



Report No.: TW2103123E File Reference No.: 2021-04-02

Applicant: Shenzhen Neewer Technology Co., Ltd

Product: WIFI RING LIGHT

Model No.: WRP18, WRP14, WRP16, WRP20

Trademark: NEEWER

Test Standards: FCC Part 15.247

Test Result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10, FCC Part 15.247 for the

evaluation of electromagnetic compatibility

Approved By

Jack Chung

Manager

Dated: April 02, 2021

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

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Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

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Test Report Conclusion

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1.0 General Details

1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le

Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688 Fax: (755) 83442996

Site Listed with Federal Communications commission (FCC)

Registration Number:744189 For 3m Anechoic Chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A

For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: Shenzhen Neewer Technology Co., Ltd

Address: ROOM 1901-1903, Block A, LU SHAN BUILDING NO.3023 CHUNFENGRD LUO HU

DISTRICT, SHENZHEN, GUANGDONG, 518001, CHINA

Telephone: -Fax: --

1.3 Description of EUT

Product: WIFI RING LIGHT

Manufacturer: Shenzhen Neewer Technology Co., Ltd

Address: ROOM 1901-1903, Block A, LU SHAN BUILDING NO.3023 CHUNFENGRD

LUO HU DISTRICT, SHENZHEN, GUANGDONG, 518001, CHINA

Brand Name: NEEWER
Model Number: WRP18

Additional Model Number: WRP14, WRP16, WRP20

Type of Modulation IEEE 802.11b: DSSS (CCK, QPSK, DBPSK)

IEEE 802.11g/n (HT20): OFDM (64QAM, 16QAM, QPSK, BPSK)

Frequency range IEEE 802.11b/g/n (HT20): 2412-2462MHz

Channel Spacing 5MHz for IEEE 802.11b/g/n HT20 Air Data Rate IEEE 802.11b: 11, 5.5, 2, 1 Mbps

IEEE 802.11g: 54, 48,36, 24, 18, 12, 9, 6 Mbps

IEEE 802.11n HT20: mcs0-mcs9

Frequency Selection By software

Channel Number IEEE 802.11b/g/n (HT20): 11

Antenna: PCB antenna used. The gain of the antennas is 2.5dBi (declared by the applicant)

The report refers only to the sample tested and does not apply to the bulk.

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Input Voltage:

DC12V

Power Supply:

Model: NW-120500D2; Input: 100-240V~, 50/60Hz, 1.6A Max; Output: DC12V, 5A

Submitted Sample: 2 Samples

1.5 Test Duration

2021-03-11 to 2021-04-02

Test Uncertainty 1.6

Conducted Emissions Uncertainty = 3.6dB

Radiated Emissions below 1GHz Uncertainty =4.7dB

Radiated Emissions above 1GHz Uncertainty =6.0dB

Conducted Power Uncertainty =6.0dB

Occupied Channel Bandwidth Uncertainty =5%

Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer Terry lang

The sample tested by

Print Name: Terry Tang

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2.0 Test Equipment							
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date		
ESPI Test Receiver	R&S	ESPI 3	100379	2020-06-23	2021-06-22		
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2020-06-23	2021-06-22		
Loop Antenna	EMCO	6507	00078608	2018-06-25	2021-06-24		
Spectrum	R&S	FSIQ26	100292	2020-06-23	2021-06-22		
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2019-06-21	2021-06-20		
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-07-09	2021-07-08		
Power meter	Anritsu	ML2487A	6K00003613	2020-06-23	2021-06-22		
Power sensor	Anritsu	MA2491A	32263	2020-06-23	2021-06-22		
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2021-07-03		
9*6*6 Anechoic			N/A	2020-07-06	2021-07-05		
EMI Test Receiver	RS	ESVB	826156/011	2020-06-23	2021-06-22		
EMI Test Receiver	RS	ESH3	860904/006	2020-06-23	2021-06-22		
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2020-06-23	2021-06-22		
Spectrum	HP/Agilent	E4407B	MY50441392	2020-06-23	2021-06-22		
Spectrum	RS	FSP	1164.4391.38	2021-01-16	2022-01-15		
RF Cable	Zhanadi	ZT26-NJ-NJ-8		2020-06-23	2021-06-22		
Kr Cable	Zhengdi	M/FA					
RF Cable	Zhengdi	7m		2020-06-23	2021-06-22		
RF Switch	EM	EMSW18	060391	2020-06-23	2021-06-22		
Pre-Amplifier	Schwarebeck	BBV9743	#218	2020-06-23	2021-06-22		
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2020-06-23	2021-06-22		
LISN	SCHAFFNER	NNB42	00012	2021-01-06	2022-01-05		

2.2 Automation Test Software

For Conducted Emission Test

Name	Version
EZ-EMC	Ver.EMC-CON 3A1.1

For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

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3. DESCRIPTION OF TEST MODES

IEEE 802.11b, 802.11g, 802.11n (HT20) mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 1Mbps data rate (worst case) was chosen for full testing. IEEE 802.11g mode: 6Mbps data rate (worst case) was chosen for full testing. IEEE 802.11n (HT20) mode: mcs0 (worst case) were chosen for full testing

Note: during the test, the duty cycle was set up to 100%.

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3.0 **Technical Details**

3.1 **Summary of test results**

Standard	Test Type	Result	Notes
CC Part 15, Paragraph 15.107 & 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	PASS	Complies
FCC Part 15, Paragraph 15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	PASS	Complies

3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

EUT Modification 4.0

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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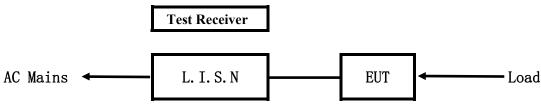
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5.0 Power Line Conducted Emission Test

5.1 Schematics of the test

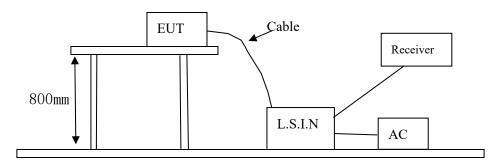


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10-2013.

Test Voltage: 120V~, 60Hz Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
WIFI RING LIGHT	Shenzhen Neewer	WRP18, WRP14,	2ANIV-WRP18
	Technology Co., Ltd	WRP16, WRP20	ZANIV-WRP18

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	Rating
Power Supply			

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5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency	Limits (dB μ V)			
(MHz)	Quasi-peak Level	Average Level		
$0.15 \sim 0.50$	66.0~56.0*	56.0~46.0*		
$0.50 \sim 5 00$	56.0	46.0		
5.00 ~ 30.00	60.0	50.0		

Notes:

- 1. *Decreasing linearly with logarithm of frequency.
- 2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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Conducted Emission on Live Terminal (150kHz to 30MHz) A:

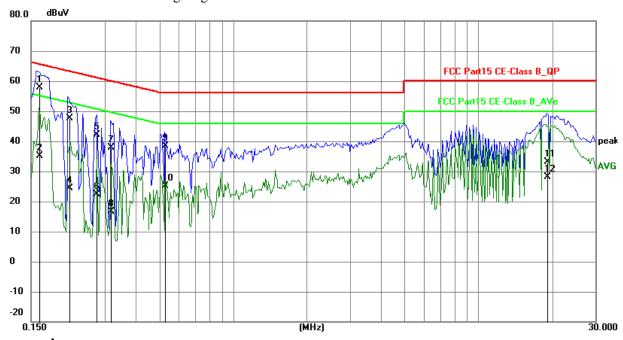
EUT Operating Environment

Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keep WIFI Transmitting

Results: PASS

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1617	48.00	9.78	57.78	65.38	-7.60	QP	Р
2	0.1617	25.44	9.78	35.22	55.38	-20.16	AVG	Р
3	0.2151	37.84	9.75	47.59	63.01	-15.42	QP	Р
4	0.2151	14.58	9.75	24.33	53.01	-28.68	AVG	Р
5	0.2787	32.43	9.76	42.19	60.85	-18.66	QP	Р
6	0.2787	12.50	9.76	22.26	50.85	-28.59	AVG	Р
7	0.3177	28.07	9.76	37.83	59.77	-21.94	QP	Р
8	0.3177	6.75	9.76	16.51	49.77	-33.26	AVG	Р
9	0.5283	28.55	9.77	38.32	56.00	-17.68	QP	Р
10	0.5283	15.28	9.77	25.05	46.00	-20.95	AVG	Р
11	19.0563	22.63	10.62	33.25	60.00	-26.75	QP	Р
12	19.0563	17.46	10.62	28.08	50.00	-21.92	AVG	Р

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

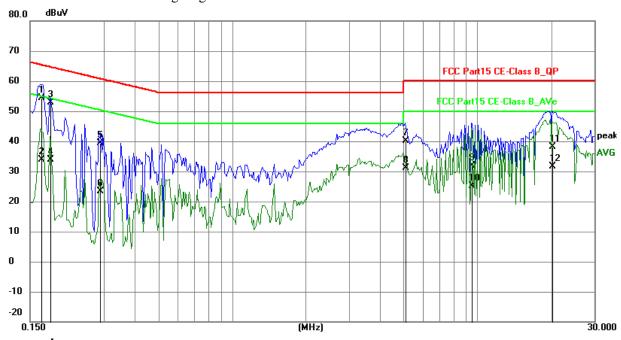
EUT Operating Environment

Humidity: 65%RH Atmospheric Pressure: 101 KPa Temperature: 26°C

EUT set Condition: Keep WIFI Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1659	44.60	9.77	54.37	65.16	-10.79	QP	Р
2	0.1659	24.22	9.77	33.99	55.16	-21.17	AVG	Р
3	0.1812	43.04	9.76	52.80	64.43	-11.63	QP	Р
4	0.1812	24.21	9.76	33.97	54.43	-20.46	AVG	Р
5	0.2904	29.50	9.76	39.26	60.51	-21.25	QP	Р
6	0.2904	13.65	9.76	23.41	50.51	-27.10	AVG	Р
7	5.0865	30.29	9.93	40.22	60.00	-19.78	QP	Р
8	5.0865	21.26	9.93	31.19	50.00	-18.81	AVG	Р
9	9.4974	21.71	10.13	31.84	60.00	-28.16	QP	Р
10	9.4974	15.09	10.13	25.22	50.00	-24.78	AVG	Р
11	20.1717	27.51	10.69	38.20	60.00	-21.80	QP	Р
12	20.1717	20.97	10.69	31.66	50.00	-18.34	AVG	Р

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6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. F For measurement above 1GHz, peak values with RBW=1MHz VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup Distance = 3m Computer Pre -Amplifier EUT Turn-table Receiver

- 6.2 Configuration of The EUT

 Same as section 5.3 of this report
- 6.3 EUT Operating Condition
 Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dB µ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2. In the Above Table, the higher limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. Worse case were recorded in the test report. 802.11b was the worst case.

