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

Smart Desk Lamp

Model No.: TL01, TL02

FCC ID: 2AOW9-TL

Prepared for	:	NET PROFIT GLOBAL COMPANY LIMITED
Address	:	RM 1421-22 14/F BLK A HI-TECH IND CTR, TSUEN WAN, N.T, HONG KONG, China.
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
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Report No.	:	ATE20190691
Date of Test	:	May. 22, 2019--Aug. 14, 2019
Date of Report	:	Sep. 16, 2019

TABLE OF CONTENTS

Description Page

Test Report Certification

Applicant	:	NET PROFIT GLOBAL COMPANY LIMITED
Address	:	RM 1421-22 14/F BLK A HI-TECH IND CTR, TSUEN WAN, N.T, HONG KONG, China.
Manufacturer	:	Mei Hua Electronics(Hui Zhou) Limited
Address	:	Jinlong road(Qingxi section), Longmen, Huizhou, Guangdong, China.
Product	:	Smart Desk Lamp
Model No.	:	TL01, TL02
Trade name	:	N/A

Measurement Procedure Used:

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

The EUT was tested according to DTS test procedure of April 02, 2019 KDB558074 D01 DTS Meas Guidance v0502 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 : May. 22, 2019--Aug. 14, 2019

Date of Report : Sep. 16, 2019

Prepared by : Tim Zhang

(Tim Zhang, Engineer)

Approved & Authorized Signer : Sean Liu

(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Smart Desk Lamp
Model Number	:	TL01, TL02
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
$G_{ANT\ MAX}$	:	0dBi
Type of Antenna	:	PCB Antenna
Power Supply	:	DC 5V(Powered by adapter)
Adapter information	:	Model: TY0500240E1mn INPUT: AC 100-240V~50/60Hz 0.3A Max OUTPUT: DC 5V/2.4A
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
Applicant	:	NET PROFIT GLOBAL COMPANY LIMITED.
Address	:	RM 1421-22 14/F BLK A HI-TECH IND CTR, TSUEN WAN, N.T, HONG KONG, China.
Manufacturer	:	Mei Hua Electronics(Hui Zhou) Limited
Address	:	Jinlong road(Qingxi section), Longmen, Huizhou, Guangdong, China.
Date of sample received	:	May. 14, 2019
Date of Test	:	May. 22, 2019--Aug. 14, 2019

1.2.Model difference declaration

TL01, TL02 are identical in interior structure, electrical circuits and components, and just model number is different for the marketing requirement.

1.3.Special Accessory and Auxiliary Equipment

PC	Manufacturer: LENOVO M/N: 4290-RT8 S/N: R9-FW93G 11/08

1.4.Laboratory Accreditation and Relationship to Customer

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 (Mains ports, 9kHz-30MHz)	=	2.72dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	2.66dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.28dB, k=2
Radiated emission expanded uncertainty (1G-18GHz)	=	4.98dB, k=2
Radiated emission expanded uncertainty (18G-26.5GHz)	=	5.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

2.1.For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan.05, 2019	1 Year
2.	Spectrum Analyzer	Rohde&Schwarz	FSV40	101495	Jan.05, 2019	1 Year
3.	Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan.05, 2019	1 Year
4.	Test Receiver	Rohde& Schwarz	ESPI	100396/003	Jan.05, 2019	1 Year
5.	Test Receiver	Rohde& Schwarz	ESPI	101526/003	Jan.05, 2019	1 Year
6.	Test Receiver	Rohde& Schwarz	ESR	101817	Jan.05, 2019	1 Year
7.	Bilog Antenna	Schwarzbeck	VULB9163	9163-194	Jan.05, 2019	1 Year
8.	Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan.05, 2019	1 Year
9.	Log.-Per.Antenna	Schwarzbeck	VUSLP 9111B	9111B-074	Jan.05, 2019	1 Year
10.	Biconical Broad Band Antenna	Schwarzbeck	VHBB 9124+BBA 9106	9124-617	Jan.05, 2019	1 Year
11.	Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan.05, 2019	1 Year
12.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan.05, 2019	1 Year
13.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan.05, 2019	1 Year
14.	Vertical Active Monopole Antenna	Schwarzbeck	VAMP 9243	9243-370	Jan.05, 2019	1 Year
15.	RF Switching Unit+PreAMP	Compliance Direction	RSU-M2	38322	Jan.05, 2019	1 Year
16.	Pre-Amplifier	Agilent	8447D	294A10619	Jan.05, 2019	1 Year
17.	Pre-Amplifier	Rohde&Schwarz	CBLU11835 40-01	3791	Jan.05, 2019	1 Year
18.	50 Coaxial Switch	Anritsu Corp	MP59B	6200237248	Jan.05, 2019	1 Year
19.	50 Coaxial Switch	Anritsu Corp	MP59B	6200506474	Jan.05, 2019	1 Year
20.	RF Coaxial Cable	Schwarzbeck	N-5m	No.1	Jan.05, 2019	1 Year
21.	RF Coaxial Cable	Schwarzbeck	N-1m	No.6	Jan.05, 2019	1 Year
22.	RF Coaxial Cable	Schwarzbeck	N-1m	No.7	Jan.05, 2019	1 Year
23.	RF Coaxial Cable	SUHNER	N-3m	No.8	Jan.05, 2019	1 Year
24.	RF Coaxial Cable	RESENBERGER	N-3.5m	No.9	Jan.05, 2019	1 Year
25.	RF Coaxial Cable	SUHNER	N-6m	No.10	Jan.05, 2019	1 Year
26.	RF Coaxial Cable	RESENBERGER	N-12m	No.11	Jan.05, 2019	1 Year
27.	RF Coaxial Cable	RESENBERGER	N-0.5m	No.12	Jan.05, 2019	1 Year
28.	RF Coaxial Cable	SUHNER	N-2m	No.13	Jan.05, 2019	1 Year
29.	RF Coaxial Cable	SUHNER	N-0.5m	No.15	Jan.05, 2019	1 Year
30.	RF Coaxial Cable	SUHNER	N-2m	No.16	Jan.05, 2019	1 Year
31.	RF Coaxial Cable	RESENBERGER	N-6m	No.17	Jan.05, 2019	1 Year
Radiated Emission Measurement Software: EZ_EMC V1.1.4.2						

2.2.The Equipment Used to Measure Conducted Disturbance (L.I.S.N)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCS30	100307	Jan.05, 2019	1 Year
2.	Test Receiver	Rohde & Schwarz	ESPI3	100396/003	Jan.05, 2019	1 Year
3.	Test Receiver	Rohde & Schwarz	ESPI3	101526/003	Jan.05, 2019	1 Year
4.	L.I.S.N.	Schwarzbeck	NLSK8126	8126431	Jan.05, 2019	1 Year
5.	L.I.S.N.	Rohde & Schwarz	ESH3-Z5	100305	Jan.05, 2019	1 Year
6.	L.I.S.N.	Rohde & Schwarz	ESH3-Z5	100310	Jan.05, 2019	1 Year
7.	L.I.S.N.	Rohde & Schwarz	ESH3-Z6	100132	Jan.05, 2019	1 Year
8.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100305	Jan.05, 2019	1 Year
9.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100312	Jan.05, 2019	1 Year
10.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100815	Jan.05, 2019	1 Year
11.	50Ω Coaxial Switch	Anritsu Corp	MP59B	6200283936	Jan.05, 2019	1 Year
12.	50Ω Coaxial Switch	Anritsu Corp	MP59B	6200283933	Jan.05, 2019	1 Year
13.	50Ω Coaxial Switch	Anritsu Corp	MP59B	6200506474	Jan.05, 2019	1 Year
14.	VOLTAGE PROBE	Schwarzbeck	TK9416	N/A	Jan.05, 2019	1 Year
15.	RF CURRENT PROBE	Rohde & Schwarz	EZ-17	100048	Jan.05, 2019	1 Year
16.	8-Wire Impedance Stabilisation Network	Schwarzbeck	CAT5 8158	8158-0035	Jan.05, 2019	1 Year
17.	RF Coaxial Cable	SUHNER	N-2m	No.2	Jan.05, 2019	1 Year
18.	RF Coaxial Cable	SUHNER	N-2m	No.3	Jan.05, 2019	1 Year
19.	RF Coaxial Cable	SUHNER	N-2m	No.14	Jan.05, 2019	1 Year
Conducted Emission Measurement Software: ES-K1 V1.71						

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.Carrier Frequency of Channels

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

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

802.11n (40MHz)

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

3.3.Configuration and peripherals

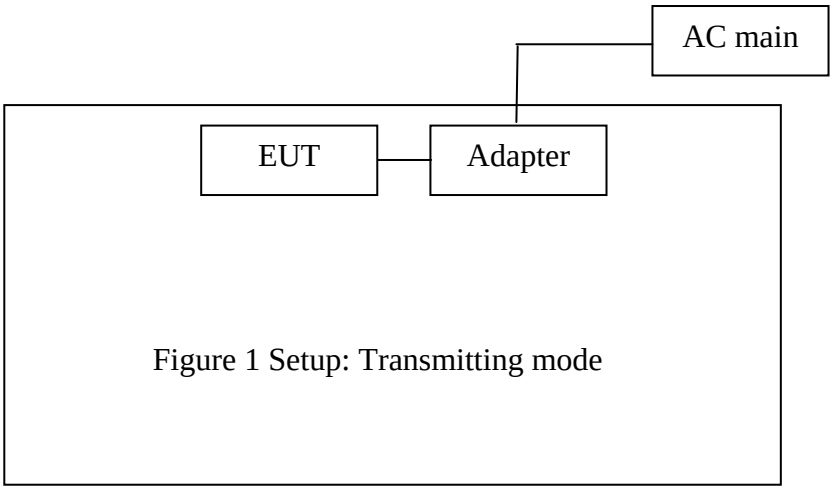


Figure 1 Setup: Transmitting mode

3.4.Test mode

Test Mode	Test Modes Description
11B	IEEE 802.11b with data rate of 1 Mbps
11G	IEEE 802.11g with data rate of 6 Mbps
11N20MHz	IEEE 802.11n with data date of MCS0 and bandwidth of 20 MHz
11N40MHz	IEEE 802.11n with data date of MCS7 and bandwidth of 40 MHz

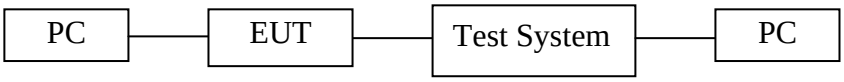
NOTE: Worst cases for each IEEE 802.11 mode are selected to perform tests.

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	AC power Line Conducted Emission Test	Compliant
Section 15.247(a)(2)	6dB Occupied Bandwidth Test	Compliant
KDB558074 D01 DTS Meas Guidance v0502	Duty cycle	Compliant
KDB558074 D01 DTS Meas Guidance v0502	OBW	Compliant
Section 15.247(b)(3)	Maximum conducted (average) output power	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.205 Section 15.209	Radiated Spurious Emissions Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 6DB OCCUPIED BANDWIDTH TEST

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.247(a)(1)

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

5.3.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.

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 TX modes measure it. The transmit frequency range are 2412-2462MHz and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

5.5.Test Procedure

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

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

5.5.3.The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

5.6.Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	8.32	> 0.5MHz
Middle	2437	8.32	> 0.5MHz
High	2462	8.32	> 0.5MHz

The test was performed with 802.11g			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	15.12	> 0.5MHz
Middle	2437	15.16	> 0.5MHz
High	2462	15.76	> 0.5MHz

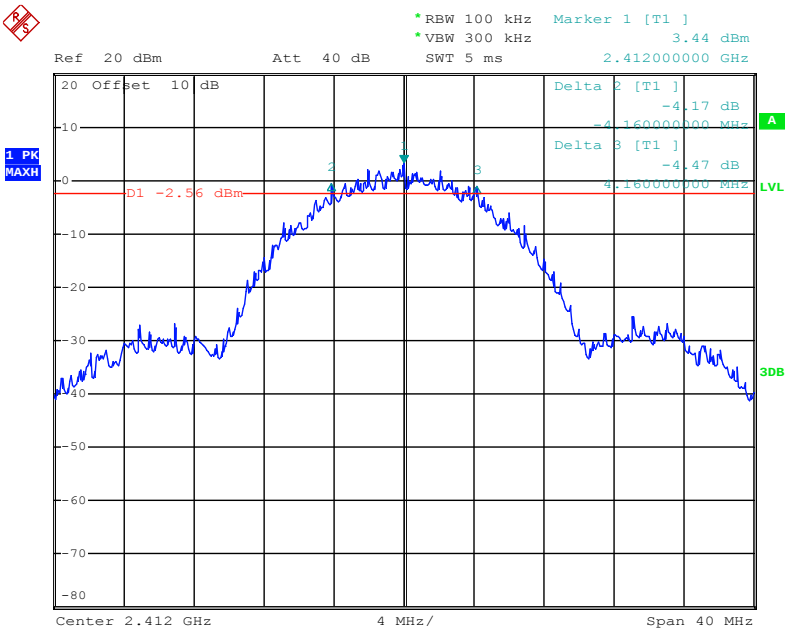
The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	15.12	> 0.5MHz
Middle	2437	15.64	> 0.5MHz
High	2462	15.76	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 40 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2422	35.68	> 0.5MHz
Middle	2437	35.84	> 0.5MHz
High	2452	35.52	> 0.5MHz

The spectrum analyzer plots are attached as below.

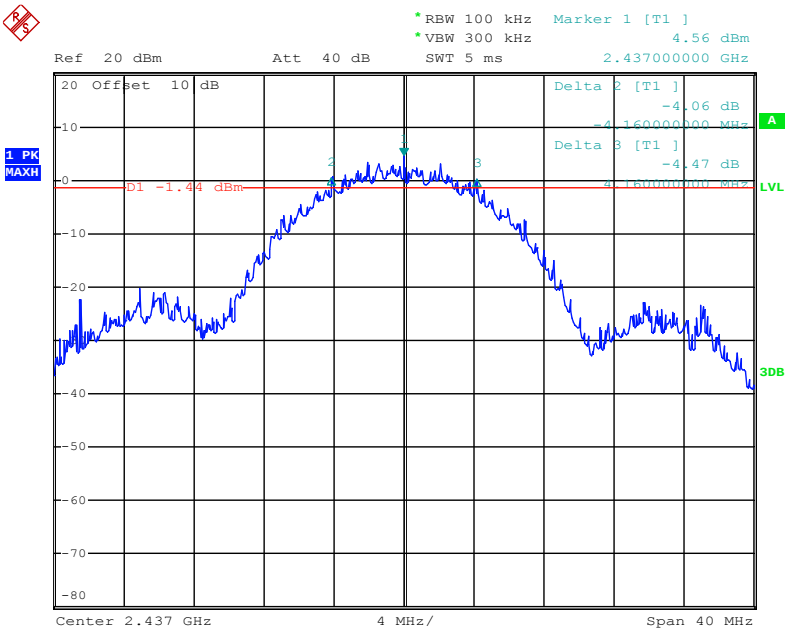
6dB Bandwidth

802.11b Channel Low 2412MHz



Date: 22.MAY.2019 09:31:01

802.11b Channel Middle 2437MHz



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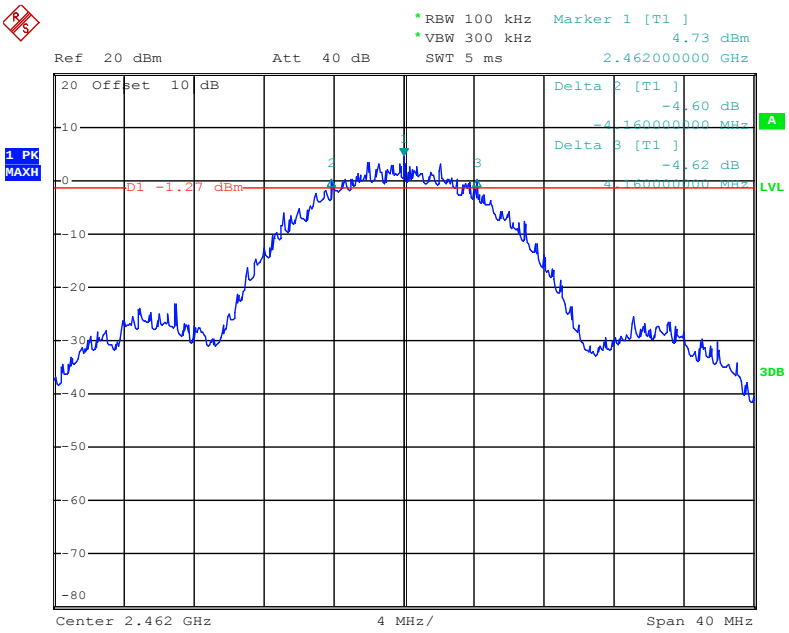
802.11b Channel High 2462MHz



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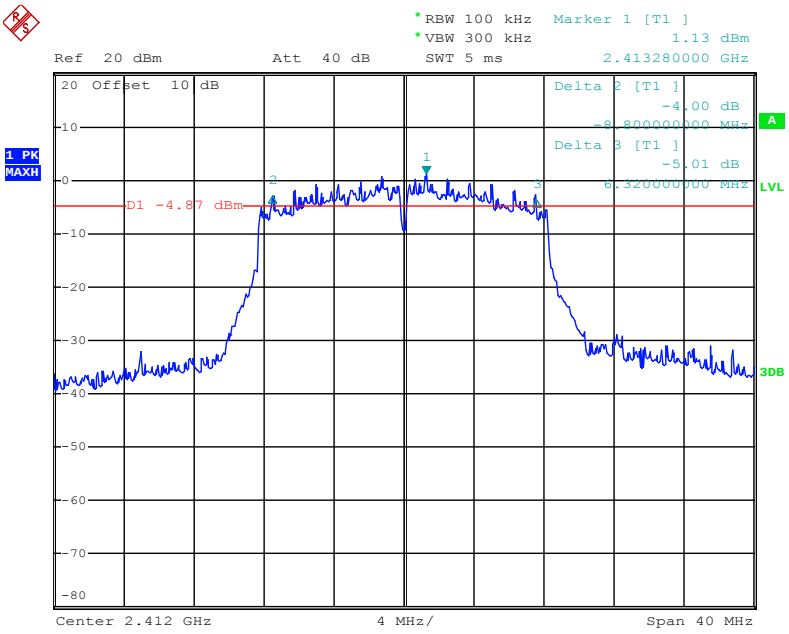
802.11g Channel Low 2412MHz



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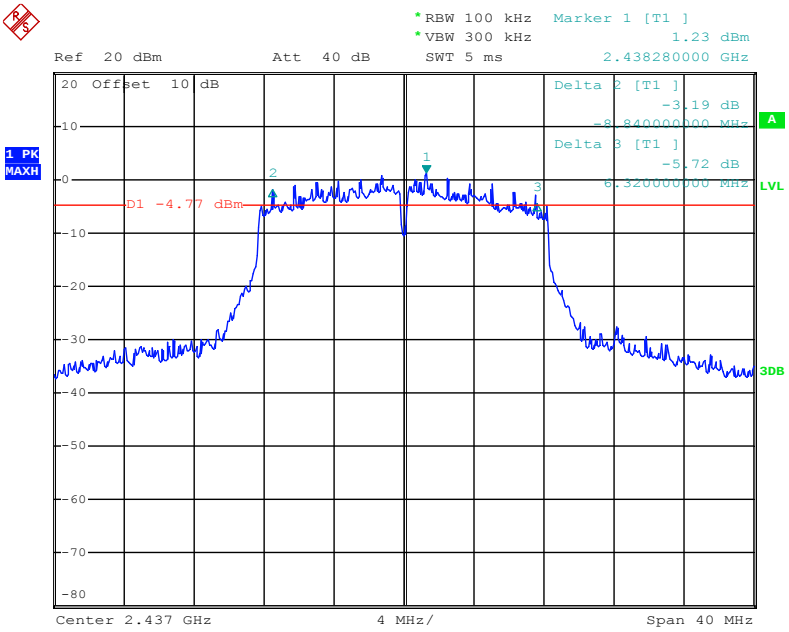
802.11g Channel Middle 2437MHz



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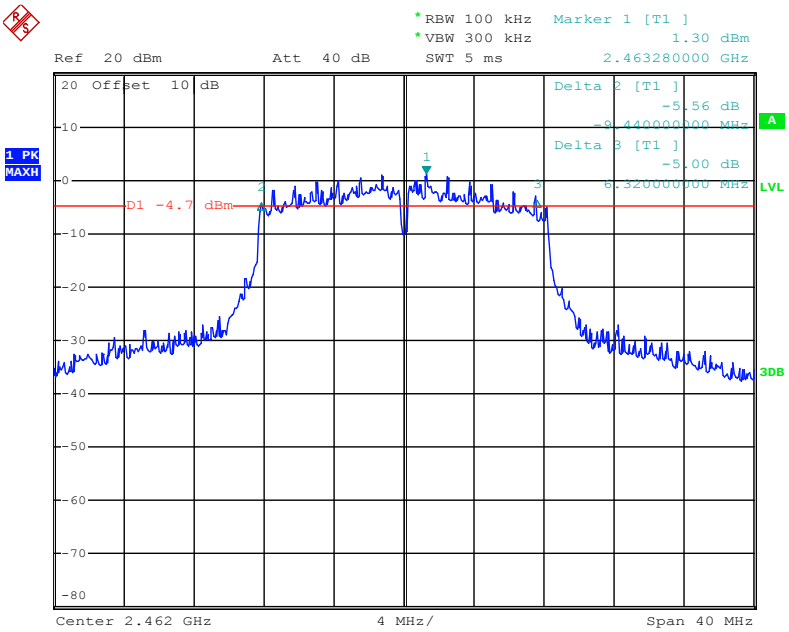
802.11g Channel High 2462MHz



