

Test Report



INTENTIONAL RADIATOR TESTS ACCORDING TO FCC SUBPART 15 E and INDUSTRY CANADA REQUIREMENTS

Equipment Under Test: Nordic ID Medea

Model: 815-1A

Manufacturer /
Customer: Nordic ID Oy

Myllyojankatu 2A
24100 Salo
Finland

FCC Rule Part: 15.407: 2014

IC Rule Part: RSS-210, Issue 8, 2010

RSS-GEN Issue 4, 2014

KDB: Guidelines For Compliance Testing of Unlicensed
National Information Infrastructure (U-NII)
Devices Part 15, Subpart E. 789033 D02 General
UNII Test Procedures New Rules v01 (June 6,
2014)

Date: March 3, 2015

Issued by:

A blue ink signature of Niko Kotsalo.

Niko Kotsalo
Testing Engineer

Date: March 3, 2015

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Rauno Repo
Testing Engineer

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Equipment Under Test (EUT)

Nordic ID Medea with 802.11 a/b/g/n + BT 2.1 + EDR module	
Brand:	Nordic ID
Model No:	815-1A
Type:	HTG00017
FCC ID (RFID radio module):	SCCNUR05WL2
IC ID (RFID radio module):	5137A-NUR05WL2
FCC ID (WLAN a/b/g/n + Bluetooth 2.1 module):	TWG-SDC SSD40NBT
IC ID (WLAN a/b/g/n + Bluetooth 2.1 module):	6616A-SDC SSD40NBT

Description of the EUT

The EUT is a battery operated portable computer with RFID radio (FCC ID: SCCNUR05WL2) and barcode reader. Nordic ID medea also includes (FCC ID: TWG-SDC SSD40NBT) 802.11 a/b/g/n WLAN and Bluetooth v2.1 + EDR module This report includes only the 5 GHz WLAN a/n test results.

Classification of the device

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

Ratings and declarations

Operating Frequency Range (OFR):	5150 – 5250 MHz
Channels:	4 (36, 40, 44, 48)
Channel separation:	20 MHz
Channel bandwidth:	20 MHz
Conducted power:	11.2 dBm (a-mode)
Transmission technique:	DSSS
Modulation:	OFDM, BPSK,
Transmission rate 802.11n, 20MHz BW:	MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7
Transmission rate 802.11a:	6, 9, 12, 18, 24, 36, 48, 54Mbps
Antenna gain:	4 dBi

Power Supply

Battery / AC operated	7.2 VDC / 100-240 VAC, 50-60 Hz
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Disclaimer

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SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.209 / RSS-GEN 8.9	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

Preliminary tests were performed in different data rates and modulation methods to find the worst case emissions. The following modes were selected for the final tests:

Mode 802.11a: 6Mbps

Mode 802.11n: 20 MHz BW, MCS0

The radiated spurious emissions tests were performed with the EUT being in three different orthogonal positions: X, Y, Z.

Following channels were used during the tests:

Channel	Channel #	Frequency/ MHz
LOW	36	5180
MID	40	5200
HIGH	48	5240

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

Transmitter Radiated Emissions 30 – 40 000 MHz and Band Edge

Standard: ANSI C63.10 (2009)
Tested by: NKO/PKA
Date: 16.02 - 23.02.2015
Temperature: 21 – 23 °C
Humidity: 21 – 31 % RH
Measurement uncertainty: ± 4.51 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.407(d), 15.209(a)

The test 30-1000 MHz was performed in a semi-anechoic room from 3 m distance. The EUT was placed on a non-conductive table 0.8 m height on the conducting ground plane of the turntable. The highest level of the spurious component is searched by rotating transmitter 360° with both measuring antenna polarization. The Final measurements at the frequencies 30-1000 MHz were performed with QP-detector (RBW: 120 kHz).

In the frequency range 1000-40000 MHz the test was performed in a semi-anechoic chamber. During the test 1000 – 26500 MHz the distance from the EUT to the measuring antenna was 3 m and in the frequency range 26500 – 40000 MHz the distance from the EUT to the measuring antenna was 1 m. The test results were extrapolated to the 3 m distance by using an extrapolation factor of 20 dB/decade. The tests were performed with the measuring antenna in horizontal and vertical polarizations. The measurements at the frequencies above 1000 MHz were performed with peak detector and average detector (RBW: 1 MHz).

The CFR 47 Part 15, Section 15.209(a) limit of 500 µV/m has been calculated to correspond 54 dB(µV/m) as follows: $[dB(\mu V/m)] = 20 \log[\mu V/m]$.

Frequency band MHz	Quasi-peak limit dB(µV/m)
30 - 88	40
88 - 216	43.5
216 - 960	46
960 - 1000	54

The CFR 47 Part 15, Section 15.209(a) limit values for radiated emissions which fall in the restricted bands (3m measuring distance)

Frequency band MHz	Average limit dB(µV/m)	Peak limit dB(µV/m)
1000 - 40000	54	74

The CFR 47 Part 15, Section 15.407 limit values for radiated emissions of UNWANTED EMISSION OUT OF THE RESTRICTED BANDS (3m measuring distance, calculated from -27 dBm limit ¹⁾)

Frequency band MHz	Average limit dB(µV/m)	Peak limit dB(µV/m)
1000 - 40000	-	68.2

$$^1) E = \frac{1000000\sqrt{30P}}{d}, \text{ where } E = \mu V/m, P = W[EIRP], d = m[\text{distance}]$$

As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

The correction factor in the final result table contains the sum of the transducers (antenna + amplifier + cables). Measurements were done with 6Mbps data rate and MCS0 data rate.

Test results 802.11a 6Mbps

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

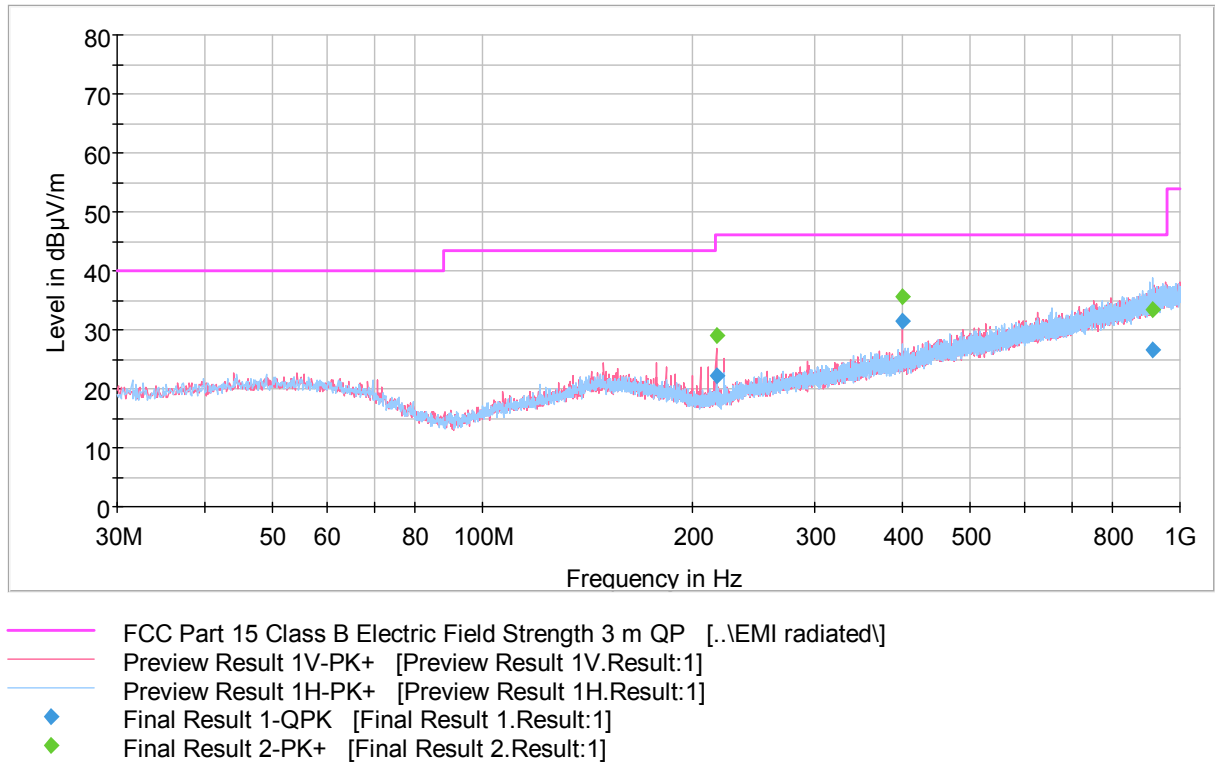


Figure 1. Measured curves with peak-detector (low channel).

Final measurements from the worst frequencies.

Table 1. Final measurements from the worst frequencies.

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
216.511000	22.1	1000.0	120.000	100.0	V	101.0	12.5	23.9	46.0	
400.018000	31.5	1000.0	120.000	138.0	V	231.0	18.4	14.5	46.0	
914.241000	26.7	1000.0	120.000	100.0	H	218.0	27.8	19.3	46.0	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

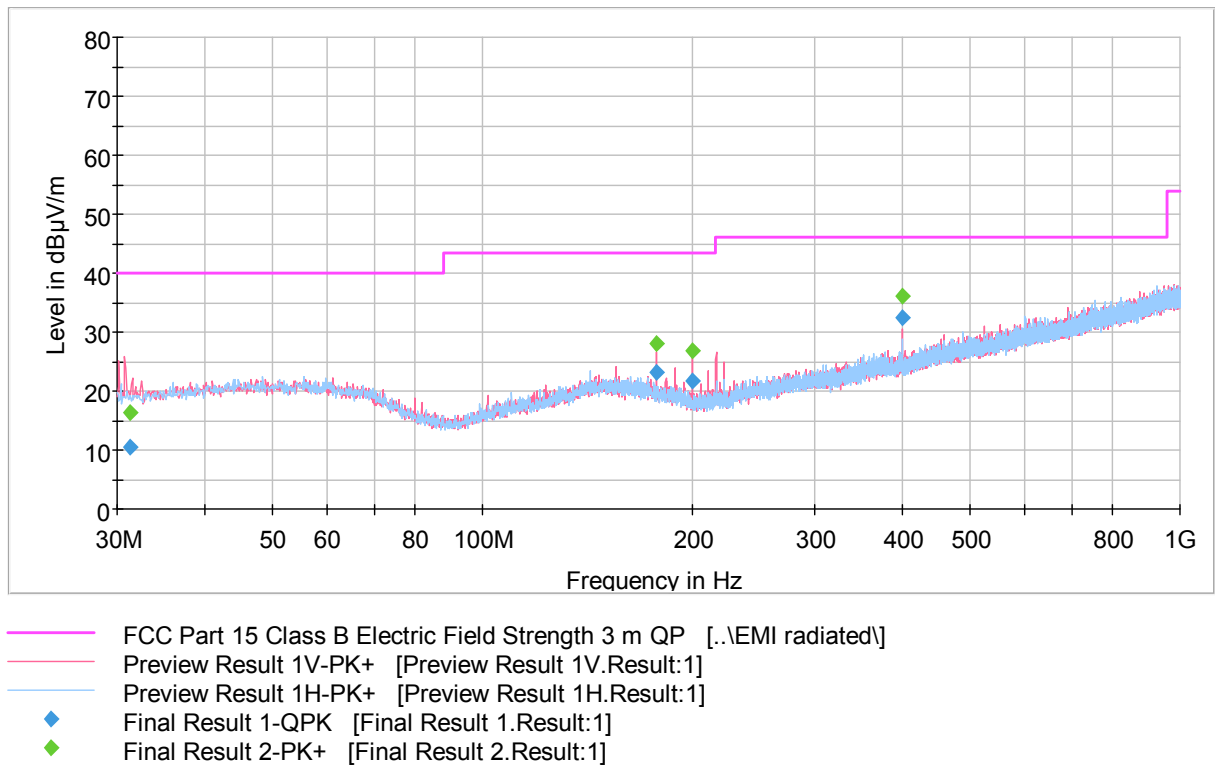


Figure 2. Measured curve with peak-detector (middle channel).

Final measurements from the worst frequencies.

Table 2. Final measurements from the worst frequencies.

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
31.356000	10.5	1000.0	120.000	296.0	V	181.0	14.1	29.5	40.0	
177.925000	23.1	1000.0	120.000	100.0	V	280.0	14.1	20.4	43.5	
199.981000	21.7	1000.0	120.000	100.0	V	224.0	12.5	21.8	43.5	
399.998000	32.4	1000.0	120.000	155.0	V	205.0	18.4	13.6	46.0	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

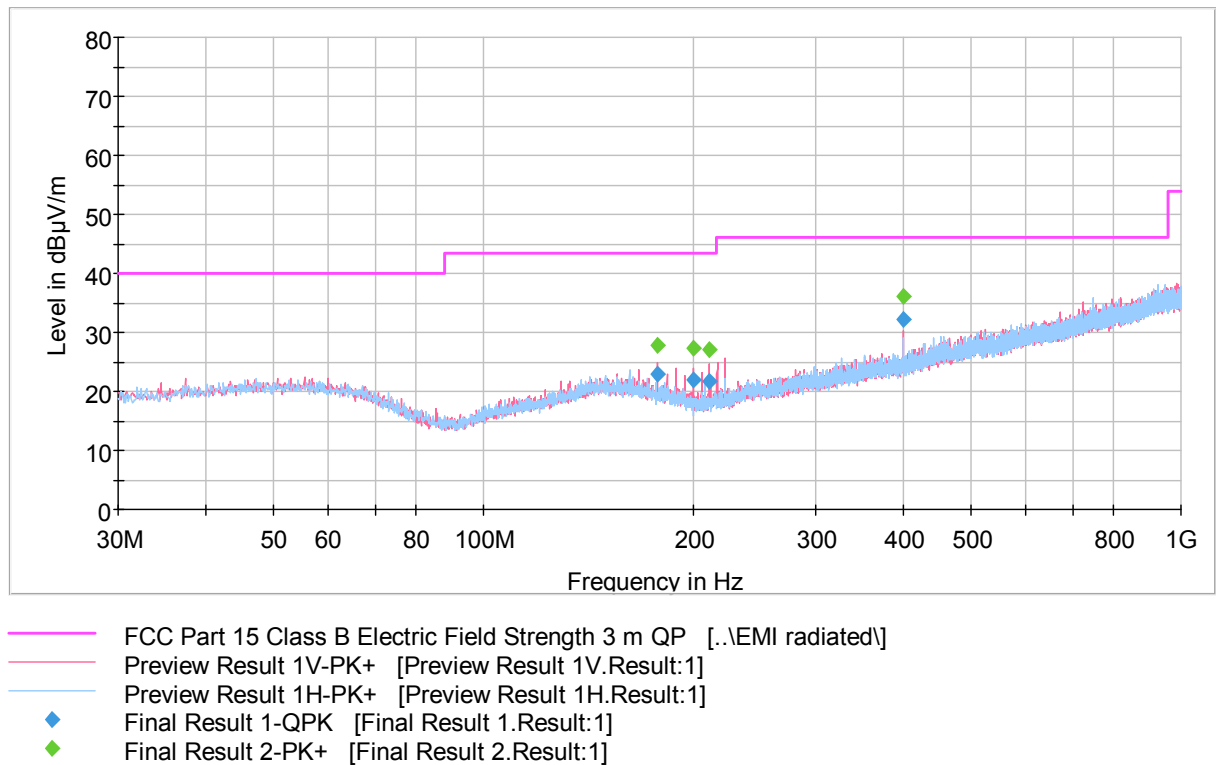


Figure 3. Measured curve with peak-detector (high channel).

