

Test Report

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

Equipment Under Test: Training computer
Model: RCX3
Type: -
Manufacturer: Polar Electro Oy
Professorintie 5
FI-90440 KEMPELE
FINLAND
Customer: Polar Electro Oy
Professorintie 5
FI-90440 KEMPELE
FINLAND
FCC Rule Part: 15.249:2011
IC Rule Part: RSS-210, Issue 8, 2010
RSS-GEN, Issue 3, 2010



Date: 29.2.2012

Issued by:


Niko Tolonen
Testing Engineer

Date: 29.2.2012

Checked by:


Jari Merikari
Technical Manager

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Equipment Under Test (EUT)

Training computer	
Brand:	POLAR
Model:	RCX3
Type:	-
Serial no:	-
HW version:	39040563.08
SW version:	71045620.00
FCC ID number:	INWX1
Industry Canada number:	6248A-X1

Description of the EUT

The EUT is a training computer for personal use. It monitors a heart beat rate of the user and also other different wireless sensors for example speed sensor and GPS sensor can be paired with it. After the training stored results can be uploaded to the computer via Datalink (external USB stick) which is connected to the computer.

Classification of the device

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

Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing

Ratings and declarations

Operating Frequency Range (OFR) TX mode:	2403 - 2482 MHz
TX Channels:	3 (advertising mode) 5 (connect mode)
TX Channel Frequencies:	Advertising mode: 2403, 2450 and 2482 MHz Connected mode: 2404, 2419, 2434, 2452 and 2467 MHz
Operating Frequency Range (OFR) RX mode:	2403 - 2482 MHz
RX Channels:	5
RX Channel Frequencies:	2409, 2441, 2471, 2473 and 2475 MHz
Channel bandwidth:	1 697 kHz
Effective radiated power:	-10.7 dBm (0.085 mW)
Communication technique:	Shock burst
Data rate:	1 Mbit/s
Modulation:	GFSK
Antenna type and gain:	Planar Inverted-L antenna, max -2.9 dBi

Power Supply

Rated voltage:	1 x 3 VDC battery (CR2025)
Operating voltage:	3.0VDC

Mechanical Size of the EUT

Length: 48 mm Width: 42 mm Height: 13 mm

Peripherals

No peripherals were used during the tests.

Samples

Sample No. 1: EUT uses its own internal antenna.

Sample No. 2: EUT is fitted with temporary 50 ohm SMA connector.

Disclaimer

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SUMMARY OF TESTING

Test Specification	Description of Test	Result
§15.249 (a) / RSS-210, A2.9 (1)	Field Strength of Fundamental	PASS
§15.249 (a)(c)(d)(e) / RSS-210, 2.6, A2.9 (1)(2)	Spurious Radiated Emissions	PASS
§15.249 (a)(c)(d)(e) / RSS-210, 2.6, A2.9 (1)(2)	Band Edge Radiated Emissions	PASS
§15.215 (c)	20 dB Bandwidth	PASS
RSS-GEN 4.4.1	99% Bandwidth	PASS
-	Duty Cycle	PASS
§15.109 / RSS-GEN 7.2.3 / ICES-003	Receiver Radiated Emissions	PASS

Test methods

References:	ANSI C63.10 (2009) American National Standard for Testing Unlicensed Wireless Devices
	ANSI C63.4 (2009) American National Standard for Methods of Measurement of Radio- Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

EUT Test Conditions During Testing

The device is provided with a maximum duty cycle of 1.33% as shown in page 35 of this report. The duty cycle is calculated for on-time duration of burst of 1.468 ms (4 * 0.367 ms). However, to enable accurate peak measurements the device was modified to transmit with a duty cycle of 98% during the testing.

The EUT uses two different transmission modes, advertising mode and connect mode. In advertising mode EUT uses three channels and connect mode 5 channels for data transmission. For both modes transmission technique and the modulation are the same.

In the radiated emission test the EUT was tested in three different orthogonal axes (X, Y and Z) in order to find out the worst direction. The worst direction result was reported.

Channels tested	Channel ID	Channel Frequency MHz
	LOW	2403
	MID	2441
	HIGH	2482

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

Field Strength of Fundamental

Standard:	ANSI C63.10 (2009)	
Tested by:	NTO	
Date:	2.2.2012	
Humidity:	36 %	
Temperature:	21 °C	
Barometric pressure	1046 hPa	
Measurement uncertainty	± 4.51 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.249 (a)

IC Rule: RSS-210 A2.9 (1)

Measured peak levels include transducer factors (antenna, amplifier, filters) and cable attenuations. The peak level was measured in continuous transmit mode with 98 % maximum duty cycle.

Average levels were calculated by subtracting the correction factor from the maximum measured peak level as stated in Part 15.35 (c).

The correction was calculated by using the formula: $20 * \text{LOG} (4 * 0.367\text{ms} / 100\text{ms}) = -36.7 \text{ dB}$.

CHANNEL LOW

Table 1. Peak level of fundamental

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2403.000000	93.1	1000.0	1000.000	172.0	V	317.0	4.7	20.9	114.0	
2403.200000	91.6	1000.0	1000.000	189.0	H	355.0	4.7	22.4	114.0	

Table 2. Average level of fundamental

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2403.000000	56.4	1000.0	1000.000	172.0	V	317.0	4.7	37.6	94.0	
2403.200000	54.9	1000.0	1000.000	189.0	H	355.0	4.7	39.1	94.0	

CHANNEL MID

Table 3. Peak level of fundamental

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2441.000000	93.8	1000.0	1000.000	167.0	V	281.0	4.4	20.2	114.0	
2441.400000	93.9	1000.0	1000.000	182.0	H	354.0	4.4	22.1	114.0	

Table 4. Average level of fundamental

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2441.000000	57.1	1000.0	1000.000	167.0	V	281.0	4.4	36.9	94.0	
2441.400000	57.2	1000.0	1000.000	182.0	H	354.0	4.4	36.8	94.0	

CHANNEL HIGH

Table 5. Peak level of fundamental

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
2481.950000	96.3	1000.0	1000.000	200.0	V	299.0	4.7	17.7	114.0	
2482.350000	96.0	1000.0	1000.000	179.0	H	343.0	4.7	18.0	114.0	

Table 6. Average level of fundamental

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
2481.950000	59.6	1000.0	1000.000	200.0	V	299.0	4.7	34.4	94.0	
2482.350000	59.3	1000.0	1000.000	179.0	H	343.0	4.7	34.7	94.0	

Transmitter Radiated Emissions 30 – 26 500 MHz and Band Edge

Standard	ANSI C63.10 (2009)	
Tested by:	NTO	
Date:	30.1. - 3.2.2012	
Humidity:	33 – 40 %	
Temperature:	20 – 21 °C	
Barometric pressure	1038 – 1052 hPa	
Measurement uncertainty	± 4.51 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.249 (a)(c)(d)(e), 15.209(a)

IC Rule: RSS-210 2.6, A2.9(1)(2)

Measured peak levels include transducer factors (antenna, amplifier, filters) and cable attenuations. The peak level was measured in continuous transmit mode with 98 % duty cycle.

Average levels were calculated by subtracting the correction factor from the maximum measured peak level as stated in Part 15.35 (c) above 1000 MHz.

The correction was calculated by using the formula: $20 * \text{LOG} (4 * 0.367\text{ms} / 100\text{ms}) = -36.7 \text{ dB}$.

Spurious and Band-Edge Radiated Emissions

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

CHANNEL LOW

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

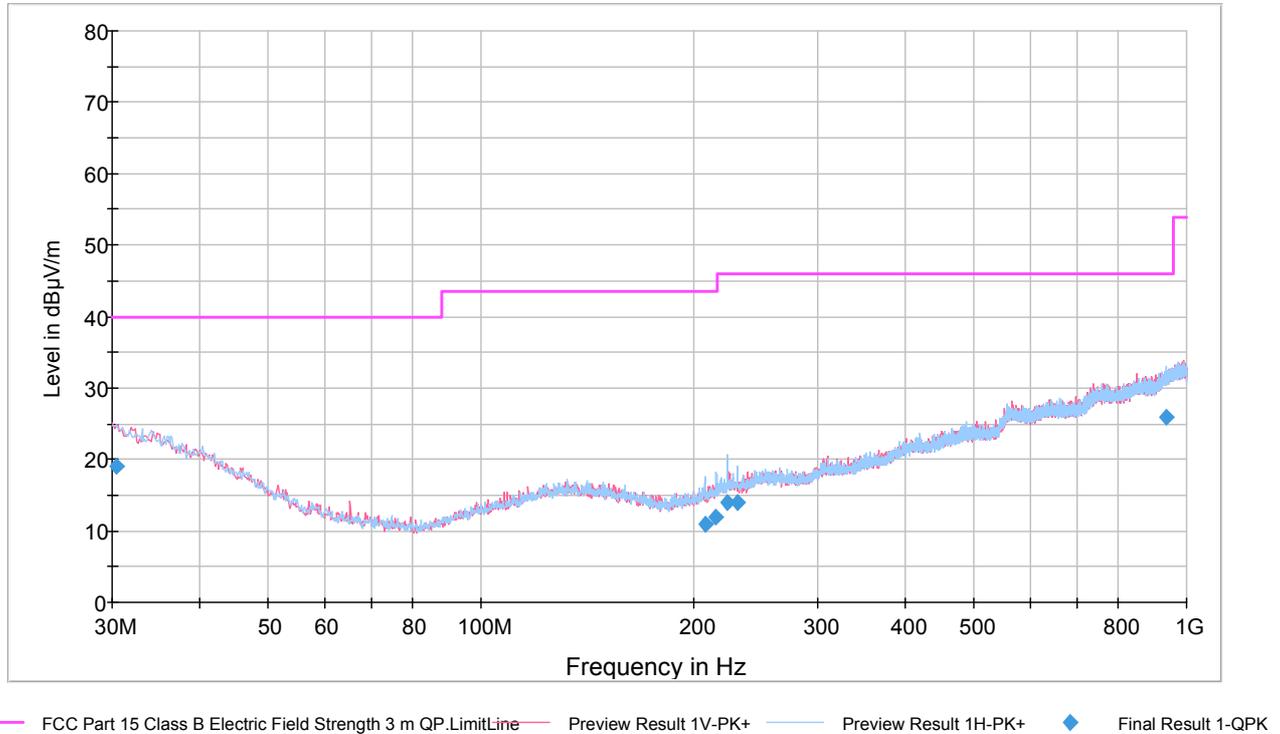


Figure 1. Measured curve with Peak detector.

Table 7. Final QuasiPeak measurement results

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.460000	19.1	1000.0	120.000	279.0	V	101.0	23.5	20.9	40.0	
207.595000	10.8	1000.0	120.000	115.0	H	170.0	12.6	32.7	43.5	
215.395000	12.0	1000.0	120.000	153.0	H	177.0	13.1	31.5	43.5	
223.205000	14.0	1000.0	120.000	126.0	H	212.0	13.8	32.0	46.0	
231.005000	13.9	1000.0	120.000	143.0	H	165.0	13.5	32.1	46.0	
936.015000	25.8	1000.0	120.000	185.0	H	107.0	27.3	20.2	46.0	

CHANNEL MID

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

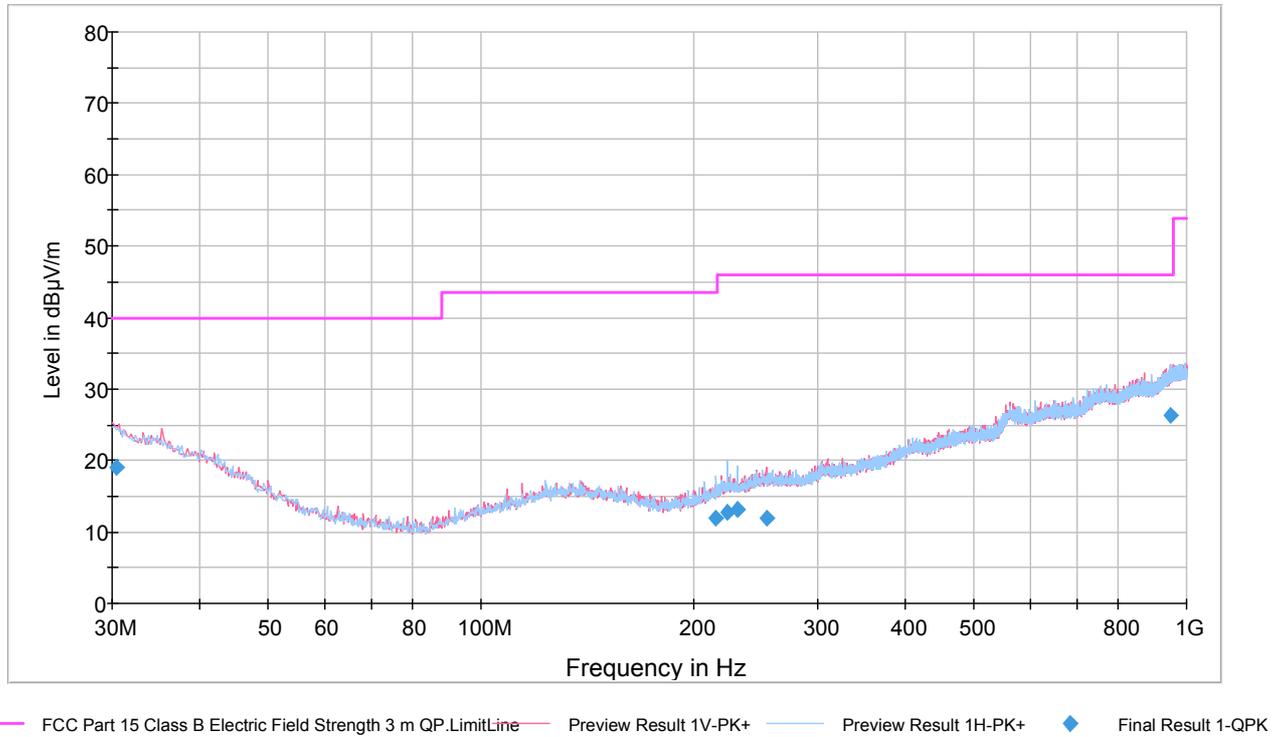


Figure 2. Measured curve with Peak detector.

