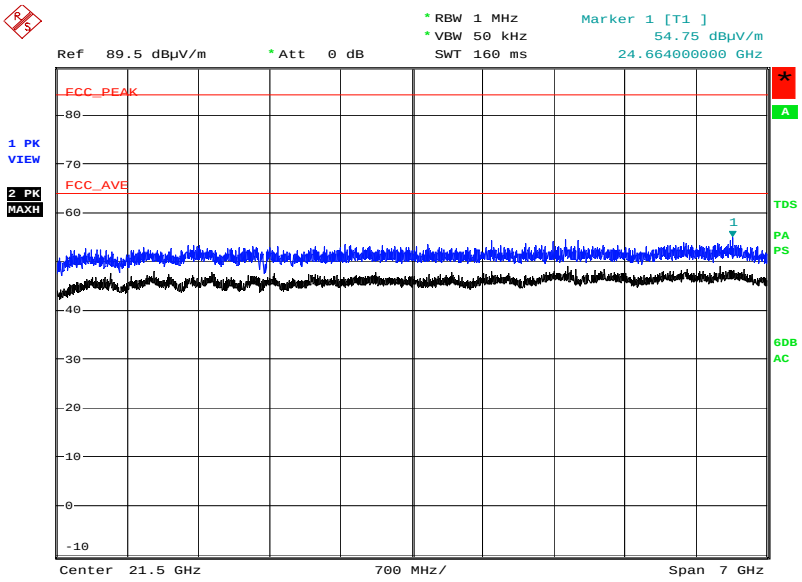
802.11g (2nd Diversity Antenna), 2462 MHz, 12 Mbps, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	As per 15.209	As per 15.209

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Product Service

Industry Canada RSS-247, Limit Clause, 5.5

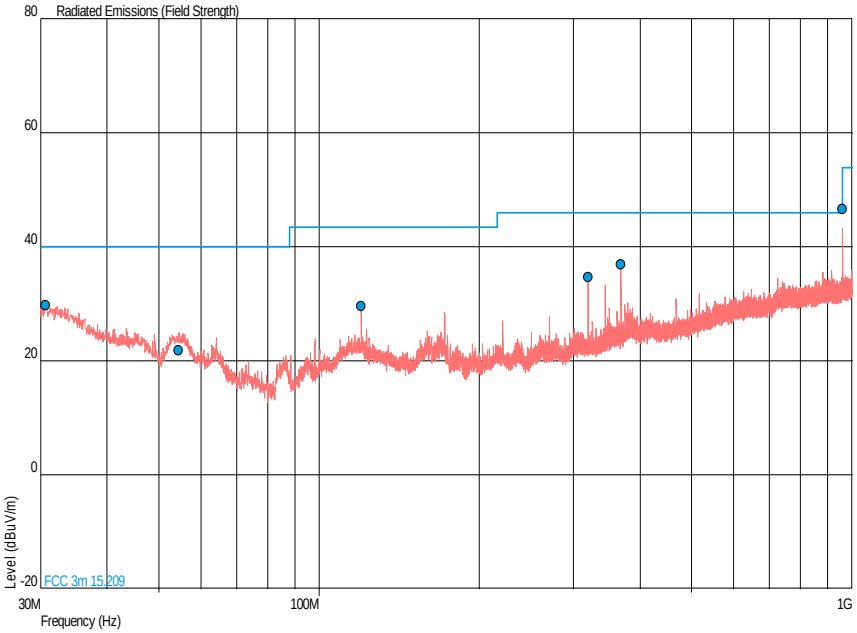
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

5.00 V DC Supply

802.11n 20 MHz Bandwidth, 2412 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.677	29.8	-10.2	30.9	-69.1	43	3.53	Vertical
54.540	21.9	-18.1	12.4	-87.6	111	1.00	Vertical
120.012	29.7	-13.8	30.5	-119.5	299	1.09	Vertical
319.494	34.7	-11.3	54.3	-145.7	0	1.00	Horizontal
368.645	36.9	-9.1	70.0	-130.0	360	1.00	Horizontal
960.021	46.7	-7.3	216.3	-284.7	251	1.90	Horizontal

802.11n 20 MHz Bandwidth, 2412 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

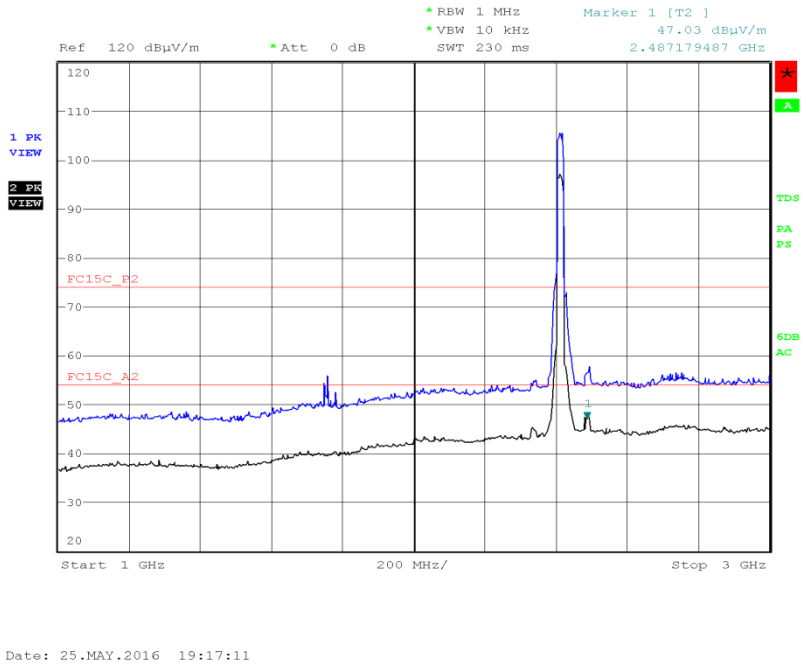


802.11n 20 MHz Bandwidth, 2412 MHz, MCS7, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

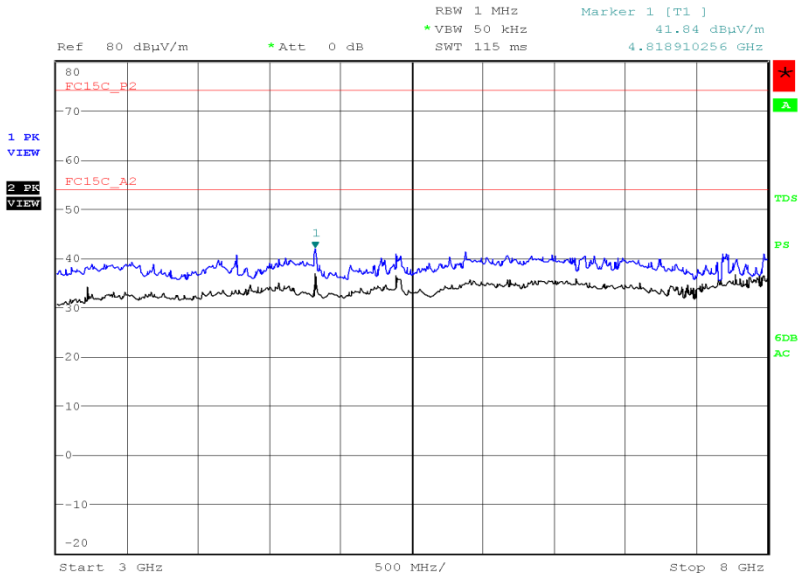
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 6 dB of the limit.

802.11n 20 MHz Bandwidth, 2412 MHz, MCS7, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

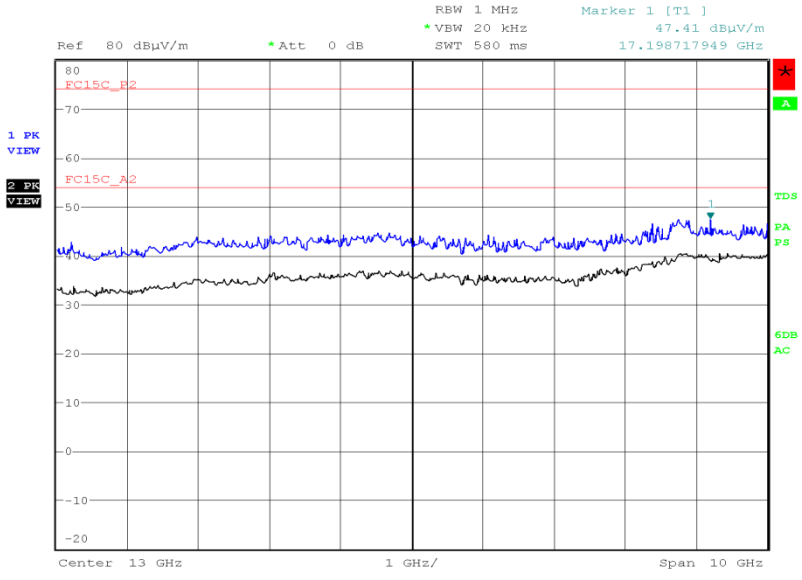


802.11n 20 MHz Bandwidth, 2412 MHz, MCS7, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



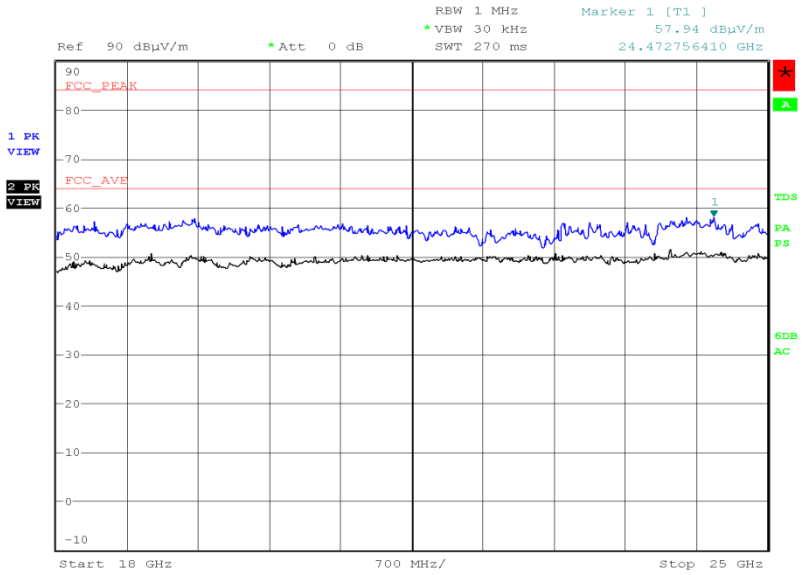
Date: 26.MAY.2016 10:46:17

802.11n 20 MHz Bandwidth, 2412 MHz, MCS7, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.MAY.2016 08:05:18

802.11n 20 MHz Bandwidth, 2412 MHz, MCS7, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

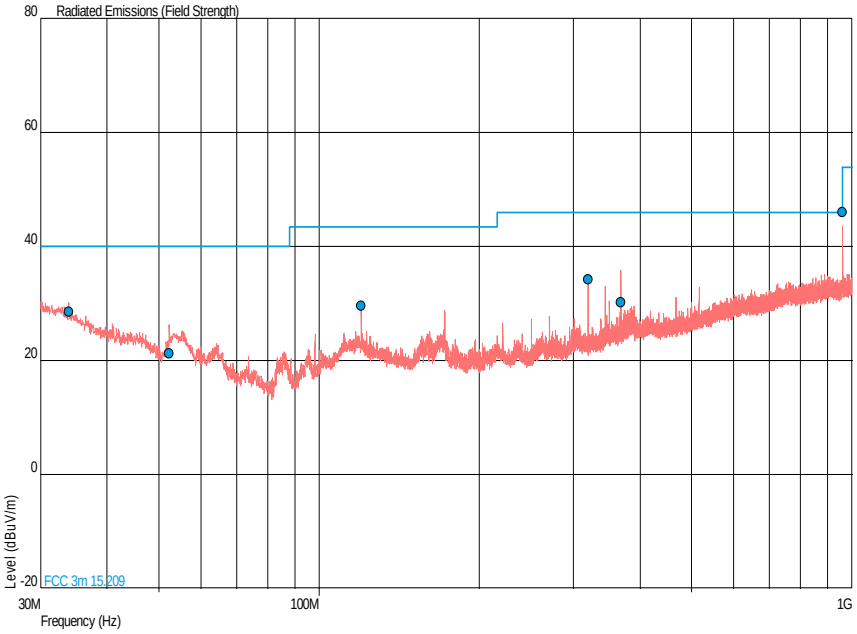


Date: 24.MAY.2016 07:20:45

802.11n 20 MHz Bandwidth, 2437 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
33.880	28.6	-11.4	26.9	-73.1	360	1.00	Vertical
52.357	21.3	-18.7	11.6	-88.4	271	1.00	Vertical
119.998	29.6	-13.9	30.2	-119.8	346	1.00	Vertical
319.499	34.3	-11.7	51.9	-148.1	317	1.08	Horizontal
368.638	30.2	-15.8	32.4	-167.6	281	1.00	Horizontal
960.003	46.0	-8.0	199.5	-301.5	239	1.89	Horizontal

802.11n 20 MHz Bandwidth, 2437 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

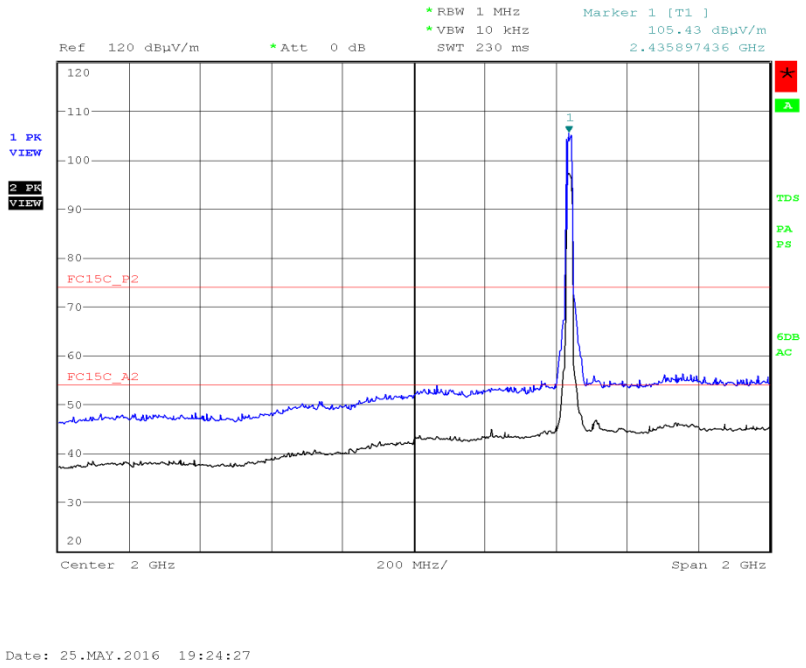


802.11n 20 MHz Bandwidth, 2437 MHz, MCS7, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

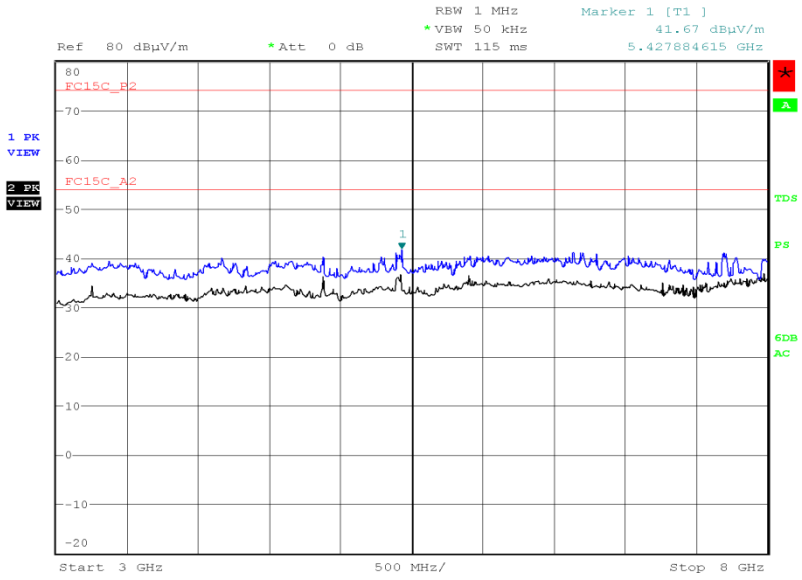
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 6 dB of the limit.

802.11n 20 MHz Bandwidth, 2437 MHz, MCS7, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

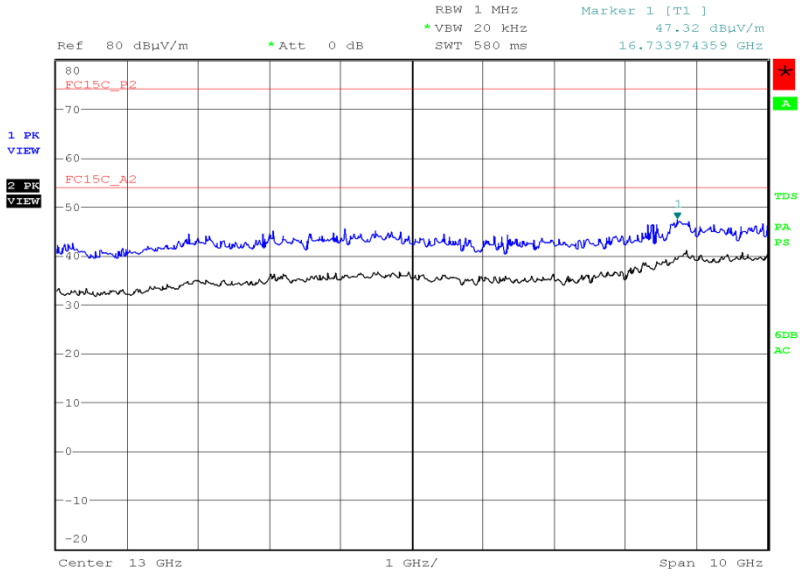


802.11n 20 MHz Bandwidth, 2437 MHz, MCS7, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



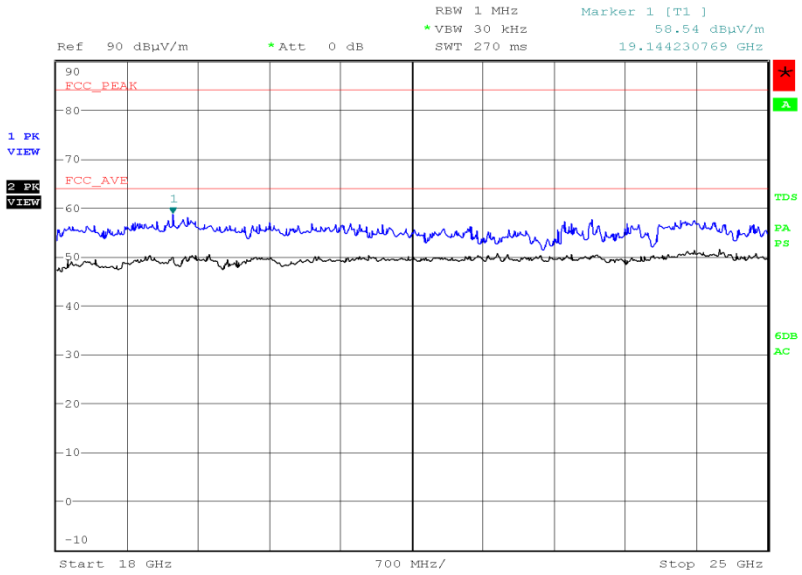
Date: 26.MAY.2016 10:57:21

802.11n 20 MHz Bandwidth, 2437 MHz, MCS7, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.MAY.2016 08:09:47

802.11n 20 MHz Bandwidth, 2437 MHz, MCS7, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



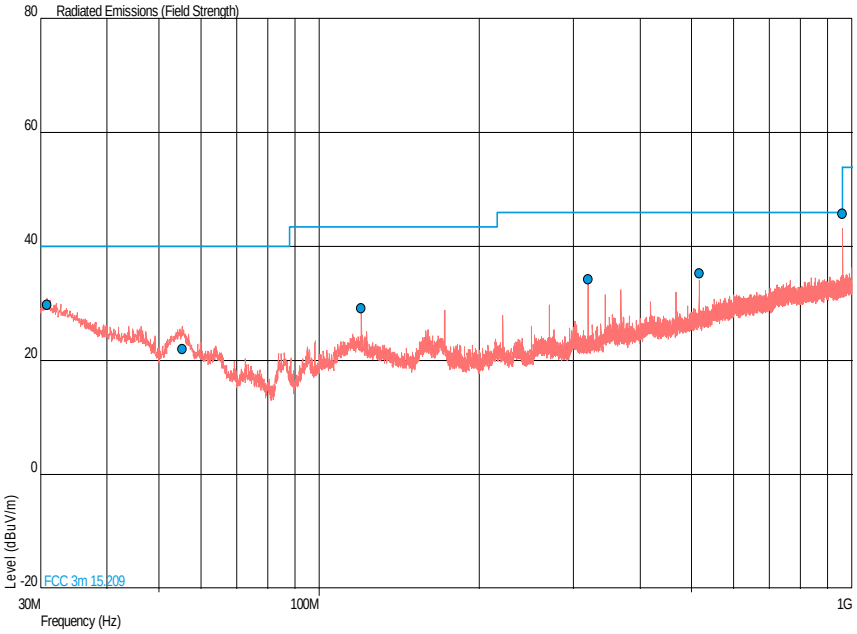
Date: 24.MAY.2016 07:26:18

Product Service

802.11n 20 MHz Bandwidth, 2462 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.829	29.7	-10.3	30.5	-69.5	360	2.69	Vertical
55.326	22.0	-18.0	12.6	-87.4	34	1.00	Vertical
119.983	29.1	-14.4	28.5	-121.5	335	1.00	Vertical
319.474	34.3	-11.7	51.9	-148.1	312	1.00	Horizontal
516.084	35.3	-10.7	58.2	-141.8	60	1.00	Vertical
960.018	45.8	-8.2	195.0	-306.0	279	1.99	Horizontal

802.11n 20 MHz Bandwidth, 2462 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

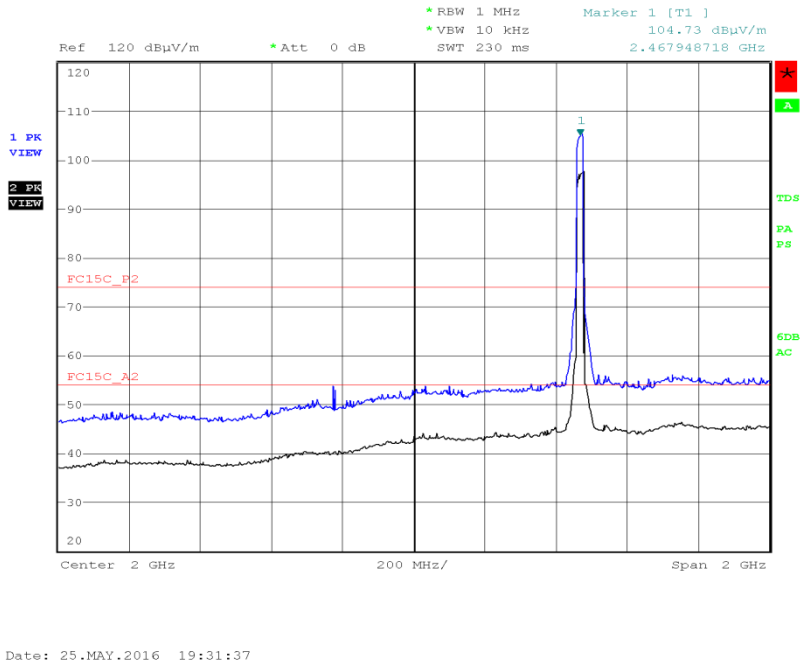


802.11n 20 MHz Bandwidth, 2462 MHz, MCS7, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

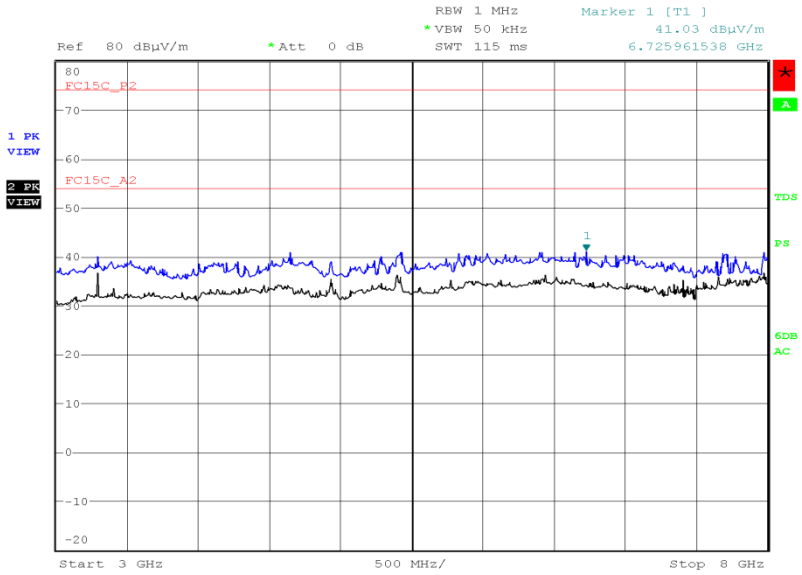
*No emissions were detected within 6 dB of the limit.

