SGS

Test Report

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

Equipment Under Test:	WLAN module
Model:	WF121–A WF121–E WF121–N
Manufacturer:	BlueGiga Technologies Oy PL 120 FI-02631 Espoo Finland
Customer:	BlueGiga Technologies Oy PL 120 FI-02631 Espoo Finland
FCC Rule Part:	15.247:2010
IC standars:	RSS-210 Issue 8, 2010 RSS-GEN Issue 2, 2007
Measurement guide:	558074 D01 DTS

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

Date:	28.06.2012	Date:	28.06.2012
Issued by:	Jari Merikari Technical Manager	Checked by:	Arto Kasanen Testing Engineer

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Equipment Under Test (EUT)

Brand:	Bluegiga
Model:	WF121-A WF121-E WF121-N
Serial no:	-
HW version:	-
SW version:	-
FCC ID number:	QOQWF121
Industry Canada number:	5123A-BGT121

Description of the EUT

WF121 is a general use IEEE 802.11 (Wi-Fi) transceiver module meant to provide wireless connectivity for various low complexity microcontroller platforms without capability of running the Wi-Fi stack. WF121 contains a microcontroller running the full Wi-Fi stack and provides customers with connectivity through serial port or USB with simple commands. WF121 can also be used to run simple customer applications on the module internal microcontroller.

WF121 supports the IEEE 802.11b/g/n wireless networking standards with a single spatial stream and 20MHz or 22MHz bandwidth, allowing bitrates of up to 72.2Mbps. WF121 provides embedded system designers with easy add-on connectivity without requiring RF design skills or knowledge about the Wi-Fi stack. Differences between the modules are:

WF121-A is equipped with integrated chip antenna

WF121-E is equipped with U.FL connector for external antenna

WF121-N is equipped with a pad on module edge

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 (OFR):	2412 – 2462 MHz
Channels:	1-11
Channel separation:	5 MHz
Channel bandwidth:	20 MHz (b-mode) 22 MHz (g/N-mode)
Conducted power:	+19.03dBm
Transmission technique: (DSSS, FHSS, etc)	DSSS/OFDM
Modulation:	CCK/OFDM
Transmission rate:	1-72.2 Mbps
Antenna type and gain:	external dipole via RF pad, +2dB
Antenna gain: WF121-A	0.5 dBi
Antenna gain: WF121-E	2.14 dBi
Antenna gain: WF121-N	2.14 dBi

Power Requirements

DC-operated	
Operating voltage range	2.7 – 3.6VDC
Normal input voltage:	3.3 VDC

Mechanical Size of the EUT

Height: 2.10 mm	Width:15.40 mm	Depth: 26.20 mm

Cable Lengths and Types

Cable:	**Length:**	**Type:**
DC power cable	1,5 m	Unshielded

Peripherals

Peripheral	**Manufacturer**	**Model**	**S/N**	**Connection to the EUT**
Switching power supply	Phihong	PSC12R-050	P01900765A1	AC/DC power supply

Disclaimer

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SUMMARY OF TESTING

FCC Rules	Description of Test	Result
§15.207(a)	Conducted Emissions	PASS
§15.247(a)(2)	6 dB Bandwidth	PASS
RSS-GEN §4.6.1	99% Bandwidth	PASS
§15.209(a) §15.247(d)	Radiated Emissions	PASS
§15.247(e)	Power Spectral Density	PASS

EUT Test Conditions During Testing

During the tests EUT was set into continuous transmit or receive mode into the channel under test. Normal test modulation and maximum transmit power was used in all tests.

Description of Test Modes

Since all modules contain exactly the same hardware and the only difference is the antenna connection the tests were performed as follows:

WF121-A radiated emission tests only.

WF121-E full testing

WF121-N radiated emission tests only.

Before performing the actual test a preliminary tests were performed in order to find out which data rate will produce the highest emission level.

The highest emission level was produced by using b-mode 1Mbps data rate, g-mode 6Mbps data rate and n-mode 7.2Mbps data rate.

All tests were performed by using the above mentioned data rates. This report contains test results of tests performed to the all three models by using b-mode and 1Mbps data rate since this mode produced the highest emission levels.

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 In The Frequency Range 150 kHz - 30 MHz.

Standard:	ANSI C63.10	(2009)
Tested by:	SOT	
Date:	04.06.2012	
Humidity:	34 %	
Temperature:	22°C	
Barometric pressure	1003.3 mbar	
Measurement uncertainty	± 2.3 dB	Level of confidence 95 % (k = 2)

Test Plan

Conducted disturbance voltage will be measured with an artificial main network from 150 kHz to 30 MHz with 4 kHz steps and a resolution bandwidth of 9 kHz. Measurements will be carried out with Peak- and Average-detectors from Phase-line(s) and Neutral-line.

This measurement will be made from the AC-main lines with supply 115VDC / 60 Hz voltage.

The EUT is working as described in the section “EUT Test Conditions”.

Test results

WF121-A

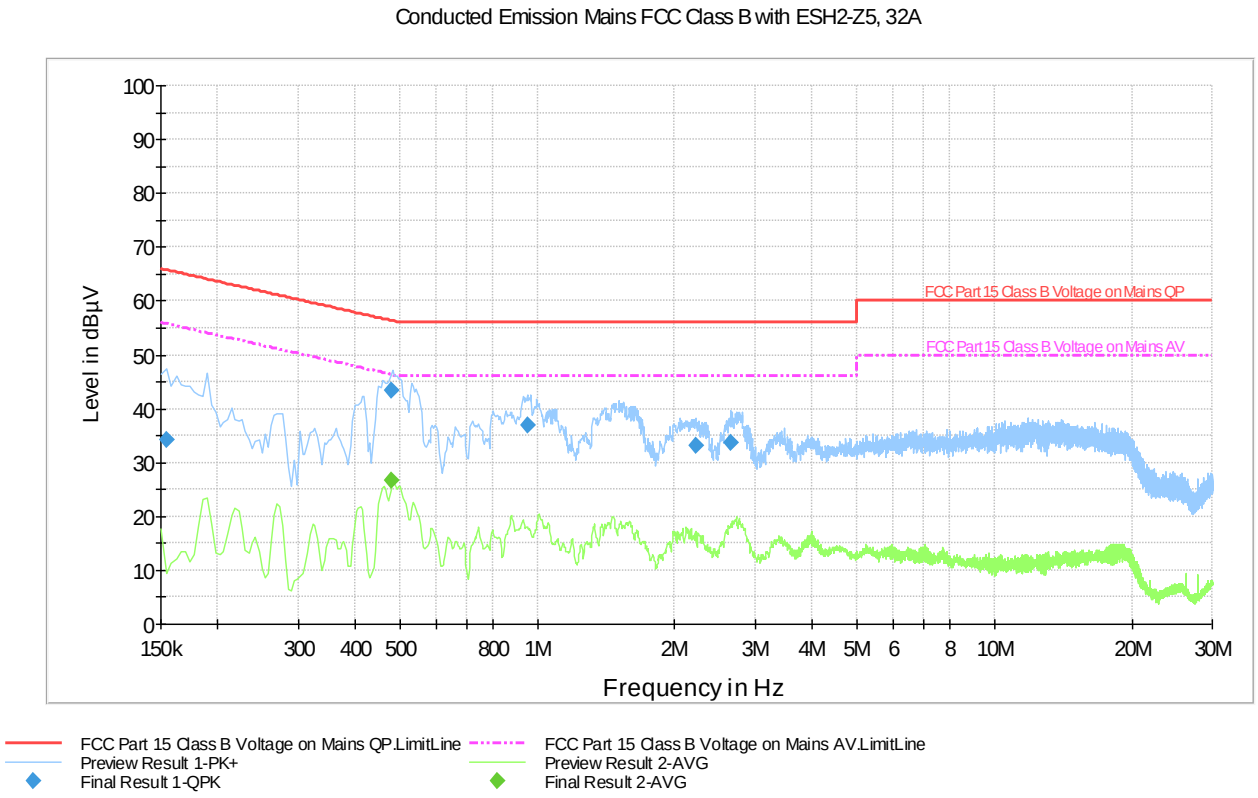


Figure 1 The measured curves with peak- and average detector.

Table 1 Final measurement results with Quasi peak detector.

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.154000	34.2	1000.0	9.000	GN	L1	31.6	65.8	
0.481000	43.3	1000.0	9.000	GN	L1	13.0	56.3	
0.953000	37.0	1000.0	9.000	GN	L1	19.0	56.0	
2.217000	33.1	1000.0	9.000	GN	L1	22.9	56.0	
2.645000	33.8	1000.0	9.000	GN	L1	22.2	56.0	

Table 2 Final measurement results with Average detector.

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.481000	26.6	1000.0	9.000	GN	L1	19.7	46.3	

WF121-E

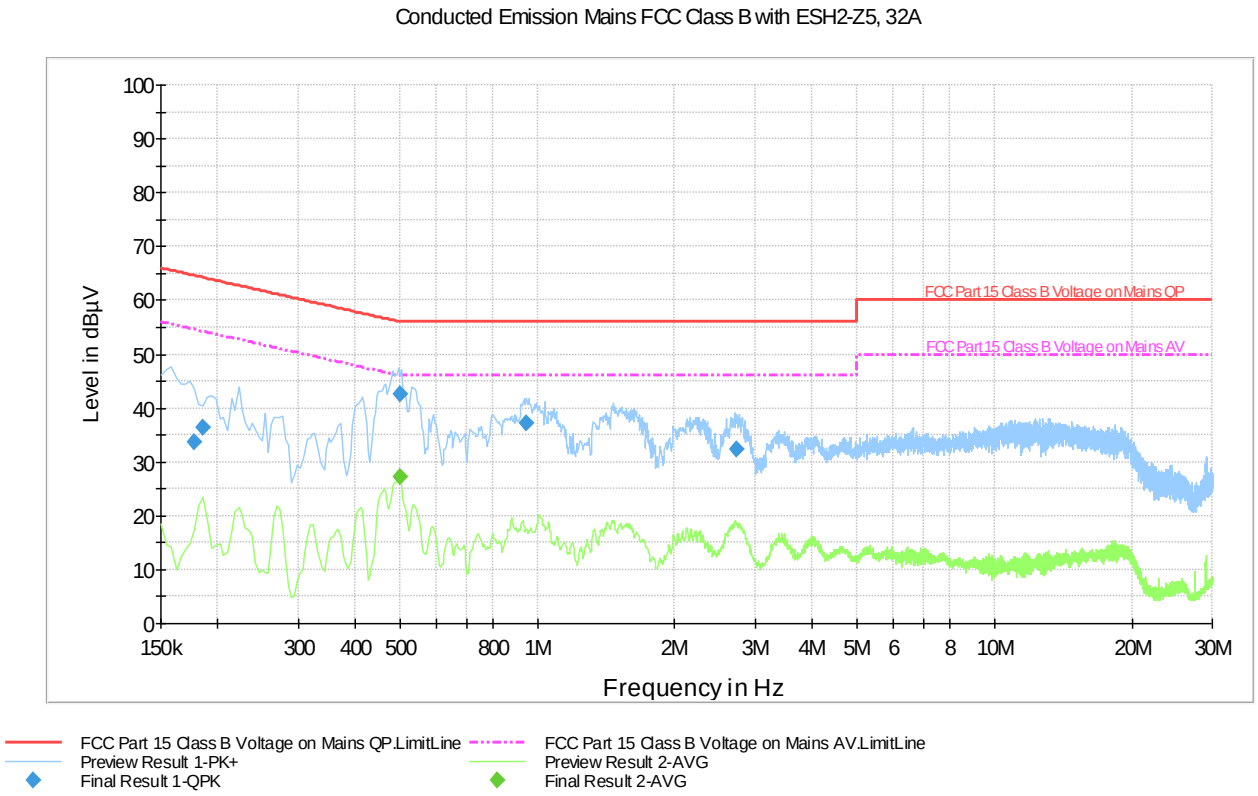


Figure 2. The measured curves with peak- and average detector.

Table 3. Final measurement results with Quasi peak detector.

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.177000	33.6	1000.0	9.000	GN	L1	31.0	64.6	
0.186000	36.4	1000.0	9.000	GN	L1	27.9	64.2	
0.501000	42.5	1000.0	9.000	GN	L1	13.5	56.0	
0.949000	37.2	1000.0	9.000	GN	L1	18.8	56.0	
2.733000	32.3	1000.0	9.000	GN	L1	23.7	56.0	

Table 4. Final measurement results with Quasi peak detector.

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.501000	27.3	1000.0	9.000	GN	L1	18.7	46.0	

WF121-N

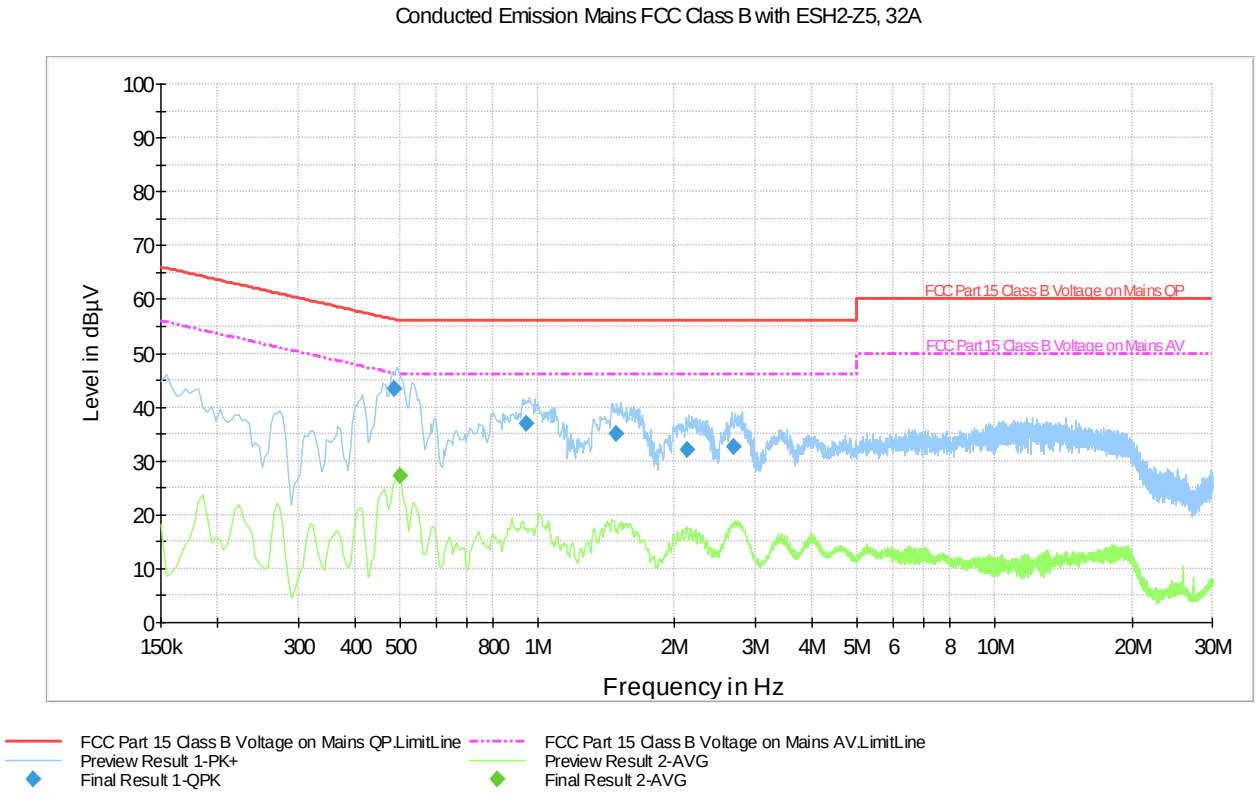


Figure 3. The measured curves with peak- and average detector.

Table 5. Final measurement results with Quasi peak detector.

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.485000	43.3	1000.0	9.000	GN	L1	12.9	56.3	
0.945000	36.8	1000.0	9.000	GN	L1	19.2	56.0	
1.489000	35.1	1000.0	9.000	GN	L1	20.9	56.0	
2.133000	32.1	1000.0	9.000	GN	L1	23.9	56.0	
2.681000	32.7	1000.0	9.000	GN	L1	23.3	56.0	

Table 6. Final measurement results with Quasi peak detector.

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Margin (dB)	Limit (dBµV)	Comment
0.501000	27.2	1000.0	9.000	GN	L1	18.8	46.0	

Transmitter Radiated Emissions 30 – 1000 MHz

Standard:	ANSI C63.10	(2009)
Tested by:	SOT	
Date:	28.05.2012	
Humidity:	68%	
Temperature:	20.4°C	
Barometric pressure	1004.1 mbar	
Measurement uncertainty	± 4.51dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.247(d), 15.209(a)

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)**.**

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

Test results:

WF121-A

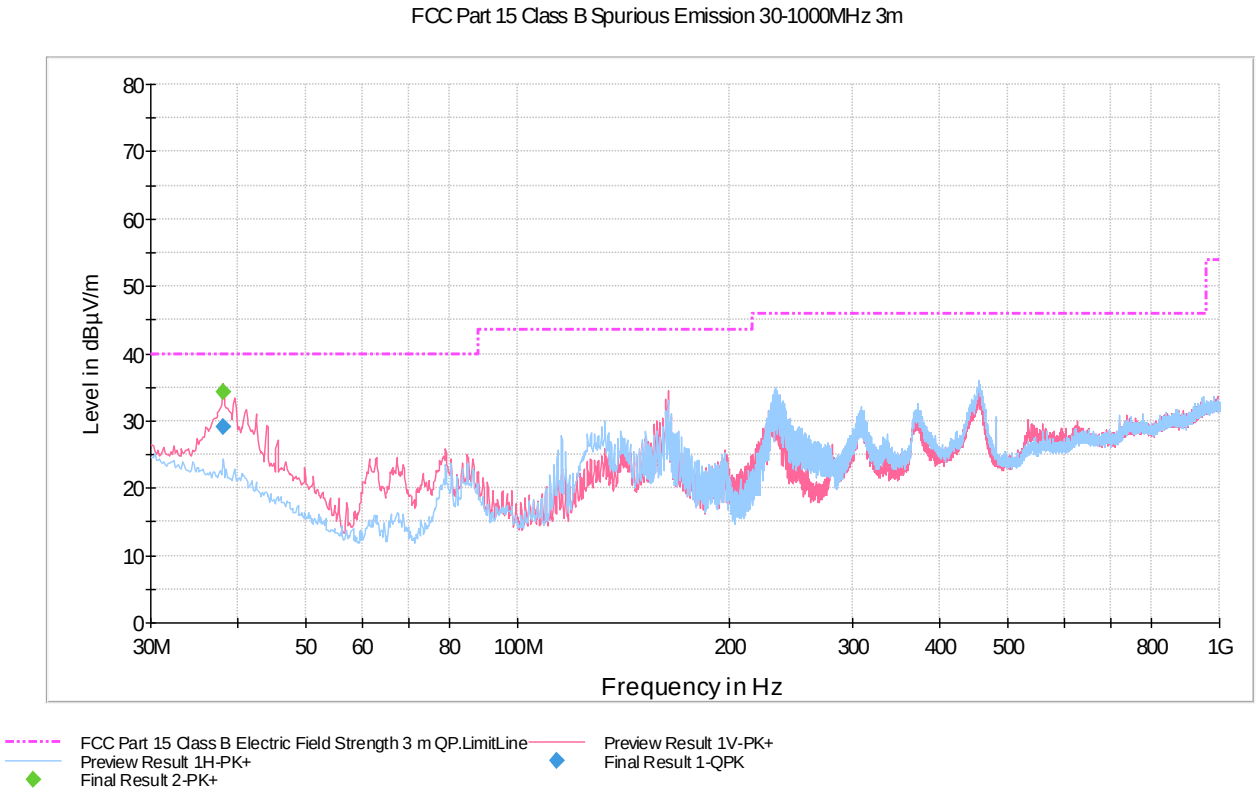


Figure 4. Measured curve with peak-detector. Channel low.

Final measurements from the worst frequencies

Table 7. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
37.985000	29.1	1000.0	120.000	125.0	V	28.0	19.9	11.0	40.0	

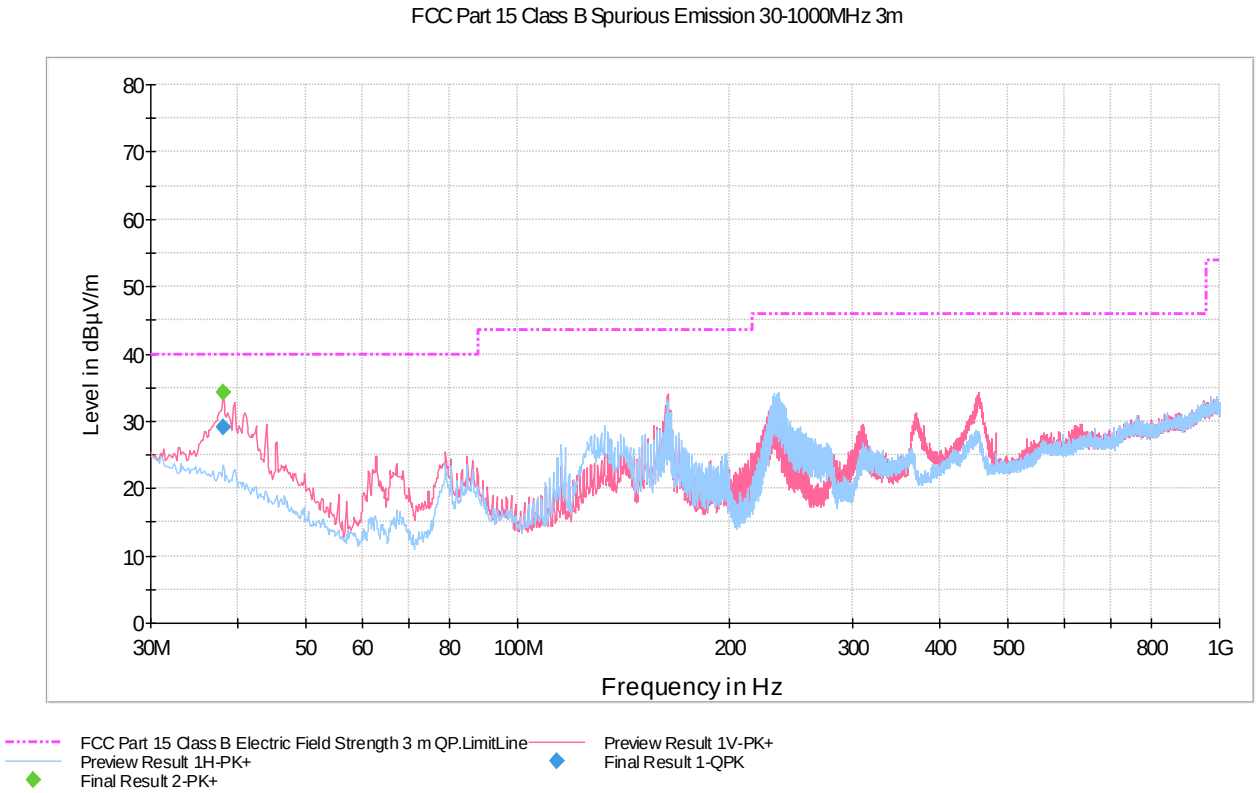


Figure 5. Measured curve with peak-detector. Channel mid.

Final measurements from the worst frequencies

Table 8. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.005000	29.0	1000.0	120.000	110.0	V	315.0	19.9	11.0	40.0	

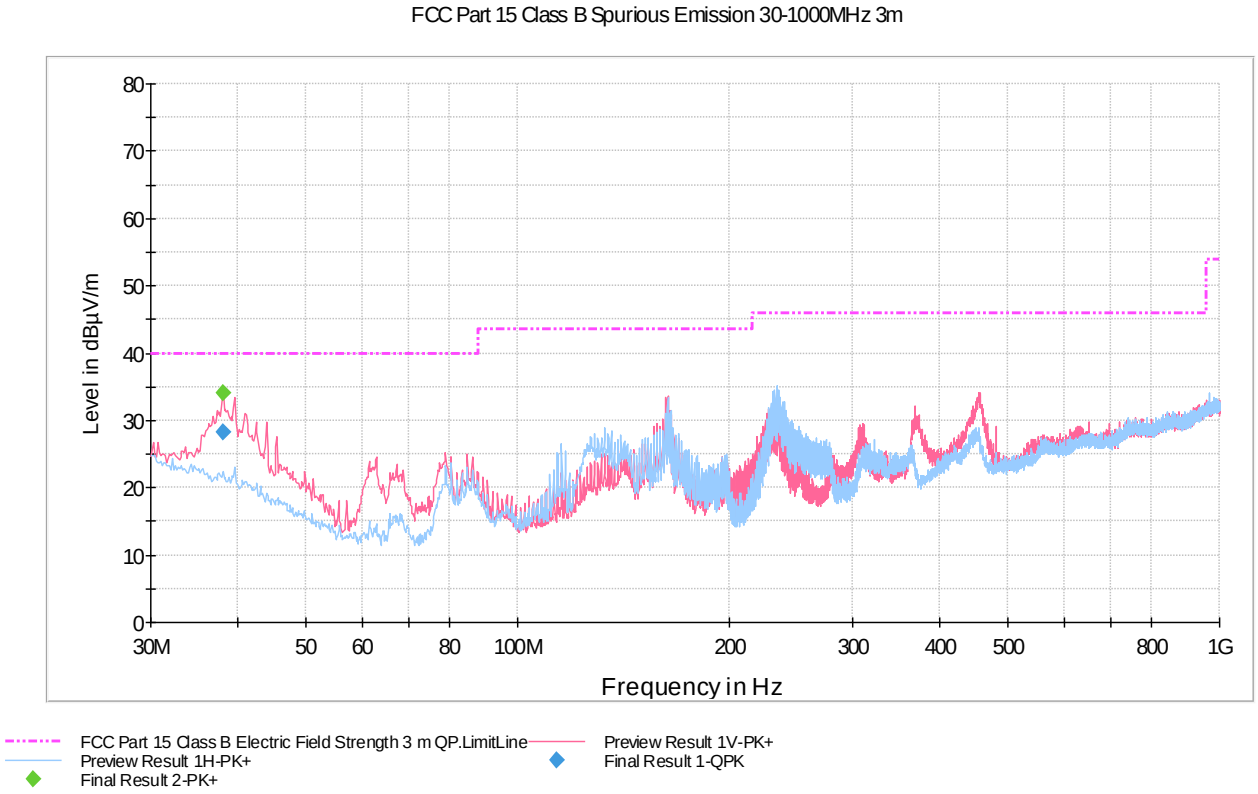


Figure 6. Measured curve with peak-detector. Channel high.

Final measurements from the worst frequencies

Table 9. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.025000	28.3	1000.0	120.000	116.0	V	1.0	19.9	11.7	40.0	

WF121-E

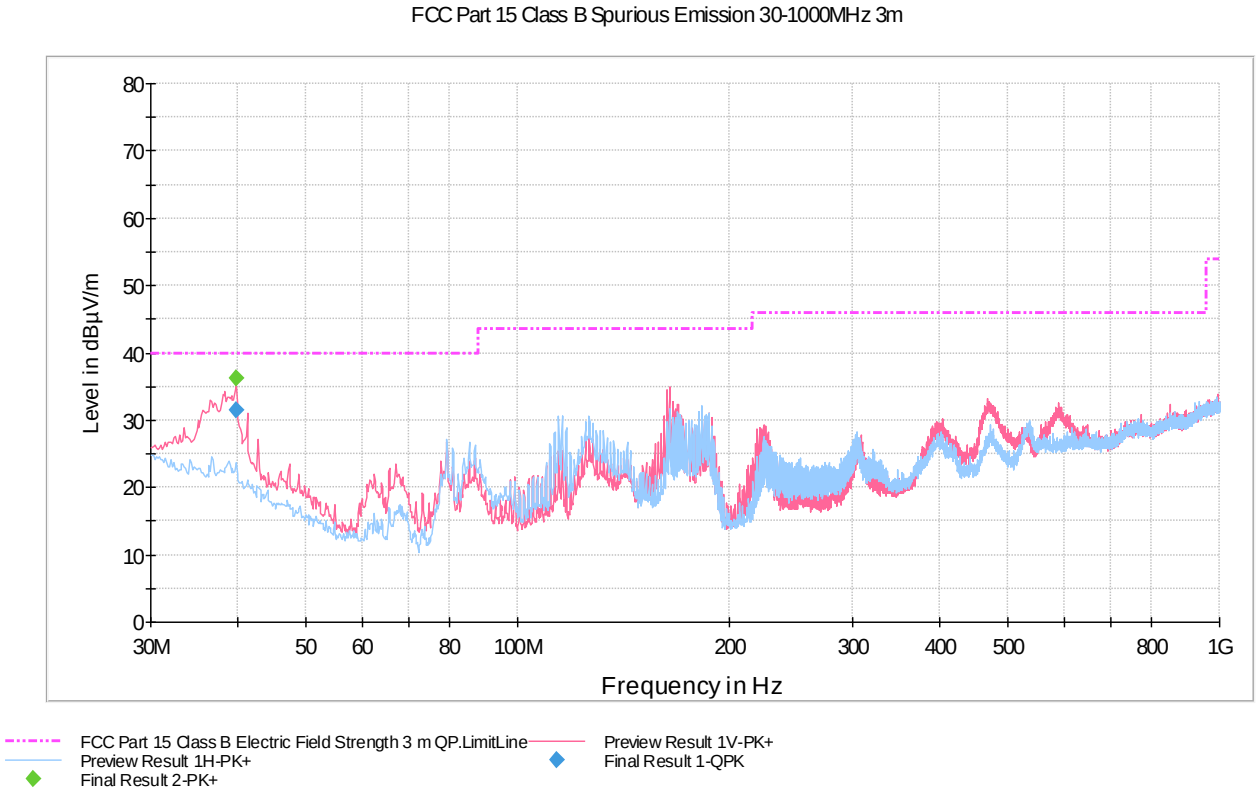


Figure 7. Measured curve with peak-detector. Channel low.

