

FCC Test Report

Client Information:

Applicant: Nicetex Electronics Ltd.
Applicant add.: Rm 22, 14/F, Block A, Hi-Tech Industrial Centre 5-21,
Pak Tin Par Street, Tsuen Wan, Hong Kong.

EUT Information:

EUT Name: Internet Radio
Model No.: DR22
Brand Name: N/A

Prepared By:

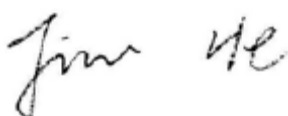
Asia Institute Technology (Dongguan) Limited
Add. : No.6 Binhe Road, Tianxin Village, Huangjiang,
Dongguan, Guangdong, China.
Date of Receipt: Sep. 25, 2009 Date of Test: Dec. 30, 2009~ Jan. 18, 2010
Date of Issue: Jan. 18, 2010 Test Result: **Pass**

Test procedure used: ANSI C63.4-2003

This device described above has been tested by Asia Institute Technology (Dongguan) Limited, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

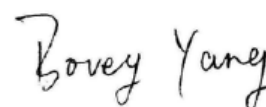
*This test report must not be used by the client to claim product endorsement by any agency of the U.S. government.

Reviewed by: _____



Test director

Approved by: _____



Technical director

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2 Test Summary

2.1 Compliance with FCC Part 15 subpart C

Test	Test Requirement	Standard Paragraph	Result
Conduction Emissions	FCC Part 15 C:2008	Section 15.203	PASS
Antenna Requirement	FCC Part 15 C:2008	Section 15.247(c)	PASS
Occupied Bandwidth	FCC Part 15 C:2008	Section 15.247(a)(2)	PASS
Peak power density	FCC Part 15 C:2008	Section 15.215(e)	PASS
Maximum Peak Output Power	FCC Part 15 C:2008	Section 15.215(b)(3)	PASS
Band edge	FCC Part 15 C:2008	Section 15.215(d)	PASS
Conducted Spurious Emissions	FCC Part 15 C:2008	Section 15.215(d)	PASS
Radiated Emissions	FCC Part 15 C:2008	Section 15.215(d)	PASS
RF Exposure requirement	FCC Part 15 C:2008	Section 15.247(i)	PASS

2.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, The following measurements uncertainty Level have estimated based on ANSI C63.4:2003, the maximum value of the uncertainty as below

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	Radiated Emission Test	$\pm 3.57\text{dB}$

3 Test Facility

The test facility is recognized, certified or accredited by the following organizations:

.FCC- Registration No: 248337

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dong guan) Limited have been registered by Federal Communications Commission (FCC) on Dec.07, 2006.

.Industry Canada(IC)-Registration No: IC6819A-1 & IC6819A-2

The 3m Semi-Anechoic Chamber and 3m/10m Open Area Test Site of Asia Institute Technology (Dongguan) Limited have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing on Nov.07, 2006.

.VCCI- Registration No: R-2482 & C-2730

The 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dongguan) Limited have been registered by Voluntary Control Council for Interference on Jan.24, 2007.

.TUV Rhineland

Asia Institute Technology (Dongguan) Limited has been assessed on Jan.16, 2007 that it can carry out EMC tests by order and under supervision of TUV Rhineland.

.ITS- Registration No: TMPSHA031

Asia Institute Technology (Dongguan) Limited has been assessed and included in Intertek Shanghai TMP Program regarding Laboratory facilities and test equipment on Nov.10, 2006.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

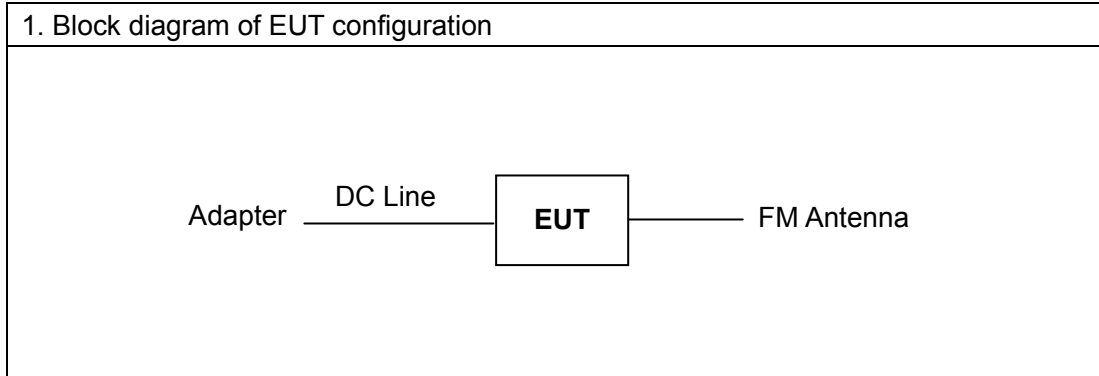
4 General Information

4.1 General Description of EUT

Manufacturer:	Mei Hua Electronics (Hui Zhou) Limited		
Manufacturer Address:	Jinlong road (Qingxi section), Longmen, Huizhou, Guangdong, China		
EUT Name:	Internet Radio		
Model No:	DR22		
Operation frequency:	2412 MHz to 2462 MHz		
Channel Number:	11		
Modulation Technology:	DSSS		
AntennaType:	PIFA		
Brand Name:	N/A		
Serial No:	N/A		
Power Supply Range:	N/A		
Power Supply:	DC 9V from adapter AC 120V/60Hz		
Power Cord:	DC Line: 1.5m/ Unshielded / Undetachable / Without ferrite core		
Signal Cable:	N/A		
Description of Channel:			
channel	Frequency (MHz)	channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

4.2 Description of Test conditions

- (1) EUT was tested in normal configuration (Please See following Block diagram)



- (2) E.U.T. test conditions:

15.31(e) :For intentional radiators, measurements of the variation of the input power or the adiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% ofthe nominal rated supply voltage. For battery operated equipment, theequipment tests shall be performed using a new battery.

- (3) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. if required. reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

- (4) Frequency range of radiated measurements:

According to the 15.33,The test range will be upto the tenth harmonic of the highest fundamental frequency

4.3 Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	AC/DC ADAPTOR	KINGS	KSS12-090-1250U	N/A	1.5m/ Unshielded / Undetachable	N/A

5 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	Agilent	E4446A	MY43360458	2009.04.17	2010.04.16
2	EMI Measuring Receiver	Schaffner	SCR3501	235	2009.04.08	2010.04.07
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2009.09.08	2010.03.07
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2009.04.08	2010.04.07
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2009.07.15	2010.07.14
6	Broadband Horn Antenna	SCHWARZBECK	BBHA9120A	451	2009.07.15	2010.07.14
7	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2009.09.08	2010.03.07
8	EMI Test Receiver	R&S	ESCI	100124	2009.12.28	2010.12.27
9	LISN	Kyoritsu	KNW-242	8-837-4	2009.04.08	2010.04.07
10	LISN	Kyoritsu	KNW-407	8-1789-3	2009.04.08	2010.04.07
11	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2009.09.08	2010.03.07

6 Test Result

6.1 Antenna Requirement

6.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

6.1.2 EUT Antenna

The antenna is PIFA type and Antenna's connector is UFL. antenna gain is 2.3dbi max

6.2 Conduction Emissions Measurement

6.2.1 limit

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: Decreases with the logarithm of the frequency.

6.2.2 Test result

EUT was placed upon a wooden test table 0.8m above the horizontal metal reference plane and 0.4m from the vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

6.2.3 Test result

Test Data: 2009-12-30

Operating Environment: 20.3°C, 52% RH, 102 Kpa

Line

Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Quasi peak (dBμV)	Limit (dBμV)	Margin (dB)	Reading Level (dBuV)	Average (dBμV)	Limit (dBμV)	Margin (dB)
0.1580	31.48	11.75	43.23	65.57	-22.34	19.84	31.59	55.57	-23.98
*0.3100	37.18	10.71	47.89	59.97	-12.08	28.24	38.95	49.97	-11.02
0.4060	27.92	10.53	38.45	57.73	-19.28	19.20	29.73	47.49	-17.76
0.6180	27.57	10.29	37.86	56.00	-18.14	13.20	23.49	46.00	-22.51
0.9420	28.20	10.19	38.39	56.00	-17.61	18.42	28.61	46.00	-17.39
29.1340	30.39	10.79	41.18	60.00	-18.82	20.18	30.97	50.00	-19.03

Neutral

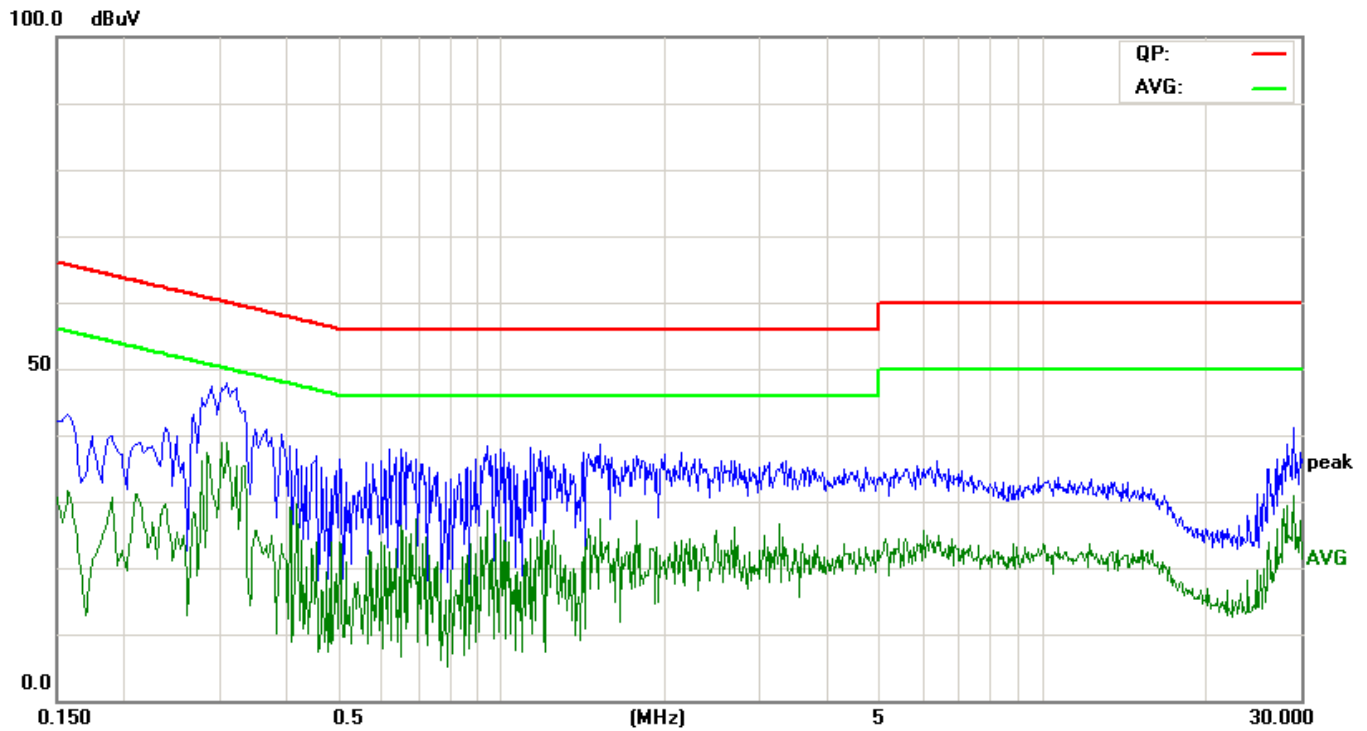
Frequency (MHz)	Reading Level (dBuV)	Factor (dB)	Quasi peak (dBμV)	Limit (dBμV)	Margin (dB)	Reading Level (dBuV)	Average (dBμV)	Limit (dBμV)	Margin (dB)
0.1540	32.25	11.85	44.10	65.78	-21.68	21.00	32.85	55.78	-22.93
0.1900	29.55	11.26	40.81	64.04	-23.23	13.51	24.77	54.03	-29.26
*0.3100	31.37	10.71	42.08	59.97	-17.89	20.50	31.21	49.97	-18.76
0.3940	20.92	10.55	31.47	57.98	-26.51	12.95	23.50	47.98	-24.48
0.6300	21.46	10.29	31.75	56.00	-24.25	9.26	19.55	46.00	-26.45
28.3060	28.05	10.73	38.78	60.00	-21.22	16.80	27.53	50.00	-22.47

