APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Nicetex Electronics Limited

KOOGEEK WIFI SMART LED LIGHT BULB
Model No.: LB2

FCC ID: 2AE3JLB2

Prepared for	:	Nicetex Electronics Limited
Address	:	RM 20-21, 14/F., BLK A, Hi-Tech Industrial Centre, 5-21 Pak Tin, Par St., Tsuen Wan, Hong Kong
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
Address	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
		Tel: (0755) 26503290
		Fax: (0755) 26503396

Report No.	:	ATE20181409
Date of Test	:	August 10-August 15, 2018
Date of Report	:	August 17, 2018

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Test Report Certification

Applicant	:	Nicetex Electronics Limited
Address	:	RM 20-21, 14/F., BLK A, Hi-Tech Industrial Centre, 5-21 Pak Tin, Par St., Tsuen Wan, Hong Kong
Product	:	KOOGEEK WIFI SMART LED LIGHT BULB
Model No.	:	LB2
Trade Mark	:	KOOGEEK

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 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 : August 10-August 15, 2018
Date of Report : August 17, 2018

Prepared by : (Steve Yang, Engineer)

Approved & Authorized Signer : (Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	KOOGEEK WIFI SMART LED LIGHT BULB
Model Number	:	LB2
Frequency Range	:	802.11b/g/n(20MHz): 2412-2462MHz 802.11n(40MHz): 2422-2452MHz
Number of Channels	:	802.11b/g/n (20MHz):11 802.11n (40MHz): 7
Antenna Gain	:	2dBi
Type of Antenna	:	PCB Antenna
Power Supply	:	AC 100-240V~50/60Hz
Data Rate	:	802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: up to 150Mbps
Modulation Type	:	DSSS, OFDM

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

PC (provided by laboratory)	:	Manufacturer: LENOVO M/N: 4290-RT8 S/N: R9-FW93G 11/08

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	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 06, 2018	1 Year
EMI Test Receiver	Rohde&Schwarz	ESR	101526/003	Jan. 06, 2018	1 Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 06, 2018	1 Year
Pre-Amplifier	Agilent	8447D	294A10619	Jan. 06, 2018	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	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	Schwarzbeck	NSLK8126	8126431	Jan. 06, 2018	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 06, 2018	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375 /2510-60/11SS	N/A	Jan. 06, 2018	1 Year
Conducted Emission Test Software: ES-K1 V1.71					
Radiated Emission Test Software: EZ_EMC V1.1.4.2					

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

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

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

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

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

3.2.Configuration and peripherals

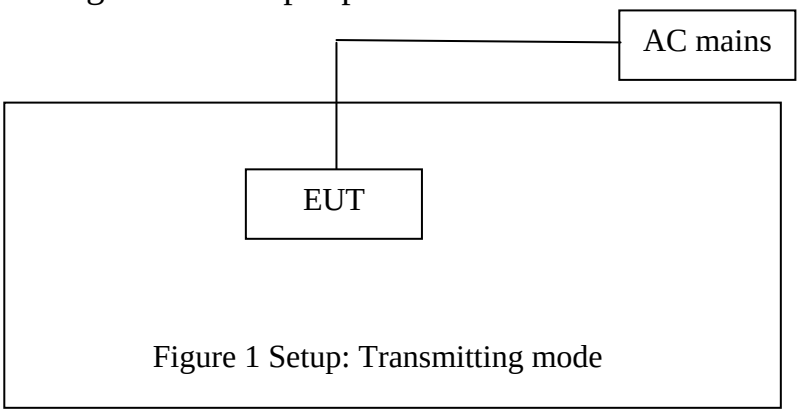


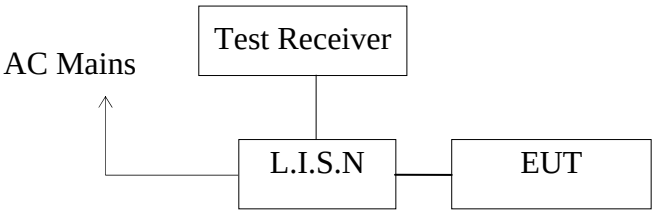
Figure 1 Setup: Transmitting mode

4. TEST PROCEDURES AND RESULTS

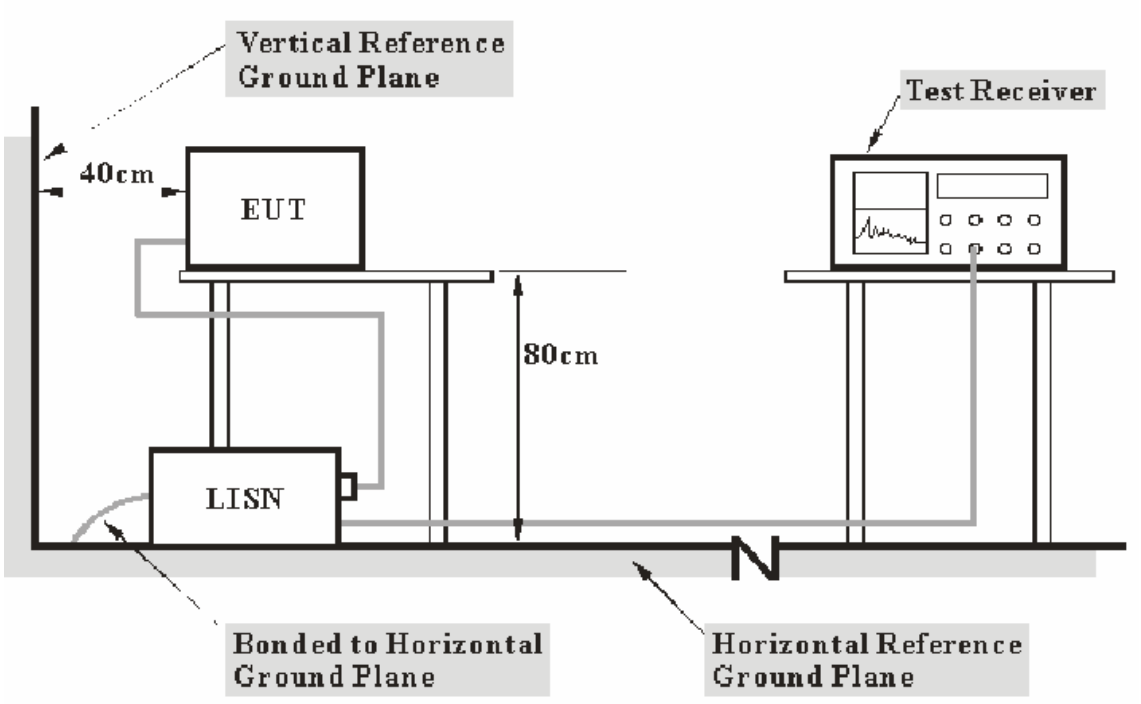
FCC Rules	Description of Test	Result
Section 15.207	Power Line Conducted Emission	Compliant
KDB558074 D01 DTS Meas Guidance v04	Duty cycle	Compliant
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
ANSI C63.10: 2013 Section 6.9.3	99% occupied Bandwidth	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(e)	Power Spectral Density 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



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.
Test Lab: Shielding room
Test Engineer: Star

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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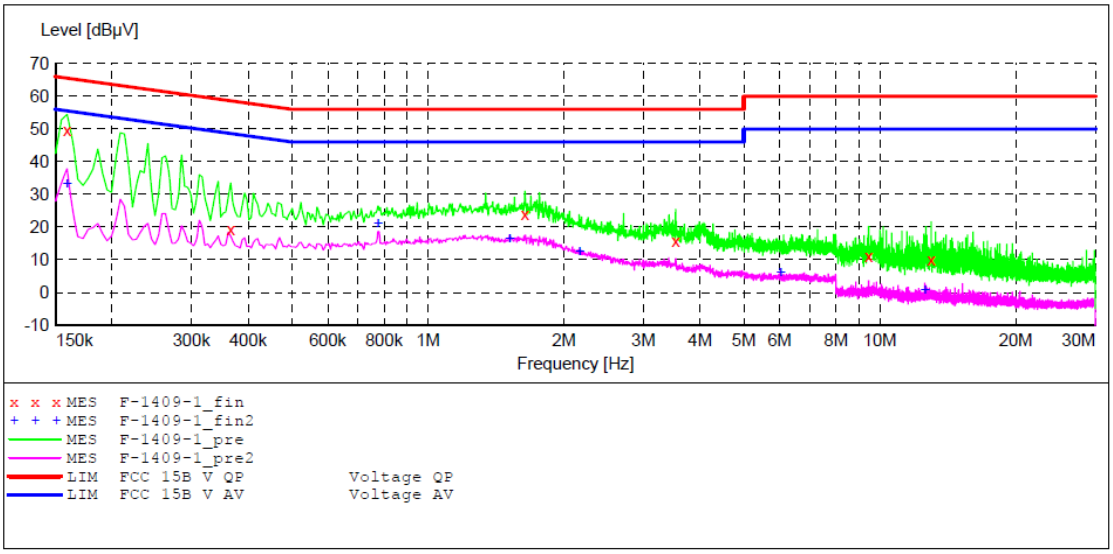
CONDUCTED EMISSION STANDARD FCC PART 15C

```
EUT:                  KOOGEEK WIFI SMART LED LIGHT BULB  M/N:LB2
Manufacturer:         NICETEX Electronics Limited
Operating Condition:  ON
Test Site:            2#Shielding Room
Operator:             Frank
Test Specification:   L  120V/60Hz
Comment:              Report NO.:ATE20181409
Start of Test:        2018-8-10 / 9:30:41
```

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-1409-1_fin"

2018-8-10 9:33

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	49.70	10.8	66	15.8	QP	L1	GND
0.366000	19.30	10.9	59	39.3	QP	L1	GND
1.639500	23.80	11.2	56	32.2	QP	L1	GND
3.534000	15.70	11.4	56	40.3	QP	L1	GND
9.451500	11.20	11.6	60	48.8	QP	L1	GND
12.997500	10.10	11.6	60	49.9	QP	L1	GND

MEASUREMENT RESULT: "F-1409-1_fin2"

2018-8-10 9:33

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.159000	33.10	10.8	56	22.4	AV	L1	GND
0.775500	20.90	11.1	46	25.1	AV	L1	GND
1.518000	16.60	11.2	46	29.4	AV	L1	GND
2.166000	12.60	11.3	46	33.4	AV	L1	GND
6.031500	6.10	11.5	50	43.9	AV	L1	GND
12.574500	0.70	11.6	50	49.3	AV	L1	GND

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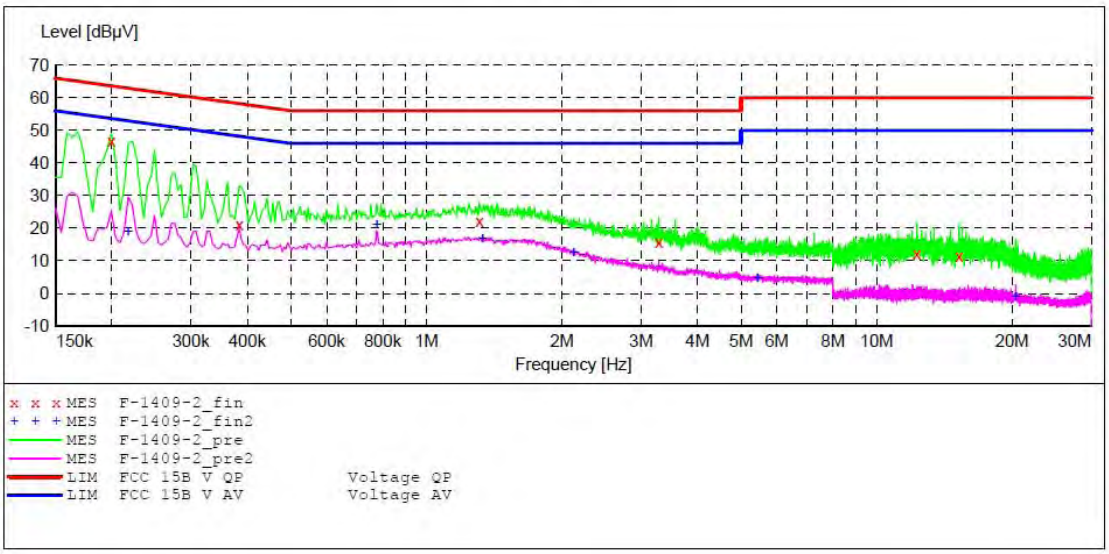
CONDUCTED EMISSION STANDARD FCC PART 15C

EUT: KOOGEEK WIFI SMART LED LIGHT BULB M/N:LB2
Manufacturer: NICETEX Electronics Limited
Operating Condition: ON
Test Site: 2#Shielding Room
Operator: Frank
Test Specification: N 120V/60Hz
Comment: Report NO.:ATE20181409
Start of Test: 2018-8-10 / 9:33:53

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

Short Description: _SUB_STD_VTERM2 1.70

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



MEASUREMENT RESULT: "F-1409-2_fin"

2018-8-10 9:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199500	46.90	10.8	64	16.7	QP	N	GND
0.384000	21.00	10.9	58	37.2	QP	N	GND
1.311000	22.10	11.2	56	33.9	QP	N	GND
3.286500	15.80	11.4	56	40.2	QP	N	GND
12.291000	12.00	11.6	60	48.0	QP	N	GND
15.261000	11.30	11.7	60	48.7	QP	N	GND

MEASUREMENT RESULT: "F-1409-2_fin2"

2018-8-10 9:35

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.217500	19.00	10.8	53	33.9	AV	N	GND
0.775500	20.90	11.1	46	25.1	AV	N	GND
1.333500	16.70	11.2	46	29.3	AV	N	GND
2.125500	12.40	11.3	46	33.6	AV	N	GND
5.437500	4.80	11.5	50	45.2	AV	N	GND
20.386500	-0.90	11.7	50	50.9	AV	N	GND

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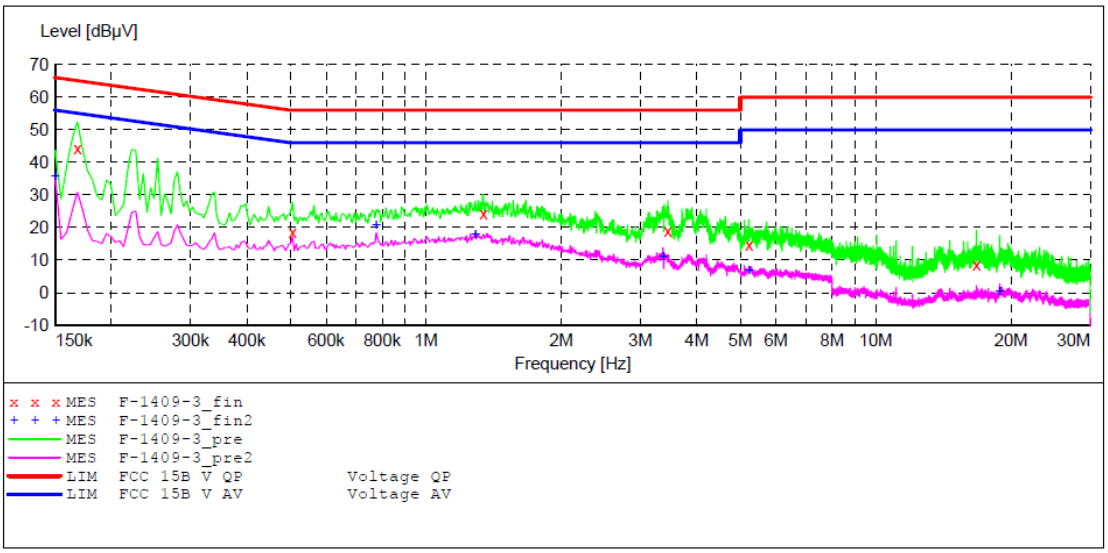
CONDUCTED EMISSION STANDARD FCC PART 15C

```
EUT:                  KOOGEEK WIFI SMART LED LIGHT BULB  M/N:LB2
Manufacturer:         NICETEX Electronics Limited
Operating Condition:  ON
Test Site:            2#Shielding Room
Operator:             Frank
Test Specification:   N  240V/60Hz
Comment:              Report NO.:ATE20181409
Start of Test:        2018-8-10 / 9:36:30
```

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-1409-3_fin"

2018-8-10 9:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.168000	44.40	10.8	65	20.7	QP	N	GND
0.505500	18.70	11.0	56	37.3	QP	N	GND
1.342500	24.20	11.2	56	31.8	QP	N	GND
3.453000	19.00	11.4	56	37.0	QP	N	GND
5.230500	14.80	11.4	60	45.2	QP	N	GND
16.741500	8.50	11.7	60	51.5	QP	N	GND

MEASUREMENT RESULT: "F-1409-3_fin2"

2018-8-10 9:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	35.80	10.8	56	20.2	AV	N	GND
0.775500	20.80	11.1	46	25.2	AV	N	GND
1.288500	17.80	11.2	46	28.2	AV	N	GND
3.367500	11.00	11.4	46	35.0	AV	N	GND
5.230500	6.80	11.4	50	43.2	AV	N	GND
18.865500	0.30	11.7	50	49.7	AV	N	GND

ACCURATE TECHNOLOGY CO.,LTD

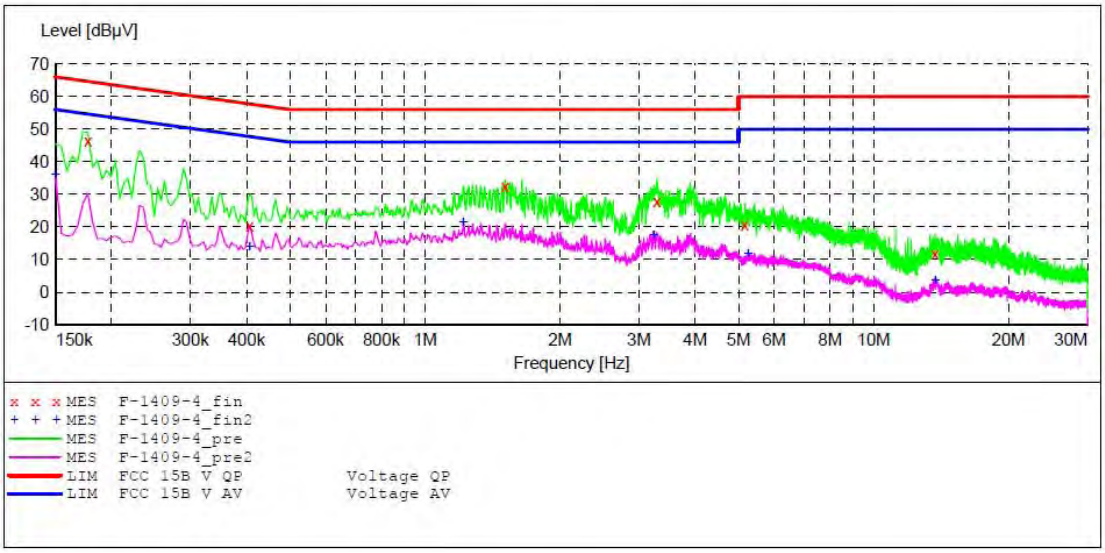
CONDUCTED EMISSION STANDARD FCC PART 15C

EUT: KOOGEEK WIFI SMART LED LIGHT BULB M/N:LB2
Manufacturer: NICETEX Electronics Limited
Operating Condition: ON
Test Site: 2#Shielding Room
Operator: Frank
Test Specification: L 240V/60Hz
Comment: Report NO.:ATE20181409
Start of Test: 2018-8-10 / 9:39:18

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

Short Description: _SUB_STD_VTERM2 1.70

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



MEASUREMENT RESULT: "F-1409-4_fin"

2018-8-10 9:41

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.177000	46.30	10.8	65	18.3	QP	L1	GND
0.406500	20.30	11.0	58	37.4	QP	L1	GND
1.509000	32.50	11.2	56	23.5	QP	L1	GND
3.291000	27.70	11.4	56	28.3	QP	L1	GND
5.163000	20.80	11.4	60	39.2	QP	L1	GND
13.722000	11.90	11.6	60	48.1	QP	L1	GND

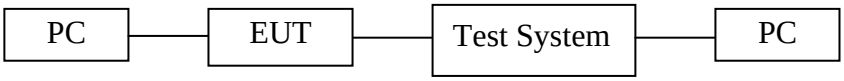
MEASUREMENT RESULT: "F-1409-4_fin2"

2018-8-10 9:41

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	36.00	10.8	56	20.0	AV	L1	GND
0.406500	14.10	11.0	48	33.6	AV	L1	GND
1.216500	21.30	11.2	46	24.7	AV	L1	GND
3.232500	17.50	11.4	46	28.5	AV	L1	GND
5.248500	11.80	11.4	50	38.2	AV	L1	GND
13.731000	3.50	11.6	50	46.5	AV	L1	GND

6. DUTY CYCLE MEASUREMENT

6.1.Block Diagram of Test Setup



6.2.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.

6.3.Operating Condition of EUT

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

6.3.2.Turn on the power of all equipment.

6.3.3.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.

6.4.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.)

6.5. Test Result

Test Lab: Shielding room
Test Engineer: Star

The test was performed with 802.11b			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	100%	0

The test was performed with 802.11g			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	100%	0

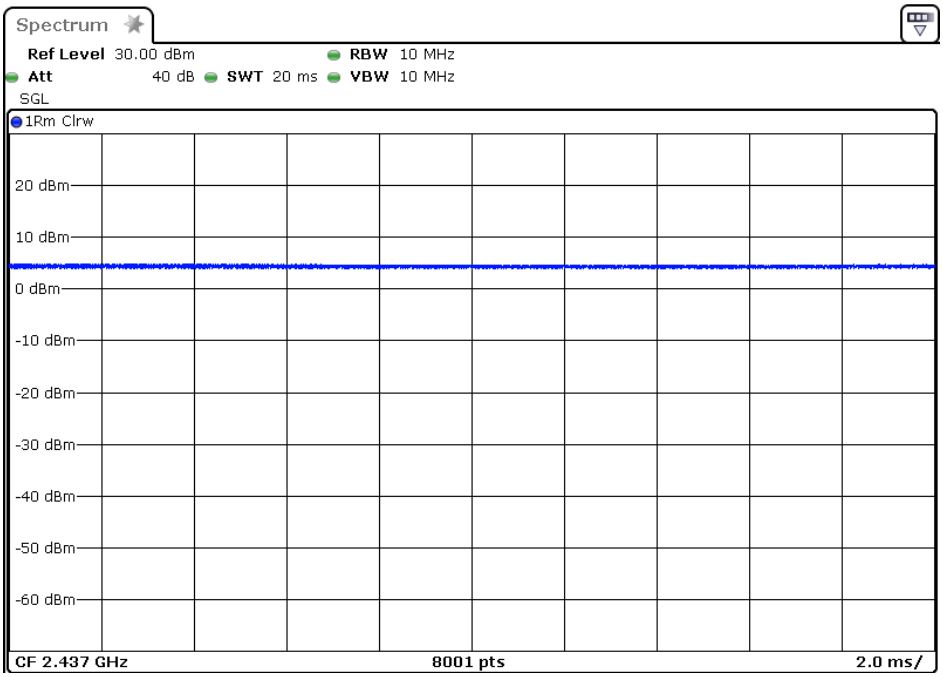
The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	100%	0

The test was performed with 802.11n (Bandwidth: 40 MHz)			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	100%	0

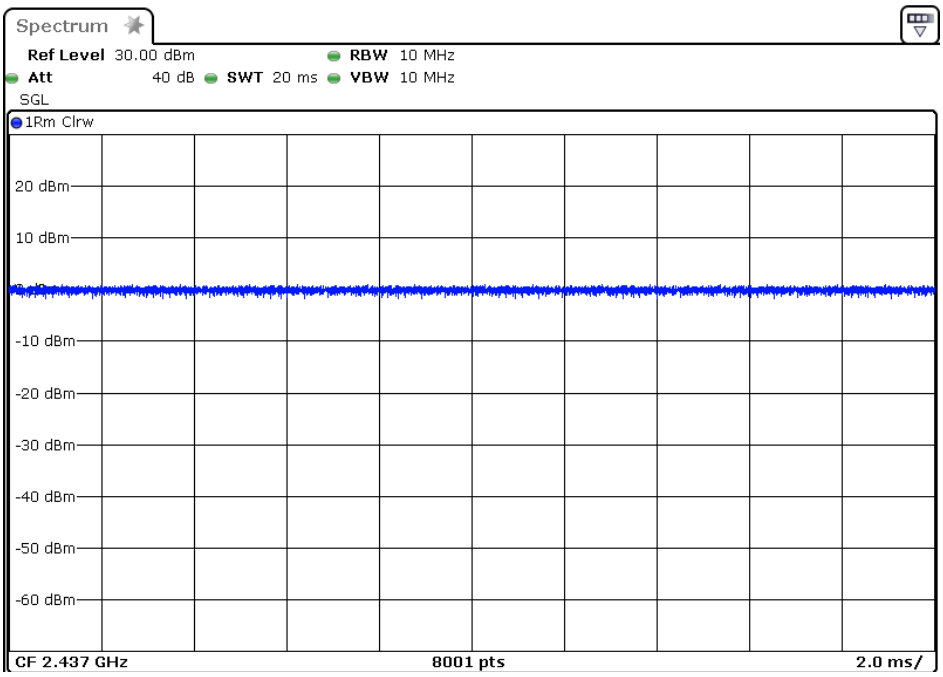
Note: We tested 802.11b/g/n mode the all data rate and recorded the worst case data for this channel to be 1Mbps for 802.11b mode and 6Mbps for 802.11g mode and MCS0 for 802.11n mode.

The spectrum analyzer plots are attached as below.

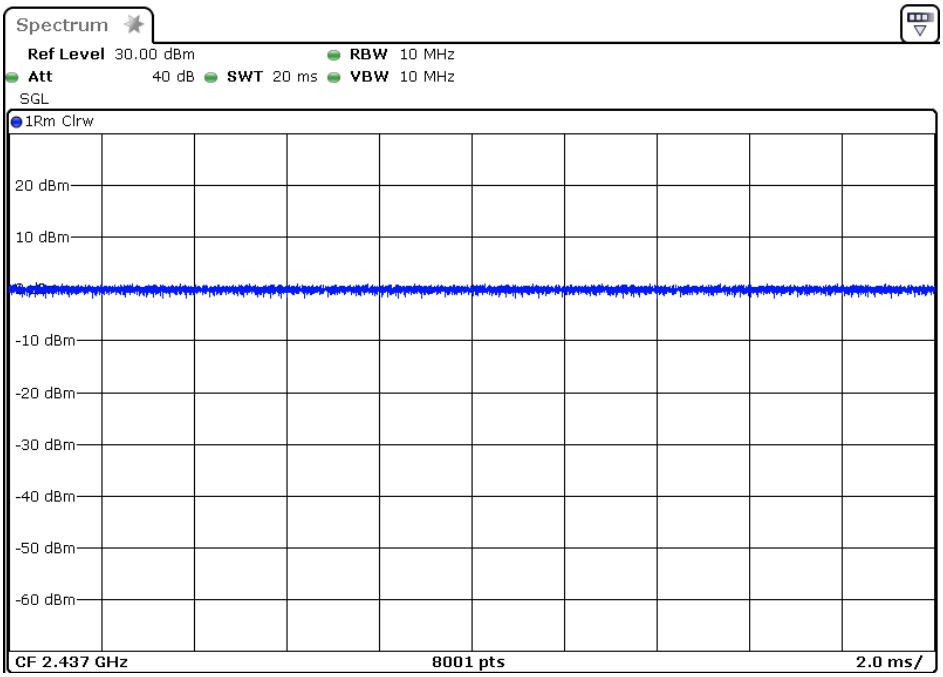
802.11b Channel Middle 2437MHz



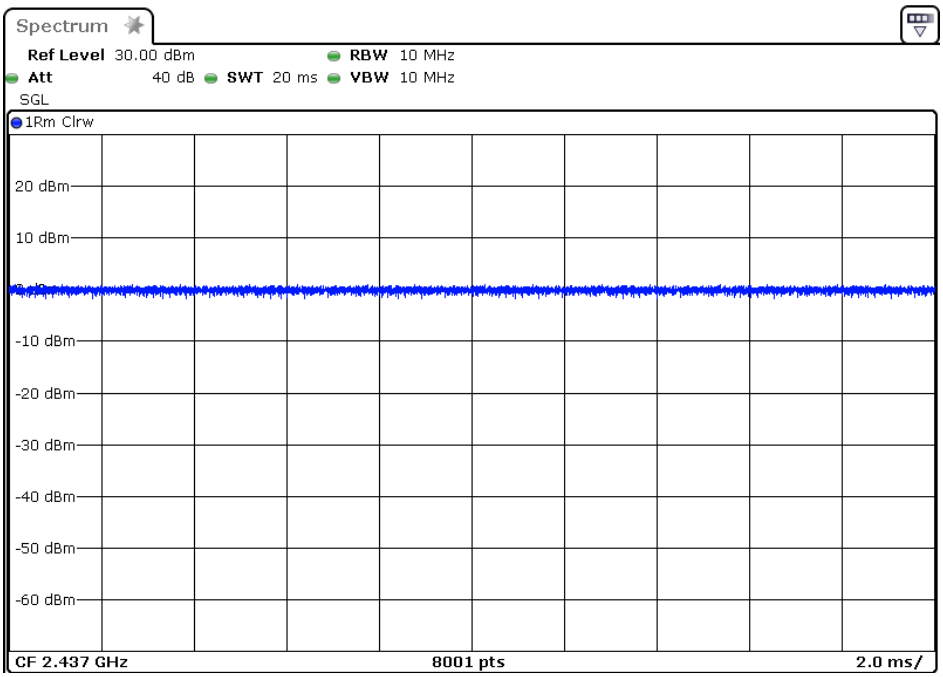
802.11g Channel Middle 2437MHz



802.11n Channel Middle 2437MHz(20MHz)

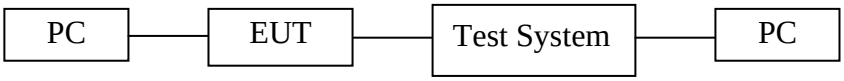


802.11n Channel Middle 2437MHz(40MHz)



7. 6DB BANDWIDTH MEASUREMENT

7.1.Block Diagram of Test Setup



7.2.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.

7.3.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.

7.4.Operating Condition of EUT

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

7.4.2.Turn on the power of all equipment.

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

7.5.Test Procedure

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.