802.11n 20 MHz Bandwidth, 2462 MHz, MCS7, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



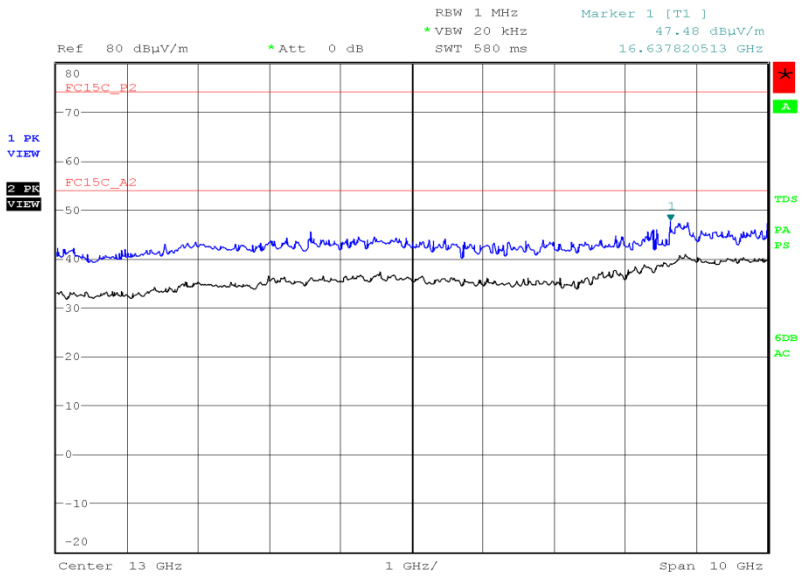
Product Service

802.11n 20 MHz Bandwidth, 2462 MHz, MCS7, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



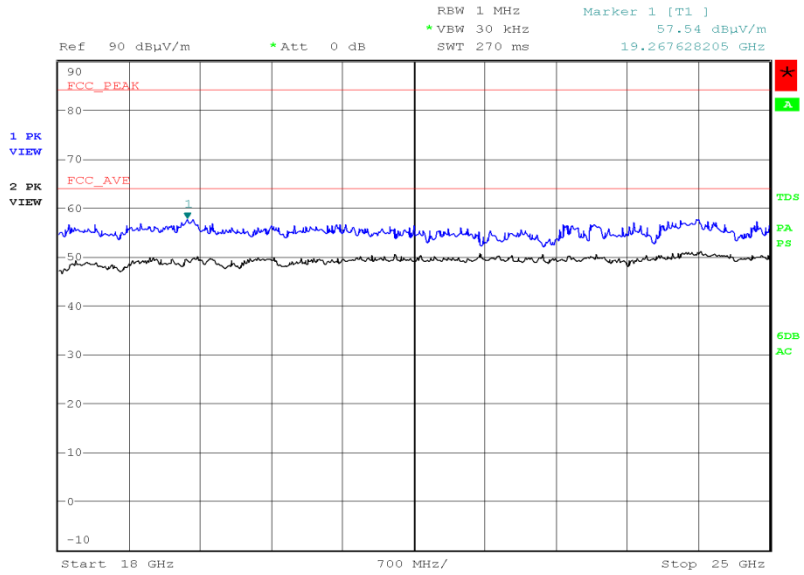
Date: 26.MAY.2016 11:17:52

802.11n 20 MHz Bandwidth, 2462 MHz, MCS7, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.MAY.2016 08:14:42

802.11n 20 MHz Bandwidth, 2462 MHz, MCS7, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	As per 15.209	As per 15.209

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Industry Canada RSS-247, Limit Clause, 5.5

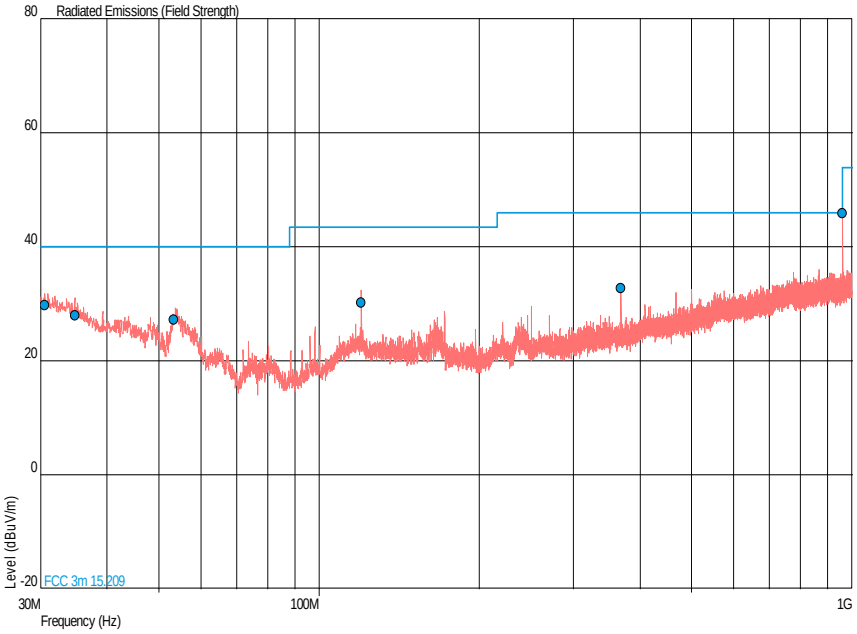
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

5.00 V DC Supply

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2412 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.590	29.7	-10.3	30.5	-69.5	281	1.00	Vertical
34.803	28.0	-12.0	25.1	-74.9	195	1.00	Horizontal
53.353	27.3	-12.7	23.2	-76.8	343	1.00	Vertical
120.010	30.2	-13.3	32.4	-117.6	275	1.00	Vertical
368.633	32.7	-13.3	43.2	-156.8	26	1.50	Vertical
960.021	45.9	-8.1	197.2	-303.8	314	1.00	Horizontal

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2412 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

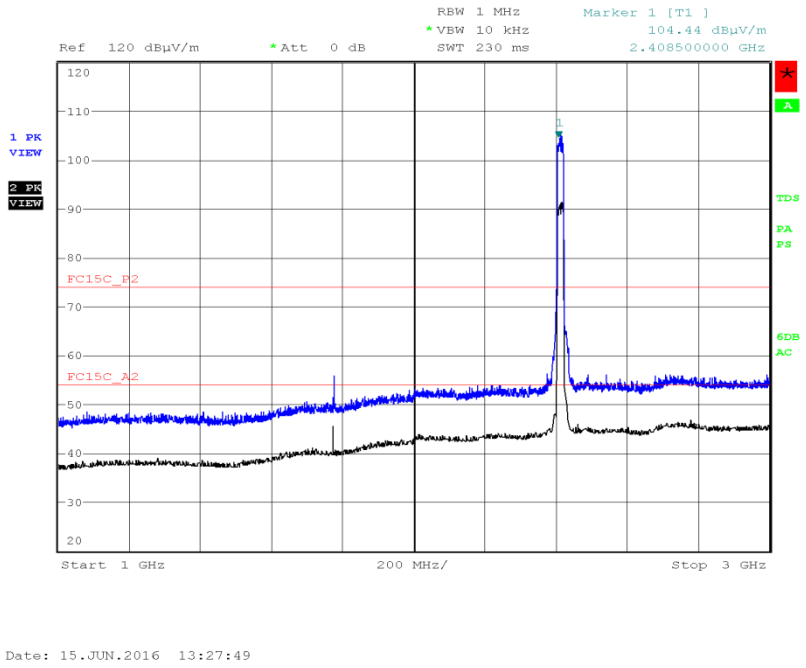


802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2412 MHz, MCS7, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

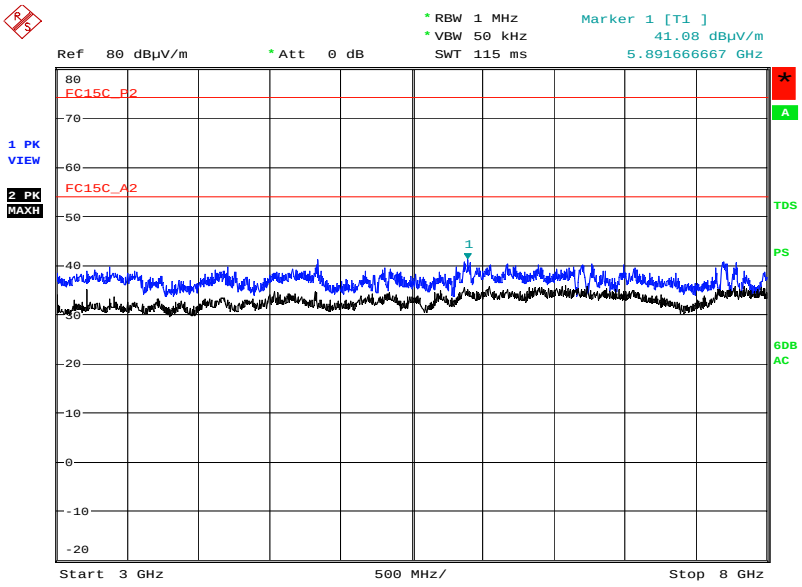
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 10 dB of the limit.

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2412 MHz, MCS7, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

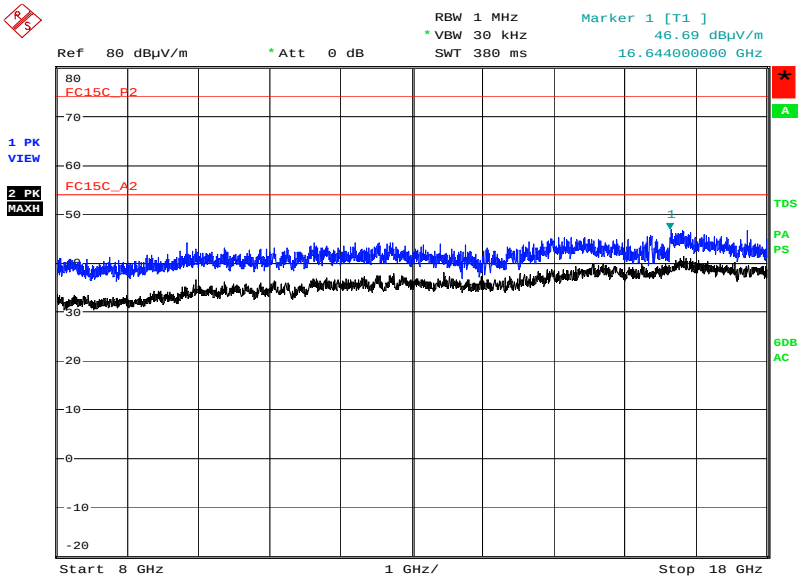


802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2412 MHz, MCS7, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



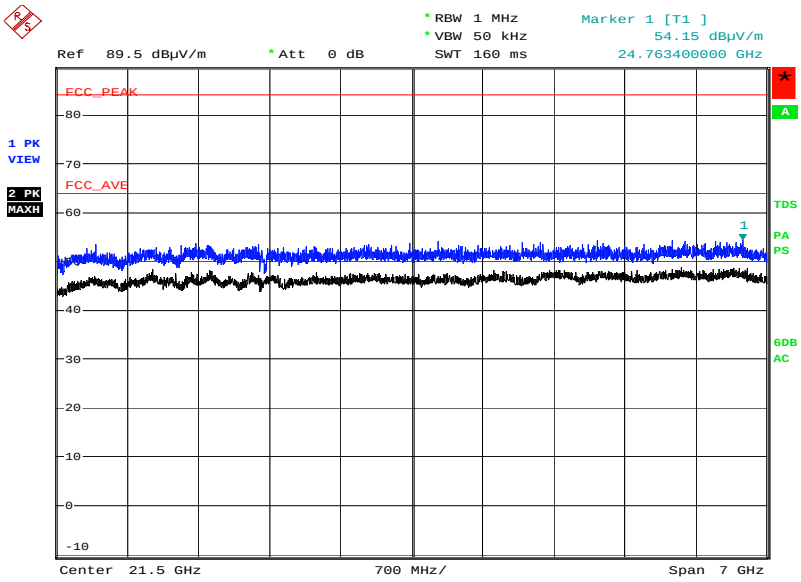
Date: 6.JUL.2016 21:55:12

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2412 MHz, MCS7, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 29.JUN.2016 21:08:06

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2412 MHz, MCS7, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

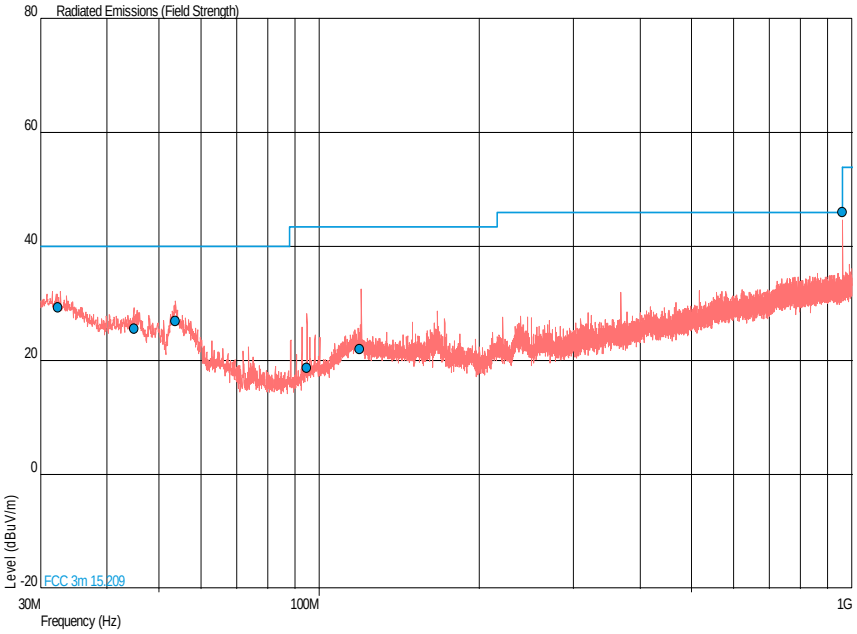


Date: 3.JUL.2016 13:57:44

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2437 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
32.382	29.4	-10.6	29.5	-70.5	86	2.99	Horizontal
44.932	25.6	-14.4	19.1	-80.9	125	1.00	Vertical
53.681	26.9	-13.1	22.1	-77.9	360	1.00	Vertical
94.858	18.7	-24.8	8.6	-141.4	295	1.00	Vertical
118.906	22.0	-21.5	12.6	-137.4	348	1.77	Vertical
960.003	46.1	-7.9	201.8	-299.2	306	1.00	Horizontal

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2437 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

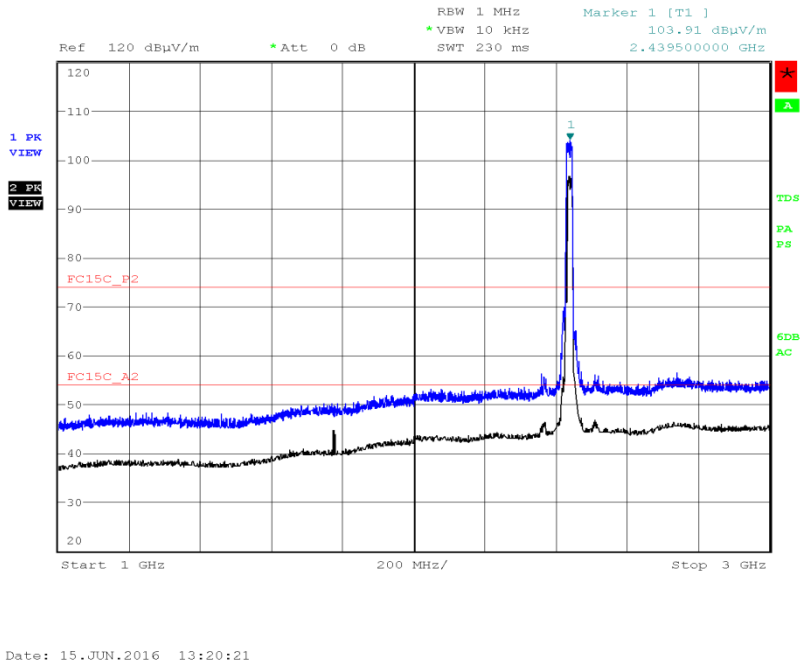


802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2437 MHz, MCS7, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

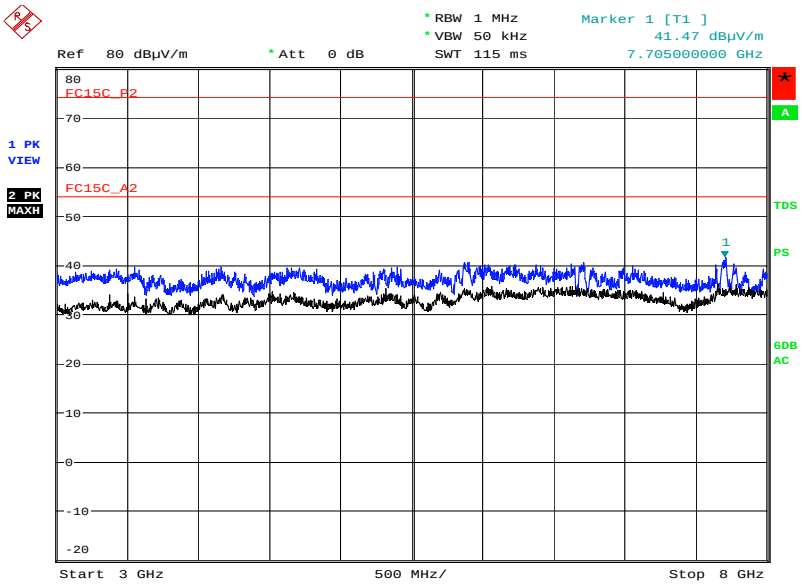
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 10 dB of the limit.

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2437 MHz, MCS7, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

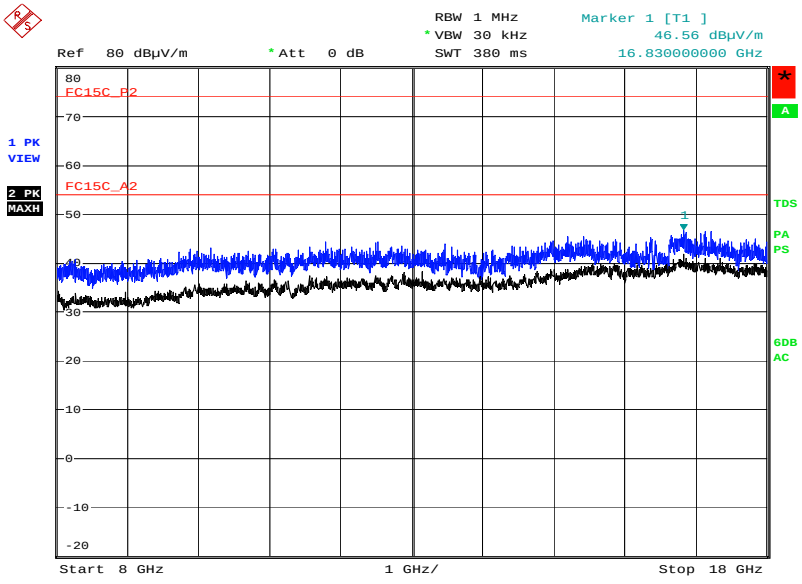


802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2437 MHz, MCS7, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 6.JUL.2016 22:07:39

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2437 MHz, MCS7, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



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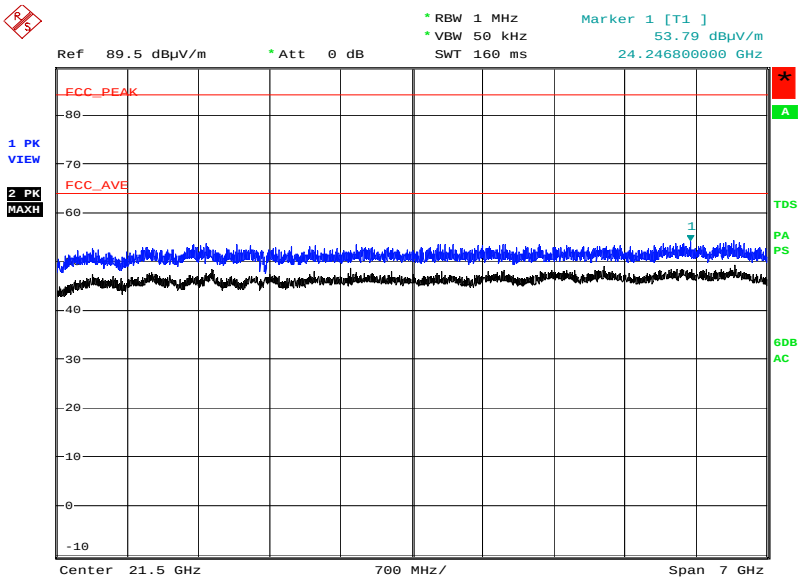
802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2437 MHz, MCS7, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

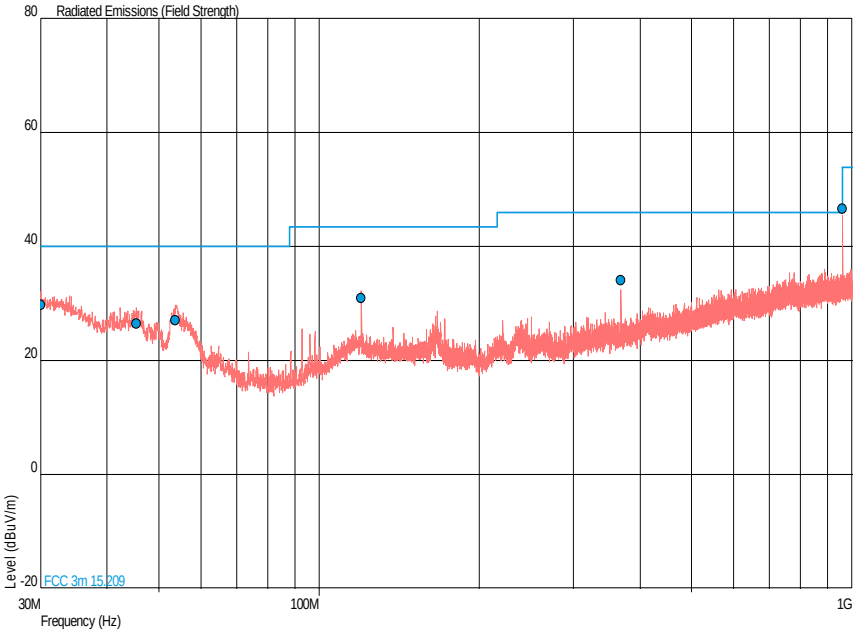


Date: 3.JUL.2016 14:00:31

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2462 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.045	29.8	-10.2	30.9	-69.1	360	1.00	Vertical
45.368	26.4	-13.6	20.9	-79.1	174	1.00	Vertical
53.657	27.0	-13.0	22.4	-77.6	359	1.00	Vertical
120.010	31.0	-12.5	35.5	-114.5	296	1.00	Vertical
368.645	34.1	-11.9	50.7	-149.3	0	1.59	Vertical
960.005	46.6	-7.4	213.8	-287.2	314	1.97	Horizontal

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2462 MHz, MCS7, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

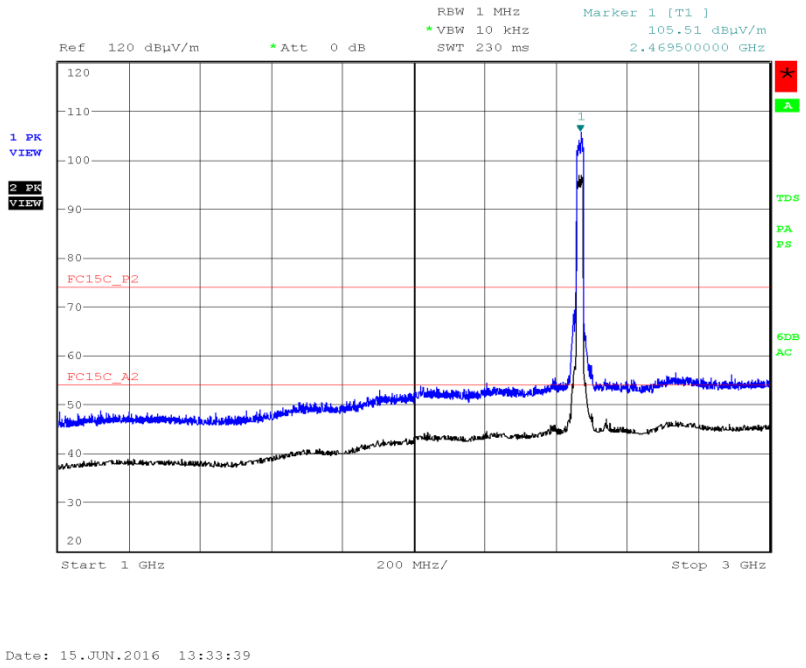


802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2462 MHz, MCS7, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

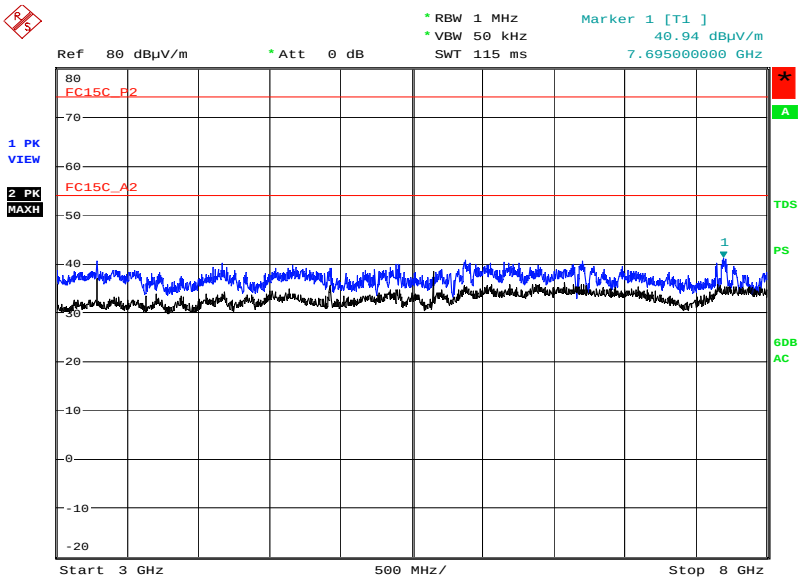
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

*No emissions were detected within 10 dB of the limit.

