RADIO TEST REPORT FCC 47 CFR PART 15 SUBPART C

Test Standard	FCC Part 15.247
FCC ID	M82-UTC520FPIKA0E
Brand name	ADVANTECH
Product name	Computer
Model No.	UTC-520F, UTC-520FXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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).





Approved by:

en Cleang

Sam Chuang Manager Tested by:

eny Ching

Jerry Chuang Engineer



Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 31, 2018	Initial Issue	ALL	Allison Chen
01	March 28, 2018	 Modify operation transmitter. Added KDB 662911D01 V02r01. Added test procedure for 99% OBW in section 5.2.2 and test plot for 99% OBW in section 5.2.4. Removed the EIRP limit in section 5.3.1. 	P.8, P.10, P.16, P.24-29, P.30	Allison Chen

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Advantech Co.Ltd. No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.
Manufacturer	Advantech Co.Ltd. No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114, Taiwan, R.O.C.
Equipment	Computer
Model Name	UTC-520F, UTC-520FXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Model Discrepancy	All the above models are identical except for the designation of model numbers. The suffix of $(X = a - z / 0.9 \text{ or blank})$ on model number is just for marketing purpose only.
Received Date	December 08, 2017
Date of Test	January 18 ~ January 26, 2018
Output Power(W)	IEEE 802.11b mode: 0.0399 IEEE 802.11g mode: 0.1059 IEEE 802.11n 20 MHz mode: 0.1726 IEEE 802.11n 40 MHz mode: 0.1493
Power Supply	Powered from AC adapter. Brand / Model: FSP / FSP084-DIBAN2 Input: 100-240Vac, 1.3A, 50-60Hz Output: 12Vdc, 7A

1.2 EUT CHANNEL INFORMATION

Frequency Range	802.11b/g/n 20: 2412MHz ~ 2462MHz 802.11n HT 40: 2422MHz ~ 2452MHz
Modulation Type	1. IEEE 802.11b mode: CCK 2. IEEE 802.11g mode: OFDM 3. IEEE 802.11n 20 MHz mode : OFDM 4. IEEE 802.11n 40 MHz mode : OFDM
Bandwidth	 IEEE 802.11b mode: 11 Channels IEEE 802.11g mode: 11 Channels IEEE 802.11n 20 MHz mode : 11 Channels IEEE 802.11n 40 MHz mode : 7 Channels

Remark:

Refer as ANSI 63.10:2013 clause 5.6.1 Table 4 and RSS-GEN Table A1 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 Type	Antenna Type 🛛 PIFA 🗌 PCB 🗌 Dipole 🗌 Coils						
		Description	Туре	Peak Gain			
	Ant 1	WIFI black	PIFA	3.03dBi			
Antenna Gain	Ant 2	WIFI white	PIFA	2.67dBi			
	Ρον	ver Directional Gain		2.85dBi			

Notes:

1. Power Directional Gain: 10LOG(((10^(Ant1/10)+10^(Ant2/10))/2))

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

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	Eric Lee	-
Radiation	Jerry Chuang	-
RF Conducted	Jerry Chuang	-

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 Date Cal Du						
Power Meter	Anritsu	ML2495A	1033009	04/11/2017	04/10/2018	
Power Sensor	Anritsu	MA2411B	917072	07/03/2017	07/02/2018	
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018	
Directional Coupler	Agilent	87301D	MY44350252	07/25/2017	07/24/2018	
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018	
Divider	Solvang Technology	2-18GHz 4Way	STI08-0015	07/26/2017	07/25/2018	
	3	M 966 Chamber	Fest Site			
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due	
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018	
Horn Antenna	EMCO	3117	55165	02/20/2017	02/19/2018	
Pre-Amplifier	EMEC	EM330	60609	06/07/2017	06/06/2018	
Spectrum Analyzer	Agilent	E4446A	US42510252	11/27/2017	11/26/2018	
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R	
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R	
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R	
Pre-Amplifier	HP	8449B	3008A00965	06/27/2017	06/26/2018	
Filter	N/A	2400-2500	N/A	N/A	N/A	
Filter	N/A	0-6000	N/A	N/A	N/A	
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018	
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	07/31/2017	07/30/2018	
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018	
AC line Conduction Test Room						
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due	
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018	
Horn Antenna	EMCO	3117	55165	02/20/2017	02/19/2018	
Pre-Amplifier	EMEC	EM330	60609	06/07/2017	06/06/2018	
Remark: Each piece of equipment is scheduled for calibration once a year.						

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1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment							
No.	No. Equipment Brand Model Series No. FCC ID						
	N/A						

Support Equipment						
No. Equipment Brand Model Series No. FCC ID						
	N/A					

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 15.247, KDB 558074 D01 V04, KDB 662911D01 V02r01.