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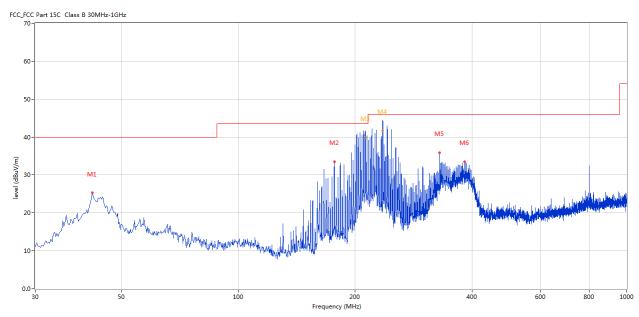


Test result General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

Results: Pass



No.	Frequency	Results	Factor	Limit	Over	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	Limit (dB)			(cm)		
1	42.122	25.25	-11.64	40.0	-14.75	Peak	42.00	100	Horizontal	Pass
2	176.676	33.46	-15.71	43.5	-10.04	Peak	30.00	100	Horizontal	Pass
3	212.314	41.67	-13.67	43.5	-1.83	Peak	60.00	100	Horizontal	Pass
3*	212.314	39.77	-13.67	43.5	-3.73	QP	60.00	100	Horizontal	Pass
4	235.346	44.43	-12.51	46.0	-1.57	Peak	72.00	100	Horizontal	Pass
4*	235.346	41.60	-12.51	46.0	-4.40	QP	72.00	100	Horizontal	Pass
5	330.140	35.84	-10.23	46.0	-10.16	Peak	57.00	100	Horizontal	Pass
6	382.507	33.44	-9.15	46.0	-12.56	Peak	57.00	100	Horizontal	Pass

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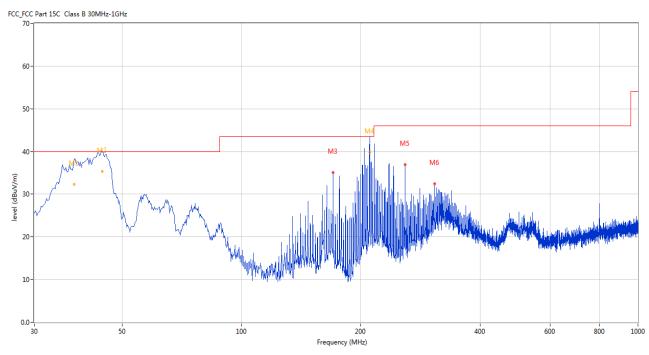


Test result General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

Results: Pass



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	37.758	38.26	-12.84	40.0	-1.74	Peak	325.00	100	Vertical	Pass
1*	37.758	32.27	-12.84	40.0	-7.73	QP	325.00	100	Vertical	Pass
2	44.546	40.32	-11.44	40.0	0.32	Peak	315.00	100	Vertical	N/A
2*	44.546	35.33	-11.44	40.0	-4.67	QP	315.00	100	Vertical	Pass
3	170.372	35.04	-15.95	43.5	-8.46	Peak	335.00	100	Vertical	Pass
4	210.375	43.39	-13.60	43.5	-0.11	Peak	333.00	100	Vertical	Pass
4*	210.375	39.84	-13.60	43.5	-3.66	QP	333.00	100	Vertical	Pass
5	258.620	36.97	-11.85	46.0	-9.03	Peak	330.00	100	Vertical	Pass
6	306.866	32.38	-10.97	46.0	-13.62	Peak	328.00	100	Vertical	Pass

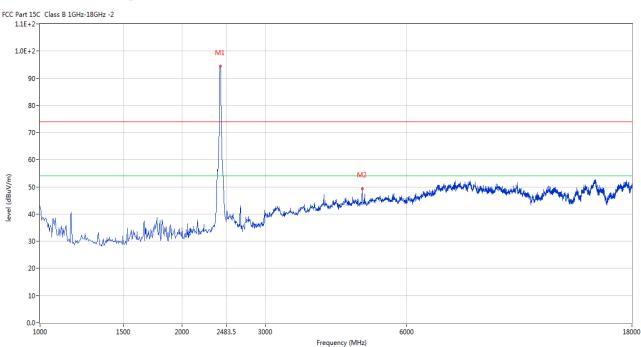
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Please refer to the following test plots for details:

CH01 for 11b at 1Mbps: Horizontal



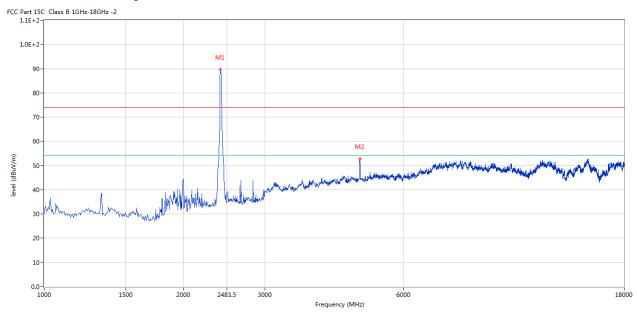
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4825.000	49.28	3.15	74.0	-24.72	Peak	291.00	100	Horizontal	Pass

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CH01 for 11b at 1Mbps: Vertical



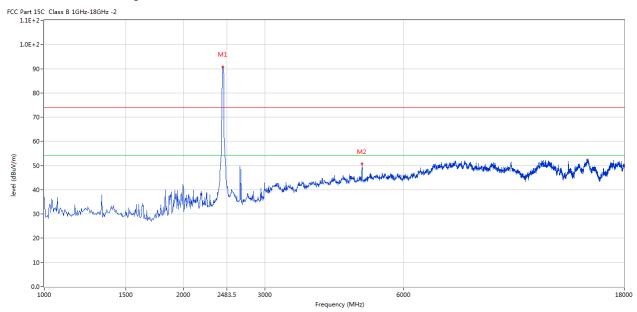
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4825.000	52.77	3.15	74.0	-21.23	Peak	279.00	100	Vertical	Pass

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CH06 for 11b at 1Mbps: Vertical



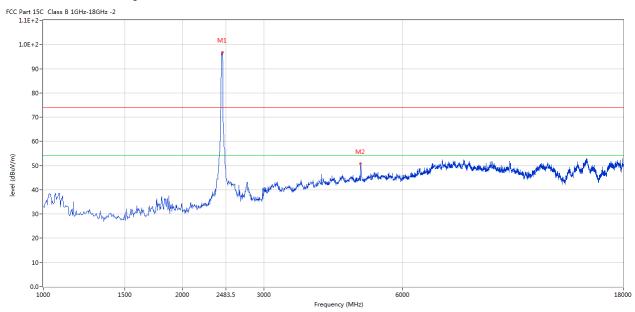
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4871.750	51.82	3.19	74.0	-22.18	Peak	277.00	100	Vertical	Pass

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CH06 for 11b at 1Mbps: Horizontal



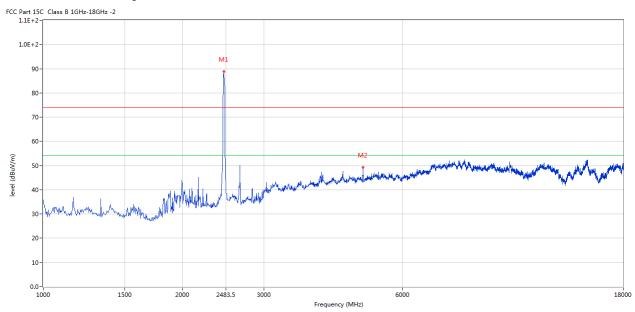
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4869.000	51.67	3.10	74.0	-22.33	Peak	288.00	100	Horizontal	Pass

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CH11 for 11b at 1Mbps: Vertical



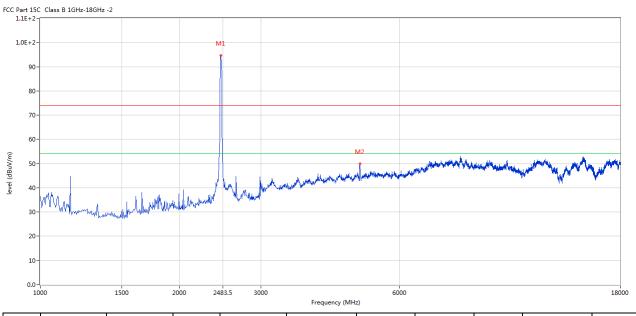
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4927.000	50.38	3.28	74.0	-23.62	Peak	263.00	100	Vertical	Pass

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CH11 for 11b at 1Mbps: Horizontal



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
2	4918.500	50.87	3.26	74.0	-23.13	Peak	284.00	100	Horizontal	Pass

Note: 1. Result Level = Reading + Factor

- 2. Factor= AF + Cable Loss- Preamp
- 3. Margin = Result– Limit
- 4. For radiated Emissions from 18-25GHz and below 30MHz, it is only the floor noise.
- 5. The peak value less than the AV limit, no necessary to take down the AV measurement result.