Table 8. Final QuasiPeak measurement results

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.440000	19.1	1000.0	120.000	218.0	V	44.0	23.5	20.9	40.0	
215.255000	11.9	1000.0	120.000	185.0	H	348.0	13.1	31.6	43.5	
223.155000	12.7	1000.0	120.000	178.0	H	105.0	13.8	33.3	46.0	
230.925000	13.1	1000.0	120.000	121.0	H	294.0	13.5	32.9	46.0	
253.575000	11.9	1000.0	120.000	170.0	V	220.0	14.7	34.1	46.0	
948.535000	26.2	1000.0	120.000	308.0	V	21.0	27.7	19.8	46.0	

CHANNEL HIGH

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

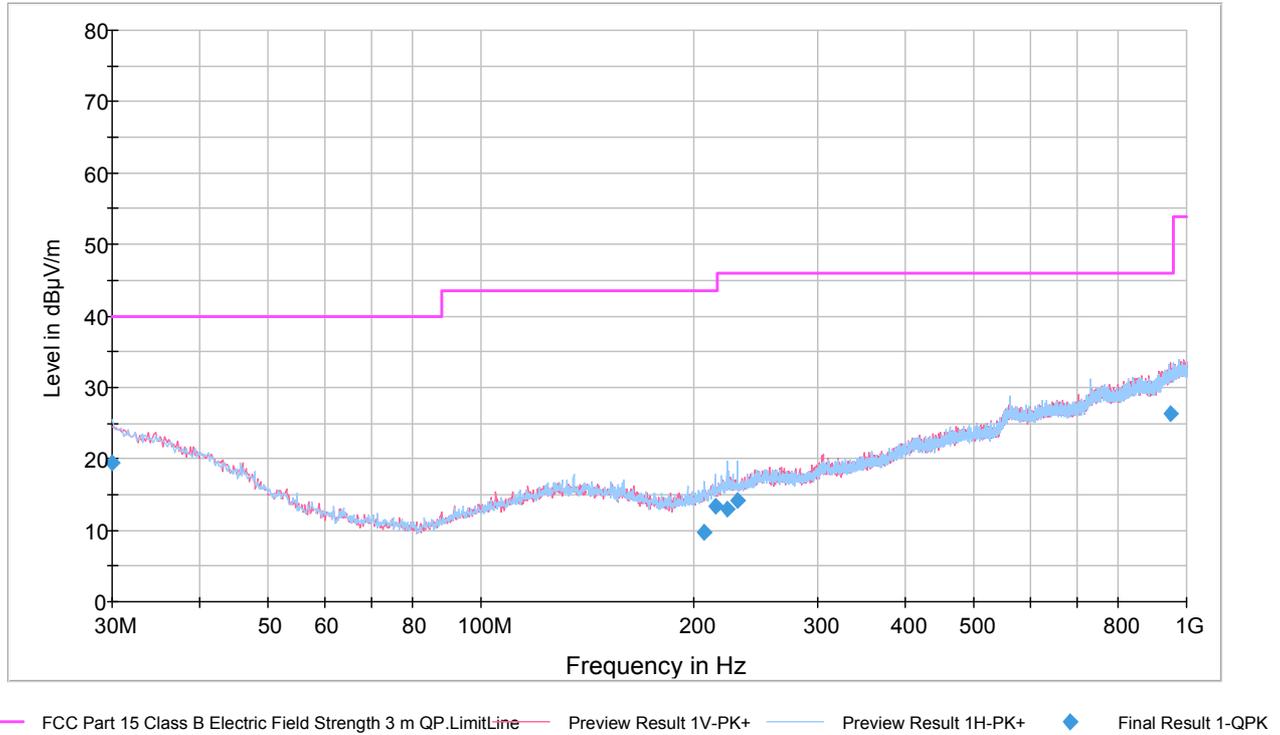


Figure 3. Measured curve with Peak detector.

Table 9. Final QuasiPeak measurement results

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
30.020000	19.5	1000.0	120.000	120.0	H	179.0	23.8	20.5	40.0	
207.485000	9.7	1000.0	120.000	169.0	H	21.0	12.6	33.8	43.5	
215.235000	13.4	1000.0	120.000	129.0	H	309.0	13.1	30.1	43.5	
223.065000	13.1	1000.0	120.000	200.0	H	253.0	13.8	32.9	46.0	
230.885000	14.1	1000.0	120.000	120.0	H	88.0	13.5	31.9	46.0	
950.345000	26.3	1000.0	120.000	165.0	V	159.0	27.7	19.7	46.0	

Measured Values In The Frequency Range 1 000 MHz – 4 000 MHz

CHANNEL LOW

Copy2 of FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

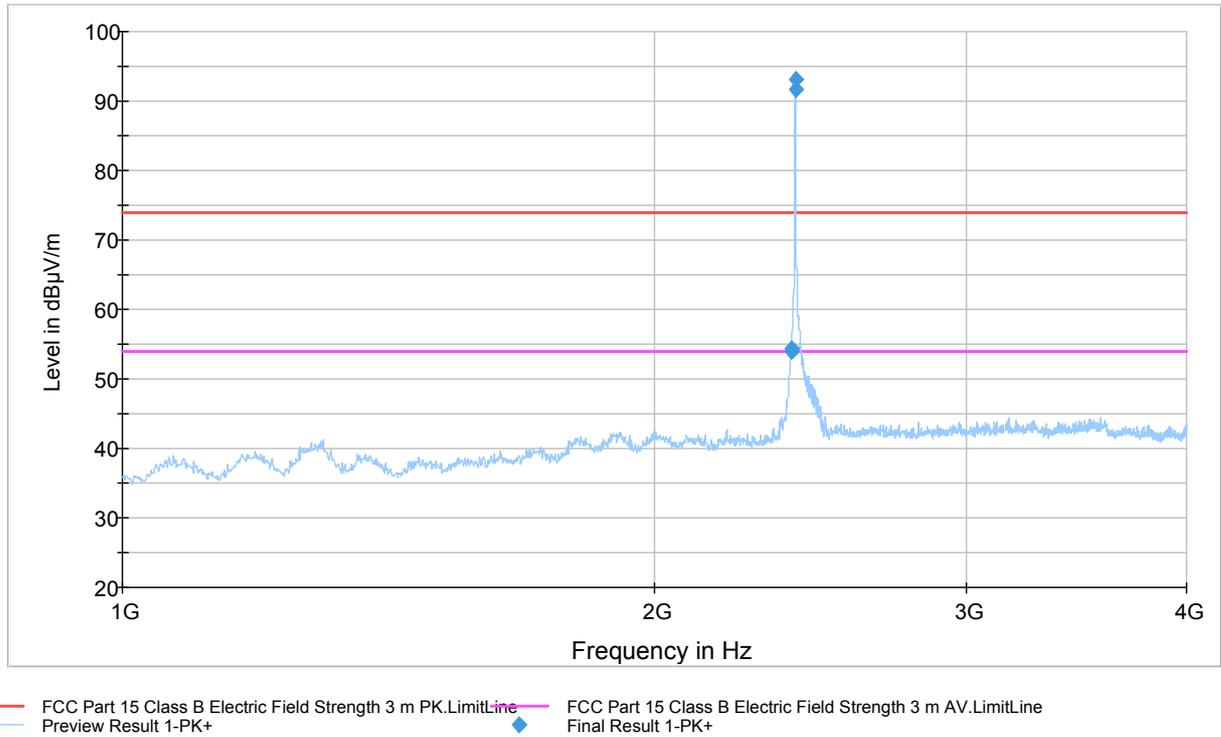


Figure 4. Measured curve with Peak detector.

Spurious and Band-Edge Radiated Emissions

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

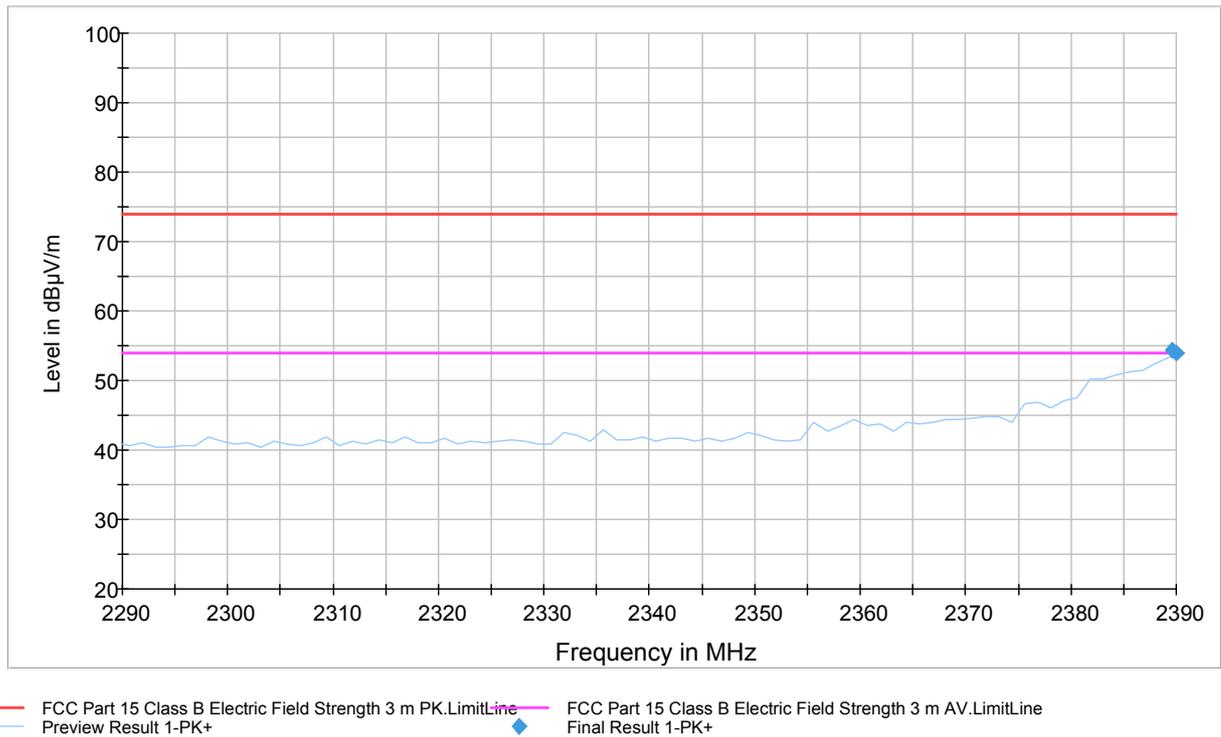


Figure 5. Measured curve with Peak detector at band-edge.