2. TEST SUMMERY

FCC Standard Section	Report Section	Test Item	Result
15.203	1.2	Antenna Requirement	Pass
15.207(a)	5.1	AC Conducted Emission	Pass
15.247(a)(2)	5.2	6 dB Bandwidth	Pass
-	5.2	Occupied Bandwidth (99%)	Pass
15.247(b)	5.3	Output Power Measurement	Pass
15.247(e)	5.4	Power Spectral Density	Pass
15.247(d)	5.5	Conducted Band Edge	Pass
15.247(d)	5.5	Conducted Emission	Pass
15.247(d)	5.6	Radiation Band Edge	Pass
15.247(d)	5.6	Radiation Spurious Emission	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	IEEE 802.11b mode :1Mbps IEEE 802.11g mode :6Mbps IEEE 802.11n 20MHz mode :MCS8 IEEE 802.11n 40MHz mode :MCS8
Test Channel Frequencies	IEEE 802.11b mode : 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz IEEE 802.11g mode : 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz IEEE 802.11n 20MHz mode : 1. Lowest Channel : 2437MHz 3. Highest Channel : 2437MHz 3. Highest Channel : 2462MHz IEEE 802.11n 40MHz mode : 1. Lowest Channel : 2422MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2437MHz 3. Highest Channel : 2437MHz 4. Lowest Channel : 2437MHz 4. Lowest Channel : 2437MHz 4. Middle Channel : 2437MHz 4
Operation Transmitter	IEEE 802.11b mode :1T1R IEEE 802.11g mode : 1T1R IEEE 802.11n 20MHz mode : 2T2R IEEE 802.11n 40MHz mode : 2T2R

Remark:

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

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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 via power cable.			
Worst Mode	🛛 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 via power 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	Radiated Emission Below 1G					
Voltage/Hz 120V/60Hz						
Test Mode Mode 1:EUT power by AC adapter via power 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(Y-Plane and Horizontal) 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 DUTY CYCLE

Duty Cycle							
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)			
802.11b	100.0000	100.0000	100.00%	0.00			
802.11g	2.0550	2.0700	99.28%	0.03			
802.11n 20MHz	1.9200	1.9450	98.71%	0.06			
802.11n 40MHz	0.9500	0.9600	98.96%	0.05			



5. TEST RESULT

5.1 AC POWER LINE CONDUCTED EMISSION

5.1.1 Test Limit

According to §15.207(a)(2),

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.

5.1.2 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.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. Recorded Line for Neutral and Line.

5.1.3 Test Setup



Pass.

Test Data

Test Mode:	Mode	1	Te	emp/Hur	n	24(°C	2)/ 50%	RH
Test Voltage:	120Vac/6	120Vac / 60Hz		Test Date		January 26, 2018		2018
Phase:	Line		Tes	st Engine	er	Eric Lee		!
30 30		MMMMMM						
-20	0.5	(MH:	2]	5			30.000	
Frequency (MHz) Quasi Peak reading (dBuV)	Average Correction reading factor (dBuV) (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.4300 17.44	11.76 0.05	17.49	11.81	57.25	47.25	-39.76	-35.44	Pass
0.8260 23.73	17.88 0.06	23.79	17.94	56.00	46.00	-32.21	-28.06	Pass
5.0300 34.52	31.57 0.09	34.61	31.66	60.00	50.00	-25.39	-18.34	Pass
5.4140 36.55	30.99 0.08	36.63	31.07	60.00	50.00	-23.37	-18.93	Pass
8.9220 35.52	30.18 -0.05	35.47	30.13	60.00	50.00	-24.53	-19.87	Pass
10.4380 34.46	27.61 -0.06	34.40	27.55	60.00	50.00	-25.60	-22.45	Pass



5.2 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

5.2.1 Test Limit

According to §15.247(a)(2),

6 dB Bandwidth :

Limit Shall be at least 500kHz	Limit
--------------------------------	-------

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

5.2.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 8.1 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. SA set RBW =100KHz , VBW = 300KHz and Detector = Peak, to measurement 6dB Bandwidth
- 4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
- 5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

5.2.3 Test Setup



5.2.4 Test Result

Test mode: IEEE 802.11b mode / 2412-2462 MHz							
Channel	el Frequency (MHz) Chain 0 Chain 1 Chain 0 Chain 1 6dB BW 0BW(99%) (MHz) (MHz) (MHz) (MHz) (MHz) (MHz) 6dB BW (MHz) (MHz)						
Low	2412	14.2402	-	10.1304	-		
Mid	2437	14.2402	-	10.1304	-	≥500	
High	2462	14.2836	-	10.1304	-		

Test mode: IEEE 802.11g mode / 2412-2462 MHz							
Channel	nnel Frequency (MHz) Chain 0 Chain 1 Chain 0 Chain 1 OBW(99%) (MHz)						
Low	2412	16.9753	-	16.3478	-		
Mid	2437	17.0188	-	16.3478	-	≥500	
High	2462	16.9753	-	16.3478	-		

Test mode: IEEE 802.11n 20 MHz mode / 2412-2462 MHz							
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)	6dB limit (kHz)	
Low	2412	18.0607	18.0173	17.5652	17.5652		
Mid	2437	18.0607	18.0173	17.5652	17.5652	≥500	
High	2462	18.0173	18.0607	17.5652	17.5652		