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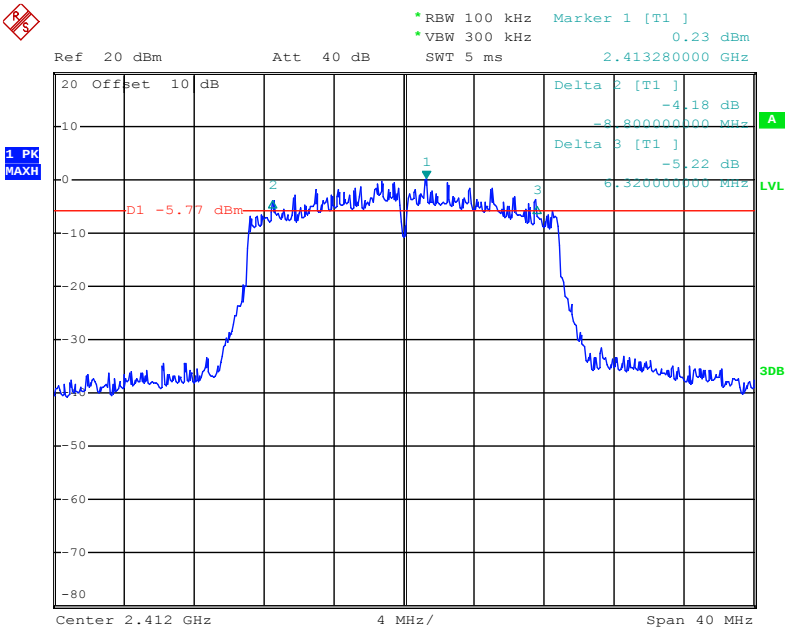
802.11n Channel Low 2412MHz (20MHz)



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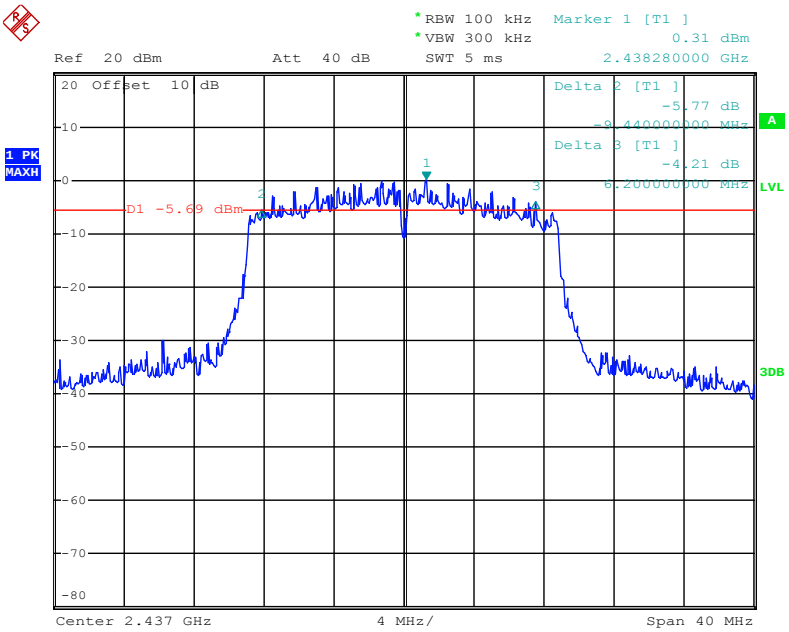
802.11n Channel Middle 2437MHz(20MHz)



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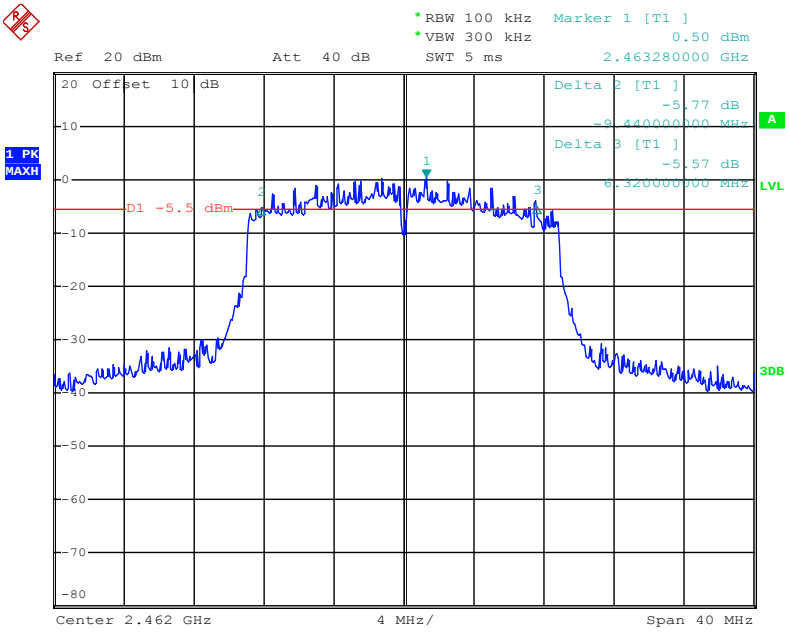
802.11n Channel High 2462MHz(20MHz)



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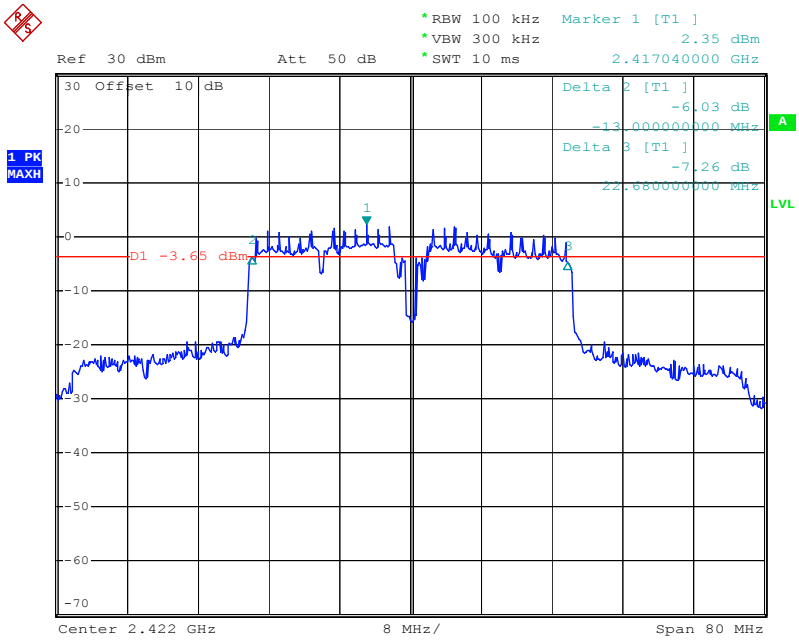
802.11n Channel Low 2422MHz (40MHz)



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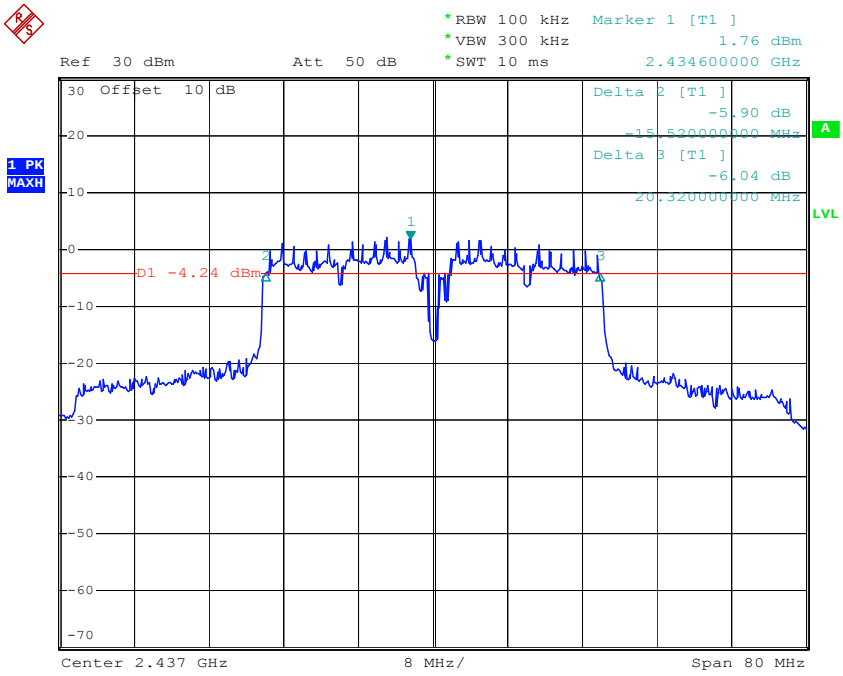
802.11n Channel Middle 2437MHz(40MHz)



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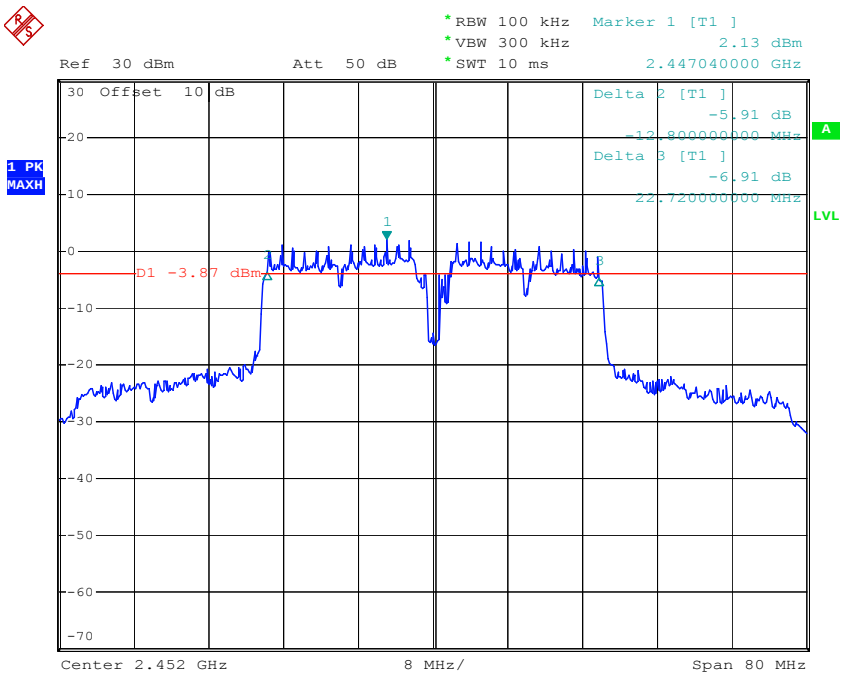
802.11n Channel High 2452MHz(40MHz)



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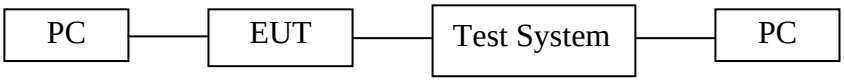
6. 99% OCCUPIED BANDWIDTH

6.1.Block Diagram of Test Setup



6.2.EUT Configuration on Measurement

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

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

6.4.Test Procedure

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

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

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

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

6.5.Measurement Result

The test was performed with 802.11b		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	14.72
Middle	2437	14.88
High	2462	14.80

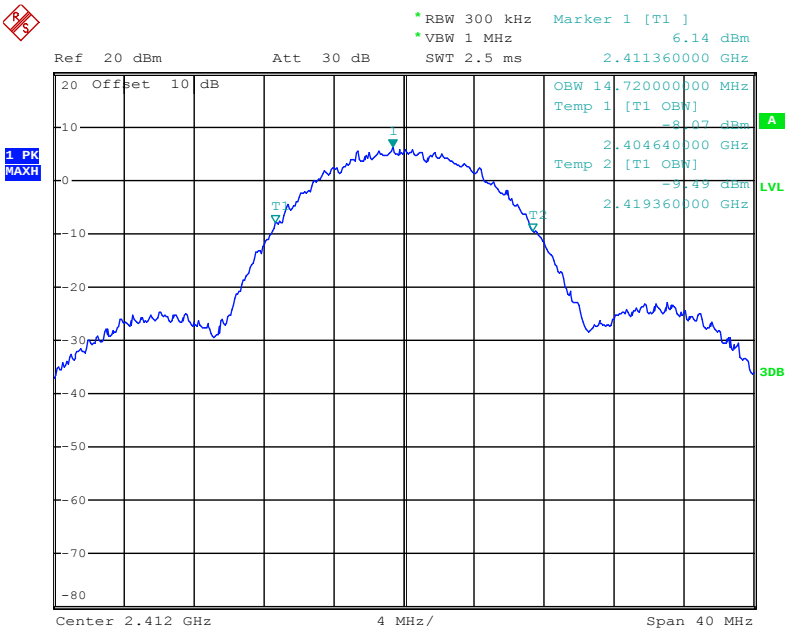
The test was performed with 802.11g		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	16.64
Middle	2437	16.72
High	2462	16.64

The test was performed with 802.11n (Bandwidth: 20 MHz)		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2412	17.68
Middle	2437	17.68
High	2462	17.68

The test was performed with 802.11n (Bandwidth: 40 MHz)		
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
Low	2422	36.00
Middle	2437	36.00
High	2452	36.00

The spectrum analyzer plots are attached as below.

802.11b Low Channel 2412MHz



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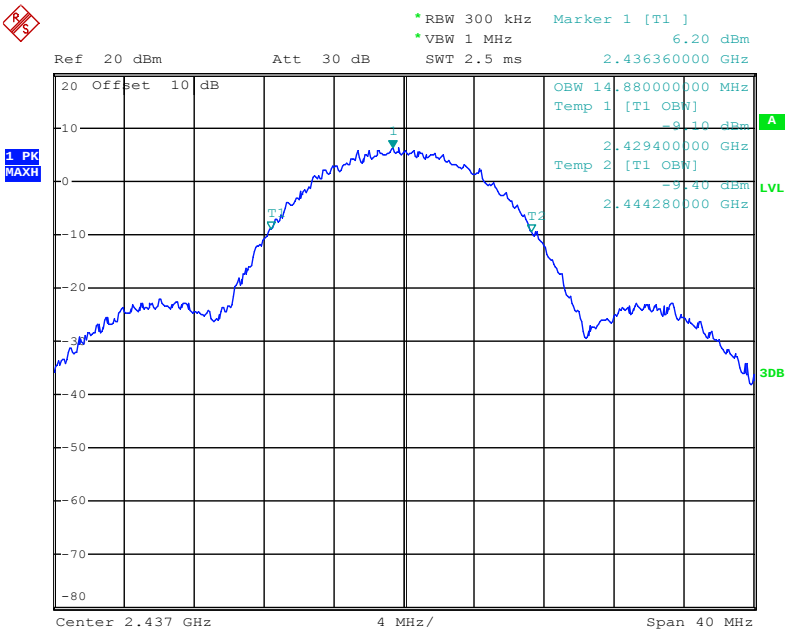
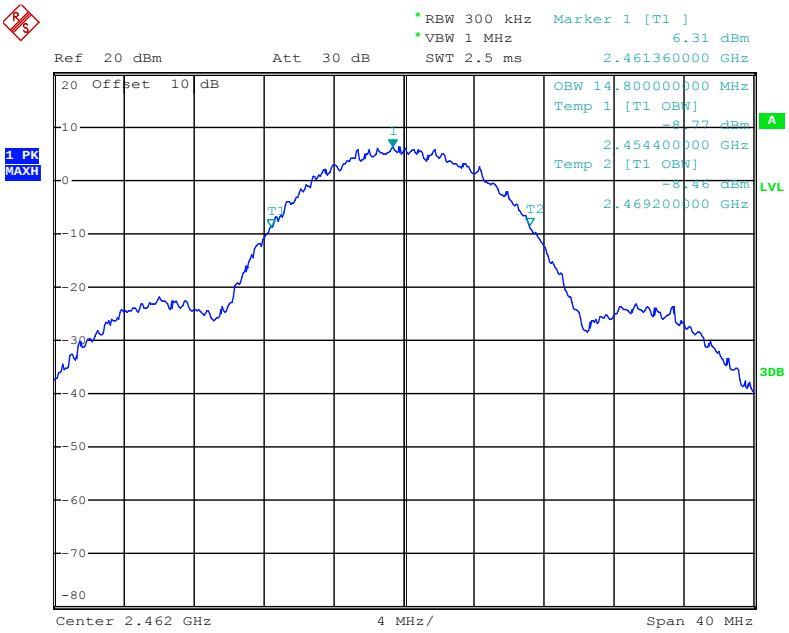
802.11b Middle Channel 2437MHz



