
		2402 MHz	2441 MHz	2480 MHz
T _{nom} (23) °C	V _{nom} (5) V	6,31	5,89	5,62
Maximum deviation from rated output power under normal test conditions (dB)				
Measurement uncertainty		± 0,75 dB		

LIMIT SUBCLAUSE 15.247(b)(1) – 5.4(2)

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

Maximum Antenna Gain: 6dBi, eirp can be calculated by multiplying conducted value with factor 4.

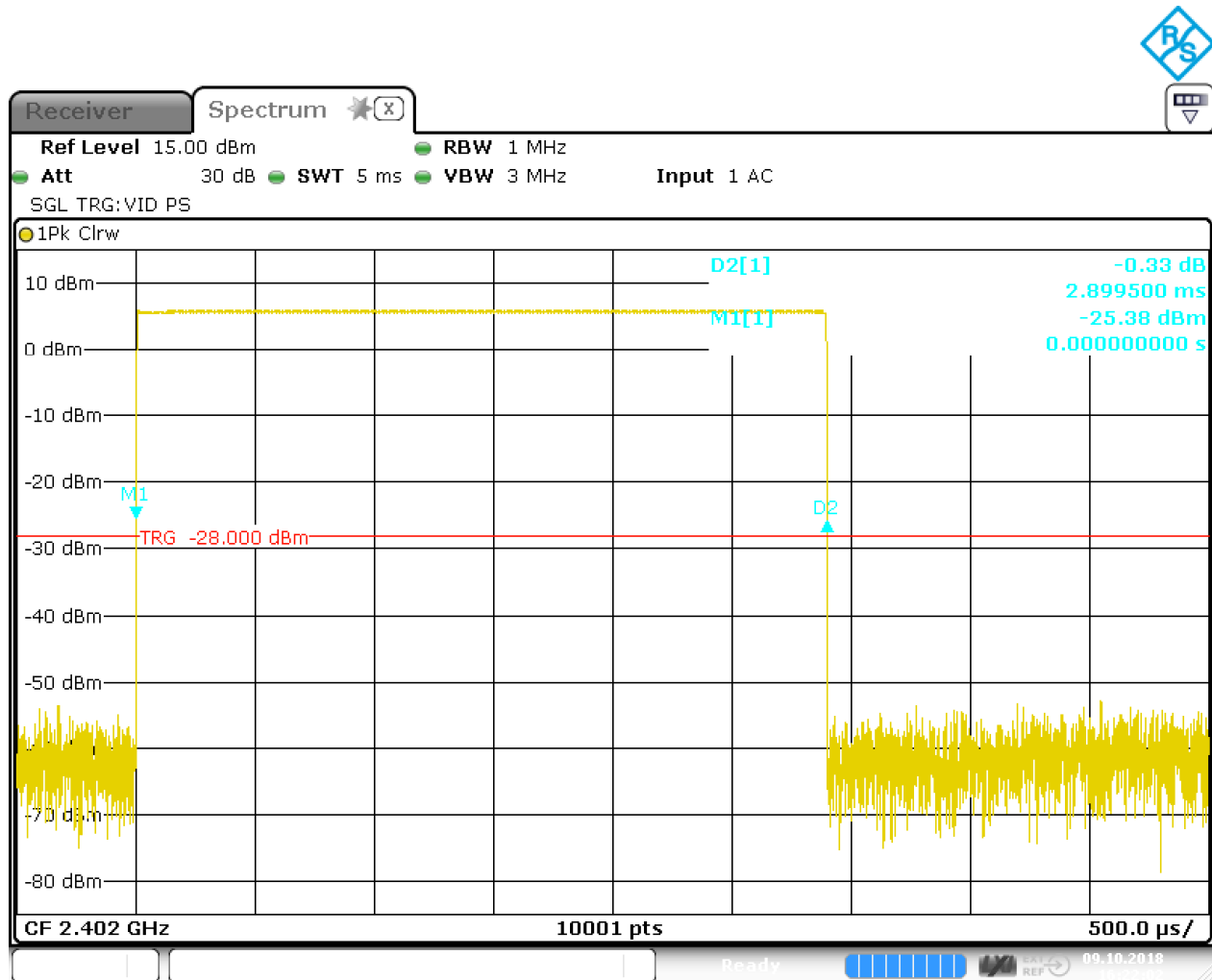
Test Equipment used: EMV-205

4.5. Average Time of Occupancy

§ 15.247(a)(1)(iii)
5.1(4)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2402 MHz



Date: 9.OCT.2018 16:22:02

The dwell time is constant 2,9 ms.

LIMIT SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

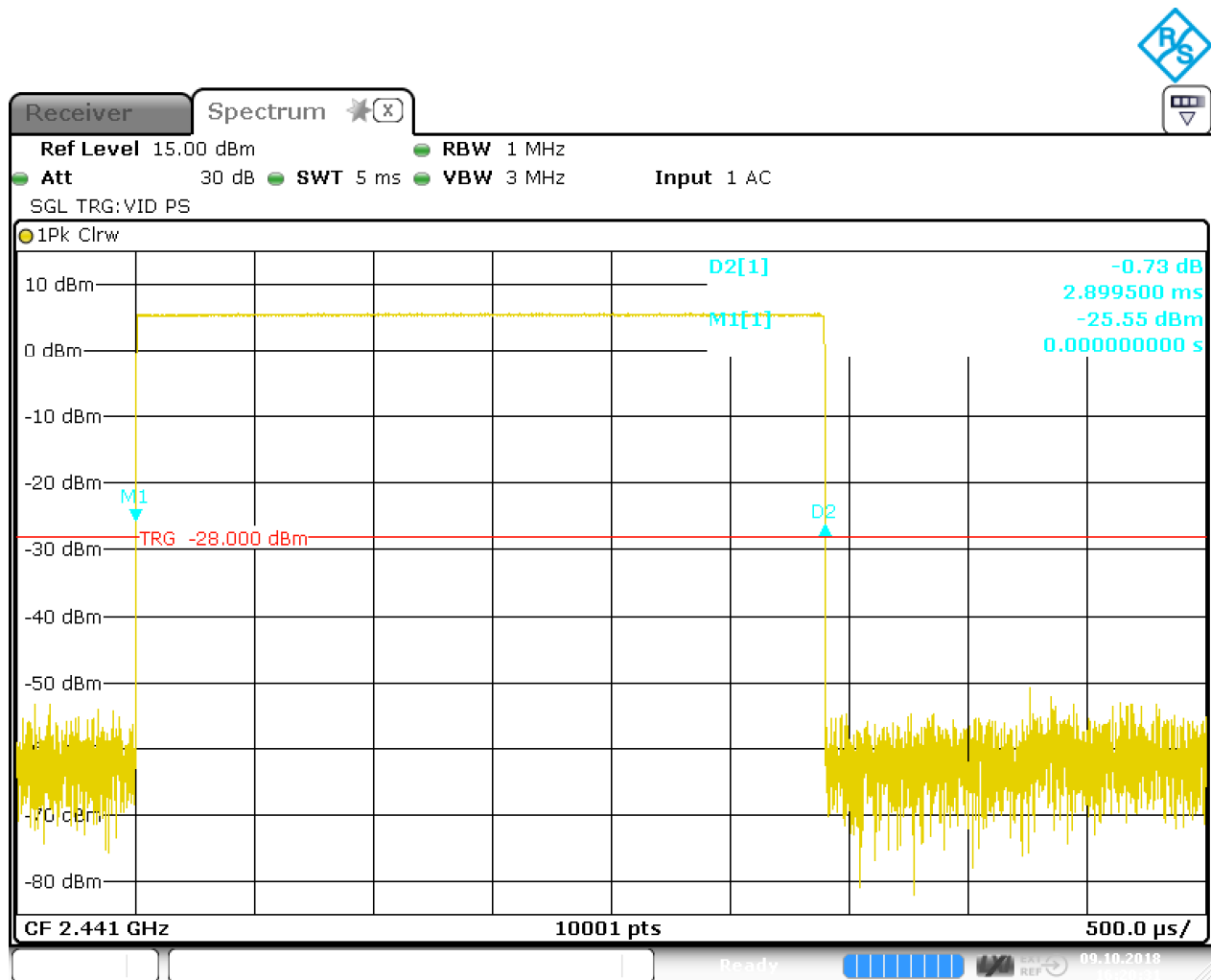
Test Equipment used: EMV-200

Average Time of Occupancy

§ 15.247(a)(1)(iii)
5.1(4)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2441 MHz



Date: 9.OCT.2018 16:20:31

The dwell time is constant 2,9 ms.

LIMIT SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

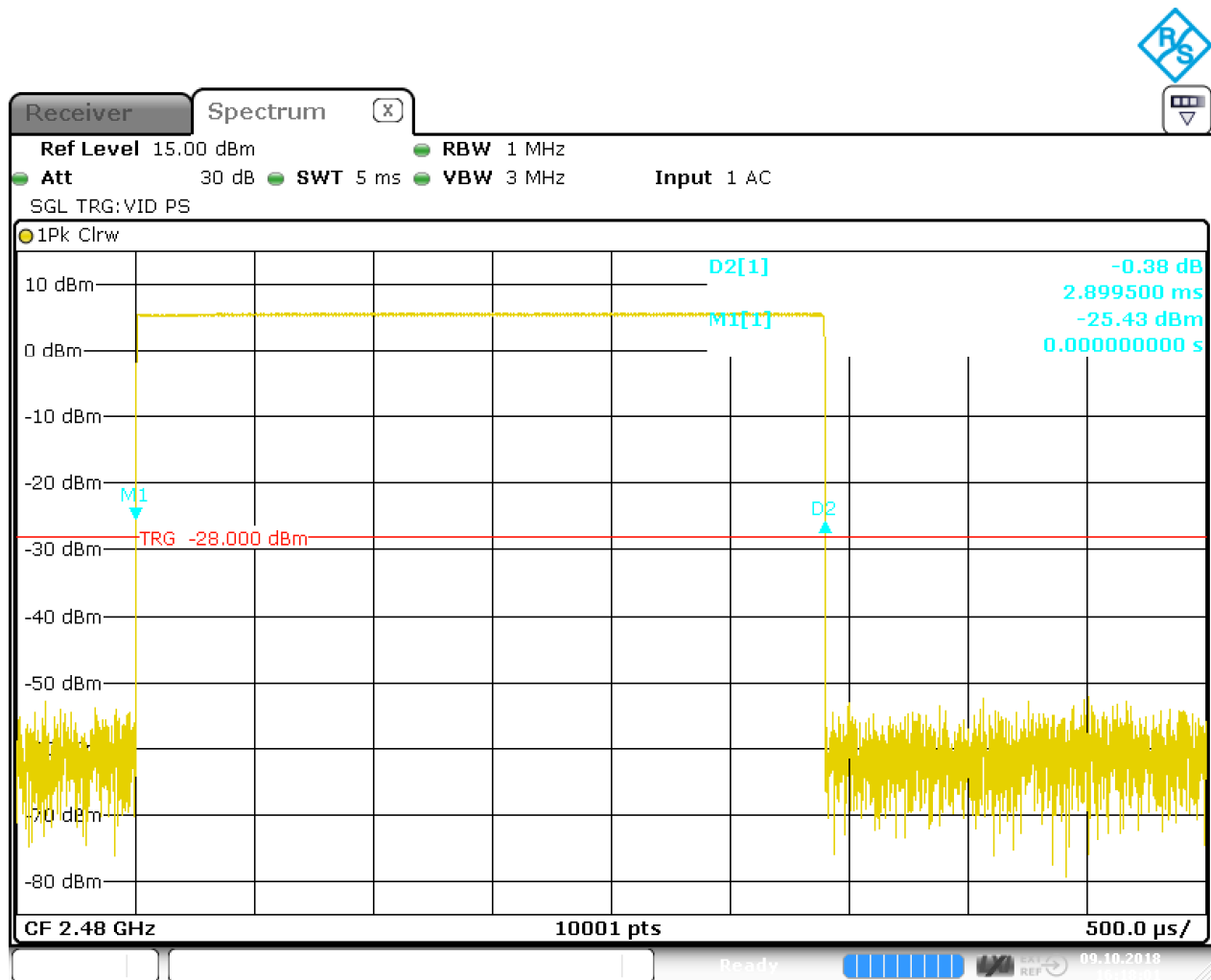
Test Equipment used: EMV-200

Average Time of Occupancy

§ 15.247(a)(1)(iii)
5.1(4)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW 2480 MHz



Date: 9.OCT.2018 16:18:02

The dwell time is constant 2,9 ms.

LIMIT SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test Equipment used: EMV-200

Average Time of Occupancy

§ 15.247(a)(1)(iii)
5.1(4)

Conducted Measurement - Mode: Bluetooth BDR

Rated output power: 12,59 mW

	Channel 0 (2402 MHz)	Channel 39 (2441 MHz)	Channel 78 (2480 MHz)
Observed time period	79 times 0,4 Seconds = 31,6 seconds		
Time of each individual transmission	2,9 ms	2,9 ms	2,9 ms
Observed number of transmissions	107	116	120
Average time of occupancy	0,3103 seconds	0,3364 seconds	0,348 seconds

LIMIT

SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

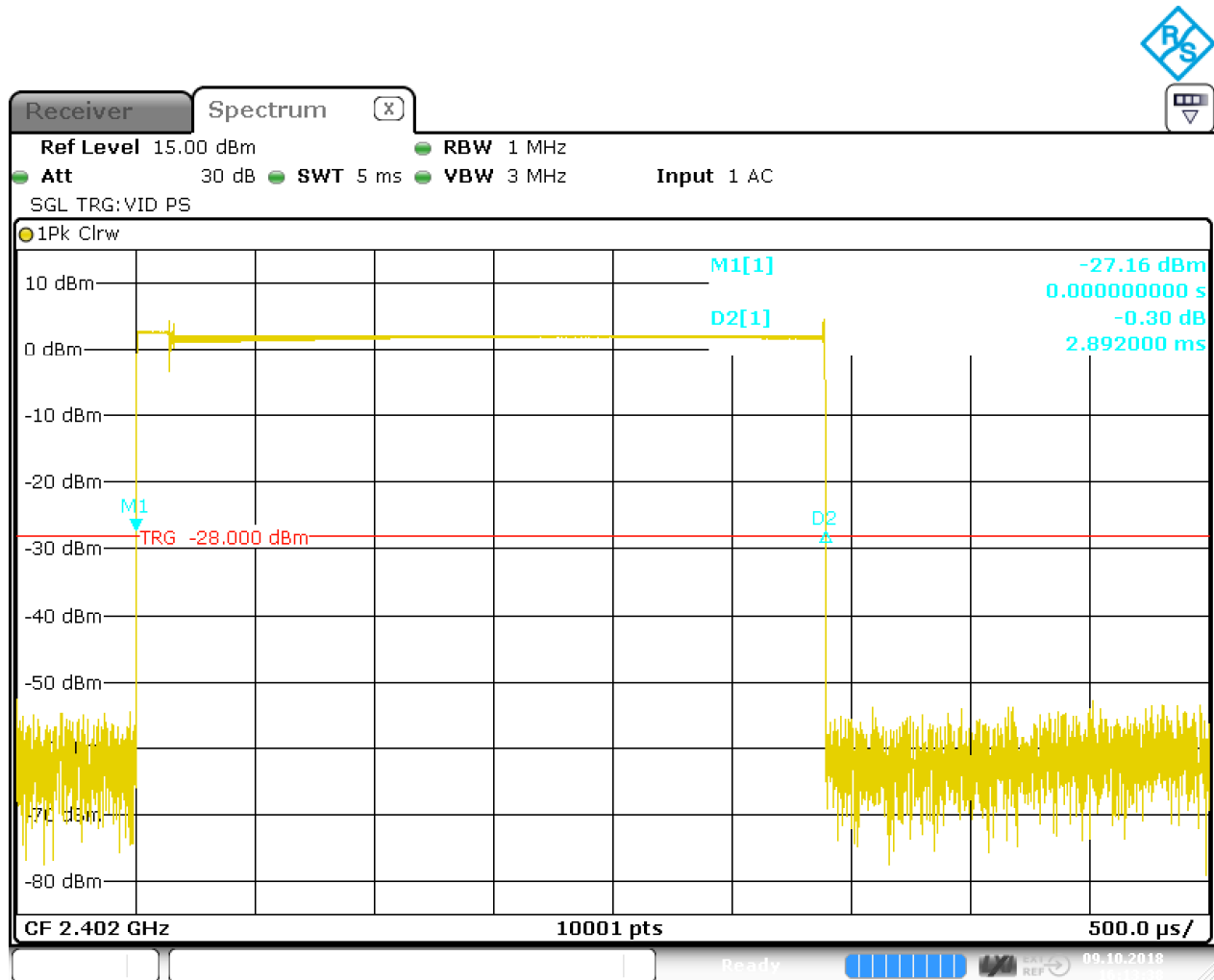
Test Equipment used: EMV-205

Average Time of Occupancy

§ 15.247(a)(1)(iii)
5.1(4)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2402 MHz



Date: 9.OCT.2018 16:13:37

The dwell time is constant 2,9 ms.

LIMIT SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

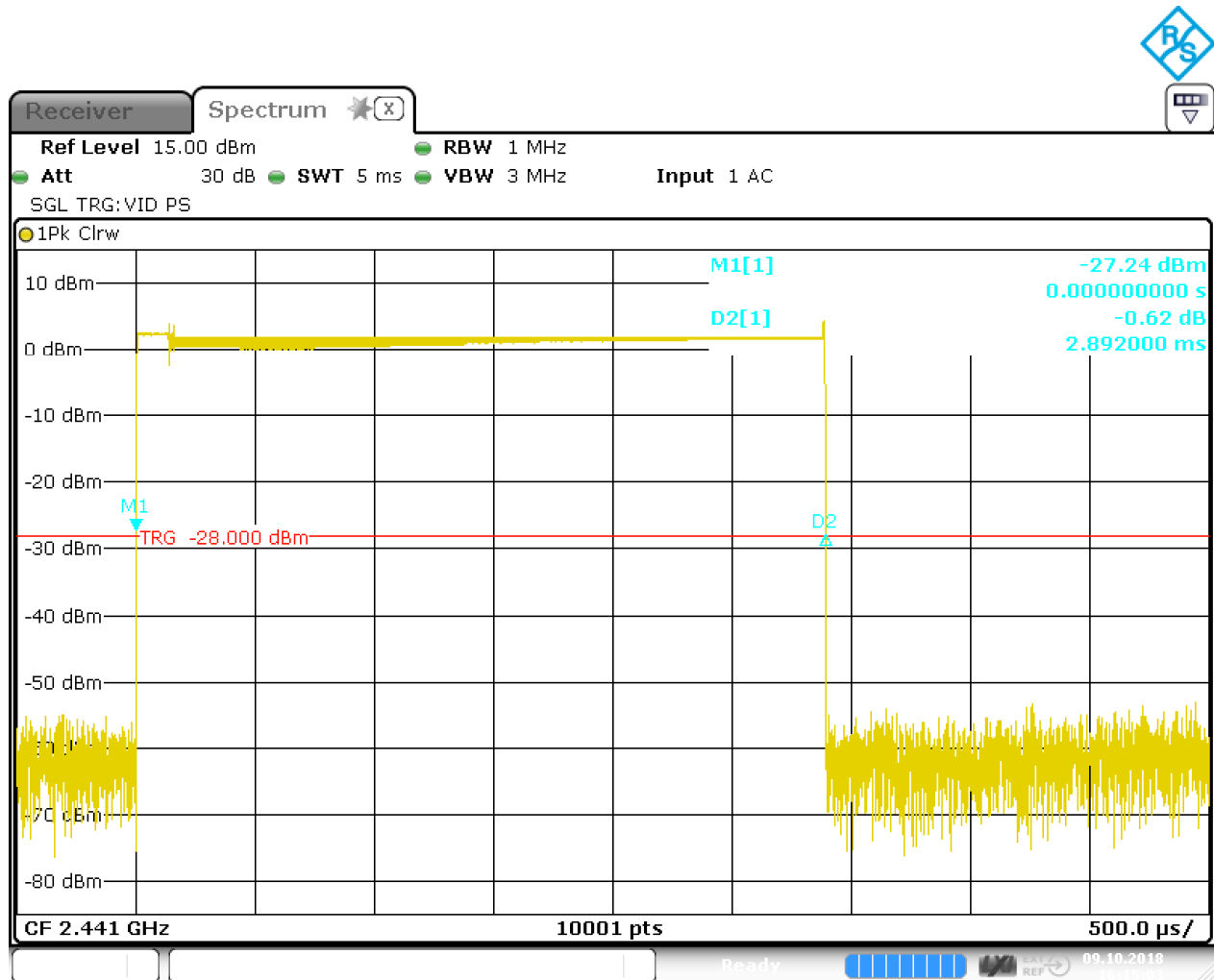
Test Equipment used: EMV-200

Average Time of Occupancy

§ 15.247(a)(1)(iii)
5.1(4)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2441 MHz



Date: 9.OCT.2018 16:15:03

The dwell time is constant 2,9 ms.