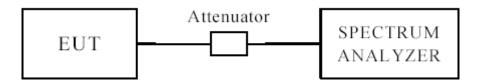
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7.0 6dB Bandwidth Measurement

7.1 Test Setup



7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

7.3 Test Procedure

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

7.4 Test Result

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6dB Occupied Bandwidth

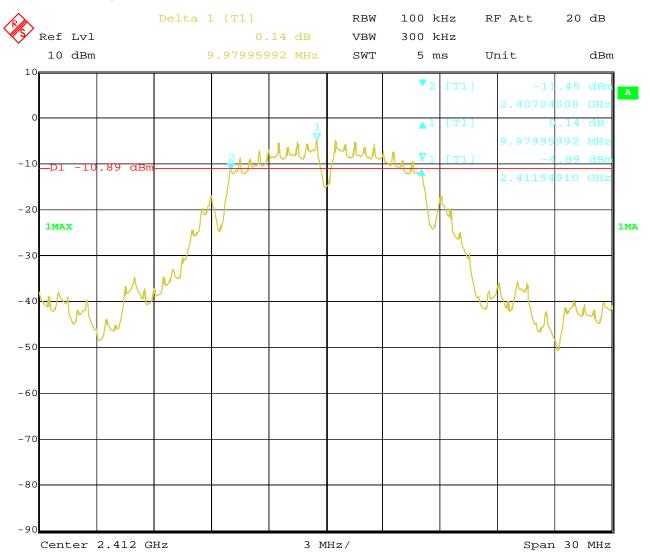
EUT		WIFI F	RING LIGH	łТ	Mod	lel	WF	RP18	
Mode		8	302.11b		Input Vol	tage	DC	212V	
Temperat	ure	24 deg. C,			Humidity		56%	% RH	
Channel		el Frequency (MHz)	Data Transfer Rate (Mbps)		andwidth Hz)		num Limit MHz)	Pass/ Fail	
1		2412	1	9.	98		0.5	Pass	
6		2437	1	9.	98		0.5	Pass	
11		2462	1	10	.04		0.5	Pass	
1		2412	11	9.	92		0.5	Pass	
6		2437	11	10	.04		0.5	Pass	
11		2462	11	9.	80		0.5	Pass	

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1. 802.11b at 1Mbps of CH01



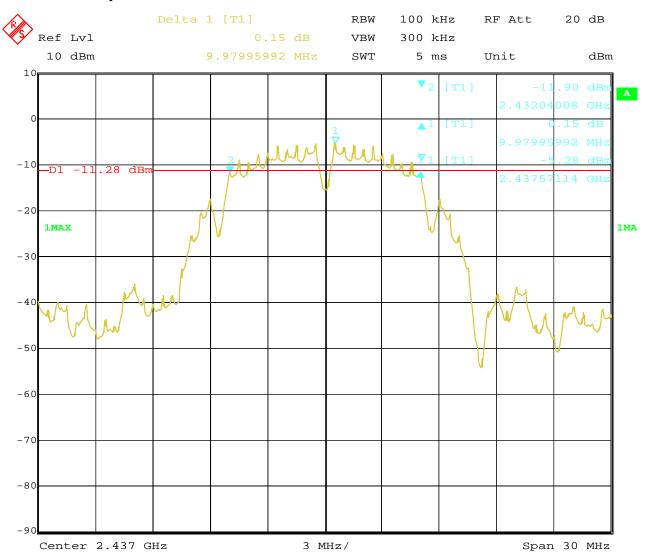
2.APR.2021 10:25:19 Date:

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2. 802.11b at 1Mbps of CH06



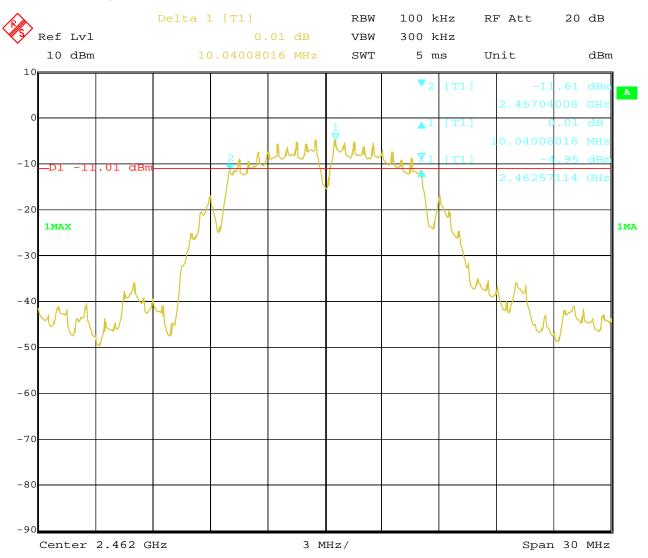
2.APR.2021 10:33:19 Date:

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3. 802.11b at 1Mbps of CH11



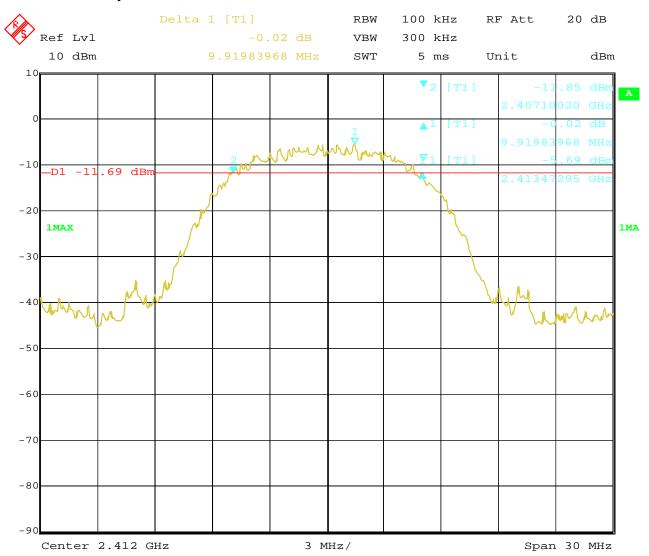
2.APR.2021 10:41:07 Date:

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4. 802.11b at 11Mbps of CH01



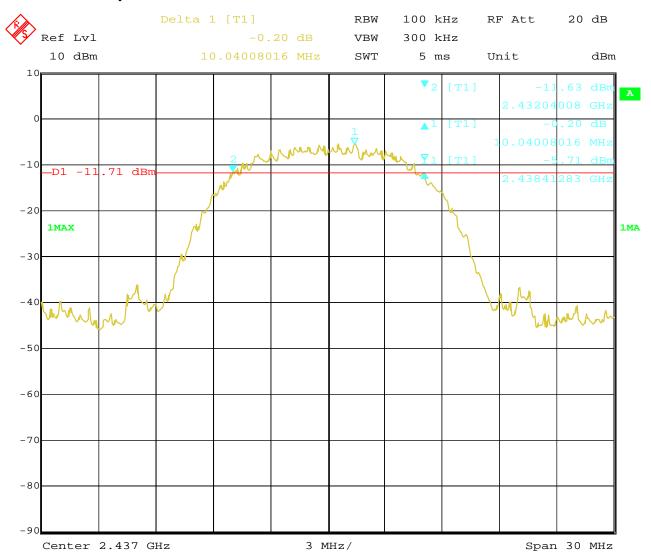
2.APR.2021 10:28:44 Date:

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5. 802.11b at 11Mbps of CH06



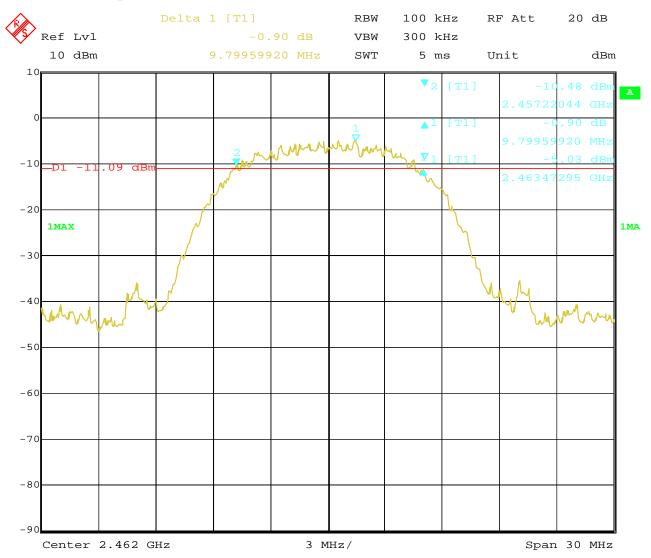
2.APR.2021 10:35:47 Date:

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6. 802.11b at 11Mbps of CH11



2.APR.2021 10:43:12 Date:

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6dB Occupied Bandwidth

EUT		WIFI F	RING LIGH	łΤ	Mod	lel	V	WRP18
Mode		8	302.11g		Input Voltage		I	DC12V
Temperat	ure	24	4 deg. C,		Humidity		5	6% RH
Channel		el Frequency (MHz)	Data Transfer Rate (Mbps)	_	andwidth [Hz]		num Limit MHz)	Pass/ Fail
1		2412	6	15	5.69		0.5	Pass
6		2437	6	15	5.81	0.5		Pass
11		2462	6	15	5.69		0.5	Pass

