FCC RADIO TEST REPORT FCC 47 CFR PART 15 SUBPART E

Test Standard FCC ID Product name Brand name / Model No. FCC Part 15.407

PPQ-WP8331

802.11ac Dual Band PoE Access Point

Model No.	Brand name
C 100	MOJO
0-100	WatchGuard
WP8331	LITE-ON
AP220	WatchGuard

Test Result

Pass

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.(Wugu Laboratory).

The sample selected for test was production product and was provided by manufacturer.





Approved by:

Sam Chuang

Reviewed by:

en Chen

Sam Chuang Manager Zeus Chen Supervisor

Revision History

Rev.	Issue Date	Revisions	Revised By
00	November 22, 2016	Initial Issue	Angel Cheng
01	December 10, 2016	P6. Addressed calculations of the directional antenna gains. P32, Addressed calculations of the directional antenna gains P35, Addressed calculations of the directional antenna gains	Angel Cheng
02	March 29, 2017	 Modify model number. In page 1, 4. (AP200 change to AP220) 	Angel Cheng

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Lite-On Technology Corp. Bldg. C, 90, Chien 1 Road, Chung Ho, New Taipei City 23585, Taiwan, R.O.C				
Equipment	802.11ac E	Jual Band PoE Access	s Point		
	Model No.	. Brand name			
Brand name /	C-100	MOJO WatchGuard			
	WP8331 AP220	LITE-ON WatchGuard			
Model Discrepancy	All the spe with differe	ecification and layout nt model numbers for	are identic marketing	al excep purposes	ot they come
EUT Functions	IEEE 802.11	1abgn+ac+BT			
Received Date	Nov 2, 201	6			
Date of Test	Nov 5 ~ 17	, 2016			
	Band	Mode	Frequency Range (MHz)	Output Power (dBm)	Output Power (w)
		IEEE 802.11a	5180 ~ 5240	25.60	0.3631
		IEEE 802.11n HT 20 MHz	5180 ~ 5240	25.07	0.3214
	U-NII-1	IEEE 802.11n HT 40 MHz	5190 ~ 5230	24.64	0.2911
		IEEE 802.11ac VHT 20 MHz	5180 ~ 5240	24.97	0.3141
Output Power		IEEE 802.11ac VHT 40 MHz	5190 ~ 5230	25.07	0.3214
		IEEE 802.11ac VH I 80 MHz	5210	20.88	0.1225
			5/45 ~ 5825	25.02	0.3177
			5745 ~ 5025	24.00	0.3020
	U-NII-3	IEEE 002.111111 40 WI12	5745 ~ 5825	24.12	0.2002
		IFFF 802 11ac VHT 40 MHz	5755 ~ 5795	24.03	0.2529
		IEEE 802.11ac VHT 80 MHz	5775	20.53	0.1130
Power Operation	AC 120 Ada PoE DC Typ Ba DC DC Exte	IV/60Hz pter(Not for sale) (Not for sale) e : ttery Power Supply ernal DC adapter			

Remark:

All listed models are using an identical RF module with the only differences on number of key buttons mounted for additional functions.

Due to similarity of RF product constructions of given model series, only dedicated model as described in test report with the most complexity constructions was selected for testing and record.

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1.2 EUT CHANNEL INFORMATION

	IEEE 802.11a	5180 ~ 5240 MHz	
	IEEE 802.11n HT 20 MHz	5180 ~ 5240 MHz	
	IEEE 802.11n HT 40 MHz	5190 ~ 5230 MHz	
	IEEE 802.11ac VHT 20 MHz	5180 ~ 5240 MHz	
	IEEE 802.11ac VHT 40 MHz	5190 ~ 5230 MHz	
	IEEE 802.11ac VHT 80 MHz	5210 MHz	
Frequency Range	IEEE 802.11a	5745 ~ 5825 MHz	
	IEEE 802.11n HT 20 MHz	5745 ~ 5825 MHz	
	IEEE 802.11n HT 40 MHz	5755 ~ 5795 MHz	
	IEEE 802.11ac VHT 20 MHz	5745 ~ 5825 MHz	
	IEEE 802.11ac VHT 40 MHz	5755 ~ 5795 MHz	
	IEEE 802.11ac VHT 80 MHz	5775 MHz	
	1. IEEE 802.11a mode: OFDM		
	2. IEEE 802.11n HT 20 MHz mode: OFDM		
Modulation Type	3. IEEE 802.11n HT 40 MHz mode: OFDM		
	4. IEEE 802.11ac VHT 20 MHz r	node: OFDM	
	5. IEEE 802.11ac VHT 40 MHz n	node: OFDM	
	5. IEEE 802.11ac VHT 80 MHz n	node: OFDM	

Remark:

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested				
Frequency range inNumber ofLocation in frequencywhich device operatesfrequenciesrange of operation				
1 MHz or less	1	Middle		
1 MHz to 10 MHz	2	1 near top and 1 near bottom		
More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom		

1.3 ANTENNA INFORMATION

Antenna Category	 Integral: antenna permanently attached External dedicated antennas External Unique antenna connector
Antenna Type	 PIFA PCB for Dipole Printed Coils
Antenna Gain	1. 5150-5250MHz ➢ Ant 1: 3.8 (dBi) ➢ Ant 2: 5.0 (dBi) 2. 5725-5850MHz ➢ Ant 1: 5.1 (dBi) ➢ Ant 2: 4.1 (dBi)
Power Directional gain	1. 5150-5250MHz : 4.44 dBi 2. 5725-5850MHz : 4.63 dBi
PSD Directional gain	1. 5150-5250MHz : 7.45 dBi 2. 5725-5850MHz : 7.64 dBi

Remark :

For UNII-1(5150-5250MHz):

1. Power Directional gain=10log(((10^(Ant1/10)+10^(Ant2/10))/2))=10log(((10^(3.8/10)+10^(5/10))/2))=4.44 dBi

2. Power Density Directional gain=10log(((10^(Ant1/10)+10^(Ant2/10))/2))+10log(NTX/Nss)

=10log(((10^(3.8/10)+10^(5/10))/2))+10log(2/1)=7.45 dBi

For UNII-3(5725-5850MHz):

1. Power Directional gain=10log(((10^(Ant1/10)+10^(Ant2/10))/2))=10log(((10^(5.1/10)+10^(4.1/10))/2))=4.63 dBi

2. Power Density Directional gain=10log(((10^(Ant1/10)+10^(Ant2/10))/2))+10log(NTx/Nss)

=10log(((10^(5.1/10)+10^(4.1/10))/2))+10log(2/1)=7.64 dBi

1.4 MEASUREMENT UNCERTAINTY

UNCERTAINTY
+/- 1.2575
+/- 1.4003
+/- 1.1372
+/- 1.4003
+/- 4.0138
+/- 3.9483
+/- 2.5975
+/- 2.6112
+/- 2.7389
+/- 2.9683
+/- 1.8509
+/- 1.9869
+/- 2.9651
+/- 2.7807
+/- 3.6437
+/- 4.2982

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of *k*=2

2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at *No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)*

Test site	Test Engineer	Remark
AC Conduction Room	Anderson Kuo	
Radiation	Dennis Li	
RF Conducted	lan Tu	

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Due	
Spectrum Analyzer 10Hz-40GHz	R&S	FSV 40	101073	07/31/2017	

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Due	
Spectrum Analyzer	Agilent	E4446A	US42510252	12/07/2016	
Loop Ant	COM-POWER	AL-130	121051	02/24/2017	
Bilog Antenna	Sunol Sciences	JB3	A030105	07/02/2017	
Pre-Amplifier	EMEC	EM330	60609	06/07/2017	
Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/01/2017	
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	01/13/2017	
Horn Antenna	EMCO	3116	26370	01/14/2017	
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	
Controller	CCS	CC-C-1F	N/A	N.C.R	
Turn Table	CCS	CC-T-1F	N/A	N.C.R	

AC Conducted Emissions Test Site					
Equipment Manufacturer Model S/N Cal Due					
LISN	R&S	ENV216	101054	05/10/2017	
Receiver	R&S	ESCI	101073	08/19/2017	

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment								
No.	No. Equipment Brand Model Series No. FCC ID							
1	Adapter	APD	WB-18D-12FU	N/A	N/A			
2	PoE	I.T.E	PW130	N/A	N/A			

Support Equipment							
No.	No. Equipment Brand Model Series No. FCC ID						
1	Notebook	ASUS	A&J	N/A	PD9WM3945ABG		
2	Notebook	ASUS	K45V	N/A	PPD-AR5B225		

1.8 Test methodology and applied standards

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.407, KDB 662911 D01 v02r01, KDB 789033 D02 v01r03, KDB 644545 D03 v01.

1.9 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	FCC MRA: TW1039
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	Canada IC 2324G-1 IC 2324G-2

2. TEST SUMMERY

FCC Standard Sec.	Chapter	Test Item	Result
15.203	1.2	Antenna Requirement	Pass
15.207	4.1	AC Conducted Emission	Pass
15.403(i)	4.2	26dB Bandwidth	Pass
15.403(i)	4.2	6dB Bandwidth	Pass
15.403(i)	4.2	Occupied Bandwidth (99%)	Pass
15.407(a)	4.3	Output Power Measurement	Pass
15.407(a)	4.4	Power Spectral Density	Pass
15.407(b)	4.5	Radiation Band Edge	Pass
15.407(b)	4.5	Radiation Spurious Emission	Pass
15.407(g)	4.6	Frequency Stability	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	 IEEE 802.11a mode: 6Mbps IEEE 802.11n HT 20 MHz mode: MCS0 IEEE 802.11n HT 40 MHz mode: MCS0 IEEE 802.11ac VHT 20 MHz mode: MCS0 IEEE 802.11ac VHT 40 MHz mode: MCS0 IEEE 802.11ac VHT 80 MHz mode: MCS0 						
		Mode	Frequency Range	Number of Channels			
		IFFF 802 11a	5180 ~ 5240	4 Channels			
		IEEE 802.11n HT 20 MHz	5180 ~ 5240	4 Channels			
	U-NII-1	IEEE 802.11n HT 40 MHz	5190 ~ 5230	2 Channels			
		IEEE 802.11ac VHT 20 MHz	5180 ~ 5240	4 Channels			
Operating Frequency		IEEE 802.11ac VHT 40 MHz	5190 ~ 5230	2 Channels			
Range &		IEEE 802.11ac VHT 80 MHz	5210	1 Channels			
Number of Channels		IEEE 802.11a	5745 ~ 5825	5 Channels			
		IEEE 802.11n HT 20 MHz	5745 ~ 5825	5 Channels			
		IEEE 802.11n HT 40 MHz	5755 ~ 5795	2 Channels			
	0-111-3	IEEE 802.11ac VHT 20 MHz	5745 ~ 5825	5 Channels			
		IEEE 802.11ac VHT 40 MHz	5755 ~ 5795	2 Channels			
		IEEE 802.11ac VHT 80 MHz	5775	1 Channels			

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

2. Covered modes are test reduction modes. The output powers on the covered modes are equal to or less than the mode referenced and use the same module 3.The mode IEEE 802.11ac VHT20 and VHT40 are only different in control messages with IEEE 802.11n HT20 and HT40, and have same power setting. Therefore, the highest power(IEEE 802.11n HT20 and HT40) were test conducted and radiated measurement and recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission					
Test Condition AC Power line conducted emission for line and neutral					
Voltage/Hz	120V/60Hz				
Test Mode	Mode 1:EUT power by AC adapter Mode 2:EUT power by PoE adapter via LAN cable				
Worst Mode I Mode 1 Mode 2 Mode 3 Mode 4					

Radiated Emission Measurement Above 1G					
Test Condition	Band edge, Emission for Unwanted and Fundamental				
Voltage/Hz	120V/60Hz				
Test Mode Mode 1:EUT power by AC adapter Mode 2:EUT power by PoE adapter via LAN cable					
Worst Mode	🛛 Mode 1 🗌 Mode 2 🗌 Mode 3 🗌 Mode 4				
Worst Position	 Placed in fixed position. Placed in fixed position at X-Plane (E2-Plane) Placed in fixed position at Y-Plane (E1-Plane) Placed in fixed position at Z-Plane (H-Plane) 				
Worst Polarity	🗌 Horizontal 🖂 Vertical				

Radiated Emission Measurement Below 1G					
Test Condition	Test Condition Radiated Emission Below 1G				
Voltage/Hz	Voltage/Hz 120V/60Hz				
Test Mode 1:EUT power by AC adapter Mode 2:EUT power by PoE adapter via LAN cable					
Worst Mode	Worst Mode Mode 1 Mode 2 Mode 3 Mode 4				

Remark:

1. The worst mode was record in this test report.

2. EUT pre-scanned in three axis, X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case were recorded in this report.

