

APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
NET PROFIT GLOBAL COMPANY LIMITED

Light Strip

Model No.: S-01

FCC ID: 2AOW9S-01

Prepared for : NET PROFIT GLOBAL COMPANY LIMITED
Address : RM 1421-22 14/F BLK A HI-TECH IND CTR, TSUEN
WAN, N.T, HONG KONG, China

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Report No. : ATE20182211
Date of Test : Dec. 26, 2018-Dec. 28, 2018
Date of Report : Dec. 29, 2018

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Test Report Certification

Applicant : NET PROFIT GLOBAL COMPANY LIMITED
Address : RM 1421-22 14/F BLK A HI-TECH IND CTR, TSUEN WAN, N.T,
HONG KONG, China
Product : Light Strip
Model No. : S-01
Trade name : n.a

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of Aug. 24, 2018 KDB558074 D01 DTS Meas Guidance v05 for compliance to FCC 47CFR 15.247 requirements.

The device described above is tested by SHENZHEN 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 SHENZHEN 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 SHENZHEN ACCURATE TECHNOLOGY CO., LTD.

Date of Test : Dec. 26, 2018-Dec. 28, 2018
Date of Report: Dec. 29, 2018

Prepared by :



(Tim Wang, Engineer)

Approved & Authorized Signer :


(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Light Strip
Model Number	:	S-01
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): 9
Antenna Gain	:	0dBi
Type of Antenna	:	PCB Antenna
Power Supply	:	DC 5V(Powered by USB port)
Data Rate	:	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: up to 150Mbps
Modulation Type	:	DSSS, OFDM
Applicant	:	NET PROFIT GLOBAL COMPANY LIMITED
Address	:	RM 1421-22 14/F BLK A HI-TECH IND CTR, TSUEN WAN, N.T, HONG KONG, China
Date of sample received	:	Dec. 26, 2018
Date of Test	:	Dec. 26, 2018-Dec. 28, 2018

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

AC/DC Power Adapter
(provided by laboratory):

M/N: TEKA006-0501000UKU
Input: 100-240V~50/60Hz 0.3A
Output: DC 5V/1A

Notebook PC:

Manufacturer: Lenovo
M/N: ThinkPad X240
S/N: n.a

1.4. Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, 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. 06, 2018	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 06, 2018	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 06, 2018	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 06, 2018	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 06, 2018	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 06, 2018	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 06, 2018	1 Year
Open Switch and Control Unit	Rohde&Schwarz	OSP120 + OSP-B157	101244 + 100866	Jan. 06, 2018	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 06, 2018	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 06, 2018	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 06, 2018	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 06, 2018	1 Year

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

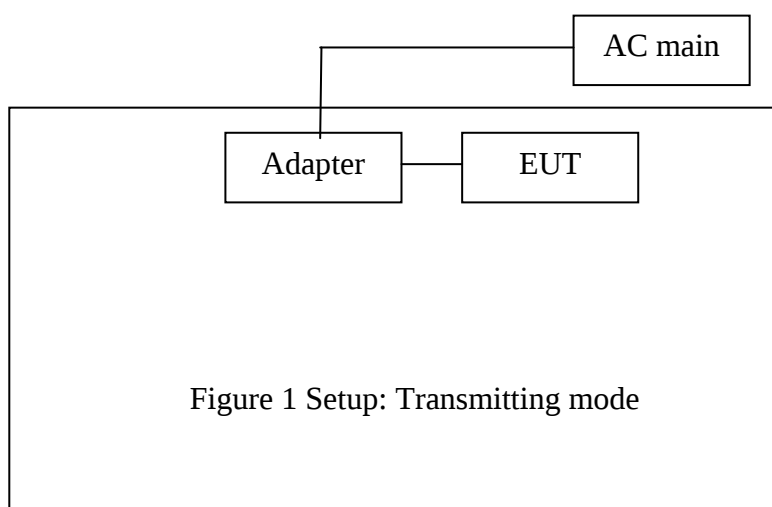
3.802.11n (20MHz) Transmitting mode

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

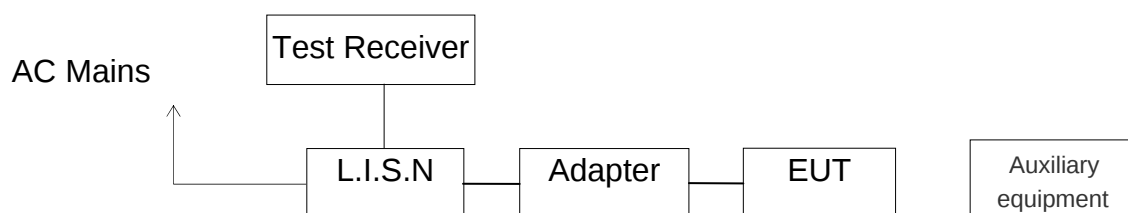


4. TEST PROCEDURES AND RESULTS

FCC&IC Rules	Description of Test	Result
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
KDB558074 D01 DTS Meas Guidance v04	Duty cycle	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
KDB558074 D01 DTS Meas Guidance v04	99% Occupied Bandwidth	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. POWER LINE CONDUCTED MEASUREMENT

5.1. Block Diagram of Test Setup



(EUT: Light Strip)

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 0.8 m 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 C63.10: 2013 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. DATA SAMPLE

Frequency (MHz)	Quasi Peak Level (dB μ V)	Average Level (dB μ V)	Transducer value (dB)	QuasiPeak Result (dB μ V)	Average Result (dB μ V)	Quasi Peak Limit (dB μ V)	Average Limit (dB μ V)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	29.4	18.3	11.1	40.5	29.4	56.0	56.0	15.5	16.6	Pass

Transducer value = Insertion loss of LISN + Cable Loss

Result = Quasi-peak Level/Average Level + Transducer value

Limit = Limit stated in standard

Calculation Formula:

Margin = Limit – Reading level value – Transducer value

5.7. Power Line Conducted Emission Measurement Results

PASS.

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

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

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

We tested the conducted emission of high and low voltage mode and recorded the worst mode data. All data was recorded in the Quasi-peak and average detection mode.

Test mode : WIFI operation (worse case)								
Test Voltage: 120V/60Hz								
MEASUREMENT RESULT: "F-2211-2_fin"								
2018-12-27 9:21								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.154500	58.00	10.8	66	7.8	QP	L1	GND	
0.375000	43.90	10.9	58	14.5	QP	L1	GND	
1.104000	32.40	11.2	56	23.6	QP	L1	GND	
2.319000	29.00	11.3	56	27.0	QP	L1	GND	
5.289000	23.80	11.4	60	36.2	QP	L1	GND	
25.566000	22.50	11.7	60	37.5	QP	L1	GND	
MEASUREMENT RESULT: "F-2211-2_fin2"								
2018-12-27 9:21								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.150000	38.50	10.8	56	17.5	AV	L1	GND	
0.528000	23.20	11.0	46	22.8	AV	L1	GND	
1.189500	20.40	11.2	46	25.6	AV	L1	GND	
2.134500	17.70	11.3	46	28.3	AV	L1	GND	
5.460000	10.60	11.5	50	39.4	AV	L1	GND	
24.567000	6.50	11.7	50	43.5	AV	L1	GND	
MEASUREMENT RESULT: "F-2211-1_fin"								
2018-12-27 9:18								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.172500	51.90	10.8	65	12.9	QP	N	GND	
0.429000	34.90	11.0	57	22.4	QP	N	GND	
1.500000	31.00	11.2	56	25.0	QP	N	GND	
2.859000	29.30	11.3	56	26.7	QP	N	GND	
7.012500	23.50	11.5	60	36.5	QP	N	GND	
25.305000	22.90	11.7	60	37.1	QP	N	GND	
MEASUREMENT RESULT: "F-2211-1_fin2"								
2018-12-27 9:18								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.150000	37.80	10.8	56	18.2	AV	N	GND	
0.514500	22.10	11.0	46	23.9	AV	N	GND	
1.027500	20.50	11.1	46	25.5	AV	N	GND	
2.125500	18.20	11.3	46	27.8	AV	N	GND	
5.433000	10.60	11.5	50	39.4	AV	N	GND	
25.719000	8.00	11.7	50	42.0	AV	N	GND	

The spectral diagrams are attached as below.

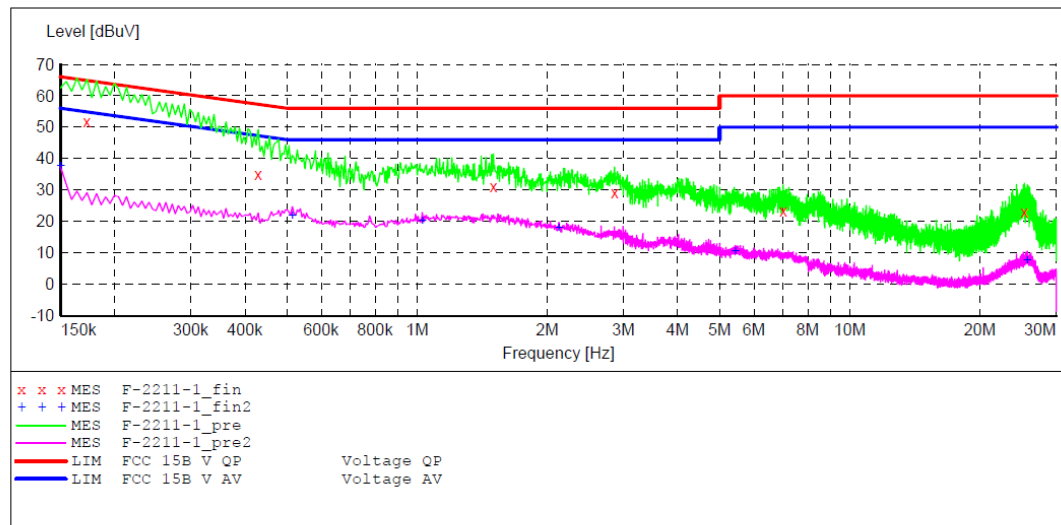
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Light Strip M/N:S-01
Applicant: NET PROFIT GLOBAL COMPANY LIMITED
Operating Condition: WIFI OPERATION
Test Site: 1#Shielding Room
Operator: Frank
Test Specification: N 120V/60Hz
Comment: Report NO.:ATE20182211
Start of Test: 2018-12-27 / 9:15:15

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

Short Description: SUB STD VTERM2 1.70
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
Average



MEASUREMENT RESULT: "F-2211-1_fin"

2018-12-27 9:18

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.172500	51.90	10.8	65	12.9	QP	N	GND
0.429000	34.90	11.0	57	22.4	QP	N	GND
1.500000	31.00	11.2	56	25.0	QP	N	GND
2.859000	29.30	11.3	56	26.7	QP	N	GND
7.012500	23.50	11.5	60	36.5	QP	N	GND
25.305000	22.90	11.7	60	37.1	QP	N	GND

MEASUREMENT RESULT: "F-2211-1_fin2"

2018-12-27 9:18

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	37.80	10.8	56	18.2	AV	N	GND
0.514500	22.10	11.0	46	23.9	AV	N	GND
1.027500	20.50	11.1	46	25.5	AV	N	GND
2.125500	18.20	11.3	46	27.8	AV	N	GND
5.433000	10.60	11.5	50	39.4	AV	N	GND
25.719000	8.00	11.7	50	42.0	AV	N	GND

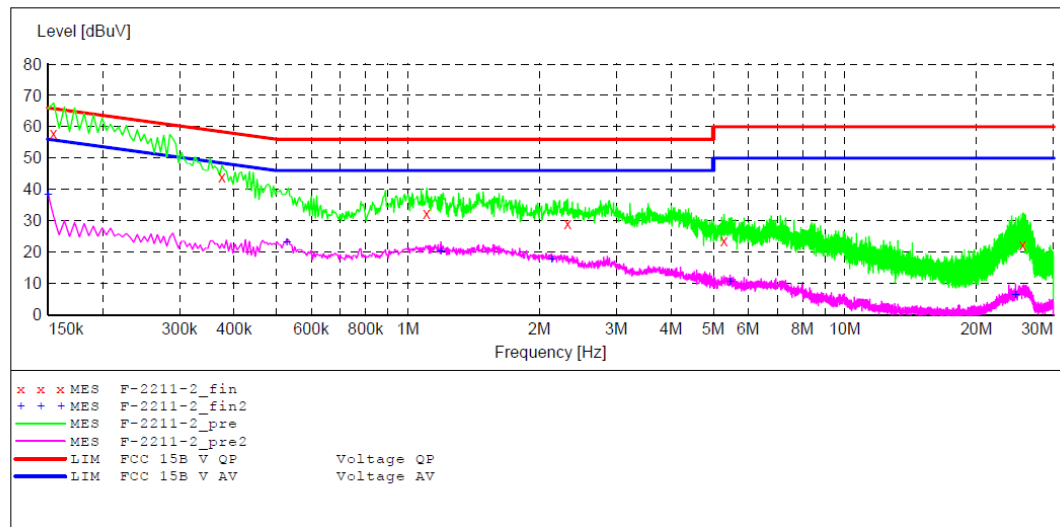
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Light Strip M/N:S-01
Applicant: NET PROFIT GLOBAL COMPANY LIMITED
Operating Condition: WIFI OPERATION
Test Site: 1#Shielding Room
Operator: Frank
Test Specification: L 120V/60Hz
Comment: Report NO.:ATE20182211
Start of Test: 2018-12-27 / 9:19:34

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

Short Description: SUB STD VTERM2 1.70
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
Average



MEASUREMENT RESULT: "F-2211-2_fin"

2018-12-27 9:21

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.154500	58.00	10.8	66	7.8	QP	L1	GND
0.375000	43.90	10.9	58	14.5	QP	L1	GND
1.104000	32.40	11.2	56	23.6	QP	L1	GND
2.319000	29.00	11.3	56	27.0	QP	L1	GND
5.289000	23.80	11.4	60	36.2	QP	L1	GND
25.566000	22.50	11.7	60	37.5	QP	L1	GND

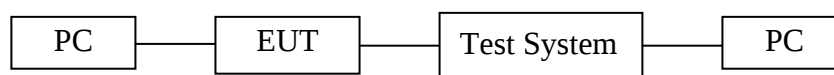
MEASUREMENT RESULT: "F-2211-2_fin2"

2018-12-27 9:21

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	38.50	10.8	56	17.5	AV	L1	GND
0.528000	23.20	11.0	46	22.8	AV	L1	GND
1.189500	20.40	11.2	46	25.6	AV	L1	GND
2.134500	17.70	11.3	46	28.3	AV	L1	GND
5.460000	10.60	11.5	50	39.4	AV	L1	GND
24.567000	6.50	11.7	50	43.5	AV	L1	GND

6. 6DB 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. The Requirement for 5.2(1)

The minimum -6 dB bandwidth shall be 500 kHz.

6.4. 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.

6.5. Operating Condition of EUT

6.5.1. Setup the EUT and simulator as shown as Section 6.1.

6.5.2. Turn on the power of all equipment.

6.5.3. 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.

6.6. Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ 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.

6.7. Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	10.203	> 0.5MHz
Middle	2437	10.115	> 0.5MHz
High	2462	10.159	> 0.5MHz

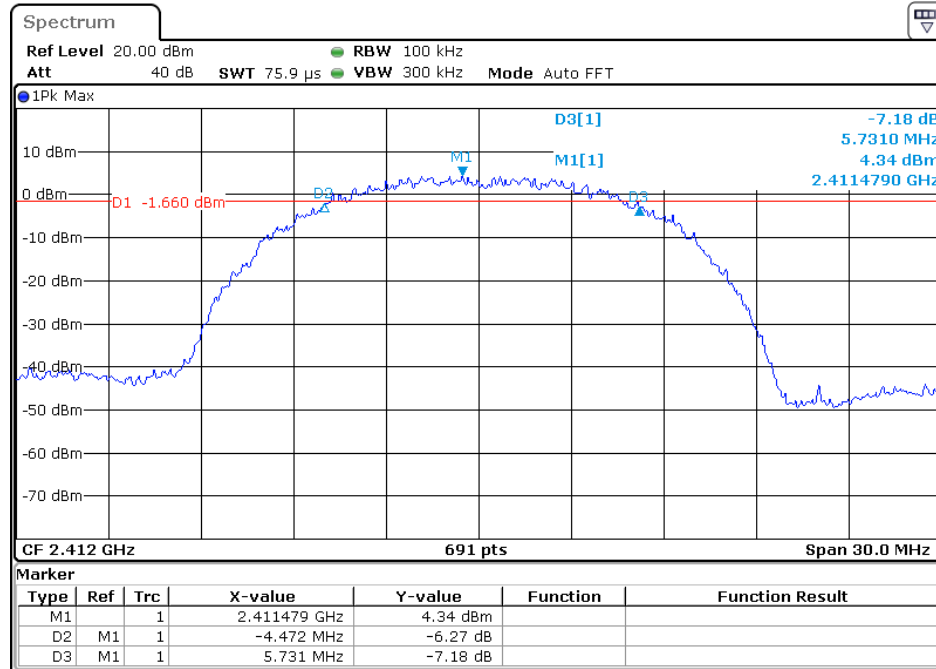
The test was performed with 802.11g			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	16.498	> 0.5MHz
Middle	2437	16.498	> 0.5MHz
High	2462	16.498	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	17.670	> 0.5MHz
Middle	2437	17.757	> 0.5MHz
High	2462	17.757	> 0.5MHz

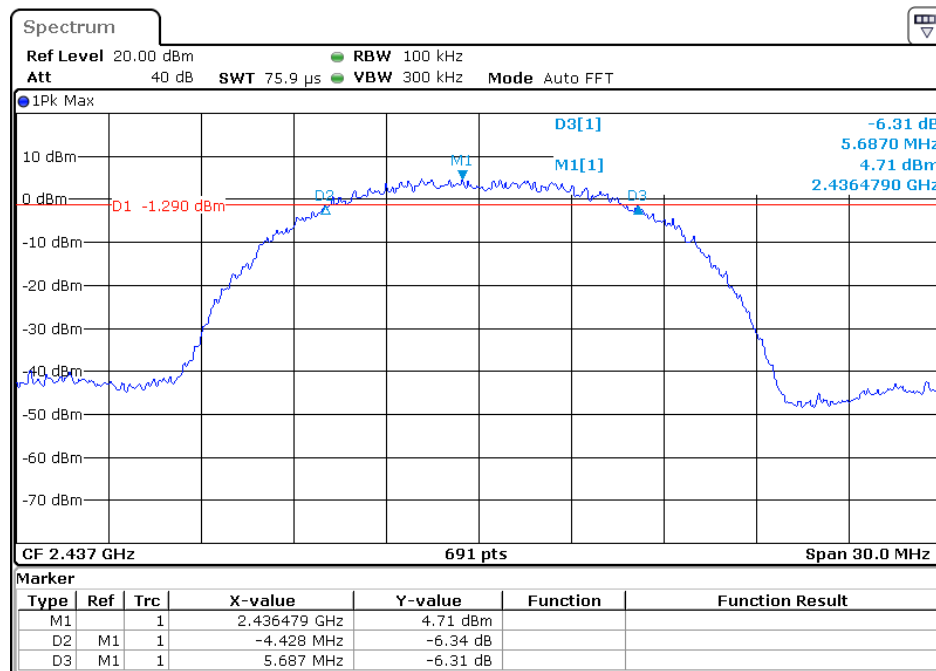
The test was performed with 802.11n (Bandwidth: 40 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2422	36.469	> 0.5MHz
Middle	2437	36.469	> 0.5MHz
High	2452	36.469	> 0.5MHz

The spectrum analyzer plots are attached as below.

