

Test report for

47 CFR Part 15 Subpart C

RSS-247, RSS-Gen



Product name : Gateway
Applicant : Cargotec Oyj
FCC ID : 2BGMHCE-IMX8-01
IC : N/A

Test report No. : P000320723 001 Ver 2.10

Laboratory information

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Testing Location

Test Site	Kiwa Nederland B.V.
Test Site location	Wilmersdorf 50 7327 AC Apeldoorn The Netherlands Tel. +31 88998 3393
Test Site FCC	NL0001
CABID	NL0001

Revision History

Version	Date	Remarks	By
v0.50	30-10-2024	First draft	RvB
v1.00	13-12-2024	Initial release	RvB
V2.00	10-04-2025	FCC ID update	MHK
V2.10	22-05-2025	Corrections to section 1.3 and iC id to N/A	MHK

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Summary of Test results

FCC	ISED	Description	Section in report	Verdict
15.247(d) 15.209 (a)	RSS-Gen 8.9	Radiated spurious emissions	3.1	Pass
15.205 (a)	RSS Gen 8.10	Spurious emissions in the restricted bands	3.1	Pass

Decision rule: Pass/Fail decisions are based on measurement results without taking into account measurement uncertainty.

Note: the EUT is DC power and not connected to a AC power source. (EUT is vehicular use) no AC mains conducted emissions are performed.

1 General Description

1.1 Applicant

Client name:	Cargotec Oyj
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Zip code:	00180
Telephone:	+358 207774000
E-mail:	seppo.laakkonen@cargotec.com
Contact name:	Mr. S. Laakkonen

1.2 Manufacturer

Manufacturer name:	Cargotec Oyj
Address:	Porkkalankatu 5, Helsinki
Zip code:	00180
Telephone:	+358 207774000
E-mail:	seppo.laakkonen@cargotec.com
Contact name:	Mr. S. Laakkonen

1.3 Tested Equipment Under Test (EUT)

Product name:	Gateway
Brand name:	Cargotec
FCC ID:	2BGMHCE-IMX8-01
IC:	N/A
Product description:	Gateway
Model(s):	CE-IMX08-1
Software version:	--
Hardware version:	--
Date of receipt:	25-06-2024
Tests started:	15-06-2024
Testing ended:	16-10-2024

1.3.1 Auxiliary items

AUX1

Product name:	Notebook
Product type:	
Remarks:	Connects to EUT Ethernet port, property test lab

AUX2

Product name:	Communication simulation for EUT
Product type:	Communication simulation box
Remarks:	Connects to EUT

1.4 Product specifications of Equipment under test

Tx Frequency:	WLAN: 2412 – 2462 MHz BLE: 2402 – 2480 MHz BT BR/EDR: 2402 – 2480 MHz LTE: bands 2/4/5/7/12/13/25/26/38/41 WCDMA: bands 2/4/5 GSM: bands 850/1900
Rx frequency:	WLAN: 2412 – 2462 MHz BLE: 2402 – 2480 MHz BT BR/EDR: 2402 – 2480 MHz LTE: bands 2/4/5/7/12/13/25/26/38/41 WCDMA: bands 2/4/5 GSM: bands 850/1900 GNSS: 1575.42 MHz
Occupied channel width:	WLAN: 20 MHz BLE: 1/2MHz BT BR/EDR: 1 MHz LTE: 1.4/3/5/10/15/20 MHz WCDMA: 5 MHz GSM: 0.2 MHz
Antenna type:	Smarteq Alldisc 710388
Antenna gain:	GSM/WCDMA/LTE: 3.25 dBi* WLAN/BLE/BT BR/BT EDR: 1.4 dBi*
Type of modulation:	According to WLAN/Bluetooth/LTE/GSM/WCDMA specs.
Emission designator	WLAN/BLE/BT BR/BT EDR: see FCC id: VPYLB1XK GSM/WCDMA/LTE: see FCC id: XMR201906ED21G

Disclaimer: The operating frequency bands are declared by the applicant

Note: antenna gain (dBi) = antenna gain(dBi) + cable loss (dB).(tested with 55cm cable length)

1.5 Environmental conditions

Normal test conditions:

Temperature (*) : +15°C to +35°C
Relative humidity(*) : 20 % to 75 %

1.6 Measurement standards

- ANSI C63.10:2013
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02

1.7 Applicable standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.209
- FCC Part 15 Subpart C §15.247
- RSS-Gen Issue 5
- RSS-247 Issue 3

1.8 Observation and remarks

The EUT contains 2 pre-certified radio: 1. Murata LBEEE5CJ1XK-687 (WLAN/BLE/BT BR/ BT EDR)
2. Quectel EG21-G (GSM/WCDMA/LTE).

This test report also contains co-location tests between WLAN and LTE and WLAN and BLE.
See chapter 3.1.7.

1.9 Modifications to the EUT (Equipment Under Test)

The applicant added some RF absorber sheets on some components to suppress Radiated emissions.
See internal photo module for details.

1.10 Conclusions

The sample of the product showed **NO NON-COMPLIANCES** to the specifications stated in paragraph 1.7 of this report.

The results of the test as stated in this report, are exclusively applicable to the product items as identified in this report. Kiwa Nederland B.V. accepts no responsibility for any properties of product items in this test report, which are not supported by the tests as specified in paragraph 1.7 "*Applicable standards*".

All tests are performed by:

Name : ing. R. van Barneveld

Review of test methods and report by:

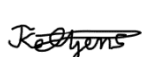
Name : ing. M.H. Khan

The above conclusions have been verified by the following signatory:

Date : 22-05-2025

Name : Ing T. Keltjens

Function : Test Engineer

Signature : 

2 Test configuration of the Equipment Under Test

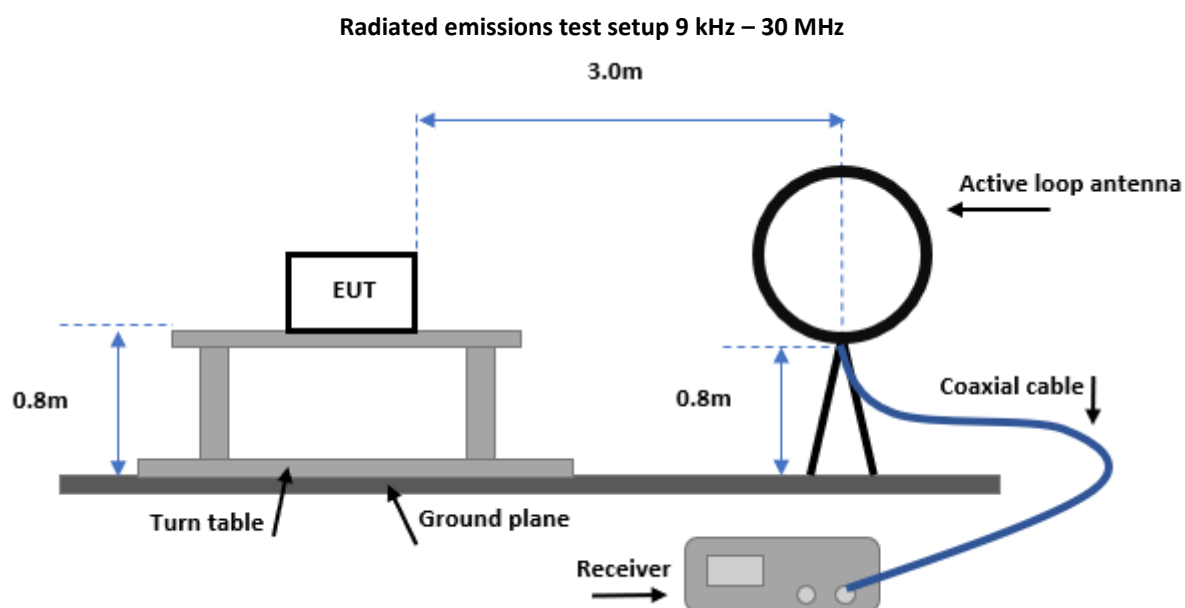
2.1 Test mode and tested channels

The applicant provided test mode software to set the frequency and RF power.

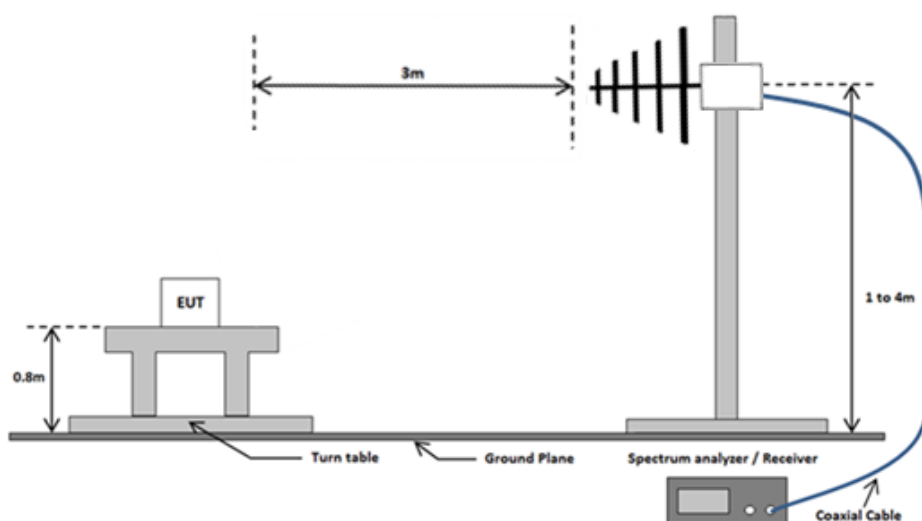
Tested channels and power setting overview.

Technology	channel	Frequency (MHz)	Power setting
802.11b	1	2412	14
	3	2437	14
	11	2462	14
802.11n	1	2412	14
	3	2437	14
	11	2462	14
BLE	37	2402	6.3
	17	2440	6.3
	39	2480	6.3
BT BR/EDR	1	2402	6.3
	39	2440	6.3
	80	2480	6.3

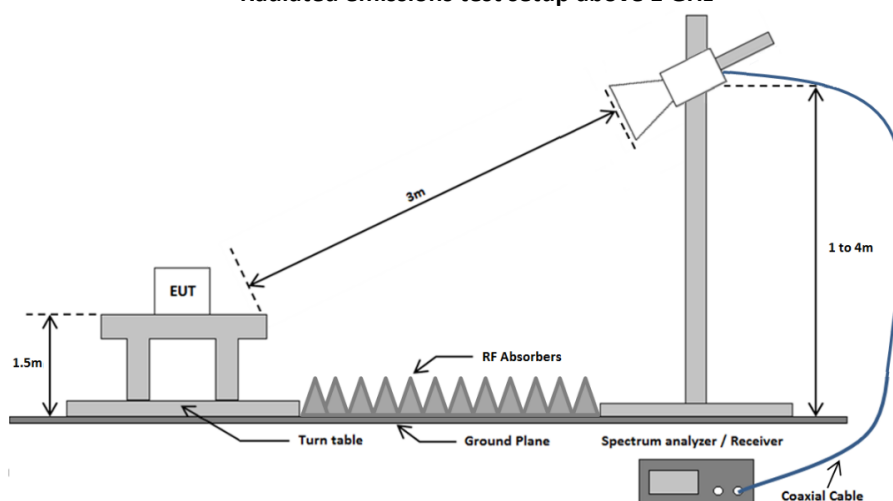
2.2 Test setups



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



List of used cables					
Number	Function	From	To	Length	Remarks
1	DC Power	DC supply	EUT	< 3m	12 – 24 V
2	I/O cable	CAN bus	EUT	< 3m	---
3	I/O cable	I/O cable	EUT	< 3m	--
	I/O cable	1-wire	EUT	< 3m	--
4	Ethernet	EUT	EUT	<3m	--

Note: all cables above are part of the wiring loom of the EUT.

2.3 Equipment used in the test configuration

Description	Manufacturer	Model	ID	Cal. Done date	Cal. due date	Used at Par.
EMI Receiver	Rohde & Schwarz	ESR7	114870	09-2024	09-2026	3.1
Spectrum Analyzer	Rohde & Schwarz	FSV3044	114923	10-2023	10-2025	3.1
3.0 GHz HPF	Wainwright	WHK3.0/18G-10EF	114682	09-2024	09-2027	3.1
Biconical antenna + 6dB attenuator	EMCO	3109	107818	06-2022	06-2025	3.1
Biconical antenna + 6dB attenuator	Schwarzbeck + HP	VHA9103 + 8491A	114436	07-2024	07-2027	3.1
Logperiodic antenna	EMCO	3147	114385	02-2021	02-2026	3.1
Horn antenna	EMCO	3115	114607	07-2024	07-2027	3.1
Horn antenna	FLANN-MICROWAVE	20240-25	114518	NA*	NA*	3.1
Horn antenna	Scientific atlanta	12A-26	114487	NA*	NA*	3.1
Preamplifier 1-18 GHz	µComp Nordic	MCNA-40-0010800-25-10P	114771	08-2024	08-2025	3.1
Preamplifier 18-40 GHz	Schwarzbeck	BBV-9721	115026	06-2024	06-2025	3.1
Semi-Anechoic Chamber	ETS Lindgren	SAR	114624	03-2023	03-2026	3.1
Test software	Raditeq	Radimation Version 2023.2.3	--	--	--	3.1

*Note: Standard gain horn antennas do not need calibration

NA= Not Applicable

2.4 Sample calculations

All formulas for data conversions and conversion factors are reported in chapter 4 of this test report.

3 Test results

3.1 Radiated spurious emissions

3.1.1 Limit

FCC 15.209(a)

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance(m)
0.009 – 0.490	2400/F(kHz)	$20 \cdot \{\log[2400] - \log[F(\text{kHz})]\}$	300*
0.490 – 1.705	24000/F(kHz)	$20 \cdot \{\log[24000] - \log[F(\text{kHz})]\}$	30*
1.705 – 30.0	30	29.5	30*
30 -88	100	40	3
88 - 216	150	43,5	3
216-960	200	46	3
Above 960	500	54	3

*Note: Measured values in the plots 9 kHz to 30 MHz corrected to 30m or 300m limit distance according to the method described in ANSI C63.10-2013, clause 6.4

RSS-GEN

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Magnetic field strength (H-Field) (μA/m)	Magnetic field strength (H-Field) (dBμA/m)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance(m)
0.009 – 0.490	6.37/F (kHz)	$20 \cdot \{\log[6.37] - \log[F(\text{kHz})]\}$	N.A.	$20 \cdot \{\log[6.37] - \log[F(\text{kHz})]\} + 51.5$	300*
0.490 – 1.705	63.7/F (kHz)	$20 \cdot \{\log[63.7] - \log[F(\text{kHz})]\}$	N.A.	$20 \cdot \{\log[63.7] - \log[F(\text{kHz})]\} + 51.5$	30*
1.705 - 30	0.08	-21.9	N.A.	29.6	30*
30 -88	N.A.	N.A.	100	40	3
88 - 216	N.A.	N.A.	150	43,5	3
216-960	N.A.	N.A.	200	46	3
Above 960	N.A.	N.A.	500	54	3

*Note: Measured values in the plots 9 kHz to 30 MHz corrected to 30m or 300m limit distance according to the method described in ANSI C63.10-2013, clause 6.4.

3.1.2 Measurement instruments

The measurement instruments are listed in chapter 2.3 of this report.

3.1.3 Test setup

The test setup is as shown in chapter 2.2 of this report.

3.1.4 Test procedure

9 kHz – 30 MHz: According to ANSI C63.10-2013, section 6.4

30 MHz to 26.5 GHz: According to ANSI C63.10-2013, section 6.5 and 6.6

9 kHz to 30 MHz: IRN 441 – Method 10

30 MHz to 1 GHz: IRN 441 – Method 1

1 GHz to 18 GHz: IRN 441– Method 2

18 to 26 GHz: IRN 441– Method 3

In case of handheld and/or body-worn equipment, the EUT's orientation (X, Y, Z) was varied in order to ensure that maximum emission amplitudes were attained. In all other cases the associated cabling and the EUT orientation was varied for maximum emissions.

The spectrum was examined from 0.009 MHz to 10 times X GHz, not more than the 10th harmonic of the highest intentional generated frequency (X GHz). Final radiated emission measurements were made at 3m distance.

The 6 highest emission amplitudes relative to the appropriate limit were recorded in this report. Field strength values of radiated emissions at frequencies not listed in the tables are more than 20 dB below the applicable limit.

3.1.5 Measurement Uncertainty

Frequency range	Polarization	Uncertainty
9 kHz – 30 MHz	--	±1.6 dB
30 – 200 MHz	Horizontal	±4.5 dB
	Vertical	±5.4 dB
200 -1000 MHz	Horizontal	±3.6 dB
	Vertical	±4.6 dB
1 – 18 GHz	Horizontal	±5.7 dB
	Vertical	±5.7 dB
18 – 26.5 GHz	Horizontal	±4.9 dB
	Vertical	±4.9 dB

3.1.6 Test results

9 – 150 kHz

Not peaks found.

150 kHz – 30 MHz

BLE middle channel

Frequency	Peak	Status	Angle	Height	Polarization
29,239 MHz	22,9 dB μ V/m	Pass	80 degrees	1 m	Vertical

BLE high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
27,16 MHz	22,5 dB μ V/m	Pass	123 degrees	1 m	Vertical	22,1 dB μ V/m	29,5 dB μ V/m

802.11b low channel

Frequency	Peak	Status	Angle	Height	Polarization
28,687 MHz	21,9 dB μ V/m	Pass	292 degrees	1 m	Vertical

802.11b middle channel

Frequency	Peak	Status	Angle	Height	Polarization
29,239 MHz	22,1 dB μ V/m	Pass	297 degrees	1 m	Vertical
26,612 MHz	18,7 dB μ V/m	Pass	342 degrees	1 m	Vertical

802.11b high channel

Frequency	Peak	Status	Angle	Height	Polarization
29,235 MHz	21 dB μ V/m	Pass	223 degrees	1 m	Vertical

802.11n low channel

Frequency	Peak	Status	Angle	Height	Polarization
29,239 MHz	21,3 dB μ V/m	Pass	0 degrees	1 m	Vertical

BT BR/EDR low channel

Frequency	Peak	Status	Angle	Height	Polarization
29,235 MHz	20,8 dB μ V/m	Pass	289 degrees	1 m	Vertical

BT BR/EDR middle channel

Frequency	Peak	Status	Angle	Height	Polarization
29,235 MHz	20,7 dB μ V/m	Pass	0 degrees	1 m	Vertical

BT BR/EDR high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
29,236 MHz	20,3 dB μ V/m	Pass	272 degrees	1 m	Vertical	19,5 dB μ V/m	29,5 dB μ V/m

30 – 250 MHz

BLE low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,603 MHz	40,7 dBμV/m	Pass	25 degrees	1 m	Vertical	37,2 dBμV/m	40 dBμV/m
32,598 MHz	38,3 dBμV/m	Pass	262 degrees	1 m	Vertical	35,3 dBμV/m	40 dBμV/m

BLE middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,623 MHz	43,8 dBμV/m	Pass	224 degrees	1 m	Vertical	39,5 dBμV/m	40 dBμV/m
42,221 MHz	41,8 dBμV/m	Pass	124 degrees	1 m	Vertical	31,2 dBμV/m	40 dBμV/m

BLE high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,615 MHz	42,5 dBμV/m	Pass	166 degrees	1 m	Vertical	39 dBμV/m	40 dBμV/m
41,978 MHz	41,2 dBμV/m	Pass	84 degrees	1,2 m	Vertical	28,9 dBμV/m	40 dBμV/m

802.11b low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
150,001 MHz	35,4 dBμV/m	Pass	279 degrees	1,9 m	Horizontal	33,3 dBμV/m	43,5 dBμV/m
42,328 MHz	41,7 dBμV/m	Pass	86 degrees	1 m	Vertical	31,7 dBμV/m	40 dBμV/m
58,707 MHz	35,1 dBμV/m	Pass	222 degrees	1,2 m	Vertical	30,6 dBμV/m	40 dBμV/m

802.11b middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
44,419 MHz	39,7 dBμV/m	Pass	99 degrees	1 m	Vertical	30,4 dBμV/m	40 dBμV/m

802.11b high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
44,844 MHz	38,2 dBμV/m	Pass	97 degrees	1 m	Vertical	29 dBμV/m	40 dBμV/m
41,568 MHz	39,8 dBμV/m	Pass	97 degrees	1 m	Vertical	29,9 dBμV/m	40 dBμV/m

802.11n low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,605 MHz	42,7 dBμV/m	Pass	206 degrees	1 m	Vertical	39 dBμV/m	40 dBμV/m
33,176 MHz	36,5 dBμV/m	Pass	261 degrees	1 m	Vertical	31,9 dBμV/m	40 dBμV/m
34,664 MHz	35,7 dBμV/m	Pass	261 degrees	1 m	Vertical	30,9 dBμV/m	40 dBμV/m
41,986 MHz	42,2 dBμV/m	Pass	206 degrees	1 m	Vertical	30,1 dBμV/m	40 dBμV/m
64,806 MHz	36,2 dBμV/m	Pass	40 degrees	2,5 m	Vertical	32,1 dBμV/m	40 dBμV/m
86,053 MHz	30,9 dBμV/m	Pass	3 degrees	1,8 m	Horizontal	26,7 dBμV/m	40 dBμV/m
98,446 MHz	38 dBμV/m	Pass	144 degrees	1 m	Vertical	34,1 dBμV/m	43,5 dBμV/m
149,967 MHz	34,6 dBμV/m	Pass	96 degrees	1,2 m	Horizontal	29,6 dBμV/m	43,5 dBμV/m

802.11n middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,616 MHz	42,2 dBμV/m	Pass	174 degrees	1,3 m	Vertical	37,9 dBμV/m	40 dBμV/m
34,619 MHz	38,3 dBμV/m	Pass	244 degrees	1 m	Vertical	34,5 dBμV/m	40 dBμV/m
42,045 MHz	40,7 dBμV/m	Pass	244 degrees	1,2 m	Vertical	30,1 dBμV/m	40 dBμV/m

802.11n high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,616 MHz	42,2 dBμV/m	Pass	124 degrees	1 m	Vertical	38,3 dBμV/m	40 dBμV/m
42,242 MHz	41,6 dBμV/m	Pass	124 degrees	1 m	Vertical	31,2 dBμV/m	40 dBμV/m
32,604 MHz	38,9 dBμV/m	Pass	244 degrees	1 m	Vertical	35,7 dBμV/m	40 dBμV/m

BT BR/EDR low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,606 MHz	40,8 dB μ V/m	Pass	320 degrees	1 m	Vertical	37,2 dB μ V/m	40 dB μ V/m
43 MHz	38,9 dB μ V/m	Pass	320 degrees	1 m	Vertical	30,8 dB μ V/m	40 dB μ V/m
64,773 MHz	37,2 dB μ V/m	Pass	3 degrees	2,5 m	Vertical	33,3 dB μ V/m	40 dB μ V/m
86,031 MHz	35,8 dB μ V/m	Pass	195 degrees	3,8 m	Horizontal	32,3 dB μ V/m	40 dB μ V/m
148,109 MHz	33,2 dB μ V/m	Pass	80 degrees	2 m	Horizontal	27,3 dB μ V/m	43,5 dB μ V/m

BT BR/EDR middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,625 MHz	42,6 dB μ V/m	Pass	243 degrees	1 m	Vertical	38,5 dB μ V/m	40 dB μ V/m
41,927 MHz	40,9 dB μ V/m	Pass	121 degrees	1 m	Vertical	29,1 dB μ V/m	40 dB μ V/m

BT BR/EDR high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,614 MHz	42,5 dB μ V/m	Pass	263 degrees	1 m	Vertical	39 dB μ V/m	40 dB μ V/m
41,98 MHz	39,5 dB μ V/m	Pass	215 degrees	1,3 m	Vertical	28 dB μ V/m	40 dB μ V/m
64,787 MHz	34,6 dB μ V/m	Pass	251 degrees	2,5 m	Vertical	30,7 dB μ V/m	40 dB μ V/m
150,003 MHz	40,6 dB μ V/m	Pass	98 degrees	2 m	Horizontal	38,3 dB μ V/m	43,5 dB μ V/m

250 – 1000 MHz

BLE low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
449,986 MHz	40 dBμV/m	Pass	208 degrees	1 m	Vertical	36,6 dBμV/m	46 dBμV/m
550 MHz	39 dBμV/m	Pass	207 degrees	1,5 m	Horizontal	35,4 dBμV/m	46 dBμV/m

BLE middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
449,988 MHz	39,7 dBμV/m	Pass	188 degrees	1 m	Vertical	35,7 dBμV/m	46 dBμV/m
550,022 MHz	37,3 dBμV/m	Pass	262 degrees	1,5 m	Horizontal	33,8 dBμV/m	46 dBμV/m
349,999 MHz	32,1 dBμV/m	Pass	191 degrees	1 m	Horizontal	28,9 dBμV/m	46 dBμV/m

BLE high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
550 MHz	41 dBμV/m	Pass	264 degrees	1 m	Vertical	37,8 dBμV/m	46 dBμV/m
450,033 MHz	37,2 dBμV/m	Pass	257 degrees	1,5 m	Vertical	32,7 dBμV/m	46 dBμV/m

802.11b low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
895,422 MHz	41,2 dBμV/m	Pass	150 degrees	4 m	Vertical	30,8 dBμV/m	46 dBμV/m

802.11b middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
450,013 MHz	40,5 dBμV/m	Pass	182 degrees	1 m	Vertical	37,7 dBμV/m	46 dBμV/m
350,004 MHz	32,9 dBμV/m	Pass	192 degrees	1 m	Horizontal	28,5 dBμV/m	46 dBμV/m
806,852 MHz	40,2 dBμV/m	Pass	318 degrees	2 m	Vertical	29,4 dBμV/m	46 dBμV/m

802.11b high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
450,02 MHz	41,2 dBμV/m	Pass	192 degrees	2 m	Horizontal	38,6 dBμV/m	46 dBμV/m
550,01 MHz	40,7 dBμV/m	Pass	204 degrees	1,5 m	Horizontal	37,9 dBμV/m	46 dBμV/m
712,483 MHz	38,7 dBμV/m	Pass	130 degrees	1 m	Horizontal	27,7 dBμV/m	46 dBμV/m

802.11n low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
450,007 MHz	41,4 dBμV/m	Pass	186 degrees	2 m	Horizontal	38,4 dBμV/m	46 dBμV/m
550,01 MHz	40,7 dBμV/m	Pass	203 degrees	1,5 m	Horizontal	38,2 dBμV/m	46 dBμV/m

802.11n middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
450,007 MHz	40,1 dBμV/m	Pass	223 degrees	1 m	Vertical	37 dBμV/m	46 dBμV/m

802.11n high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
450,013 MHz	38,4 dBμV/m	Pass	272 degrees	1,5 m	Vertical	35,2 dBμV/m	46 dBμV/m

BT BR/EDR low channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
450,026 MHz	37,9 dBμV/m	Pass	145 degrees	1 m	Vertical	34,1 dBμV/m	46 dBμV/m
664,901 MHz	37,6 dBμV/m	Pass	166 degrees	3,5 m	Horizontal	26,4 dBμV/m	46 dBμV/m

BT BR/EDR middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
550 MHz	40 dBμV/m	Pass	337 degrees	1,5 m	Horizontal	37,2 dBμV/m	46 dBμV/m
450,007 MHz	40,8 dBμV/m	Pass	182 degrees	1,5 m	Horizontal	37,3 dBμV/m	46 dBμV/m

BT BR/EDR high channel

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
450,023 MHz	38,2 dBμV/m	Pass	262 degrees	1,5 m	Vertical	34 dBμV/m	46 dBμV/m
489,98 MHz	35,3 dBμV/m	Pass	60 degrees	3,5 m	Vertical	24,4 dBμV/m	46 dBμV/m

1 – 18 GHz

BLE middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Average	Average Limit
7,32 GHz	51,2 dBμV/m	Pass	6 degrees	3,5 m	Vertical	44,9 dBμV/m	54 dBμV/m

BLE high channel

Frequency	Peak	Status	Angle	Height	Polarization	Average	Average Limit
7,439 GHz	52,9 dBμV/m	Pass	355 degrees	3 m	Vertical	44,9 dBμV/m	54 dBμV/m

802.11b low channel

Frequency	Peak	Status	Angle	Height	Polarization	Average	Average Limit
2,981 GHz	46 dBμV/m	Pass	237 degrees	1,5 m	Vertical	34,8 dBμV/m	54 dBμV/m
2,791 GHz	44,8 dBμV/m	Pass	143 degrees	3 m	Horizontal	33,9 dBμV/m	54 dBμV/m
3,216 GHz	44,2 dBμV/m	Pass	268 degrees	1,5 m	Vertical	34,6 dBμV/m	54 dBμV/m

802.11b middle channel

Frequency	Peak	Status	Angle	Height	Polarization	Average	Average Limit
2,811 GHz	46,4 dBμV/m	Pass	39 degrees	1,5 m	Vertical	35,7 dBμV/m	54 dBμV/m
3,248 GHz	45,4 dBμV/m	Pass	52 degrees	3 m	Vertical	36,2 dBμV/m	54 dBμV/m

802.11b high channel

Frequency	Peak	Status	Angle	Height	Polarization	Average	Average Limit
2,938 GHz	45,9 dBμV/m	Pass	257 degrees	1 m	Vertical	35,6 dBμV/m	54 dBμV/m
2,811 GHz	45,8 dBμV/m	Pass	298 degrees	1 m	Vertical	35,7 dBμV/m	54 dBμV/m
3,11 GHz	43,8 dBμV/m	Pass	134 degrees	3 m	Horizontal	33,1 dBμV/m	54 dBμV/m

802.11n

No peaks found

BT BR/EDR

No peaks found

Co-location
30 – 250 MHz

Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
30,44 MHz	48,5 dB μ V/m	Pass	204 degrees	1,8 m	Vertical	38,7 dB μ V/m	40 dB μ V/m
32,331 MHz	48,3 dB μ V/m	Pass	219 degrees	1 m	Vertical	38,6 dB μ V/m	40 dB μ V/m
30,633 MHz	43,6 dB μ V/m	Pass	47 degrees	3,6 m	Vertical	34,9 dB μ V/m	40 dB μ V/m
150,003 MHz	40,5 dB μ V/m	Pass	275 degrees	1,2 m	Horizontal	39,2 dB μ V/m	43,5 dB μ V/m
30,034 MHz	50,5 dB μ V/m	Pass	219 degrees	1,2 m	Vertical	39,4 dB μ V/m	40 dB μ V/m
31,998 MHz	46,5 dB μ V/m	Pass	219 degrees	1 m	Vertical	35 dB μ V/m	40 dB μ V/m
32,865 MHz	47,9 dB μ V/m	Pass	219 degrees	1 m	Vertical	38,8 dB μ V/m	40 dB μ V/m
31,157 MHz	47 dB μ V/m	Pass	204 degrees	2 m	Vertical	35,9 dB μ V/m	40 dB μ V/m

250 – 1000 MHz

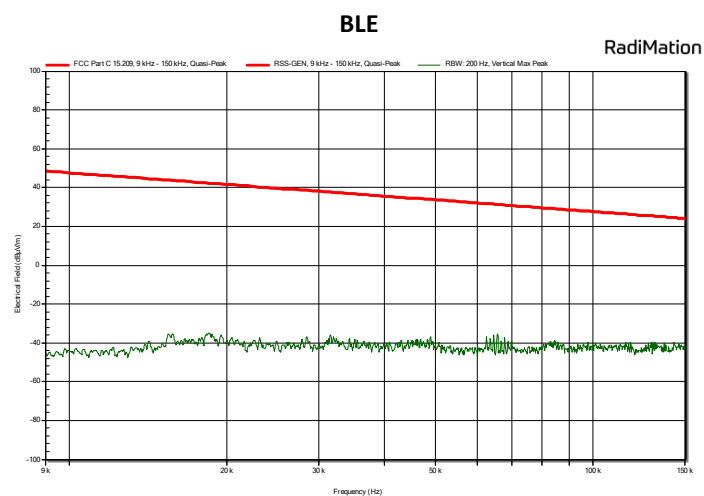
Frequency	Peak	Status	Angle	Height	Polarization	Quasi-Peak	Quasi-Peak Limit
850,004 MHz	37,5 dB μ V/m	Pass	141 degrees	1 m	Vertical	32,1 dB μ V/m	46 dB μ V/m

1 – 18 GHz

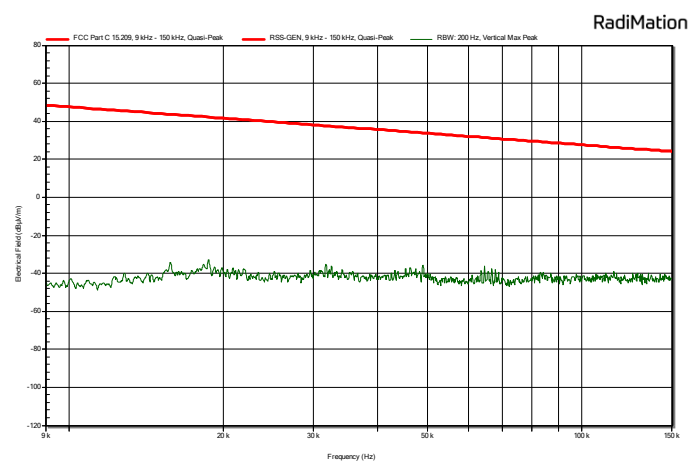
Frequency	Peak	Peak Limit	Status	Angle	Height	Polarization	Average	Average Limit
3,76 GHz	64 dB μ V/m	82.2 dB μ V/m	Pass	201 degrees	2 m	Vertical	58,3 dB μ V/m	82.2 dB μ V/m
5,643 GHz	55,6 dB μ V/m	74 dB μ V/m	Pass	291 degrees	2,5 m	Vertical	47,6 dB μ V/m	54 dB μ V/m
4,381 GHz	53,2 dB μ V/m	74 dB μ V/m	Pass	261 degrees	3 m	Vertical	42,6 dB μ V/m	54 dB μ V/m
3,138 GHz	51,6 dB μ V/m	74 dB μ V/m	Pass	328 degrees	1,5 m	Vertical	43,2 dB μ V/m	54 dB μ V/m
6,266 GHz	52,1 dB μ V/m	74 dB μ V/m	Pass	261 degrees	3 m	Vertical	40,5 dB μ V/m	54 dB μ V/m
3,624 GHz	48,8 dB μ V/m	74 dB μ V/m	Pass	214 degrees	4 m	Vertical	34,3 dB μ V/m	54 dB μ V/m

The results of the radiated emission tests are depicted in the table above. A selection of plots is provided on the next pages

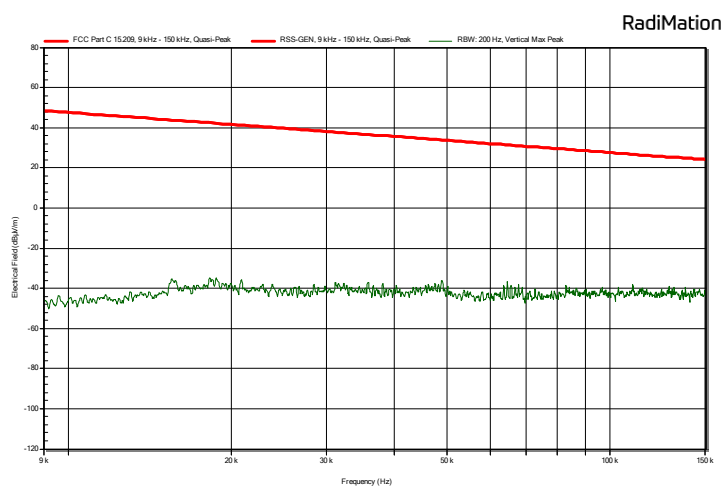
3.1.7 Plots of the Radiated Spurious Emissions Measurement



