

Test Report



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

Equipment Under Test:	PTT Voice Responder
Model:	APTT1
Trade Mark:	AINA Wireless
Customer / Manufacturer:	Paumax Oy Tehdaskatu 6 / CO HubSalo FI-24100, SALO FINLAND
FCC Rule Part:	15.247: 2015
IC Rule Part:	RSS-247, Issue 1, 2015 RSS-GEN Issue 4, 2014
KDB:	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (June 9, 2015)

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Rauno Repo
EMC/RF Specialist

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Equipment Under Test (EUT)

PTT Voice Responder
Model: APTT1
Trade Mark: AINA Wireless
Serial Number: -
FCC ID: 2AH78-APTT1
IC: 21419-APTT1

The equipment under test (EUT) is a wireless remote speaker microphone system with classic Bluetooth and Bluetooth Low Energy. Audio signal is transferred using the classic Bluetooth system and Bluetooth Low Energy is used to transfer push button information, and also control indication leds.

According to manufacturer's declaration, the tested product has alternative model 12082-0800 which has slight changes in logo and software of the product. Due to small differences between two models, only APTT1 was tested.

This report contains test results of Bluetooth Low Energy.

Modifications incorporated in the EUT

Two samples were used with the tests. The first sample had a temporary connector for setting the BLE parameters with a PC. The other sample had also temporary antenna cables for BLE and BT antenna ports measurements.

Classification of the device

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

Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing

Ratings and declarations

Operating Frequency Range : 2402 – 2480 MHz
Channels: 40
Channel separation: 2 MHz
Conducted power: -5.60 dBm
Transmission technique: DSSS
Modulation: GFSK
Internal chip antenna max gain: 0.5 dBi

Power Supply

Operating voltage range: Nominal 3.7 V

The EUT is a battery operated device which can also be used with a separate AC/DC adaptor connected to the USB-port of the device.

AC/DC adaptor:

Type:	Separate AC/DC adaptor, FW7713
Rated voltage:	100 - 240 V
Rated current:	150 mA
Rated frequency:	50 / 60 Hz
Output voltage:	5 V, USB
Output current:	1000 mA

Tests were performed with AC/DC adaptor using 115V / 60 Hz. USB cable length was 1m.

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	Maximum Peak Conducted Output Power	PASS
§15.247(a)(2) / RSS-247 5.2(1)	6 dB Bandwidth	PASS
§15.247(e) / RSS-247 5.2(2)	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
§15.109 / RSS-GEN 6.13	Unintentional Radiated Emissions	PASS

EUT Test Conditions during Testing

The EUT was configured into the wanted channel and was in continuous transmit mode during all the tests. During the radiated measurements above 1 GHz the EUT was on 150 cm high Styrofoam table and 80 cm with the tests below 1 GHz.

Following channels were used during the tests:

Channel	Frequency/ MHz
Low (CH 0)	2402
Mid (CH 19)	2440
High (CH 39)	2480

Test Facility

☐ Testing Location / address: FCC registration number: 90598	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
☒ Testing Location / address: FCC registration number: 178986 Industry Canada registration number: 8708A-2	SGS Fimko Ltd Karakaarenkuja 4 FI-02610, ESPOO FINLAND

Conducted Emissions on Power Supply Lines (150 kHz - 30 MHz)

Standard: ANSI C63.10 (2013)
Tested by: RRE
Date: 1 June 2016
Temperature: 20 °C
Humidity: 47 % RH
Barometric pressure: 1016 hPa
Measurement uncertainty: ± 2.9 dB

Level of confidence 95 % (k = 2)

FCC Rule: §15.207(a)
RSS-GEN 8.8

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.

During the test the EUT was powered from the separate power supply through the LISN.

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.

Conducted Emissions on PowerSupply Lines

Conducted Emission Mains FCC Part 15 Class B with ENV216

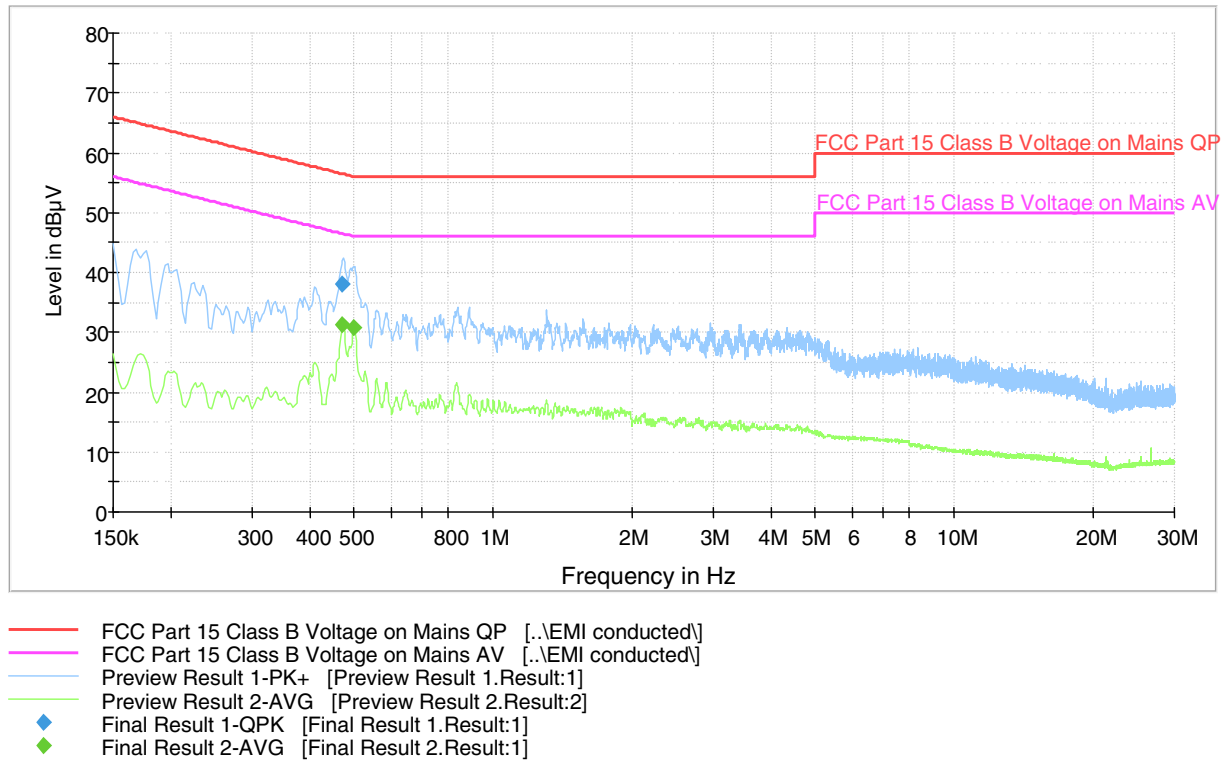


Figure 1. The measured curves with peak- and average detector

Final measurements from the worst frequencies

Table 1. Final results with a QP detector

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.471500	38.2	1000.0	9.000	L1	10.1	18.3	56.5	-

Table 2. Final results with an average detector

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.471500	31.3	1000.0	9.000	L1	10.1	15.2	46.5	-
0.499500	30.8	1000.0	9.000	L1	10.1	15.2	46.0	-

Maximum Peak Conducted Output Power

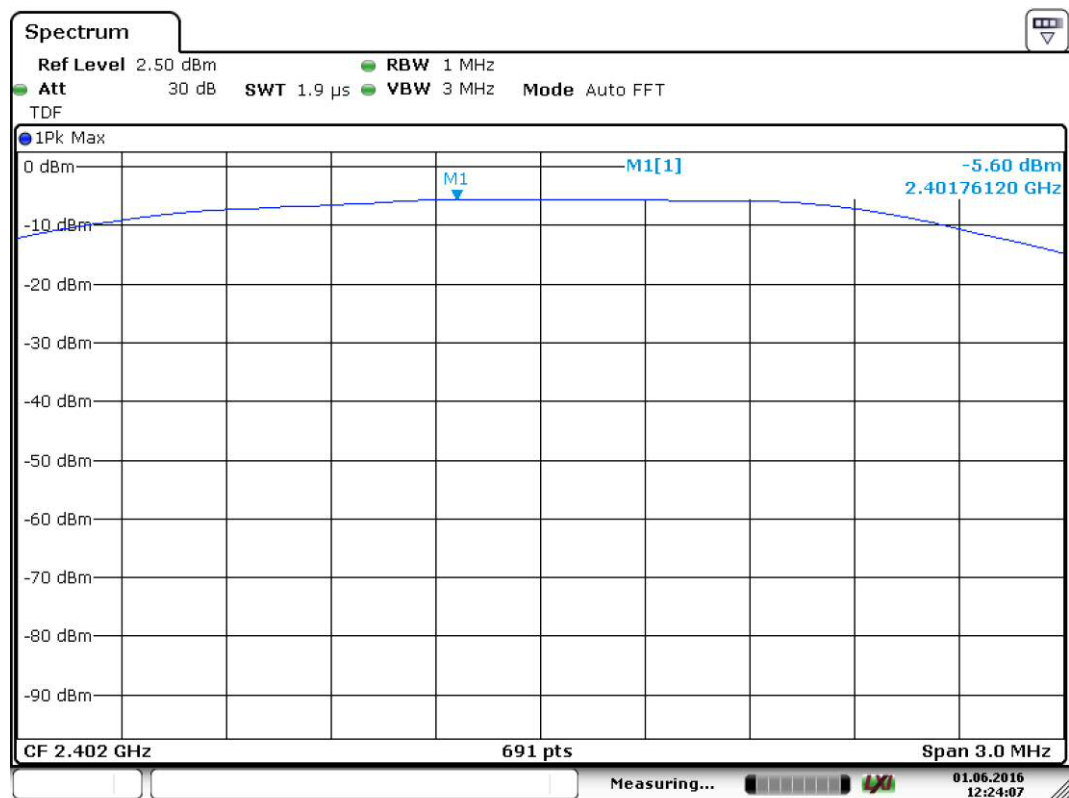
Maximum Peak Radiated Output Power

Standard: ANSI C63.10 (2013)
Tested by: RRE
Date: 1 June 2016
Temperature: 22 ± 3 °C
Humidity: 30 - 60 % RH
Measurement uncertainty: ± 2.87 dB Level of confidence 95 % (k = 2)

FCC Rule: §15.247(b)(3)
RSS-247 5.4

Results:

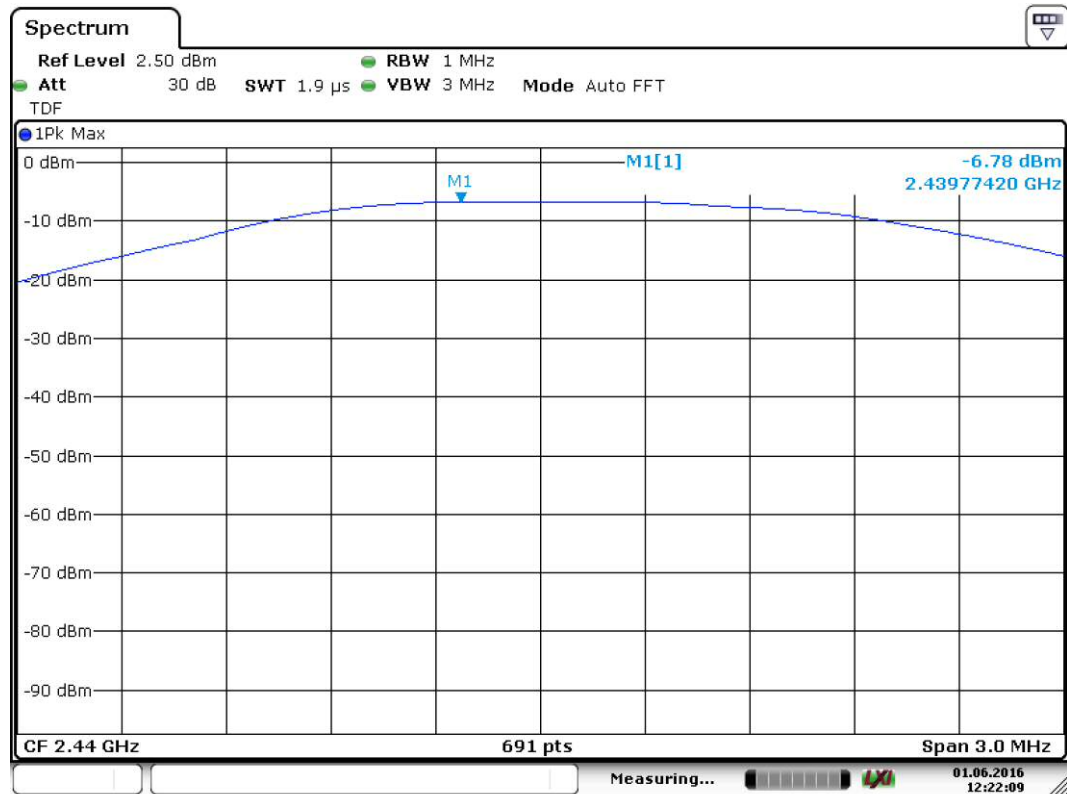
Channel	Conducted Power [dBm]	Limit [dBm]	Margin [dBm]	Result
Low	-5.60	30	35.60	PASS
Mid	-6.78	30	36.78	PASS
High	-7.11	30	37.11	PASS



Date: 1.JUN.2016 12:24:07

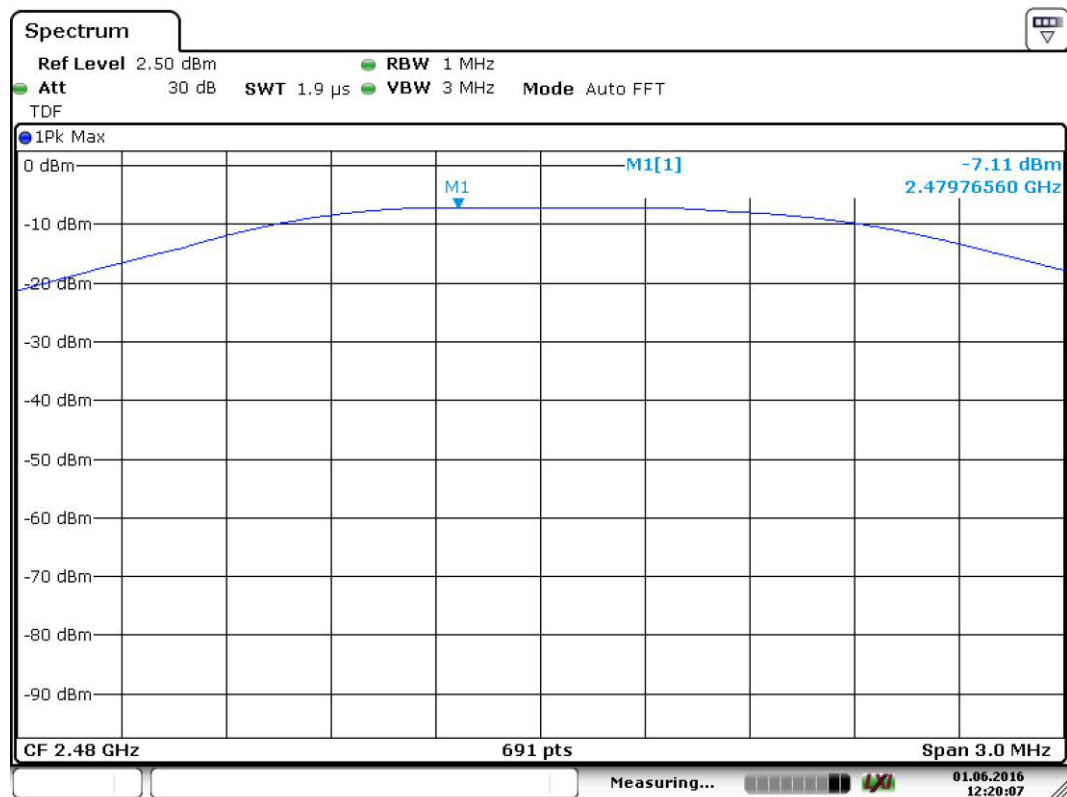
Figure 2. Low channel.