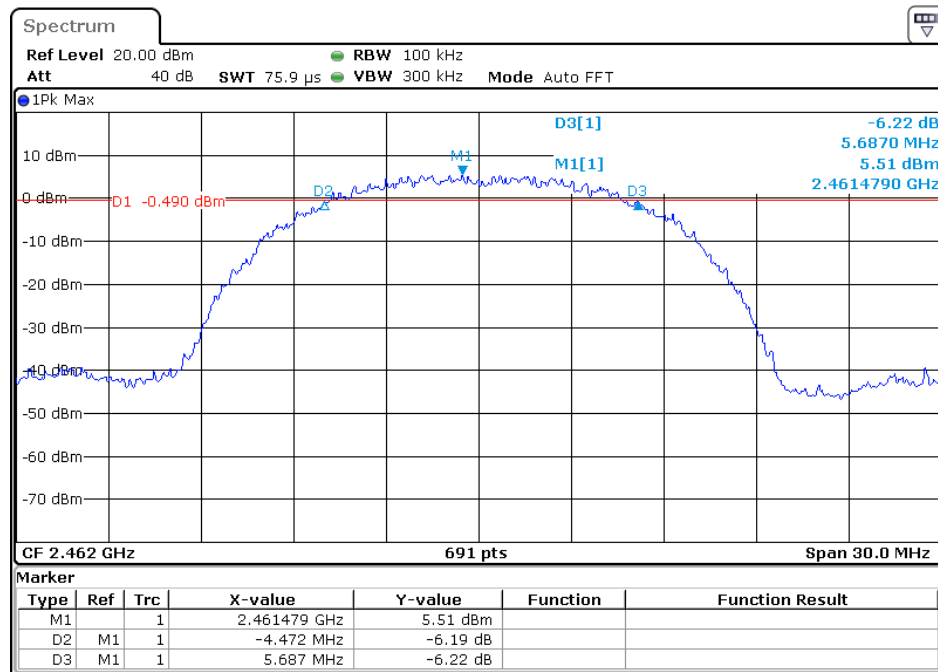
6dB Bandwidth 802.11b Channel Low 2412MHz



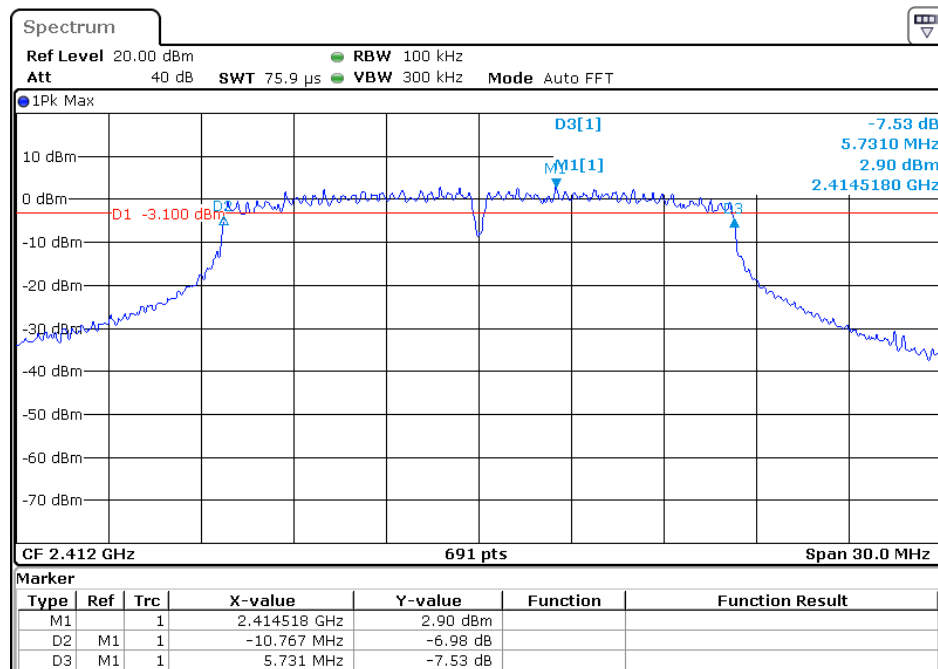
802.11b Channel Middle 2437MHz



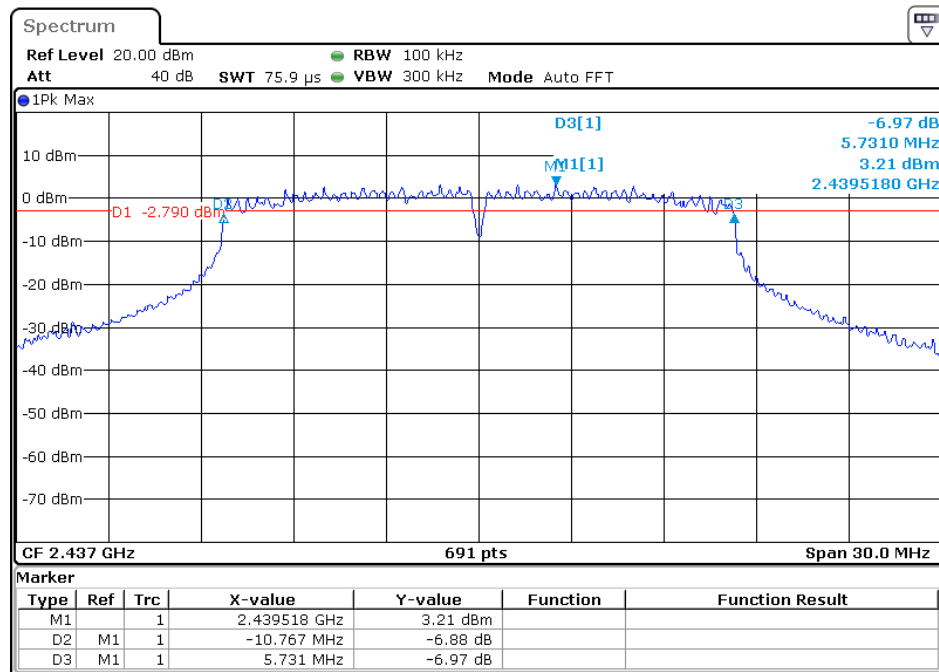
802.11b Channel High 2462MHz



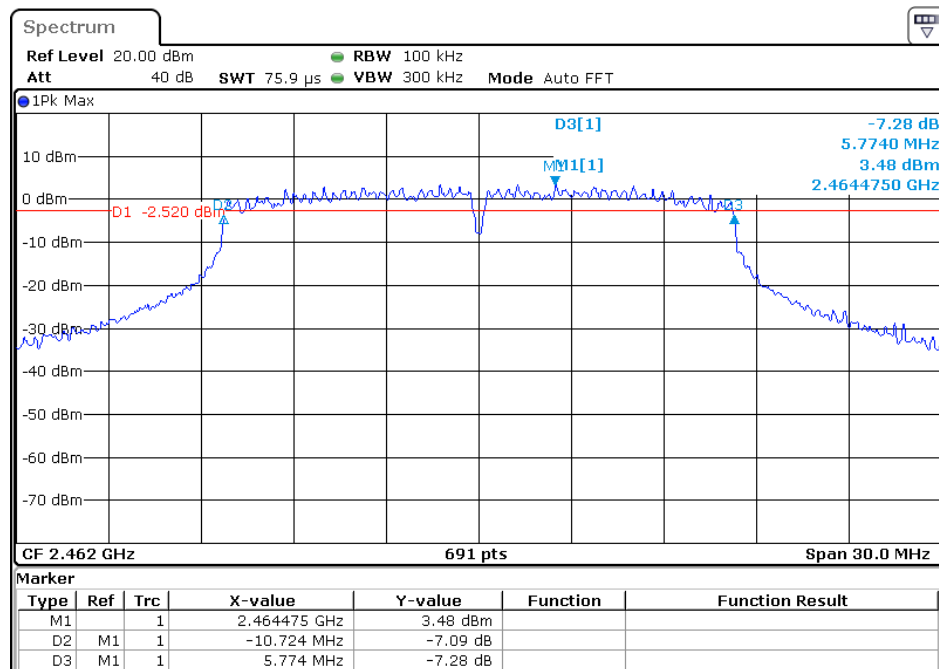
802.11g Channel Low 2412MHz



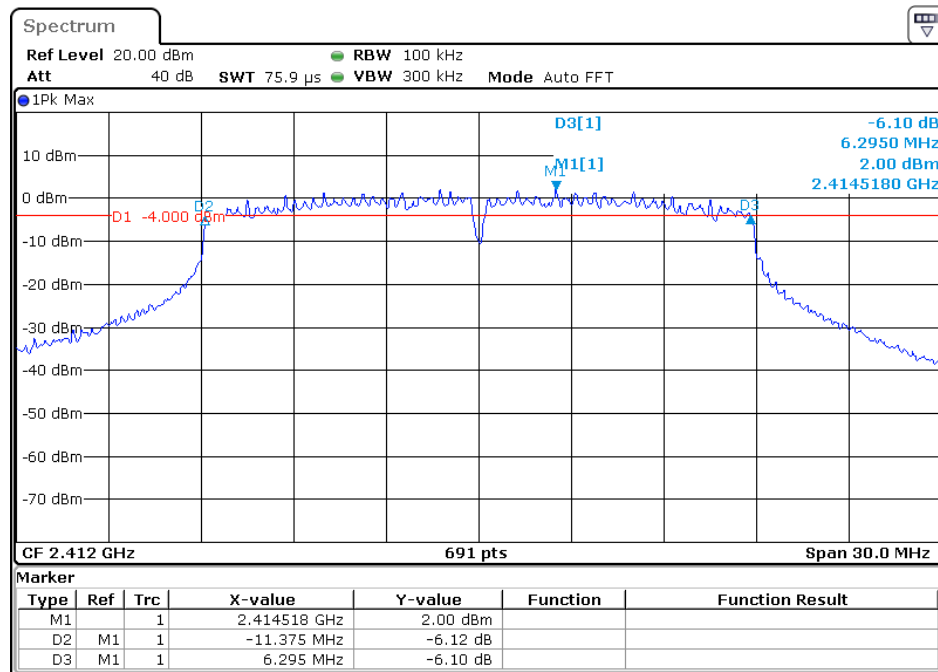
802.11g Channel Middle 2437MHz



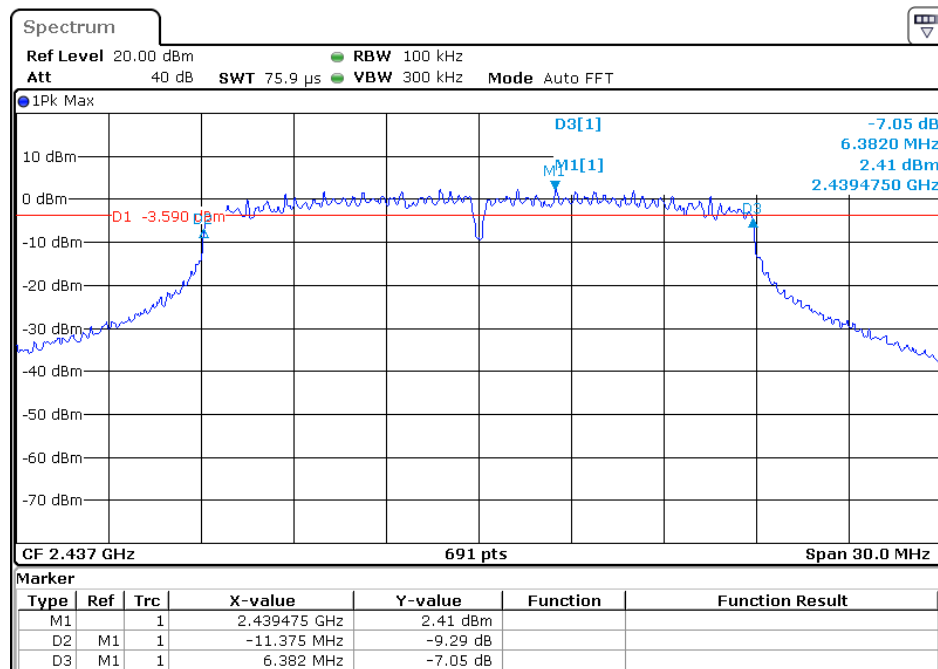
802.11g Channel High 2462MHz



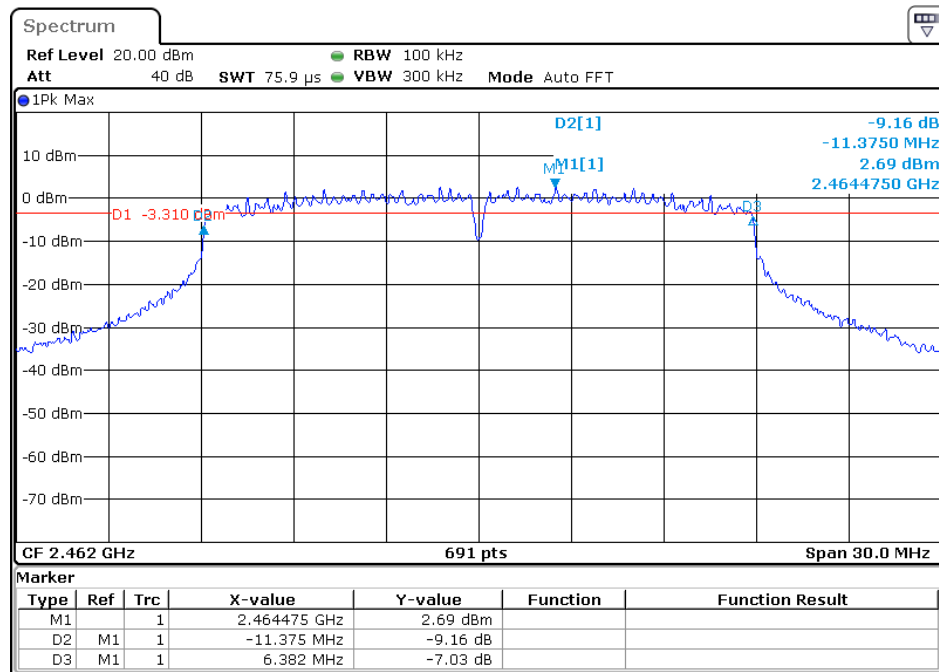
802.11n Channel Low 2412MHz (20MHz)



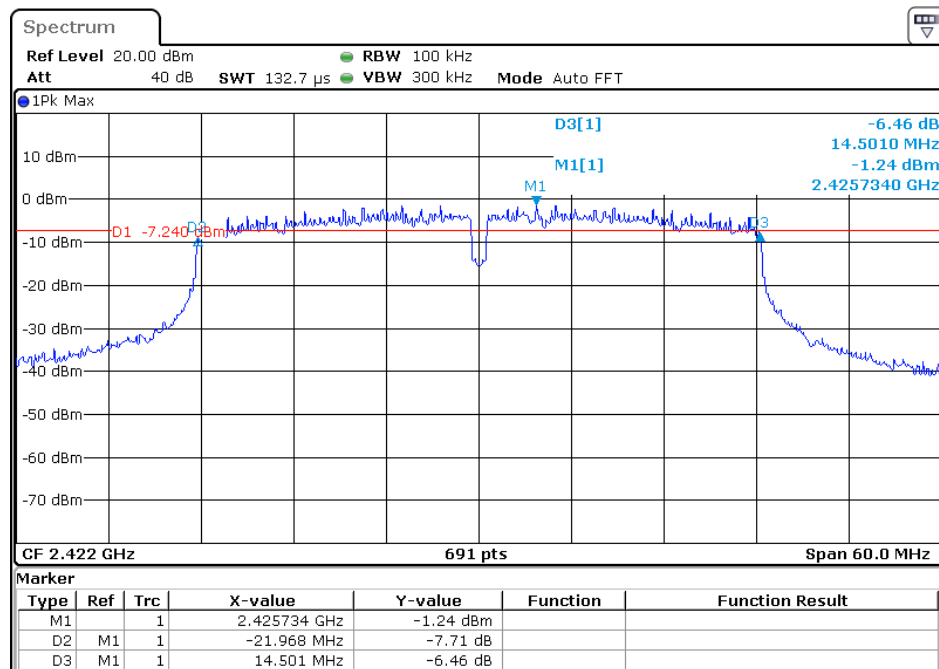
802.11n Channel Middle 2437MHz(20MHz)



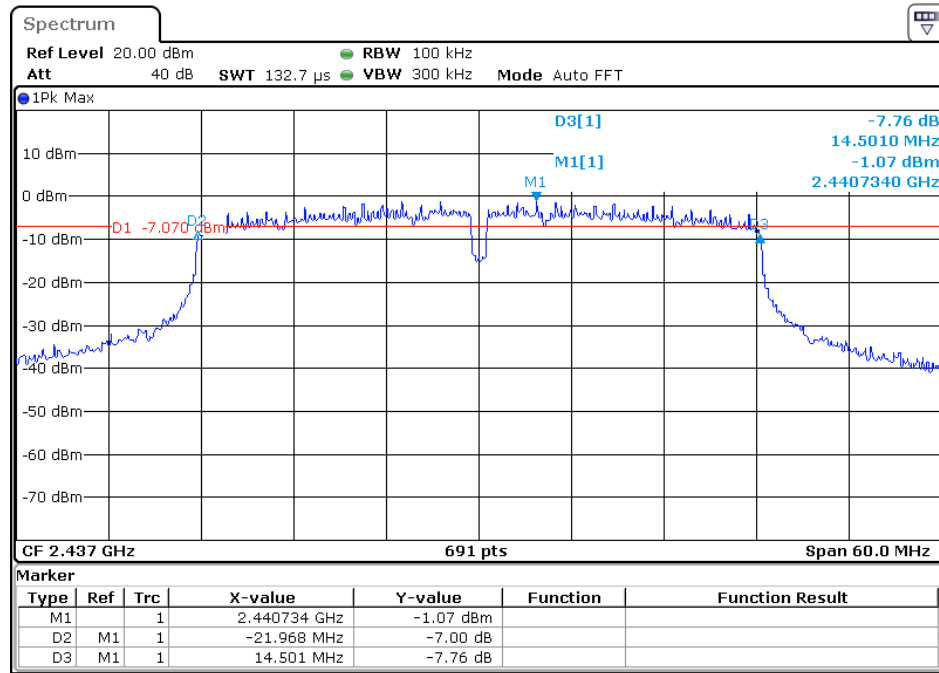
802.11n Channel High 2462MHz(20MHz)



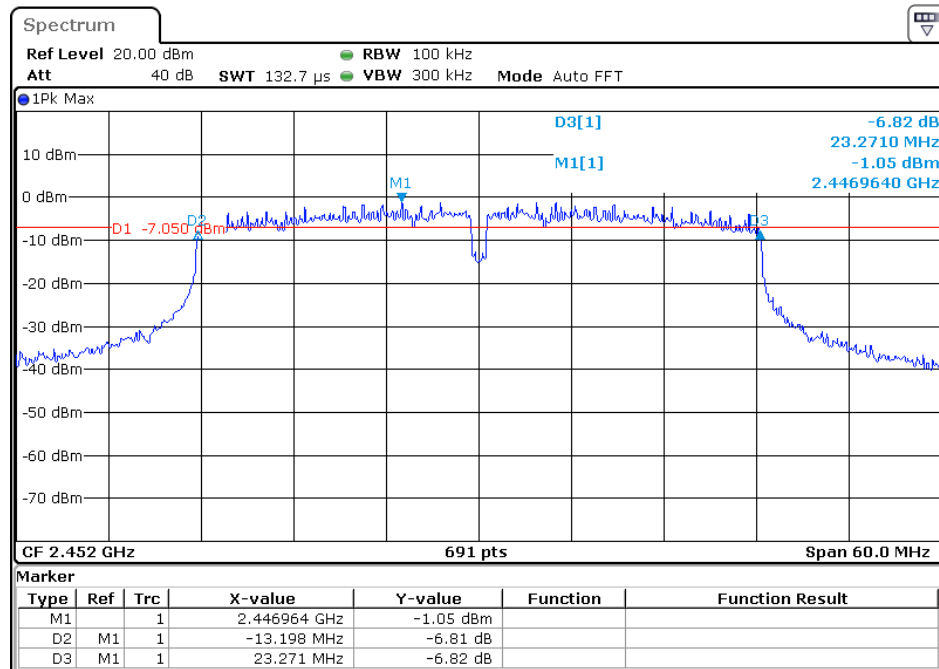
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz (40MHz)

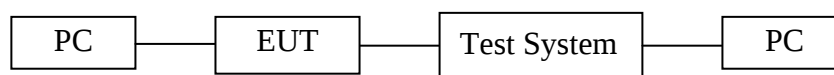


802.11n Channel High 2452MHz(40MHz)



7. DUTY CYCLE MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. 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.

7.3. Operating Condition of EUT

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

7.3.2. Turn on the power of all equipment.

7.3.3. 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.

7.4. Test Procedure

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

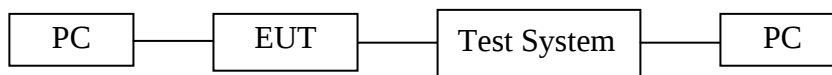
1. A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on- and off-times of the transmitted signal.
2. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on- and off-times of the transmitted signal
 - a. Set the center frequency of the instrument to the centre frequency of the transmission
 - b. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value(10MHz).
 - c. Set detector = Peak or average.
 - d. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100.
(For example, if VBW and/or RBW are limited to 3MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

7.5. Test Result

The manufacturer can set up the duty cycle of 100%,
So we tested the power and PSD at 100% of the duty cycle.

8. MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

8.1. Block Diagram of Test Setup



8.2. 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.

8.3. 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.

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 EUT was tested according to DTS test procedure of Aug. 24, 2018 KDB558 074 D01 DTS Meas Guidance v05 for compliance to FCC 47CFR 15.247 requirements.

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

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

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

8.6.Test Result

Final power= Ave output power+10log(1/ duty cycle)

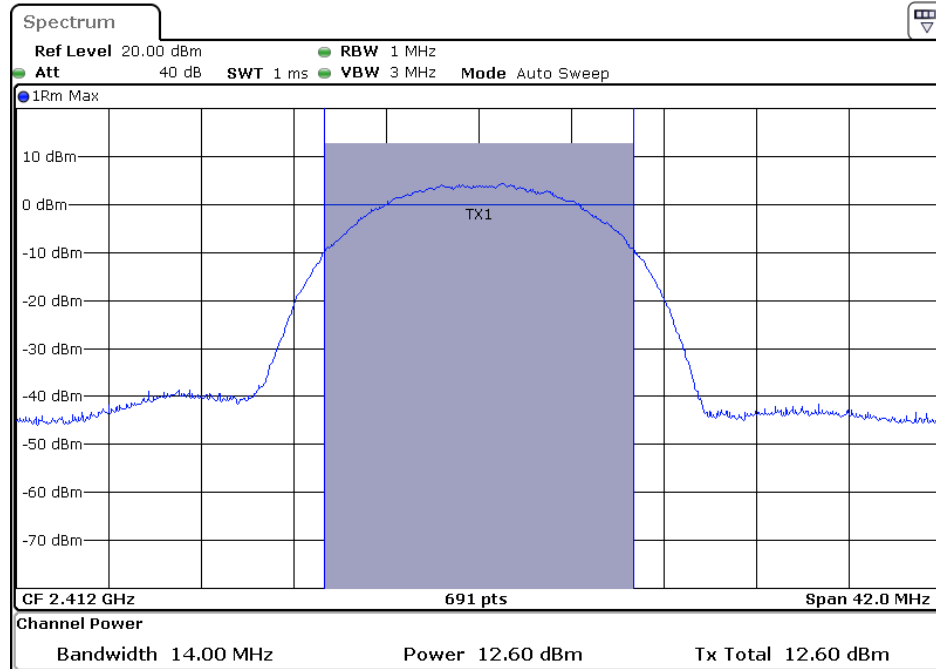
The test was performed with 802.11b					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2412	12.60	0.00	12.60	0.018	30 dBm / 1 W
2437	13.00	0.00	13.00	0.020	30 dBm / 1 W
2462	13.35	0.00	13.35	0.022	30 dBm / 1 W

The test was performed with 802.11g					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2412	14.01	0.00	14.01	0.025	30 dBm / 1 W
2437	14.35	0.00	14.35	0.027	30 dBm / 1 W
2462	14.33	0.00	14.33	0.027	30 dBm / 1 W

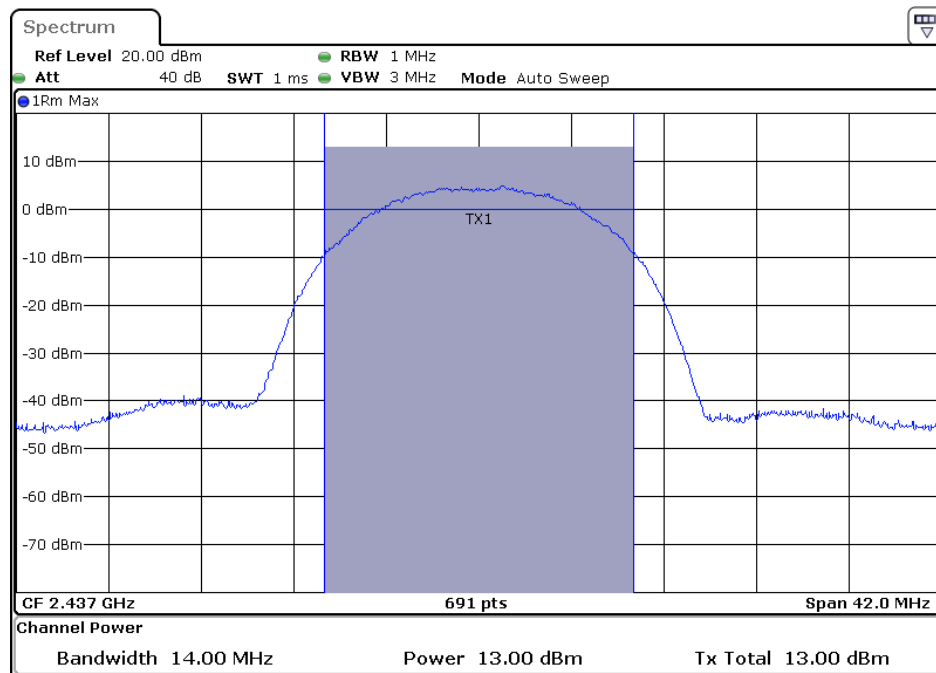
The test was performed with 802.11n(20MHz)					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2412	12.94	0.00	12.94	0.020	30 dBm / 1 W
2437	13.44	0.00	13.44	0.022	30 dBm / 1 W
2462	13.16	0.00	13.16	0.021	30 dBm / 1 W