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2462 MHz, MCS7, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot

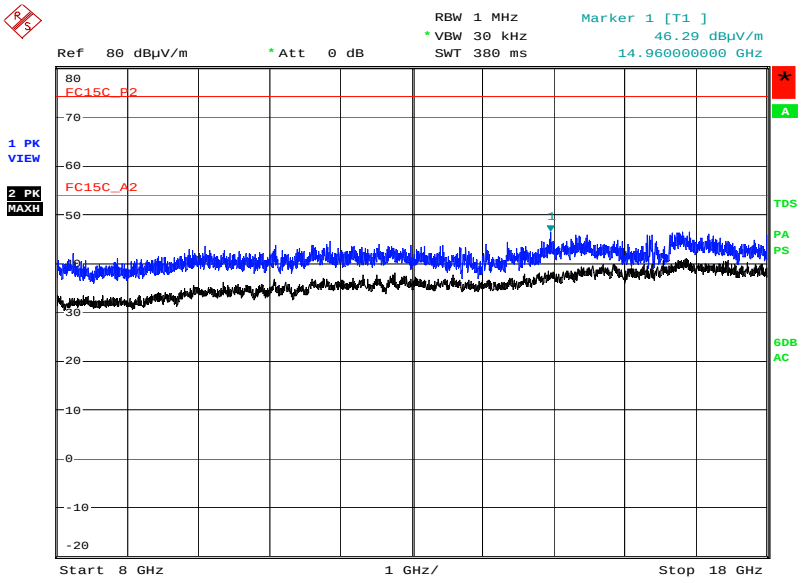


802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2462 MHz, MCS7, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



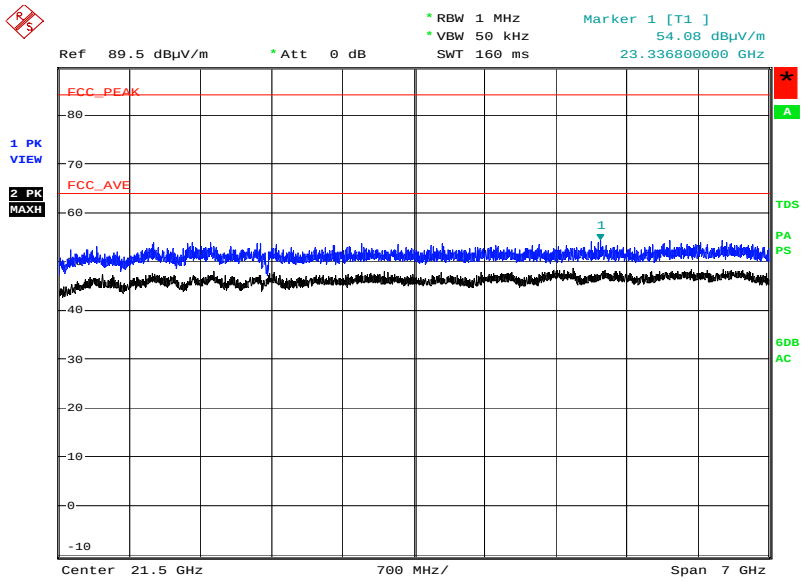
Date: 6.JUL.2016 22:14:53

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2462 MHz, MCS7, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 29.JUN.2016 21:26:41

802.11n 20 MHz Bandwidth (2nd Diversity Antenna), 2462 MHz, MCS7, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



Date: 3.JUL.2016 14:03:14

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	As per 15.209	As per 15.209

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Product Service

Industry Canada RSS-247, Limit Clause, 5.5

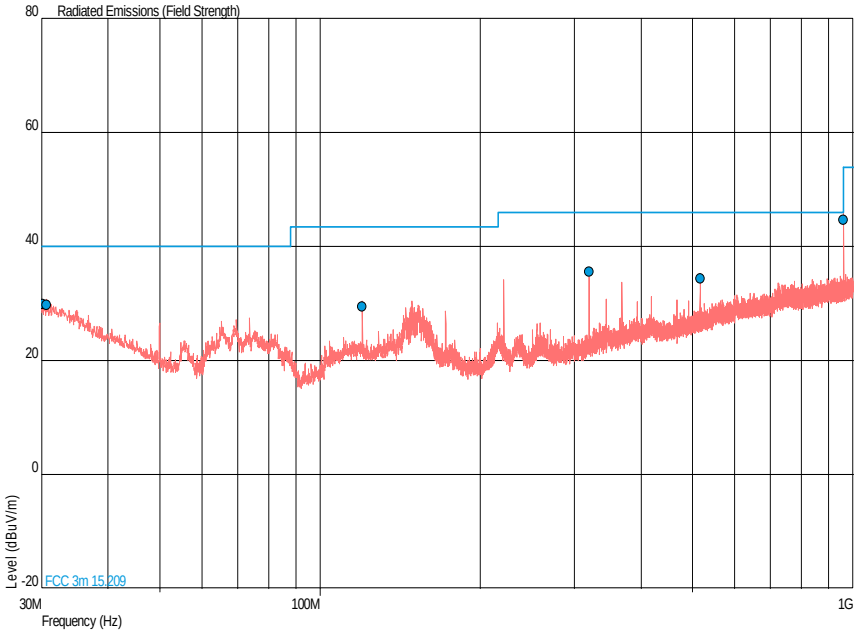
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

5.00 V DC Supply

Bluetooth Low Energy, 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.198	29.9	-10.1	30.9	-69.1	358	2.11	Horizontal
30.691	29.7	-10.3	20.9	-79.1	348	1.00	Horizontal
120.000	29.5	-14.0	22.4	-127.6	298	1.00	Vertical
319.484	35.6	-10.4	35.5	-164.5	53	1.00	Horizontal
516.114	34.4	-11.6	50.7	-149.3	169	1.00	Vertical
960.000	44.7	-1.3	213.8	13.8	27	1.00	Horizontal

Bluetooth Low Energy, 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

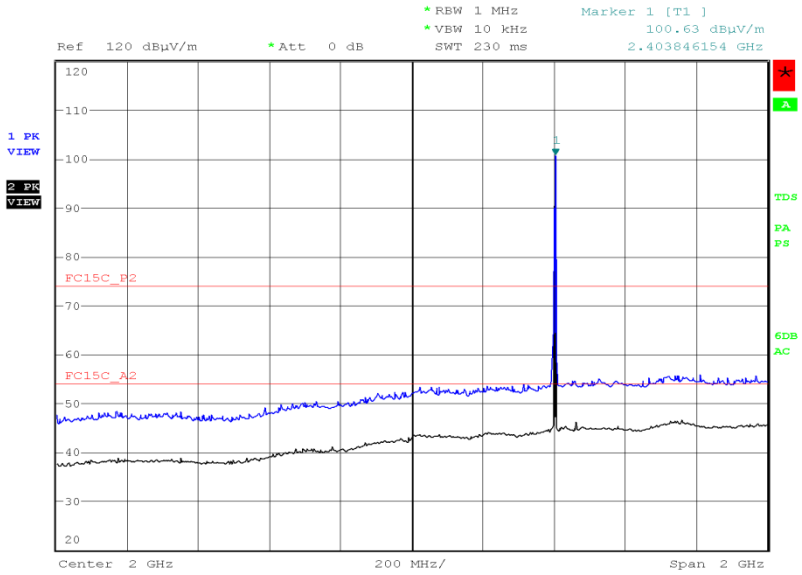


Bluetooth Low Energy, 2402 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

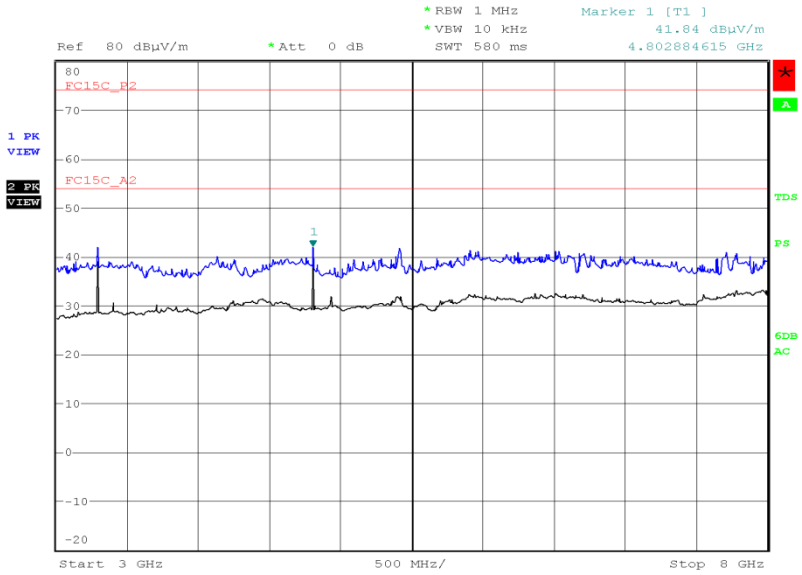
*No emissions were detected within 6 dB of the limit.

Bluetooth Low Energy, 2402 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



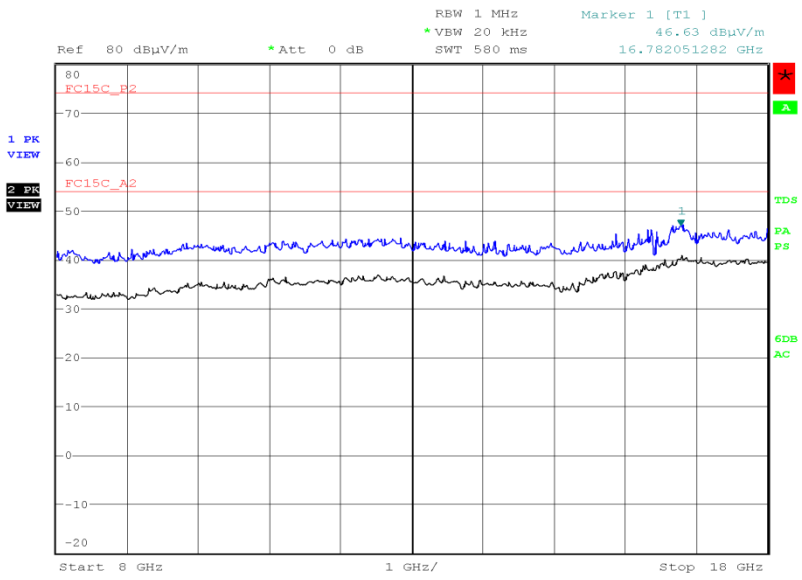
Product Service

Bluetooth Low Energy, 2402 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 25.MAY.2016 20:37:43

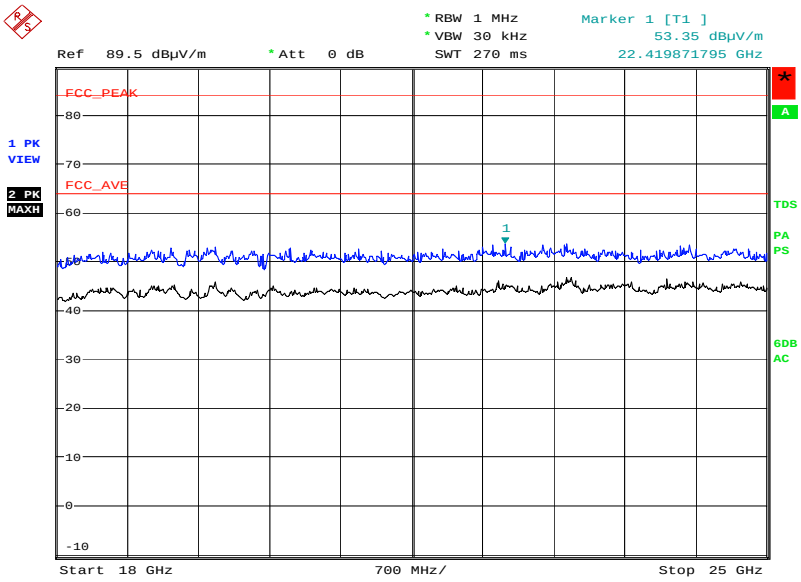
Bluetooth Low Energy, 2402 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.MAY.2016 08:37:32

Product Service

Bluetooth Low Energy, 2402 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

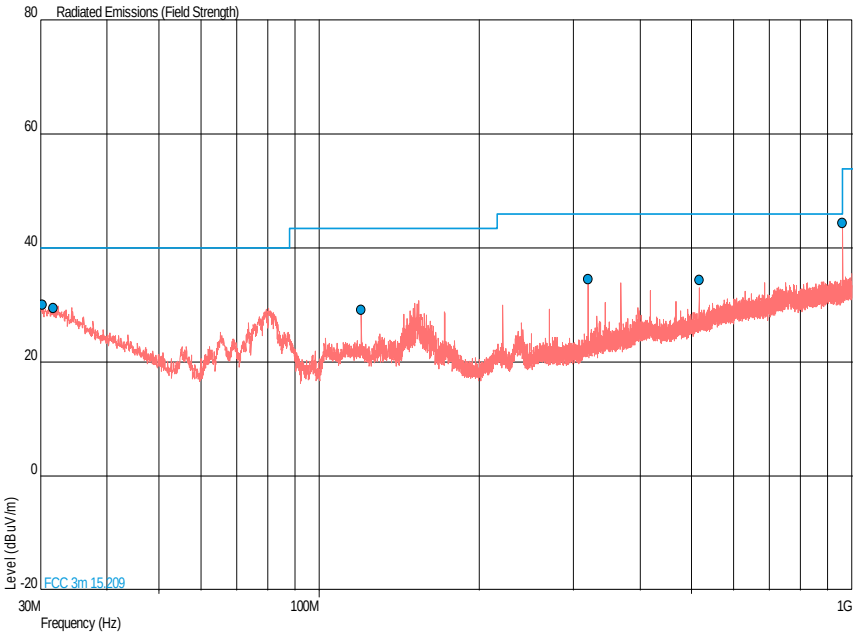


Date: 10.JUL.2016 23:15:48

Bluetooth Low Energy, 2440 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.212	30.0	-10.0	31.6	-68.4	207	2.58	Vertical
31.722	29.5	-10.5	29.9	-70.1	26	3.60	Horizontal
119.994	29.2	-14.3	28.8	-121.2	360	1.00	Vertical
319.487	34.6	-11.4	53.7	-146.3	210	1.00	Horizontal
516.093	34.4	-11.6	52.5	-147.5	130	1.16	Vertical
960.000	44.3	-1.7	164.1	-35.9	132	1.48	Horizontal

Bluetooth Low Energy, 2440 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

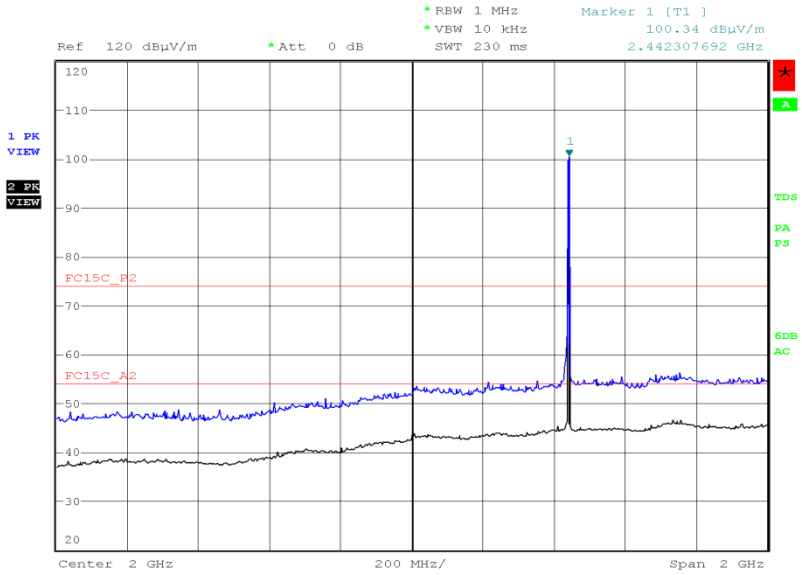


Bluetooth Low Energy, 2440 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

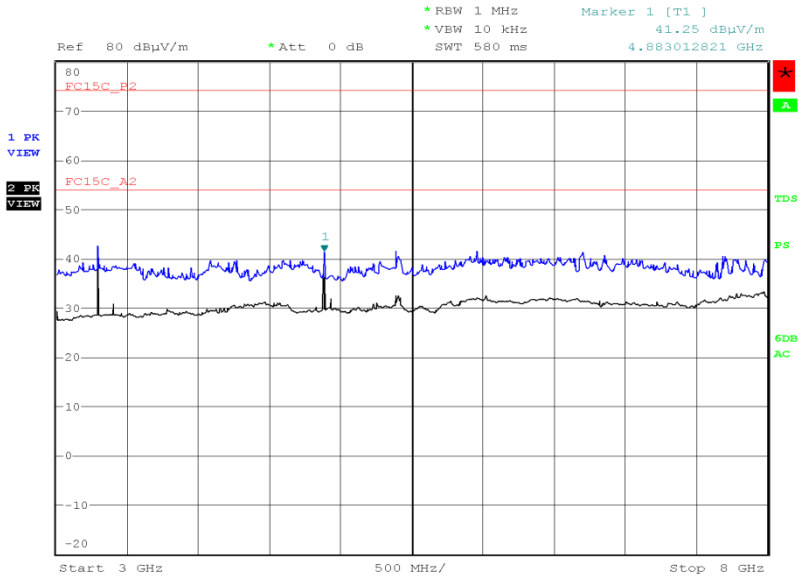
*No emissions were detected within 6 dB of the limit.

Bluetooth Low Energy, 2440 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



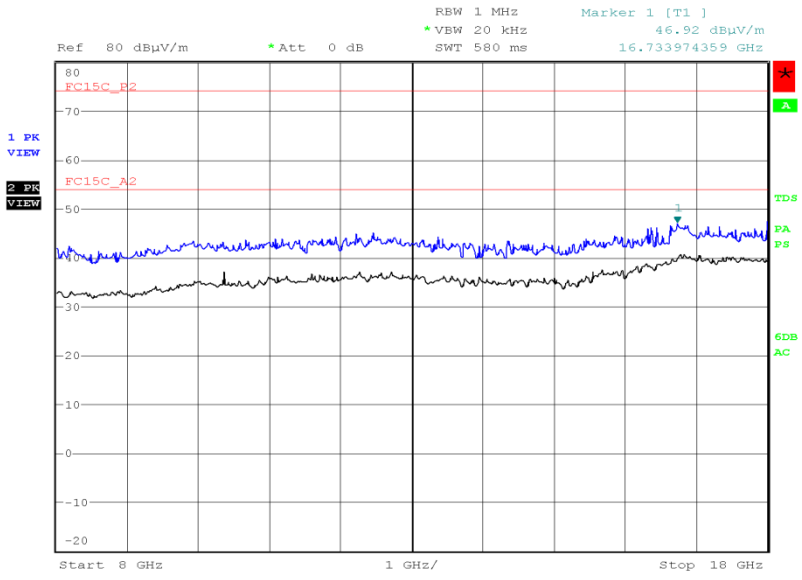
Product Service

Bluetooth Low Energy, 2440 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 25.MAY.2016 20:42:39

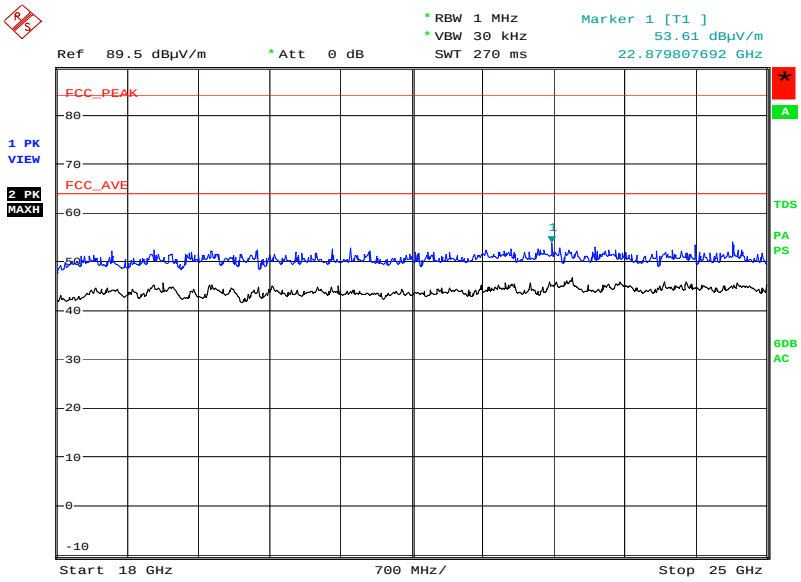
Bluetooth Low Energy, 2440 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.MAY.2016 08:41:59

Product Service

Bluetooth Low Energy, 2440 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



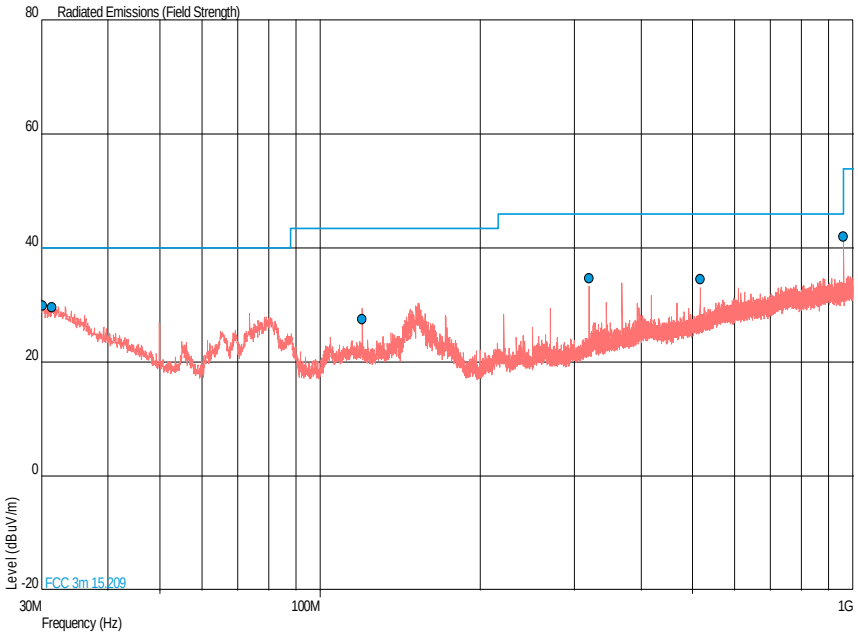
Date: 10.JUL.2016 23:20:20

Product Service

Bluetooth Low Energy, 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.105	29.9	-10.1	31.3	-68.7	49	1.00	Horizontal
31.358	29.7	-10.3	30.5	-69.5	350	1.00	Horizontal
120.000	27.5	-16.0	23.7	-126.3	6	1.00	Vertical
319.484	34.8	-11.2	55.0	-145.0	208	1.00	Horizontal
516.084	34.5	-11.5	53.1	-146.9	286	1.00	Vertical
960.000	42.0	-4.0	125.9	-74.1	23	1.00	Horizontal

Bluetooth Low Energy, 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

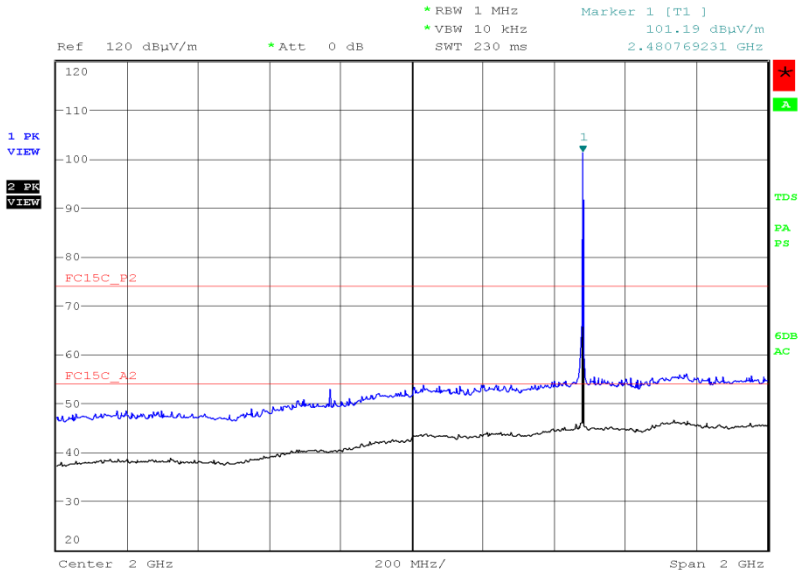


Bluetooth Low Energy, 2480 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

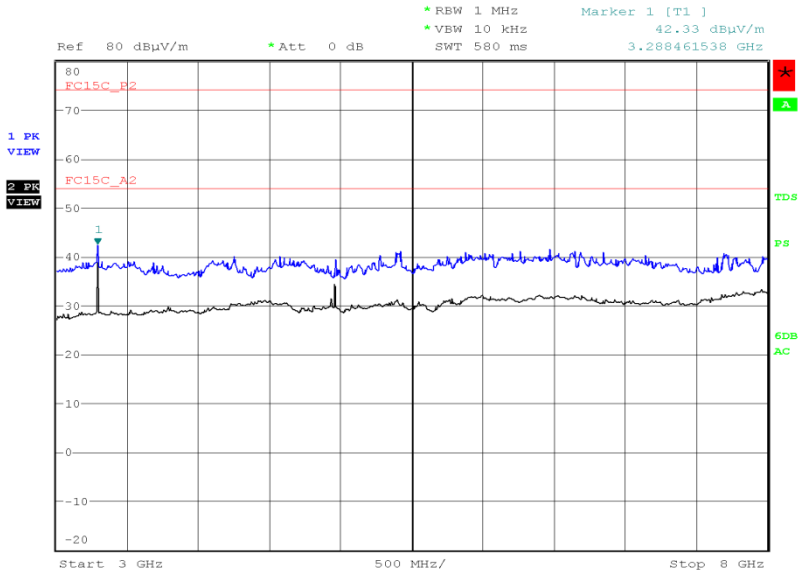
*No emissions were detected within 6 dB of the limit.