Final measurements from the worst frequencies

Table 10. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
39.635000	31.5	1000.0	120.000	100.0	V	38.0	19.2	8.5	40.0	

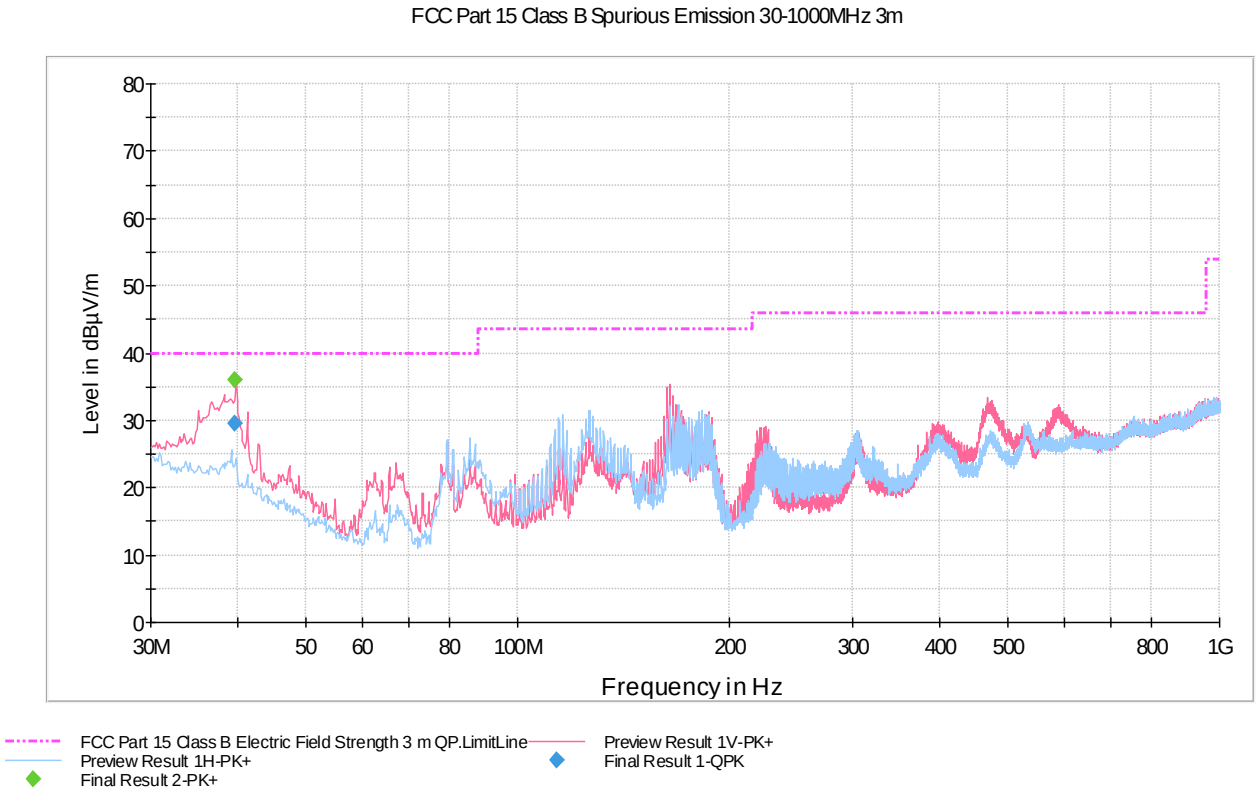


Figure 8. Measured curve with peak-detector. Channel mid.

Final measurements from the worst frequencies

Table 11. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
39.575000	29.5	1000.0	120.000	110.0	V	-4.0	19.3	10.5	40.0	

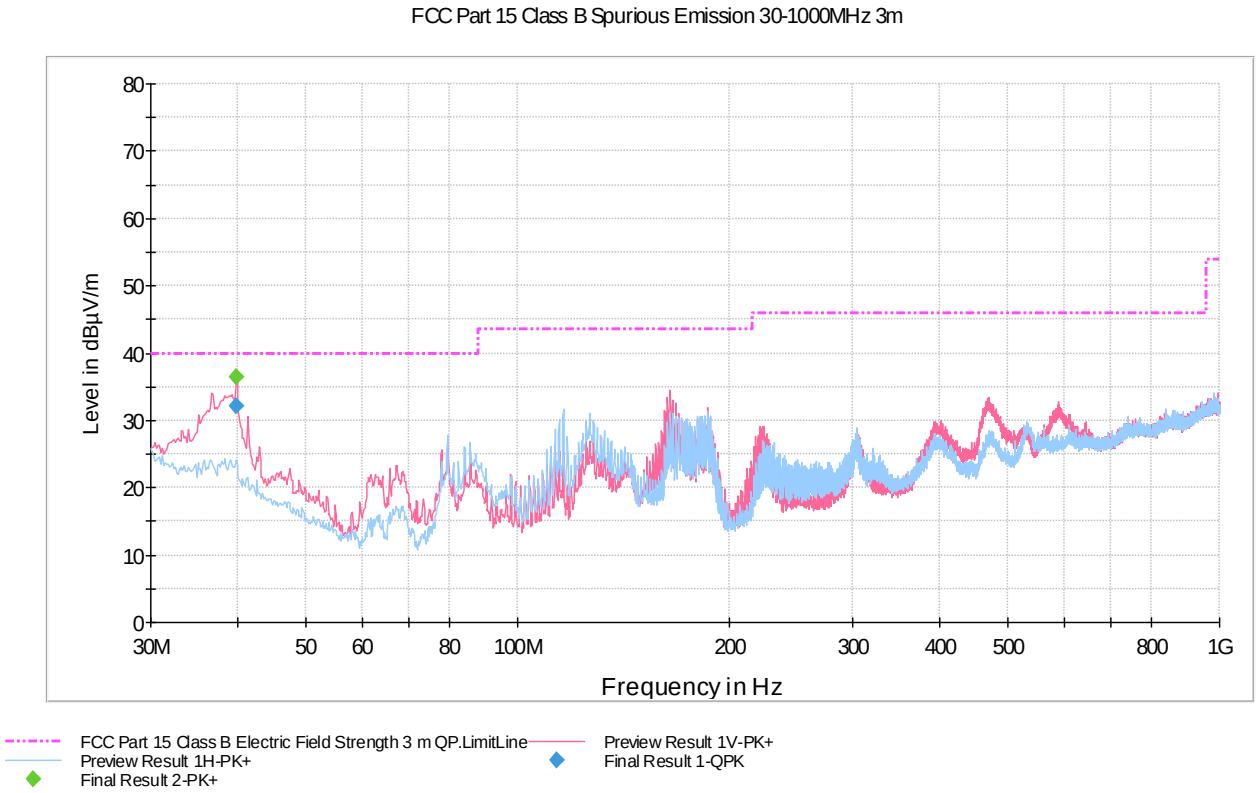


Figure 9. Measured curve with peak-detector. Channel high.

Final measurements from the worst frequencies

Table 12. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
39.665000	32.2	1000.0	120.000	100.0	V	19.0	19.2	7.8	40.0	

WF121-N

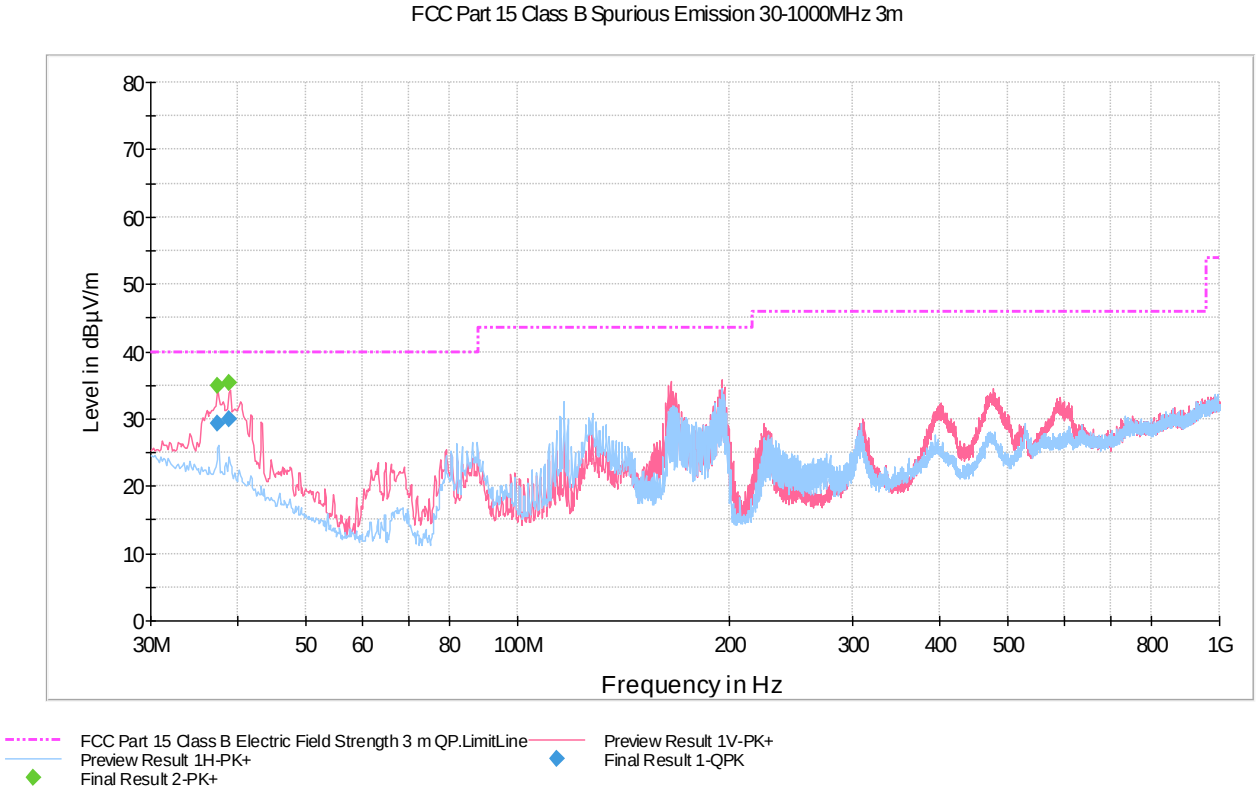


Figure 10. Measured curve with peak-detector. Channel low.

Final measurements from the worst frequencies

Table 13. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
37.325000	29.3	1000.0	120.000	100.0	V	31.0	20.2	10.7	40.0	
38.765000	29.9	1000.0	120.000	116.0	V	33.0	19.6	10.1	40.0	

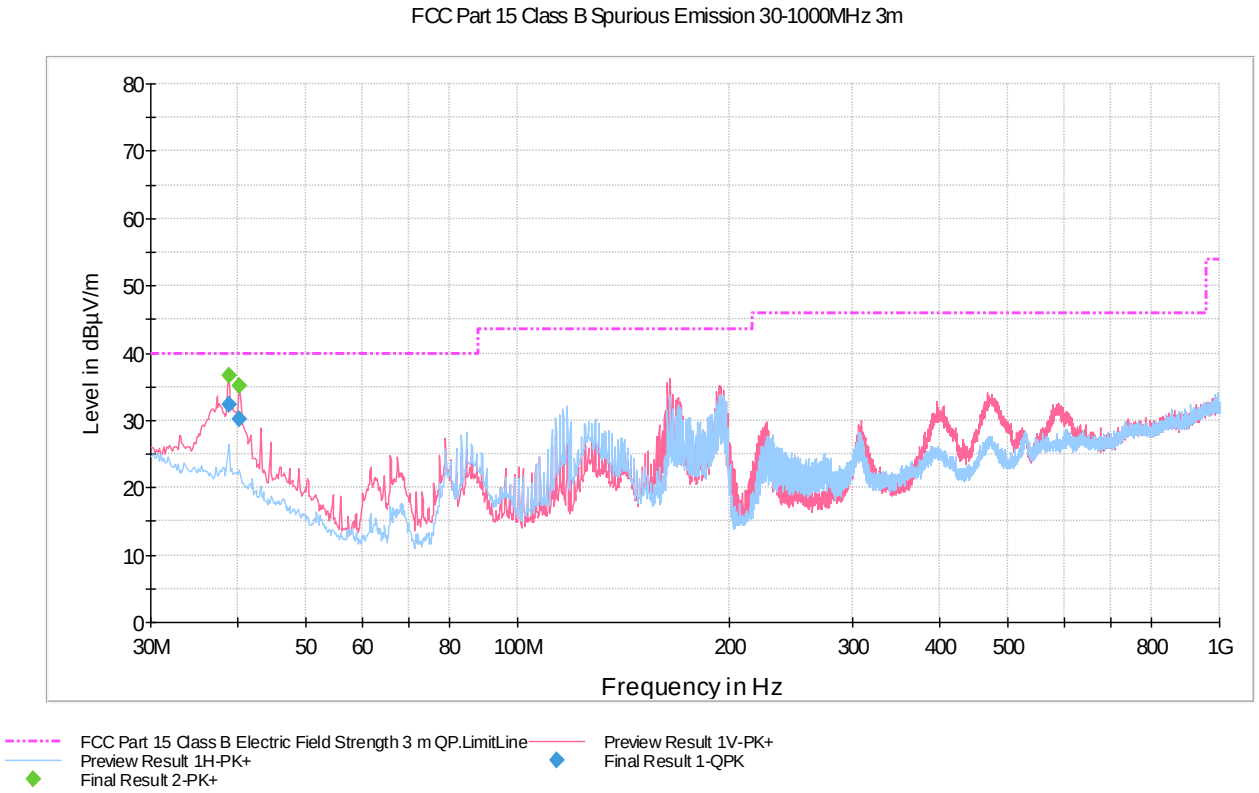


Figure 11. Measured curve with peak-detector. Channel mid.

Final measurements from the worst frequencies

Table 14. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.735000	32.3	1000.0	120.000	100.0	V	221.0	19.6	7.7	40.0	
40.165000	30.3	1000.0	120.000	100.0	V	1.0	19.0	9.7	40.0	

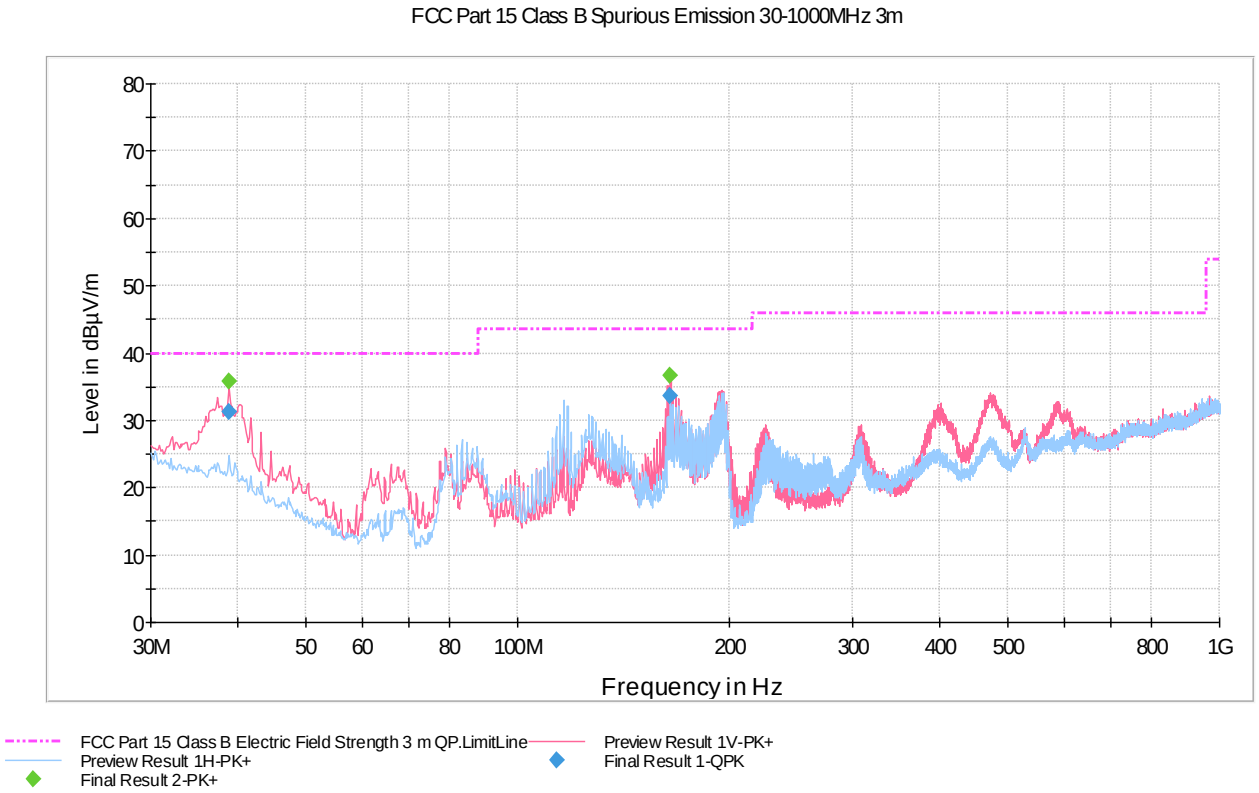


Figure 12. Measured curve with peak-detector. Channel high.

Final measurements from the worst frequencies

Table 15. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.755000	31.2	1000.0	120.000	110.0	V	77.0	19.6	8.8	40.0	
165.075000	33.5	1000.0	120.000	100.0	V	103.0	12.3	10.0	43.5	

Transmitter Radiated Emissions 1 000 – 4 000 MHz

WF121-A

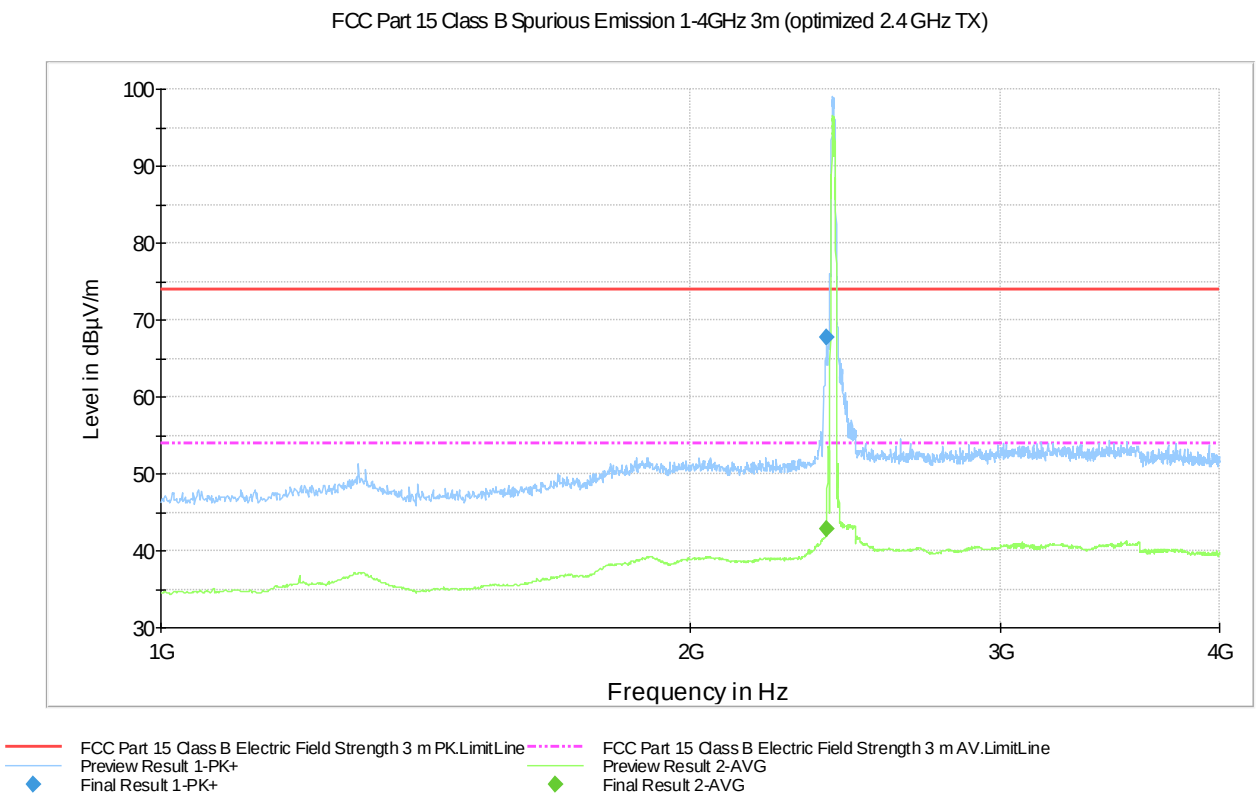


Figure 13. Measured curve with peak and average detectors. Channel low.

Final measurements from the worst frequencies

Table 16. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2390.000000	67.8	1000.0	1000.000	178.0	H	34.0	14.8	6.1	73.9	

Table 17. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2389.200000	42.9	1000.0	1000.000	187.0	H	33.0	14.8	11.0	53.9	

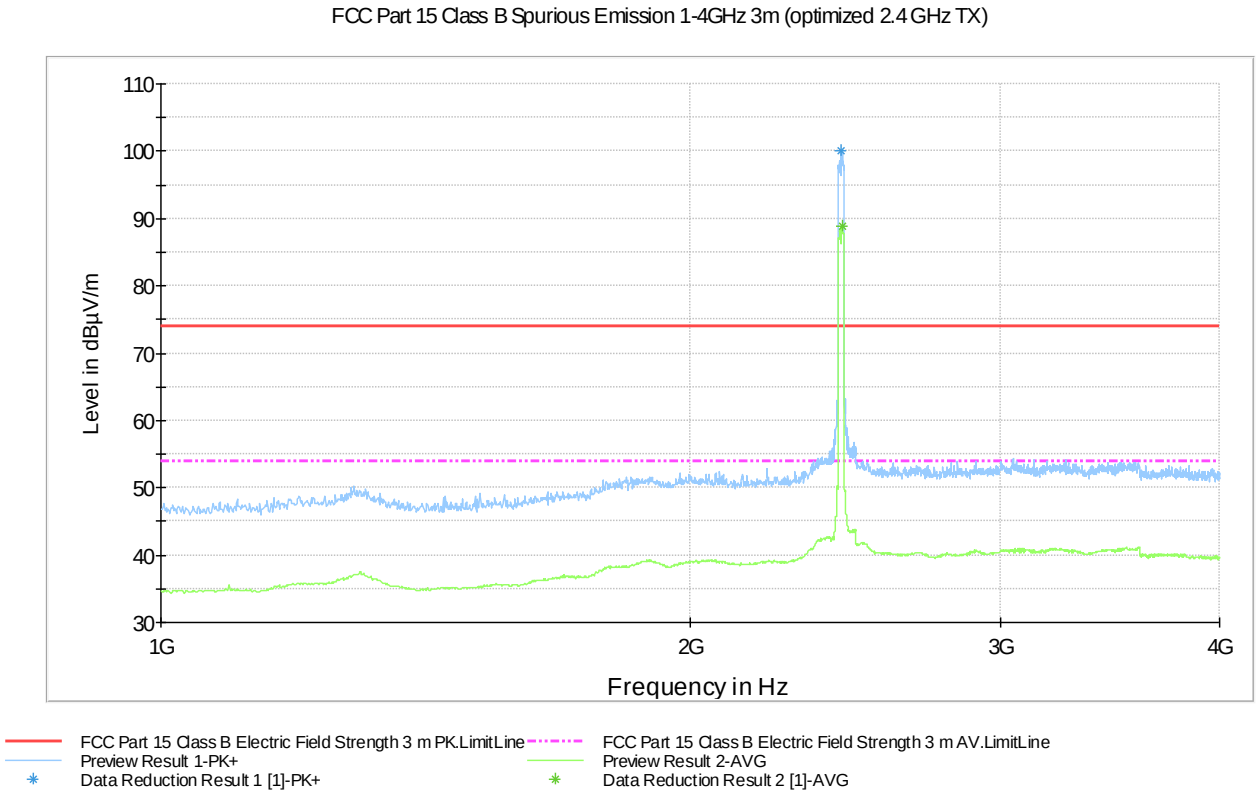


Figure 14. Measured curve with peak and average detectors. Channel mid.

Final measurements from the worst frequencies

No final measurements were made since peak emissions were below the average limit line outside the operating frequency band.

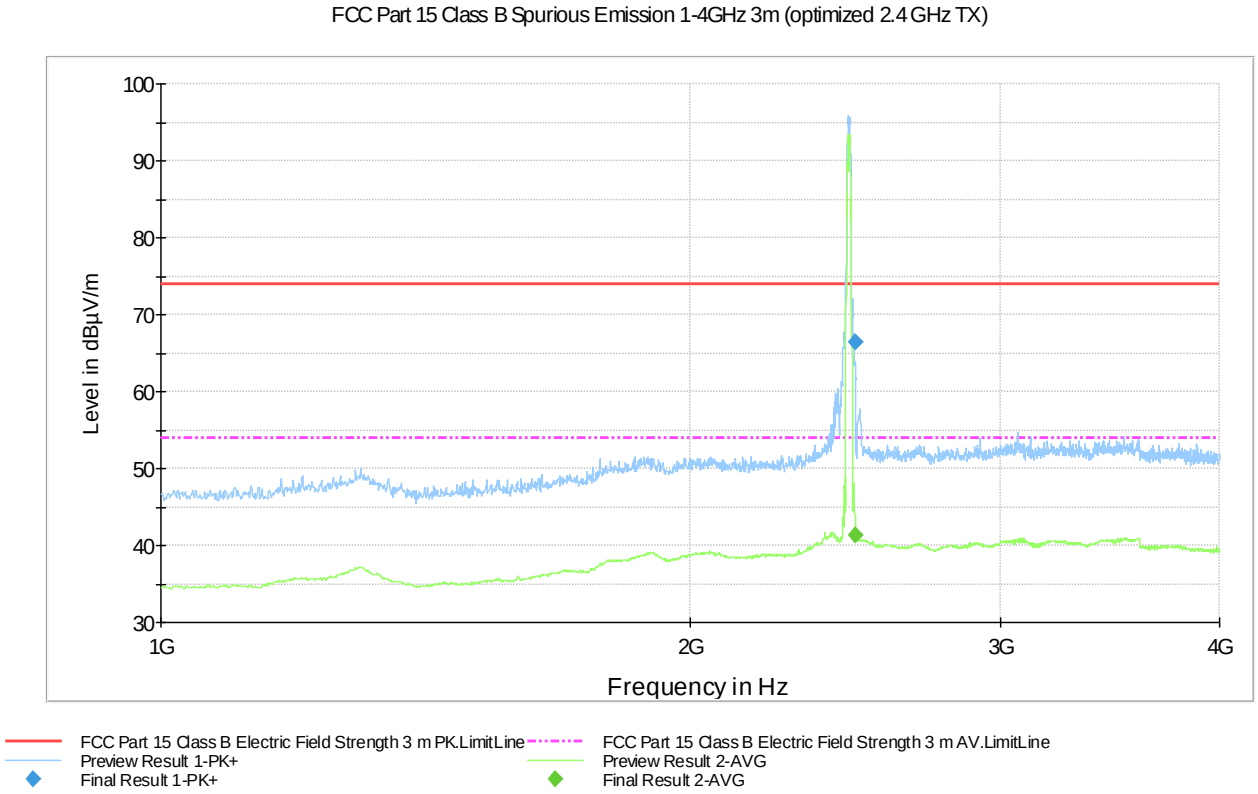


Figure 15. Measured curve with peak and average detectors. Channel high.

Final measurements from the worst frequencies

Table 18. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2484.700000	66.3	1000.0	1000.000	219.0	H	47.0	14.7	7.6	73.9	

Table 19. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	41.4	1000.0	1000.000	179.0	H	40.0	14.7	12.5	53.9	

WF121-E

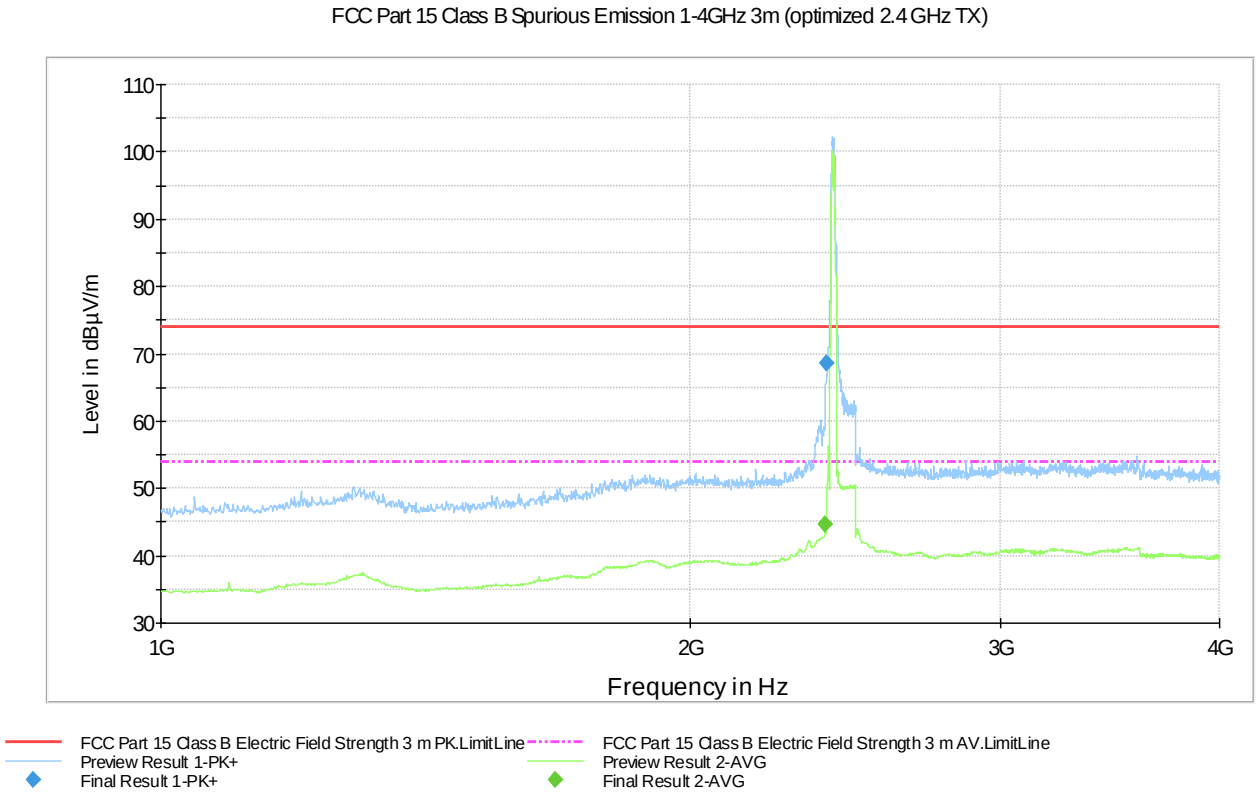


Figure 16. Measured curve with peak and average detectors. Channel low.

Final measurements from the worst frequencies

Table 20. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2389.800000	68.7	1000.0	1000.000	170.0	V	167.0	14.8	5.2	73.9	

Table 21. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2387.000000	44.6	1000.0	1000.000	212.0	V	127.0	14.8	9.3	53.9	

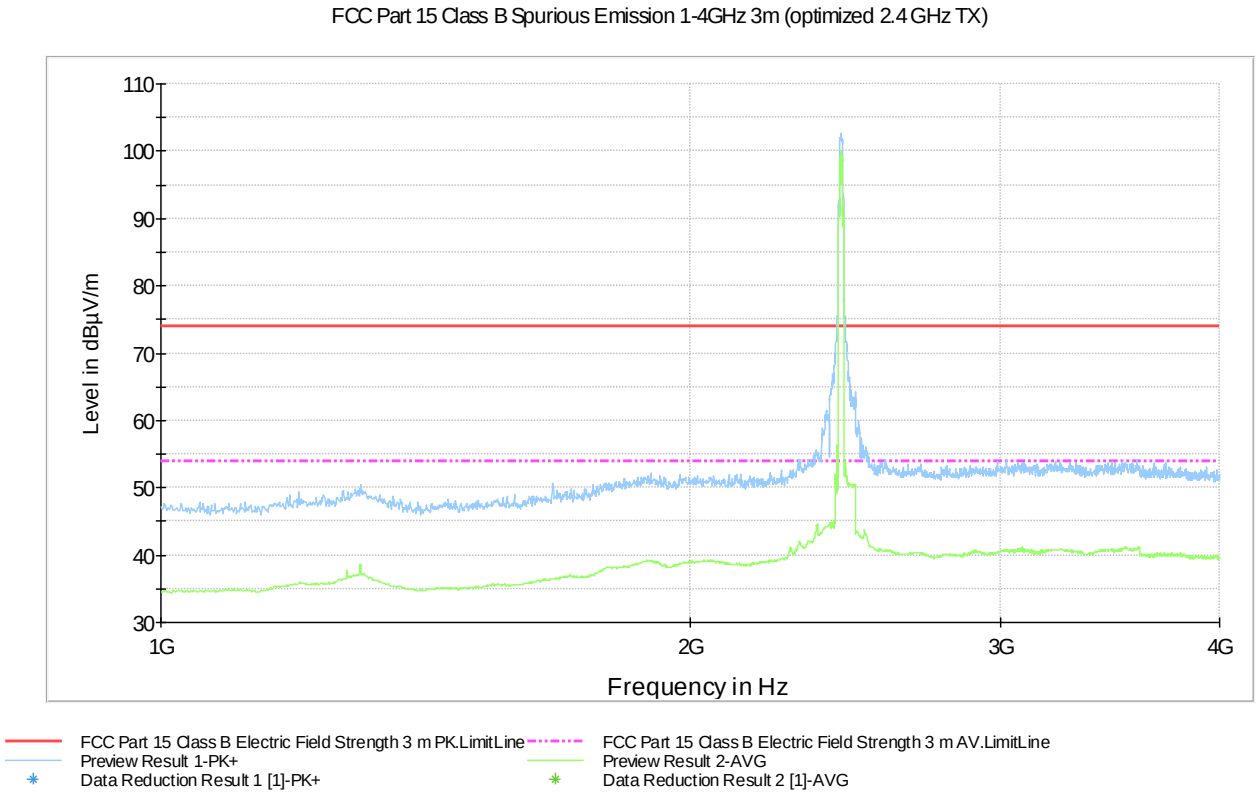


Figure 17. Measured curve with peak and average detectors. Channel mid.