The test was performed with 802.11n(40MHz)					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2422	12.01	0.00	12.01	0.016	30 dBm / 1 W
2437	11.93	0.00	11.93	0.016	30 dBm / 1 W
2452	12.74	0.00	12.74	0.019	30 dBm / 1 W

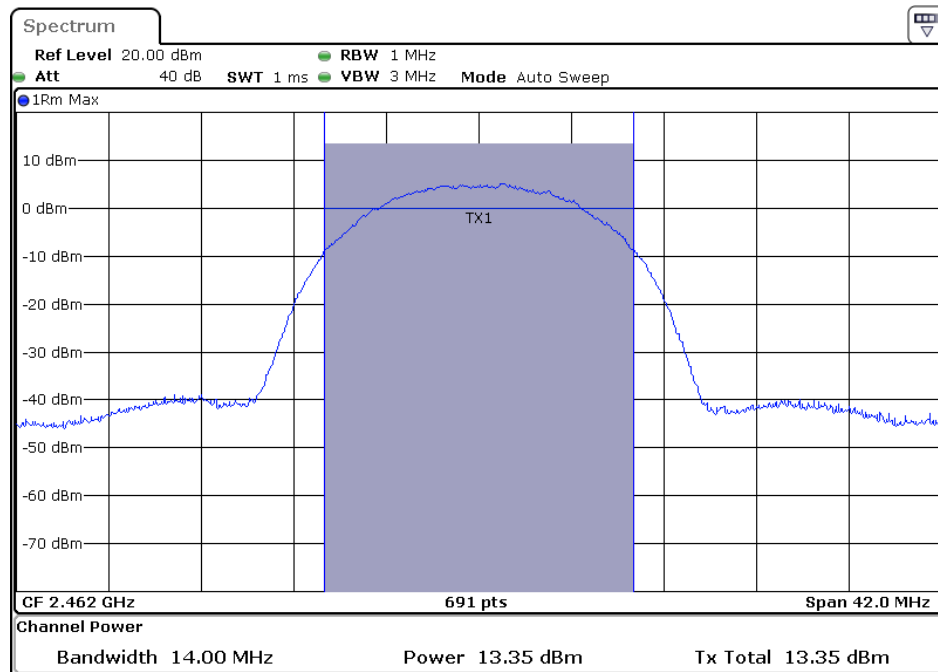
Ave output power 802.11b Channel Low 2412MHz



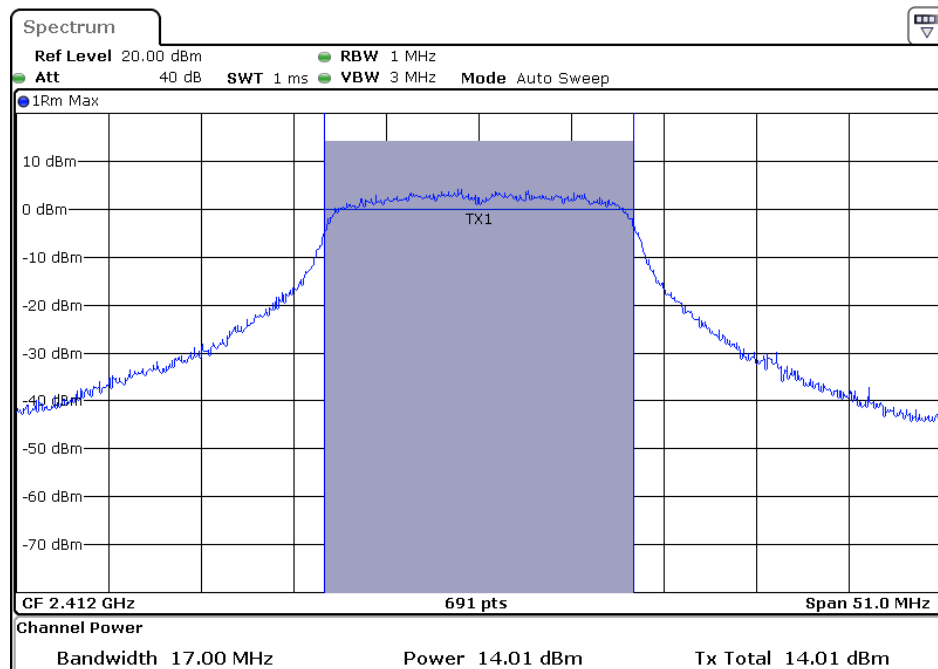
802.11b Channel Middle 2437MHz



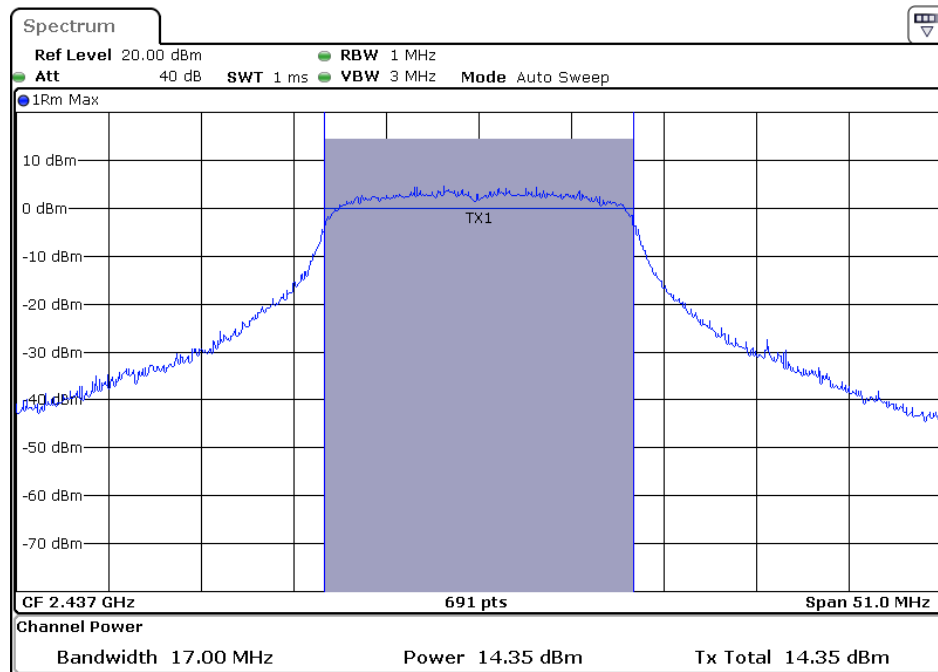
802.11b Channel High 2462MHz



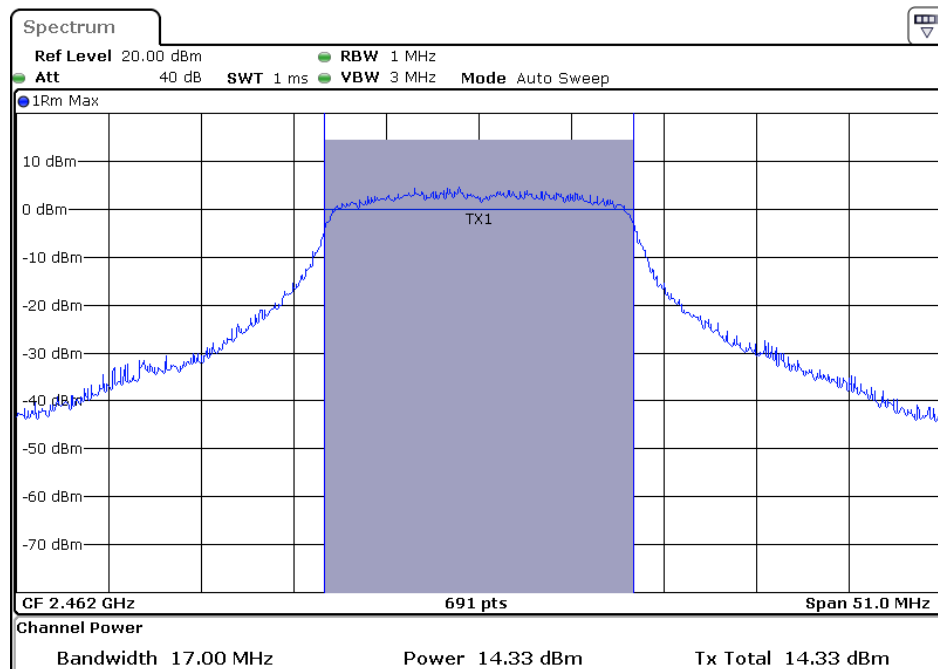
802.11g Channel Low 2412MHz



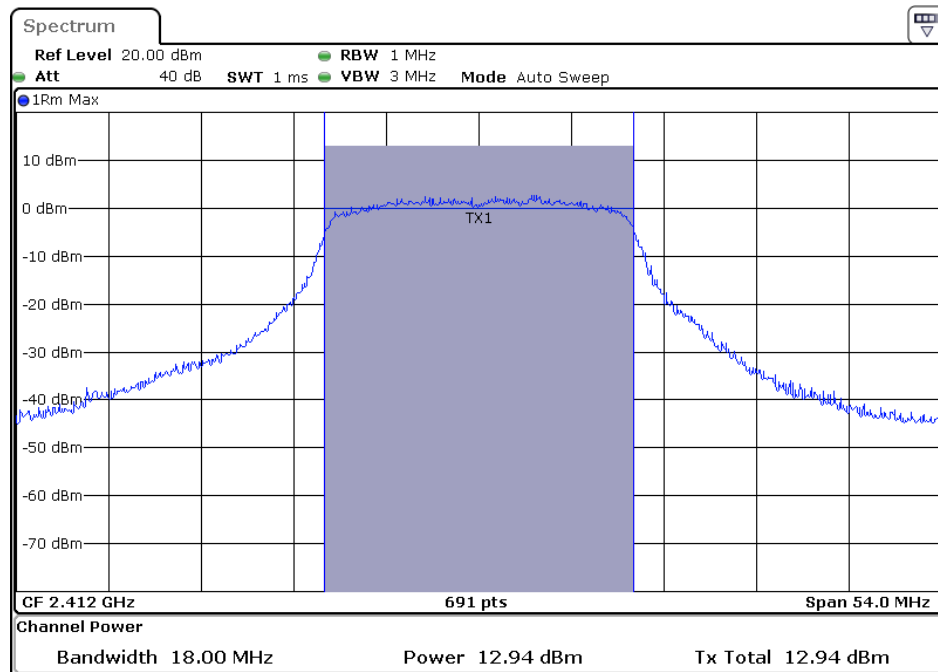
802.11g Channel Middle 2437MHz



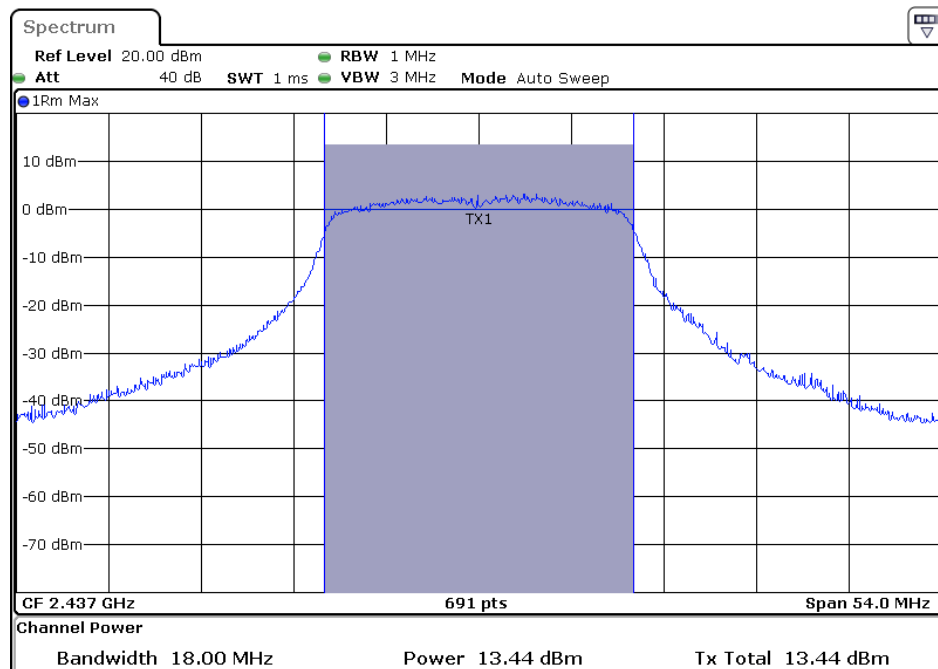
802.11g Channel High 2462MHz



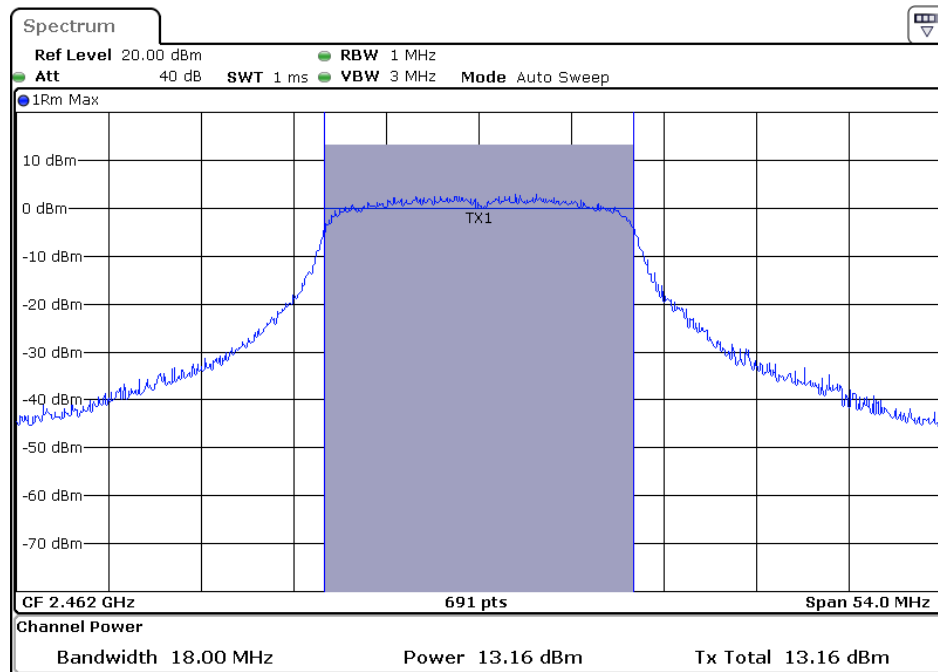
802.11n Channel Low 2412MHz (20MHz)



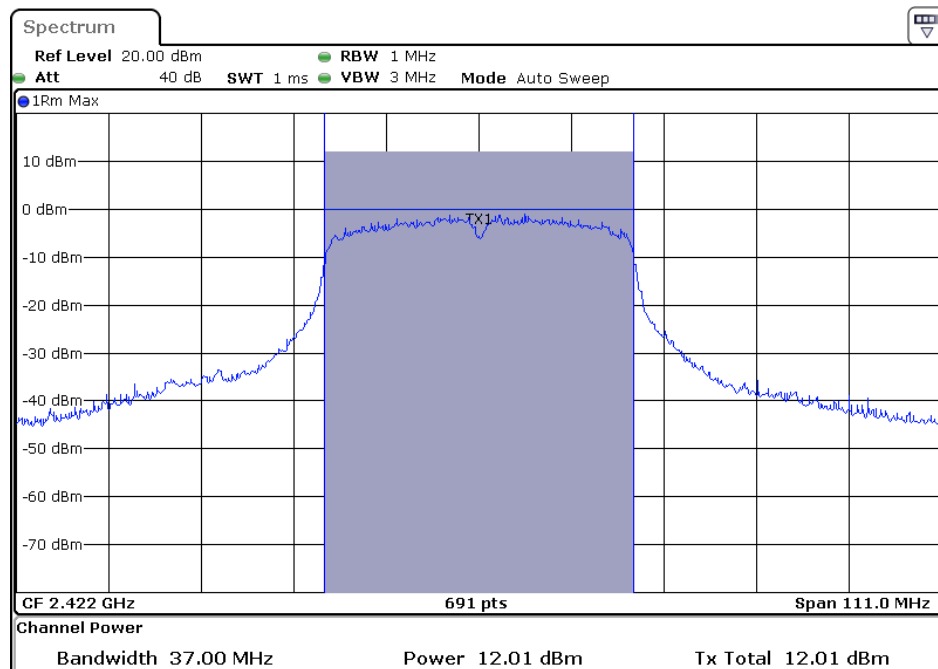
802.11n Channel Middle 2437MHz(20MHz)



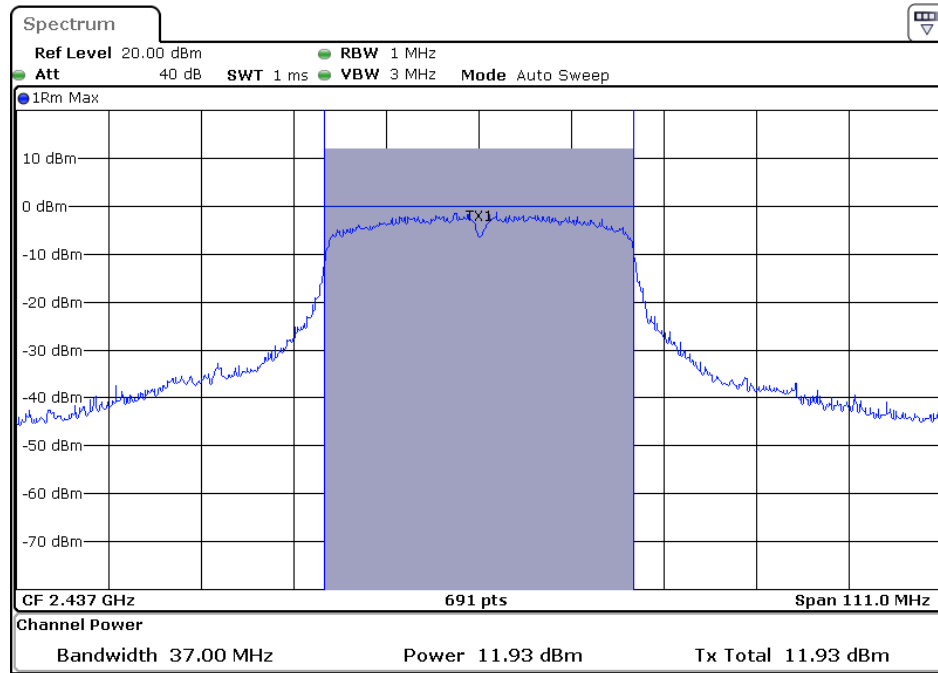
802.11n Channel High 2462MHz(20MHz)



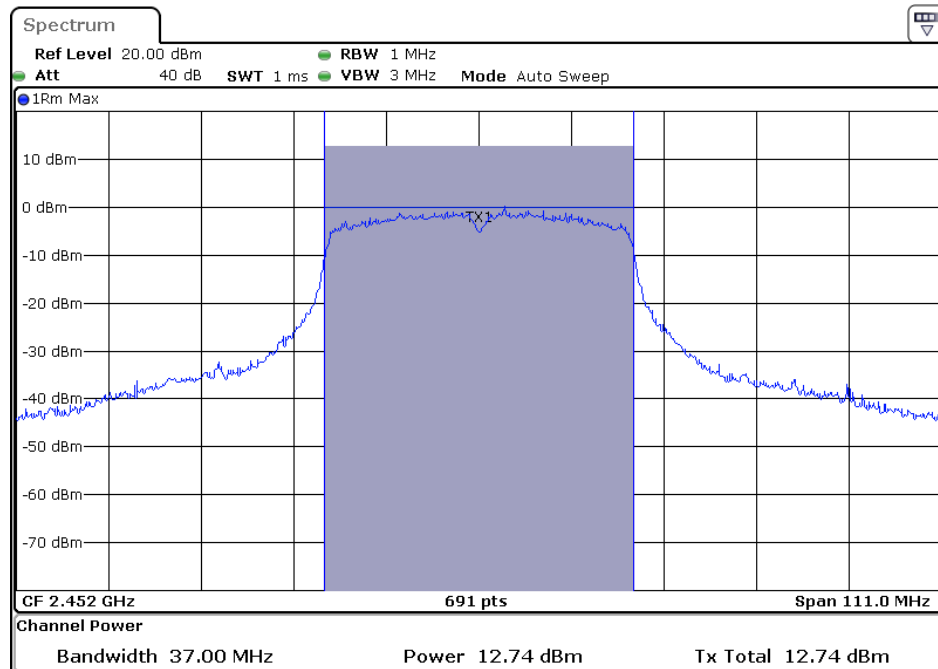
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz (40MHz)

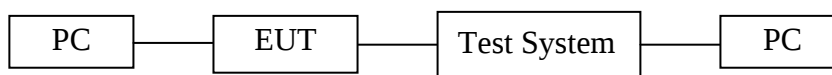


802.11n Channel High 2452MHz(40MHz)



9. POWER SPECTRAL DENSITY MEASUREMENT

9.1. Block Diagram of Test Setup



9.2. 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.

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. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

9.5. Test Procedure

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

9.5.2. Measurement Procedure AVGPSD-2:

This procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., duty cycle < 98%), and when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty is constant (i.e., duty cycle variations are less than $\pm 2\%$):

Measure the duty cycle(x) of the transmitter output signal as described in Section 6.0.

Set instrument center frequency to DTS channel center frequency.

Set span to at least $1.5 \times \text{OBW}$.

Set RBW to: $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$.

Set VBW $\geq 3 \times \text{RBW}$

Detector=power averaging(RMS) or sample detector(when RMS not available).

Ensure that the number of measurement points in sweep $\geq 2 \times \text{span}/\text{RBW}$.

Sweep time=auto couple.

Do not use sweep triggering. Allow sweep to “free run”.

Employ trace averaging(RMS) mode over a minimum of 100 traces.

Use the peak maker function to determine the maximum amplitude level.

Add $10\log(1/x)$, where x is the duty cycle measured in step(a, to the measured PSD to compute the average PSD during the actual transmission time.