LIMIT SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

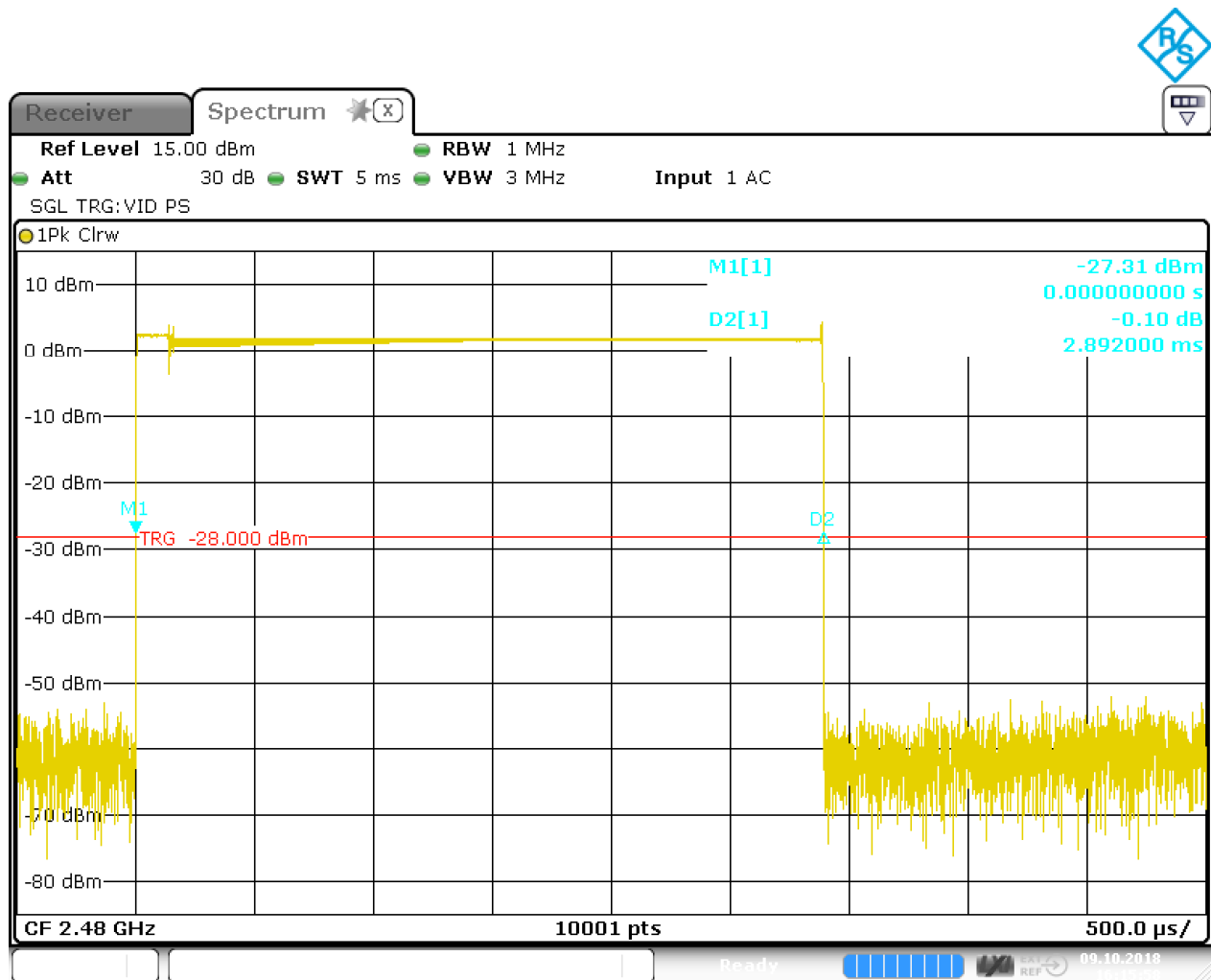
Test Equipment used: EMV-200

Average Time of Occupancy

§ 15.247(a)(1)(iii)
5.1(4)

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW 2480 MHz



Date: 9.OCT.2018 16:15:58

The dwell time is constant 2,9 ms.

LIMIT

SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test Equipment used: EMV-200

Average Time of Occupancy

**§ 15.247(a)(1)(iii)
5.1(4)**

Conducted Measurement - Mode: Bluetooth EDR

Rated output power: 12,59 mW

	Channel 0 (2402 MHz)	Channel 39 (2441 MHz)	Channel 78 (2480 MHz)
Observed time period	79 times 0,4 Seconds = 31,6 seconds		
Time of each individual transmission	2,9 ms	2,9 ms	2,9 ms
Observed number of transmissions	102	110	105
Average time of occupancy	0,2958 seconds	0,3190 seconds	0,3045 seconds

LIMIT **SUBCLAUSE 15.247(a)(1)(iii) – 5.1(4)**

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

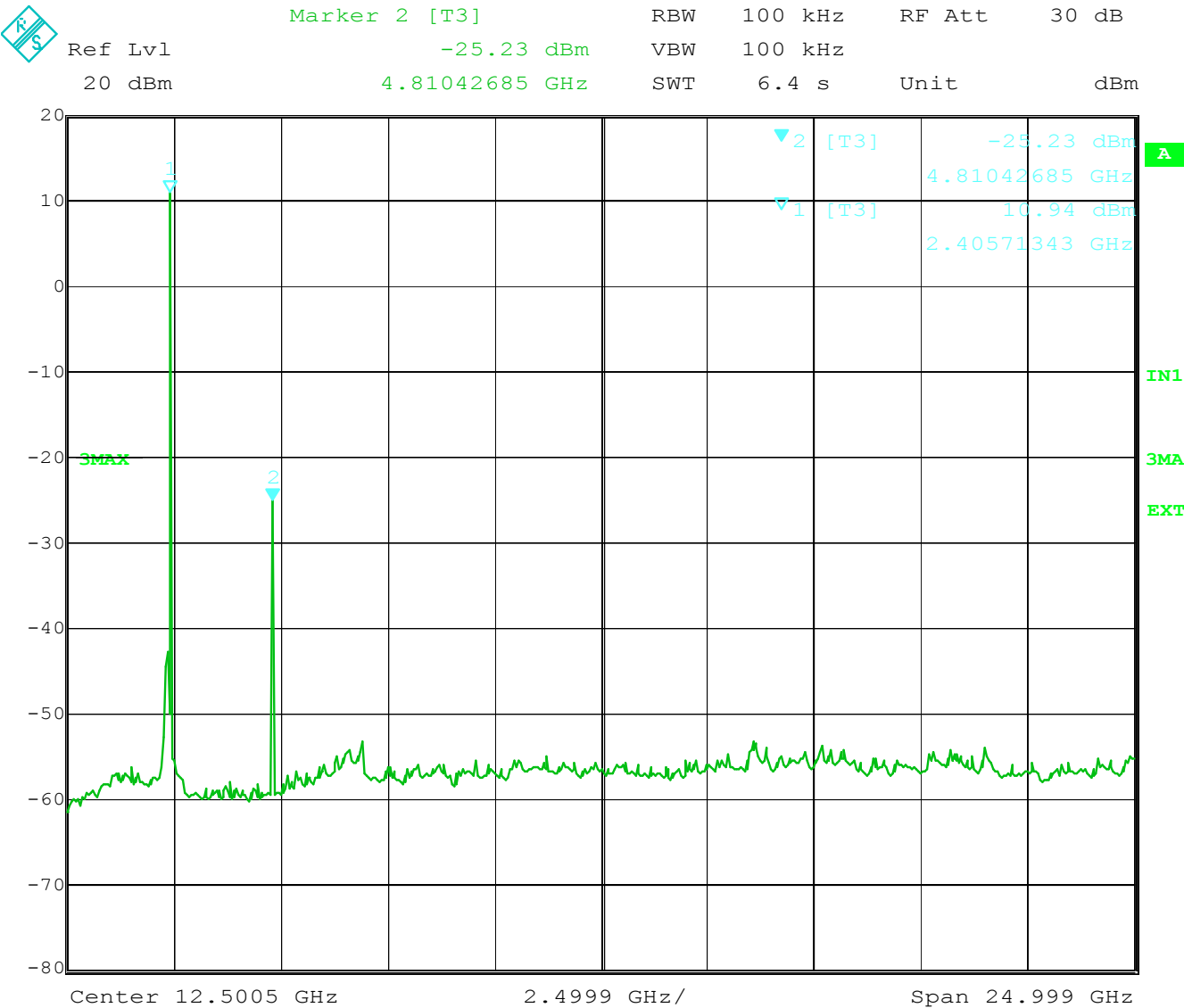
Test Equipment used: EMV-205

4.6. Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth BDR – Channel 0 – 2402 MHz – Antenna 1



Date: 28.SEP.2018 14:32:56

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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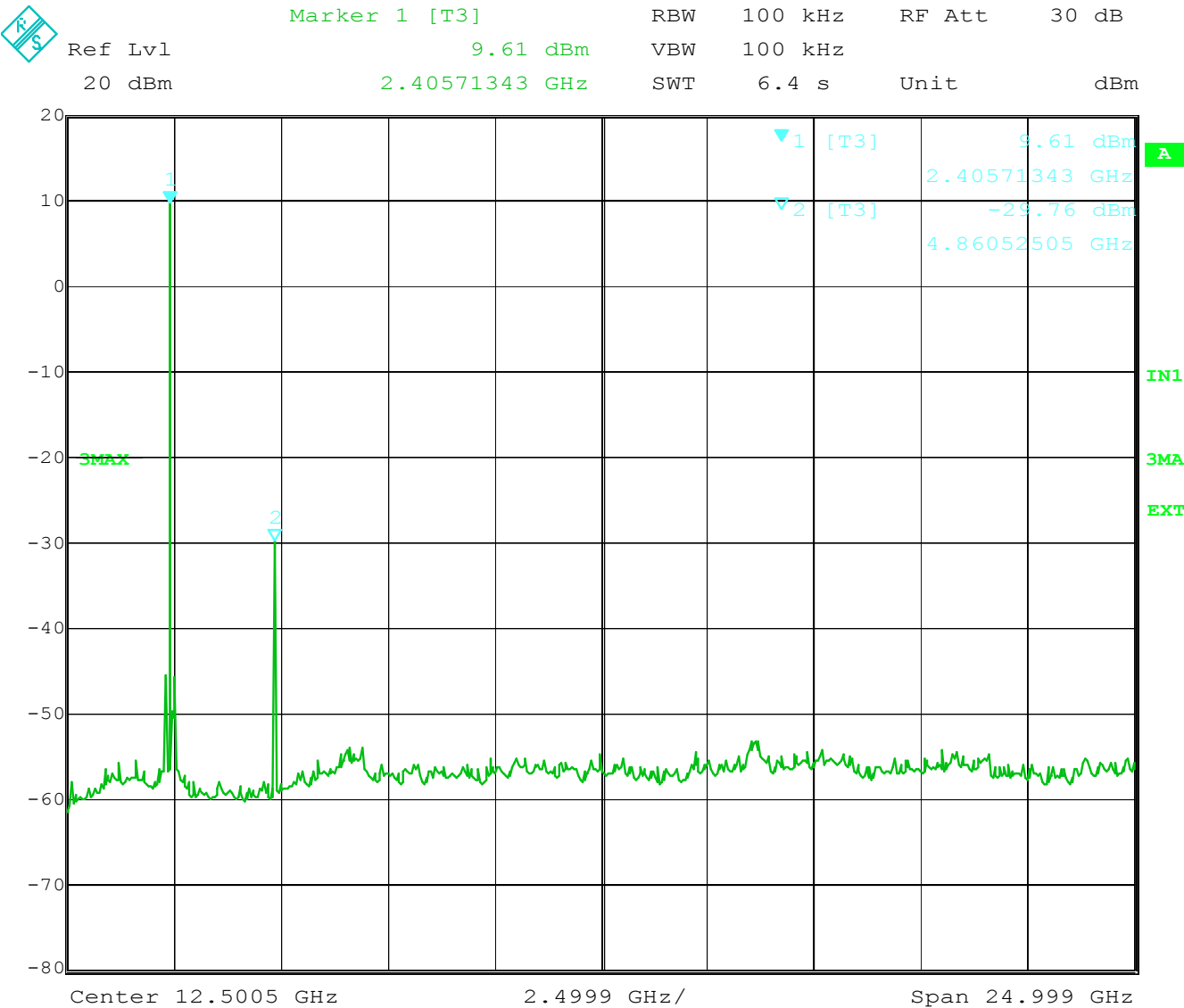
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth BDR – Channel 39 – 2441 MHz – Antenna 1



Date: 28.SEP.2018 14:33:37

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
---	--

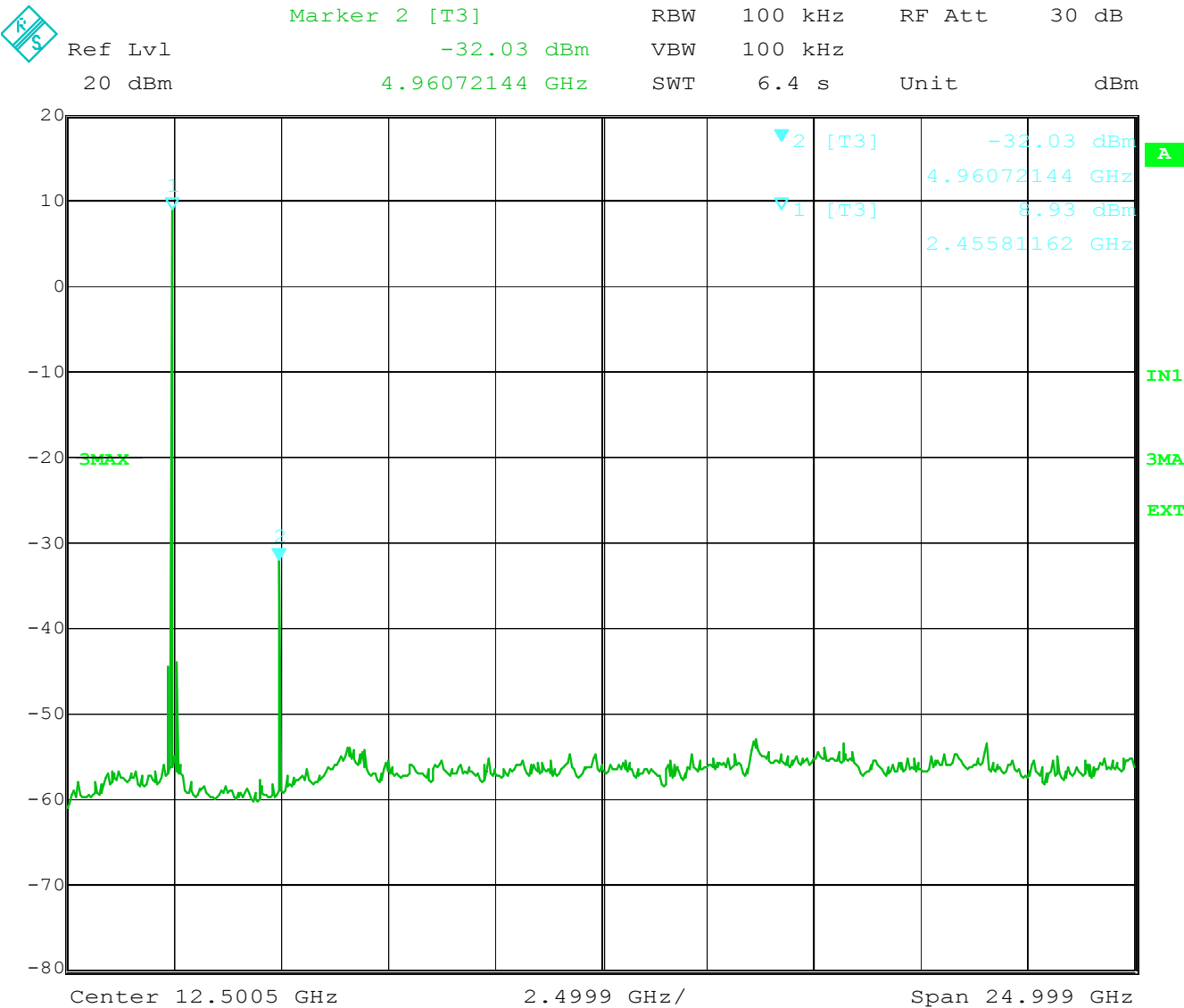
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth BDR – Channel 78 – 2480 MHz – Antenna 1



