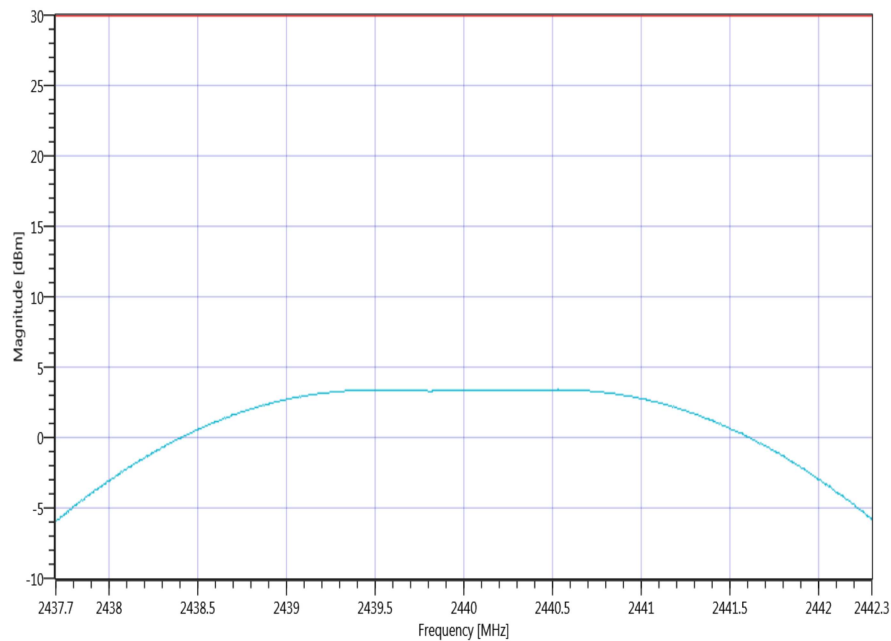


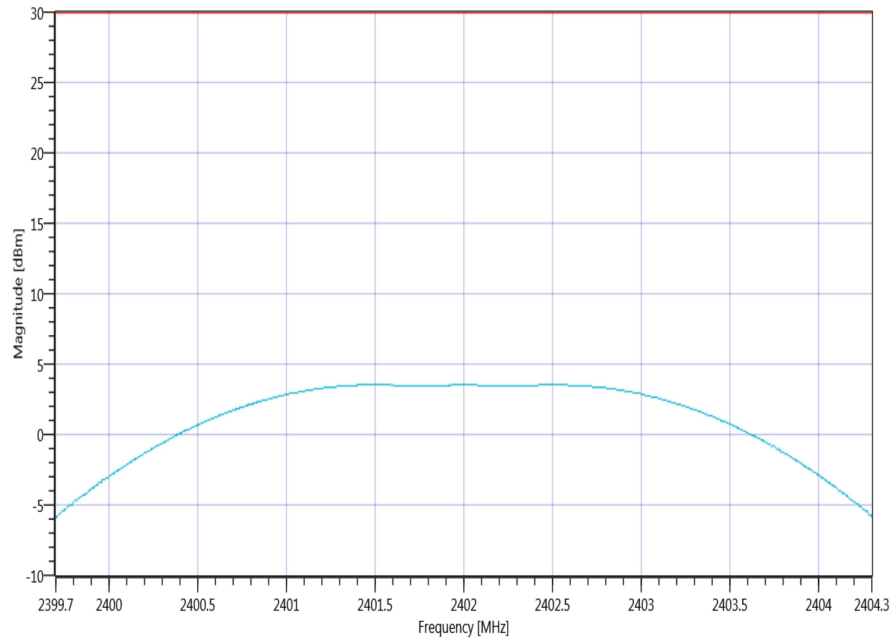
Plot 5: mid channel, 2 Msps



Spectrum analyzer settings read out

Ref. Level [dBm]	13.46
Ref. Lev. offs [dB]	9.53
Input Attenuation [dB]	20
Freq. Start [MHz]	2437.700
Freq. Stop [MHz]	2442.300
Resolution BW. [MHz]	2.000000
Video BW. [MHz]	5.000000
Detector	POS
Sweep Time [ms]	1000
Sweep Count	10
Sweep Mode	MAXH
Used Sweep Type	SWE

Plot 6: highest channel, 2 Msps



Spectrum analyzer settings read out

Ref. Level [dBm]	13.49
Ref. Lev. offs [dB]	9.54
Input Attenuation [dB]	20
Freq. Start [MHz]	2477.700
Freq. Stop [MHz]	2482.300
Resolution BW. [MHz]	2.000000
Video BW. [MHz]	5.000000
Detector	POS
Sweep Time [ms]	1000
Sweep Count	10
Sweep Mode	MAXH
Used Sweep Type	SWE

11.6 Detailed spurious emissions @ the band edge - conducted

Description:

Measurement of the conducted band edge compliance. EUT is measured at the lower and upper band edge in single channel.

Measurement parameters	
Test setup	See sub clause 6.4 A
Measurement uncertainty	See sub clause 8

Limits:

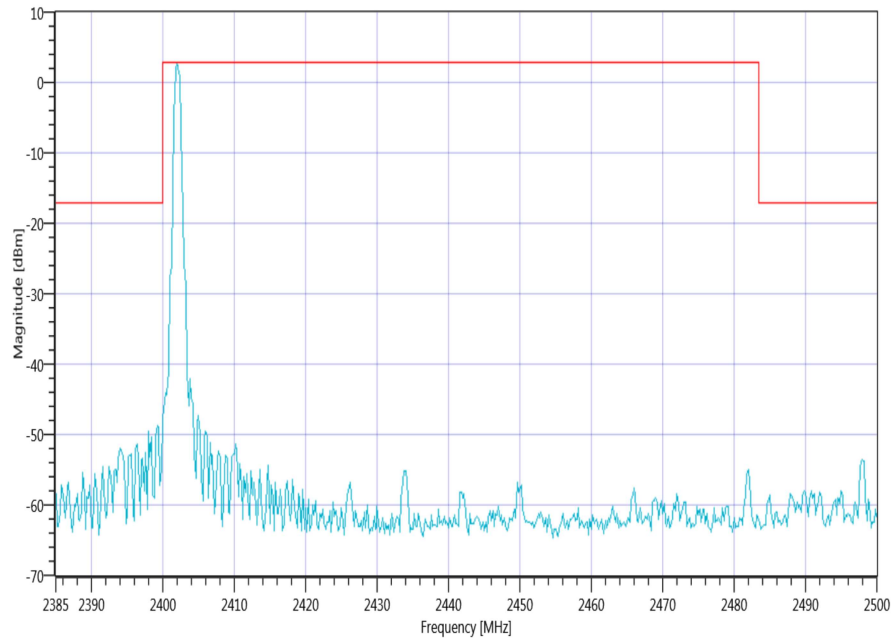
FCC	IC
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.	

Result:

Scenario	Spurious band edge conducted [dB]
Modulation	GFSK
Lower band edge – hopping off	> 20 dB
Upper band edge – hopping off	> 20 dB

Plots:

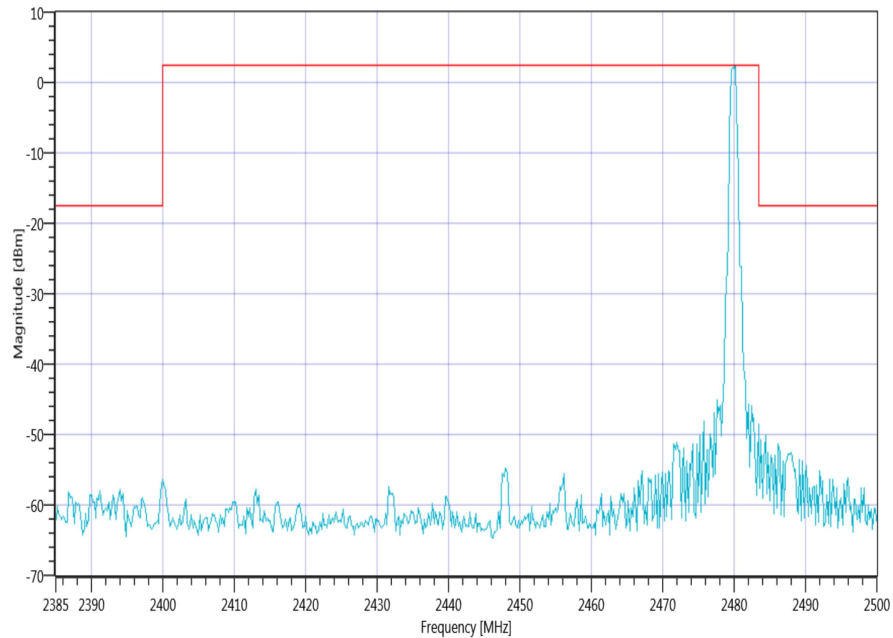
Plot 1: Lower band edge, 1 Msps



Spectrum analyzer settings read out

Ref. Level [dBm]	11.62
Resolution BW. [MHz]	0.100000
Video BW. [MHz]	0.300000
Detector	POS
Sweep Time [ms]	500
Sweep Count	3
Sweep Mode	MAXH
Used Sweep Type	SWE

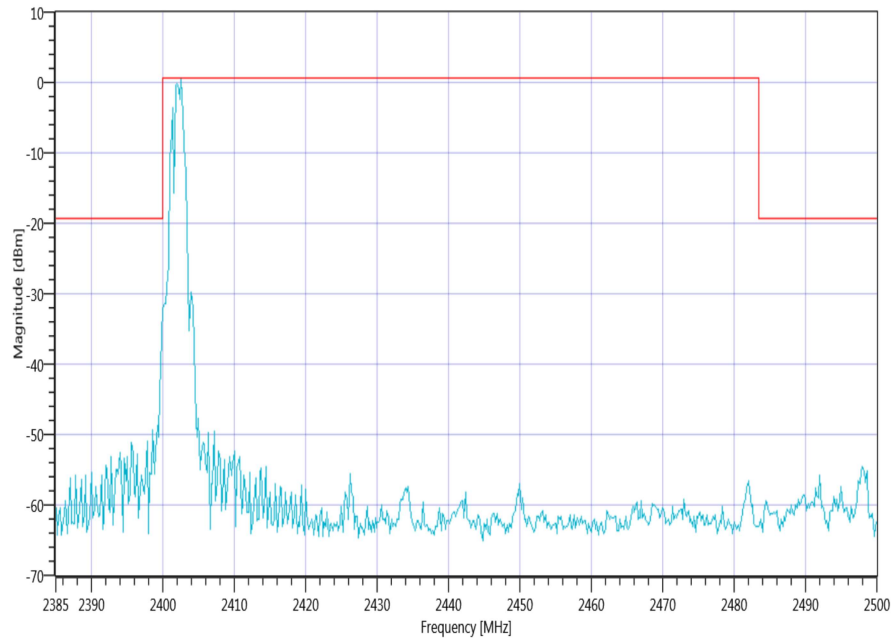
Plot 2: Upper band edge, 1 Msps



Spectrum analyzer settings read out

Ref. Level [dBm]	11.52
Resolution BW. [MHz]	0.100000
Video BW. [MHz]	0.300000
Detector	POS
Sweep Time [ms]	500
Sweep Count	3
Sweep Mode	MAXH
Used Sweep Type	SWE

