

Test Report



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

Equipment Under Test: Bluetooth module

Model: BLE112-A

Type: -

Manufacturer: Bluegiga Oy
Sinikalliontie 5 A
FI-02630 ESPOO
Finland

Customer: Bluegiga Oy
Sinikalliontie 5 A
FI-02630 ESPOO
Finland

FCC Rule Part: 15.247: 2010
IC Rule Part: RSS-210, Issue 8, 2010
RSS-GEN Issue 2, 2007

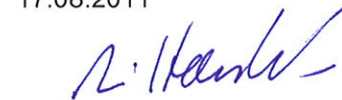
Date: 17.08.2011

Issued by:


Jari Merikari
Technical Manager

Date: 17.08.2011

Checked by:


Ari Honkala
Product Line Manager

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Equipment Under Test (EUT)

Bluetooth module
 Model: BLE112-A
 Type: -
 Serial no: -
 HW version:
 SW version: 1.0
 FCC ID number: QOQBLE112
 Industry Canada number: 5123A-BGTBLE112

Description of the EUT

The EUT is a Bluetooth low energy single mode module targeted for low power sensors and accessories. Device can be used with batteries or from DC power supply.

Classification of the device

Fixed device	<input type="checkbox"/>
Mobile Device (Human body distance > 20cm)	<input checked="" type="checkbox"/>
Portable Device (Human body distance < 20cm)	<input type="checkbox"/>

Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing

Ratings and declarations

Operating Frequency Range (OFR): 2402 – 2480 MHz
 Channels: 40
 Transmission technique: Digital transmission
 Modulation: GFSK
 Antenna connector type: Internal
 Antenna gain: 0.5 dBi

Power Supply

Battery operated
 Operating voltage range: 2,0 – 3,6 VDC
 Normal input voltage: 3.0 V coin battery or 2 x 1,5V AAA batteries
 Tested by using external power supply and 3.0 VDC voltage level

Mechanical Size of the EUT

Height: 2,03 mm	Width: 12,05 mm	Depth: 18,10 mm
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Peripherals**Peripheral**

DC power supply Thandar TS3021S.

Samples

All tests were performed to one sample. No modifications were done during the tests.

Disclaimer

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SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.209(a) §15.247(d) / RSS-210 A8.5	Radiated Emissions Within The Restricted Bands	PASS
§15.109 RSS-GEN 7.2.3.2	Unintentional Radiated Emissions	PASS
§15.207 RSS-GEN 7.2.2	Conducted emissions	PASS

EUT Test Conditions During Testing

The EUT was in continuous transmit mode during all the tests.

The hopping was stopped and the EUT was configured into the wanted channel. Normal modulation and duty cycle was applied in all the tests.

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

Channel LOW (CH 0) = 2402 MHz

Channel MID (CH 20) = 2442 MHz

Channel HIGH (CH 39) = 2480 MHz

Test Facility

<input type="checkbox"/> Testing Location / address: FCC registration number: 90598	SGS Fimko Ltd Särkiniementie 3 FI-00210, HELSINKI FINLAND
<input checked="" type="checkbox"/> 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 – 1000 MHz

Standard:	ANSI C63.10	(2009)
Tested by:	JJM	
Date:	25.5.2011	
Humidity:	35 %	
Temperature:	22.0 °C	
Measurement uncertainty	± 4.51 dB	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.

Measured Peak Values In The Frequency Range 30 MHz - 1000 MHz.

FCC Part 15 Class B Electric Field Strength

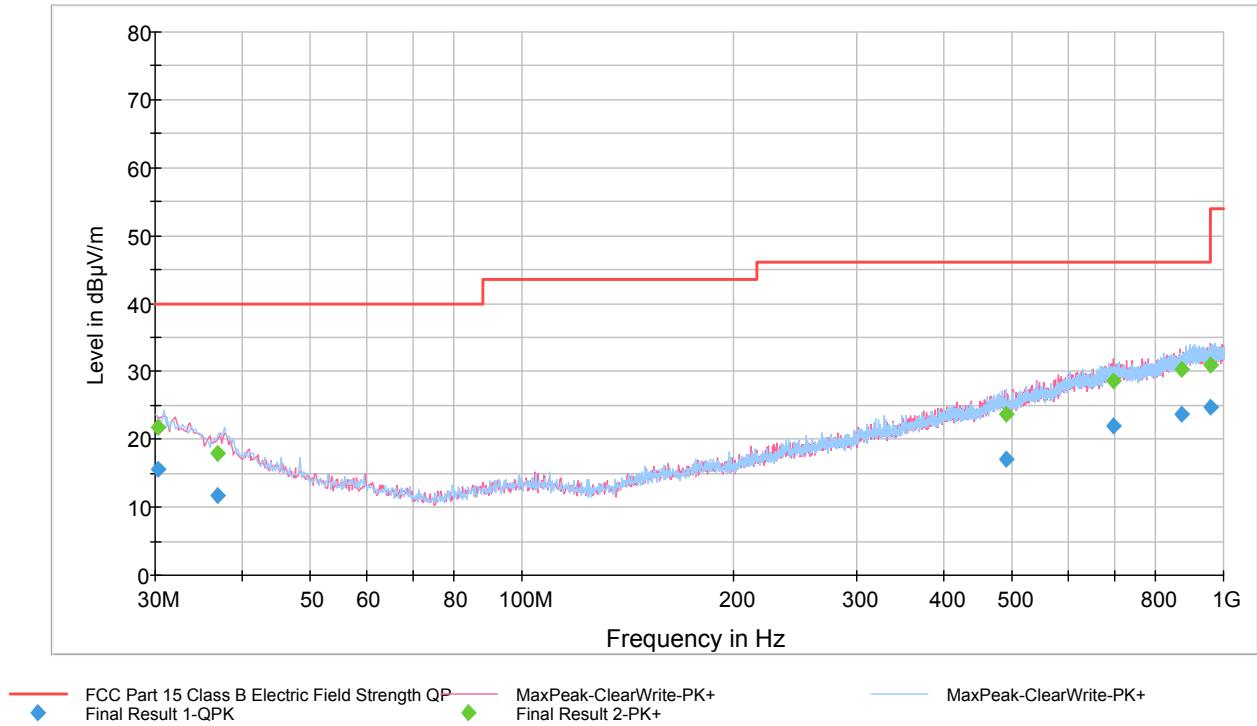


Figure 1. Measured curve with peak-detector. Channel LOW.

Final measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	PoI	Azimuth (deg)	Corr. (dB)	Margin (dB)
30.340000	15.5	15000.0	120.000	130.0	H	195.0	19.0	24.5
36.798750	11.7	15000.0	120.000	128.0	H	48.0	15.3	28.3
490.245000	17.0	15000.0	120.000	250.0	H	104.0	21.6	29.0
696.856250	22.0	15000.0	120.000	100.0	V	226.0	25.5	24.0
869.425000	23.8	15000.0	120.000	204.0	V	72.0	27.1	22.2
958.293750	24.7	15000.0	120.000	100.0	V	315.0	28.3	21.3

Table 1. Final results.

FCC Part 15 Class B Electric Field Strenght

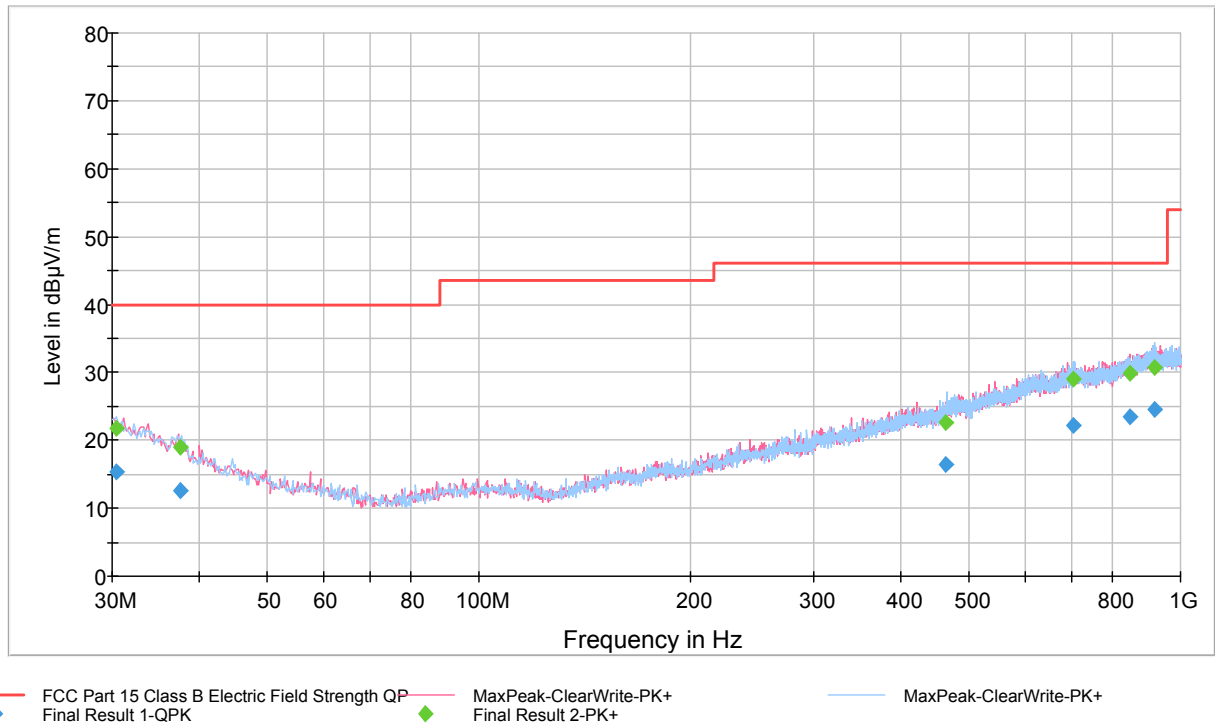


Figure 2. Measured curve with peak-detector. Channel MID.