Date: 28.SEP.2018 14:34:12

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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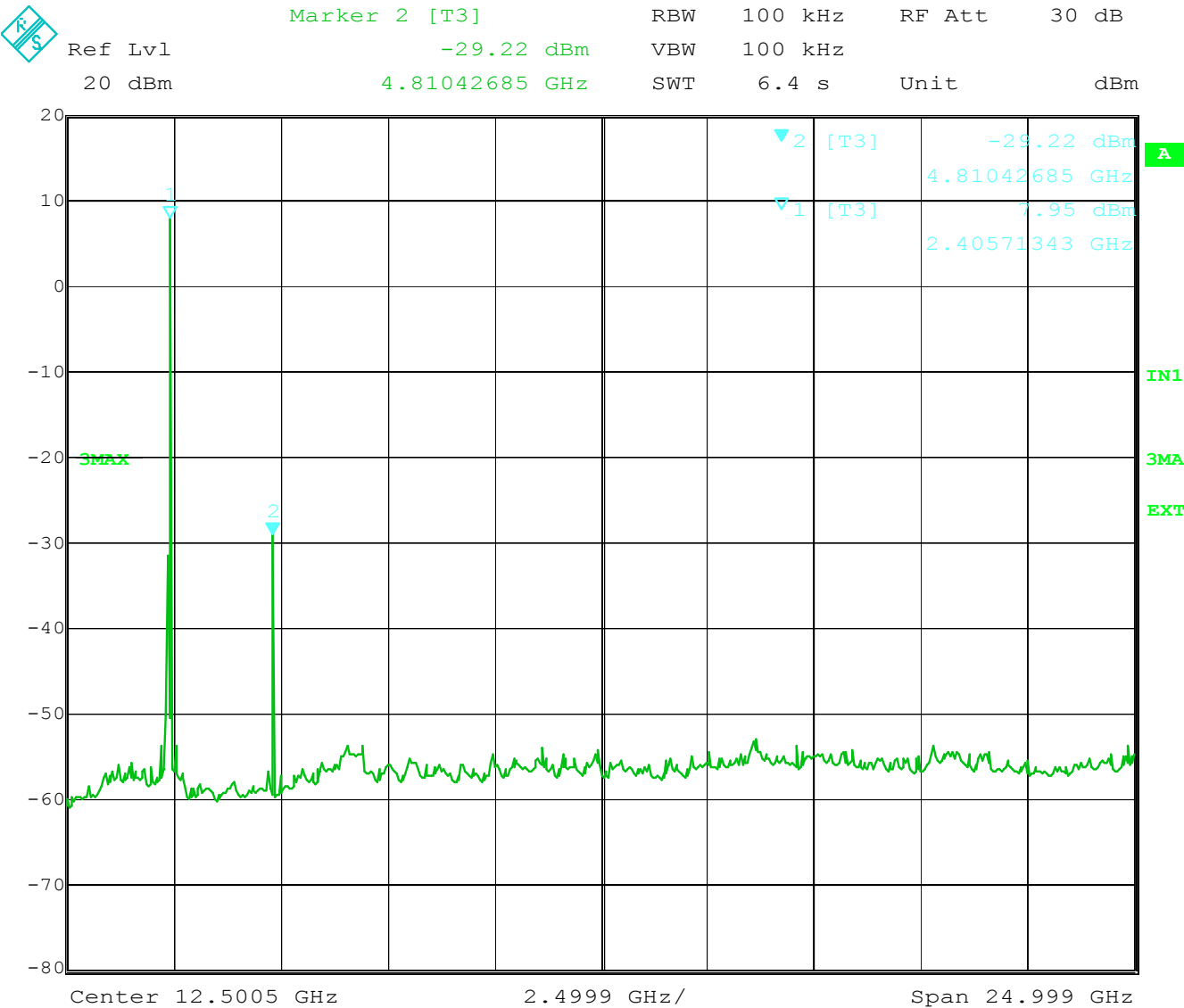
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth EDR – Channel 0 – 2402 MHz – Antenna 1



Date: 28.SEP.2018 14:36:30

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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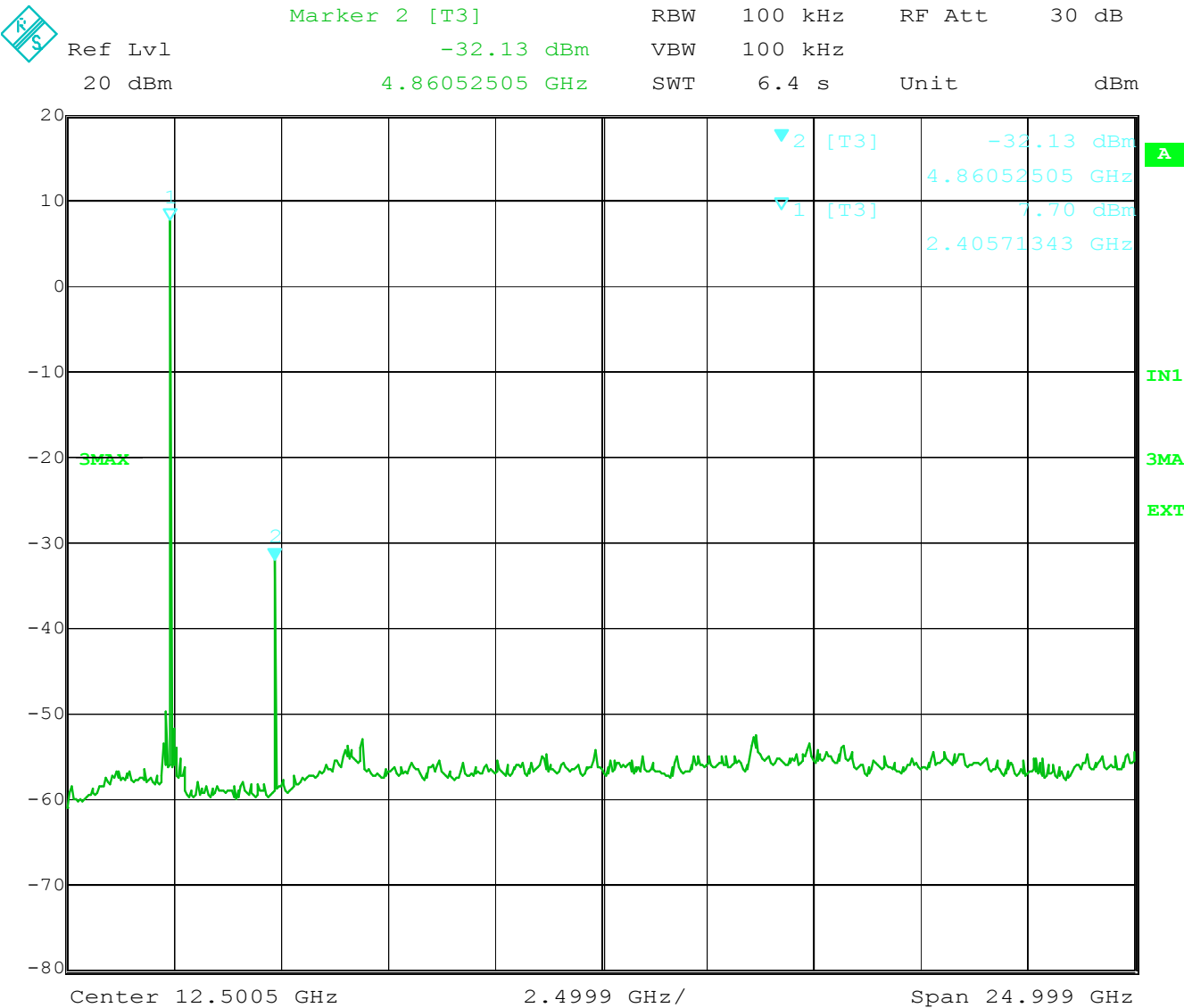
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth EDR – Channel 39 – 2441 MHz – Antenna 1



Date: 28.SEP.2018 14:35:49

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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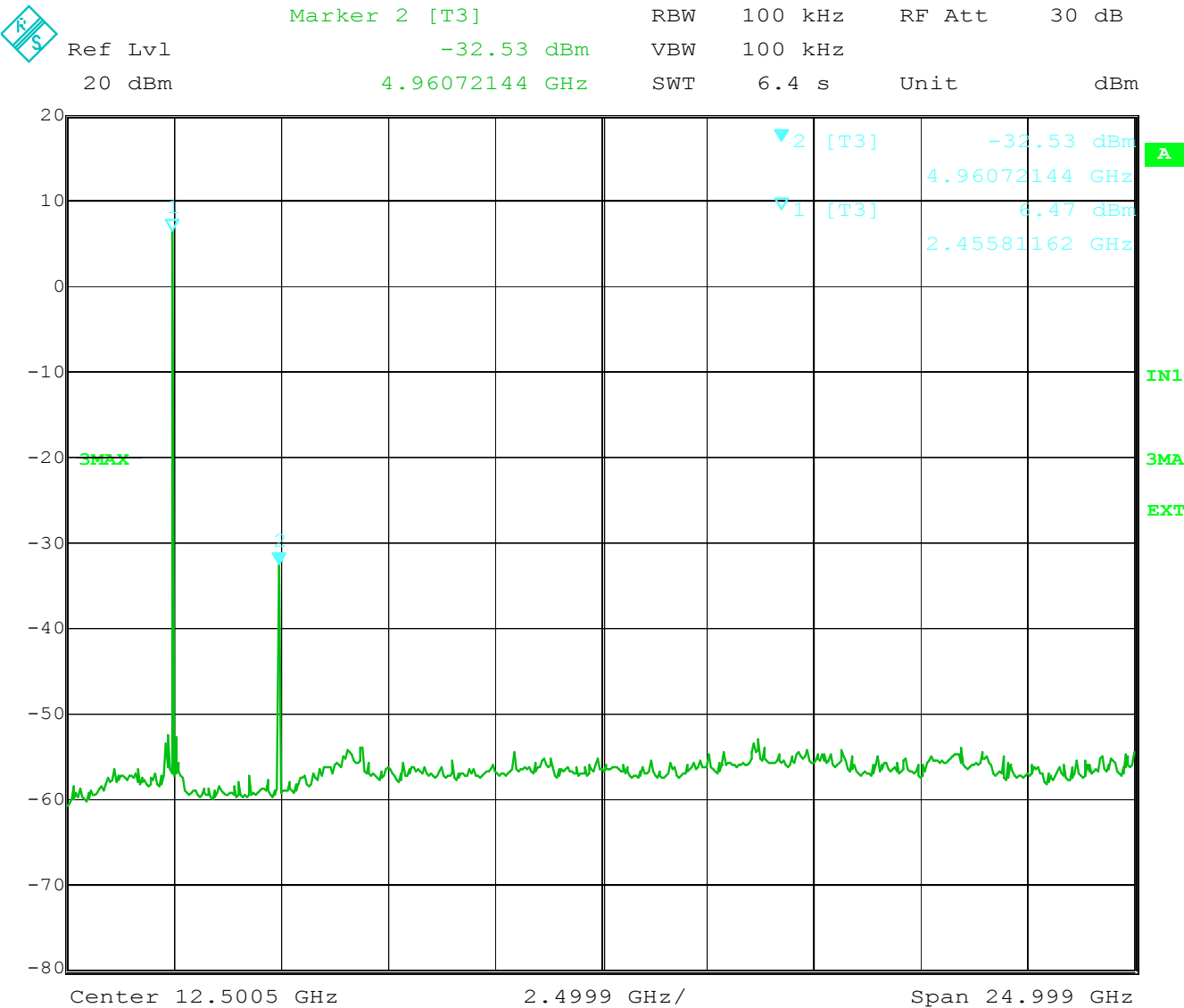
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth EDR – Channel 78 – 2480 MHz – Antenna 1



Date: 28.SEP.2018 14:35:02

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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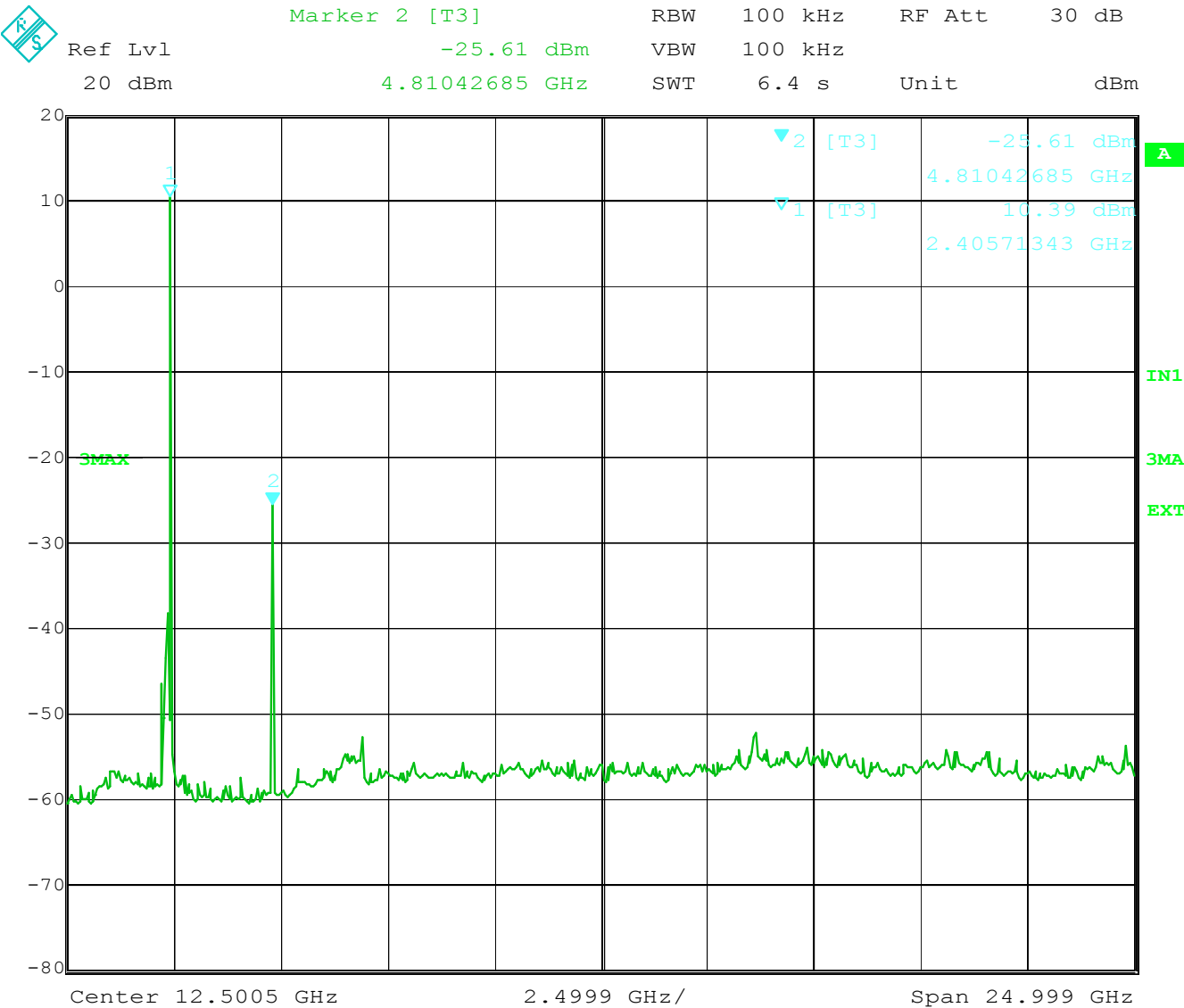
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth BDR – Channel 0 – 2402 MHz – Antenna 2



Date: 27.SEP.2018 16:36:25

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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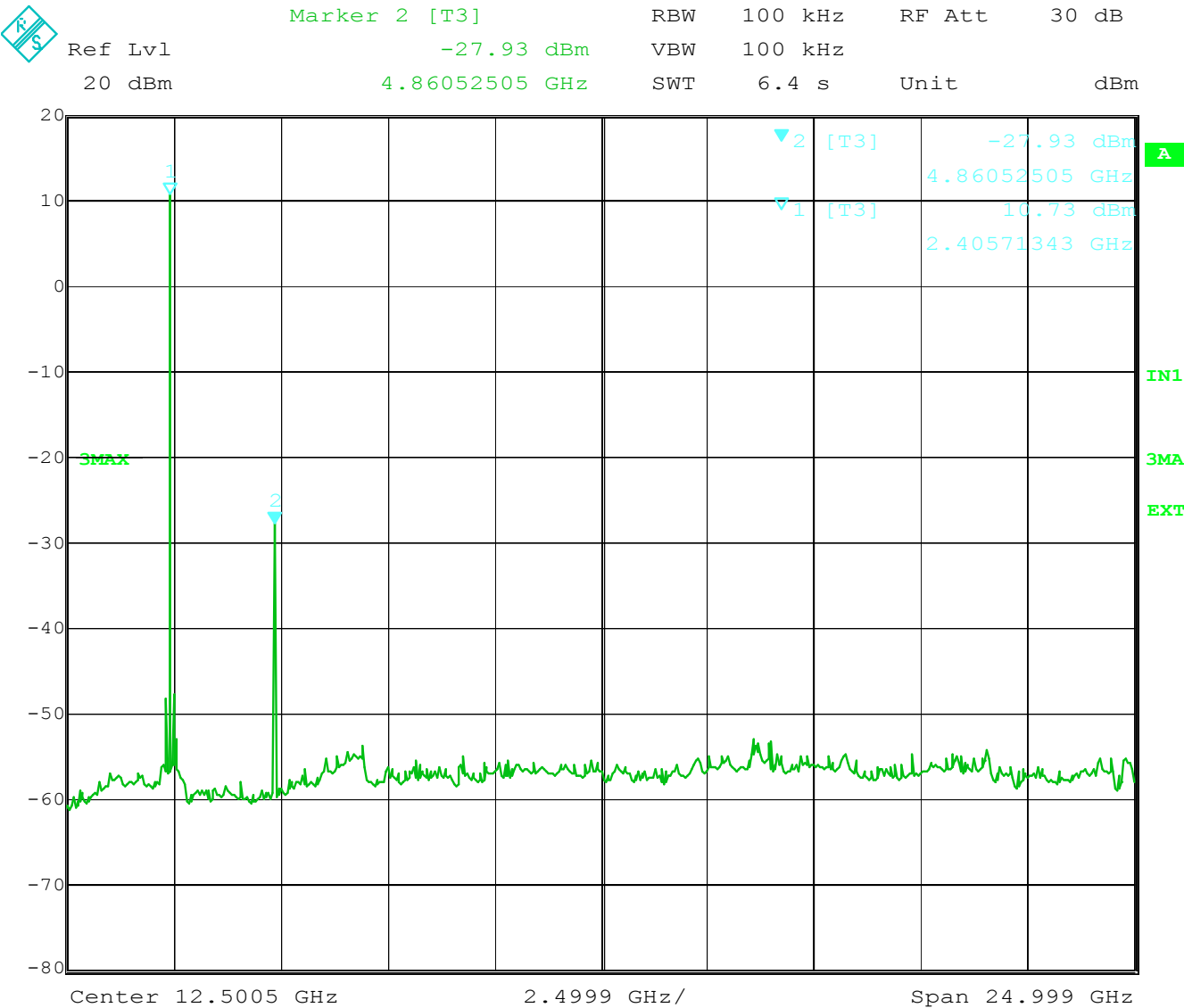
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth BDR – Channel 39 – 2441 MHz – Antenna 2



