SGS

Test Report

FINAS
Finnish Accreditation Service
T004 (EN ISO/IEC 17025)

INTENTIONAL RADIATOR TESTS ACCORDING TO FCC PART 15 C AND ISED CANADA REQUIREMENTS

Equipment Under Test:	Random Orbital Sander with Bluetooth Low Energy technology
Model:	LEROS 950X
Trade Mark:	Mirka
Manufacturer:	Mirka Ltd Pensalantie 210 FI-66850, JEPUA FINLAND
Customer:	Mirka Ltd Pensalantie 210 FI-66850, JEPUA FINLAND
FCC Rule Part:	15.247: 2017
IC Rule Part:	RSS-247, Issue 2, 2017 RSS-GEN Issue 5, 2018
KDB:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (August 24,2018)

Date:	16 May 2019	Date:	16 May 2019
Issued by:	Rauno Repo Senior RF/EMC Specialist	Checked by:	Pekka Kälviäinen Testing Engineer

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RELEASE HISTORY

Version	Changes	Issued
1.0	Initial release	3 January 2018
1.1	EUT model name and HW revision corrected	10 January 2019
1.2	Editional corrections, radiated emission low and high channel results 9 kHz – 1000 MHz added, test setup block diagram added	22 February 2019
1.3	Radiated upper band edge updated	16 May 2019

Equipment Under Test (EUT)

Type:	Random Orbital Sander with Bluetooth Low Energy technology
Trade mark:	Mirka
Model:	LEROS 950X
Serial no:	-
Software version:	v2.14
Hardware version:	LC2.0
FCC ID:	2AK2S-LCX
ISED ID:	22379-LCX

Description of the EUT

The equipment under test (EUT) is a Random Orbital Sander with Bluetooth Low Energy 4.0.

Classification of the device

Fixed device	☐
Mobile Device (Human body distance > 20cm)	☐
Portable Device (Human body distance < 20cm)	☒

Modifications Incorporated in the EUT

EUT No.	Name	Description
1	Conducted	Temporary USB control cable for controlling radio module. Temporary antenna connector was soldered to replace original antenna.
2	Radiated	Temporary USB control cable for controlling radio module.

Ratings and declarations

Operating Frequency Range (OFR):	2402 - 2480 MHz
Channels:	40
Channel separation:	2 MHz
Effective conducted power:	0.19 dBm (Peak)
Modulation:	GFSK
Antenna gain:	0 dBi
Antenna type:	Internal antenna
Antenna count:	1

Power Supply

Operating voltage range: 115 VAC / 60 Hz

Samples

Two samples were used in tests, samples are listed in table below.

EUT No.	Name	Description
1	Conducted	Temporary USB control cable for controlling radio module. Temporary antenna connector was soldered to replace original antenna.
2	Radiated	Temporary USB control cable for controlling radio module.

Disclaimer

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. This document cannot be reproduced except in full, without prior approval of the Company.

SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.207(a) / RSS-GEN 8.8	Conducted Emissions on Power Supply Lines	PASS
§15.247(b)(3) / RSS-247 5.4(d)	Maximum Peak Conducted Output Power	PASS
§15.247(a)(2) / RSS-247 5.2(a)	6 dB Bandwidth	PASS
§15.247(e) / RSS-247 5.2(b)	Power Spectral Density	PASS
RSS-GEN 6.6	99% Occupied Bandwidth	PASS
§15.247(d) / RSS-247 5.5	100 kHz Bandwidth of Frequency Band Edges and Conducted Spurious Emissions	PASS
§15.209(a), §15.247(d) / RSS-247 5.5	Radiated Emissions Within the Restricted Bands	PASS

EUT Test Conditions during Testing

The EUT was in continuous transmit mode during all the tests. The hopping was stopped and the EUT was configured into the wanted channel using software provided by the manufacturer. Normal modulation and maximum transmit power was used in all tests.

Following channels were used during the tests when the hopping was stopped:

Channel Low: 2402 MHz
Channel Mid: 2440 MHz
Channel High: 2480 MHz

Antenna port measurements were performed with the sample no. 1 using 30 VDC supply voltage. Radiated measurements were performed with the sample no. 2 using 115 VAC and 60 Hz supply voltage. Conducted emission measurement was also repeated with a plastic molded circuit board without transmitting. During the radiated and conducted emission measurements the sander was rotating.

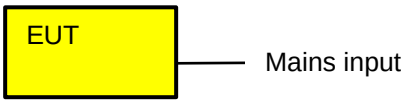

Figure 1. The EUT setup block diagram

Test Facility

Testing Laboratory / address: FCC registration number: **904175**	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
Test Site:	☐ Kara 10, ISED Canada registration number: **8708A-1** ☒ Kara 5, ISED Canada registration number: **8708A-2** ☐ Laru 3 ☐ Kallio 10

TEST RESULTS

Conducted Emissions In The Frequency Range 150 kHz - 30 MHz.

Standard:	ANSI C63.10	(2013)
Tested by:	PKA	
Date:	3 January 2019	
Temperature:	21 °C	
Humidity:	31 % RH	
Measurement uncertainty:	± 2.9 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.207 (a)
IC Rule: RSS-GEN

Conducted disturbance voltage was measured with an artificial main network from 150 kHz to 30 MHz with 4.5 kHz steps and a resolution bandwidth of 9 kHz. Measurements were carried out with peak and average detectors.

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

*Decreases with the logarithm of the frequency.

Test results

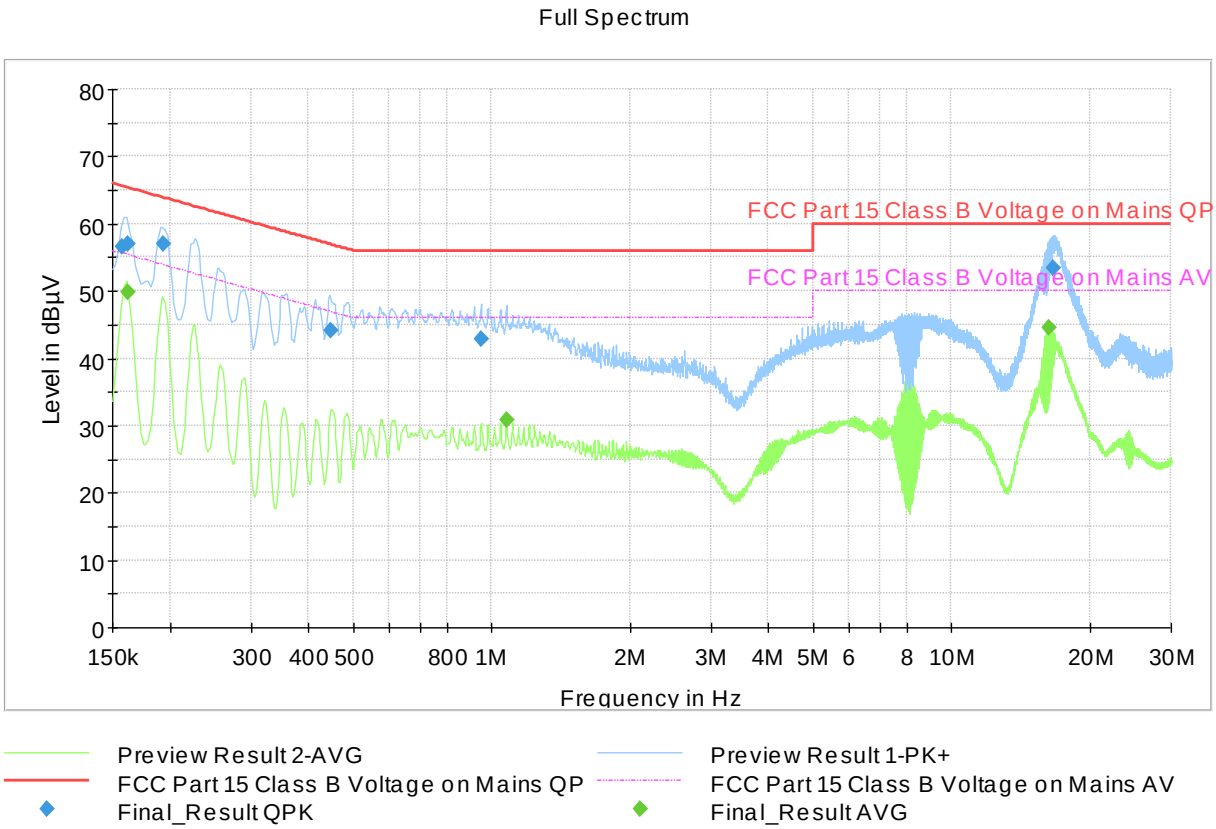

Figure 2. The measured curves with peak- and average detector

Table 1. Final results

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.158000	56.57	---	65.57	9.00	1000.0	9.000	L1	10.1
0.162000	---	49.81	55.36	5.55	1000.0	9.000	N	10.1
0.162000	56.95	---	65.36	8.41	1000.0	9.000	L1	10.2
0.193500	56.99	---	63.89	6.90	1000.0	9.000	L1	10.1
0.447750	44.13	---	56.92	12.79	1000.0	9.000	L1	10.1
0.947750	42.93	---	56.00	13.07	1000.0	9.000	N	10.3
1.077750	---	30.78	46.00	15.22	1000.0	9.000	N	10.3
16.295500	---	44.44	50.00	5.56	1000.0	9.000	L1	10.4
16.622750	53.48	---	60.00	6.52	1000.0	9.000	L1	10.5

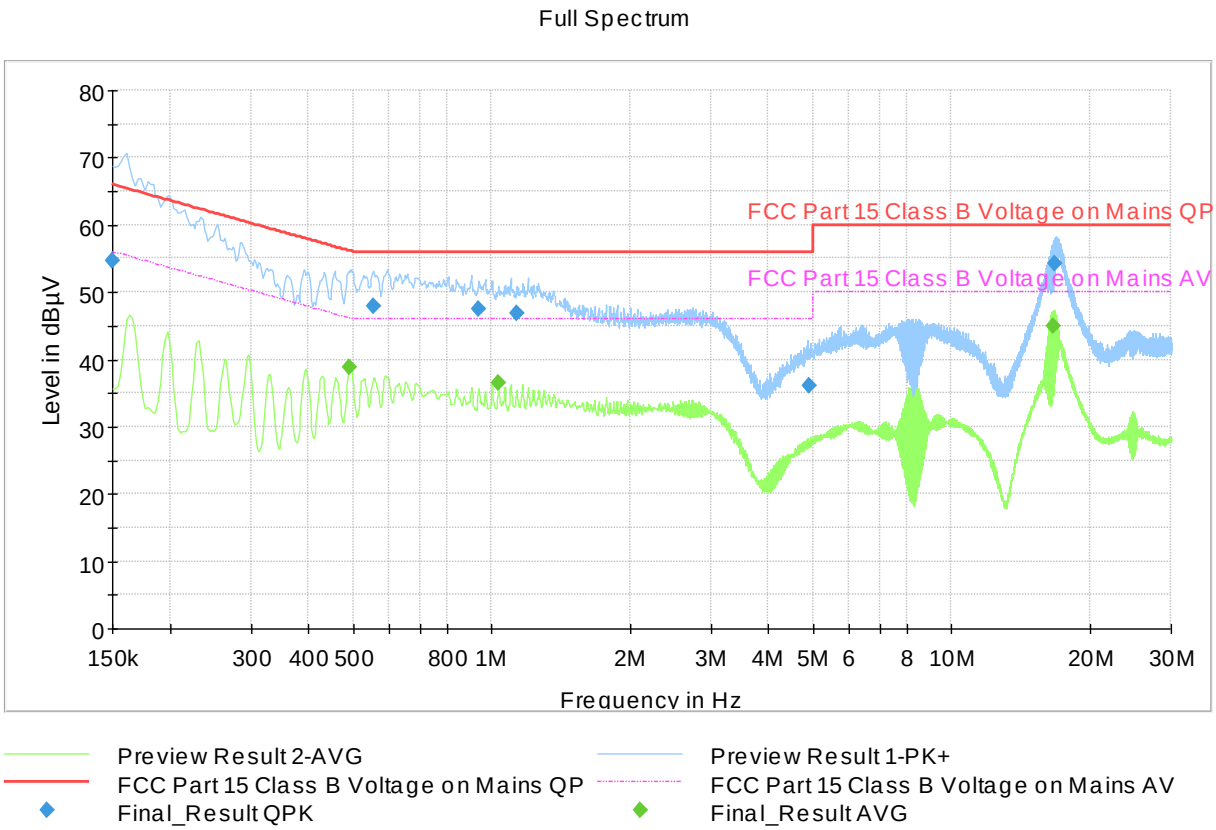

Figure 3. The measured curves with peak- and average detector (plastic molded board)

Table 2. Final results

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	54.69	---	66.00	11.31	1000.0	9.000	N	10.1
0.491000	---	38.80	46.15	7.35	1000.0	9.000	L1	10.1
0.552250	47.95	---	56.00	8.05	1000.0	9.000	L1	10.1
0.934750	47.47	---	56.00	8.53	1000.0	9.000	N	10.3
1.033250	---	36.44	46.00	9.56	1000.0	9.000	N	10.3
1.132250	46.78	---	56.00	9.22	1000.0	9.000	N	10.3
4.900500	36.15	---	56.00	19.85	1000.0	9.000	N	10.4
16.675500	---	44.86	50.00	5.14	1000.0	9.000	L1	10.5
16.802500	54.26	---	60.00	5.74	1000.0	9.000	L1	10.5

Maximum Peak Conducted Output Power

Standard:	ANSI C63.10	(2013)
Tested by:	RRE	
Date:	17 December 2018	
Temperature:	23 ± 3 °C	
Humidity:	20 - 60 % RH	
Measurement uncertainty:	± 2.87dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.247(b)(3)
RSS-247 5.4(d)

For systems using digital modulation in the 2400-2483.5 MHz bands the limit is 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

Measured values are peak values.