Final measurements from the worst frequencies.

Table 3. Final measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
177.945000	22.9	1000.0	120.000	100.0	V	261.0	14.1	20.6	43.5	
200.004000	21.9	1000.0	120.000	100.0	V	292.0	12.5	21.6	43.5	
211.019000	21.7	1000.0	120.000	100.0	V	314.0	12.4	21.8	43.5	
400.018000	32.1	1000.0	120.000	135.0	V	13.0	18.4	13.9	46.0	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 1-6.5GHz 3m

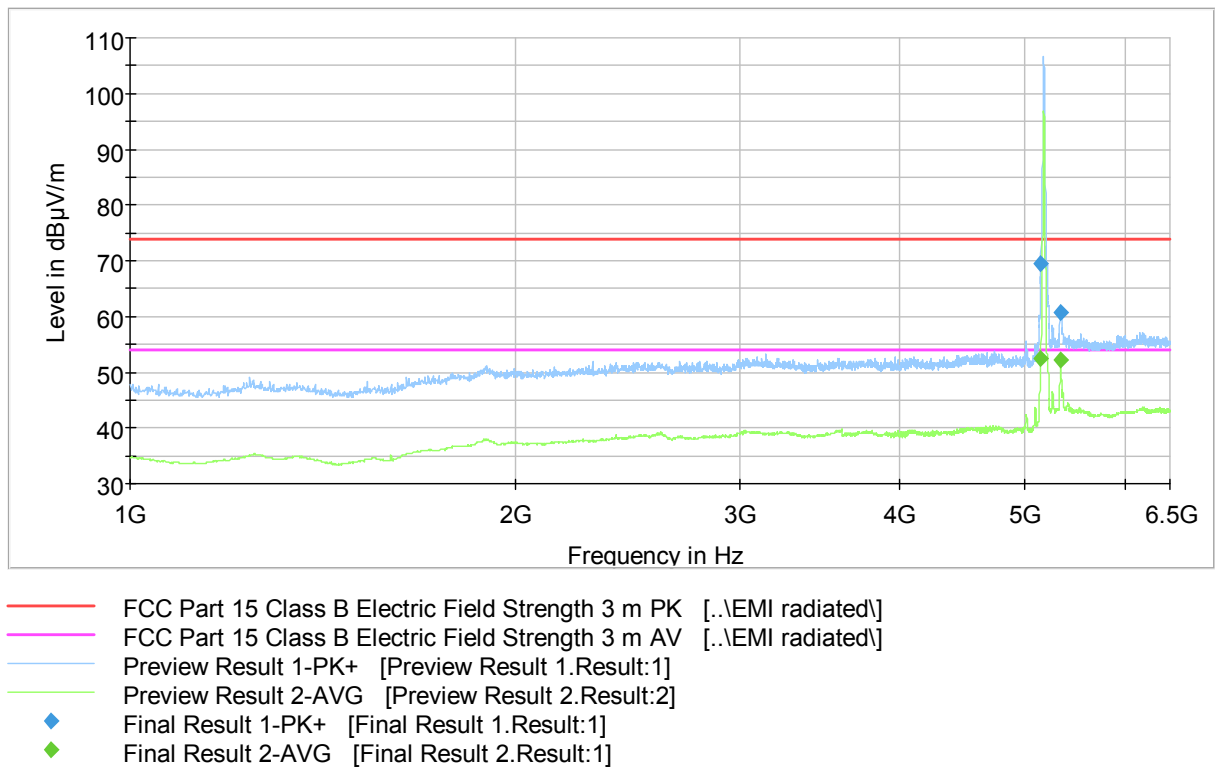


Figure 4. Measured curve with peak- and average detector (low channel).

FCC Part 15 Class B Spurious Emission 1-6.5GHz 3m

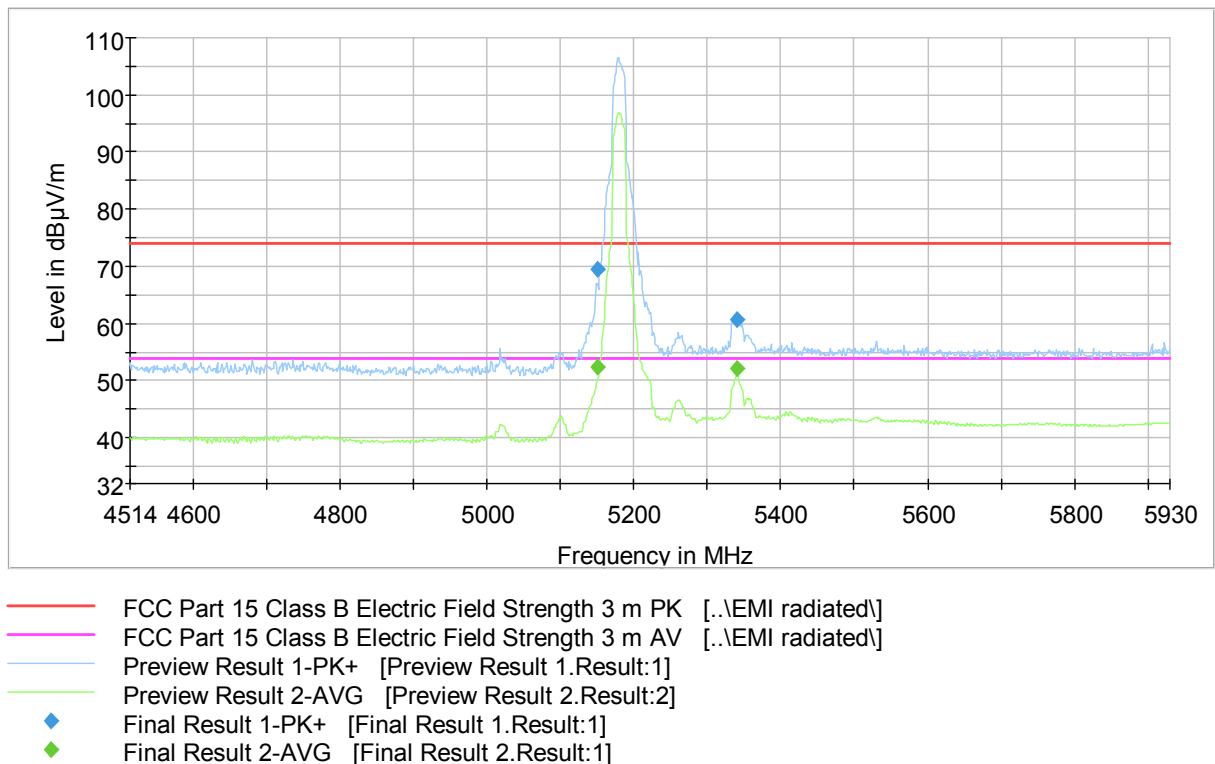


Figure 5. Low channel band edge.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

Final measurements from the worst frequencies.

Table 4. 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
5150.025000	69.6	1000.0	1000.000	194.0	H	337.0	19.6	4.3	73.9	
5340.975000	60.8	1000.0	1000.000	169.0	H	359.0	20.2	13.1	73.9	

Table 5. 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
5150.000000	52.4	1000.0	1000.000	184.0	H	338.0	19.6	1.5	53.9	
5341.225000	52.1	1000.0	1000.000	170.0	H	319.0	20.2	1.8	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

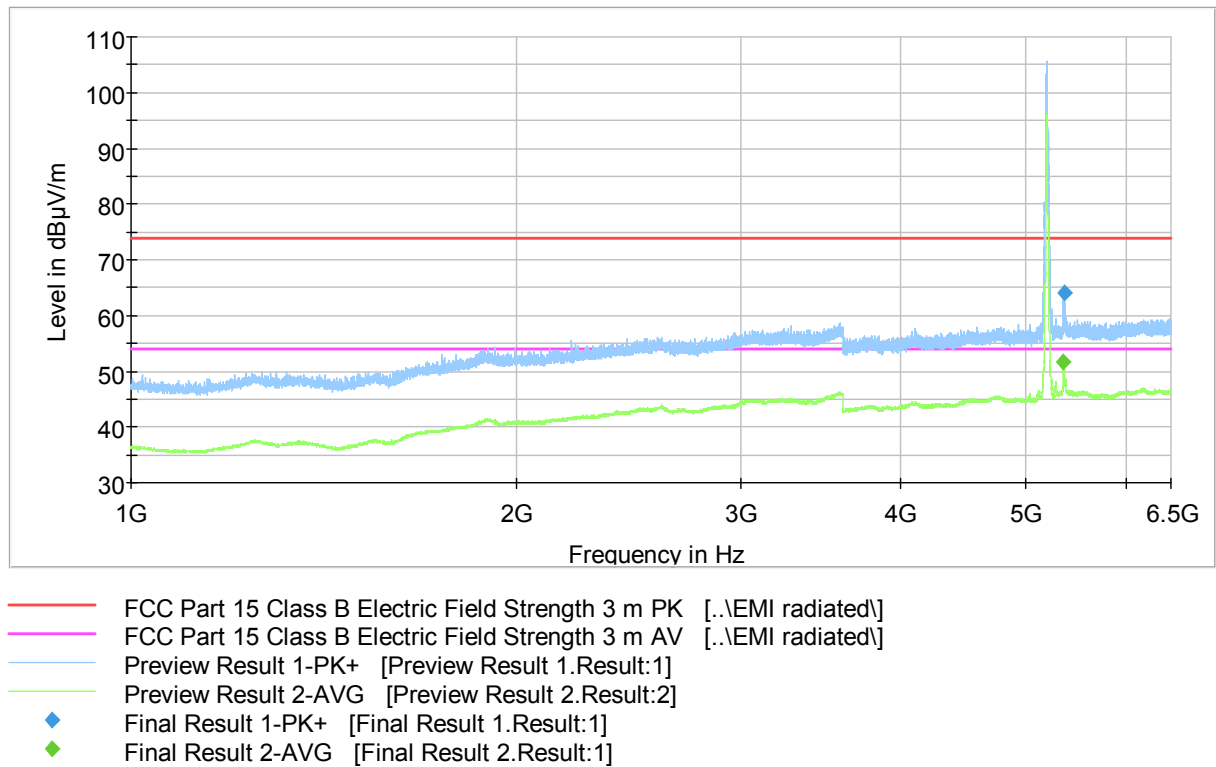


Figure 6. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

Table 6. 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
5360.025000	64.0	1000.0	1000.000	193.0	H	-4.0	20.2	9.9	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
5358.950000	51.6	1000.0	1000.000	195.0	H	3.0	20.2	2.3	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

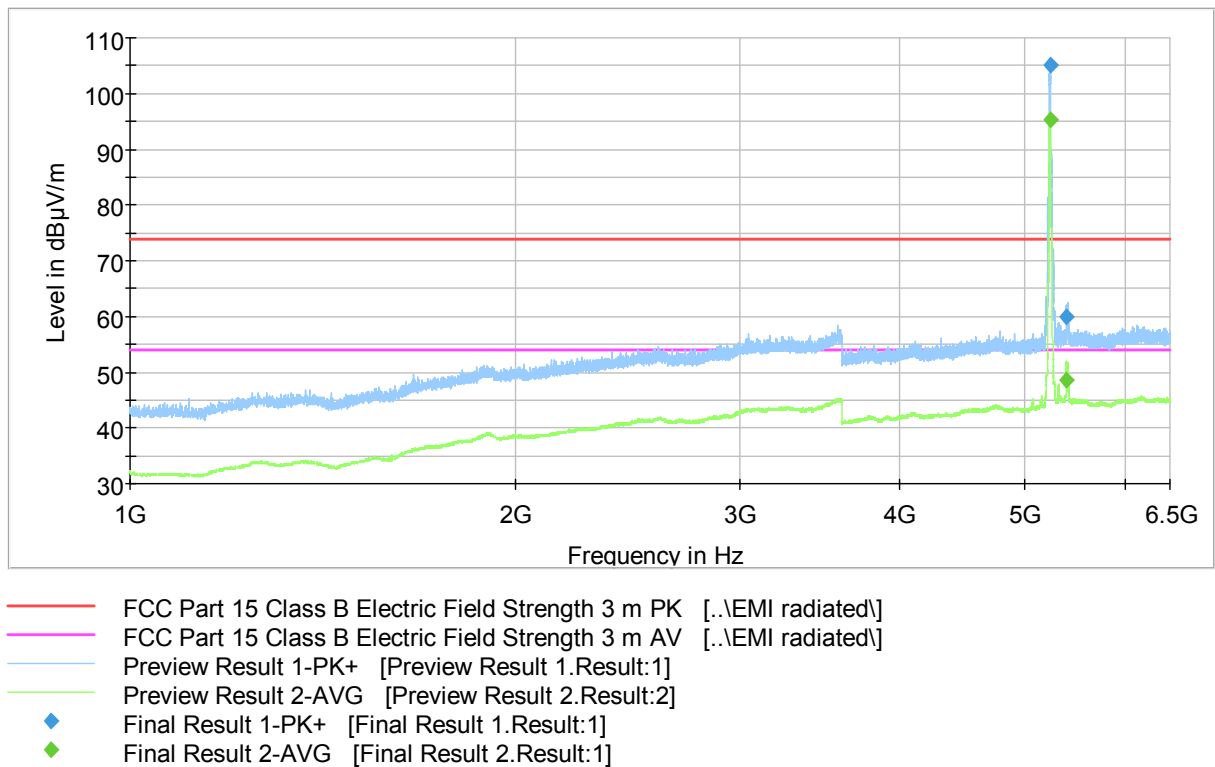


Figure 7. Measured curve with peak- and average detector (high channel).

