APPLICATION CERTIFICATION FCC Part 15C
On Behalf of

SWAGTEK

MINI Wi-Fi Plug
Model No.: MINI Wi-Fi Plug, LO-FP01, Mini Smart Socket

FCC ID: O55005017

Prepared for	:	SWAGTEK
Address	:	10205 NW 19th Street STE101, Miami, Florida 33172, United States
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
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Report No.	:	ATE20172536
Date of Test	:	December 25, 2017-January 23, 2018
Date of Report	:	February 6, 2018

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Description Page

Test Report Certification

Applicant	:	SWAGTEK
Manufacturer	:	SWAGTEK
Product	:	MINI Wi-Fi Plug
Model No.	:	MINI Wi-Fi Plug, LO-FP01, Mini Smart Socket
Trade name	:	LOGIC, iSWAG, UNONU

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2017
ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of Apr 05, 2017 KDB558074 D01 DTS Meas Guidance v04 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 :	December 25, 2017-January 23, 2018
Date of Report :	February 6, 2018

Prepared by : _____
(Bob Wang, Engineer)

Approved & Authorized Signer : _____
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	MINI Wi-Fi Plug
Model Number	:	MINI Wi-Fi Plug, LO-FP01, Mini Smart Socket (Note: We hereby state that these models are identical in interior structure, electrical circuits and components, Just Model name is different. Therefore only model MINI Wi-Fi Plug Plug is for tests.)
Frequency Range	:	802.11b/g/n(20MHz): 2412-2462MHz
Number of Channels	:	802.11b/g/n (20MHz):11
Antenna Gain	:	2dBi
Type of Antenna	:	Integral antenna
Power Supply	:	AC 120V; 60Hz
Data Rate	:	802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: 72.2~6.5Mbps
Modulation Type	:	DSSS, OFDM
Applicant	:	SWAGTEK
Address	:	10205 NW 19th Street STE101, Miami, Florida 33172, United States
Manufacturer	:	SWAGTEK
Address	:	10205 NW 19th Street STE101, Miami, Florida 33172, United States
Date of sample received	:	December 19, 2017
Date of Test	:	December 25, 2017-January 23, 2018
Sample number	:	1702066

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	---	---

1.3.Accessory and Auxiliary Equipment

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 (ISEDC) 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	2017 Calibrated dates	2018 Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 07, 2017	Jan. 06, 2018	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 07, 2017	Jan. 06, 2018	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 07, 2017	Jan. 06, 2018	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 07, 2017	Jan. 06, 2018	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 07, 2017	Jan. 06, 2018	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 13, 2017	Jan. 12, 2018	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 13, 2017	Jan. 12, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 13, 2017	Jan. 12, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 13, 2017	Jan. 12, 2018	1 Year
Open Switch and Control Unit	Rohde&Schwarz	OSP120 + OSP-B157	101244 + 100866	Jan. 07, 2017	Jan. 06, 2018	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 07, 2017	Jan. 06, 2018	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 07, 2017	Jan. 06, 2018	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 07, 2017	Jan. 06, 2018	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 07, 2017	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

3.2.Configuration and peripherals

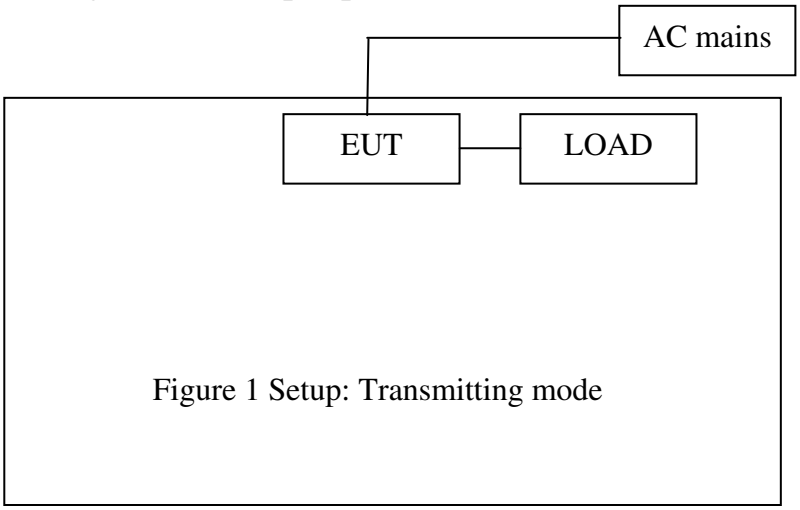


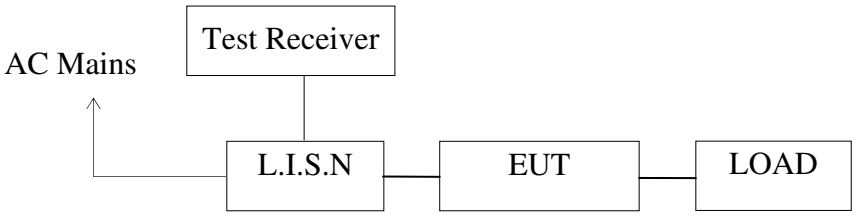
Figure 1 Setup: Transmitting mode

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
KDB558074 D01 DTS Meas Guidance v04	Duty cycle	Compliant
KDB558074 D01 DTS Meas Guidance v04	99% Occupied Bandwidth	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum average 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 15.203	Antenna Requirement	Compliant

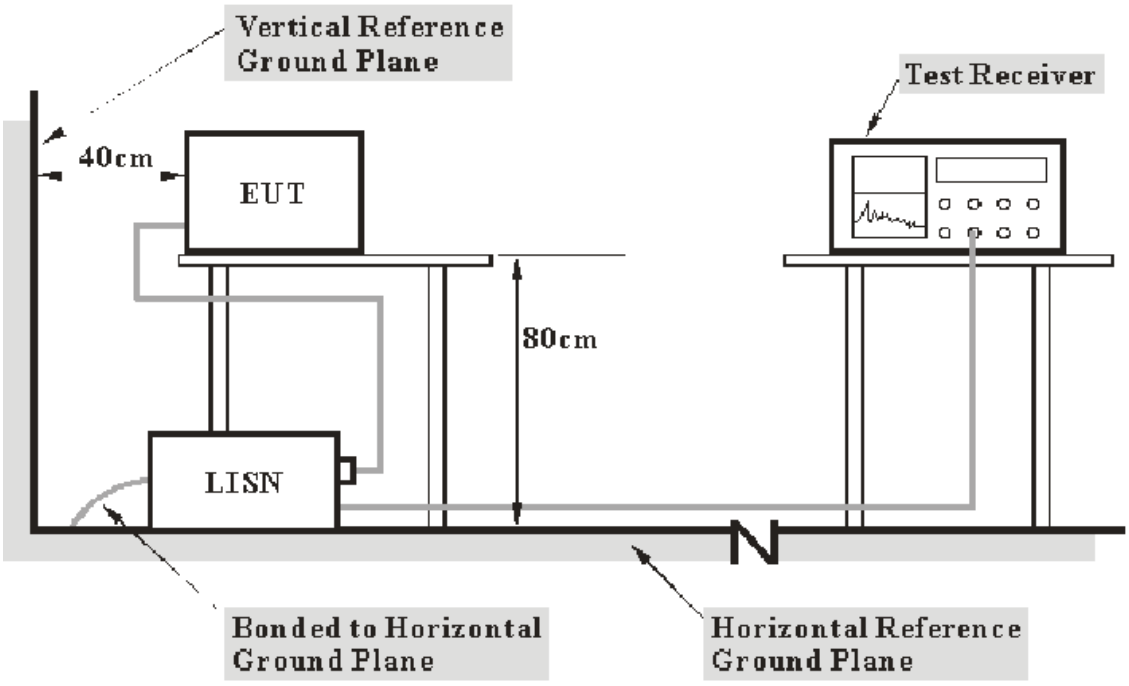
5. POWER LINE CONDUCTED MEASUREMENT

5.1.Block Diagram of Test Setup



(EUT: MINI Wi-Fi Plug)

5.1.1. Test System Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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 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)	Transducer value (dB)	QuasiPeak Level (dBμV)	Average Level (dBμV)	QuasiPeak Limit (dBμV)	Average Limit (dBμV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.5	51.1	34.2	56.0	46.0	4.9	11.8	Pass

Frequency(MHz) = Emission frequency in MHz
Transducer value(dB) = Insertion loss of LISN + Cable Loss
Level(dBμV) = Quasi-peak Reading/Average Reading + Transducer value
Limit (dBμV) = Limit stated in standard
Margin = Limit (dBμV) - Level (dBμV)

Calculation Formula:
Margin = Limit (dBμV) - Level (dBμV)

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.

All data was recorded in the Quasi-peak and average detection mode.

The spectral diagrams are attached as below.

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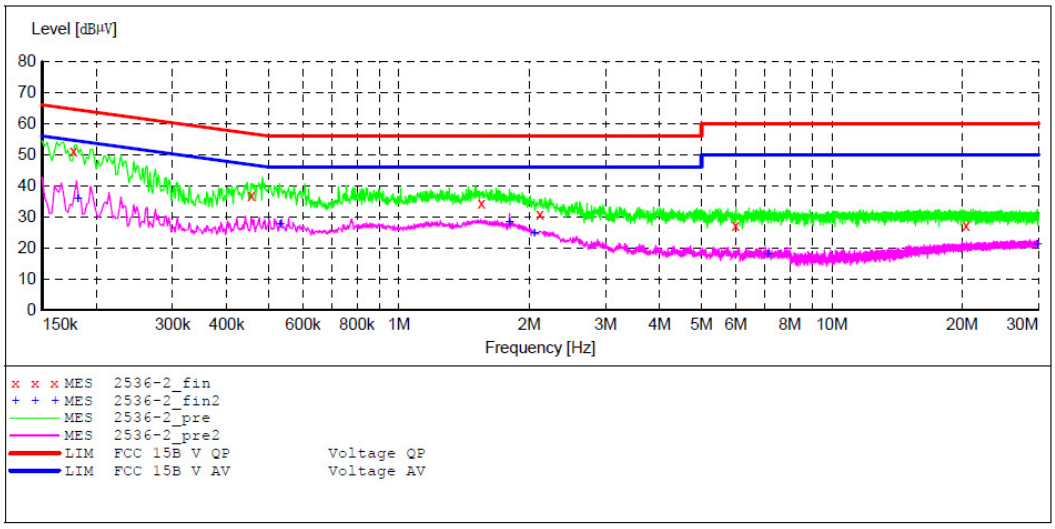
CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                  MINI Wi-Fi Plug  M/N: MINI Wi-Fi Plug
Manufacturer:         SWAGTEK
Operating Condition:  ON
Test Site:            2#Shielding Room
Operator:             Frank
Test Specification:   N    120V/60Hz
Comment:              Report NO.:ATE20172536
Start of Test:        2017-12-25 / 11:20:39
```

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: "2536-2_fin"

2017-12-25 11:23

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	51.10	10.8	65	13.5	QP	N	GND
0.456000	36.80	11.0	57	20.0	QP	N	GND
1.549500	34.30	11.2	56	21.7	QP	N	GND
2.116500	30.80	11.3	56	25.2	QP	N	GND
5.991000	27.30	11.5	60	32.7	QP	N	GND
20.418000	27.30	11.7	60	32.7	QP	N	GND

MEASUREMENT RESULT: "2536-2_fin2"

2017-12-25 11:23

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.181500	35.80	10.8	54	18.6	AV	N	GND
0.532500	27.70	11.0	46	18.3	AV	N	GND
1.801500	28.50	11.2	46	17.5	AV	N	GND
2.058000	24.90	11.3	46	21.1	AV	N	GND
7.111500	18.10	11.5	50	31.9	AV	N	GND
29.827500	21.30	11.8	50	28.7	AV	N	GND

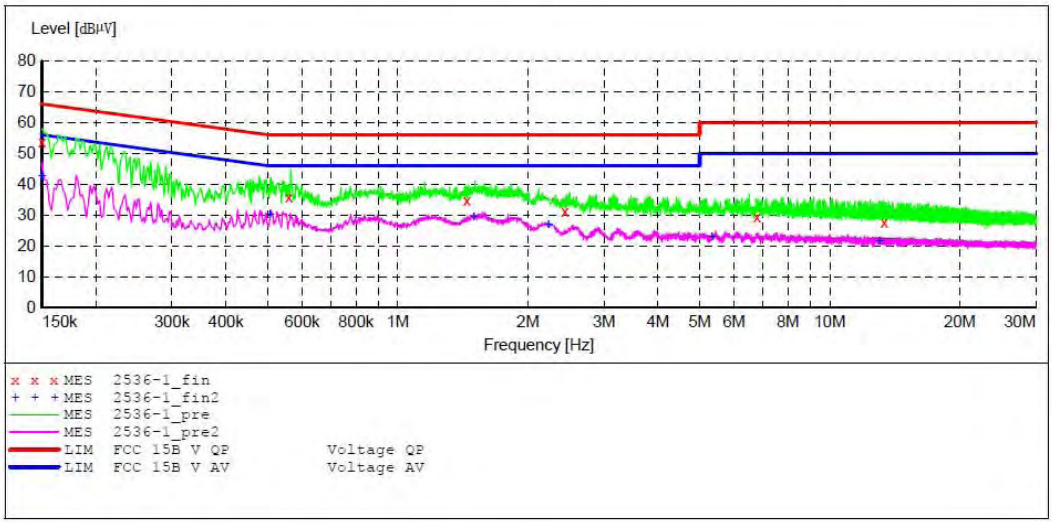
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

