

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTIONAL RADIATOR CERTIFICATION

Product Name : WIFI & Bluetooth
Model Number : GM10
Trade Name : N/A
FCC ID : ZDYGM1X
Report Number : EESZD02230002-3
Date : Mar. 25, 2011
Regulations : See below

Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart C 15.247:2009	PASS

Prepared for

Shenzhen Leader Digital-tech Weitong Co., Ltd
4 Floor, Dongjiang Environmental Building, Central Langshan Road,
HI-Tech Park, Nanshan District, ShenZhen, China

Prepared by

CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION
Building C, Hongwei Industrial Zone, Baoan 70 District,
Shenzhen, Guangdong, China
TEL: 86-755-3368 3362
FAX: 86-755-3368 3368

Check No.: 57123012

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CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION**

Building C, Hongwei Industrial Zone, Baoan 70 District, Shenzhen

TABLE OF CONTENTS

Description	Page
1. CERTIFICATION INFORMATION	4
2. TEST SUMMARY	5
3. MEASUREMENT UNCERTAINTY	5
4. PRODUCT INFORMATION	6
5. TEST EQUIPMENT	6
6. AC POWER LINE CONDUCTED EMISSIONS MEASUREMENT	7
6.1 LIMITS.....	7
6.2 BLOCK DIAGRAM OF TEST SETU	7
6.3 TEST PROCEDURE.....	7
6.4 TEST RESULT	8
7. MAXIMUM PEAK OUTPUT POWER MEASUREMENT	10
7.1 LIMITS.....	10
7.2 BLOCK DIAGRAM OF TEST SETUP	10
7.3 TEST PROCEDURE.....	10
7.4 TEST RESULT	11
8. POWER SPECTRAL DENSITY (PSD) MEASUREMENT	20
8.1 LIMITS.....	20
8.2 BLOCK DIAGRAM OF TEST SETUP	20
8.3 TEST PROCEDURE.....	20
8.4 TEST RESULT	21
9. 6DB SPECTRUM BANDWIDTH MEASUREMENT.....	30
9.1 LIMITS.....	30
9.2 BLOCK DIAGRAM OF TEST SETUP	30
9.3 TEST PROCEDURE.....	30
9.4 TEST RESULT	31
10. SPURIOUS RF CONDUCTED EMISSIONS MEASUREMENT.....	40
10.1 LIMITS.....	40
10.2 BLOCK DIAGRAM OF TEST SETUP	40

10.3 TEST PROCEDURE.....	40
10.4 TEST RESULT	40
11. RADIATED EMISSIONS MEASUREMENT	69
11.1 LIMITS.....	69
11.2 BLOCK DIAGRAM OF TEST SETUP	69
11.3 TEST PROCEDURE.....	70
11.4 TEST RESULT	71
12. BAND EDGE EMISSIONS MEASUREMENT & RESTRICTED BANDS OF OPERATION.....	86
12.1 LIMITS (FCC 'S REQUIREMENT).....	87
12.2 BLOCK DIAGRAM OF TEST SETUP	87
12.3 TEST PROCEDURE.....	87
12.4 TEST RESULT	88
APPENDIX 1 PHOTOGRAPHS OF TEST SETUP.....	95
APPENDIX 2 PHOTOGRAPHS OF EUT	97
<i>N/A means not applicable.</i>	

1. CERTIFICATION INFORMATION

Applicant: Shenzhen Leader Digital-tech Weitong Co., Ltd
4 Floor, Dongjiang Environmental Building, Central Langshan Road,
HI-Tech Park, Nanshan District, ShenZhen, China

Manufacturer: Shenzhen Leader Digital-tech Weitong Co., Ltd
4 Floor, Dongjiang Environmental Building, Central Langshan Road,
HI-Tech Park, Nanshan District, ShenZhen, China

Product Name : WIFI & Bluetooth

Model Name: GM10

Trade Name: N/A

FCC ID: ZDYGM1X

Report Number: EESZD02230002-3

Date of Test: Mar. 01, 2011 to Mar. 25, 2011

The above equipment was tested by CENTRE TESTING INTERNATIONAL (SHENZHEN) CORPORATION for compliance with the requirements set forth in FCC Rules and the measurement procedure according to ANSI C63.4-2009.

The test results of this report relate only to the tested sample identified in this report.

Prepared by : Christy Chen
Christy Chen

Reviewed by : Louisa Lu
Louisa Lu

Approved by : Lily Yan
Lily Yan
Supervisor

Date Mar. 25, 2011



2. TEST SUMMARY

EMISSION -- FCC Part 15			
Clause	Test Item	Rule	Result
6	AC Power Line Conducted Emissions	15.207	PASS
7	Maximum Peak Conducted Output Power	15.247(b)(3)	PASS
8	Power Spectral Density	15.247(e)	PASS
9	6dB Spectrum Bandwidth	15.247(a)(2)	PASS
10	Radiated Emission	15.209	PASS
11	Band Edge Emission	15.247(d)	PASS

TABLE FOR TEST MODES				
Voltage:	AC120V/ 60Hz	Mode:	Max. Transmitting & normal	
Temperature:	24℃	Humidity:	54%	
Test Items		Mode - Modulation	Data Rate (Mbps)	Channel
AC Power Line Conducted Emissions		802.11b – DSSS	11	CH6
		802.11g – OFDM	54	CH6
Maximum Peak Conducted Output Power Power Spectral Density 6dB Spectrum Bandwidth Radiated Emission		802.11b – DSSS	1/11	CH1 CH6 CH11
		802.11g – OFDM	6 /24 / 54	
Band Edge Emission		802.11b – DSSS	1/11	Ch1 Ch11
		802.11g – OFDM	6 /24 / 54	

3. MEASUREMENT UNCERTAINTY

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement items	Uncertainty
AC Power Line Conducted Emissions	2.6 dB
Maximum Peak Conducted Output Power	0.22 dB
Power Spectral Density	0.5 dB
6dB Spectrum Bandwidth	--
Radiated Emissions / Band Edge Emissions	4.4 dB

4. PRODUCT INFORMATION

Items	Description
Intentional Transceiver	Intentional Transceiver
Modulation	802.11b: DSSS with BPSK, QPSK, CCK 802.11g: OFDM with BPSK, QPSK, 16QAM, 64QAM
Data Rate	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11
Transmit Power	802.11b: 20.45dBm 802.11g: 19.99dBm
Gain	1.5dBi

5. TEST EQUIPMENT

Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2012
Spectrum Analyzer	Agilent	E4440A	MY46185649	04/09/2011
Spectrum Analyzer	R&S	FSP40	100416	07/10/2011
Biconilog Antenna	ETS-LINGREN	3142C	00044562	07/31/2011
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Horn Antenna	ETS-LINGREN	3117	00057407	06/07/2011
Microwave Preamplifier	Agilent	8449B	3008A02425	N/A
Receiver	R&S	ESCI	100009	07/10/2011
LISN	R&S	ENV216	100098	07/10/2011

6. AC POWER LINE CONDUCTED EMISSIONS MEASUREMENT

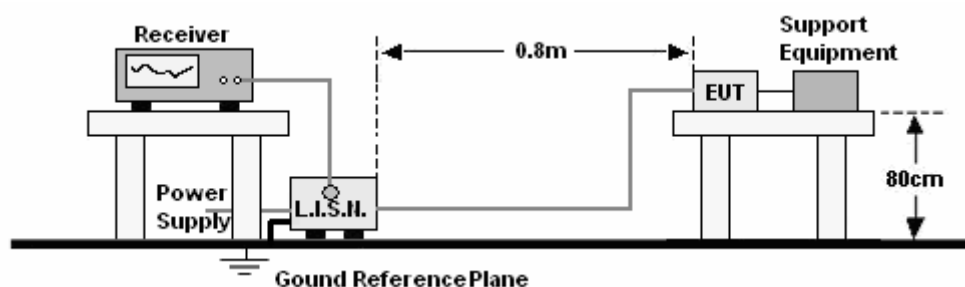
6.1 LIMITS

Limits for Class B digital devices

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

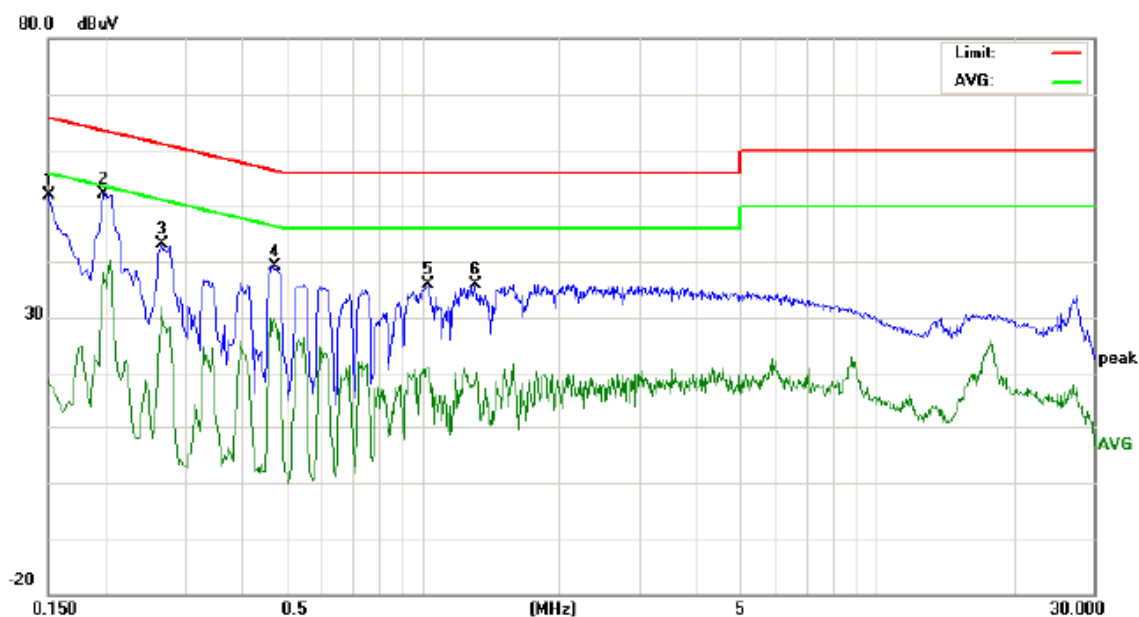
6.2 BLOCK DIAGRAM OF TEST SETU



6.3 TEST PROCEDURE

- The EUT was placed on a nonconductive table above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from EUT in all power lines in the full band.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

6.4 TEST RESULT



Site site #1

Phase: L1

Temperature: 23

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 59 %

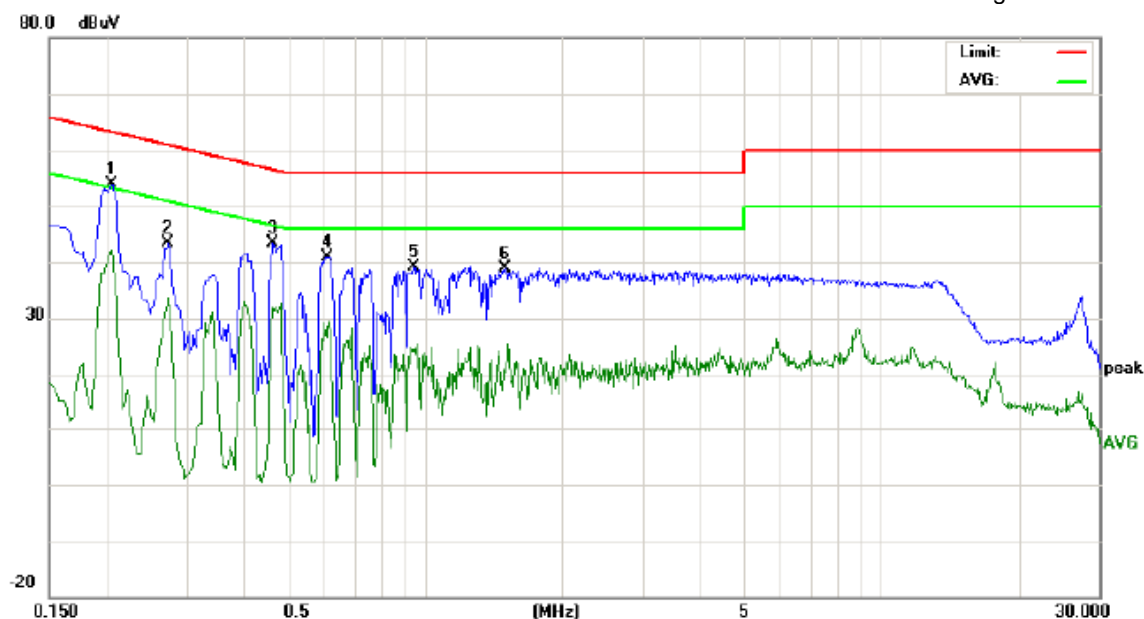
EUT: WIFI & Bluetooth

M/N: GM10

Mode: WIFI

Note:

No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1500	42.18		8.74	9.79	51.97		18.53	66.00	56.00	-14.03	-37.47	P	
2	0.1980	42.40		28.25	9.81	52.21		38.06	63.69	53.69	-11.48	-15.63	P	
3	0.2660	33.41		22.10	9.81	43.22		31.91	61.24	51.24	-18.02	-19.33	P	
4	0.4740	29.36		19.66	9.81	39.17		29.47	56.44	46.44	-17.27	-16.97	P	
5	1.0300	25.98		11.16	9.86	35.84		21.02	56.00	46.00	-20.16	-24.98	P	
6	1.3060	25.92		8.85	9.87	35.79		18.72	56.00	46.00	-20.21	-27.28	P	



Site site #1

Phase: **N**

Temperature: 23

Limit: FCC Class B Conduction (QP)

Power: AC 120V/60Hz

Humidity: 59 %

EUT: WIFI & Bluetooth

M/N: GM10

Mode: WIFI

Note:

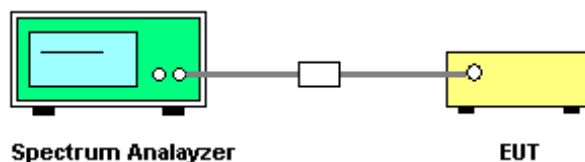
No.	Freq. MHz	Reading_Level (dBμV)			Correct Factor dB	Measurement (dBμV)			Limit (dBμV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	0.2060	44.00		32.42	9.81	53.81		42.23	63.37	53.37	-9.56	-11.14	P	
2	0.2740	33.60		23.74	9.81	43.41		33.55	61.00	51.00	-17.59	-17.45	P	
3	0.4660	33.45		21.06	9.81	43.26		30.87	56.58	46.58	-13.32	-15.71	P	
4	0.6100	31.16		16.67	9.83	40.99		26.50	56.00	46.00	-15.01	-19.50	P	
5	0.9460	29.23		14.49	9.86	39.09		24.35	56.00	46.00	-16.91	-21.65	P	
6	1.4980	29.01		10.67	9.88	38.89		20.55	56.00	46.00	-17.11	-25.45	P	

7. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

7.1 LIMITS

The limit for peak output power is 1 Watt (30dBm).

7.2 BLOCK DIAGRAM OF TEST SETUP



7.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the channel power within 99% occupied bandwidth.

7.4 TEST RESULT

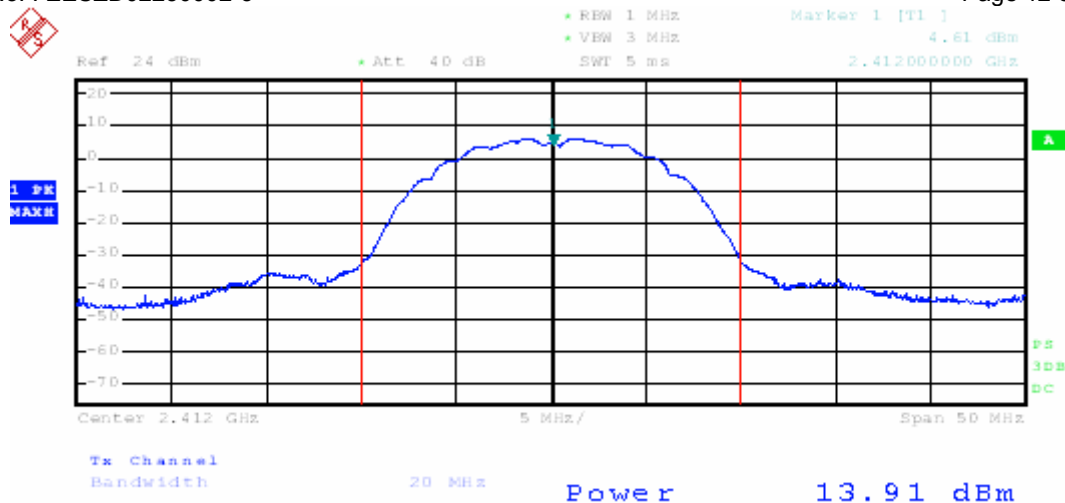
Measured Power= Reading Power + Antenna Gain + 10*log(1/x) + Cable Loss

Where, x means Duty Cycle measurement = $T_{on} / (T_{on} + T_{off}) = 100\%$; Cable Loss = 0.3dB;

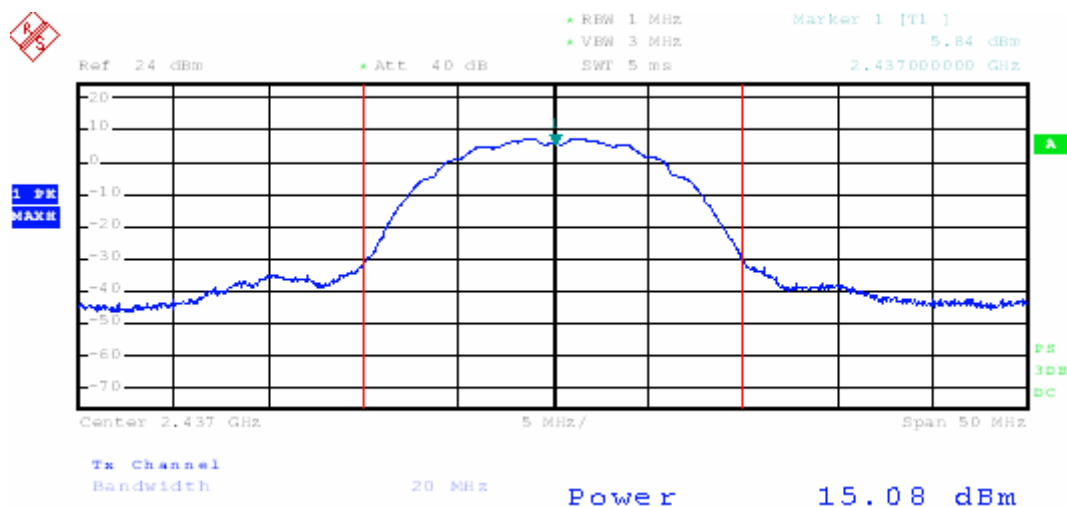
Antenna Gain = 1.5dBi

Mode - Modulation	Data Rate	Channel	Reading Power (dBm)	Measured Power (dBm)	Max. Limit (dBm)	Result (P/F)
802.11b – DSSS	1 Mbps	CH1	13.91	14.21	30	P
		CH6	15.08	15.38	30	P
		CH11	16.09	16.39	30	P
	11 Mbps	CH1	16.41	16.71	30	P
		CH6	17.58	17.88	30	P
		CH11	18.65	18.95	30	P
802.11g – OFDM	6 Mbps	CH1	14.79	15.09	30	P
		CH6	16.34	16.64	30	P
		CH11	17.32	17.62	30	P
	24 Mbps	CH1	16.30	16.60	30	P
		CH6	17.24	17.54	30	P
		CH11	18.11	18.41	30	P
	54 Mbps	CH1	16.20	16.50	30	P
		CH6	17.36	17.66	30	P
		CH11	18.19	18.49	30	P

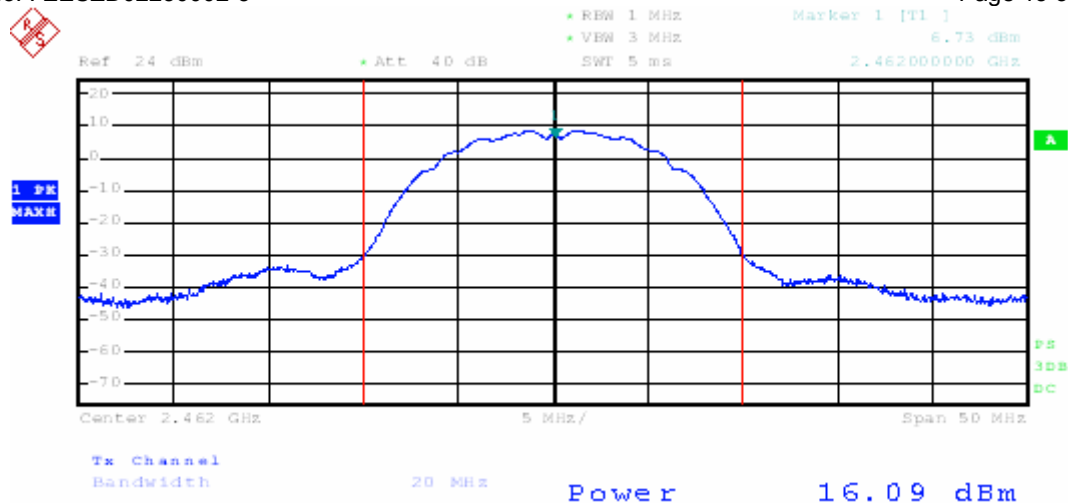
The unit does meet the FCC requirements. Please refer the graphs as below:



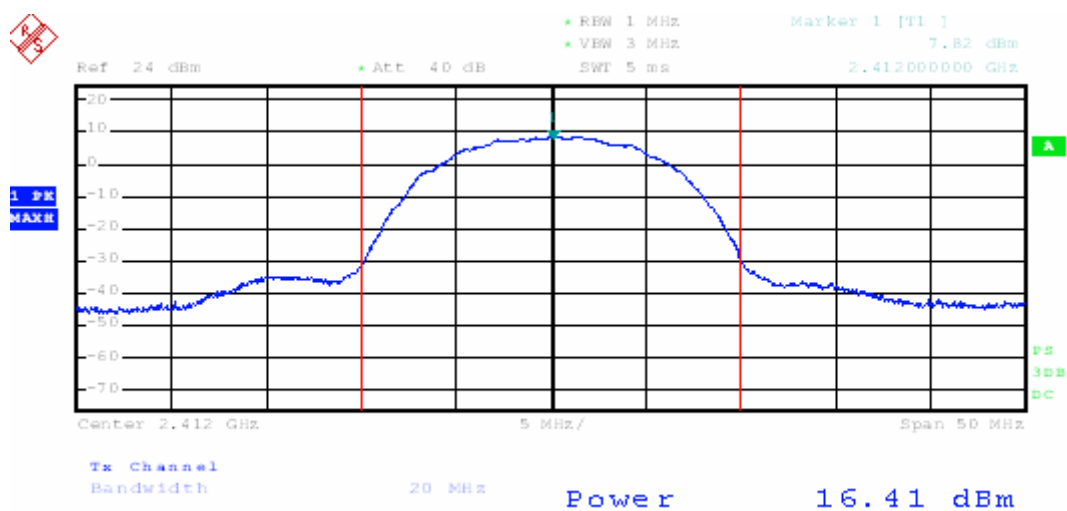
IEEE 802.11b, CH low, 1Mbps



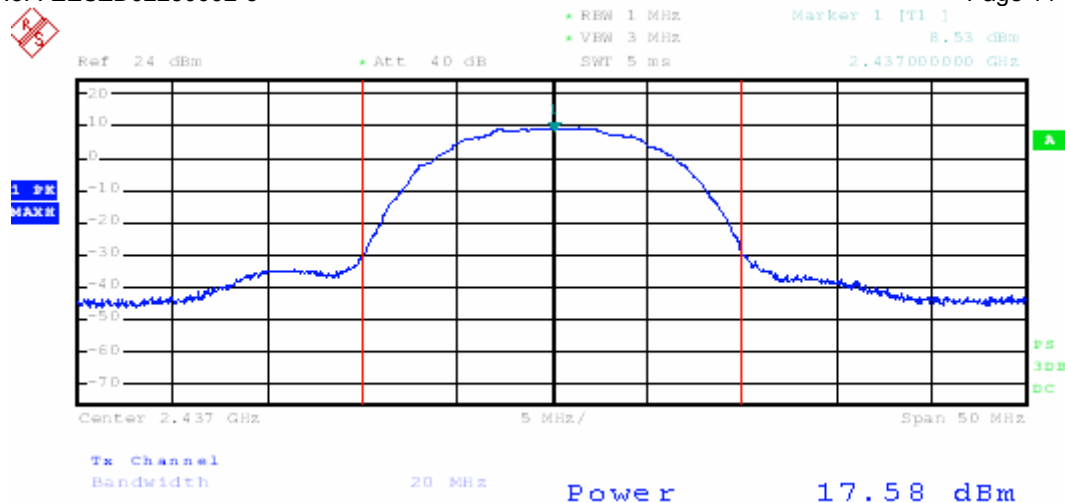
IEEE 802.11b, CH middle, 1Mbps



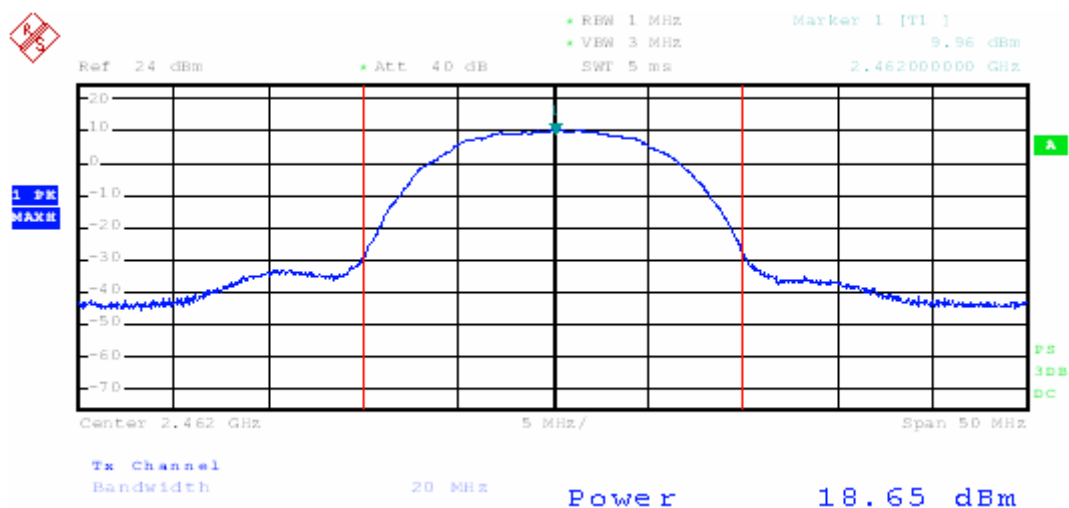
IEEE 802.11b, CH high, 1Mbps



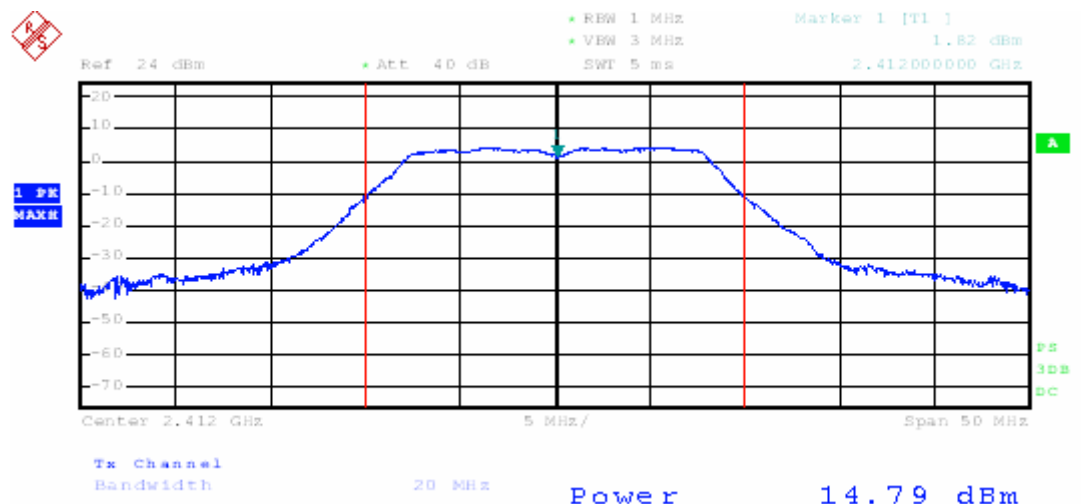
IEEE 802.11b, CH low, 11Mbps



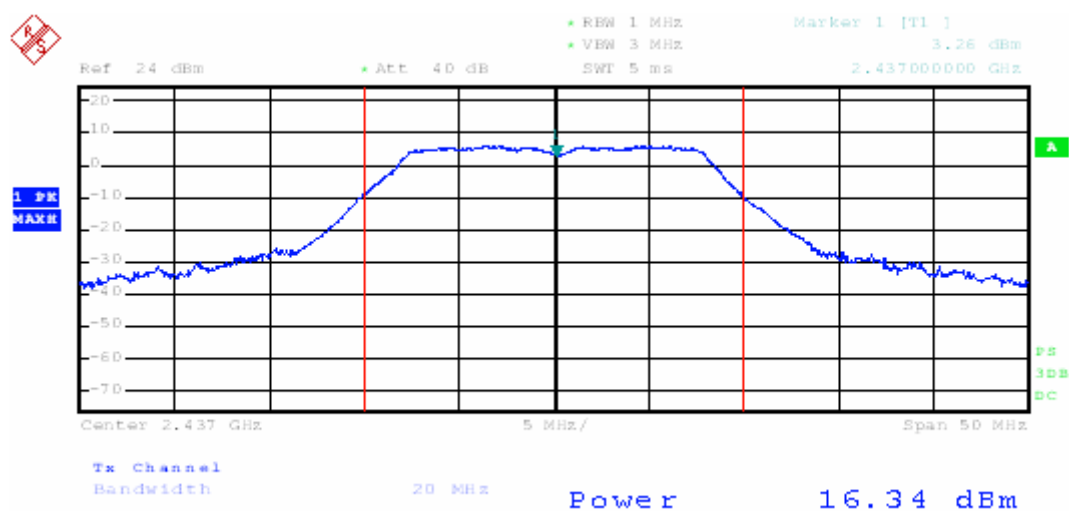
IEEE 802.11b, CH middle, 11Mbps



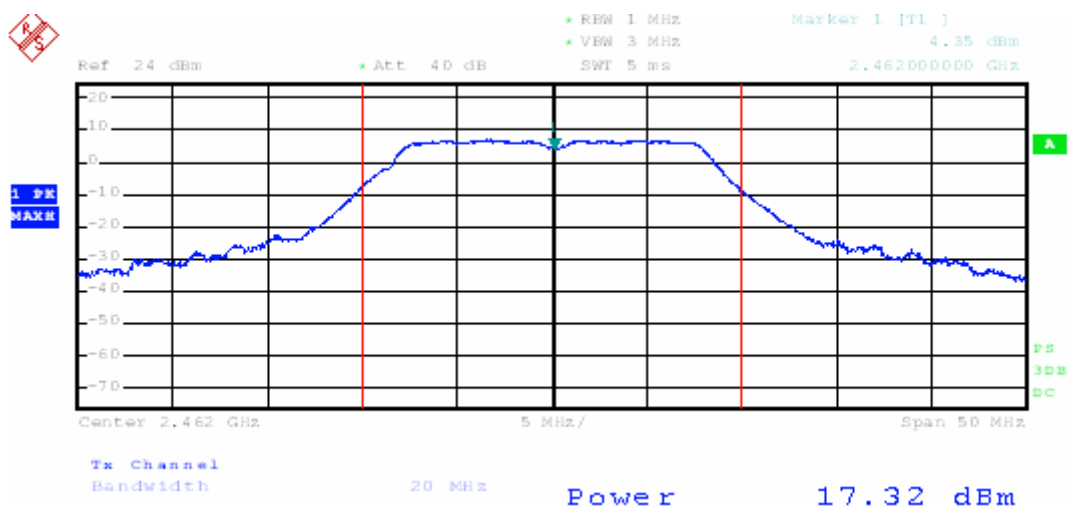
IEEE 802.11b, CH high, 11Mbps



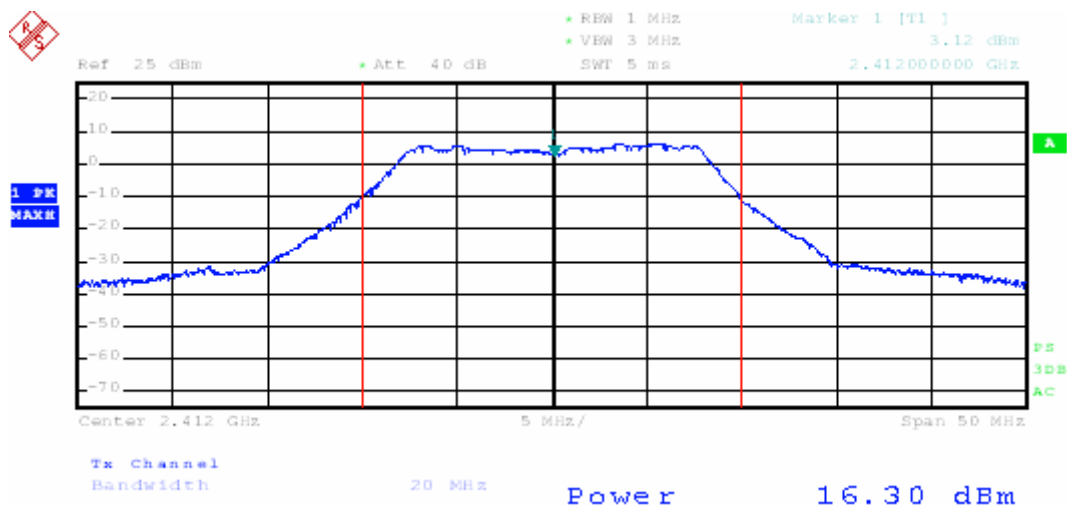
IEEE 802.11g, CH low, 6Mbps



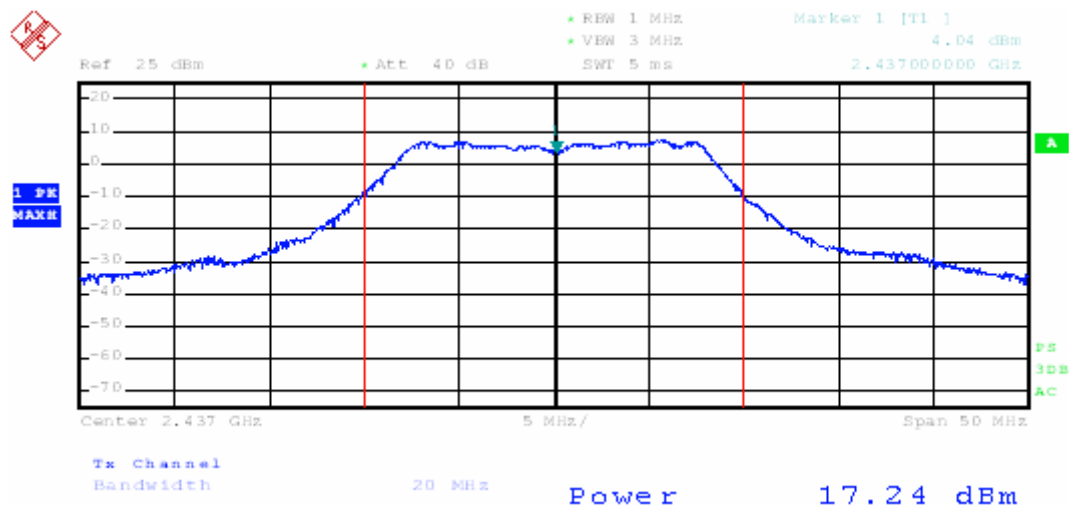
IEEE 802.11g, CH middle, 6Mbps



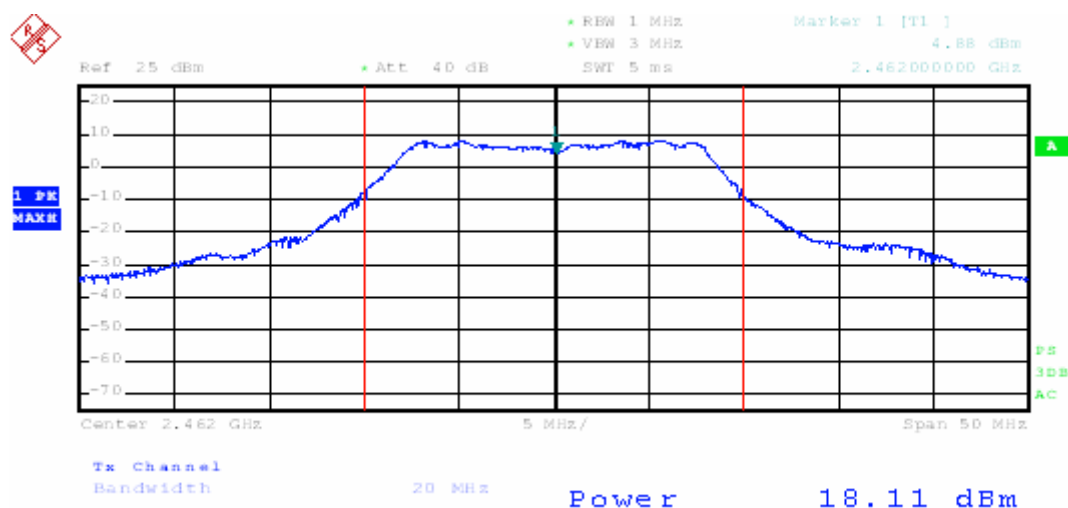
IEEE 802.11g, CH high, 6Mbps



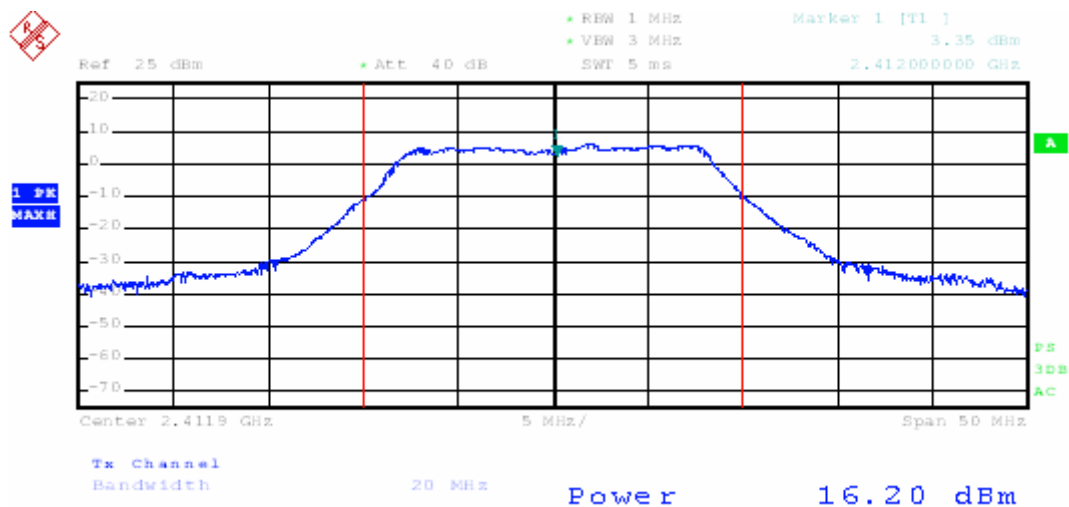
IEEE 802.11g, CH low, 24Mbps



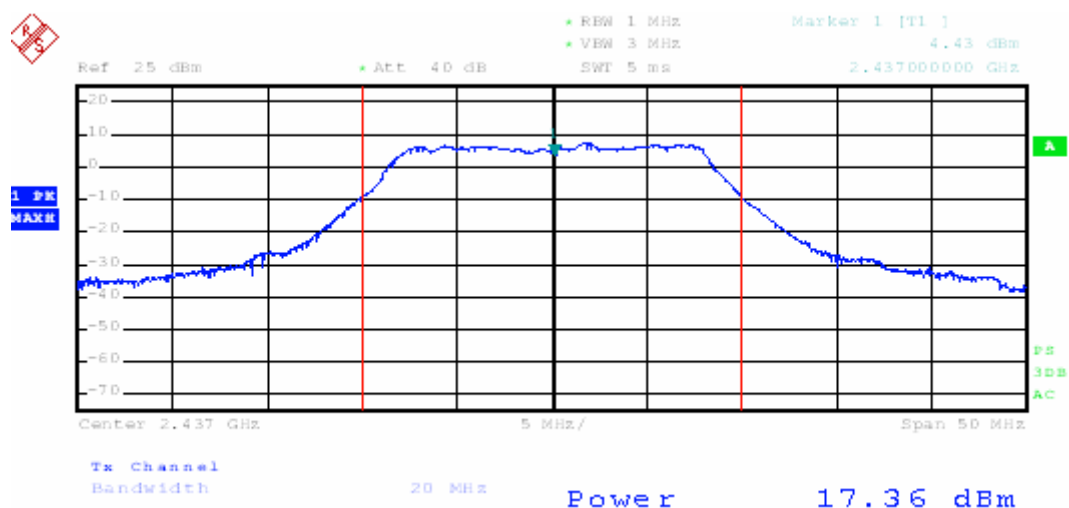
IEEE 802.11g, CH middle, 24Mbps



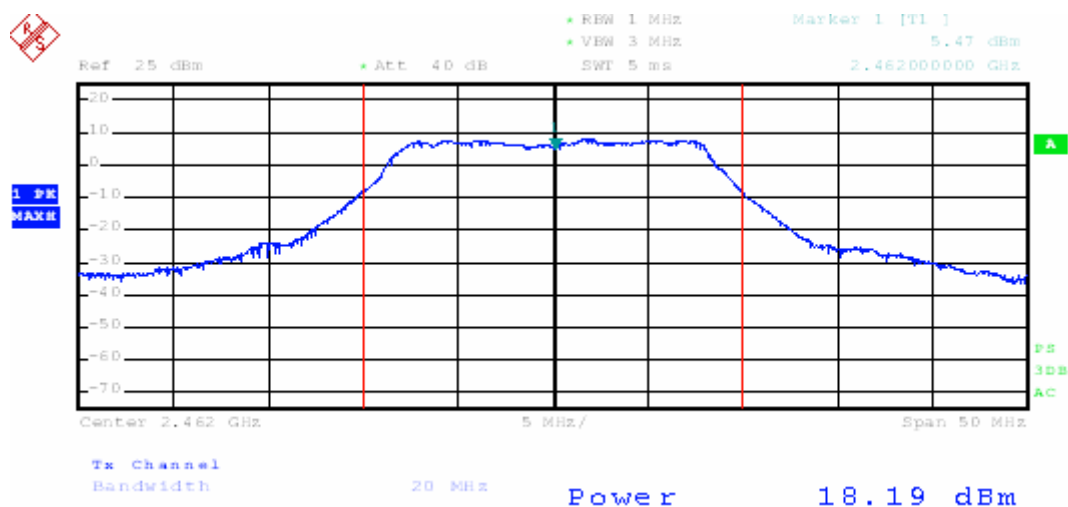
IEEE 802.11g, CH high, 24Mbps



IEEE 802.11g, CH low, 54Mbps



IEEE 802.11g, CH middle, 54Mbps



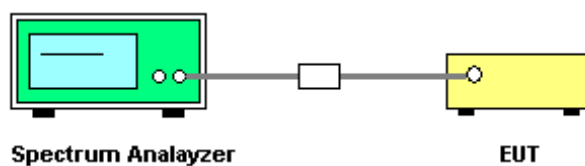
IEEE 802.11g, CH high, 54Mbps

8. POWER SPECTRAL DENSITY (PSD) MEASUREMENT

8.1 LIMITS

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

8.2 BLOCK DIAGRAM OF TEST SETUP



8.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 10kHz with Peak in Max Hold.
3. Mark the frequency with max. peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and record the maximum peak value.

8.4 TEST RESULT

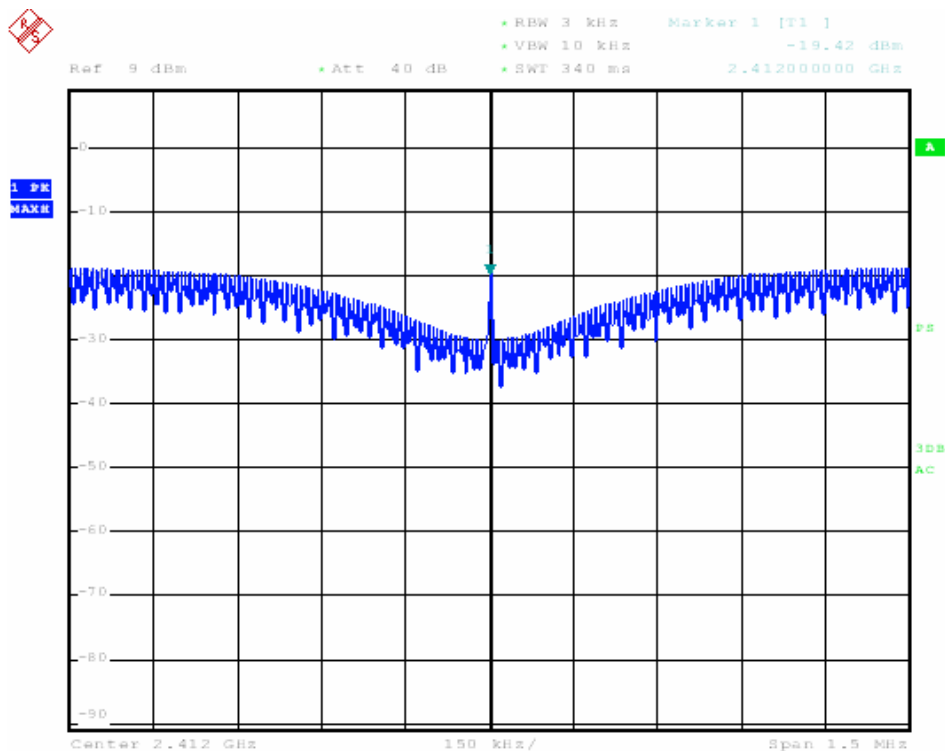
Measured PSD = Reading PSD + Antenna Gain + $10 \cdot \log(1/x)$ + Cable Loss

Where, x means Duty Cycle measurement = $T_{on} / (T_{on} + T_{off}) = 100\%$; Cable Loss = 0.9dB;

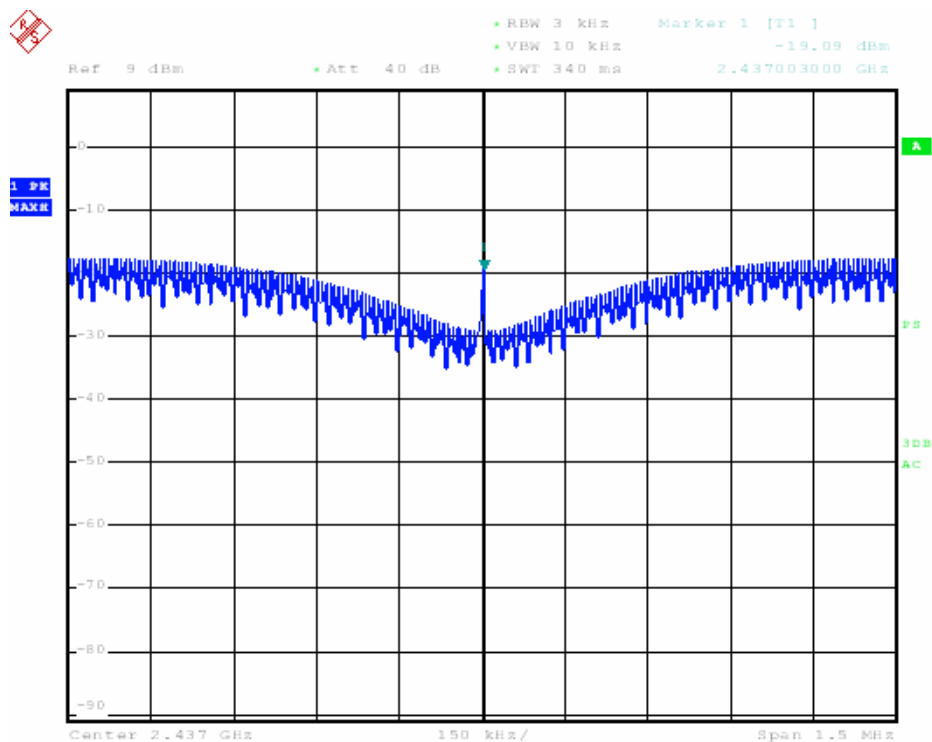
Antenna Gain = 1.5dBi

Mode Modulation	Data Rate	Channel	Reading PSD (dBm)	Measured PSD (dBm)	Max. Limit (dBm)	Result (P/F)
802.11b – DSSS	1 Mbps	CH1	-19.42	-18.52	8	P
		CH6	-19.09	-18.19	8	P
		CH11	-18.55	-17.65	8	P
	11 Mbps	CH1	-19.56	-18.66	8	P
		CH6	-19.10	-18.20	8	P
		CH11	-18.69	-17.79	8	P
802.11g – OFDM	6 Mbps	CH1	-18.74	-17.84	8	P
		CH6	-20.17	-19.27	8	P
		CH11	-18.89	-17.99	8	P
	24 Mbps	CH1	-19.89	-18.99	8	P
		CH6	-17.80	-16.90	8	P
		CH11	-18.96	-18.06	8	P
	54 Mbps	CH1	-18.58	-17.68	8	P
		CH6	-19.95	-19.05	8	P
		CH11	-19.91	-19.01	8	P

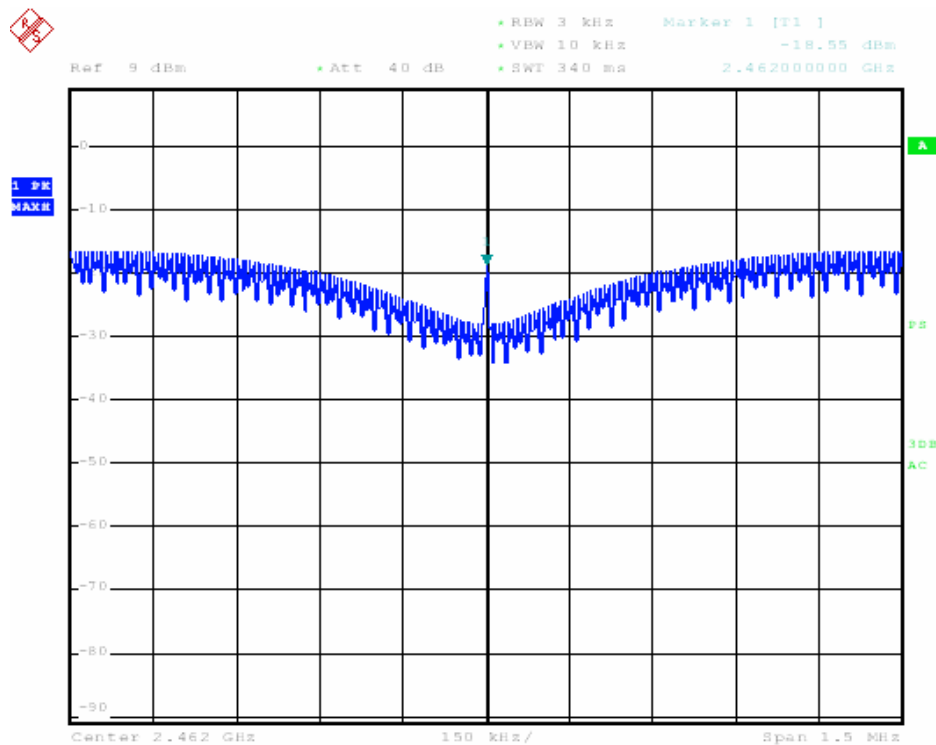
The unit does meet the FCC requirements. Please refer the graphs as below:



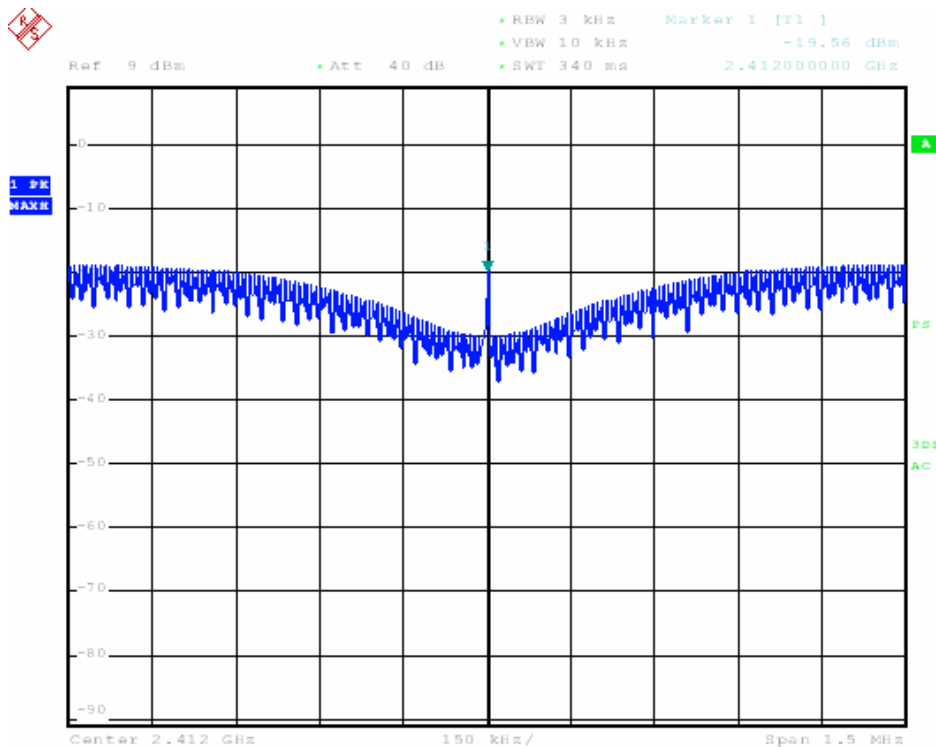
IEEE 802.11b, CH low, 1Mbps



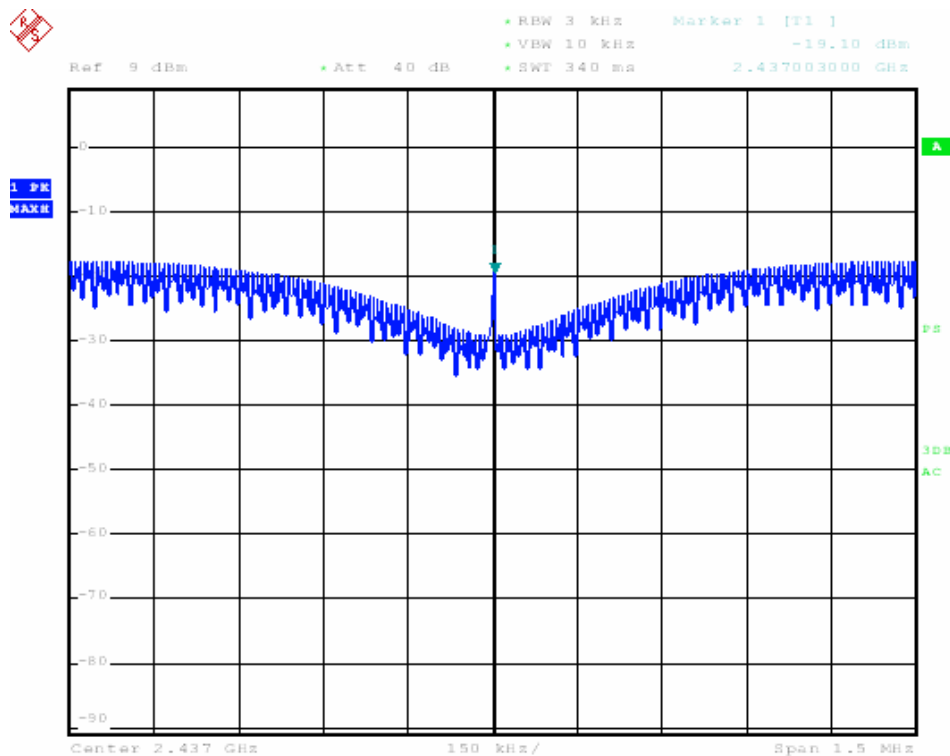
IEEE 802.11b, CH middle, 1Mbps



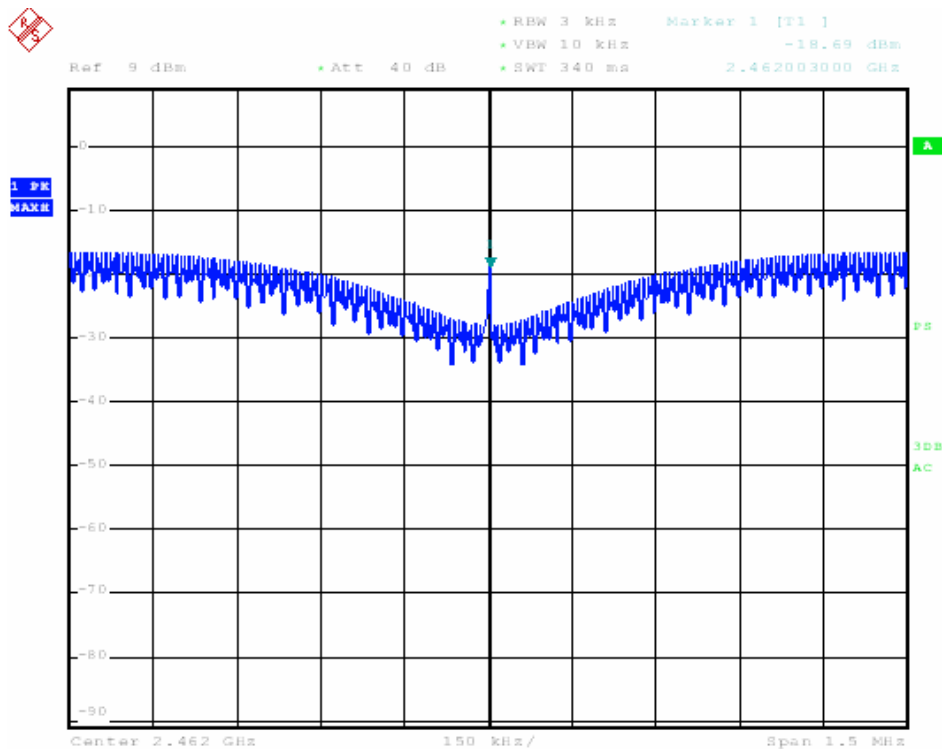
IEEE 802.11b, CH high, 1Mbps



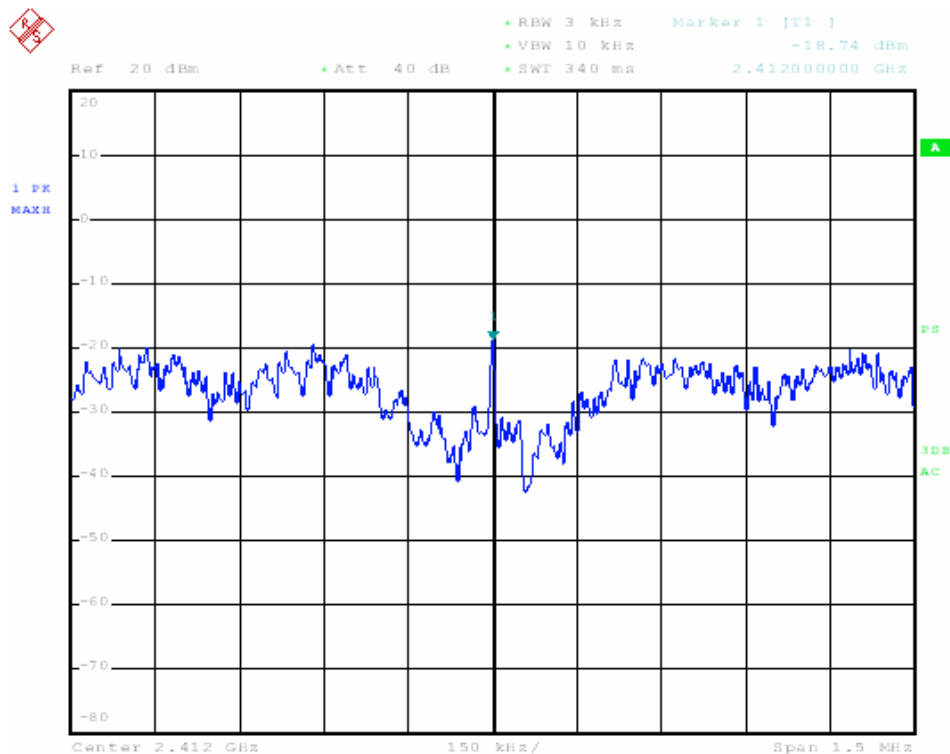
IEEE 802.11b, CH low, 11Mbps



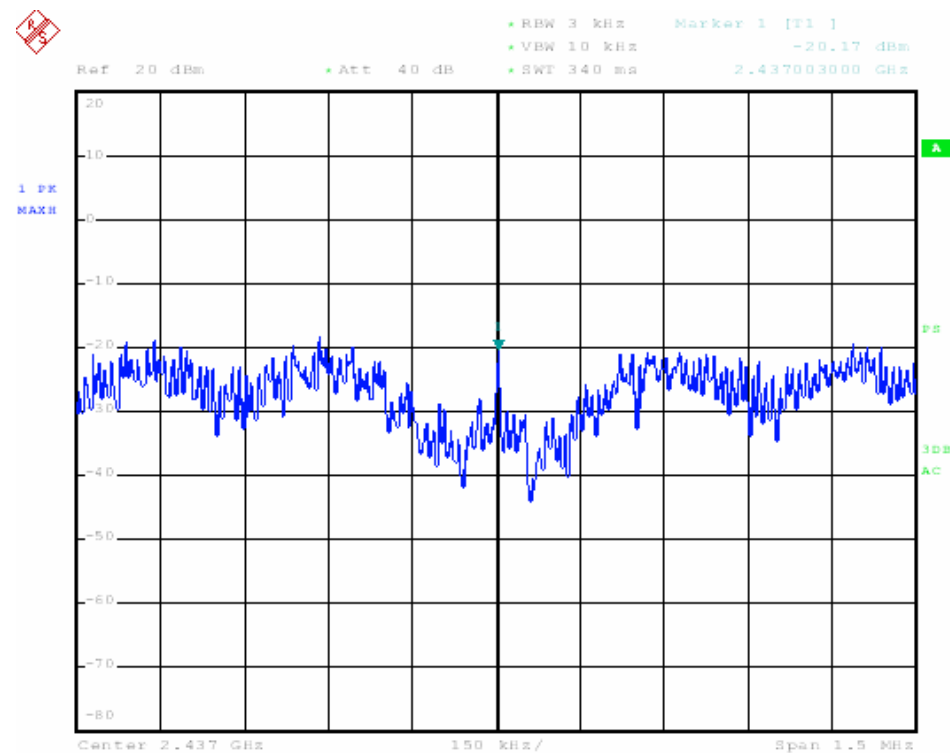
IEEE 802.11b, CH middle, 11Mbps



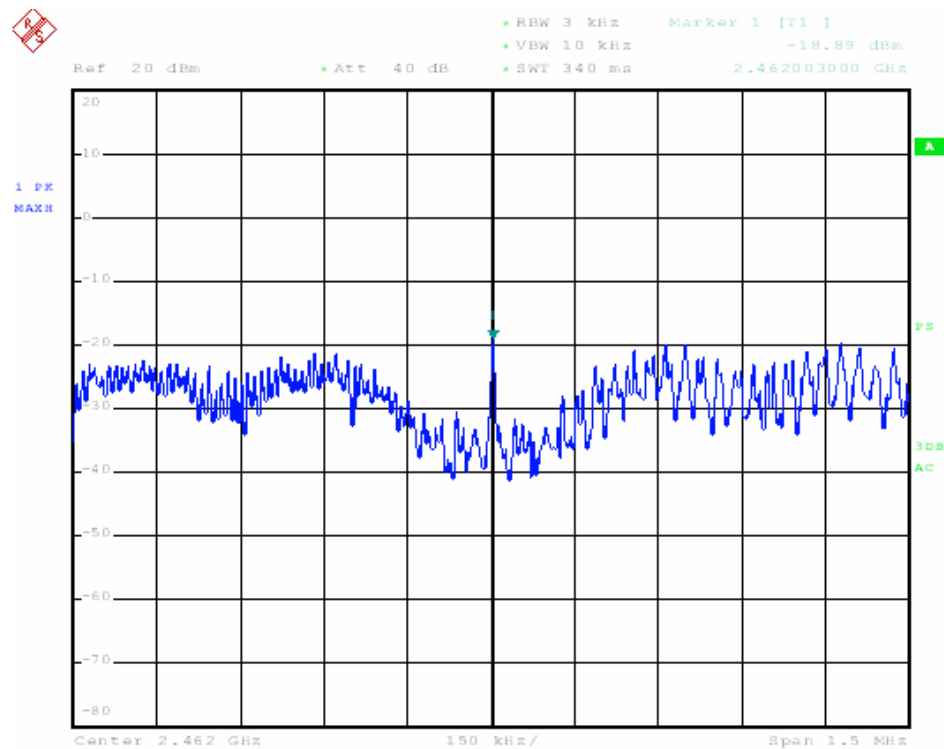
IEEE 802.11b, CH high, 11Mbps



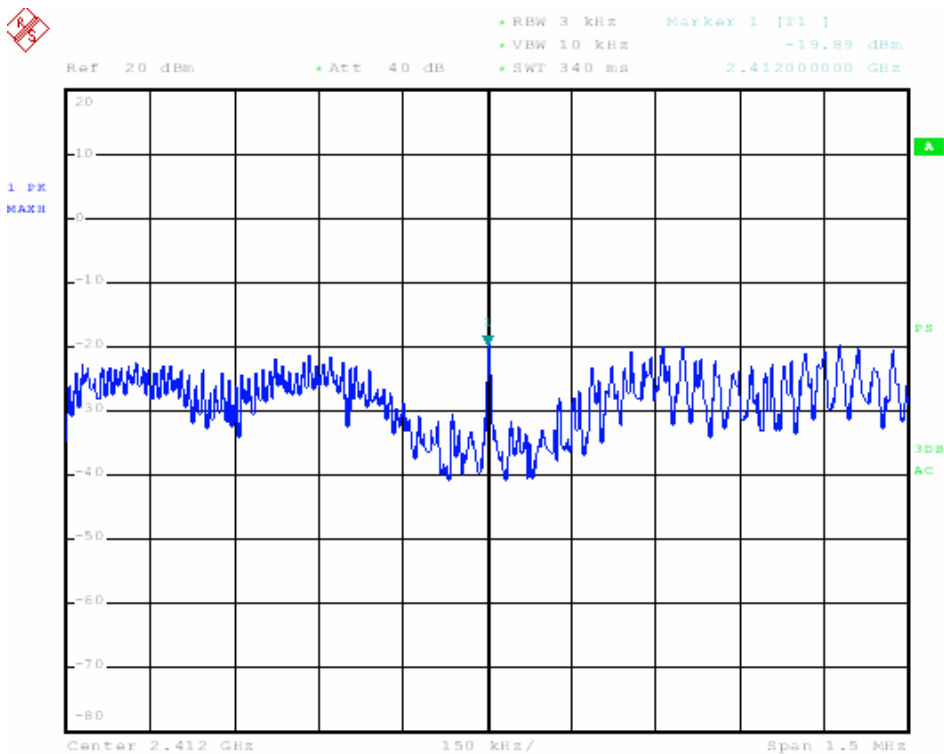
IEEE 802.11g, CH low, 6Mbps



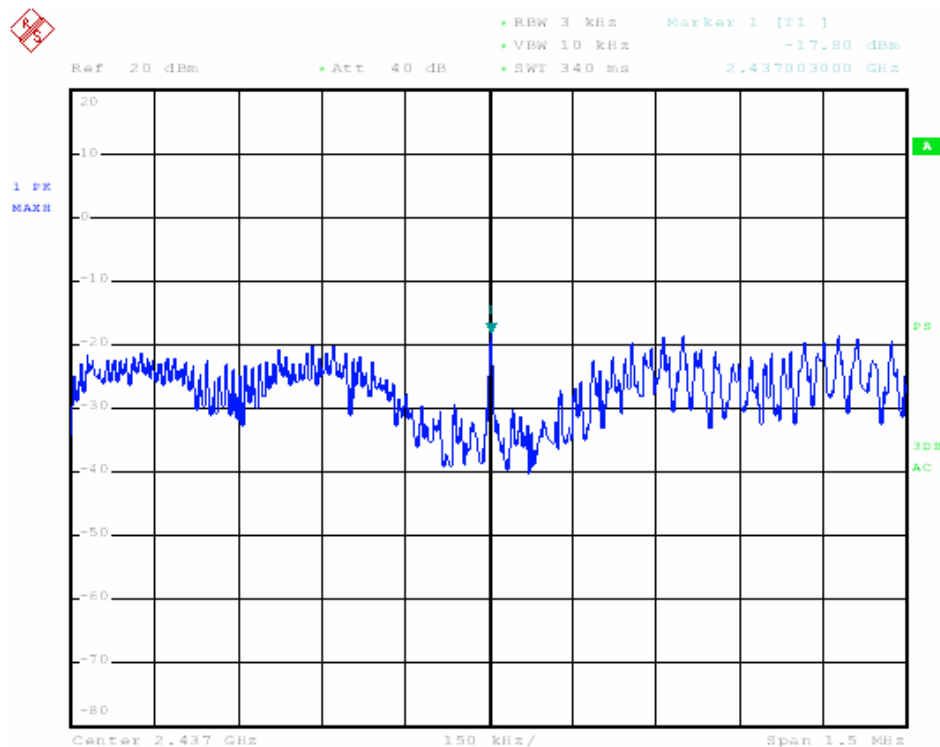
IEEE 802.11g, CH middle, 6Mbps



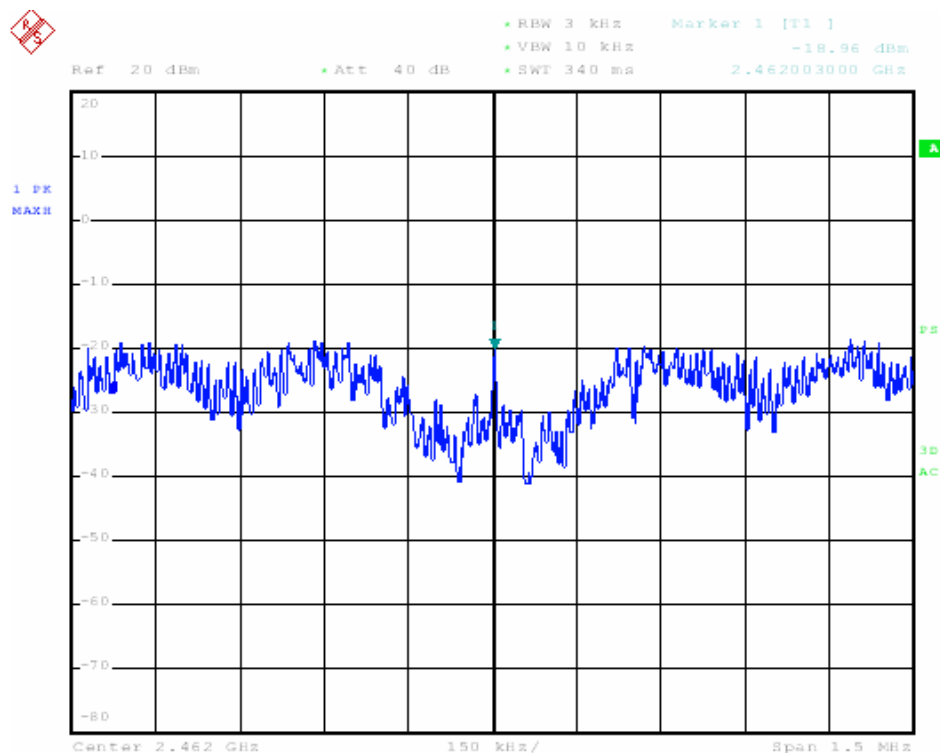
IEEE 802.11g, CH high, 6Mbps



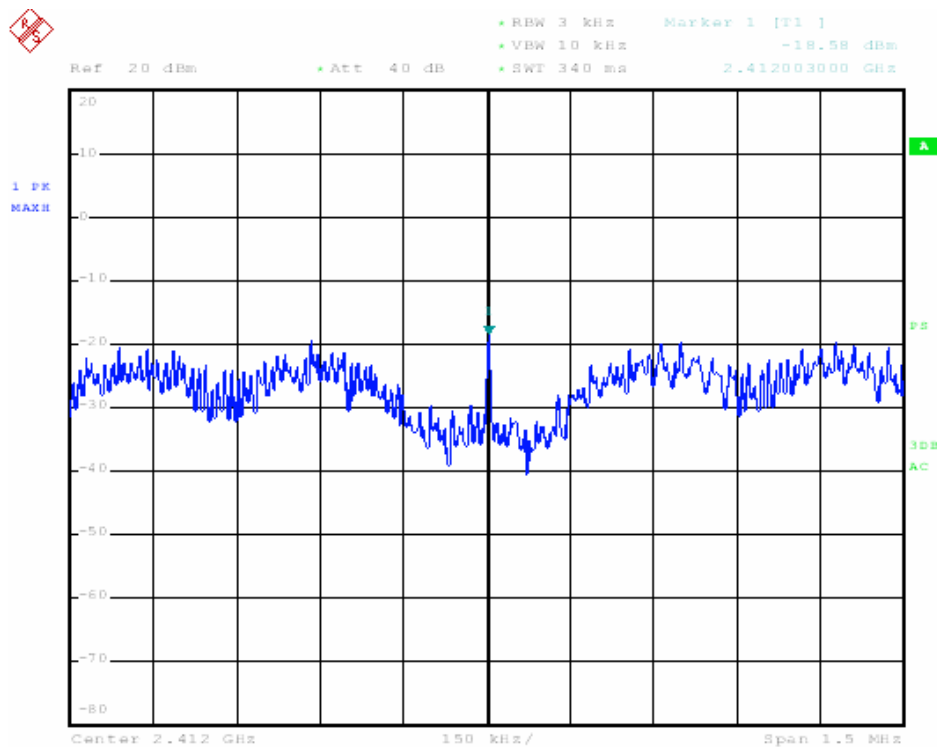
IEEE 802.11g, CH low, 24Mbps



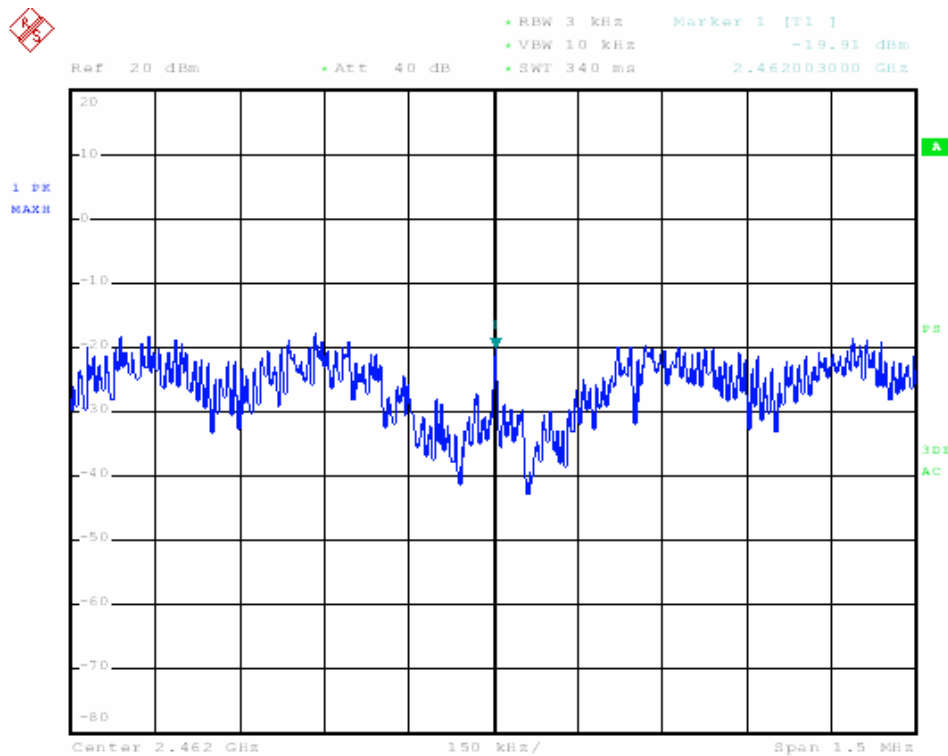
IEEE 802.11g, CH middle, 24Mbps



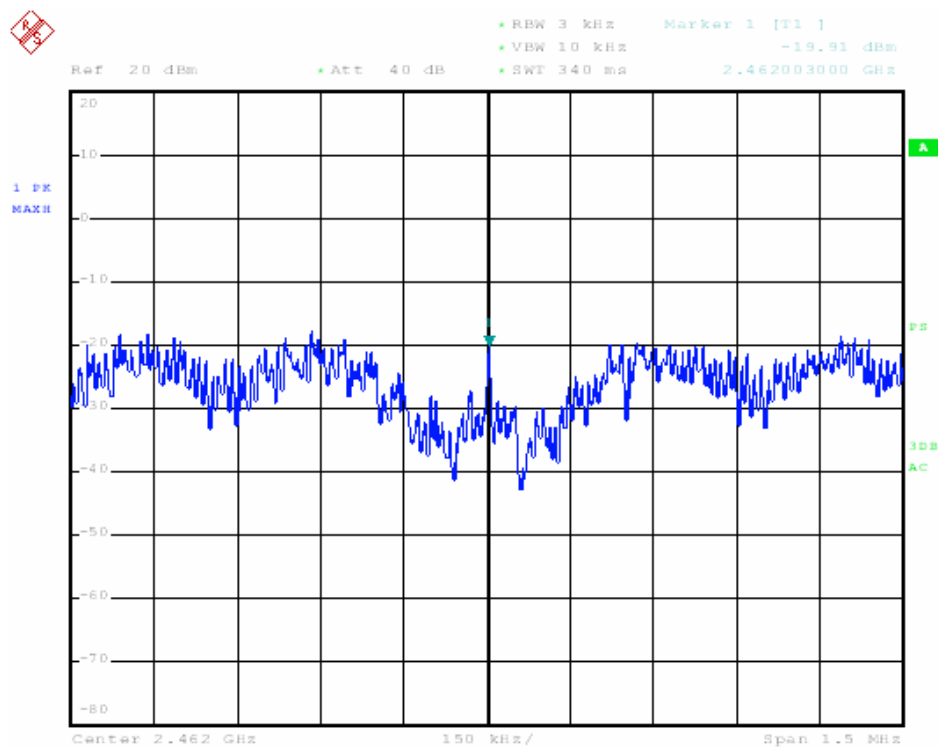
IEEE 802.11g, CH high, 24Mbps



IEEE 802.11g, CH low, 54Mbps



IEEE 802.11g, CH middle, 54Mbps



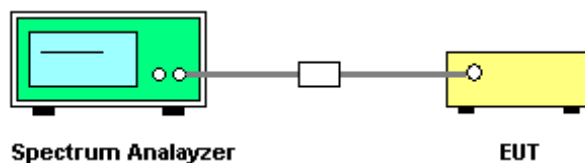
IEEE 802.11g, CH high, 54Mbps

9. 6DB SPECTRUM BANDWIDTH MEASUREMENT

9.1 LIMITS

The minimum 6 dB bandwidth shall be at least 500 kHz.

9.2 BLOCK DIAGRAM OF TEST SETUP



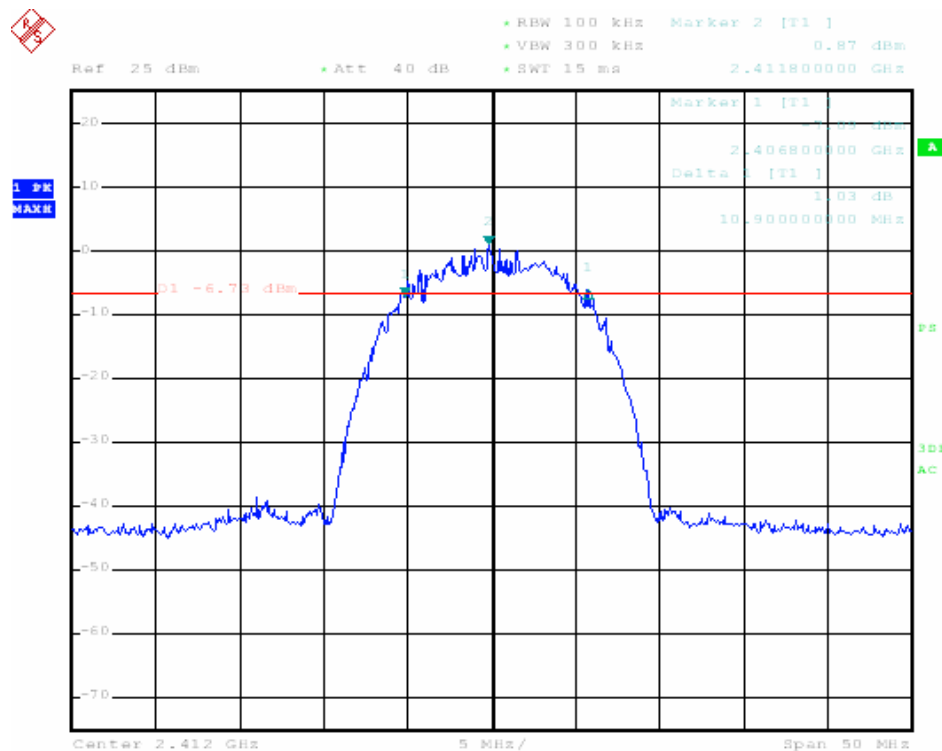
9.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Measured the spectrum width with power higher than 6dB below carrier.

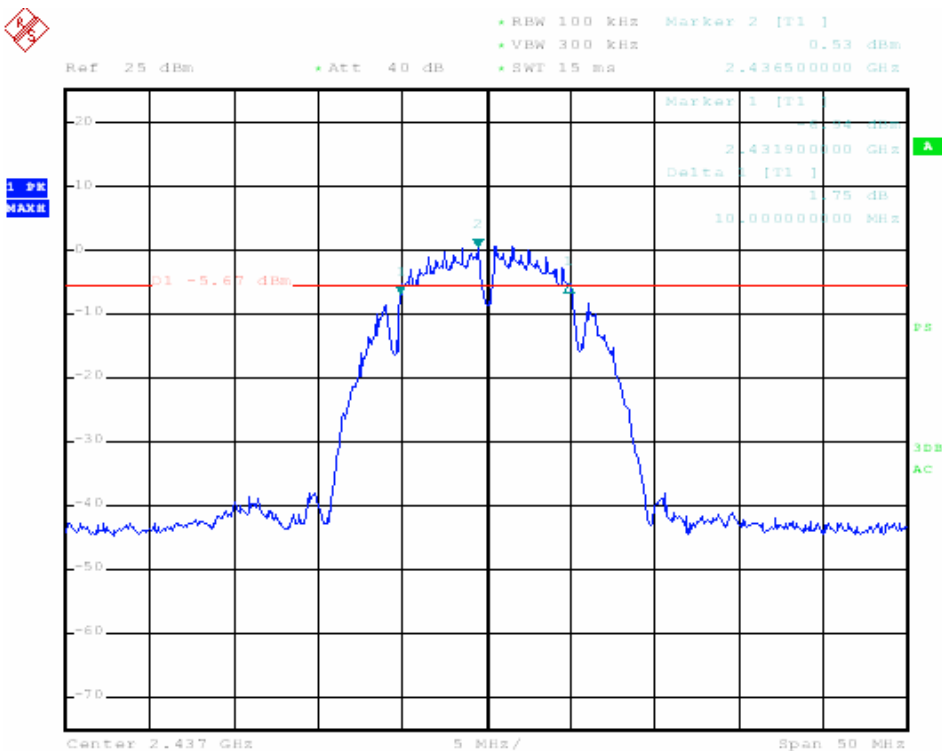
9.4 TEST RESULT

Mode - Modulation	Data Rate	Channel	6 dB BW (MHz)	Min. Limit (kHz)	Result (P/F)
802.11b-DSSS	1 Mbps	CH1	10.9	500	P
		CH6	10.0	500	P
		CH11	9.9	500	P
	11 Mbps	CH1	10.0	500	P
		CH6	9.4	500	P
		CH11	10.1	500	P
802.11g – OFDM	6 Mbps	CH1	16.6	500	P
		CH6	16.7	500	P
		CH11	16.6	500	P
	24 Mbps	CH1	16.6	500	P
		CH6	16.6	500	P
		CH11	16.5	500	P
	54 Mbps	CH1	16.6	500	P
		CH6	16.7	500	P
		CH11	16.6	500	P

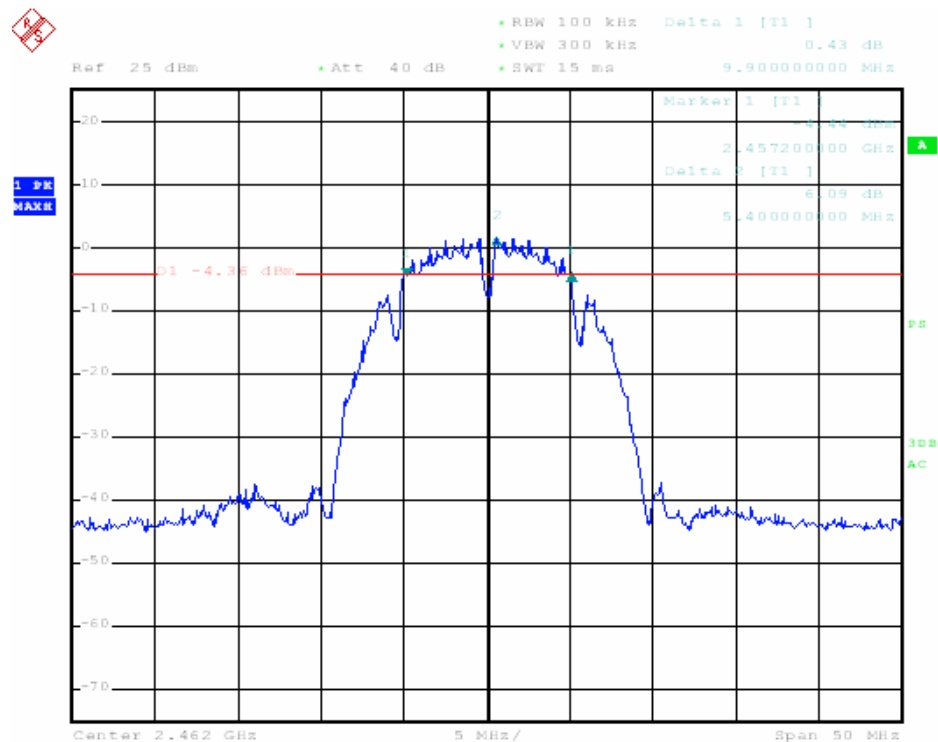
The unit does meet the FCC requirements. Please refer the graphs as below:



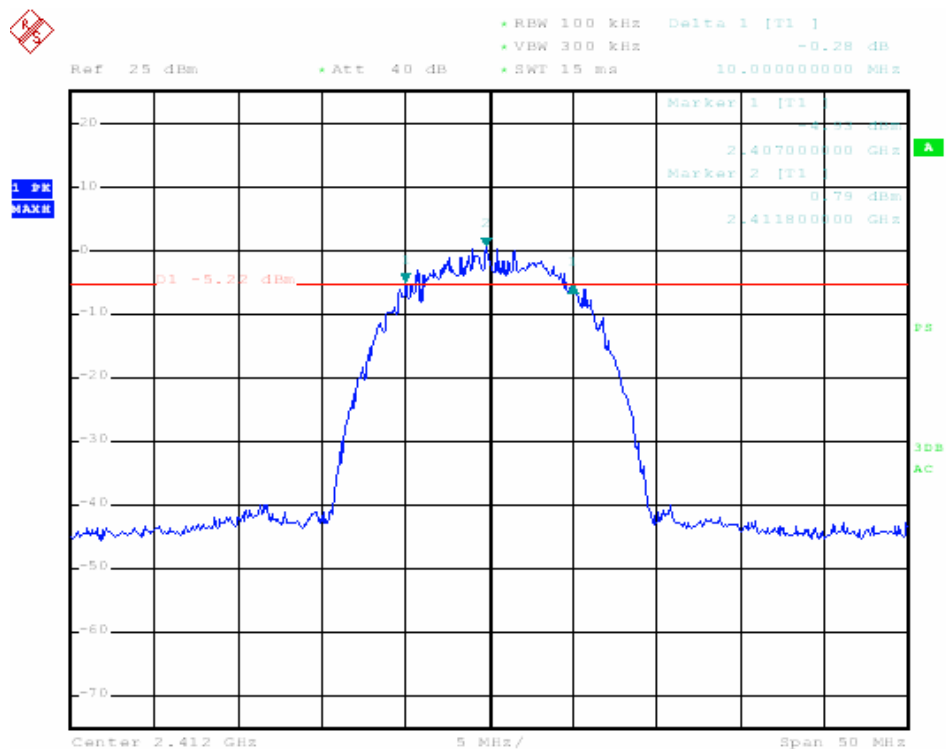
IEEE 802.11b, CH low, 1Mbps



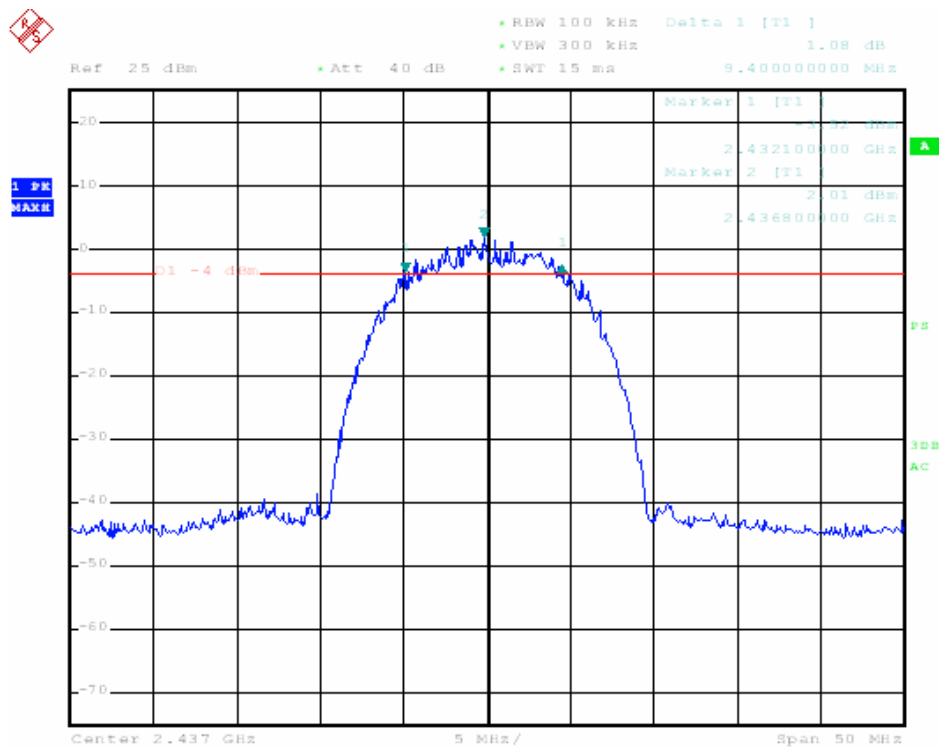
IEEE 802.11b, CH middle, 1Mbps



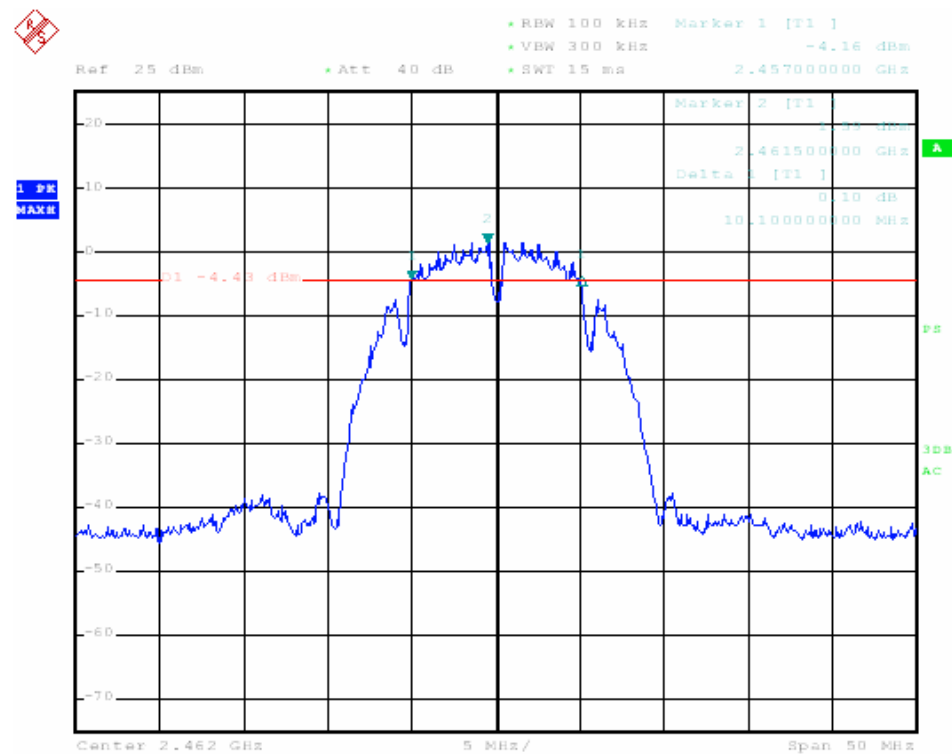
IEEE 802.11b, CH high, 1Mbps



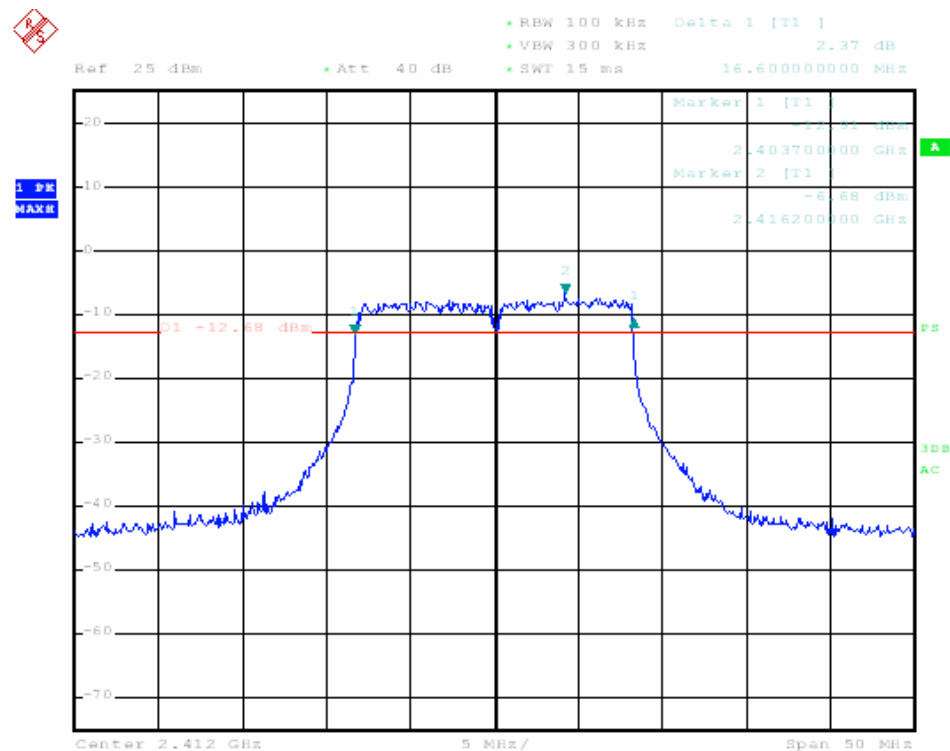
IEEE 802.11b, CH low, 11Mbps



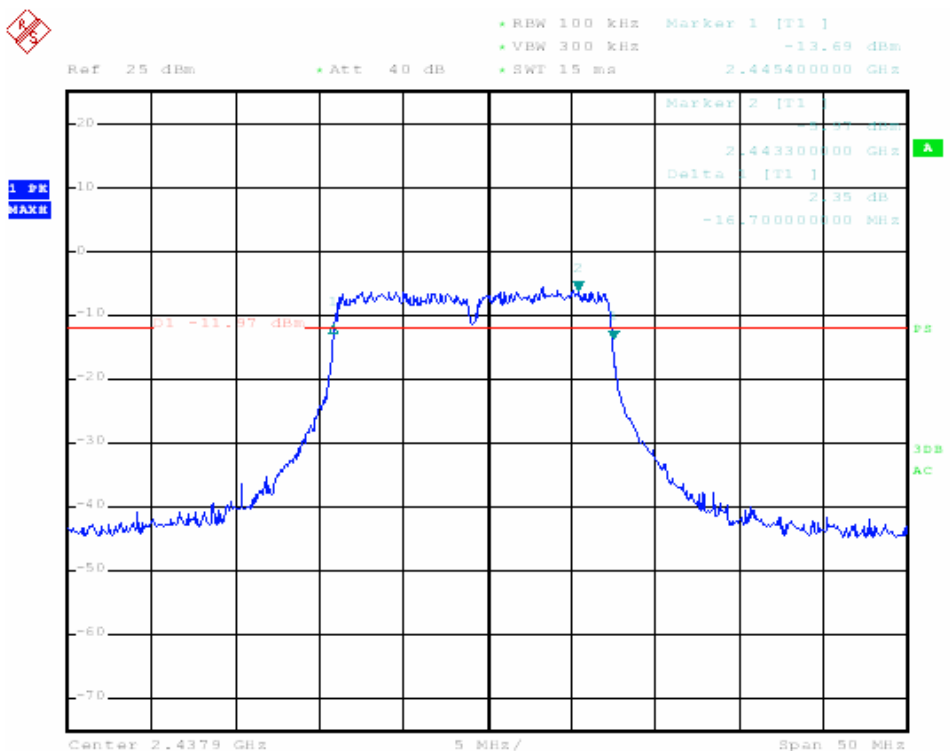
IEEE 802.11b, CH middle, 11Mbps



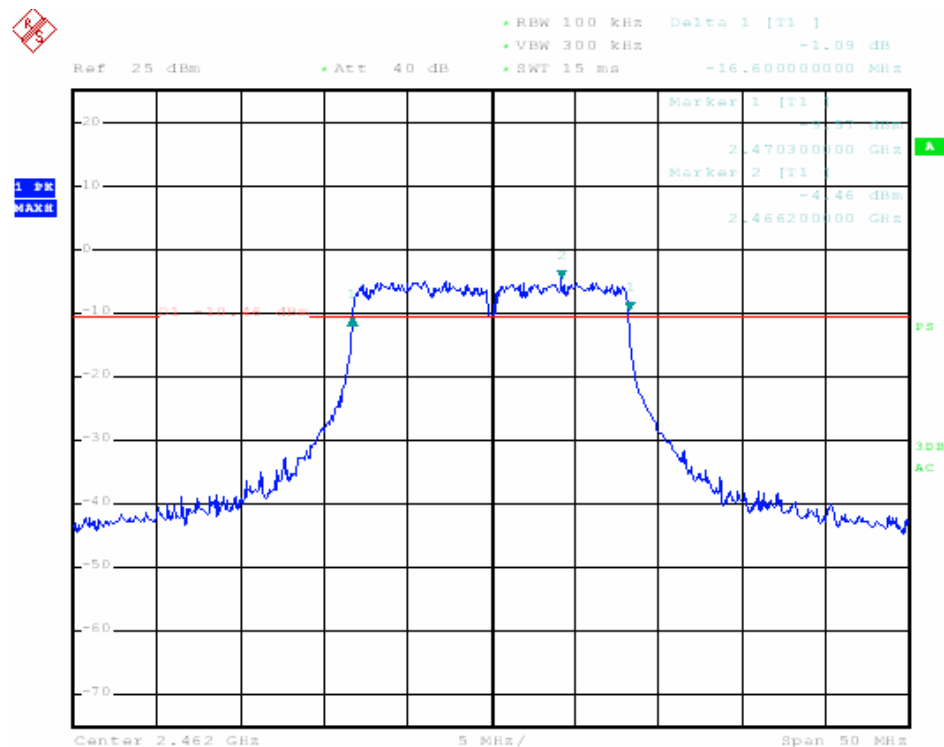
IEEE 802.11b, CH high, 11Mbps



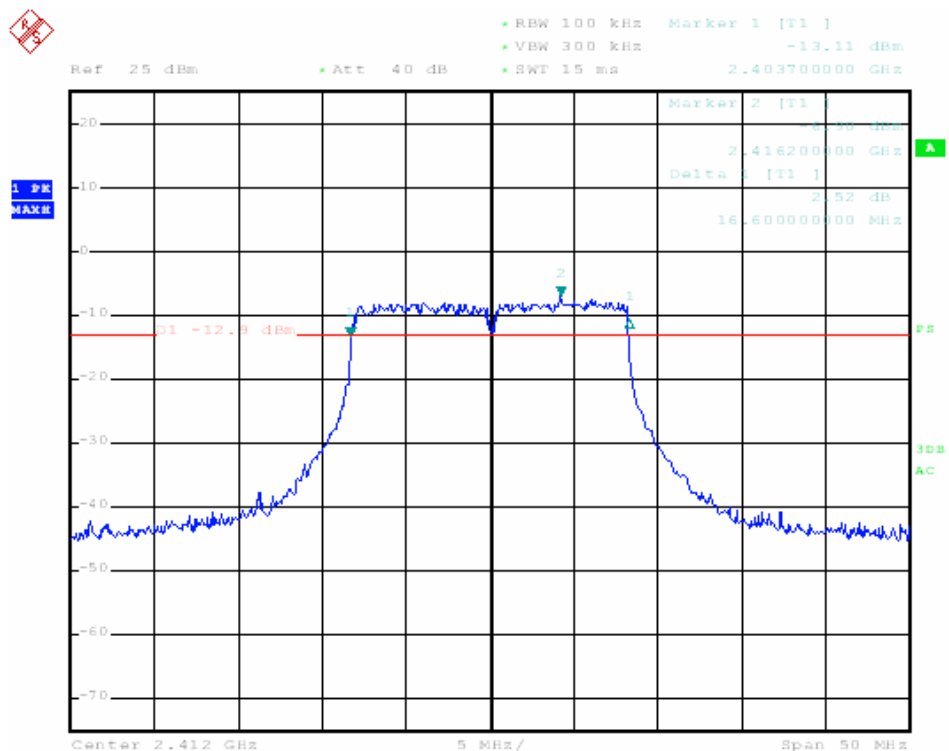
IEEE 802.11g, CH low, 6Mbps



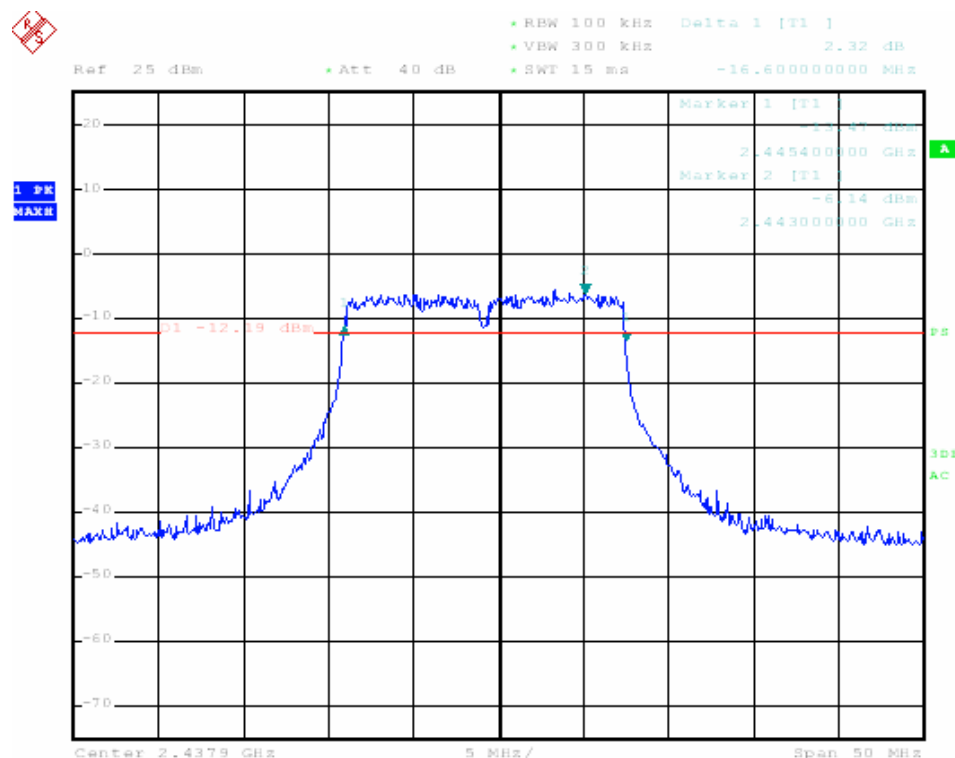
IEEE 802.11g, CH middle, 6Mbps



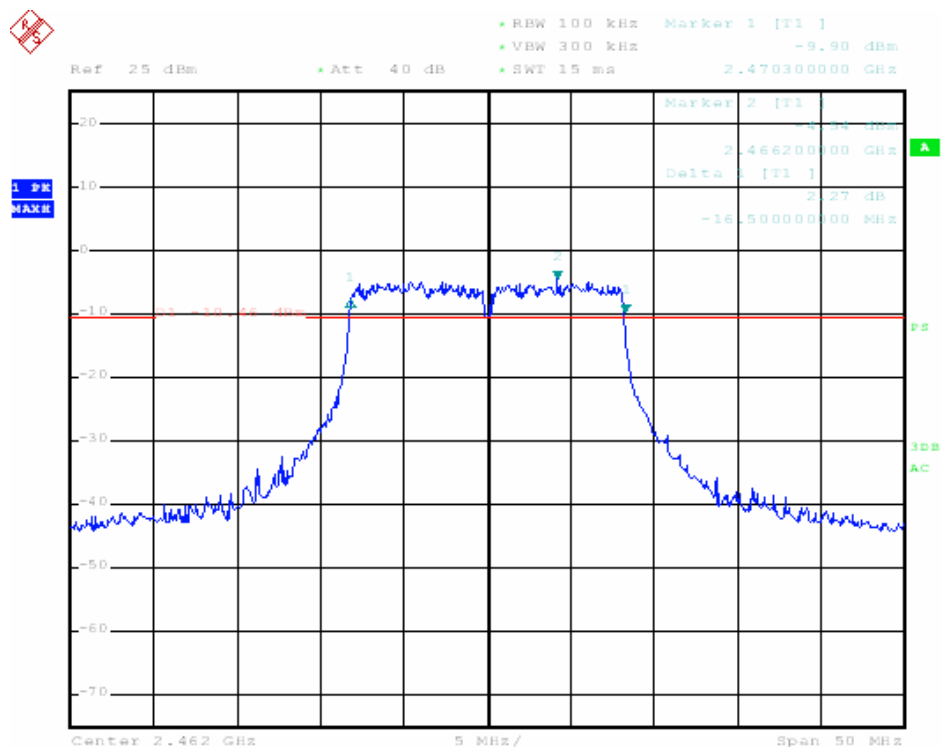
IEEE 802.11g, CH high, 6Mbps



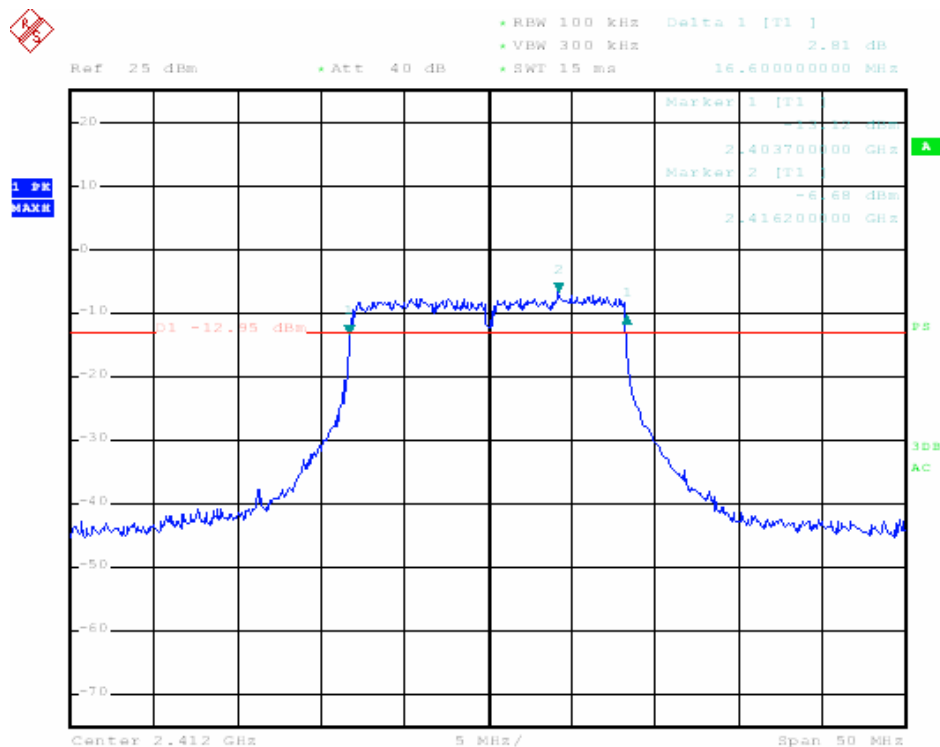
IEEE 802.11g, CH low, 24Mbps



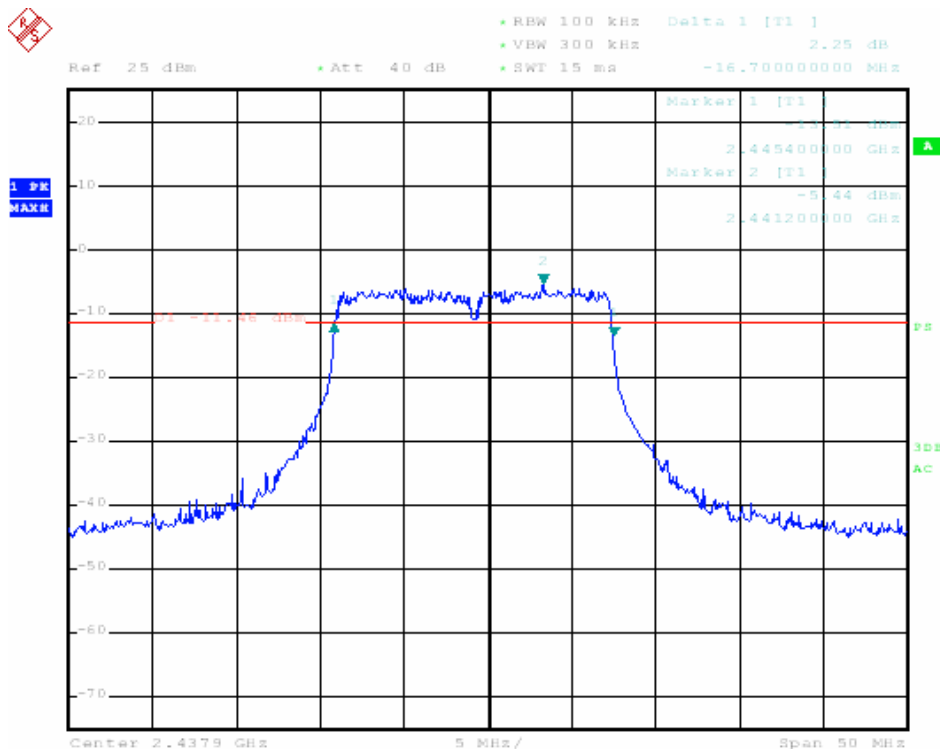
IEEE 802.11g, CH middle, 24Mbps



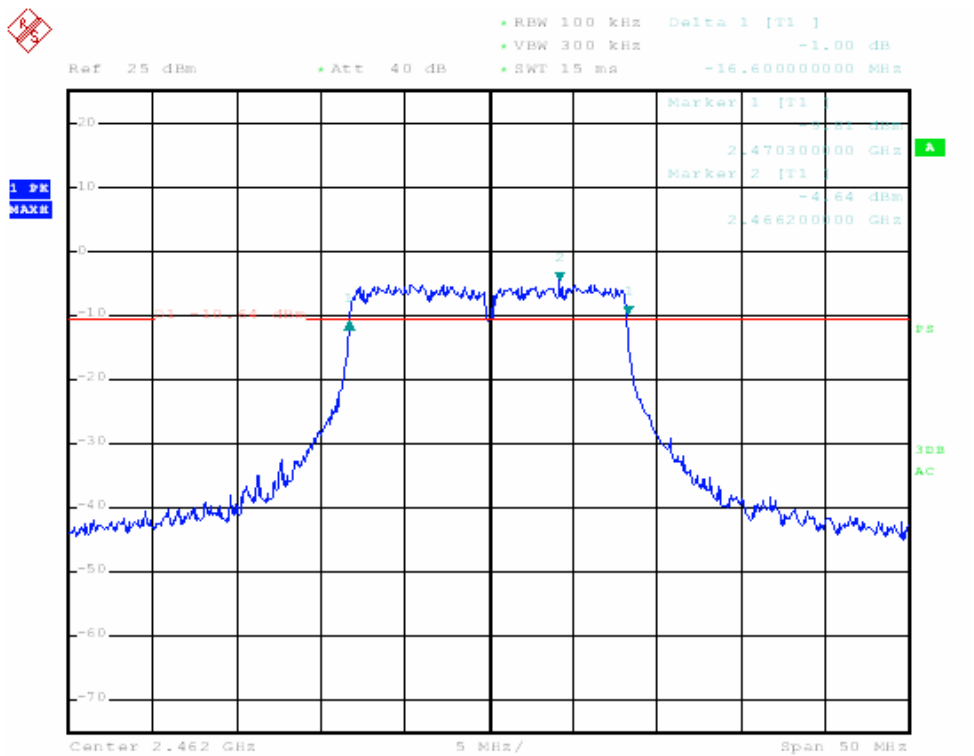
IEEE 802.11g, CH high, 24Mbps



IEEE 802.11g, CH low, 54Mbps



IEEE 802.11g, CH middle, 54Mbps



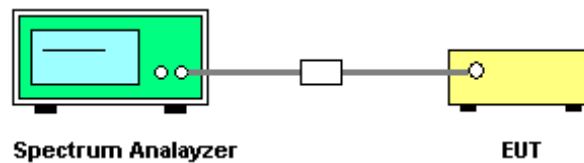
IEEE 802.11g, CH high, 54Mbps

10. SPURIOUS RF CONDUCTED EMISSIONS MEASUREMENT

10.1 LIMITS

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.

10.2 BLOCK DIAGRAM OF TEST SETUP

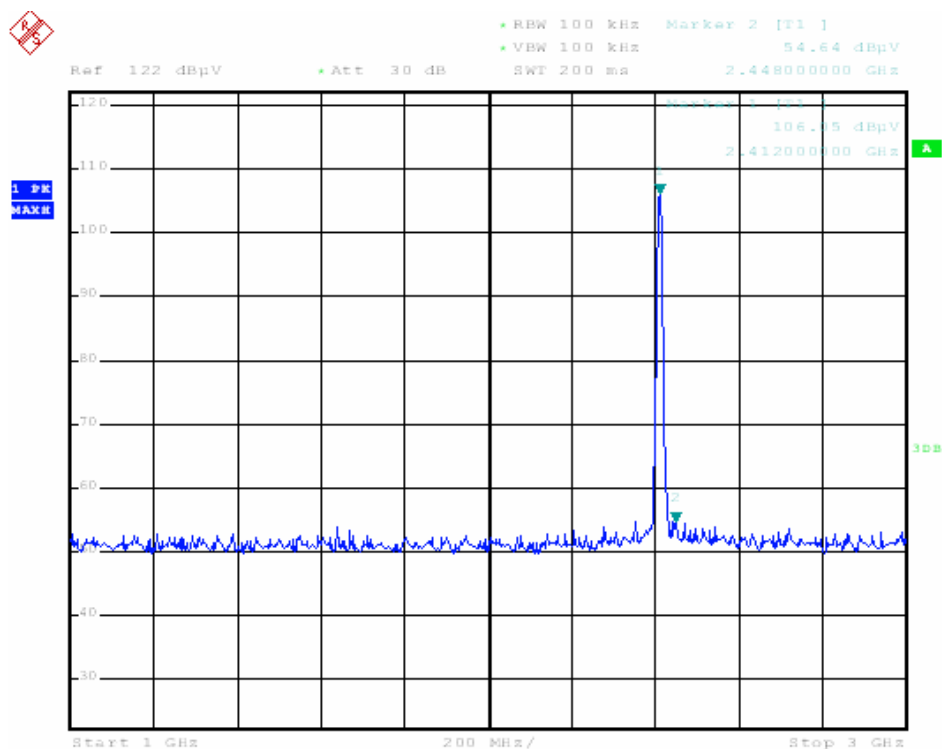
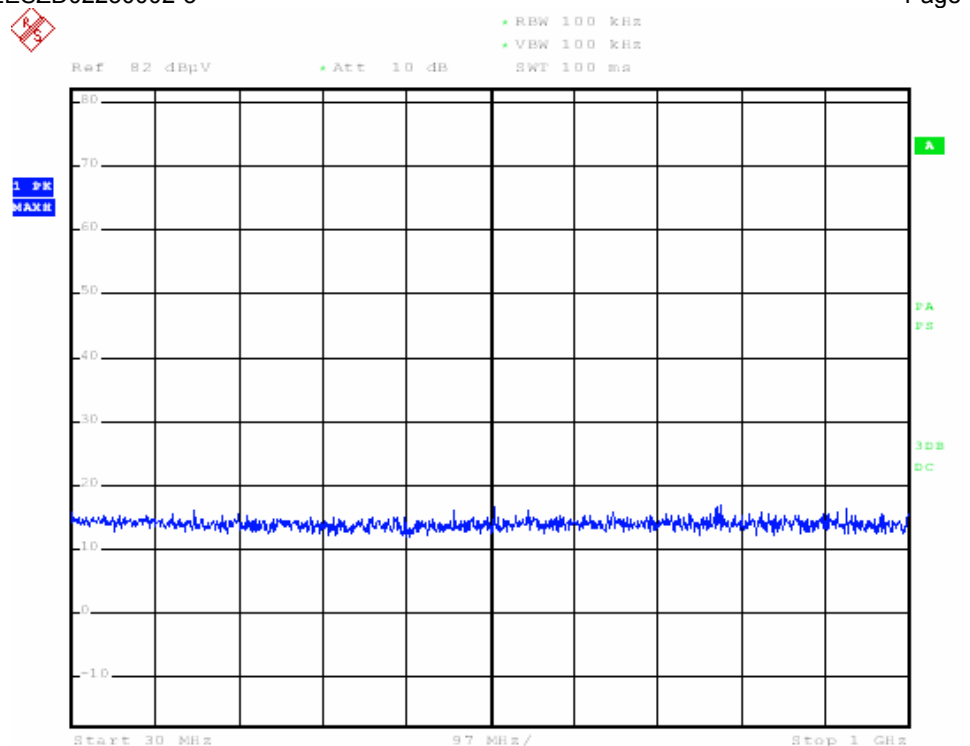


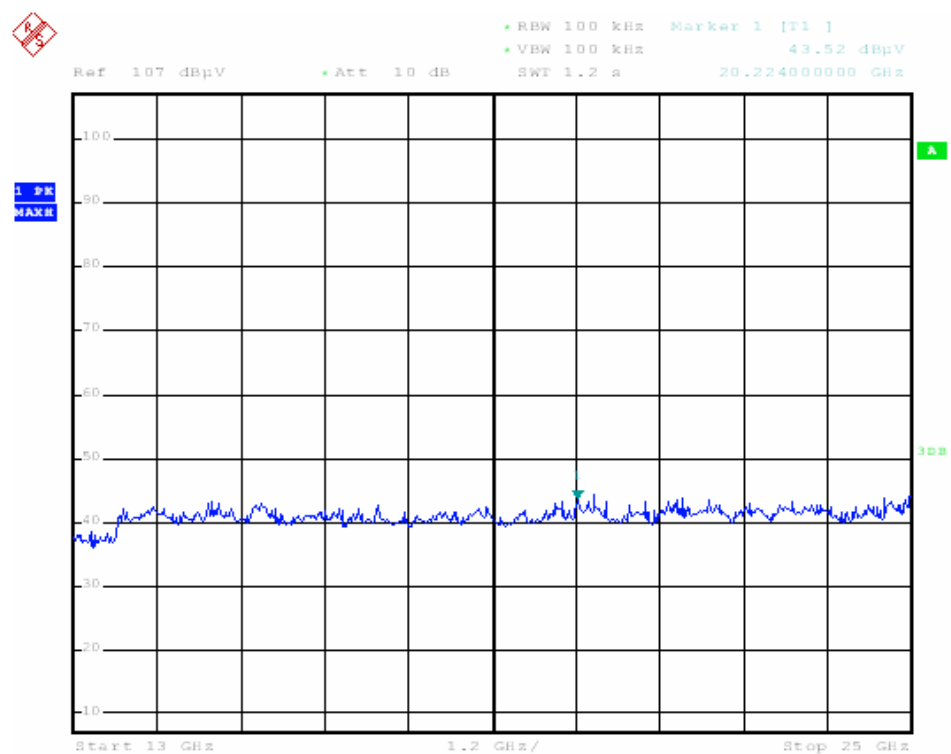
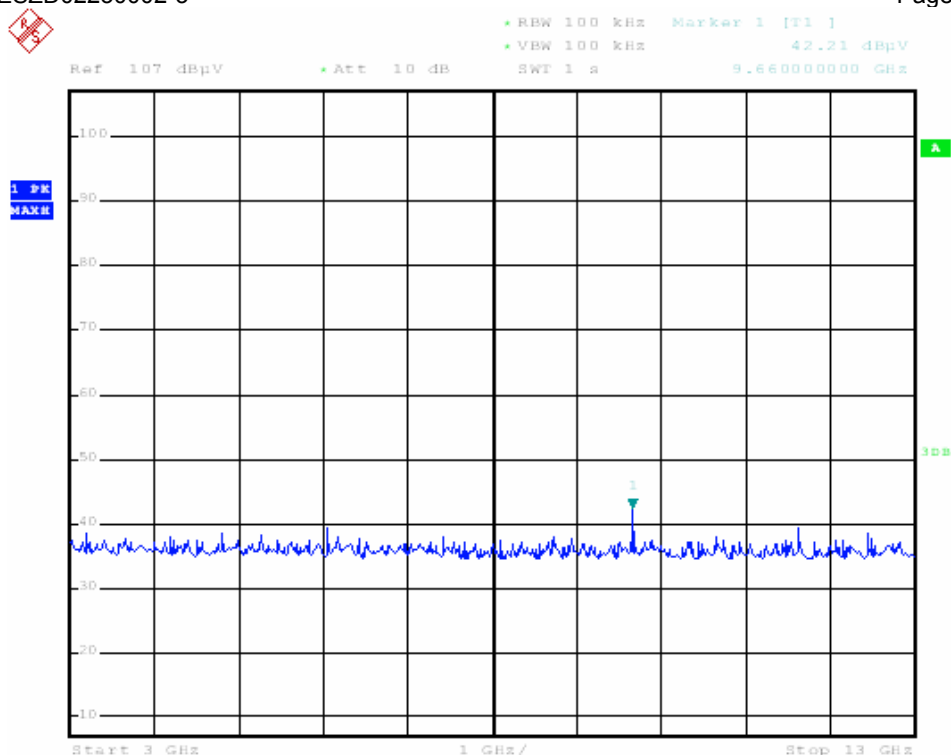
10.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.

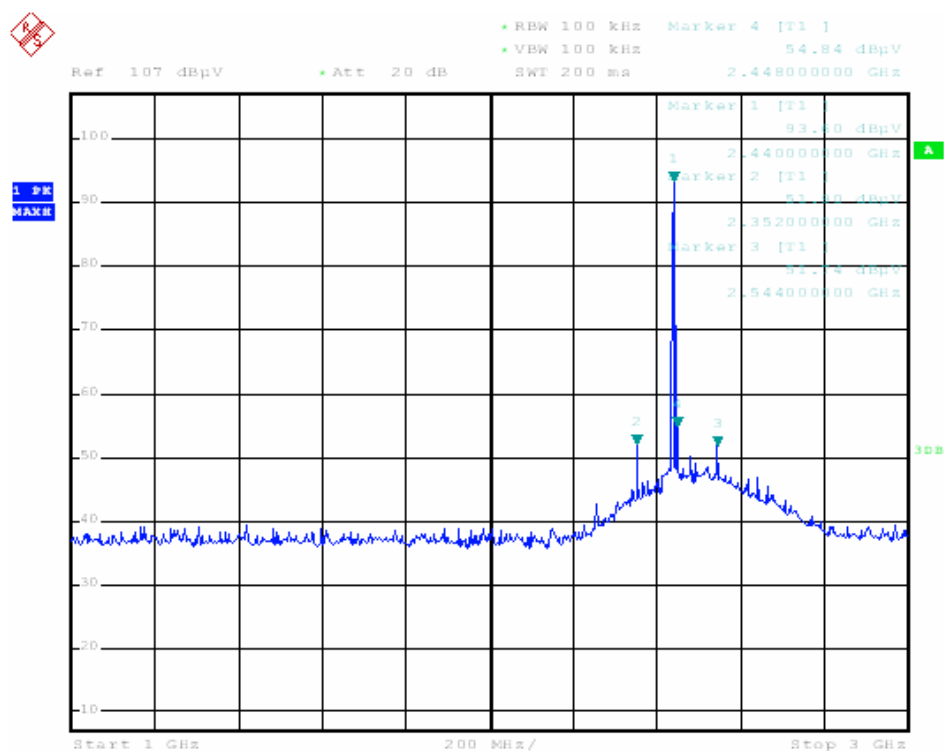
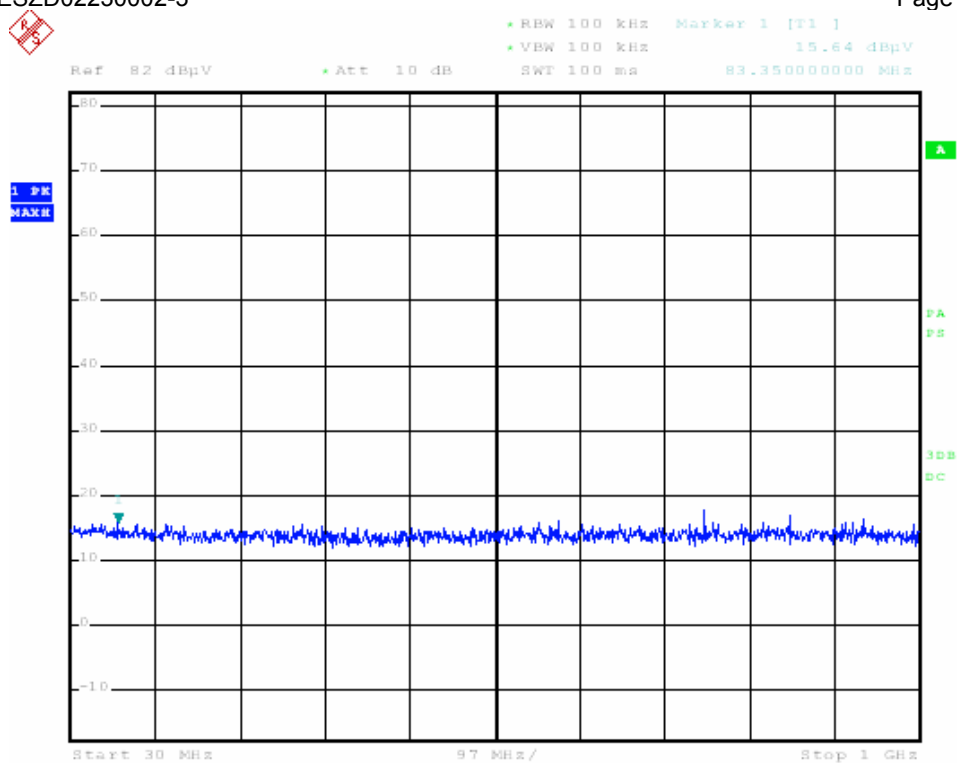
10.4 TEST RESULT

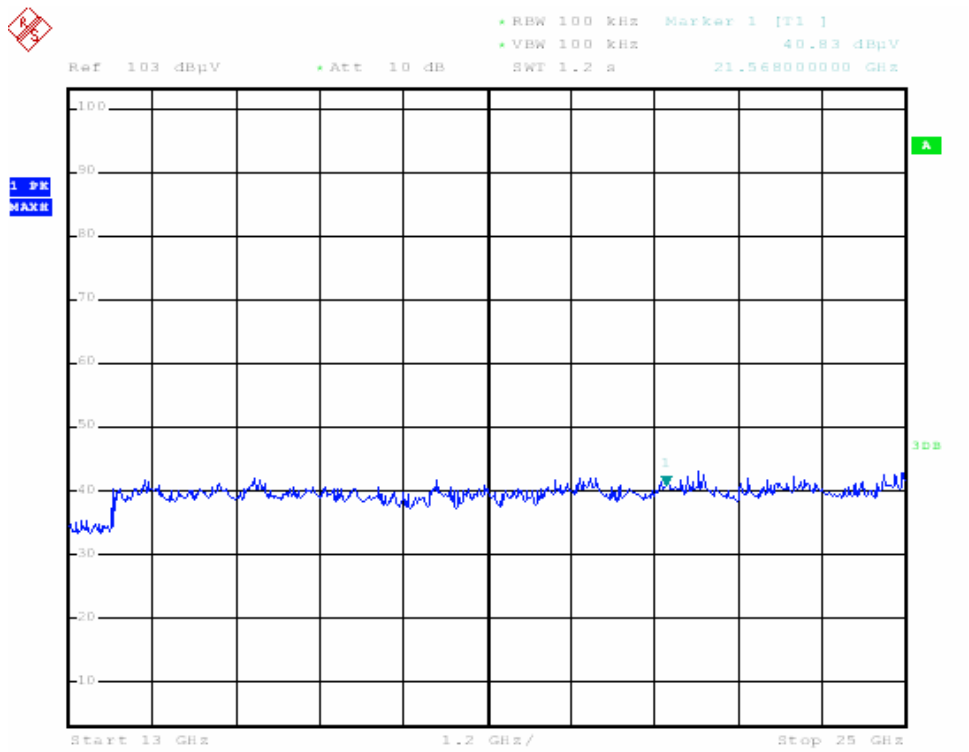
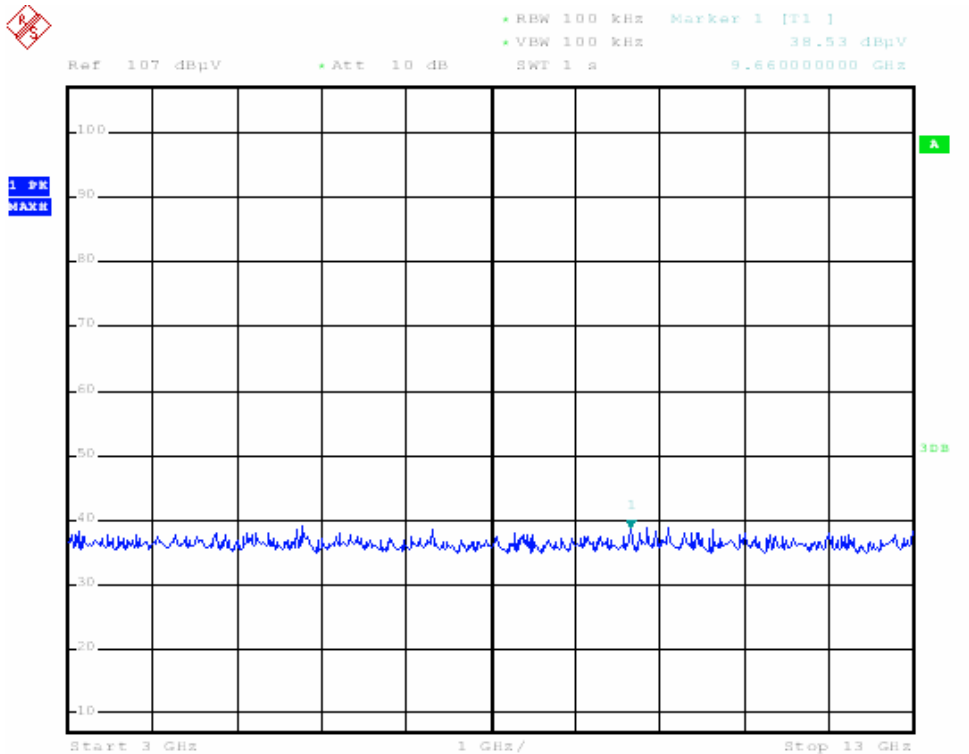
Please see the following plots.



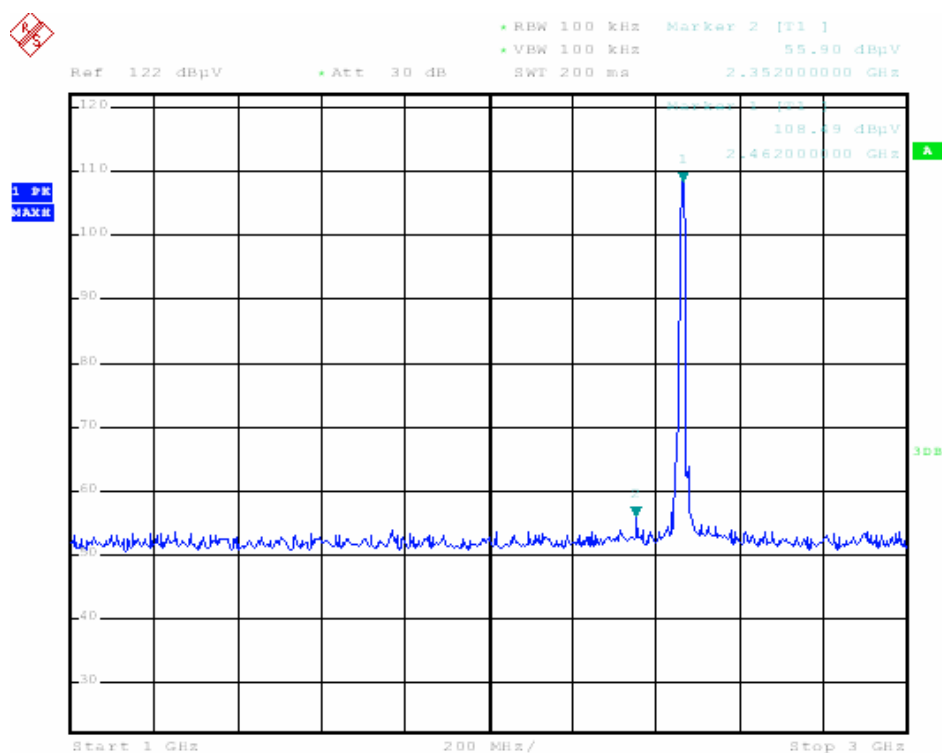
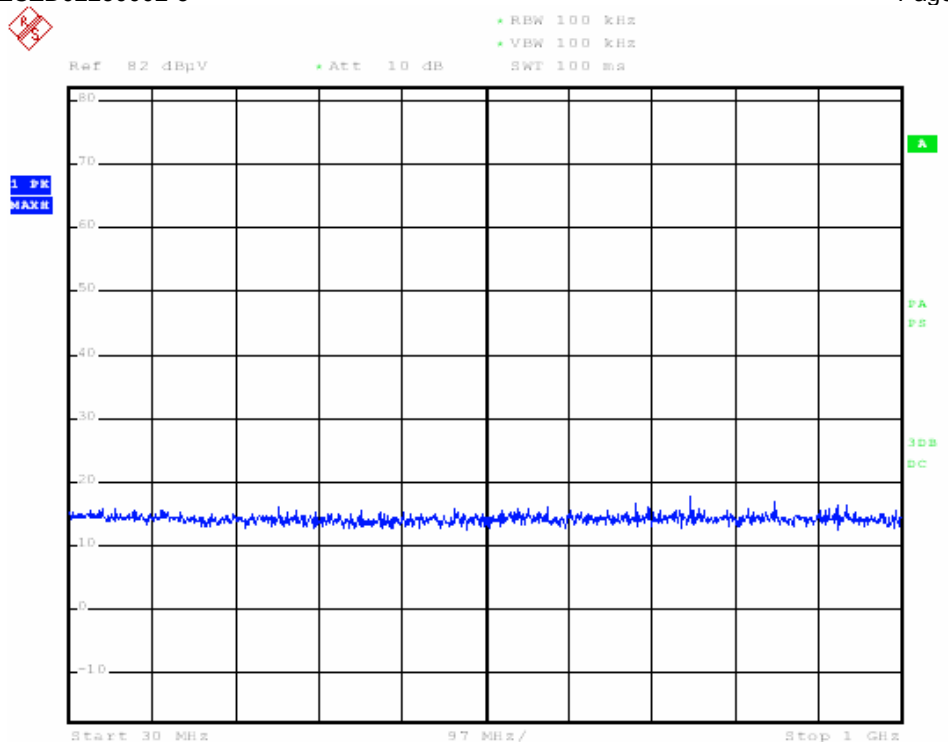


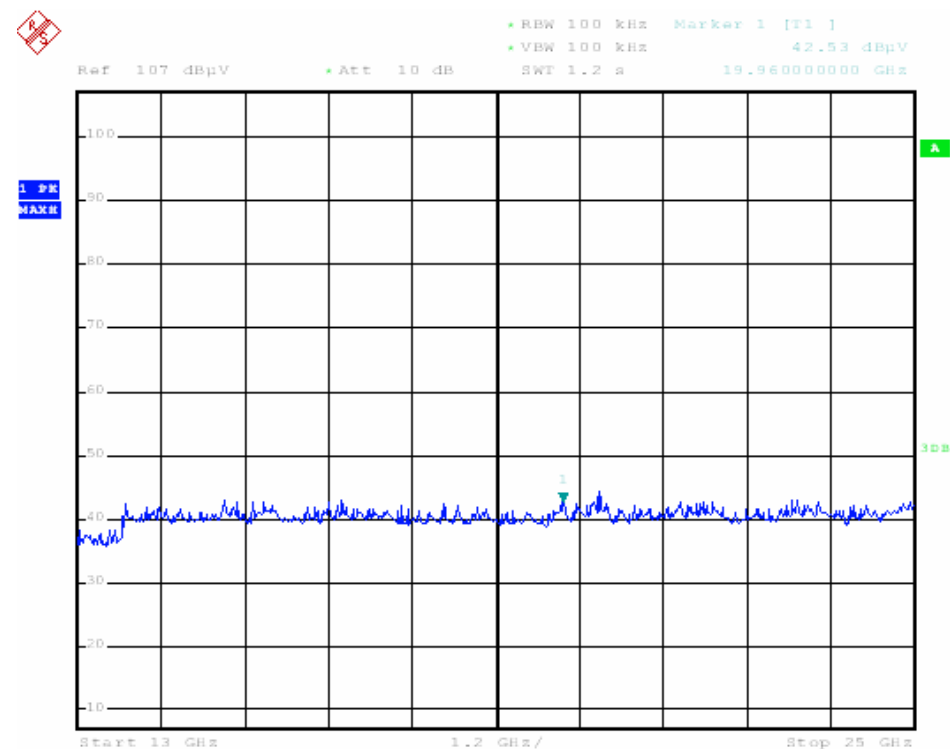
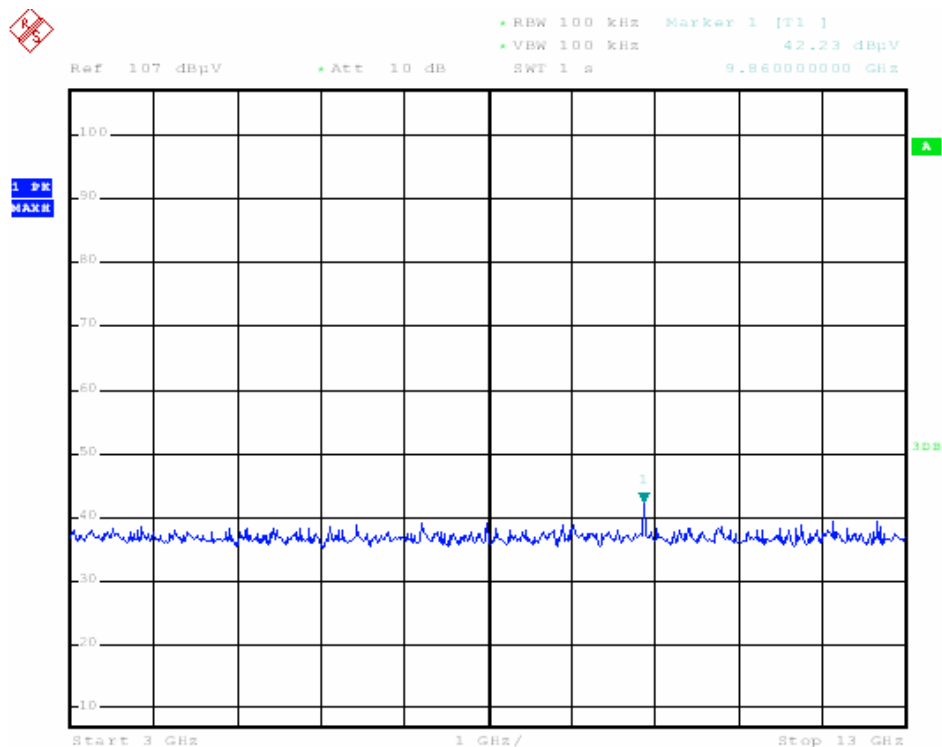
IEEE 802.11b, CH low, 1Mbps