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

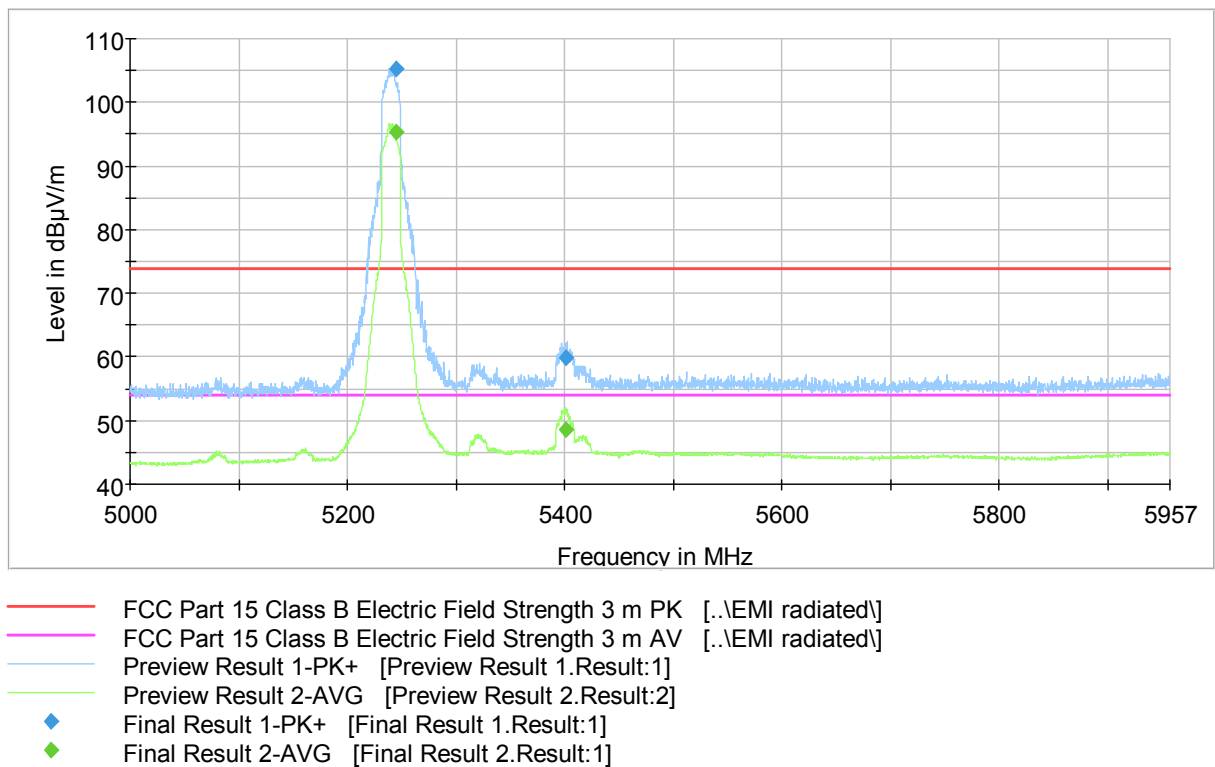


Figure 8. High channel band edge.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

Final measurements from the worst frequencies.

Table 8. 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
5245.000000	105.2	1000.0	1000.000	177.0	H	-4.0	9.7	-31.3	73.9	Carrier
5401.350000	59.8	1000.0	1000.000	200.0	H	3.0	10.3	14.1	73.9	

Table 9. 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
5245.400000	95.4	1000.0	1000.000	195.0	H	-4.0	9.7	-41.5	53.9	Carrier
5400.825000	48.6	1000.0	1000.000	186.0	H	1.0	10.3	5.3	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 6.5-18 GHz 3m

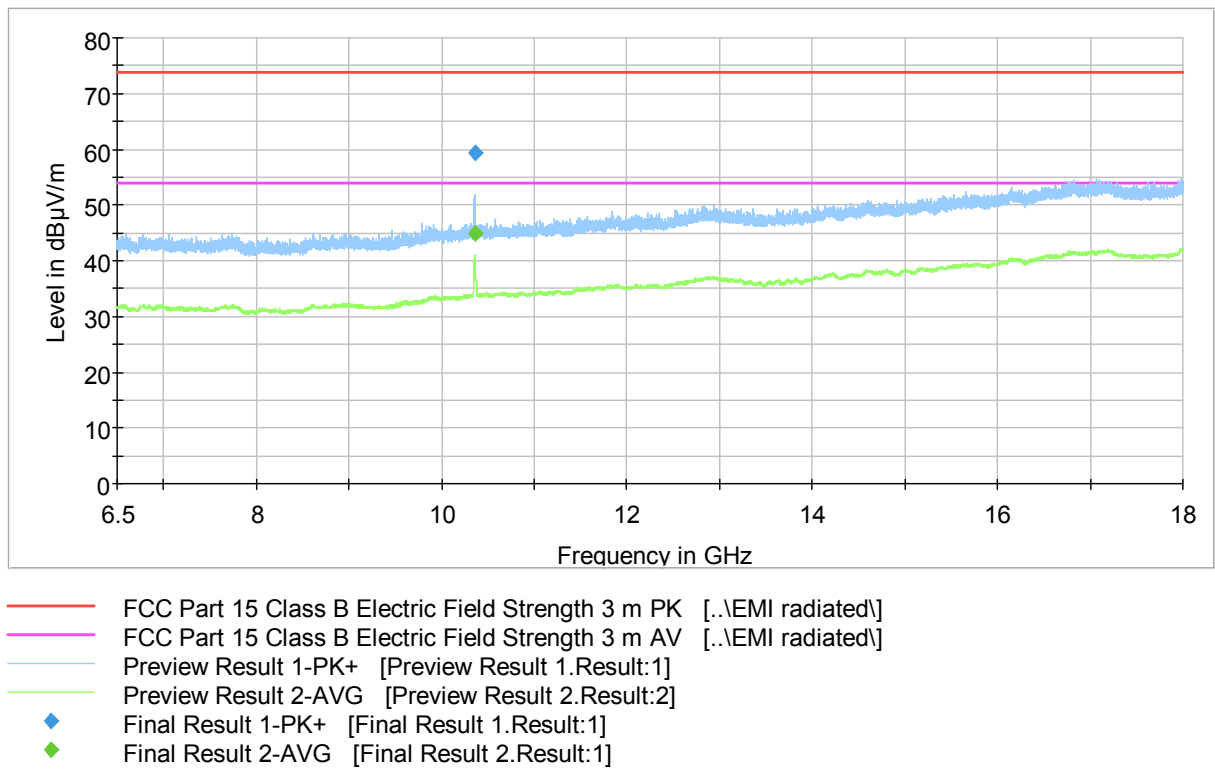


Figure 9. Measured curve with peak- and average detector (low channel).

Final measurements from the worst frequencies.

Table 10. Final Max Peak results.

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
10359.900000	59.5	1000.0	1000.000	162.0	H	309.0	16.6	14.4	73.9	

Table 11. Final Average results.

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
10361.150000	44.8	1000.0	1000.000	146.0	H	310.0	16.6	9.1	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 6.5-18 GHz 3m

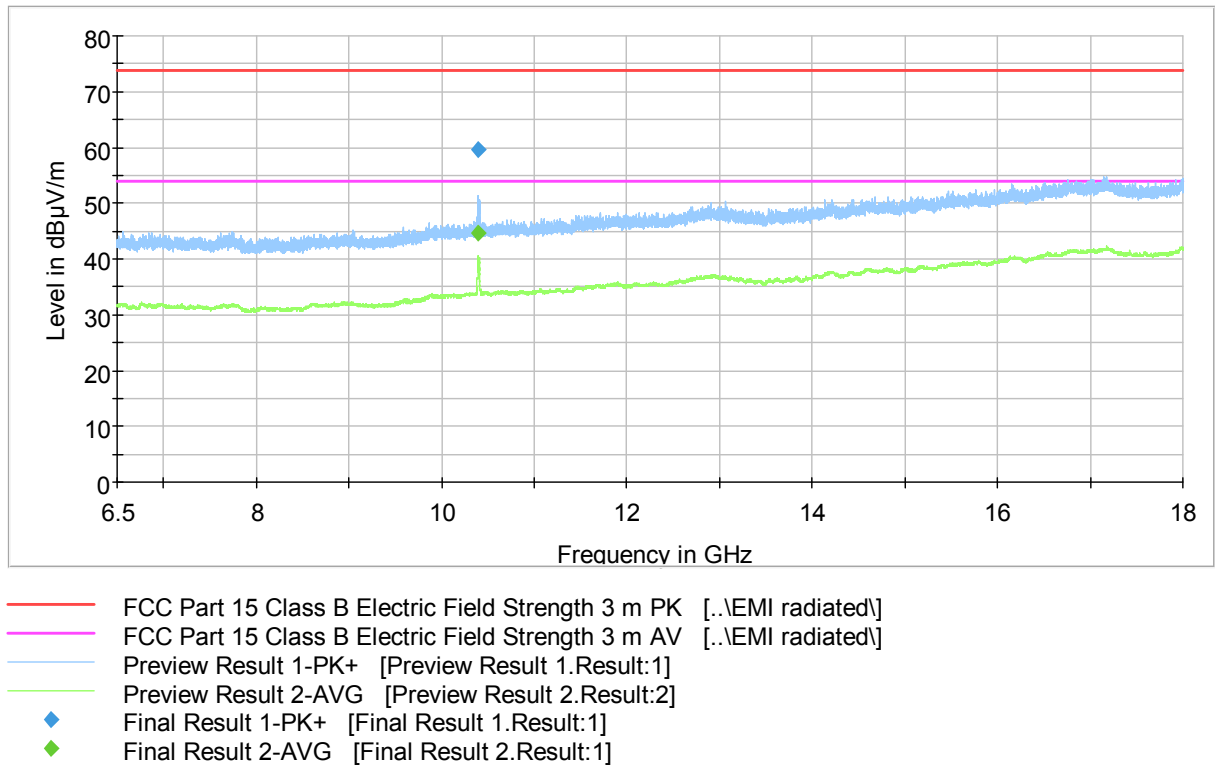


Figure 10. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

Table 12. 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
10399.675000	59.6	1000.0	1000.000	129.0	H	291.0	16.6	14.3	73.9	

Table 13. 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
10400.150000	44.7	1000.0	1000.000	154.0	H	291.0	16.6	9.2	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 6.5-18 GHz 3m

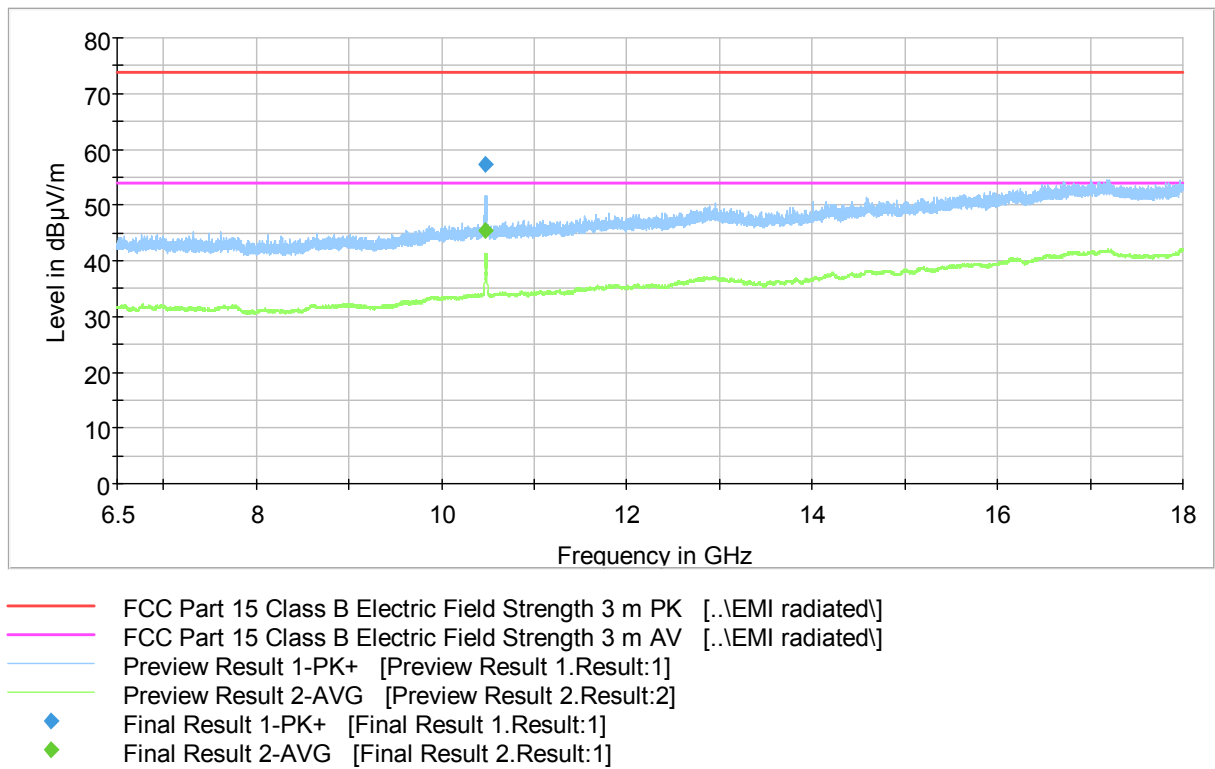


Figure 11. Measured curve with peak- and average detector (high channel).

Final measurements from the worst frequencies.

Table 14. Final Max Peak results.

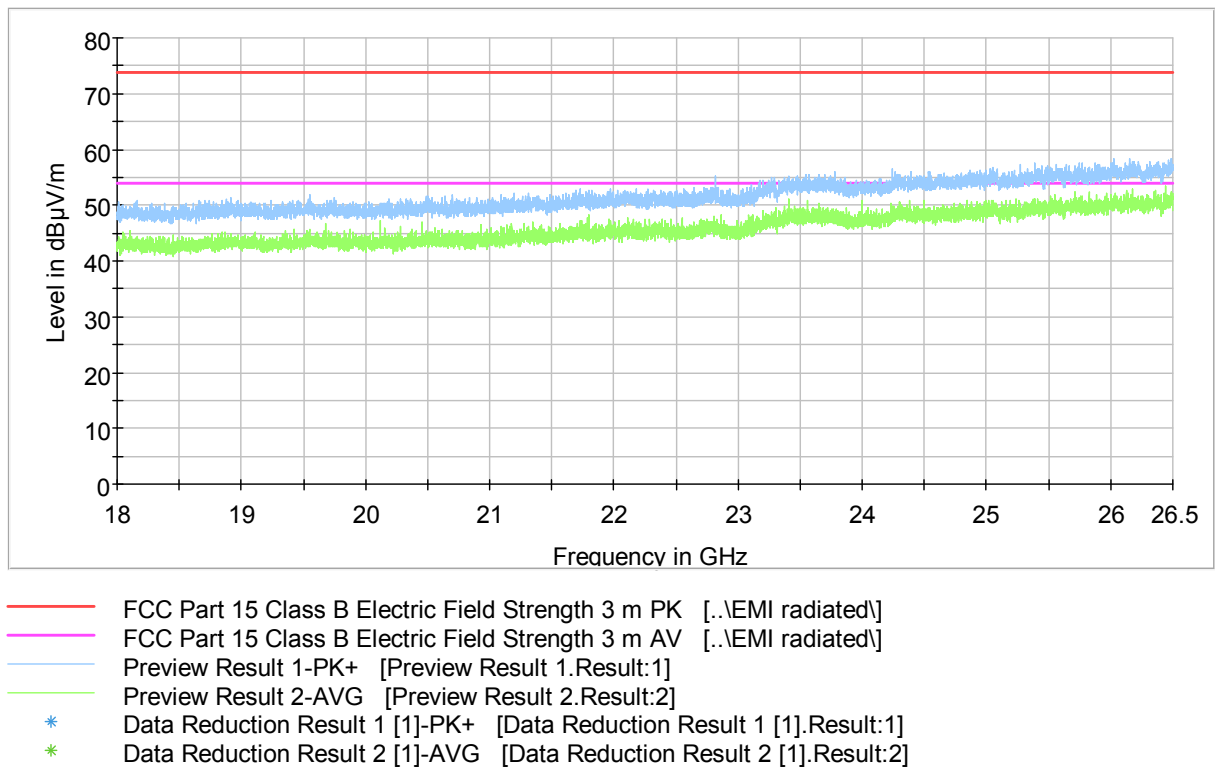
Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
10478.800000	57.2	1000.0	1000.000	138.0	H	312.0	16.8	16.7	73.9	

Table 15. Final Average results.

