



Test report No. : 4789507582-US-R0-V0
Page : 1 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

RADIO TEST REPORT

Product : 2x2 802.11 A/B/G/N/AC WIFI+ Bluetooth Module

Model Name : QCNFA324

FCC ID : 2AWKZ-QCNFA324

Test Regulation : FCC 47 CFR Part 15 Subpart C (Section 15.247)

Received Date : Jun. 9, 2020

Test Date : Jun. 11, 2020 ~ Nov 12, 2020

Issued Date : Dec. 15, 2020

Applicant : ENLI INCORPORATION
4F., No. 42, Aly. 5, Ln. 12, Sec. 3, Bade Rd., Songshan
Dist., Taipei 10559, Taiwan

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building B and Building E, No. 372-7, Sec. 4, Zhongxing
Rd., Zhudong Township, Hsinchu County, Taiwan



The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report are responsible of the test sample(s) provided by the client only and are not to be used to indicate applicability to other similar products.

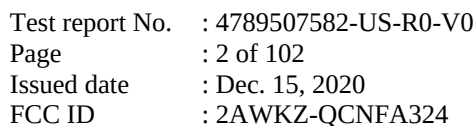
Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Original Test Report No.: 4789507582-US-R0-V0

Underwriters Laboratories Taiwan Co., Ltd.

Telephone :+886-2-7737-3000

Doc No: 17-EM-F0876 / 5.0



Table Of Contents

1. Attestation of Test Results	4
2. Summary of Test Results	5
3. Test Methodology and Reference Procedures.....	6
4. Facilities and Accreditation	6
5. Measurement Uncertainty	7
6. Equipment under Test	8
6.1. Description of EUT	8
6.2. Channel List	9
6.3. Test Condition	10
6.4. Description Of Available Antennas	10
6.5. Test Mode Applicability and Tested Channel Detail.....	11
6.6. Duty cycle	12
7. Test Equipment.....	13
8. Description of Test Setup.....	15
9. Test Results.....	16
9.1. 6dB Bandwidth	16
9.2. Conducted output power	19
9.3. Power Spectral Density	22
9.4. Conducted Out of Band Emission.....	26
9.5. Radiated Spurious Emission	39
9.6. AC Power Line Conducted Emission	73
Appendix I Radiated Band Edge Measurement	79
Appendix II Radiated Spurious Emission Measurement	95



Test report No. : 4789507582-US-R0-V0
Page : 4 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

1. Attestation of Test Results

APPLICANT: ENLI INCORPORATION
4F., No. 42, Aly. 5, Ln. 12, Sec. 3, Bade Rd., Songshan Dist.,
Taipei 10559, Taiwan

MANUFACTURER ENLI INCORPORATION
4F., No. 42, Aly. 5, Ln. 12, Sec. 3, Bade Rd., Songshan Dist.,
Taipei 10559, Taiwan

EUT DESCRIPTION: 2x2 802.11 A/B/G/N/AC WIFI+ Bluetooth Module

BRAND: ENLI

MODEL: QCNFA324

SAMPLE STAGE: Identical Prototype

DATE of TESTED: Jun. 11, 2020 ~ Nov 12, 2020

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart C (Section 15.247)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Sally Lu
Project Handler

Date : Dec. 15, 2020

Approved and Authorized By:

Waternil Guan Date : Dec. 15, 2020
Engineer

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)	Conducted Output Power	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Antenna Port Emission	PASS
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS
15.207	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	PASS

Note:

1. For the Radiated Band Edge test plots were recorded in Appendix I, the Radiated Emissions test plots were recorded in Appendix II.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB558074 D01 Meas Guidance v05r02, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013 and KDB 662911 D01 Multiple Transmitter Output v02r01.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398. The full scope of accreditation can be viewed at http://accreditation.taftw.org.tw/taf/public/basic/viewApplyItems.action?unitNo=3398

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



5. Measurement Uncertainty

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Test Item	Measurement Frequency Range	K	U(dB)
Conducted disturbance at mains terminals ports	0.15MHz ~ 30MHz	2	1.5
RF Conducted	9 kHz - 40GHz	2	1.0
Radiated disturbance below 30MHz	9 kHz - 30 MHz	2	1.9
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	2	5.4
Radiated disturbance above 1GHz	1GHz ~ 40GHz	2	4.7

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



6. Equipment under Test

6.1. Description of EUT

Product	2x2 802.11 A/B/G/N/AC WIFI+ Bluetooth Module
Brand Name	ENLI
Model Name	QCNFA324
S/N	E4AAEA8A1CE1
Operating Frequency	2412MHz ~ 2462MHz
Modulation	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to MCS15
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Maximum Output Power	802.11b: 21.25 dBm 802.11g: 24.24 dBm 802.11n (HT20): 26.57 dBm 802.11n (HT40): 26.49 dBm
Normal Voltage	3.3Vdc
Software Version	N/A

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx,Rx Function
802.11b	1TX,1RX
802.11g	1TX,1RX
802.11n (HT20)	2TX,2RX
802.11n (HT40)	2TX,2RX

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



2. The EUT contains following accessory devices.

Product	Brand	Model	Ant. Type	Frequency Band (MHz)	Antenna Gain(dBi)
Ant 1	ANJIE Electronics	AEDQ4S-B0003	Dipole	2400 ~ 2500	5
				5150 ~ 5250	5.1
				5250 ~ 5350	5.1
				5470 ~ 5725	5.3
				5725 ~ 5850	5.3
Ant 2	ANJIE Electronics	AJDP2J-C0012	PIFA	2400 ~ 2500	3.62
				5150 ~ 5250	5
				5250 ~ 5350	5
				5470 ~ 5725	6
				5725 ~ 5850	5.8

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

6.2. Channel List

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz	-	-

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz	-	-

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	23~26°C / 63~68%RH	120Vac / 60 Hz	Jun. 11, 2020 ~ Nov 12, 2020	Mike Cai
Radiated Spurious Emission	966-2	22~26°C / 62~68%RH	120Vac / 60 Hz	Jun. 11, 2020 ~ Nov 12, 2020	Mike Cai
AC power Line Conducted Emission	SR1	23~25°C / 63~68%RH	120Vac / 60 Hz	Jun. 11, 2020 ~ Nov 12, 2020	Mike Cai

FCC Test Firm Registration Number: 498077

6.4. Description Of Available Antennas

Ant. No.	Brand Name	Model Name	Ant. Type	Ant. Gain (dBi)
1	ANJIE Electronics	AEDQ4S-B0003	Dipole	5
2	ANJIE Electronics	AJDP2J-C0012	PIFA	3.62

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



6.5. Test Mode Applicability and Tested Channel Detail

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.
- 11b/g with antenna diversity function, the worst-case was be chosen via radiated emission pre-scan.
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- The fundamental of the EUT was investigated in three orthogonal axes X-Y/Y-Z/-X-Z, it was determined that Y-Z axis was worst-case. Therefore, all final radiated testing was performed with the EUT in Y-Z axis.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For AC power line conducted emissions, the pre-scan has been determined by AC power 120Vac/60Hz (worst case)

Test item	Mode	Modulation Technology	Modulation Type	Available Channel	Test Channel	Data Rate	Antenna Type
Radiated Emissions (Above 1GHz)	802.11b	DSSS	DBPSK	1 to 11	1,6,11	1.0	Dipole & PIFA
	802.11g	OFDM	BPSK	1 to 11	1,6,11	6.0	
	802.11n(HT20)	OFDM	BPSK	1 to 11	1,6,11	MCS0	
	802.11n(HT40)	OFDM	BPSK	3 to 9	3,6,9	MCS0	
Radiated Emissions (Below 1GHz)	802.11b	OFDM	BPSK	1 to 11	1, 6	MCS0	Dipole & PIFA
AC Power Line Conducted Emission	802.11b	OFDM	BPSK	1 to 11	6	MCS0	PIFA (Worst Case)
Antenna Port Conducted Measurement	802.11b	DSSS	DBPSK	1 to 11	1,6,11	1.0	N/A
	802.11g	OFDM	BPSK	1 to 11	1,6,11	6.0	
	802.11n(HT20)	OFDM	BPSK	1 to 11	1,6,11	MCS0	
	802.11n(HT40)	OFDM	BPSK	3 to 9	3,6,9	MCS0	

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



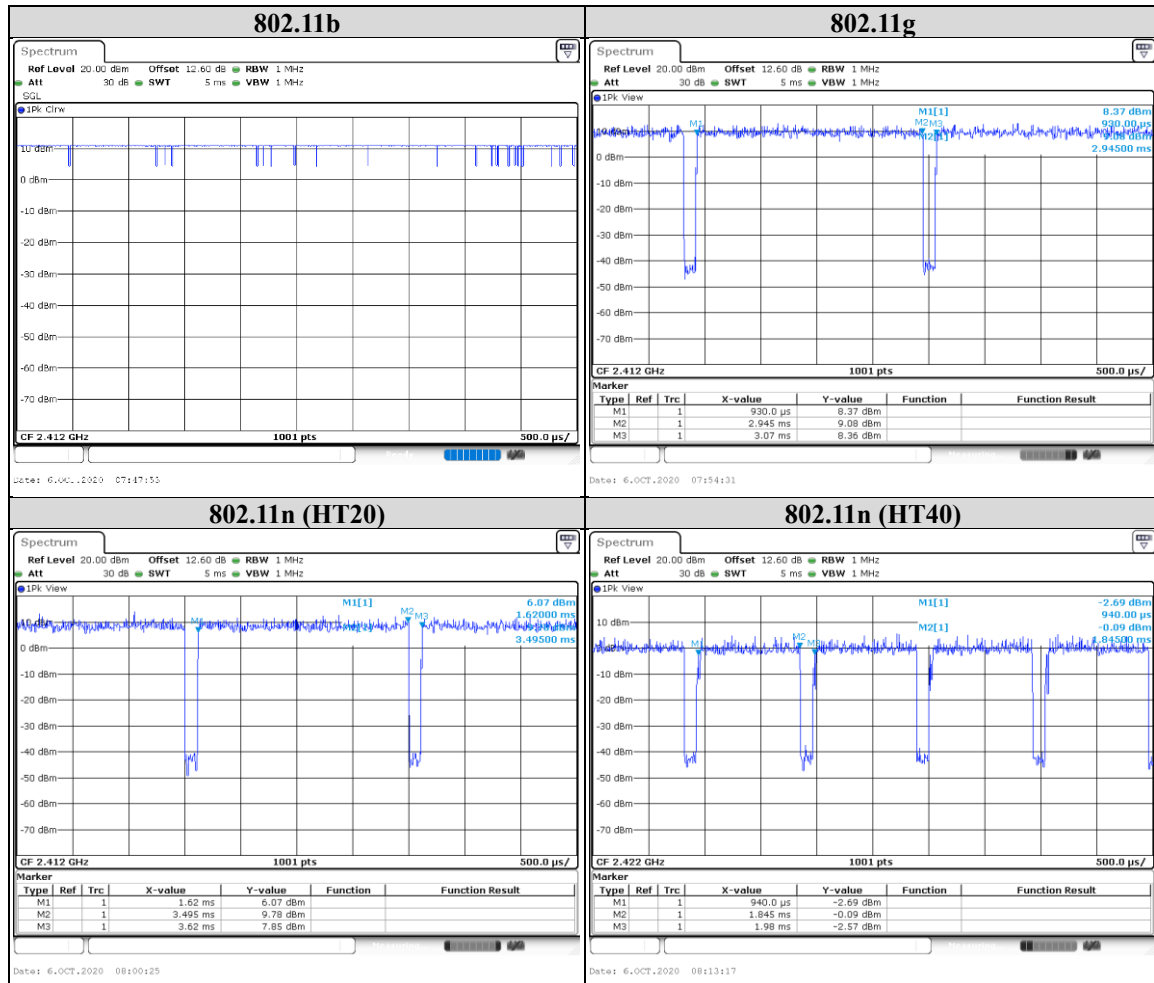
6.6. Duty cycle

802.11b: Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11g: Duty cycle = $2.015 / 2.14 = 0.942$, Duty factor = $10 * \log(1/0.942) = 0.26$

802.11n (HT20): Duty cycle = $1.875 / 2 = 0.938$, Duty factor = $10 * \log(1/0.938) = 0.28$

802.11n (HT40): Duty cycle = $0.905 / 1.04 = 0.87$, Duty factor = $10 * \log(1/0.87) = 0.6$





7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	Nov. 13, 2019 Nov. 11, 2020	1 year
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	Dec. 17, 2019	1 year
Loop Antenna	ETS lindgren	6502	00213440	Dec. 19, 2019	1 year
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	Jan. 3, 2020	1 year
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	Jan. 3, 2020	1 year
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	Dec. 27, 2019	1 year
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	Feb. 4, 2020	1 year
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	Feb. 4, 2020	1 year
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	May. 8, 2019	1 year
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	Jan. 8, 2020	1 year
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	Jan. 8, 2020	1 year

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 14 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Antenna Port Conducted Measurement					
Spectrum Analyzer	Keysight	N9010A	MY56070834	Nov. 6, 2019	1 year
				Nov. 6, 2020	
Pulse Power Sensor	Anrisu	MA2411B	1531202	Dec. 23, 2019	1 year
Power Meter	Anrisu	ML2495A	1645002	Dec. 23, 2019	1 year
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	Nov. 19, 2019	1 year
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	Aug. 8, 2019	1 year
				Aug. 19, 2020	
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	Aug. 6, 2019	1 year
				Aug. 12, 2020	
Cables	HARBOUR INDUSTRIES	LL142	170205-5000-1	Feb. 5, 2020	1 year

UL Software		
Description	Name	Version
Radiated measurement	EZ EMC	1.1.4.2
Conducted measurement	Keysight.TestSystem	1.0.0.0
AC power Line Conducted Emission	EZ EMC	1.1.4.2