Test mode: IEEE 802.11n 40 MHz mode / 2422-2452 MHz								
Channel	Frequency (MHz)Chain 0 OBW(99%)Chain 1 OBW(99%)Chain 0 6dB BWChain 6dB 6dB(MHz)(MHz)(MHz)(MHz)(MHz)				Chain 1 6dB BW (MHz)	6dB limit (kHz)		
Low	2422	39.4790	40.8683	36.406	36.406			
Mid	2437	39.3632	39.4790	36.406	36.406	>500		
High	2452	39.0159	39.5947	36.406	36.406			

Test Data

6dB













Test Data















5.3 OUTPUT POWER MEASUREMENT

5.3.1 Test Limit

According to §15.247(b),

Peak output power :

For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt(30 dBm), base on the use of antennas with directional gain not exceed 6 dBi. If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

	Antenna not exceed 6 dBi : 30dBm
Limit	Antenna with DG greater than 6 dBi :
	[Limit = 30 - (DG - 6)]
	Point-to-point operation :

Average output power : For reporting purposes only.

5.3.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 9.1.3.

- 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 Peak output power and Average output power. in the test report.

5.3.3 Test Setup



5.3.4 Test Result

Peak output power :

Wifi 2.4G									
Config	СН	Freq. (MHz)	power set		PK Power(dBm)		PK Total	PK Total	Limit
			chain0	chain1	chain0	chain1	(dBm)	(W)	(dBm)
IEEE	Low	2412	-	17.5	-	16.01	16.01	0.0399	
802.11b Data rate:	Mid	2437	-	14.0	-	12.44	12.44	0.0175	
1Mbps	High	2462	-	14.5	-	12.13	12.13	0.0163	
IEEE	Low	2412	-	13.0	-	14.24	14.24	0.0265	
802.11g Data rate:	Mid	2437	-	31.5	-	20.25	20.25	0.1059	
6Mbps	High	2462	-	11.0	-	11.48	11.48	0.0141	30
IEEE 802 11n	Low	2412	10.5	10.5	11.54	11.26	14.41	0.0276	- 30
20MHz	Mid	2437	31.5	31.5	19.47	19.25	22.37	0.1726	
Data rate: MCS8	High	2462	10.0	10.0	10.67	9.93	13.33	0.0215	
IEEE 802.11n 40MHz Data rate: MCS8	Low	2422	8.0	8.0	8.87	9.55	12.23	0.0167	
	Mid	2437	31.5	31.5	18.53	18.92	21.74	0.1493	
	High	2452	7.0	7.0	8.74	8.51	11.64	0.0146	

Average output power :

Wifi 2.4G								
Config	сн	Freq.	AV Pow	AV Total Power				
comg		(MHz)	chain0	chain1	(dBm)			
IEEE	Low	2412	-	13.99	13.99			
802.11b Data rate:	Mid	2437	-	10.36	10.36			
1Mbps	High	2462	-	10.07	10.07			
IEEE	Low	2412	-	9.75	9.75			
802.11g Data rate:	Mid	2437	-	16.61	16.61			
6Mbps	High	2462	-	6.67	6.67			
IEEE 802 11n	Low	2412	7.14	6.79	9.98			
20MHz	Mid	2437	15.72	15.96	18.85			
Data rate: MCS8	High	2462	6.55	5.62	9.12			
IEEE 802.11n 40MHz Data rate: MCS8	Low	2422	4.40	5.26	7.86			
	Mid	2437	15.63	15.88	18.77			
	High	2452	4.13	4.03	7.09			

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5.4 POWER SPECTRAL DENSITY

5.4.1 Test Limit

According to §15.247(e),

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

	Antenna not exceed 6 dBi : 8dBm
Limit	Antenna with DG greater than 6 dBi :
	[Limit = 8 - (DG - 6)]
	Point-to-point operation :

5.4.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 10.2

- 1. The EUT RF output connected to the spectrum analyzer by RF cable.
- 2. Setting maximum power transmit of EUT
- 3. SA set RBW = 3kHz, VBW = 30kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
- 4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
- 5. Mark the maximum level.
- 6. Measure and record the result of power spectral density. in the test report.

5.4.3 Test Setup



5.4.4 Test Result

Test mode: IEEE 802.11b mode / 2412-2462 MHz						
Channel	Frequency (MHz)	Limit (dBm)				
Low	2412	-7.59	-	-7.59		
Mid	2437	-9.45	-	-9.45	8	
High	2462	-10.54	-	-10.54		

Test mode: IEEE 802.11g mode / 2412-2462 MHz							
Channel	Frequency (MHz)Chain 0Chain 1TotalPPSDPPSDPPSDPSSD(dBm)(dBm)(dBm)				Limit (dBm)		
Low	2412	-12.84	-	-12.84			
Mid	2437	-5.85	-	-5.85	8		
High	2462	-14.15	-	-14.15			

Test mode: IEEE 802.11n 20MHz mode / 2412-2462 MHz							
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PSSD (dBm)	Limit (dBm)		
Low	2412	-14.81	-14.60	-11.69			
Mid	2437	-5.20	-6.37	-2.74	8		
High	2462	-14.67	-15.75	-12.17			

Test mode: IEEE 802.11n 40MHz mode / 2422-2452 MHz							
Channel	Frequency (MHz)	Limit (dBm)					
Low	2422	-18.00	-16.82	-14.36			
Mid	2437	-5.36	-5.88	-2.60	8		
High	2452	-17.12	-18.77	-14.86			

Test Data





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5.5 CONDUCTED BANDEDGE AND SPURIOUS EMISSION

5.5.1 Test Limit

According to §15.247(d),

In any 100 kHz bandwidth outside the authorized frequency band,

Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

5.5.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 11.