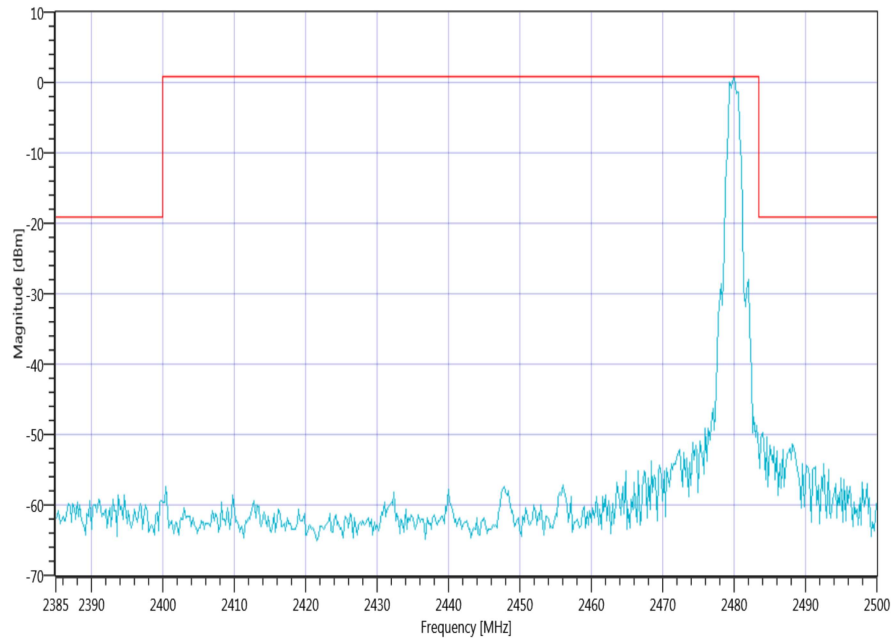
Plot 3: Lower band edge, 2 Msps



Spectrum analyzer settings read out

Ref. Level [dBm]	11.58
Resolution BW. [MHz]	0.100000
Video BW. [MHz]	0.300000
Detector	POS
Sweep Time [ms]	500
Sweep Count	3
Sweep Mode	MAXH
Used Sweep Type	SWE

Plot 4: Upper band edge, 2 Msps



Spectrum analyzer settings read out

Ref. Level [dBm]	11.51
Resolution BW. [MHz]	0.100000
Video BW. [MHz]	0.300000
Detector	POS
Sweep Time [ms]	500
Sweep Count	3
Sweep Mode	MAXH
Used Sweep Type	SWE

11.7 Band edge compliance radiated

Description:

Measurement of the radiated band edge compliance. The EUT is turned in the position that results in the maximum level at the band edge. Then a sweep over the corresponding restricted band is performed. The EUT is set to single channel mode and the transmit frequency 2402 MHz for the lower restricted band and 2480 MHz for the upper restricted band. Measurement distance is 3m.

Measurement parameters	
Detector	Peak / RMS
Sweep time	Auto
Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Span	Lower Band: 2300 – 2400 MHz higher Band: 2480 – 2500 MHz
Trace mode	Max hold
Test setup	See sub clause 7.2 B
Measurement uncertainty	See sub clause 8

Limits:

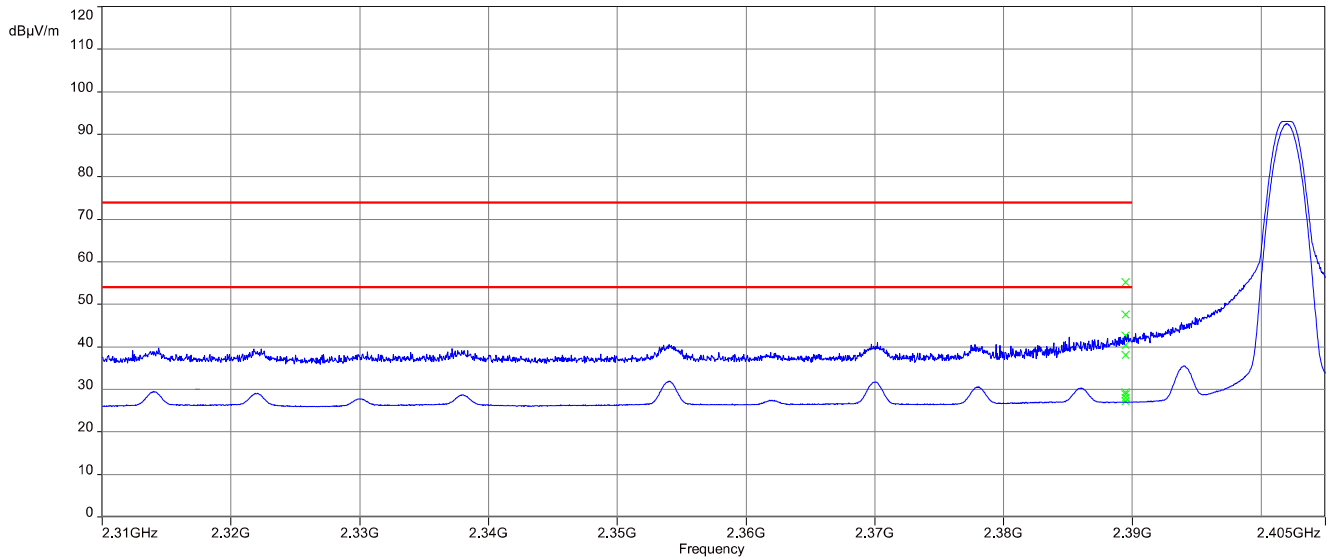
FCC	IC
Band edge compliance radiated	
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. 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 5.205(c)).	
54 dBµV/m AVG 74 dBµV/m Peak	

Result:

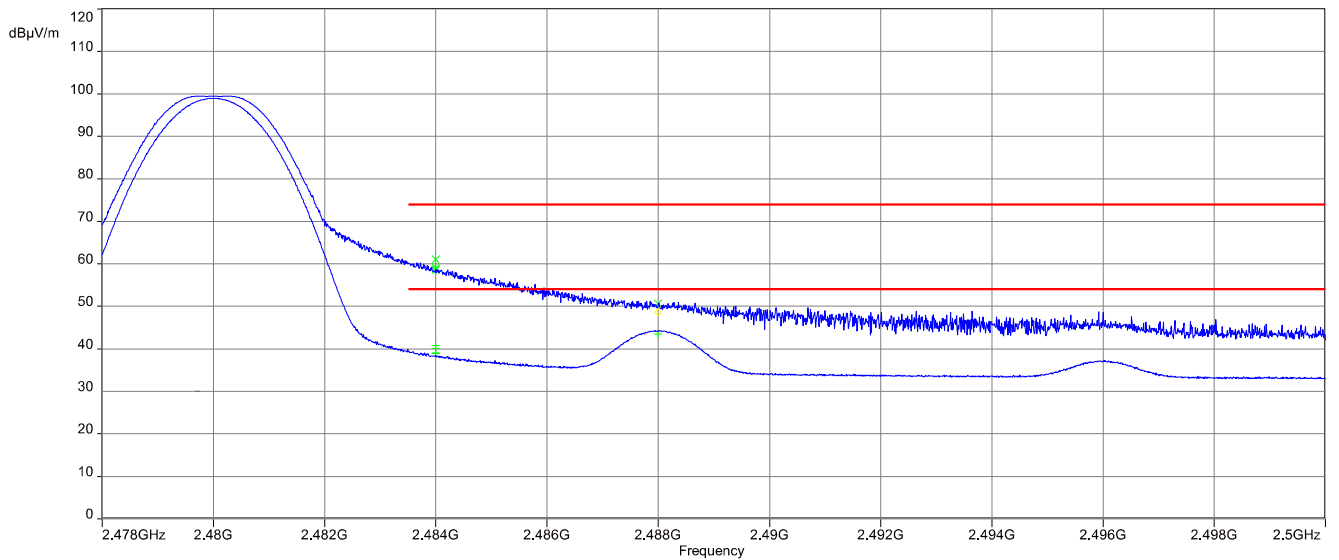
Scenario	Band edge compliance radiated [dBµV/m]
Modulation	GFSK
Lower restricted band	< 54 AVG / < 74 PP
Upper restricted band	< 54 AVG / < 74 PP

Plots:

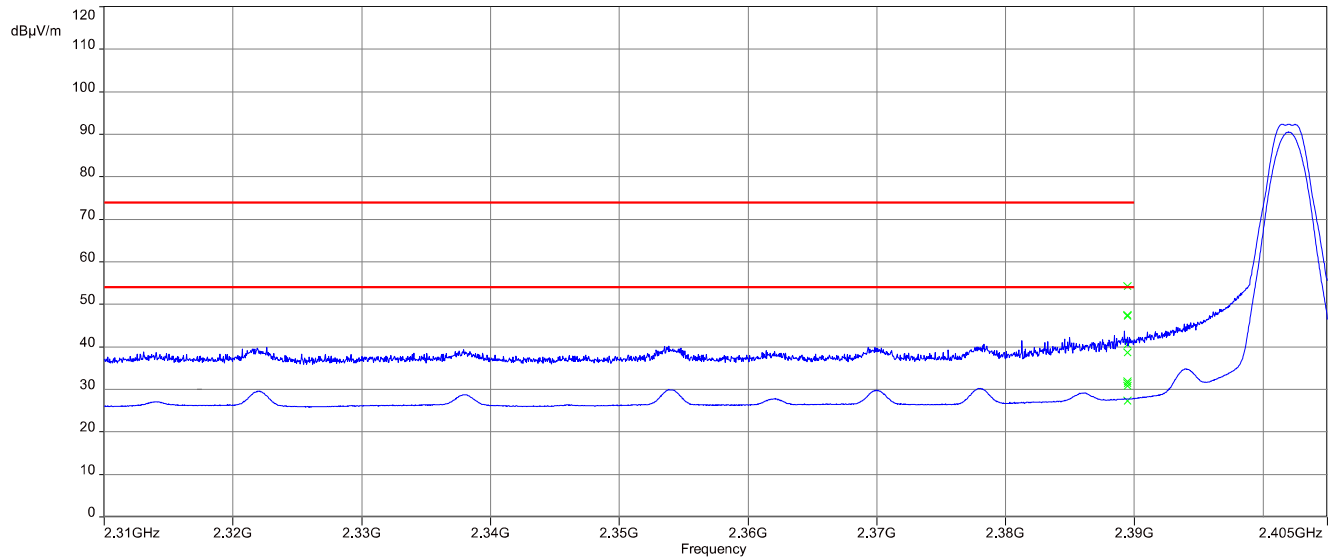
Plot 1: Lower restricted band, 1 Msps, on-board antenna