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)	Comment
10480.750000	45.5	1000.0	1000.000	150.0	H	267.0	16.8	8.4	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

**Figure 12.** Measured curve with peak- and average detector (low channel).**Final measurements from the worst frequencies.**

No final measurements were made due to the low emission level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

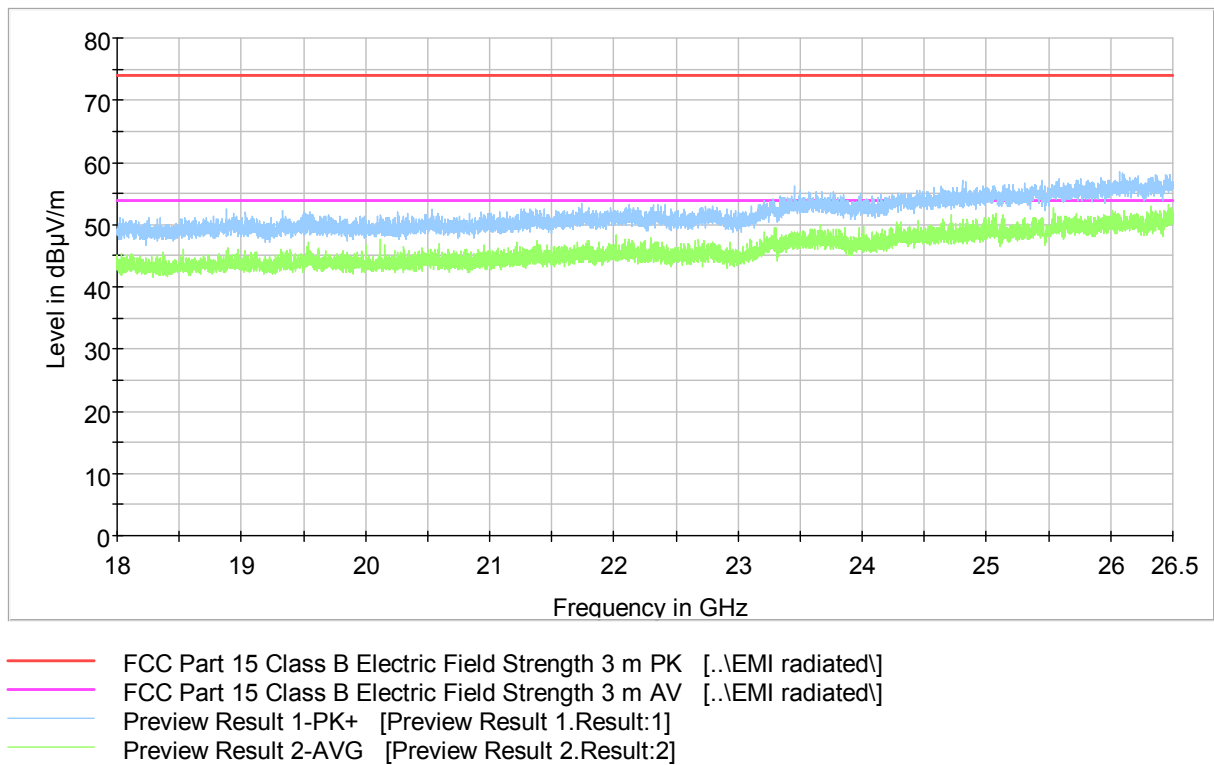


Figure 13. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

No final measurements were made due to the low emission level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

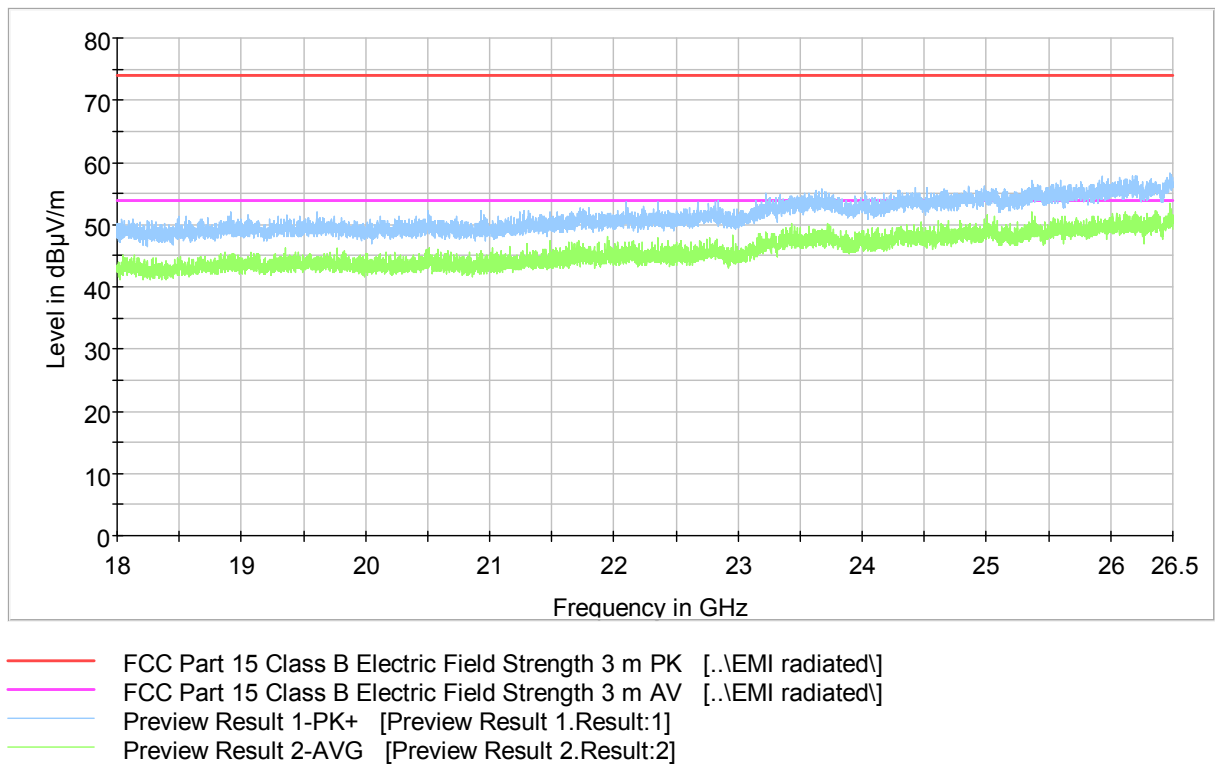


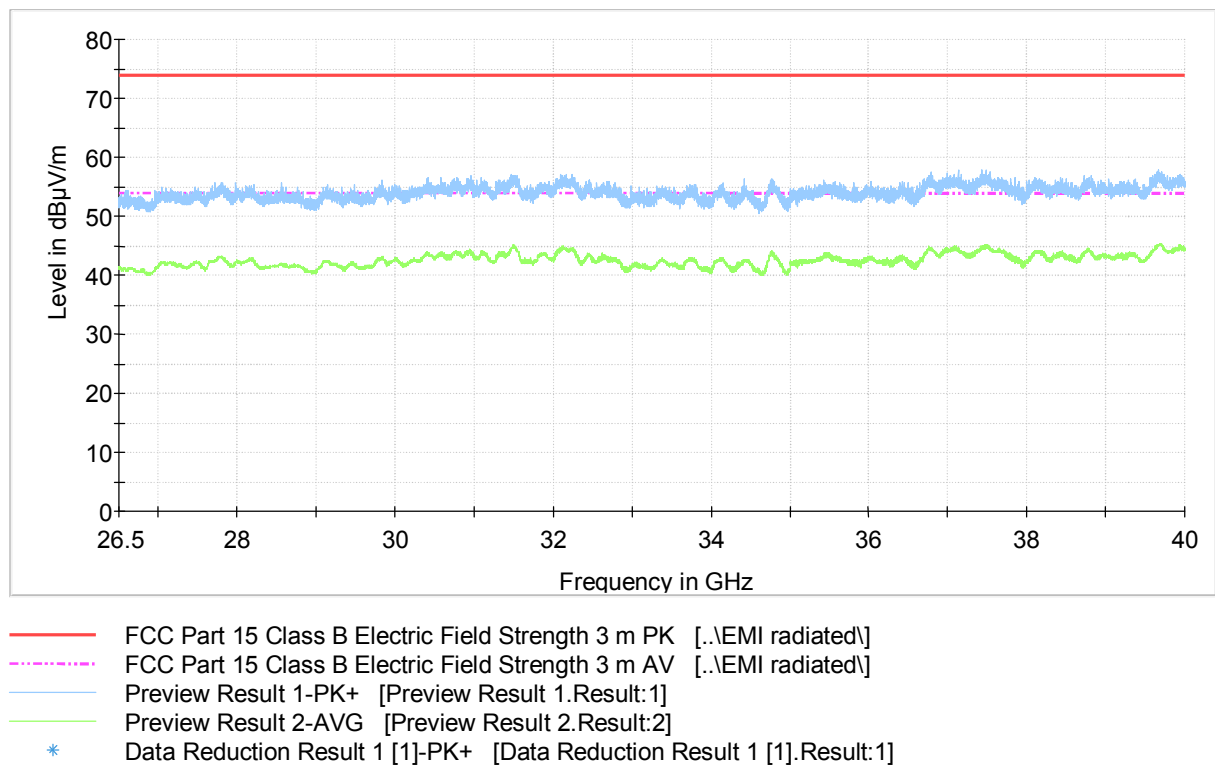
Figure 14. Measured curve with peak- and average detector (high channel).

Final measurements from the worst frequencies.

No final measurements were made due to the low emission level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 26.5-40GHz 1m

**Figure 15.** Measured curve with peak- and average detector (low channel).**Final measurements from the worst frequencies.**

No final measurements were made due to the low emission level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 26.5-40GHz 1m

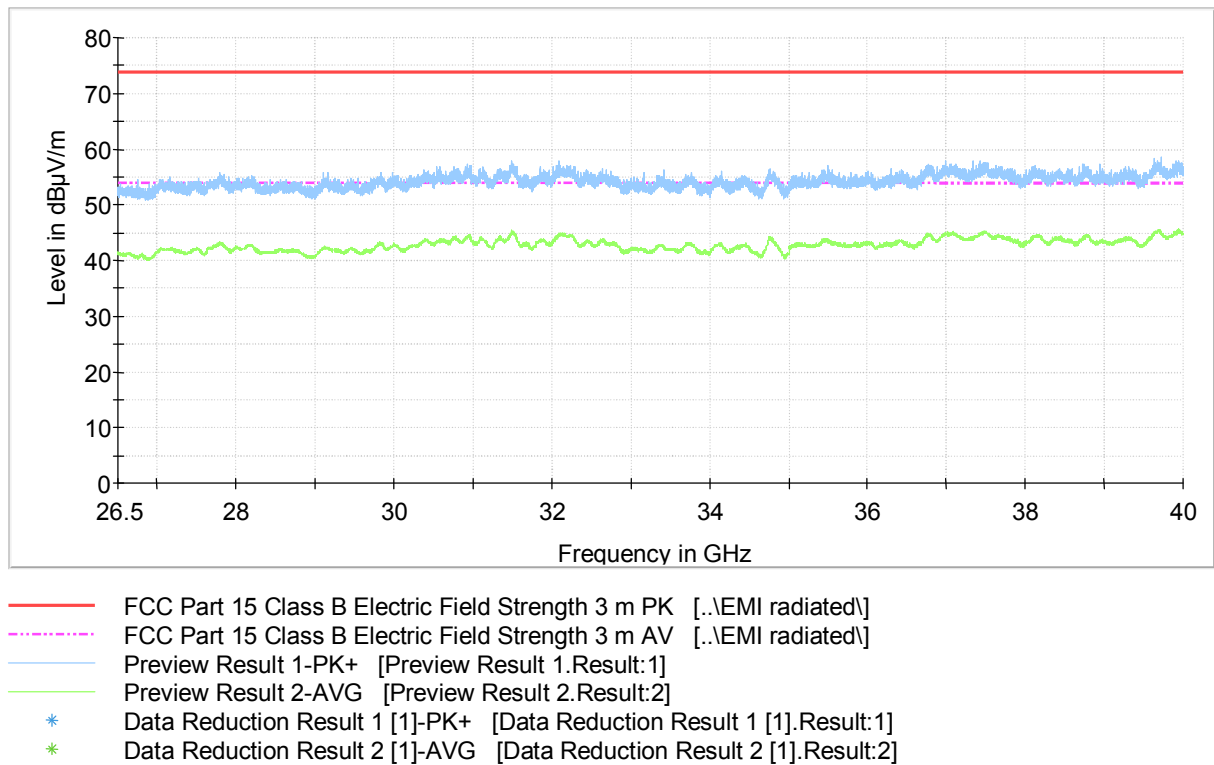


Figure 16. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

No final measurements were made due to the low emission level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 26.5-40GHz 1m

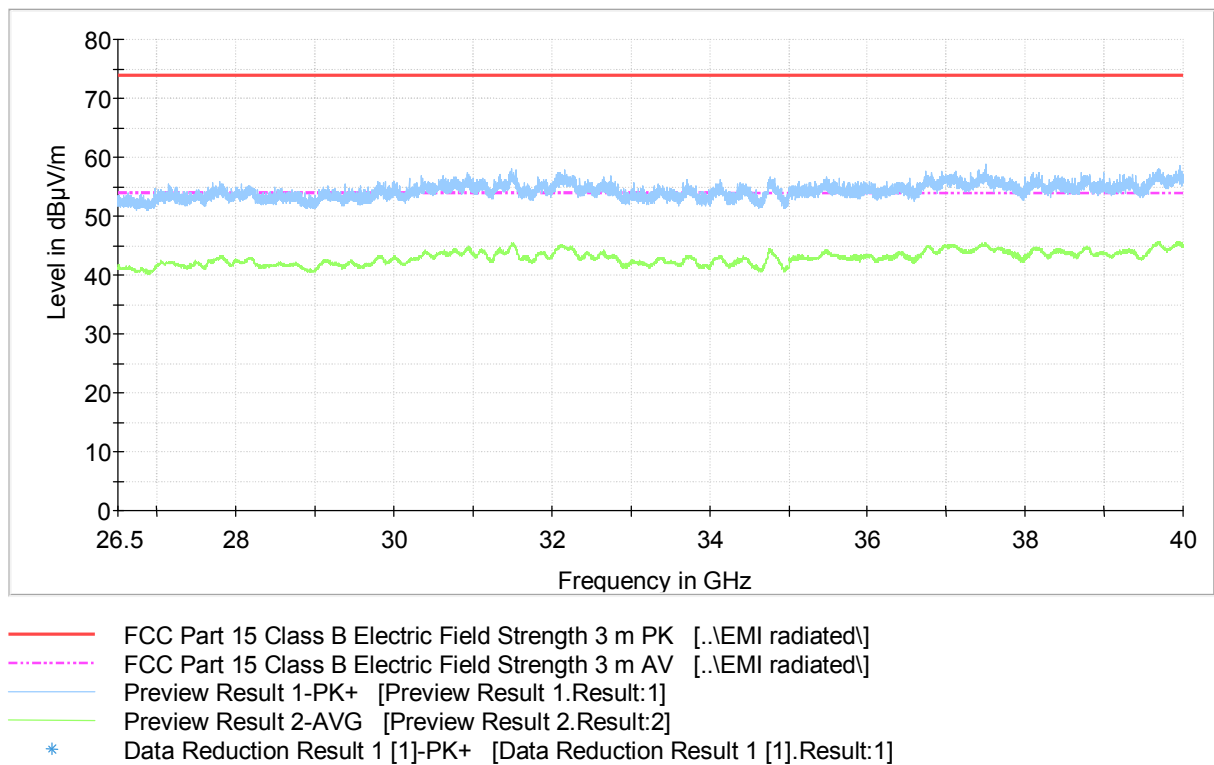


Figure 17. Measured curve with peak- and average detector (high channel).