Maximum Peak Conducted Output Power



Date: 1.JUN.2016 12:22:09

Figure 3. Mid channel.



Date: 1.JUN.2016 12:20:06

Figure 4. High channel.

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

Standard: ANSI C63.10 (2013)
Tested by: RRE
Date: 30 May 2016
Temperature: 22 ± 3 °C
Humidity: 30 - 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

The correction factor in the final result table contains the sum of the transducers (antenna + amplifier + cables).
 The result value is the measured value corrected with the correction factor.

Test results

FCC Part 15 Class B Spurious Emission 30-1000MHz 3m

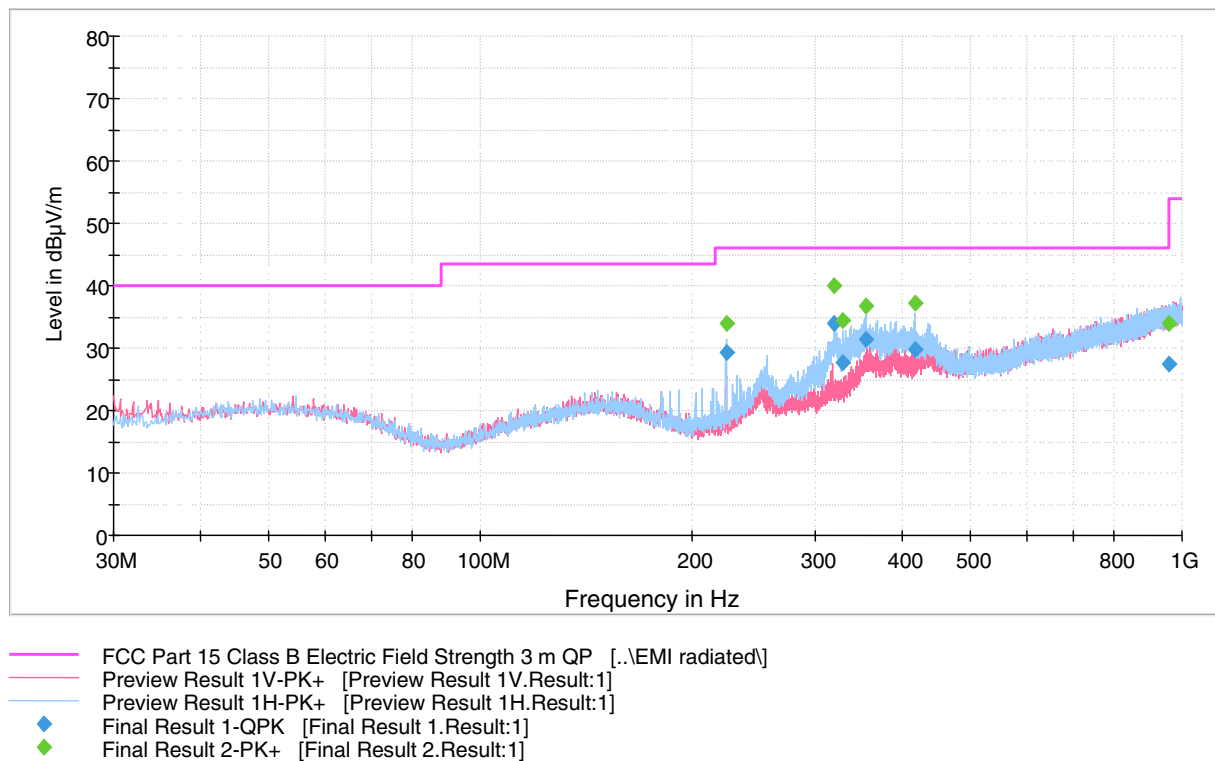


Figure 5. Measured curve with peak detector (Low channel).

Table 3. Final Quasi Peak results

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
224.000000	29.3	1000.0	120.000	153.0	H	15.0	11.7	16.7	46.0	-
319.970000	34.0	1000.0	120.000	100.0	H	142.0	15.9	12.0	46.0	-
328.292000	27.7	1000.0	120.000	100.0	H	123.0	16.1	18.3	46.0	-
354.145000	31.4	1000.0	120.000	100.0	H	139.0	16.6	14.6	46.0	-
416.009000	29.7	1000.0	120.000	100.0	H	156.0	18.3	16.3	46.0	-
957.512000	27.4	1000.0	120.000	136.0	H	147.0	27.8	18.6	46.0	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 30-1000MHz 3m

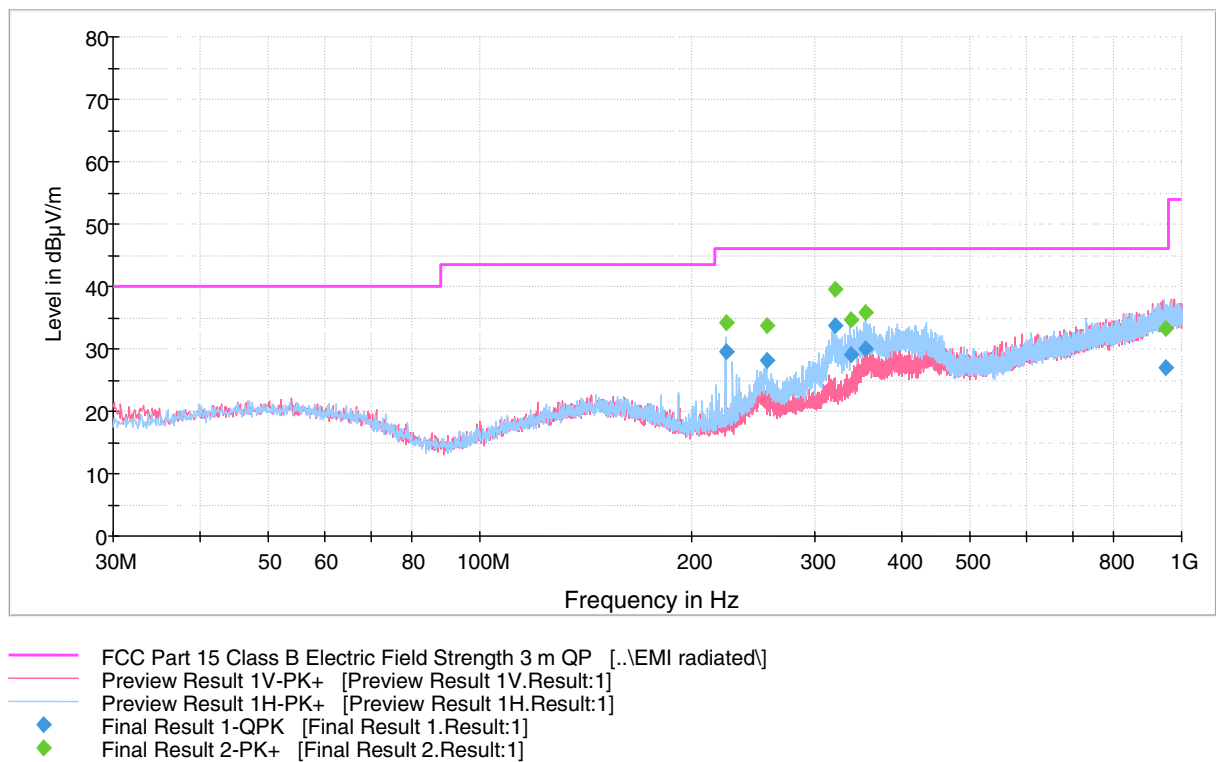


Figure 6. Measured curve with peak detector (Mid channel).

Table 4. Final Quasi Peak results

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
224.000000	29.6	1000.0	120.000	156.0	H	131.0	11.7	16.4	46.0	-
256.010000	28.2	1000.0	120.000	122.0	H	352.0	13.7	17.8	46.0	-
320.030000	33.8	1000.0	120.000	100.0	H	148.0	16.0	12.2	46.0	-
337.502000	29.1	1000.0	120.000	100.0	H	131.0	16.2	16.9	46.0	-
354.416000	30.0	1000.0	120.000	100.0	H	131.0	16.6	16.0	46.0	-
946.887000	27.1	1000.0	120.000	100.0	H	314.0	27.7	18.9	46.0	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 30-1000MHz 3m

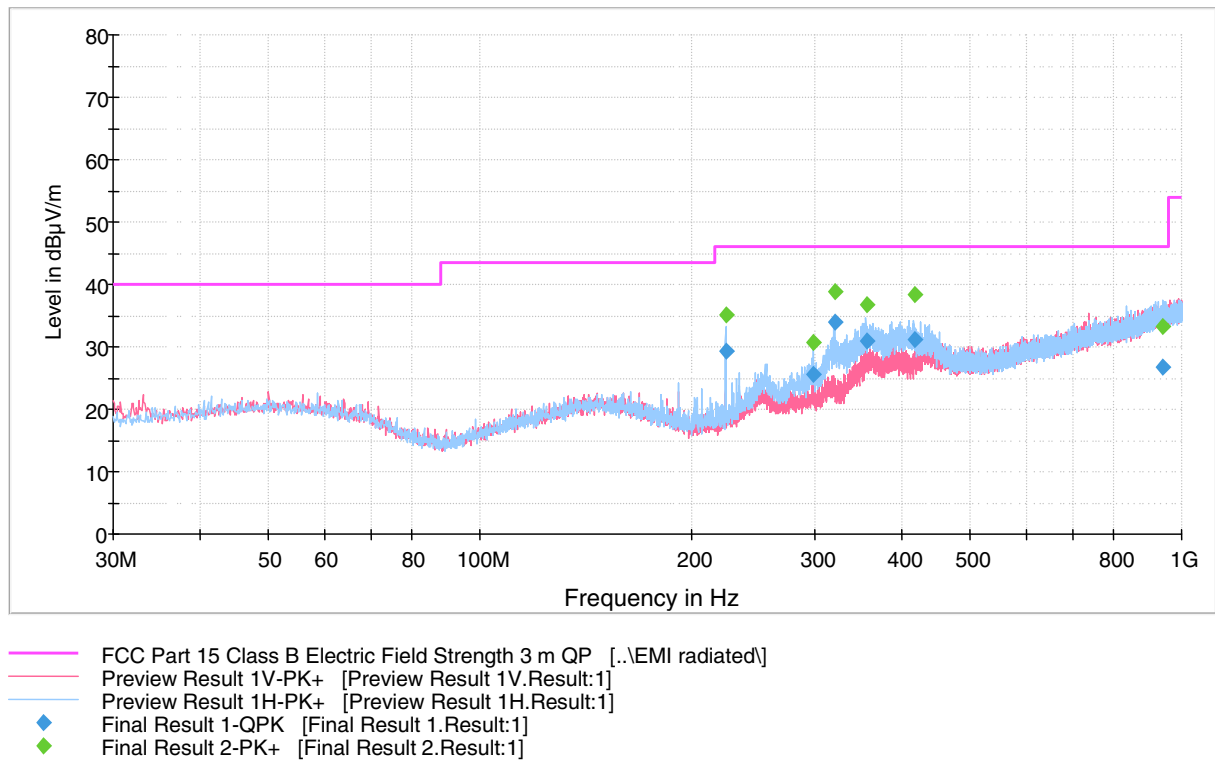


Figure 7. Measured curve with peak detector (High channel).

Table 5. Final Quasi Peak results

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
224.000000	29.3	1000.0	120.000	154.0	H	15.0	11.7	16.7	46.0	-
298.610000	25.6	1000.0	120.000	100.0	H	148.0	15.3	20.4	46.0	-
320.013000	33.9	1000.0	120.000	100.0	H	151.0	16.0	12.1	46.0	-
355.501000	31.0	1000.0	120.000	100.0	H	148.0	16.6	15.0	46.0	-
416.032000	31.3	1000.0	120.000	247.0	H	230.0	18.3	14.7	46.0	-
940.430000	26.7	1000.0	120.000	383.0	H	230.0	27.7	19.3	46.0	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

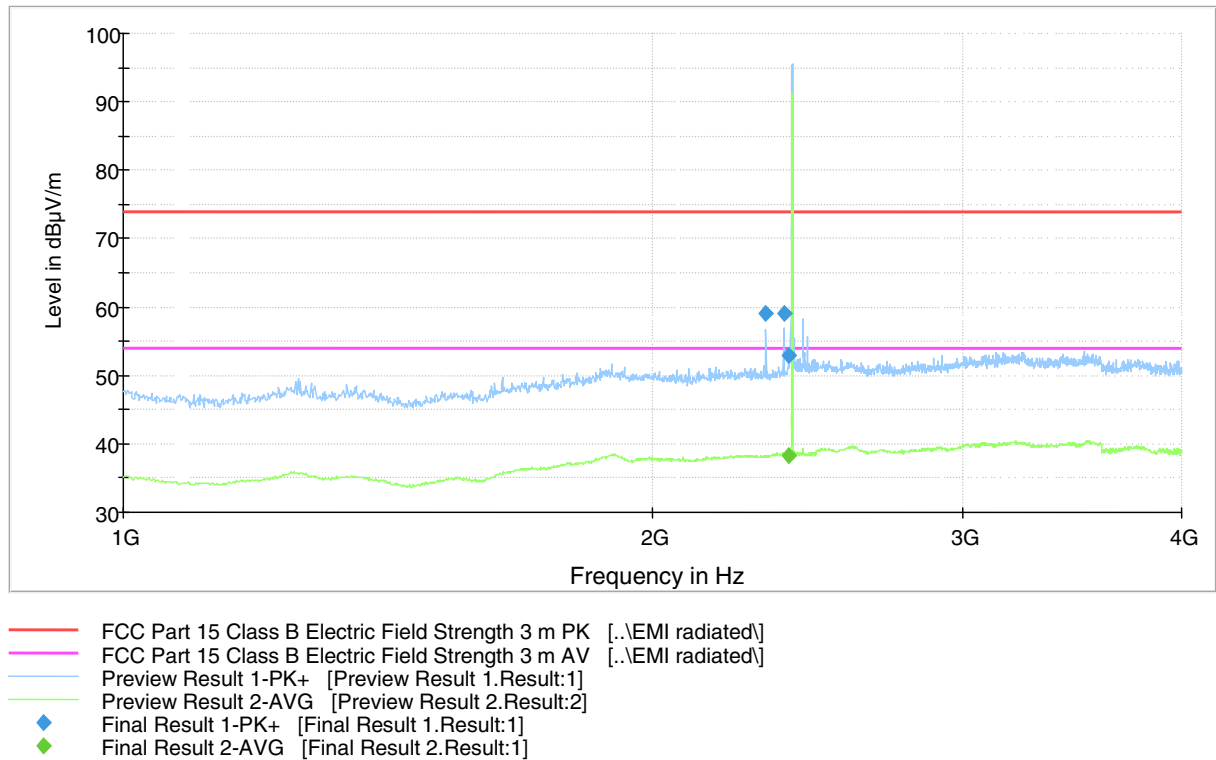


Figure 8. Measured curve with peak and average detectors (Low channel).