If resultant value exceeds the limit, then reduce RBW(no less than 3kHz) and repeat(note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

9.6.Test Result

The test was performed with 802.11b					
Channel	Frequency (MHz)	Power Spectral Density(dBm)	$10\log(1/\text{duty cycle})$	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2412	-15.54	0.00	-15.54	8 dBm
Middle	2437	-15.04	0.00	-15.04	8 dBm
High	2462	-14.67	0.00	-14.67	8 dBm

The test was performed with 802.11g					
Channel	Frequency (MHz)	Power Spectral Density(dBm)	$10\log(1/\text{duty cycle})$	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2412	-15.11	0.00	-15.11	8 dBm
Middle	2437	-14.66	0.00	-14.66	8 dBm
High	2462	-14.67	0.00	-14.67	8 dBm

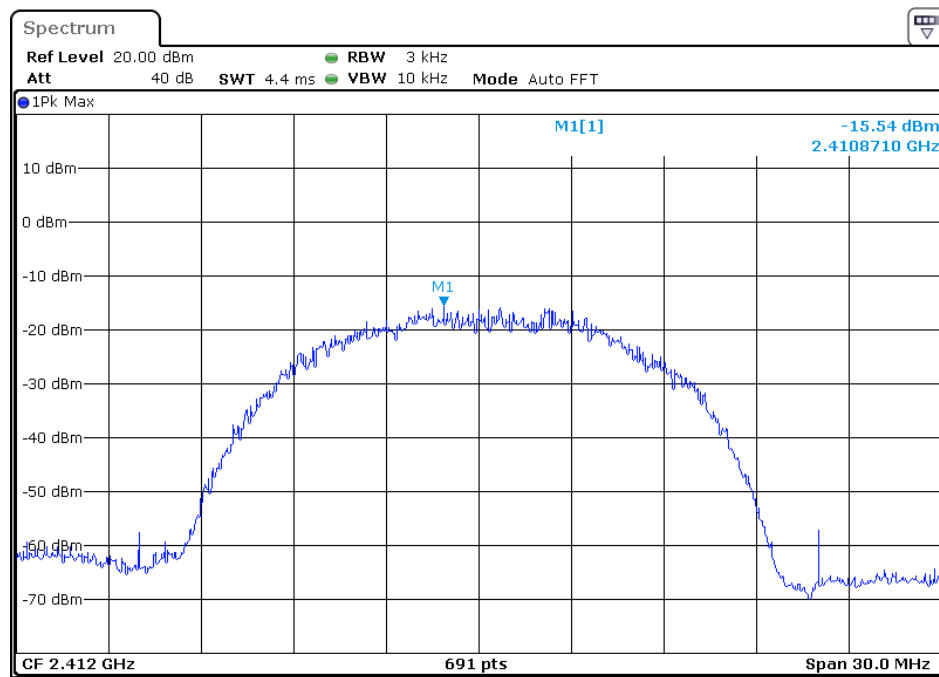
The test was performed with 802.11n(20MHz)					
Channel	Frequency (MHz)	Power Spectral Density(dBm)	$10\log(1/\text{duty cycle})$	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2412	-16.53	0.00	-16.53	8 dBm
Middle	2437	-16.12	0.00	-16.12	8 dBm
High	2462	-15.09	0.00	-15.09	8 dBm

The test was performed with 802.11n(40MHz)

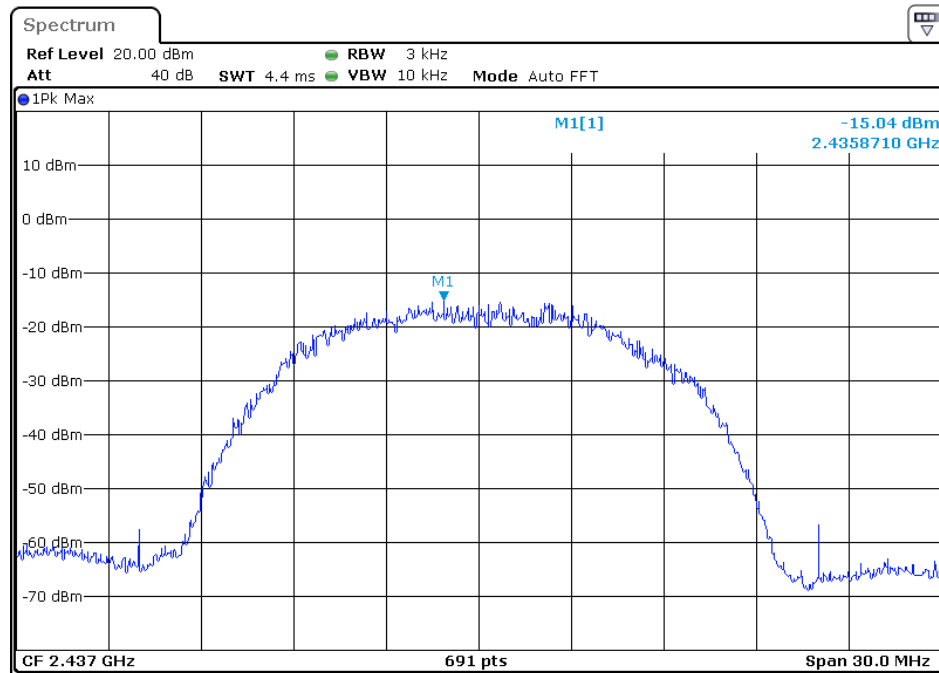
Channel	Frequency (MHz)	Power Spectral Density(dBm)	10log(1/ duty cycle)	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2422	-20.41	0.00	-20.41	8 dBm
Middle	2437	-20.67	0.00	-20.67	8 dBm
High	2452	-20.51	0.00	-20.51	8 dBm

The spectrum analyzer plots are attached as below.