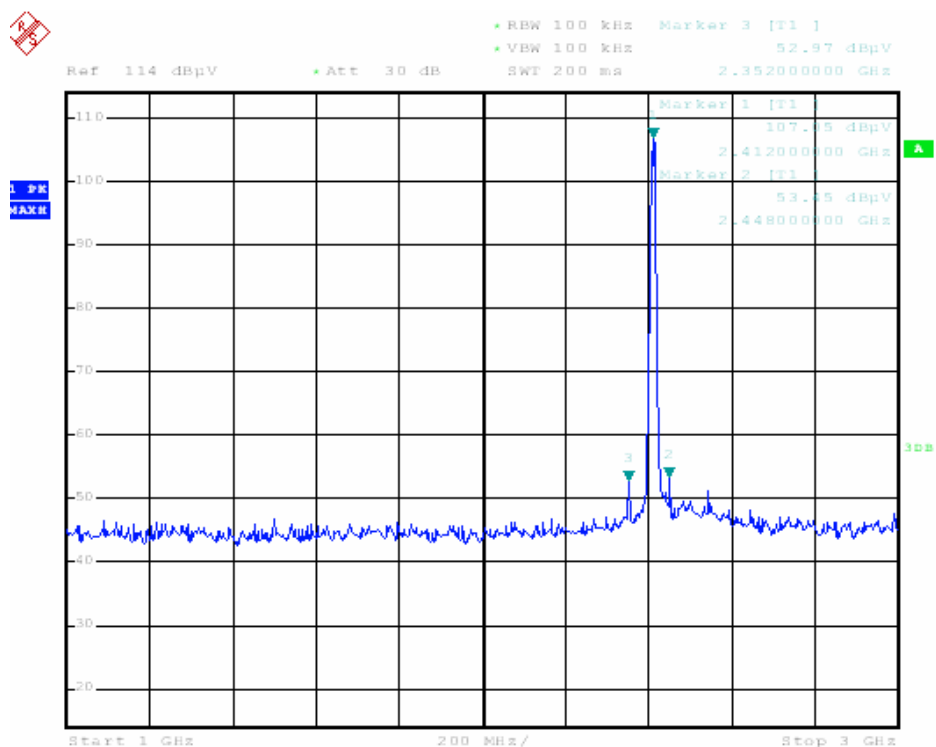
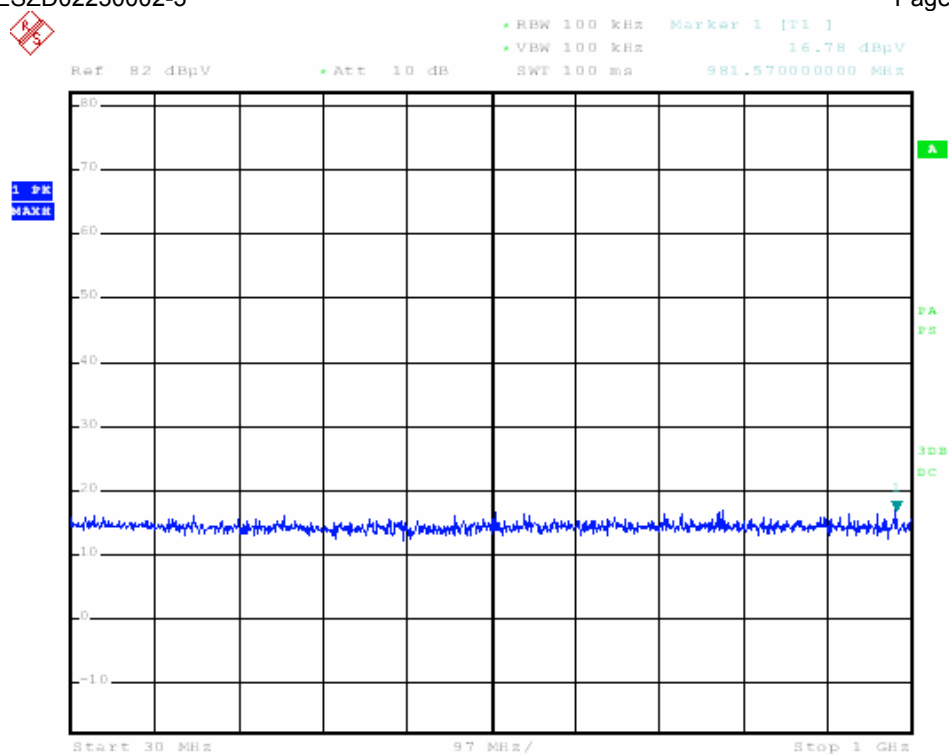


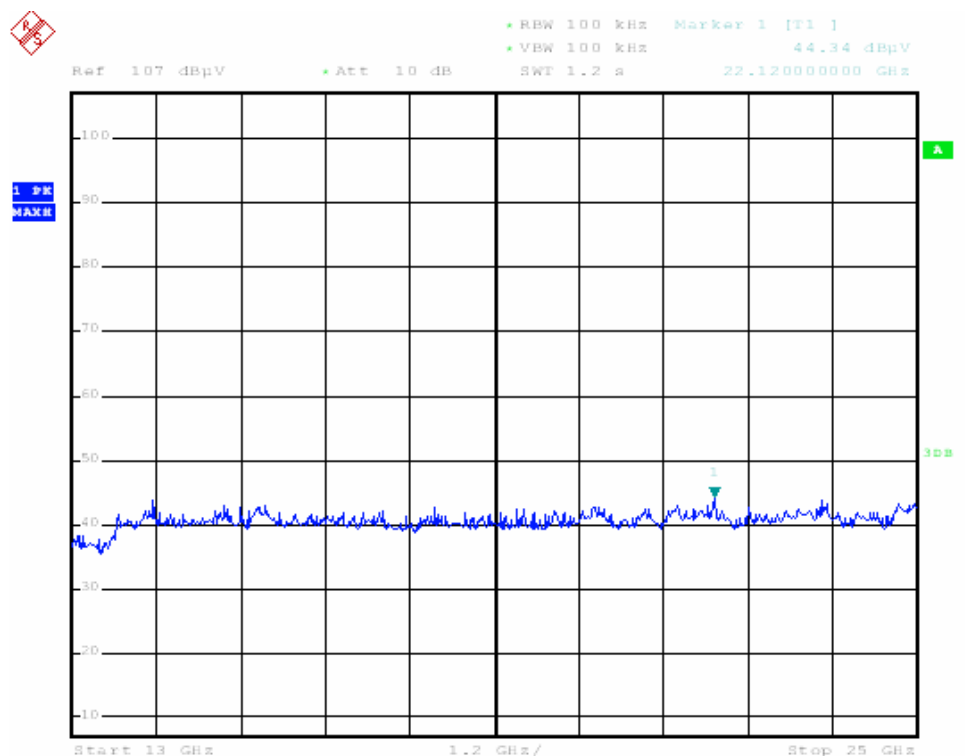
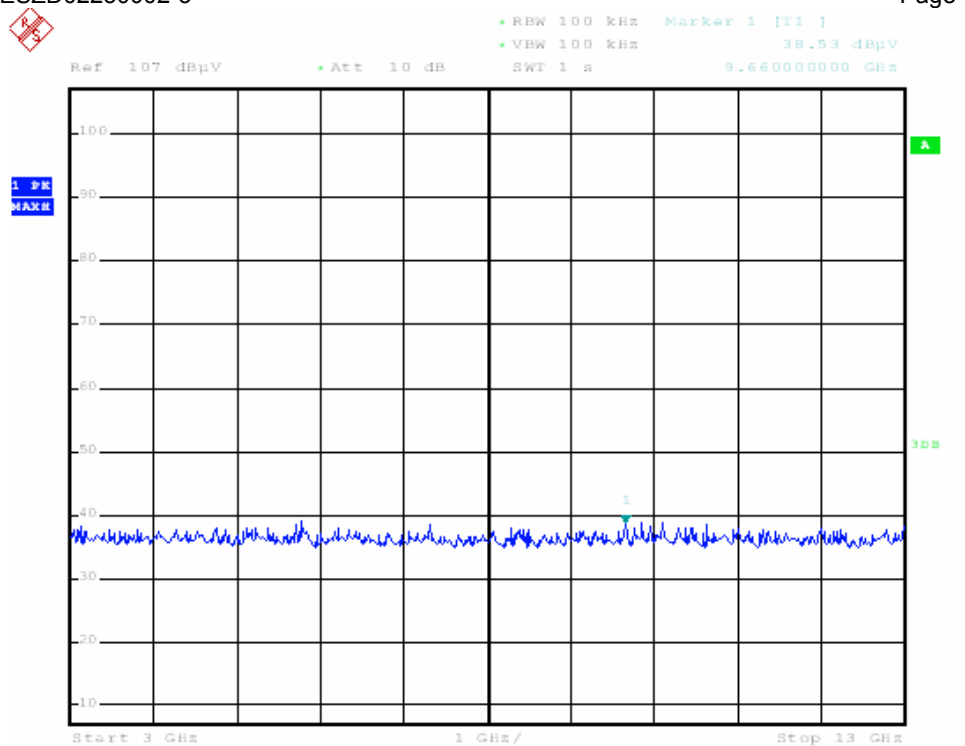
IEEE 802.11b, CH middle, 1Mbps



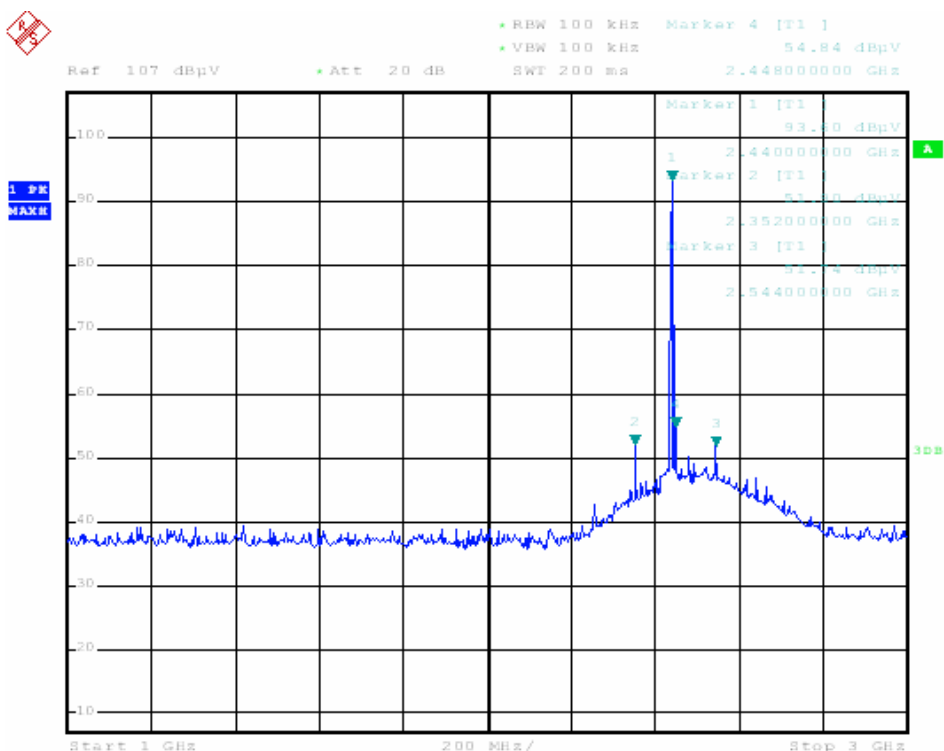
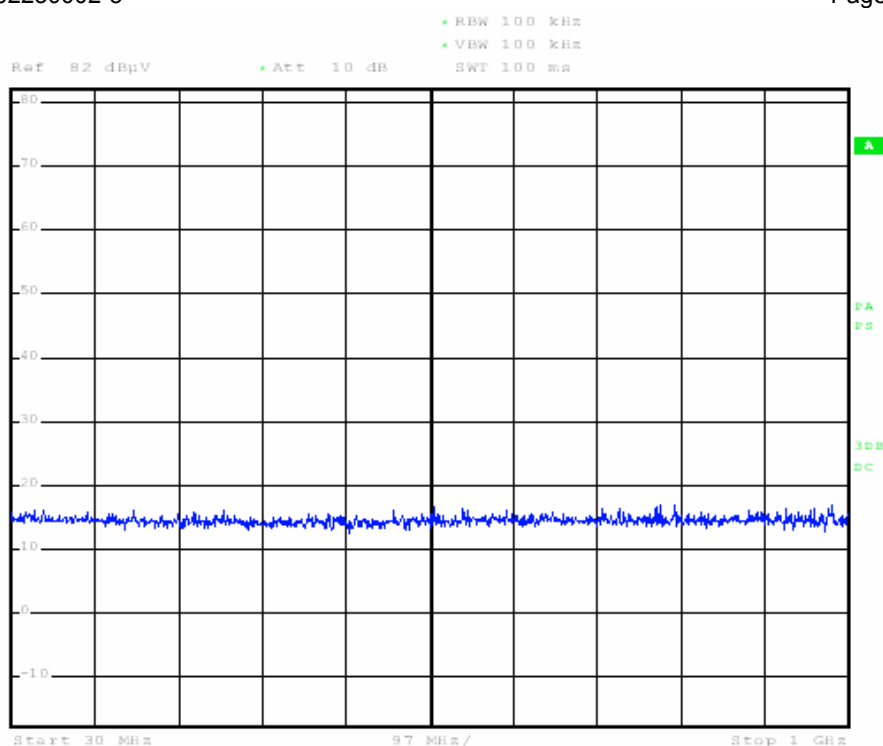


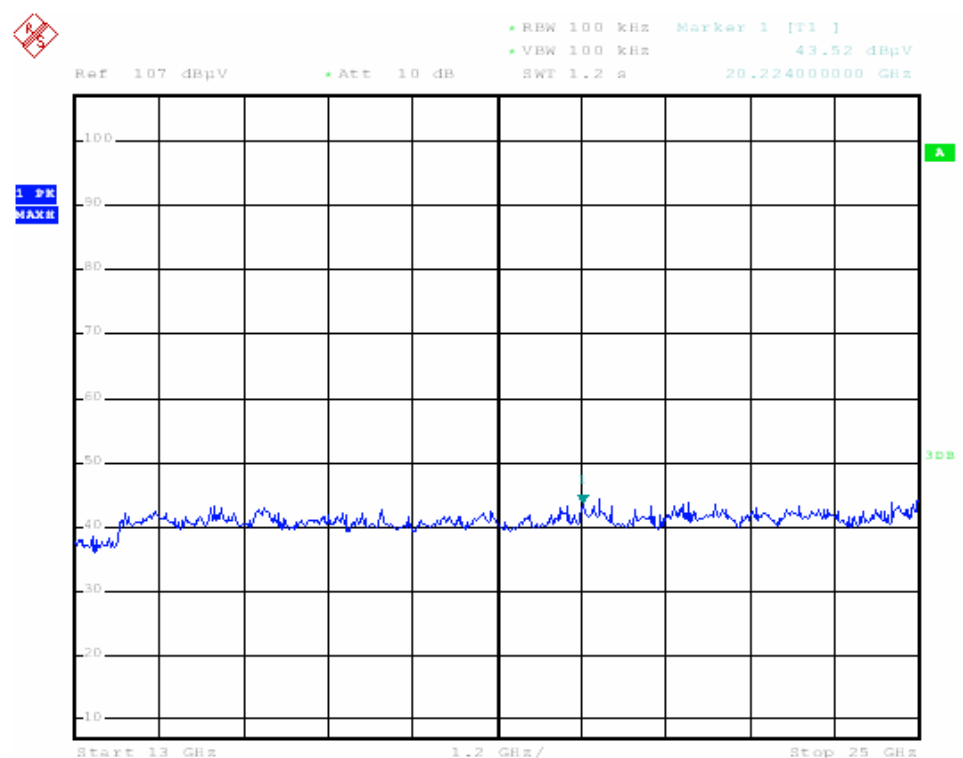
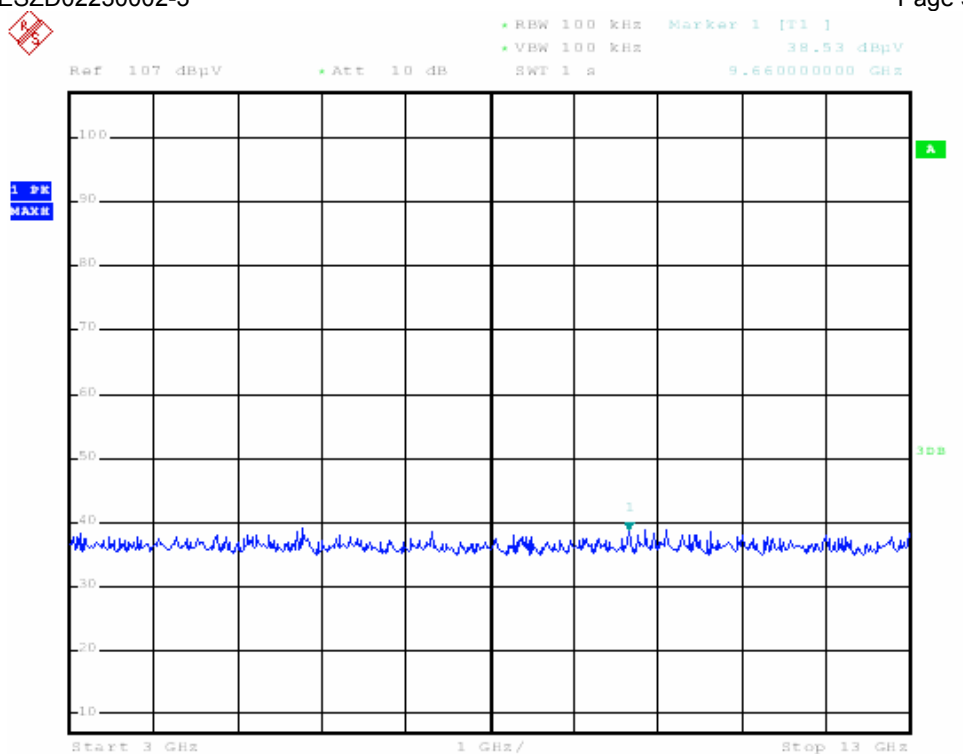
IEEE 802.11b, CH high, 1Mbps





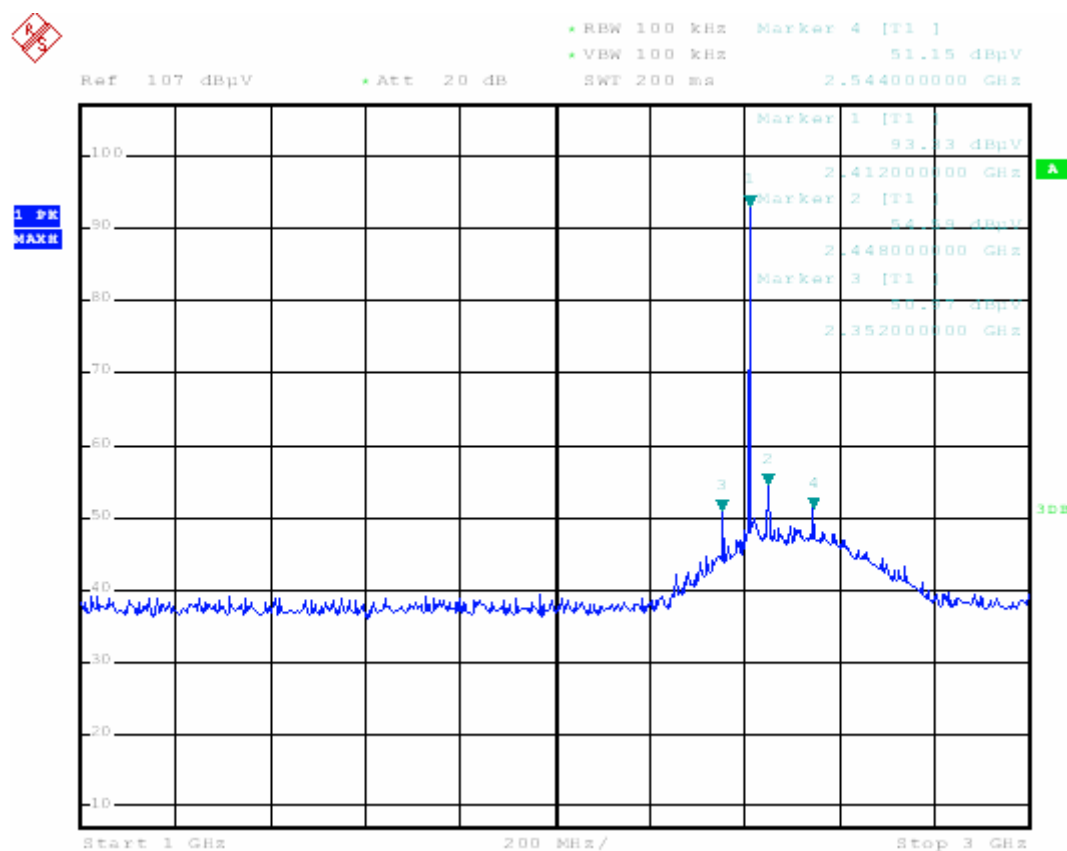
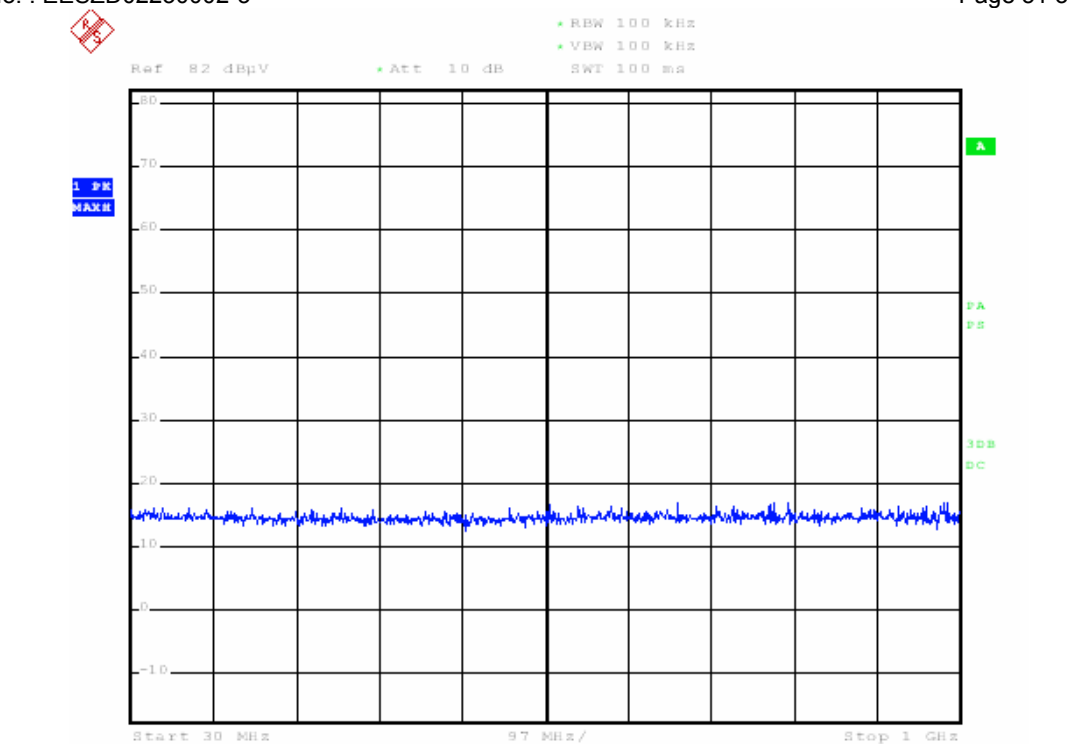
IEEE 802.11b, CH low, 11Mbps

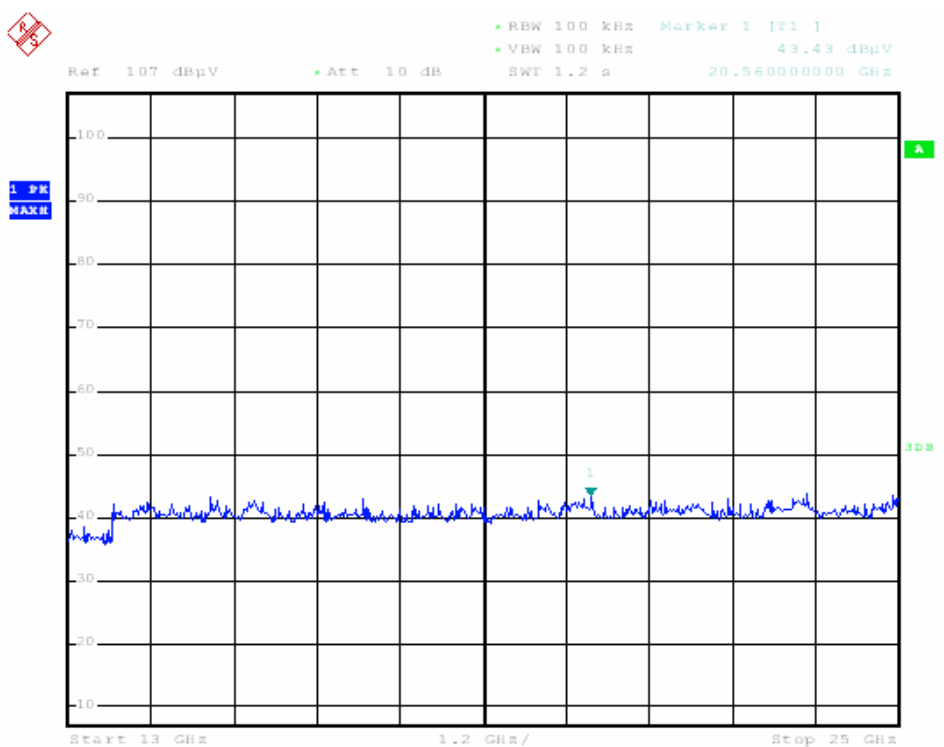
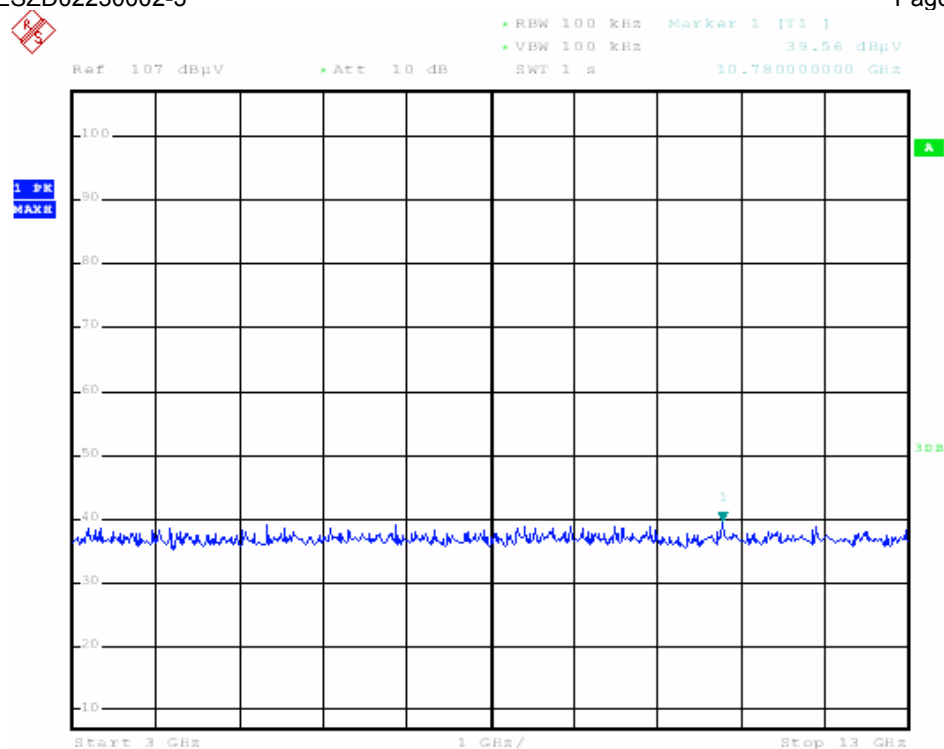




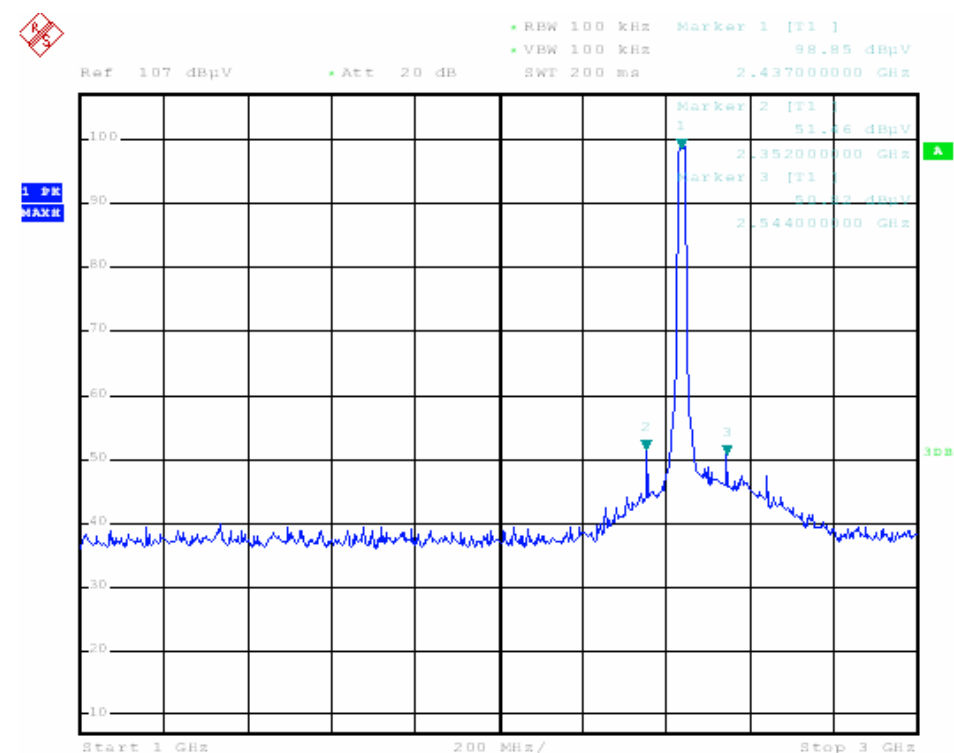
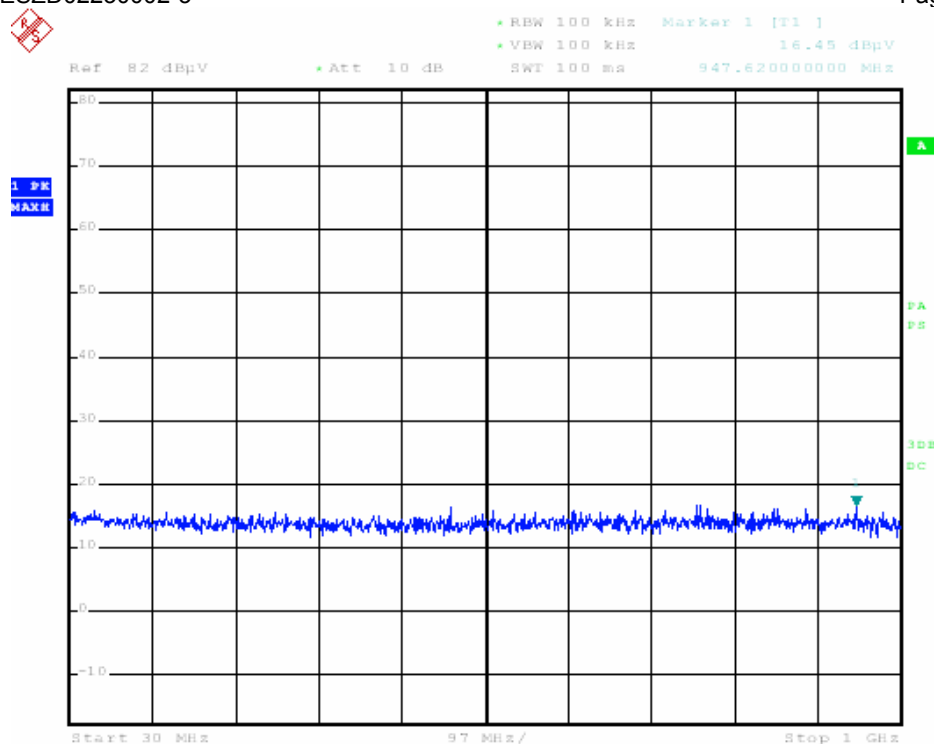
IEEE 802.11b, CH middle, 11Mbps

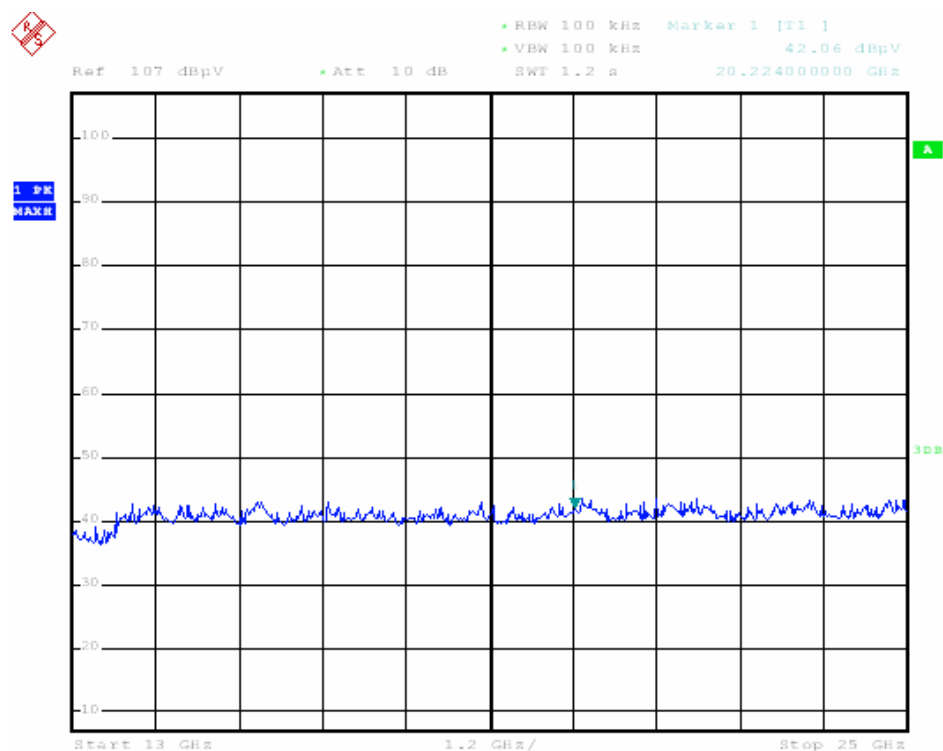
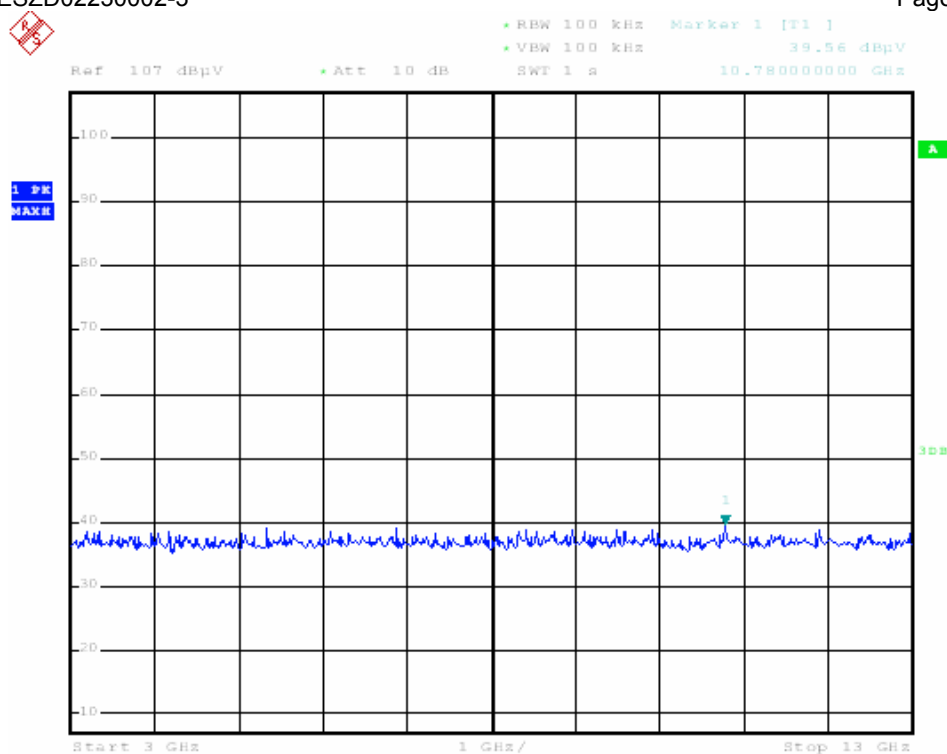