Final measurements from the worst frequencies

No final measurements were made since peak emissions were below the average limit line outside the operating frequency band.

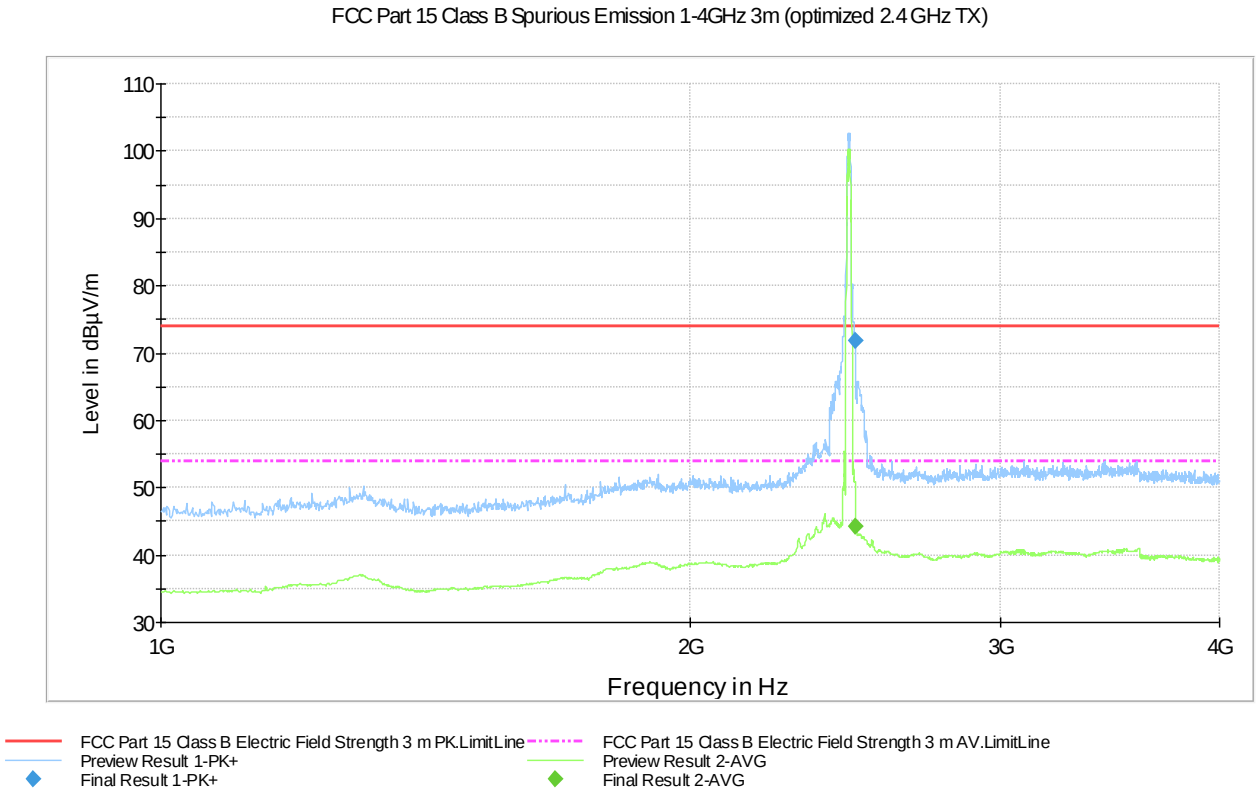


Figure 18. Measured curve with peak and average detectors. Channel high.

Table 22. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	71.9	1000.0	1000.000	203.0	V	70.0	14.7	2.0	73.9	

Table 23. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.700000	44.3	1000.0	1000.000	195.0	V	67.0	14.7	9.6	53.9	

WF121-N

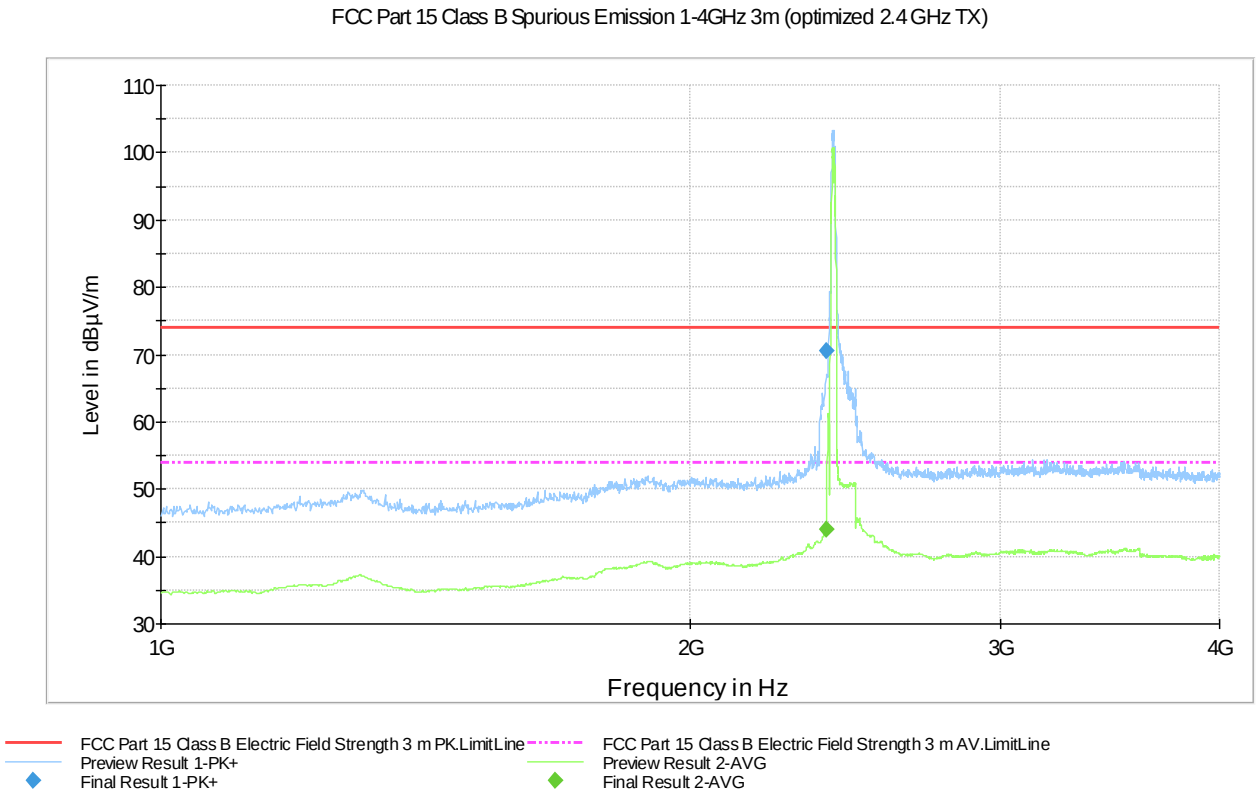


Figure 19. Measured curve with peak and average detectors. Channel low.

Table 24. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2390.000000	70.5	1000.0	1000.000	114.0	V	343.0	14.8	3.4	73.9	

Table 25. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2389.400000	44.1	1000.0	1000.000	114.0	V	345.0	14.8	9.8	53.9	

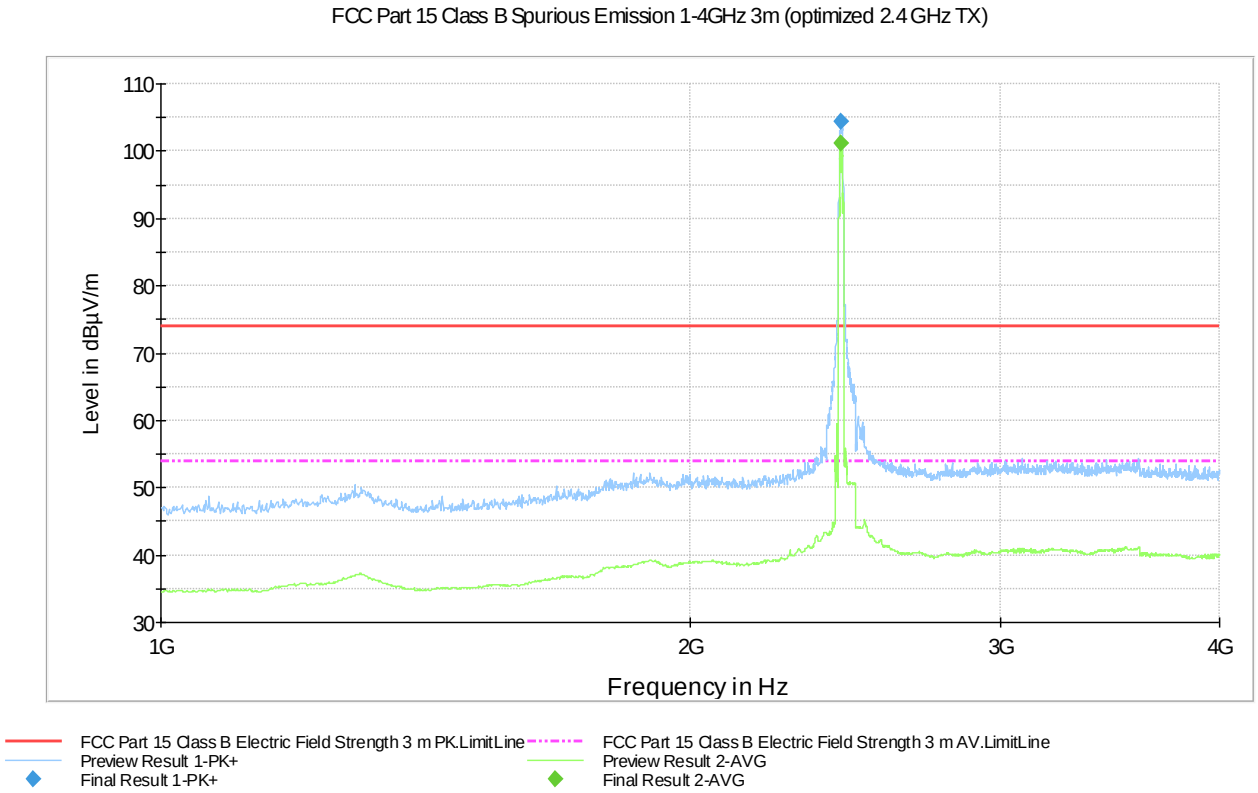


Figure 20. Measured curve with peak and average detectors. Channel mid.

No final measurements were made since peak emissions were below the average limit line outside the operating frequency band.

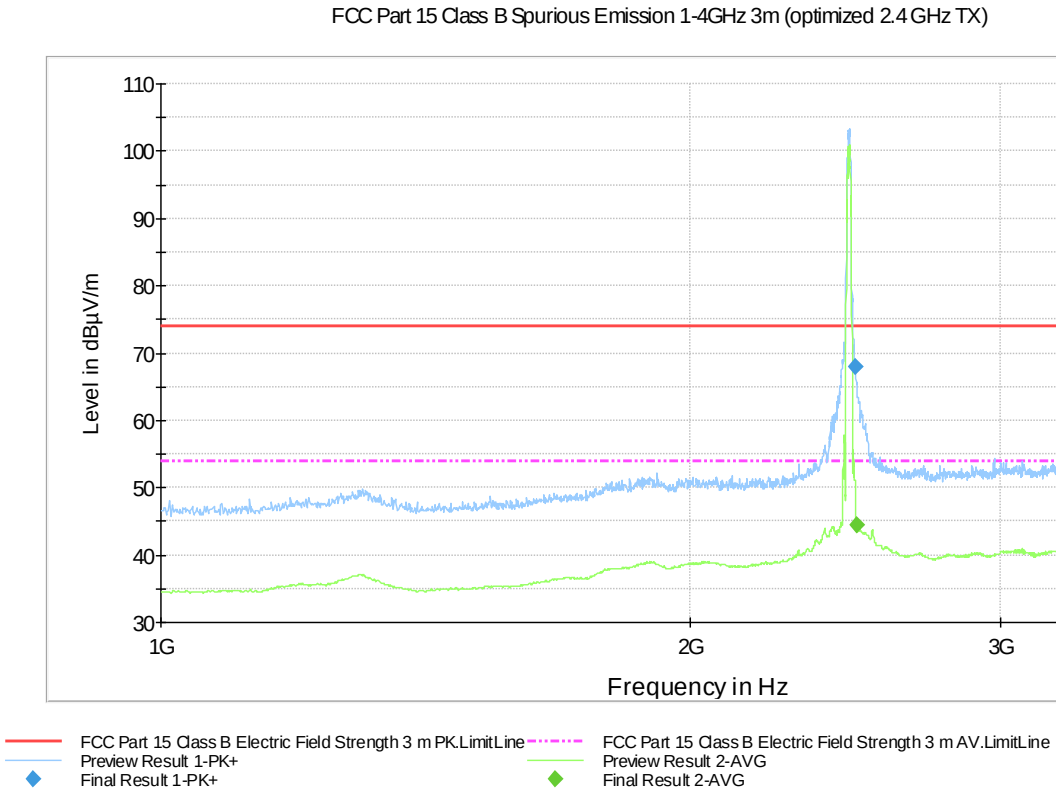


Figure 21. Measured curve with peak and average detectors. Channel high.

Table 26. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	68.0	1000.0	1000.000	178.0	V	345.0	14.7	5.9	73.9	

Table 27. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2487.100000	44.4	1000.0	1000.000	171.0	V	121.0	14.8	9.5	53.9	

Transmitter Radiated Emissions 4 000 – 18 000 MHz

WF121-A

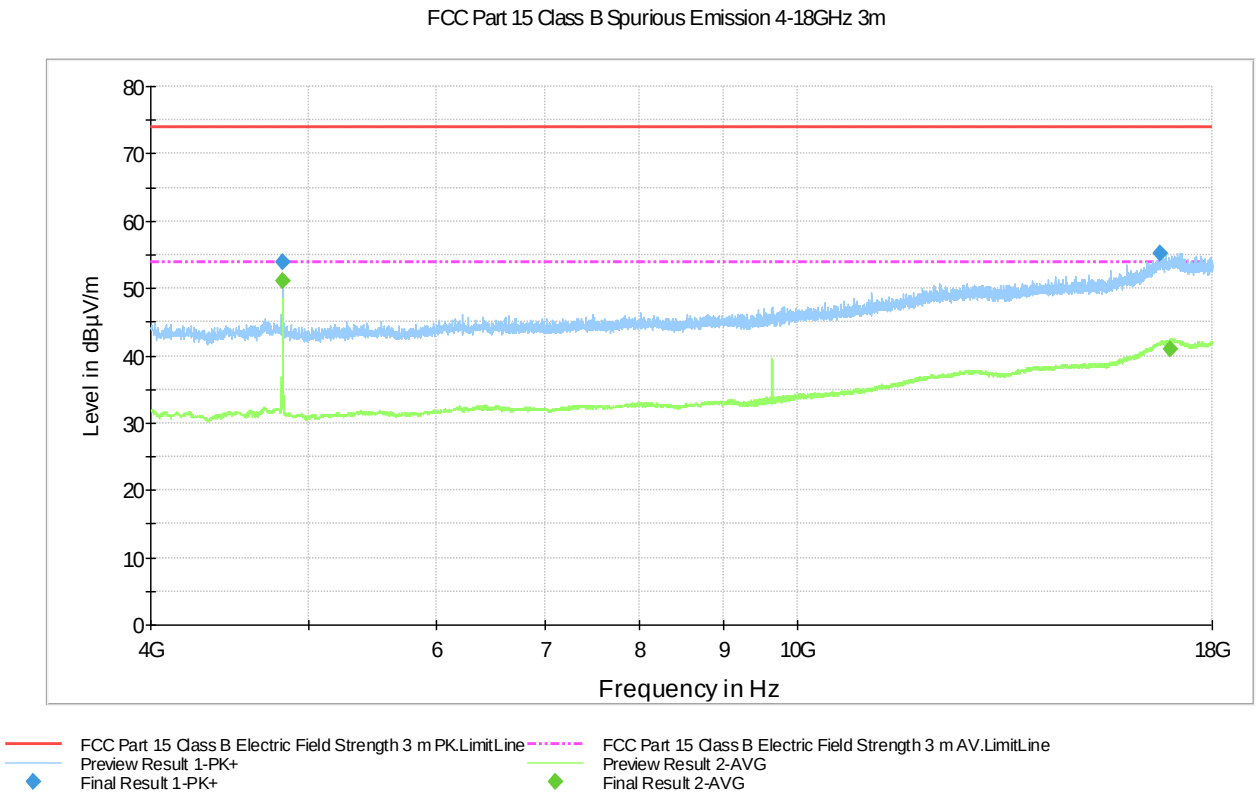


Figure 22. Measured curve with peak and average detectors. Channel low.

Table 28. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4824.125000	54.0	1000.0	1000.000	100.0	V	247.0	10.7	19.9	73.9	
16726.975000	55.2	1000.0	1000.000	171.0	H	127.0	25.3	18.8	73.9	

Table 29. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4823.925000	51.0	1000.0	1000.000	100.0	V	247.0	10.7	2.9	53.9	
16971.575000	40.9	1000.0	1000.000	100.0	V	329.0	25.8	13.0	53.9	

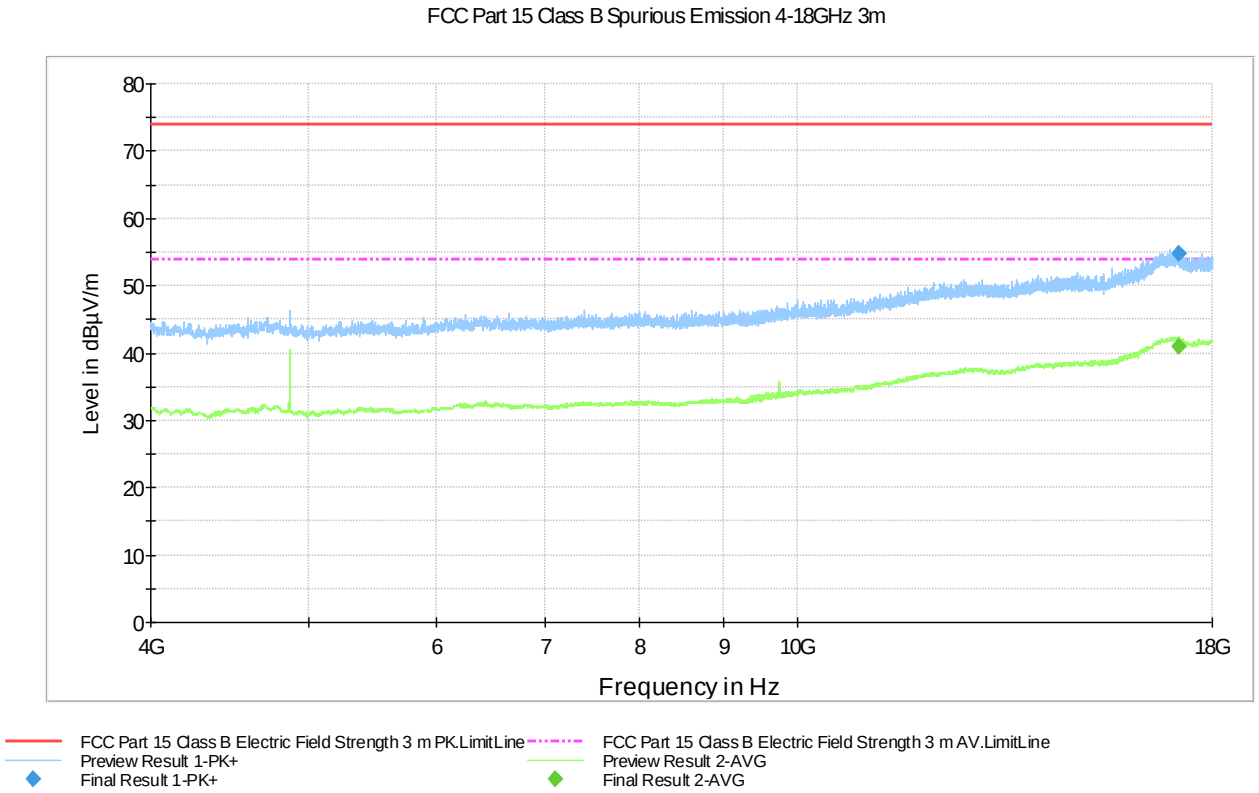


Figure 23. Measured curve with peak and average detectors. Channel mid.

Table 30. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
17166.125000	54.7	1000.0	1000.000	158.0	H	228.0	25.6	19.2	73.9	

Table 31. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
17170.075000	41.0	1000.0	1000.000	100.0	V	206.0	25.6	12.9	53.9	

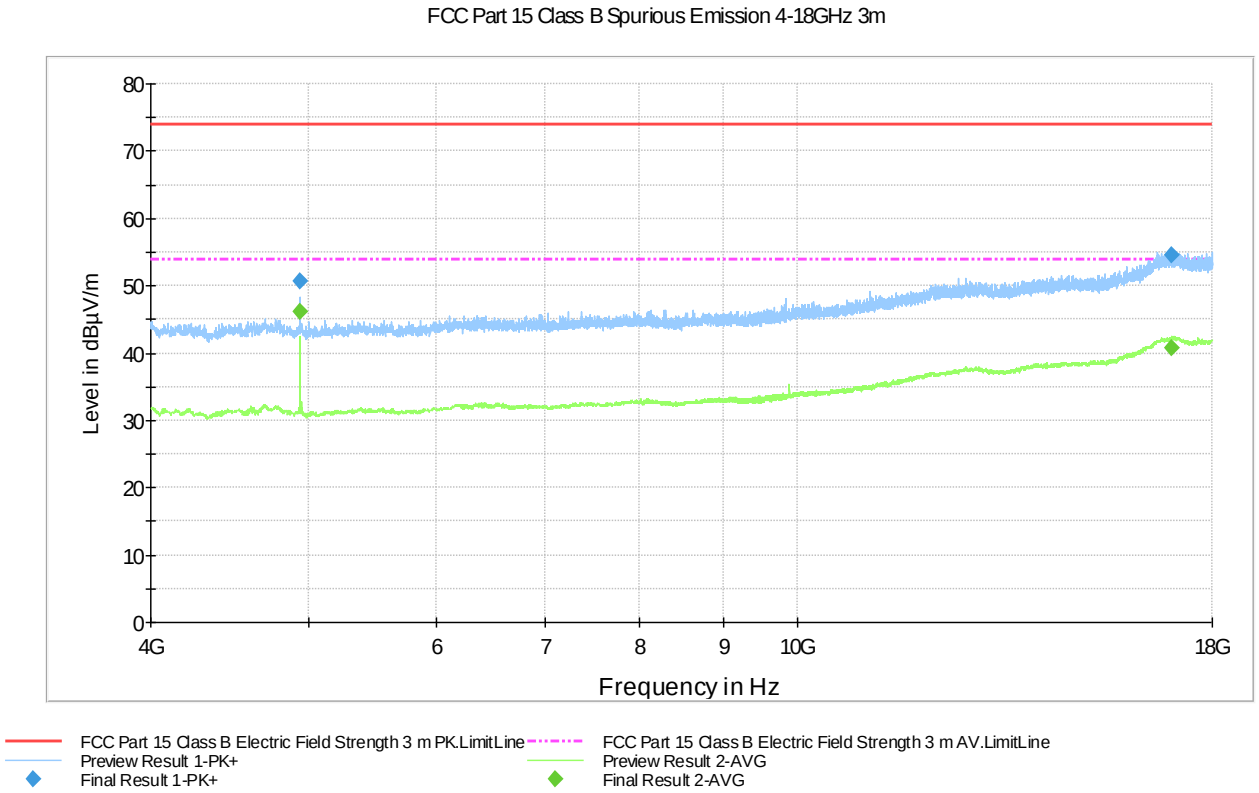


Figure 24. Measured curve with peak and average detectors. Channel high.

Table 32. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4943.925000	50.6	1000.0	1000.000	100.0	V	262.0	10.6	23.3	73.9	
16995.975000	54.5	1000.0	1000.000	179.0	V	250.0	25.9	19.4	73.9	

Table 33. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4943.925000	46.1	1000.0	1000.000	100.0	V	253.0	10.6	7.8	53.9	
16999.525000	40.8	1000.0	1000.000	105.0	V	284.0	25.9	13.1	53.9	

WF121-E

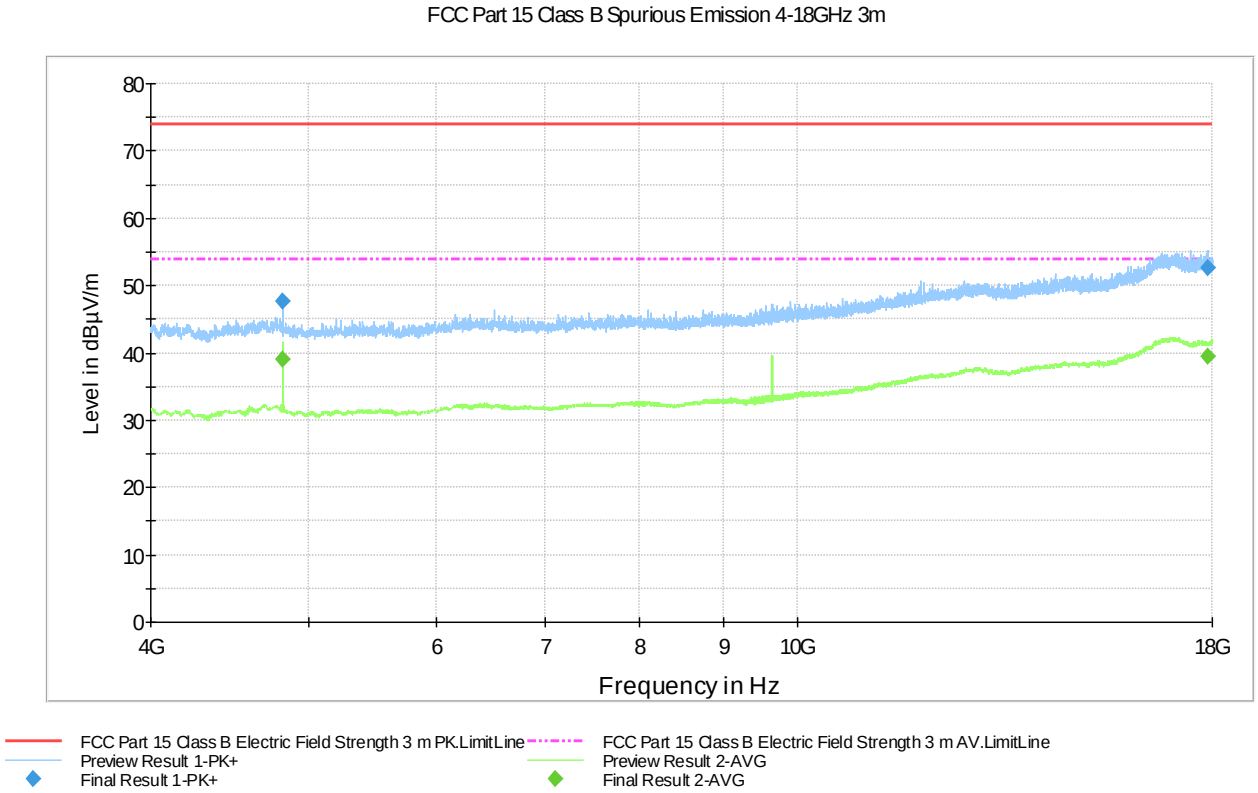


Figure 25. Measured curve with peak and average detectors. Channel low.

Table 34. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4824.125000	47.6	1000.0	1000.000	154.0	H	6.0	10.7	26.3	73.9	
17895.675000	52.7	1000.0	1000.000	213.0	V	217.0	25.7	21.2	73.9	

Table 35. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4824.125000	39.0	1000.0	1000.000	154.0	H	6.0	10.7	14.9	53.9	
17895.675000	39.4	1000.0	1000.000	213.0	V	217.0	25.7	14.5	53.9	

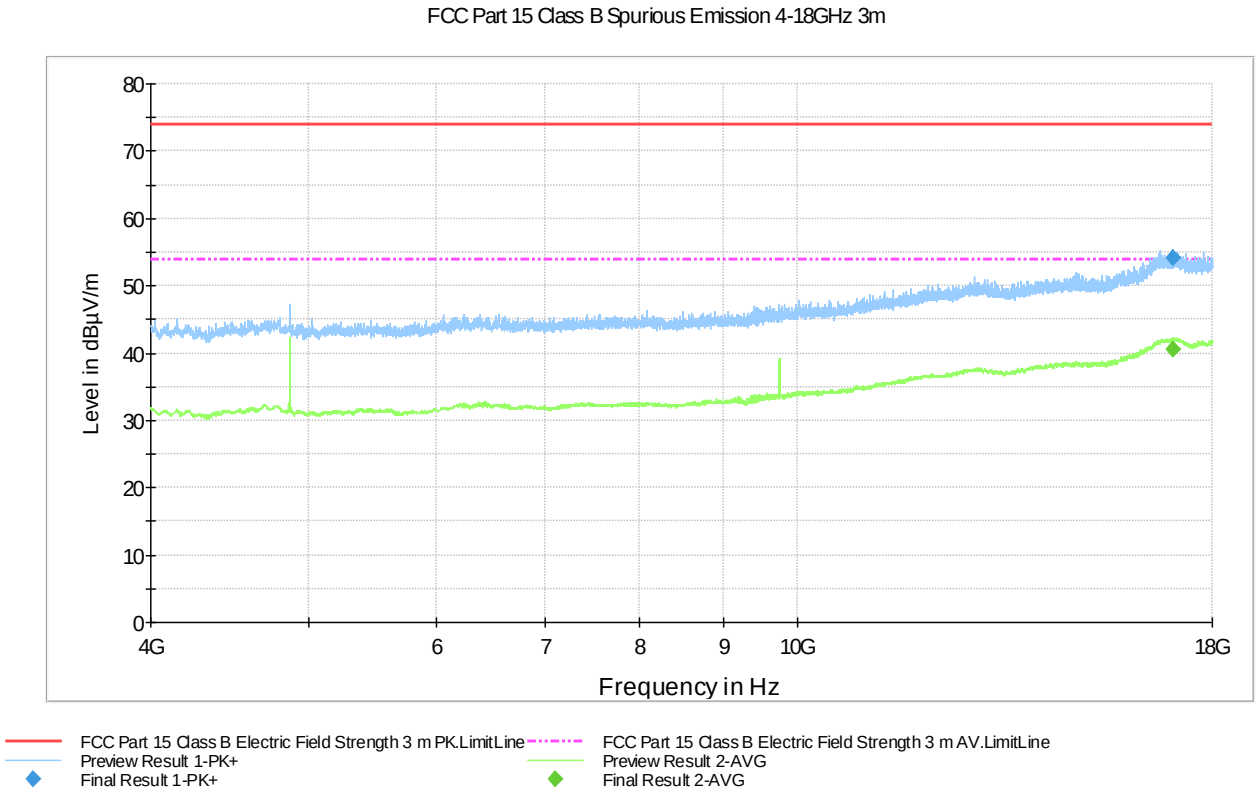


Figure 26. Measured curve with peak and average detectors. Channel mid.