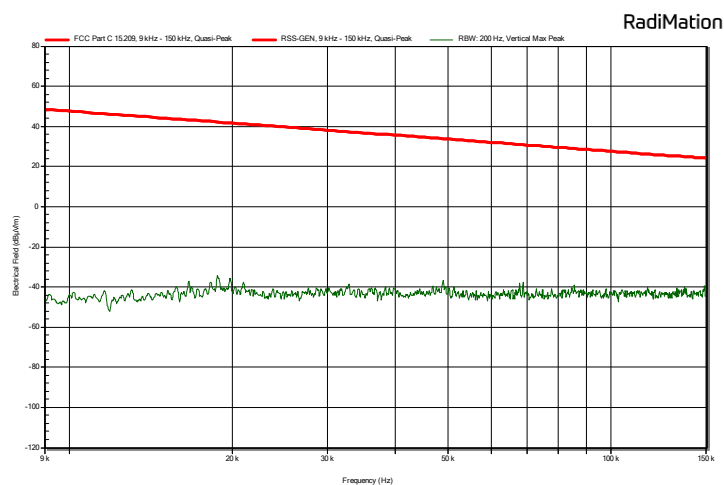
Note: Antenna perpendicular, in the range 9 – 150kHz, low channel
(pre-scan peak values shown)



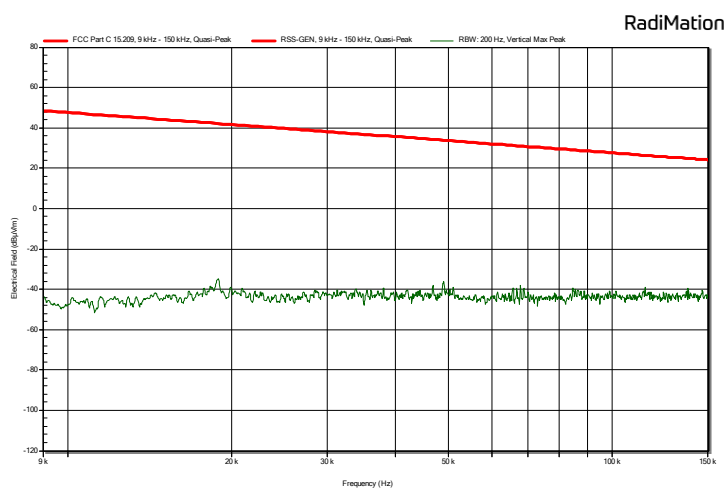
Note: Antenna perpendicular, in the range 9 – 150kHz, middle channel
(pre-scan peak values shown)



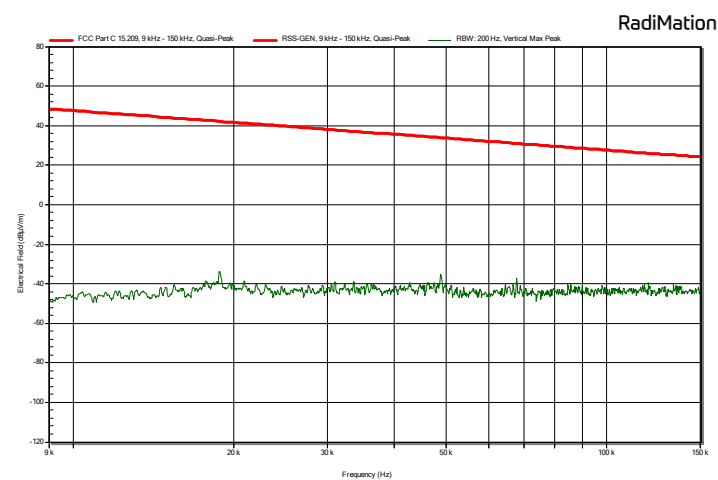
Note: Antenna perpendicular, in the range 9 – 150kHz, high channel
(pre-scan peak values shown)



Note: Antenna parallel, in the range 9 – 150KHz, low channel
(pre-scan peak values shown)

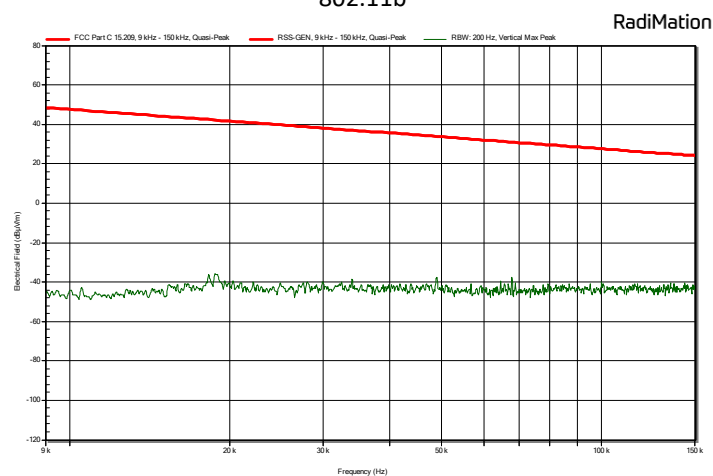


Note: Antenna parallel r, in the range 9 – 150KHz, middle channel
(pre-scan peak values shown)

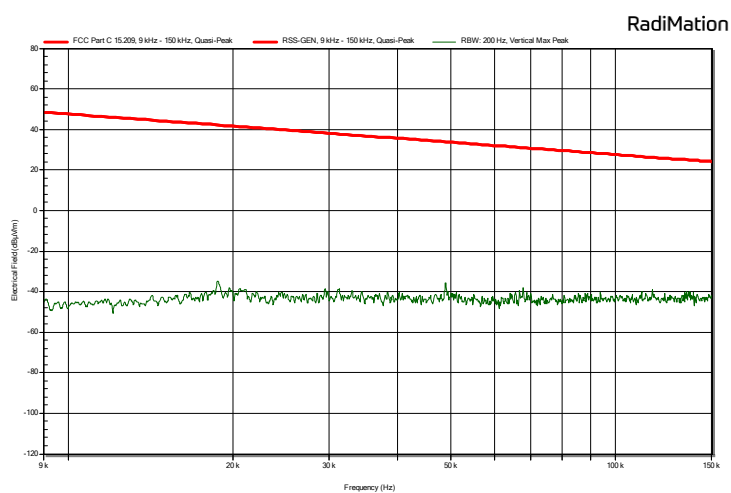


Note: Antenna parallel, in the range 9 – 150KHz, high channel
(pre-scan peak values shown)

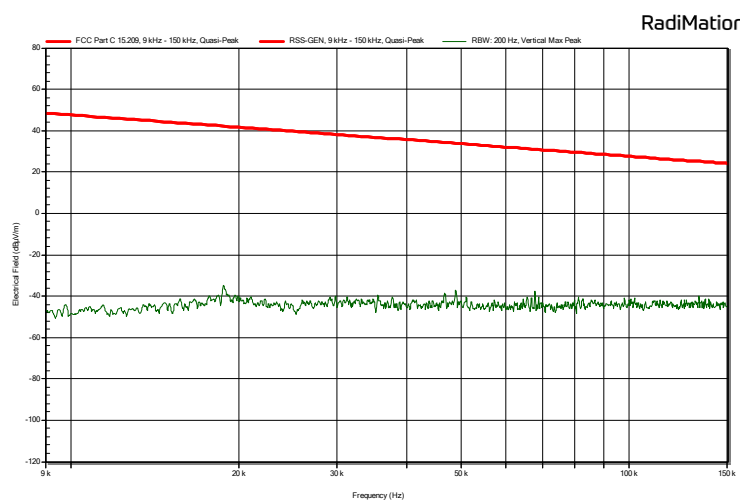
802.11b



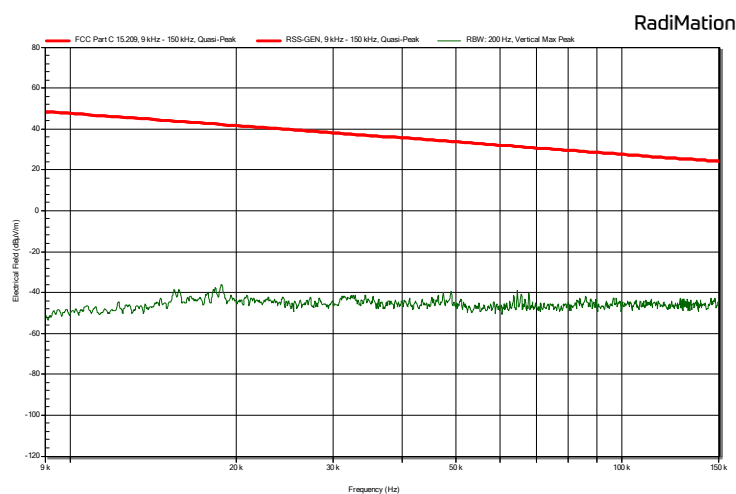
Note: Antenna perpendicular, in the range 9 – 150KHz, low channel
(pre-scan peak values shown)



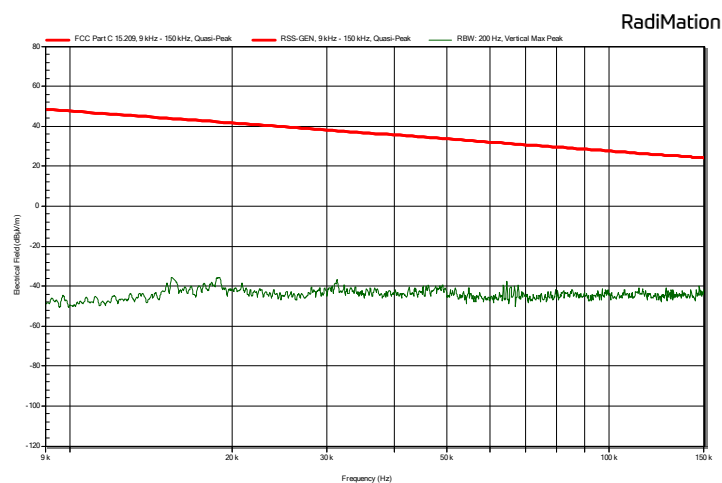
Note: Antenna perpendicular, in the range 9 – 150KHz, middle channel
(pre-scan peak values shown)



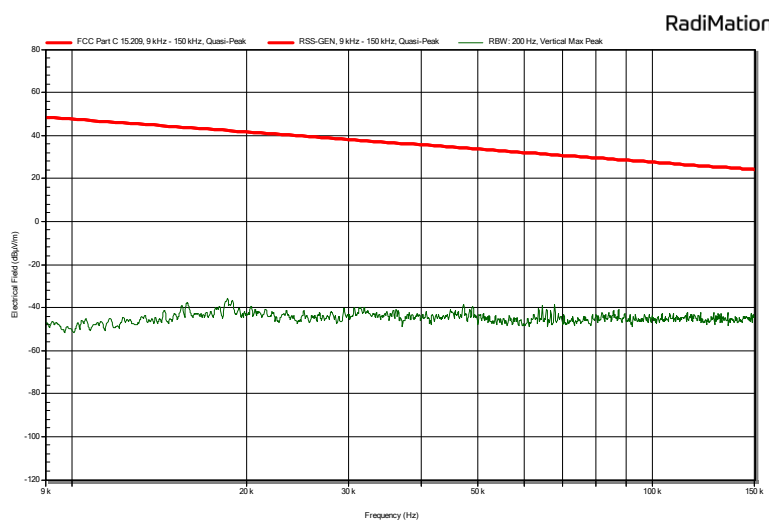
Note: Antenna perpendicular, in the range 9 – 150KHz, high channel
(pre-scan peak values shown)



Note: Antenna parallel, in the range 9 – 150KHz, low channel
(pre-scan peak values shown)

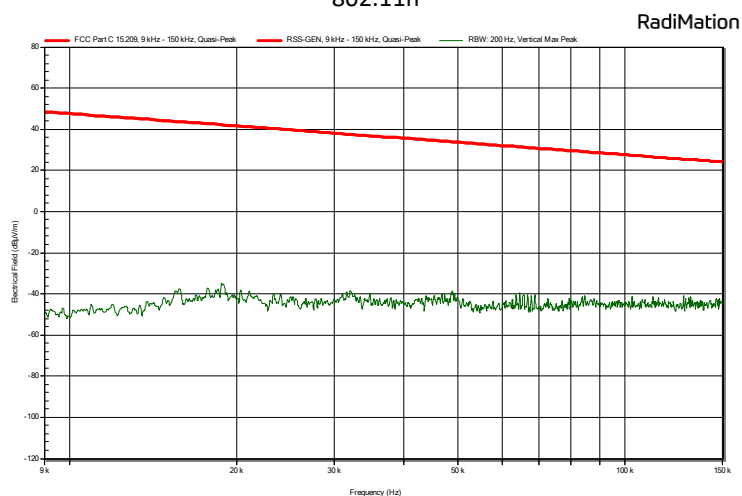


Note: Antenna parallel r, in the range 9 – 150KHz, middle channel
(pre-scan peak values shown)

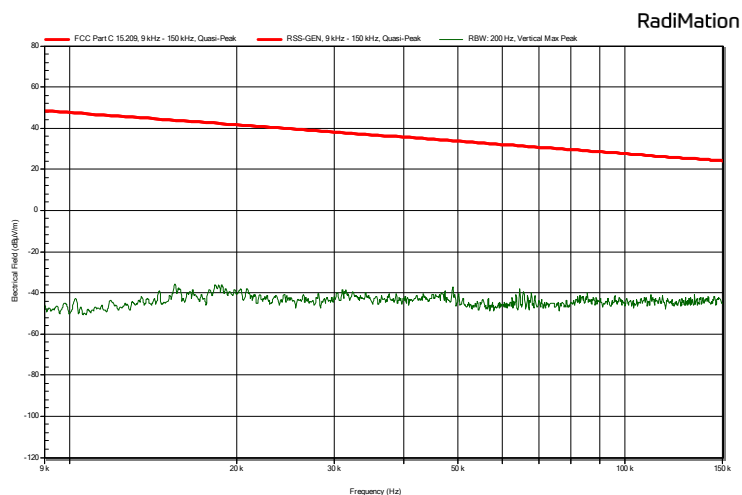


Note: Antenna parallel, in the range 9 – 150KHz, high channel
(pre-scan peak values shown)

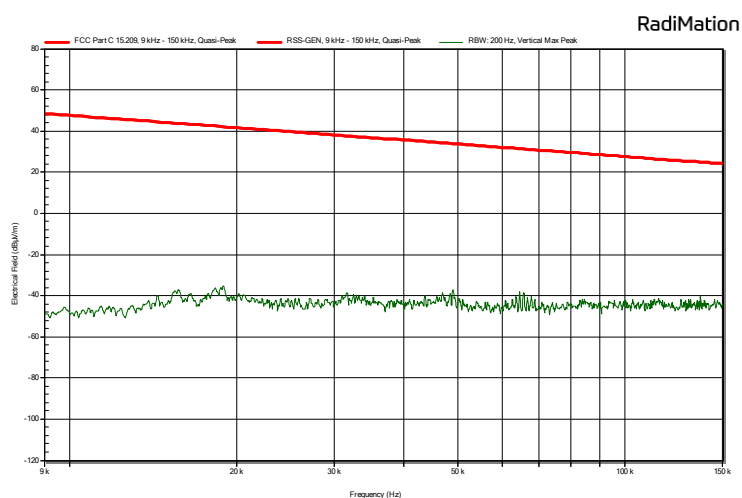
802.11n



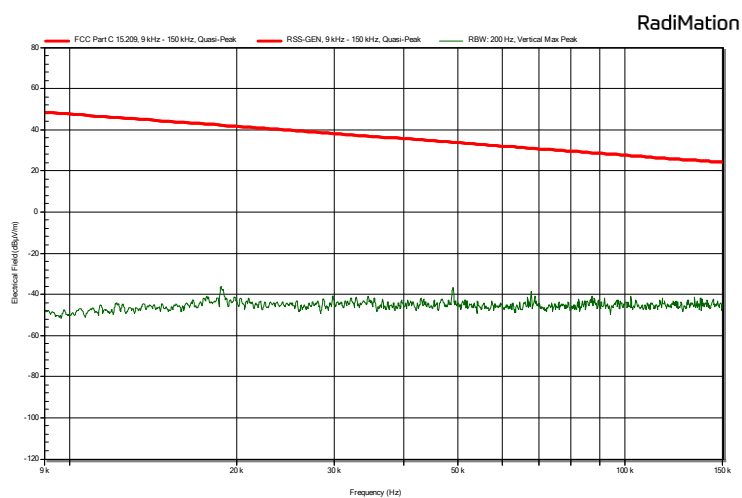
Note: Antenna perpendicular, in the range 9 – 150KHz, low channel
(pre-scan peak values shown)



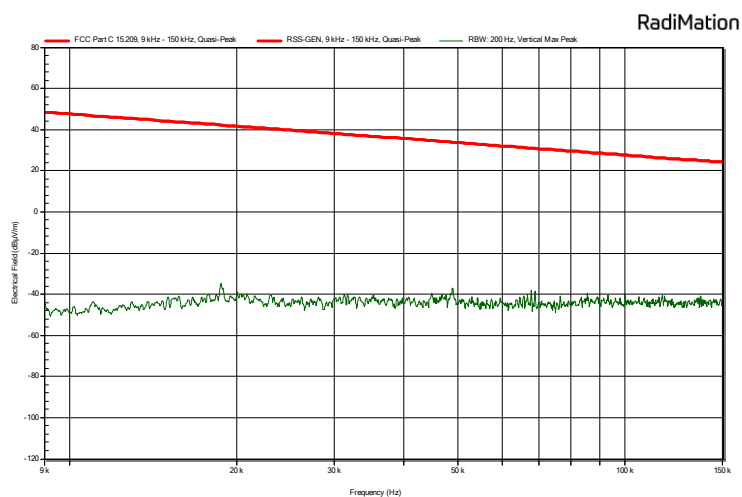
Note: Antenna perpendicular, in the range 9 – 150KHz, middle channel
(pre-scan peak values shown)



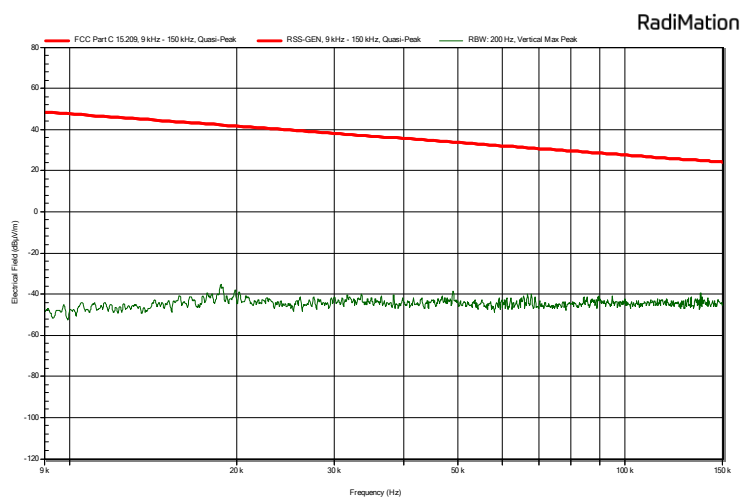
Note: Antenna perpendicular, in the range 9 – 150KHz, high channel
(pre-scan peak values shown)



Note: Antenna parallel, in the range 9 – 150KHz, low channel
(pre-scan peak values shown)



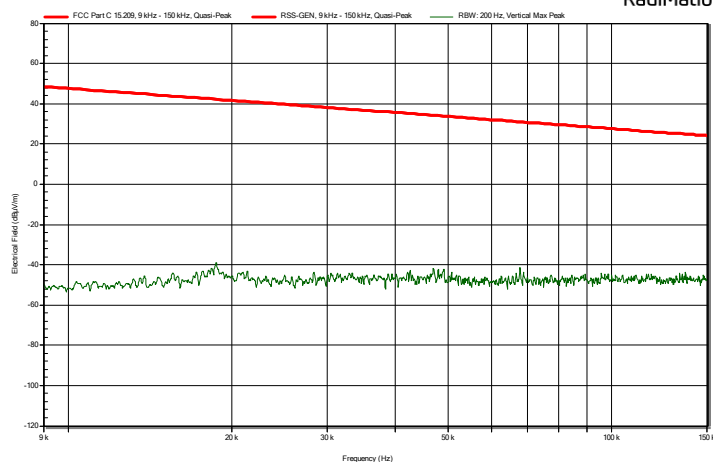
Note: Antenna parallel r, in the range 9 – 150KHz, middle channel
(pre-scan peak values shown)



Note: Antenna parallel, in the range 9 – 150KHz, high channel
(pre-scan peak values shown)

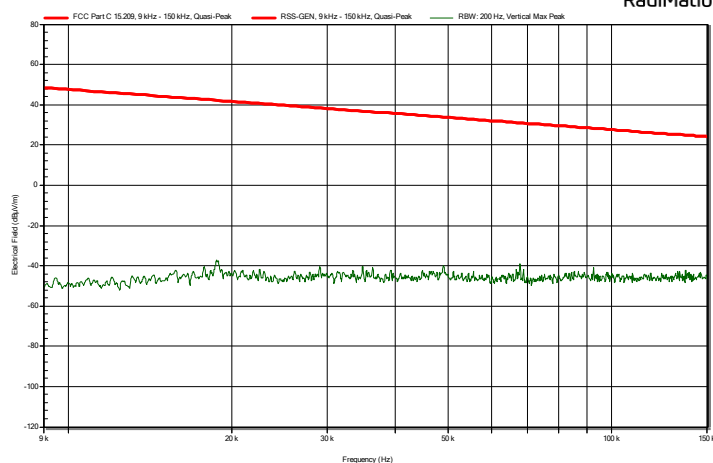
BT BR/EDR

RadiMation



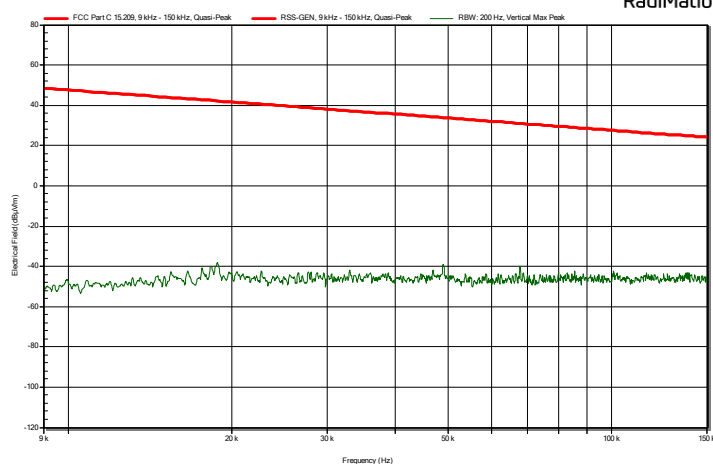
Note: Antenna perpendicular, in the range 9 – 150KHz, low channel
(pre-scan peak values shown)

RadiMation

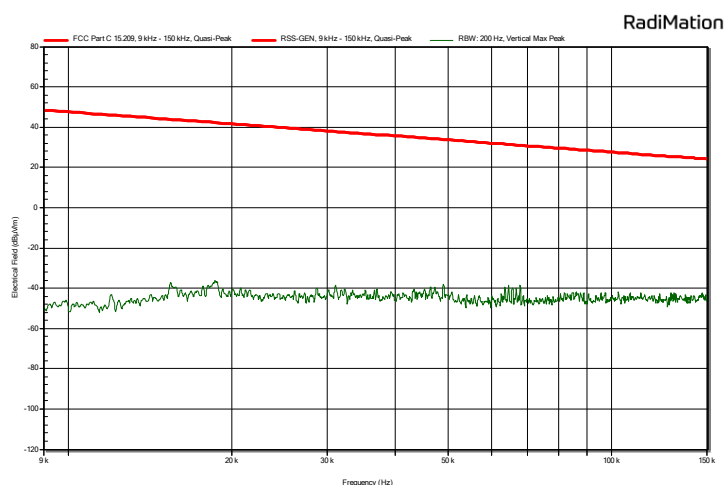


Note: Antenna perpendicular, in the range 9 – 150KHz, middle channel
(pre-scan peak values shown)

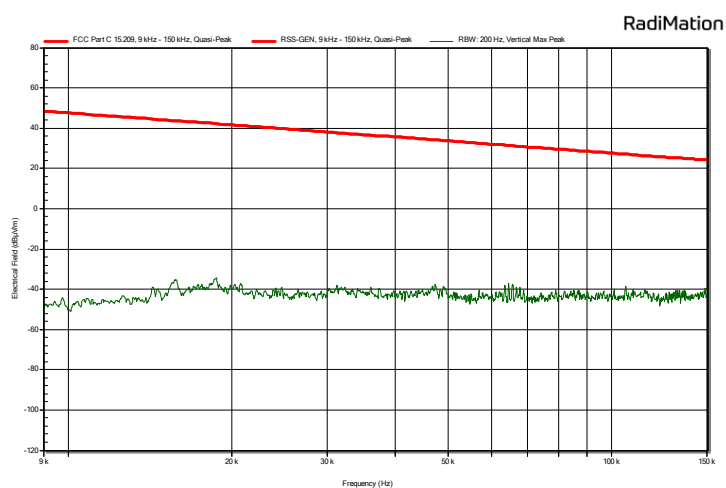
RadiMation



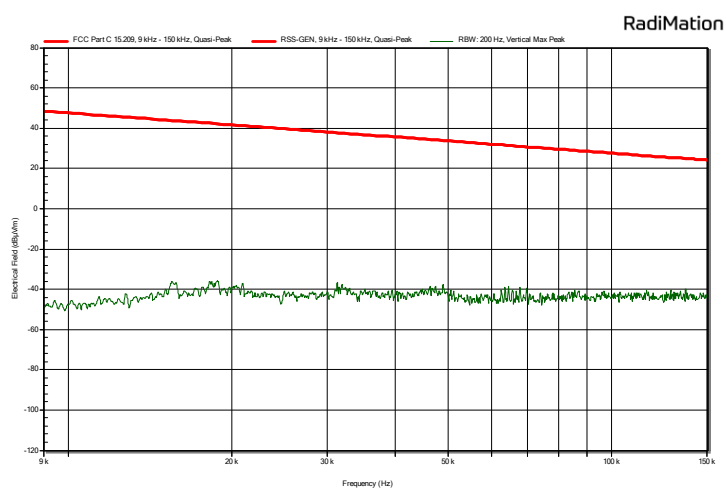
Note: Antenna perpendicular, in the range 9 – 150KHz, high channel
(pre-scan peak values shown)



Note: Antenna parallel, in the range 9 – 150KHz, low channel
(pre-scan peak values shown)



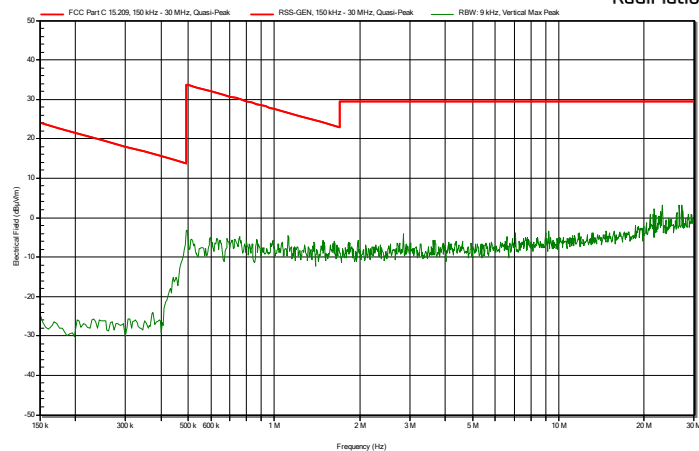
Note: Antenna parallel r, in the range 9 – 150KHz, middle channel
(pre-scan peak values shown)



Note: Antenna parallel, in the range 9 – 150KHz, high channel
(pre-scan peak values shown)

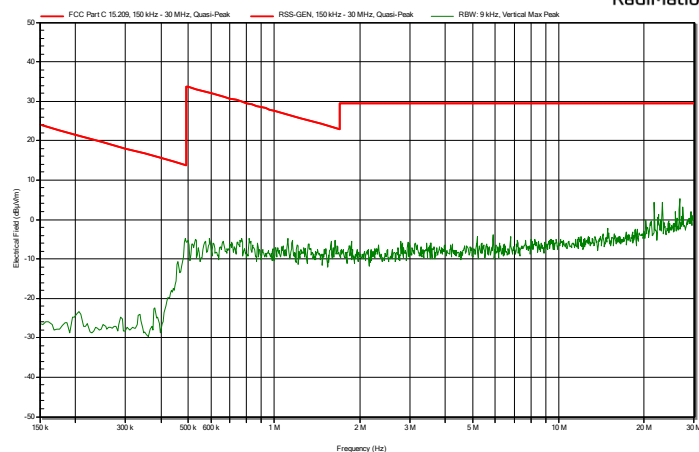
BLE

RadiMation



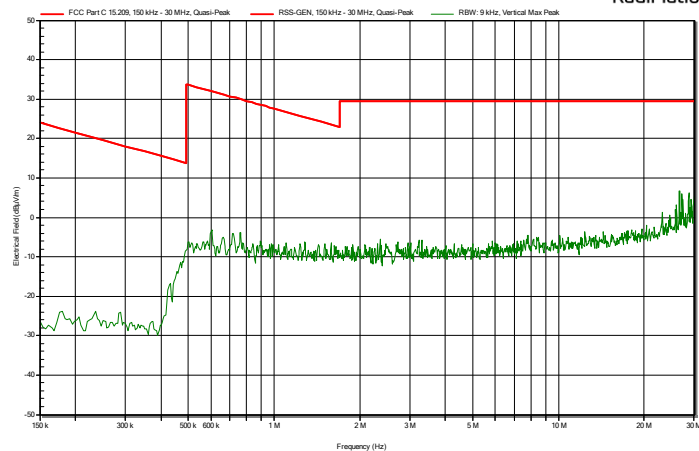
Antenna perpendicular, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)

RadiMation

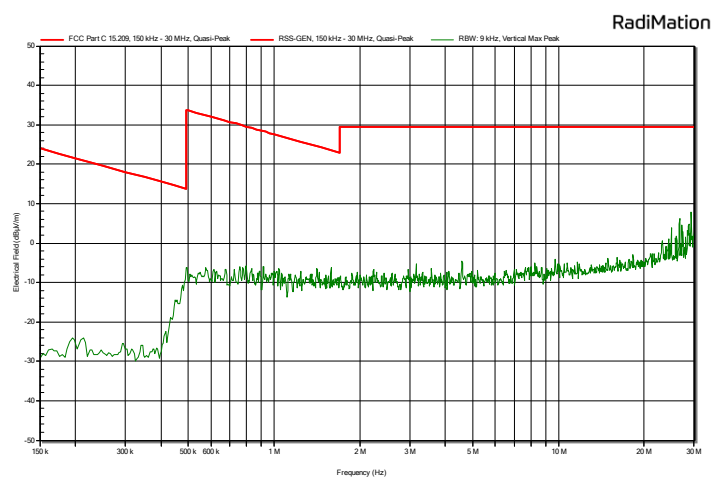


Antenna perpendicular, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)

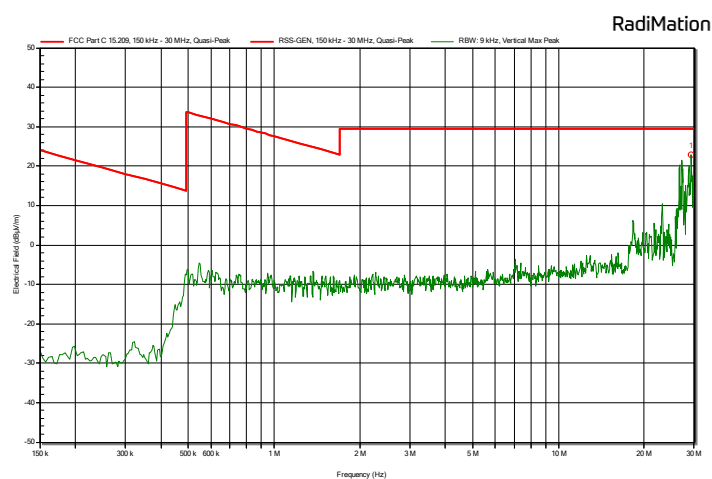
RadiMation



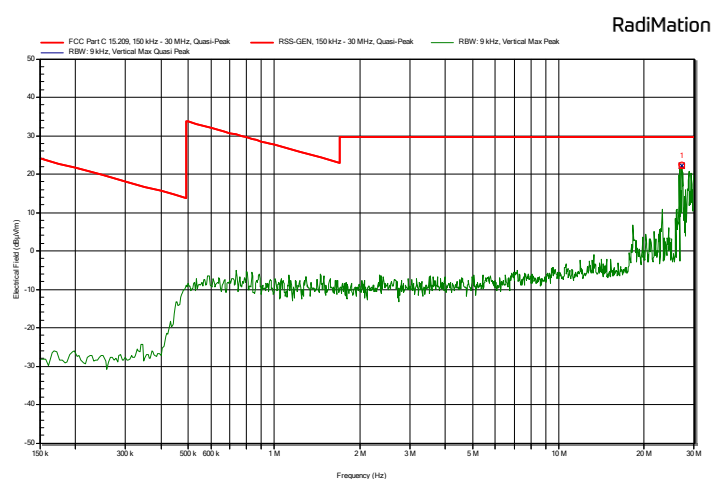
Antenna perpendicular, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)



Antenna parallel, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)

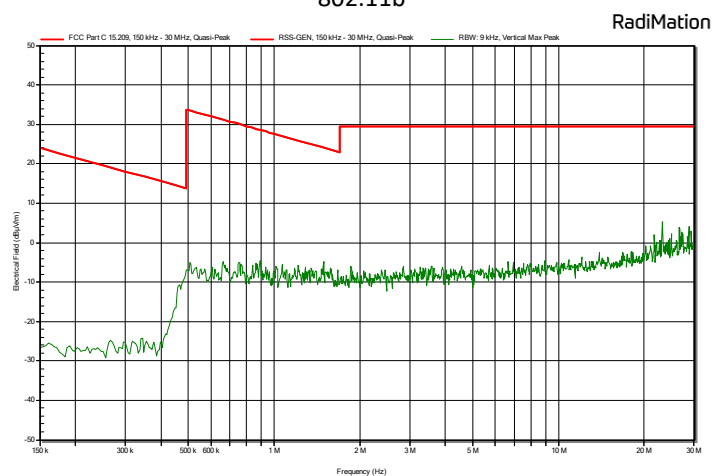


Antenna parallel, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)

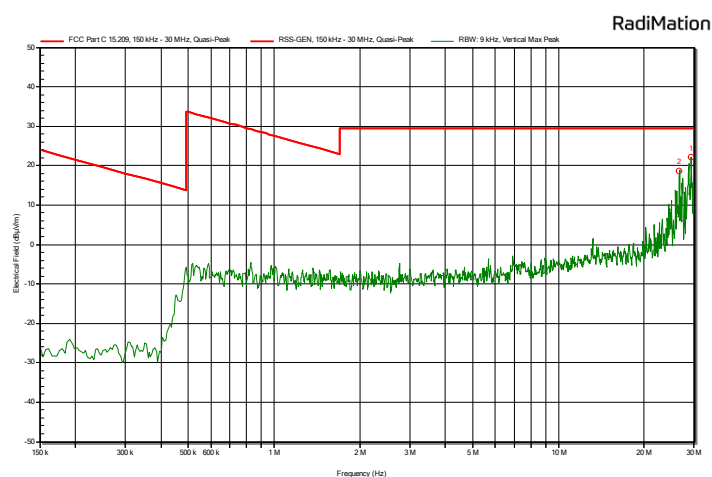


Antenna parallel, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)