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



8. Description of Test Setup

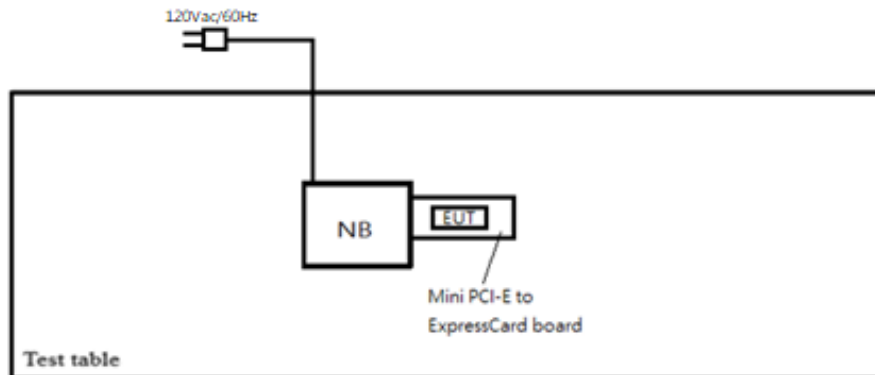
Support Equipment

Equipment	Brand Name	Model Name	S/N	Remark
Notebook	Lenovo	T430	PBE38AK	N/A
Mini PCI-E to ExpressCard board	N/A	N/A	N/A	N/A

Test Setup

Controlled using a bespoke application (QCARCT V3.0.203.0) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

Setup Diagram for Test



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



9. Test Results

9.1. 6dB Bandwidth

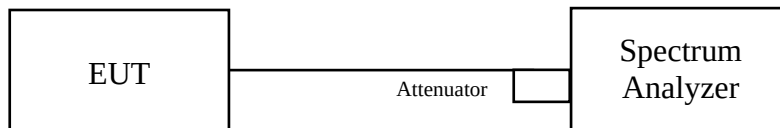
Requirements

The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test Data

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	7.073	0.5	Pass
6	2437	7.073	0.5	Pass
11	2462	7.073	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.305	0.5	Pass
6	2437	15.105	0.5	Pass
11	2462	15.105	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.105	15.145	0.5	Pass
6	2437	15.025	15.105	0.5	Pass
11	2462	15.105	15.345	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.085	35.085	0.5	Pass
6	2437	35.085	35.085	0.5	Pass
9	2452	35.005	35.005	0.5	Pass

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

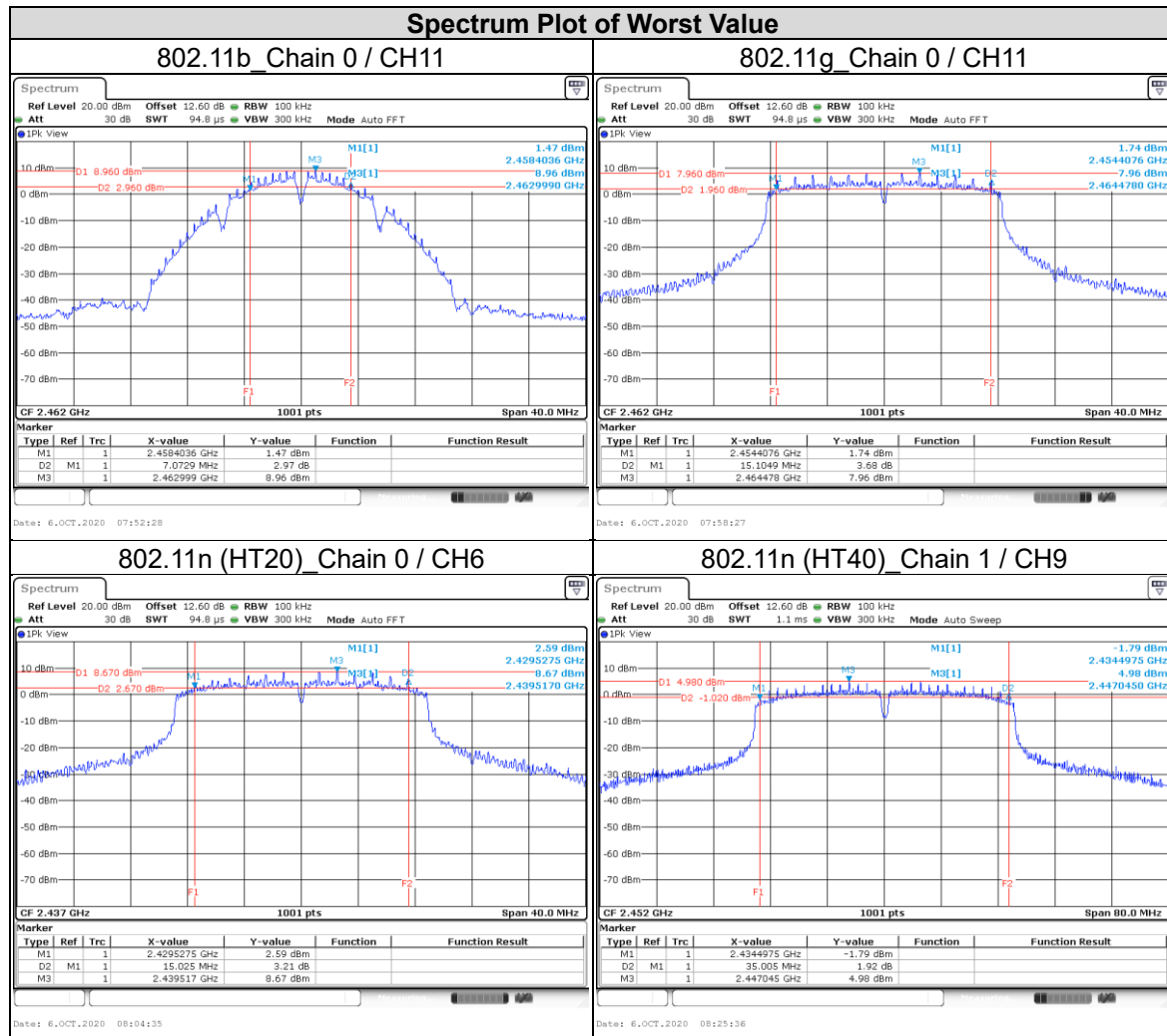
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 18 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



9.2. Conducted output power

Requirements

For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

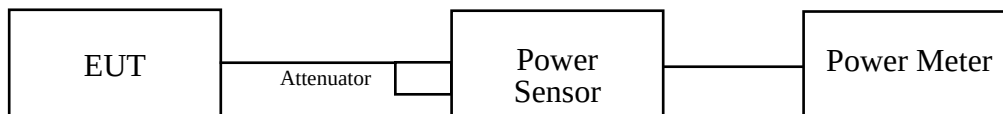
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

Test Procedure

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Test Setup



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test Data

Peak Power

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	133.35	21.25	30	Pass
6	2437	123.88	20.93	30	Pass
11	2462	129.42	21.12	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	260.62	24.16	30	Pass
6	2437	252.93	24.03	30	Pass
11	2462	265.46	24.24	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.42	23.49	443.14	26.47	30	Pass
6	2437	23.49	23.63	454.03	26.57	30	Pass
11	2462	23.38	23.54	443.72	26.47	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	23.31	23.51	438.68	26.42	30	Pass
6	2437	23.35	23.61	445.89	26.49	30	Pass
9	2452	23.39	23.55	444.74	26.48	30	Pass

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Average Power (Reference Only)

802.11b

Channel	Frequency (MHz)	Total Power (mW)	Total Power (dBm)
1	2412	70.47	18.48
6	2437	68.55	18.36
11	2462	70.15	18.46

802.11g

Channel	Frequency (MHz)	Total Power (mW)	Total Power (dBm)
1	2412	69.50	18.42
6	2437	65.92	18.19
11	2462	68.08	18.33

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	18.36	18.49	139.18	21.44
6	2437	18.45	18.48	140.45	21.48
11	2462	18.39	18.46	139.17	21.44

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	17.34	17.48	110.18	20.42
6	2437	17.27	17.45	108.92	20.37
9	2452	17.35	17.48	110.30	20.43

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



9.3. Power Spectral Density

Requirements

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz (If $G_{TX} > 6$ dBi, then $PSD = 8 - (G_{TX} - 6)$).

Note:

1. PSD = power spectral density that the same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz.
2. G_{TX} = the maximum transmitting antenna directional gain in dBi.
3. Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{Gn/20})^2 / Nant]$ dBi.

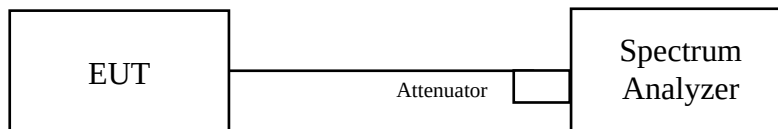
Nant: Number of Transmit Antennas

G1, G2,..., Gn: Gain of Individual Antennas

Test procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set the VBW $\geq 3 \times \text{RBW}$.
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test Data

802.11b

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-4.27	8	Pass
6	2437	-4.63	8	Pass
11	2462	-4.24	8	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-5.04	8	Pass
6	2437	-4.21	8	Pass
11	2462	-4.97	8	Pass

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



802.11n (HT20)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-6.99	3.01	-3.98	5.99	Pass
	6	2437	-5.21	3.01	-2.20	5.99	Pass
	11	2462	-4.80	3.01	-1.79	5.99	Pass
1	1	2412	-6.09	3.01	-3.08	5.99	Pass
	6	2437	-5.17	3.01	-2.16	5.99	Pass
	11	2462	-4.83	3.01	-1.82	5.99	Pass

NOTE: Directional gain = 8.01 dBi > 6 dBi , so the limit shall be reduced.

802.11n (HT40)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	3	2422	-11.31	3.01	-8.30	5.99	Pass
	6	2437	-8.35	3.01	-5.34	5.99	Pass
	9	2452	-8.81	3.01	-5.80	5.99	Pass
1	3	2422	-10.34	3.01	-7.33	5.99	Pass
	6	2437	-9.28	3.01	-6.27	5.99	Pass
	9	2452	-8.38	3.01	-5.37	5.99	Pass

NOTE: Directional gain = 8.01 dBi > 6 dBi , so the limit shall be reduced.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

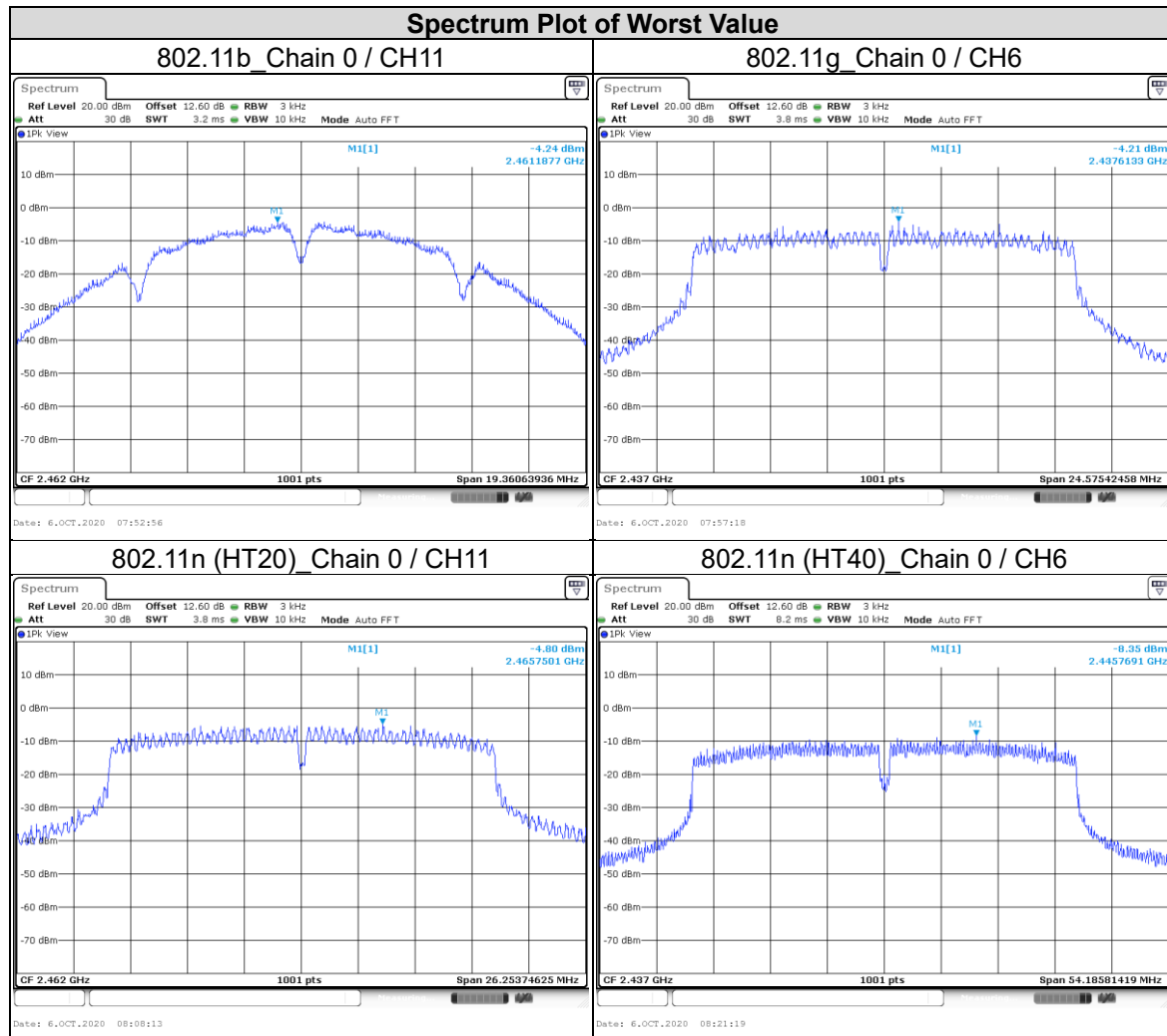
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 25 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



9.4. Conducted Out of Band Emission

Requirements

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 §15.209 (a) is not required.