Note: “*” means the worst case

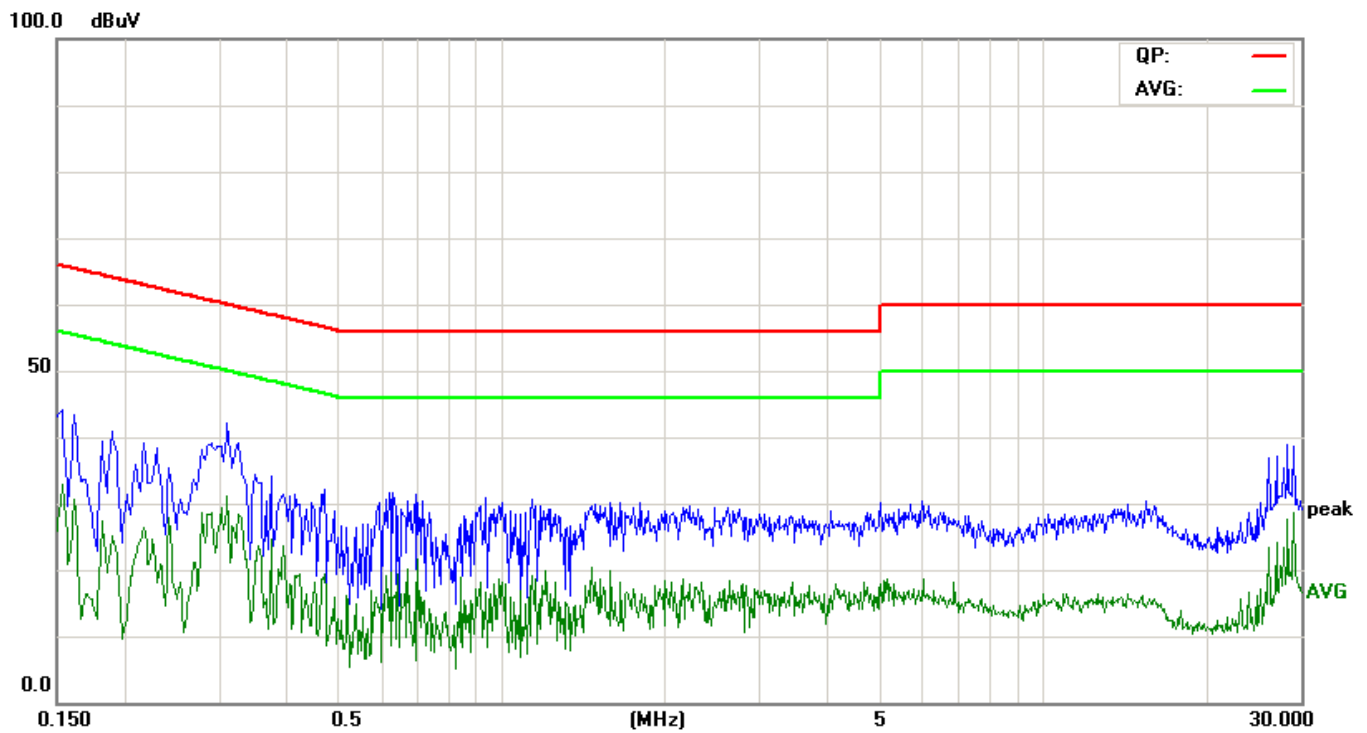
Quasi peak/Average = Reading Level + Factor

Factor= Cable Loss + LISN insertion loss

Line --Operating mode: Running



Neutral --Operating mode: Running



6.3 Occupied Bandwidth

6.3.1 limit

15.247(a) (2) Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.3.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer , set the Spectrum Analyzer as RBW=100kHz,VBW $\geq$ RBW,Sweep time=Auto, Detector Function=Peak
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB down one side of the emission.
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. also shall be performed at different modes of operation

6.3.3 Test result

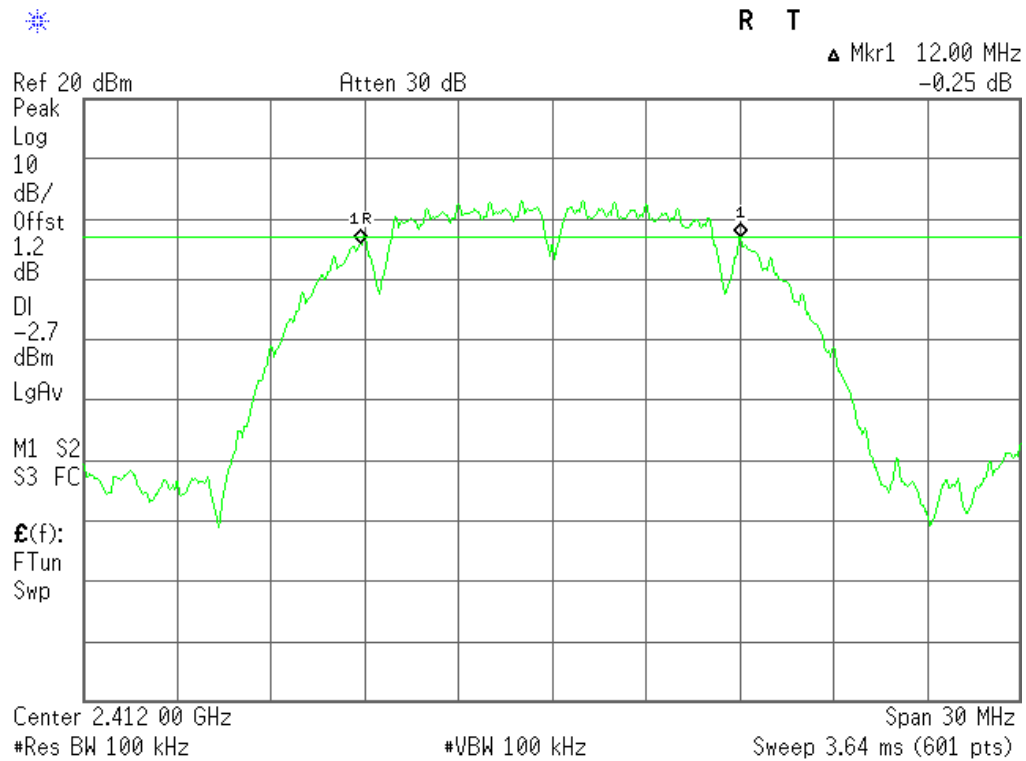
802.11 b

channel	Channel frequency (MHz)	6dB bandwidth (MHz)	Limit (KHz)	Conclusion
Low	2412	12.00	500	Pass
Middle	2437	12.08	500	Pass
Highest	2462	12.04	500	Pass

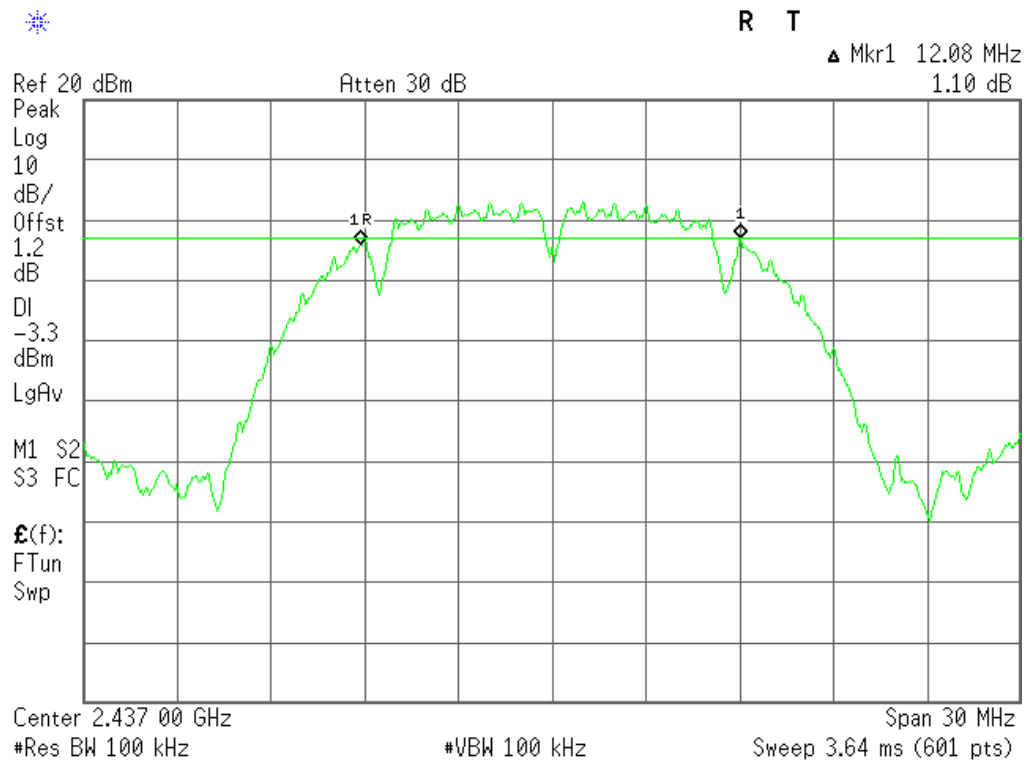
802.11 g

channel	Channel frequency (MHz)	6dB bandwidth (MHz)	Limit (KHz)	Conclusion
Low	2412	16.50	500	Pass
Middle	2437	16.50	500	Pass
Highest	2462	16.52	500	Pass

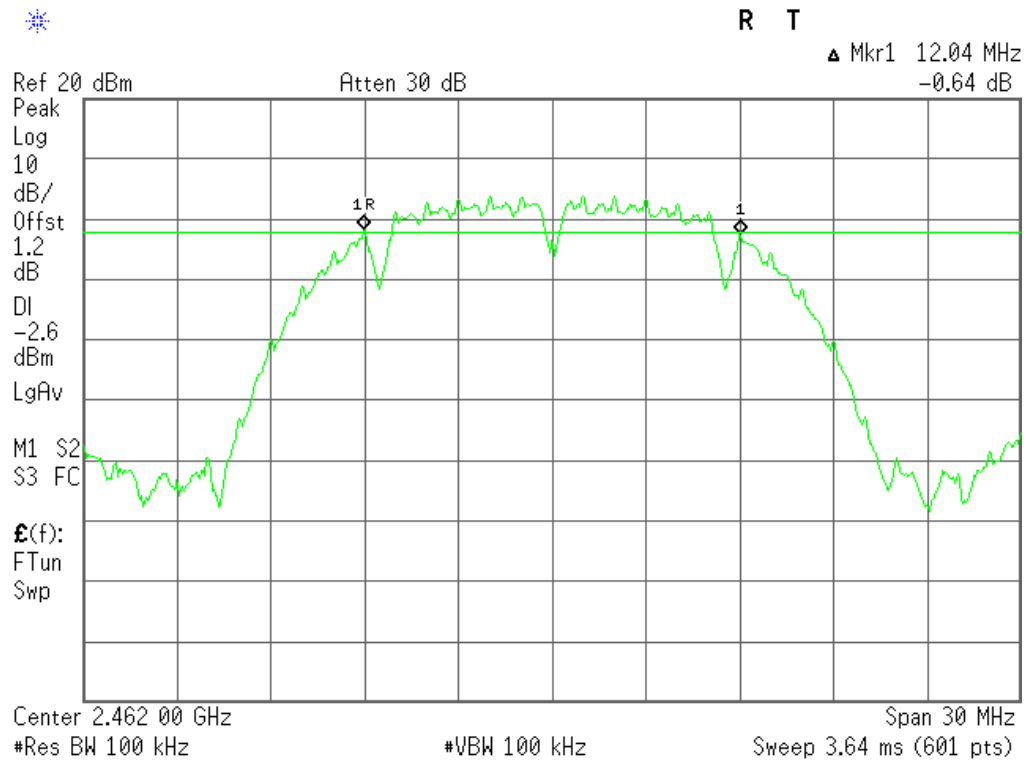
Low (802.11 b)



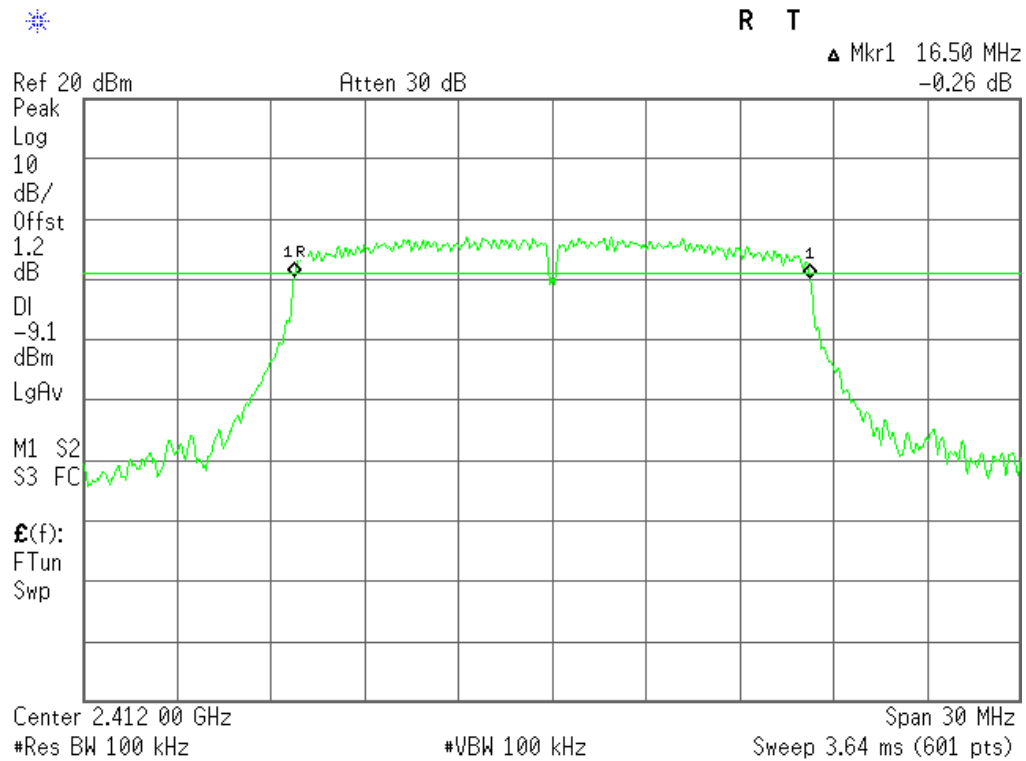
Middle (802.11 b)