Final measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)
30.480000	15.3	15000.0	120.000	129.0	H	105.0	18.9	24.7
37.515000	12.5	15000.0	120.000	130.0	V	105.0	14.9	27.5
463.277500	16.4	15000.0	120.000	175.0	H	182.0	21.0	29.6
703.332500	22.2	15000.0	120.000	325.0	H	1.0	25.6	23.8
847.393750	23.5	15000.0	120.000	164.0	V	91.0	26.9	22.5
915.996250	24.6	15000.0	120.000	400.0	H	74.0	28.1	21.4

Table 2. Final results.

FCC Part 15 Class B Electric Field Strenght

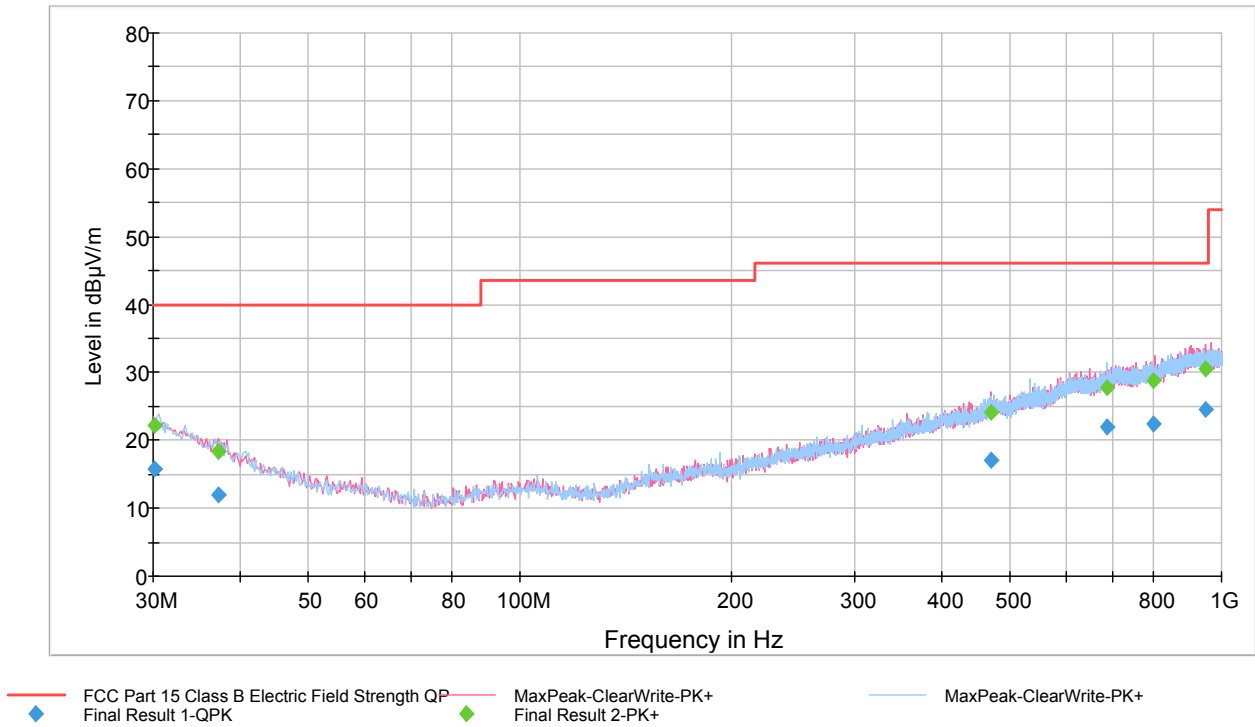


Figure 3. Measured curve with peak-detector. Channel HIGH.

Final measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)
30.100000	15.8	15000.0	120.000	250.0	H	286.0	19.1	24.2
37.245000	12.0	15000.0	120.000	205.0	V	286.0	15.1	28.0
469.935000	17.1	15000.0	120.000	100.0	V	164.0	21.4	28.9
686.242500	21.9	15000.0	120.000	271.0	H	195.0	25.3	24.1
801.138750	22.4	15000.0	120.000	400.0	V	271.0	25.9	23.6
948.226250	24.5	15000.0	120.000	130.0	V	272.0	28.1	21.5

Table 3. Final results.

Transmitter Radiated Emissions 1 000 – 26 500 MHz

Measured Peak and Average Values In The Frequency Range 1 000 MHz – 4 000 MHz.

The correction factor in the final result tables contains the sum of the transducers (antenna + amplifier + cables). The Max Peak and Average values are measured values corrected with the correction factor.

Copy of Radiated Emission FCC Part 15 Class B 1-4GHz 3m

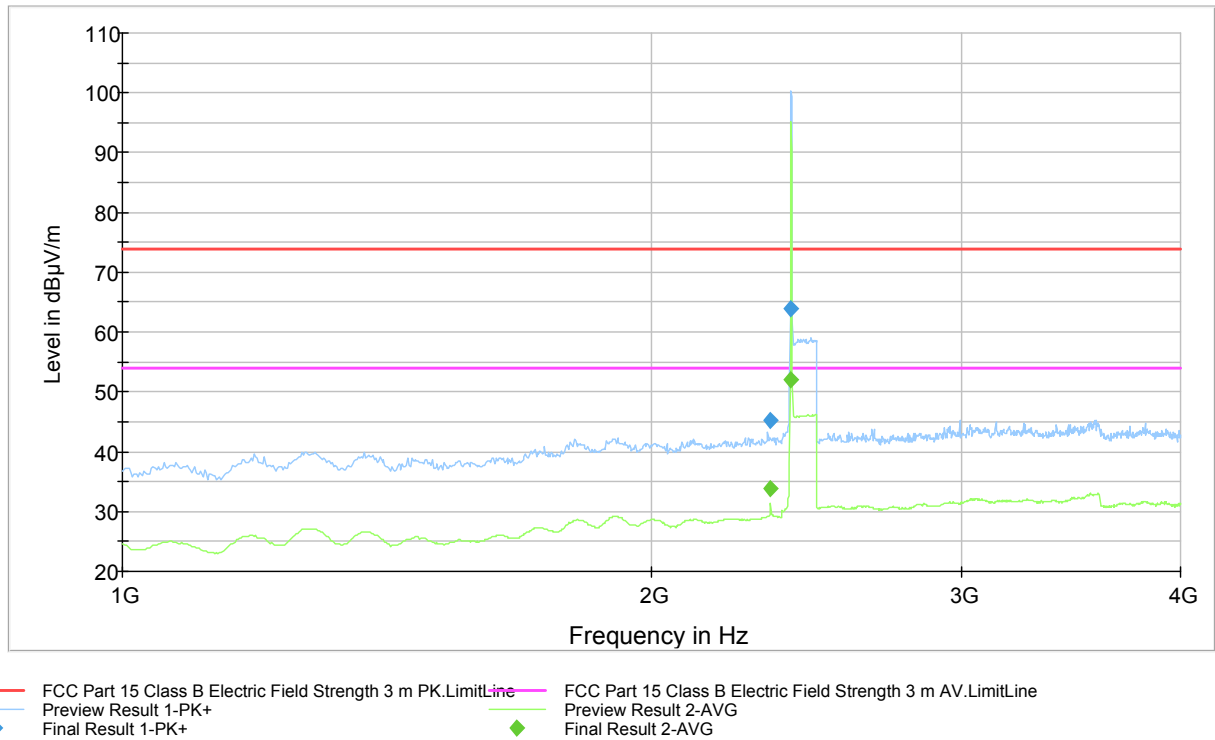


Figure 4. Measured curve with peak- and average detector. Channel LOW.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2337.550000	45.3	1000.0	1000.000	244.0	H	144.0	4.2	28.6	73.9	
2400.000000	64.0	1000.0	1000.000	196.0	H	183.0	4.4	9.9	73.9	

Table 4. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2337.950000	33.9	1000.0	1000.000	200.0	H	150.0	4.2	20.0	53.9	
2399.400000	52.1	1000.0	1000.000	196.0	H	180.0	4.4	1.8	53.9	

Table 5. Final Average results..