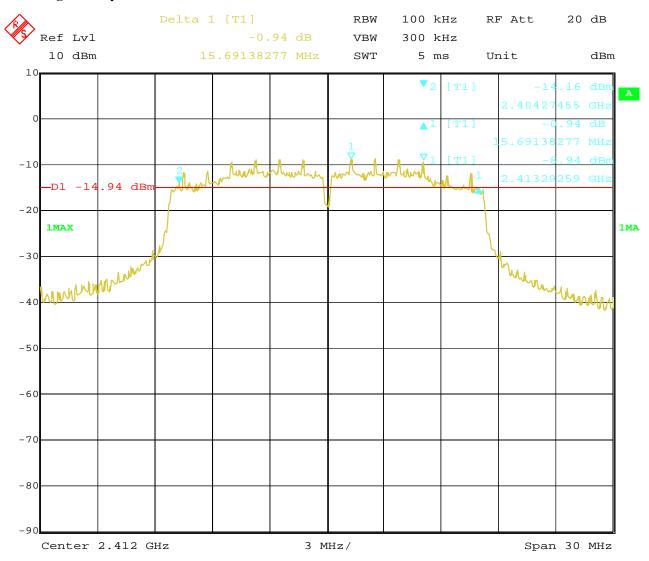
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Test Plots:

1. 802.11g at 6Mbps of CH01



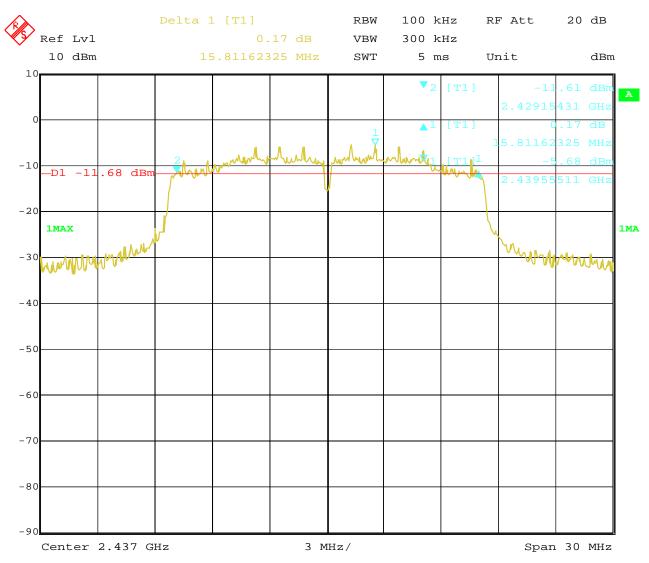
Date: 2.APR.2021 10:27:40

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2. 802.11g at 6Mbps of CH06



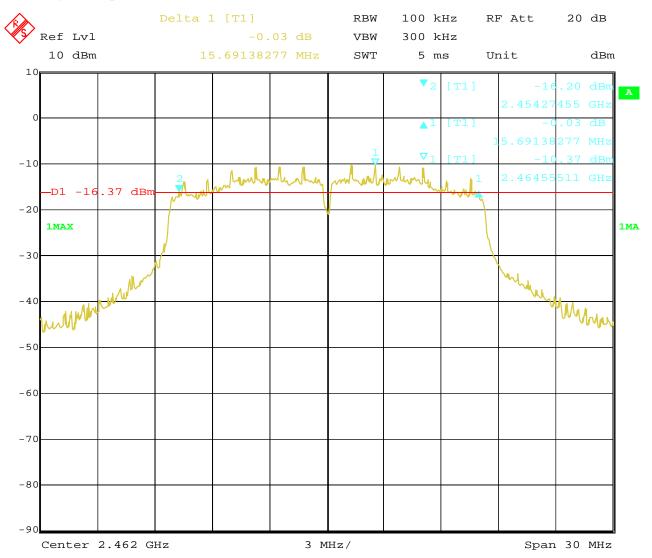
Date: 2.APR.2021 10:34:49

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3. 802.11g at 6Mbps of CH11



2.APR.2021 10:42:12 Date:

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6dB Occupied Bandwidth

EUT		WIFI I	RING LIGH	ΗT	Mod	lel	WF	RP18
Mode		802	.11n HT20		Input Vol	tage	DC	212V
Temperat	ure	24	4 deg. C,		Humidity		56%	6 RH
Channel		el Frequency (MHz)	Data Transfer Rate (Mbps)	-	ndwidth Hz)		num Limit MHz)	Pass/ Fail
1		2412	mcs0	17	.07		0.5	Pass
6		2437	mcs0	17	17.56		0.5	Pass
11		2462	mcs0	17	.89	0.5		Pass

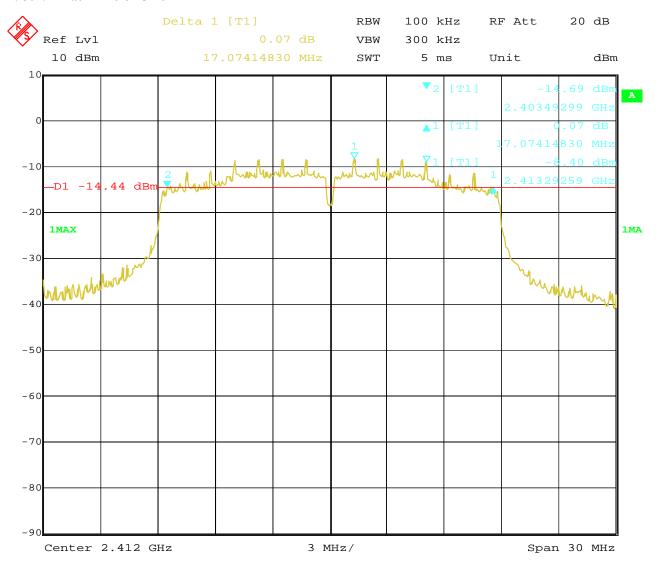
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Test Plots:

1. 802.11n at HT20 of CH01



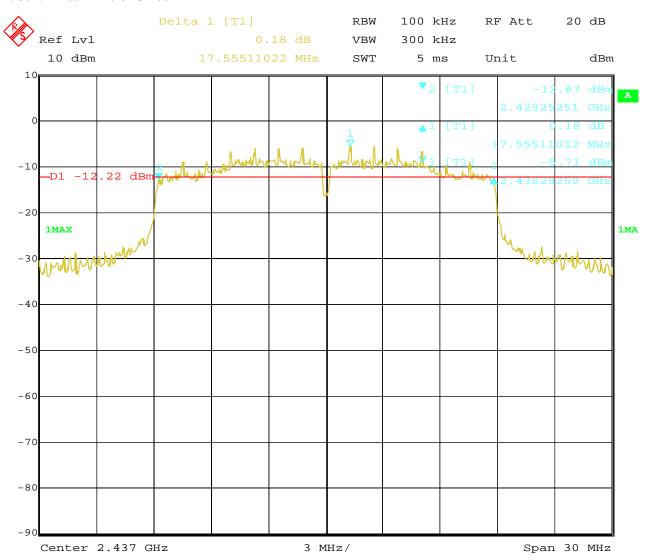
Date: 2.APR.2021 10:29:53

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2. 802.11n at HT20 of CH06



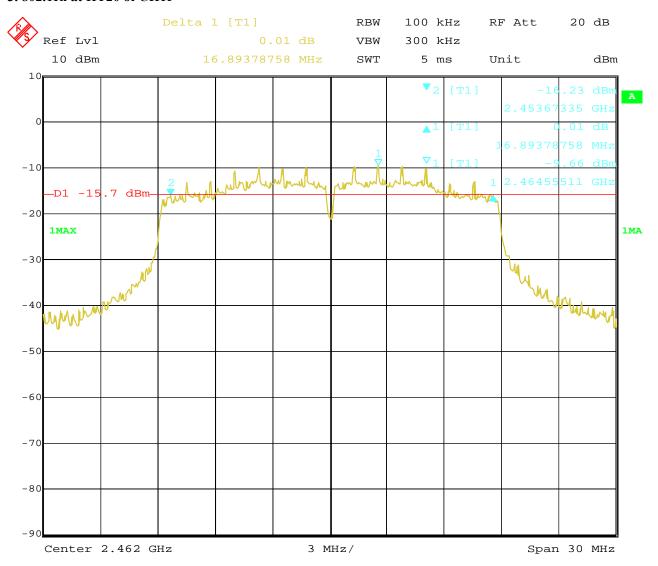
2.APR.2021 10:37:02 Date:

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3. 802.11n at HT20 of CH11



2.APR.2021 10:44:13 Date:

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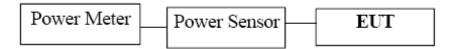
Date: 2021-04-02



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8. Maximum Output Power

8.1 Test Setup



8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the PK power was measured

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8.4Test Results

EUT		WIFI RING LIGHT		Model	WRP18	
Mode		802.11b		Input Voltage	DC12V	
Temperat	ure	24 deg. C,		Humidity	56% RH	
Channel	Frequ (MH	uency z)	Max. Power Output (dBm)		Power Limit (dBm)	Pass/ Fail
1	2412		15.21		30	Pass
6	2437		14.83		30	Pass
11	2462			16.05	30	Pass

Note: 1. At finial test to get the worst-case emission at 1Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

Power Output = Power Reading + Cable loss + Attenuator

3. The worse case was recorded

EUT		W	IFI RING LIGHT	Model	WRP18	
Mode			802.11g	Input Voltage	DC12V	
Temperat	ure	24 deg. C,		Humidity	56% RH	
Channel	Freque (MH	uency z)	Max. Power	r Output (dBm)	Power Limit (dBm)	Pass/ Fail
1	2412		16.56		30	Pass
6	2437		17.72		30	Pass
11	2462		1	15.86		Pass

Note: 1. At finial test to get the worst-case emission at 6Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow: Power Output = Power Reading + Cable loss + Attenuator

3. The worse case was recorded

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EUT		W	IFI RING LIGHT	Model	WRP18	
Mode			802.11n (HT20)	Input Voltage	DC12V	
Temperat	erature 24 deg. C,		24 deg. C,	Humidity	56% RH	
Channel	Frequ (MH	uency z)	Max. Power Output (dBm)		Power Limit (dBm)	Pass/ Fail
1	2412			16.31	30	Pass
6	2437			17.18	30	Pass
11	2462		,	15.02	30	Pass

Note: 1. At finial test to get the worst-case emission at mcs0 of 11n HT20 for CH01, CH06 and CH11

2. The result basic equation calculation as follow: Power Output = Power Reading + Cable loss + Attenuator

3. The worse case was recorded

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9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm/3kHz.