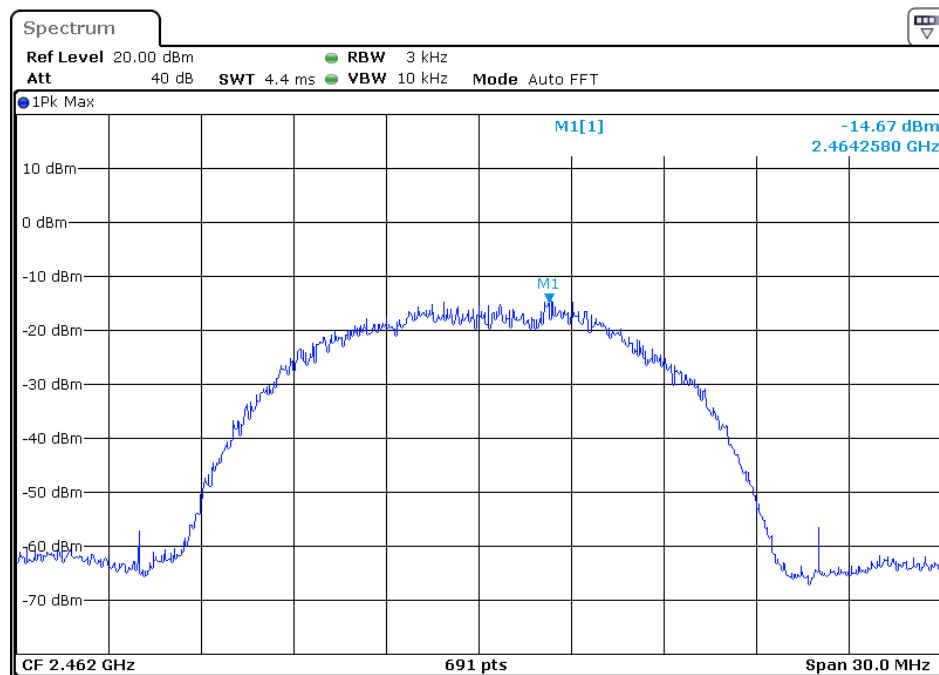
802.11b Low Channel 2412MHz



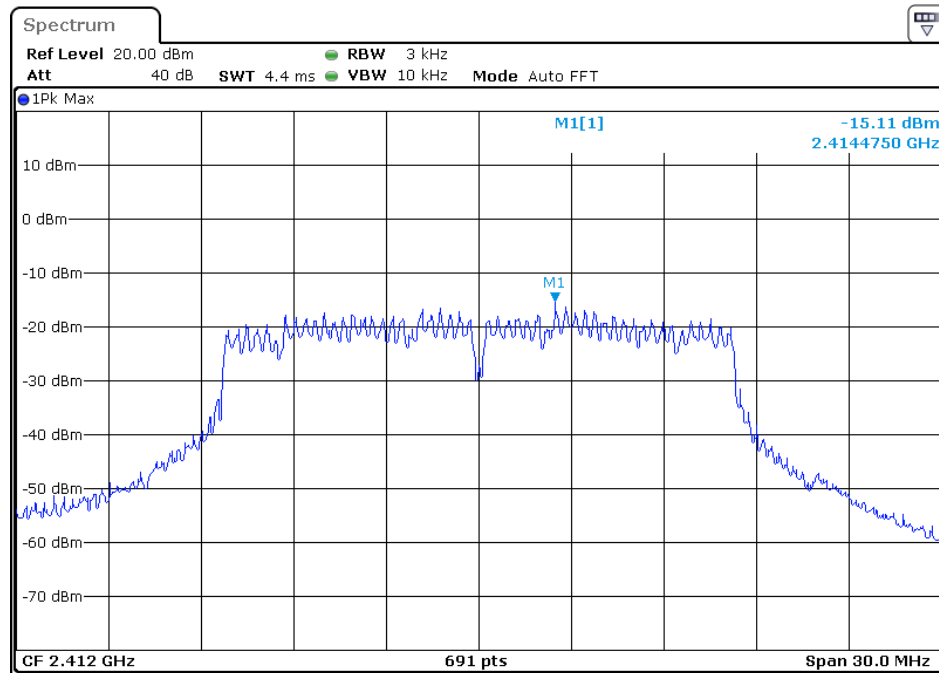
802.11b Middle Channel 2437MHz



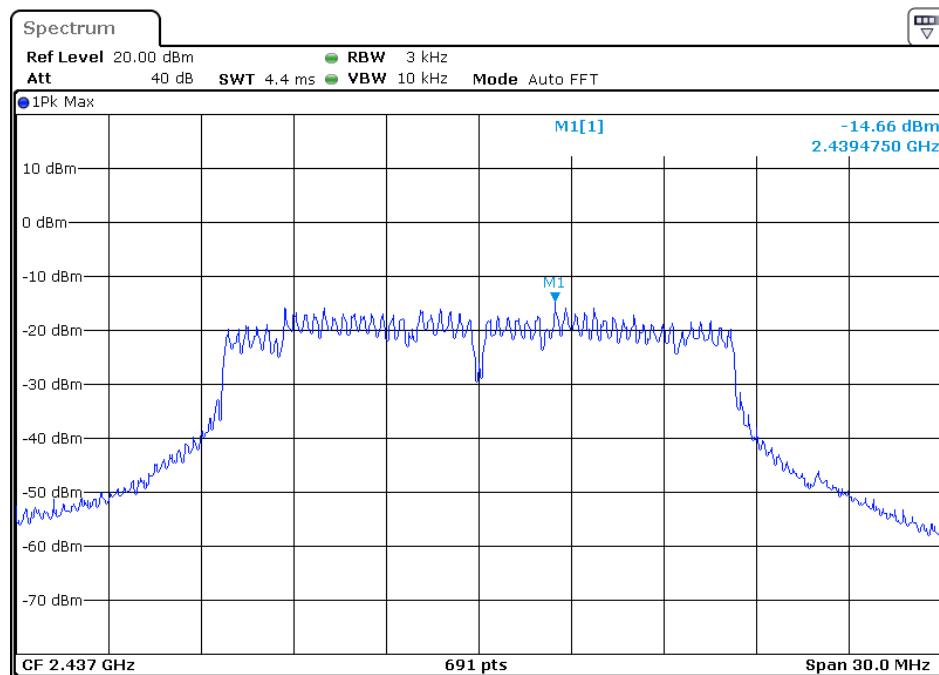
802.11b High Channel 2462MHz



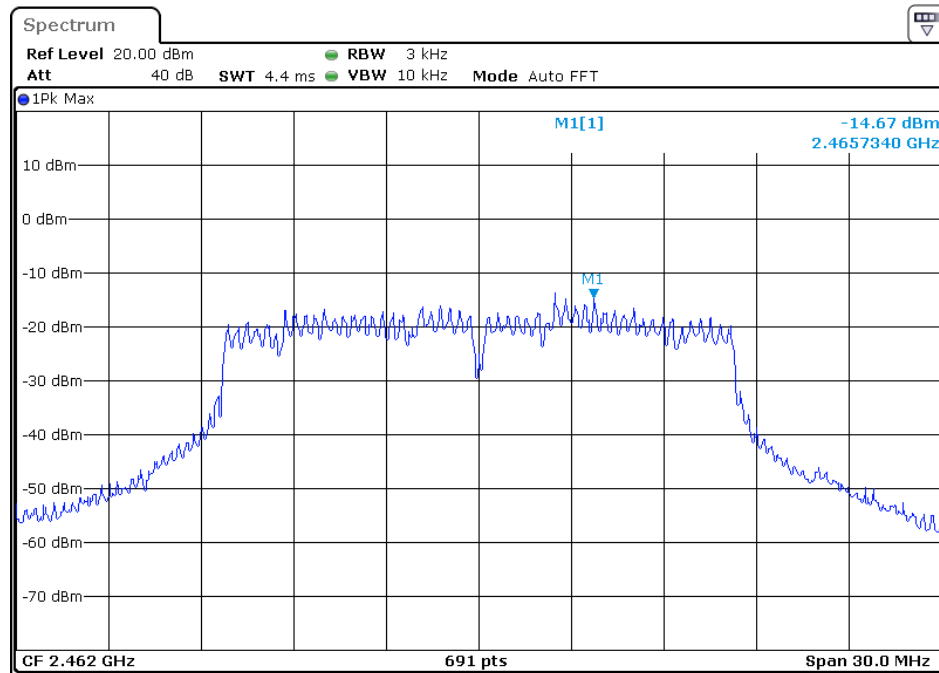
802.11g Low Channel 2412MHz



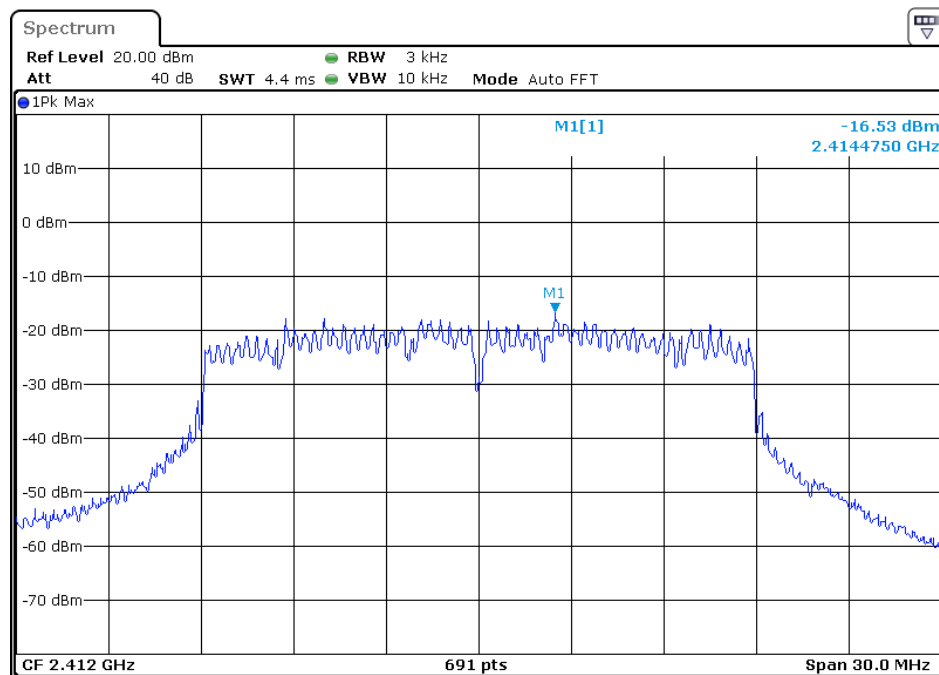
802.11g Middle Channel 2437MHz



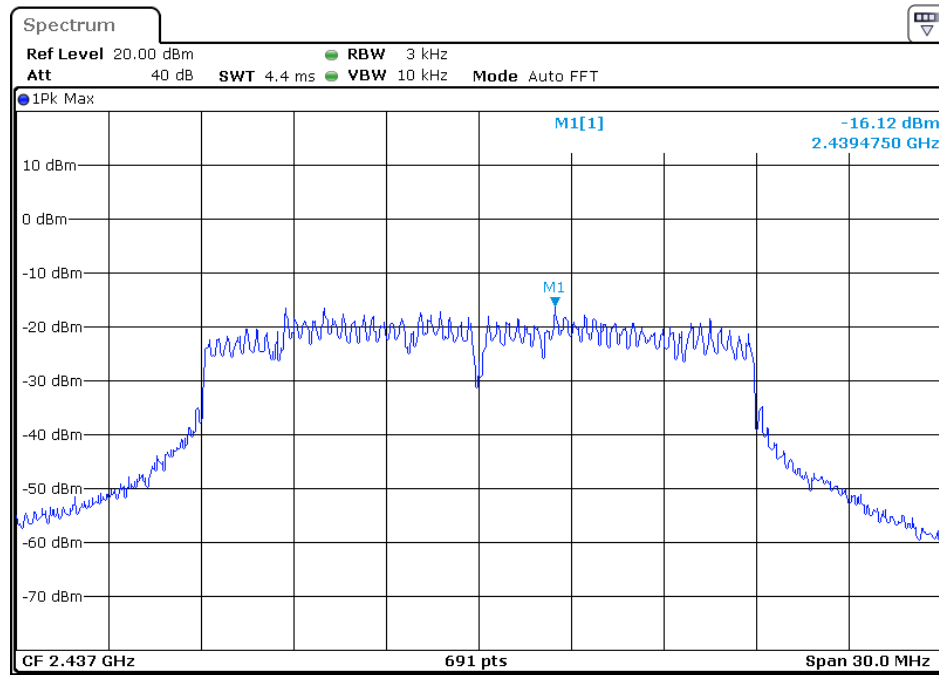
802.11g High Channel 2462MHz



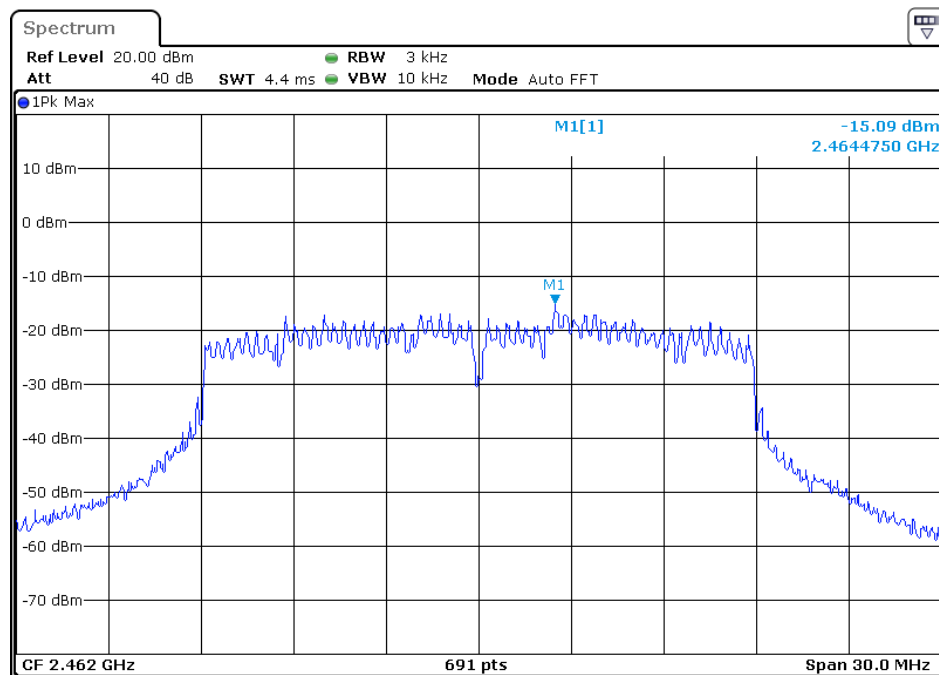
802.11n(20MHz) Low Channel 2412MHz



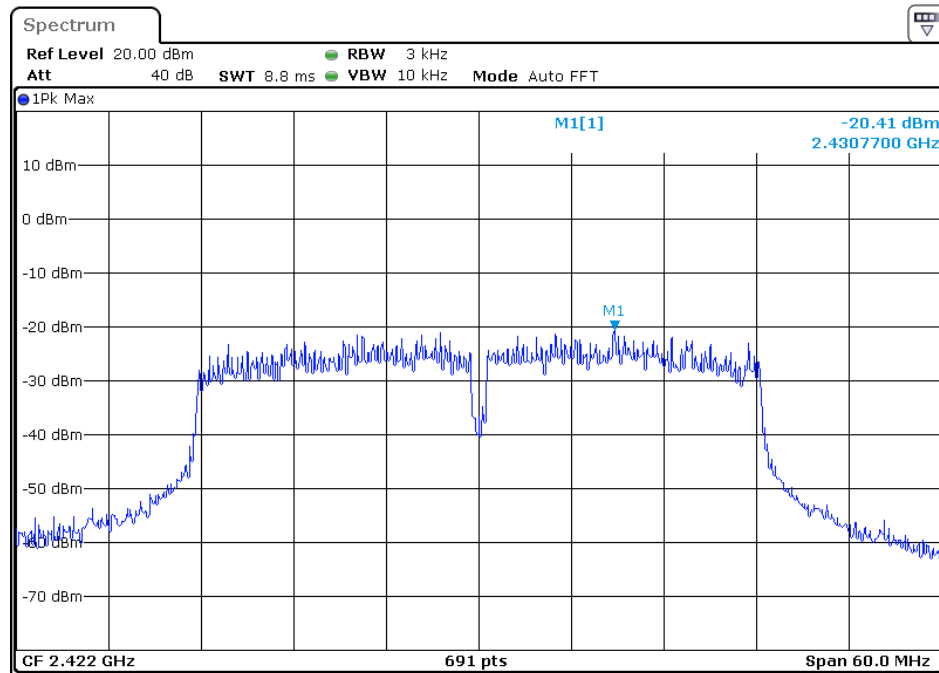
802.11n(20MHz) Middle Channel 2437MHz



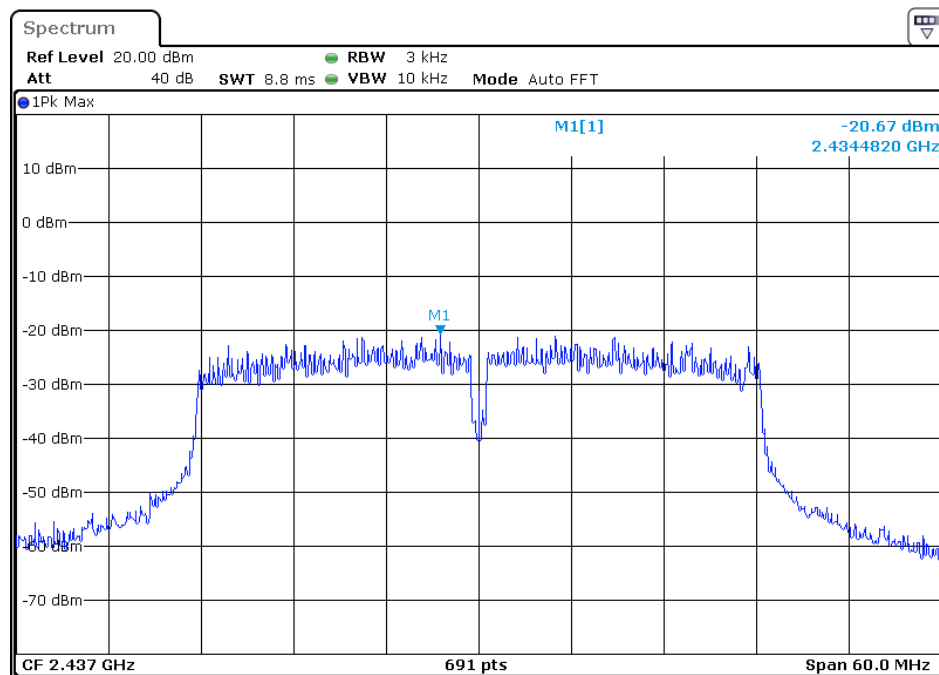
802.11n(20MHz) High Channel 2462MHz



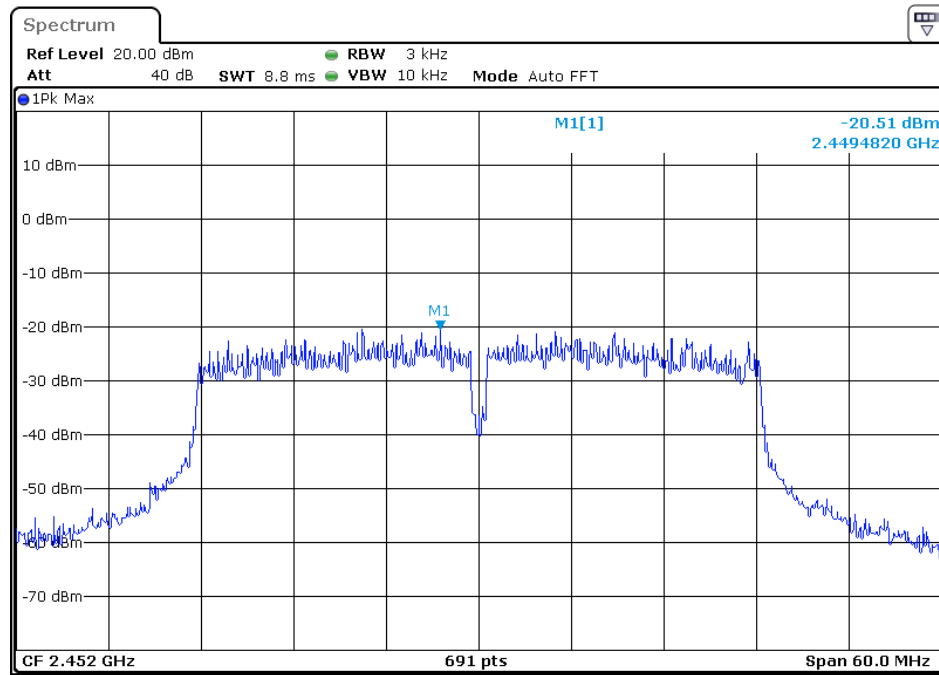
802.11n(40MHz) Low Channel 2422MHz



802.11n(40MHz) Middle Channel 2437MHz

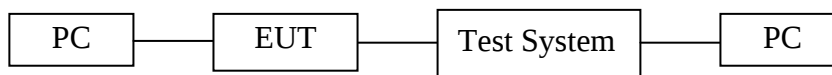


802.11n(40MHz) High Channel 2452MHz



10.BAND EDGE COMPLIANCE TEST

10.1.Block Diagram of Test Setup



10.2.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).

10.3.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.

10.4.Operating Condition of EUT

10.4.1.Setup the EUT and simulator as shown as Section 10.1.

10.4.2.Turn on the power of all equipment.

10.4.3.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.

10.5. Test Procedure

Conducted Band Edge:

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

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

Radiate Band Edge:

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

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

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

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

10.5.7. RBW=1MHz, VBW=1MHz

10.5.8. The band edges was measured and recorded.

10.6.Test Result

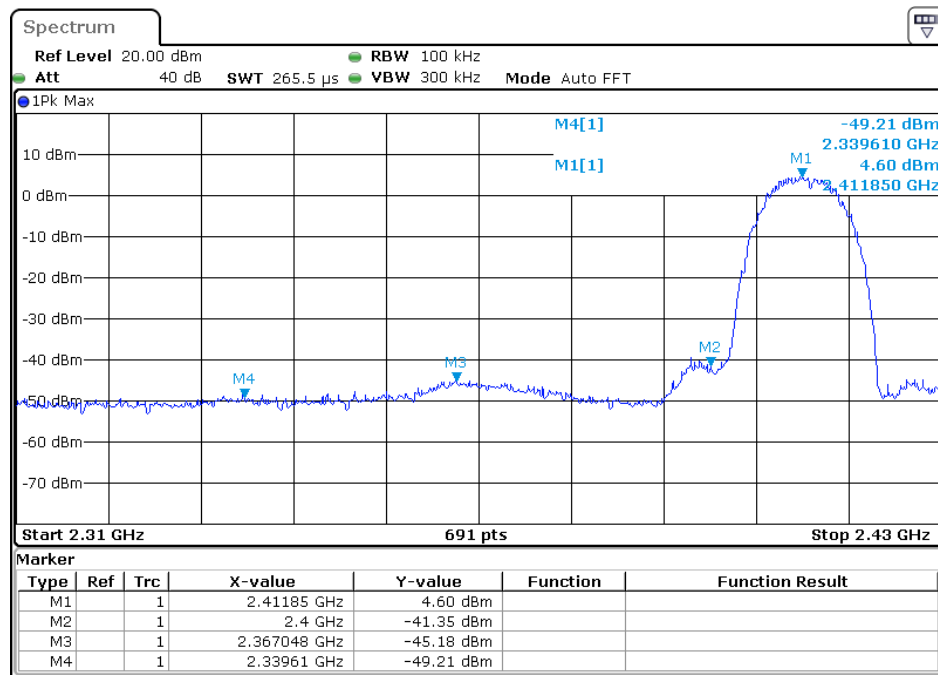
The test was performed with 802.11b		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	45.95	> 20dBc
2497.1	50.84	> 20dBc

The test was performed with 802.11g		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	31.08	> 20dBc
2483.5	49.06	> 20dBc

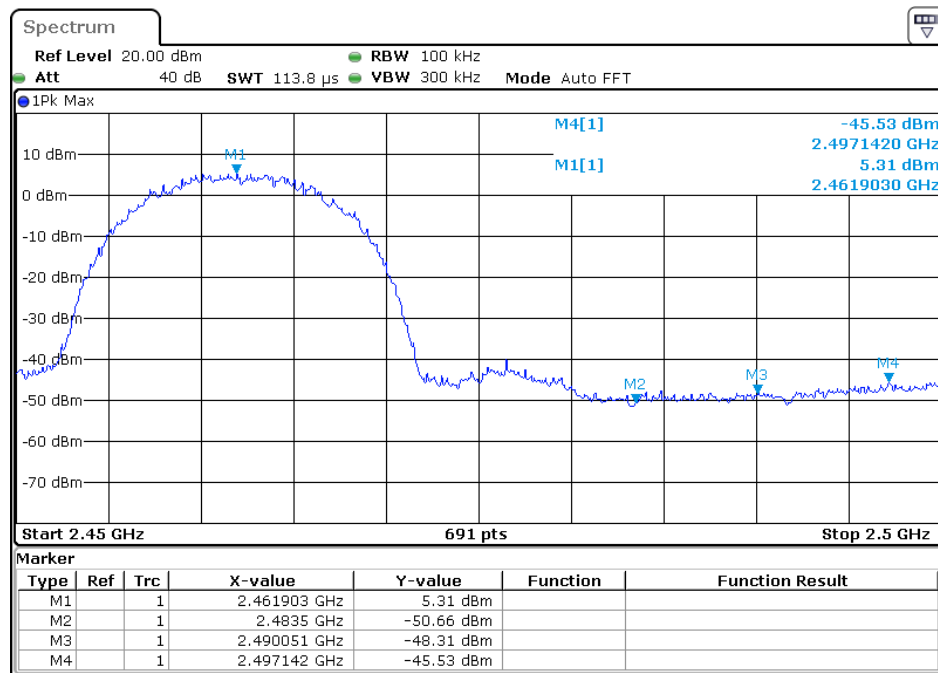
The test was performed with 802.11n (20MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	32.39	> 20dBc
2483.5	47.09	> 20dBc

The test was performed with 802.11n (40MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	29.98	> 20dBc
2489.5	36.92	> 20dBc

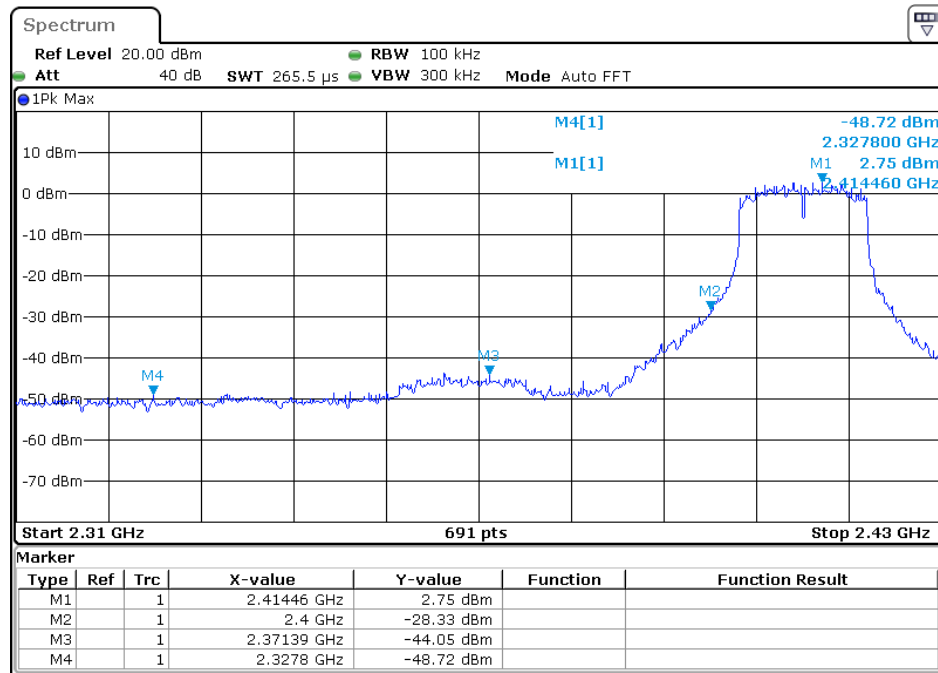
802.11b Low Channel 2412MHz



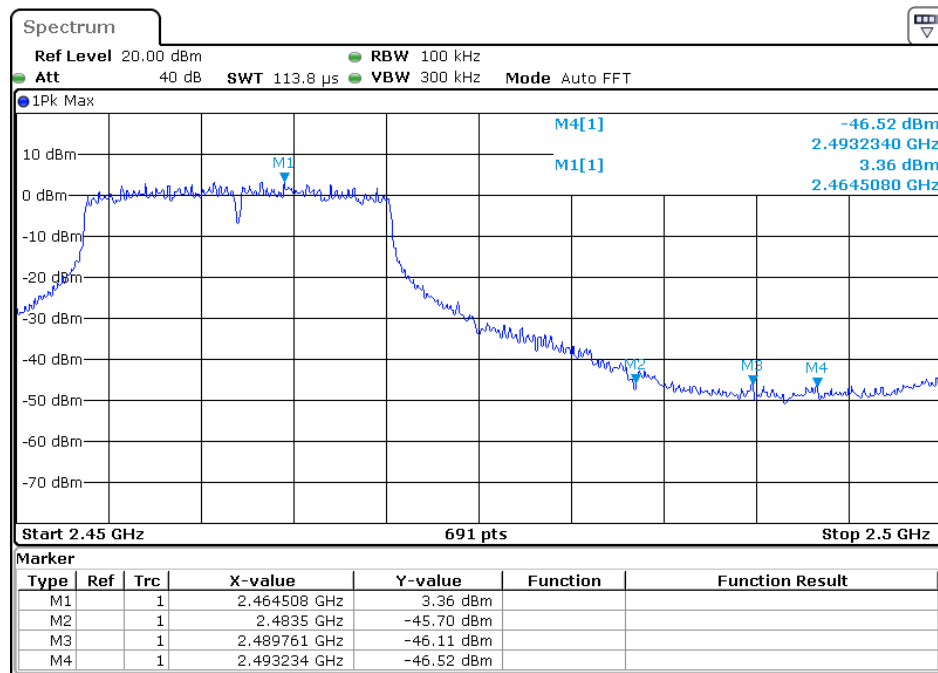
802.11b High Channel 2462MHz



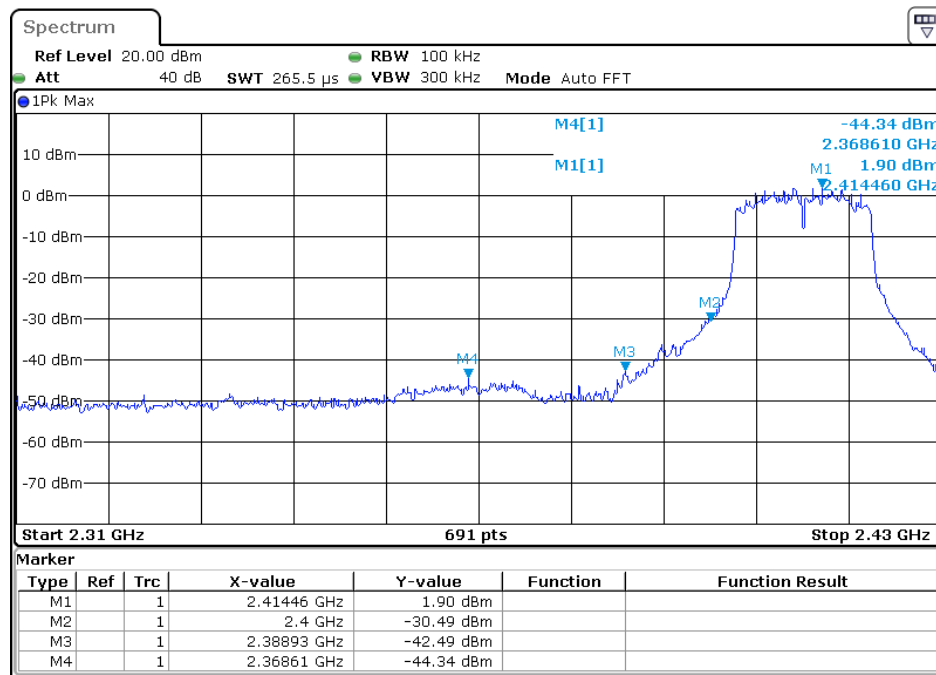
802.11g Low Channel 2412MHz



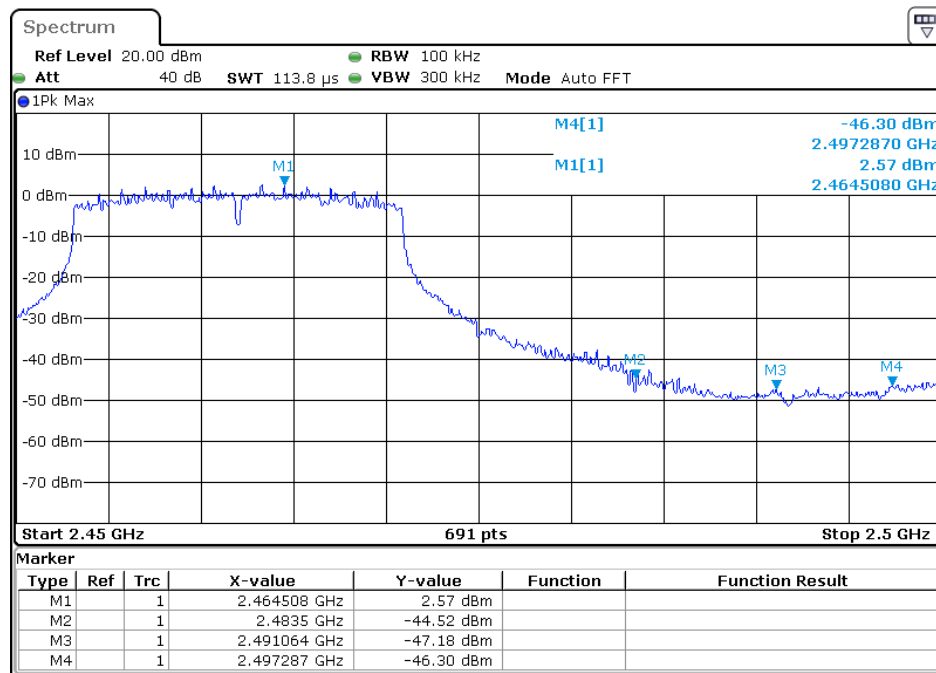
802.11g High Channel 2462MHz



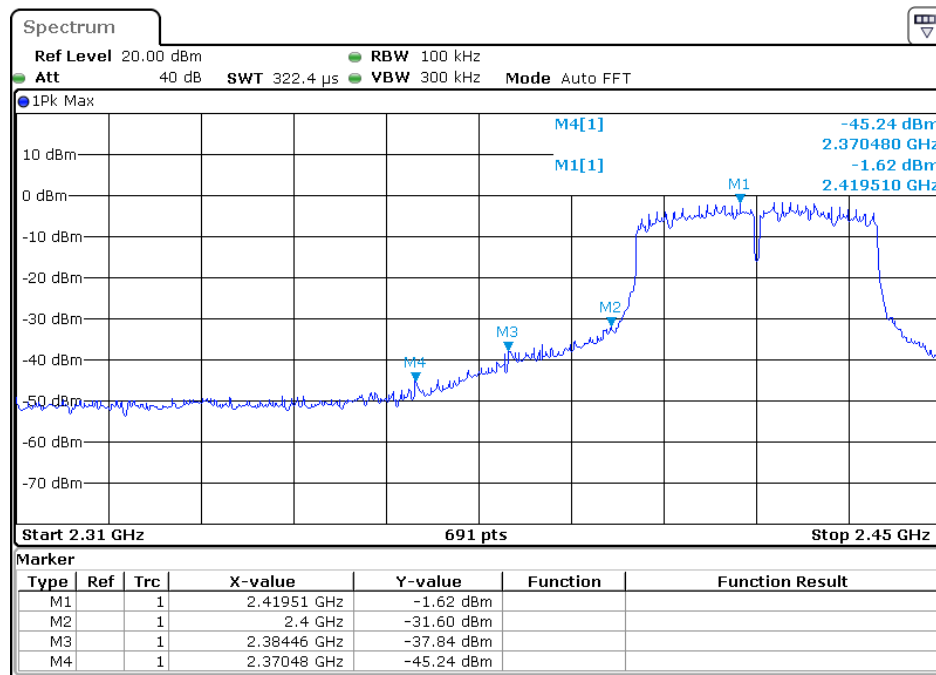
802.11n(20MHz) Low Channel 2412MHz



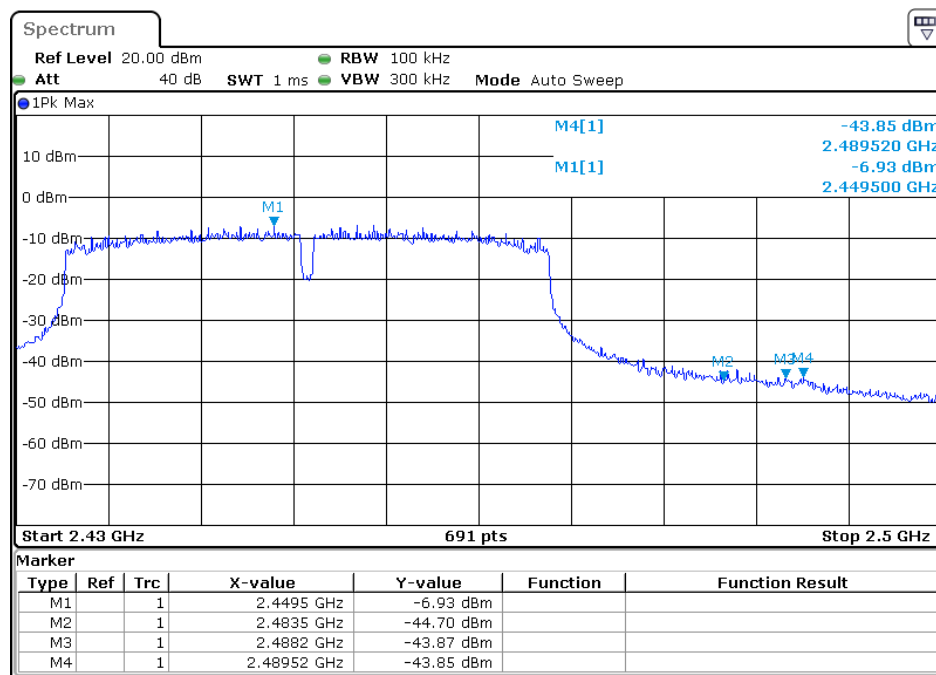
802.11n(20MHz) High Channel 2462MHz



802.11n(40MHz) Low Channel 2422MHz



802.11n(40MHz) High Channel 2452MHz



Radiated Band Edge Result

Note:

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E-mail: webmaster@atc-lab.com

Http://www.atc-lab.com

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 1.5 meter high above ground(Above 1GHz). 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 bi-log 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 EUT location must be manipulated according to ANSI C63.10:2013 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).