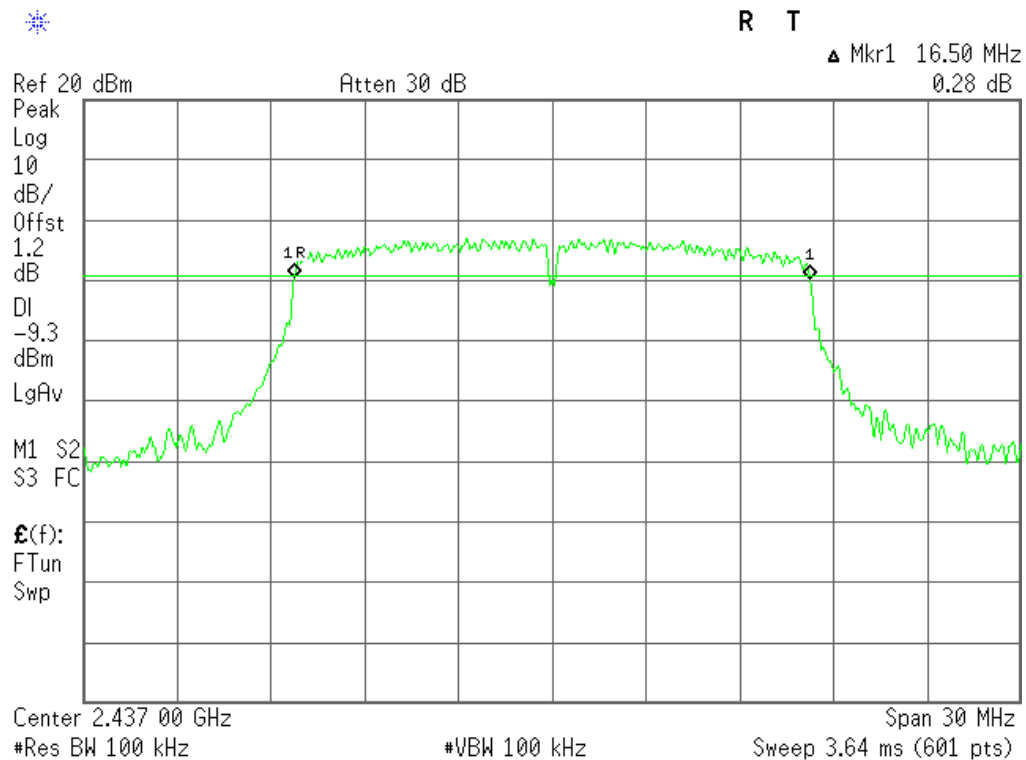
Highest (802.11 b)



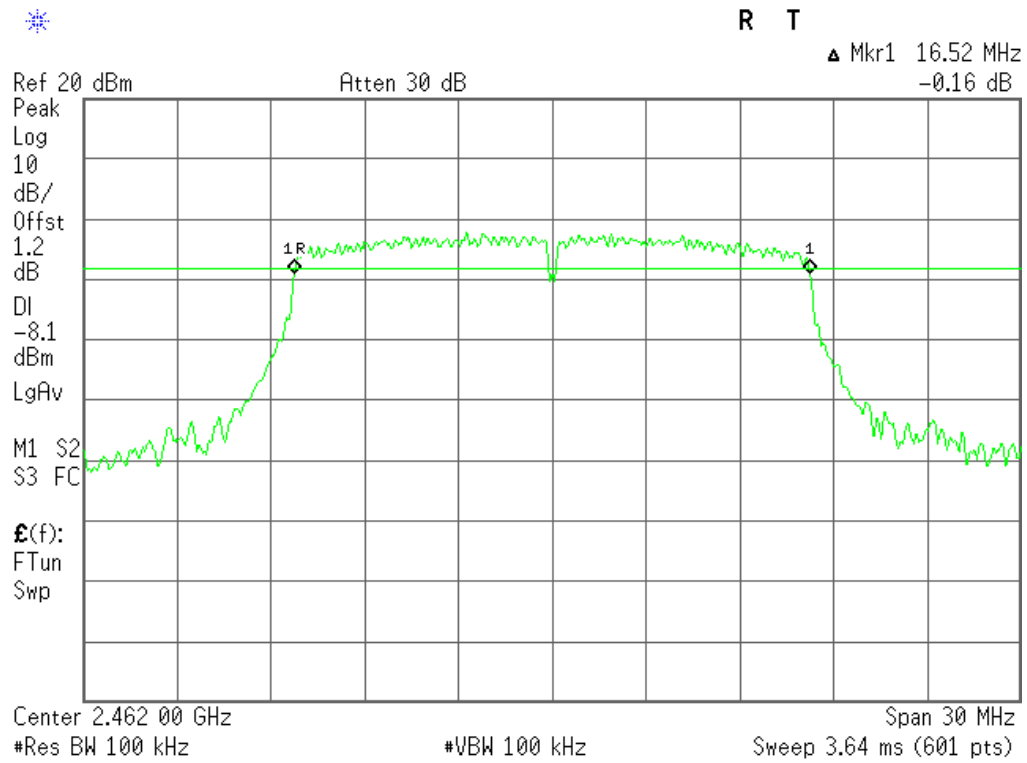
Low (802.11 g)



Middle (802.11 g)



Highest (802.11 g)



6.4 Peak Power Density

6.4.1 limit

15.247(a) (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

6.4.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=3kHz, VBW=10kHz, Sweep time=100s, Detector Function=Peak
- (2) The EUT should be transmitting at its maximum data rate. Use the marker-peak function to set the marker to the peak of the emission
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. also shall be performed at different modes of operation

6.4.3 Test result

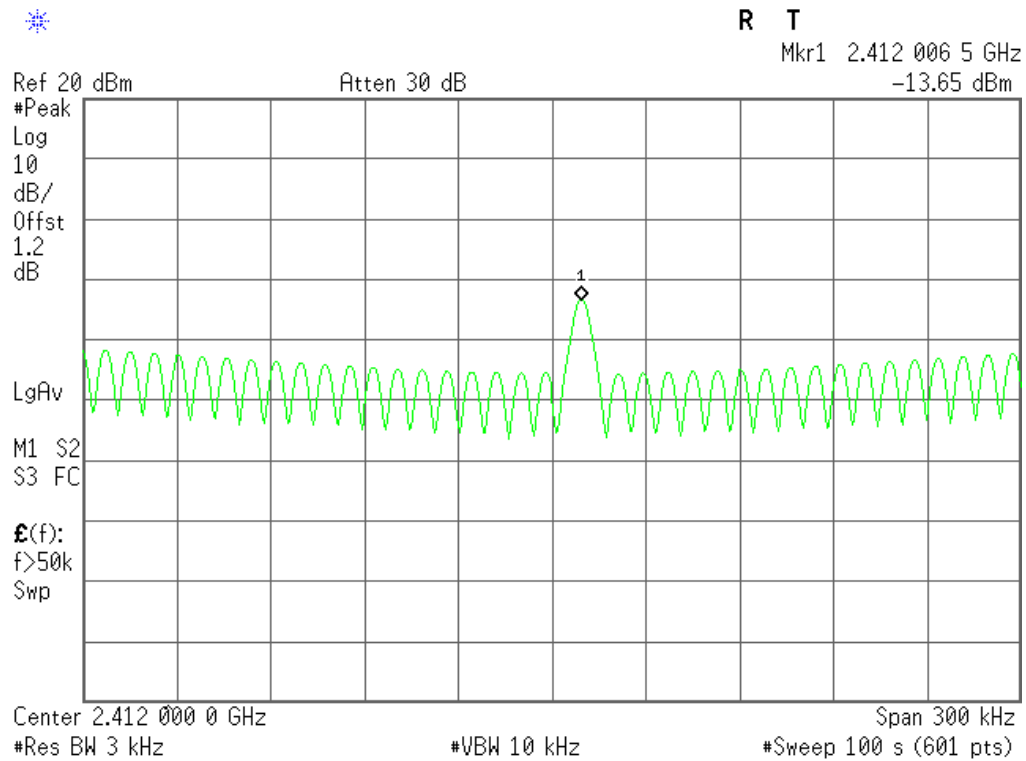
802.11 b

channel	Channel frequency (MHz)	Peak power density (dBm)	Limit (dBm)	Conclusion
Low	2412	-13.65	8	Pass
Middle	2437	-13.89	8	Pass
Highest	2462	-13.80	8	Pass

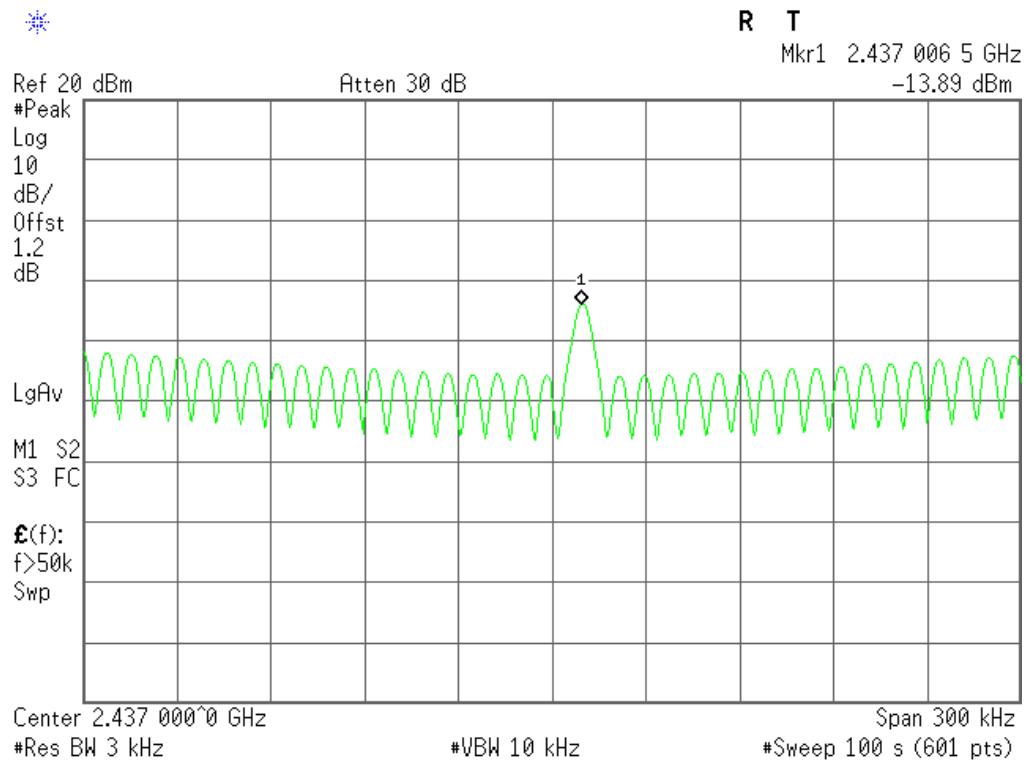
802.11 g

channel	Channel frequency (MHz)	Peak power density (dBm)	Limit (dBm)	Conclusion
Low	2412	-17.51	8	Pass
Middle	2437	-18.34	8	Pass
Highest	2462	-17.23	8	Pass

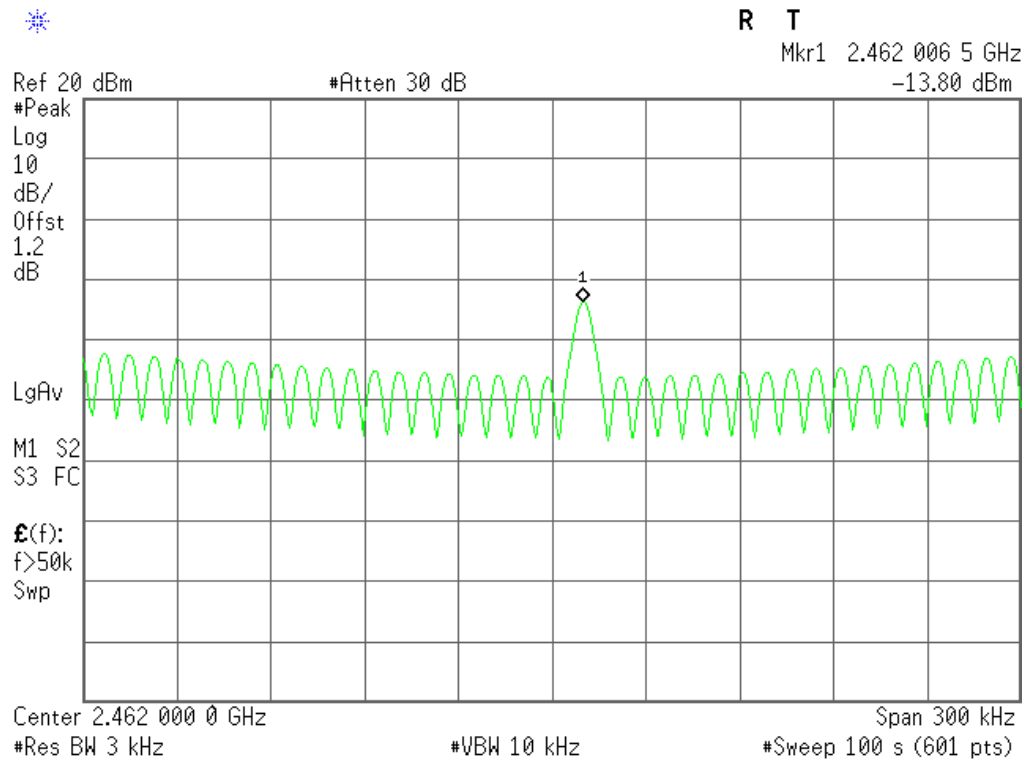
Low (802.11 b)



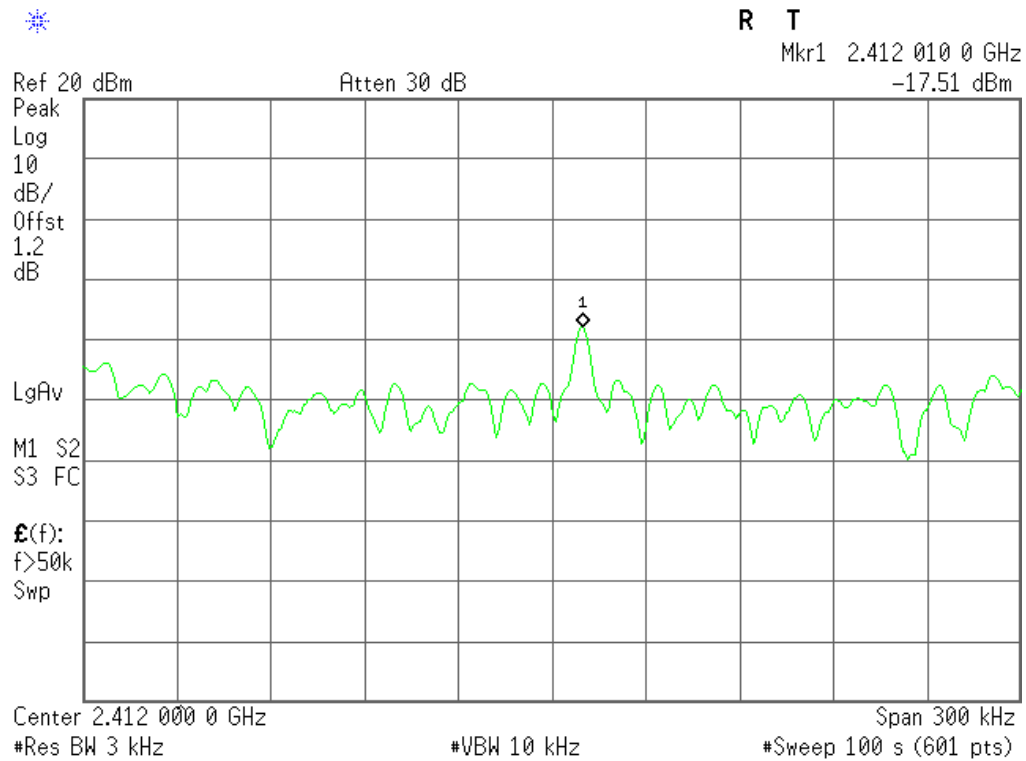
Middle (802.11 b)