Test procedure

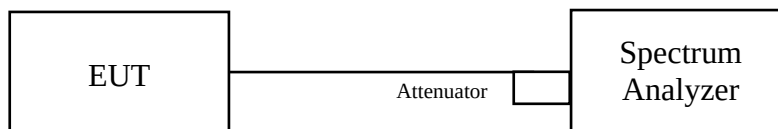
Measurement Procedure REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

Measurement Procedure OOBE

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

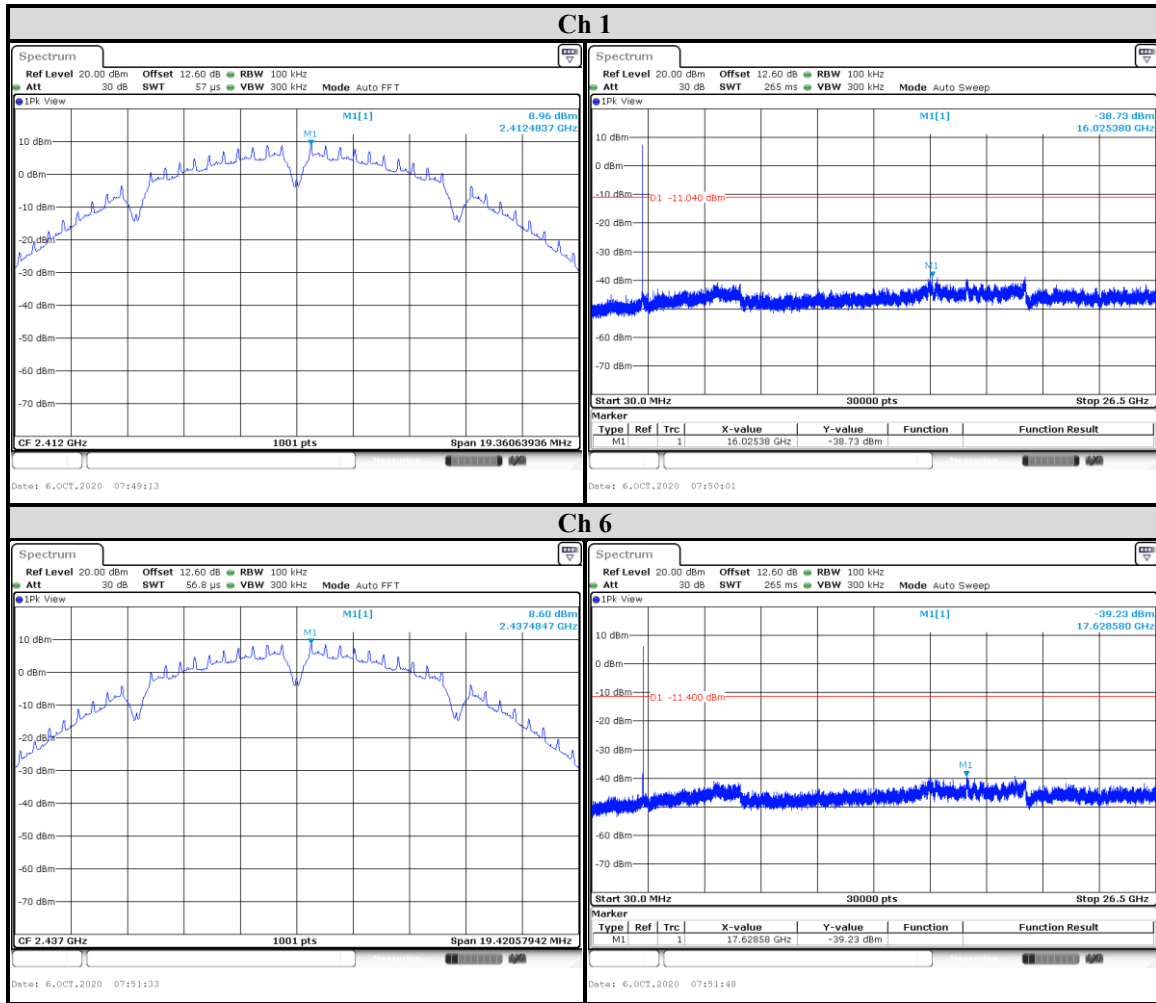
Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 27 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

Test Data

802.11b



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

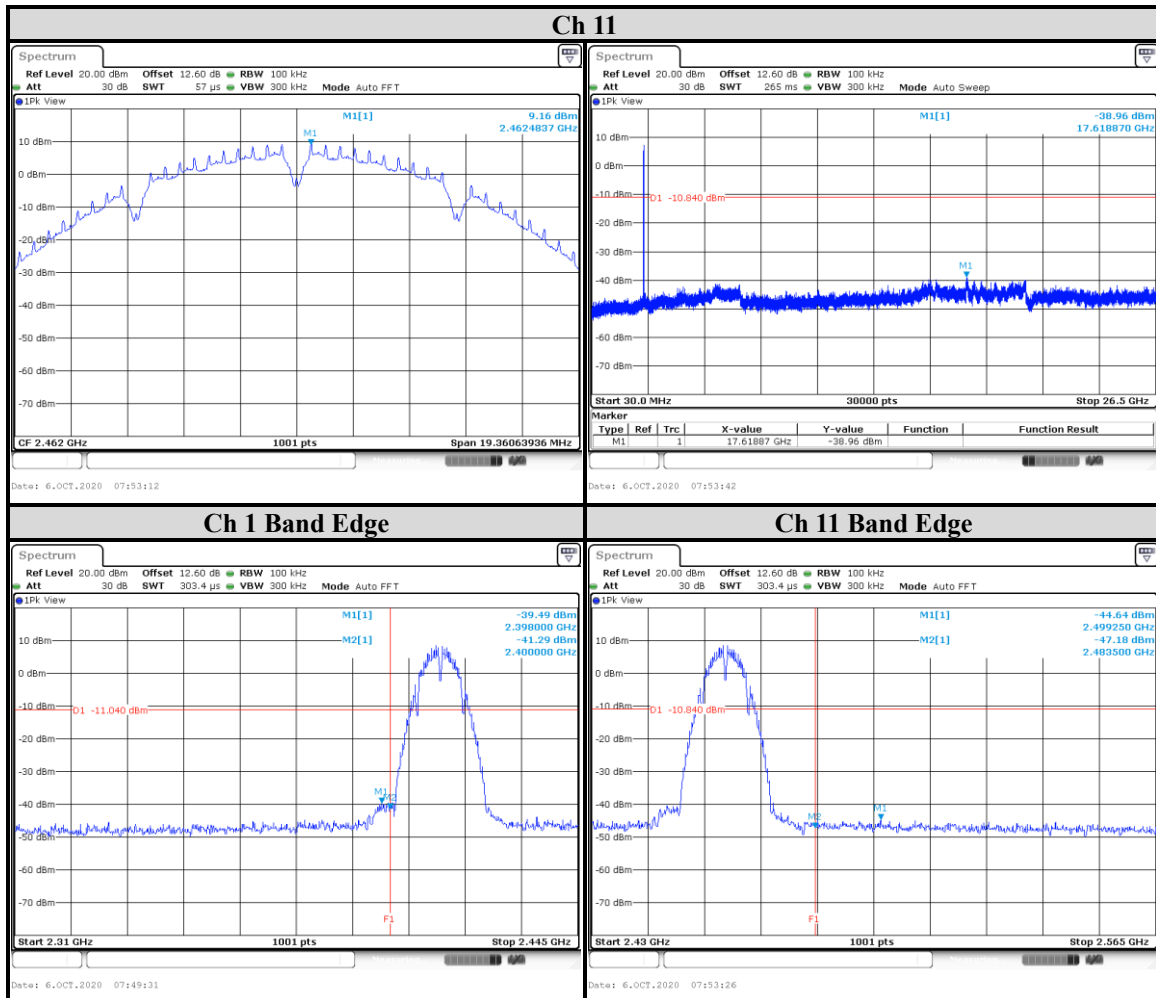
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 28 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

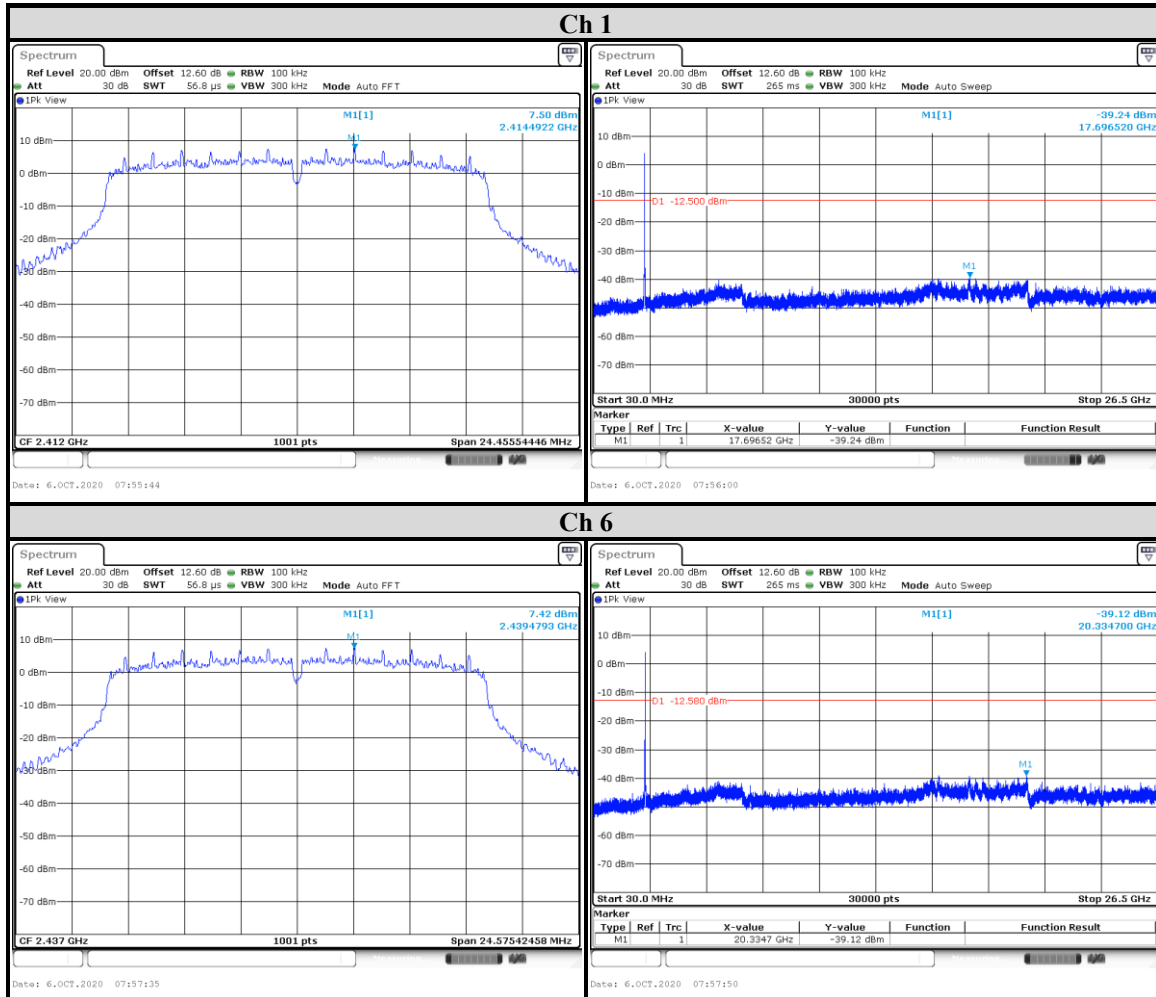
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



802.11g



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

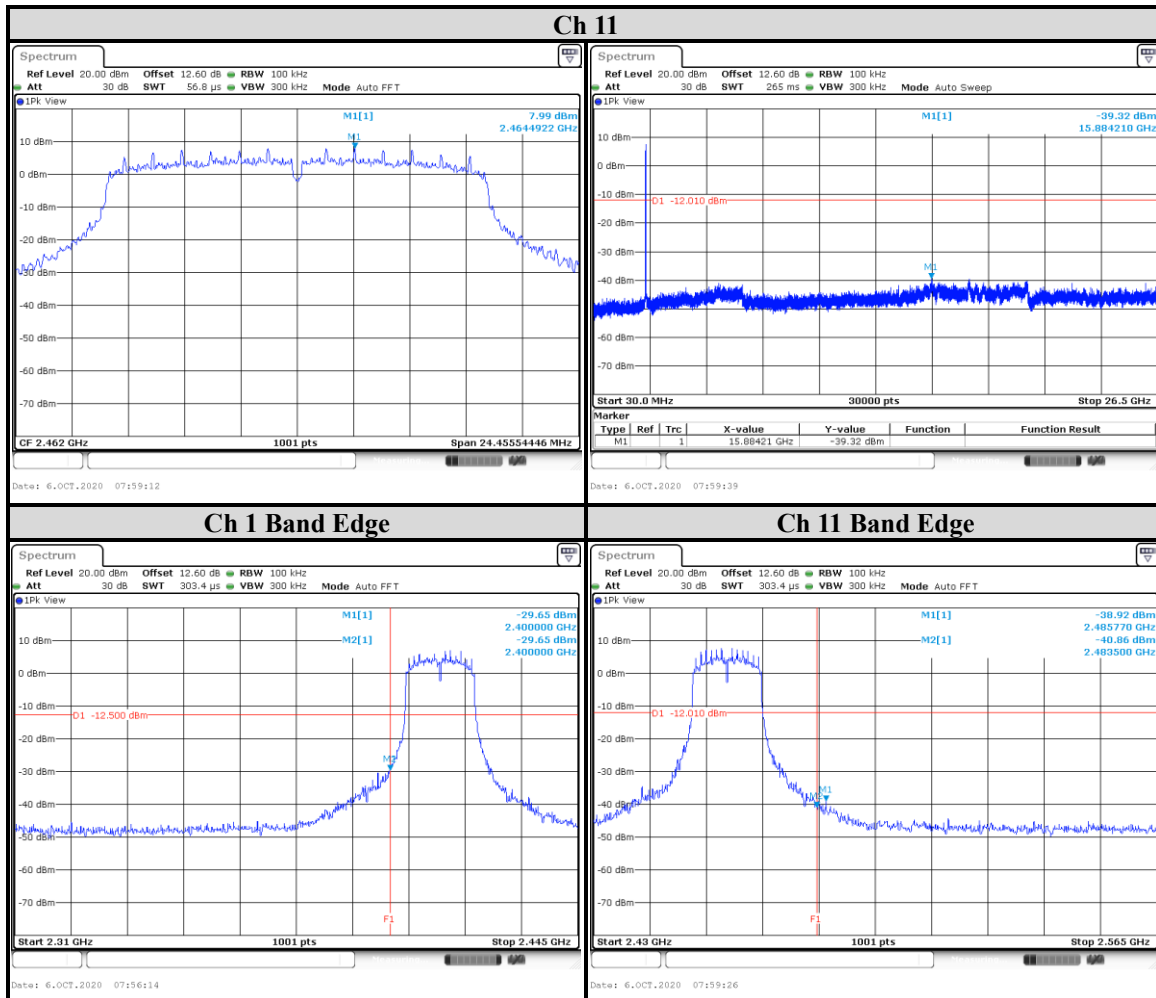
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 30 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