Table 6. Final MaxPeak results

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2321.025000	59.0	1000.0	1000.000	179.0	H	179.0	13.5	14.9	73.9	-
2376.225000	59.1	1000.0	1000.000	196.0	H	179.0	13.9	14.8	73.9	-
2388.600000	52.9	1000.0	1000.000	150.0	H	180.0	14.0	21.0	73.9	-

Table 7. Final Average results

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2389.000000	38.2	1000.0	1000.000	150.0	H	216.0	14.0	15.7	53.9	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

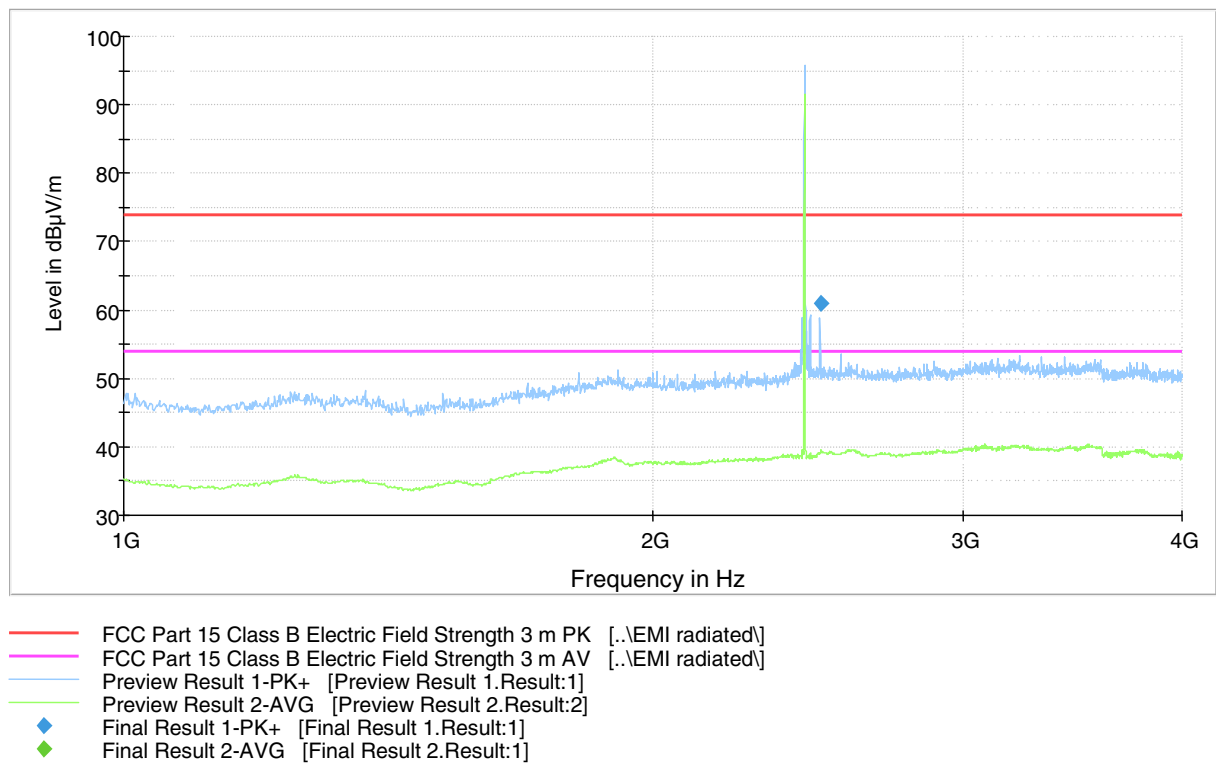


Figure 9. Measured curve with peak and average detectors (Mid channel).

Table 8. Final MaxPeak results

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2490.575000	61.0	1000.0	1000.000	180.0	H	192.0	14.5	12.9	73.9	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

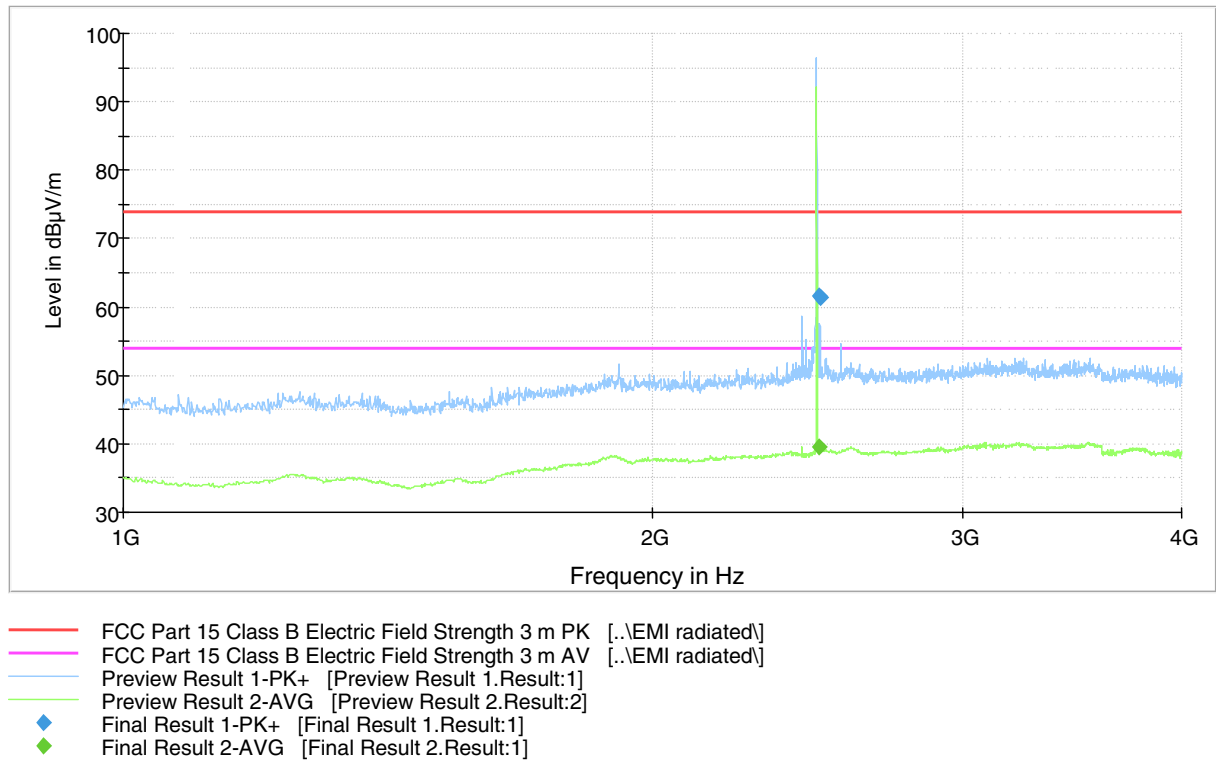


Figure 10. Measured curve with peak and average detectors (High channel).

Table 9. Final MaxPeak results

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2490.500000	61.6	1000.0	1000.000	196.0	H	188.0	14.5	12.3	73.9	-
2490.575000	61.3	1000.0	1000.000	188.0	H	184.0	14.5	12.6	73.9	-

Table 10. Final Average results

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2490.500000	39.6	1000.0	1000.000	220.0	H	193.0	14.5	14.3	53.9	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 4-18GHz 3m

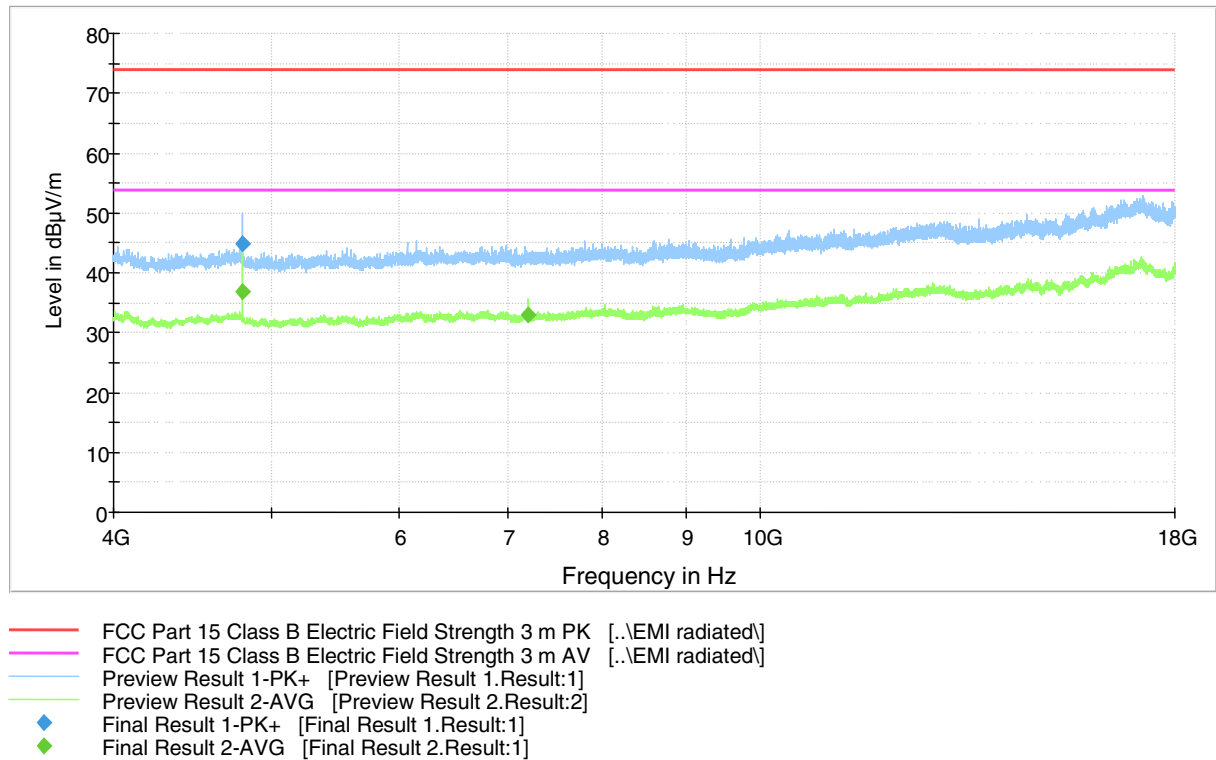


Figure 11. Measured curve with peak and average detectors (Low channel).

Table 11. Final MaxPeak results.

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
4804.000000	44.8	1000.0	1000.000	253.0	H	176.0	10.4	29.1	73.9	-

Table 12. Final Average results.

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
4804.000000	36.8	1000.0	1000.000	249.0	H	164.0	10.4	17.1	53.9	-
7206.000000	33.0	1000.0	1000.000	267.0	V	345.0	12.6	20.9	53.9	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 4-18GHz 3m

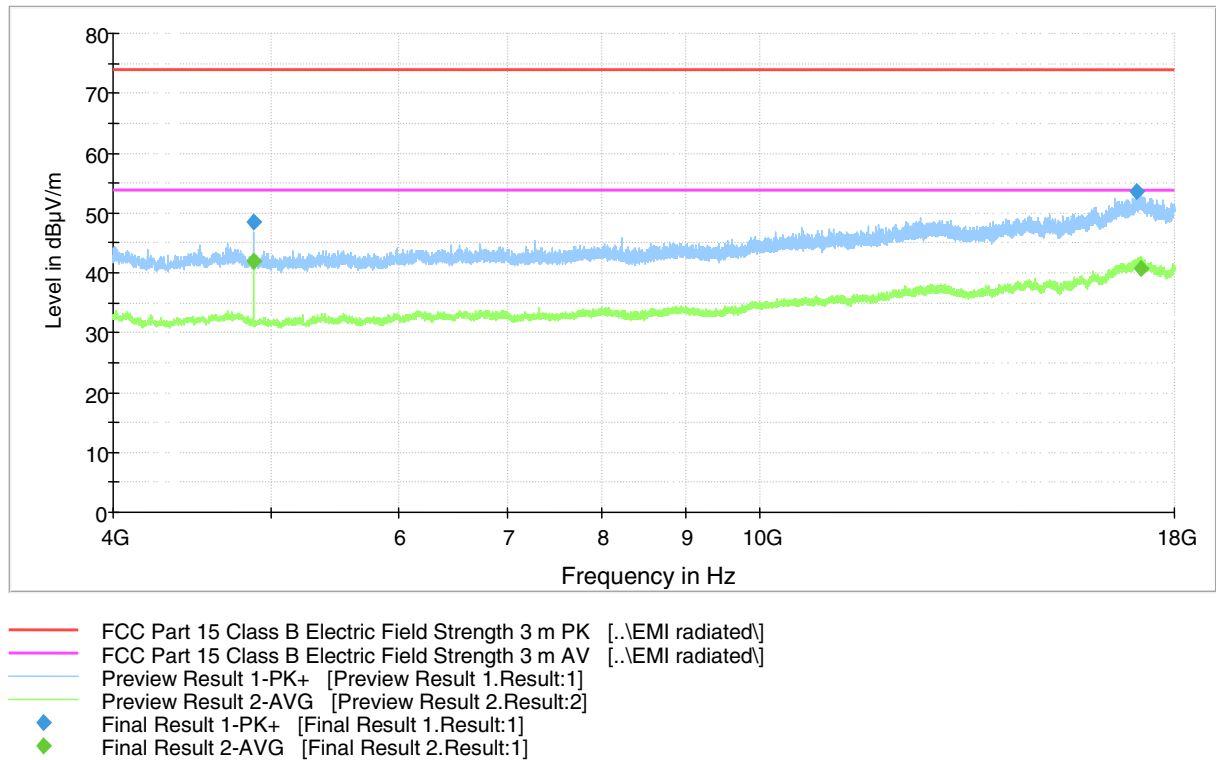


Figure 12. Measured curve with peak and average detectors (Mid channel).

Table 13. Final MaxPeak results.

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
4880.100000	48.5	1000.0	1000.000	212.0	H	328.0	10.4	25.4	73.9	-
17049.400000	53.5	1000.0	1000.000	350.0	H	191.0	26.0	20.4	73.9	-

Table 14. Final Average results.

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
4880.100000	41.9	1000.0	1000.000	213.0	H	332.0	10.4	12.0	53.9	-
17170.200000	40.6	1000.0	1000.000	377.0	H	46.0	26.2	13.3	53.9	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 4-18GHz 3m

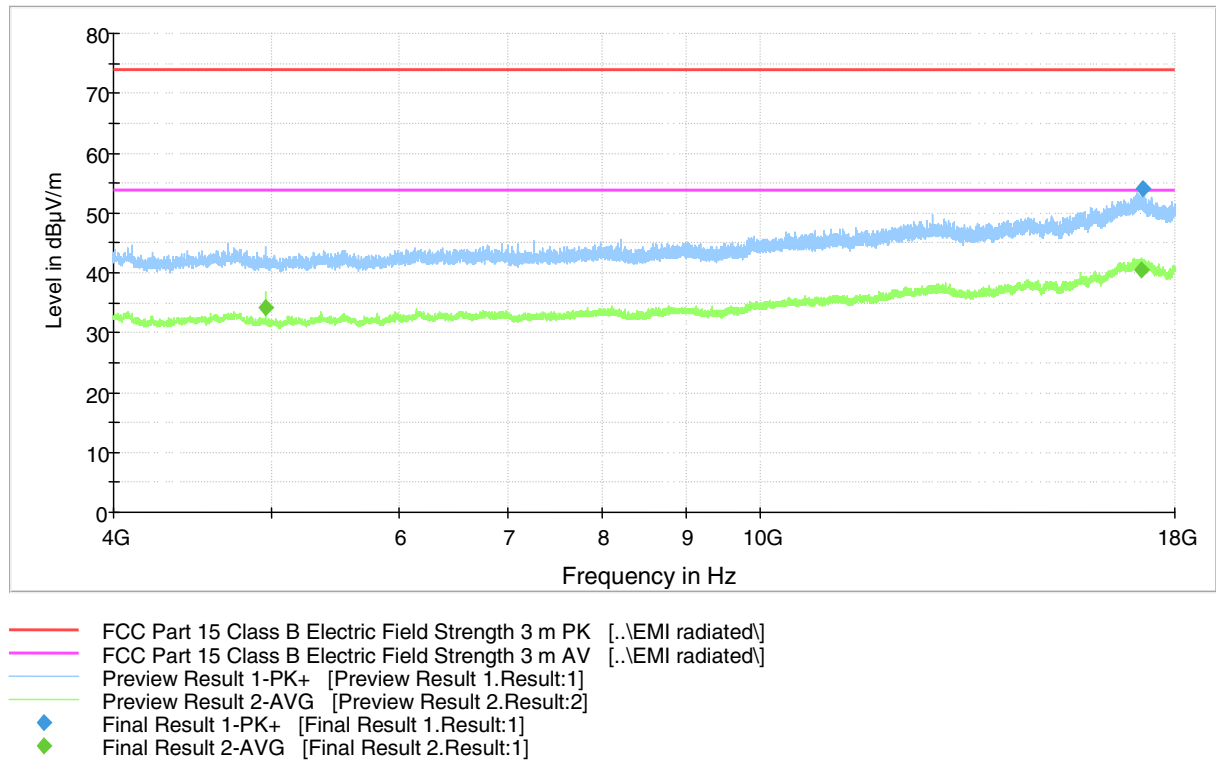


Figure 13. Measured curve with peak and average detectors (High channel).