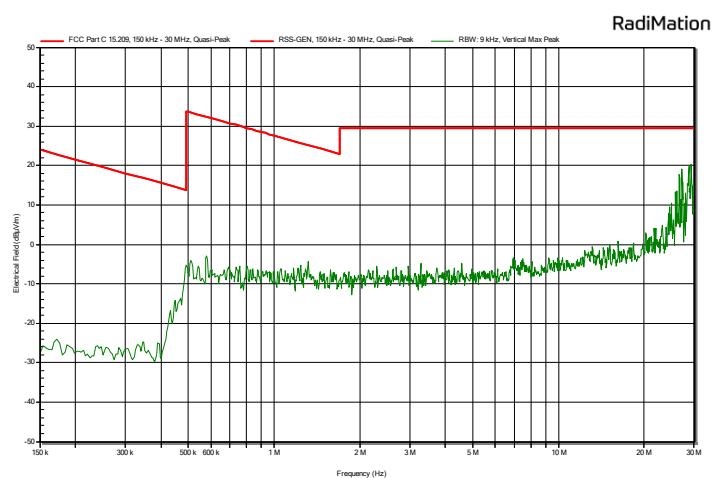
802.11b



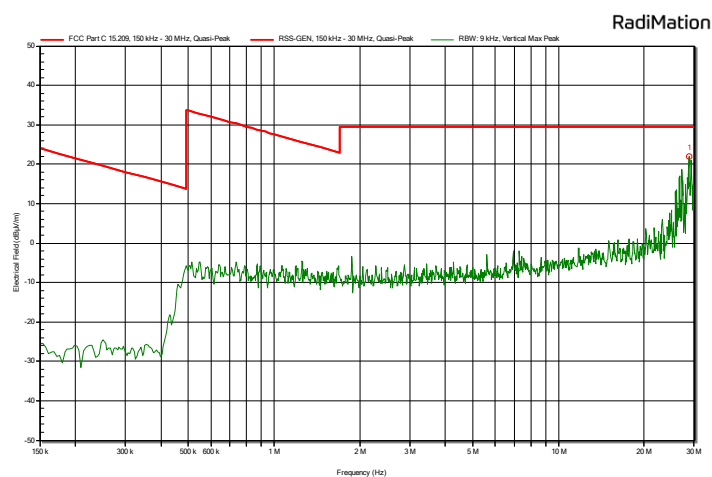
Antenna perpendicular, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)



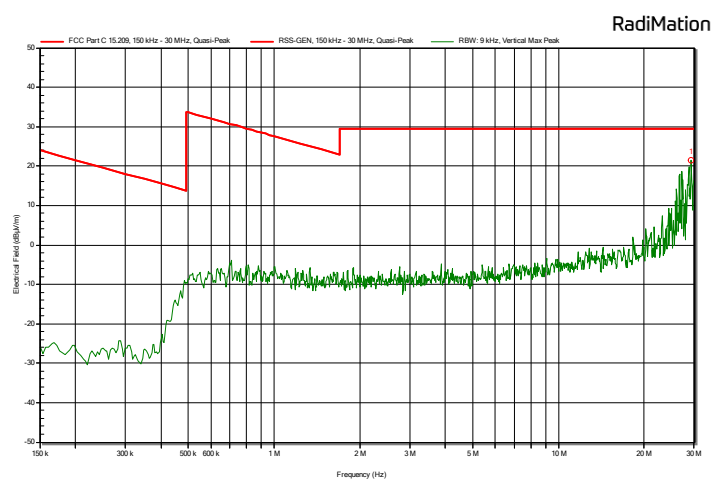
Antenna perpendicular, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)



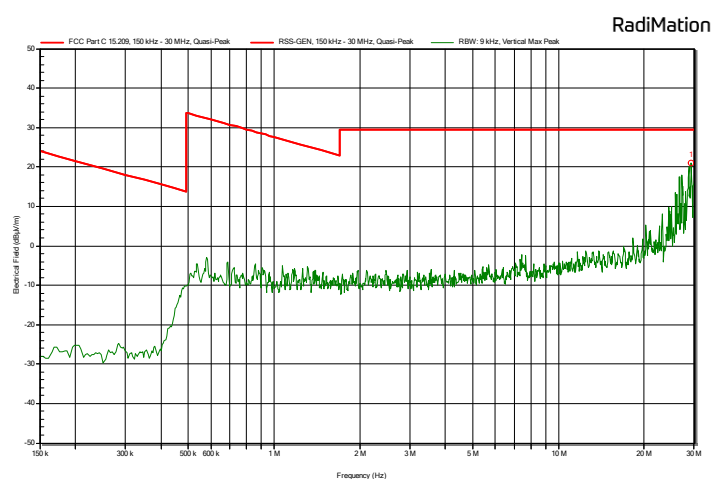
Antenna perpendicular, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)



Antenna parallel, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)

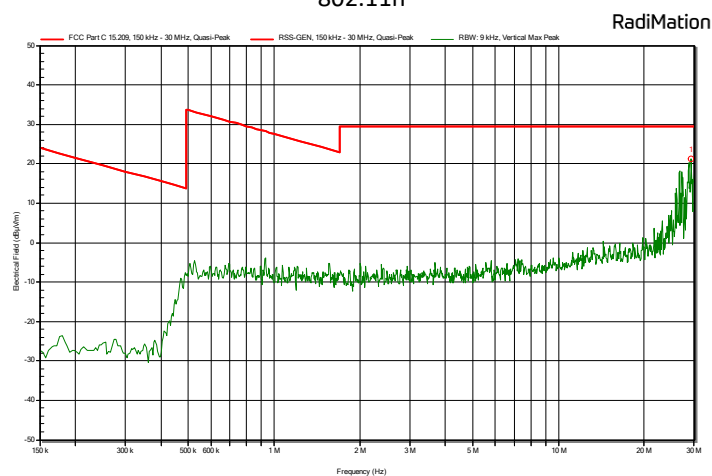


Antenna parallel, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)

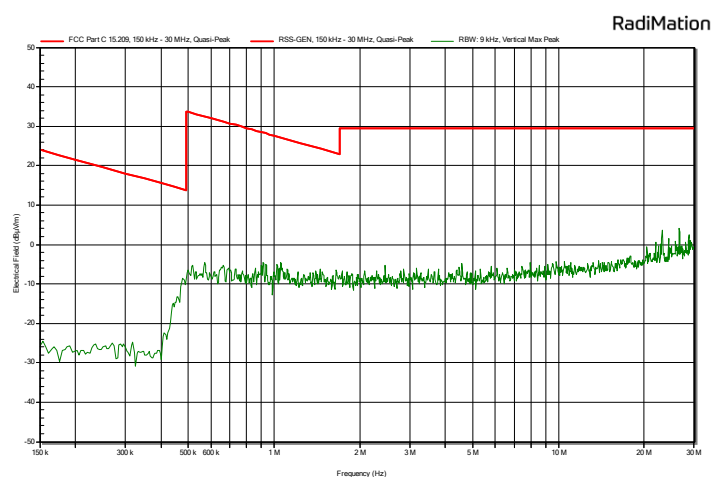


Antenna parallel, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)

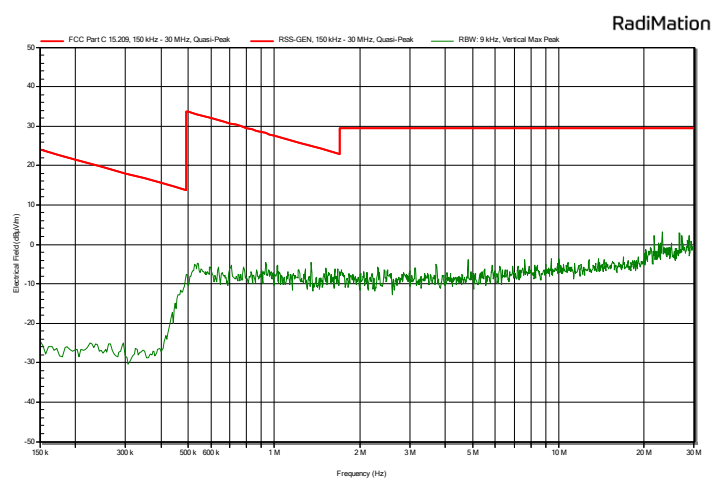
802.11n



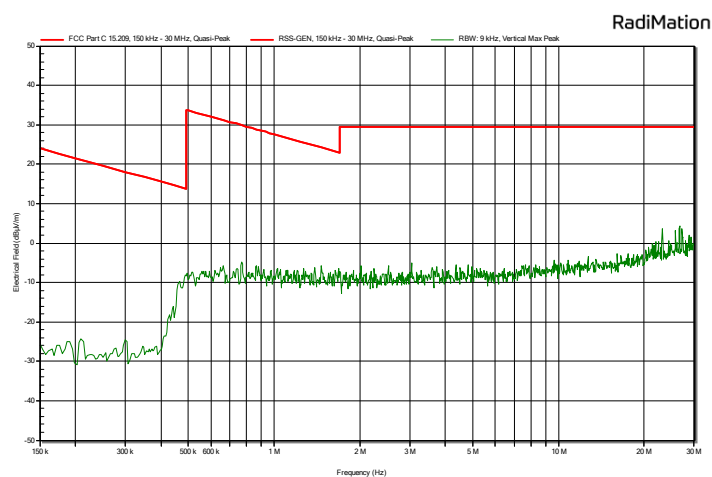
Antenna perpendicular, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)



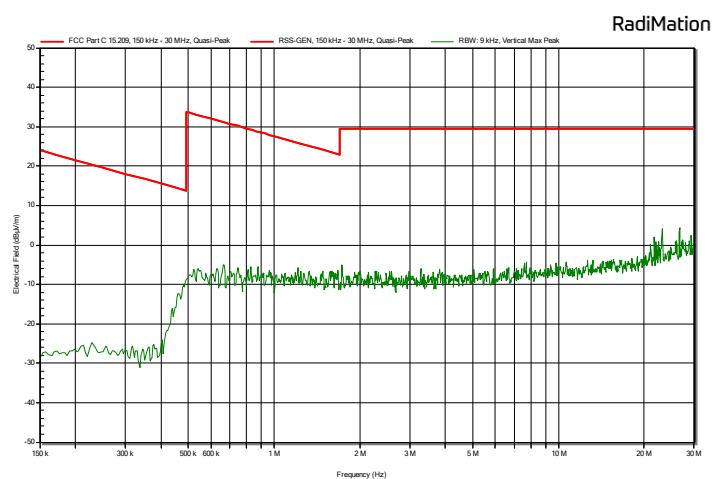
Antenna perpendicular, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)



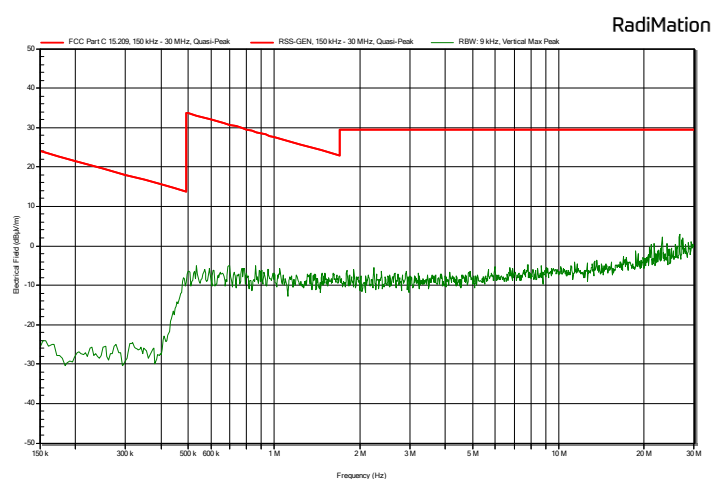
Antenna perpendicular, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)



Antenna parallel, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)

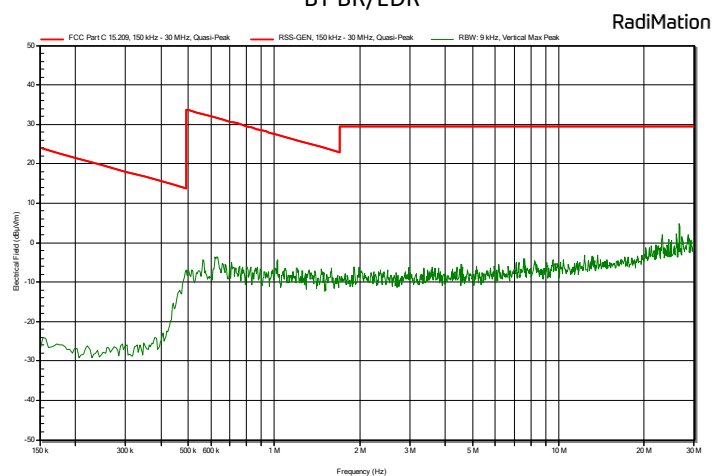


Antenna parallel, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)

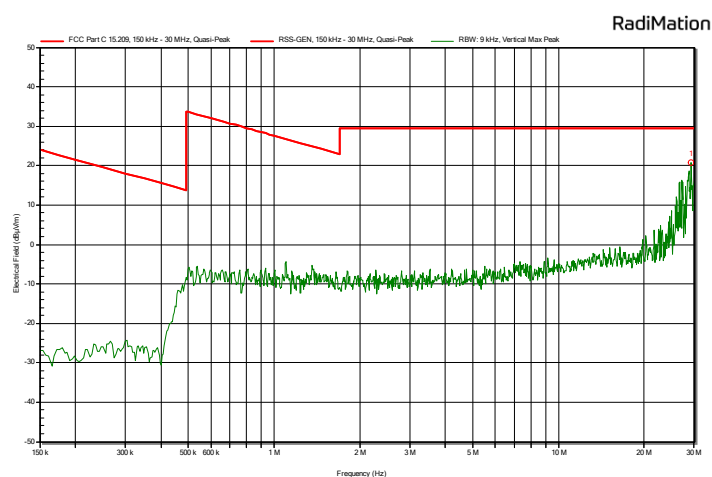


Antenna parallel, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)

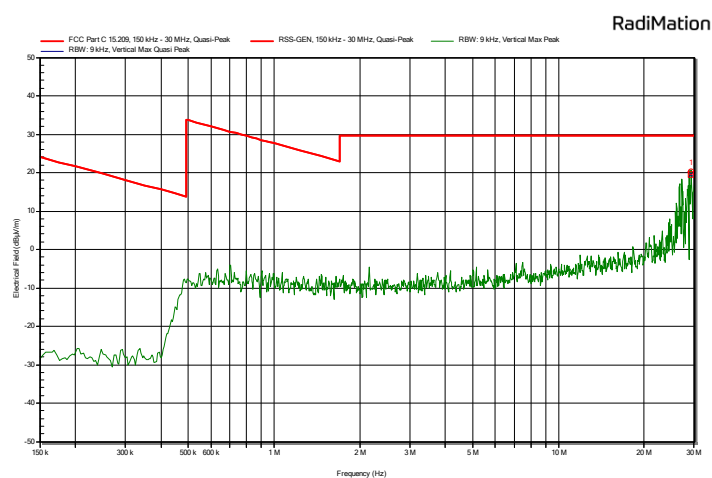
BT BR/EDR



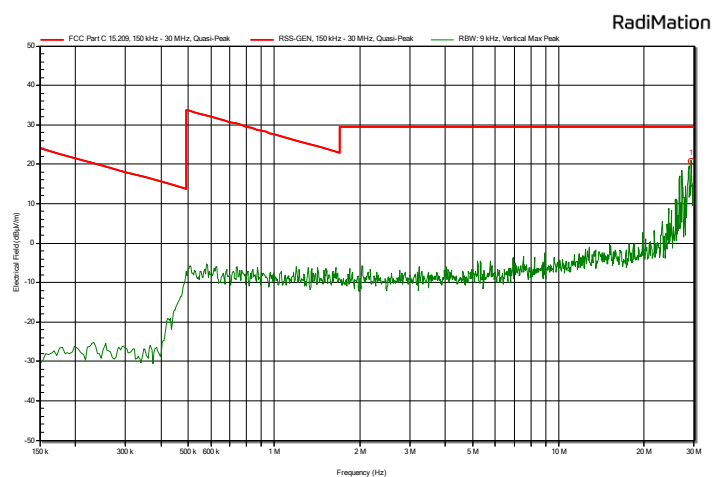
Antenna perpendicular, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)



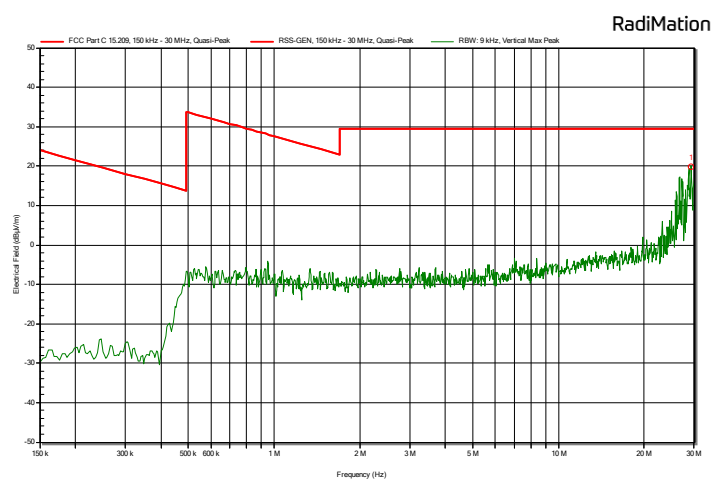
Antenna perpendicular, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)



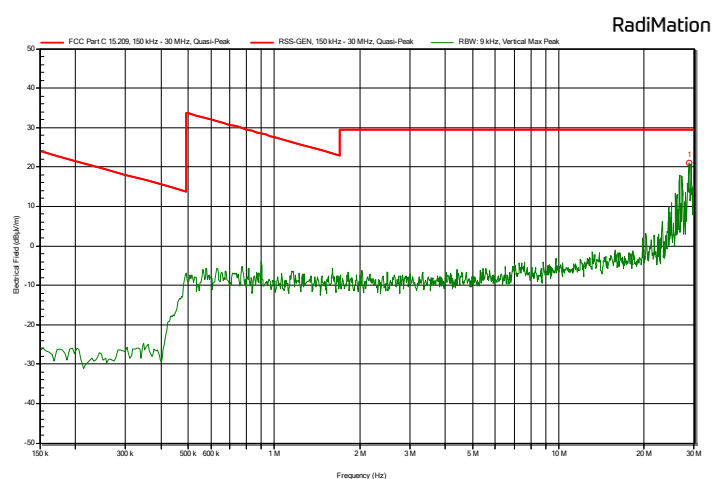
Antenna perpendicular, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)



Antenna parallel, in the range 150KHz-30 MHz, low channel
(pre-scan peak values shown)



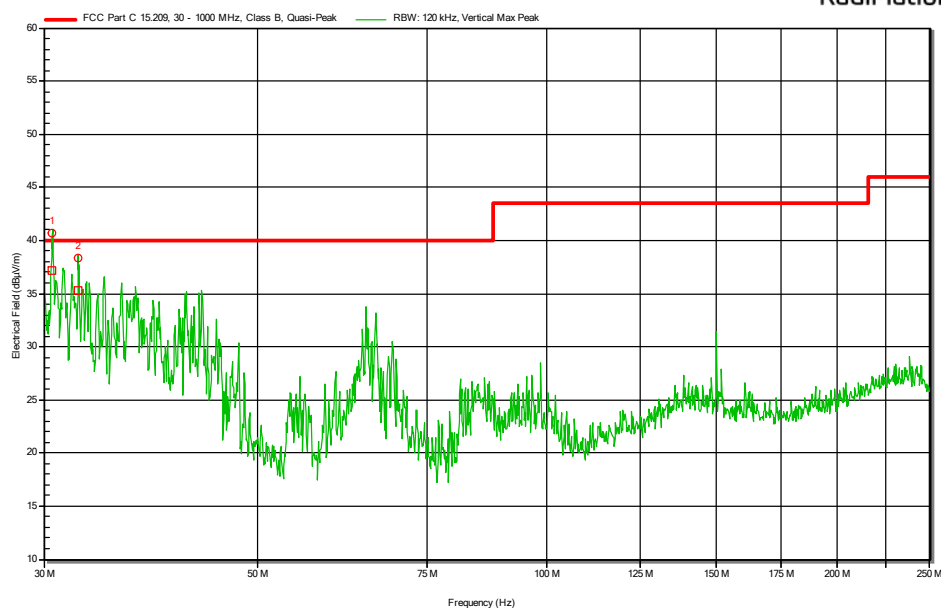
Antenna parallel, in the range 150KHz-30 MHz, middle channel
(pre-scan peak values shown)



Antenna parallel, in the range 150KHz-30 MHz, high channel
(pre-scan peak values shown)

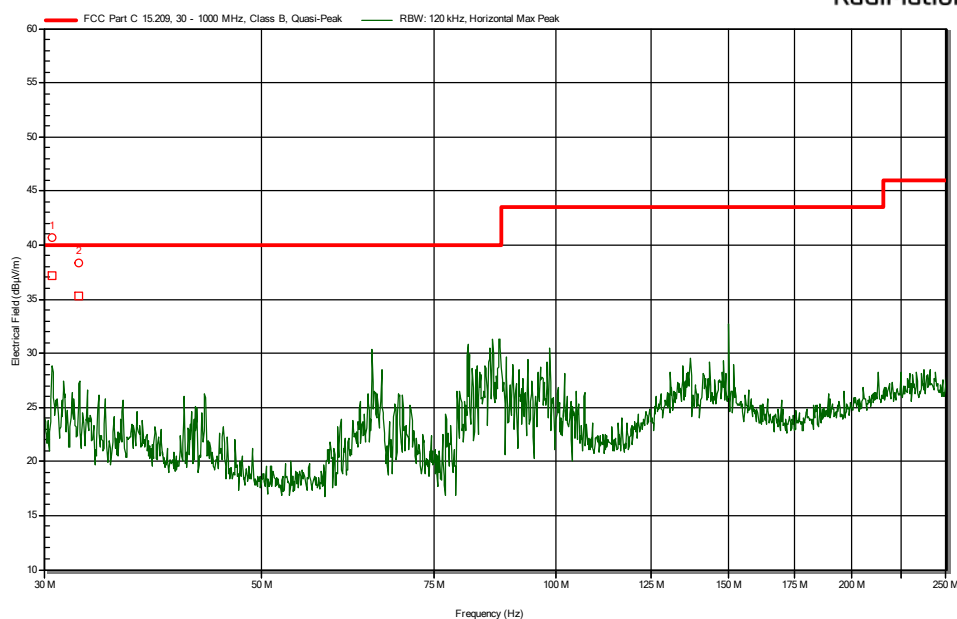
BLE

RadiMation

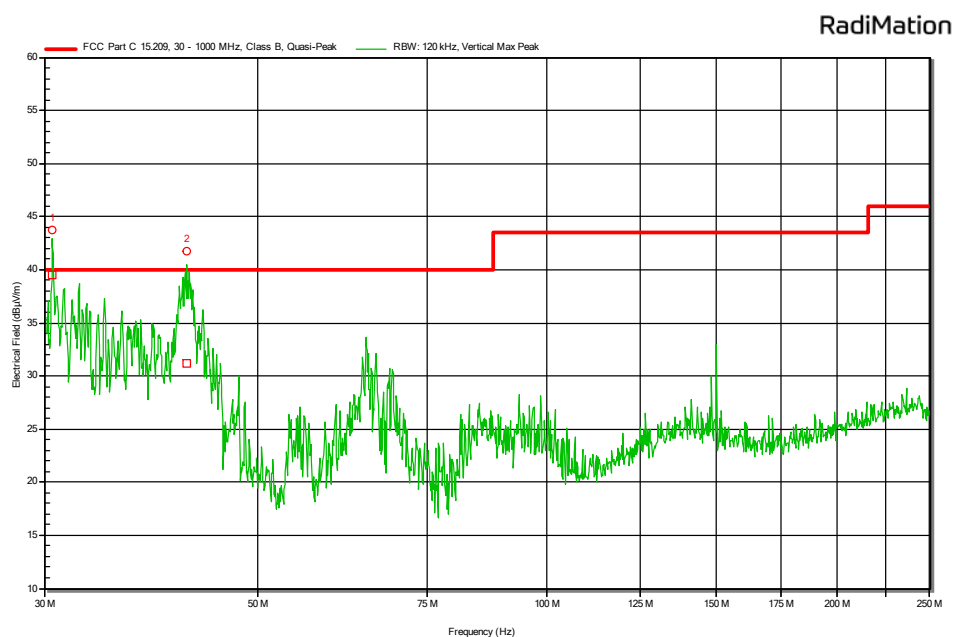


Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel

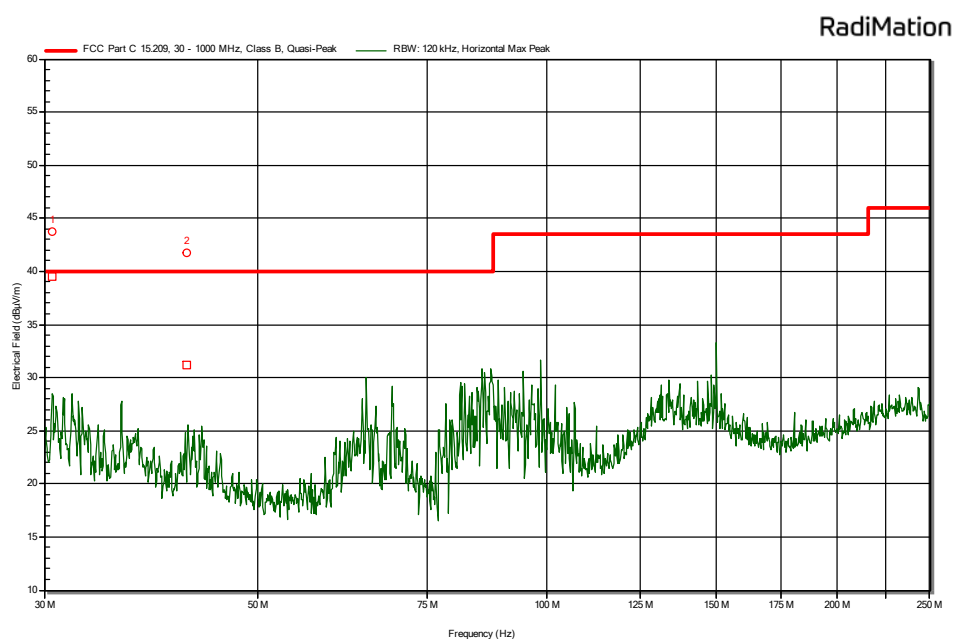
RadiMation



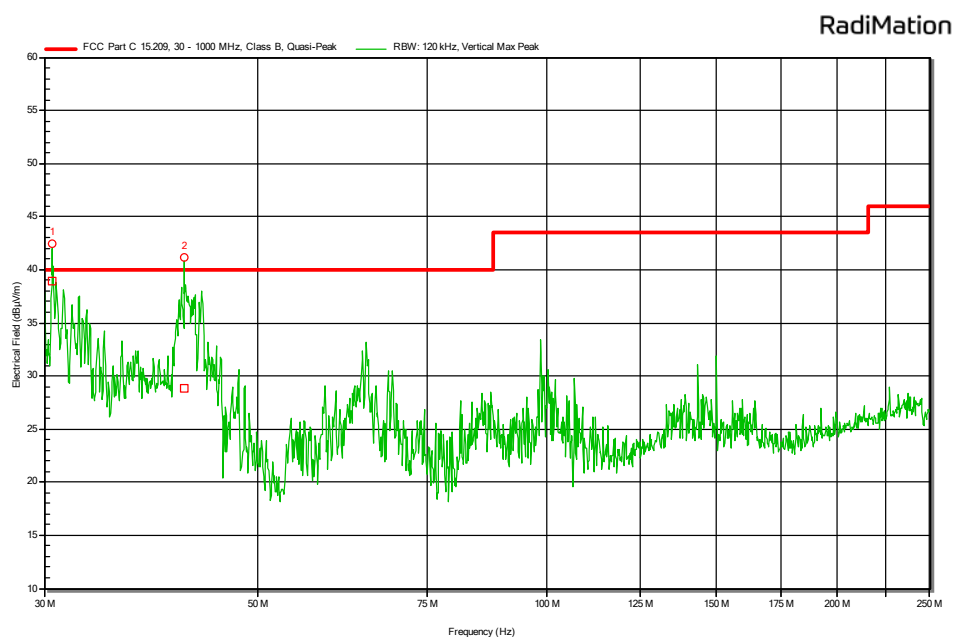
Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel



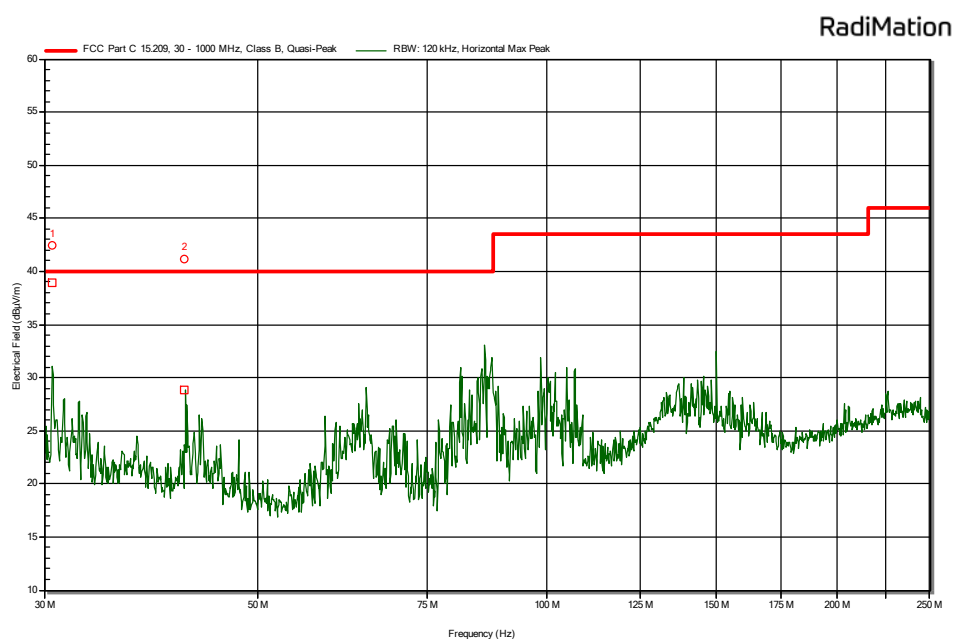
Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel



Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel



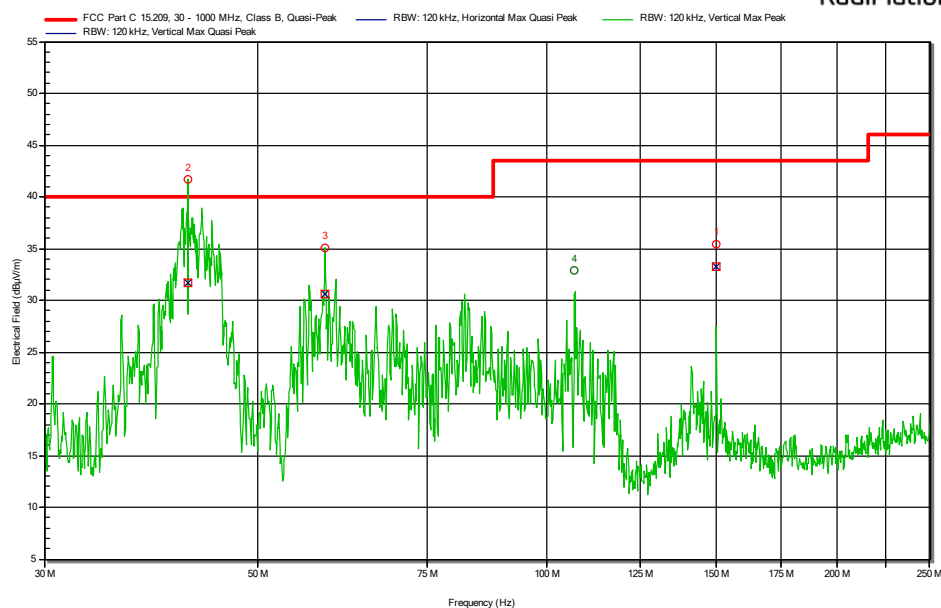
Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel

802.11b

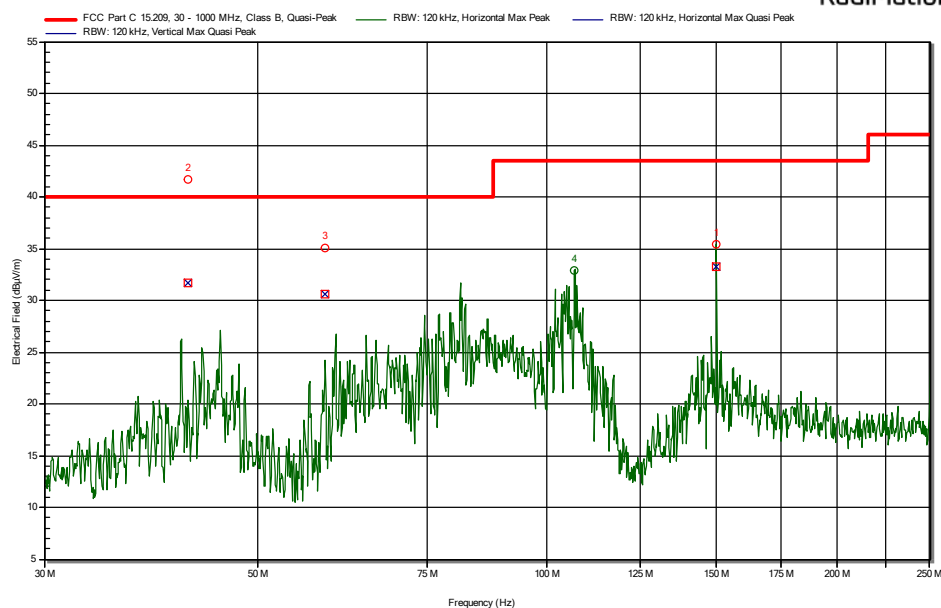
RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)

Low channel

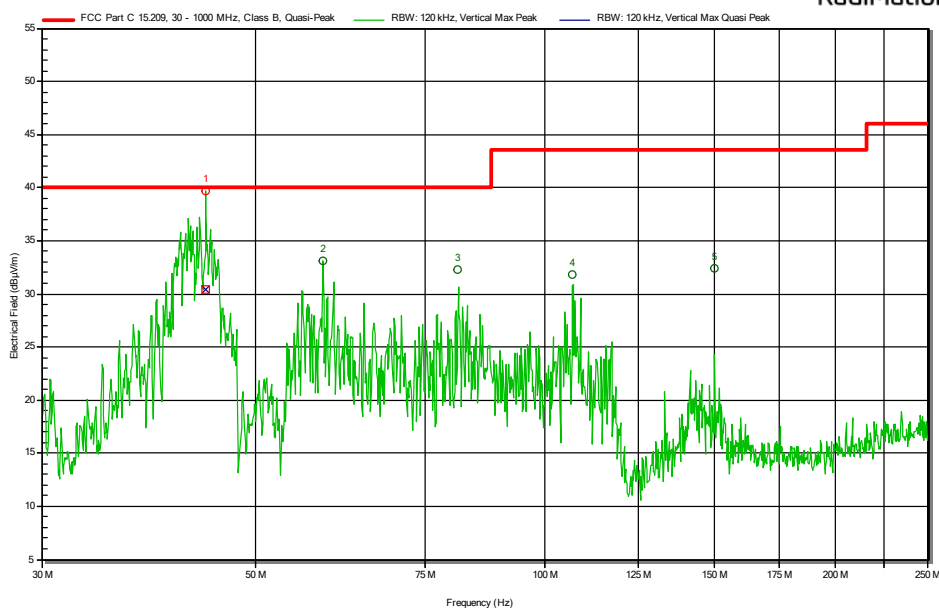
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)