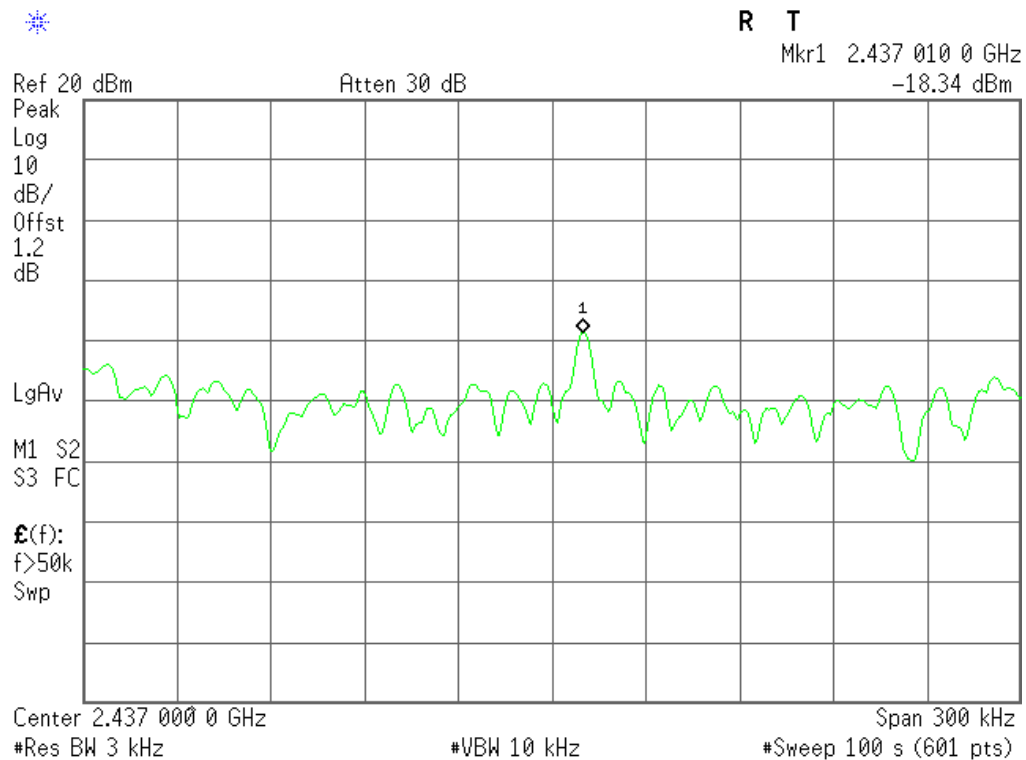
Highest (802.11 b)



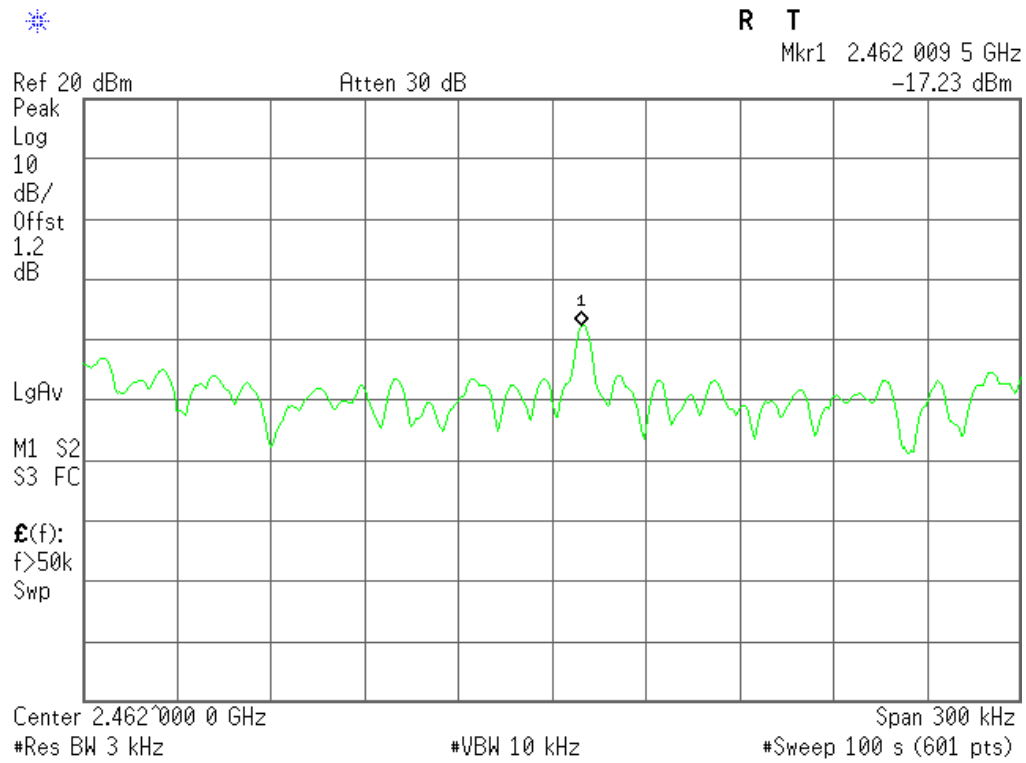
Low (802.11 g)



Middle (802.11 g)



Highest (802.11 g)



6.5 Maximum Peak Output Power

6.5.1 limit

15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

6.5.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=1MHz,VBW $\geq$ RBW,Sweep time=Auto, Detector Function=Peak
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use channel function to find Maximum power. The indicated level is the output power
- (3) The above procedure shall be repeated at the lowest, the middle, and the highest frequency of the stated frequency range with modulated mode. also shall be performed at different modes of operation

6.5.3 Test result

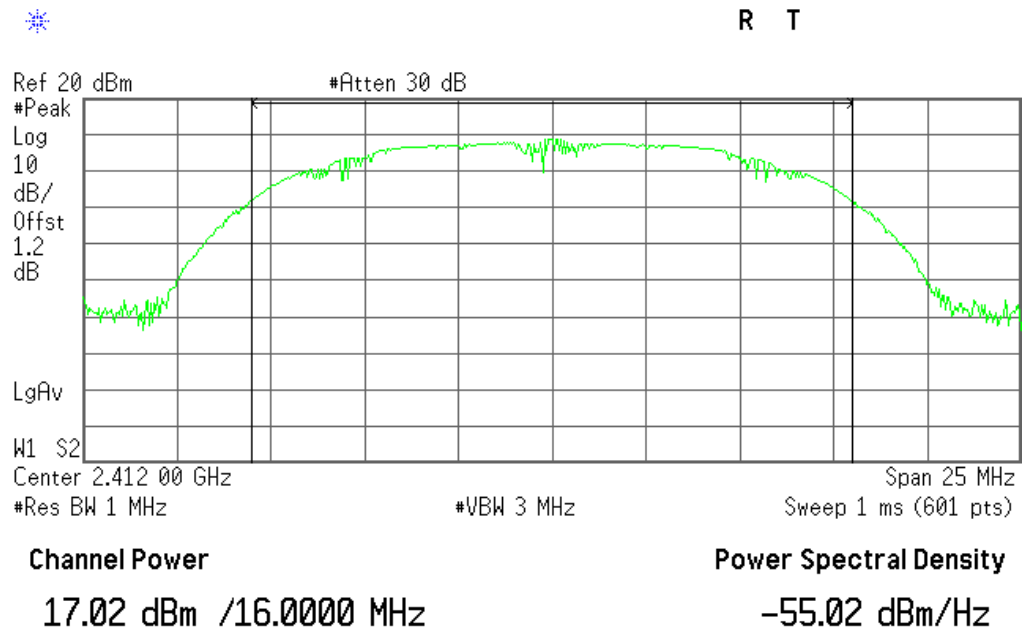
802.11 b

channel	Channel frequency (MHz)	Read Power (dBm)	Limit (dBm)	Conclusion
Low	2412	17.02	30	Pass
Middle	2437	17.07	30	Pass
Highest	2462	17.26	30	Pass

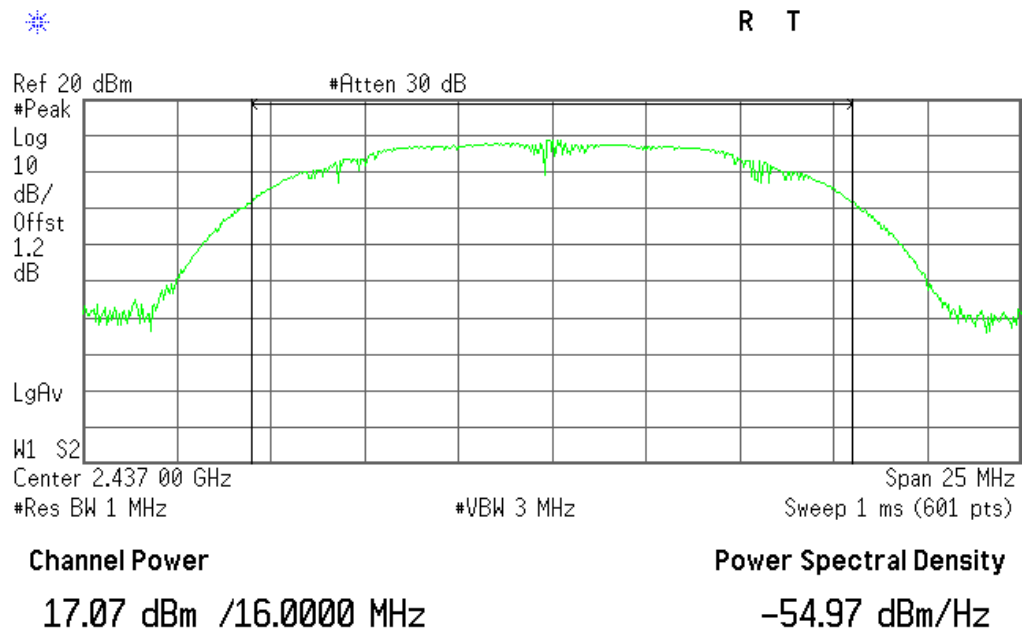
802.11 g

channel	Channel frequency (MHz)	Read Power (dBm)	Limit (dBm)	Conclusion
Low	2412	15.07	30	Pass
Middle	2437	15.02	30	Pass
Highest	2462	15.12	30	Pass

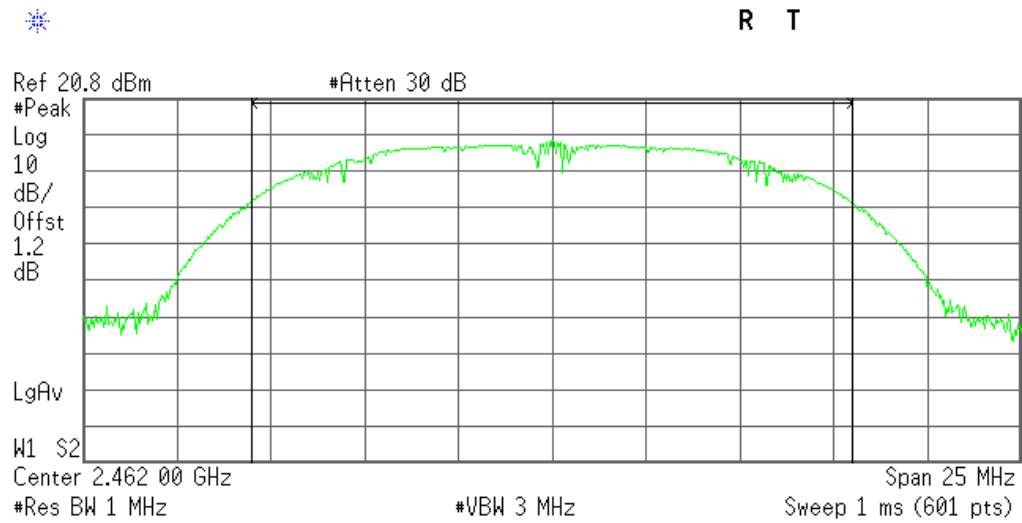
Low (802.11 b)



Middle (802.11 b)



Highest (802.11 b)



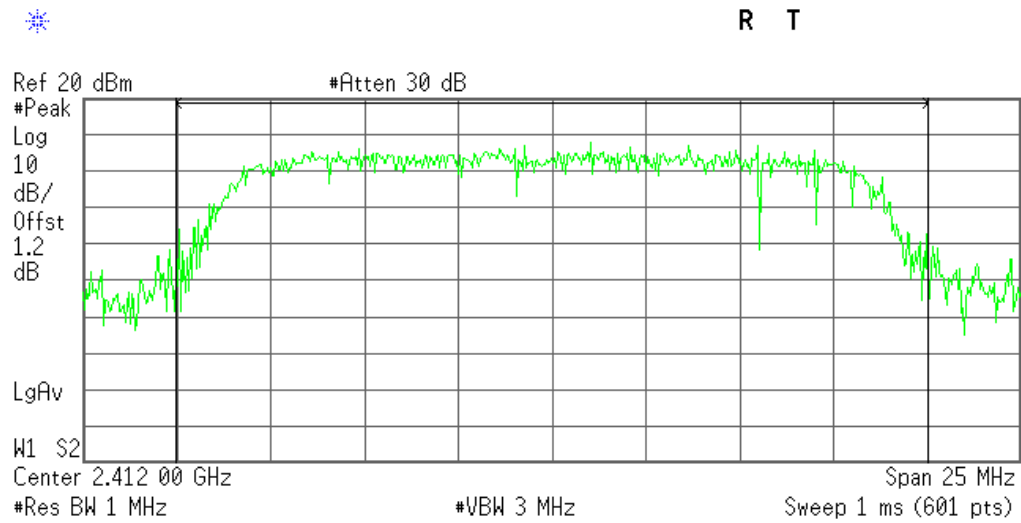
Channel Power

17.26 dBm /16.0000 MHz

Power Spectral Density

-54.79 dBm/Hz

Low (802.11 g)