9.3 Test Procedure

- 1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
- 2. Set the RBW = 10 kHz.
- 3. Set the VBW \geq 30 kHz.
- 4. Set the span to 1.5 times the DTS channel bandwidth.
- 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.
- 11. The resulting peak PSD level must be $\leq 8 \text{ dBm/3kHz}$.

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9.4Test Result

EUT		WIFI RING LIC	GHT	Model	WRP18	
Mode		802.11b 11Mb	pps	Input Voltage	DC12V	
Temperat	ure	24 deg. C,		Humidity	56% RH	
Channel	F	requency (MHz)		r Spectral Density dBm/10kHz)	Limit (dBm/3kHz)	Pass/ Fail
1		2412		-14.10	8	Pass
6		2437		-14.16	8	Pass
11	2462			-13.74	8	Pass

EUT		WIFI RING LIC	GHT	Model	WRP18	
Mode		802.11b 1Mb _l	ps	Input Voltage	DC12V	
Temperat	ure	24 deg. C,		Humidity	56% RH	
Channel	F	requency (MHz)		r Spectral Density (dBm/10kHz)	Limit (dBm/3kHz)	Pass/ Fail
1		2412		-14.75	8	Pass
6		2437		-14.43	8	Pass
11		2462		-14.34	8	Pass

EUT		WIFI RING LIGHT		Model	WRP18	
Mode		802.11g 6Mbps		Input Voltage	DC12V	
Temperat	ure	e 24 deg. C,		Humidity	56% RH	
Channel	F	requency (MHz)		r Spectral Density (dBm/10kHz)	Limit (dBm/3kHz)	Pass/ Fail
1		2412		-17.31	8	Pass
6		2437		-14.14	8	Pass
11		2462		-19.21	8	Pass

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EUT		WIFI RING LIGHT		Model	WRP18	
Mode		802.11n HT20 mcs0		Input Voltage	DC12V	
Temperat	ure	24 deg. C	,	Humidity	56% RH	
Channel	Fr	requency (MHz)	ncy (MHz) Power S (dB		Limit (dBm/3kHz)	Pass/ Fail
1		2412		-18.25	8	Pass
6	2437			-14.43	8	Pass
11	·	2462		-19.43	8	Pass

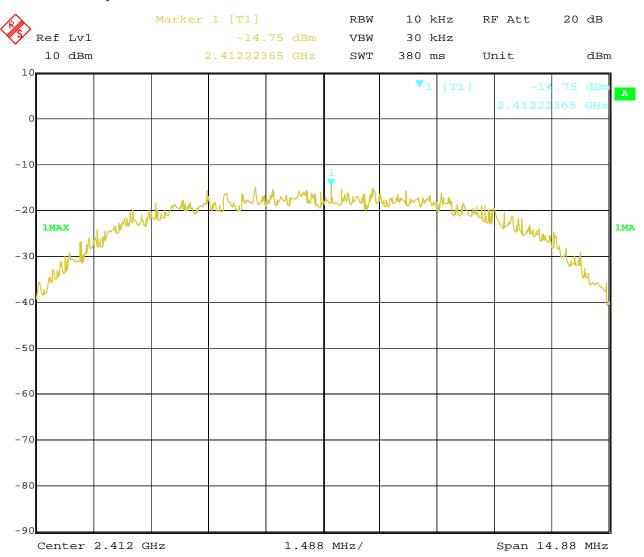
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9.5 Photo of Power Spectral Density Measurement

1.802.11b at 11Mbps of CH01



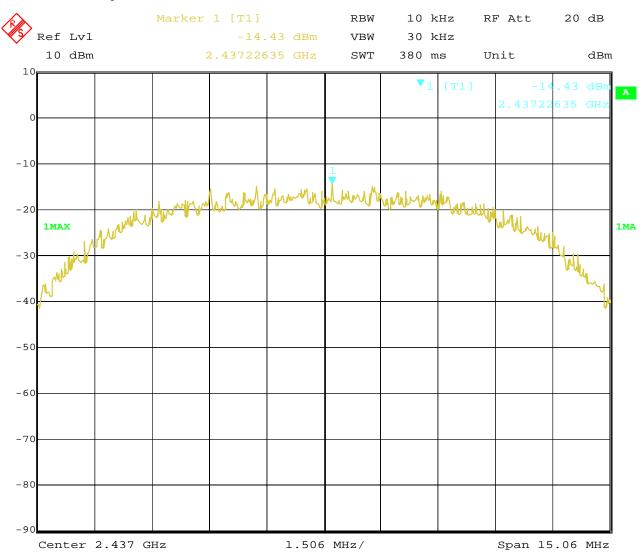
Date: 2.APR.2021 11:18:32

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2. 802.11b at 11Mbps at CH06



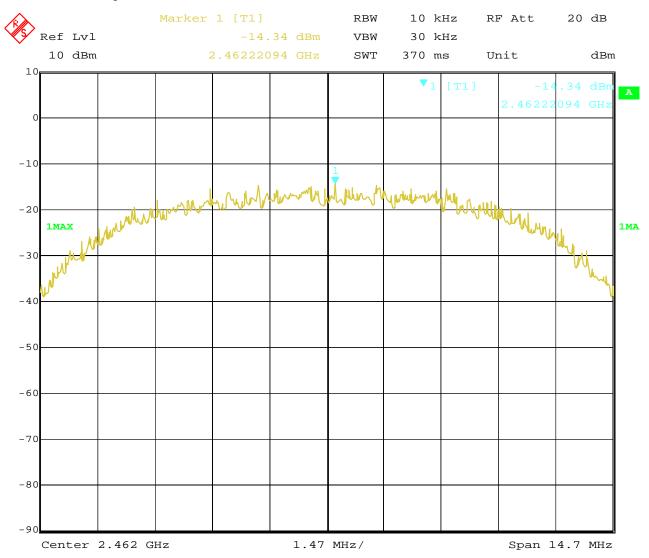
2.APR.2021 Date: 11:26:10

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3. 802.11b at 11Mbps of CH11



2.APR.2021 Date: 11:29:57

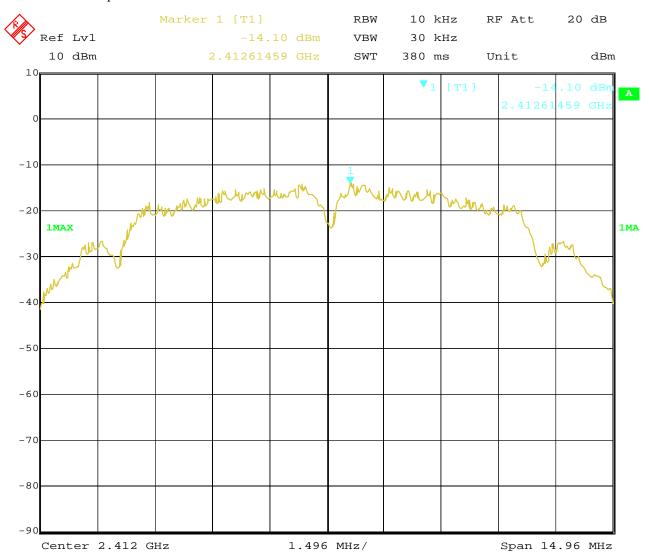
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4. 802.11b at 1Mbps of CH1



2.APR.2021 11:14:56 Date:

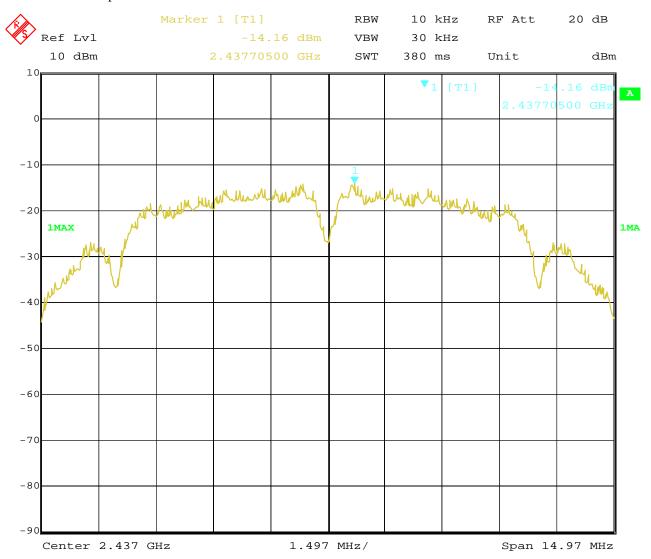
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5. 802.11b at 1Mbps of CH6



