APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Shenzhen Sungworld Electronics Co., LTD.

MID
Model No.: M7XX

FCC ID: WI3-M7XX

Prepared for	:	Shenzhen Sungworld Electronics Co., LTD
Address	:	4#, North District, Shangxue Industrial Park Bantian, Long Gang District, Shenzhen, China
Prepared by	:	ACCURATE TECHNOLOGY CO., LTD
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China
		Tel: (0755) 26503290 Fax: (0755) 26503396

Report No.	:	ATE20141876
Date of Test	:	Sep 26, 2014-Oct 22, 2014
Date of Report	:	Oct 22, 2014

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Description Page

Test Report Certification

Applicant : Shenzhen Sungworld Electronics Co., LTD

Manufacturer : Shenzhen Sungworld Electronics Co., LTD

EUT Description : MID

(A) MODEL NO.: M7XX

(B) Trade Name.: /

(C) POWER SUPPLY: DC 3.7V (Powered by battery)or AC 120V/60Hz

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.4: 2009

The EUT was tested according to DTS test procedure of Jun 05, 2014 KDB558074 D01 DTS Meas Guidance v03r02 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : Sep 26-Oct 22, 2014

Prepared by : Tim Zhang
(Tim.zhang, Engineer)

Approved & Authorized Signer :
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	MID
Model Number	:	M7XX
Frequency Range	:	802.11b/g/n(20MHz): 2412-2462MHz 802.11n(40MHz): 2422-2452MHz
Number of Channels	:	802.11b/g/n (20MHz):11 802.11n (40MHz): 7
Antenna Gain	:	0dBi
Type of Antenna	:	PCB Antenna
Power Supply	:	AC 120V/60Hz (Powered by Adapter)
Data Rate	:	802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: up to 150Mbps
Adapter	:	Model:WYT-0520 Input: AC 100-240VAC 50/60Hz 0.3A Output: 5.0V 2.0A
Modulation Type	:	CCK, OFDM
Applicant	:	Shenzhen Sungworld Electronics Co., LTD
Address	:	4#, North District, Shangxue Industrial Park Bantian, Long Gang District, Shenzhen, China
Manufacturer	:	Shenzhen Sungworld Electronics Co., LTD
Address	:	4#, North District, Shangxue Industrial Park Bantian, Long Gang District, Shenzhen, China
Date of sample received	:	Sep 26, 2014
Date of Test	:	Sep 26-Oct 22, 2014

1.2.Carrier Frequency of Channels

802.11b, 802.11g, 802.11n (20MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437	---	---

802.11n (40MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
---	---	07	2442
---	---	08	2447
03	2422	09	2452
04	2427	---	---
05	2432	---	---
06	2437	---	---

1.3.Accessory and Auxiliary Equipment

N/A

1.4.Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen

Listed by FCC
The Registration Number is 752051

Listed by Industry Canada
The Registration Number is 5077A-2

Accredited by China National Accreditation Committee for Laboratories
The Certificate Registration Number is L3193

Name of Firm : ACCURATE TECHNOLOGY CO. LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2014	Jan. 10, 2015
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2014	Jan. 10, 2015
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2014	Jan. 10, 2015
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 11, 2014	Jan. 10, 2015
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2014	Jan. 14, 2015
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 15, 2014	Jan. 14, 2015
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2014	Jan. 10, 2015
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2014	Jan. 10, 2015
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 11, 2014	Jan. 10, 2015
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 11, 2014	Jan. 10, 2015

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **1.802.11b Transmitting mode**
Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

2.802.11g Transmitting mode
Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

3.802.11n (20MHz) Transmitting mode
Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

4.802.11n (40MHz) Transmitting mode
Low Channel: 2422MHz
Middle Channel: 2437MHz
High Channel: 2452MHz

3.2.Configuration and peripherals

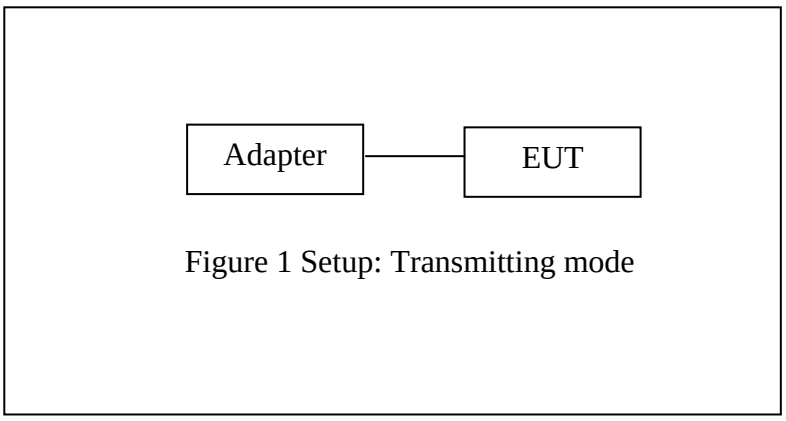


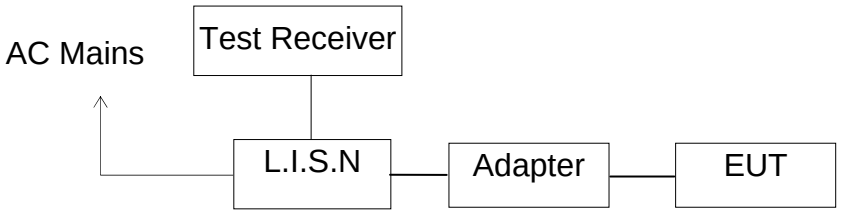
Figure 1 Setup: Transmitting mode

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Power Line Conducted Emission	Compliant
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. POWER LINE CONDUCTED MEASUREMENT

5.1.Block Diagram of Test Setup



(EUT: MID)

5.2.Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

5.3.Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in test mode and measure it.

5.5. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2009 on Conducted Emission Measurement.
The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

5.6. Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150kHz to 30MHz is checked.

Test mode : Charging&WIFI communicating

MEASUREMENT RESULT: "1876-3_fin"

10/14/2014 11:44AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	53.60	10.5	65	11.1	QP	L1	GND
3.270000	37.60	11.1	56	18.4	QP	L1	GND
18.725000	32.50	11.4	60	27.5	QP	L1	GND

MEASUREMENT RESULT: "1876-3_fin2"

10/14/2014 11:44AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	39.40	10.5	55	15.3	AV	L1	GND
2.910000	29.90	11.0	46	16.1	AV	L1	GND
18.450000	26.20	11.4	50	23.8	AV	L1	GND

MEASUREMENT RESULT: "1876-2_fin"

10/14/2014 11:40AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	54.00	10.5	65	10.7	QP	N	GND
2.940000	37.20	11.1	56	18.8	QP	N	GND
19.000000	32.50	11.4	60	27.5	QP	N	GND

MEASUREMENT RESULT: "1876-2_fin2"

10/14/2014 11:40AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	39.90	10.5	55	14.8	AV	N	GND
4.820000	27.70	11.1	46	18.3	AV	N	GND
18.775000	26.20	11.4	50	23.8	AV	N	GND

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.

ACCURATE TECHNOLOGY CO.,LTD

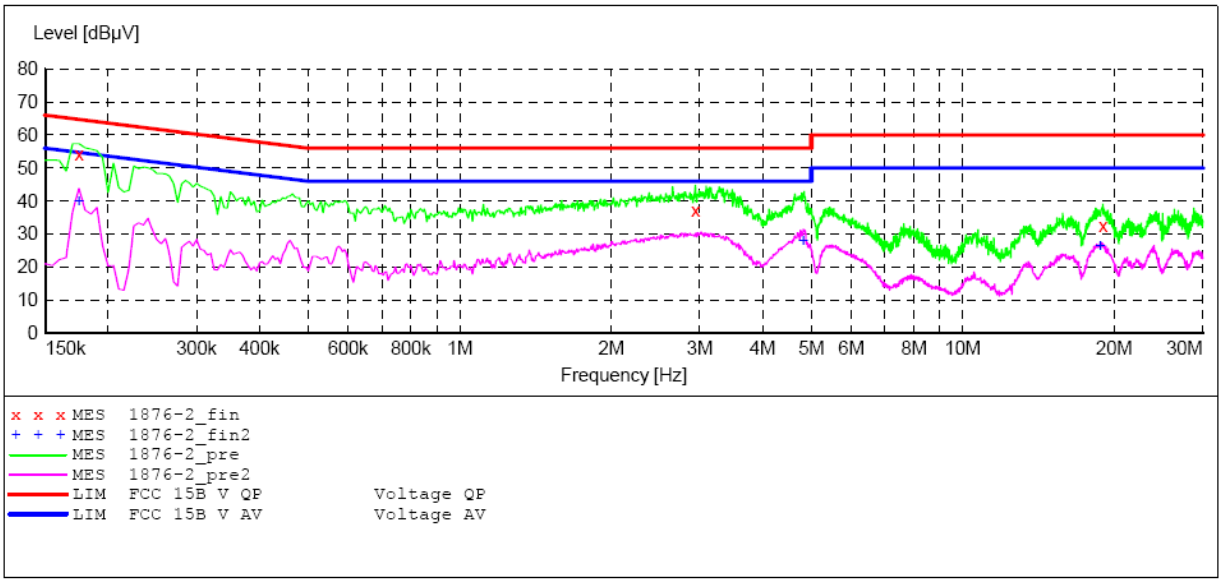
CONDUCTED EMISSION STANDARD FCC PART15B

EUT: MID M/N:M7XX
Manufacturer: SungWorld
Operating Condition: WIFI Operation
Test Site: 1#Shielding Room
Operator: Carry
Test Specification: N 120V/60Hz
Comment: Report NO.:ATE20141876
Start of Test: 10/14/2014 / 11:36:38AM

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "1876-2_fin"

10/14/2014 11:40AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	54.00	10.5	65	10.7	QP	N	GND
2.940000	37.20	11.1	56	18.8	QP	N	GND
19.000000	32.50	11.4	60	27.5	QP	N	GND

MEASUREMENT RESULT: "1876-2_fin2"

10/14/2014 11:40AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	39.90	10.5	55	14.8	AV	N	GND
4.820000	27.70	11.1	46	18.3	AV	N	GND
18.775000	26.20	11.4	50	23.8	AV	N	GND

ACCURATE TECHNOLOGY CO.,LTD

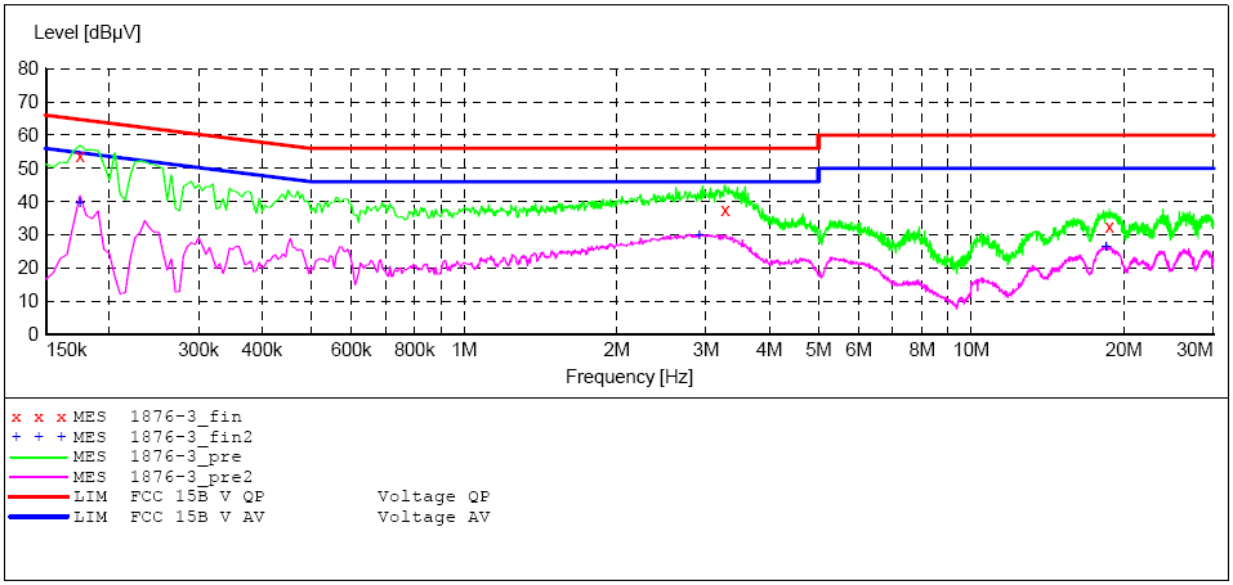
CONDUCTED EMISSION STANDARD FCC PART15B

EUT: MID M/N:M7XX
Manufacturer: SungWorld
Operating Condition: WIFI Operation
Test Site: 1#Shielding Room
Operator: Carry
Test Specification: L 120V/60Hz
Comment: Report NO.:ATE20141876
Start of Test: 10/14/2014 / 11:41:30AM

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "1876-3_fin"

10/14/2014 11:44AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	53.60	10.5	65	11.1	QP	L1	GND
3.270000	37.60	11.1	56	18.4	QP	L1	GND
18.725000	32.50	11.4	60	27.5	QP	L1	GND

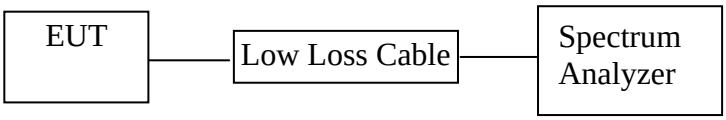
MEASUREMENT RESULT: "1876-3_fin2"

10/14/2014 11:44AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.175000	39.40	10.5	55	15.3	AV	L1	GND
2.910000	29.90	11.0	46	16.1	AV	L1	GND
18.450000	26.20	11.4	50	23.8	AV	L1	GND

6. 6DB&20DB BANDWIDTH MEASUREMENT

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.247(a)(2)

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

6.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 5.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

6.5.Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

20dB bandwidth

1. Set resolution bandwidth (RBW) = 1%-5% OBW.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.

3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Once the reference level is established, the equipment is conditioned with typical modulating signals to produce the worst-case (i.e., the widest) bandwidth. Unless otherwise specified for an unlicensed wireless device, measure the bandwidth at the －20 dB levels with respect to the reference level

6.6.Test Result

The test was performed with 802.11b				
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2412	10.12	17.598	> 0.5MHz
Middle	2437	10.12	17.135	> 0.5MHz
High	2462	10.12	17.54	> 0.5MHz

The test was performed with 802.11g				
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2412	16.60	19.740	> 0.5MHz
Middle	2437	16.60	19.392	> 0.5MHz
High	2462	16.60	19.624	> 0.5MHz

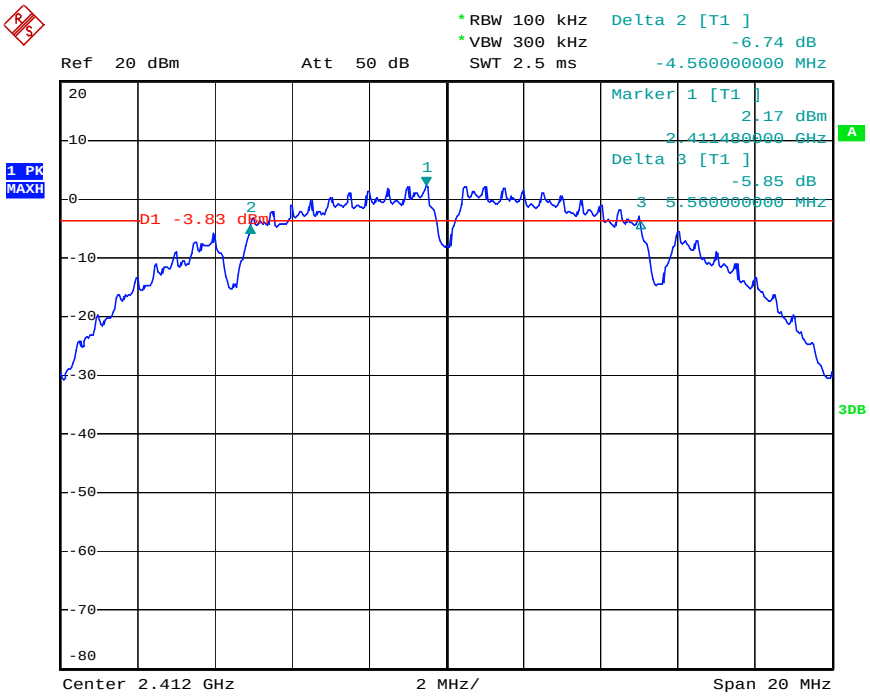
The test was performed with 802.11n (Bandwidth: 20 MHz)				
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2412	17.84	20.904	> 0.5MHz
Middle	2437	17.84	20.123	> 0.5MHz
High	2462	17.84	19.472	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 40 MHz)				
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2422	36.56	40.84	> 0.5MHz
Middle	2437	36.56	40.96	> 0.5MHz
High	2452	36.56	40.96	> 0.5MHz

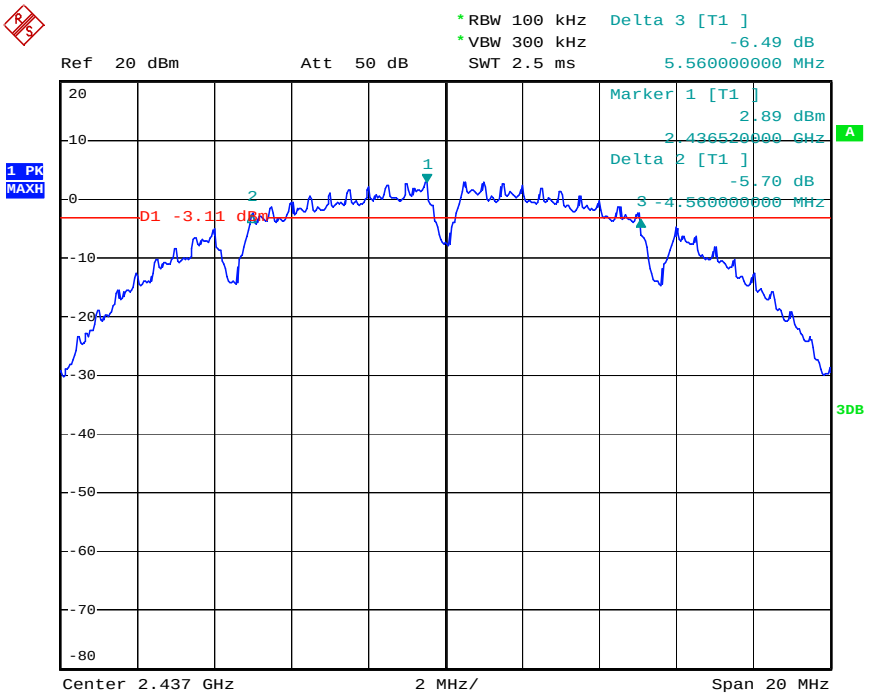
The spectrum analyzer plots are attached as below.