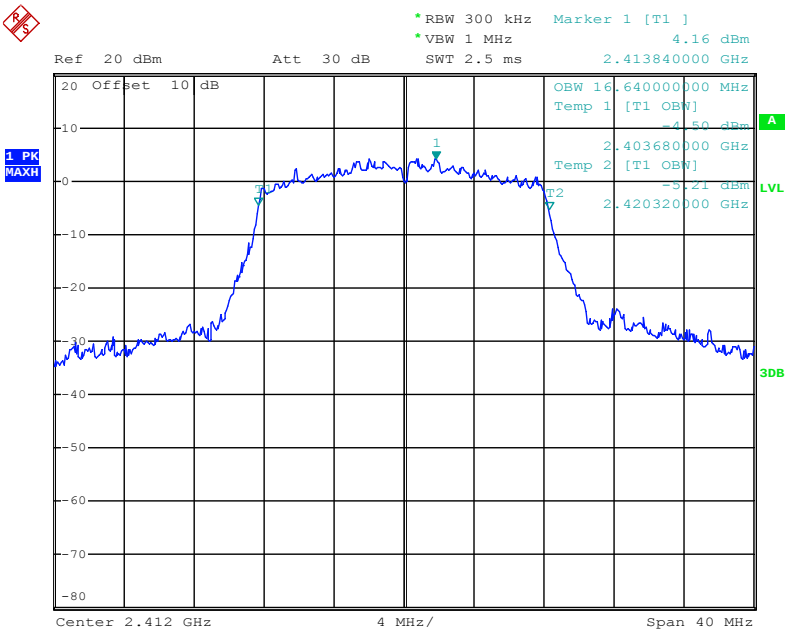
Date: 22.MAY.2019 09:59:02

802.11b High Channel 2462MHz



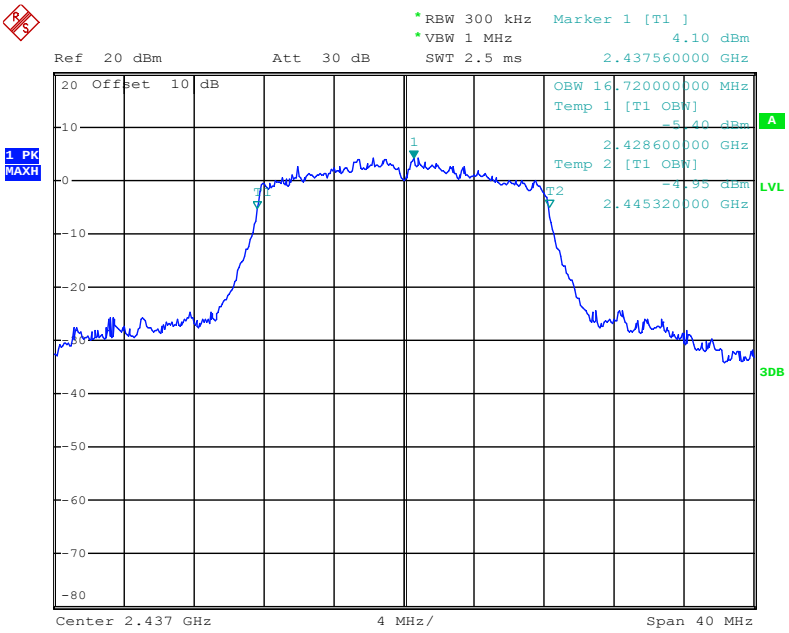
Date: 22.MAY.2019 09:58:22

802.11g Channel Low 2412MHz



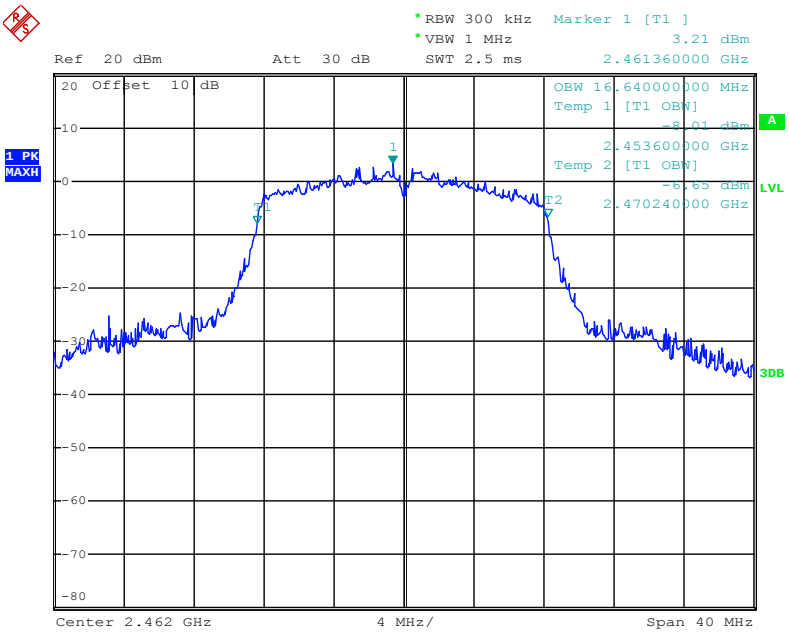
Date: 22.MAY.2019 09:56:25

802.11g Middle Channel 2437MHz



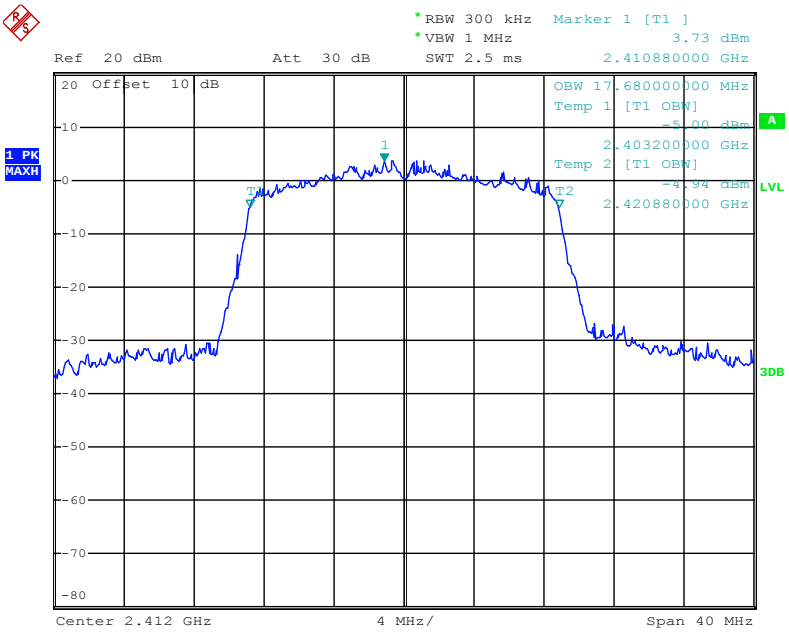
Date: 22.MAY.2019 09:57:09

802.11g High Channel 2462MHz



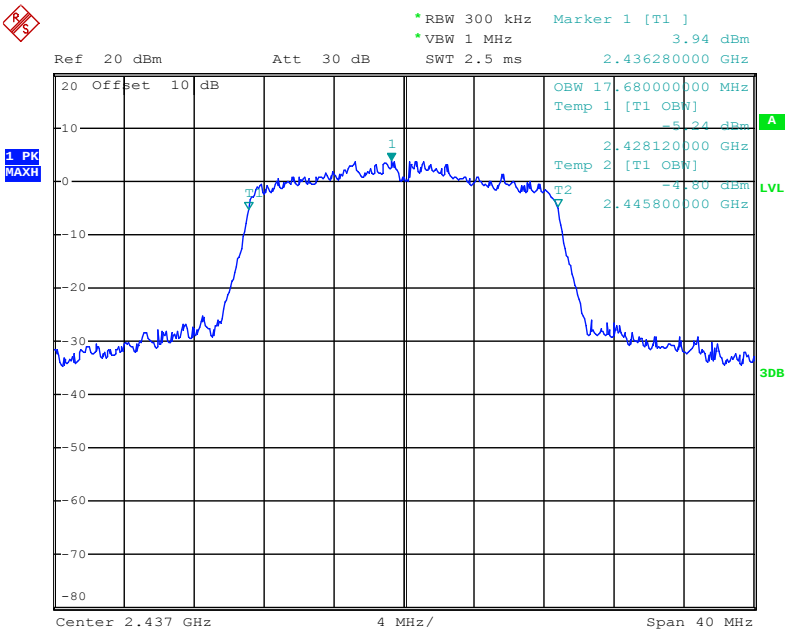
Date: 22.MAY.2019 09:57:46

802.11n(20MHz) Low Channel 2412MHz



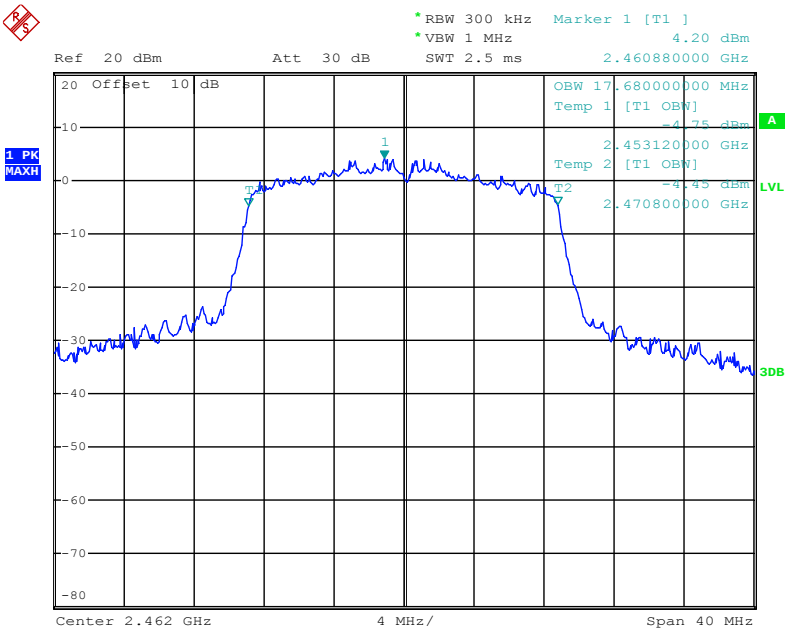
Date: 22.MAY.2019 09:55:40

802.11n(20MHz) Middle Channel 2437MHz



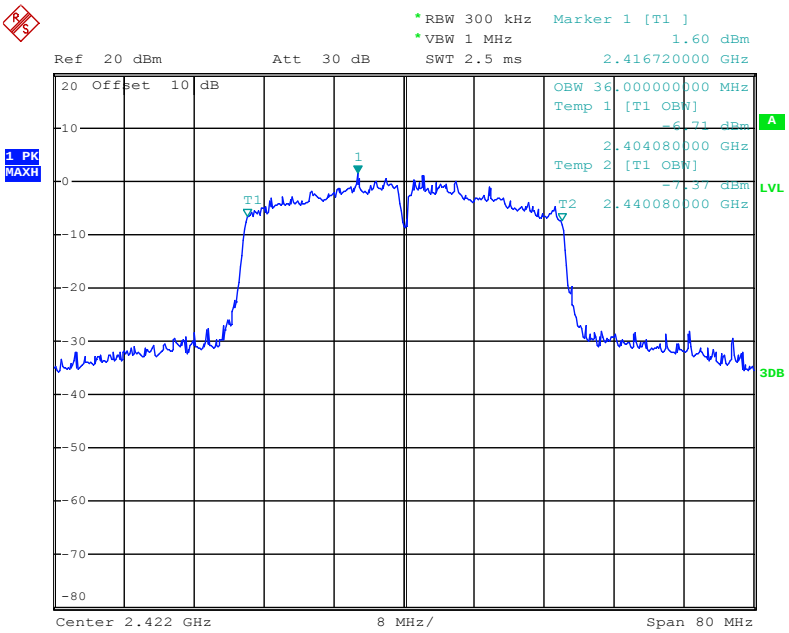
Date: 22.MAY.2019 09:55:07

802.11n(20MHz) High Channel 2462MHz



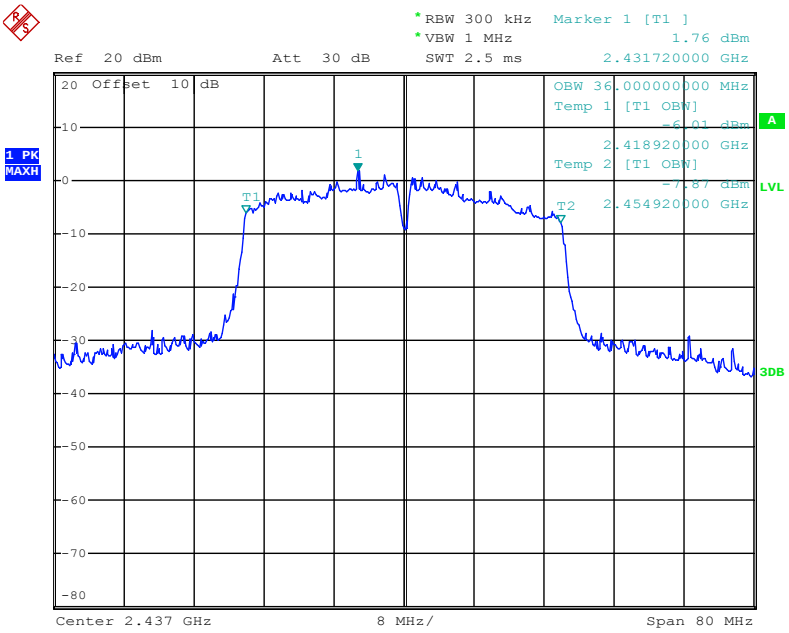
Date: 22.MAY.2019 09:54:14

802.11n(40MHz) Low Channel 2422MHz



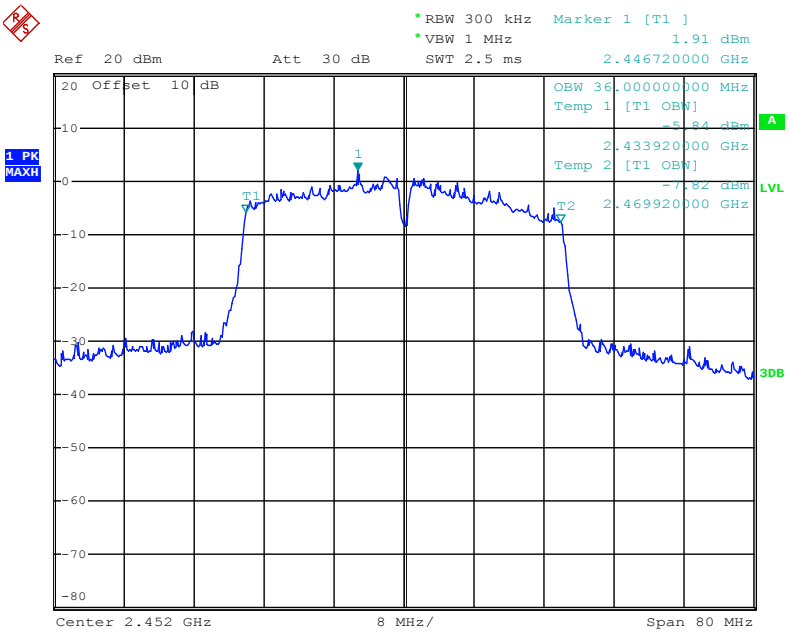
Date: 22.MAY.2019 09:50:32

802.11n(40MHz) Middle Channel 2437MHz



Date: 22.MAY.2019 09:51:49

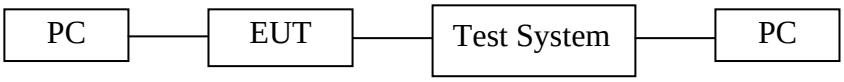
802.11n(40MHz) High Channel 2452MHz



Date: 22.MAY.2019 09:53:05

7. DUTY CYCLE MEASUREMENT

7.1.Block Diagram of Test Setup



7.2.EUT Configuration on Measurement

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

7.3.Operating Condition of EUT

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

7.3.2.Turn on the power of all equipment.

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

7.4.Test Procedure

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

7.5.Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	94.1%	0.264

The test was performed with 802.11g			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	75.2%	1.238

The test was performed with 802.11n20			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	69.1%	1.605

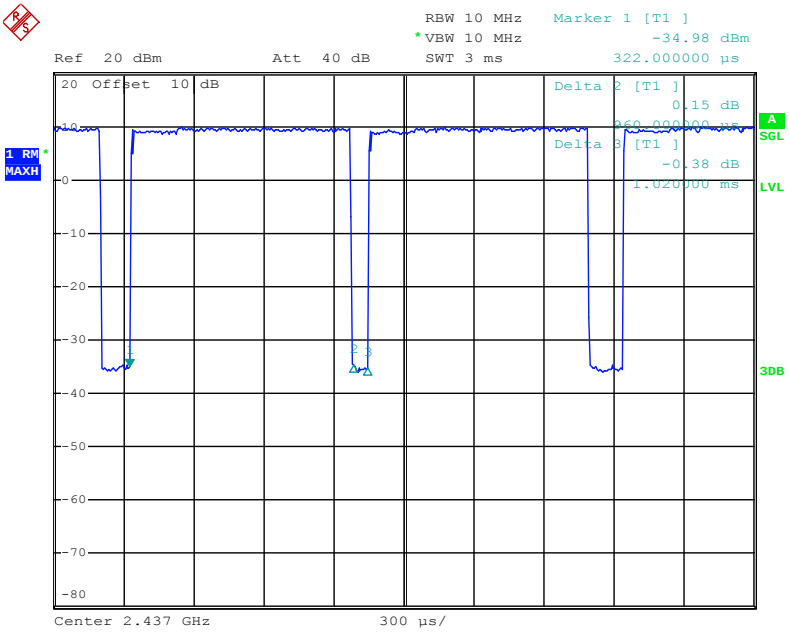
The test was performed with 802.11n40			
Channel	Frequency (MHz)	duty cycle(x)	10log(1/x)
Middle	2437	60.5%	2.182

Note: The duty cycle's parameter settings for each mode(802.11b,g,n) are the same, Therefore, other channels can refer to the test data of the middle channel.

The spectrum analyzer plots are attached as below.

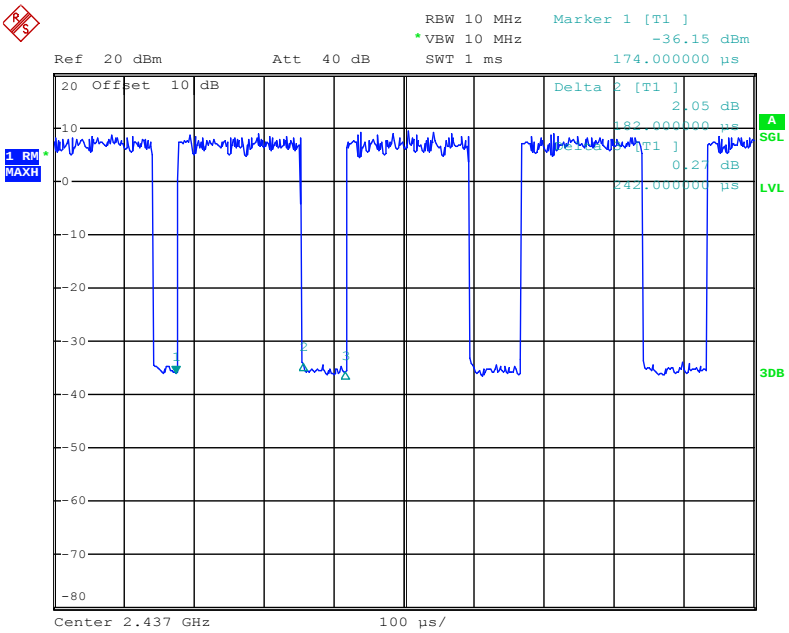
Duty cycle

802.11b Channel Middle 2437MHz



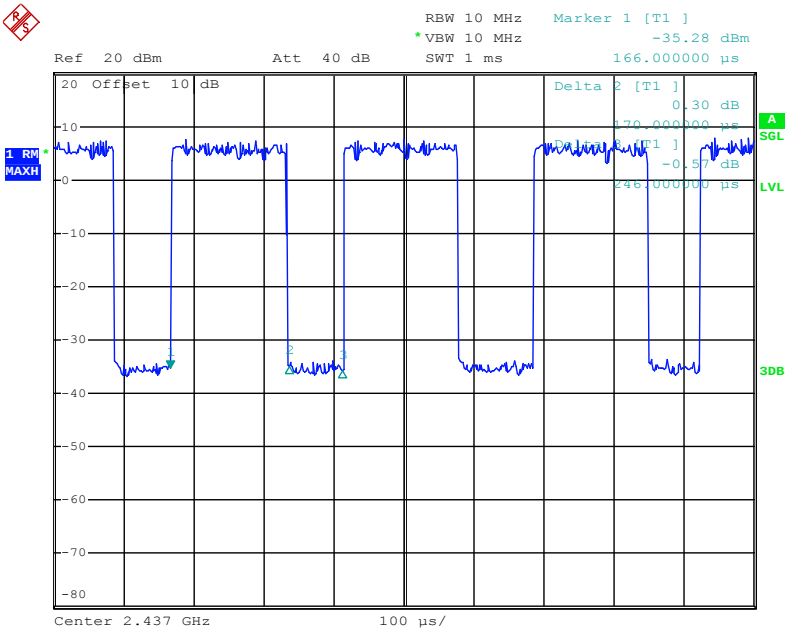
Date: 22.MAY.2019 10:25:30

802.11g Channel Middle 2437MHz



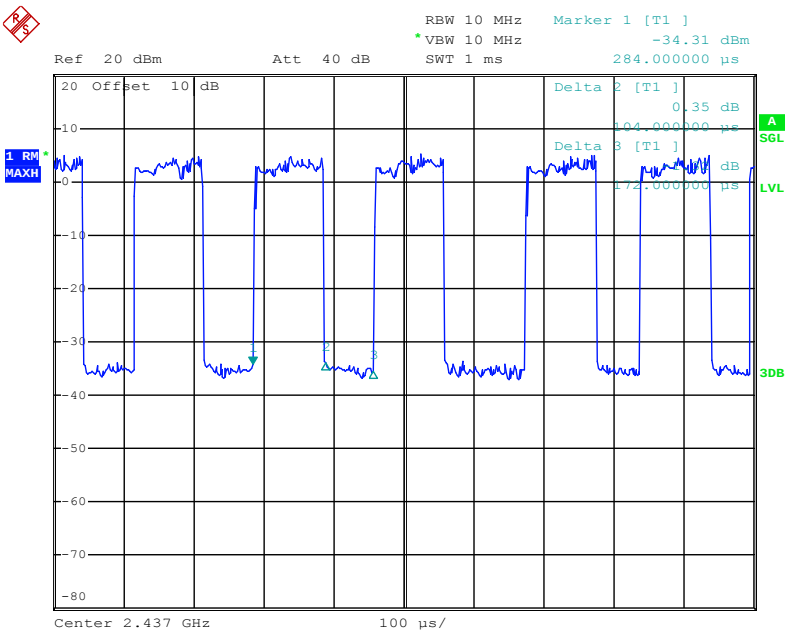
Date: 22.MAY.2019 10:26:39

802.11n20 Channel Middle 2437MHz



Date: 22.MAY.2019 10:31:34

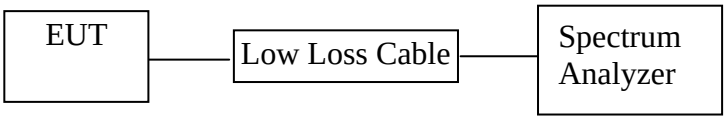
802.11n40 Channel Middle 2437MHz



Date: 22.MAY.2019 10:33:46

8. POWER SPECTRAL DENSITY TEST

8.1.Block Diagram of Test Setup



8.2.The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

8.3.EUT Configuration on Measurement

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

8.4.Operating Condition of EUT

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

8.4.2.Turn on the power of all equipment.

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

8.5.Test Procedure

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

8.5.2.Measurement Procedure PKPSD:

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

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW 3 kHz $\leqslant$ RBW $\leqslant$ 100 kHz.

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

8.5.3.Measurement the maximum power spectral density.

8.6.Test Result

PASS

Note: We have recorded the worst case value in the report.