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.

2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.

3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. f the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.5.3 Test Setup



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5.5.4 Test Result

Test Data































Reference Level of PSD in 100kHz	Spurious Emission 30MHz-25GHz
Spectrum () Ref Level 20.00 dBm ● RBW 100 kHz ● Att 30 dB ● SWT 500 ms ● VBW 300 kHz ● IPk View () ● 10 dBm () 10 dBm ()	Spectrum Tmm Ref Level 20.00 dBm RBW 100 kHz Att 30 dB = SWT 500 ms = VBW 300 kHz Mode Auto Sweep P1Pk View M1[1] 2.420380 gHz 10 dBm -45.46 dBm
o dBm h1 -10 dBm h1 -20 dBm h1 -20 dBm h1 -30 dBm h1 -30 dBm h1 -30 dBm h1 -30 dBm h1 -30 dBm h1 -60 dBm h1 -50 dBm	0 dBm 2.479940 GHz 0 dBm 10 10 dBm 1 -20 dBm 1 -30 dBm 1 -30 dBm 1 -50 dBm 1 -60 dBm 1 -60 dBm 1
-70 dBm	Stort 30.0 MHz 32001 pts Stop 26.0 GHz Date: 19.73N.2018 19:12:59









5.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

5.6.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

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)	Measurement Distance (metres)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

5.6.2 Test Procedure

Test method Refer as KDB 558074 D01 v04, Section 12.1.

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 9kHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.

Note: No emission found between lowest internal used/generated frequency to 30MHz (9KHz~30MHz)

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are 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 937606.

4. 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 \geq 98%, VBW=10Hz.

'If Duty Cycle < 98%, VBW=1/T.5

Configuration	Duty Cycle (%)	T(ms)	1/T (kHz)	VBW Setting
802.11b	100%	100.0000	-	10Hz
802.11g	99%	2.0550	-	10Hz
802.11n 20MHz	99%	1.9200	-	10Hz
802.11n 40MHz	99%	0.9500	-	10Hz

5.6.3 Test Setup

<u>9kHz ~ 30MHz</u>



<u>30MHz ~ 1GHz</u>



Above 1 GHz



5.6.4 Test Result

Band Edge Test Data



Test Mode	IE	EE 802.11b L	ow CH	Temperature:		24(°C)/ 33%RH				
Test Item		Band Edg	je	Т	est Date	January 24, 2018				
Polarize		Horizonta	al	Tes	t Engineer	Jerry	Chuang			
Detector		Average	•	Te	st Voltage	120Va	ac/60Hz			
110.0 dBu∀/m	110.0 dBuV/m									
70						Linit1: Linit2:				
30.0	v h	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~								
2310.000 2321.	20 2332.40	2343.60 2354.6	80 2366.00	2377.2	0 2388.40 2399	3.60 24	122.00 MHz			
	-									
Frequency (MHz)	Reading (dBuV)	g Correct Factor (dB/m)	Resi (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark			
2386.272	53.53	-2.99	50.5	54	54.00	-3.46	AVG			
2411.248	105.09	9 -2.92	102.	17	-	-	AVG			
	•	1				•				

Test Mode	IEEE 8	802.11b Hig	gh CH	Temp/Hum			24(°C)/ 33%RH		
Test Item	E	Band Edge	•	Test Date			January 24, 2018		018
Polarize		Horizontal		Tes	t Engin	neer	Jerr	y Chuar	ng
Detector		Peak		Tes	st Volta	age	120	Vac/60F	łz
120.0 dBuV/m	120.0 dBuV/m								
							Limit1: Limit2:	_	
80									
	\square	2 A A A A A A A A A A A A A A A A A A A	with maken .						
40.0			1, 1 dob	ANT CLOSED AND AND AND	edh-Maand-Manhaan	all with shouth	nout manufacture.	typlaner mendelske	
2452.000 2462.00	2472.00 248	2.00 2492.00	2502.00	2512.00	0 2522.0	00 2532	2.00	2552.00 MH	z
Frequency (MHz)	eading dBuV)	Correct Factor (dB/m)	Resu (dBuV	ult //m)	Lir (dBu	nit V/m)	Margin (dB)	Ren	nark
2463.250	06.52	-2.75	103.	77	-		-	pe	ak
2487.200	60.28	-2.68	57.6	60	74.	.00	-16.40	ре	ak