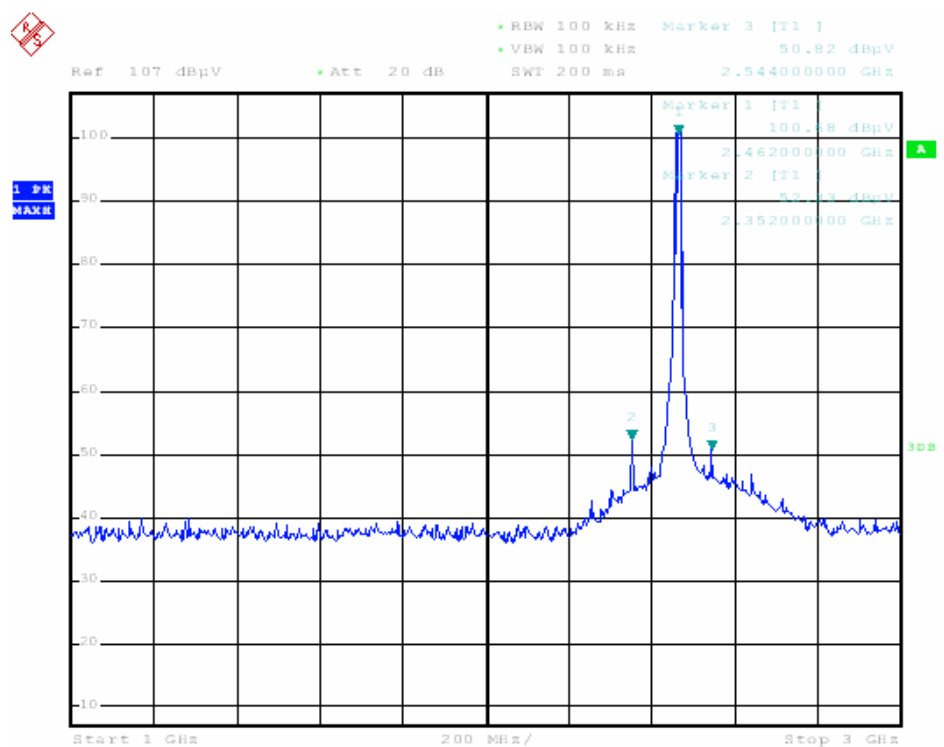
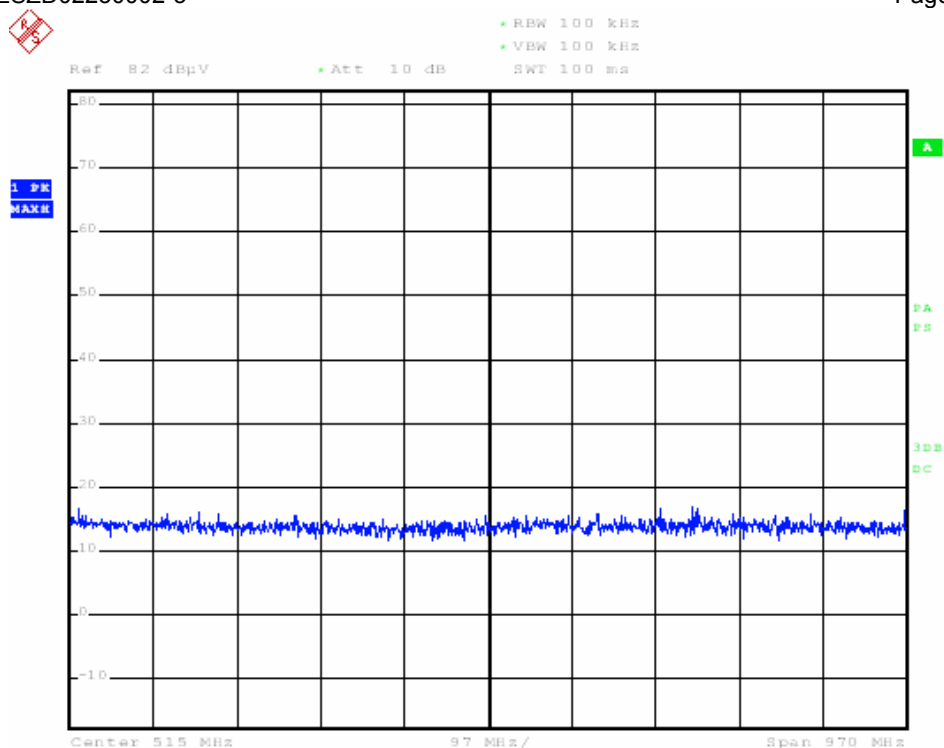
IEEE 802.11g, CH low, 6Mbps

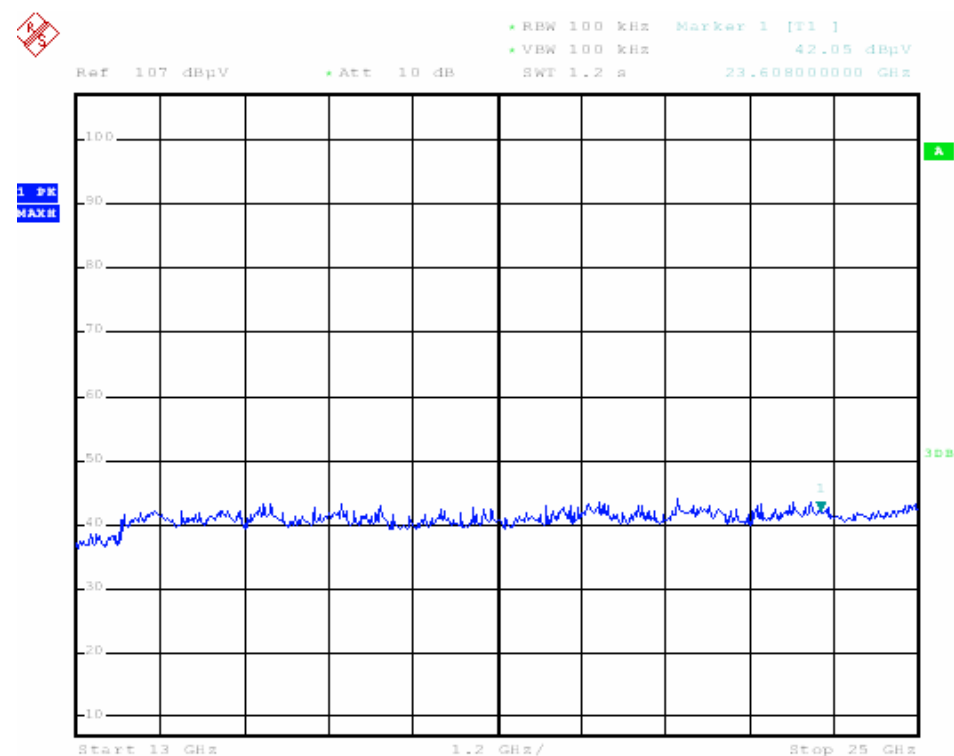
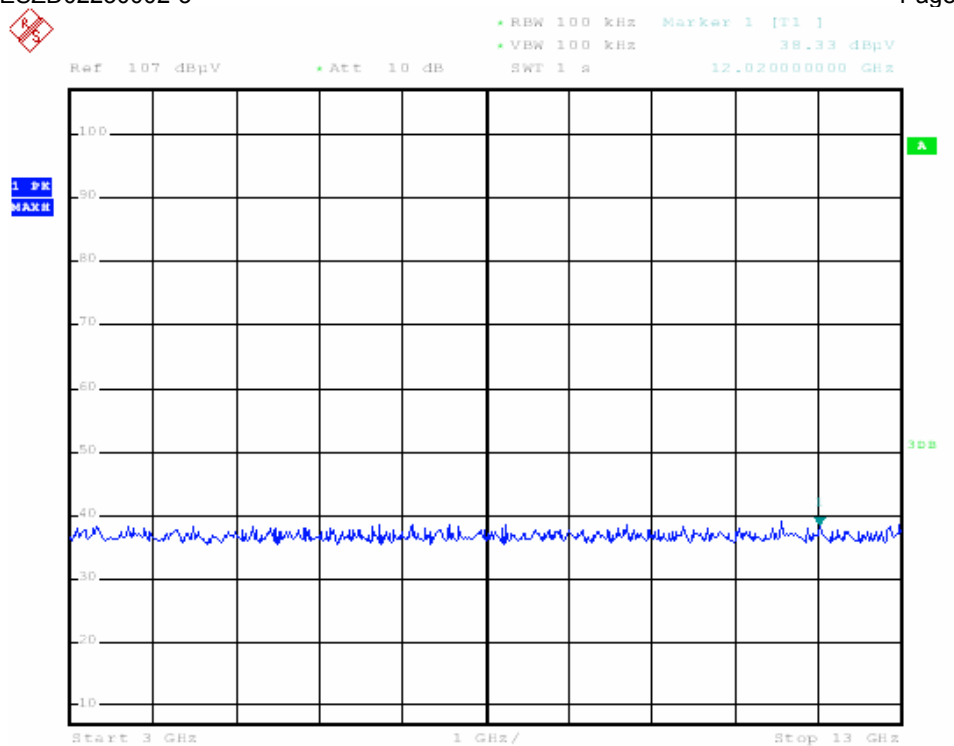




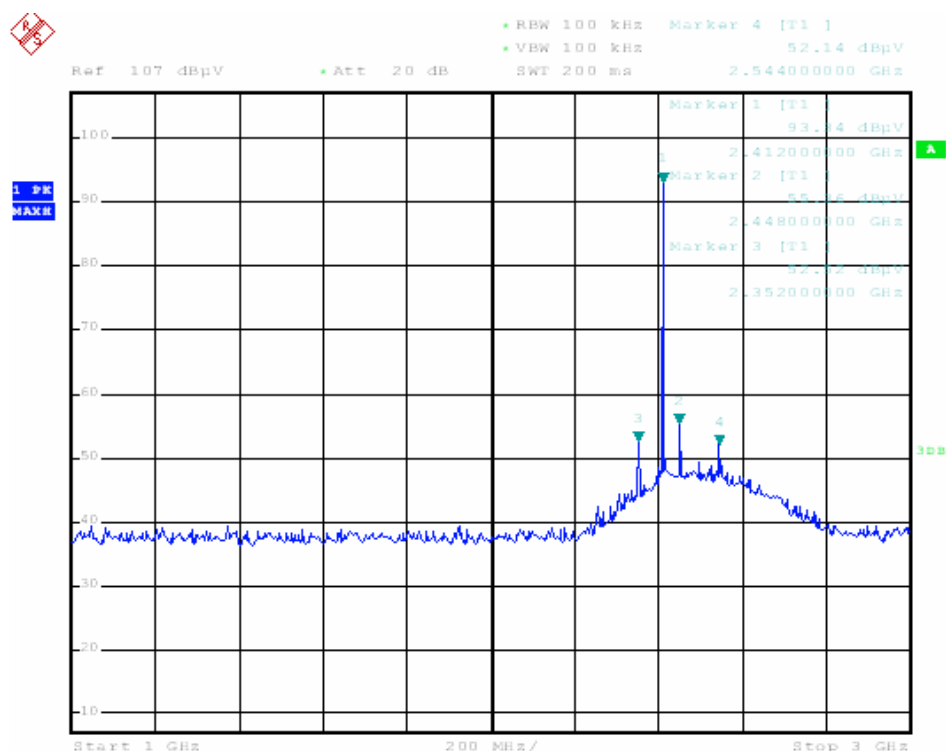
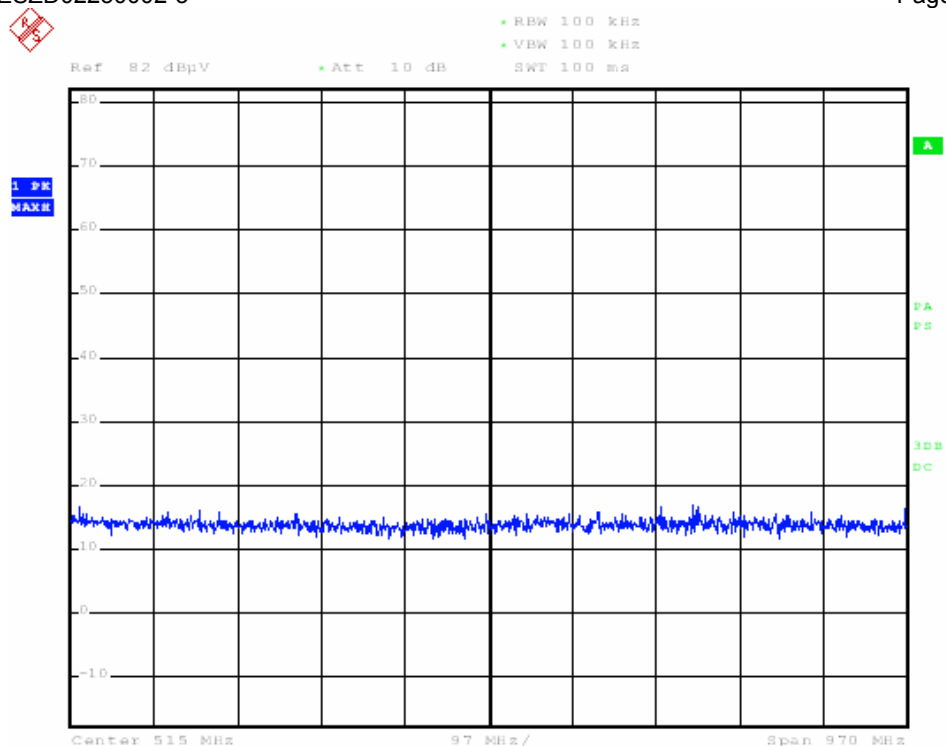
IEEE 802.11g, CH middle, 6Mbps

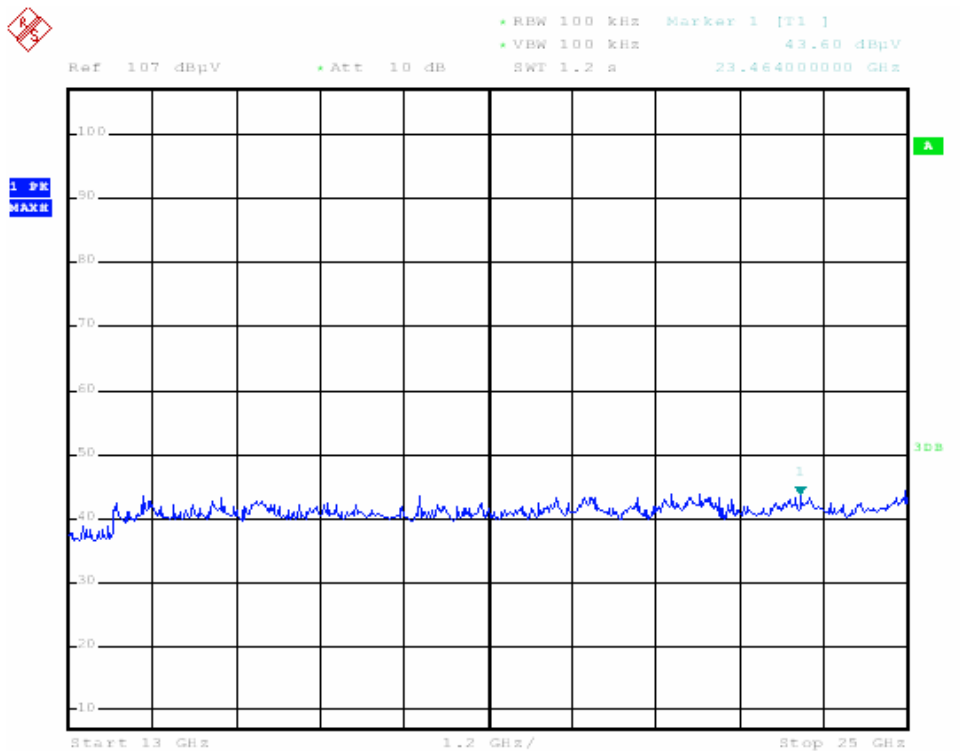
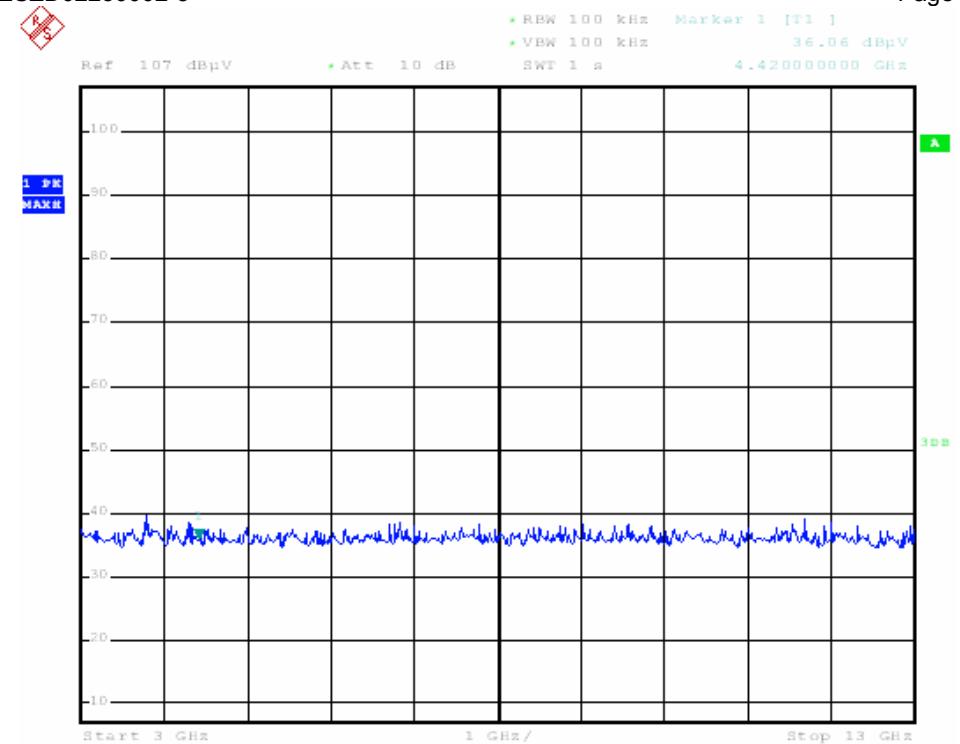




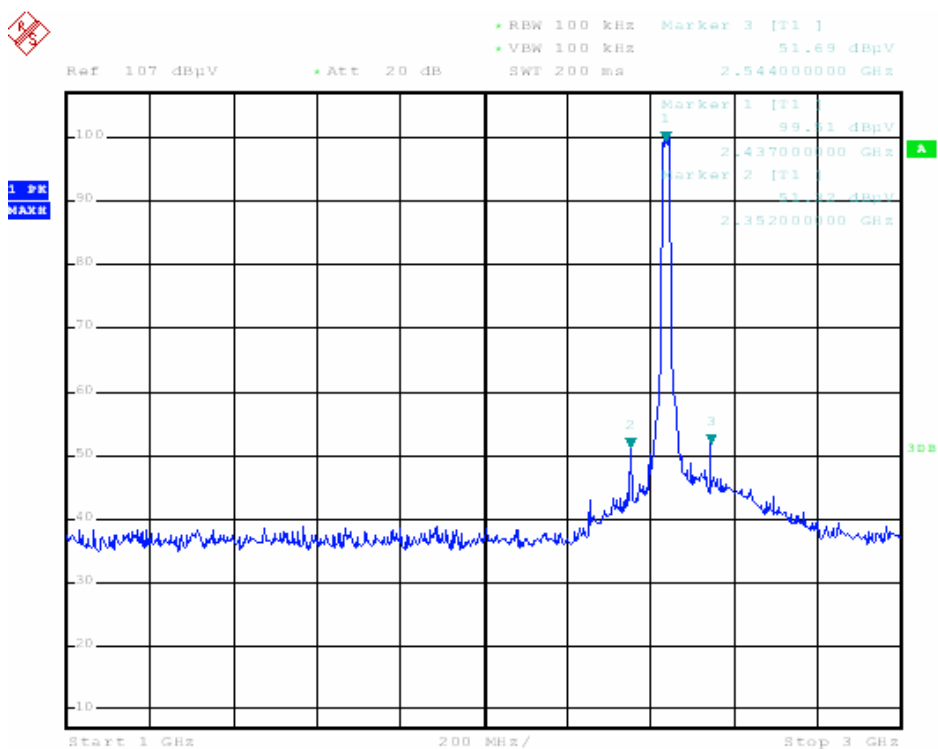
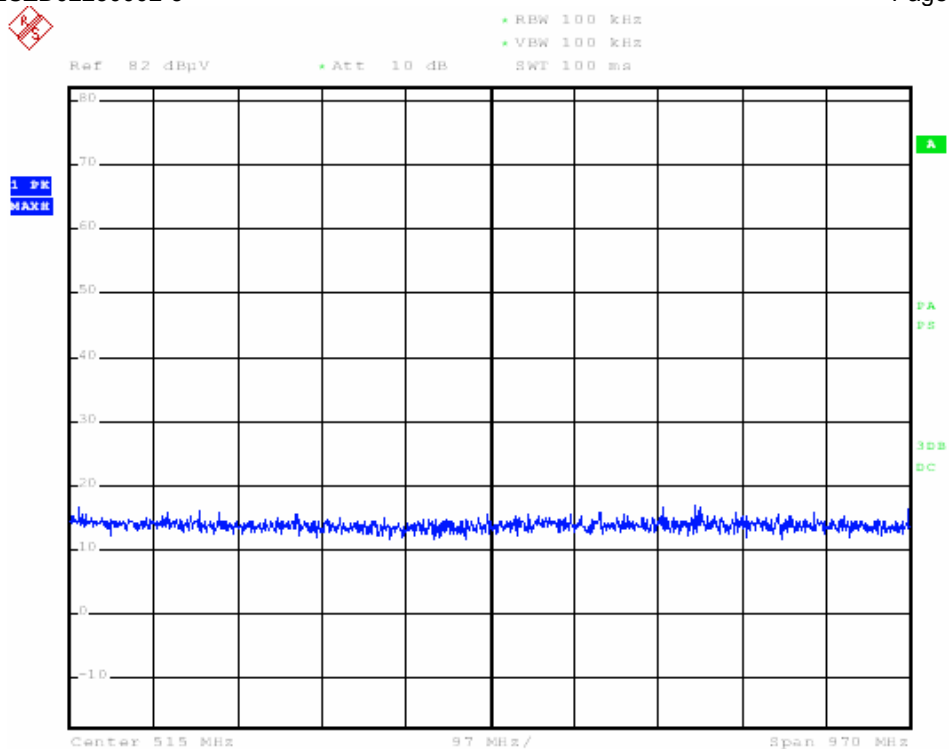


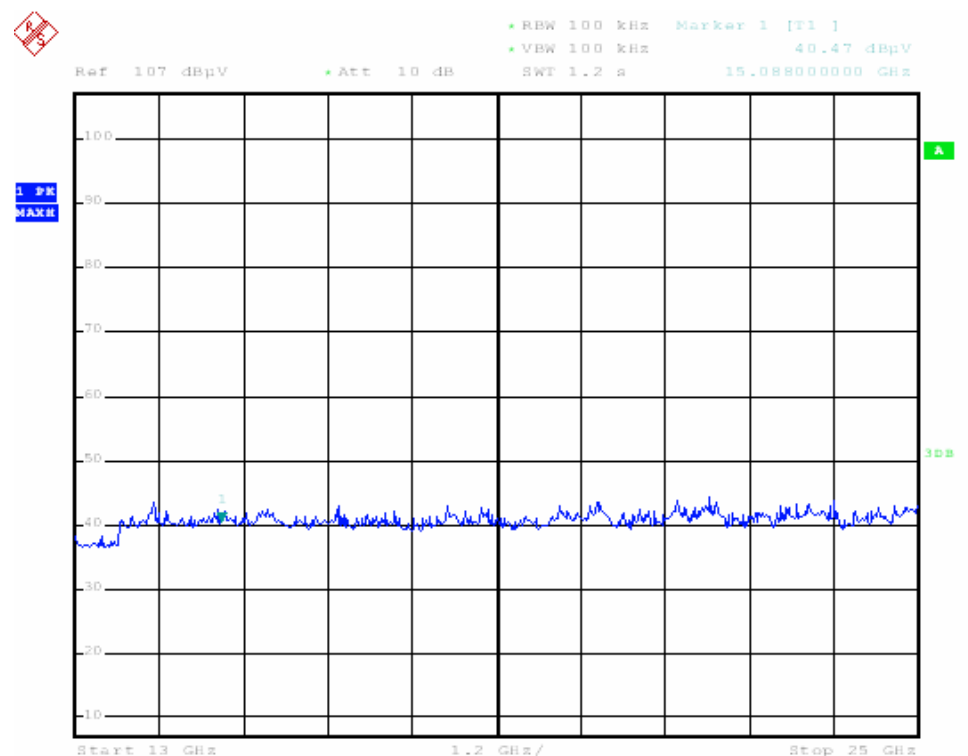
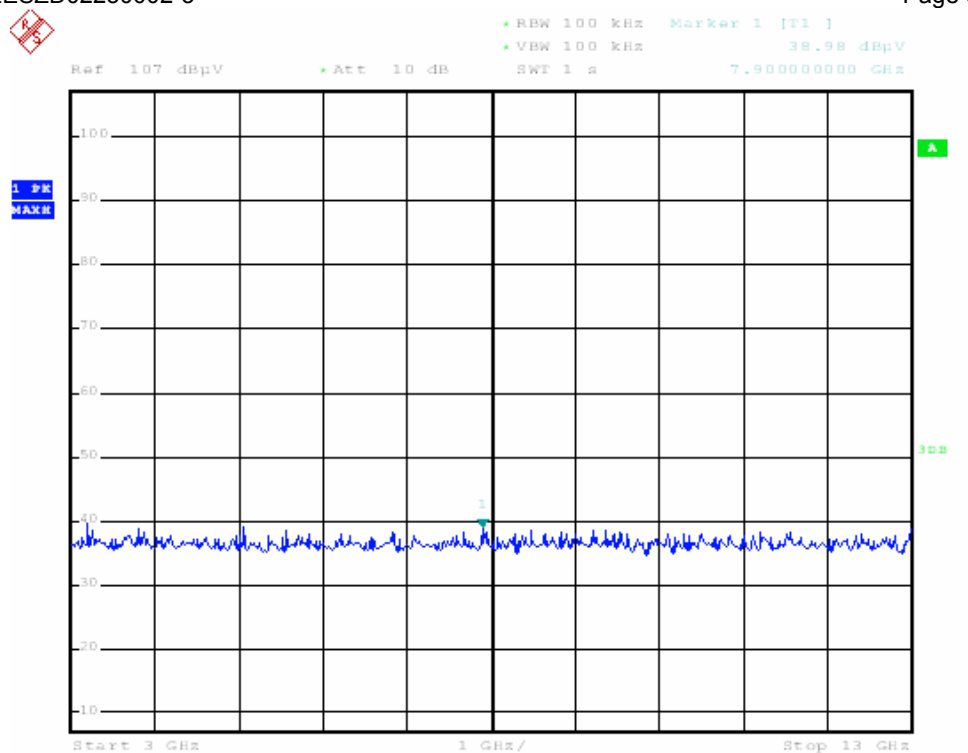
IEEE 802.11g, CH high, 6Mbps



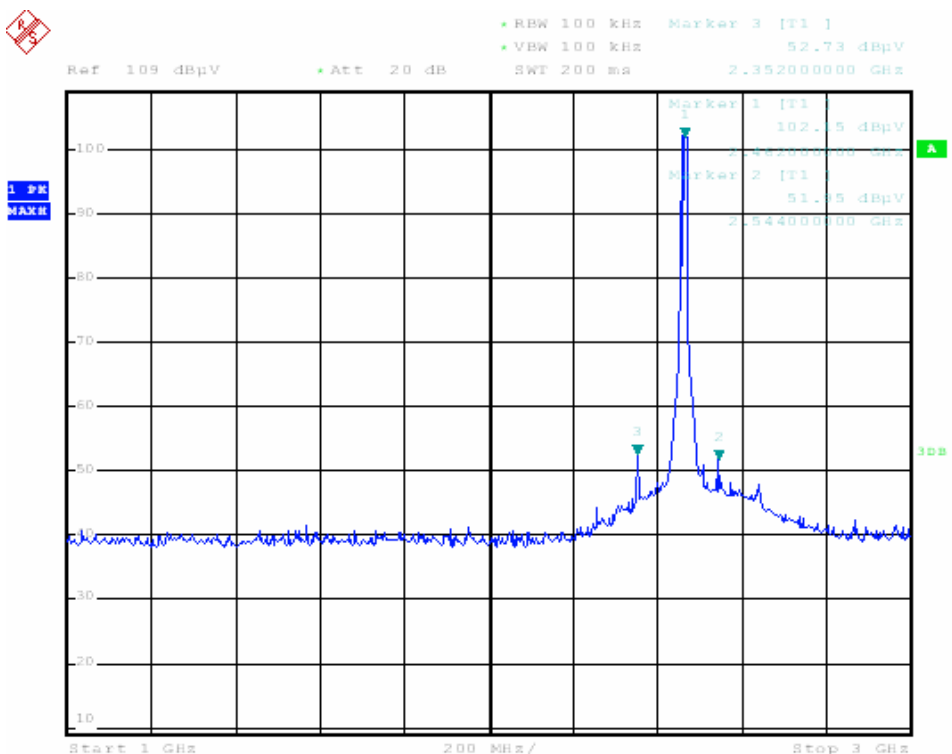
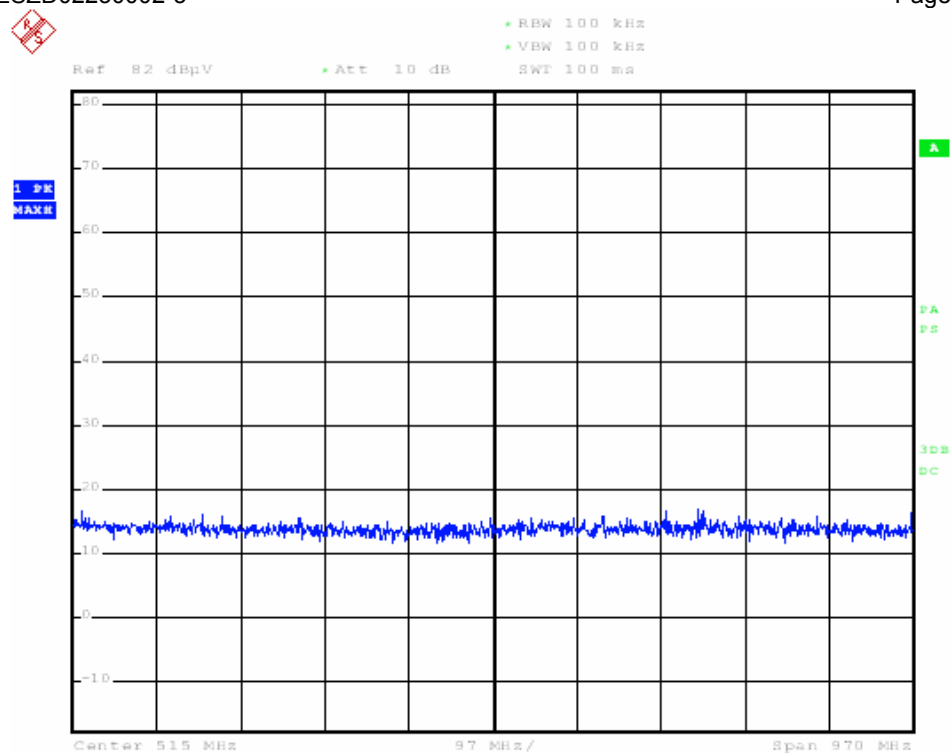


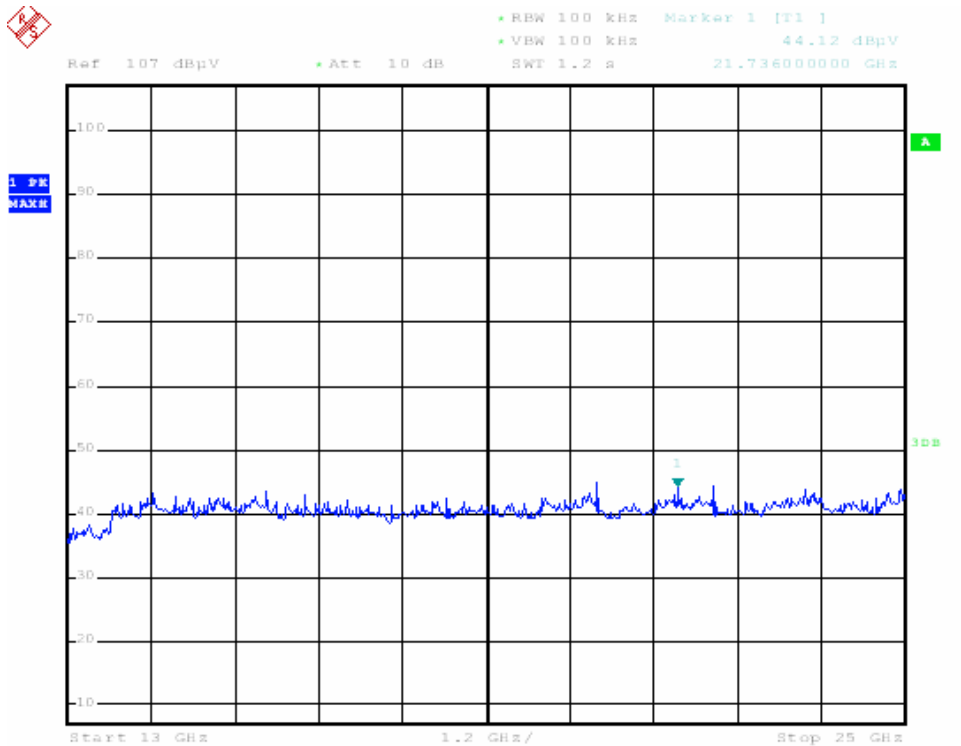
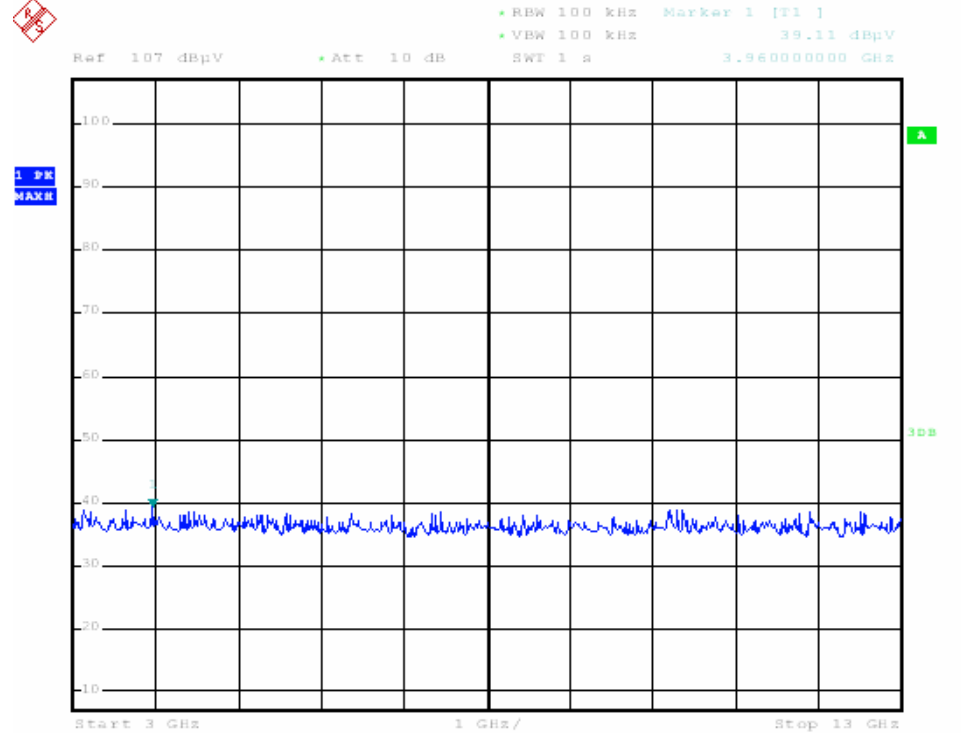
IEEE 802.11g, CH low, 24Mbps