```
EUT:                  MINI Wi-Fi Plug  M/N: MINI Wi-Fi Plug
Manufacturer:         SWAGTEK
Operating Condition:  ON
Test Site:            2#Shielding Room
Operator:             Frank
Test Specification:   L    120V/60Hz
Comment:              Report NO.:ATE20172536
Start of Test:        2017-12-25 / 11:16:47
```

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: "2536-1_fin"

2017-12-25 11:19

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	53.80	10.8	66	12.2	QP	L1	GND
0.559500	35.80	11.0	56	20.2	QP	L1	GND
1.446000	34.70	11.2	56	21.3	QP	L1	GND
2.440500	31.20	11.3	56	24.8	QP	L1	GND
6.787500	29.60	11.5	60	30.4	QP	L1	GND
13.380000	27.70	11.6	60	32.3	QP	L1	GND

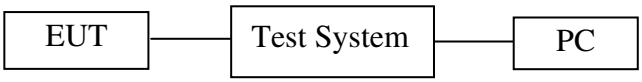
MEASUREMENT RESULT: "2536-1_fin2"

2017-12-25 11:19

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	42.70	10.8	56	13.3	AV	L1	GND
0.505500	30.00	11.0	46	16.0	AV	L1	GND
1.500000	29.60	11.2	46	16.4	AV	L1	GND
2.233500	26.90	11.3	46	19.1	AV	L1	GND
5.338500	23.20	11.5	50	26.8	AV	L1	GND
13.029000	21.70	11.6	50	28.3	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. 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 6.1.

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 . We select 2412MHz, 2437MHz, 2462MHz 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.

6.6.Test Result

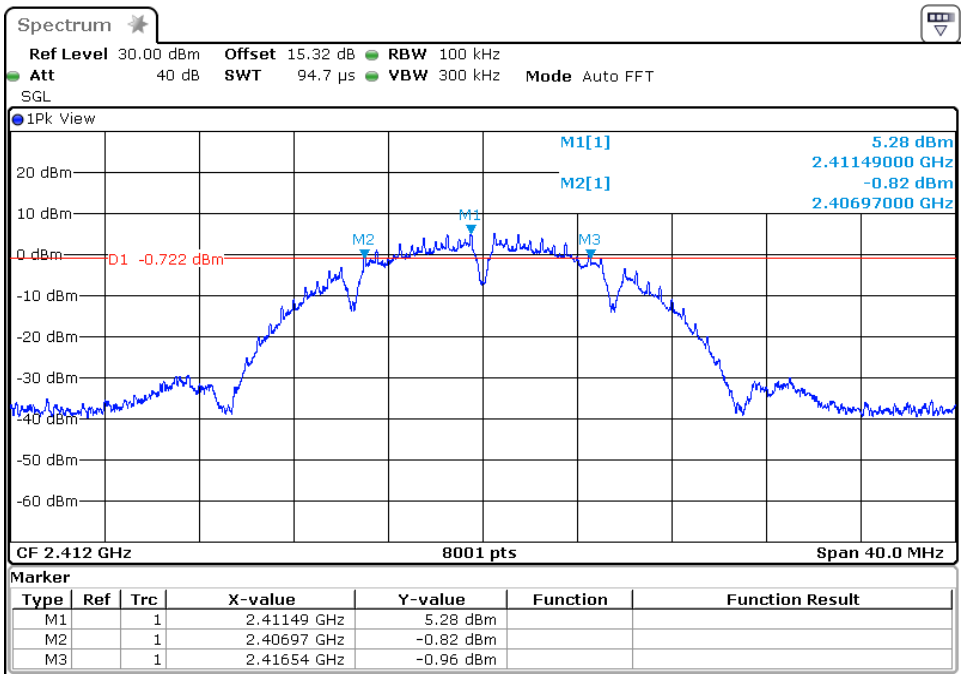
The test was performed with 802.11b			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	9.570	> 0.5MHz
Middle	2437	9.585	> 0.5MHz
High	2462	9.095	> 0.5MHz

The test was performed with 802.11g			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	16.335	> 0.5MHz
Middle	2437	16.340	> 0.5MHz
High	2462	16.340	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	17.585	> 0.5MHz
Middle	2437	17.580	> 0.5MHz
High	2462	17.590	> 0.5MHz

The spectrum analyzer plots are attached as below.

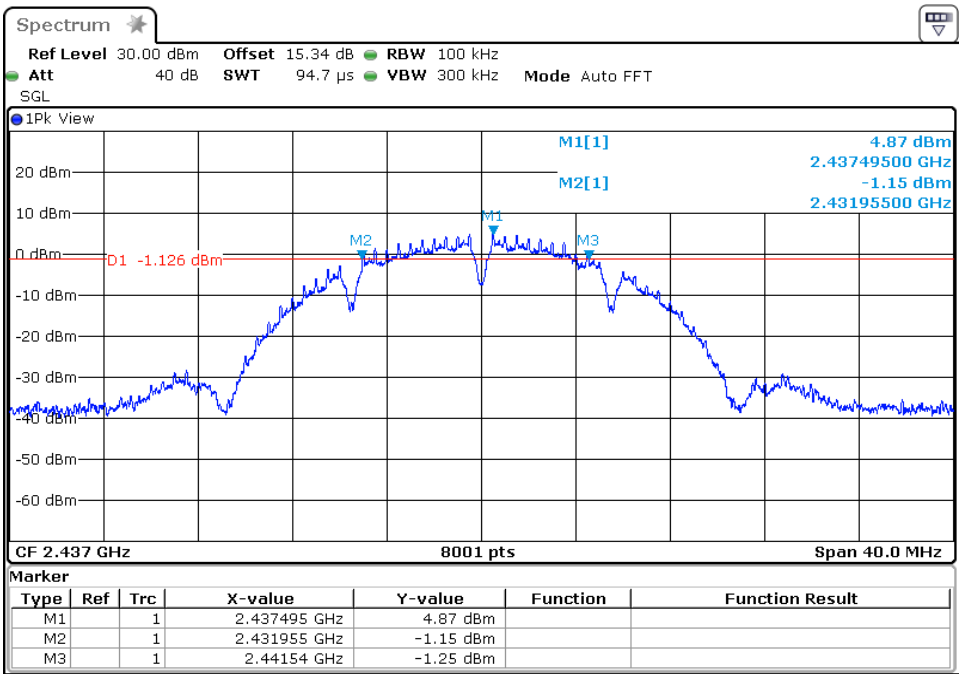
802.11b Channel Low 2412MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.41149 GHz	5.28 dBm		
M2		1	2.40697 GHz	-0.82 dBm		
M3		1	2.41654 GHz	-0.96 dBm		

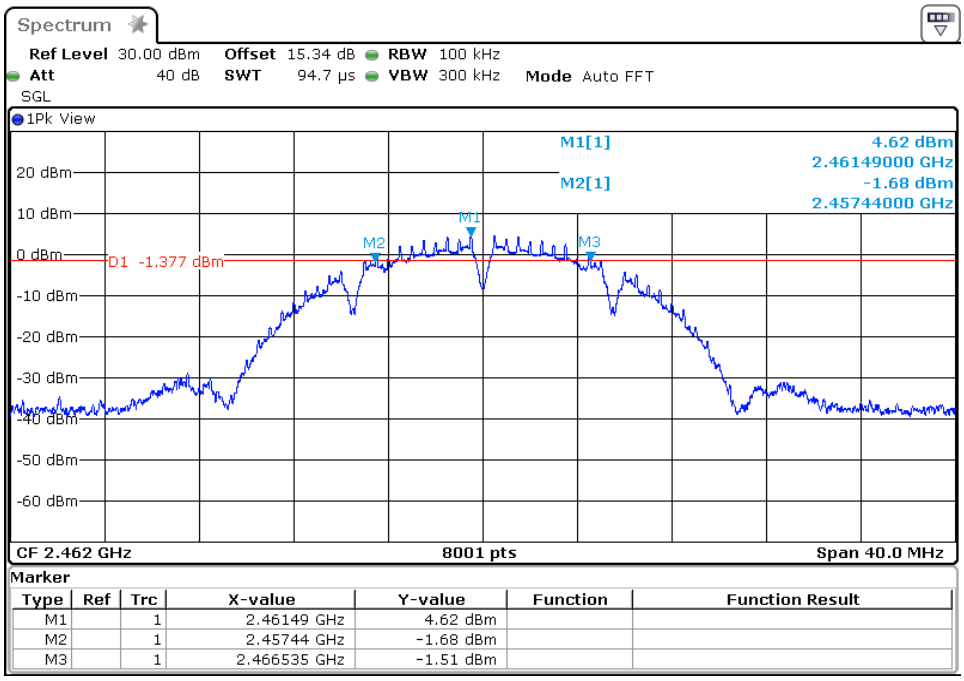
802.11b Channel Middle 2437MHz



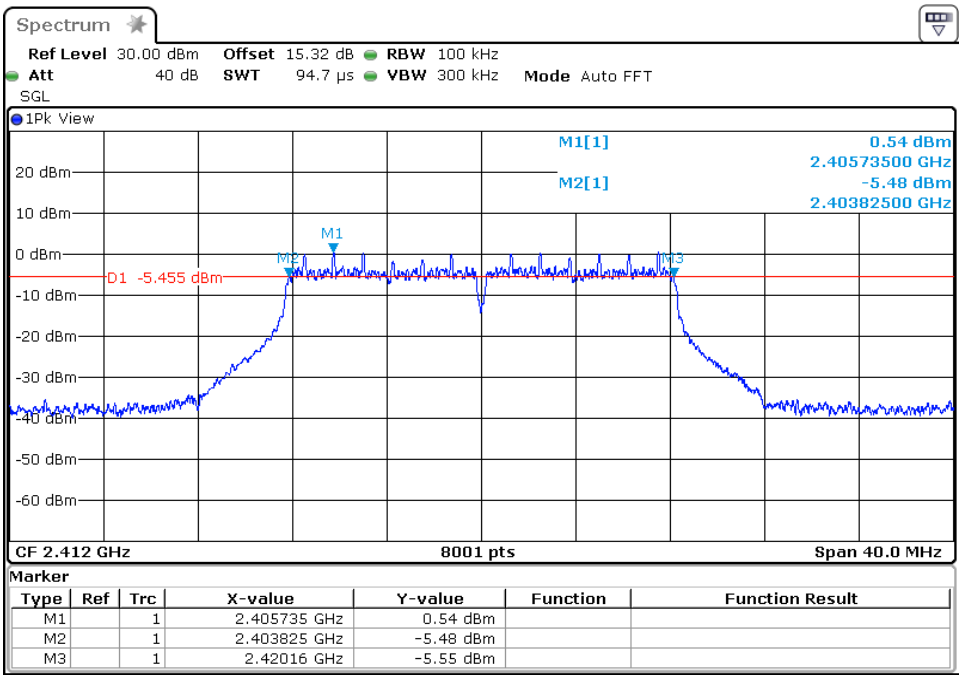
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.437495 GHz	4.87 dBm		
M2		1	2.431955 GHz	-1.15 dBm		
M3		1	2.44154 GHz	-1.25 dBm		

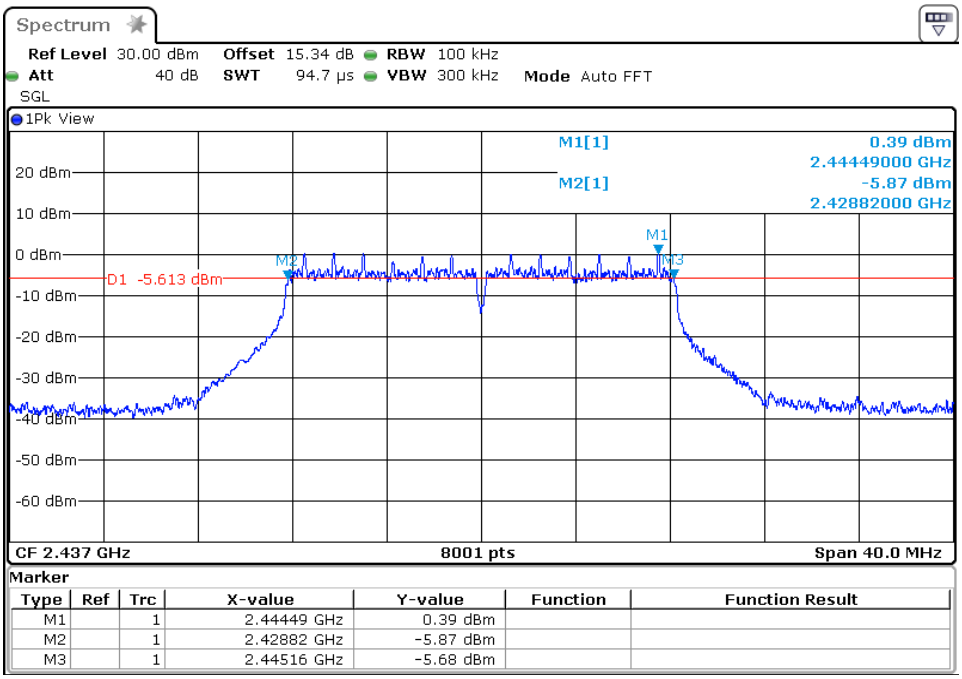
802.11b Channel High 2462MHz



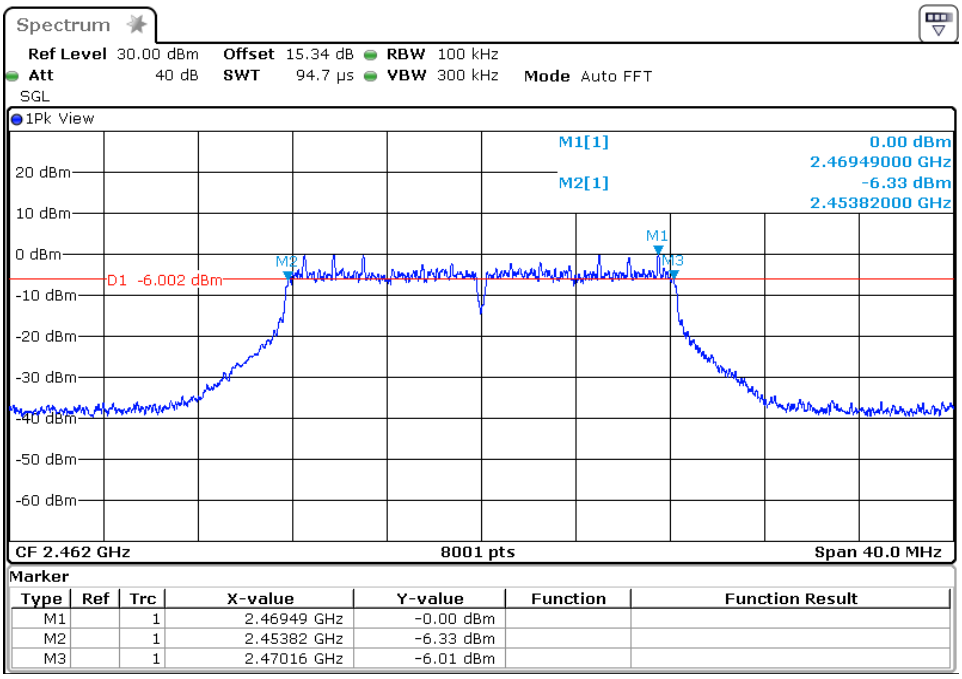
802.11g Channel Low 2412MHz



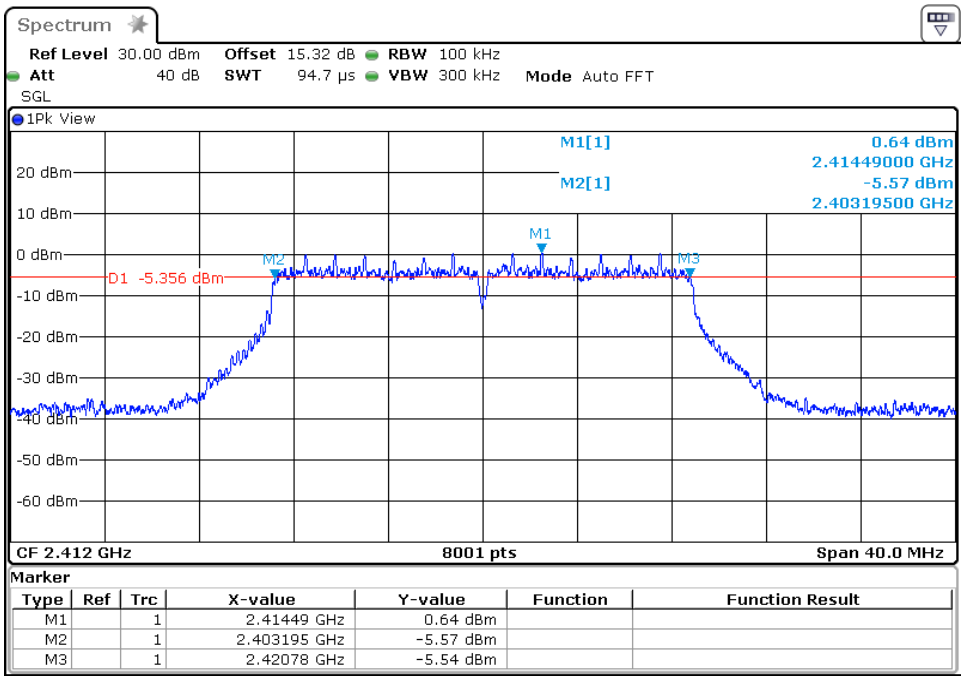
802.11g Channel Middle 2437MHz



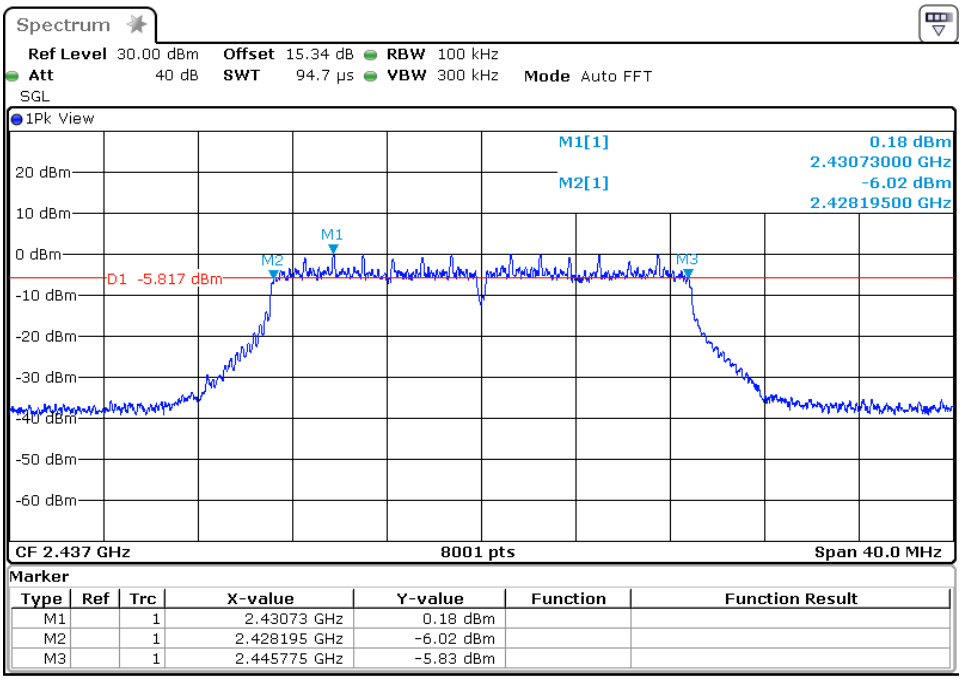
802.11g Channel High 2462MHz



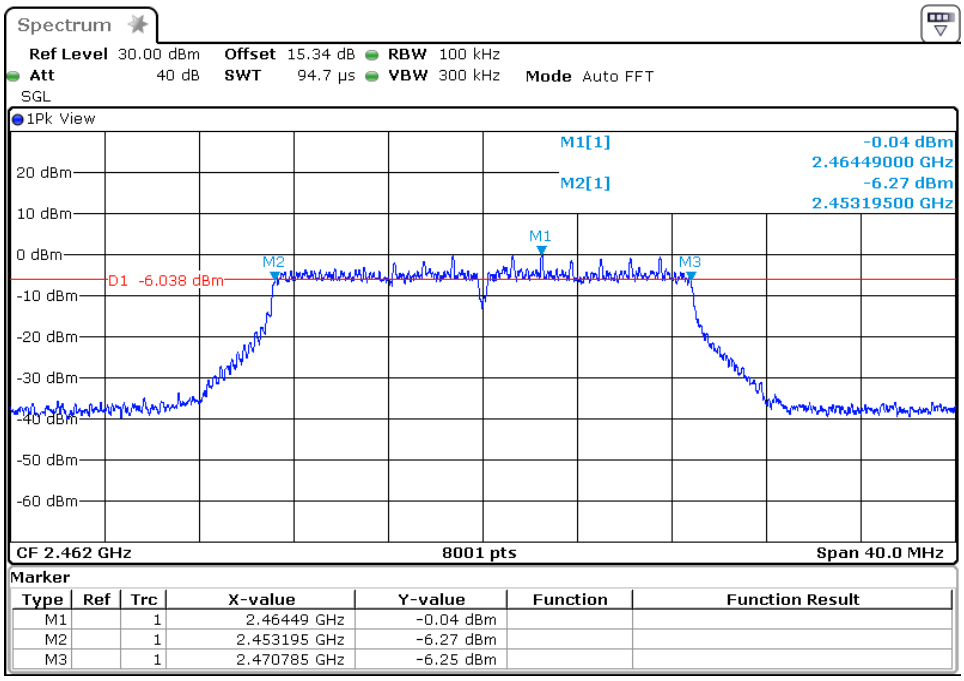
802.11n Channel Low 2412MHz (20MHz)



802.11n Channel Middle 2437MHz(20MHz)

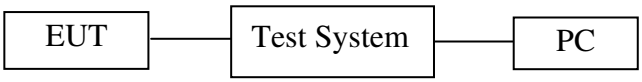


802.11n Channel High 2462MHz(20MHz)



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 . We select 2412MHz, 2437MHz, 2462MHz 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 ≥ 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≤16.7 microseconds.)

7.5.Test Result

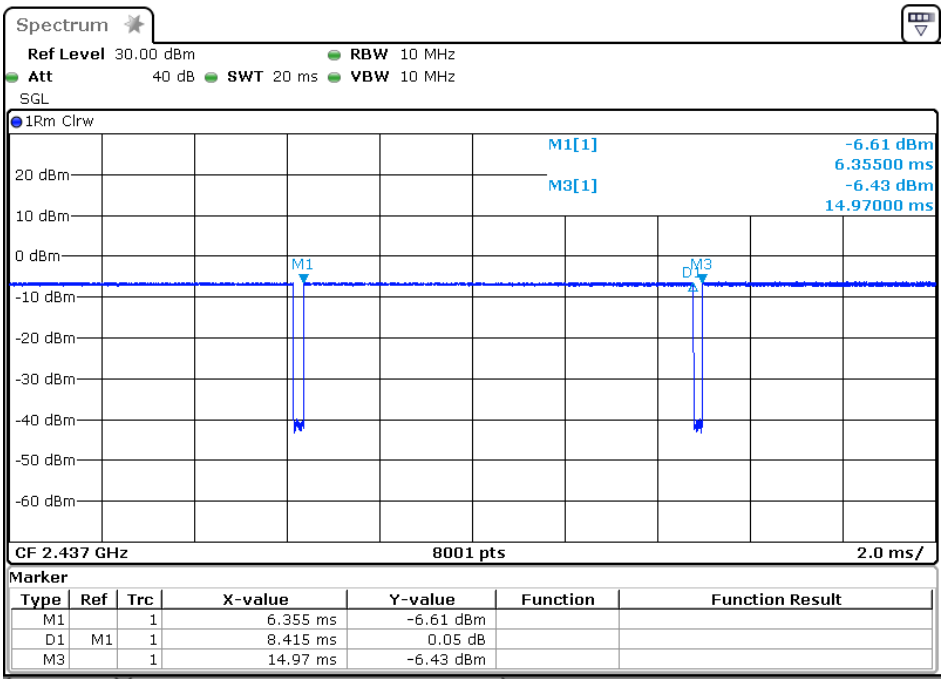
The test was performed with 802.11b			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	97.68%	0.10

The test was performed with 802.11g			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	97.20%	0.12

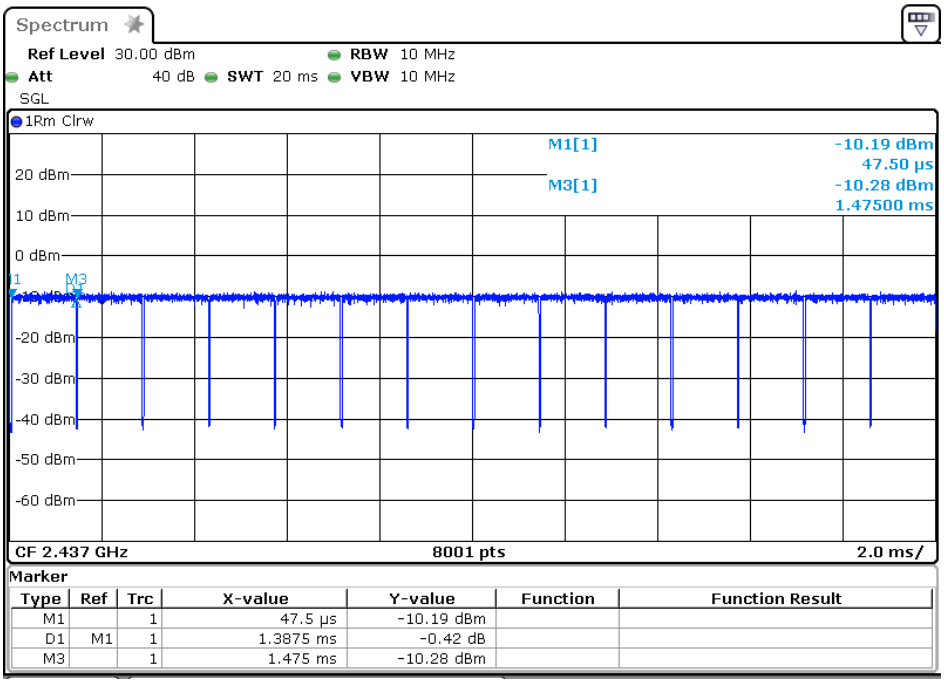
The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	97.00%	0.13

The spectrum analyzer plots are attached as below.

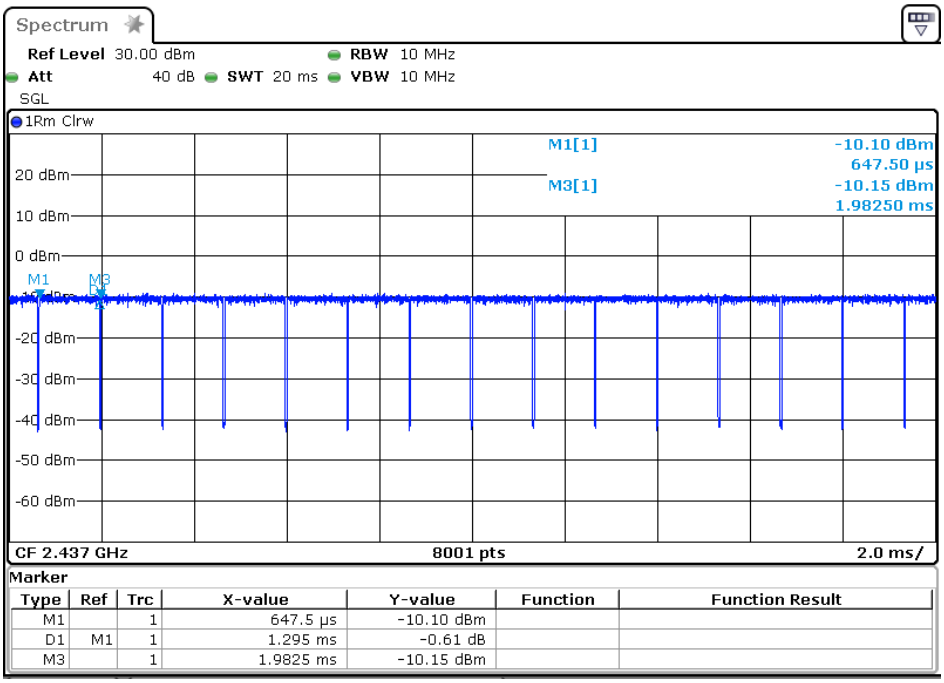
802.11b Channel Middle 2437MHz



802.11g Channel Middle 2437MHz



802.11n Channel Middle 2437MHz(20MHz)

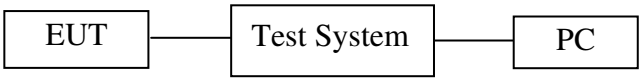


Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	647.5 µs	-10.10 dBm		
D1	M1	1	1.295 ms	-0.61 dB		
M3		1	1.9825 ms	-10.15 dBm		

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

8.5.Test Procedure

8.5.1.The EUT was tested according to DTS test procedure of Apr 05, 2017 KDB558 074 D01 DTS Meas Guidance v04 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 ≥ 3 x 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						
Channel	Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (mW)	Limits dBm / W
Low	2412	9.18	0.10	9.28	8.47	30 dBm / 1 W
Middle	2437	9.30	0.10	9.40	8.71	30 dBm / 1 W
High	2462	9.24	0.10	9.34	8.59	30 dBm / 1 W

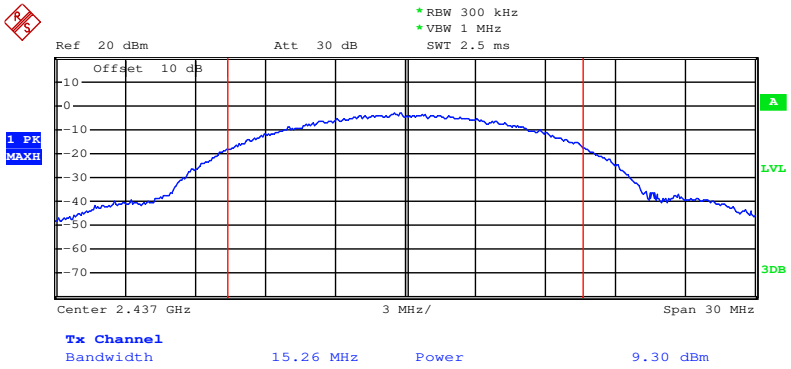
The test was performed with 802.11g						
Channel	Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (mW)	Limits dBm / W