Table 10. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2389.600000	54.5	1000.0	1000.000	169.0	V	332.0	4.6	19.4	73.9	
2390.000000	53.9	1000.0	1000.000	189.0	H	352.0	4.6	20.0	73.9	
2403.000000	93.1	1000.0	1000.000	172.0	V	317.0	4.7	---	---	*
2403.200000	91.6	1000.0	1000.000	189.0	H	355.0	4.7	---	---	*

* The fundamental frequency of transmitter

Table 11. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2389.600000	17.8	1000.0	1000.000	169.0	V	332.0	4.6	36.1	53.9	
2390.000000	17.2	1000.0	1000.000	189.0	H	352.0	4.6	36.7	53.9	

Spurious and Band-Edge Radiated Emissions

CHANNEL MID

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

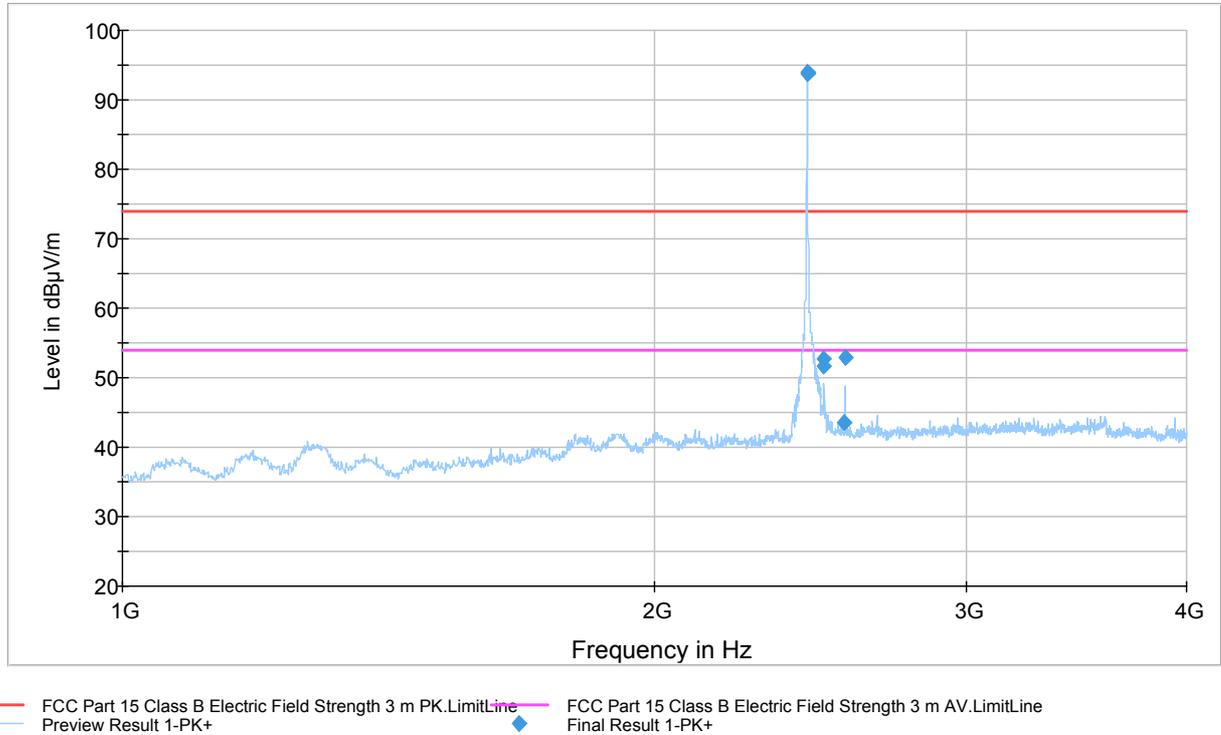


Figure 6. Measured curve with Peak detector.

Table 12. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2441.000000	93.8	1000.0	1000.000	167.0	V	281.0	4.4	---	---	*
2441.400000	93.9	1000.0	1000.000	182.0	H	354.0	4.4	---	---	*
2493.725000	52.6	1000.0	1000.000	217.0	H	3.0	4.8	21.3	73.9	
2493.725000	51.6	1000.0	1000.000	200.0	V	276.0	4.8	22.3	73.9	
2559.325000	43.5	1000.0	1000.000	240.0	H	349.0	5.1	30.4	73.9	
2564.125000	52.9	1000.0	1000.000	192.0	V	270.0	5.1	21.0	73.9	

* The fundamental frequency of transmitter

Table 13. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2493.725000	15.9	1000.0	1000.000	217.0	H	3.0	4.8	38.0	53.9	
2493.725000	14.9	1000.0	1000.000	200.0	V	276.0	4.8	39.0	53.9	
2559.325000	6.8	1000.0	1000.000	240.0	H	349.0	5.1	47.1	53.9	
2564.125000	16.2	1000.0	1000.000	192.0	V	270.0	5.1	37.7	53.9	

CHANNEL HIGH

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

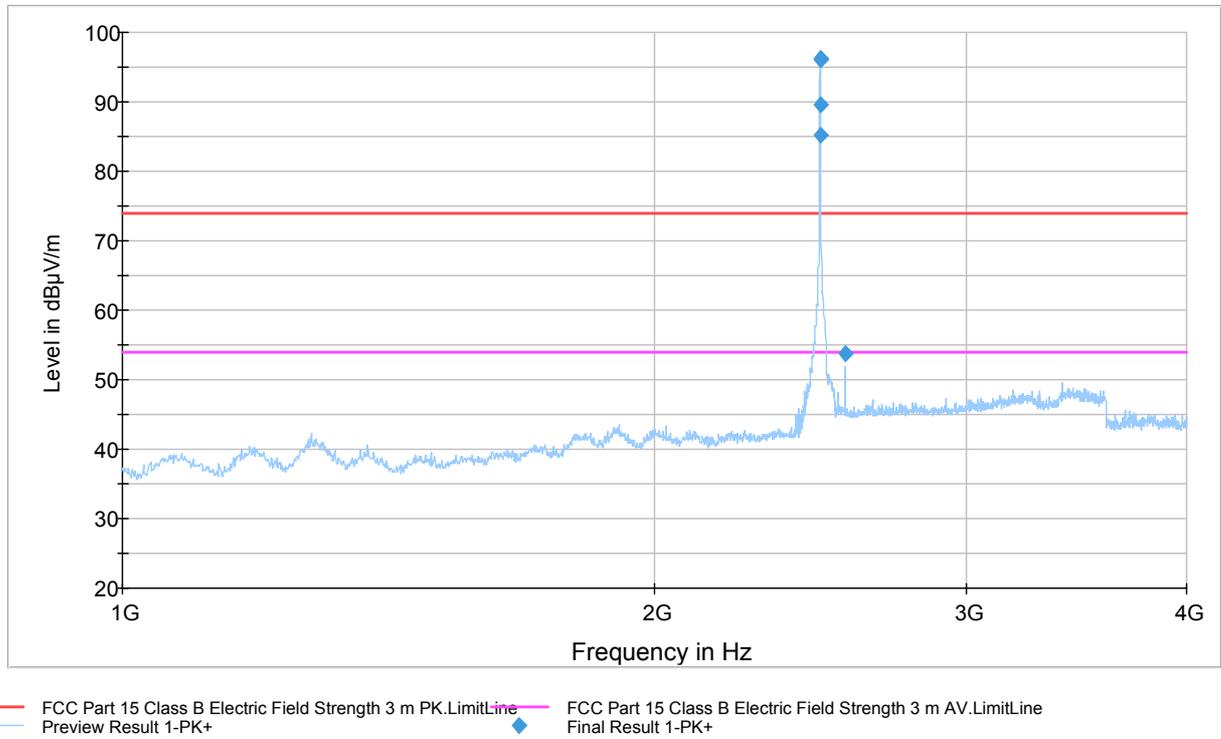


Figure 7. Measured curve with Peak detector.

Spurious and Band-Edge Radiated Emissions

Copy2 of FCC Part 15 Class B Spurious Emission 1-4GHz 3m (optimized 2.4 GHz TX)

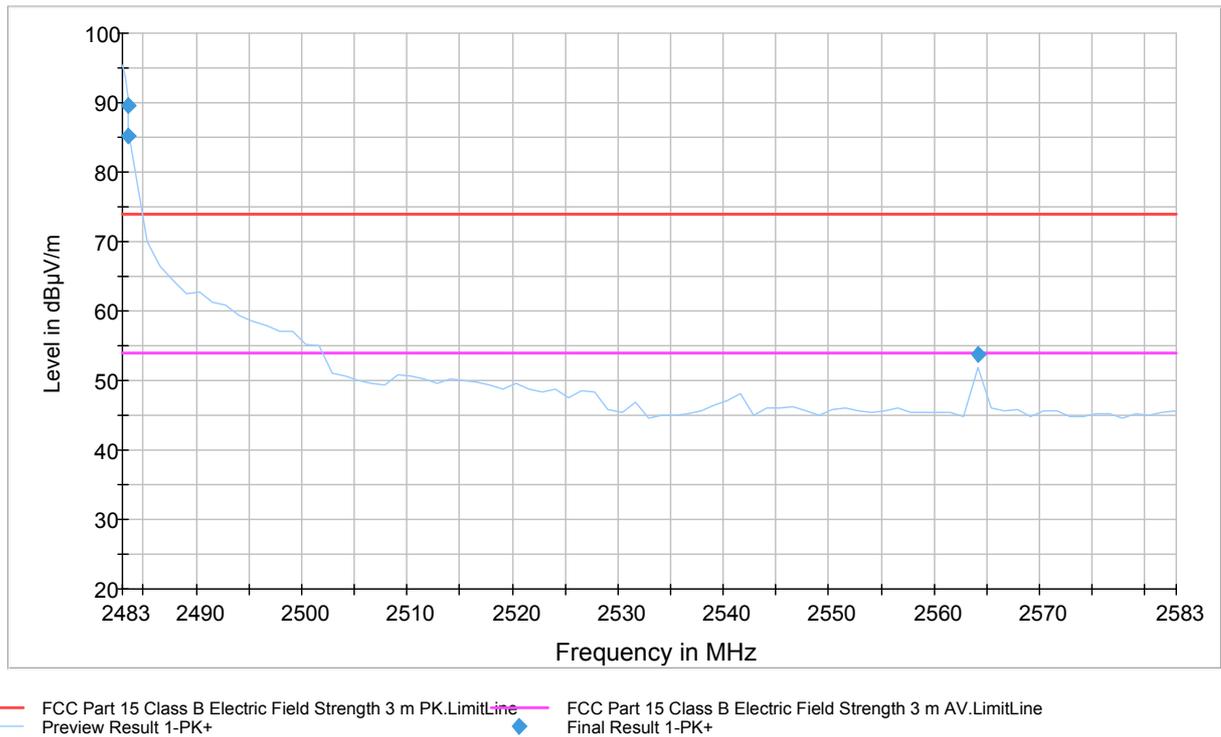


Figure 8. Measured curve with Peak detector at band-edge.

Table 14. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2481.950000	96.3	1000.0	1000.000	200.0	V	299.0	4.7	---	---	*
2482.350000	96.0	1000.0	1000.000	179.0	H	343.0	4.7	---	---	*
2483.500000	89.7	1000.0	1000.000	200.0	V	217.0	4.7	---	---	**
2483.500000	85.2	1000.0	1000.000	171.0	H	180.0	4.7	---	---	**
2564.125000	53.8	1000.0	1000.000	173.0	H	2.0	5.1	20.1	73.9	

* The fundamental frequency of transmitter

** Higher band-edge is measured with the alternative delta-marker method on next page

Table 15. Final Average measurement results

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	53.0	1000.0	1000.000	200.0	V	217.0	4.7	---	---	**
2483.500000	48.5	1000.0	1000.000	171.0	H	180.0	4.7	---	---	**
2564.125000	17.1	1000.0	1000.000	173.0	H	2.0	5.1	36.8	53.9	

* The fundamental frequency of transmitter

** Higher band-edge is measured with the alternative delta-marker method on next page

Band-Edge Radiated Emission with Delta-Marker method

CHANNEL HIGH

Table 16. Measured in-band field strength of the fundamental

Frequency (MHz)	MaxPeak (dBµV/m)	Bandwidth (kHz)	Corr. (dB)
2481.950000	94.73	1000.000	4.7

Table 17. Measured relative band-edge emissions

Absolute Frequency (MHz)	Delta Frequency (MHz)	Absolute MaxPeak (dBµV/m)	Delta MaxPeak (dB)	Bandwidth (kHz)	Corr. (dB)
2482.009821	Reference	94.67	Reference	100.000	4.7
2483.500000	1.490179	---	30.60	100.000	4.7
2483.740590	1.730769	---	28.14	100.000	4.7
2484.202129	2.192308	---	34.45	100.000	4.7