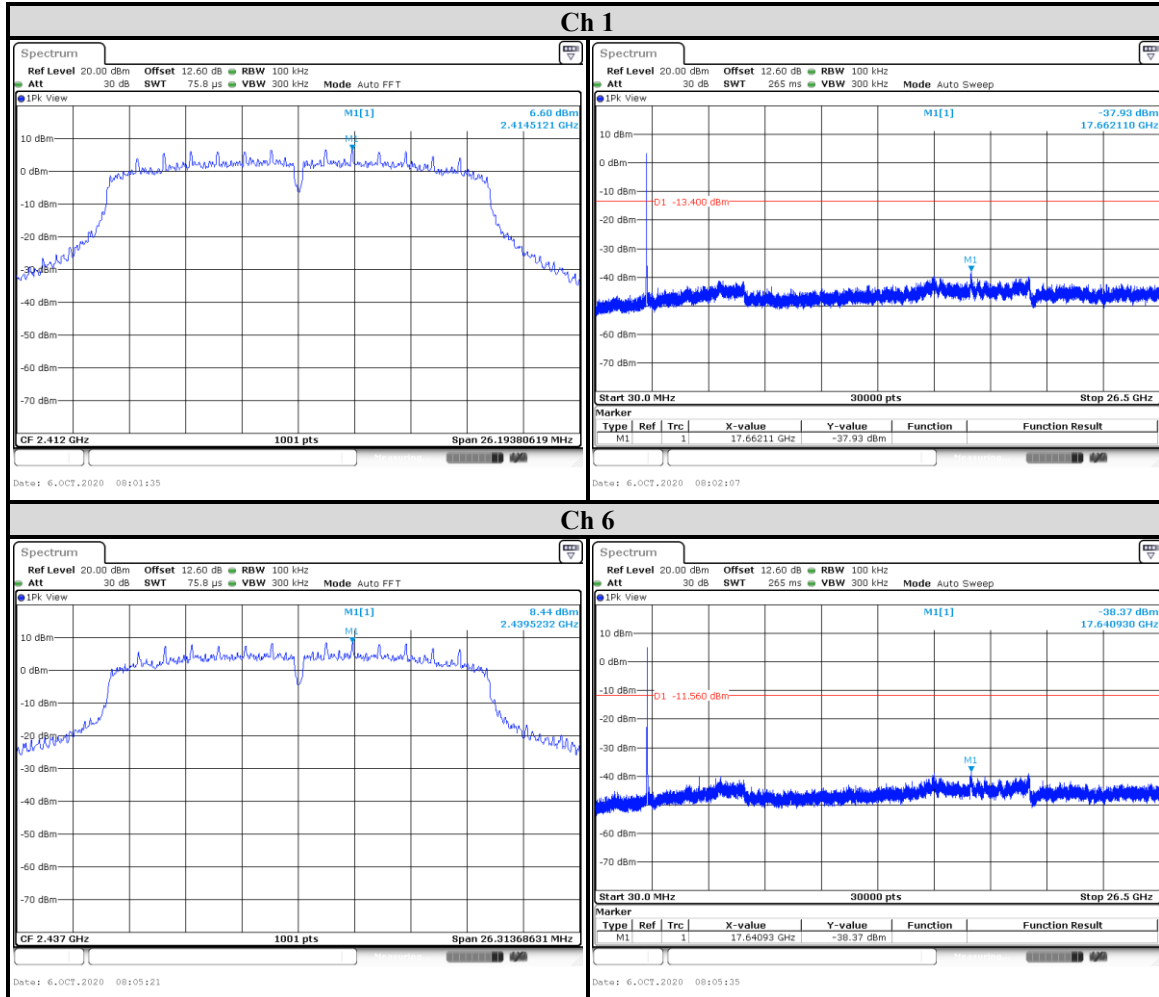
Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 31 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

802.11n (HT20)

CHAIN 0



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

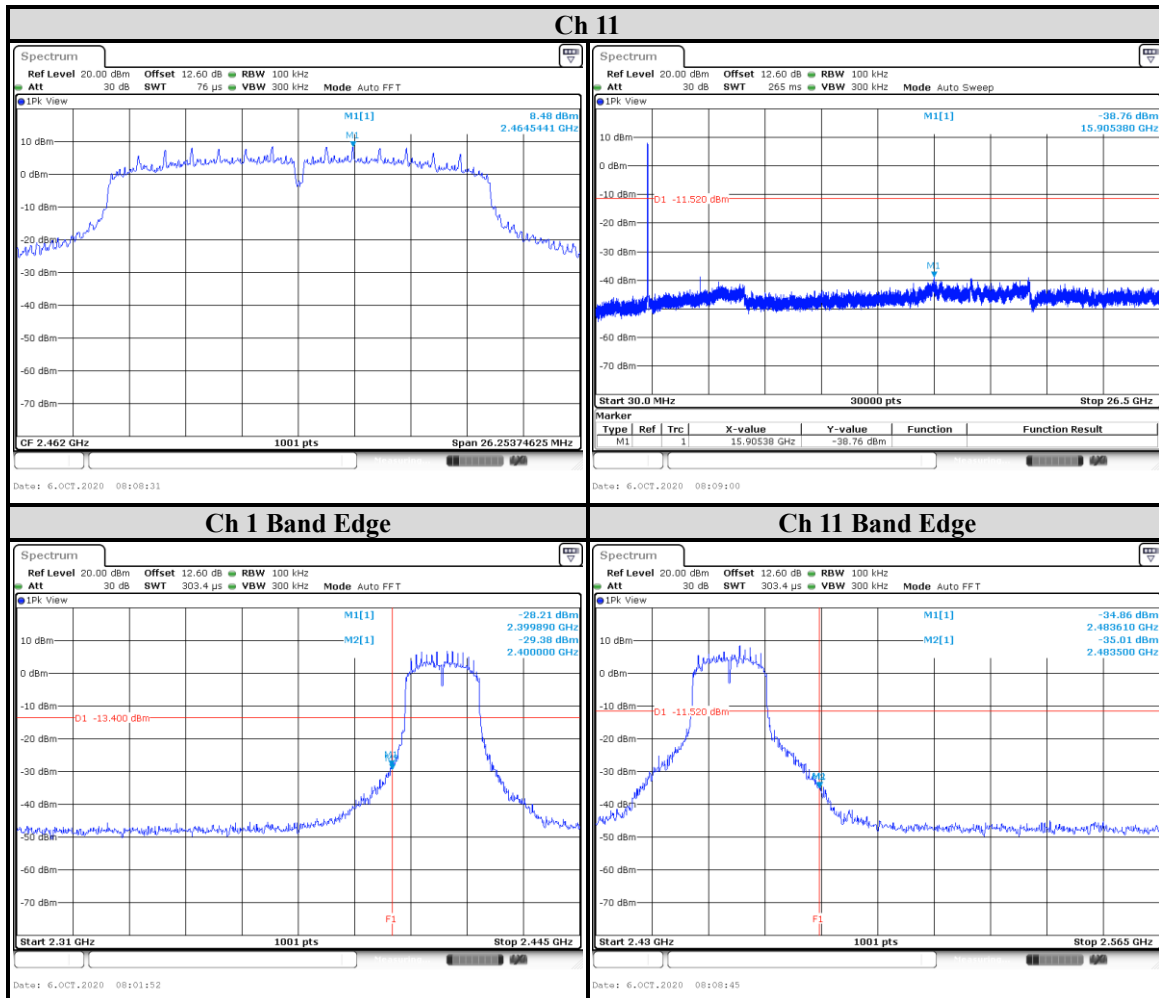
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 32 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

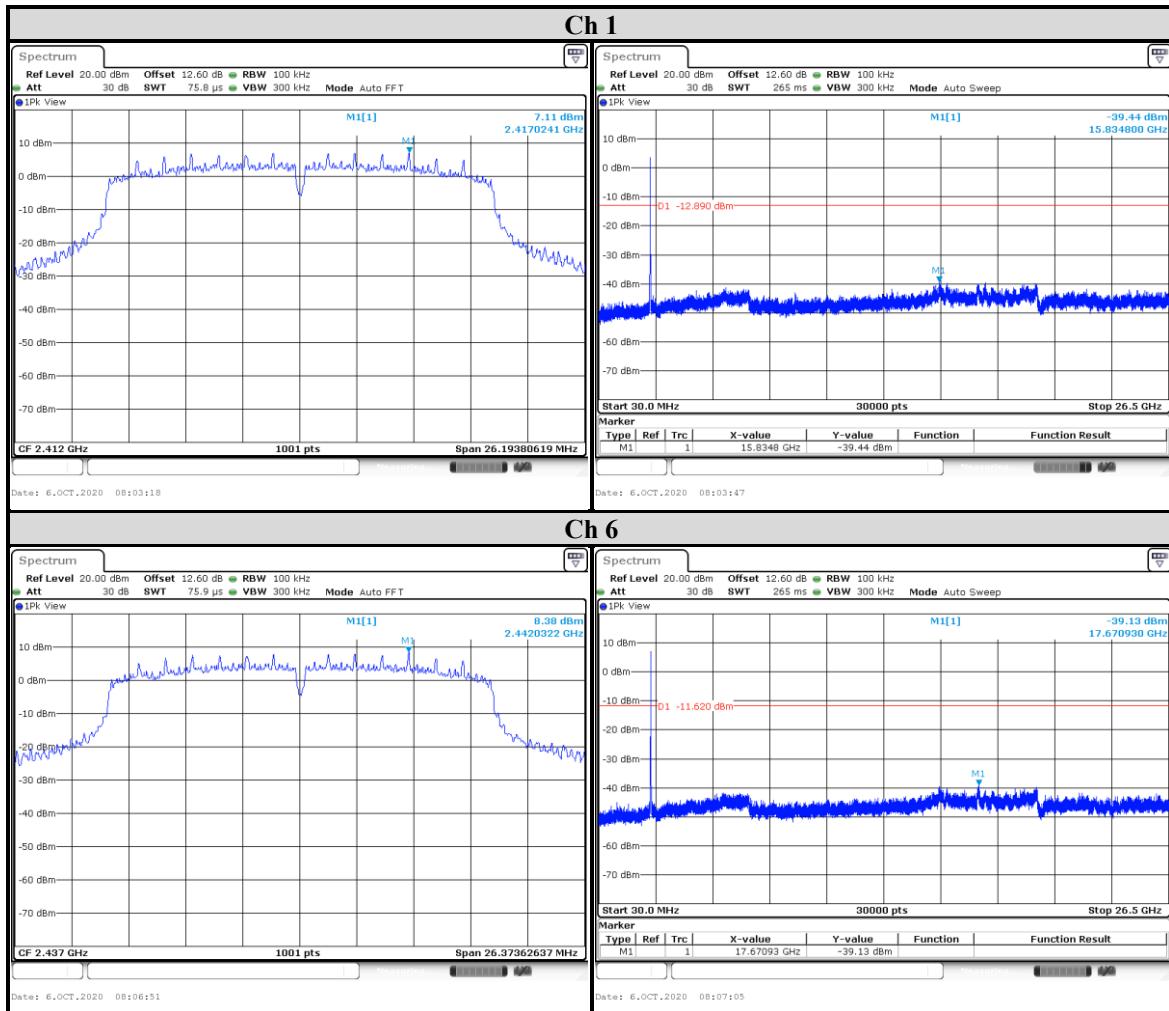
Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 33 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

CHAIN 1



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

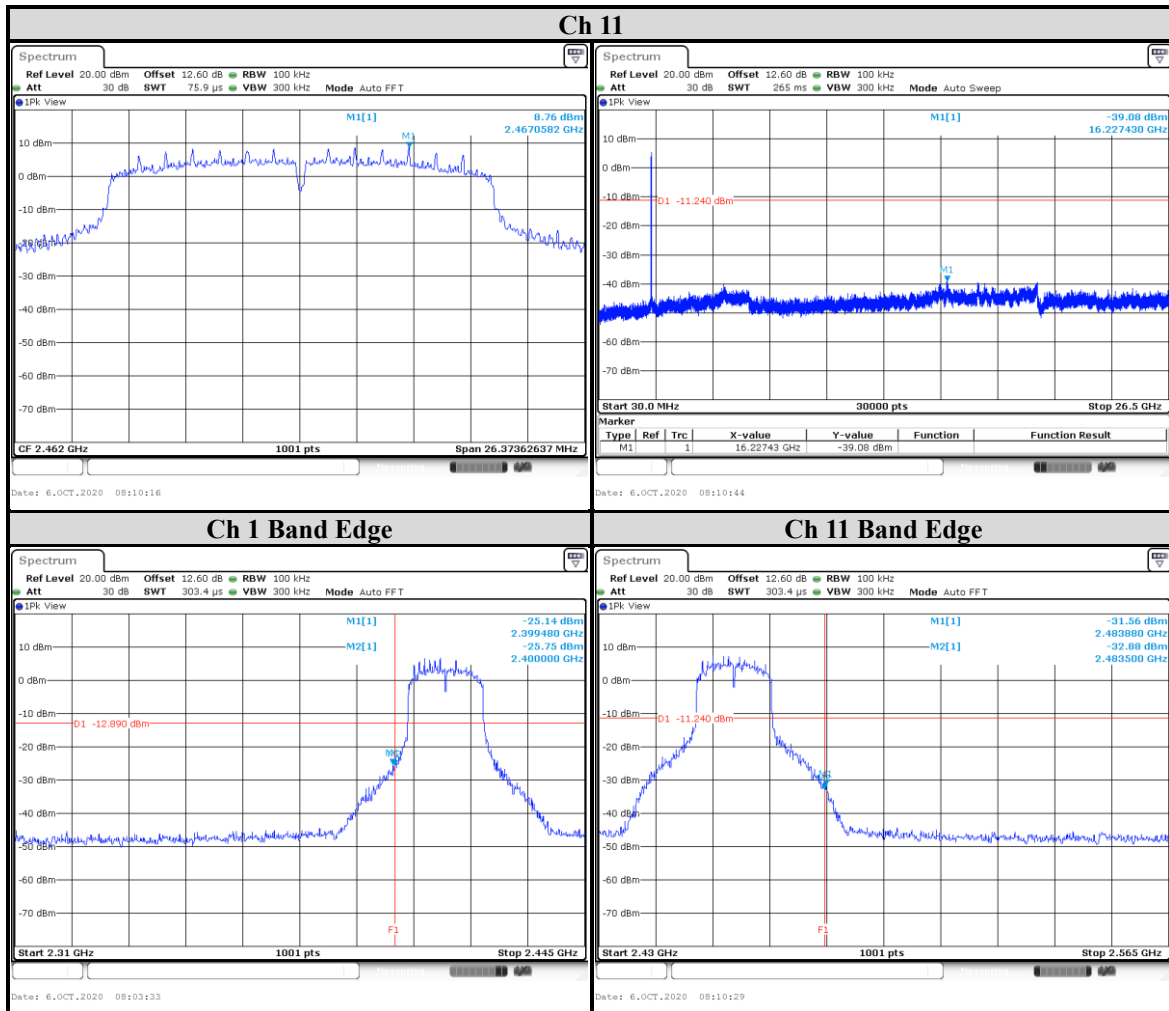
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 34 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