Low	2412	8.39	0.12	8.51	7.10	30 dBm / 1 W
Middle	2437	8.74	0.12	8.86	7.69	30 dBm / 1 W
High	2462	8.85	0.12	8.97	7.89	30 dBm / 1 W

The test was performed with 802.11n (20MHz)						
Channel	Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (mW)	Limits dBm / W
Low	2412	8.86	0.13	8.99	7.93	30 dBm / 1 W
Middle	2437	8.73	0.13	8.86	7.69	30 dBm / 1 W
High	2462	8.42	0.13	8.55	7.16	30 dBm / 1 W

The spectrum analyzer plots are attached as below.

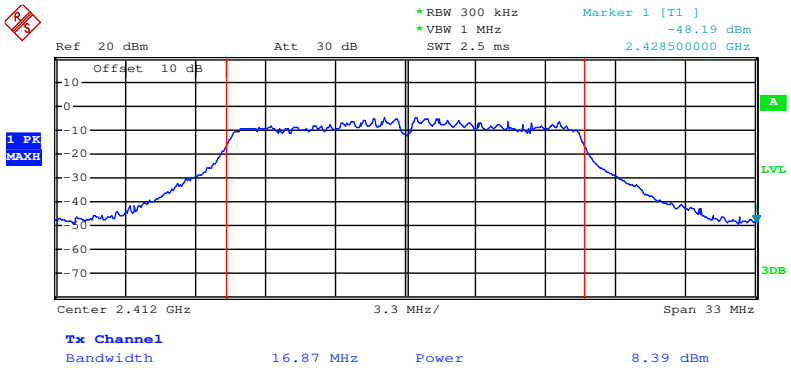
802.11b Channel Low 2412MHz

802.11b Channel Middle 2437MHz

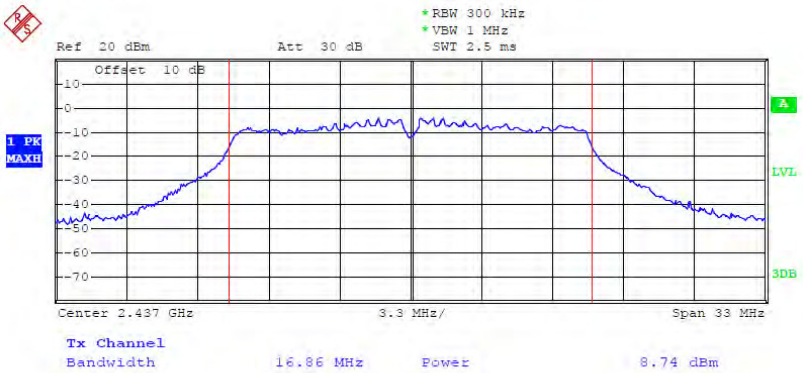


802.11b Channel High 2462MHz

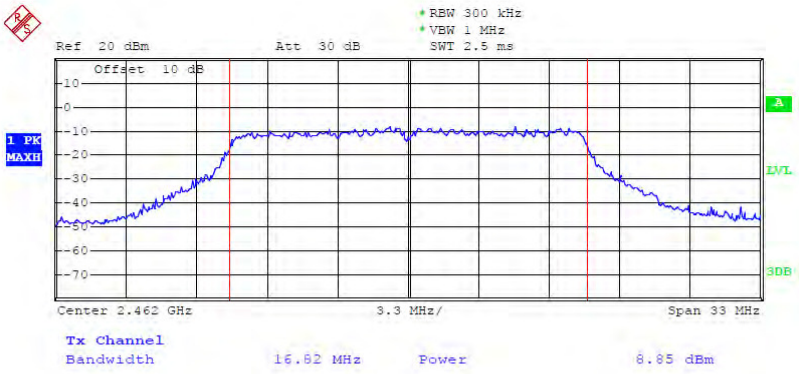
802.11g Channel Low 2412MHz



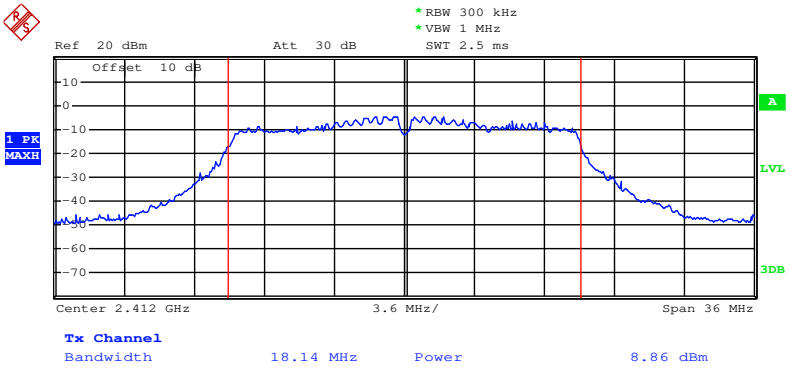
802.11g Channel Middle 2437MHz



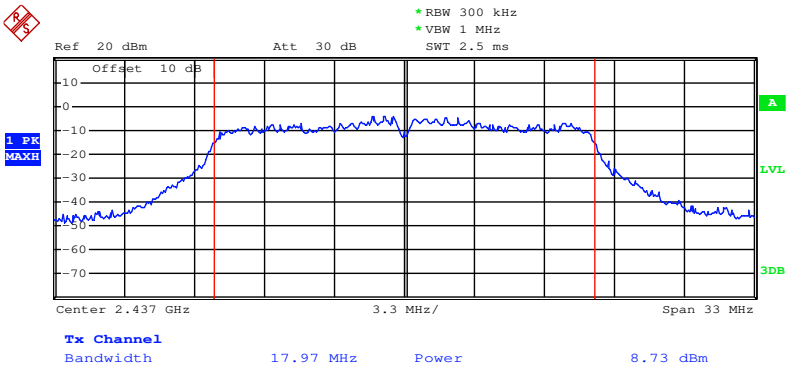
802.11g Channel High 2462MHz



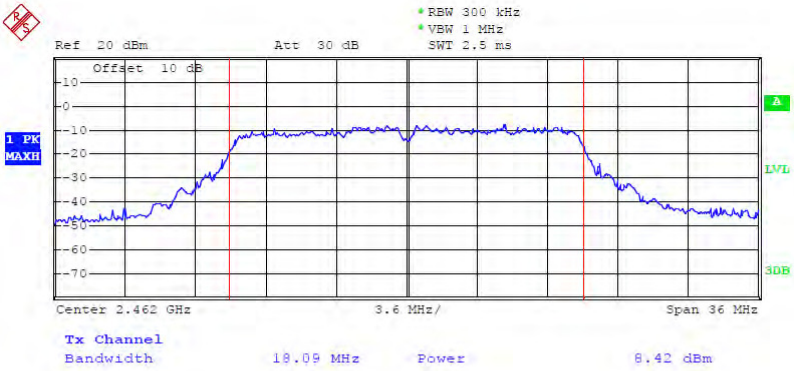
802.11n Channel Low 2412MHz (20MHz)



802.11n Channel Middle 2437MHz (20MHz)

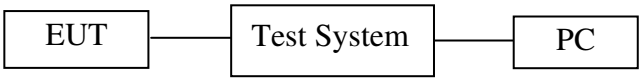


802.11n Channel High 2462MHz (20MHz)



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 . We select 2412MHz, 2437MHz, 2462MHz 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 ±2%):

Measure the dyty 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×OBW.
Set RBW to: 3kHz≤ RBW≤100kHz.
Set VBW≥ 3×RBW
Detector=power averaging(RMS) or sample detector(when RMS not available).
Ensure that the number of measurement points in sweep≥2×span/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 10log(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

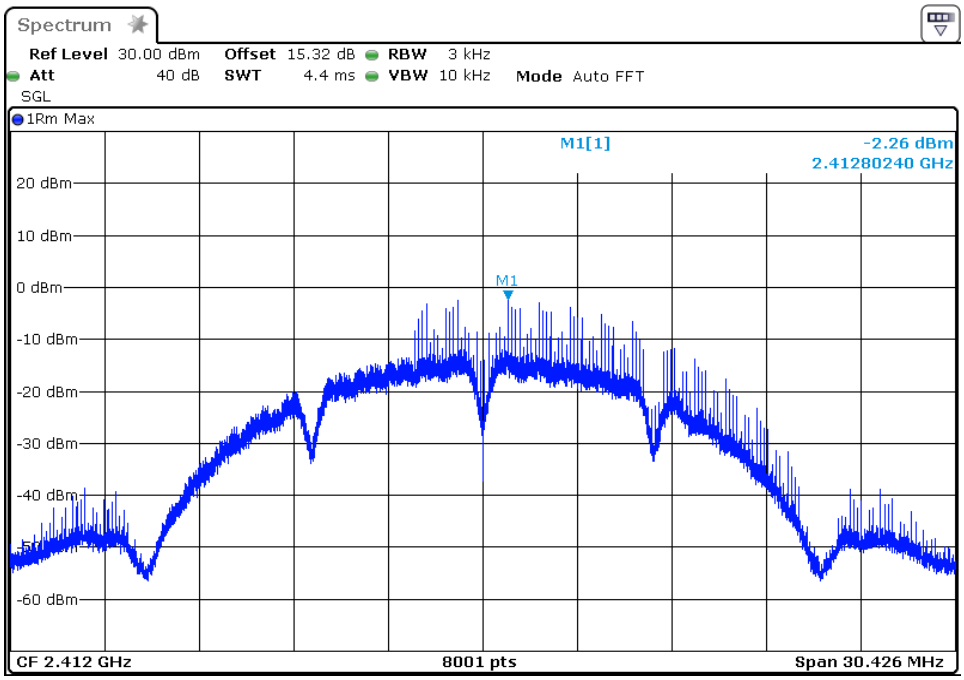
The test was performed with 802.11b					
Channel	Frequency (MHz)	AVG Power Spectral Density (dBm)	10log(1/ duty cycle)	Final Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-2.26	0.10	-2.16	8 dBm
Middle	2437	-3.89	0.10	-3.79	8 dBm
High	2462	-4.03	0.10	-3.93	8 dBm

The test was performed with 802.11g					
Channel	Frequency (MHz)	AVG Power Spectral Density (dBm)	10log(1/ duty cycle)	Final Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-16.01	0.12	-15.89	8 dBm
Middle	2437	-17.33	0.12	-17.21	8 dBm
High	2462	-16.86	0.12	-16.74	8 dBm

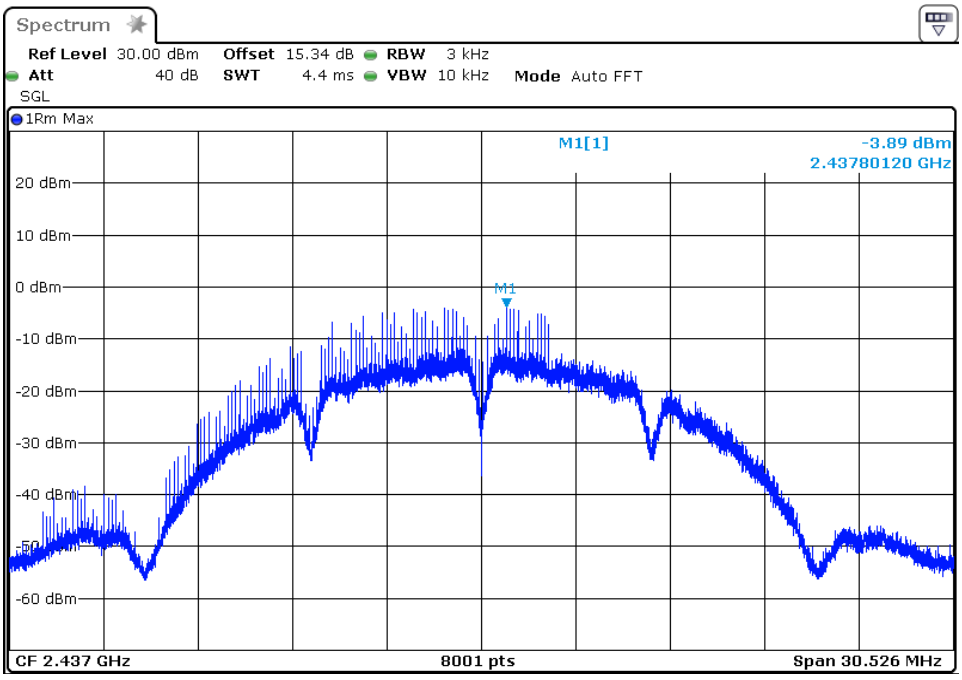
The test was performed with 802.11n (20MHz)					
Channel	Frequency (MHz)	AVG Power Spectral Density (dBm)	10log(1/ duty cycle)	Final Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-16.43	0.13	-16.30	8 dBm
Middle	2437	-16.29	0.13	-16.16	8 dBm
High	2462	-16.86	0.13	-16.73	8 dBm

The spectrum analyzer plots are attached as below.

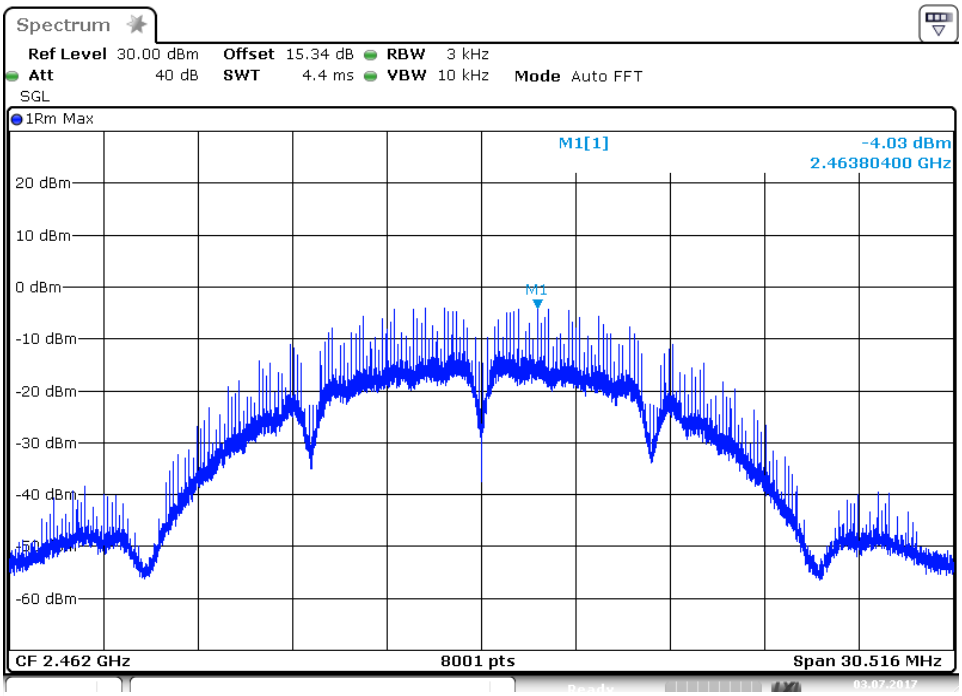
802.11b Channel Low 2412MHz



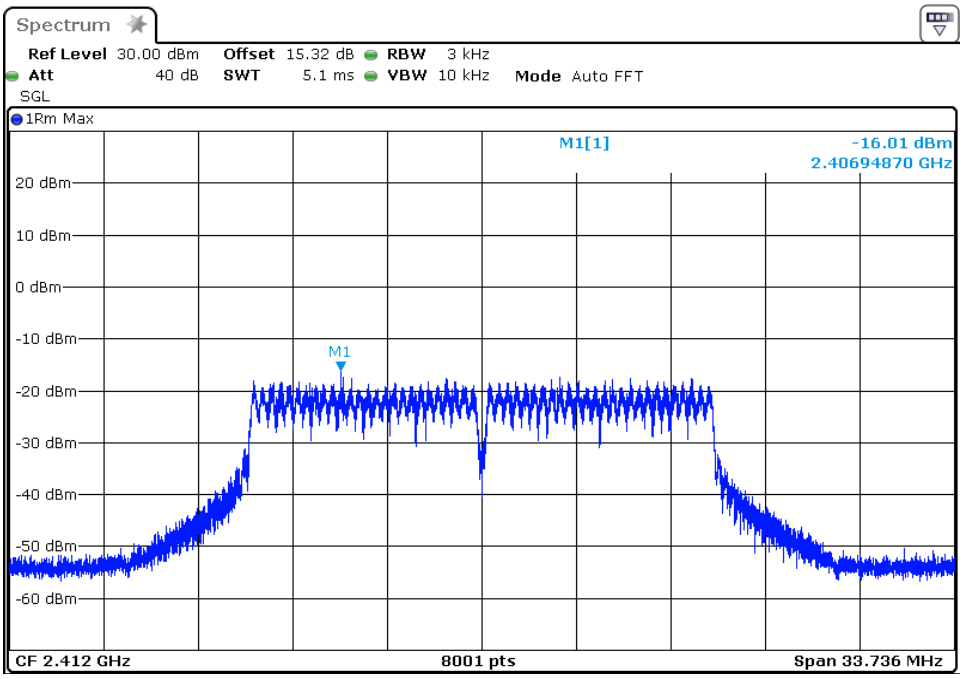
802.11b Channel Middle 2437MHz



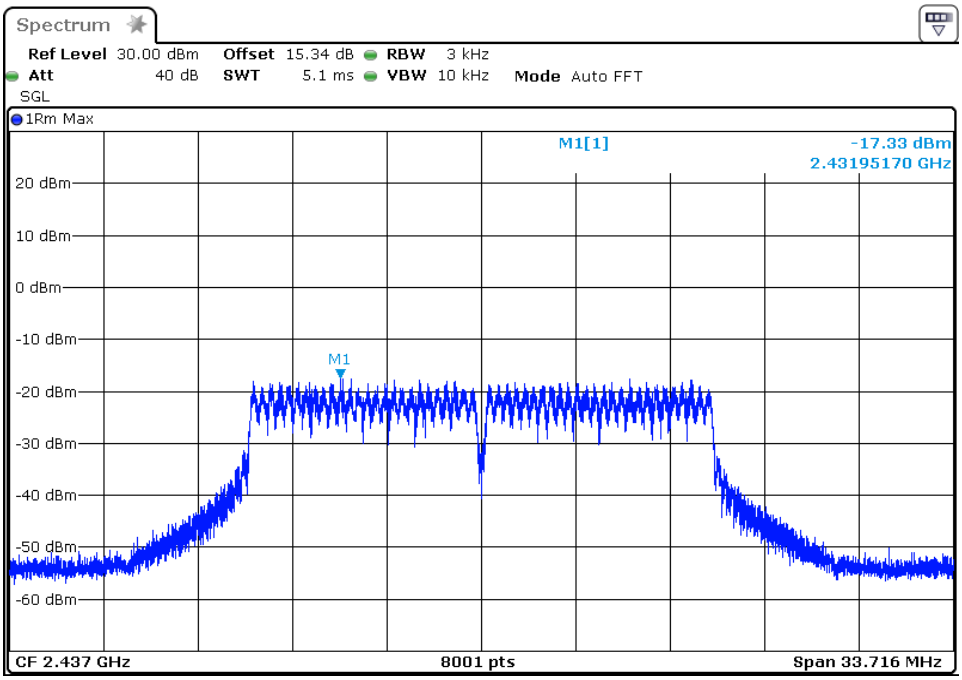
802.11b Channel High 2462MHz



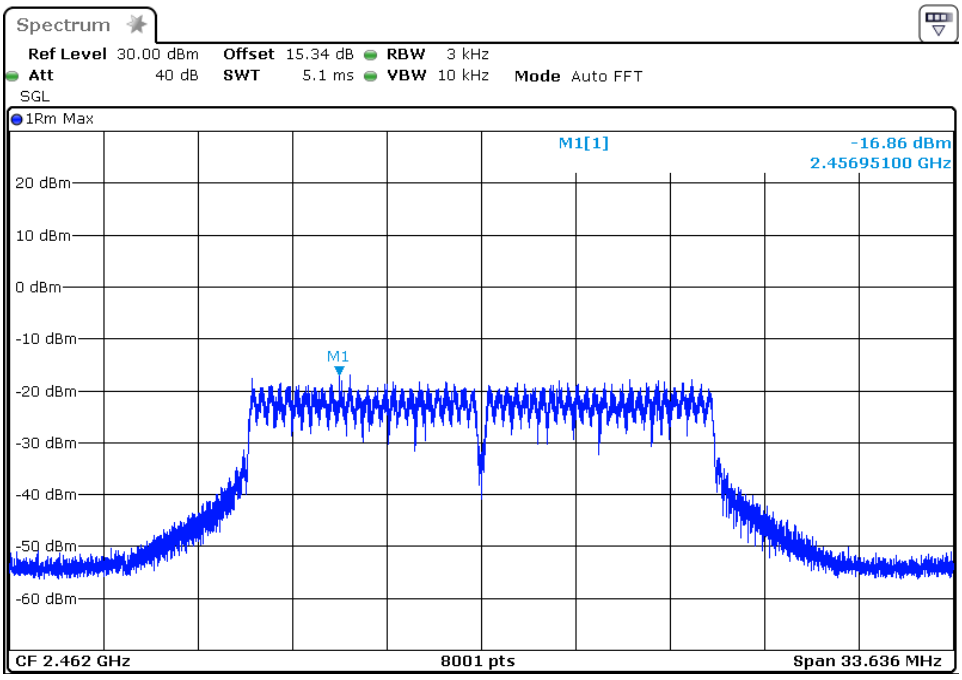
802.11g Channel Low 2412MHz



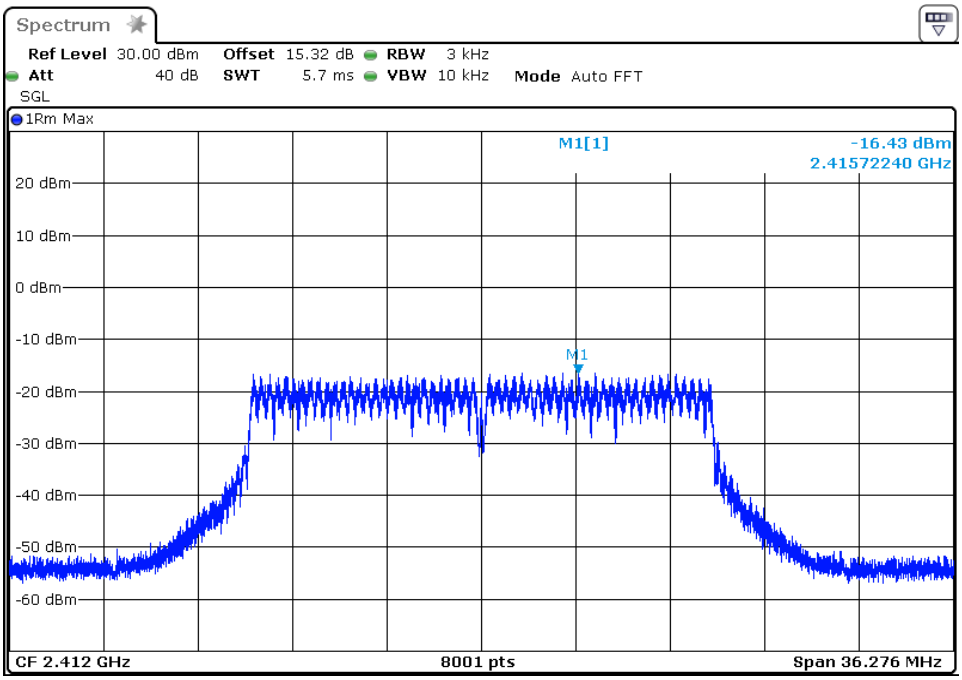
802.11g Channel Middle 2437MHz



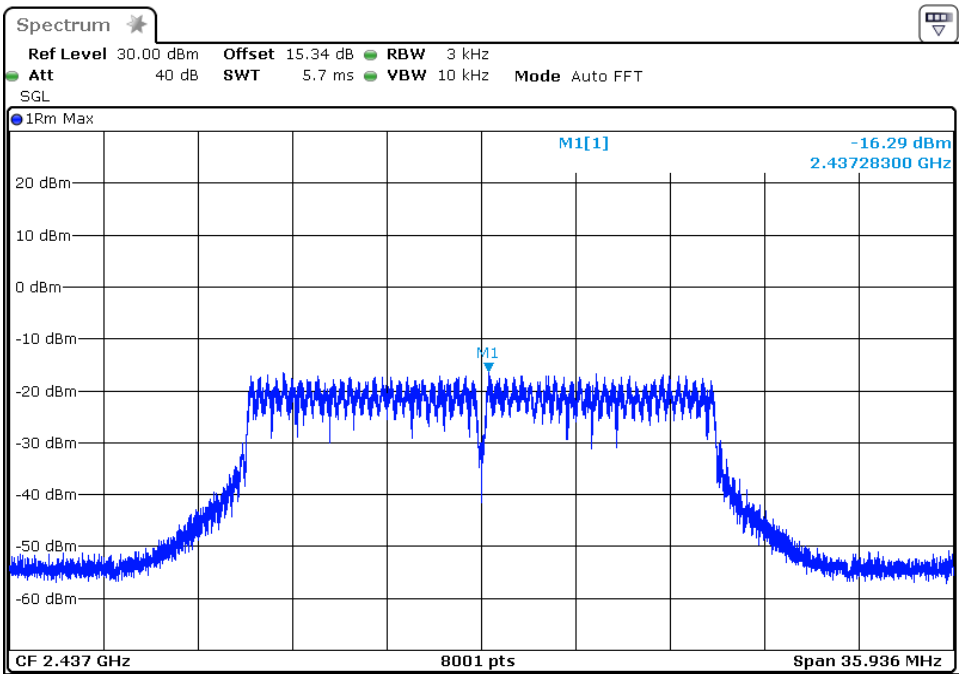
802.11g Channel High 2462MHz



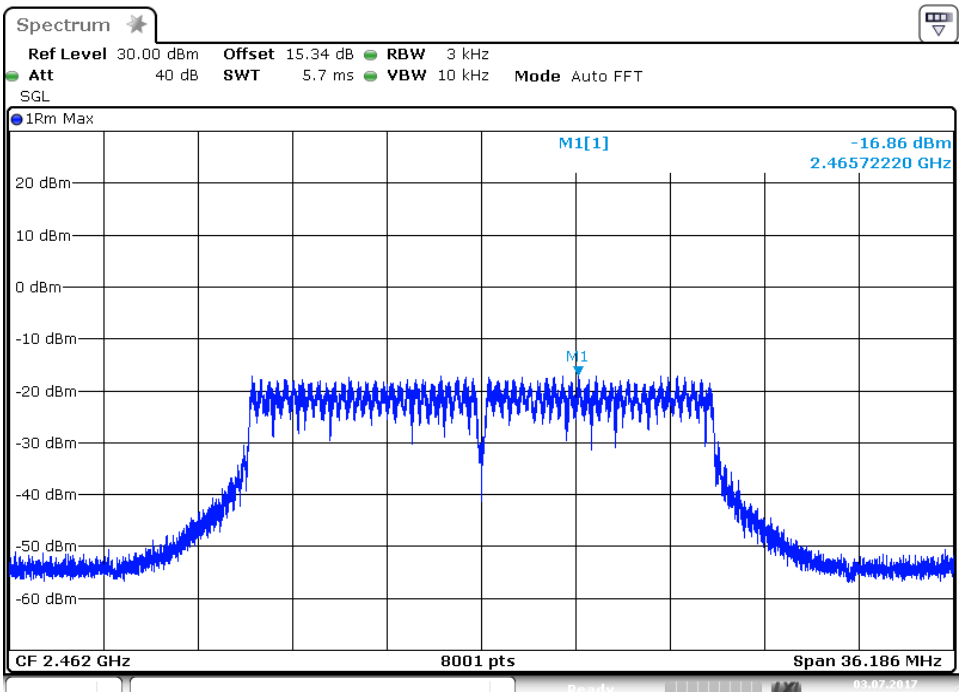
802.11n Channel Low 2412MHz (20MHz)



802.11n Channel Middle 2437MHz (20MHz)

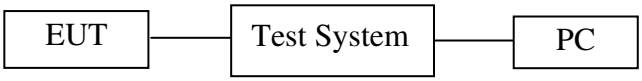


802.11n Channel High 2462MHz(20MHz)


Spectrum
Ref Level 30.00 dBm Offset 15.34 dB RBW 3 kHz
Att 40 dB SWT 5.7 ms VBW 10 kHz Mode Auto FFT
SGL
1Rm Max
M1[1]
-16.86 dBm
2.46572220 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
M1
CF 2.462 GHz
8001 pts
Span 36.186 MHz

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 9.1.

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 MHz. We select 2412MHz, 2462MHz 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=100kHz, VBW=300kHz

10.5.8.The band edges was measured and recorded.

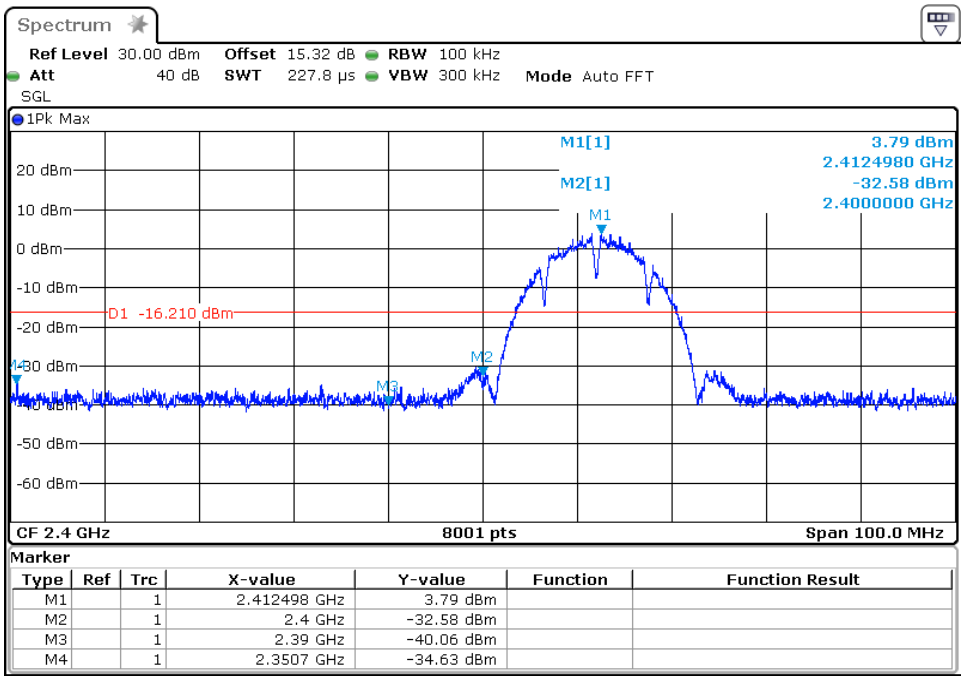
10.6.Test Result

The test was performed with 802.11b		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400	36.37	> 30dBc
2483.5	43.34	> 30dBc

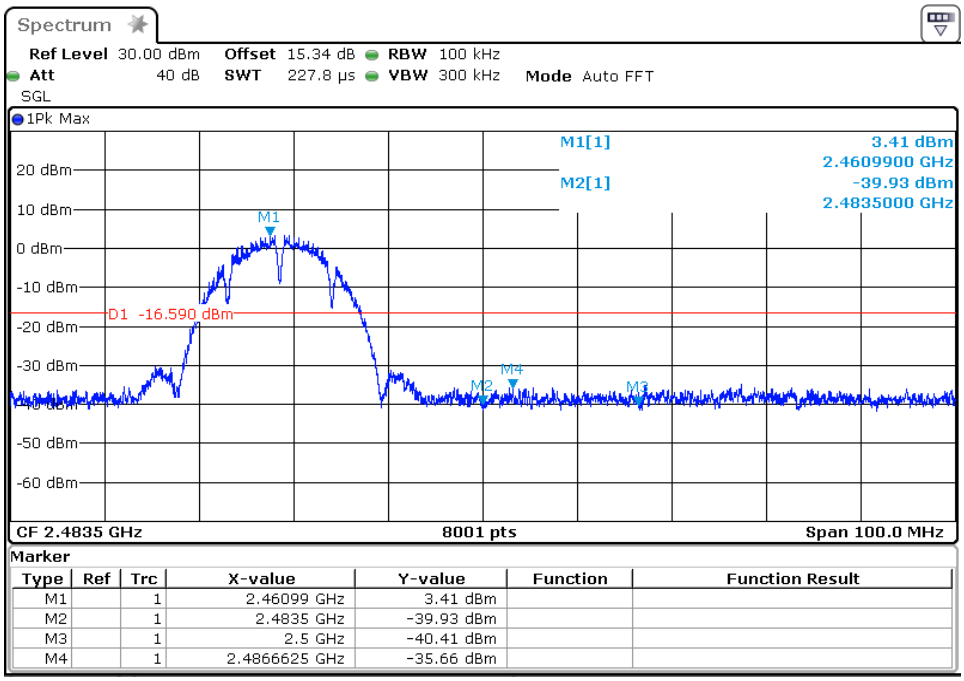
The test was performed with 802.11g		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400	38.00	> 30dBc
2483.5	36.75	> 30dBc

The test was performed with 802.11n (20MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400	37.19	> 30dBc
2483.5	38.84	> 30dBc

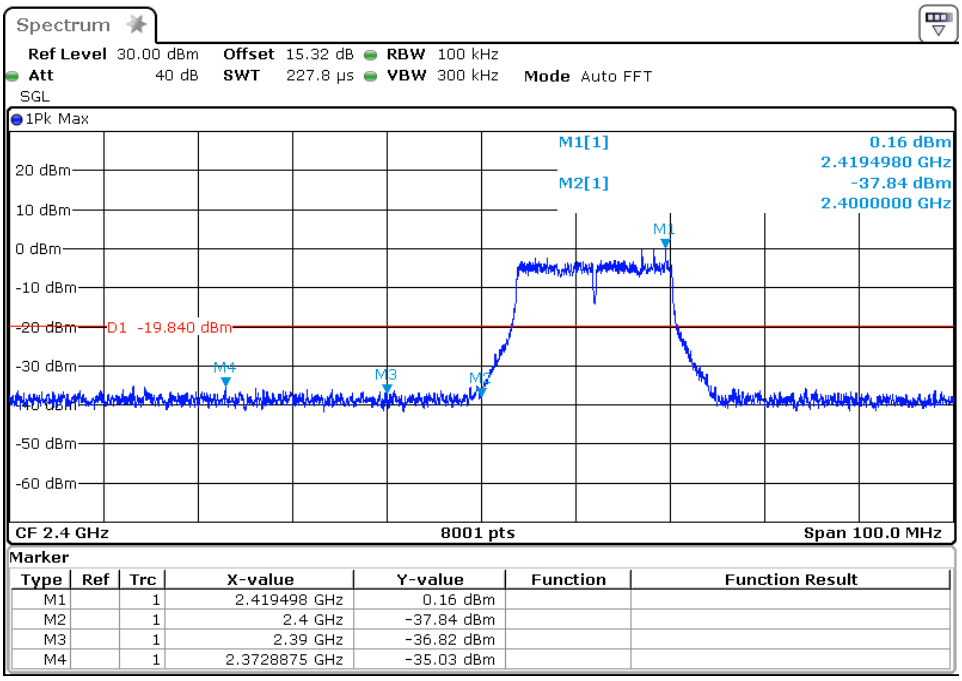
802.11b Channel Low 2412MHz



802.11b Channel High 2462MHz



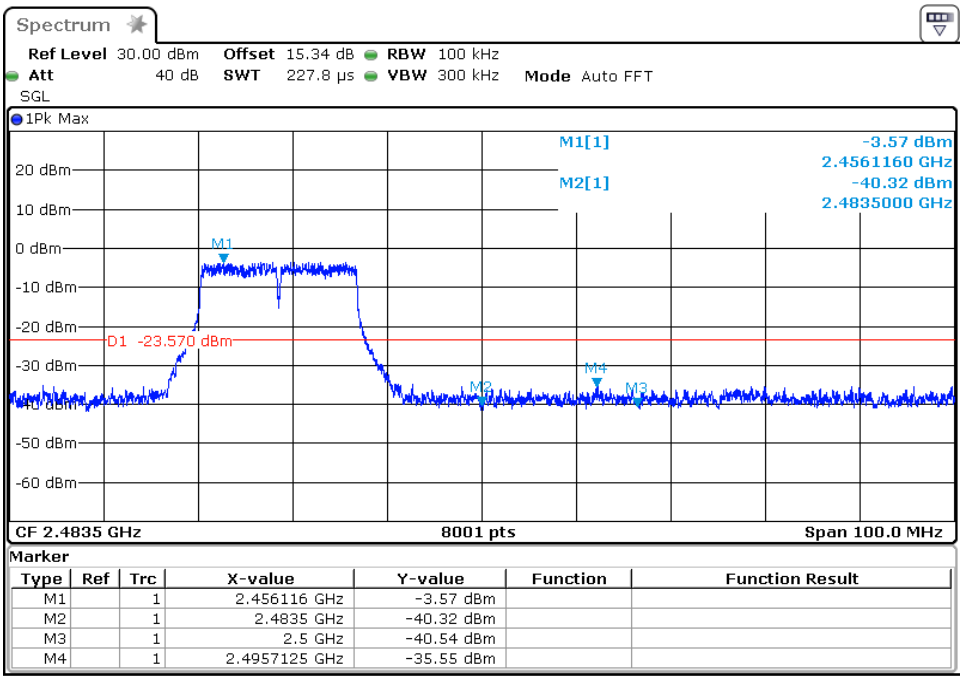
802.11g Channel Low 2412MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.419498 GHz	0.16 dBm		
M2		1	2.4 GHz	-37.84 dBm		
M3		1	2.39 GHz	-36.82 dBm		