3. For below 1G AC power line conducted emission and radiation emission were performed the EUT transmit at the highest output power channel as worse case.
4. EUT power supply had two ways (Adapter and PoE, both not for sale), that EUT pre-scanned two power supply at Radiated below 1G, and the worst case was Adapter mode. Therefore EUT used adapter mode for Radiated measurement above 1G and Conduction below 1G in test report.

3.3 EUT DUTY CYCLE

Duty Cycle							
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)			
802.11a	2.11	2.15	98.14	0.08			
802.11n HT20	5.02	5.08	98.82	0.05			
802.11n HT40	2.47	2.53	97.63	0.10			
802.11ac VHT80	1.19	1.23	96.75	0.14			



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

Frequency Range	Limits(dBµV)		
(MHz)	Quasi-peak	Average	
0.15 to 0.50	66 to 56*	56 to 46*	
0.50 to 5	56	46	
5 to 30	60	50	

* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 clause 6.2,

- 1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
- 2. EUT connected to the line impedance stabilization network (LISN)
- 3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
- Maximum procedure was performed on the six highest emissions to ensure EUT 4. compliance.
- 5. Recorded Line for Neutral and Line.

4.1.3 Test Setup



<u>Test Data</u>





4.2 26DB BANDWIDTH, 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

26 dB Bandwidth : For reporting purposes only.

6 dB Bandwidth : Least 500kHz.

Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03 Section C, D, and ANSI 63.10:2013 clause 6.9.2,

- 1. The EUT RF output connected to the spectrum analyzer by RF cable.
- 2. Setting maximum power transmit of EUT
- 3. UNII-1, SA set RBW = 300kHz, VBW = 1MHz and Detector = Peak, to measurement 26 dB Bandwidth and 99% Bandwidth
- 4. UNII-3, SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 26 dB Bandwidth and 99% Bandwidth
- 5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup



4.2.4 Test Result

	UNII-1 5150-5250 MHz							
	Test mode: IEEE 802.11a mode							
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)			
Low	5180	17.2214	16.8596	27.5326	25.2174			
Mid	5220	17.0043	16.8596	23.9130	24.2029			
High	5240	17.0767	16.8596	24.7826	24.8551			
	Tes	t mode: IEEE 8	02.11n HT20 mo	ode				
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)			
Low	5180	18.3068	18.1620	27.8986	28.5507			
Mid	5220	18.3068	18.1620	29.1350	28.6232			
High	5240	18.2344	18.1620	27.7536	28.6232			
	Tes	t mode: IEEE 8	02.11n HT40 mo	ode				
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)			
Low	5190	37.6266	37.3950	48.0000	46.6090			
High	5230	37.9739	37.7420	61.2170	59.1300			
Test mode: IEEE 802.11ac VHT80 mode								
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)			
Mid	5210	76.8740	76.6425	91.1300	89.7390			

	UNII-3 5725-5825MHz							
	Test mode: IEEE 802.11a mode							
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)			
Low	5745	16.6714	16.8451	16.4348	16.4348			
Mid	5785	16.6714	16.9753	16.3913	16.3913			
High	5825	16.6280	16.7583	16.3913	16.3913			
	Tes	t mode: IEEE 8	02.11n HT20 mc	ode				
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)			
Low	5745	17.8437	17.8871	17.6522	17.6522			
Mid	5785	17.8437	18.0173	17.6522	17.6090			
High	5825	17.7568	17.9305	17.6088	17.6088			
	Tes	t mode: IEEE 8	02.11n HT40 mc	ode				
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)			
Low	5755	36.2373	36.3531	36.2900	36.4060			
High	5795	36.3531	36.3531	36.4060	36.4060			
	Test mode: IEEE 802.11ac VHT80 mode							
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)			
Mid	5775	75.7163	75.7163	76.7540	76.0580			

<u>Test Data</u>

















<u>Test Data</u>

















4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.407 (a)(1) and 15.407(a)(3)

<u>UNII-1 :</u>

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

<u>UNII-3:</u>

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

*Directional gain(DG) reference Page 6 for calculations.

UNII-1 Limit	 Antenna not exceed 6 dBi : 30dBm Antenna with DG greater than 6 dBi : [Limit = 30 - (DG - 6)]
UNII-3 Limit	 Antenna not exceed 6 dBi : 30dBm Antenna with DG greater than 6 dBi : [Limit = 30 - (DG - 6)]

4.3.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r02, Section E.3.b.

- 1. The EUT RF output connected to the power meter by RF cable.
- 2. Setting maximum power transmit of EUT.
- 3. The path loss was compensated to the results for each measurement.
- 4. Measure and record the result of Average output power. in the test report.

4.3.3 Test Setup



4.3.4 Test Result

Conducted output power :

UNII-1 2Tx								
Config CH	C L	Freq. (MHz)	AV Power(dBm)		AV Total	AV Total	DG	Limit
	GI		chain0	chain1	(dBm)	(W)	(dBi)	(dBm)
IEEE 802.11a Data rate: 6Mbps	36	5180	20.33	20.91	23.64	0.2312	-	30
	44	5220	19.98	20.07	23.03	0.2009		
	48	5240	22.61	22.58	25.60	0.3631		
IEEE 3 802.11n HT20 4 Data rate: MCS0 4	36	5180	21.82	21.66	24.75	0.2985		
	44	5220	22.44	21.66	25.07	0.3214	4.44	
	48	5240	21.99	22.01	25.01	0.3170		
IEEE 802.11n HT40 Data rate: MCS0	38	5190	19.07	19.79	22.45	0.1758		
	46	5230	21.13	22.08	24.64	0.2911		
IEEE 36 802.11ac 44 VHT20 44 Data rate: 48	36	5180	21.66	21.61	24.64	0.2911		
	44	5220	20.96	21.61	24.31	0.2698		
	48	5240	21.93	21.99	24.97	0.3141		
IEEE 802.11ac VHT40 Data rate: MCS0	38	5190	19.31	19.72	22.53	0.1791		
	46	5230	22.10	22.02	25.07	0.3214		
IEEE 802.11ac VHT80 Data rate: MCS0	42	5210	17.84	17.90	20.88	0.1225		

UNII-3 2Tx								
Config C	CH	Freq.	AV Power(dBm)		AV Total	AV Total	DG	Limit
	Сп	(MHz)	chain0	chain1	(dBm)	Power (W)	(dBi)	(dBm)
IEEE 802.11a Data rate: 6Mbps	149	5745	22.43	21.56	25.02	0.3177	-	30
	157	5785	22.44	21.41	24.96	0.3133		
	165	5825	22.24	21.16	24.74	0.2979		
IEEE 802.11n HT20 Data rate: MCS0	149	5745	22.17	21.37	24.80	0.3020		
	157	5785	22.32	21.17	24.79	0.3013	4.63	
	165	5825	22.11	20.96	24.58	0.2871		
IEEE 802.11n HT40 Data rate: MCS0	151	5755	20.80	20.18	23.51	0.2244		
	159	5795	21.24	20.97	24.12	0.2582		
IEEE 149 802.11ac 157 VHT20 157 Data rate: MCS0 MCS0 165	149	5745	21.62	21.83	24.74	0.2979		
	157	5785	21.36	21.56	24.47	0.2799		
	165	5825	22.22	21.32	24.80	0.3020		
IEEE 802.11ac VHT40 Data rate: MCS0	151	5755	20.80	20.79	23.81	0.2404		
	159	5795	21.15	20.89	24.03	0.2529		
IEEE 802.11ac VHT80 Data rate: MCS0	155	5775	17.66	17.37	20.53	0.1130		

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.407 (a)(1) and 15.407(a)(3)

UNII-1:

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

*Directional gain(DG) reference Page 6 for calculations.

UNII-1 Limit	Antenna not exceed 6 dBi : Antenna with DG greater than 6 dBi : 15.55 [Limit = $17 - (DG - 6) = 17 - 1.45 = 15.55$, DG = 7.45]
UNII-3 Limit	Antenna not exceed 6 dBi : Antenna with DG greater than 6 dBi : 28.36 [Limit = $30 - (DG - 6) = 30-1.64 = 28.36$, DG = 7.64]

4.4.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r02, Section F

- 1. The EUT RF output connected to the spectrum analyzer by RF cable.
- 2. Setting maximum power transmit of EUT
- UNII-1, SA set RBW = 1MHz, VBW = 1MHz and Detector = RMS, to measurement 3. Power Density.
- UNII-3, SA set RBW = 500kHz, VBW = 2MHz and Detector = RMS, to measurement 4. Power Densitv
- The path loss and Duty Factor were compensated to the results for each 5. measurement by SA.
- Mark the maximum level. 6.
- Measure and record the result of power spectral density. in the test report. 7.

4.4.3 Test Setup



4.4.4 Test Result

UNII-1 5150-5250 MHz								
	Test mode: IEEE 802.11a mode							
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Low	5180	10.32	10.36	13.35				
Mid	5220	10.26	10.36	13.32	15.55			
High	5240	10.54	10.37	13.47				
	Test	mode: IEEE 8	02.11n HT20 n	node				
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Low	5180	10.39	10.42	13.42	15.55			
Mid	5220	10.41	10.45	13.44				
High	5240	10.57	10.53	13.56				
	Test	mode: IEEE 8	02.11n HT40 n	node				
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Low	5190	5.23	5.29	8.27	15.55			
High	5230	7.60	7.68	10.65				
Test mode: IEEE 802.11ac VHT80 mode								
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Mid	5210	0.36	0.26	3.32	15.55			
UNII-3 5725-5825 MHz								
------------------------------	-------------------------------------	--------------------------	--------------------------	------------------------	----------------	--	--	--
Test mode: IEEE 802.11a mode								
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Low	5745	7.58	7.89	10.75				
Mid	5785	7.45	7.58	10.53	28.36			
High	5825	7.41	7.63	10.53				
	Test n	node: IEEE 80	2.11n HT20 m	ode				
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Low	5745	6.82	7.51	10.19				
Mid	5785	7.06	7.42	10.25	28.36			
High	5825	7.35	7.48	10.43				
	Test n	node: IEEE 80	2.11n HT40 m	ode				
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Low	5755	3.40	3.72	6.57	28.36			
High	5795	3.42	3.50	6.47	20.30			
	Test mode: IEEE 802.11ac VHT80 mode							
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	limit (dBm)			
Mid	5775	-3.50	-3.00	-0.23	28.36			

<u>Test Data</u>

















<u>Test Data</u>

















4.5 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to §15.407, §15.209 and §15.205,

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)						
(MHZ)	Transmitters	Receivers					
30-88	100 (3 nW)	100 (3 nW)					
88-216	150 (6.8 nW)	150 (6.8 nW)					
216-960	200 (12 nW)	200 (12 nW)					
Above 960	500 (75 nW)	500 (75 nW)					

4.5.2 Test Procedure

Test method Refer as KDB 789033 D02 v01r03, Section G.3, G.4, G.5, and G.6,.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10, and the EUT set in a continuous mode.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.

3. Span shall wide enough to full capture the emission measured. The SA from 30MHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.