Bluetooth Low Energy, 2480 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



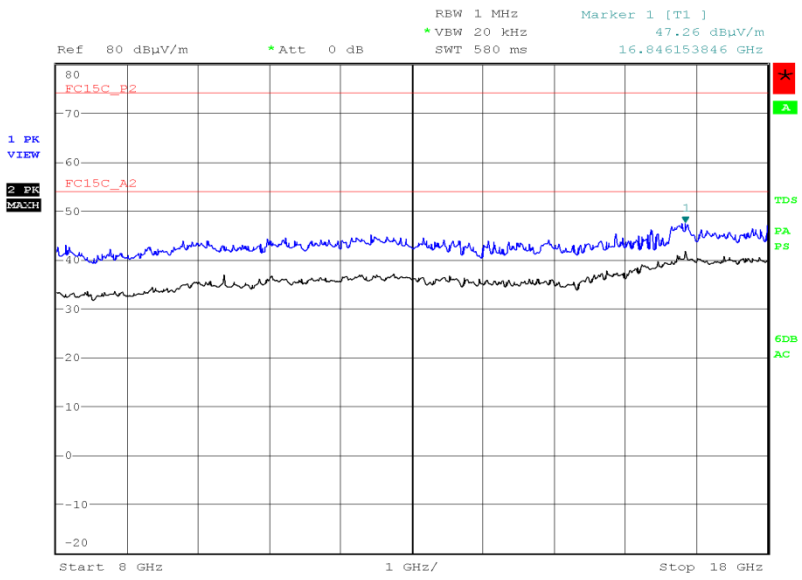
Product Service

Bluetooth Low Energy, 2480 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 25.MAY.2016 20:30:31

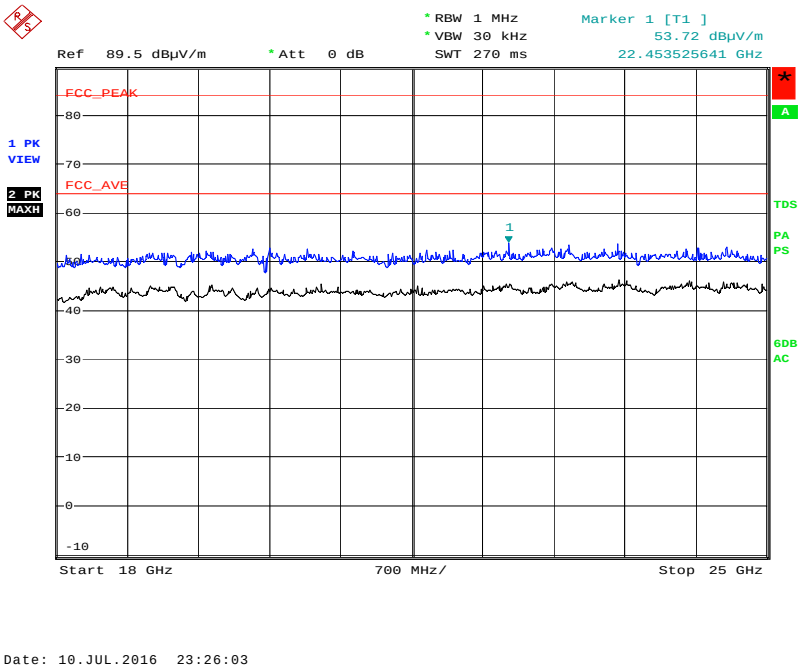
Bluetooth Low Energy, 2480 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 26.MAY.2016 08:55:38

Product Service

Bluetooth Low Energy, 2480 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	As per 15.209	As per 15.209

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Product Service

Industry Canada RSS-247, Limit Clause, 5.5

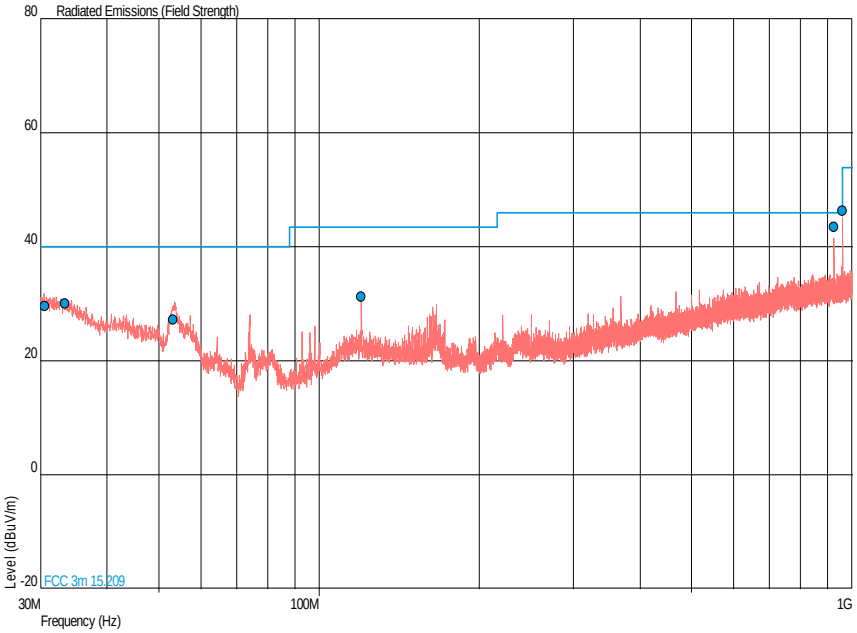
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

5.00 V DC Supply

Bluetooth Low Energy (2nd Diversity Antenna), 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.530	29.7	-10.3	31.3	-68.7	24	1.00	Vertical
33.360	30.1	-9.9	30.5	-69.5	360	2.18	Vertical
53.137	27.2	-12.8	23.7	-76.3	347	1.08	Vertical
120.006	31.3	-12.2	55.0	-95.0	309	1.00	Vertical
923.463	43.5	-2.5	53.1	-146.9	334	2.48	Horizontal
960.018	46.3	-7.7	125.9	-375.1	305	2.00	Horizontal

Bluetooth Low Energy (2nd Diversity Antenna), 2402 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

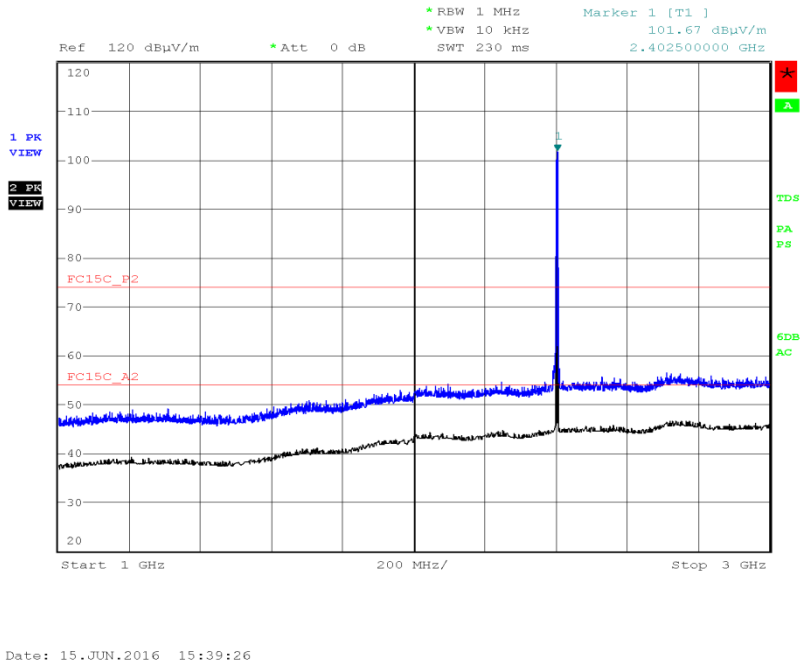


Bluetooth Low Energy (2nd Diversity Antenna), 2402 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

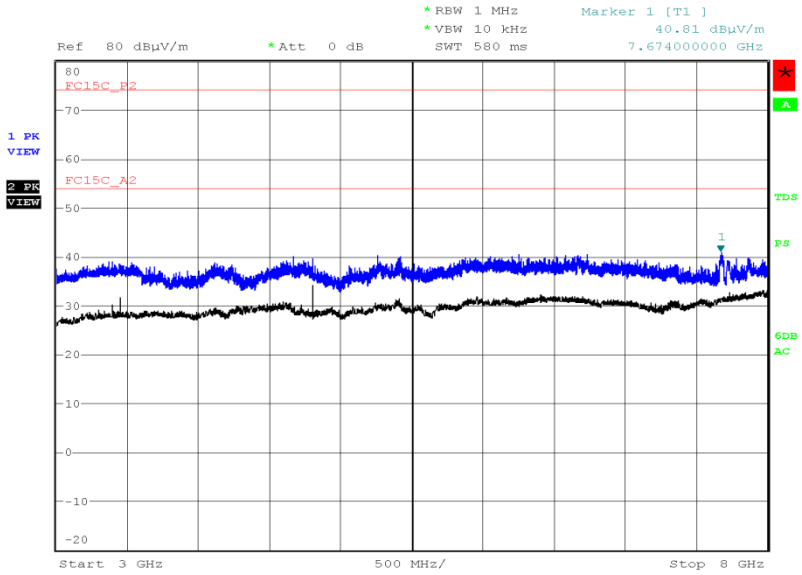
*No emissions were detected within 10 dB of the limit.

Bluetooth Low Energy (2nd Diversity Antenna), 2402 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



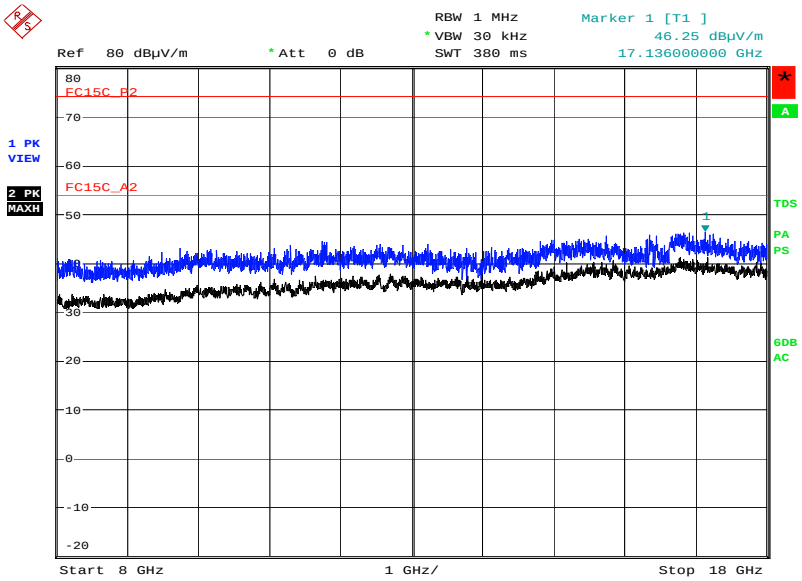
Product Service

Bluetooth Low Energy (2nd Diversity Antenna), 2402 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.JUN.2016 10:32:27

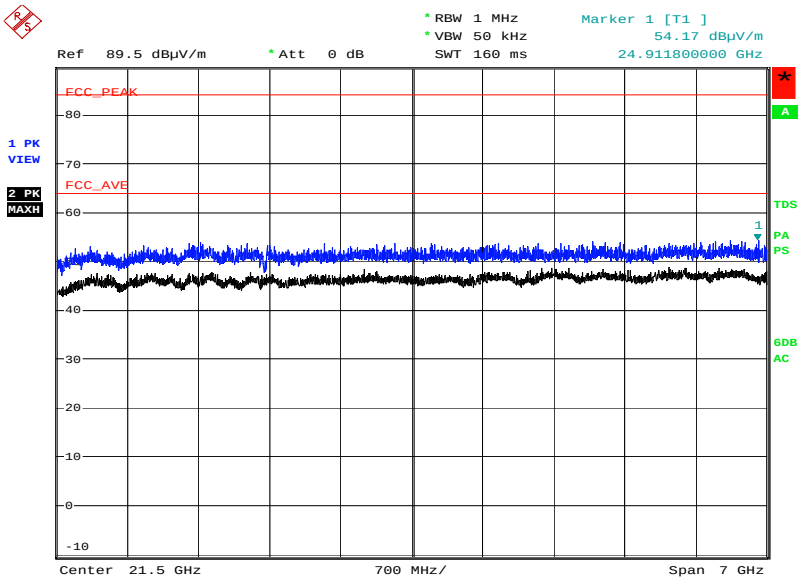
Bluetooth Low Energy (2nd Diversity Antenna), 2402 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 29.JUN.2016 22:10:42

Product Service

Bluetooth Low Energy (2nd Diversity Antenna), 2402 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

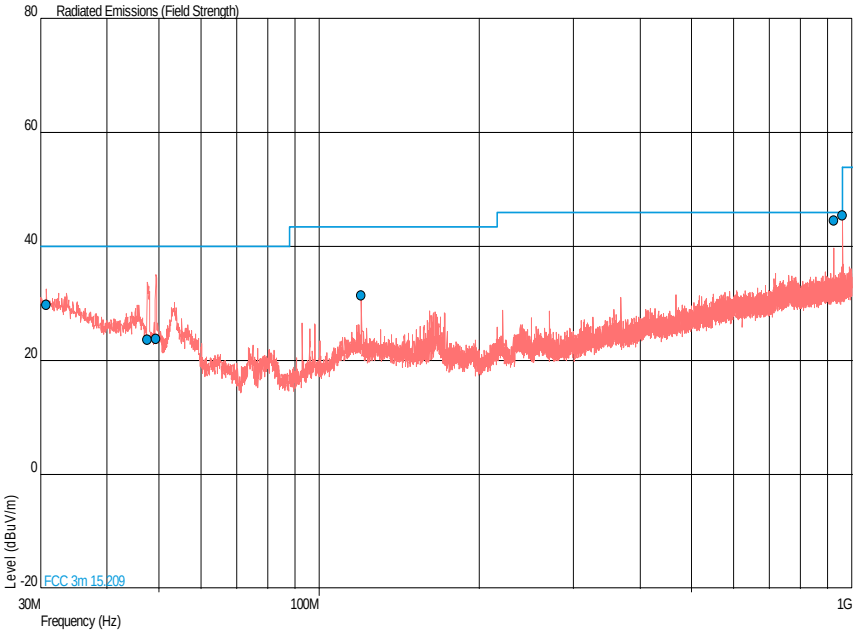


Date: 3.JUL.2016 14:50:46

Bluetooth Low Energy (2nd Diversity Antenna), 2440 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.773	29.7	-10.3	30.5	-69.5	360	1.00	Vertical
47.609	23.7	-16.3	15.3	-84.7	150	1.00	Vertical
49.402	23.8	-16.2	15.5	-84.5	297	1.00	Vertical
119.998	31.4	-12.1	37.2	-112.8	305	1.00	Vertical
923.429	44.6	-1.4	169.8	-30.2	0	2.50	Horizontal
960.018	45.5	-8.5	188.4	-312.6	312	1.00	Horizontal

Bluetooth Low Energy (2nd Diversity Antenna), 2440 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

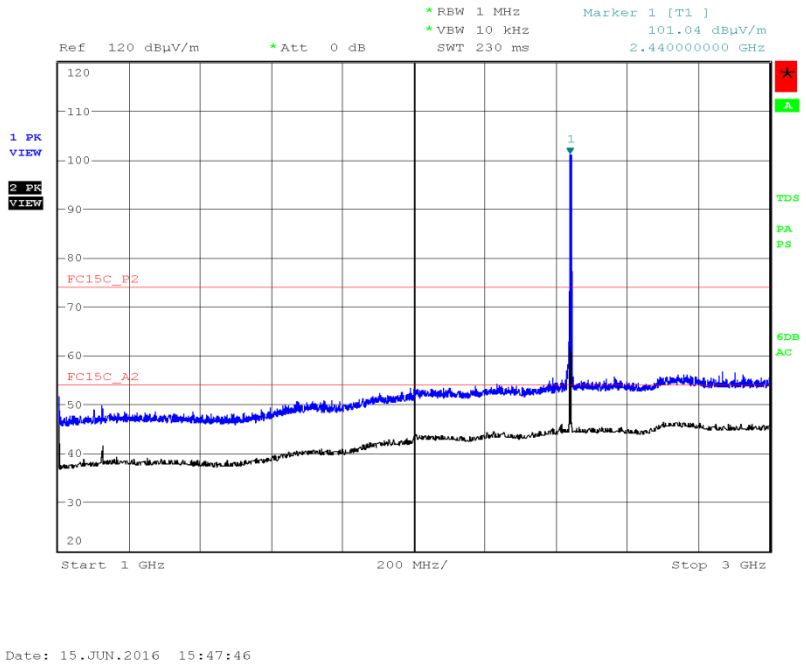


Bluetooth Low Energy (2nd Diversity Antenna), 2440 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

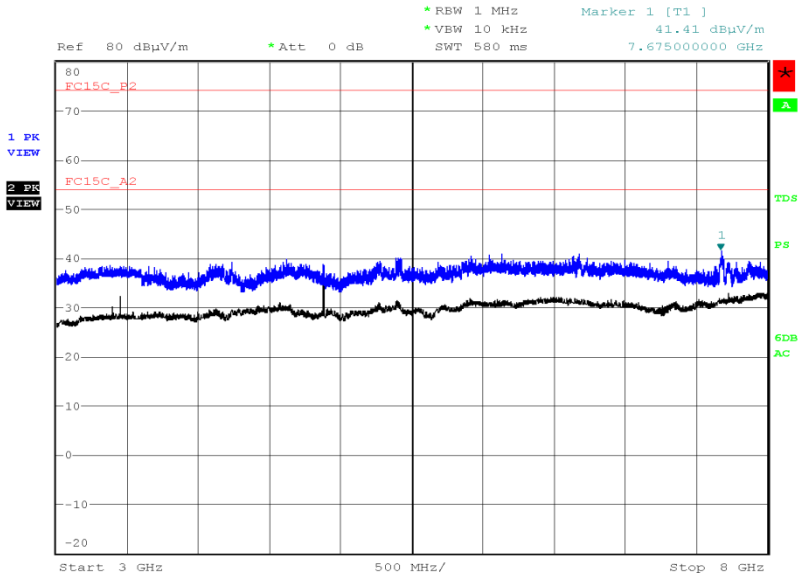
*No emissions were detected within 10 dB of the limit.

Bluetooth Low Energy (2nd Diversity Antenna), 2440 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



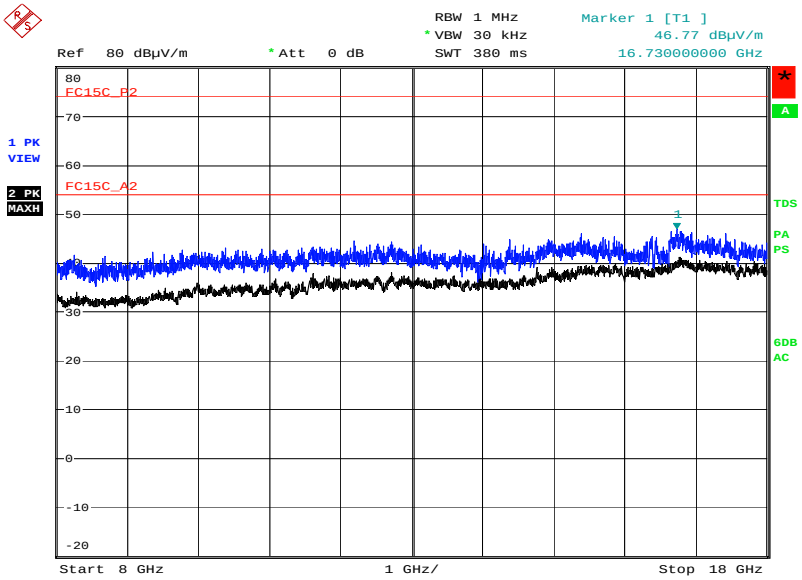
Product Service

Bluetooth Low Energy (2nd Diversity Antenna), 2440 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



Date: 17.JUN.2016 10:41:09

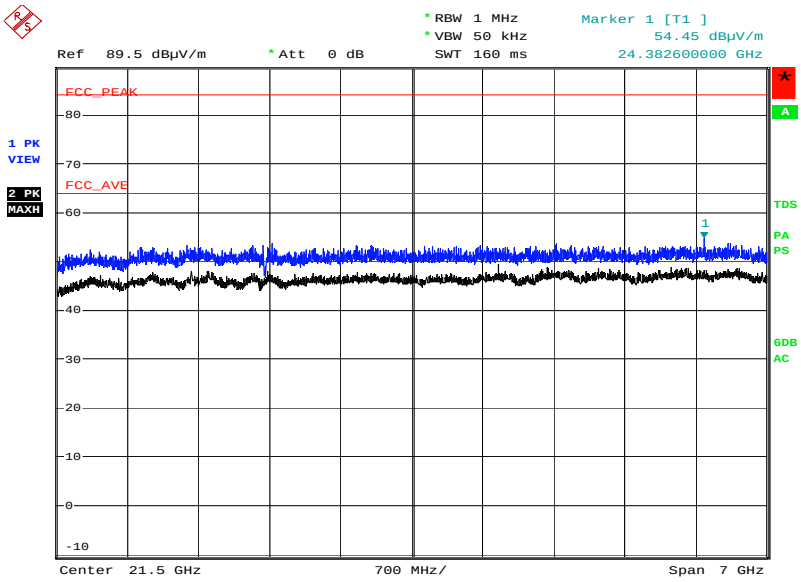
Bluetooth Low Energy (2nd Diversity Antenna), 2440 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 29.JUN.2016 22:21:52

Product Service

Bluetooth Low Energy (2nd Diversity Antenna), 2440 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot

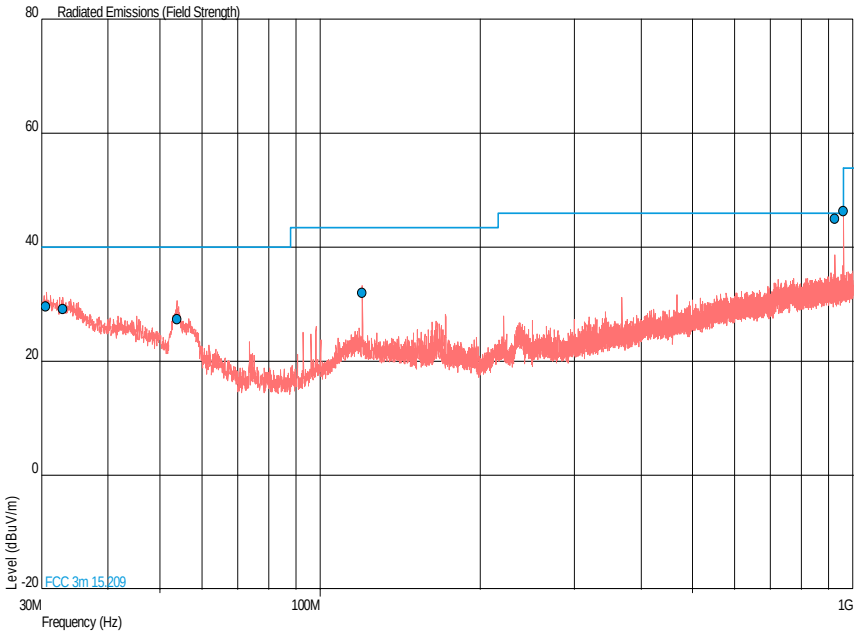


Date: 3.JUL.2016 14:55:07

Bluetooth Low Energy (2nd Diversity Antenna), 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	QP Level (dBµV/m)	QP Margin (dBµV/m)	QP Level (µV/m)	QP Margin (µV/m)	Angle (°)	Height (m)	Polarisation
30.607	29.7	-10.3	30.5	-69.5	269	1.00	Horizontal
32.910	29.2	-10.8	28.8	-71.2	37	1.00	Vertical
53.947	27.4	-12.6	23.4	-76.6	165	1.00	Vertical
120.004	32.0	-11.5	39.8	-110.2	8	2.08	Vertical
923.404	44.9	-1.1	175.8	-24.2	29	2.31	Horizontal
960.003	46.4	-7.6	208.9	-292.1	360	1.99	Horizontal

Bluetooth Low Energy (2nd Diversity Antenna), 2480 MHz, 30 MHz to 1 GHz, Spurious Radiated Emissions Plot

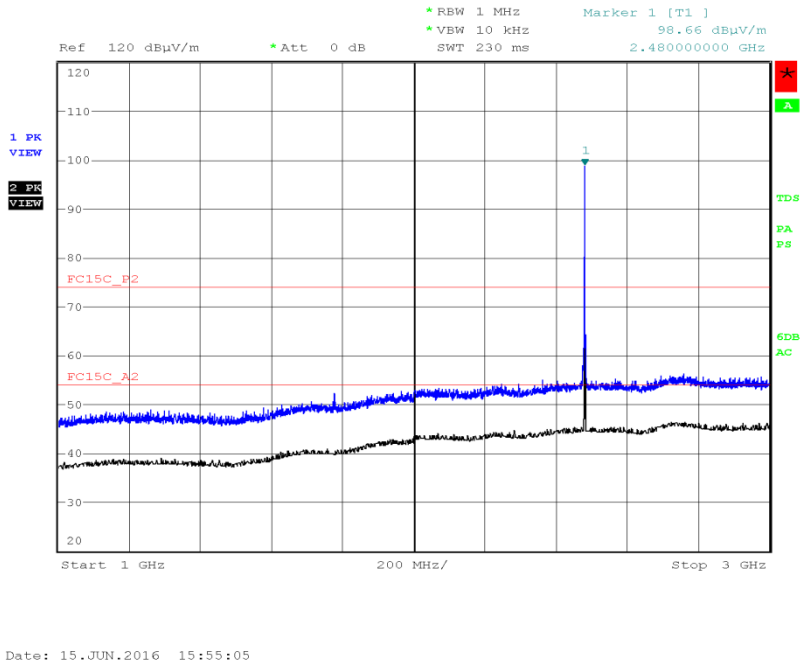


Bluetooth Low Energy (2nd Diversity Antenna), 2480 MHz, 1 GHz to 25 GHz, Spurious Radiated Emissions Results

Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)	Final Peak (µV/m)	Final Average (µV/m)	Angle (°)	Height (m)	Polarisation
*							

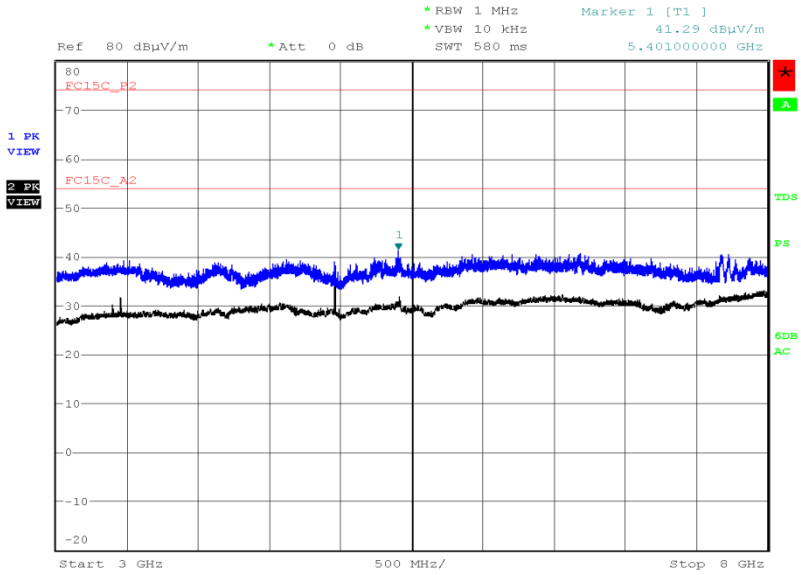
*No emissions were detected within 10 dB of the limit.

Bluetooth Low Energy (2nd Diversity Antenna), 2480 MHz, 1 GHz to 3 GHz, Spurious Radiated Emissions Plot



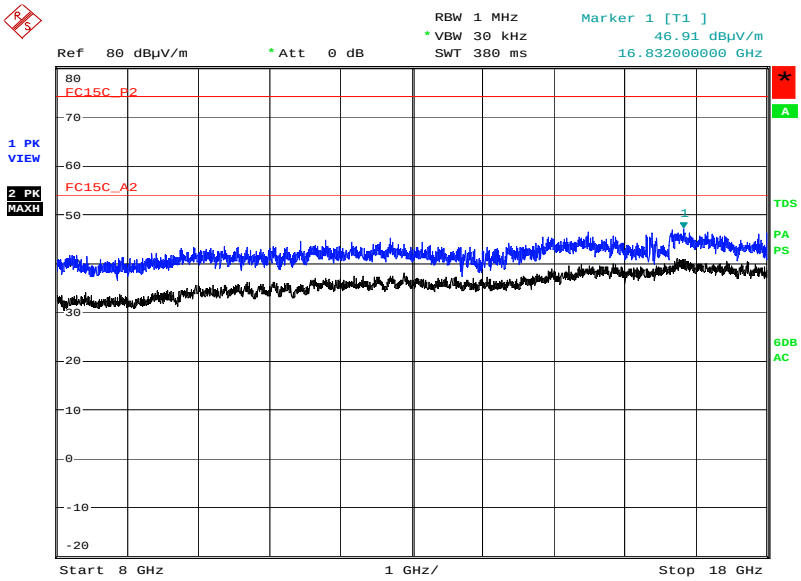
Product Service

Bluetooth Low Energy (2nd Diversity Antenna), 2480 MHz, 3 GHz to 8 GHz, Spurious Radiated Emissions Plot



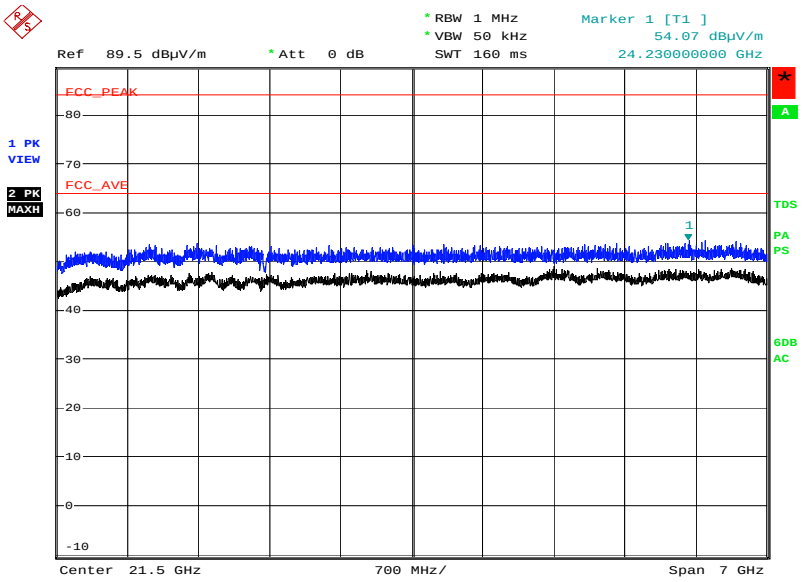
Date: 17.JUN.2016 10:50:00

Bluetooth Low Energy (2nd Diversity Antenna), 2480 MHz, 8 GHz to 18 GHz, Spurious Radiated Emissions Plot



Date: 29.JUN.2016 22:30:41

Bluetooth Low Energy (2nd Diversity Antenna), 2480 MHz, 18 GHz to 25 GHz, Spurious Radiated Emissions Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

Emissions outside the restricted bands shall be at least 20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	As per 15.209	As per 15.209

FCC 47 CFR Part 15, Limit Clause 15.209

Frequency (MHz)	Field Strength			Measurement Distance (m)
	(µV/m)	Average (dBµV/m)	Peak (dBµV/m)	
30-88	100	40.0	60.0	3
88-216	150	43.5	63.5	3
216-960	200	46.0	66.0	3
Above 960	500	54.0	74.0	3

Industry Canada RSS-247, Limit Clause, 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

Product Service

2.6 RESTRICTED BAND EDGES

2.6.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.205
Industry Canada RSS-GEN, Clause 8.10

2.6.2 Equipment Under Test and Modification State

Minuet/FS5332 S/N: RAD108624 (Module) and RAD108700 (Platform) - Modification State 0

2.6.3 Date of Test

9 May 2016 & 26 May 2016

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Test Procedure

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

Remarks

Plots for average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.3
Final average measurements were taken in accordance with ANSI C63.10, clause 4.1.4.2.2

2.6.6 Environmental Conditions

Ambient Temperature	19.7 - 20.9°C
Relative Humidity	37.0 - 40.0%

Product Service

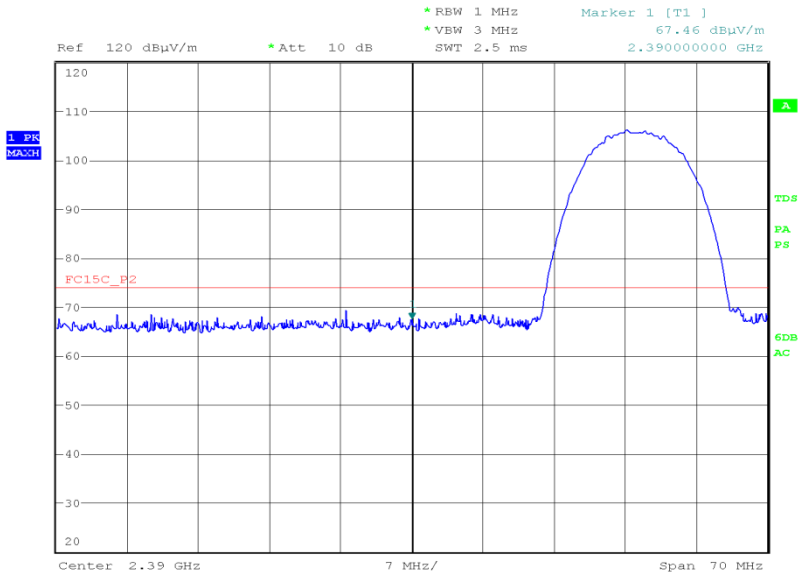
2.6.7 Test Results

5.00 V DC Supply

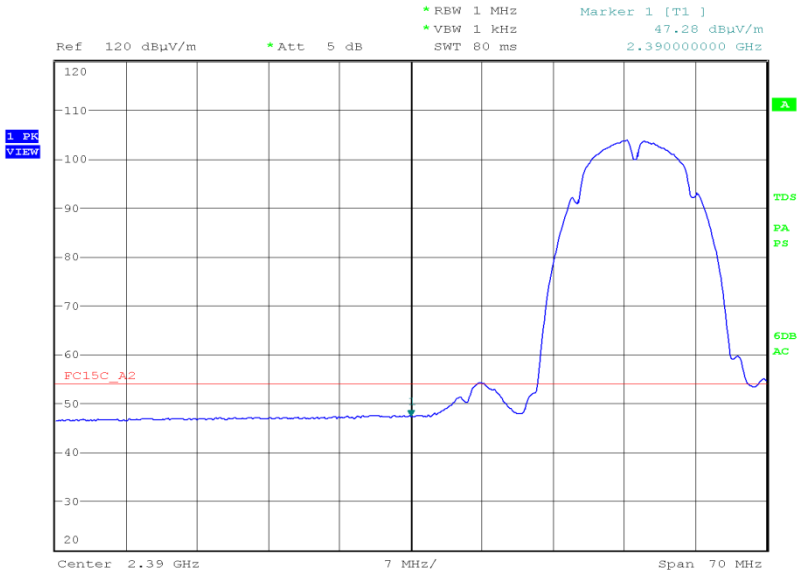
802.11b, 1 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
67.46	46.55	64.00	48.16

802.11b, 2412 MHz, Measured Frequency 2390 MHz, 1 Mbps, Final Peak, Restricted Band Edges Plot

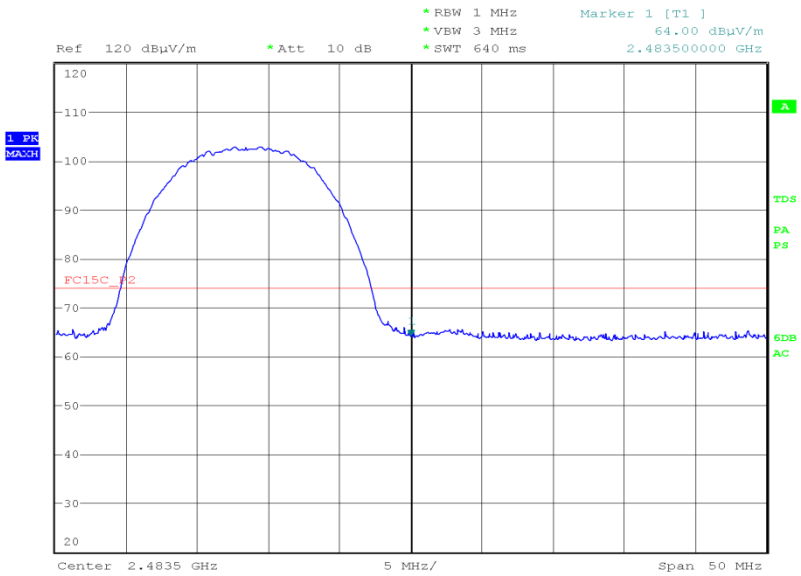


802.11b, 2412 MHz, Measured Frequency 2390 MHz, 1 Mbps, Final Average, Restricted Band Edges Plot



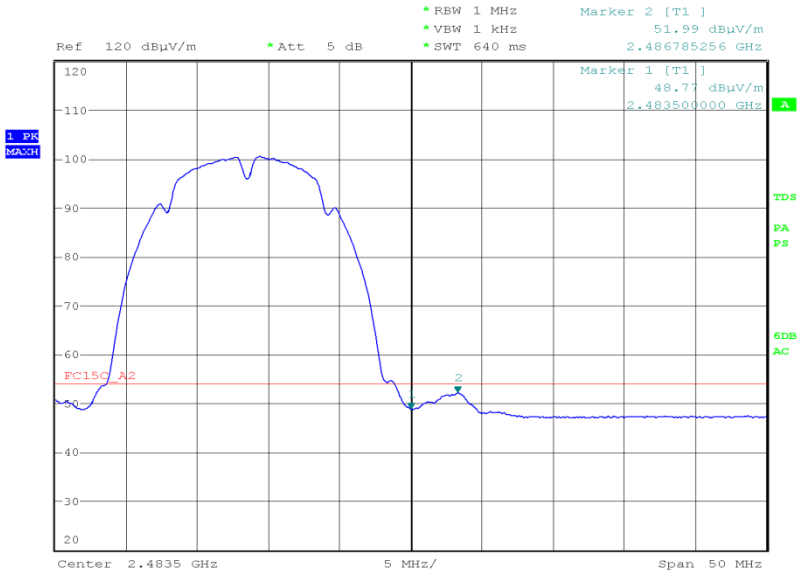
Date: 9.MAY.2016 14:29:37

802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 1 Mbps, Final Peak, Restricted Band Edges Plot



Date: 9.MAY.2016 15:36:16

802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 1 Mbps, Final Average, Restricted Band Edges Plot

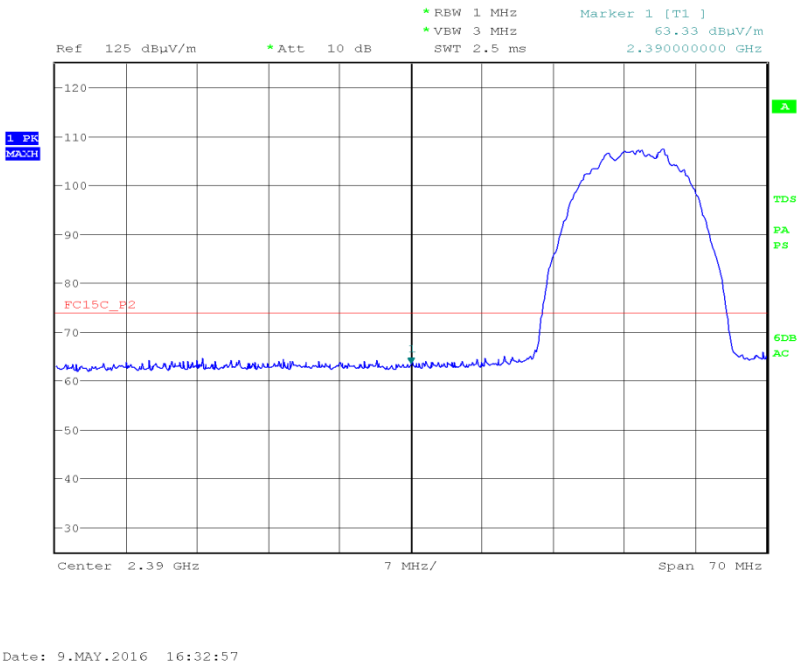


Date: 9.MAY.2016 15:30:23

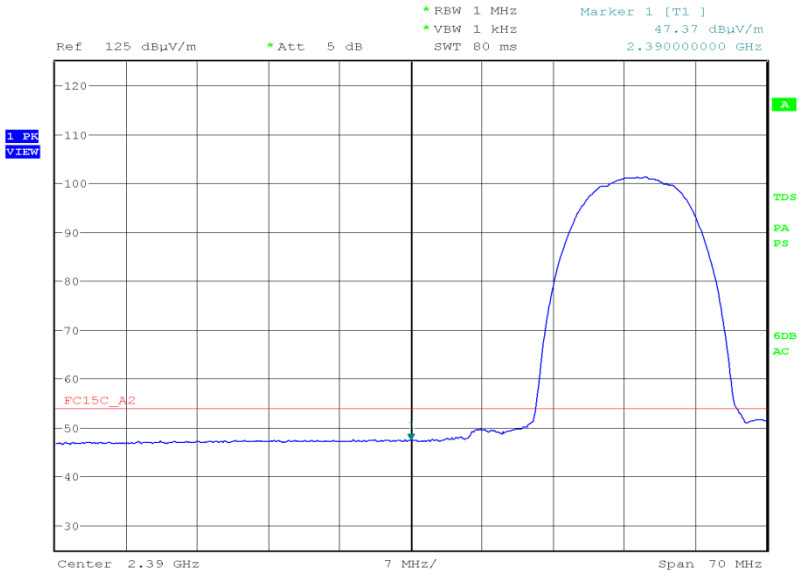
802.11b, 5.5 Mbps, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
63.33	46.55	63.13	47.30

802.11b, 2412 MHz, Measured Frequency 2390 MHz, 5.5 Mbps, Final Peak, Restricted Band Edges Plot

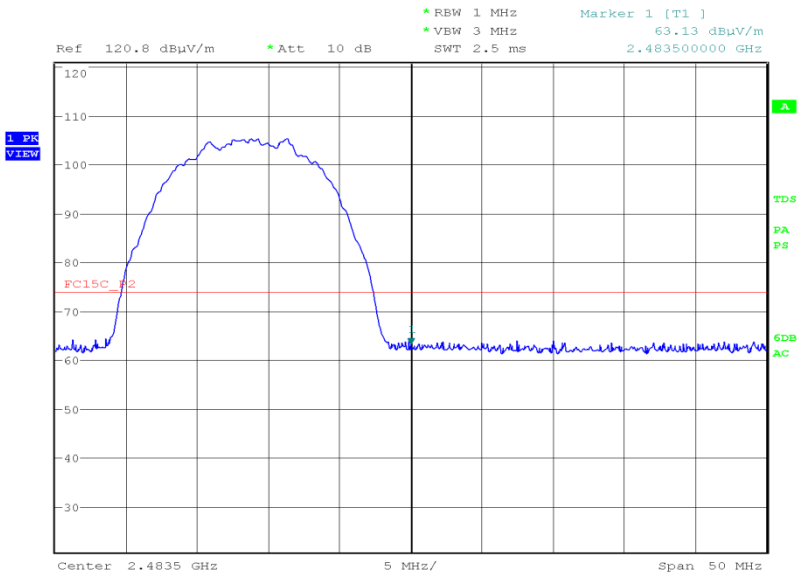


802.11b, 2412 MHz, Measured Frequency 2390 MHz, 5.5 Mbps, Final Average, Restricted Band Edges Plot



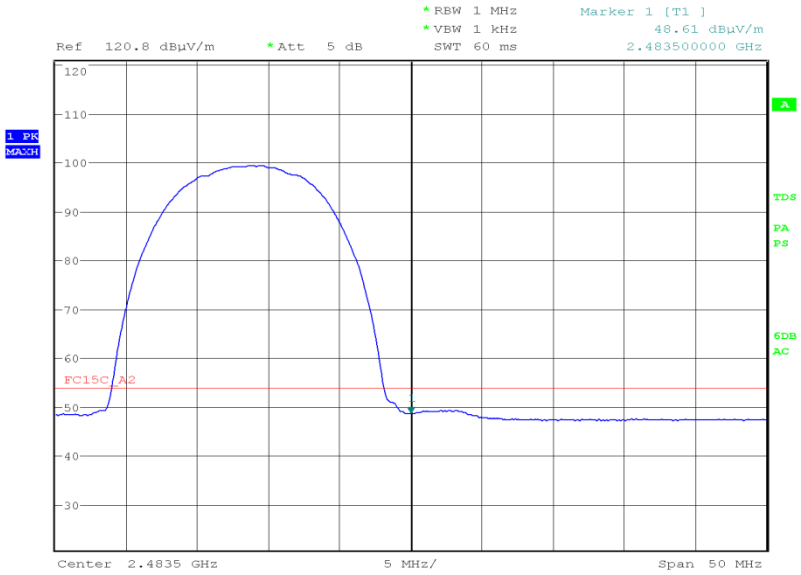
Date: 9.MAY.2016 16:30:16

802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 5.5 Mbps, Final Peak, Restricted Band Edges Plot



Date: 9.MAY.2016 16:12:58

802.11b, 2462 MHz, Measured Frequency 2483.5 MHz, 5.5 Mbps, Final Average, Restricted Band Edges Plot



Remark

The test was performed on 1 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 5.5 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

Final average results shown in the tables above were recorded using a CISPR average detector as described in ANSI C63.10 clause 4.1.2. In order to determine the maximum emissions with the restricted band near the band edge, the method described in ANSI C63.10 clause 6.10.5.2 has been used and these plots are included in the report.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

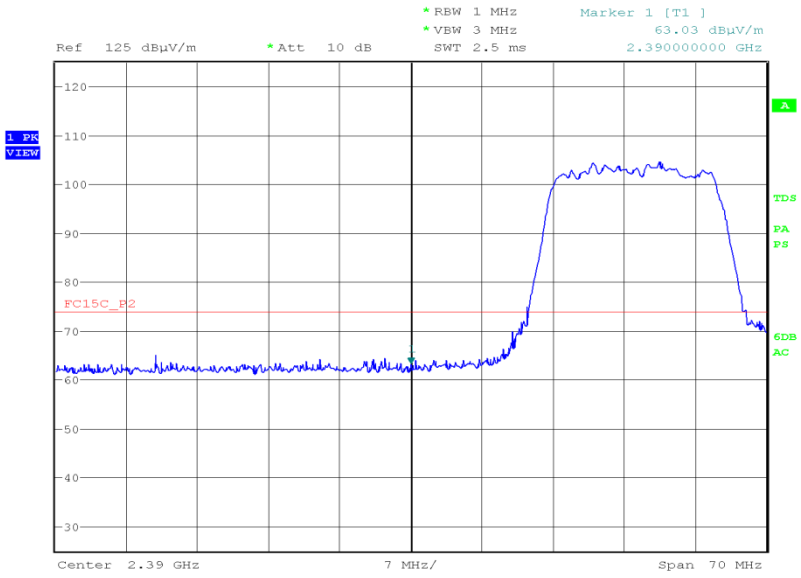
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