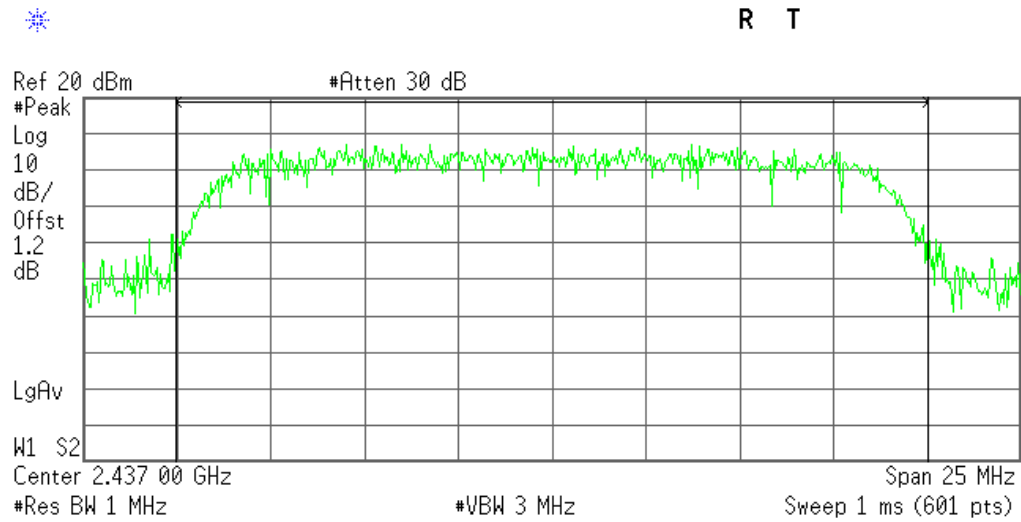
Channel Power

15.07 dBm /20.0000 MHz

Power Spectral Density

-59.94 dBm/Hz

Middle (802.11 g)



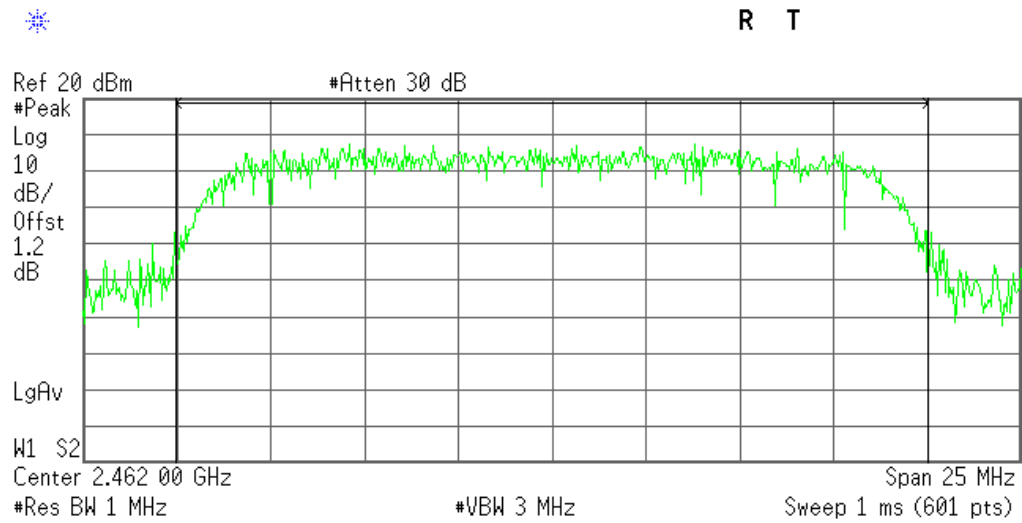
Channel Power

15.02 dBm /20.0000 MHz

Power Spectral Density

-59.99 dBm/Hz

Highest (802.11 g)



Channel Power

15.12 dBm /20.0000 MHz

Power Spectral Density

-58.16 dBm/Hz

6.6 Band edge

6.6.1 limit

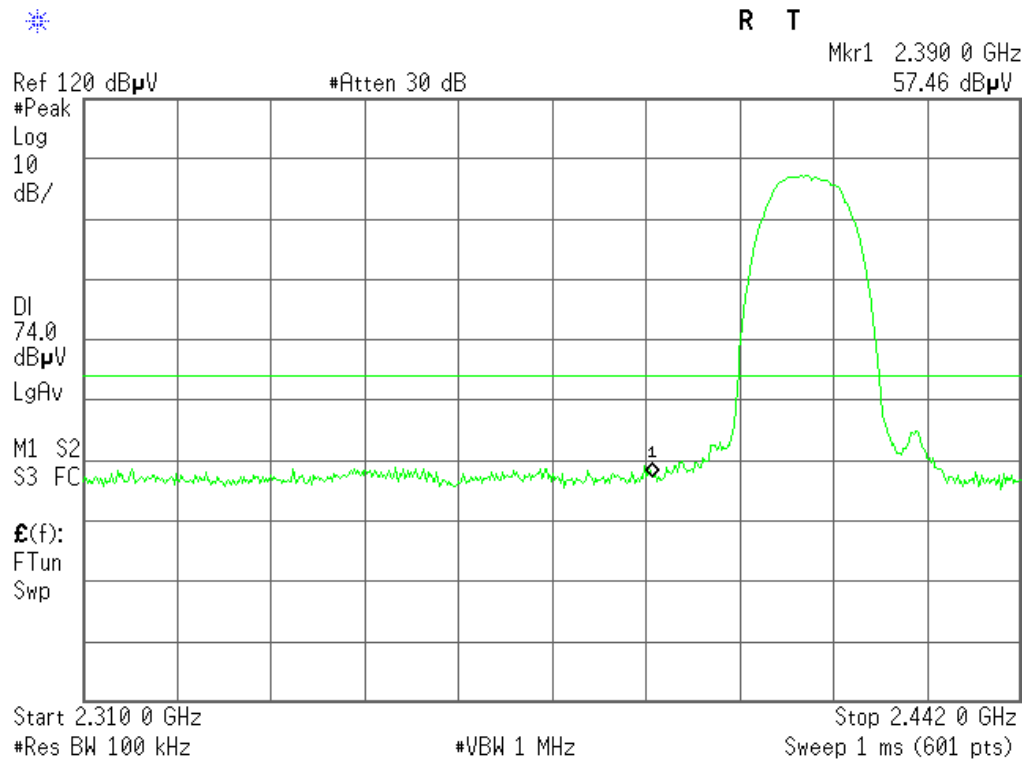
15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.6.2 Test procedure

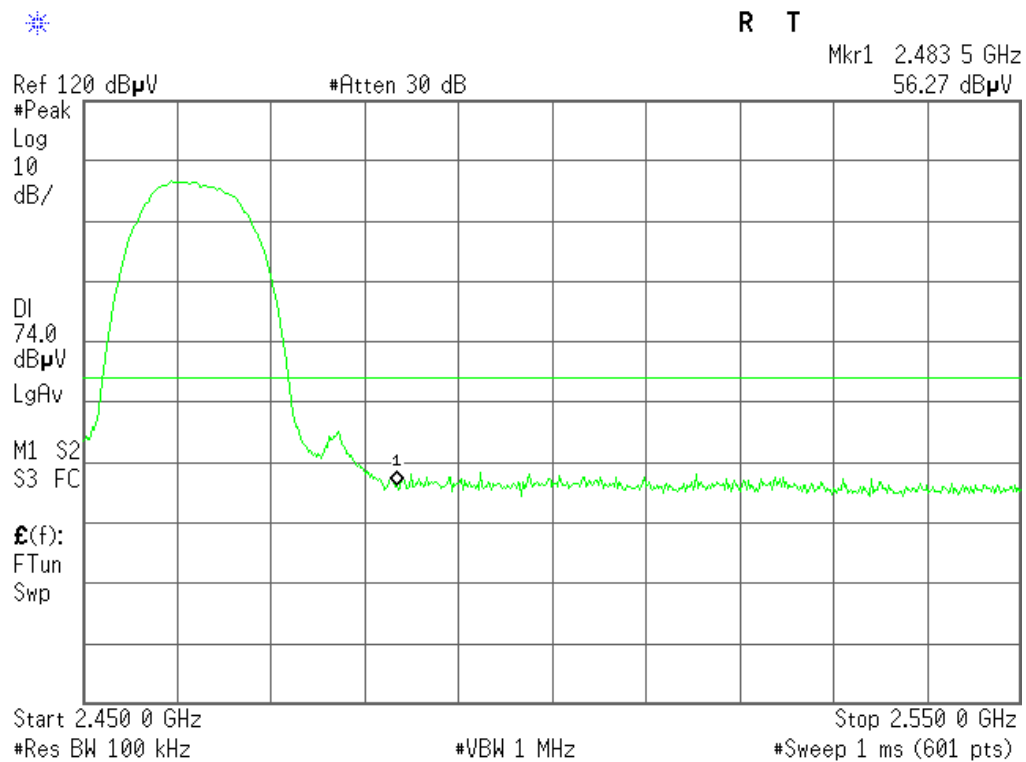
- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=100kHz, VBW $\geq$ RBW, Sweep time=Auto, Detector Function=Peak
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. And then marker the bandedge Level.
- (3) The above procedure shall be repeated at the lowest, and the highest frequency of the stated frequency range with modulated mode.

6.6.3 Test result

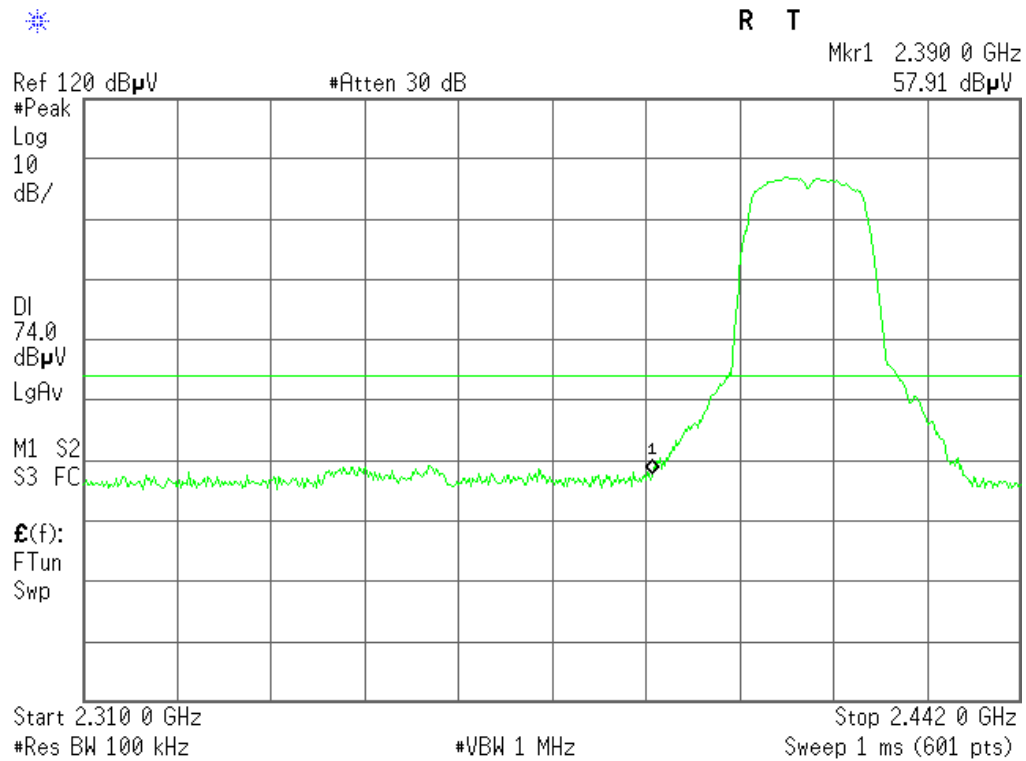
Low (802.11 b)



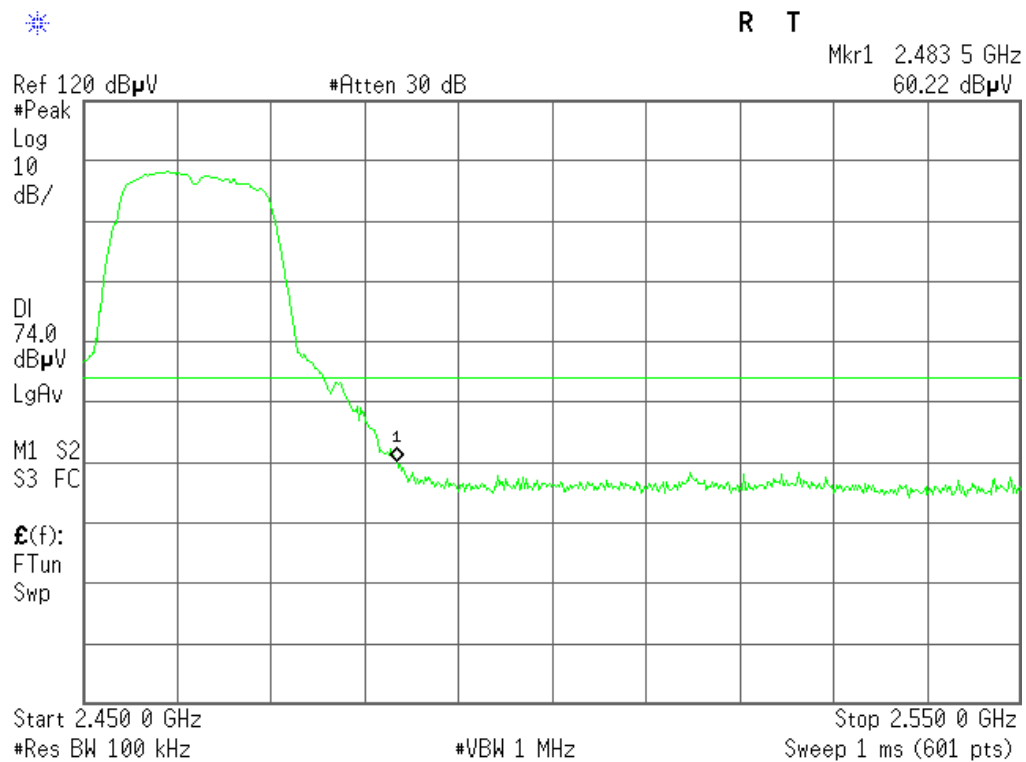
Highest (802.11 b)