- 5. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW ≥ 3*RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G:
 - (2.1) For Peak measurement : RBW = 1MHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW

'If Duty Cycle ≥ 98%, VBW=10Hz.

If Duty Cycle < 98%, VBW=1/T.

Configuration	Duty Cycle (%)	VBW		
802.11a	99.43%	10Hz		
802.11n HT20	97.97%	10Hz		
802.11n HT40	94.44%	750Hz		
802.11ac VHT80	90.67%	1.5kHz		

4.5.3 Test Setup <u>9kHz ~ 30MHz</u>



Above 1 GHz



4.5.4 Test Result

Test Data

Band Edge Test Data for UNII-1







Test Mode	IEEE	802.11a Hi	gh CH	Temperature		27(°∁)/ 53%RH					
Test Item		Band Edge			est Date	Nov 08, 2016					
Polarize		Vertical		Tes	t Engineer	Der	nnis Li				
Detector		Average		Те	st Voltage	120Va	ic / 60Hz				
110.0 dBuV/m	110.0 dBuV/m										
						Limit2:	_				
			N N N								
70			h								
	N N										
		Ń	V								
				Mr.							
	1	~~'		· /\	mul	3					
30.0											
5100.000 5130.0	00 5160.00 5	190.00 5220.00	5250.00	5280.0	0 5310.00 534	0.00 5	400.00 MHz				
		Commont									
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark				
5150.000	37.13	3.04	40.1	7	54.00	-13.83	AVG				
5241.900	99.51	4.63	104.	14	-	-	AVG				
5379.900	36.95	5.56	42.5	51	54.00	-11.49	AVG				

Test Mode	IEEE 802.	11n HT20 L	ow CH	Temp/Hum		27(°C)/ 53%RH			
Test Item	Ba	Band Edge			est Date	Nov 08, 2016			
Polarize		Vertical			st Engineer	Der	nnis Li		
Detector		Peak		Те	st Voltage	120Va	c / 60Hz		
120.0 dBuV/m									
80				M	Al work	Limit1:			
and the second s	Mananahata kana kana kana kana kana kana kana k	Annandaria	June June	/					
40.0									
5100.000 5110.0	00 5120.00 5 [.]	130.00 5140.00	5150.00	5160.0	0 5170.00 518	0.00 52	200.00 MHz		
		•							
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark		
5148.700	68.41	3.03	71.4	4	74.00	-2.56	peak		
5187.300	110.73 4.12 114.8		35 -		-	peak			
			•			•	·		

Test Mode	IEEE 802.	11n HT20 L	ow CH	Temperature		27(°C)/ 53%RH			
Test Item	Band Edge			Test Date		Nov 0	8, 2016		
Polarize	Vertical			Test Engineer		Der	nnis Li		
Detector	Average			Te	st Voltage	120Va	c / 60Hz		
110.0 dBuV/m									
70									
30.0	0 5120.00 5	130.00 5140.00	5150.00	5160 0	0 5170.00 518	0.00 53	200.00 MHz		
3100.000 3110.0	JU JIZU.UU J	130.00 3140.00	5150.00	5100.0	o 31ro.00 310	0.00 32			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV/	llt /m)	Limit (dBuV/m)	Margin (dB)	Remark		
5150.000	49.31	3.04	52.3	5	54.00	-1.65	AVG		
5186.800	100.86 4.11 104.9		97 -		-	AVG			

Test Mode	IEEE 802.11n HT20 High CH				Temp/Hum		27(°∁)/ 53%RH				
Test Item	Band Edge				Test Date		Nov 08, 2016				
Polarize	\ \	/ertical		Tes	st Engine	er	De	ennis Li			
Detector		Peak		Те	st Voltag	je	120\	/ac / 60Hz			
120.0 dBuV/m	120.0dBuV/m										
							Limit1: Limit2:	_			
80			h								
		<u> </u>									
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40.0											
5100.000 5130	0.00 5160.00 51	90.00 5220.00	5250.00	5280.0	0 5310.00	5340).00	5400.00 MHz			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Lim (dBuV	it /m)	Margin (dB)	Remark			
5142.000	51.36	2.99	54.3	35	74.0	0	-19.65	peak			
5247.000	109.04	4.65	113.	69	-		-	peak			
5388.300	50.86	5.62	56.4	18	74.0	0	-17.52	peak			

Test Mode	IEEE 802.11n HT20 High CH				mperature	27(°∁)/ 53%RH			
Test Item	Band Edge				est Date	Nov 08, 2016			
Polarize	V	ertical		Tes	t Engineer	Der	nnis Li		
Detector	A	verage		Te	st Voltage	120Va	ic / 60Hz		
110.0 dBuV/m									
			2			Limit1: Limit2:	_		
70		/							
	1				<u> </u>		3		
30.0									
5100.000 51	30.00 5160.00 5	190.00 5220.00	5250.00	5280.0	0 5310.00 534	0.00 5	400.00 MHz		
Eroguanau	Deading	Correct	Baa	.14	Limit	Morgin			
(MHz)	(dBuV)	Factor (dB/m)	(dBuV	//m)	(dBuV/m)	(dB)	Remark		
5150.000	37.38	3.04	40.4	2	54.00	-13.58	AVG		
5247.000	99.15	4.65	103.	80	-	-	AVG		
5397.000	37.00	5.70	42.7	'0	54.00	-11.30	AVG		

Test Mode	IEEE 802.1	1n HT40 Lo	ow CH	Temp/Hum		27(°C)/ 53%RH			
Test Item	Band Edge			Т	est Date	Nov 08, 2016			
Polarize	Vertical			Tes	t Engineer	Der	nnis Li		
Detector	Peak		Te	st Voltage	120Va	c / 60Hz			
120.0 dBuV/m									
					Current Mark	Limit1: Limit2:			
80			^^	water of the second	,				
have to define a	decomposition and the form	Numana							
40.0	1.00 5122.00 5	133.00 5144.00	5155.00	5166.0	0 5177.00 518	8.00 52	210.00 MHz		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark		
5150.000	65.35	3.04	68.3	9	74.00	-5.61	peak		
5196.690	105.66 4.39 110.0		05 -		-	peak			
	•					•			

Test Mode	IEEE 802.11n HT40 Low CH				Temperature		27(°C)/ 53%RH				
Test Item	Band Edge				Test Date		Nov 08, 2016				
Polarize	Vertical			Tes	t Engi	neer	De	ennis Li			
Detector	A	verage		Tes	st Volt	age	120\	/ac / 60Hz			
120.0 dBuV/m	120.0 dBu∀/m										
							Limit1: Limit2:	_			
							2				
							V I	M			
80											
				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~							
			1								
40.0											
5100.000 51	1.00 5122.00 5	133.00 5144.00	5155.00	5166.0	0 5177	7.00 5188	3.00	5210.00 MHz			
		Correct									
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Resı (dBuV	ult //m)	Li (dBi	mit uV/m)	Margin (dB)	Remark			
5150.000	48.16	3.04	51.2	:0	54	.00	-2.80	AVG			
5197.130	94.87 4.41 99.2		.8 -		-	-	AVG				

Test Mode	IEEE 802.11n HT40 High CH				emp/Hum	<b>27(</b> °C	27(°C)/ 53%RH				
Test Item	Band Edge			Т	est Date	Nov	08, 2016				
Polarize	\	/ertical		Tes	st Enginee	r De	ennis Li				
Detector		Peak		Те	st Voltage	120\	/ac / 60Hz				
120.0 dBuV/m	120.0 dBuV/m										
		A.	2			Limit1: Limit2:	_				
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80		MM	Mu	Lu.							
	hu.	N.		M							
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40.0											
5100.000 5130	).00 5160.00 51	90.00 5220.00	5250.00	5280.0	0 5310.00	5340.00	5400.00 MHz				
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m	Margin ) (dB)	Remark				
5147.400	55.27	3.02	58.2	29	74.00	-15.71	peak				
5237.100	107.62	4.62	112.2	24	-	-	peak				
5399.100	50.97	5.71	56.6	8	74.00	-17.32	peak				

Test Mode	IEEE 802.11n HT40 High CH				mperature	27(℃)/ 53%RH				
Test Item	Band Edge				est Date	Nov 08, 2016				
Polarize	Vertical			Tes	t Engineer	Dennis Li				
Detector	A	verage		Te	st Voltage	120Va	ic / 60Hz			
110.0 dBuV/m										
	2					Limit1: Limit2:	_			
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		~		h						
	*~~			ł		3				
30.0										
5100.000 5130	).00	90.00 5220.00	5250.00	5280.0	0 5310.00 534	0.00 54	400.00 MHz			
Corroct										
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark			
5138.700	40.27	2.96	43.2	23	54.00	-10.77	AVG			
5237.700	96.16	4.62	4.62 100.		-	-	AVG			
5361.900	36.88	5.41	5.41 42.2		54.00	-11.71	AVG			

Test Mode	IEEE 802.11ac VHT80 Mid CH			Temp/Hum		<b>27(</b> °C)/	/ 53%RH
Test Item	Band Edge			Test Date		Nov 0	8, 2016
Polarize	Vertical			Test Engineer		Dennis Li	
Detector		Peak		Tes	st Voltage	120Va	c / 60Hz
120.0 dBuV/m							
						Limit1: Limit2:	_
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40.0 5100.000 5115	.00 5130.00 5	145.00 5160.00	5175.00	5190.0	0 5205.00 522	20.00 52	250.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV	ılt /m)	Limit (dBuV/m)	Margin (dB)	Remark
5138.400	65.98	2.96	68.9	4	74.00	-5.06	peak
5216.850	100.96 4.55 105		105.5	51 -		-	peak
		•	•			•	

Test Mode	IEEE 802.11ac VHT80 Mid CH				nperature	27(℃)/ 53%RH	
Test Item	Band Edge				est Date	Nov 08, 2016	
Polarize	Vertical			Tes	t Engineer	Der	nnis Li
Detector	A	verage		Tes	st Voltage	120Va	ic / 60Hz
120.0 dBuV/m							
						Limit1: Limit2:	_
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40.0	~~	$\sim$					
5100.000 5115.	.00 5130.00 51	45.00 5160.00	5175.00	5190.0	0 5205.00 522	20.00 52	250.00 MHz
<b>F</b>	Deading	Correct	Deer	.14	1 : :4	Manaia	
(MHz)	(dBuV)	Factor (dB/m)	(dBuV	/m)	(dBuV/m)	(dB)	Remark
5138.700	48.72	2.96	51.6	8	54.00	-2.32	AVG
5239.650	90.94	4.62	95.5	6	-	-	AVG

#### Test Mode IEEE 802.11a Low CH Temp/Hum 27(°C)/ 53%RH Test Item Band Edge Test Date Nov 08, 2016 Dennis Li Polarize Vertical Test Engineer Detector 120Vac / 60Hz Peak **Test Voltage** 130.0 dBuV/m Limit1: 85 40.0 5685.000 5692.00 5734.00 5699.00 5706.00 5713.00 5720.00 5727.00 5741.00 5755.00 MHz Correct Frequency Reading Result Limit Margin Factor Remark (MHz) (dBuV) (dBuV/m) (dBuV/m) (dB) (dB/m) 5717.970 71.30 77.48 -32.75 110.23 6.18 peak 5722.730 78.73 6.20 84.93 117.02 -32.09 peak 5746.530 109.15 6.30 115.45 -peak

#### Band Edge Test Data for UNII-3





Test Mode	IEEE	IEEE 802.11a High CH		Temperature		27(°∁)/ 53%RH	
Test Item		Band Edge		Test Date		Nov 08, 2016	
Polarize		Vertical		Test	Engineer	Der	nnis Li
Detector		Average		Tes	t Voltage	120Va	ic / 60Hz
130.0 dBu∀/m						Limit1:	
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85							
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40.0					Ĭ		$\sim$
5815.000 5820.50	5826.00 5	331.50 5837.00	5842.50	5848.00	5853.50 585	59.00 58	870.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
5826.825	98.46	6.64	105.	10	-	-	AVG
5851.300	48.47	6.75	55.2	22	119.24	-64.02	AVG
5855.865	45.72	6.77	52.4	.9	110.56	-58.07	AVG