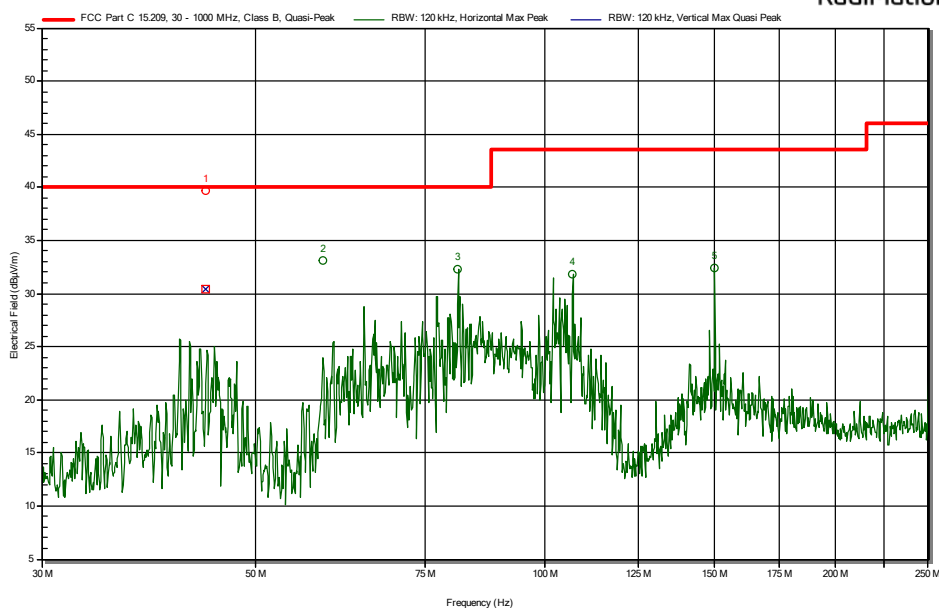
Low channel

RadiMation



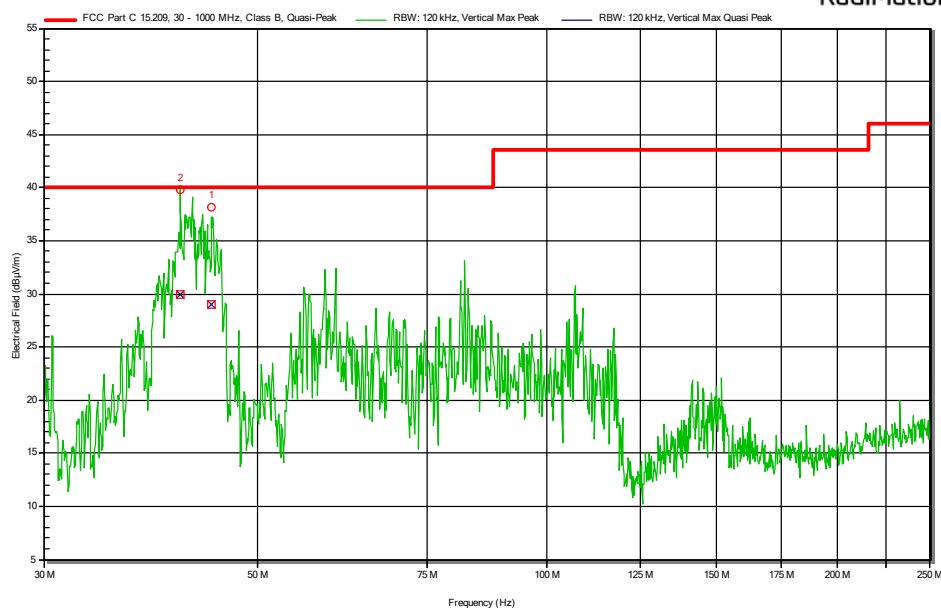
Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



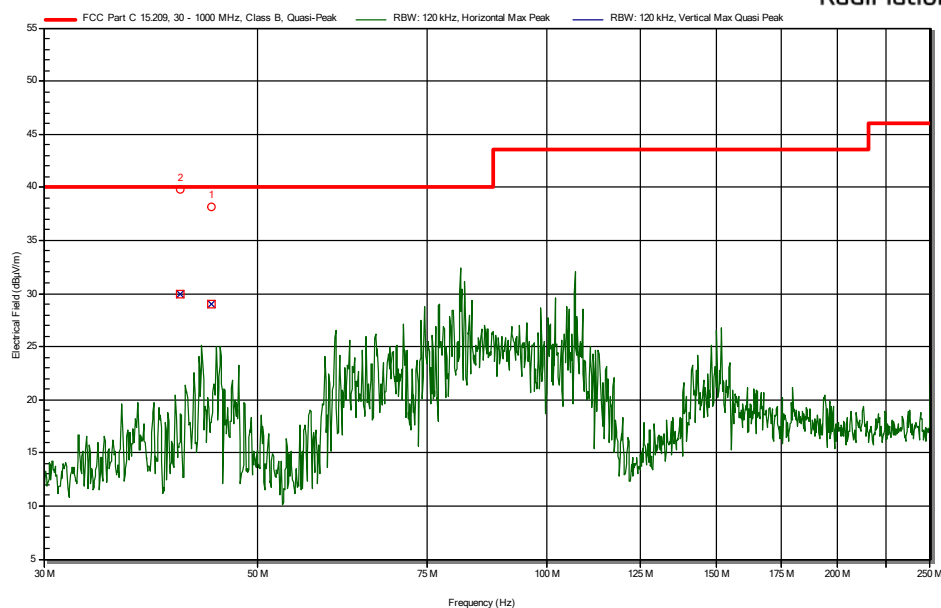
Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel

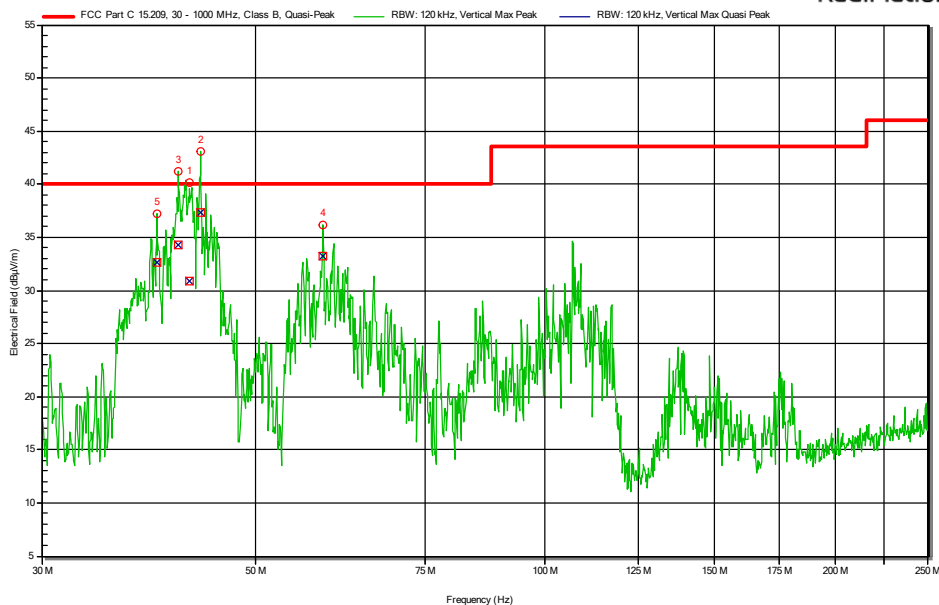
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel

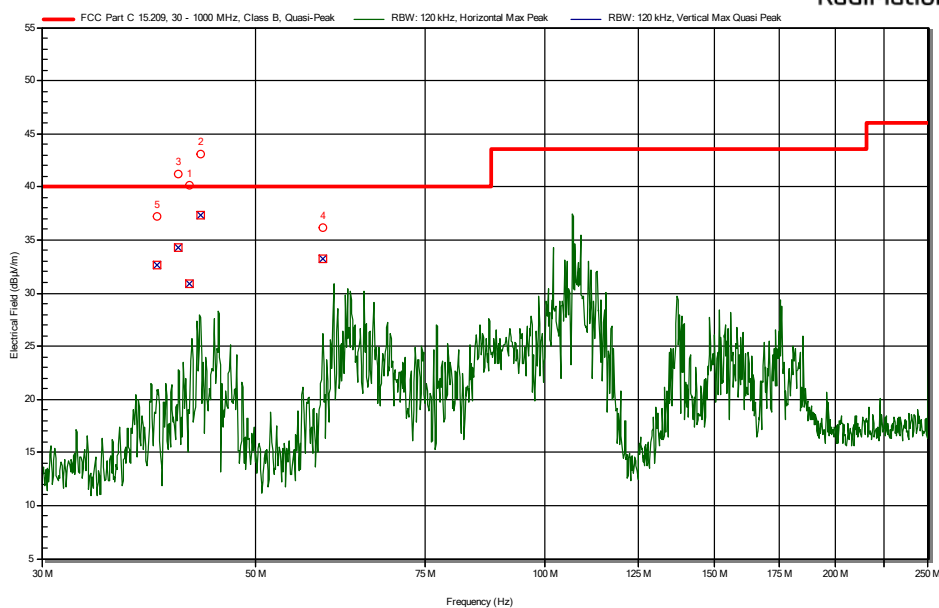
802.11n

RadiMation



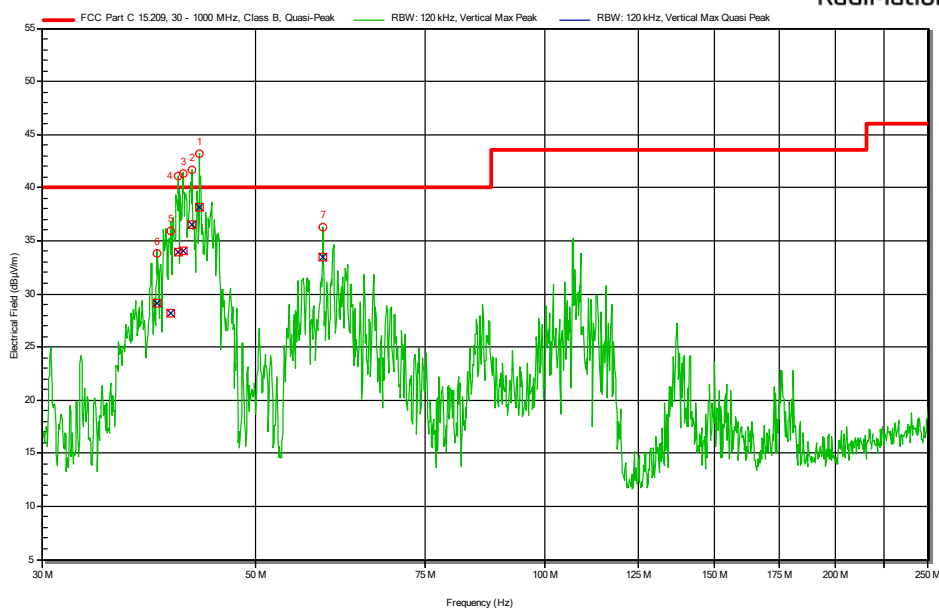
Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel

RadiMation



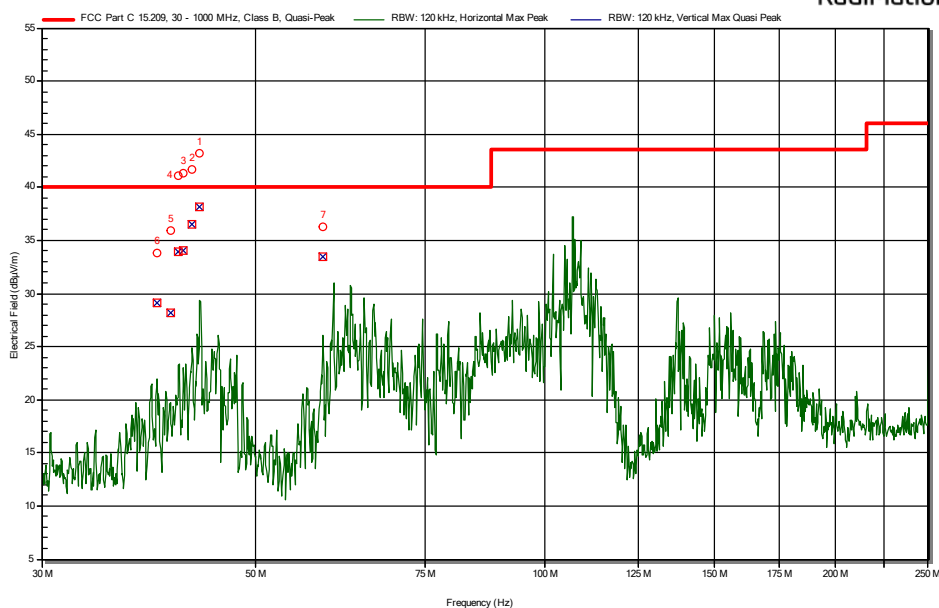
Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel

RadiMation



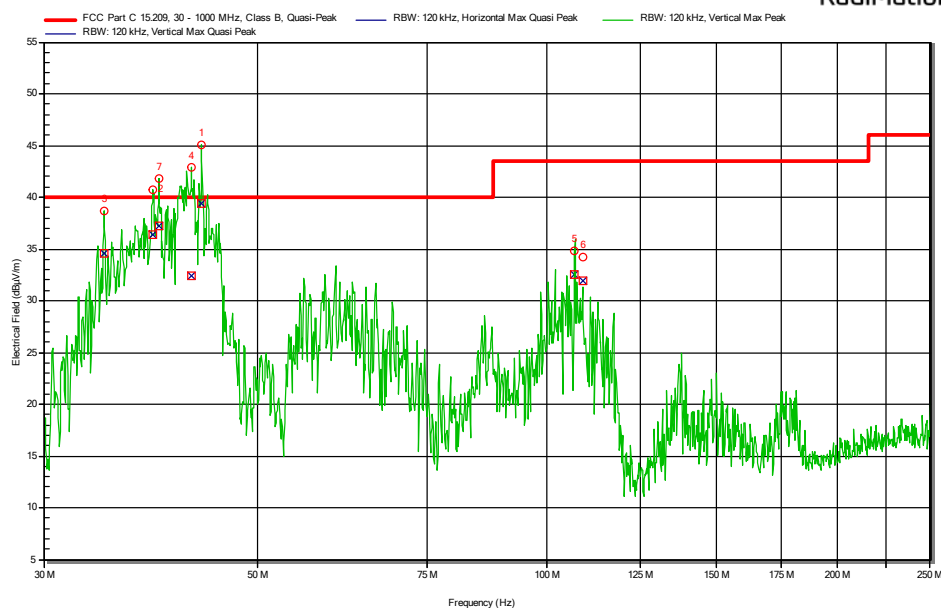
Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



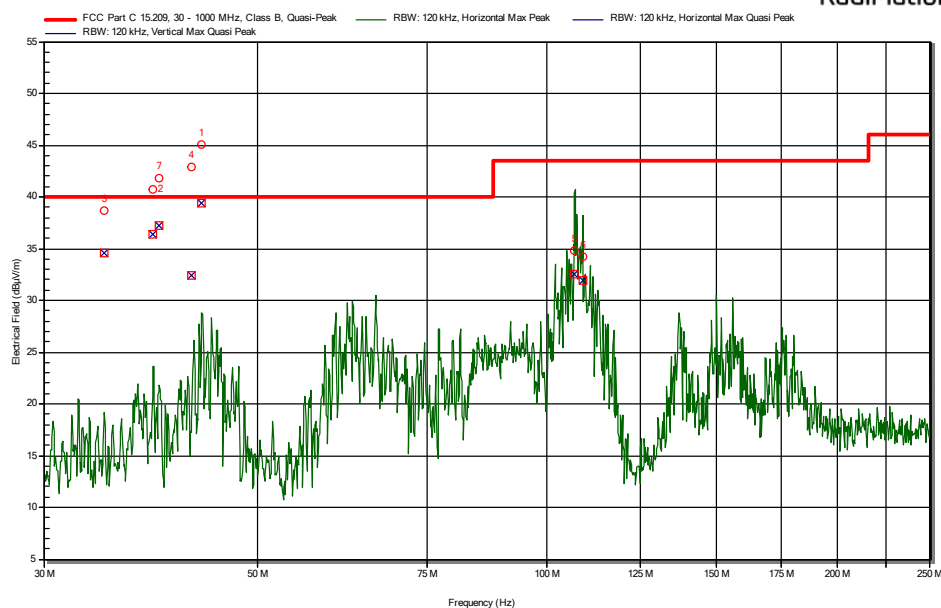
Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel

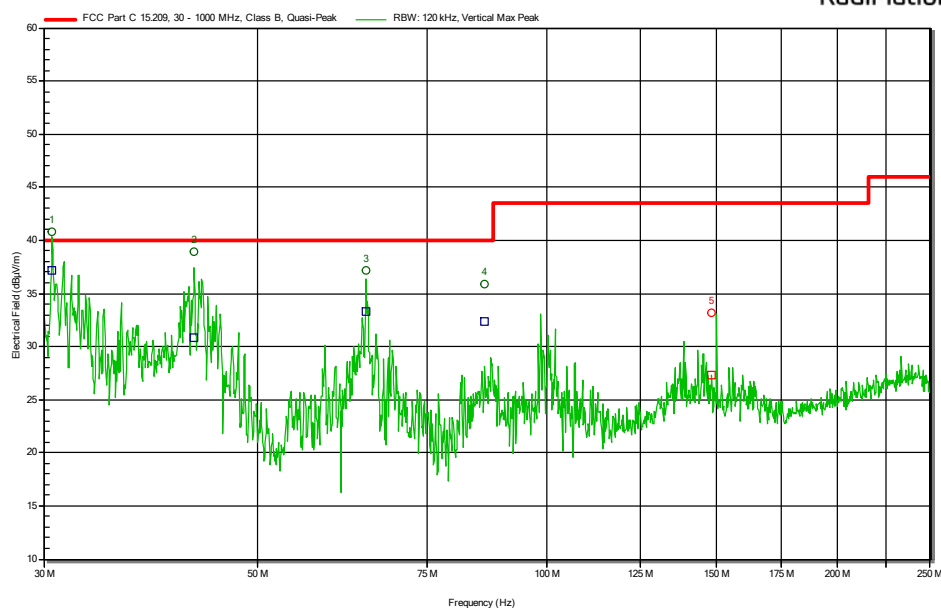
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel

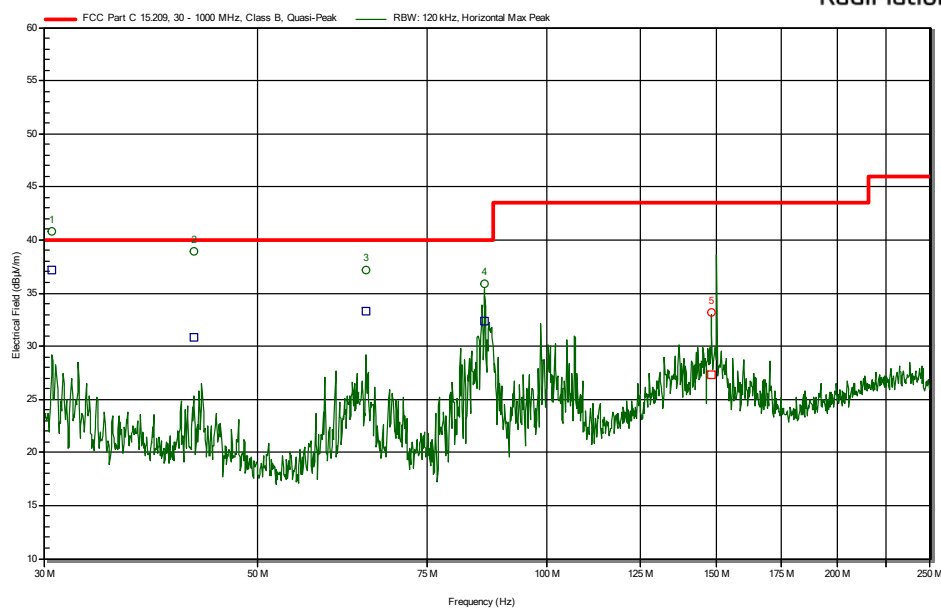
BT BR/EDR

RadiMation



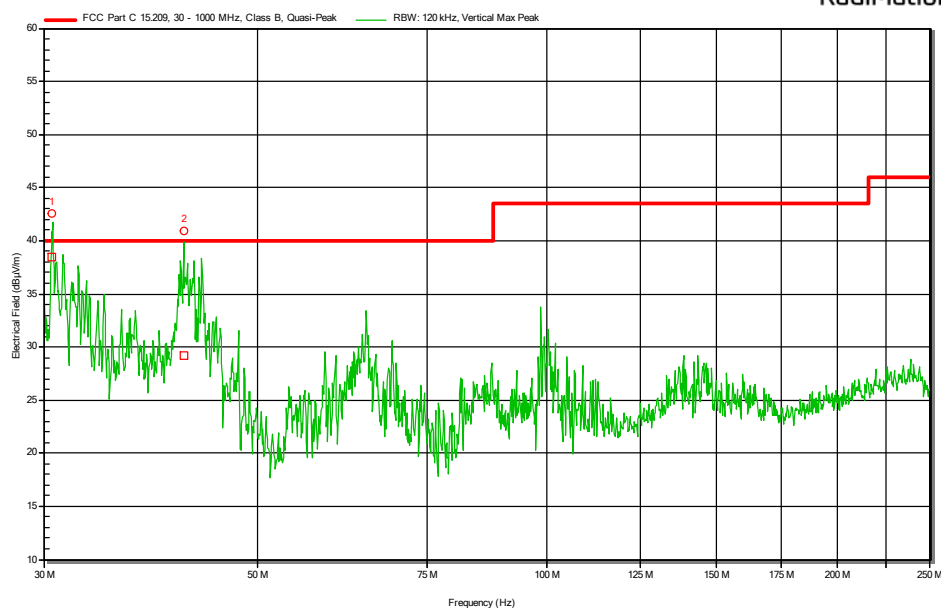
Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel

RadiMation



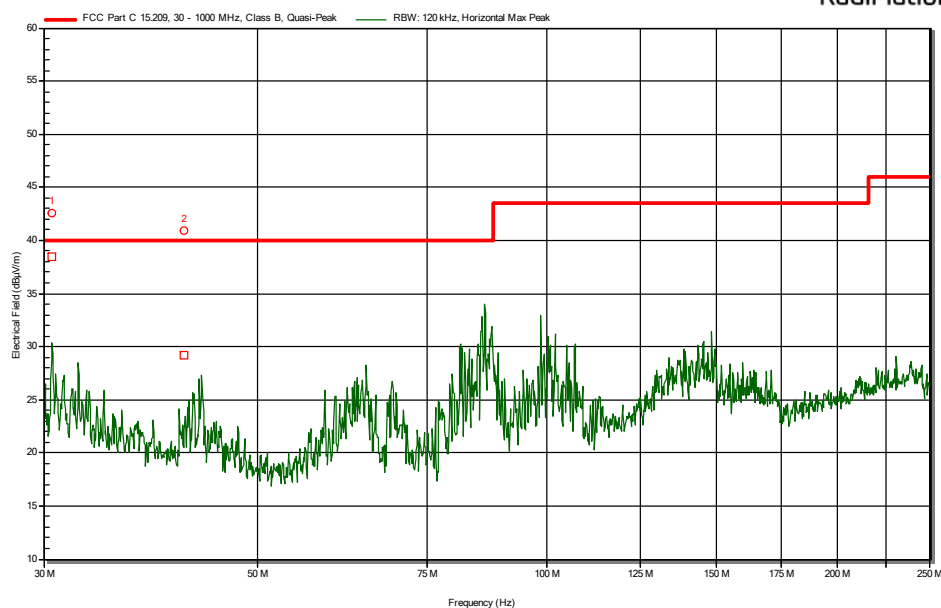
Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel

RadiMation

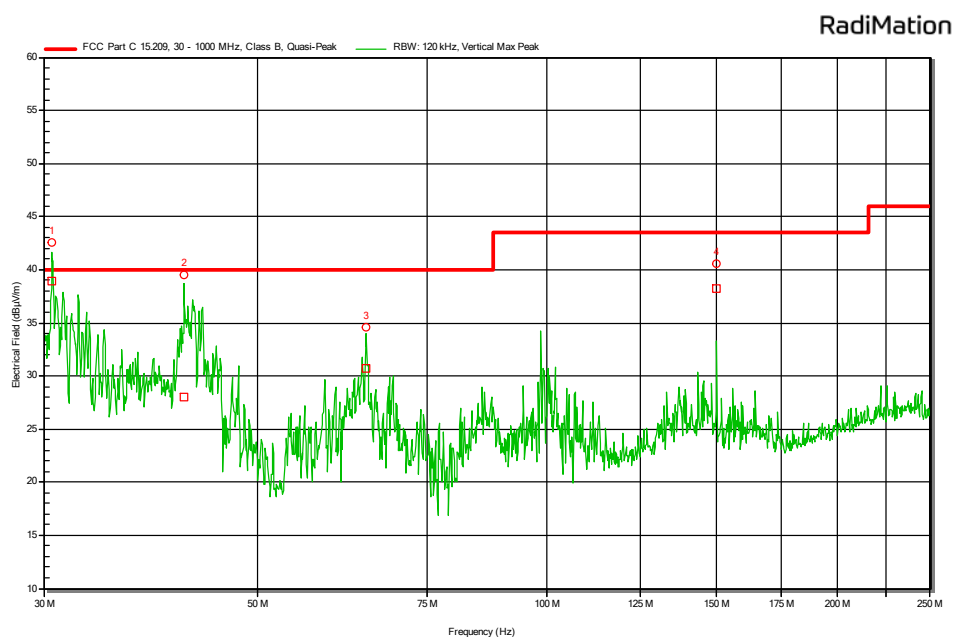


Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel

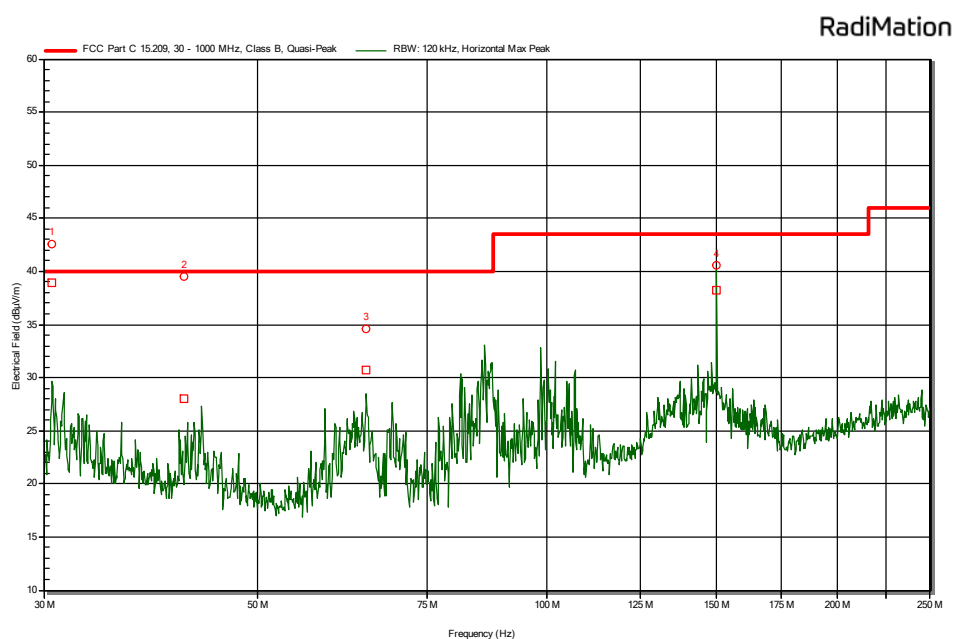
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel



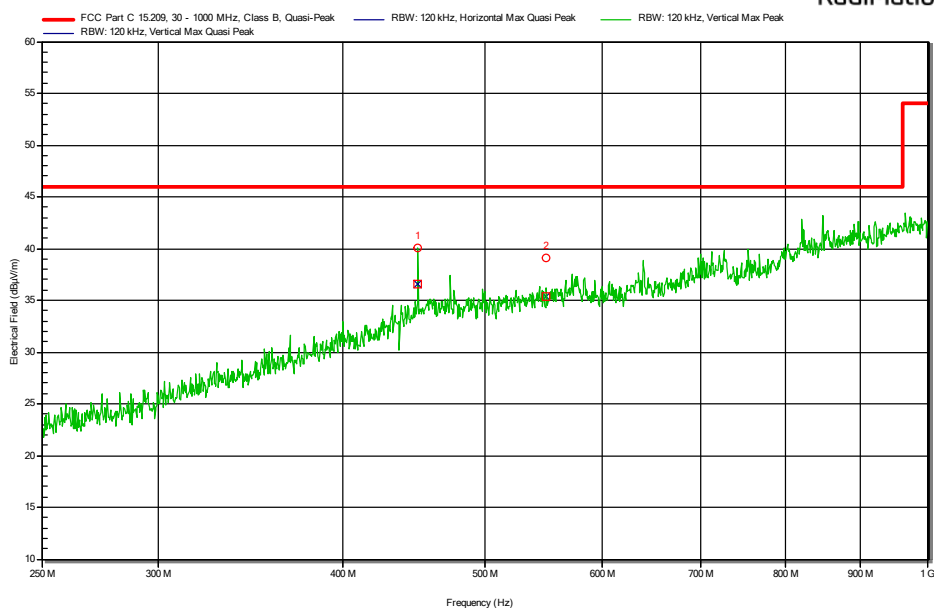
Radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel

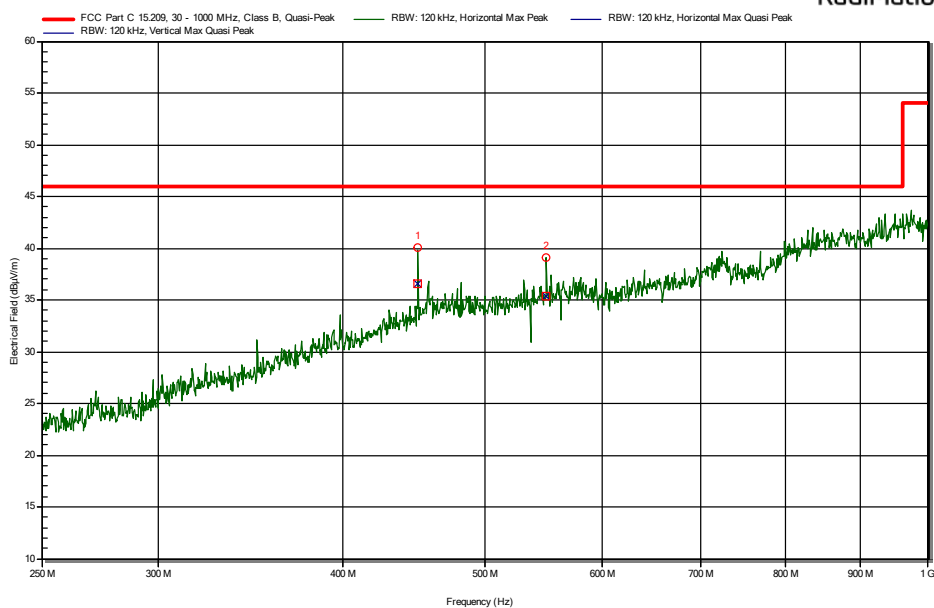
BLE

RadiMation



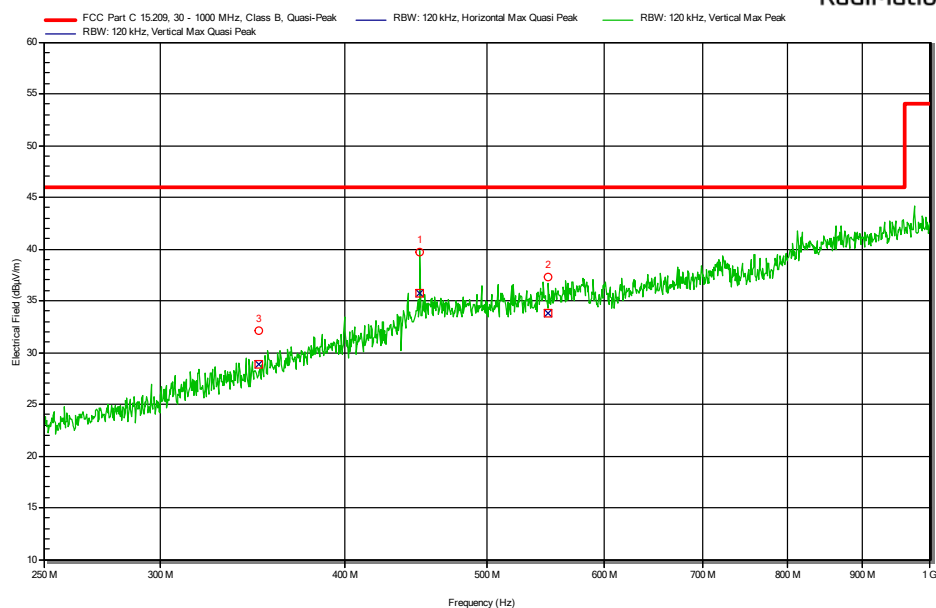
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel

RadiMation



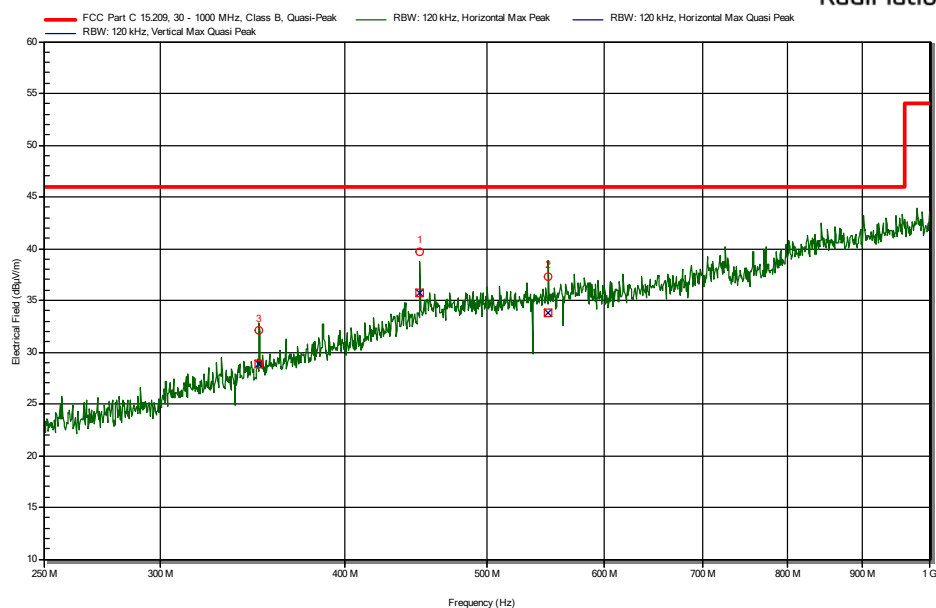
Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel

RadiMation



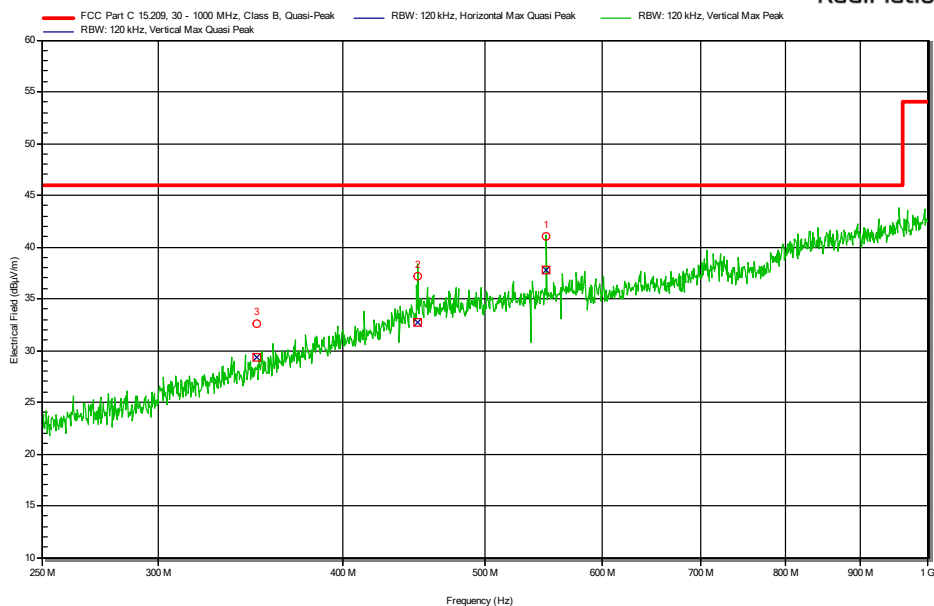
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