Copy of Radiated Emission FCC Part 15 Class B 1-4GHz 3m

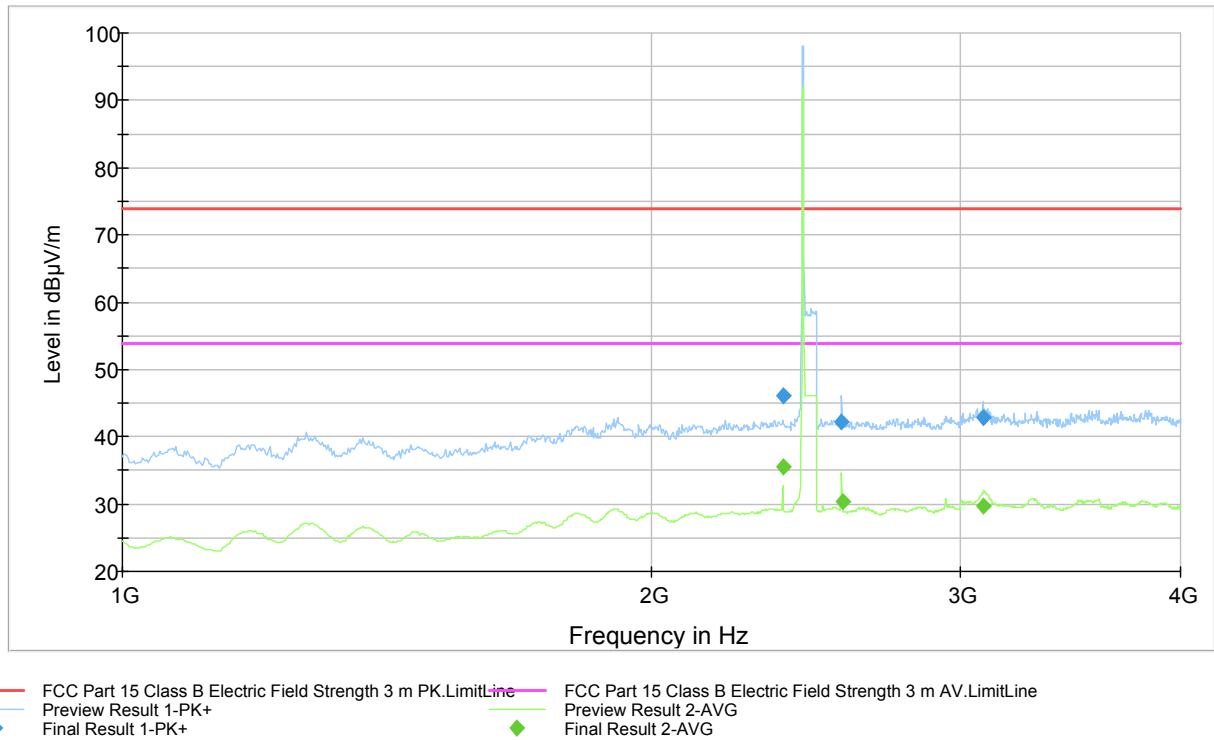


Figure 5. Measured curve with peak- and average detector. Channel MID.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2376.050000	46.2	1000.0	1000.000	195.0	H	165.0	4.4	27.7	73.9	
2568.050000	42.3	1000.0	1000.000	152.0	H	179.0	4.8	31.6	73.9	
3089.650000	42.9	1000.0	1000.000	170.0	H	171.0	6.3	31.0	73.9	

Table 6. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2376.050000	35.5	1000.0	1000.000	197.0	H	165.0	4.4	18.4	53.9	
2569.650000	30.4	1000.0	1000.000	192.0	H	180.0	4.8	23.5	53.9	
3091.650000	29.6	1000.0	1000.000	175.0	H	190.0	6.3	24.3	53.9	

Table 7. Final Average results.

Copy of Radiated Emission FCC Part 15 Class B 1-4GHz 3m

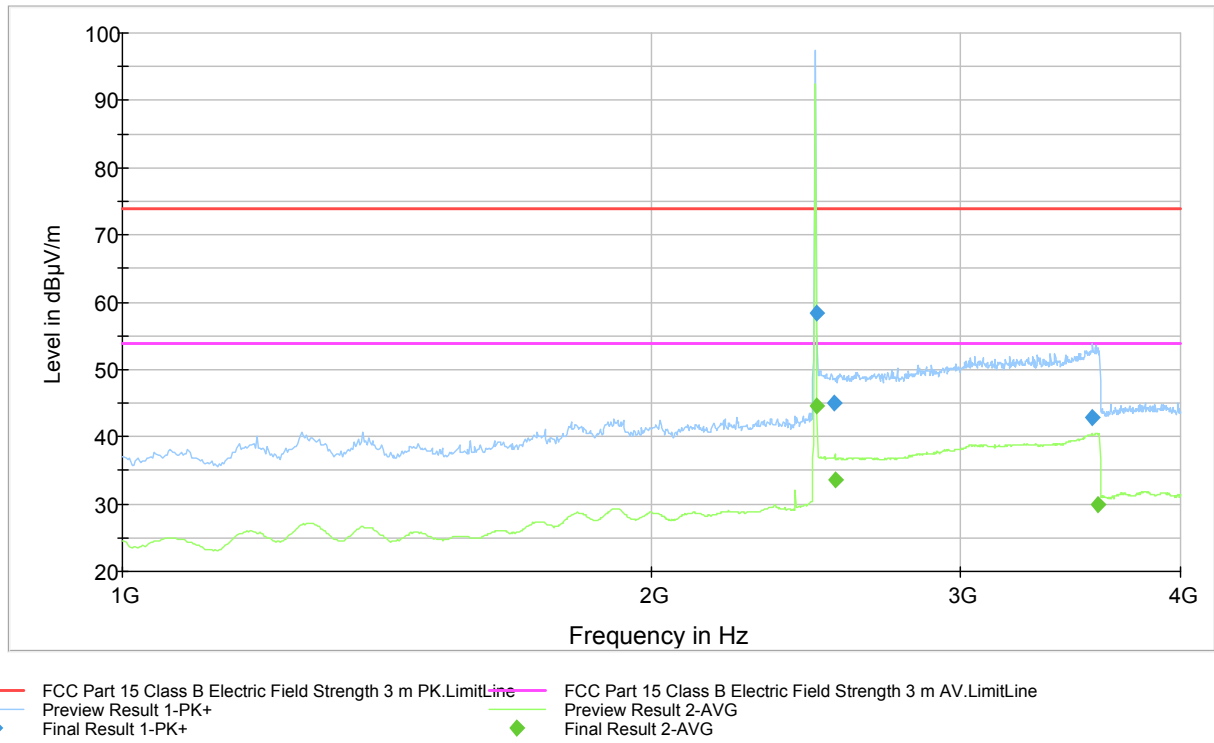


Figure 6. Measured curve with peak- and average detector. Channel HIGH.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	58.3	1000.0	1000.000	116.0	H	313.0	4.7	15.6	73.9	
2543.750000	44.9	1000.0	1000.000	109.0	H	315.0	4.6	29.0	73.9	
3564.050000	42.8	1000.0	1000.000	154.0	H	247.0	6.8	31.1	73.9	

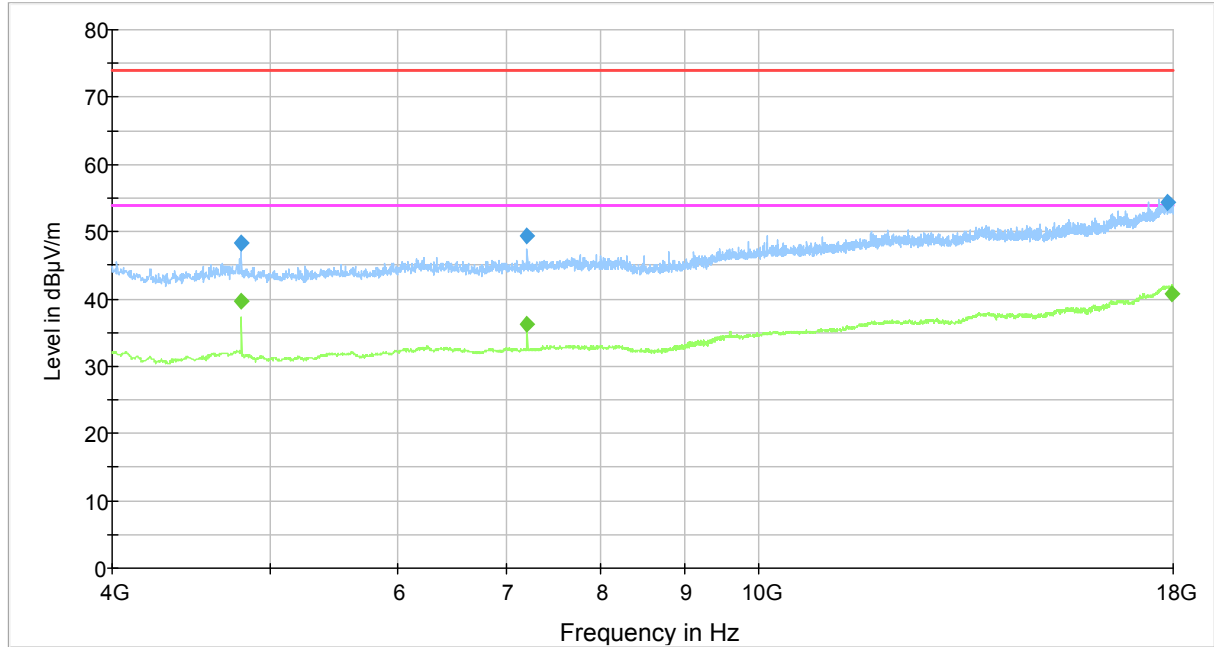
Table 8. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	44.6	1000.0	1000.000	109.0	H	321.0	4.7	9.3	53.9	
2543.950000	33.5	1000.0	1000.000	175.0	H	315.0	4.6	20.4	53.9	
3592.050000	29.8	1000.0	1000.000	100.0	H	265.0	6.9	24.1	53.9	

Table 9. Final Average results.