7.6.Test Result

Test Lab: Shielding room
Test Engineer: Star

The test was performed with 802.11b			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	12.040	> 0.5MHz
Middle	2437	12.035	> 0.5MHz
High	2462	12.030	> 0.5MHz

The test was performed with 802.11g			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	16.300	> 0.5MHz
Middle	2437	16.320	> 0.5MHz
High	2462	16.275	> 0.5MHz

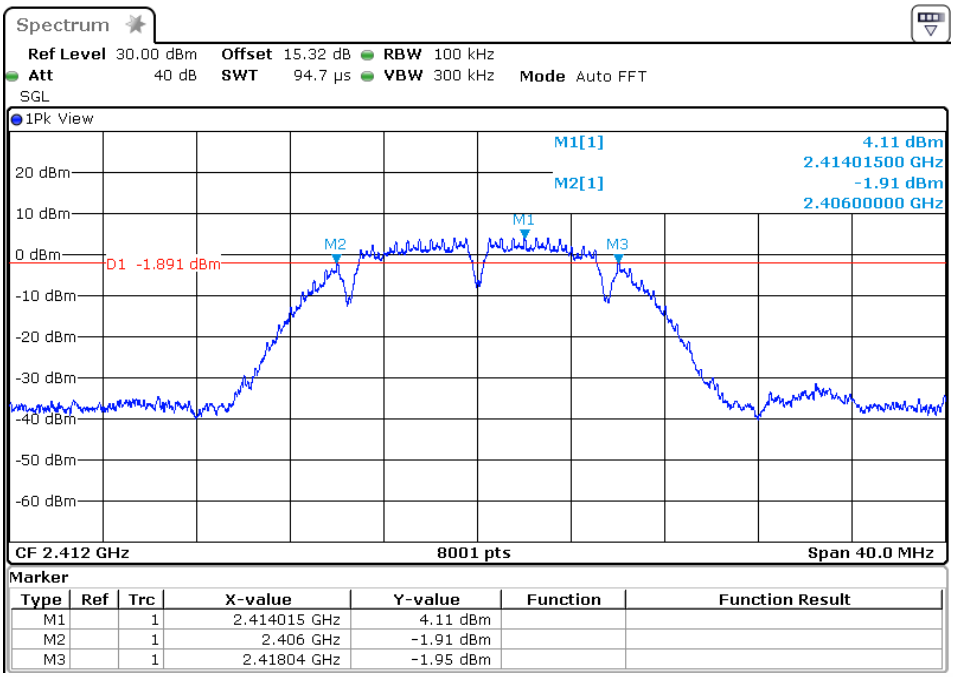
The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	16.040	> 0.5MHz
Middle	2437	15.930	> 0.5MHz
High	2462	15.925	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 40 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2422	35.140	> 0.5MHz
Middle	2437	35.150	> 0.5MHz
High	2452	35.360	> 0.5MHz

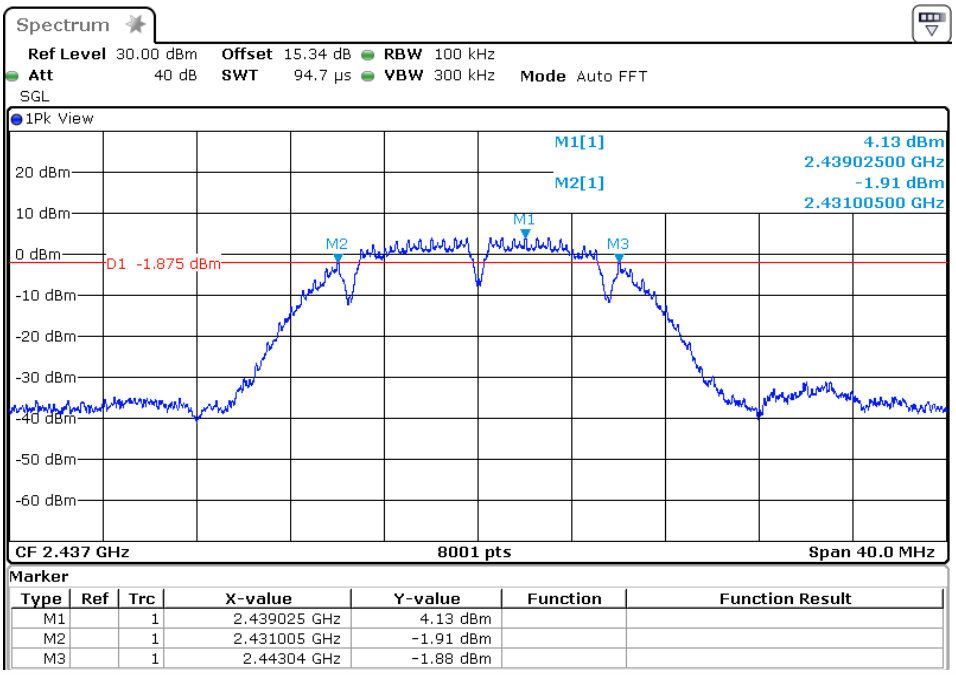
Note: We tested 802.11b/g/n mode the all data rate and recorded the worst case data for this channel to be 1Mbps for 802.11b mode and 6Mbps for 802.11g mode and MCS0 for 802.11n mode.

The spectrum analyzer plots are attached as below.

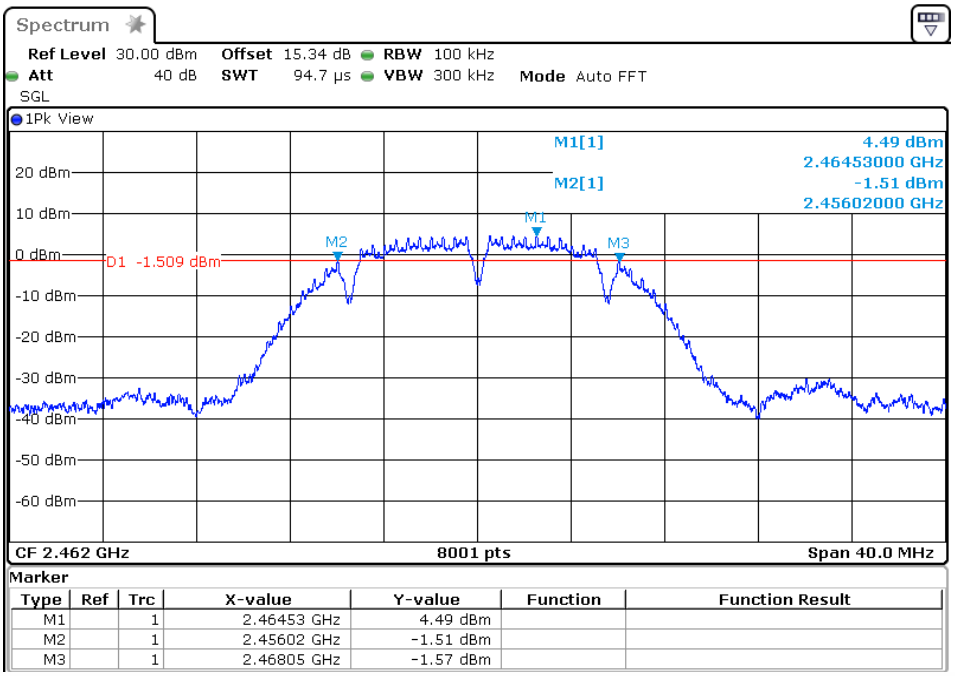
802.11b Channel Low 2412MHz



802.11b Channel Middle 2437MHz



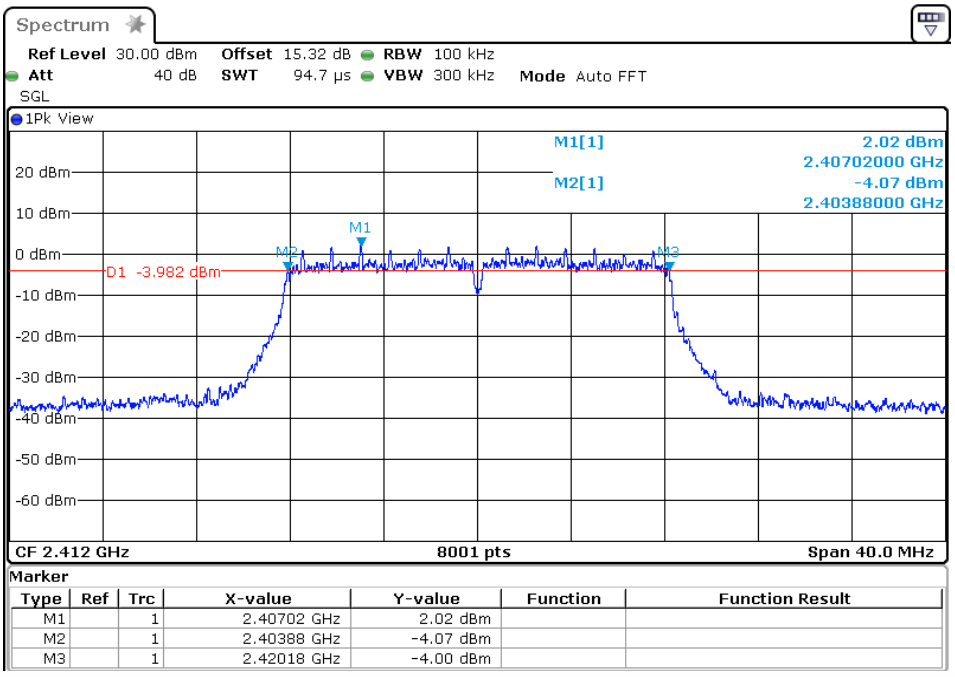
802.11b Channel High 2462MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.46453 GHz	4.49 dBm		
M2		1	2.45602 GHz	-1.51 dBm		
M3		1	2.46805 GHz	-1.57 dBm		

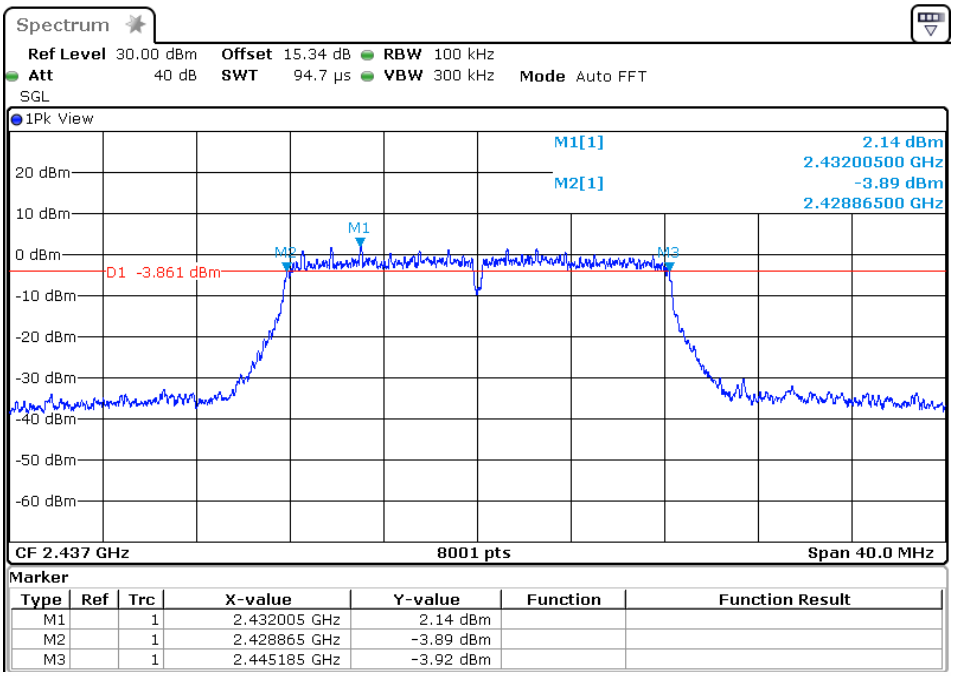
802.11g Channel Low 2412MHz



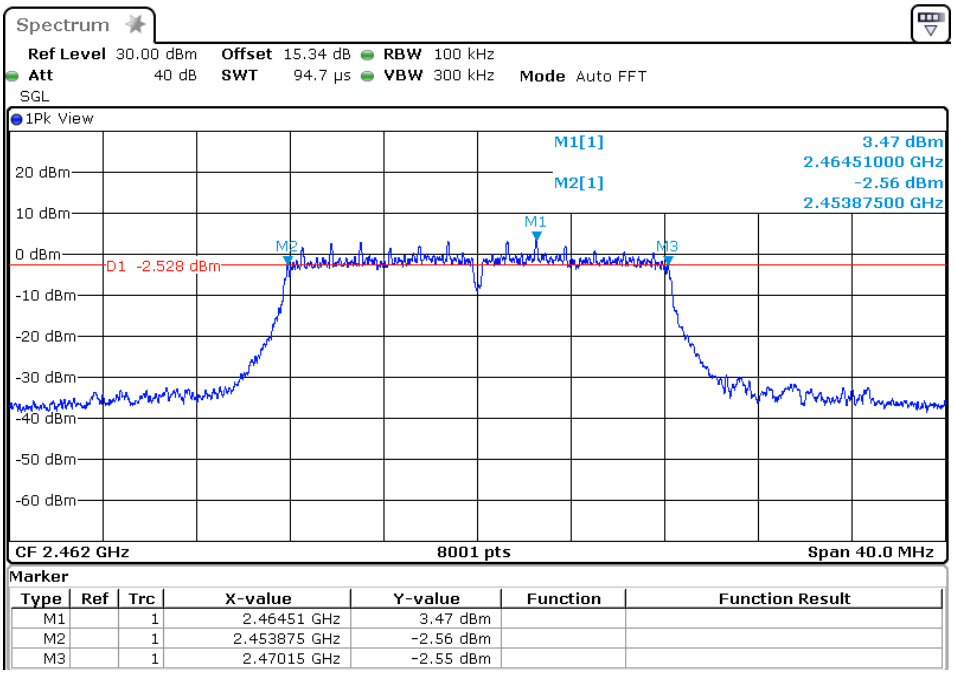
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40702 GHz	2.02 dBm		
M2		1	2.40388 GHz	-4.07 dBm		
M3		1	2.42018 GHz	-4.00 dBm		

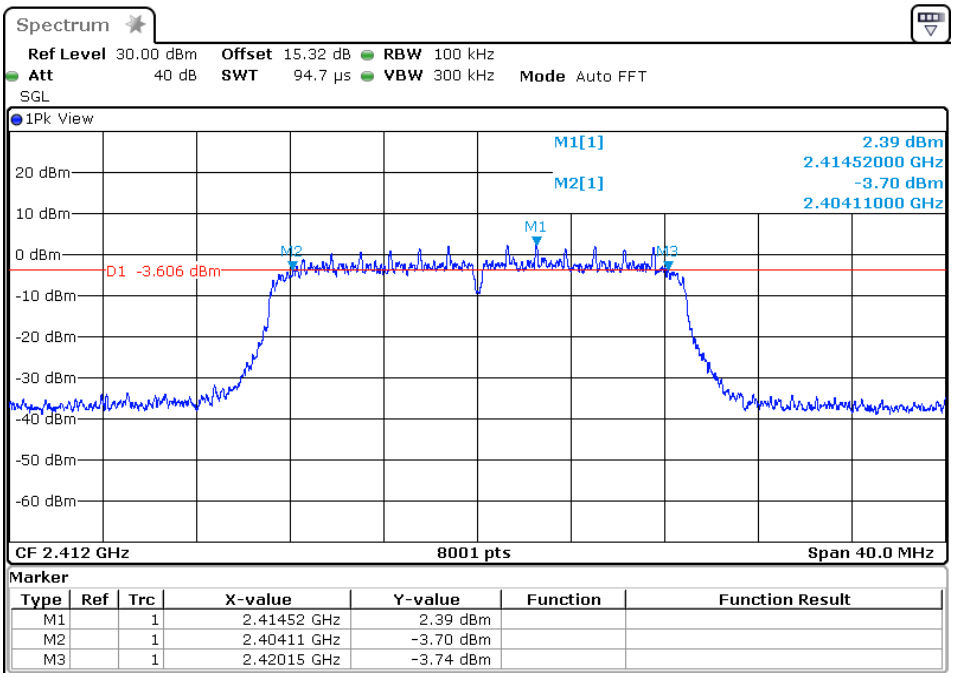
802.11g Channel Middle 2437MHz



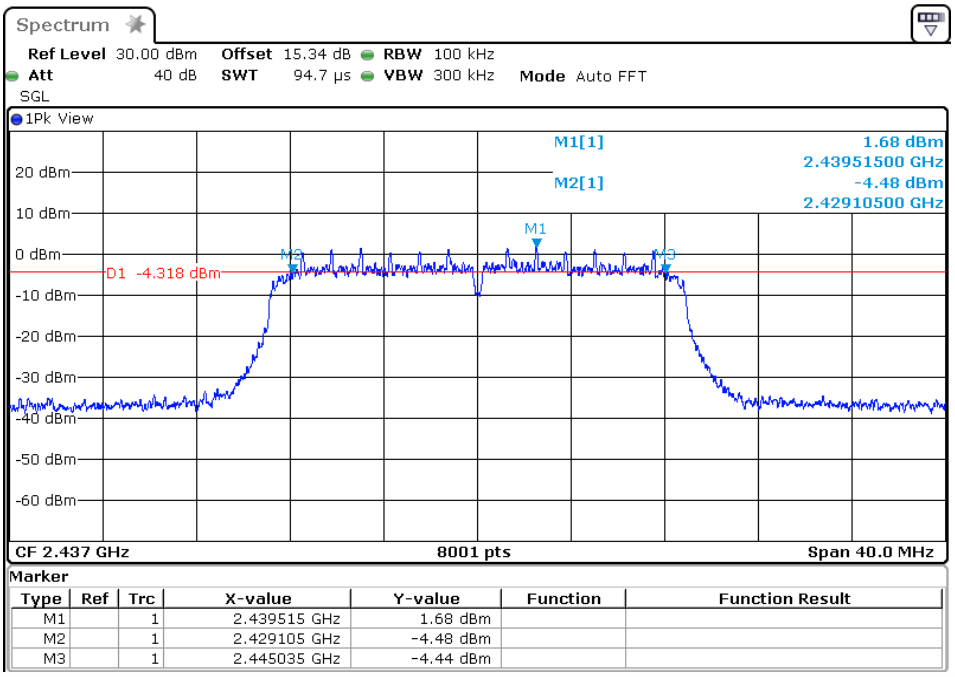
802.11g Channel High 2462MHz



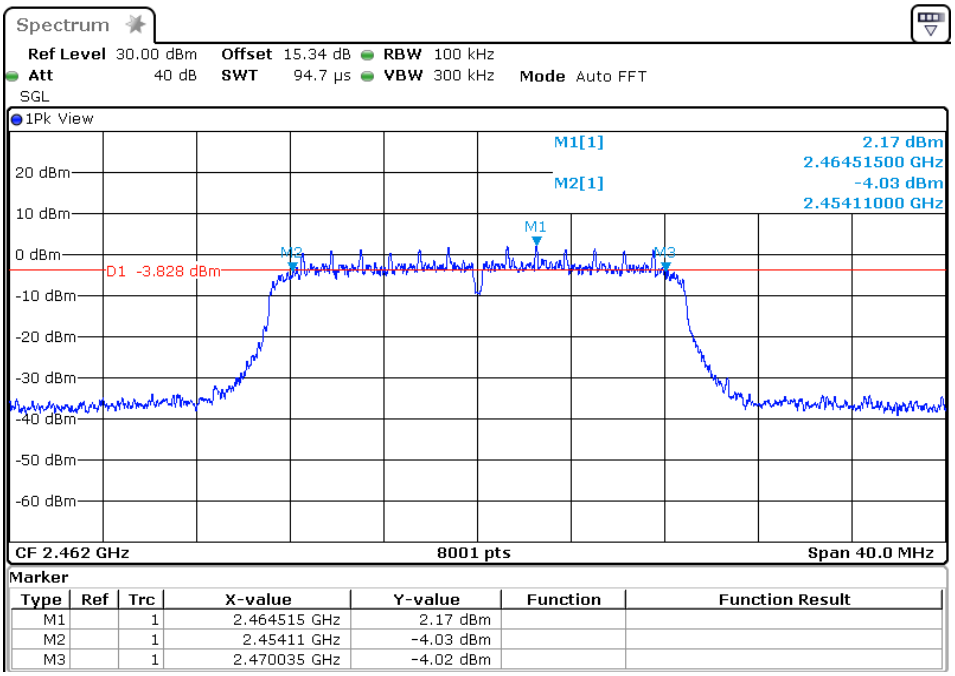
802.11n Channel Low 2412MHz (20MHz)



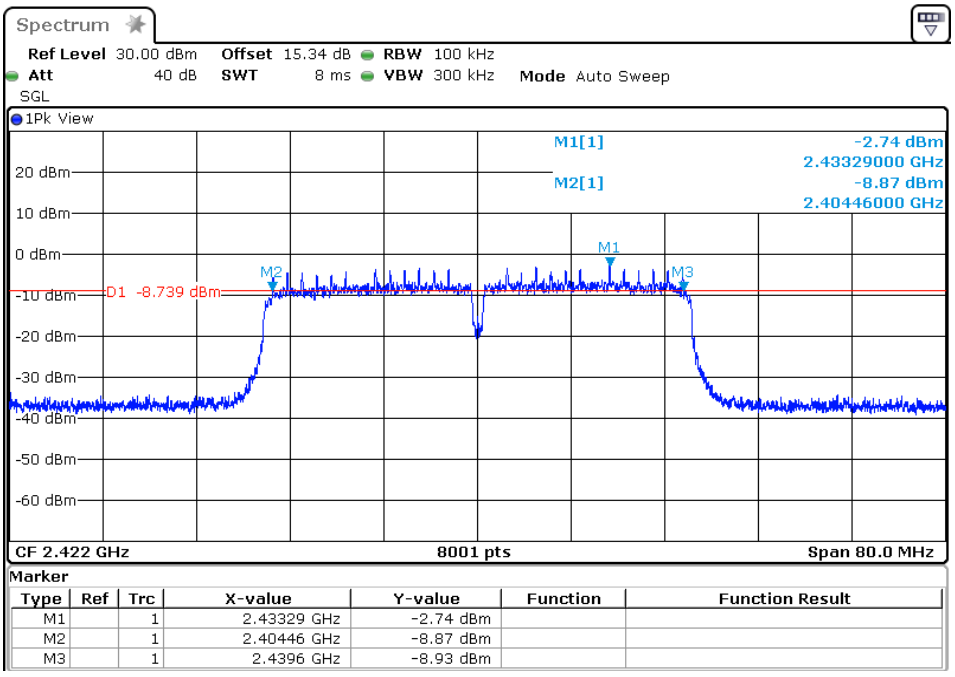
802.11n Channel Middle 2437MHz(20MHz)



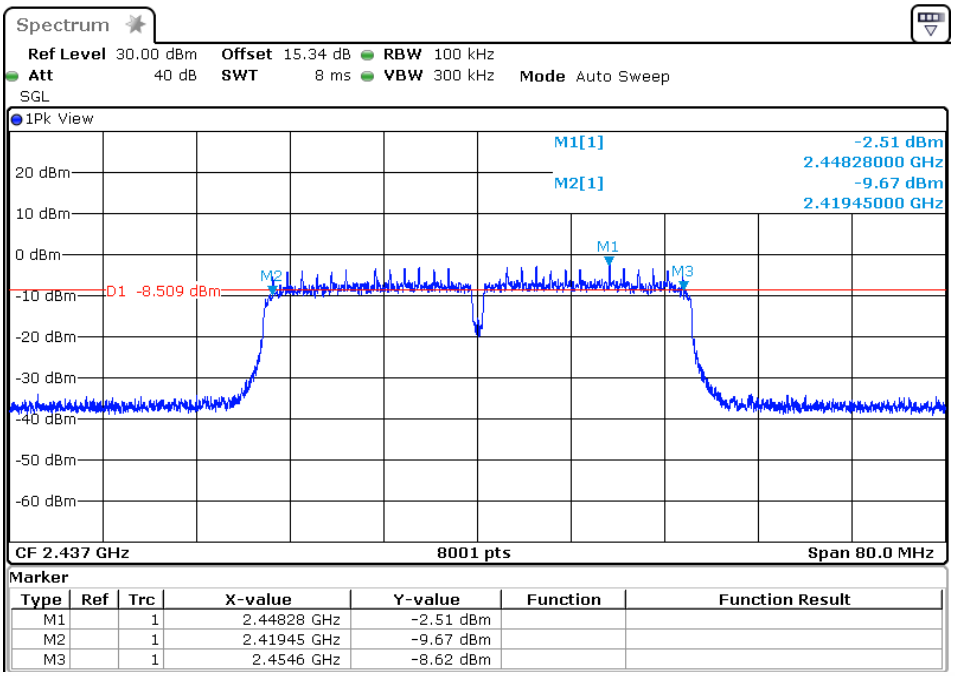
802.11n Channel High 2462MHz(20MHz)



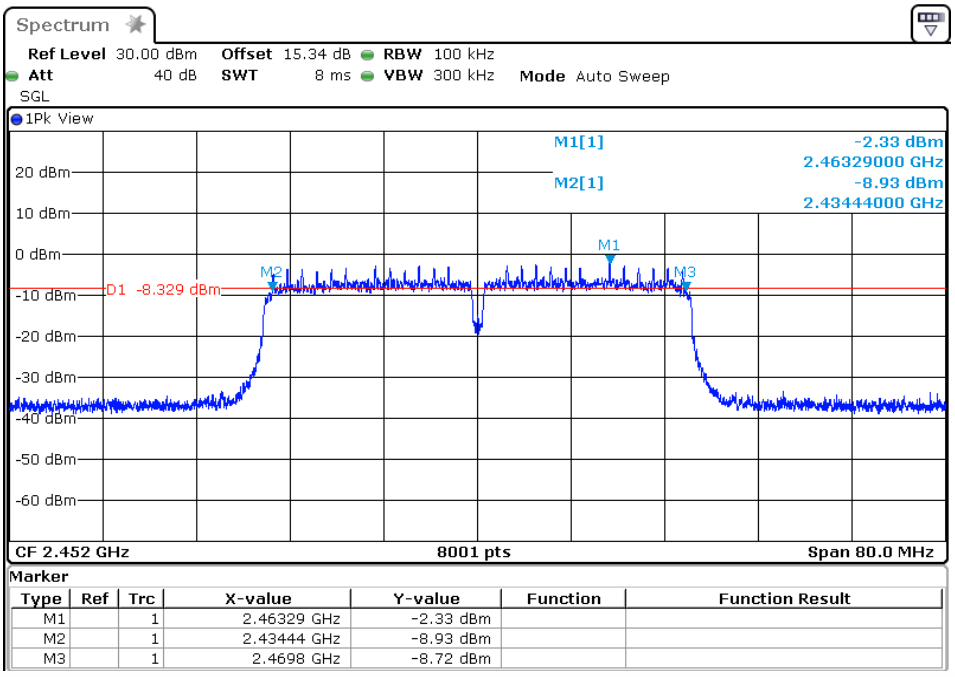
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz(40MHz)

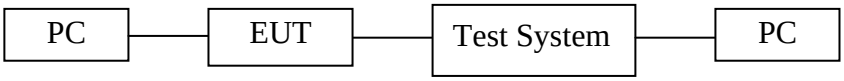


802.11n Channel High 2452MHz(40MHz)



8. 99% OCCUPIED BANDWIDTH

8.1.Block Diagram of Test Setup



8.2.The Requirement For ANSI C63.10: 2013 Section 6.9.3

ANSI C63.10: 2013 Section 6.9.3: The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

8.3.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.

8.4.Operating Condition of EUT

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

8.4.2.Turn on the power of all equipment.

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

8.5.Test Procedure

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

8.5.2.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.

8.5.3.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.

8.5.4.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.

8.6.Measurement Result

Test Lab: Shielding room
Test Engineer: Star

The test was performed with 802.11b		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	14.568
Middle	2437	14.558
High	2462	14.488

The test was performed with 802.11g		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	16.613
Middle	2437	16.568
High	2462	16.513

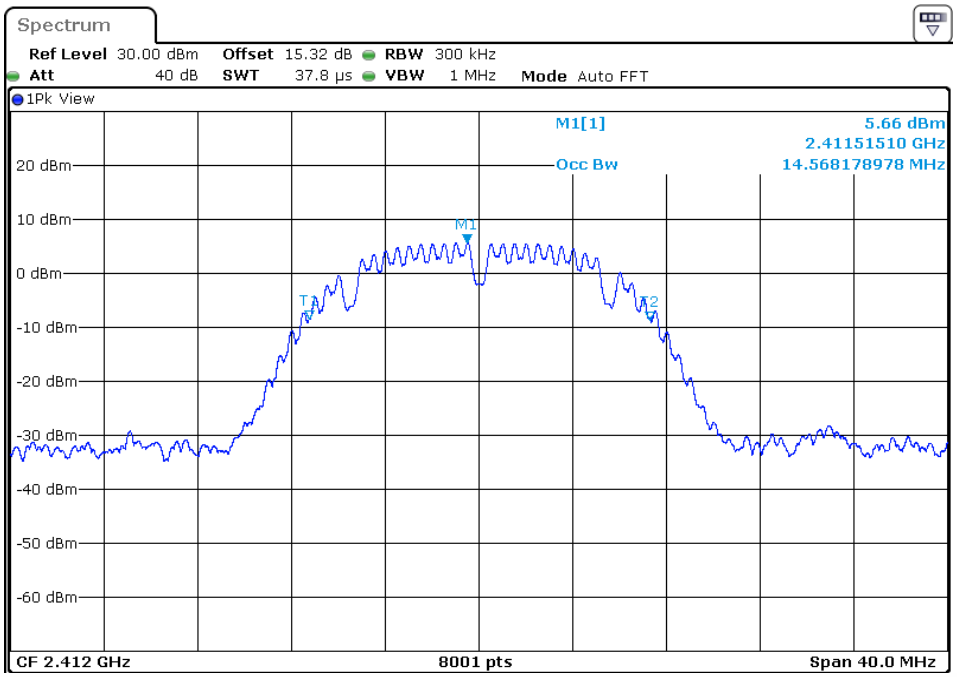
The test was performed with 802.11n (Bandwidth: 20 MHz)		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	17.423
Middle	2437	17.453
High	2462	17.418

The test was performed with 802.11n (Bandwidth: 40 MHz)		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2422	36.135
Middle	2437	36.145
High	2452	36.125

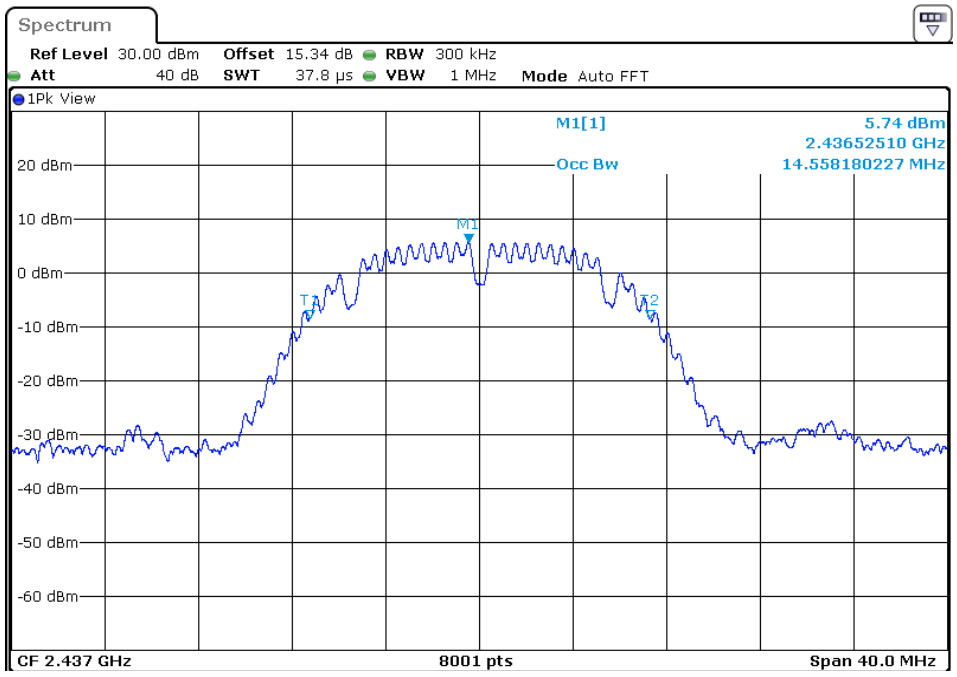
Note: We tested 802.11b/g/n mode the all data rate and recorded the worst case data for this channel to be 1Mbps for 802.11b mode and 6Mbps for 802.11g mode and MCS0 for 802.11n mode.

The spectrum analyzer plots are attached as below.