Date: 27.SEP.2018 16:36:57

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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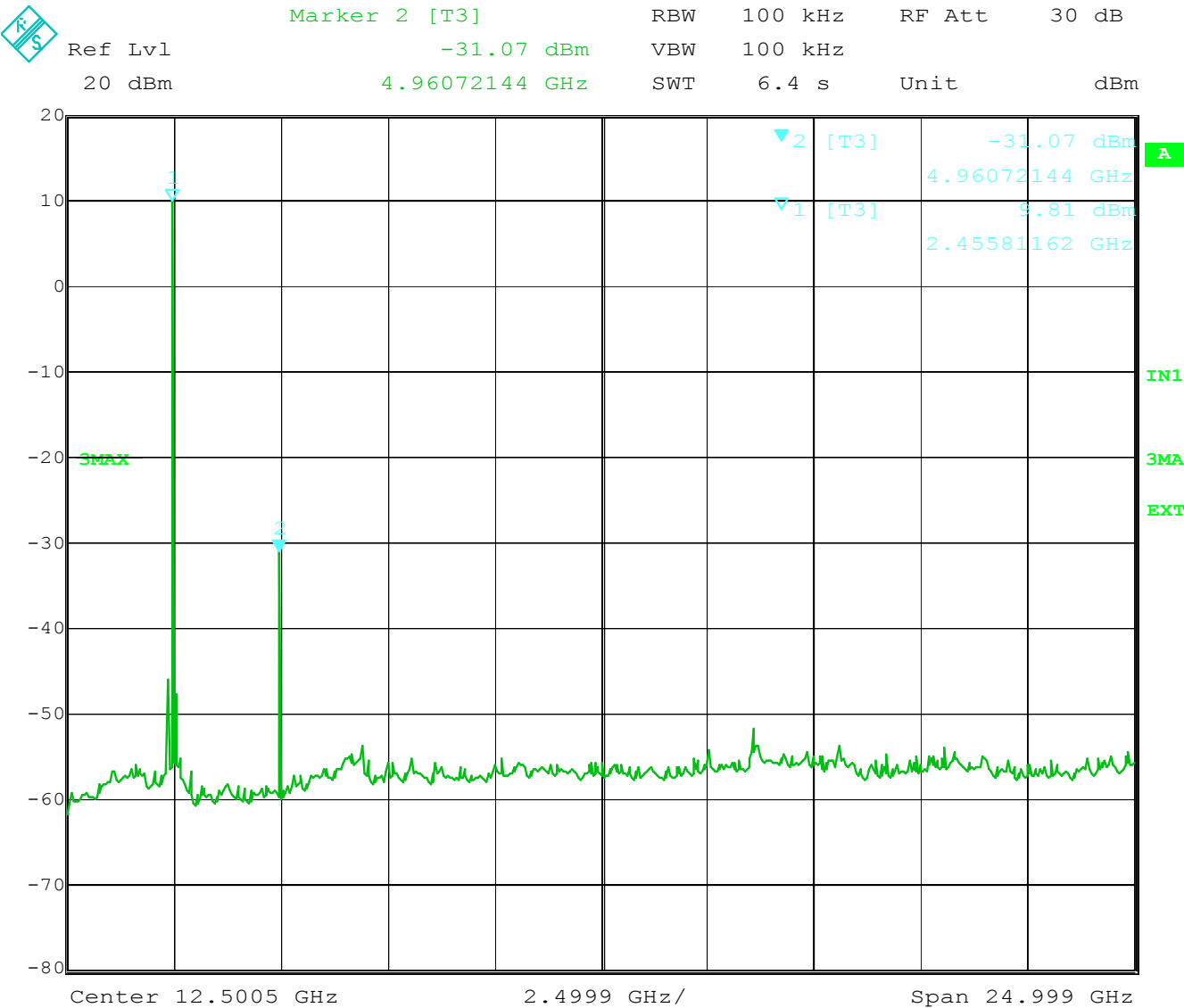
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth BDR – Channel 78 – 2480 MHz – Antenna 2



Date: 27.SEP.2018 16:37:35

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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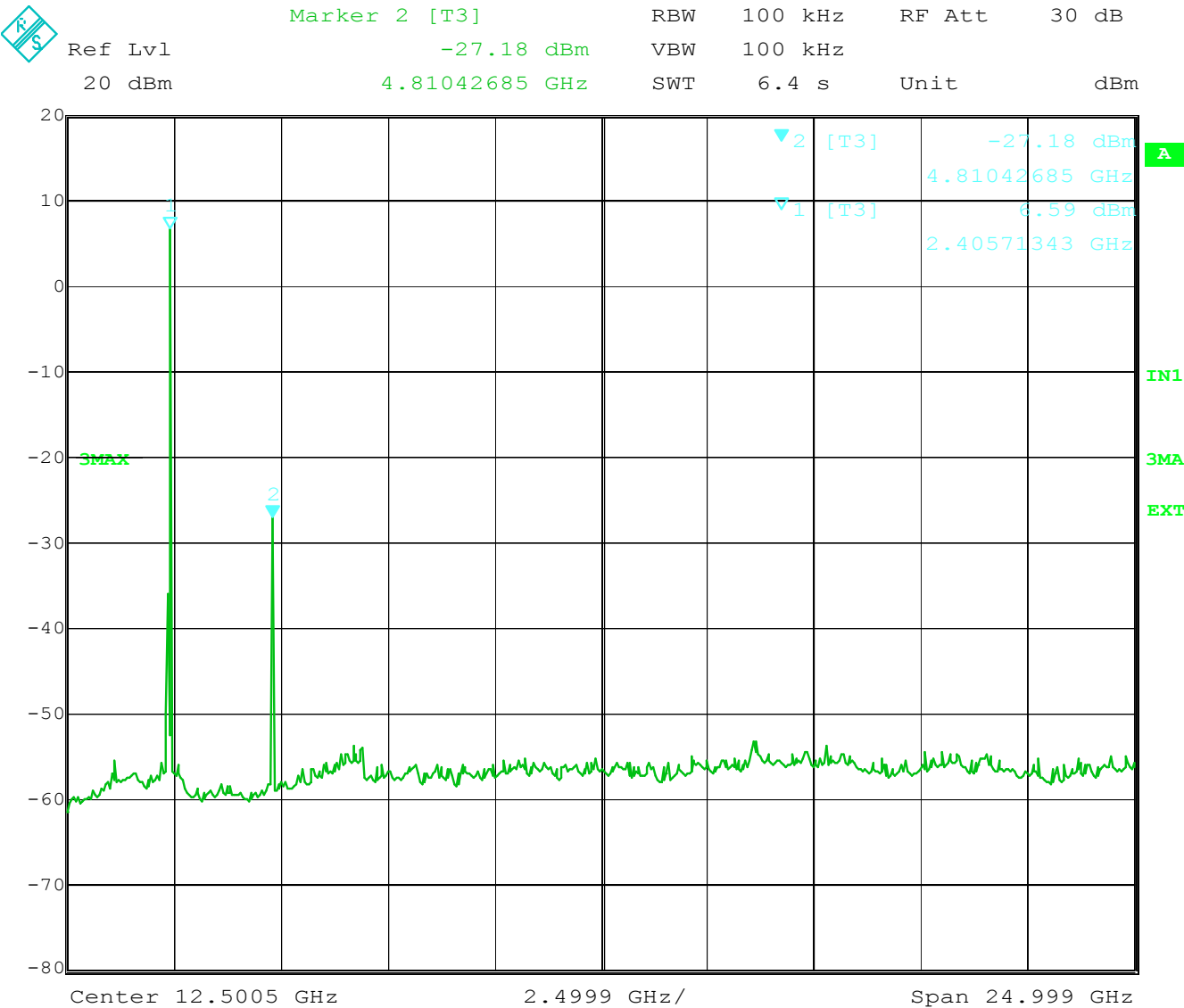
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth EDR – Channel 0 – 2402 MHz – Antenna 2



Date: 28.SEP.2018 14:17:40

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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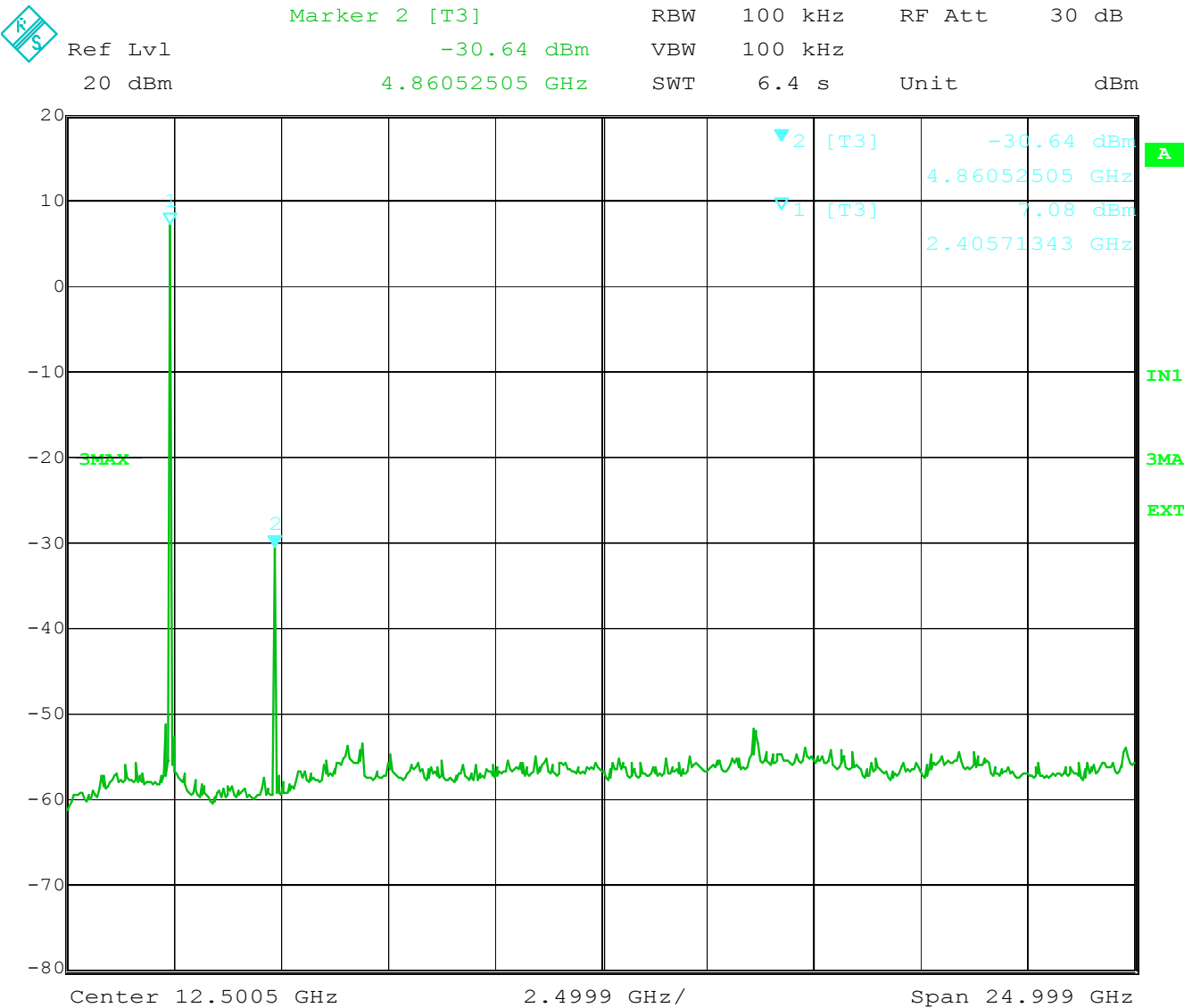
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth EDR – Channel 39 – 2441 MHz – Antenna 2



Date: 28.SEP.2018 14:18:27

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
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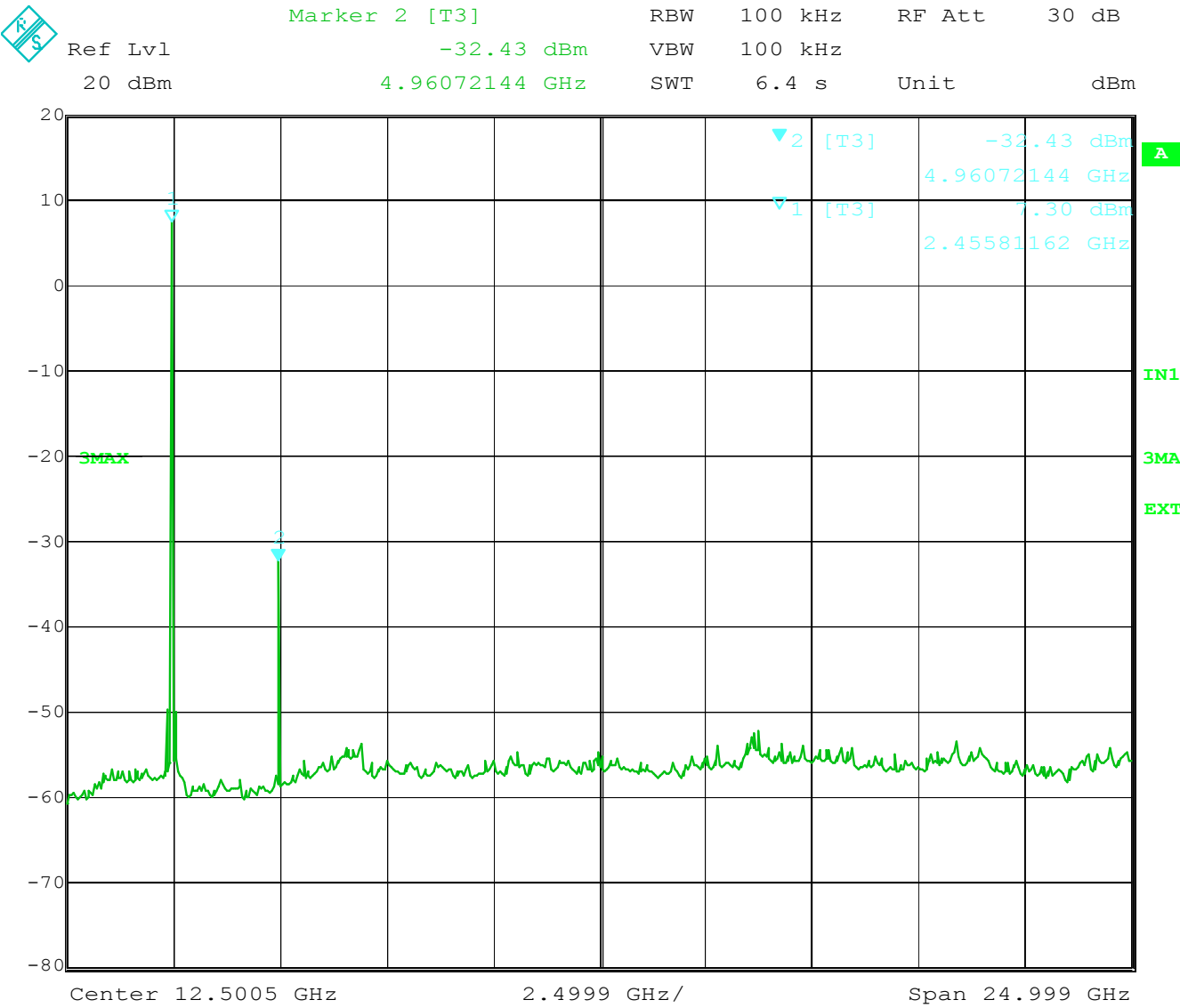
Test Equipment used: NT-207

Out-of-band Emission

§ 15.247(d)
5.5

Measurement conducted with Peak-Detector:

Mode: Bluetooth EDR – Channel 78 – 2480 MHz – Antenna 2



Date: 28.SEP.2018 14:16:57

LIMIT

SUBCLAUSE 15.247(d) – 5.5

In any 100 kHz bandwidth outside the frequency band in which the radio device is operating.	At least 20dB below the power in the 100 kHz bandwidth within the band that contains the highest level of the desired power.
---	--

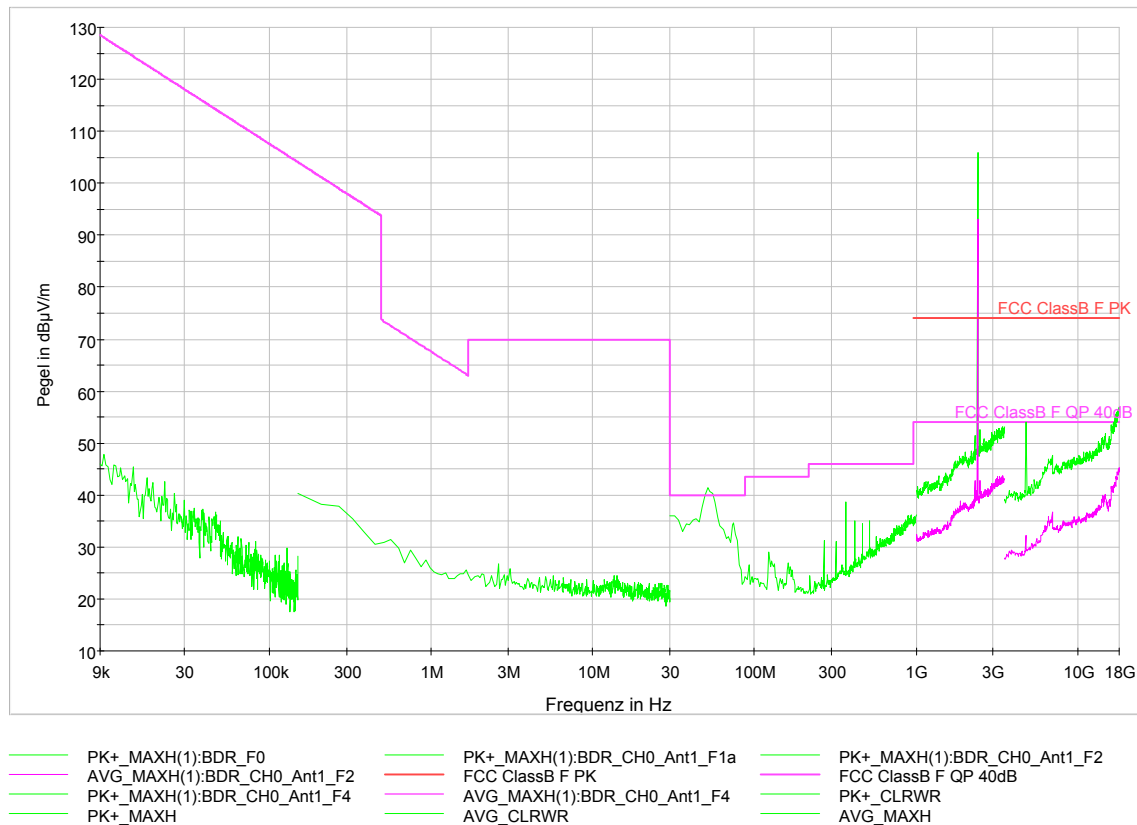
Test Equipment used: NT-207

4.7. Emissions in restricted bands Emissions falling within restricted frequency bands

§ 15.209(a)
RSS-Gen

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

Mode: Bluetooth BDR – Channel 0 – 2402 MHz – Antenna 1



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 29,5 dBµV/m @ 4808 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