M4		1	2.3728875 GHz	-35.03 dBm		

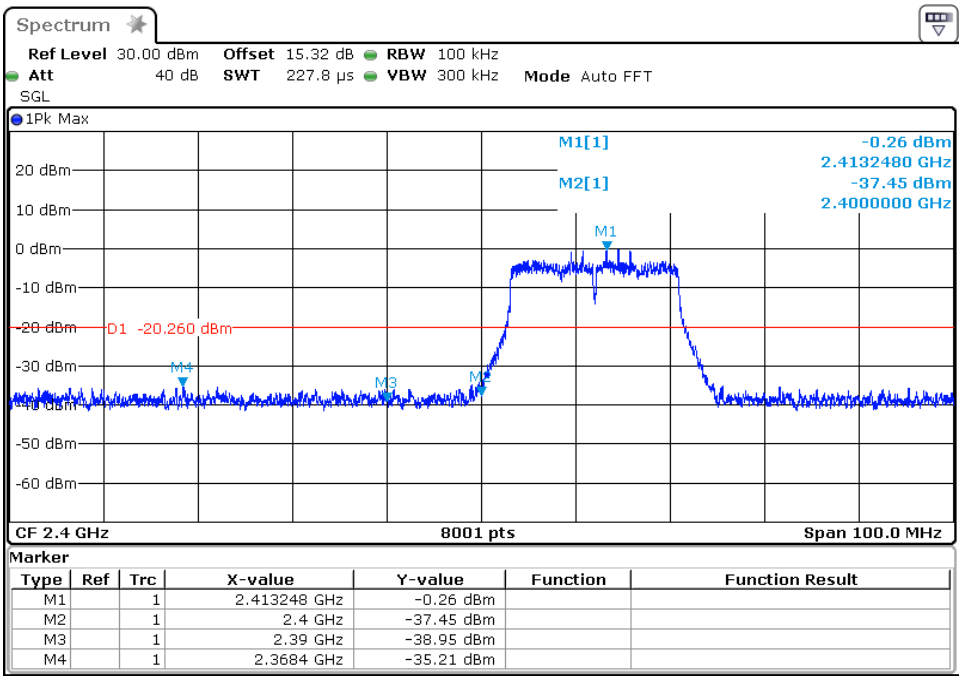
802.11g Channel High 2462MHz



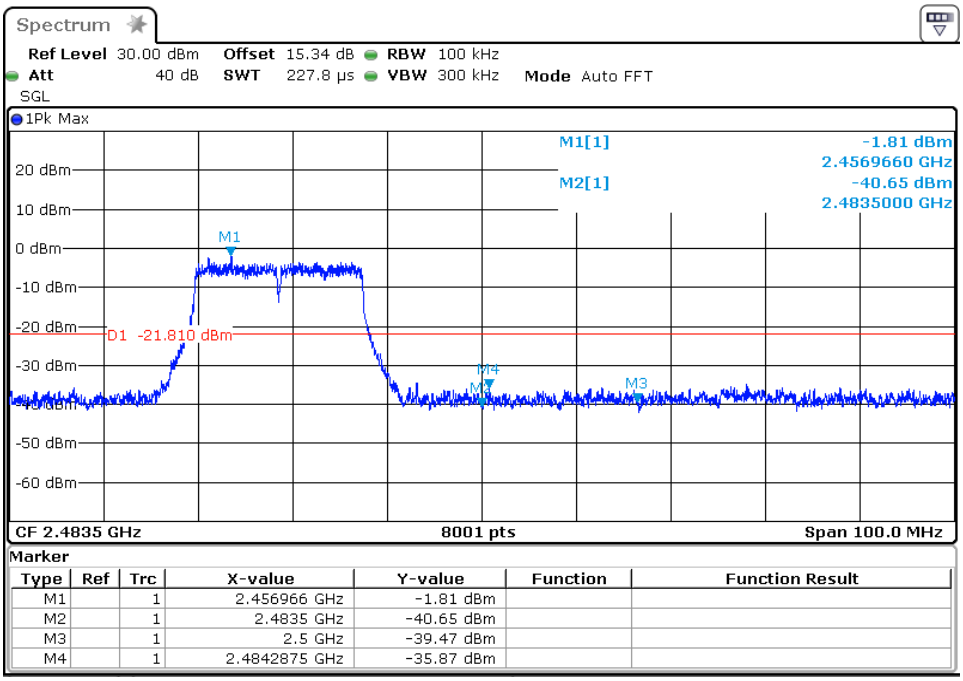
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.456116 GHz	-3.57 dBm		
M2		1	2.4835 GHz	-40.32 dBm		
M3		1	2.5 GHz	-40.54 dBm		
M4		1	2.4957125 GHz	-35.55 dBm		

802.11n Channel Low 2412MHz (20MHz)



802.11n Channel High 2462MHz (20MHz)



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 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).

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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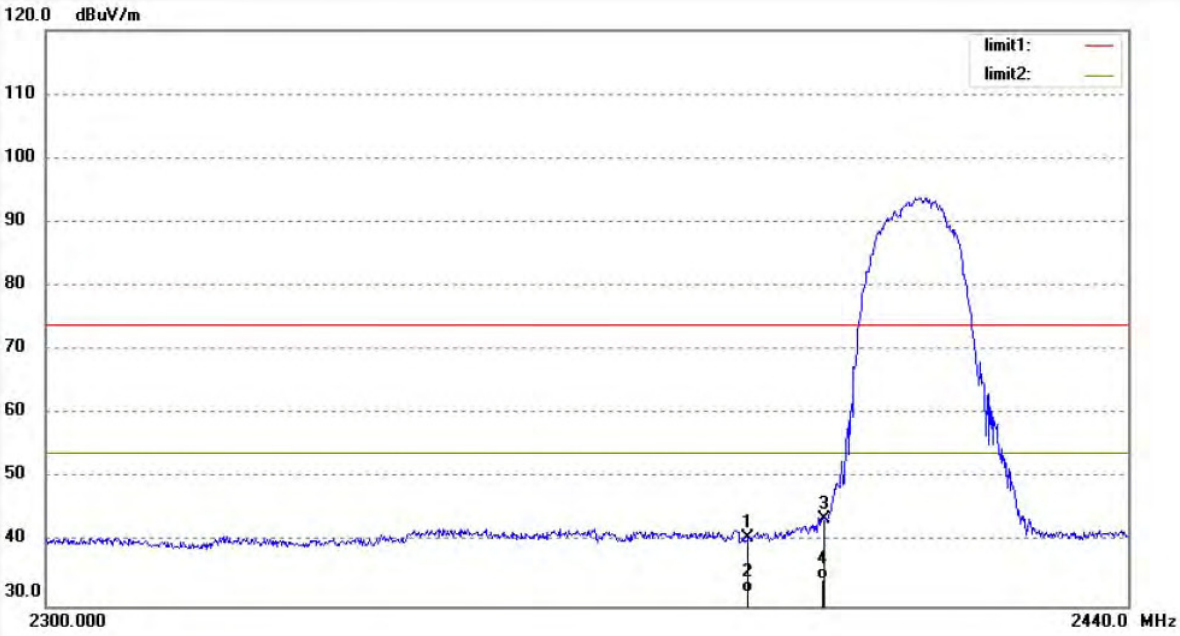
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: Frank2017 #2178
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11B)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 09/12/14
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	45.00	-4.32	40.68	74.00	-33.32	peak	250	56	
2	2390.000	36.46	-4.32	32.14	54.00	-21.86	AVG	250	72	
3	2400.000	47.93	-4.27	43.66	74.00	-30.34	peak	250	108	
4	2400.000	38.49	-4.27	34.22	54.00	-19.78	AVG	250	102	

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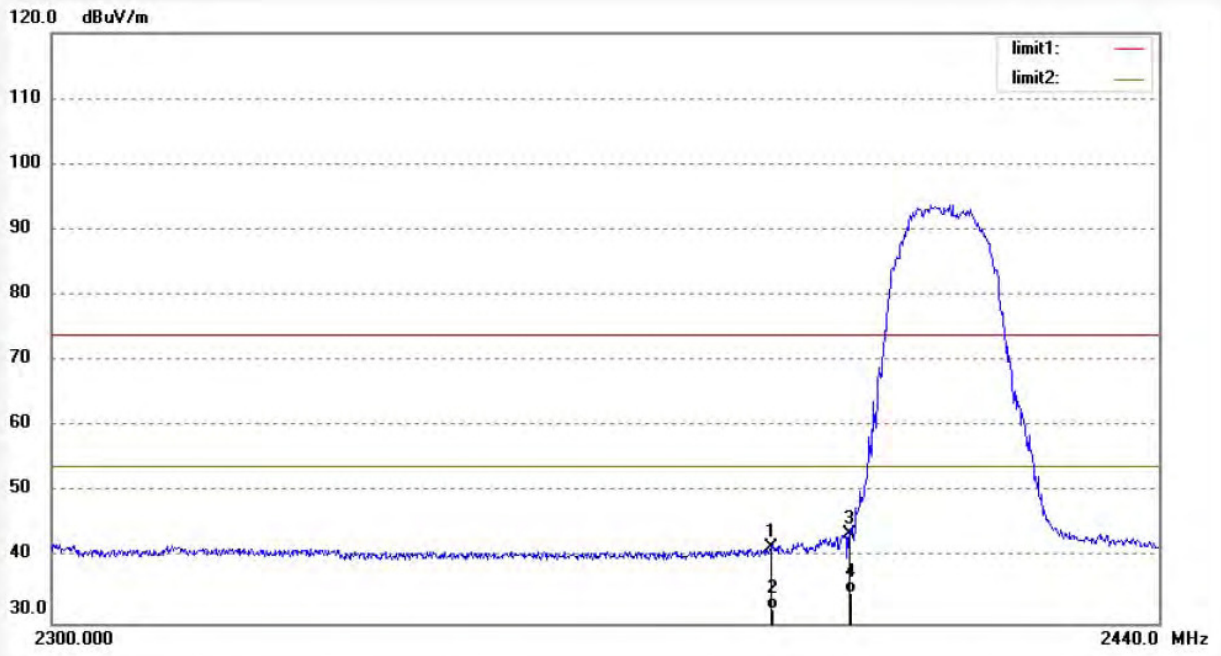
Fax:+86-0755-26503396

Job No.: Frank2017 #2179
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11B)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 09/20/32
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	45.87	-4.32	41.55	74.00	-32.45	peak	250	301	
2	2390.000	36.48	-4.32	32.16	54.00	-21.84	AVG	200	251	
3	2400.000	47.90	-4.27	43.63	74.00	-30.37	peak	200	91	
4	2400.000	38.94	-4.27	34.67	54.00	-19.33	AVG	200	102	

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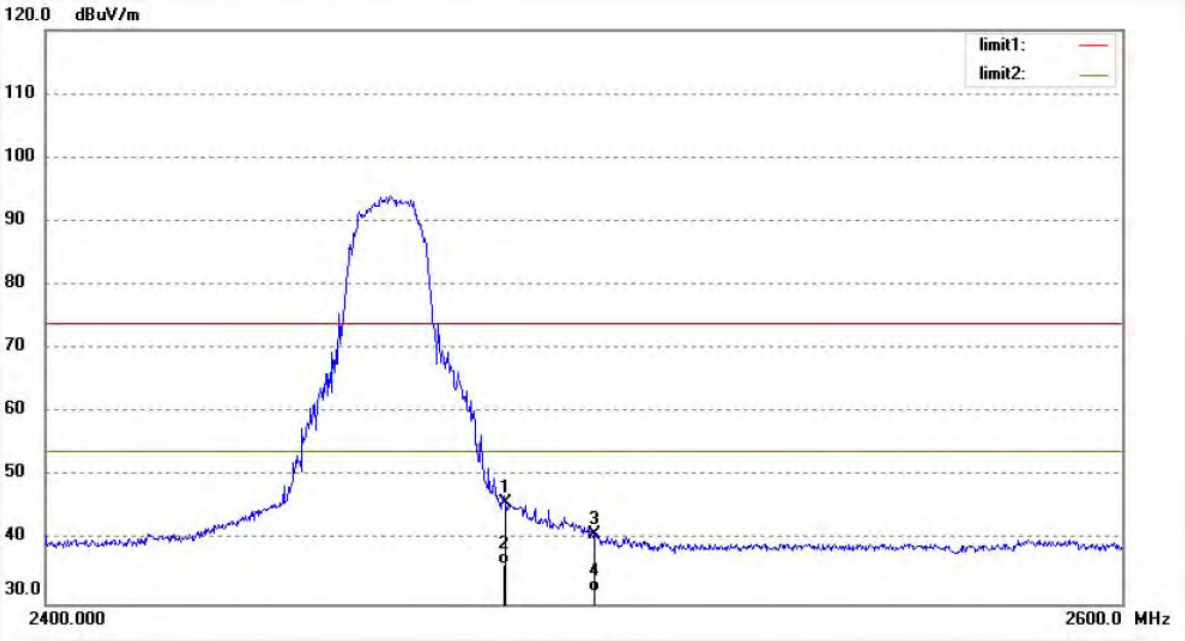
Fax:+86-0755-26503396

Job No.: Frank2017 #2188
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11B)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 10/30/15
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



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	49.71	-3.89	45.82	74.00	-28.18	peak	250	101	
2	2483.500	39.98	-3.89	36.09	54.00	-17.91	AVG	150	321	
3	2500.000	44.68	-3.81	40.87	74.00	-33.13	peak	250	205	
4	2500.000	35.61	-3.81	31.80	54.00	-22.20	AVG	150	95	

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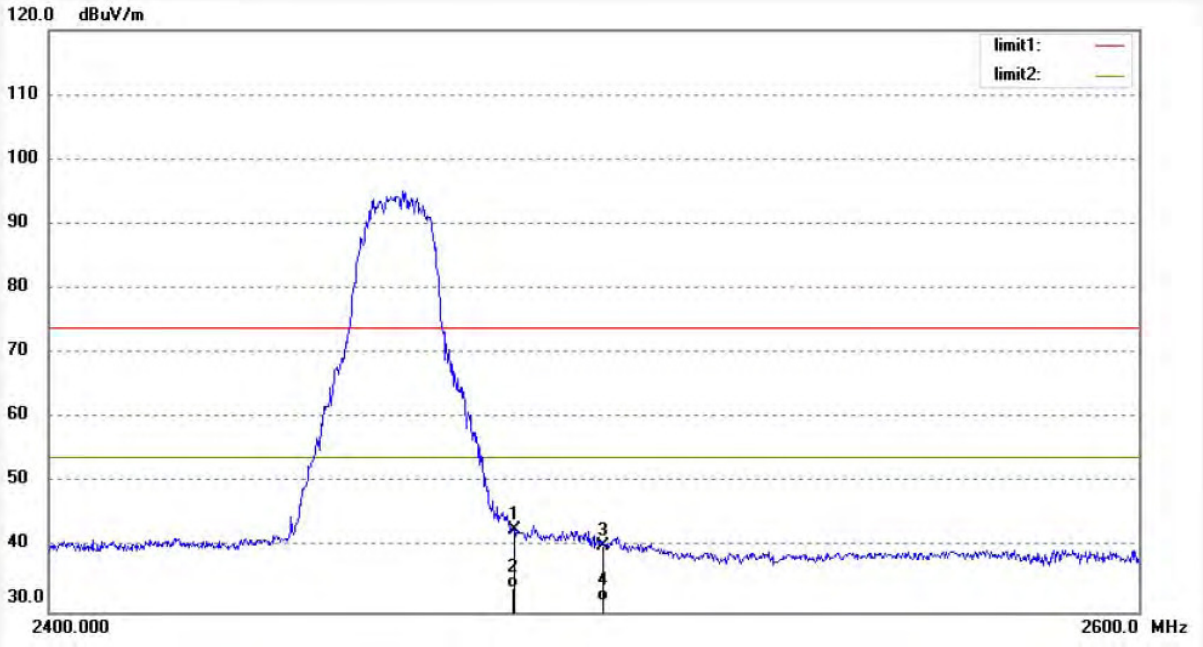
Fax:+86-0755-26503396

Job No.: Frank2017 #2189
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11B)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 10/47/25
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



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	46.52	-3.89	42.63	74.00	-31.37	peak	300	120	
2	2483.500	37.64	-3.89	33.75	54.00	-20.25	AVG	250	93	
3	2500.000	44.07	-3.81	40.26	74.00	-33.74	peak	250	156	
4	2500.000	35.46	-3.81	31.65	54.00	-22.35	AVG	250	194	

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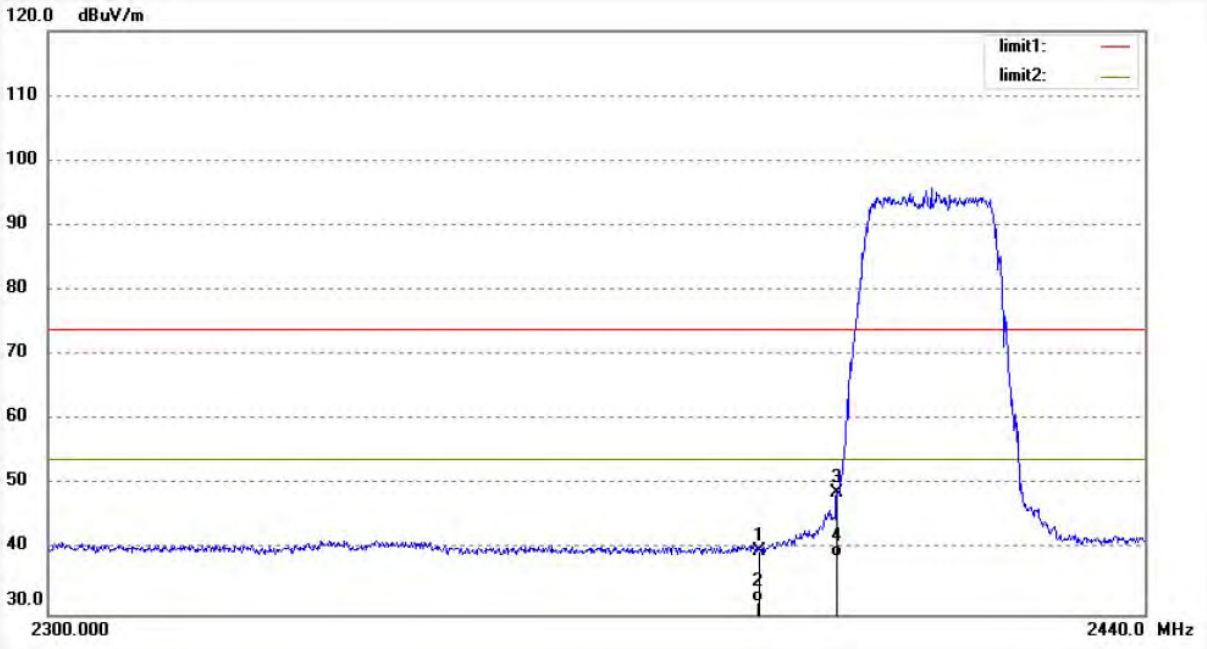
Fax:+86-0755-26503396

Job No.: Frank2017 #2180
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 09/30/52
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	44.12	-4.32	39.80	74.00	-34.20	peak	250	65	
2	2390.000	36.15	-4.32	31.83	54.00	-22.17	AVG	200	30	
3	2400.000	53.11	-4.27	48.84	74.00	-25.16	peak	250	185	
4	2400.000	43.19	-4.27	38.92	54.00	-15.08	AVG	250	109	

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Site: 1# Chamber
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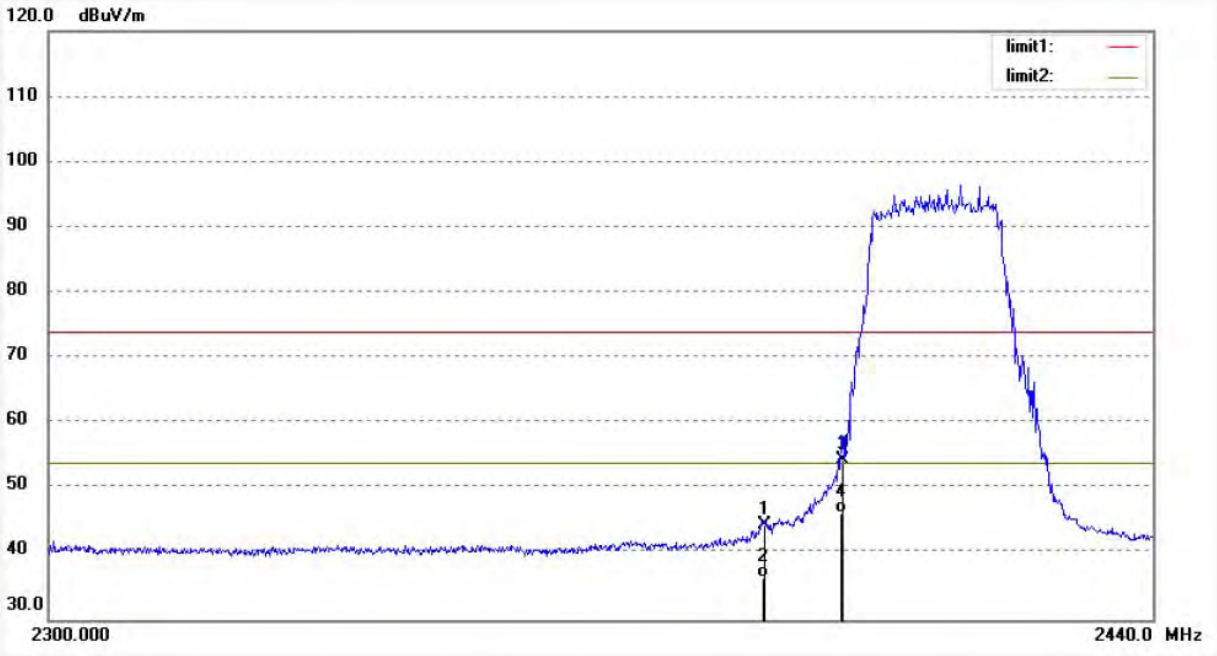
Job No.: Frank2017 #2181
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 09/40/32
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	48.81	-4.32	44.49	74.00	-29.51	peak	250	193	
2	2390.000	40.69	-4.32	36.37	54.00	-17.63	AVG	250	198	
3	2400.000	58.70	-4.27	54.43	74.00	-19.57	peak	250	102	
4	2400.000	50.64	-4.27	46.37	54.00	-7.63	AVG	250	97	

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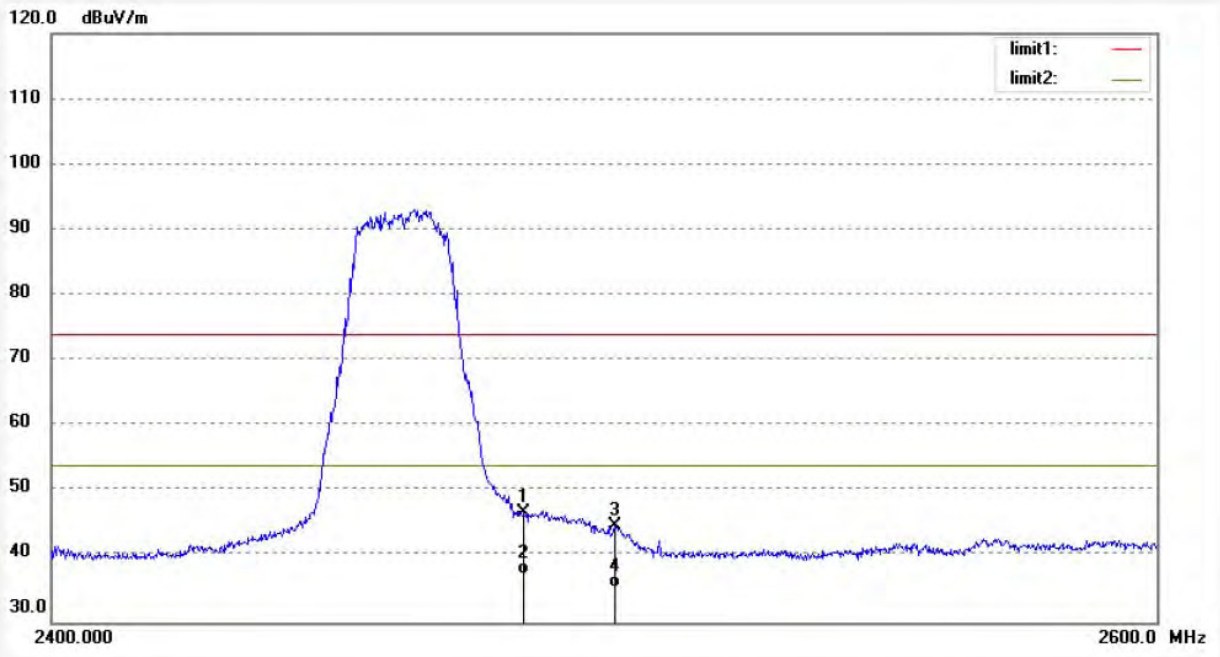
Fax:+86-0755-26503396

Job No.: Frank2017 #2186
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 10/18/26
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



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	50.73	-3.89	46.84	74.00	-27.16	peak	250	201	
2	2483.500	41.31	-3.89	37.42	54.00	-16.58	AVG	250	309	
3	2500.000	48.44	-3.81	44.63	74.00	-29.37	peak	250	164	
4	2500.000	39.18	-3.81	35.37	54.00	-18.63	AVG	250	247	

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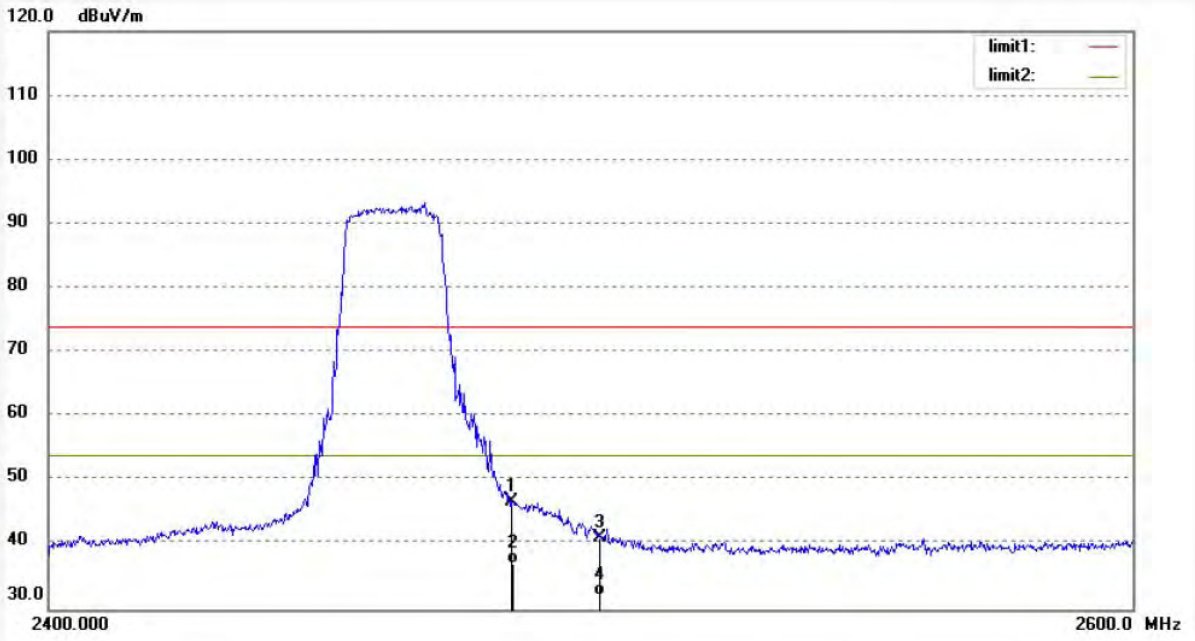
Job No.: Frank2017 #2187