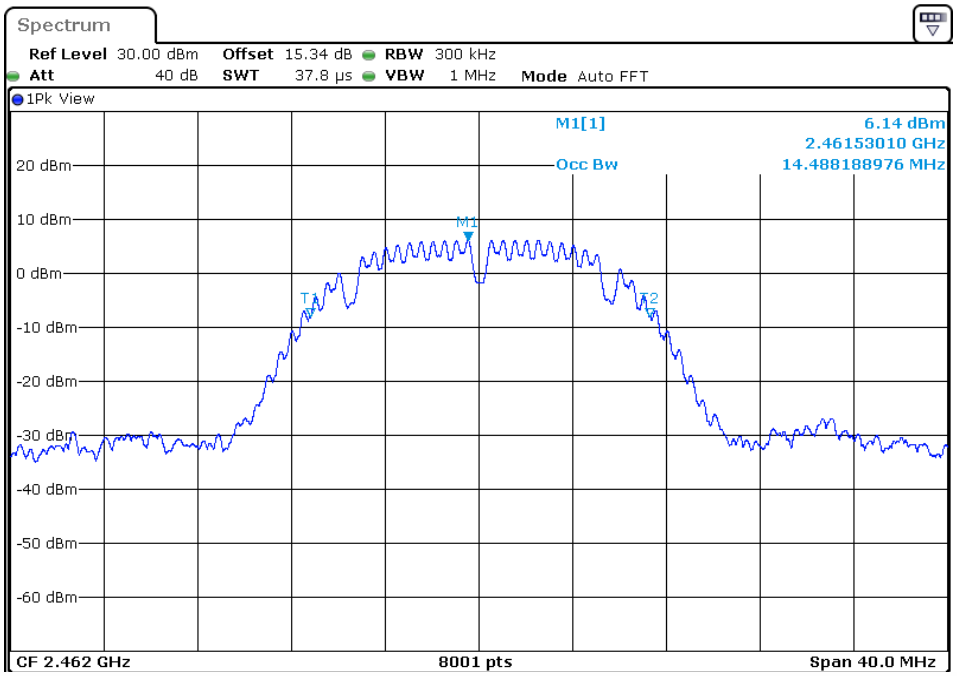
802.11b Channel Low 2412MHz



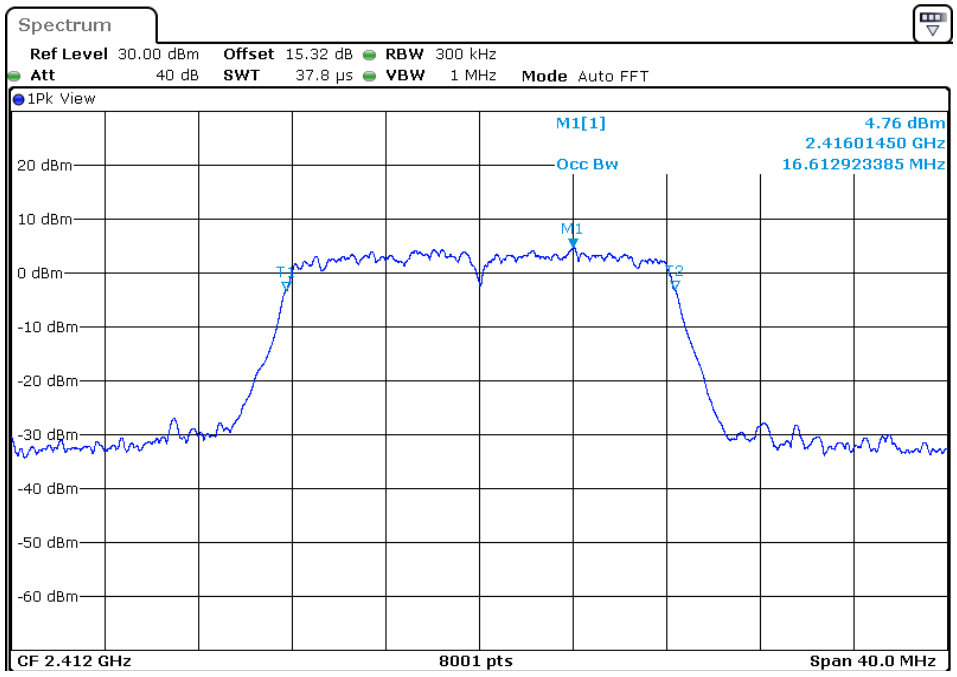
802.11b Channel Middle 2437MHz



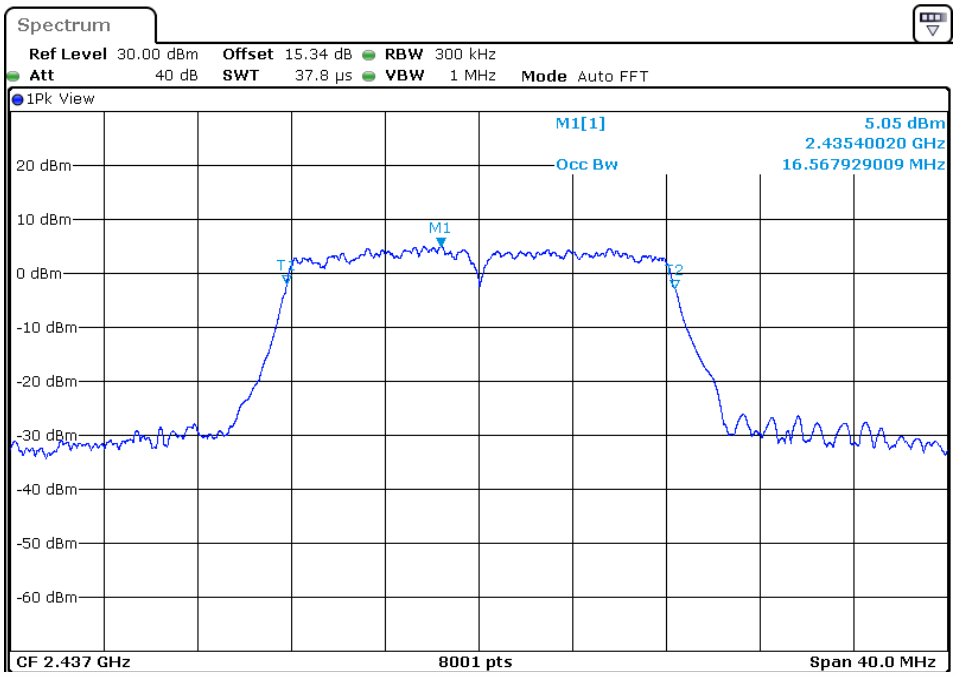
802.11b Channel High 2462MHz



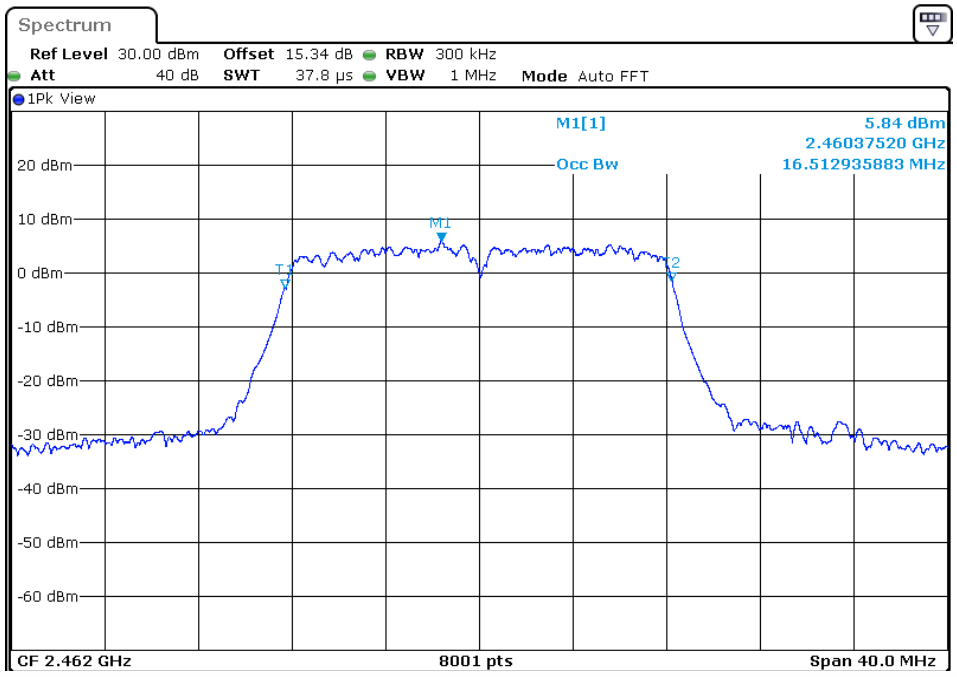
802.11g Channel Low 2412MHz



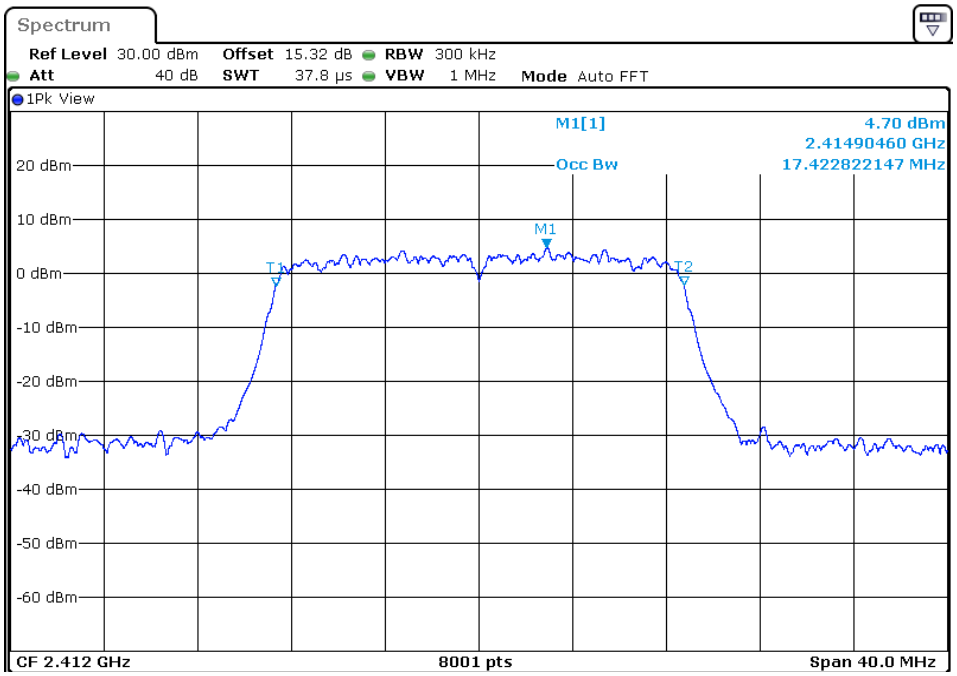
802.11g Channel Middle 2437MHz



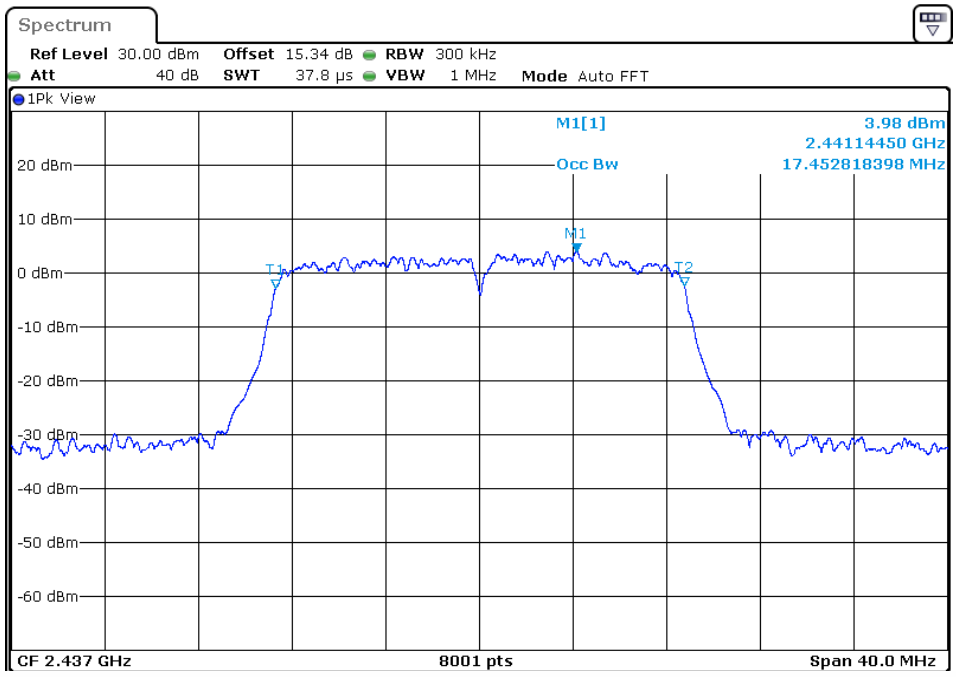
802.11g Channel High 2462MHz



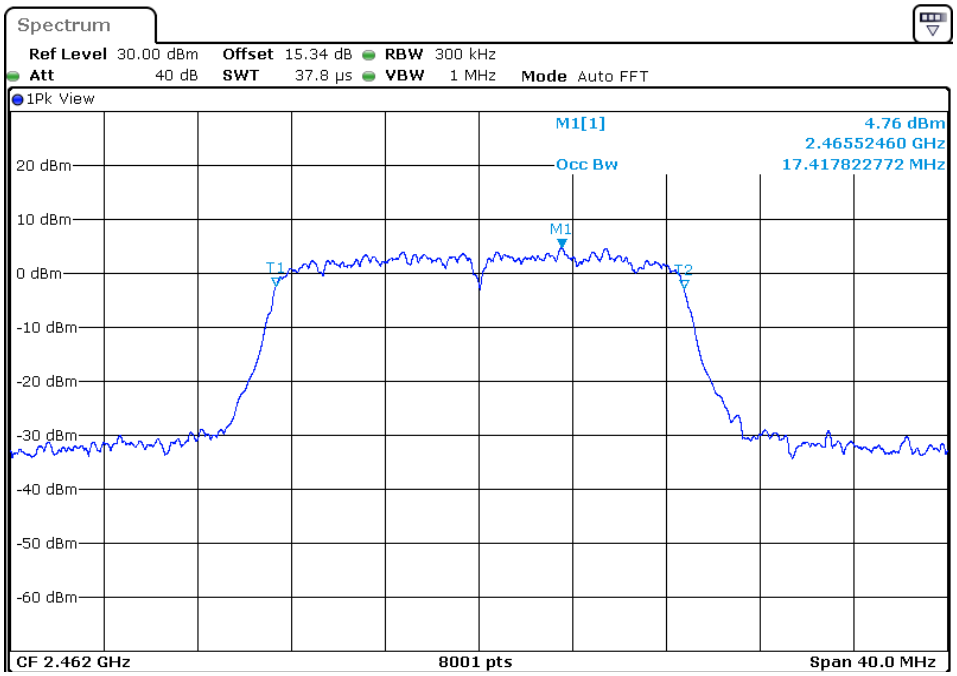
802.11n Channel Low 2412MHz (20MHz)



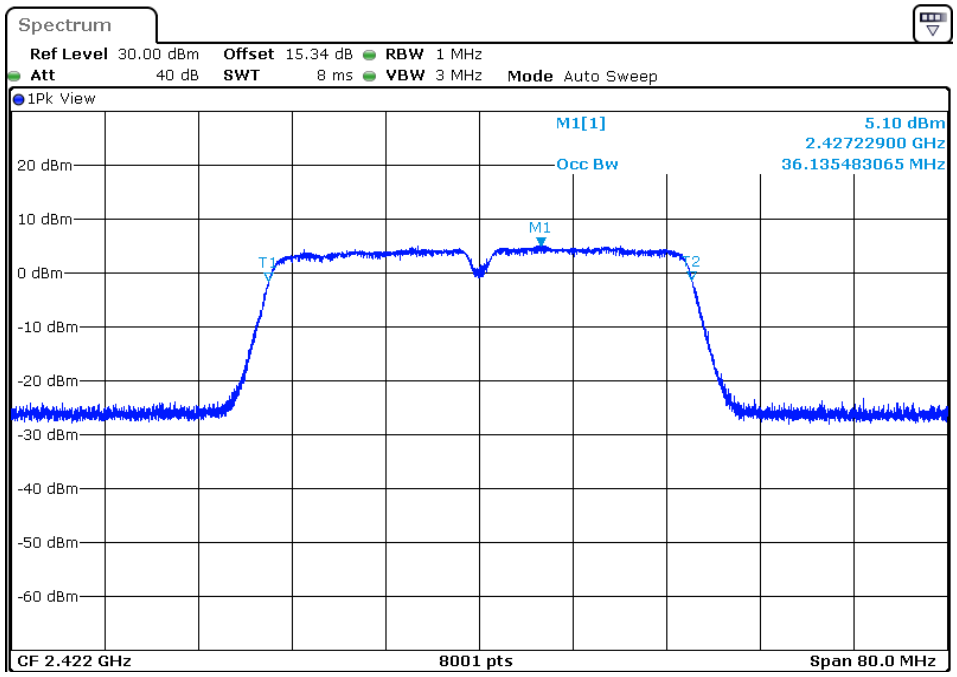
802.11n Channel Middle 2437MHz(20MHz)



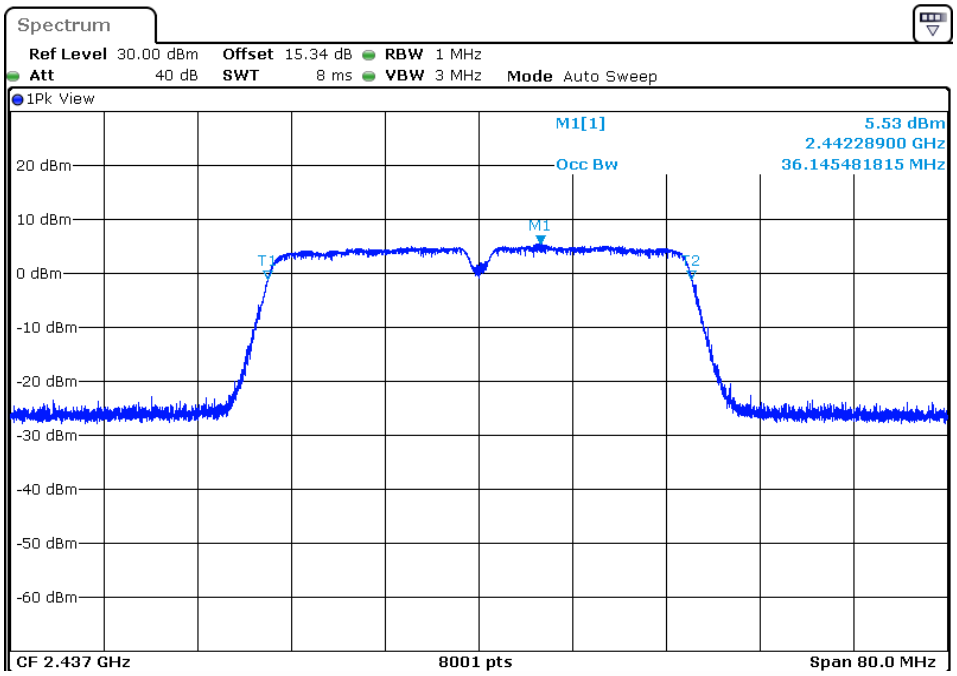
802.11n Channel High 2462MHz(20MHz)



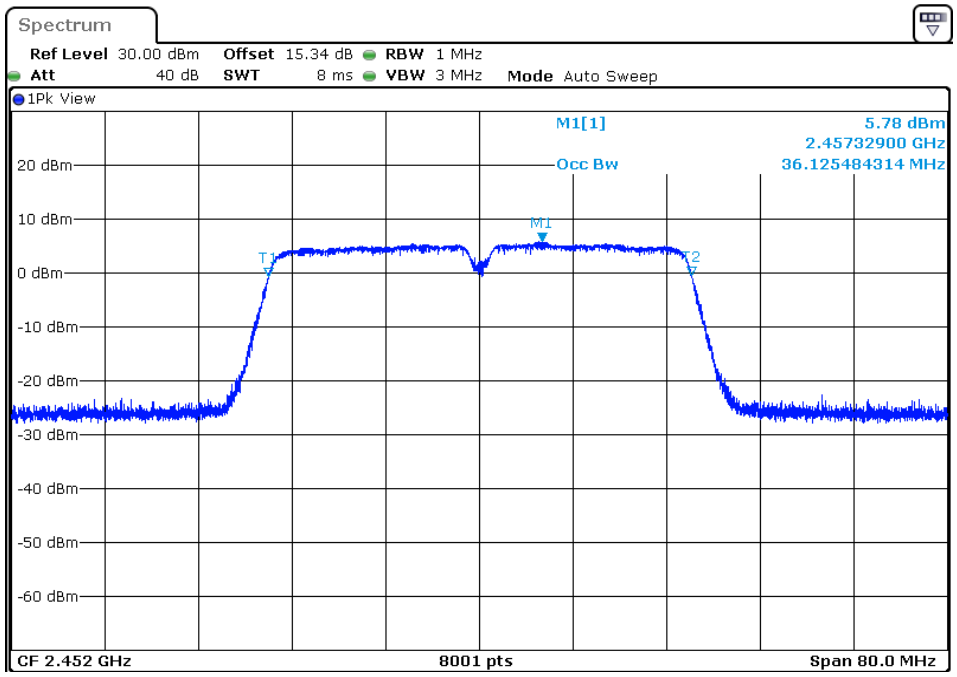
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz(40MHz)

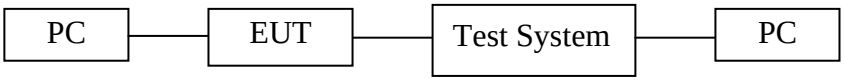


802.11n Channel High 2452MHz(40MHz)



9. MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

9.1.Block Diagram of Test Setup



9.2.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.

9.3.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.

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 EUT was tested according to DTS test procedure of Apr 05, 2017 KDB5580 74 D01 DTS Meas Guidance v04 for compliance to FCC 47CFR 15.247 requirements.

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

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

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

9.6.Test Result

Test Lab: Shielding room
Test Engineer: Star
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 (W)	Limits dBm / W
Low	2412	15.83	0	15.83	0.038	30 dBm / 1 W
Middle	2437	15.73	0	15.73	0.037	30 dBm / 1 W
High	2462	16.15	0	16.15	0.041	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 (W)	Limits dBm / W
Low	2412	14.03	0	14.03	0.025	30 dBm / 1 W
Middle	2437	14.65	0	14.65	0.029	30 dBm / 1 W
High	2462	14.84	0	14.84	0.031	30 dBm / 1 W

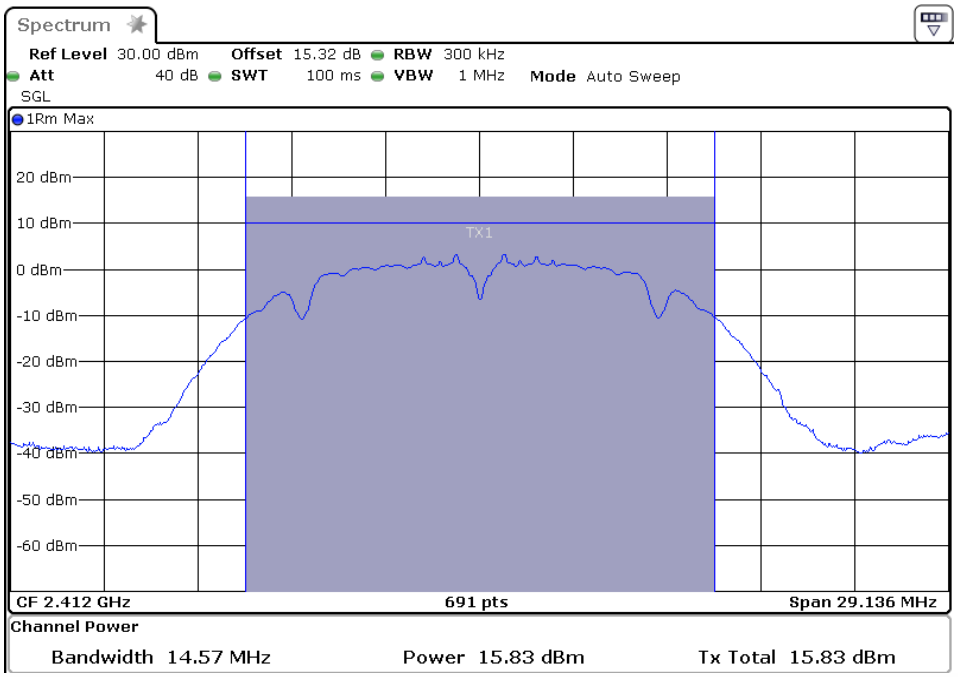
The test was performed with 802.11n (20MHz)						
Channel	Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	Limits dBm / W
Low	2412	13.78	0	13.78	0.024	30 dBm / 1 W
Middle	2437	13.19	0	13.19	0.021	30 dBm / 1 W
High	2462	13.52	0	13.52	0.023	30 dBm / 1 W

The test was performed with 802.11n (40MHz)						
Channel	Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	Limits dBm / W
Low	2422	11.23	0	11.23	0.013	30 dBm / 1 W
Middle	2437	11.59	0	11.59	0.014	30 dBm / 1 W
High	2452	11.96	0	11.96	0.016	30 dBm / 1 W

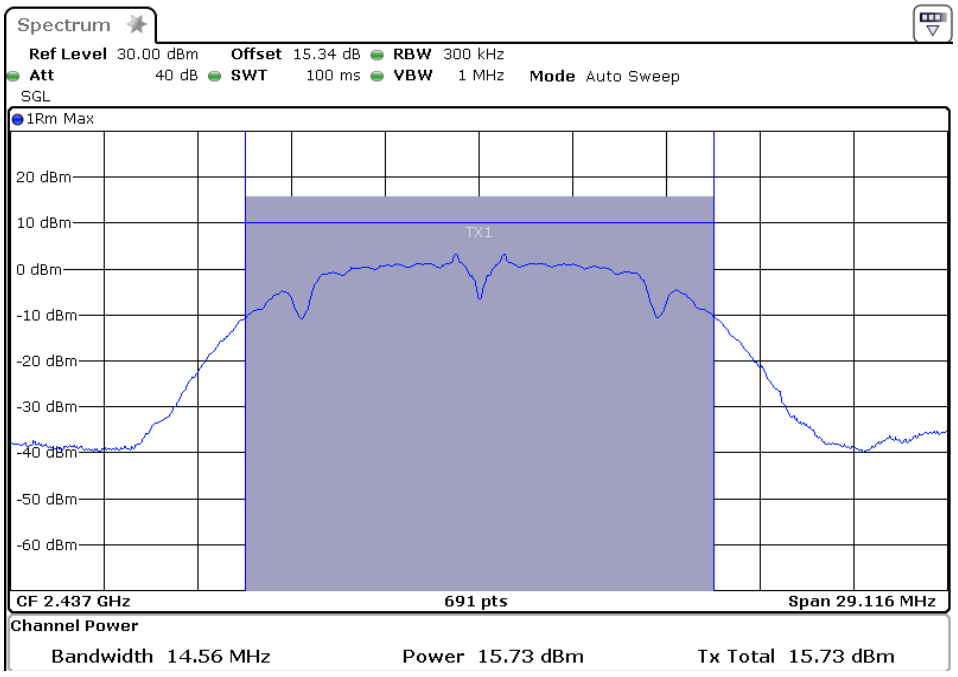
Note: We tested 802.11b/g/n mode the all data rate and recorded the worst case data for this channel to be 1Mbps for 802.11b mode and 6Mbps for 802.11g mode and MCS0 for 802.11n mode.

The spectrum analyzer plots are attached as below.