Results:

Table 3. Maximum conducted output power

Channel	Conducted Power [dBm]	Limit [dBm]	Margin [dBm]	Result
Low	-0.73	30	30.73	PASS
Mid	-0.15	30	30.15	PASS
High	0.19	30	29.81	PASS

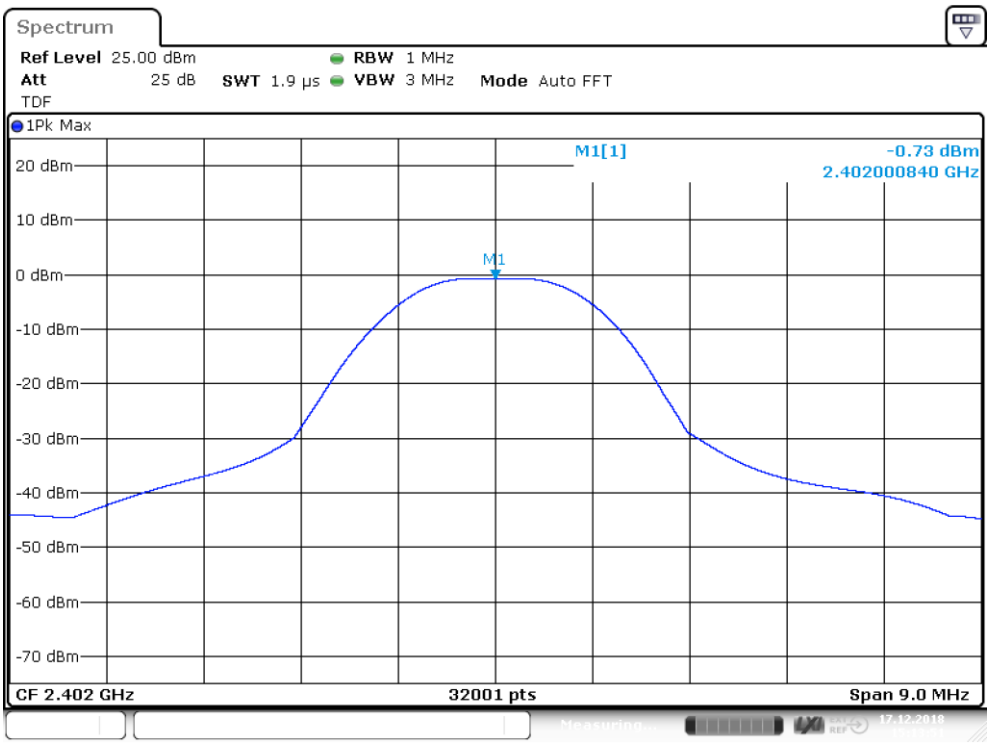

Figure 4. Conducted power, Channel low

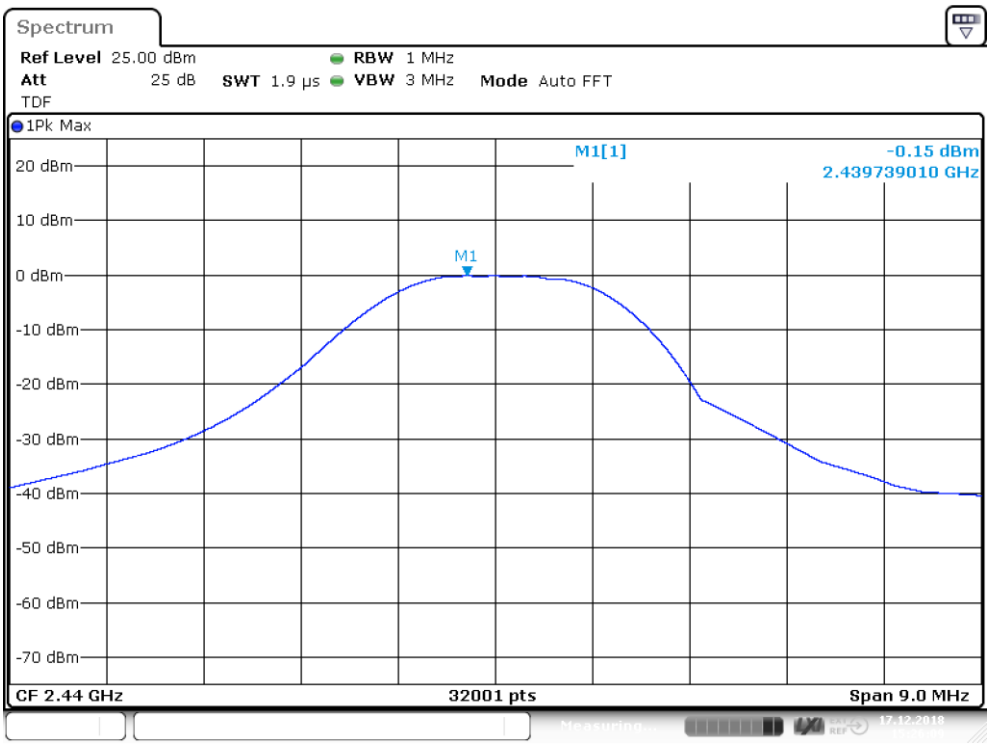

Figure 5. Conducted power, Channel mid

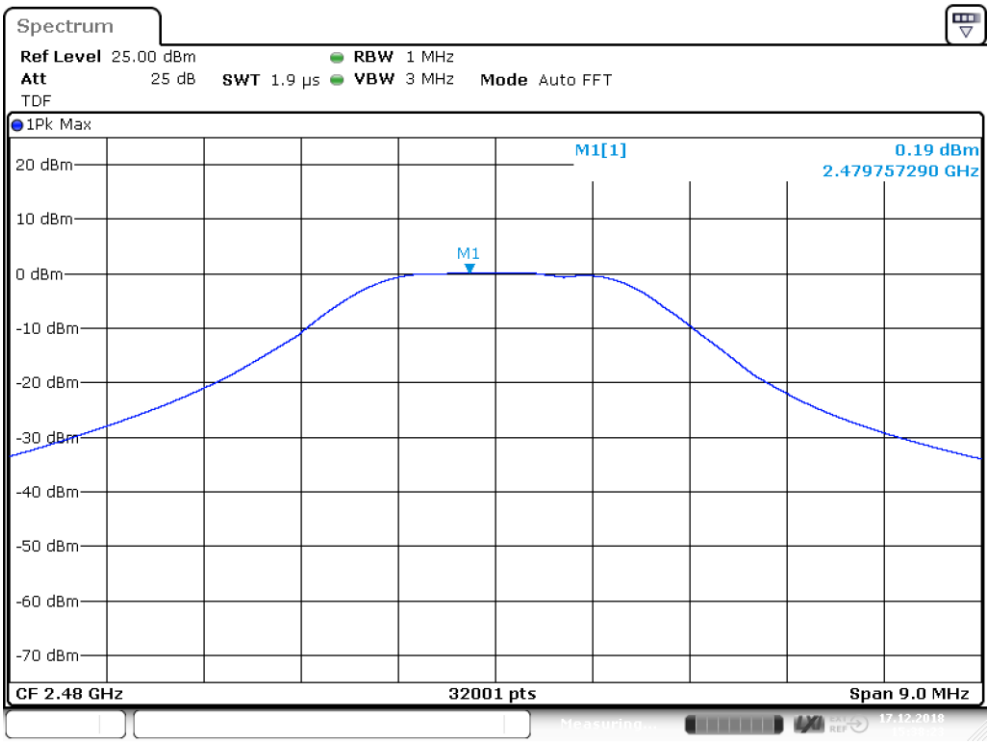

Figure 6. Conducted power, Channel high

Transmitter Radiated Spurious Emissions 9 kHz - 26500 MHz

Standard:	ANSI C63.10	(2013)
Tested by:	RRE, PKA	
Date:	20 – 21 December 2018,	3 January 2019, 21-22 February 2019
Temperature:	23 ± 3 °C	
Humidity:	20 - 60 % RH	
Measurement uncertainty:	± 4.51 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.247(d), 15.209(a)
RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a)**.**

The correction factor in the final result table contains the sum of the transducers (antenna + amplifier + cables).
Peak values of emissions below 1000 MHz measured for reference as well as transmitter fundamental.

Transmitter radiated spurious emissions were tested the EUT being in three different orthogonal positions. The highest results were reported.

Frequency range [MHz]	Limit [µV/m]	Limit [dBµV/m]	Detector	Measurement distance [m]
0.009 – 0.09	2400/F(kHz)	20*log(2400/F(kHz))	Average	300
0.09 – 0.110	2400/F(kHz)	20*log(2400/F(kHz))	Quasi-peak	300
0.110 – 0.490	2400/F(kHz)	20*log(2400/F(kHz))	Average	300
0.490 – 1.705	25000/F(kHz)	20*log(24000/F(kHz))	Quasi-peak	30
1.705 – 30	30	29.5	Quasi-peak	30
30 - 80	100	40.0	Quasi-peak	3
88 - 216	150	43.5	Quasi-peak	3
216 - 960	200	46.0	Quasi-peak	3
960 - 1000	500	53.9	Quasi-peak	3
Above 1000	500	53.9	Average	3
Above 1000	5000	73.9	Peak	3