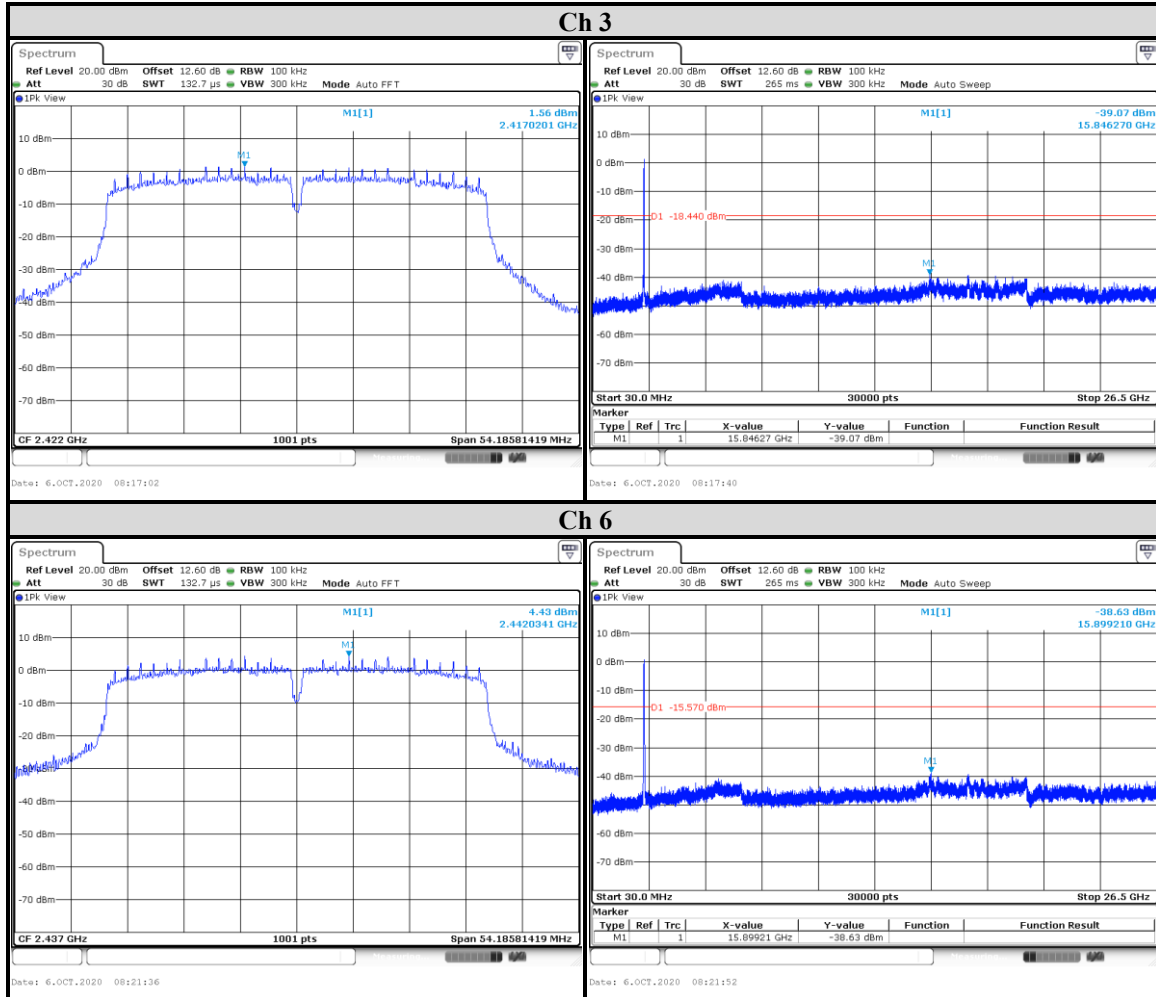
Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 35 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

802.11n (HT40)

CHAIN 0



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

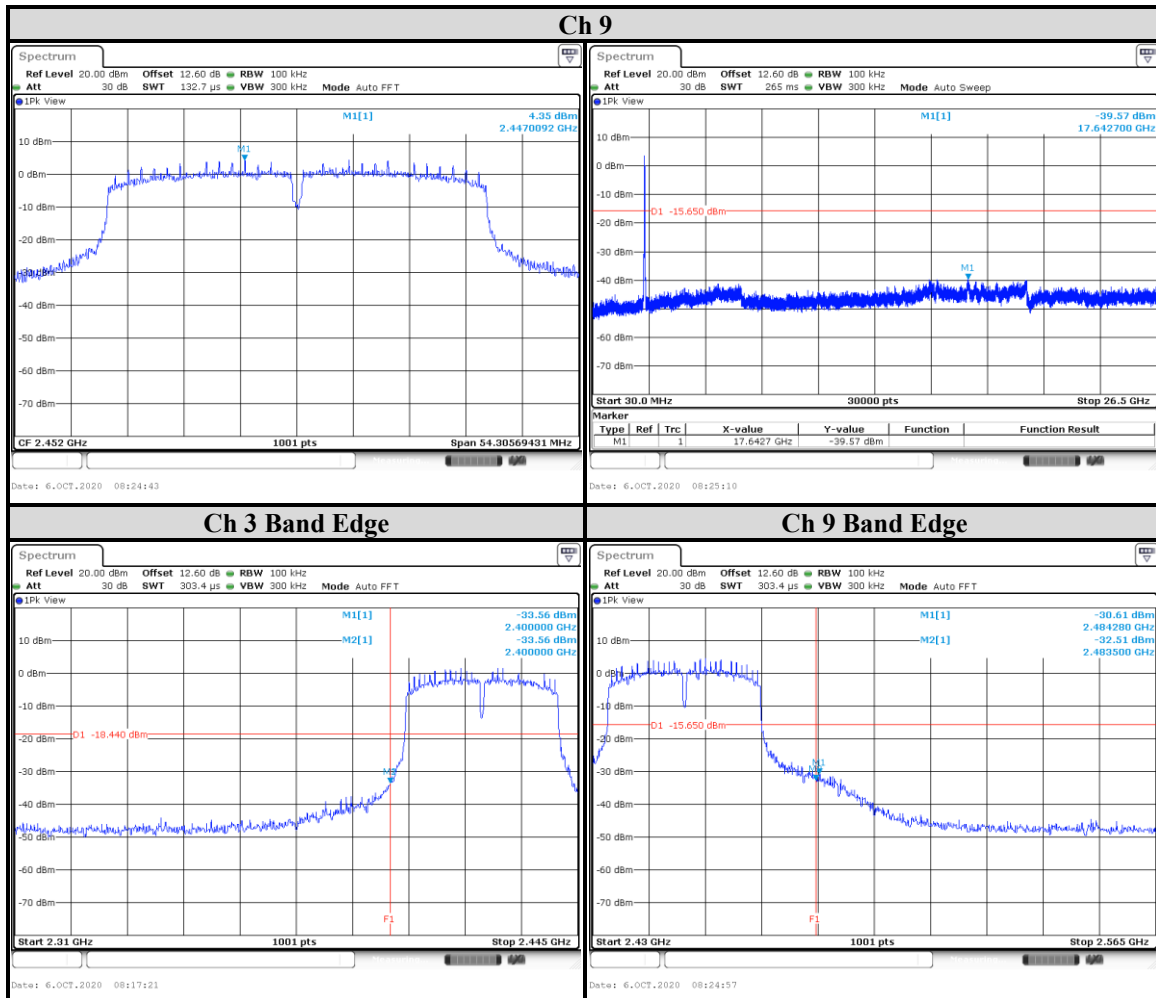
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 36 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

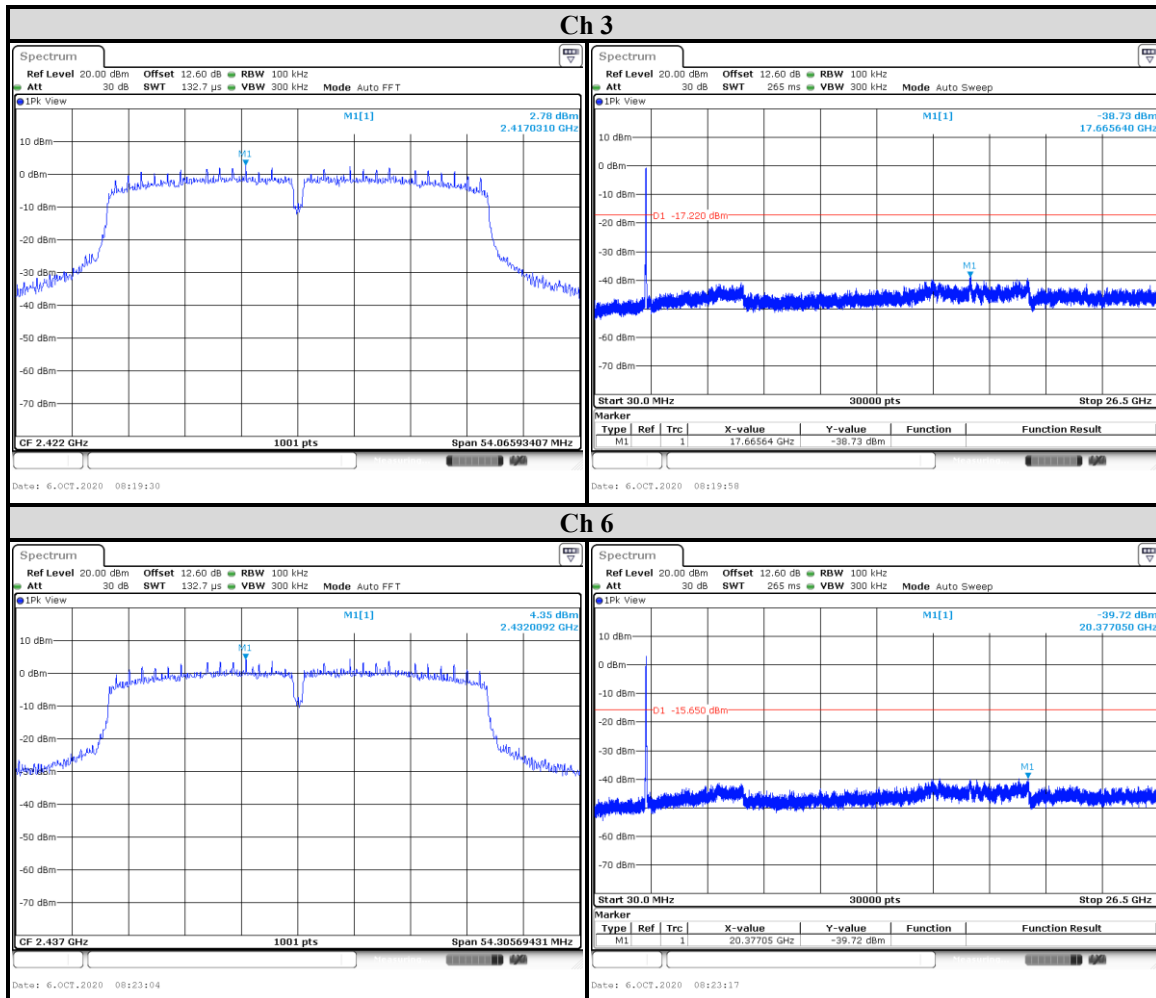
Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 37 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