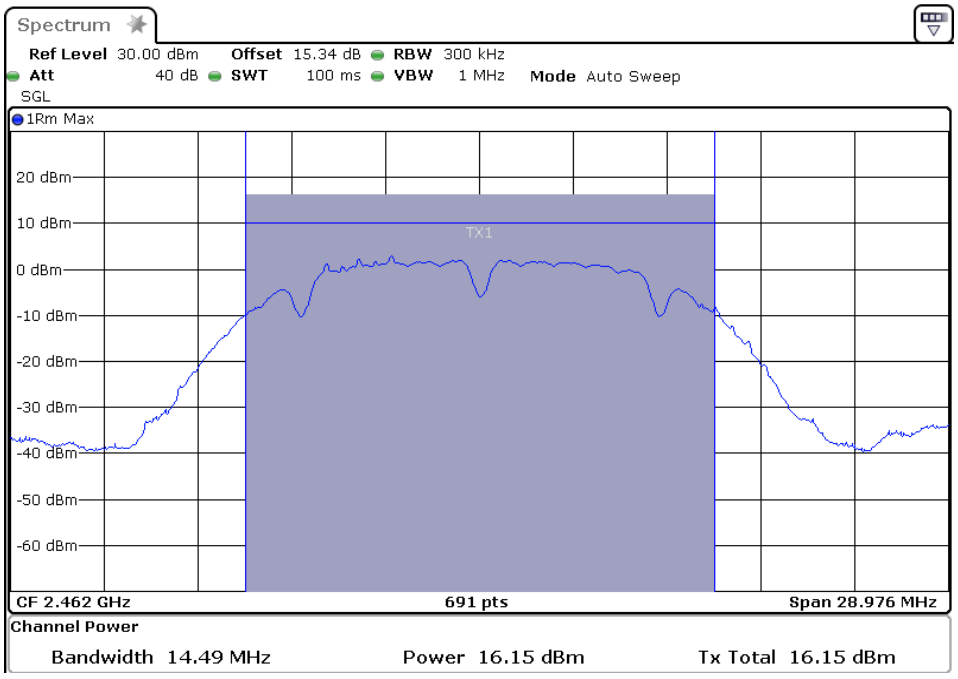
802.11b Channel Low 2412MHz



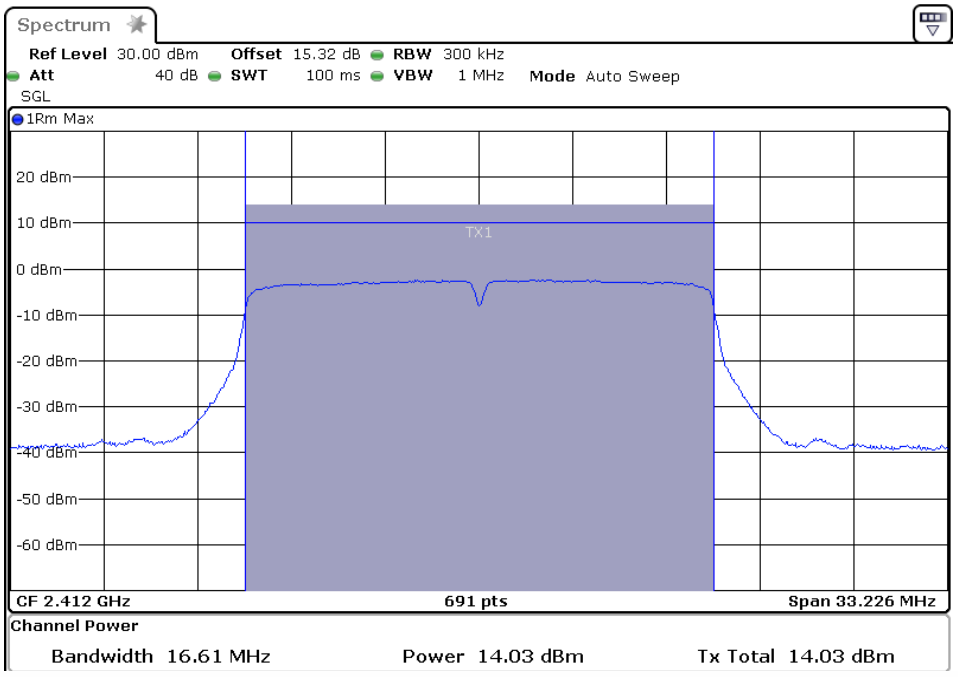
802.11b Channel Middle 2437MHz



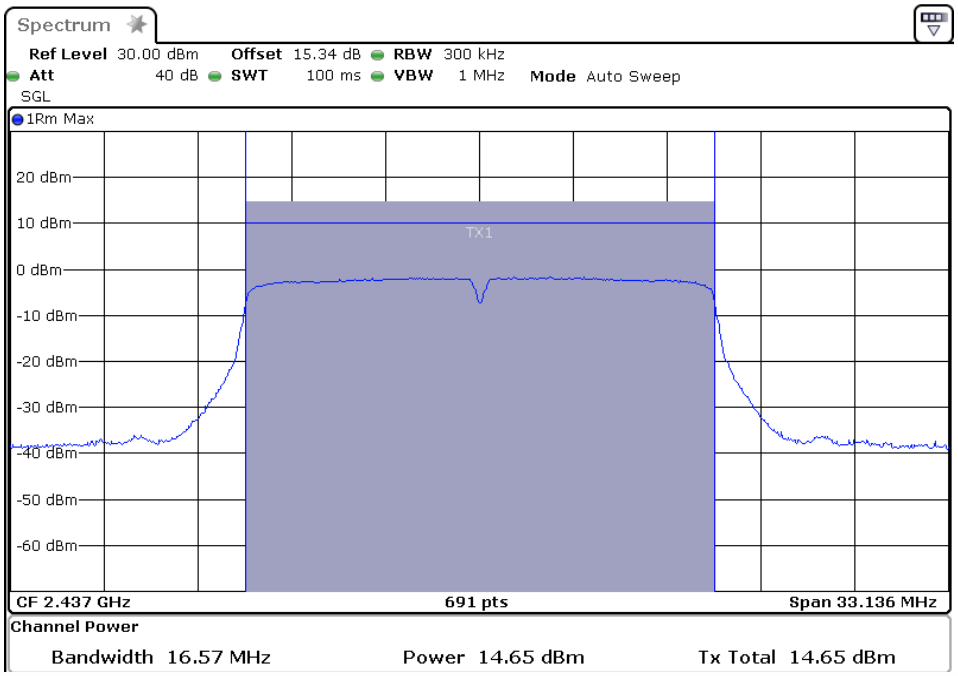
802.11b Channel High 2462MHz



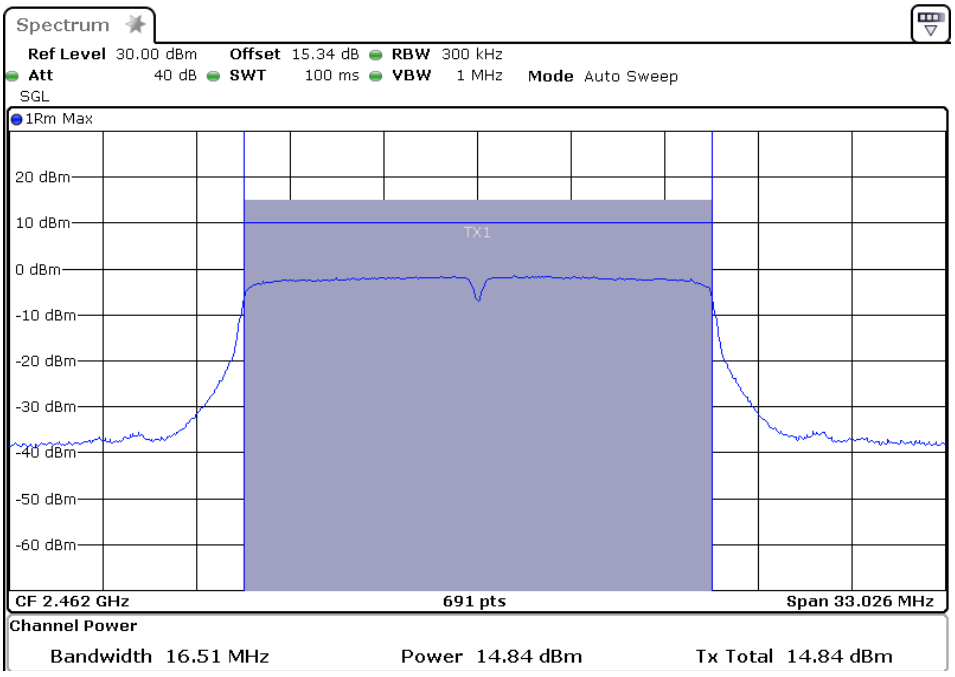
802.11g Channel Low 2412MHz



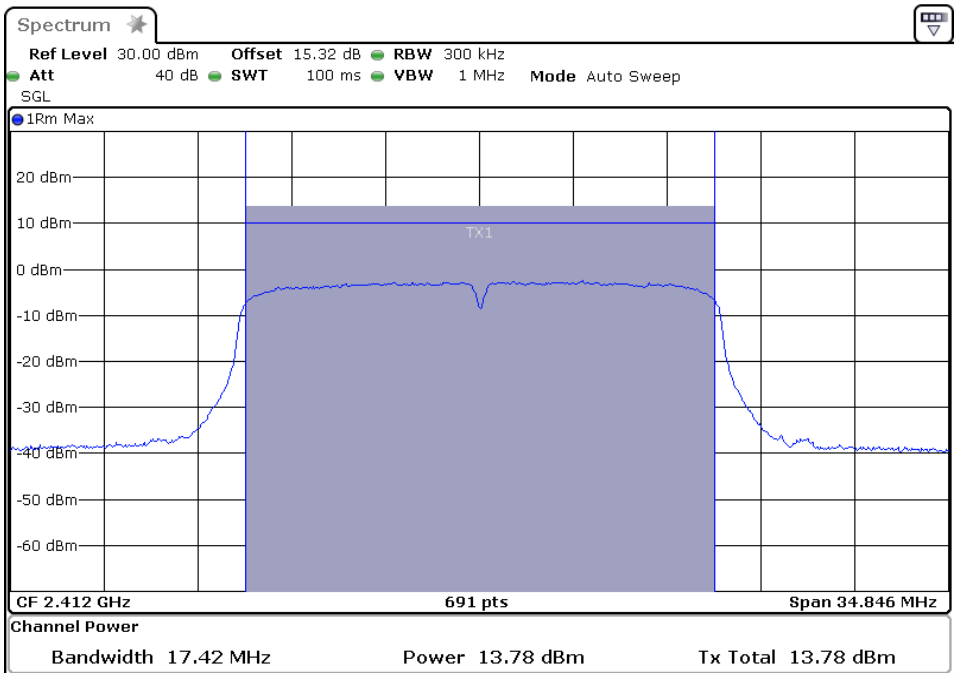
802.11g Channel Middle 2437MHz



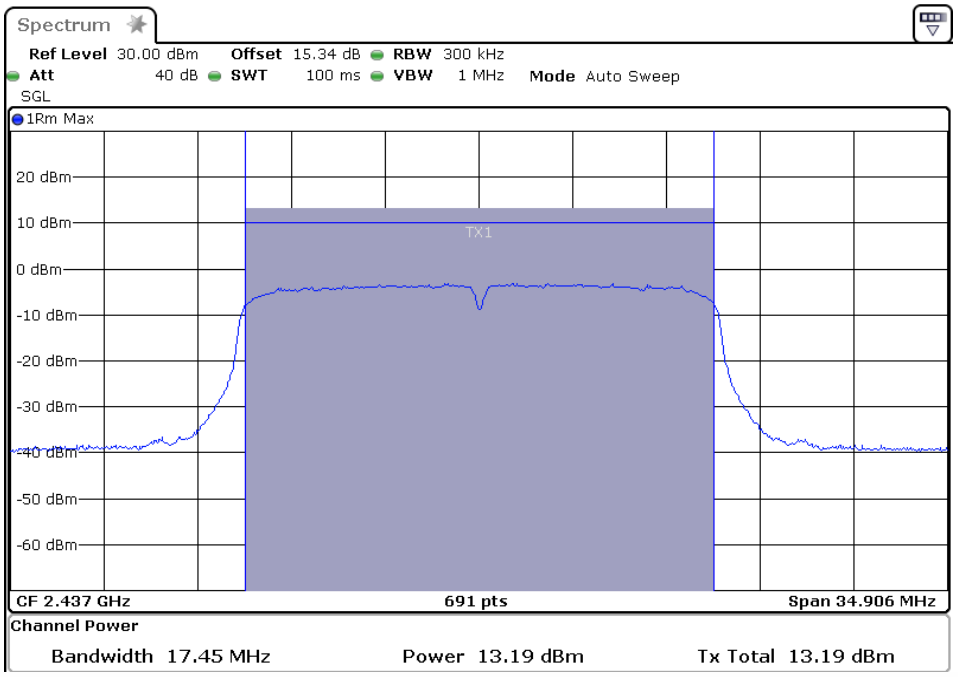
802.11g Channel High 2462MHz



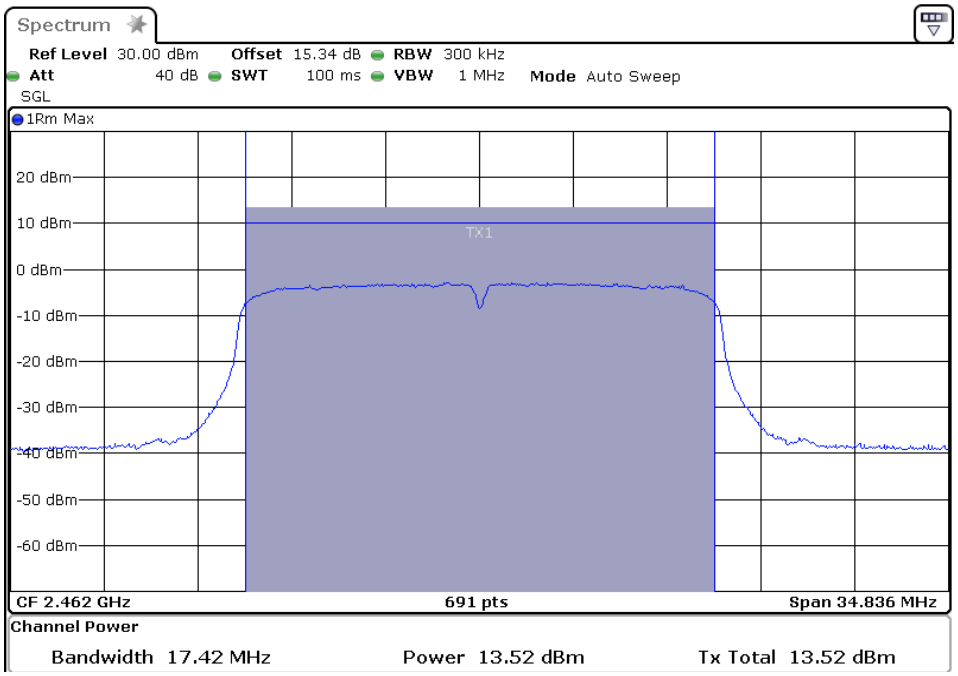
802.11n Channel Low 2412MHz (20MHz)



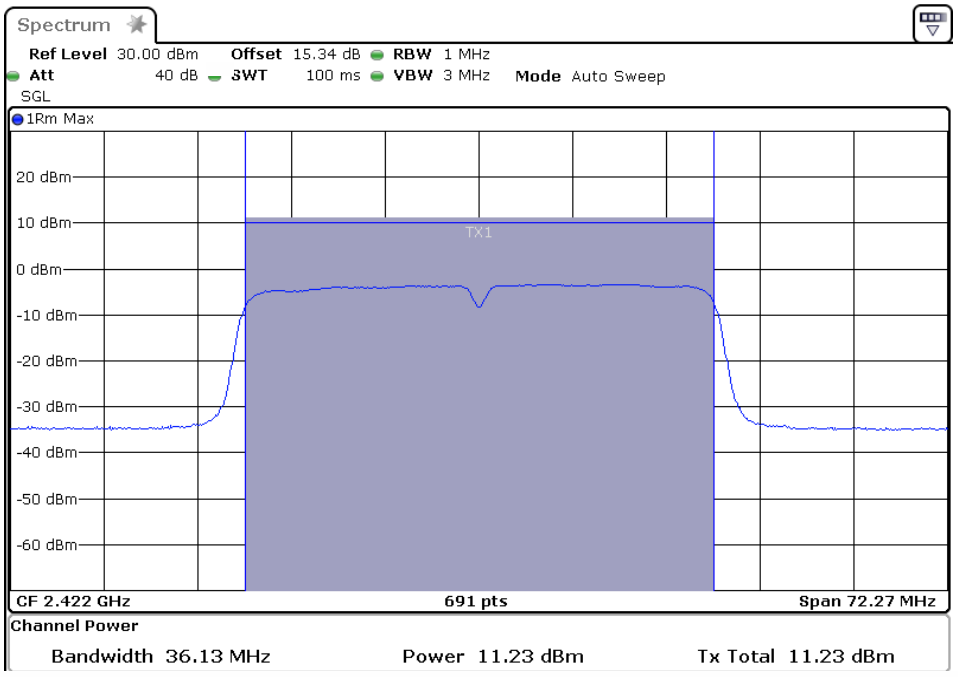
802.11n Channel Middle 2437MHz (20MHz)



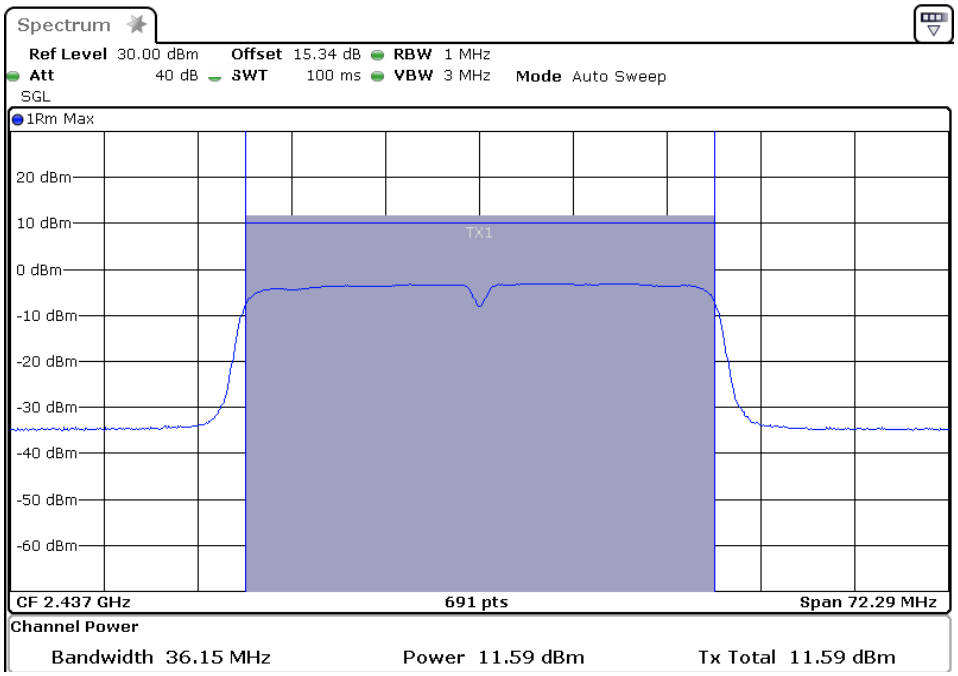
802.11n Channel High 2462MHz (20MHz)



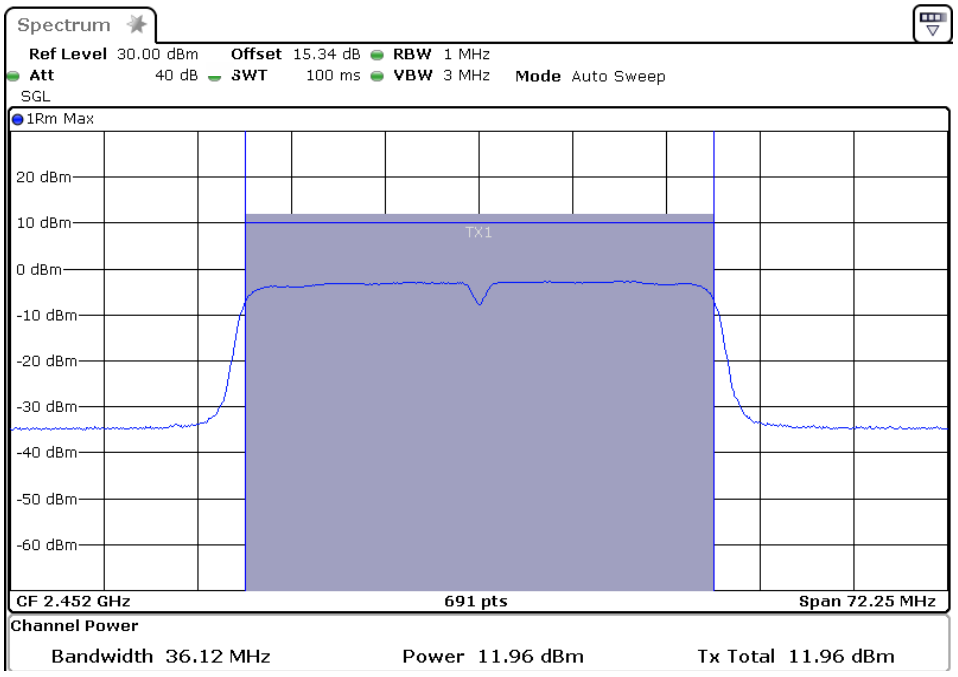
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz (40MHz)

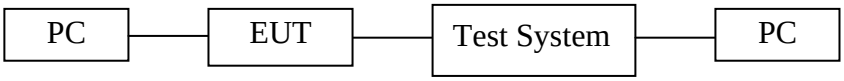


802.11n Channel High 2452MHz (40MHz)



10.POWER SPECTRAL DENSITY MEASUREMENT

10.1.Block Diagram of Test Setup



10.2.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.

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

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

10.5.2.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).

10.6.Test Result

Test Lab: Shielding room
Test Engineer: Star

The test was performed with 802.11b					
Channel	Frequency (MHz)	AVG Power Spectral Density (dBm/3KHz)	10log(1/ duty cycle)	Final Power Spectral Density (dBm/3KHz)	Limits (dBm/3KHz)
Low	2412	1.95	0	1.95	8 dBm
Middle	2437	1.86	0	1.86	8 dBm
High	2462	1.61	0	1.61	8 dBm

The test was performed with 802.11g					
Channel	Frequency (MHz)	AVG Power Spectral Density (dBm/3KHz)	10log(1/ duty cycle)	Final Power Spectral Density (dBm/3KHz)	Limits (dBm/3KHz)
Low	2412	-13.16	0	-13.16	8 dBm
Middle	2437	-13.36	0	-13.36	8 dBm
High	2462	-12.76	0	-12.76	8 dBm

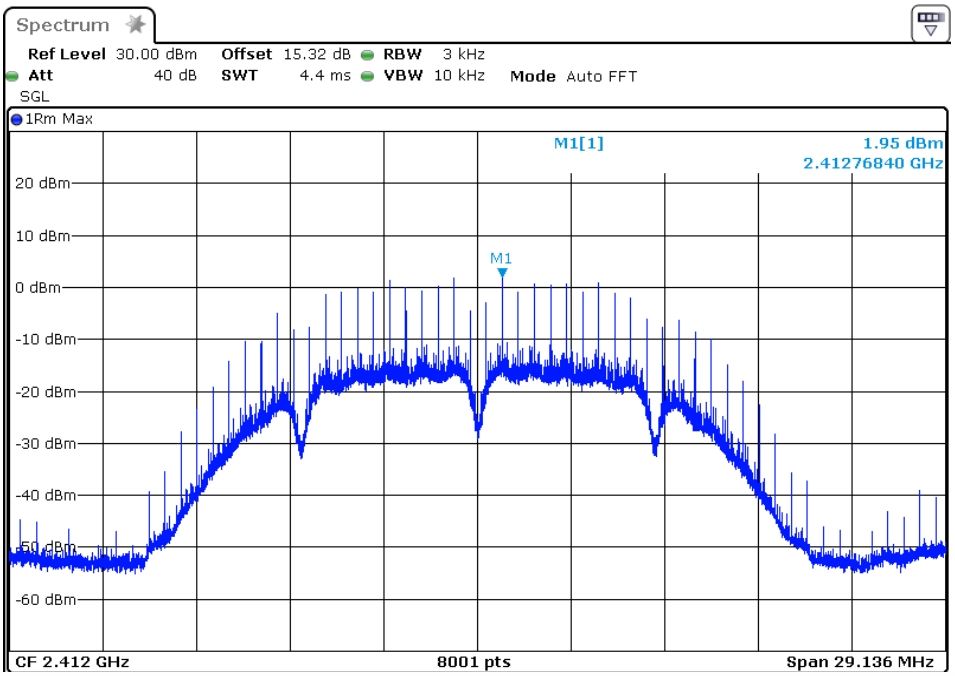
The test was performed with 802.11n (20MHz)					
Channel	Frequency (MHz)	AVG Power Spectral Density (dBm/3KHz)	10log(1/ duty cycle)	Final Power Spectral Density (dBm/3KHz)	Limits (dBm/3KHz)
Low	2412	-13.96	0	-13.96	8 dBm
Middle	2437	-13.32	0	-13.32	8 dBm
High	2462	-13.68	0	-13.68	8 dBm

The test was performed with 802.11n (40MHz)					
Channel	Frequency (MHz)	AVG Power Spectral Density (dBm)	10log(1/ duty cycle)	Final Power Spectral Density (dBm/3KHz)	Limits (dBm/3KHz)
Low	2422	-20.38	0	-20.38	8 dBm
Middle	2437	-20.08	0	-20.08	8 dBm
High	2452	-20.02	0	-20.02	8 dBm

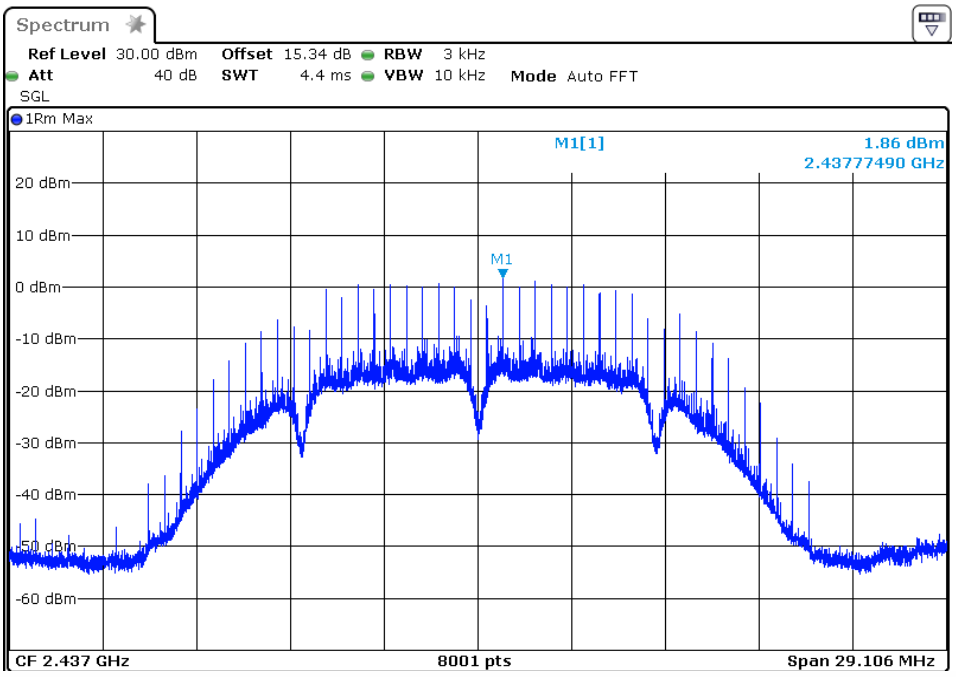
Note: We tested 802.11b/g/n mode the all data rate and recorded the worst case data for this channel to be 11Mbps for 802.11b mode and 54Mbps for 802.11g mode and MCS7 for 802.11n mode.

The spectrum analyzer plots are attached as below.