6dB Bandwidth

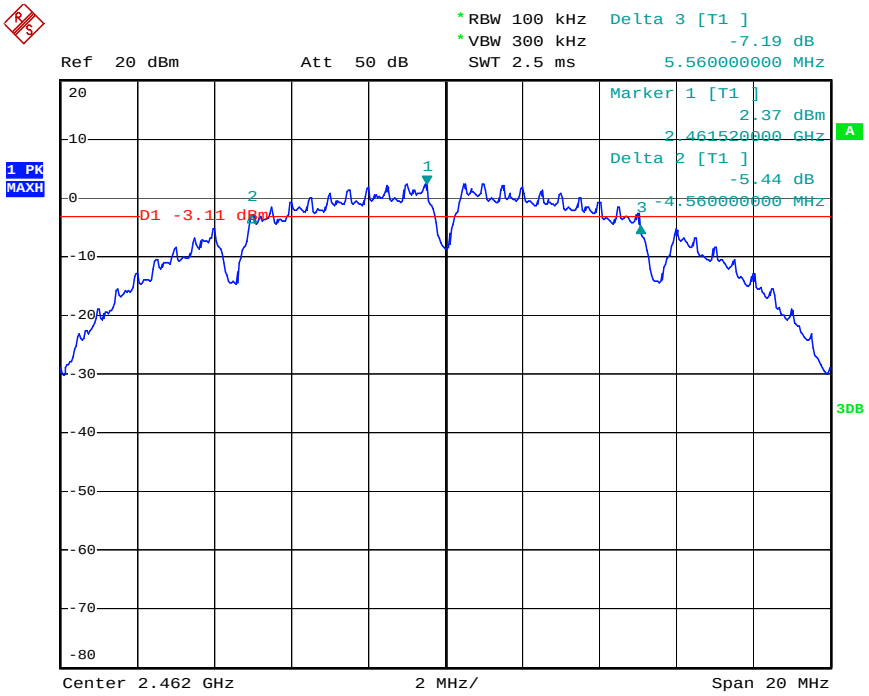
802.11b Channel Low 2412MHz



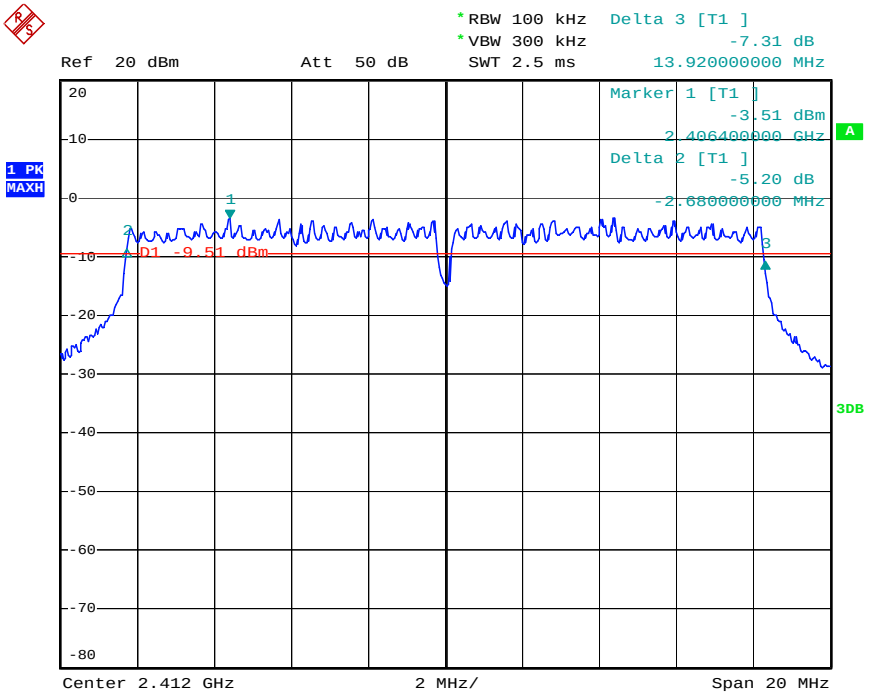
802.11b Channel Middle 2437MHz



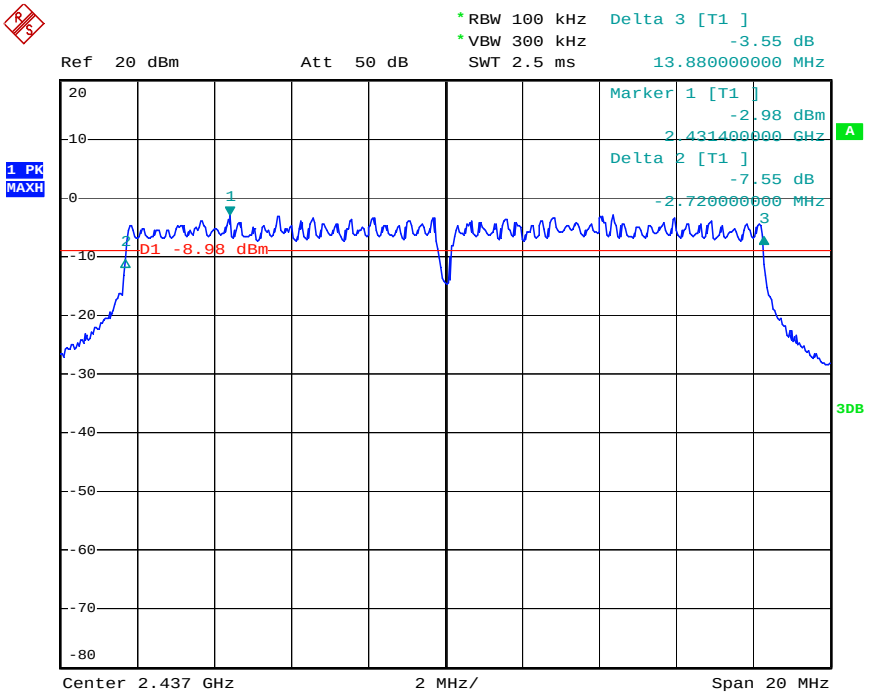
802.11b Channel High 2462MHz



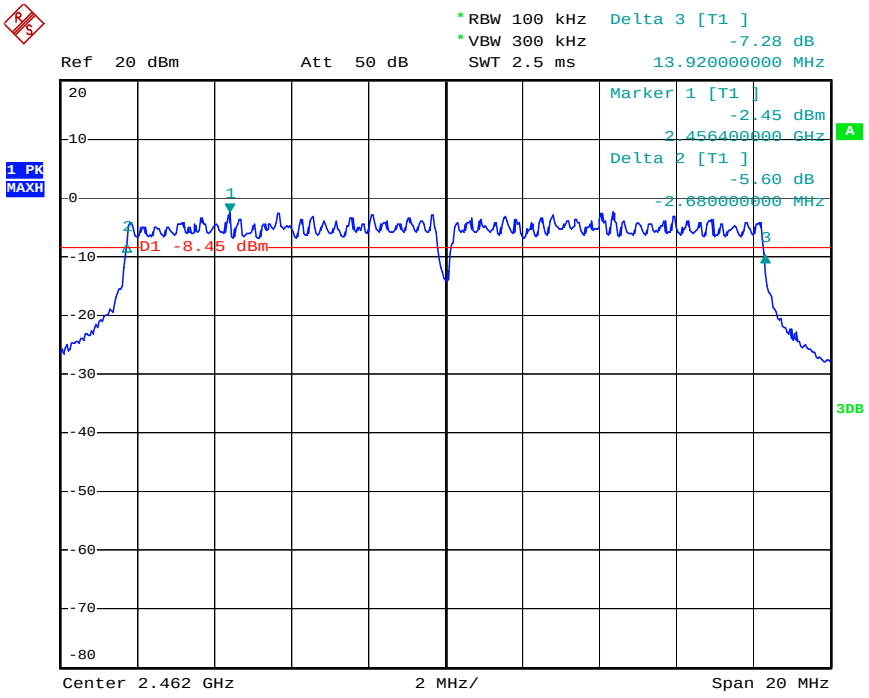
802.11g Channel Low 2412MHz



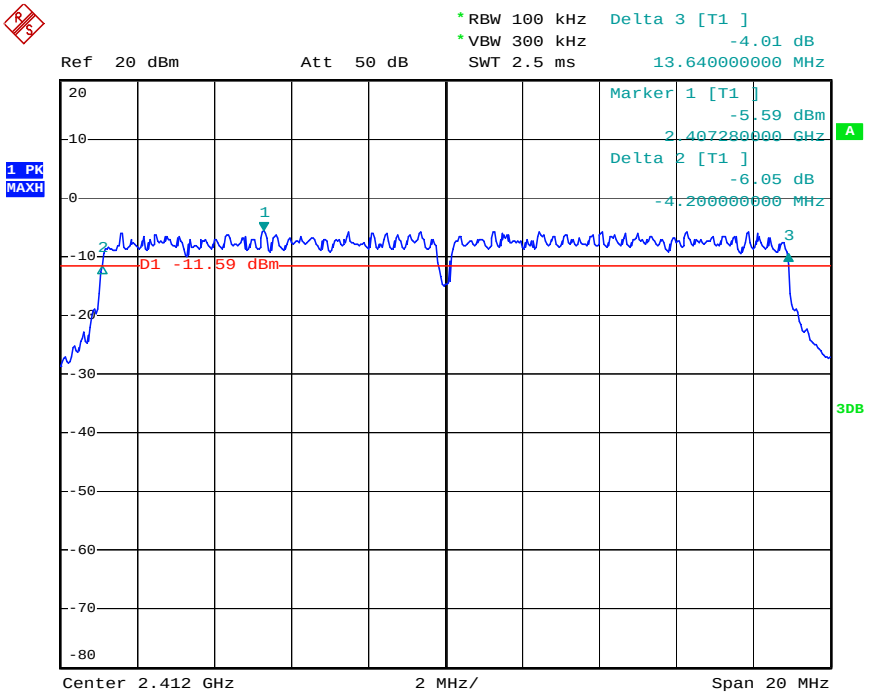
802.11g Channel Middle 2437MHz



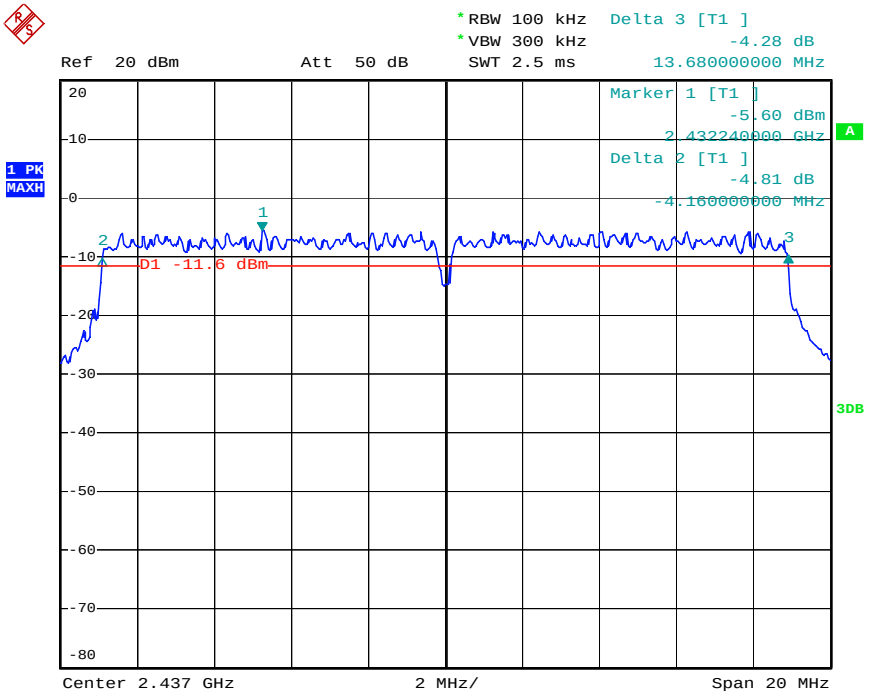
802.11g Channel High 2462MHz



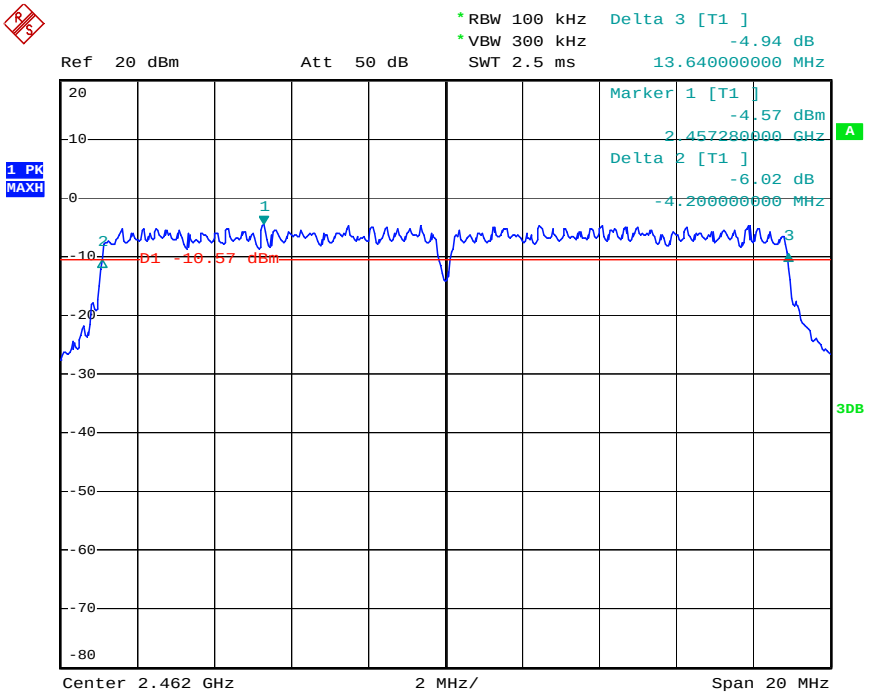
802.11n Channel Low 2412MHz (20MHz)



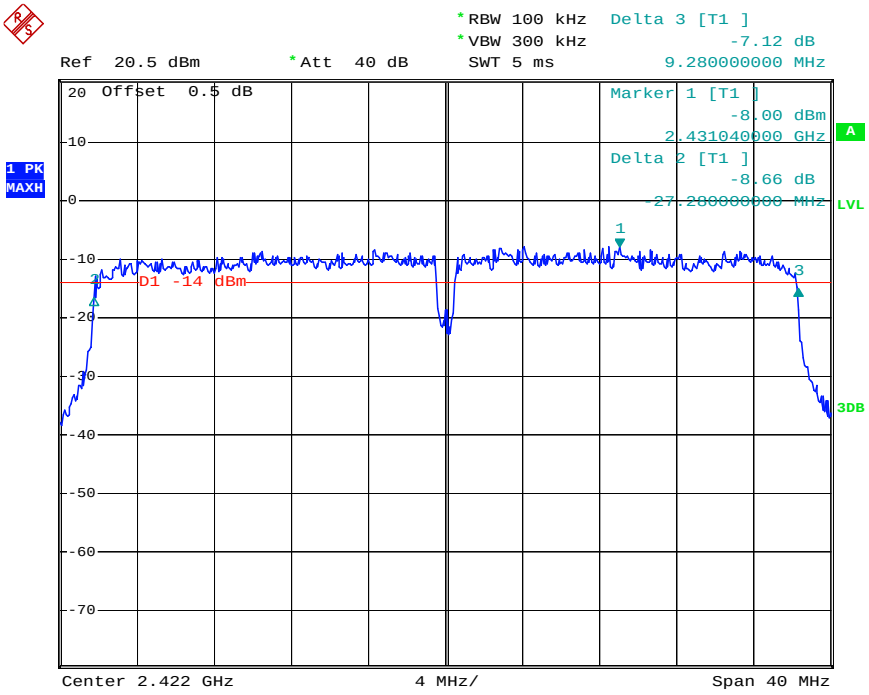
802.11n Channel Middle 2437MHz(20MHz)



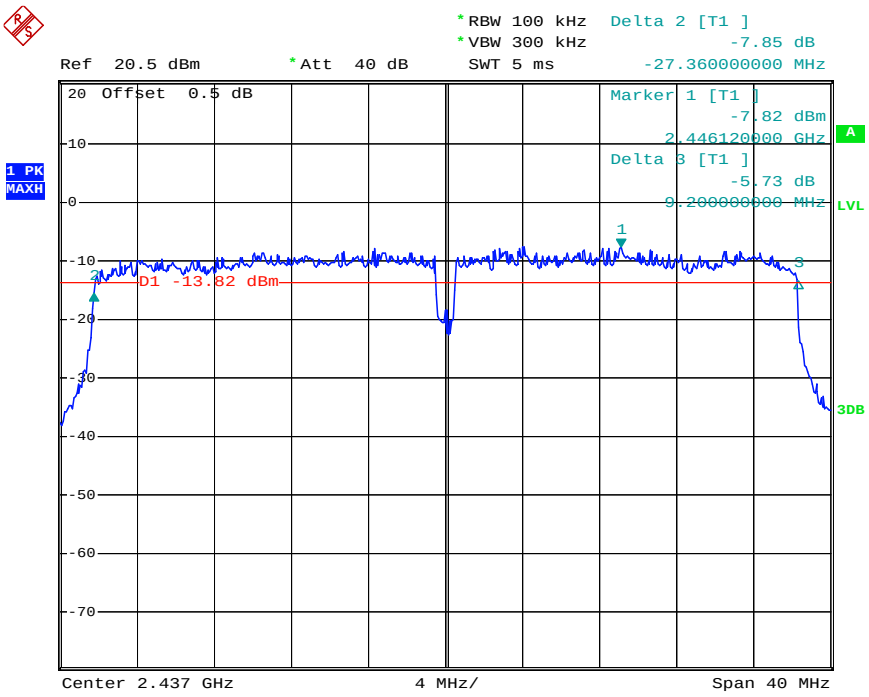
802.11n Channel High 2462MHz(20MHz)



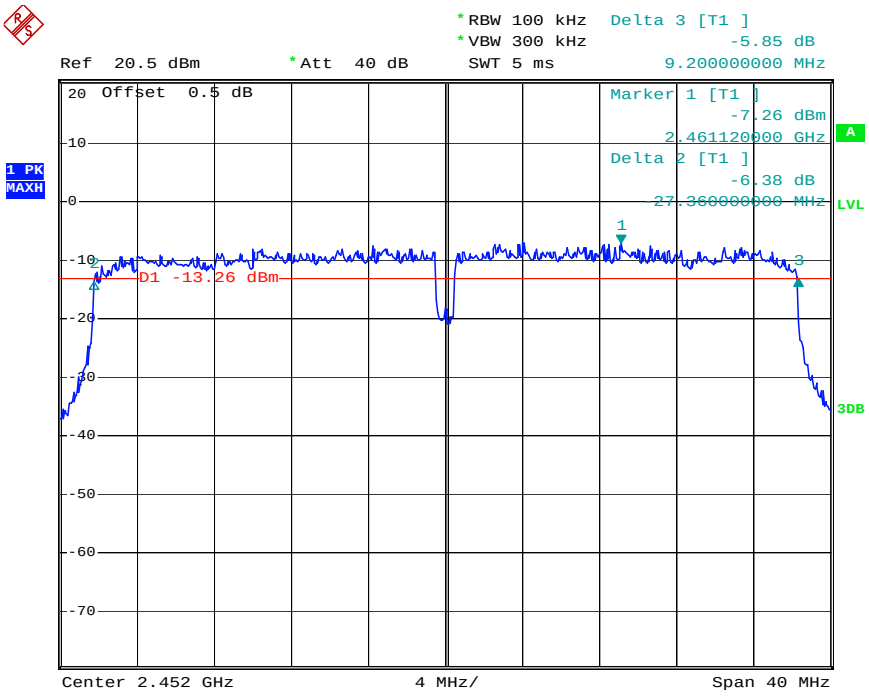
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz(40MHz)

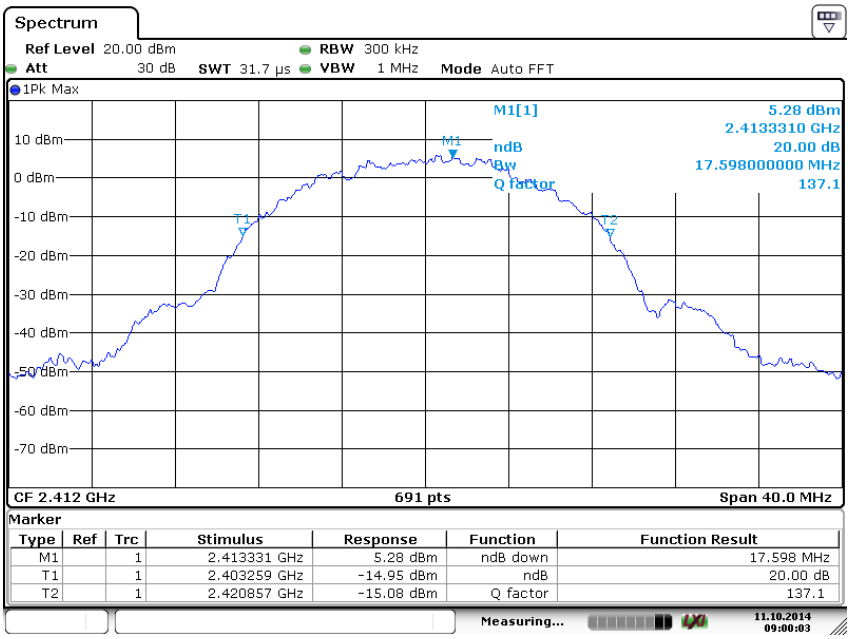


802.11n Channel High 2452MHz(40MHz)