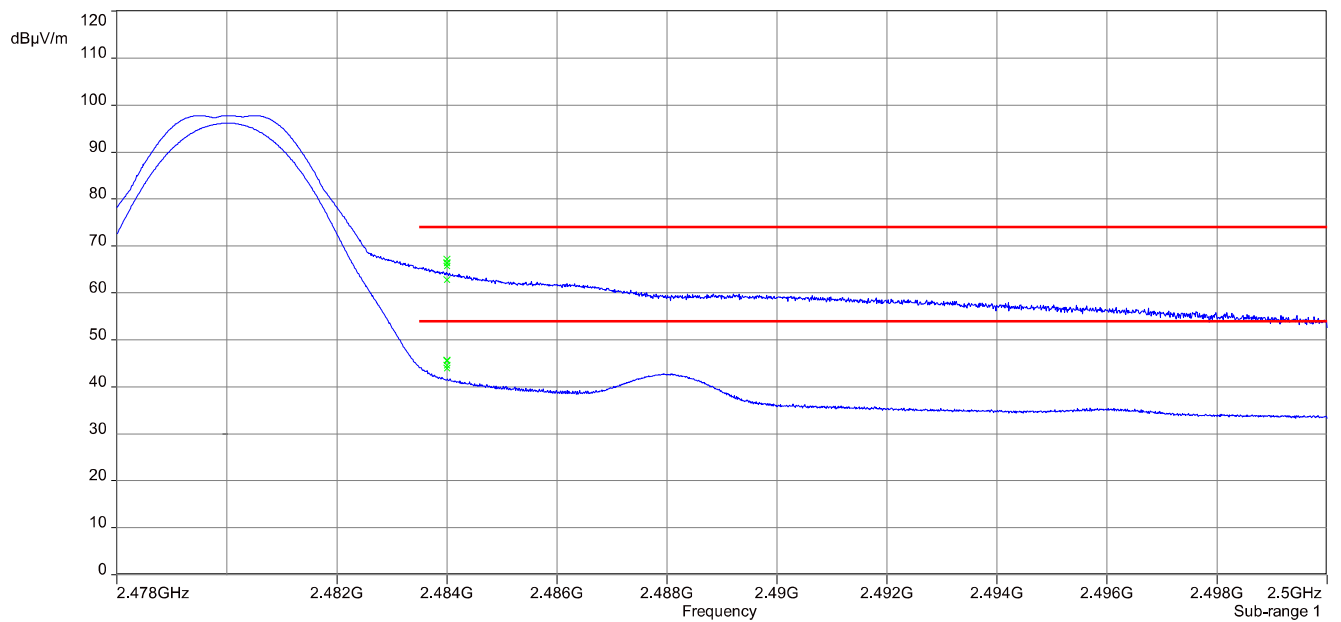
Plot 2: Upper restricted band, 1 Msps, on-board antenna



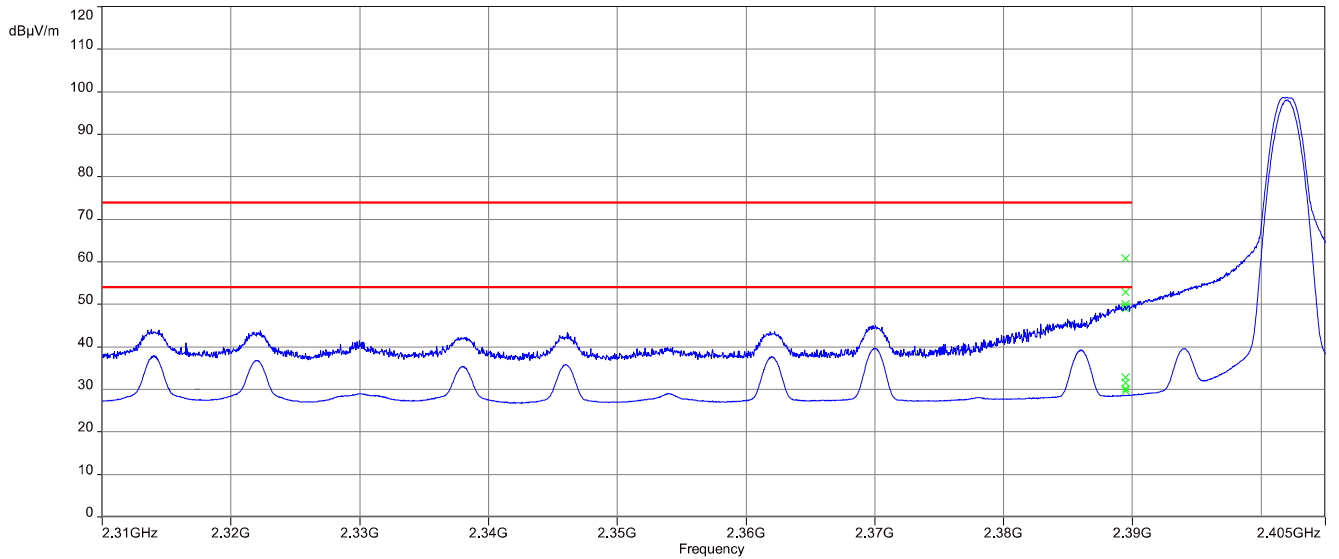
Plot 3: Lower restricted band, 2 Msps, on-board antenna



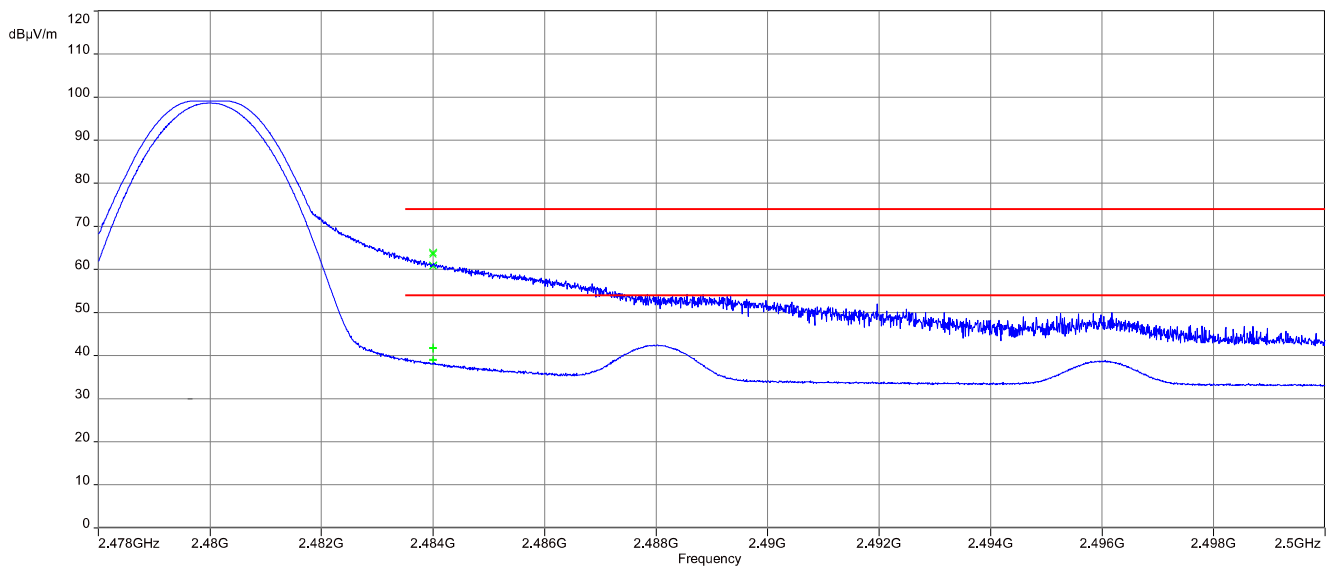
Plot 4: Upper restricted band, 2 Msps, on-board antenna



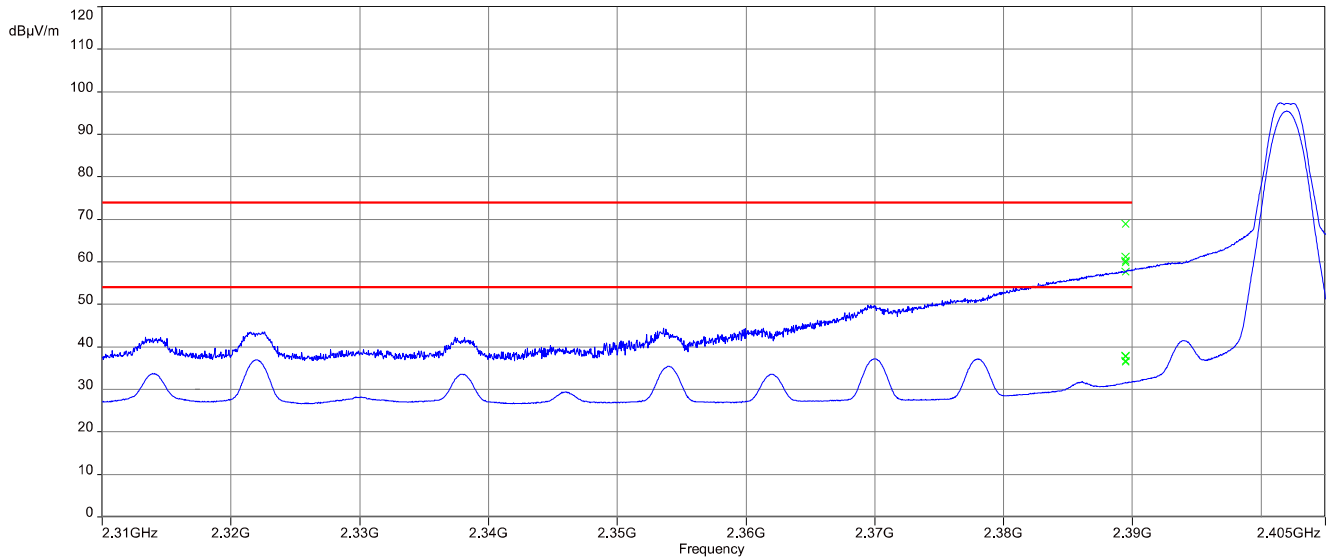
Plot 5: Lower restricted band, 1 Msp, external antenna



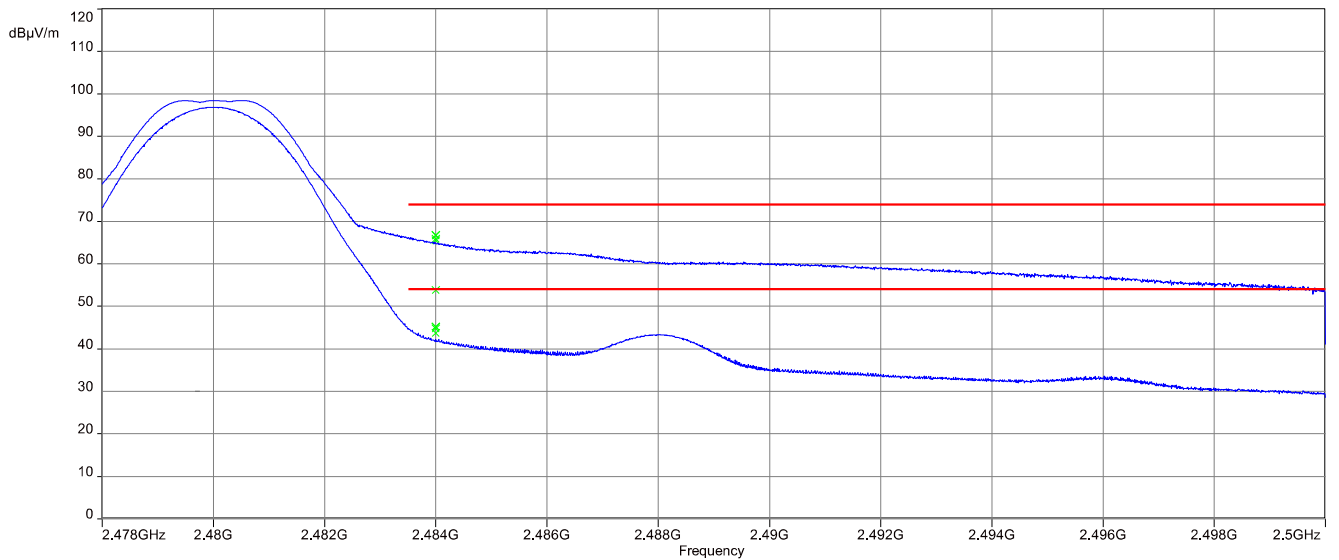
Plot 6: Upper restricted band, 1 Msp, external antenna



Plot 7: Lower restricted band, 2 Msps, external antenna



Plot 8: Upper restricted band, 2 Msps, external antenna



11.8 TX spurious emissions conducted

Description:

Measurement of the conducted spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit frequencies are 2402 MHz, 2440 MHz and 2480 MHz.