The test was performed with 802.11b					
Channel	Frequency (MHz)	Power Spectral Density(dBm)	10log(1/ duty cycle)	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2412	-20.03	0.264	-19.766	8 dBm
Middle	2437	-19.88	0.264	-19.616	8 dBm
High	2462	-20.34	0.264	-20.076	8 dBm

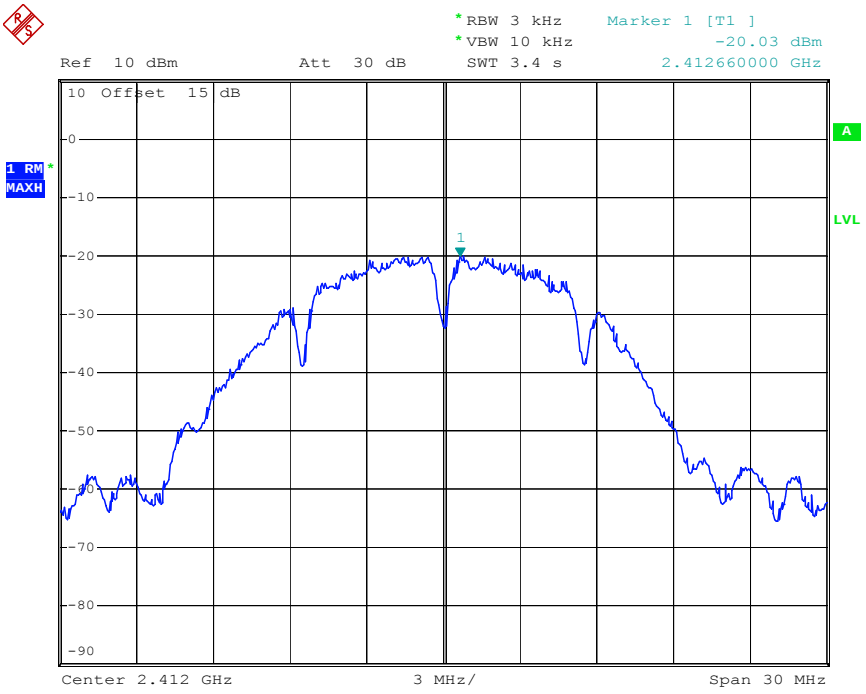
The test was performed with 802.11g					
Channel	Frequency (MHz)	Power Spectral Density(dBm)	10log(1/ duty cycle)	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2412	-22.77	1.238	-21.532	8 dBm
Middle	2437	-22.51	1.238	-21.272	8 dBm
High	2462	-22.37	1.238	-21.132	8 dBm

The test was performed with 802.11n(20MHz)					
Channel	Frequency (MHz)	Power Spectral Density(dBm)	10log(1/ duty cycle)	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2412	-22.80	1.605	-21.195	8 dBm
Middle	2437	-22.79	1.605	-21.185	8 dBm
High	2462	-22.53	1.605	-20.925	8 dBm

The test was performed with 802.11n(40MHz)					
Channel	Frequency (MHz)	Power Spectral Density(dBm)	10log(1/ duty cycle)	Final Power Spectral Density(dBm)	Limits (dBm)
Low	2422	-29.24	2.182	-27.058	8 dBm
Middle	2437	-28.59	2.182	-26.408	8 dBm
High	2452	-27.75	2.182	-25.568	8 dBm

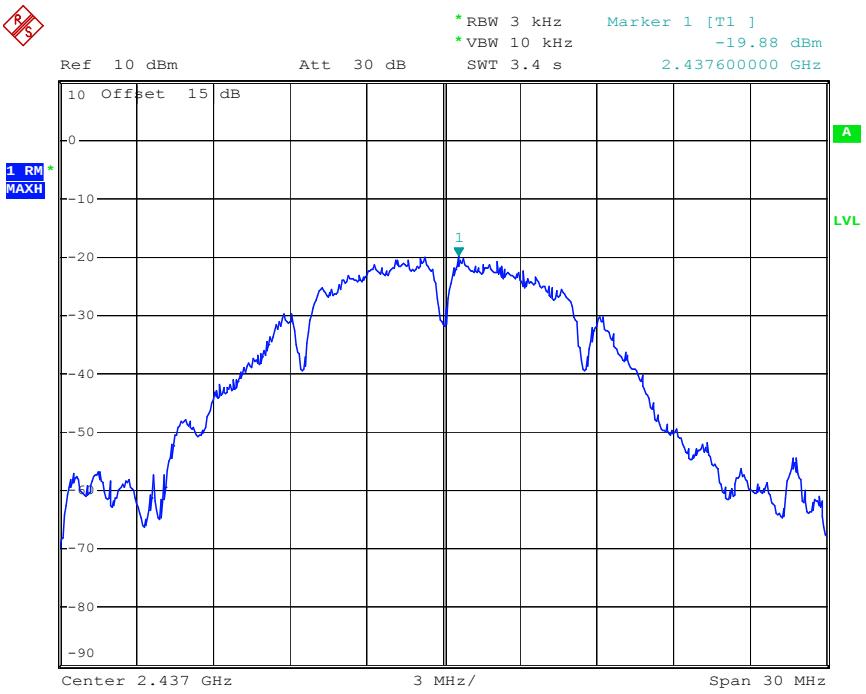
The spectrum analyzer plots are attached as below.

802.11b Low Channel 2412MHz



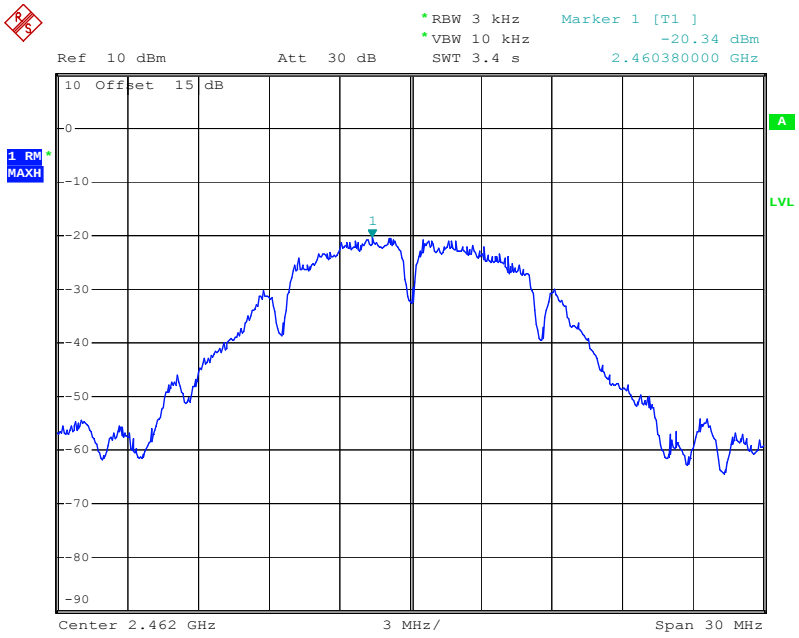
Date: 6.AUG.2019 13:41:22

802.11b Middle Channel 2437MHz



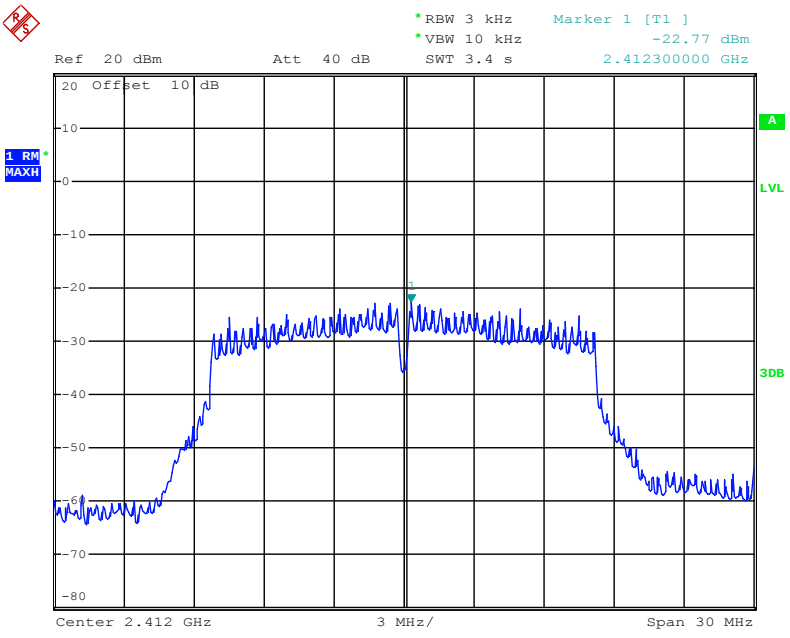
Date: 6.AUG.2019 13:41:49

802.11b High Channel 2462MHz



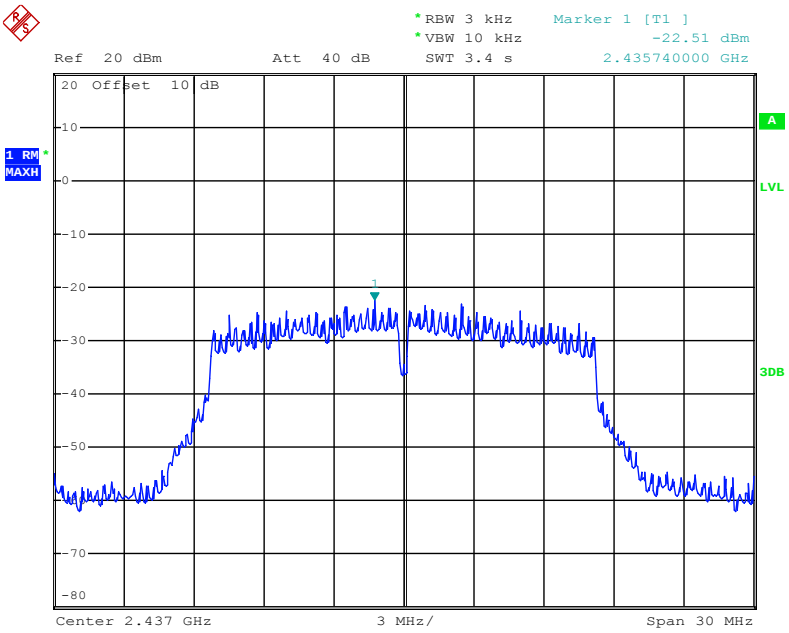
Date: 6.AUG.2019 13:42:10

802.11g Low Channel 2412MHz



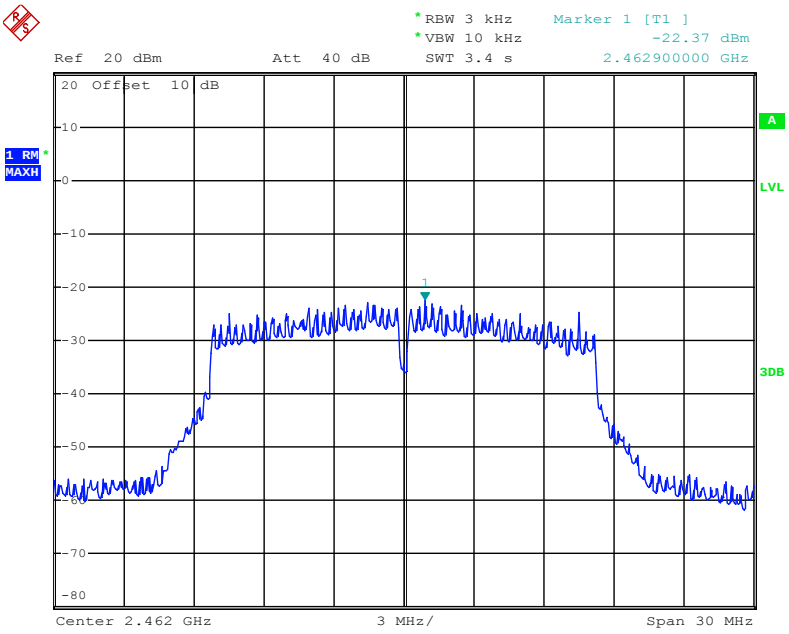
Date: 22.MAY.2019 10:17:37

802.11g Middle Channel 2437MHz



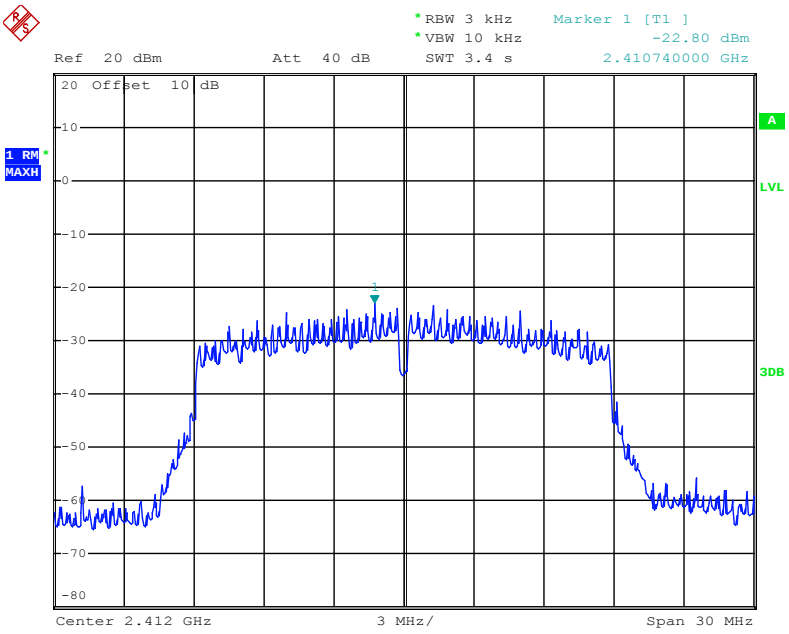
Date: 22.MAY.2019 10:18:06

802.11g High Channel 2462MHz



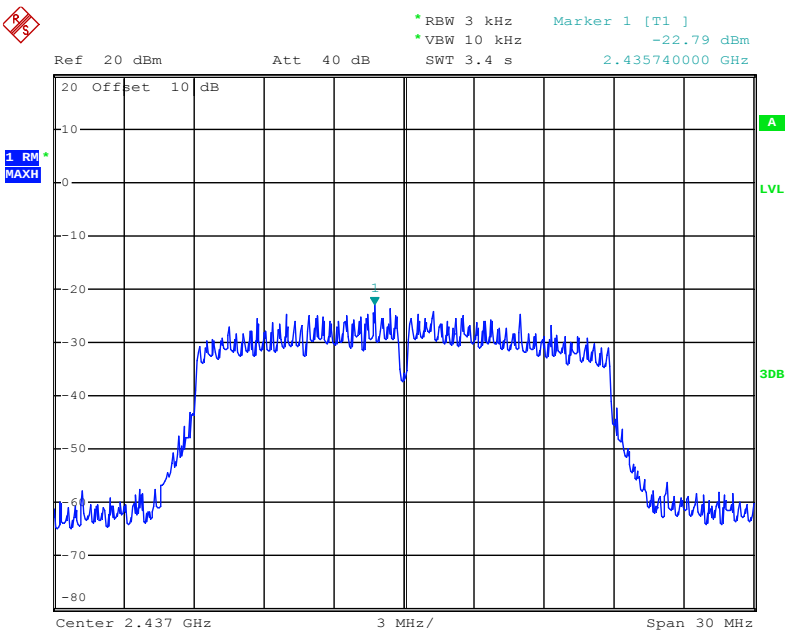
Date: 22.MAY.2019 10:18:33

802.11n(20MHz) Low Channel 2412MHz



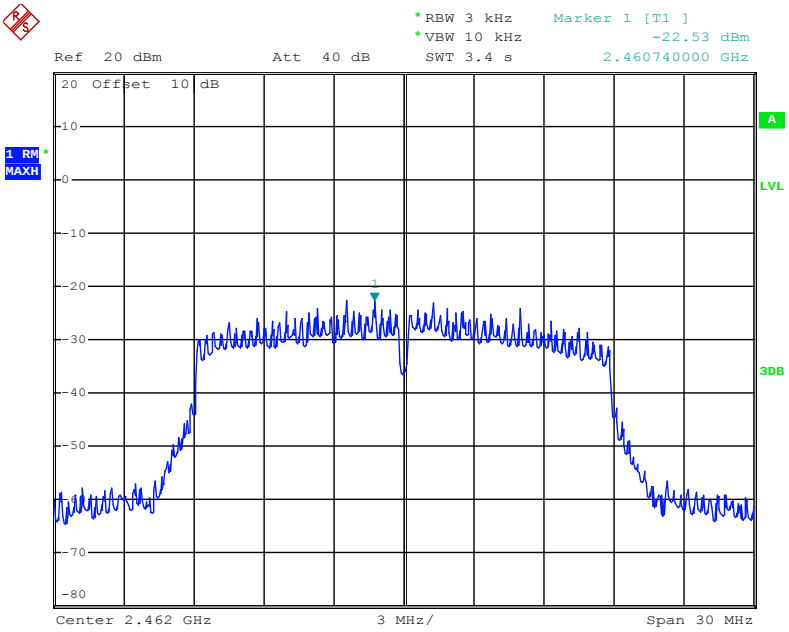
Date: 22.MAY.2019 10:17:12

802.11n(20MHz) Middle Channel 2437MHz



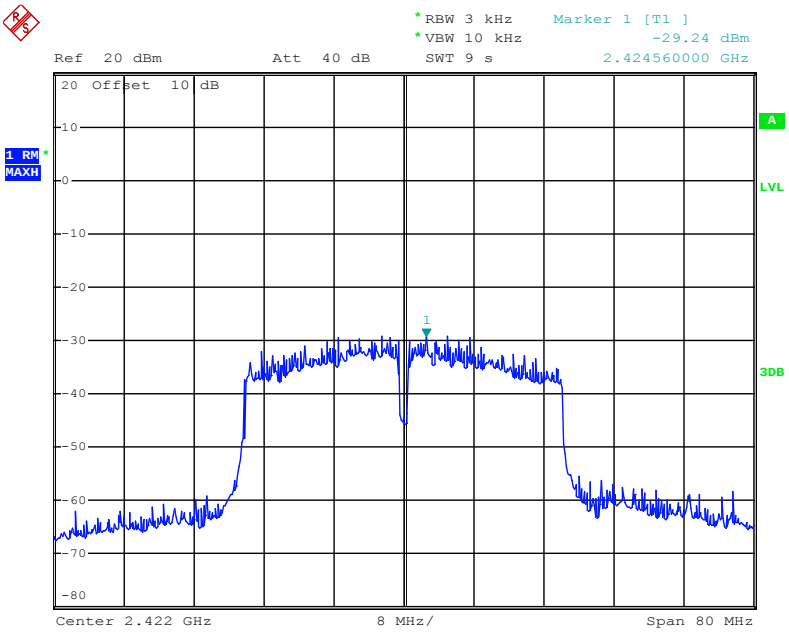
Date: 22.MAY.2019 10:16:44

802.11n(20MHz) High Channel 2462MHz



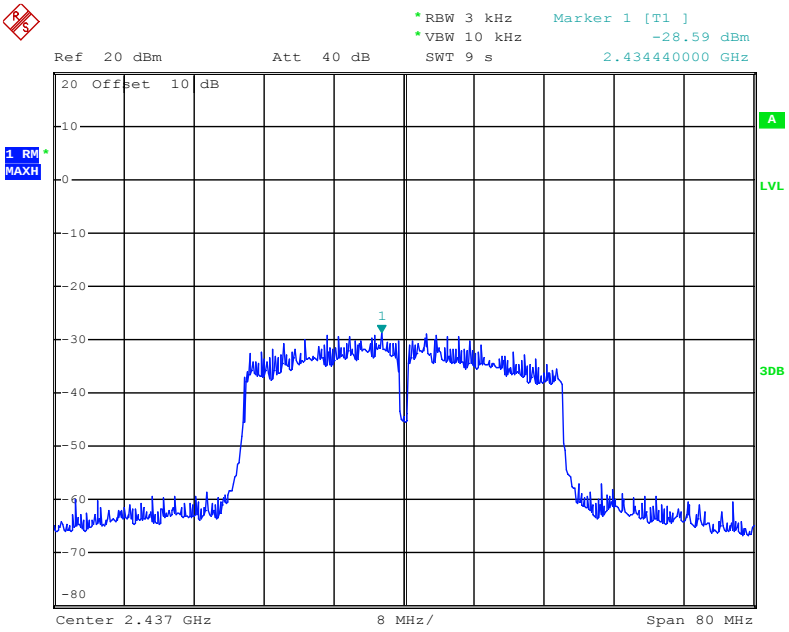
Date: 22.MAY.2019 10:16:14

802.11n(40MHz) Low Channel 2422MHz



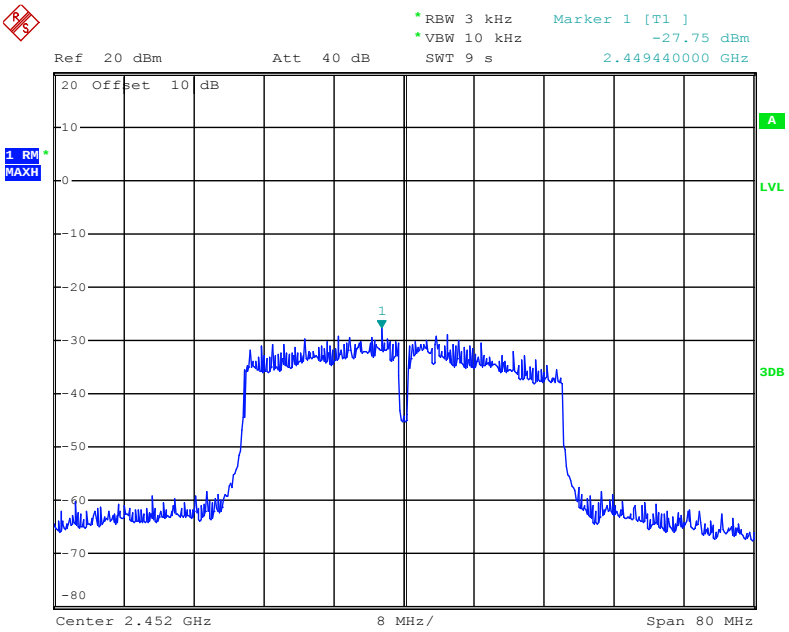
Date: 22.MAY.2019 10:13:23

802.11n(40MHz) Middle Channel 2437MHz



Date: 22.MAY.2019 10:14:14

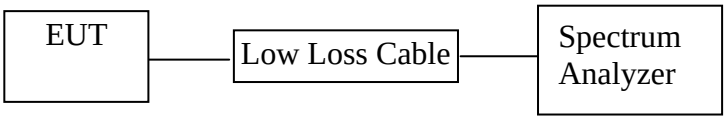
802.11n(40MHz) High Channel 2452MHz



Date: 22.MAY.2019 10:14:54

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 2412-2462MHz and 2422-2452MHz. We select low channel, middle channel and high channel of each frequency band to transmit.