Final measurements from the worst frequencies.

No final measurements were made due to the low emissions level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

Test results 802.11n MCS0

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

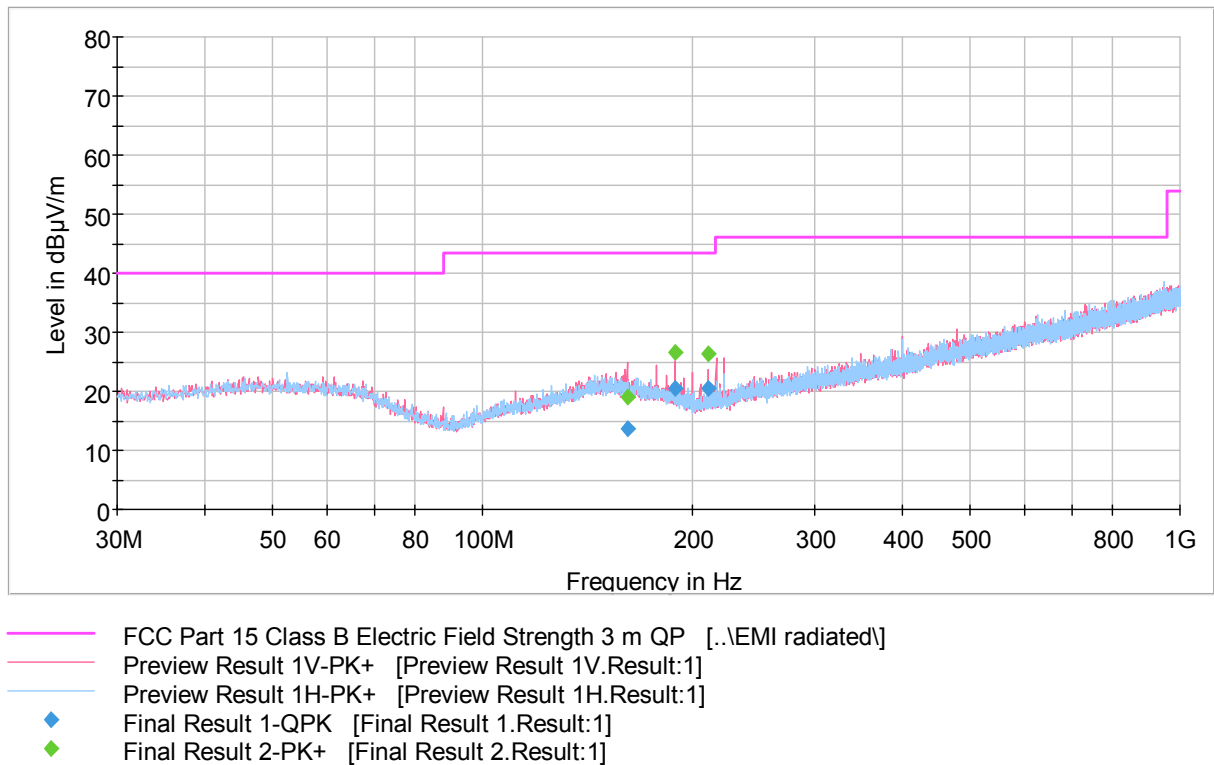


Figure 18. Measured curves with peak-detector (low channel).

Final measurements from the worst frequencies.

Table 16. Final measurements from the worst frequencies.

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
161.378000	13.7	1000.0	120.000	100.0	V	279.0	14.9	29.8	43.5	
188.983000	20.5	1000.0	120.000	100.0	V	253.0	13.4	23.0	43.5	
211.062000	20.4	1000.0	120.000	100.0	V	292.0	12.5	23.1	43.5	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

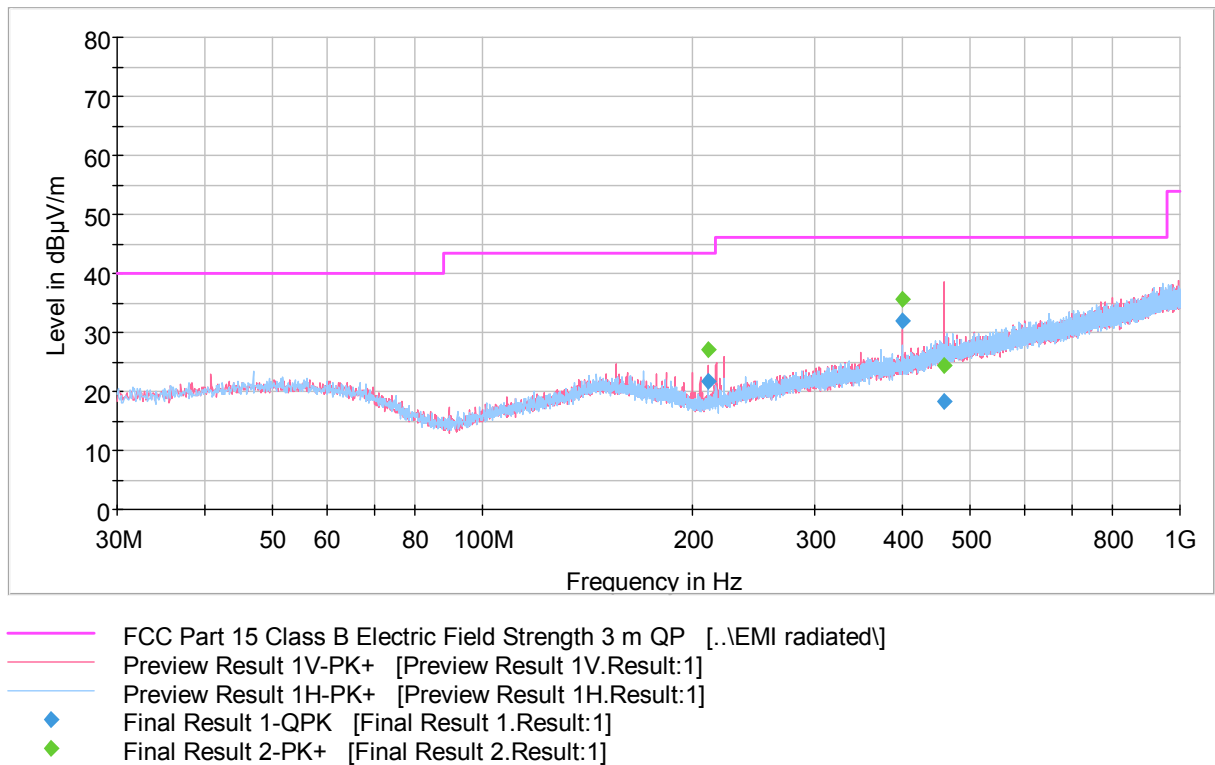


Figure 19. Measured curve with peak-detector (middle channel).

Final measurements from the worst frequencies.

Table 17. Final measurements from the worst frequencies.

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
211.022000	21.8	1000.0	120.000	100.0	V	0.0	12.4	21.7	43.5	
399.998000	32.0	1000.0	120.000	139.0	V	0.0	18.4	14.0	46.0	
458.709000	18.3	1000.0	120.000	100.0	V	26.0	20.3	27.7	46.0	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

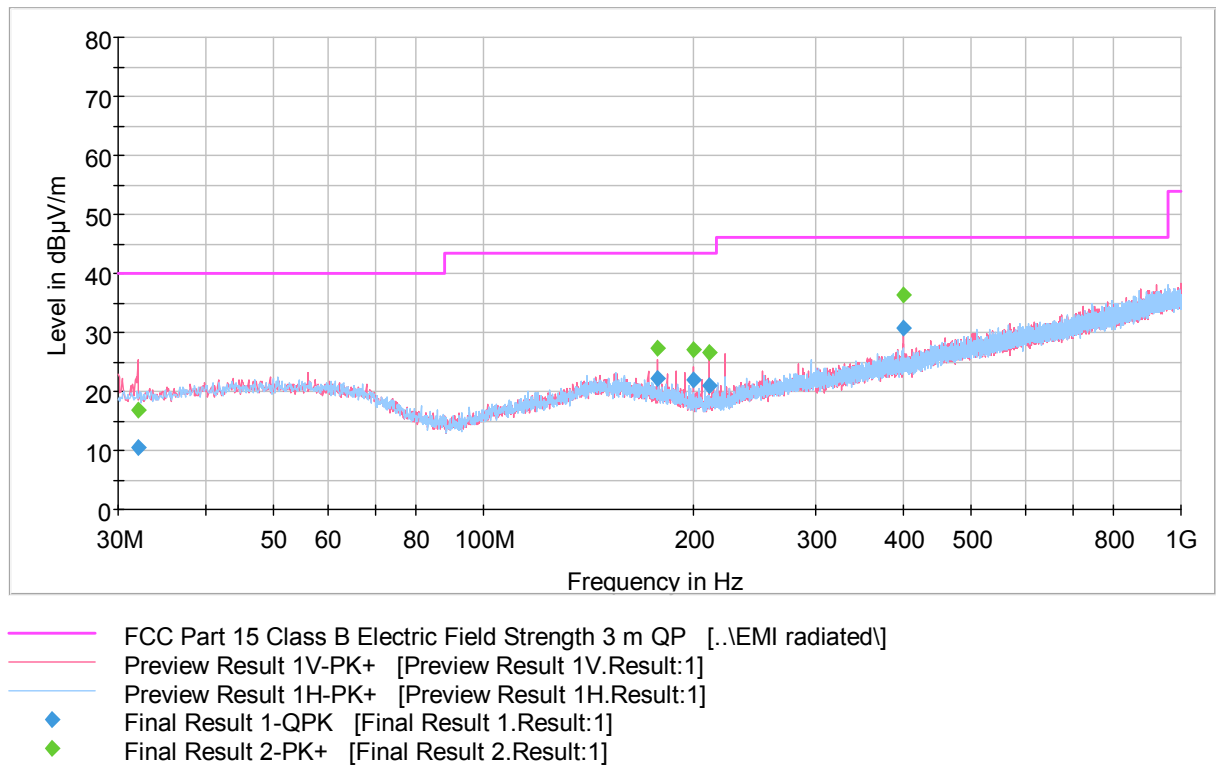


Figure 20. Measured curve with peak-detector (high channel).

Final measurements from the worst frequencies.

Table 18. Final measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
32.117000	10.5	1000.0	120.000	398.0	V	174.0	14.1	29.5	40.0	
177.925000	22.2	1000.0	120.000	100.0	V	224.0	14.1	21.3	43.5	
199.984000	21.8	1000.0	120.000	100.0	V	242.0	12.5	21.7	43.5	
211.042000	21.1	1000.0	120.000	100.0	V	323.0	12.5	22.4	43.5	
400.058000	30.7	1000.0	120.000	155.0	V	13.0	18.4	15.3	46.0	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

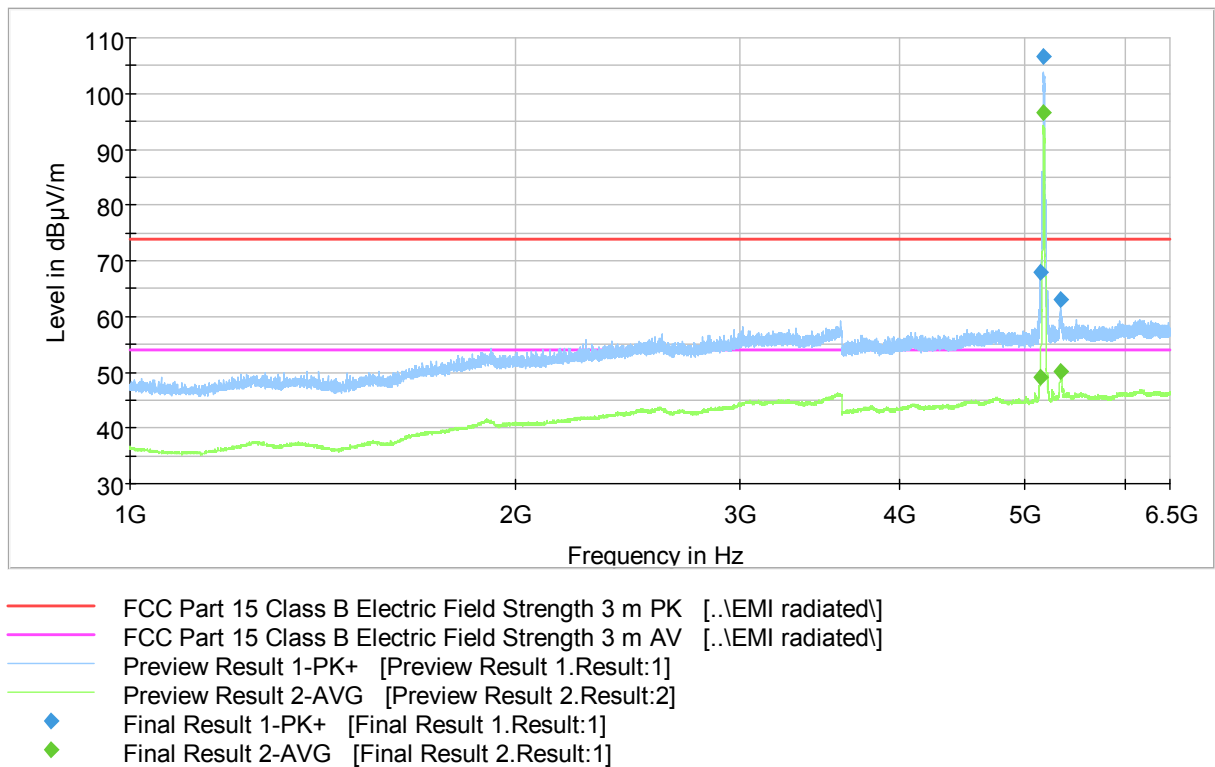


Figure 21. Measured curve with peak- and average detector (low channel).