Table 18. Calculated final peak results of the band-edge

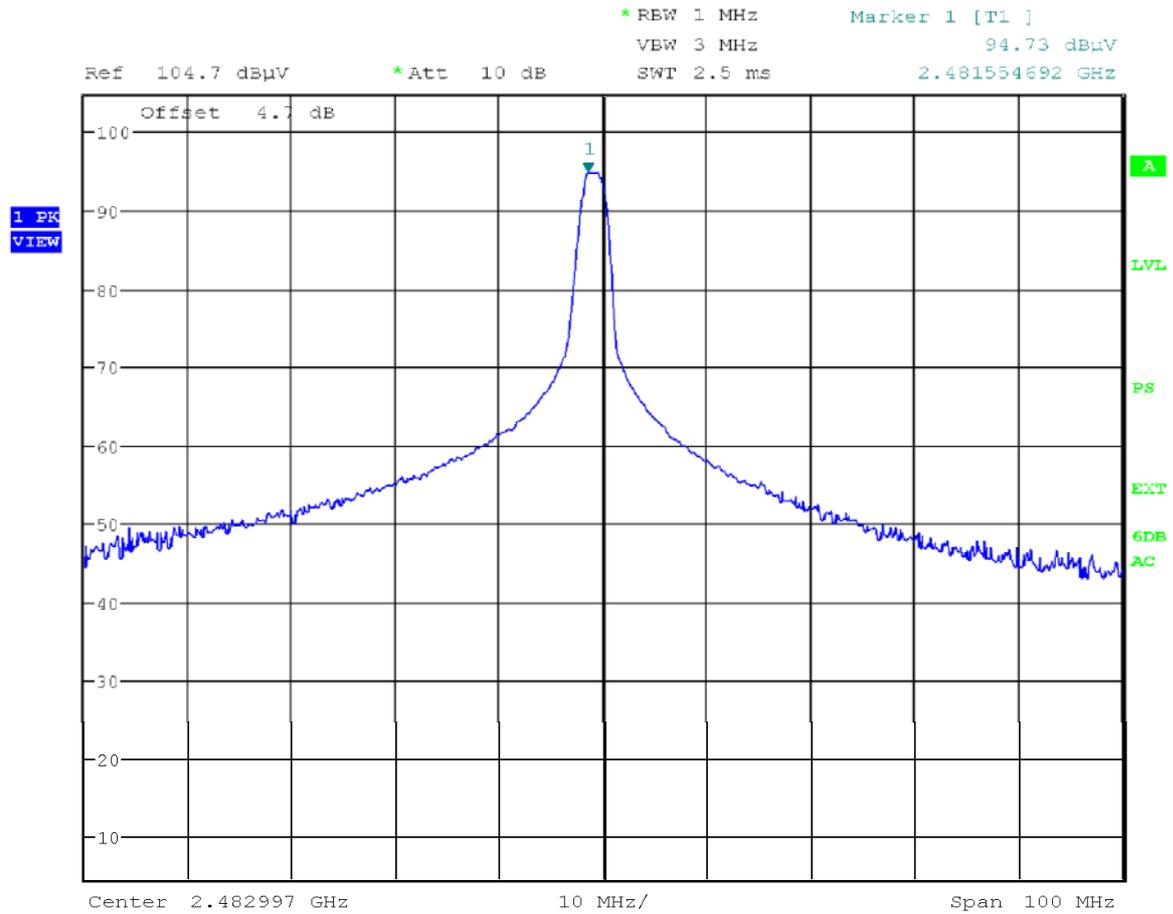
Absolute Frequency (MHz)	Fundamental MaxPeak (dBµV/m)	Delta (dB)	Calc. Final Band-edge (dBµV/m)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	94.73	30.60	64.13	4.7	9.77	73.9	*
2483.740590	94.73	28.14	66.59	4.7	7.31	73.9	*
2484.202129	94.73	34.45	60.28	4.7	13.62	73.9	*

* Equation: *Calc. Final Band-edge = Fundamental - Delta*

Table 19. Calculated final average results of the band-edge

Frequency (MHz)	Average (dBµV/m)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2483.500000	27.43	4.7	26.47	53.9	
2483.740590	29.89	4.7	24.01	53.9	
2484.202129	23.58	4.7	30.32	53.9	

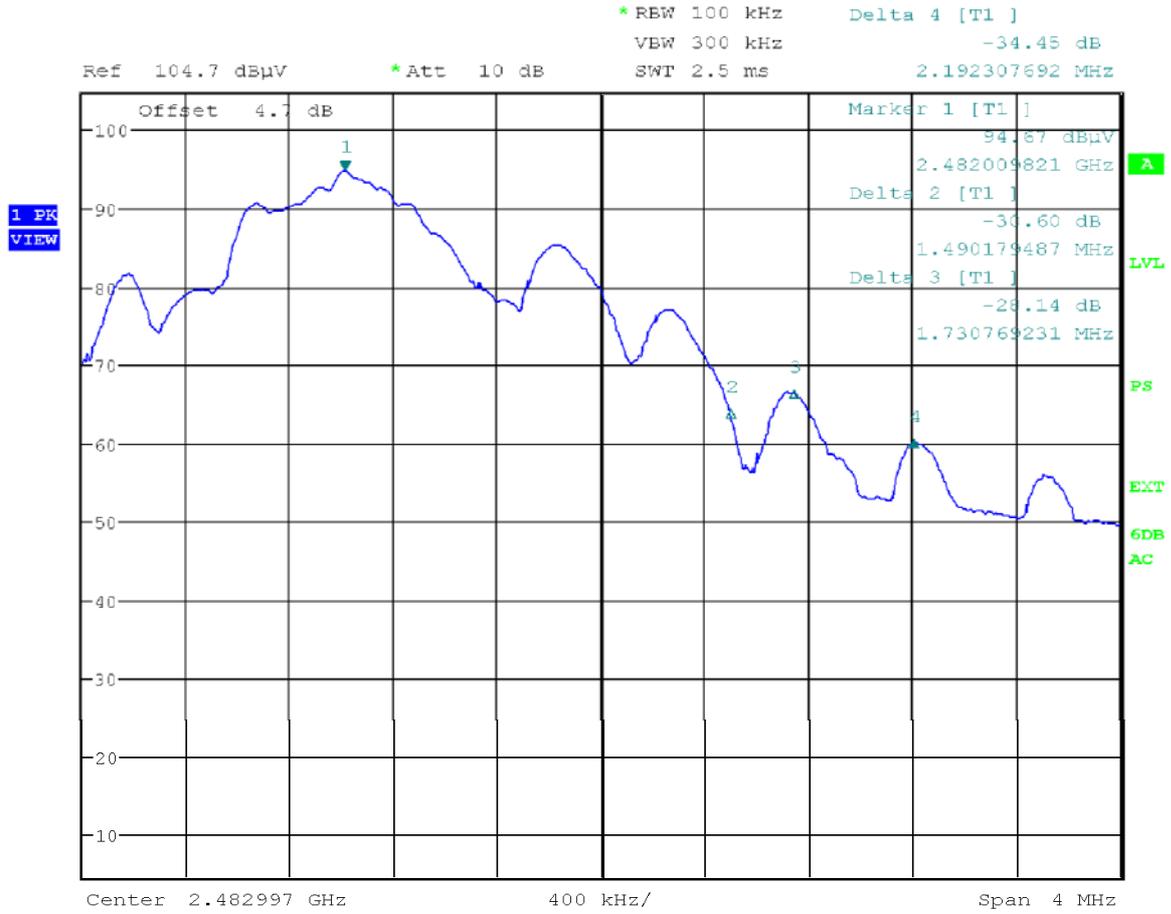
Spurious and Band-Edge Radiated Emissions



Date: 31.JAN.2012 09:03:11

Figure 9. Measured field strength of fundamental with peak detector.

Spurious and Band-Edge Radiated Emissions



Date: 31.JAN.2012 09:07:34

Figure 10. Measured relative field strengths of band-edge emissions with peak detector.

Measured Values In The Frequency Range 4 000 MHz – 18 000 MHz

CHANNEL LOW

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

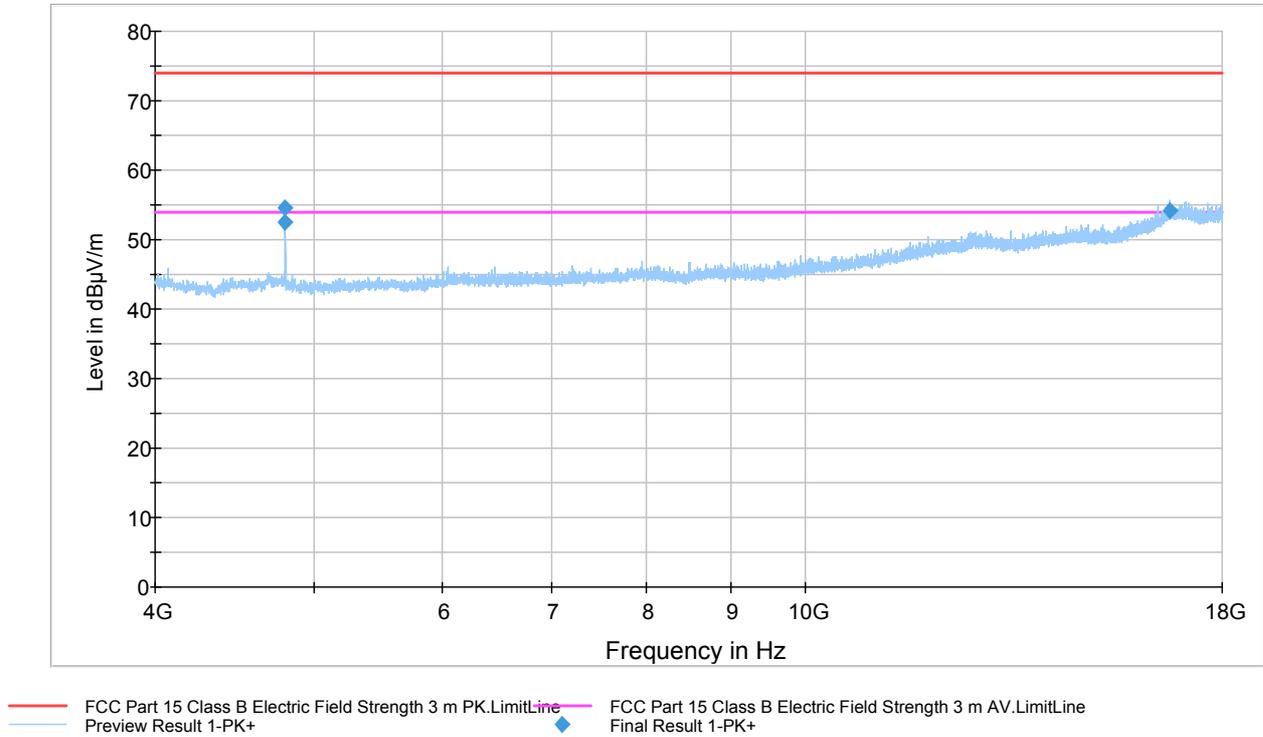


Figure 11. Measured curve with peak detector.

Table 20. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4806.225000	52.4	1000.0	1000.000	100.0	H	337.0	10.8	21.5	73.9	
4806.425000	54.7	1000.0	1000.000	172.0	V	346.0	10.8	19.2	73.9	
16722.075000	54.2	1000.0	1000.000	123.0	V	136.0	25.3	19.7	73.9	

Table 21. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4806.225000	15.7	1000.0	1000.000	100.0	H	337.0	10.8	38.2	53.9	
4806.425000	18.0	1000.0	1000.000	172.0	V	346.0	10.8	35.9	53.9	
16722.075000	17.5	1000.0	1000.000	123.0	V	136.0	25.3	36.4	53.9	

Spurious and Band-Edge Radiated Emissions

CHANNEL MID

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

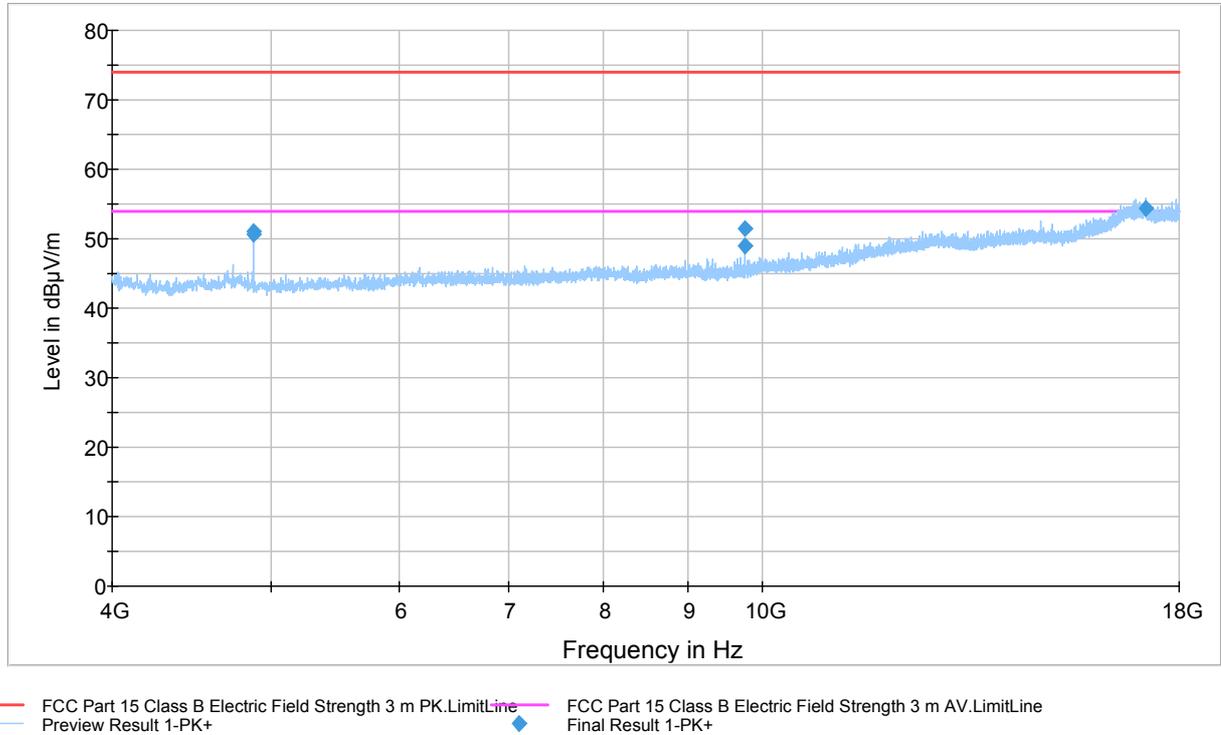


Figure 12. Measured curve with peak detector.