Low (802.11 g)



Highest (802.11 g)



6.7 Conducted Spurious Emissions

6.7.1 limit

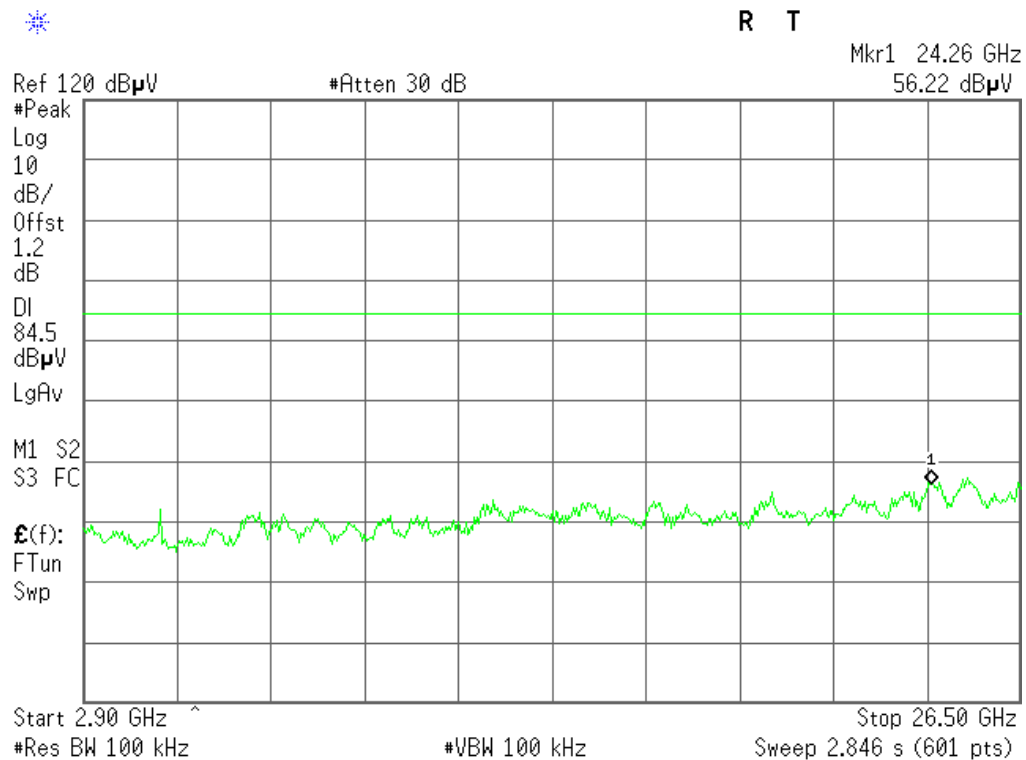
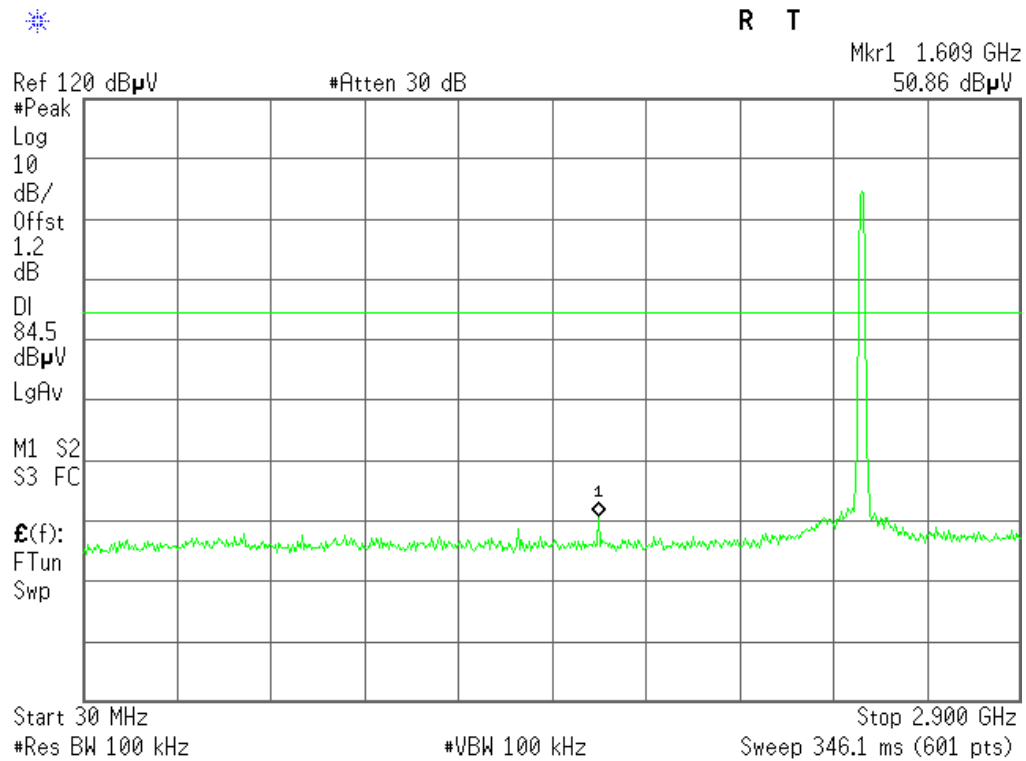
15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.7.2 Test procedure

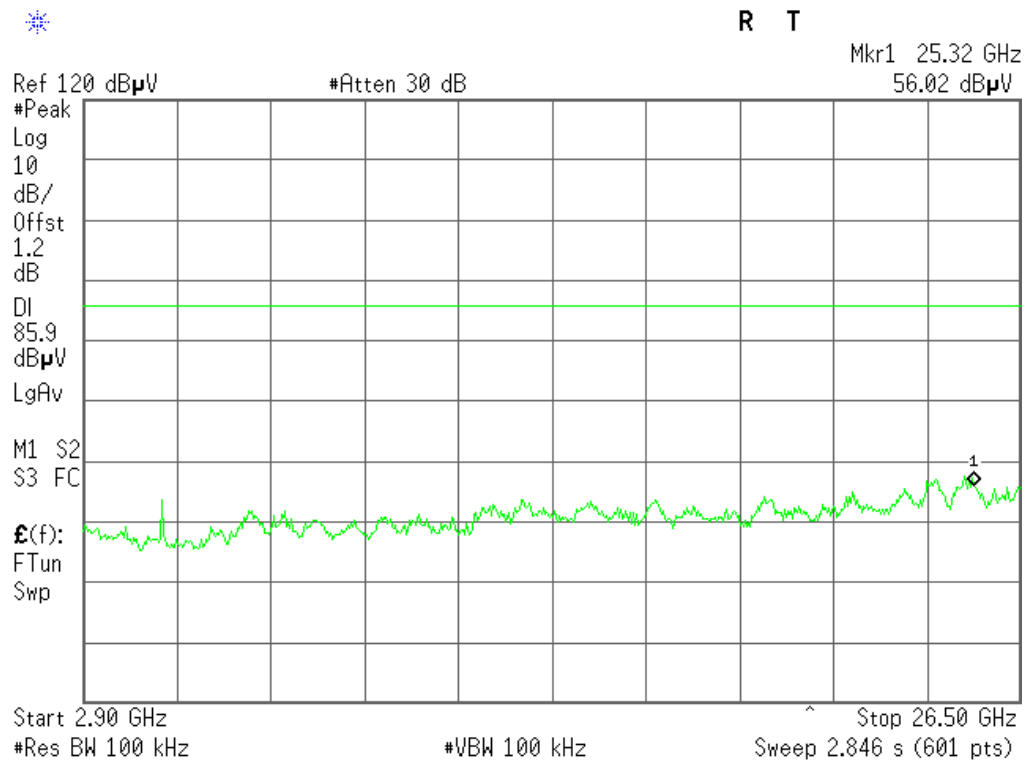
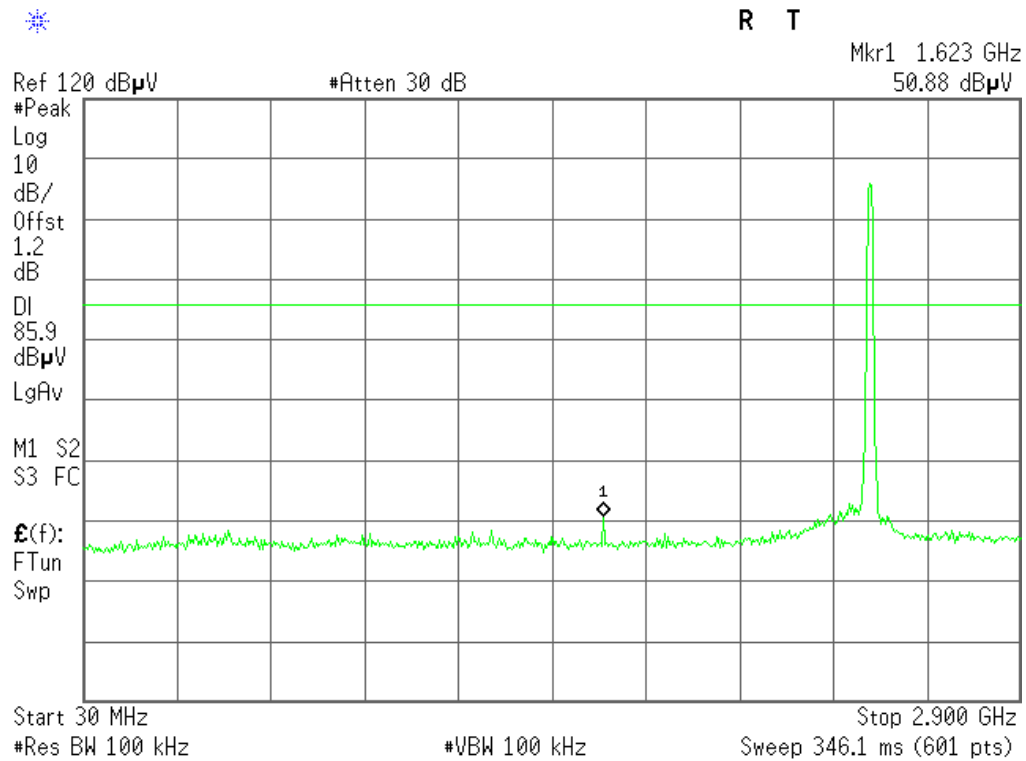
- (4) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=100kHz, VBW $\geq$ RBW, Sweep time=Auto, Detector Function=Peak
- (5) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. And then marker the bandedge Level.
- (6) The above procedure shall be repeated at the lowest, and the highest frequency of the stated frequency range with modulated mode.