Test Mode	IEEE 802.11n HT20 Low CH				Temp/Hum		27(°∁)/ 53%RH	
Test Item	Band Edge				Test Date		Nov 08, 2016	
Polarize	Vertical			Test Engineer		Dennis Li		
Detector		Peak		Te	st Volta	ige	120\	/ac / 60Hz
130.0 dBuV/m							Limit1:	—
				2	www.			3
85			way was	president and a second s				
and the with hard man	ntarinateduration personalitation data							
40.0	0 5699.00 57	706.00 5713.00	5720.00	5727 0	10 5734 1	00 5741		5755 00 MHz
		0.00 0110.00	0120.00	0121.0				
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Lir (dBu	nit V/m)	Margin (dB)	Remark
5719.790	70.08	6.19	76.2	27	110	.74	-34.47	peak
5724.900	82.24	6.21	88.4	5	121	.97	-33.52	peak
5750.240	109.05	6.32	115.3	37	-		-	peak
Test Mode	IEEE 802.7	11n HT20 L	ow CH	Te	mperature	<b>27(</b> °C)	/ 53%RH	
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Test Item	Ba	and Edge		Т	est Date	Nov (	08, 2016	
Polarize		Vertical		Tes	st Engineer	De	nnis Li	
Detector		Average		Те	ac / 60Hz			
130.0 dBu\/m						Limit1:		
40.0	0 5699.00 57	706.00 5713.00	5720.00	2	0 5734.00	5741.00 5	755.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark	
5720.000	48.90	6.19	55.0	9	110.80	-55.71	AVG	
5725.110	61.91	6.21	68.1	2	122.20	-54.08	AVG	
5750.310	98.75	6.32	105.0	07	-	-	AVG	

Test Mode	IEEE 802.1	1n HT20 Hi	gh CH	Te	mp/Hu	ım	27(°C)/ 53%RH	
Test Item	Ba	nd Edge		Te	est Dat	te	Nov	08, 2016
Polarize	\ \	/ertical		Tes	t Engir	neer	De	nnis Li
Detector		EE 802.11n HT20 High ( Band Edge Vertical Peak			st Volta	age	120Va	ac / 60Hz
130.0 dBuV/m								
					<b>_</b>		Limit1:	_
	Mar Andrewski					<u> </u>		
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			, warden de	re manual has	2	<b>.</b>		
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							and many with milling the	wayangarah
40.0								
40.0 5915 000 592	0.50 5926.00 50	221 50 5927 00	5942 50	5040 0	n 5052	50 5959	100	5970.00 MHz
5615.000 562	.0.30 3828.00 36	551.50 5657.00	J042.JU	J040.U	J JOJJ.	JU JOJ		J070.00 MHZ
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Lir (dBu	nit IV/m)	Margin (dB)	Remark
5830.125	107.43	6.66	114.0	09		-	-	peak
5850.090	71.28	6.74	78.0	2	121	.99	-43.97	peak
5855.975	66.37	6.77	73.1	4	110	).53	-37.39	peak

Test Mode	IEEE 802.1	1n HT20 Hi	gh CH	Ter	mperatui	e	<b>27(°</b> C)/ 53%RH	
Test Item	Ba	nd Edge		T	est Date		Nov	08, 2016
Polarize	۱	/ertical		Tes	t Engine	er	De	nnis Li
Detector	A	verage		Tes	st Voltag	е	120V	ac / 60Hz
130.0 dBuV/m								
					_		Limit1:	-
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40.0 5915 000 5920	50 5926 00 50	221 50 5927 00	5942 50	5040 0	0 5952 50	5050	00	5970.00 MH-
3013.000 3020	J. JU JUZU. UU JU	JJ1.JU JUJ1.UU	J042.J0	J040.U	0 3033.30	2024		JUTU.UU MIIZ
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV	ult //m)	Limi (dBuV/	t 'm)	Margin (dB)	Remark
5830.345	97.25	6.66	103.9	91	-		-	AVG
5850.035	52.19	6.74	58.9	3	122.1	2	-63.19	AVG
5854.930	46.58	6.76	53.3	4	110.9	6	-57.62	AVG

Test Mode	IEEE 802.1	1n HT40 Lo	ow CH	Te	emp/Hum	27(° ℃)	/ 53%RH
Test Item	Ba	nd Edge		Т	est Date	Nov 0)8, 2016
Polarize	<u>۱</u>	/ertical		Tes	t Engineer	Der	nnis Li
Detector		Peak		Te	st Voltage	120Va	ic / 60Hz
130.0 dBuV/m						1	
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40.0							
5680.000 5690	.00 5700.00 57	10.00 5720.00	5730.00	5740.0	0 5750.00	5760.00 5	780.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
5719.000	81.21	6.18	87.3	9	110.52	-23.13	peak
5723.800	82.75	6.20	88.9	95	119.46	-30.51	peak
5761.100	106.25	6.36	112.6	61	-	-	peak

Test Mode	IEEE 802.1	1n HT40 Lo	ow CH	Tei	mperature	27(°C)/ 53%RH	
Test Item	Ba	nd Edge		Т	est Date	Nov 0	8, 2016
Polarize	N	/ertical		Tes	t Engineer	Der	nnis Li
Detector	A	verage		Te	st Voltage	120Va	c / 60Hz
130.0 dBuV/m					1		
						Limit1:	
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						3	
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85							
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4U.U	00 5700 00 57	10.00 5720.00	E720.00	6740.0	0 5750.00 570	0.00 5	700.00 MU-
3680.000 3630.	00 3700.00 37	10.00 3720.00	5730.00	<b>3740.</b> 0	0 3730.00 376	0.00 37	78U.UU MHZ
						I	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
5719.800	62.69	6.19	68.8	8	110.74	-41.86	AVG
5721.700	63.86	6.19	70.0	)5	114.68	-44.63	AVG
5760.700	94.67	6.36	101.	03	-	-	AVG

Test Mode	IEEE	802.11	n HT40 H	igh CH	Te	emp/Hum		27(°C)/ 53%RH	
Test Item		Bar	nd Edge		T	est Date		Nov (	08, 2016
Polarize		V	ertical		Tes	t Enginee	er	De	nnis Li
Detector			Peak		Test Engineer Dennis   Test Voltage 120Vac /			ac / 60Hz	
130.0 dBuV/	n							Limit1:	_
								2	
		m	1						
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85				mon	-				
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40.0	780.00 579	0.00 58	00.00 5810.00	0 5820.00	5830.0	0 5840.00	5850	00 5	1870.00 MHz
Frequency (MHz)	Rea (dE	iding BuV)	Correct Factor (dB/m)	Resi (dBuV	ult //m)	Limit (dBuV/n	n)	Margin (dB)	Remark
5802.100	10	5.43	6.54	111.9	97	-		-	peak
5849.900	59	.13	6.74	65.8	37	122.20	)	-56.33	peak
5861.700	60	.43	6.79	67.2	22	108.92	2	-41.70	peak

Test Mode	IEEE 802.1	1n HT40 Hi	gh CH	Tei	mperatu	re	27(°C)/ 53%RH		
Test Item	Ba	nd Edge		Т	est Date	<b>;</b>	Nov	v 08, 2016	
Polarize	\	/ertical		Tes	t Engine	er	D	ennis Li	
Detector	A	verage		Te	st Voltag	ge	120	Vac / 60Hz	
130.0 dBuV/m	1								
							Limit		
		1							
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40.0									
5770.000 578	0.00 5790.00 50	300.00 5810.00	5820.00	5830.0	0 5840.00	) 5850	).00	5870.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Lim (dBuV	it //m)	Margin (dB)	Remark	
5803.100	94.57	6.54	101.	11	-		-	AVG	
5849.800	44.07	6.74	50.8	31	122.2	20	-71.39	AVG	
5858.400	42.35	6.78	49.1	3	109.8	85	-60.72	AVG	

Test Mode	IEEE 80 N	2.11ac VHT ⁄lid CH	Г80	Te	emp/Hum	<b>27(</b> °C)/	′ 53%RH
Test Item	Ba	nd Edge		Т	est Date	Nov 0	8, 2016
Polarize	١	/ertical		Tes	st Engineer	Der	nnis Li
Detector		Peak		Te	st Voltage	120Va	c / 60Hz
120.0 dBuV/m		3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4					5
40.0	.00 5734.00 5	751.00 5768.00	5785.00	5802.0	0 5819.00 583	16.00 58	Х Мини 370.00 MHz
<b>F</b>	Deading	Correct	Deer	.14	Linuid	Manaia	
(MHz)	(dBuV)	Factor (dB/m)	(dBuV	//m)	(dBuV/m)	(dB)	Remark
5717.850	67.04	6.18	73.2	22	110.20	-36.98	peak
5723.970	67.55	6.20	73.7	'5	119.85	-46.10	peak
5762.900	98.54	6.37	104.9	91	-	-	peak
5850.790	58.36	6.74	65.1	0	120.40	-55.30	peak
5860.310	63.05	6.78	69.8	3	109.31	-39.48	peak

Fest Mode	IEEE 802 N	2.11ac VHT8 1id CH	80	Terr	nperature	27(°C)/ 53%RH	
Test Item	Bai	nd Edge		Те	est Date	Nov 0	8, 2016
Polarize	V	ertical		Test	Engineer	Der	nnis Li
Detector	A	verage		Tes	t Voltage	120Va	c / 60Hz
120.0 dBuV/m							
							į
40.0	17.00 5734.00 5	751.00 5768.00	5785.00	5802.00	5819.00 583	36.00 58	370.00 MHz
40.0 5700.000 57 Frequency (MHz)	17.00 5734.00 5 Reading (dBuV)	751.00 5768.00 Correct Factor (dB/m)	5785.00 Resu (dBuV	5802.00 Ilt /m)	5819.00 583	86.00 58 Margin (dB)	Remark
40.0 5700.000 57 Frequency (MHz) 5719.890	17.00 5734.00 5 Reading (dBuV) 50.65	751.00 5768.00 Correct Factor (dB/m) 6.19	5785.00 Resu (dBuV 56.8	5802.00 Ilt /m) 4	5819.00 583	Margin (dB) -53.93	Remark
40.0 5700.000 57 Frequency (MHz) 5719.890 5724.140	Reading (dBuV)       50.65       51.74	751.00 5768.00 Correct Factor (dB/m) 6.19 6.20	5785.00 Resu (dBuV 56.8 57.9	5802.00	5819.00 583 Limit (dBuV/m) 110.77 120.24	Margin (dB) -53.93 -62.30	Remark
40.0 5700.000 57 Frequency (MHz) 5719.890 5724.140 5763.240	Reading (dBuV)       50.65       51.74       88.37	751.00 5768.00 Correct Factor (dB/m) 6.19 6.20 6.37	5785.00 Resu (dBuV 56.8 57.9 94.7	5802.00	5819.00 583 Limit (dBuV/m) 110.77 120.24	Margin (dB) -53.93 -62.30 -	Remark AVG AVG AVG
40.0 5700.000 57 Frequency (MHz) 5719.890 5724.140 5763.240 5851.130	Reading (dBuV)       50.65       51.74       88.37       43.63	751.00 5768.00 Correct Factor (dB/m) 6.19 6.20 6.37 6.75	5785.00 Resu (dBuV) 56.8 57.9 94.7 50.3	5802.00	5819.00 583 Limit (dBuV/m) 110.77 120.24 - 119.62	Margin (dB) -53.93 -62.30 - - -69.24	Remark AVG AVG AVG AVG AVG