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 10/23/27
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



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	50.61	-3.89	46.72	74.00	-27.28	peak	200	101	
2	2483.500	40.94	-3.89	37.05	54.00	-16.95	AVG	150	93	
3	2500.000	44.95	-3.81	41.14	74.00	-32.86	peak	250	108	
4	2500.000	35.94	-3.81	32.13	54.00	-21.87	AVG	150	342	

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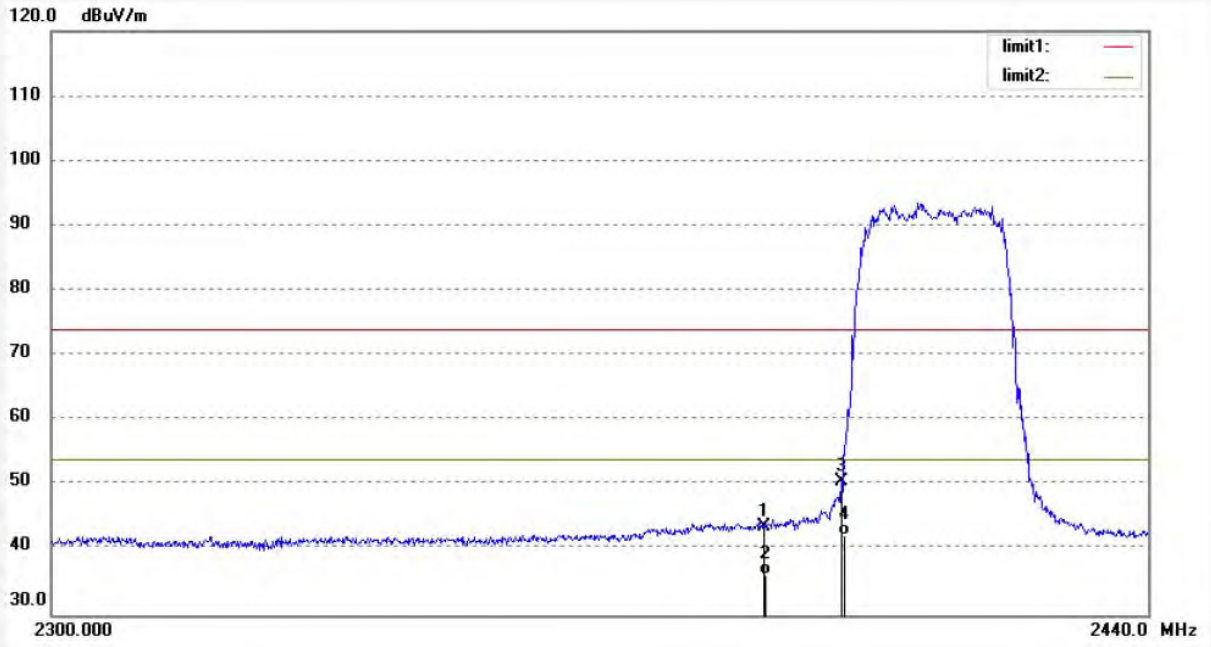
Job No.: Frank2017 #2182
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 09/50/18
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	47.94	-4.32	43.62	74.00	-30.38	peak	250	191	
2	2390.000	40.62	-4.32	36.30	54.00	-17.70	AVG	250	103	
3	2400.000	54.86	-4.27	50.59	74.00	-23.41	peak	250	169	
4	2400.000	46.59	-4.27	42.32	54.00	-11.68	AVG	250	108	

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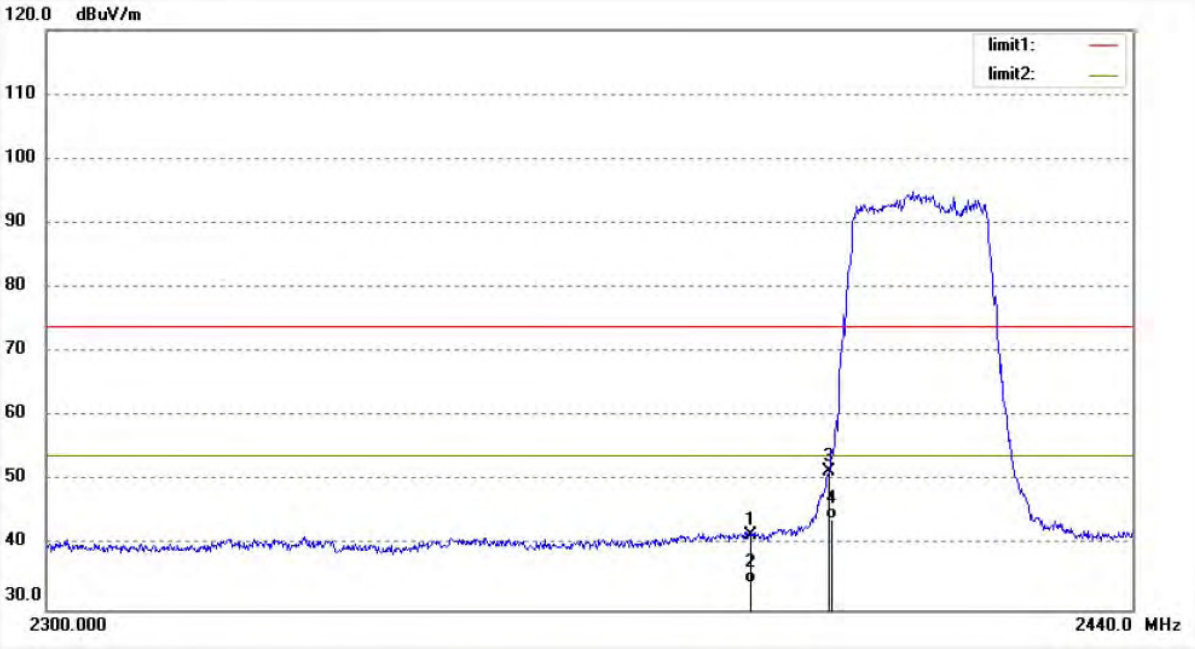
Fax:+86-0755-26503396

Job No.: Frank2017 #2183
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 10/03/32
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	45.91	-4.32	41.59	74.00	-32.41	peak	250	106	
2	2390.000	38.46	-4.32	34.14	54.00	-19.86	AVG	150	184	
3	2400.000	55.79	-4.27	51.52	74.00	-22.48	peak	300	309	
4	2400.000	48.37	-4.27	44.10	54.00	-9.90	AVG	150	207	

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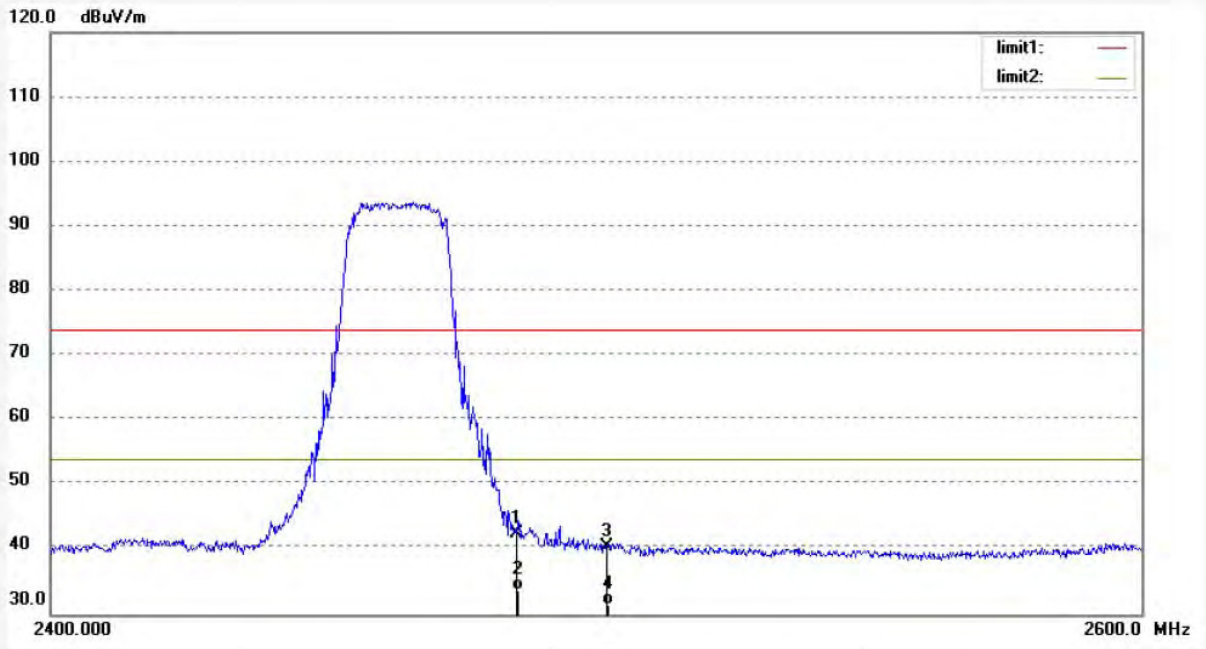
Fax:+86-0755-26503396

Job No.: Frank2017 #2184
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SHENZHEN AVATAR CONTROLS CO.,LTD

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 10/13/32
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



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	46.47	-3.89	42.58	74.00	-31.42	peak	250	34	
2	2483.500	37.61	-3.89	33.72	54.00	-20.28	AVG	150	52	
3	2500.000	44.37	-3.81	40.56	74.00	-33.44	peak	200	198	
4	2500.000	35.17	-3.81	31.36	54.00	-22.64	AVG	150	101	

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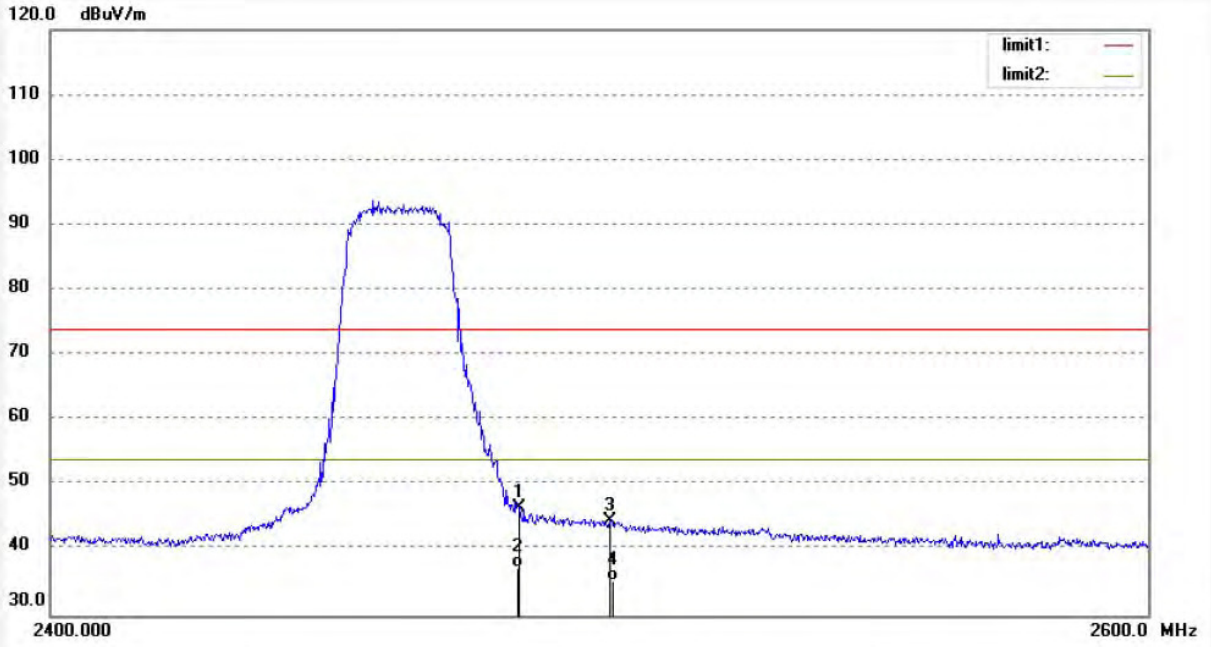
Job No.: Frank2017 #2185
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SHENZHEN AVATAR CONTROLS CO.,LTD

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/05/
Time: 10/15/22
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



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	50.53	-3.89	46.64	74.00	-27.36	peak	250	102	
2	2483.500	41.25	-3.89	37.36	54.00	-16.64	AVG	250	197	
3	2500.000	48.26	-3.81	44.45	74.00	-29.55	peak	250	248	
4	2500.000	39.15	-3.81	35.34	54.00	-18.66	AVG	250	321	

11.RADIATED SPURIOUS EMISSION TEST

11.1.Block Diagram of Test Setup

11.1.1.Block diagram of connection between the EUT and peripherals

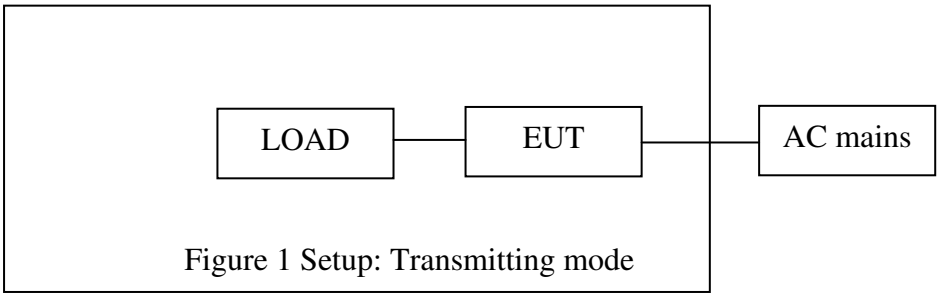
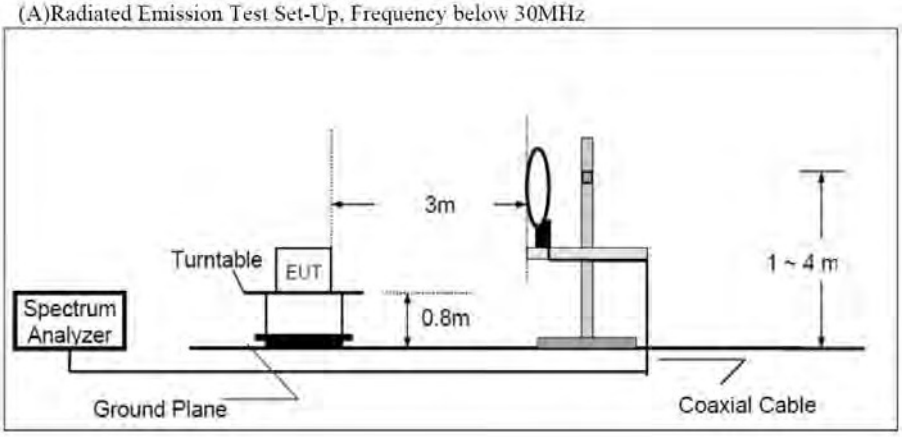


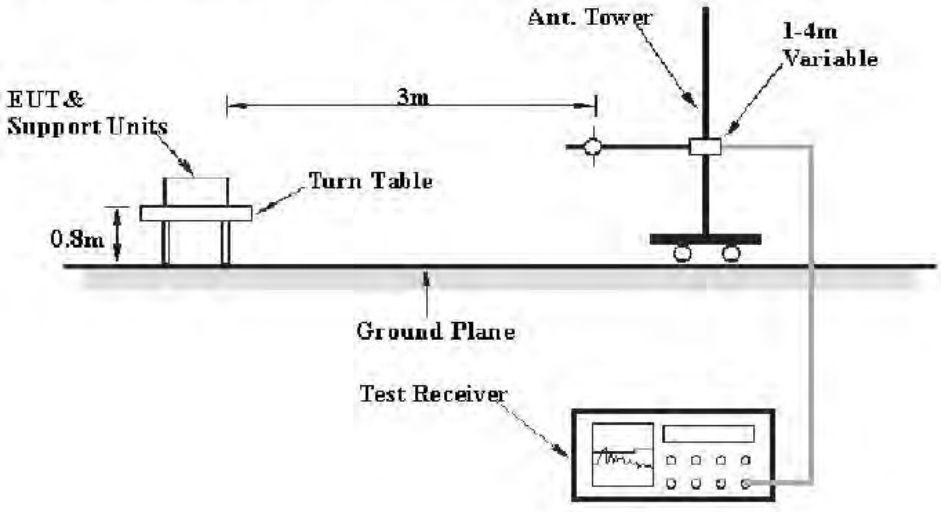
Figure 1 Setup: Transmitting mode

11.1.2.Semi-Anechoic Chamber Test Setup Diagram

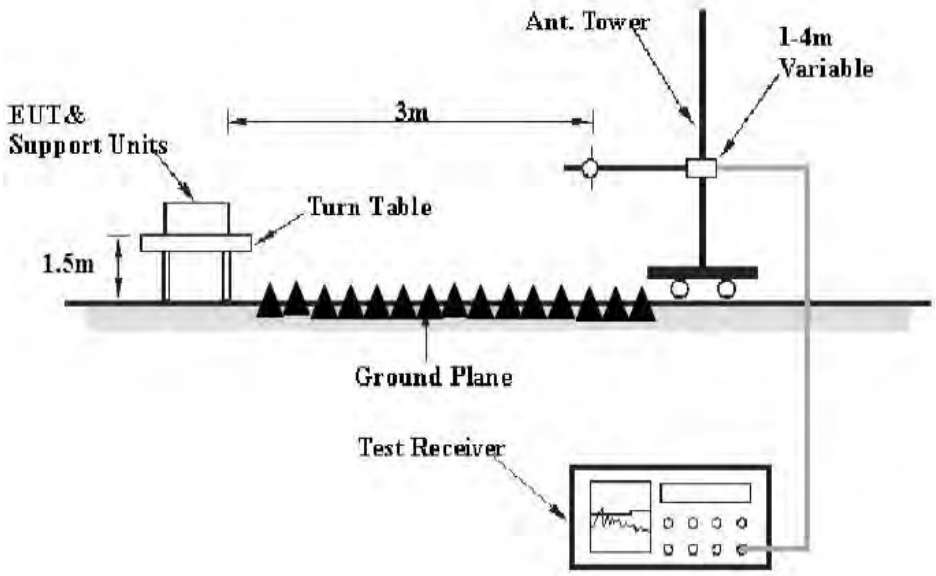
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



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

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 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 Section15.209 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 . We select 2412MHz, 2437MHz, 2462MHz TX frequency to transmit.

11.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). 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.

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.

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.Data Sample

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	48.69	-13.35	35.34	46	-10.66	QP

Frequency(MHz) = Emission frequency in MHz
Reading(dBμv) = Uncorrected Analyzer/Receiver reading
Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain
Result(dBμv/m) = Reading(dBμv) + Factor(dB/m)
Limit (dBμv/m) = Limit stated in standard
Margin (dB) = Result(dBμv/m) - Limit (dBμv/m)
QP = Quasi-peak Reading

Calculation Formula:
Margin(dB) = Result (dBμV/m)–Limit(dBμV/m)
Result(dBμV/m)= Reading(dBμV)+ Factor(dB/m)

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

11.8.The Field Strength of Radiation Emission Measurement Results

PASS.

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. The radiation emissions from 18-25GHz and 9KHz-30MHz are not reported, because the test values lower than the limits of 20dB.

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

Below 1G

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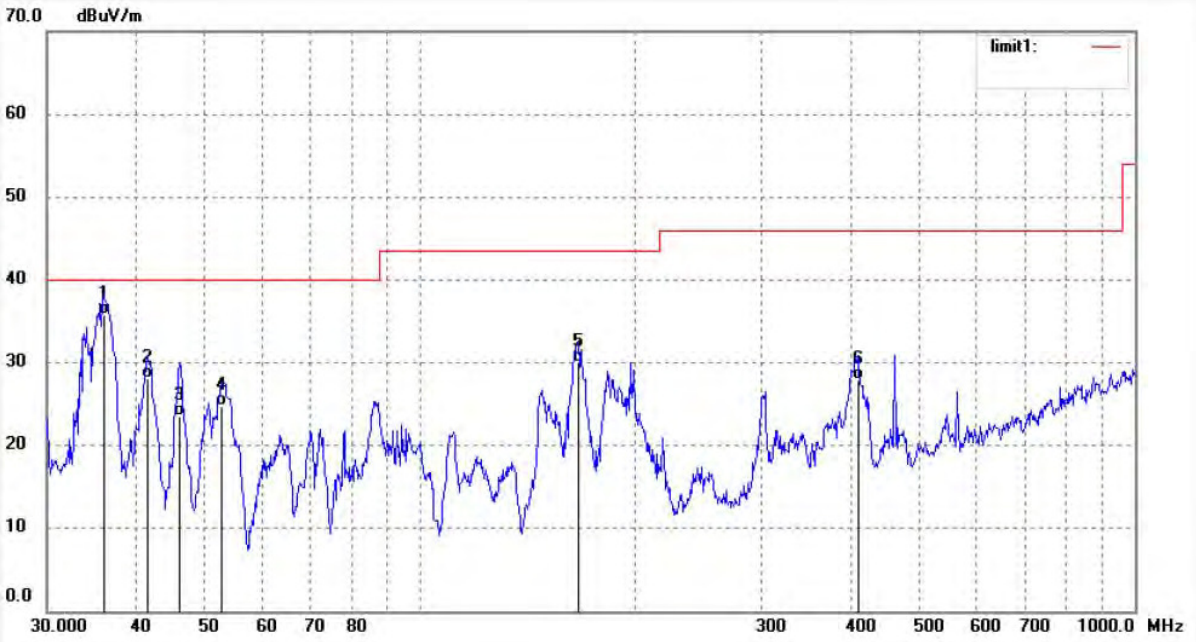