Measured Peak and Average Values In The Frequency Range 4 000 MHz – 18 000 MHz.

Copy of Radiated Emission FCC Part 15 Class B 1-18GHz 3m



— FCC Part 15 Class B Electric Field Strength 3 m PK.LimitLine — FCC Part 15 Class B Electric Field Strength 3 m AV.LimitLine
— Preview Result 1-PK+ — Preview Result 2-AVG
◆ Final Result 1-PK+ ◆ Final Result 2-AVG

Figure 7. Measured curve with peak- and average detector. Channel LOW.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4805.950000	48.4	1000.0	1000.000	115.0	H	168.0	10.5	25.5	73.9	
7205.350000	49.4	1000.0	1000.000	100.0	H	285.0	12.3	24.5	73.9	
17870.750000	54.3	1000.0	1000.000	115.0	V	114.0	25.7	19.6	73.9	

Table 10. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4805.950000	39.8	1000.0	1000.000	100.0	H	168.0	10.5	14.1	53.9	
7205.550000	36.2	1000.0	1000.000	105.0	H	-5.0	12.3	17.7	53.9	
17963.750000	40.7	1000.0	1000.000	100.0	V	15.0	25.8	13.2	53.9	

Table 11. Final Average results.

Copy of Radiated Emission FCC Part 15 Class B 1-18GHz 3m

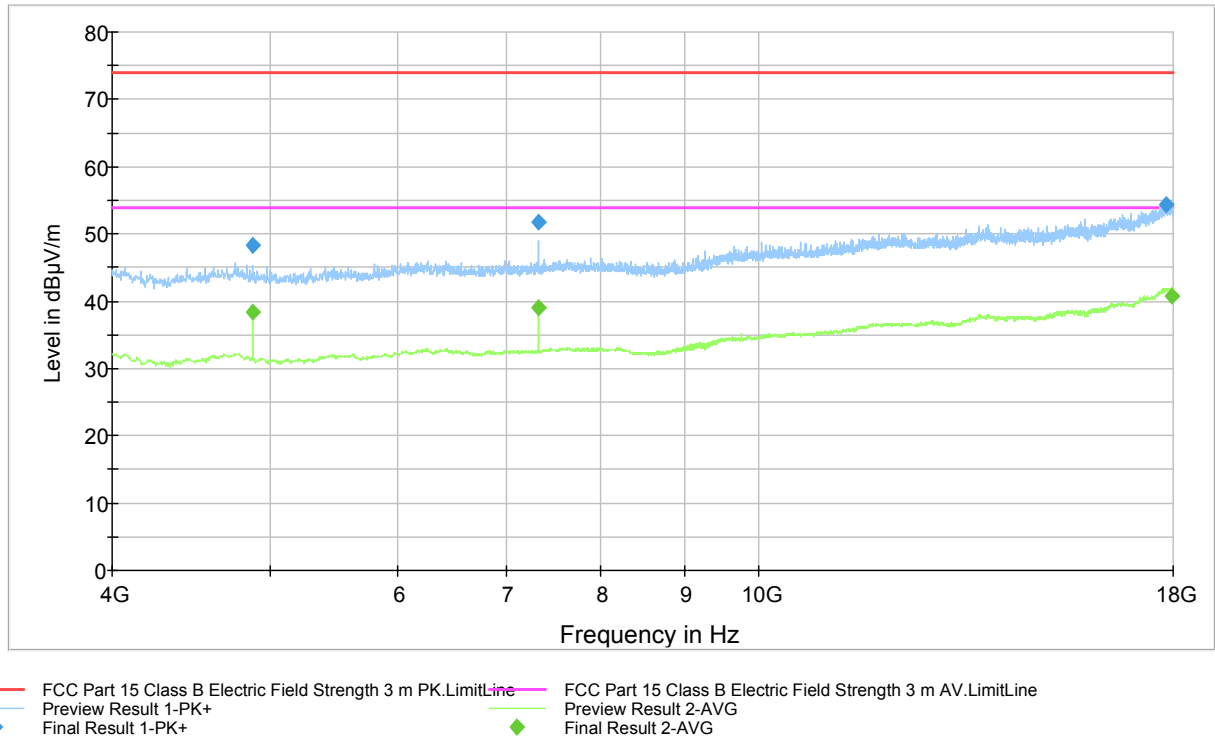


Figure 8. Measured curve with peak- and average detector. Channel MID.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4882.050000	48.2	1000.0	1000.000	100.0	H	175.0	10.5	25.7	73.9	
7320.750000	51.7	1000.0	1000.000	100.0	H	156.0	12.5	22.2	73.9	
17804.250000	54.4	1000.0	1000.000	180.0	V	35.0	25.6	19.5	73.9	

Table 12. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4882.050000	38.4	1000.0	1000.000	100.0	H	173.0	10.5	15.5	53.9	
7319.550000	38.9	1000.0	1000.000	100.0	H	-5.0	12.5	15.0	53.9	
17962.550000	40.7	1000.0	1000.000	100.0	V	11.0	25.8	13.2	53.9	

Table 13. Final Average results.

Copy of Radiated Emission FCC Part 15 Class B 1-18GHz 3m

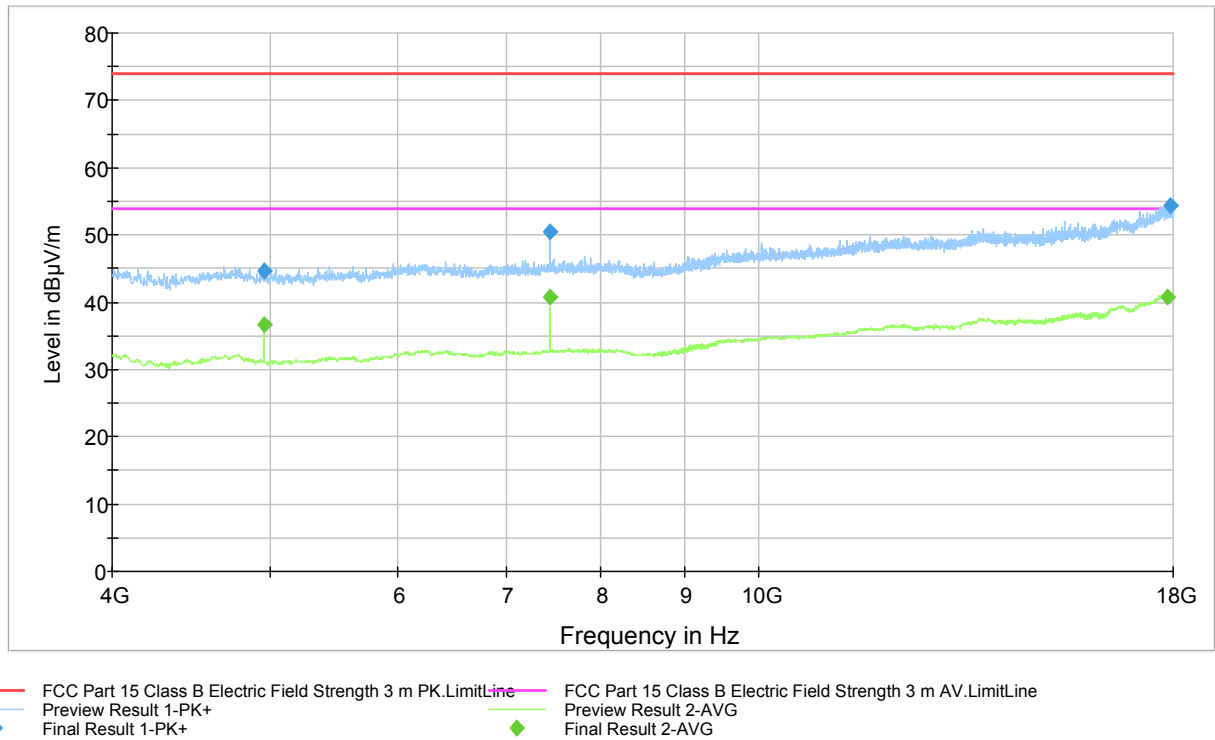


Figure 9. Measured curve with peak- and average detector. Channel HIGH.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4962.850000	44.7	1000.0	1000.000	125.0	V	55.0	10.4	29.2	73.9	
7439.350000	50.5	1000.0	1000.000	100.0	H	97.0	12.8	23.4	73.9	
17913.050000	54.4	1000.0	1000.000	100.0	V	5.0	25.8	19.5	73.9	

Table 14. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4962.050000	36.6	1000.0	1000.000	182.0	V	55.0	10.4	17.3	53.9	
7439.550000	40.7	1000.0	1000.000	100.0	H	151.0	12.8	13.2	53.9	
17854.650000	40.8	1000.0	1000.000	100.0	V	0.0	25.7	13.1	53.9	

Table 15. Final Average results.