9.5.Test Procedure

9.5.1.The EUT was tested according to DTS test procedure of April 02, 2019 KDB558074 D01 DTS Meas Guidance v0502 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

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

The test was performed with 802.11b					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2412	16.82	0.264	17.084	0.051	30 dBm / 1 W
2437	17.07	0.264	17.334	0.054	30 dBm / 1 W
2462	17.00	0.264	17.264	0.053	30 dBm / 1 W

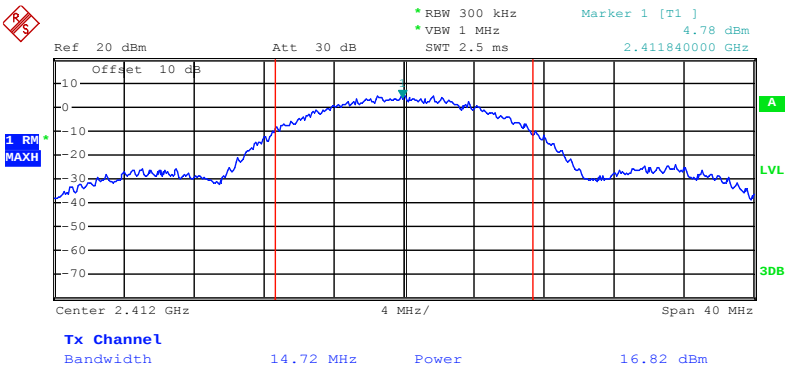
The test was performed with 802.11g					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2412	14.17	1.238	15.408	0.035	30 dBm / 1 W
2437	14.29	1.238	15.528	0.036	30 dBm / 1 W
2462	14.60	1.238	15.838	0.038	30 dBm / 1 W

The test was performed with 802.11n(20MHz)					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2412	13.62	1.605	15.225	0.033	30 dBm / 1 W
2437	13.80	1.605	15.405	0.035	30 dBm / 1 W
2462	14.17	1.605	15.775	0.038	30 dBm / 1 W

The test was performed with 802.11n(40MHz)					
Frequency (MHz)	Ave output power (dBm)	10log(1/ duty cycle)	Final power (dBm)	Final power (W)	FCC Limits dBm / W
2422	13.53	2.182	15.712	0.037	30 dBm / 1 W
2437	13.46	2.182	15.642	0.037	30 dBm / 1 W
2452	13.71	2.182	15.892	0.039	30 dBm / 1 W

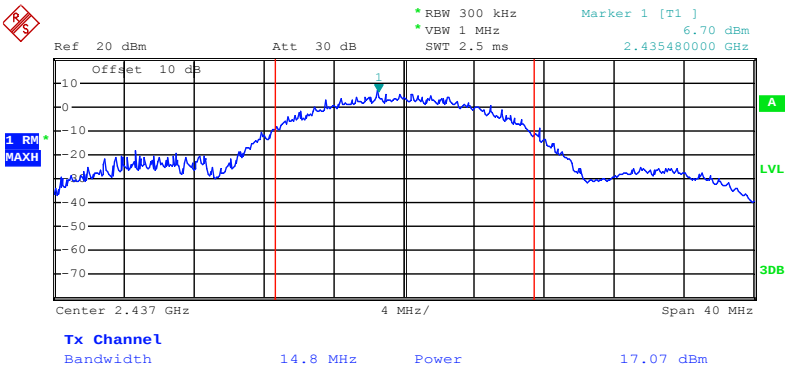
The spectrum analyzer plots are attached as below.

802.11b Low Channel 2412MHz



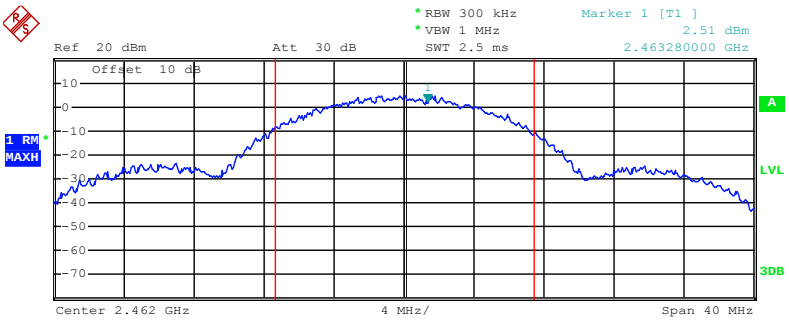
Date: 22.MAY.2019 10:46:56

802.11b Middle Channel 2437MHz



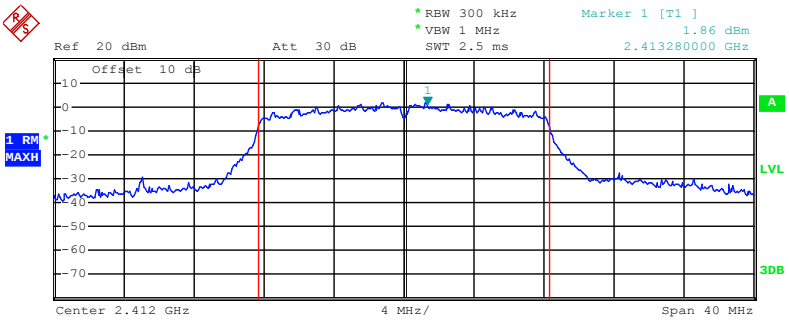
Date: 22.MAY.2019 10:45:48

802.11b High Channel 2462MHz



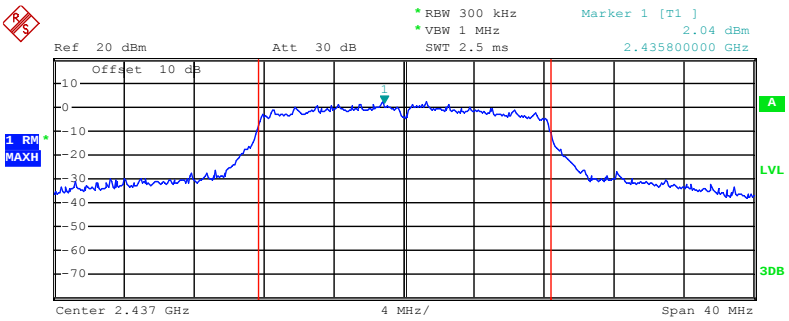
Date: 22.MAY.2019 10:45:03

802.11g Low Channel 2412MHz



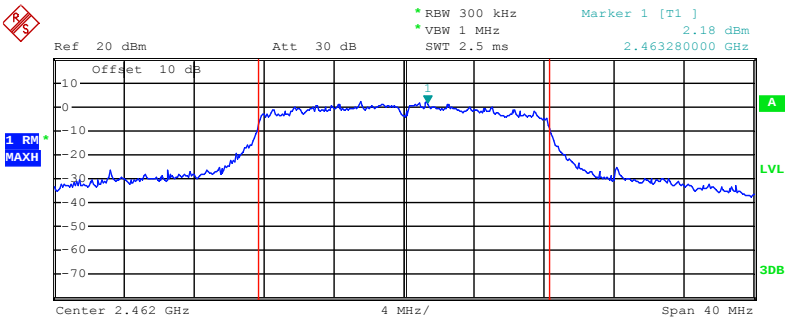
Date: 22.MAY.2019 10:41:59

802.11g Middle Channel 2437MHz



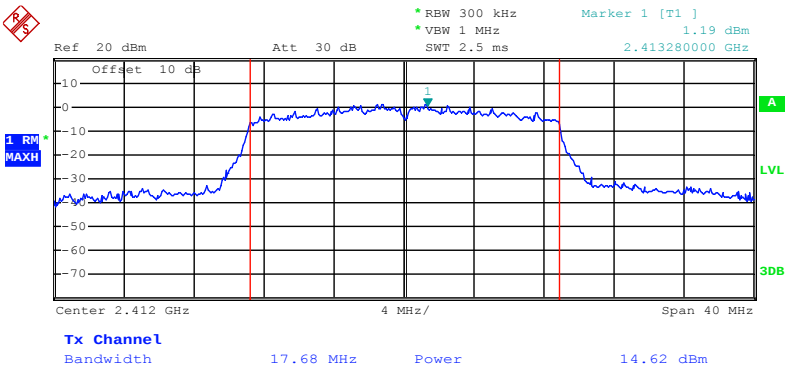
Date: 22.MAY.2019 10:42:58

802.11g High Channel 2462MHz



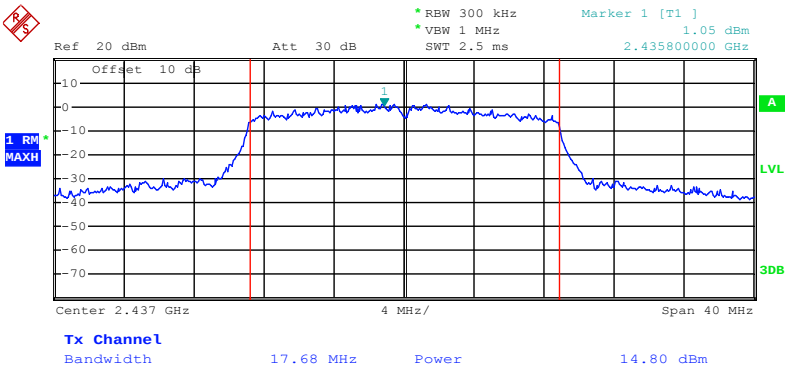
Date: 22.MAY.2019 10:44:02

802.11n(20MHz) Low Channel 2412MHz



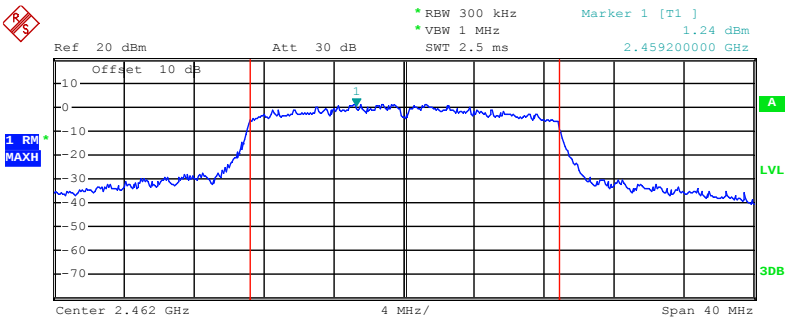
Date: 22.MAY.2019 10:40:59

802.11n(20MHz) Middle Channel 2437MHz



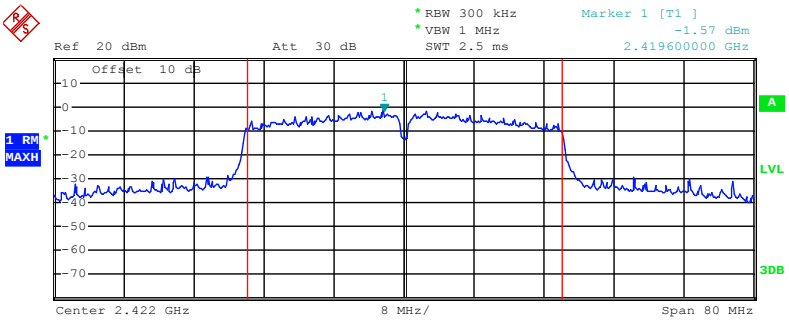
Date: 22.MAY.2019 10:40:25

802.11n(20MHz) High Channel 2462MHz



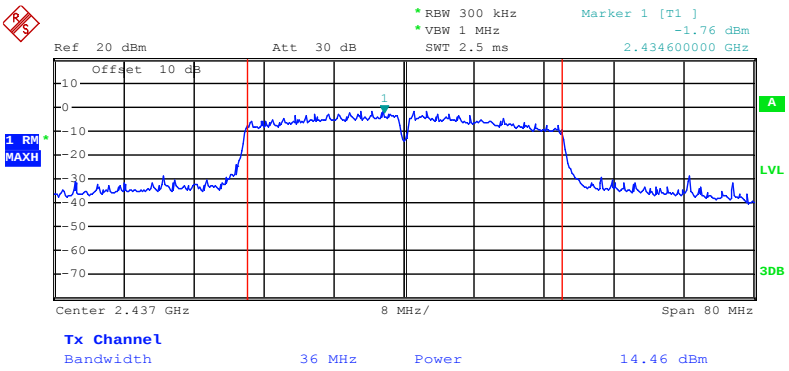
Date: 22.MAY.2019 10:39:24

802.11n(40MHz) Low Channel 2422MHz



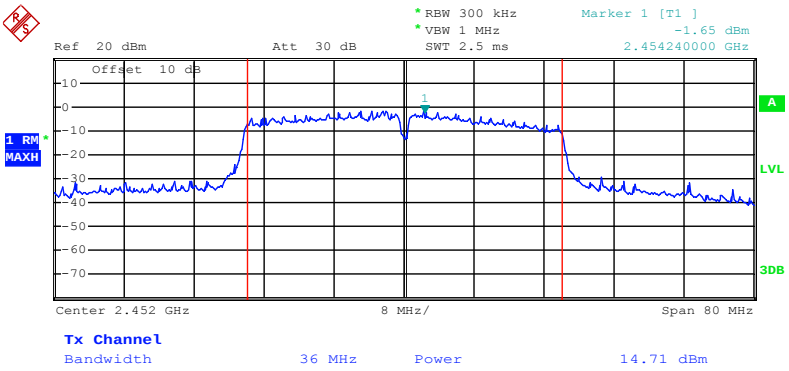
Date: 22.MAY.2019 10:37:20

802.11n(40MHz) Middle Channel 2437MHz



Date: 22.MAY.2019 10:36:46

802.11n(40MHz) High Channel 2452MHz



Date: 22.MAY.2019 10:37:58

10.RADIATED SPURIOUS EMISSION TEST

10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

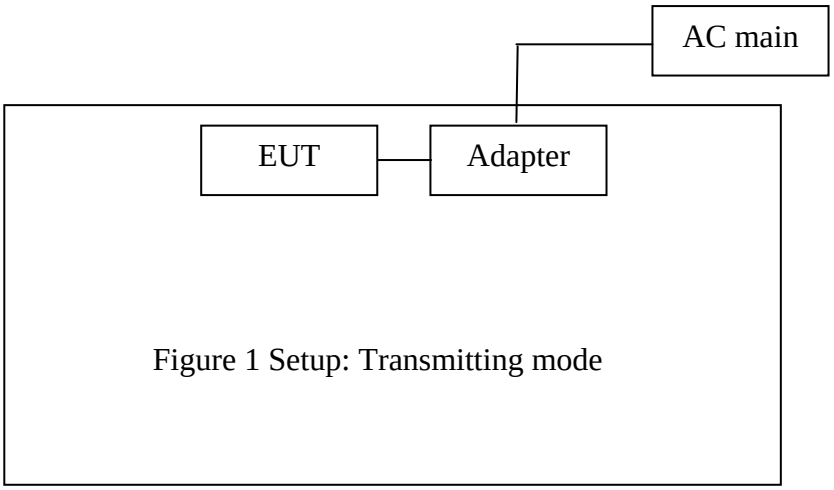
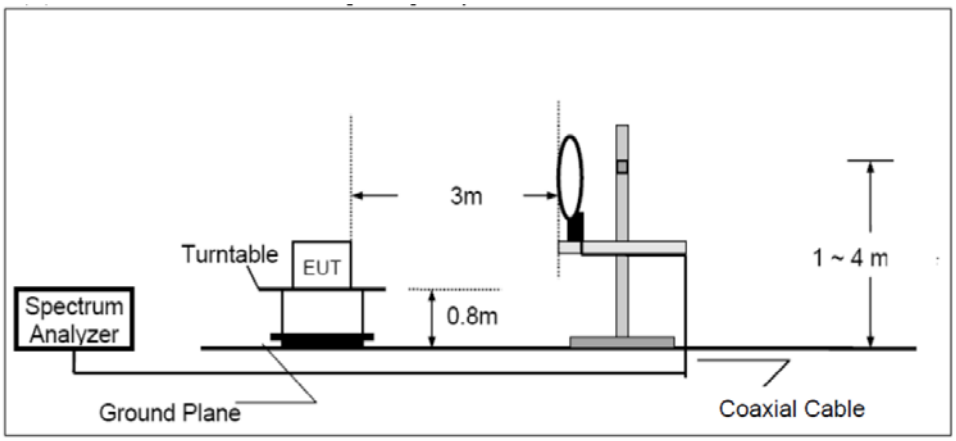


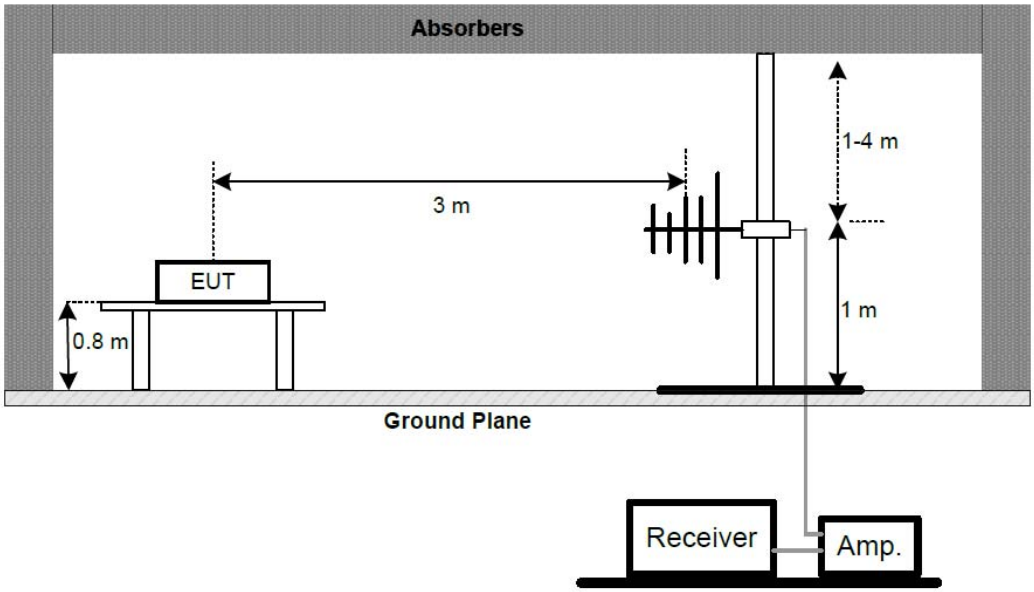
Figure 1 Setup: Transmitting mode

10.1.2.Semi-Anechoic Chamber Test Setup Diagram

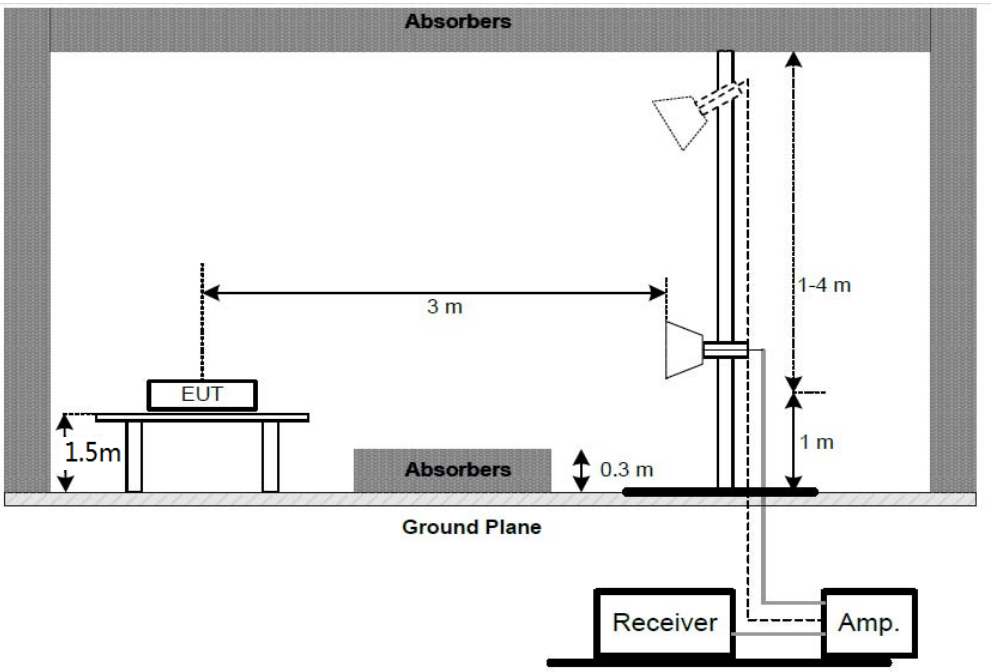
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



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



Above 1GHz:



10.2.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).

10.3.Restricted bands of operation

10.3.1.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.

10.4.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.

10.5.Operating Condition of EUT

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

10.5.2.Turn on the power of all equipment.

10.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462MHz and 2422-2452MHz. We select low channel, middle channel and high channel of each frequency range to transmit.

10.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

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

The frequency range from 30MHz to 25000MHz is checked.
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain
During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions

are reported.

10.7.The Field Strength of Radiation Emission Measurement Results

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

2. *: Denotes restricted band of operation.

3. The EUT is tested radiation emission at each test mode (802.11b/g/n) in three axes. The worst emissions are reflected in the following plots.