CHAIN 1



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

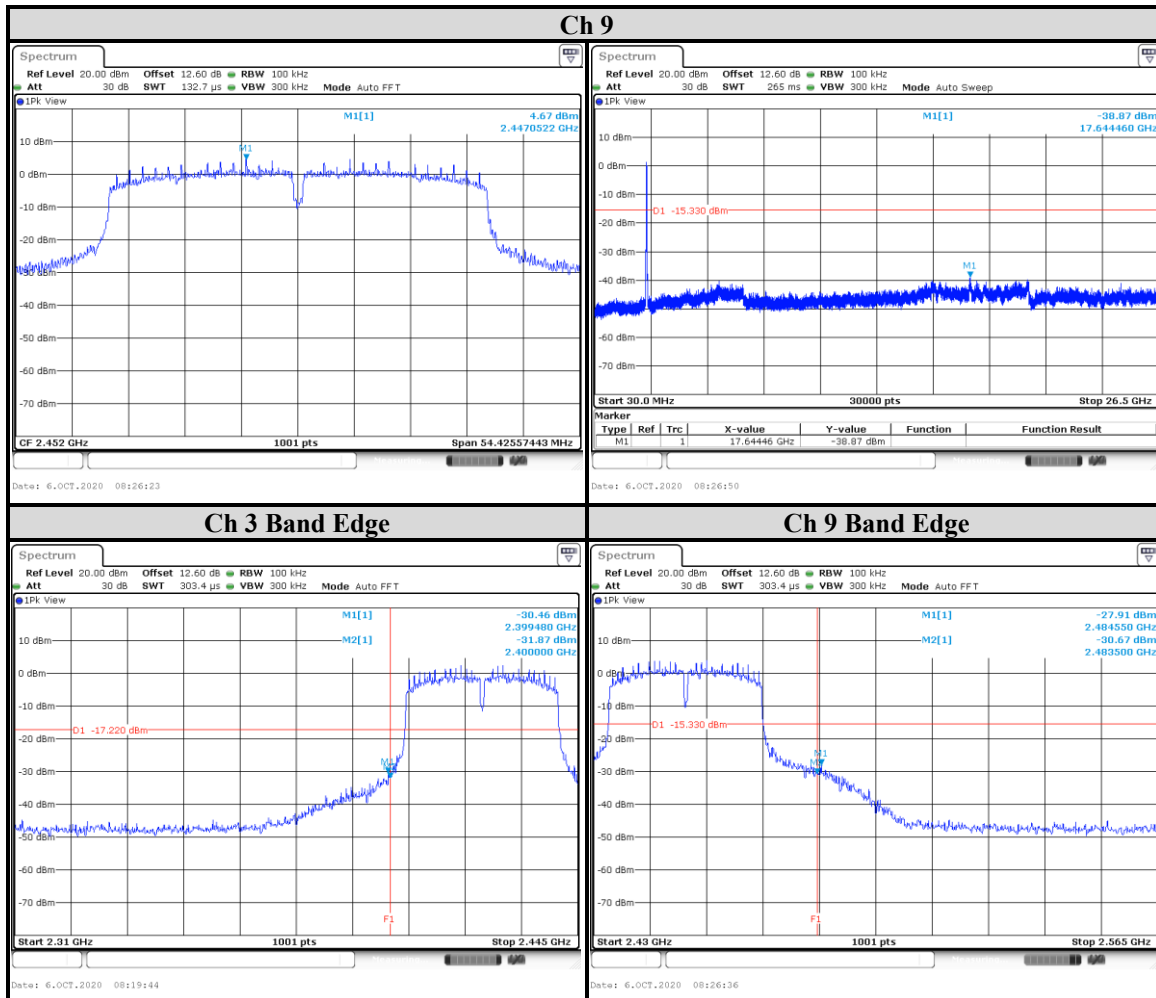
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 38 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



9.5. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test Procedures

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Note:

- a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- b. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

Configuration	Average	
	RBW	VBW
802.11b	1MHz	10 Hz
802.11g		1 kHz
802.11n (HT20)		1 kHz
802.11n (HT40)		2 kHz

Note: Refer to section 6.6 for duty cycle.

- d. All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

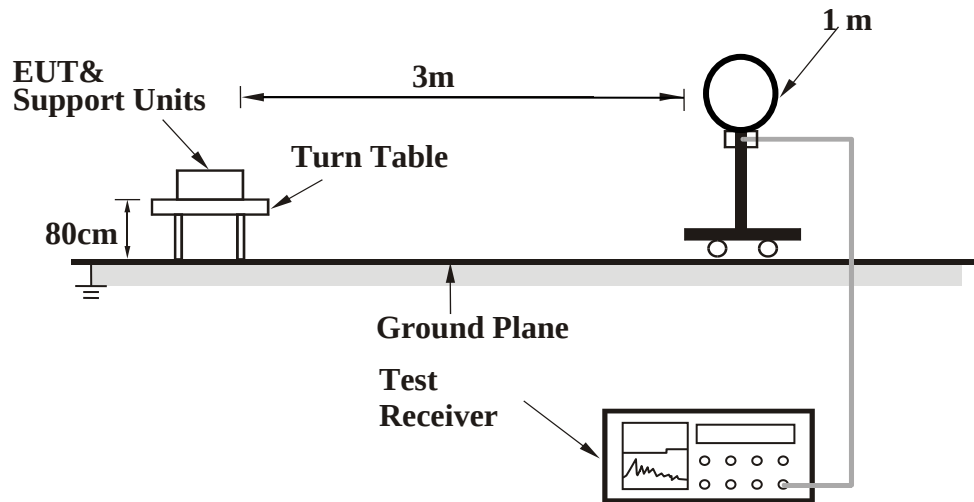
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

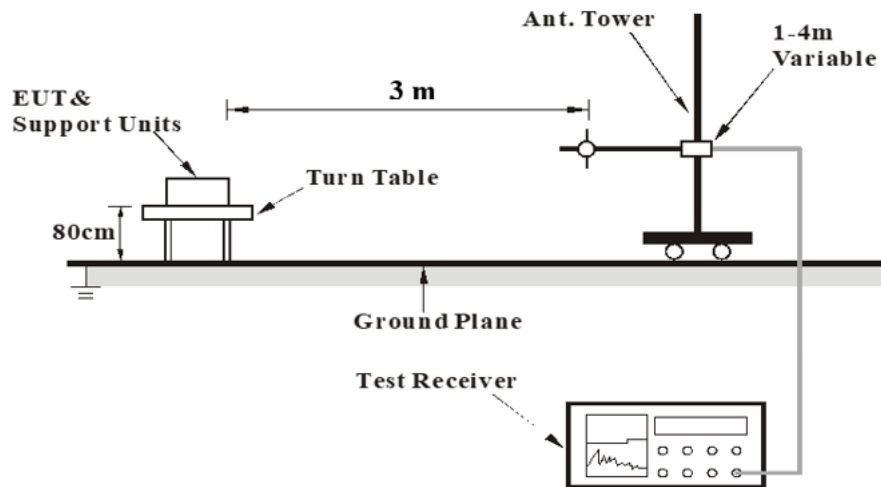
Doc No: 17-EM-F0876 / 5.0

Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

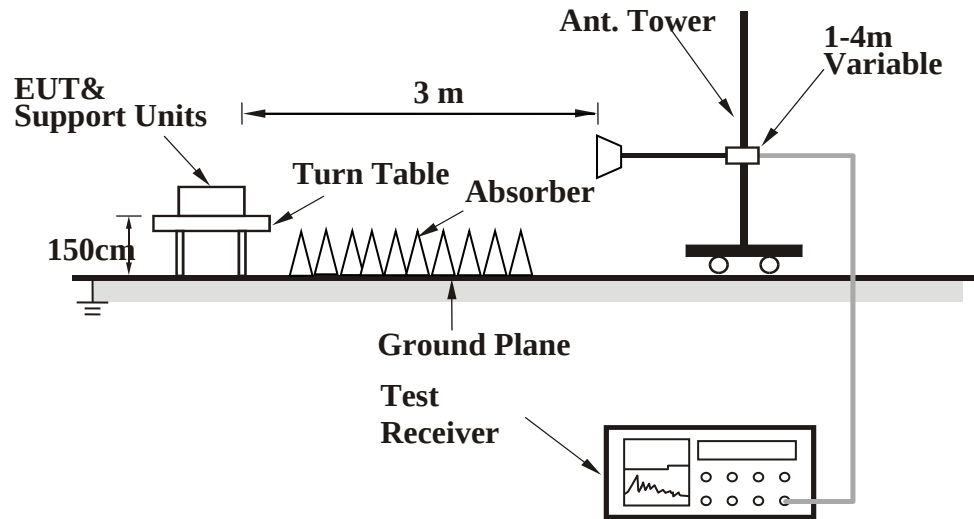
Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test Data

Above 1GHz Data

Dipole Antenna

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2388.4	42.01	6.73	48.74	74	-25.26	Peak
@	2412	80.29	6.68	86.97	-	-	Peak
-	2384.4	28.66	6.73	35.39	54	-18.61	Average
@	2412	76.53	6.68	83.21	-	-	Average
*	4824	50.26	3.53	53.79	74	-20.21	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2371.2	41.54	6.74	48.28	74	-25.72	Peak
@	2412	87.84	6.68	94.52	-	-	Peak
-	2388.2	29.12	6.73	35.85	54	-18.15	Average
@	2412	85.05	6.68	91.73	-	-	Average
-	4824	49.12	3.53	52.65	54	-1.35	Average
-	4824	53.06	3.53	56.59	74	-17.41	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 45 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2363.4	40.97	6.73	47.7	74	-26.3	Peak
@	2437	78.12	6.59	84.71	-	-	Peak
-	2493	41.9	6.53	48.43	74	-25.57	Peak
-	2362.8	28.62	6.73	35.35	54	-18.65	Average
@	2437	76.39	6.59	82.98	-	-	Average
-	2497.4	28.87	6.53	35.4	54	-18.6	Average
*	4874	46.73	3.63	50.36	74	-23.64	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2361.4	41.31	6.73	48.04	74	-25.96	Peak
@	2437	87.79	6.59	94.38	-	-	Peak
-	2491.2	44.75	6.53	51.28	74	-22.72	Peak
-	2387	28.59	6.74	35.33	54	-18.67	Average
@	2437	84.58	6.59	91.17	-	-	Average
-	2494.8	29.25	6.53	35.78	54	-18.22	Average
*	4874	46.86	3.63	50.49	74	-23.51	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 46 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	77.76	6.54	84.3	-	-	Peak
-	2499.4	48.76	6.53	55.29	74	-18.71	Peak
@	2462	74.31	6.54	80.85	-	-	Average
-	2498.4	28.9	6.53	35.43	54	-18.57	Average
*	4924	46.22	3.69	49.91	74	-24.09	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	86.43	6.54	92.97	-	-	Peak
-	2495.4	43.94	6.53	50.47	74	-23.53	Peak
@	2462	82.87	6.54	89.41	-	-	Average
-	2494.6	29.29	6.53	35.82	54	-18.18	Average
*	4924	49.71	3.69	53.4	74	-20.6	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 47 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2371.8	41.65	6.74	48.39	74	-25.61	Peak
@	2412	83.85	6.68	90.53	-	-	Peak
-	2390	35.35	6.74	42.09	54	-11.91	Average
@	2412	72.97	6.68	79.65	-	-	Average
*	4824	46.12	3.53	49.65	74	-24.35	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2389.8	57.31	6.74	64.05	74	-9.95	Peak
@	2412	90.94	6.68	97.62	-	-	Peak
-	2390	42.33	6.74	49.07	54	-4.93	Average
@	2412	81.46	6.68	88.14	-	-	Average
*	4824	49.01	3.53	52.54	74	-21.46	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 48 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2355	41.47	6.73	48.2	74	-25.8	Peak
@	2437	81.77	6.59	88.36			Peak
-	2499	52.86	6.53	59.39	74	-14.61	Peak
-	2374	28.55	6.73	35.28	54	-18.72	Average
@	2437	71.87	6.59	78.46	-	-	Average
-	2493.2	29.16	6.53	35.69	54	-18.31	Average
*	4874	42.38	3.63	46.01	74	-27.99	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2344.4	40.86	6.73	47.59	74	-26.41	Peak
@	2437	89.26	6.59	95.85	-	-	Peak
-	2497.2	49.86	6.53	56.39	74	-17.61	Peak
-	2388.6	28.76	6.73	35.49	54	-18.51	Average
@	2437	79.9	6.59	86.49	-	-	Average
-	2496.4	29.08	6.53	35.61	54	-18.39	Average
*	4874	43.53	3.63	47.16	74	-26.84	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 49 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	79.49	6.54	86.03	-	-	Peak
-	2490.6	52.93	6.53	59.46	74	-14.54	Peak
@	2462	69.77	6.54	76.31	-	-	Average
-	2491.2	29.14	6.53	35.67	54	-18.33	Average
*	4924	44.93	3.69	48.62	74	-25.38	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	88.77	6.54	95.31	-	-	Peak
-	2490	51.92	6.53	58.45	74	-15.55	Peak
@	2462	78.19	6.54	84.73	-	-	Average
-	2484.2	29.95	6.53	36.48	54	-17.52	Average
*	4924	47.05	3.69	50.74	74	-23.26	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 50 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2390	51.74	6.74	58.48	74	-15.52	Peak
@	2412	85.66	6.68	92.34	-	-	Peak
-	2390	38.97	6.74	45.71	54	-8.29	Average
@	2412	75.27	6.68	81.95	-	-	Average
*	4824	45.36	3.53	48.89	74	-25.11	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2390	58.28	6.74	65.02	74	-8.98	Peak
@	2412	93.31	6.68	99.99	-	-	Peak
-	2389.8	45.87	6.74	52.61	54	-1.39	Average
@	2412	82.5	6.68	89.18	-	-	Average
*	4824	48.29	3.53	51.82	74	-22.18	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 51 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2342.2	41.92	6.74	48.66	74	-25.34	Peak
@	2437	85.15	6.59	91.74	-	-	Peak
-	2497.8	51.99	6.53	58.52	74	-15.48	Peak
-	2348.4	28.45	6.72	35.17	54	-18.83	Average
@	2437	74.36	6.59	80.95	-	-	Average
-	2494.4	28.85	6.53	35.38	54	-18.62	Average
*	4874	47.35	3.63	50.98	74	-23.02	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2372.2	41.84	6.74	48.58	74	-25.42	Peak
@	2437	91.78	6.59	98.37	-	-	Peak
-	2495.4	51.32	6.53	57.85	74	-16.15	Peak
-	2388.8	29.01	6.73	35.74	54	-18.26	Average
@	2437	81.92	6.59	88.51	-	-	Average
-	2492.4	29	6.53	35.53	54	-18.47	Average
*	4874	48.4	3.63	52.03	74	-21.97	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 52 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	82.41	6.54	88.95	-	-	Peak
-	2494	46.37	6.53	52.9	74	-21.1	Peak
@	2462	73.13	6.54	79.67	-	-	Average
-	2483.6	30.69	6.53	37.22	54	-16.78	Average
*	4924	47.74	3.69	51.43	74	-22.57	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	89.47	6.54	96.01	-	-	Peak
-	2483.6	48.46	6.53	54.99	74	-19.01	Peak
@	2462	80.71	6.54	87.25	-	-	Average
-	2483.6	35.8	6.53	42.33	54	-11.67	Average
*	4924	50.09	3.69	53.78	74	-20.22	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 53 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2388.6	52.59	6.73	59.32	74	-14.68	Peak
@	2422	81.96	6.65	88.61	-	-	Peak
-	2389	39.9	6.73	46.63	54	-7.37	Average
@	2422	70.66	6.65	77.31	-	-	Average
*	4844	40.65	3.6	44.25	74	-29.75	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2388.8	60.12	6.73	66.85	74	-7.15	Peak
@	2422	87.94	6.65	94.59	-	-	Peak
-	2390	46.23	6.74	52.97	54	-1.03	Average
@	2422	76.19	6.65	82.84	-	-	Average
*	4844	43.73	3.6	47.33	74	-26.67	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 54 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2385	46.44	6.74	53.18	74	-20.82	Peak
@	2437	81.55	6.59	88.14	-	-	Peak
-	2492.6	46.4	6.52	52.92	74	-21.08	Peak
-	2390	32.58	6.74	39.32	54	-14.68	Average
@	2437	71.63	6.59	78.22	-	-	Average
-	2484	30.07	6.53	36.6	54	-17.4	Average
*	4874	44.81	3.63	48.44	74	-25.56	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2377.8	51.49	6.73	58.22	74	-15.78	Peak
@	2437	87.61	6.59	94.2	-	-	Peak
-	2487	46.61	6.53	53.14	74	-20.86	Peak
-	2390	37.39	6.74	44.13	54	-9.87	Average
@	2437	78.82	6.59	85.41	-	-	Average
-	2483.6	33.95	6.53	40.48	54	-13.52	Average
*	4874	43.54	3.63	47.17	74	-26.83	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 55 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	79.05	6.54	85.59	-	-	Peak
-	2483.6	50.53	6.53	57.06	74	-16.94	Peak
@	2462	69.18	6.54	75.72	-	-	Average
-	2484.2	37.85	6.53	44.38	54	-9.62	Average
*	4904	44.9	3.67	48.57	74	-25.43	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	85.7	6.54	92.24	-	-	Peak
-	2484.4	57.5	6.53	64.03	74	-9.97	Peak
@	2462	76.55	6.54	83.09	-	-	Average
-	2483.6	45.6	6.53	52.13	54	-1.87	Average
*	4904	45.86	3.67	49.53	74	-24.47	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