5.00 V DC Supply

802.11g, 12 Mbps, Restricted Band Edges Results

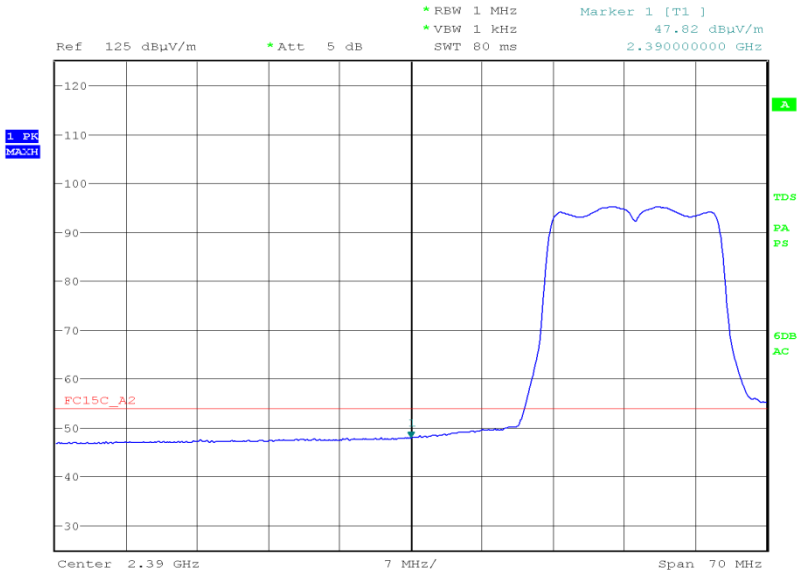
2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
63.03	47.07	64.78	50.80

802.11g, 2412 MHz, Measured Frequency 2390 MHz, 12 Mbps, Final Peak, Restricted Band Edges Plot



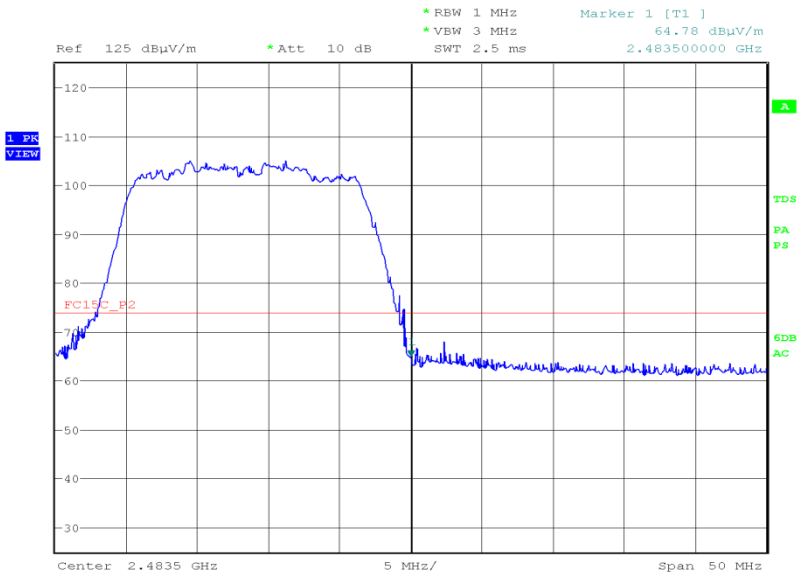
Date: 9.MAY.2016 17:26:36

802.11g, 2412 MHz, Measured Frequency 2390 MHz, 12 Mbps, Final Average, Restricted Band Edges Plot



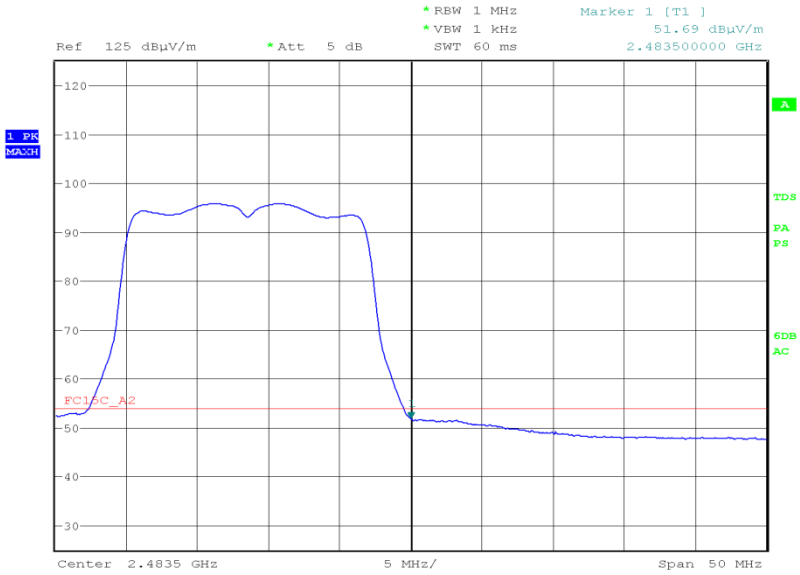
Date: 9.MAY.2016 17:25:23

802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 12 Mbps, Final Peak, Restricted Band Edges Plot



Date: 9.MAY.2016 17:03:23

802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 12 Mbps, Final Average, Restricted Band Edges Plot

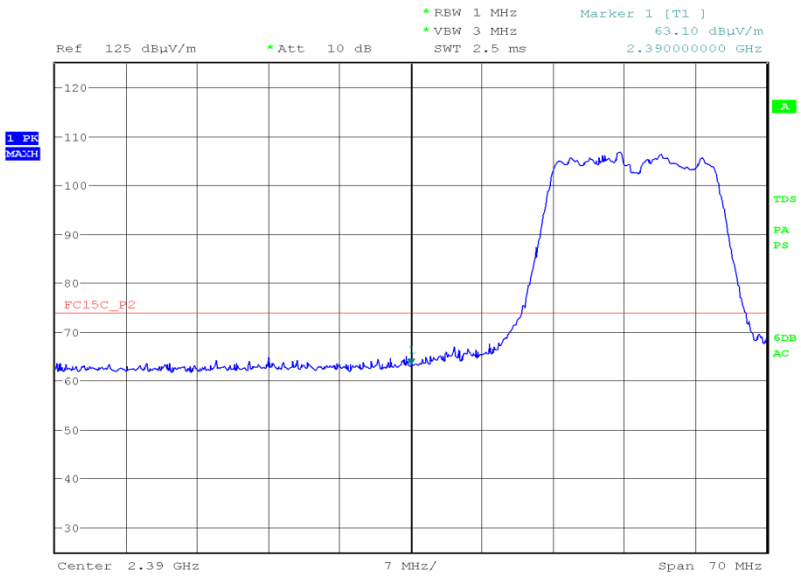


Date: 9.MAY.2016 17:05:06

802.11g, 36 Mbps, Restricted Band Edges Results

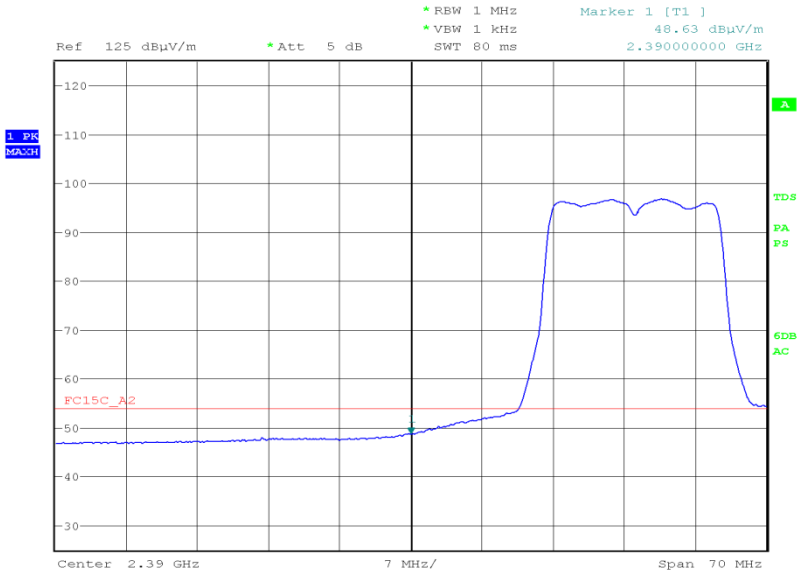
2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
63.10	47.82	68.01	50.16

802.11g, 2412 MHz, Measured Frequency 2390 MHz, 36 Mbps, Final Peak, Restricted Band Edges Plot



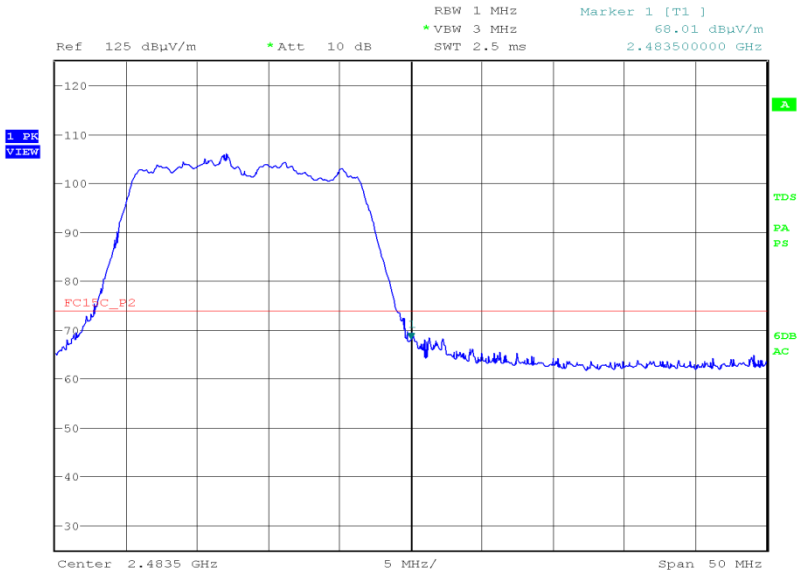
Date: 10.MAY.2016 09:16:53

802.11g, 2412 MHz, Measured Frequency 2390 MHz, 36 Mbps, Final Average, Restricted Band Edges Plot



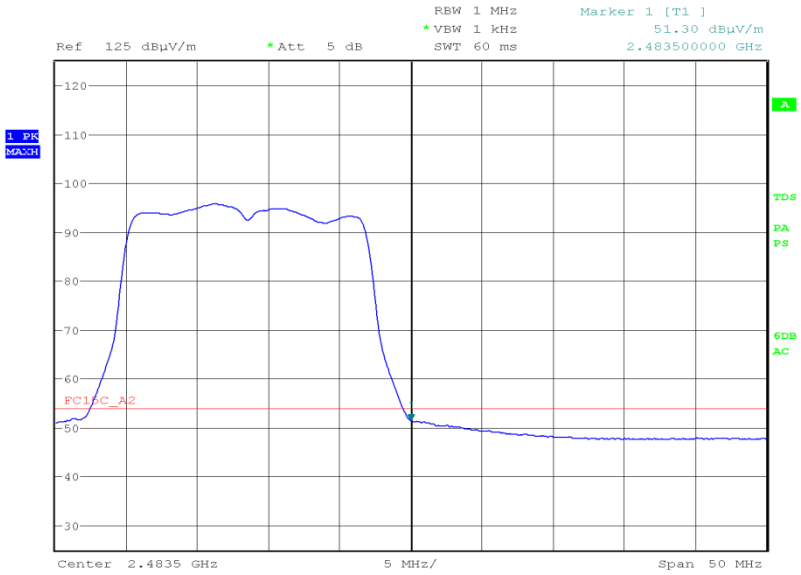
Date: 10.MAY.2016 09:13:59

802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 36 Mbps, Final Peak, Restricted Band Edges Plot



Date: 10.MAY.2016 08:41:20

802.11g, 2462 MHz, Measured Frequency 2483.5 MHz, 36 Mbps, Final Average, Restricted Band Edges Plot



Remark

The test was performed on 12 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 36 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

Final average results shown in the tables above were recorded using a CISPR average detector as described in ANSI C63.10 clause 4.1.2. In order to determine the maximum emissions with the restricted band near the band edge, the method described in ANSI C63.10 clause 6.10.5.2 has been used and these plots are included in the report.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

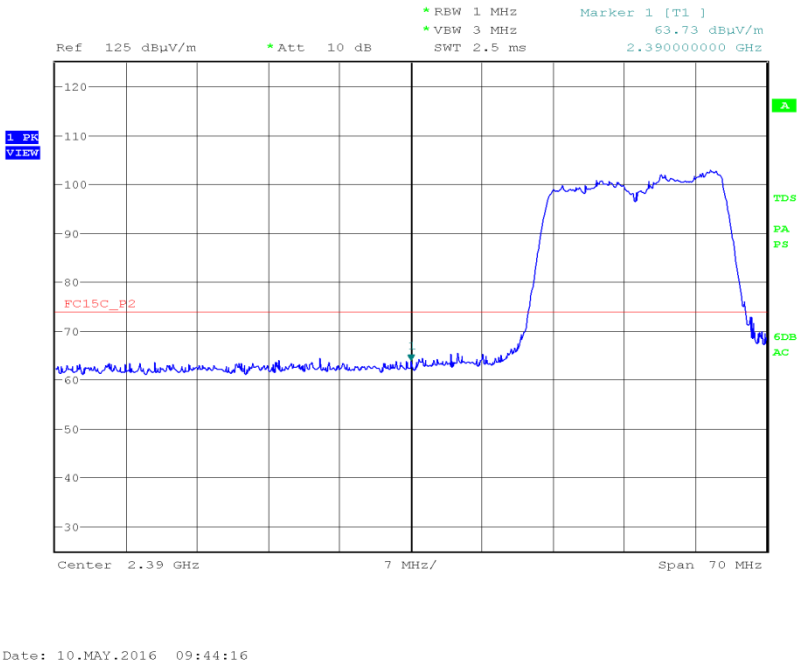
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

5.00 V DC Supply

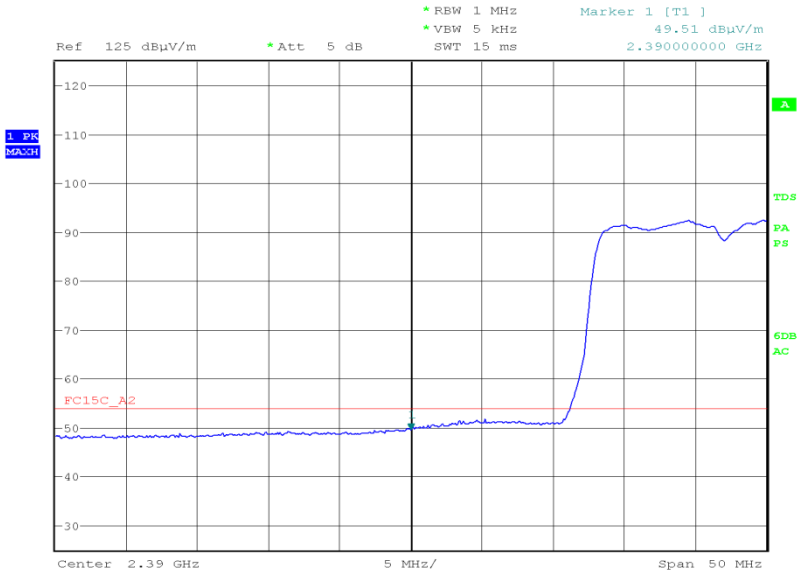
802.11n 20 MHz Bandwidth, MCS7, Restricted Band Edges Results

2412 MHz		2462 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
63.73	47.59	70.30	50.46

802.11n 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2390 MHz, MCS7, Final Peak, Restricted Band Edges Plot

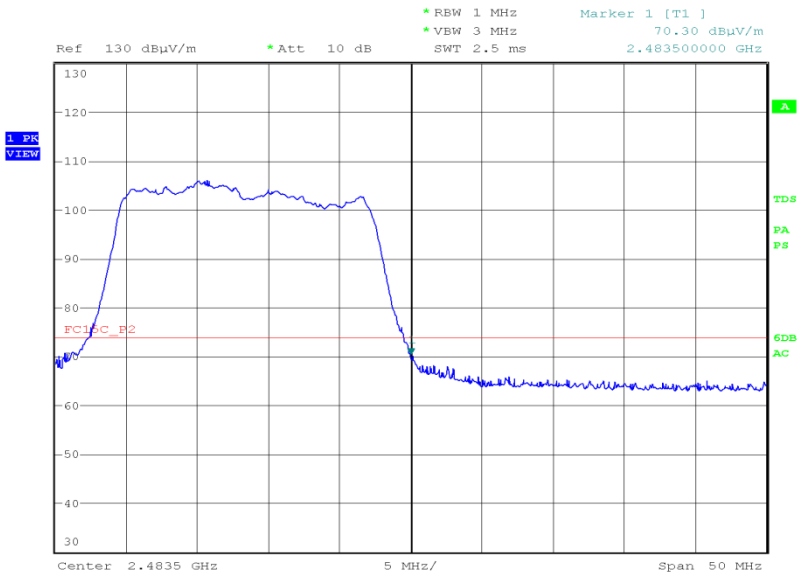


802.11n 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2390 MHz, MCS7, Final Average, Restricted Band Edges Plot



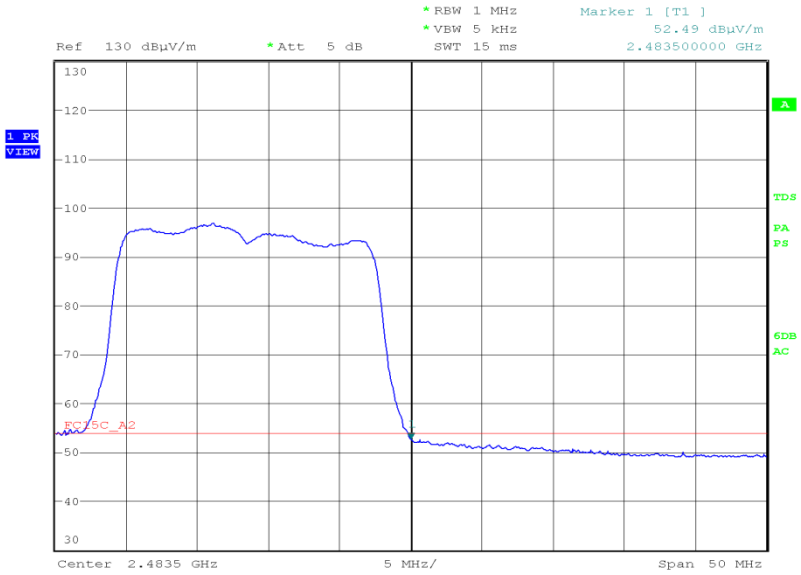
Date: 10.MAY.2016 09:37:27

802.11n 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, MCS7, Final Peak, Restricted Band Edges Plot



Date: 6.MAY.2016 16:10:49

802.11n 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.5 MHz, MCS7, Final Average, Restricted Band Edges Plot



Remark

The test was performed on MCS7 because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on MCS7 because this was deemed the worst case data rate for 6 dB Bandwidth.

Final average results shown in the tables above were recorded using a CISPR average detector as described in ANSI C63.10 clause 4.1.2. In order to determine the maximum emissions with the restricted band near the band edge, the method described in ANSI C63.10 clause 6.10.5.2 has been used and these plots are included in the report.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

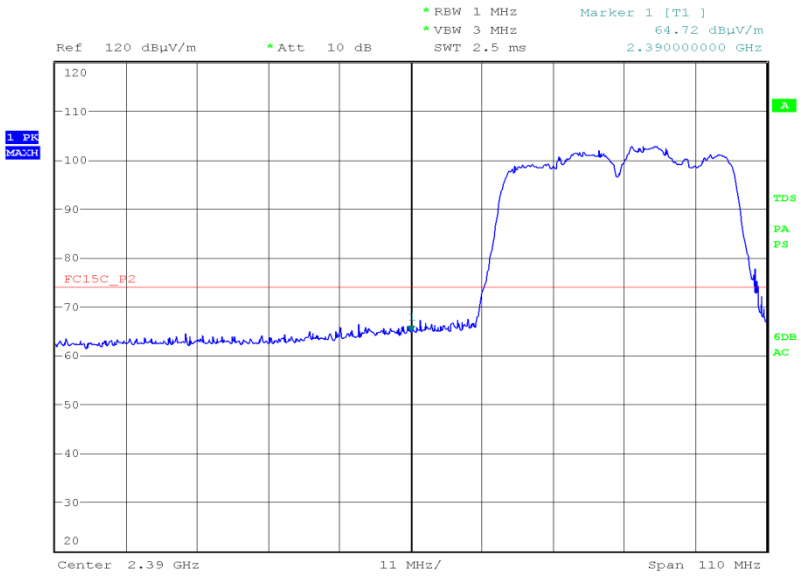
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

5.00 V DC Supply

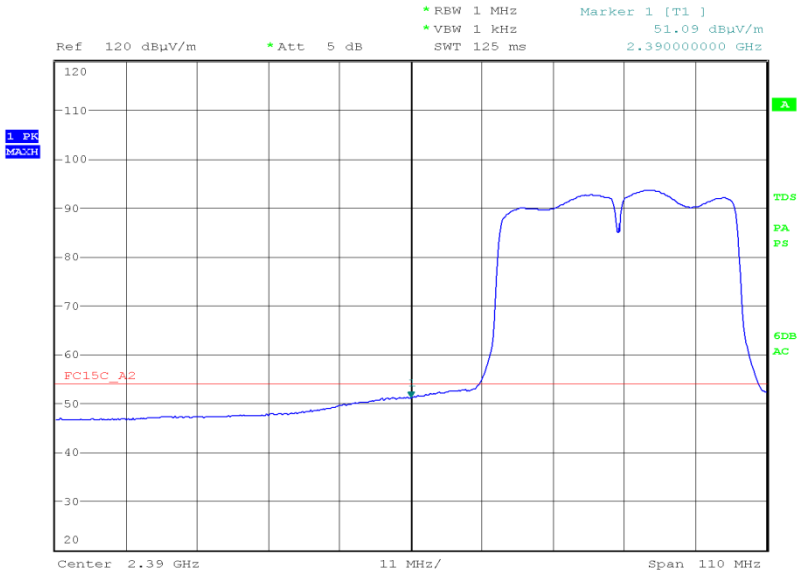
802.11n 40 MHz Bandwidth, MCS0, Restricted Band Edges Results

2422 MHz		2452 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
64.72	50.12	63.71	50.2

802.11n 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2390 MHz, MCS0, Final Peak, Restricted Band Edges Plot

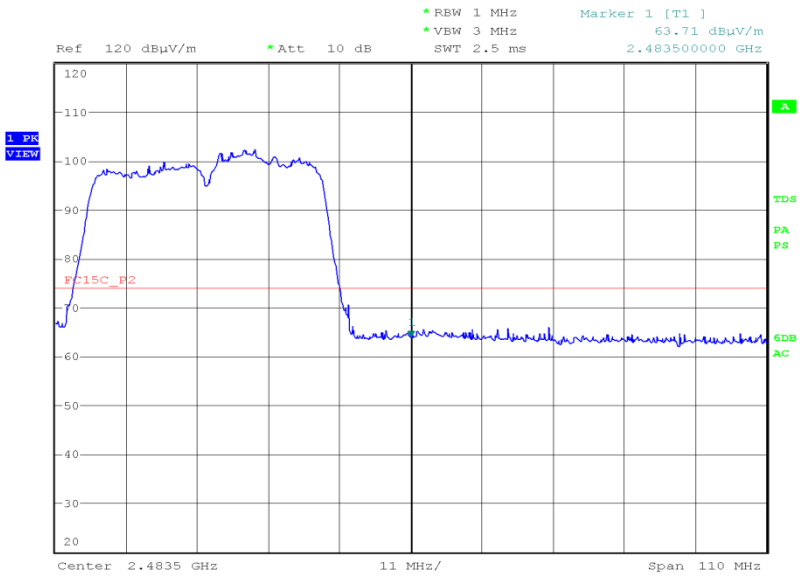


802.11n 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2390 MHz, MCS0, Final Average, Restricted Band Edges Plot



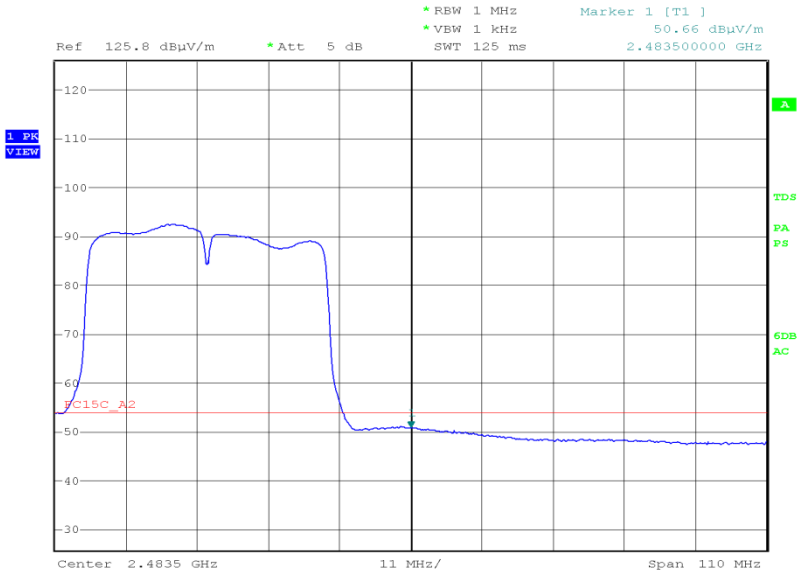
Date: 9.MAY.2016 12:08:40

802.11n 40 MHz Bandwidth, 2452 MHz, Measured Frequency 2483.5 MHz, MCS0, Final Peak, Restricted Band Edges Plot