Table 36. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
17038.725000	54.0	1000.0	1000.000	200.0	V	272.0	25.8	19.9	73.9	

Table 37. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
17038.725000	40.5	1000.0	1000.000	200.0	V	272.0	25.8	13.4	53.9	

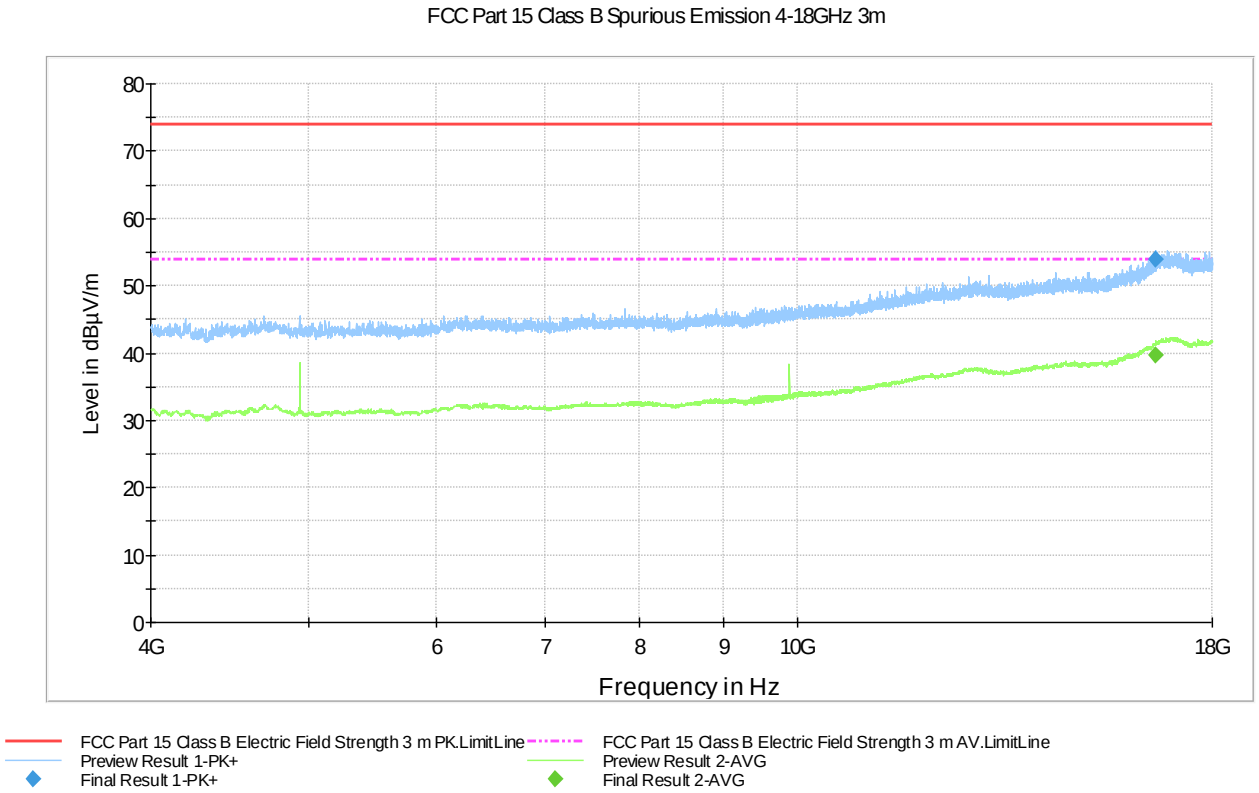


Figure 27. Measured curve with peak and average detectors. Channel high.

Table 38. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
16612.825000	53.9	1000.0	1000.000	235.0	V	184.0	25.0	20.0	73.9	

Table 39. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
16612.825000	39.8	1000.0	1000.000	235.0	V	184.0	25.0	14.1	53.9	

WF121-N

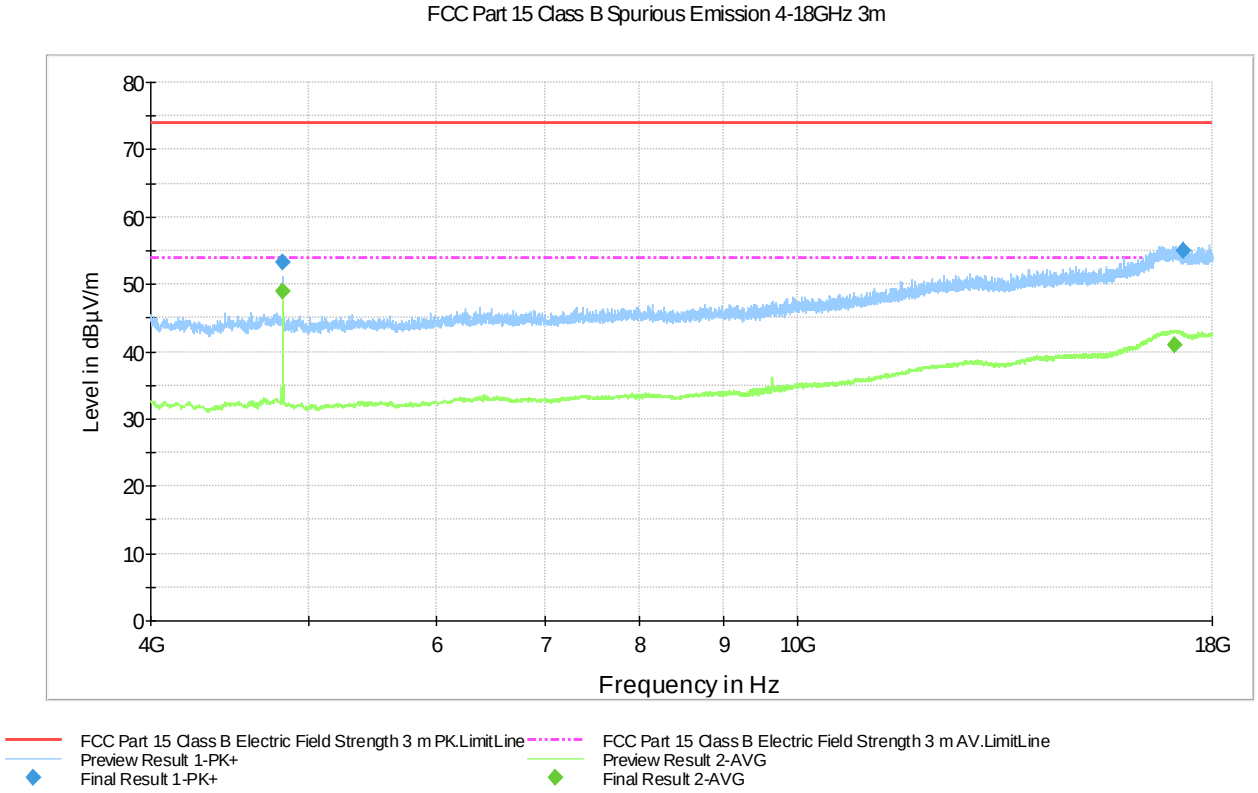


Figure 28. Measured curve with peak and average detectors. Channel low.

Table 40. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4823.925000	53.4	1000.0	1000.000	174.0	V	316.0	10.7	20.5	73.9	
17279.775000	55.1	1000.0	1000.000	191.0	V	206.0	25.4	18.8	73.9	

Table 41. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4823.925000	49.0	1000.0	1000.000	162.0	V	321.0	10.7	4.9	53.9	
17070.625000	41.0	1000.0	1000.000	105.0	V	252.0	25.8	12.9	53.9	

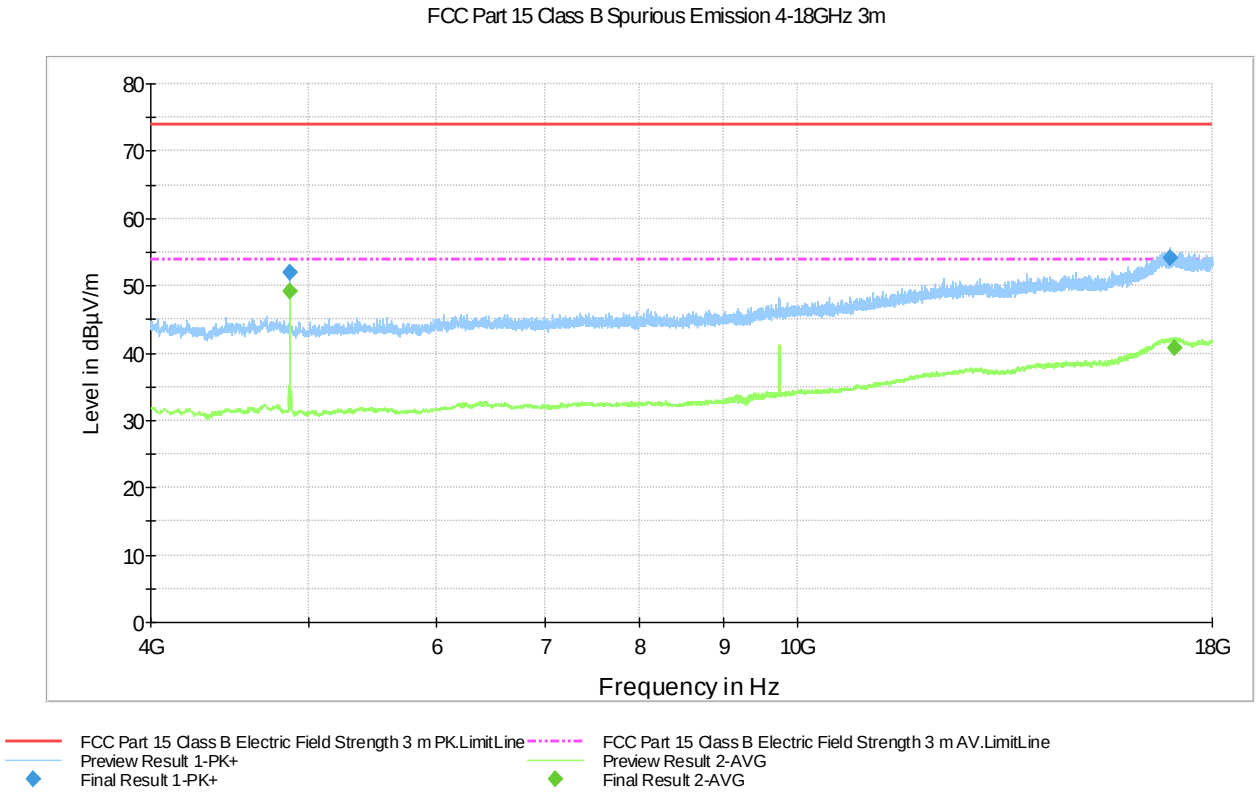


Figure 29. Measured curve with peak and average detectors. Channel mid.

Table 42. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4874.125000	52.1	1000.0	1000.000	179.0	V	320.0	10.6	21.8	73.9	
16959.875000	54.2	1000.0	1000.000	255.0	V	74.0	25.7	19.7	73.9	

Table 43. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4873.925000	49.1	1000.0	1000.000	171.0	V	322.0	10.6	4.8	53.9	
17065.025000	40.8	1000.0	1000.000	100.0	V	328.0	25.8	13.1	53.9	

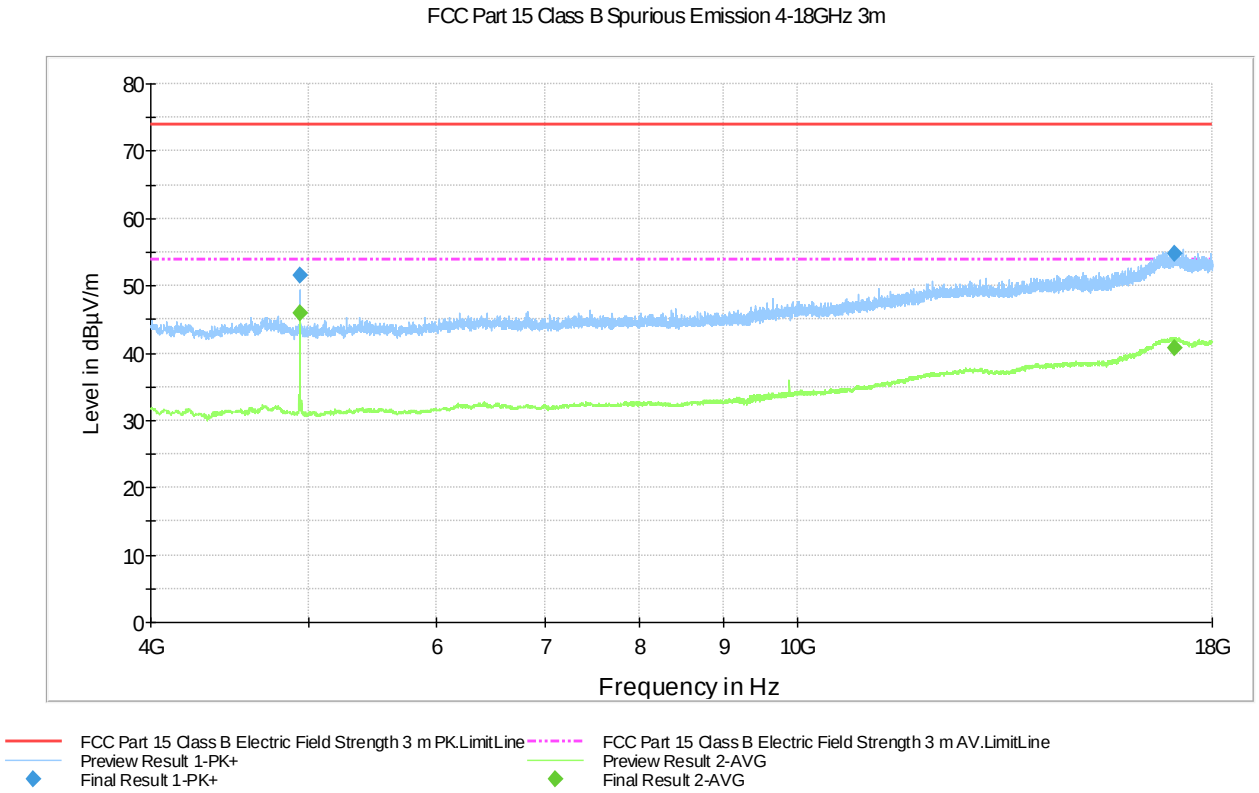


Figure 30. Measured curve with peak and average detectors. Channel high.

Table 44. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4943.925000	51.5	1000.0	1000.000	253.0	V	339.0	10.6	22.4	73.9	
17062.275000	54.7	1000.0	1000.000	114.0	H	122.0	25.8	19.2	73.9	

Table 45. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4943.925000	45.9	1000.0	1000.000	173.0	V	344.0	10.6	8.0	53.9	
17048.875000	40.7	1000.0	1000.000	100.0	V	204.0	25.8	13.2	53.9	

Transmitter Radiated Emissions 18 000 – 25 000 MHz

WF121-A

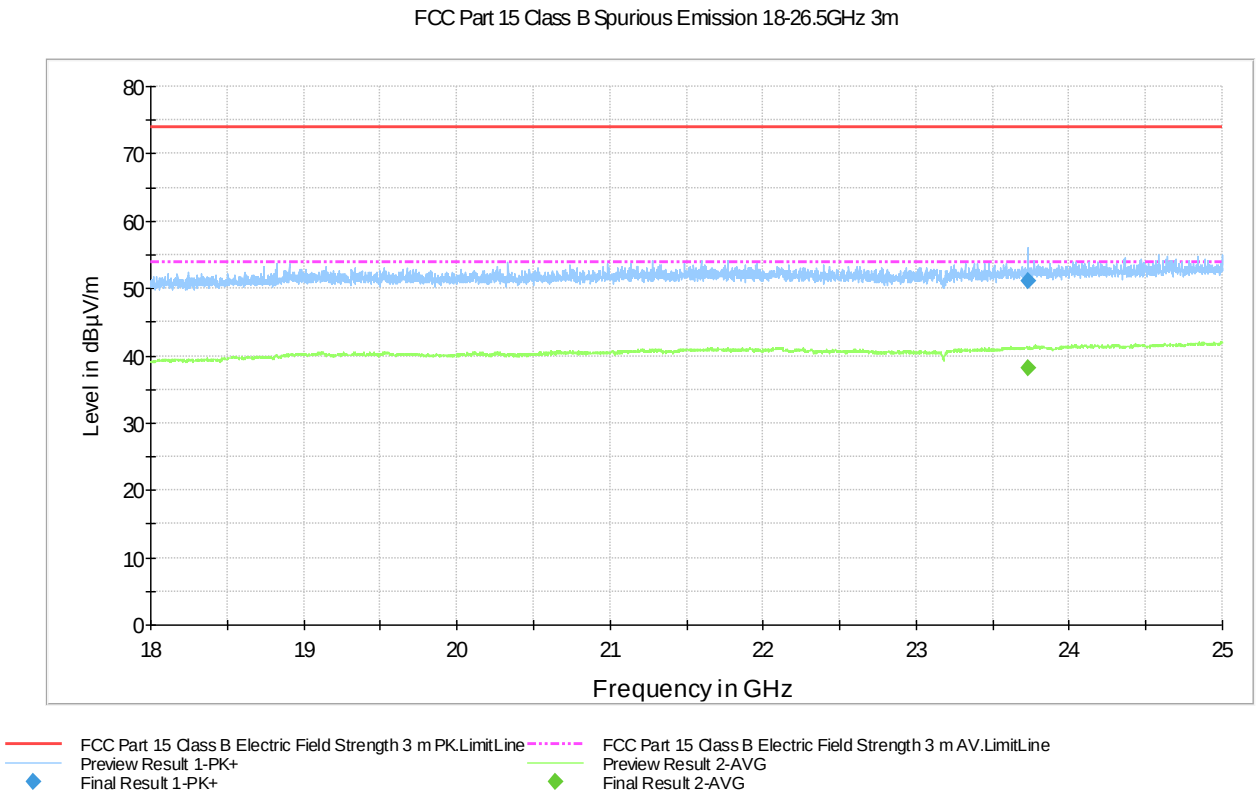


Figure 31. Measured curve with peak and average detectors. Channel low.

Table 46. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23726.725000	51.1	1000.0	1000.000	180.0	V	128.0	27.0	22.8	73.9	

Table 47. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23726.725000	38.3	1000.0	1000.000	180.0	V	128.0	27.0	15.6	53.9	

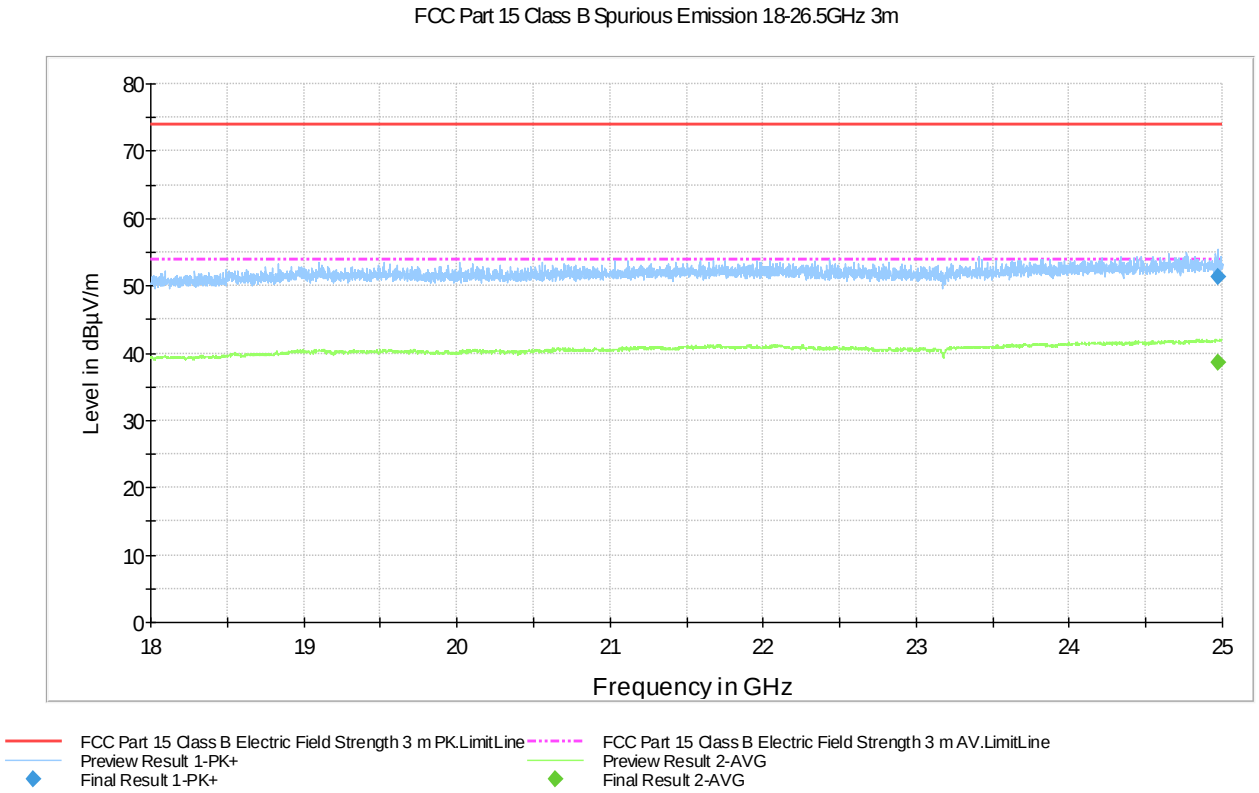


Figure 32. Measured curve with peak and average detectors. Channel mid.

Table 48. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24967.475000	51.4	1000.0	1000.000	164.0	V	212.0	27.8	22.5	73.9	

Table 49. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24967.475000	38.5	1000.0	1000.000	164.0	V	212.0	27.8	15.4	53.9	

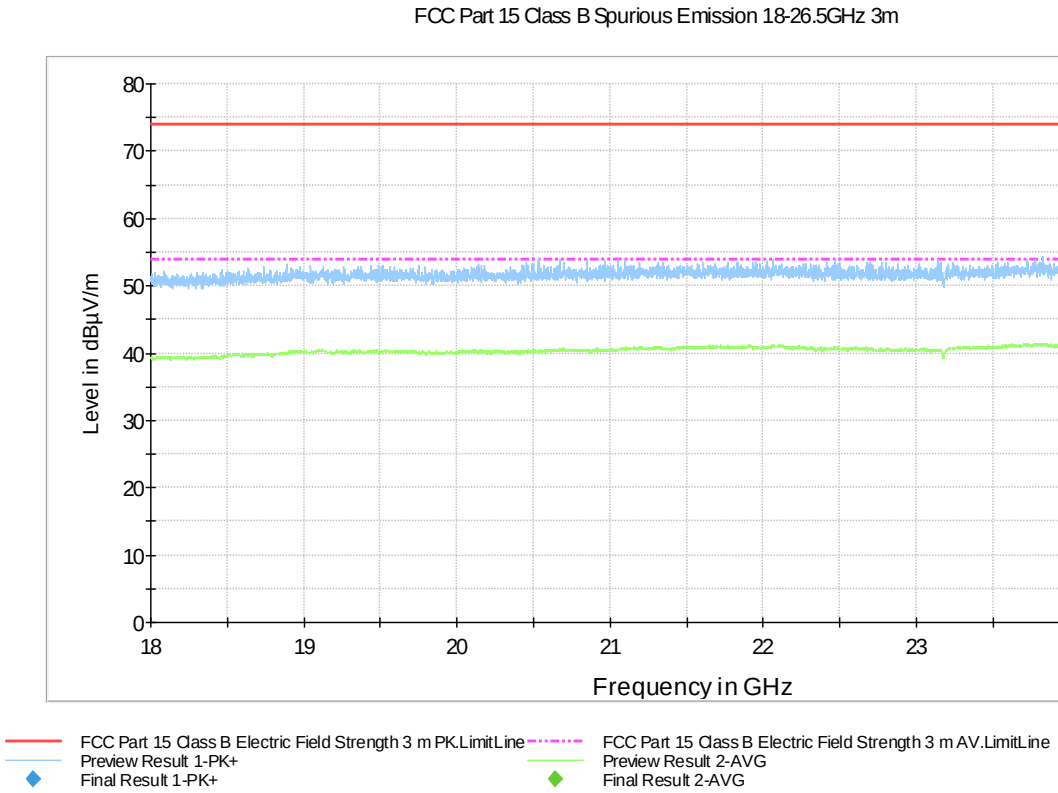


Figure 33. Measured curve with peak and average detectors. Channel high.

Table 50. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24566.625000	51.9	1000.0	1000.000	223.0	V	46.0	27.4	22.0	73.9	

Table 51. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24566.625000	38.1	1000.0	1000.000	223.0	V	46.0	27.4	15.8	53.9	

WF121-E

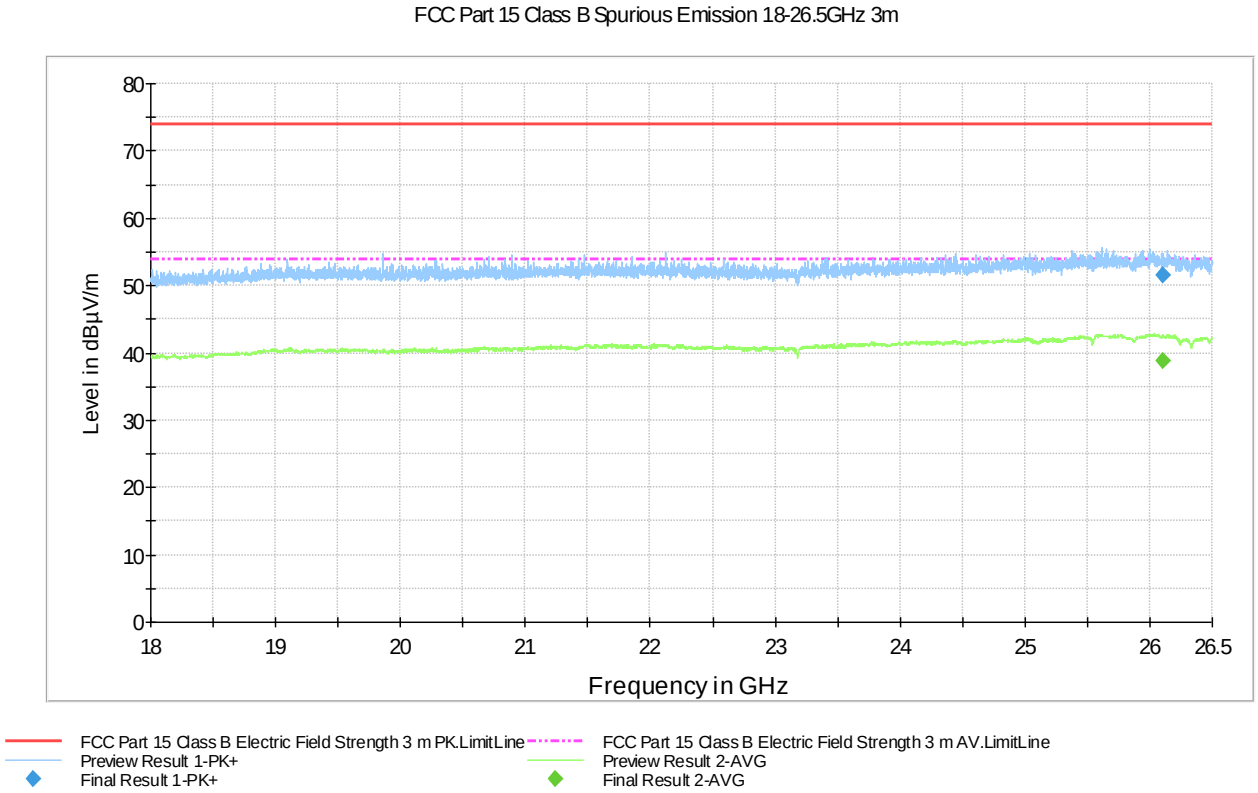


Figure 34. Measured curve with peak and average detectors. Channel low.

Table 52. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
26108.525000	51.6	1000.0	1000.000	207.0	V	261.0	28.6	22.3	73.9	

Table 53. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
26108.525000	38.7	1000.0	1000.000	207.0	V	261.0	28.6	15.2	53.9	

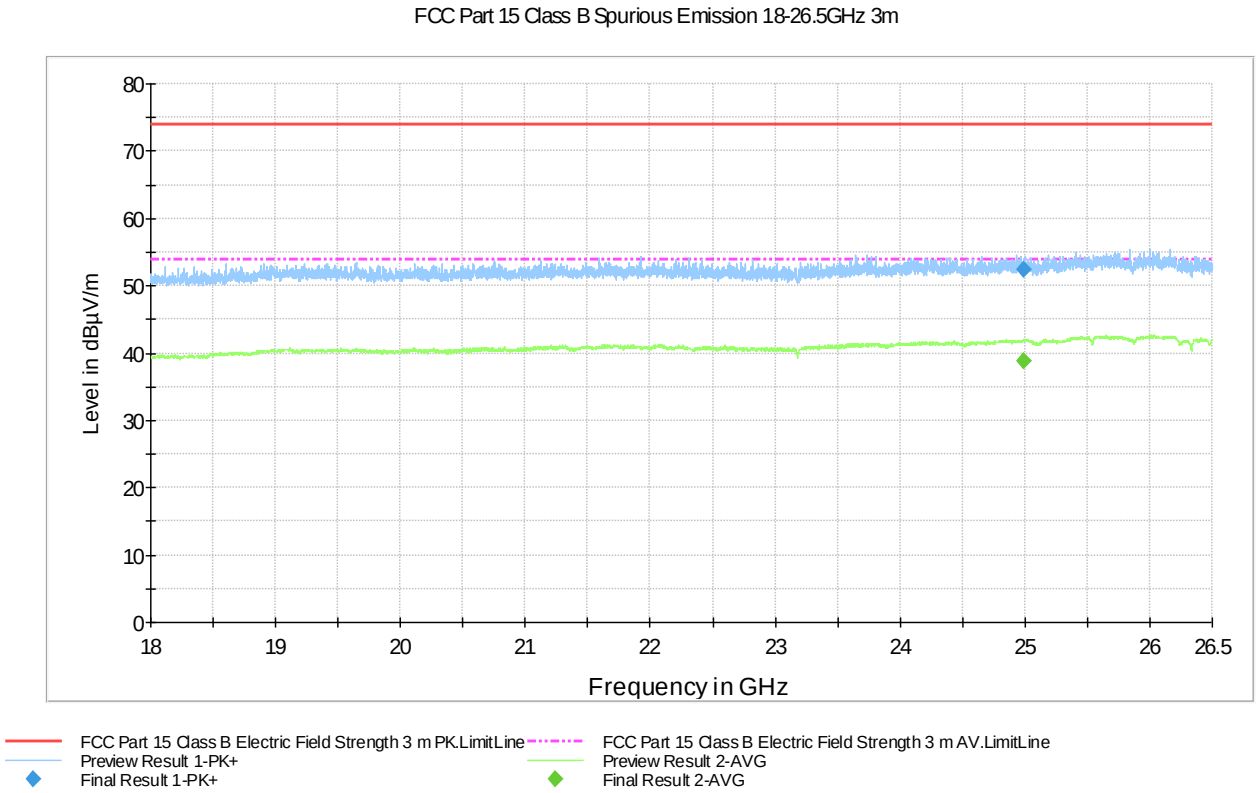


Figure 35. Measured curve with peak and average detectors. Channel mid.