Table 22. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4881.475000	50.7	1000.0	1000.000	100.0	H	339.0	10.6	23.2	73.9	
4881.675000	51.1	1000.0	1000.000	152.0	V	294.0	10.6	22.8	73.9	
9763.125000	48.9	1000.0	1000.000	160.0	V	4.0	15.2	25.0	73.9	
9763.725000	51.4	1000.0	1000.000	100.0	H	214.0	15.2	22.5	73.9	
17157.125000	54.5	1000.0	1000.000	198.0	H	252.0	25.7	19.4	73.9	

Table 23. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4881.475000	14.0	1000.0	1000.000	100.0	H	339.0	10.6	39.9	53.9	
4881.675000	14.4	1000.0	1000.000	152.0	V	294.0	10.6	39.5	53.9	
9763.125000	12.2	1000.0	1000.000	160.0	V	4.0	15.2	41.7	53.9	
9763.725000	14.7	1000.0	1000.000	100.0	H	214.0	15.2	39.2	53.9	
17157.125000	17.8	1000.0	1000.000	198.0	H	252.0	25.7	37.1	53.9	

Spurious and Band-Edge Radiated Emissions

CHANNEL HIGH

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

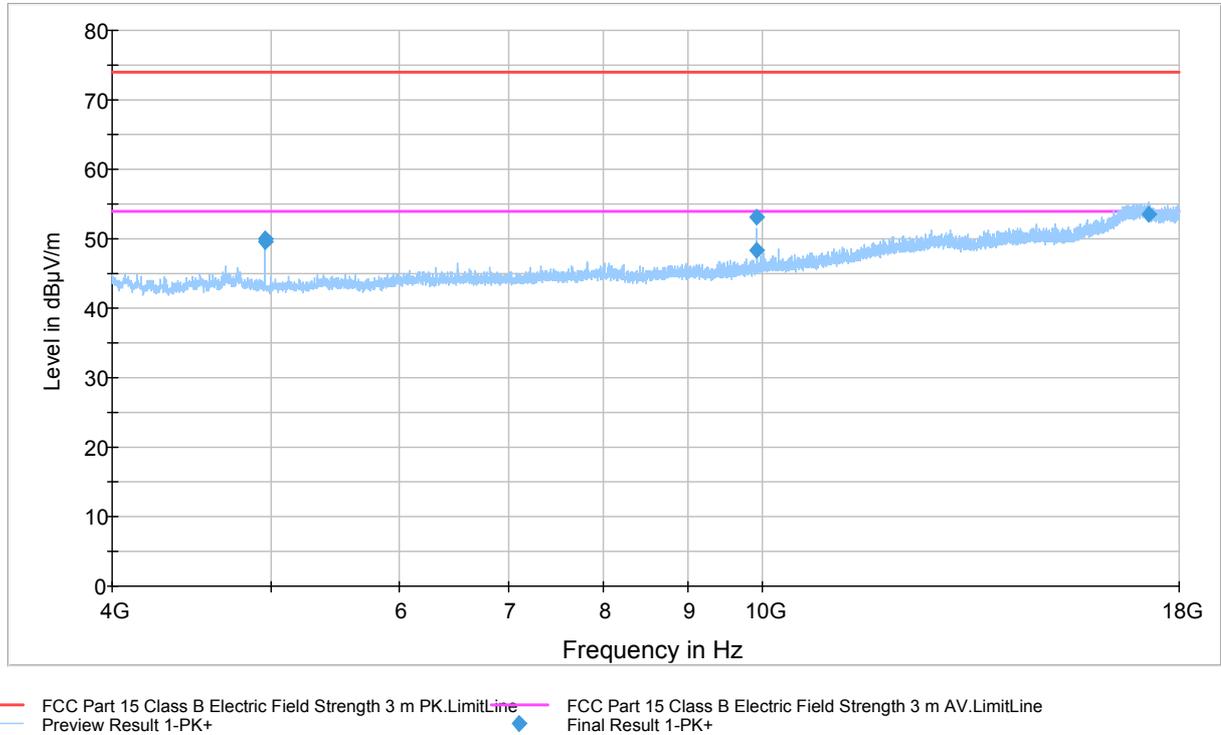


Figure 13. Measured curve with peak detector.

Table 24. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4963.925000	49.6	1000.0	1000.000	159.0	V	0.0	10.6	24.3	73.9	
4965.925000	50.0	1000.0	1000.000	100.0	H	336.0	10.6	23.9	73.9	
9928.075000	48.4	1000.0	1000.000	168.0	V	9.0	15.4	25.5	73.9	
9928.475000	53.0	1000.0	1000.000	100.0	H	222.0	15.4	20.9	73.9	
17234.725000	53.5	1000.0	1000.000	237.0	V	4.0	25.4	20.4	73.9	

Table 25. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
4963.925000	12.9	1000.0	1000.000	159.0	V	0.0	10.6	41.0	53.9	
4965.925000	13.3	1000.0	1000.000	100.0	H	336.0	10.6	40.6	53.9	
9928.075000	11.7	1000.0	1000.000	168.0	V	9.0	15.4	42.2	53.9	
9928.475000	16.3	1000.0	1000.000	100.0	H	222.0	15.4	37.6	53.9	
17234.725000	16.8	1000.0	1000.000	237.0	V	4.0	25.4	38.1	53.9	

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

CHANNEL LOW

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

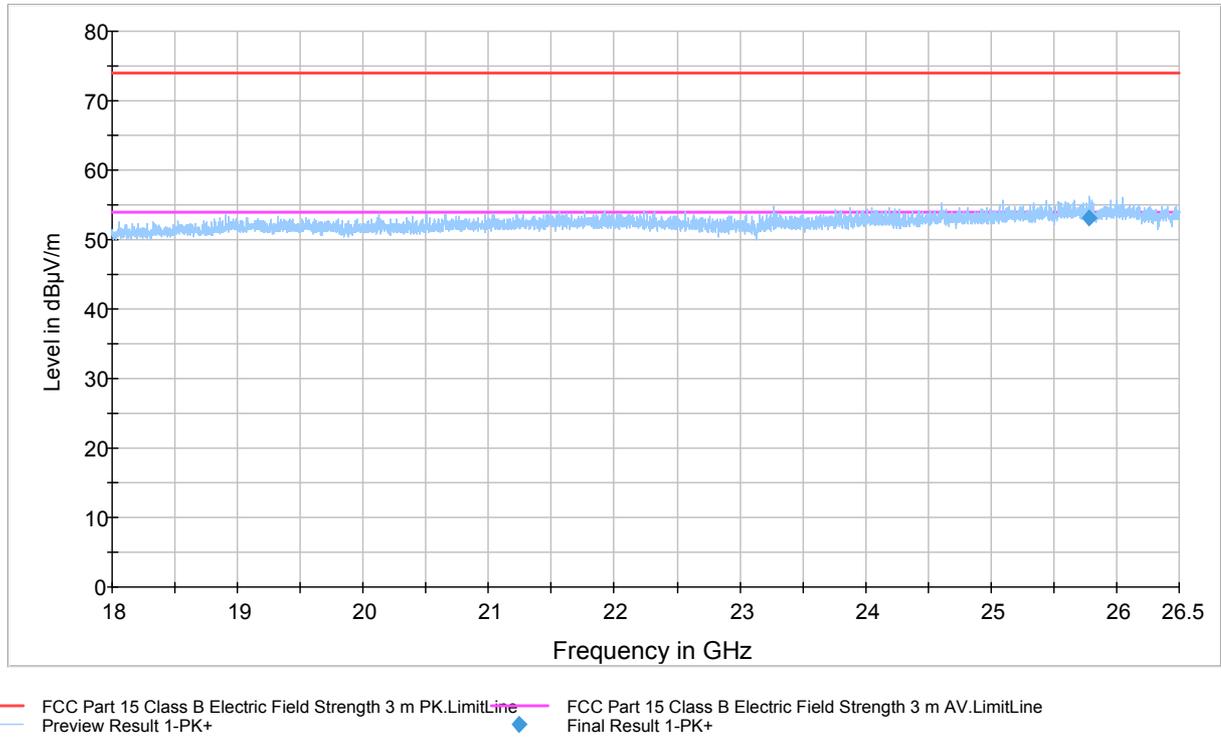


Figure 14. Measured curve with peak detector.

Table 26. Final Peak measurement results

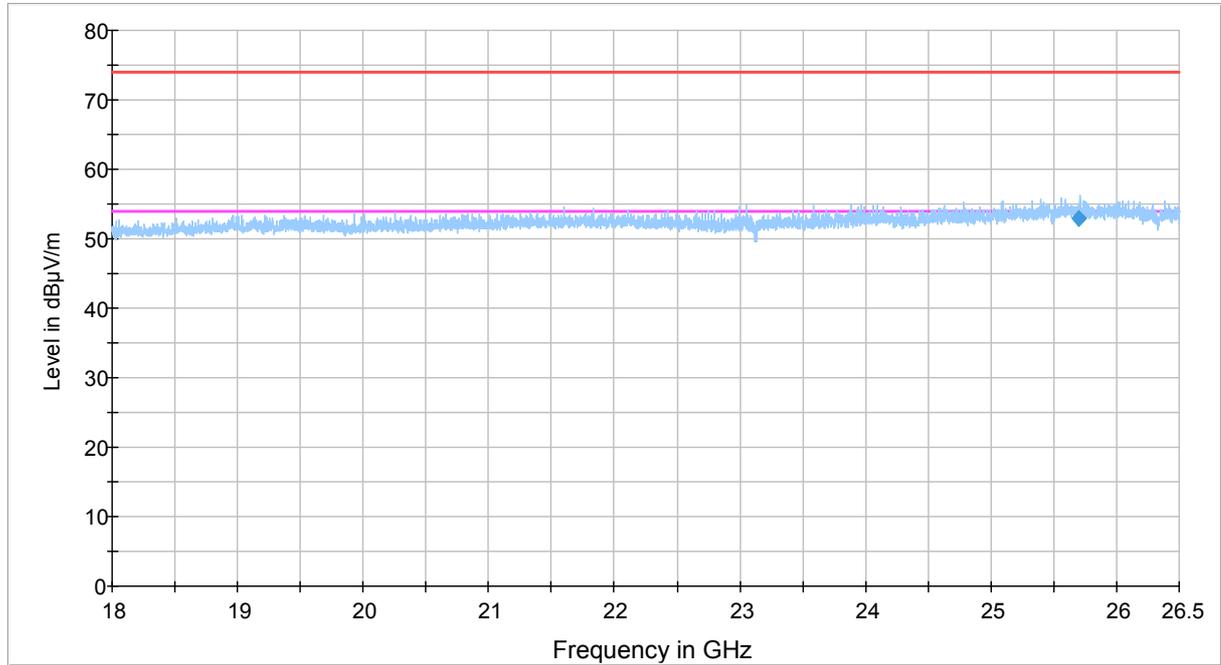
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25782.025000	53.0	1000.0	1000.000	121.0	V	312.0	28.6	20.9	73.9	

Table 27. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25782.025000	16.3	1000.0	1000.000	121.0	V	312.0	28.6	37.6	53.9	

CHANNEL MID

Copy of FCC Part 15 Class B Spurious Emission 18-26.5GHz 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+
 ◆ Final Result 1-PK+

Figure 15. Measured curve with peak detector.

