Test report for

47 CFR Part 15 Subpart C

RSS-247, RSS-Gen

The RvA is signatory to ILAC - MRA

Product name	: TCU V5.5
Applicant	: The Goodyear Tire & Rubber Company
FCC ID	: 2BEXS-TPH55M
IC	: 32033-TPH55M

Test report No. : P000334442 007 V1.00

Laboratory information

Accreditation

Kiwa Nederland B.V. complies with the accreditation criteria for test laboratories as laid down in ISO/IEC 17025:2017. The accreditation covers the quality system of the laboratory as well as the specific activities as described in the authorized annex bearing the accreditation number L248 and is granted by the Dutch Council For Accreditation (RvA: Raad voor Accreditatie).

Kiwa Nederland B.V. is designated by the FCC as an Accredited Test Firm for compliance testing of equipment subject to Certification under Parts 15 & 18. The Designation number is: NL0001.

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The Industry Canada company number for Kiwa Nederland B.V. is: 4173A. The CABID is NL0001.

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Documentation

The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 10 years at Kiwa Nederland B.V.

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	25-10-2024	First draft	MHK
v1.00	11-12-2024	Initial release	MHK

Table of Contents

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
15.247 (a)	RSS-247 5.2(a)	6 dB bandwidth	--	NA (Pre-certified)
--	RSS-Gen 6.7	99% bandwidth	--	NA (Pre-certified)
15.247 (b)	RSS-247 5.4 (d)	RF output power	--	NA (Pre-certified)
15.247 (e)	RSS-247 5.2 (b)	Power spectral density	--	NA (Pre-certified)
15.247 (d)	RSS-247 5.5	Band edge	--	NA (Pre-certified)
15.207 (c)	RSS-Gen 8.8	AC power-line conducted emissions	--	NA (Vehicular use battery powered)
--	RSS-210 Annex D	Field strength of emissions	3.1	NA (Not a licence-exempt category 1 radio apparatus)

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

1 General Description

1.1 Applicant

Client name:	The Goodyear Tire & Rubber Company
Address:	200 Innovation Way, OH 44316 Akron, USA
Telephone:	00352691964033
E-mail:	chris_helsel@goodyear.com
Contact name:	Christopher P. Helsel

1.2 Manufacturer

Manufacturer name:	IOSiX, LLC
Address:	1161 Oak Valley Dr, MI 48108 Ann Arbor, USA
Telephone:	0014158002060
E-mail:	info@iosix.com
Contact name:	Robert Vogt

1.3 Tested Equipment Under Test (EUT)

Product name:	TCU V5.5
Brand name:	Goodyear
FCC ID:	2BEXS-TPH55M
IC:	32033-TPH55M
Product description:	IoT gateway for vehicle and tire remote monitoring
Variant model(s):	--
Batch and/or serial No.	--
Software version:	--
Hardware version:	--
Date of receipt	05-04-2024
Tests started:	06-05-2024
Testing ended:	30-10-2024

1.3.1 Auxiliary items

AUX1

Product name:	Lenovo ThinkPad
Product type:	Notebook
Remarks:	Connects to EUT USB port, property test lab

1.4 Product specifications of Equipment under test

Tx Frequency:	2412-2462MHz (Wi-Fi) 2402-2480 (Bluetooth)
Rx frequency:	2412-2462MHz (Wi-Fi) 2402-2480 (Bluetooth) 433.92MHz (Rx only) GNNS 1559-1610 MHz (Rx only)
Occupied channel width:	Wi-Fi:20 MHz, 40 MHz BLE: 1 MHz, 2 MHz
Antenna type:	PCB inverted F (Wi-Fi/ BLE) and Folded inverted F (433.92MHz)
Antenna gain:	2.87dBi (Wi-Fi/BLE) & -5 dB Folded inverted F (433.92MHz)
Type of modulation:	GFSK, π/4-DQPSK,8-DPSK,BPSK, QPSK, 16QAM, 64QAM
Emission designator	Wi-Fi: 20M0F1D, 40M0F1D BLE: 1M00F1D, 2M00F1D

Disclaimer: The operating frequency bands are declared by the applicant

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 §15.247
- RSS-Gen Issue 5
- RSS-247 Issue 3

1.8 Observation and remarks

Device uses pre-certified module (ESP32).

1.9 Modifications to the EUT (Equipment Under Test)

None

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. M.H. Khan

Review of test methods and report by:

Name : P. van Wanrooij, BSc.

The above conclusions have been verified by the following signatory:

Date : 07-01-2025

Name : P. van Wanrooij

Function : Test Engineer

Signature :

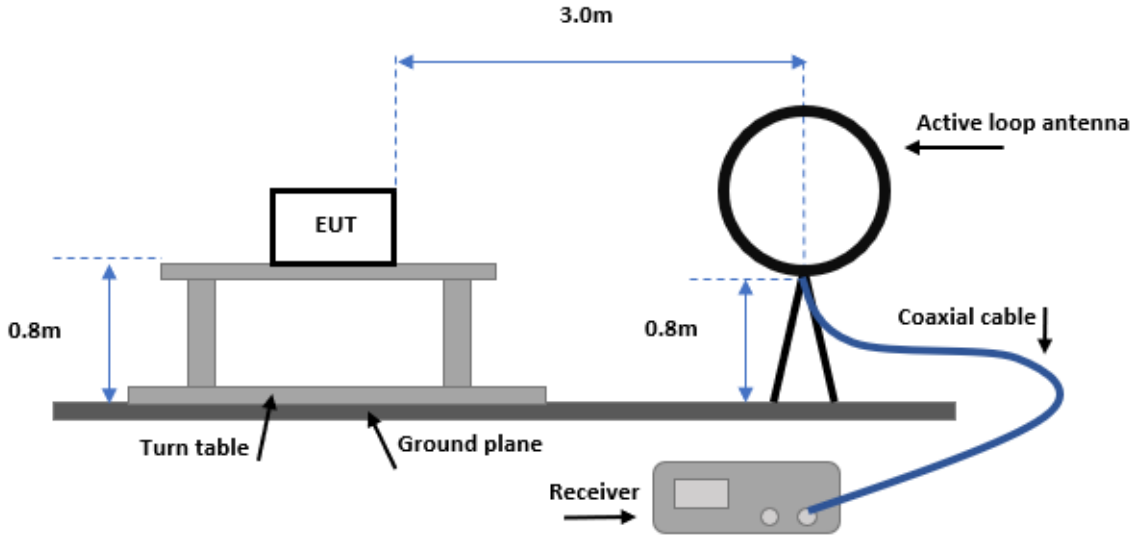
2 Test configuration of the Equipment Under Test

2.1 Test mode

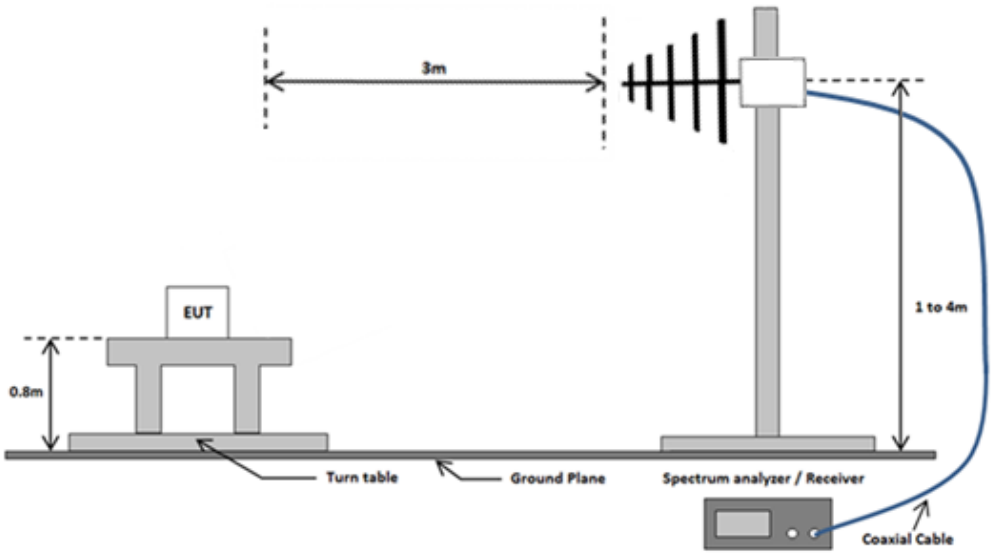
Customer has provided device prepared with a test mode. The devices for Wi-Fi and BLE testing are flashed with Espressif RF test firmware. Test firmware allowed the engineer to set Wi-Fi channels and technology.

2.2 Test setups

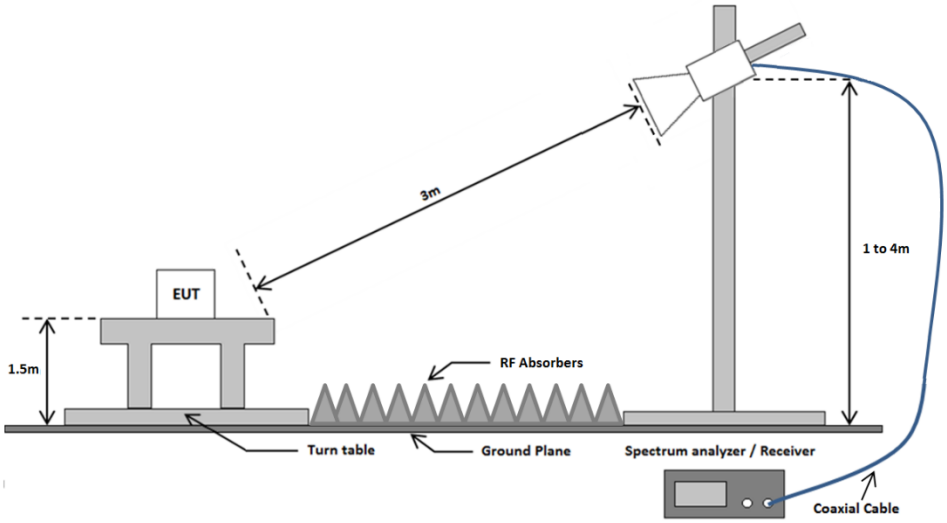
Radiated emissions test setup 9 kHz – 30 MHz



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



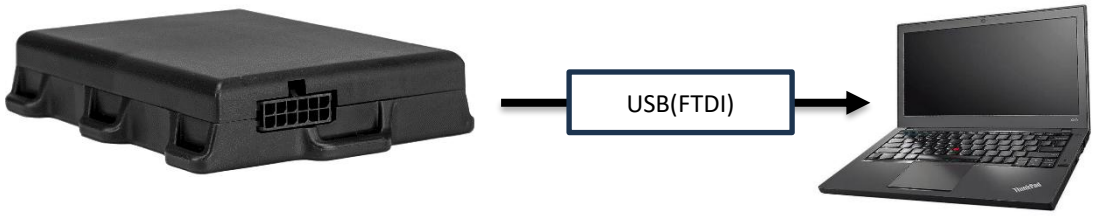


Figure 1. EUT and auxiliary setup

List of used cables					
Number	**Function**	**From**	**To**	**Length**	**Remarks**
1	12-24 Vdc power	EUT	Battery	< 3m	-
2	USB	EUT	Test laptop	<3m	-

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	114605	11-2024	11-2025	3.1
Spectrum Analyzer	Rohde & Schwarz	FSV3044	114923	10-2023	10-2025	3.1
Active loop antenna	EMCO	6502	114515	01-2022	01-2025	3.1 and 3.2
Biconical antenna + 6dB attenuator	Schwarzbeck + HP	VHA9103 + 8491A	114436 + 114254	08-2024	08-2027	3.1
Logperiodic antenna	EMCO	3147	114385	02-2021	02-2026	3.1
Horn antenna	EMCO	3115	114607	01-2021	01-2025	3.1
Horn antenna	FLANN-MICROWAVE	20240-25	114518	NA*	NA*	3.1
Preamplifier	µComp	MCNA-40-001080	114771	05-2022	05-2024	3.1
Preamplifier 18-40 GHz	Schwarzbeck	BBV 9721	115434	01-2024	01-2025	3.1
Semi-Anechoic room	ETS Lindgren	SAR	114624	03-2023	03-2026	3.1 and 3.2
Test software	Raditeq	Radimation Version 2023.2.3	--	--	--	3.1;3.2

*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 Output Power Measurement

3.1.1 Limit

FCC: For systems using digital modulation in the 2400-2483.5 MHz, the limit for the peak output power is 1W (30 dBm). If transmitting antenna of directional gain greater than 6 dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point to point operation, the limit has to be reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

RSS: For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4W

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

The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02.
IRN 402 - RF power (W) - Method 1 – AVGSA (DTS) according to ANSI C63.10.

3.1.5 Test results of Output Power Measurement

Peak method

Technology Std.	Channel	Frequency (MHz)	Data rate	Peak output power conducted (dBm)	Peak output power conducted (W)	Peak output power EIRP (W)
Bluetooth Low Energy	37	2402	1 Mbps	-4.87	0.0033	0.00063
	18	2444	1 Mbps	-4.87	0.0033	0.00063
	39	2480	1 Mbps	-4.87	0.0033	0.00063
Uncertainty				±0.71 dB		

Technology Std.	Channel	Frequency (MHz)	Data rate	Peak output power conducted (dBm)	Peak output power conducted (W)	Peak output power EIRP (W)
802.11b	1	2412	1 Mbps	9.13	0.0082	0.01558
	7	2442	1 Mbps	8.13	0.0065	0.01260
	11	2462	1 Mbps	5.43	0.0035	0.00680
Uncertainty				±0.71 dB		

Technology Std.	Channel	Frequency (MHz)	Data rate	Peak output power conducted (dBm)	Peak output power conducted (W)	Peak output power EIRP (W)
802.11n 40MHz	3	2422	1 Mbps	9.13	0.0082	0.01230
	7	2442	1 Mbps	8.13	0.0065	0.00100
	11	2462	1 Mbps	5.43	0.0035	0.00680
Uncertainty				±0.71 dB		

3.2 Radiated spurious emissions

3.2.1 Limit

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*{log[2400]-log[F(kHz)]}	300*
0.490 – 1.705	24000/F(kHz)	20*{log[24000]-log[F(kHz)]}	30*
1.705 – 13.11 14.01 – 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

3.2.2 Measurement instruments

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

3.2.3 Test setup

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

3.2.4 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 410 – Method 1
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.

3.2.5 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

3.2.6 Test results

Highest measured peaks reported.

30-250 MHz BLE Middle Channel

Peak Number	Frequency	Peak	Quasi-Peak	Quasi-Peak Limit	Status	Polarization	Height
2	92.376 MHz	20.7 dBµV/m	11.3 dBµV/m	43.5 dBµV/m	Pass	Vertical	1.5 m
1	167.161 MHz	25 dBµV/m	13.3 dBµV/m	43.5 dBµV/m	Pass	Horizontal	2.3 m
3	49.624 MHz	27.3 dBµV/m	16.6 dBµV/m	40 dBµV/m	Pass	Vertical	2.8 m
4	77.506 MHz	15.3 dBµV/m	4.2 dBµV/m	40 dBµV/m	Pass	Vertical	3 m

30-250 MHz BLE High Channel

Peak Number	Frequency	Peak	Quasi-Peak	Quasi-Peak Limit	Polarization	Status	Height
1	71.993 MHz	44.5 dBµV/m	38.9 dBµV/m	40 dBµV/m	Horizontal	Pass	3.2 m
2	74.023 MHz	41.2 dBµV/m	37.7 dBµV/m	40 dBµV/m	Horizontal	Pass	2.7 m
3	220.156 MHz	43.3 dBµV/m	39.8 dBµV/m	46 dBµV/m	Horizontal	Pass	3.0 m
4	50.501 MHz	39.2 dBµV/m	32.5 dBµV/m	40 dBµV/m	Vertical	Pass	1.0 m

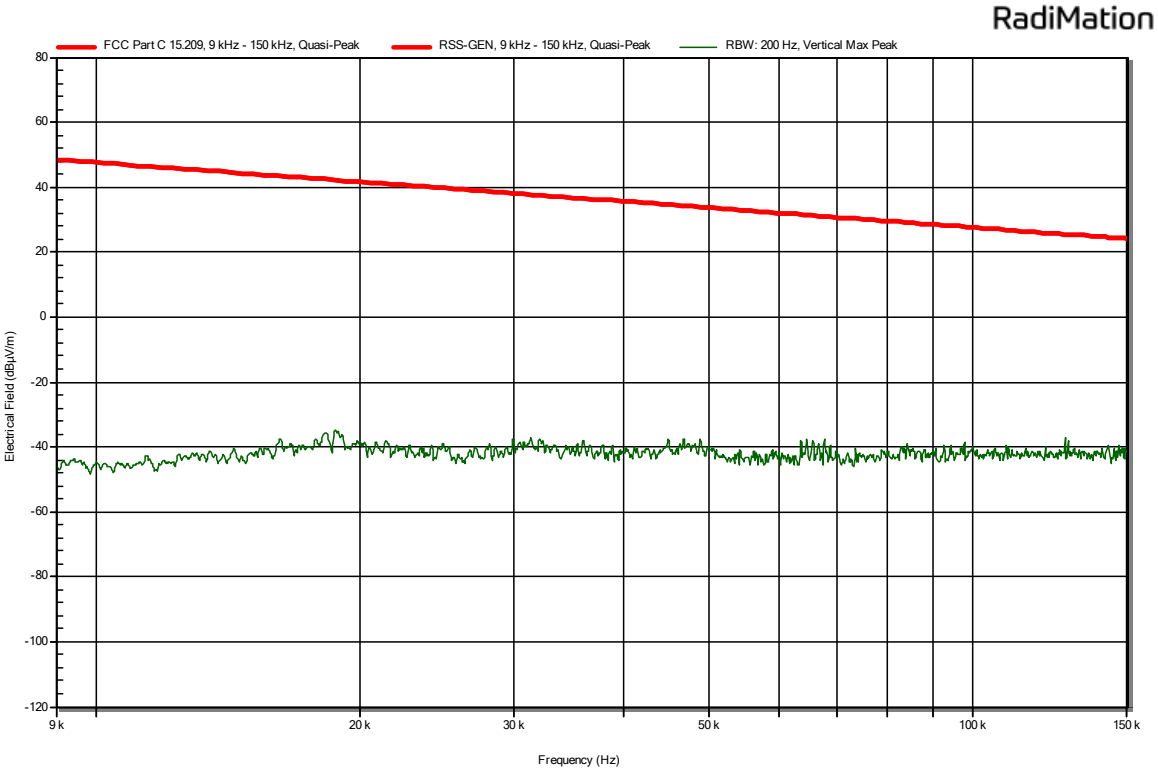
30-250 MHz 802.11b Middle Channel

Peak Number	Frequency	Peak	Quasi-Peak	Quasi-Peak Limit	Polarization	Status	Height
2	46.054 MHz	15.5 dBµV/m	4.9 dBµV/m	40 dBµV/m	Vertical	Pass	1.0 m
1	79.938 MHz	10.4 dBµV/m	-0.9 dBµV/m	40 dBµV/m	Vertical	Pass	2.1 m
3	93.969 MHz	13 dBµV/m	1 dBµV/m	43.5 dBµV/m	Horizontal	Pass	2.4 m

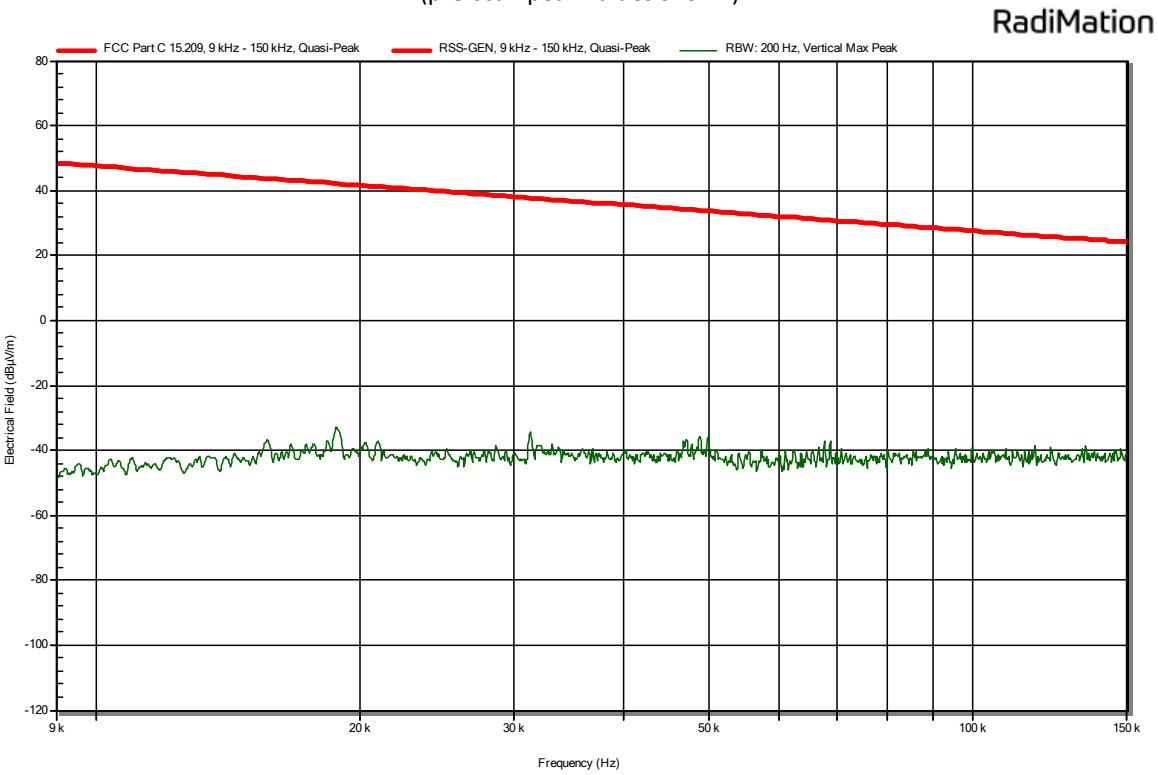
30-250 MHz 802.11b High Channel

Peak Number	Frequency	Peak	Quasi-Peak	Quasi-Peak Limit	Polarization	Status	Height
1	68.083 MHz	10.7 dBµV/m	-1.4 dBµV/m	40 dBµV/m	Horizontal	Pass	2.8 m

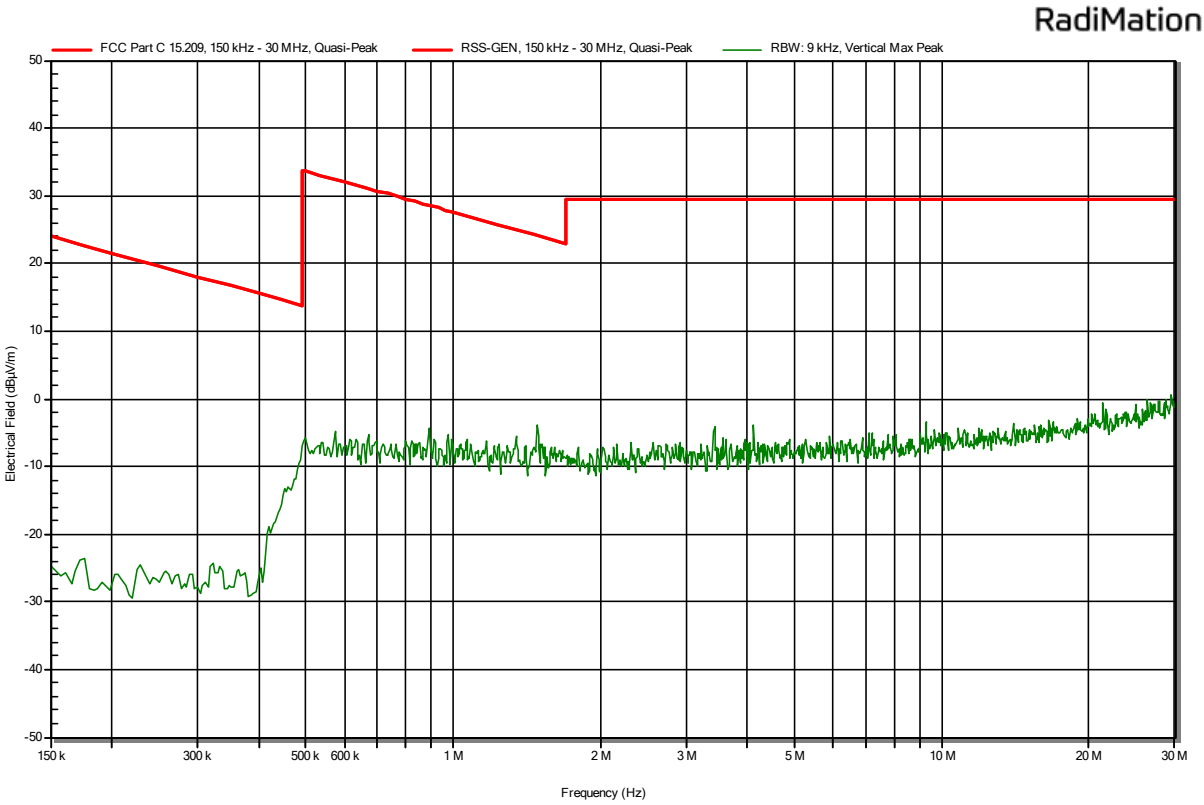
3.2.7 Plots of the Radiated Spurious Emissions Measurement BLE