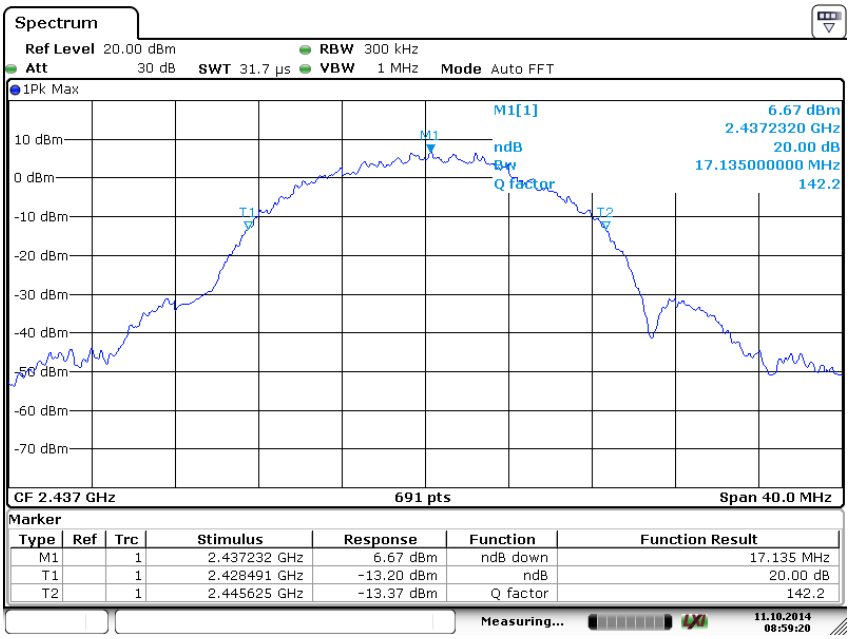


20dB Bandwidth

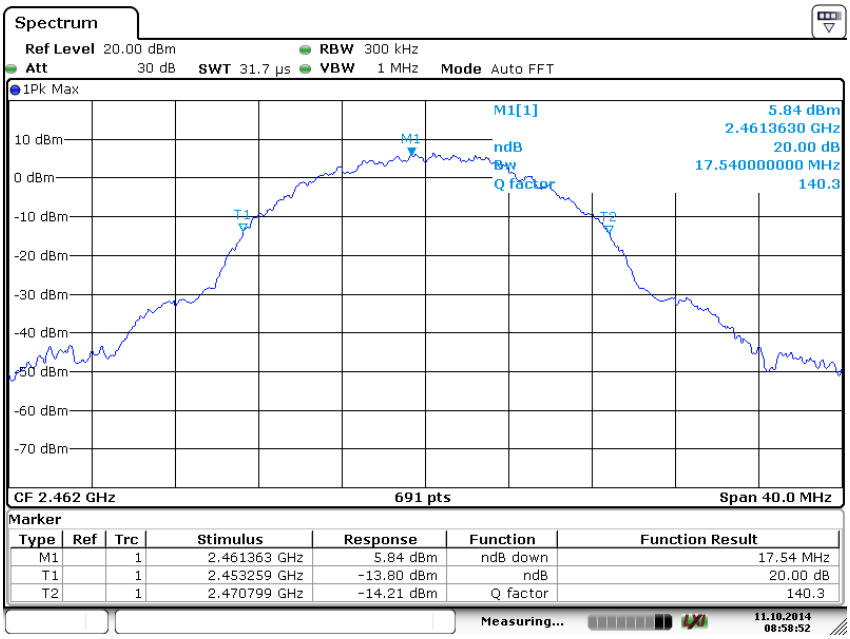
802.11b Channel Low 2412MHz



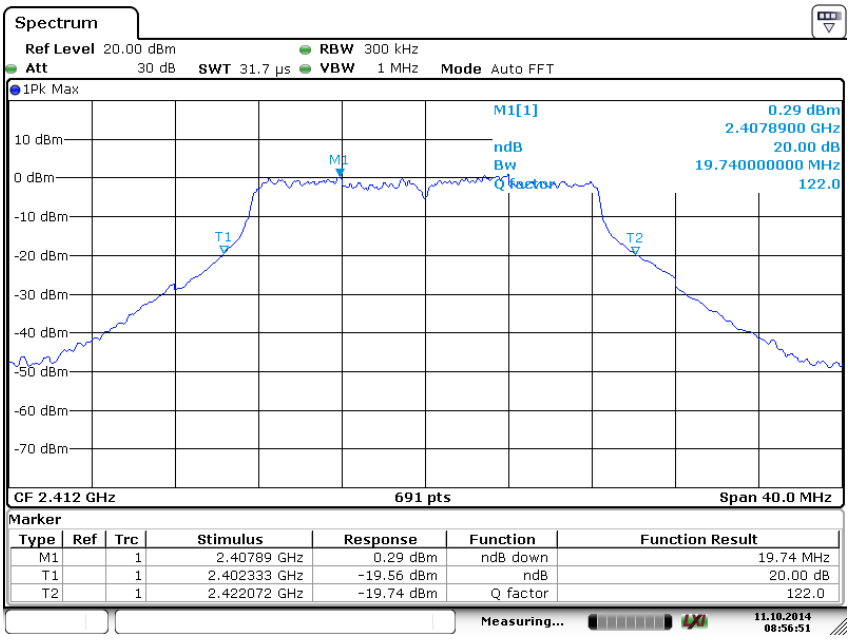
802.11b Channel Middle 2437MHz



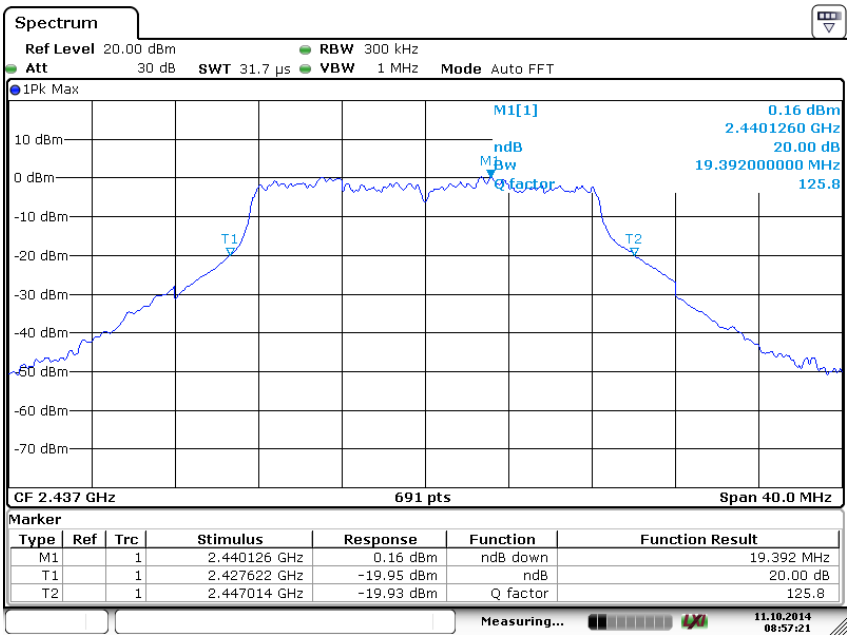
802.11b Channel High 2462MHz



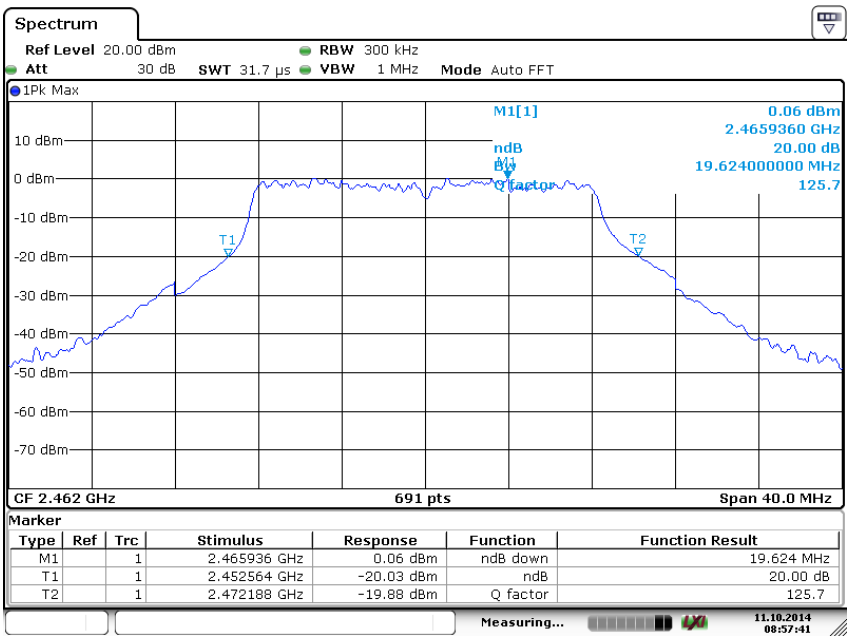
802.11g Channel Low 2412MHz



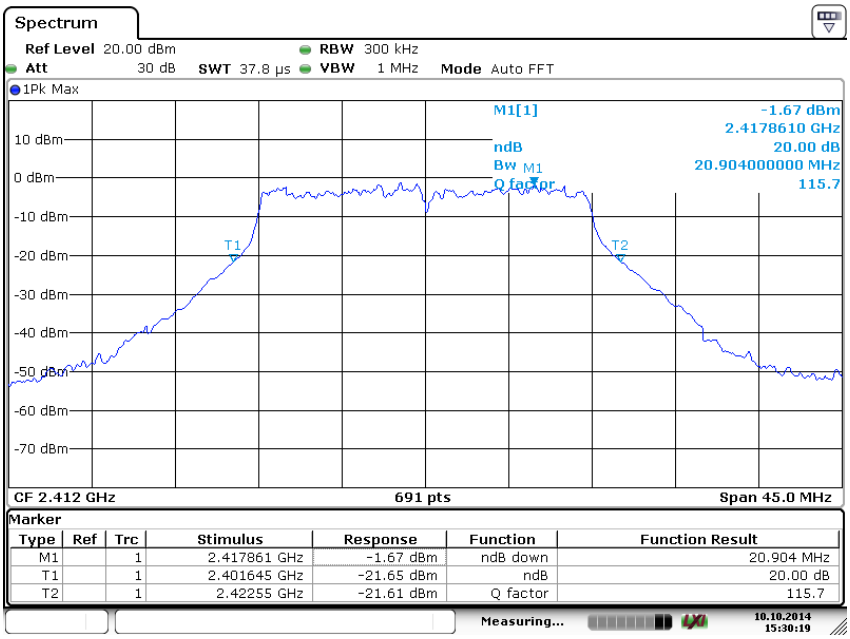
802.11g Channel Middle 2437MHz



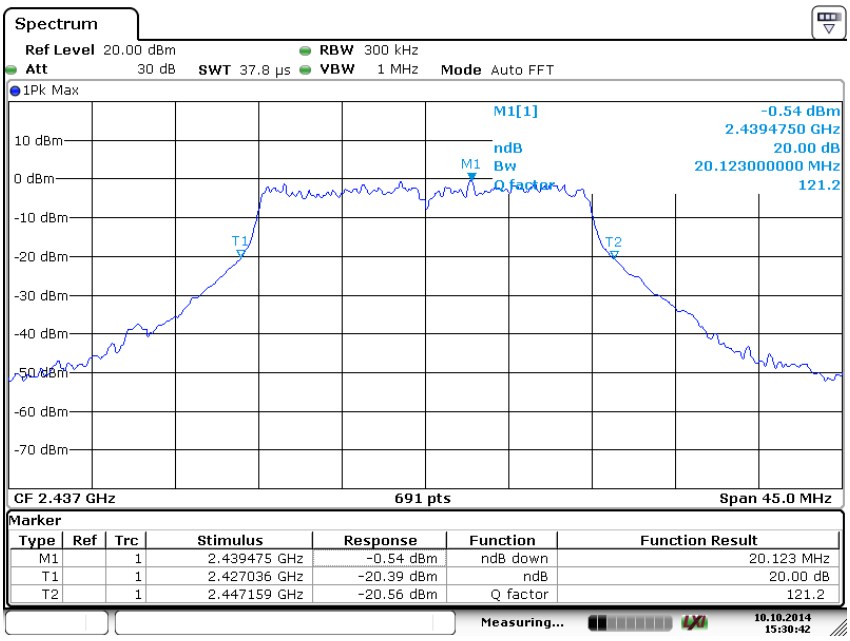
802.11g Channel High 2462MHz



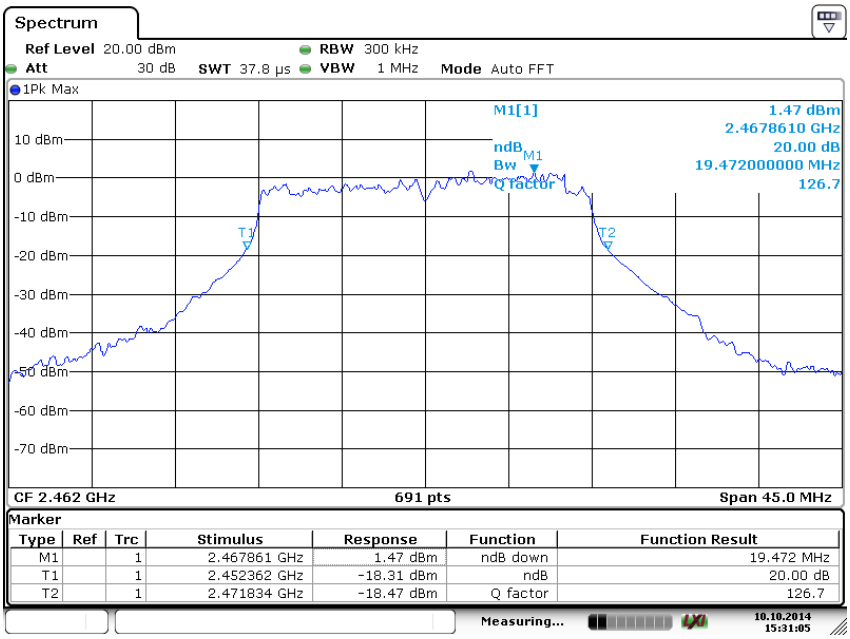
802.11n Channel Low 2412MHz (20MHz)



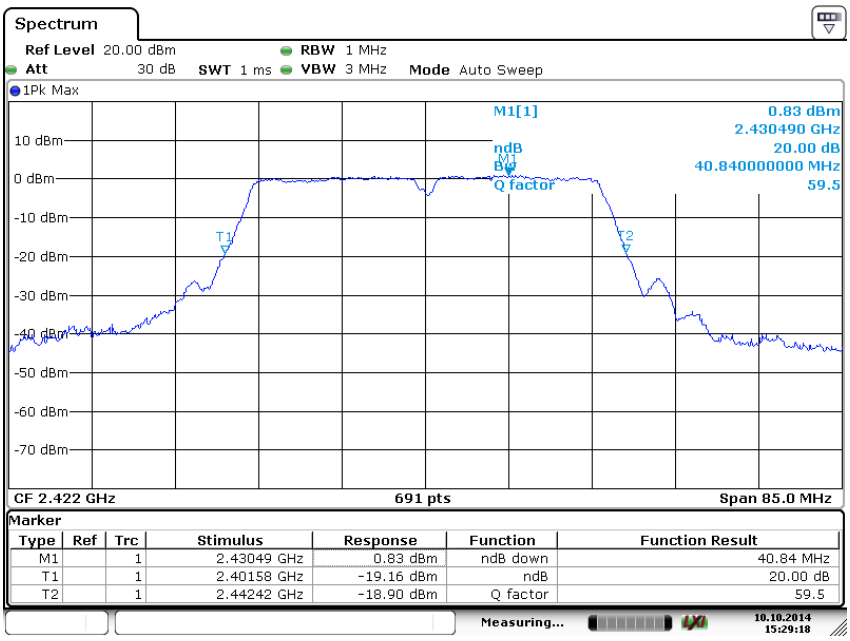
802.11n Channel Middle 2437MHz(20MHz)



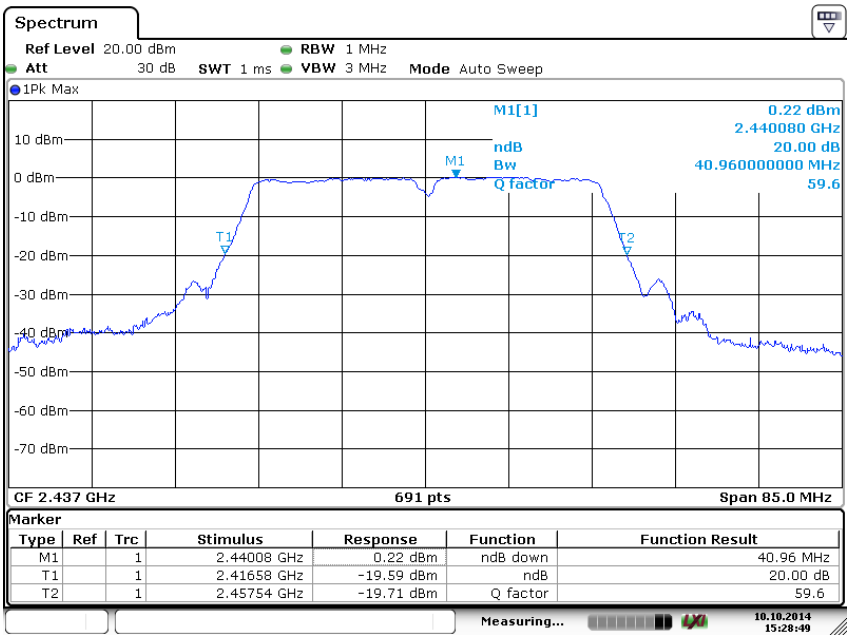
802.11n Channel High 2462MHz(20MHz)



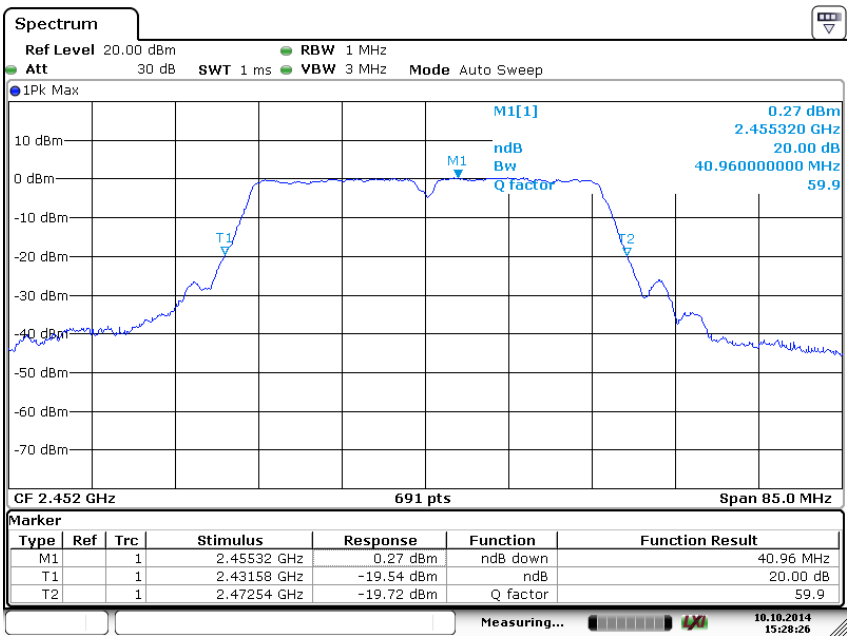
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz(40MHz)

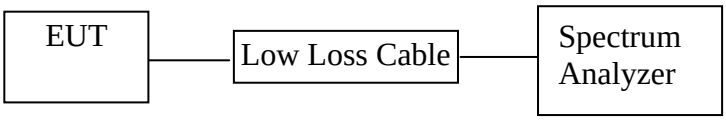


802.11n Channel High 2452MHz(40MHz)



7. MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

7.1.Block Diagram of Test Setup



7.2.The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

7.3.EUT Configuration on Measurement

The equipment is installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

7.5.Test Procedure

7.5.1.The EUT was tested according to DTS test procedure of Jun 05, 2014 KDB558074 D01 DTS Meas Guidance v03r02 for compliance to FCC 47CFR 15.247 requirements.

7.5.2.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.3.Set RBW = 1-5% of the OBW, not to exceed 1 MHz, VBW $\geqslant$ 3 x RBW, Sweep time = auto, Set span to at least 1.5 times the OBW, Detector = RMS.

7.5.4.Measurement the Maximum conducted (average) output power.