Low channel

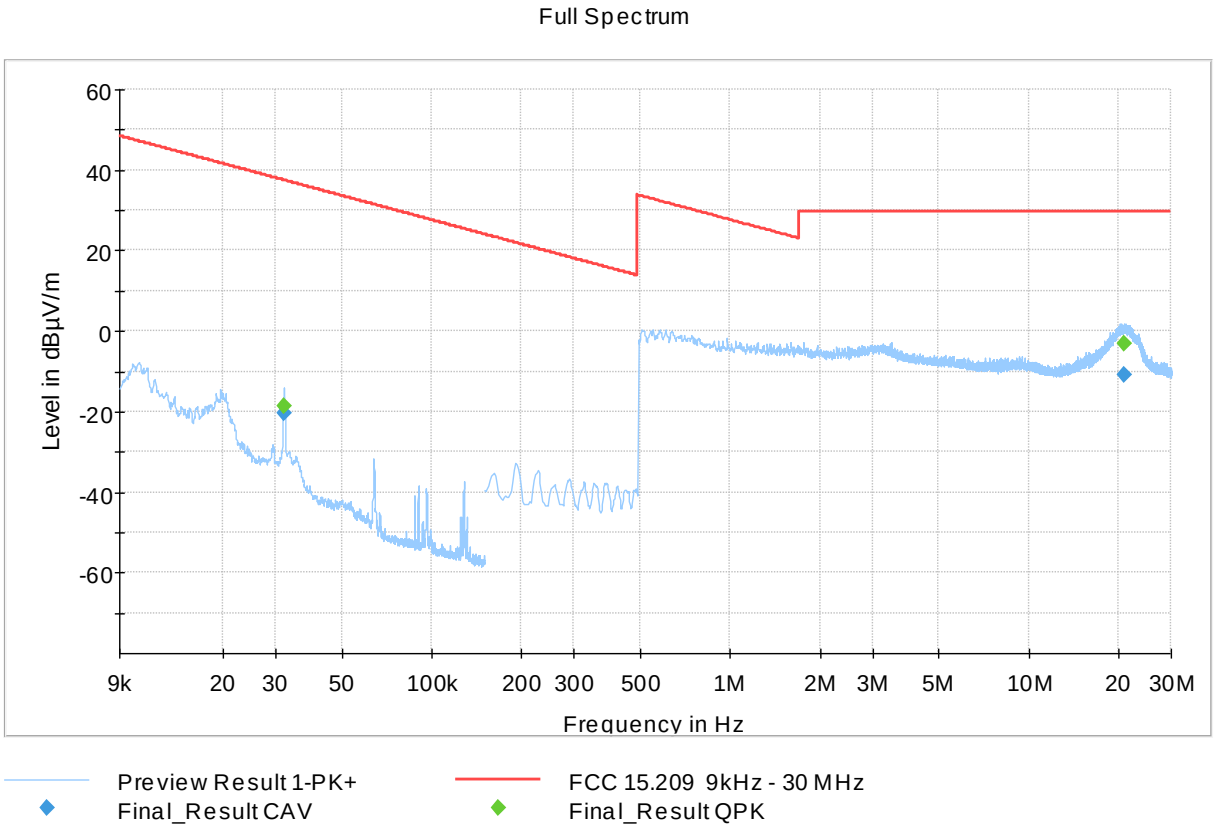

Figure 7. Low channel 9 kHz – 30 MHz

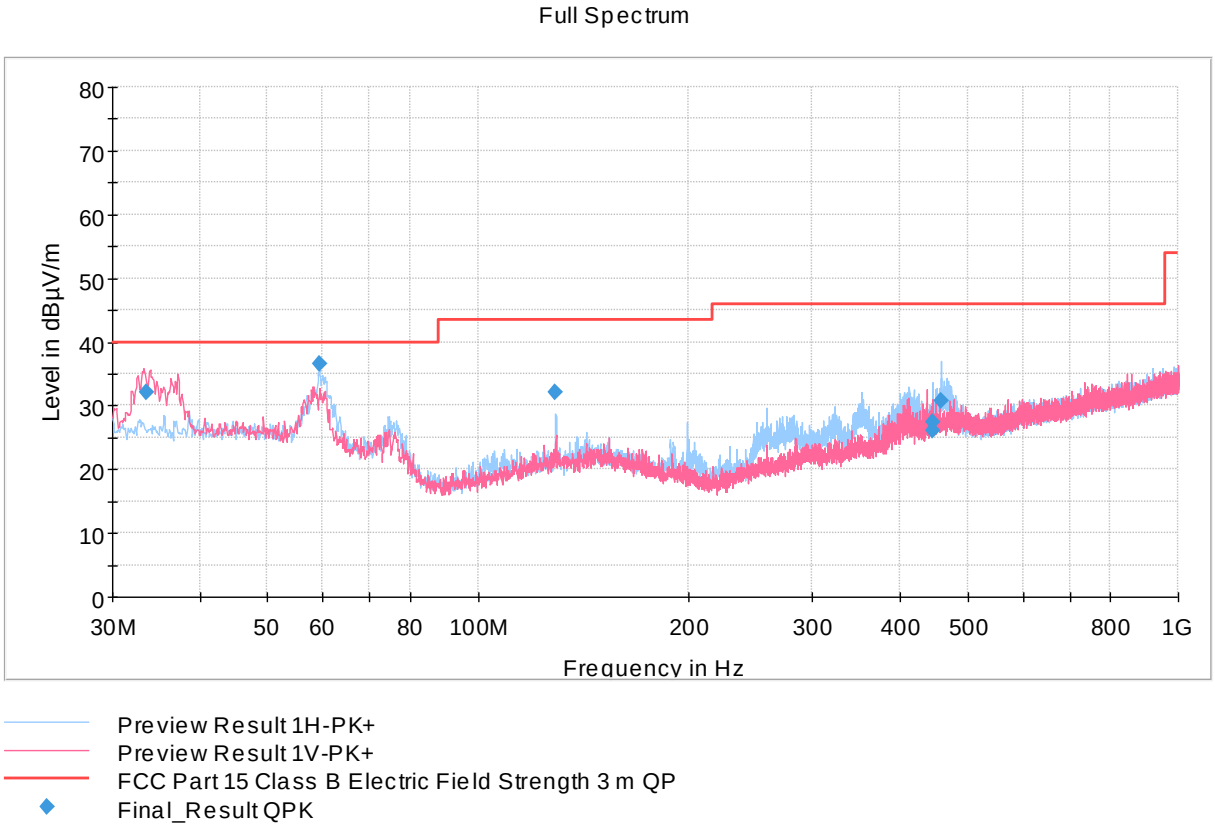

Figure 8. Low channel 30 MHz – 1000 MHz

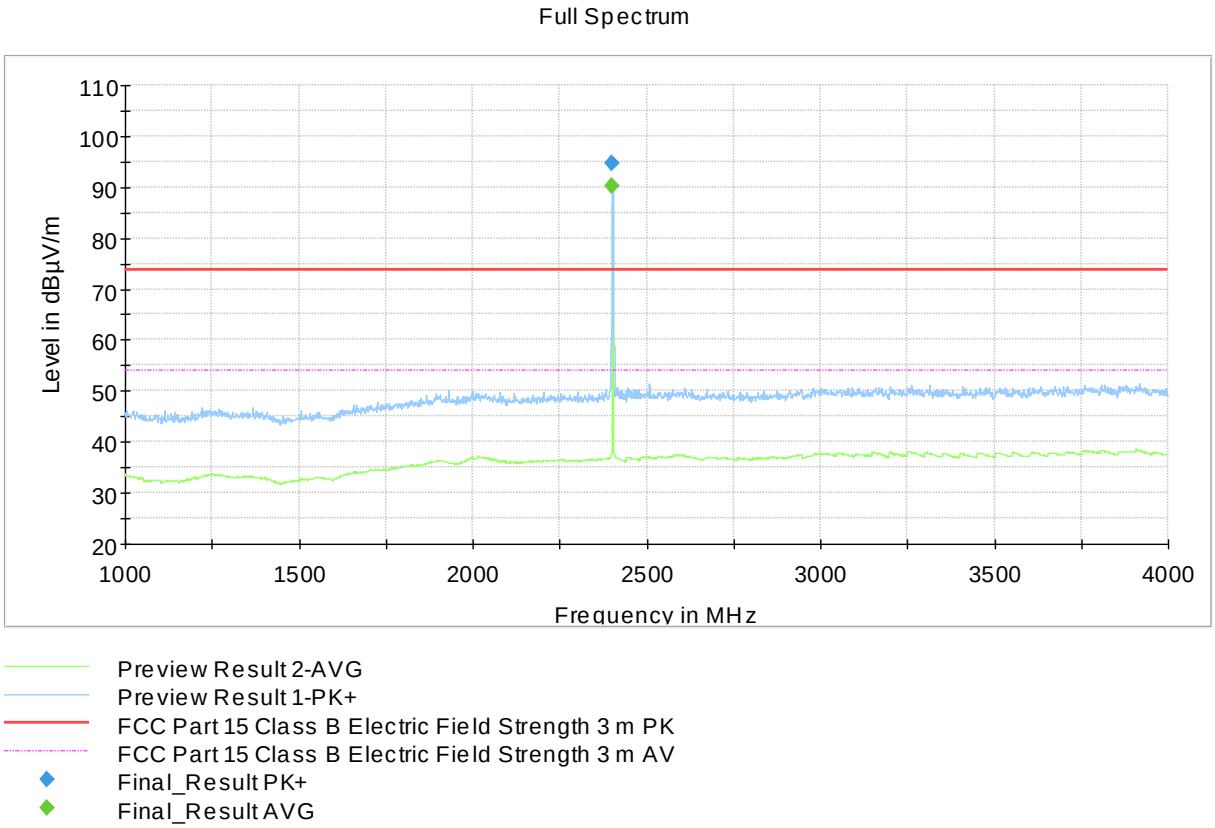

Figure 9. Low channel 1 GHz – 4 GHz

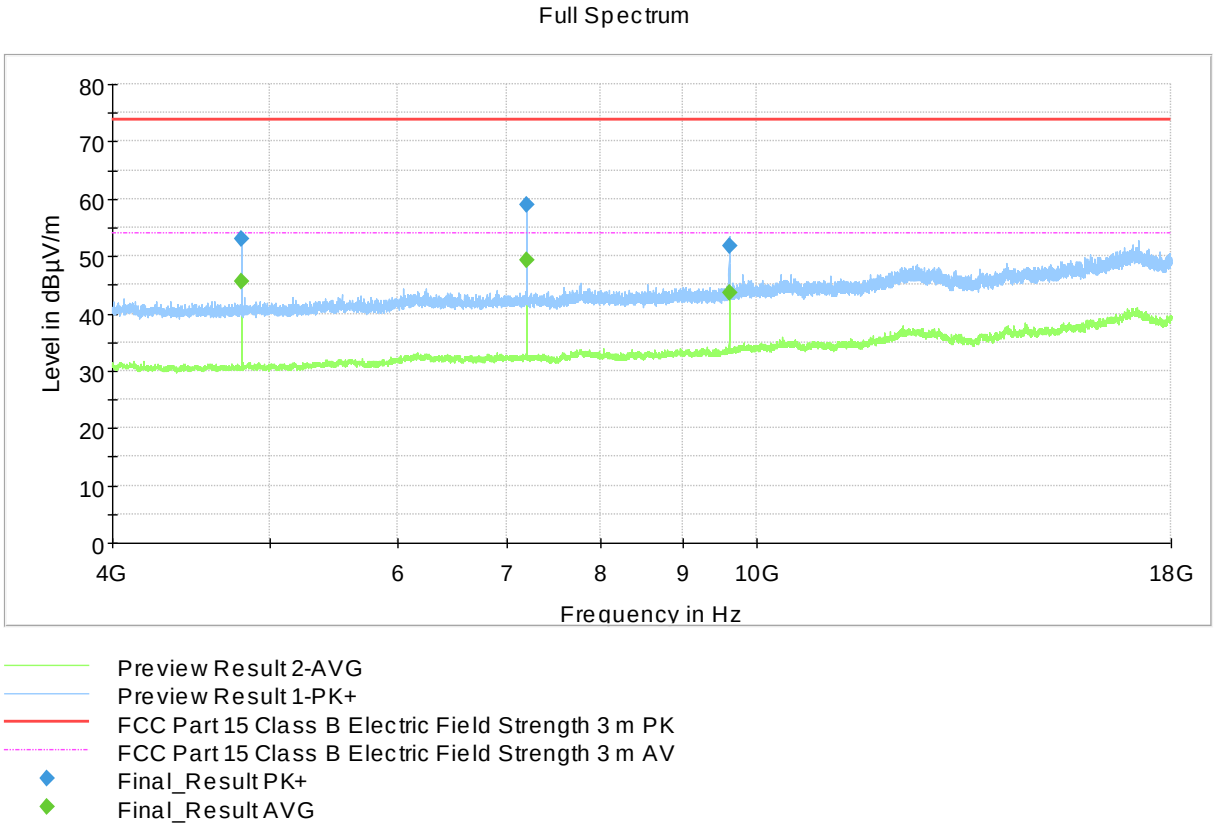

Figure 10. Low channel 4 GHz – 18 GHz

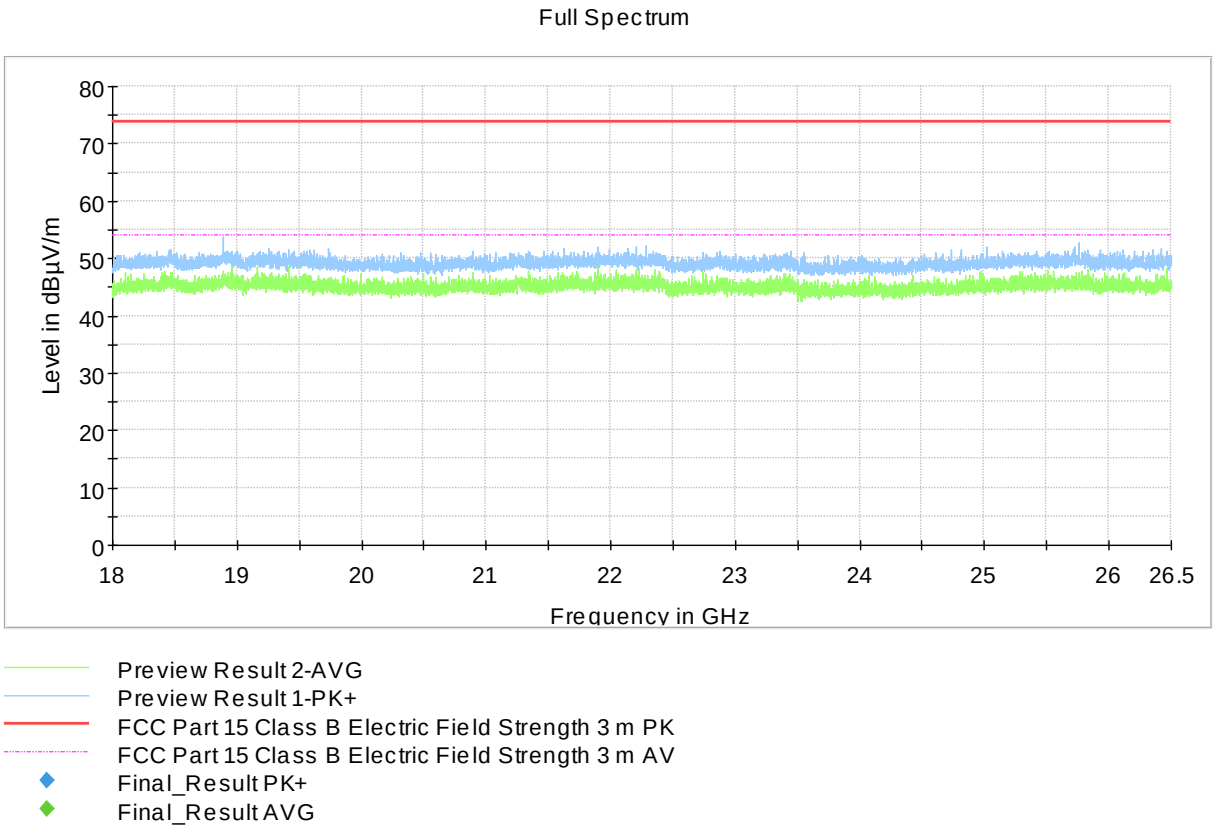

Figure 11. Low channel 18 GHz – 26.5 GHz

Table 4. Low channel results

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.032060	---	-20.52	---	37.47	57.99	0.200	100.0	V	287.0	-60.1
0.032060	---	---	-18.49	37.47	55.96	0.200	100.0	V	287.0	-60.1
20.821250	---	-10.74	---	29.50	40.24	9.000	100.0	V	97.0	-19.7
20.821250	---	---	-3.04	29.50	32.54	9.000	100.0	V	97.0	-19.7
33.518000	---	---	32.06	40.00	7.94	120.000	103.0	V	318.0	17.2
59.254000	---	---	36.47	40.00	3.53	120.000	365.0	H	0.0	18.0
129.017000	---	---	32.14	43.50	11.36	120.000	239.0	H	19.0	17.2
445.928000	---	---	26.02	46.00	19.98	120.000	112.0	H	201.0	23.0
446.772000	---	---	27.38	46.00	18.62	120.000	103.0	H	204.0	23.0
458.215000	---	---	30.72	46.00	15.28	120.000	100.0	H	203.0	23.2
4803.500000	53.05	---	---	73.90	20.85	1000.000	171.0	H	211.0	7.2
4804.000000	---	45.45	---	53.90	8.45	1000.000	195.0	H	212.0	7.2
7205.200000	59.02	---	---	73.90	14.88	1000.000	148.0	H	140.0	10.4
7205.400000	---	49.25	---	53.90	4.65	1000.000	165.0	H	141.0	10.4
9606.900000	51.87	---	---	73.90	22.03	1000.000	150.0	V	321.0	13.7
9607.200000	---	43.54	---	53.90	10.36	1000.000	189.0	V	0.0	13.7