Date: 9.MAY.2016 12:31:58

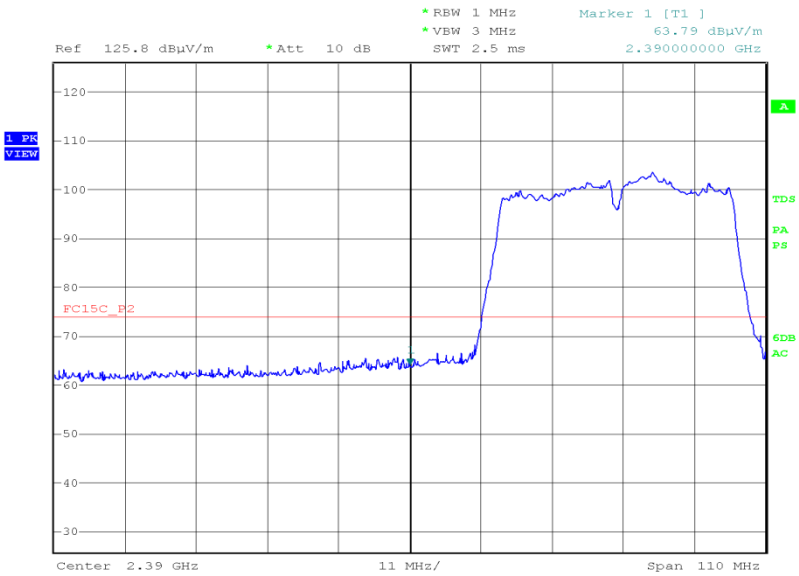
802.11n 40 MHz Bandwidth, 2452 MHz, Measured Frequency 2483.5 MHz, MCS0, Final Average, Restricted Band Edges Plot



802.11n 40 MHz Bandwidth, MCS5, Restricted Band Edges Results

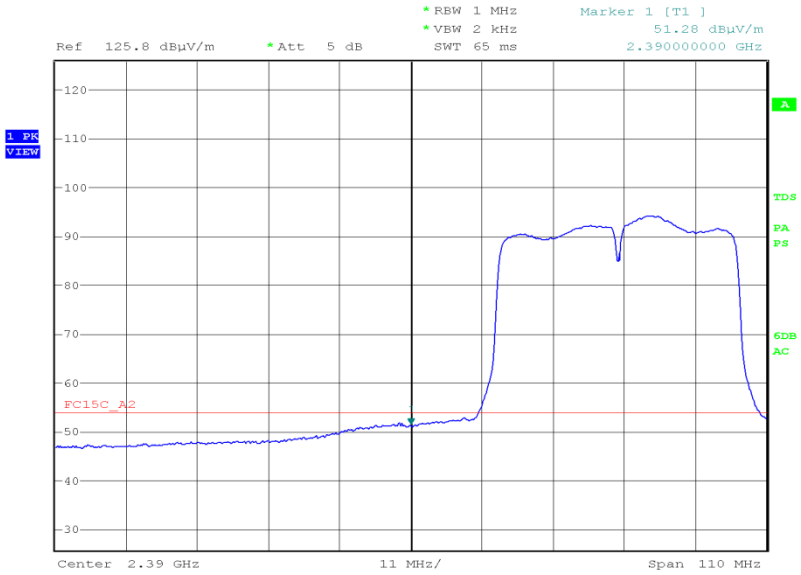
2422 MHz		2452 MHz	
Measured Frequency 2390.00 MHz		Measured Frequency 2483.50 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
63.79	50.03	65.05	50.85

802.11n 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2390 MHz, MCS5, Final Peak, Restricted Band Edges Plot



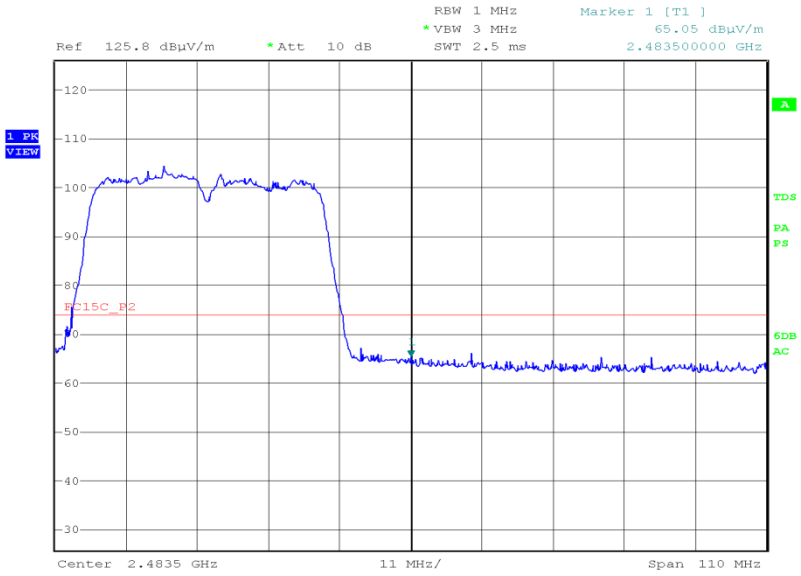
Date: 9.MAY.2016 13:42:13

802.11n 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2390 MHz, MCS5, Final Average, Restricted Band Edges Plot



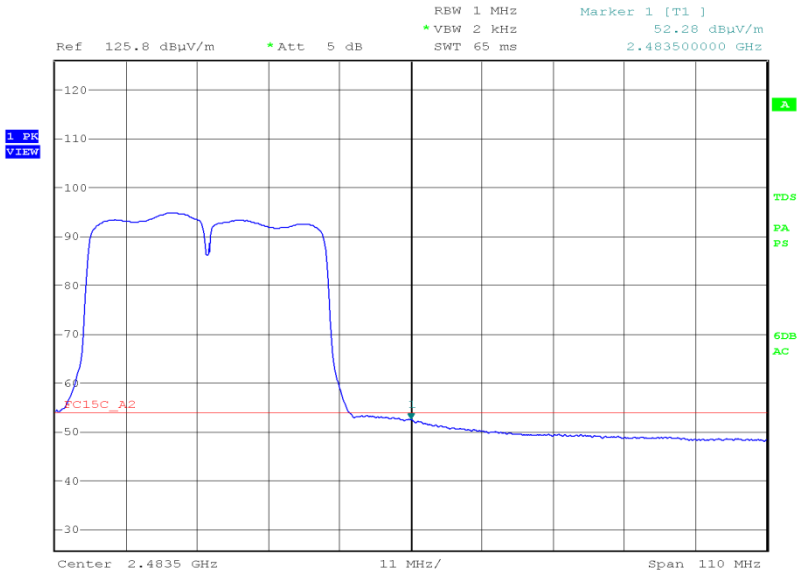
Date: 9.MAY.2016 13:40:48

802.11n 40 MHz Bandwidth, 2452 MHz, Measured Frequency 2483.5 MHz, MCS5, Final Peak, Restricted Band Edges Plot



Date: 9.MAY.2016 12:48:41

802.11n 40 MHz Bandwidth, 2452 MHz, Measured Frequency 2483.5 MHz, MCS5, Final Average, Restricted Band Edges Plot



Remark

The test was performed on MCS0 because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on MCS5 because this was deemed the worst case data rate for 6 dB Bandwidth.

Final average results shown in the tables above were recorded using a CISPR average detector as described in ANSI C63.10 clause 4.1.2. In order to determine the maximum emissions with the restricted band near the band edge, the method described in ANSI C63.10 clause 6.10.5.2 has been used and these plots are included in the report.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

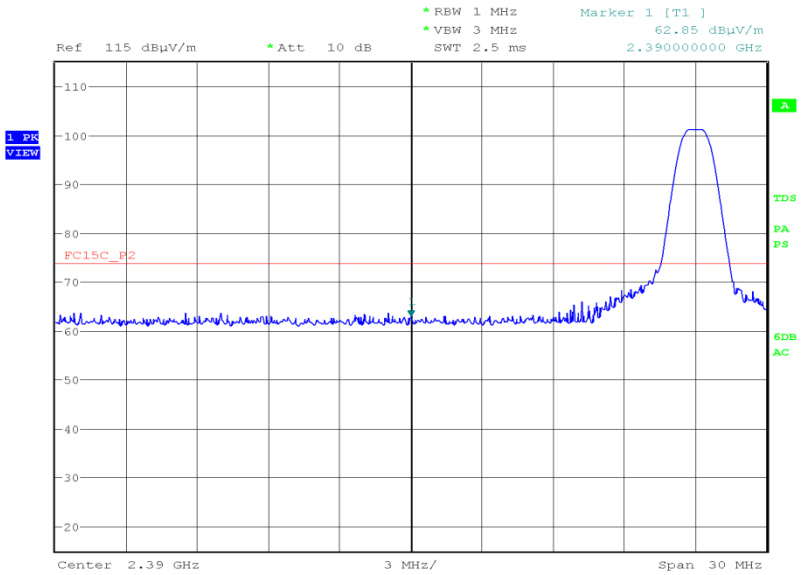
	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

5.00 V DC Supply

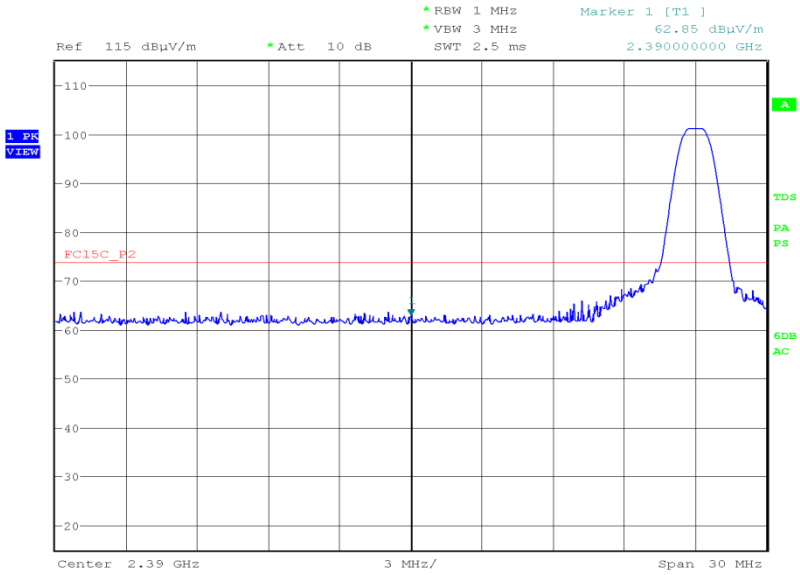
Bluetooth Low Energy, GFSK, Restricted Band Edges Results

2402 MHz		2480 MHz	
Measured Frequency 2390 MHz		Measured Frequency 2483.5 MHz	
dBµV/m		dBµV/m	
Final Peak	Final Average	Final Peak	Final Average
62.85	46.24	66.27	46.50

Bluetooth Low Energy, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Peak, Restricted Band Edges Plot

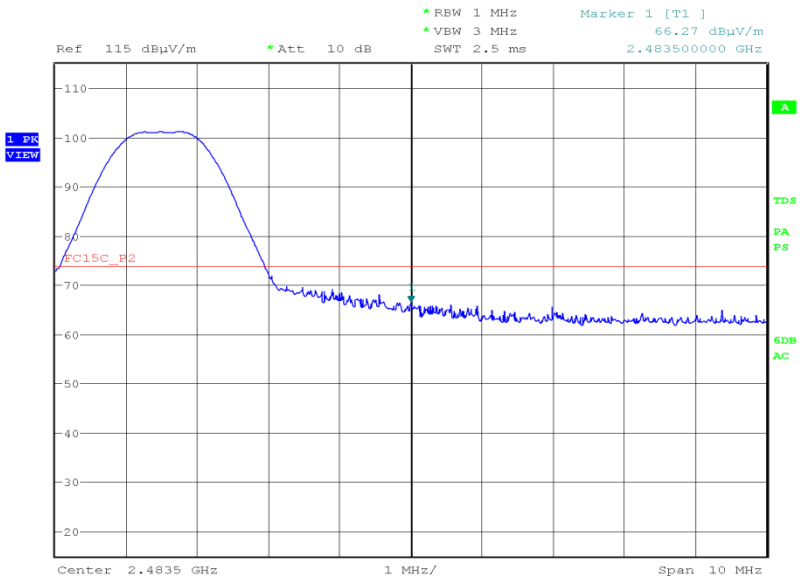


Bluetooth Low Energy, 2402 MHz, Measured Frequency 2390 MHz, GFSK, Final Average, Restricted Band Edges Plot



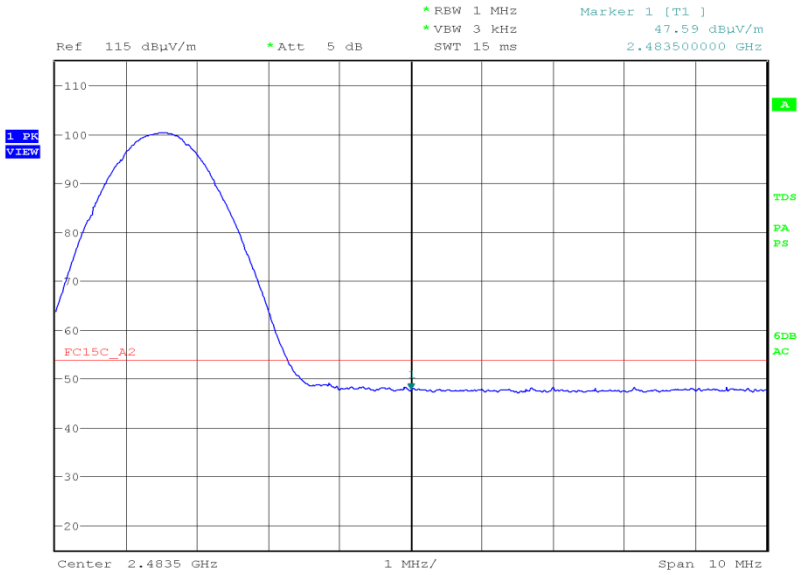
Date: 25.MAY.2016 15:37:30

Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Peak, Restricted Band Edges Plot



Date: 25.MAY.2016 15:54:30

Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.5 MHz, GFSK, Final Average, Restricted Band Edges Plot



Remarks

Final average results shown in the tables above were recorded using a CISPR average detector as described in ANSI C63.10 clause 4.1.2. In order to determine the maximum emissions with the restricted band near the band edge, the method described in ANSI C63.10 clause 6.10.5.2 has been used and these plots are included in the report.

FCC 47 CFR Part 15, Limit Clause 15.205

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

Industry Canada RSS-GEN, Limit Clause 8.10

	Peak (dBµV/m)	Average (dBµV/m)
Restricted Bands of Operation	74	54

2.7 AUTHORISED BAND EDGES

2.7.1 Specification Reference

FCC 47 CFR Part 15C, Clause 15.247 (d)
Industry Canada RSS-247m Clause 5.5

2.7.2 Equipment Under Test and Modification State

Minuet/FS5332 S/N: RAD108624 (Module) and RAD108700 (Platform) - Modification State 0

2.7.3 Date of Test

9 May 2016 & 26 May 2016

2.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.5 Test Procedure

The test was performed in accordance with ANSI C63.10, clause 6.3, 6.5 and 6.6.

2.7.6 Environmental Conditions

Ambient Temperature	19.7 - 20.9°C
Relative Humidity	37.0 - 40.0%

Product Service

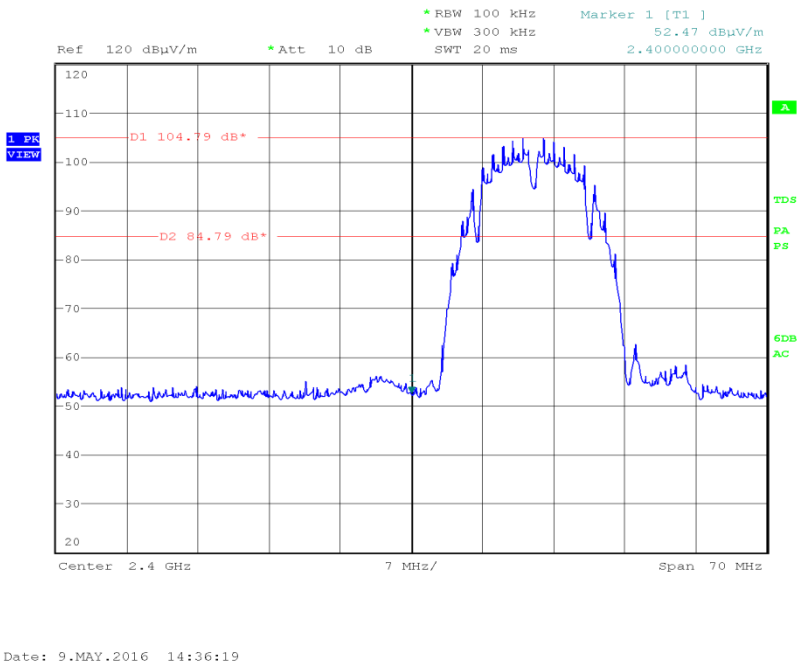
2.7.7 Test Results

5.00 V DC Supply

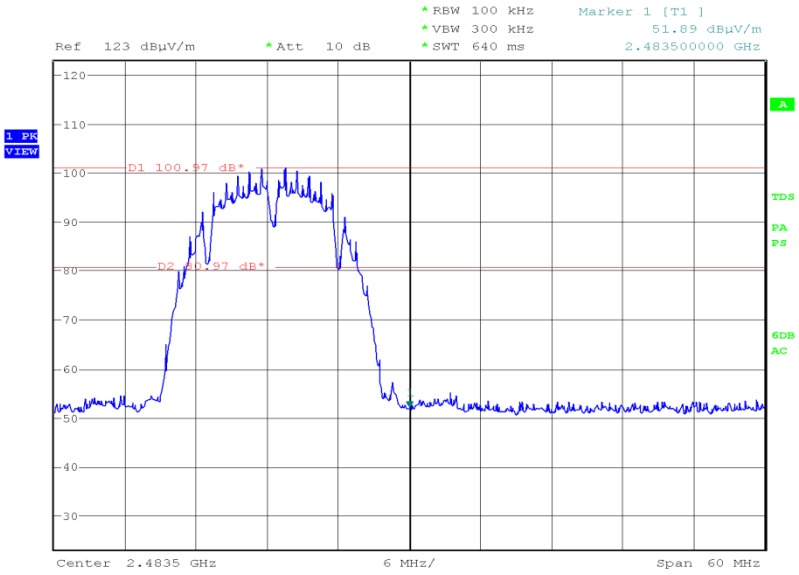
802.11b, 1 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
52.47	51.89

802.11b, 2412 MHz, Measured Frequency 2400.00 MHz, 1 Mbps, Final Peak, Authorised Band Edges Plot



802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 1 Mbps, Final Peak, Authorised Band Edges Plot



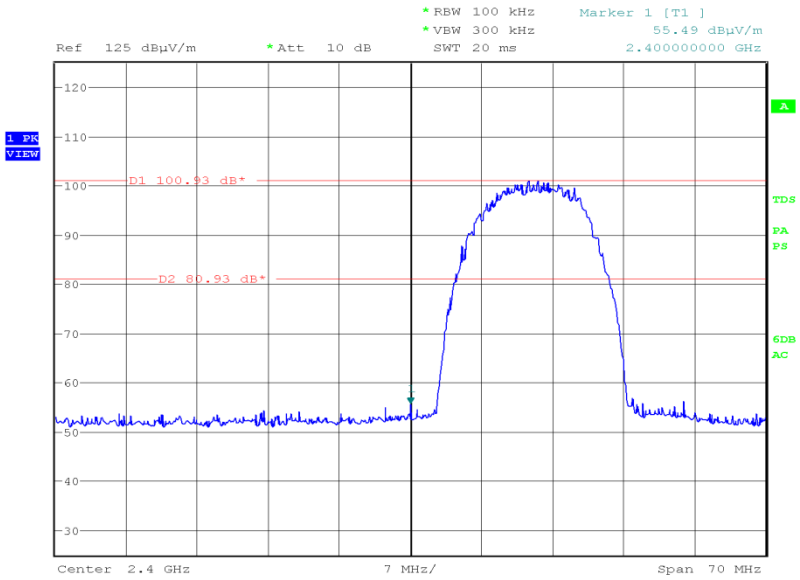
Date: 9.MAY.2016 15:49:01

Product Service

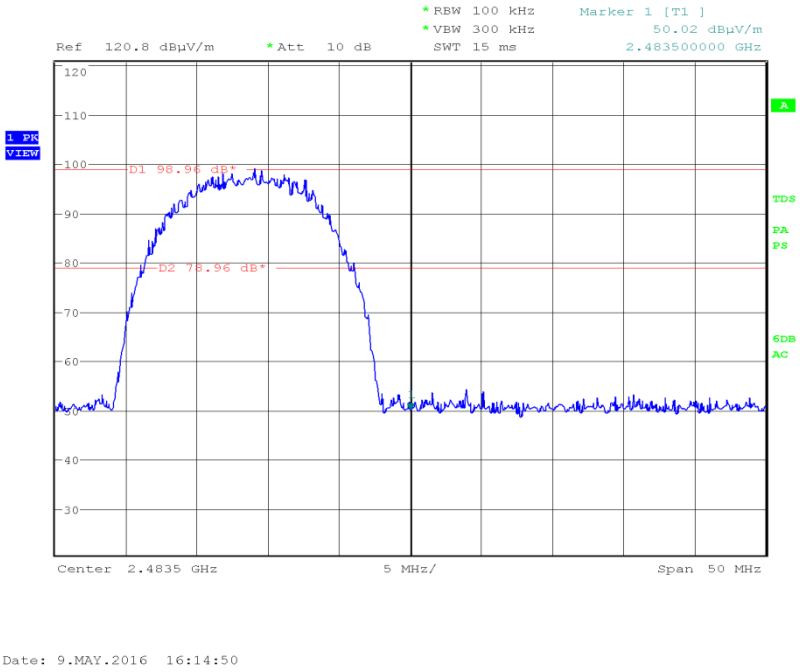
802.11b, 5.5 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
55.49	50.02

802.11b, 2412 MHz, Measured Frequency 2400.00 MHz, 5.5 Mbps, Final Peak, Authorised Band Edges Plot



802.11b, 2462 MHz, Measured Frequency 2483.50 MHz, 5.5 Mbps, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on 1 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 5.5 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

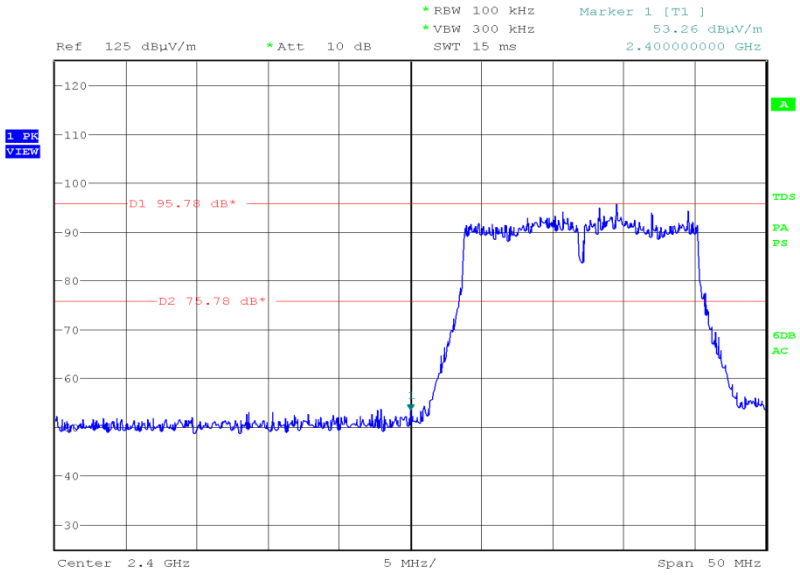
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