Table 15. Final Max Peak results.

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
17196.500000	54.1	1000.0	1000.000	292.0	H	227.0	26.2	19.8	73.9	-

Table 16. Final Average results.

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
4960.100000	34.2	1000.0	1000.000	250.0	H	307.0	10.4	19.7	53.9	-
17173.900000	40.5	1000.0	1000.000	258.0	H	230.0	26.2	13.4	53.9	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 18-26.5GHz 3m

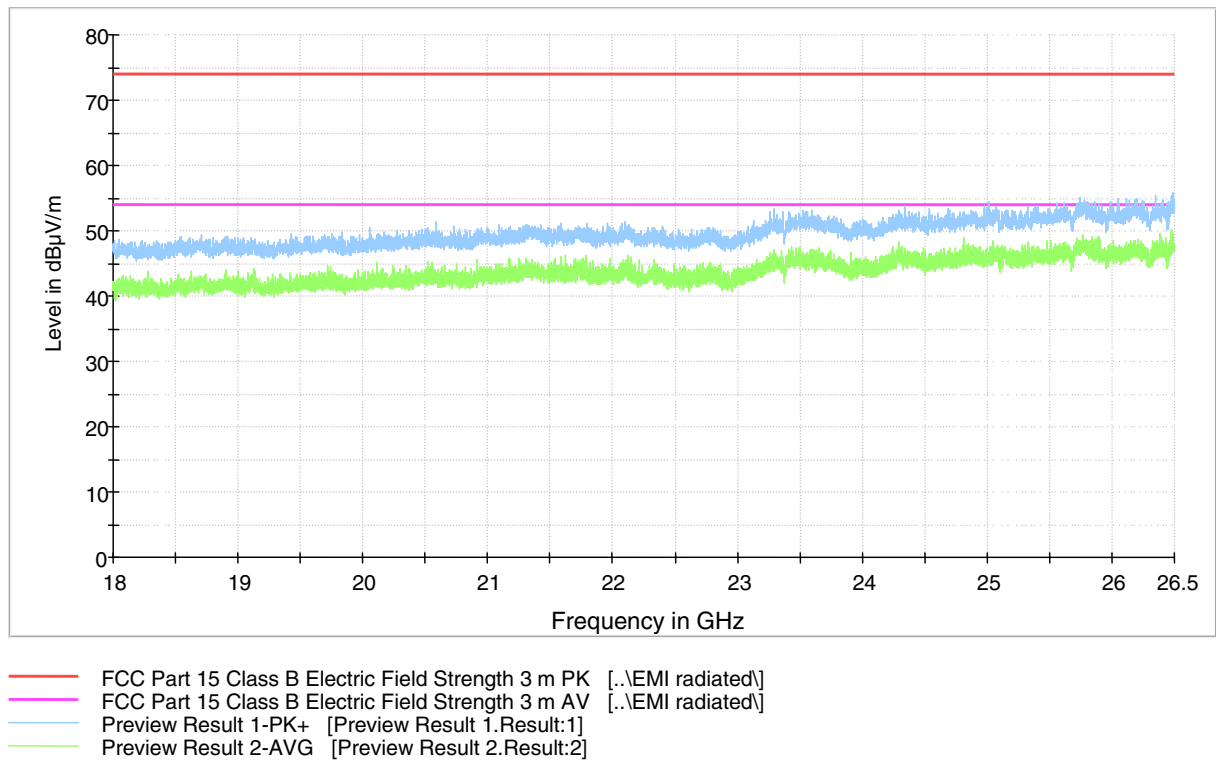


Figure 14. Measured curve with peak and average detectors (Low channel).

FCC Part 15 Class B Spurious Emission 18-26.5GHz 3m

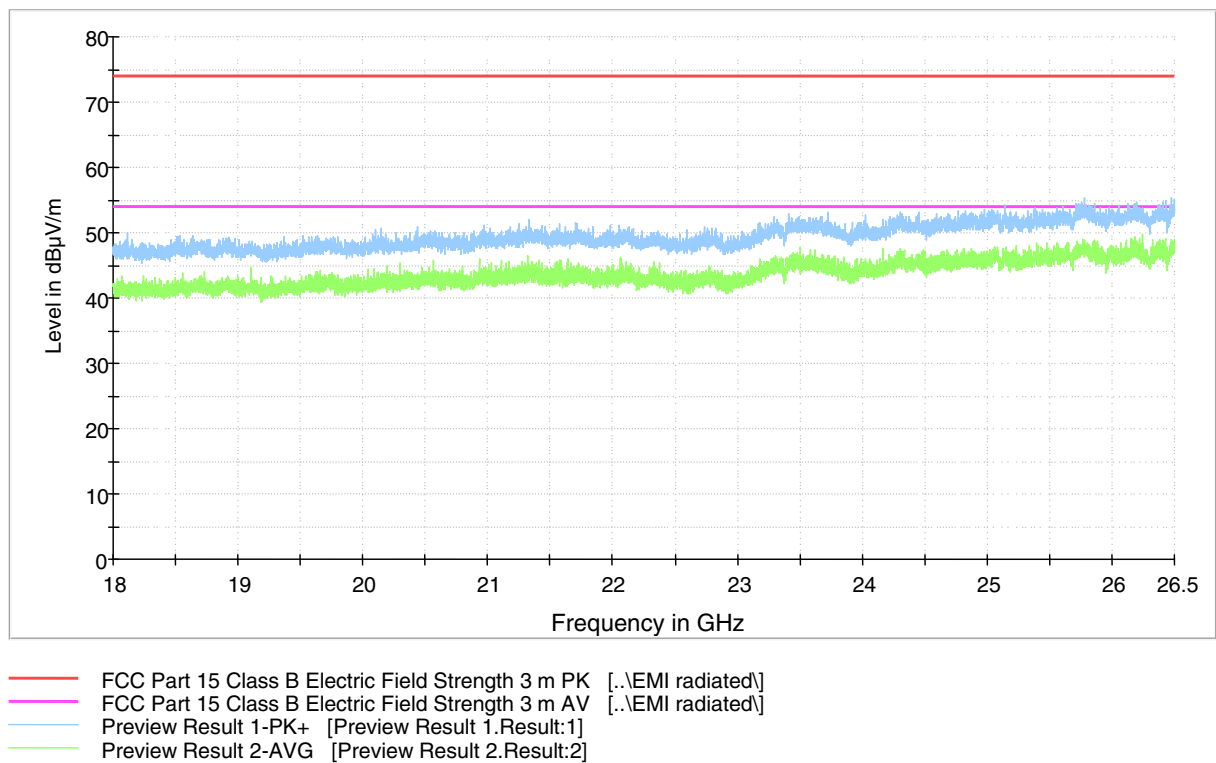


Figure 15. Measured curve with peak and average detectors (Mid channel).

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 18-26.5GHz 3m

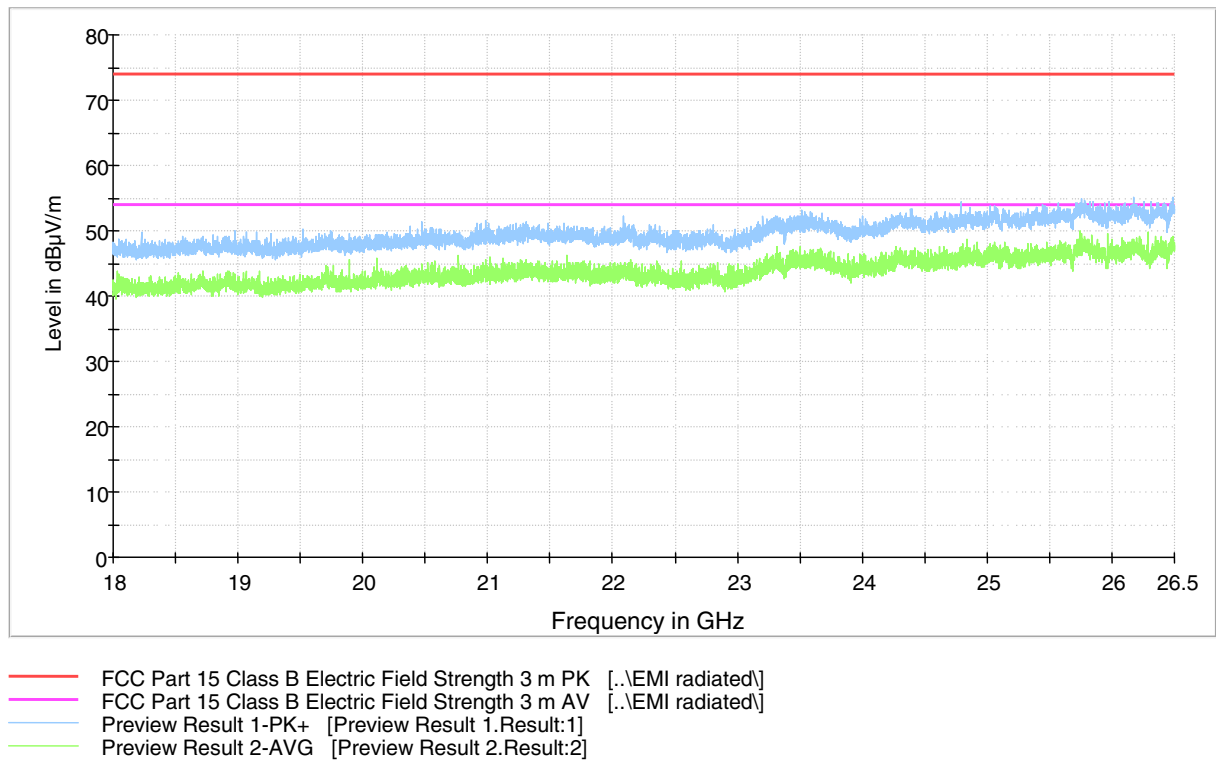


Figure 16. Measured curve with peak and average detectors (High channel).

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

Radiated Band Edge Measurement results

FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

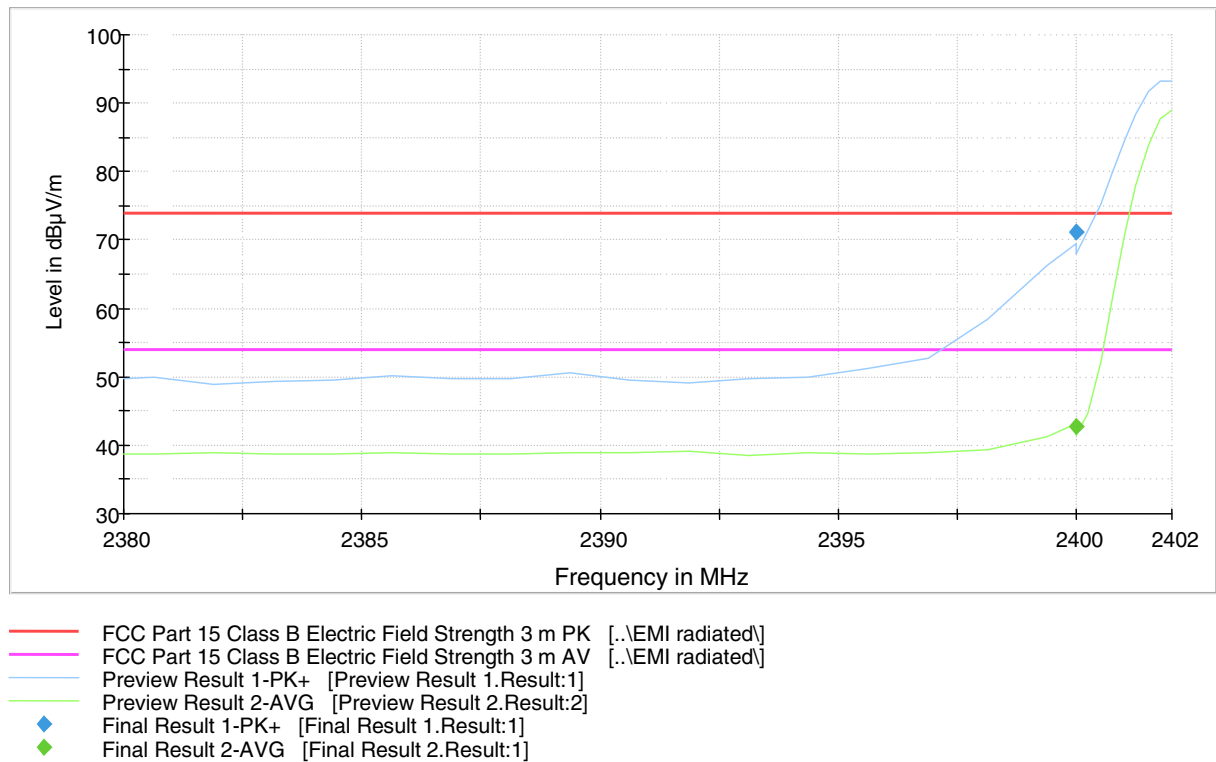


Figure 17. Low channel band edge.

Table 17. Final MaxPeak results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2400.000000	71.1	1000.0	1000.000	170.0	H	179.0	14.1	2.8	73.9	-

Table 18. Final Average results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2400.000000	42.7	1000.0	1000.000	186.0	H	178.0	14.1	11.2	53.9	-

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

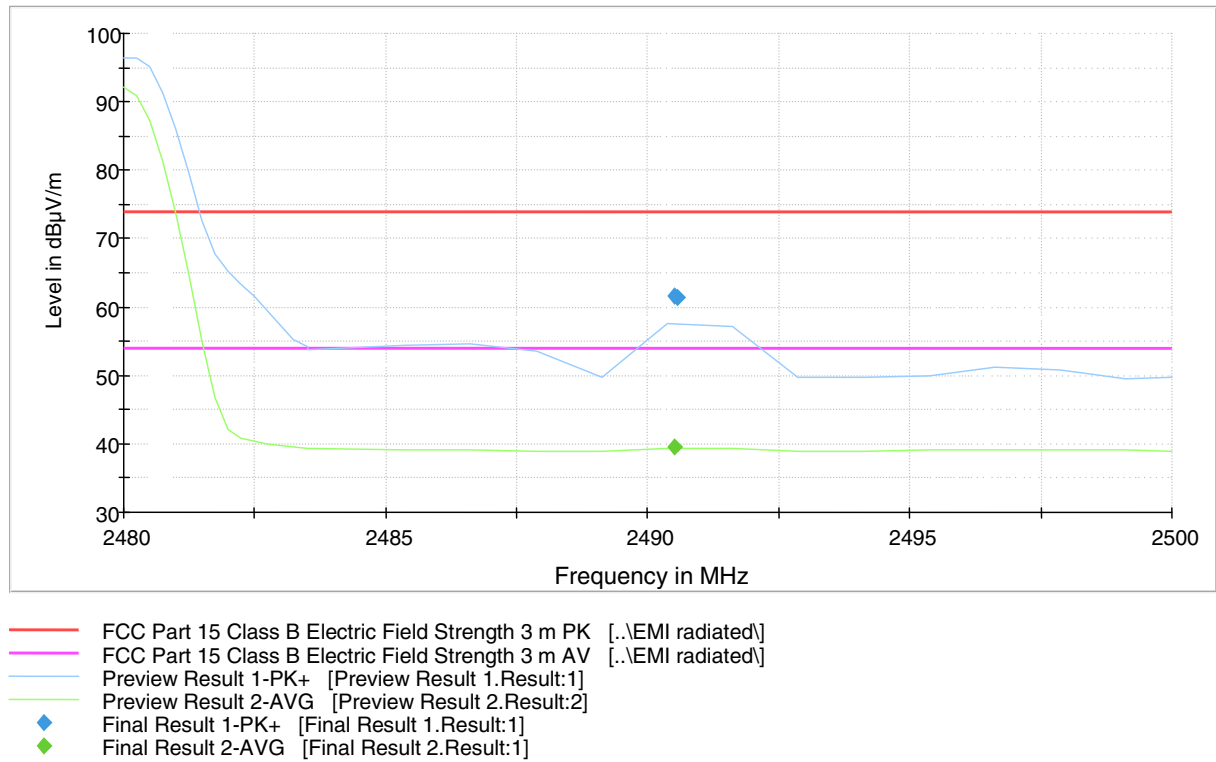


Figure 18. High channel band edge

Table 19. Final MaxPeak results

Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2490.500000	61.6	1000.0	1000.000	196.0	H	188.0	14.5	12.3	73.9	-
2490.575000	61.3	1000.0	1000.000	188.0	H	184.0	14.5	12.6	73.9	-

Table 20. Final Average results

Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
2490.500000	39.6	1000.0	1000.000	220.0	H	193.0	14.5	14.3	53.9	-

Transmitter Band Edge Measurement and Conducted Spurious Emissions

Transmitter Band Edge Measurement and Conducted Spurious Emissions

Standard: ANSI C63.10 (2013)
Tested by: RRE
Date: 1 June 2016
Temperature: 22 ± 3 °C
Humidity: 30 - 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)).