COMPLIANCE Certification Services Inc. FCC ID: M82-UTC520FPIKA0E



Test Mode	IEI	EE 802.11g Lc	w CH	Tei	mp/Hum	24(°C)/ 33%RH			
Test Item		Band Edge			est Date	January 24, 2018			
Polarize		Horizontal		Test	Engineer	Jerry	Chuang		
Detector		Peak		Tes	t Voltage	120Va	ac/60Hz		
120.0 dBuV/m									
						Limit1: Limit2:	_		
						2			
80					A A A A A A A A A A A A A A A A A A A	/			
Latter and the field way of	uppethodowald marked			www	Manaphin				
40.0		ብሩ	www.loluna.uous.le	'n					
40.0	20 2332 40	2343.60 2354.80	2366.00	2377 20	2388 40 2399	160 24			
2010.000 2021.	20 2002.40	2010.00 2001.00	2000.00	2011.20	2000.40 2000				
Frequency (MHz)	Reading (dBuV)	Gerrect Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark		
2390.000	73.59	-2.98	70.6	51	74.00	-3.39	peak		
2415.224	107.76	-2.90	104.8	86	-	-	peak		
			•			•			

Test Mode	IEEE	IEEE 802.11g Low CH			nperature:	24(°C)	/ 33%RH
Test Item		Band Edge			est Date	January	/ 24, 2018
Polarize		Horizontal		Test	t Engineer	Jerry	Chuang
Detector		Average		Tes	st Voltage	120Va	ac/60Hz
110.0 dBu¥/m							
						Limit1: Limit2:	
							2
70							
					1		
30.0							
2310.000 2321.20	2332.40 23	343.60 2354.80	2366.00	2377.20	2388.40 23	99.60 24	122.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
2390.000	52.78	-2.98	49.8	80	54.00	-4.20	AVG
2417.296	97.00	-2.90	94.1	0	-	-	AVG

Compliance Certification Services Inc. FCC ID: M82-UTC520FPIKA0E

Test Mode	IEEE	802.11g Hi	gh CH	Te	emp/Hum	24(°0	C)/ 33%RH			
Test Item		Band Edge	;	Т	est Date	Janua	ary 24, 2018			
Polarize		Horizontal		Tes	t Engineer	· Jerr	y Chuang			
Detector		Peak		Tes	st Voltage	120	Vac/60Hz			
120.0 dBuV/m										
						Limit1: Limit2:	_			
and a service and and and a service and a	<u>\</u>									
	\backslash									
80										
		4 2 4 X								
		- Multinetter								
			the physical and the physical and the second se	withindurication	mantendersteraders	nahologudinaansikaalaansad	redationthansates			
40.0										
2452.000 2462.00	2472.00 24	182.00 2492.00	2502.00	2512.00	0 2522.00	2532.00	2552.00 MHz			
			-							
Frequency R (MHz) (eading dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult /m)	Limit (dBuV/m)	Margin (dB)	Remark			
2464.800 1	07.83	-2.75	105.0	08	-	-	peak			
2483.700	70.75	-2.69	68.0	6	74.00	-5.94	peak			
·						-				

Test Mode	IEEE 8	802.11g Hiệ	gh CH	Ten	nperature:	24(°C)	/ 33%RH
Test Item	E	Band Edge	•	Т	est Date	Januar	y 24, 2018
Polarize		Horizontal		Tes	t Engineer	Jerry	Chuang
Detector		Average		Tes	st Voltage	120V	ac/60Hz
110.0 dBuV/m							
						Limit1: Limit2:	_
70							
		2					
30.0 2452.000 2462.00 2	2472.00 248	2.00 2492.00	2502.00	2512.00) 2522.00 24	532.00 2	552.00 MHz
Frequency R (MHz) (eading dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
2467.400	96.68	-2.75	93.9	3	-	-	AVG
2483.500	52.87	-2.69	50.1	8	54.00	-3.82	AVG
·			-				

Test Mode	IEEE 802.1	Temp/Hum		24(°C)/ 33%RH			
Test Item	Ba	Test Date		January 24, 2018			
Polarize	Н	orizontal		Test Eng	gineer	Jerry	Chuang
Detector		Peak		Test Vo	ltage	120Va	ac/60Hz
120.0 dBu¥/m							
						Limit1: Limit2:	
						- And	And I
80					1.10		
40.0	enalderanetalloten manakalante	synnestheddor entreddolog	melunarhadanaraddid	WANN BUNN			
2310.000 2321	.20 2332.40 23	43.60 2354.80	2366.00	2377.20 238	8.40 2399	9.60 24	122.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m	n) (dB	.imit suV/m)	Margin (dB)	Remark
2389.856	73.28	-2.98	70.30	7	4.00	-3.70	peak
2409.624	105.50	-2.92	102.58		-	-	peak