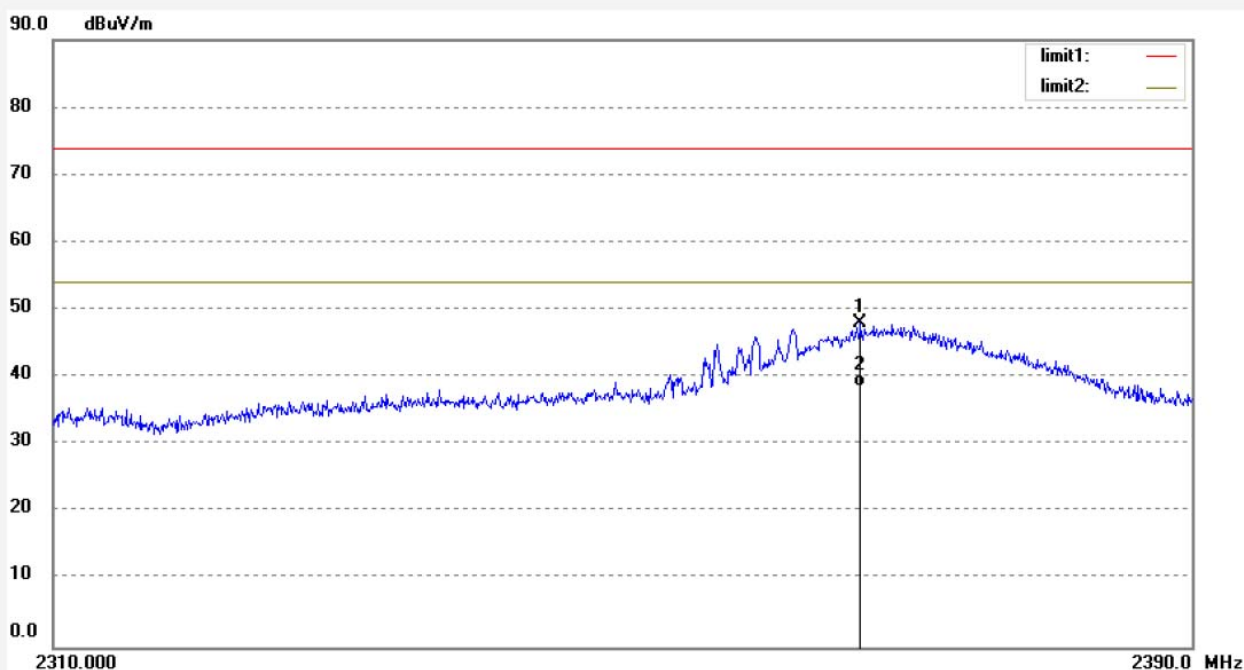
During the radiated emission test, the spectrum analyzer was set with the following configurations:

- 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.

Job No.: LGW2018 #1263
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2412MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11b

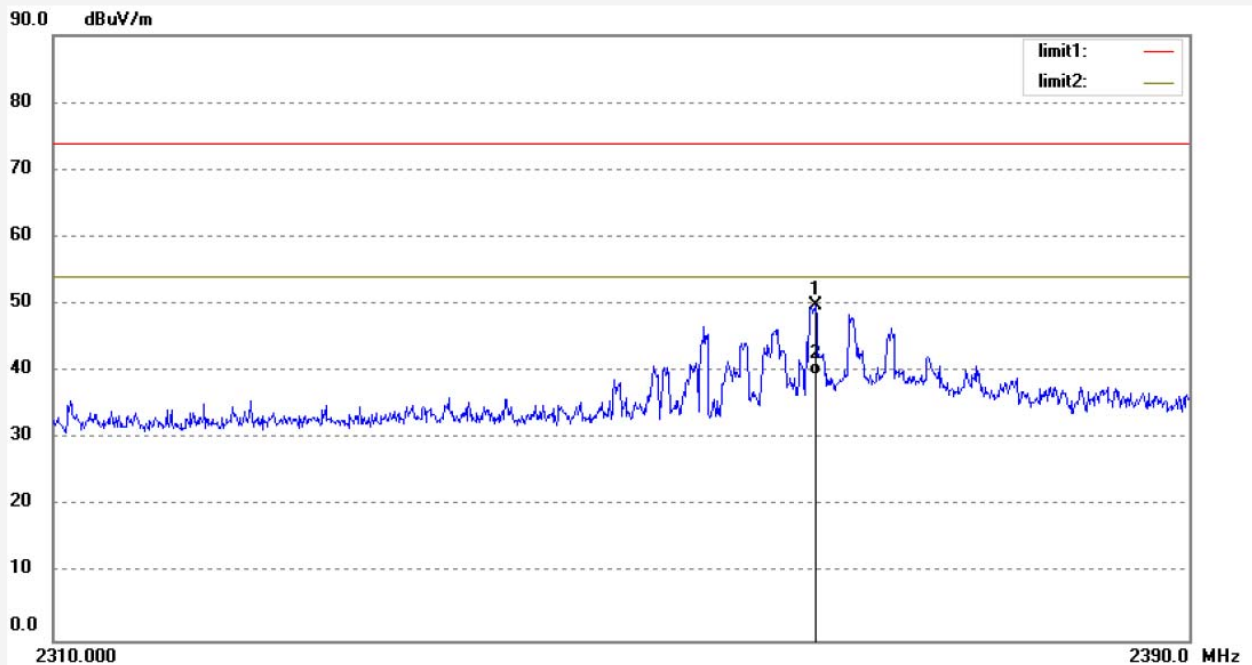


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2366.480	47.40	0.61	48.01	74.00	-25.99	peak			
2	2366.480	37.93	0.61	38.54	54.00	-15.46	AVG			

Job No.: LGW2018 #1262
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2412MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11b

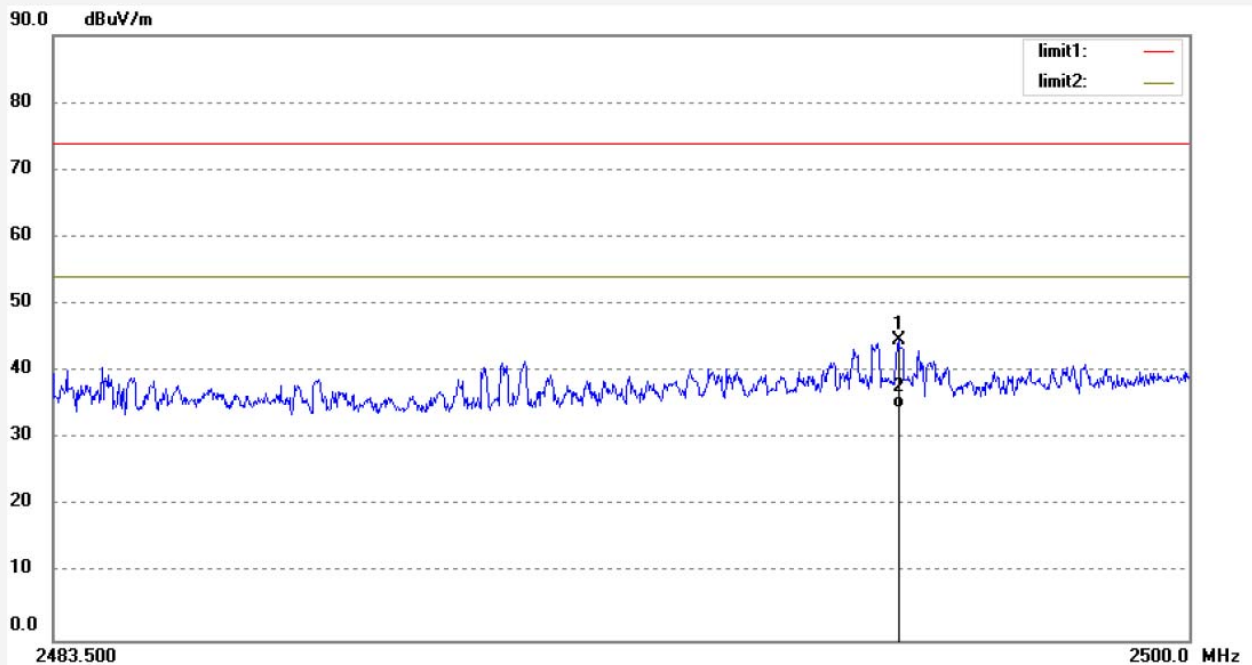


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2363.440	49.19	0.57	49.76	74.00	-24.24	peak			
2	2363.440	38.84	0.57	39.41	54.00	-14.59	AVG			

Job No.: LGW2018 #1268
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2462MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11b

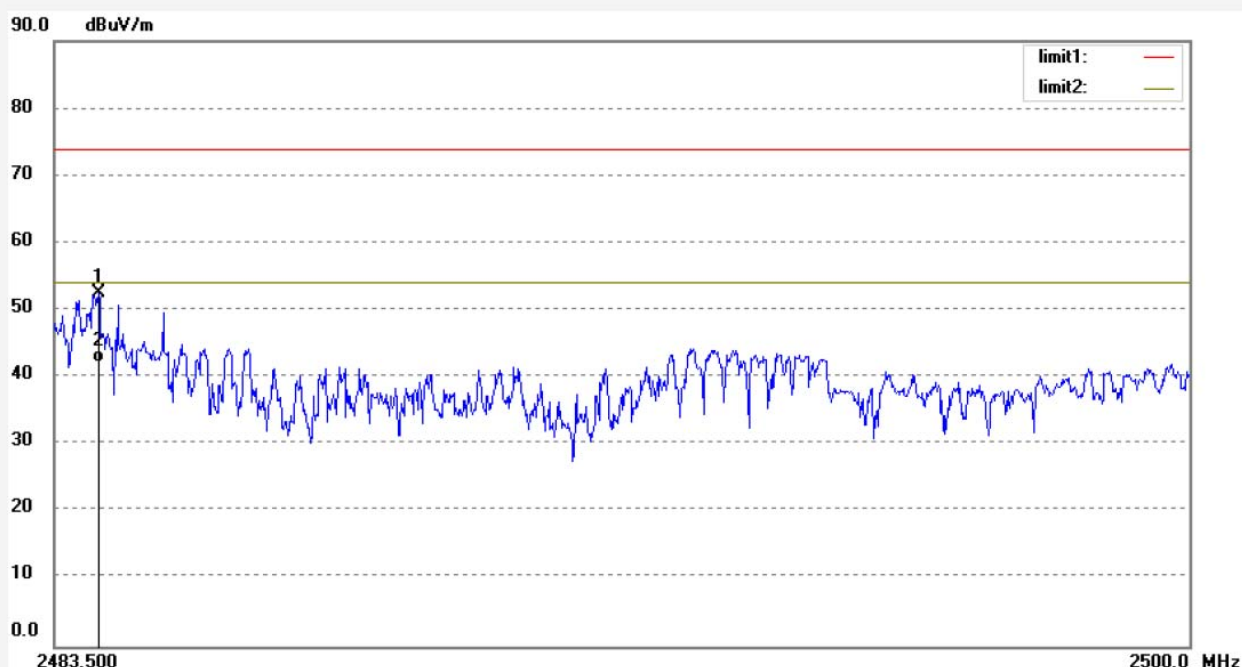


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2495.776	43.54	1.10	44.64	74.00	-29.36	peak			
2	2495.776	33.41	1.10	34.51	54.00	-19.49	AVG			

Job No.: LGW2018 #1269
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2462MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11b

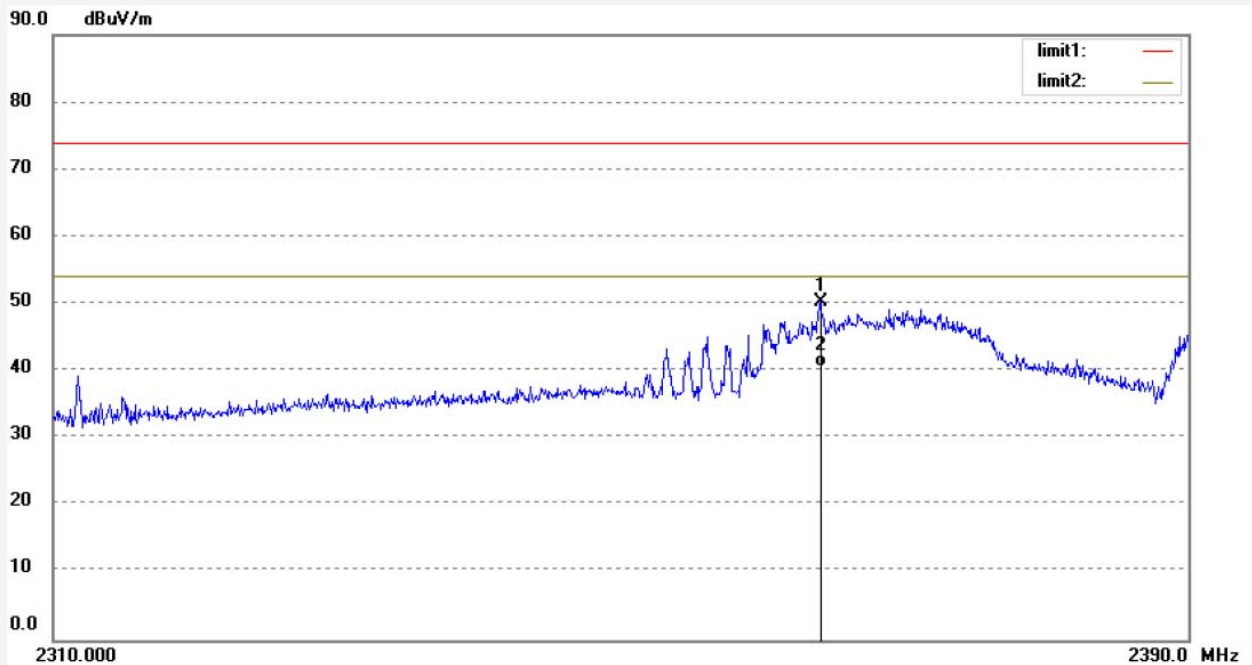


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2484.144	51.47	1.09	52.56	74.00	-21.44	peak			
2	2484.144	41.02	1.09	42.11	54.00	-11.89	AVG			

Job No.: LGW2018 #1279
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2412MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11g

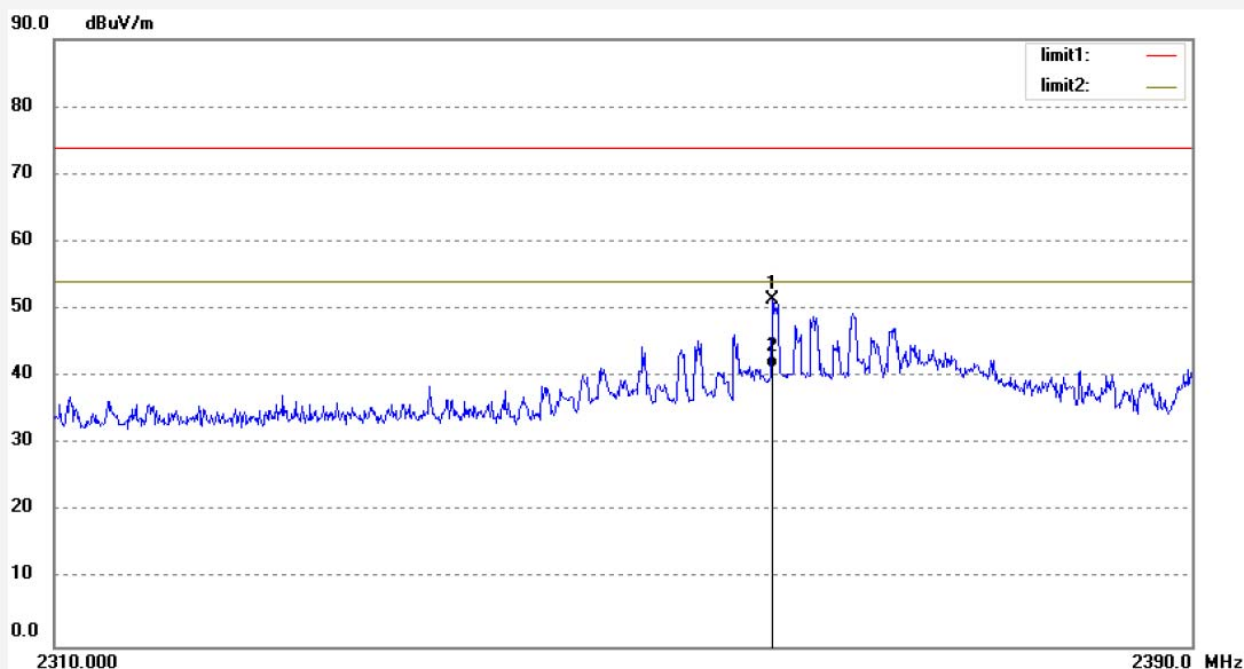


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2363.840	49.73	0.59	50.32	74.00	-23.68	peak			
2	2363.840	39.98	0.59	40.57	54.00	-13.43	AVG			

Job No.: LGW2018 #1278
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2412MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11g

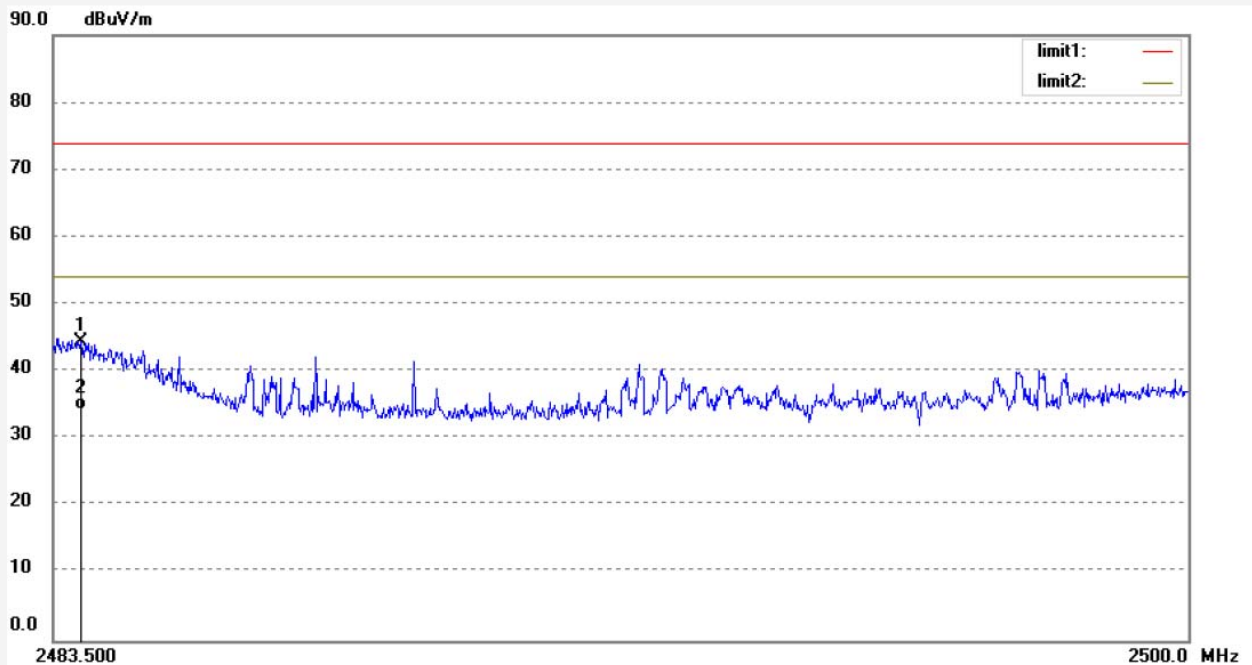


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2360.240	50.78	0.56	51.34	74.00	-22.66	peak			
2	2360.240	40.67	0.56	41.23	54.00	-12.77	AVG			

Job No.: LGW2018 #1284
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2462MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11g

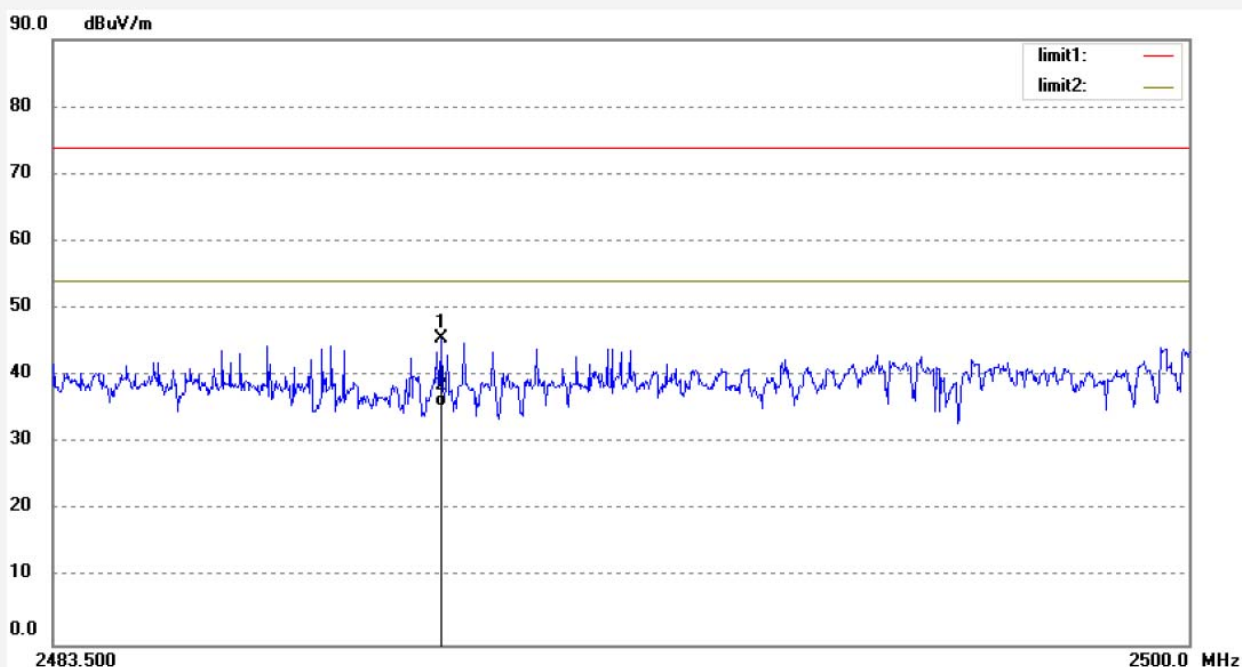


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.896	43.39	1.09	44.48	74.00	-29.52	peak			
2	2483.896	33.15	1.09	34.24	54.00	-19.76	AVG			

Job No.: LGW2018 #1285
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2462MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11g

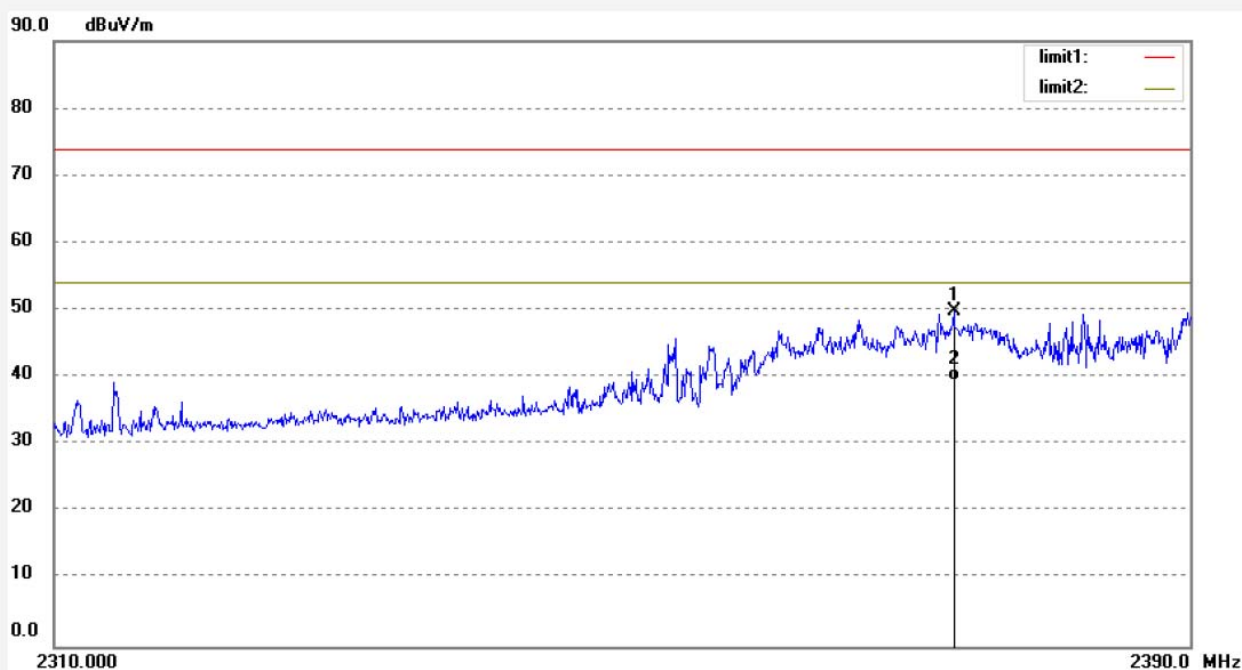


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2489.143	44.38	1.09	45.47	74.00	-28.53	peak			
2	2489.143	34.37	1.09	35.46	54.00	-18.54	AVG			