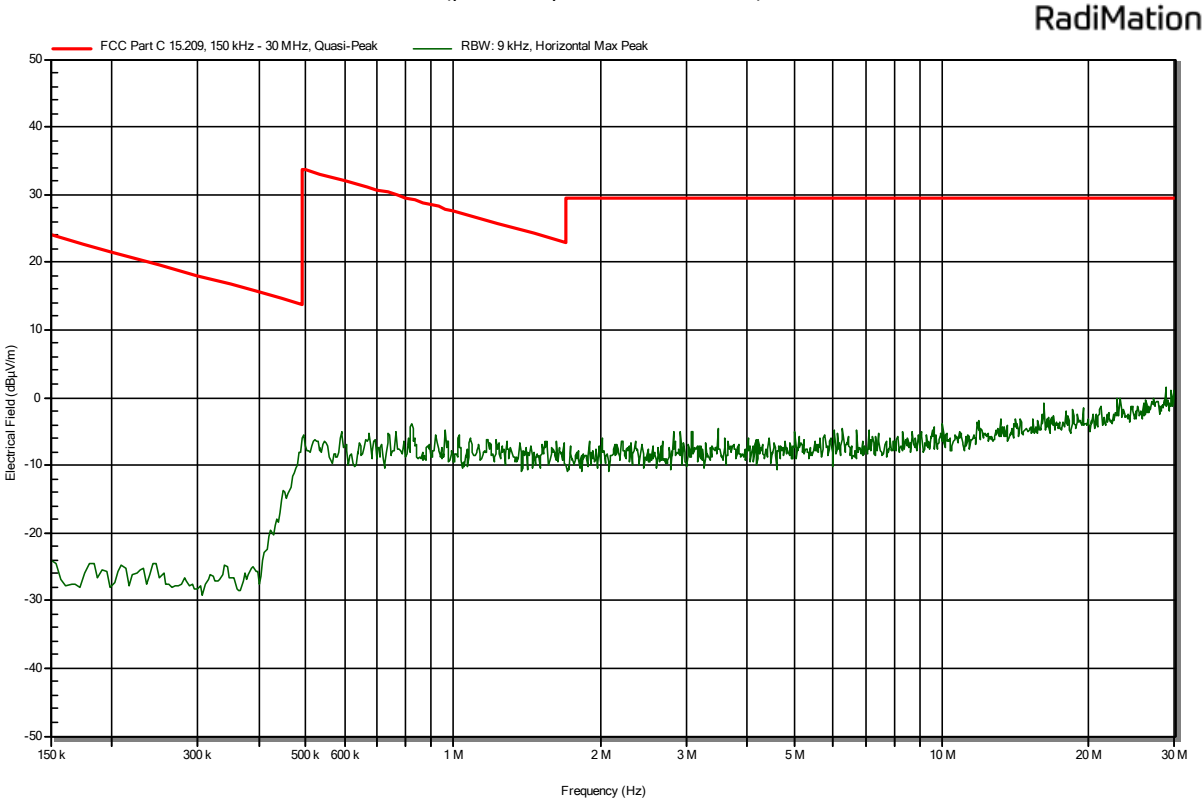
Plot 1a: radiated emissions of the EUT, Antenna perpendicular, in the range 9 – 150KHz
(pre-scan peak values shown)



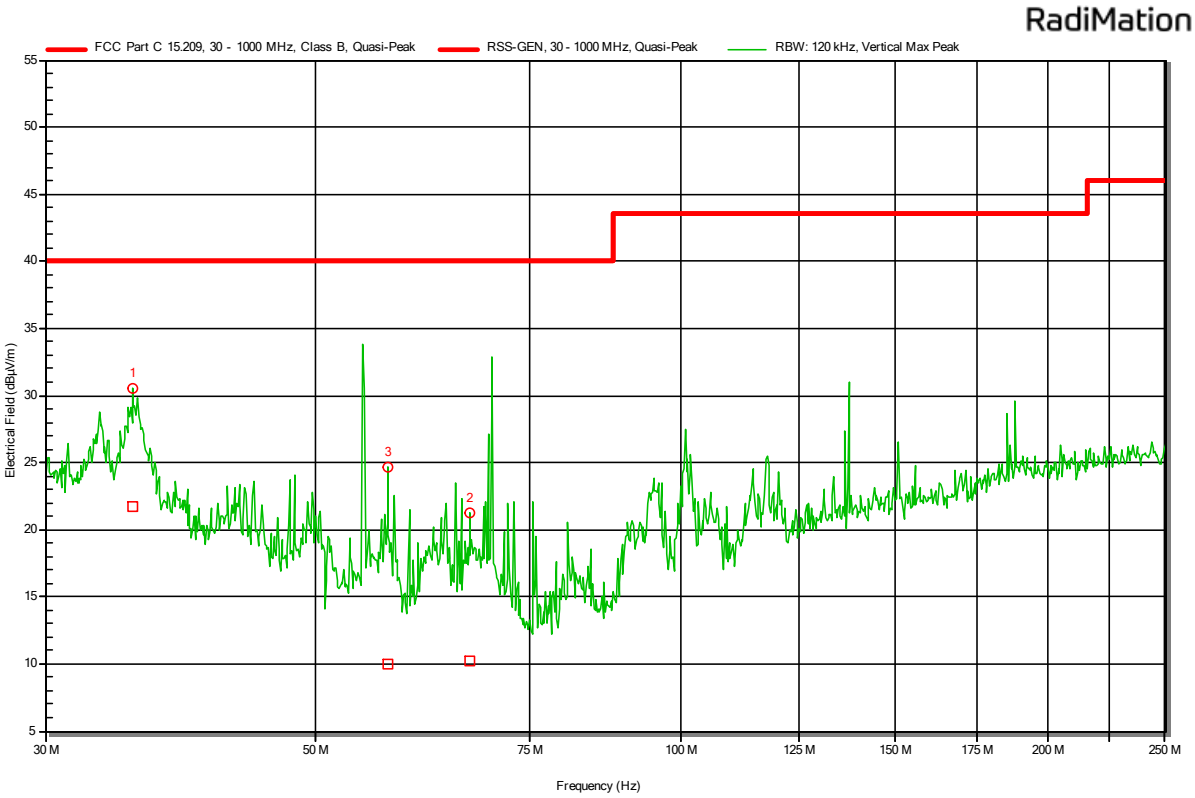
Plot 1b: radiated emissions of the EUT, Antenna parallel, in the range 9 – 150KHz
(pre-scan peak values shown)



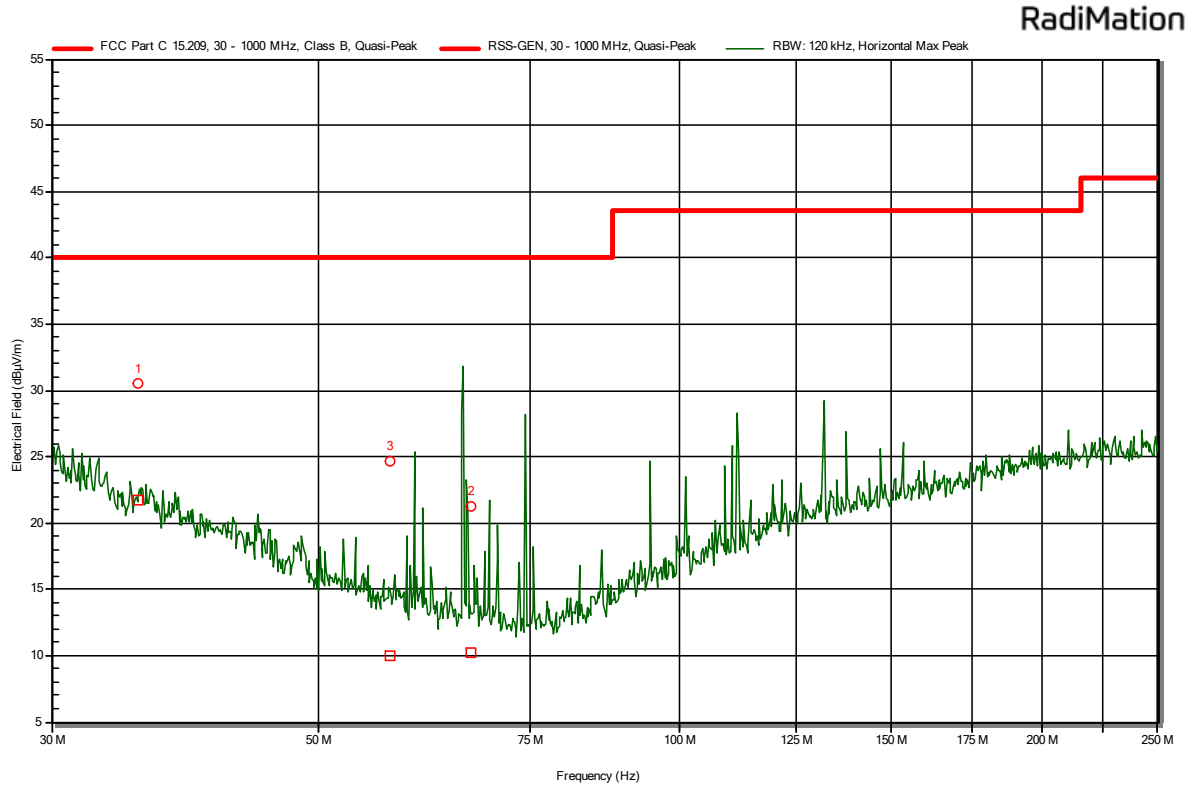
Plot 2a: radiated emissions of the EUT, Antenna perpendicular, in the range 150KHz-30 MHz (pre-scan peak values shown)



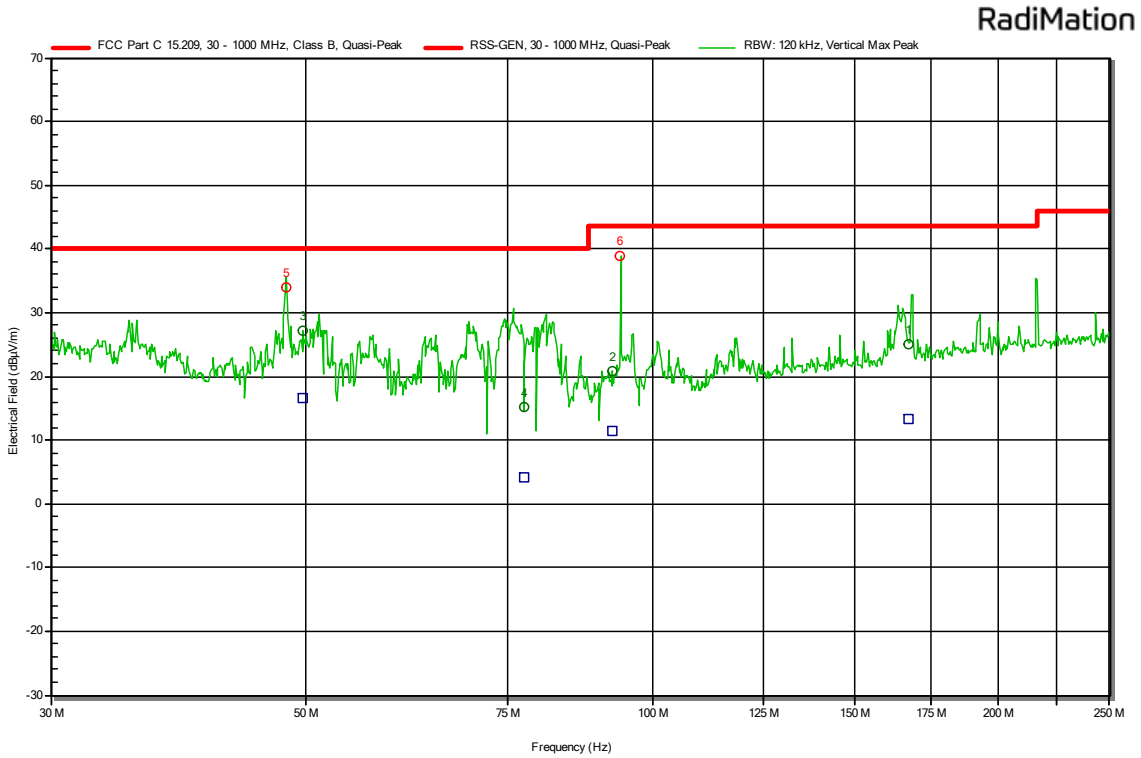
Plot 2b: radiated emissions of the EUT, Antenna parallel, in the range 150KHz-30 MHz (pre-scan peak values shown)



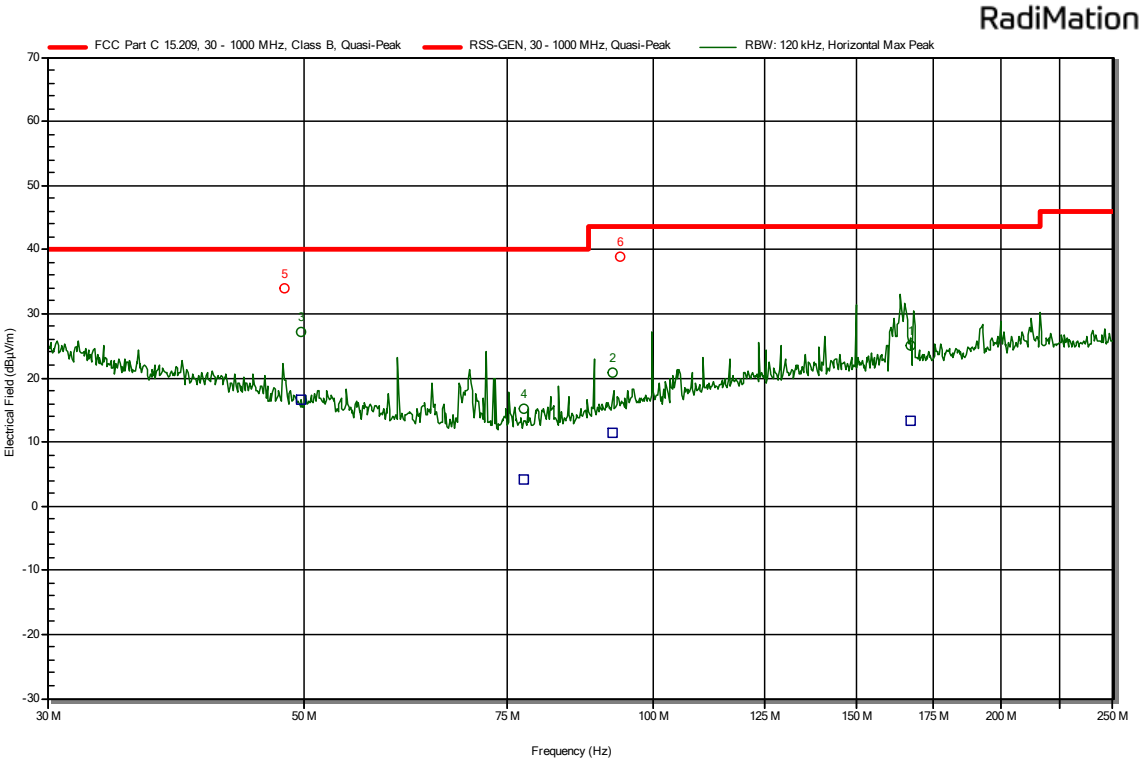
Plot 3a: radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel



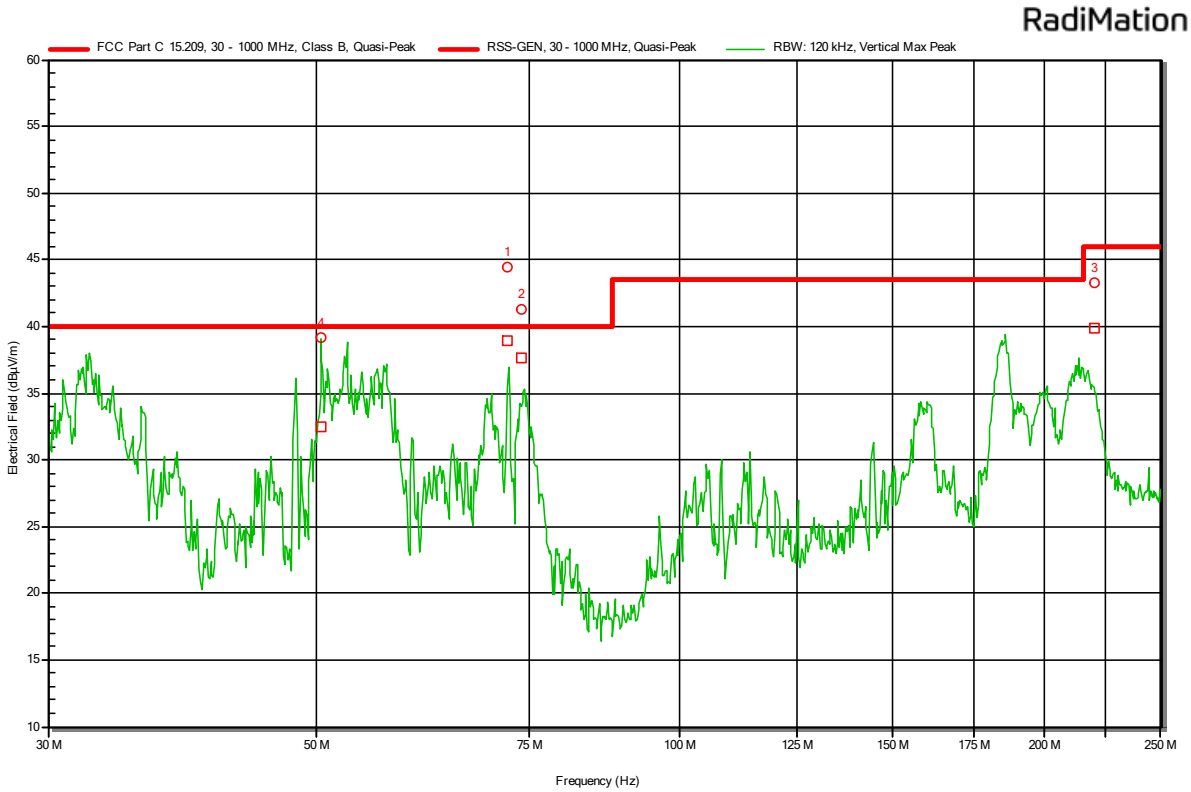
Plot 3b: radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel



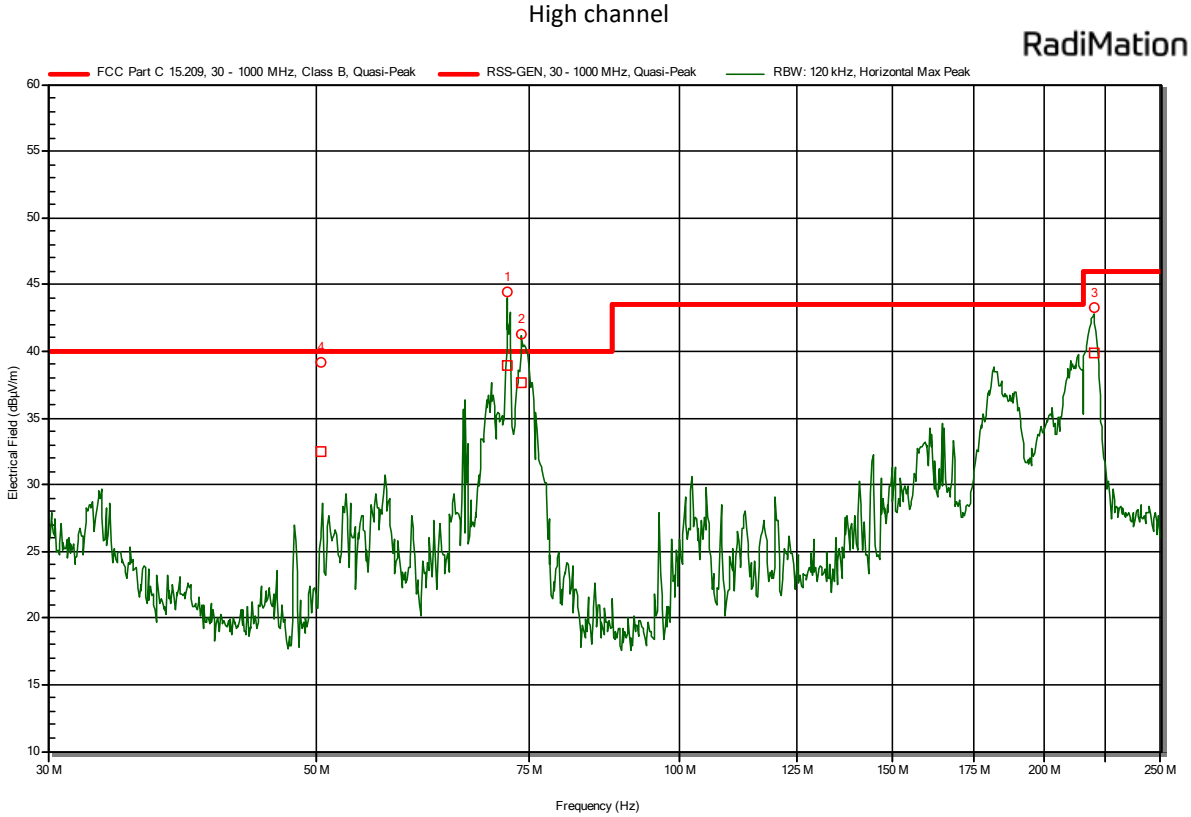
Plot 3c: radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel