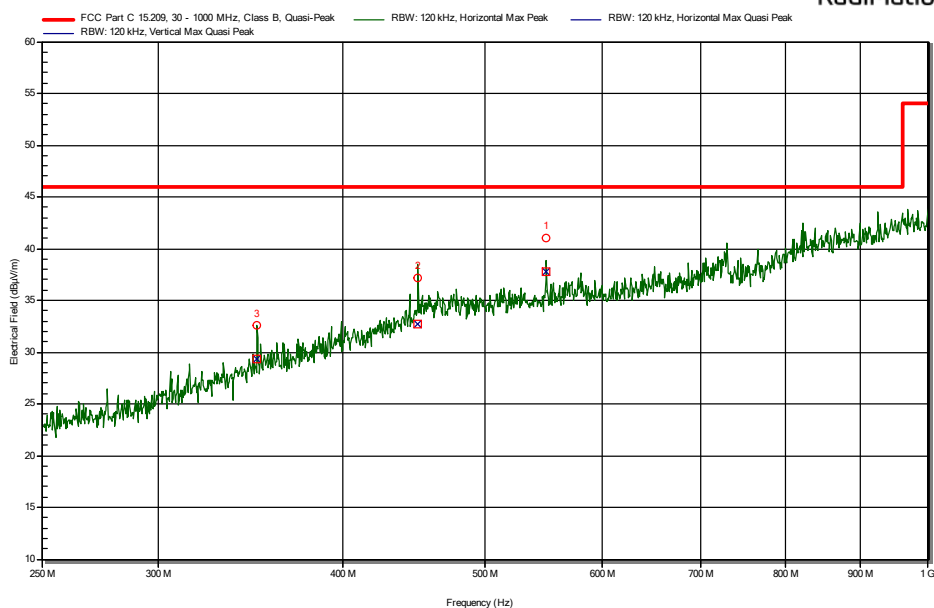
Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel

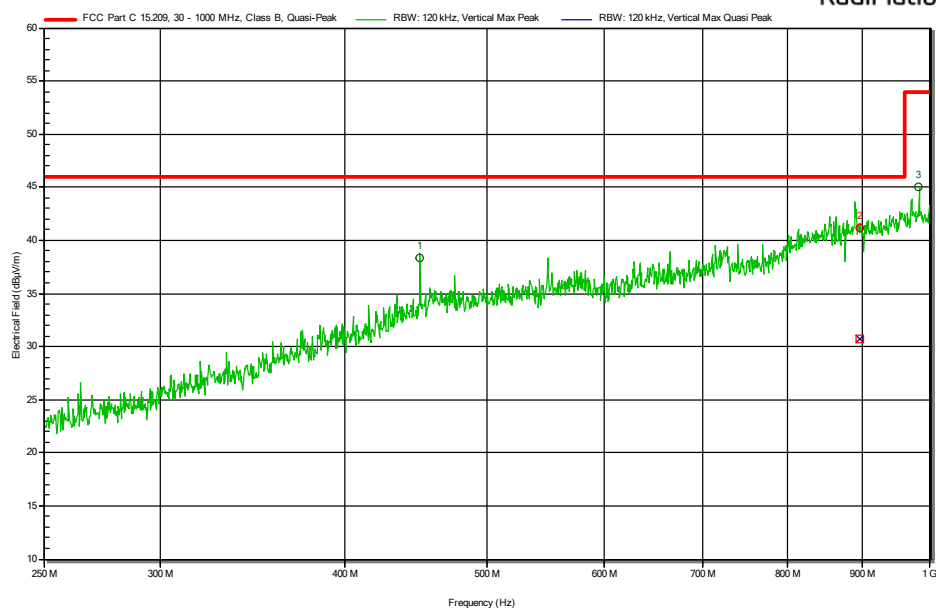
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel

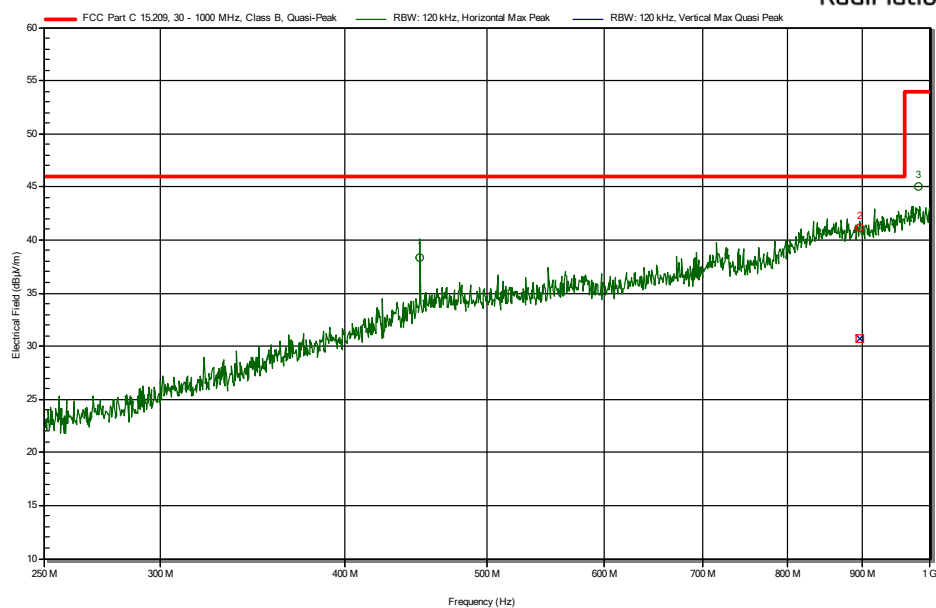
802.11b

RadiMation



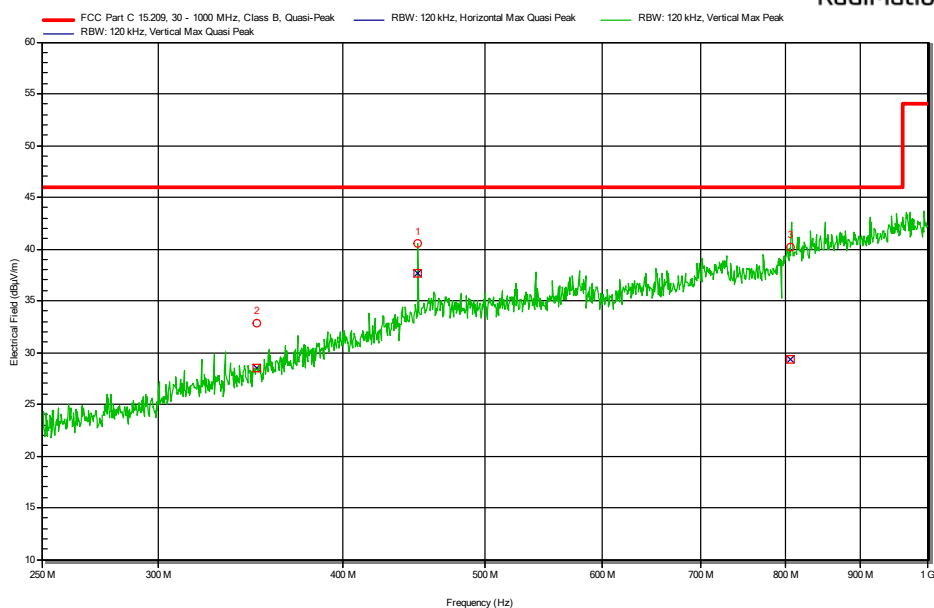
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel

RadiMation



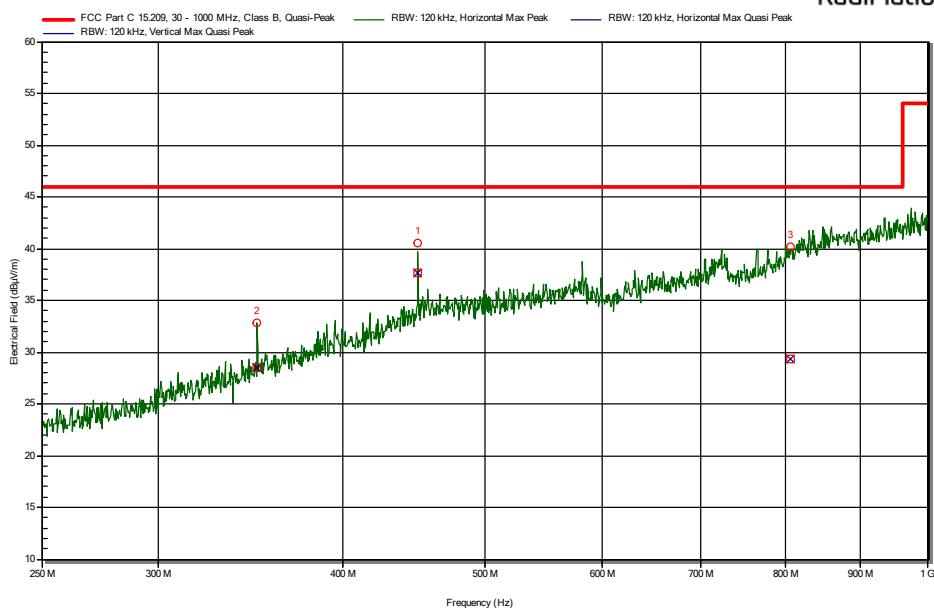
Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel

RadiMation



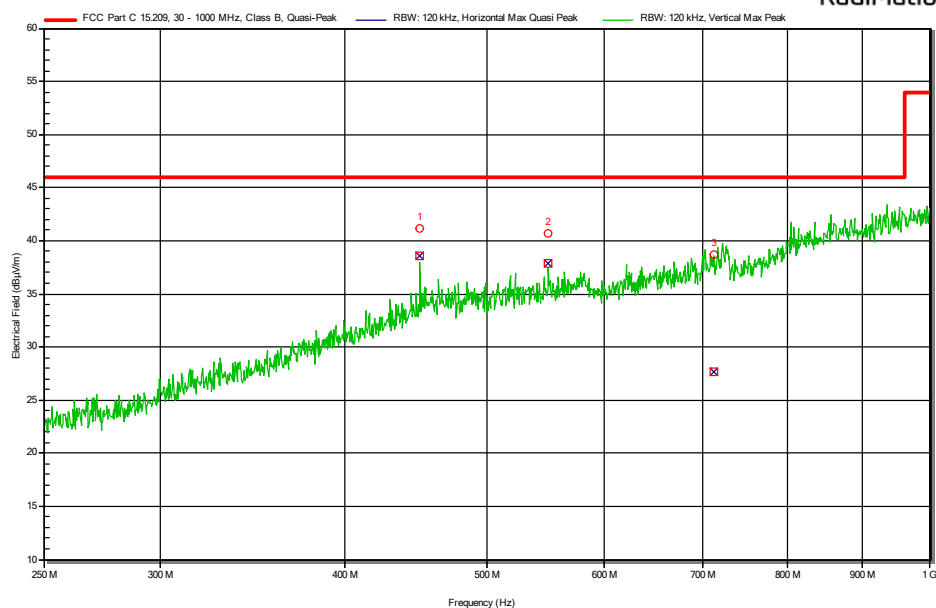
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



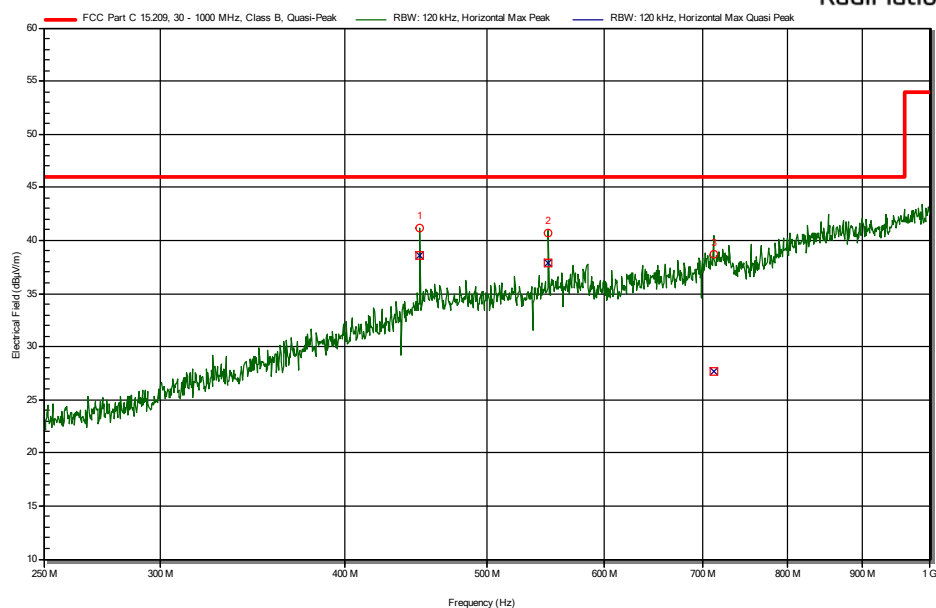
Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel

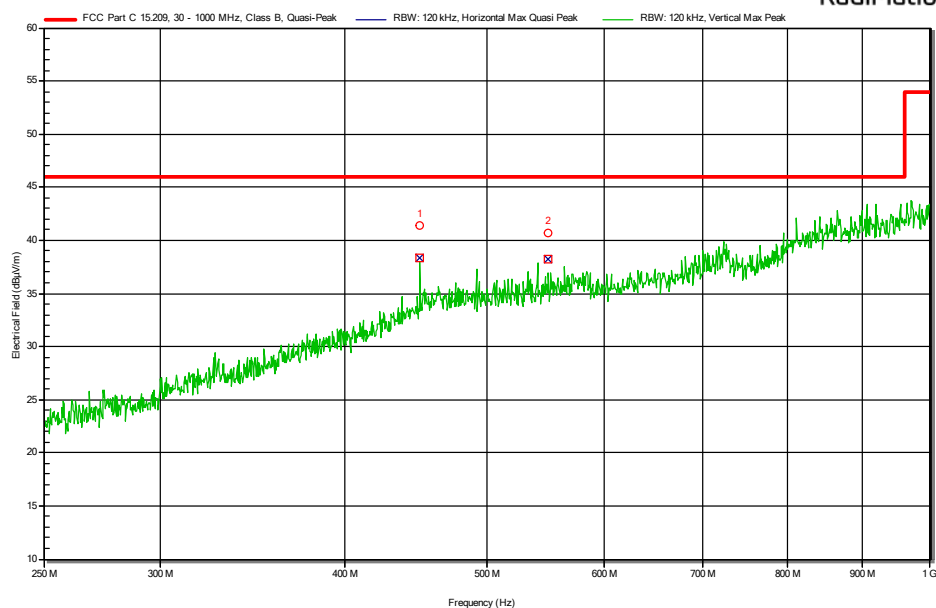
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel

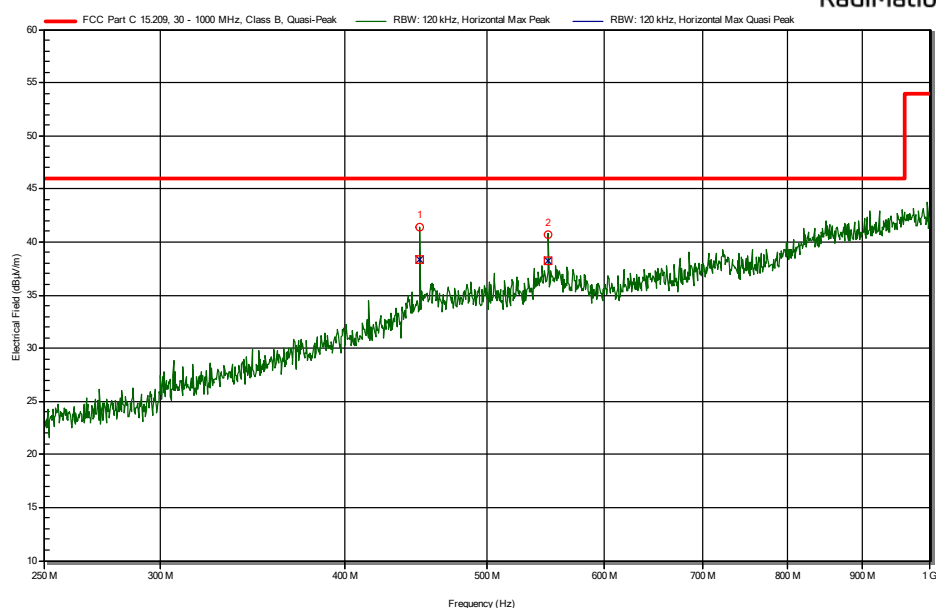
802.11n

RadiMation

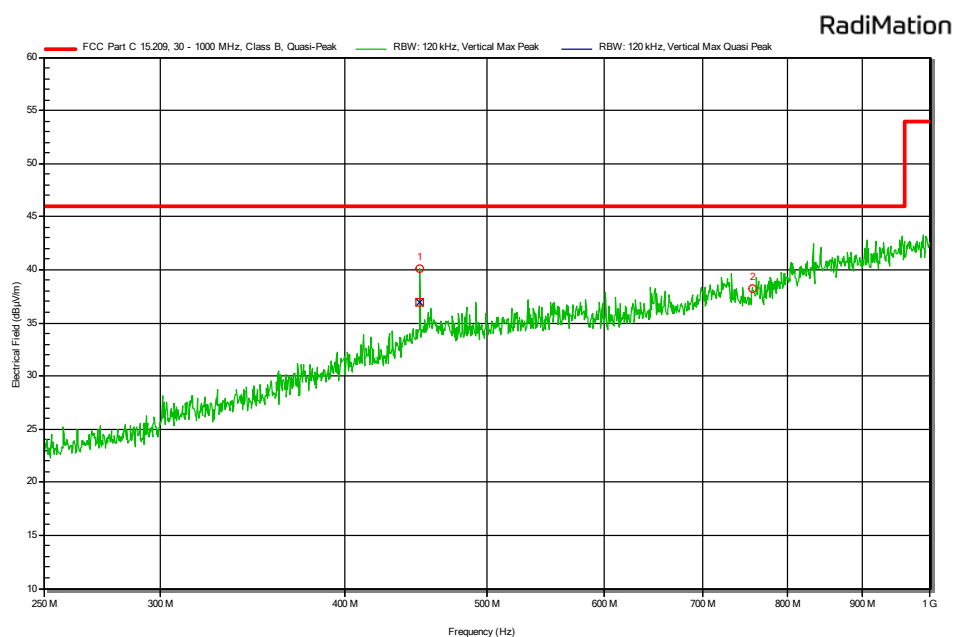


Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel

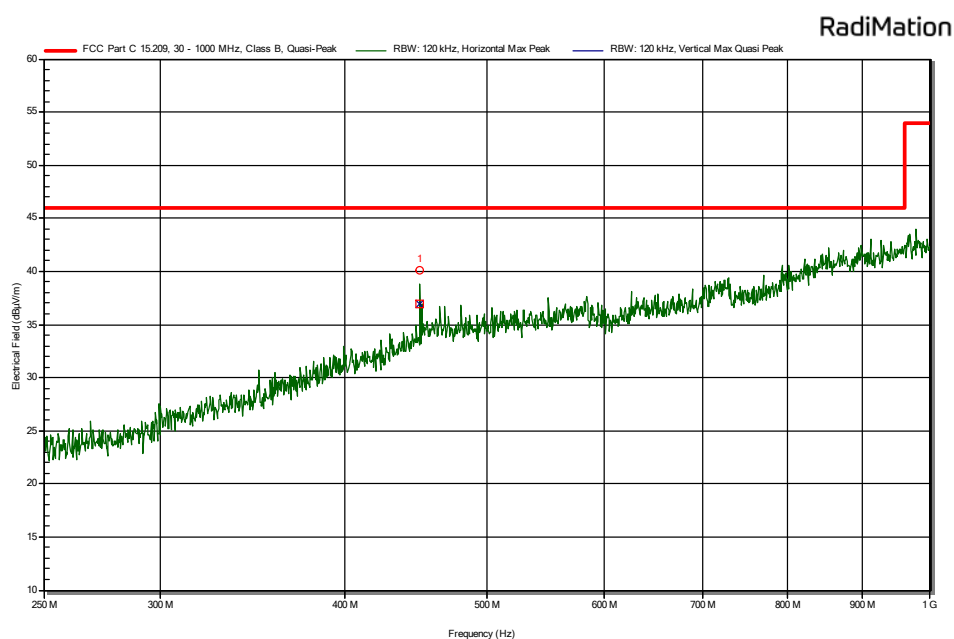
RadiMation



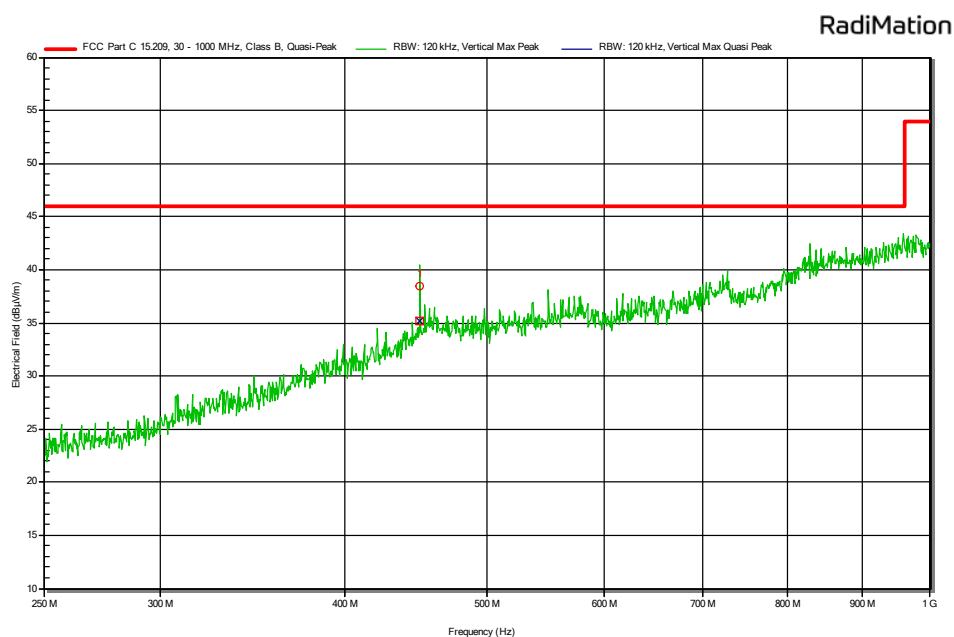
Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel



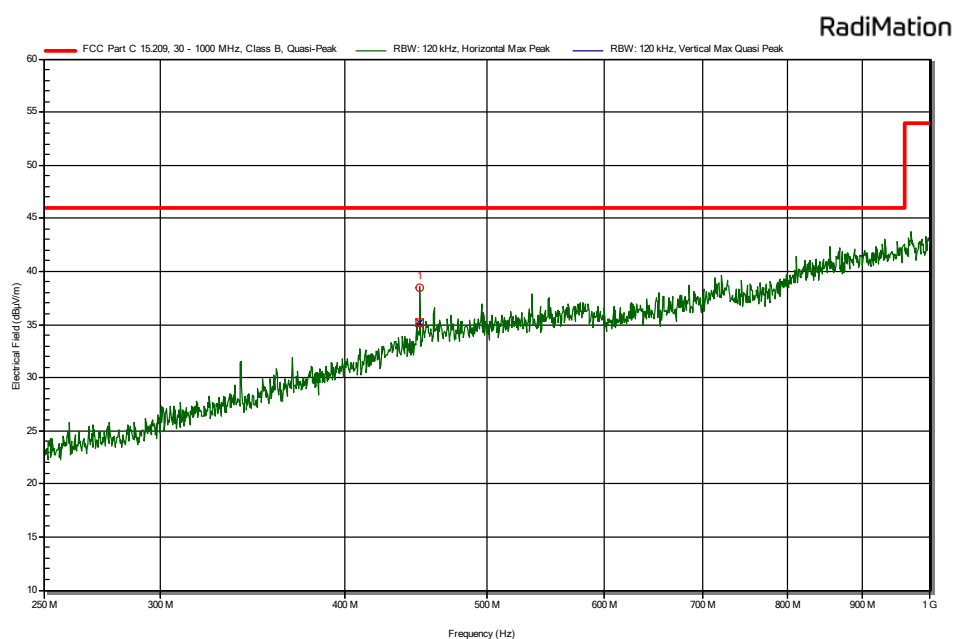
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



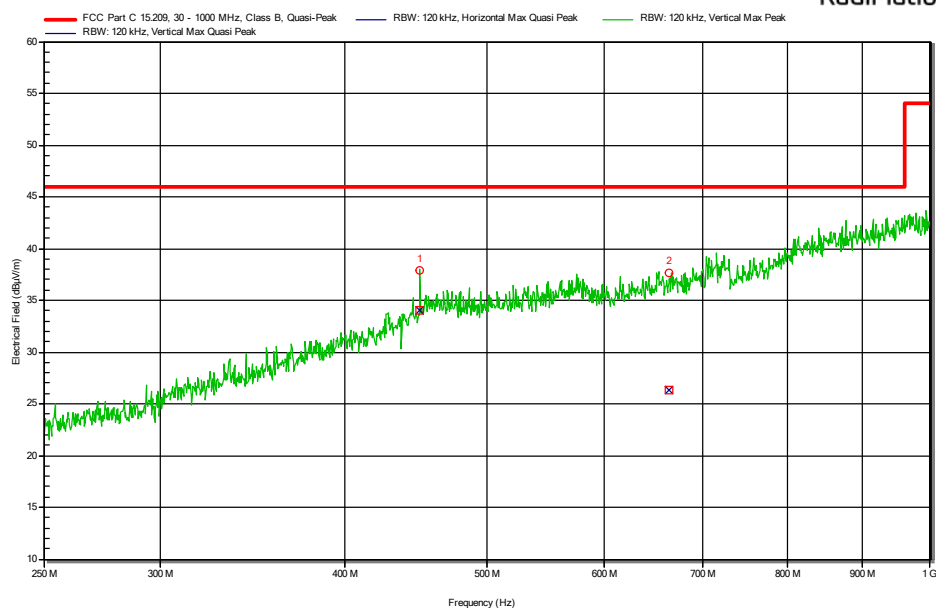
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel

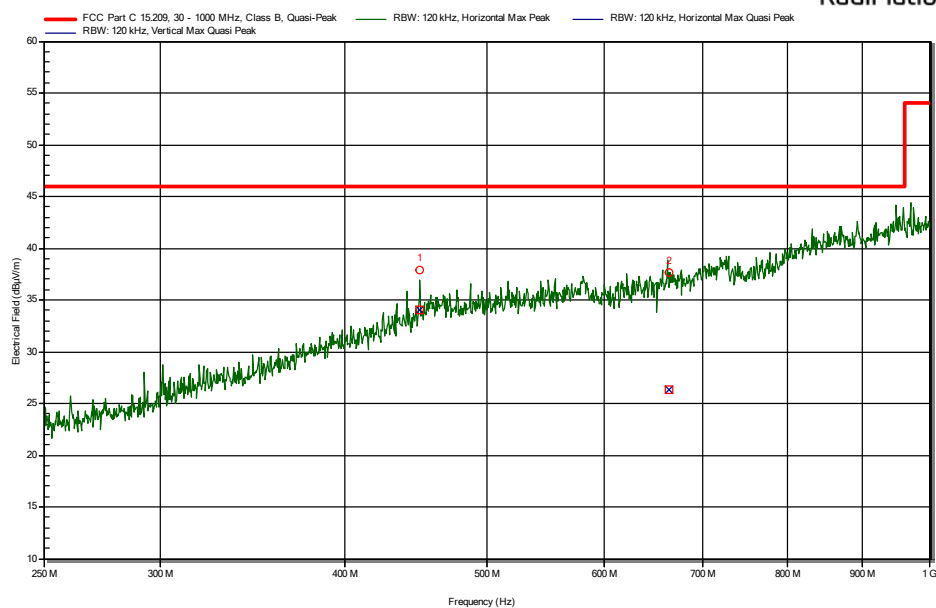
BT BR/EDR

RadiMation

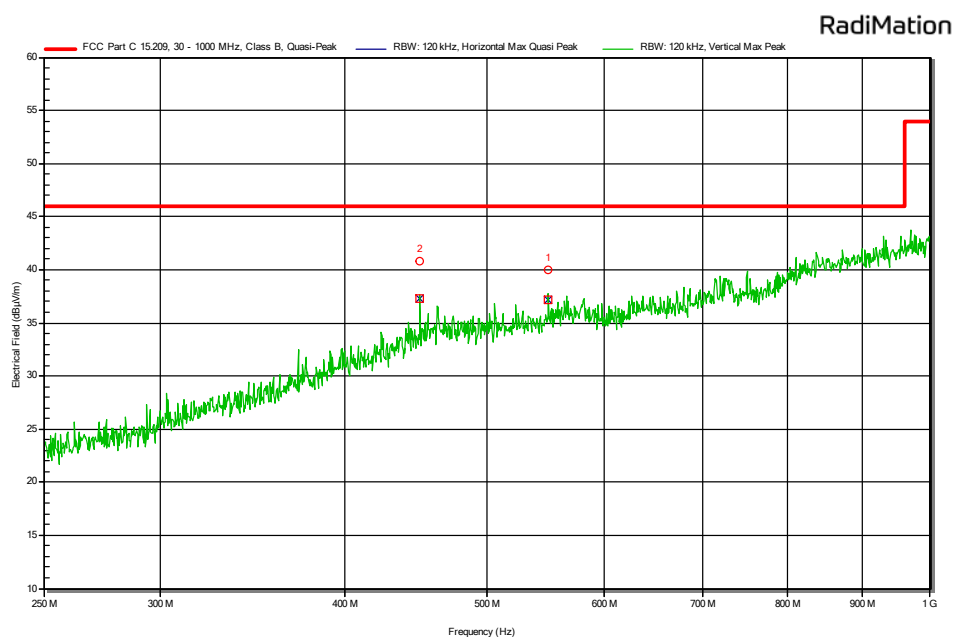


Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel

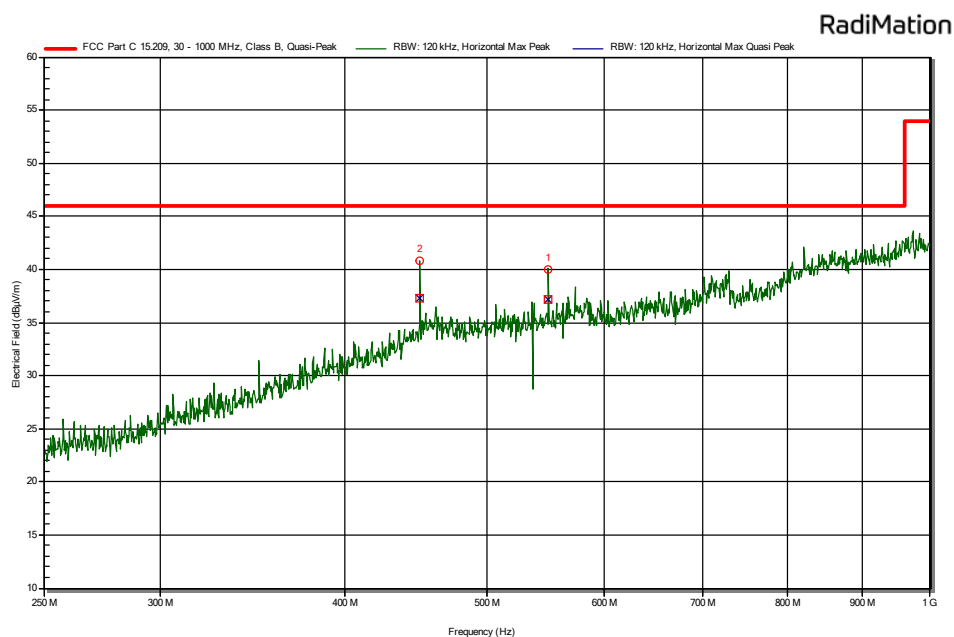
RadiMation



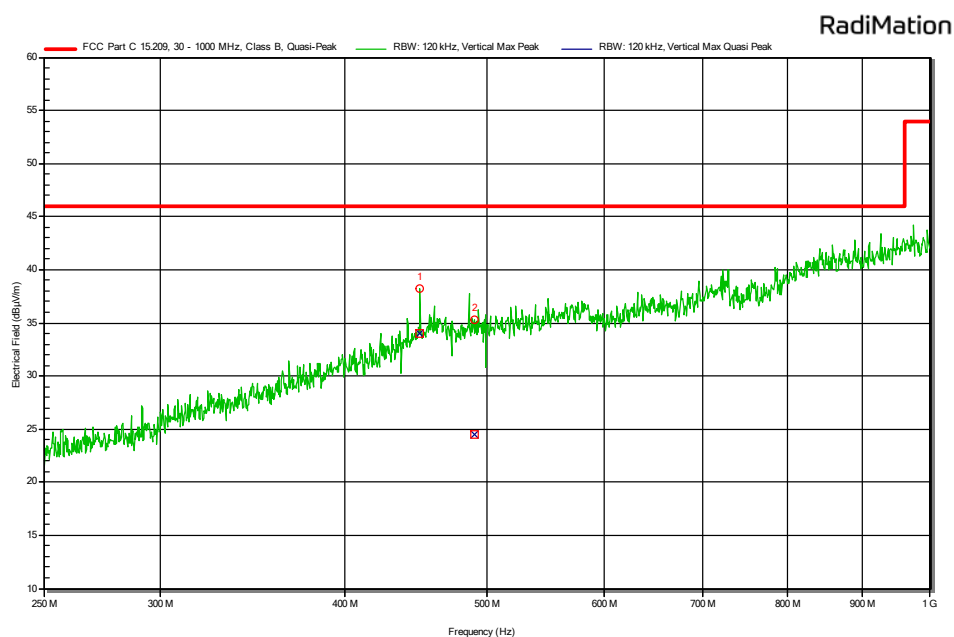
Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel



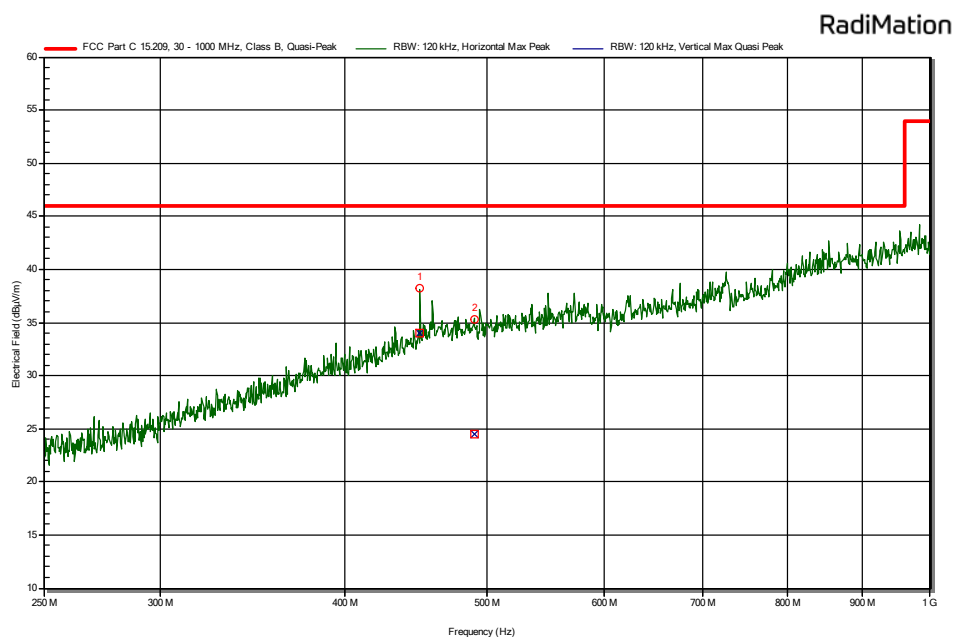
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