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

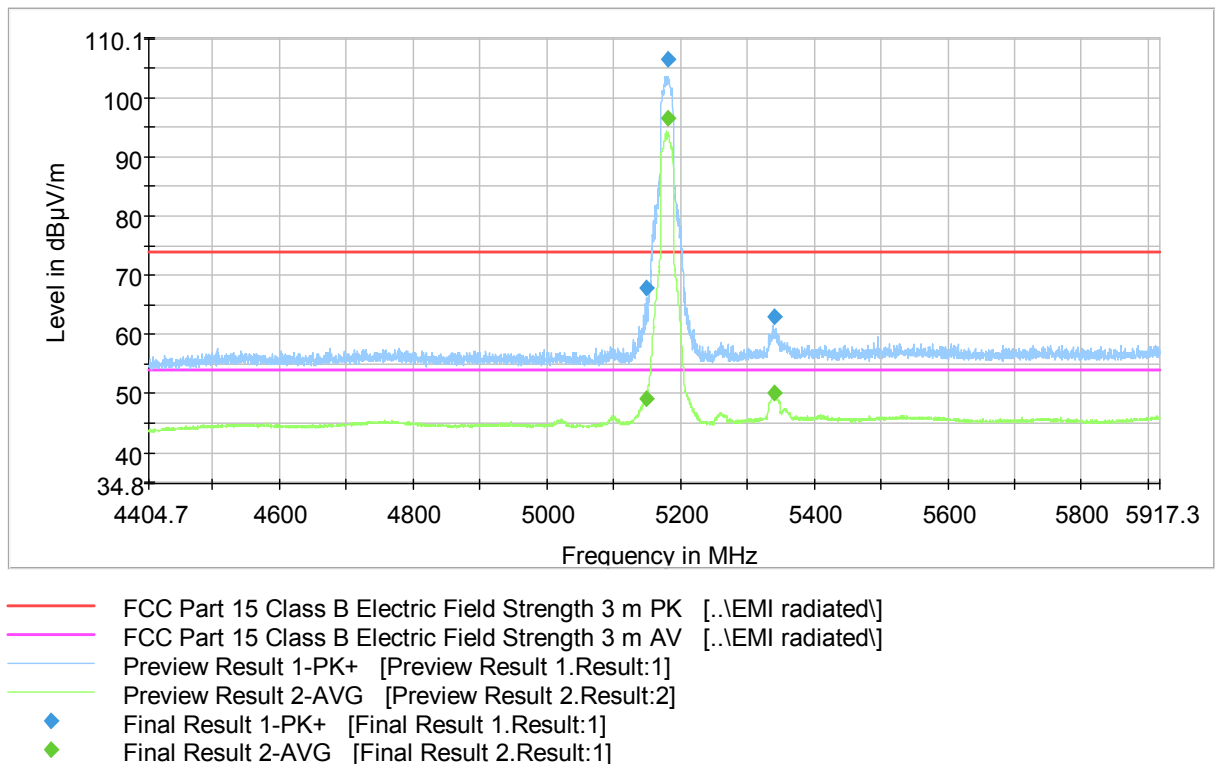


Figure 22. Low channel band edge.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

Final measurements from the worst frequencies.

Table 19. 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
5149.600000	67.9	1000.0	1000.000	185.0	H	3.0	19.6	6.0	73.9	
5180.625000	106.6	1000.0	1000.000	170.0	H	-5.0	19.6	-32.7	73.9	Carrier
5341.575000	62.9	1000.0	1000.000	179.0	H	5.0	20.2	11.0	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
5150.000000	49.2	1000.0	1000.000	194.0	H	21.0	19.6	4.7	53.9	
5181.300000	96.6	1000.0	1000.000	186.0	H	-4.0	19.6	-42.7	53.9	Carrier
5341.275000	50.0	1000.0	1000.000	198.0	H	-4.0	20.2	3.9	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

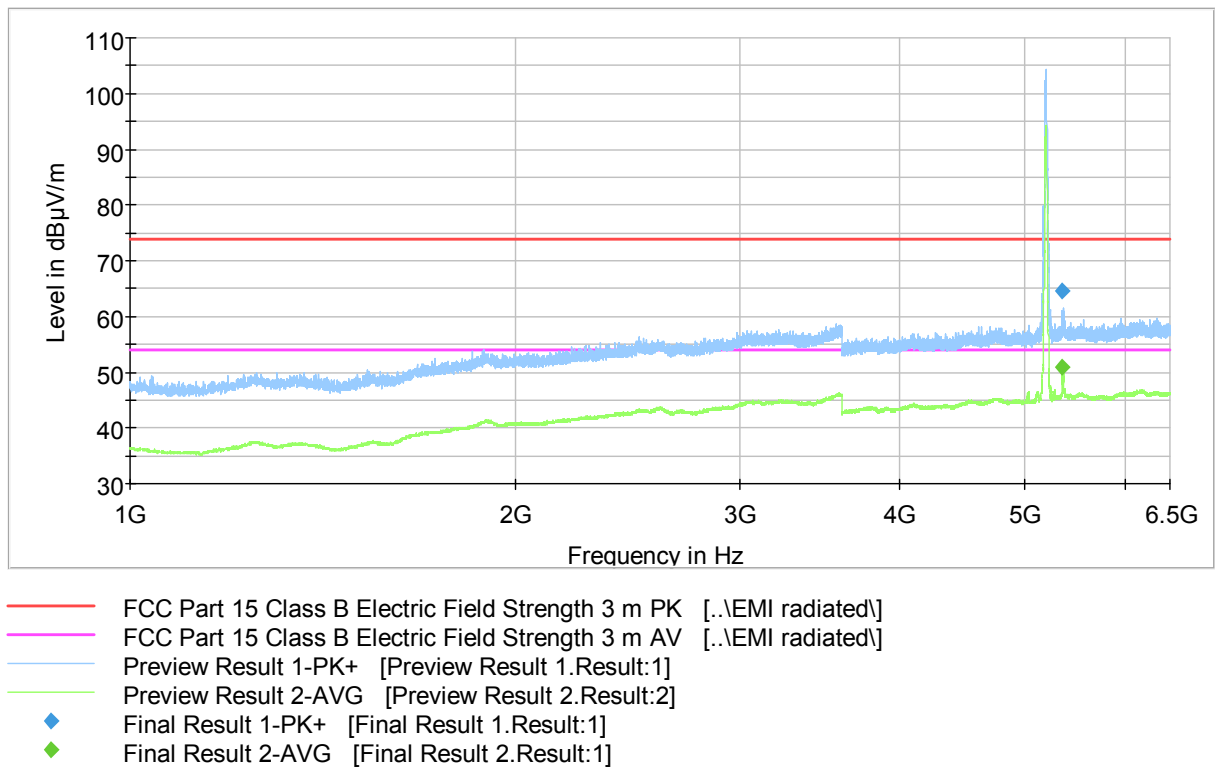


Figure 23. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

Table 21. 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
5358.525000	64.5	1000.0	1000.000	177.0	H	292.0	20.2	9.4	73.9	

Table 22. 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
5358.875000	51.0	1000.0	1000.000	159.0	V	95.0	20.2	2.9	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

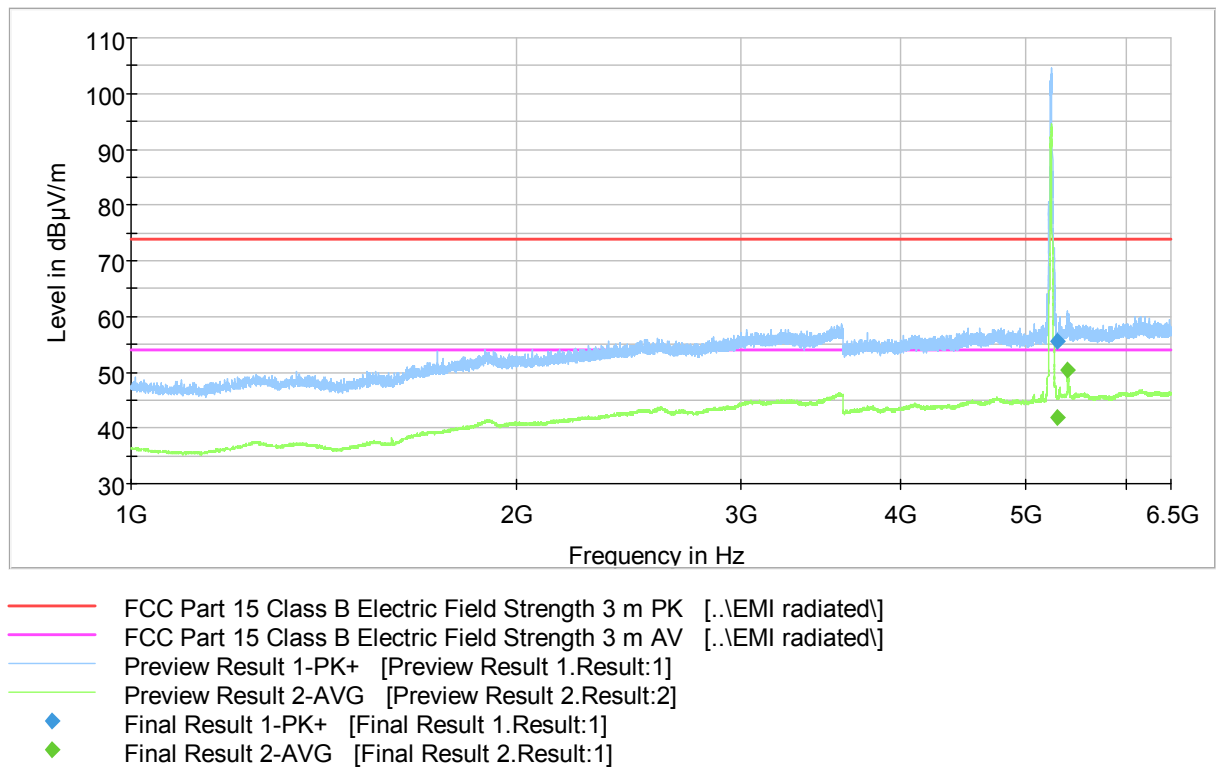


Figure 24. Measured curve with peak- and average detector (high channel).

FCC Part 15 Class B Spurious Emission 1-6.5 GHz 3m

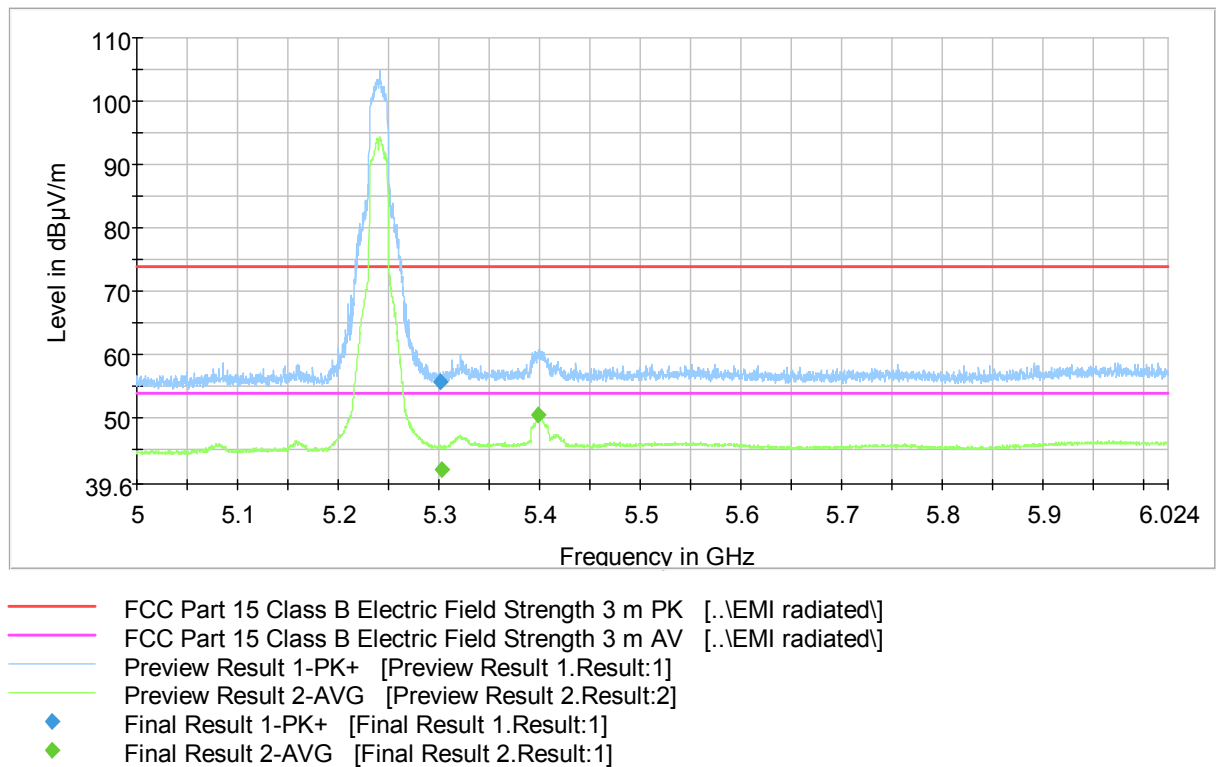


Figure 25. High channel band edge.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

Final measurements from the worst frequencies.

Table 23. 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
5301.200000	55.6	1000.0	1000.000	194.0	H	0.0	20.0	18.3	73.9	

Table 24. 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
5302.800000	41.9	1000.0	1000.000	183.0	H	-5.0	20.0	12.0	53.9	
5398.900000	50.4	1000.0	1000.000	178.0	H	2.0	20.4	3.5	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 6.5-18 GHz 3m

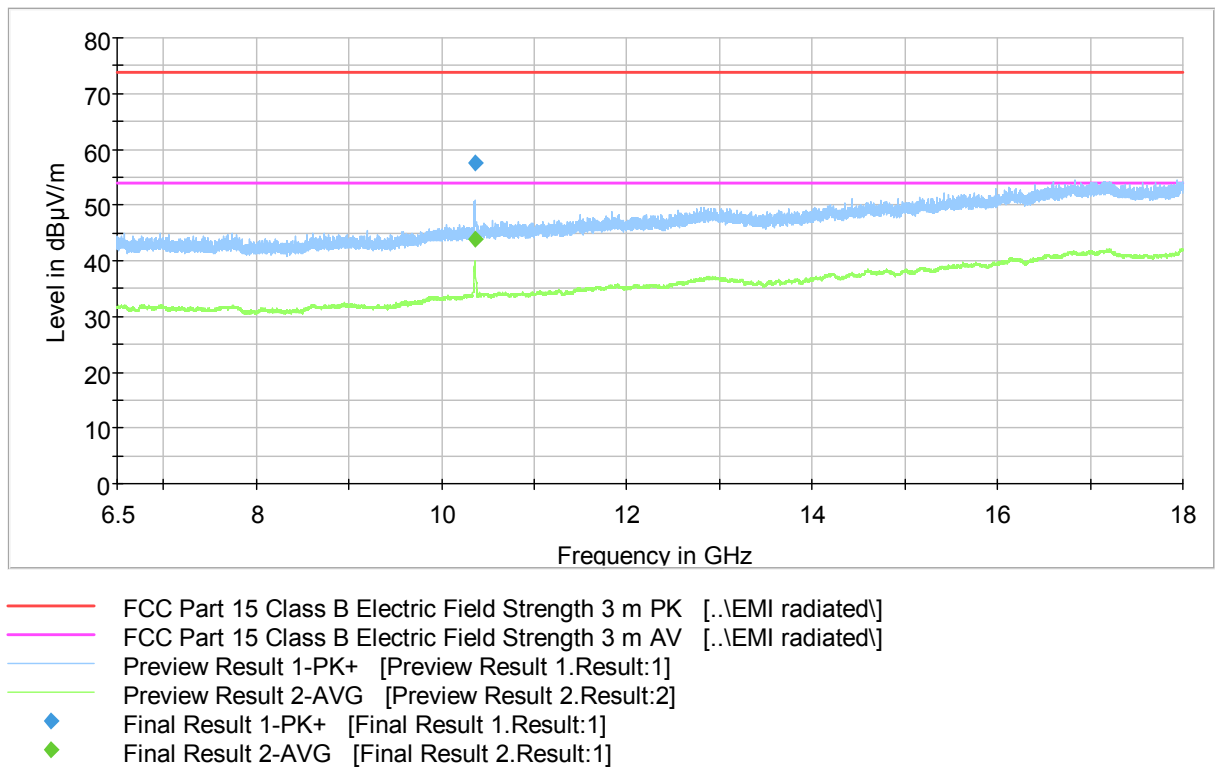


Figure 26. Measured curve with peak- and average detector (low channel).