Job No.: frank2018 #89
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2018/01/23
Time: 17:05:34
Engineer Signature: frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.0138	57.65	-21.88	35.77	40.00	-4.23	QP	100	79	
2	41.4483	51.89	-23.84	28.05	40.00	-11.95	QP	100	354	
3	46.0557	48.37	-24.80	23.57	40.00	-16.43	QP	100	256	
4	52.6345	51.38	-26.63	24.75	40.00	-15.25	QP	100	164	
5	166.6384	56.35	-26.36	29.99	43.50	-13.51	QP	100	259	
6	409.6505	46.12	-18.12	28.00	46.00	-18.00	QP	100	198	

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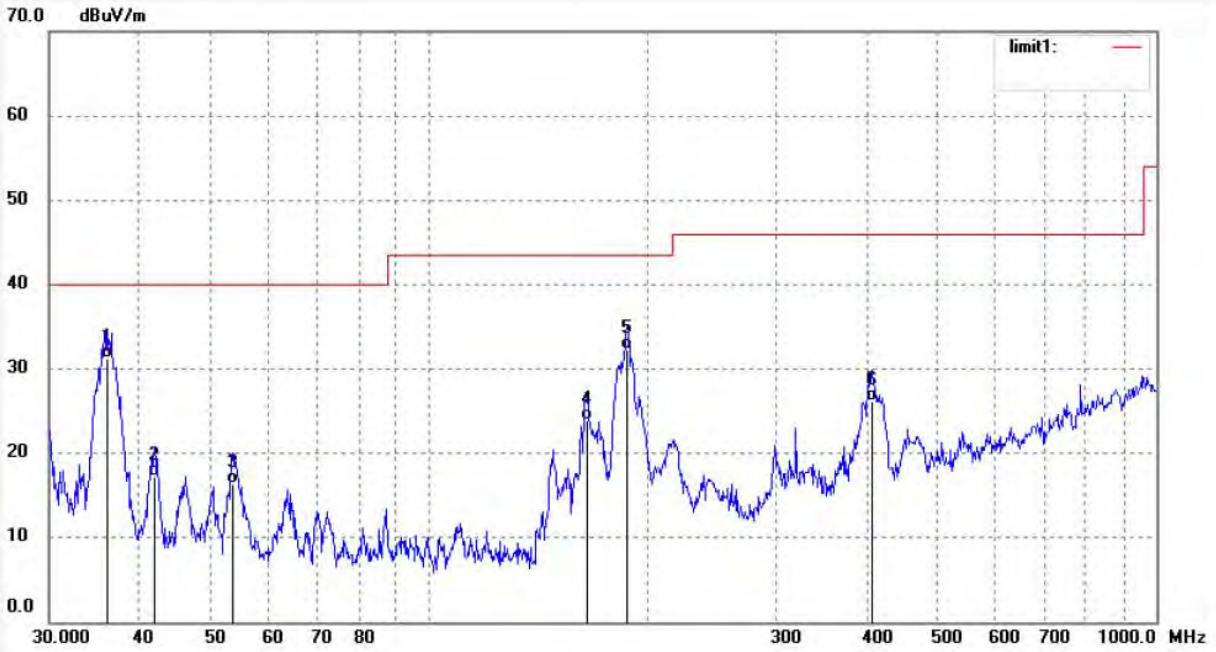
Job No.: frank2018 #90
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 2018/01/23
Time: 17:06:32
Engineer Signature: frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.0138	53.17	-21.88	31.29	40.00	-8.71	QP	200	167	
2	41.8875	41.13	-23.91	17.22	40.00	-22.78	QP	200	183	
3	53.7558	43.25	-26.81	16.44	40.00	-23.56	QP	200	325	
4	164.8911	50.38	-26.55	23.83	43.50	-19.67	QP	200	187	
5	187.1246	57.68	-25.35	32.33	43.50	-11.17	QP	200	254	
6	406.7819	44.38	-18.19	26.19	46.00	-19.81	QP	200	90	

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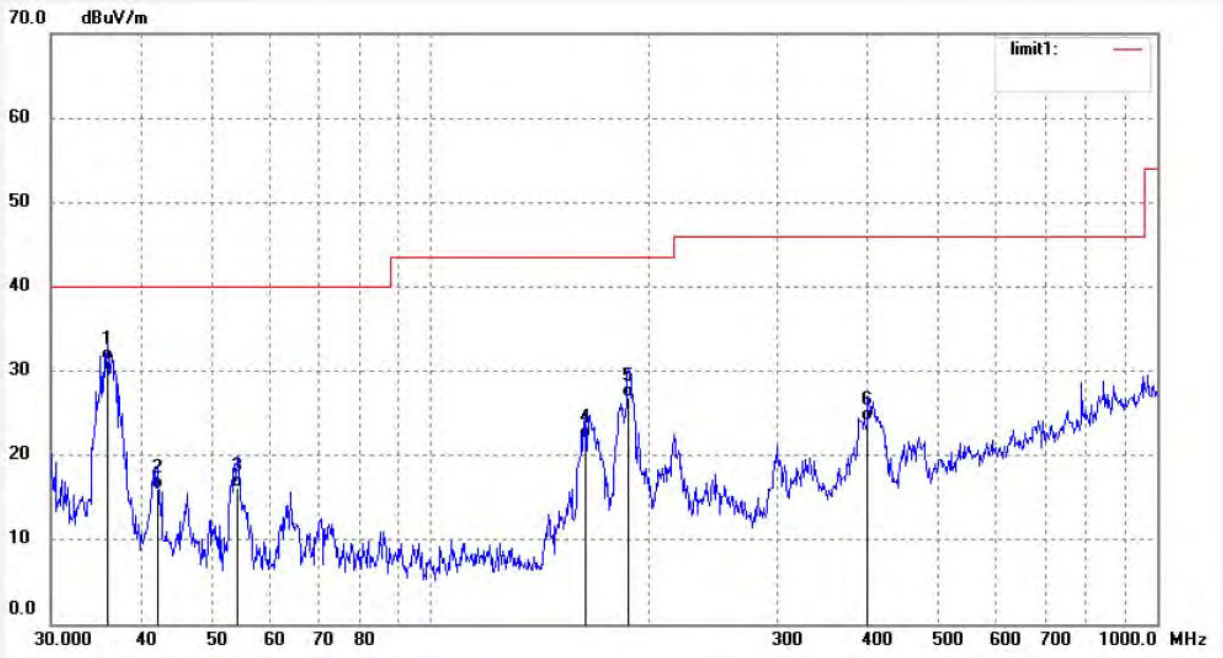
Job No.: frank2018 #91
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 2018/01/23
Time: 17:07:04
Engineer Signature: frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	35.8875	53.12	-21.83	31.29	40.00	-8.71	QP	200	133	
2	42.0349	39.98	-23.93	16.05	40.00	-23.95	QP	200	92	
3	54.1349	43.12	-26.88	16.24	40.00	-23.76	QP	200	360	
4	163.7366	48.65	-26.68	21.97	43.50	-21.53	QP	200	189	
5	187.1246	52.18	-25.35	26.83	43.50	-16.67	QP	200	263	
6	399.6981	42.38	-18.31	24.07	46.00	-21.93	QP	200	147	

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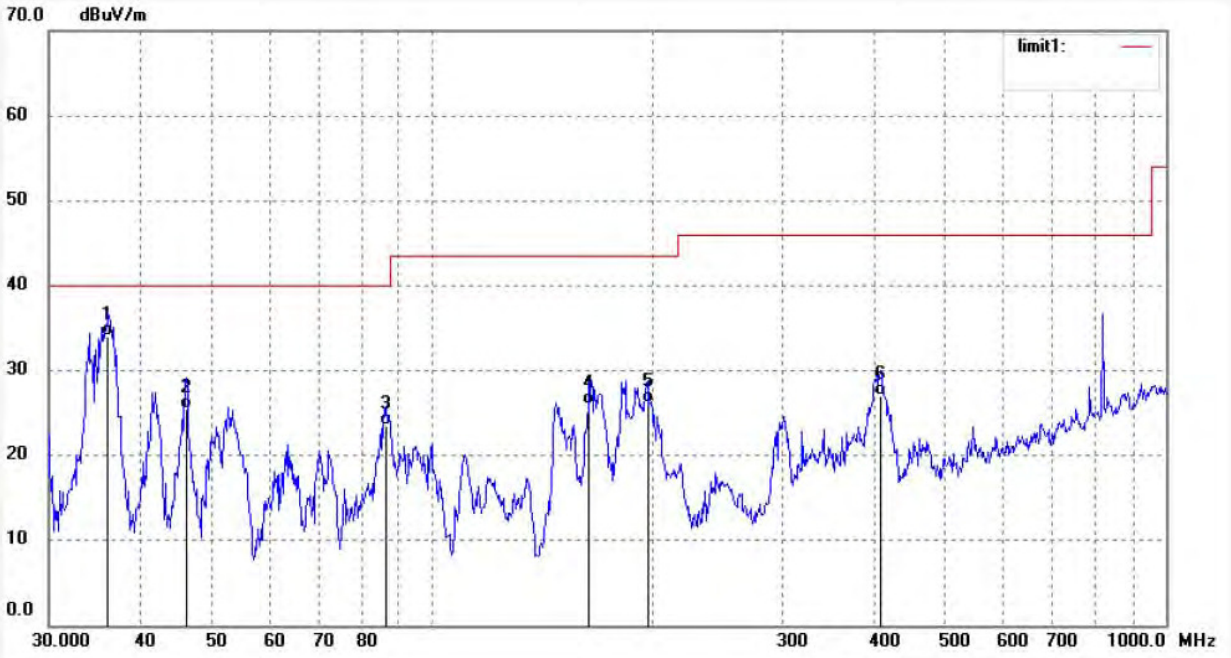
Job No.: frank2018 #92
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2018/01/23
Time: 17:07:59
Engineer Signature: frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.1405	56.02	-21.95	34.07	40.00	-5.93	QP	100	49	
2	46.2180	50.39	-24.85	25.54	40.00	-14.46	QP	100	158	
3	86.3825	50.99	-27.45	23.54	40.00	-16.46	QP	100	198	
4	163.7366	52.61	-26.68	25.93	43.50	-17.57	QP	100	320	
5	196.5595	50.68	-24.56	26.12	43.50	-17.38	QP	100	312	
6	408.2137	45.21	-18.16	27.05	46.00	-18.95	QP	100	102	

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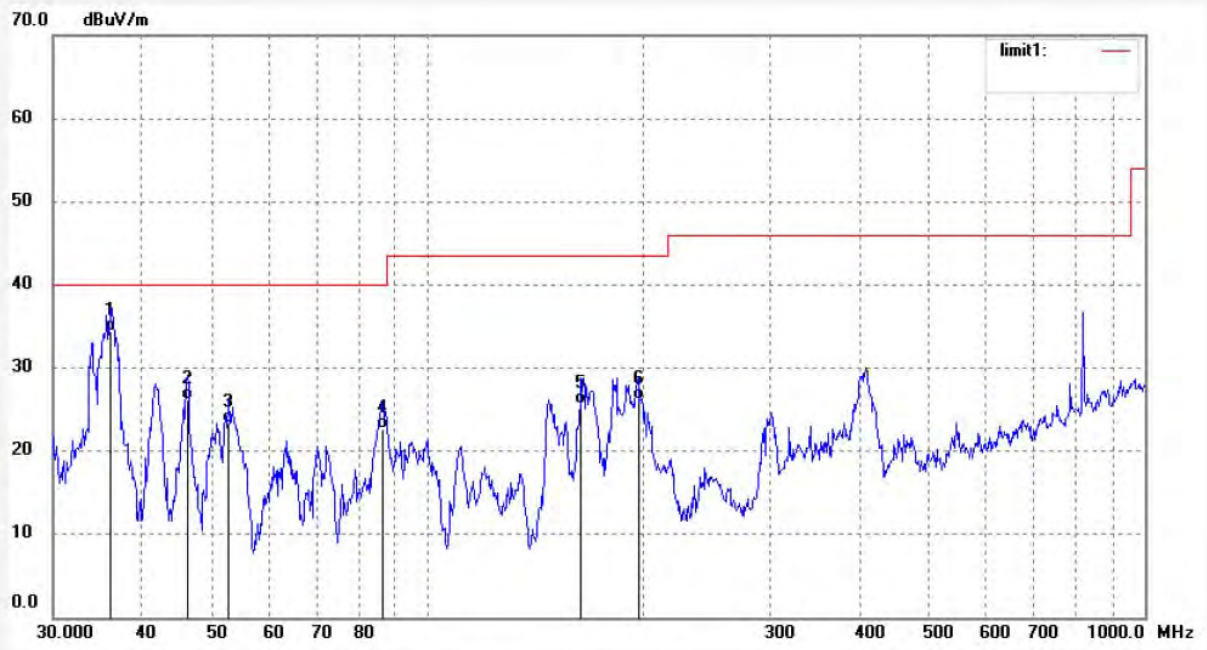
Job No.: frank2018 #93
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2018/01/23
Time: 17:08:11
Engineer Signature: frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.1405	56.33	-21.95	34.38	40.00	-5.62	QP	100	197	
2	46.2180	50.98	-24.85	26.13	40.00	-13.87	QP	100	215	
3	52.8196	50.11	-26.66	23.45	40.00	-16.55	QP	100	324	
4	86.6867	50.12	-27.45	22.67	40.00	-17.33	QP	100	268	
5	163.7366	52.39	-26.68	25.71	43.50	-17.79	QP	100	102	
6	196.5595	50.65	-24.56	26.09	43.50	-17.41	QP	100	198	

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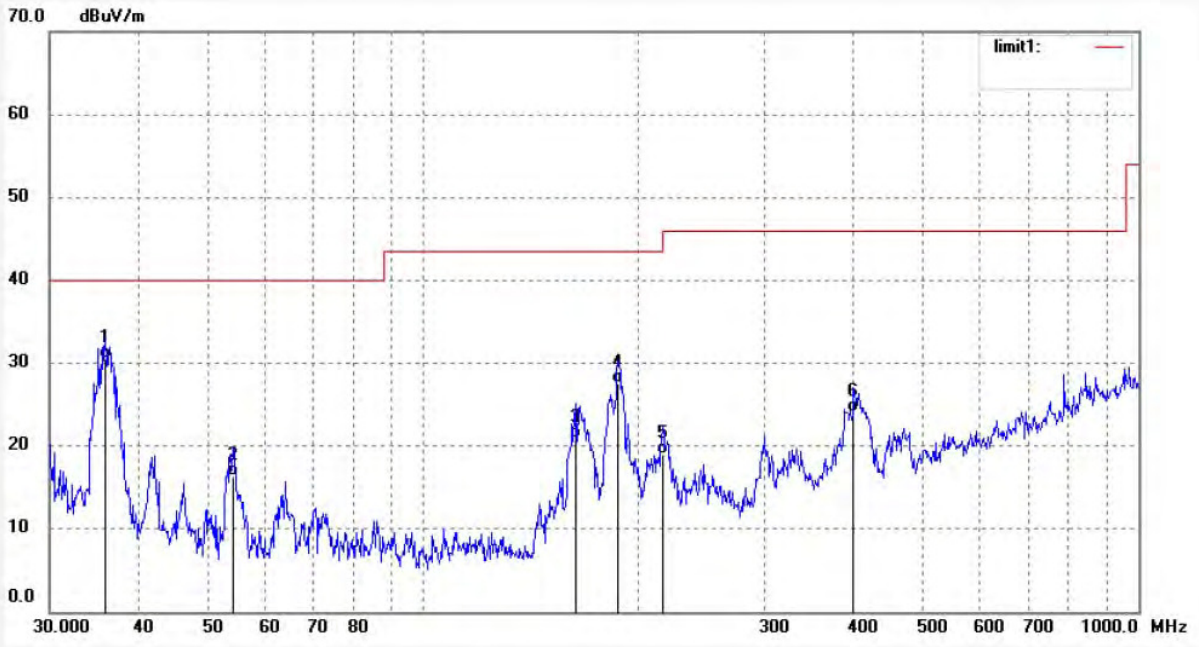
Job No.: frank2018 #94
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 2018/01/23
Time: 17:07:04
Engineer Signature: frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	35.8875	52.37	-21.83	30.54	40.00	-9.46	QP	200	197	
2	54.1349	43.22	-26.88	16.34	40.00	-23.66	QP	200	254	
3	163.7366	47.67	-26.68	20.99	43.50	-22.51	QP	200	103	
4	187.1245	52.99	-25.35	27.64	43.50	-15.86	QP	200	156	
5	216.1195	43.12	-24.05	19.07	46.00	-26.93	QP	200	98	
6	399.6981	42.35	-18.31	24.04	46.00	-21.96	QP	200	104	

Above 1G

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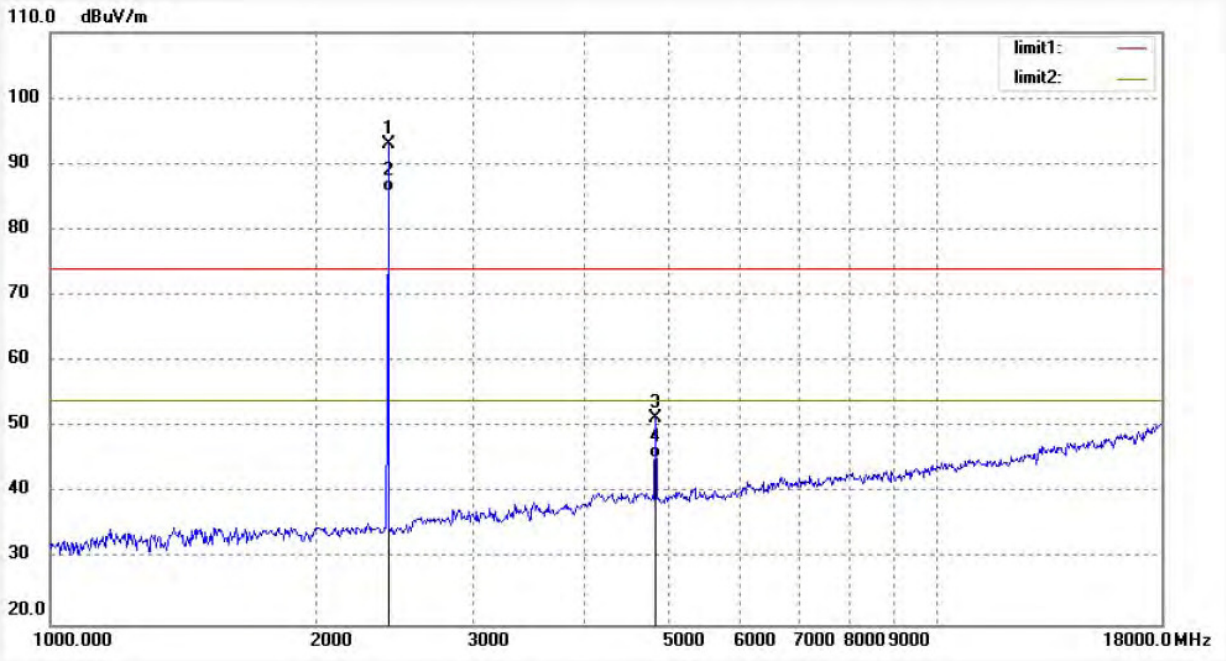
Job No.: Frank2017 #2160
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.000	97.31	-4.24	93.07	74.00	19.07	peak	200	123	
2	2412.000	90.00	-4.24	85.76	54.00	31.76	AVG	150	52	
3	4824.000	48.28	3.13	51.41	74.00	-22.59	peak	200	348	
4	4824.000	42.15	3.13	45.28	54.00	-8.72	AVG	150	254	

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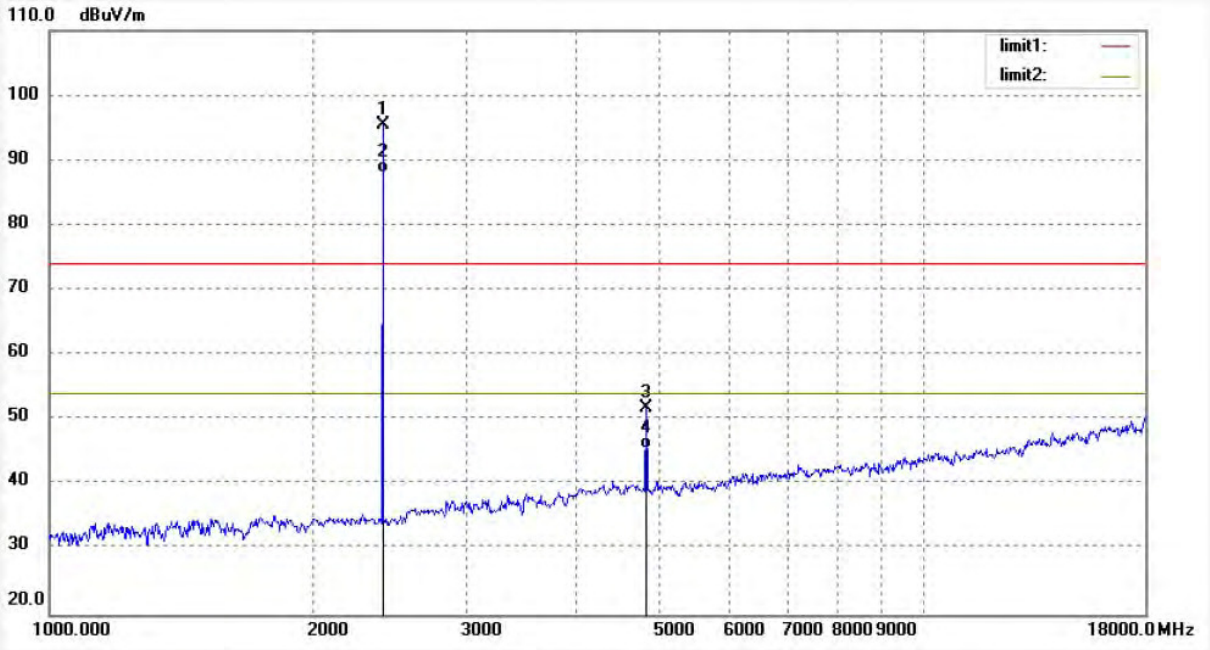
Job No.: Frank2017 #2161
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.000	99.81	-4.24	95.57	74.00	21.57	peak	250	321	
2	2412.000	92.34	-4.24	88.10	54.00	34.10	AVG	250	124	
3	4824.000	48.78	3.13	51.91	74.00	-22.09	peak	250	248	
4	4824.000	42.45	3.13	45.58	54.00	-8.42	AVG	250	132	

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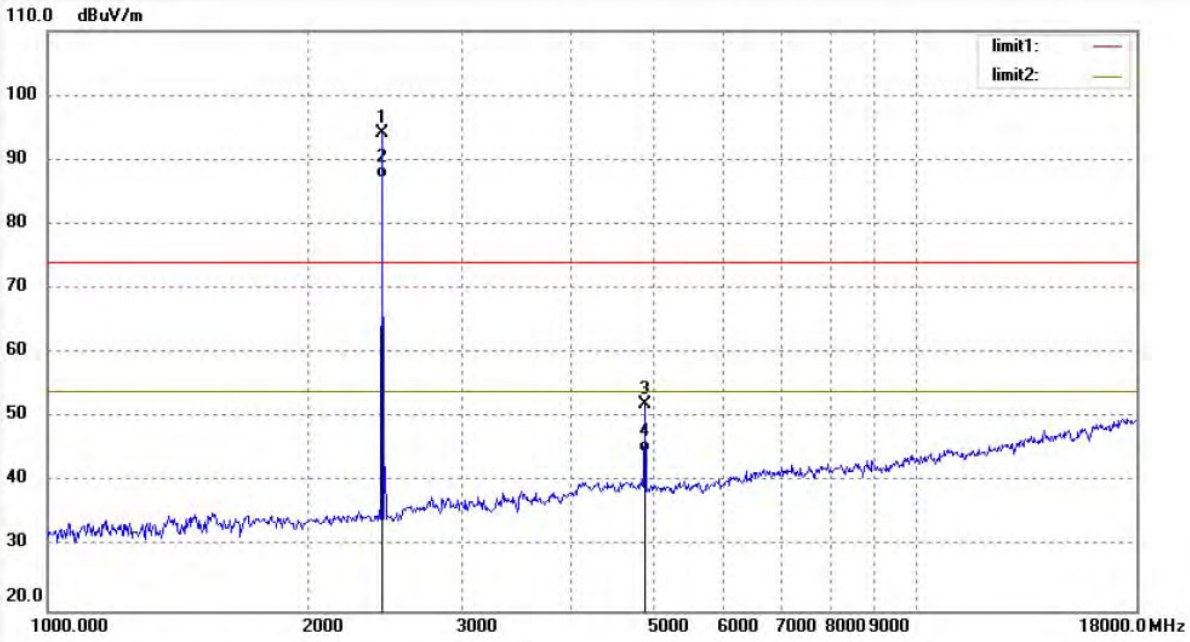
Job No.: Frank2017 #2162
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.000	98.28	-4.14	94.14	74.00	20.14	peak	250	101	