Band Edge Attenuation	
Lower Band Edge	Upper Band Edge
-37.80 dBc	-36.07 dBc
Limit: -20dBc	

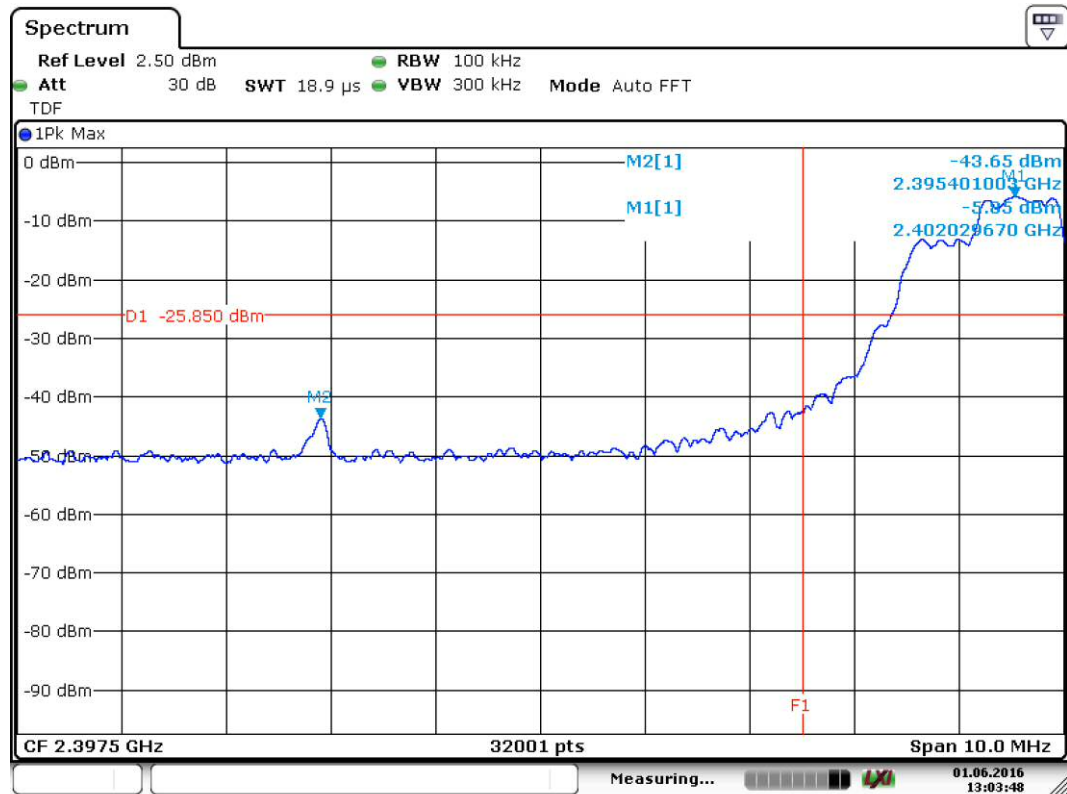
Table 21. Band edge attenuation.

Table 22. Conducted spurious emissions.

Conducted Spurious Emissions				
Channel	Measured Attenuation [dB]	Limit [dBc]	Margin [dB]	Result
Low	-	-20.0	-	-
Mid	-	-20.0	-	-
High	-	-20.0	-	-

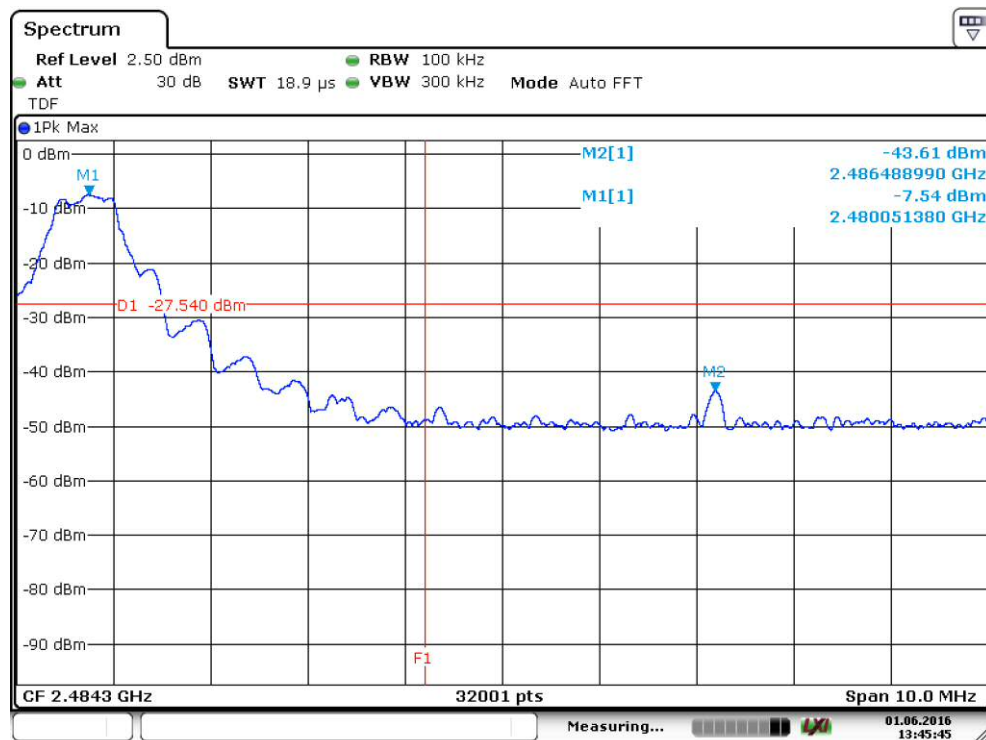
No significant emissions were detected close to the limit.

Transmitter Band Edge Measurement and Conducted Spurious Emissions



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Figure 19. Lower Band Edge.



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Figure 20. Upper Band Edge.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

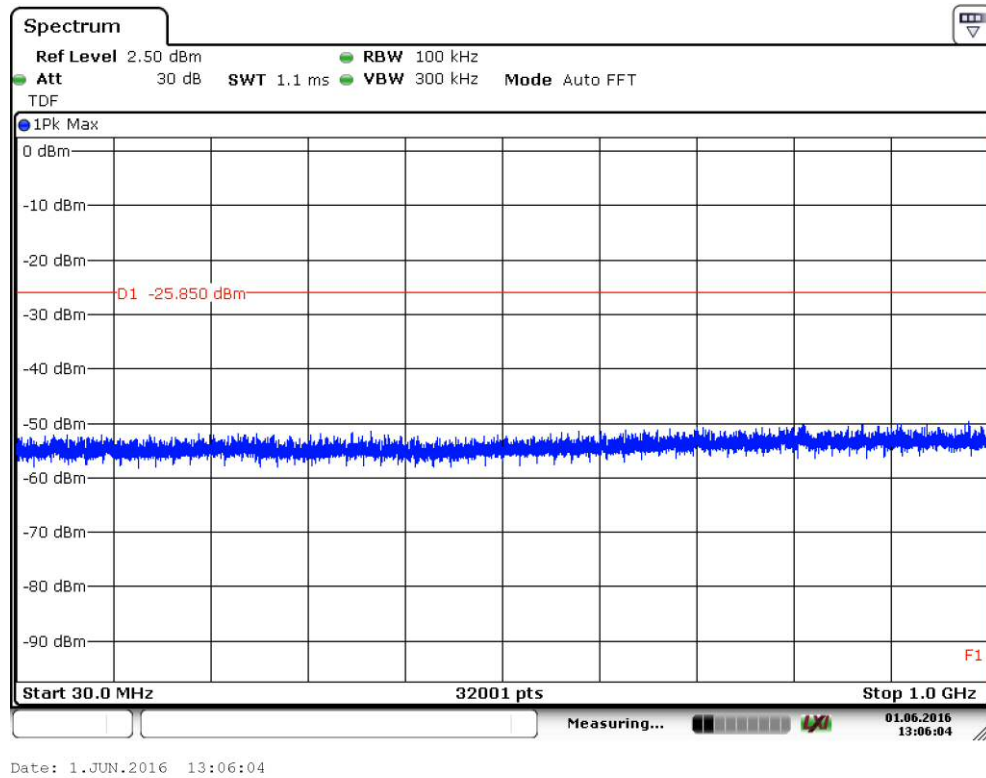


Figure 21. Conducted Spurious Emissions 30 – 1 000 MHz. Low channel.

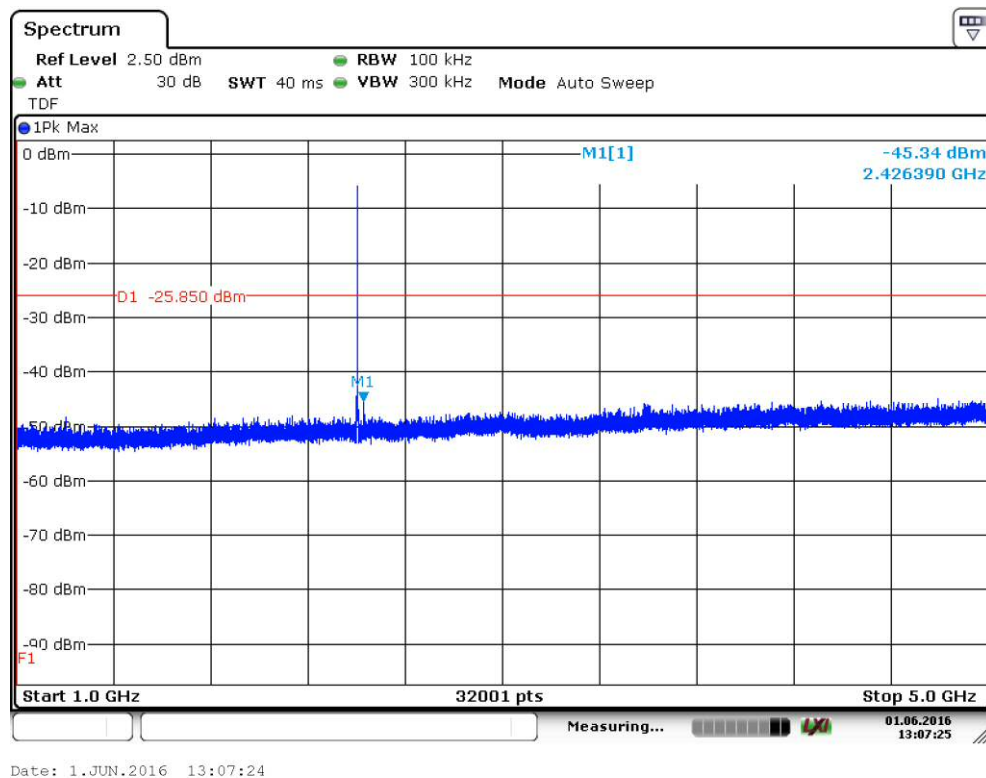


Figure 22. Conducted Spurious Emissions 1 000 – 5 000 MHz. Low channel.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

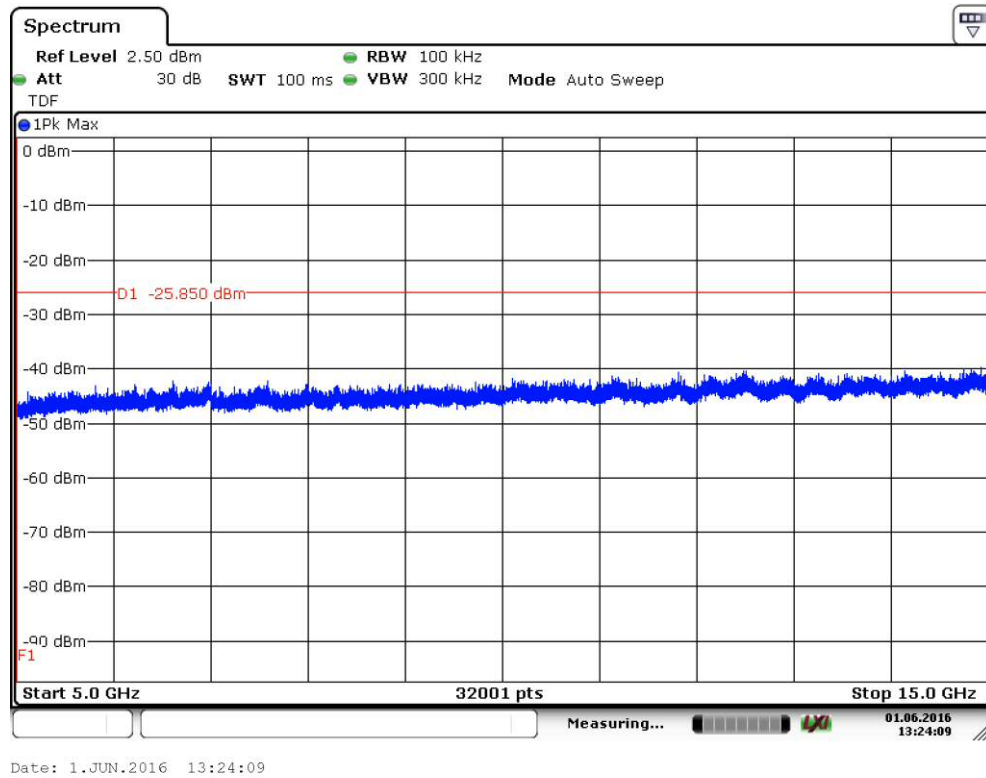


Figure 23. Conducted Spurious Emissions 5 000 – 15 000 MHz. Low channel.