Measurement parameters	
Detector	Peak
Sweep time	Auto
Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Span	9 kHz to 25 GHz
Trace mode	Max hold
Test setup	See sub clause 6.4 A
Measurement uncertainty	See sub clause 8

Limits:

FCC	IC
TX spurious emissions conducted	
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. Attenuation below the general limits specified in Section 15.209(a) is not required	

Results: 1 Msps

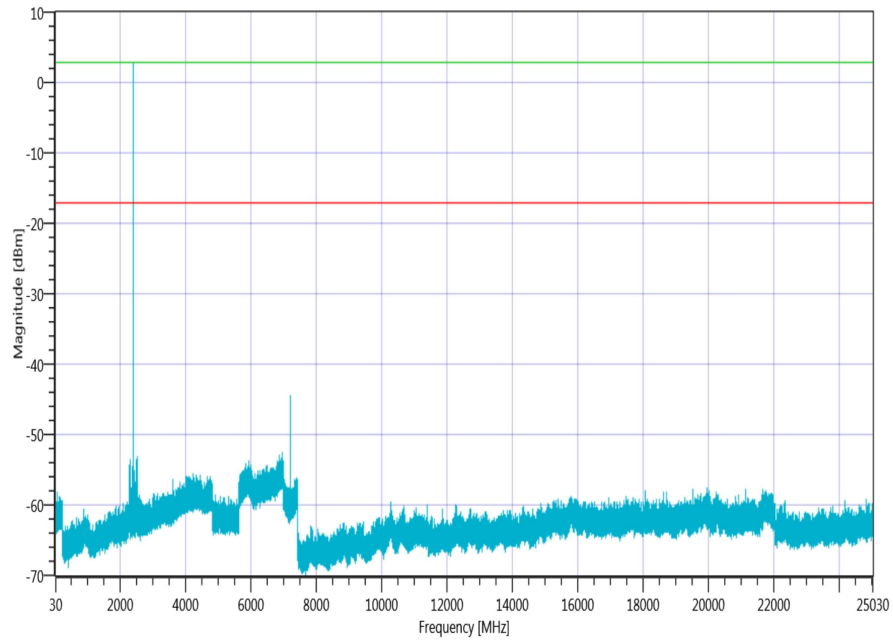
TX spurious emissions conducted					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		2.9	30 dBm		Operating frequency
All detected emissions are compliant with the -20 dBc limit!			-20 dBc		compliant
2440		3.1	30 dBm		Operating frequency
All detected emissions are compliant with the -20 dBc limit!			-20 dBc		compliant
2480		2.5	30 dBm		Operating frequency
All detected emissions are compliant with the -20 dBc limit!			-20 dBc		compliant

Results: 2 Msps

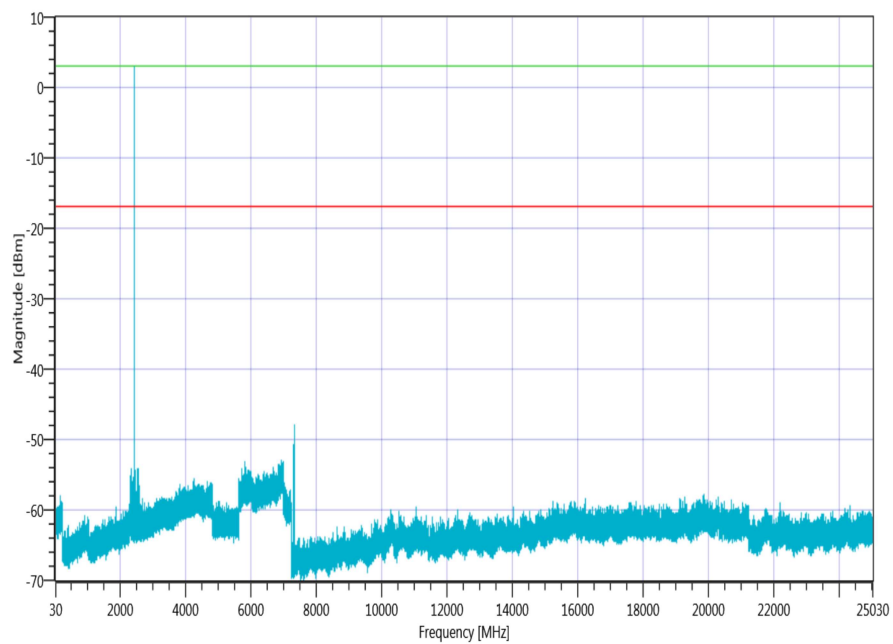
TX spurious emissions conducted					
f [MHz]		amplitude of emission [dBm]	limit max. allowed emission power	actual attenuation below frequency of operation [dB]	results
2402		0.7	30 dBm		Operating frequency
All detected emissions are compliant with the -20 dBc limit!			-20 dBc		compliant
2440		0.0	30 dBm		Operating frequency
All detected emissions are compliant with the -20 dBc limit!			-20 dBc		compliant
2480		0.9	30 dBm		Operating frequency
All detected emissions are compliant with the -20 dBc limit!			-20 dBc		compliant

Plots:

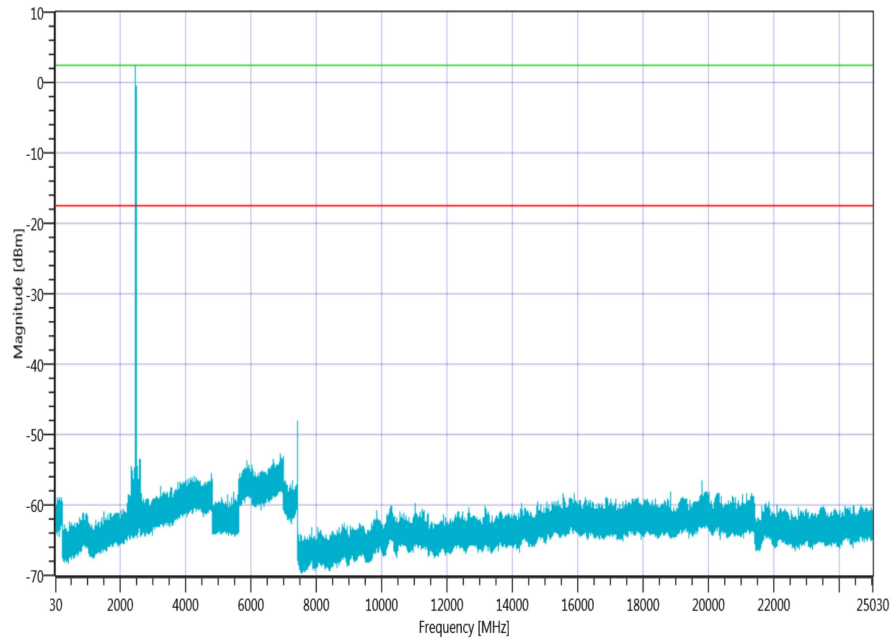
Plot 1: lowest channel, 1 Msps



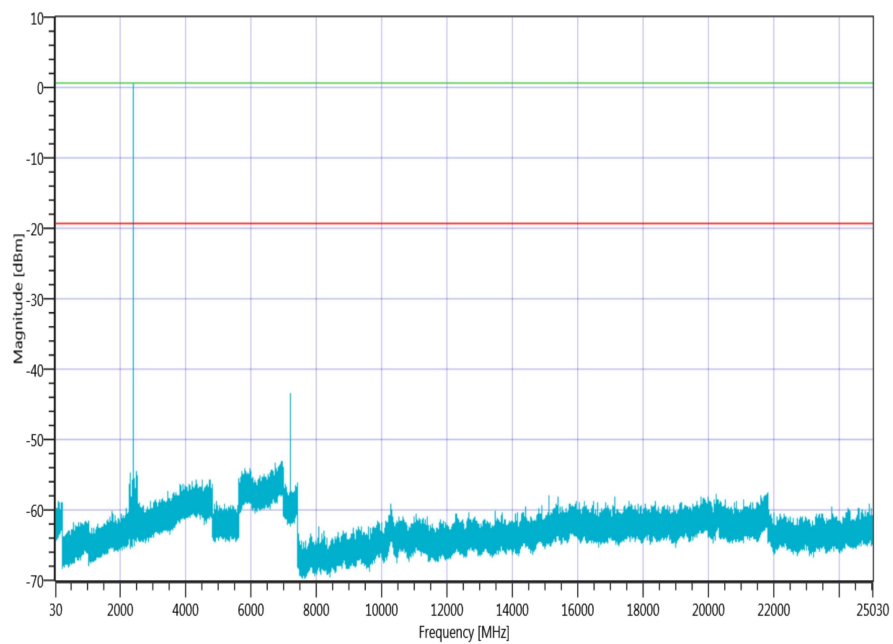
Plot 2: mid channel, 1 Msps



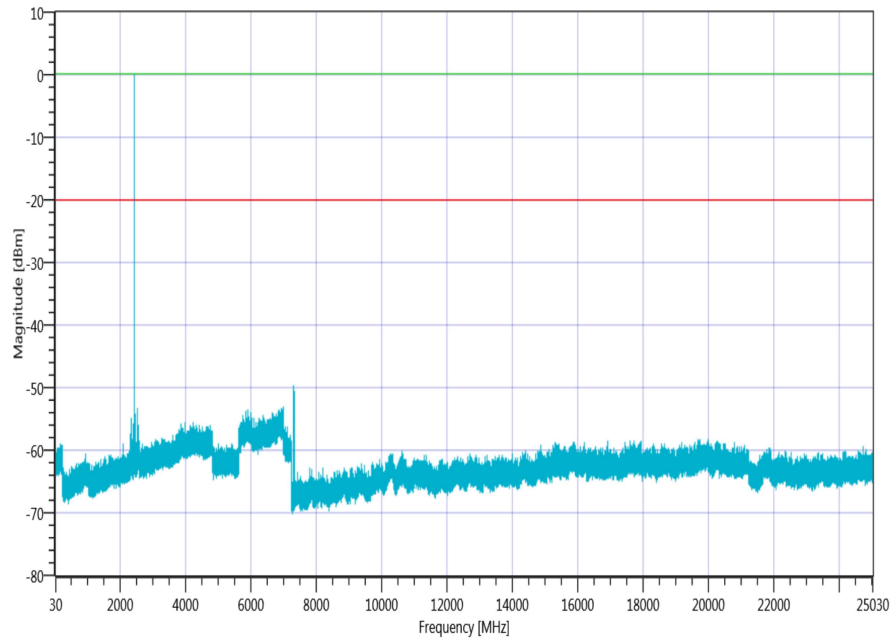
Plot 3: highest channel, 1 Msps



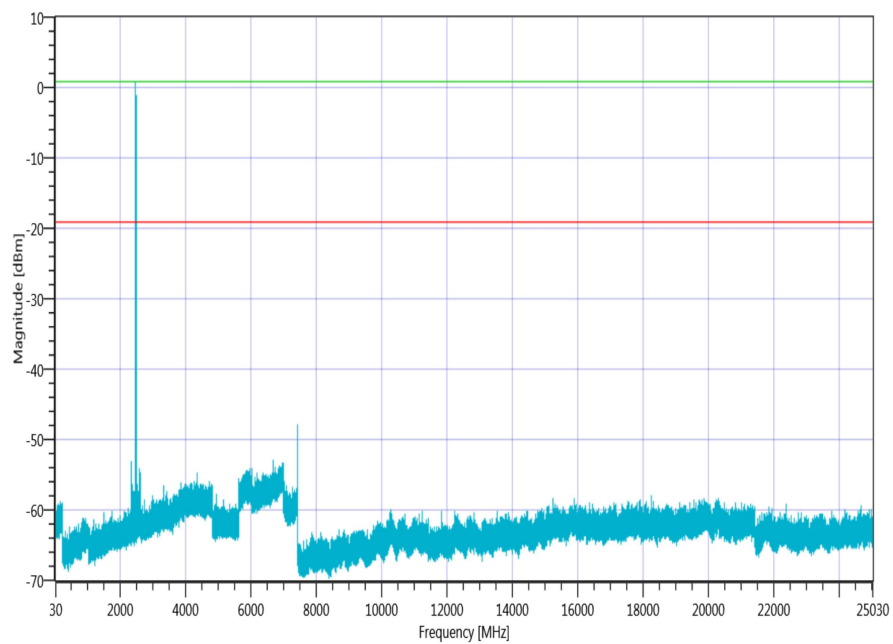
Plot 4: lowest channel, 2 Msps



Plot 5: mid channel, 2 Msps



Plot 6: highest channel, 2 Msps



11.9 Spurious emissions radiated below 30 MHz

Description:

Measurement of the radiated spurious emissions in transmit mode below 30 MHz. The EUT is set to single channel mode and the transmit frequencies are 2402 MHz, 2440 MHz and 2480 MHz. The measurement is performed in the mode with the highest output power. The limits are recalculated to a measurement distance of 3 m according the ANSI C63.10.

Measurement parameters	
Detector	Peak / Quasi peak
Sweep time	Auto
Resolution bandwidth	F < 150 kHz: 200 Hz F > 150 kHz: 9 kHz
Video bandwidth	F < 150 kHz: 1 kHz F > 150 kHz: 30 kHz
Span	9 kHz to 30 MHz
Trace mode	Max hold
Test setup	See sub clause 6.2 C
Measurement uncertainty	See sub clause 8

Limits:

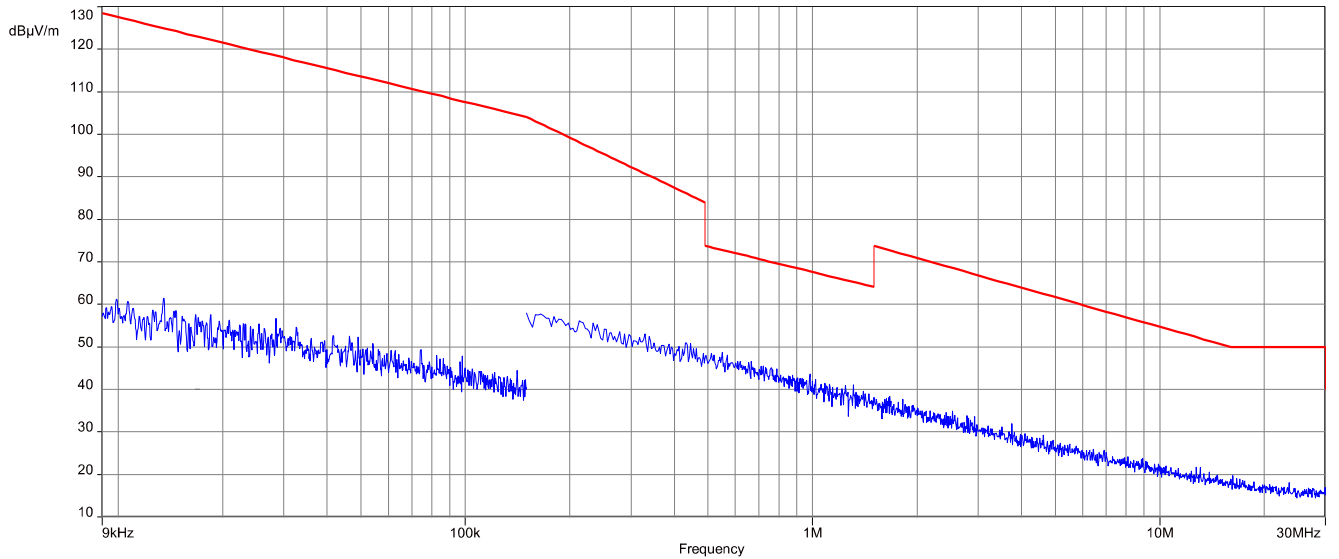
FCC		IC
TX spurious emissions radiated below 30 MHz		
Frequency (MHz)	Field strength (dB μ V/m)	Measurement distance
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Results:

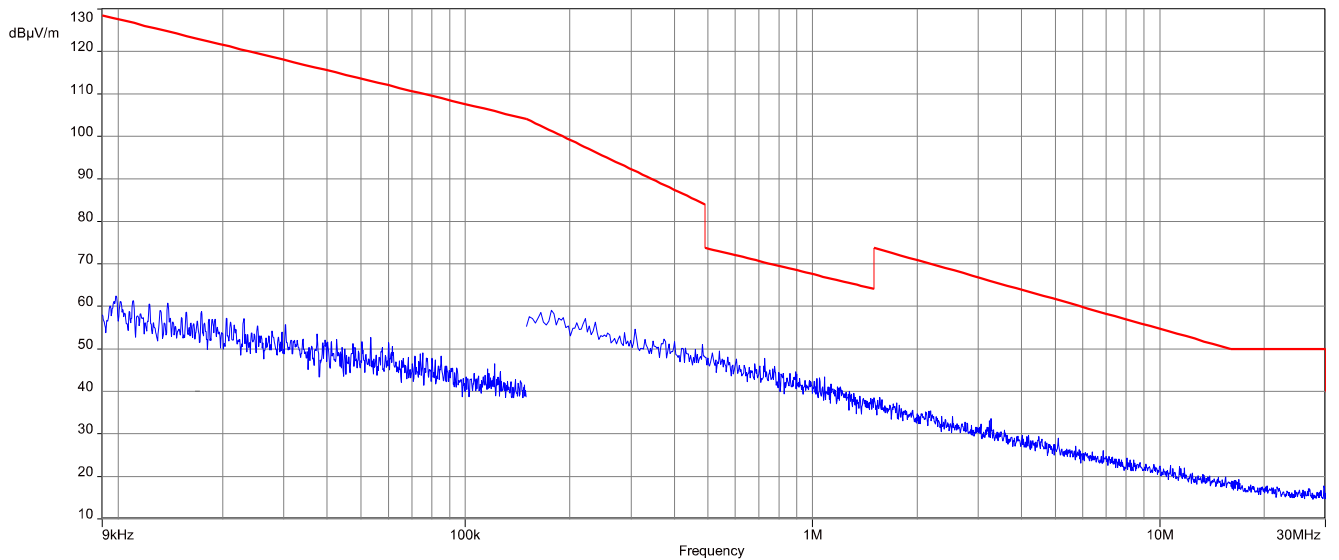
TX spurious emissions radiated below 30 MHz [dB μ V/m]		
F [MHz]	Detector	Level [dB μ V/m]
All detected emissions are more than 20 dB below the limit.		

Plots:

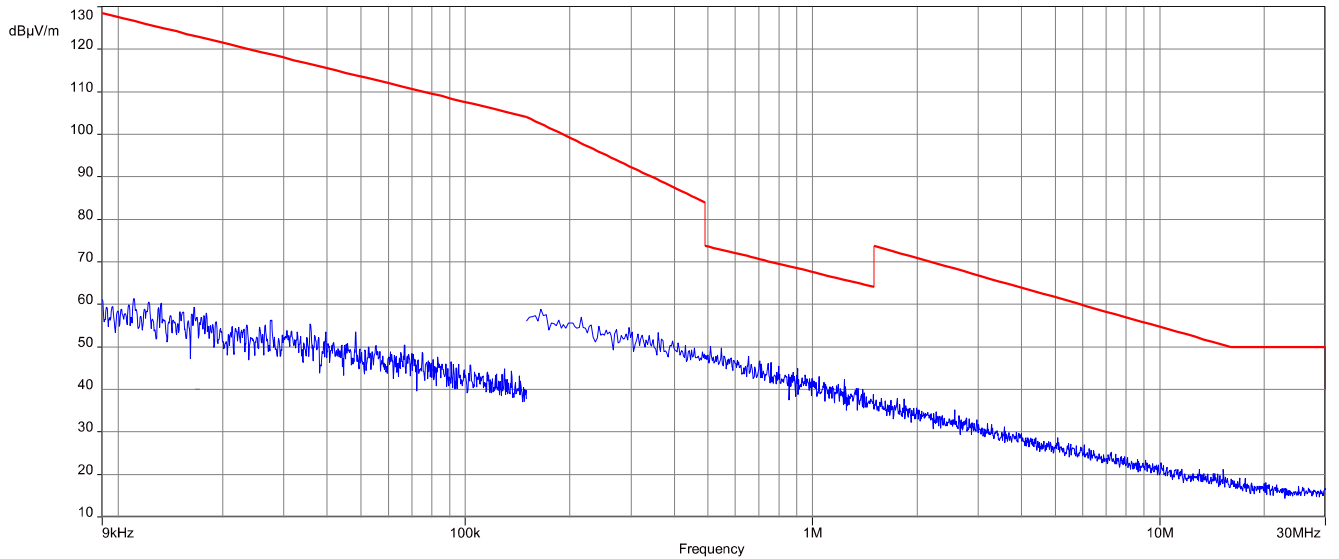
Plot 1: 9 kHz to 30 MHz, 2402 MHz, transmit mode, 1 Msps, on-board antenna