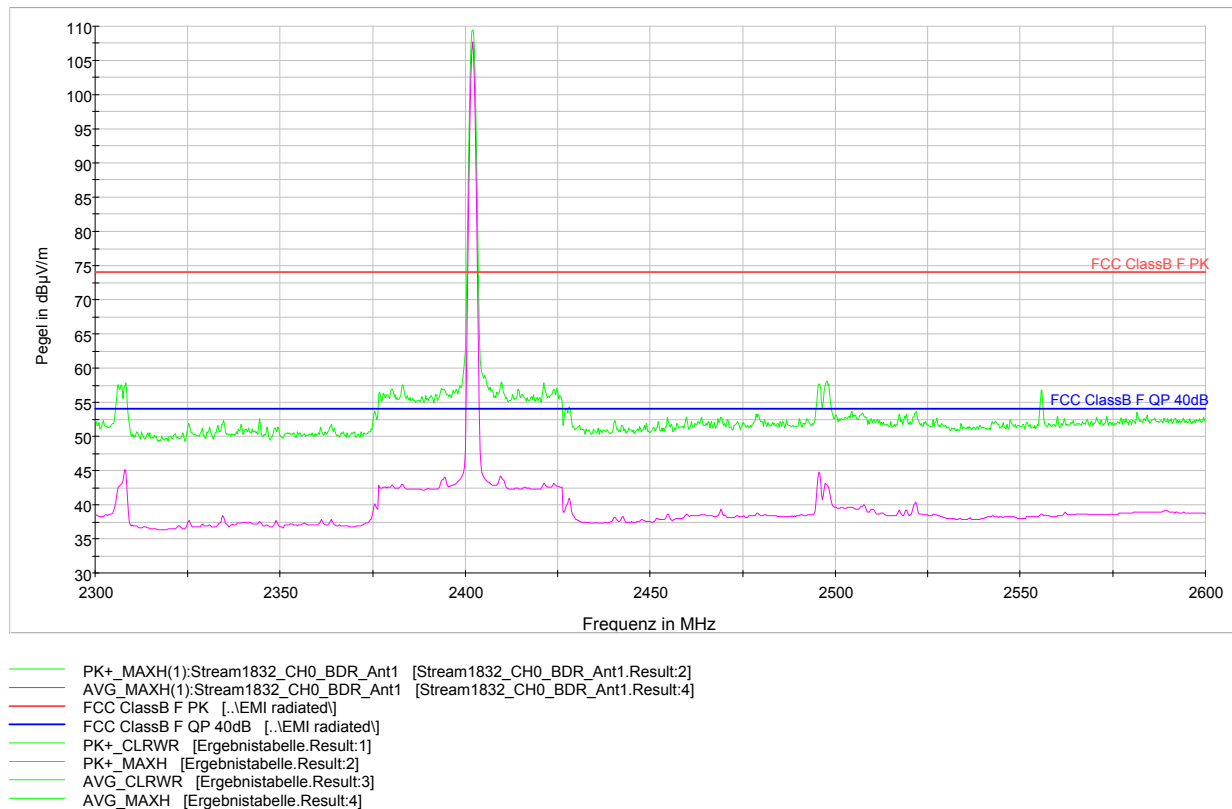
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth BDR – CH 0: 2402 MHz – Antenna 1



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

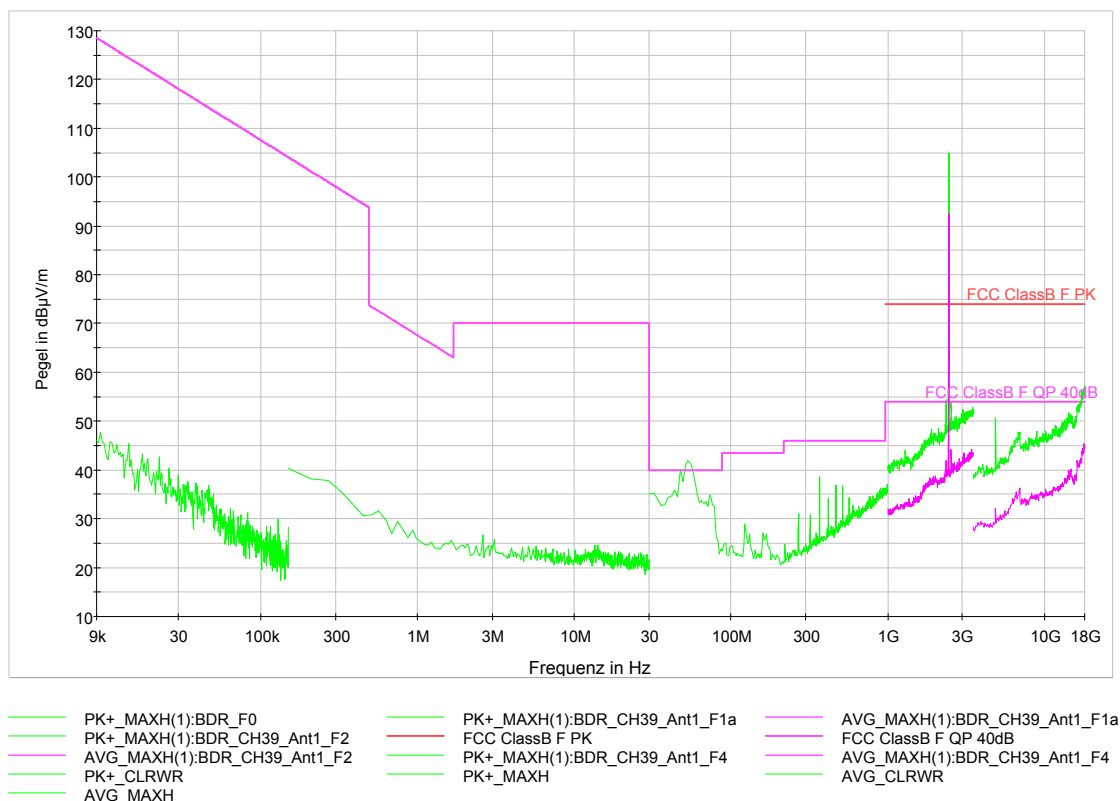
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth BDR – Channel 39 – 2441 MHz – Antenna 1



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 26,8 dBµV/m @ 4882 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

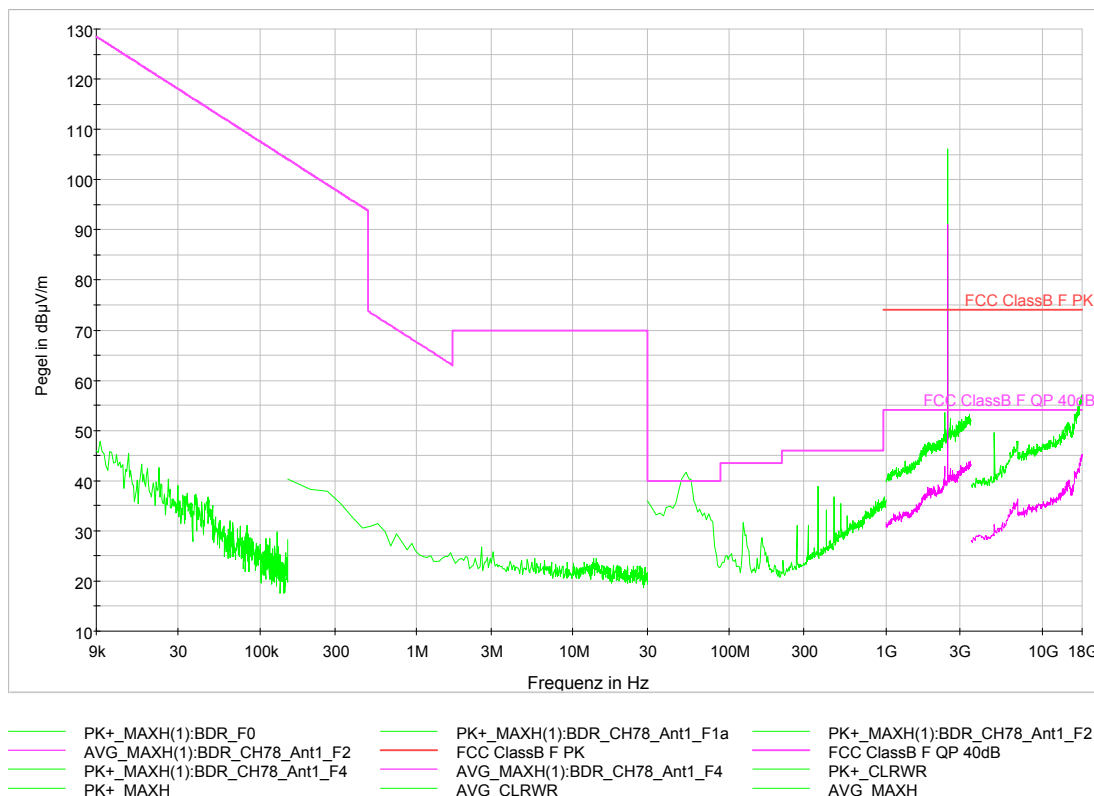
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth BDR – Channel 78 – 2480 MHz – Antenna 1



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 27,0 dBµV/m @ 4960 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

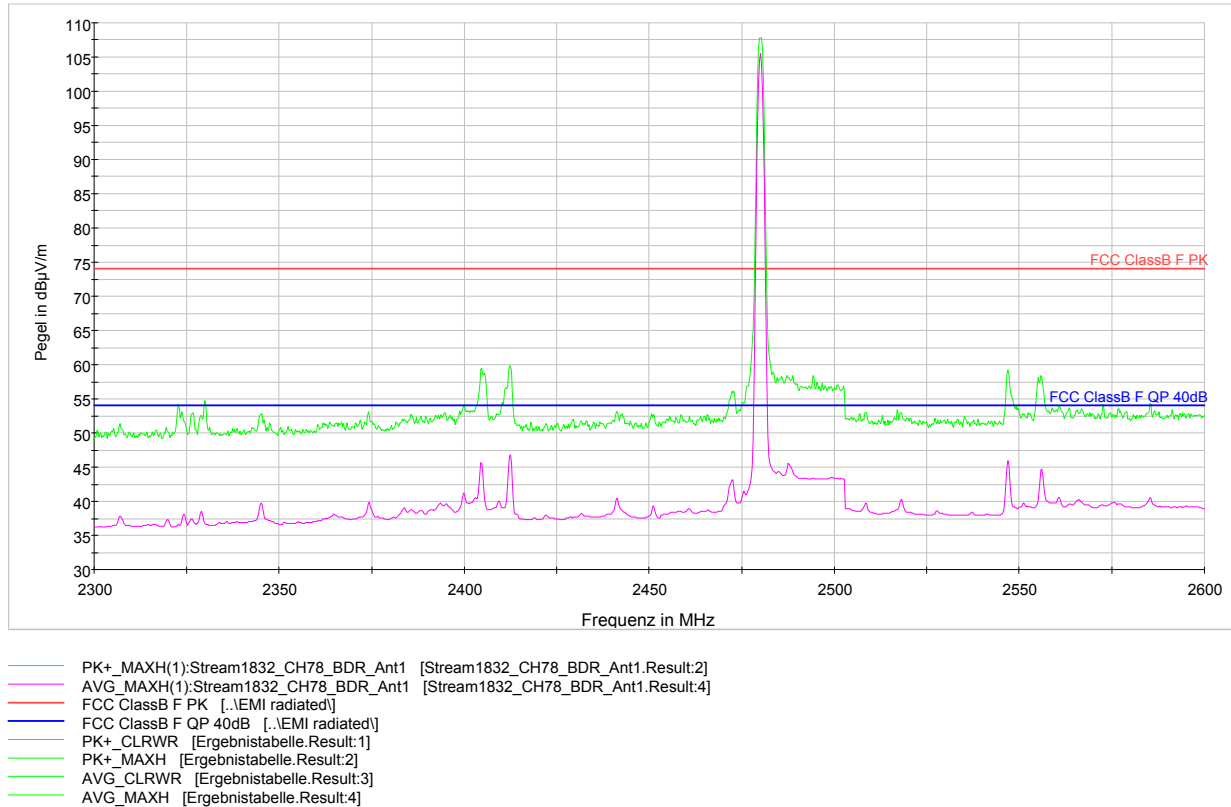
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth BDR – CH 78: 2480 MHz – Antenna 1



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

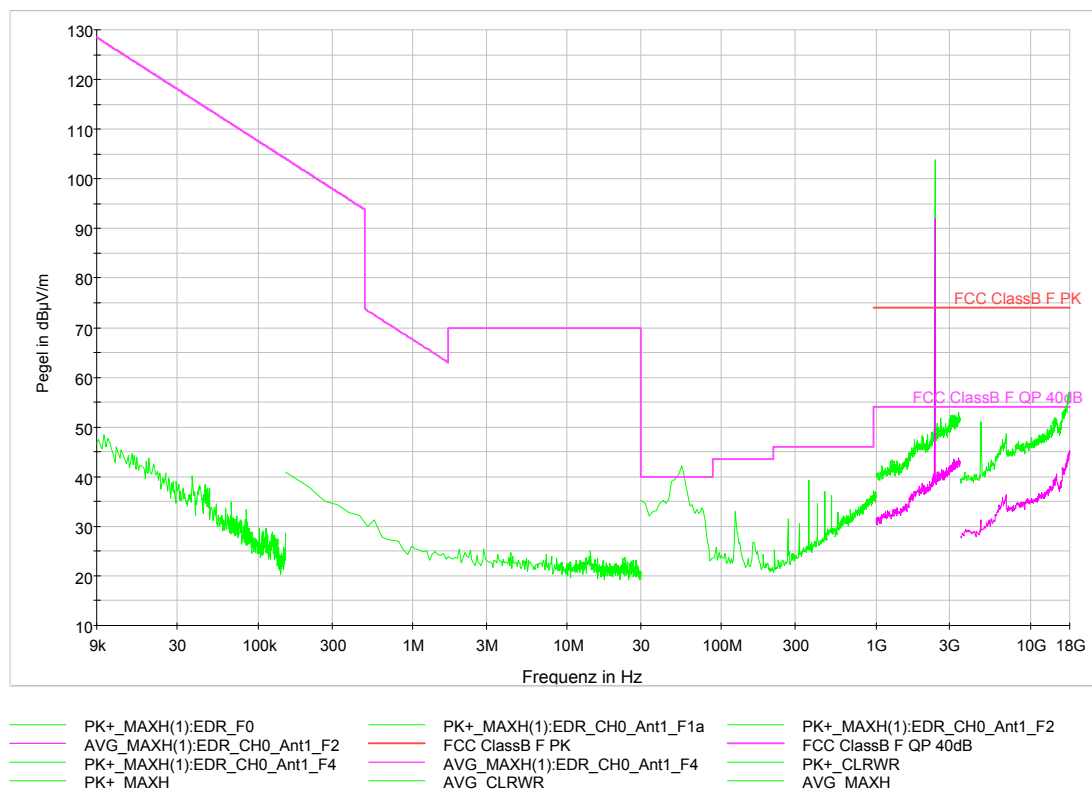
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth EDR – Channel 0 – 2402 MHz – Antenna 1



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBμV/m; 26,8 dBμV/m @ 4808 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

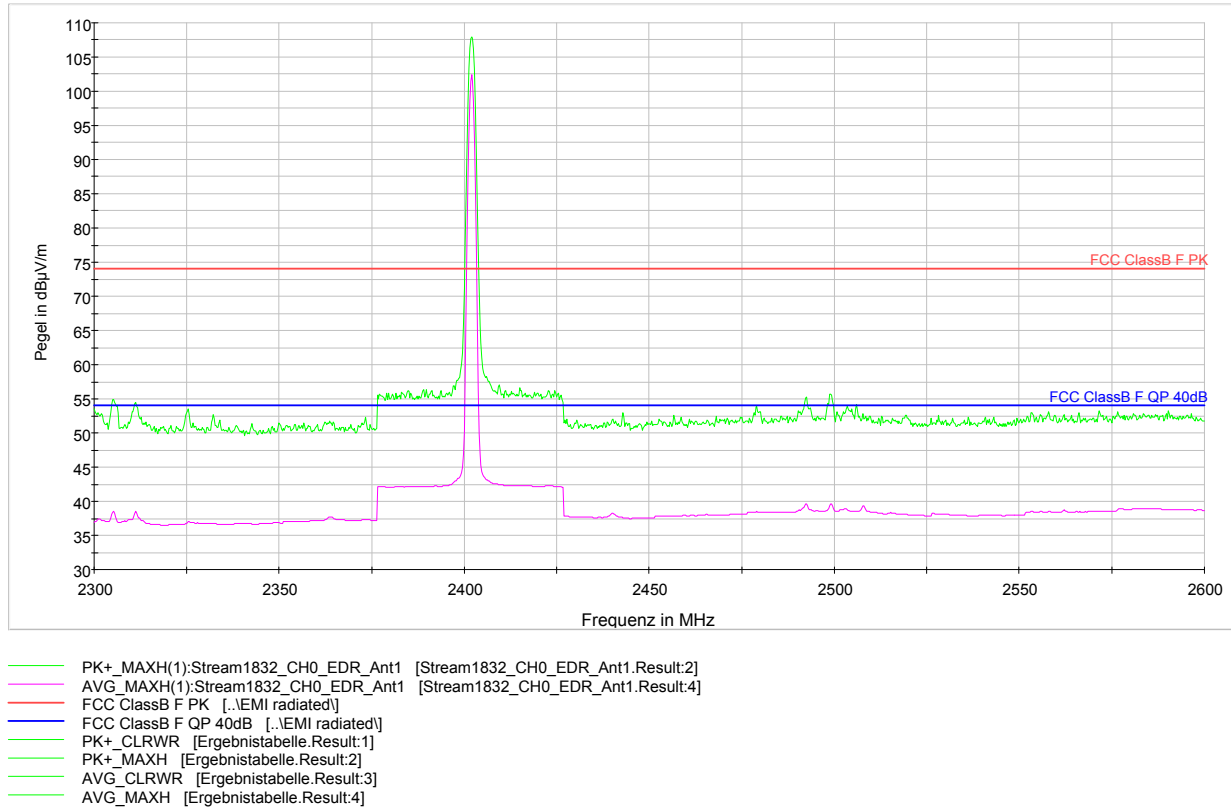
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth EDR – CH 0: 2402 MHz – Antenna 1