5.00 V DC Supply

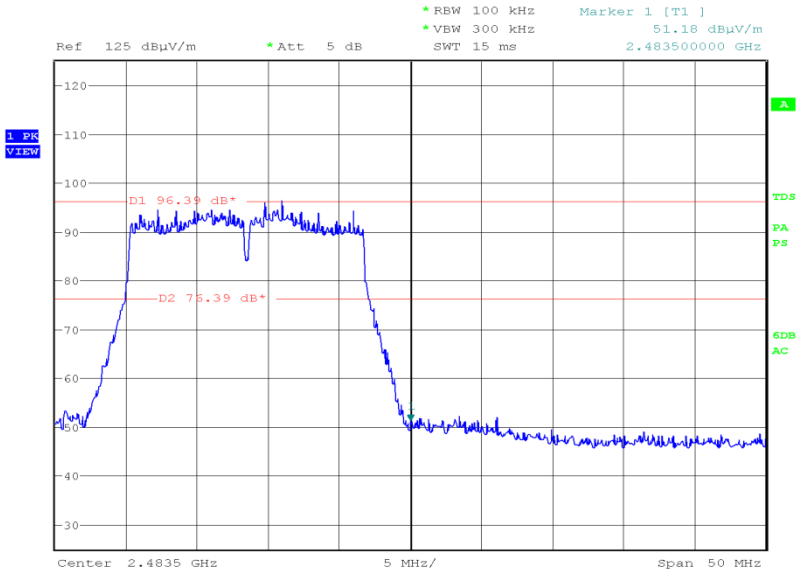
802.11g, 12 Mbps, Authorised Band Edges Results

2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
53.26	51.18

802.11g, 2412 MHz, Measured Frequency 2400.00 MHz, 12 Mbps, Final Peak, Authorised Band Edges Plot



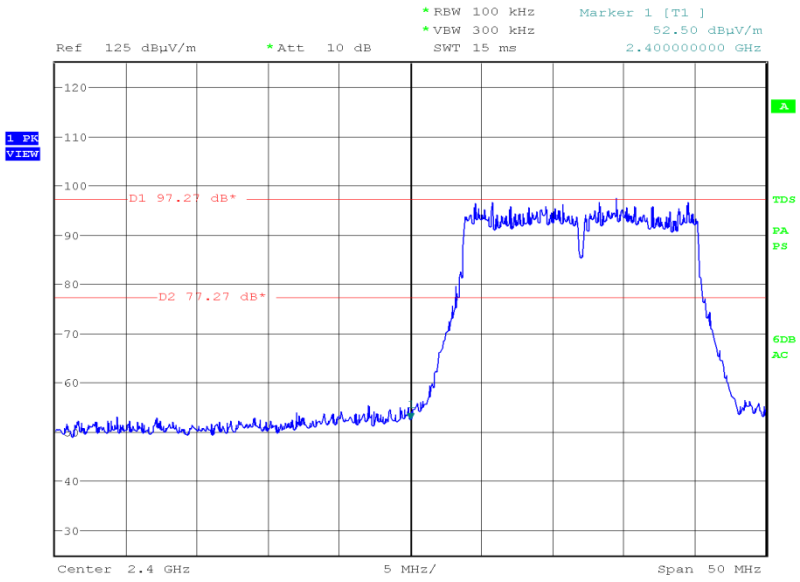
802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 12 Mbps, Final Peak, Authorised Band Edges Plot



802.11g, 36 Mbps, Authorised Band Edges Results

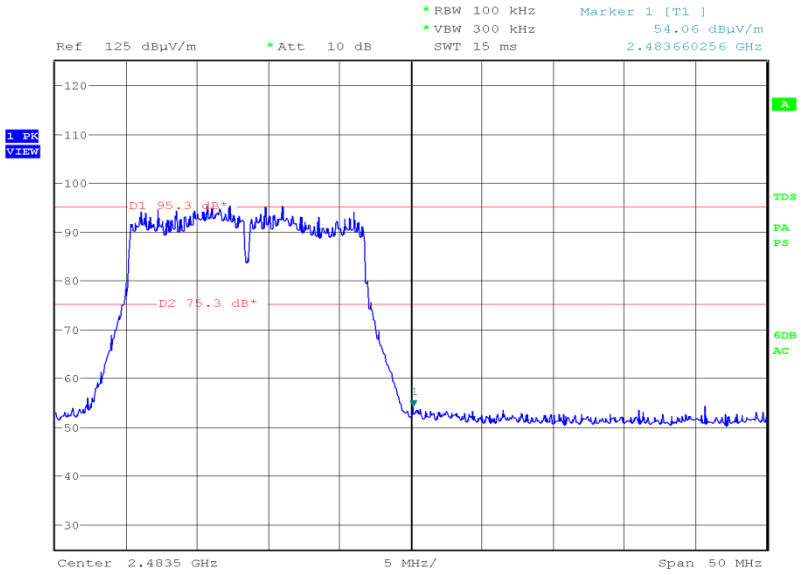
2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
52.50	54.06

802.11g, 2412 MHz, Measured Frequency 2400.00 MHz, 36 Mbps, Final Peak, Authorised Band Edges Plot



Date: 10.MAY.2016 09:20:14

802.11g, 2462 MHz, Measured Frequency 2483.50 MHz, 36 Mbps, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on 12 Mbps because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on 36 Mbps because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

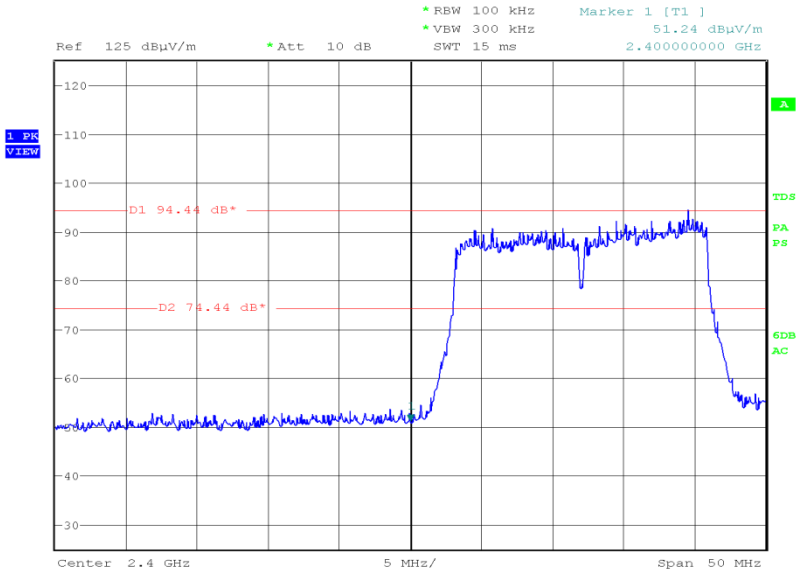
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

5.00 V DC Supply

802.11n 20 MHz Bandwidth, MCS7, Authorised Band Edges Results

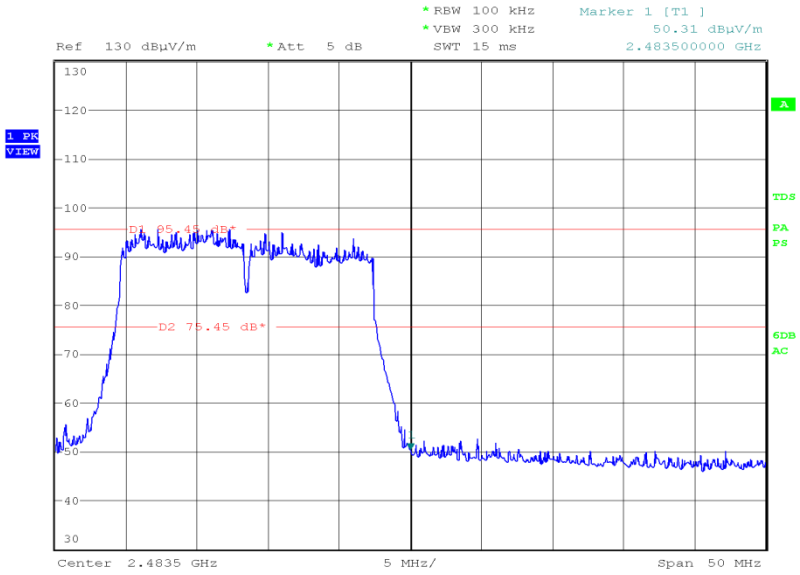
2412 MHz	2462 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
51.24	50.31

802.11n 20 MHz Bandwidth, 2412 MHz, Measured Frequency 2400.00 MHz, MCS7, Final Peak, Authorised Band Edges Plot



Date: 10.MAY.2016 09:40:04

802.11n 20 MHz Bandwidth, 2462 MHz, Measured Frequency 2483.50 MHz, MCS7, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on MCS7 because this was deemed the worst case data rate for Conducted Output Power and 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

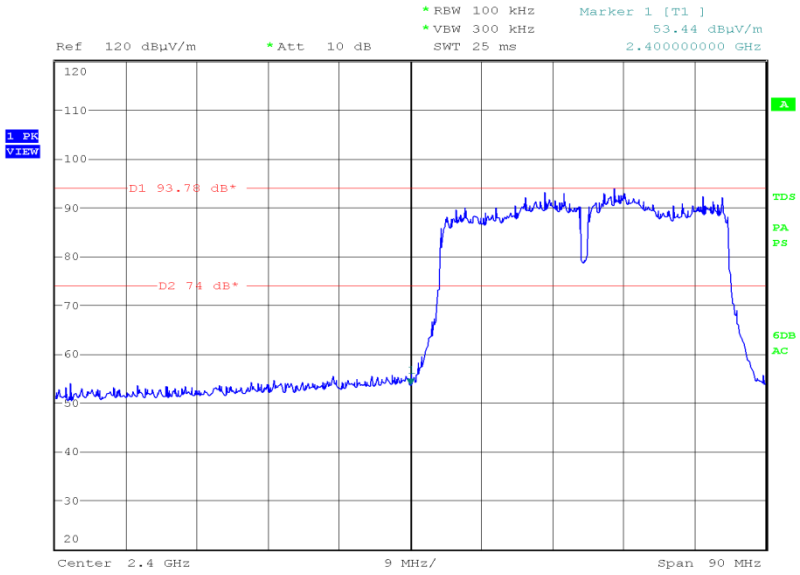
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

5.00 V DC Supply

802.11n 40 MHz Bandwidth, MCS0, Authorised Band Edges Results

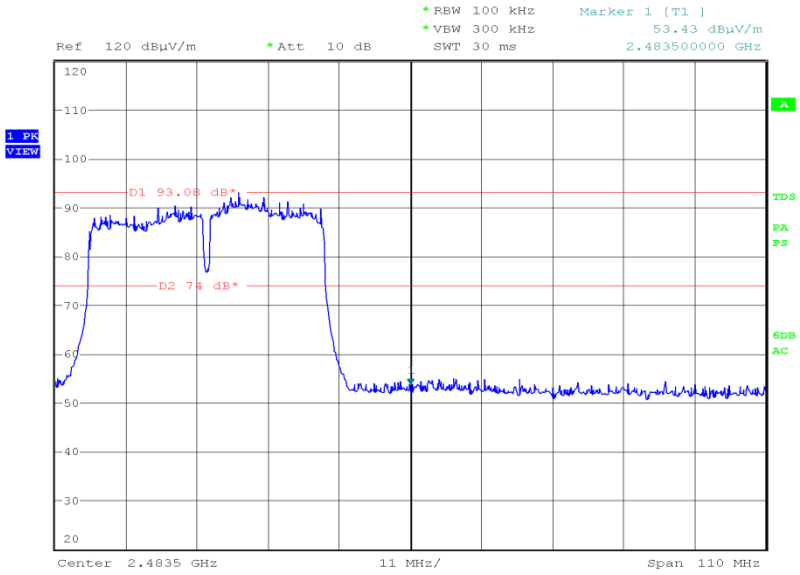
2422 MHz	2452 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
53.44	53.43

802.11n 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2400.00 MHz, MCS0, Final Peak, Authorised Band Edges Plot



Date: 9.MAY.2016 12:16:47

802.11n 40 MHz Bandwidth, 2452 MHz, Measured Frequency 2483.50 MHz, MCS0, Final Peak, Authorised Band Edges Plot



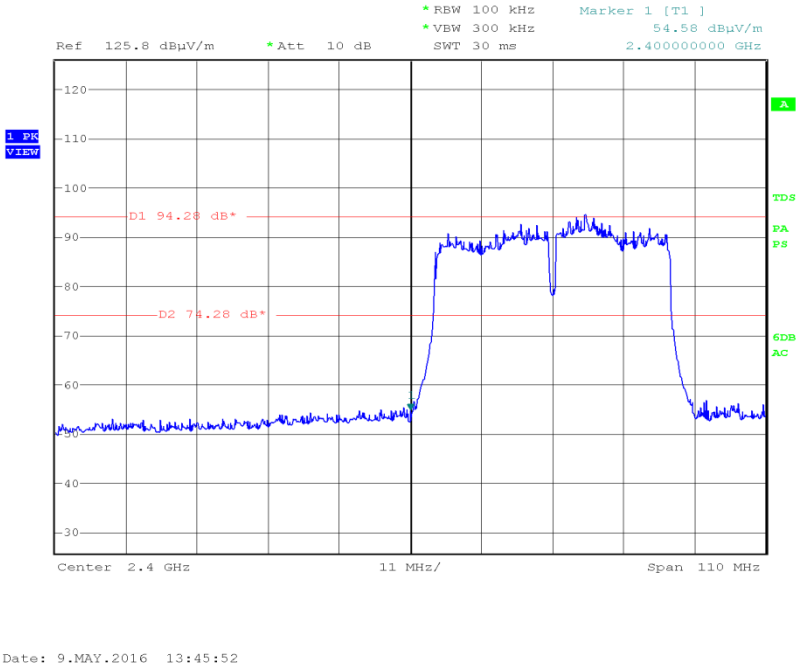
Date: 9.MAY.2016 12:33:13

Product Service

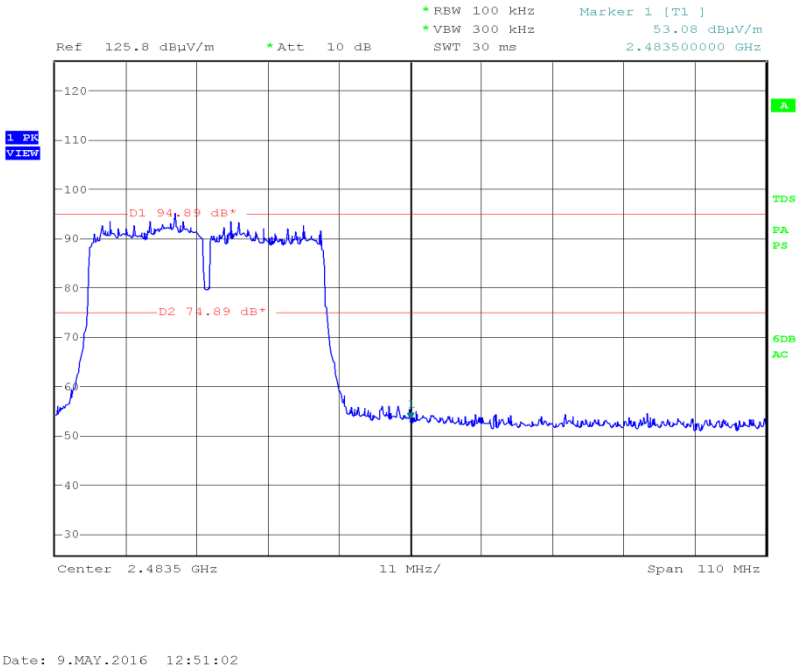
802.11n 40 MHz Bandwidth, MCS5, Authorised Band Edges Results

2422 MHz	2452 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
54.58	53.08

802.11n 40 MHz Bandwidth, 2422 MHz, Measured Frequency 2400.00 MHz, MCS5, Final Peak, Authorised Band Edges Plot



802.11n 40 MHz Bandwidth, 2452 MHz, Measured Frequency 2483.50 MHz, MCS5, Final Peak, Authorised Band Edges Plot



Remark

The test was performed on MCS0 because this was deemed the worst case data rate for Conducted Output Power.

The test was performed on MCS5 because this was deemed the worst case data rate for 6 dB Bandwidth.

FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

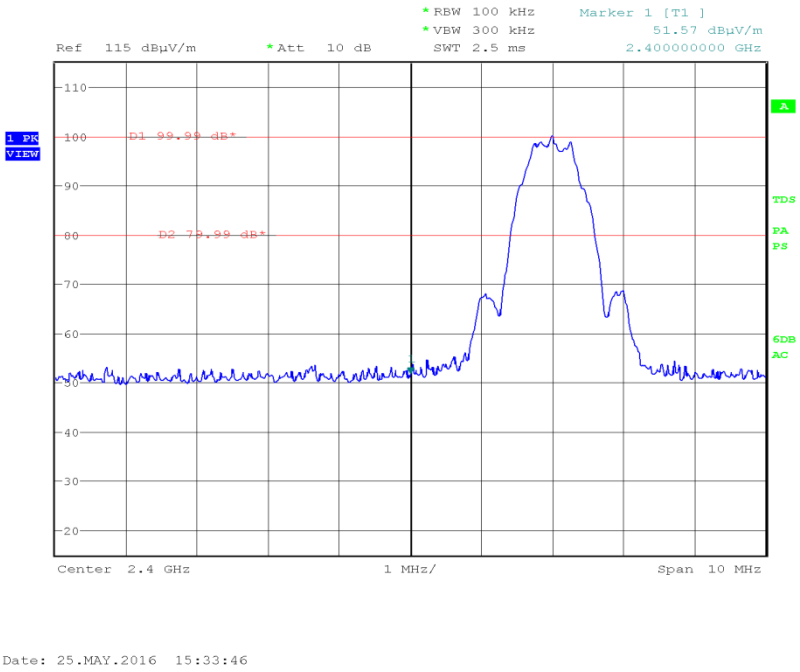
20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

5.00 V DC Supply

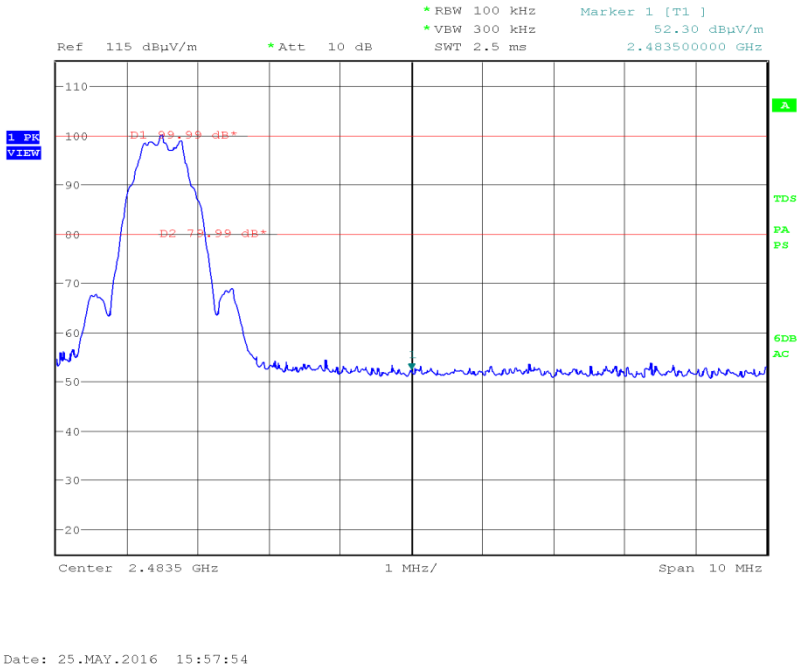
Bluetooth Low Energy, GFSK, Authorised Band Edges Results

2402 MHz	2480 MHz
Measured Frequency 2400.00 MHz	Measured Frequency 2483.50 MHz
dBµV/m	dBµV/m
Final Peak	Final Peak
51.57	52.30

Bluetooth Low Energy, 2402 MHz, Measured Frequency 2400.00 MHz, GFSK, Final Peak, Authorised Band Edges Plot



Bluetooth Low Energy, 2480 MHz, Measured Frequency 2483.50 MHz, GFSK, Final Peak, Authorised Band Edges Plot



FCC 47 CFR Part 15, Limit Clause 15.247 (d)

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Industry Canada RSS-247, Limit Clause 5.5

20 dB below the fundamental measured in a 100 kHz bandwidth using a peak detector. If the transmitter complies with the conducted power limits, based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB below the fundamental instead of 20 dB.

Product Service

SECTION 3

3TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 – AC Line Conducted Emissions					
LISN	Rohde & Schwarz	ESH2-Z5	17	12	11-Feb-2017
Multimeter	Iso-tech	IDM-101	466	12	11-Sep-2016
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Transient Limiter	Hewlett Packard	11947A	2377	12	16-Feb-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
7m Armoured RF Cable	SSI Cable Corp.	1501-13-13-7m WA(-)	3600	-	TU
Section 2.2 - Peak Power Spectral Density					
Power Supply Unit	Farnell	LB30-4	158	-	O/P Mon
20dB/2W Attenuator	Narda	4772-20	462	-	TU
Cable (2m, SMA-SMA)	Reynolds	262-0248-2000	2400	12	20-Aug-2016
Multimeter	Iso-tech	IDM101	2424	12	29-Sep-2016
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	3-Sep-2016
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	8-Oct-2016
Section 2.3 - 6dB Bandwidth					
Power Supply Unit	Farnell	LB30-4	158	-	O/P Mon
Multimeter	Iso-tech	IDM101	2424	12	29-Sep-2016
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
2 Metre SMA Type Cable	Rhophase	3PS-1801A-2000-3PS	4111	12	6-Nov-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016
Frequency Standard	Spectracom	Secure Sync 1200-0408-0601	4393	6	3-Sep-2016
PXA Signal Analyser	Keysight Technologies	N9030A	4654	12	8-Oct-2016
Section 2.4 - Maximum Conducted Output Power					
Power Supply Unit	Farnell	LB30-4	158	-	O/P Mon
20dB/2W Attenuator	Narda	4772-20	462	-	TU
Cable (2m, SMA-SMA)	Reynolds	262-0248-2000	2400	12	20-Aug-2016
Multimeter	Iso-tech	IDM101	2424	12	29-Sep-2016
Hygrometer	Rotronic	I-1000	3220	12	19-Aug-2016
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	2-Sep-2016
P-Series Power Meter	Agilent Technologies	N1911A	3980	12	25-Sep-2016
50 MHz-18 GHz Wideband Power Sensor	Agilent Technologies	N1921A	3982	12	25-Sep-2016
Calibration Unit	Rohde & Schwarz	ZV-Z54	4368	12	7-Sep-2016

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.5 - Spurious Radiated Emissions					
Antenna 18-40GHz (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	12-Feb-2018
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2017
Multimeter	Iso-tech	IDM-101	466	12	11-Sep-2016
Hygrometer	Rotronic	A1	1388	12	13-Apr-2017
Antenna 18-40GHz (Double Ridge Guide)	Q-Par Angus Ltd	QSH 180K	1511	24	27-Nov-2016
Pre-Amplifier	Phase One	PS04-0086	1533	12	30-Jul-2016
18GHz - 40GHz Pre-Amplifier	Phase One	PSO4-0087	1534	12	23-Dec-2016
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygromer	Rotronic	A1	2138	12	9-Dec-2016
Cable (2m)	Rosenberger	FA147A2020002020	2195	12	19-Aug-2016
Multimeter	Iso-tech	IDM101	2417	12	29-Sep-2016
Power Supply	Farnell	LT30-2	2659	-	TU
Filter (Hi Pass)	Lorch	9HP7-7000-SR	2833	12	5-Feb-2017
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
Compliance 5 Emissions	Schaffner	C5e Software V.5.00.00	3275	-	N/A - Software
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Cable 1503 2M 2.92(P)m 2.92(P)m	Rhophase	KPS-1503A-2000-KPS	4293	-	O/P Mon
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	6-Oct-2016
Suspended Substrate Highpass Filter	Advance Power Components	11SH10-3000/X18000-O/O	4411	12	23-Mar-2017
Cable (Yellow, Rx, Km-Km 2m)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
Section 2.6 - Restricted Band Edges					
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygromer	Rotronic	A1	2138	12	9-Dec-2016
Multimeter	Iso-tech	IDM101	2417	12	29-Sep-2016
Power Supply	Farnell	LT30-2	2659	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016
Section 2.7- Authorised Band Edges					
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygromer	Rotronic	A1	2138	12	9-Dec-2016
Multimeter	Iso-tech	IDM101	2417	12	29-Sep-2016
Power Supply	Farnell	LT30-2	2659	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
Tilt Antenna Mast	maturo Gmbh	TAM 4.0-P	3916	-	TU
Mast Controller	maturo Gmbh	NCD	3917	-	TU
Double Ridged Waveguide Horn Antenna	ETS-Lindgren	3117	4722	12	29-Dec-2016

TU – Traceability Unscheduled
O/P MON – Output Monitored with Calibrated Equipment

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
6 dB Bandwidth	± 212.114 kHz
Power Spectral Density	± 3.0 dB
Maximum Conducted Output Power	± 0.70 dB
AC Line Conducted Emissions	± 3.2 dB
Spurious Radiated Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB
Authorised Band Edges	Conducted: ± 3.08 dB Radiated: 30 MHz to 1 GHz: ± 5.1 dB Radiated: 1 GHz to 40 GHz: ± 6.3 dB
Restricted Band Edges	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB

Product Service

SECTION 4

4ACCREDITATION, DISCLAIMERS AND COPYRIGHT

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).