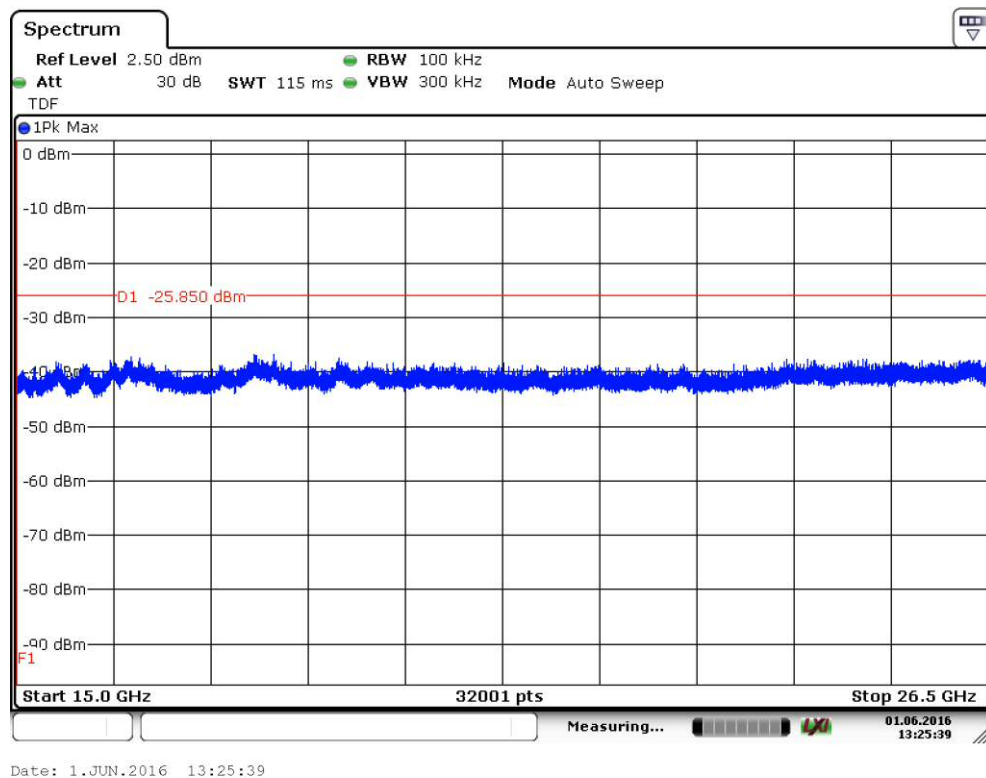


Figure 24. Conducted Spurious Emissions 15 000 – 26 500 MHz. Low channel.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

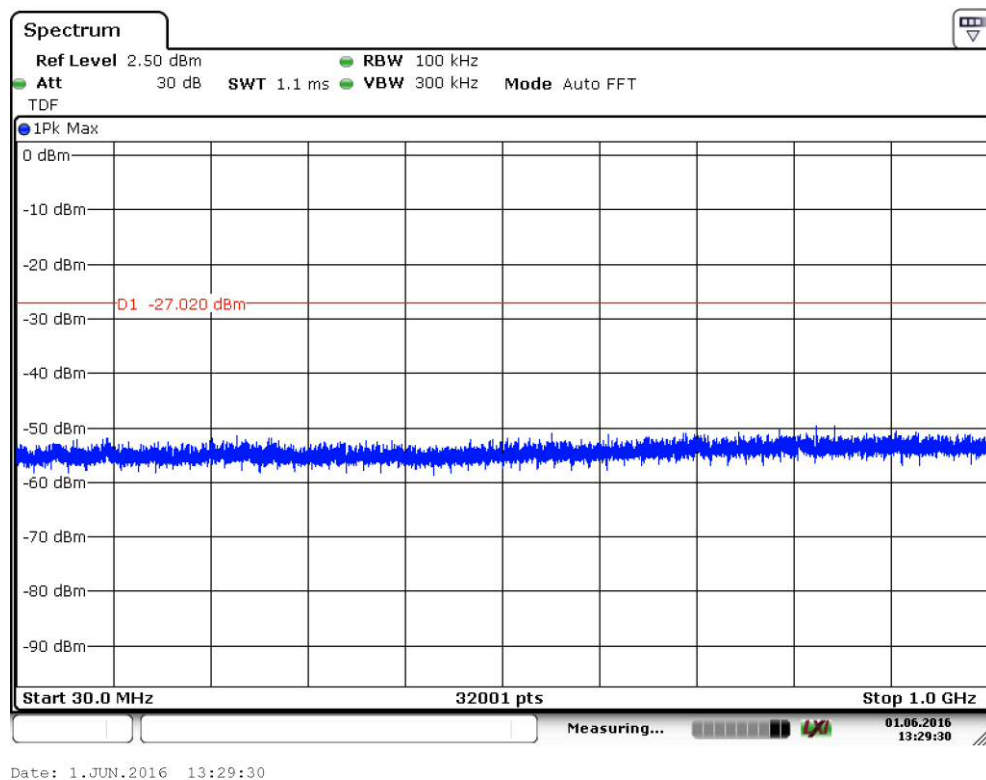


Figure 25. Conducted Spurious Emissions 30 – 1 000 MHz. Mid channel.

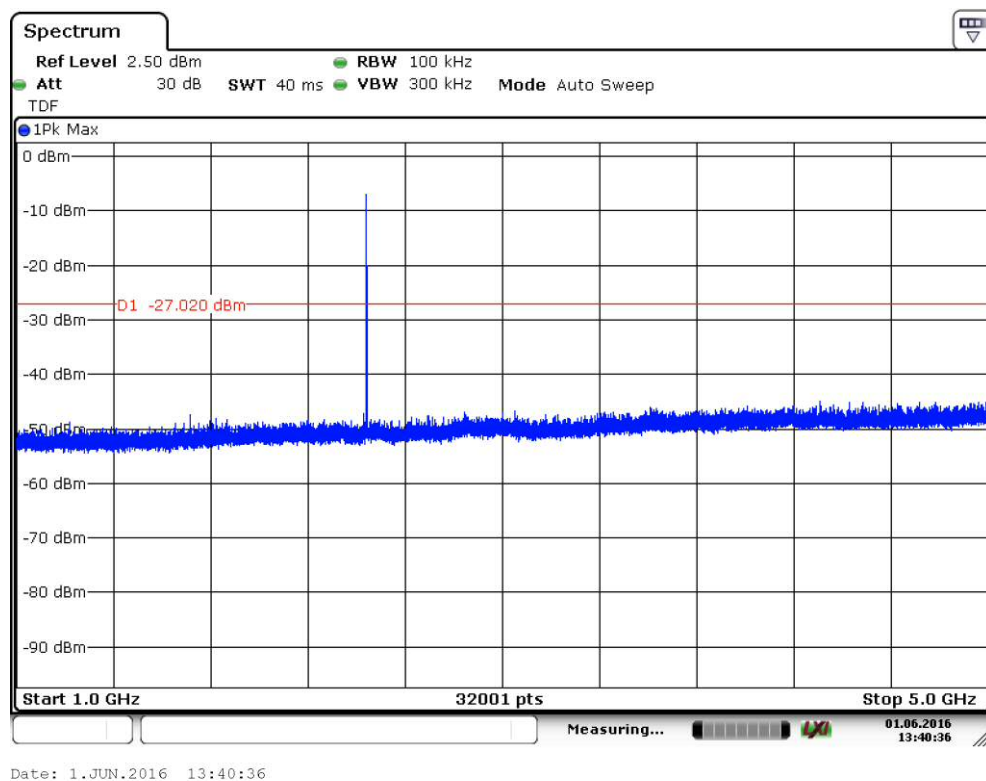


Figure 26. Conducted Spurious Emissions 1 000 – 5 000 MHz. Mid channel.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

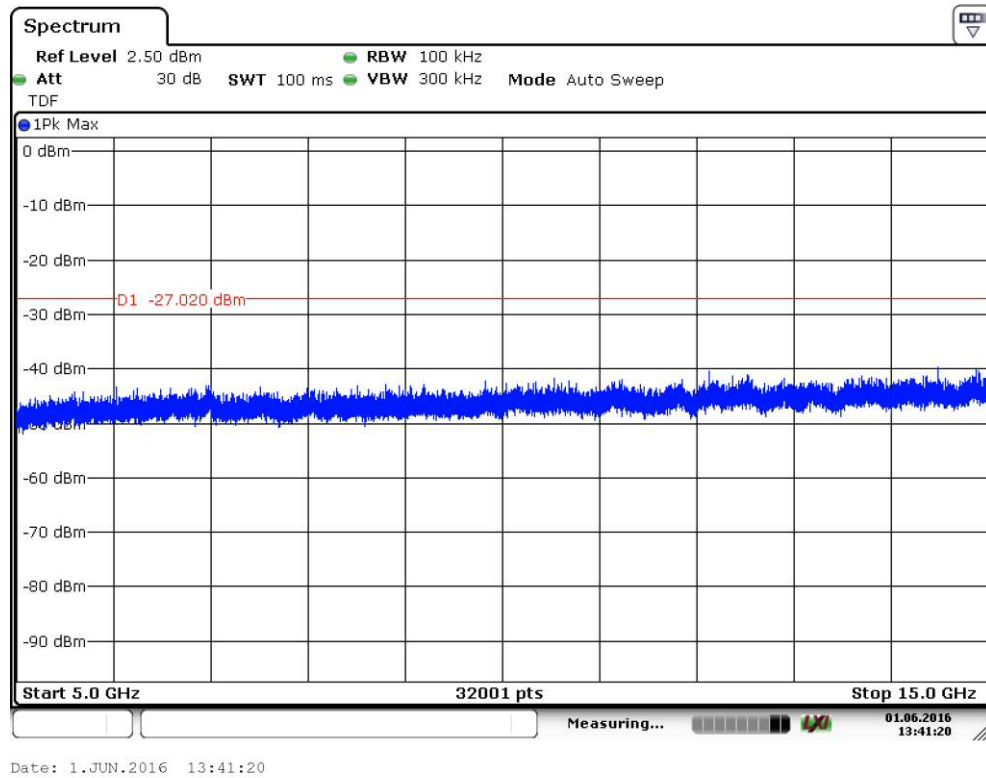


Figure 27. Conducted Spurious Emissions 5 000 – 15 000 MHz. Mid channel.

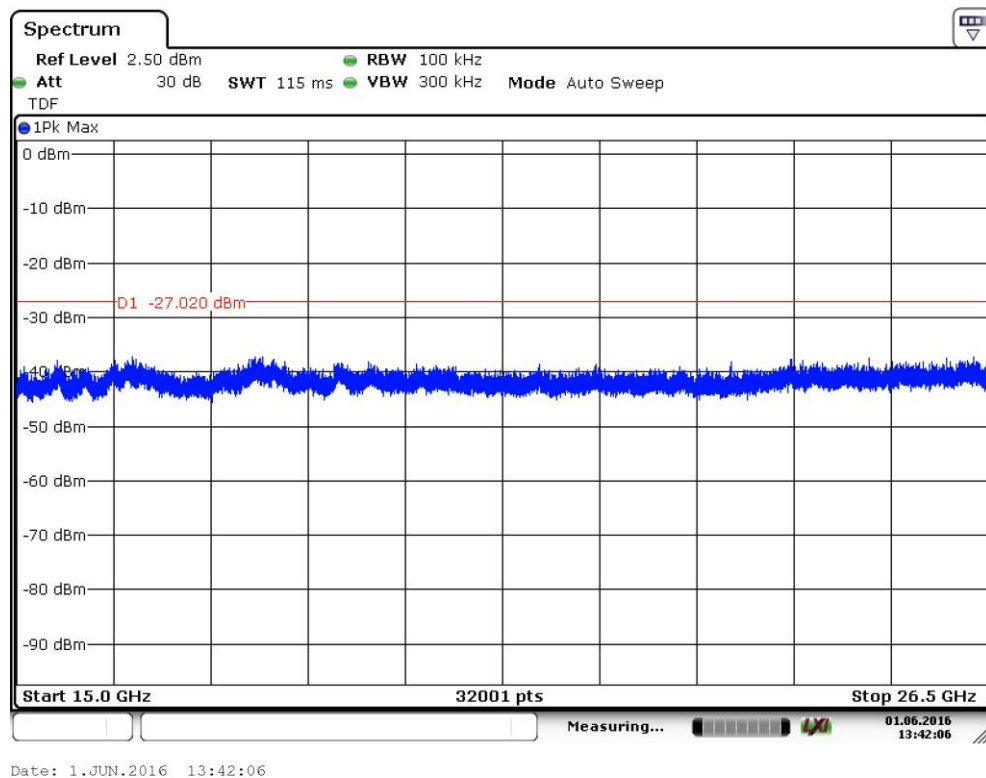


Figure 28. Conducted Spurious Emissions 15 000 – 26 500 MHz. Mid channel.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

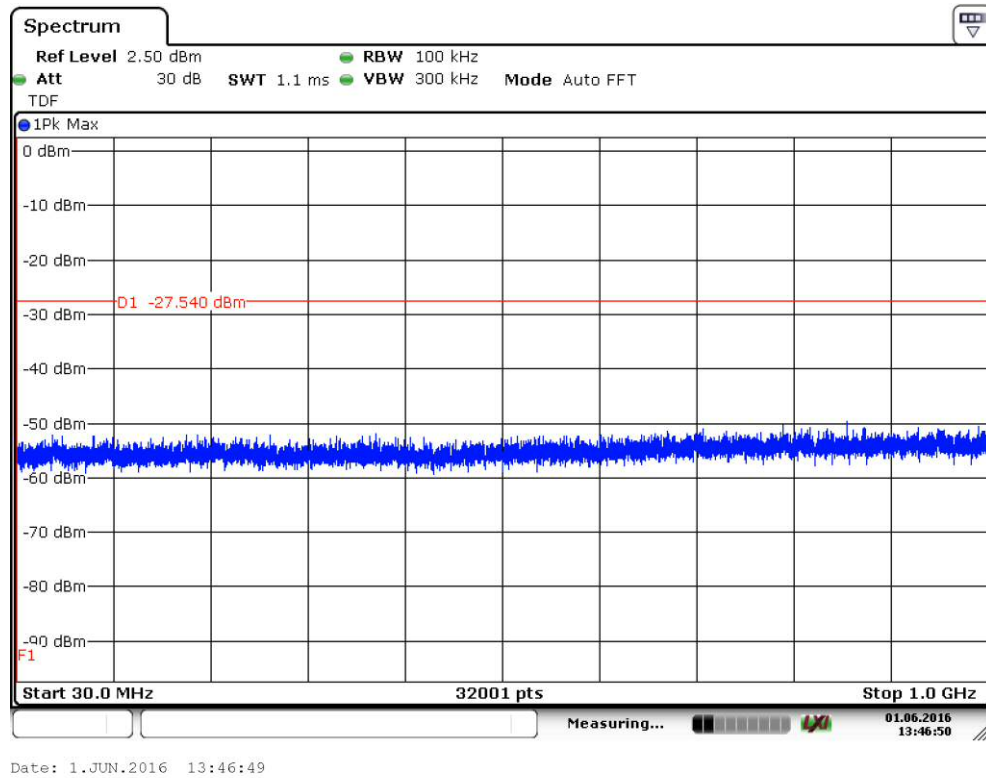


Figure 29. Conducted Spurious Emissions 30 – 1 000 MHz. High channel.

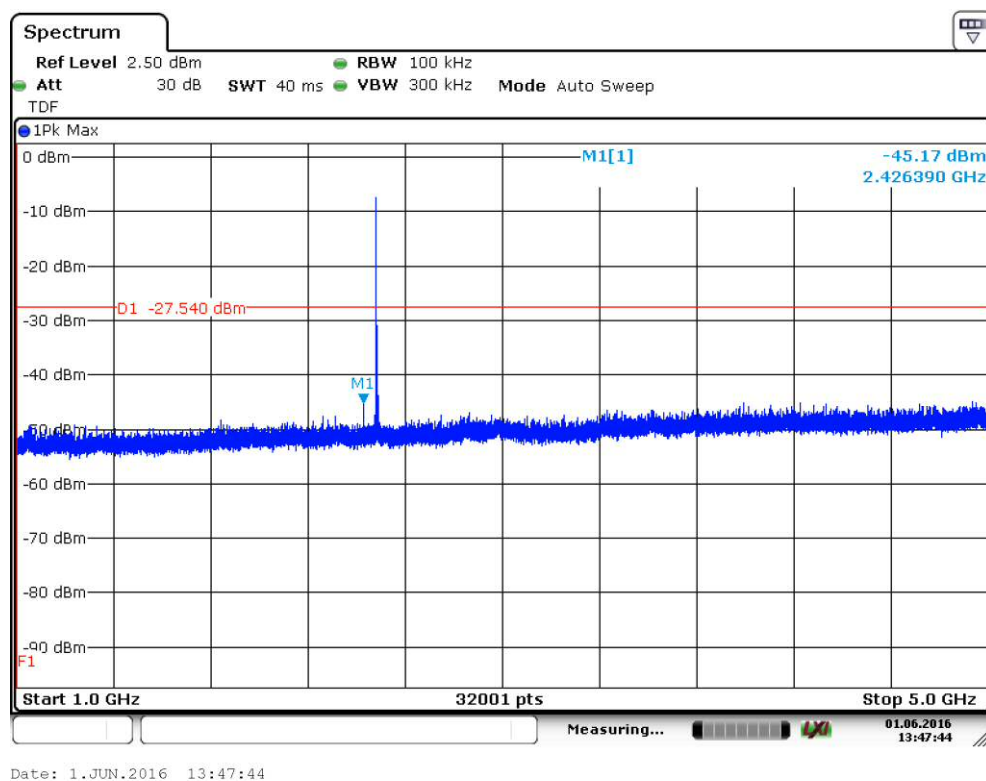


Figure 30. Conducted Spurious Emissions 1 000 – 5 000 MHz. Channel High.