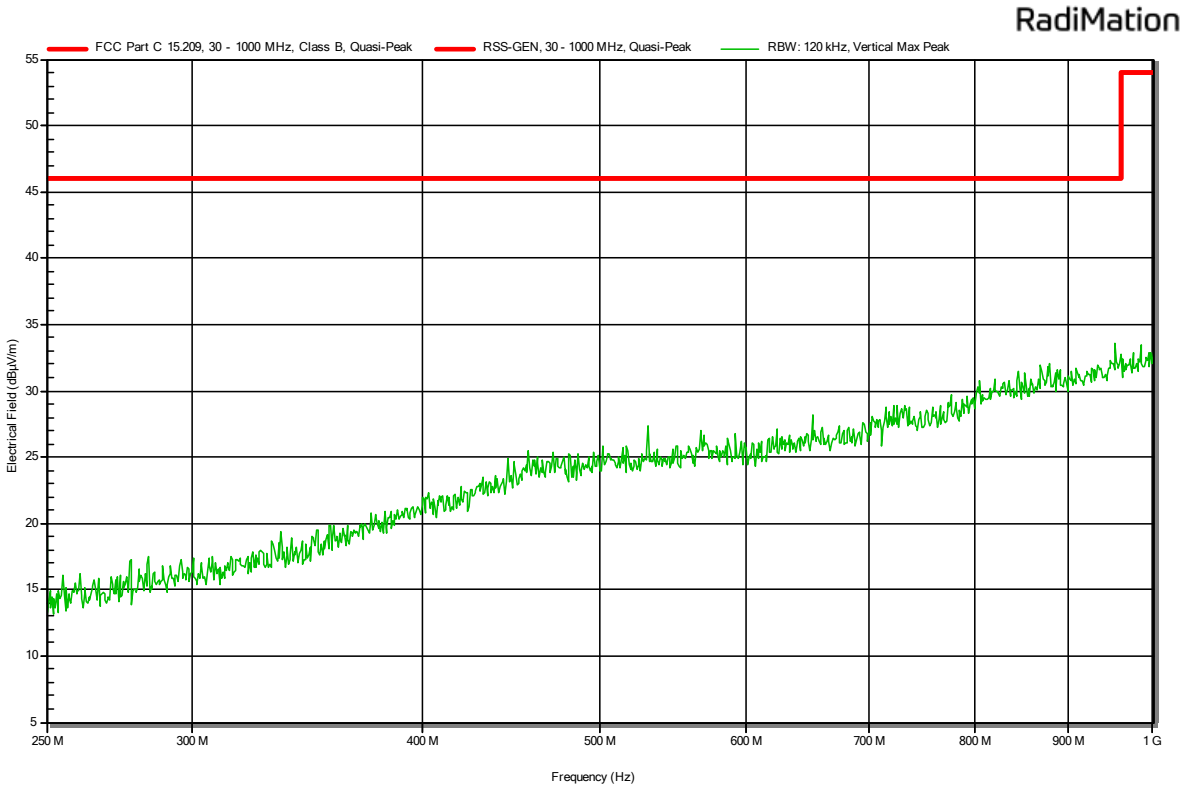
Plot 3d: radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel



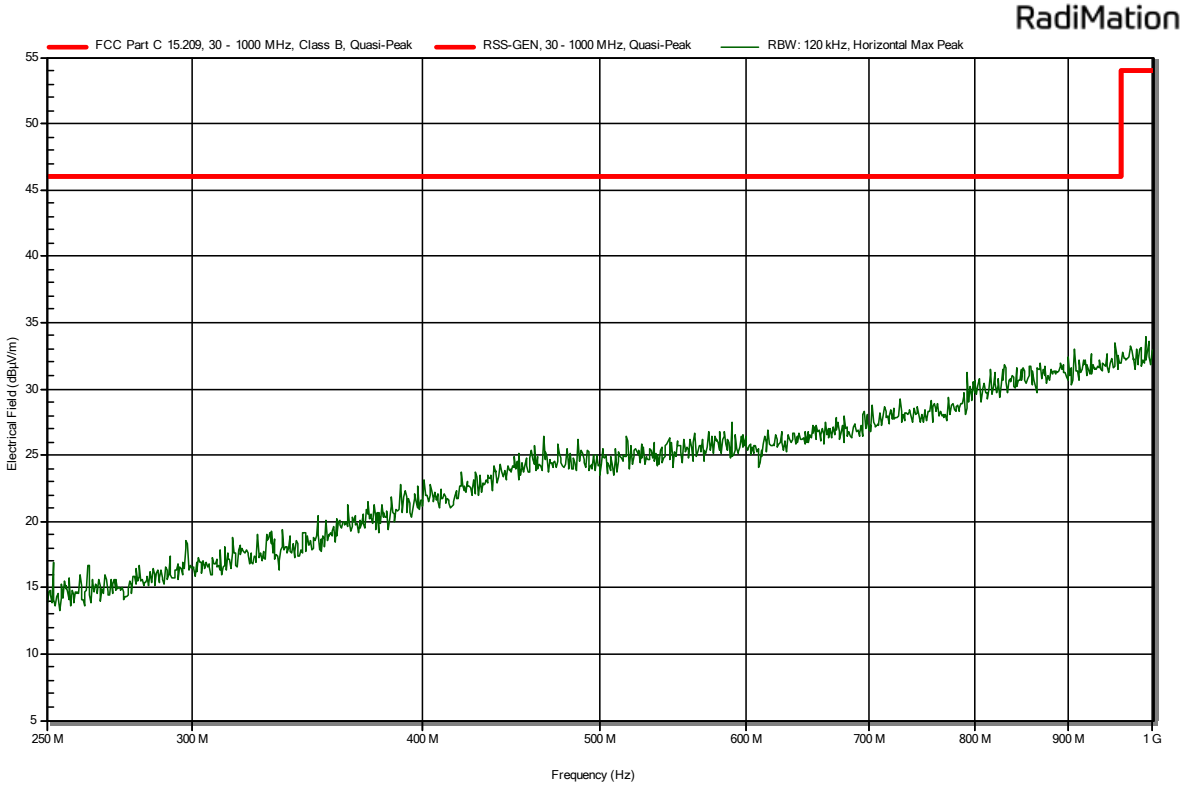
Plot 3e: radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel



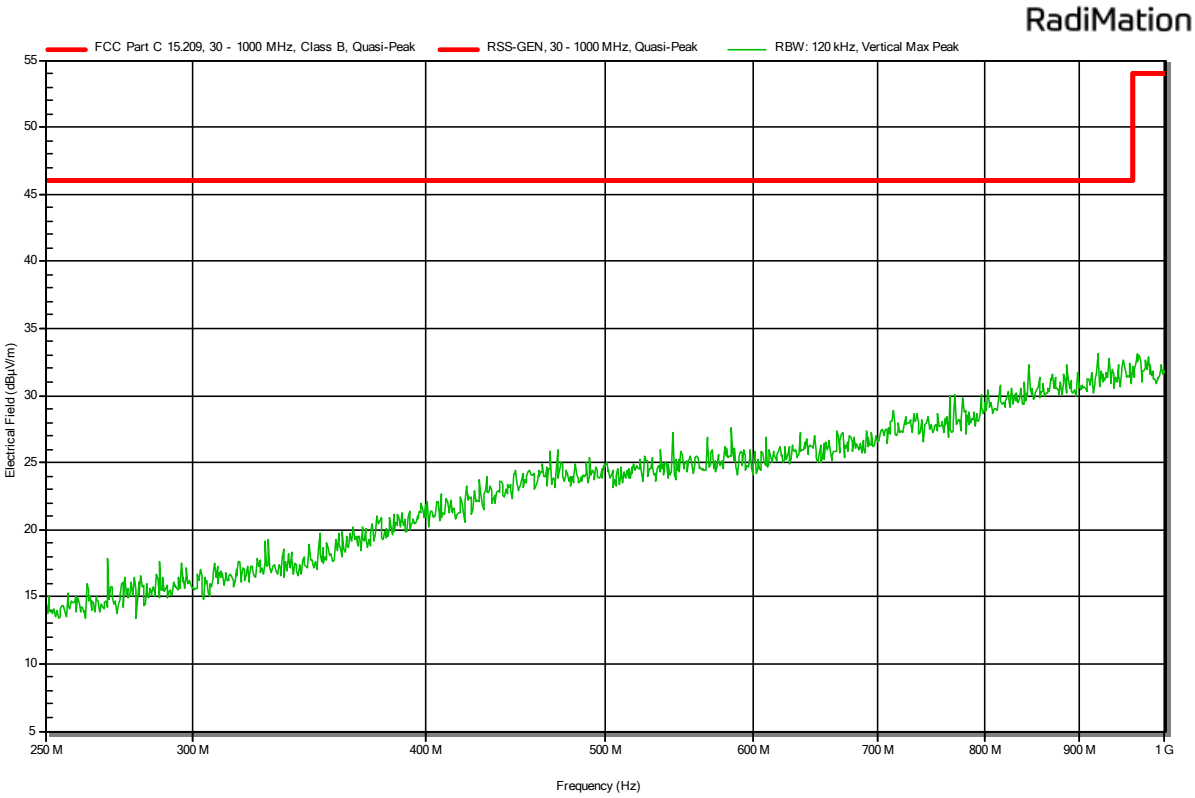
Plot 3f: radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel



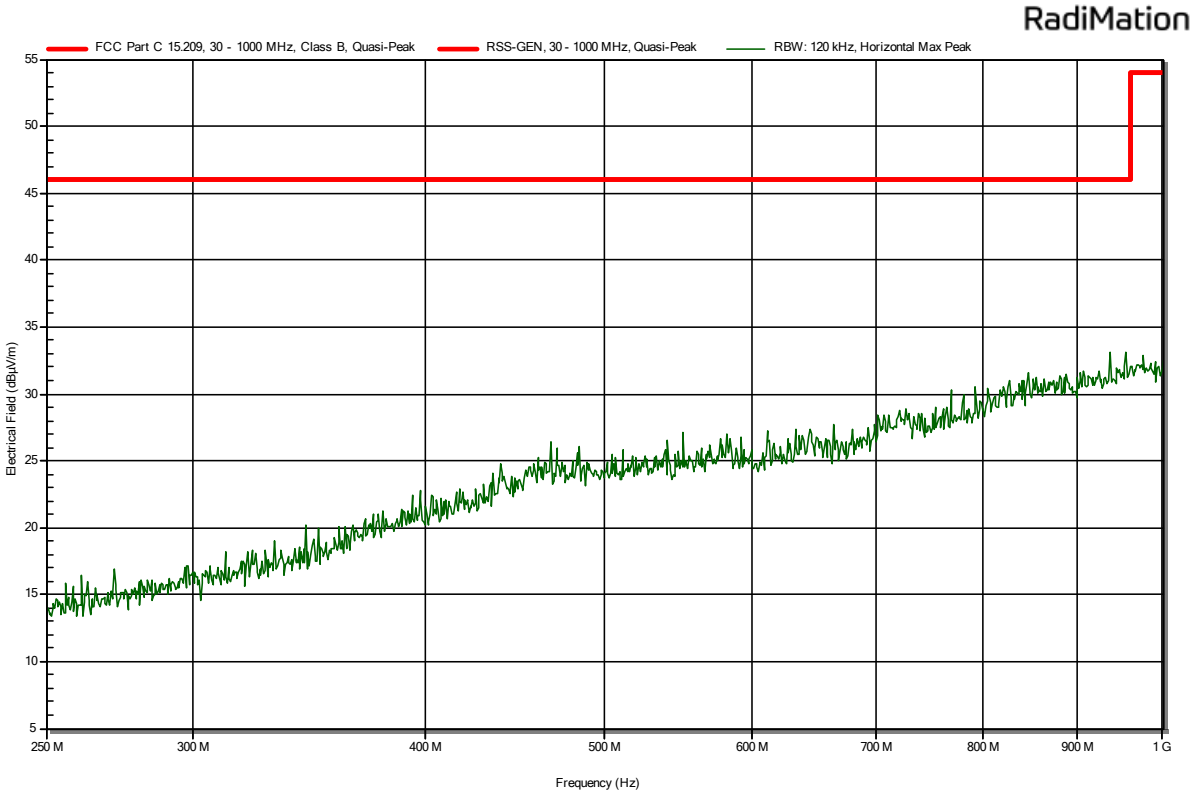
Plot 4a: radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel



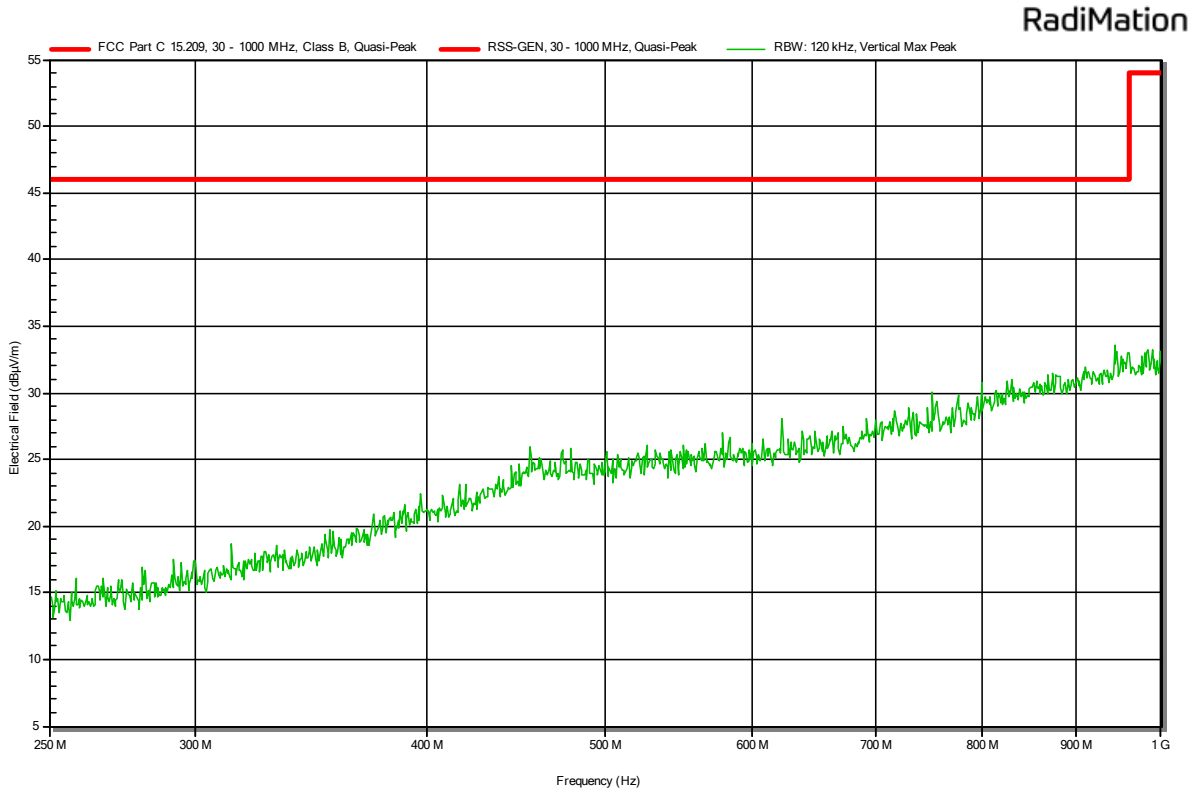
Plot 4b: radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel



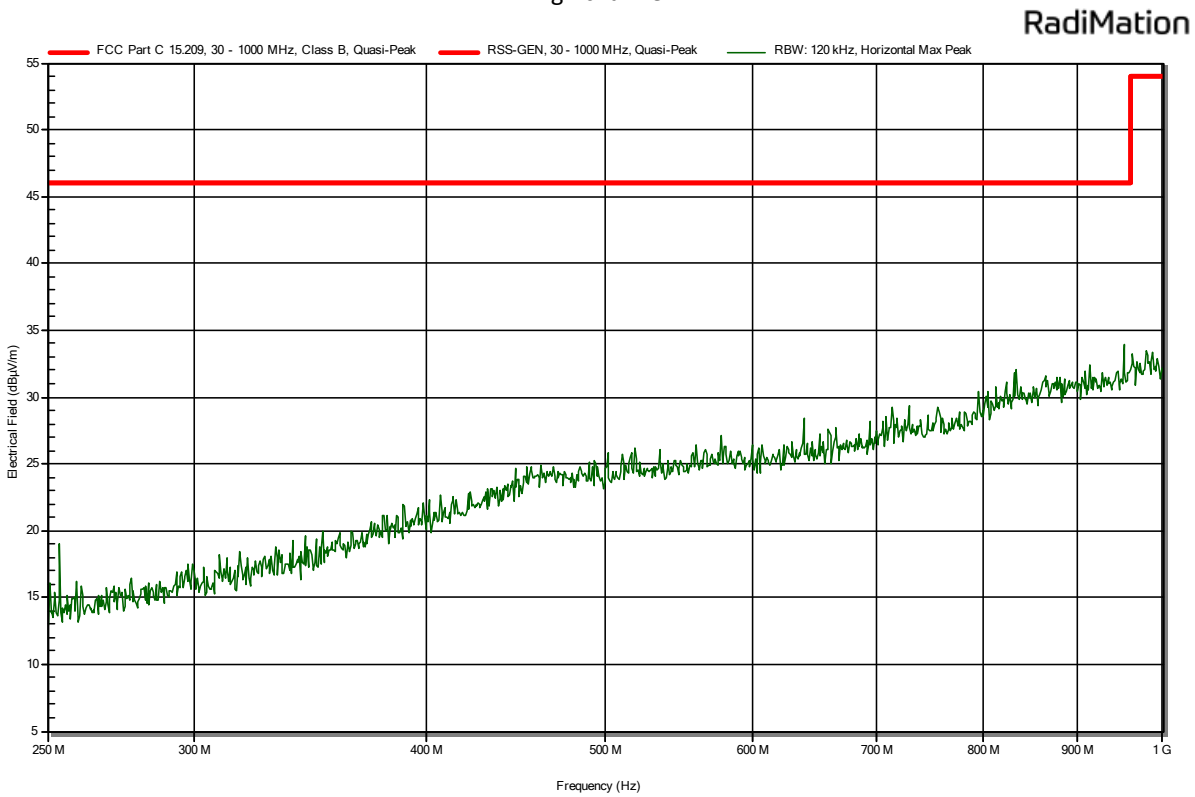
Plot 4c: radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



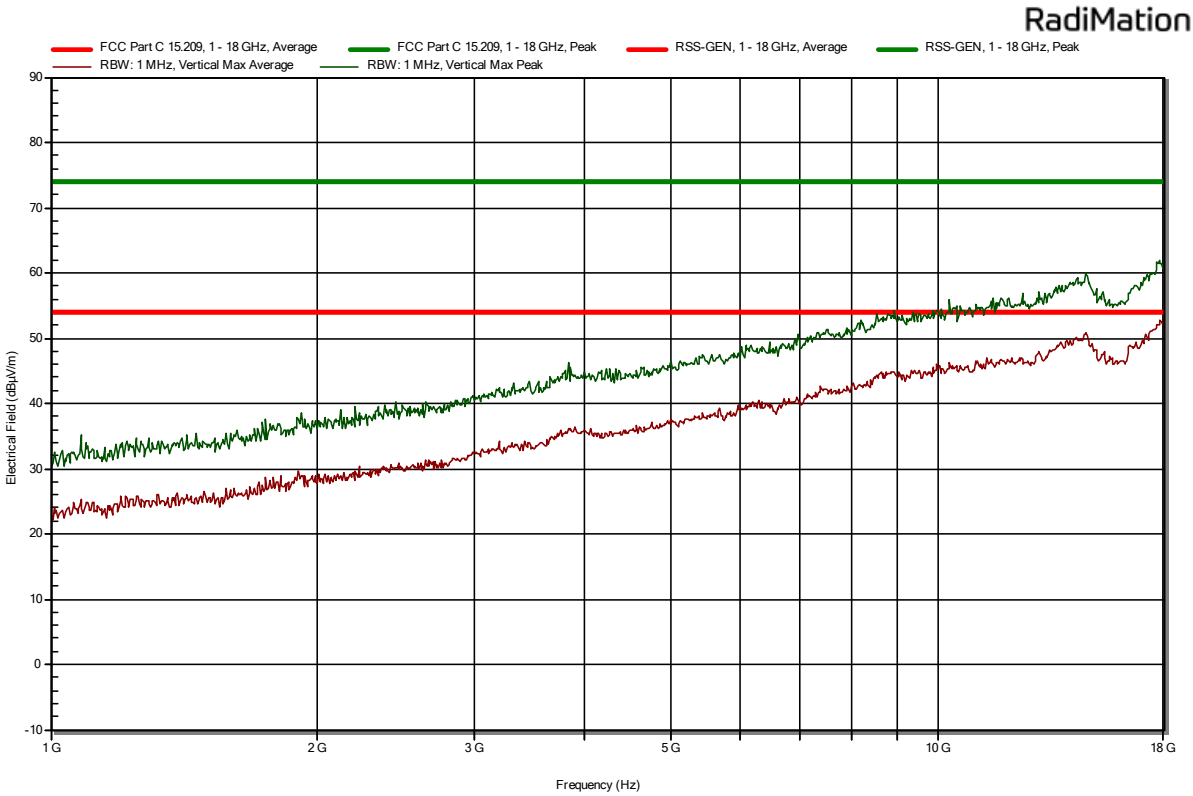
Plot 4d: radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



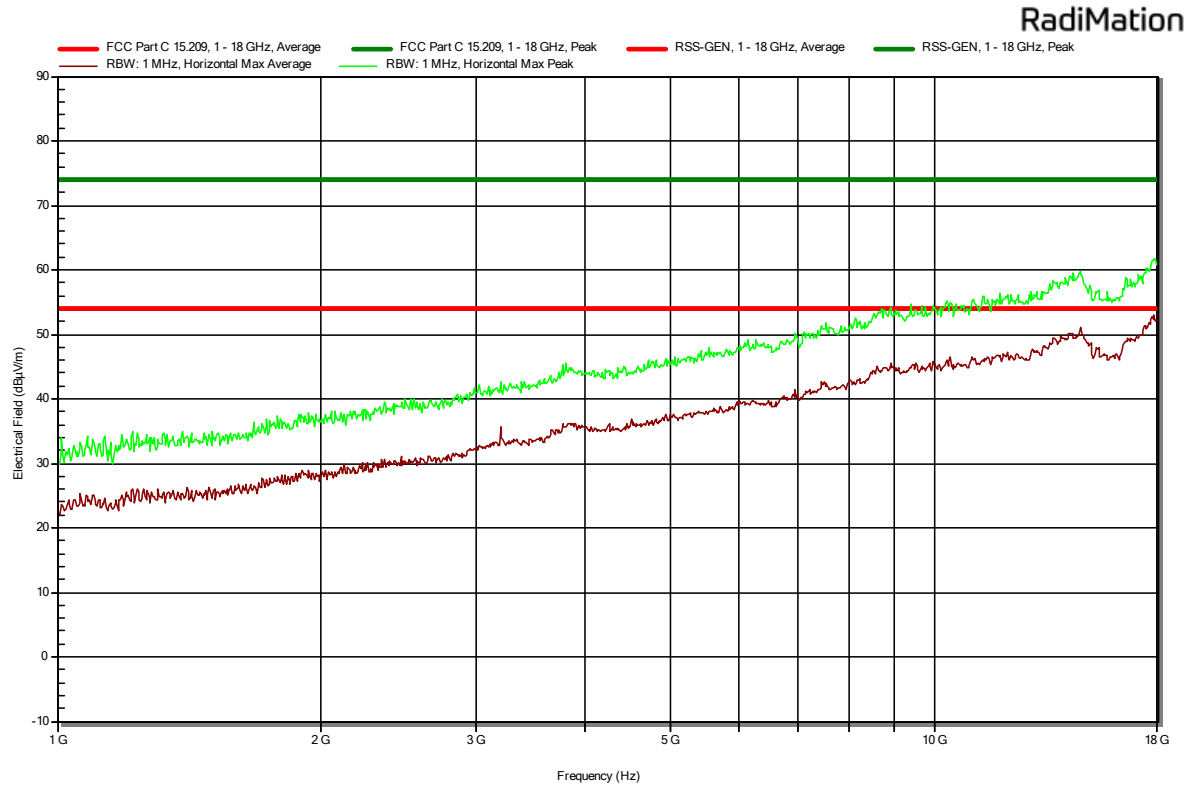
Plot 4e: radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel



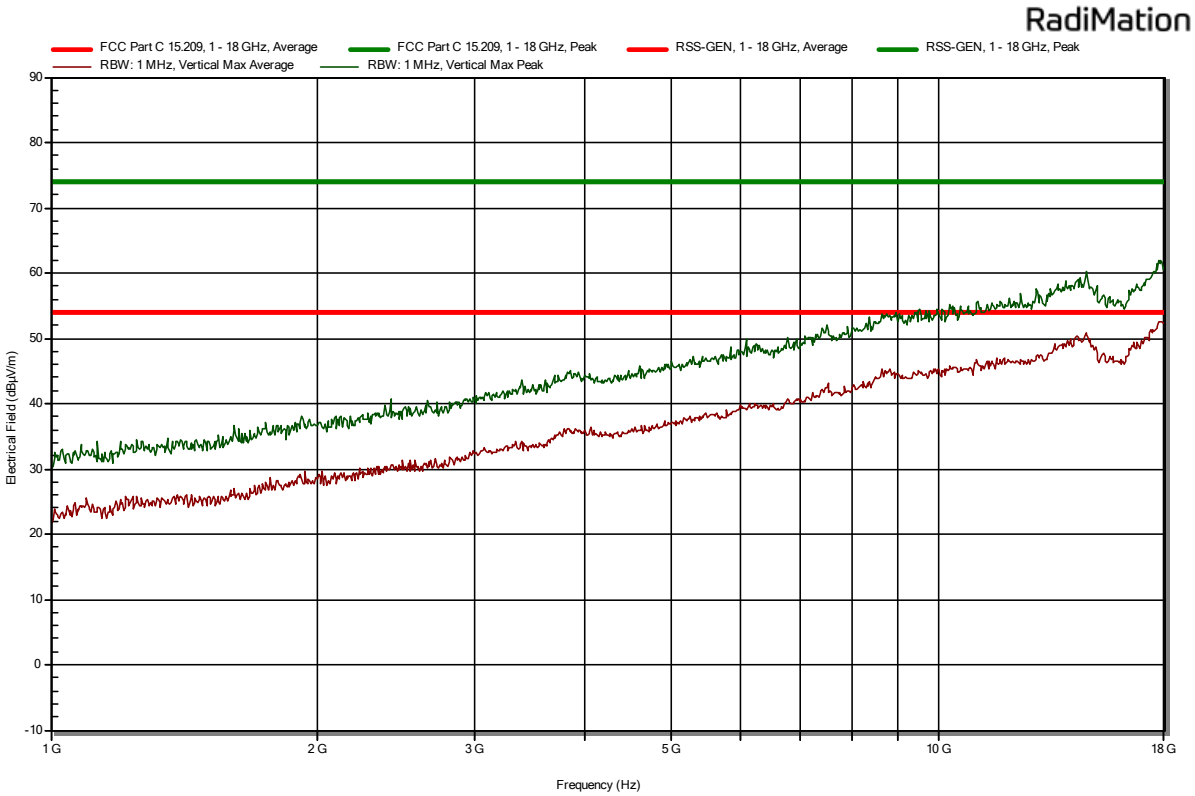
Plot 4f: radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel



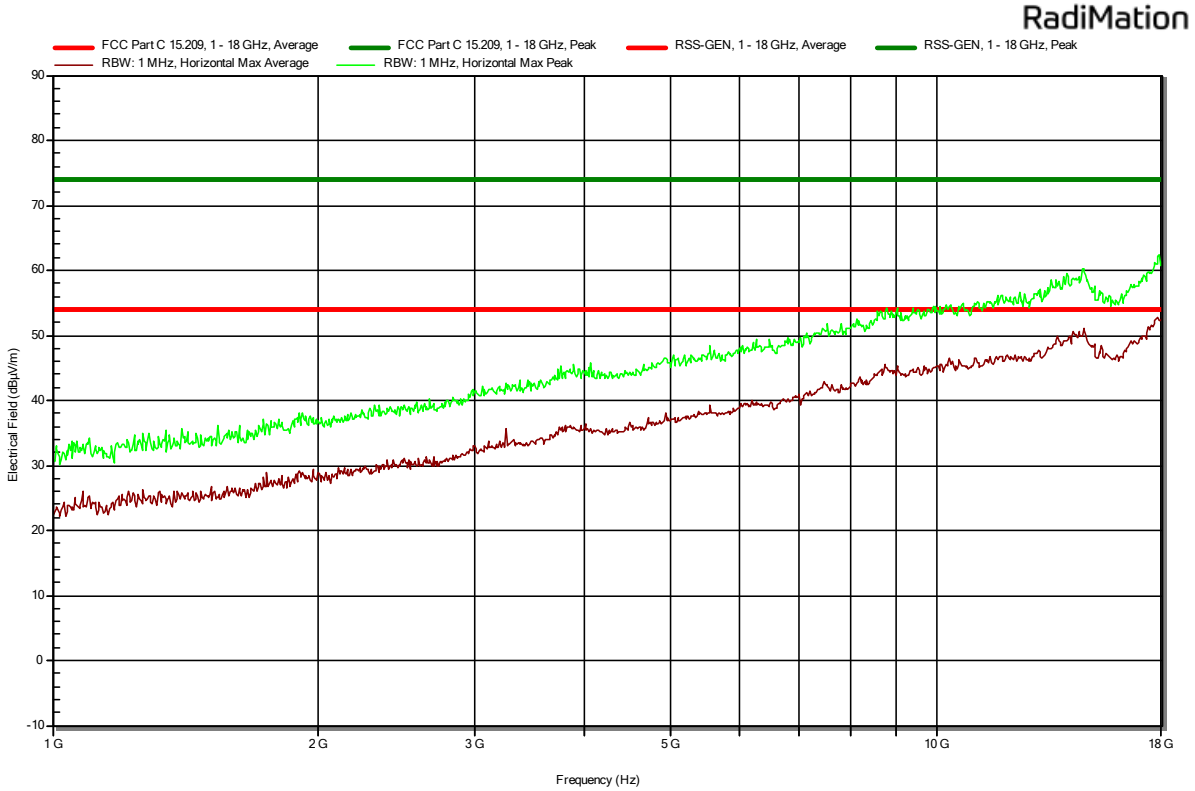
Plot 5a: radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Low channel 1Mbit



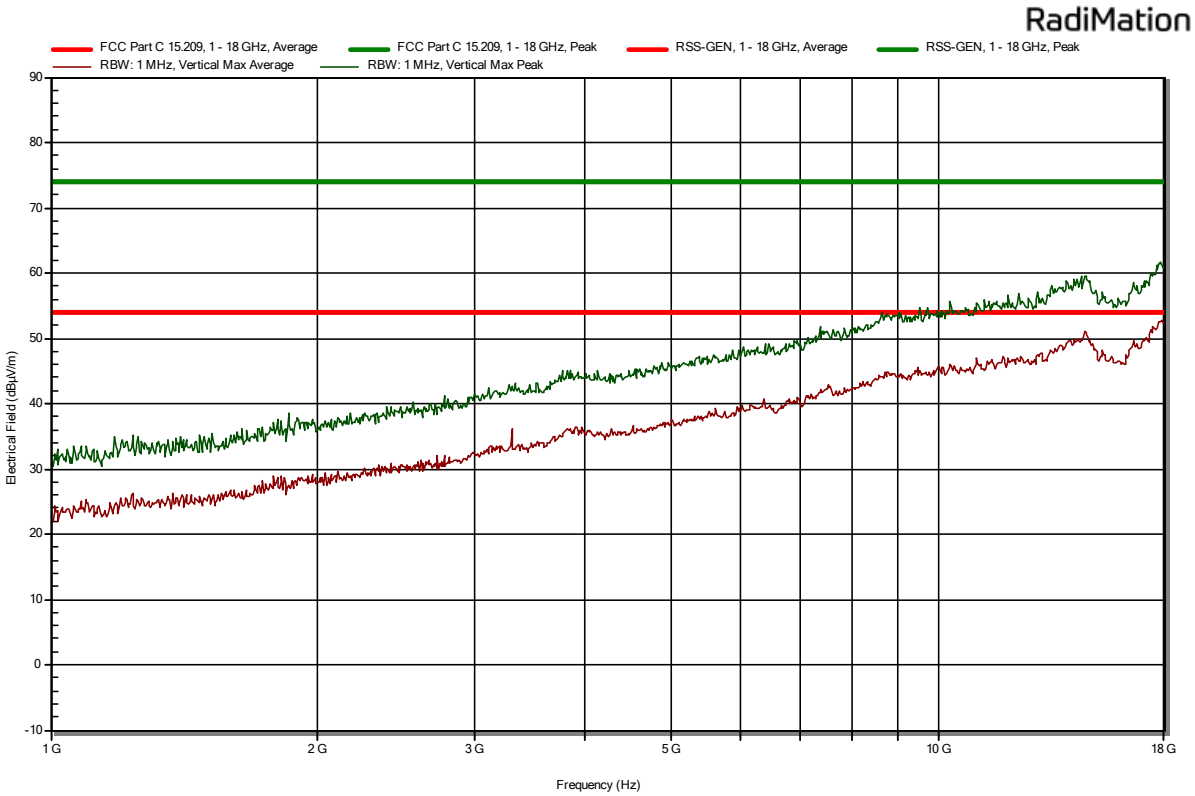
Plot 5b: radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Low channel 1Mbit



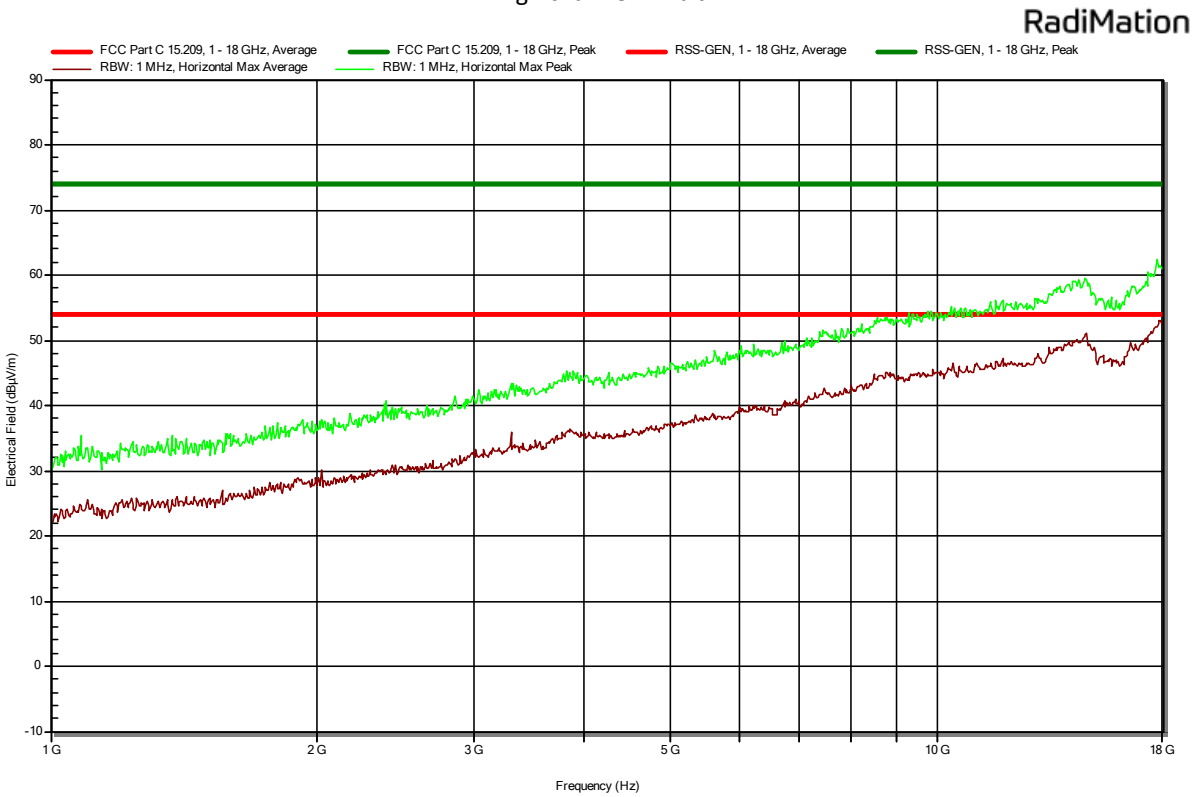
Plot 5c: radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel 1Mbit



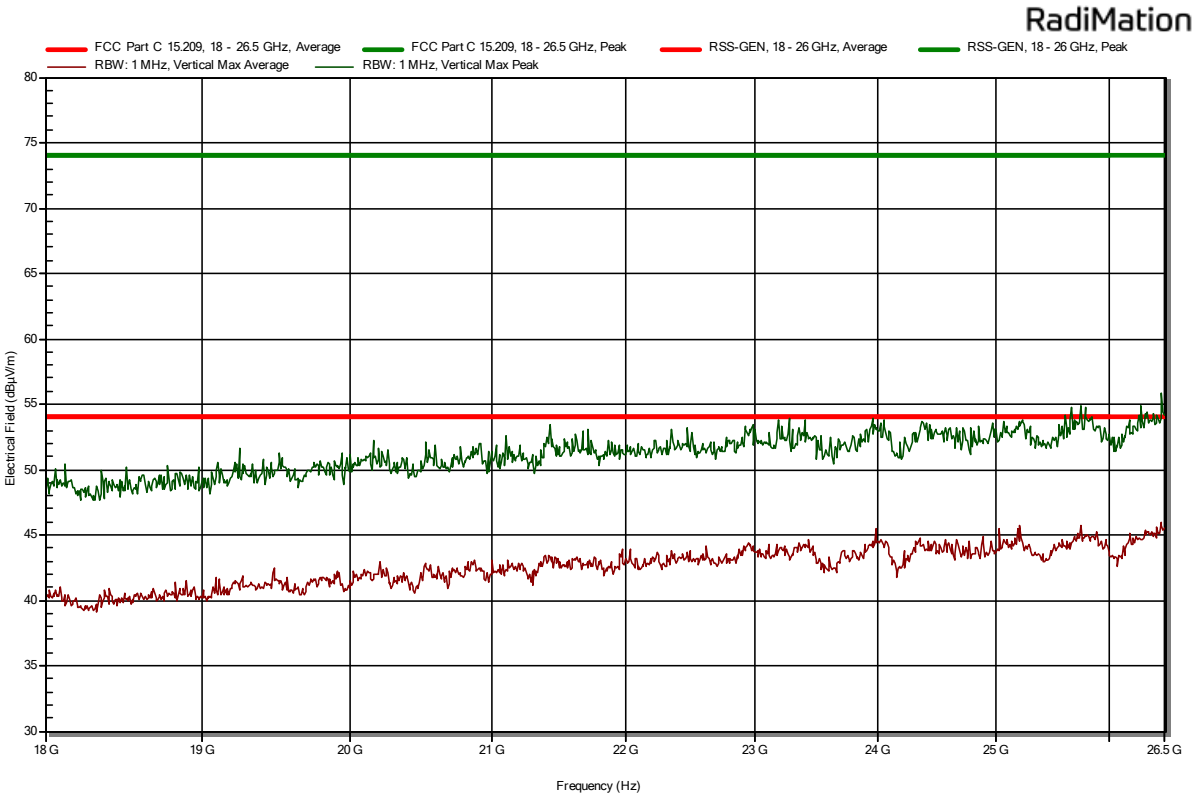
Plot 5d: radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel 1Mbit



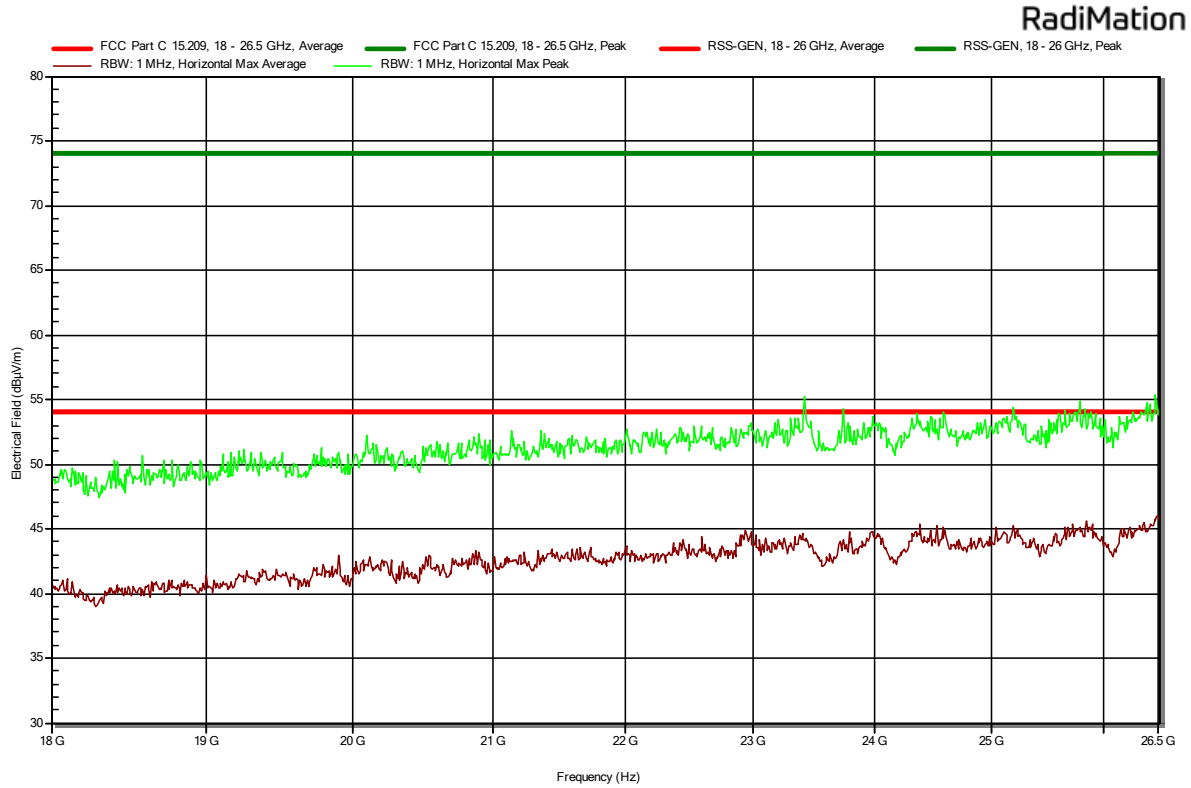
Plot 5e: radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
High channel 1Mbit



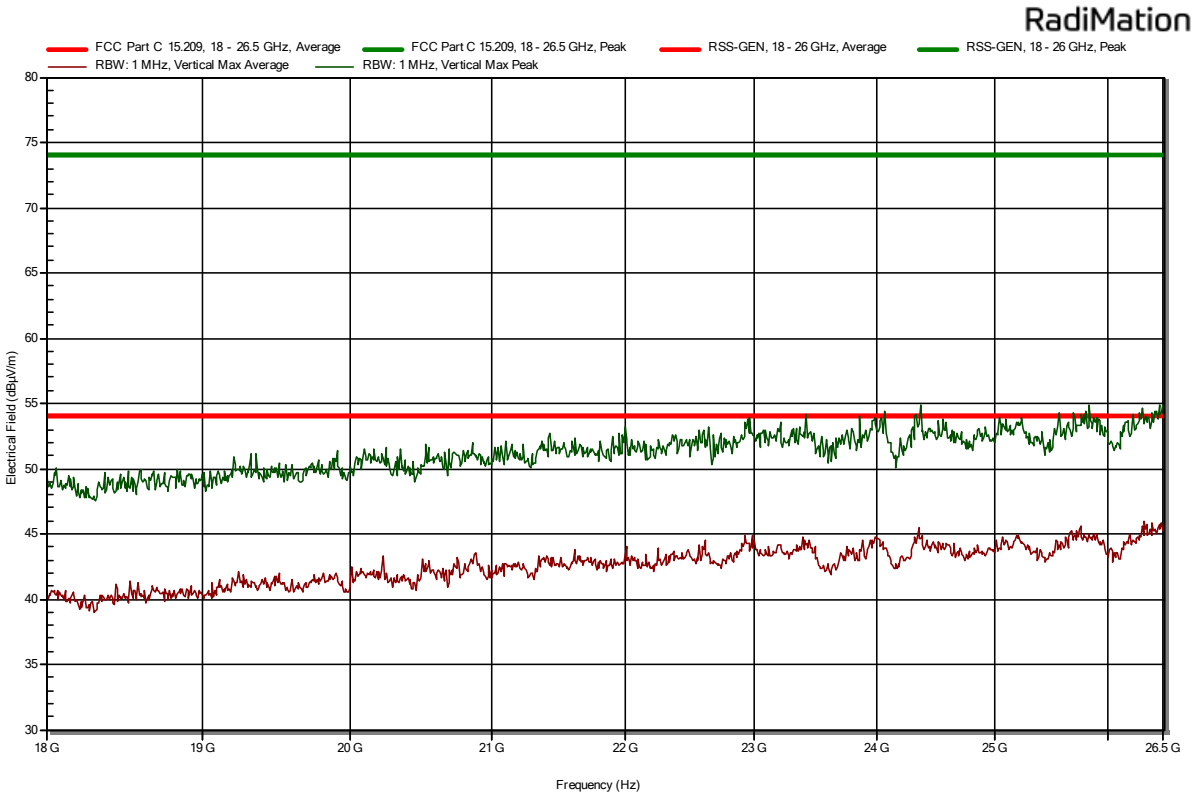
Plot 5f: radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
High channel 1Mbit



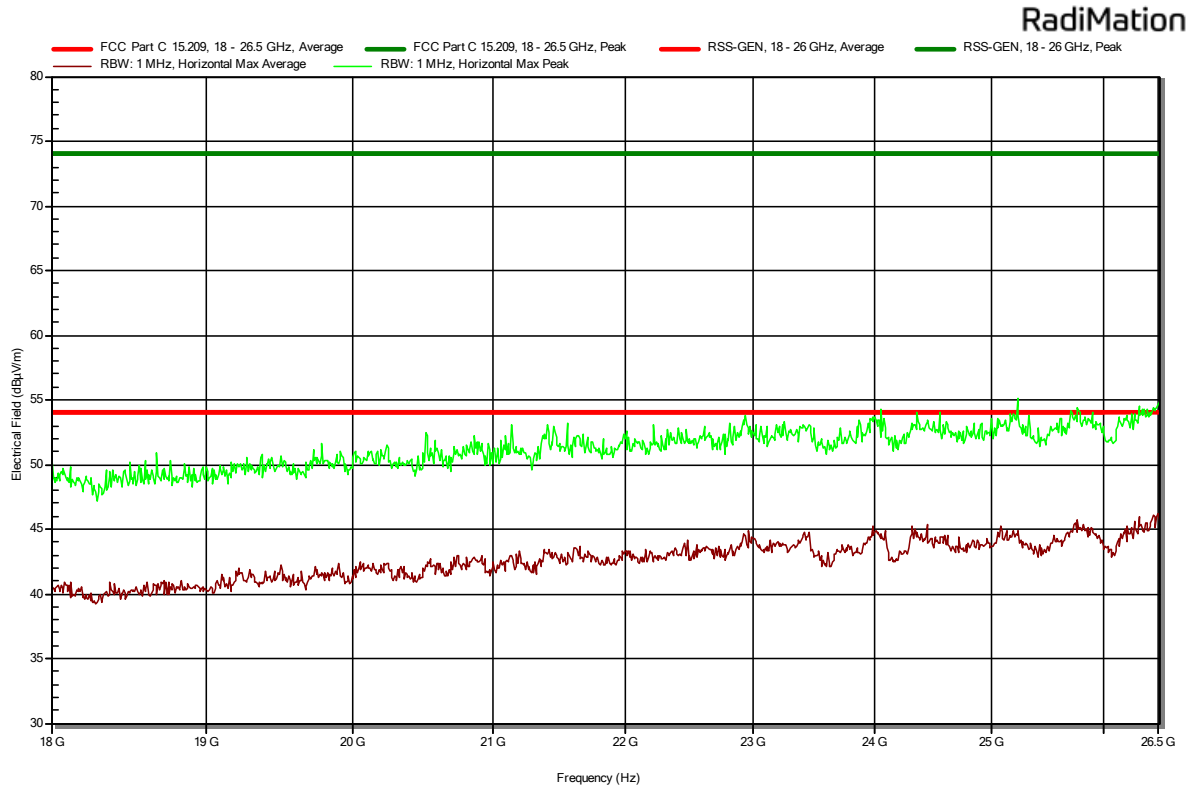
Plot 6a: radiated emissions of the EUT, Antenna vertical, in the range 18 – 26.5 GHz
(peak and average values shown)
Low channel