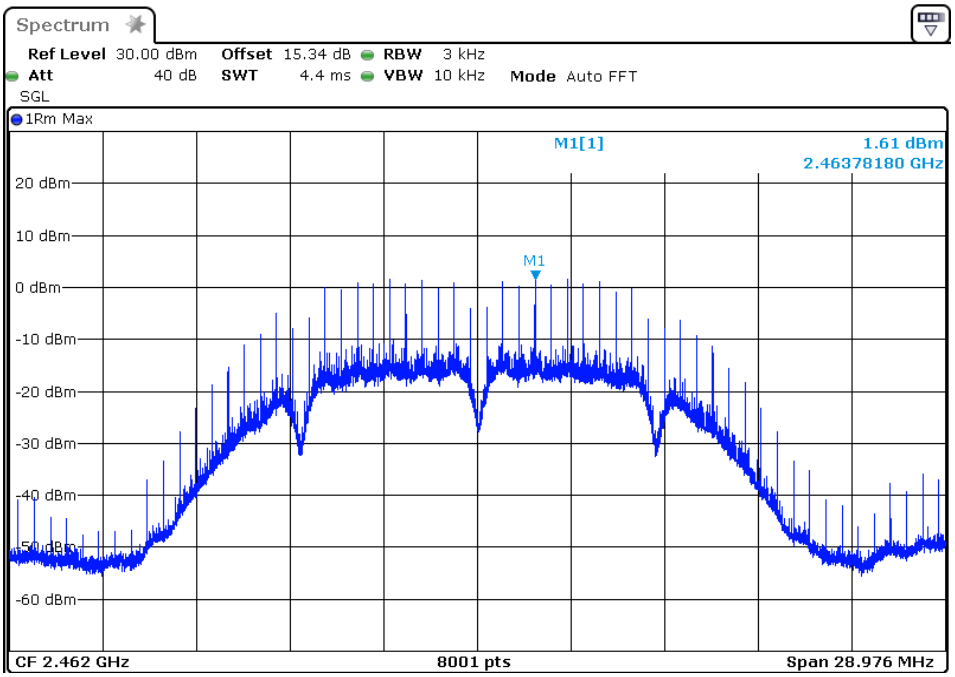
802.11b Channel Low 2412MHz



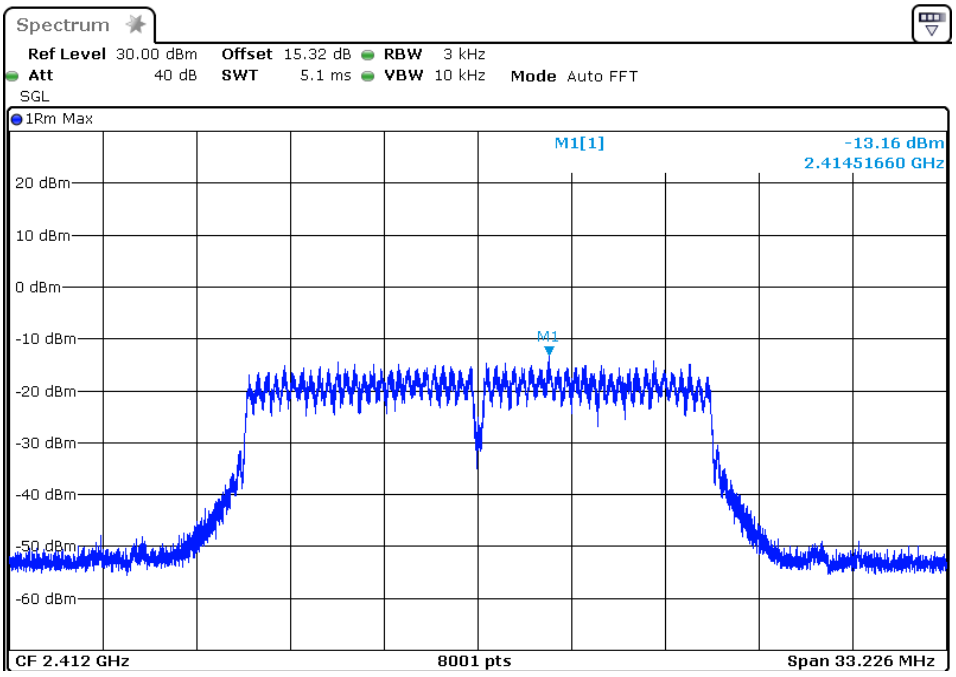
802.11b Channel Middle 2437MHz



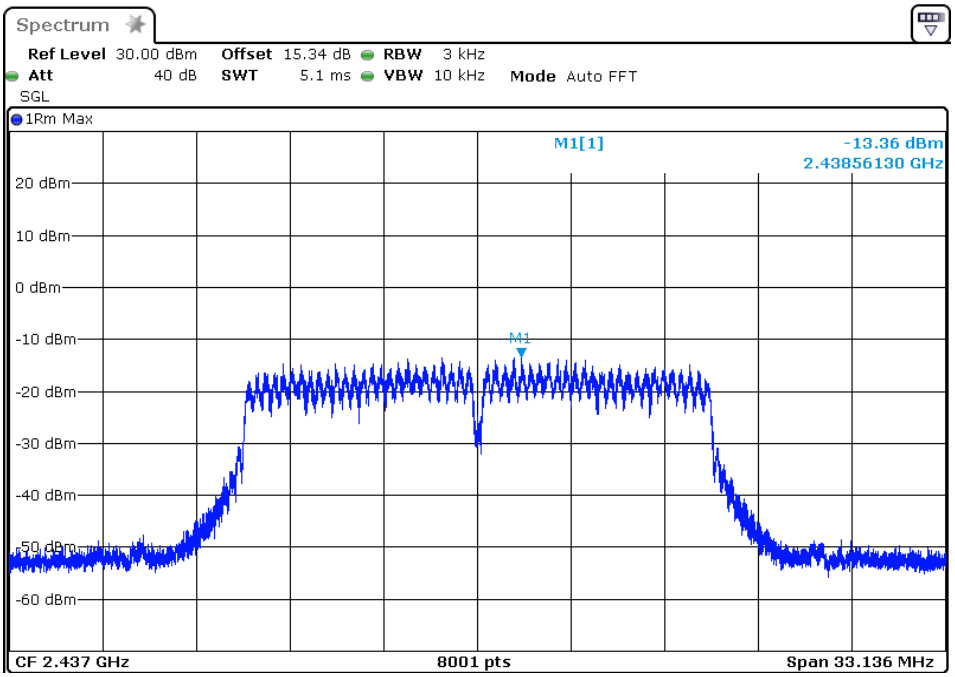
802.11b Channel High 2462MHz



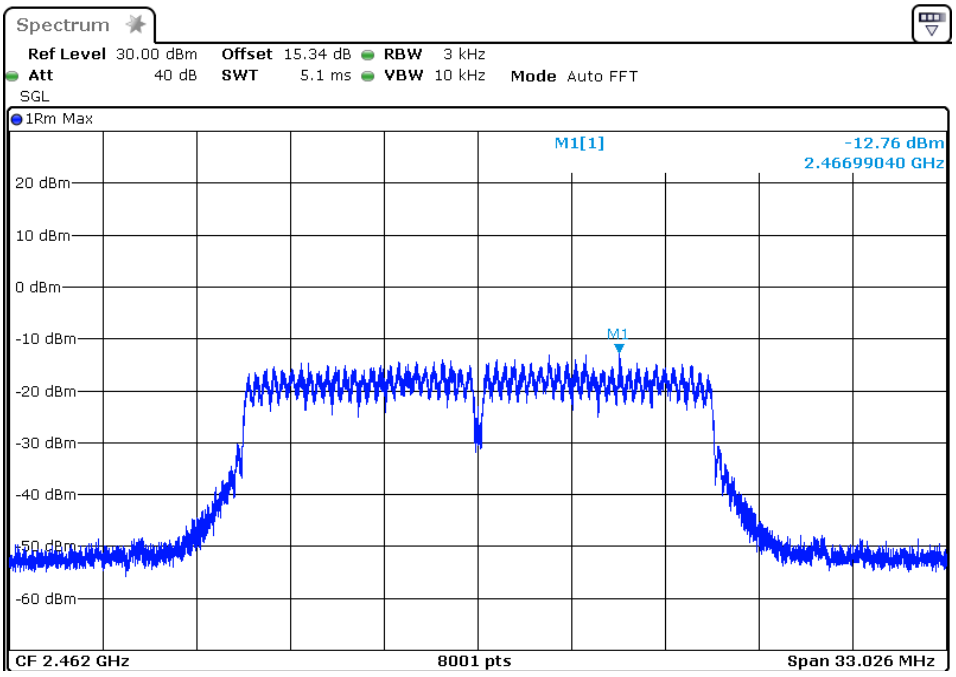
802.11g Channel Low 2412MHz



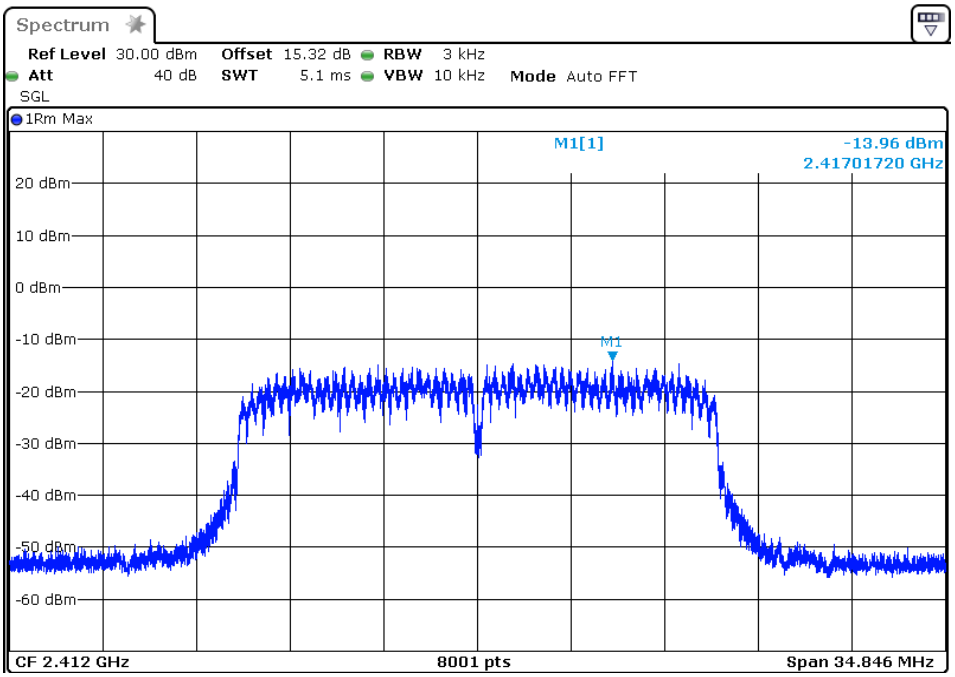
802.11g Channel Middle 2437MHz



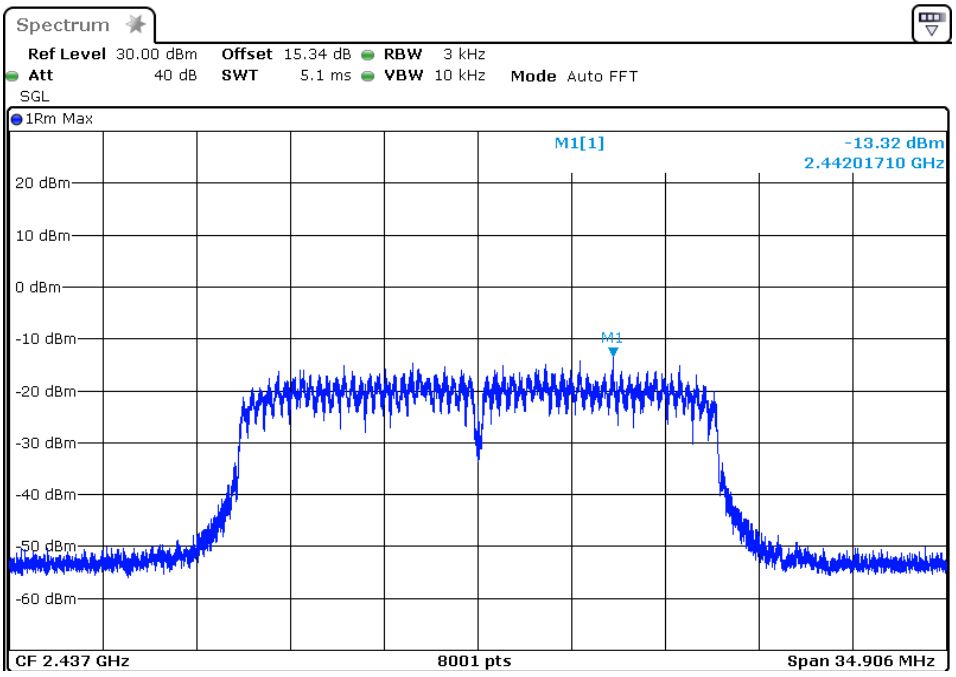
802.11g Channel High 2462MHz



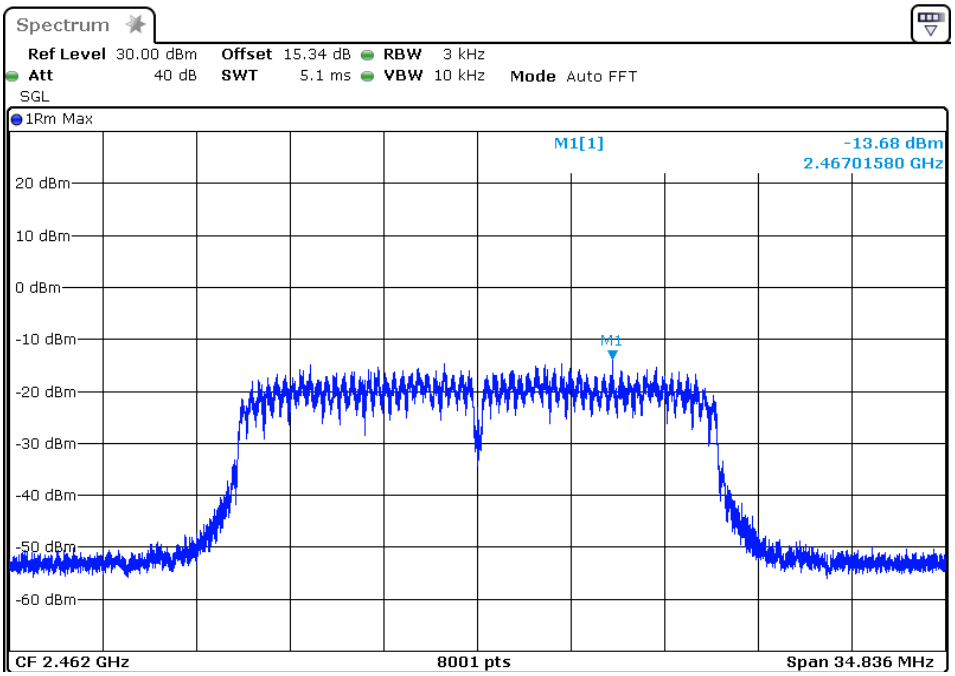
802.11n Channel Low 2412MHz (20MHz)



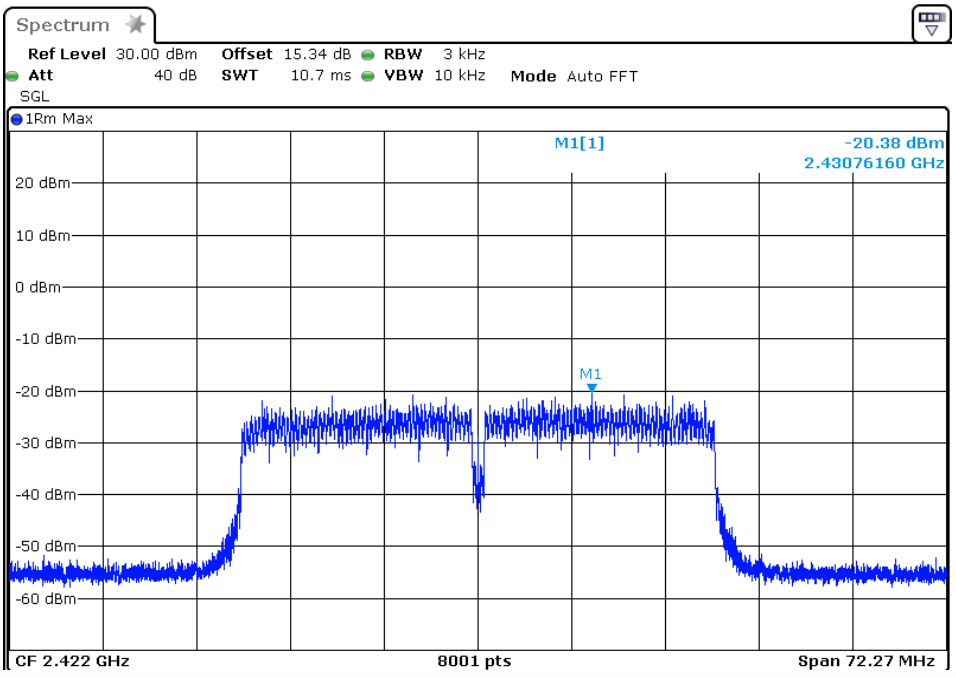
802.11n Channel Middle 2437MHz (20MHz)



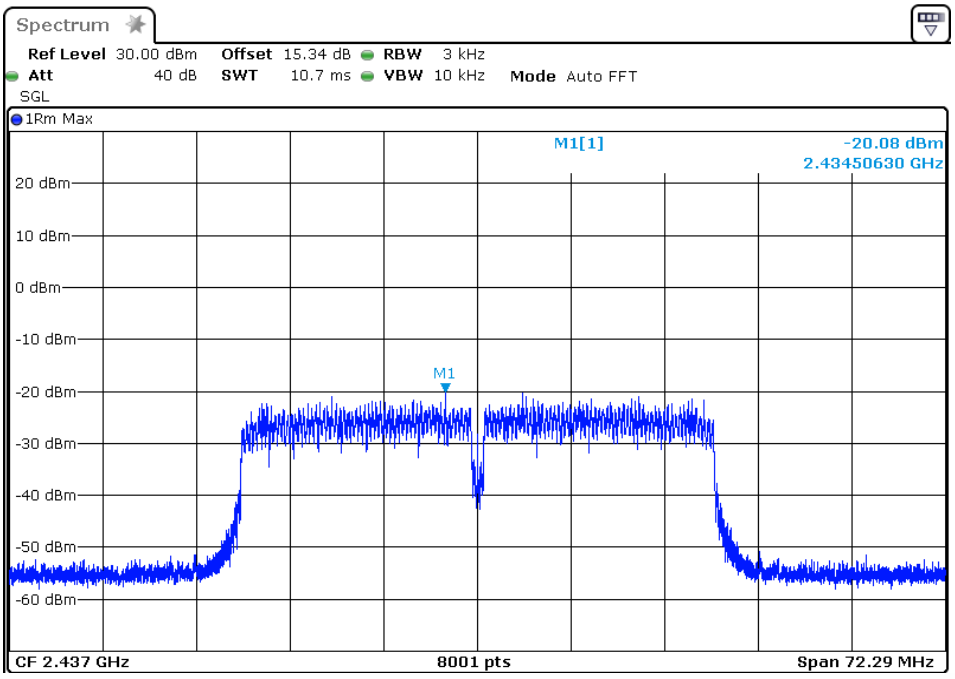
802.11n Channel High 2462MHz(20MHz)



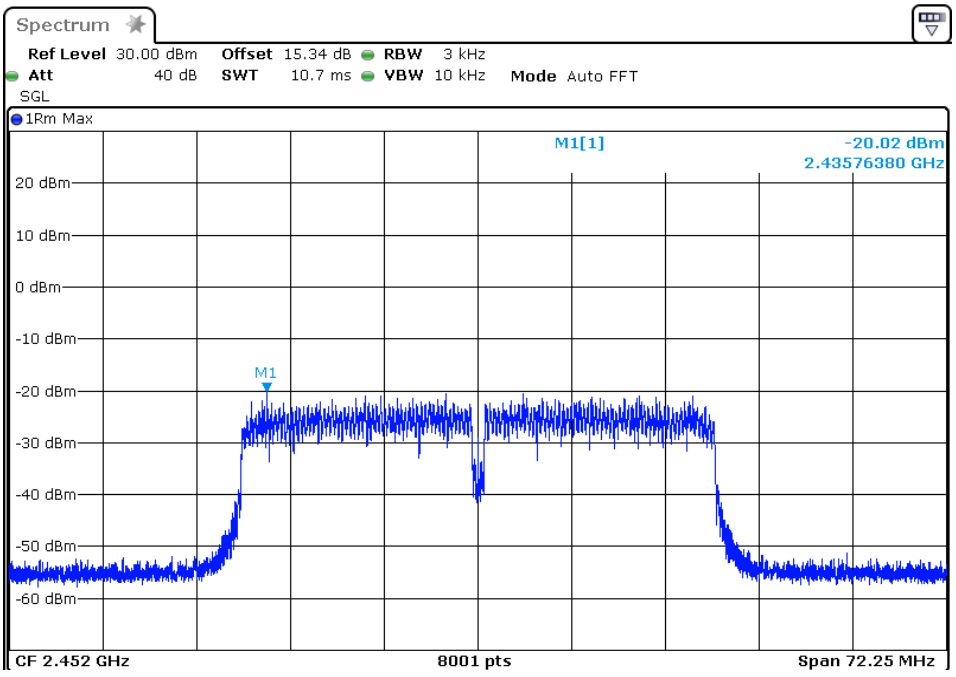
802.11n Channel Low 2422MHz (40MHz)



802.11n Channel Middle 2437MHz(40MHz)

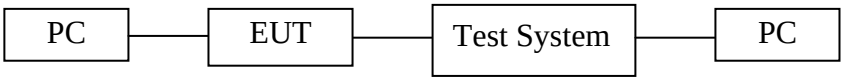


802.11n Channel High 2452MHz(40MHz)



11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



11.2.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).

11.3.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.

11.4.Operating Condition of EUT

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

11.4.2.Turn on the power of all equipment.

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

11.5.Test Procedure

Conducted Band Edge:

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

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

Radiate Band Edge:

11.5.1.The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.

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

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

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

11.5.5.RBW=1MHz, VBW=1MHz

11.5.6.The band edges was measured and recorded.

11.6.Test Result

Test Lab: Shielding room
Test Engineer: Star

The test was performed with 802.11b		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400	44.66	> 30dBc
2483.5	44.98	> 30dBc

The test was performed with 802.11g		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400	39.64	> 30dBc
2483.5	42.24	> 30dBc

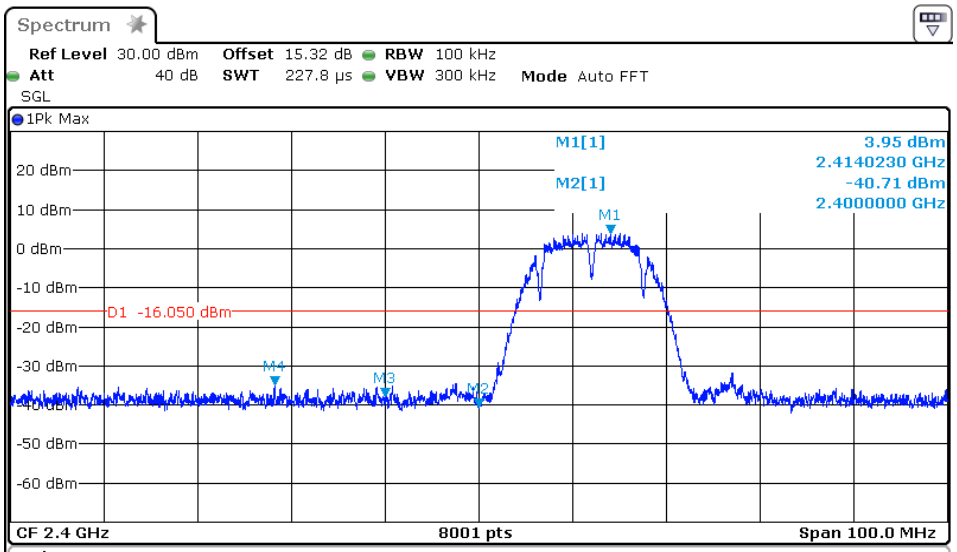
The test was performed with 802.11n (20MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400	39.35	> 30dBc
2483.5	41.44	> 30dBc

The test was performed with 802.11n (40MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400	36.90	> 30dBc
2483.5	38.73	> 30dBc

Note: We tested 802.11b/g/n mode the all data rate and recorded the worst case data for this channel to be 1Mbps for 802.11b mode and 6Mbps for 802.11g mode and MCS0 for 802.11n mode.

The spectrum analyzer plots are attached as below.

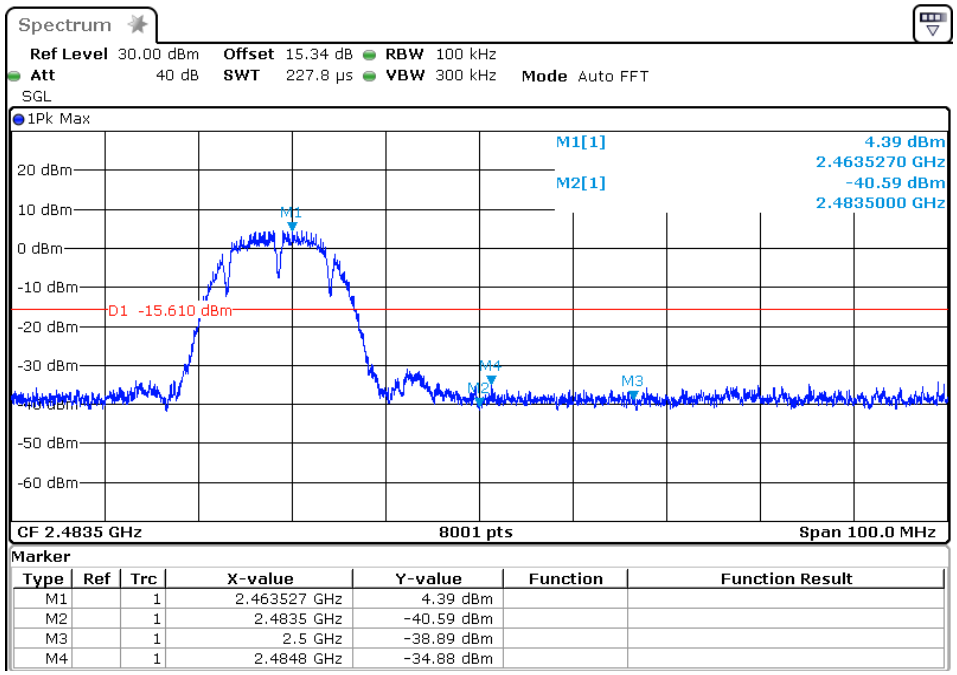
802.11b Channel Low 2412MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.414023 GHz	3.95 dBm		
M2		1	2.4 GHz	-40.71 dBm		
M3		1	2.39 GHz	-37.72 dBm		
M4		1	2.3782125 GHz	-34.80 dBm		

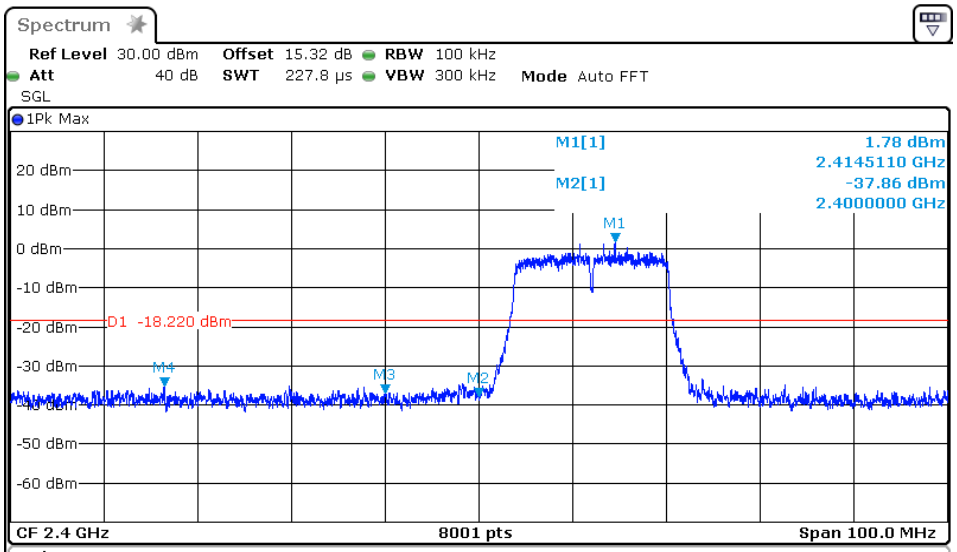
802.11b Channel High 2462MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.463527 GHz	4.39 dBm		
M2		1	2.4835 GHz	-40.59 dBm		
M3		1	2.5 GHz	-38.89 dBm		
M4		1	2.4848 GHz	-34.88 dBm		

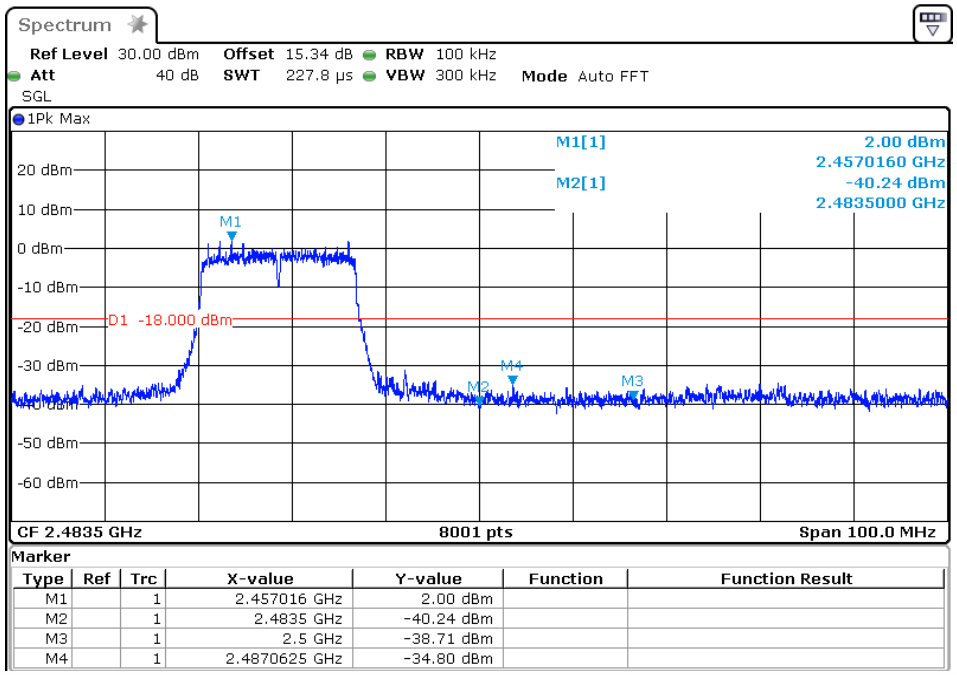
802.11g Channel Low 2412MHz



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.414511 GHz	1.78 dBm		
M2		1	2.4 GHz	-37.86 dBm		
M3		1	2.39 GHz	-37.11 dBm		
M4		1	2.3664 GHz	-35.26 dBm		

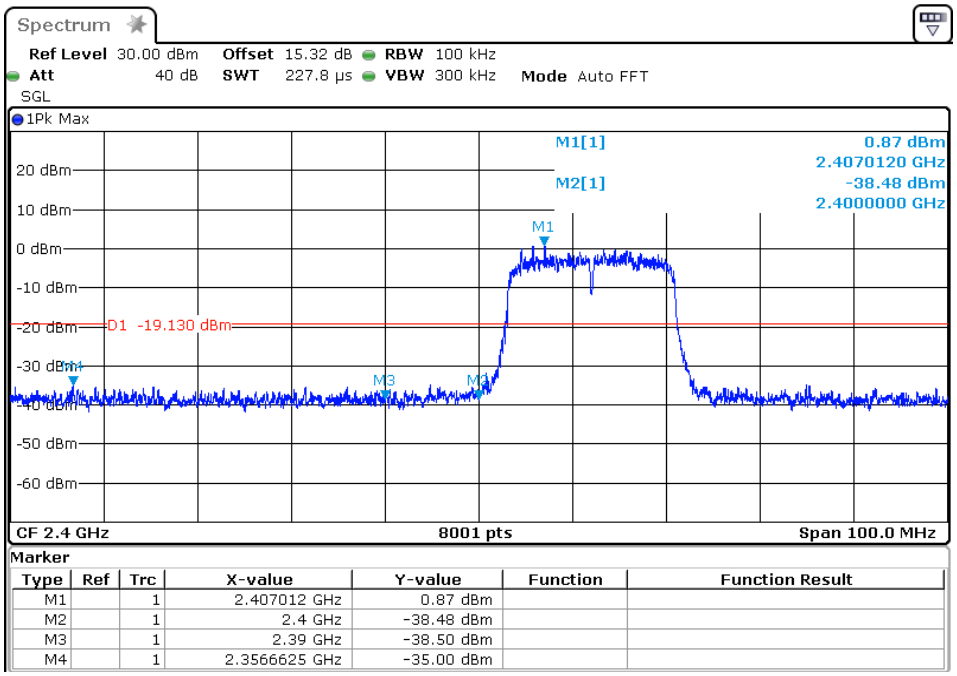
802.11g Channel High 2462MHz



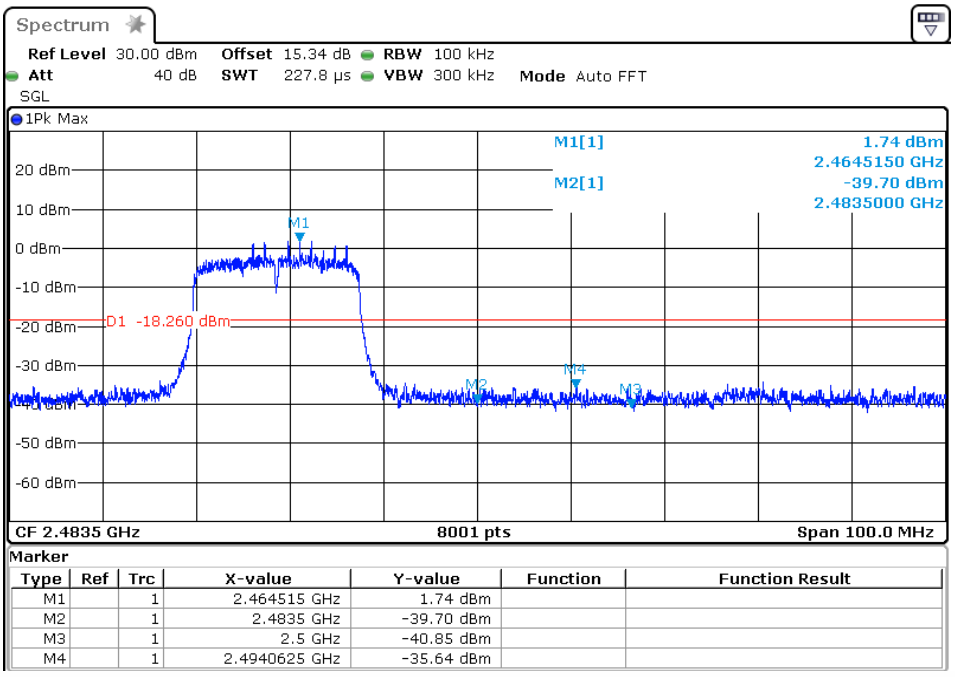
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.457016 GHz	2.00 dBm		
M2		1	2.4835 GHz	-40.24 dBm		
M3		1	2.5 GHz	-38.71 dBm		
M4		1	2.4870625 GHz	-34.80 dBm		

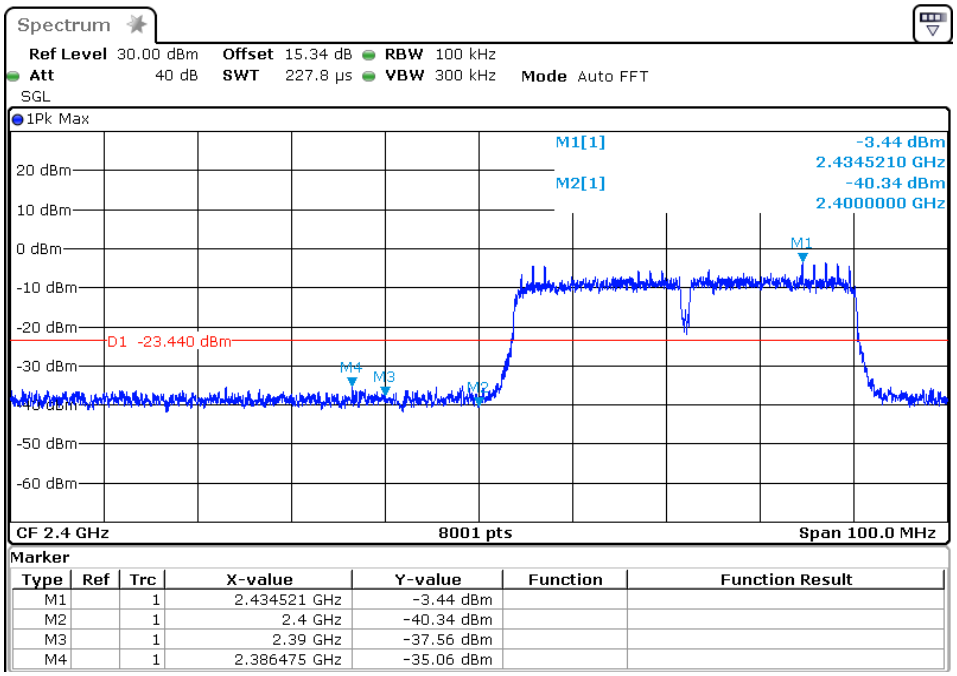
802.11n Channel Low 2412MHz (20MHz)



802.11n Channel High 2462MHz (20MHz)



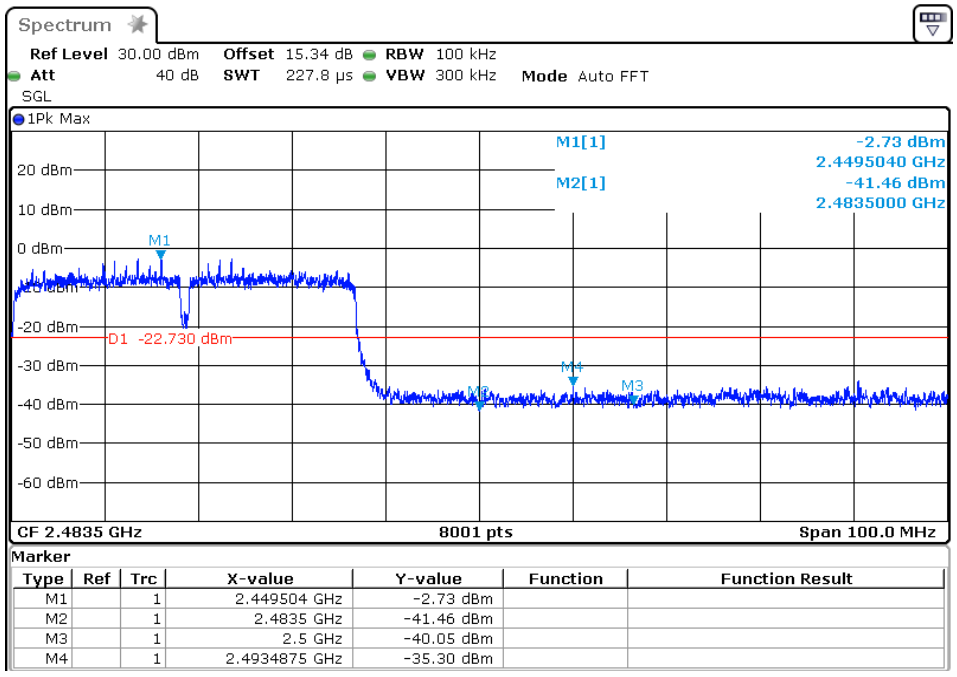
802.11n Channel Low 2422MHz (40MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.434521 GHz	-3.44 dBm		
M2		1	2.4 GHz	-40.34 dBm		
M3		1	2.39 GHz	-37.56 dBm		
M4		1	2.386475 GHz	-35.06 dBm		

802.11n Channel High 2452MHz (40MHz)



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.449504 GHz	-2.73 dBm		
M2		1	2.4835 GHz	-41.46 dBm		
M3		1	2.5 GHz	-40.05 dBm		
M4		1	2.4934875 GHz	-35.30 dBm		

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. This EUT was tested in 3 orthogonal positions and the worst case position data was reported.

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.We tested 802.11b/g/n mode the all and the worst-case emissions are reported.