7.6.Test Result

The test was performed with 802.11b				
Channel	Frequency (MHz)	Ave output power (dBm)	Ave output power (mW)	Limits dBm / W
Low	2412	9.20	8.32	30 dBm / 1 W
Middle	2437	9.14	8.20	30 dBm / 1 W
High	2462	9.26	8.43	30 dBm / 1 W

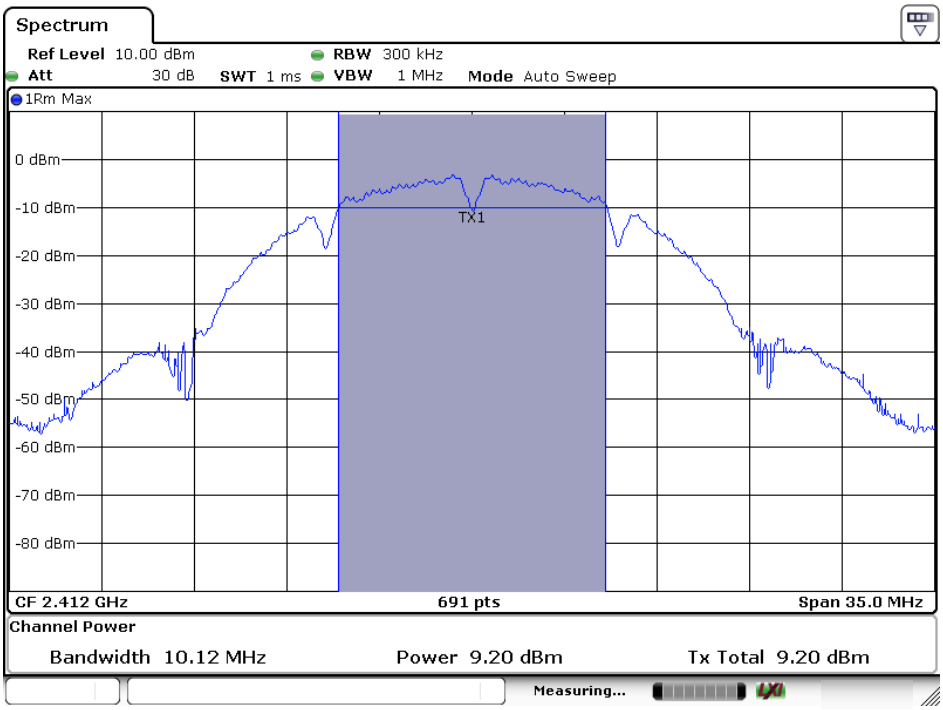
The test was performed with 802.11g				
Channel	Frequency (MHz)	Ave output power (dBm)	Ave output power (mW)	Limits dBm / W
Low	2412	8.23	6.65	30 dBm / 1 W
Middle	2437	8.12	6.49	30 dBm / 1 W
High	2462	8.46	7.01	30 dBm / 1 W

The test was performed with 802.11n (20MHz)				
Channel	Frequency (MHz)	Ave output power (dBm)	Ave output power (mW)	Limits dBm / W
Low	2412	8.26	6.70	30 dBm / 1 W
Middle	2437	7.92	6.19	30 dBm / 1 W
High	2462	7.63	5.79	30 dBm / 1 W

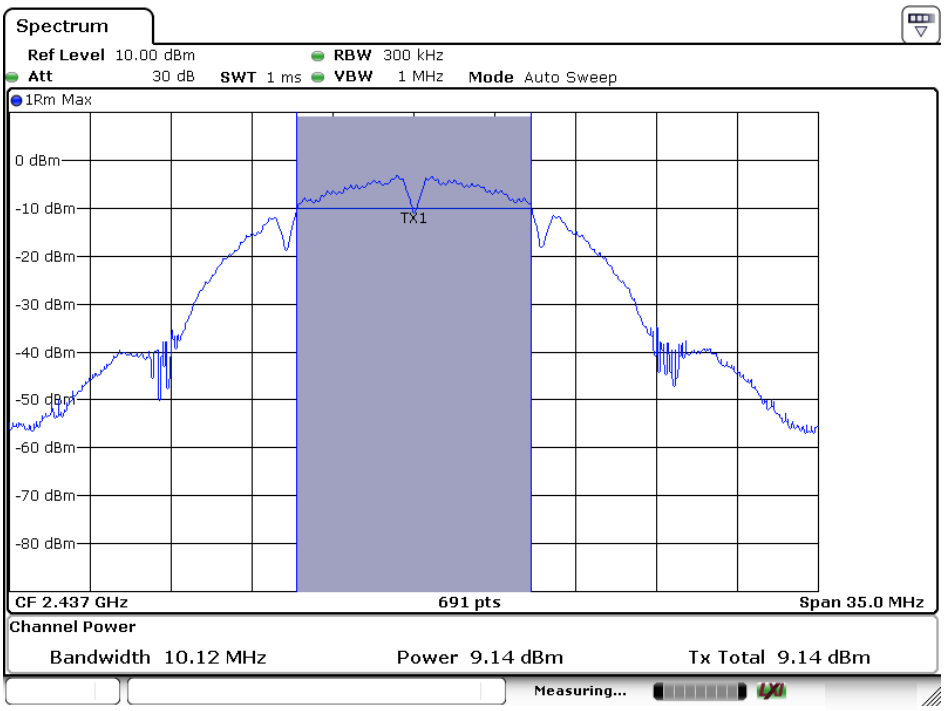
The test was performed with 802.11n (40MHz)				
Channel	Frequency (MHz)	Ave output power (dBm)	Ave output power (mW)	Limits dBm / W
Low	2422	6.88	4.88	30 dBm / 1 W
Middle	2437	6.82	4.81	30 dBm / 1 W
High	2452	6.83	4.82	30 dBm / 1 W

The spectrum analyzer plots are attached as below.

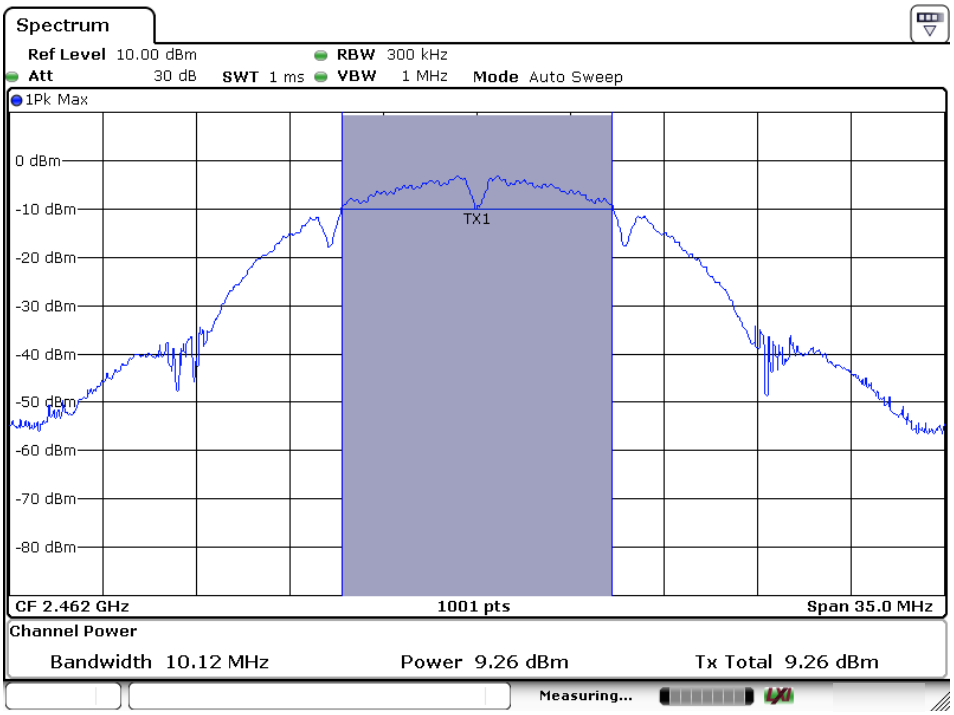
802.11b Channel Low 2412MHz



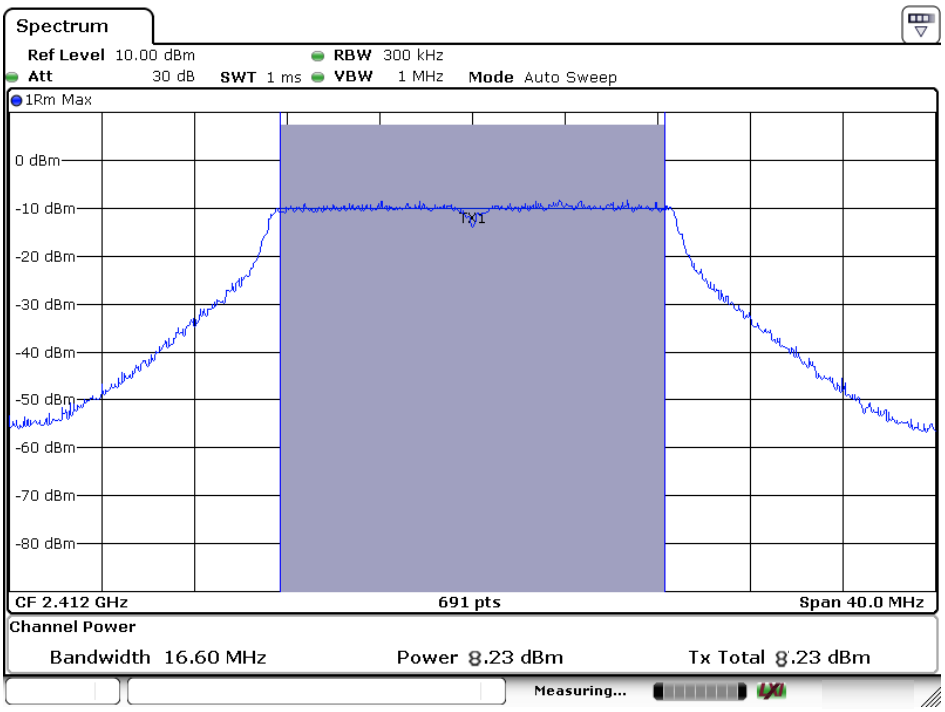
802.11b Channel Middle 2437MHz



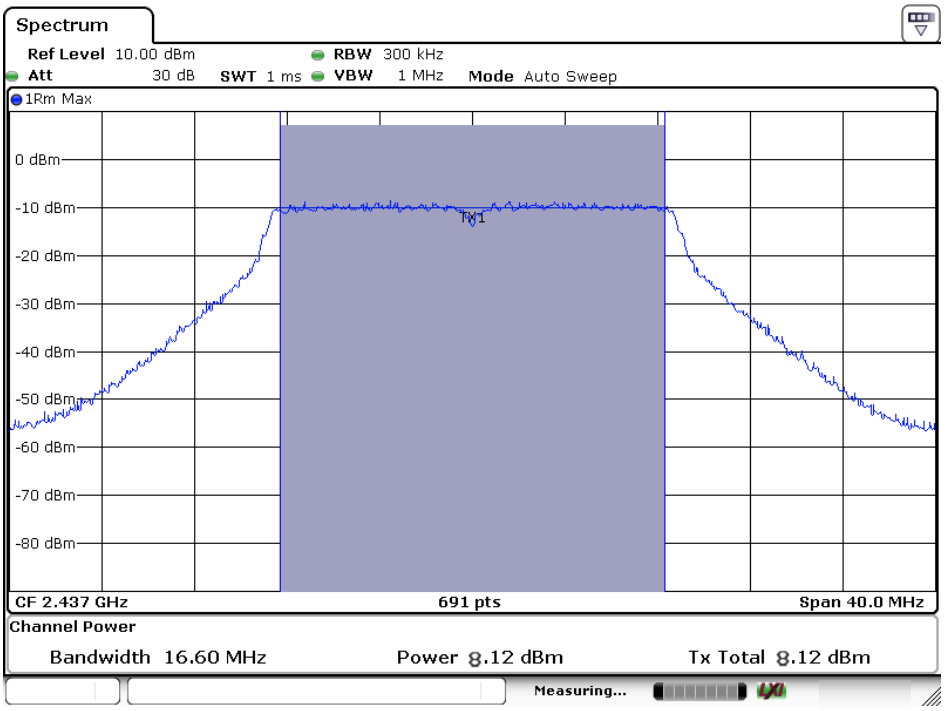
802.11b Channel High 2462MHz



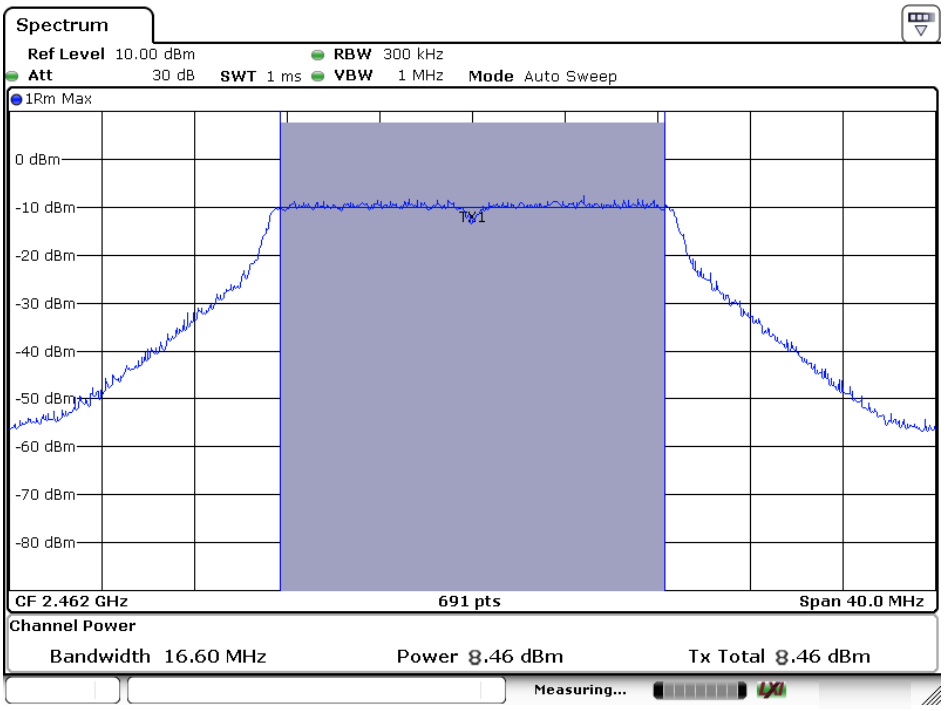
802.11g Channel Low 2412MHz



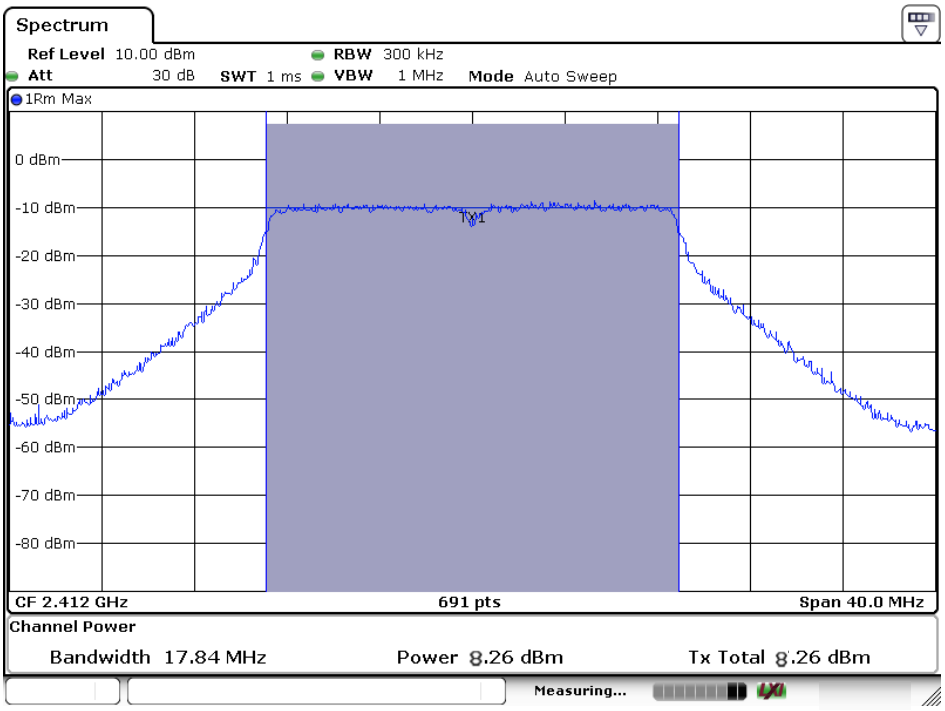
802.11g Channel Middle 2437MHz



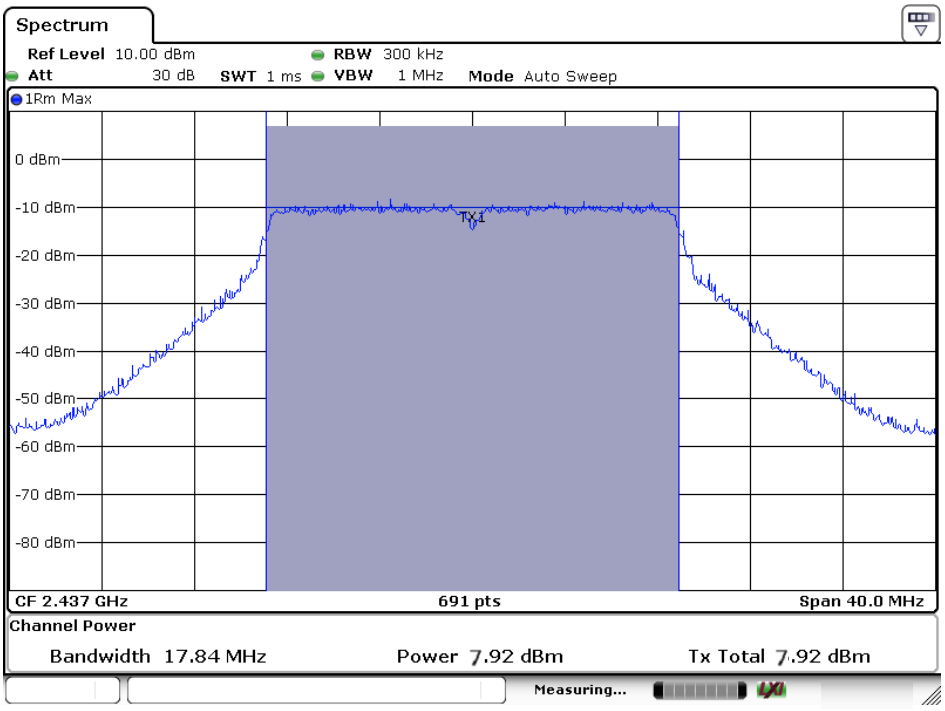
802.11g Channel High 2462MHz



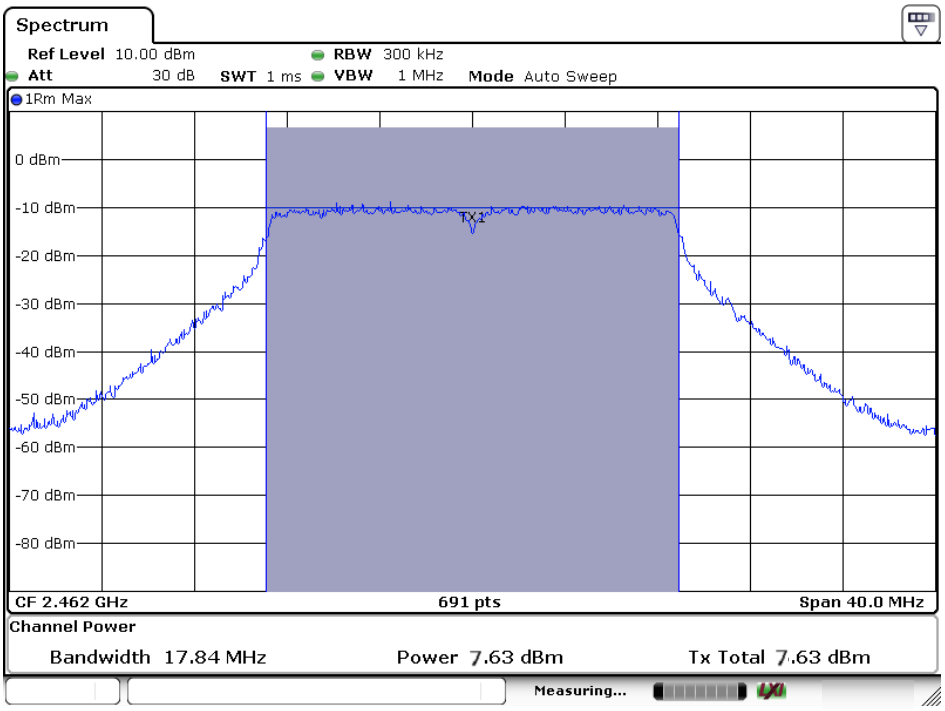
802.11n Channel Low 2412MHz (20MHz)



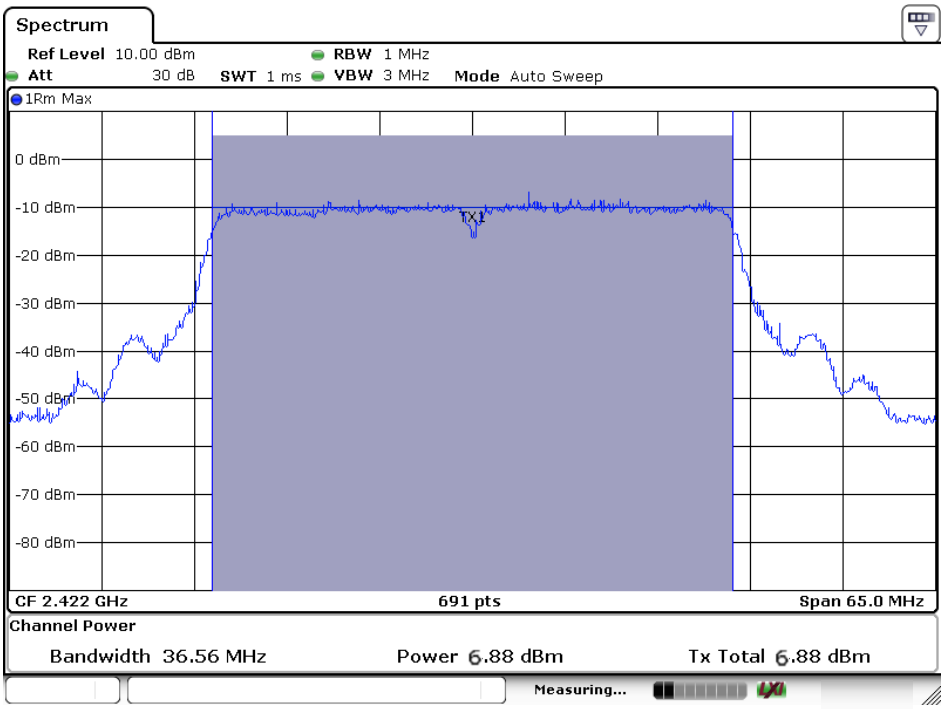
802.11n Channel Middle 2437MHz (20MHz)