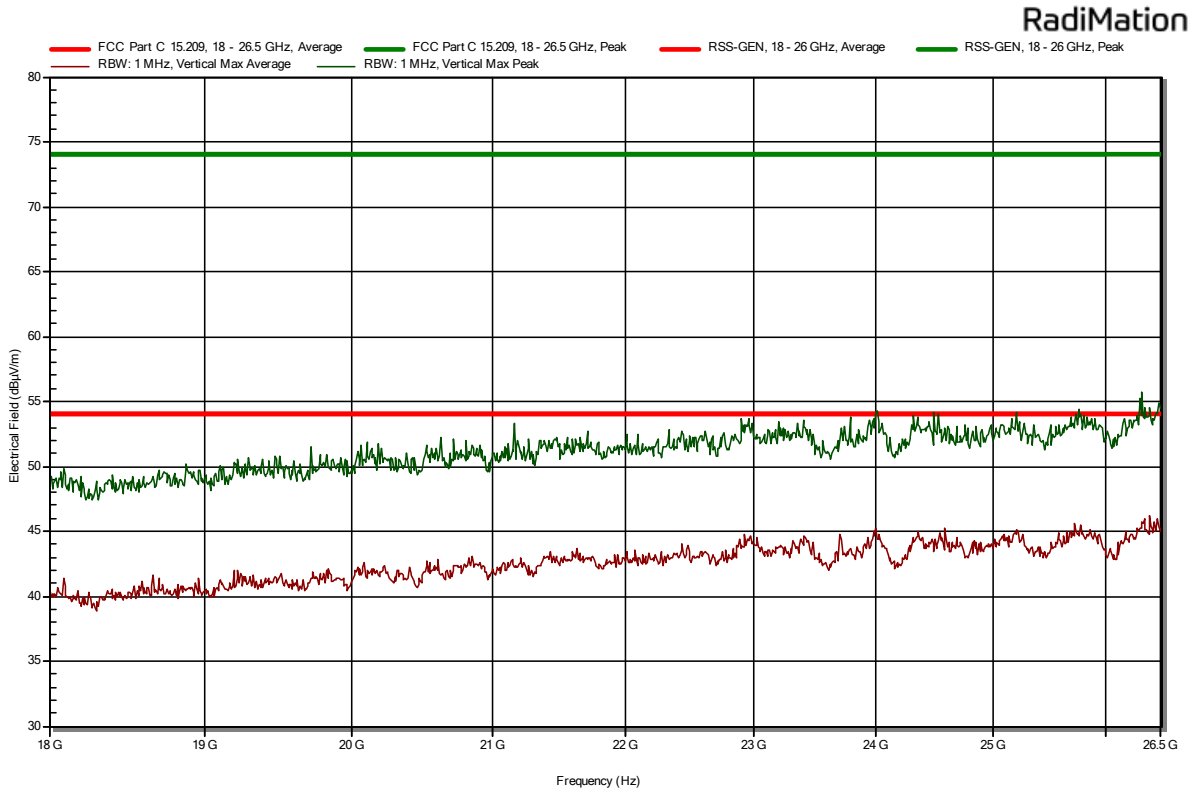
Plot 6b: radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26.5GHz
(peak and average values shown)
Low channel



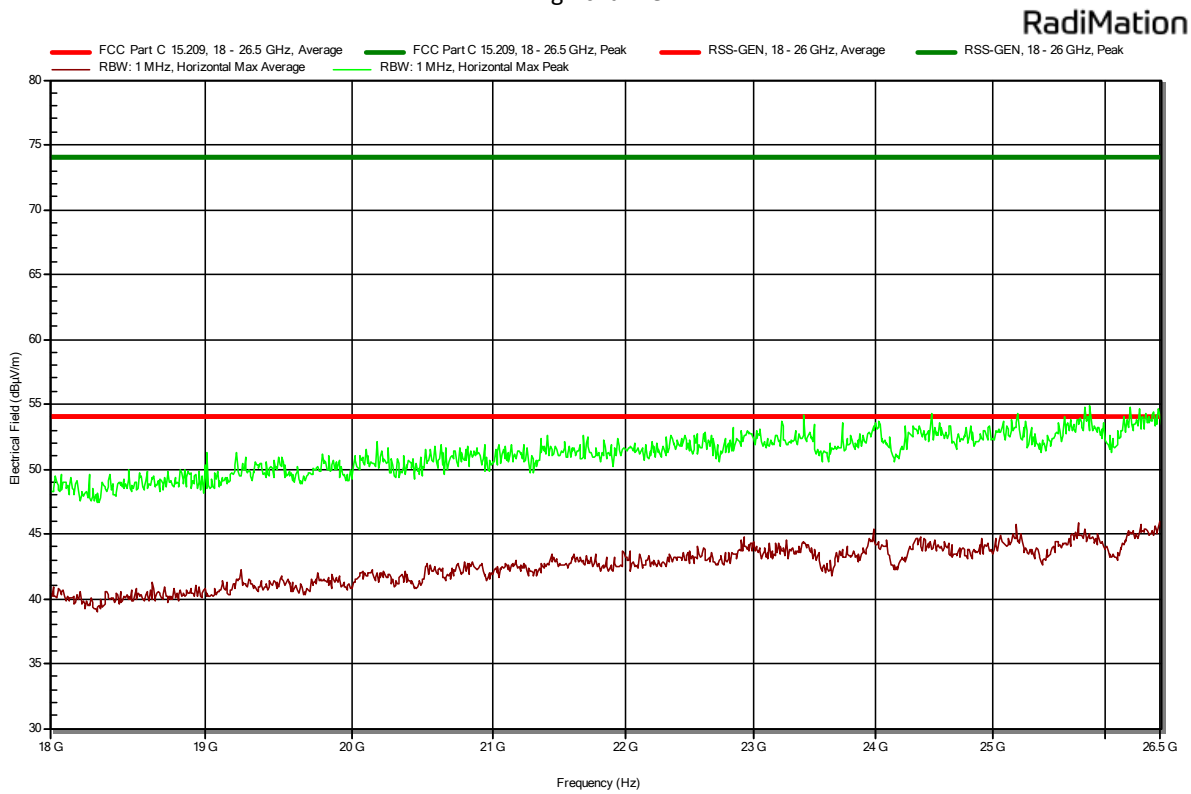
Plot 6c: radiated emissions of the EUT, Antenna vertical, in the range 18 – 26.5GHz
(peak and average values shown)
Middle channel



Plot 6d: radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26.5GHz
(peak and average values shown)
Middle channel

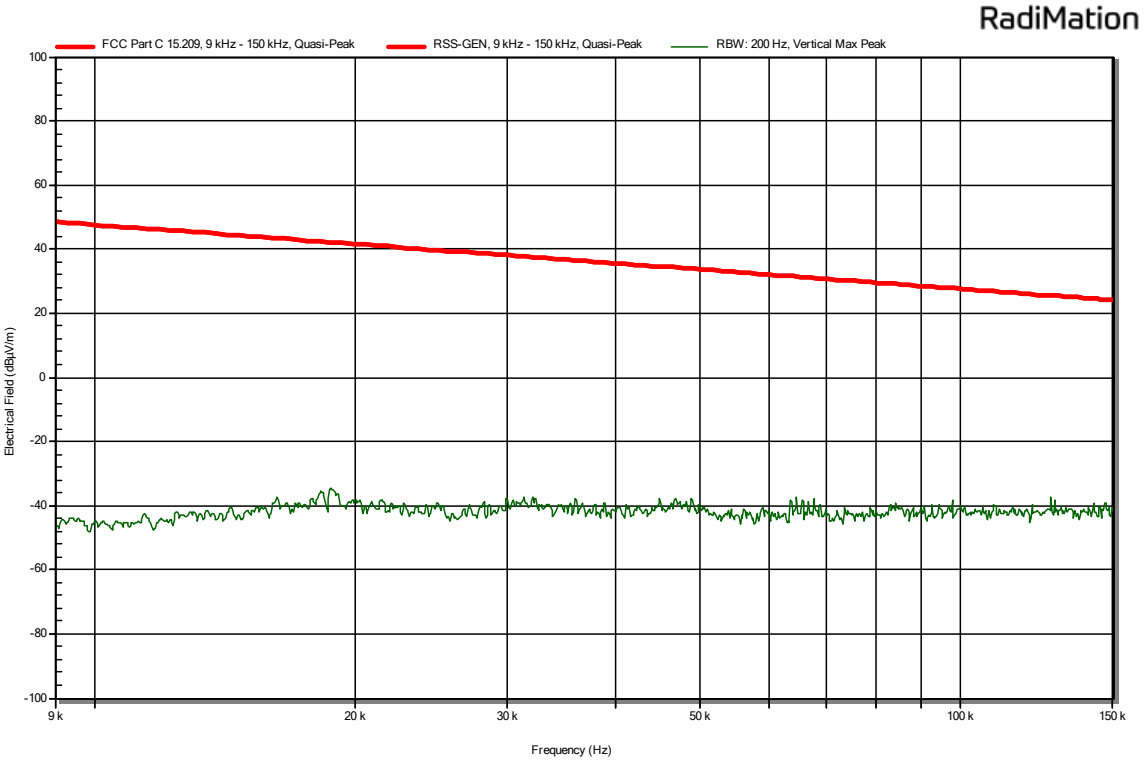


Plot 6e: radiated emissions of the EUT, Antenna vertical, in the range 18 – 26.5 GHz
(peak and average values shown)
High channel

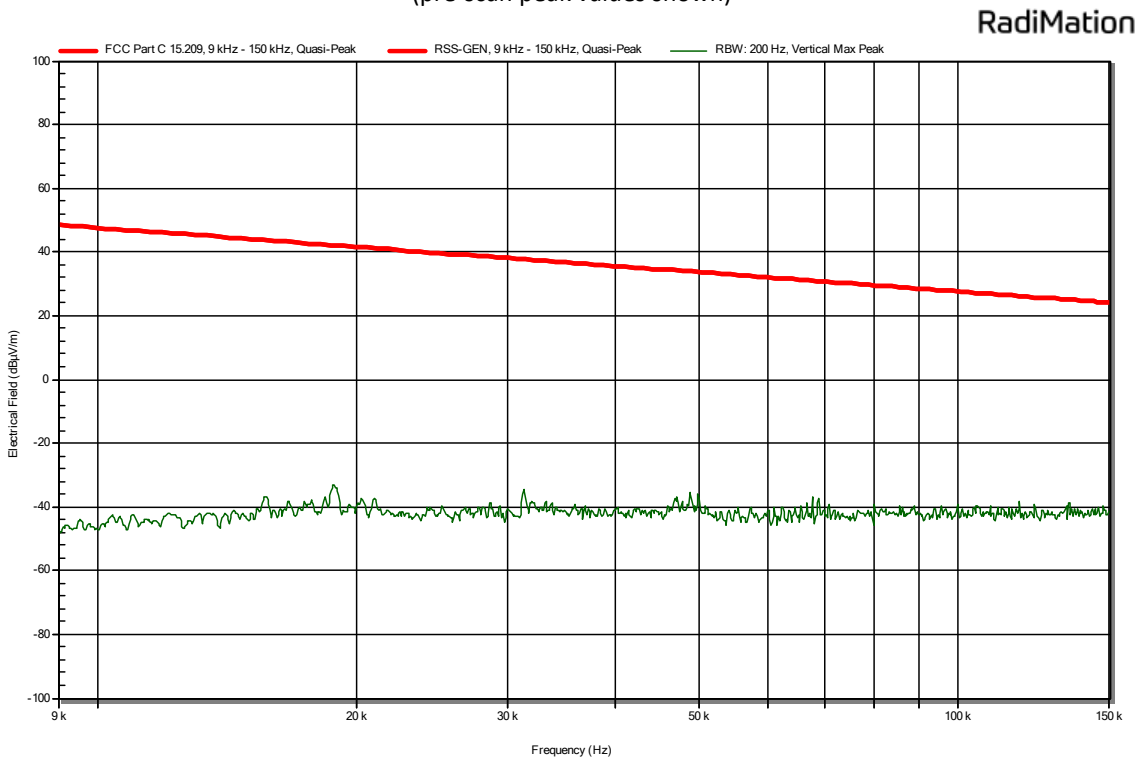


Plot 6f: radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26.5 GHz
(peak and average values shown)
High channel

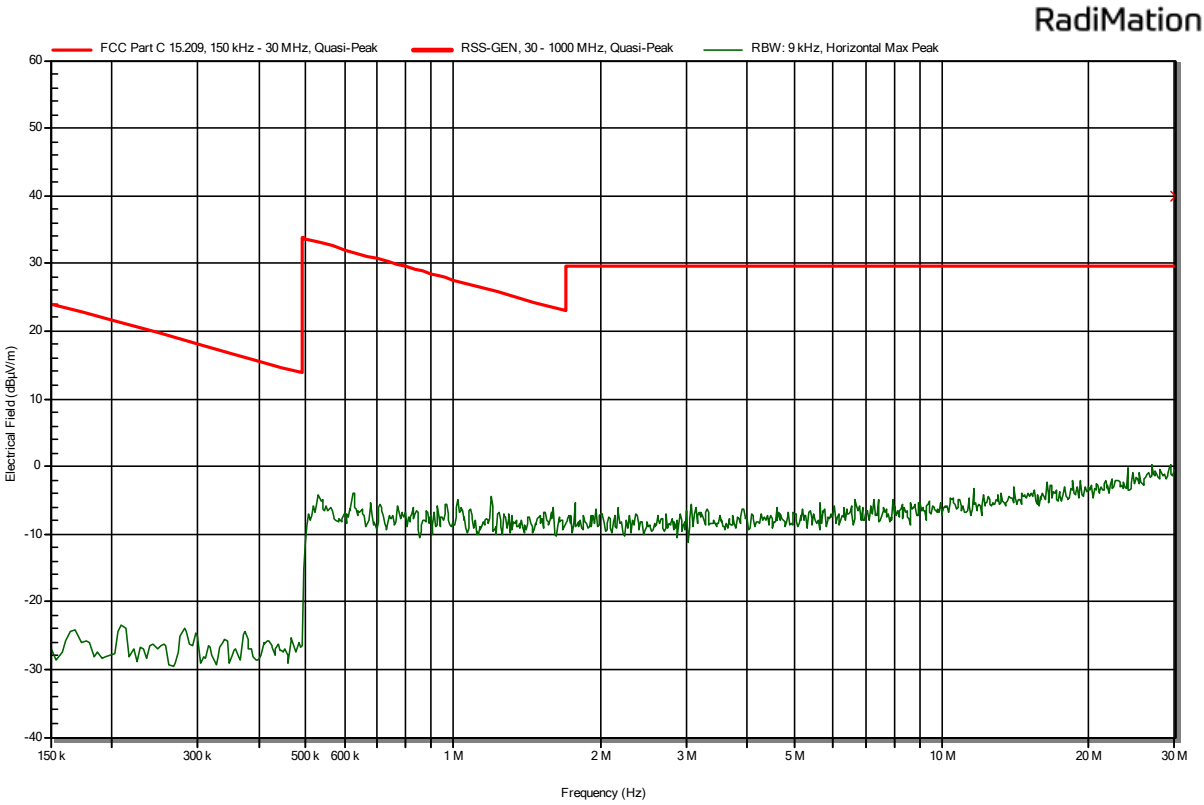
3.2.8 Plots of the Radiated Spurious Emissions Measurement IEEE 802.11b



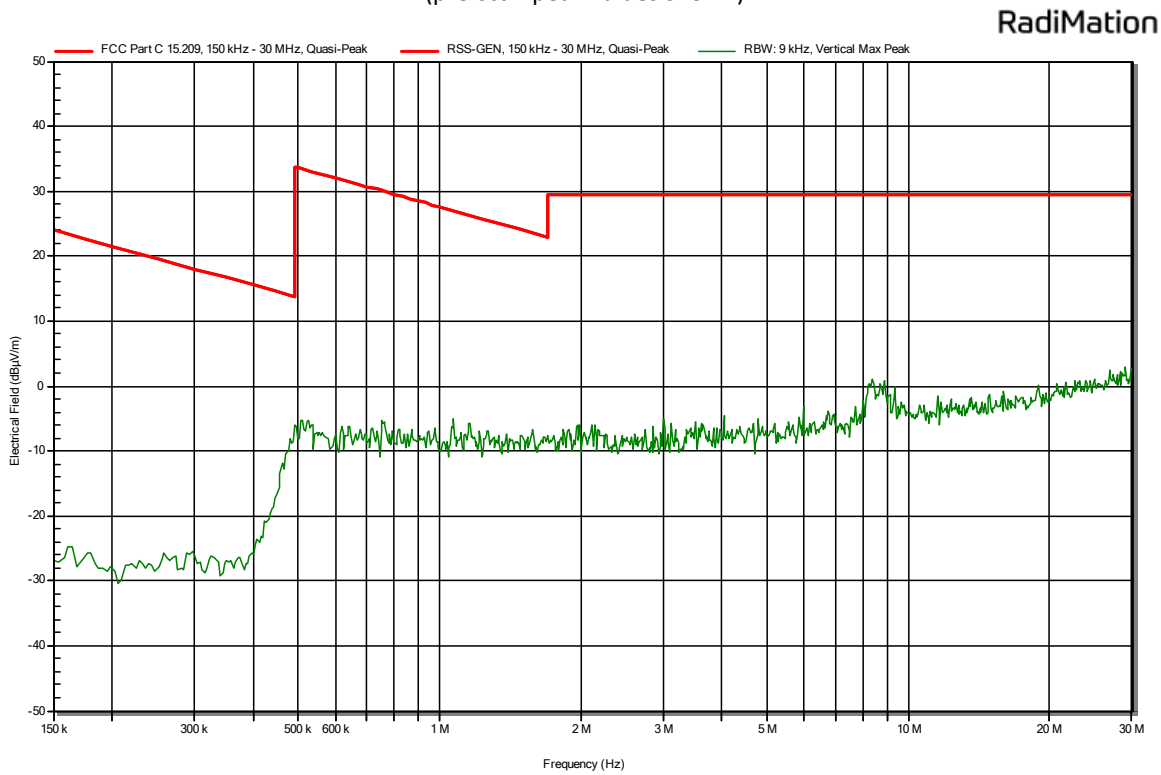
Plot 1a: radiated emissions of the EUT, Antenna perpendicular, in the range 9 – 150KHz
(pre-scan peak values shown)



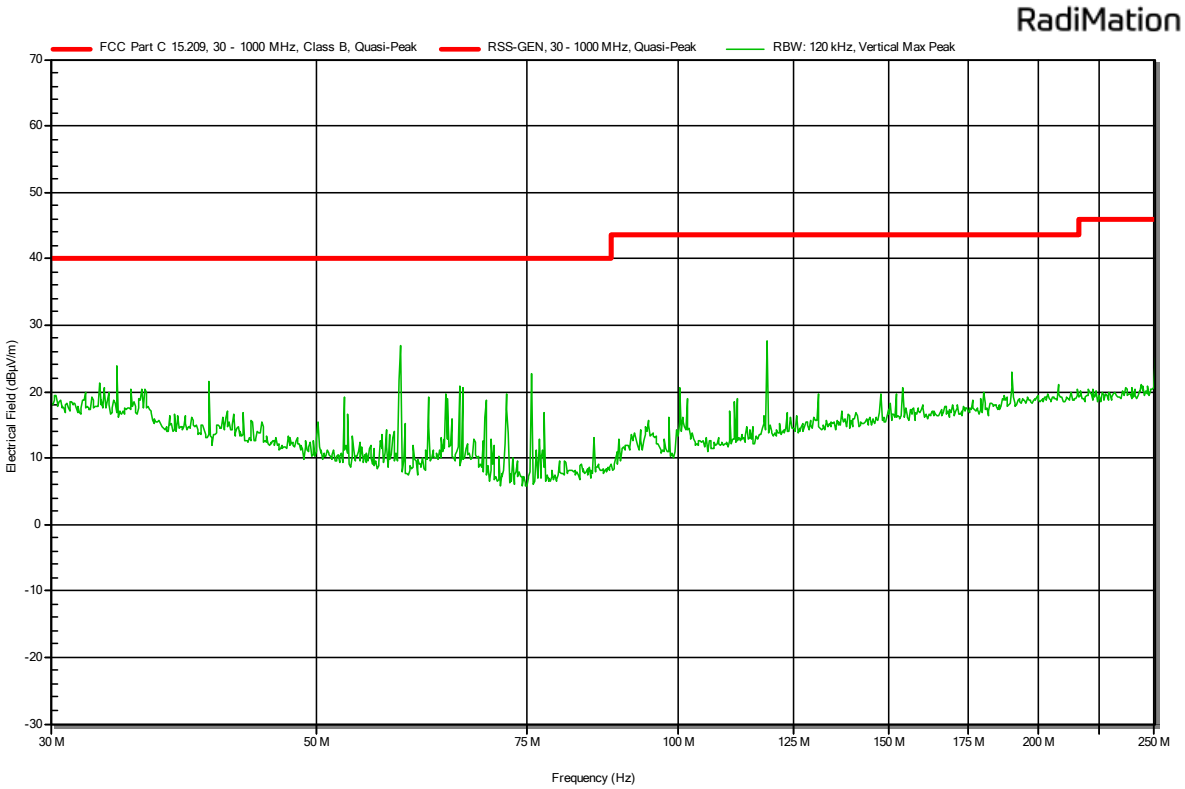
Plot 1b: radiated emissions of the EUT, Antenna parallel, in the range 9 – 150KHz
(pre-scan peak values shown)



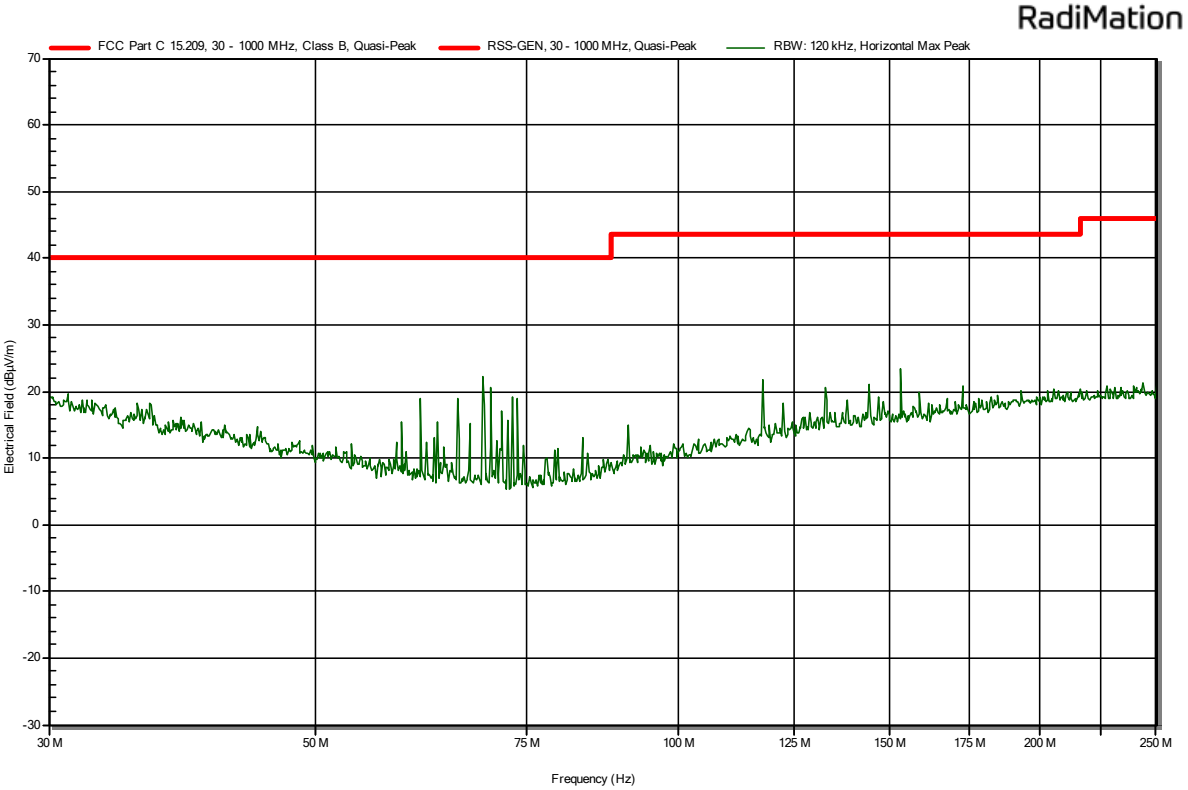
Plot 2a: radiated emissions of the EUT, Antenna perpendicular, in the range 150KHz-30 MHz
(pre-scan peak values shown)