# Below 1G Test Data

Test Mode		Mode 1		Te	emp/Hum		27(°C)/ 53%RH	
Test Item	3	0MHz-1GH	z	Т	est Date		Nov	17, 2016
Polarize		Vertical		Tes	t Engine	er	De	nnis Li
Detector	Peal	k and Qusi-	peak	Те	st Voltage	e	120Va	ac / 60Hz
80.0 dBuV/m							Limit1: Margin:	
0.0 127.00	224.00 3	21.00 418.00	5	612.00	) 709.00	6 1 1 806.	00	1000.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/r	m)	Margin (dB)	Remark
66.8600	40.52	-21.16	19.3	6	40.00	)	-20.64	QP
98.8700	54.55	-19.31	35.2	4	43.50	)	-8.26	peak
125.0600	36.31	-15.57	20.7	4	43.50	)	-22.76	QP
250.1900	53.51	-16.27	37.2	4	46.00	)	-8.76	peak
502.3900	38.79	-9.20	29.5	9	46.00	)	-16.41	peak
749.7400	29.81	-4.93	24.8	8	46.00	)	-21.12	peak







#### Test Mode IEEE 802.11a Low CH Temp/Hum 27(°C)/ 53%RH Test Item Harmonic Test Date Nov 17, 2016 Vertical Polarize Test Engineer Dennis Li Test Voltage 120Vac / 60Hz Detector Peak and Average 110.0 dBuV/m Limit1: Limit2: 3 70 2 X 30.0 1000.000 3550.00 6100.00 8650.00 11200.00 13750.00 16300.00 18850.00 21400.00 26500.00 MHz Correct Frequency Reading Result Limit Margin Factor Remark (MHz) (dBuV) (dBuV/m) (dBuV/m) (dB) (dB/m) 8655.000 32.14 74.00 -26.49 15.37 47.51 peak

## Above 1G Test Data for UNII-1

### Remark:

10360.000

15550.000

15550.000

45.06

48.79

31.44

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

17.58

20.64

20.64

2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

62.64

69.43

52.08

74.00

74.00

54.00

-11.36

-4.57

-1.92

peak

peak

AVG

Test Mode	IEEE	IEEE 802.11a Low CH			emp/Hum	<b>27(</b> ℃	)/ 53%RH
Test Item		Harmonic		Т	est Date	Nov	08, 2016
Polarize		Horizontal		Tes	st Engineer	r De	nnis Li
Detector	Pea	ak and Aver	age	Те	st Voltage	120V	ac / 60Hz
110.0 dBuV/m						Limit1: Limit2:	_
70				3X •			
30.0 1000.000 3550.0	0 6100.00 8	650.00 11200.00	0 13750.00	16300	.00 18850.00	21400.00	26500.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m	Margin ) (dB)	Remark
8698.000	30.87	15.45	46.3	32	74.00	-27.68	peak
10360.000	35.50	17.58	53.0	)8	74.00	-20.92	peak
15550.000	45.02	20.64	65.6	6	74.00	-8.34	peak
15550.000	31.83	20.64	52.4	7	54.00	-1.53	AVG
Romark:							

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode		IEEE	IEEE 802.11a Mid C			emp/Hun	า	27(℃)/ 53%RH	
Test Item			Harmor	nic	1	lest Date		Nov	08, 2016
Polarize			Vertica	al	Tes	st Engine	er	De	nnis Li
Detector		Pea	ak and Av	verage	Te	est Voltag	е	120Va	ac / 60Hz
110.0 dBuV/m								Limit1: Limit2:	
70			2 X 1		*				
30.0 1000.000 3550.	00 6	100.00 88	650.00 112	00.00 13750.00	16300	.00 18850.0	D 214	00.00	26500.00 MHz
Frequency (MHz)	Re (c	eading IBuV)	Correct Factor (dB/m)	t Rest (dBu)	ult //m)	Limi (dBuV/	t ′m)	Margin (dB)	Remark
8753.000	3	0.56	15.56	46.1	12	74.0	0	-27.88	peak
10440.000	3	9.77	17.57	57.3	34	74.0	0	-16.66	peak
15670.000	5	0.36	21.05	71.4	11	74.0	0	-2.59	peak
15670.000	3	1.18	21.05	52.2	23	54.0	0	-1.77	AVG
Romark ·									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Tes	st Mode		IEEE	802.11	la M	id CH	Temp/Hum			27(°C)/ 53%RH		
Те	st Item			Harmo	onic		-	Test Da	ate	Nov	08, 2016	
P	olarize			Horizo	ontal		Te	st Engi	neer	De	ennis Li	
D	etector		Pea	k and a	Aver	verage Test Voltage 120Vac / 60Hz						
110.0	) dBuV/m									Limit1: Limit2:	_	
70				2×			3 X X					
30.0 10	INN NNN 355N (	10 611	38 00.00	50.00 1	11200.00	1 13750 00	1630	<u>188</u>	50.00 21.40	חח חח	26500 00 MHz	
Ĩ	00.000 3330.0		0.00 00	50.00	11200.00	1 13130.00	10300	J. 00 100.	JU. UU 214	50.00	20300.00 M12	
Freq (N	uency IHz)	Rea (dE	iding BuV)	Corre Facto (dB/r	ect or n)	Resı (dBuV	ult //m)	L (dB	imit uV/m)	Margin (dB)	Remark	
867	4.000	30	.23	15.4	.1	45.6	64	74	4.00	-28.36	peak	
1044	10.000	38	8.76	17.5	57	56.3	33	74	4.00	-17.67	peak	
1565	50.000	48	8.63	20.9	8	69.6	61	74	4.00	-4.39	peak	
1565	50.000	30	.84	20.9	8	51.8	32	54	4.00	-2.18	AVG	
	_											

- Remark:
  - 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
  - 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	Test Mode IEEE 802.11a High Cl					um	27(°∁)/ 53%RH		
Test Item		Harmonic		-	Test Da	ate	Nov 08, 2016		
Polarize		Vertical		Te	st Engi	neer	Der	nis Li	
Detector	Pea	ak and Aver	rage	Te	est Volt	age	120Va	c / 60Hz	
110.0 dBuV/m							Limit1: Limit2:	_	
70				*					
30.0 1000.000 3550.00	6100.00 8	650.00 11200.0	0 13750.00	16300	).00 1885	50.00 214	00.00 26	5500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV	ult //m)	Li (dB	imit uV/m)	Margin (dB)	Remark	
8793.000	30.65	15.63	46.2	28	74	1.00	-27.72	peak	
10480.000	38.13	17.57	55.7	0	74	1.00	-18.30	peak	
15730.000	50.58	21.26	71.8	34	74	1.00	-2.16	peak	
15730.000	15730.000 30.66 21.26		51.9	92	54	1.00	-2.08	AVG	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Tes	st Mode		IEEE 8	302.11	a Hi	gh CH		Temp/Hum			27(℃)/ 53%RH		
Те	est Item			Harm	onic				lest Da	ate	Nov 08, 2016		
P	olarize			Horizo	ontal			Tes	st Engi	neer	D	Dennis Li	
D	etector		Pea	k and	Aver	age		Te	est Volt	age	120	Vac / 6	)Hz
110.0	) dBuV/m										Limit1 Limit2	:	
70							Š	3					
				;	2		\$	1 K					
30.0 10	00.000 3550.0	10 61	00.00 86	50.00	11200.00	) 13750.	00 1	6300	).00 188	50.00 214	00.00	26500.00	MHz
Freq (N	uency IHz)	Re (d	ading BuV)	Corre Fact (dB/r	ect or m)	Re (dBu	sult ıV/m)		Li (dB	imit uV/m)	Margin (dB)	Re	emark
875	6.000	30	0.80	15.5	56	46	.36		74	1.00	-27.64	p	eak
1048	30.000	3	5.39	17.5	57	52	.96		74	1.00	-21.04	p	eak
1573	30.000	49	9.22	21.2	26	70	.48		74	1.00	-3.52	p	eak
1573	30.000	3	1.07	21.2	26	52	.33		54	1.00	-1.67	ŀ	ŧVG

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.1	1n HT20 Lo	ow CH	Temp/Hum			27(°C)/ 53%RH		
Test Item	Ha	armonic		٦	lest Da	ite	Nov 0	8, 2016	
Polarize	\	/ertical		Tes	st Engi	neer	Der	nis Li	
Detector	Peak a	and Average	е	Te	est Volt	age	120Va	ic / 60Hz	
110.0 dBu¥/m							Limit1: Limit2:		
70				3 X 4 X					
30.0 1000.000 3550	0.00 6100.00 80	350.00 11200.00	0 13750.00	16300	).00 1885	0.00 214	00.00 2	6500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Li (dBi	mit uV/m)	Margin (dB)	Remark	
8658.000	31.76	15.38	47.1	4	74	.00	-26.86	peak	
10360.000	39.30	17.58	56.8	8	74	.00	-17.12	peak	
15540.000	51.46	20.61	72.0	)7	74	.00	-1.93	peak	
15540.000	32.14	20.61	52.7	'5	54	.00	-1.25	AVG	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.	11n HT20 L	ow CH	H Temp/Hum			27(°∁)/ 53%RH		
Test Item	F	larmonic		Т	est Date		Nov C	8, 2016	
Polarize	Н	orizontal		Test Engineer			Der	nis Li	
Detector	Peak	and Averag	je	Те	st Voltag	e	120Va	c / 60Hz	
110.0 dBuV/m							Limit1: Limit2:	_	
70									
30.0 1000.000 3550.0	00 6100.00 80	i50.00 11200.0	0 13750.00	16300	.00 18850.0	0 214	00.00 21	3500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resi (dBuV	ult //m)	Limi (dBuV	t /m)	Margin (dB)	Remark	
8758.000	31.94	15.57	47.5	51	74.0	0	-26.49	peak	
10360.000	38.28	17.58	55.8	36	74.0	0	-18.14	peak	
15540.000	51.19	20.61	71.8	30	74.0	0	-2.20	peak	
15540.000	32.21	20.61	52.8	32	54.0	0	-1.18	AVG	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
  - 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.	11n HT20 N	/id CH	I Temp/Hum			27(°∁)/ 53%RH		
Test Item	F	larmonic		Т	est Date		Nov 08, 2016		
Polarize		Vertical		Test Engineer			Dennis Li		
Detector	Peak	and Average	je	Test Voltage 120Vac / 60Hz					
110.0 dBuV/m							Limit1: Limit2:	_	
70				3 X					
30.0									
1000.000 3550.0	10 6100.00 80	650.00 11200.0	0 13750.00	16300	.00 18850.00	214	00.00 2	6500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resi (dBuV	ult //m)	Limit (dBuV/	: m)	Margin (dB)	Remark	
8756.000	30.91	15.56	46.4	17	74.00	)	-27.53	peak	
10450.000	38.24	17.57	55.8	31	74.00	)	-18.19	peak	
15670.000	51.75	21.05	72.8	30	74.00	)	-1.20	peak	
15670.000	31.09	21.05	52.1	4	54.00	)	-1.86	AVG	
Romark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test M	ode	IEEE	E 802.´	11n H	Г20 N	/lid CH	Temp/Hum			27(°C)/ 53%RH		
Test It	em		Н	armor	nic			Test D	ate	Nov 08, 2016		
Polari	ize		H	orizon	tal		Т	est Eng	gineer	De	ennis Li	
Detec	tor		Peak	and A	verag	je		est Vo	Itage	120V	ac / 60Hz	
110.0	dBuV/m									Limit1:	—	
70					2		*					
30.0 1000.	000 3550.0	0 6100	).00 86	50.00	11200.00	) 13750.	00 163	00.00 18	850.00 214	00.00	26500.00 MHz	
Freque (MHz	ency z)	Read (dB	ding uV)	Corr Fact (dB/	ect tor m)	Re (dBu	sult ıV/m)	(d	Limit BuV/m)	Margin (dB)	Remark	
8678.0	000	30.	25	15.4	41	45	.66	-	74.00	-28.34	peak	
10440.	000	38.	03	17.5	57	55	.60		74.00	-18.40	peak	
15660.	000	51.	40	21.0	02	72	.42		74.00	-1.58	peak	
15660.	000	31.	52	21.0	02	52	.54	į	54.00	-1.46	AVG	