Test Mode	IEEE 802.11	n 20MHz L	ow CH	Temperature:		ure:	24(°C)/ 33%RH				
Test Item	Ba	nd Edge		Т	est Dat	e	January 24, 2018				
Polarize	Ho	orizontal		Tes	t Engin	eer	Jerry	Chuang			
Detector	A	verage		Tes	st Volta	ge	120Va	ac/60Hz			
110.0 dBuV/m	110.0 dBuV/m										
							Limit1: Limit2:	_			
								2			
70											
					1						
30.0				0077.0/							
2310.000 2321	.20 2332.40 23	43.60 2354.80	2366.00	2377.20	J 2388.4	10 2399.	.60 24	ZZ.UU MHz			
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ılt /m)	Lin (dBu	nit V/m)	Margin (dB)	Remark			
2390.000	53.50	-2.98	50.5	2	54.	00	-3.48	AVG			
2416.176	96.07	-2.90	93.1	7	-		-	AVG			
Test Mode	IEEE 802.	11n 20MHz CH	High	Те	emp/Hum	24(°C).	/ 33%RH				
--------------------	-------------------	-----------------------------------------	------------------	-----------------	------------------------------	-------------------------	-------------				
Test Item	Ba	nd Edge		Т	est Date	January	/ 24, 2018				
Polarize	Ho	orizontal		Tes	t Engineer	Jerry	Chuang				
Detector		Peak		Tes	st Voltage	120Va	ac/60Hz				
120.0 dBu∀/m	i	- iiiii									
						Limit1: Limit2:					
- William May											
80											
		AND	4								
		" "With	Martin Martingle	waxelantuuqqaha	Martin Martin and Martin and	wellin which providence	rephonephia				
40.0											
2452.000 2462.	.00 2472.00 24	82.00 2492.00	2502.00	2512.00	0 2522.00 253	2.00 25	52.00 MHz				
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult /m)	Limit (dBuV/m)	Margin (dB)	Remark				
2467.850	107.17	-2.73	104.4	44	-	-	peak				
2485.100	71.68	-2.69	68.9	9	74.00	-5.01	peak				

Test Mode	IEEE 802.	11n 20MHz CH	High	Ten	nperature:	24(°C)/	/ 33%RH
Test Item	Ba	and Edge		Т	est Date	January	/ 24, 2018
Polarize	Н	orizontal		Tes	t Engineer	Jerry	Chuang
Detector	A	verage		Tes	st Voltage	120Va	ac/60Hz
110.0 dBu∀/m						l imit1	
70	mminn I						
		m					
30.0							
2452.000 2462	.00 2472.00 2	482.00 2492.00	2502.00	2512.00	0 2522.00 2	532.00 25	52.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV/	lt /m)	Limit (dBuV/m)	Margin (dB)	Remark
2466.900	96.29	-2.75	93.5	4	-	-	AVG
2483.500	53.44	-2.69	50.7	5	54.00	-3.25	AVG

Test Mode	IEEE 802.11	n 40MHz L	ow CH	Те	mp/Hum	24(°C)	/ 33%RH
Test Item	Ba	nd Edge		Te	est Date	Januar	/ 24, 2018
Polarize	Ho	orizontal		Test	t Engineer	Jerry	Chuang
Detector		Peak		Tes	st Voltage	120V	ac/60Hz
120.0 dBuV/m			1	ī			
						Limit1: Limit2:	_
80					- Marken		
	An a referrance and the adversaria to be	mar home when the	Man	M			
	and a second state of						
40.0	20 2226 40 23	NO CO CO CO DO	2276 00	2200 20	240240 2	415.60 2	(42.00 MHz
2310.000 232.	J.20 2JJU.40 2.	43.00 2302.00	2370.00	2303.20	2402.40 2	415.00 2	142.00 MII2
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
2388.804	70.07	-2.98	67.0)9	74.00	-6.91	peak
2409.132	100.49	-2.92	97.5	57	-	-	peak

Test Mode	IEEE 802.	11n 40MHz CH	z Low	Ter	nperature	e:	24(°C)/ 33%RH
Test Item	Ba	nd Edge		Т	est Date		Januai	ry 24, 2018
Polarize	H	orizontal		Tes	st Enginee	ər	Jerry	Chuang
Detector	A	verage		Те	st Voltage	e	120\	/ac/60Hz
110.0 dBuV/m								
							Limit1: Limit2:	_
					(~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
70								
				*				
30.0								
2310.000 2323.	20 2336.40 23	49.60 2362.80	2376.00	2389.2	0 2402.40	2415.6	i0 :	2442.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV	ılt /m)	Limit (dBuV/r	n)	Margin (dB)	Remark
2390.000	53.89	-2.98	50.9	1	54.00		-3.09	AVG
2430.384	89.09	-2.86	86.2	3	-		-	AVG
			-					

Test Mode	IEEE 802.	11n 40MHz CH	High	Te	emp/H	um	24(°C)	/ 33%RH
Test Item	Ba	nd Edge		Т	est Da	te	Januar	y 24, 2018
Polarize	Ho	orizontal		Tes	t Engi	neer	Jerry	Chuang
Detector		Peak		Te	st Volta	age	120V	ac/60Hz
120.0 dBuV/m								
							Limit1: Limit2:	_
- Martin Martine	Mar Marine	www.						
80								
			hour hours	Hurty Hu				
				"V _{PN}	w.httywww.y	shythe menunusha	warunation yantarta takana	4444
40.0								
2432.000 2444	.00 2456.00 24	68.00 2480.00	2492.00	2504.0	0 2516	.00 2528	.00 2	552.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Li (dBı	mit JV/m)	Margin (dB)	Remark
2461.520	101.48	-2.76	98.7	'2		-	-	peak
2483.500	69.78	-2.69	67.0)9	74	.00	-6.91	peak