Middle channel

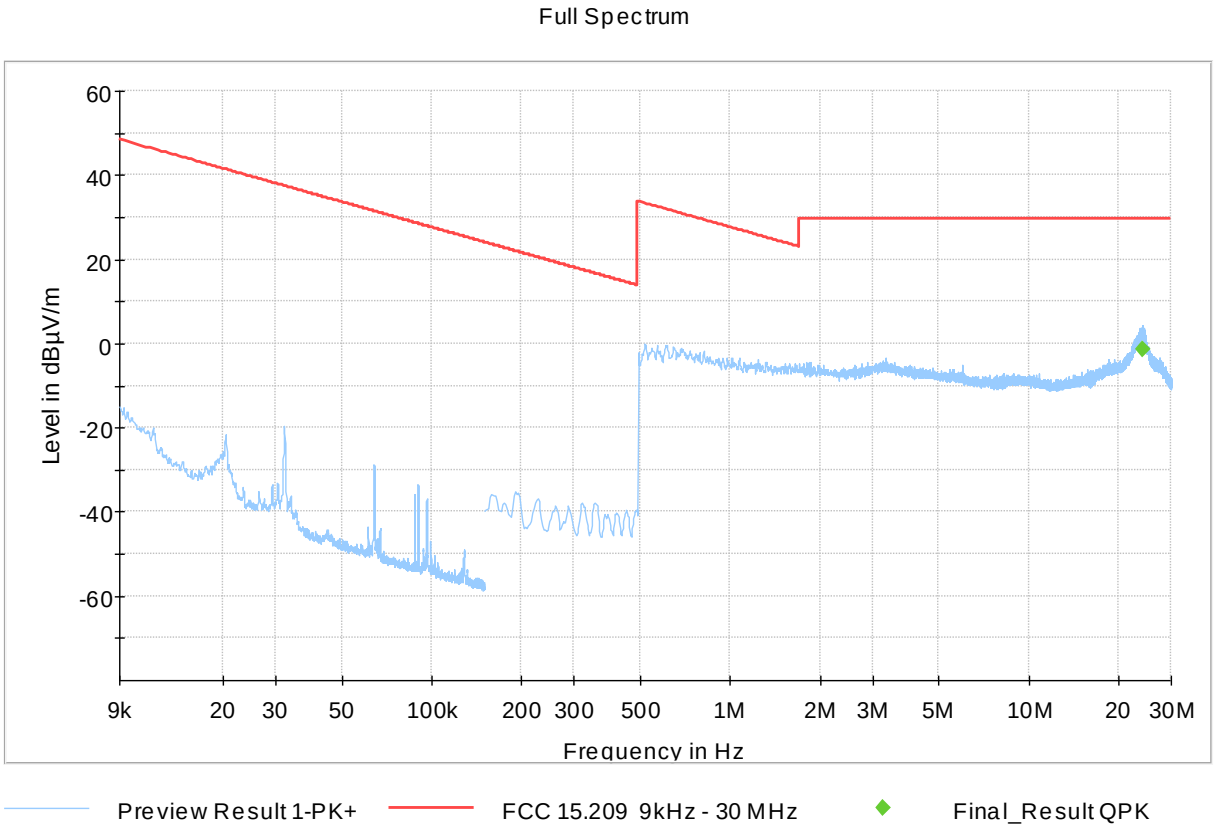

Figure 12. Mid channel 9 kHz – 30 MHz

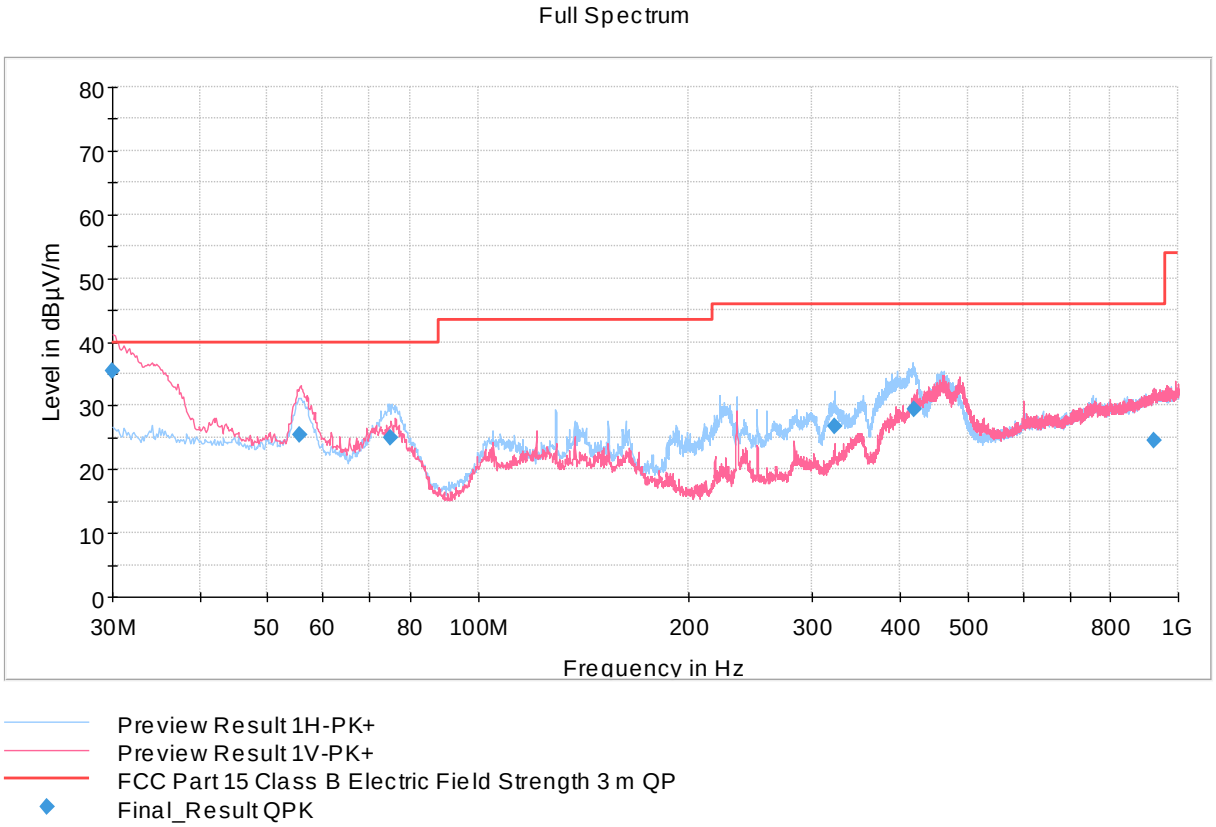

Figure 13. Mid channel 30 MHz – 1000 MHz

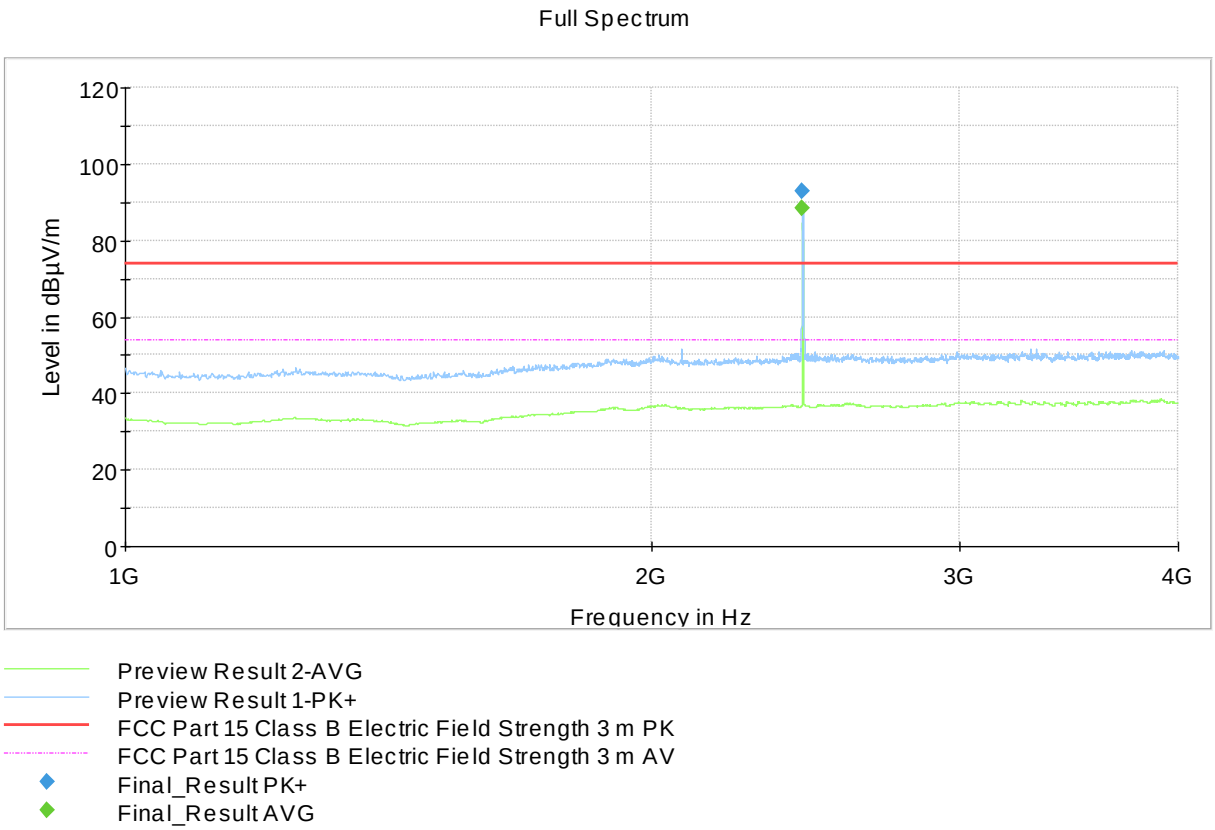

Figure 14. Mid channel 1 GHz – 4 GHz

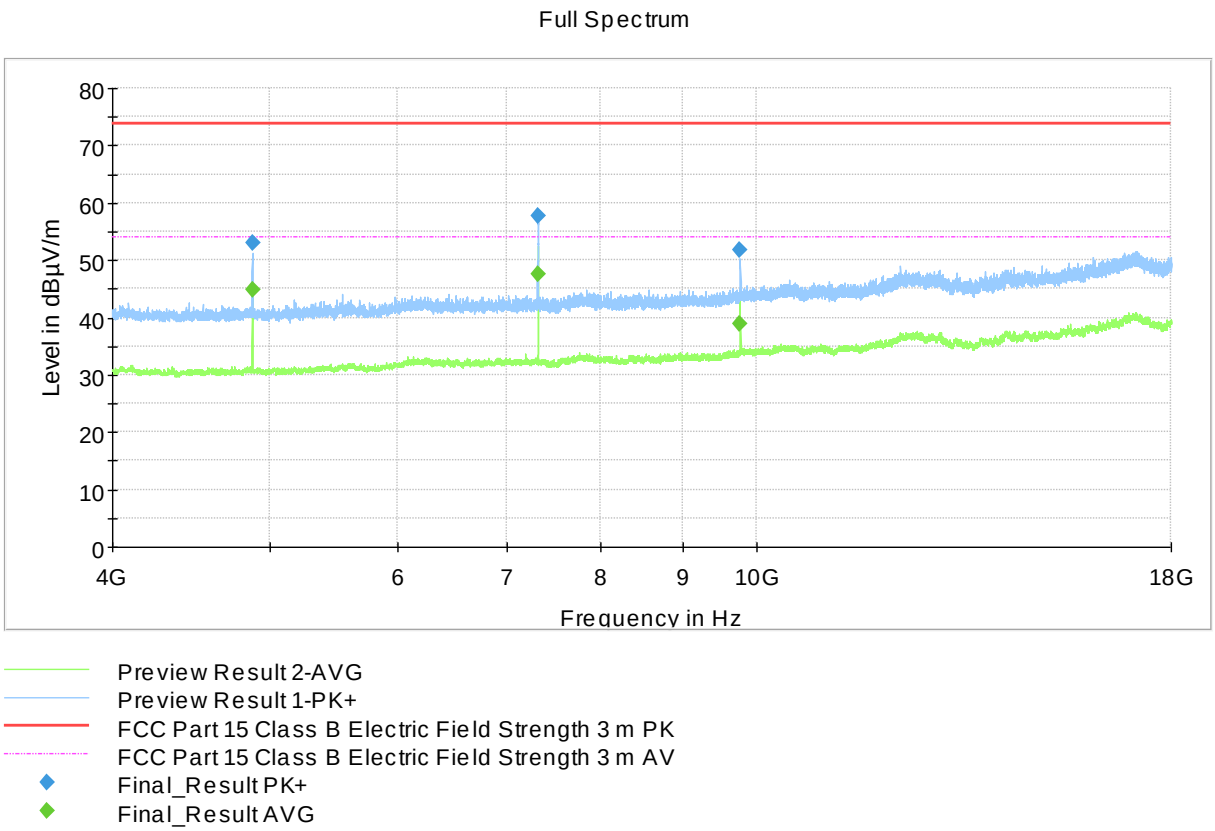

Figure 15. Mid channel 4 GHz – 18 GHz

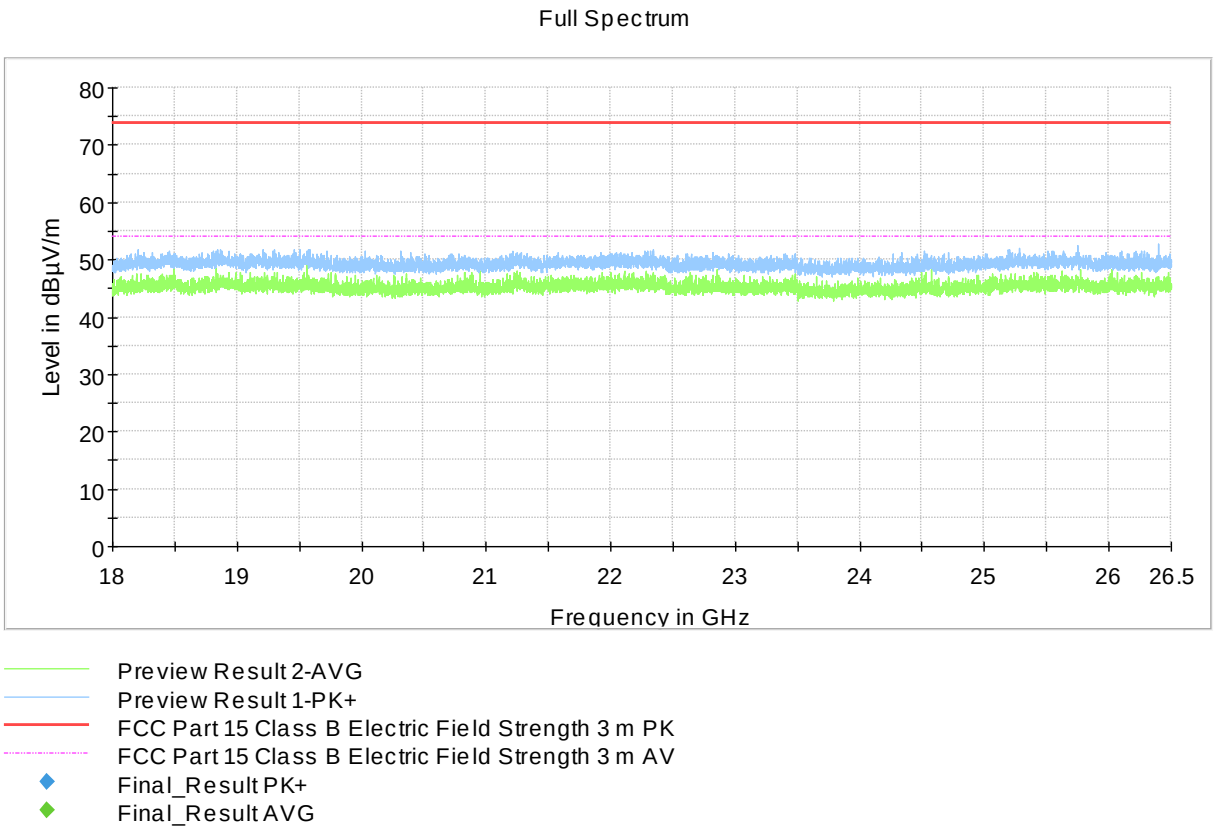

Figure 16. Mid channel 18 GHz – 26.5 GHz

Table 5. Mid channel results

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m
24.121750	---	---	-1.41	29.50	30.91	9.000	190.0	V	86.0	-19.5
24.121750	---	-10.49	---	29.50	39.99	9.000	190.0	V	86.0	-19.5
30.040000	---	---	35.44	40.00	4.56	120.000	100.0	V	12.0	16.9
55.645000	---	---	25.31	40.00	14.69	120.000	223.0	V	270.0	18.4
74.805000	---	---	25.05	40.00	14.95	120.000	197.0	H	345.0	15.3
322.565000	---	---	26.78	46.00	19.22	120.000	100.0	H	229.0	19.9
418.875000	---	---	29.41	46.00	16.59	120.000	102.0	H	133.0	22.2
924.135000	---	---	24.51	46.00	21.49	120.000	387.0	H	154.0	31.0
4879.500000	52.88	---	---	73.90	21.02	1000.000	196.0	H	189.0	7.2
4879.900000	---	44.88	---	53.90	9.02	1000.000	202.0	H	185.0	7.2
7319.400000	---	47.59	---	53.90	6.31	1000.000	158.0	H	216.0	10.3
7320.800000	57.67	---	---	73.90	16.23	1000.000	158.0	H	216.0	10.3
9759.200000	---	38.95	---	53.90	14.95	1000.000	159.0	V	181.0	14.0
9761.000000	51.68	---	---	73.90	22.22	1000.000	173.0	V	183.0	14.0

High channel

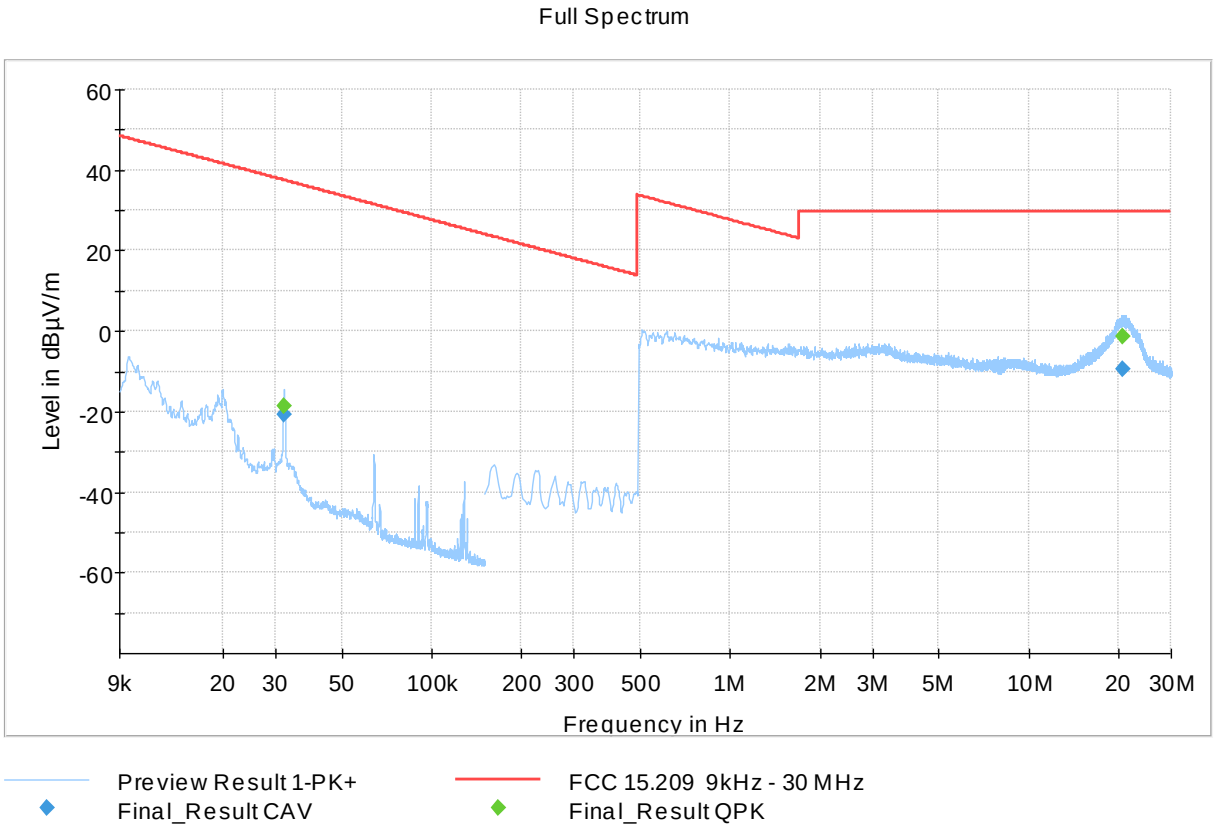

Figure 17. High channel (9 kHz – 30 MHz)