Job No.: LGW2018 #1295
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2412MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT20

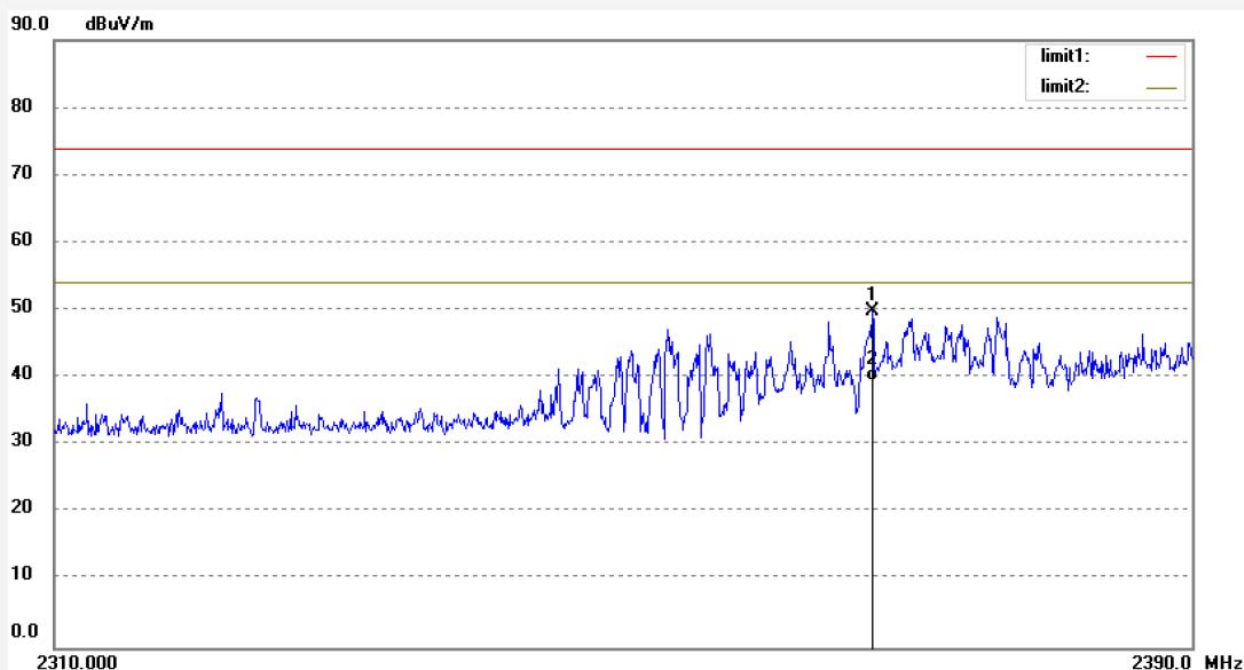


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.200	49.13	0.66	49.79	74.00	-24.21	peak			
2	2373.200	38.88	0.66	39.54	54.00	-14.46	AVG			

Job No.: LGW2018 #1294
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2412MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT20

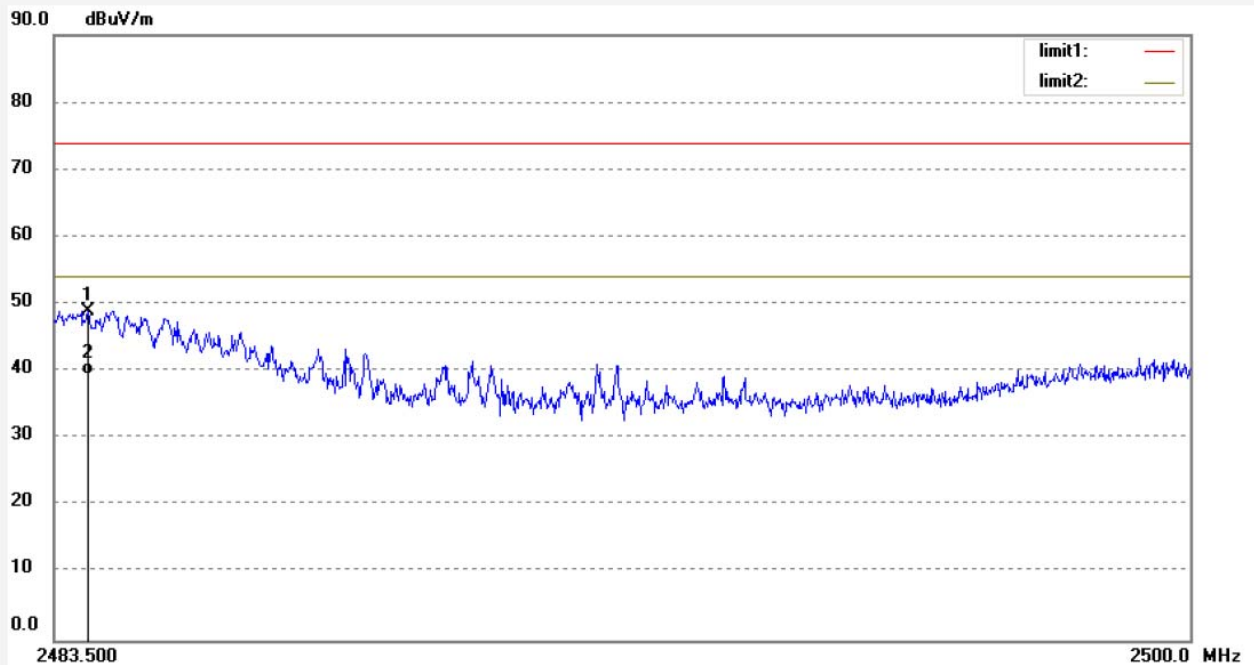


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2367.280	49.33	0.61	49.94	74.00	-24.06	peak			
2	2367.280	38.80	0.61	39.41	54.00	-14.59	AVG			

Job No.: LGW2018 #1300
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2462MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT20

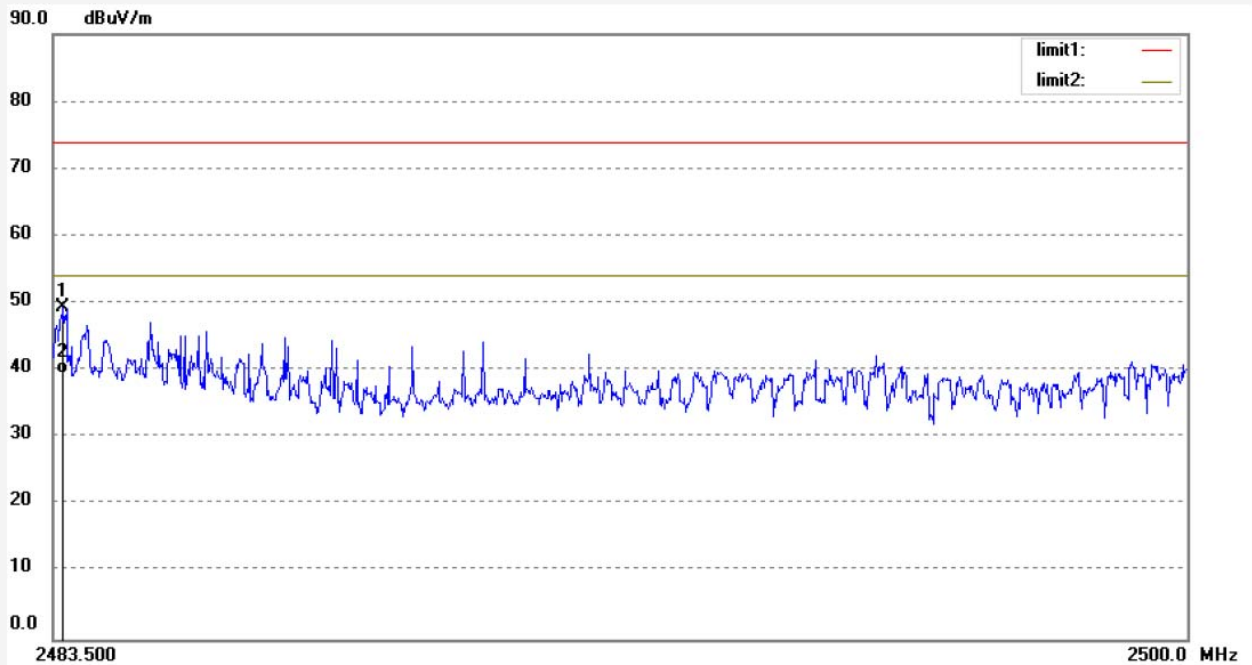


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.995	47.94	1.09	49.03	74.00	-24.97	peak			
2	2483.995	38.32	1.09	39.41	54.00	-14.59	AVG			

Job No.: LGW2018 #1301
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2462MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT20

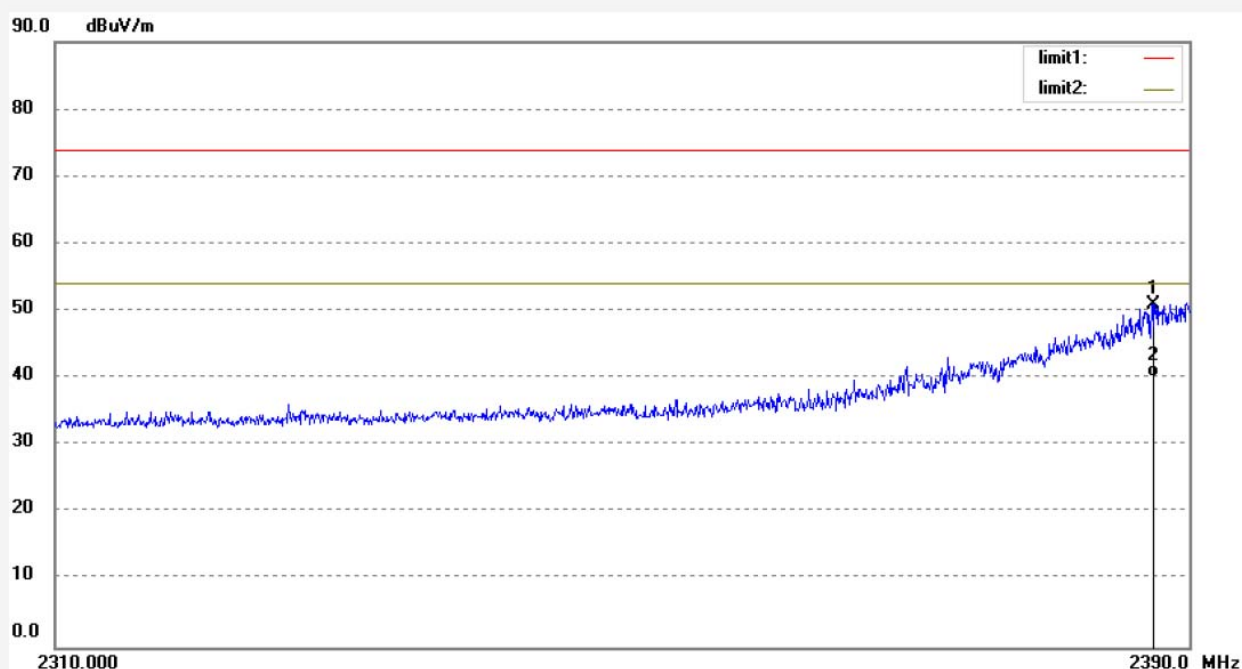


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.648	48.18	1.10	49.28	74.00	-24.72	peak			
2	2483.648	38.45	1.10	39.55	54.00	-14.45	AVG			

Job No.: LGW2018 #1311
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2422MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT40

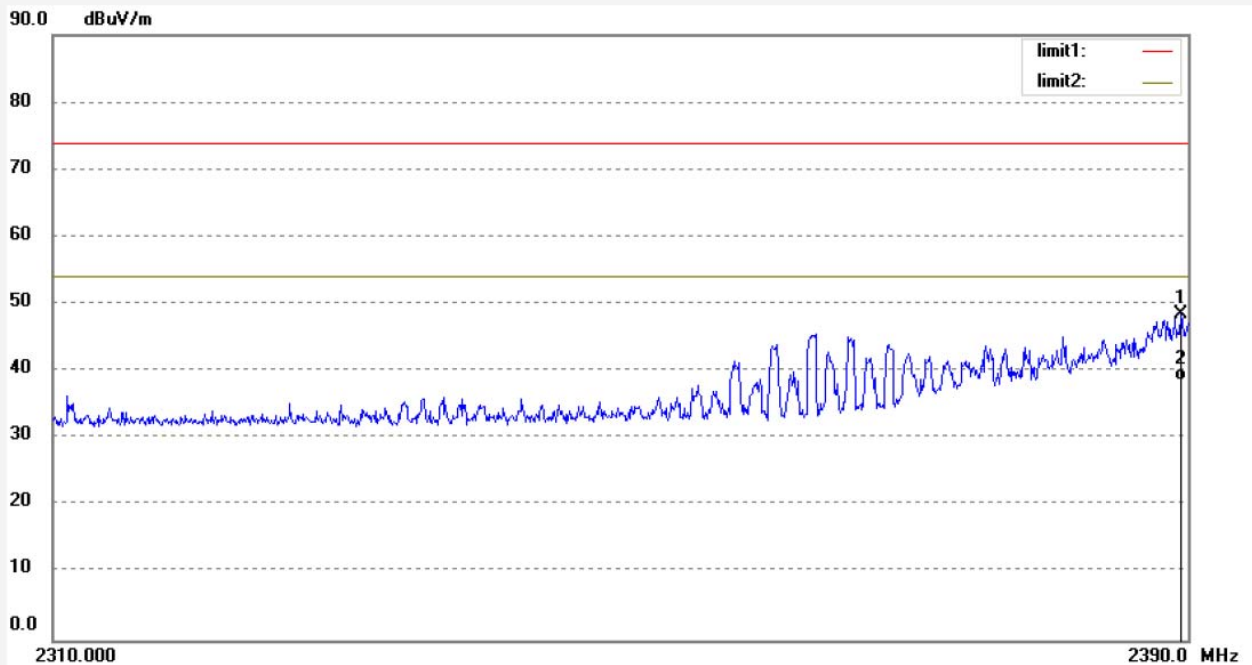


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2387.440	50.16	0.78	50.94	74.00	-23.06	peak			
2	2387.440	39.45	0.78	40.23	54.00	-13.77	AVG			

Job No.: LGW2018 #1310
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2422MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT40

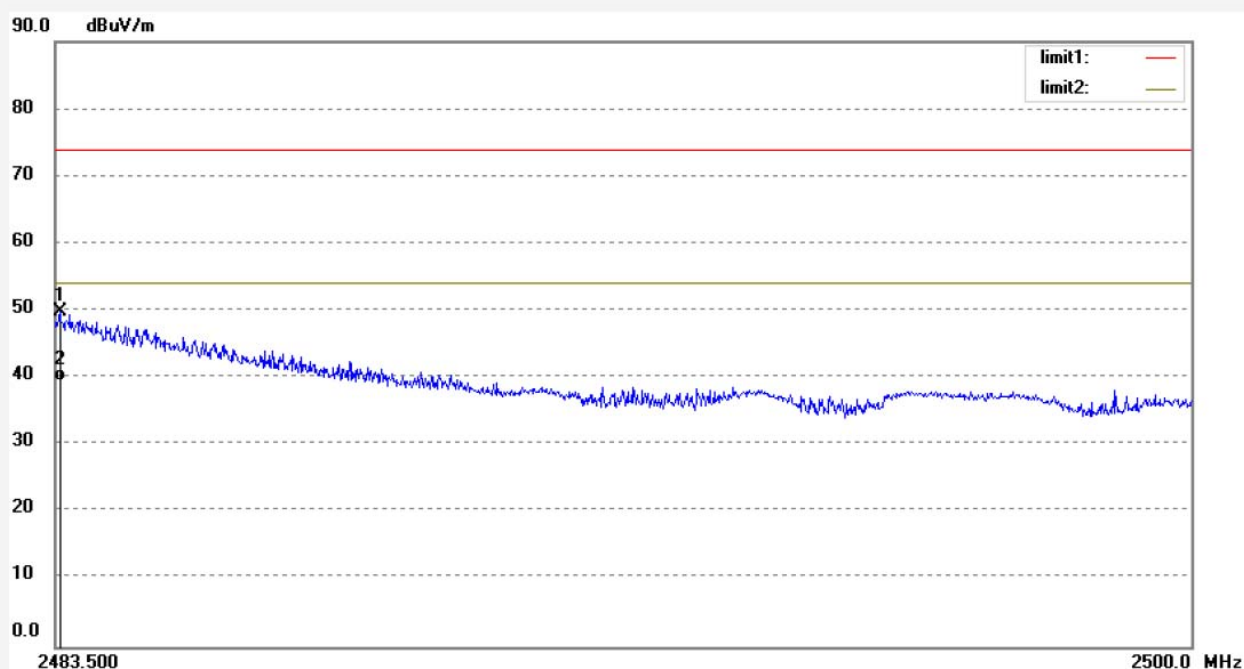


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2389.520	47.75	0.79	48.54	74.00	-25.46	peak			
2	2389.520	37.89	0.79	38.68	54.00	-15.32	AVG			

Job No.: LGW2018 #1316
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2452MHz
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT40

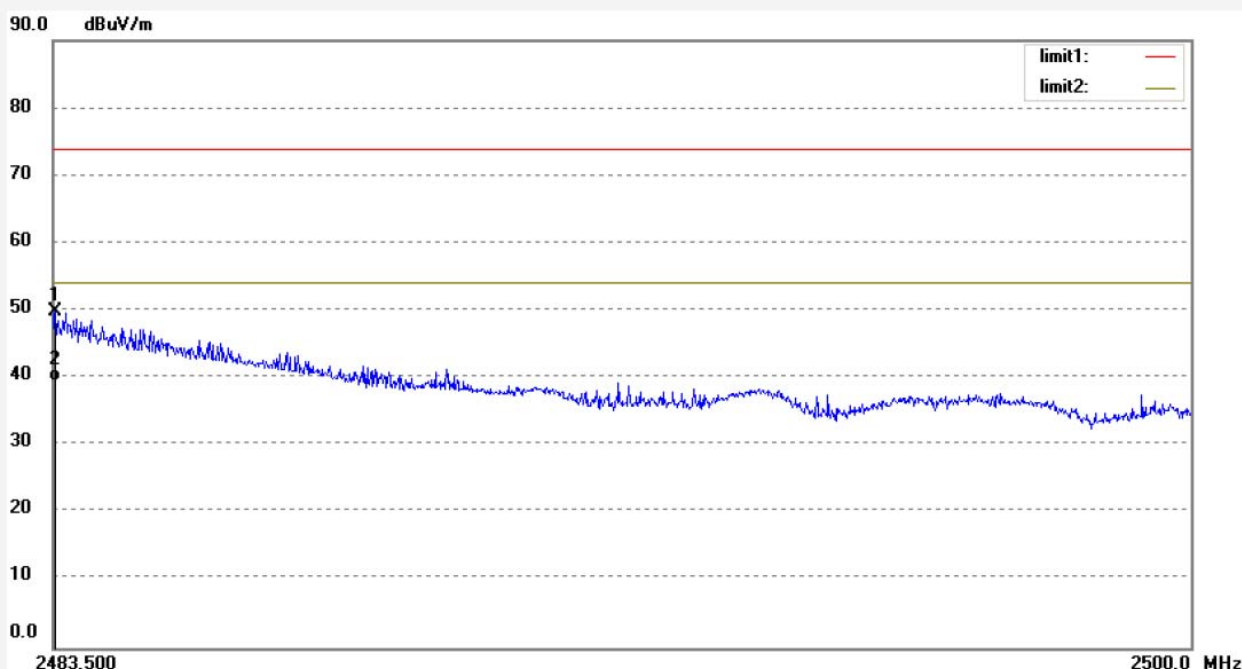


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.566	48.69	1.10	49.79	74.00	-24.21	peak			
2	2483.566	38.32	1.10	39.42	54.00	-14.58	AVG			

Job No.: LGW2018 #1317
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Light Strip
Mode: TX 2452MHz
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/26/
Time:
Engineer Signature: WADE
Distance: 3m

Note: 802.11n HT40

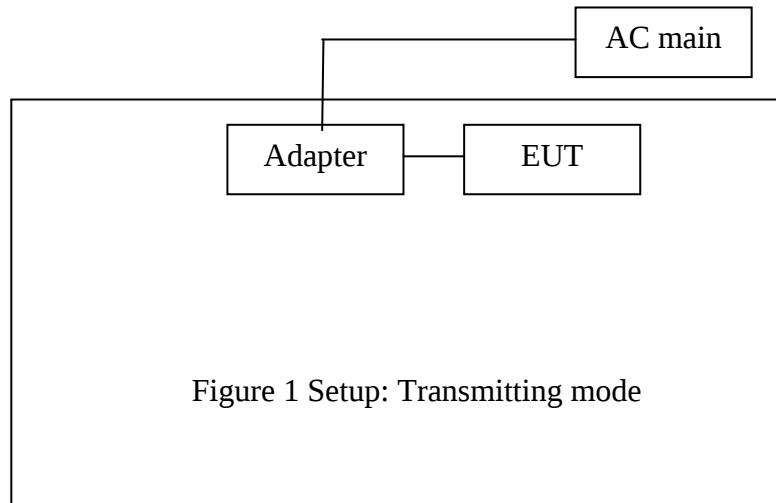


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.533	48.76	1.10	49.86	74.00	-24.14	peak			
2	2483.533	38.44	1.10	39.54	54.00	-14.46	AVG			