PIFA Antenna

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2389.4	43	6.73	49.73	74	-24.27	Peak
@	2412	89.1	6.68	95.78	-	-	Peak
-	2382.6	30.09	6.73	36.82	54	-17.18	Average
@	2412	85.87	6.68	92.55	-	-	Average
-	4824	49.32	3.53	52.85	54	-1.15	Average
-	4824	52.38	3.53	55.91	74	-18.09	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2378.8	41.7	6.73	48.43	74	-25.57	Peak
@	2412	88.68	6.68	95.36	-	-	Peak
-	2385	30.11	6.74	36.85	54	-17.15	Average
@	2412	86.51	6.68	93.19	-	-	Average
-	4824	49.24	3.53	52.77	54	-1.23	Average
-	4824	51.7	3.53	55.23	74	-18.77	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 57 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2333.8	41.87	6.73	48.6	74	-25.4	Peak
@	2437	88.33	6.59	94.92	-	-	Peak
-	2490.2	46.76	6.53	53.29	74	-20.71	Peak
-	2387.6	29.15	6.73	35.88	54	-18.12	Average
@	2437	85.27	6.59	91.86	-	-	Average
-	2496.6	29.18	6.53	35.71	54	-18.29	Average
-	4874	49.32	3.63	52.95	54	-1.05	Average
-	4874	52.38	3.63	56.01	74	-17.99	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2323.4	42.17	6.73	48.9	74	-25.1	Peak
@	2437	87.24	6.59	93.83	-	-	Peak
-	2500	45.98	6.53	52.51	74	-21.49	Peak
-	2389.8	29.29	6.74	36.03	54	-17.97	Average
@	2437	84.82	6.59	91.41	-	-	Average
-	2494	29.03	6.53	35.56	54	-18.44	Average
-	4874	49.11	3.63	52.74	54	-1.26	Average
-	4874	51.83	3.63	55.46	74	-18.54	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 58 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	87.58	6.54	94.12	-	-	Peak
-	2492.2	49.47	6.53	56	74	-18	Peak
@	2462	84.46	6.54	91	-	-	Average
-	2488.4	29.53	6.53	36.06	54	-17.94	Average
*	4924	49.58	3.69	53.27	74	-20.73	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	87.97	6.54	94.51	-	-	Peak
-	2497.4	43.23	6.53	49.76	74	-24.24	Peak
@	2462	84.79	6.54	91.33	-	-	Average
-	2489.4	29.3	6.53	35.83	54	-18.17	Average
-	4924	49.01	3.69	52.7	54	-1.3	Average
-	4924	50.98	3.69	54.67	74	-19.33	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2389.2	50.06	6.73	56.79	74	-17.21	Peak
@	2412	92.8	6.68	99.48	-	-	Peak
-	2390	36.31	6.74	43.05	54	-10.95	Average
@	2412	82.66	6.68	89.34	-	-	Average
*	4824	44.23	3.53	47.76	74	-26.24	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2389.8	49.89	6.74	56.63	74	-17.37	Peak
@	2412	93.71	6.68	100.39	-	-	Peak
-	2390	36.57	6.74	43.31	54	-10.69	Average
@	2412	82.9	6.68	89.58	-	-	Average
*	4824	47.22	3.53	50.75	74	-23.25	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 60 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2362.8	41.45	6.73	48.18	74	-25.82	Peak
@	2437	91.61	6.59	98.2	-	-	Peak
-	2496	50.11	6.53	56.64	74	-17.36	Peak
-	2390	29.33	6.74	36.07	54	-17.93	Average
@	2437	81.57	6.59	88.16	-	-	Average
-	2490	29.72	6.53	36.25	54	-17.75	Average
*	4874	44.11	3.63	47.74	74	-26.26	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2350.6	41.63	6.73	48.36	74	-25.64	Peak
@	2437	93.15	6.59	99.74	-	-	Peak
-	2497.6	48.8	6.53	55.33	74	-18.67	Peak
-	2389.2	29.42	6.73	36.15	54	-17.85	Average
@	2437	82.43	6.59	89.02	-	-	Average
-	2489.4	29.25	6.53	35.78	54	-18.22	Average
*	4874	45.56	3.63	49.19	74	-24.81	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 61 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	92.15	6.54	98.69	-	-	Peak
-	2492.2	51.18	6.53	57.71	74	-16.29	Peak
@	2462	82.05	6.54	88.59	-	-	Average
-	2483.6	33.24	6.53	39.77	54	-14.23	Average
*	4924	45.52	3.69	49.21	74	-24.79	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	91.89	6.54	98.43	-	-	Peak
-	2490.2	49.33	6.53	55.86	74	-18.14	Peak
@	2462	81.95	6.54	88.49	-	-	Average
-	2483.6	33.39	6.53	39.92	54	-14.08	Average
*	4924	48.87	3.69	52.56	74	-21.44	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 62 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2390	53.17	6.74	59.91	74	-14.09	Peak
@	2412	96.26	6.68	102.94	-	-	Peak
-	2390	38.74	6.74	45.48	54	-8.52	Average
@	2412	86.33	6.68	93.01	-	-	Average
*	4824	47.22	3.53	50.75	74	-23.25	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2389.2	48.84	6.73	55.57	74	-18.43	Peak
@	2412	93.78	6.68	100.46	-	-	Peak
-	2390	37.15	6.74	43.89	54	-10.11	Average
@	2412	84.27	6.68	90.95	-	-	Average
*	4824	50.11	3.53	53.64	74	-20.36	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 63 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2366.4	41.77	6.73	48.5	74	-25.5	Peak
@	2437	97.38	6.59	103.97	-	-	Peak
-	2495.6	50.4	6.53	56.93	74	-17.07	Peak
-	2389.2	29.79	6.73	36.52	54	-17.48	Average
@	2437	87.6	6.59	94.19	-	-	Average
-	2485.6	29.95	6.53	36.48	54	-17.52	Average
*	4874	48.54	3.63	52.17	74	-21.83	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2323.6	41.85	6.73	48.58	74	-25.42	Peak
@	2437	95.32	6.59	101.91	-	-	Peak
-	2500.2	47.39	6.53	53.92	74	-20.08	Peak
-	2390	29.07	6.74	35.81	54	-18.19	Average
@	2437	85.89	6.59	92.48	-	-	Average
-	2486.4	29.39	6.53	35.92	54	-18.08	Average
-	4874	42.55	3.63	46.18	54	-7.82	Average
-	4874	53.17	3.63	56.8	74	-17.2	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 64 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	98.55	6.54	105.09	-	-	Peak
-	2483.6	54.89	6.53	61.42	74	-12.58	Peak
@	2462	88.55	6.54	95.09	-	-	Average
-	2483.6	40.28	6.53	46.81	54	-7.19	Average
*	4924	47.48	3.69	51.17	74	-22.83	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2462	95.3	6.54	101.84	-	-	Peak
-	2483.6	51.4	6.53	57.93	74	-16.07	Peak
@	2462	85.56	6.54	92.1	-	-	Average
-	2483.6	37.45	6.53	43.98	54	-10.02	Average
-	4924	42.13	3.69	45.82	54	-8.18	Average
-	4924	51.99	3.69	55.68	74	-18.32	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 65 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2387.6	57.49	6.73	64.22	74	-9.78	Peak
@	2422	92.57	6.65	99.22	-	-	Peak
-	2390	41.09	6.74	47.83	54	-6.17	Average
@	2422	81.34	6.65	87.99	-	-	Average
*	4844	42.06	3.6	45.66	74	-28.34	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2386.2	55.25	6.74	61.99	74	-12.01	Peak
@	2422	90.1	6.65	96.75	-	-	Peak
-	2389.6	39.8	6.74	46.54	54	-7.46	Average
@	2422	79.61	6.65	86.26	-	-	Average
*	4844	45.96	3.6	49.56	74	-24.44	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 66 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2389.8	56.86	6.74	63.6	74	-10.4	Peak
@	2437	93.44	6.59	100.03	-	-	Peak
-	2487.8	53.47	6.52	59.99	74	-14.01	Peak
-	2390	37.05	6.74	43.79	54	-10.21	Average
@	2437	83.24	6.59	89.83	-	-	Average
-	2484.8	32.69	6.53	39.22	54	-14.78	Average
*	4874	43.36	3.63	46.99	74	-27.01	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	2386.8	54.8	6.74	61.54	74	-12.46	Peak
@	2437	90.86	6.59	97.45	-	-	Peak
-	2484.4	50.95	6.53	57.48	74	-16.52	Peak
-	2390	35.37	6.74	42.11	54	-11.89	Average
@	2437	80.83	6.59	87.42	-	-	Average
-	2484.8	32.38	6.53	38.91	54	-15.09	Average
*	4874	48	3.63	51.63	74	-22.37	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 67 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

EUT Test Condition		Measurement Detail	
Channel	Channel 9	Frequency Range	1 GHz ~ 26.5 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2452	94.01	6.54	100.55	-	-	Peak
-	2484.4	58.99	6.53	65.52	74	-8.48	Peak
@	2452	83.83	6.54	90.37	-	-	Average
-	2483.6	42.61	6.53	49.14	54	-4.86	Average
*	4904	45.44	3.67	49.11	74	-24.89	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	2452	92.05	6.54	98.59	-	-	Peak
-	2486	57.17	6.53	63.7	74	-10.3	Peak
@	2452	81.59	6.54	88.13	-	-	Average
-	2483.6	40.59	6.53	47.12	54	-6.88	Average
*	4904	47.87	3.67	51.54	74	-22.46	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



9 kHz ~ 30 MHz Data:

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

KDB 414788 D01 OATS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



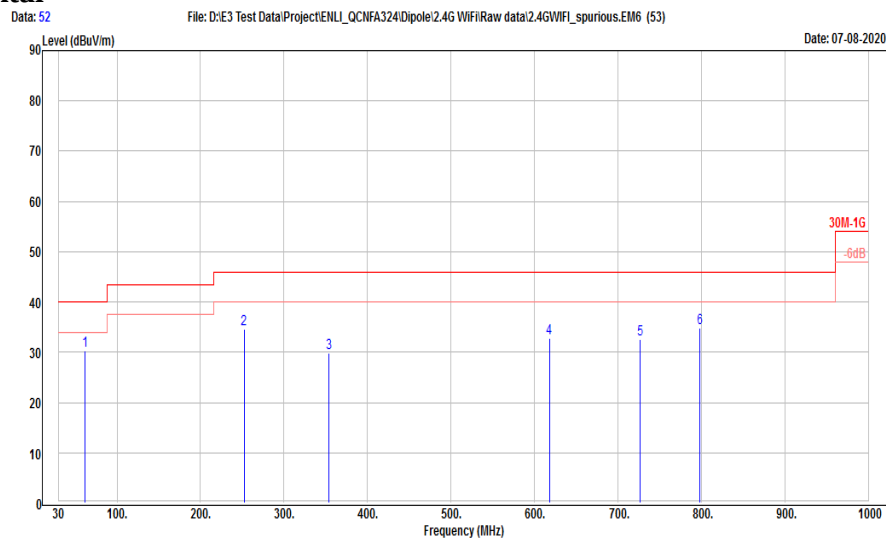
30 MHz ~ 1 GHz Data

Dipole Antenna

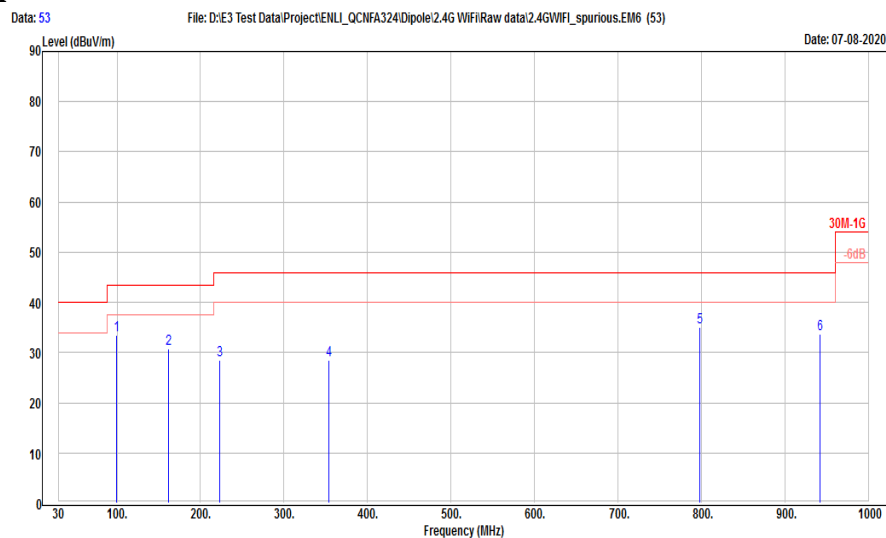
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	30 MHz ~ 1 GHz