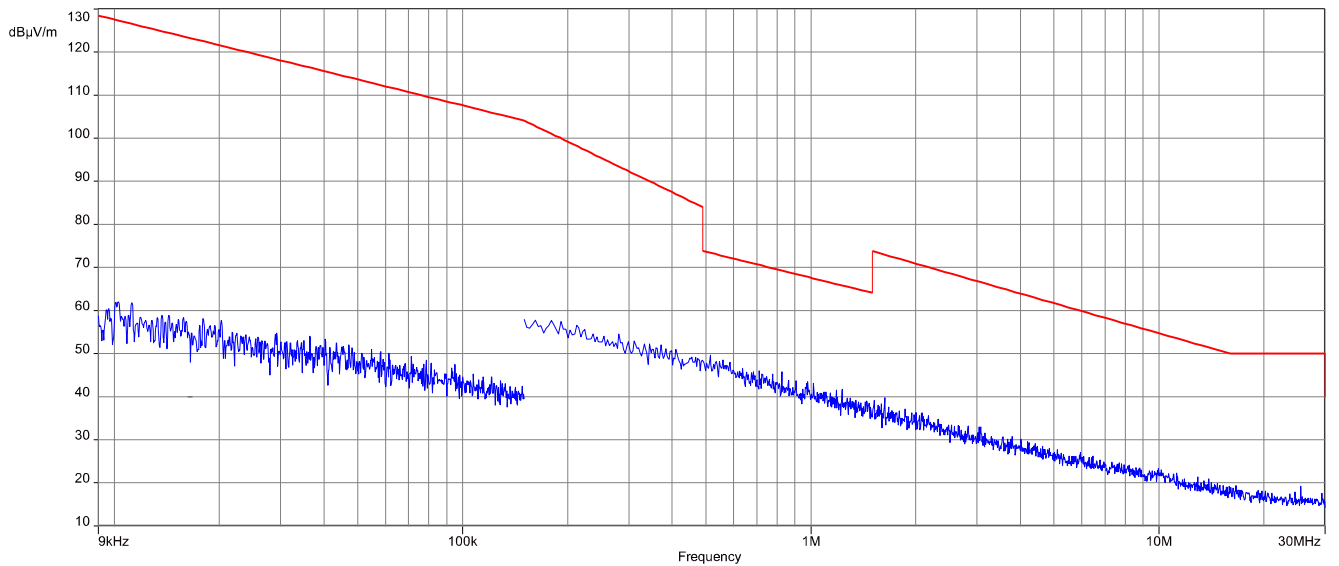
Plot 2: 9 kHz to 30 MHz, 2440 MHz, transmit mode, 1 Msps, on-board antenna



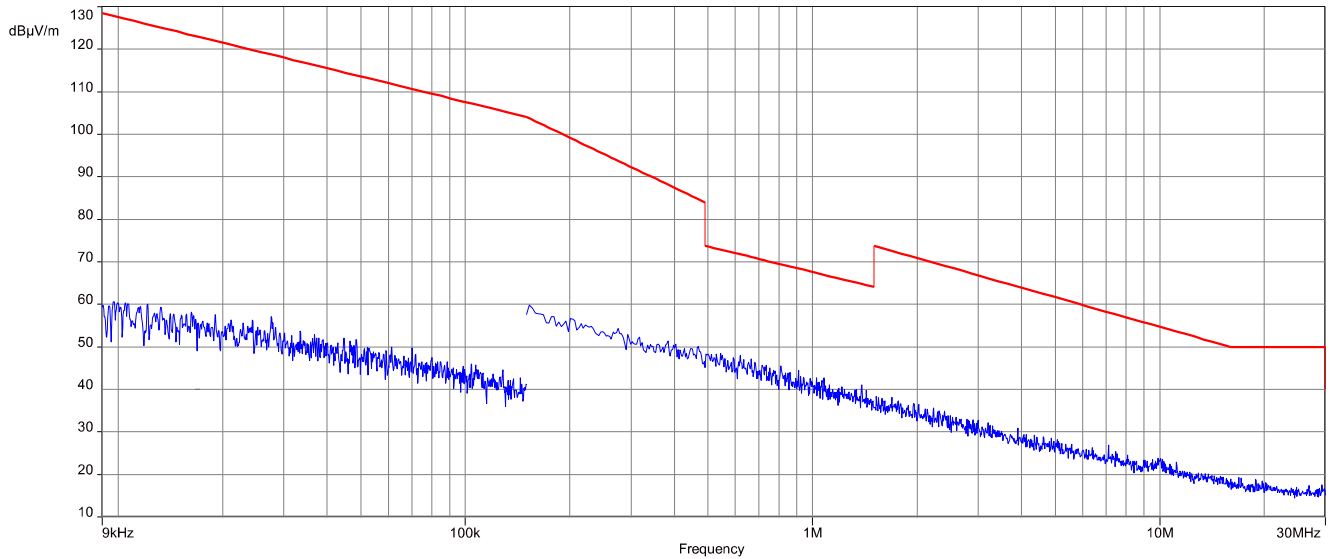
Plot 3: 9 kHz to 30 MHz, 2480 MHz, transmit mode, 1 Msps, on-board antenna



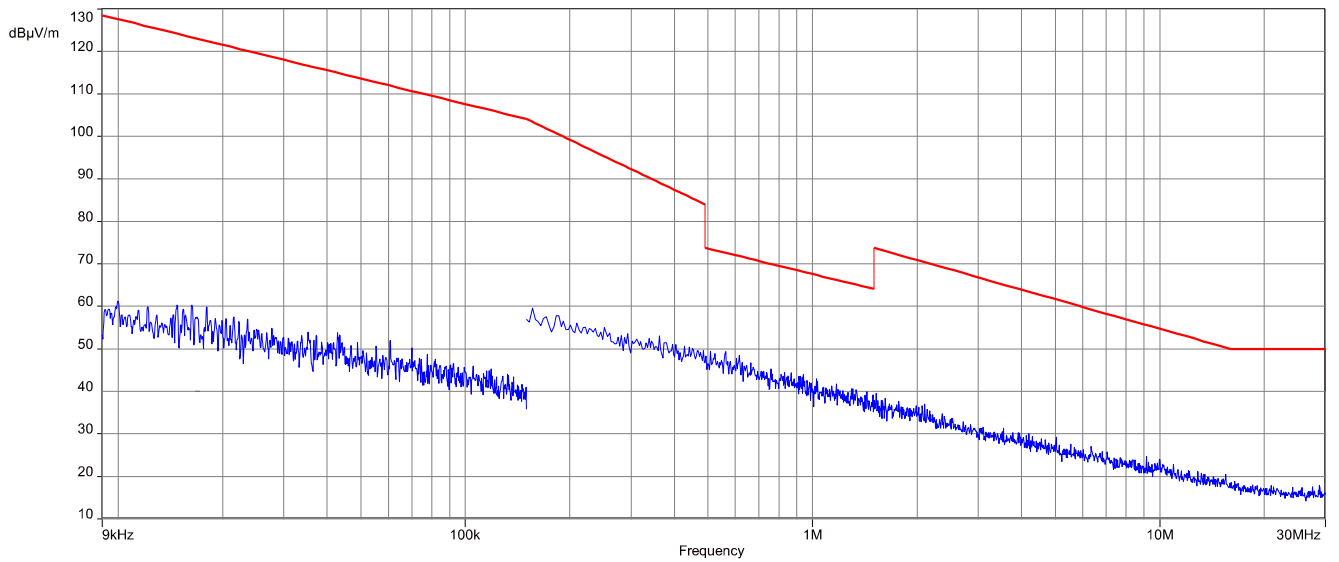
Plot 4: 9 kHz to 30 MHz, 2402 MHz, transmit mode, 2 Msps, on-board antenna



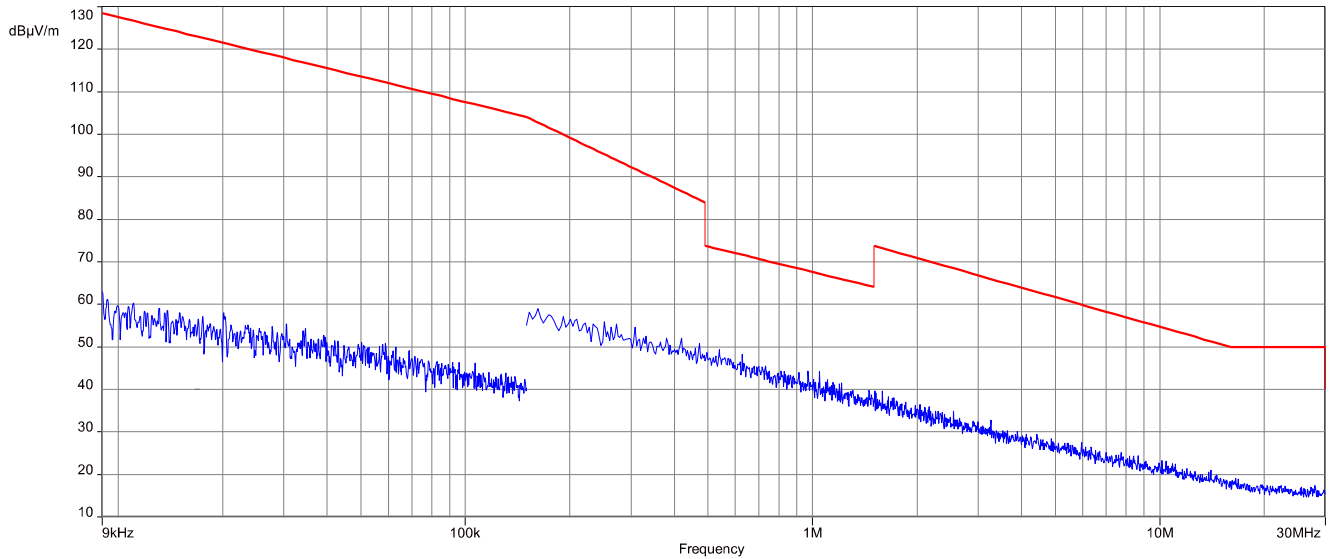
Plot 5: 9 kHz to 30 MHz, 2440 MHz, transmit mode, 2 Msps, on-board antenna



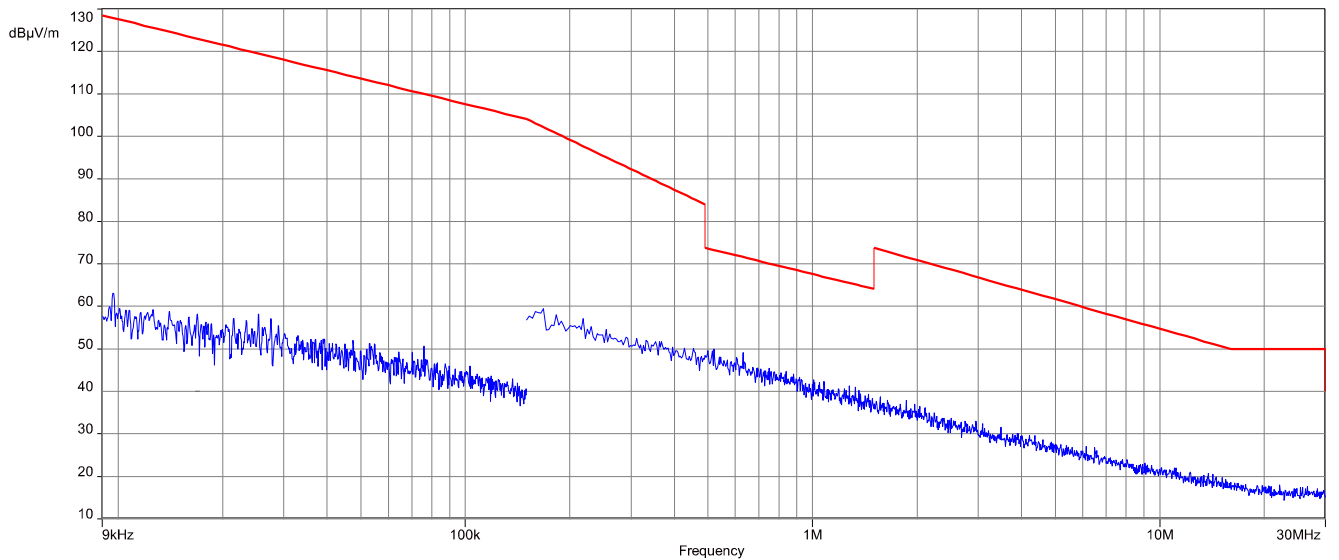
Plot 6: 9 kHz to 30 MHz, 2480 MHz, transmit mode, 2 Msps, on-board antenna