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.1	1n HT20 Hi	gh CH	Temp/Hum			27(°∁)/ 53%RH		
Test Item	Ha	armonic		Т	est Da	te	Nov 08, 2016		
Polarize	\	/ertical		Tes	st Engir	neer	Dennis Li		
Detector	Peak a	and Average	е	Те	st Volta	age	120Va	ic / 60Hz	
110.0 dBu¥/m							Limit1: Limit2:	_	
70		2 X X							
30.0 1000.000 3550	0.00 6100.00 80	350.00 11200.00	0 13750.00	16300	.00 1885	0.00 2140	0.00 2	6500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Liı (dBı	mit ıV/m)	Margin (dB)	Remark	
8755.000	30.67	15.56	46.2	23	74	.00	-27.77	peak	
10490.000	35.26	17.57	52.8	3	74	.00	-21.17	peak	
15710.000	51.11	21.19	72.3	0	74	.00	-1.70	peak	
15710.000	28.74	21.19	49.9	3	54	.00	-4.07	AVG	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.1	1n HT20 Hi	gh CH	Te	emp/Hum	<b>27(</b> ℃	27(°C)/ 53%RH		
Test Item	Н	armonic		Т	est Date	Nov	08, 2016		
Polarize	H	orizontal		Tes	st Engineer	De	ennis Li		
Detector	Peak	and Averag	е	Test Voltage 120Vac / 60Hz					
110.0 dBu¥/m						Limit1:	_		
70				3					
30.0 1000.000 355	0.00 6100.00 8	650.00 11200.0	0 13750.00	16300	.00 18850.00	21400.00	26500.00 MHz		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark		
8758.000	29.95	15.57	45.5	52	74.00	-28.48	peak		
10480.000	34.61	17.57	52.1	8	74.00	-21.82	peak		
15720.000	49.03	21.22	70.2	25	74.00	-3.75	peak		
15720.000	27.68	21.22	48.9	0	54.00	-5.10	AVG		
_									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.	11n HT40 L	ow CH	Te	emp/Hum	<b>27(</b> °C)	/ 53%RH			
Test Item	F	larmonic		Т	Test Date	Nov 0	08, 2016			
Polarize		Vertical		Tes	st Engineer	Der	nnis Li			
Detector	Peak	and Average	ge	Test Voltage 120Vac / 60Hz						
110.0 dBu¥/m						Limit1: Limit2:				
70				3 X 4 X						
0.00										
1000.000 3550	.00 6100.00 8	650.00 <b>11200.0</b>	0 13750.00	16300	.00 18850.00	21400.00 2	6500.00 MHz			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark			
8788.000	32.14	15.62	47.7	'6	74.00	-26.24	peak			
10380.000	32.48	17.58	50.0	)6	74.00	-23.94	peak			
15570.000	38.53	20.71	59.2	24	74.00	-14.76	peak			
15570.000	24.64	20.71	45.3	85	54.00	-8.65	AVG			
Pomark:										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.7	11n HT40 L	ow CH	H Temp/Hum			27(℃)/ 53%RH		
Test Item	F	larmonic		Т	est Date	9	Nov (	08, 2016	
Polarize	H	orizontal		Tes	st Engine	er	Der	nnis Li	
Detector	Peak	and Average	ge	lest Voltage 120Vac / 60Hz					
110.0 dBu¥/m							Limit1:	_	
70				3X					
30.0 1000.000 3550.0	0 6100.00 80	550.00 11200.0	0 13750.00	16300	.00 18850.1	00 2140	00.00 2	6500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Lim (dBuV	it //m)	Margin (dB)	Remark	
8788.000	32.11	15.62	47.7	'3	74.0	00	-26.27	peak	
10380.000	32.53	17.58	50.1	1	74.0	00	-23.89	peak	
15570.000	36.56	20.71	57.2	27	74.0	00	-16.73	peak	
15570.000	15570.000 27.65 20.71			86	54.0	00	-5.64	AVG	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.1	1n HT40 H	igh CH	Temp/Hum			27(°C)/ 53%RH		
Test Item	Ha	armonic		Г	Test Da	ite	Nov 08, 2016		
Polarize	\\	/ertical		Tes	st Engi	neer	Dennis Li		
Detector	Peak a	and Averag	е	Те	st Volt	age	120Va	c / 60Hz	
110.0 dBuV/m							Limit1:	_	
							Limit2:	_	
70				3					
				Ť					
				4					
		×		×					
20.0									
1000.000 3550	.00 6100.00 80	350.00 11200.0	0 13750.00	16300	.00 1885	i0.00 21 <b>4</b>	00.00 26	500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Li (dBi	mit uV/m)	Margin (dB)	Remark	
8745.000	31.80	15.54	47.3	34	74	1.00	-26.66	peak	
10450.000	34.49	17.57	52.0	)6	74	1.00	-21.94	peak	
15690.000	44.24	21.12	65.3	86	74	1.00	-8.64	peak	
15690.000	27.29	21.12	48.4	1	54	1.00	-5.59	AVG	
			-						
Romark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.1	1n HT40 Hi	gh CH	Т	emp/H	um	27(°C)/ 53%RH		
Test Item	H	Test Date			Nov 08, 2016				
Polarize	H	orizontal		Tes	st Engi	neer	De	nnis Li	
Detector	Peak a	and Average	е	Te	est Volt	age	120Va	ac / 60Hz	
110.0 dBuV/m							Limit1: Limit2:	_	
70				3 X 4 X					
30.0 1000.000 3550	0.00 6100.00 8	650.00 11200.00	D 13750.00	16300	).00 188	<u>50.00 214</u>	00.00 2	6500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Li (dB	imit uV/m)	Margin (dB)	Remark	
8745.000	32.77	15.54	48.3	81	74	1.00	-25.69	peak	
10450.000	33.04	17.57	50.6	61	74	1.00	-23.39	peak	
15690.000	42.44	21.12	63.5	56	74	1.00	-10.44	peak	
15690.000	28.24	21.12	49.3	86	54	1.00	-4.64	AVG	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
  - 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11	ac VHT80 N	Aid CH	Te	emp/H	um	27(℃)/ 53%RH		
Test Item	Ha	armonic		Test Date			Nov 08, 2016		
Polarize	V	ertical		Test Engineer			Dennis Li		
Detector	Peak a	ind Average	;	Те	est Voltage   120Vac / 60Hz				
110.0 dBu¥/r	n						Limit1: Limit2:	_	
70				3					
30.0 1000.000 3	550.00 6100.00 8	650.00 11200.0	0 13750.00	16300	.00 1885	i0.00 214	00.00 21	3500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Li (dBi	mit uV/m)	Margin (dB)	Remark	
8756.000	31.84	15.56	47.4	0	74	l.00	-26.60	peak	
10420.000	31.31	17.57	48.8	88	74	.00	-25.12	peak	
15720.000	32.23	21.22	53.4	5	74	.00	-20.55	peak	
15720.000	28.11	21.22	49.3	33	54	l.00	-4.67	AVG	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mo	ode	IEEE 8	02.11a	ac VH ⁻	T80 N	/lid CH	Т	emp/H	um	<b>27(</b> °C	:)/ 53%RH	
Test Ite	em	Harmonic						Test Da	ate	Nov 08, 2016		
Polariz	ze		Ho	rizonta	al		Test Engineer			Dennis Li		
Detect	tor	F	eak a	nd Ave	erage	•	Te	est Volt	age	120\	/ac / 60Hz	
110.0	dBu¥/m									Limit1:	—	
70					2		3					
30.0 1000	0.000 35	50.00 610	).00 86	50.00	11200.00	) 13750.00	) 1630(	0.00 188	50.00 2140	)0.00	26500.00 MHz	
Frequ (MH	ency Iz)	Rea (dB	ding uV)	Corr Fac (dB/	rect tor /m)	Res (dBu\	ult //m)	L (dB	imit uV/m)	Margin (dB)	Remark	
8866	.000	31.	44	15.	77	47.2	21	74	4.00	-26.79	peak	
10420	0.000	31.	72	17.	57	49.2	29	74	4.00	-24.71	peak	
15720	0.000	32.	99	21.2	22	54.2	21	74	4.00	-19.79	peak	
15720	0.000	27.	14	21.2	22	48.3	36	54	4.00	-5.64	AVG	

- Remark:
  - 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
  - 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE	802.11a Lo	w CH	Temp	o/Hum	27(°C)/ 53%RH		
Test Item		Harmonic		Test	Date	Nov 1	7, 2016	
Polarize		Vertical		Test E	ngineer	Der	nnis Li	
Detector	Pea	ak and Aver	age	Test \	/oltage	120Va	c / 60Hz	
110.0 dBuV/m						Limit1: Limit2:		
		1 X X		4				
30.0 1000.000 3550.	00 6100.00 8	650.00 11200.00	0 13750.00	16300.00	18850.00 214	00.00 26	6500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/r	t n)	Limit (dBuV/m)	Margin (dB)	Remark	
8659.000	32.03	15.38	47.41		74.00	-26.59	peak	
11/00 000	32.16	18.16	50.32	32 74.00		-23.68	peak	
11490.000	1	19.16	45.36	45.36 54.00		-8.64	AVG	
11490.000	27.20	10.10	17230 000 34 21 26 80 61 01				-	

## Above 1G Test Data for UNII-3

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode		IEEE	802.11a L	ow CH	Te	emp/H	um	<b>27(</b> °C)	/ 53%RH	
Test Item			Harmonic	;	Т	est Da	ate	Nov 08, 2016		
Polarize			Horizonta		Tes	st Engi	neer	Dennis Li		
Detector		Pea	ik and Ave	rage	Те	st Volt	age	120Va	ic / 60Hz	
110.0 dBuV/m								Limit1: Limit2:		
70			2 			<b>4</b> X				
30.0 1000.000 3550.0	DO 6 ⁻	100.00 86	50.00 11200.	00 13750.00	16300	.00 188	50.00 214	00.00 2	6500.00 MHz	
Frequency (MHz)	Re (d	ading IBuV)	Correct Factor (dB/m)	Resi (dBuV	ult //m)	L (dB	imit uV/m)	Margin (dB)	Remark	
8788.000	3	0.75	15.62	46.3	37	74	4.00	-27.63	peak	
11490.000	3	4.25	18.16	52.4	1	74	4.00	-21.59	peak	
11490.000	3	0.09	18.16	48.2	25	54	4.00	-5.75	AVG	
17230.000	3	9.20	26.80	66.0	00	74	4.00	-8.00	peak	
Remark:										

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Item Polarize Detector	Po	Harmonic Vertical	<u> </u>	Test Date	Nov 0	8, 2016
Polarize Detector	Po	Vertical	T	oct Enginger		
Detector					Der	inis Li
	Fe	ak and Aver	age	lest Voltage	120Va	c / 60Hz
110.0 dBuV/m					Limit1: Limit2:	_
/0		2		4		
30.0						
1000.000 3550.0	0 6100.00	8650.00 11200.00	0 13750.00 163	300.00 18850.00 214	400.00 26	500.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
8654.000	31.48	15.37	46.85	74.00	-27.15	peak
11570.000	33.71	.71 18.17		74.00	-22.12	peak
11570.000	27.51	18.17	45.68	54.00	-8.32	AVG
		1		74.00	40.45	maali