Measured Peak and Average Values In The Frequency Range 18 000 MHz – 26 500 MHz.

Copy of Radiated Emission FCC Part 15 Class B 18-26.5GHz at 3m

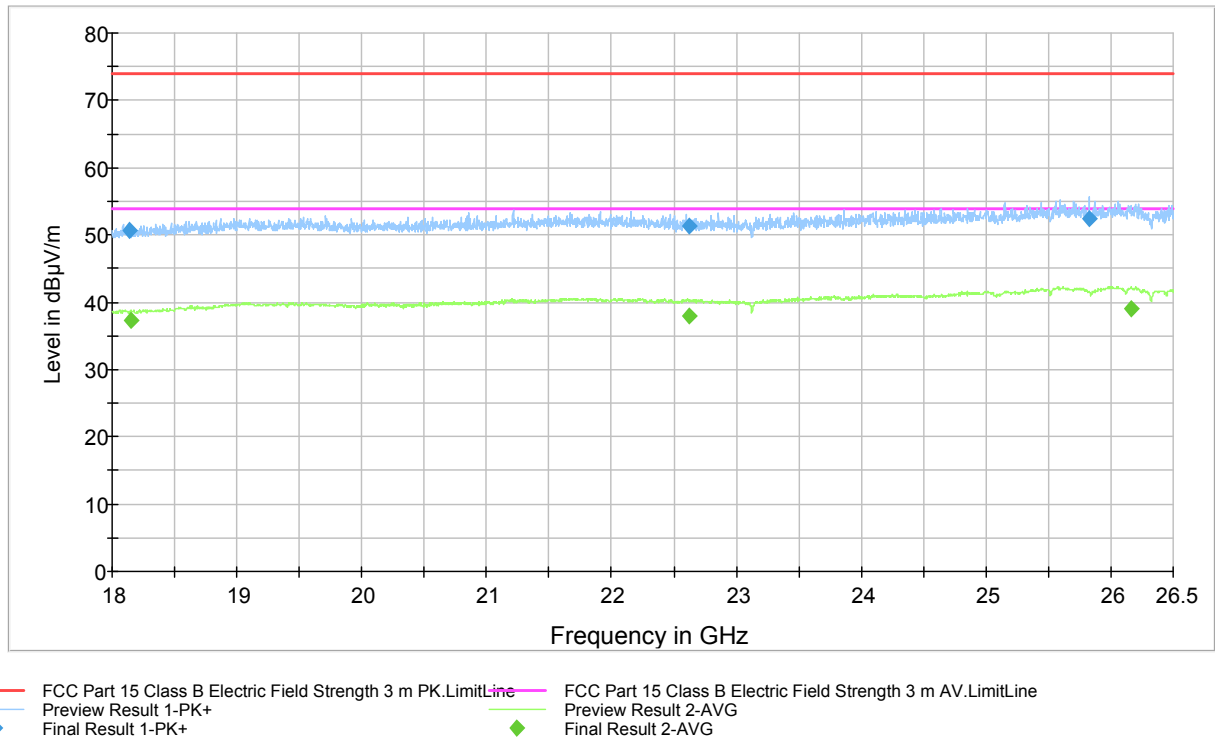


Figure 10. Measured curve with peak- and average detector. Channel LOW.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18136.750000	50.8	15000.0	1000.000	145.0	V	5.0	22.5	23.1	73.9	
22622.550000	51.3	15000.0	1000.000	150.0	V	17.0	25.8	22.6	73.9	
25827.050000	52.4	15000.0	1000.000	125.0	V	12.0	28.0	21.5	73.9	

Table 16. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18151.250000	37.3	15000.0	1000.000	125.0	V	2.0	22.5	16.6	53.9	
22620.450000	38.0	15000.0	1000.000	137.0	V	17.0	25.8	15.9	53.9	
26161.450000	39.0	15000.0	1000.000	106.0	V	8.0	28.1	14.9	53.9	

Table 17. Final Average results.

Copy of Radiated Emission FCC Part 15 Class B 18-26.5GHz at 3m

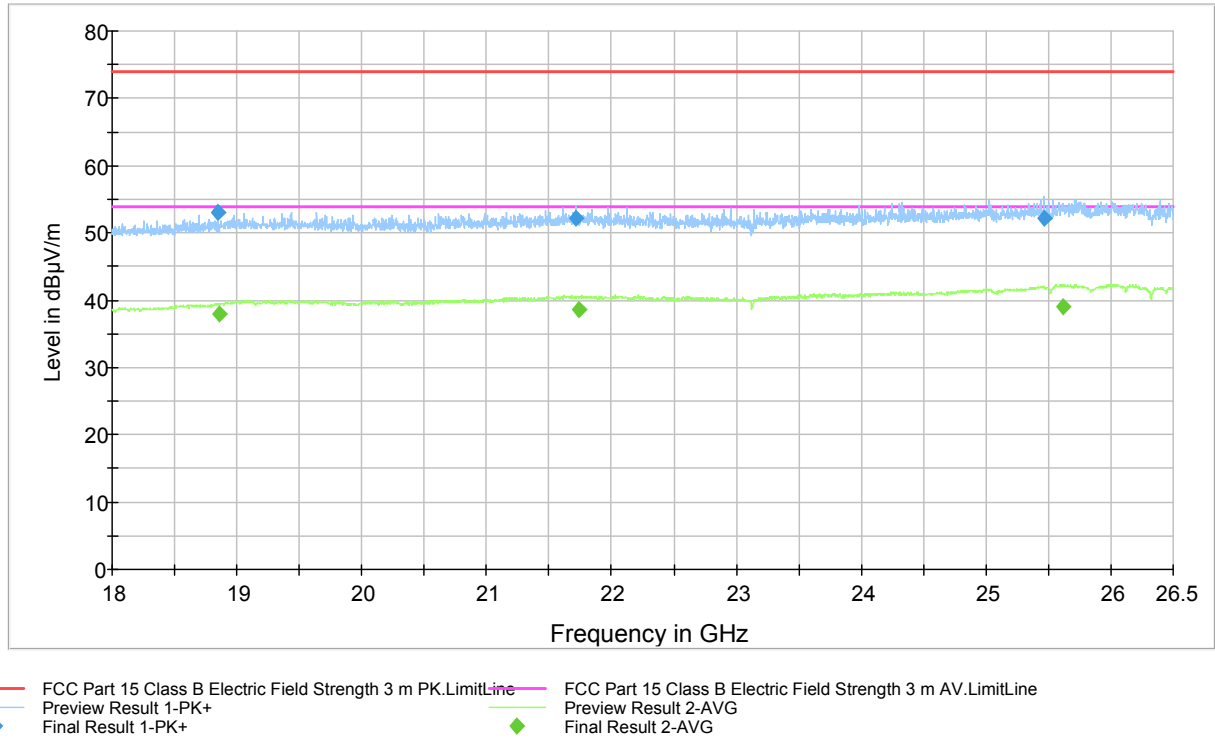


Figure 11. Measured curve with peak- and average detector. Channel MID.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18848.250000	53.1	15000.0	1000.000	132.0	V	1.0	23.3	20.8	73.9	
21710.750000	52.3	15000.0	1000.000	134.0	V	22.0	25.2	21.6	73.9	
25468.050000	52.2	15000.0	1000.000	128.0	V	12.0	27.6	21.7	73.9	

Table 18. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18853.750000	38.0	15000.0	1000.000	100.0	V	-2.0	23.3	15.9	53.9	
21736.550000	38.6	15000.0	1000.000	100.0	V	17.0	25.2	15.3	53.9	
25615.650000	39.1	15000.0	1000.000	126.0	V	6.0	27.9	14.8	53.9	

Table 19. Final Average results.