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

5. The average measurement was not performed when peak measured data under the limit of average detection.

Below 1G

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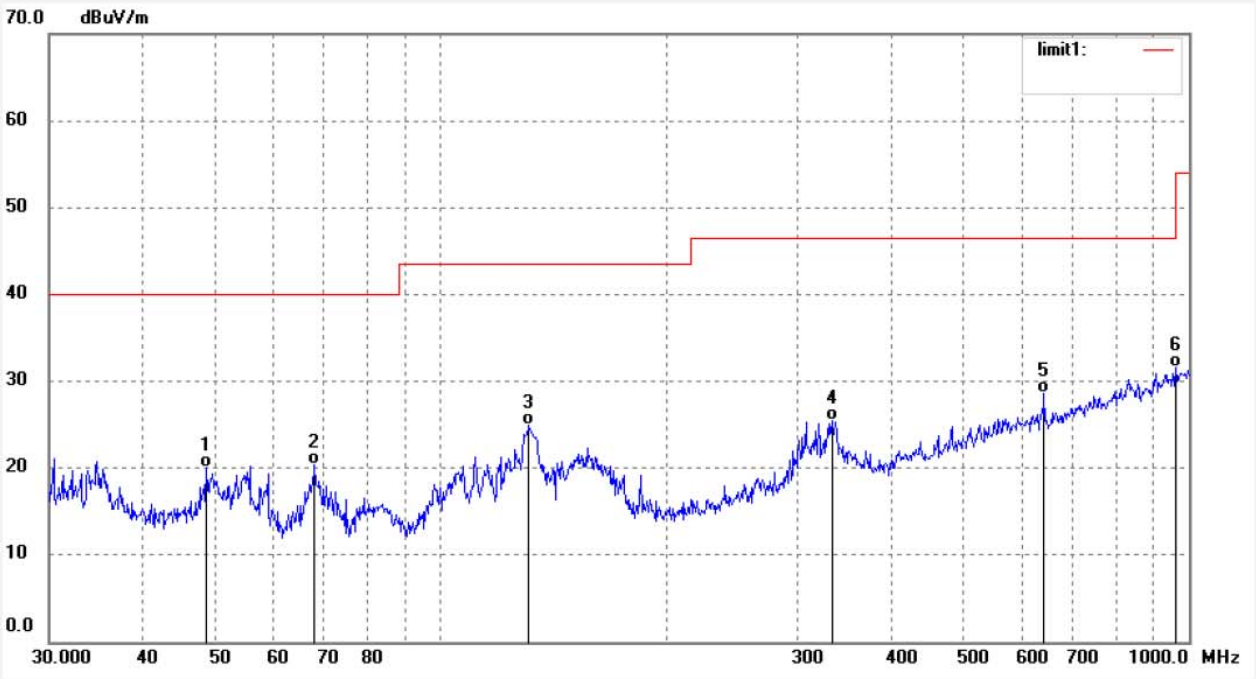
Job No.: FRANK2019-W #110
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Smart Desk Lamp
Mode: TX Channel 1(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 9/15/01
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	48.6719	32.61	-12.59	20.02	40.00	-19.98	QP	200	193	
2	67.9128	36.34	-15.91	20.43	40.00	-19.57	QP	200	320	
3	131.2965	38.83	-13.82	25.01	43.50	-18.49	QP	200	112	
4	333.6865	33.37	-7.97	25.40	46.50	-21.10	QP	200	82	
5	640.6109	30.45	-1.90	28.55	46.50	-17.95	QP	200	119	
6	962.1622	28.34	3.33	31.67	54.00	-22.33	QP	200	301	

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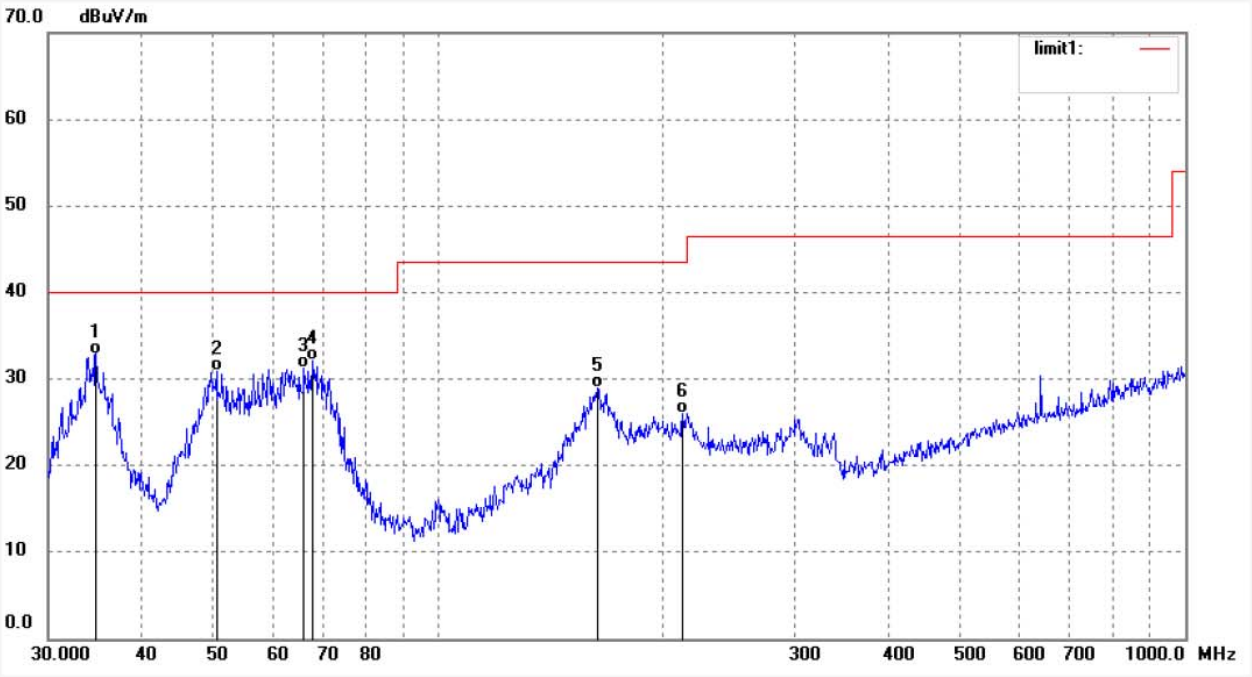
Job No.: FRANK2019-W #109
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Smart Desk Lamp
Mode: TX Channel 1(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 9/14/35
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	34.6385	43.19	-10.32	32.87	40.00	-7.13	QP	100	103	
2	50.4089	43.46	-12.62	30.84	40.00	-9.16	QP	100	93	
3	66.0341	47.09	-15.77	31.32	40.00	-8.68	QP	100	112	
4	67.6751	48.04	-15.89	32.15	40.00	-7.85	QP	100	107	
5	163.1818	43.32	-14.35	28.97	43.50	-14.53	QP	100	85	
6	212.2694	37.87	-11.85	26.02	43.50	-17.48	QP	100	66	

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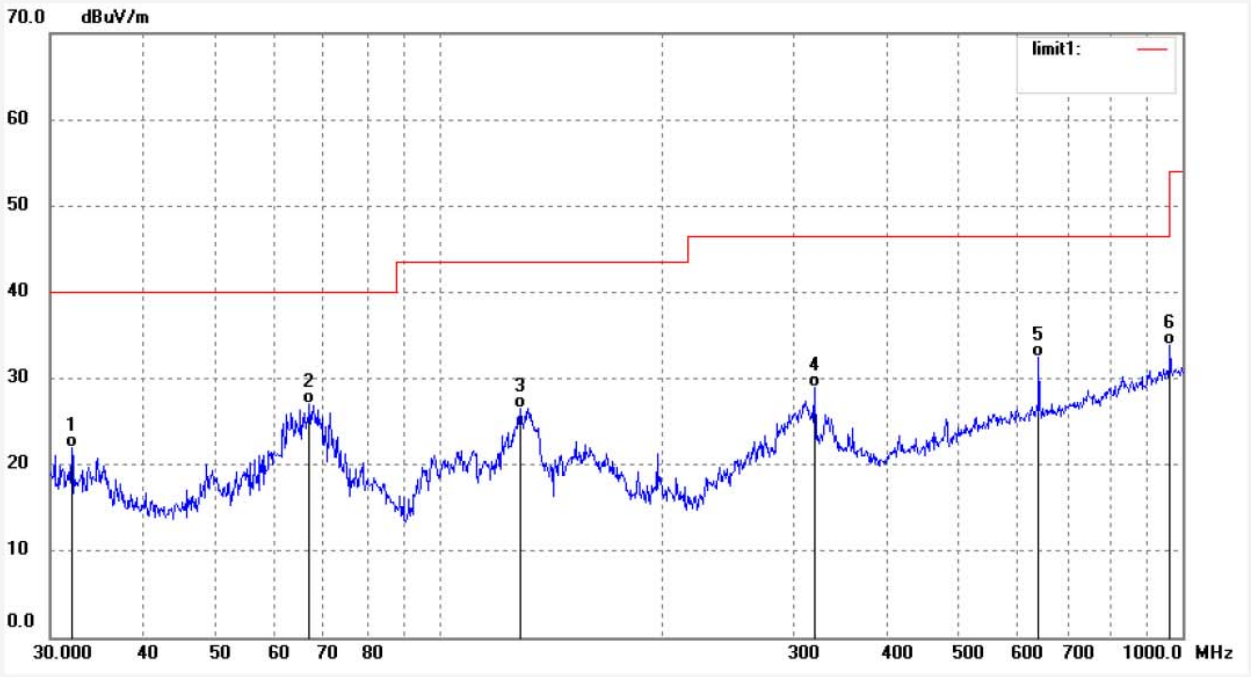
Job No.: FRANK2019-W #111	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 19/08/14/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/15/20
EUT: Smart Desk Lamp	Engineer Signature: CHARLEY
Mode: TX Channel 6(802.11B)	Distance: 3m
Model: TL01	
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited	

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.0667	32.08	-10.13	21.95	40.00	-18.05	QP	200	193	
2	66.9668	42.90	-15.84	27.06	40.00	-12.94	QP	200	211	
3	128.5629	40.26	-13.72	26.54	43.50	-16.96	QP	200	201	
4	319.9370	37.36	-8.45	28.91	46.50	-17.59	QP	200	33	
5	640.6109	34.34	-1.90	32.44	46.50	-14.06	QP	200	218	
6	962.1622	30.57	3.33	33.90	54.00	-20.10	QP	200	96	

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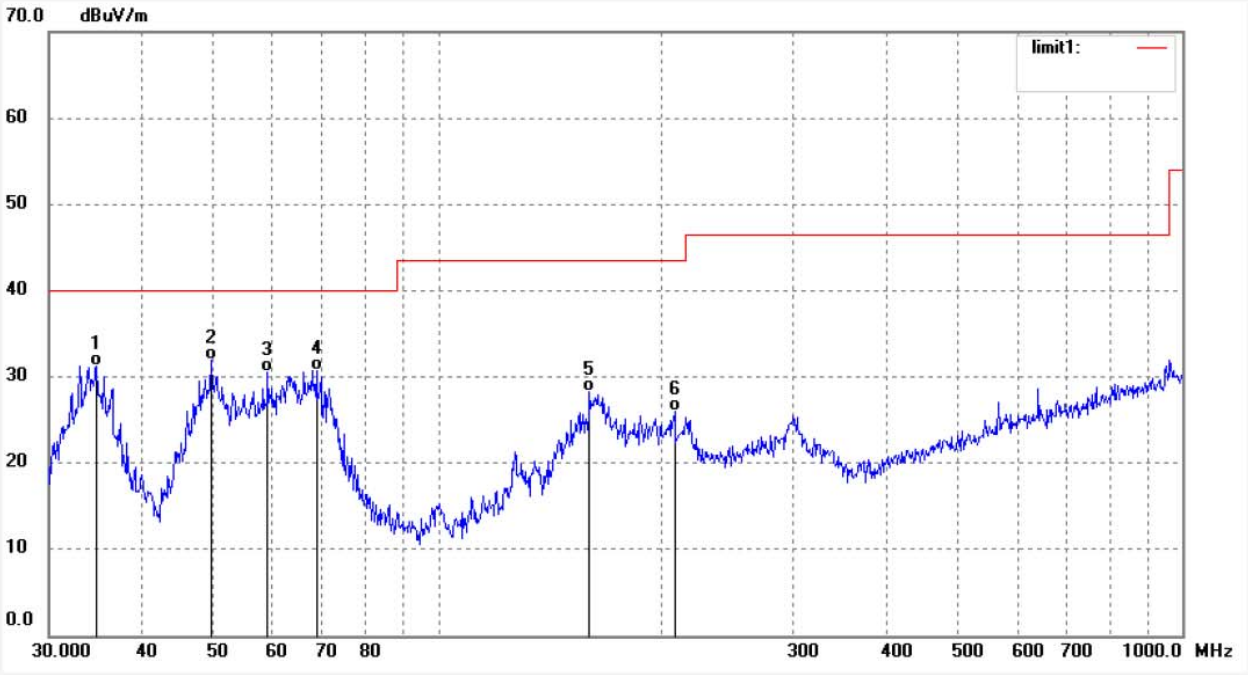
Job No.: FRANK2019-W #112	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 19/08/14/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/15/37
EUT: Smart Desk Lamp	Engineer Signature: CHARLEY
Mode: TX Channel 6(802.11B)	Distance: 3m
Model: TL01	
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited	

Note: Report NO.:ATE20190691



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	41.66	-10.34	31.32	40.00	-8.68	QP	100	104	
2	49.5328	44.58	-12.58	32.00	40.00	-8.00	QP	100	118	
3	59.0251	44.24	-13.72	30.52	40.00	-9.48	QP	100	66	
4	68.6310	46.70	-15.96	30.74	40.00	-9.26	QP	100	331	
5	159.7844	42.71	-14.44	28.27	43.50	-15.23	QP	100	201	
6	207.8500	37.96	-12.05	25.91	43.50	-17.59	QP	100	71	

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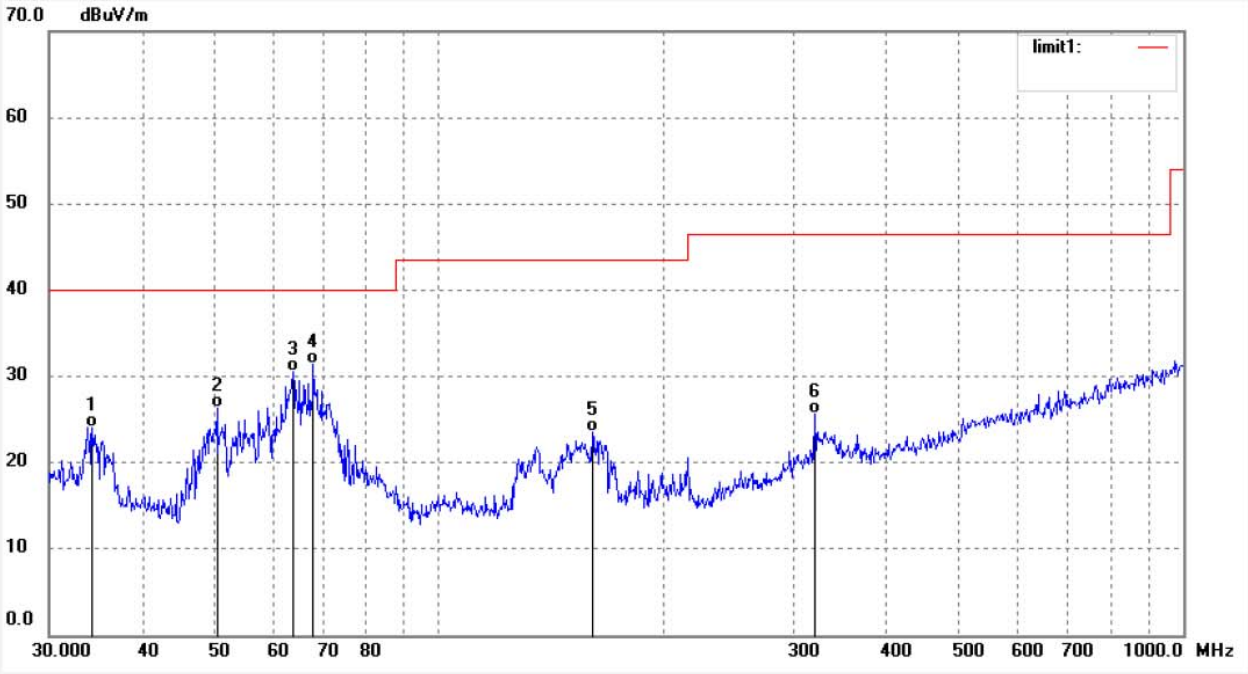
Job No.: FRANK2019-W #114
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Smart Desk Lamp
Mode: TX Channel 11(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 9/16/28
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	34.2760	34.45	-10.35	24.10	40.00	-15.90	QP	200	163	
2	50.4089	38.95	-12.62	26.33	40.00	-13.67	QP	200	221	
3	63.7588	45.74	-15.26	30.48	40.00	-9.52	QP	200	82	
4	67.9128	47.37	-15.91	31.46	40.00	-8.54	QP	200	114	
5	160.9088	37.89	-14.40	23.49	43.50	-20.01	QP	200	66	
6	319.9370	34.07	-8.45	25.62	46.50	-20.88	QP	200	103	

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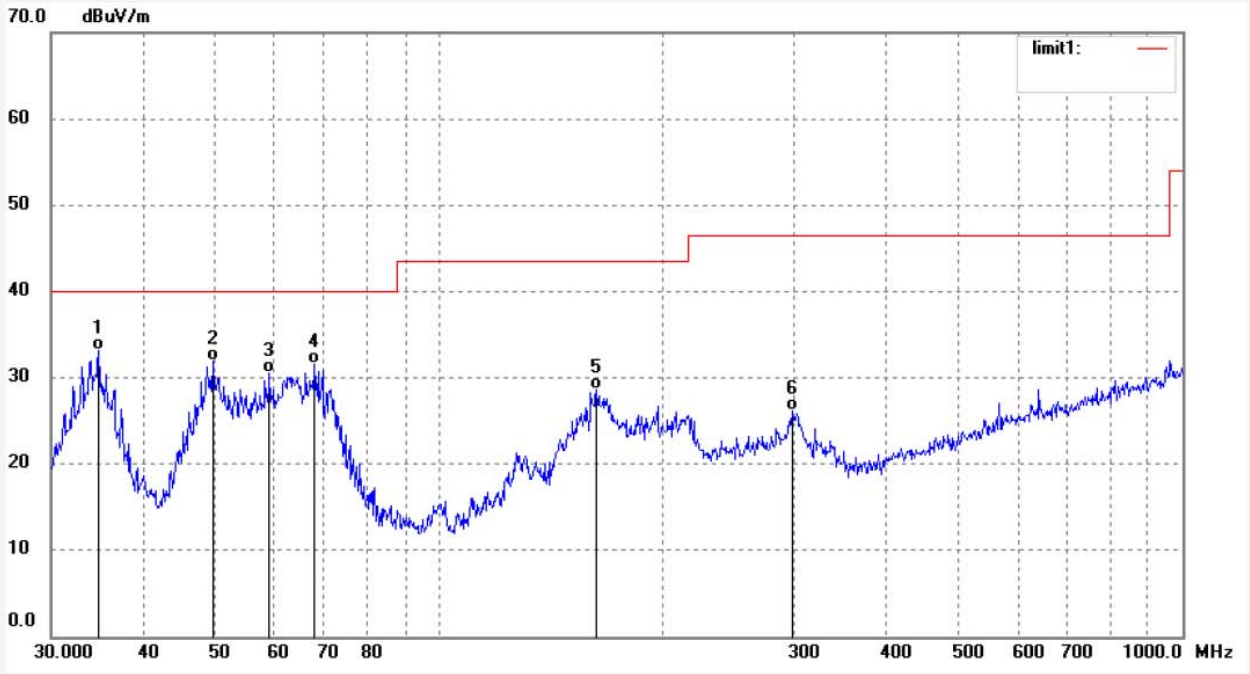
Job No.: FRANK2019-W #113
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Smart Desk Lamp
Mode: TX Channel 11(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 9/15/46
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



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	43.55	-10.34	33.21	40.00	-6.79	QP	100	30	
2	49.5328	44.58	-12.58	32.00	40.00	-8.00	QP	100	211	
3	59.0251	44.24	-13.72	30.52	40.00	-9.48	QP	100	189	
4	67.9128	47.42	-15.91	31.51	40.00	-8.49	QP	100	66	
5	162.6106	42.97	-14.36	28.61	43.50	-14.89	QP	100	332	
6	298.2681	35.27	-9.04	26.23	46.50	-20.27	QP	100	201	

Above 1G

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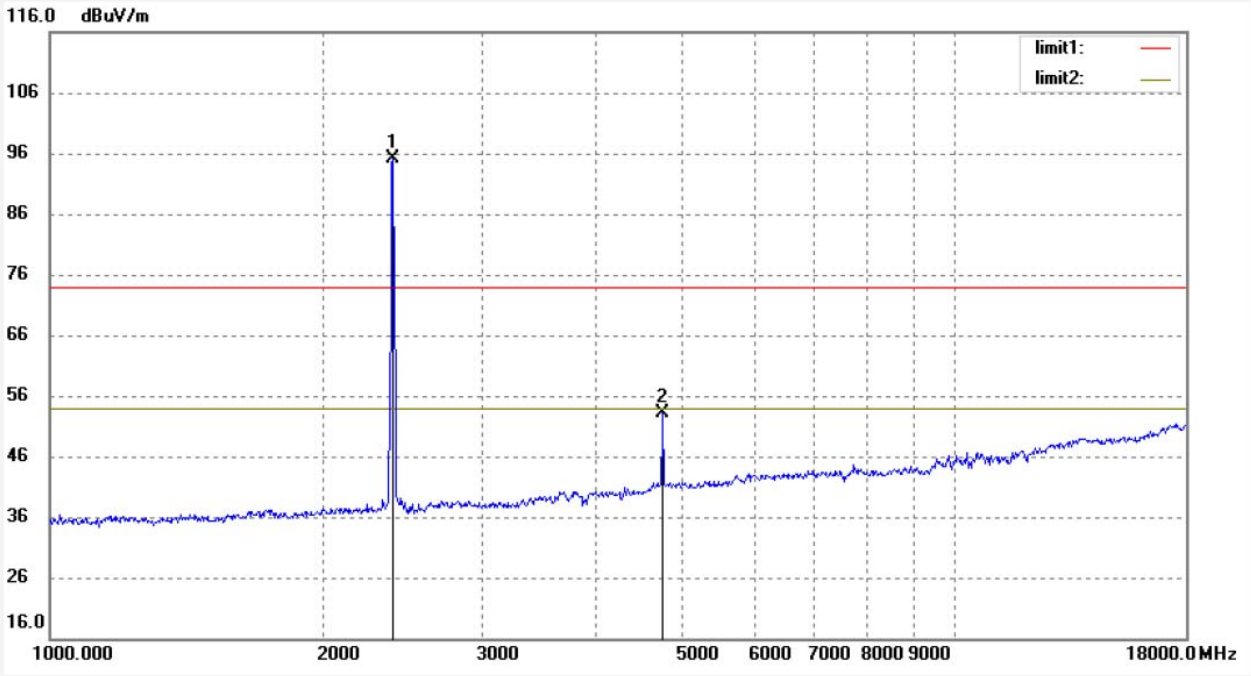
Job No.: FRANK2019-W #40	Polarization: Horizontal
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 19/08/14/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/34/07
EUT: Smart Desk Lamp	Engineer Signature: CHARLEY
Mode: TX Channel 1(802.11B)	Distance: 3m
Model: TL01	
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited	

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.219	101.33	-6.29	95.04			peak	200	229	
2	4824.584	52.20	0.82	53.02	74.00	-20.98	peak	200	103	

Note: The fundamental radiated emissions were reduced by Band Reject Filter in the plot.