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Tes	st Mode		IEEE	802.11a	Mid CH	Т	emp/H	lum	<b>27(°</b> ℃)	/ 53%RH
Te	st Item			Harmon	ic	1	lest Da	ate	Nov (	08, 2016
P	olarize			Horizont	al	Tes	st Eng	ineer	Dei	nnis Li
D	etector		Pea	ik and Av	verage	Te	est Vol	tage	120Va	ac / 60Hz
110.0	) dBu¥/m								Limit1:	_
70							4 X			
30.0 10	00.000 3550.0	)0 610	00.00 86	50.00 1120	00.00 13750.0	0 16300	0.00 188	50.00 2140	00.00 2	6500.00 MHz
Freq (N	uency IHz)	Rea (di	nding BuV)	Correct Factor (dB/m)	Res (dBu	ult V/m)	L (dB	imit suV/m)	Margin (dB)	Remark
886	6.000	31	.30	15.77	47.	07	7	4.00	-26.93	peak
1157	0.000	38	8.17	18.17	56.	34	7	4.00	-17.66	peak
1157	0.000	31	.41	18.17	49.	58	5	4.00	-4.42	AVG
1735	55.000	35	5.91	27.57	63.	48	7	4.00	-10.52	peak

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE	802.11a Hiợ	gh CH	Te	emp/H	um	<b>27(</b> ℃)	)/ 53%RH
Test Item		Harmonic		T	est Da	ite	Nov	08, 2016
Polarize		Vertical		Tes	st Engi	neer	De	nnis Li
Detector	Pea	ak and Aver	age	Te	st Volta	age	120Va	ac / 60Hz
110.0 dBuV/m							Limit1: Limit2:	
70								
	2	*						
30.0 1000.000 4900.0	× * 00 8800.00 11	2700.00 16600.00	0 20500.00	24400.	.00 2830	10.00 3220	00.00	40000.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor	Resi (dBuV	ult //m)	Li (dBi	mit uV/m)	Margin (dB)	Remark
8877 000	30.67	( <b>dB/m</b> )	46.4	16	74	1 00	-27 54	neak
11650.000	33.91	18.19	52.1	0	74	4.00	-21.90	peak
11650.000	29.06	18.19	47.2	25	54	1.00	-6.75	AVG
17475.000	32.05	28.30	60.3	5	74	1.00	-13.65	peak
8877.000 11650.000 11650.000 17475.000	30.67 33.91 29.06 32.05	15.79 18.19 18.19 28.30	46.4 52.1 47.2 60.3	6 0 25 35	74 74 54 74	00 +.00 +.00 +.00	-27.54 -21.90 -6.75 -13.65	peak peak AVG peak

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit
| Test M            | Test Mode IEEE 802.11a High CH |                 |                             |               | Te          | )/ 53%RH   |               |                    |               |  |
|-------------------|--------------------------------|-----------------|-----------------------------|---------------|-------------|------------|---------------|--------------------|---------------|--|
| Test It           | em                             |                 | Harmonic                    |               | ٦           | lest Da    | ate           | Nov                | 08, 2016      |  |
| Polari            | ze                             |                 | Horizontal                  |               | Tes         | st Engi    | neer          | De                 | nnis Li       |  |
| Detec             | tor                            | Pea             | k and Aver                  | rage          | Те          | st Volt    | age           | 120V               | 120Vac / 60Hz |  |
| 110.0 dBu         | W/m                            |                 |                             |               |             |            |               | Limit1:<br>Limit2: | _             |  |
| 70                |                                | 22              |                             |               |             |            |               |                    |               |  |
| 30.0<br>1000.000  | 1 <b>4900.00</b> 8             | 800.00 12       | 700.00 16600.0              | 0 20500.00    | 24400       | .00 2830   | 0.00 3220     | 0.00               | 40000.00 MHz  |  |
| Frequenc<br>(MHz) | sy Ri<br>((                    | eading<br>IBuV) | Correct<br>Factor<br>(dB/m) | Resi<br>(dBuV | ult<br>//m) | Li<br>(dBi | imit<br>uV/m) | Margin<br>(dB)     | Remark        |  |
| 8877.000          | 0 3                            | 81.72           | 15.79                       | 47.5          | 51          | 74         | 1.00          | -26.49             | peak          |  |
| 11650.00          | 0 3                            | 86.97           | 18.19                       | 55.1          | 6           | 74         | 1.00          | -18.84             | peak          |  |
| 11650.00          | 0 3                            | 80.17           | 18.19                       | 48.3          | 86          | 54         | 1.00          | -5.64              | AVG           |  |
| 17475.00          | 0 3                            | 35.52           | 28.30                       | 63.8          | 32          | 74         | 1.00          | -10.18             | peak          |  |
|                   |                                |                 |                             |               |             |            |               |                    |               |  |

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.2	11n HT20 L	ow CH	Tei	/ 53%RH						
Test Item	F	larmonic		Te	est Date	Nov C	8, 2016				
Polarize		Vertical		Test	Engineer	Der	nnis Li				
Detector	Peak	and Averag	je	Tes	t Voltage	120Va	c / 60Hz				
110.0 dBu¥/m						Limit1: Limit2:	_				
70					4 *						
30.0 1000.000 3550.0	)0 6100.00 88	50.00 11200.00	0 13750.00	16300.0	0 18850.00 2	21400.00 20	5500.00 MHz				
Frequency (MHz)	Frequency (MHz) Reading (dBuV) Correct Result Limit Margin (dBuV/m) (dBuV/m) (dBuV/m) (dB) Remark										
8675.000	32.63	15.41	48.0	4	74.00	-25.96	peak				
11500.000	33.96	18.16	52.1	2	74.00	-21.88	peak				
11500.000	28.20	18.16	46.3	6	54.00	-7.64	AVG				
17250.000	39.17	26.92	66.0	9	74.00	-7.91	peak				
Remark:											

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	Test Mode IEEE 802.11n HT20 Low CI					H Temp/Hum 27(°C)/ 53				
Test Item	1	ŀ	Harmonic		Te	est Date	Nov 0	8, 2016		
Polarize		F	lorizontal		Tes	t Engineer	Dennis Li			
Detector	•	Peak	and Averag	je	Tes	st Voltage	120Va	c / 60Hz		
110.0 dBuV	//m						Limit1: Limit2:	_		
70						*				
30.0	3550.0	0 6100.00 8	650.00 11200.0	0 13750.00	16300.0	00 18850.00 214	00.00 20	5500.00 MHz		
Frequency (MHz)	'	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark		
8675.000		31.09	15.41	46.5	50	74.00	-27.50	peak		
11490.000	)	38.75	18.16	56.9	)1	74.00	-17.09	peak		
11490.000	)	28.42	18.16	46.5	58	54.00	-7.42	AVG		
17250.000	)	44.71	26.92	71.6	63	74.00	-2.37	peak		

- Remark:
  - 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
  - 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.	11n HT20 N	/lid CH	Tei	53%RH				
Test Item	F	larmonic		Te	est Date	Nov 0	Nov 08, 2016		
Polarize		Vertical		Test	Engineer	Dennis Li			
Detector	Peak	and Averag	je	Tes	t Voltage	120Va	c / 60Hz		
110.0 dBuV/m						Limit1: Limit2:			
70					4×				
30.0 1000.000 3550.0	0 6100.00 86	350.00 11200.00	D 13750.00	16300.0	0 18850.00 214	00.00 26	500.00 MHz		
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark		
8698.000	31.50	15.45	46.9	95	74.00	-27.05	peak		
11570.000	37.19	18.17	55.3	6	74.00	-18.64	peak		
11570.000	31.94	18.17	50.1	1	54.00	-3.89	AVG		
17350.000	37.55	27.54	65.0	9	74.00	-8.91	peak		
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test	Mode	IEEE 802.11n HT20 Mid CH				Temp/Hum			27(°∁)/ 53%RH			ĥRH		
Test	Item		Н	armonic				Tes	st Da	ate	N	ov 0	8, 20	016
Pola	arize		H	orizontal			Te	est l	Engi	neer	Dennis Li			i
Dete	ector		Peak	and Aver	age	;	T	est	Volt	age	12	0Va	c / 60	OHz
110.0	) dBu¥/m										Lir Lir	nit1: nit2:	_	
70					22			4						
30.0 10	000.000 3550.0	0 610	0.00 86	50.00 1120	)0.00	13750.00	1630	0.00	188	50.00 214	DO. OO	26	500.00 I	<b>H</b> Hz
Freq (N	uency IHz)	Rea (dB	ding uV)	Correct Factor (dB/m)		Res (dBu\	ult //m)		L (dB	imit uV/m)	Marg (dB	jin )	Re	mark
869	9.000	31	43	15.45	45 46.8		38		74	4.00	-27.1	12	р	eak
1157	70.000	43.	60	18.17		61.7	77		74	4.00	-12.2	23	р	eak
1157	70.000	29	.07	18.17		47.2	24		54	4.00	-6.7	6	A	WG
1735	50.000	42	22	27.54		69.7	76		74	4.00	-4.2	4	р	eak

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Item   Harmonic   Test Date   Nov 08, 2016     Polarize   Vertical   Test Engineer   Dennis Li     Detector   Peak and Average   Test Voltage   120Vac / 60Hz     110.0   dBuV/m   Imit:	Test Mode	IEEE 802.1	1n HT20 Hi	gh CH	Ter	np/Hum	<b>27(</b> °C	)/ 53%RH
Polarize   Vertical   Test Engineer   Dennis Li     Detector   Peak and Average   Test Voltage   120Vac / 60Hz     110.0   dBw/m   Imit :	Test Item	Ha	armonic		Те	st Date	Nov	08, 2016
Detector   Peak and Average   Test Voltage   120Vac / 60Hz     110.0   dBuV/m	Polarize	\\	/ertical		Test	Engineer	· De	ennis Li
110.0   dBuV/m     Image: constrained by the second by the	Detector	Peak a	and Average	е	Tes	t Voltage	120	'ac / 60Hz
Image: Non-State in the state in t	110.0 dBu¥/m						Limit1: Limit2:	_
30.0 30.0 30.0 30.0 1000.000 3550.00 6100.00 8650.00 11200.00 13750.00 16300.00 18850.00 21400.00 26500.00 MHz   Frequency (MHz) Reading (dBuV) Correct Factor (dB/m) Result (dBuV/m) Limit (dBuV/m) Margin (dB) Remark   8679 000 31 72 15 42 47 14 74 00 -26 86 peak	70					4		
Frequency (MHz)Reading (dBuV)Correct Factor (dB/m)Result (dBuV/m)Limit (dBuV/m)Margin (dB)Remark8679 00031.7215.4247.1474.00-26.86peak	30.0 1000.000 3550	).00 6100.00 86	350.00 11200.00	0 13750.00	16300.00	D 18850.00	21400.00	26500.00 MHz
8679.000 31.72 15.42 47.14 74.00 -26.86 peak	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ılt '/m)	Limit (dBuV/m)	Margin ) (dB)	Remark
	8679.000	31.72	15.42	47.1	4	74.00	-26.86	peak
11650.000 36.17 18.19 54.36 74.00 -19.64 peak	11650.000	36.17	18.19	54.3	6	74.00	-19.64	peak
11650.000 32.62 18.19 50.81 54.00 -3.19 AVG	11650.000	32.62	18.19	50.8	31	54.00	-3.19	AVG
17475.000 32.69 28.30 60.99 74.00 -13.01 peak	17475.000	32.69	28.30	60.9	9	74.00	-13.01	peak

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test N	/lode	IEEE 802.11n HT20 High CH					H	Temp/Hum 27				°C)/ 53%	6RH
Test I	tem		Ha	armonic				Te	est Da	ate	Nov 08, 2016		
Pola	rize		Hc	prizontal			1	ſest	: Engi	neer	Dennis Li		
Dete	ctor		Peak a	and Ave	rag	е		Tes	st Volt	age	120	Vac / 6	0Hz
110.0	dBuV∕m										Limit Limit	1: — 2: —	
70					22				*				
30.0 100	00.000 3550	.00 610(	).00 86	50.00 11	0 11200.00 13750.00		50.00 16	5300.0	0 188	50.00 214	00.00	26500.00	MHz
Frequ (M	quency Reading Correct Res (dBuV) (dBuV) (dB/m)		Result BuV/m)		L (dB	imit uV/m)	Margii (dB)	n R	emark				
8756	6.000	32.	35	15.56		2	17.91		74	4.00	-26.09		beak
1165	0.000	43.	40	18.19		61.59			74	4.00	-12.41	1 f	beak
1165	0.000	29.	25	18.19		4	17.44		54	4.00	-6.56		AVG
1747	5.000	39.	67	28.30		6	67.97		74	4.00	-6.03	ł	beak