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

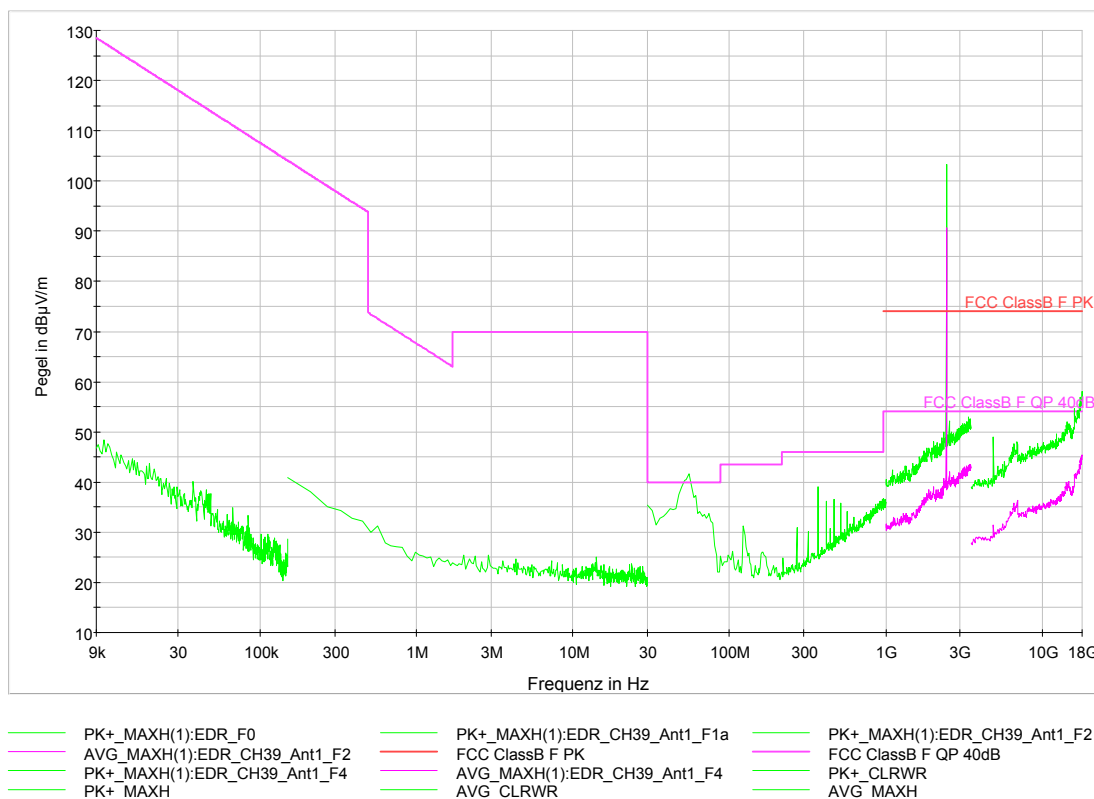
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth EDR – Channel 39 – 2441 MHz – Antenna 1



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 25,2 dBµV/m @ 4882 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

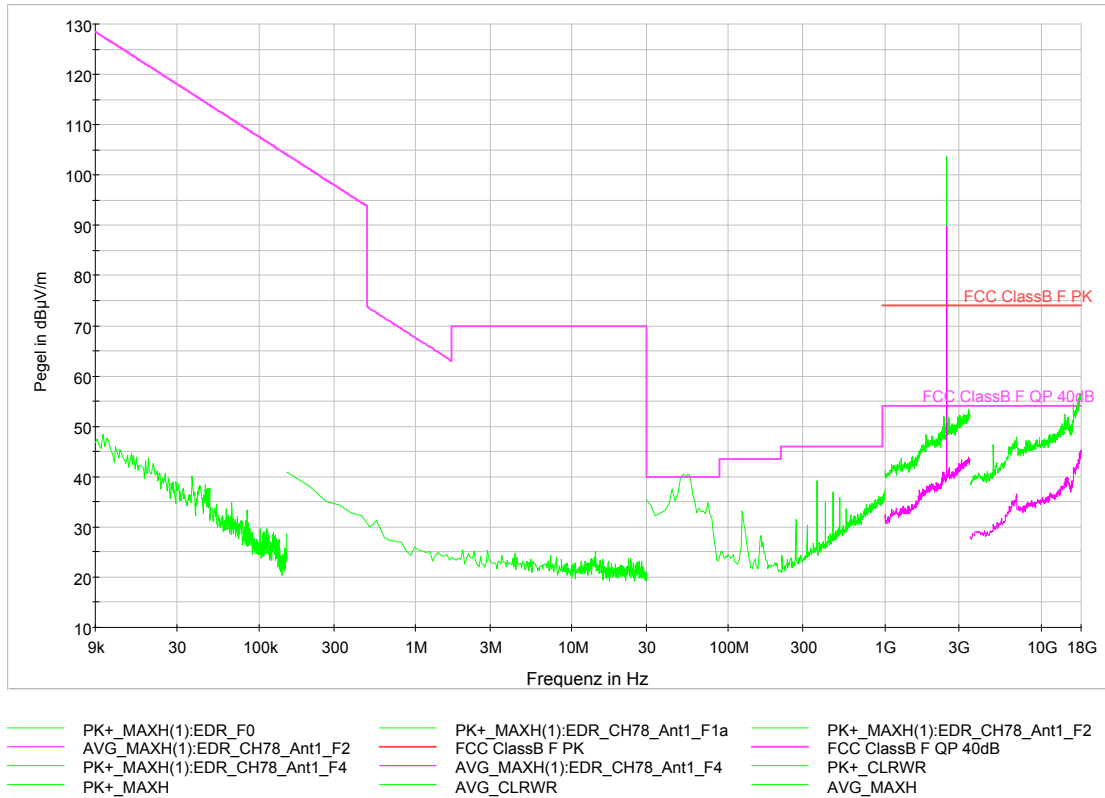
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth EDR – Channel 78 – 2480 MHz – Antenna 1



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 23,9 dBµV/m @ 4960 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

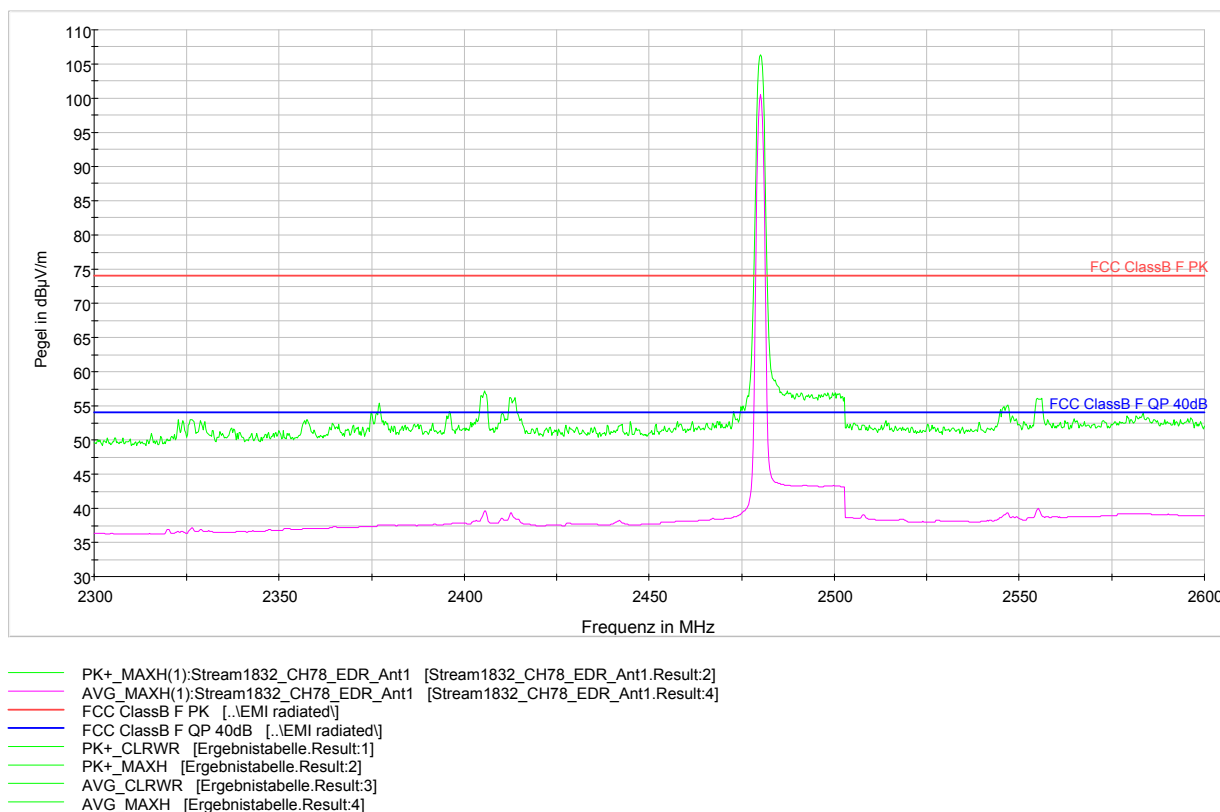
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth EDR – CH 78: 2480 MHz – Antenna 1



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

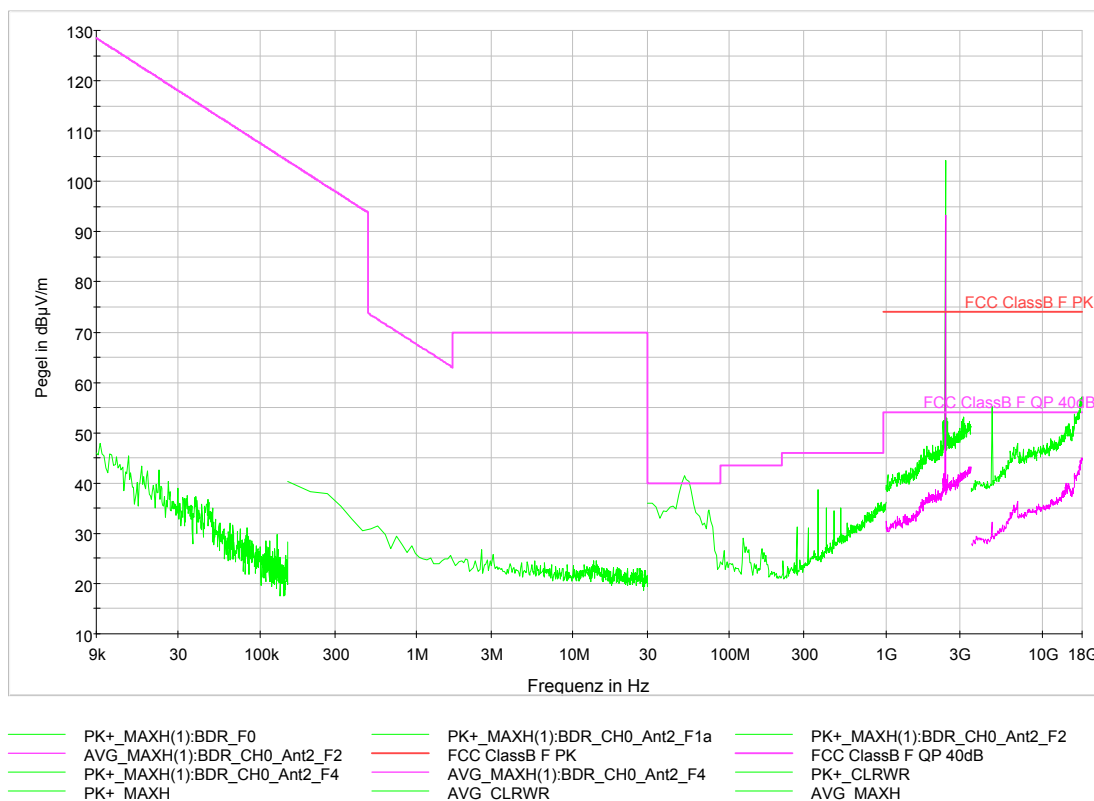
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth BDR – Channel 0 – 2402 MHz – Antenna 2



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 30,4 dBµV/m @ 4808 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

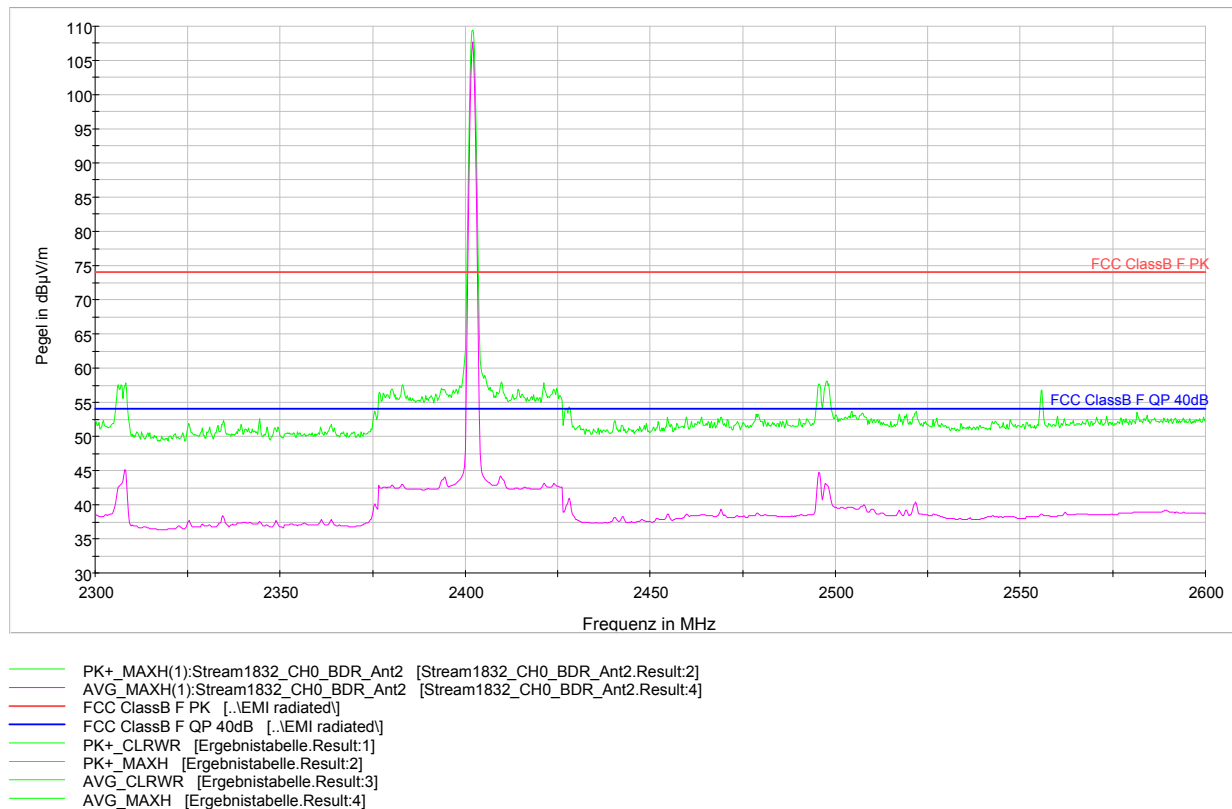
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth BDR – CH 0: 2402 MHz – Antenna 2



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

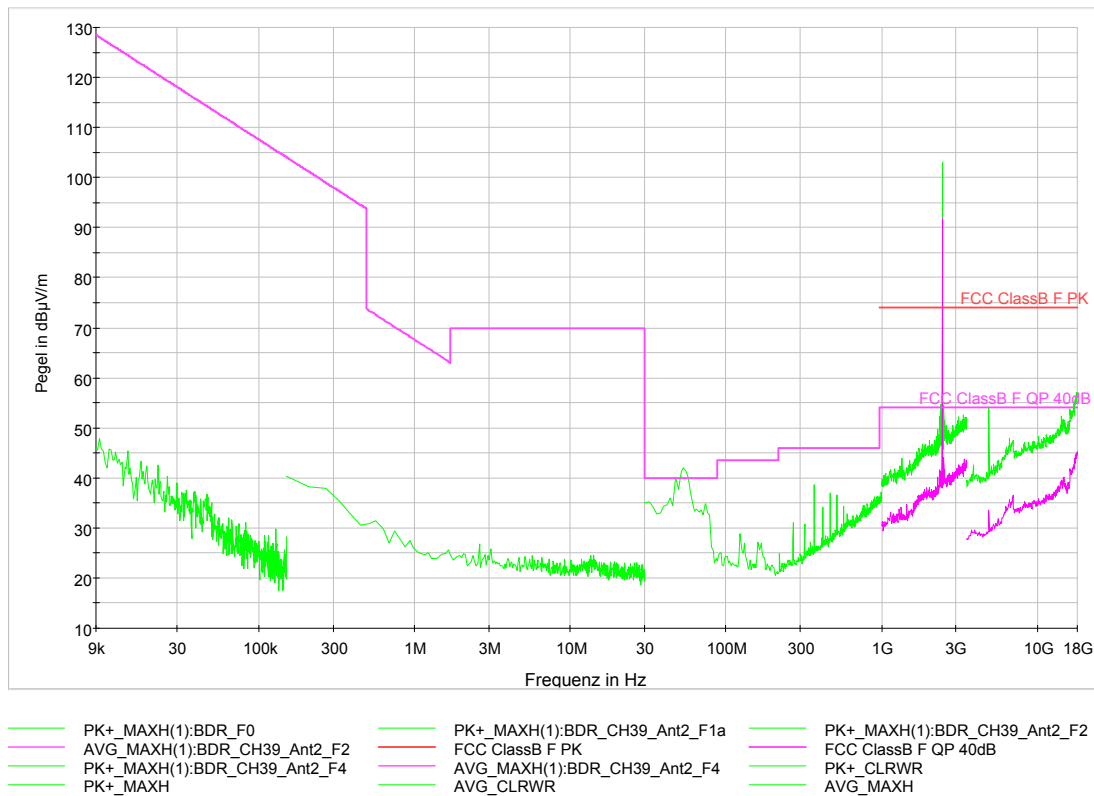
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth BDR – Channel 39 – 2441 MHz – Antenna 2



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 29,8 dBµV/m @ 4882 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT **SUBCLAUSE 15.209(a) – RSS-Gen**

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

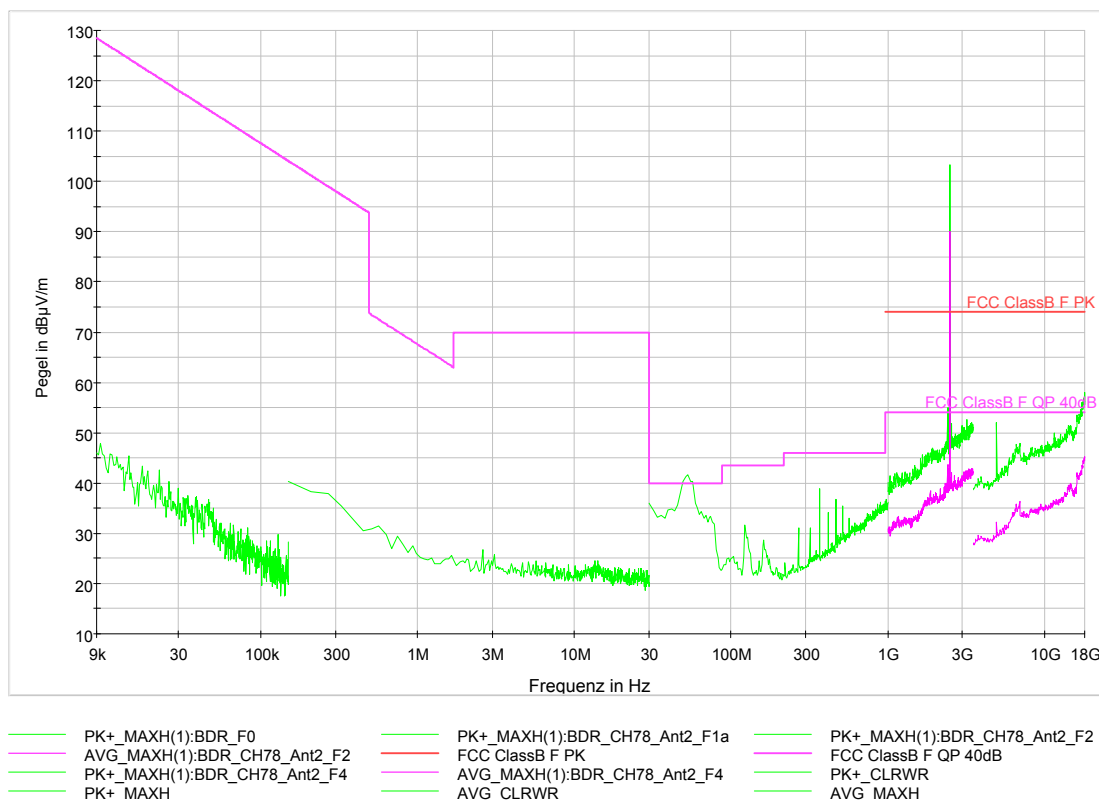
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth BDR – Channel 78 – 2480 MHz – Antenna 2