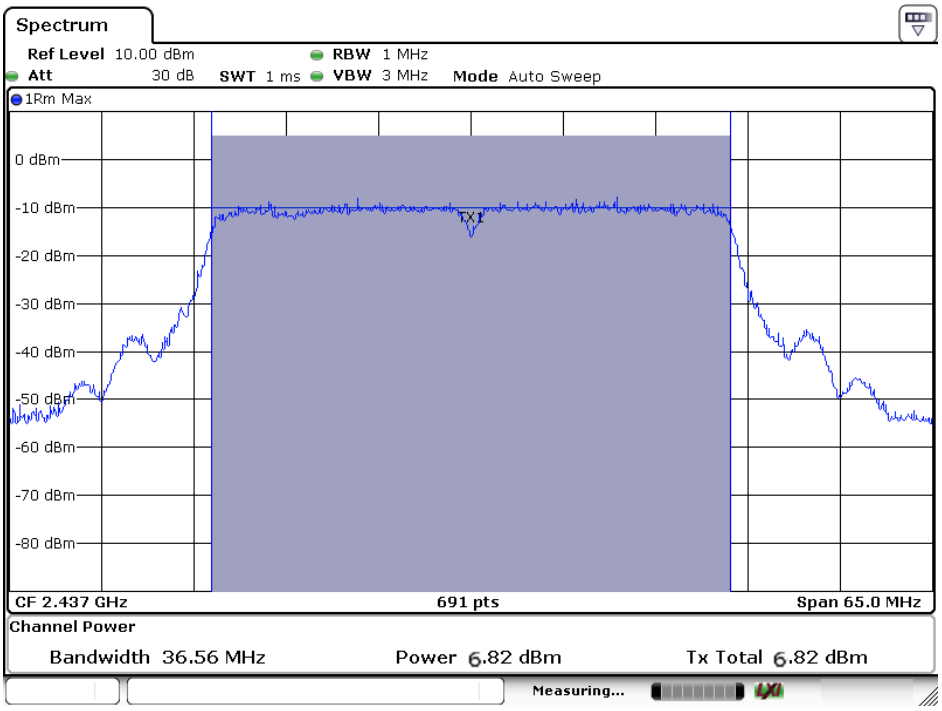
802.11n Channel High 2462MHz (20MHz)



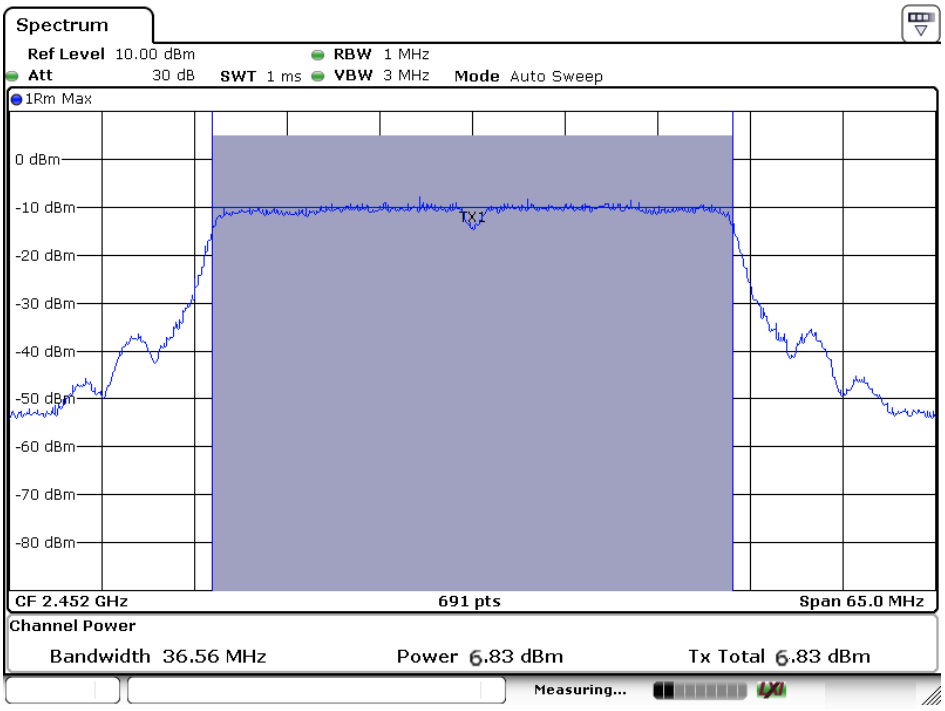
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz (40MHz)

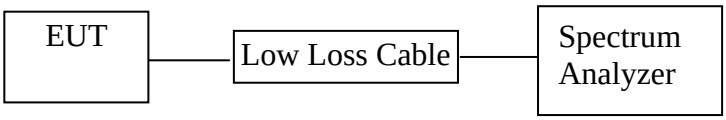


802.11n Channel High 2452MHz (40MHz)



8. POWER SPECTRAL DENSITY MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. The Requirement For Section 15.247(e)

Section 15.247(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.

8.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4. Operating Condition of EUT

8.4.1. Setup the EUT and simulator as shown as Section 8.1.

8.4.2. Turn on the power of all equipment.

8.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

8.5. Test Procedure

8.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2. Measurement Procedure PKPSD:

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.

3. Set the RBW 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

8.5.3.Measurement the maximum power spectral density.

8.6.Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-19.36	8 dBm
Middle	2437	-19.20	8 dBm
High	2462	-20.11	8 dBm

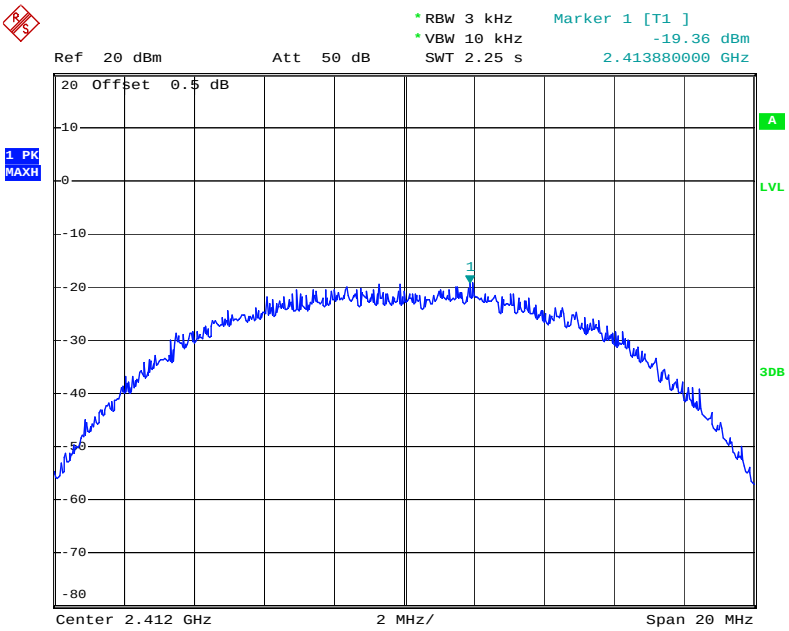
The test was performed with 802.11g			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-23.88	8 dBm
Middle	2437	-24.52	8 dBm
High	2462	-23.79	8 dBm

The test was performed with 802.11n (20MHz)			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-24.54	8 dBm
Middle	2437	-25.50	8 dBm
High	2462	-24.74	8 dBm

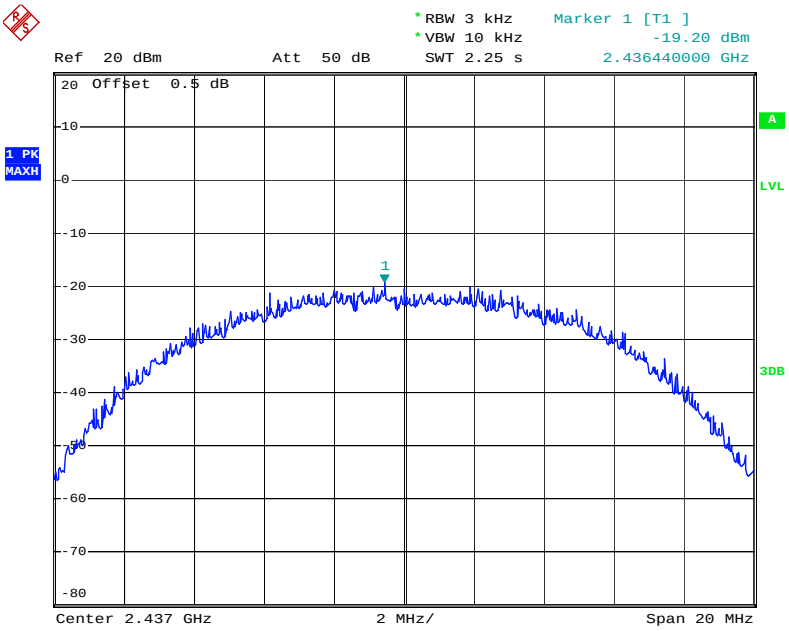
The test was performed with 802.11n (40MHz)			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2422	-29.52	8 dBm
Middle	2437	-29.55	8 dBm
High	2452	-30.52	8 dBm

The spectrum analyzer plots are attached as below.

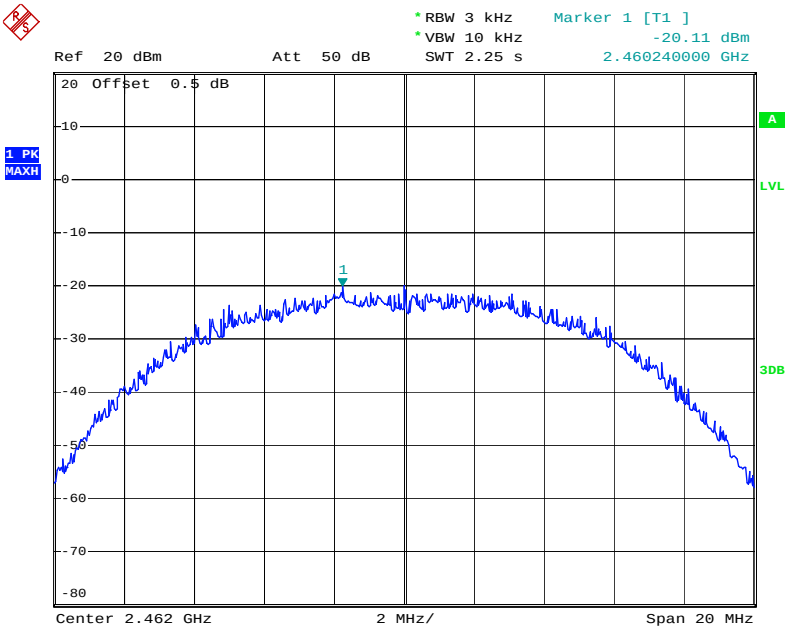
802.11b Channel Low 2412MHz



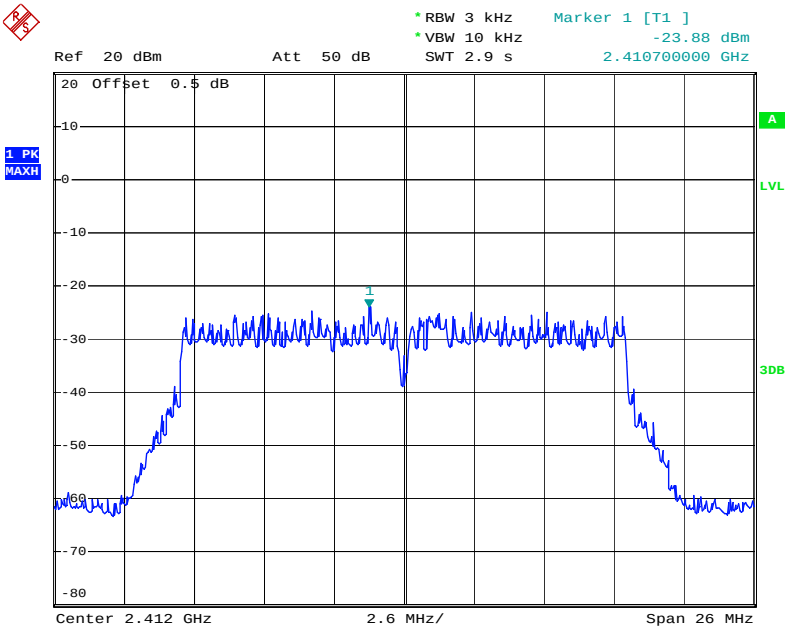
802.11b Channel Middle 2437MHz



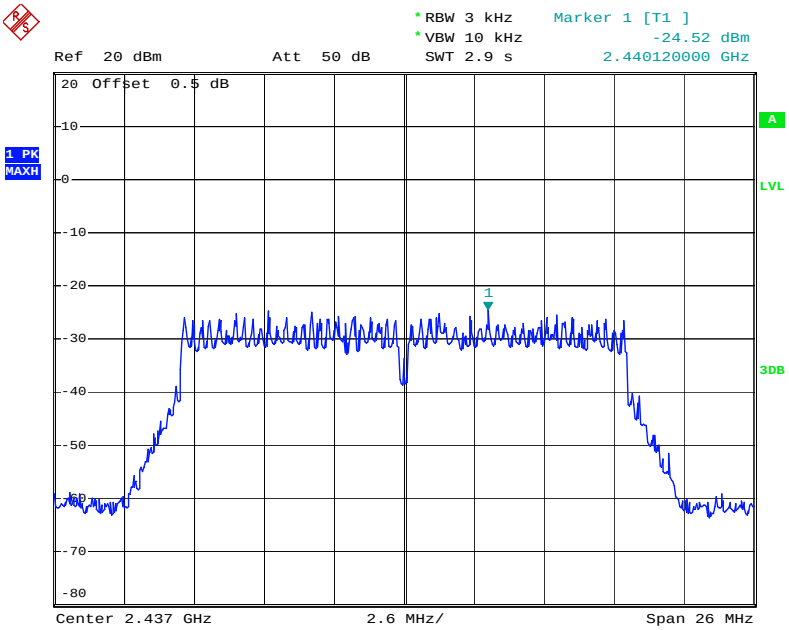
802.11b Channel High 2462MHz



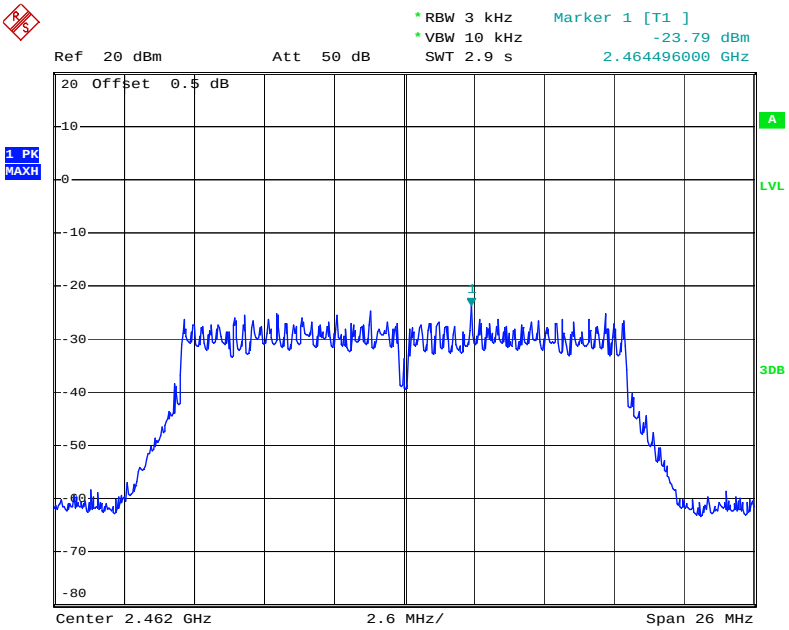
802.11g Channel Low 2412MHz



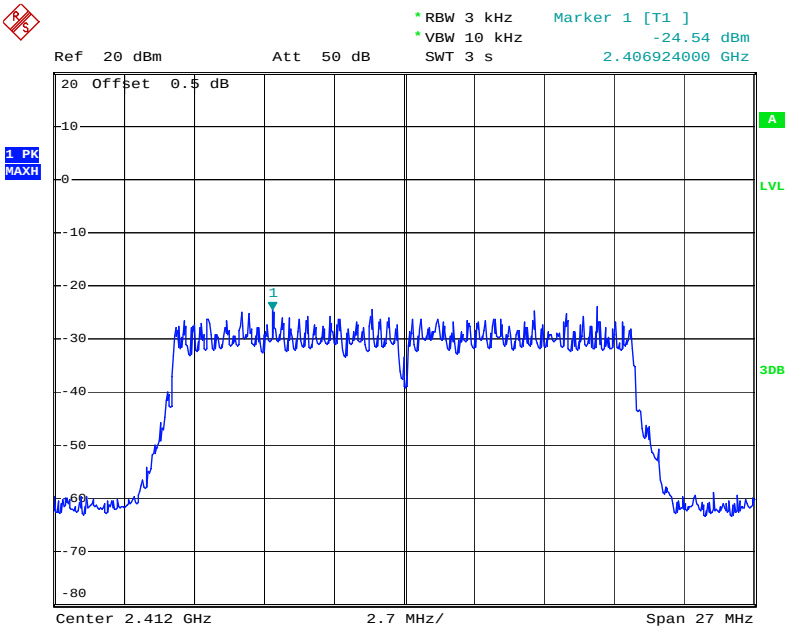
802.11g Channel Middle 2437MHz



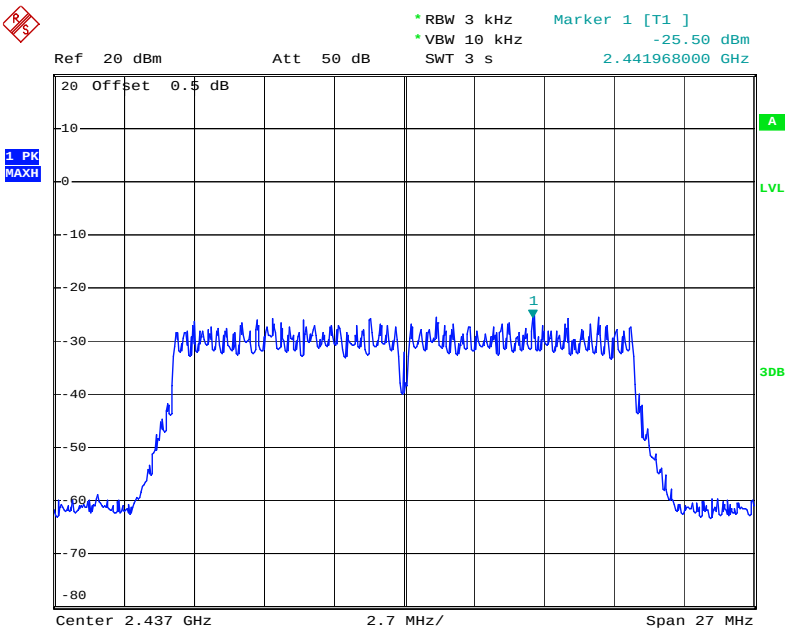
802.11g Channel High 2462MHz



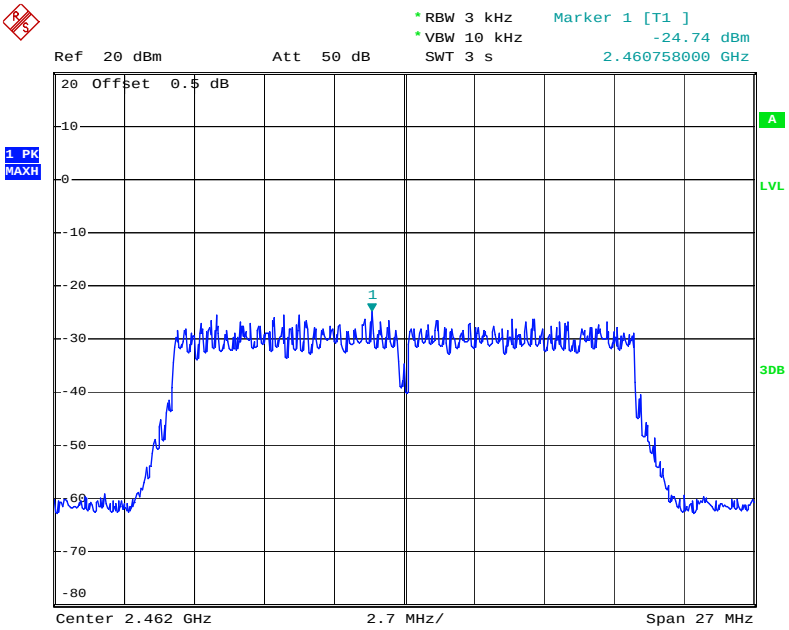
802.11n Channel Low 2412MHz (20MHz)