Transmitter Band Edge Measurement and Conducted Spurious Emissions

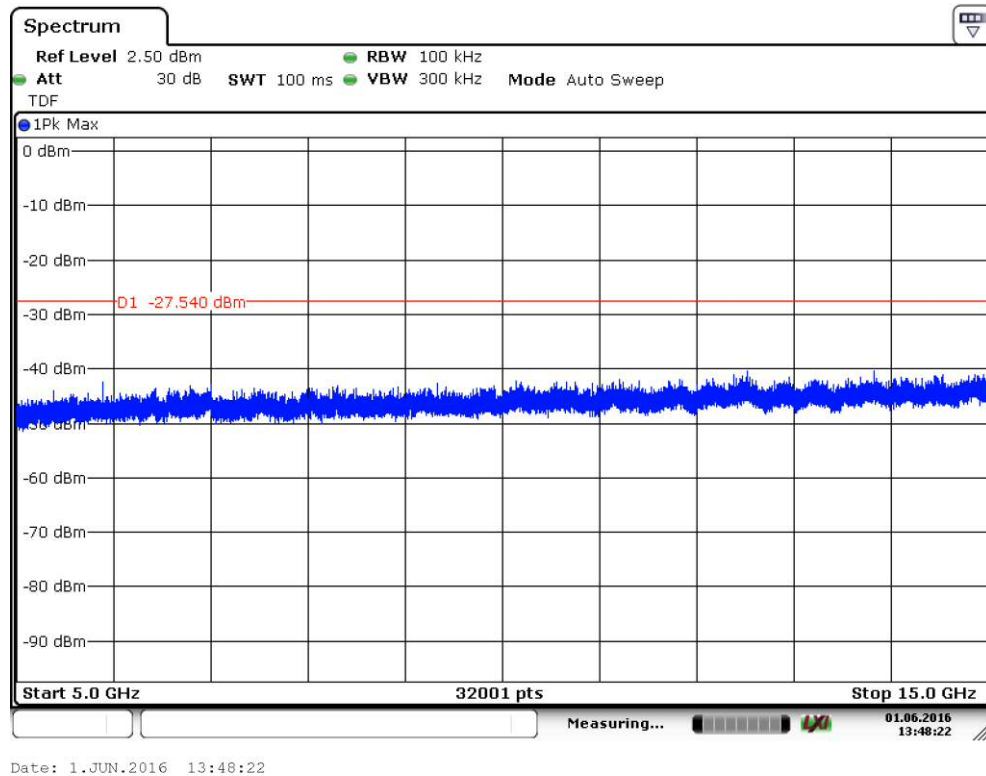


Figure 31. Conducted Spurious Emissions 5 000 – 15 000 MHz. High channel.

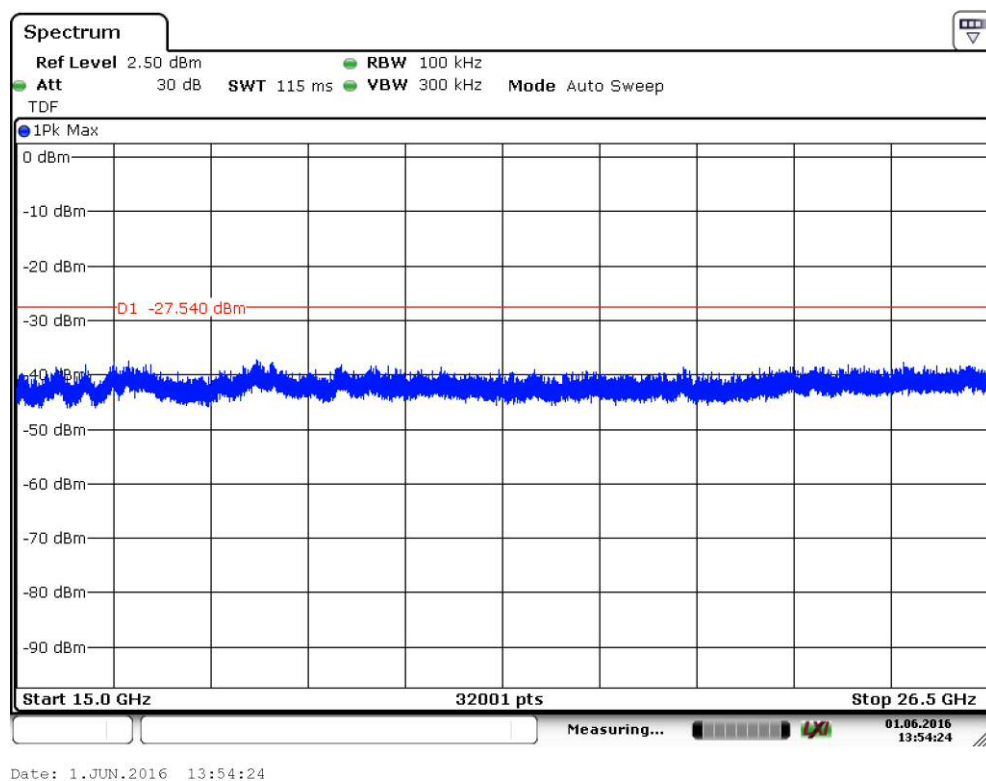


Figure 32. Conducted Spurious Emissions 15 000 – 26 500 MHz. High channel.

6 dB Bandwidth of the Channel

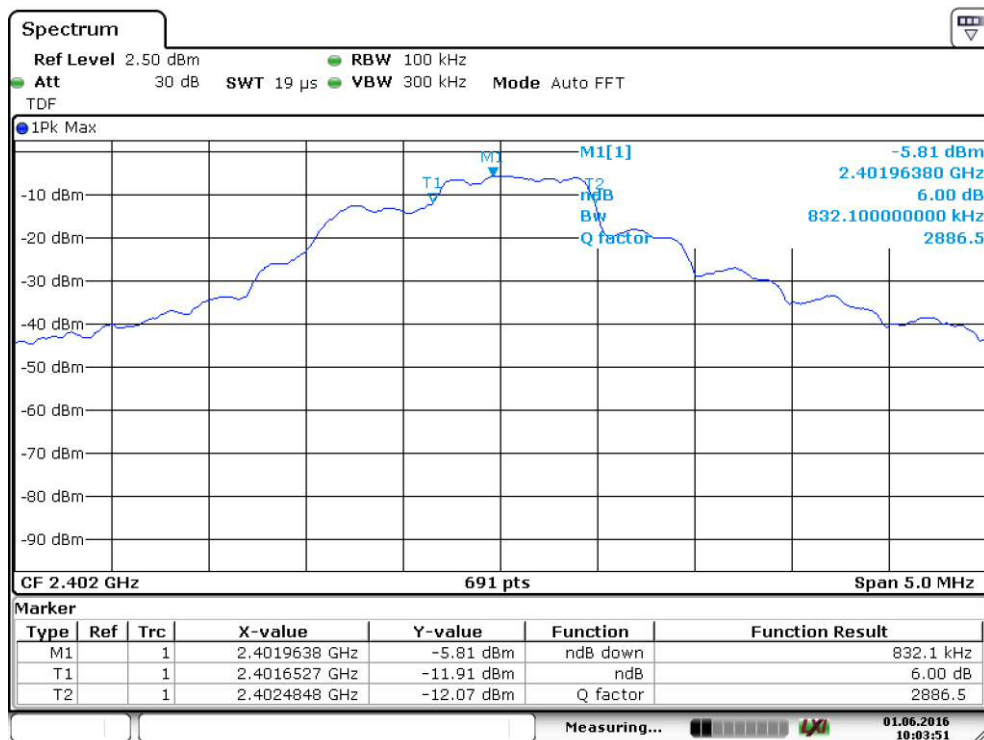
Standard: ANSI C63.10 (2013)
Tested by: RRE
Date: 1 June 2016
Temperature: 22 ± 3 °C
Humidity: 30 - 60 % RH

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

Results:

Table 23. 6 dB bandwidth test results.

Channel	6 dB BW [kHz]	Minimum limit [kHz]	Result
Low	832.1	500	PASS
Mid	709.1		PASS
High	701.9		PASS



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Figure 33. 6 dB bandwidth of the Low channel.

6 dB Bandwidth of the Channel

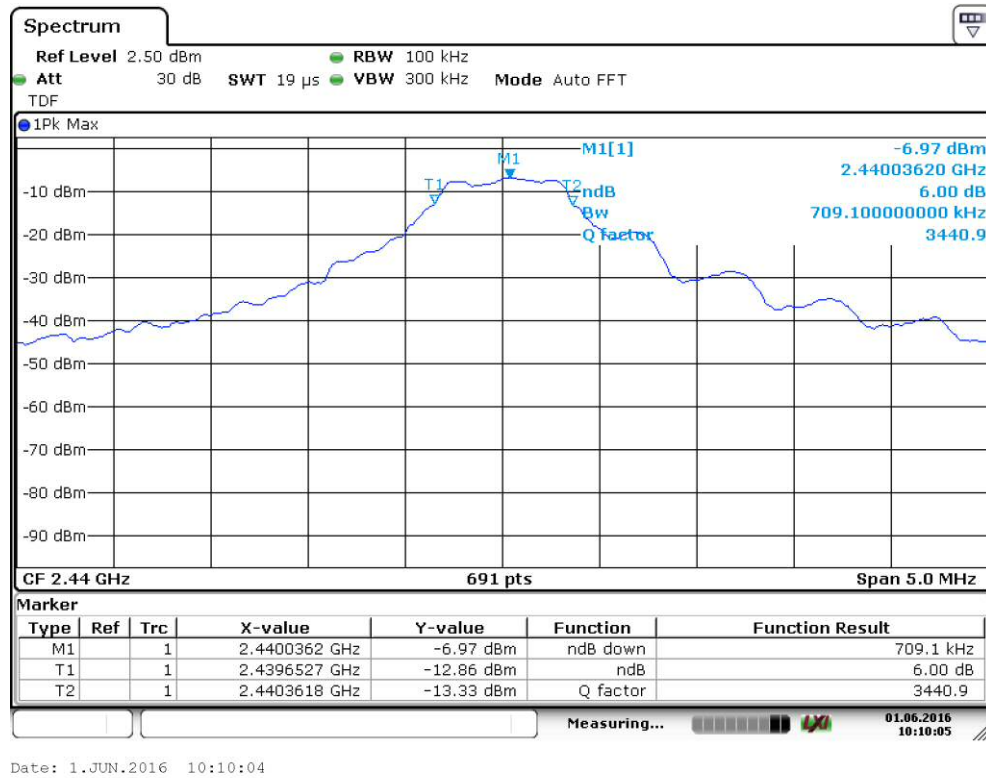


Figure 34. 6 dB bandwidth of the Mid channel.

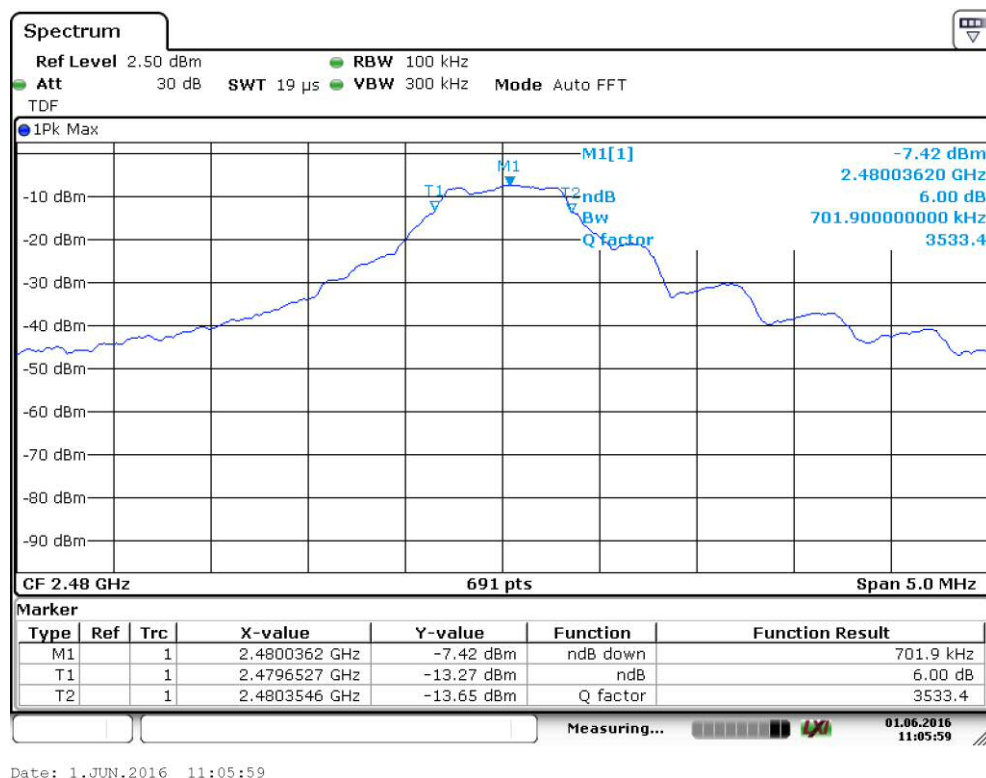


Figure 35. 6 dB bandwidth of the High channel.

Power Spectral Density

Standard: ANSI C63.10 (2013)
Tested by: RRE
Date: 1 June 2016
Temperature: 22 ± 3 °C
Humidity: 30 - 60 % RH

FCC Rule: 15.247(e)
RSS-247 5.2

Results:

Table 24. Power Spectral Density test results.

Channel	PSD dBm/3 kHz	Maximum limit [dBm/3kHz]
Low	-18.37	+8.00
Mid	-20.17	
High	-19.97	

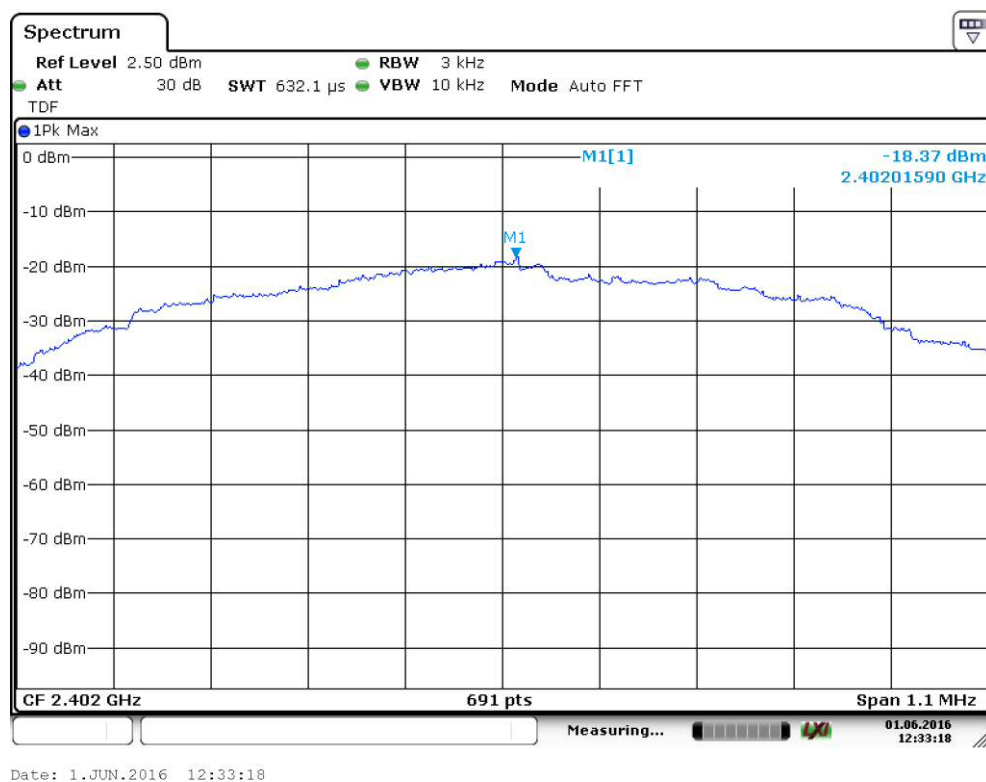


Figure 36. Power Spectral Density of the Low channel.