6.7.3 Test result

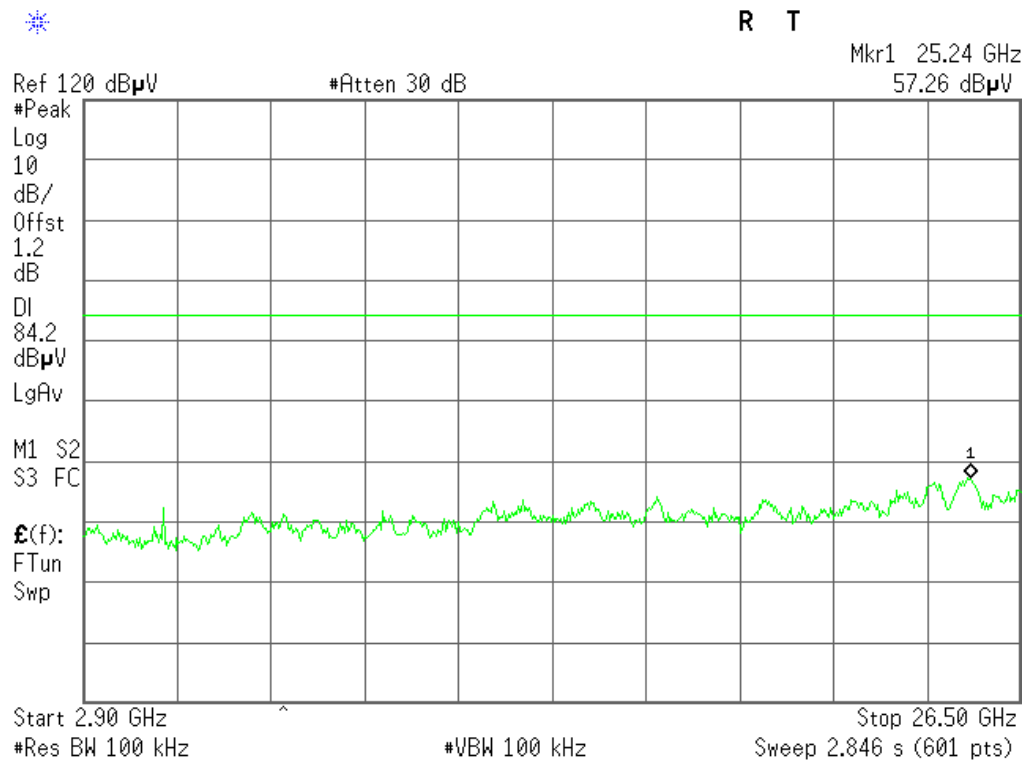
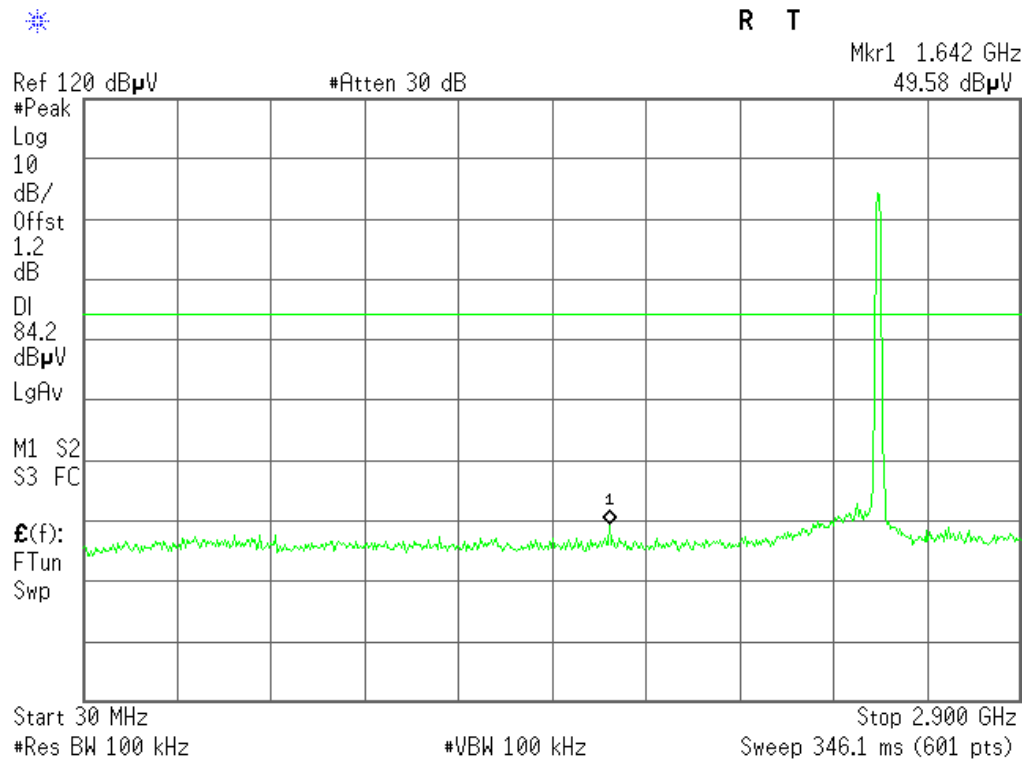
Low (802.11 b)



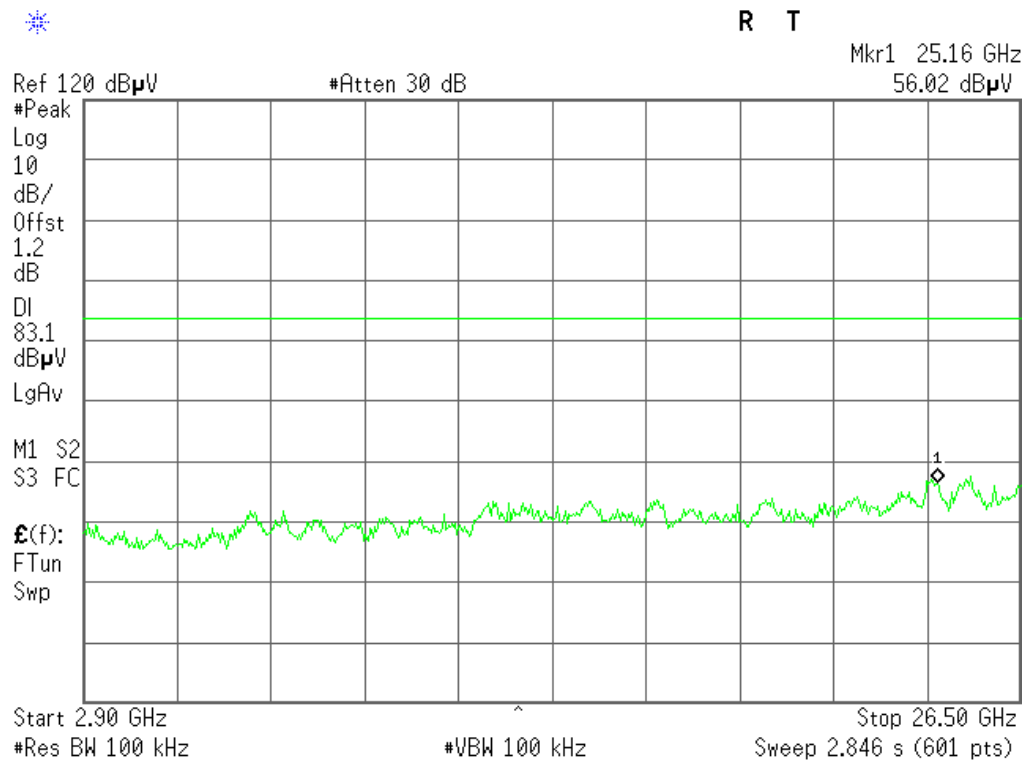
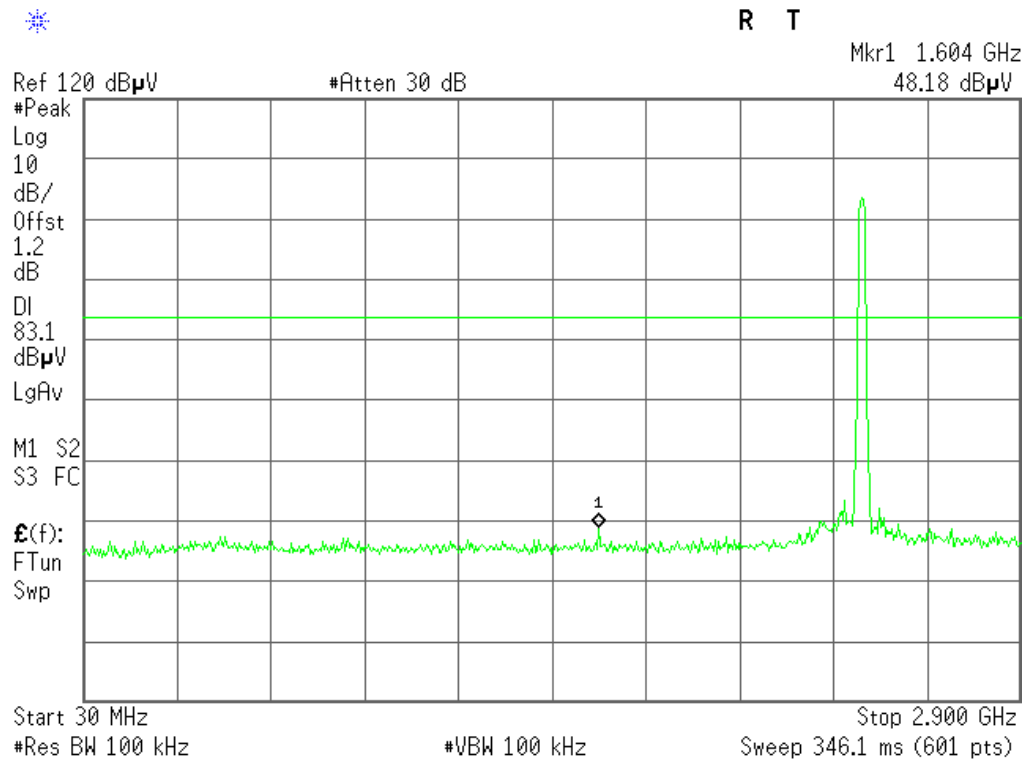
Middle (802.11 b)



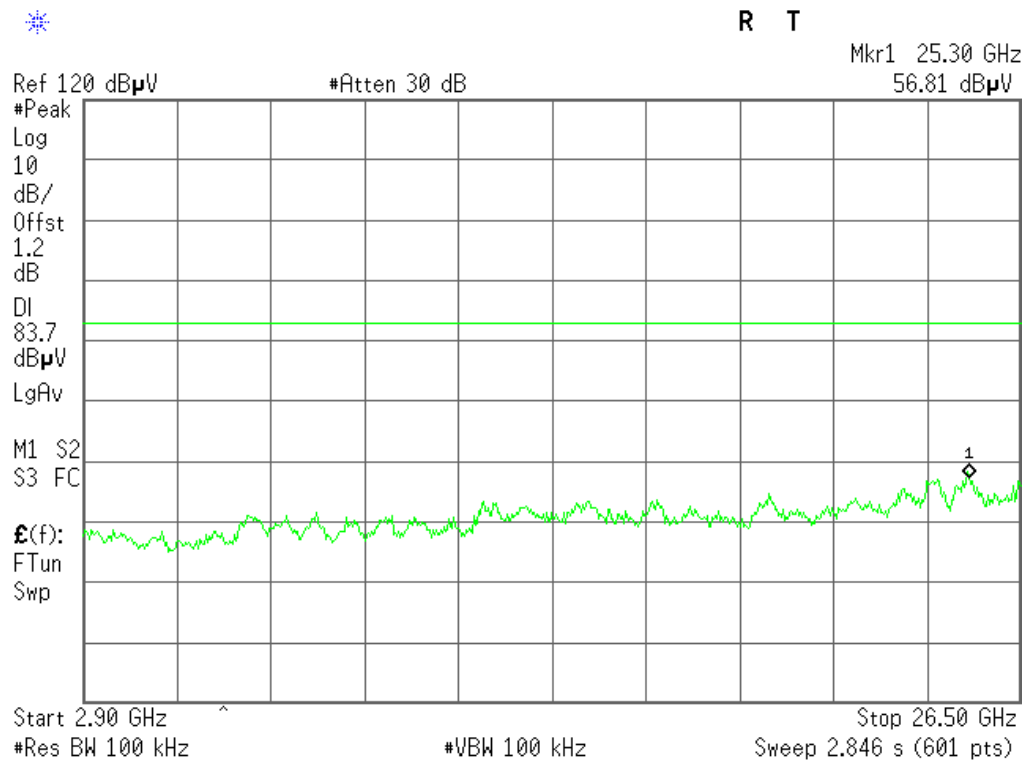
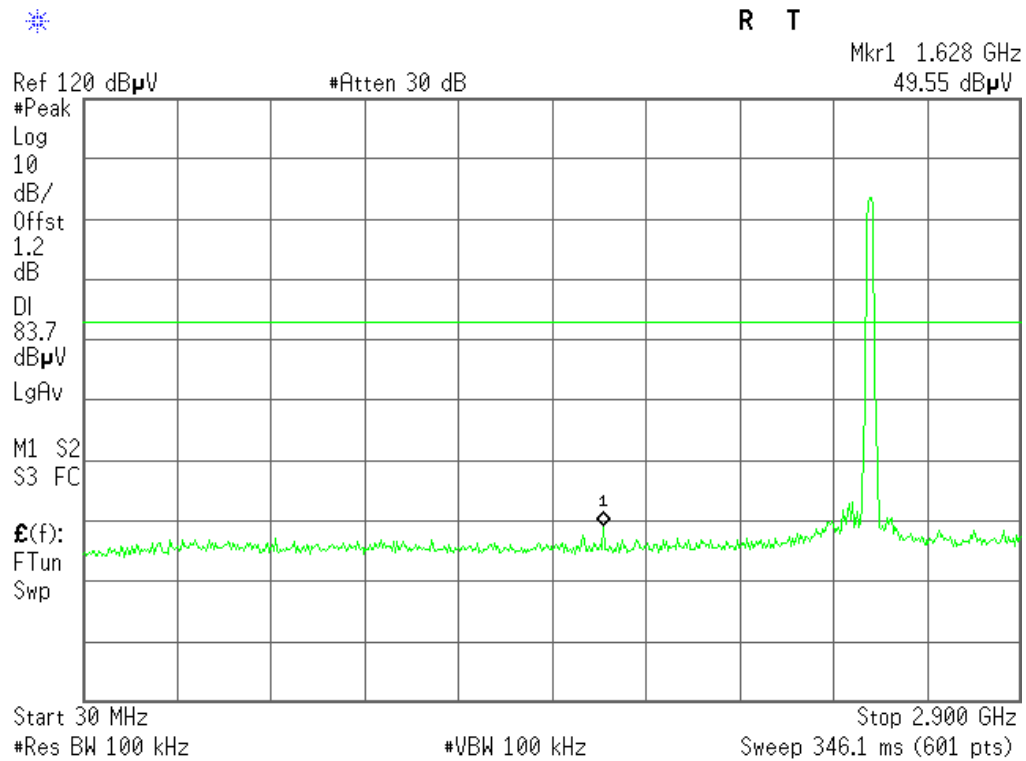
Highest (802.11 b)