11.RADIATED SPURIOUS EMISSION TEST

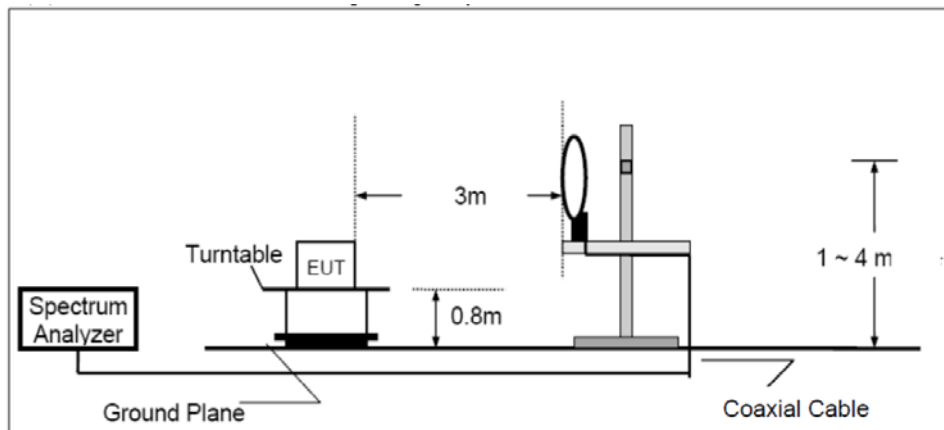
11.1.Block Diagram of Test Setup

11.1.1.Block diagram of connection between the EUT and peripherals

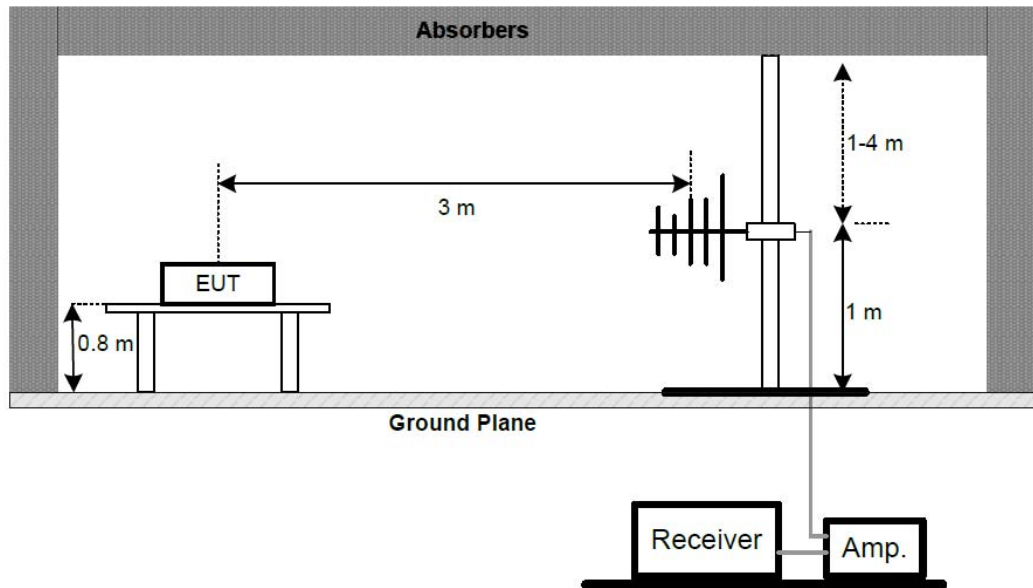


11.1.2.Semi-Anechoic Chamber Test Setup Diagram

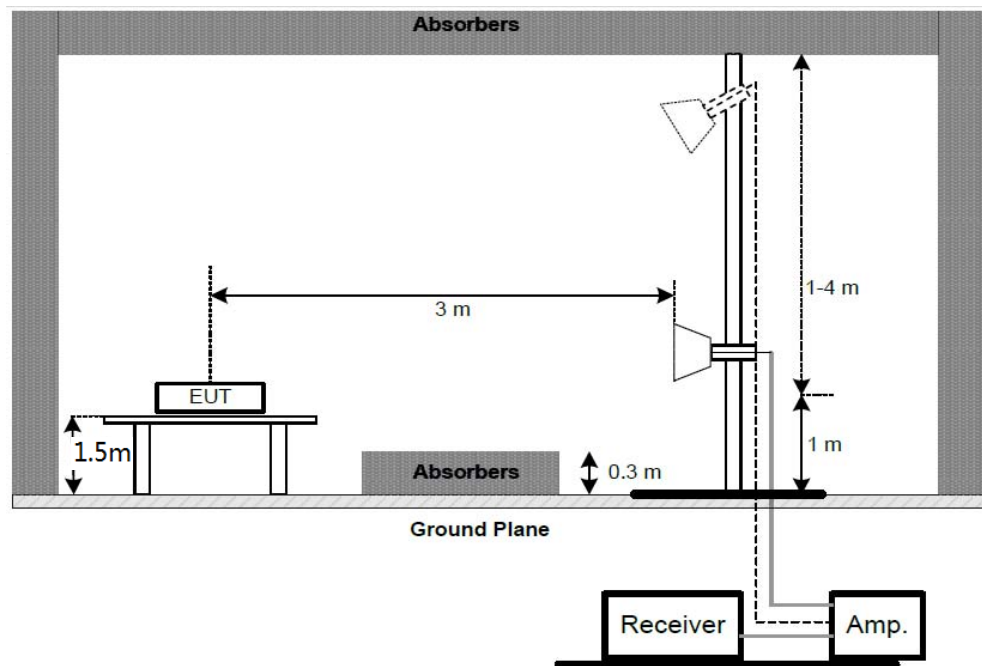
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1GHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



11.2.The Limit 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).

11.3.Restricted bands of operation

11.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

11.4.Configuration of EUT on Measurement

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

11.5.Operating Condition of EUT

11.5.1.Setup the EUT and simulator as shown as Section 11.1.

11.5.2.Turn on the power of all equipment.

11.5.3.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.

11.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.1 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 bi-log 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 EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The worst-case data rate for this channel to be 1Mbps for 802.11b mode and 6Mbps for 802.11g mode and 150Mbps for 802.11n mode, based on previous with 802.11 WLAN product design architectures.

The frequency range from 30MHz to 25000MHz is checked.

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. 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.
3. 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.

4. All modes of operation were investigated and the worst-case emissions are reported.

11.7.The Field Strength of Radiation Emission Measurement Results

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

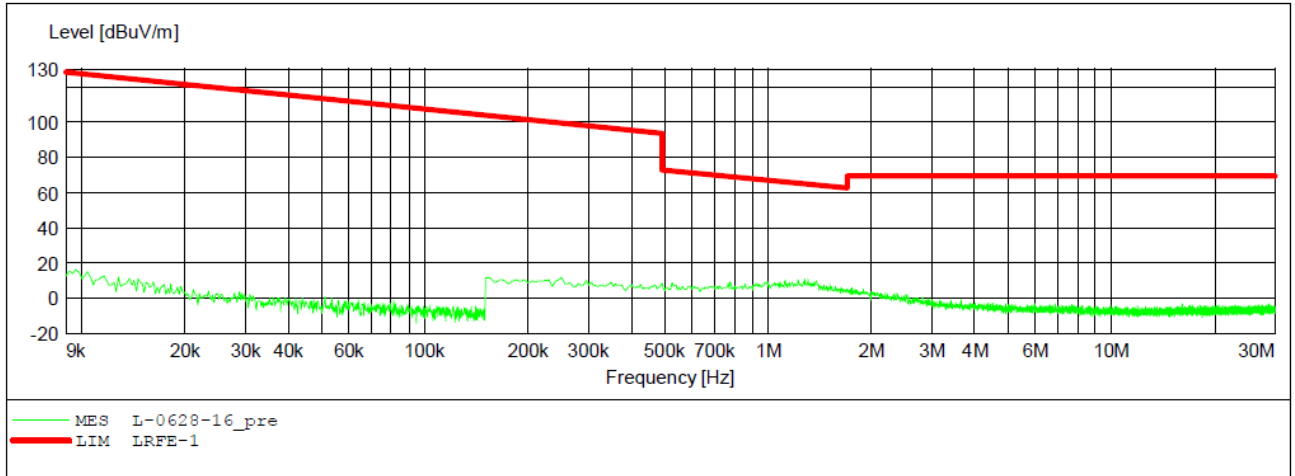
2. *: Denotes restricted band of operation.

3. The EUT is tested radiation emission at each test mode (802.11 b/g/n) in three axes. The worst emissions are reported in all test mode and channels.

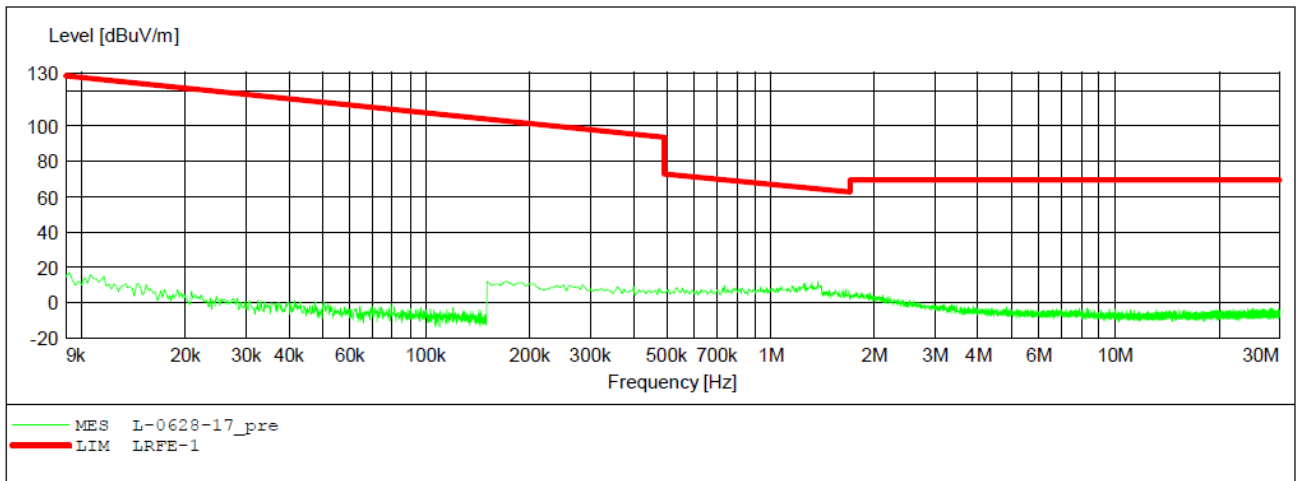
4.We tested 802.11b,g,n mode and recorded the worst case data(802.11b) for radiated emission test below 1GHz.

5.The radiation emissions from 18-25GHz are not reported, because the test values lower than the limits of 20dB.

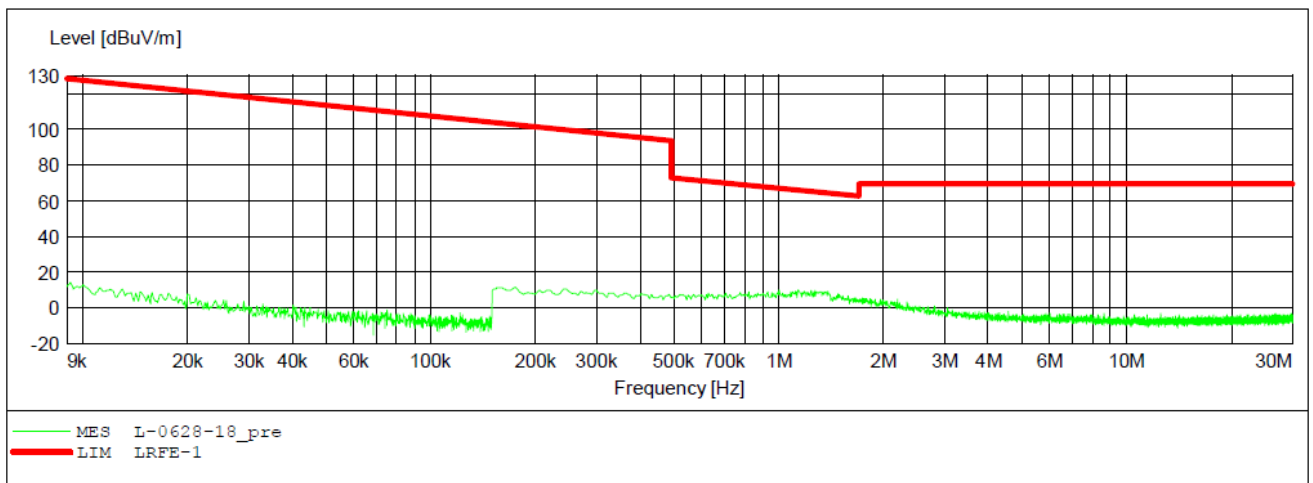
9kHz-30MHz test data



X axis test data(worse case)



Y axis test data(worse case)



Z axis test data(worse case)

30MHz-1000MHz test data(worse case)

Job No.: FRANK2018A #660

Standard: FCC 15.247 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: Light Strip

Mode: TX Channel 1(802.11b)

Model: S-01

Manufacturer: Mei Hua Electronics/Hui Zhou limited

Polarization: Horizontal

Power Source: AC 120V/60Hz

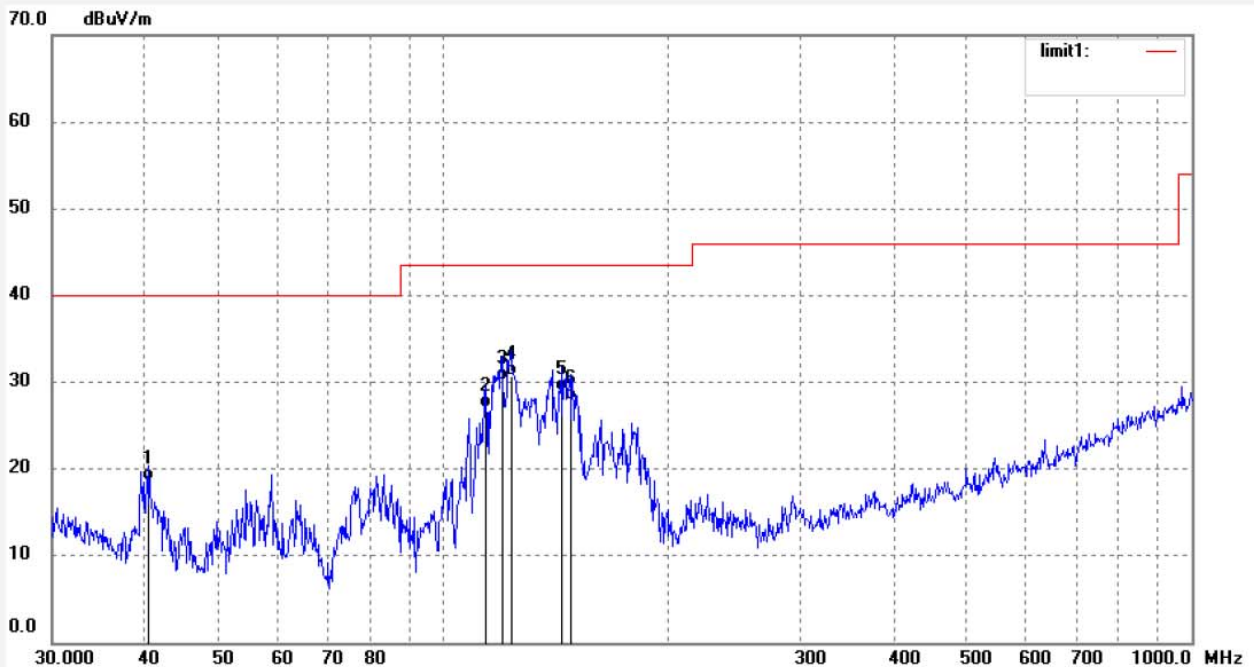
Date: 18/12/27/

Time: 16/48/08

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20182211

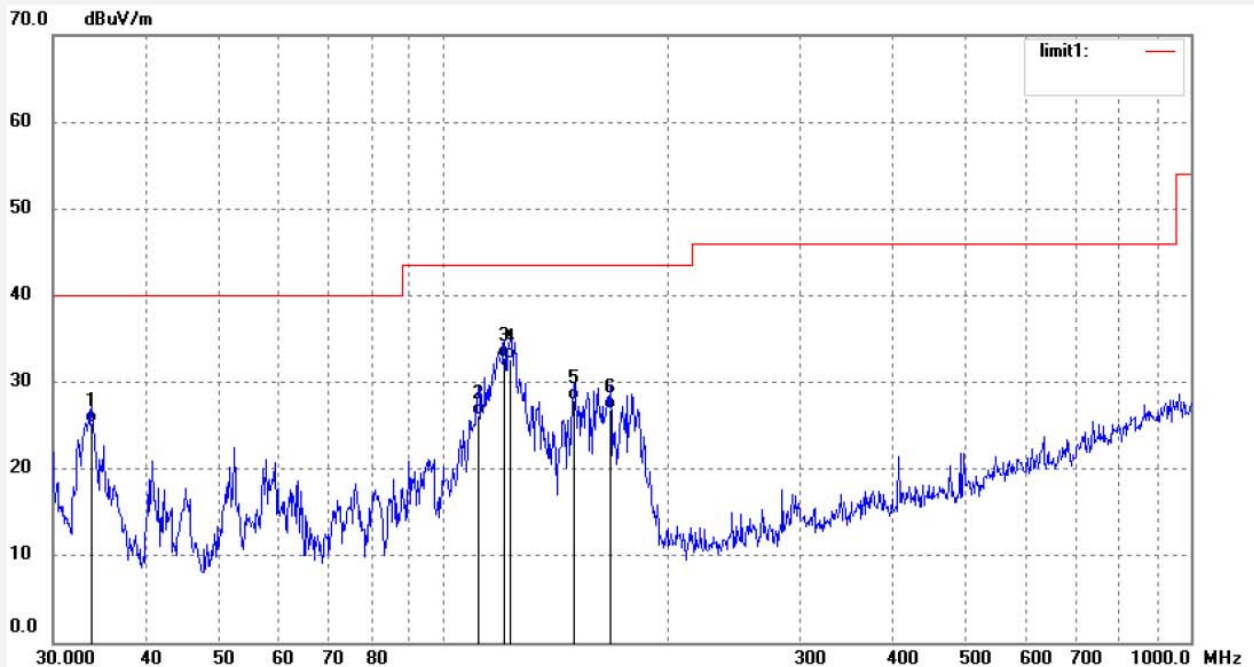


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	40.4411	42.31	-23.67	18.64	40.00	-21.36	QP	200	264	
2	114.0183	54.30	-27.33	26.97	43.50	-16.53	QP	200	198	
3	119.7672	57.65	-27.43	30.22	43.50	-13.28	QP	200	56	
4	123.1814	58.32	-27.53	30.79	43.50	-12.71	QP	200	201	
5	143.7760	56.98	-28.03	28.95	43.50	-14.55	QP	200	49	
6	147.8746	55.95	-28.05	27.90	43.50	-15.60	QP	200	211	

Job No.: FRANK2018A #661
Standard: FCC 15.247 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Light Strip
Mode: TX Channel 1(802.11b)
Model: S-01
Manufacturer: /

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/12/27/
Time: 16/48/57
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20182211

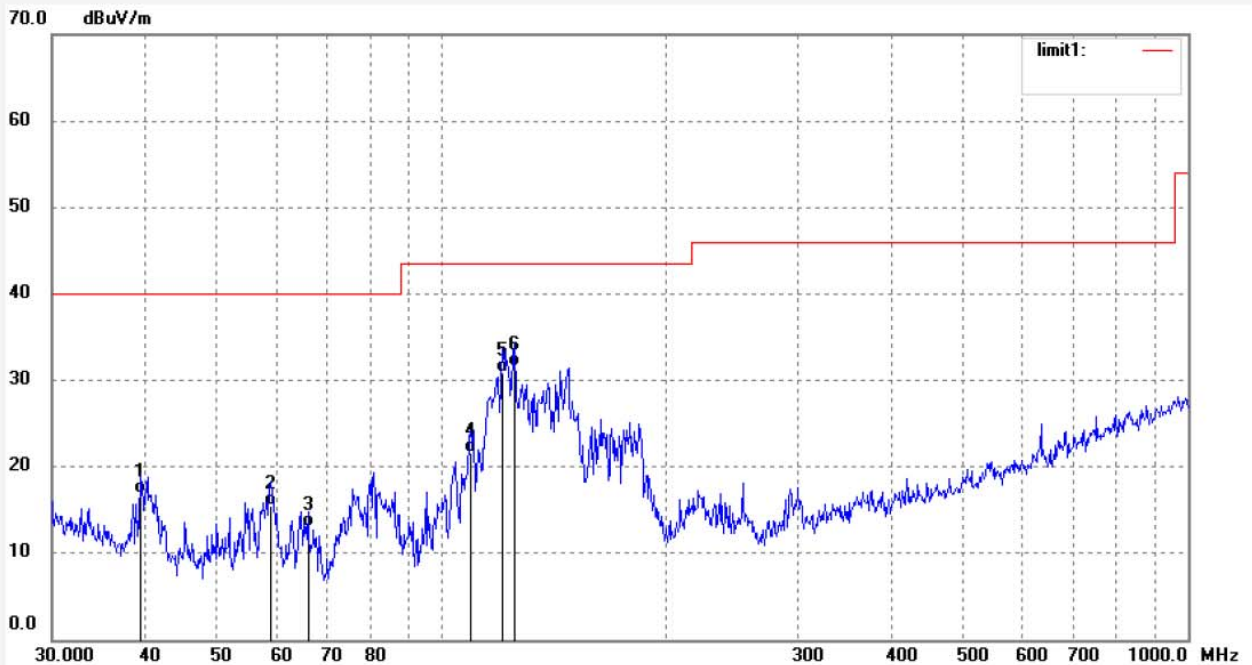


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.8066	46.37	-21.16	25.21	40.00	-14.79	QP	100	21	
2	111.2483	53.48	-27.29	26.19	43.50	-17.31	QP	100	196	
3	120.6118	60.21	-27.46	32.75	43.50	-10.75	QP	100	200	
4	123.1814	60.15	-27.53	32.62	43.50	-10.88	QP	100	199	
5	149.4415	55.96	-28.05	27.91	43.50	-15.59	QP	100	323	
6	167.2249	53.21	-26.29	26.92	43.50	-16.58	QP	100	221	

Job No.: FRANK2018A #663
Standard: FCC 15.247 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Light Strip
Mode: TX Channel 6(802.11b)
Model: S-01
Manufacturer: /

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/12/27/
Time: 16/50/31
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20182211



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	39.4587	40.29	-23.37	16.92	40.00	-23.08	QP	200	102	
2	58.8978	42.69	-27.16	15.53	40.00	-24.47	QP	200	96	
3	66.1386	40.31	-27.34	12.97	40.00	-27.03	QP	200	123	
4	109.3110	48.95	-27.39	21.56	43.50	-21.94	QP	200	169	
5	120.6118	58.32	-27.46	30.86	43.50	-12.64	QP	200	63	
6	124.9248	59.12	-27.60	31.52	43.50	-11.98	QP	200	120	