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 27,0 dBµV/m @ 4960 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

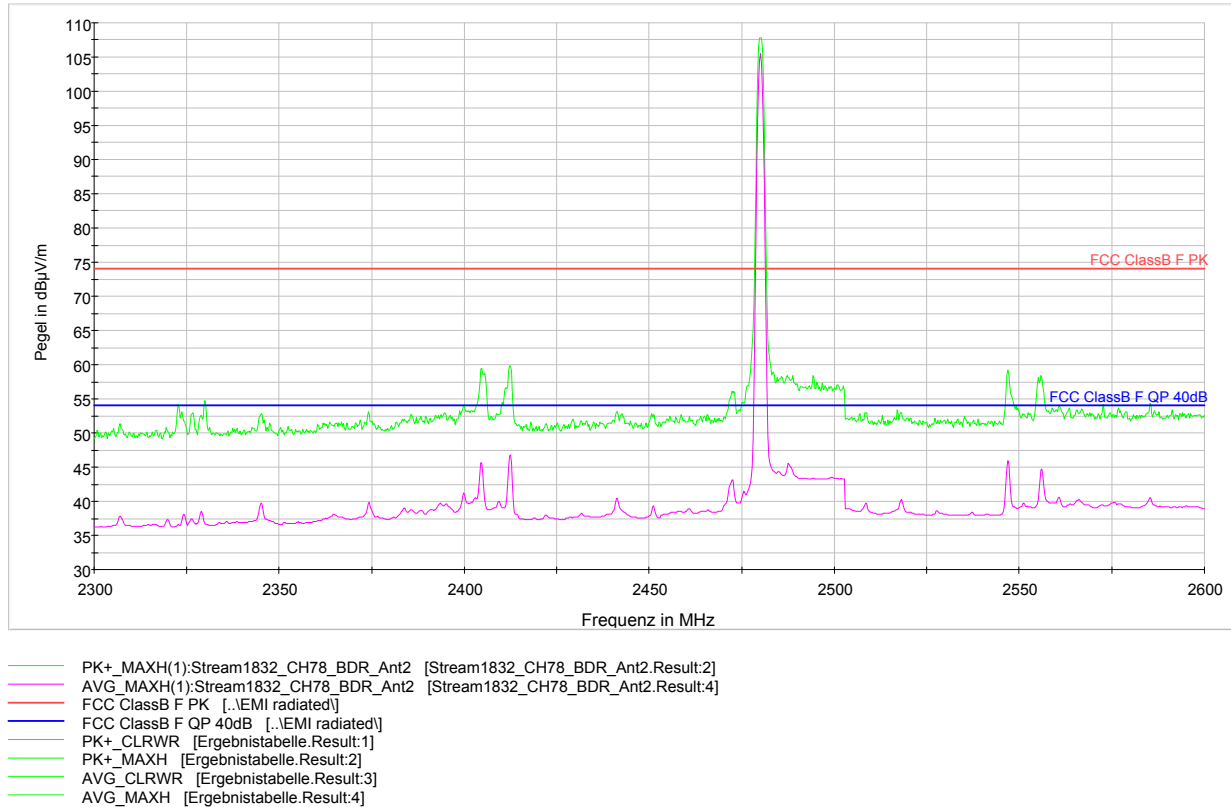
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth BDR – CH 78: 2480 MHz – Antenna 2



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

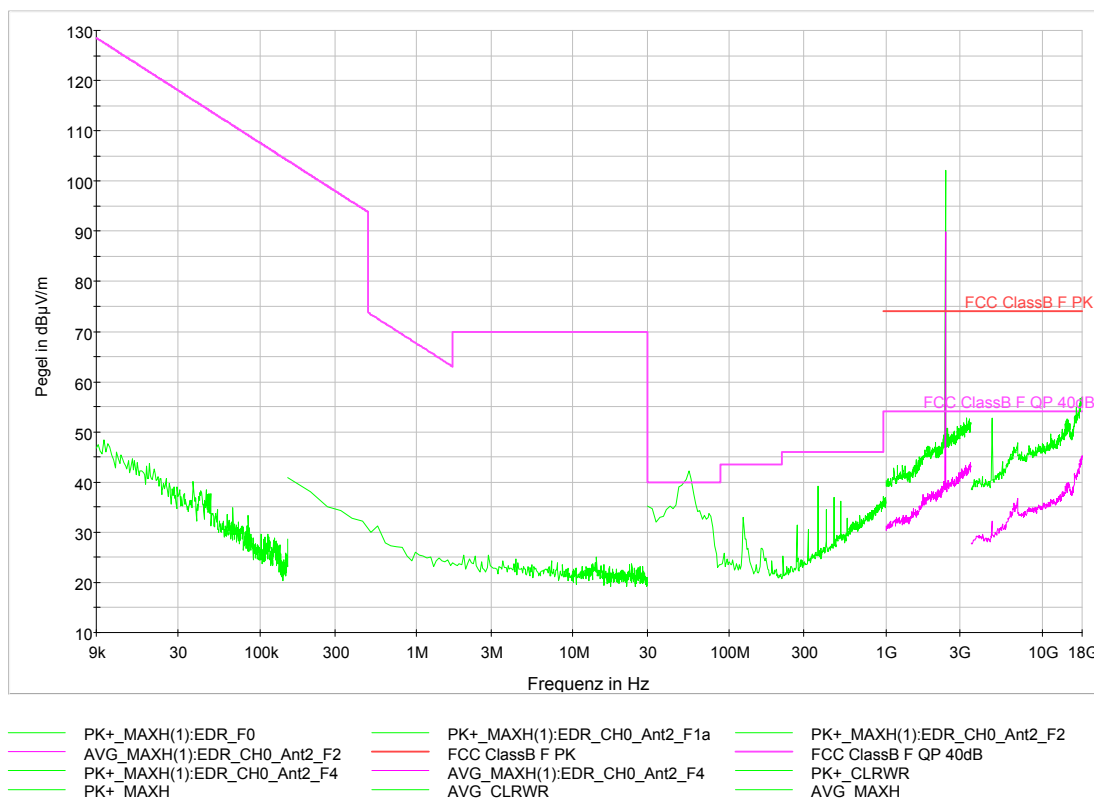
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth EDR – Channel 0 – 2402 MHz – Antenna 2



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 29,5 dBµV/m @ 4808 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

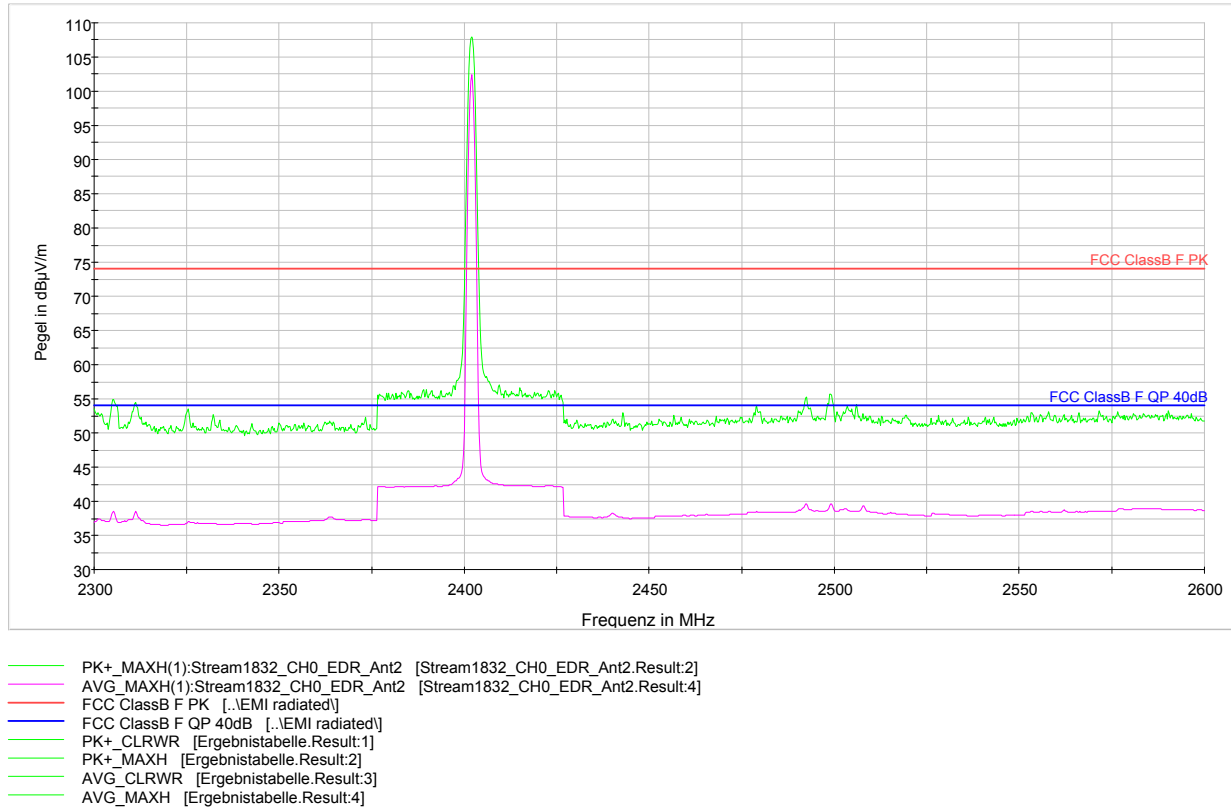
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth EDR – CH 0: 2402 MHz – Antenna 2



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

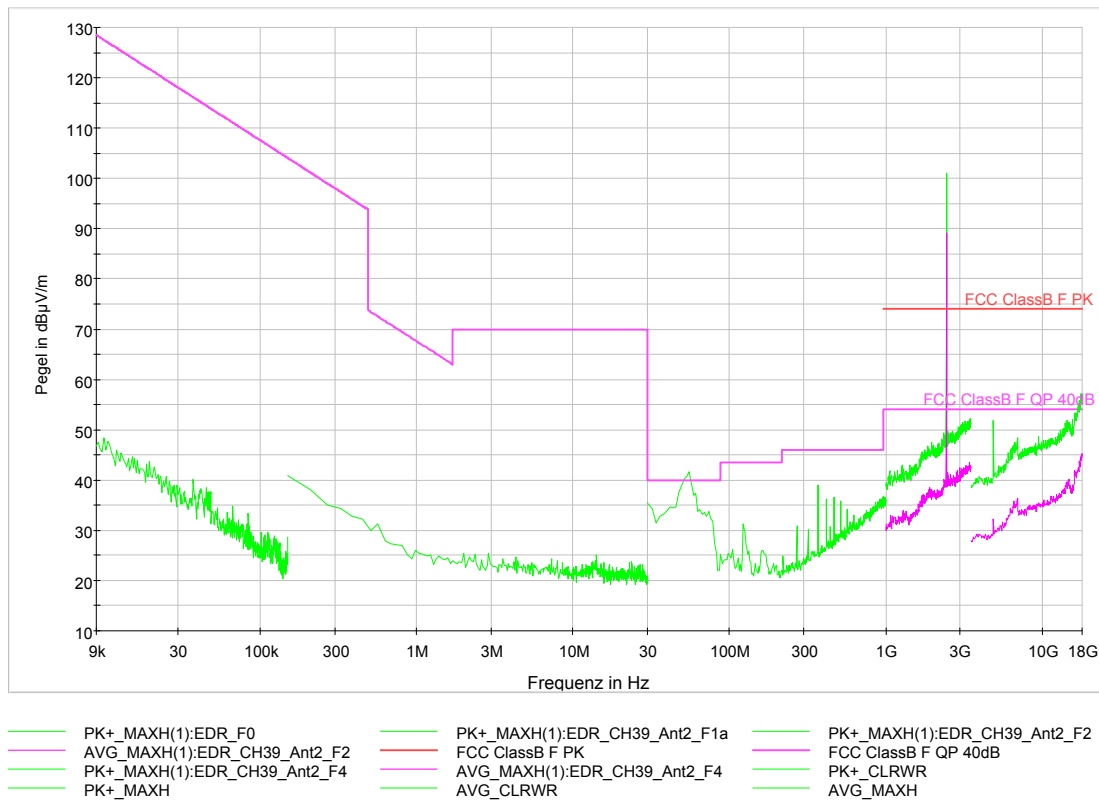
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth EDR – Channel 39 – 2441 MHz – Antenna 2



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 28,2 dBµV/m @ 4882 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

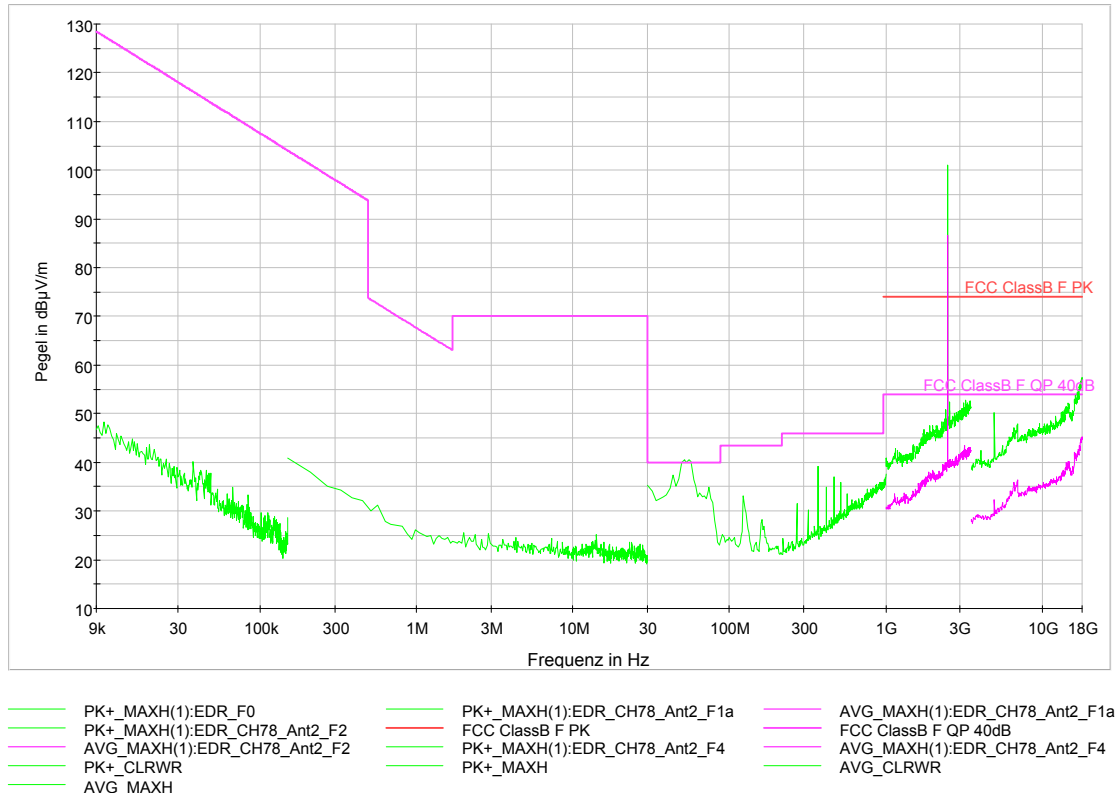
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Mode: Bluetooth EDR – Channel 78 – 2480 MHz – Antenna 2



Worst case emission: Quasipeak @ 54,0 MHz: 38,5dBµV/m; 25,9 dBµV/m @ 4960 MHz

Remark: An averaging factor of -24,7 dB was taken into account at the harmonics, assuming that a maximum of two transmissions can occur at one channel in 100ms (average time between transmissions on one channel >250ms).

LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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

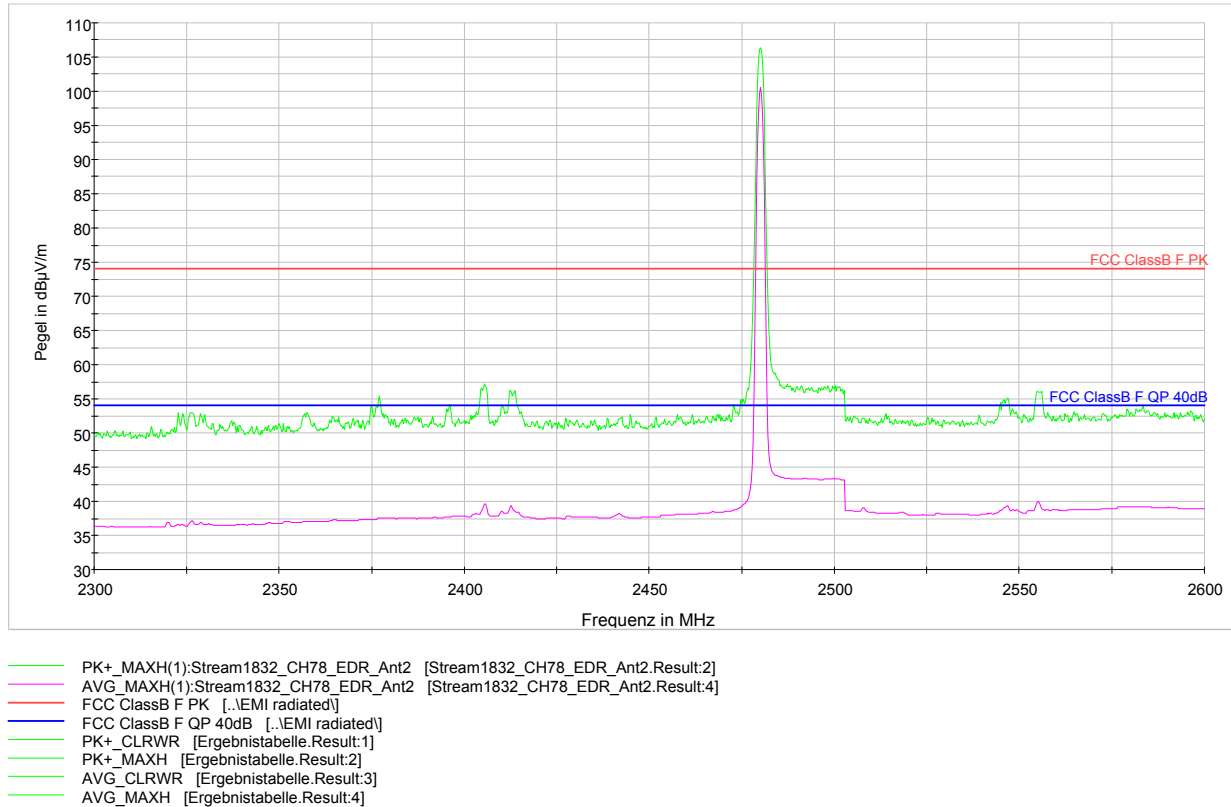
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-111; EMV-112; EMV-114; EMV-200; EMV-205; NT-122; NT-126; NT-416

Emissions in restricted bands **Emissions falling within restricted frequency bands**

§ 15.209(a) **RSS-Gen**

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

Setup: Bluetooth EDR – CH 78: 2480 MHz – Antenna 2



LIMIT

SUBCLAUSE 15.209(a) – RSS-Gen

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.