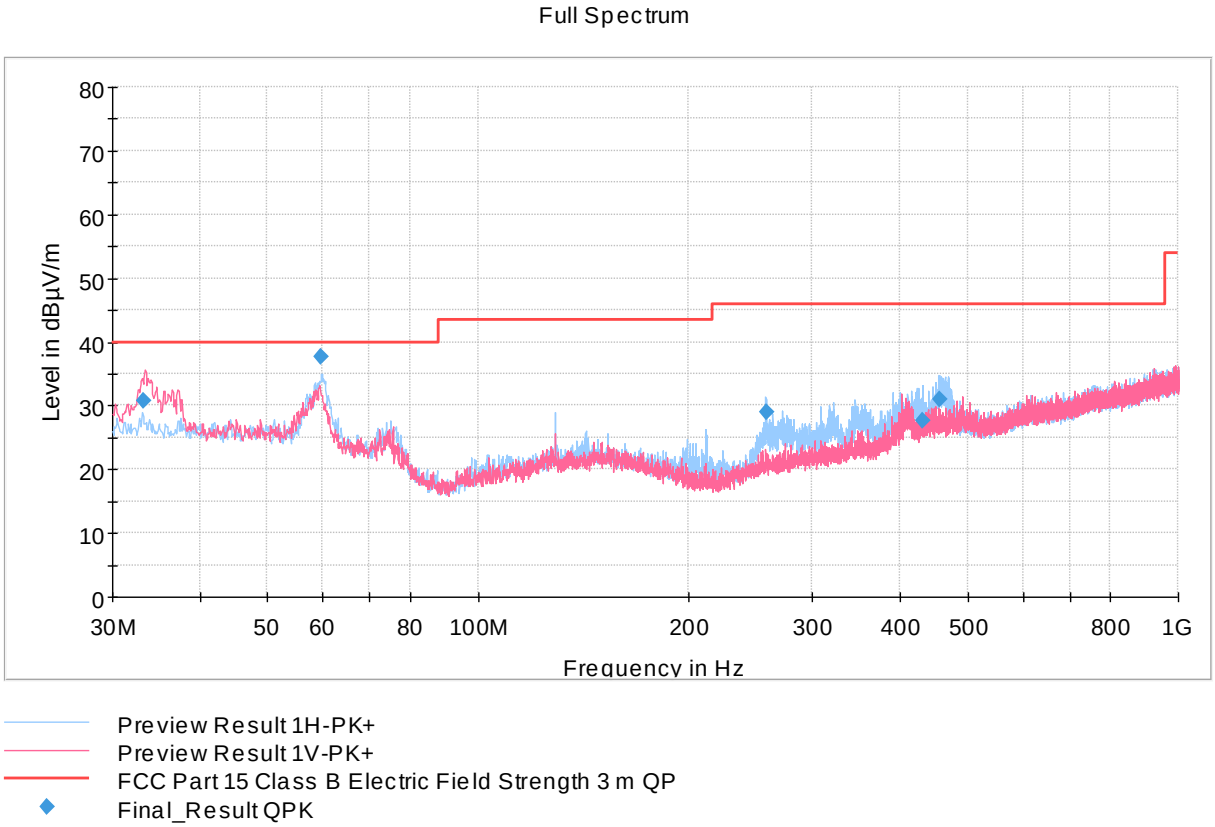

Figure 18. High channel (30 MHz – 1000 MHz)

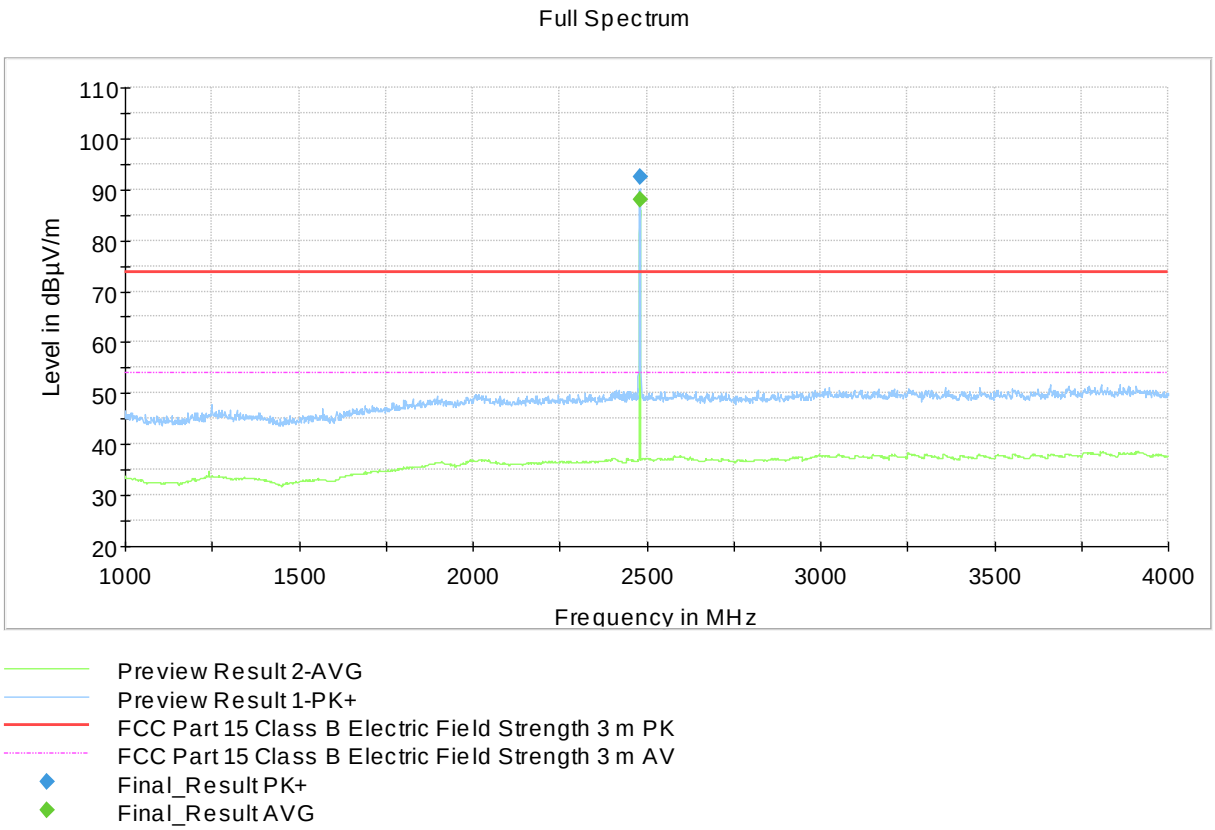

Figure 19. High channel 1 GHz – 4 GHz

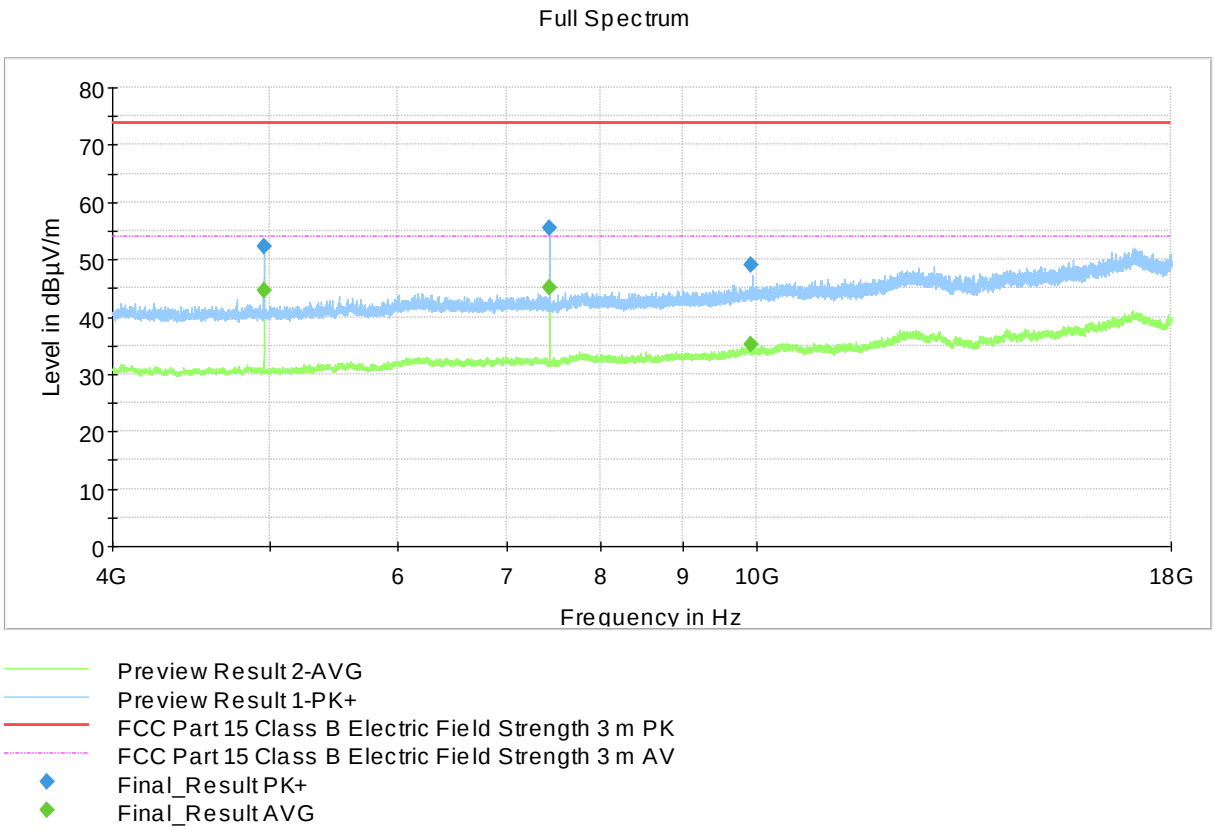

Figure 20. High channel 4 GHz – 18 GHz

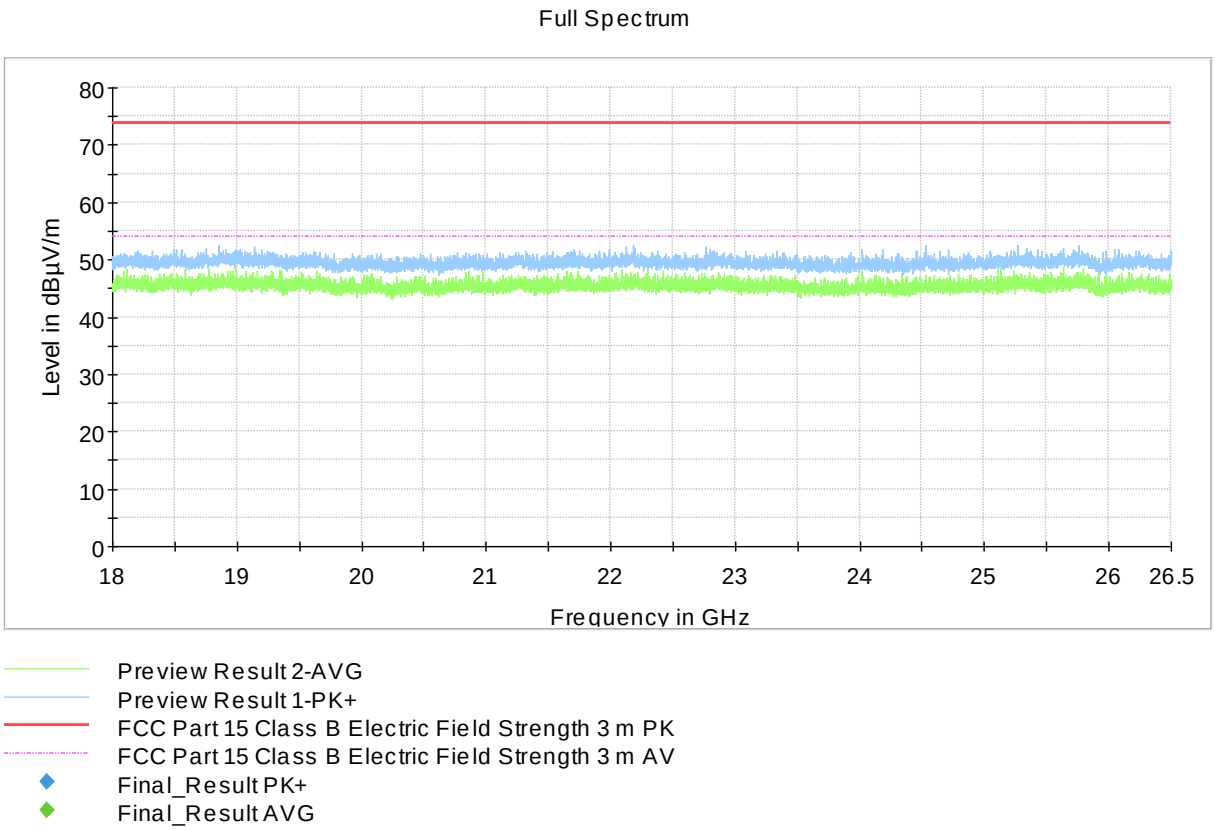

Figure 21. High channel 18 GHz – 26.5 GHz

Table 6. High channel results

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
0.032010	---	-20.75	---	37.49	58.24	0.200	100.0	V	277.0	-60.1
0.032010	---	---	-18.73	37.49	56.22	0.200	100.0	V	277.0	-60.1
20.608250	---	-9.48	---	29.50	38.98	9.000	100.0	V	73.0	-19.7
20.608250	---	---	-1.49	29.50	30.99	9.000	100.0	V	73.0	-19.7
33.215000	---	---	30.74	40.00	9.26	120.000	146.0	V	296.0	17.2
59.602000	---	---	37.68	40.00	2.32	120.000	400.0	H	9.0	17.9
257.802000	---	---	29.02	46.00	16.98	120.000	134.0	H	238.0	17.7
430.781000	---	---	27.56	46.00	18.44	120.000	109.0	H	203.0	22.6
455.685000	---	---	31.08	46.00	14.92	120.000	100.0	H	203.0	23.1
4959.900000	---	44.62	---	53.90	9.28	1000.000	165.0	H	187.0	7.1
4960.500000	52.23	---	---	73.90	21.67	1000.000	186.0	H	183.0	7.1
7439.300000	55.55	---	---	73.90	18.35	1000.000	142.0	H	134.0	10.3
7439.600000	---	45.14	---	53.90	8.76	1000.000	143.0	H	134.0	10.3
9918.900000	48.94	---	---	73.90	24.96	1000.000	221.0	H	133.0	14.1
9919.100000	---	35.28	---	53.90	18.62	1000.000	208.0	H	136.0	14.1