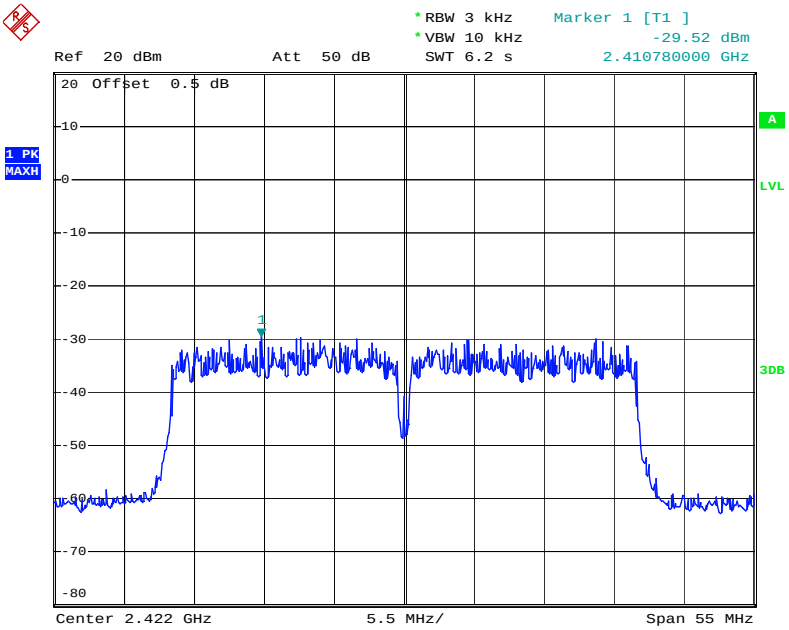
802.11n Channel Middle 2437MHz (20MHz)



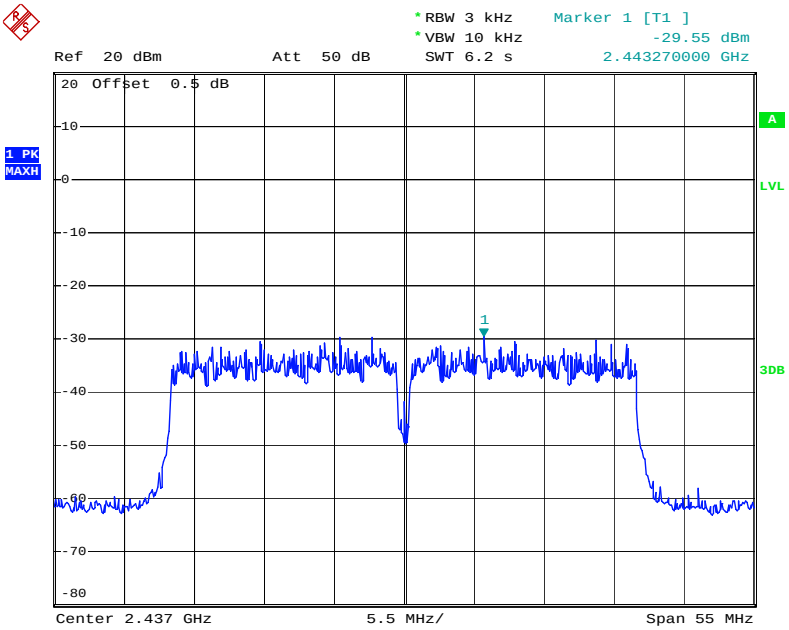
802.11n Channel High 2462MHz(20MHz)



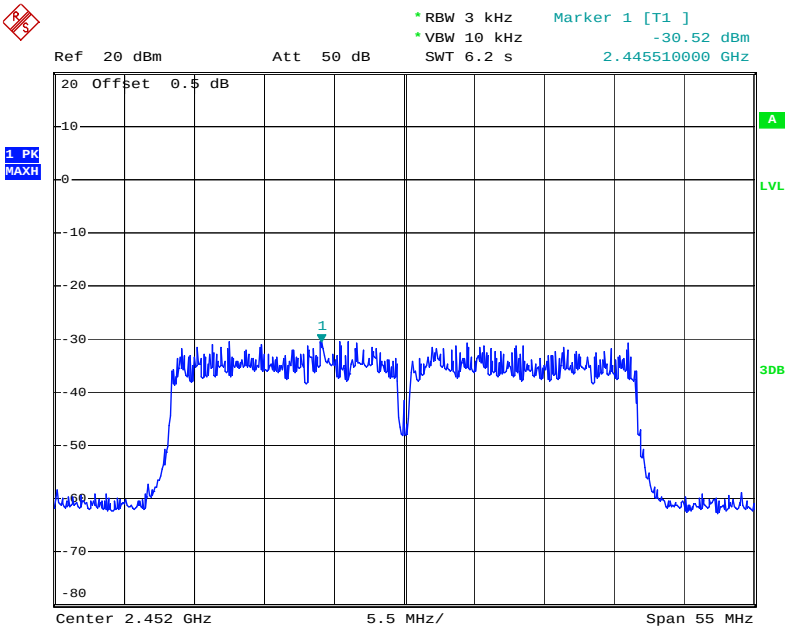
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz(40MHz)

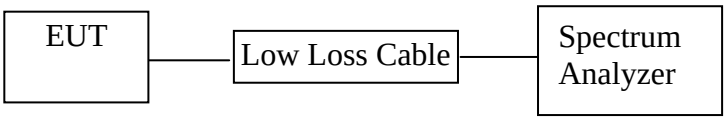


802.11n Channel High 2452MHz(40MHz)



9. BAND EDGE COMPLIANCE TEST

9.1. Block Diagram of Test Setup



9.2. The Requirement For Section 15.247(d)

Section 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).

9.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.4. Operating Condition of EUT

9.4.1. Setup the EUT and simulator as shown as Section 9.1.

9.4.2. Turn on the power of all equipment.

9.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz MHz. We select 2412MHz, 2462MHz and 2422MHz, 2452MHz TX frequency to transmit.

9.5. Test Procedure

Conducted Band Edge:

9.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz.

Radiate Band Edge:

9.5.3.The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

9.5.4.The turntable was rotated for 360 degrees to determine the position of maximum emission level.

9.5.5.EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

9.5.6.Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

9.5.7.RBW=1MHz, VBW=1MHz

9.5.8.The band edges was measured and recorded.

9.6.Test Result

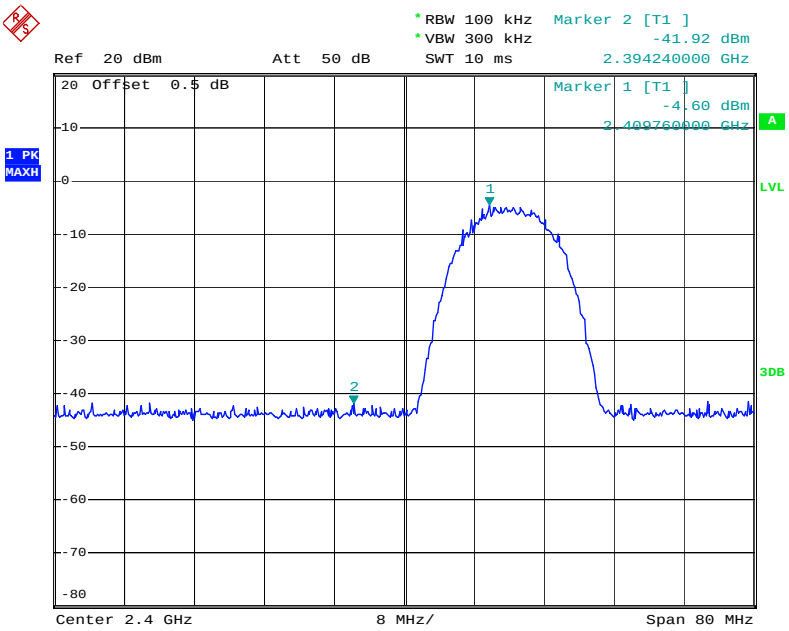
The test was performed with 802.11b		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	37.32	> 20dBc
2462	36.98	> 20dBc

The test was performed with 802.11g		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	33.63	> 20dBc
2462	33.11	> 20dBc

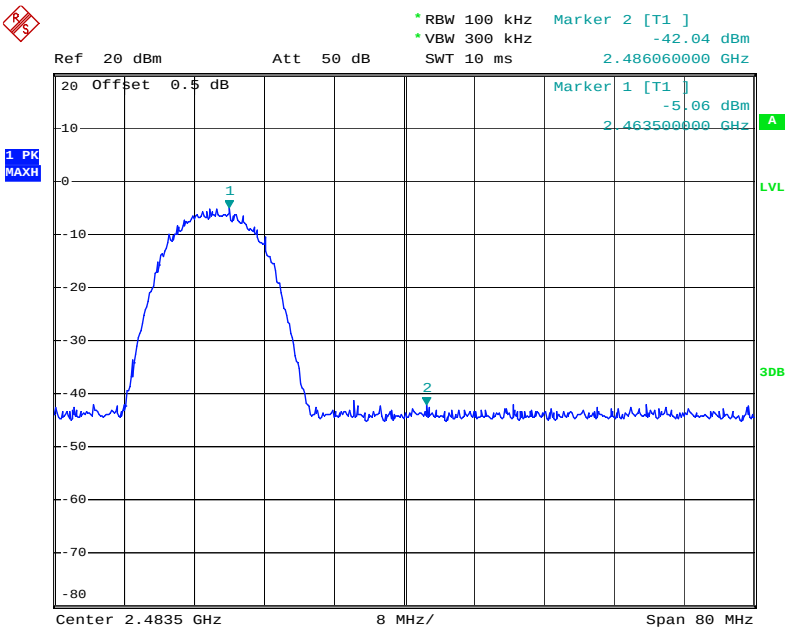
The test was performed with 802.11n (20MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	34.39	> 20dBc
2462	33.21	> 20dBc

The test was performed with 802.11n (40MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2422	29.43	> 20dBc
2452	29.21	> 20dBc

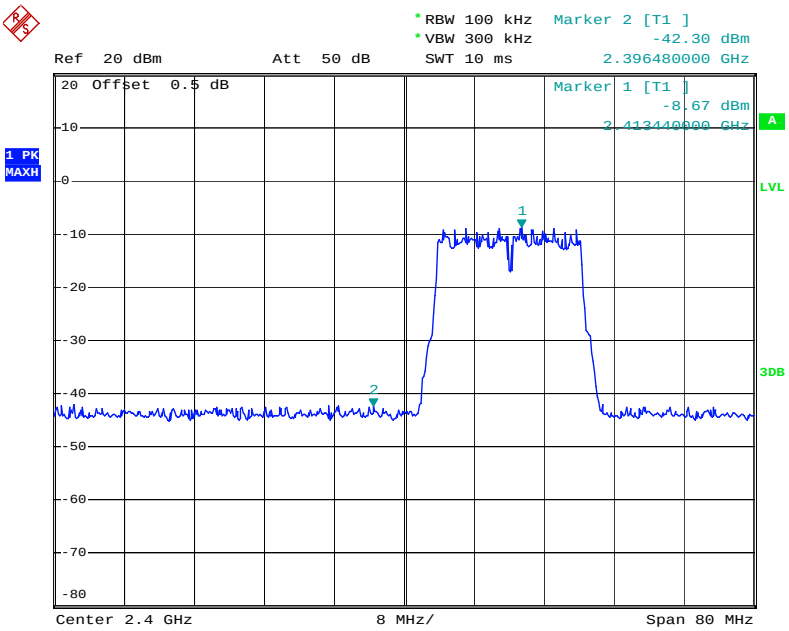
802.11b Channel Low 2412MHz



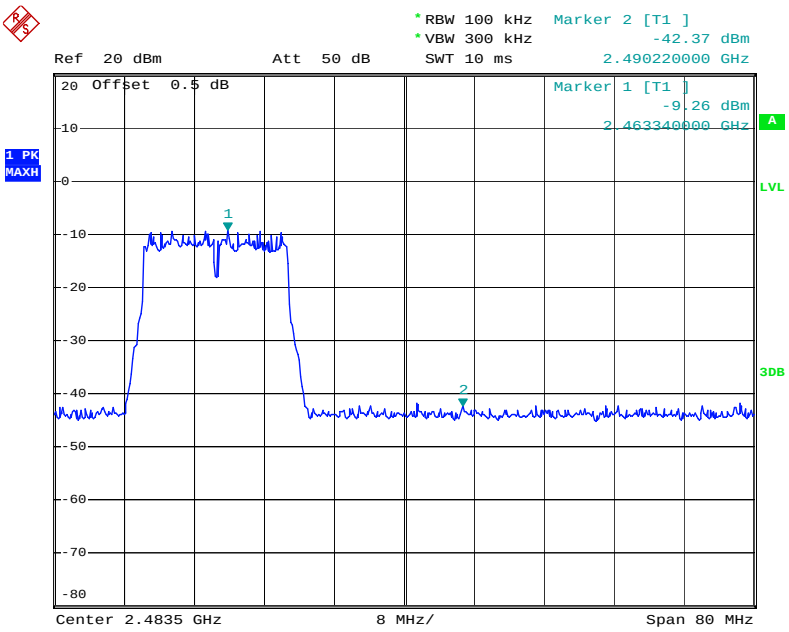
802.11b Channel High 2462MHz



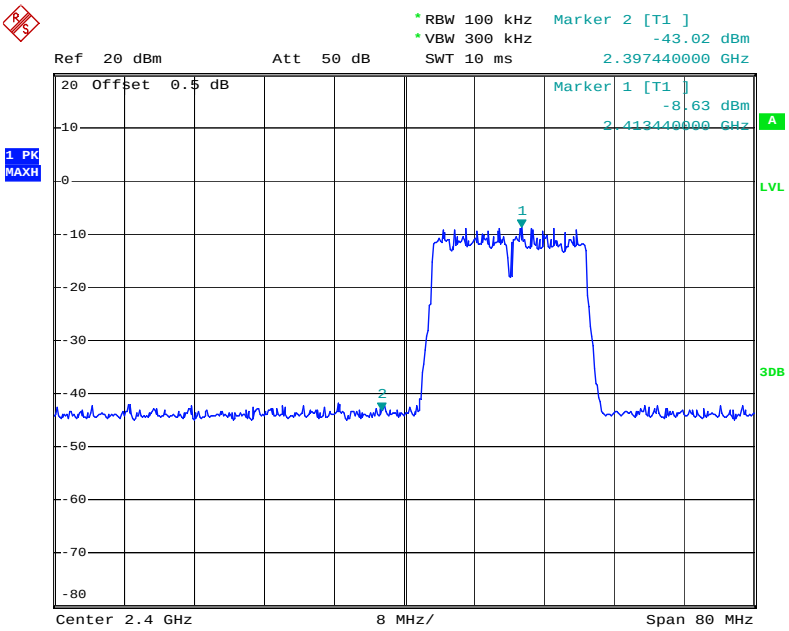
802.11g Channel Low 2412MHz



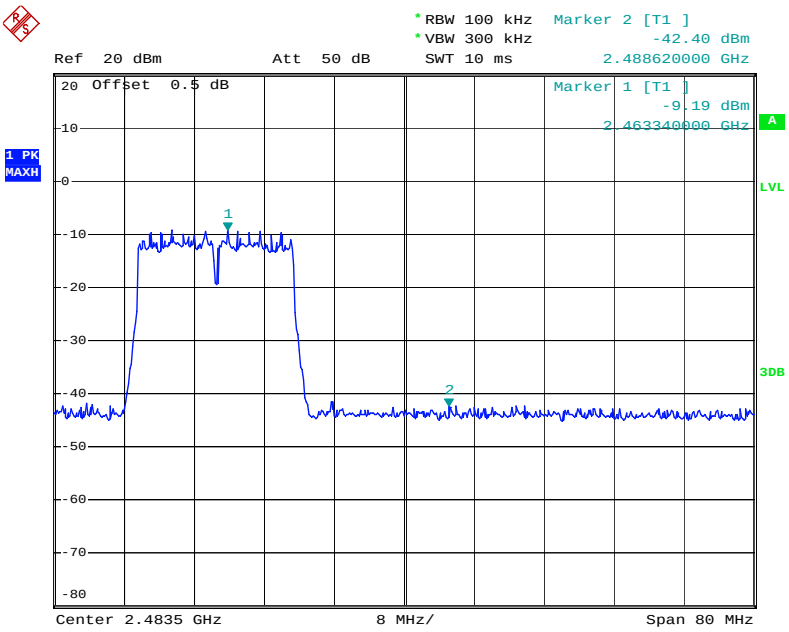
802.11g Channel High 2462MHz



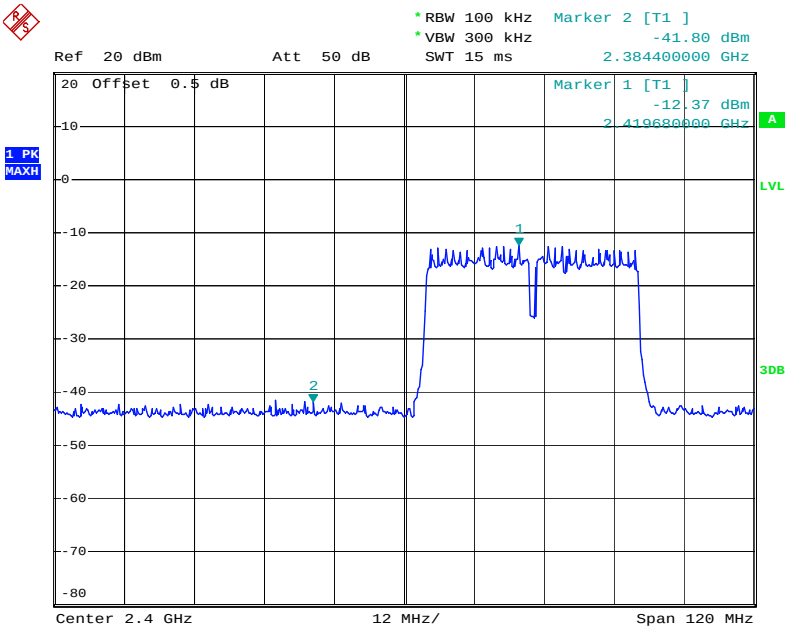
802.11n Channel Low 2412MHz (20MHz)



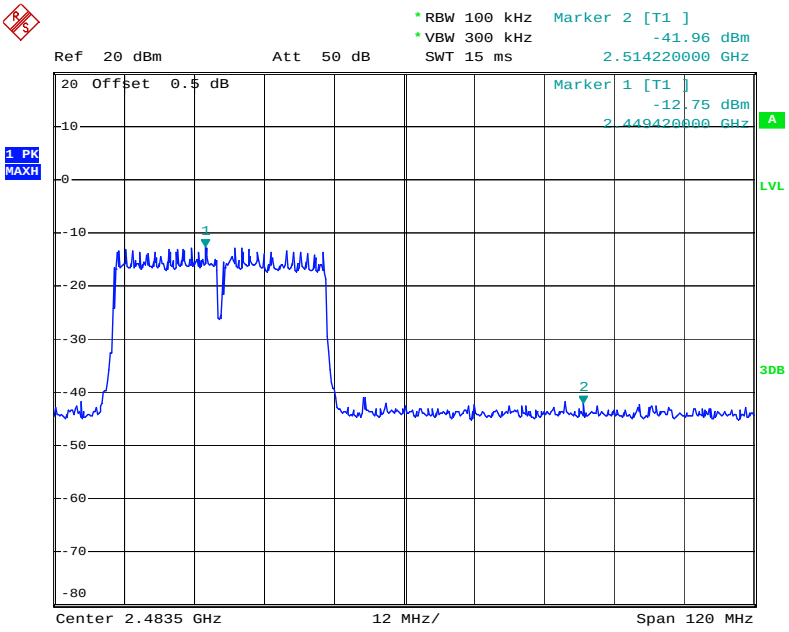
802.11n Channel High 2462MHz (20MHz)



802.11n Channel Low 2422MHz (40MHz)



802.11n Channel High 2452MHz (40MHz)



Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

Test Procedure:

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

Let the EUT work in TX modes then measure it.
We select 2412MHz, 2462MHz TX frequency to transmit(802.11b/g/n20 mode).
We select 2422MHz, 2452MHz TX frequency to transmit(802.11n40 mode).

During the radiated emission test, the spectrum analyzer was set with the following configurations:
1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
3.All modes of operation were investigated and the worst-case emissions are reported.