Table 54. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24996.200000	52.3	1000.0	1000.000	211.0	V	71.0	27.8	21.6	73.9	

Table 55. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24996.200000	38.7	1000.0	1000.000	211.0	V	71.0	27.8	15.2	53.9	

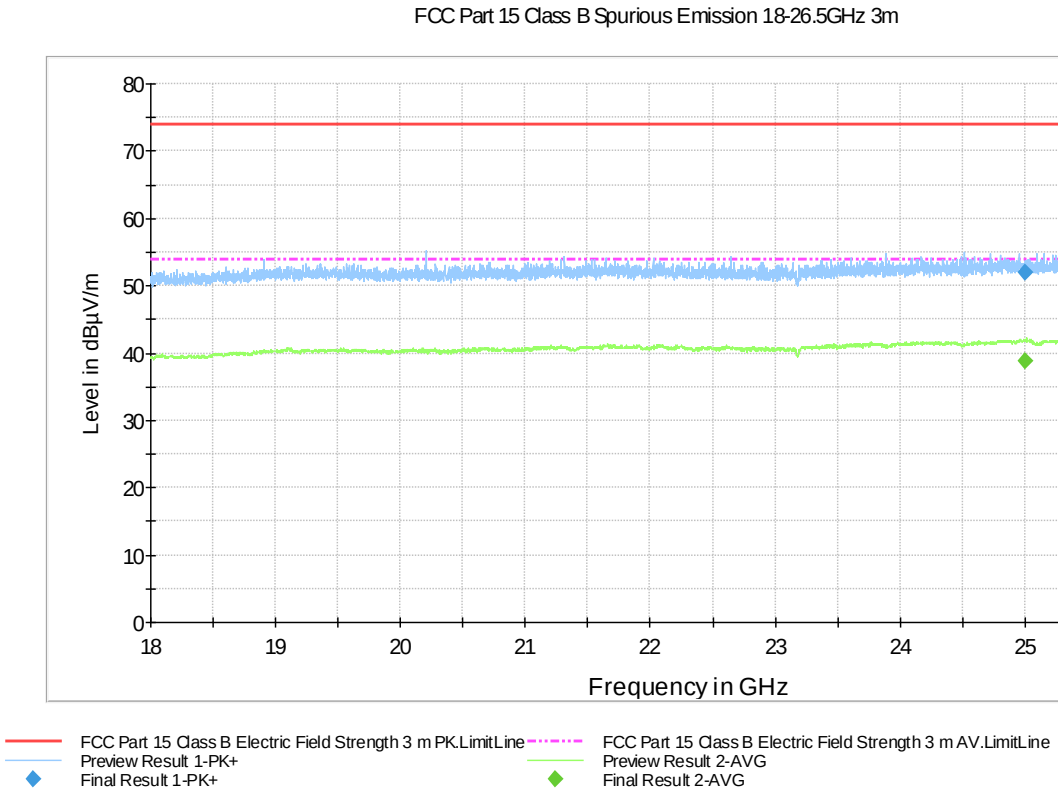


Figure 36. Measured curve with peak and average detectors. Channel high.

Table 56. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25000.800000	52.1	1000.0	1000.000	100.0	V	128.0	27.8	21.8	73.9	

Table 57. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25000.800000	38.8	1000.0	1000.000	100.0	V	128.0	27.8	15.1	53.9	

WF121-N

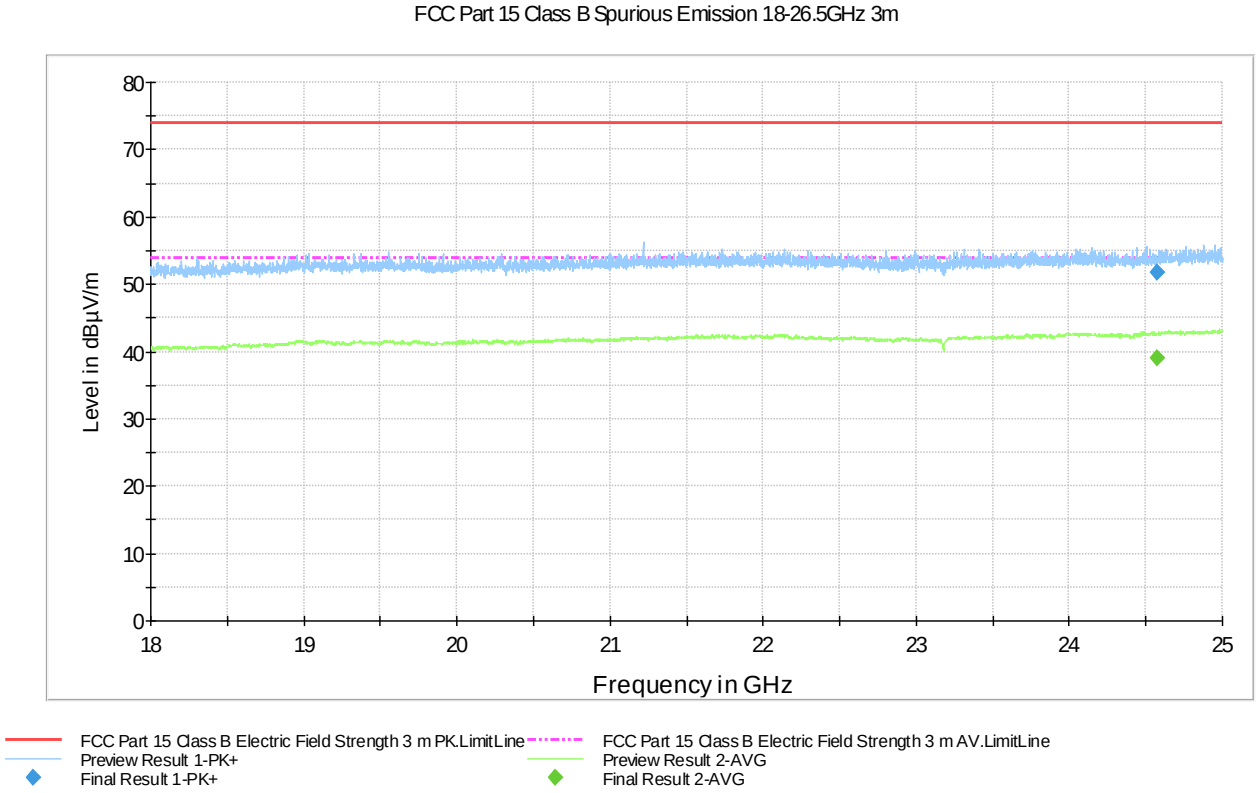


Figure 37. Measured curve with peak and average detectors. Channel low.

Table 58. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24578.375000	51.8	1000.0	1000.000	122.0	V	51.0	27.4	22.1	73.9	

Table 59. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24578.375000	39.0	1000.0	1000.000	122.0	V	51.0	27.4	14.9	53.9	

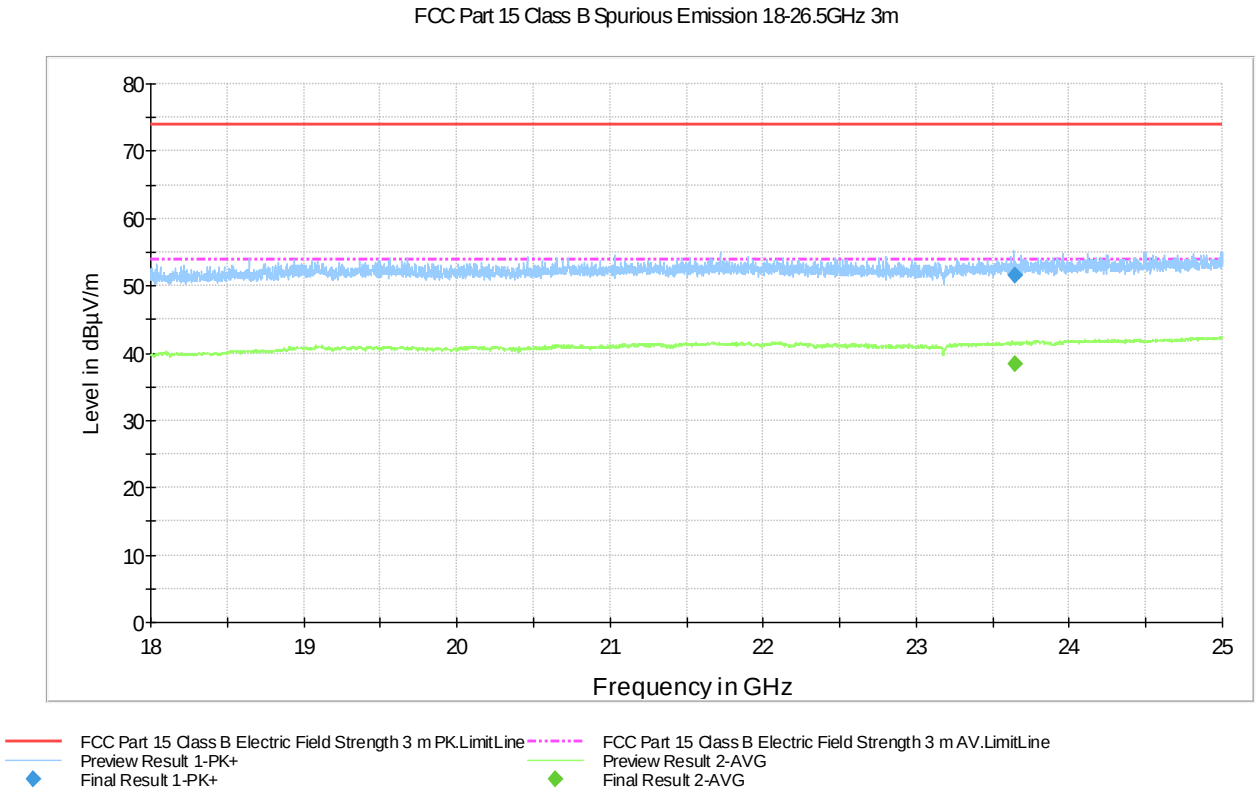


Figure 38. Measured curve with peak and average detectors. Channel mid.

Table 60. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23644.375000	51.5	1000.0	1000.000	130.0	V	0.0	27.0	22.4	73.9	

Table 61. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23644.375000	38.4	1000.0	1000.000	130.0	V	0.0	27.0	15.5	53.9	

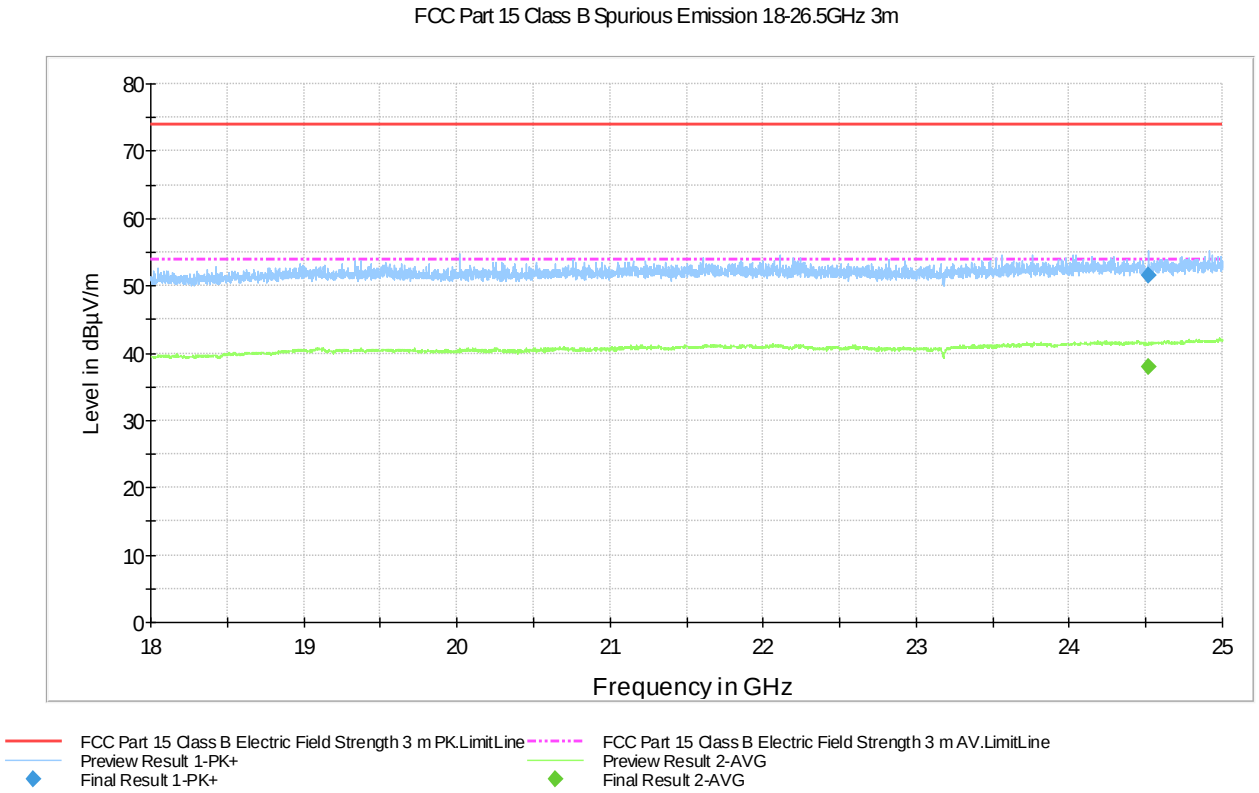


Figure 39. Measured curve with peak and average detectors. Channel high.

Table 62. Final results Max Peak detector.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24518.075000	51.5	1000.0	1000.000	100.0	V	213.0	27.4	22.4	73.9	

Table 63. Final results Average detector.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
24518.075000	38.1	1000.0	1000.000	100.0	V	213.0	27.4	15.8	53.9	

Transmitter Band Edge Measurement

Standard:	ANSI C63.10	(2009)
Tested by:	JJM	
Date:	14.6.2012	
Humidity:	62 %	
Temperature:	20 °C	
Barometric pressure	1009 mbar	

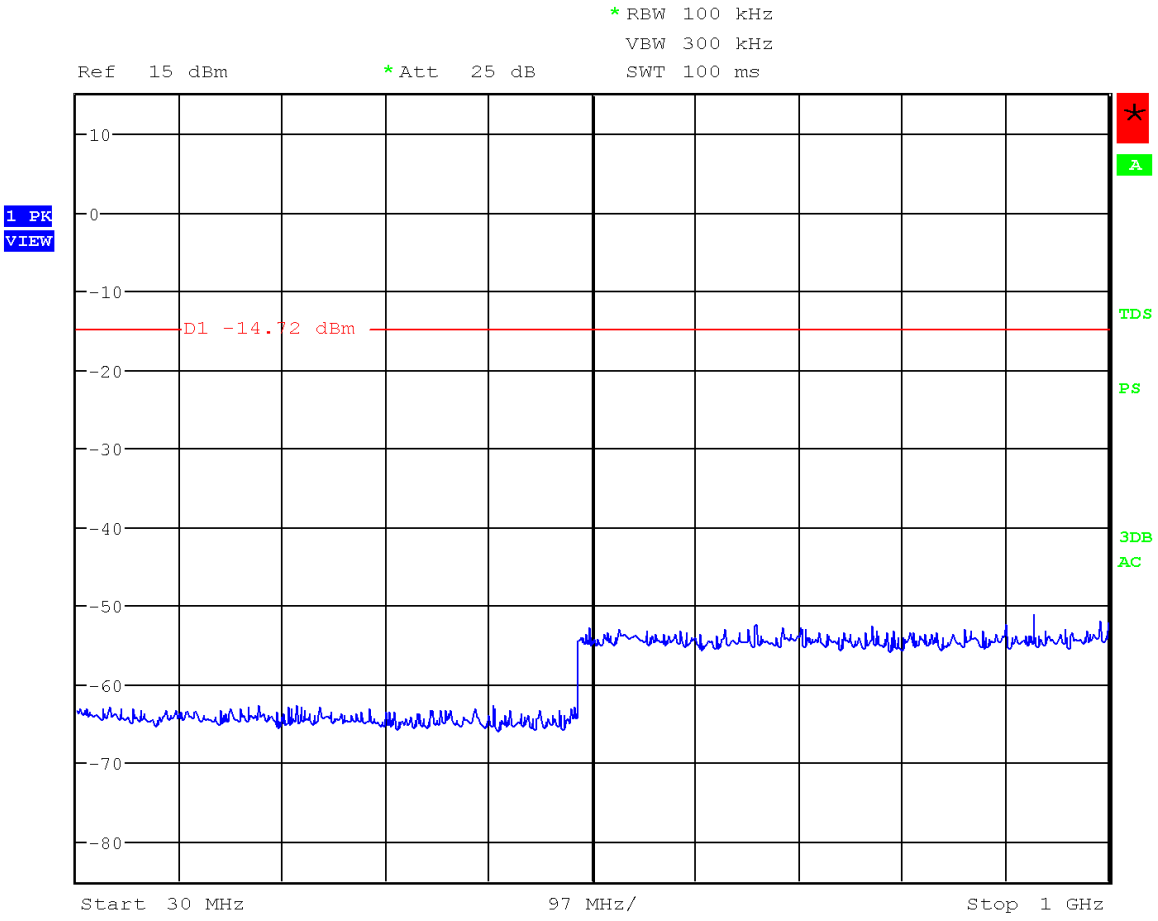
FCC Rule: 15.247(d), 15.209(a)

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	
Data mode	Lower Band Edge	Upper Band Edge
b-mode	- 50.13 dBc	- 51.52 dBc
	Limit: -20dBc	

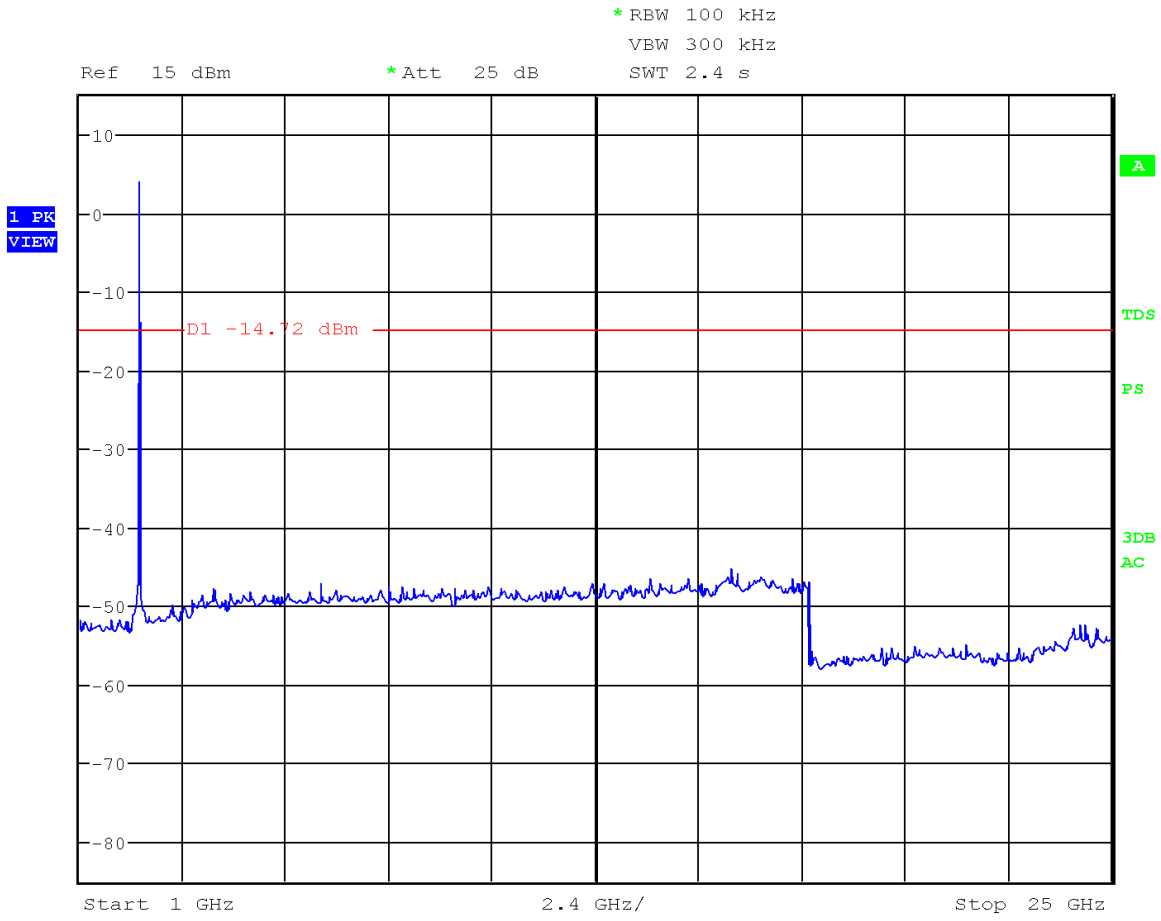
Conducted Spurious Emissions				
Channel	**Measured Attenuation [dB]**	**Limit [dBc]**	**Margin [dB]**	**Result**
Low	-	-20.0	-	-
Mid	-	-20.0	-	-
High	-	-20.0	-	-

No significant emissions were detected.



Date: 14.JUN.2012 14:37:49

Figure 40. Channel low 30 – 1 000 MHz.



Date: 14.JUN.2012 14:37:18

Figure 41. Channel low 1 000 – 25 000 MHz.

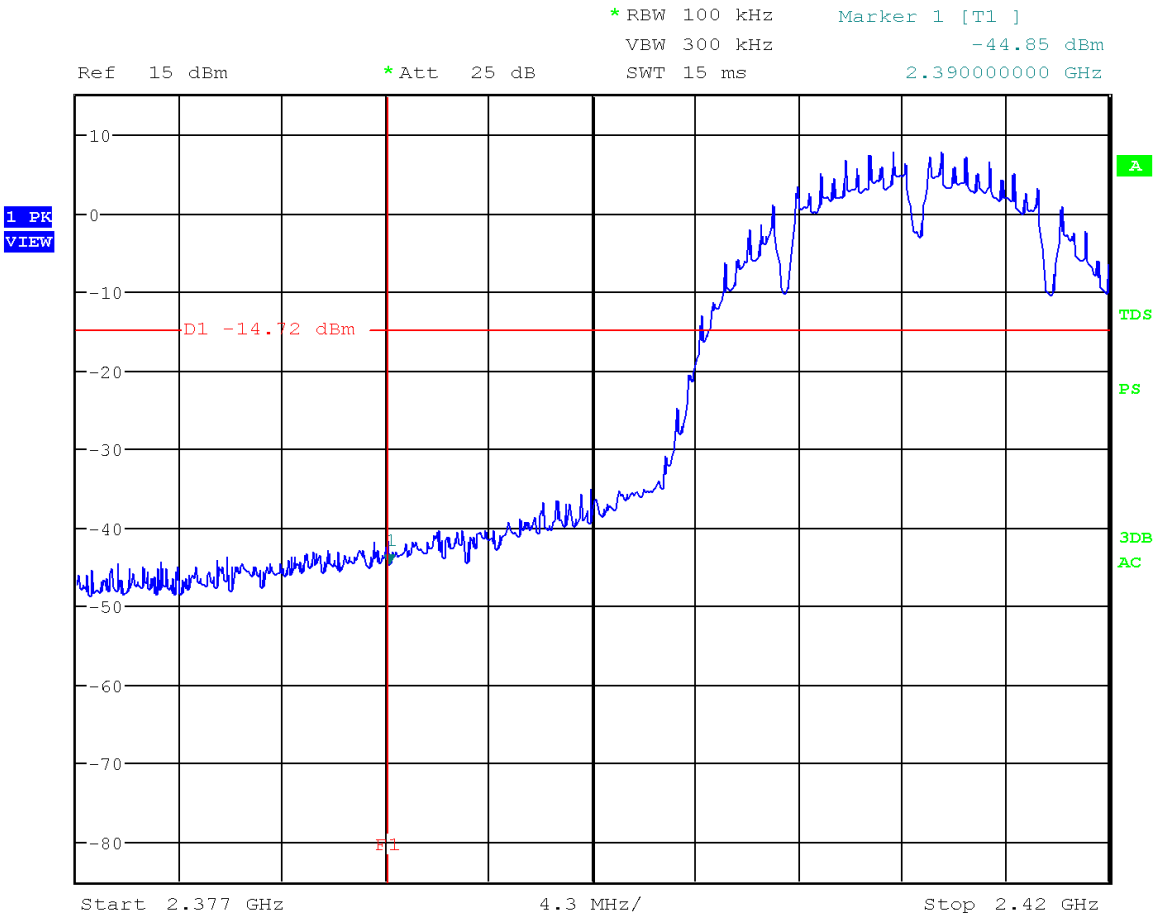
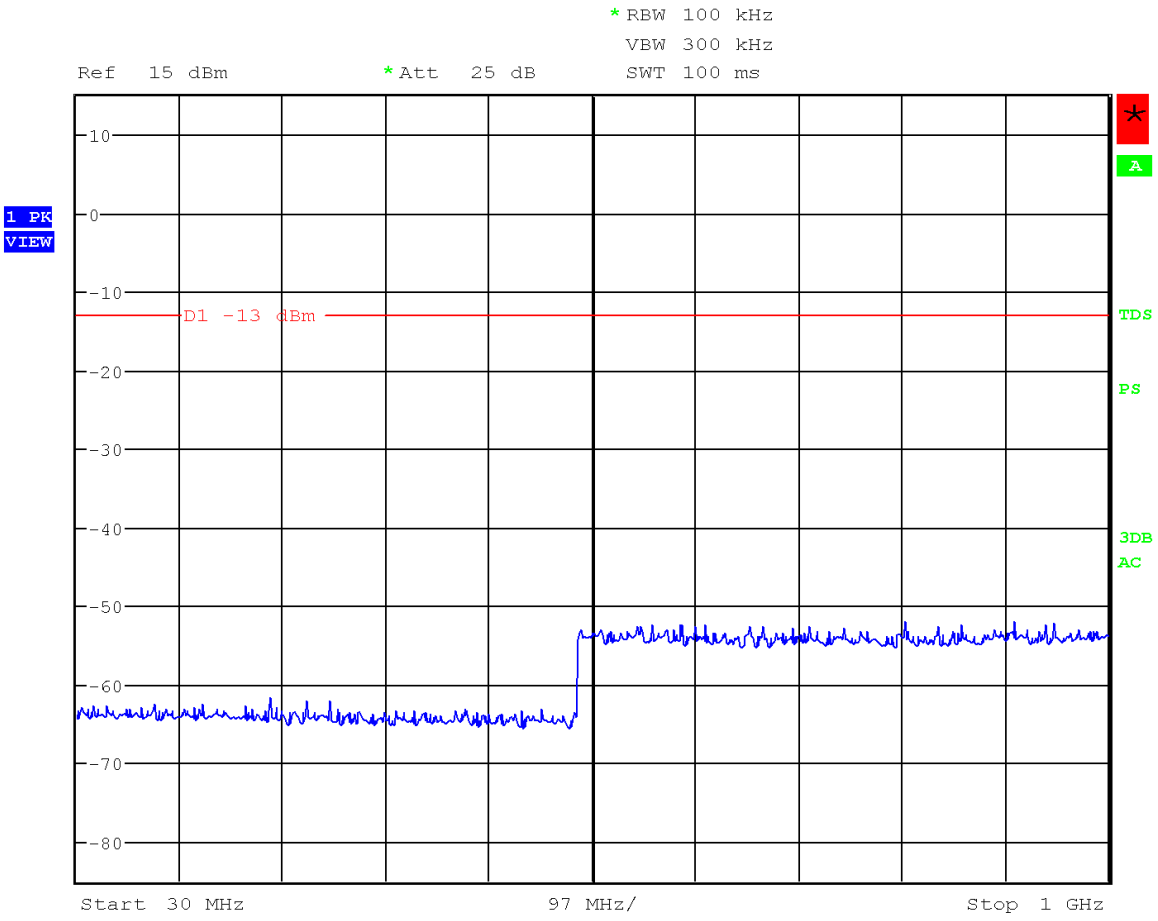
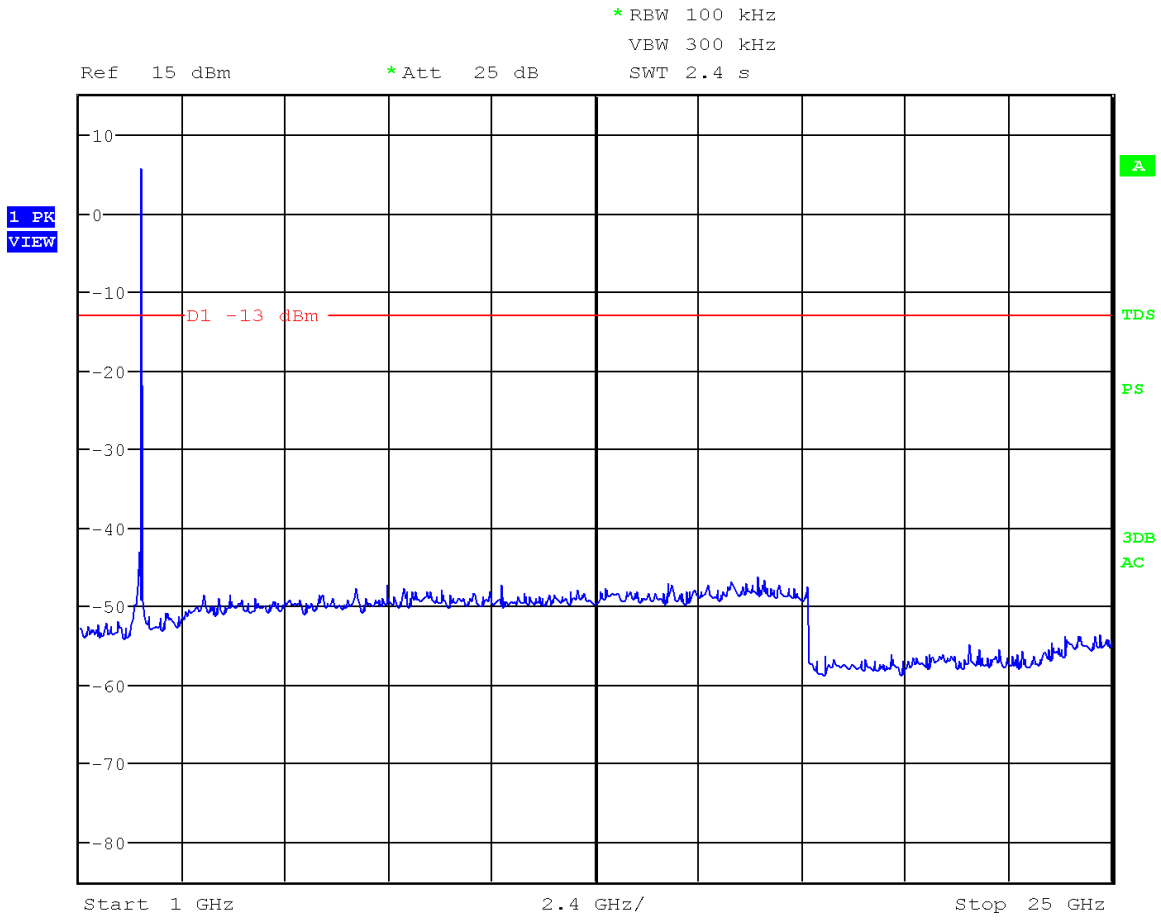


Figure 42. Lower band edge.