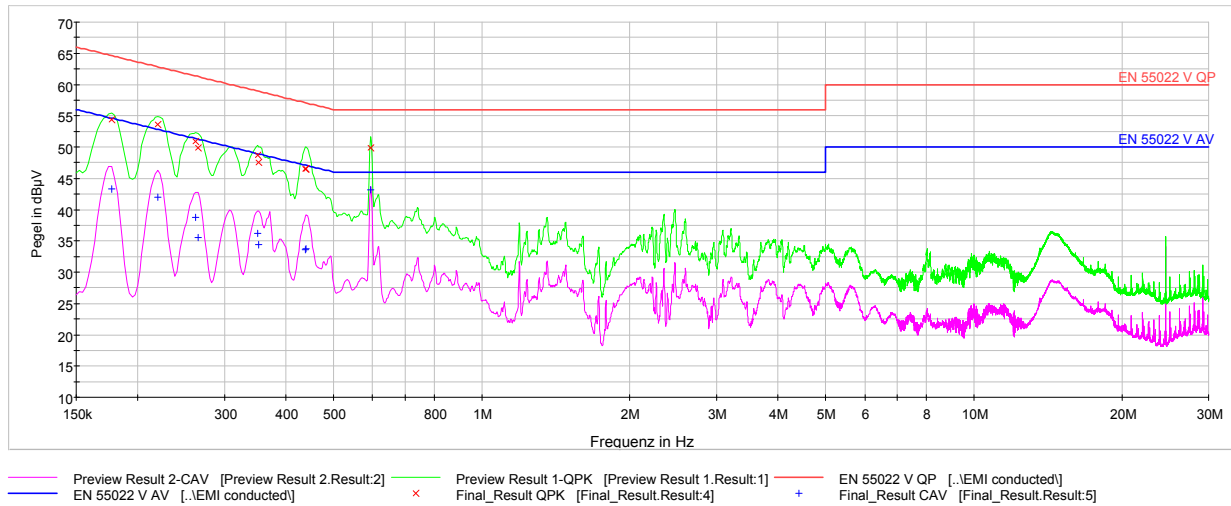
Test Equipment used: EMV-100; EMV-101; EMV-102; EMV-103; EMV-105; EMV-110; EMV-200

4.8. Conducted Limits

§ 15.207 RSS-Gen 8.8

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

Setup: Bluetooth BDR, Frequency hopping active



LIMIT

SUBCLAUSE 15.207(a) – RSS-Gen 8.8

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

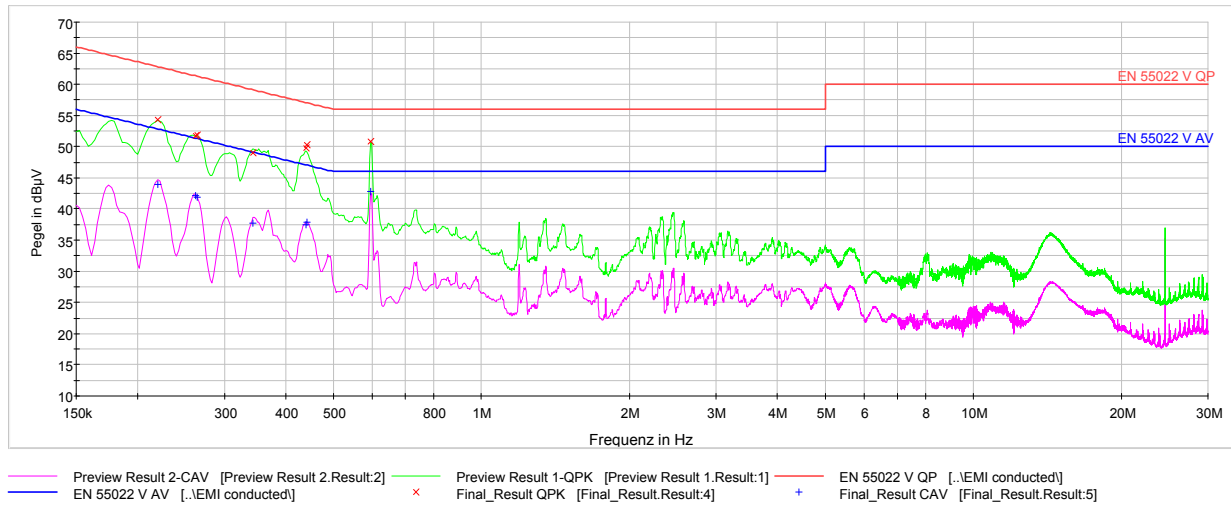
Test Equipment used: EMV-105; EMV-151; EMV-200; EMV-405

Conducted Limits

§ 15.207 RSS-Gen 8.8

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

Setup: Bluetooth EDR, Frequency hopping active



LIMIT

SUBCLAUSE 15.207(a) – RSS-Gen 8.8

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Test Equipment used: EMV-105; EMV-151; EMV-200; EMV-405

4.9. Maximum permissible Exposure

§ 15.247(i)

This kind of radio equipment is categorically excluded from routine environmental evaluation.

Appendix 1

Test equipment used

☐	Anechoic Chamber with 3m measurement distance	NT-100	☐	Spectrum analyzer – FSP7 9 kHz – 7 GHz	NT-200
☐	Stripline according to ISO 11452-5	NT-108	☐	ESCI - Test receiver 9 kHz – 7 GHz	NT-203/1
☐	MA4000 - Antenna mast 1 - 4 m height	NT-110/1	☐	ESI26 – Test receiver 20 Hz – 26,5 GHz	NT-207
☐	DS - Turntable 0 - 400 ° Azimuth	NT-111/1	☐	Digital Radio Tester CTS55	NT-208
☐	CO3000 Controller Mast+Turntable	NT-112/1	☐	Noise-gen., ITU-R 559-2 20 Hz – 20 kHz	NT-209
☐	HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz	NT-121	☐	CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz	NT-210
☐	FMZB1513 - Loop Antenna 9 kHz - 30 MHz	NT-122/1	☐	3271 - Spectrum analyzer 100 Hz - 26,5 GHz	NT-211
☐	HFH-Z6 - Rod Antenna 9 kHz - 30 MHz	NT-123	☐	Digital Radio Tester Aeroflex 3920	NT-212/1
☐	3121C - Dipole Antenna 28 - 1000 MHz	NT-124	☐	Mixer M28HW 26,5 GHz - 40 GHz	NT-214
☐	3115 - Horn Antenna 1 - 18 GHz (immunity)	NT-125	☐	RubiSource T&M Timing reference	NT-216
☐	3116 - Horn Antenna 18 - 40 GHz	NT-126	☐	Radiocommunication analyzer SWR 1180 MD	NT-217
☐	SAS-200/543 - Bicon. Antenna 20 MHz - 300 MHz	NT-127	☐	Mixer M19HWD 40 GHz – 60 GHz	NT-218
☐	AT-1080 - Log. Per. Antenna 80 - 1000 MHz	NT-128	☐	Mixer M12HWD 60 GHz – 90 GHz	NT-219
☐	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-129	☐	DSO9104 Digital scope	NT-220/1
☐	HK-116 - bicon. Antenna 20 MHz - 300 MHz	NT-130	☐	TPS 2014 Digital scope	NT-222
☐	3146 - Log. Per. Antenna 200 – 1000 MHz	NT-131	☐	Artificial Ear according to IEC 60318	NT-224
☐	VULB 9163 Trilog Antenna 30 – 3000 MHz	NT-131/1	☐	1 kHz Sound calibrator	NT-225
☐	Loop Antenna H-Field	NT-132	☐	B10 - Harmonics and flicker analyzer	NT-232
☐	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	☐	Hall-Teslameter ETM-1	NT-241
☐	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			
☐	Power quality analyzer Fluke 1760 (complete set)	NT-160 - NT-173			

Division:
Industry & Energy

Department: FG

Test report number:
INE-AT/FG-18/153

Page: 1 of 4

Date: 06.11.2018

Checked by: _____

Appendix 1 (continued)

Test equipment used

☐	E-field probe 3 MHz – 18 GHz	NT-247	☐	500W1000M7 - RF-Amplifier 80 - 1000 MHz / 500 W	NT-332
☐	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 100 MHz – 23 GHz	NT-337
☐	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
☐	PHE 4500/B Power amplifier	NT-304	☐	FP-EFT 32M 3 ph. Coupling filter (Burst)	NT-400/1
☐	EZ10 T-Artificial Network	NT-305	☐	PHE 4500 - Mains impedance network	NT-401
☐	SMG - Signal generator 0,1 - 1000 MHz	NT-310	☐	IP 6.2 Coupling filter for data lines (Surge)	NT-403
☐	SMA100A - Signal generator 9 kHz - 6 GHz	NT-310/1	☐	TK 9421 High Power Volt. Probe 150 kHz - 30 MHz	NT-409
☐	RefRad Reference generator	NT-312	☐	ESH2-Z3 - Probe 9 kHz - 30 MHz	NT-410
☐	SMP 02 Signal generator 10 MHz - 20 GHz	NT-313	☐	IP 4 - Capacitive clamp (Burst)	NT-411
☐	40 MHz Arbitrary Generator TGA1241	NT-315	☐	Highpass-Filter 100 MHz – 3 GHz	NT-412
☐	Artificial mains network NSLK 8127-PLC	NT-316	☐	Highpass-Filter 600 MHz – 4 GHz	NT-413
☐	ESD 30 System up to 25 kV	NT-321	☐	Highpass-Filter 1250 MHz – 4 GHz	NT-414
☐	PSURGE 4.1 Surge generator	NT-324	☐	Highpass-Filter 1800 MHz – 16 GHz	NT-415
☐	IMU4000 Immunity test system	NT-325/1			
☐	VCS 500-M6 Surge-Generator	NT-326			
☐	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			

Division:
Industry & Energy

Department: FG

Test report number:
INE-AT/FG-18/153

Page: 2 of 4

Date: 06.11.2018

Checked by: _____

Appendix 1 (continued)

Test equipment used

☐	Highpass-Filter 3500 MHz – 18 GHz	NT-416	☐	FCC-801-AF10 Coupling decoupling network	NT-461
☐	RF-Attenuator 10 dB DC – 18 GHz / 50 W	NT-417	☐	FCC-801-S25 Coupling decoupling network	NT-462
☐	RF-Attenuator 6 dB DC – 18 GHz / 50 W	NT-418	☐	FCC-801-T4 Coupling decoupling network	NT-463
☐	RF-Attenuator 3 dB DC – 18 GHz / 50 W	NT-419	☐	FCC-801-C1 Coupling decoupling network	NT-464
☐	RF-Attenuator 20 dB DC - 1000 MHz / 25 W	NT-421	☐	SW 9605 - Current probe 150 kHz – 30 MHz	NT-465/1
☐	RF-Attenuator 30 dB DC - 1000 MHz / 1 W	NT-423	☐	95242-1 – Current probe 1 MHz – 400 MHz	NT-468
☐	RF-Attenuator 30 dB	NT-424	☐	94106-1L-1 – Current probe 100 kHz – 450 MHz	NT-471
☐	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-425	☐	GA 1240 Power amplifier according to EN 61000-4-16	NT-480
☐	RF-Attenuator 6 dB DC - 1000 MHz / 1 W	NT-426	☐	Coupling networks according to EN 61000-4-16	NT-481 - NT-483
☐	RF-Attenuator 6 dB	NT-428	☐	Van der Hoofden Test Head	NT-484
☐	RF-Attenuator 0 dB - 81 dB	NT-429	☐	EMC Video/Audiosystem	NT-511/1
☐	WRU 27 - Band blocking 27 MHz	NT-430	☐	ES-K1 Version 1.71 SP2 Test software	NT-520
☐	WHJ450C9 AA - High pass 450 MHz	NT-431	☐	EMC32 Version 10.40.00 Test software	NT-520/1
☐	WHJ250C9 AA - High pass 250 MHz	NT-432	☐	SRM-TS Version 1.3 software for SRM-3000	NT-522
☐	RF-Load 150 W	NT-433	☐	SRM-TS Version 1.3.1 software for SRM-3006	NT-522/1
☐	Impedance transducer 1:4 ; 1:9 ; 1:16	NT-435	☐	Spitzenberger und Spies Test software V4.1	NT-525
☐	RF-Attenuator DC – 18 GHz 6 dB	NT-436	☐	Noise power test apparatus according to EN 55014	NT-530
☐	RF-Attenuator DC – 18 GHz 6 dB	NT-437	☐	Vertical coupling plane (ESD)	NT-531
☐	RF-Attenuator DC – 18 GHz 10 dB	NT-438	☐	Test cable #4 for EN 61000-4-6	NT-553
☐	RF-Attenuator DC – 18 GHz 20 dB	NT-439	☐	Test cable #3 for conducted emission	NT-554
☐	I+P 7780 Directional coupler 100 - 2000 MHz	NT-440	☐	Test cable #5+#6 ESD-cable (2x470k)	NT-555 + NT-556
☐	ESH3-Z2 - Pulse limiter 9 kHz - 30 MHz	NT-441	☐	Test cable #8 Sucoflex 104EA	NT-559
☐	Power Divider 6 dB/1 W/50 Ohm	NT-443	☐	Test cable #9 (for outdoor measurements)	NT-580
☐	Directional coupler 0,1 MHz – 70 MHz	NT-444	☐	Test cable #10 (for outdoor measurements)	NT-581
☐	Directional coupler 0,1 MHz – 70 MHz	NT-445	☐	Test cable #13 Sucoflex 104PE	NT-584
☐	Tube imitations according to EN 55015	NT-450	☐	Test cable #21 for SRM-3000	NT-592
☐	FCC-801-M3-16A Coupling decoupling network	NT-458	☐	Shield chamber	NT-600
☐	FCC-801-M2-50A Coupling decoupling network	NT-459	☐	Climatic chamber	M-1200
☐	FCC-801-M5-25 Coupling decoupling network	NT-460			

Division:
Industry & Energy

Department: FG

Test report number:
INE-AT/FG-18/153

Page: 3 of 4

Date: 06.11.2018

Checked by: _____

Appendix 1 (continued)

Test equipment used

☐	Anechoic Chamber 3 m / 5 m measuring distance	EMV-100	☐	Log.per Antenna 0,7 – 9 GHz STLP9149	EMV-305
☐	Turntabel 6 m diameter	EMV-101	☐	HF- Amplifier 9 kHz-250 MHz BBA150 (low noise)	EMV-306
☐	Antenna mast 1 – 4 m	EMV-102	☐	Load Dump Generator LD 200N	EMV-350
☐	Mast and Turntable controller FC-06	EMV-103	☐	Ultra Compact Symulator UCS 200N100	EMV-351
☐	EMC Video/Audiosystem	EMV-104	☐	Automotive Power fail module PFM 200N100.1	EMV-352
☐	EMC Software EMC32 Version 10.40.00	EMV-105	☐	Voltage Drop Symulator VDS 200Q100	EMV-353
☐	Hornantenna 1 – 18 GHz HF 907	EMV-110	☐	Arb. Generator AutoWave	EMV-354
☐	Antennapre.amp. 1 – 18 GHz ERZ-LNA0200-1800-30-2	EMV-111	☐	Ultra Compact Symulator UCS 500N7	EMV-355
☐	Trilog Antenna 30-3000 MHz VULB9163	EMV-112	☐	Coupling decoupling network CNI 503B7 / 32 A	EMV-356
☐	Monopol 9 kHz – 30 MHz VAMP 9243	EMV-113	☐	Coupling decoupling network CNI 503B7 / 63 A	EMV-357
☐	Antennapre.amp 18 – 40 GHz BBV 9721	EMV-114	☐	Telecom Surge Generator TSurge 7	EMV-358
☐	Hornantenna 200 – 2000 MHz AH-220	EMV-115	☐	Coupling decoupling network CNI 508N2	EMV-359
☐	DC Artificial Network PVDC 8300	EMV-150	☐	Coupling decoupling network CNV 504N2.2	EMV-360
☐	AC Artificial Network NNLK 8121 RC	EMV-151	☐	Immunity generator NSG4060/NSG4060-1	EMV-361
☐	EMI Receiver ESR26	EMV-200	☐	Coupling network CDND M316-2	EMV-362
☐	Signalgenerator 9 kHz – 40 GHz N5173B	EMV-201	☐	Coupling network CT419-5	EMV-363
☐	GPS Frequency normal B-88	EMV-202	☐	ESD Generator NSG 437	EMV-364
☐	DC Power supply N5745A	EMV-203	☐	Pulse Limiter VTSD 9561-F BNC	EMV-405
☐	Spektrum Analyzator FSV40	EMV-205	☐	Transient emission BSM200N40+BS200N100	EMV-450+451
☐	Thd Multimeter Model 2015	EMV-206	☐	Cap. Coupling Clamp HFK	EMV-455
☐	Poweramplifier PAS15000	EMV-207/abc	☐	Mag. Field System MS100N+MC26100+MC2630	EMV-456-458
☐	Inrush Current Source	EMV-208/abc	☐	Coupling network CDN M2-100A	EMV-459
☐	Arb.-generator Sycore	EMV-209	☐	Coupling network CDN M3-32A	EMV-460
☐	Harmonics/Flicker analyzer ARS 16/3	EMV-210	☐	Coupling network CDN M5-100A	EMV-461
☐	HF- Amplifier 9 kHz-250 MHz BBA150	EMV-300	☐	Current Clamp CIP 9136A	EMV-462
☐	HF- Amplifier 80 -1000 MHz BBA150	EMV-301	☐	DC Artificial Network HV-AN 150	EMV-464+465
☐	HF- Amplifier 0,8 - 6 GHz BBA150	EMV-302	☐	Coupling Clamp EM 101	EMV-466
☐	High Power Ant. 20-200 MHz VHBD 9134	EMV-303	☐	Decoupling Clamp FTC 101	EMV-467
☐	Log.per Antenna 80-2700 MHz STLP 9128 E special	EMV-304	☐	Power attenuator 10 dB / 250 Watt	EMV-469/2

Division:
Industry & Energy

Department: FG

Test report number:
INE-AT/FG-18/153

Page: 4 of 4

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