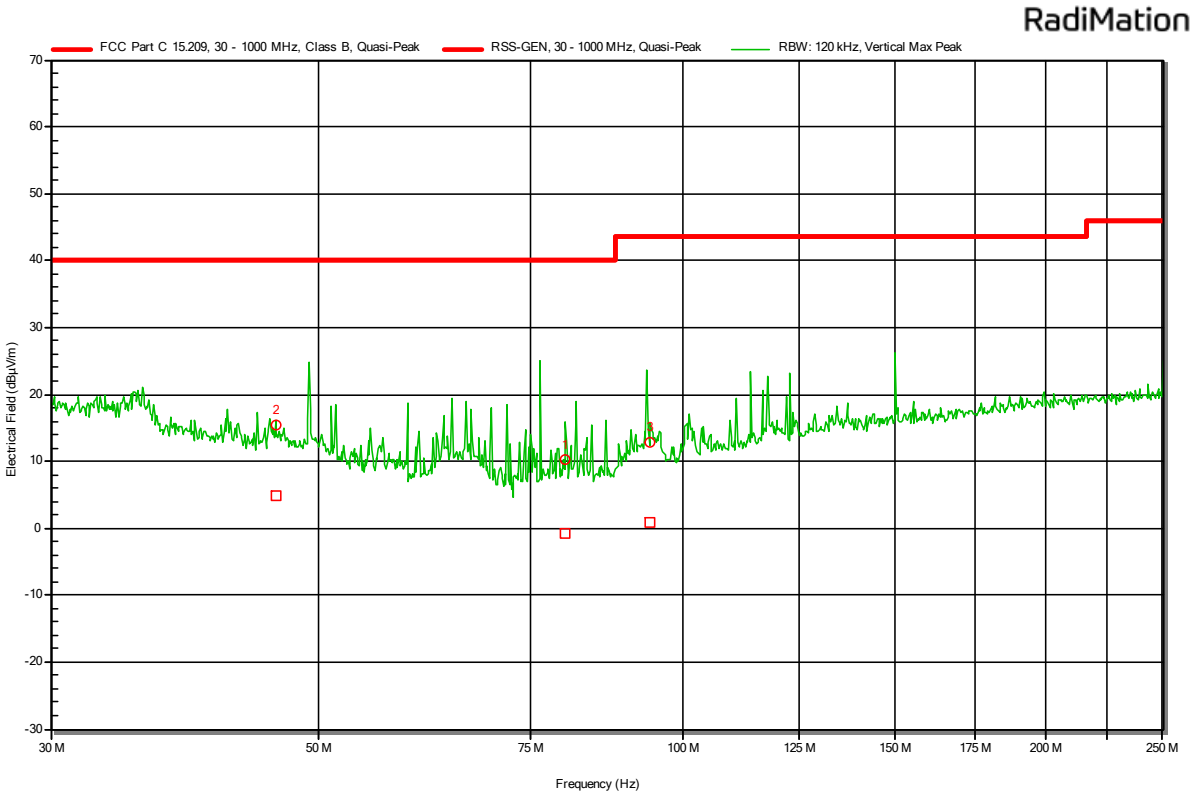
Plot 2b: radiated emissions of the EUT, Antenna parallel, in the range 150KHz-30 MHz
(pre-scan peak values shown)



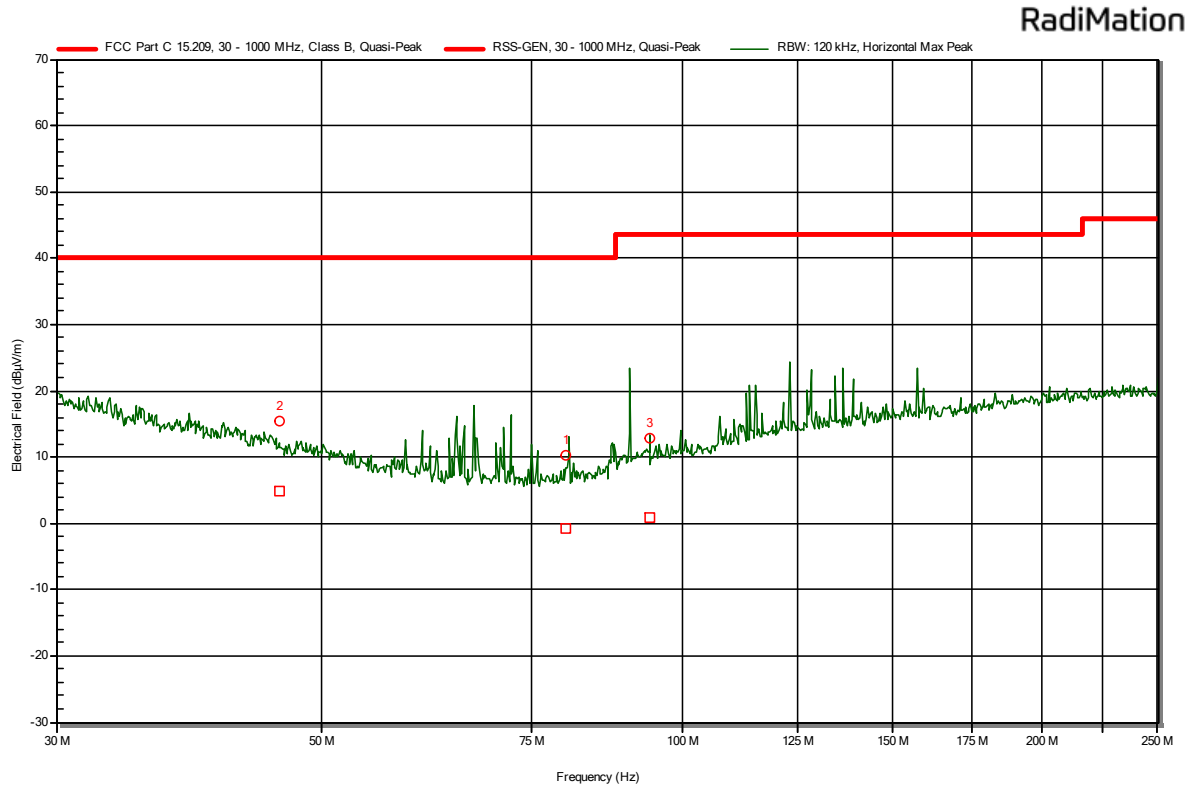
Plot 3a: radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel



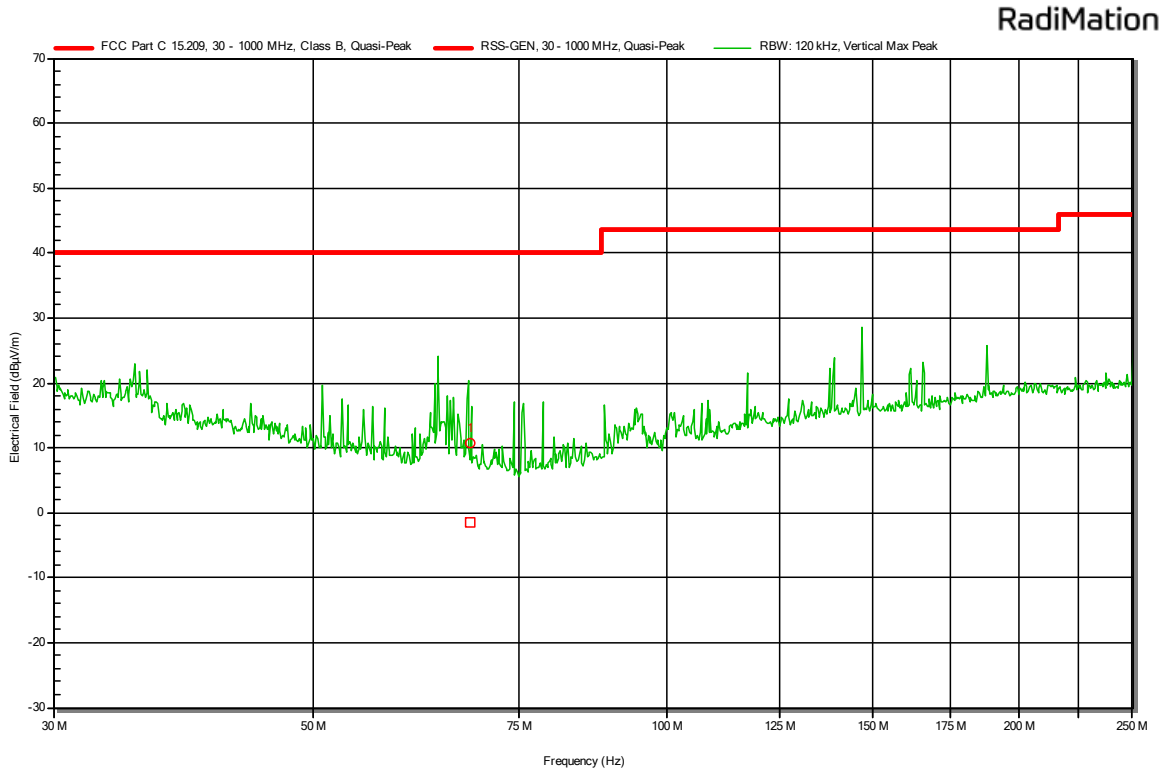
Plot 3b: radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Low channel



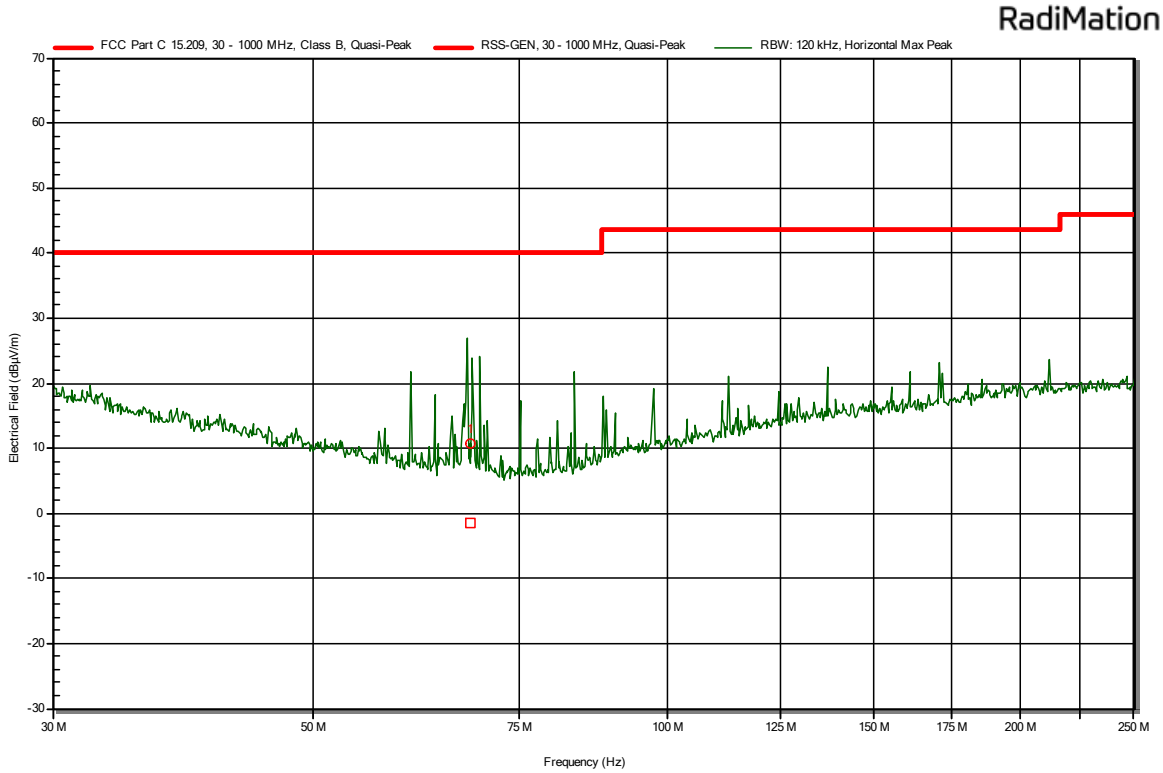
Plot 3c: radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel



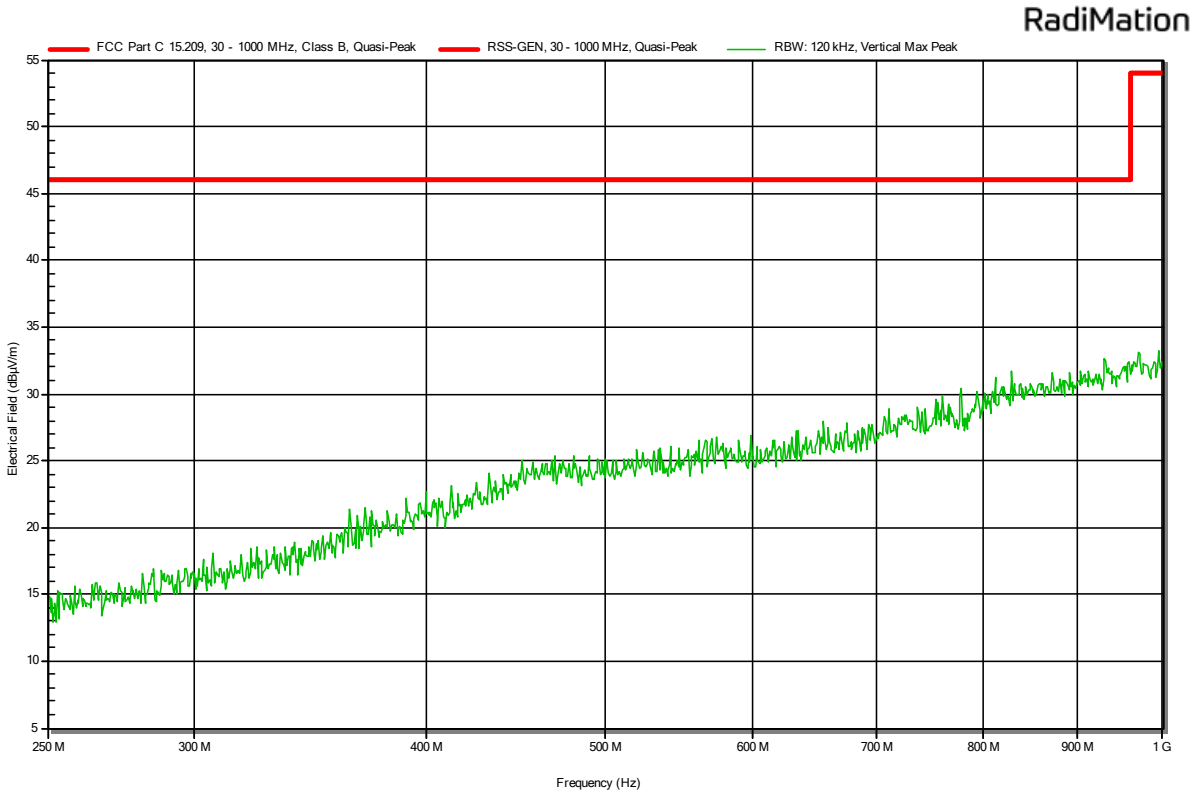
Plot 3d: radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
Middle channel



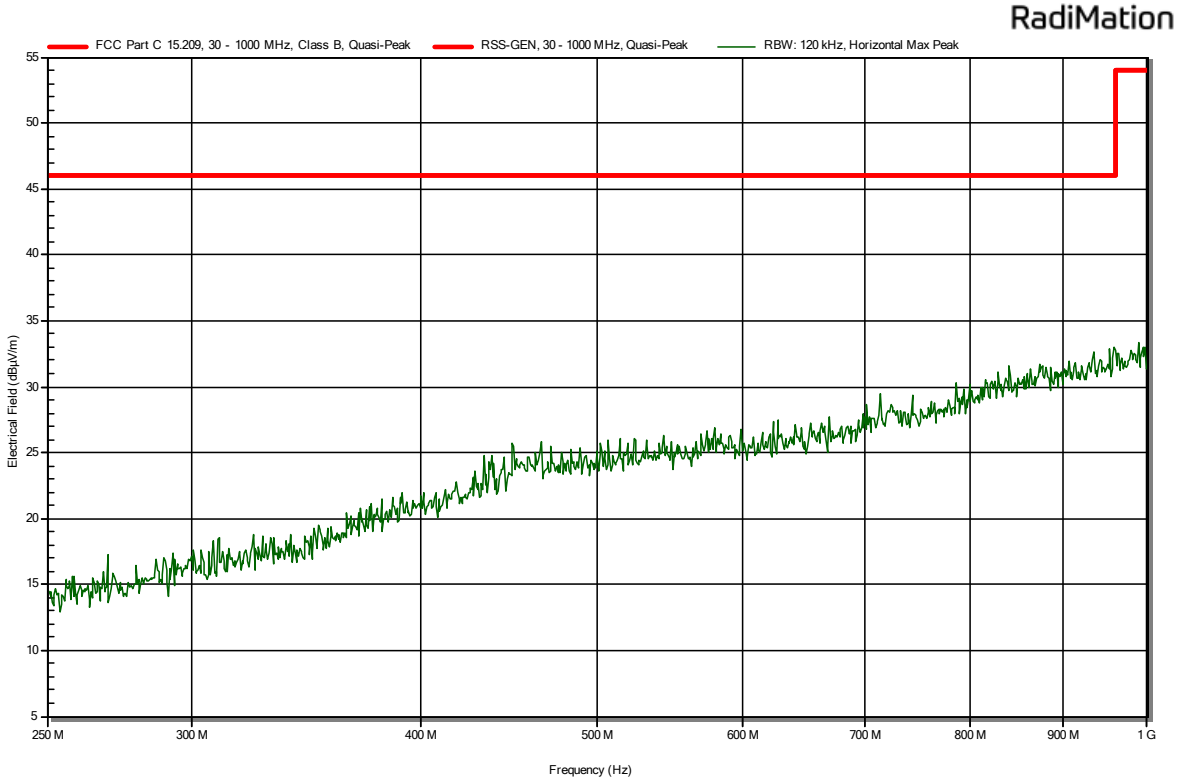
Plot 3e: radiated emissions of the EUT, Antenna vertical, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel



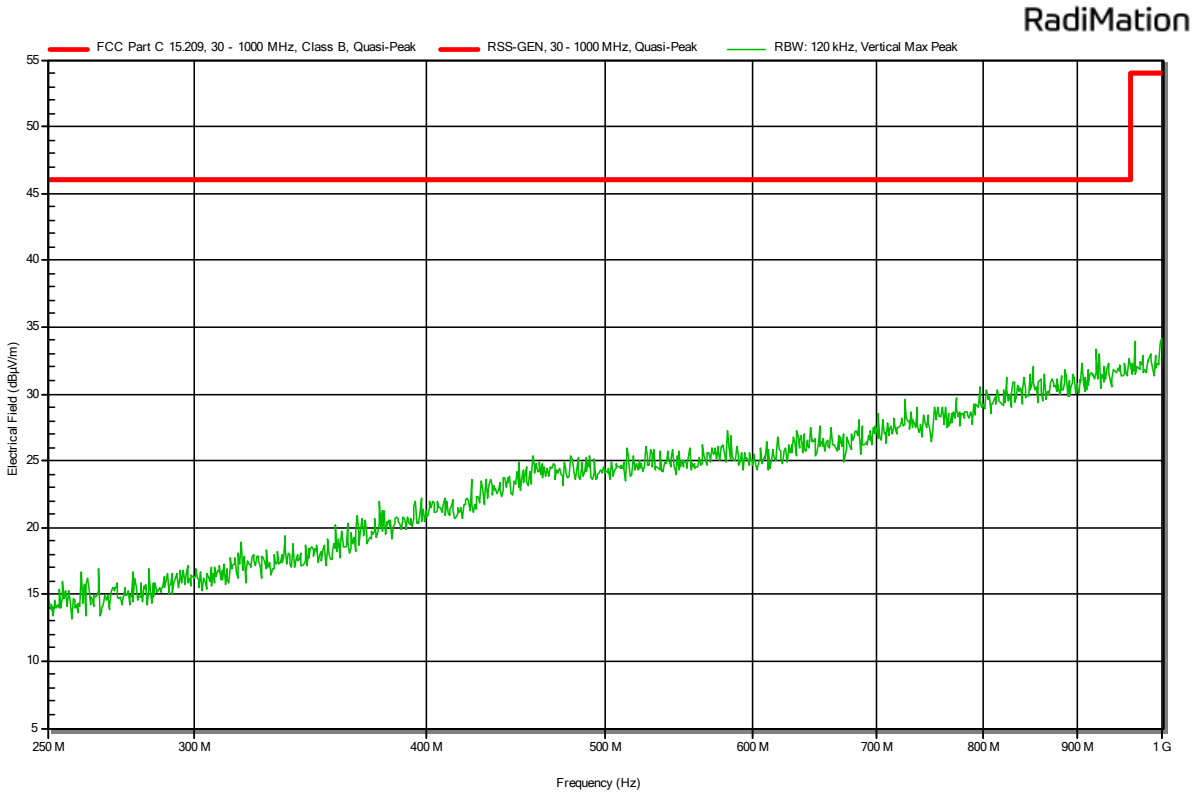
Plot 3f: radiated emissions of the EUT, Antenna horizontal, in the range 30 – 250 MHz
(pre-scan peak values shown)
High channel



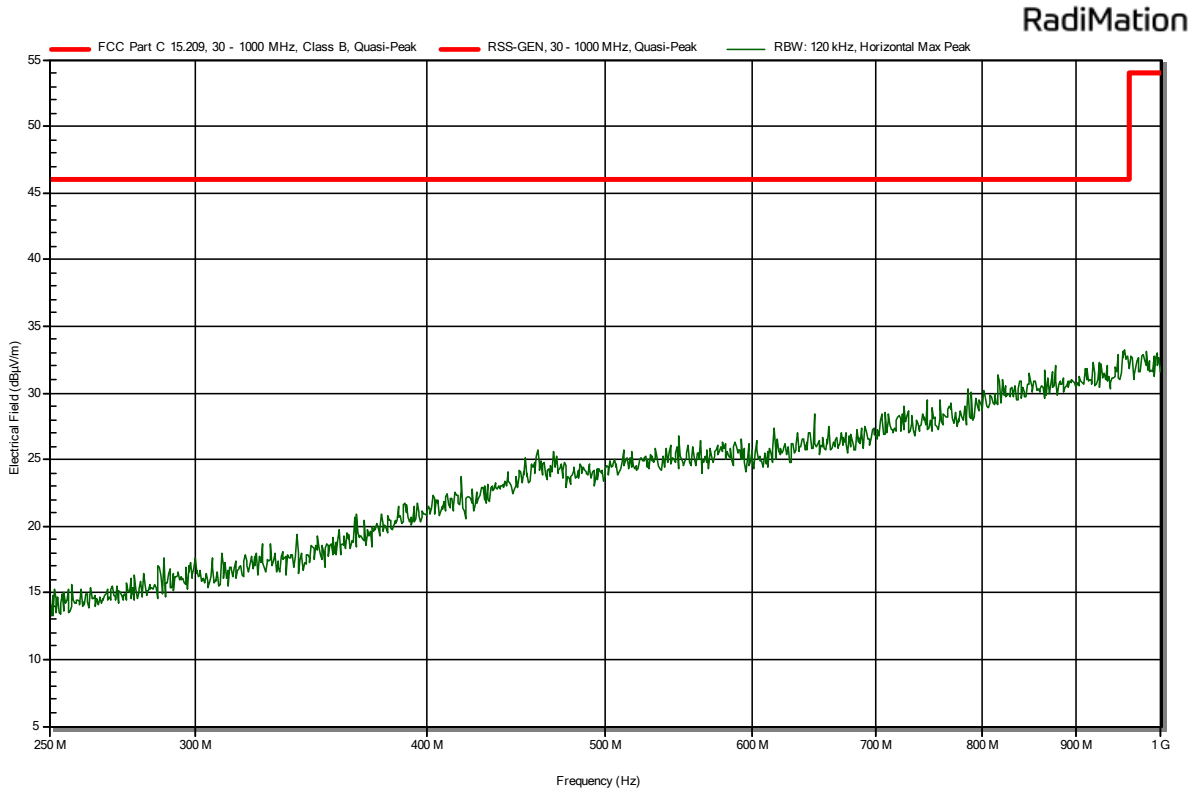
Plot 4a: radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel



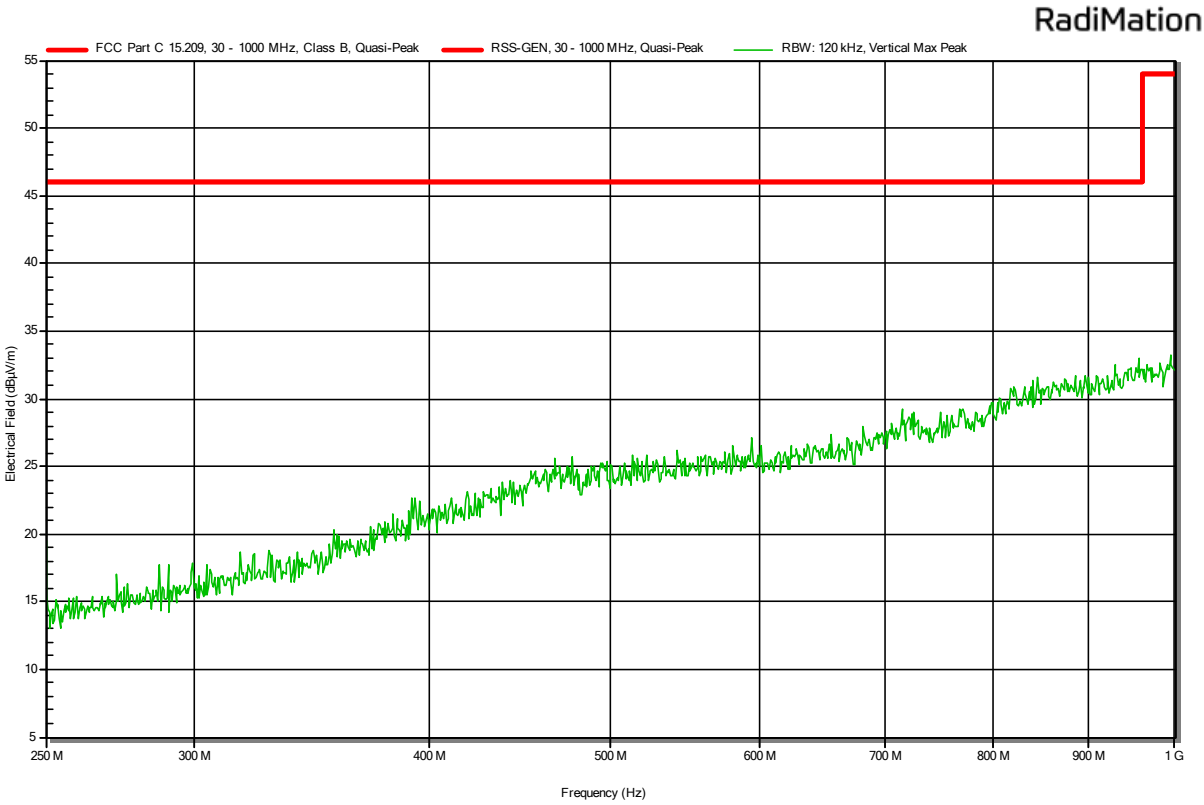
Plot 4b: radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Low channel



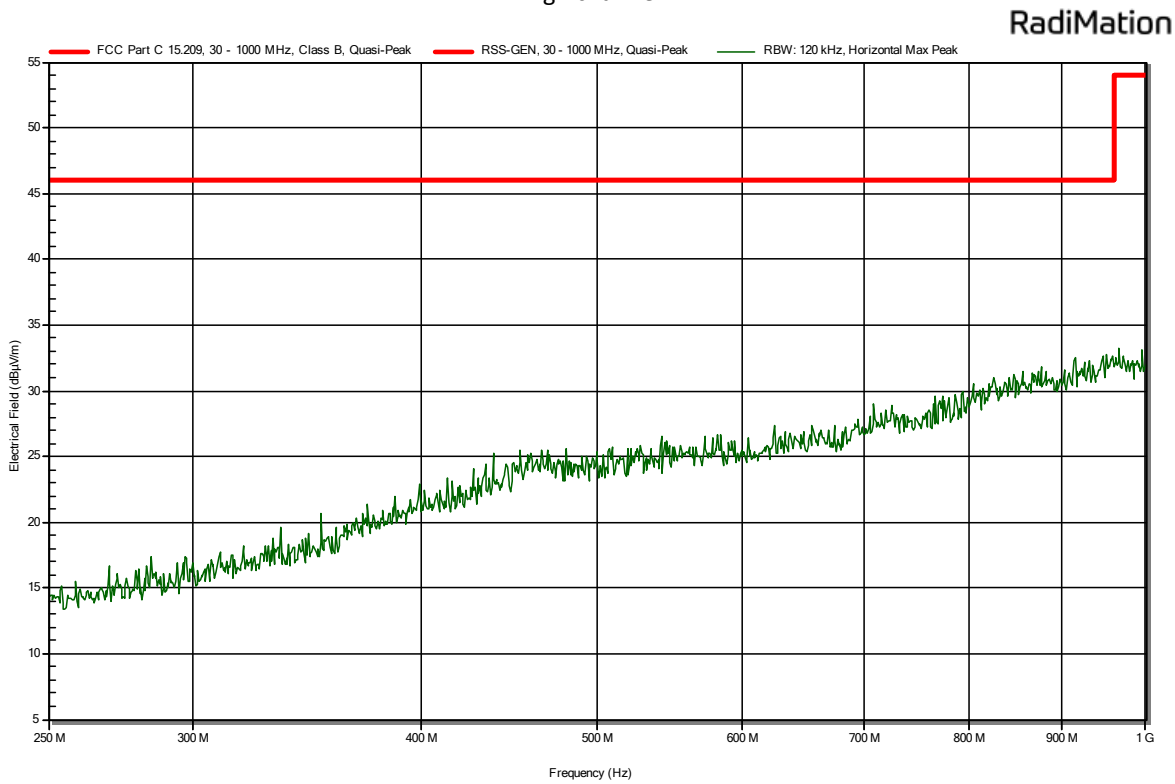
Plot 4c: radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



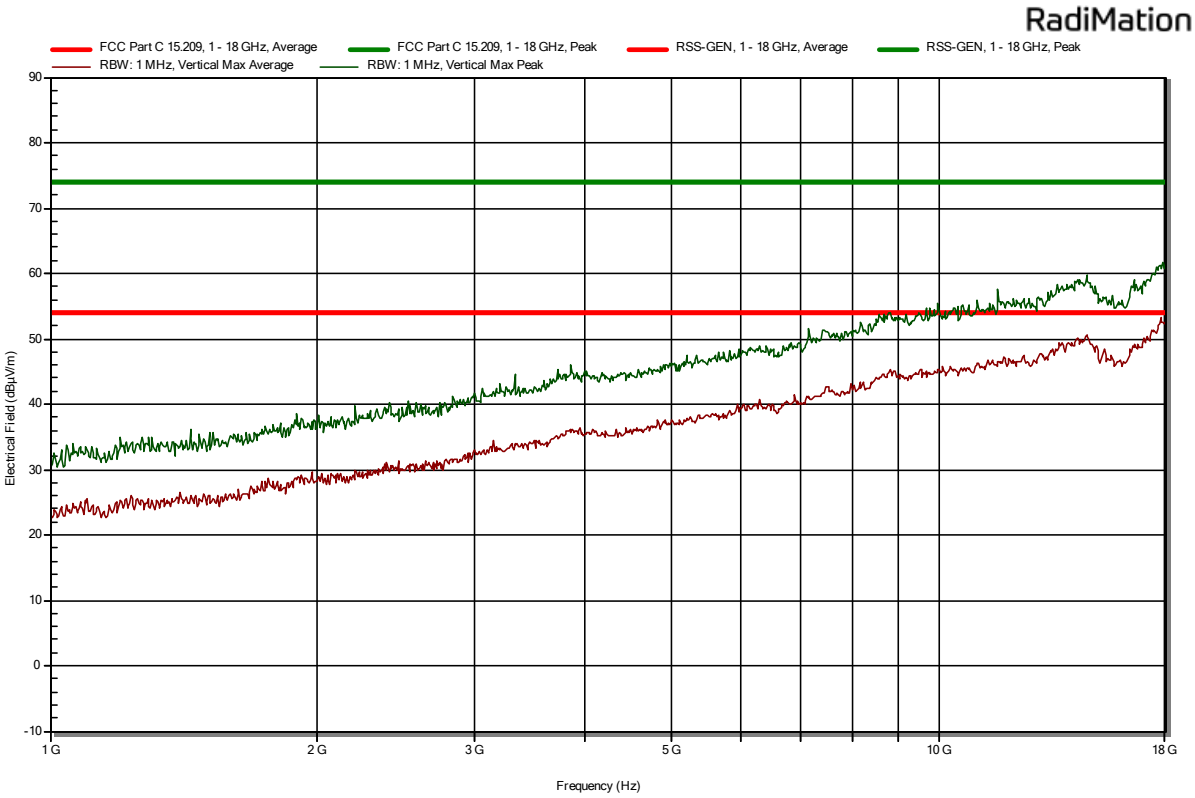
Plot 4d: radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
Middle channel



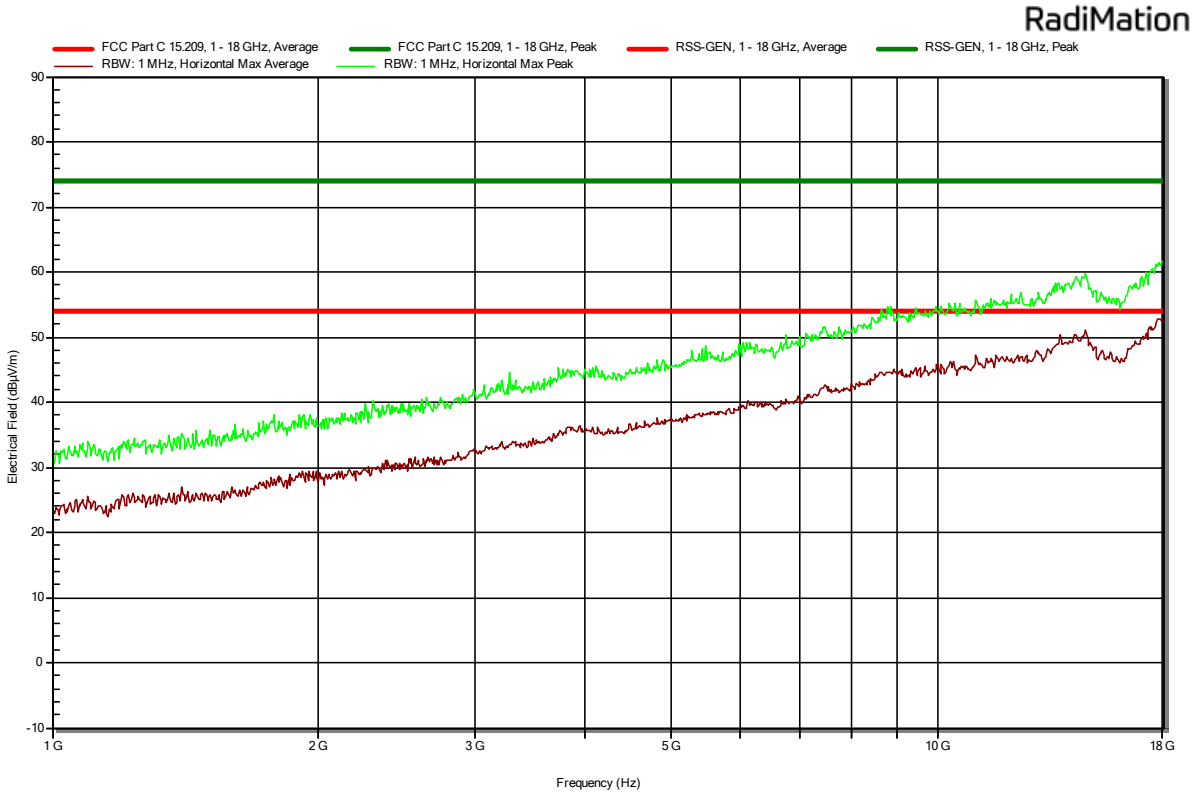
Plot 4e: radiated emissions of the EUT, Antenna vertical, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel



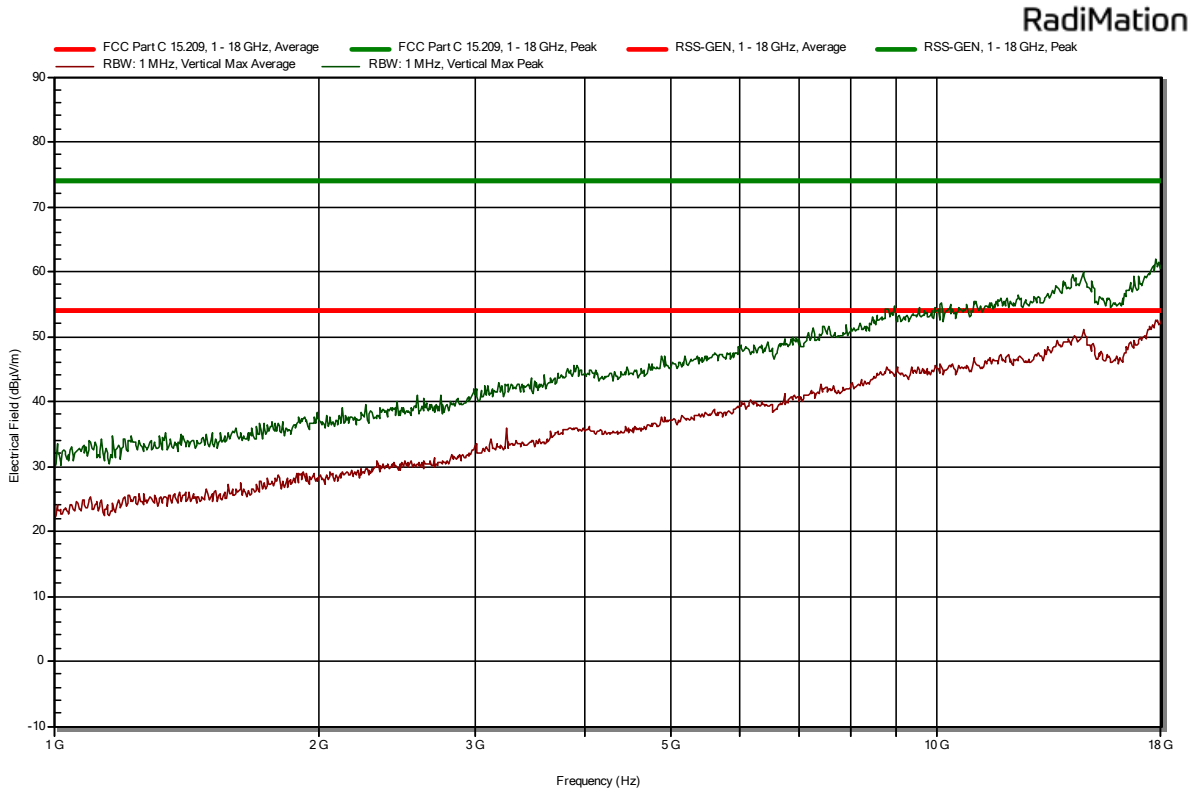
Plot 4f: radiated emissions of the EUT, Antenna horizontal, in the range 250-1000 MHz
(pre-scan peak values shown)
High channel



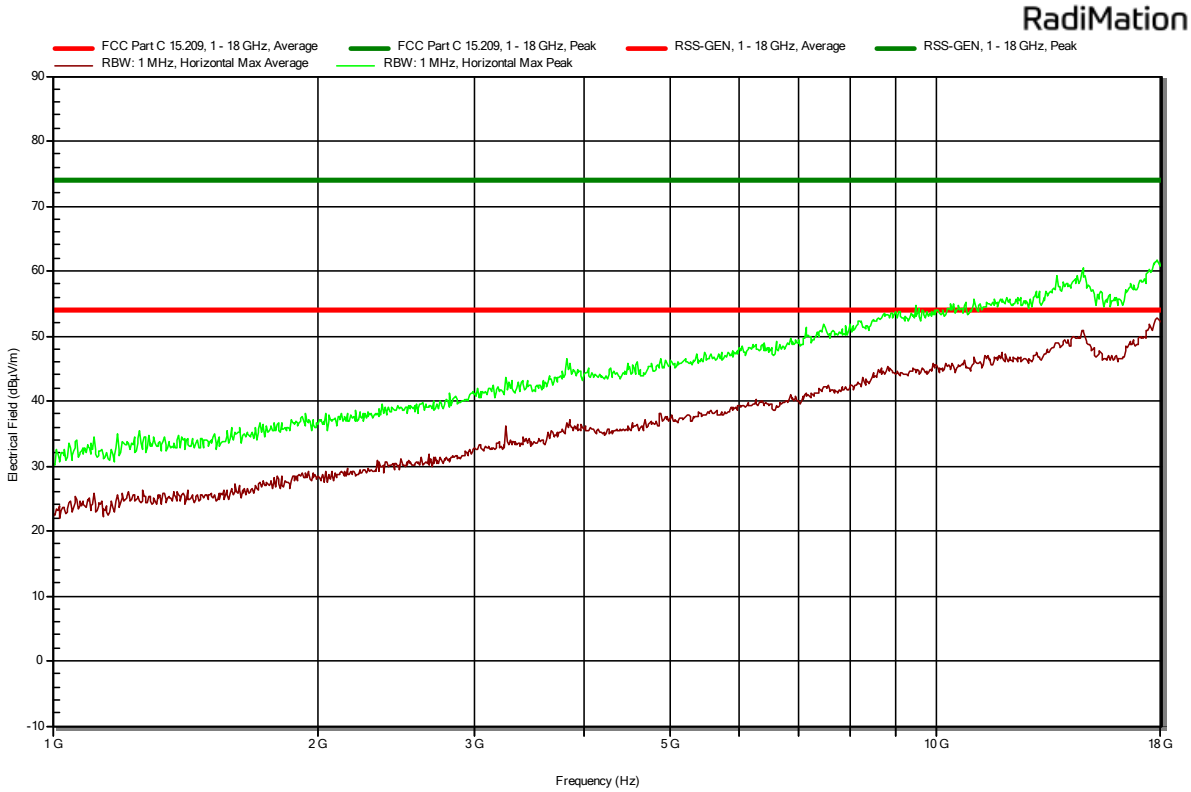
Plot 5a: radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Low channel



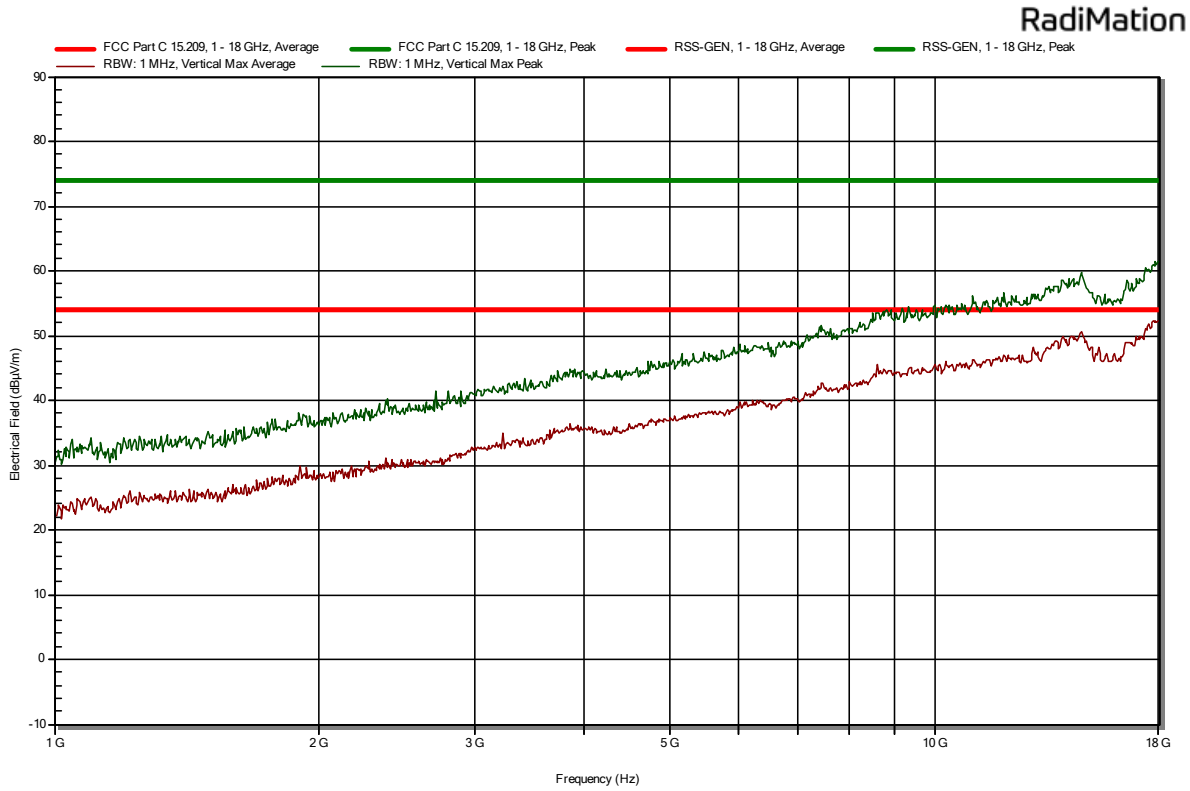
Plot 5b: radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Low channel



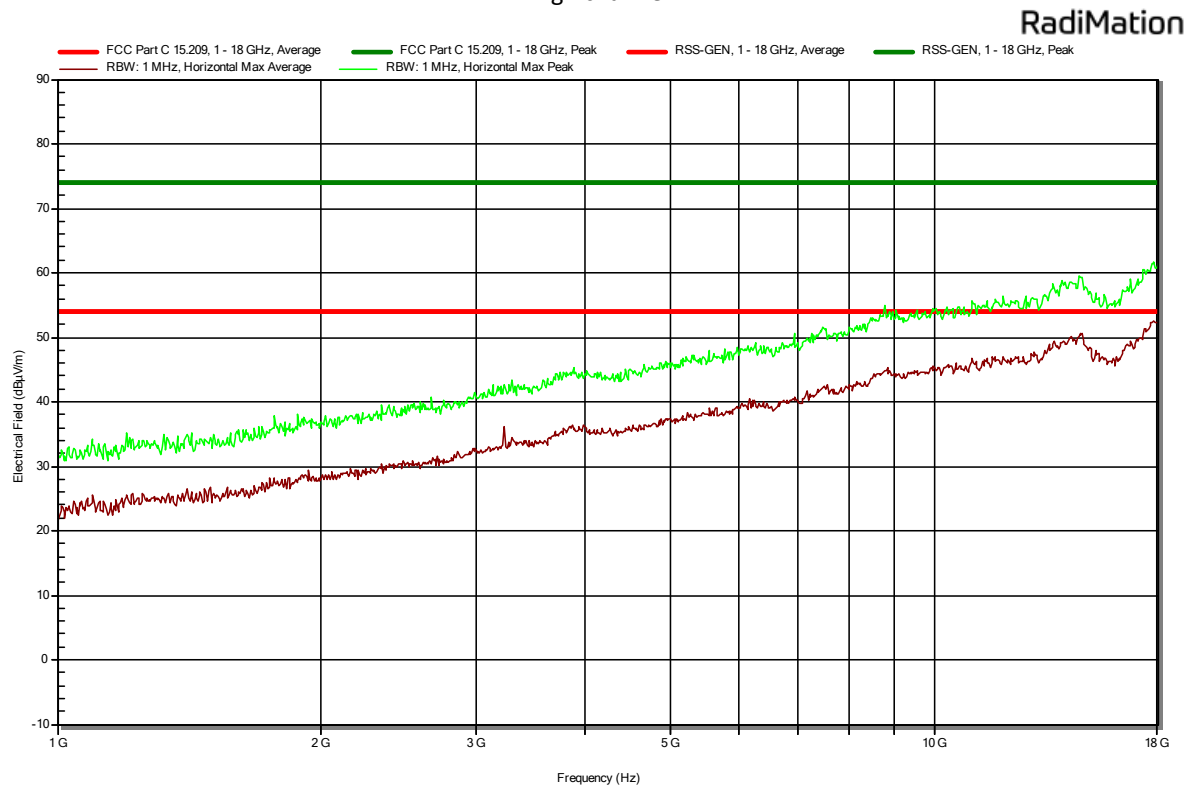
Plot 5c: radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