Final measurements from the worst frequencies.

Table 25. 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
10363.600000	57.6	1000.0	1000.000	146.0	H	310.0	16.6	16.3	73.9	

Table 26. 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
10360.950000	44.0	1000.0	1000.000	154.0	H	310.0	16.6	9.9	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 6.5-18 GHz 3m

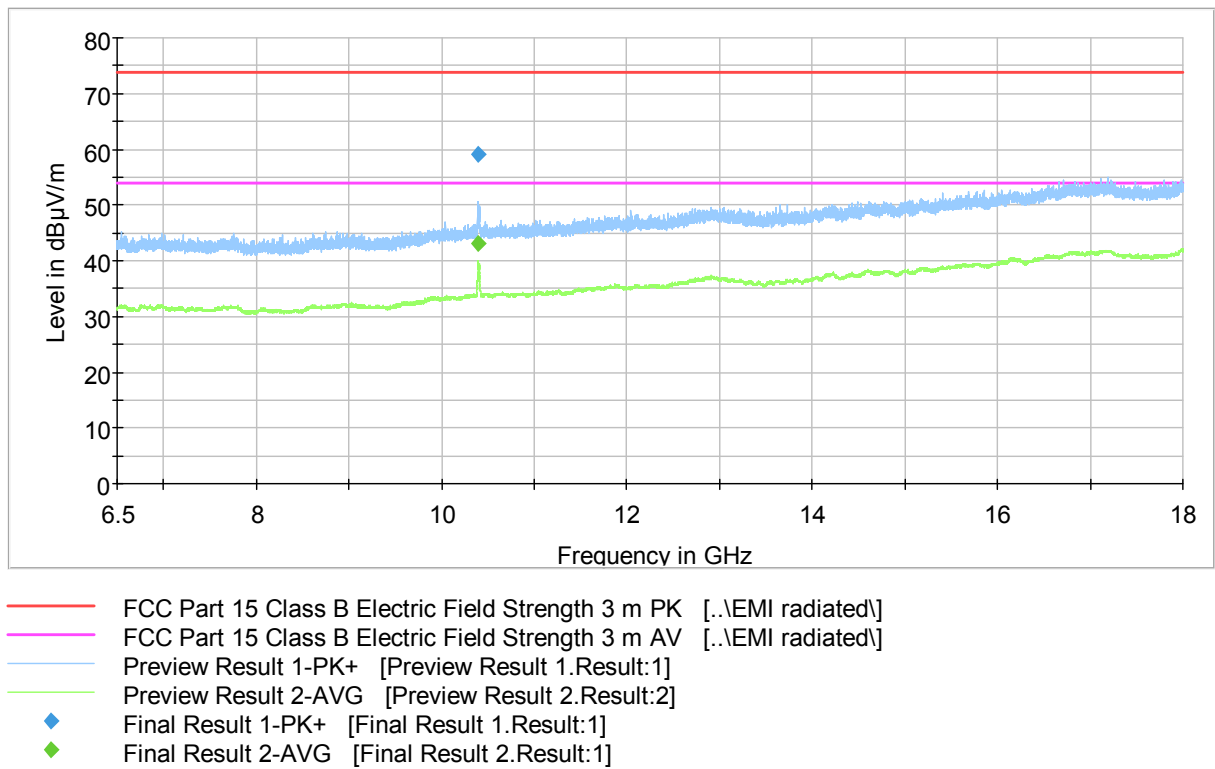


Figure 27. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

Table 27. 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
10401.925000	59.0	1000.0	1000.000	150.0	H	303.0	16.6	14.9	73.9	

Table 28. 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
10398.800000	43.2	1000.0	1000.000	146.0	H	306.0	16.6	10.7	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 6.5-18 GHz 3m

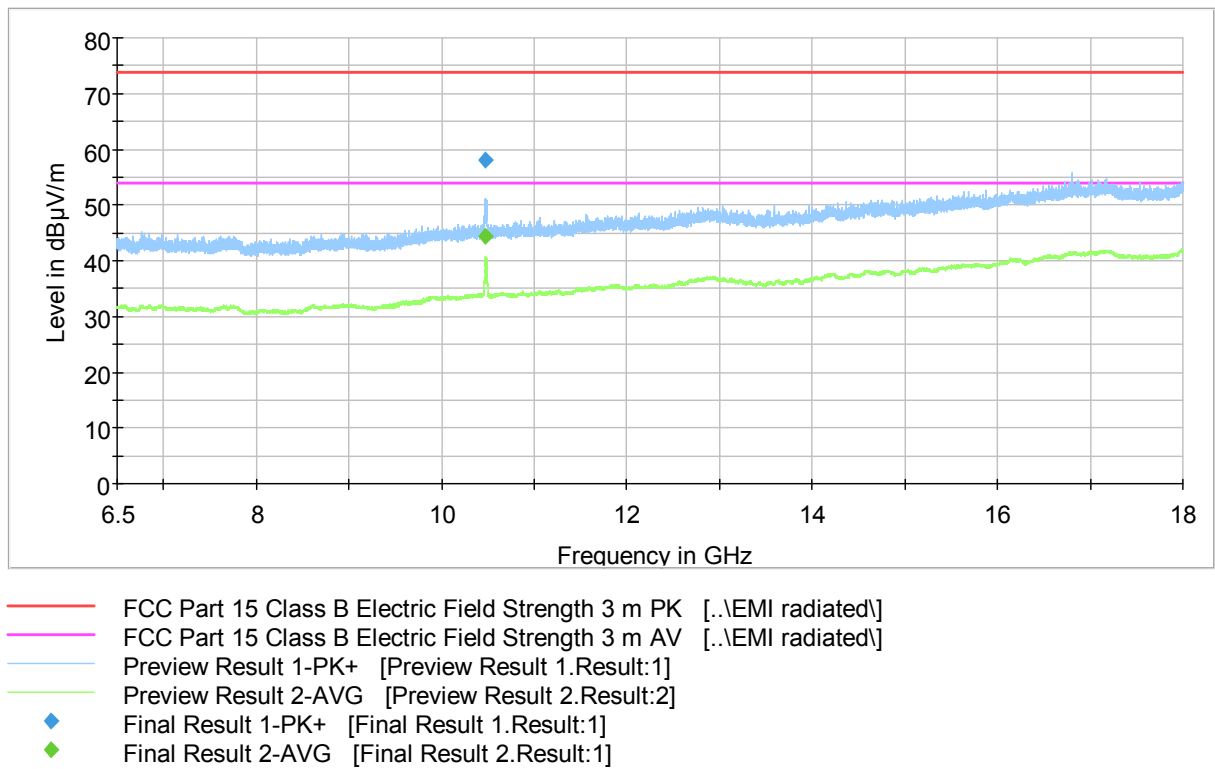


Figure 28. Measured curve with peak- and average detector (high channel).

Final measurements from the worst frequencies.

Table 29. 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
10477.775000	58.0	1000.0	1000.000	154.0	H	314.0	16.8	15.9	73.9	

Table 30. 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
10479.175000	44.4	1000.0	1000.000	146.0	H	308.0	16.8	9.5	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

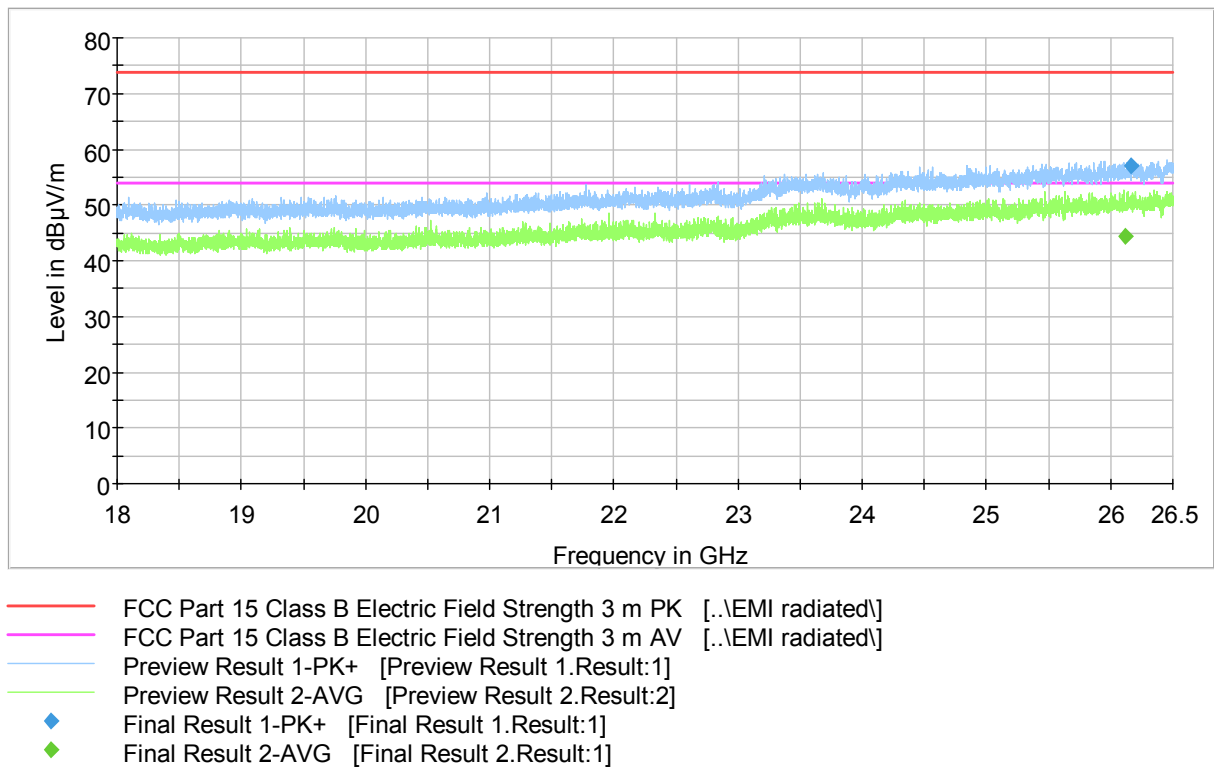


Figure 29. Measured curve with peak- and average detector (low channel).

Final measurements from the worst frequencies.

Table 31. 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
26164.900000	56.9	1000.0	1000.000	239.0	V	9.0	35.2	17.0	73.9	

Table 32. 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
26114.250000	44.3	1000.0	1000.000	100.0	V	221.0	35.0	9.6	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

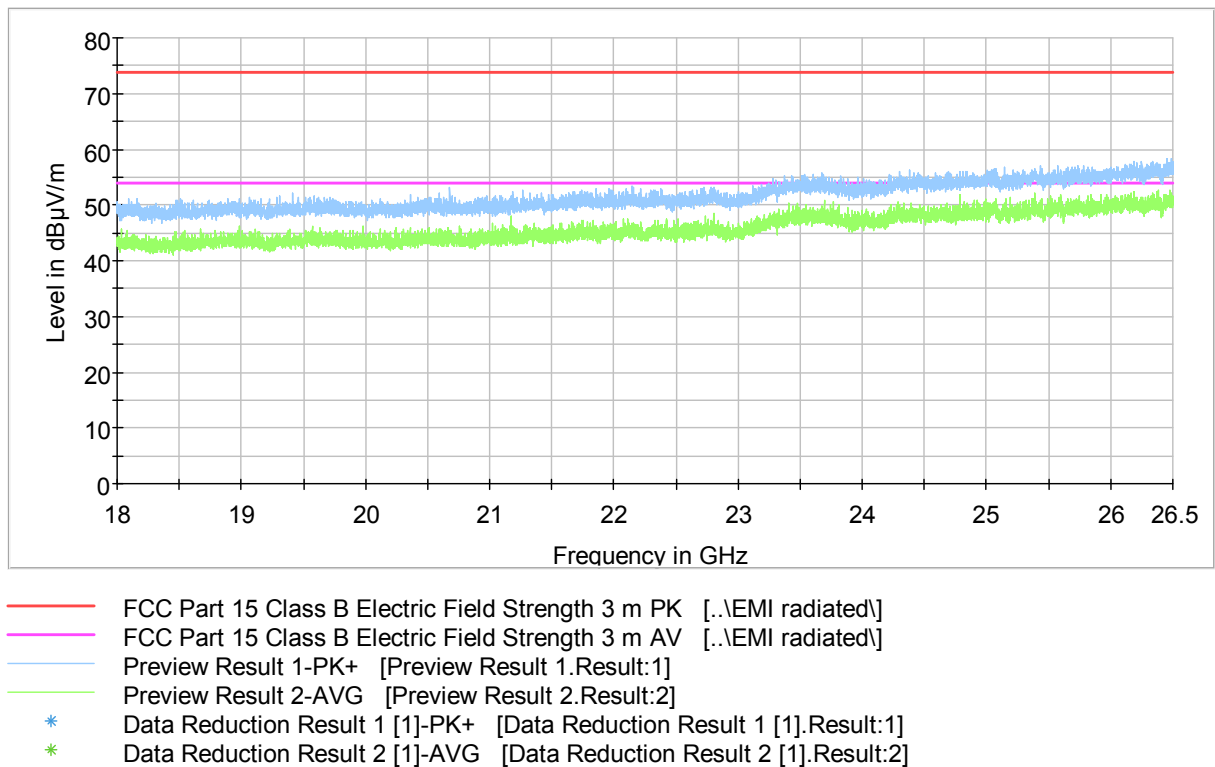


Figure 30. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

No final measurements were made due to the low emission level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