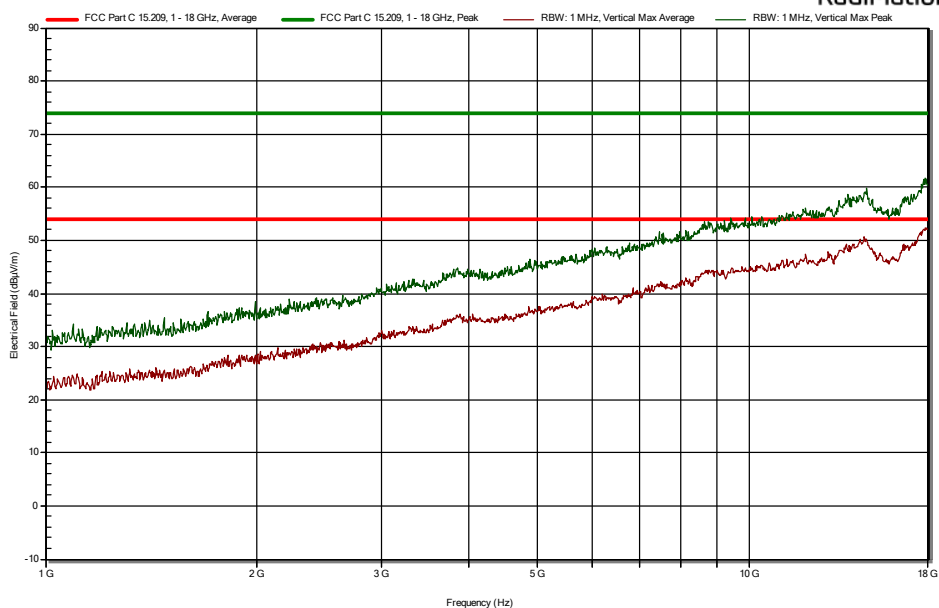
Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel

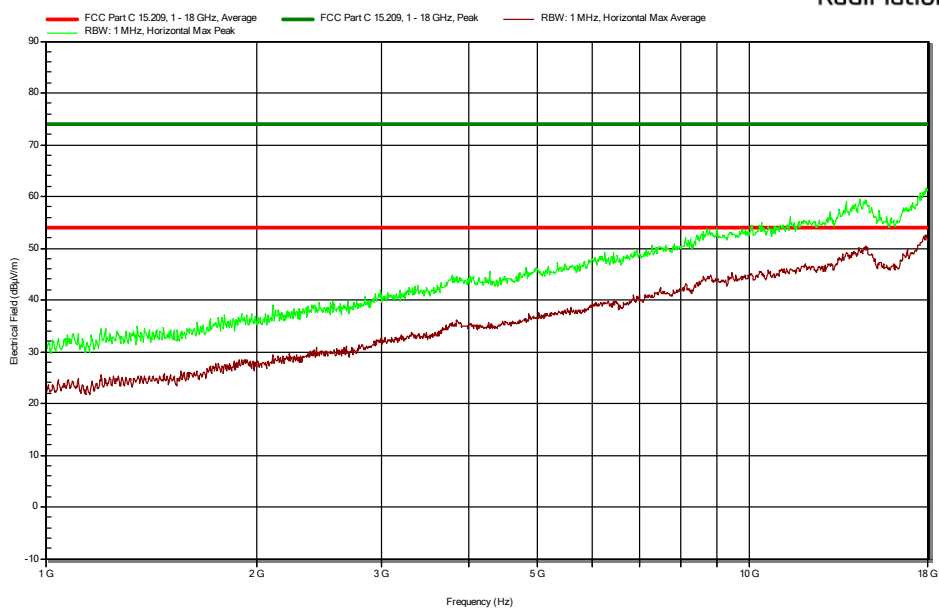
BLE

RadiMation

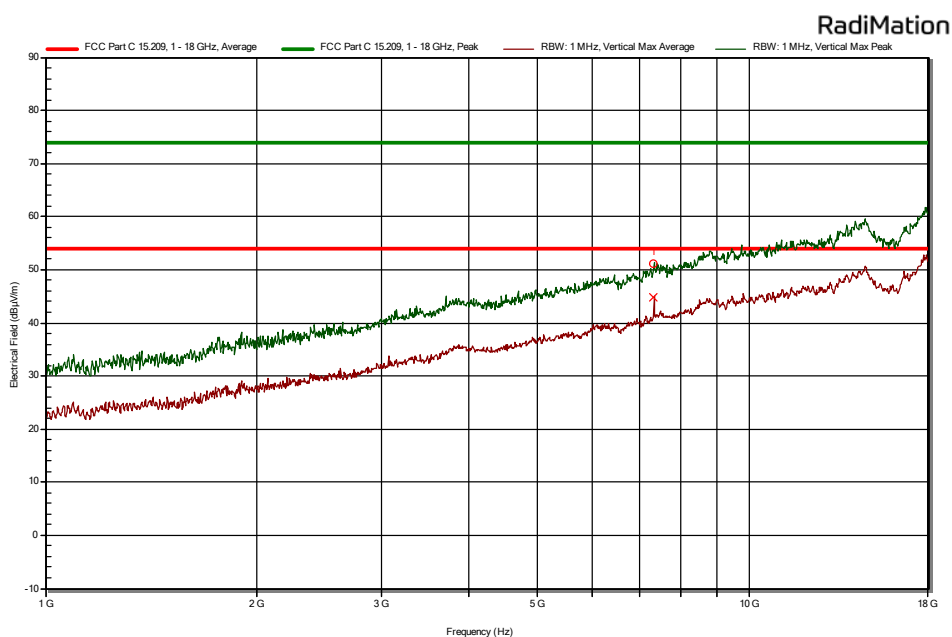


Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Low channel

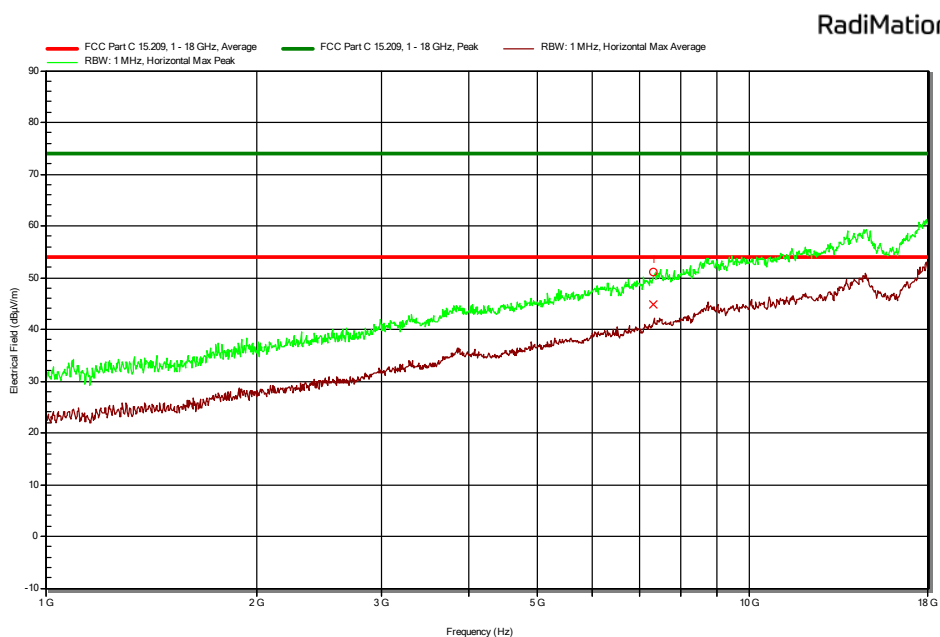
RadiMation



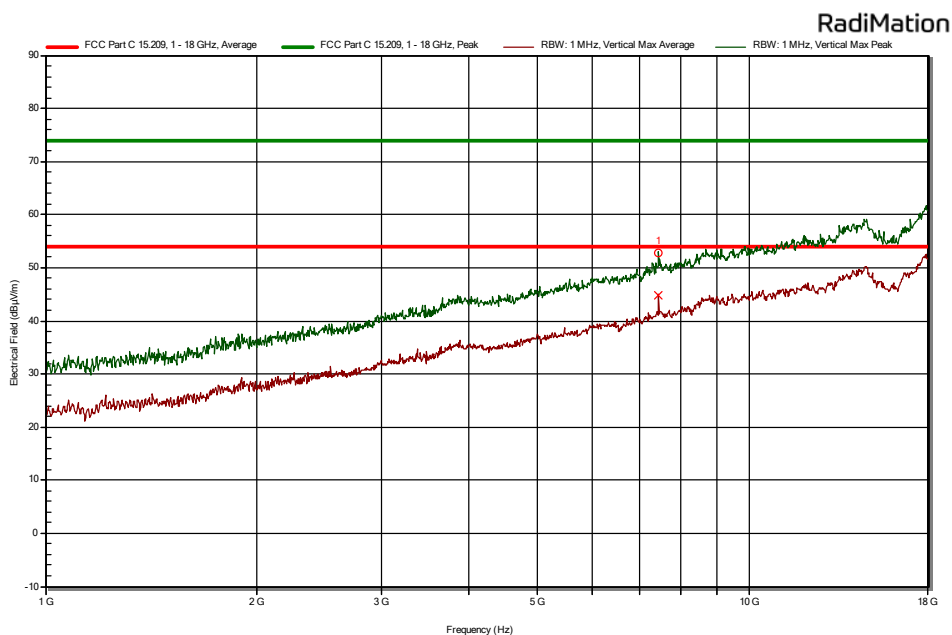
Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Low channel



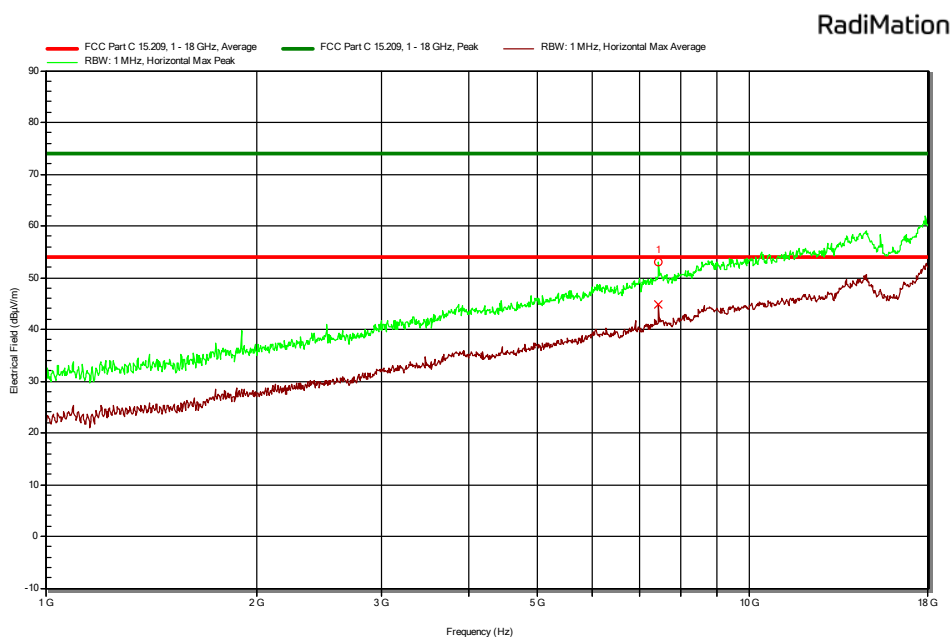
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



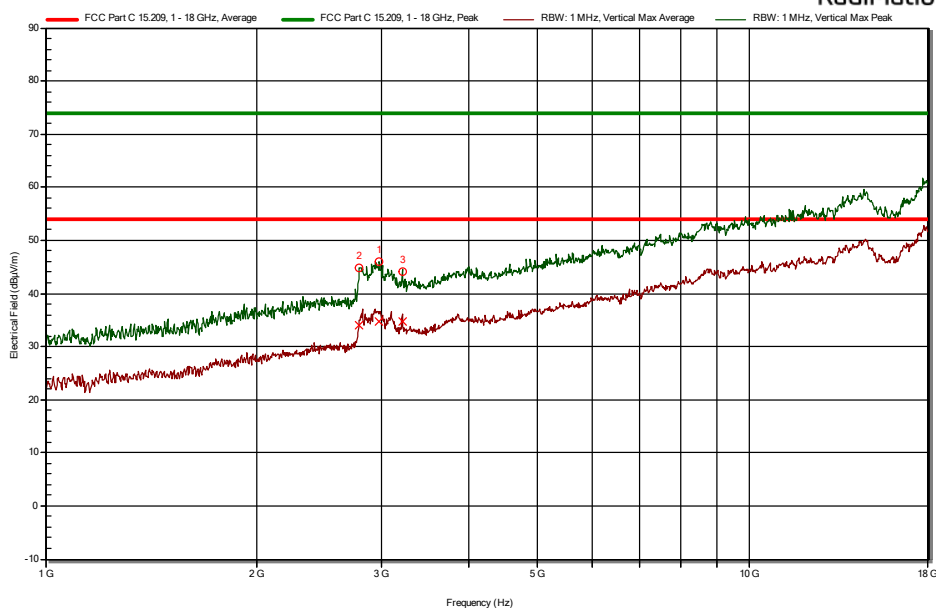
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
High channel

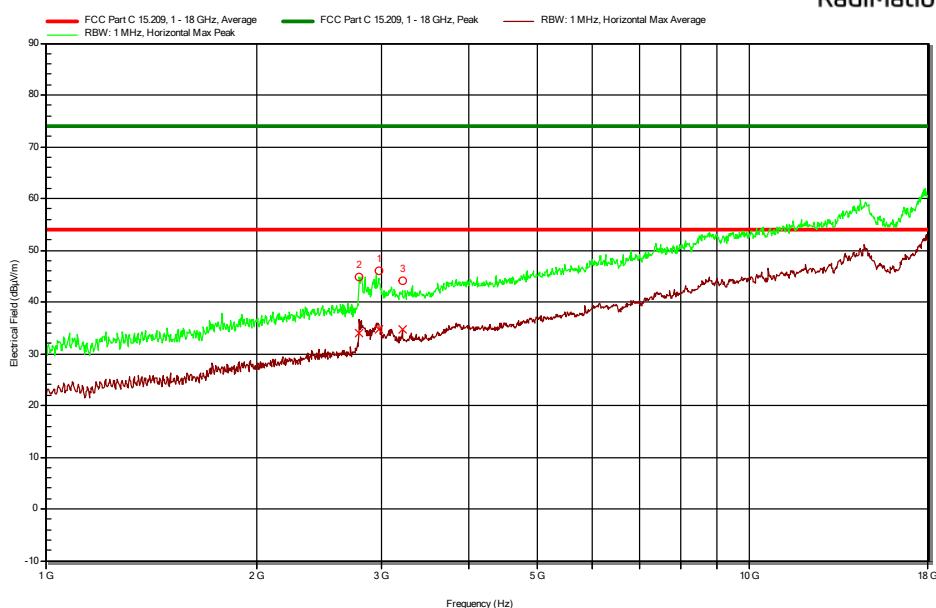
802.11b

RadiMation

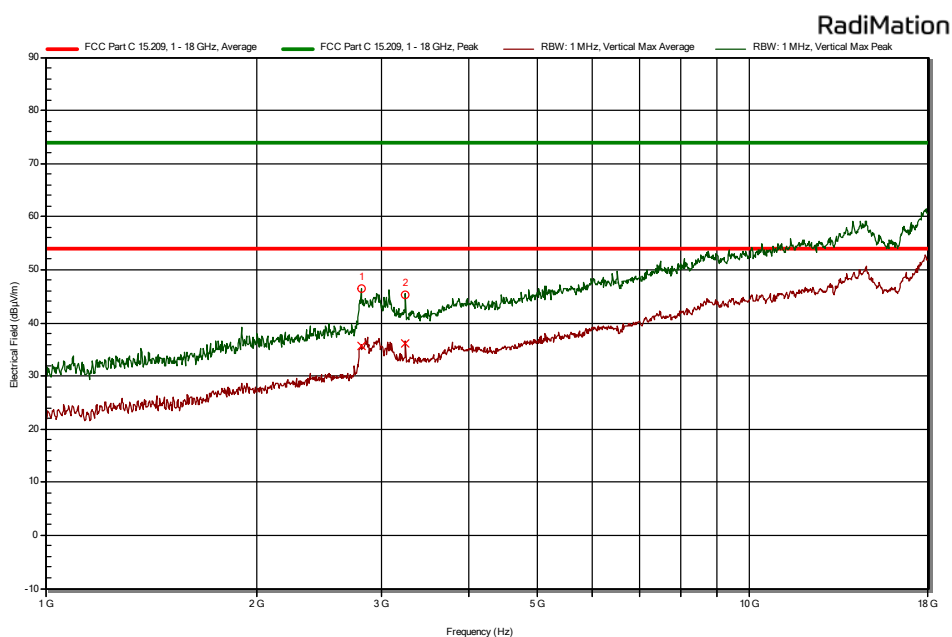


Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Low channel

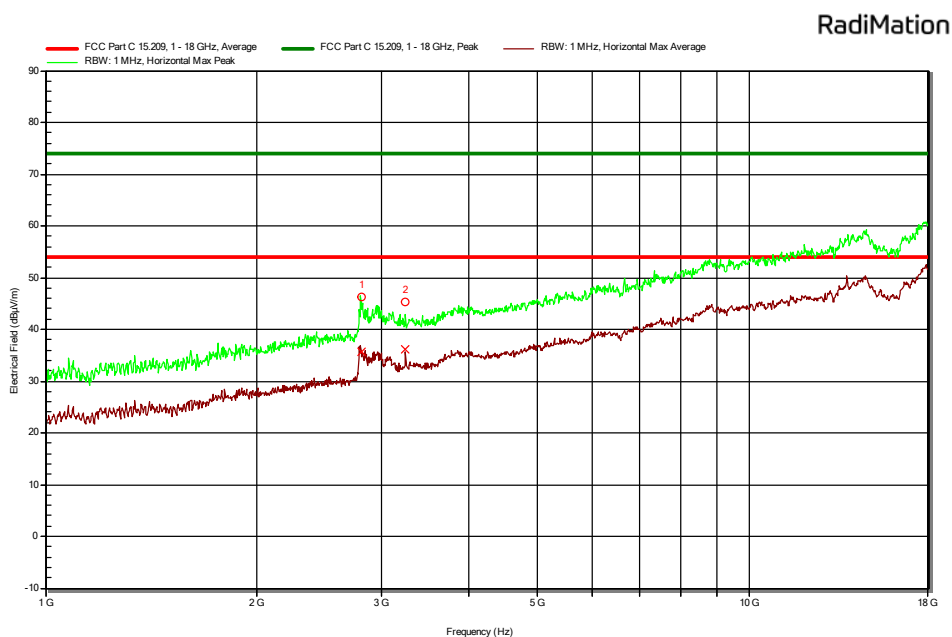
RadiMation



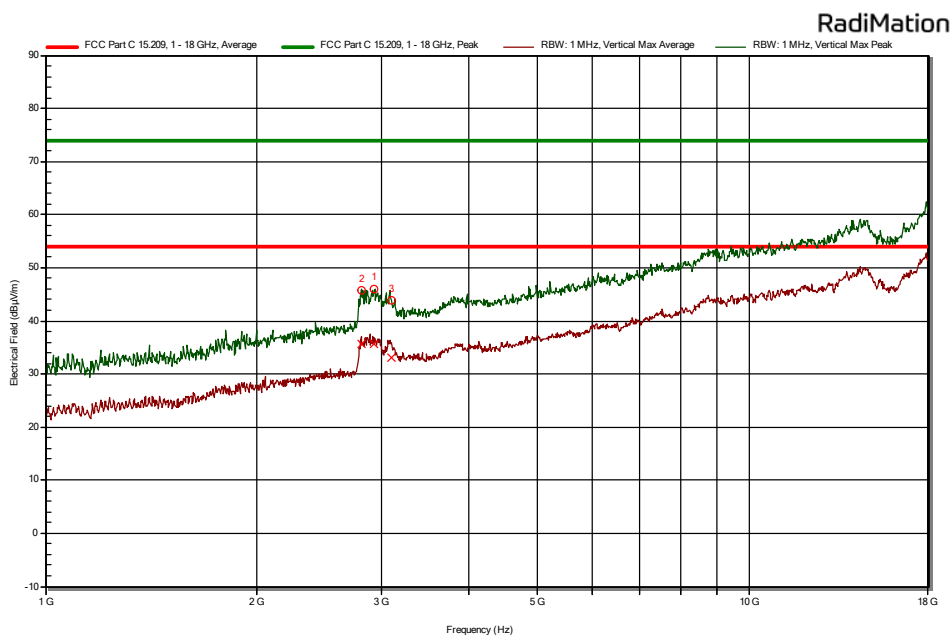
Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Low channel



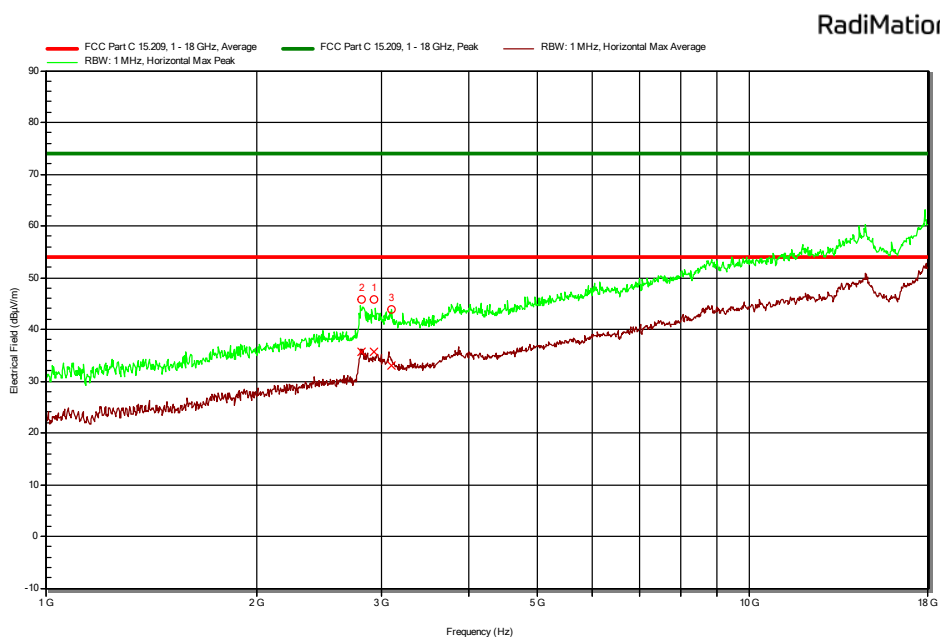
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



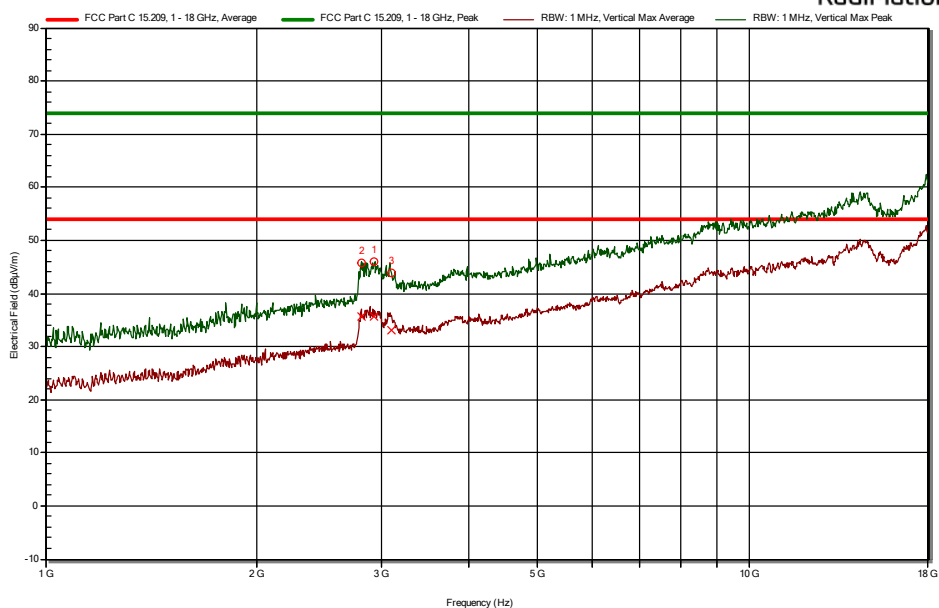
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
High channel

802.11n

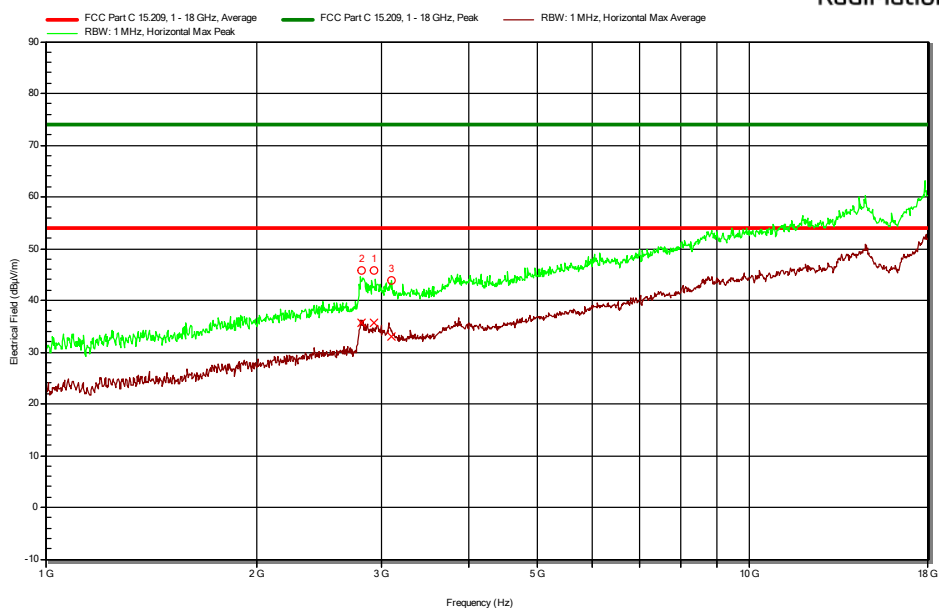
RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)

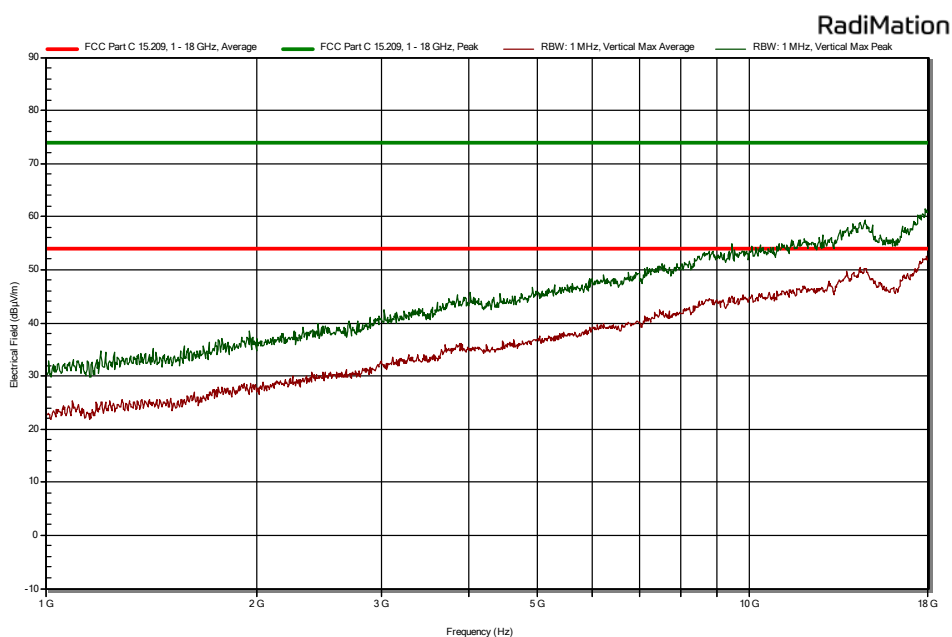
Low channel

RadiMation

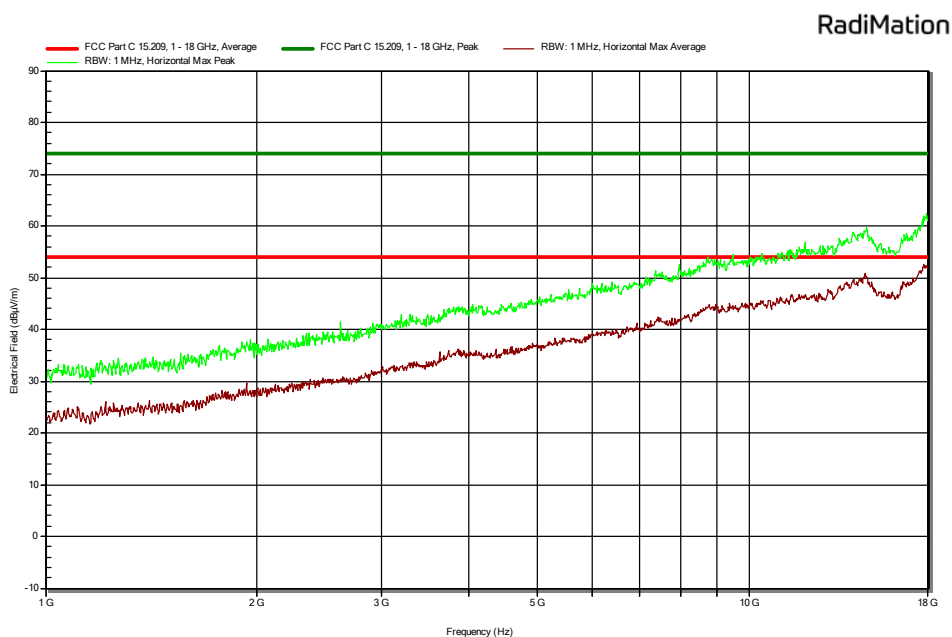


Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)

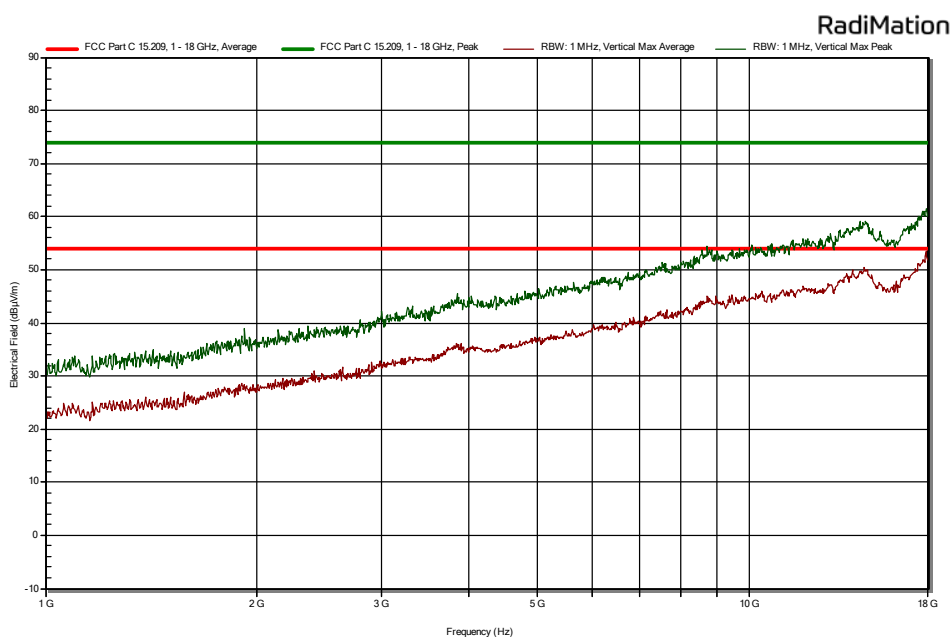
Low channel



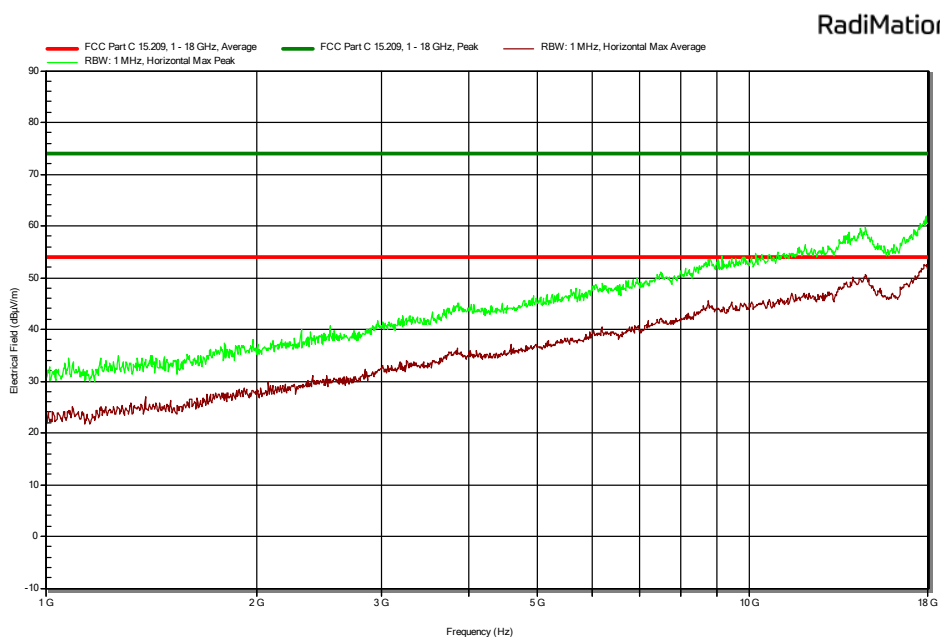
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



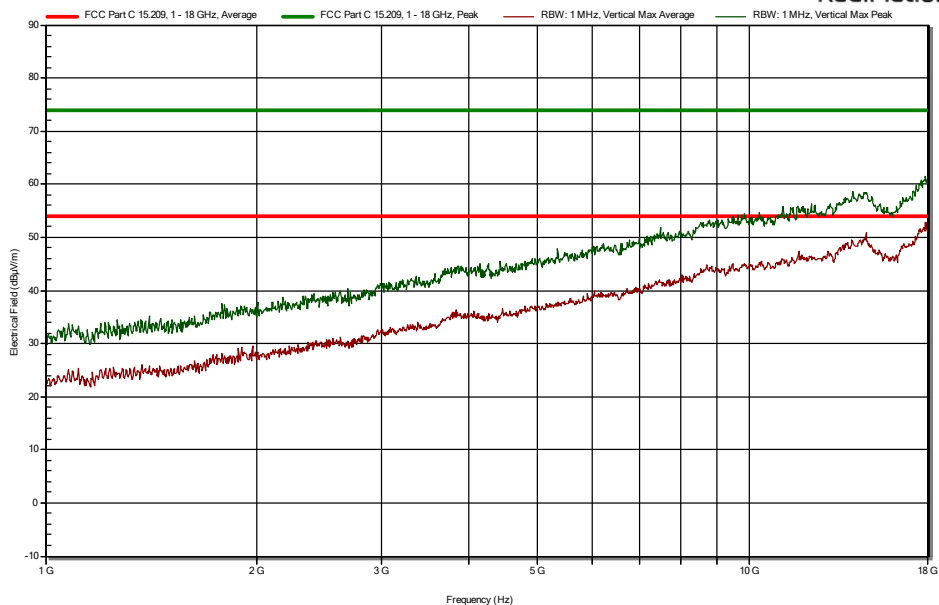
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
High channel