2	2437.000	91.31	-4.14	87.17	54.00	33.17	AVG	250	120	
3	4874.000	48.62	3.36	51.98	74.00	-22.02	peak	250	352	
4	4874.000	41.34	3.36	44.70	54.00	-9.30	AVG	250	95	

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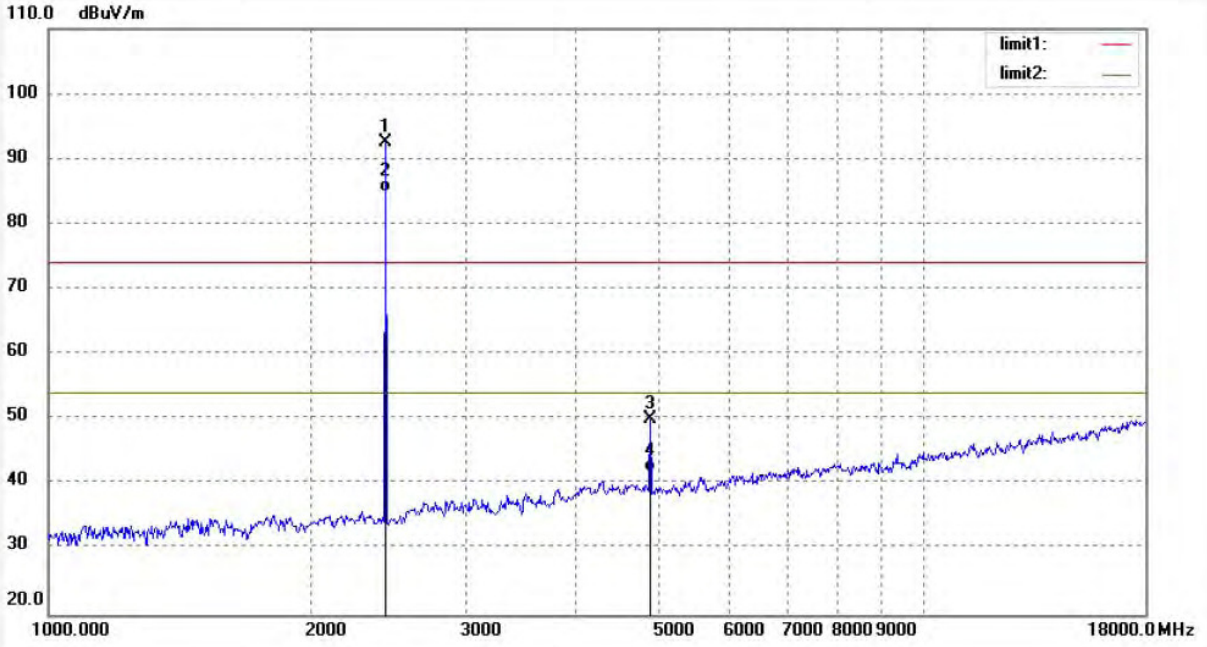
Job No.: Frank2017 #2163
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.000	96.78	-4.14	92.64	74.00	18.64	peak	200	192	
2	2437.000	89.15	-4.14	85.01	54.00	31.01	AVG	150	214	
3	4874.000	46.62	3.36	49.98	74.00	-24.02	peak	200	233	
4	4874.000	38.61	3.36	41.97	54.00	-12.03	AVG	150	120	

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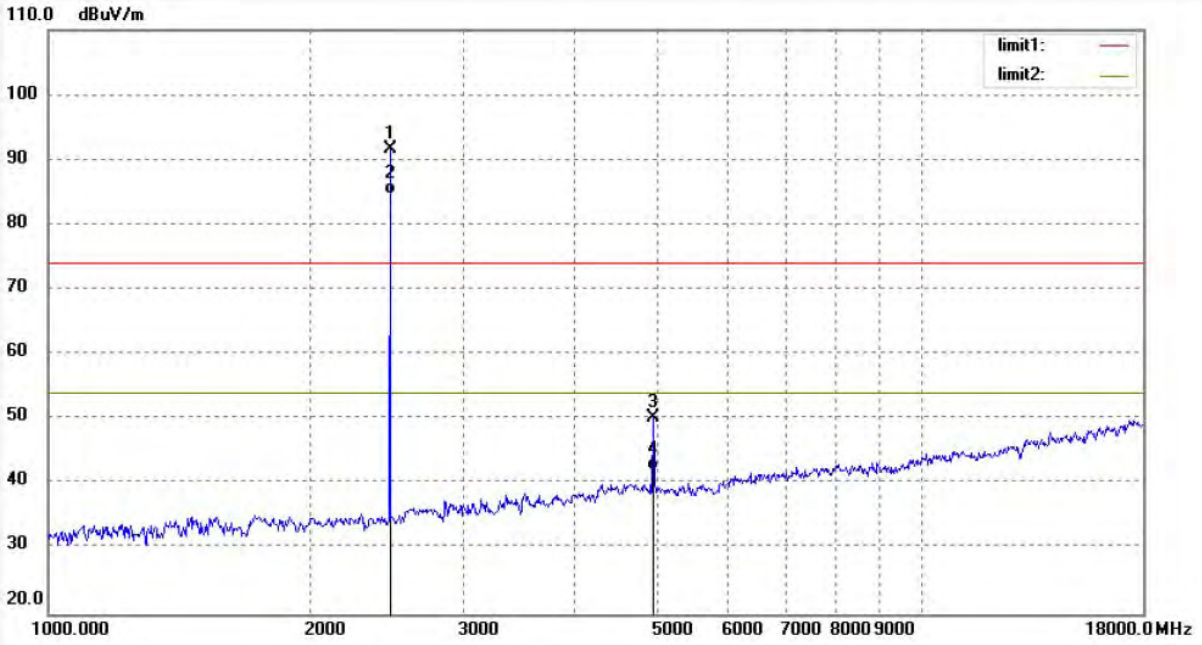
Job No.: Frank2017 #2164
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.000	95.61	-3.97	91.64	74.00	17.64	peak	200	163	
2	2462.000	88.61	-3.97	84.64	54.00	30.64	AVG	150	66	
3	4924.000	46.54	3.62	50.16	74.00	-23.84	peak	200	192	
4	4924.000	38.56	3.62	42.18	54.00	-11.82	AVG	150	103	

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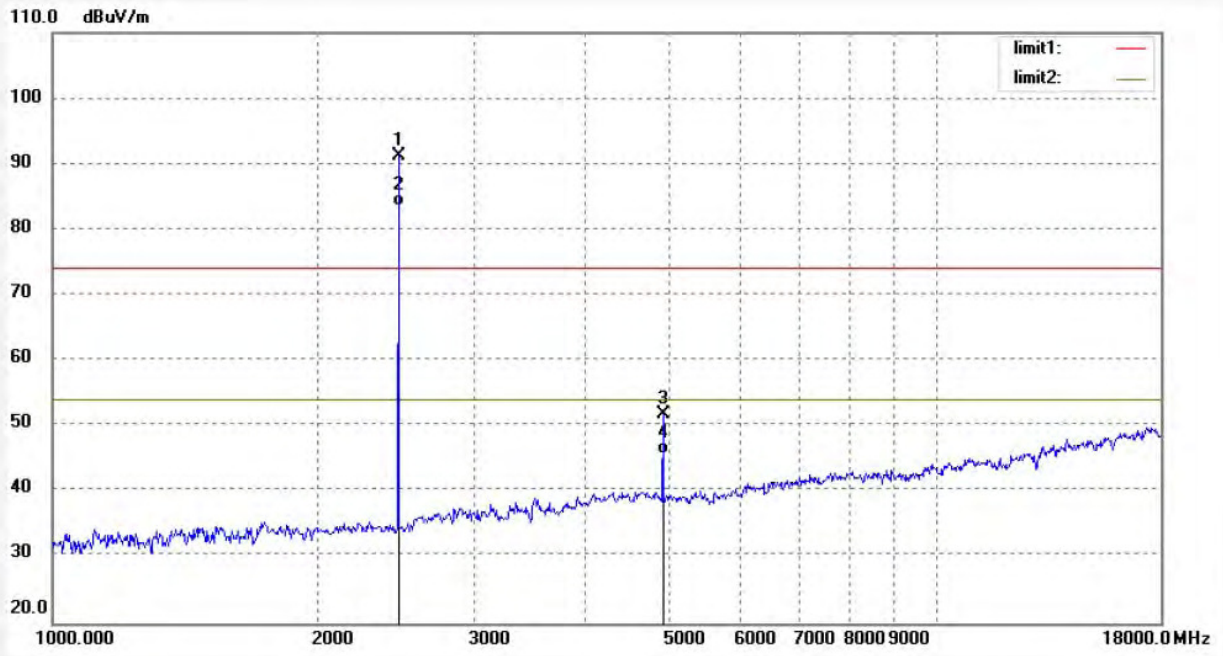
Fax:+86-0755-26503396

Job No.: Frank2017 #2165
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11b)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.000	95.11	-3.97	91.14	74.00	17.14	peak	250	193	
2	2462.000	87.64	-3.97	83.67	54.00	29.67	AVG	250	269	
3	4924.000	48.24	3.50	51.74	74.00	-22.26	peak	250	194	
4	4924.000	42.31	3.50	45.81	54.00	-8.19	AVG	250	34	

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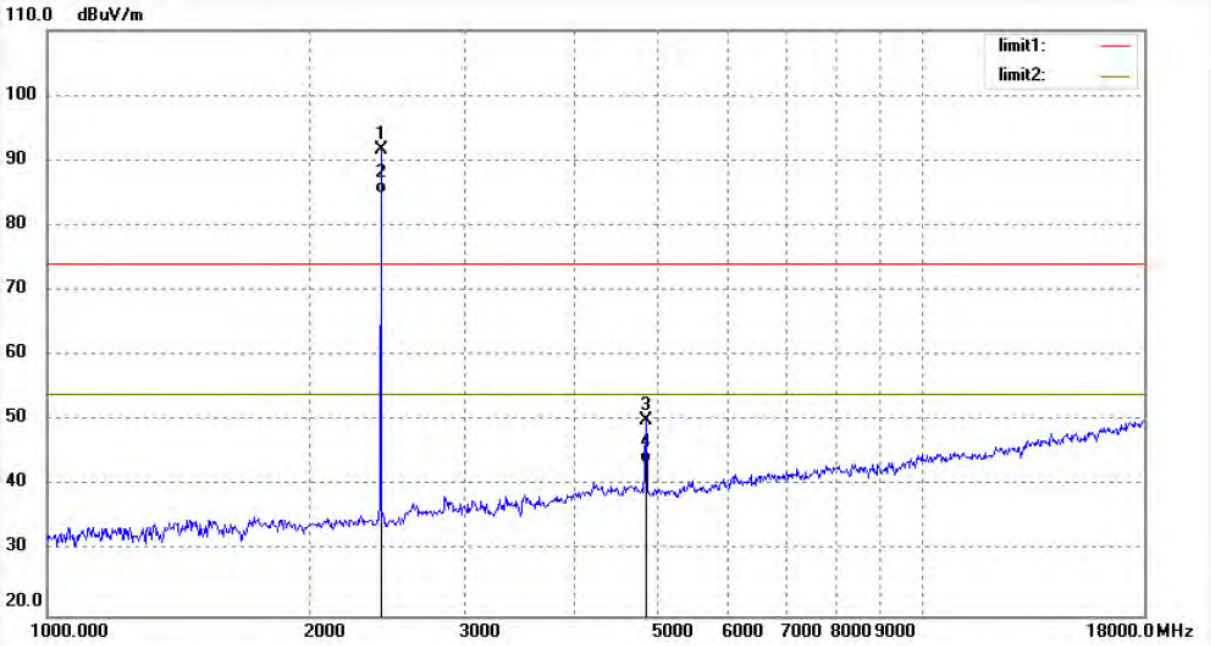
Job No.: Frank2017 #2166
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.000	95.81	-4.24	91.57	74.00	17.57	peak	250	183	
2	2412.000	89.16	-4.24	84.92	54.00	30.92	AVG	250	133	
3	4824.000	46.75	3.19	49.94	74.00	-24.06	peak	250	210	
4	4824.000	40.31	3.19	43.50	54.00	-10.50	AVG	250	85	

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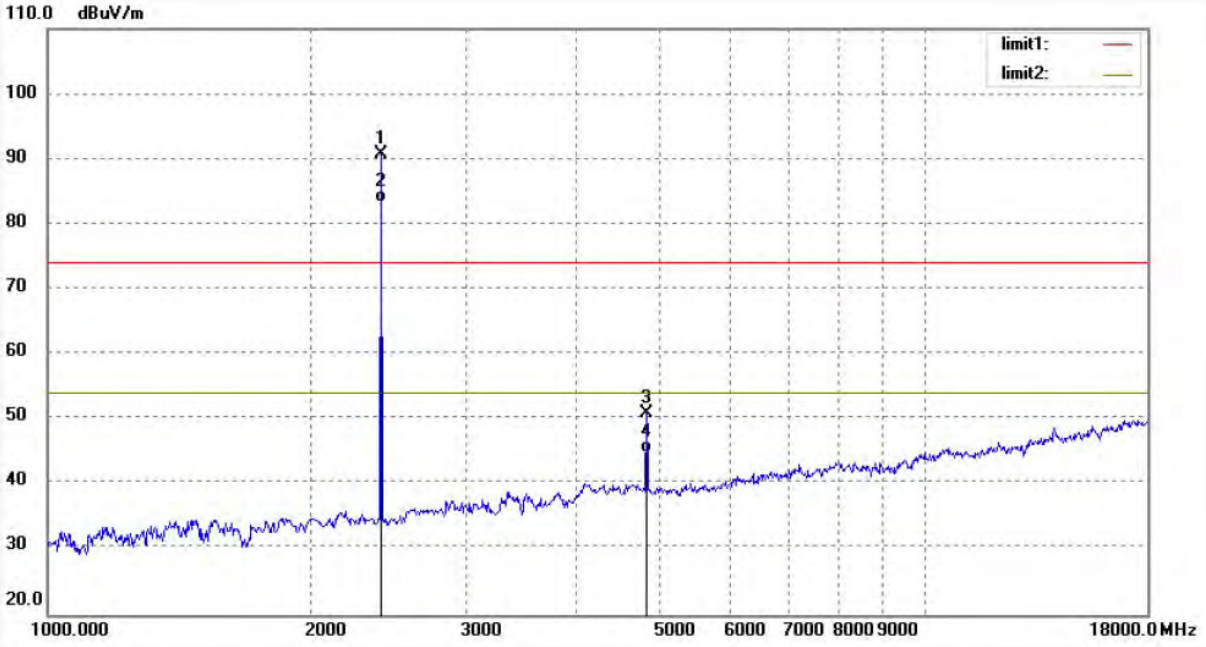
Job No.: Frank2017 #2167
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.000	94.94	-4.27	90.67	74.00	16.67	peak	200	198	
2	2412.000	87.65	-4.27	83.38	54.00	29.38	AVG	150	63	
3	4824.000	47.78	3.13	50.91	74.00	-23.09	peak	200	126	
4	4824.000	41.64	3.13	44.77	54.00	-9.23	AVG	150	168	

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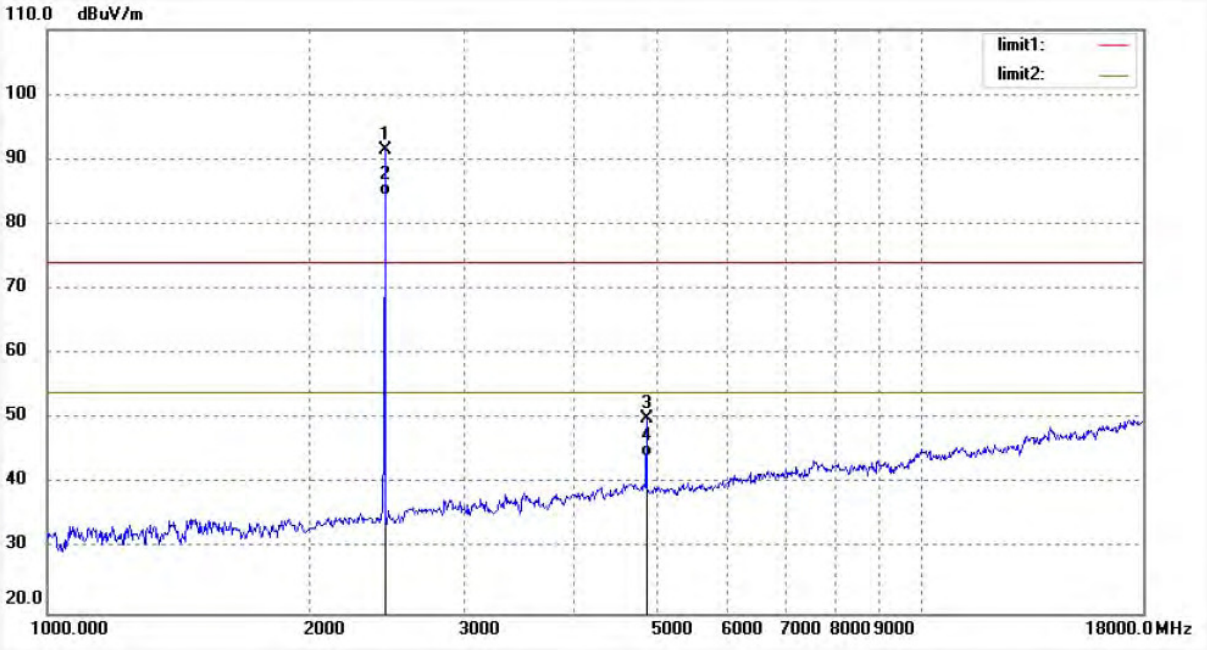
Job No.: Frank2017 #2168
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.000	95.54	-4.10	91.44	74.00	17.44	peak	200	136	
2	2437.000	88.61	-4.10	84.51	54.00	30.51	AVG	150	235	
3	4874.000	46.76	3.25	50.01	74.00	-23.99	peak	200	195	
4	4874.000	40.92	3.25	44.17	54.00	-9.83	AVG	150	202	

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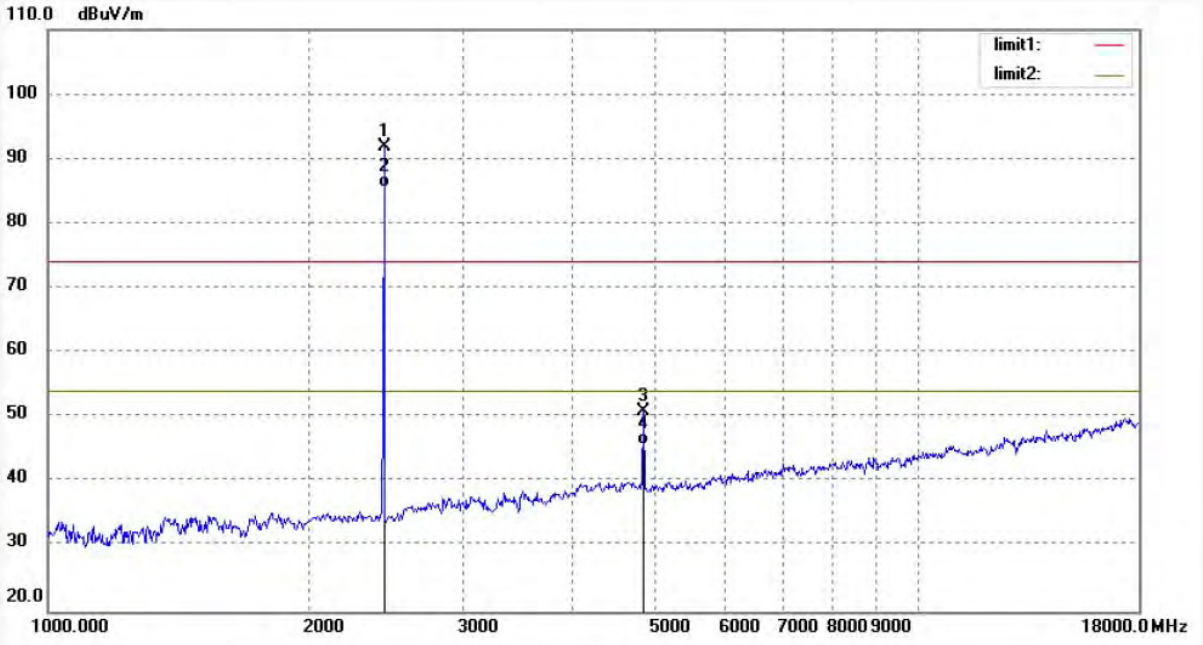
Job No.: Frank2017 #2169
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.000	96.04	-4.10	91.94	74.00	17.94	peak	250	196	
2	2437.000	89.61	-4.10	85.51	54.00	31.51	AVG	200	301	
3	4874.000	47.75	3.19	50.94	74.00	-23.06	peak	250	51	
4	4874.000	42.64	3.19	45.83	54.00	-8.17	AVG	200	102	

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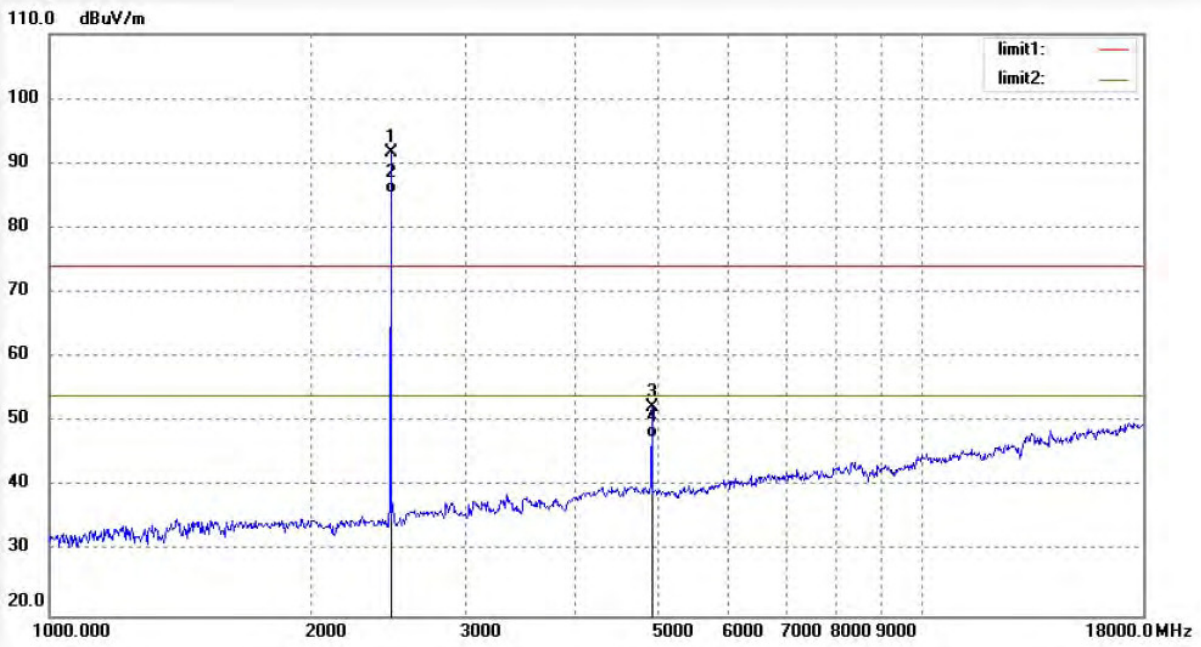
Job No.: Frank2017 #2170
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.000	95.61	-3.97	91.64	74.00	17.64	peak	250	193	
2	2462.000	89.34	-3.97	85.37	54.00	31.37	AVG	250	265	
3	4924.000	48.74	3.50	52.24	74.00	-21.76	peak	250	162	
4	4924.000	43.95	3.50	47.45	54.00	-6.55	AVG	250	101	

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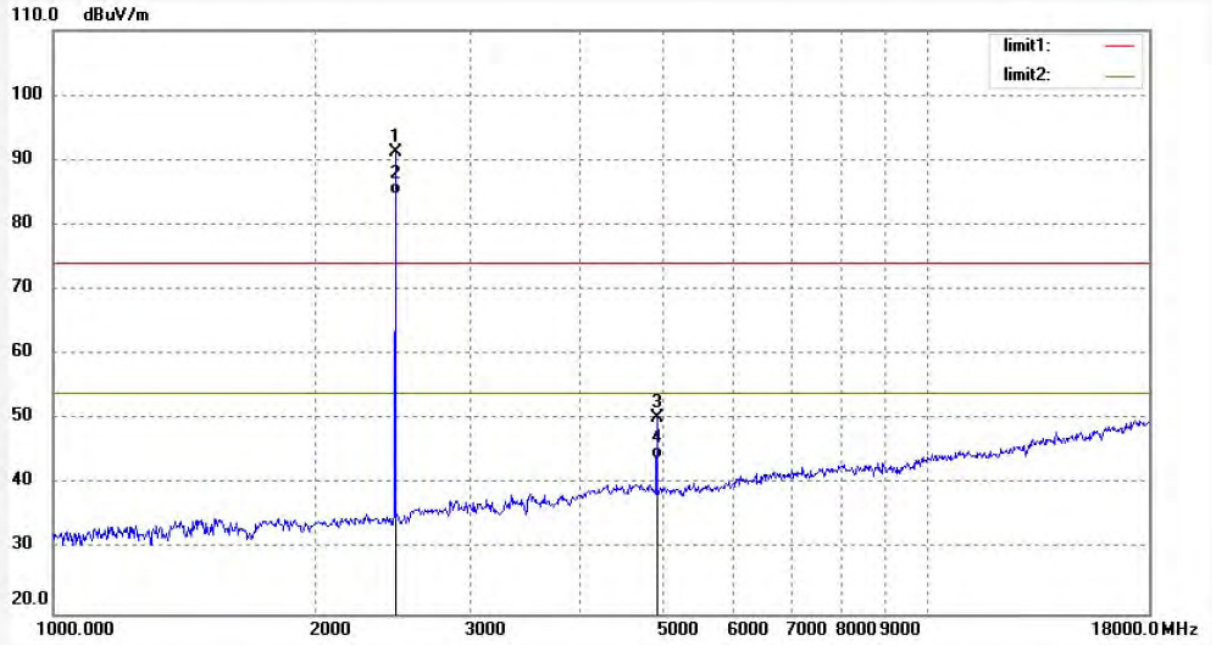
Job No.: Frank2017 #2171
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11G)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.000	95.11	-3.97	91.14	74.00	17.14	peak	200	96	
2	2462.000	88.62	-3.97	84.65	54.00	30.65	AVG	150	233	
3	4924.000	46.74	3.50	50.24	74.00	-23.76	peak	250	100	
4	4924.000	40.38	3.50	43.88	54.00	-10.12	AVG	150	201	

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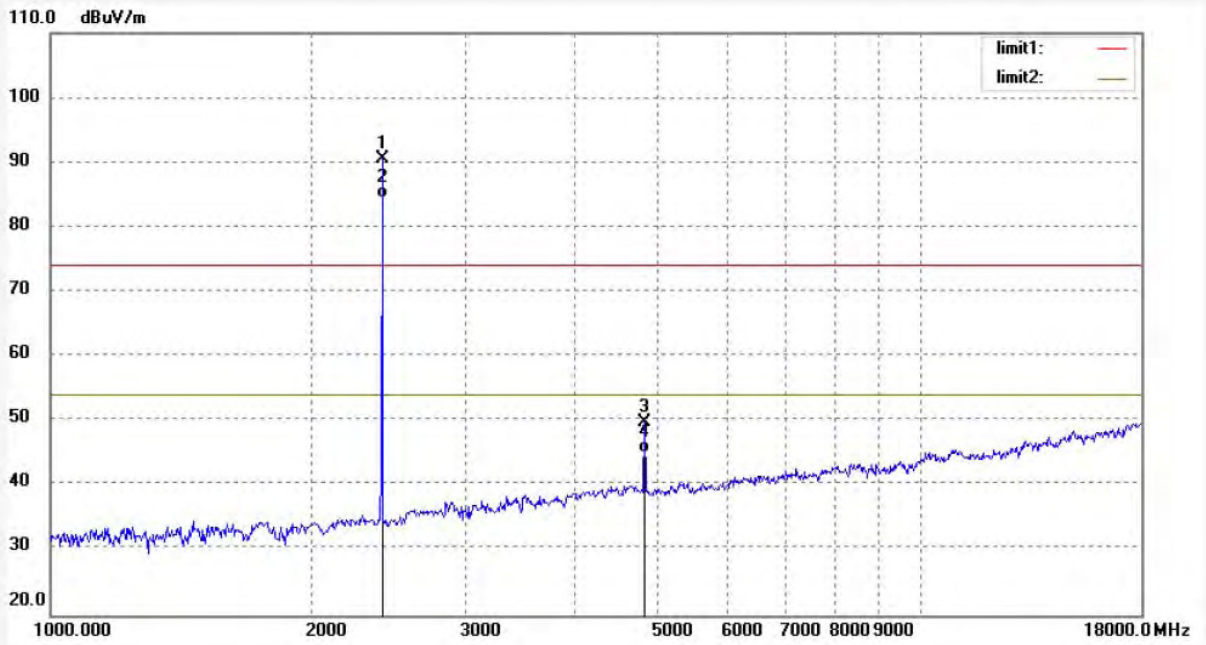
Job No.: Frank2017 #2176
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.000	94.81	-4.24	90.57	74.00	16.57	peak	200	112	
2	2412.000	88.64	-4.24	84.40	54.00	30.40	AVG	150	320	
3	4824.000	46.78	3.13	49.91	74.00	-24.09	peak	200	210	
4	4824.000	41.92	3.13	45.05	54.00	-8.95	AVG	150	49	

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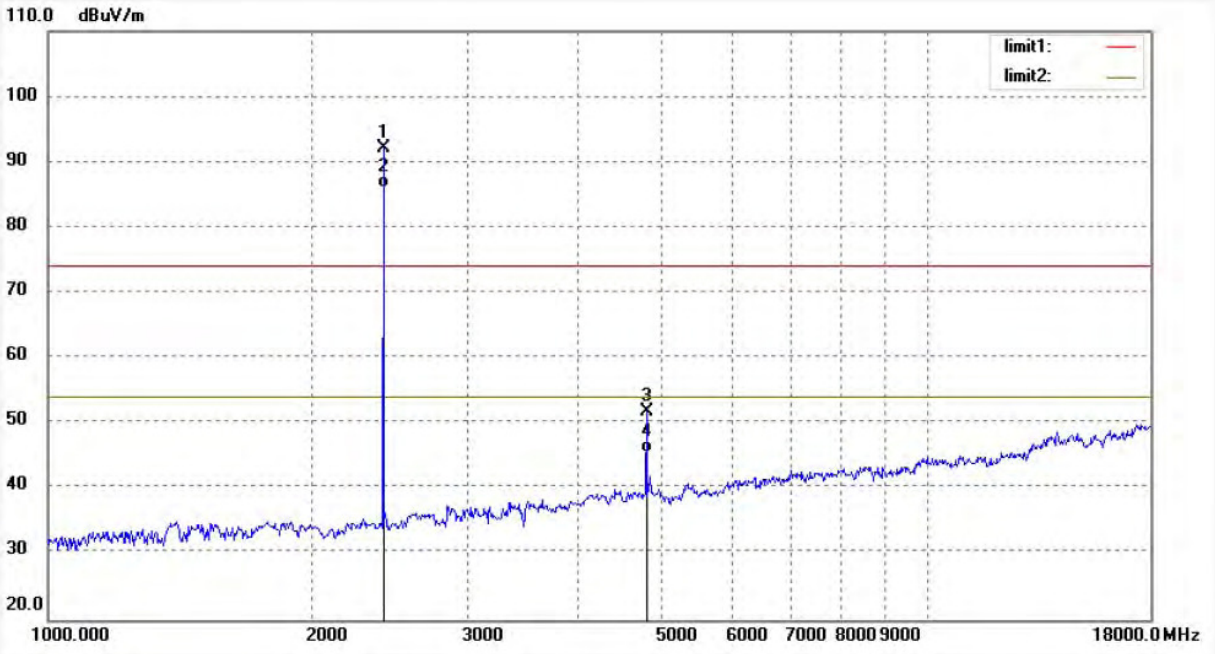
Job No.: Frank2017 #2177
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 1(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.000	96.31	-4.24	92.07	74.00	18.07	peak	250	120	
2	2412.000	90.32	-4.24	86.08	54.00	32.08	AVG	250	201	