Test Mode	IEEE 802.	11n 40MHz CH	High	Temperature:		24(°C)/	/ 33%RH
Test Item	Ba	nd Edge		Т	est Date	January	/ 24, 2018
Polarize	Ho	orizontal		Tes	t Engineer	Jerry	Chuang
Detector	А	verage		Te	st Voltage	120Va	ac/60Hz
110.0 dBu∀/m						1:-:	
70							
				-			
30.0							
2432.000 2444	.00 2456.00 24	468.00 2480.00	2492.00	2504.0	0 2516.00 252	28.00 25	52.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resu (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
2463.200	90.34	-2.75	87.5	9	-	-	AVG
2483.500	52.91	-2.69	50.2	2	54.00	-3.78	AVG



Below 1G Test Data



Test Mode			Mode 1		Те	Temp/Hum			24(°C)/ 33%RH	
Test Item		30MHz-1GHz Test Date Horizontal Test Engineer				Ja	anuary	y 24, 2018		
Polarize			Horizonta	al	Tes	t Engi	neer		Jerry	Chuang
Detector			Peak		Tes	st Volt	age		120V	ac/60Hz
80.0 dBuV/m									Limit1: Margin:	_
30		X	2				**************************************	۲۵۵ ۲۰۵۸	A matrix and a matrix a	
-20	224.00) 22 [.]	00 410 00	515.00	C12 00	700.0	0 000	00		000 00 MU-
30.000 127.00	224.00) 32	1.00 410.00	515.00	612.00	703.0	U 0U0.	UU		JUU.UU MH2
Frequency (MHz)	Read (dBu	ing IV)	Correct Factor (dB/m)	Resu (dBuV/	ılt /m)	Lir (dBu	nit V/m)	Ma (argin dB	Remark
288.9900	57.3	34	-14.19	43.1	5	46	.02	-2	2.87	QP
415.0900	46.6	6	-10.85	35.8	1	46	.02	-1	0.21	peak
727.4300	40.3	37	-4.56	35.8	1	46	.02	-1	0.21	QP
	12 1	7	-3.43	38.7	4	46	.02	-7	7.28	QP
797.2700	42.			-						
797.2700 831.2200	40.1	3	-3.06	37.0	7	46	.02	-8	3.95	QP

30MHz(9KHz~30MHz)



Above 1G Test Data

Test Mode	Ð	IEEE	802.11b L	ow CH	Te	emp/Hum	24(°C).	/ 33%RH
Test Item			Harmonic	;	Т	est Date	January	/ 25, 2018
Polarize			Vertical		Tes	t Engineer	Jerry	Chuang
Detector		Pea	ik and Ave	erage	Te	st Voltage	120Va	ac/60Hz
110.0 dBuV/m	1							
70								
1000.000 3550	0.00 61	00.00 86	50.00 11200.0	00 13750.00	16300.0	00 18850.00 2	1400.00 26	6500.00 MHz
Frequency (MHz)	Re (d	ading BuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Limit (dBuV/m)	Margin (dB)	Remark
4827.000	4	8.62	4.38	53.0	00	74.00	-21.00	peak
N/A								
Remark: 1. Meas funda	suring amenta	frequen al freque	icies from ency.	1 GHz to	the 1	Oth harmon	ic of highest	
2. For a Avera	above age va	1GHz,th alue con	ne EUT pe npliance w	ak value vith the av	was u /erage	nder averag limit	ge limit, ther	efore the

Test Mode	IEEE	802.11b Lo	ow CH	Ter	mp/Hum	24(°C)	/ 33%RH
Test Item		Harmonic		Te	est Date	January	/ 25, 2018
Polarize	Da	Horizontal		Test	Engineer	Jerry	Chuang
Detector	Pe	ak and Avei	rage	Tes	t voltage	12008	ac/60HZ
110.0 dBuV/m							
						Limit1: Limit2:	
70							
	1						
30.0							
1000.000 3550.	00 6100.00 8	8650.00 11200.0	0 13750.00	16300.00) 18850.00 214	400.00 26	500.00 MHz
F	Deeding	Correct	Deer	.14	Linait	Manaia	
(MHz)	(dBuV)	Factor (dB/m)	dBuV	/m)	(dBuV/m)	(dB)	Remark
4827.000	48.84	4.38	53.2	2	74.00	-20.78	peak
N/A							
mark:							
						<i></i>	
1. Meas	uring freque	ncies from a	1 GHz to	the 10	th harmonic	c of highest	