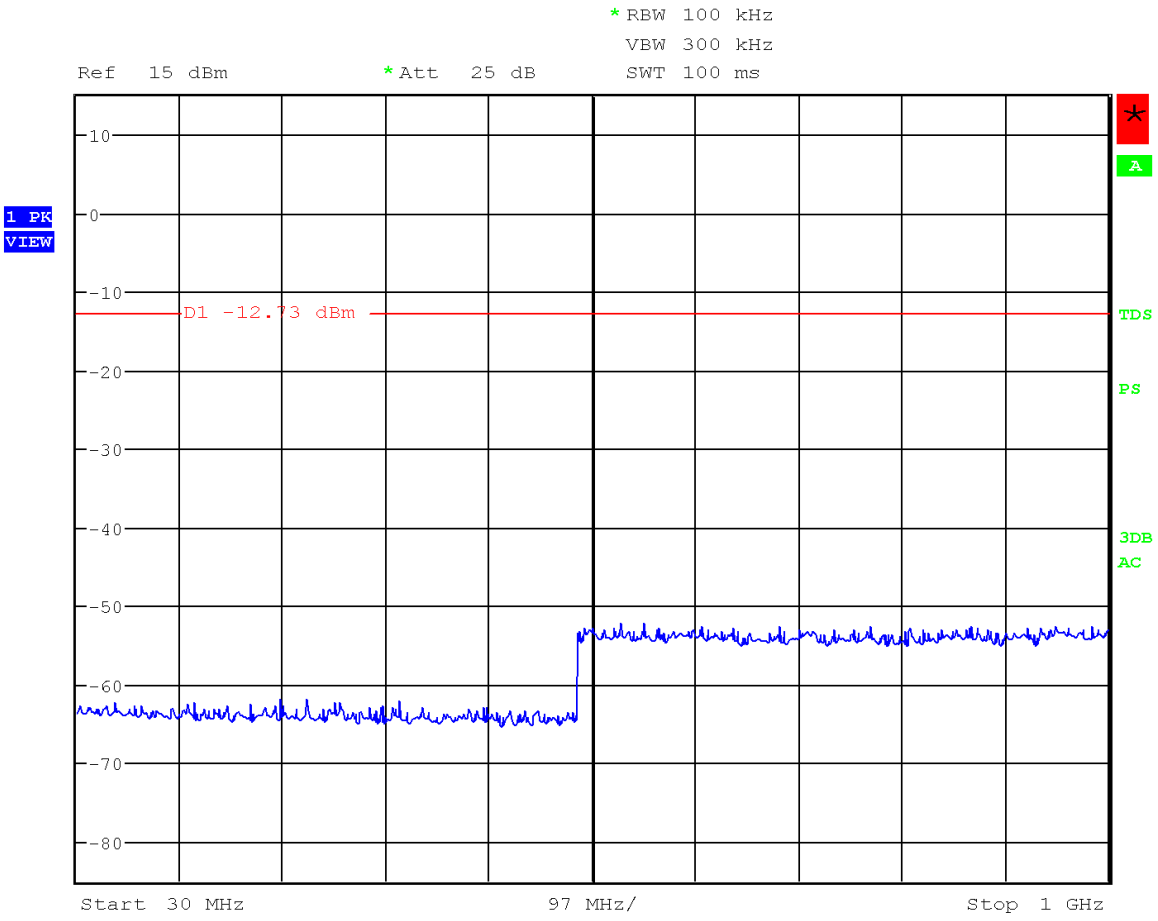
Date: 14.JUN.2012 14:39:19

Figure 43. Channel mid 30 – 1 000 MHz.



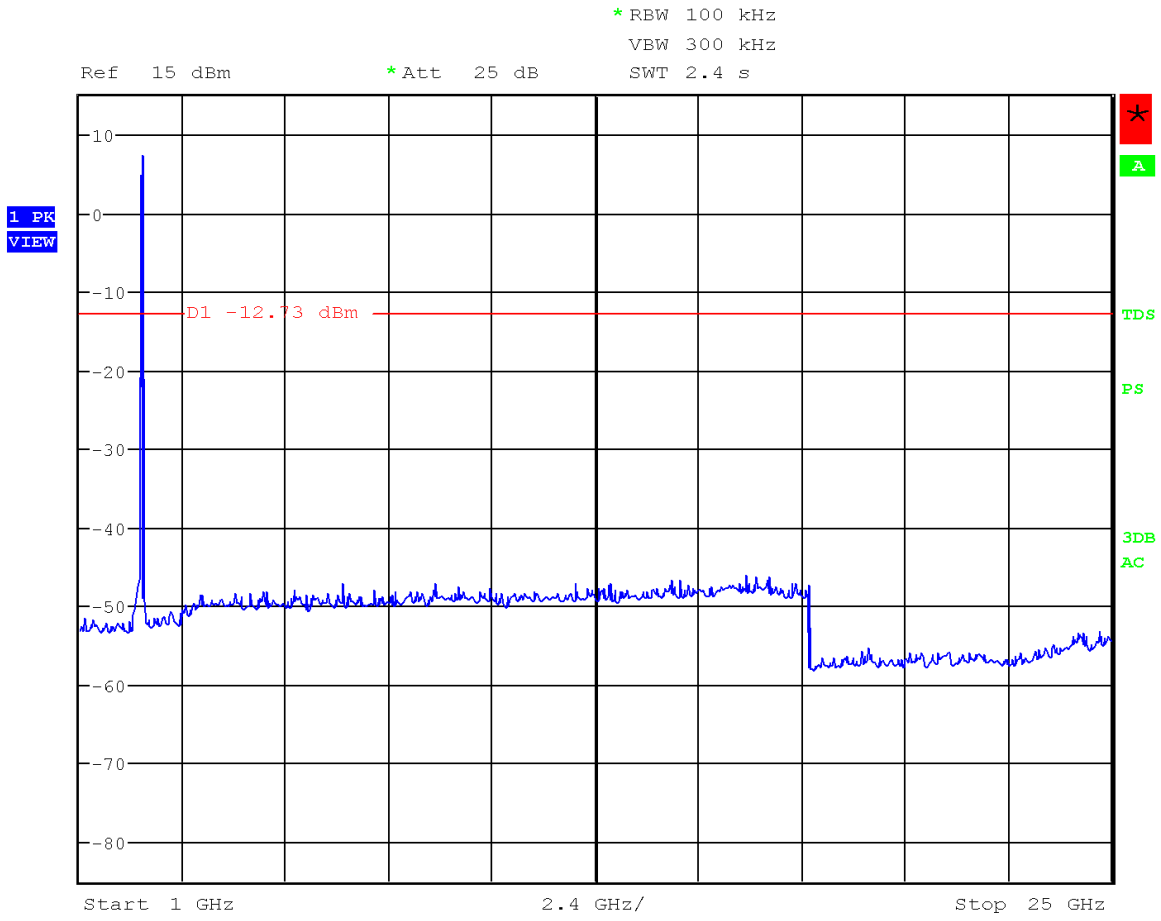
Date: 14.JUN.2012 14:39:51

Figure 44. Channel mid 1 000 – 25 000 MHz.



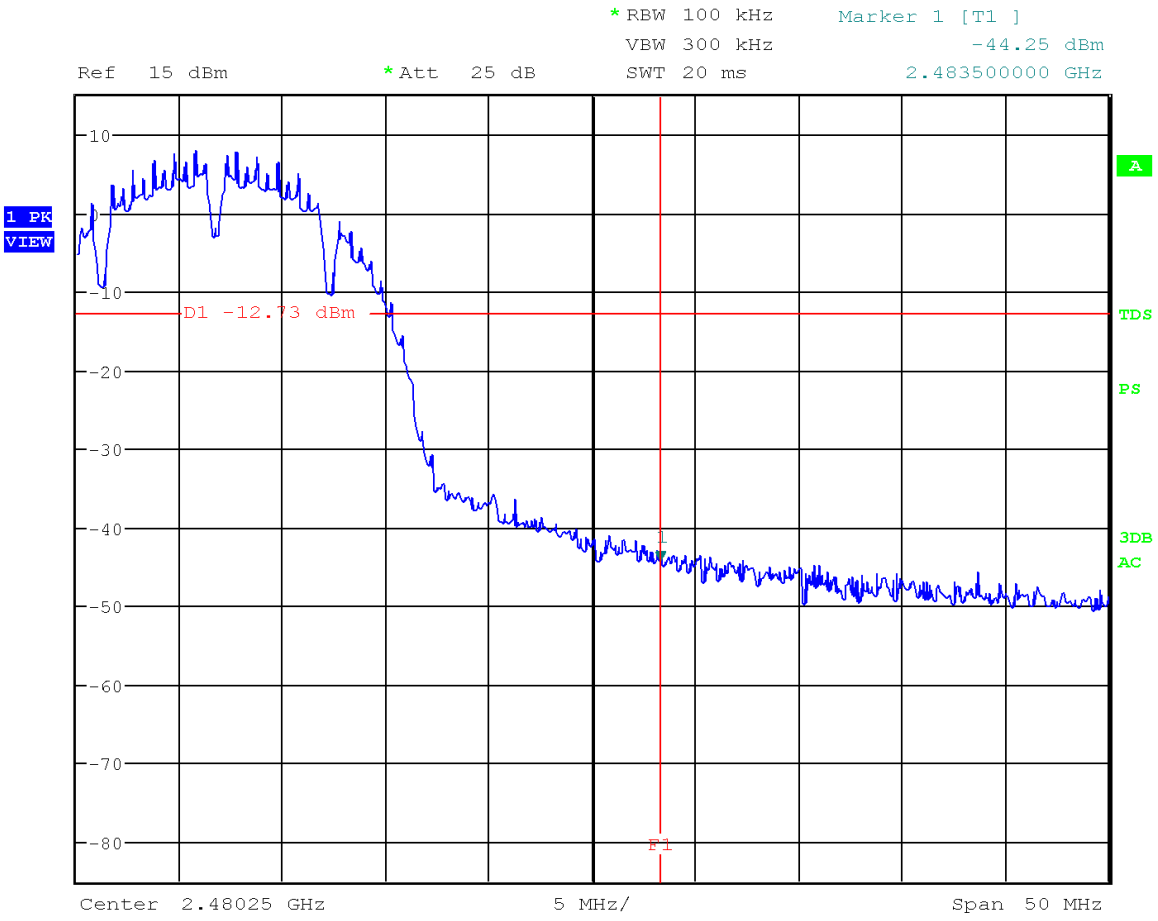
Date: 14.JUN.2012 14:41:10

Figure 45. Channel high 30 – 1 000 MHz.



Date: 14.JUN.2012 14:42:07

Figure 46. Channel high 1 000 – 25 000 MHz.



Date: 14.JUN.2012 14:50:07

Figure 47. Upper band edge.

6dB Bandwidth

Standard:	ANSI C63.10	(2009)
Tested by:	JJM	
Date:	29.5.2012	
Humidity:	33 %	
Temperature:	19.8 °C	
Barometric pressure	1004 Mbar	

FCC Rule: 15.247 (a) (2)

Systems using digital modulation techniques may operate in the 2400 - 2483.5 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

6dB Bandwidth		
Channel low	**Channel mid.**	**Channel high**
10.337 MHz	10.337 MHz	10.385 MHz

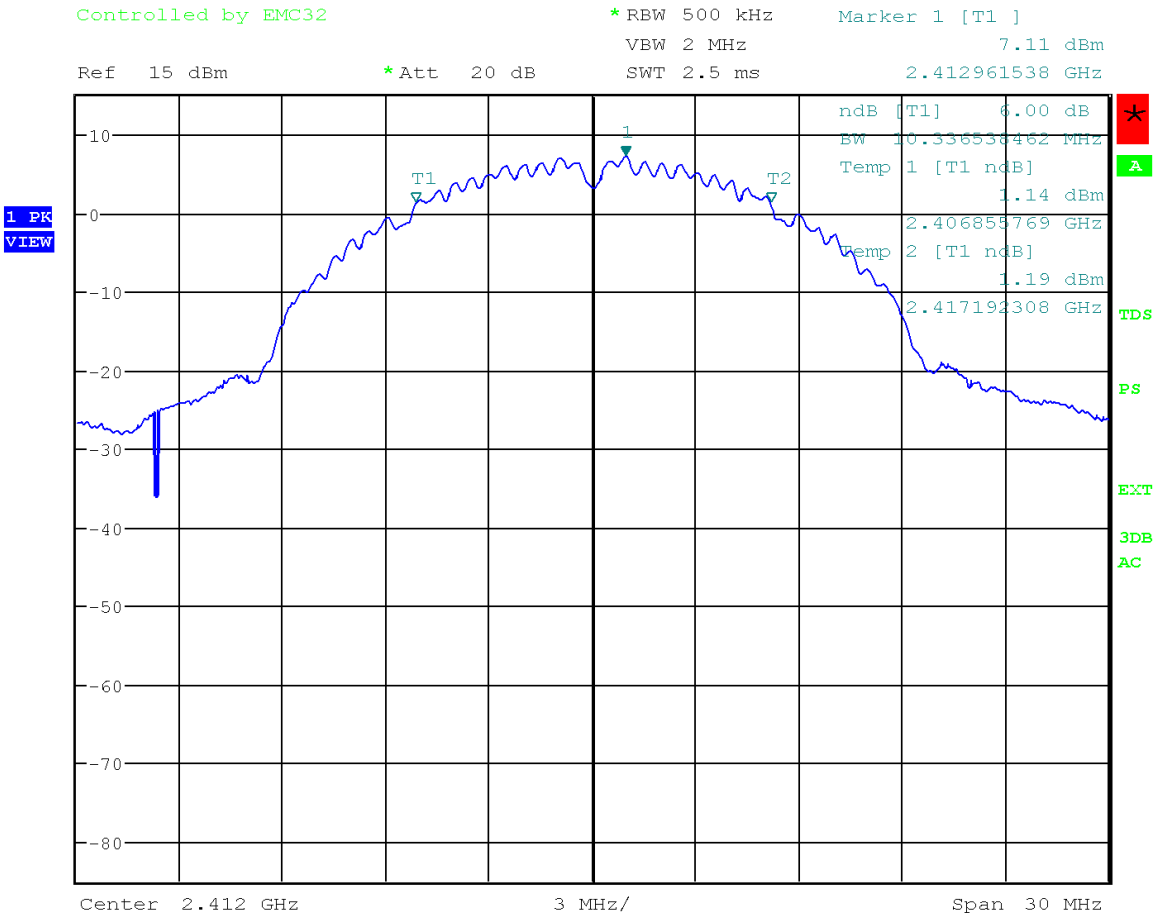
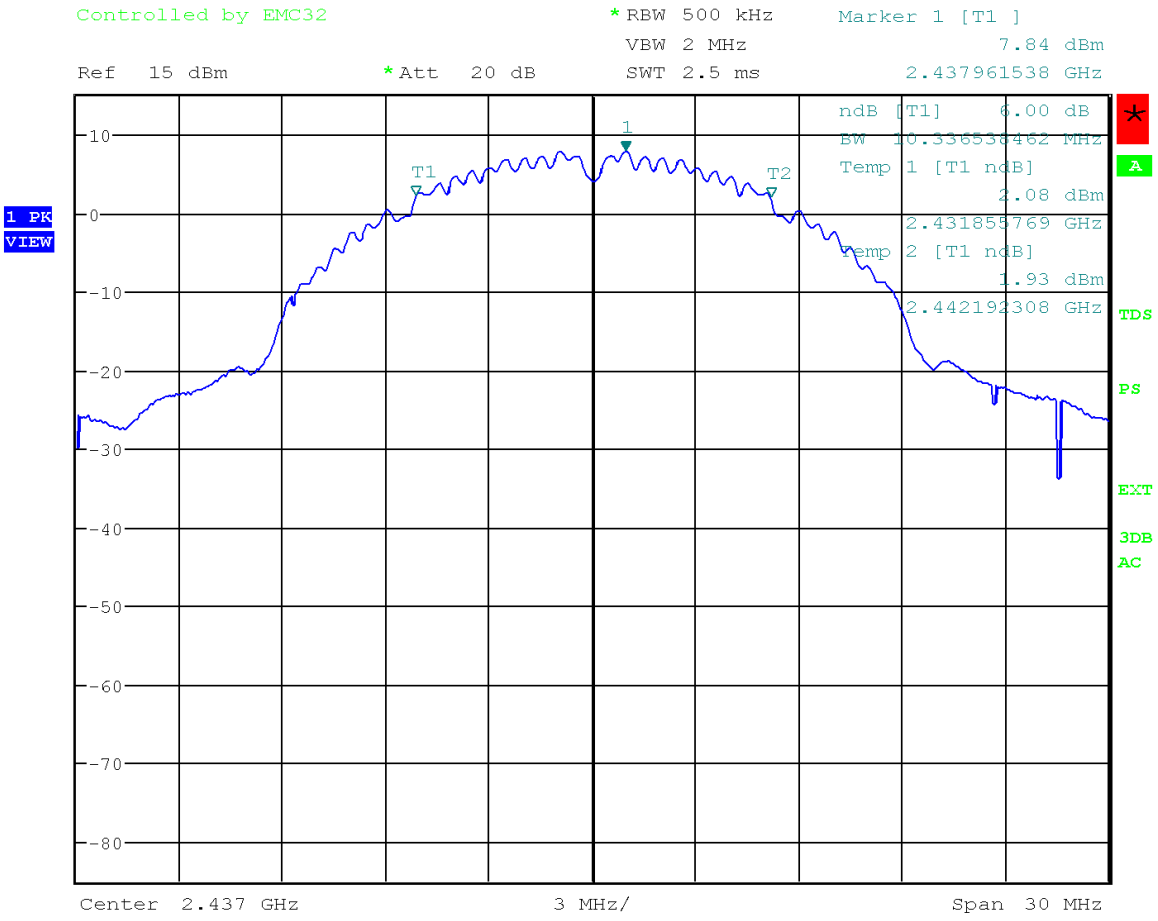
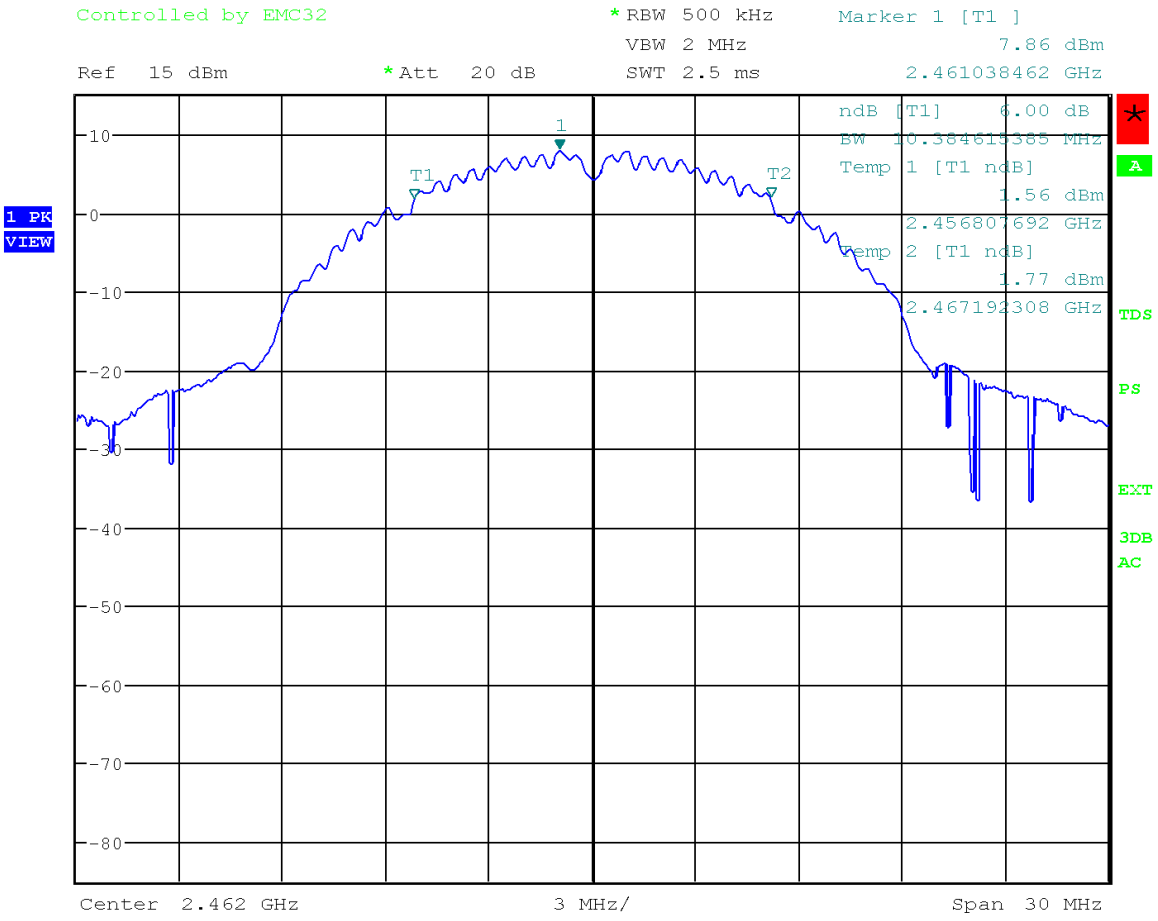


Figure 48. Channel low.



Date: 29.MAY.2012 09:22:02

Figure 49. Channel mid.



Date: 29.MAY.2012 09:24:17

Figure 50. Channel high.

Power Spectral Density

Standard:	ANSI C63.10	(2010)
Tested by:	JJM	
Date:	30.5.2012	
Humidity:	26 %	
Temperature:	19.8 °C	
Barometric pressure	1007 Mbar	

FCC Rule: 15.247(e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of section 15.247. The same method of determining the conducted output power shall be used to determine the power spectral density.

The measured power level is scaled to an equivalent level in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor = 10log (3 kHz/100 kHz) = -15.2 dB.

Channel	RF Power Density [dBm]	Limit [dBm]
Low	**-9.92**	**8**
Mid	**-8.20**	**8**
High	**-7.93**	**8**

Power Spectral Density Measurement

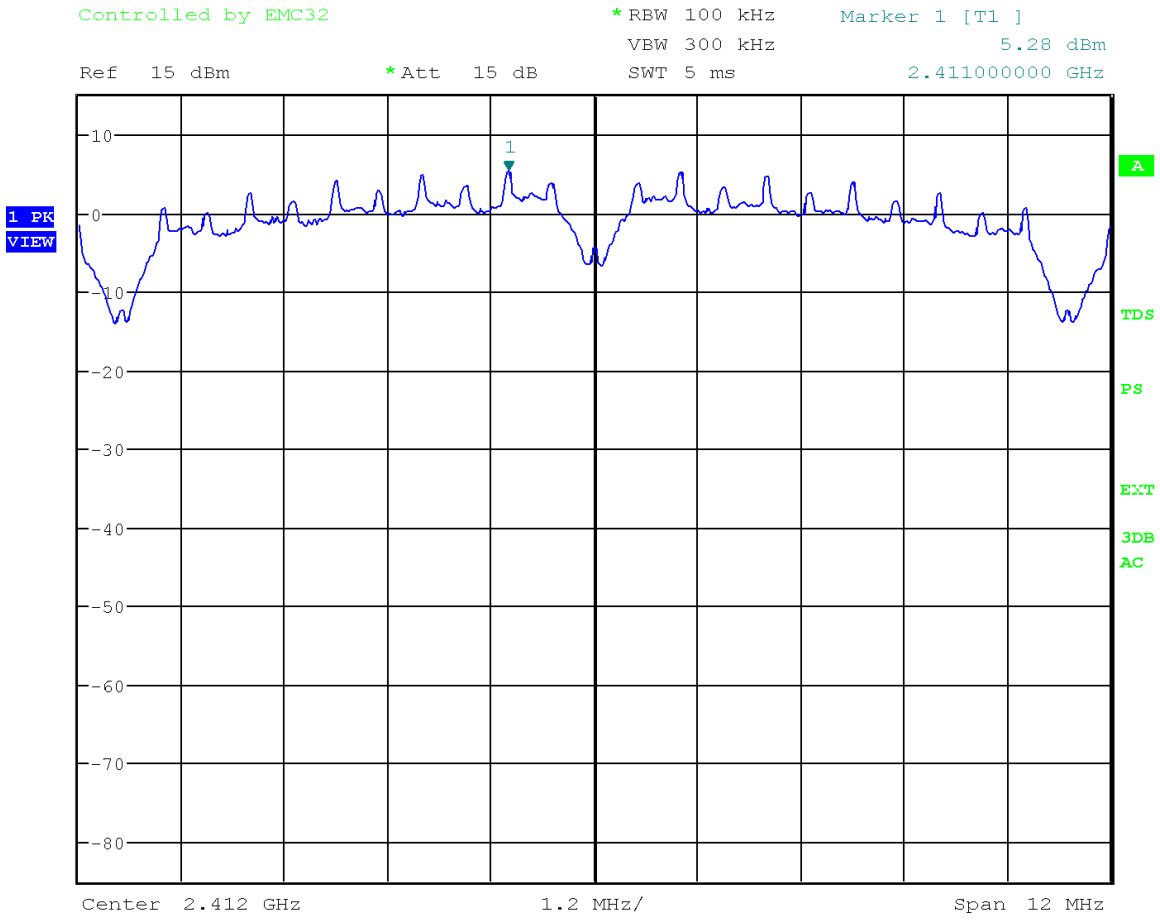


Figure 51. Channel low.

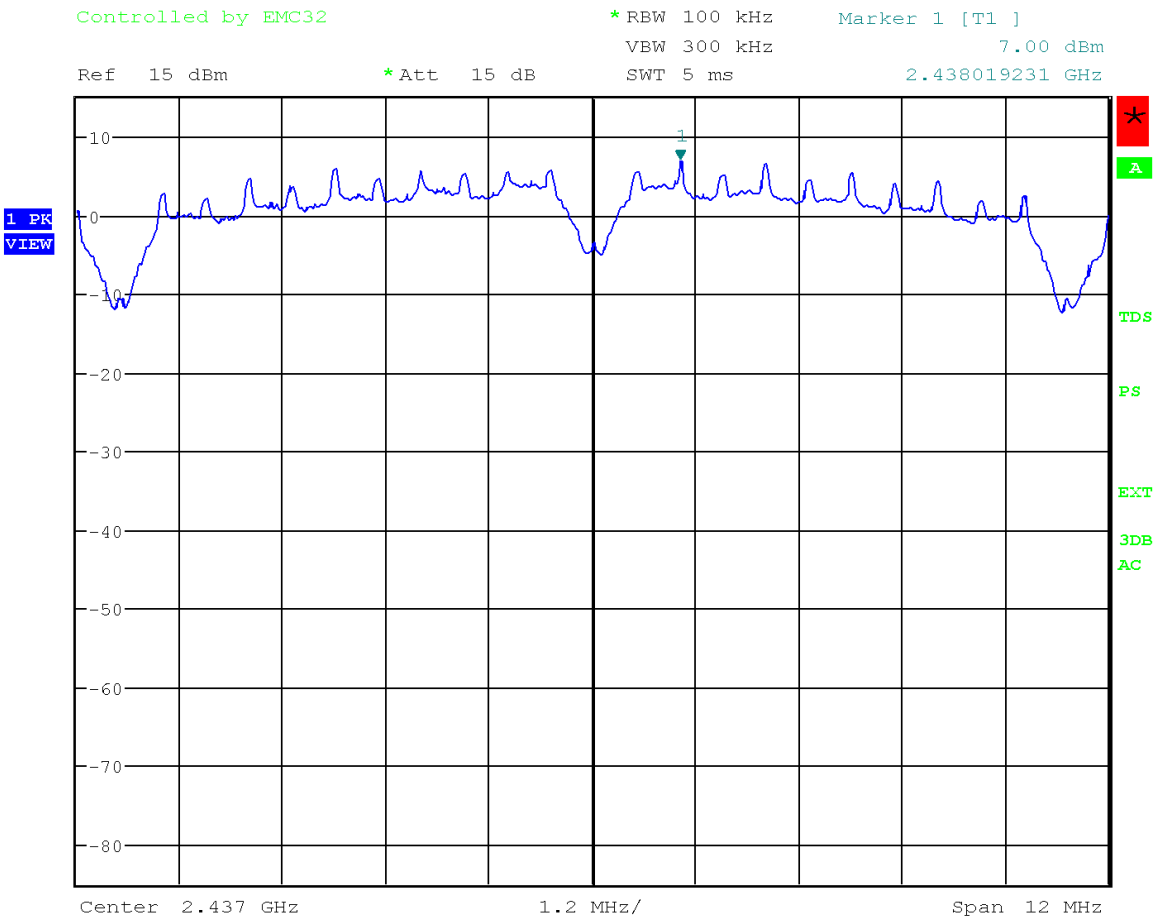
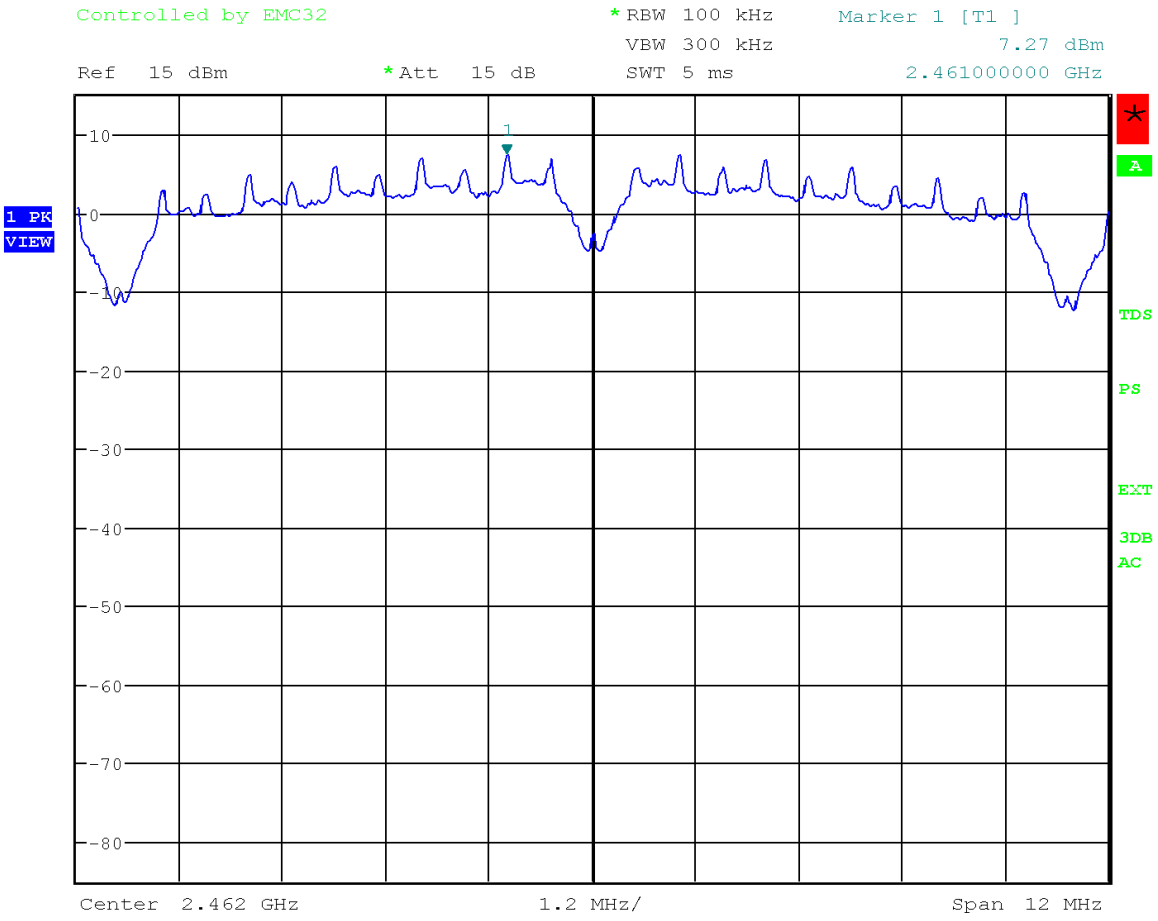


Figure 52. Channel mid.