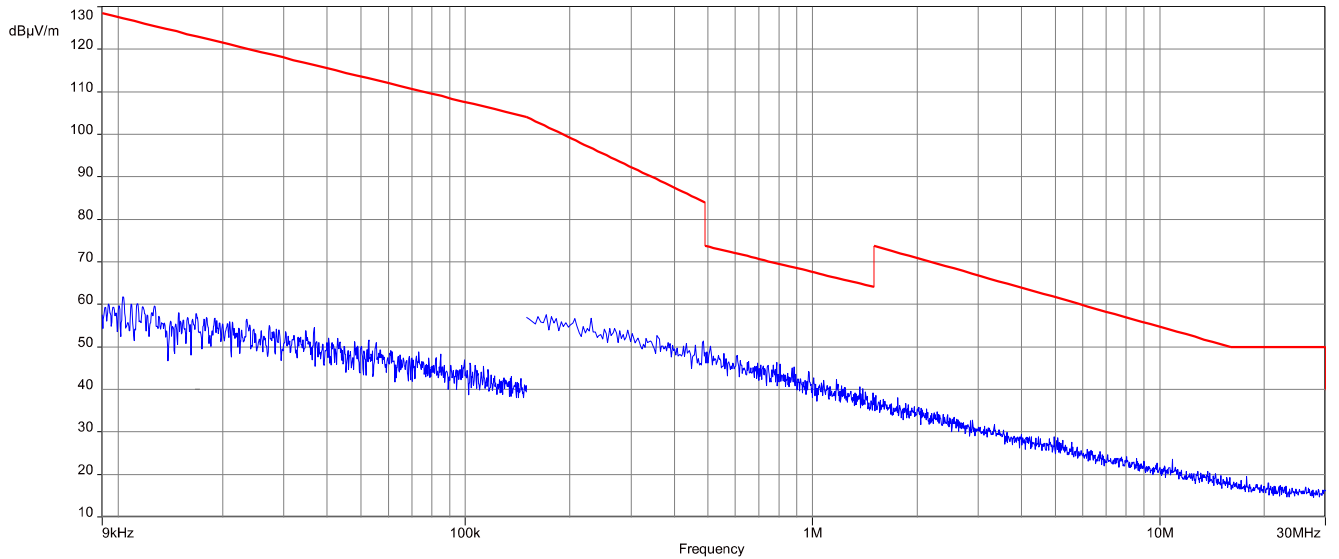
Plot 7: 9 kHz to 30 MHz, 2402 MHz, transmit mode, 1 Msps, external antenna



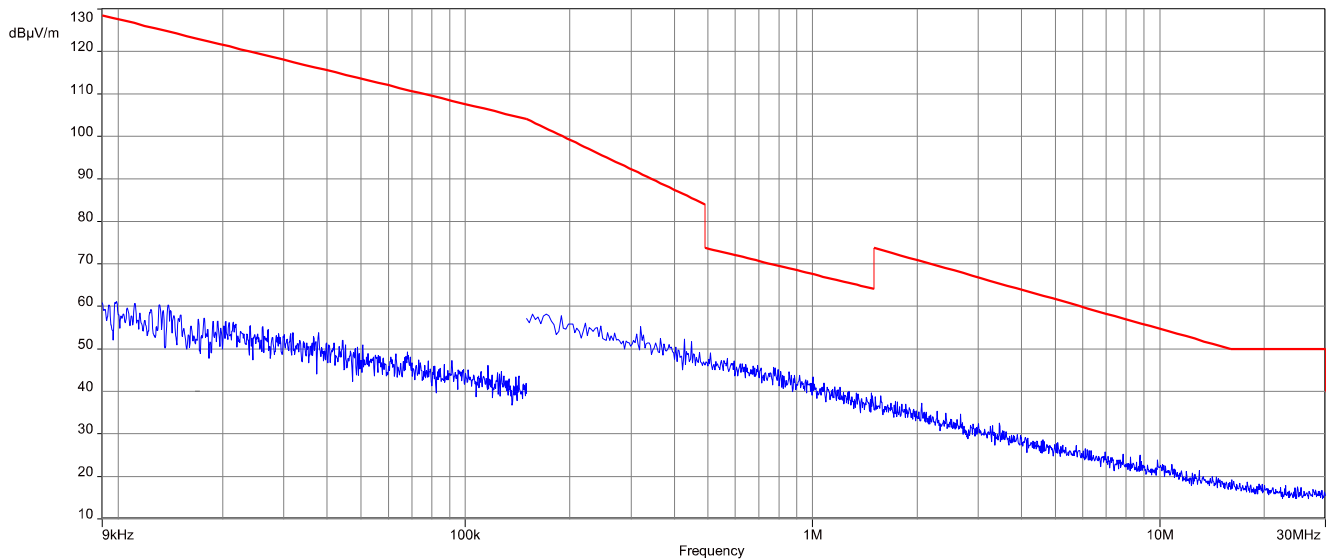
Plot 8: 9 kHz to 30 MHz, 2440 MHz, transmit mode, 1 Msps, external antenna



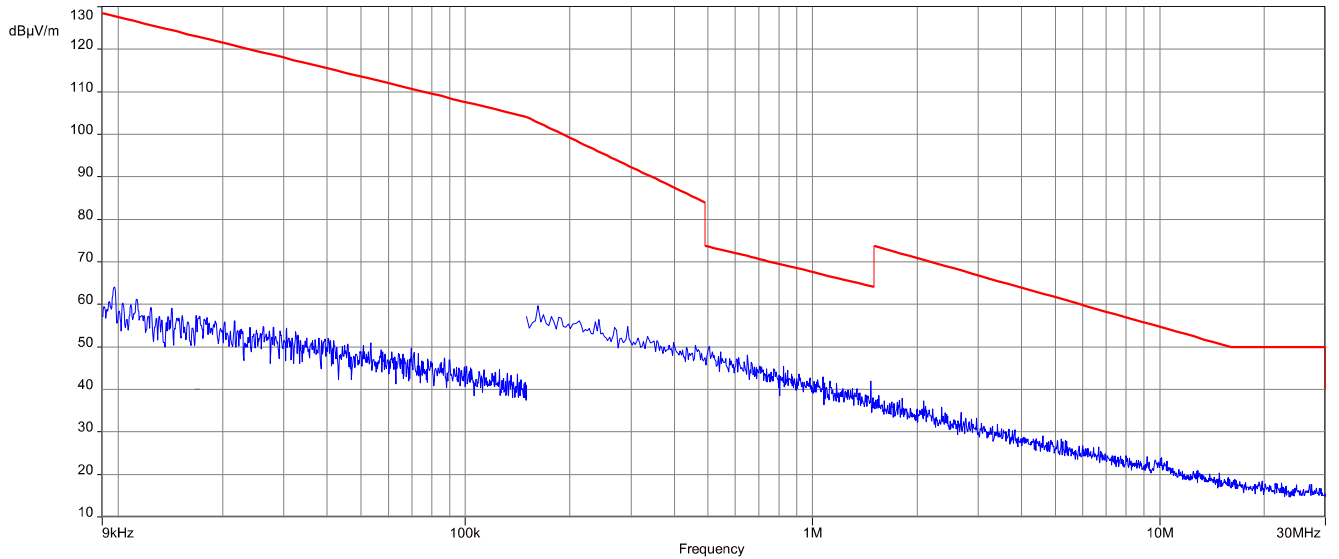
Plot 9: 9 kHz to 30 MHz, 2480 MHz, transmit mode, 1 Msps, external antenna



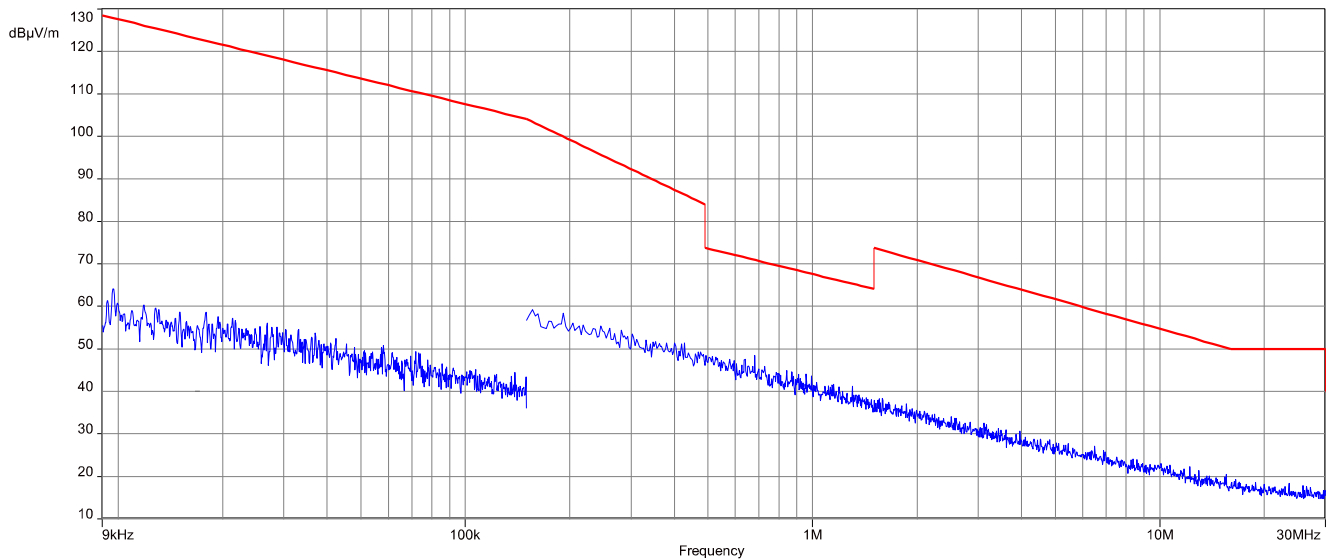
Plot 10: 9 kHz to 30 MHz, 2402 MHz, transmit mode, 2 Msps, external antenna



Plot 11: 9 kHz to 30 MHz, 2440 MHz, transmit mode, 2 Msps, external antenna



Plot 12: 9 kHz to 30 MHz, 2480 MHz, transmit mode, 2 Msps, external antenna



11.10 Spurious emissions radiated 30 MHz to 1 GHz

Description:

Measurement of the radiated spurious emissions in transmit mode. The EUT is set to single channel mode and the transmit frequencies are 2402 MHz, 2440 MHz and 2480 MHz. The measurement is performed in the mode with the highest output power.