Radiated Band Edge results

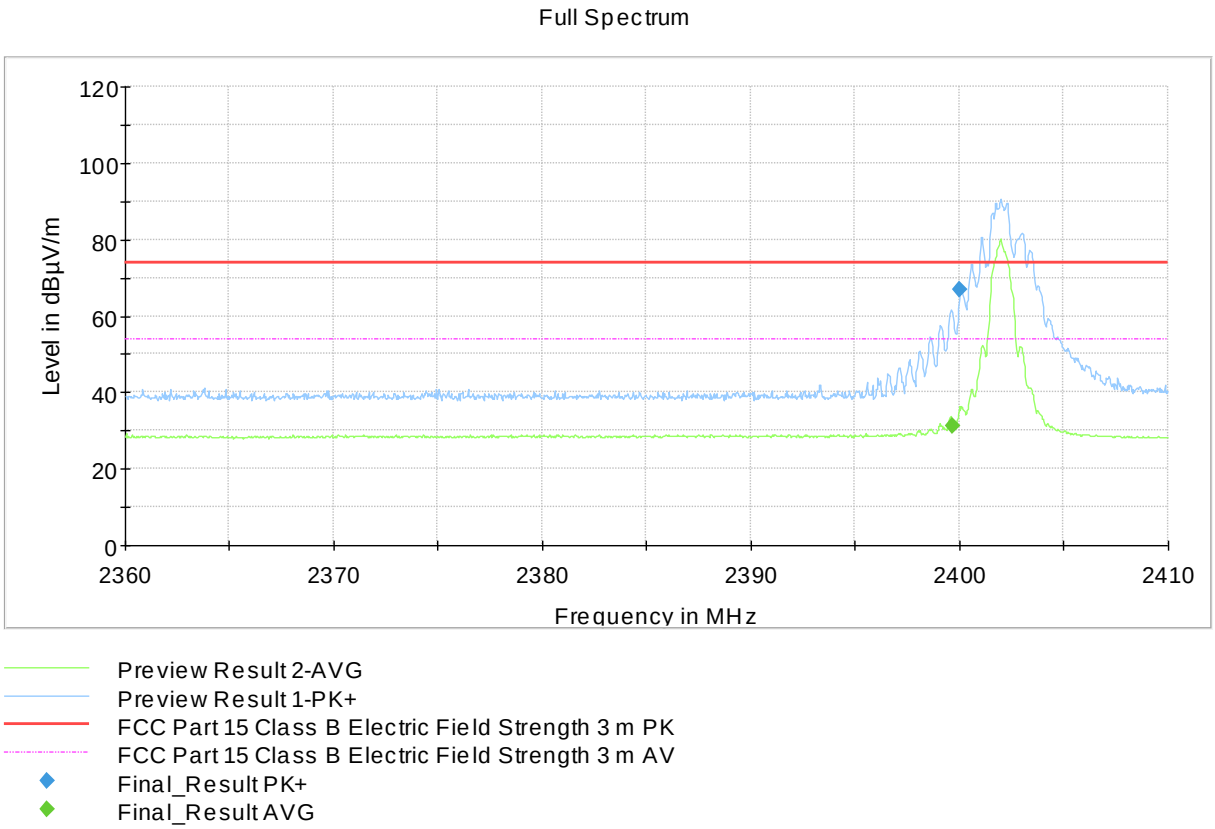

Figure 22. Radiated Band Edge measurement graph, low channel

Table 7. Low channel band edge results

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2399.640000	---	31.25	53.90	22.65	100.000	202.0	V	297.0	14.0
2400.000000	66.86	---	73.90	7.04	100.000	175.0	H	249.0	14.0

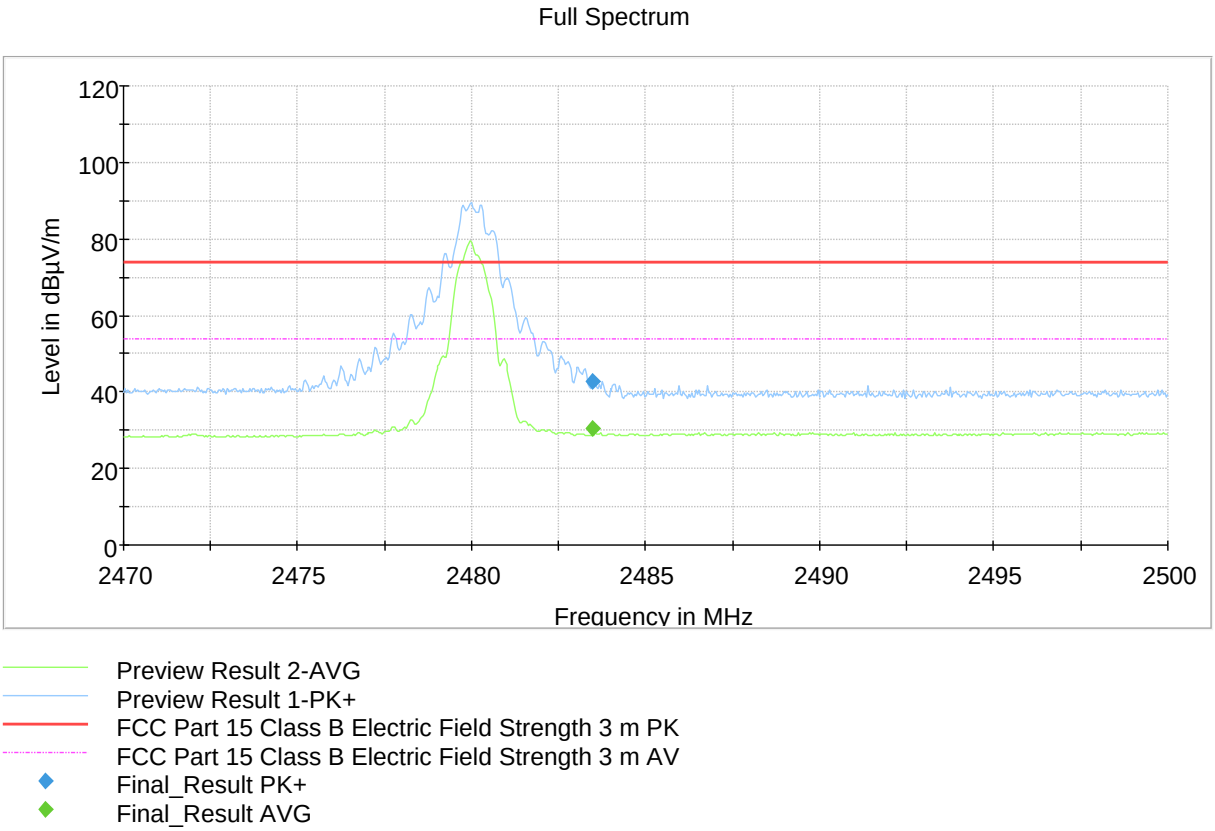

Figure 23. Radiated Band Edge measurement graph, high channel

Table 8. High channel band edge results

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.500000	---	28.7	54.0	25.3	100.000	124.0	H	21.0	14.1
2483.500000	41.6	---	74.0	32.4	100.000	174.0	H	0.0	14.1

Transmitter Band Edge Measurement and Conducted Spurious Emissions

Standard:	ANSI C63.10	(2013)
Tested by:	RRE	
Date:	17 December 2018	
Temperature:	23 ± 3 °C	
Humidity:	20 - 60 % RH	
Measurement uncertainty:	± 2.87 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.247(d), 15.209(a)
RSS-247 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Table 9. Band edge attenuation

Band Edge Attenuation	
Lower Band Edge (ch 0)	**Upper Band Edge (ch 39)**
-37.50 dBc	-37.69 dBc
Limit: -20 dBc	

Table 10. Conducted spurious emissions, low channel

Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
937.82	-63.02	-20.70	-42.31	PASS
1201.00	-45.94	-20.70	-25.24	PASS
3849.61	-65.12	-20.70	-44.42	PASS
4804.02	-47.35	-20.70	-26.64	PASS
9859.90	-60.19	-20.70	-39.48	PASS
12537.78	-58.32	-20.70	-37.62	PASS
15505.06	-56.14	-20.70	-35.43	PASS
16126.51	-55.24	-20.70	-34.54	PASS
19158.48	-56.94	-20.70	-36.23	PASS
24473.56	-55.38	-20.70	-34.67	PASS
26235.66	-55.15	-20.70	-34.44	PASS

Table 11. Conducted spurious emissions, mid channel

Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
937.85	-63.60	-20.26	-43.34	PASS
1220.03	-45.83	-20.26	-25.58	PASS
3761.75	-64.80	-20.26	-44.54	PASS
4880.05	-48.21	-20.26	-27.96	PASS
9835.90	-60.70	-20.26	-40.44	PASS
12530.75	-58.52	-20.26	-38.26	PASS
15491.19	-56.09	-20.26	-35.83	PASS
16136.17	-54.12	-20.26	-33.86	PASS
21624.68	-56.84	-20.26	-36.58	PASS
24446.94	-56.21	-20.26	-35.95	PASS
26257.88	-55.71	-20.26	-35.46	PASS

Table 12. Conducted spurious emissions, high channel

Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
937.79	-66.27	-19.81	-46.46	PASS
1240.03	-45.99	-19.81	-26.17	PASS
2483.71	-43.77	-19.81	-23.95	PASS
4960.02	-49.82	-19.81	-30.00	PASS
7440.00	-56.34	-19.81	-36.53	PASS
12477.03	-58.59	-19.81	-38.78	PASS
15844.33	-56.30	-19.81	-36.49	PASS
16151.92	-54.76	-19.81	-34.95	PASS
21815.37	-56.40	-19.81	-36.59	PASS
24217.82	-55.97	-19.81	-36.16	PASS
26255.11	-55.79	-19.81	-35.97	PASS