Date: 30.MAY.2012 10:07:29

Figure 53. Channel high.

Maximum Peak Conducted Output Power

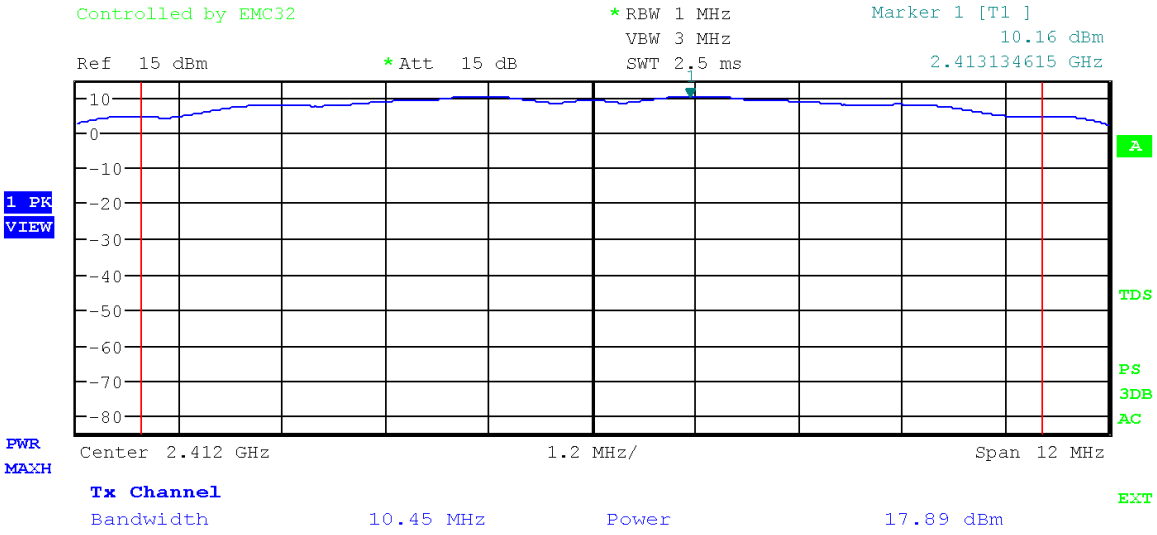
Standard:	ANSI C63.10	(2009)
Tested by:	JJM	
Date:	30.5.2012	
Humidity:	26 %	
Temperature:	19.8 °C	
Barometric pressure:	1007 Mbar	

FCC Rule: 15.247(b) (4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Results:

Channel	Conducted Power [dBm]	Limit [dBm]	Margin [dBm]	Result
Low	17.89	30	12.11	PASS
Mid	19.02	30	9.98	PASS
High	19.03	30	9.97	PASS



Date: 30.MAY.2012 08:52:57

Figure 54. Channel low.

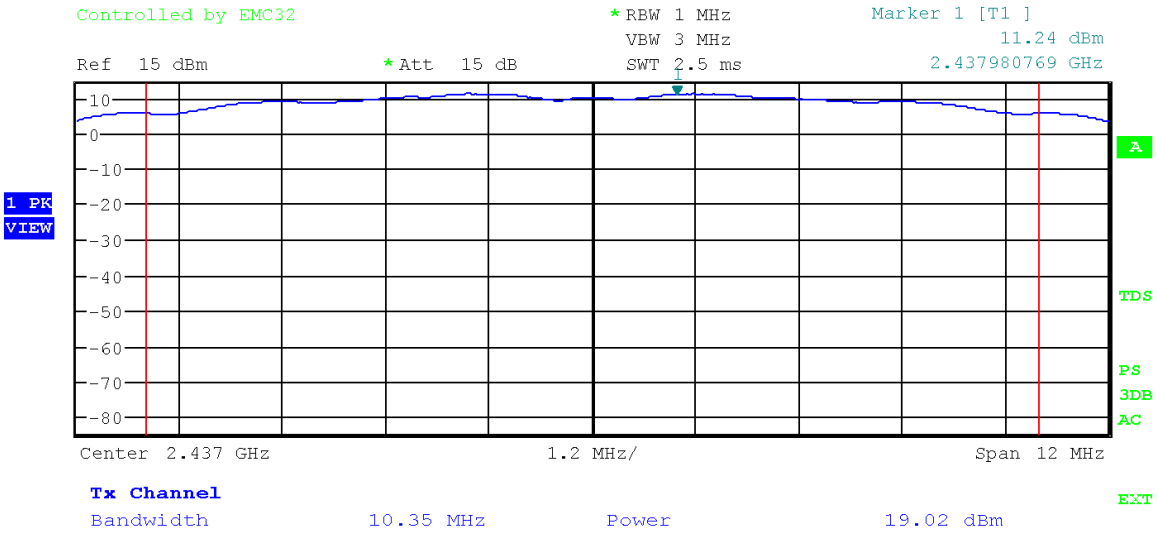
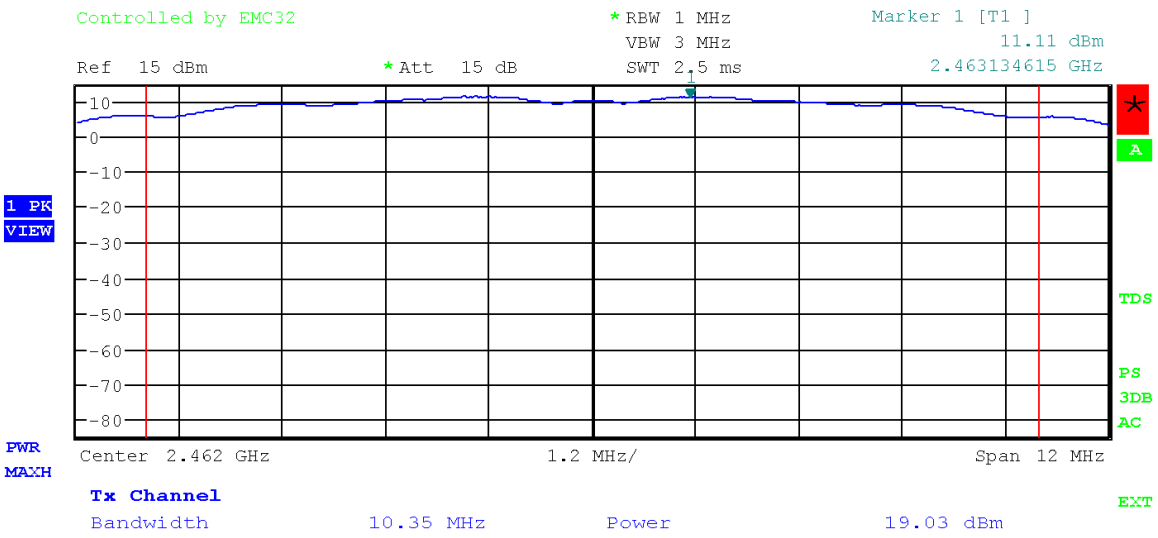


Figure 55. Channel mid.



Date: 30.MAY.2012 08:55:02

Figure 56. Channel high.

Receiver Radiated Emissions 30 – 25 000 MHz

Standard:	ANSI C63.10	(2009)
Tested by:	SOT	
Date:	28.05.2012	
Humidity:	68%	
Temperature:	20.4°C	
Barometric pressure:	1004.1 mbar	
Measurement uncertainty:	± 4.51dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.247(d), 15.209(a)

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)**.**

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

WF121-A

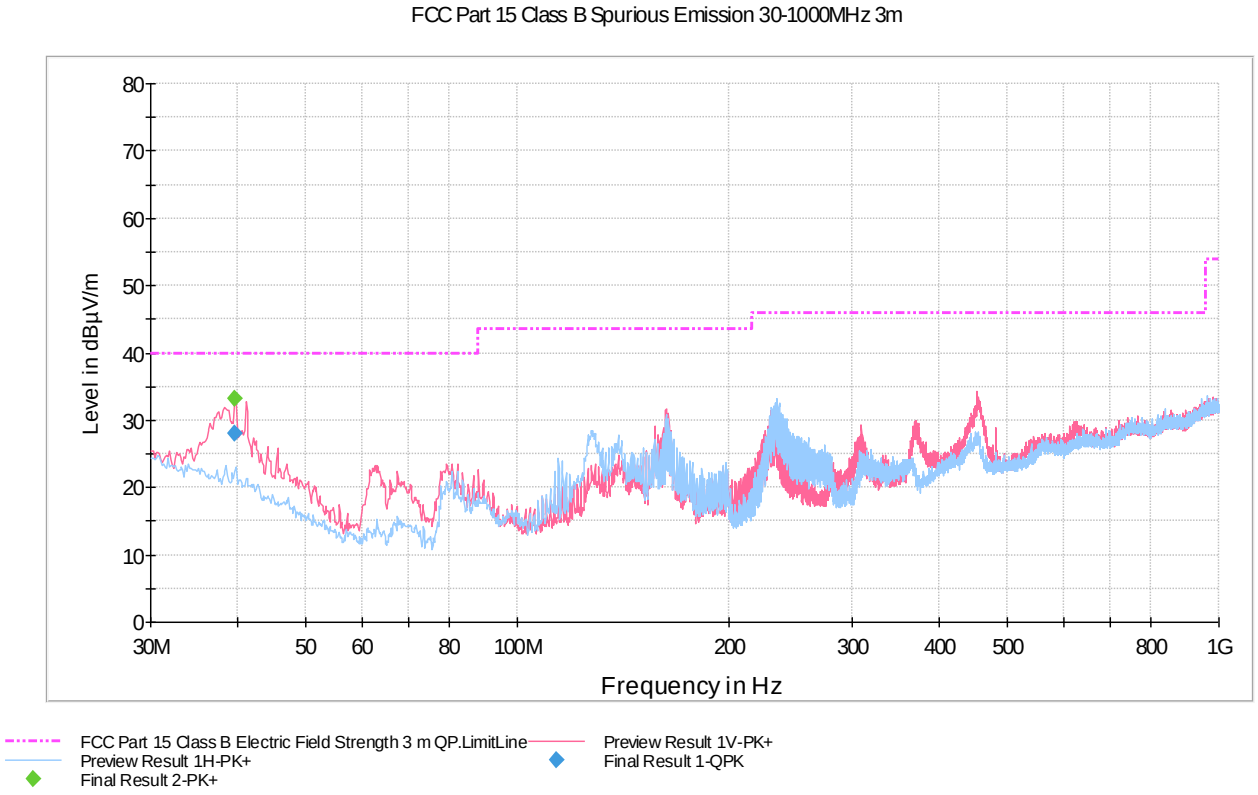


Figure 57. Measured curve with peak-detector. Channel mid.

Final measurements from the worst frequencies

Table 64. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
39.605000	27.9	1000.0	120.000	100.0	V	35.0	19.2	12.1	40.0	

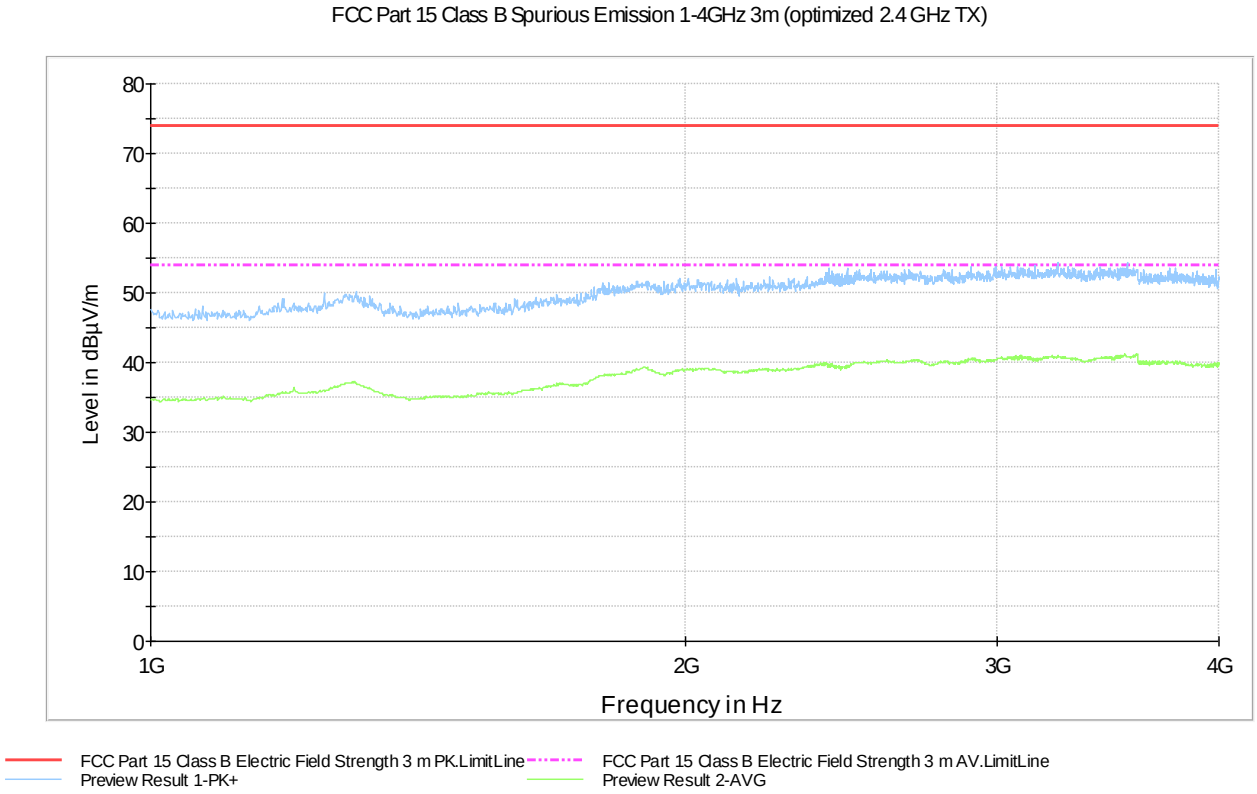


Figure 58. Measured curve with peak and average detector. Channel mid.

No final measurements were made since emission level is below the Average limit.

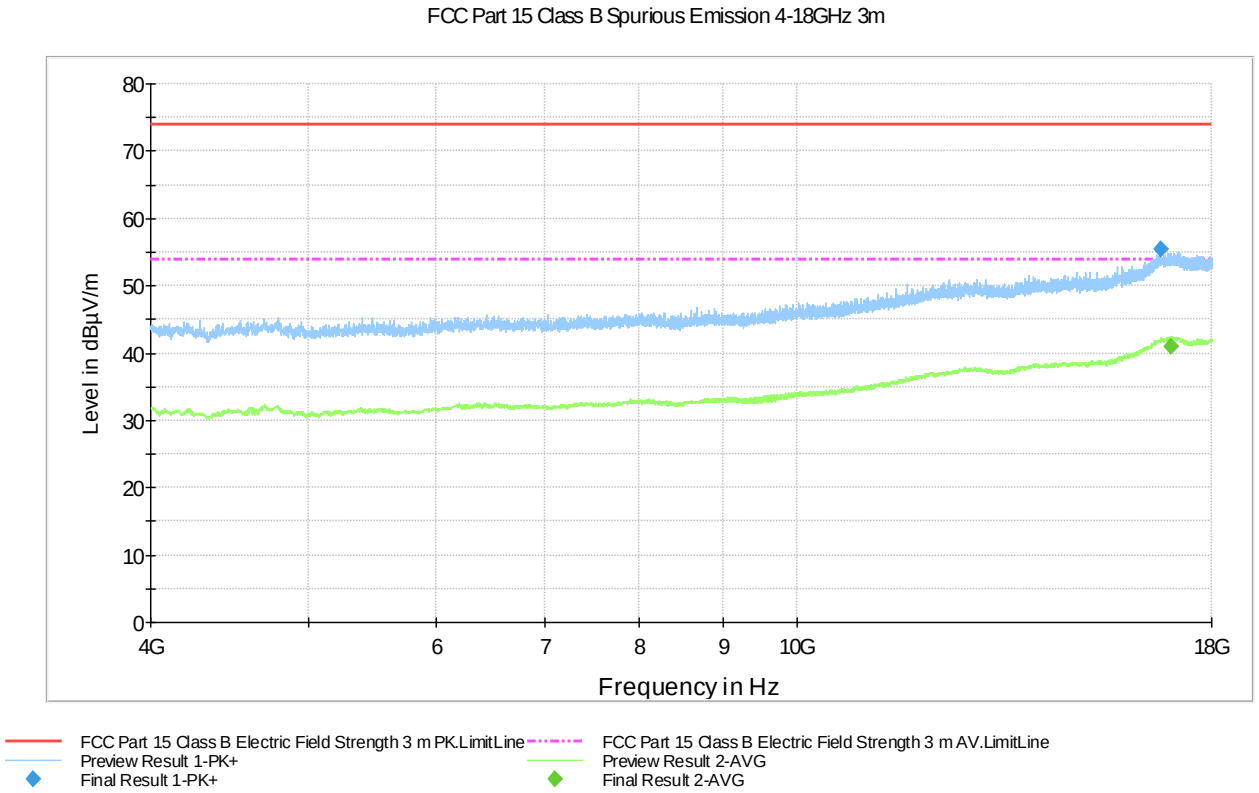


Figure 59. Measured curve with peak and average detector. Channel mid.

Final measurements from the worst frequencies

Table 65. Final results Max Peak.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
16765.625000	55.3	1000.0	1000.000	122.0	V	114.0	25.4	18.6	73.9	

Table 66. Final results Average.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
16998.025000	40.9	1000.0	1000.000	105.0	V	110.0	25.9	13.0	53.9	

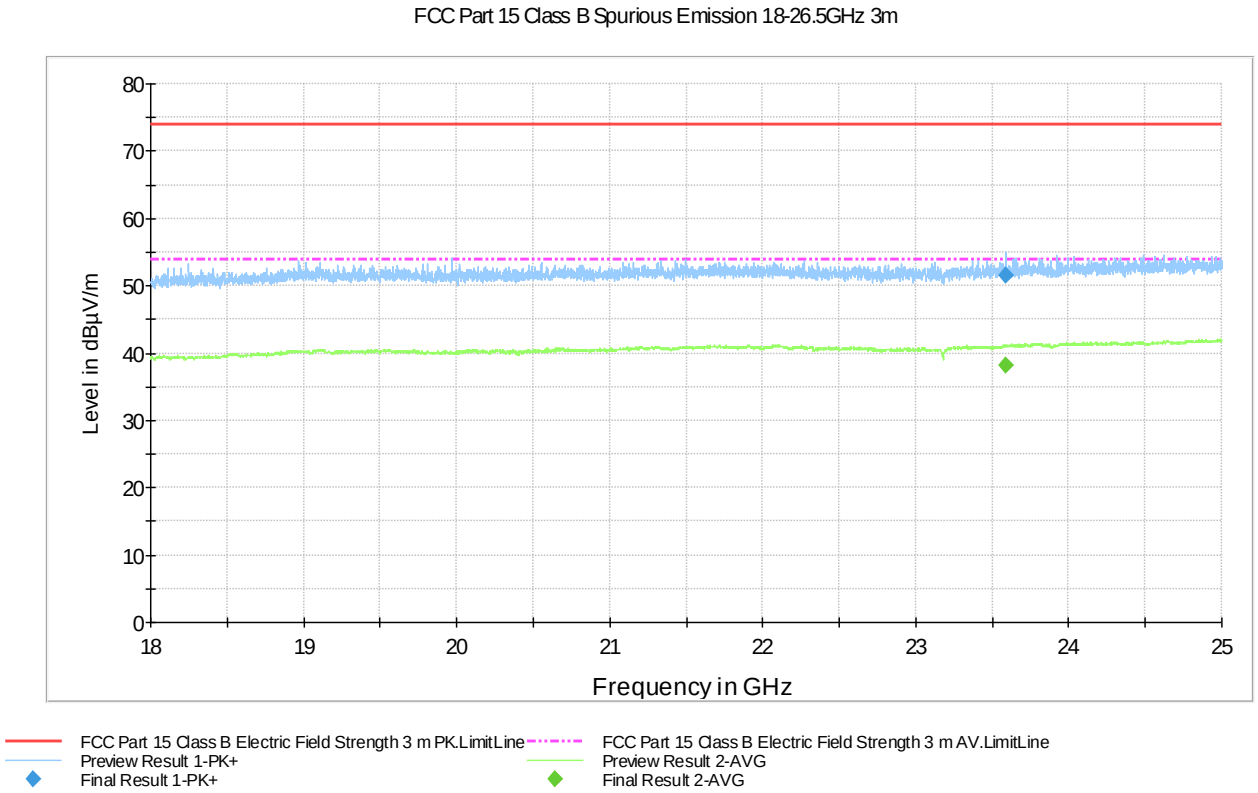


Figure 60. Measured curve with peak and average detector. Channel mid.

Final measurements from the worst frequencies

Table 67. Final results Max Peak.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23592.725000	51.5	1000.0	1000.000	122.0	V	10.0	26.9	22.4	73.9	

Table 68. Final results Average.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23592.725000	38.2	1000.0	1000.000	122.0	V	10.0	26.9	15.7	53.9	

WF121-E

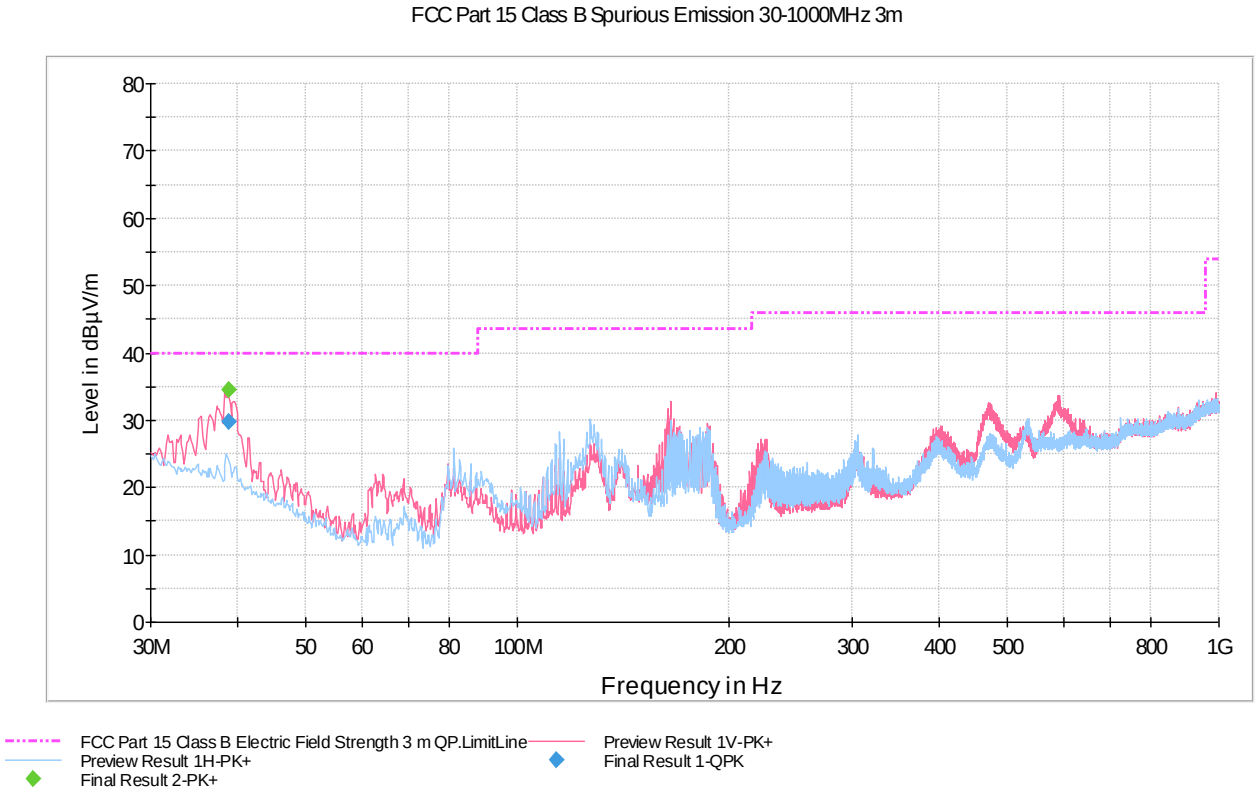


Figure 61. Measured curve with peak detector. Channel mid.

Final measurements from the worst frequencies

Table 69. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.705000	29.7	1000.0	120.000	100.0	V	325.0	19.7	10.3	40.0	

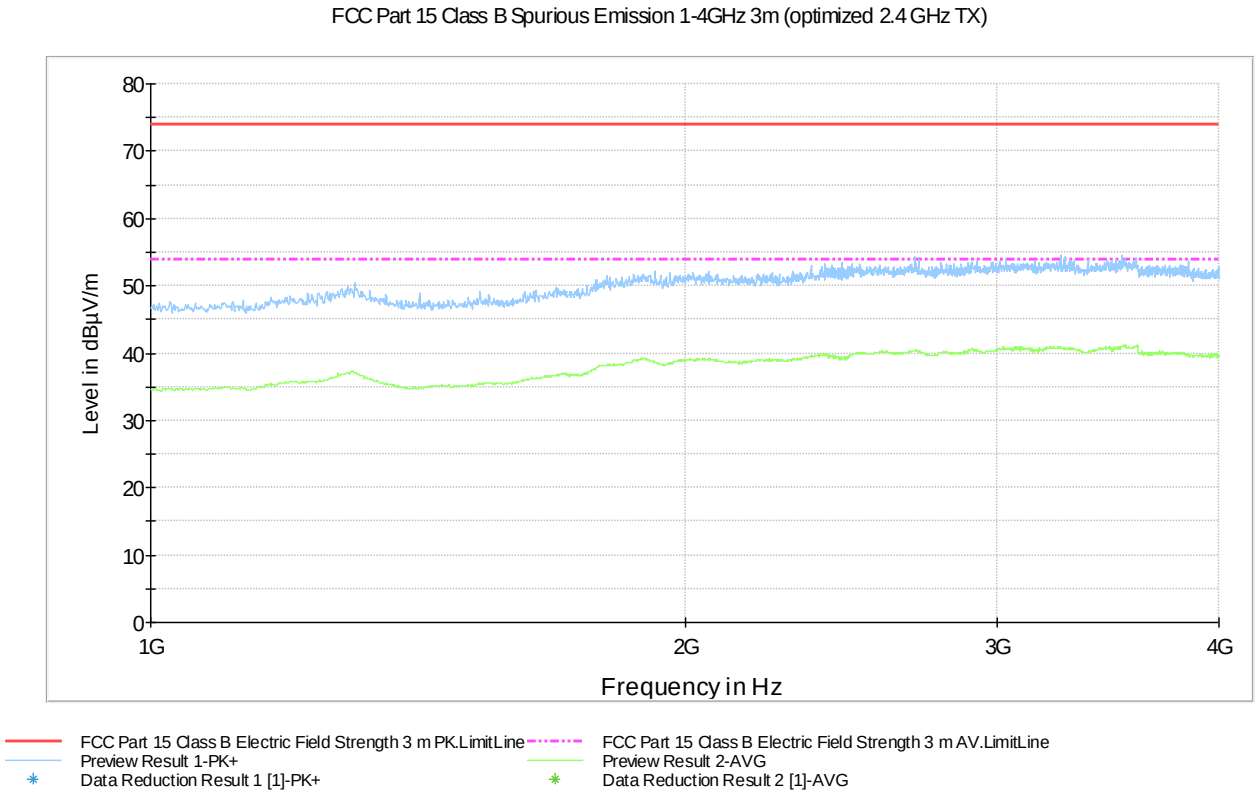


Figure 62. Measured curve with peak and average detector. Channel mid.

No final measurements were made since emission level is below the Average limit.