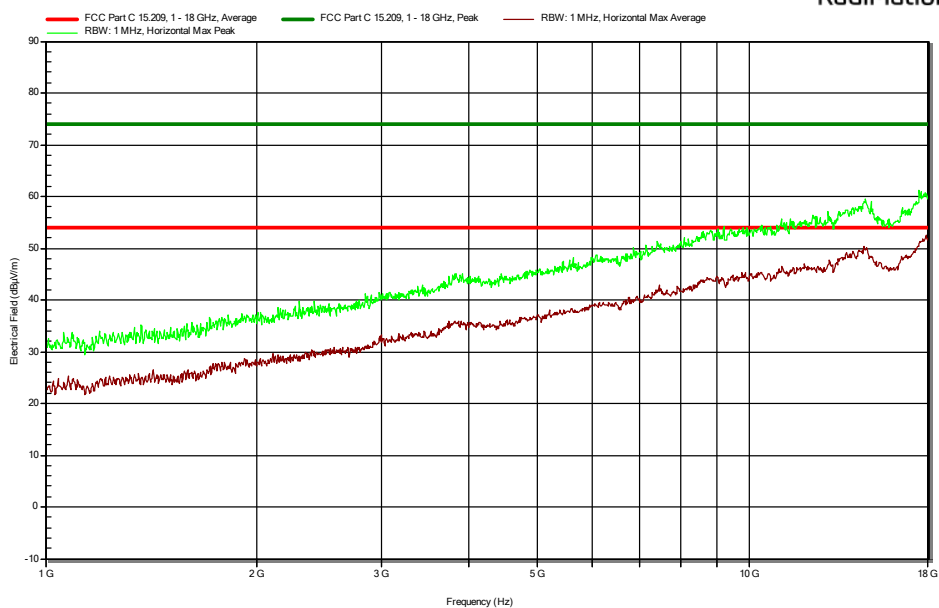
BT BR/EDR

RadiMation

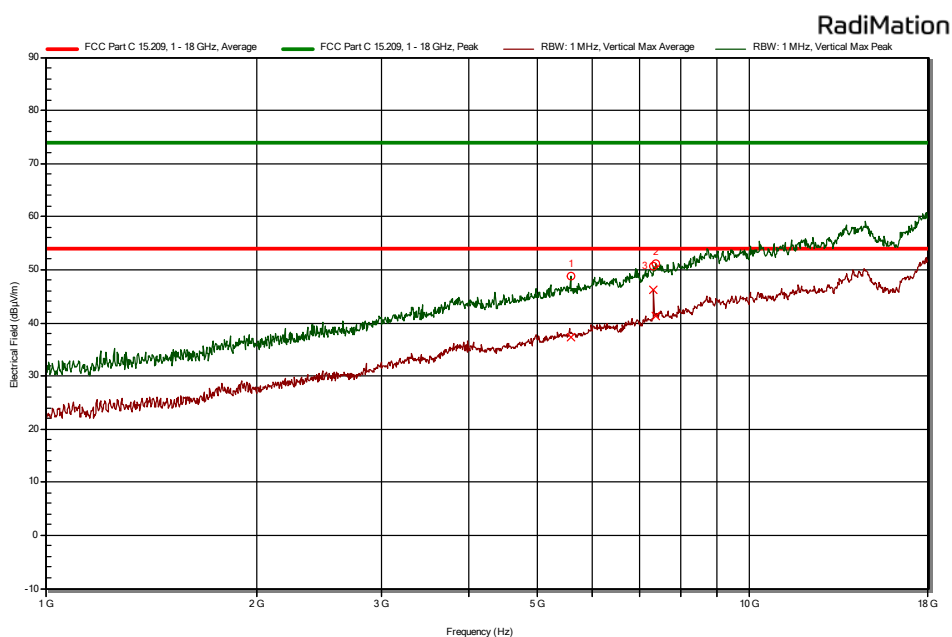


Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Low channel

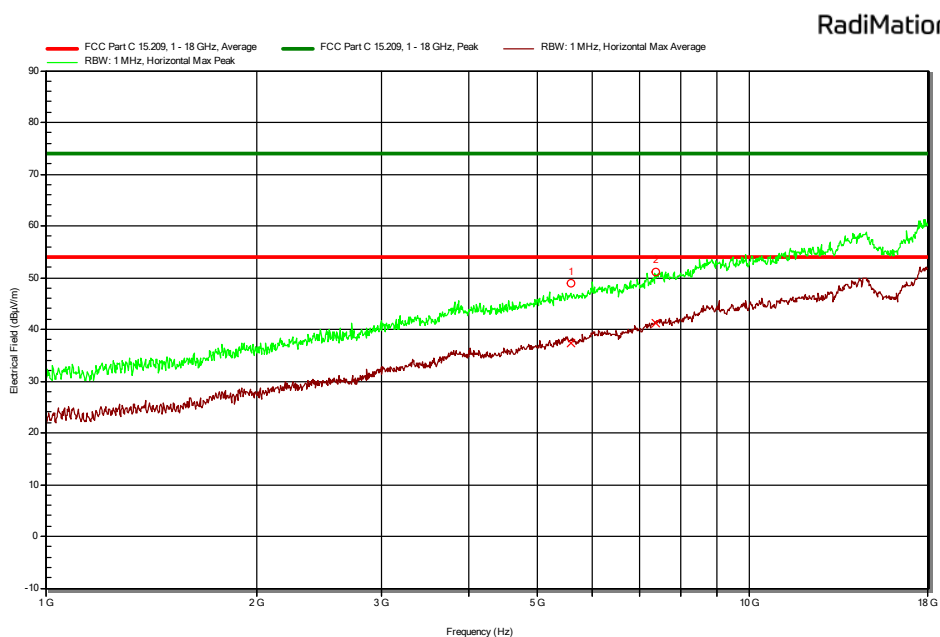
RadiMation



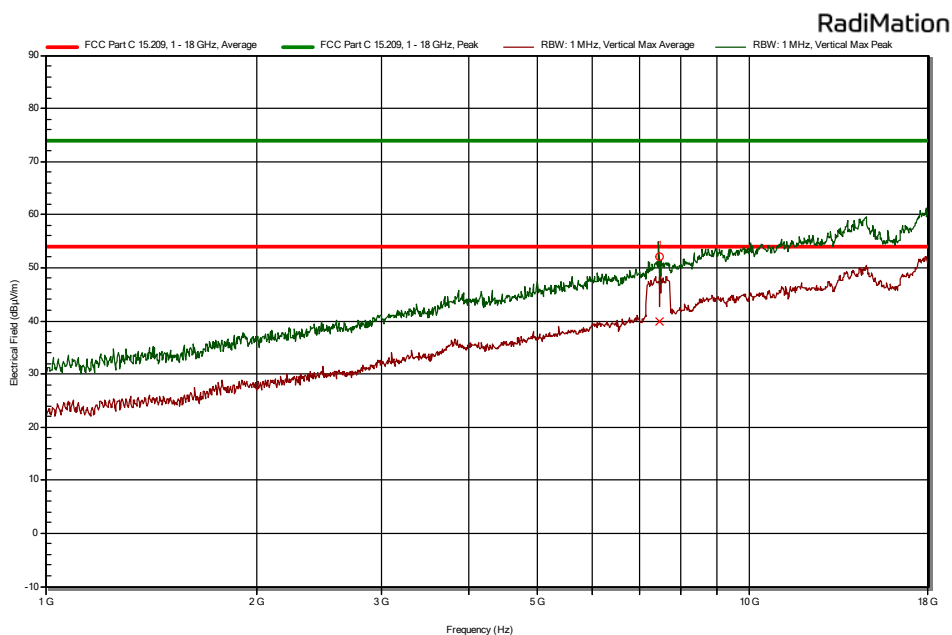
Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Low channel



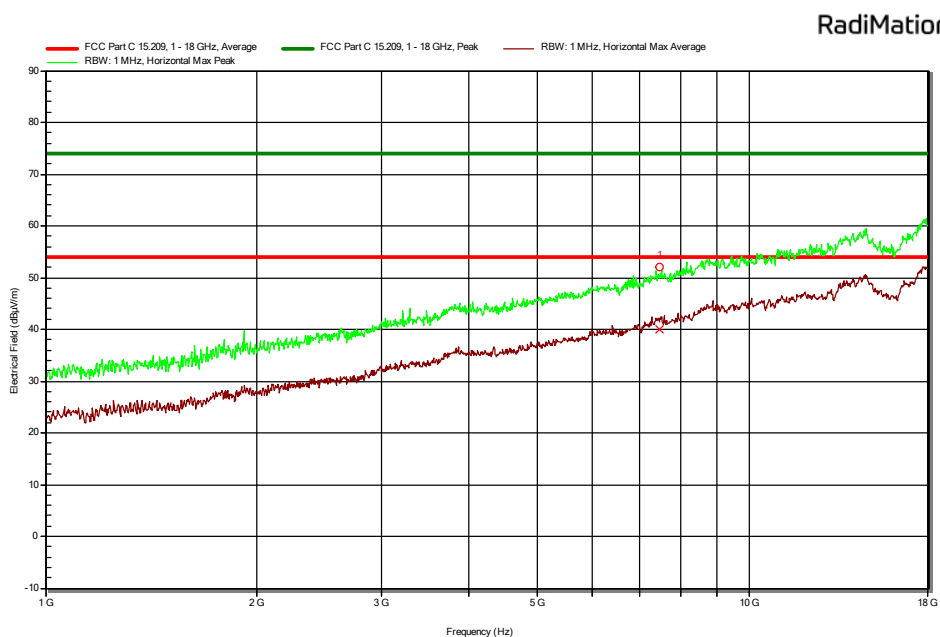
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



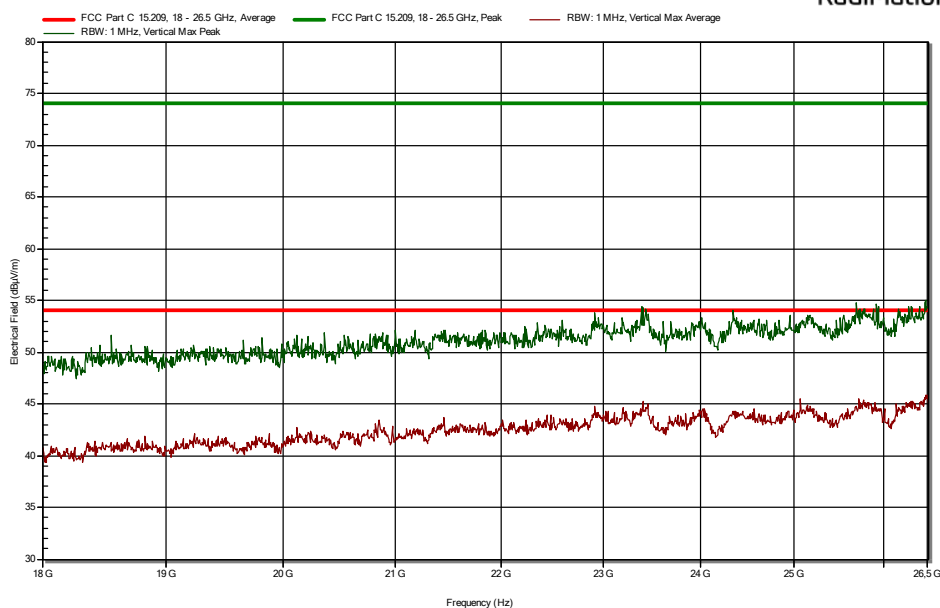
Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
High channel



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
High channel

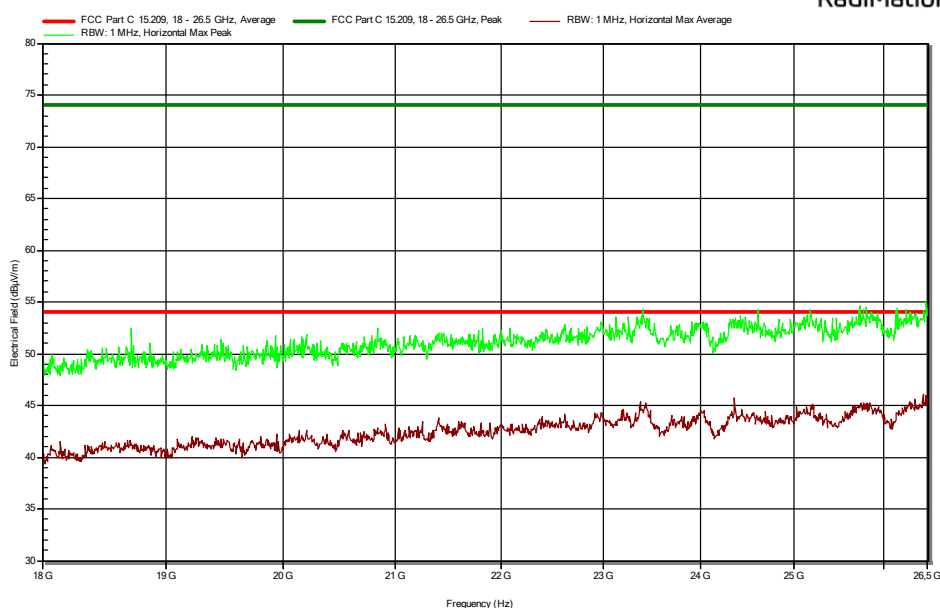
BLE

RadiMation



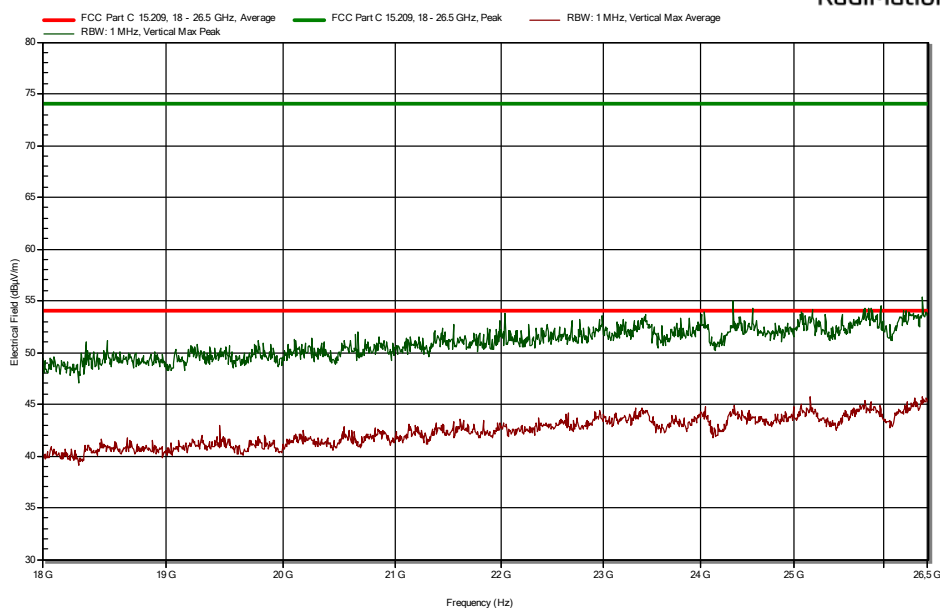
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26 GHz
(peak and average values shown)
Low channel

RadiMation



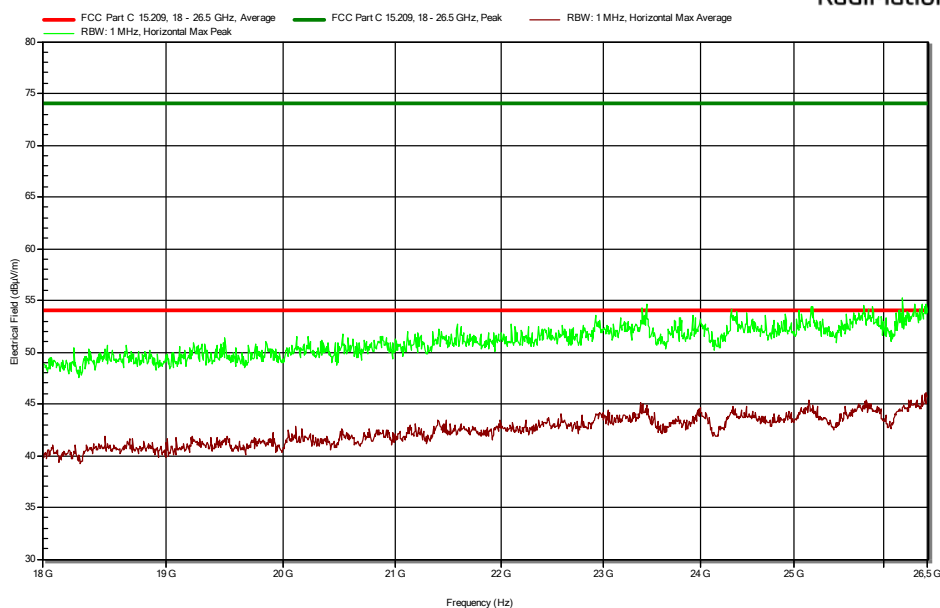
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Low channel

RadiMation



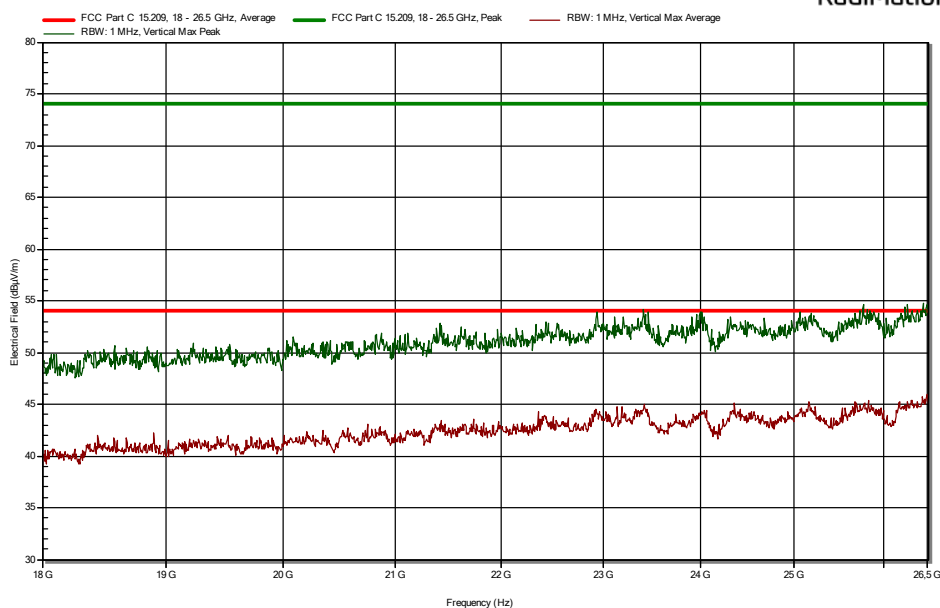
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



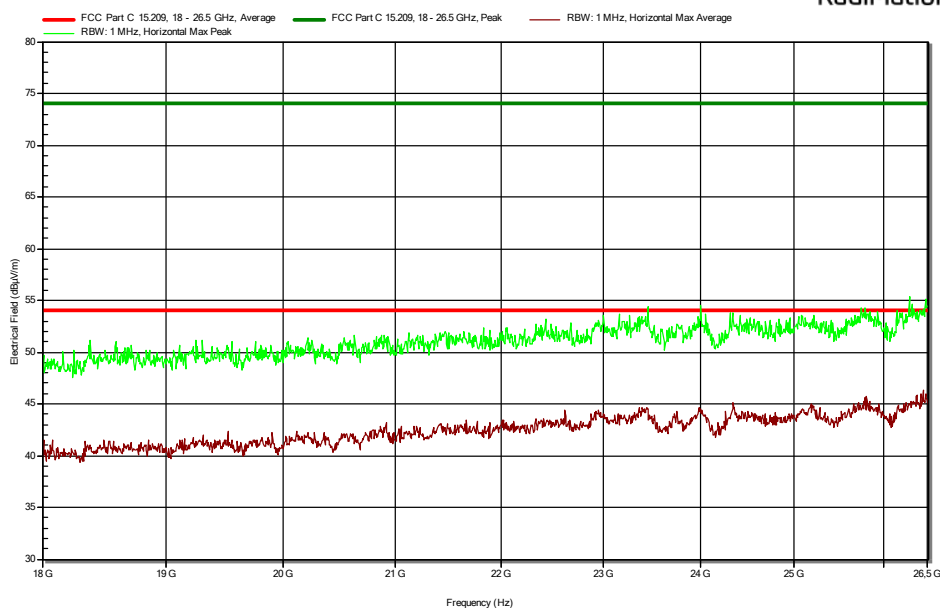
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
High channel

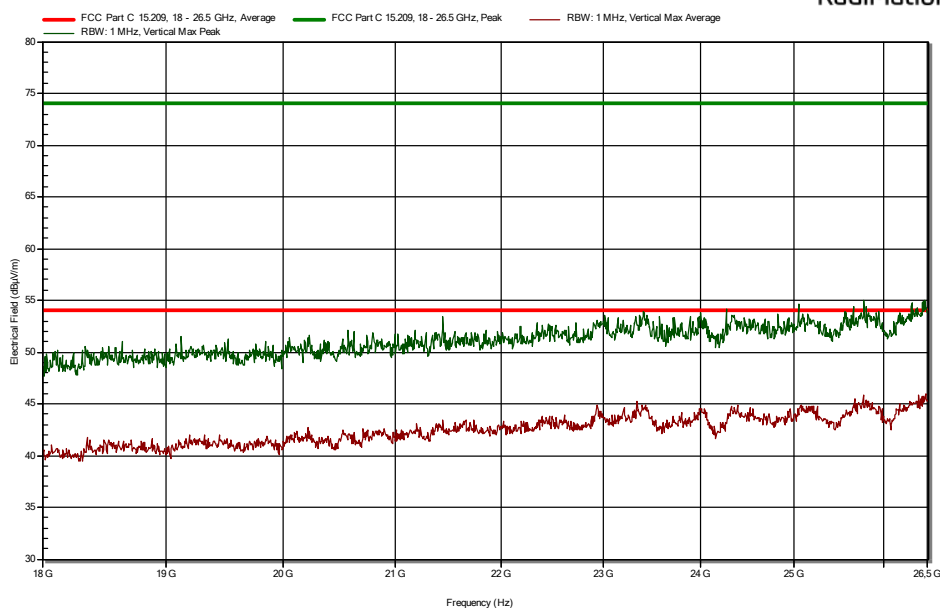
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26 GHz
(peak and average values shown)
High channel

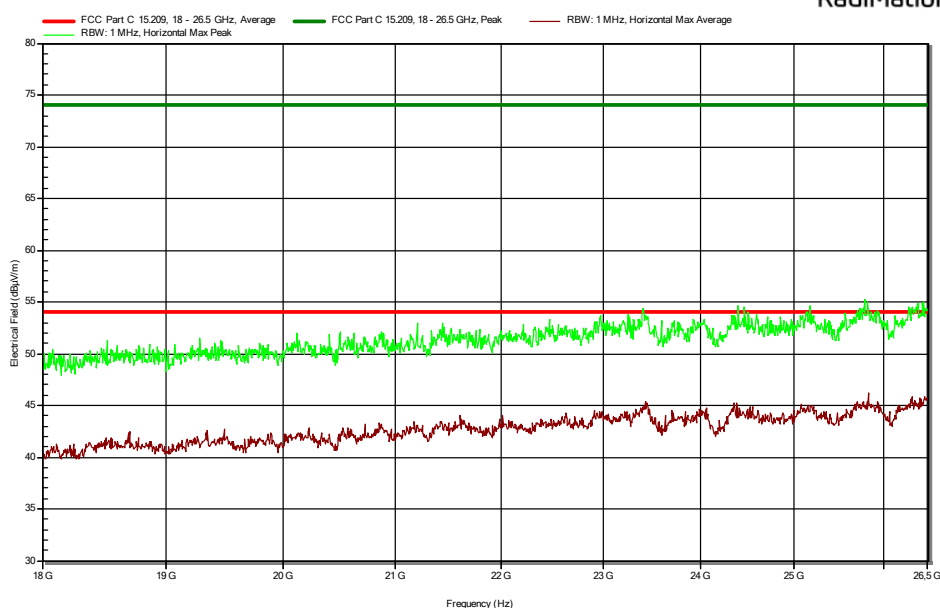
802.11b

RadiMation



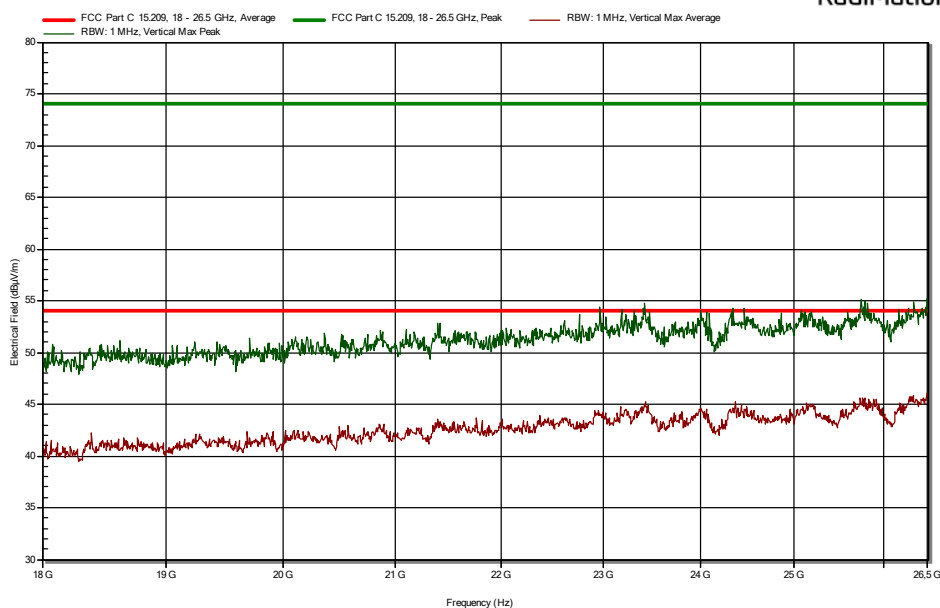
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26 GHz
(peak and average values shown)
Low channel

RadiMation



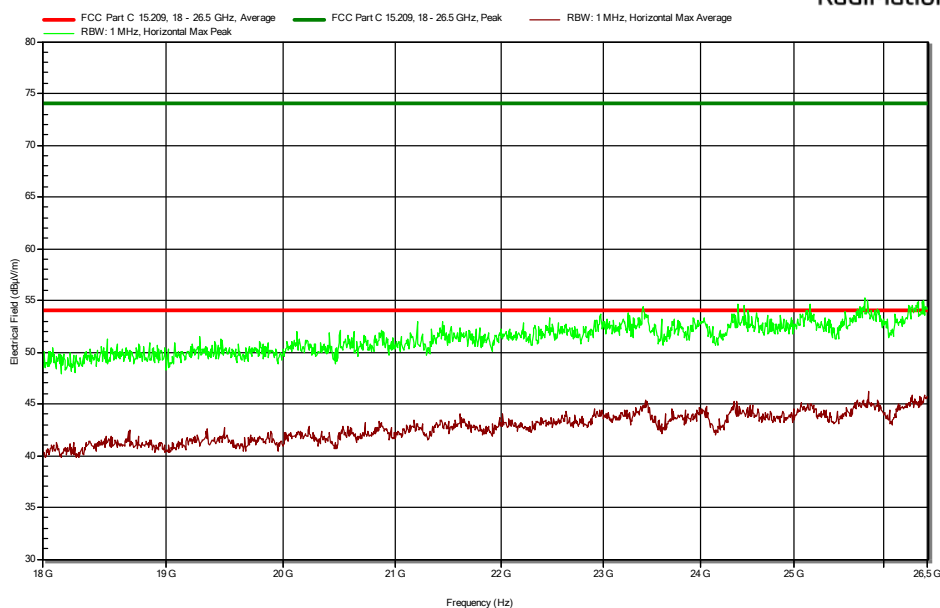
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Low channel

RadiMation



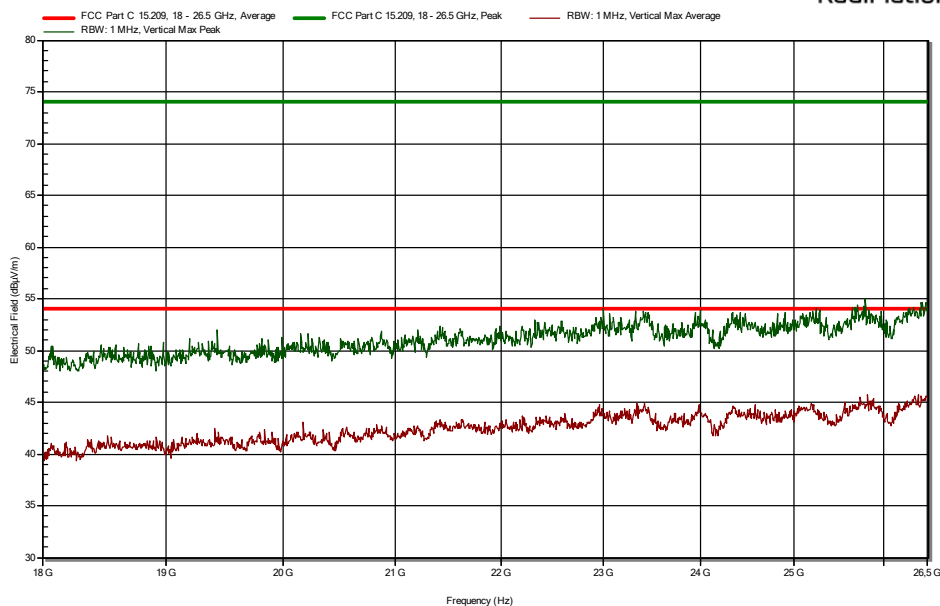
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



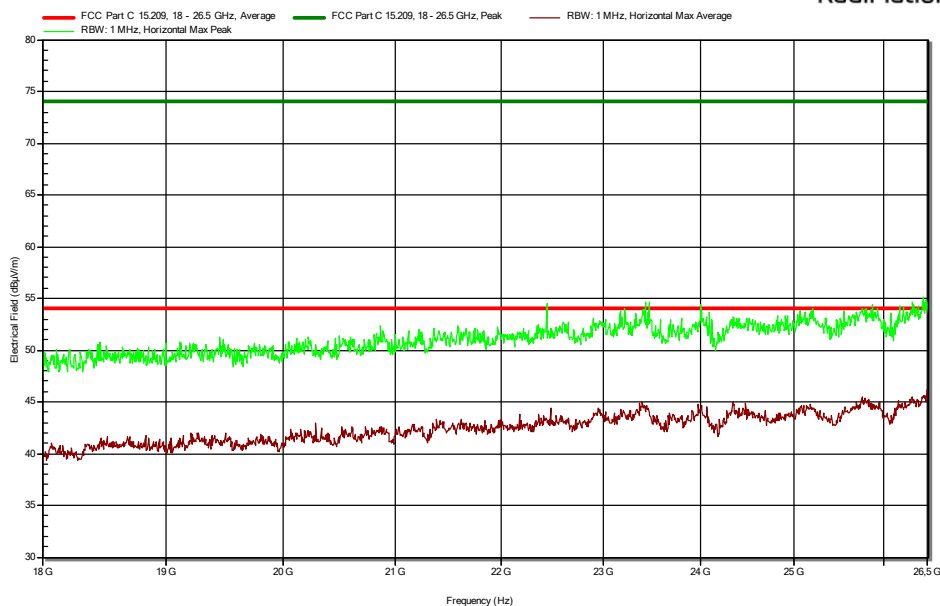
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
High channel

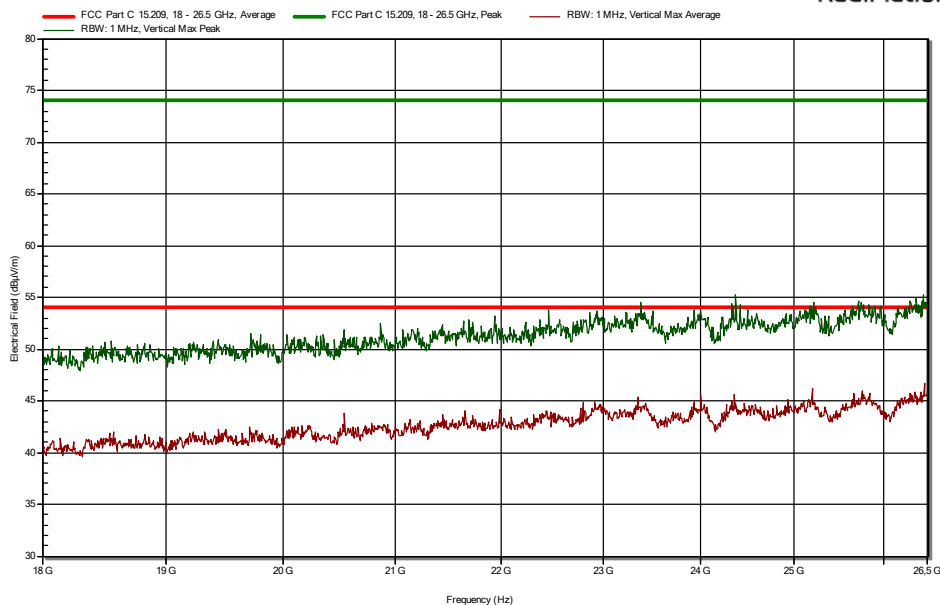
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26 GHz
(peak and average values shown)
High channel

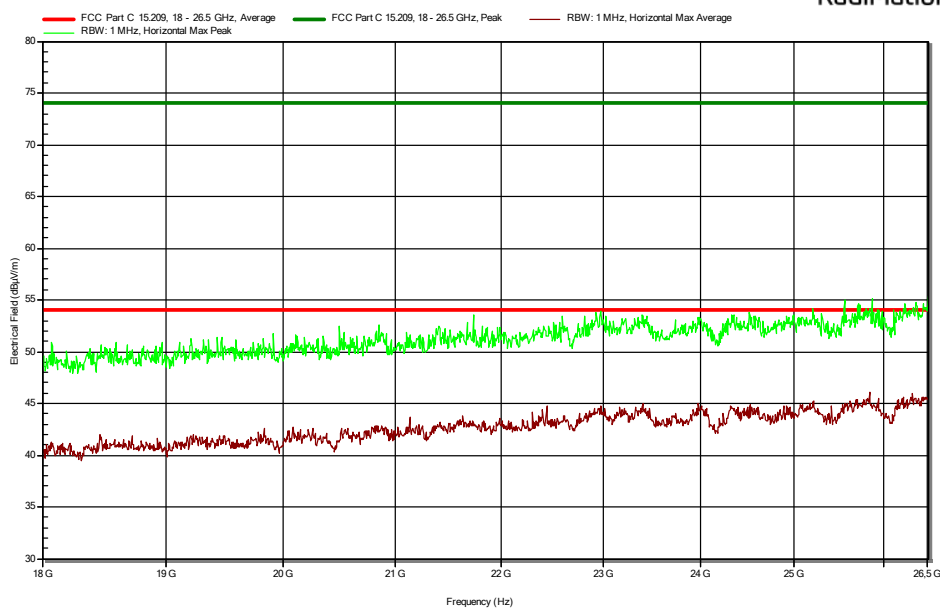
802.11n

RadiMation



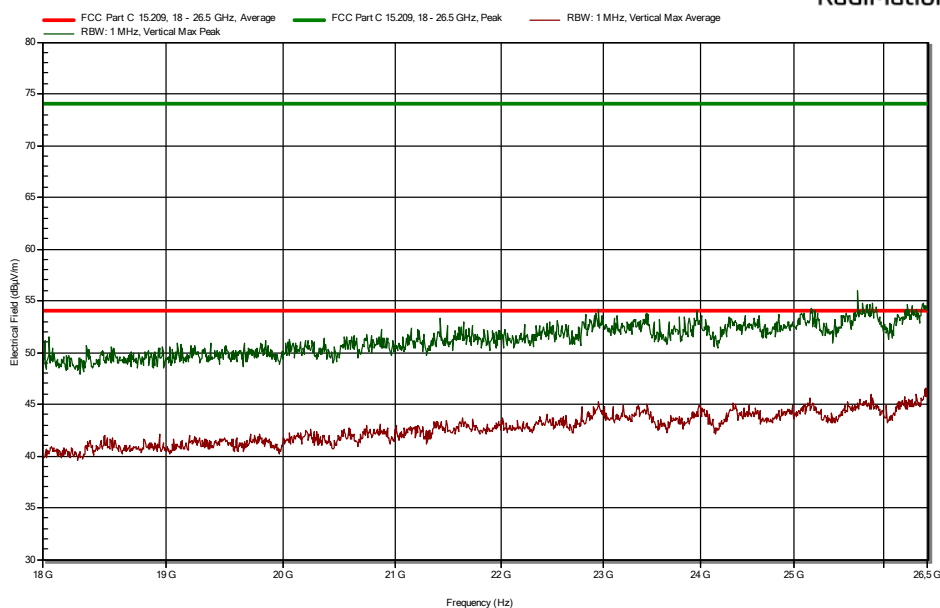
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26 GHz
(peak and average values shown)
Low channel