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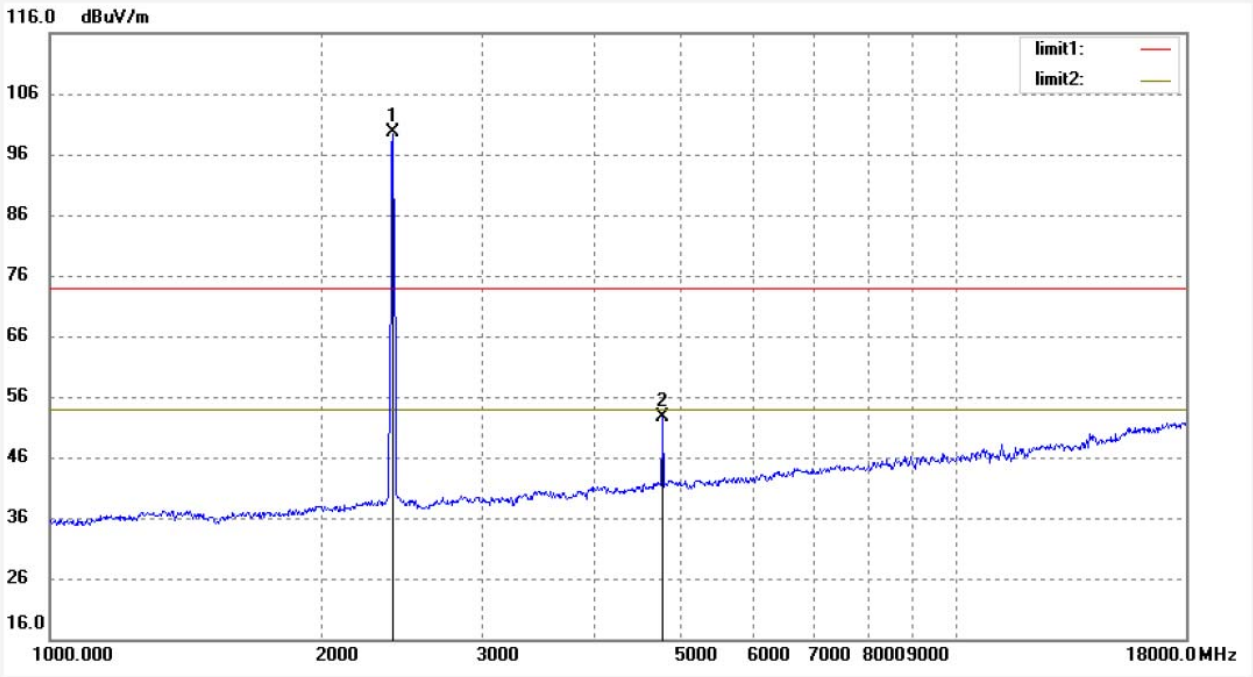
Job No.: FRANK2019-W #41
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Smart Desk Lamp
Mode: TX Channel 1(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 13/35/50
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2412.219	105.85	-6.29	99.56			peak	150	54	
2	4824.584	51.72	0.82	52.54	74.00	-21.46	peak	150	195	

Note: The fundamental radiated emissions were reduced by Band Reject Filter in the plot.

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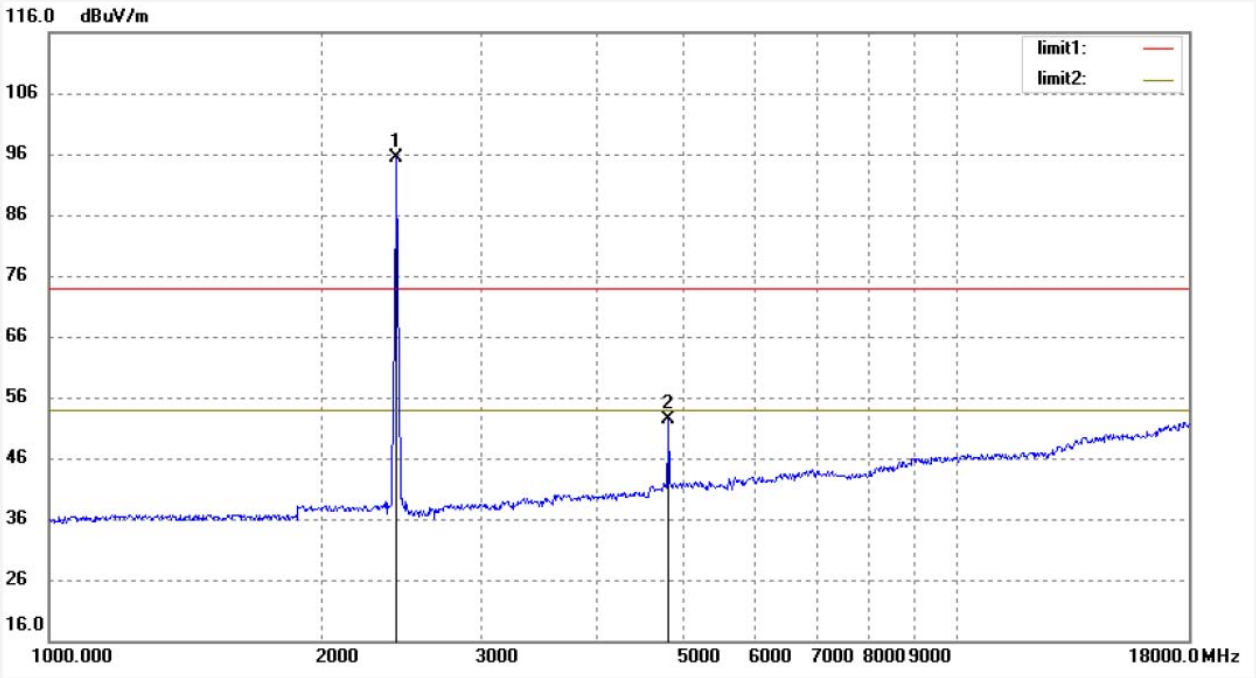
Job No.: FRANK2019-W #43
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Smart Desk Lamp
Mode: TX Channel 6(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 13/37/53
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.121	101.59	-6.20	95.39			peak	200	198	
2	4874.324	51.36	1.07	52.43	74.00	-21.57	peak	200	54	

Note: The fundamental radiated emissions were reduced by Band Reject Filter in the plot.

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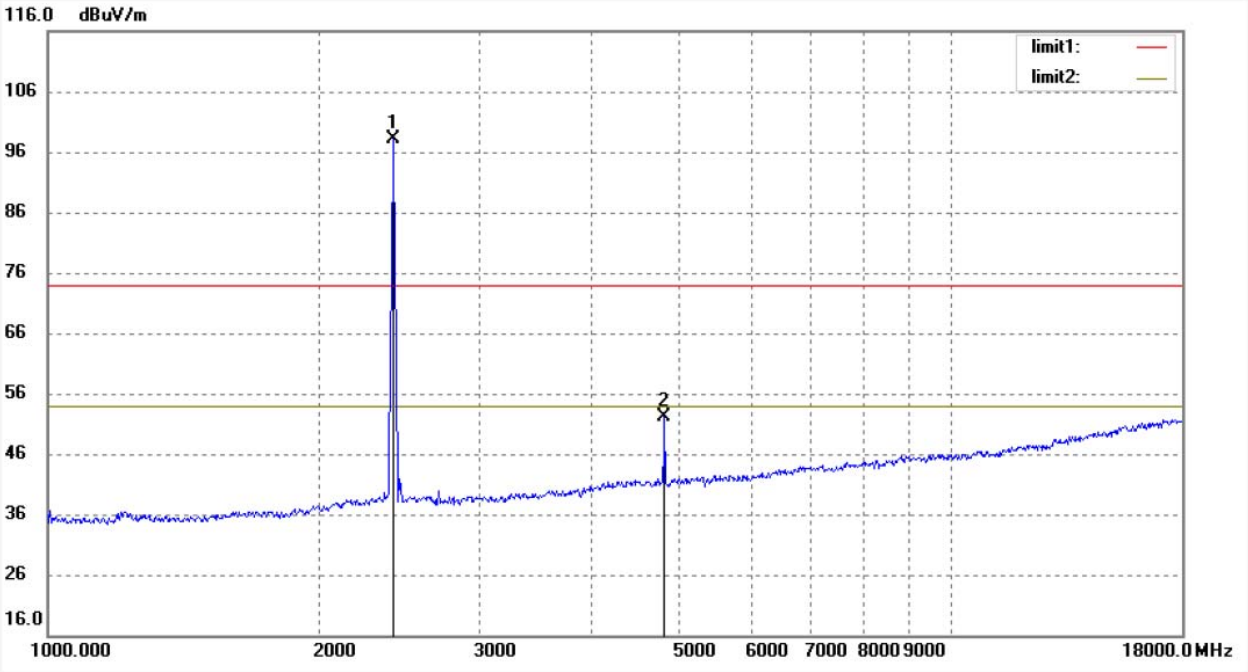
Job No.: FRANK2019-W #42	Polarization: Vertical
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 19/08/14/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/36/51
EUT: Smart Desk Lamp	Engineer Signature: CHARLEY
Mode: TX Channel 6(802.11B)	Distance: 3m
Model: TL01	
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited	

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2437.100	104.28	-6.24	98.04			peak	150	221	
2	4874.324	51.02	1.07	52.09	74.00	-21.91	peak	150	198	

Note: The fundamental radiated emissions were reduced by Band Reject Filter in the plot.

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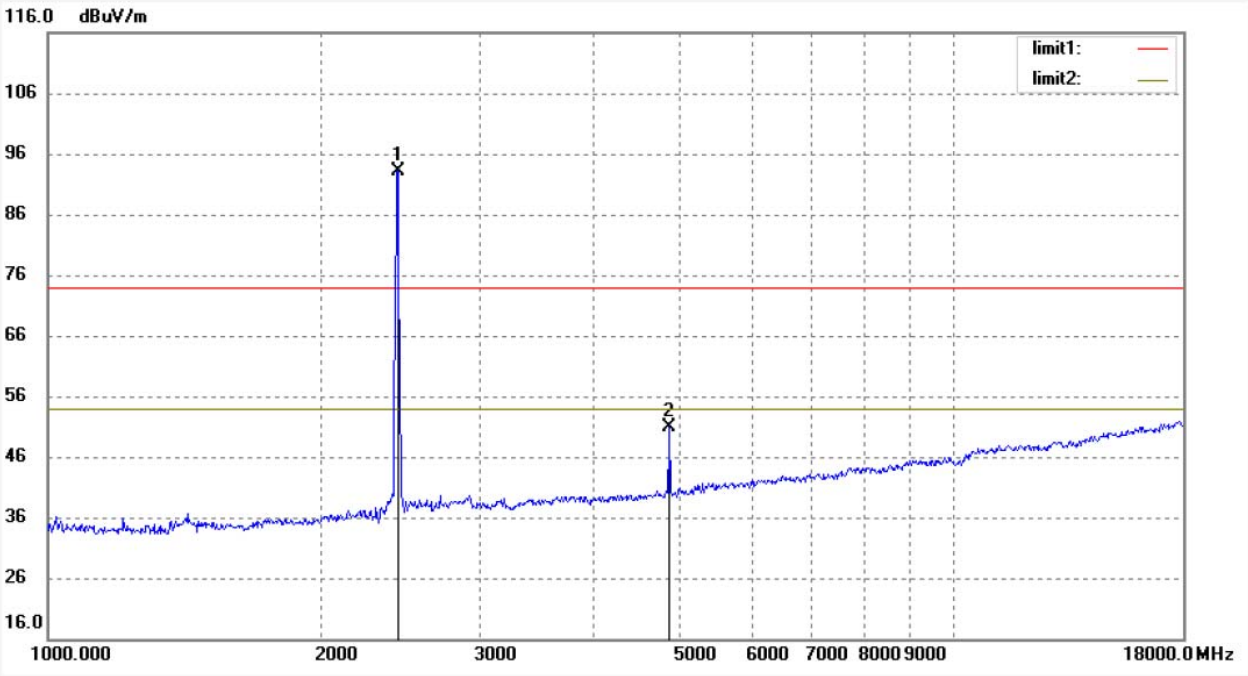
Job No.: FRANK2019-W #44	Polarization: Horizontal
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 19/08/14/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/39/57
EUT: Smart Desk Lamp	Engineer Signature: CHARLEY
Mode: TX Channel 11(802.11B)	Distance: 3m
Model: TL01	
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited	

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.307	99.31	-6.10	93.21			peak	200	92	
2	4924.717	49.66	1.32	50.98	74.00	-23.02	peak	200	101	

Note: The fundamental radiated emissions were reduced by Band Reject Filter in the plot.

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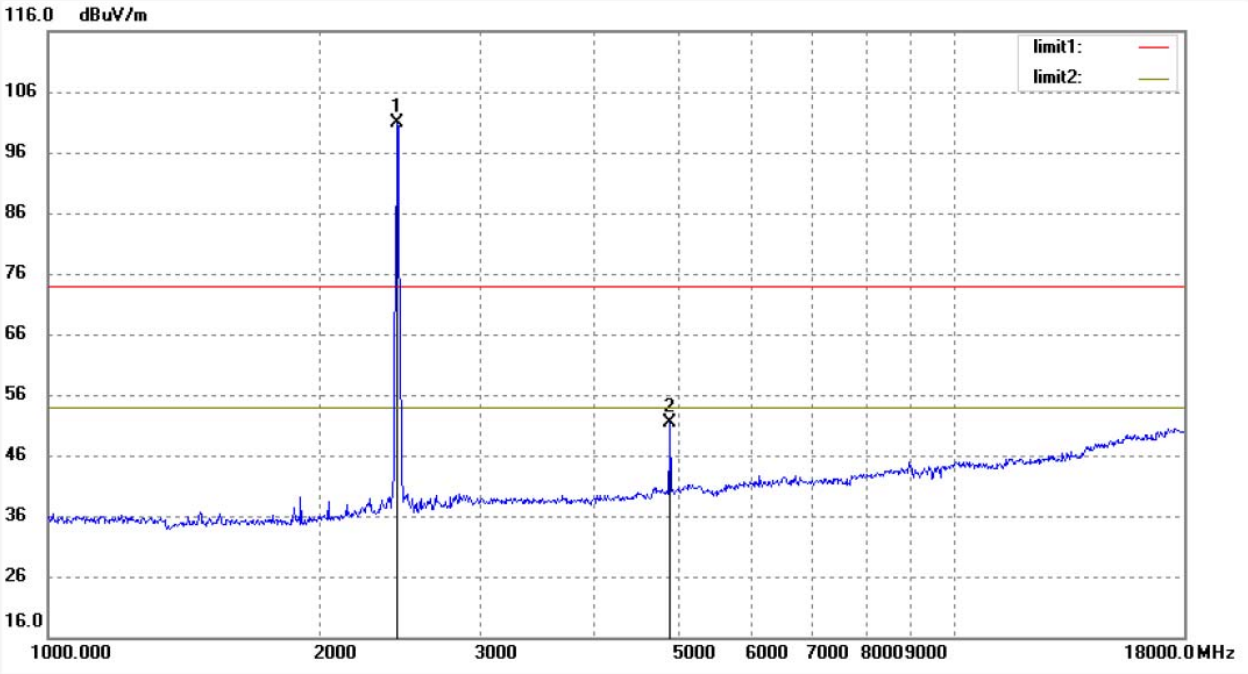
Job No.: FRANK2019-W #45	Polarization: Vertical
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 19/08/14/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 13/40/52
EUT: Smart Desk Lamp	Engineer Signature: CHARLEY
Mode: TX Channel 11(802.11B)	Distance: 3m
Model: TL01	
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited	

Note: Report NO.:ATE20190691

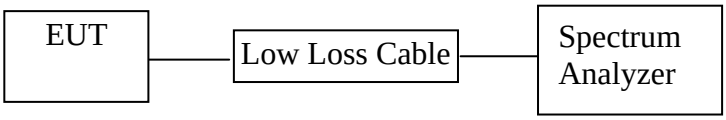


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2462.324	106.97	-6.14	100.83			peak	150	103	
2	4924.717	50.04	1.32	51.36	74.00	-22.64	peak	150	95	

Note: The fundamental radiated emissions were reduced by Band Reject Filter in the plot.

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 2412-2462MHz. We select 2412MHz and 2462MHz 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:

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

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

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

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

11.5.7.RBW=1MHz, VBW=1MHz

11.5.8.The band edges was measured and recorded.