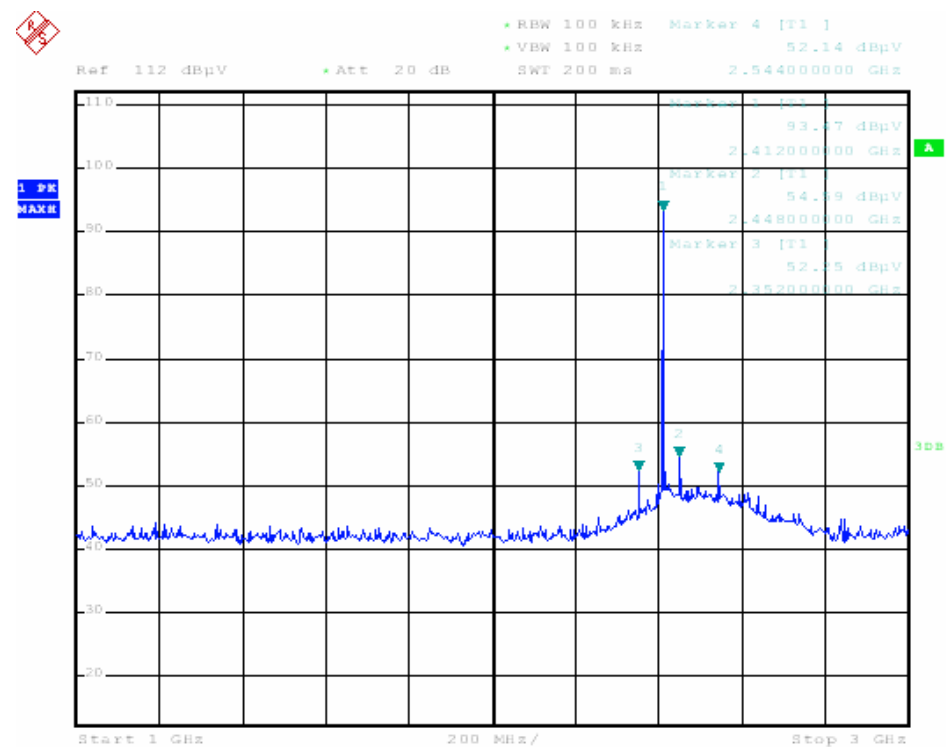
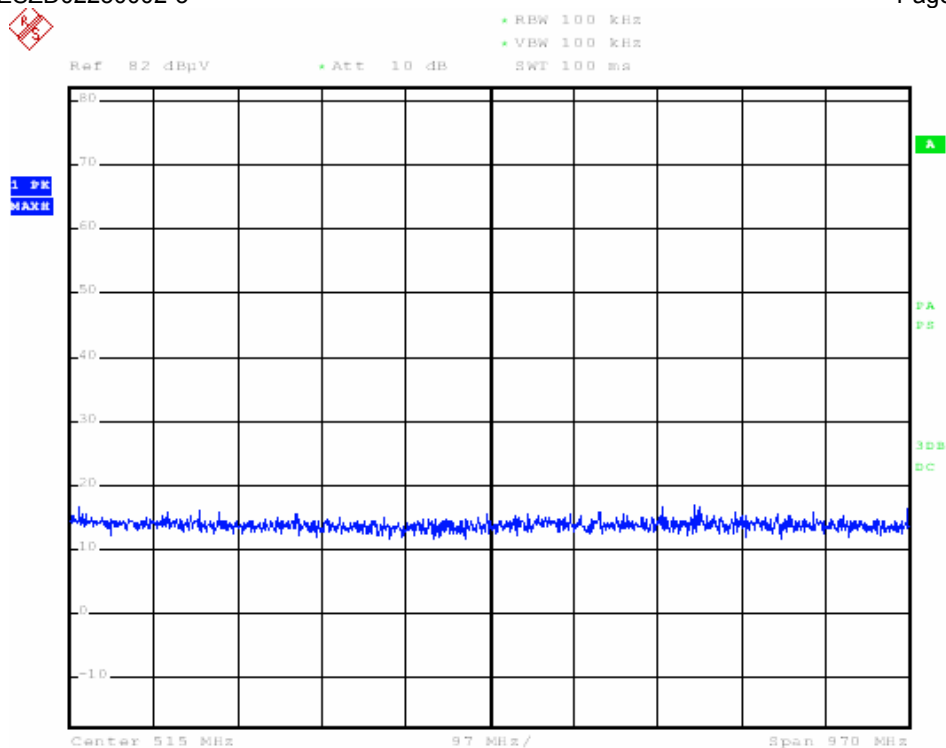


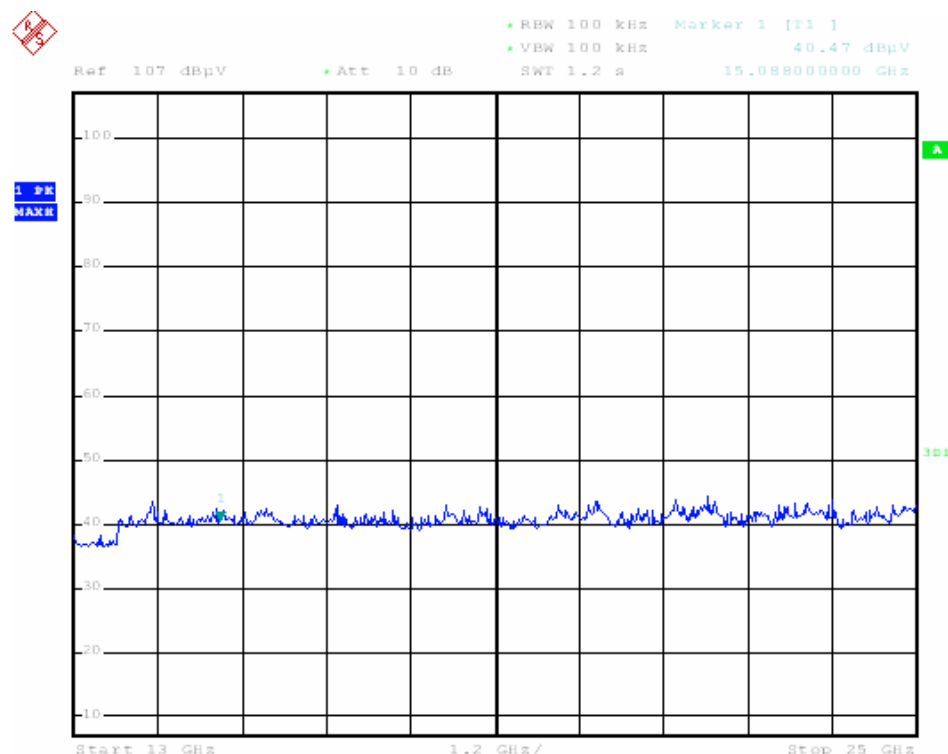
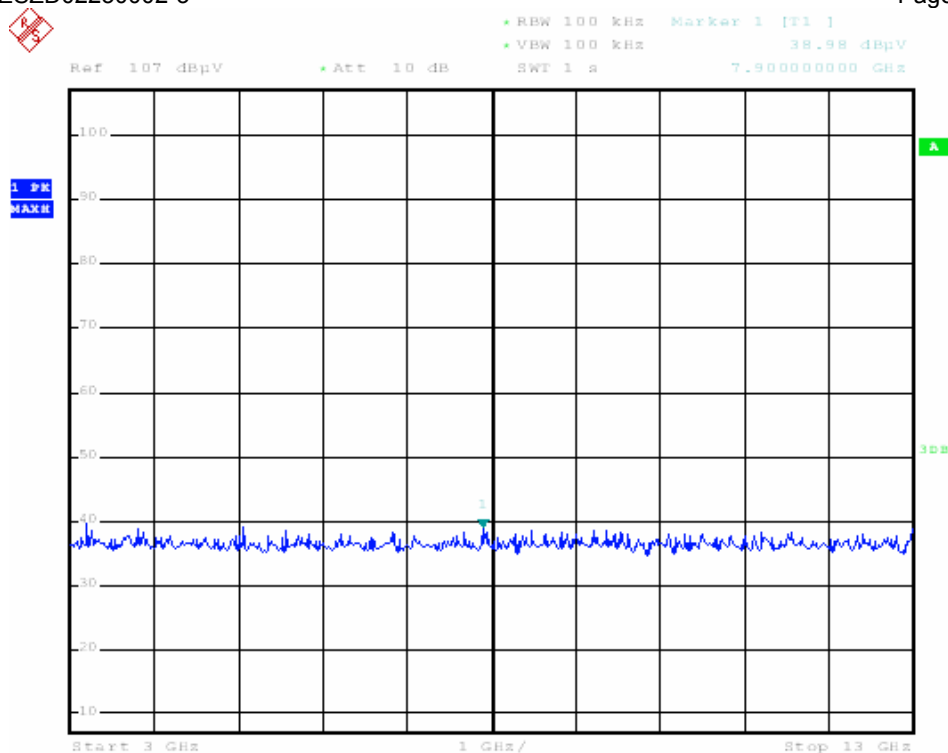
IEEE 802.11g, CH middle, 24Mbps





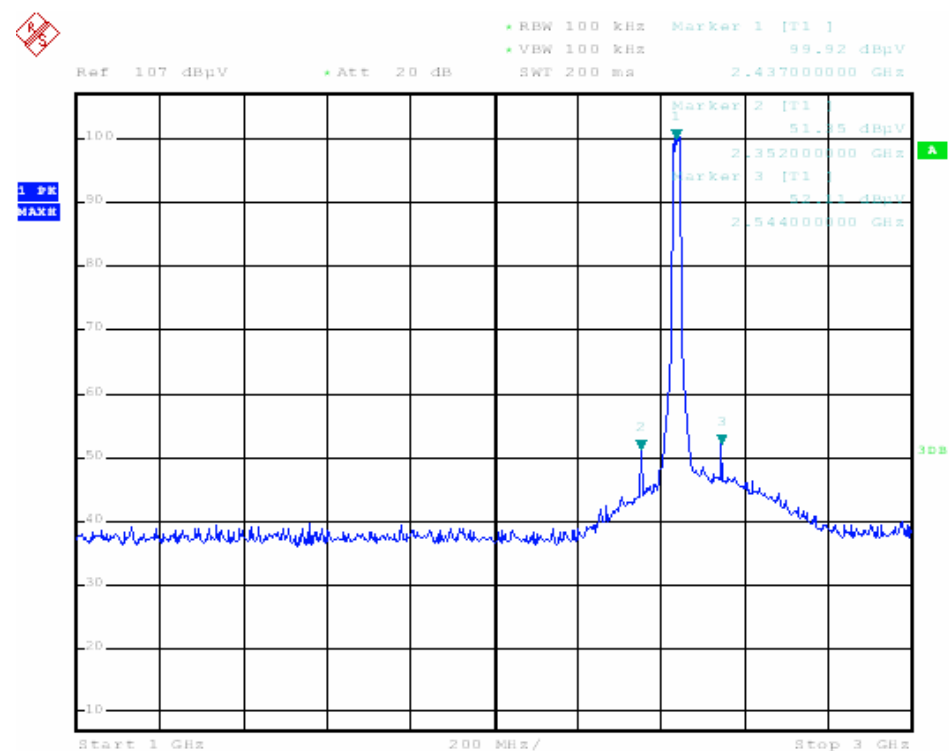
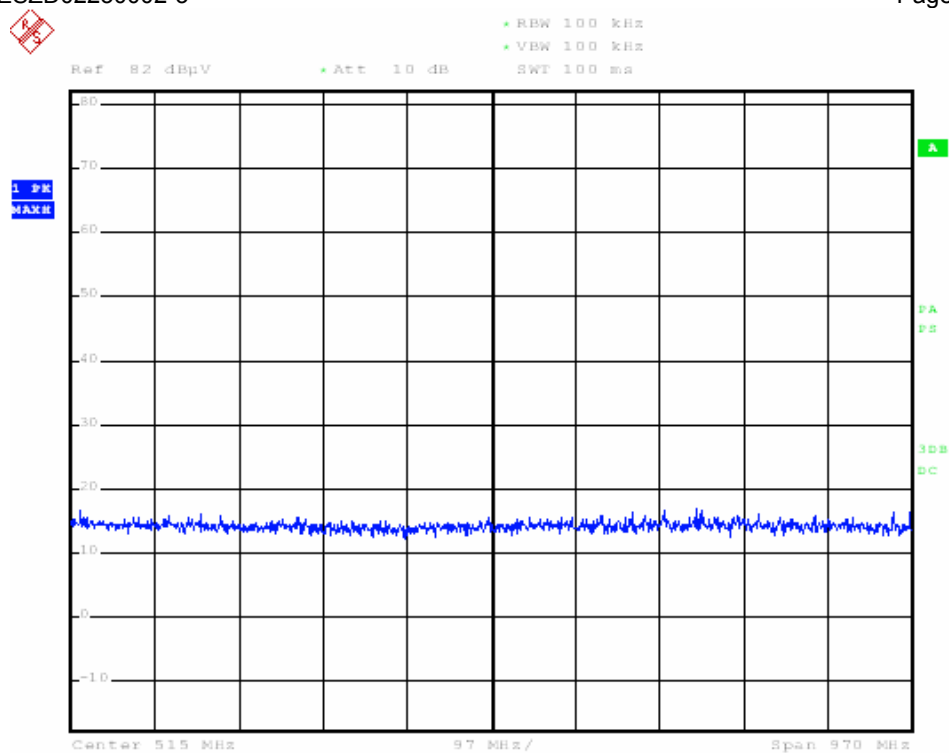
IEEE 802.11g, CH high, 24Mbps

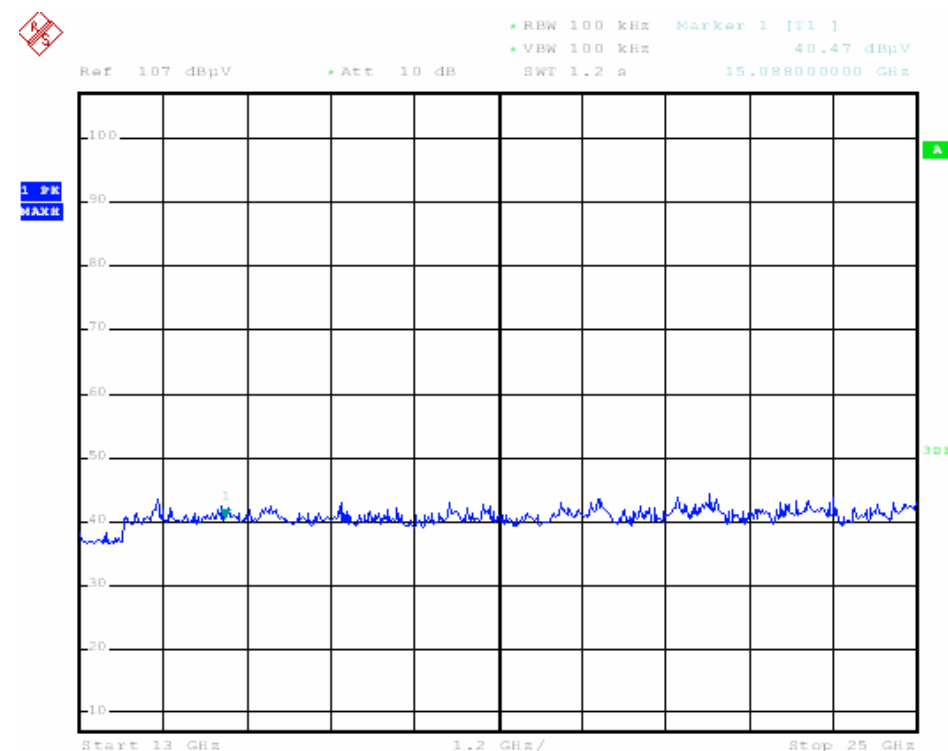
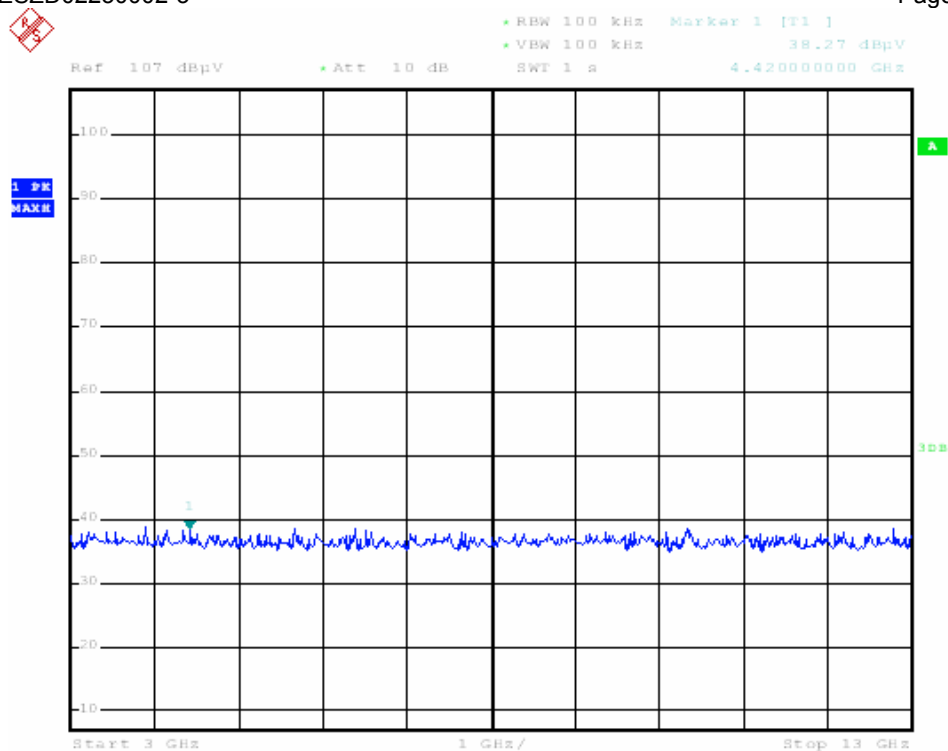




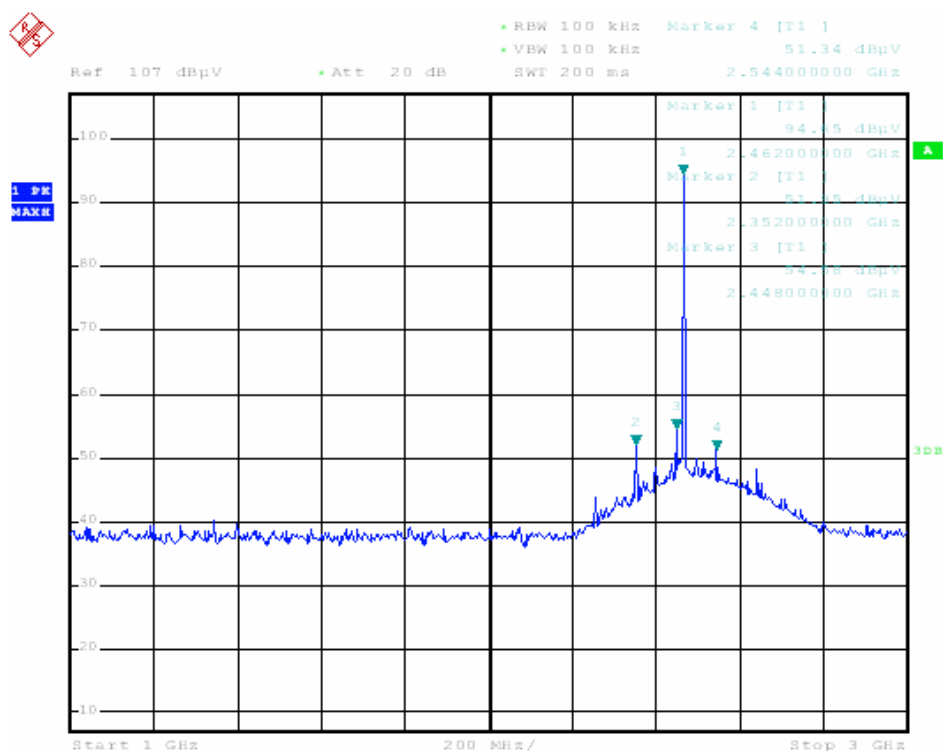
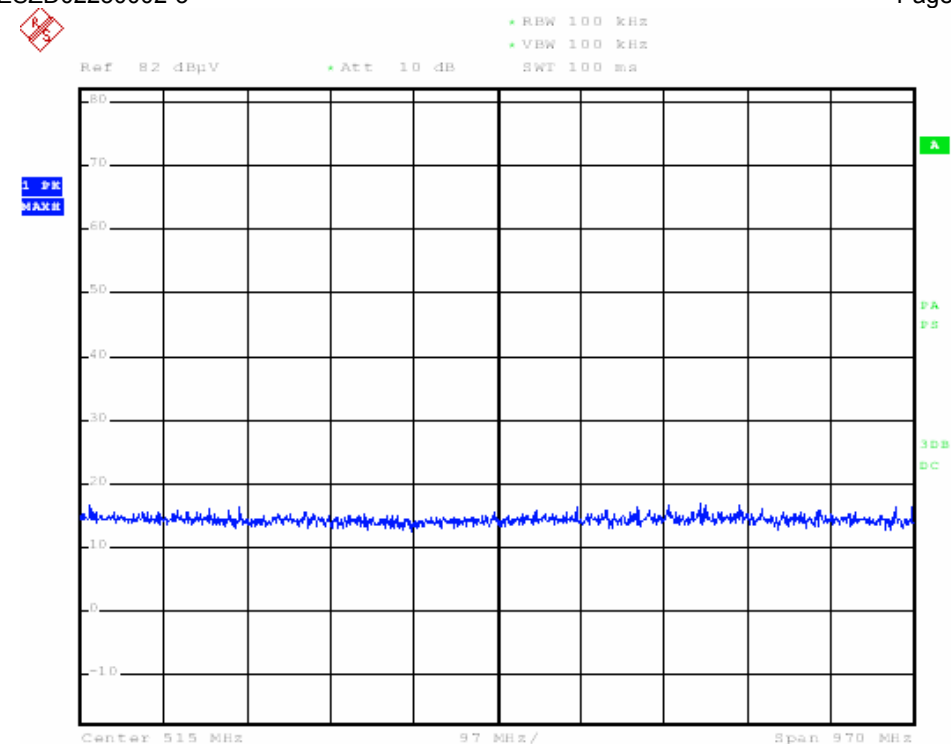
IEEE 802.11g, CH low, 54Mbps

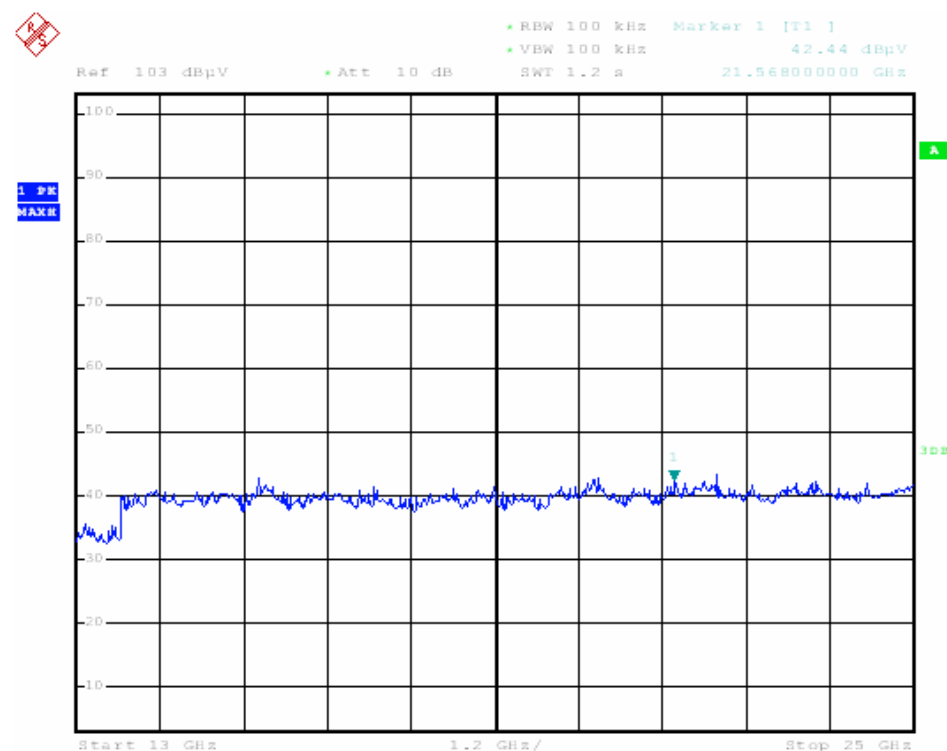
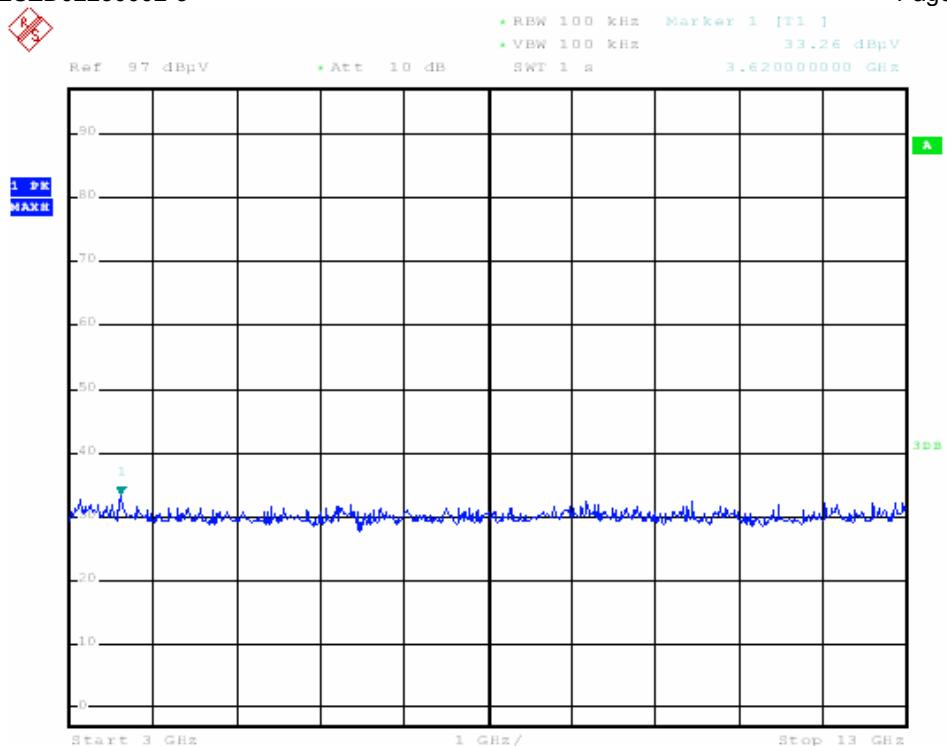






IEEE 802.11g, CH middle, 54Mbps





IEEE 802.11g, CH high, 54Mbps

11. RADIATED EMISSIONS MEASUREMENT

11.1 LIMITS

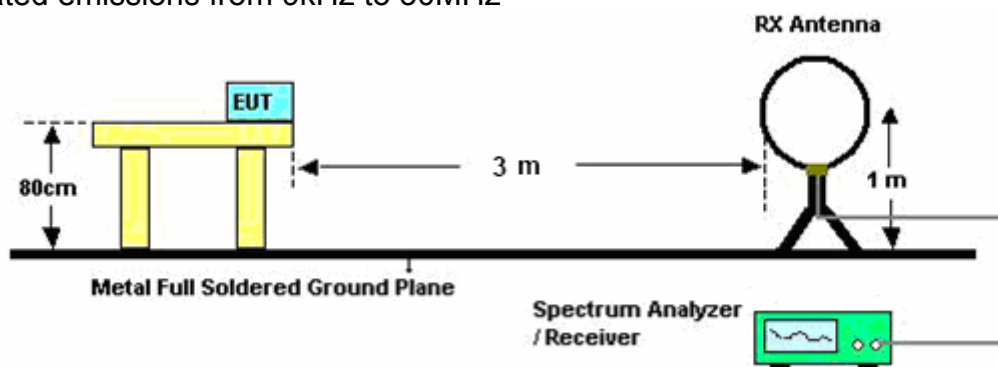
Rule: FCC Part15.209 -- The field strength of any emissions, which appear outside of operating frequency band and restricted band specified on 15.205(a), shall not exceed the general radiated emission limits as below.

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

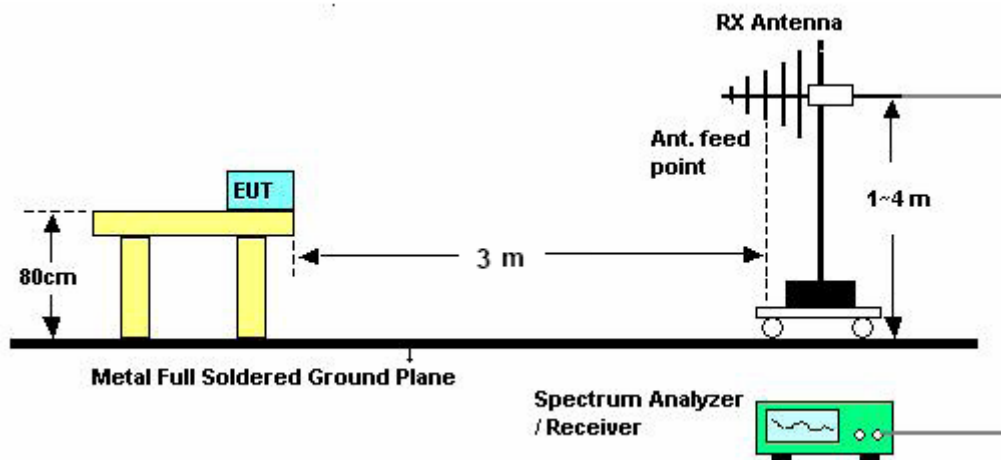
Note: the tighter limit applies at the band edges.

11.2 BLOCK DIAGRAM OF TEST SETUP

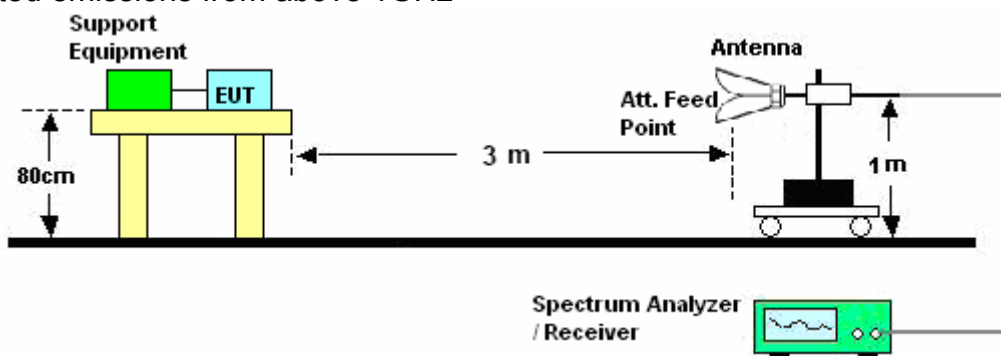
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions from above 1GHz



11.3 TEST PROCEDURE

Below 30MHz

- The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

30MHz ~ 1GHz:

- The EUT was placed on the non-conductive turntable 0.8 m above the ground at a chamber.
- Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where EUT radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Above 1GHz:

a. The EUT was placed on the non-conductive turntable 0.8 m above the ground at a chamber.

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where EUT radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

11.4 TEST RESULT

Note:

Limit dB μ V/m @1m = Limit dB μ V/m @300m+ 90

Limit dB μ V/m @1m = Limit dB μ V/m @30m + 50

Limit dB μ V/m @1m = Limit dB μ V/m @3m +10

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
81.2230	H	QP	33.02	---	40.0	---	Pass
479.4333	H	QP	35.12	---	46.0	---	Pass
1236.667	H	PK	35.02	74.0	---	54.0	Pass
2412.000	H	PK	87.25	---	---	---	Pass
4824.000	H	PK	41.23	74.0	---	54.0	Pass
5767.223	H	PK	42.36	74.0	---	54.0	Pass
7896.322	H	PK	44.69	74.0	---	54.0	Pass
81.223	V	QP	32.12	---	40.0	---	Pass
479.4333	V	QP	33.02	---	46.0	---	Pass
1235.667	V	PK	34.02	74.0	---	54.0	Pass
2412.000	V	PK	86.02	---	---	---	Pass
4824.000	V	PK	42.63	74.0	---	54.0	Pass
7986.332	V	PK	43.56	74.0	---	54.0	Pass
9786.333	V	PK	45.69	74.0	---	54.0	Pass

IEEE 802.11b, CH low, 1Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
81.2230	H	QP	32.02	---	40.0	---	Pass
479.4333	H	QP	34.12	---	46.0	---	Pass
1336.667	H	PK	34.02	74.0	---	54.0	Pass
2437.000	H	PK	84.63	---	---	---	Pass
4874.000	H	PK	42.02	74.0	---	54.0	Pass
5768.667	H	PK	43.01	74.0	---	54.0	Pass
7866.667	H	PK	44.09	74.0	---	54.0	Pass
81.223	V	QP	31.96	---	40.0	---	Pass
479.4333	V	QP	34.28	---	46.0	---	Pass
1356.667	V	PK	35.02	74.0	---	54.0	Pass
2437.000	V	PK	80.96	---	---	---	Pass
4874.000	V	PK	43.02	74.0	---	54.0	Pass
8000.667	V	PK	43.66	74.0	---	54.0	Pass
8736.667	V	PK	44.32	74.0	---	54.0	Pass

IEEE 802.11b, CH middle, 1Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
81.2230	H	QP	30.26	---	40.0	---	Pass
479.4333	H	QP	33.12	---	46.0	---	Pass
1556.333	H	PK	35.02	74.0	---	54.0	Pass
2462.000	H	PK	85.12	---	---	---	Pass
4924.000	H	PK	42.45	74.0	---	54.0	Pass
5867.667	H	PK	42.89	74.0	---	54.0	Pass
7968.333	H	PK	44.12	74.0	---	54.0	Pass
81.223	V	QP	32.02	---	40.0	---	Pass
479.4333	V	QP	33.12	---	46.0	---	Pass
1556.333	V	PK	35.85	74.0	---	54.0	Pass
2462.000	V	PK	81.63	---	---	---	Pass
4924.000	V	PK	43.12	74.0	---	54.0	Pass
7856.667	V	PK	43.52	74.0	---	54.0	Pass
9786.667	V	PK	44.85	74.0	---	54.0	Pass

IEEE 802.11b, CH high, 1Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
81.2230	H	QP	29.63	---	40.0	---	Pass
479.4333	H	QP	32.02	---	46.0	---	Pass
1223.333	H	PK	34.20	74.0	---	54.0	Pass
2412.000	H	PK	82.36	---	---	---	Pass
4824.000	H	PK	41.63	74.0	---	54.0	Pass
5888.667	H	PK	42.62	74.0	---	54.0	Pass
8500.000	H	PK	44.63	74.0	---	54.0	Pass
81.223	V	QP	31.02	---	40.0	---	Pass
479.4333	V	QP	32.99	---	46.0	---	Pass
1555.660	V	PK	36.02	74.0	---	54.0	Pass
2412.000	V	PK	79.63	---	---	---	Pass
4824.000	V	PK	43.02	74.0	---	54.0	Pass
7432.333	V	PK	43.12	74.0	---	54.0	Pass
9800.000	V	PK	44.87	74.0	---	54.0	Pass

IEEE 802.11b, CH low, 11Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
81.2230	H	QP	30.02	---	40.0	---	Pass
479.4333	H	QP	33.96	---	46.0	---	Pass
1555.333	H	PK	35.62	74.0	---	54.0	Pass
2437.000	H	PK	83.69	---	---	---	Pass
4874.000	H	PK	42.02	74.0	---	54.0	Pass
5625.667	H	PK	42.56	74.0	---	54.0	Pass
7855.667	H	PK	44.25	74.0	---	54.0	Pass
81.223	V	QP	30.85	---	40.0	---	Pass
479.4333	V	QP	33.96	---	46.0	---	Pass
1888.333	V	PK	36.25	74.0	---	54.0	Pass
2437.000	V	PK	80.25	---	---	---	Pass
4874.000	V	PK	43.68	74.0	---	54.0	Pass
7800.000	V	PK	44.01	74.0	---	54.0	Pass
8999.333	V	PK	44.74	74.0	---	54.0	Pass

IEEE 802.11b, CH middle, 11Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
81.2230	H	QP	29.98	---	40.0	---	Pass
479.4333	H	QP	34.01	---	46.0	---	Pass
1666.667	H	PK	35.12	74.0	---	54.0	Pass
2462.000	H	PK	82.69	---	---	---	Pass
4924.000	H	PK	43.12	74.0	---	54.0	Pass
5800.000	H	PK	42.98	74.0	---	54.0	Pass
8000.125	H	PK	44.63	74.0	---	54.0	Pass
81.223	V	QP	31.21	---	40.0	---	Pass
479.4333	V	QP	34.02	---	46.0	---	Pass
1556.333	V	PK	35.12	74.0	---	54.0	Pass
2462.000	V	PK	79.62	---	---	---	Pass
4924.000	V	PK	44.12	74.0	---	54.0	Pass
7955.333	V	PK	44.45	74.0	---	54.0	Pass
8500.000	V	PK	44.56	74.0	---	54.0	Pass