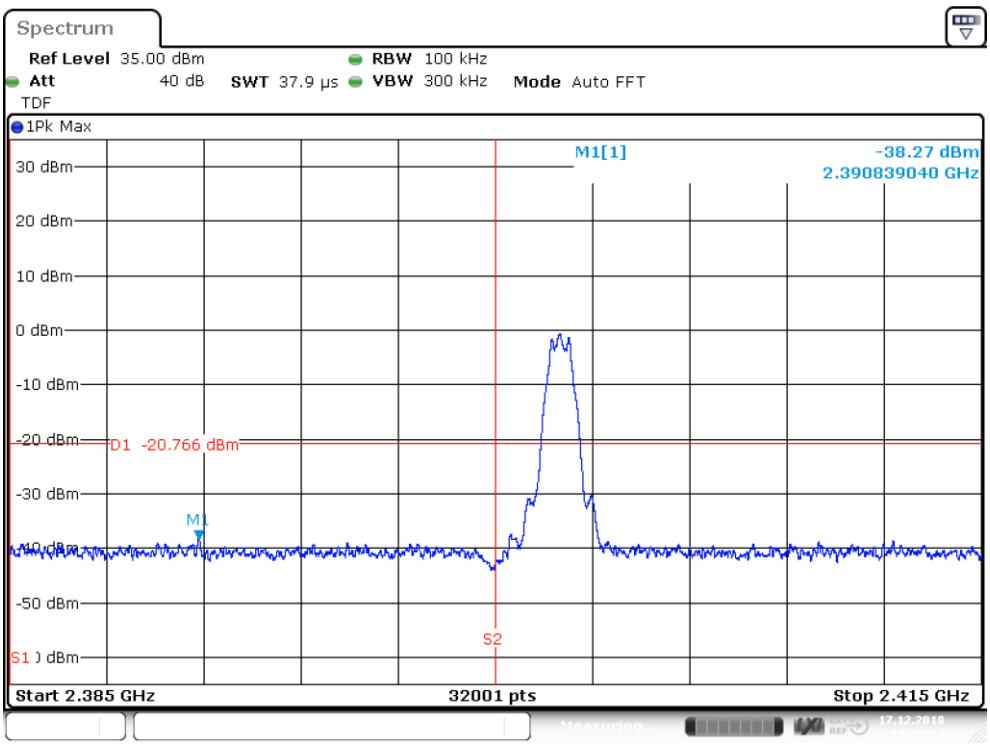

Figure 24. Lower Band Edge, low channel

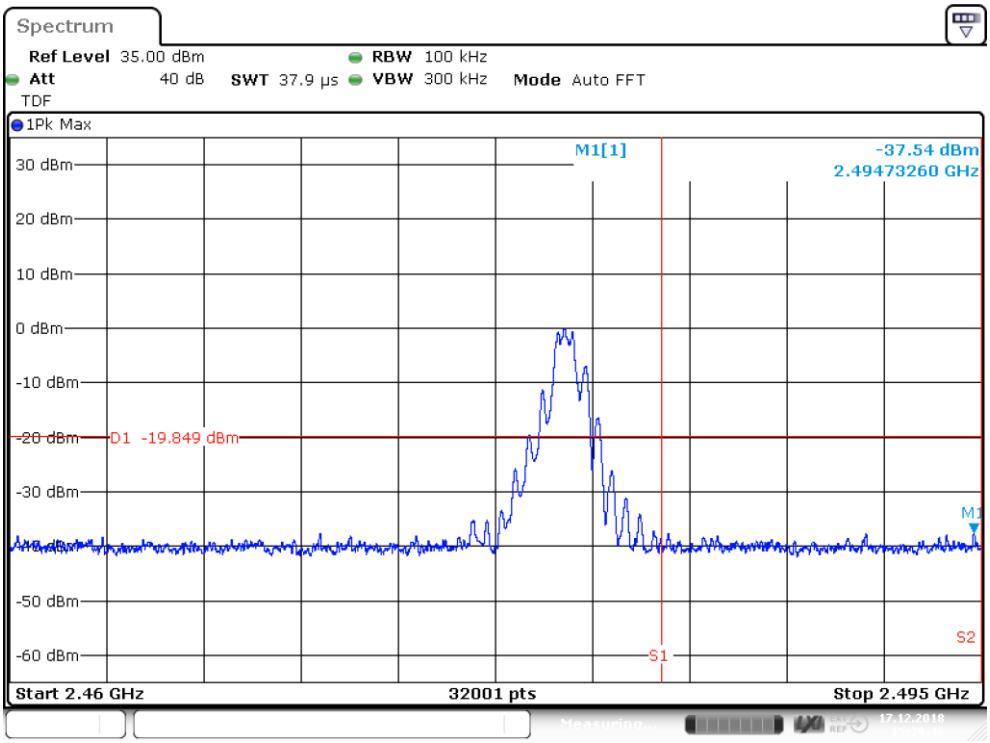

Figure 25. Upper Band Edge, high channel

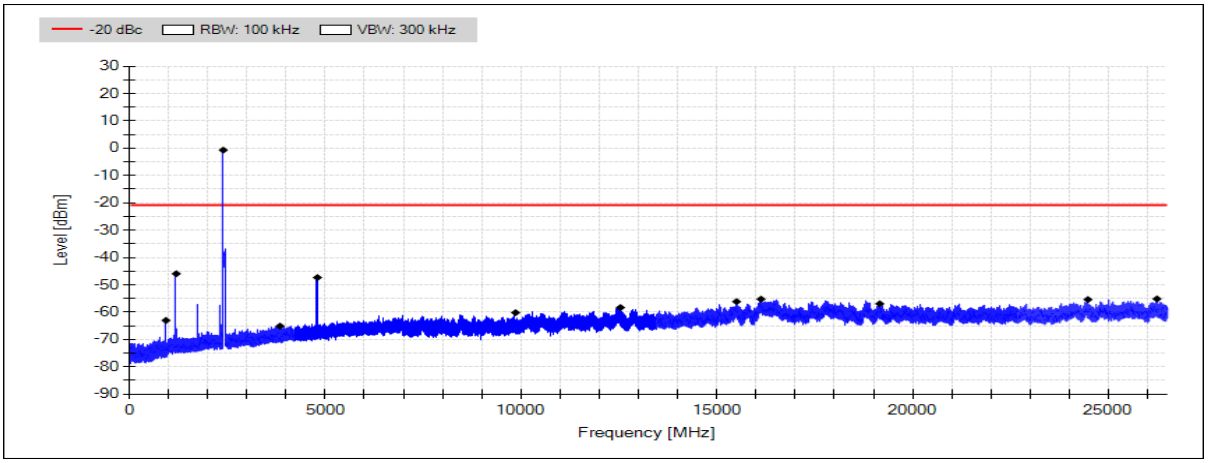

Figure 26. Conducted spurious emissions 30 - 26500 MHz, low channel

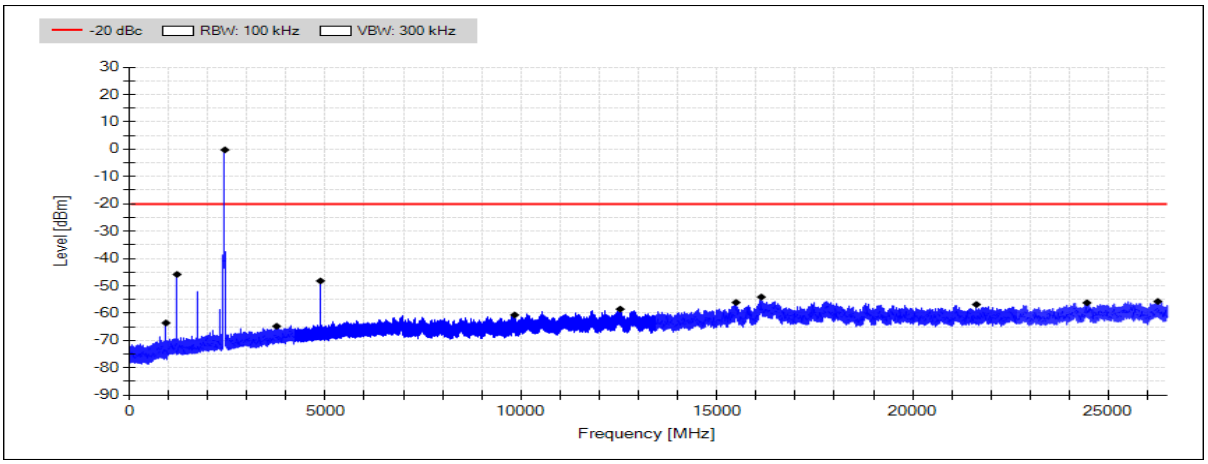

Figure 27. Conducted spurious emissions 30 - 26500 MHz, mid channel

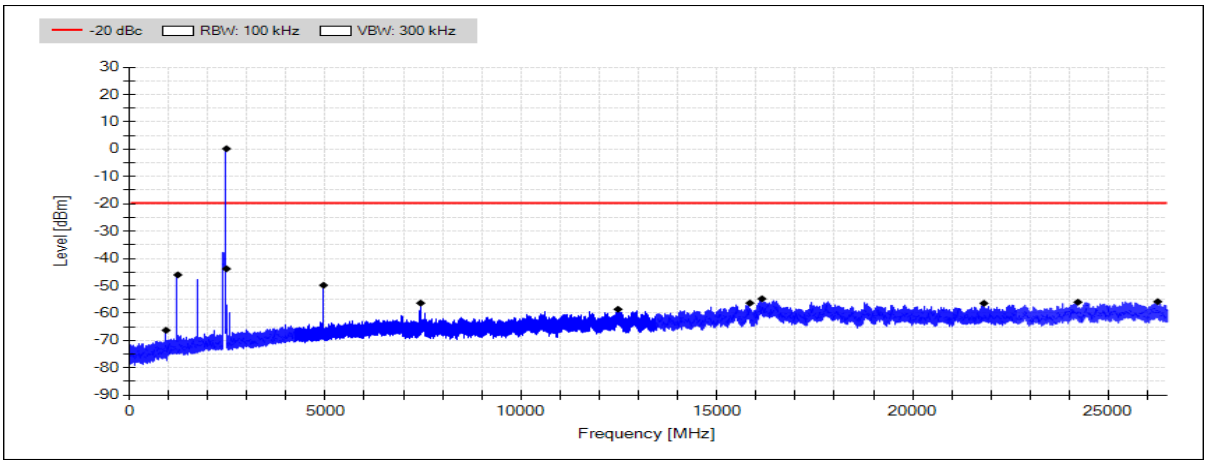

Figure 28. Conducted spurious emissions 30 - 26500 MHz, high channel

6 dB Bandwidth of the Channel

Standard:	ANSI C63.10	(2013)
Tested by:	RRE	
Date:	17 December 2018	
Temperature:	23 ± 3 °C	
Humidity:	20 - 60 % RH	

FCC Rule: 15.247(a)(2)
RSS-247 5.2(a)

Results:

Table 13. 6 dB bandwidth test results

Channel	6 dB BW [kHz]	Minimum limit [kHz]
Low	1041.875	500
Mid	1078.250	
High	1114.750	

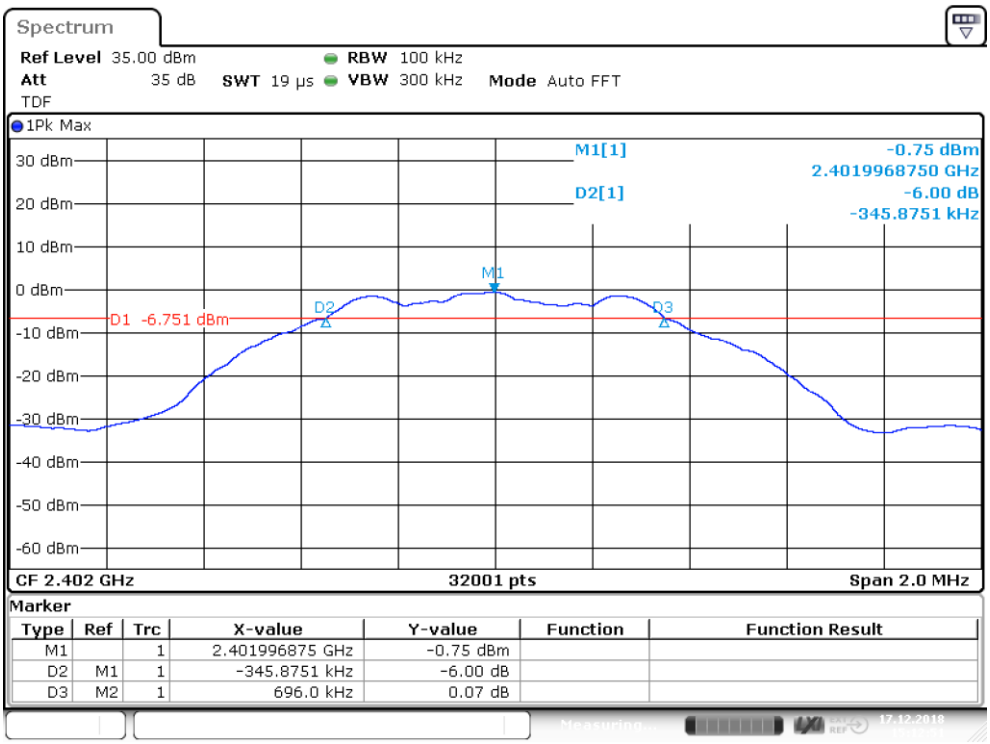

Figure 29. 6 dB bandwidth, low channel

6 dB Bandwidth of the Channel

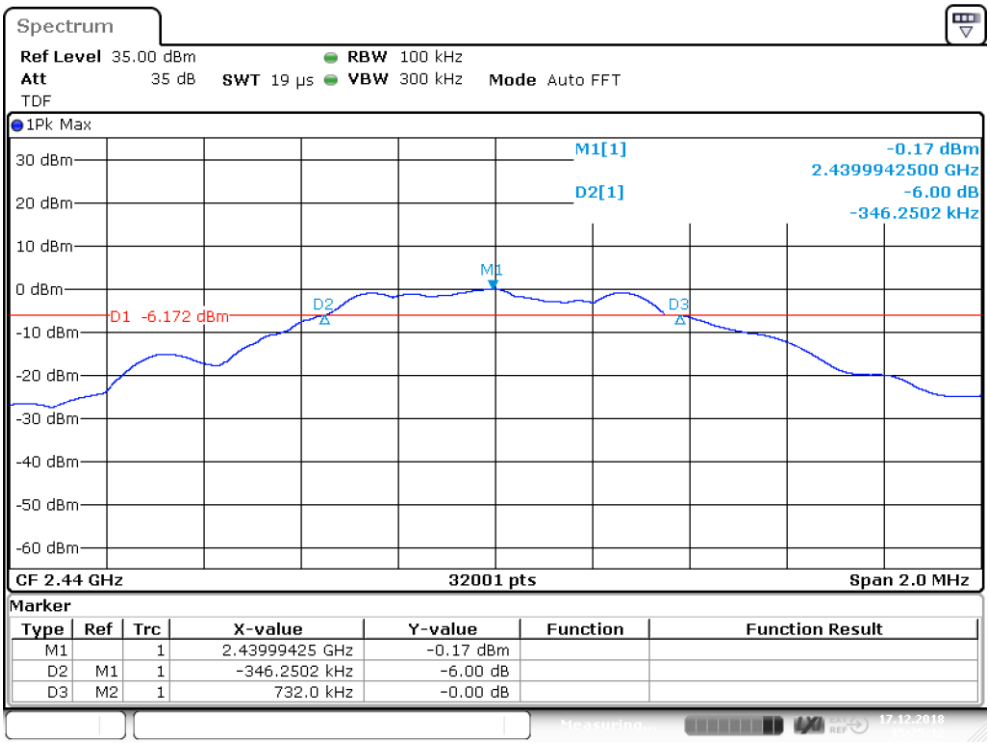

Figure 30. 6 dB bandwidth, mid channel

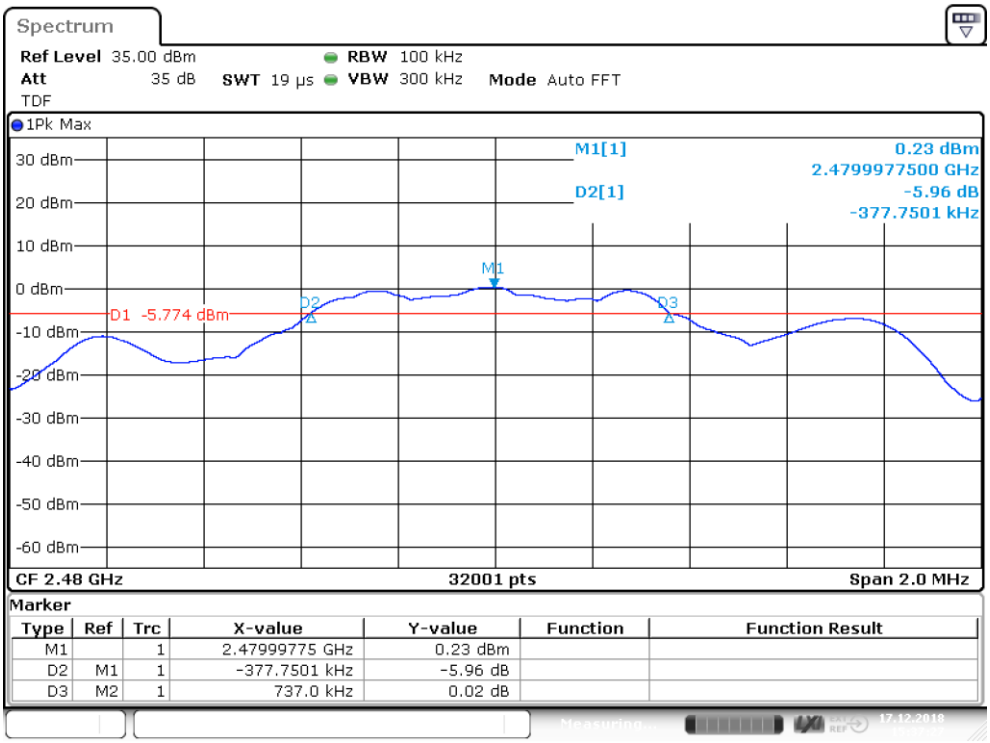

Figure 31. 6 dB bandwidth, high channel

Power Spectral Density

Standard:	ANSI C63.10	(2013)
Tested by:	RRE	
Date:	17 December 2018	
Temperature:	23 ± 3 °C	
Humidity:	20 - 60 % RH	

FCC Rule: 15.247(e)
RSS-247 5.2(b)

Results:

Table 14. Power spectral density test results

Channel	PSD dBm/3 kHz	Maximum limit [dBm/3kHz]
Low	-13.36	+8.00
Mid	-13.65	
High	-12.78	