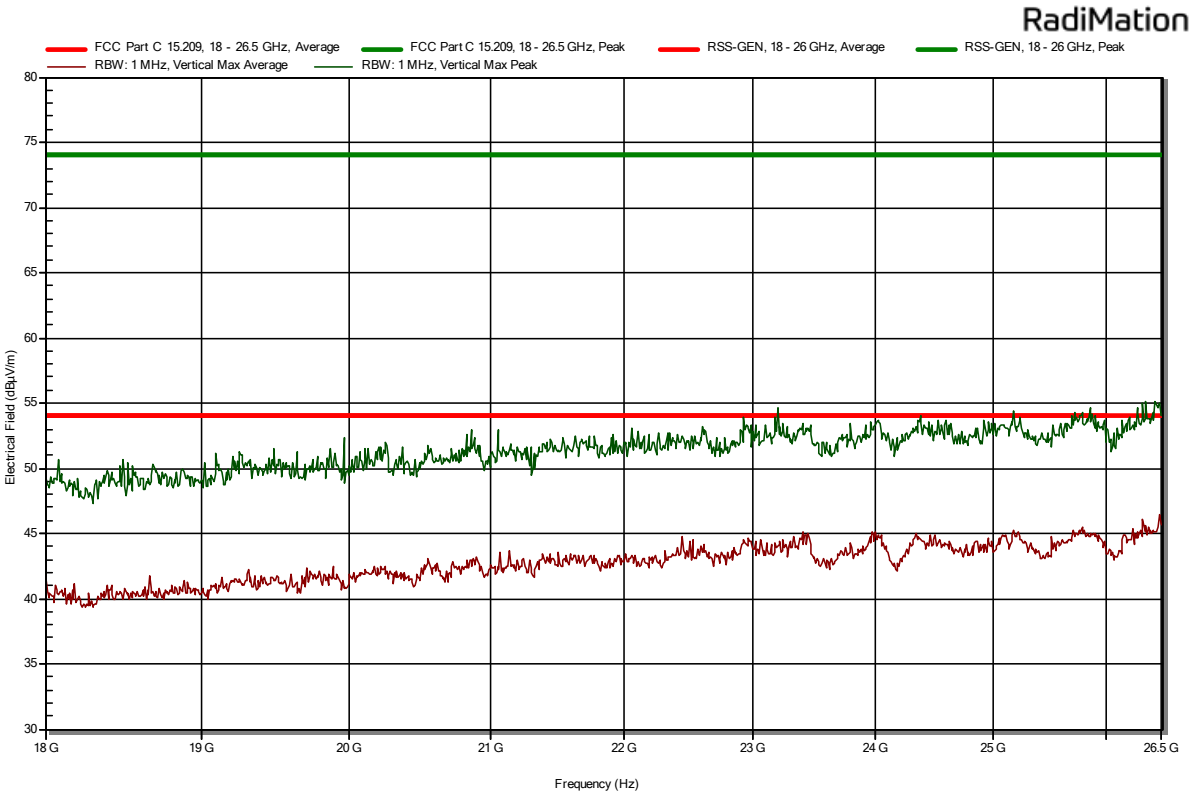
Plot 5d: radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
Middle channel



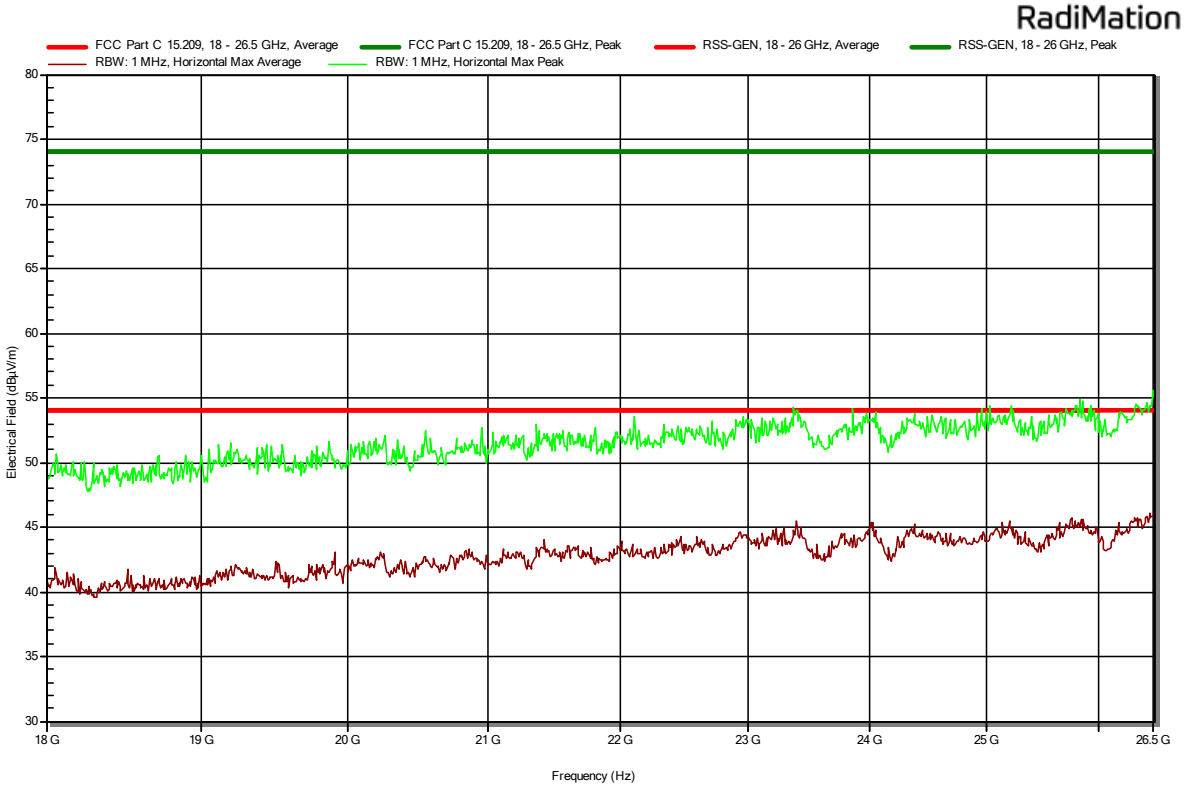
Plot 5e: radiated emissions of the EUT, Antenna vertical, in the range 1 – 18 GHz
(peak and average values shown)
High channel



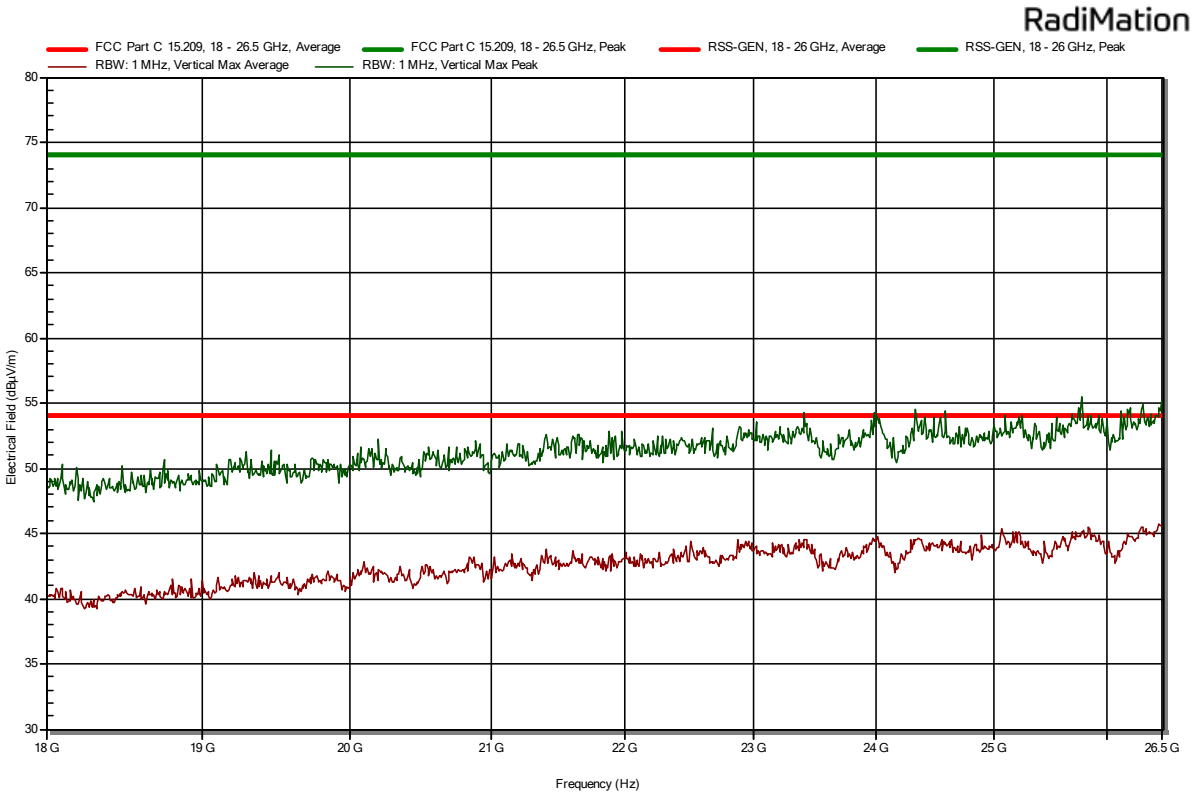
Plot 5f: radiated emissions of the EUT, Antenna horizontal, in the range 1 – 18 GHz
(peak and average values shown)
High channel



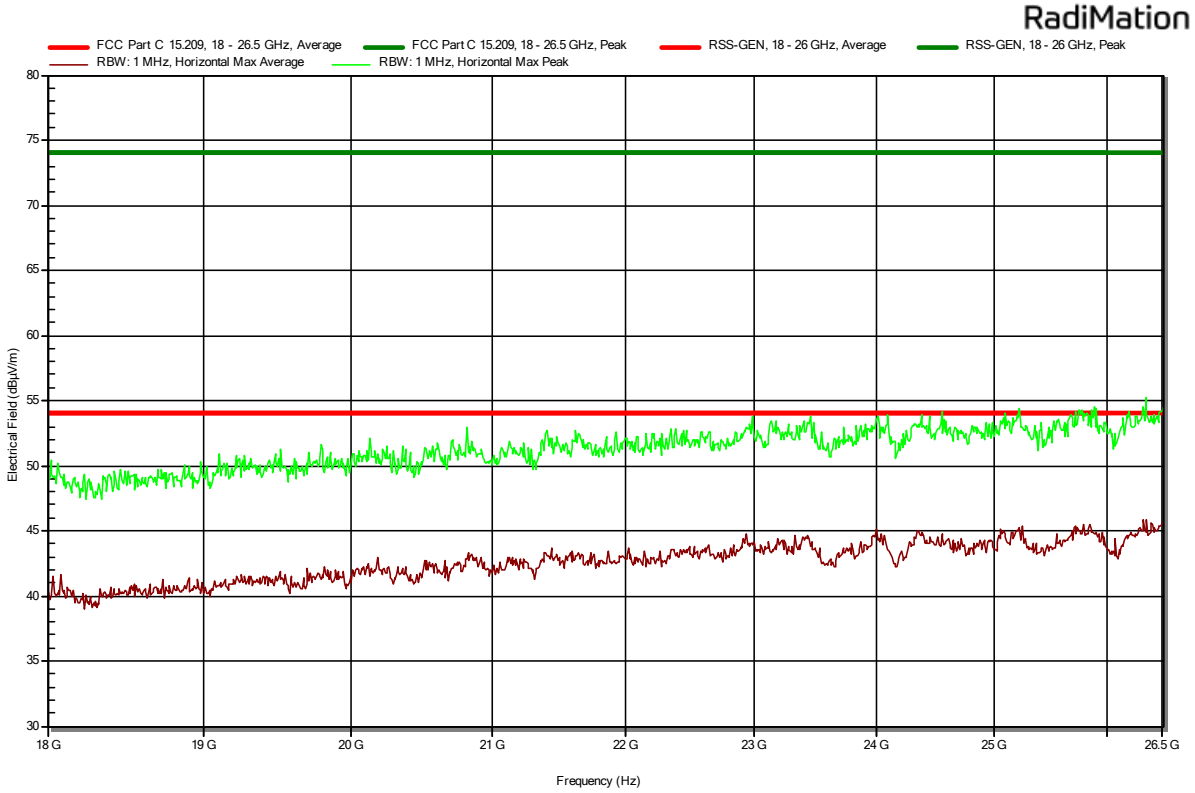
Plot 6a: radiated emissions of the EUT, Antenna vertical, in the range 18 – 26.5 GHz
(peak and average values shown)
Low channel



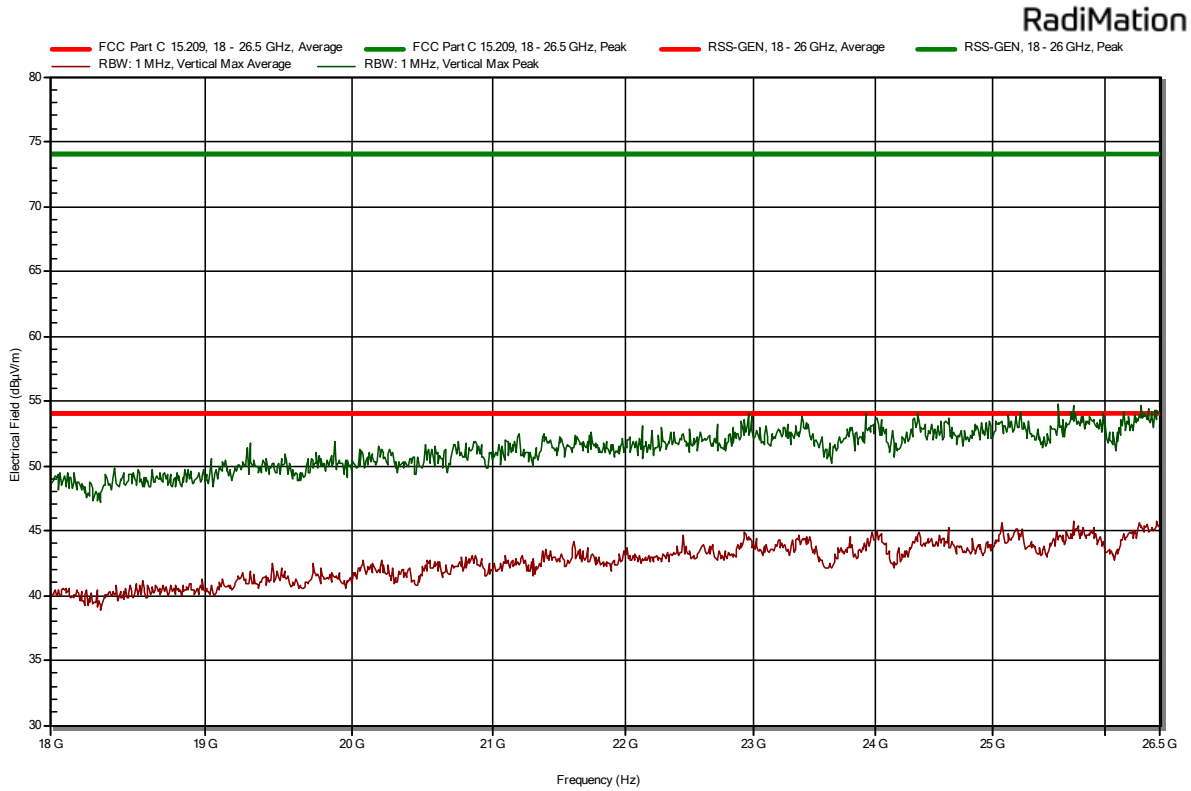
Plot 6b: radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26.5GHz
(peak and average values shown)
Low channel



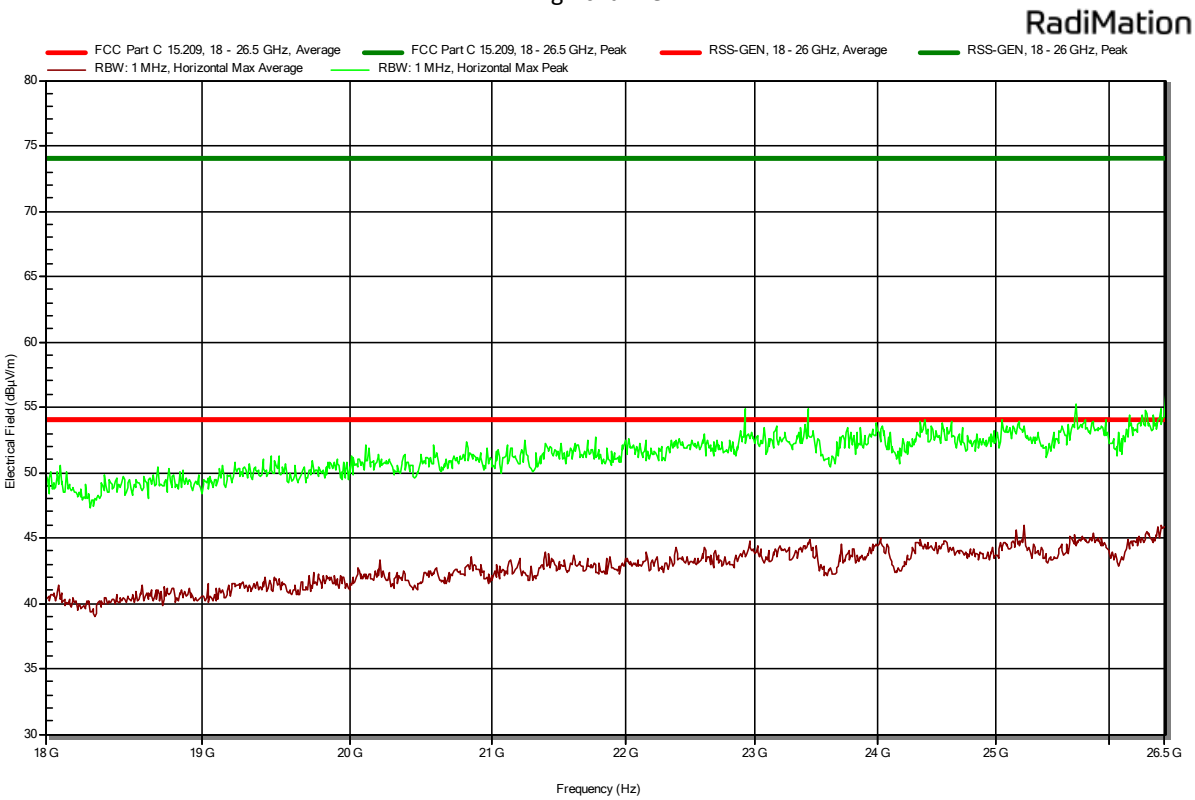
Plot 6c: radiated emissions of the EUT, Antenna vertical, in the range 18 – 26.5GHz
(peak and average values shown)
Middle channel



Plot 6d: radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26.5GHz
(peak and average values shown)
Middle channel



Plot 6e: radiated emissions of the EUT, Antenna vertical, in the range 18 – 26.5 GHz
(peak and average values shown)
High channel



Plot 6f: radiated emissions of the EUT, Antenna horizontal, in the range 18 – 26.5 GHz
(peak and average values shown)
High channel

4 Sample calculations

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

Magnetic field strength measurement:

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

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 (dB/Ωm) 114515 EMCO 6505 S/N:9112-2710	CL (dB) SAR cable	Corr. (dB)
0,009	-32,35	0,7	-31,65
0,01	-33,16	0,05	-33,11
0,02	-37,56	0,07	-37,49
0,03	-39,29	0,1	-39,19
0,04	-40,11	0,1	-40,01
0,1	-41,27	0,1	-41,17
0,2	-41,48	0,1	-41,38
0,5	-41,58	0,1	-41,48
1	-41,62	0,2	-41,42
3	-41,6	0,2	-41,4
5	-41,65	0,3	-41,35
10	-42,11	0,6	-41,51
15	-42,88	0,9	-41,98
20	-43,78	1	-42,78
25	-44,85	0,7	-44,15
27	-45,36	1,2	-44,16
30	-46,25	1	-45,25

Field Strength Measurement:

E (dBµV/m) = U(dBµV) + AF (dB/m) + 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)** **ID: 114436** **VHA 9103 + BBA 9106** **SN: 9856**	**Cable loss (dB)** **Id: SAR cable**	**Corr. (dB)**
30	18.6	0.68	19.28
100	10.4	1.15	11.55
150	14.8	1.41	16.21
200	16.0	1.63	17.63
250	16.9	1.93	18.83

Frequency (MHz)	**Gain (dBi)** **ID: 114385** **EMCO LPDA** **SN: 9856**	**Cable loss (dB)** **Id: SAR cable**	**Corr. (dB)**
250	11.8	1.93	13.73
300	13	2.12	15.12
350	15.6	2.2	17.8
400	17.1	2.29	19.39
450	17.3	2.53	19.83
500	17.7	2.67	20.37
550	18.4	2.9	21.3
600	19.2	3.02	22.22
650	19.7	3.09	22.79
700	20.3	3.22	23.52
750	21.4	3.56	24.96
800	22	3.69	25.69
900	22.1	3.81	25.91
950	22.6	3.91	26.51
1000	22.5	4.3	26.8

Frequency (MHz)	AF (dB/m) Kiwa ID: 114607 Emco 3115 SN: 9412-4377	Gain (dB) Kiwa ID: 114693 Miteq JS4-18004000-30-8P-A1	Cable loss (dB) TE 01315	Corr. (dB)
1000	23,6	40,4	2,0	66
1500	25,1	40,5	2,4	68
2000	27,1	40,5	2,7	70,3
2500	28,6	40,7	3,2	72,5
3000	30,5	40,7	3,2	74,4
3500	31,2	40,7	3,4	75,3
4000	32,7	40,9	4,9	78,5
4500	32,4	40,9	4,4	77,7
5000	33,2	40,7	4,6	78,5
5500	34,0	40,5	4,5	79
6000	34,6	40,0	5,2	79,8
6500	34,3	39,4	5,9	79,6
7000	35,2	38,6	5,7	79,5
7500	36,4	39,2	5,9	81,5
8000	37,0	38,9	6,3	82,2
8500	37,5	38,4	6,4	82,3
9000	38,1	37,4	6,5	82
9500	37,8	37,0	7,1	81,9
10000	38,2	36,5	7,3	82
10500	38,1	36,7	7,6	82,4
11000	38,3	36,9	8,3	83,5
11500	38,5	37,6	8,1	84,2
12000	39,1	38,3	8,4	85,8
12500	38,7	38,5	8,3	85,5
13000	39,2	38,9	9,2	87,3
13500	40,5	40,2	8,3	89
14000	41,1	40,0	8,2	89,3
14500	41,4	40,1	8,2	89,7
15000	40,2	41,4	8,3	89,9
15500	37,9	41,4	8,6	87,9
16000	37,5	42,8	9,2	89,5
16500	38,6	42,3	8,8	89,7
17000	41,1	43,1	9,4	93,6
17500	42,7	43,2	9,4	95,3
18000	44,0	44,2	9,8	98

Frequency (MHz)	AF (dB/m) Kiwa ID: 114518 Flann 20240-25 SN: 163703	Gain (dB) Kiwa ID:114693 Miteq JS4-18004000-30-8P-A1	Cable loss (dB) TE 01315	Corr. (dB)
18000	31,3	26,2	9,8	67,3
19000	31,5	26,1	9,6	67,2
20000	31,7	25,9	11	68,6
21000	31,9	24,3	10,7	66,9
22000	32,1	18,3	10,5	60,9
23000	32,2	18,9	10,8	61,9
24000	32,3	23,6	11,4	67,3
25000	32,4	24,5	11,6	68,5
26000	32,5	25,3	11,7	69,5

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