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz, the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test I	Mode	IEEE	IEEE 802.11n HT40 Low CH				Temp/Hum			27(°C)/ 53%RH		
Test	Item		F	larmonio	)			Test Da	ate	Nov	08, 201	6
Pola	arize			Vertical			Te	est Engi	neer	De	ennis Li	
Dete	ector		Peak	and Ave	erag	je	T	est Volt	age	120\	/ac / 60⊦	lz
110.0	dBuV/m									Limit1:	_	
70					4							
30.0												
10	00.000 4900.0	)0 880	0.00 12	2700.00 16	500.00	0 20500.00	2440	10.00 283	00.00 322	DO.OO	40000.00 MHz	:
<b>F</b>		P	-11	Correc	t	Base	.14			<b>B4</b> a marine		
Frequ (M	uency IHz)	Rea (dB	aing suV)	Factor (dB/m		dBuV	uit //m)	(dB	uV/m)	(dB)	Rema	ark
8691	1.000	31	.17	15.44		46.6	61	74	4.00	-27.39	pea	ık
1151	0.000	32	.17	18.16		50.3	33	74	4.00	-23.67	pea	ık
1151	0.000	30	.53	18.16		48.6	69	54	4.00	-5.31	AV	G
1726	5.000	33	.54	27.02		60.5	56	74	4.00	-13.44	pea	ık

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test N	Node	IEEE 802.11n HT40 Low CH				Temp/Hum			27(°C)/ 53%RH			
Test	Item		Ha	armonic	;			Test Da	ate	Nov	08, 2016	
Pola	rize		Ho	orizonta			Te	est Engi	ineer	Dennis Li		
Dete	ector		Peak a	and Ave	rag	е	T	est Volt	tage	120Vac / 60Hz		
110.0	) dBuV/m									Limit1:	_	
										Limit2:	_	
70												
					4							
		2										
		>	3 {									
30.0												
10	00.000 4900	.00 880	0.00 12	2700.00 16	600.00	0 20500.0	0 2440	)0.00 283	00.00 322	00.00	40000.00 MHz	
Freq (M	uency IHz)	Rea (dB	ding suV)	Correc Facto (dB/m	r 1)	Res (dBu	ult V/m)	L (dB	imit suV/m)	Margin (dB)	Remark	
869	1.000	31	.65	15.44	ł	47.	09	74	4.00	-26.91	peak	
1151	0.000	36	.16	18.16	;	54.	32	74	4.00	-19.68	peak	
1151	0.000	30	.20	18.16	;	48.	36	54	4.00	-5.64	AVG	
1726	65.000	34	.01	27.02	2	61.	03	74	4.00	-12.97	peak	

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 8	02.11n HT4 liah CH	O Temp/Hum			<b>27(°</b> ∁)/ 53%RH		
Test Item	H	armonic		Te	est Da	ate	Nov (	08, 2016
Polarize	<u>\</u>	/ertical		Tes	t Engi	neer	De	nnis Li
Detector	Peak a	and Average	;	Tes	st Volt	age	120Va	ac / 60Hz
110.0 dBuV/m								
							Limit1: Limit2:	_
70								
					4 X			
		2 1 3 3						
30.0								
1000.000 3550.	.00 6100.00 86	350.00 11200.00	13750.00	16300.0	00 188	50.00 2140	00.00 2	:6500.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV/	lt m)	L (dB	imit uV/m)	Margin (dB)	Remark
8756.000	31.14	15.56	46.70	2	74	4.00	-27.30	peak
11590.000	30.95	18.18	49.13	3	74	4.00	-24.87	peak
	25.18	18.18	43.36	3	54	4.00	-10.64	AVG
11590.000		4 1	F0 0/	2	7.	1 00	-14 64	

2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Ha Ho Peak a	armonic prizontal and Average		Test Date Test Engine	Nov er De	08, 2016 ennis Li
Ho Peak a	orizontal and Average		Test Engine	er De	ennis Li
Peak a	and Average				
		3	Test Voltag	e 120V	/ac / 60Hz
				Limit1: Limit2:	
			4		
	2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3				
C100 00 90	× 00 11200 00	12750.00	1000 00 10050 0	2 21400 00	20500.00 MHz
0100.00 00	130.00 11200.00	13730.00	16300.00 10030.00	1 21400.00	20000.00 Minz
Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m	Limit ) (dBuV/	m) (dB)	Remark
31.84	15.56	47.40	74.00	-26.60	peak
34.21	18.18	52.39	74.00	) -21.61	peak
31.15	18.18	49.33	54.00	.4.67	AVG
35.20	27.75	62.95	74.00	11.05	peak
	6100.00 86   31.84 34.21   31.15 31.25	Reading (dBuV) Correct Factor (dB/m)   31.84 15.56   34.21 18.18   31.15 18.18	Reading (dBuV) Correct Factor (dB/m) Result (dBuV/m)   31.84 15.56 47.40   31.15 18.18 49.33	Reading (dBuV) Correct Factor (dB/m) 1200.00 13750.00 16300.00 18850.00   31.84 15.56 47.40 74.00   31.15 18.18 49.33 54.00	Reading (dBuV) Correct Factor (dB/W) Result (dBuV/m) Limit (dBuV/m) Margin (dB/W)   31.84 15.56 47.40 74.00 -26.60   34.21 18.18 49.33 54.00 -4.67

2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mode	IEEE 802.11	ac VHT80 N	/lid CH	Te	emp/Hu	IM	27(°∁)/ 53%RH		
Test Item	Ha	armonic		Т	est Dat	e	Nov 08, 2016		
Polarize	V	ertical		Tes	t Engir	ieer	Dennis Li		
Detector	Peak a	nd Average	9	Те	st Volta	ige	120Va	c / 60Hz	
110.0 dBu¥/n	n						Limit1: Limit2:	_	
70					4 X				
30.0 1000.000 35	550.00 6100.00 8	650.00 11200.0	0 13750.00	16300.	.00 18850	).00 214	00.00 21	5500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resi (dBuV	ult //m)	Lir (dBu	nit V/m)	Margin (dB)	Remark	
8746.000	31.86	15.54	47.4	0	74.	00	-26.60	peak	
11550.000	33.95	18.17	52.1	2	74.	00	-21.88	peak	
11550.000	30.96	18.17	49.1	3	54.	00	-4.87	AVG	
17325.000	33.06	27.38	60.4	4	74.	00	-13.56	peak	
Remark:									

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

Test Mod	est Mode IEEE 802.11ac VHT80 Mid CH						emp/H	um	27(°C)/ 53%RH		
Test Item	st Item Harmonic						Test Da	ate	Nov 08, 2016		
Polarize	Polarize Horizontal						st Engi	ineer	Der	nnis Li	
Detector Peak a				nd Avera	ge	IE	est Voli	age	120Va	ic / 60Hz	
110.0 dBuV/m											
									Limit1: Limit2:	_	
70											
							4				
				-	2 X						
				×							
30.0											
1000.00	)0 3550	.00 6100	).00 86	50.00 1120	0.00 13750	.00 16300	).00 188	50.00 2140	00.00 2	6500.00 MHz	
Frequen (MHz)	су	Read (dB	ding uV)	Correct Factor (dB/m)	Re (dB	esult uV/m)	L (dB	imit uV/m)	Margin (dB)	Remark	
8646.00	8646.000		57	15.35	47	47.92		4.00	-26.08	peak	
11550.0	11550.000		34.14 18.17		52	52.31		4.00	-21.69	peak	
11550.0	00	31.33 18		18.17	49	9.50	54.00		-4.50	AVG	
17325.000		32.	41	27.38	59	59.79		4.00	-14.21	peak	

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. For above 1GHz,the EUT peak value was under average limit, therefore the Average value compliance with the average limit

# 4.6 FREQUENCY STABILITY

# 4.6.1 Test Limit

According to §15.407(g) manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the operational description.

# 4.6.2 Test Procedure

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to  $-20^{\circ}$ C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with  $10^{\circ}$ C increased per stage until the highest temperature of  $+50^{\circ}$ C reached.

### 4.6.3 Test Setup

Temperature Chamber



### 4.6.4 Test Result

### **Temperature Variations for UNII-1**

Temp. (°C)	Voltage (V) Measured Frequency		5180		(MHz)	Limit				
					Result					
Operating	Frequency:	0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min	
50	12	5179.9889	5179.9889	5179.9889	5179.9889	-2.1347	-2.1351	-2.1351	-2.1371	Pass
40	12	5179.9882	5179.9888	5179.9882	5179.9883	-2.2871	-2.1593	-2.2819	-2.2683	Pass
30	12	5179.9881	5179.9881	5179.9881	5179.9880	-2.2973	-2.2934	-2.3069	-2.3108	Pass
20	12	5179.9837	5179.9837	5179.9836	5179.9836	-3.1556	-3.1564	-3.1660	-3.1680	Pass
10	12	5180.0091	5180.0091	5180.0092	5180.0092	1.7593	1.7625	1.7683	1.7741	Pass
0	12	5180.0106	5180.0106	5180.0106	5180.0108	2.0367	2.0425	2.0463	2.0753	Pass
-10	12	5180.0222	5180.0225	5180.0223	5180.0227	4.2853	4.3436	4.3127	4.3726	Pass
-20	12	5180.0409	5180.0409	5180.0410	5180.0412	7.8890	7.8919	7.9054	7.9575	Pass
Temp. (°C)	Voltage (V)	Measured Frequency	5180		(MHz)	Limit				
					Result					
Operating	Frequency:	0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min	
20	10.2	5179.9851	5179.9851	5179.9851	5179.9851	-2.8718	-2.8718	-2.8718	-2.8707	Pass
20	12	5179.9837	5179.9837	5179.9837	5179.9837	-3.1556	-3.1556	-3.1544	-3.1533	Pass
20	13.8	5179.9822	5179.9822	5179.9822	5179.9822	-3.4288	-3.4288	-3.4295	-3.4284	Pass

### **Temperature Variations for UNII-3**

Temp. (°C)	) Voltage (V) Measured Frequency		5745		(MHz)	Limit				
					Result					
Operating	Frequency:	0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min	
50	12	5745.9813	5745.9813	5745.9812	5745.9812	170.8007	170.8007	170.7990	170.7990	Pass
40	12	5745.9810	5745.9811	5745.9810	5745.9810	170.7641	170.7659	170.7641	170.7641	Pass
30	12	5745.9811	5745.9810	5745.9810	5745.9810	170.7746	170.7589	170.7554	170.7554	Pass
20	12	5745.9808	5745.9808	5745.9808	5745.9808	170.7171	170.7171	170.7154	170.7154	Pass
10	12	5745.0052	5745.0052	5745.0052	5745.0052	0.9069	0.9069	0.9051	0.9034	Pass
0	12	5745.0105	5745.0105	5745.0104	5745.0104	1.8190	1.8190	1.8172	1.8172	Pass
-10	12	5745.0211	5745.0211	5745.0211	5745.0211	3.6658	3.6675	3.6675	3.6658	Pass
-20	12	5745.0409	5745.0409	5745.0409	5745.0409	7.1140	7.1123	7.1123	7.1105	Pass
Temp. (°C)	C) Voltage (V) Measured Frequency		57	45	(MHz)					
					Result					
Operating Frequency:		0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min	
20	10.2	5745.9846	5745.9846	5745.9846	5745.9846	171.3856	171.3838	171.3838	171.3821	Pass
20	12	5745.9808	5745.9808	5745.9808	5745.9808	170.7171	170.7171	170.7154	170.7154	Pass
20	13.8	5745.9811	5745.9811	5745.9811	5745.9811	170.7659	170.7659	170.7676	170.7676	Pass