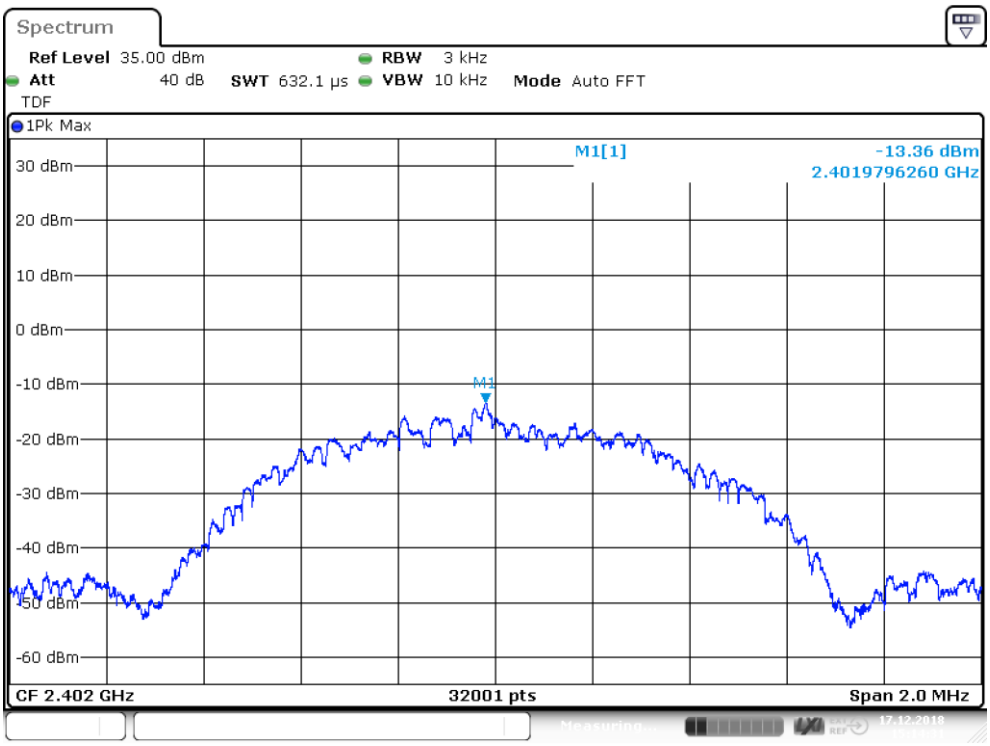

Figure 32. Power spectral density, low channel

Power Spectral Density

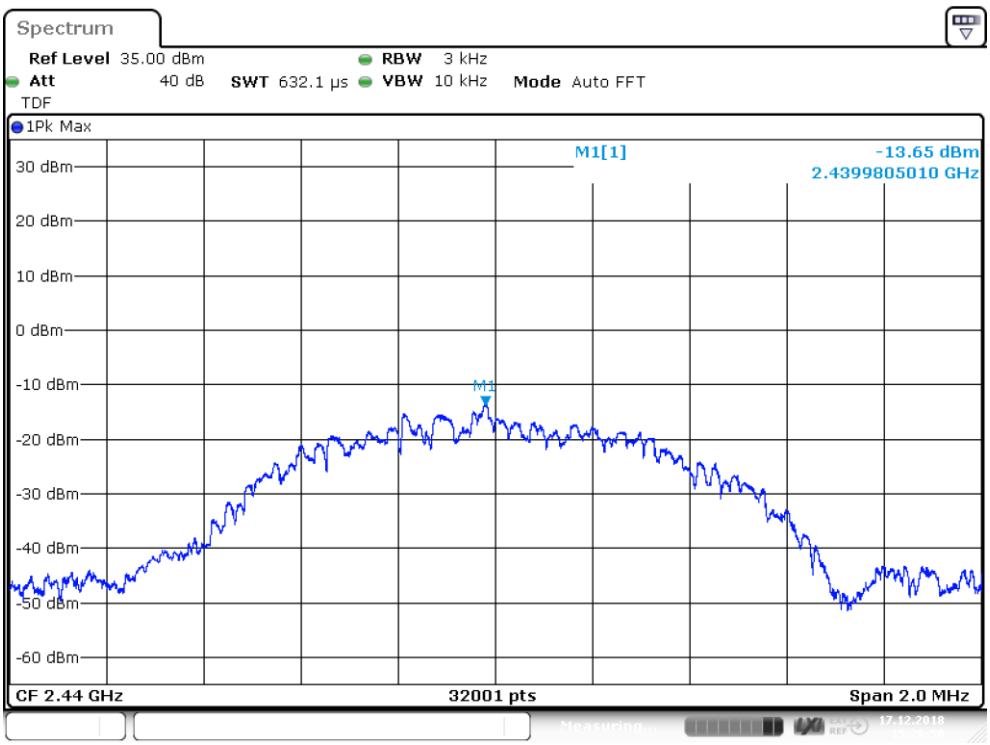

Figure 33. Power spectral density, mid channel

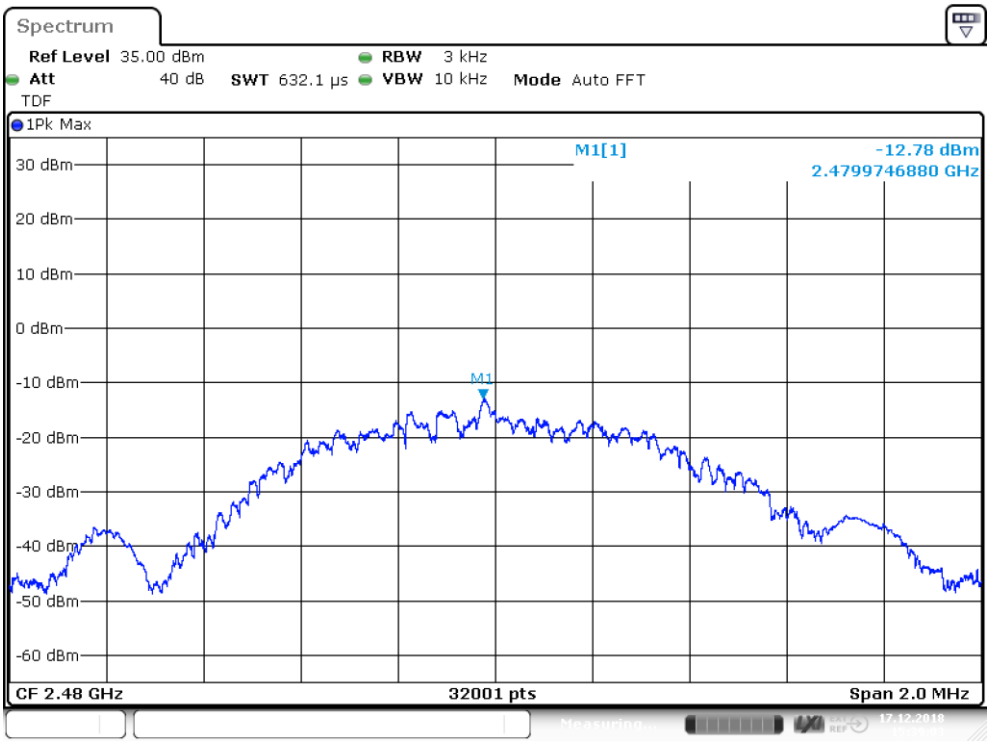

Figure 34. Power spectral density, high channel

99% Occupied Bandwidth

Standard:	RSS-GEN	(2014)
Tested by:	RRE	
Date:	17 December 2018	
Temperature:	23 ± 3 °C	
Humidity:	20 - 60 % RH	

RSS-GEN 6.6

Results:

Table 15. 99% occupied bandwidth test results

Channel	Limit	99 % BW [MHz]	Result
Low	-	1.022343052	PASS
Mid	-	1.163338646	PASS
High	-	1.672197744	PASS

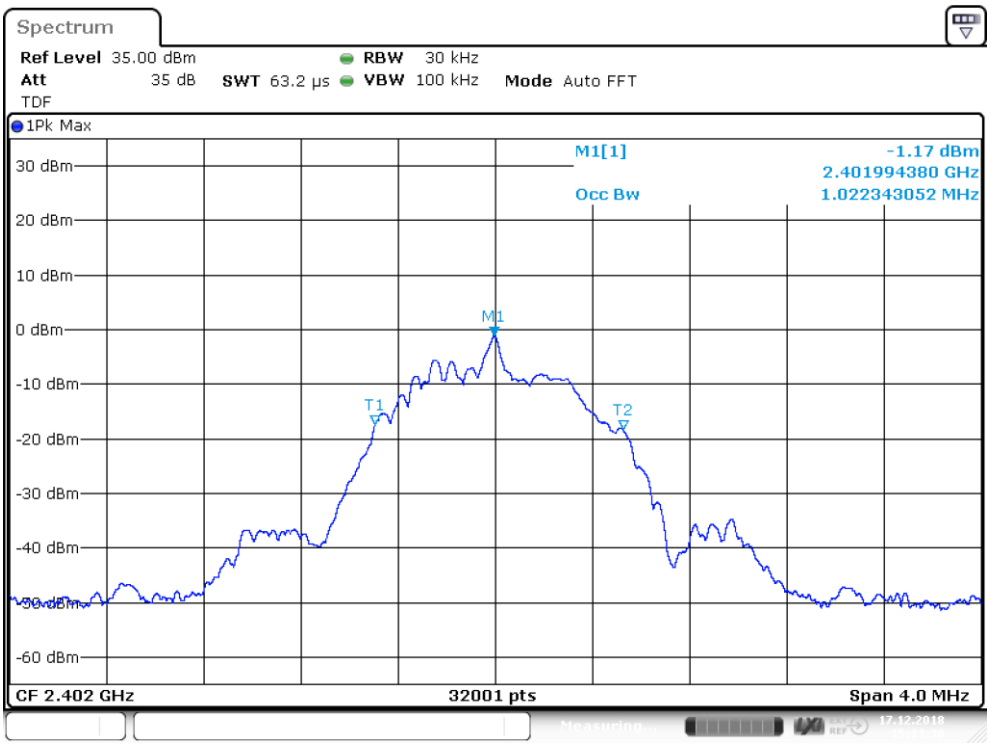

Figure 35. 99% OBW, low channel

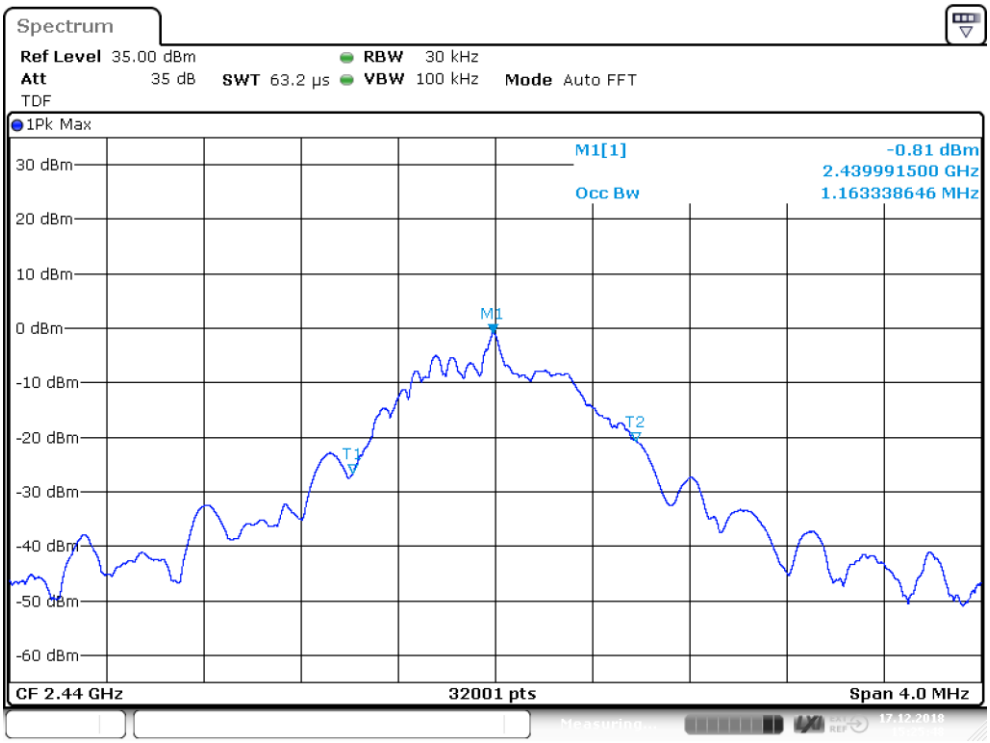

Figure 36. 99% OBW, mid channel

99 % Occupied Bandwidth

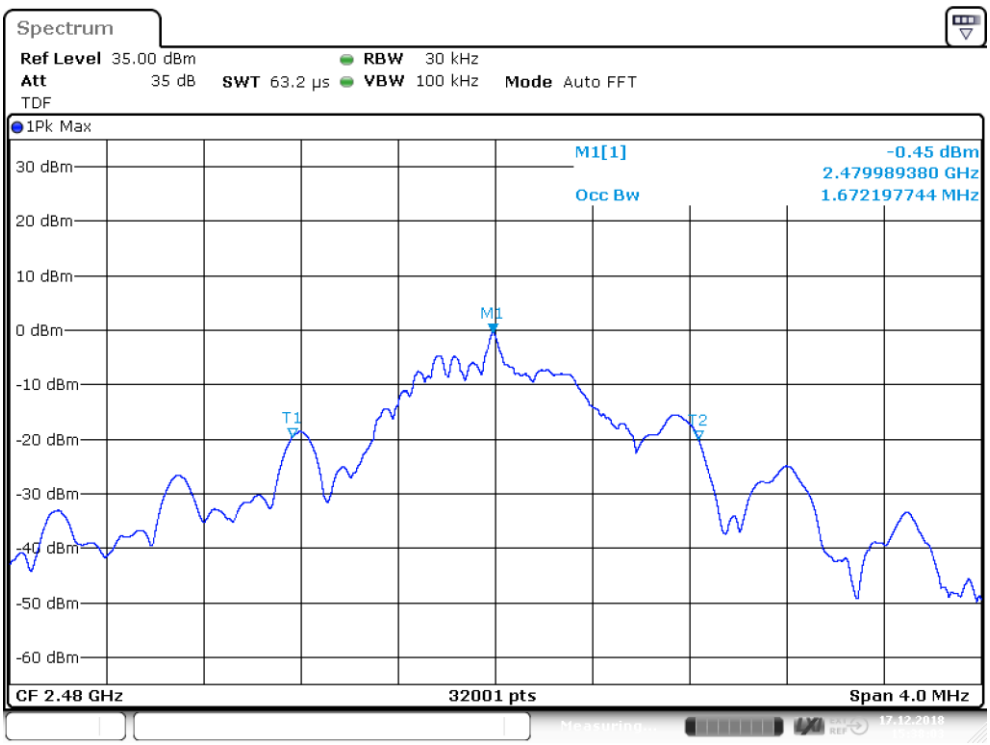

Figure 37. 99% OBW, high channel

TEST EQUIPMENT

RF-Test Equipment

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
ANTENNA	A.H. SYSTEMS	SAS-200/518	inv:7873	-	-
SPECTRUM ANALYZER	AGILENT	E7405A	inv:9746	2018-01-08	2020-01-08
RF PREAMPLIFIER	AMC MICROWAVE	ALS1826-41-12	sn:11	2017-11-16	-
RF PREAMPLIFIER	CIAO	CA118-3123	inv:10278	2018-11-26	2019-11-26
TEMPERATURE/ HUMIDITY METER	DAVIS	VantagePro	inv:5296	2018-09-18	2019-09-18
ANTENNA	EMCO	3117, 1-18GHz	inv:7293	2018-03-14	2020-03-14
ANTENNA	EMCO	3160-09	inv:7294	2018-03-19	2019-03-19
ATTENUATOR	INMET	10 dB, DC-40 GHz	inv:10347	2017-11-16	2019-11-16
TURNTABLE	MATURO	DS430 UPGRADED	inv:10182	-	-
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	-	-
ANTENNA MAST	MATURO	TAM 4.0E	inv:10181	-	-
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW26	inv:10679	2018-06-26	2019-06-26
SIGNAL ANALYZER	ROHDE & SCHWARZ	FSV40	inv:9093	2018-06-28	2019-06-28
ANTENNA	ROHDE & SCHWARZ	HFH2-Z2 , 335.4711.52	inv:8013	2018-10-30	2020-10-30
SWITCH UNIT	ROHDE & SCHWARZ	OSP 120	inv:9289	2016-03-14	2019-03-14
ANTENNA	SCHWARZBECK	VULB 9168, 30-2000MHz	inv:8911	2018-10-25	2020-10-25
POWER SUPPLY	THANDAR	PL330TP	inv:9787	-	-
TEMPERATURE/ HUMIDITY METER	VAISALA	HMT 333	inv:8638	2018-04-05	2019-04-05
FILTER	WAINWRIGHT	HP, WHKX4.0/18G-10SS	inv:10403	2017-03-01	2019-03-01
MULTIMETER	FLUKE	21	inv:8253	2018-10-29	2019-10-29
COAXIAL CABLE	MEGAPHASE	PN:EM40-3131-59	sn:11153209 001 (733)	-	-
POWER SUPPLY	CALIFORNIA INSTR.	5001i-400	inv:9487	-	-
LISN	ROHDE & SCHWARZ	ENV216	inv:9611	2018-03-01	2019-03-01