Table 28. Final Peak measurement results

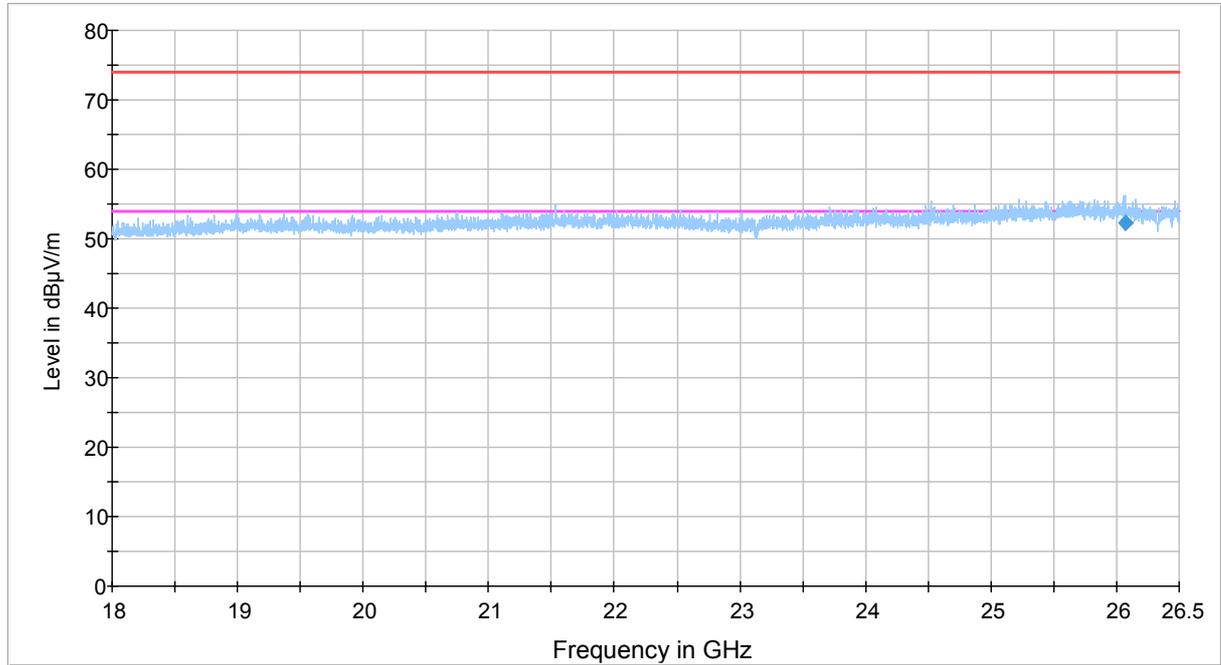
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25704.525000	52.9	1000.0	1000.000	128.0	V	356.0	28.5	21.0	73.9	

Table 29. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25704.525000	16.2	1000.0	1000.000	128.0	V	356.0	28.5	37.7	53.9	

CHANNEL HIGH

Copy of FCC Part 15 Class B Spurious Emission 18-26.5GHz 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+ ◆ Final Result 1-PK+

Figure 16. Measured curve with peak detector.

Table 30. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
26070.225000	52.2	1000.0	1000.000	100.0	V	341.0	28.6	21.7	73.9	

Table 31. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
26070.225000	15.5	1000.0	1000.000	100.0	V	341.0	28.6	38.4	53.9	

20 dB Bandwidth

Standard: ANSI C63.10 (2009)
Tested by: NTO
Date: 6.2.2012
Humidity: 52%
Temperature: 21 °C
Barometric pressure: 972 hPa

FCC Rule: 15.215 (c)

CHANNEL LOW

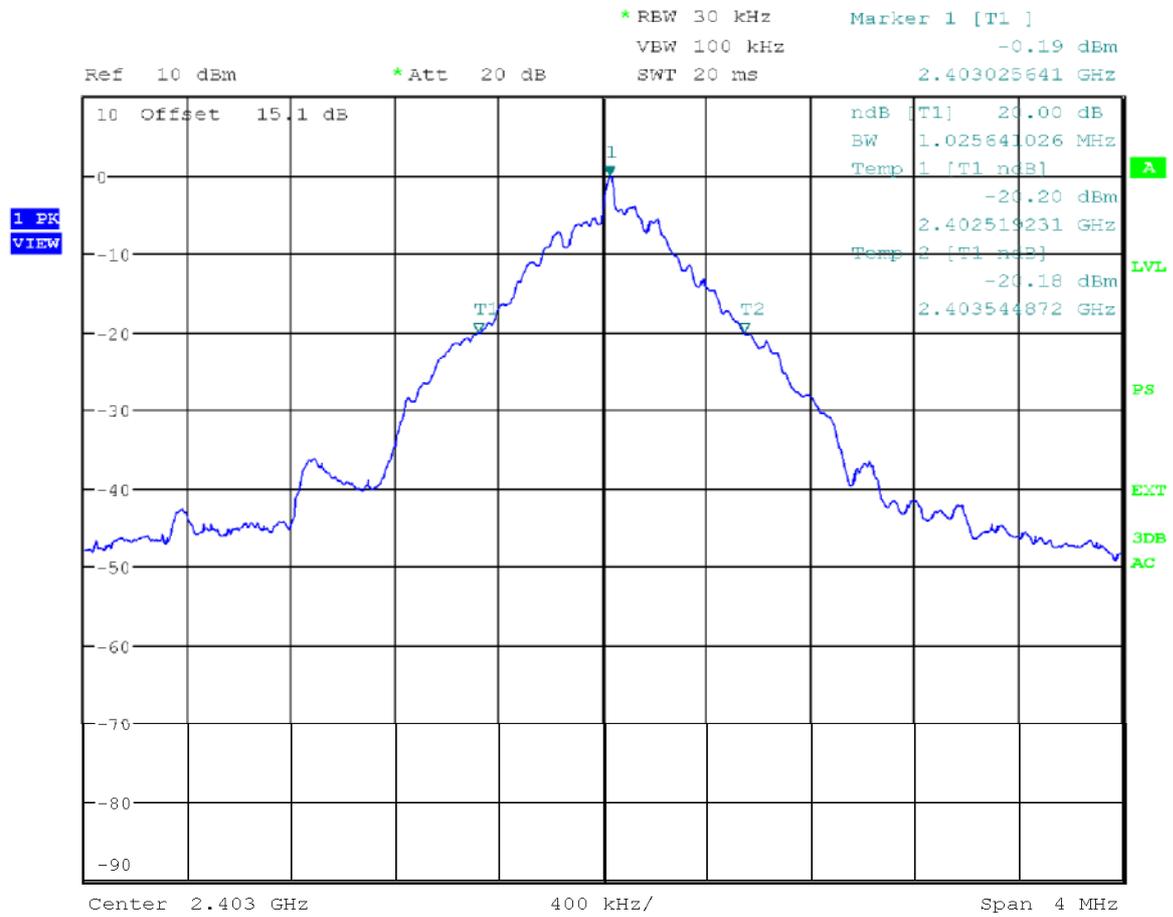
EUT frequency [MHz]	Limit [kHz]	20 dB BW [MHz]	Result
2409	---	1.026	PASS

CHANNEL MID

EUT frequency [MHz]	Limit [kHz]	20 dB BW [MHz]	Result
2441	---	1.269	PASS

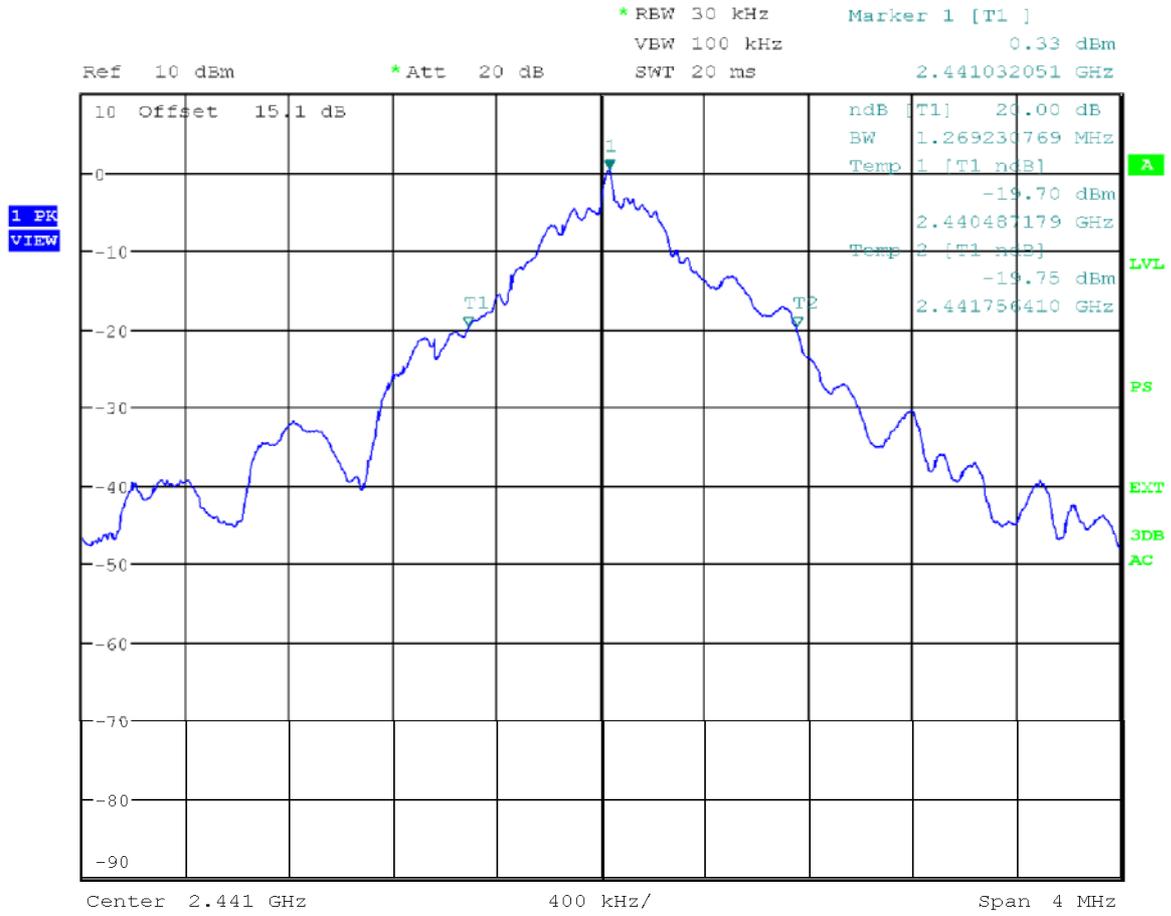
CHANNEL HIGH

EUT frequency [MHz]	Limit [kHz]	20 dB BW [MHz]	Result
2473	---	1.697	PASS



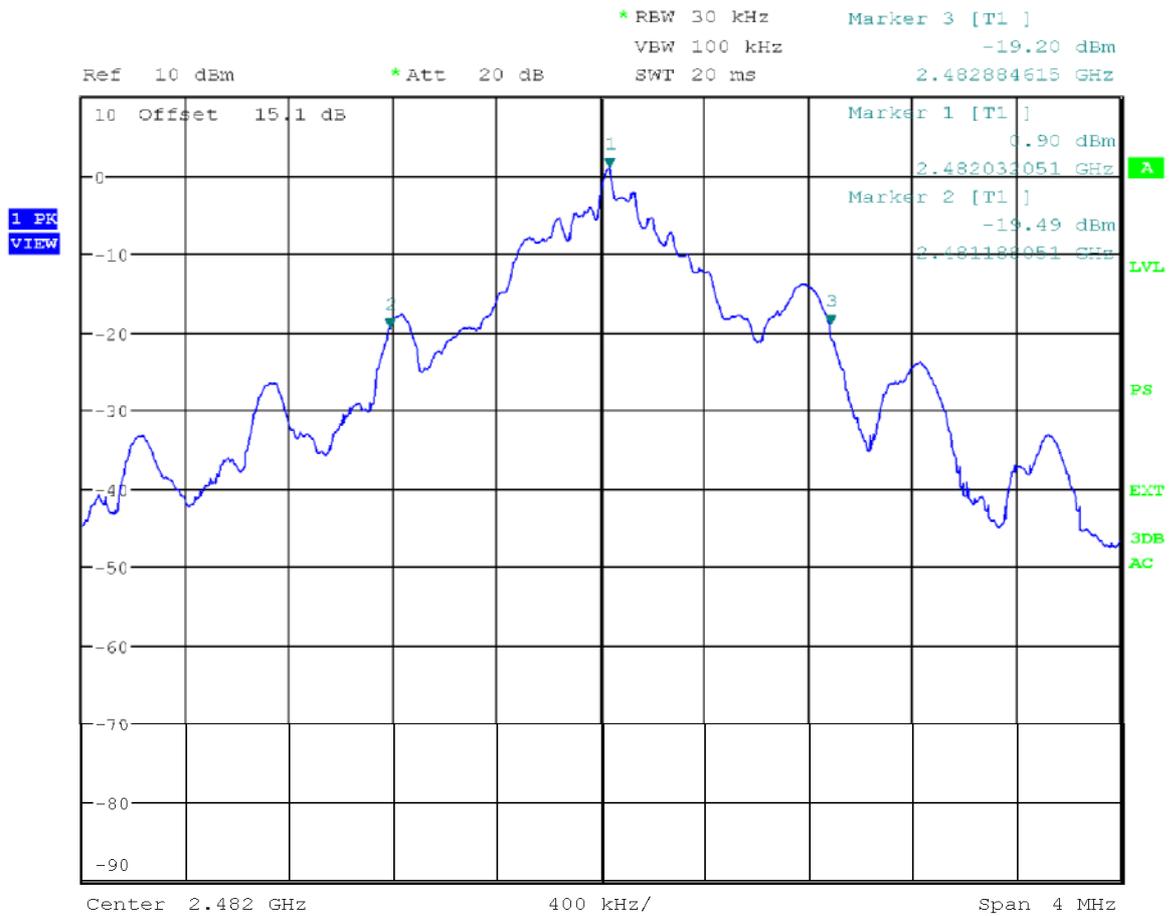
Date: 6.FEB.2012 12:36:50

Figure 17. 20dB bandwidth of channel LOW.