2.APR.2021 Date: 11:24:45

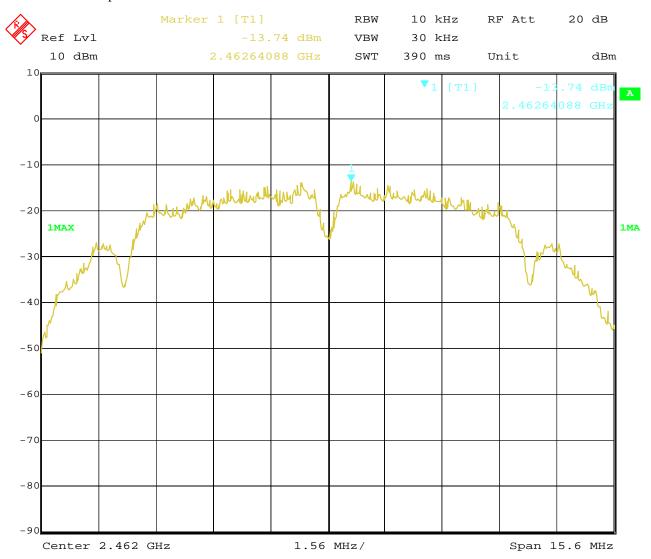
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6. 802.11b at 1Mbps of CH11



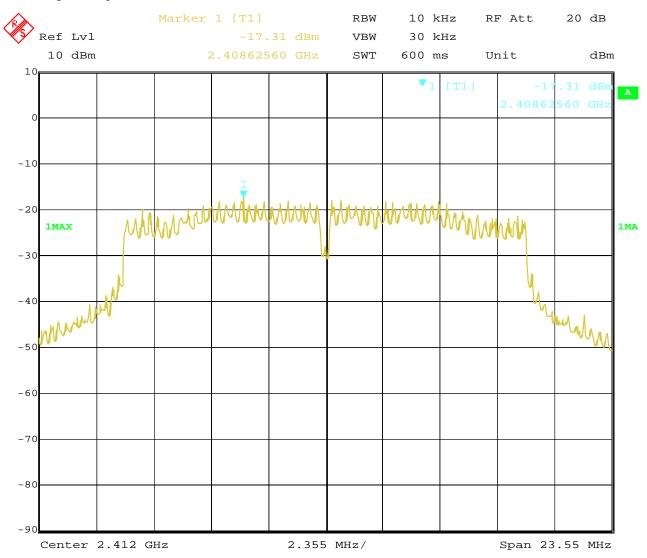
2.APR.2021 Date: 11:31:45 Page 51 of 80

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7. 802.11g at 6Mbps of CH1

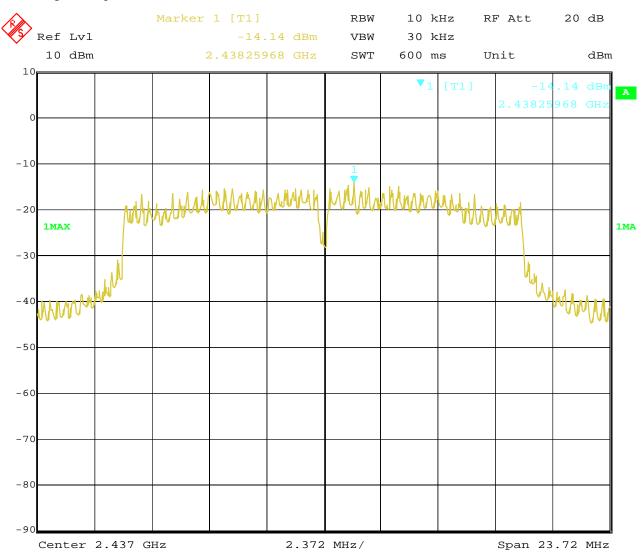


2.APR.2021 Date: 11:15:59

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8. 802.11g at 6Mbps of CH6



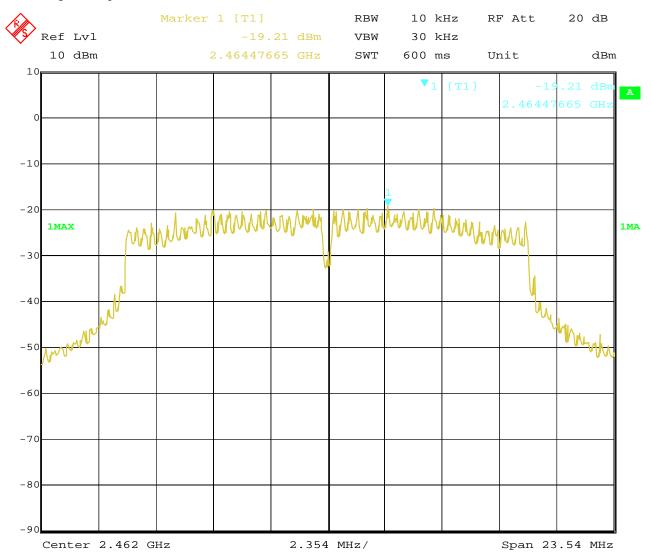
2.APR.2021 Date: 11:25:26

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9. 802.11g at 6Mbps of CH11



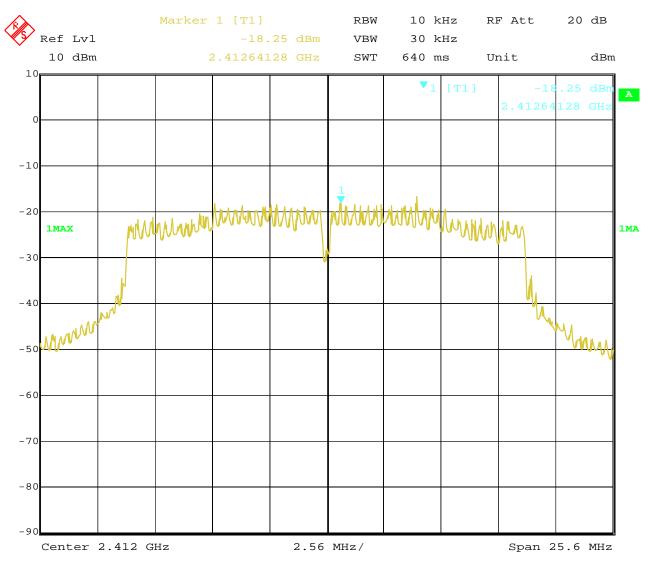
Date: 2.APR.2021 11:31:06

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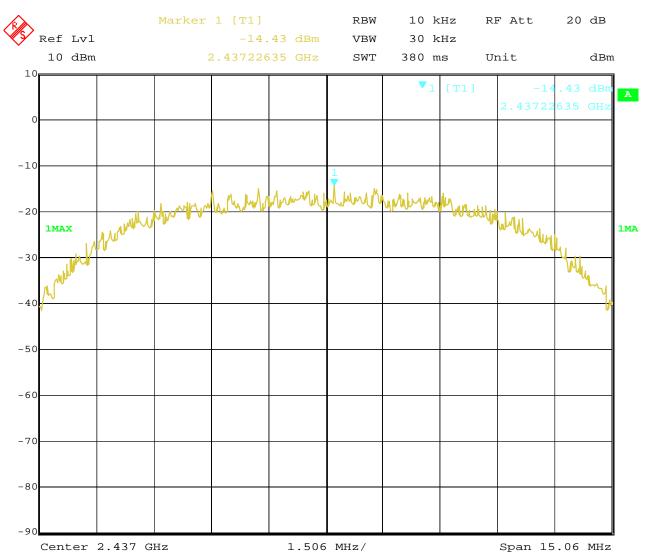
10. 802.11n at HT20 of CH01



2.APR.2021 Date: 11:20:57 Page 55 of 80

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11. 802.11n at HT20 of CH06



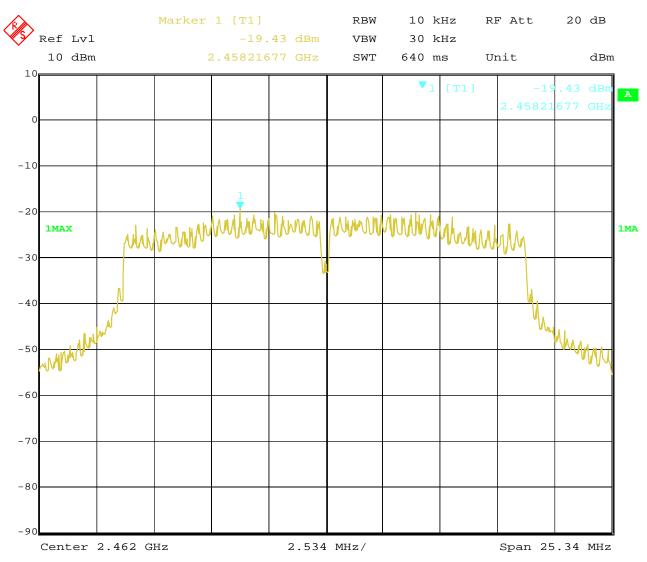
2.APR.2021 Date: 11:26:10

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12. 802.11n at HT20 of CH11



Date: 2.APR.2021 11:28:48 Report No.: TW2103123E

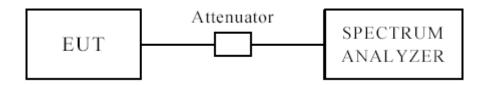
Date: 2021-04-02



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10 Out of Band Measurement

10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

10.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test.(Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

For bandage test, the spectrum set as follows: RBW=100, VBW=300 kHz. A conducted measurement used