11.6.Test Result

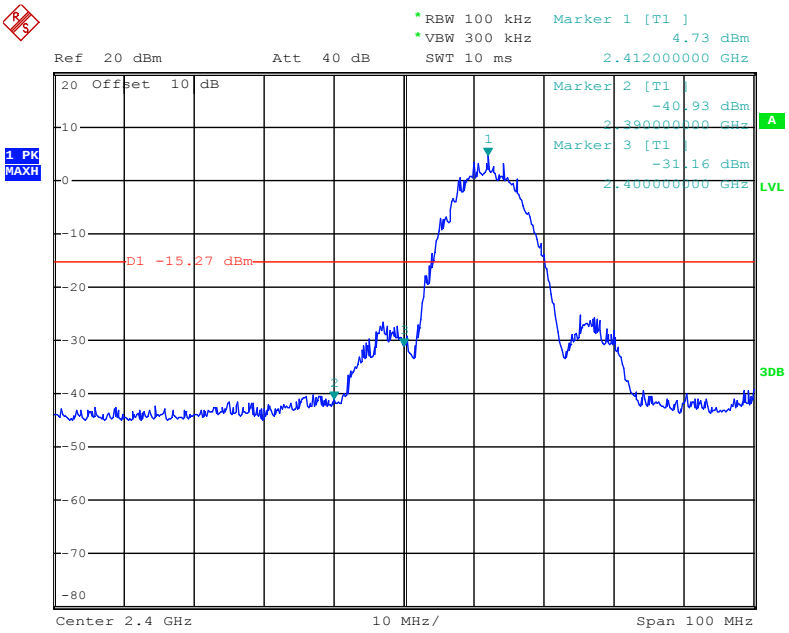
The test was performed with 802.11b		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	35.89	> 20dBc
2483.5	47.02	> 20dBc

The test was performed with 802.11g		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	35.47	> 20dBc
2483.5	38.57	> 20dBc

The test was performed with 802.11n (20MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	37.23	> 20dBc
2483.5	40.26	> 20dBc

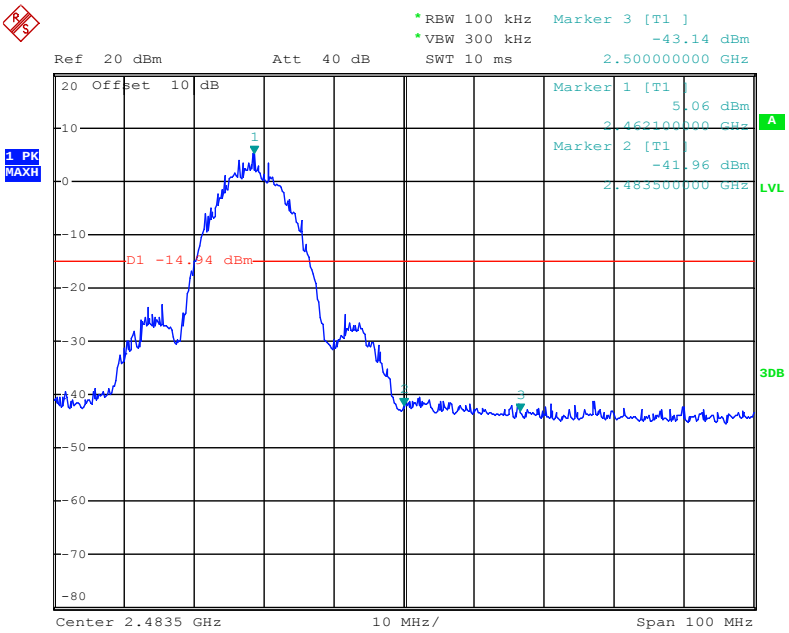
The test was performed with 802.11n (40MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2400.0	34.58	> 20dBc
2483.5	35.42	> 20dBc

802.11b Low Channel 2412MHz



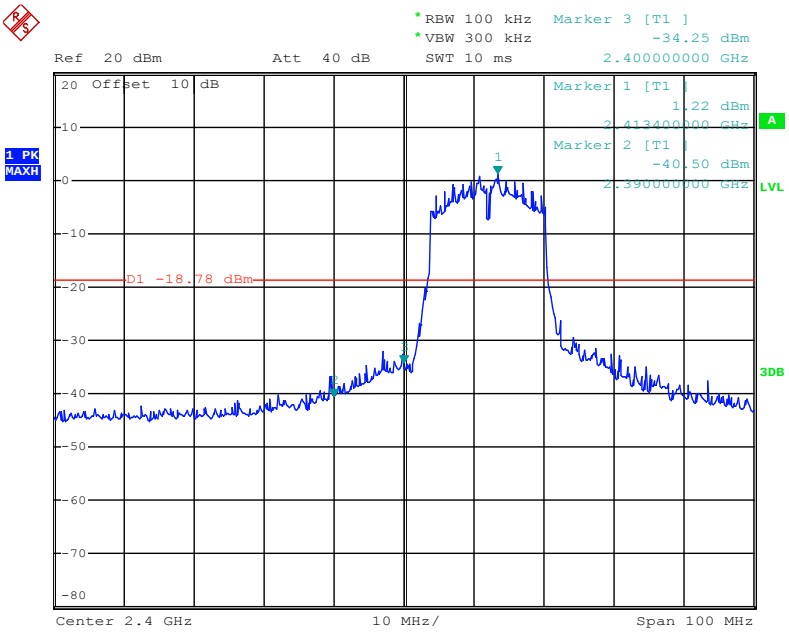
Date: 22.MAY.2019 10:03:53

802.11b High Channel 2462MHz



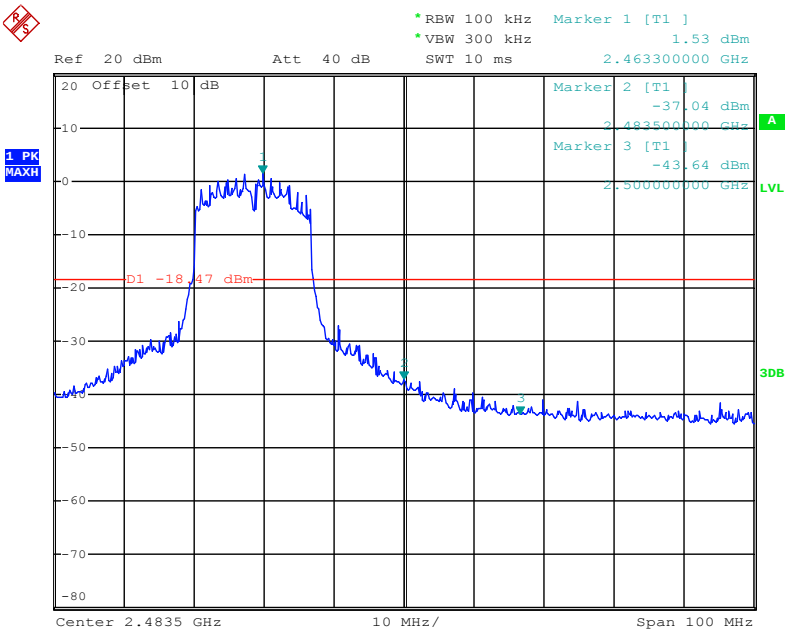
Date: 22.MAY.2019 10:05:17

802.11g Low Channel 2412MHz



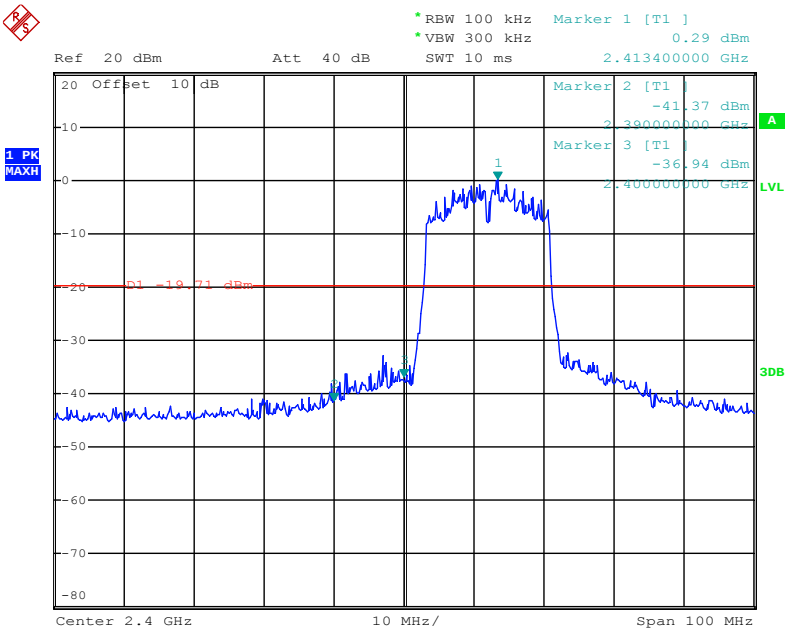
Date: 22.MAY.2019 10:07:09

802.11g High Channel 2462MHz



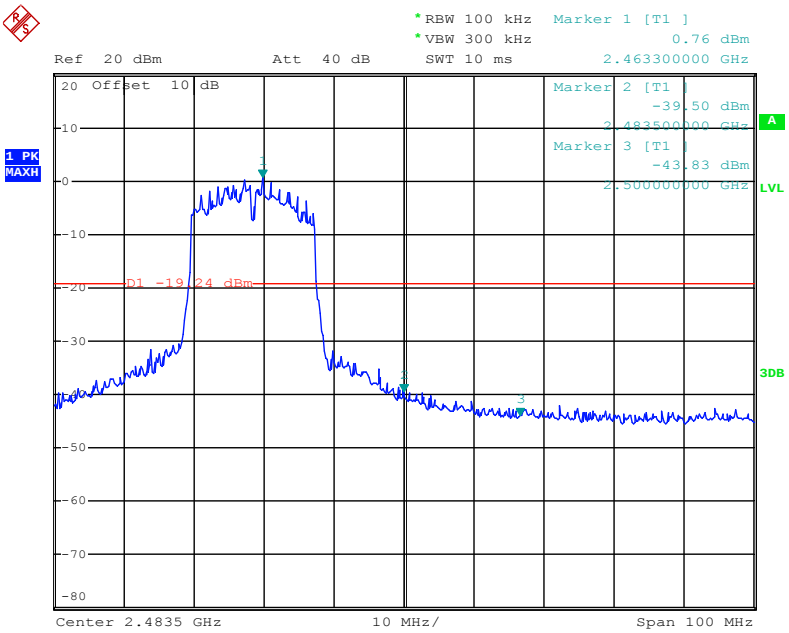
Date: 22.MAY.2019 10:06:24

802.11n(20MHz) Low Channel 2412MHz



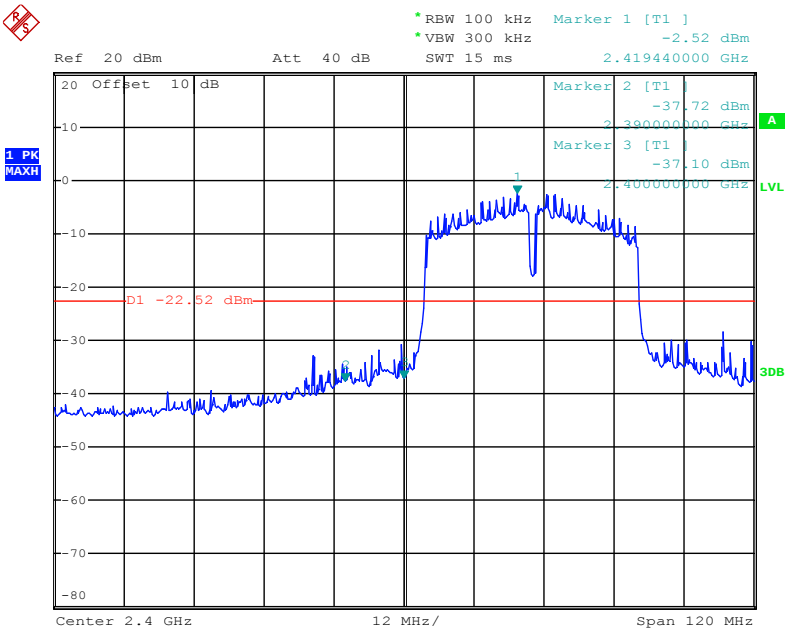
Date: 22.MAY.2019 10:07:55

802.11n(20MHz) High Channel 2462MHz



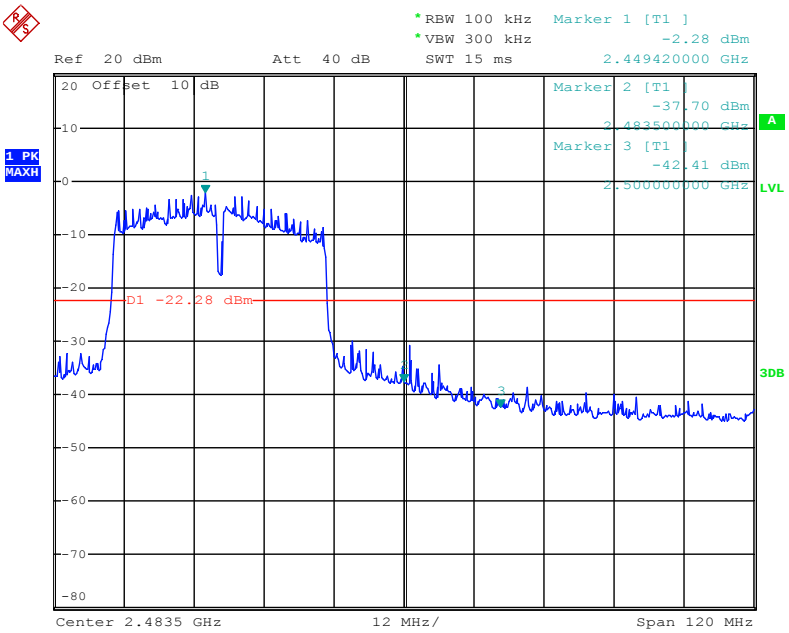
Date: 22.MAY.2019 10:08:44

802.11n(40MHz) Low Channel 2422MHz



Date: 22.MAY.2019 10:51:36

802.11n(40MHz) High Channel 2452MHz



Date: 22.MAY.2019 10:10:07

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.
4. The EUT is tested radiation emission at each test mode (802.11b/g/n) in three axes. The worst emissions are reflected in the following plots.
5. The average measurement was not performed when peak measured data under the limit of average detection.

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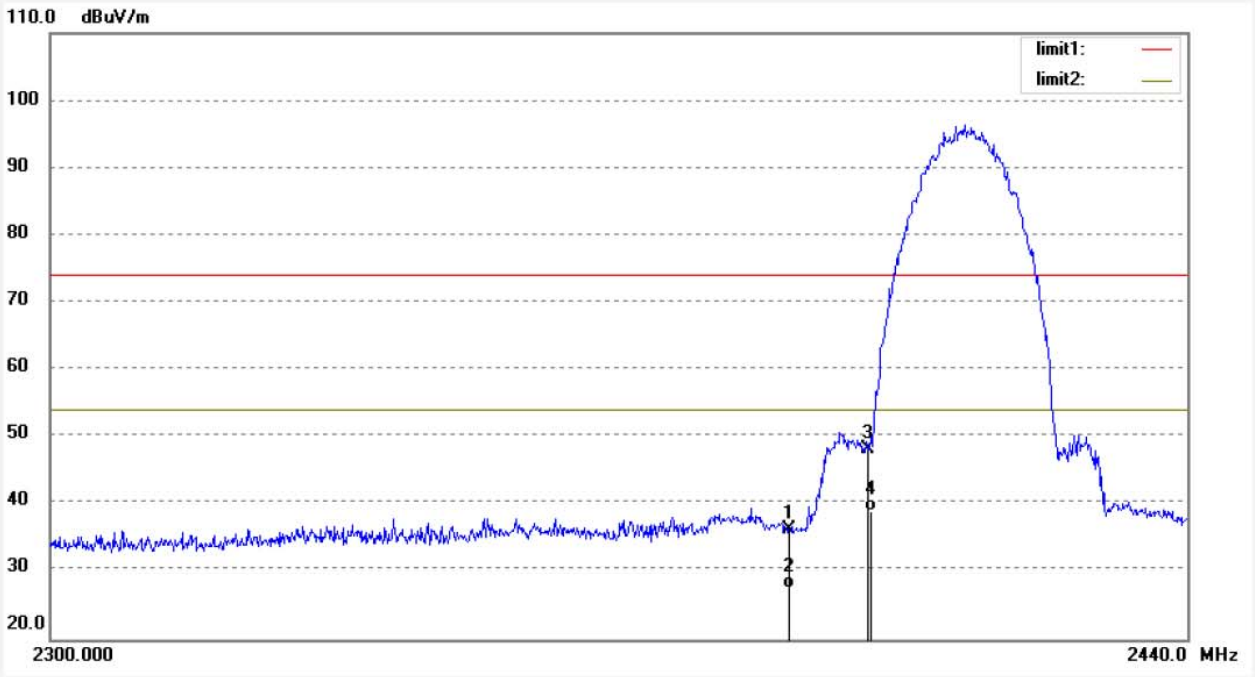
Job No.: FRANK2019-W #61
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Smart Desk Lamp
Mode: TX Channel 1(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 14/09/10
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



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	42.66	-6.32	36.34	74.00	-37.66	peak	150	93	
2	2390.000	33.97	-6.32	27.65	54.00	-26.35	AVG	150	118	
3	2400.000	54.57	-6.27	48.30	74.00	-25.70	peak	150	302	
4	2400.000	45.35	-6.27	39.08	54.00	-14.92	AVG	150	109	

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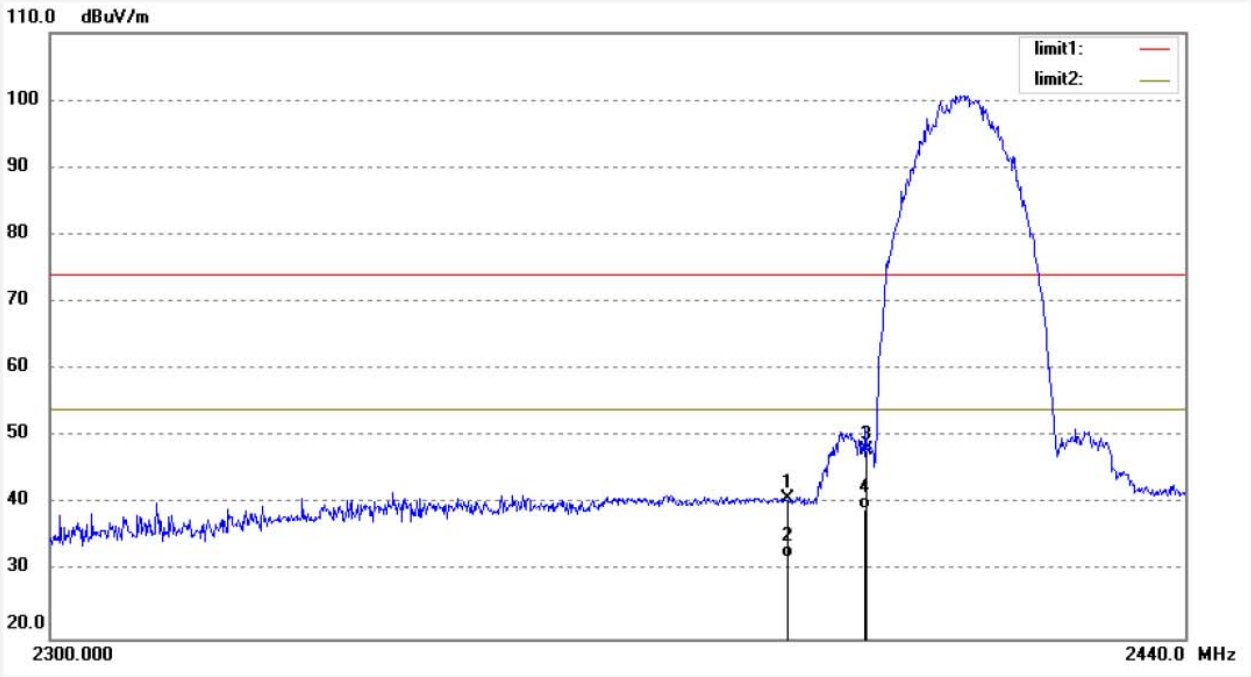
Job No.: FRANK2019-W #60
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Smart Desk Lamp
Mode: TX Channel 1(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 14/08/18
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	47.02	-6.32	40.70	74.00	-33.30	peak	200	201	
2	2390.000	38.46	-6.32	32.14	54.00	-21.86	AVG	200	331	
3	2400.000	54.28	-6.27	48.01	74.00	-25.99	peak	200	93	
4	2400.000	45.49	-6.27	39.22	54.00	-14.78	AVG	200	140	

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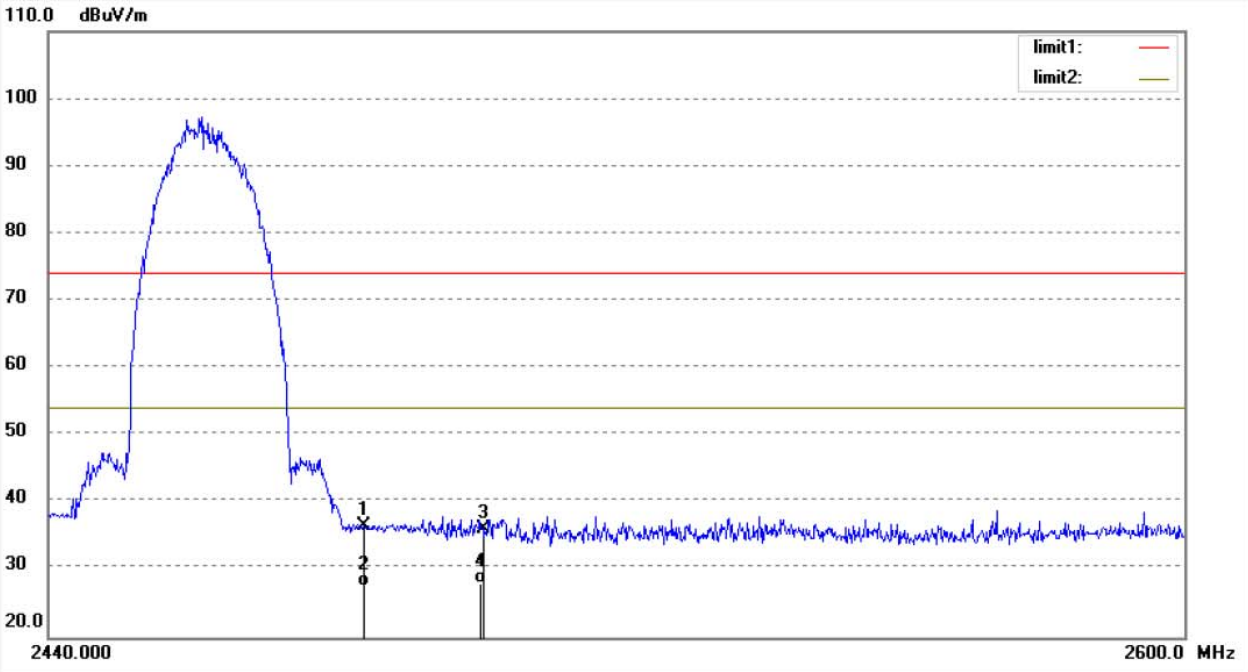
Job No.: FRANK2019-W #46
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Smart Desk Lamp
Mode: TX Channel 11(802.11B)
Model: TL01
Manufacturer: Mei Hua Electronics (Hui Zhou) Limited

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 19/08/14/
Time: 13/43/43
Engineer Signature: CHARLEY
Distance: 3m

Note: Report NO.:ATE20190691



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	42.32	-5.89	36.43	74.00	-37.57	peak	150	201	
2	2483.500	33.41	-5.89	27.52	54.00	-26.48	AVG	150	331	
3	2500.000	42.00	-5.81	36.19	74.00	-37.81	peak	150	96	
4	2500.000	33.84	-5.81	28.03	54.00	-25.97	AVG	150	108	