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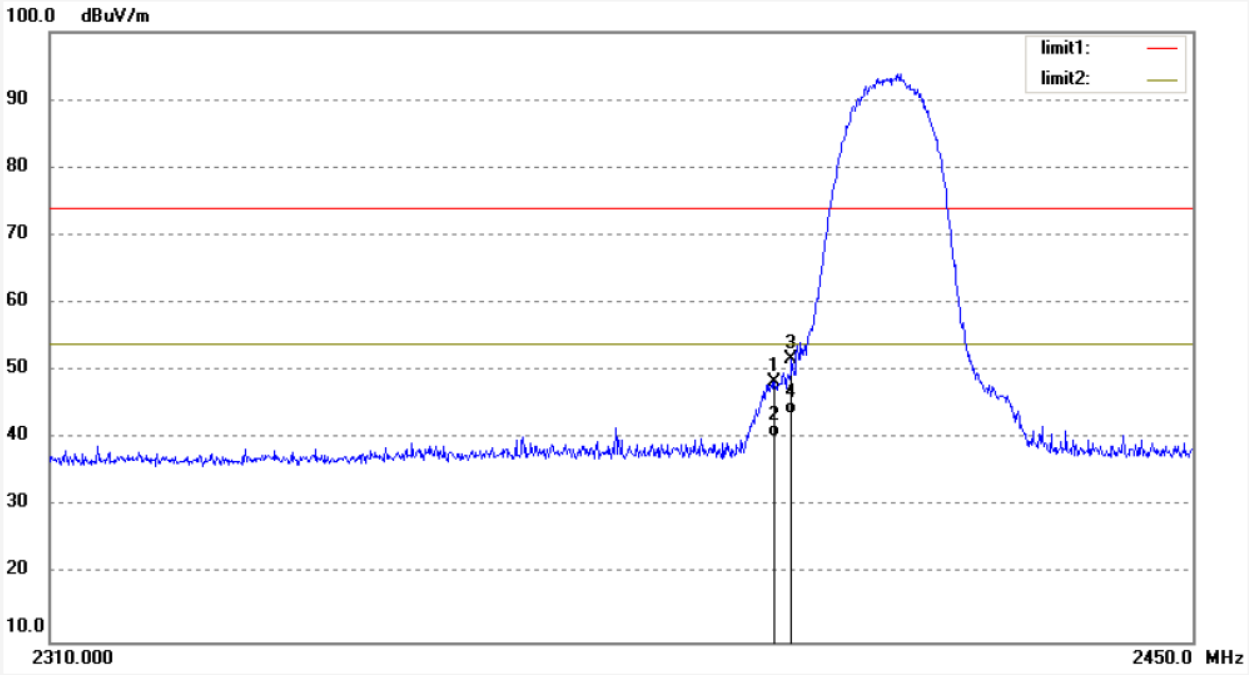
Fax:+86-0755-26503396

Job No.: alen #4582
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2412MHz(802.11b)
Model: M7XX
Manufacturer: SungWorld

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/32/45
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2397.920	55.02	-6.76	48.26	74.00	-25.74	peak			
2	2397.920	47.01	-6.76	40.25	54.00	-13.75	peak			
3	2400.020	58.43	-6.76	51.67	74.00	-22.33	peak			
4	2400.020	50.37	-6.76	43.61	54.00	-10.39	peak			

Note: Average measurement with peak detection at No.2&4

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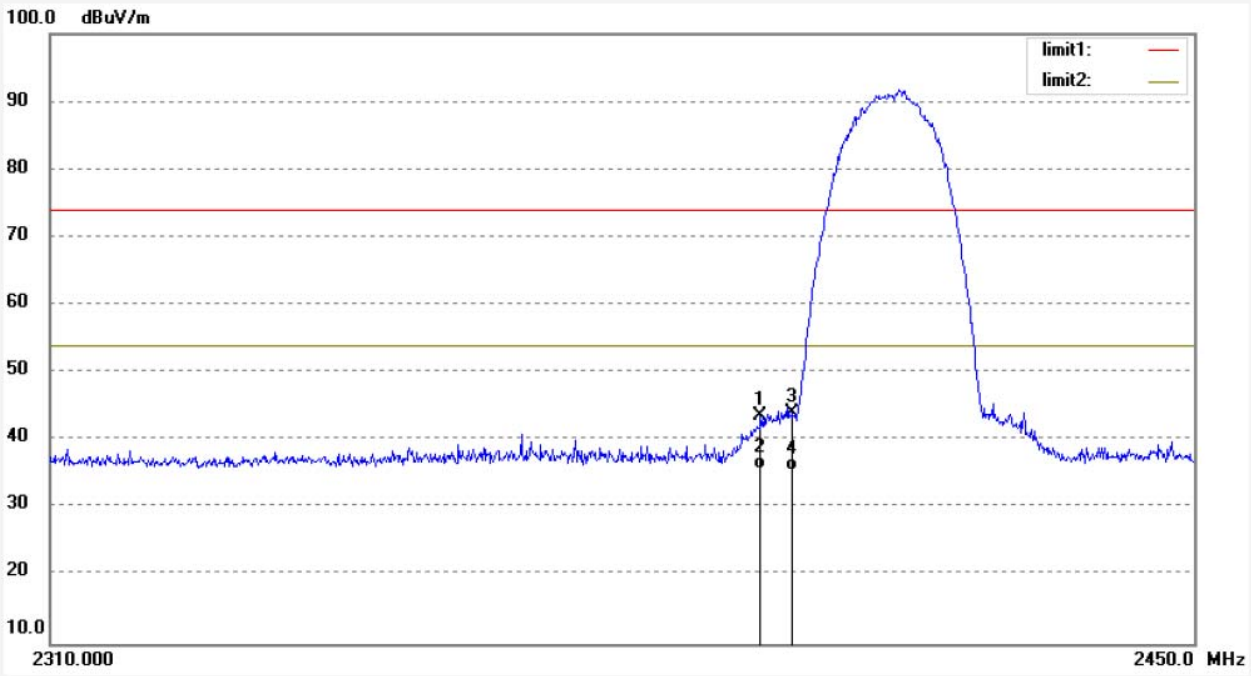
Fax:+86-0755-26503396

Job No.: alen #4583
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2412MHz(802.11b)
Model: M7XX
Manufacturer: SungWorld

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/35/57
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2396.100	50.41	-6.76	43.65	74.00	-30.35	peak			
2	2396.100	42.48	-6.76	35.72	54.00	-18.28	peak			
3	2400.020	50.74	-6.76	43.98	74.00	-30.02	peak			
4	2400.020	42.38	-6.76	35.62	54.00	-18.38	peak			

Note: Average measurement with peak detection at No.2&4

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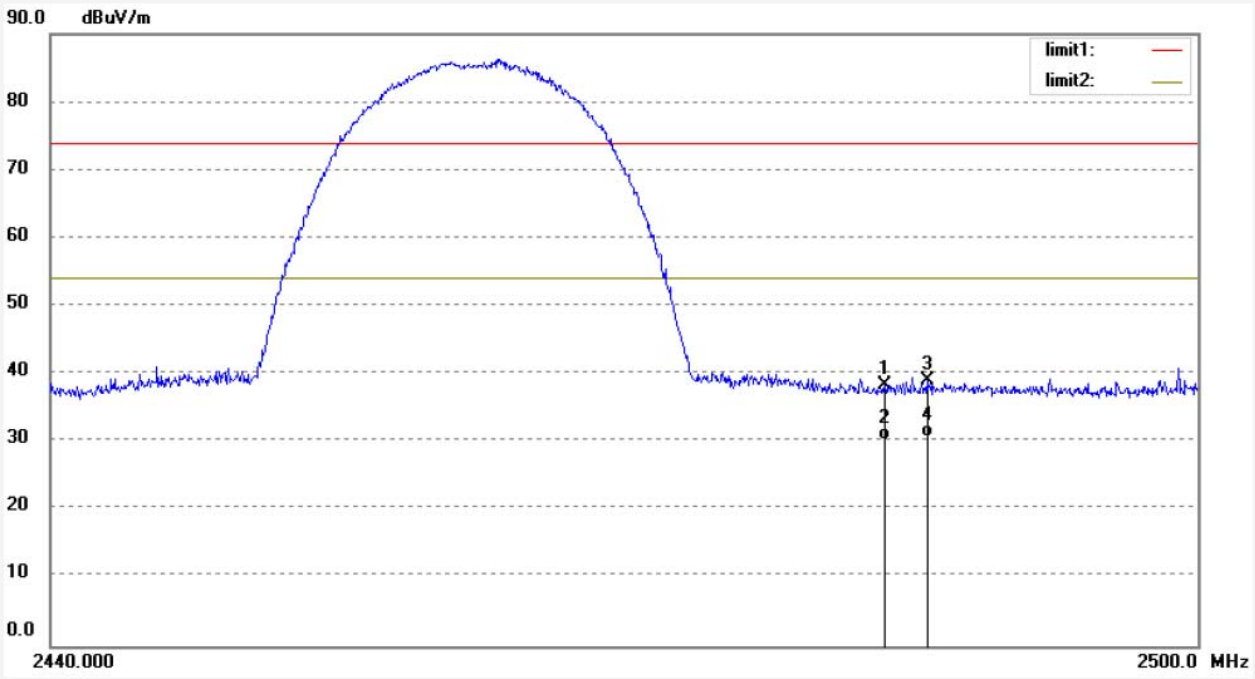
Fax:+86-0755-26503396

Job No.: alen #4585
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2462MHz(802.11b)
Model: M7XX
Manufacturer: SungWorld

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/39/55
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	44.83	-6.54	38.29	74.00	-35.71	peak			
2	2483.500	36.78	-6.54	30.24	54.00	-23.76	peak			
3	2485.720	45.47	-6.54	38.93	74.00	-35.07	peak			
4	2485.720	37.35	-6.54	30.81	54.00	-23.19	peak			

Note: Average measurement with peak detection at No.2&4

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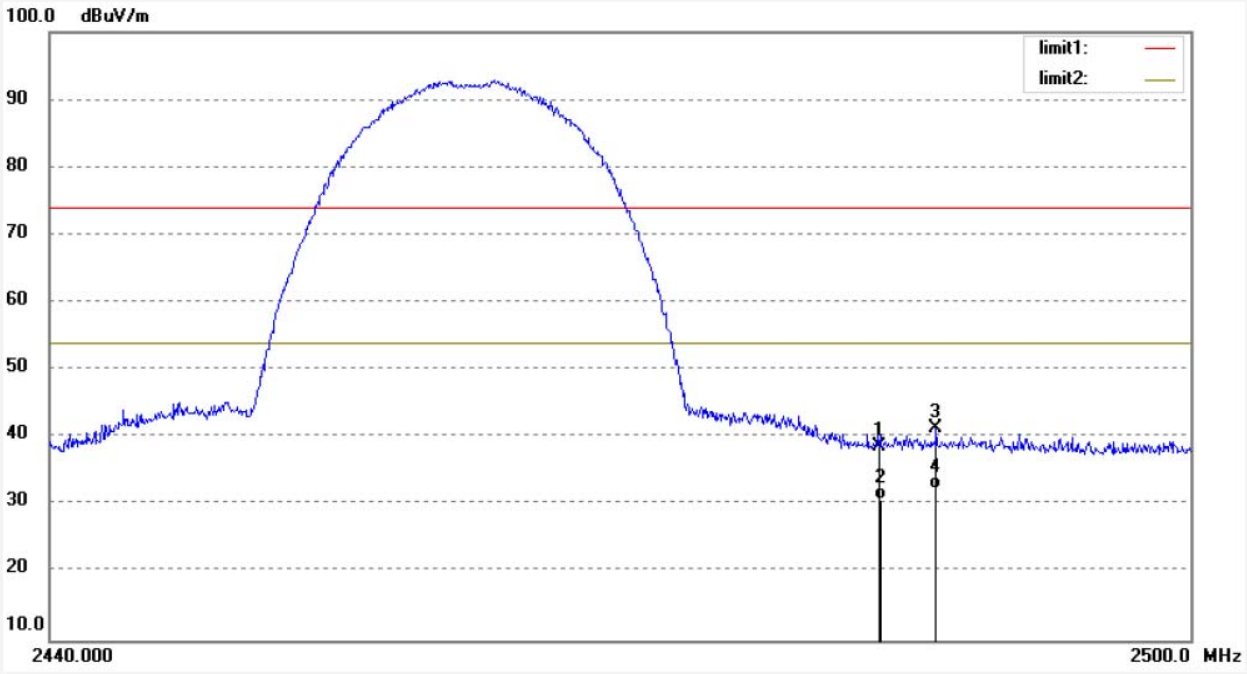
Fax:+86-0755-26503396

Job No.: alen #4584
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2462MHz(802.11b)
Model: M7XX
Manufacturer: SungWorld

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/38/37
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	45.22	-6.54	38.68	74.00	-35.32	peak			
2	2483.500	37.35	-6.54	30.81	54.00	-23.19	peak			
3	2486.500	47.98	-6.54	41.44	74.00	-32.56	peak			
4	2486.500	38.98	-6.54	32.44	54.00	-21.56	peak			

Note: Average measurement with peak detection at No.2&4

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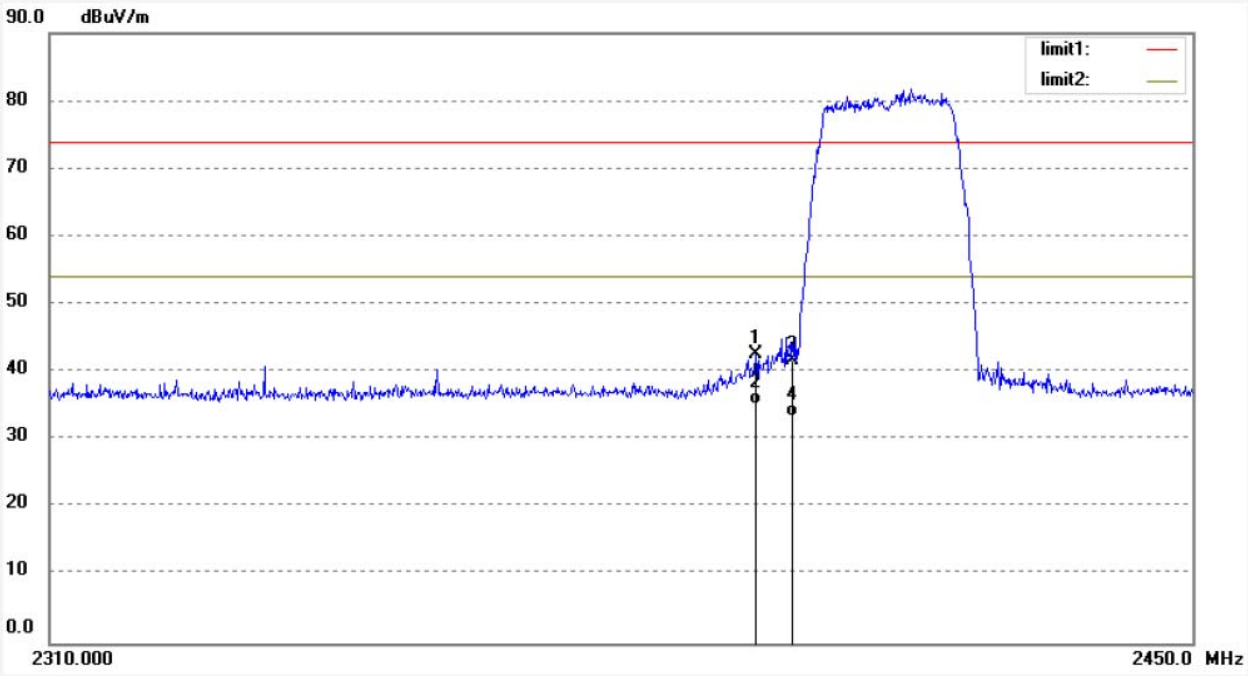
Fax:+86-0755-26503396

Job No.: alen #4589
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2412MHz(802.11g)
Model: M7XX
Manufacturer: SungWorld

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/45/37
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2395.680	49.44	-6.76	42.68	74.00	-31.32	peak			
2	2395.680	42.03	-6.76	35.27	54.00	-18.73	peak			
3	2400.020	48.43	-6.76	41.67	74.00	-32.33	peak			
4	2400.020	40.21	-6.76	33.45	54.00	-20.55	peak			

Note: Average measurement with peak detection at No.2&4

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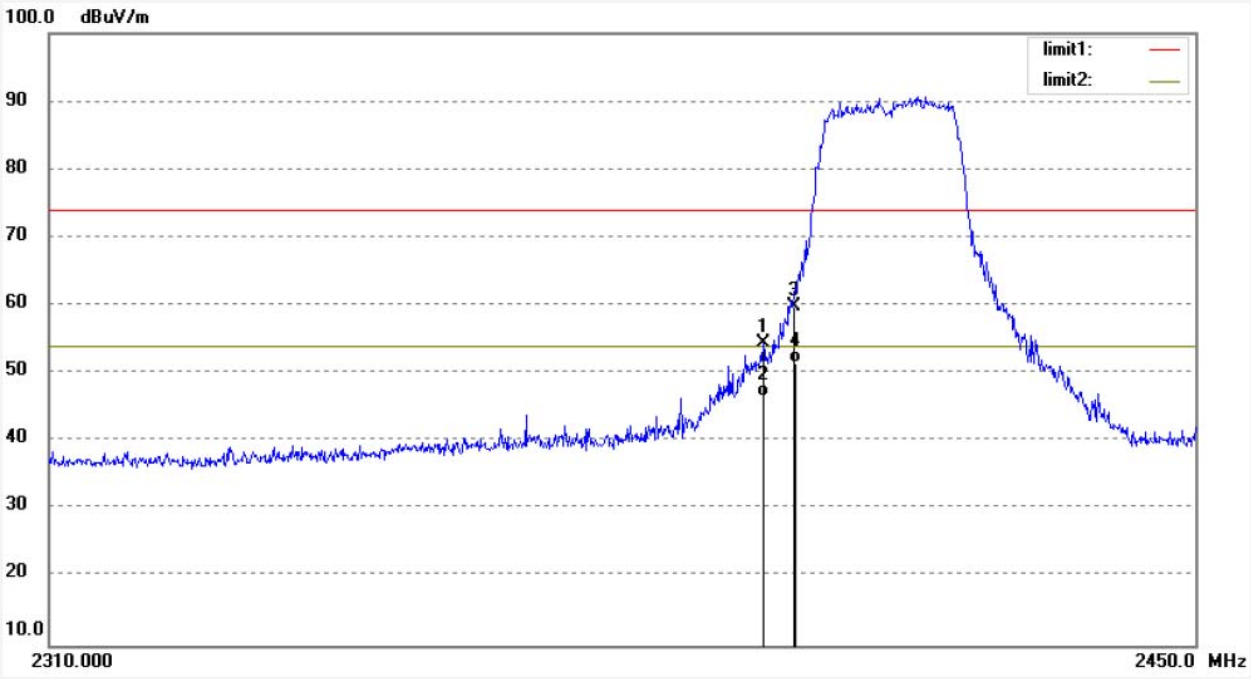
Job No.: alen #4588
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2412MHz(802.11g)
Model: M7XX
Manufacturer: SungWorld

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/44/28
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2396.380	61.12	-6.76	54.36	74.00	-19.64	peak			
2	2396.380	53.24	-6.76	46.48	54.00	-7.52	peak			
3	2400.020	66.59	-6.76	59.83	74.00	-14.17	peak			
4	2400.020	58.23	-6.76	51.47	54.00	-2.53	peak			

Note: Average measurement with peak detection at No.2&4

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Site: 1# Chamber
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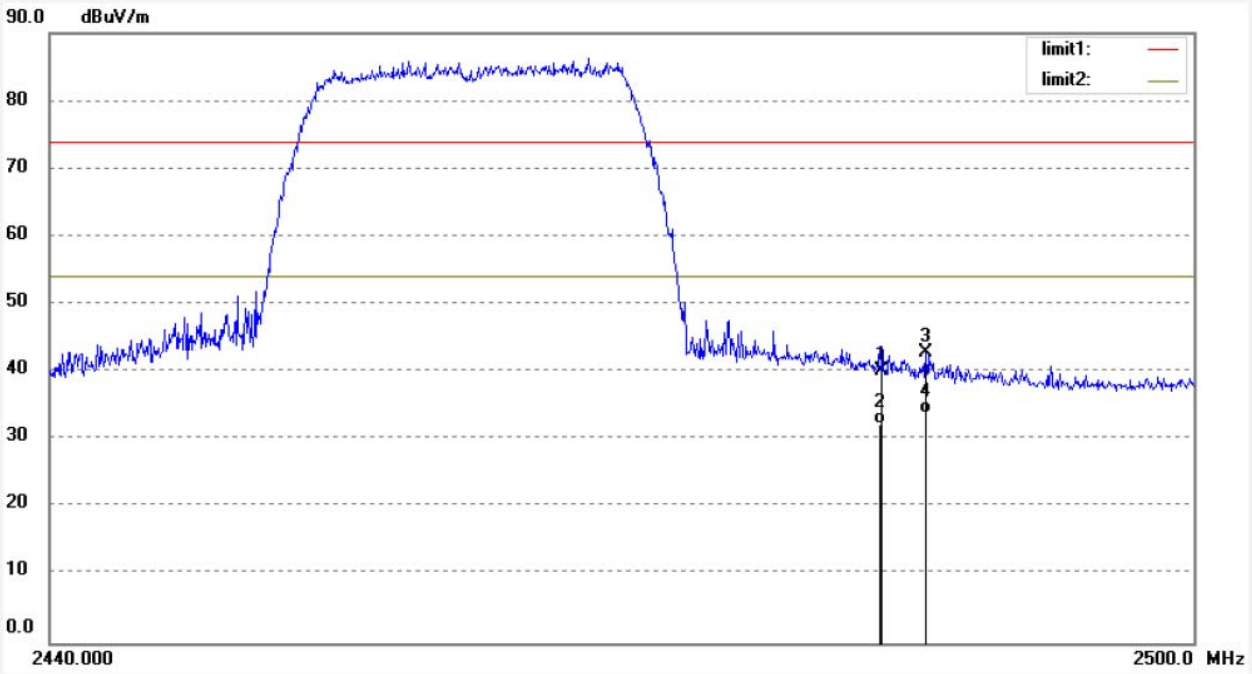
Fax:+86-0755-26503396