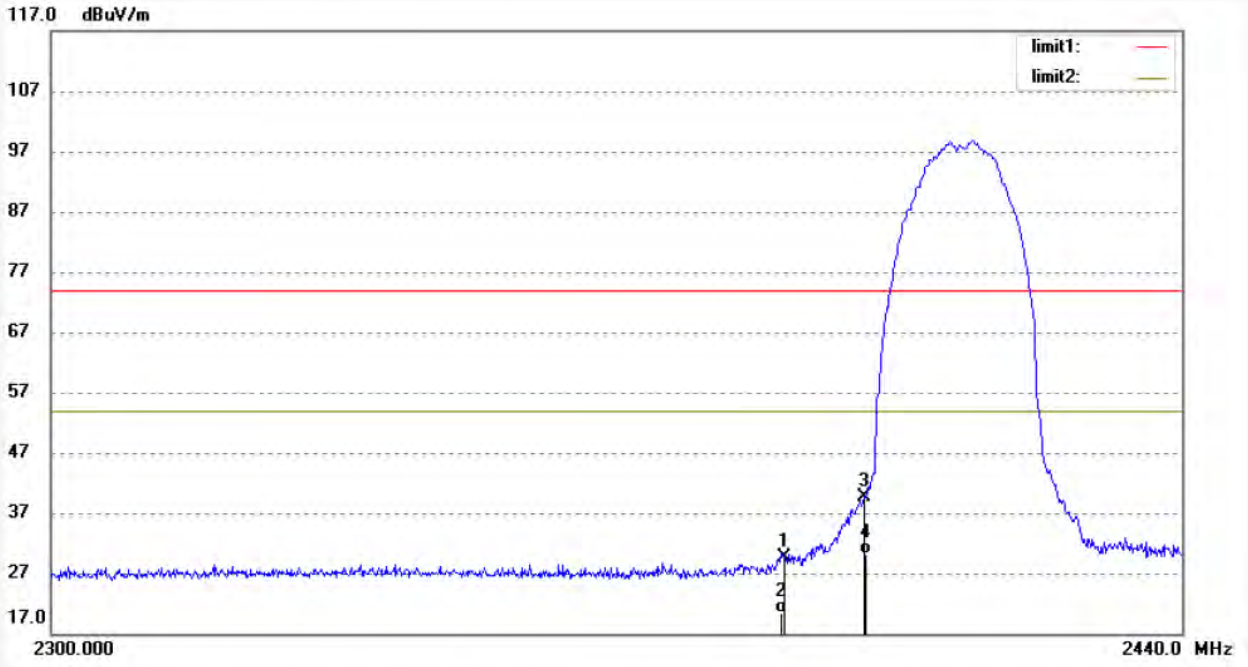
Test Lab: 3m Anechoic chamber
Test Engineer: Star

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #660
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/12/16
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



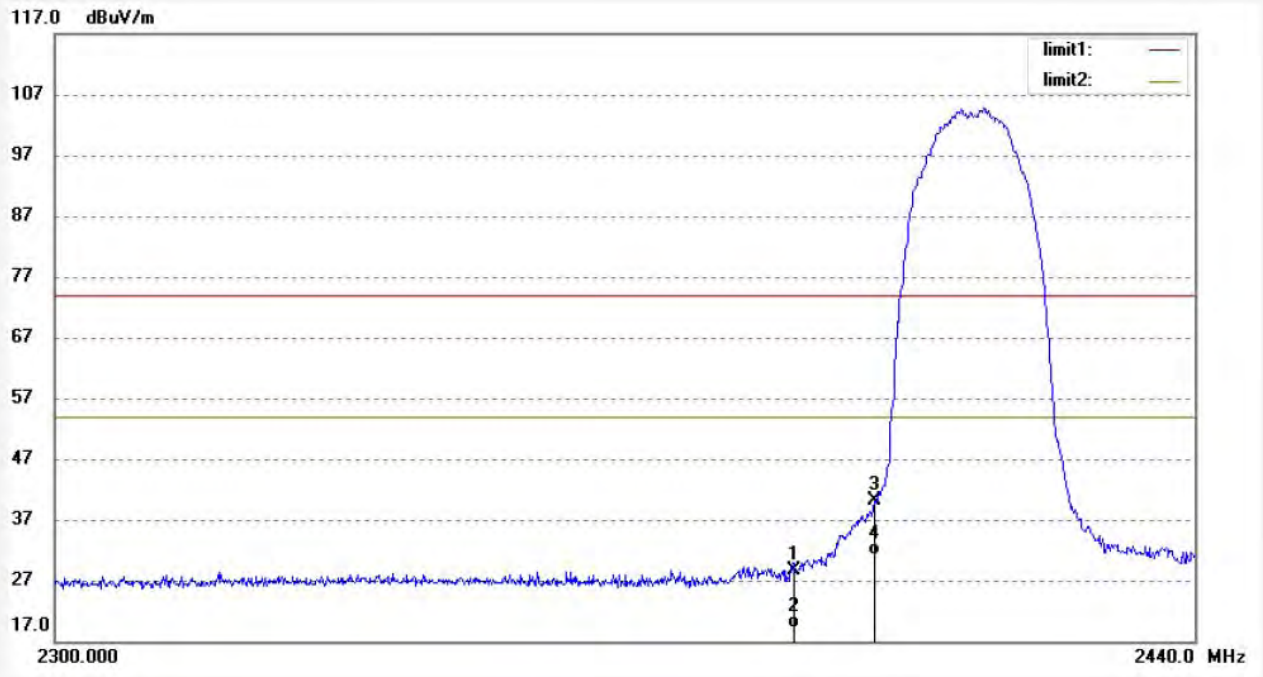
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	28.74	0.79	29.53	74.00	-44.47	peak	250	305	
2	2390.000	19.56	0.79	20.35	54.00	-33.65	AVG	250	45	
3	2400.000	38.72	0.88	39.60	74.00	-34.40	peak	250	187	
4	2400.000	29.15	0.88	30.03	54.00	-23.97	AVG	250	265	

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #659
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/11/47
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	27.72	0.79	28.51	74.00	-45.49	peak	200	320	
2	2390.000	18.32	0.79	19.11	54.00	-34.89	AVG	150	115	
3	2400.000	39.22	0.88	40.10	74.00	-33.90	peak	200	54	
4	2400.000	30.24	0.88	31.12	54.00	-22.88	AVG	150	95	

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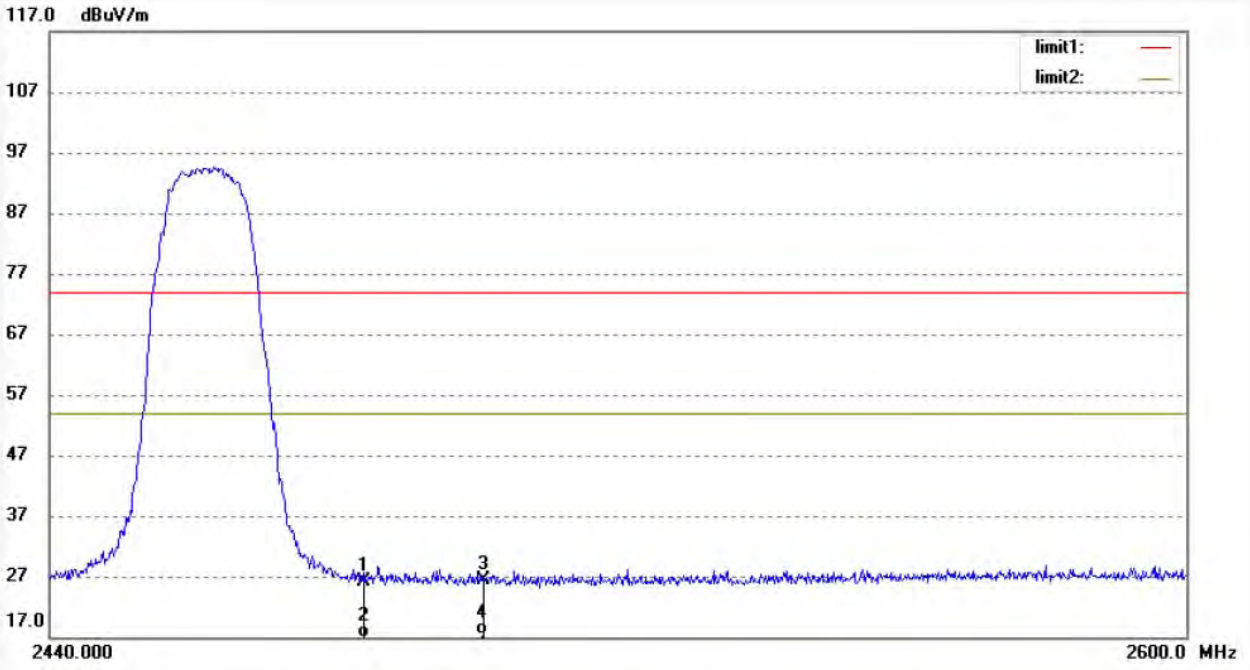
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #661
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/13/22
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	24.97	1.10	26.07	74.00	-47.93	peak	250	320	
2	2483.500	15.32	1.10	16.42	54.00	-37.58	AVG	250	155	
3	2500.000	25.23	1.10	26.33	74.00	-47.67	peak	200	48	
4	2500.000	16.28	1.10	17.38	54.00	-36.62	AVG	250	157	

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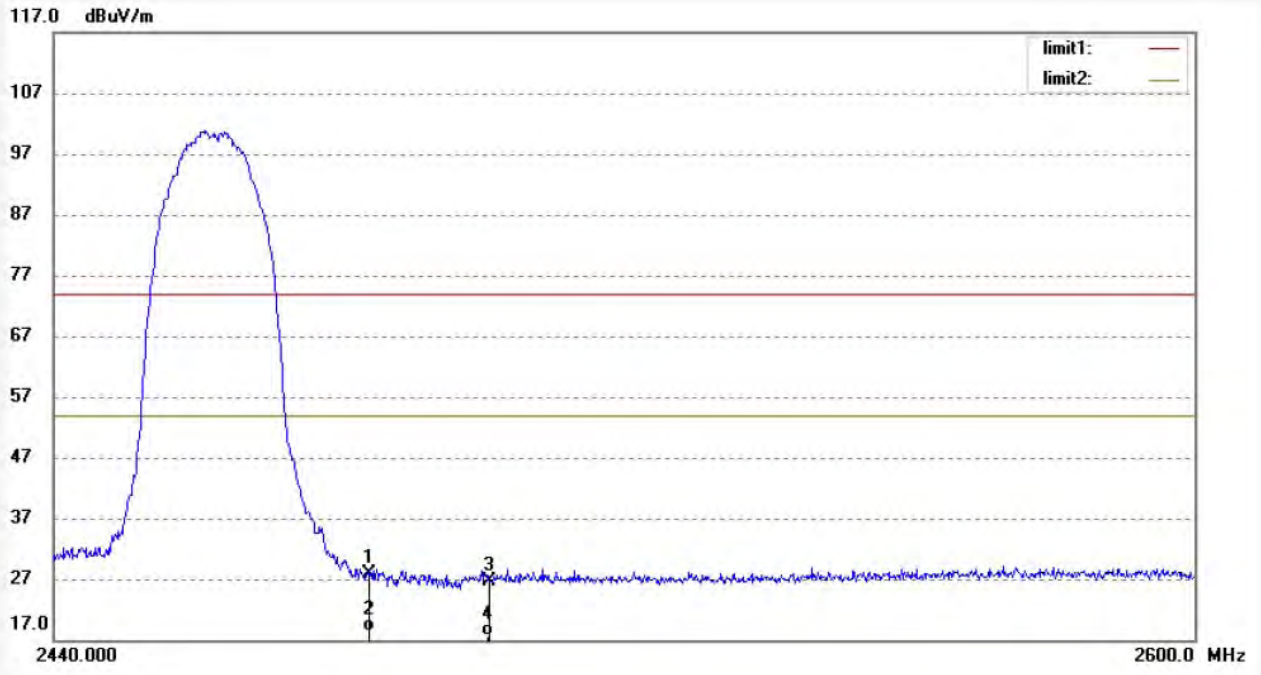
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #662
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/14/03
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	26.90	1.10	28.00	74.00	-46.00	peak	250	139	
2	2483.500	17.32	1.10	18.42	54.00	-35.58	AVG	200	55	
3	2500.000	25.63	1.10	26.73	74.00	-47.27	peak	200	166	
4	2500.000	16.65	1.10	17.75	54.00	-36.25	AVG	200	135	

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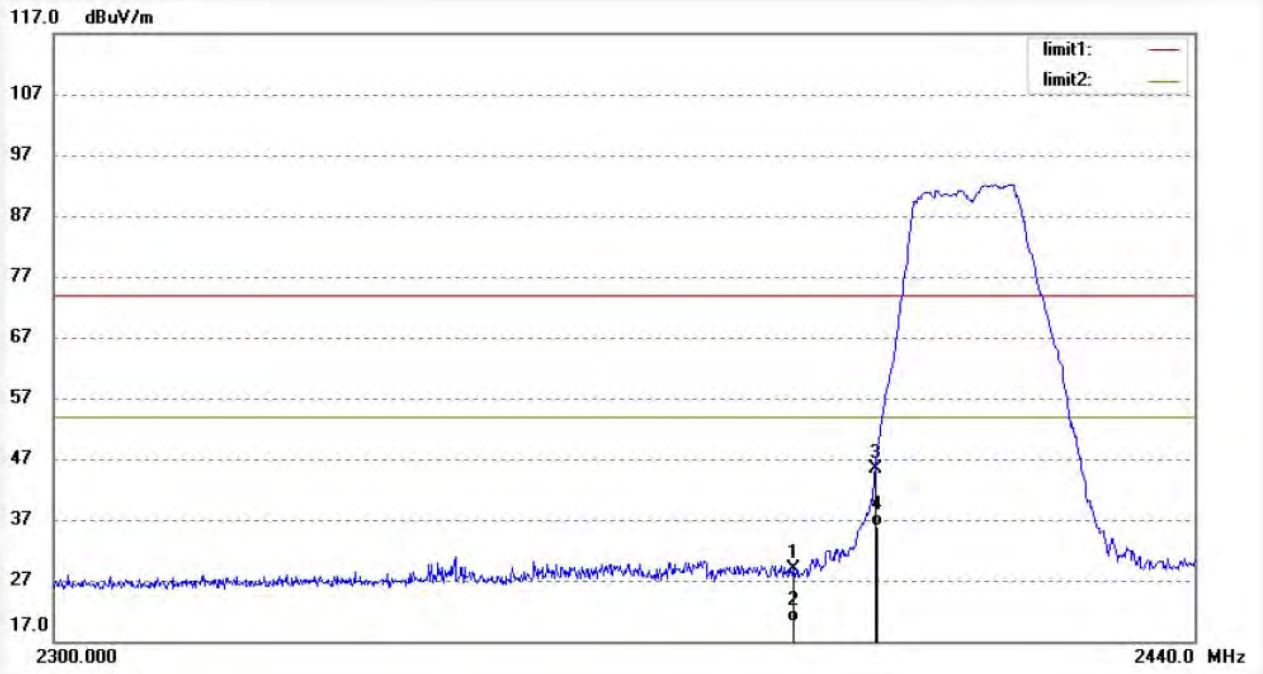
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #664
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11g)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/18/53
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	28.10	0.79	28.89	74.00	-45.11	peak	200	320	
2	2390.000	19.32	0.79	20.11	54.00	-33.89	AVG	200	302	
3	2400.000	44.54	0.88	45.42	74.00	-28.58	peak	250	154	
4	2400.000	35.12	0.88	36.00	54.00	-18.00	AVG	200	49	

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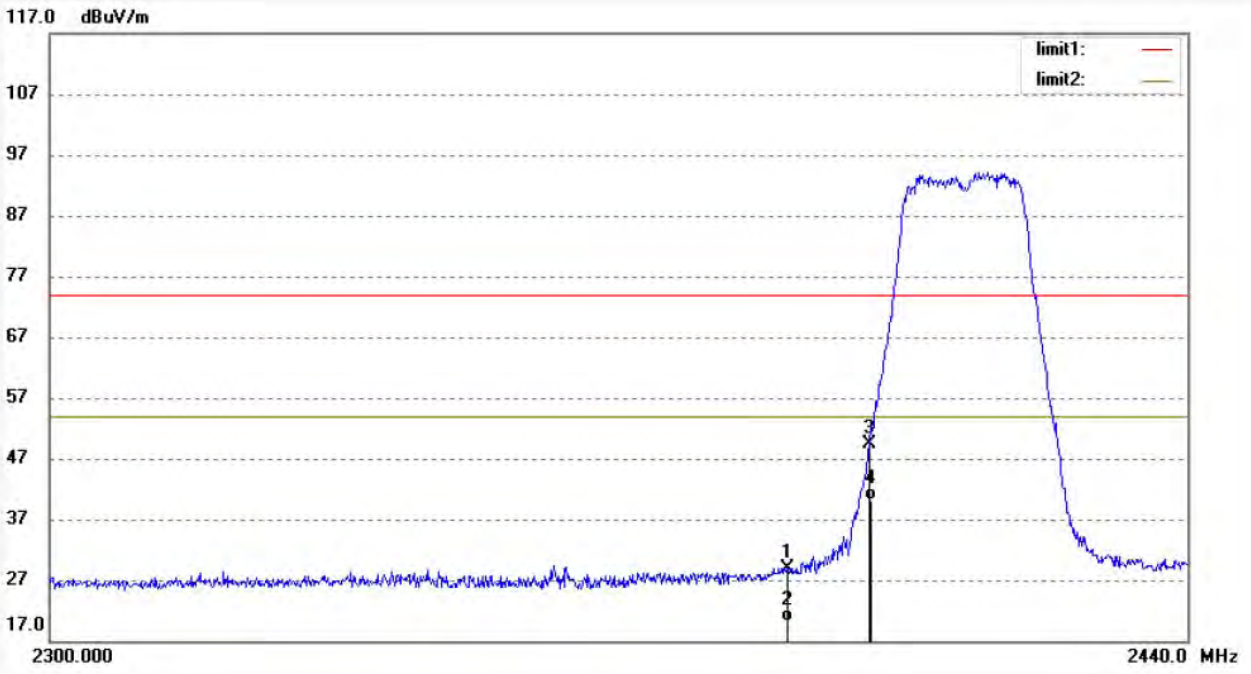
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #663
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11g)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/18/21
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	28.00	0.79	28.79	74.00	-45.21	peak	200	197	
2	2390.000	19.34	0.79	20.13	54.00	-33.87	AVG	200	55	
3	2400.000	48.54	0.88	49.42	74.00	-24.58	peak	200	234	
4	2400.000	39.32	0.88	40.20	54.00	-13.80	AVG	200	136	

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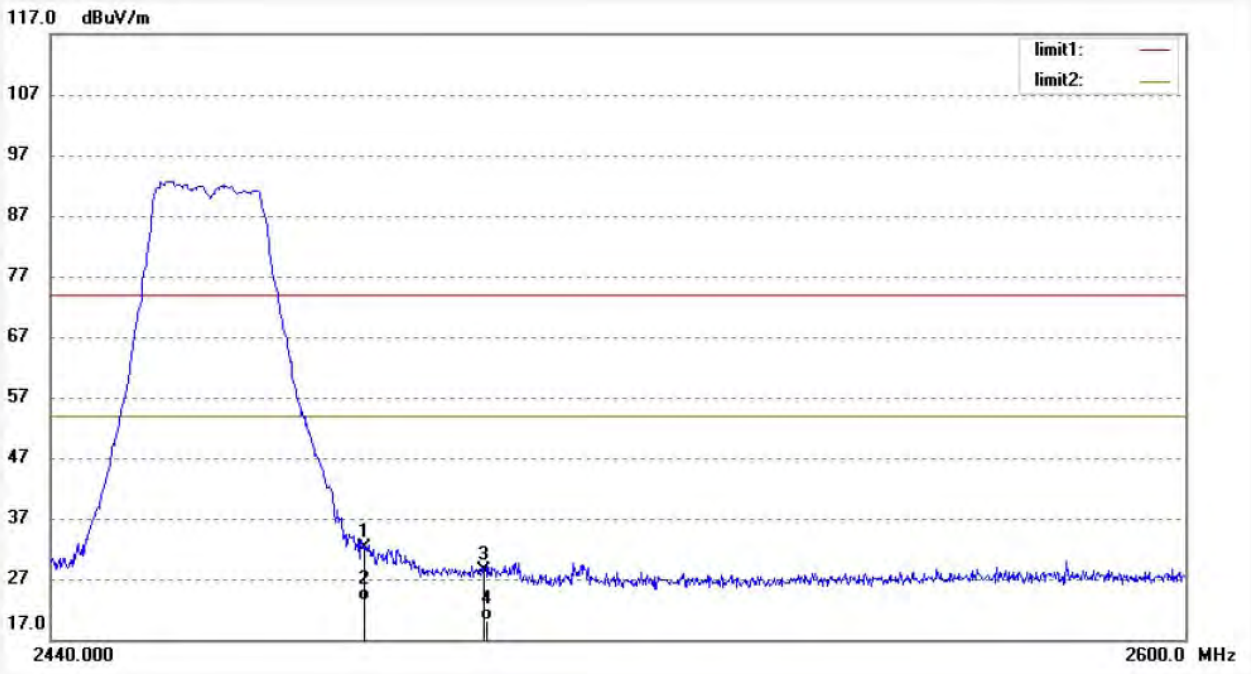
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #665
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11g)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/19/49
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	31.11	1.10	32.21	74.00	-41.79	peak	300	38	
2	2483.500	22.32	1.10	23.42	54.00	-30.58	AVG	250	264	
3	2500.000	27.29	1.10	28.39	74.00	-45.61	peak	250	112	
4	2500.000	18.96	1.10	20.06	54.00	-33.94	AVG	300	216	

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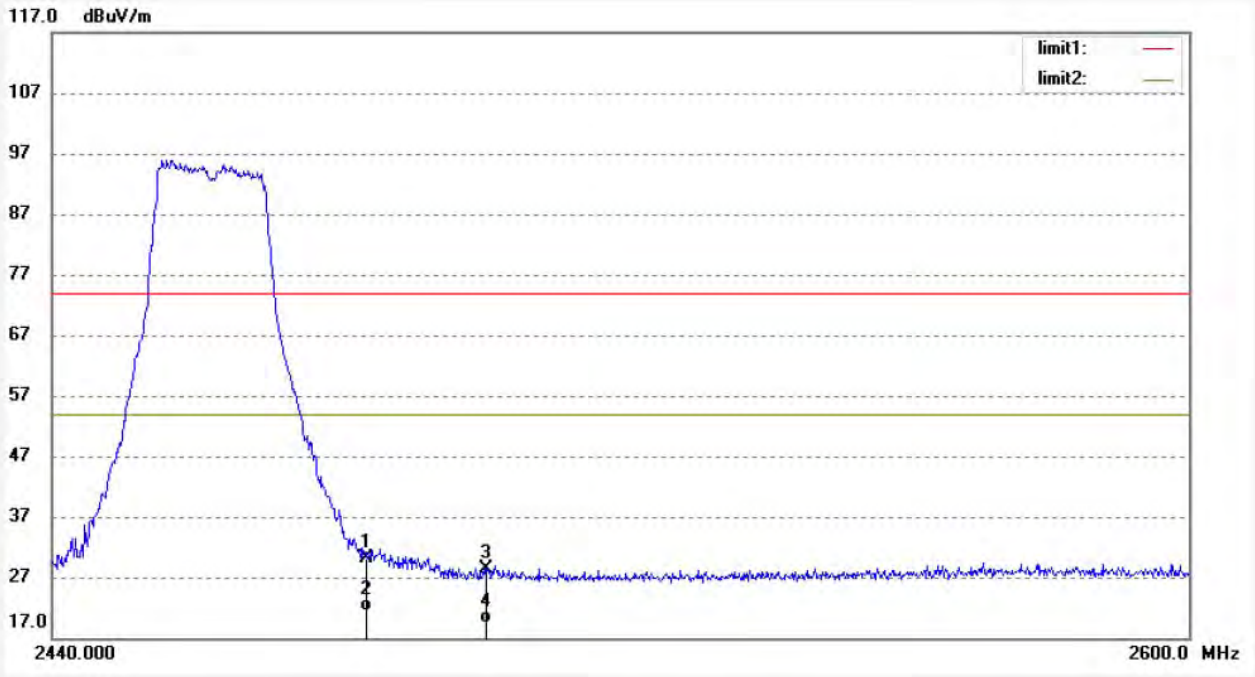
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #666
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11g)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/20/48
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	29.01	1.10	30.11	74.00	-43.89	peak	200	201	
2	2483.500	20.21	1.10	21.31	54.00	-32.69	AVG	150	45	
3	2500.000	27.31	1.10	28.41	74.00	-45.59	peak	200	157	
4	2500.000	18.35	1.10	19.45	54.00	-34.55	AVG	200	126	

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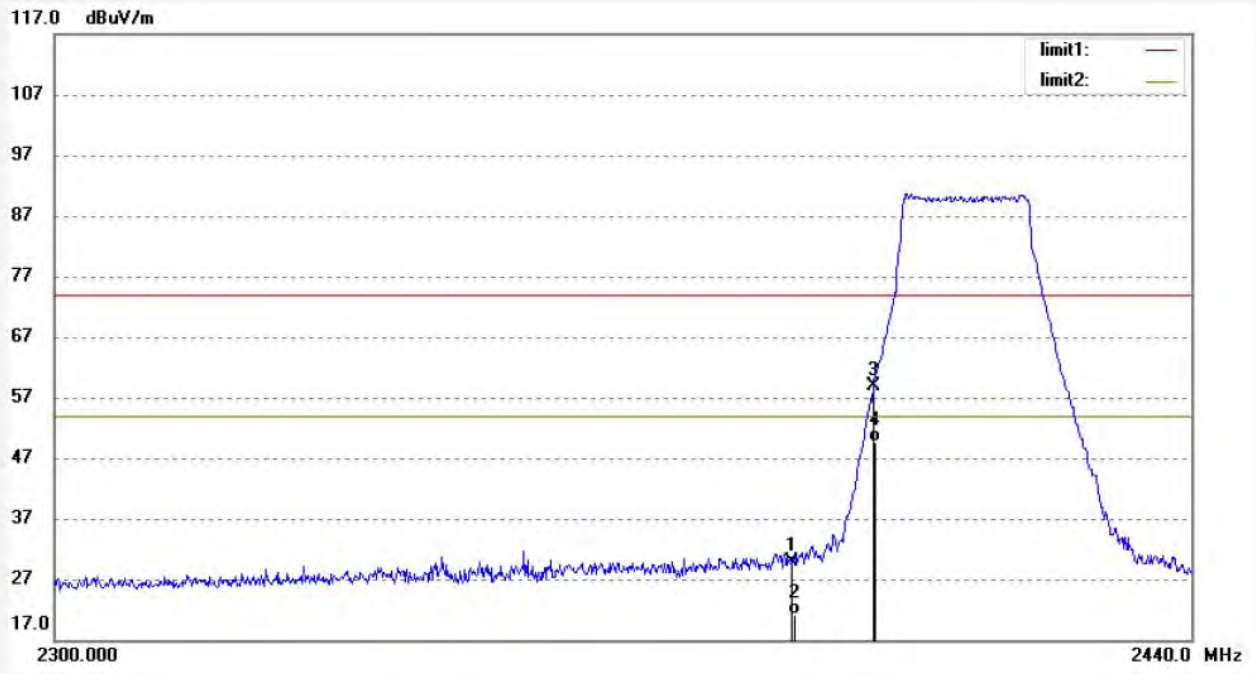
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #669
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11 n20)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/24/19
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	29.05	0.79	29.84	74.00	-44.16	peak	250	316	
2	2390.000	20.31	0.79	21.10	54.00	-32.90	AVG	250	234	
3	2400.000	57.90	0.88	58.78	74.00	-15.22	peak	200	215	
4	2400.000	48.65	0.88	49.53	54.00	-4.47	AVG	200	160	

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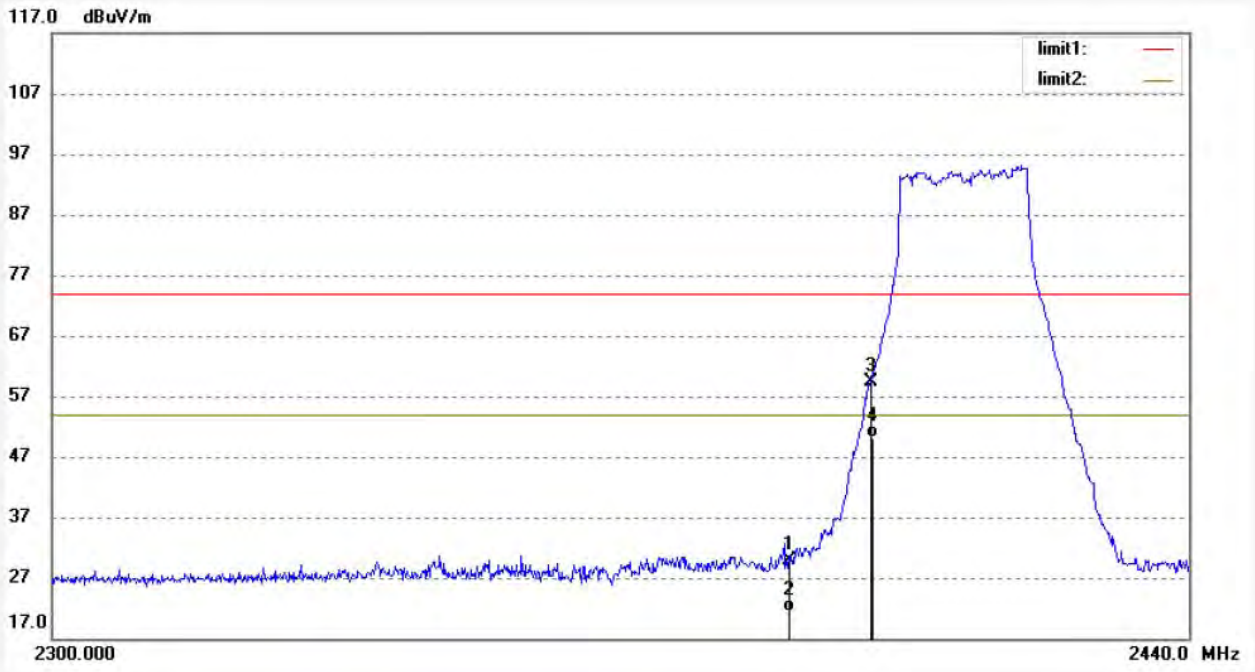
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #670
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11 n20)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/24/59
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	29.05	0.79	29.84	74.00	-44.16	peak	200	64	
2	2390.000	20.65	0.79	21.44	54.00	-32.56	AVG	150	220	
3	2400.000	58.40	0.88	59.28	74.00	-14.72	peak	200	164	
4	2400.000	49.14	0.88	50.02	54.00	-3.98	AVG	150	321	