Copy of Radiated Emission FCC Part 15 Class B 18-26.5GHz at 3m

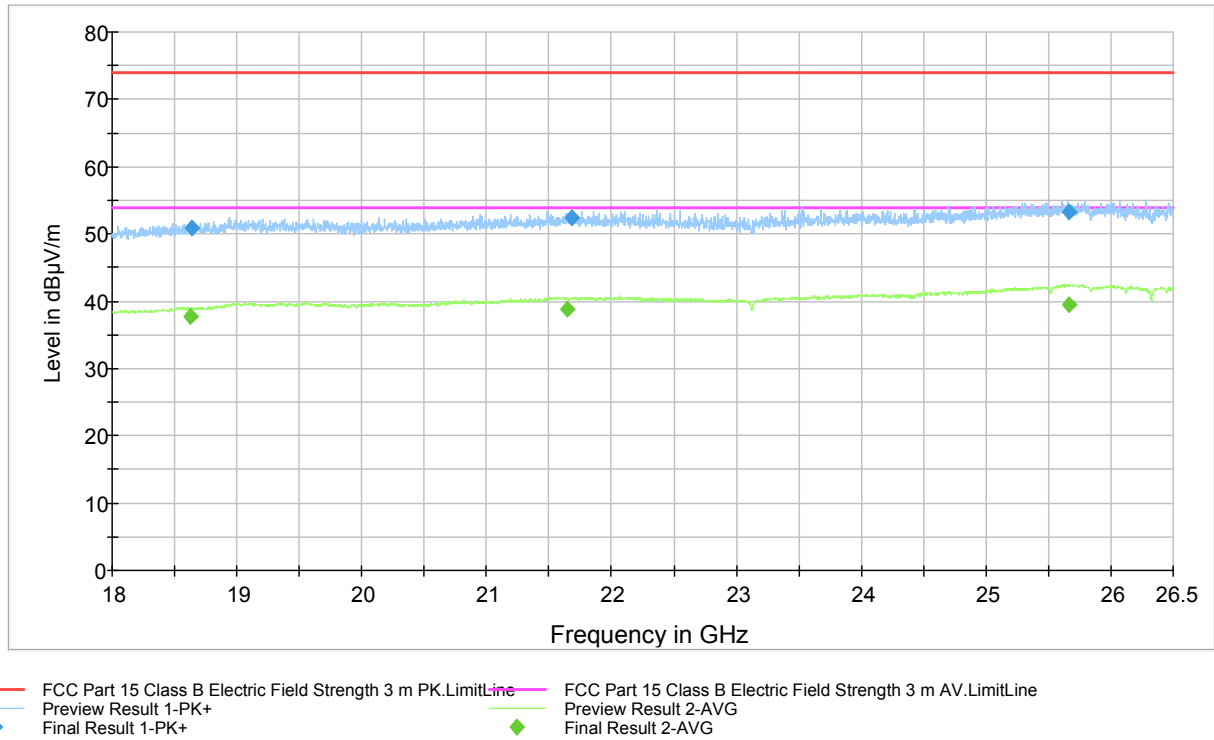


Figure 12. Measured curve with peak- and average detector. Channel HIGH.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18639.650000	50.9	15000.0	1000.000	141.0	V	-3.0	23.2	23.0	73.9	
21675.850000	52.4	15000.0	1000.000	109.0	V	22.0	25.1	21.5	73.9	
25659.250000	53.2	15000.0	1000.000	125.0	V	22.0	27.9	20.7	73.9	

Table 20. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18627.050000	37.8	15000.0	1000.000	100.0	V	0.0	23.2	16.1	53.9	
21648.750000	38.8	15000.0	1000.000	100.0	V	0.0	25.1	15.1	53.9	
25664.450000	39.5	15000.0	1000.000	100.0	V	6.0	27.9	14.4	53.9	

Table 21. Final Average results.

Radiated band edge measurement results

Band edge measurements were performed by using scanning mode of the receiver and 1 MHz bandwidth (6dB filter) and using auto attenuation and auto pre-amplifier.

Copy of Radiated Emission FCC Part 15 Class B 1-4GHz 3m

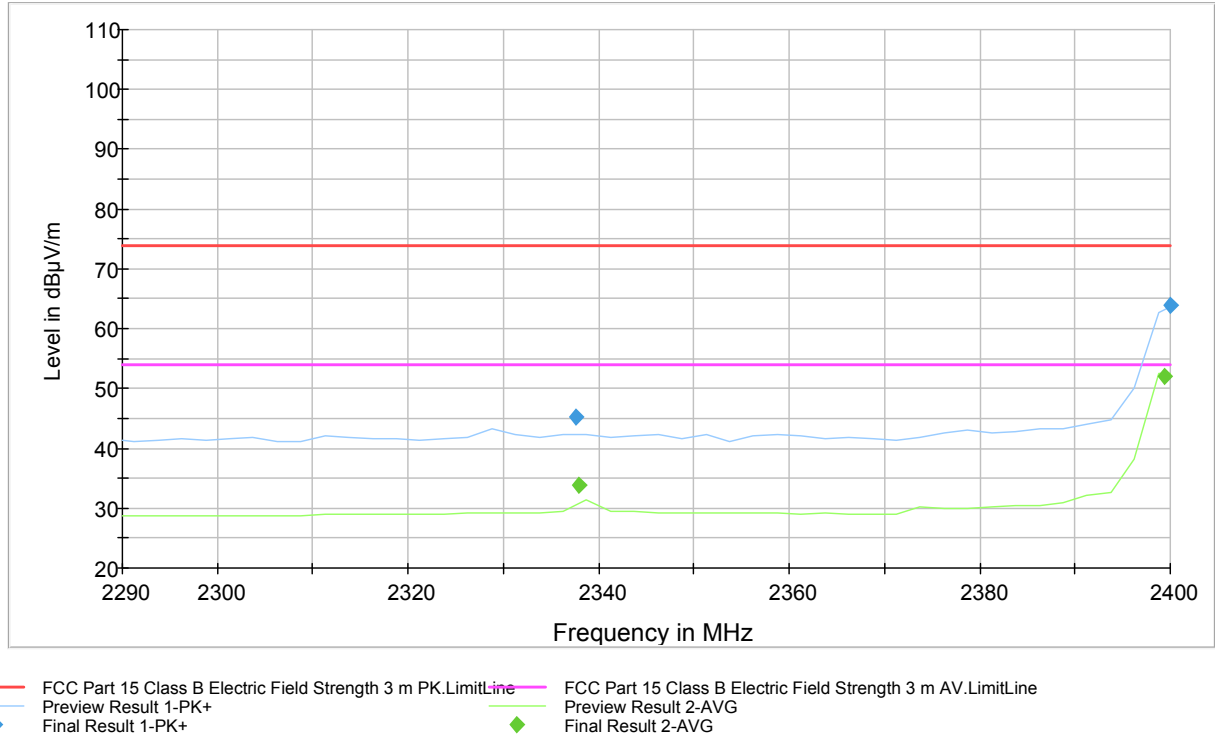


Figure 13. Measured curve with peak- and average detector. Lower band edge.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2337.550000	45.3	1000.0	1000.000	244.0	H	144.0	4.2	28.6	73.9	
2400.000000	64.0	1000.0	1000.000	196.0	H	183.0	4.4	9.9	73.9	

Table 22. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2337.950000	33.9	1000.0	1000.000	200.0	H	150.0	4.2	20.0	53.9	
2399.400000	52.1	1000.0	1000.000	196.0	H	180.0	4.4	1.8	53.9	

Table 23. Final Average results.

Copy of Radiated Emission FCC Part 15 Class B 1-4GHz 3m

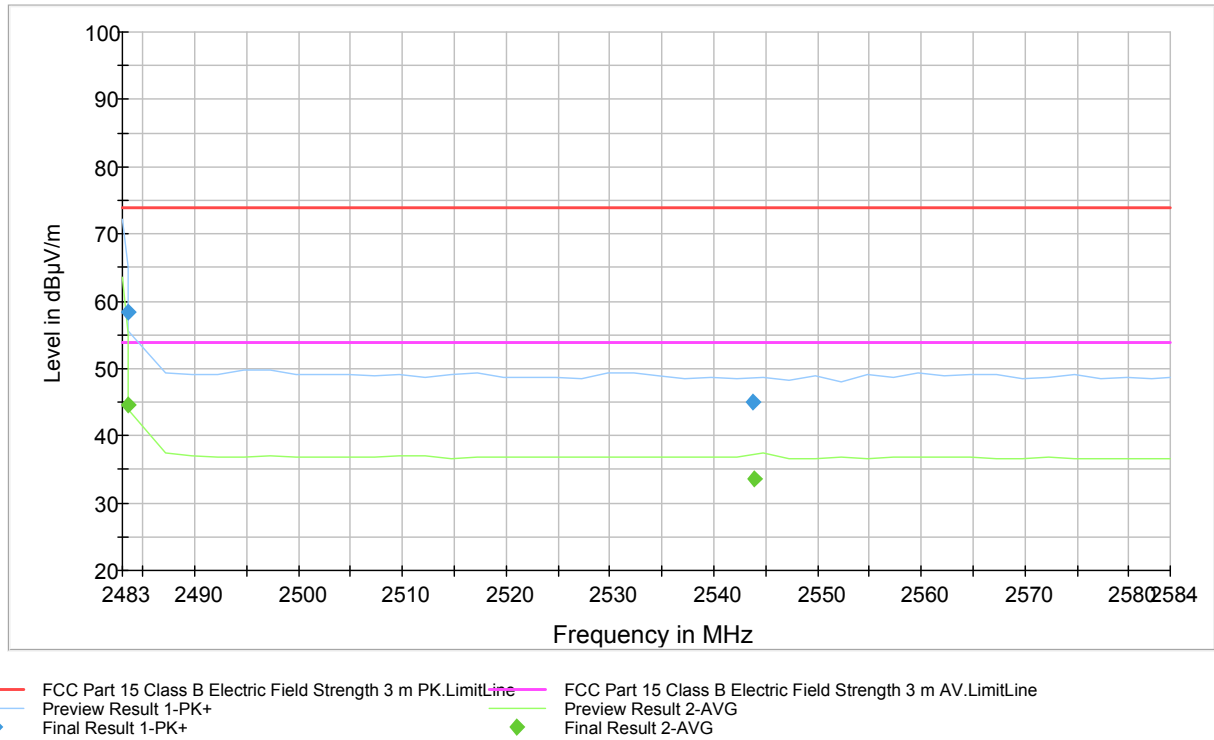


Figure 14. Measured curve with peak- and average detector. Upper band edge.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	58.3	1000.0	1000.000	116.0	H	313.0	4.7	15.6	73.9	
2543.750000	44.9	1000.0	1000.000	109.0	H	315.0	4.6	29.0	73.9	

Table 24. Final Max Peak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	44.6	1000.0	1000.000	109.0	H	321.0	4.7	9.3	53.9	
2543.950000	33.5	1000.0	1000.000	175.0	H	315.0	4.6	20.4	53.9	

Table 25. Final Average results.