RadiMation



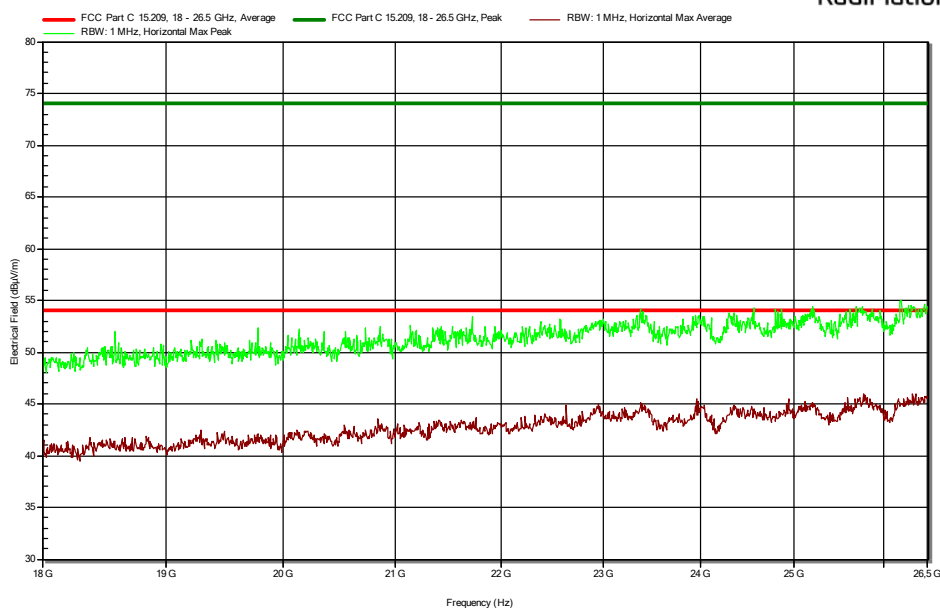
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Low channel

RadiMation



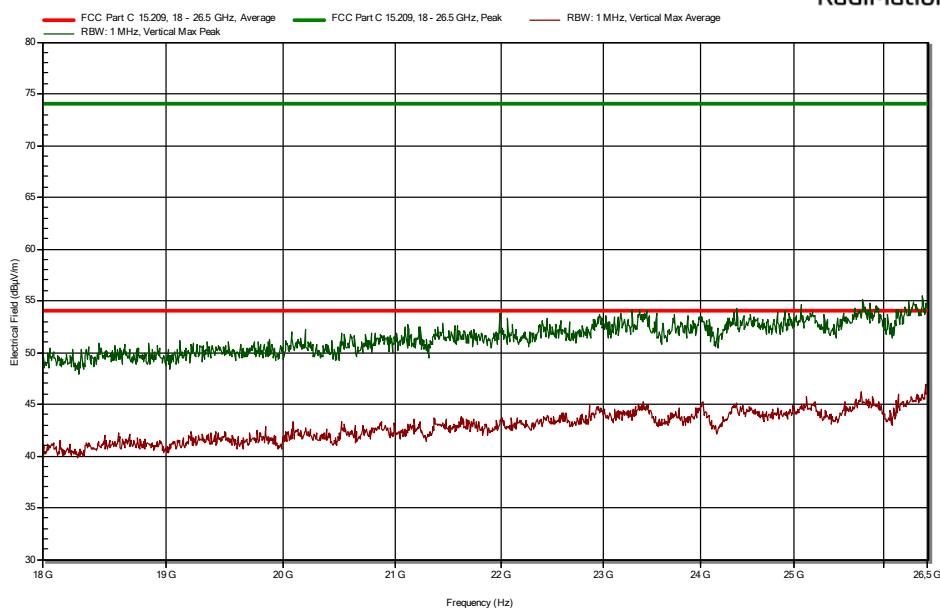
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



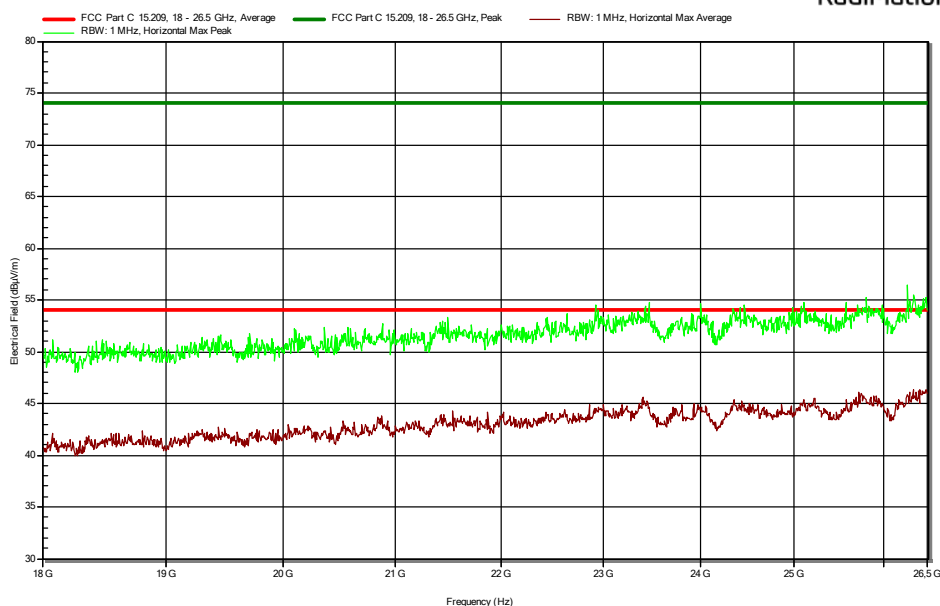
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
High channel

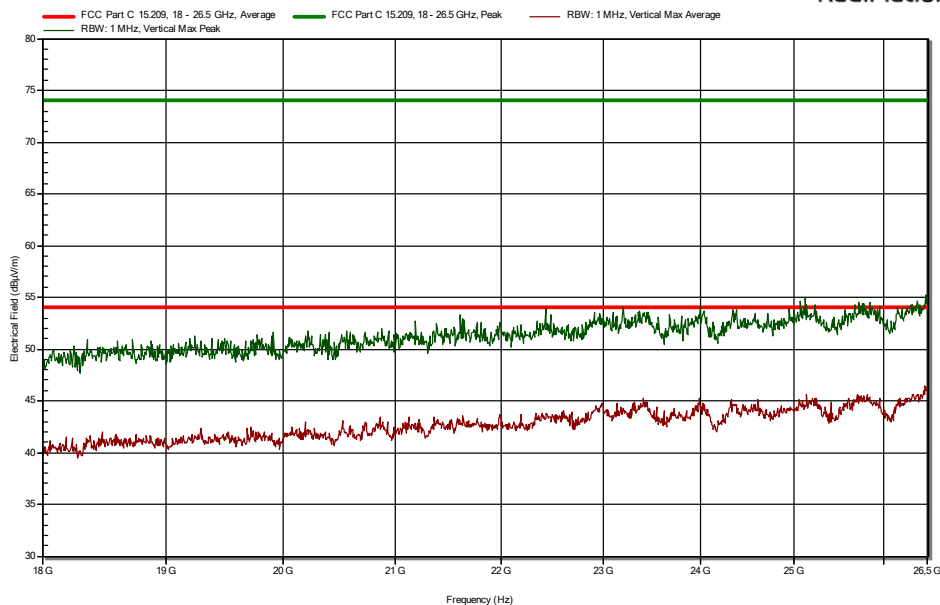
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26 GHz
(peak and average values shown)
High channel

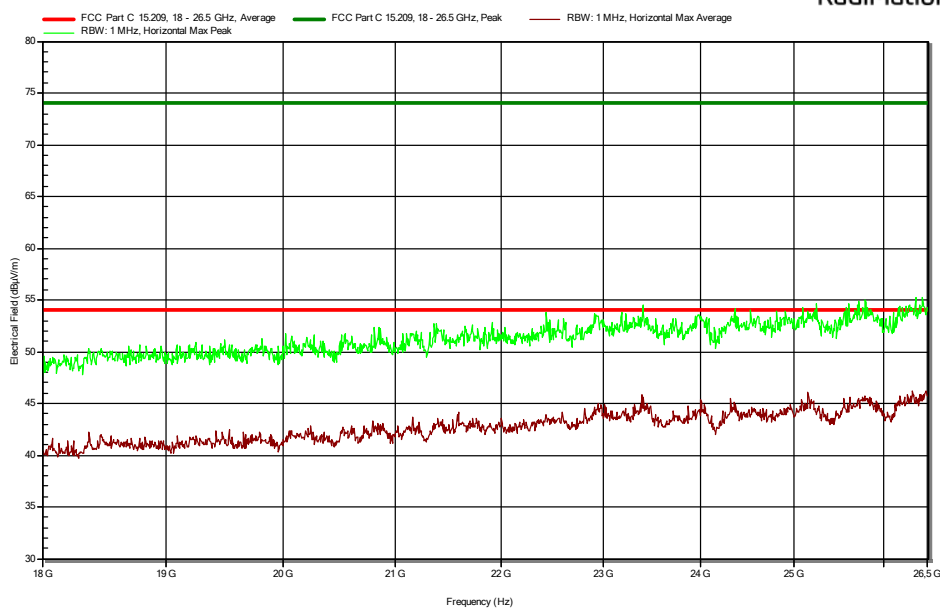
BT BR/EDR

RadiMation



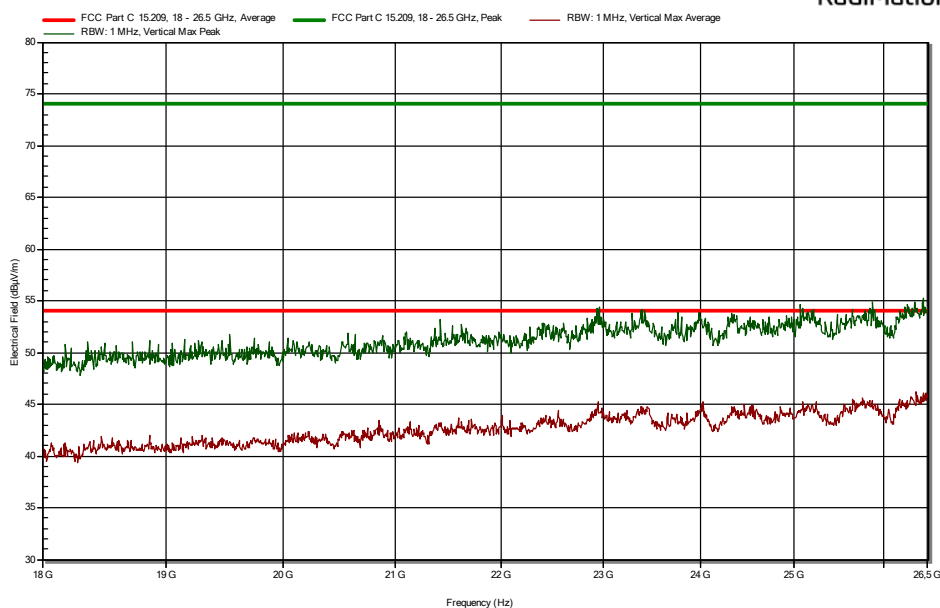
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26 GHz
(peak and average values shown)
Low channel

RadiMation



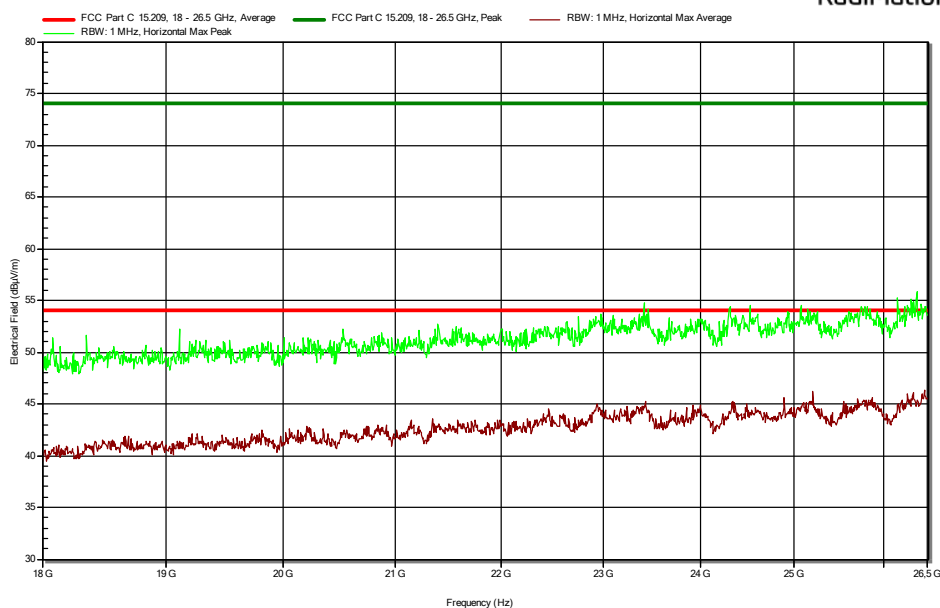
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Low channel

RadiMation



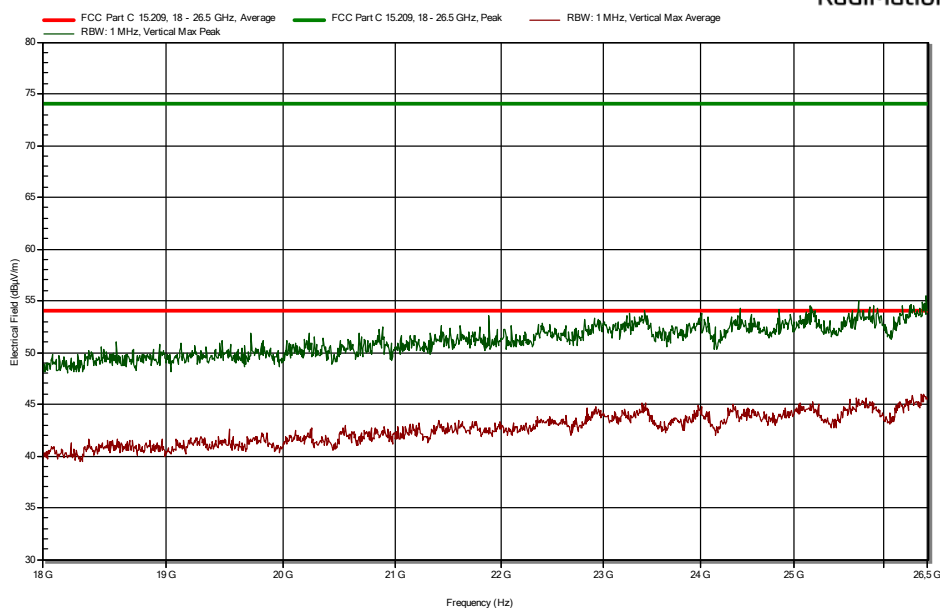
Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



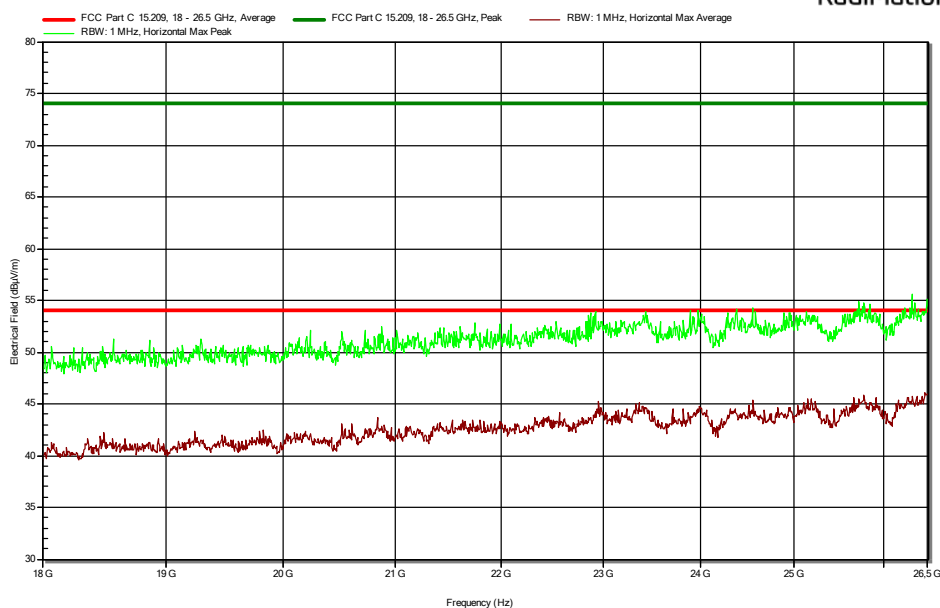
Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26GHz
(peak and average values shown)
Middle channel

RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 18 – 26GHz
(peak and average values shown)
High channel

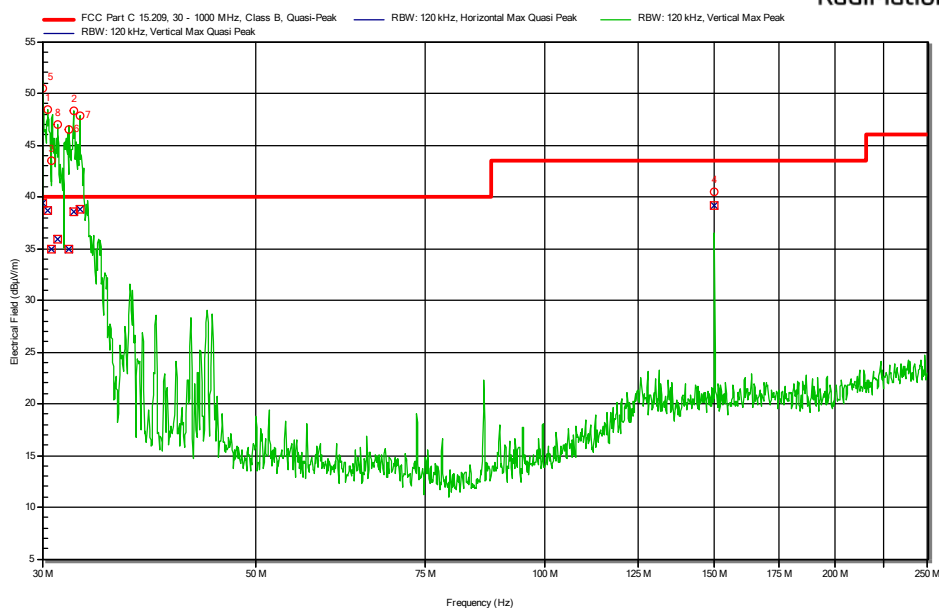
RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26 GHz
(peak and average values shown)
High channel

Co-location WLAN low channel + LTE band 2

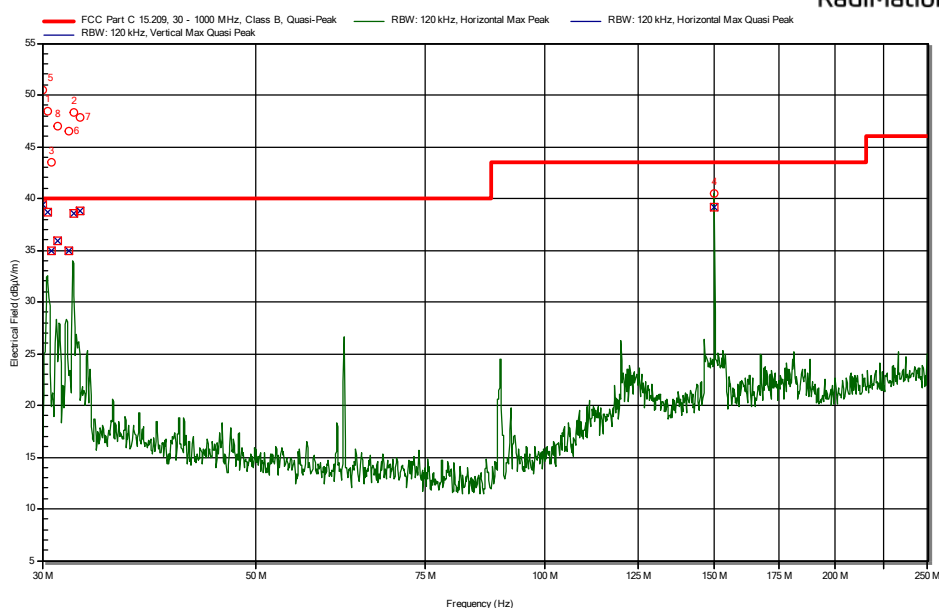
RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 30-250 MHz
(pre-scan peak values shown)

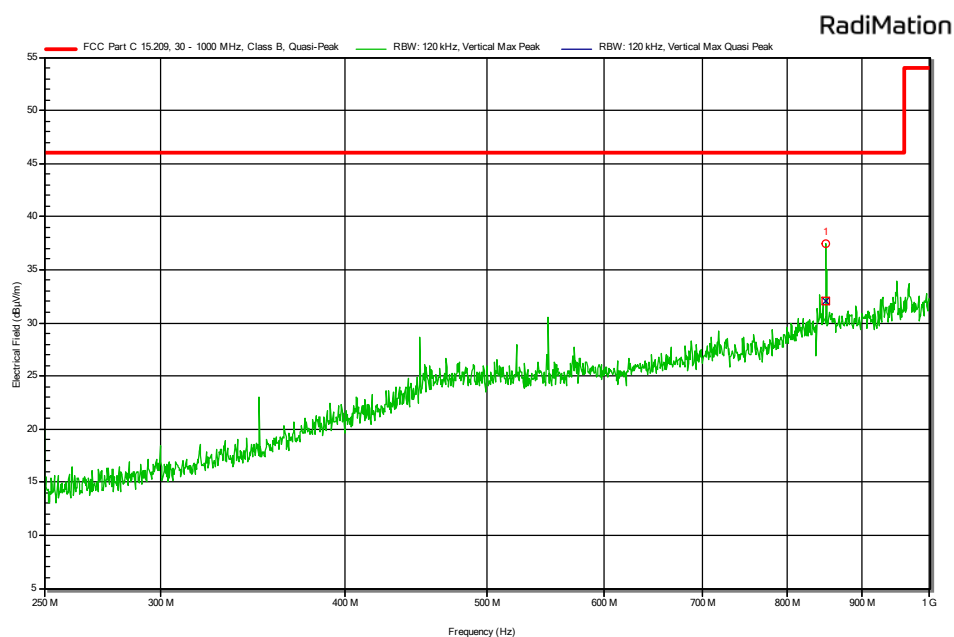
Note: tested with AC PSU in chamber

RadiMation

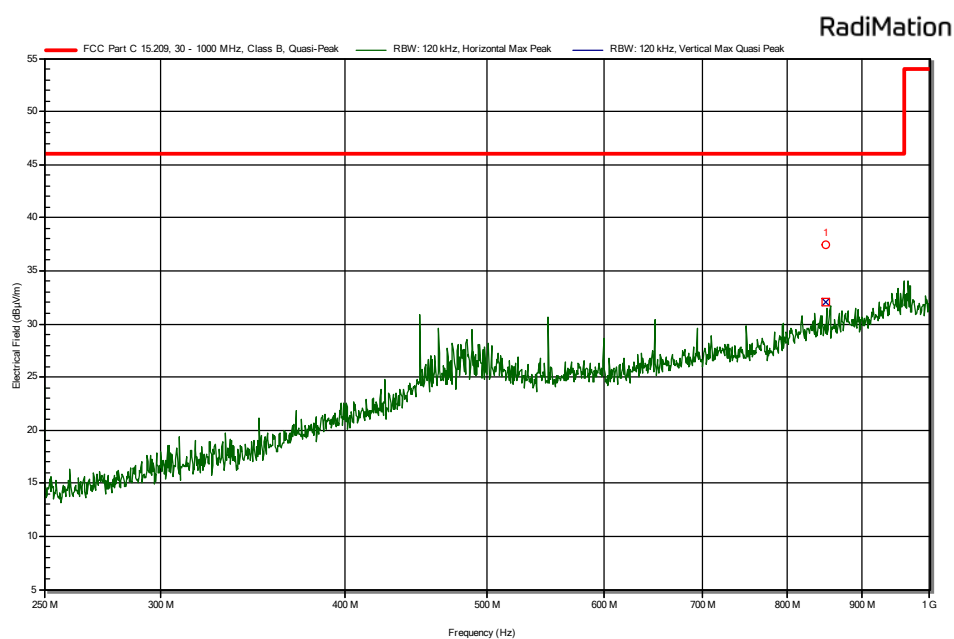


Radiated emissions of the EUT, Antenna horizontal, in the range 30-250 MHz
(pre-scan peak values shown)

Note: tested with AC PSU in chamber

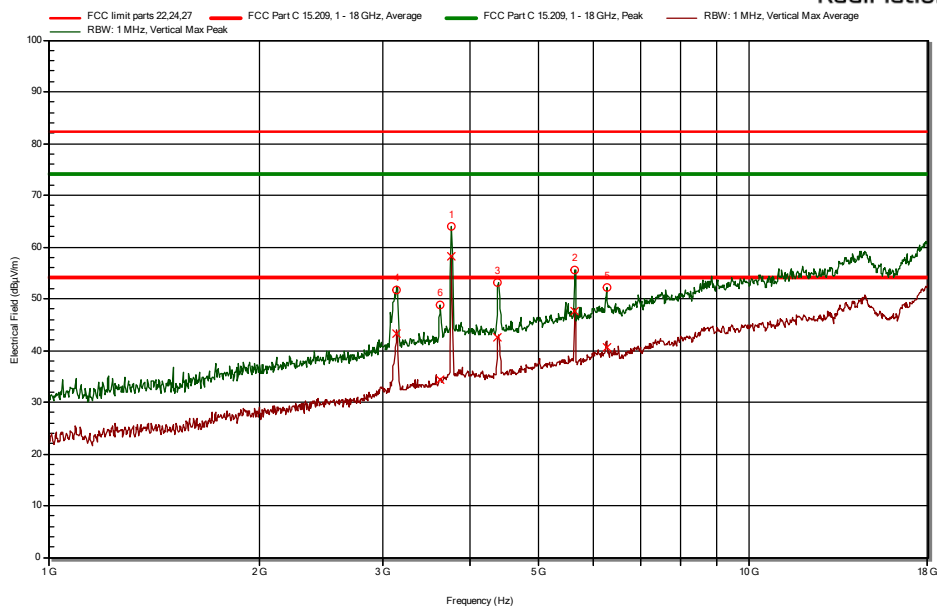


Radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)



Radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)

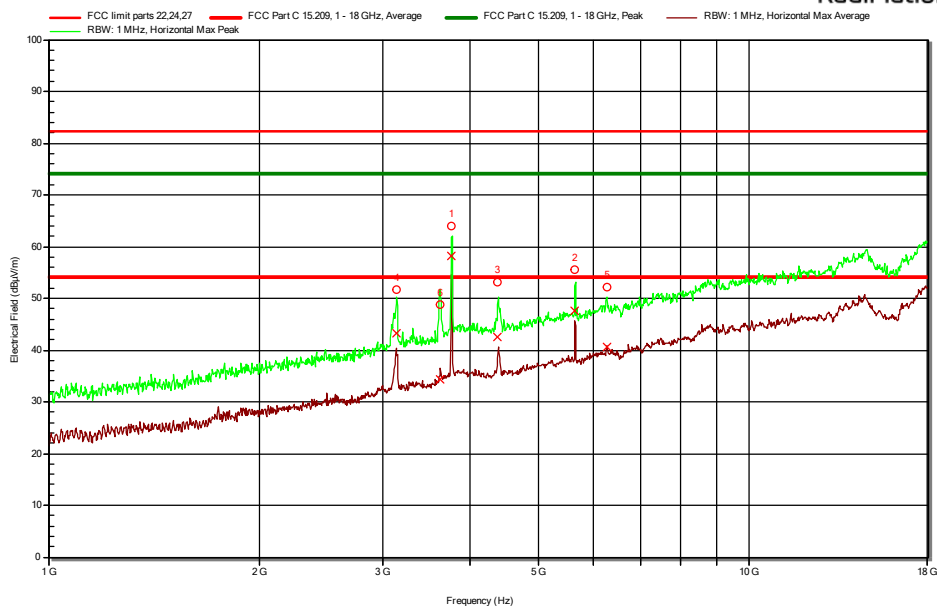
RadiMation



Radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)

Note: peak 1 is the 2 harmonic of the LTE transmission and is not subject to the 15.209 limit.

RadiMation



Radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)

Note: peak 1 is the 2 harmonic of the LTE transmission and is not subject to the 15.209 limit.

4 Sample calculations

All formulas for data conversions and conversion factors are reported in this chapter.

Conducted emission Measurement:

$$U_{\text{lisn}} (\text{dB}\mu\text{V}) = U (\text{dB}\mu\text{V}) + \text{Corr. (dB)}$$

Where:

U = Measuring receiver voltage

LISN insertion loss = Voltage division factor of LISN

Corr. = sum of single correction factors of used LISN, cables and pulse limiter.

Linear interpolation will be used for frequencies in between the values in the table.

Frequency (MHz)	Voltage division LISN (db)	Cable loss (dB)	Corr. (dB)
	114379 SN: 230000813 Rohde & Schwarz ENV 216	TE 11134	
0,15	9.7	0.02	9.72
0,2	9.68	0.03	9.71
0,3	9.68	0.03	9.71
0,5	9.69	0.08	9.77
0,7	9.69	0.25	9.94
0,8	9.69	0.25	9.94
1	9.68	0.11	9.79
2	9.7	0.15	9.85
3	9.71	0.21	9.92
5	9.72	0.21	9.93
7	9.76	0.25	10.01
8	9.77	0.25	10.02
10	9.77	0.29	10.06
15	9.84	0.34	10.18
20	9.88	0.37	10.25
25	9.97	0.43	10.4
30	10.08	0.45	10.53

Magnetic field strength measurement:

$$H \left[dB \left(\mu \frac{A}{m} \right) \right] = V[dB(\mu V)] + L_c[dB] + AF^H \left[\frac{dB}{\Omega m} \right]$$

Where:

H is the magnetic field strength (to be compared to the limit)

V is the voltage level measured by the receiver or spectrum analyzer

L_c is the cable loss

AF^H is the magnetic antenna factor

Frequency (MHz)	AF	300m to 3m and 30m to 3m correction	CL (dB)	Corr. (dB)
	114515 EMCO 6505 S/N:9112-2710		SAR cable	
0.009	18.49	104.956	0.7	-85.8
0.01	17.64	104.041	0.05	-86.4
0.02	13.23	98.02	0.07	-84.7
0.03	11.65	94.498	0.1	-82.7
0.04	10.97	91.999	0.1	-80.9
0.1	10.14	84.041	0.1	-73.8
0.2	10.01	78.02	0.1	-67.9
0.5	9.95	50.061	0.1	-40
1	9.91	44.041	0.2	-33.9
3	9.93	34.498	0.2	-24.4
5	9.93	30.061	0.3	-19.8
10	9.75	24.041	0.6	-13.7
15	9.29	20.519	0.9	-10.3
20	8.57	18.02	1	-8.5
25	7.55	16.082	0.7	-7.8
27	7.01	15.413	1.2	-7.2
30	6.03	14.498	1	-7.5

Field Strength Measurement:

$$E \text{ (dB}\mu\text{V/m)} = U \text{ (dB}\mu\text{V)} + AF \text{ (dB/m)} + \text{Corr. (dB)}$$

Where:

E = Electric field strength

U = Measuring receiver voltage

AF = Antenna factor

CL = Cable loss

Corr. = sum of single correction factors of used cable and amplifier (if applicable).

Linear interpolation will be used for frequencies in between the values in the table.

Tables shows an extract of the values.

Frequency (MHz)	AF (dB/m)	Cable loss (dB)	Attenuator	Corr. (dB)
	ID: 107818 EMCO 3109	Id: 114928	ID:114525 Hewlett Packet	
30	13.5	1.8	6	21.3
100	9.2	2.7	6	17.9
150	12.6	3.2	6	21.8
200	13.6	3.6	6	23.2
250	15.2	4.3	6	25.5

Frequency (MHz)	AF (dB/m)	Cable loss (dB)	Corr. (dB)
	ID: 114385 EMCO LPDA	Id: 114928	
250	11.8	4.3	16.1
300	13	5.1	18.1
350	14.2	5.8	20.0
400	15.6	7.3	22.9
450	17.1	7.9	25.0
500	17.3	8.0	25.3
550	17.7	8.0	25.7
600	18.4	7.7	26.1
650	19.2	7.5	26.7
700	19.7	7.7	27.4
750	20.3	7.9	28.2
800	21.4	8.2	29.6
850	22.0	8.7	30.7
900	22.1	8.9	31.0
950	22.6	9.2	31.8
1000	22.5	9.6	32.1

Frequency (MHz)	AF (dB/m)	Gain (dB)	Cable loss (dB)	Corr. (dB)
	114607 Emco 3115 SN: 9412-4377	114690 µComp Nordic MCNA-40-0010800-25-10P	114691	
1000	23.6	45.1	2.1	-19.4
2000	27.1	44.7	3.3	-14.3
3000	30.5	44.2	4.2	-9.5
4000	32.7	43.5	4.9	-5.9
5000	33.2	43.1	5.6	-4.3
6000	34.6	43.0	6.3	-2.1
7000	35.2	42.9	6.4	-1.3
8000	37.0	43.3	7.2	0.9
9000	38.1	43.3	7.9	2.7
10000	38.2	43.0	8.2	3.4
11000	38.3	42.9	8.7	4.1
12000	39.1	42.6	9.0	5.5
13000	39.2	43.6	9.8	5.4
14000	41.1	44.3	9.7	6.5
15000	40.2	44.4	10.4	6.2
16000	37.5	44.3	10.8	4.0
17000	41.1	44.5	11.4	8.0
18000	44.0	44.9	11.4	10.5

Frequency (MHz)	AF (dB/m)	Gain (dB)	Cable loss (dB)	Corr. (dB)
	Kiwa ID: 114518 Flann 20240-25 SN: 163703	Kiwa ID: Schwarzbeck BBV 9721	114691	
18000	31.3	34.5	11.4	8.2
19000	31.5	34.9	11.2	7.8
20000	31.7	34.1	11.6	9.2
21000	31.9	33.6	12.1	10.4
22000	32.1	33.6	12.4	10.9
23000	32.2	33.3	13.6	12.5
24000	32.3	32.3	13.5	13.5
25000	32.4	33.0	13.4	12.8
26000	32.5	32.9	13.7	13.3

Frequency (MHz)	AF (dB/m)	Gain (dB)	Cable loss (dB)	Corr. (dB)
	Kiwa ID: 114487 Scientific Atlanta	Kiwa ID: Schwarzbeck BBV 9721	114691	
26000	35.3	32.9	13.7	16.1
27000	35.4	32.6	14.9	17.7
28000	35.6	32.6	14.4	17.4
29000	35.9	32.9	14.6	17.6
30000	36.2	32.7	15.2	18.7
31000	36.1	32.9	14.9	18.1
32000	36.0	33.8	16.7	18.9
33000	36.2	34.8	16.8	18.2
34000	36.3	35.5	15.9	16.7
35000	36.4	35.5	17.5	18.4
36000	36.5	34.6	17.9	19.8
37000	36.6	33.6	18.2	21.2
38000	36.8	32.5	17.7	22.0
39000	37.0	32.1	17.7	22.6
40000	37.2	29.9	19.0	26.3

<< END OF REPORT>>