IEEE 802.11b, CH high, 11Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	31.26	---	40.0	---	Pass
479.4333	H	QP	32.02	---	46.0	---	Pass
1233.333	H	PK	34.02	74.0	---	54.0	Pass
2412.000	H	PK	84.12	---	---	---	Pass
4824.000	H	PK	41.02	74.0	---	54.0	Pass
5812.333	H	PK	41.69	74.0	---	54.0	Pass
7856.667	H	PK	43.12	74.0	---	54.0	Pass
80.1167	V	QP	30.02	---	40.0	---	Pass
479.4333	V	QP	32.12	---	46.0	---	Pass
1233.333	V	PK	34.33	74.0	---	54.0	Pass
2412.000	V	PK	82.69	---	---	---	Pass
4824.000	V	PK	42.69	74.0	---	54.0	Pass
7855.667	V	PK	43.02	74.0	---	54.0	Pass
8733.333	V	PK	43.25	74.0	---	54.0	Pass

IEEE 802.11g, CH low, 6Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	32.63	---	40.0	---	Pass
479.4333	H	QP	33.52	---	46.0	---	Pass
1333.333	H	PK	33.26	74.0	---	54.0	Pass
2437.000	H	PK	84.69	---	---	---	Pass
4874.000	H	PK	42.02	74.0	---	54.0	Pass
5966.667	H	PK	41.78	74.0	---	54.0	Pass
7966.122	H	PK	43.15	74.0	---	54.0	Pass
80.1167	V	QP	31.87	---	40.0	---	Pass
479.4333	V	QP	33.51	---	46.0	---	Pass
1555.667	V	PK	35.02	74.0	---	54.0	Pass
2437.000	V	PK	80.12	---	---	---	Pass
4874.000	V	PK	42.85	74.0	---	54.0	Pass
7966.667	V	PK	43.21	74.0	---	54.0	Pass
9756.333	V	PK	44.02	74.0	---	54.0	Pass

IEEE 802.11g, CH middle, 6Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	29.63	---	40.0	---	Pass
479.4333	H	QP	32.02	---	46.0	---	Pass
1555.223	H	PK	34.02	74.0	---	54.0	Pass
2462.000	H	PK	83.23	---	---	---	Pass
4924.000	H	PK	42.36	74.0	---	54.0	Pass
6000.667	H	PK	41.98	74.0	---	54.0	Pass
7856.333	H	PK	43.02	74.0	---	54.0	Pass
80.1167	V	QP	30.12	---	40.0	---	Pass
479.4333	V	QP	32.25	---	46.0	---	Pass
1666.667	V	PK	34.63	74.0	---	54.0	Pass
2462.000	V	PK	81.65	---	---	---	Pass
4924.000	V	PK	43.01	74.0	---	54.0	Pass
8122.333	V	PK	43.02	74.0	---	54.0	Pass
9500.667	V	PK	43.56	74.0	---	54.0	Pass

IEEE 802.11g, CH high, 6Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	30.68	---	40.0	---	Pass
479.4333	H	QP	33.21	---	46.0	---	Pass
1211.333	H	PK	33.02	74.0	---	54.0	Pass
2412.000	H	PK	82.98	---	---	---	Pass
4824.000	H	PK	43.02	74.0	---	54.0	Pass
5666.667	H	PK	42.00	74.0	---	54.0	Pass
7956.333	H	PK	43.12	74.0	---	54.0	Pass
80.1167	V	QP	31.25	---	40.0	---	Pass
479.4333	V	QP	30.96	---	46.0	---	Pass
1555.336	V	PK	33.63	74.0	---	54.0	Pass
2412.000	V	PK	80.69	---	---	---	Pass
4824.000	V	PK	42.96	74.0	---	54.0	Pass
7855.221	V	PK	43.25	74.0	---	54.0	Pass
8700.333	V	PK	43.36	74.0	---	54.0	Pass

IEEE 802.11g, CH low, 24Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	31.21	---	40.0	---	Pass
479.4333	H	QP	32.26	---	46.0	---	Pass
1333.333	H	PK	34.12	74.0	---	54.0	Pass
2437.000	H	PK	83.63	---	---	---	Pass
4874.000	H	PK	42.63	74.0	---	54.0	Pass
5802.112	H	PK	42.02	74.0	---	54.0	Pass
7852.333	H	PK	43.00	74.0	---	54.0	Pass
80.1167	V	QP	30.21	---	40.0	---	Pass
479.4333	V	QP	31.29	---	46.0	---	Pass
1888.366	V	PK	33.99	74.0	---	54.0	Pass
2437.000	V	PK	81.02	---	---	---	Pass
4874.000	V	PK	43.02	74.0	---	54.0	Pass
7999.566	V	PK	43.99	74.0	---	54.0	Pass
9700.667	V	PK	44.02	74.0	---	54.0	Pass

IEEE 802.11g, CH middle, 24Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	30.01	---	40.0	---	Pass
479.4333	H	QP	33.96	---	46.0	---	Pass
1556.667	H	PK	34.02	74.0	---	54.0	Pass
2462.000	H	PK	82.96	---	---	---	Pass
4924.000	H	PK	42.98	74.0	---	54.0	Pass
5900.667	H	PK	42.36	74.0	---	54.0	Pass
8000.265	H	PK	43.25	74.0	---	54.0	Pass
80.1167	V	QP	30.20	---	40.0	---	Pass
479.4333	V	QP	33.21	---	46.0	---	Pass
1556.333	V	PK	34.02	74.0	---	54.0	Pass
2462.000	V	PK	83.02	---	---	---	Pass
4924.000	V	PK	43.12	74.0	---	54.0	Pass
7855.333	V	PK	43.02	74.0	---	54.0	Pass
8712.333	V	PK	43.68	74.0	---	54.0	Pass

IEEE 802.11g, CH high, 24Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	29.23	---	40.0	---	Pass
479.4333	H	QP	32.65	---	46.0	---	Pass
1333.333	H	PK	33.12	74.0	---	54.0	Pass
2412.000	H	PK	83.02	---	---	---	Pass
4824.000	H	PK	42.26	74.0	---	54.0	Pass
5812.112	H	PK	42.03	74.0	---	54.0	Pass
7853.122	H	PK	43.02	74.0	---	54.0	Pass
80.1167	V	QP	31.02	---	40.0	---	Pass
479.4333	V	QP	32.65	---	46.0	---	Pass
1223.333	V	PK	33.26	74.0	---	54.0	Pass
2412.000	V	PK	80.12	---	---	---	Pass
4824.000	V	PK	43.65	74.0	---	54.0	Pass
7952.333	V	PK	43.12	74.0	---	54.0	Pass
9655.333	V	PK	43.98	74.0	---	54.0	Pass

IEEE 802.11g, CH low, 54Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	31.23	---	40.0	---	Pass
479.4333	H	QP	33.12	---	46.0	---	Pass
1776.667	H	PK	33.41	74.0	---	54.0	Pass
2437.000	H	PK	82.01	---	---	---	Pass
4874.000	H	PK	43.02	74.0	---	54.0	Pass
5666.112	H	PK	42.12	74.0	---	54.0	Pass
7966.333	H	PK	43.32	74.0	---	54.0	Pass
80.1167	V	QP	30.85	---	40.0	---	Pass
479.4333	V	QP	33.65	---	46.0	---	Pass
1443.223	V	PK	32.69	74.0	---	54.0	Pass
2437.000	V	PK	78.26	---	---	---	Pass
4874.000	V	PK	42.68	74.0	---	54.0	Pass
8125.333	V	PK	43.52	74.0	---	54.0	Pass
9700.333	V	PK	44.02	74.0	---	54.0	Pass

IEEE 802.11g, CH middle, 54Mbps

Remark:

No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

Frequency (MHZ)	Antenna Polarization (H / V)	Detector (PK / QP / AV)	Final Emission (dB μ V/m)	Limit (dB μ V/m)			Result (Pass / Fail)
				PK	QP	AV	
80.1167	H	QP	30.21	---	40.0	---	Pass
479.4333	H	QP	32.68	---	46.0	---	Pass
133.333	H	PK	32.12	74.0	---	54.0	Pass
2462.000	H	PK	83.32	---	---	---	Pass
4924.000	H	PK	42.69	74.0	---	54.0	Pass
5700.000	H	PK	42.36	74.0	---	54.0	Pass
8125.000	H	PK	43.62	74.0	---	54.0	Pass
80.1167	V	QP	31.02	---	40.0	---	Pass
479.4333	V	QP	33.97	---	46.0	---	Pass
1556.332	V	PK	33.01	74.0	---	54.0	Pass
2462.000	V	PK	82.12	---	---	---	Pass
4924.000	V	PK	42.99	74.0	---	54.0	Pass
8500.667	V	PK	43.67	74.0	---	54.0	Pass
9542.333	V	PK	43.89	74.0	---	54.0	Pass

IEEE 802.11g, CH high, 54Mbps

Remark:

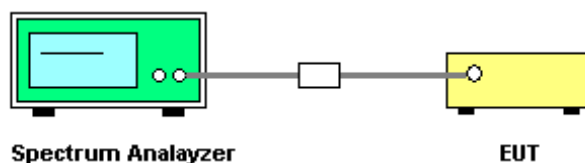
No emissions were found higher than the background below 30MHz and background is lower than the limit, so it deems to compliance with the limit without recorded.

12. BAND EDGE EMISSIONS MEASUREMENT & RESTRICTED BANDS OF OPERATION

12.1 LIMITS (FCC 's requirement)

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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

12.2 BLOCK DIAGRAM OF TEST SETUP



12.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the emission drops at the band-edge relative to the highest fundamental emission level.
4. Use the marker-delta method to determine band-edge compliance as required.

12.4 TEST RESULT

All the band edge emissions are very low, and please see the plots in below:

IEEE 802.11b, 1Mbps

Channel Frequency (MHz)	Fundamental Emission (dB μ V/m)	Delta (dB)	Final Emission (dB μ V/m)	Limit (dB μ V/m)		Result (Pass / Fail)
	PK		PK	PK	AV	
CH1_2412	87.25	---	---	---	---	---
2400.0	---	49.70	37.55	74	54	Pass
CH11_2462	85.12	---	---	---	---	---
2483.5	---	52.43	32.69	74	54	Pass

IEEE 802.11b, 11Mbps

Channel Frequency (MHz)	Fundamental Emission (dB μ V/m)	Delta (dB)	Final Emission (dB μ V/m)	Limit (dB μ V/m)		Result (Pass / Fail)
	PK		PK	PK	AV	
CH1_2412	82.36	---	---	---	---	---
2400.0	---	56.52	25.84	74	54	Pass
2398.6	---	43.36	49.00	74	54	Pass
CH11_2462	82.69	---	---	---	---	---
2483.5	---	52.89	29.80	74	54	Pass

IEEE 802.11g, 6Mbps

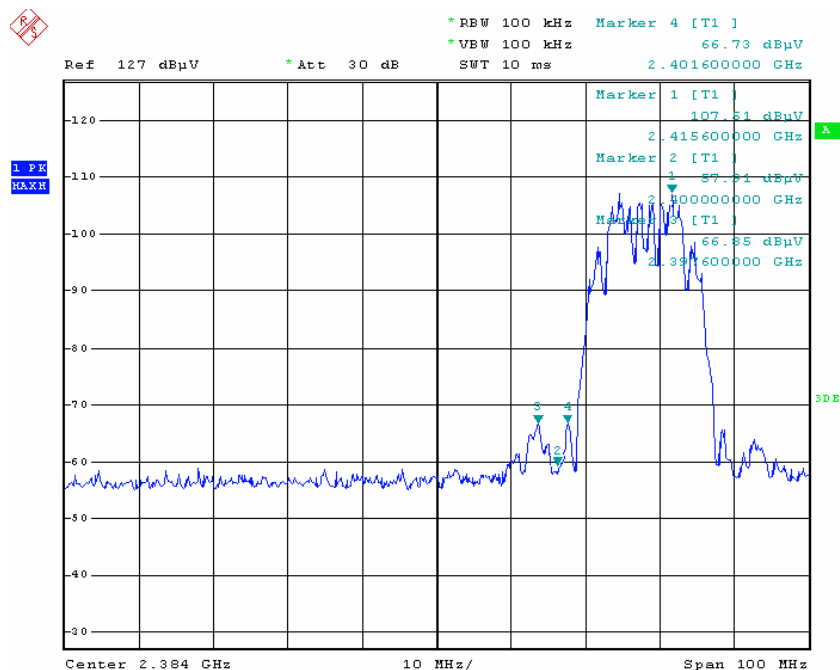
Channel Frequency (MHz)	Fundamental Emission (dB μ V/m)	Delta (dB)	Final Emission (dB μ V/m)	Limit (dB μ V/m)		Result (Pass / Fail)
	PK		PK	PK	AV	
CH1_2412	84.12	---	---	---	---	---
2400.0	---	35.69	48.43	74	54	Pass
CH11_2462	83.23	---	---	---	---	---
2483.5	---	43.21	40.02	74	54	Pass

IEEE 802.11g, 24Mbps

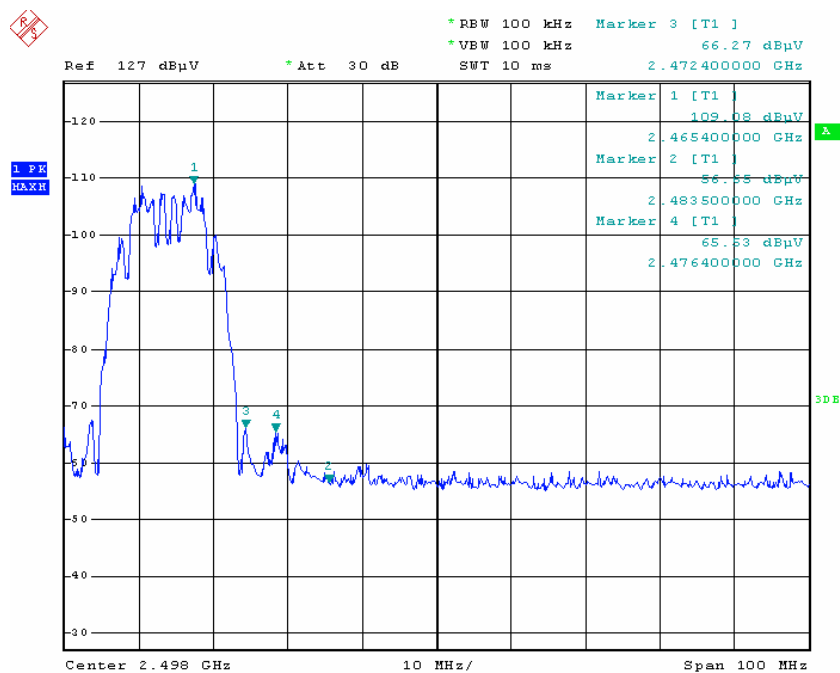
Channel Frequency (MHz)	Fundamental Emission (dBμV/m)	Delta (dB)	Final Emission (dBμV/m)	Limit (dBμV/m)		Result (Pass / Fail)
	PK		PK	PK	AV	
CH1_2412	82.98	---	---	---	---	---
2400.0	---	38.51	44.47	74	54	Pass
CH11_2462	83.02	---	---	---	---	---
2483.5	---	41.40	41.62	74	54	Pass

IEEE 802.11g, 54Mbps

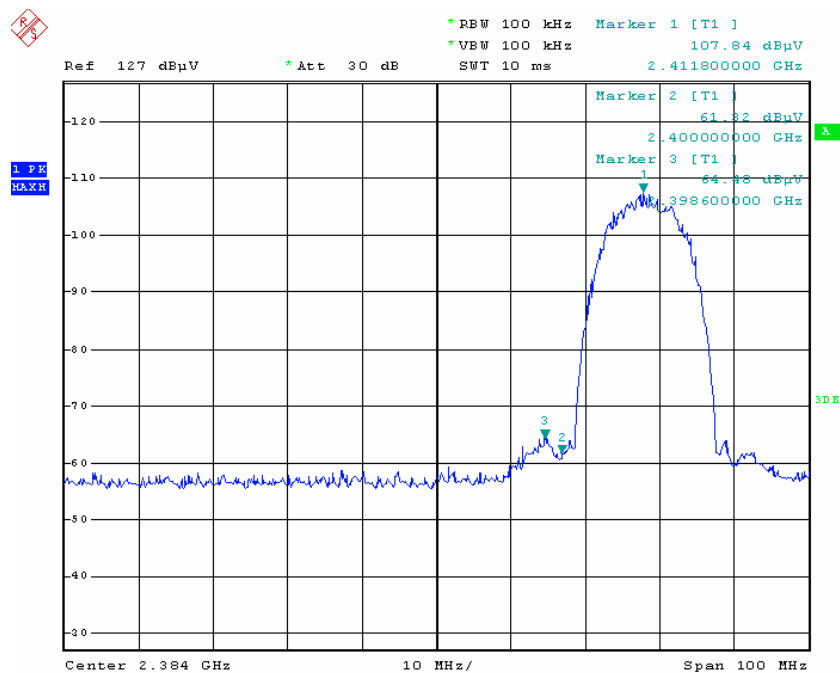
Channel Frequency (MHz)	Fundamental Emission (dBμV/m)	Delta (dB)	Final Emission (dBμV/m)	Limit (dBμV/m)		Result (Pass / Fail)
	PK		PK	PK	AV	
CH1_2412	83.02	---	---	---	---	---
2400.0	---	37.65	45.37	74	54	Pass
CH11_2462	82.01	---	---	---	---	---
2483.5	---	43.99	48.02	74	54	Pass



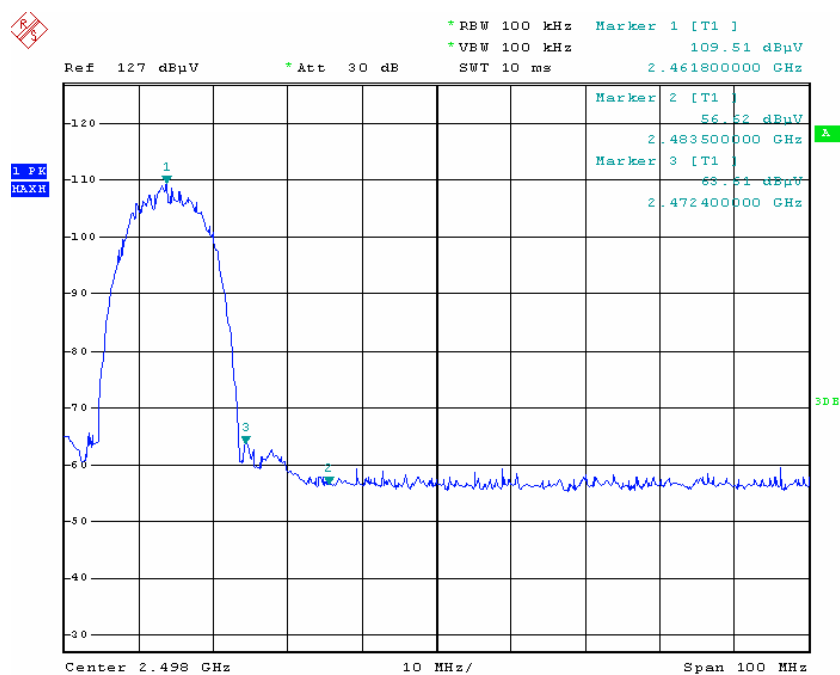
IEEE 802.11b, CH low, 1Mbps



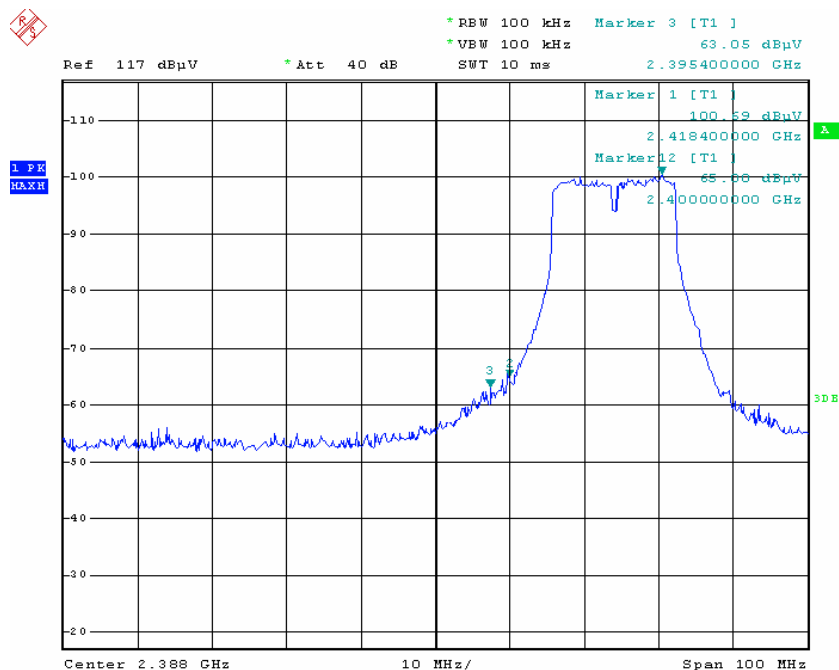
IEEE 802.11b, CH high, 1Mbps



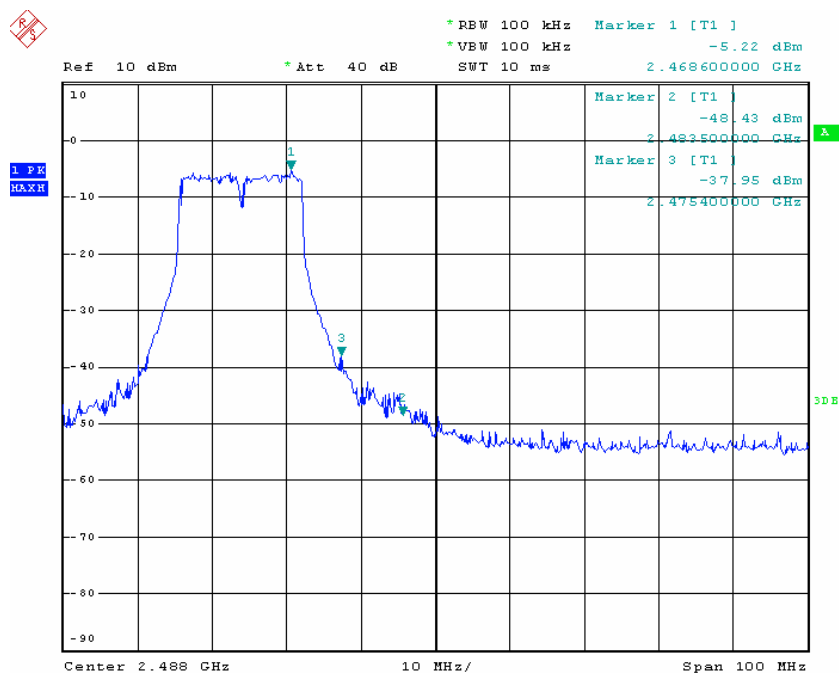
IEEE 802.11b, CH low, 11Mbps



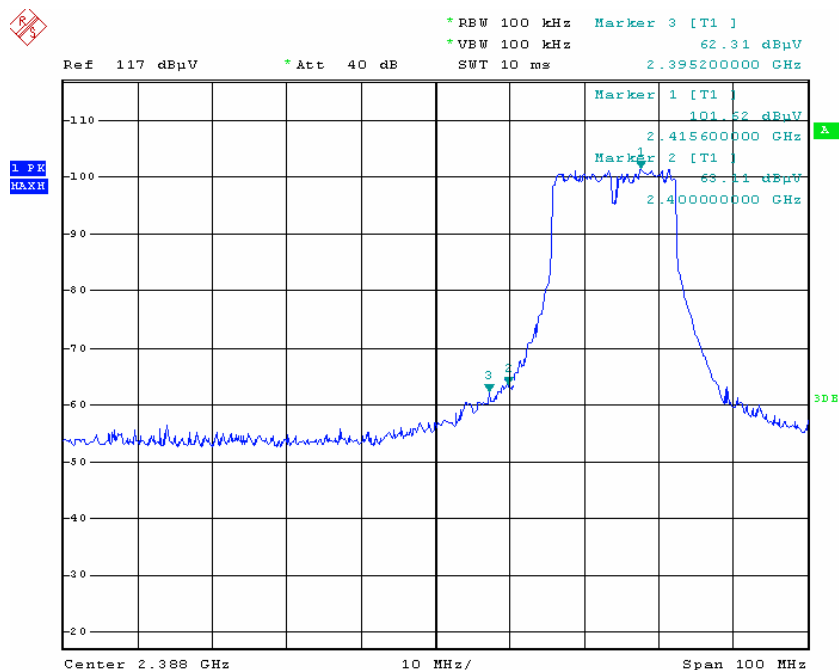
IEEE 802.11b, CH high, 11Mbps



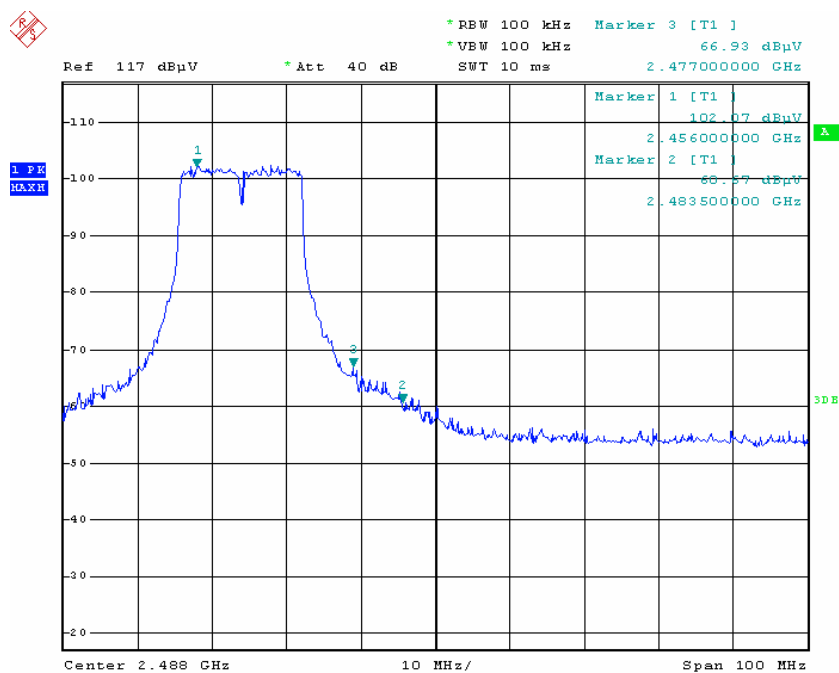
IEEE 802.11g, CH low, 6Mbps



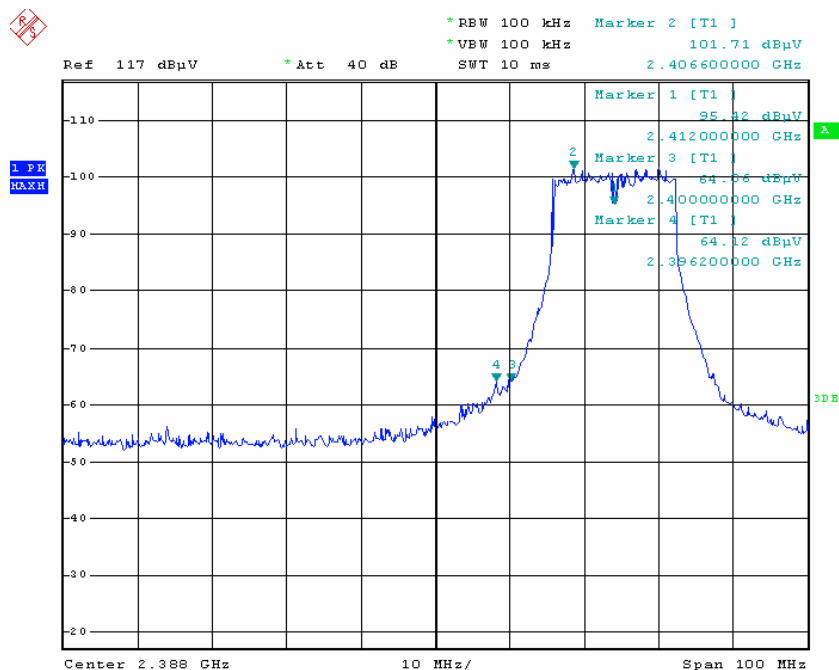
IEEE 802.11g, CH high, 6Mbps



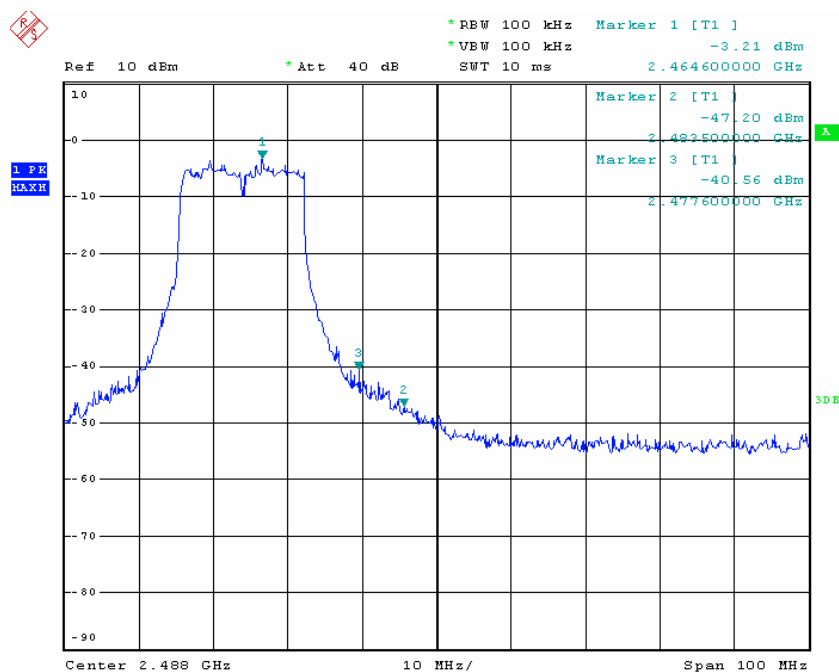
IEEE 802.11g, CH low, 24Mbps



IEEE 802.11g, CH high, 24Mbps



IEEE 802.11g, CH low, 54Mbps



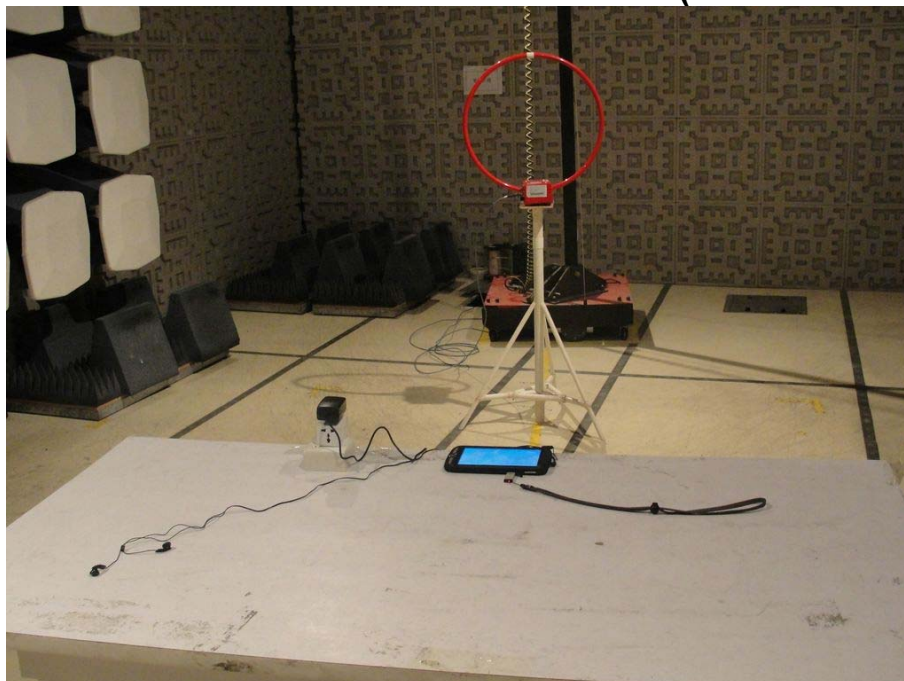
IEEE 802.11g, CH high, 54Mbps

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

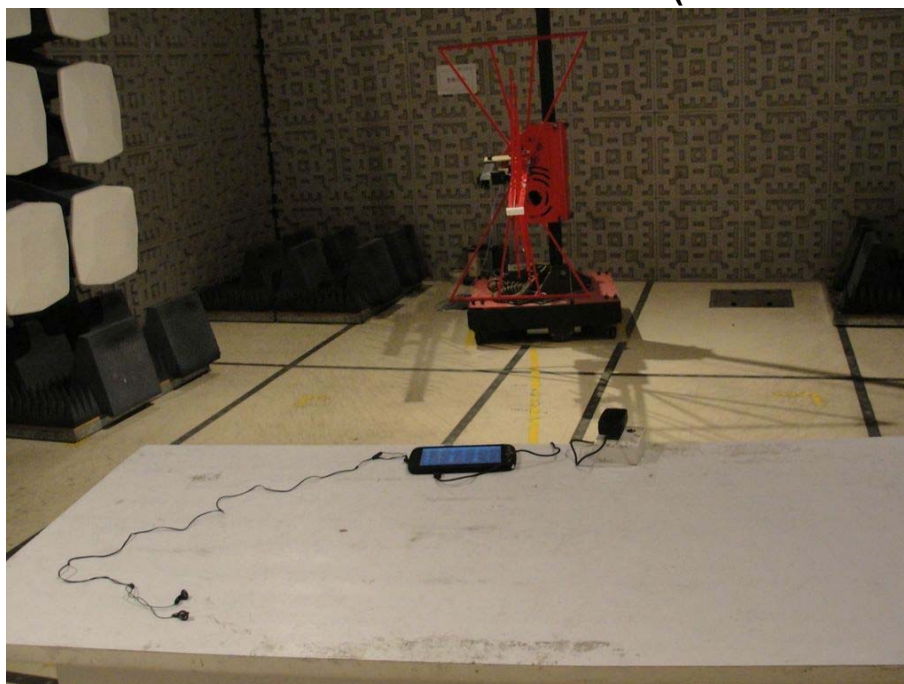
TEST SETUP OF CONDUCTED EMISSION



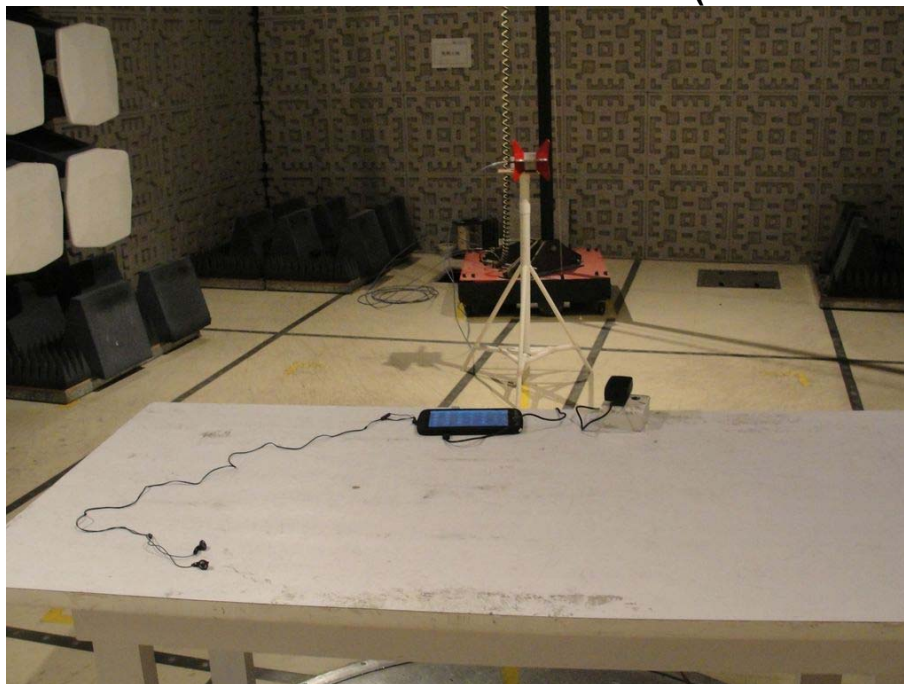
TEST SETUP OF RADIATED EMISSION (Below 30MHz)



TEST SETUP OF RADIATED EMISSION (30MHz~1GHz)



TEST SETUP OF RADIATED EMISSION (Above 1GHz)



APPENDIX 2 PHOTOGRAPHS OF EUT



View of EUT-1



View of EUT-2

----- End of report -----