Date: 6.FEB.2012 12:25:42

Figure 18. 20dB bandwidth of channel MID.



Date: 6.FEB.2012 12:31:35

Figure 19. 20dB bandwidth of channel HIGH.

Manually calculated 20 dB bandwidth with the markers of *figure 19*.

$$f_{\text{high}} - f_{\text{low}} = 2\,482.884\,615\text{ MHz} - 2\,481.188\,051\text{ MHz} = 1.697\text{ MHz}$$

99% Occupied Bandwidth

Standard: ANSI C63.10 (2009)
Tested by: NTO
Date: 6.2.2012
Humidity: 52%
Temperature: 21 °C
Barometric pressure: 972 hPa

RSS-GEN Rule: 4.4.1

CHANNEL LOW

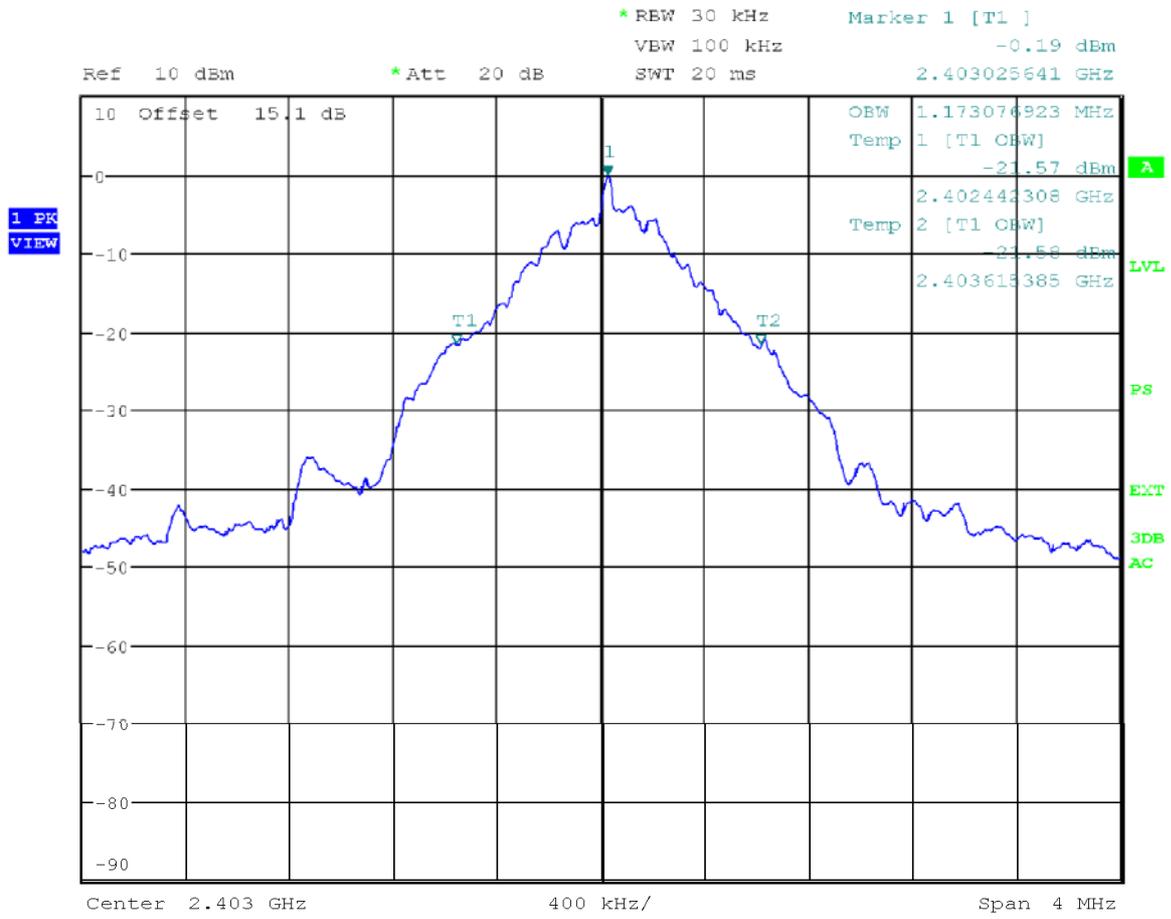
EUT frequency [MHz]	Limit [kHz]	99% BW [MHz]	Result
2409	---	1.173	PASS

CHANNEL MID

EUT frequency [MHz]	Limit [kHz]	99% BW [MHz]	Result
2441	---	1.397	PASS

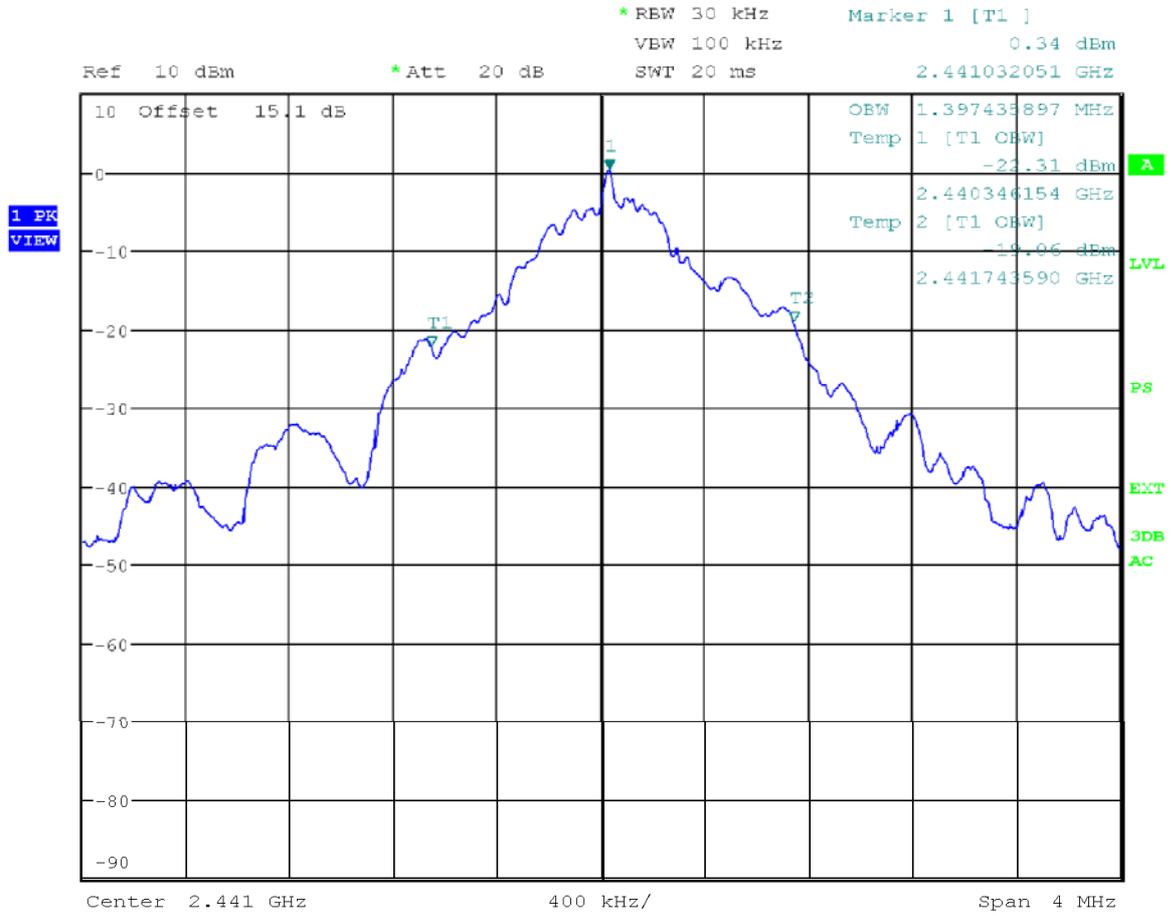
CHANNEL HIGH

EUT frequency [MHz]	Limit [kHz]	99% BW [MHz]	Result
2473	---	1.686	PASS



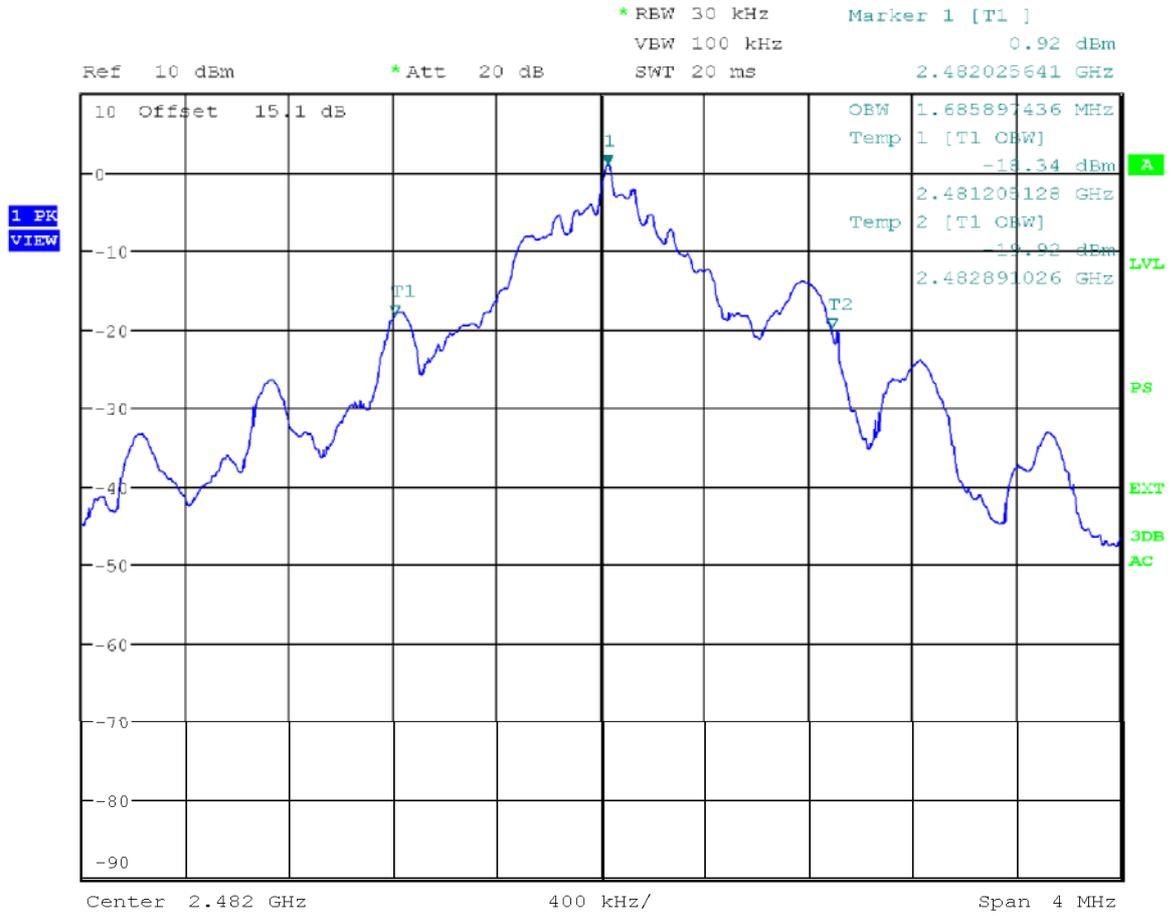
Date: 6.FEB.2012 12:39:20

Figure 20. 99% bandwidth of channel LOW.