Receiver Radiated Emissions 30 – 26 500 MHz

Standard: ANSI C63.10 (2009)
Tested by: JJM / NTO
Date: 25.5.2011, 13.6.2011
Humidity: 37 - 50 %
Temperature: 19.8 - 21.0 °C
Measurement uncertainty ± 4.51 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.109

The EUT was in a receiving mode and measurement was performed on middle channel only.
 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.

Measured Peak Values In The Frequency Range 30 MHz - 1000 MHz.

FCC Part 15 Class B Electric Field Strenght

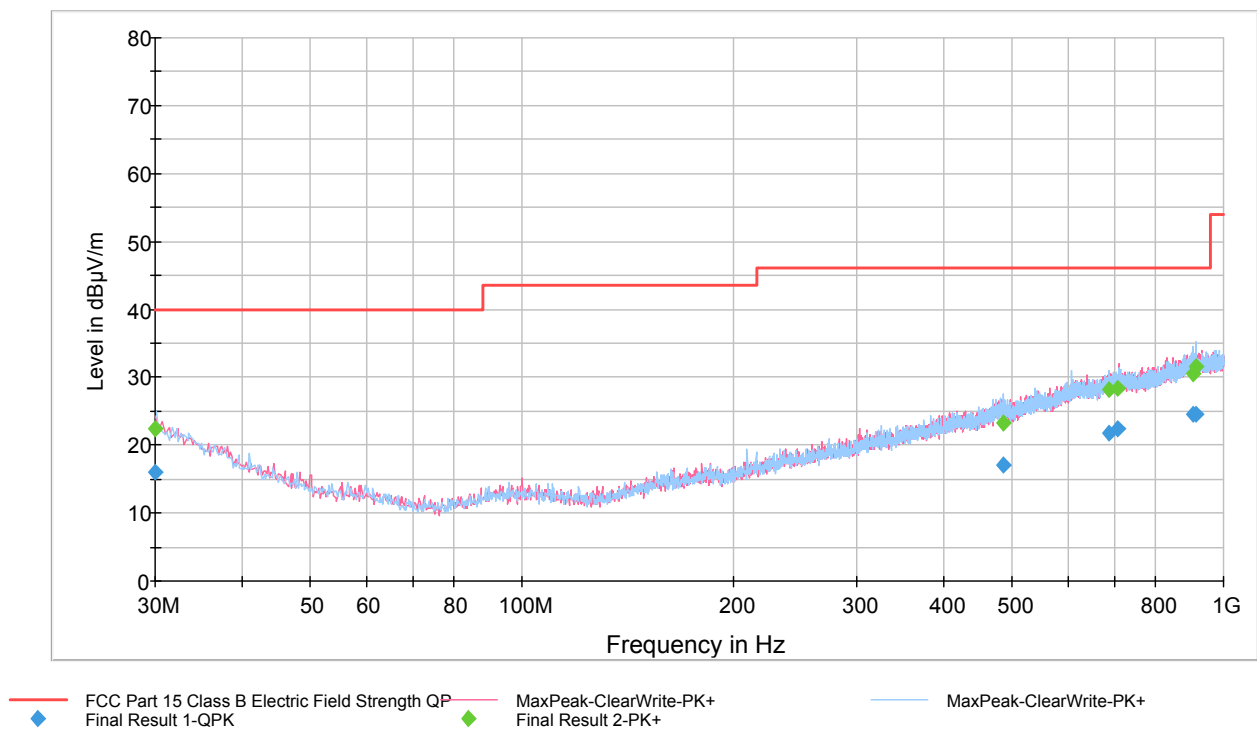


Figure 15. Measured curve with peak-detector.

Final measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.020000	15.9	15000.0	120.000	130.0	H	285.0	19.1	24.1	40.0	
485.037500	17.1	15000.0	120.000	305.0	H	182.0	21.7	28.9	46.0	
685.276250	21.8	15000.0	120.000	204.0	H	-13.0	25.2	24.2	46.0	
708.037500	22.3	15000.0	120.000	100.0	V	74.0	25.7	23.7	46.0	
903.140000	24.6	15000.0	120.000	204.0	H	182.0	28.2	21.4	46.0	
912.771250	24.6	15000.0	120.000	325.0	H	105.0	28.2	21.4	46.0	

Table 26. Final results.

Measured Peak Values In The Frequency Range 1 000 MHz – 18 000 MHz.

Copy of Radiated Emission FCC Part 15 Class B 1-18GHz 3m

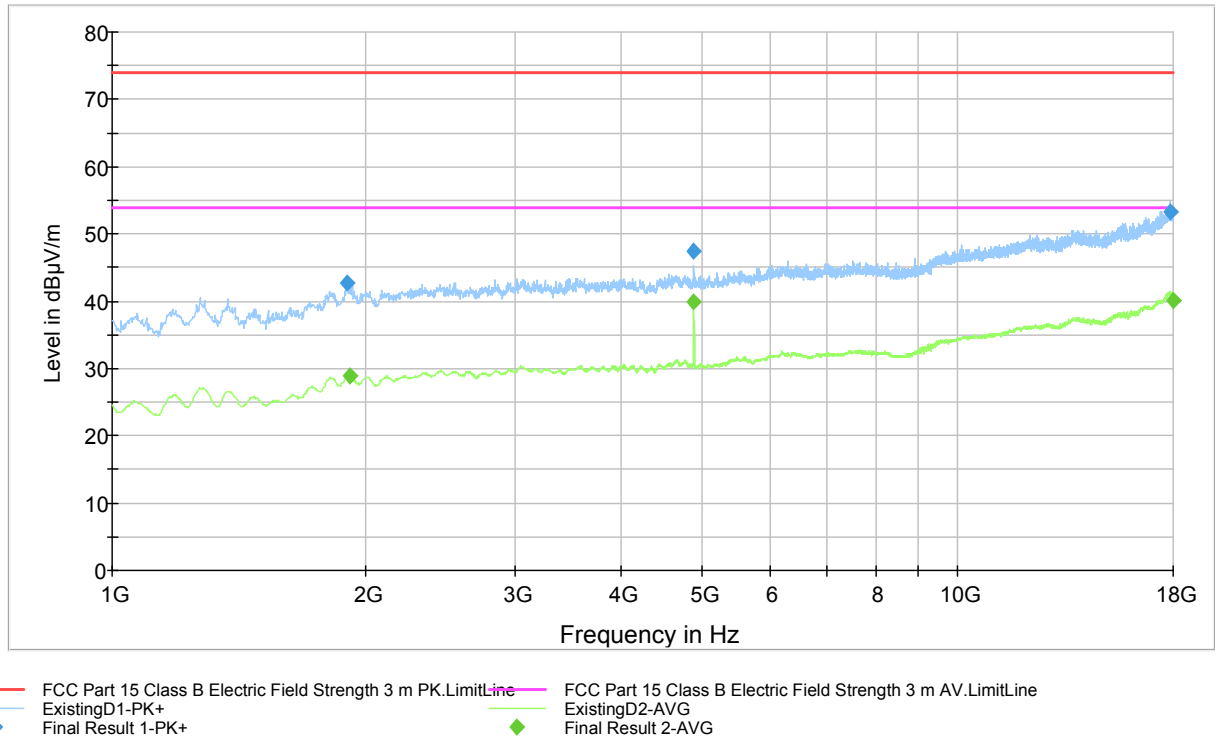


Figure 16. Measured curve with peak-and average detector.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1898.750000	42.6	15000.0	1000.000	140.0	H	124.0	2.6	31.3	73.9	
4882.050000	47.4	15000.0	1000.000	100.0	H	172.0	9.7	26.5	73.9	
17882.350000	53.3	15000.0	1000.000	175.0	V	20.0	25.1	20.7	73.9	