6 dB Bandwidth of the Channel

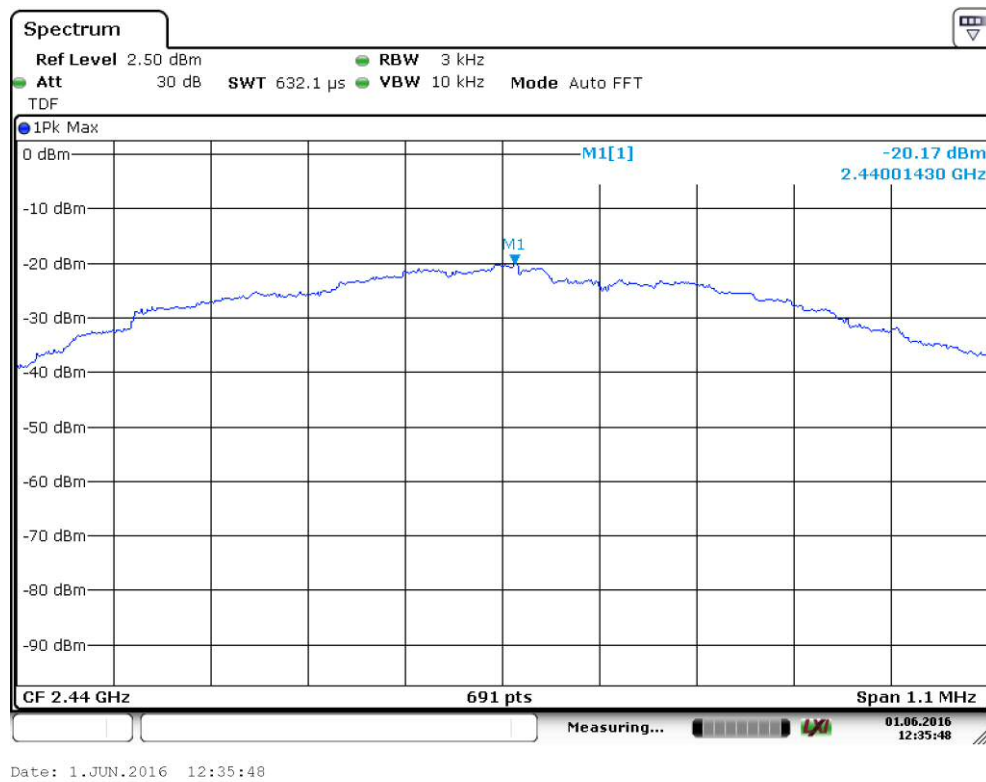


Figure 37. Power Spectral Density of the Mid channel.

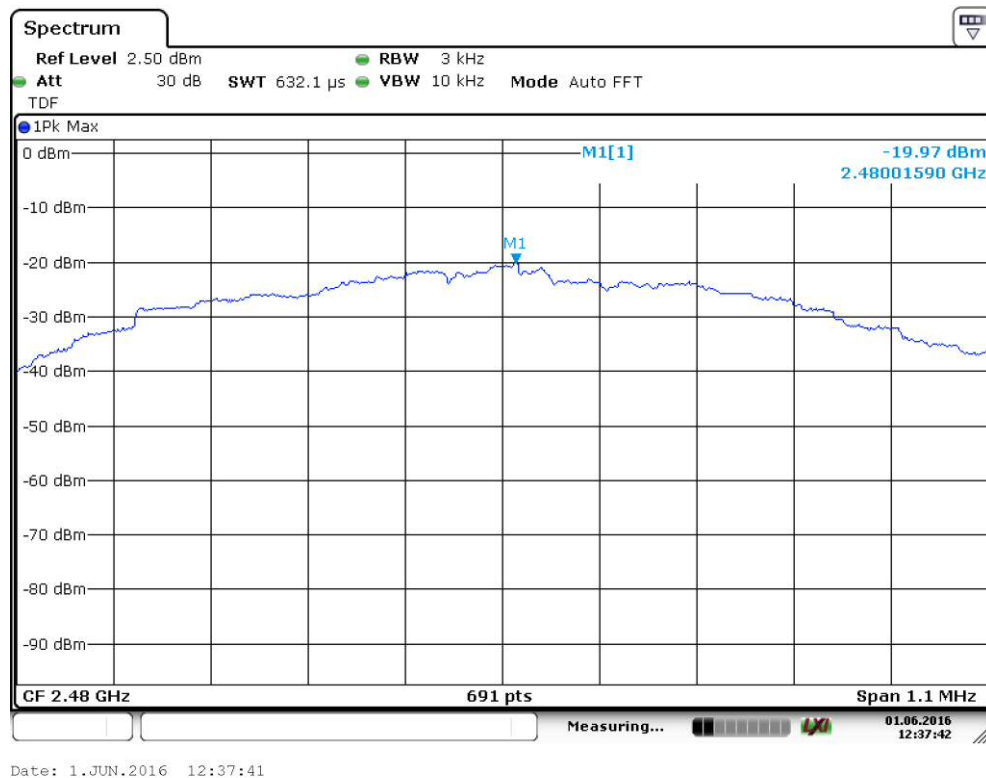


Figure 38. Power Spectral Density of the High channel.

Transmitter Radiated Emissions 30 MHz to 26.5 GHz

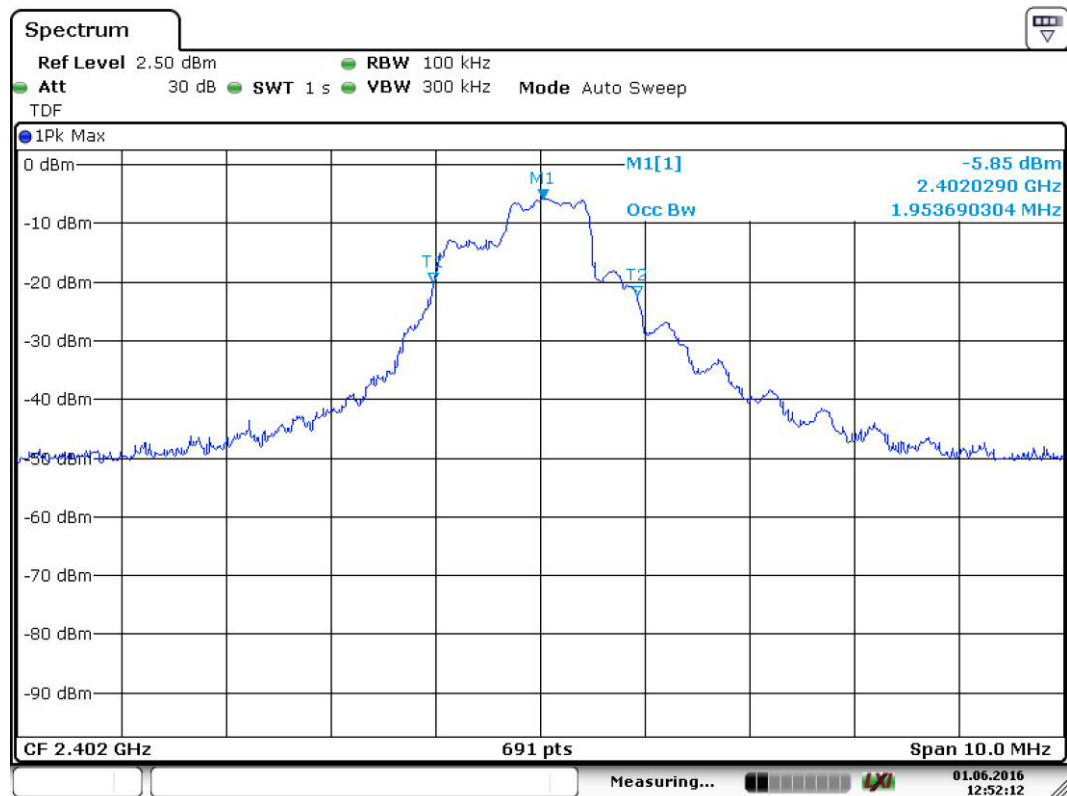
99% Occupied Bandwidth

Standard: RSS-GEN (2014)
Tested by: RRE
Date: 30 May 2016
Temperature: 22 ± 3 °C
Humidity: 30 - 60 % RH

RSS-GEN 6.6

Table 25. 99 % OBW test results.

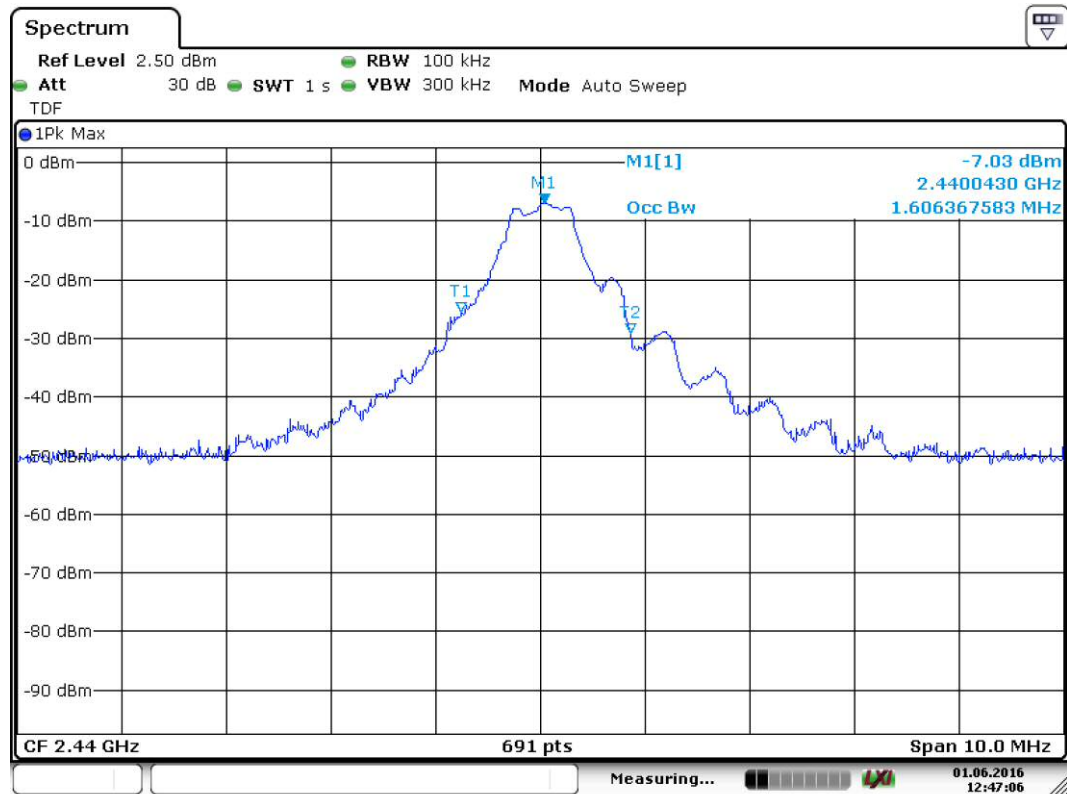
Channel	Limit	99 % BW [MHz]	Result
Low	-	1.953690304	PASS
Mid	-	1.606367583	PASS
High	-	1.476121563	PASS



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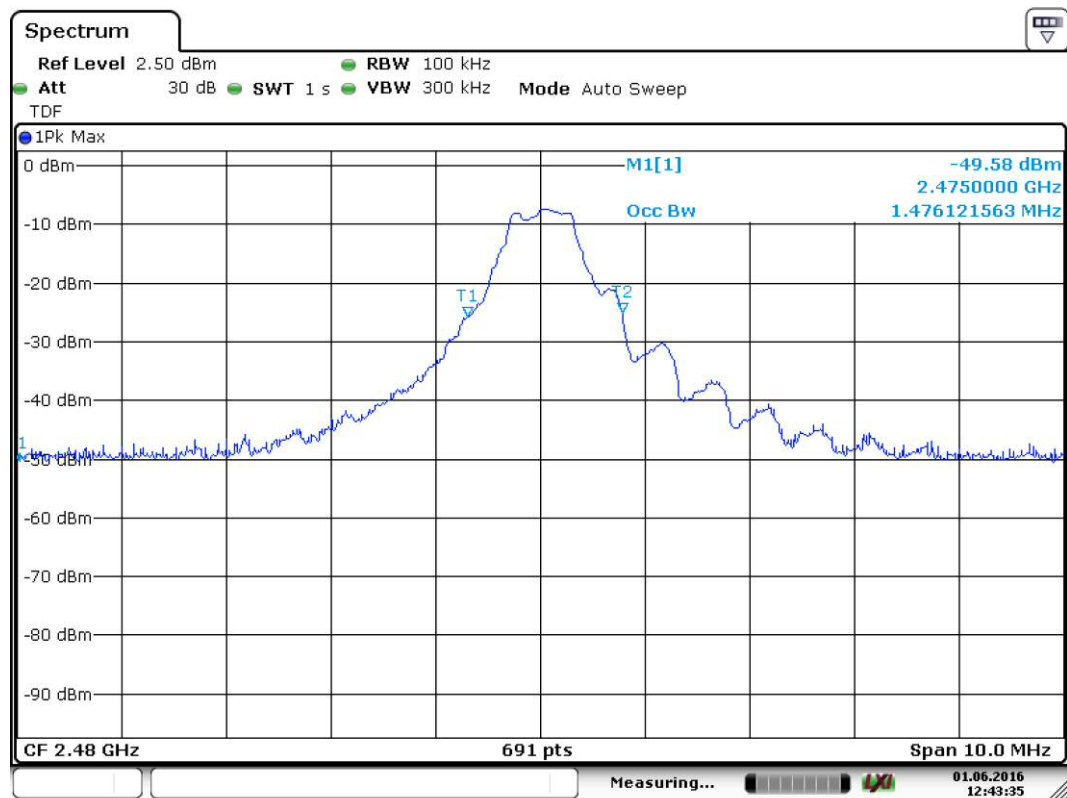
Figure 39. 99 % OBW. Low channel.

Transmitter Radiated Emissions 30 MHz to 26.5 GHz



Date: 1.JUN.2016 12:47:06

Figure 40. 99 % OBW. Mid channel.



Date: 1.JUN.2016 12:43:35

Figure 41. 99 % OBW. High channel.

LIST OF TEST EQUIPMENT

RF-Test Equipment

Equipment	Manufacturer	Type	Inv or serial	Prev Calib	Next Calib
MONITORING ANTENNA	A.H. SYSTEMS	SAS-200/518	inv:7873	-	-
MONITORING SPECTRUM ANALYZER	AGILENT	E7405A	inv:9746	2016-01-07	2018-01-07
TURNTABLE	DEISEL	DS 430	sn:430/447/97	-	-
MAST & TURNTABLE CONTROLLER	DEISEL	HD-100	sn:100/544	-	-
MAST & TURNTABLE CONTROLLER	MATURO	NCD	inv:10183	-	-
ANTENNA MAST	DEISEL	MA 240	inv:7896	-	-
ANTENNA	EMCO	3117	inv:7293	2016-03-16	2018-03-06
ANTENNA	EMCO	3160-09	inv:7294	2016-03-16	2017-03-16
PREAMPLIFIER	HEWLETT PACKARD	83017A (25 dB)	inv:5226	2016-02-03	2017-02-03
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-	-
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU 26	inv:8453	2015-07-01	2016-07-01
SIGNAL ANALYZER	ROHDE & SCHWARZ	FSV40	inv:9093	2015-07-01	2016-07-01
ANTENNA	SCHWARZBECK	VULB 9168	inv:8911	2014-11-04	2016-11-04
HIGH PASS FILTER	WAINWRIGHT	WHKX4.0/18G-10SS	sn:10	2016-01-22	2017-01-22
ATT SMAM/F 50 Ω 18 GHZ 10 DB 1 W	HUBER&SUHNER	6610.19.AA	sn:RF ATTEN 07	2016-02-02	2017-02-02
POWER SOURCE	CALIFORNIA INSTR.	500i-400	inv:9489	-	-
LISN	ROHDE & SCHWARZ	ENV216	inv:9611	2016-02-24	2017-02-24