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

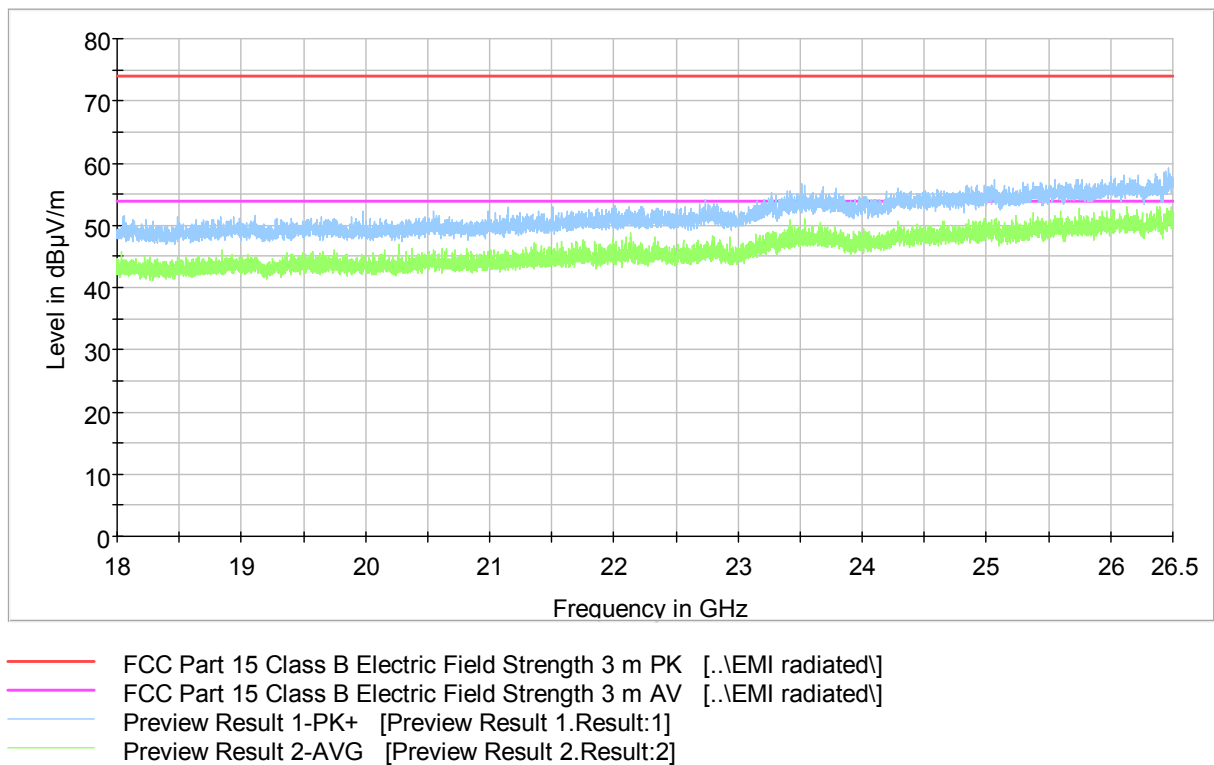


Figure 31. Measured curve with peak- and average detector (high channel).

Final measurements from the worst frequencies.

No final measurements were made due to the low emission level.

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 26.5-40GHz 1m

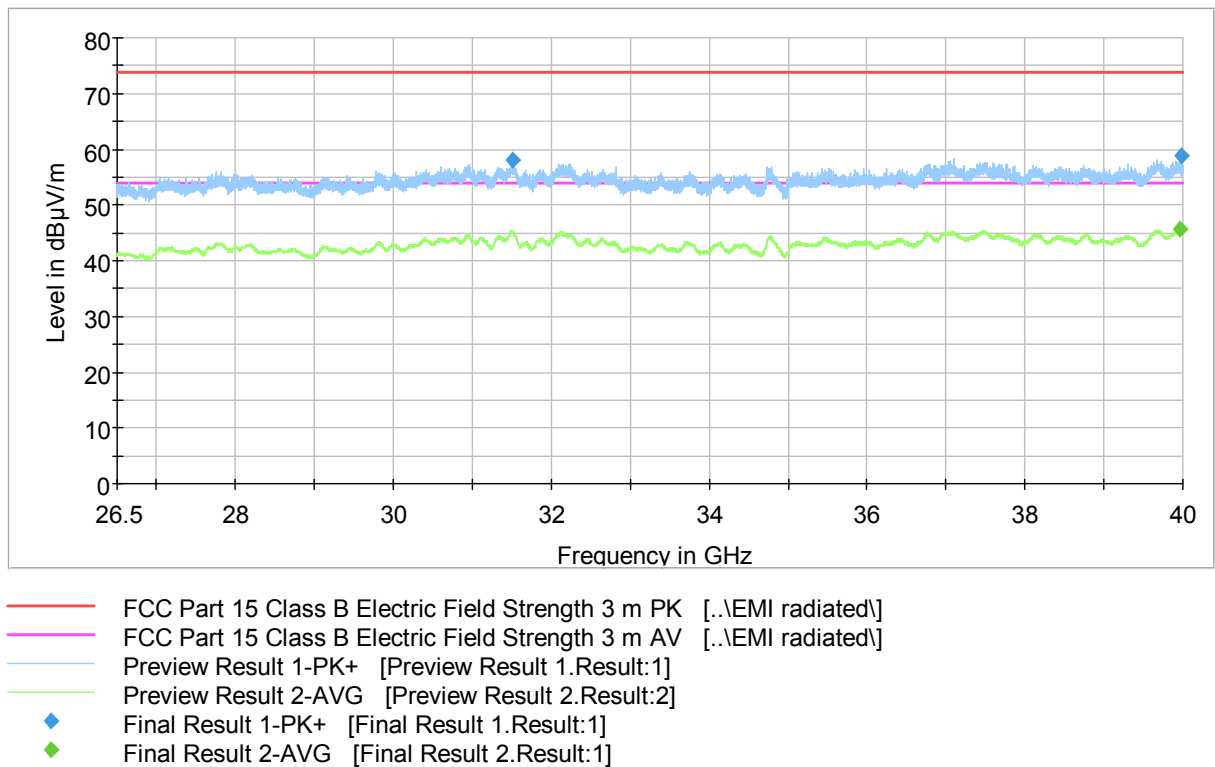


Figure 32. Measured curve with peak- and average detector (low channel).

Final measurements from the worst frequencies.

Table 33. Final Max Peak results.

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
31506.812500	58.0	100.0	H	53.0	36.6	15.9	73.9	
39984.812500	58.8	100.0	H	141.0	37.3	15.1	73.9	

Table 34. Final Average results.

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
39956.125000	45.7	100.0	V	349.0	37.7	8.2	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 26.5-40GHz 1m

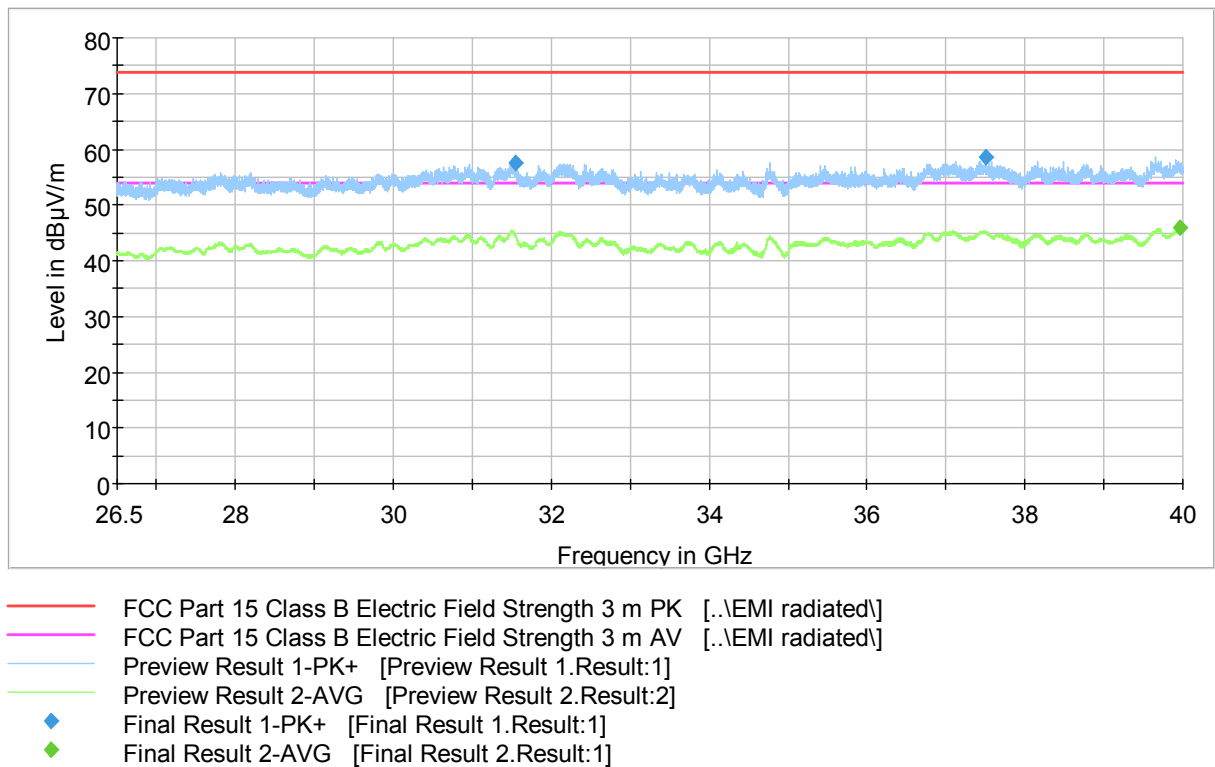


Figure 33. Measured curve with peak- and average detector (middle channel).

Final measurements from the worst frequencies.

Table 35. Final Max Peak results.

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
31554.906250	57.6	100.0	V	0.0	36.9	16.3	73.9	
37497.437500	58.7	100.0	V	305.0	37.3	15.2	73.9	

Table 36. Final Average results.

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
39960.343750	45.9	100.0	V	39.0	37.7	8.0	53.9	

Radiated Spurious Emissions 30 to 40 000 MHz and Band Edge

FCC Part 15 Class B Spurious Emission 26.5-40GHz 1m

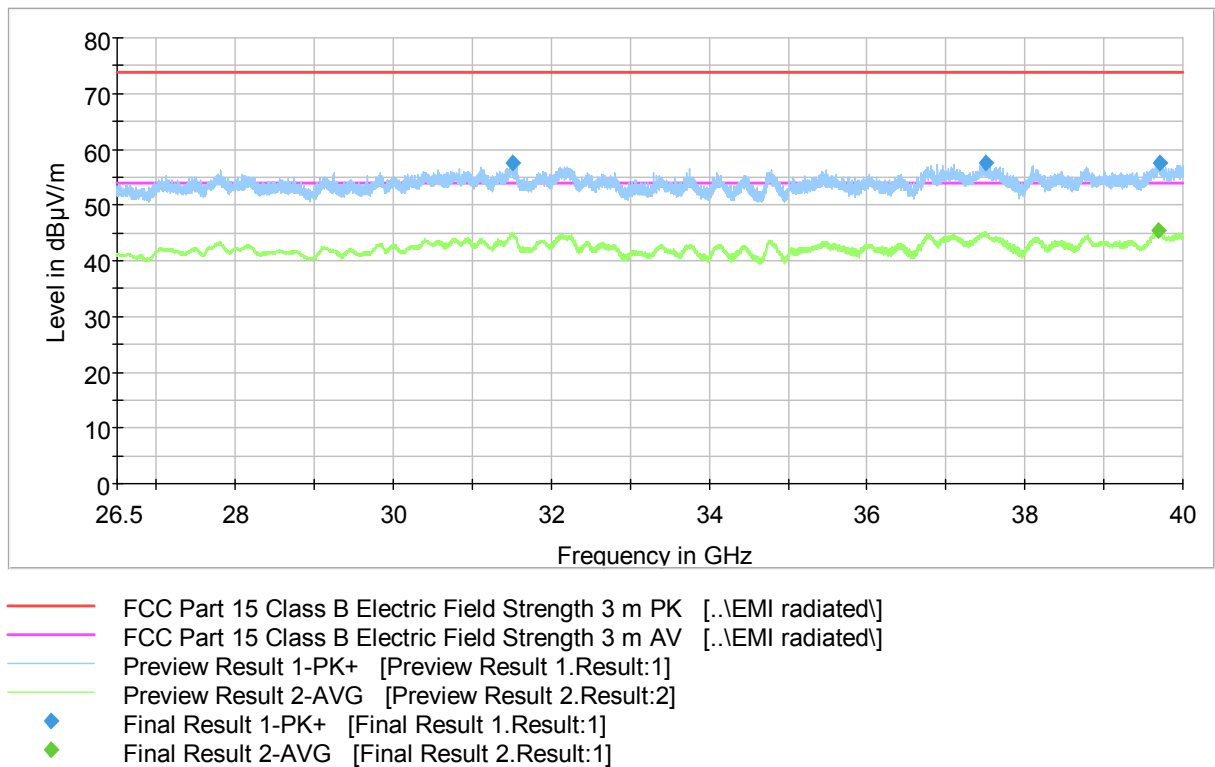


Figure 34. Measured curve with peak- and average detector (high channel).

Final measurements from the worst frequencies.

Table 37. Final Max Peak results.

Frequency (MHz)	MaxPeak-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
31511.875000	57.6	100.0	V	0.0	36.9	16.3	73.9	
37499.968750	57.5	100.0	H	0.0	37.0	16.4	73.9	
39702.156250	57.6	100.0	V	0.0	37.6	16.3	73.9	

Table 38. Final Average results.

Frequency (MHz)	Average-MaxHold (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)	Comment
39689.500000	45.4	100.0	V	0.0	37.6	8.5	53.9	

TEST EQUIPMENT

Radiated Emissions

Equipment	Manufacturer	Type	Serial no	Inv.no
TEST RECEIVER	ROHDE & SCHWARZ	ESU 26	100185	8453
TEST SOFTWARE	ROHDE & SCHWARZ	EMC-32	-	-
ANTENNA (30-1000 MHz)	SCHWARZBECK	VULB 9168	8168-503	8911
ANTENNA MAST	DEISEL	MA240	240/455	5017
TURNTABLE	DEISEL	DS420	-	5015
CONTROLLER	COMTEST	HD100	100/457	5018
ANTENNA (1-18 GHz)	EMCO	3117	29617	7293
ANTENNA (18-26.5 GHz)	EMCO	3160- 09	030232-022	7294
ANTENNA (26.5 – 40 GHz)	ETS-LINDGREN	3160-10	00154809	9151
PREAMPLIFIER (0.5-26GHz)	HP	83017A	3950M00102	5226
ATTENUATOR 10 dB	HUBER & SUHNER	6810.17B	-	-
HIGH PASS FILTER (6.5-18GHz)	MICRO-TRONICS	HPM13021	S/N-001	-
SIGNAL ANALYZER	ROHDE & SCHWARZ	FSV40	101068	9093

All used measurement equipment was calibrated (if required).