Job No.: alen #4586
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2462MHz(802.11g)
Model: M7XX
Manufacturer: SungWorld

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/41/23
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	46.73	-6.54	40.19	74.00	-33.81	peak			
2	2483.500	38.86	-6.54	32.32	54.00	-21.68	peak			
3	2485.840	49.37	-6.54	42.83	74.00	-31.17	peak			
4	2485.840	40.35	-6.54	33.81	54.00	-20.19	peak			

Note: Average measurement with peak detection at No.2&4

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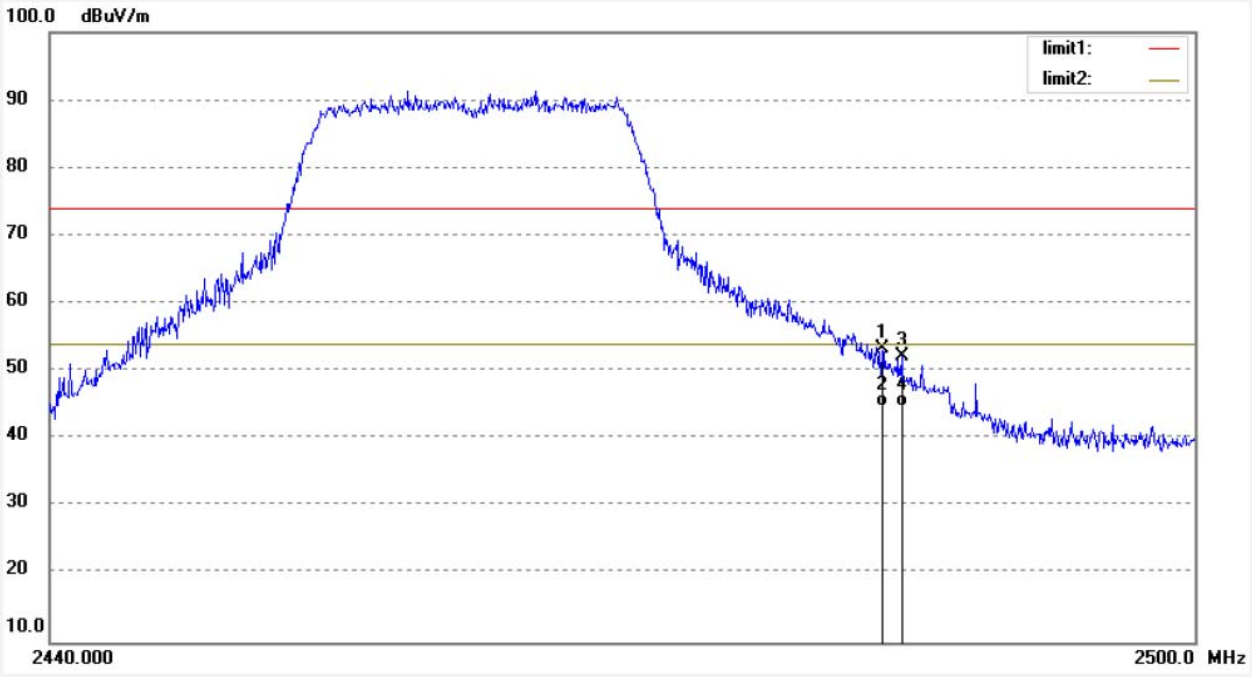
Job No.: alen #4587
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2462MHz(802.11g)
Model: M7XX
Manufacturer: SungWorld

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/42/26
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	59.74	-6.54	53.20	74.00	-20.80	peak			
2	2483.500	51.36	-6.54	44.82	54.00	-9.18	peak			
3	2484.520	58.78	-6.54	52.24	74.00	-21.76	peak			
4	2484.520	51.23	-6.54	44.69	54.00	-9.31	peak			

Note: Average measurement with peak detection at No.2&4

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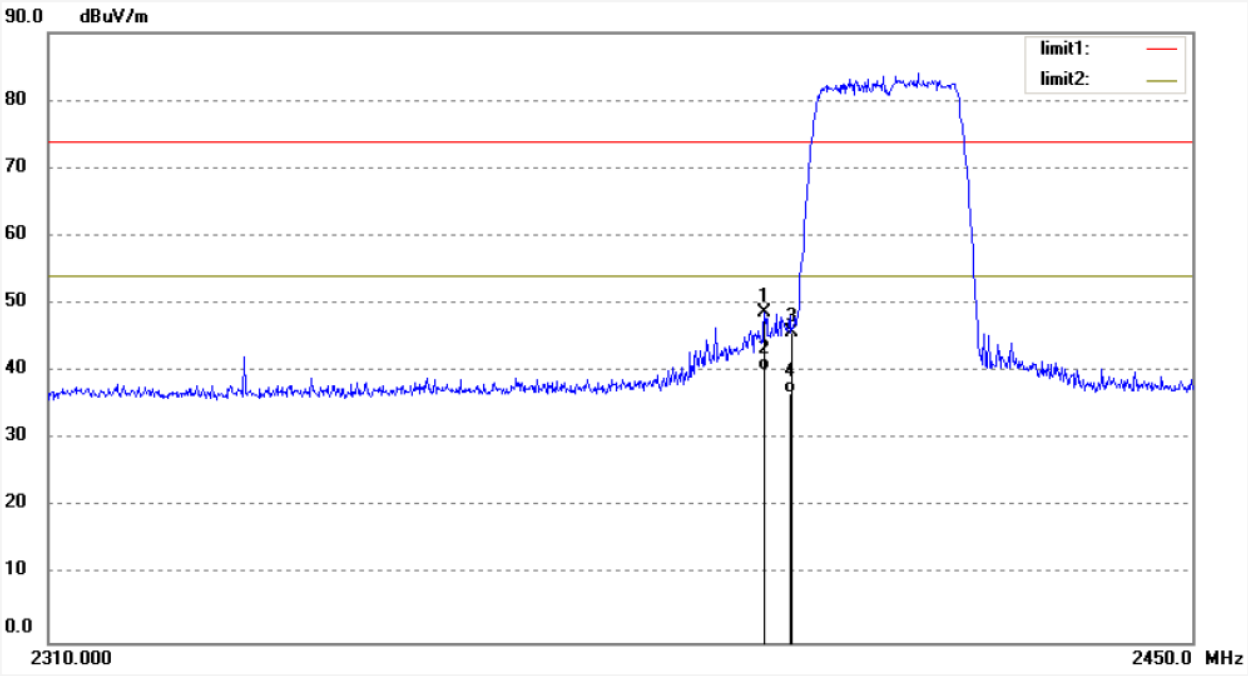
Fax:+86-0755-26503396

Job No.: alen #4590
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2412MHz(802.11n20)
Model: M7XX
Manufacturer: SungWorld

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/47/04
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2396.800	55.41	-6.76	48.65	74.00	-25.35	peak			
2	2396.800	46.89	-6.76	40.13	54.00	-13.87	peak			
3	2400.020	52.56	-6.76	45.80	74.00	-28.20	peak			
4	2400.020	43.51	-6.76	36.75	54.00	-17.25	peak			

Note: Average measurement with peak detection at No.2&4

ACCURATE TECHNOLOGY CO., LTD.
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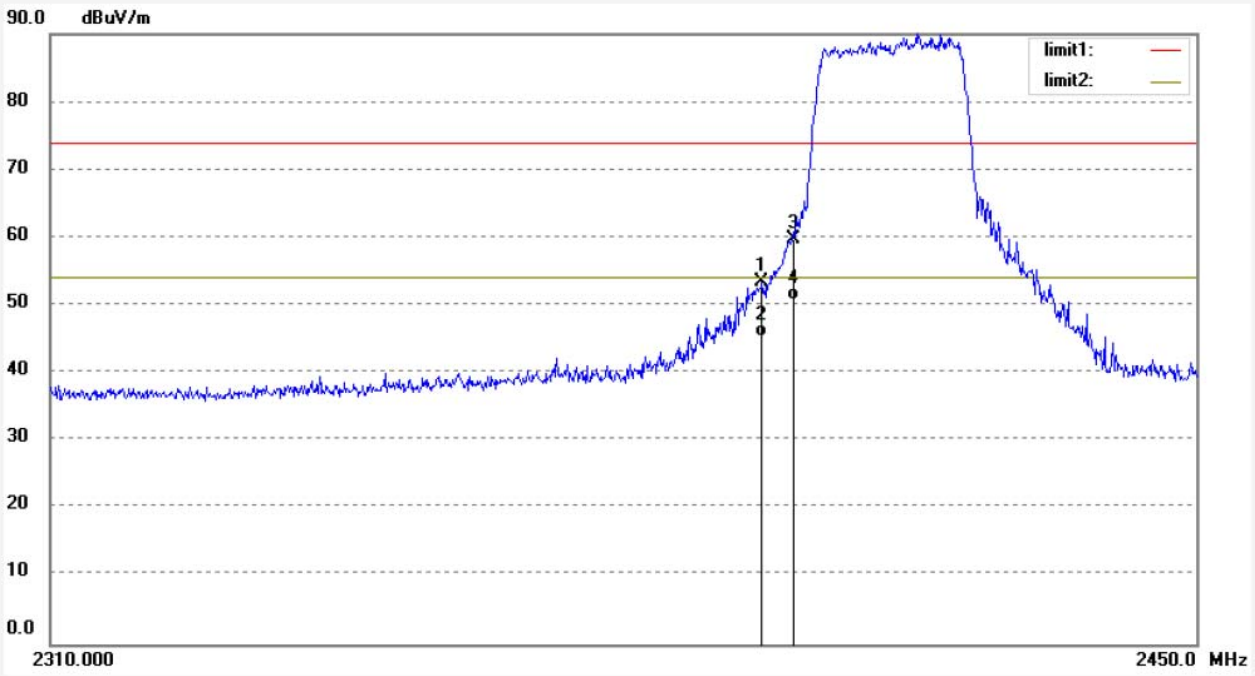
Job No.: alen #4591
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2412MHz(802.11n20)
Model: M7XX
Manufacturer: SungWorld

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/48/12
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2396.100	60.28	-6.76	53.52	74.00	-20.48	peak			
2	2396.100	52.12	-6.76	45.36	54.00	-8.64	peak			
3	2399.740	66.39	-6.76	59.63	74.00	-14.37	peak			
4	2399.740	57.54	-6.76	50.78	54.00	-3.22	peak			

Note: Average measurement with peak detection at No.2&4

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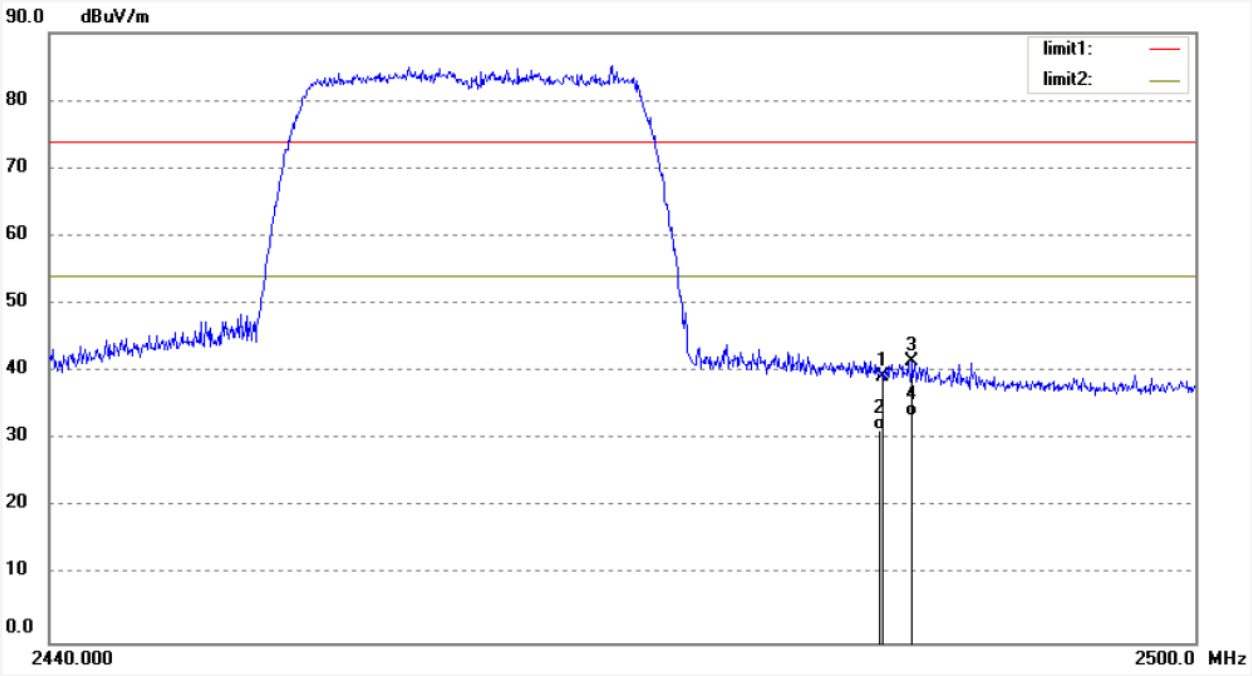
Fax:+86-0755-26503396

Job No.: alen #4593
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2462MHz(802.11n20)
Model: M7XX
Manufacturer: SungWorld

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/51/40
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	45.86	-6.54	39.32	74.00	-34.68	peak			
2	2483.500	38.01	-6.54	31.47	54.00	-22.53	peak			
3	2485.060	48.05	-6.54	41.51	74.00	-32.49	peak			
4	2485.060	40.02	-6.54	33.48	54.00	-20.52	peak			

Note: Average measurement with peak detection at No.2&4

ACCURATE TECHNOLOGY CO., LTD.
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Site: 1# Chamber
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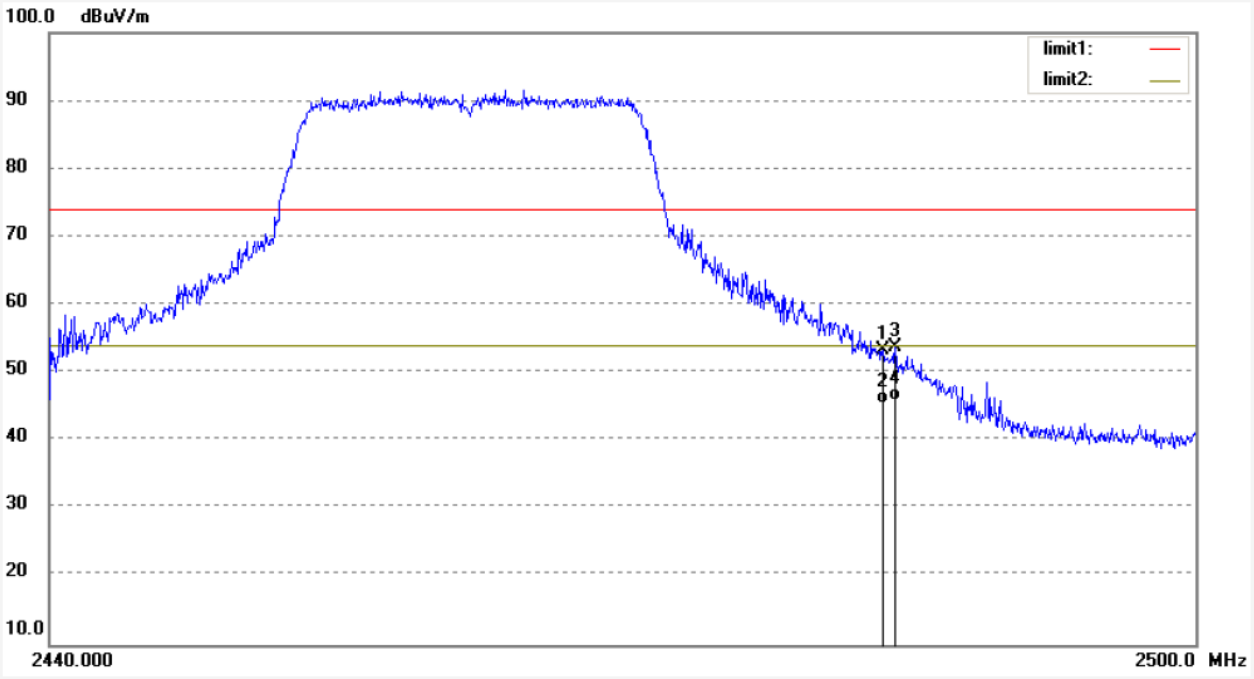
Job No.: alen #4592
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2462MHz(802.11n20)
Model: M7XX
Manufacturer: SungWorld

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/50/28
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	59.90	-6.54	53.36	74.00	-20.64	peak			
2	2483.500	52.01	-6.54	45.47	54.00	-8.53	peak			
3	2484.160	60.41	-6.54	53.87	74.00	-20.13	peak			
4	2484.160	52.35	-6.54	45.81	54.00	-8.19	peak			

Note: Average measurement with peak detection at No.2&4

ACCURATE TECHNOLOGY CO., LTD.
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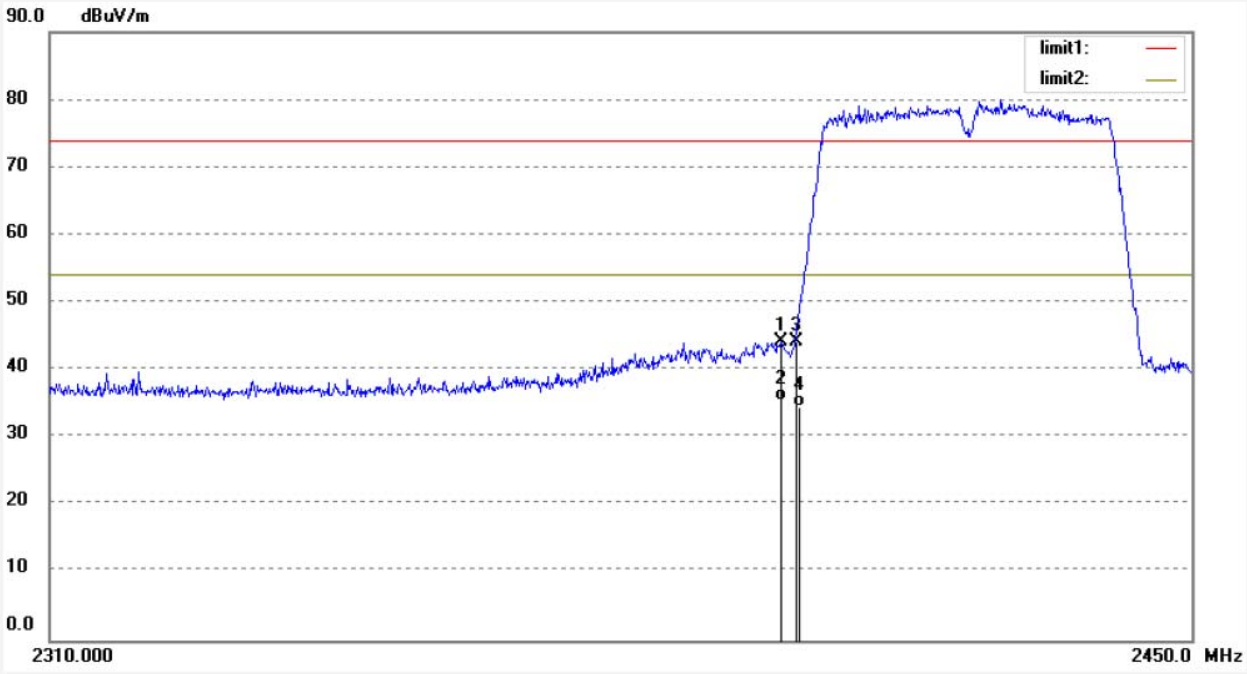
Fax:+86-0755-26503396

Job No.: alen #4597
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MID
Mode: TX 2422MHz(802.11n40)
Model: M7XX
Manufacturer: SungWorld

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 14/10/14/
Time: 9/58/40
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20141876



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2398.760	51.08	-6.76	44.32	74.00	-29.68	peak			
2	2398.760	42.13	-6.76	35.37	54.00	-18.63	peak			
3	2400.580	50.95	-6.76	44.19	74.00	-29.81	peak			
4	2400.580	41.36	-6.76	34.60	54.00	-19.40	peak			

Note: Average measurement with peak detection at No.2&4