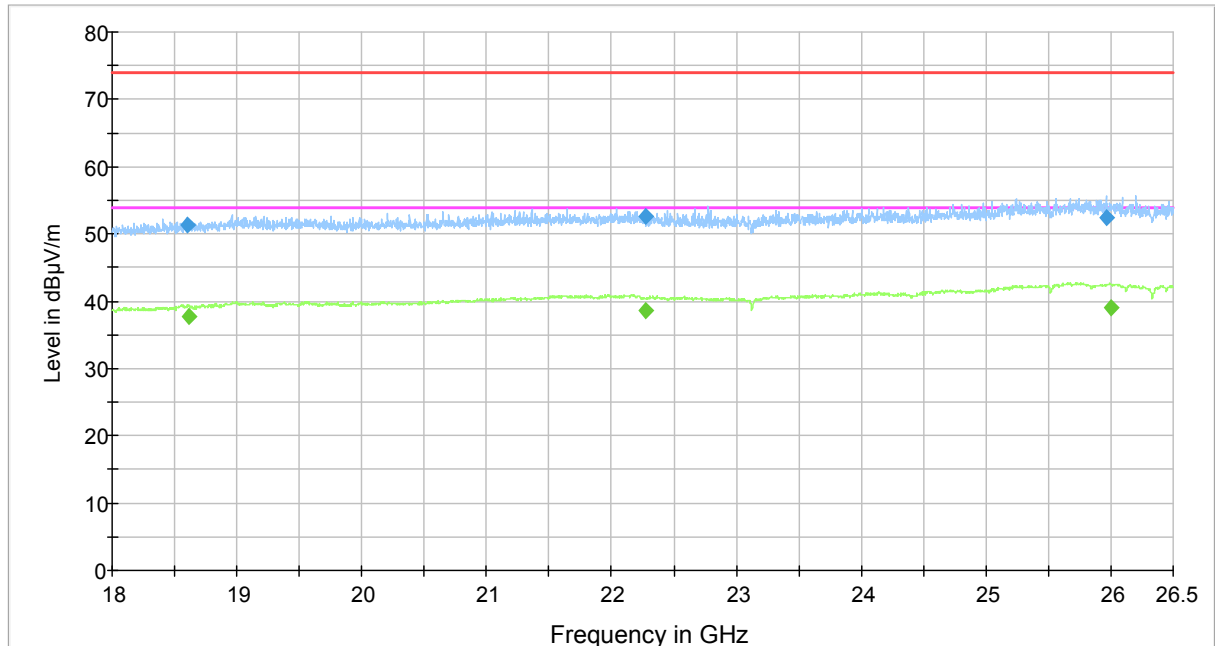
Table 27. Final MaxPeak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
1909.950000	28.9	15000.0	1000.000	200.0	H	228.0	2.6	25.0	53.9	
4882.050000	40.0	15000.0	1000.000	100.0	H	173.0	9.7	13.9	53.9	
17967.250000	40.1	15000.0	1000.000	100.0	V	0.0	25.2	13.8	53.9	

Table 28. Final Average results.

Measured Peak Values In The Frequency Range 18 000 MHz – 26 500 MHz.

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



— FCC Part 15 Class B Electric Field Strength 3 m PK.LimitLine — FCC Part 15 Class B Electric Field Strength 3 m AV.LimitLine
◆ Preview Result 1-PK+ ◆ Preview Result 2-AVG
◆ Final Result 1-PK+ ◆ Final Result 2-AVG

Figure 17. Measured curve with peak-and average detector.

Final measurements from the worst frequencies

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18602.050000	51.3	15000.0	1000.000	352.0	V	113.0	23.2	22.6	73.9	
22268.050000	52.6	15000.0	1000.000	303.0	V	147.0	25.6	21.3	73.9	
25961.450000	52.4	15000.0	1000.000	171.0	V	66.0	28.0	21.5	73.9	

Table 29. Final MaxPeak results.

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
18610.650000	37.8	15000.0	1000.000	385.0	V	141.0	23.2	16.1	53.9	
22267.850000	38.6	15000.0	1000.000	365.0	V	17.0	25.6	15.3	53.9	
25997.950000	39.0	15000.0	1000.000	352.0	V	23.0	28.0	14.9	53.9	

Table 30. Final Average results.

Conducted emissions

Standard: ANSI C63.10 (2009)
Tested by: JJM
Date: 29.6.2011
Humidity: 49 %
Temperature: 24 °C
Measurement uncertainty ± 2,87 dB Level of confidence 95 % (k = 2)

FCC Rule: 15.207

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 AC / DC power supply which was connected to the LISN. The supply voltage through the LISN to the power supply was 115 VAC / 60 Hz.

Test results

FCC Part 15 Class B Voltage on Mains 2-Line-LISN

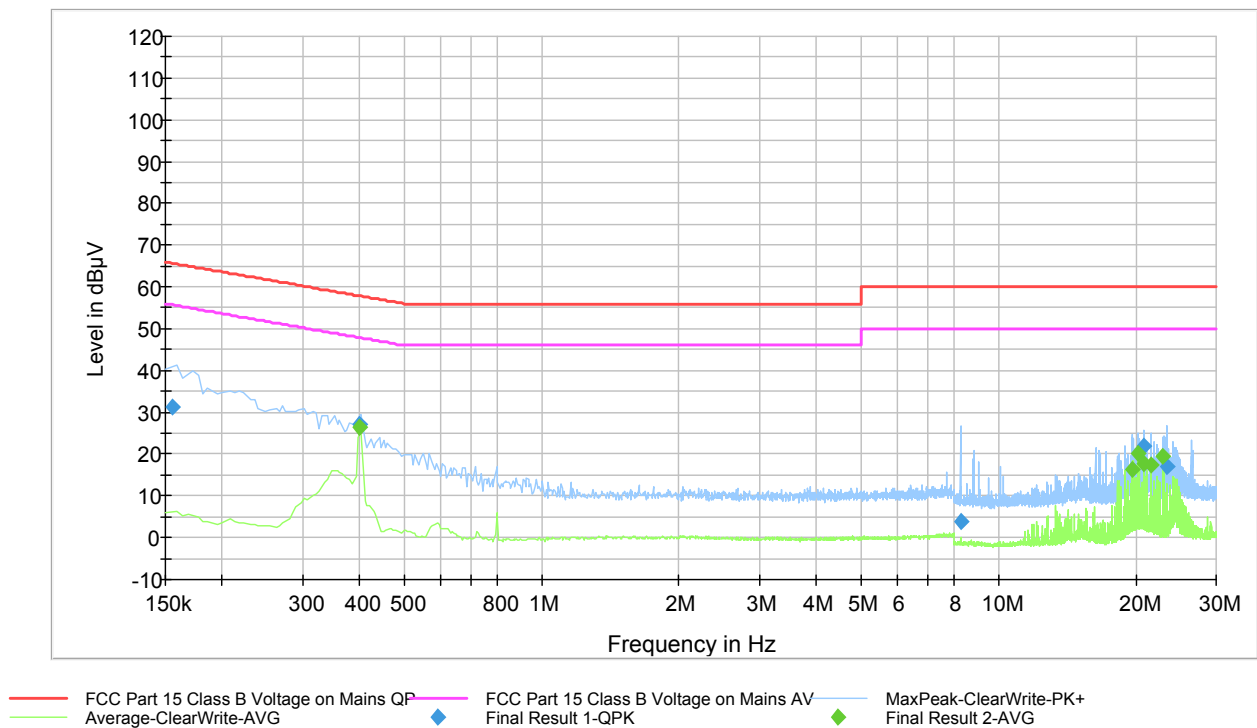


Figure 18. The measured curves with peak- and average-detectors

Final measurements from the worst frequencies

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.156001	31.2	15000.0	9.000	GND	N	10.1	34.5	65.7	
0.400501	27.1	15000.0	9.000	GND	L1	10.2	30.7	57.8	
8.263501	4.0	15000.0	9.000	GND	L1	10.8	56.0	60.0	
20.806501	21.8	15000.0	9.000	GND	L1	11.6	38.2	60.0	
23.373001	17.1	15000.0	9.000	GND	L1	11.7	42.9	60.0	

Table 31. Final quasi-peak measurements from the worst frequencies

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.399001	26.3	15000.0	9.000	GND	N	10.1	21.6	47.9	
19.585501	16.4	15000.0	9.000	GND	L1	11.6	33.6	50.0	
20.259001	20.1	15000.0	9.000	GND	L1	11.6	29.9	50.0	
20.808001	17.7	15000.0	9.000	GND	L1	11.6	32.3	50.0	
21.663001	17.4	15000.0	9.000	GND	L1	11.7	32.6	50.0	
22.933501	19.3	15000.0	9.000	GND	L1	11.7	30.7	50.0	

Table 32. Final average measurements from the worst frequencies

The correction factor in the final result tables contains the sum of the transducers (cables + transient limiter + LISN).

The QuasiPeak and Average values are the measured values corrected with the correction factor.

List of test equipments

Manufacturer	Type	Serial no	Inv. no
ROHDE & SCHWARZ			
EMI Test receiver	ESCI 3	100885	8264
EMI Test receiver	ESU 26	100185	8453
Test software	EMC32	Ver. 8.30.0	-
LISN	ESH2-Z5		4126
Transient limiter	ESH3-Z2		
DAVIS			
Weather station	Vantage Pro	-	5297
EMCO			
Antenna (1 - 18 GHz)	3117	29617	7293
CHASE			
Antenna (30 MHz - 1 GHz)	6141A	4102	7895
HEWLETT- PACKARD			
Microwave amplifier	83017A	-	5226
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