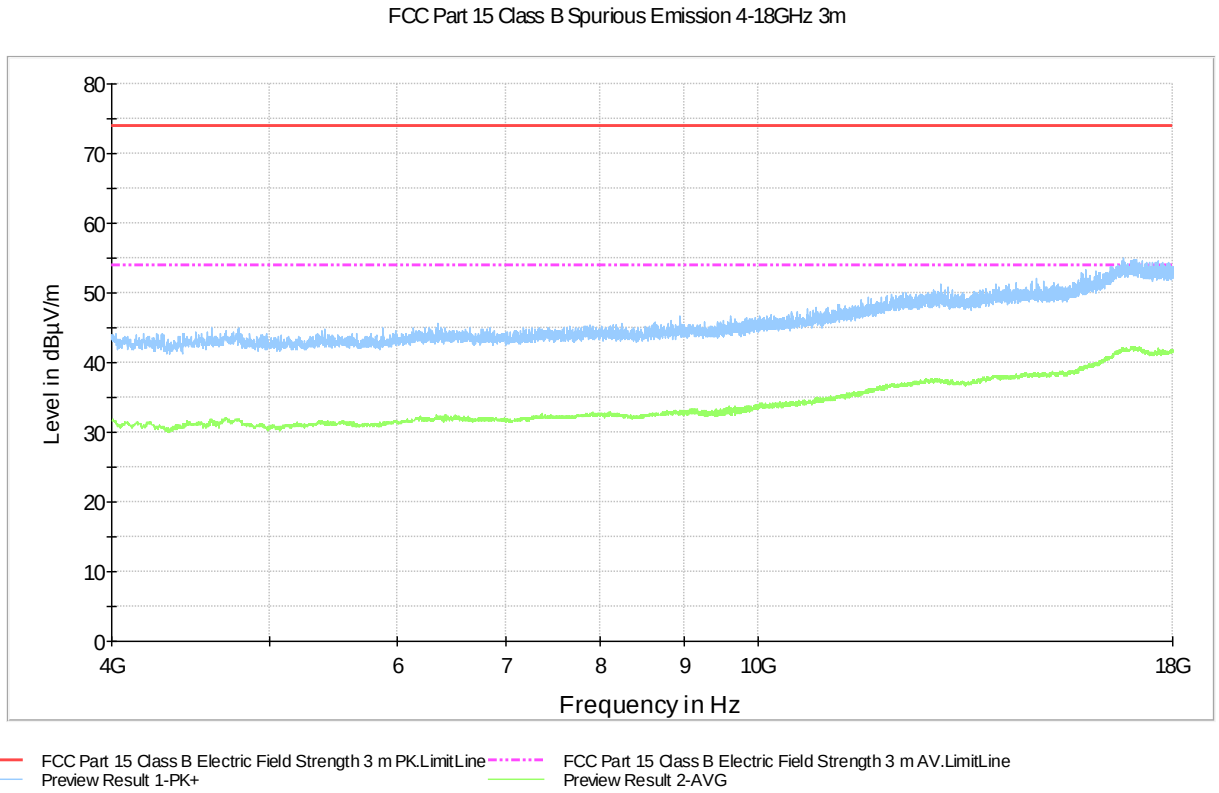


Figure 63. Measured curve with peak and average detector. Channel mid.

No final measurements were made since emission level is below the Average limit.

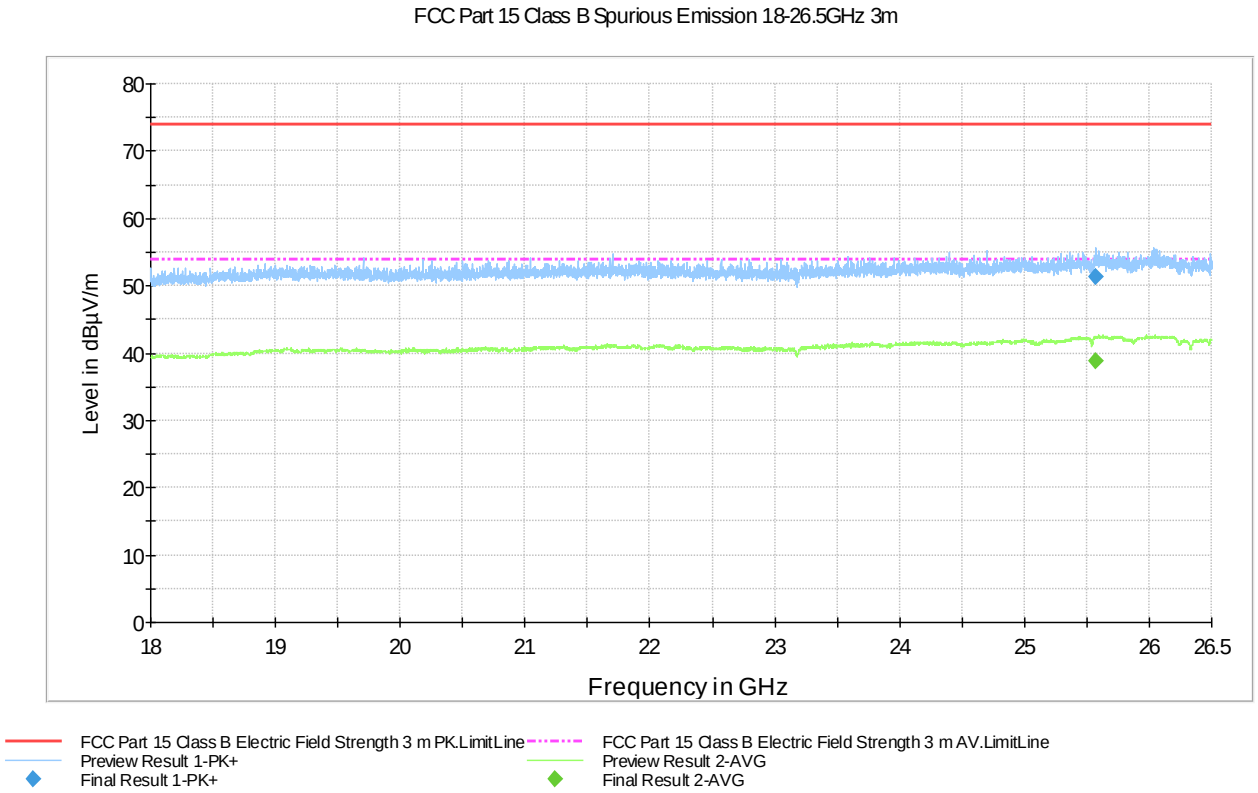


Figure 64. Measured curve with peak and average detector. Channel mid.

Table 70. Final results Max Peak.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25569.125000	51.3	1000.0	1000.000	255.0	V	82.0	28.4	22.6	73.9	

Table 71. Final results Average.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25569.125000	38.9	1000.0	1000.000	255.0	V	82.0	28.4	15.0	53.9	

WF121-N

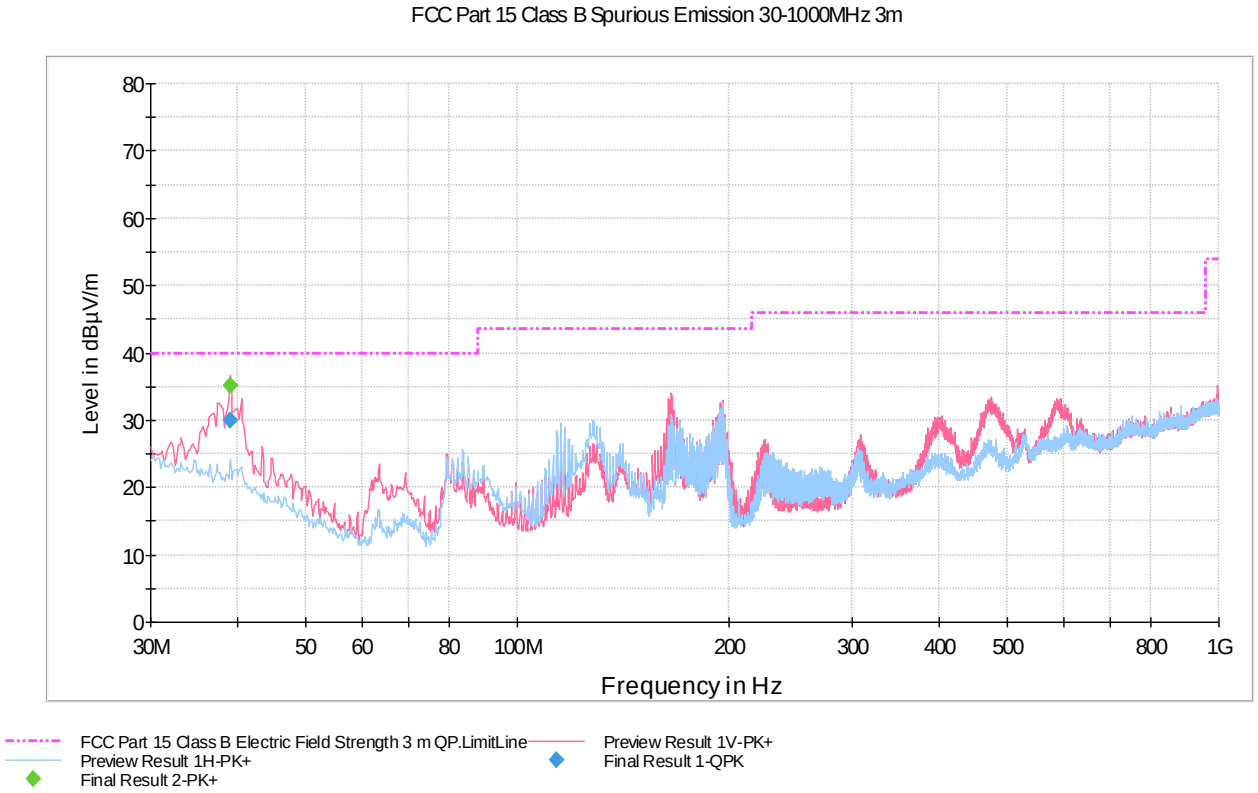


Figure 65. Measured curve with peak detector. Channel mid.

Final measurements from the worst frequencies

Table 72. Final results.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
38.945000	30.0	1000.0	120.000	100.0	V	13.0	19.6	10.0	40.0	

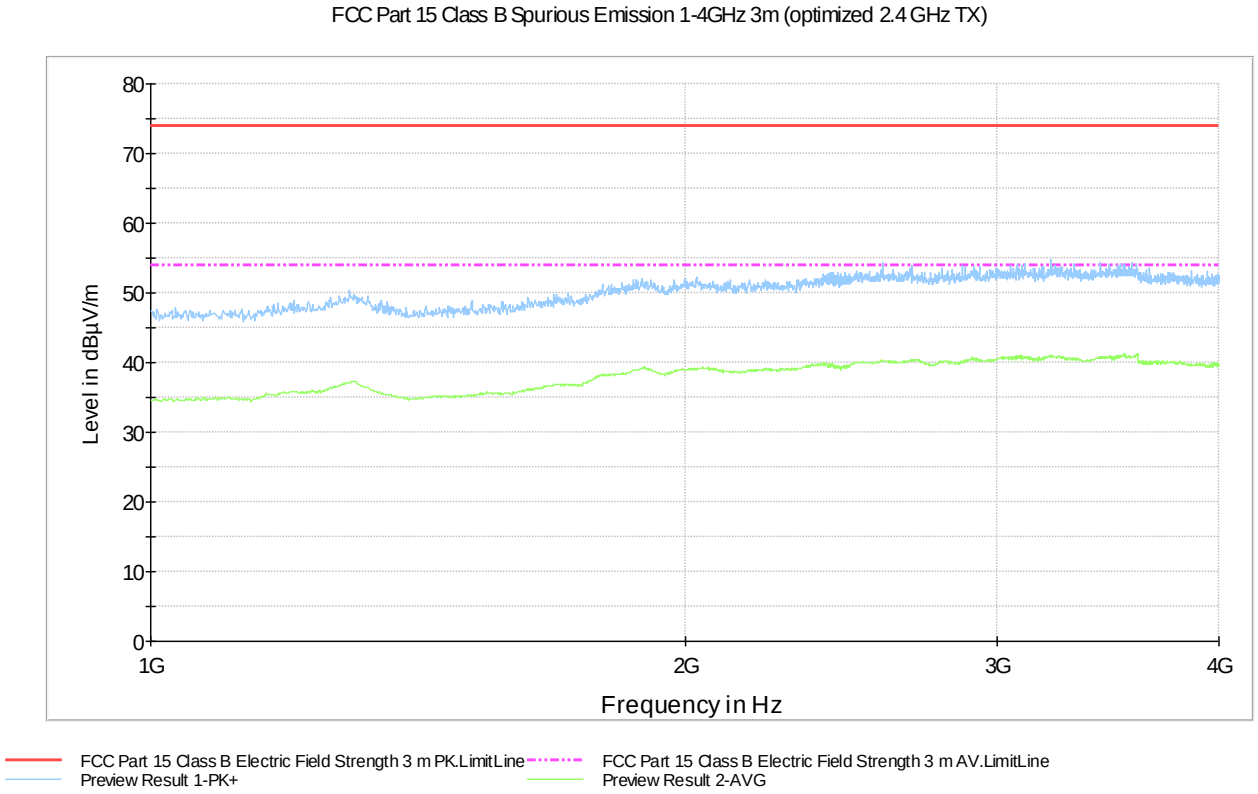


Figure 66. Measured curve with peak and average detector. Channel mid.

No final measurements were made since emission level is below the Average limit.

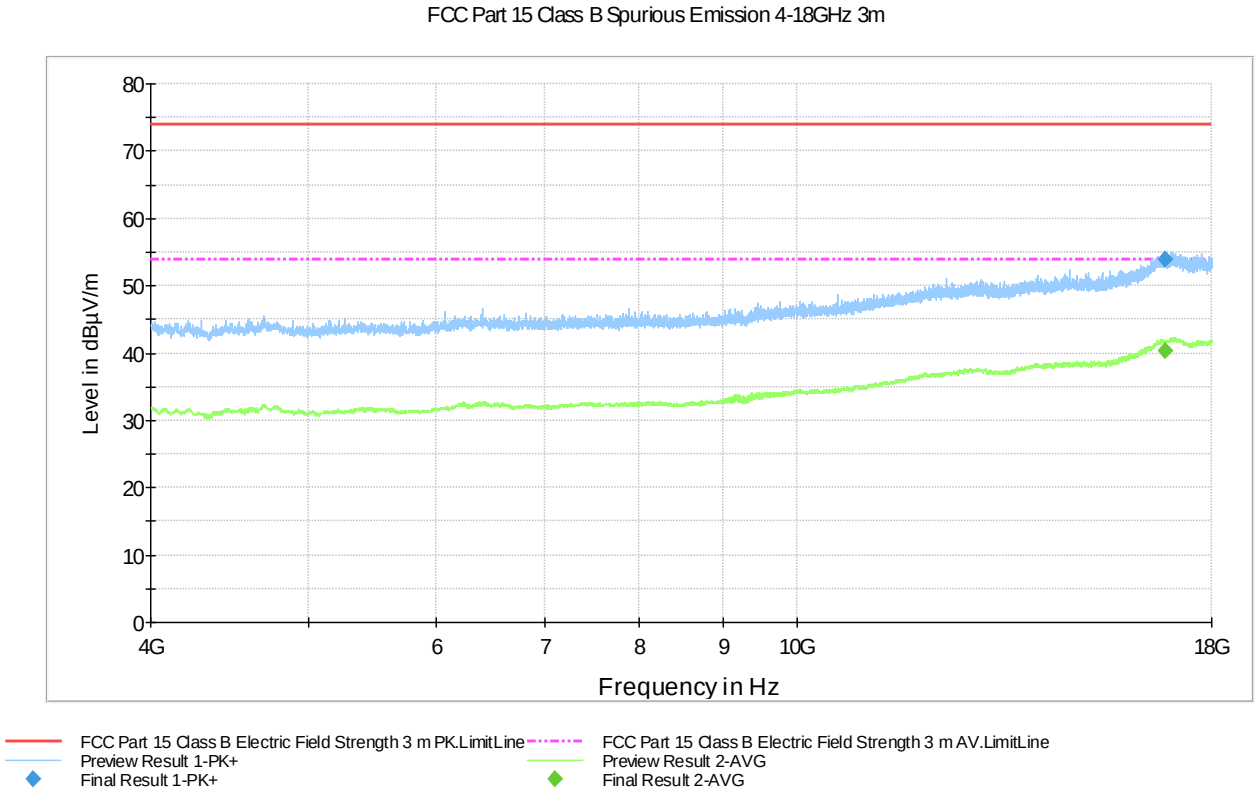


Figure 67. Measured curve with peak and average detector. Channel mid.

Table 73. Final results Max Peak.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
16839.075000	54.0	1000.0	1000.000	114.0	V	122.0	25.5	19.9	73.9	

Table 74. Final results Average.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
16839.075000	40.4	1000.0	1000.000	114.0	V	122.0	25.5	13.5	53.9	

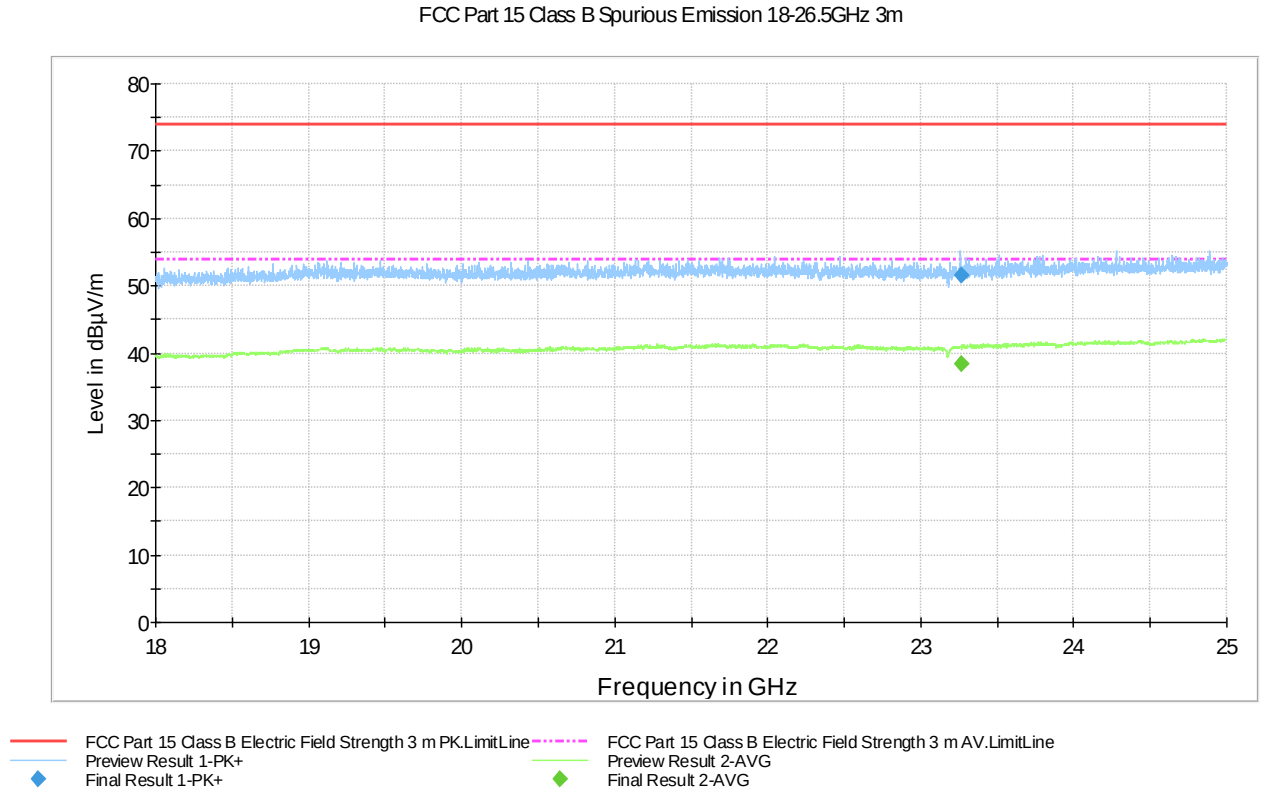


Figure 68. Measured curve with peak and average detector. Channel mid.

Table 75. Final results Max Peak.

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23264.825000	51.6	1000.0	1000.000	154.0	V	82.0	26.8	22.3	73.9	

Table 76. Final results Average.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
23264.825000	38.3	1000.0	1000.000	154.0	V	82.0	26.8	15.6	53.9	

99% Occupied Bandwidth

Standard:	ANSI C63.10	(2009)
Tested by:	RRE	
Date:	27.6.2012	
Humidity:	43 %	
Temperature:	22 °C	
Barometric pressure	997 hPa	

RSS-GEN Rule: 4.4.1

CHANNEL LOW

EUT frequency [MHz]	Limit [kHz]	99% BW [MHz]	Result
2412	---	16.250	PASS

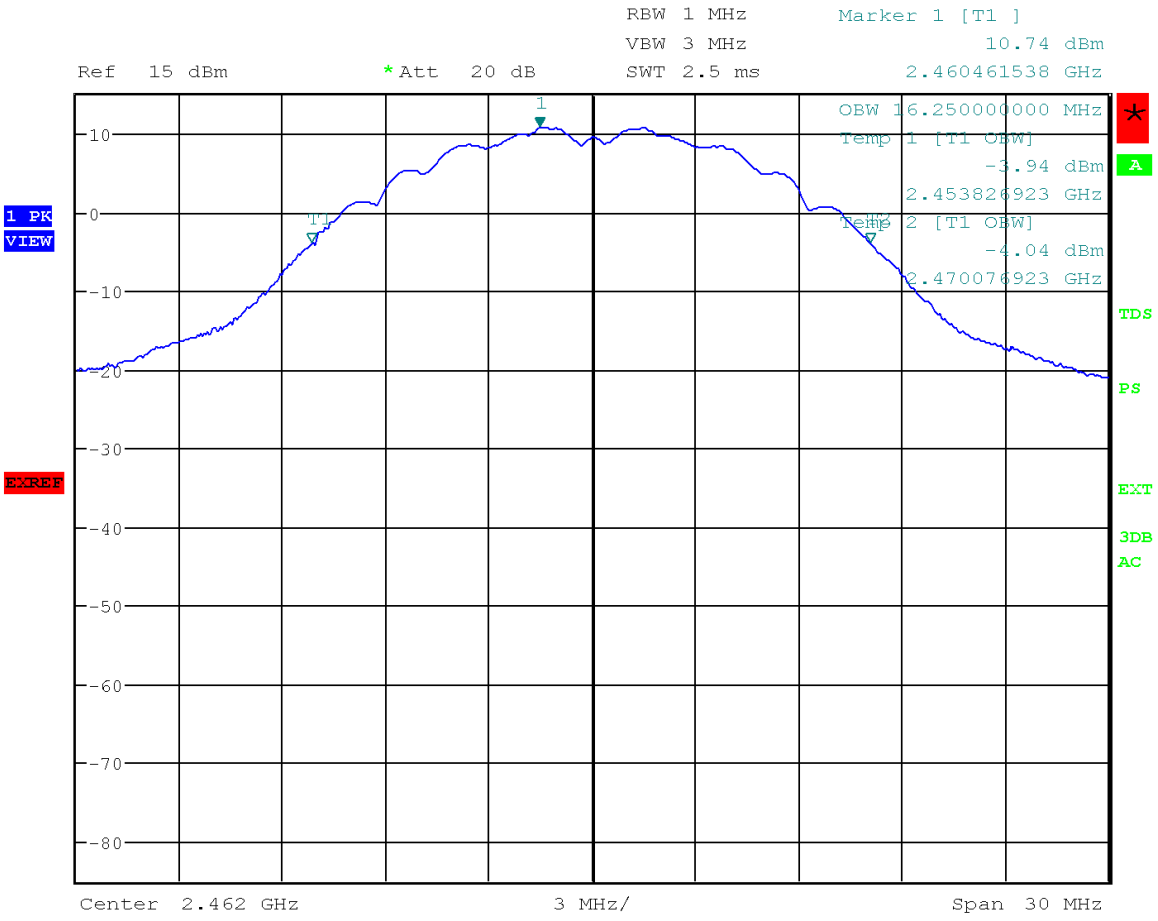
CHANNEL MID

EUT frequency [MHz]	Limit [kHz]	99% BW [MHz]	Result
2441	---	16.298	PASS

CHANNEL HIGH

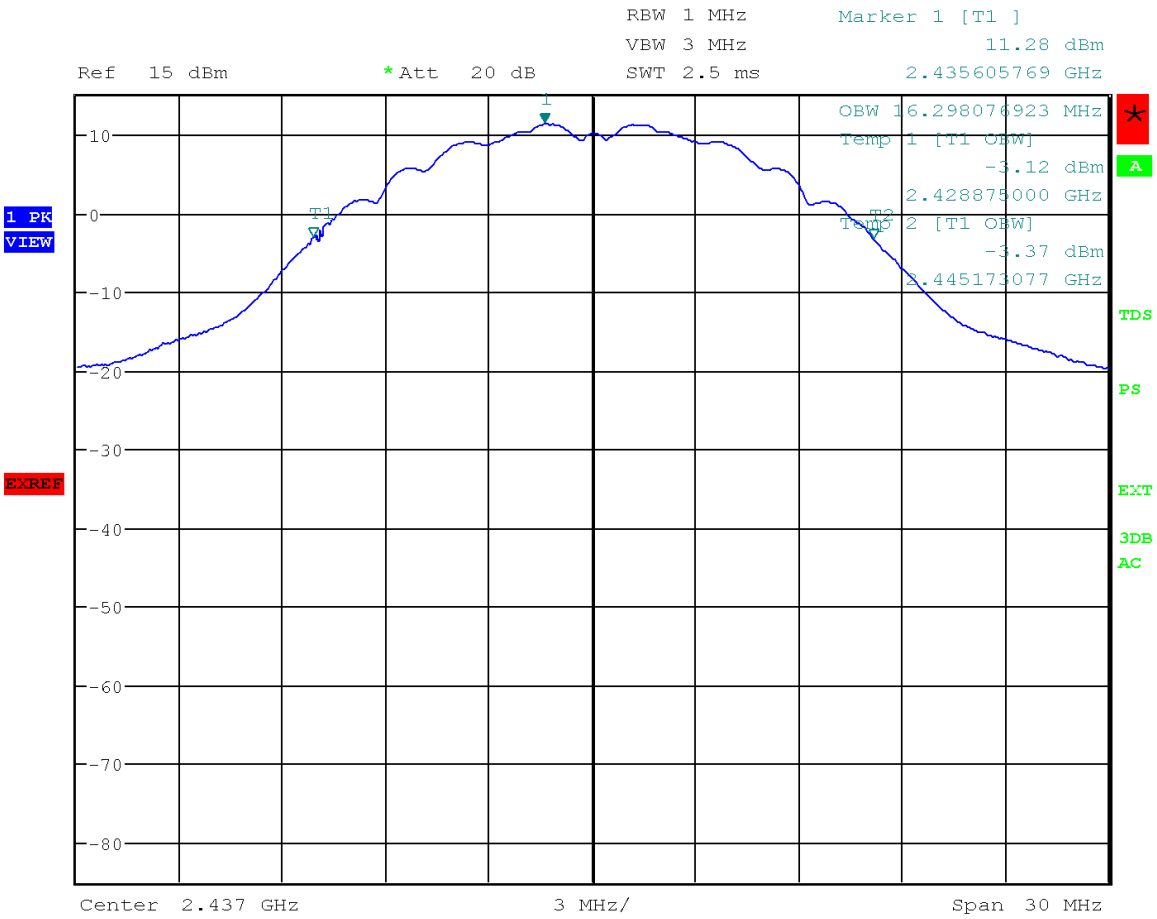
EUT frequency [MHz]	Limit [kHz]	99% BW [MHz]	Result
2482	---	16.298	PASS

99% Occupied Bandwidth



Date: 27.JUN.2012 14:47:03

Figure 69. 99% bandwidth of channel low.



Date: 27.JUN.2012 14:50:45

Figure 70. 99% bandwidth of channel mid.

99% Occupied Bandwidth

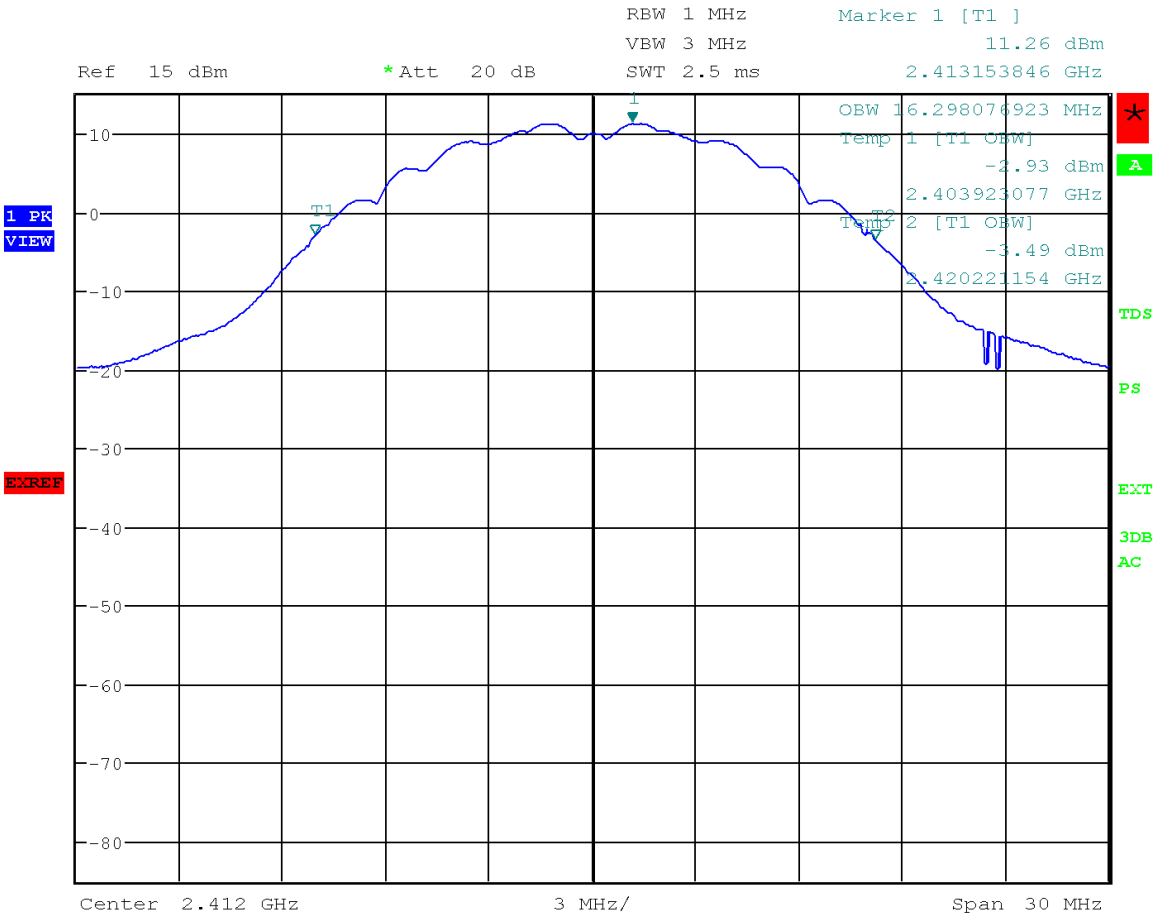


Figure 71. 99% bandwidth of channel high.

Conducted and radiated emissions

Manufacturer	Type	Serial no	Inv. no
ROHDE & SCHWARZ			
EMI Test receiver	ESU 26	100185	8453
EMI Test receiver	ESCI 3	100885	8264
Test software	EMC32	-	-
CHASE			
Antenna (30 MHz - 1 GHz)	6141A	4102	7895
EMCO			
Antenna (1 - 18 GHz)	3117	29617	7293
Antenna (18 - 26 GHz)	3160-9	28535	7294
HEWLETT- PACKARD			
Microwave amplifier	83017A	-	5226
HUBER+SUHNER			
Attenuator 10dB	6810.17B	-	-
DEISEL			
Antenna mast	MA 240 T	240/394/96	5017
Tilt option	KE 220	220/307/96	-
Controller	HD 100	100/413/96	5018
Turntable	DS 420	420/420/96	5015
WAINWRIGHT			
High Pass Filter	WHKX	10	8267
CALIFORNIA INSTRUMENTS			
AC power source	13500L/3-3PT-4708	4009-419-1 Rev B	4970

NOTE! All testing equipment were calibrated.