Date: 6.FEB.2012 12:27:34

Figure 21. 99% bandwidth of channel MID.



Date: 6.FEB.2012 12:35:20

Figure 22. 99% bandwidth of channel HIGH.

Duty Cycle

Standard:	ANSI C63.10	(2009)
Tested by:	NTO	
Date:	29.2.2012	
Humidity:	-	
Temperature:	-	
Barometric pressure	-	

FCC Rule: -**RSS-GEN Rule:** -

Duty cycle is measured the EUT in connected mode where the EUT transmit data to computer via Datalink. Used data channel in measurements was 2404 MHz. Measurement results and plots used in duty cycle calculations can be found from Polar RCX3 Technical Description v1.0 document.

CHANNEL 2404 MHz

$$\text{Duty cycle} = \text{Duration/Period} = (4 * 0.367\text{ms})/110.000\text{ms} = 1.33 \%$$

Receiver Radiated Emissions 30 – 26 500 MHz

Standard	ANSI C63.4 (2009)	
Tested by:	NTO	
Date:	2. - 3.2.2012	
Humidity:	36 - 40%	
Temperature:	20 - 21°C	
Barometric pressure	1038 - 1046 hPa	
Measurement uncertainty	± 4.51 dB	Level of confidence 95 % (k = 2)

FCC Rule: 15.109**IC Rule:** RSS-GEN 7.2.3, ICES-003

Measured peak and average levels include transducer factors (antenna, amplifier, filters) and cable attenuations.

Measured Values In The Frequency Range 30 MHz - 1000 MHz

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

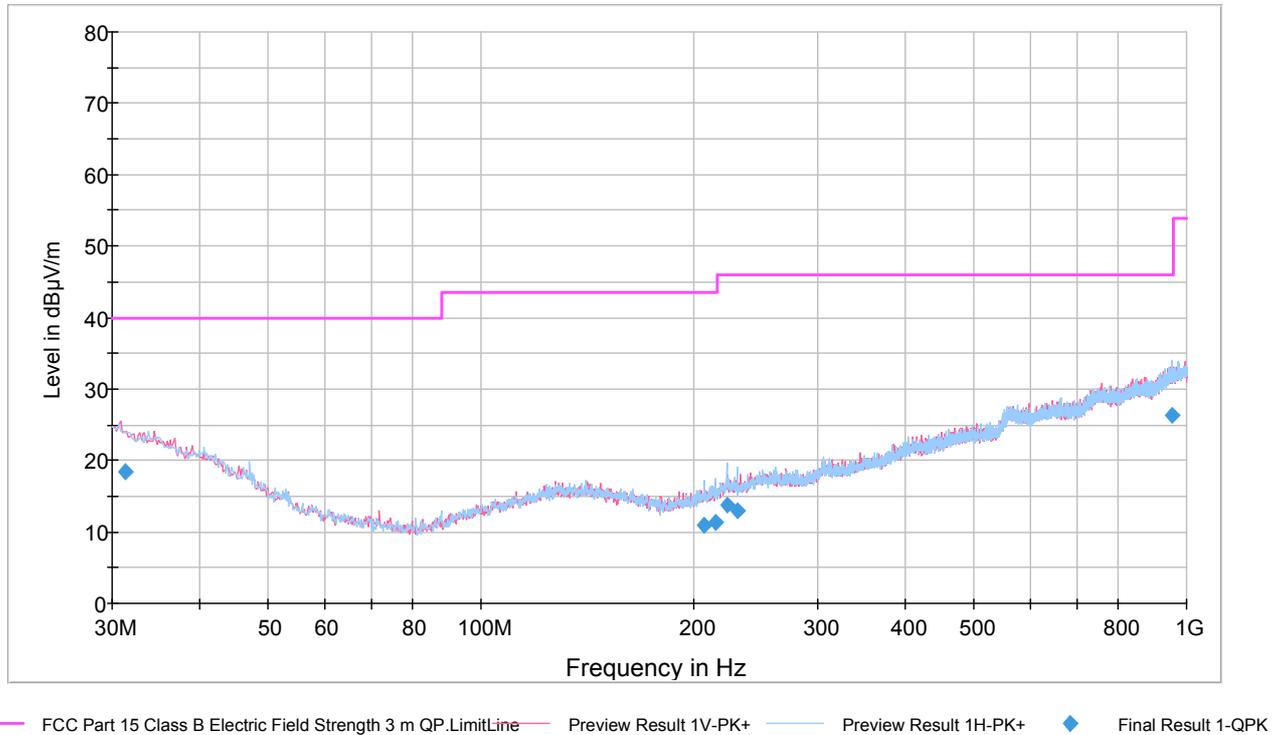


Figure 23. Measured curves with peak detector.

Table 32. Final QuasiPeak measurement results

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
31.245000	18.4	1000.0	120.000	245.0	V	202.0	23.0	21.6	40.0	
207.315000	11.0	1000.0	120.000	158.0	H	204.0	12.6	32.5	43.5	
215.205000	11.4	1000.0	120.000	120.0	H	275.0	13.1	32.1	43.5	
222.995000	13.9	1000.0	120.000	164.0	H	195.0	13.8	32.1	46.0	
230.845000	12.9	1000.0	120.000	180.0	H	76.0	13.5	33.1	46.0	
955.235000	26.3	1000.0	120.000	315.0	H	41.0	27.8	19.7	46.0	

Measured Values In The Frequency Range 1 – 18 000 MHz

FCC Part 15 Class B Spurious Emission 1-18GHz 3m

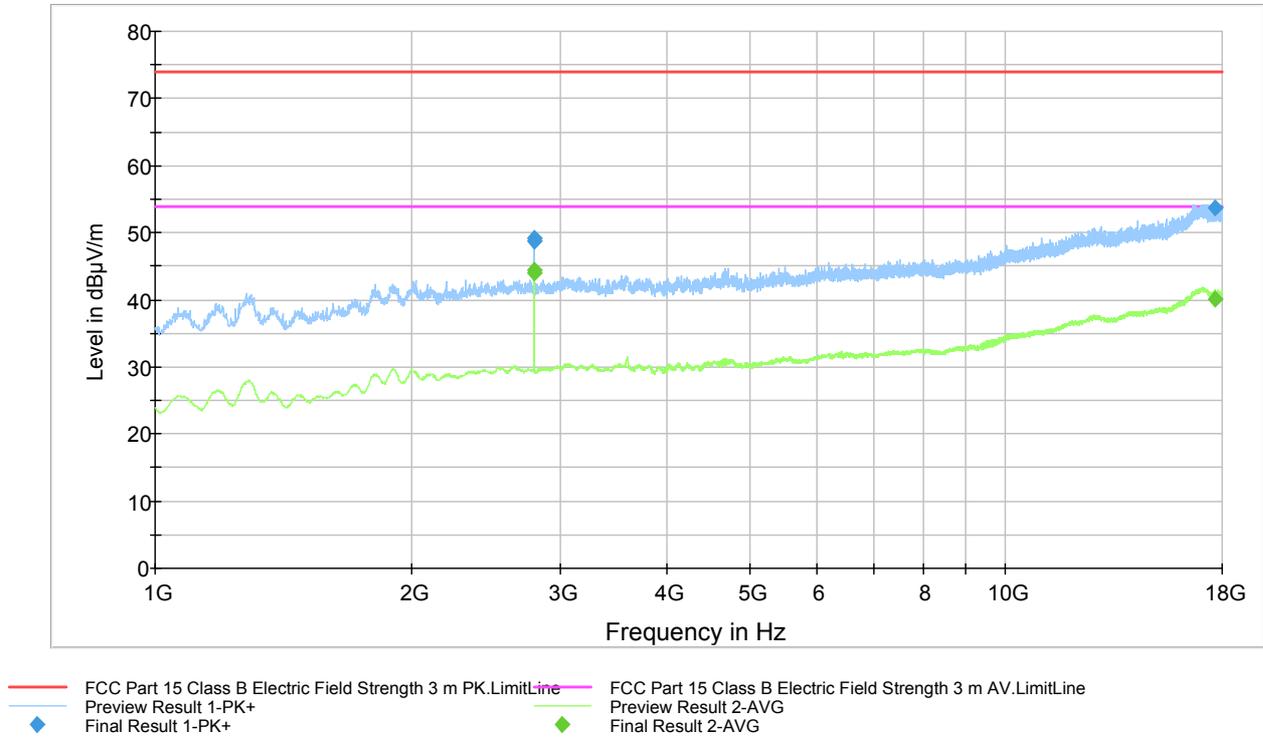


Figure 24. Measured curves with peak and average detectors.

Table 33. Final Peak measurement results

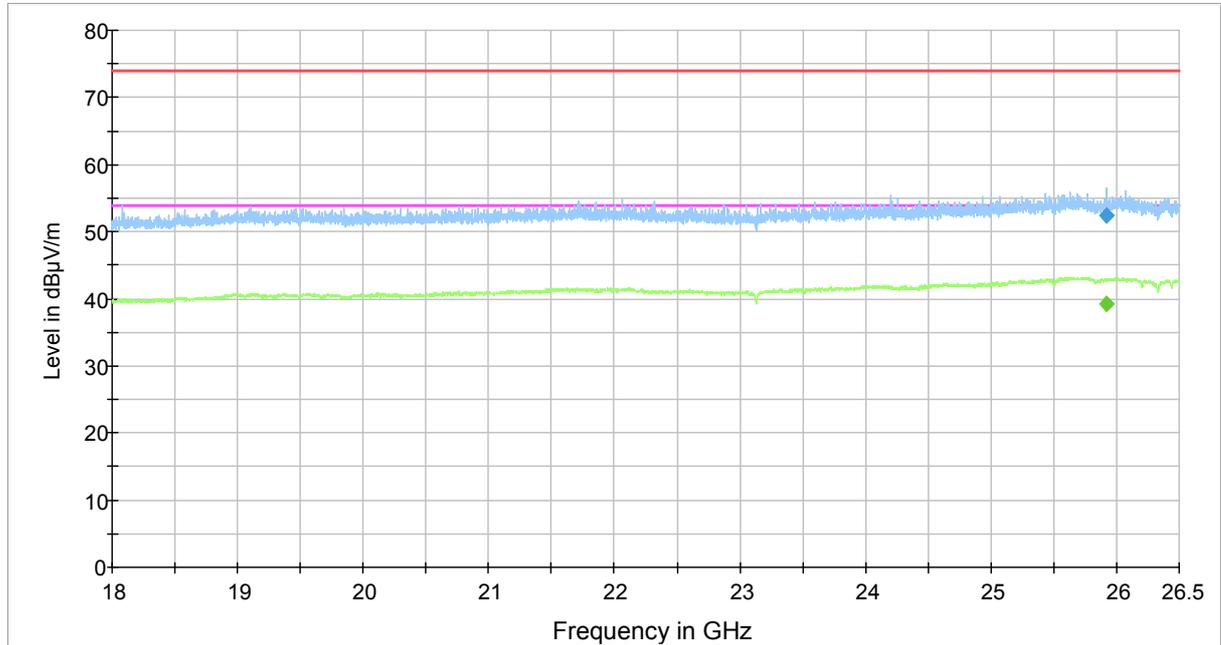
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2791.875000	48.8	1000.0	1000.000	214.0	H	4.0	5.3	25.1	73.9	
2792.075000	49.2	1000.0	1000.000	176.0	V	296.0	5.3	24.7	73.9	
17649.025000	53.7	1000.0	1000.000	115.0	V	279.0	24.9	20.2	73.9	

Table 34. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
2791.875000	44.0	1000.0	1000.000	214.0	H	4.0	5.3	9.9	53.9	
2792.075000	44.5	1000.0	1000.000	176.0	V	296.0	5.3	9.4	53.9	
17649.025000	40.0	1000.0	1000.000	115.0	V	279.0	24.9	13.9	53.9	

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

FCC Part 15 Class B Spurious Emission 18-26.5GHz 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 25. Measured curves with peak and average detectors.

Table 35. Final Peak measurement results

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25922.125000	52.4	1000.0	1000.000	220.0	V	198.0	28.5	21.5	73.9	

Table 36. Final Average measurement results

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
25922.125000	39.3	1000.0	1000.000	220.0	V	198.0	28.5	14.6	53.9	

List of Test Equipment

Manufacturer	Type	Serial no	Inv. no
ROHDE & SCHWARZ			
EMI Test receiver	ESU 26	100185	8453
Test software	EMC32	-	-
CHASE			
Antenna (30 MHz - 1 GHz)	6141A	4102	7895
EMCO			
Antenna (1 - 18 GHz)	3117	29617	7293
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

NOTE! All testing equipment were calibrated.