3	4824.000	48.79	3.00	51.79	74.00	-22.21	peak	250	93	
4	4824.000	42.64	3.00	45.64	54.00	-8.36	AVG	250	264	

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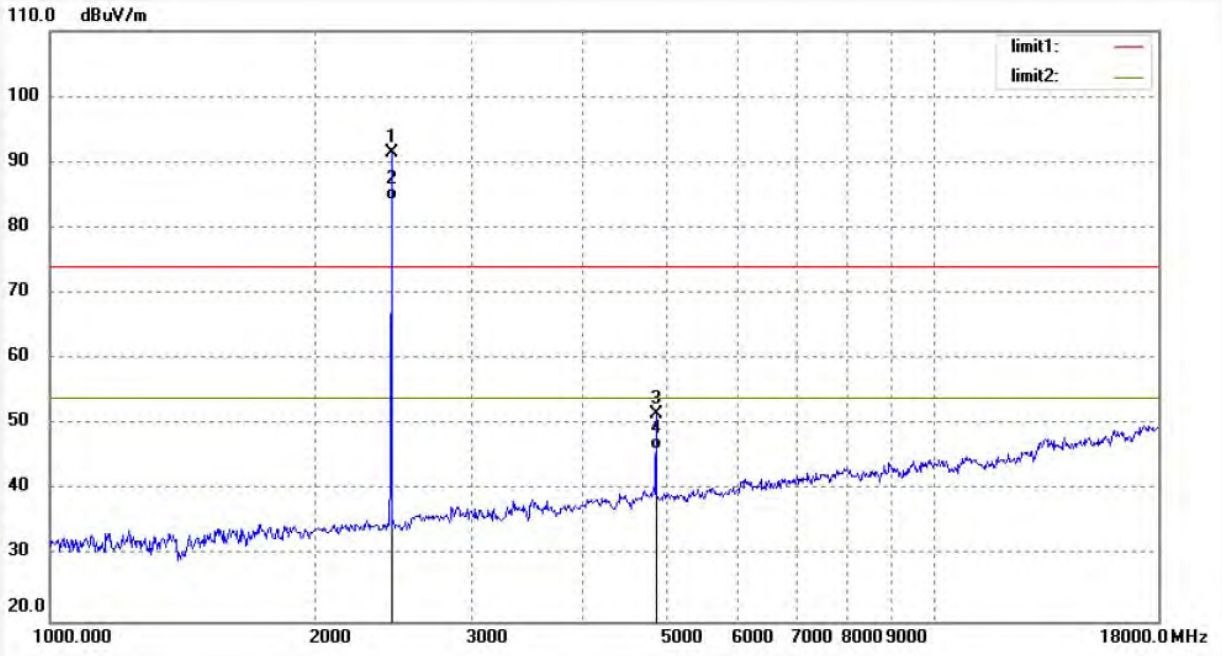
Job No.: Frank2017 #2174
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.000	95.54	-4.10	91.44	74.00	17.44	peak	250	182	
2	2437.000	88.31	-4.10	84.21	54.00	30.21	AVG	250	102	
3	4874.000	48.26	3.25	51.51	74.00	-22.49	peak	250	98	
4	4874.000	42.94	3.25	46.19	54.00	-7.81	AVG	250	57	

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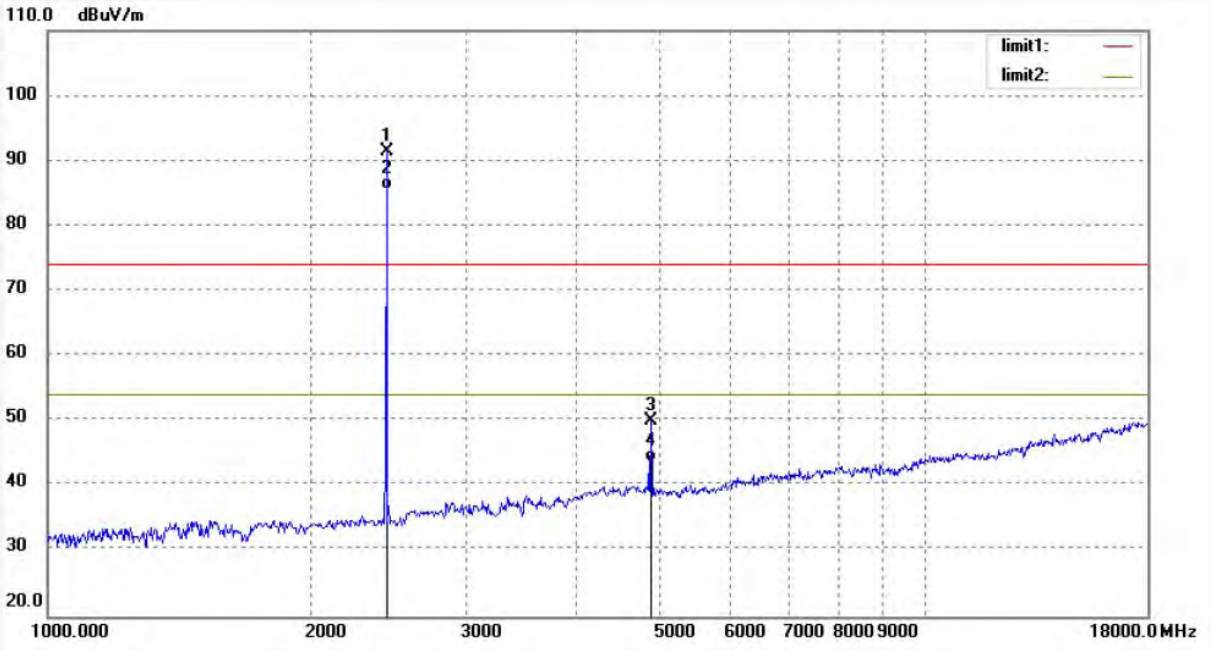
Job No.: Frank2017 #2175
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 6(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.000	95.54	-4.10	91.44	74.00	17.44	peak	200	196	
2	2437.000	89.65	-4.10	85.55	54.00	31.55	AVG	150	328	
3	4874.000	46.62	3.36	49.98	74.00	-24.02	peak	200	45	
4	4874.000	40.38	3.36	43.74	54.00	-10.26	AVG	150	329	

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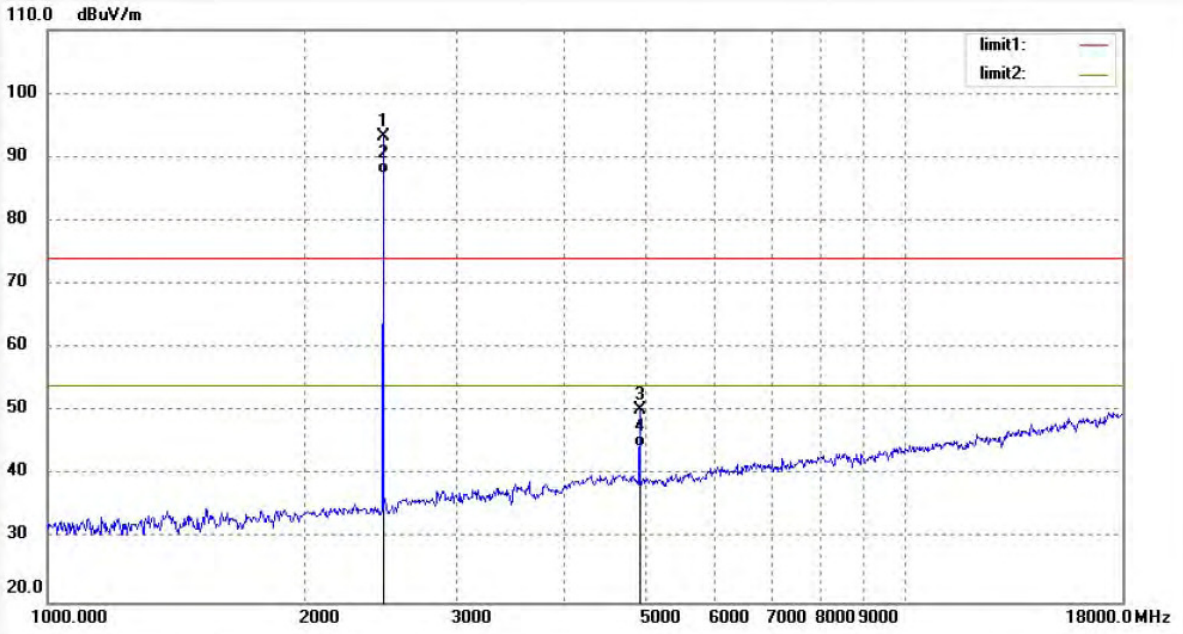
Job No.: Frank2017 #2172
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.000	97.11	-3.97	93.14	74.00	19.14	peak	200	102	
2	2462.000	91.34	-3.97	87.37	54.00	33.37	AVG	150	194	
3	4924.000	46.74	3.50	50.24	74.00	-23.76	peak	200	321	
4	4924.000	40.91	3.50	44.41	54.00	-9.59	AVG	150	51	

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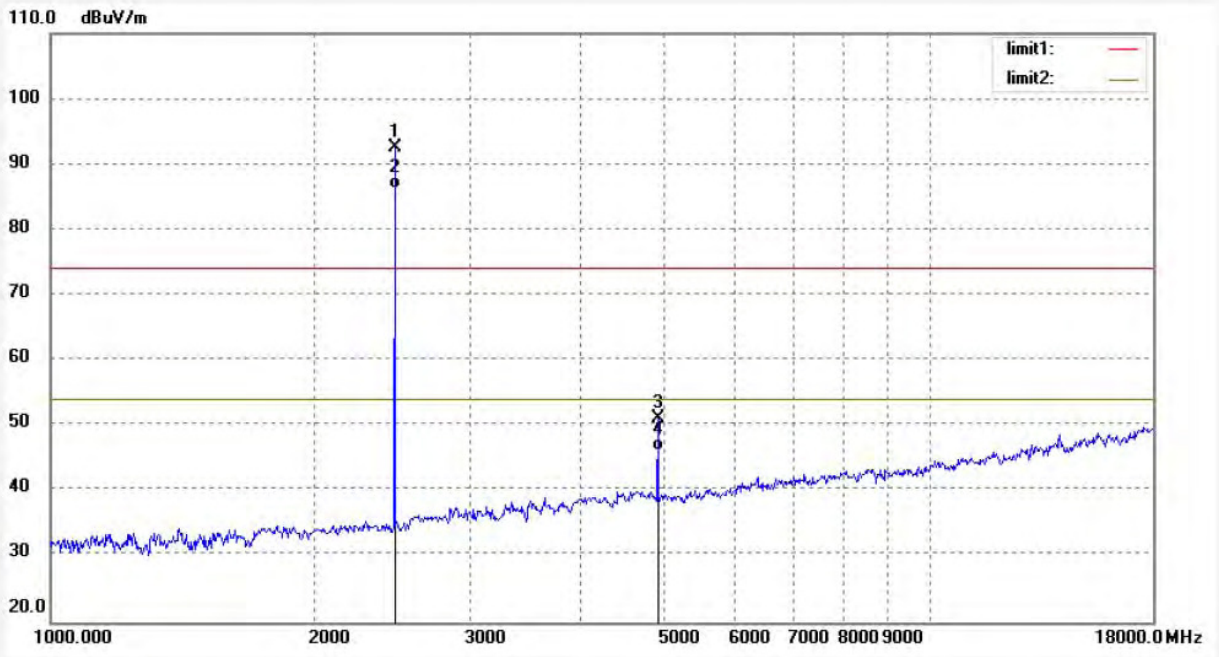
Job No.: Frank2017 #2173
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: MINI Wi-Fi Plug
Mode: TX Channel 11(802.11N20)
Model: MINI Wi-Fi Plug
Manufacturer: SWAGTEK

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/02/02/
Time: 9/22/43
Engineer Signature: Frank
Distance: 3m

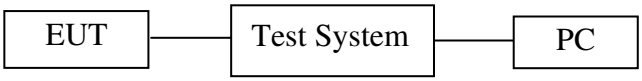
Note: Report NO.:ATE20172536



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.000	96.61	-3.97	92.64	74.00	18.64	peak	250	192	
2	2462.000	90.31	-3.97	86.34	54.00	32.34	AVG	200	345	
3	4924.000	47.74	3.50	51.24	74.00	-22.76	peak	250	102	
4	4924.000	42.61	3.50	46.11	54.00	-7.89	AVG	250	356	

12.99% OCCUPIED BANDWIDTH

12.1.Block Diagram of Test Setup



12.2.EUT Configuration on Measurement

The following 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.

12.3.Operating Condition of EUT

12.3.1.Setup the EUT and simulator as shown as Section 12.1.

12.3.2.Turn on the power of all equipment.

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

12.4.Test Procedure

12.4.1.The transmitter output was connected to the spectrum analyzer through a low loss cable. The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

12.4.2.The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

12.4.3.A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

12.4.4.Set SPA “Meas” function, Select “Occupied Bandwidth” function, Select “99% Power Bandwidth”. The frequency of the upper and lower markers indicating the edges of the transmitters “99% Power” emission bandwidth shall be recorded to automate by SPA.

12.5.Measurement Result

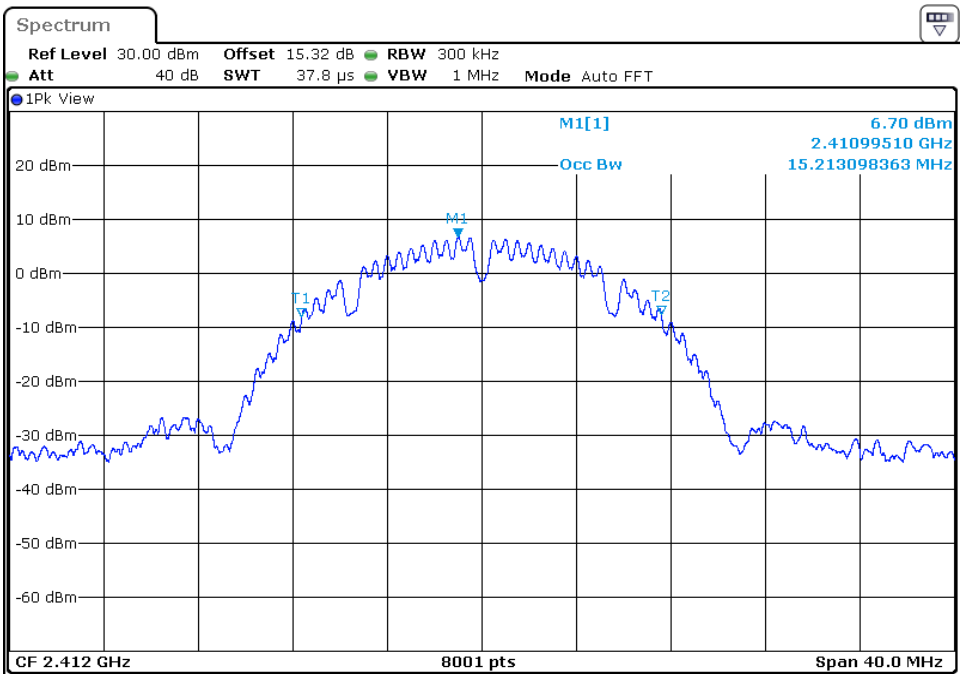
The test was performed with 802.11b		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	15.213
Middle	2437	15.263
High	2462	15.258

The test was performed with 802.11g		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	16.868
Middle	2437	16.858
High	2462	16.818

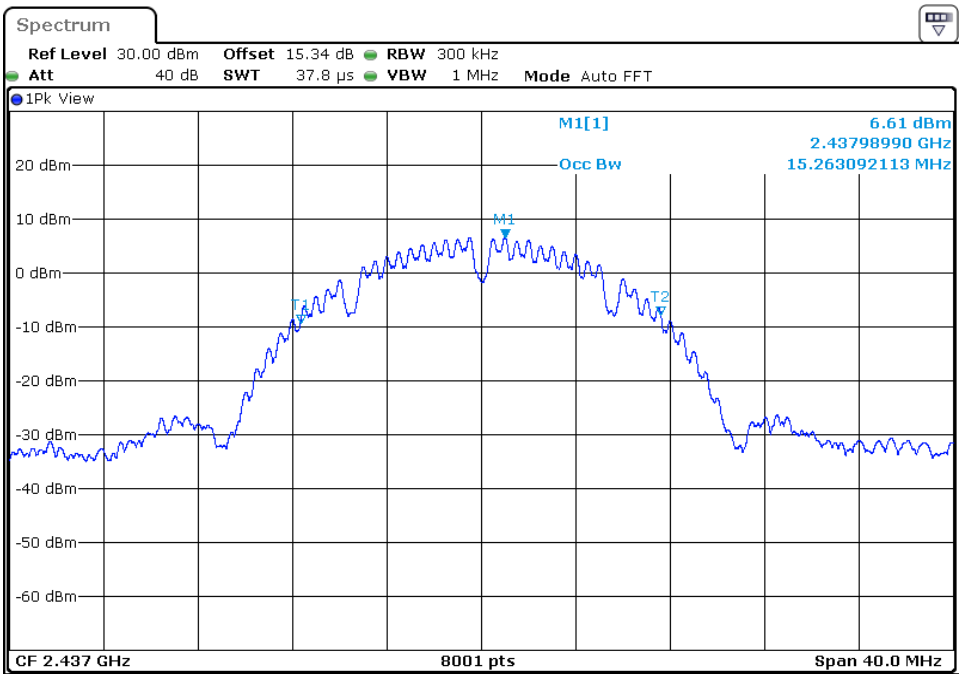
The test was performed with 802.11n (Bandwidth: 20 MHz)		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	18.138
Middle	2437	17.968
High	2462	18.093

The spectrum analyzer plots are attached as below.

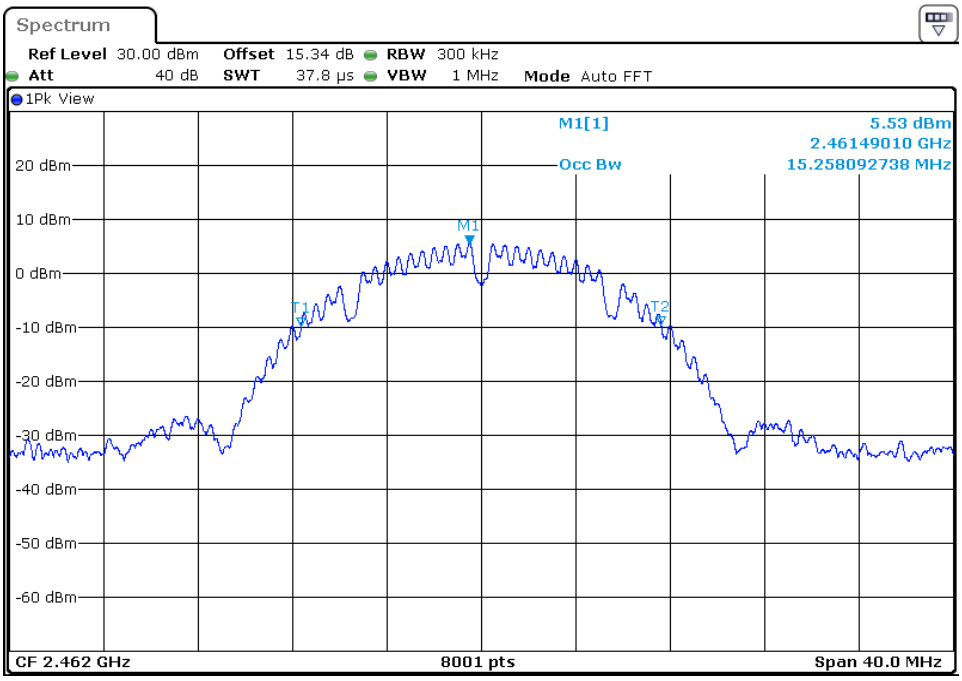
802.11b Channel Low 2412MHz



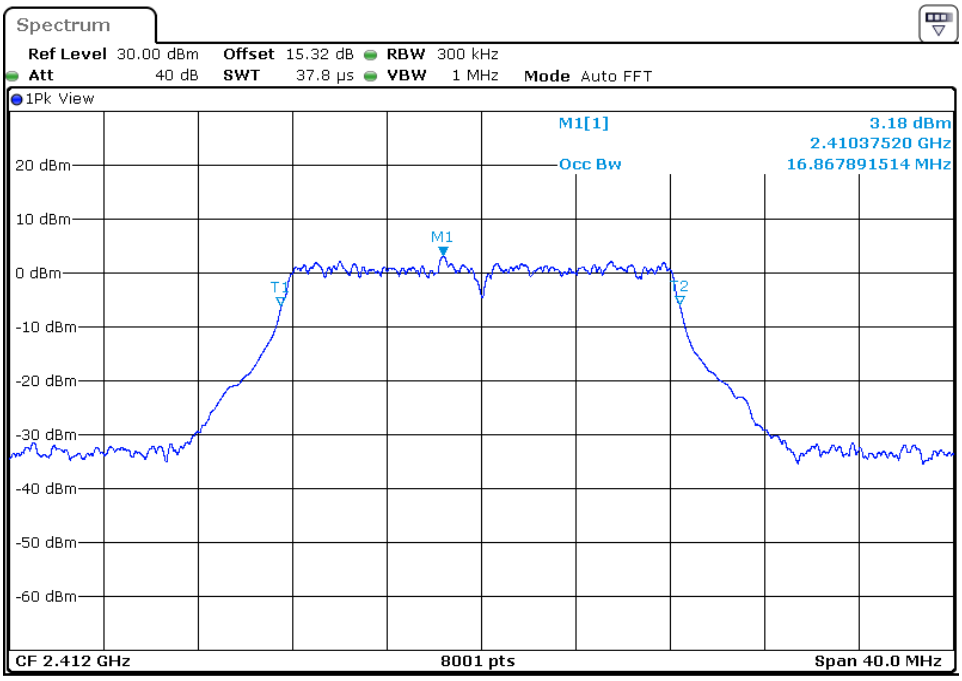
802.11b Channel Middle 2437MHz



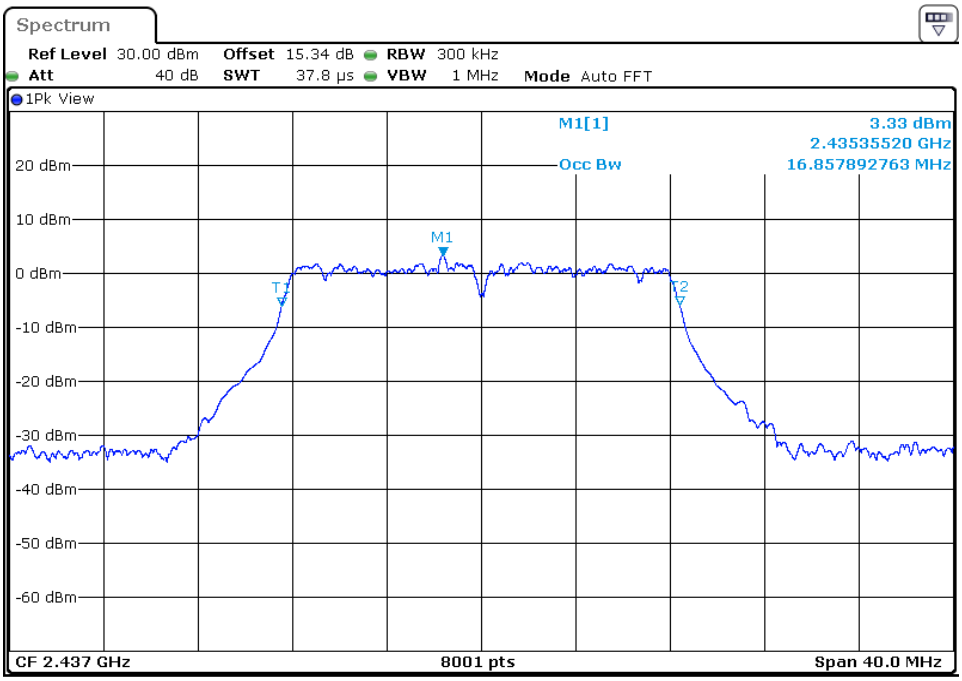
802.11b Channel High 2462MHz



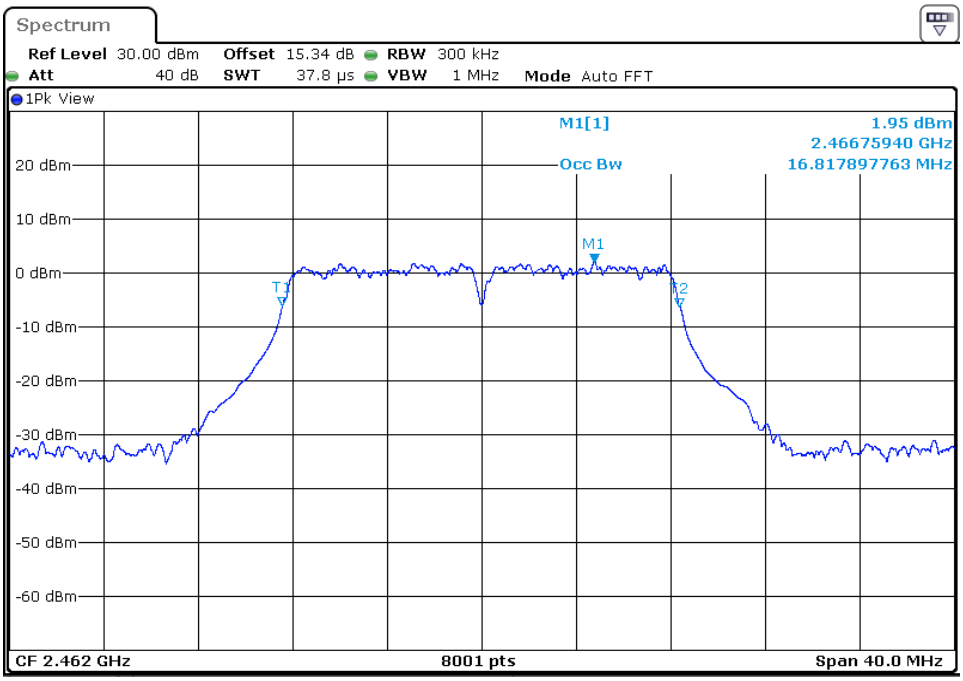
802.11g Channel Low 2412MHz



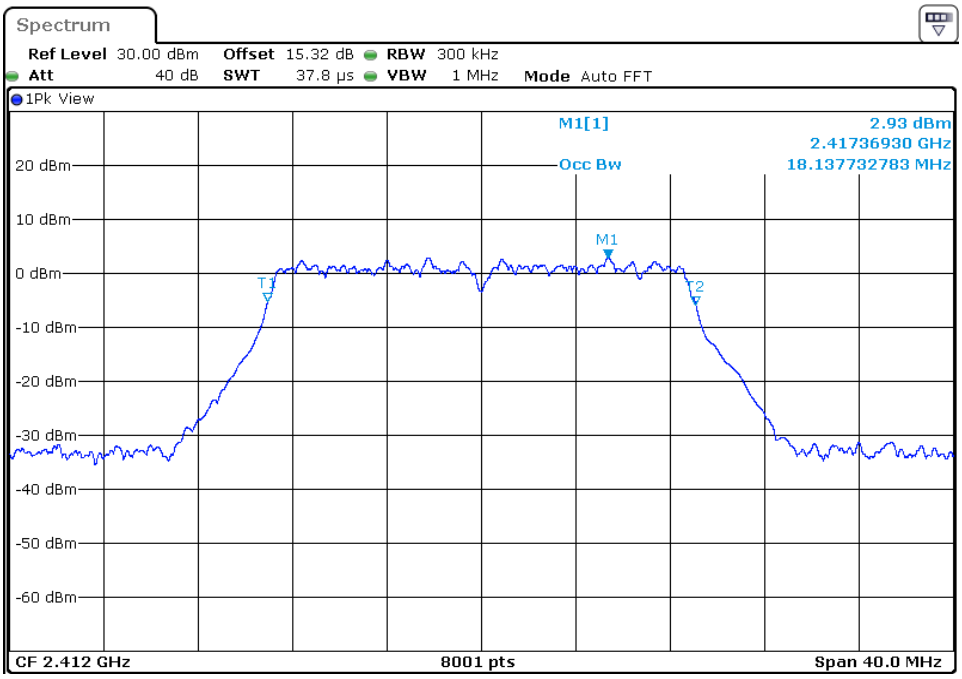
802.11g Channel Middle 2437MHz



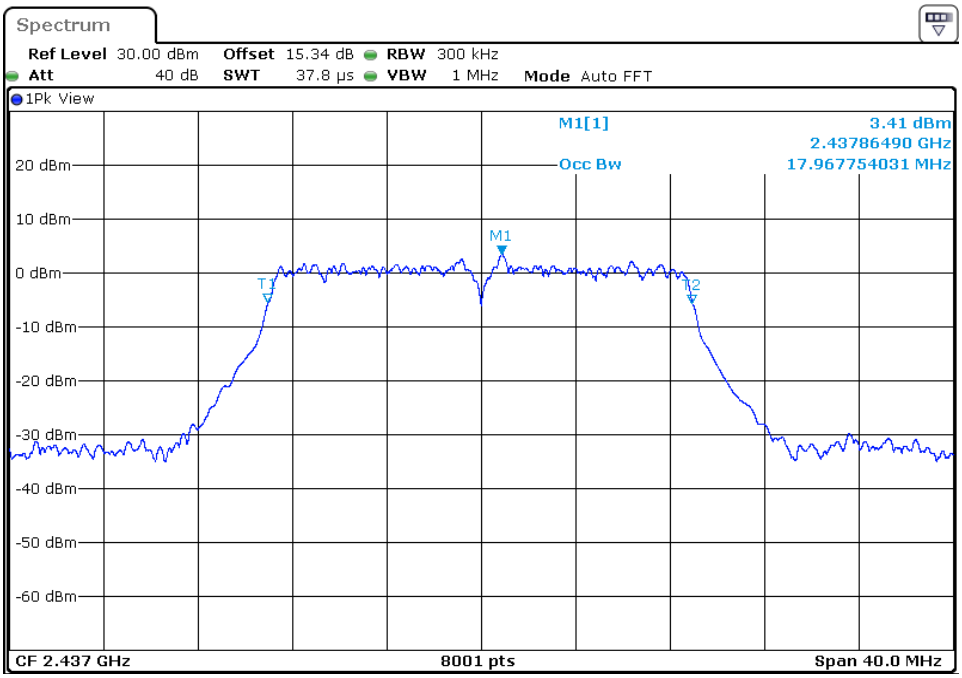
802.11g Channel High 2462MHz



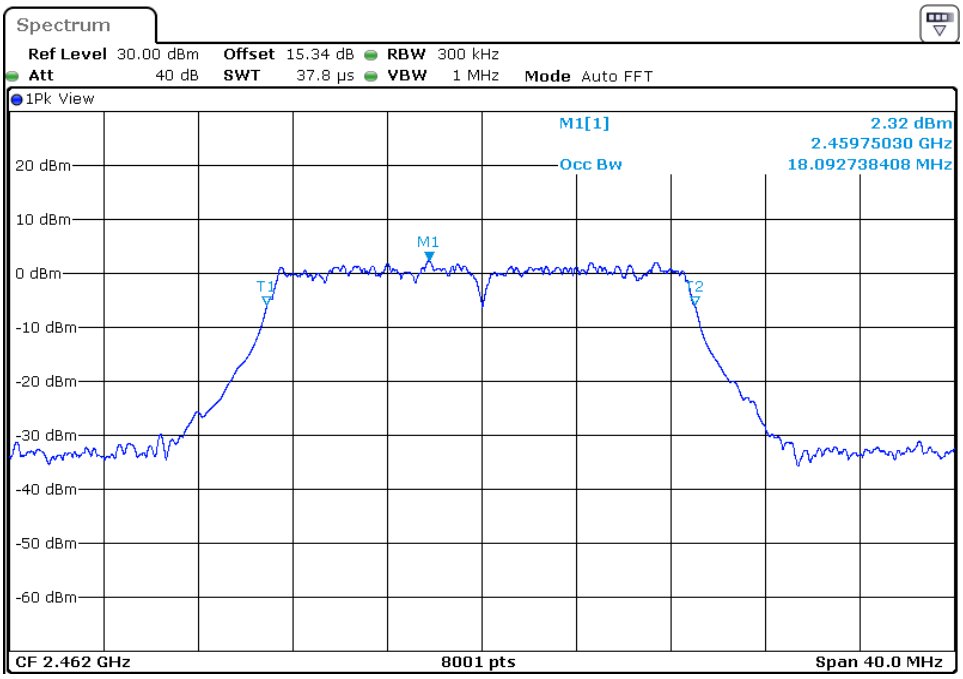
802.11n Channel Low 2412MHz (20MHz)



802.11n Channel Middle 2437MHz(20MHz)



802.11n Channel High 2462MHz(20MHz)



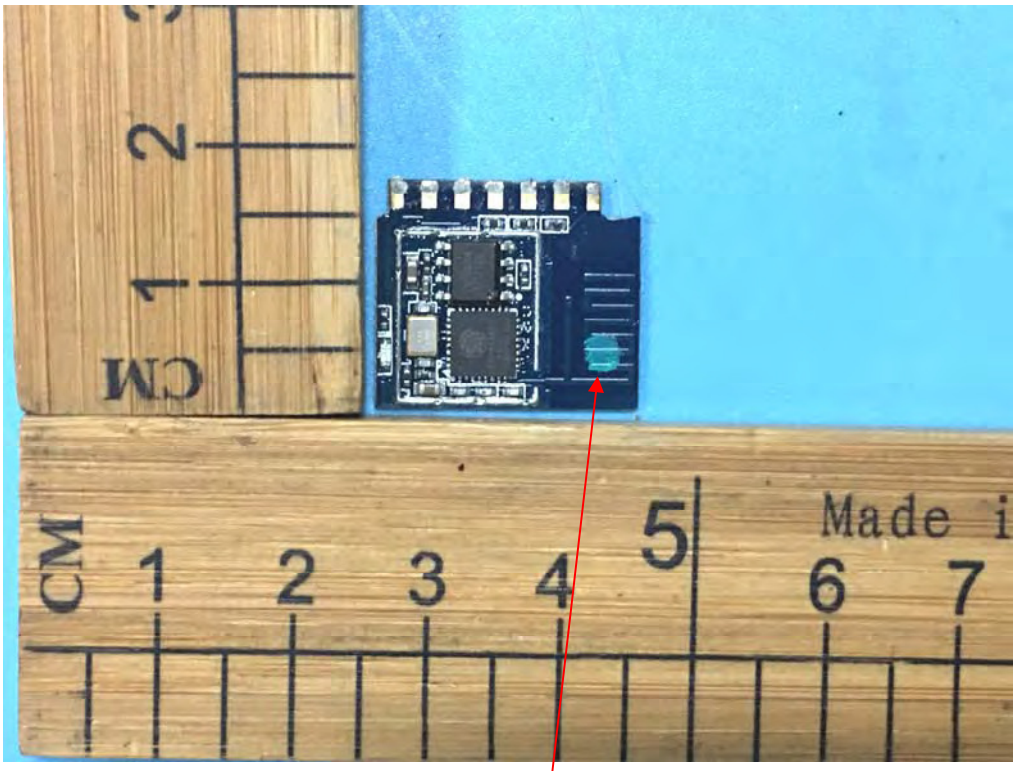
13. ANTENNA REQUIREMENT

13.1. The Requirement

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

13.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 2dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna

******* End of Test Report *******