Measurement parameters	
Detector	Peak / Quasi Peak
Sweep time	Auto
Resolution bandwidth	120 kHz
Video bandwidth	3 x RBW
Span	30 MHz to 1 GHz
Trace mode	Max hold
Measured modulation	GFSK
Test setup	See sub clause 6.1 A
Measurement uncertainty	See sub clause 8

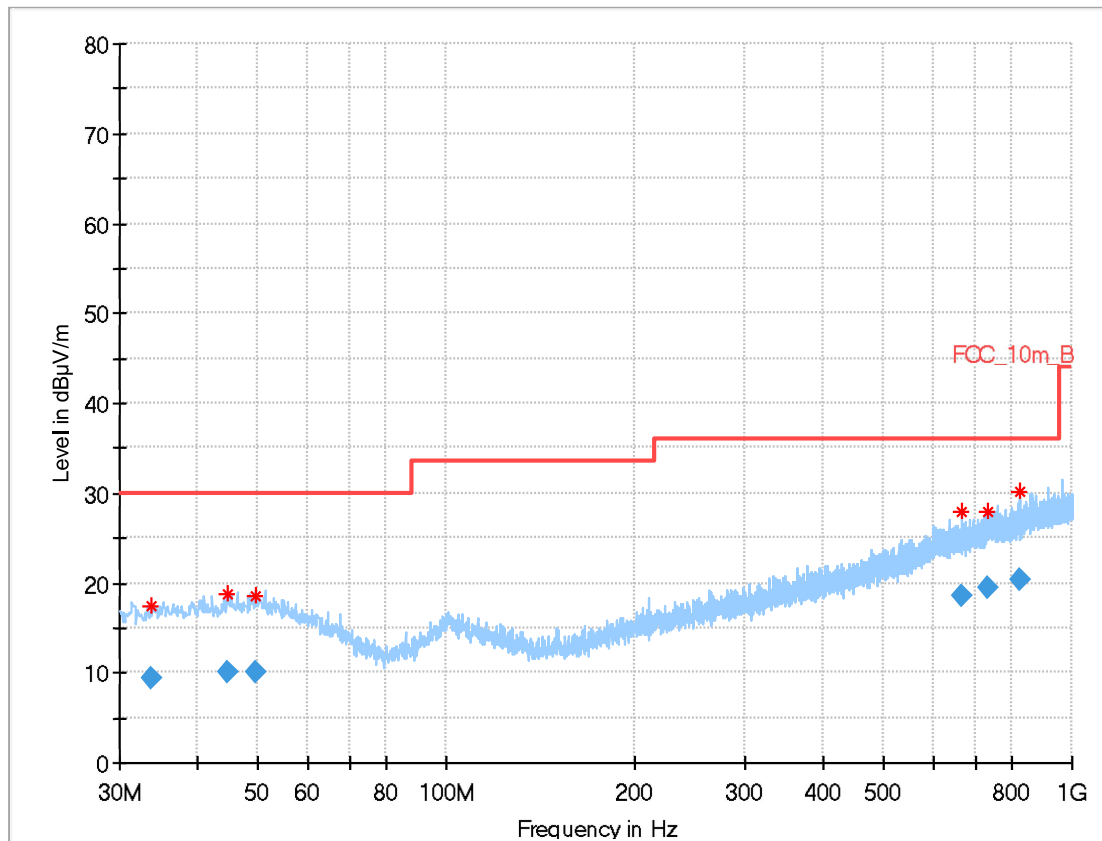
The modulation with the highest output power was used to perform the transmitter spurious emissions. If spurious were detected a re-measurement was performed on the detected frequency with each modulation.

Limits:

FCC		IC
TX spurious emissions radiated		
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. 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 §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).		
§15.209		
Frequency (MHz)	Field strength (dBµV/m)	Measurement distance
30 - 88	30.0	10
88 – 216	33.5	10
216 – 960	36.0	10
Above 960	54.0	3

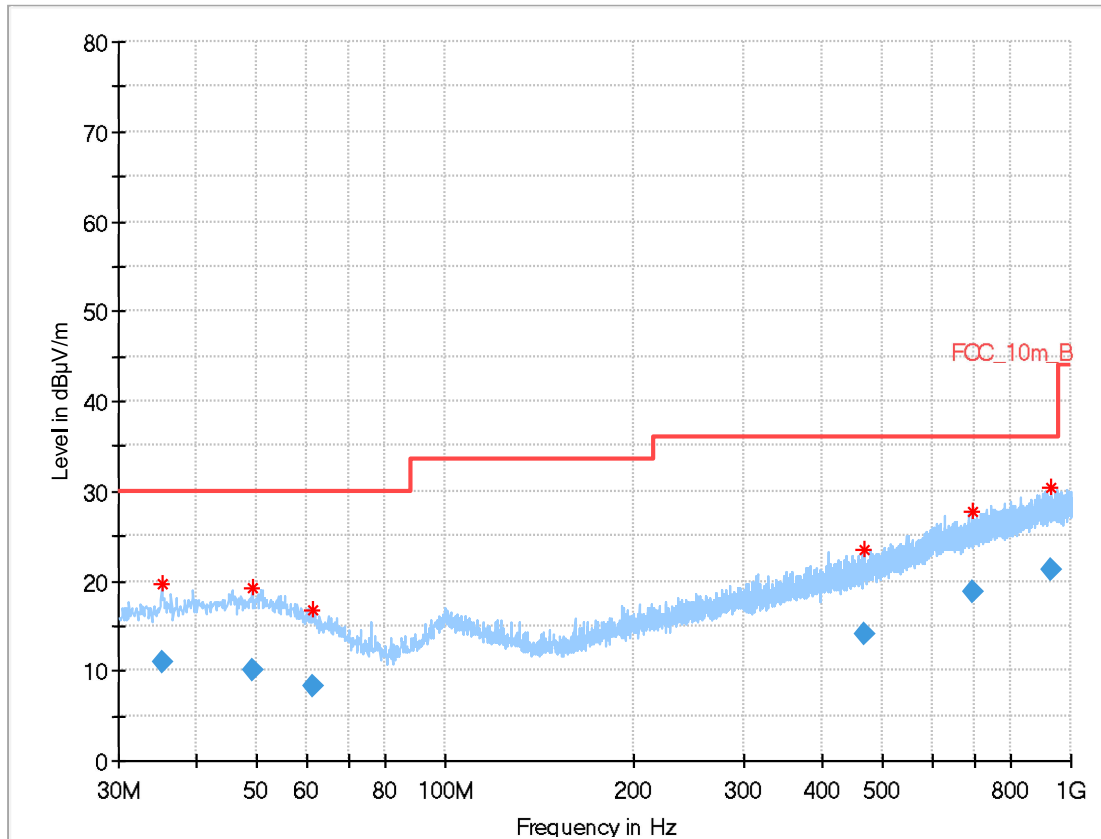
Plots: Transmit mode

Plot 1: 30 MHz to 1 GHz, TX mode, 2402 MHz, vertical & horizontal polarization, 1 Msps, on-board antenna

**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
33.832	9.33	30.0	20.67	1000	120	170.0	H	94.0	12.5
44.713	10.14	30.0	19.86	1000	120	101.0	H	240.0	13.6
49.450	10.03	30.0	19.97	1000	120	170.0	H	274.0	13.7
665.857	18.59	36.0	17.41	1000	120	170.0	H	-10.0	21.3
733.200	19.51	36.0	16.49	1000	120	100.0	V	99.0	22.3
825.045	20.32	36.0	15.68	1000	120	170.0	V	303.0	23.1

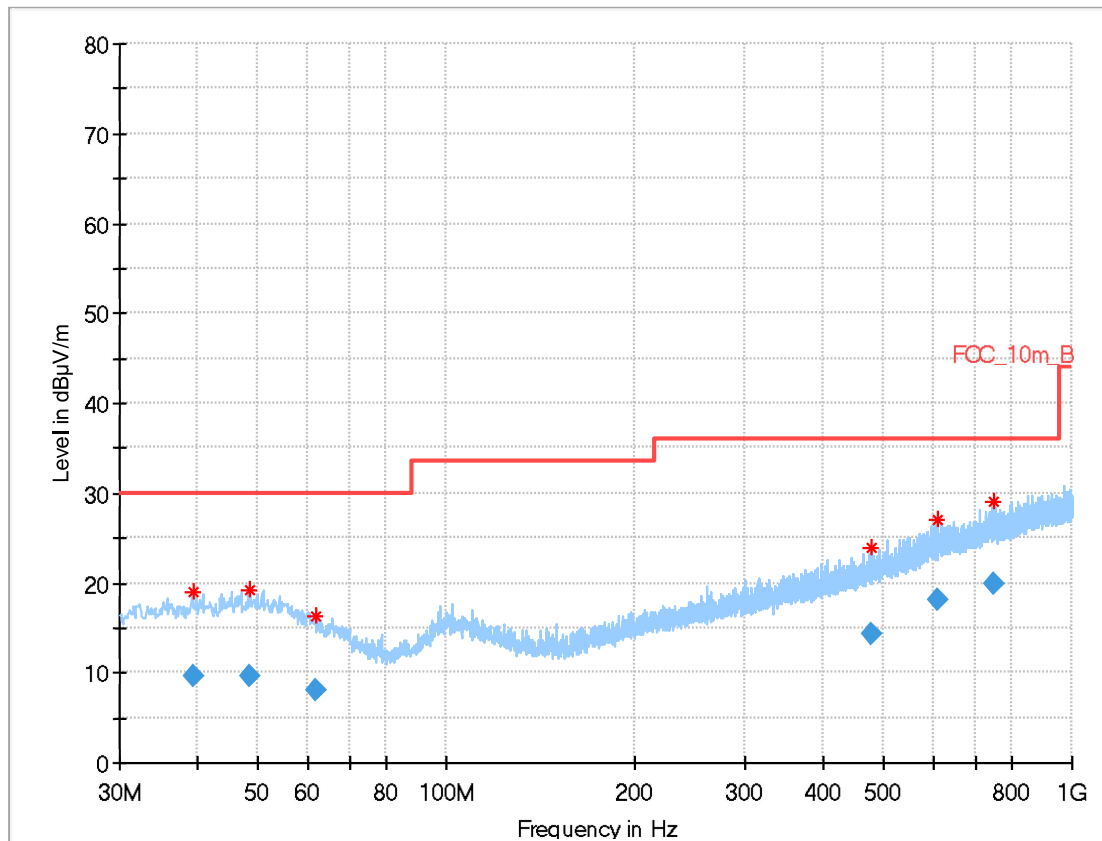
Plot 2: 30 MHz to 1 GHz, TX mode, 2440 MHz, vertical & horizontal polarization, 1 Msps, on-board antenna



Final results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
35.281	10.97	30.0	19.03	1000	120	100.0	V	111.0	12.7
49.353	10.06	30.0	19.94	1000	120	170.0	V	296.0	13.7
61.242	8.35	30.0	21.65	1000	120	170.0	V	0.0	11.6
468.717	14.04	36.0	21.96	1000	120	170.0	H	209.0	18.1
696.646	18.79	36.0	17.21	1000	120	170.0	H	265.0	21.5
930.252	21.26	36.0	14.74	1000	120	170.0	H	235.0	24.3

Plot 3: 30 MHz to 1 GHz, TX mode, 2480 MHz, vertical & horizontal polarization, on-board antenna

**Final results:**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
39.548	9.63	30.0	20.37	1000	120	101.0	H	13.0	13.2
48.307	9.53	30.0	20.47	1000	120	98.0	V	147.0	13.7
61.925	8.05	30.0	21.95	1000	120	101.0	H	180.0	11.4
479.005	14.33	36.0	21.67	1000	120	170.0	V	-10.0	18.3
607.947	18.10	36.0	17.90	1000	120	101.0	V	178.0	20.8
748.785	19.80	36.0	16.20	1000	120	170.0	V	45.0	22.7