Horizontal



Vertical



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 70 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	62.01	42.53	-12.3	30.23	40	-9.77	Peak
-	252.13	46.36	-11.79	34.57	46	-11.43	Peak
-	353.98	38.2	-8.29	29.91	46	-16.09	Peak
-	617.82	34.36	-1.5	32.86	46	-13.14	Peak
-	726.46	32.54	0.07	32.61	46	-13.39	Peak
-	798.24	33.81	0.9	34.71	46	-11.29	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	99.84	49.75	-16.23	33.52	43.5	-9.98	Peak
-	161.92	41.85	-11.1	30.75	43.5	-12.75	Peak
-	223.03	41.74	-13.33	28.41	46	-17.59	Peak
-	353.98	36.75	-8.29	28.46	46	-17.54	Peak
-	798.24	34.06	0.9	34.96	46	-11.04	Peak
-	941.8	30.05	3.68	33.73	46	-12.27	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamplifier Factor (dB).
4. The peak result complies with QP limit, QP result is deemed to comply with QP limit.
5. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0

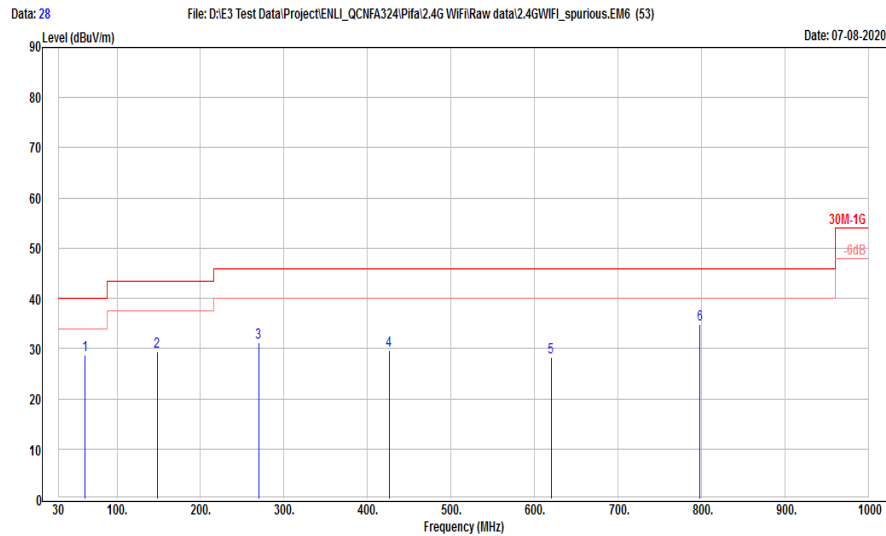


PIFA Antenna

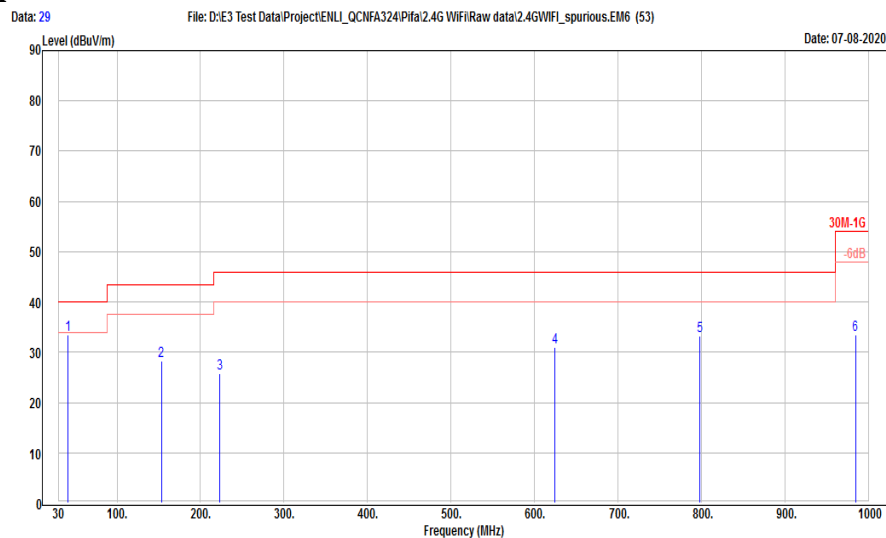
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	30 MHz ~ 1 GHz

Horizontal



Vertical



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 72 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	62.01	40.94	-12.3	28.64	40	-11.36	Peak
-	148.34	41.12	-11.68	29.44	43.5	-14.06	Peak
-	269.59	41.99	-10.84	31.15	46	-14.85	Peak
-	425.76	35.95	-6.35	29.6	46	-16.4	Peak
-	619.76	29.45	-1.29	28.16	46	-17.84	Peak
-	798.24	33.95	0.9	34.85	46	-11.15	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	41.64	45.38	-11.86	33.52	40	-6.48	Peak
-	153.19	39.71	-11.55	28.16	43.5	-15.34	Peak
-	223.03	39.16	-13.33	25.83	46	-20.17	Peak
-	624.61	32.21	-1.33	30.88	46	-15.12	Peak
-	798.24	32.3	0.9	33.2	46	-12.8	Peak
-	984.48	29.08	4.36	33.44	54	-20.56	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamplifier Factor (dB).
4. The peak result complies with QP limit, QP result is deemed to comply with QP limit.
5. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



9.6. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

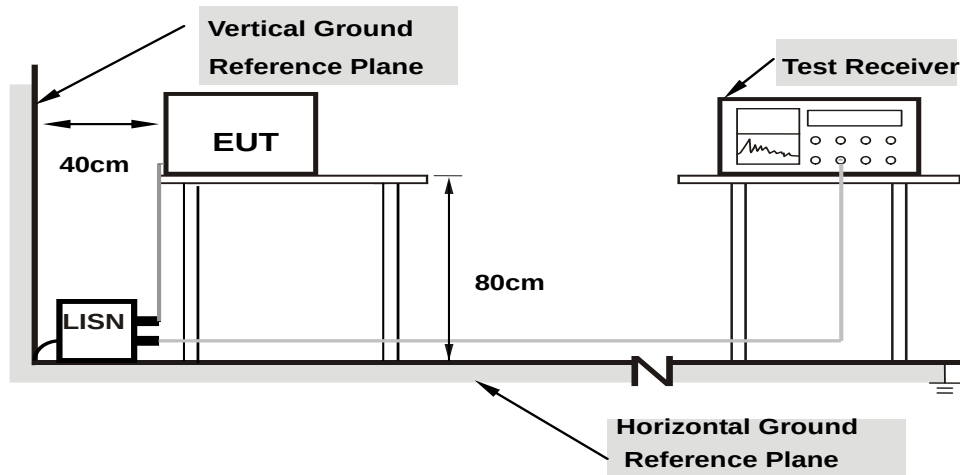
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the Setup Configurations.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0

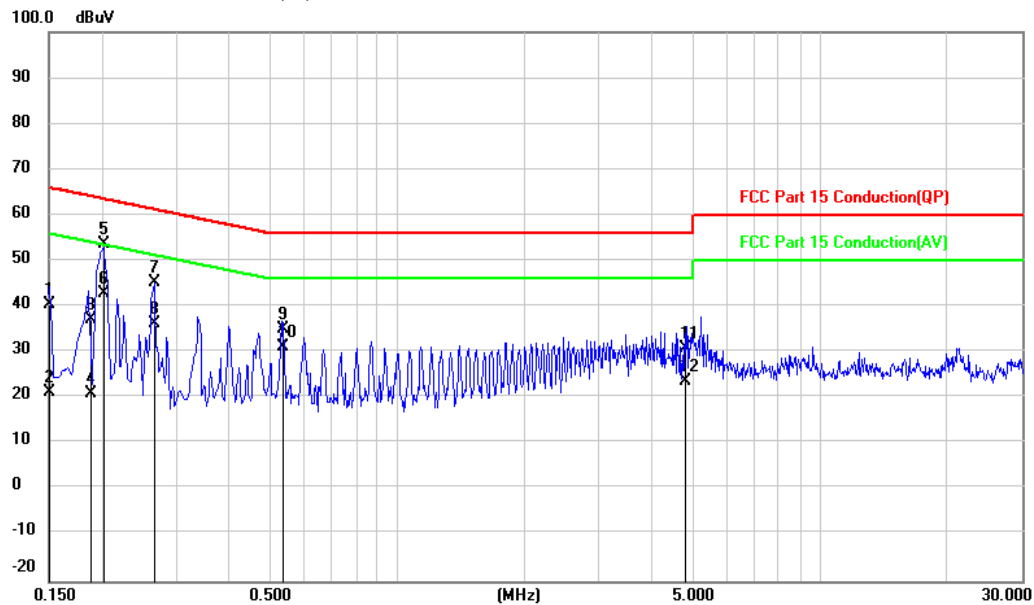


Test Data

802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	150 kHz ~ 30 MHz

Phase of Power : Line (L)



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 76 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.1502	20.84	19.47	40.31	65.99	-25.68	QP
2	0.1502	1.92	19.47	21.39	55.99	-34.60	AVG
3	0.1896	17.65	19.46	37.11	64.05	-26.94	QP
4	0.1896	1.50	19.46	20.96	54.05	-33.09	AVG
5	0.2010	34.16	19.46	53.62	63.57	-9.95	QP
6	0.2010	23.28	19.46	42.74	53.57	-10.83	AVG
7	0.2677	25.65	19.47	45.12	61.19	-16.07	QP
8	0.2677	16.88	19.47	36.35	51.19	-14.84	AVG
9	0.5354	15.49	19.48	34.97	56.00	-21.03	QP
10	0.5354	11.66	19.48	31.14	46.00	-14.86	AVG
11	4.8209	11.38	19.61	30.99	56.00	-25.01	QP
12	4.8209	4.15	19.61	23.76	46.00	-22.24	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

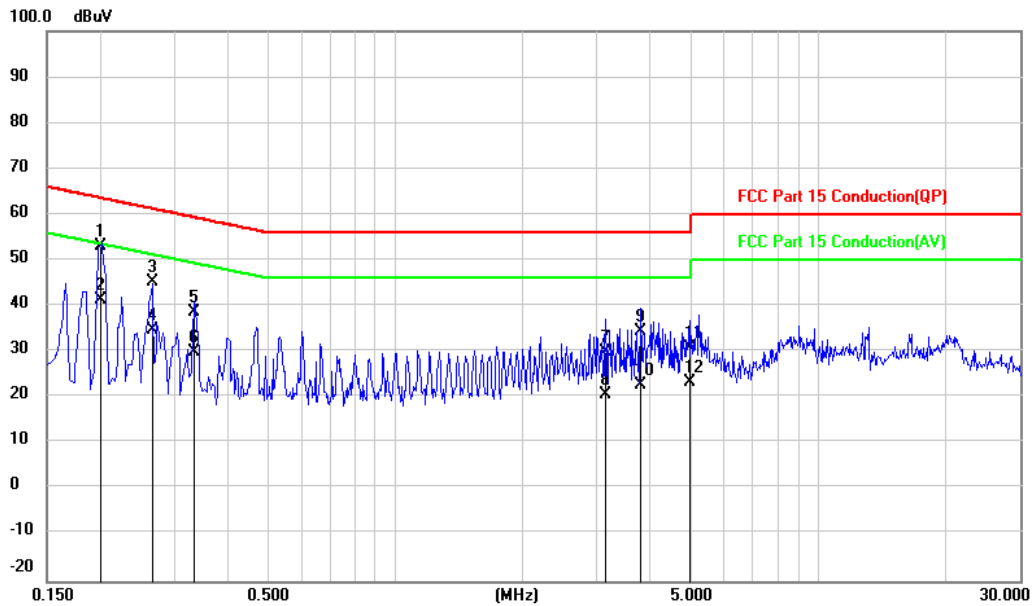
Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Phase of Power : Neutral (N)



Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone : +886-2-7737-3000

Facsimile (FAX) : +886-3-583-7948

Doc No: 17-EM-F0876 / 5.0



Test report No. : 4789507582-US-R0-V0
Page : 78 of 102
Issued date : Dec. 15, 2020
FCC ID : 2AWKZ-QCNFA324

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.2002	33.49	19.47	52.96	63.60	-10.64	QP
2	0.2002	21.79	19.47	41.26	53.60	-12.34	AVG
3	0.2680	25.64	19.48	45.12	61.18	-16.06	QP
4	0.2680	15.20	19.48	34.68	51.18	-16.50	AVG
5	0.3347	19.11	19.48	38.59	59.33	-20.74	QP
6	0.3347	10.62	19.48	30.10	49.33	-19.23	AVG
7	3.1467	10.42	19.57	29.99	56.00	-26.01	QP
8	3.1467	1.03	19.57	20.60	46.00	-25.40	AVG
9	3.8166	14.91	19.59	34.50	56.00	-21.50	QP
10	3.8166	3.03	19.59	22.62	46.00	-23.38	AVG
11	4.9554	11.16	19.62	30.78	56.00	-25.22	QP
12	4.9554	3.76	19.62	23.38	46.00	-22.62	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

Underwriters Laboratories Taiwan Co., Ltd.

Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan

Telephone :+886-2-7737-3000

Facsimile (FAX) :+886-3-583-7948

Doc No: 17-EM-F0876 / 5.0