10.4 Test Result

Please see next pages

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

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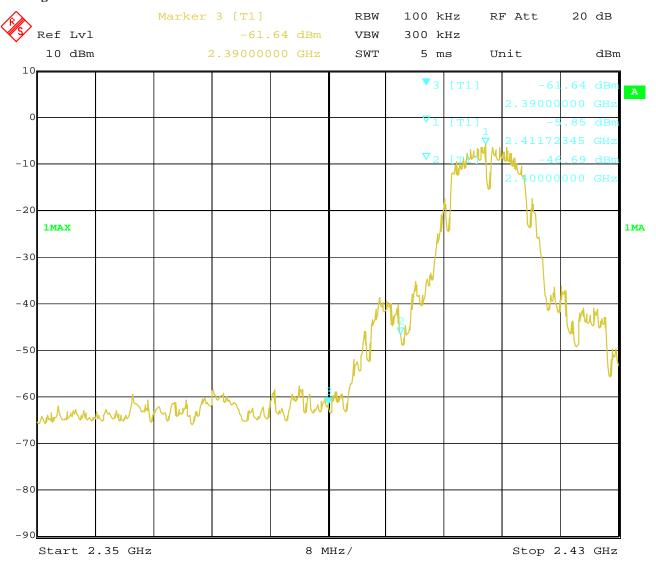
For 802.11b mode

CH01 at 1Mbps

10.4 Band-edge Measurement

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



1.APR.2021 21:31:43 Date:

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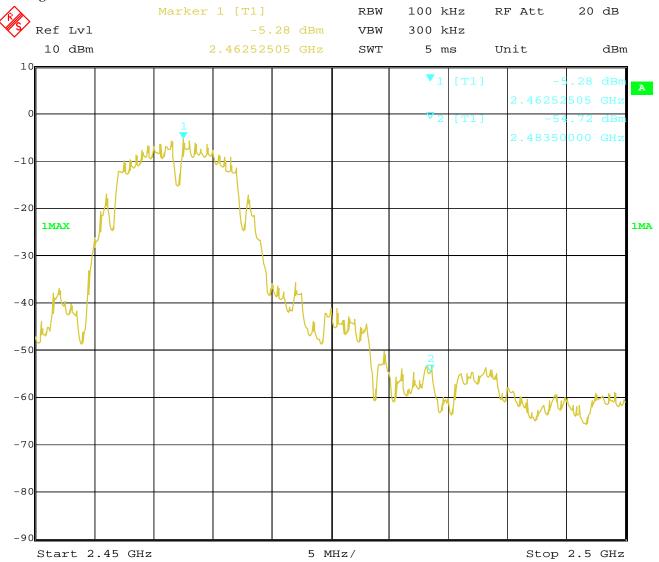


CH11 at 1Mbps

10.4 Band-edge Measurement

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



1.APR.2021 21:41:13 Date:

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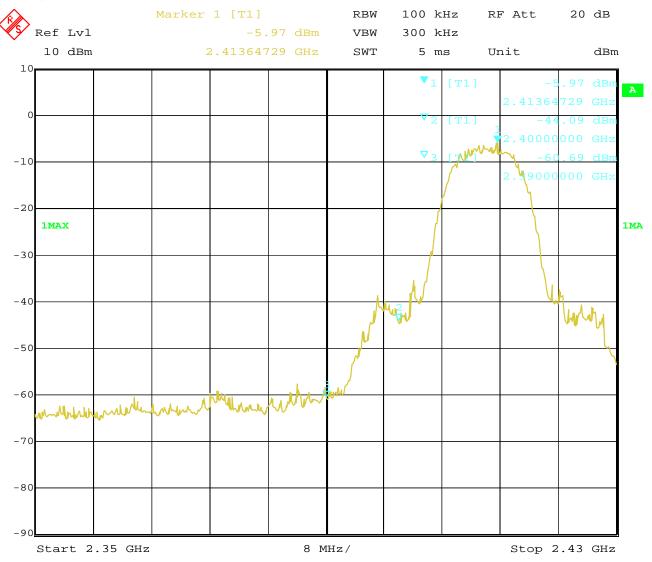
For 802.11b mode

CH01 at 11Mbps

10.4 Band-edge Measurement

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



1.APR.2021 21:32:52 Date:

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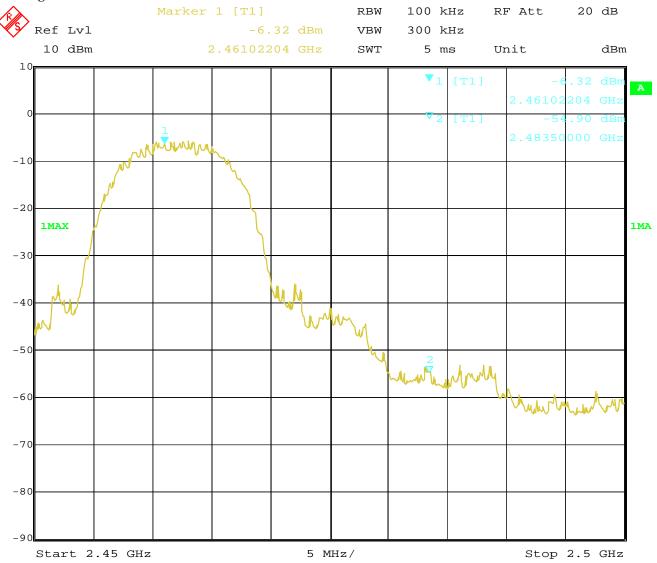


CH11 at 11Mbps

10.4 Band-edge Measurement

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



1.APR.2021 21:42:50 Date:

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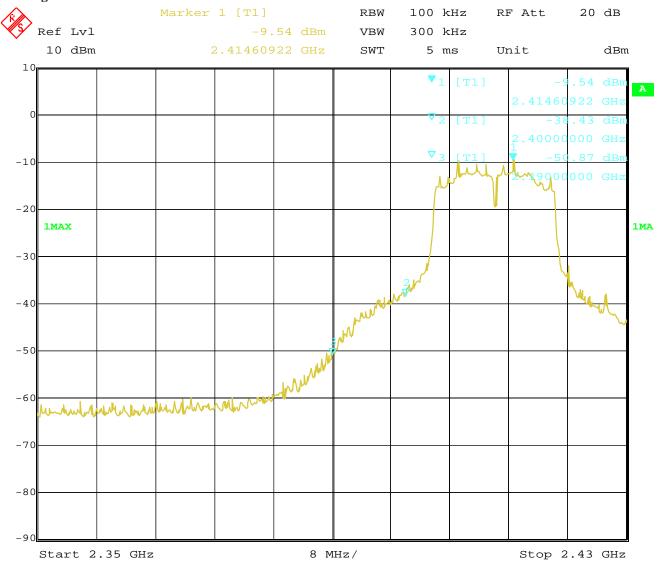
For 802.11g mode

CH01 at 6Mbps

10.4 Band-edge Measurement

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 1.APR.2021 21:33:47

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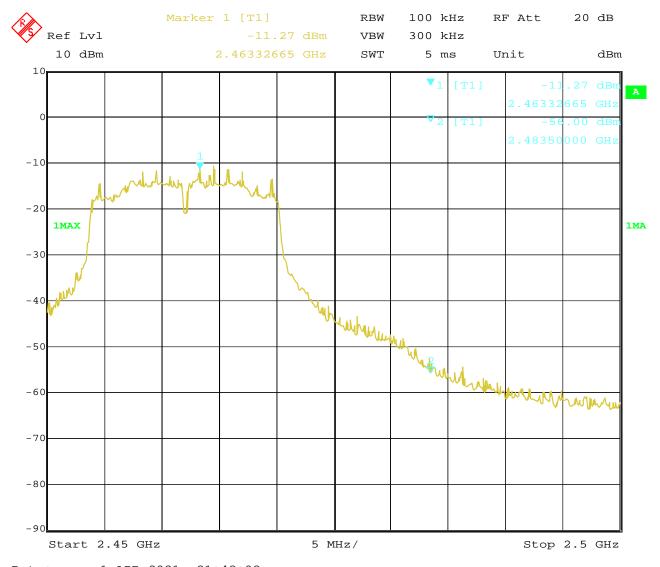


CH11 at 6Mbps

Band-edge Measurement 10.4

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



1.APR.2021 21:42:02 Date:

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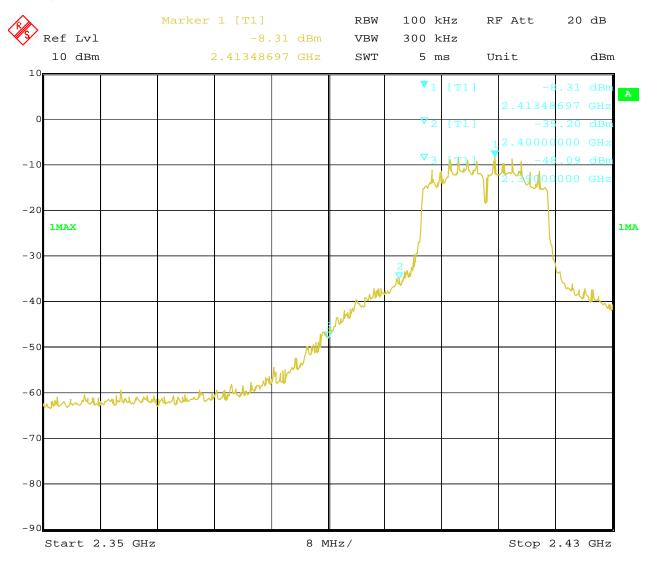
For 802.11n (HT20) mode

CH01 at mcs0

Band-edge Measurement 10.4

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



2.APR.2021 10:17:20 Date:

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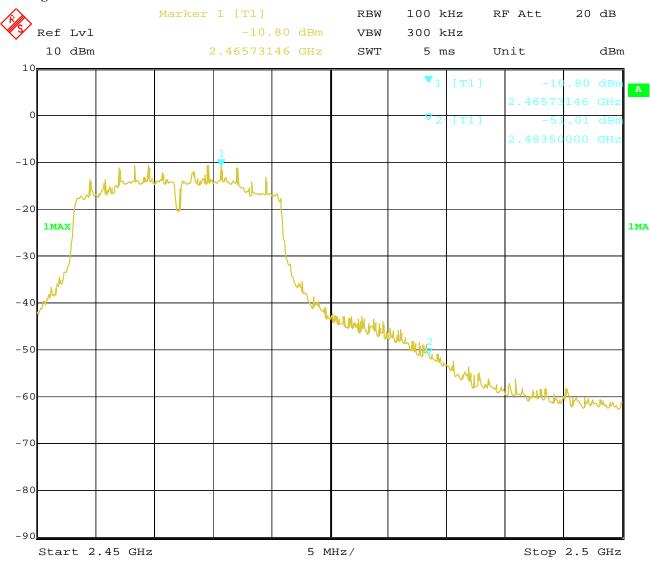


CH11 at mcs0

10.4 Band-edge Measurement

EUT	WIFI RING LIGHT	Model	WRP18
Mode	Keeping Transmitting	Input Voltage	DC12V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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10.5 Restricted band Measurement

EUT	WIFI RING LIGHT		Model	WRP18		
Mode	Keeping Transmitting		Input Voltage	DC12V		
Temperature	24 deg. C,		Humidity	56% RH		
Test Result:	Pass		Detector	PK		
802.11b mode, Low Channel, Horizontal						
2390	PK (dBµV/m)	46.78	Limit	$74(dB\mu V/m)$		
	AV (dBμV/m)		Limit	54(dBμV/m)		
802.11b mode, Vertical						
2390	PK (dBμV/m)	45.23	Limit	74(dBμV/m)		
	AV (dBμV/m)		Lillit	54(dBμV/m)		

10.5 Restricted band Measurement

EUT	WIFI RING LIGHT		Model	WRP18		
Mode	Keeping Transmitting		Input Voltage	DC12V		
Temperature	24 deg. C,		Humidity	56% RH		
Test Result:	Pass		Detector	PK		
802.11b mode, High Channel, Horizontal						
2483.5	PK (dBµV/m)	46.69	T 114	$74(dB\mu V/m)$		
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$		
802.11b mode, High Channel, Vertical						
2483.5	PK (dBμV/m)	46.20	Limit	74(dBμV/m)		
	AV (dBμV/m)			$54(dB\mu V/m)$		

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10.5 Restricted band Measurement

EUT	WIFI RING LIGHT		Model	WRP18		
Mode	Keeping	Keeping Transmitting		DC12V		
Temperature	24	24 deg. C,		56% RH		
Test Result:		Pass		PK		
802.11g mode, Low Channel, Horizontal						
2390	PK (dBμV/m)	48.88	Limit	$74(dB\mu V/m)$		
	AV (dBμV/m)		Limit	54(dBμV/m)		
802.11g mode, Vertical						
2390	PK (dBμV/m)	48.16	I imit	$74(dB\mu V/m)$		
	AV (dBμV/m)		- Limit	54(dBμV/m)		

10.5 Restricted band Measurement

10.5 Restricted data violationent						
EUT	WIFI RING LIGHT		Model	WRP18		
Mode	Keeping Transmitting		Input Voltage	DC12V		
Temperature	24 deg. C,		Humidity	56% RH		
Test Result:	Pass		Detector	PK		
802.11g mode, High Channel, Horizontal						
2483.5	PK (dBµV/m)	49.33	T ' '/	$74(dB\mu V/m)$		
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$		
802.11g mode, High Channel, Vertical						
2483.5	PK (dBµV/m)	48.74	T ::4	74(dBμV/m)		
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$		

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10.5 Restricted band Measurement

EUT	WIFI RING LIGHT		Model	WRP18		
Mode	Keeping Transmitting		Input Voltage	DC12V		
Temperature	24 deg. C,		Humidity	56% RH		
Test Result:	Pass		Detector	PK		
802.11n HT20 mode, Low Channel, Horizontal						
2390	PK (dBμV/m)	49.08	Limit	$74(dB\mu V/m)$		
	AV (dBμV/m)		Limit	54(dBμV/m)		
802.11n HT20 mode, Low Channel, Vertical						
2390	PK (dBμV/m)	48.67	T ::4	$74(dB\mu V/m)$		
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$		

10.5 Restricted band Measurement

EUT	WIFI RING LIGHT		Model	WRP18		
Mode	Keeping Transmitting		Input Voltage	DC12V		
Temperature	24 deg. C,		Humidity	56% RH		
Test Result:	Pass		Detector	PK		
802.11n HT20 mode, High Channel, Horizontal						
2483.5	PK (dBµV/m)	49.20	T :!4	$74(dB\mu V/m)$		
	AV (dBμV/m)		Limit	54(dBμV/m)		
802.11n HT20 mode, High Channel, Vertical						
2483.5	PK (dBμV/m)	49.39	T ::4	74(dBμV/m)		
	AV (dBμV/m)		Limit	$54(dB\mu V/m)$		

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11.0 Antenna Requirement

11.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected construction

PCB antenna used. The gain of 2.5dBi.

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12.0 FCC ID Label

FCC ID: 2ANIV-WRP18

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



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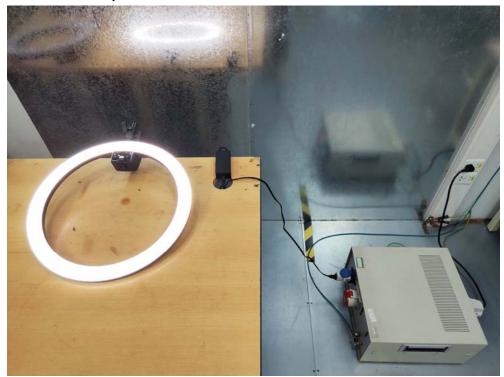
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13.0 **Photo of testing**

Conducted Emission Test Setup:



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Radiated Emission Test Setup:





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Photographs - EUT

Outside View





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Outside View





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Outside View





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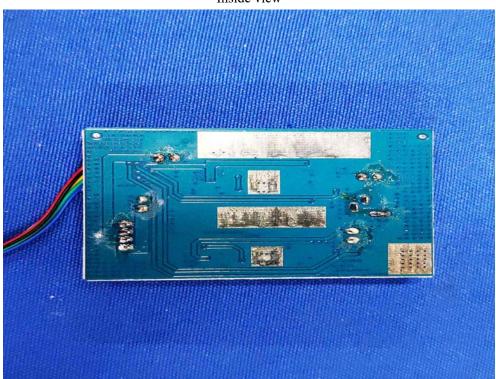
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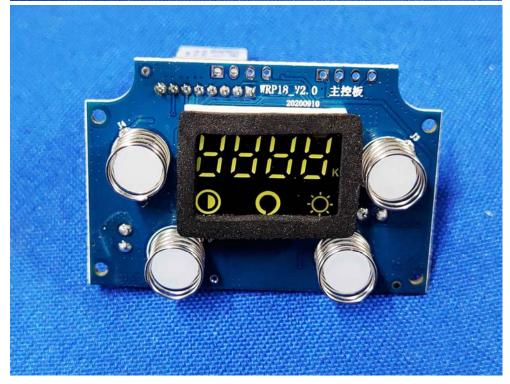
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Inside view





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Inside view





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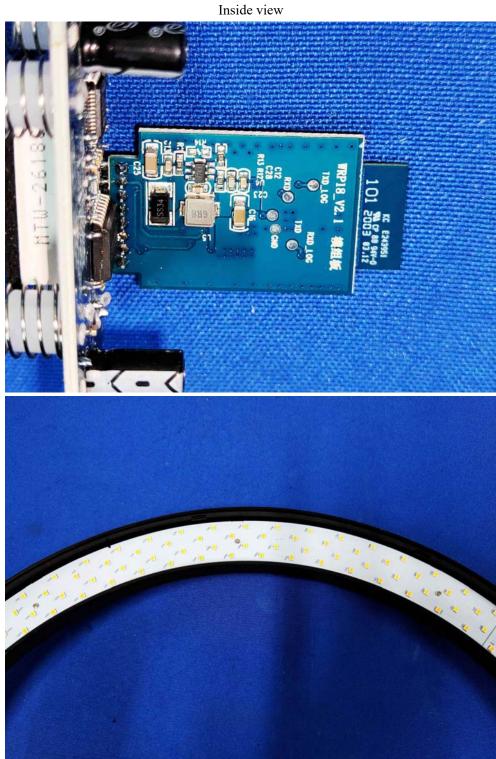
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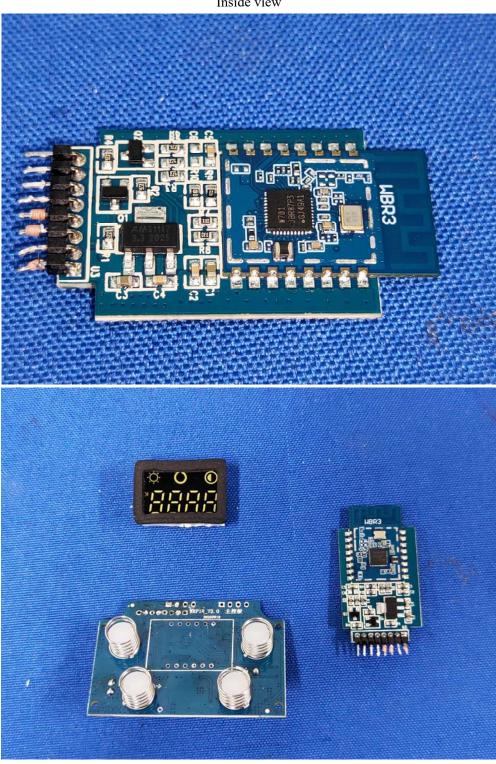
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Inside view



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