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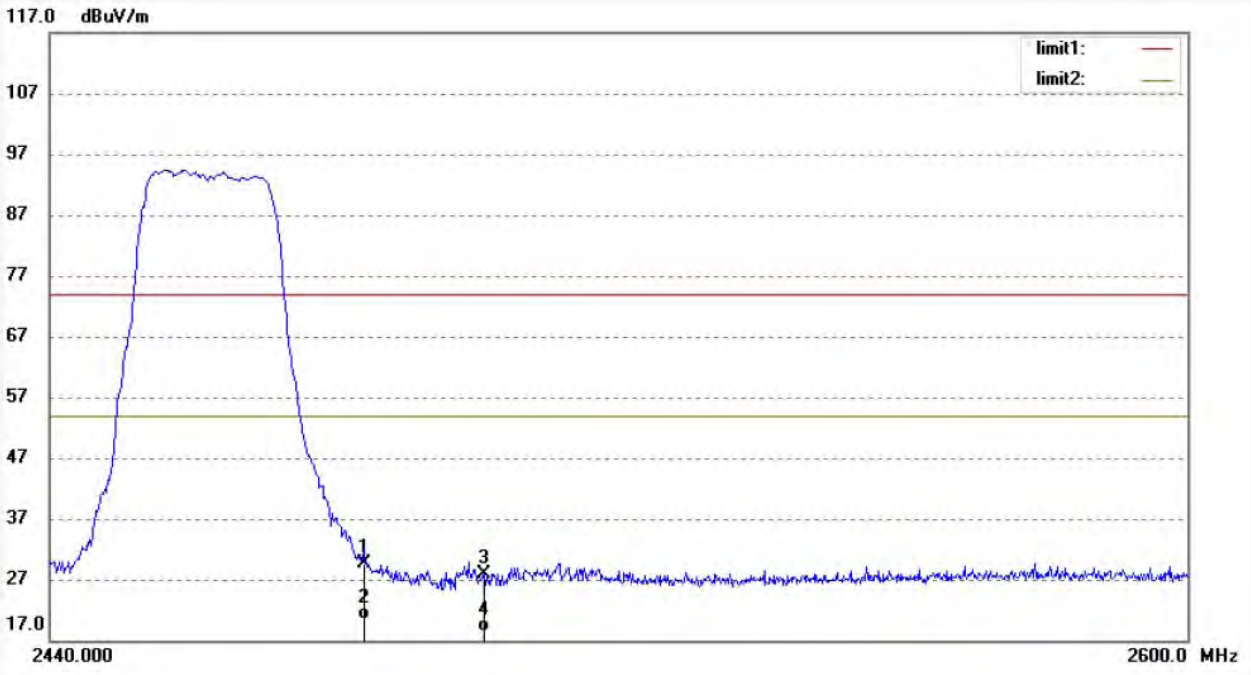
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #668
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11 n20)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/23/10
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	28.47	1.10	29.57	74.00	-44.43	peak	250	302	
2	2483.500	19.32	1.10	20.42	54.00	-33.58	AVG	200	154	
3	2500.000	26.81	1.10	27.91	74.00	-46.09	peak	250	146	
4	2500.000	17.32	1.10	18.42	54.00	-35.58	AVG	200	196	

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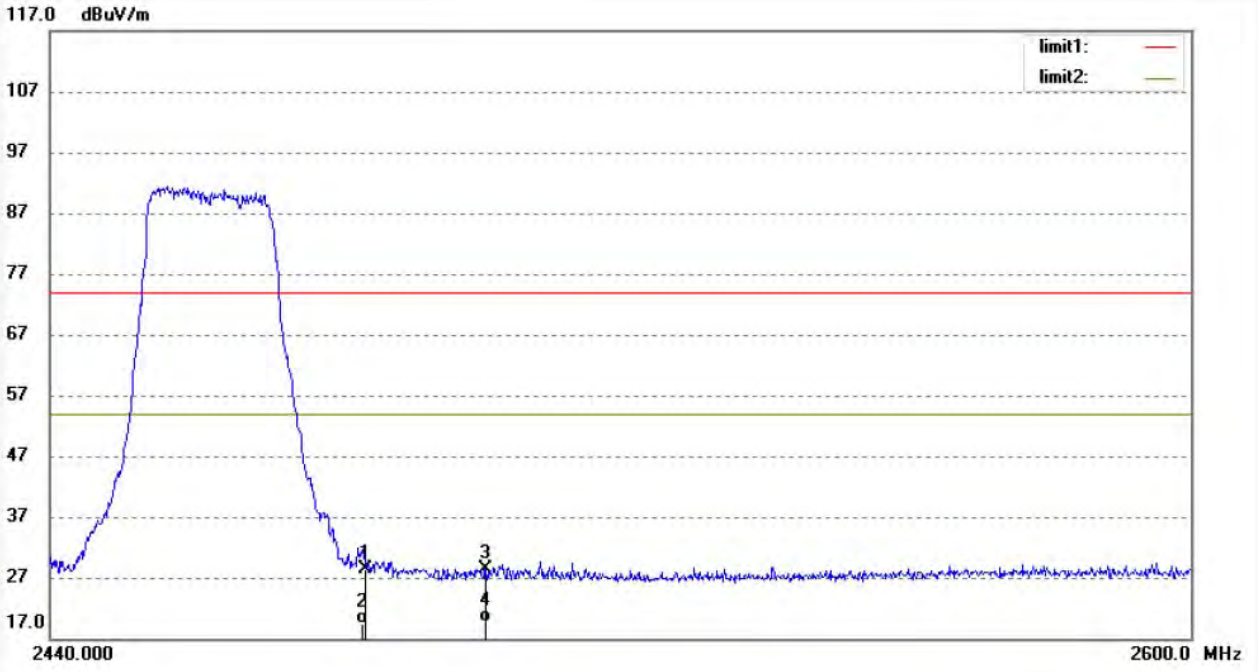
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #667
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11 n20)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/22/34
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	27.25	1.10	28.35	74.00	-45.65	peak	150	65	
2	2483.500	18.36	1.10	19.46	54.00	-34.54	AVG	200	148	
3	2500.000	27.38	1.10	28.48	74.00	-45.52	peak	200	320	
4	2500.000	18.64	1.10	19.74	54.00	-34.26	AVG	150	115	

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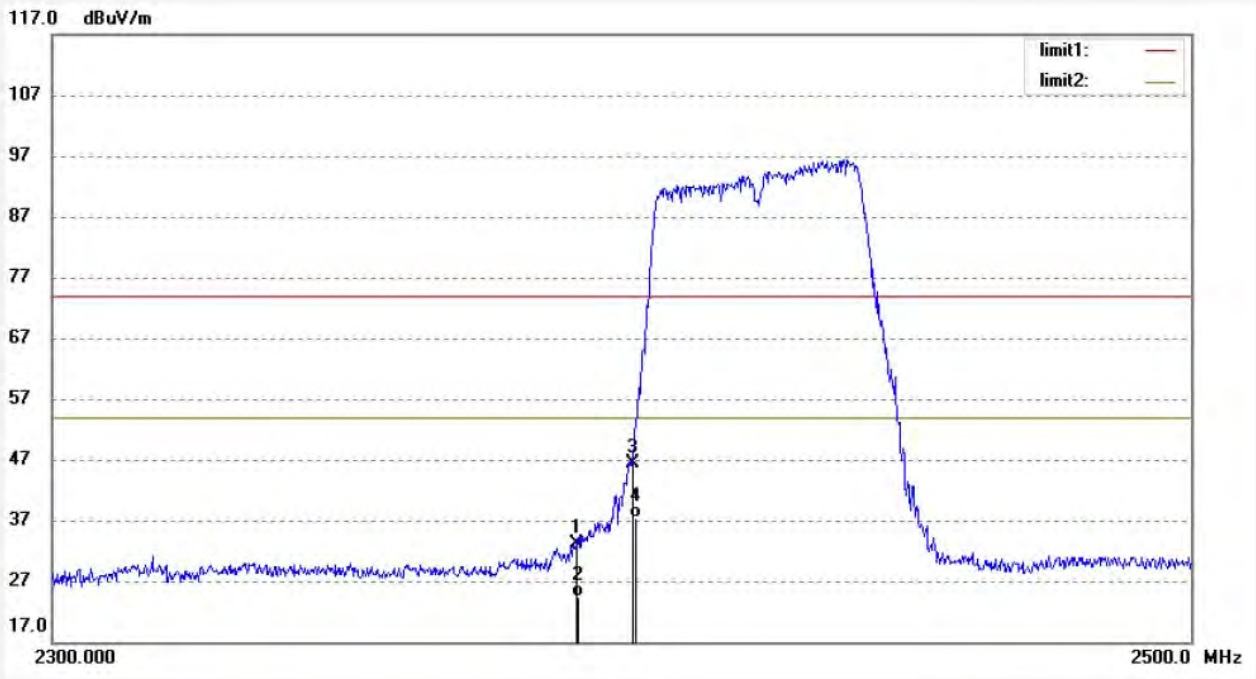
Fax:+86-0755-26503396

Job No.: FRANK2018 #672
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 3(802.11 n40)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/27/00
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	32.33	0.79	33.12	74.00	-40.88	peak	250	31	
2	2390.000	23.60	0.79	24.39	54.00	-29.61	AVG	200	72	
3	2400.000	45.48	0.88	46.36	74.00	-27.64	peak	250	159	
4	2400.000	36.48	0.88	37.36	54.00	-16.64	AVG	200	187	

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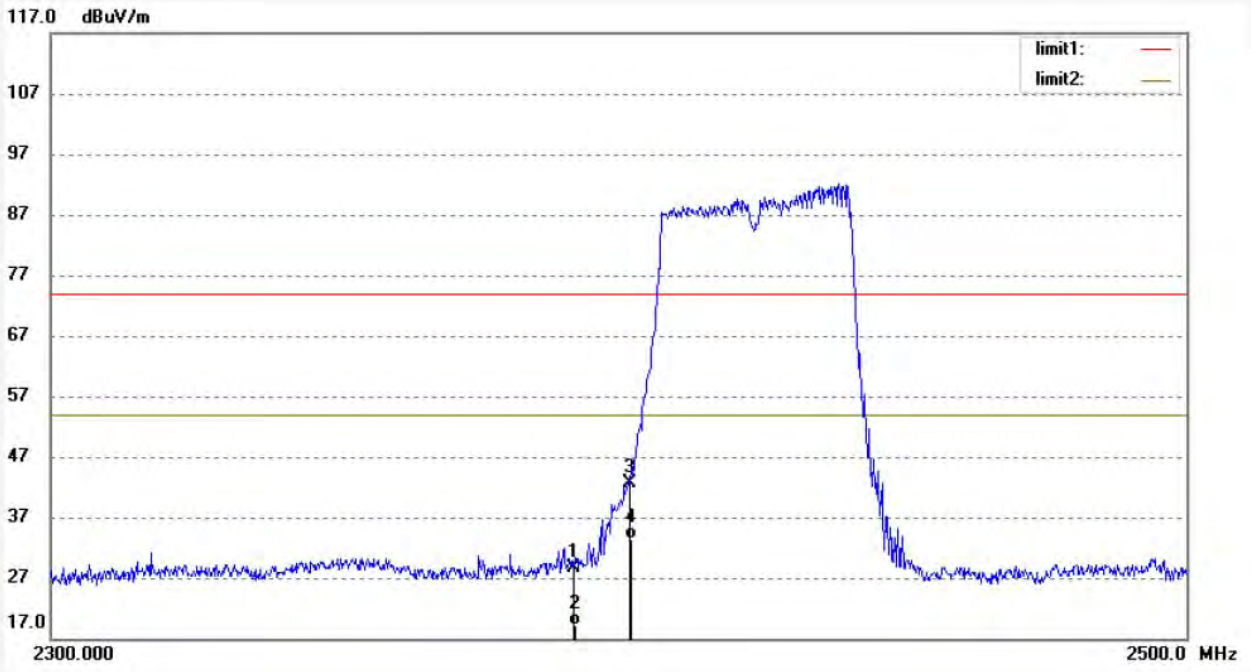
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #671
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 3(802.11 n40)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/26/28
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	27.77	0.79	28.56	74.00	-45.44	peak	200	301	
2	2390.000	18.35	0.79	19.14	54.00	-34.86	AVG	150	287	
3	2400.000	41.63	0.88	42.51	74.00	-31.49	peak	200	56	
4	2400.000	32.39	0.88	33.27	54.00	-20.73	AVG	150	187	

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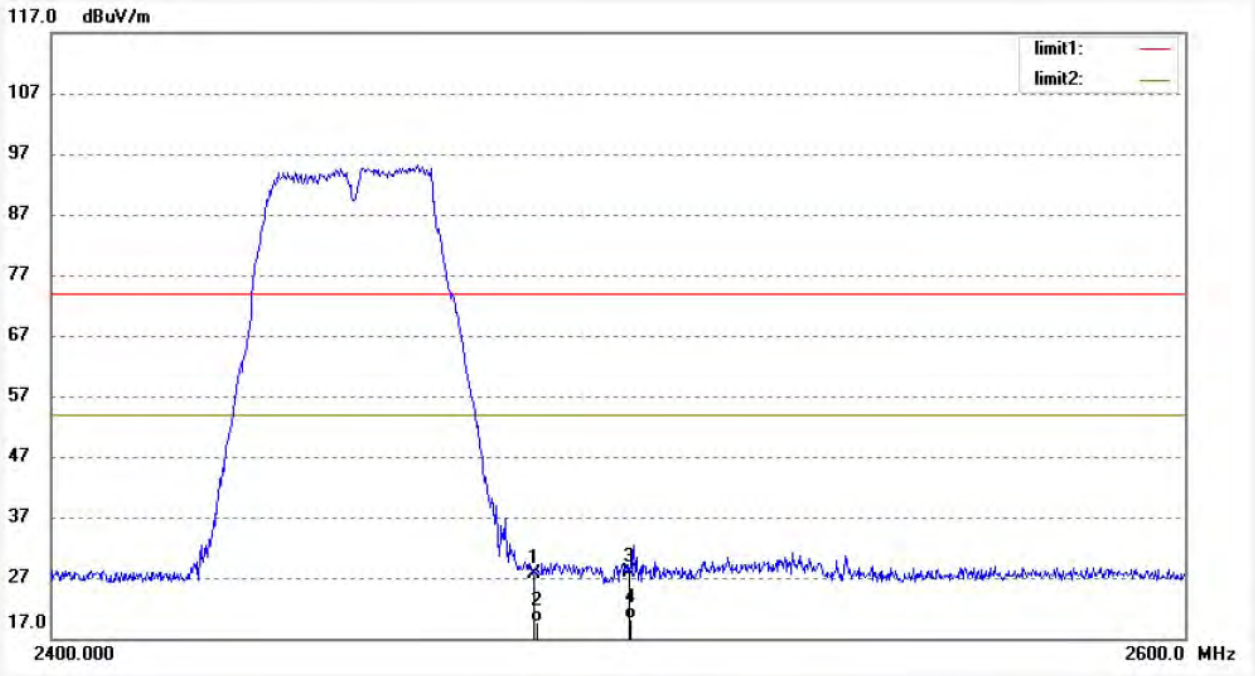
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #673
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 9(802.11 n40)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/28/19
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	26.64	1.10	27.74	74.00	-46.26	peak	200	320	
2	2483.500	18.65	1.10	19.75	54.00	-34.25	AVG	200	214	
3	2500.000	26.84	1.10	27.94	74.00	-46.06	peak	200	61	
4	2500.000	18.97	1.10	20.07	54.00	-33.93	AVG	200	223	

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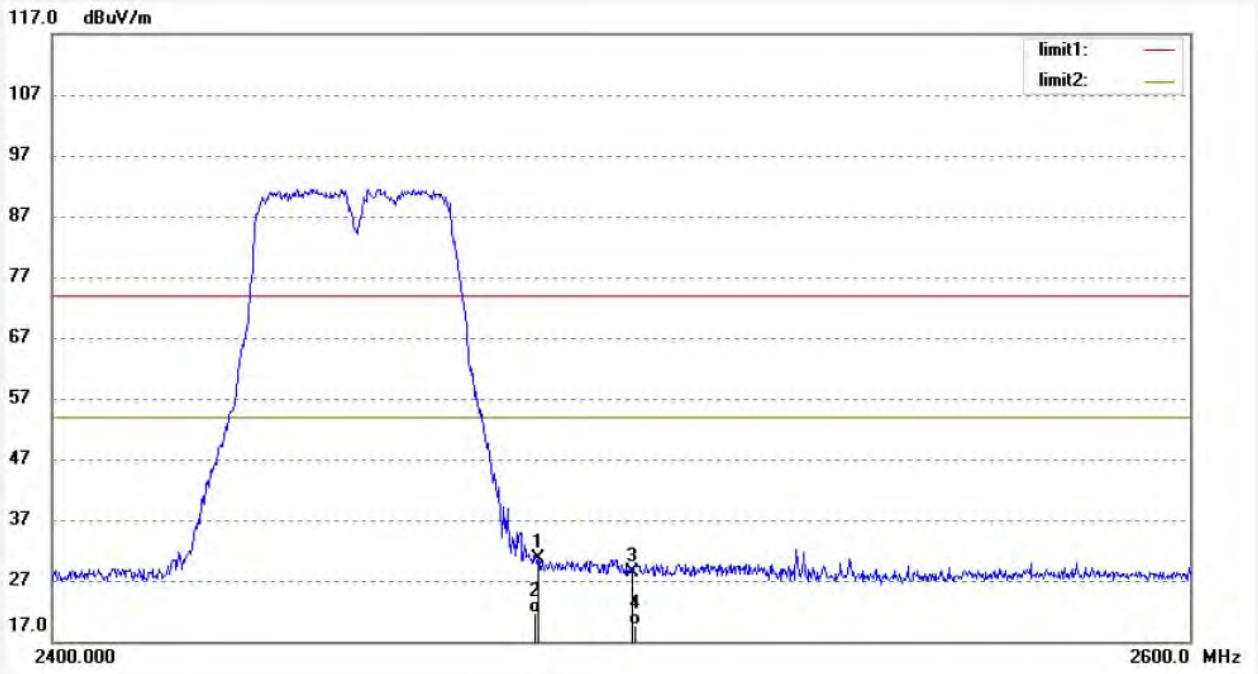
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #674
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 9(802.11 n40)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/29/07
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



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	29.64	1.10	30.74	74.00	-43.26	peak	200	302	
2	2483.500	20.65	1.10	21.75	54.00	-32.25	AVG	250	145	
3	2500.000	27.34	1.10	28.44	74.00	-45.56	peak	250	168	
4	2500.000	18.65	1.10	19.75	54.00	-34.25	AVG	300	65	

12.RADIATED SPURIOUS EMISSION TEST

12.1.Block Diagram of Test Setup

12.1.1.Block diagram of connection between the EUT and peripherals

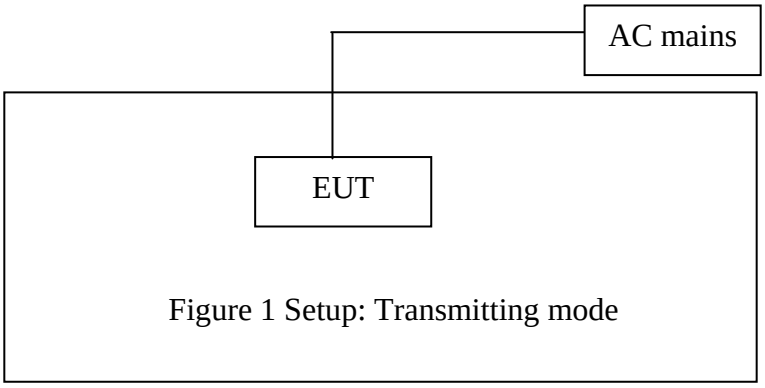
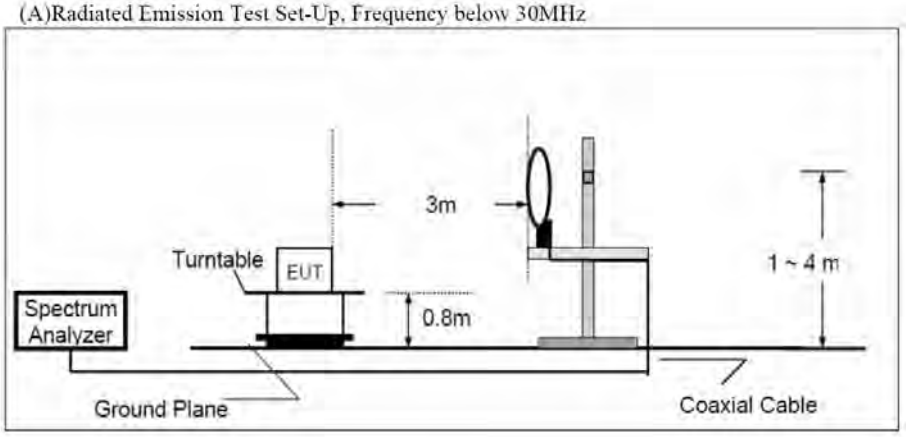


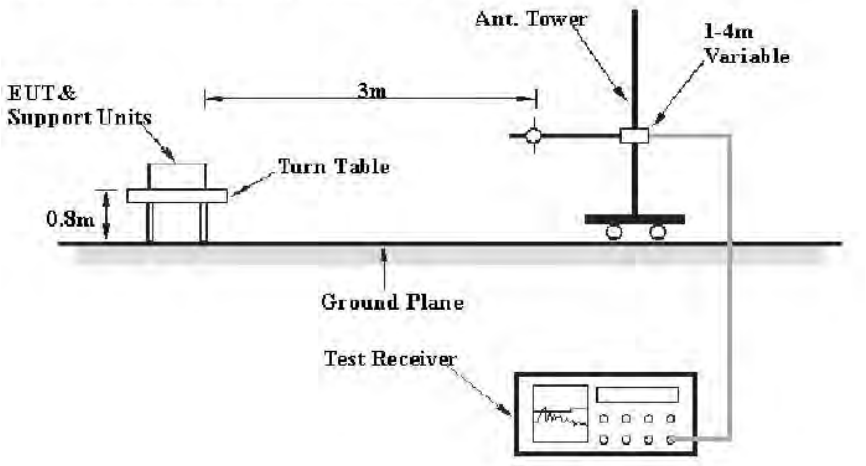
Figure 1 Setup: Transmitting mode

12.1.2.Semi-Anechoic Chamber Test Setup Diagram

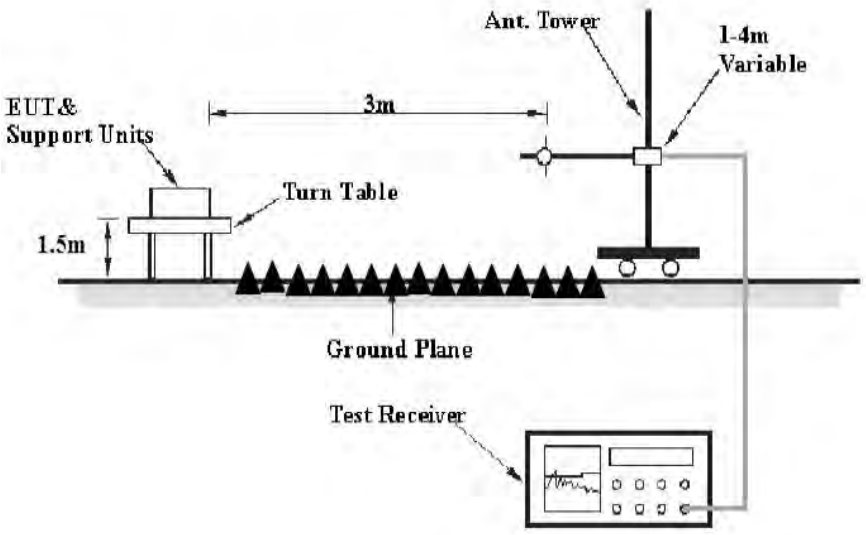
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



(B)Radiated Emission Test Set-Up, Frequency 30MHz-1GHz



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



12.2.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).

12.3.Restricted bands of operation

12.3.1.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.

12.4.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.

12.5.Operating Condition of EUT

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

12.5.2.Turn on the power of all equipment.

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

12.6.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 frequency range from 30MHz to 26500MHz 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.

12.7.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.

12.8.The Field Strength of Radiation Emission Measurement Results

Test Lab: 3m Anechoic chamber
Test Engineer: Star

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

2. The radiation emissions from 9KHz-30MHz and 18-26.5GHz are not reported, because the test values lower than the limits of 20dB.

3. We tested 802.11b/g/n mode the all data rate and the worst case data for this channel to be 11Mbps for 802.11b mode.

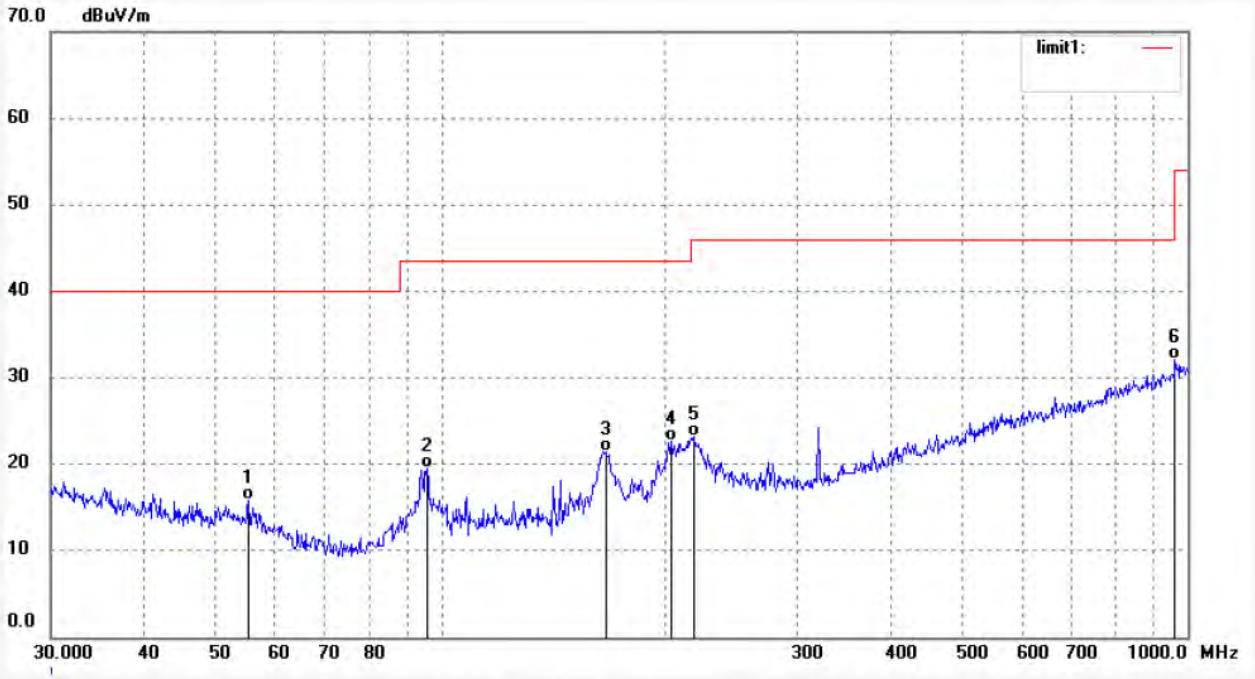
The spectrum analyzer plots are attached as below.

Below 1G

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #617	Polarization: Horizontal
Standard: FCC PART 15C 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/08/13/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/25/12
EUT: KOOGEEK WIFI SMART LED LIGHT BULB	Engineer Signature:
Mode: TX Channel 1(802.11b)	Distance: 3m
Model: LB2	
Manufacturer: NICETEX Electronics Limited	

Note: Report NO.:ATE20181409



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	55.2207	28.83	-12.99	15.84	40.00	-24.16	QP	200	122	
2	95.7622	34.04	-14.48	19.56	43.50	-23.94	QP	200	302	
3	166.0680	35.68	-14.16	21.52	43.50	-21.98	QP	200	92	
4	203.5227	34.88	-12.16	22.72	43.50	-20.78	QP	200	84	
5	218.3085	34.84	-11.58	23.26	46.00	-22.74	QP	200	156	
6	962.1622	28.76	3.33	32.09	54.00	-21.91	QP	200	210	

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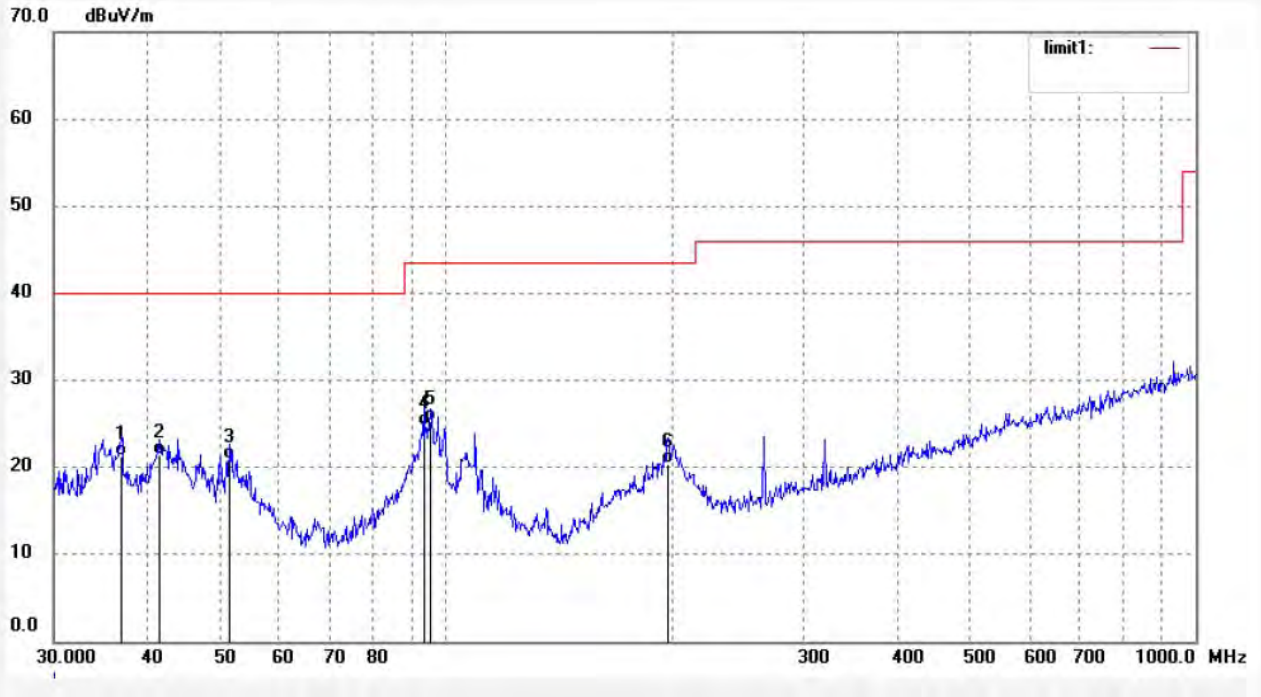
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #618
Standard: FCC PART 15C 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/13/
Time: 9/26/05
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.8952	32.02	-10.84	21.18	40.00	-18.82	QP	100	302	
2	41.4215	33.26	-11.85	21.41	40.00	-18.59	QP	100	12	
3	51.4806	33.61	-12.69	20.92	40.00	-19.08	QP	100	108	
4	93.4402	39.56	-14.83	24.73	43.50	-18.77	QP	100	152	
5	95.4270	39.88	-14.59	25.29	43.50	-18.21	QP	100	96	
6	197.8926	32.60	-12.28	20.32	43.50	-23.18	QP	100	348	