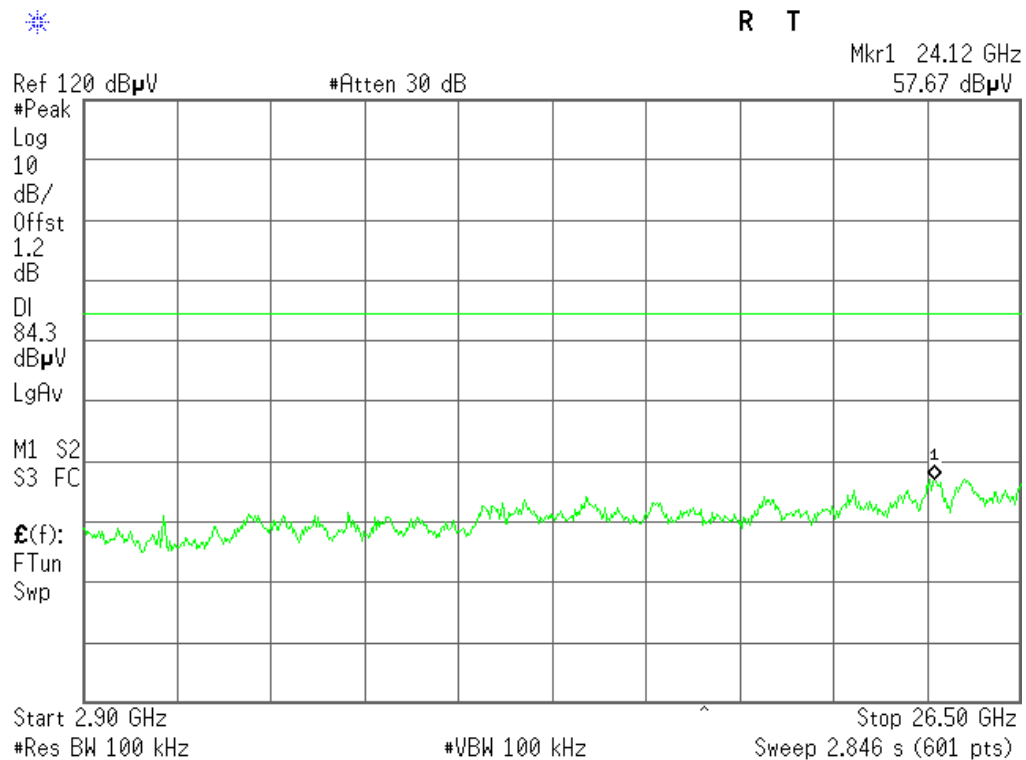
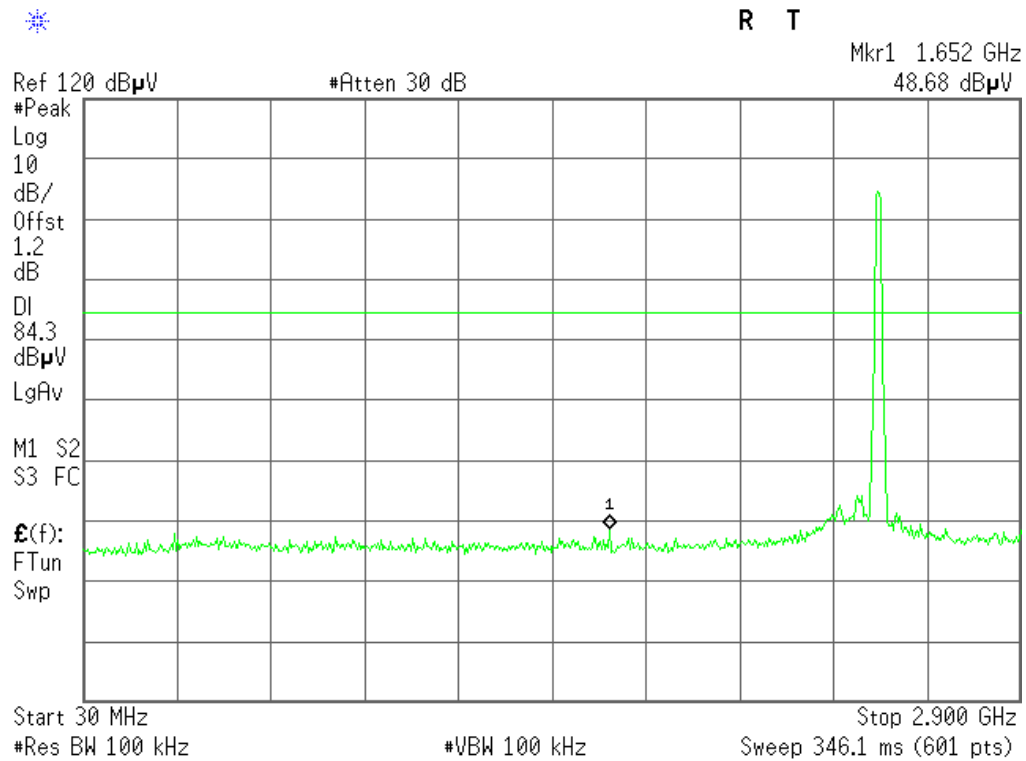
Low (802.11 g)



Middle (802.11 g)



Highest (802.11 g)



6.8 Radiated Emissions Measurement

6.8.1 Limit

15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c))

Frequency of Emission (MHz)	Field Strength		Measurement Distance (meters)
	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$	
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

6.8.2 Test procedure

EUT was placed upon a wooden test table which was placed on the turn table 0.8m above the horizontal metal ground plane, and operating in the mode as mentioned above. A receiving antenna was placed 3m away from the EUT. During testing, turn around the turn table and move the antenna from 1m to 4m to find the maximum field-strength reading. All peripherals were placed at a distance of 10cm between each other. Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

6.8.3 Test Result

Test Data: 2009-12-30

Frequency Range: 30MHz to 1GHz

Measurement Distance: 3 m

Operating Environment: 22.1°C, 50% RH, 102 Kpa

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
157.070	16.610	21.315	37.925	-5.575	43.500	QUASIPeAK
224.000	14.280	26.605	40.885	-5.115	46.000	QUASIPeAK
*335.550	18.150	23.982	42.132	-3.868	46.000	QUASIPeAK
447.100	21.170	20.747	41.917	-4.083	46.000	QUASIPeAK
783.690	28.280	10.067	38.347	-7.653	46.000	QUASIPeAK
895.240	29.620	10.731	40.351	-5.649	46.000	QUASIPeAK

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
*30.440	13.349	22.300	35.649	-4.351	40.000	QUASIPeAK
157.070	16.610	18.248	34.858	-8.642	43.500	QUASIPeAK
224.000	14.280	21.477	35.757	-10.243	46.000	QUASIPeAK
447.100	21.170	18.991	40.161	-5.839	46.000	QUASIPeAK
559.620	23.670	14.081	37.751	-8.249	46.000	QUASIPeAK
783.690	28.280	13.134	41.414	-4.586	46.000	QUASIPeAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor = Ant Factor + Cable Loss

Test Data: 2009-12-30

Frequency Range: 1GHz to 25GHz

Measurement Distance: 3 m

Operating Environment: 20.5°C, 51% RH, 102 Kpa

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1145.000	35.162	11.346	46.508	-7.492	54.000	AVERAGE
1145.000	35.162	18.746	53.908	-20.092	74.000	PEAK
1610.000	35.292	13.464	48.756	-5.244	54.000	AVERAGE
1610.000	35.292	25.964	61.256	-12.744	74.000	PEAK
2140.000	37.020	9.461	46.481	-7.519	54.000	AVERAGE
2140.000	37.020	17.261	54.281	-19.719	74.000	PEAK
*2400.000	37.867	12.827	50.694	-3.306	54.000	AVERAGE
2400.000	37.867	25.927	63.794	-10.206	74.000	PEAK

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1140.000	35.150	11.346	46.496	-7.504	54.000	AVERAGE
1140.000	29.060	29.636	58.696	-15.304	74.000	PEAK
1620.000	35.333	12.238	47.571	-6.429	54.000	AVERAGE
1620.000	30.033	29.938	59.971	-14.029	74.000	PEAK
*2400.000	37.867	12.361	50.228	-3.772	54.000	AVERAGE
2400.000	33.897	30.731	64.628	-9.372	74.000	PEAK
4860.000	41.903	5.144	47.047	-6.953	54.000	AVERAGE
4865.000	40.121	16.776	56.897	-17.103	74.000	PEAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Low Channel:2412 MHz (802.11 b)

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBUV)	Measure Level (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Detector Type
1145.000	35.162	10.912	46.074	-7.926	54.000	AVERAGE
1145.000	35.162	17.012	52.174	-21.826	74.000	PEAK
*1620.000	35.333	14.879	50.212	-3.788	54.000	AVERAGE
1620.000	35.333	28.279	63.612	-10.388	74.000	PEAK
2135.000	37.003	8.399	45.402	-8.598	54.000	AVERAGE
2155.000	37.067	13.991	51.058	-22.942	74.000	PEAK

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBUV)	Measure Level (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Detector Type
1140.000	35.150	11.627	46.777	-7.223	54.000	AVERAGE
1140.000	35.150	20.327	55.477	-18.523	74.000	PEAK
*1625.000	35.354	13.707	49.061	-4.939	54.000	AVERAGE
1625.000	35.354	24.807	60.161	-13.839	74.000	PEAK
4900.000	41.960	13.464	55.424	-18.576	74.000	PEAK
4905.000	41.968	6.550	48.518	-5.482	54.000	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Middle Channel :2437 MHz (802.11 b)

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1145.000	35.162	10.846	46.008	-7.992	54.000	AVERAGE
1145.000	35.162	17.246	52.408	-21.592	74.000	PEAK
1630.000	35.375	13.615	48.990	-5.010	54.000	AVERAGE
1640.000	35.417	26.385	61.802	-12.198	74.000	PEAK
*2483.500	38.135	12.382	50.517	-3.483	54.000	AVERAGE
2483.500	38.135	21.382	59.517	-14.483	74.000	PEAK

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1145.000	35.162	13.829	48.991	-5.009	54.000	AVERAGE
1640.000	35.417	14.021	49.438	-4.562	54.000	AVERAGE
1640.000	35.417	25.721	61.138	-12.862	74.000	PEAK
*2483.500	38.135	12.665	50.800	-3.200	54.000	AVERAGE
2483.500	38.135	27.765	65.900	-8.100	74.000	PEAK
4925.000	42.002	6.771	48.773	-5.227	54.000	AVERAGE
4925.000	42.002	15.471	57.473	-16.527	74.000	PEAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

High Channel :2462 MHz (802.11 b)

Test Data: 2010-01-18

Frequency Range: 1GHz to 25GHz

Measurement Distance: 3 m

Operating Environment: 21°C, 53% RH, 102 Kpa

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
2288.16	4.24	48.47	52.71	-21.29	74.00	PEAK
2288.16	4.24	35.03	39.27	-14.73	54.00	AVERAGE
*2400.00	4.92	65.68	70.60	-3.40	74.00	PEAK
2400.00	4.92	44.23	49.15	-4.85	54.00	AVERAGE
4825.00	11.01	45.73	56.74	-17.26	74.00	PEAK
4825.00	11.01	30.24	41.25	-12.75	54.00	AVERAGE
7235.43	18.43	35.69	54.12	-19.88	74.00	PEAK
7235.43	18.43	21.02	39.45	-14.55	54.00	AVERAGE

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
2288.32	4.24	48.47	52.71	-21.29	74.00	PEAK
2288.32	4.24	36.87	41.11	-12.89	54.00	AVERAGE
2400.00	4.92	59.05	63.97	-10.03	74.00	PEAK
*2400.00	4.92	40.80	45.72	-8.28	54.00	AVERAGE
4824.33	11.01	45.73	56.74	-17.26	74.00	PEAK
4824.33	11.01	32.25	43.26	-10.74	54.00	AVERAGE
7234.56	18.42	35.69	54.11	-19.89	74.00	PEAK
7234.56	18.42	22.31	40.73	-13.27	54.00	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Low Channel:2412 MHz (802.11 g)

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
2288.23	4.24	45.98	50.22	-23.78	74.00	PEAK
2288.23	4.24	35.54	39.78	-14.22	54.00	AVERAGE
4875.00	11.08	44.71	55.79	-18.21	74.00	PEAK
*4875.00	11.08	32.73	43.81	-10.19	54.00	AVERAGE
7315.42	18.22	34.53	52.75	-21.25	74.00	PEAK
7315.42	18.22	21.50	39.72	-14.28	54.00	AVERAGE

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
2288.17	4.24	47.58	51.82	-22.18	74.00	PEAK
2288.17	4.24	35.91	40.15	-13.85	54.00	AVERAGE
4873.67	11.08	45.85	56.93	-17.07	74.00	PEAK
*4873.67	11.08	33.04	44.12	-9.88	54.00	AVERAGE
7312.56	18.22	35.05	53.27	-20.73	74.00	PEAK
7312.56	18.22	21.93	40.15	-13.85	54.00	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Middle Channel :2437 MHz (802.11 g)

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
2288.21	4.24	45.58	49.82	-24.18	74.00	PEAK
2288.21	4.24	33.61	37.85	-16.15	54.00	AVERAGE
2483.50	4.92	58.99	63.91	-10.09	74.00	PEAK
*2483.50	4.92	39.68	44.60	-9.40	54.00	AVERAGE
4924.53	11.15	43.71	54.86	-19.14	74.00	PEAK
4924.53	11.15	30.19	41.34	-12.66	54.00	AVERAGE
7383.45	18.01	35.70	53.71	-20.29	74.00	PEAK
7383.45	18.01	21.94	39.95	-14.05	54.00	AVERAGE

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
2288.12	4.24	47.74	51.98	-22.02	74.00	PEAK
2288.12	4.24	36.05	40.29	-13.71	54.00	AVERAGE
2483.50	4.92	54.33	59.25	-14.75	74.00	PEAK
*2483.50	4.92	36.88	41.80	-12.20	54.00	AVERAGE
4925.00	11.15	44.63	55.78	-18.22	74.00	PEAK
4925.00	11.15	30.64	41.79	-12.21	54.00	AVERAGE
7385.00	18.01	36.98	54.99	-19.01	74.00	PEAK
7385.00	18.01	22.86	40.87	-13.13	54.00	AVERAGE

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

High Channel :2462 MHz (802.11 g)

6.9 RF Exposure requirement

6.9.1 Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E 2, H 2 or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1.0	30

6.9.2 MPE Calculation Method

$$E \text{ (V/m)} = (30 \cdot P \cdot G)^{0.5} / d \quad \text{Power Density: } P_d \text{ (W/m}^2\text{)} = E^2 / 377$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m) The formula can be changed to

$$P_d = (30 \cdot P \cdot G) / (377 \cdot d^2)$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

6.9.3 Result

Operating Mode: 802.11 b and 802.11 g

Channel (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (W)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Result
2412	2.3	17.02	0.05035	0.2304	1	Pass
2437	2.3	17.07	0.05093	0.2330	1	Pass
2462	2.3	17.26	0.05321	0.2435	1	Pass
2412	2.3	15.07	0.03214	0.1470	1	Pass
2437	2.3	15.02	0.03177	0.1454	1	Pass
2462	2.3	15.12	0.03251	0.1487	1	Pass