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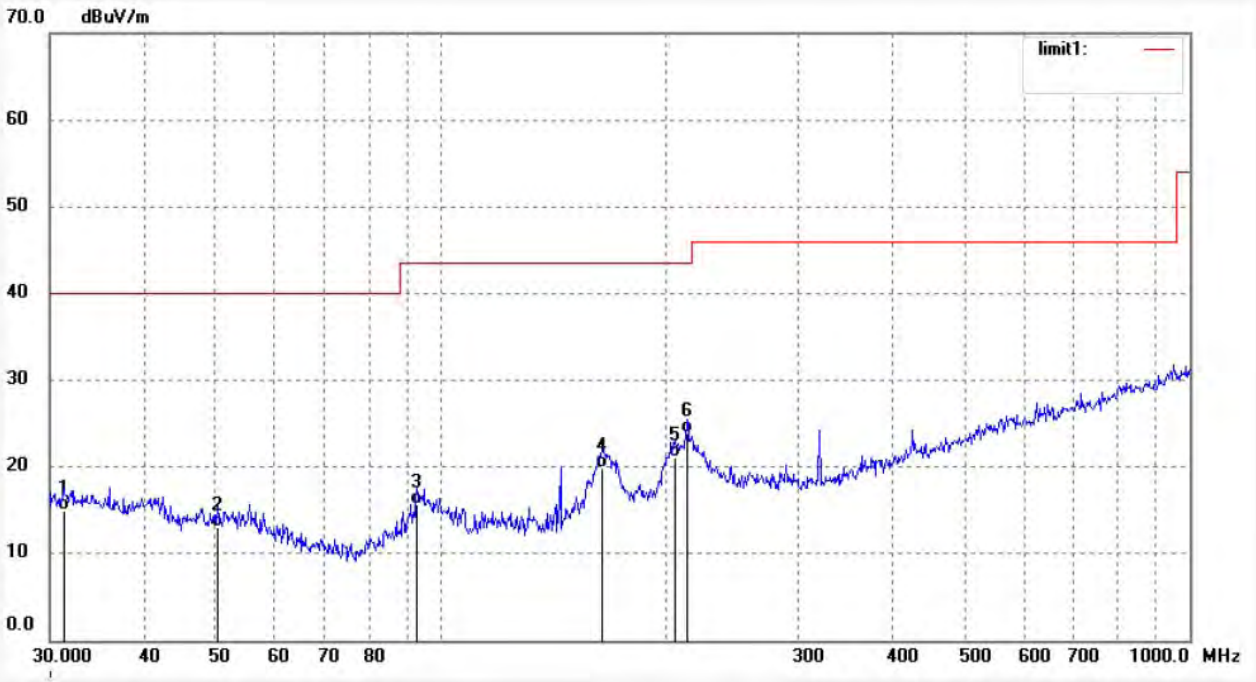
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #620
Standard: FCC PART 15C 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 6(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/13/
Time: 9/27/22
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.2893	25.02	-10.05	14.97	40.00	-25.03	QP	200	63	
2	50.2324	25.62	-12.60	13.02	40.00	-26.98	QP	200	205	
3	92.7871	30.61	-14.87	15.74	43.50	-27.76	QP	200	132	
4	163.7549	34.13	-14.34	19.79	43.50	-23.71	QP	200	166	
5	205.6750	33.16	-12.09	21.07	43.50	-22.43	QP	200	302	
6	213.0150	35.62	-11.81	23.81	43.50	-19.69	QP	200	56	

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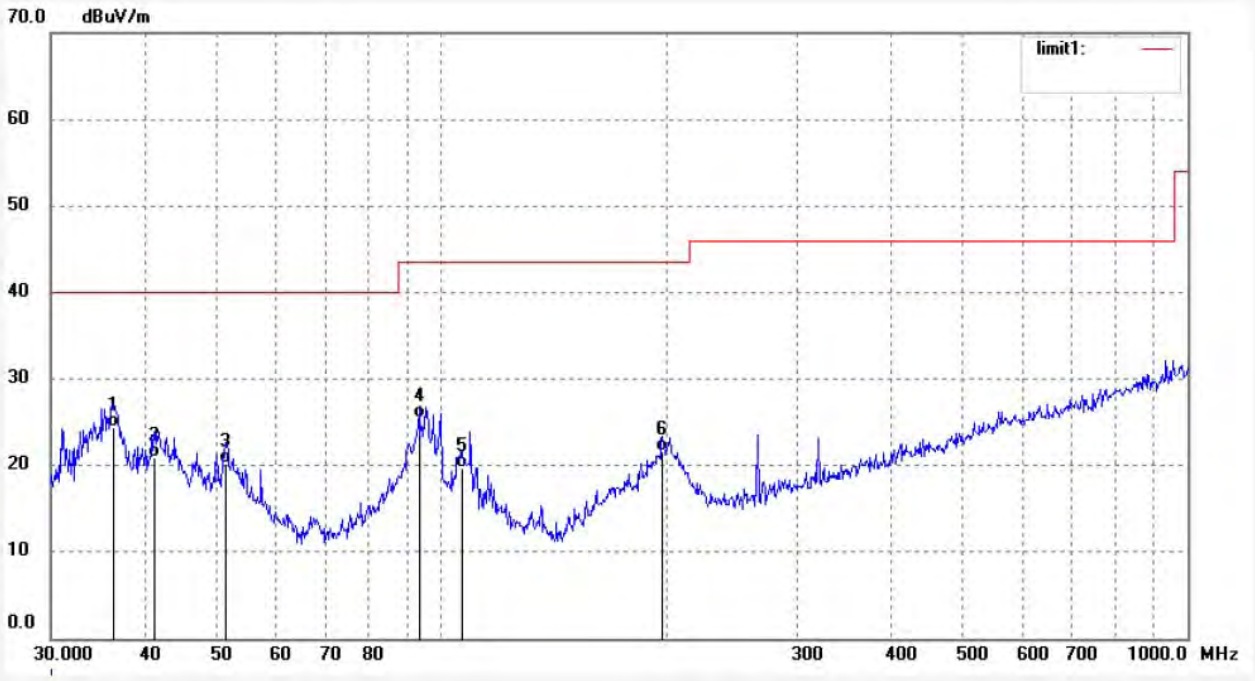
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #619	Polarization: Vertical
Standard: FCC PART 15C 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/08/13/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/26/17
EUT: KOOGEEK WIFI SMART LED LIGHT BULB	Engineer Signature:
Mode: TX Channel 6(802.11b)	Distance: 3m
Model: LB2	
Manufacturer: NICETEX Electronics Limited	

Note: Report NO.:ATE20181409



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	36.3813	35.12	-10.72	24.40	40.00	-15.60	QP	100	233	
2	41.2764	32.65	-11.81	20.84	40.00	-19.16	QP	100	61	
3	51.4806	32.96	-12.69	20.27	40.00	-19.73	QP	100	54	
4	93.4402	40.22	-14.83	25.39	43.50	-18.11	QP	100	126	
5	106.7587	33.48	-13.85	19.63	43.50	-23.87	QP	100	302	
6	197.8926	33.95	-12.28	21.67	43.50	-21.83	QP	100	159	

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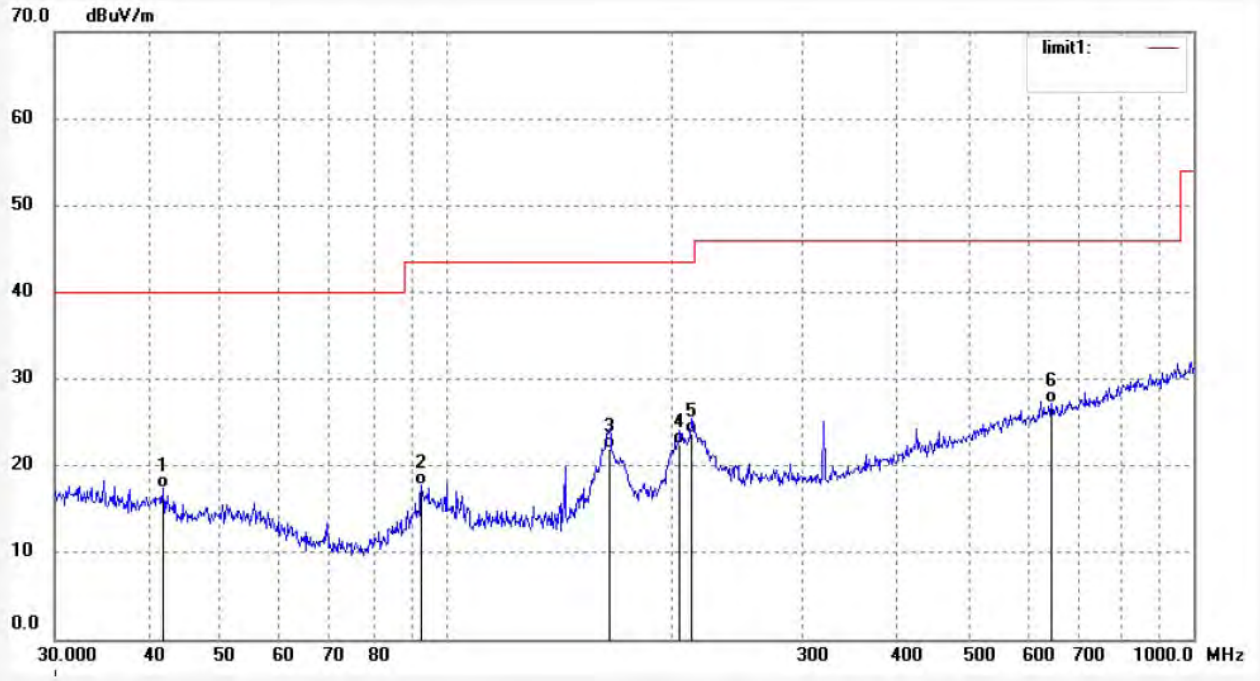
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #621
Standard: FCC PART 15C 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/13/
Time: 9/28/03
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	41.8596	29.37	-11.94	17.43	40.00	-22.57	QP	200	306	
2	92.7871	32.56	-14.87	17.69	43.50	-25.81	QP	200	102	
3	165.4866	36.23	-14.24	21.99	43.50	-21.51	QP	200	213	
4	205.6750	34.65	-12.09	22.56	43.50	-20.94	QP	200	264	
5	213.0150	35.61	-11.81	23.80	43.50	-19.70	QP	200	130	
6	645.1195	29.12	-1.89	27.23	46.00	-18.77	QP	200	231	

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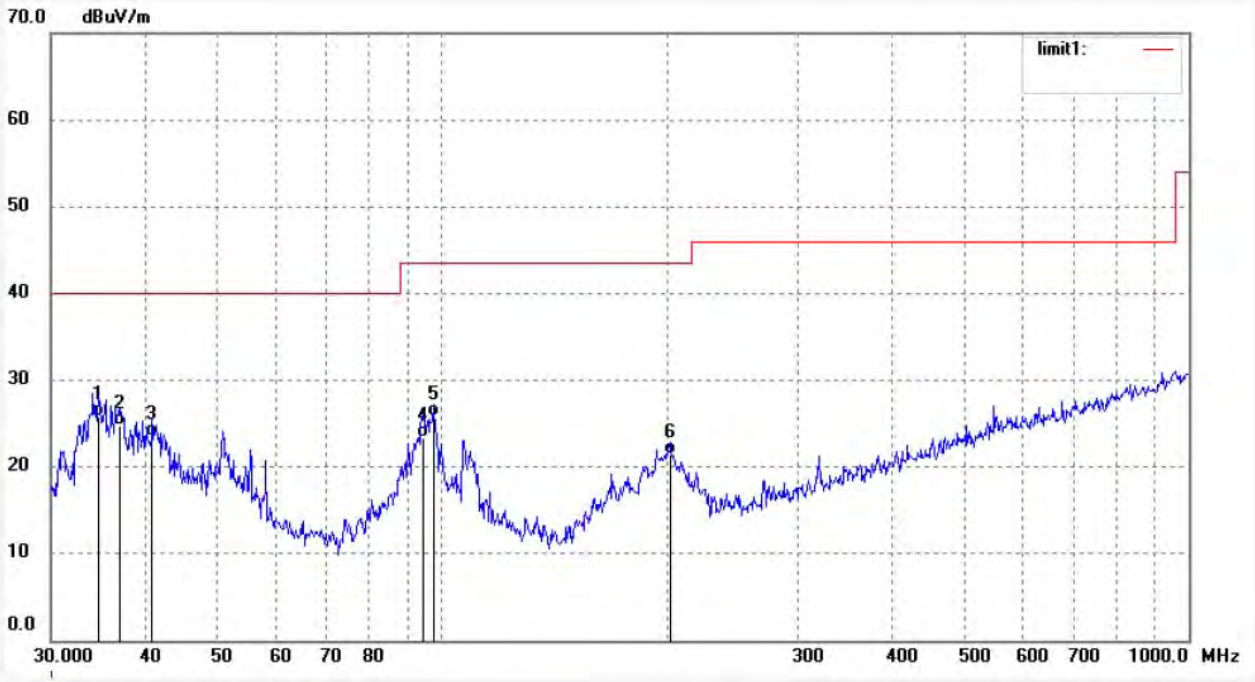
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #622
Standard: FCC PART 15C 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/13/
Time: 9/28/37
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	34.7601	36.12	-10.34	25.78	40.00	-14.22	QP	100	41	
2	37.0248	35.62	-10.86	24.76	40.00	-15.24	QP	100	320	
3	40.9881	35.21	-11.75	23.46	40.00	-16.54	QP	100	122	
4	94.4283	38.16	-14.78	23.38	43.50	-20.12	QP	100	156	
5	97.4560	39.65	-13.91	25.74	43.50	-17.76	QP	100	64	
6	202.1005	33.65	-12.21	21.44	43.50	-22.06	QP	100	302	

Above 1G

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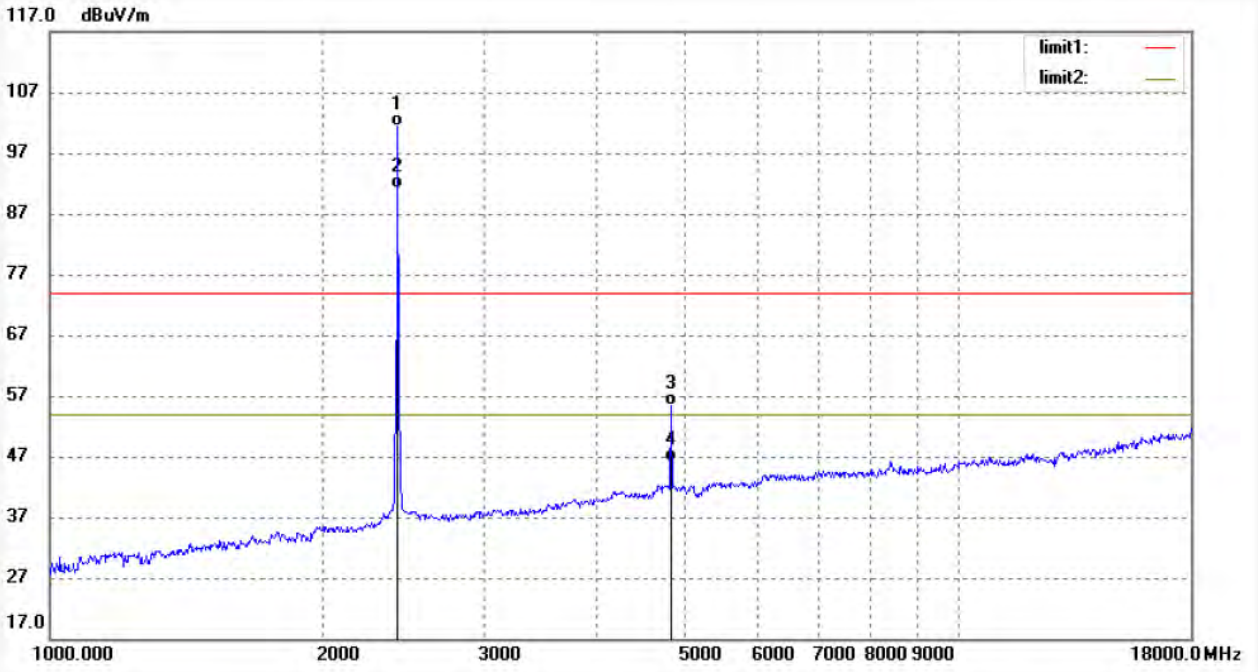
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #657	Polarization: Horizontal
Standard: FCC PART 15C	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 18/08/15/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15/10/34
EUT: KOOGEEK WIFI SMART LED LIGHT BULB	Engineer Signature:
Mode: TX Channel 1(802.11b)	Distance: 3m
Model: LB2	
Manufacturer: NICETEX Electronics Limited	

Note: Report NO.:ATE20181409



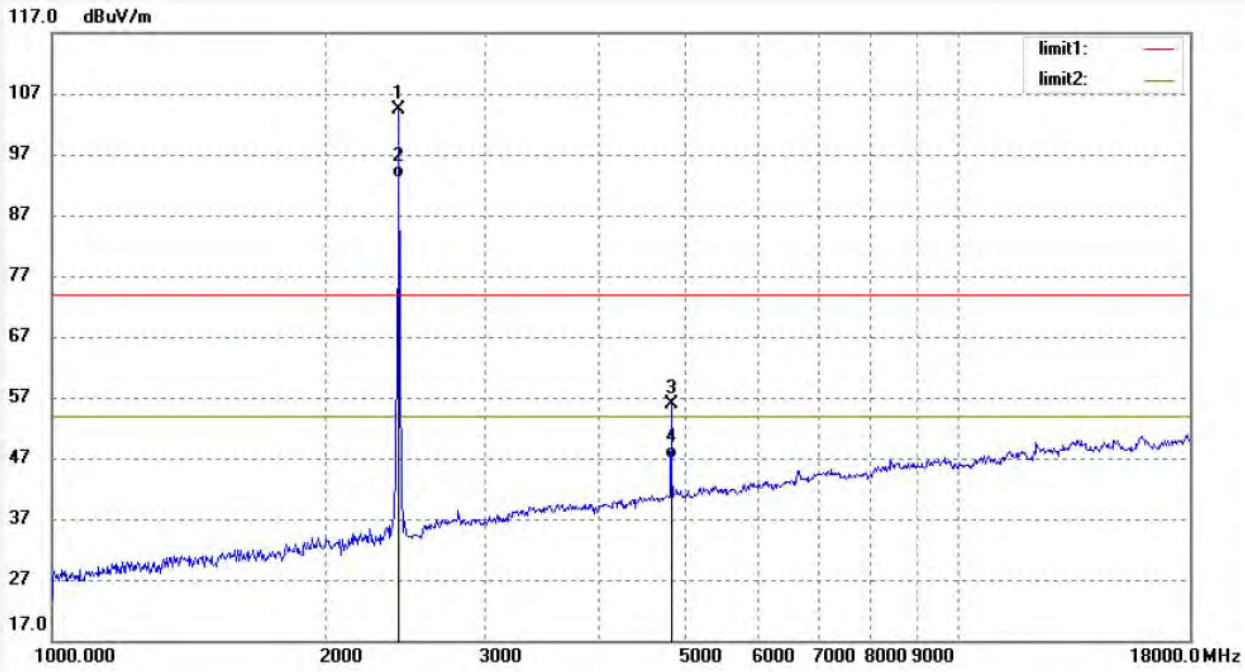
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.072	100.45	0.94	101.39			peak	250	58	
2	2412.072	90.12	0.94	91.06			AVG	250	187	
3	4824.016	47.84	7.53	55.37	74.00	-18.63	peak	250	102	
4	4824.016	38.56	7.53	46.09	74.00	-27.91	AVG	250	92	

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #658
Standard: FCC PART 15C
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 1(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/10/58
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



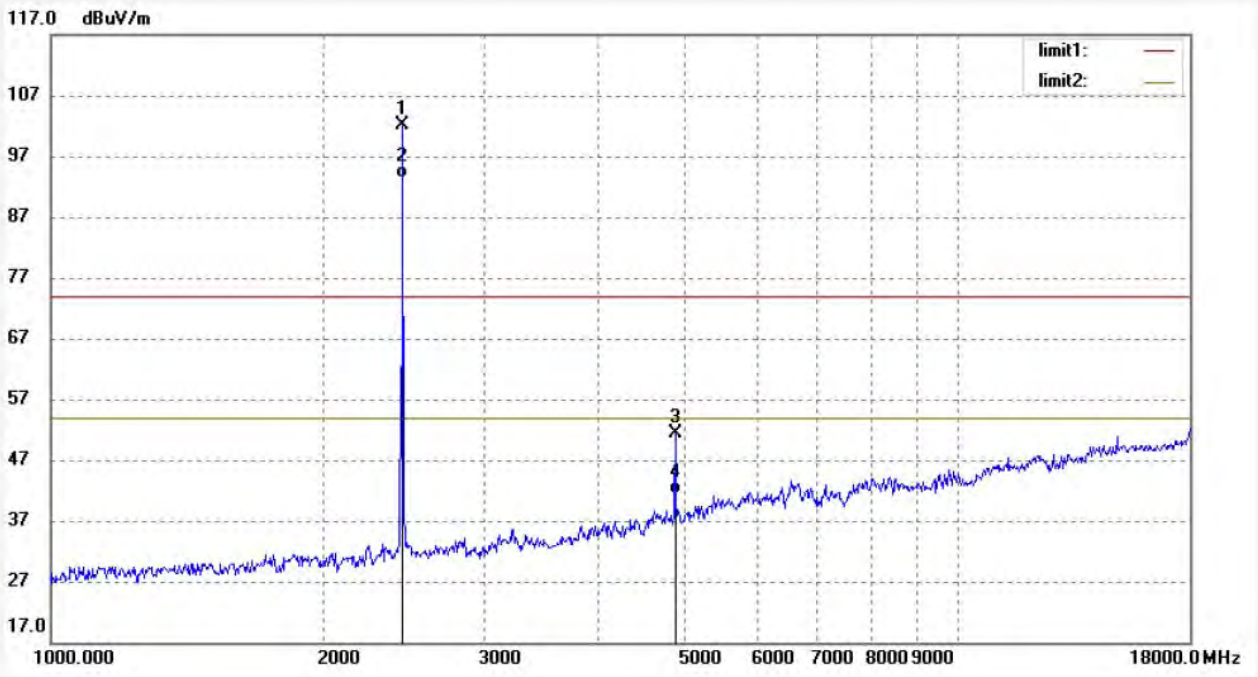
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.072	103.53	0.94	104.47			peak	250	135	
2	2412.072	92.31	0.94	93.25			AVG	150	65	
3	4824.016	48.32	7.53	55.85	74.00	-18.15	peak	200	187	
4	4824.016	39.45	7.53	46.98	54.00	-7.02	AVG	150	123	

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #656
Standard: FCC PART 15C
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 6(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/09/28
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



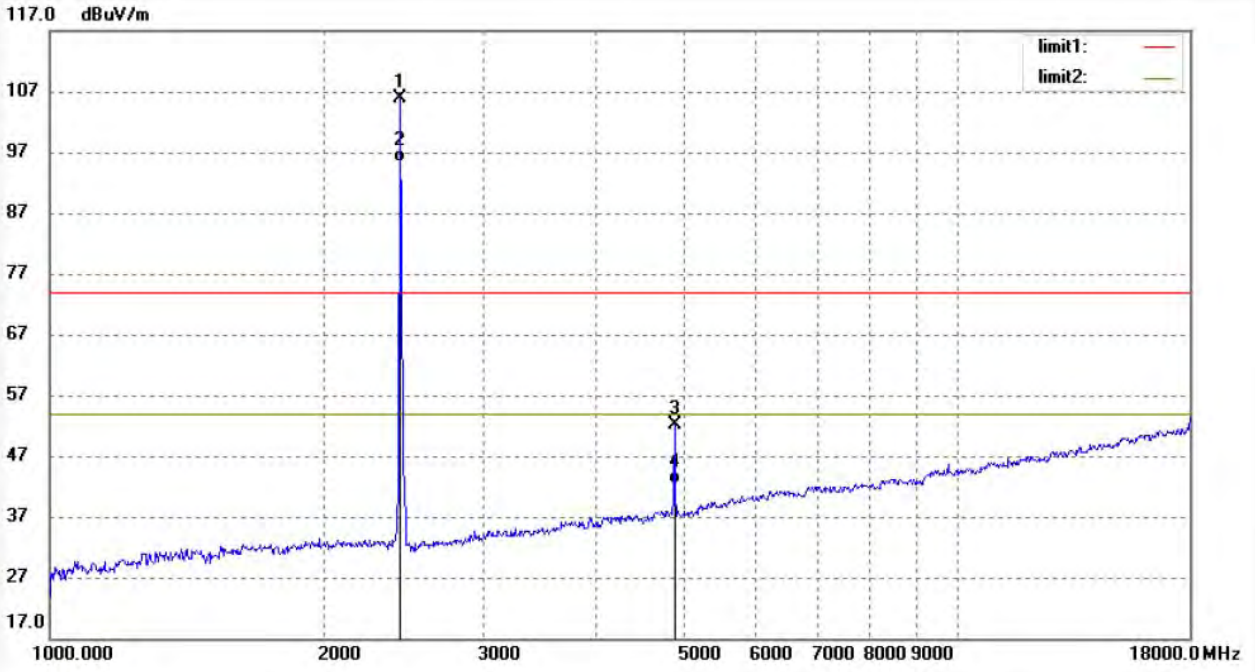
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.051	101.06	1.06	102.12			peak	250	301	
2	2437.051	92.31	1.06	93.37			AVG	250	256	
3	4874.042	43.23	8.04	51.27	74.00	-22.73	peak	250	281	
4	4874.042	33.46	8.04	41.50	54.00	-12.50	AVG	250	100	

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #655
Standard: FCC PART 15C
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 6(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/09/01
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



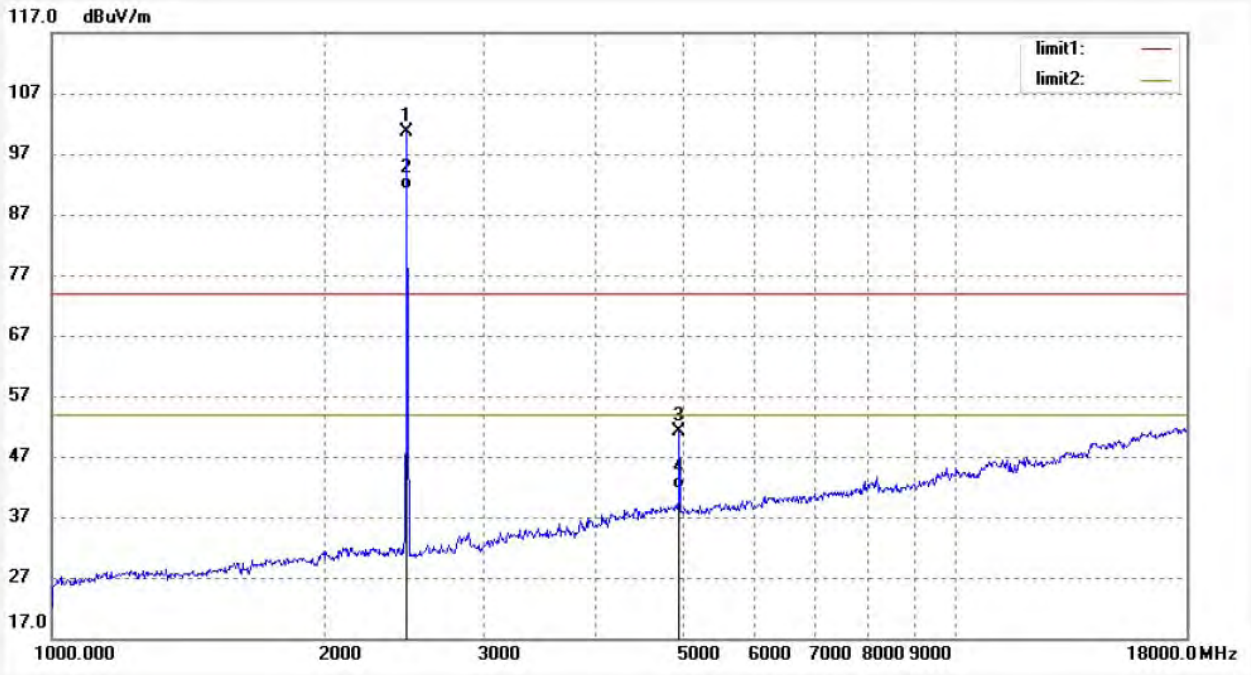
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.071	104.95	1.00	105.95			peak	250	45	
2	2437.071	94.46	1.00	95.46			AVG	150	123	
3	4874.042	43.99	8.04	52.03	74.00	-21.97	peak	250	78	
4	4874.042	34.32	8.04	42.36	54.00	-11.64	AVG	200	115	

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #653
Standard: FCC PART 15C
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/07/11
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



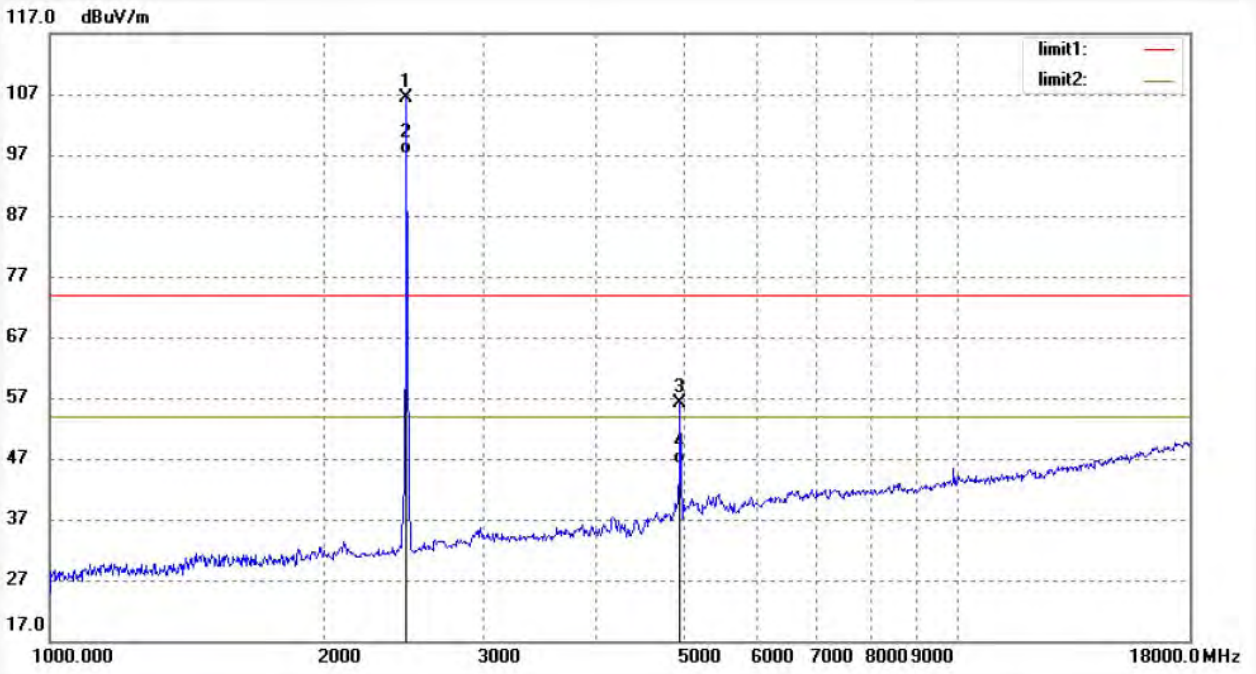
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.157	99.55	1.09	100.64			peak	200	302	
2	2462.157	90.12	1.09	91.21			AVG	200	126	
3	4924.093	42.63	8.52	51.15	74.00	-22.85	peak	200	120	
4	4924.093	33.15	8.52	41.67	54.00	-12.33	AVG	200	93	

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018 #654
Standard: FCC PART 15C
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: KOOGEEK WIFI SMART LED LIGHT BULB
Mode: TX Channel 11(802.11b)
Model: LB2
Manufacturer: NICETEX Electronics Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 18/08/15/
Time: 15/07/31
Engineer Signature:
Distance: 3m

Note: Report NO.:ATE20181409



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.157	105.19	1.09	106.28			peak	150	102	
2	2462.157	96.12	1.09	97.21			AVG	150	65	
3	4924.093	47.52	8.52	56.04	74.00	-17.96	peak	250	164	
4	4924.093	37.54	8.52	46.06	54.00	-7.94	AVG	150	123	

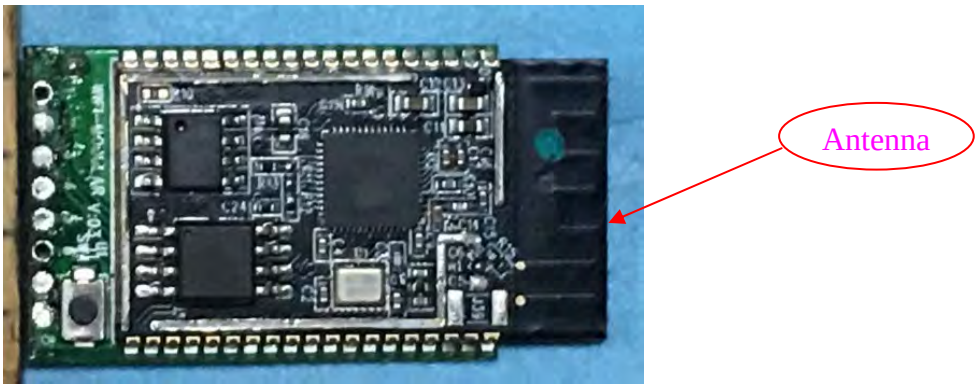
13. ANTENNA REQUIREMENT

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 0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



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