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

Test Mode	IE	EE 802.1	11b Mid	СН	Terr	np/Hu	IM	24((°C)/ 3	3%RH
Test Item		Harn	nonic		Tes	st Dat	e	Jan	uary 2	5, 2018
Polarize Detector		Ven Peak and	tical 1 Averag	A	Test	Engir Volta	ieer	Je 12	erry Cn 20Vac/	iuang 60Hz
		T Car and	Averag	6	1631	VOILE	ige	12	_0 vac/	00112
								Lim Lim	it1: — it2: —	-
										_
70										
	1									_
	X									
	×									
30.0	X 00 6100.00	8650.00	11200.00	13750.00	16300.00	18850	.00 2140	0.00	26500.	00 MHz
30.0 1000.000 3550. Frequency (MHz)	X 00 6100.00 Reading (dBuV)	8650.00 g Corr) Fac	11200.00 1 rect :tor /m)	13750.00 Result (dBuV/r	16300.00 t n)	18850 Lin (dBu	.00 2140 nit V/m)	0.00 Marg (dB)	26500.	00 MHz Remark
30.0 1000.000 3550. Frequency (MHz) 4876.000	X 00 6100.00 Reading (dBuV) 47.72	8650.00 g Corr) Fac (dB 4.4	11200.00 rect :tor /m) 47	13750.00 Result (dBuV/r 52.19	16300.00 t n)	18850 Lin (dBu 74.	.00 2140 nit V/m) 00	0.00 Marg (dB) -21.8	26500.	00 MHz Remark
30.0 1000.000 3550. Frequency (MHz) 4876.000 N/A	X 00 6100.00 Reading (dBuV) 47.72	8650.00 g Corr Fac (dB 4.4	11200.00 rect :tor /m) 47	13750.00 Result (dBuV/r 52.19	16300.00 t n)	18850 Lin (dBu 74.	.00 2140 nit V/m) 00	0.00 Marg (dB) -21.8	26500. in 31	00 MHz Remark peak
30.0 1000.000 3550. Frequency (MHz) 4876.000 N/A	X 00 6100.00 Reading (dBuV) 47.72	8650.00 g Corr Fac (dB 4.4	11200.00 rect tor /m) 47	13750.00 Result (dBuV/r 52.19	16300.00	18850 Lin (dBu 74.	.00 2140 nit V/m)	0.00 Marg (dB) -21.8	26500. in 31	00 MHz Remark peak
30.0 1000.000 3550. Frequency (MHz) 4876.000 N/A	X 00 6100.00 Readiny (dBuV) 47.72	8650.00 g Corr Fac (dB 4.4	11200.00	13750.00 Result (dBuV/r 52.19	16300.00	18850 Lin (dBu	.00 2140 nit V/m) 00	0.00 Marg (dB) -21.8	26500.	00 MHz Remark peak
30.0 1000.000 3550. Frequency (MHz) 4876.000 N/A	X 00 6100.00 Reading (dBuV) 47.72	8650.00 g Corr Fac (dB 4.4	11200.00	13750.00 Result (dBuV/r 52.19	16300.00	18850 Lin (dBu 74.	.00 2140 nit V/m) 00	0.00 Marg (dB) -21.8	26500. in 31	00 MHz Remark peak
30.0 1000.000 3550. Frequency (MHz) 4876.000 N/A	X 00 6100.00 Readin (dBuV) 47.72	8650.00 g Corr Fac (dB 4.4	11200.00	13750.00 Result (dBuV/r 52.19	16300.00	18850 Lin (dBu 74.	.00 2140 nit V/m) 00	0.00 Marg (dB) -21.8	26500.	00 MHz Remark peak
30.0 1000.000 3550. Frequency (MHz) 4876.000 N/A	X 00 6100.00 Readin (dBuV) 47.72	8650.00 g Corr Fac (dB 4.4	11200.00	13750.00 Result (dBuV/r 52.19	16300.00	18850 Lin (dBu 74.	.00 2140 nit V/m) 00	0.00 Marg (dB) -21.8	26500. in 31	00 MHz Remark peak
30.0 1000.000 3550. Frequency (MHz) 4876.000 N/A Measure 1. Measure	Reading (dBuV) 47.72	8650.00	11200.00	13750.00 Result (dBuV/r 52.19	16300.00	18850 Lin (dBu 74.	.00 2140 nit V/m) 00	0.00 Marg (dB) -21.8	26500. in 31	00 MHz Remark peak

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

Test Mode	9	IEEE	802.11b N	∕lid CH	Te	emp/H	um	24(°C)	/ 33%RH
Test Item			Harmonic	<u>}</u>	T	est Da	ate	Januar	y 25, 2018
Detector		Pea	Horizonta	arage	Te	st Engl	neer ade	Jerry 120V	<u>Cnuang</u> /ac/60Hz
				lage			ago		
110.0 dBu¥/m								Limit1:	_
								Limit2:	_
70									
	1								
30.0	0.00 61	100 00 - 8f	50 00 11200 (00 13750 00	16300	00 1885	<u>n nn 214</u> (10 00 2	6500.00 MHz
	_								<u> </u>
Frequency (MHz)	Re (d	ading BuV)	Correct Factor (dB/m)	Resu (dBuV	ult 7/m)	Li (dBr	mit uV/m)	Margin (dB)	Remark
4876.000	4	6.06	4.47	50.5	3	74	1.00	-23.47	peak
N/A									
									<u> </u>
mark									
1. Meas	suring	frequer	ncies from	1 GHz to	the 1	0th ha	rmonic	of highes	t
funda	amenta	al frequ	ency.					-	
2. For a	above	1GHz,tl	he EUT pe	ak value	was u	inder a	average	e limit, thei	refore the
<u>Aupr</u>	ade va	alue con	npliance w	∕ith the a∖	/erage	e limit			

Test Mode		IEEE 8	802.11b F	ligh CH	Te	emp/H	um	24(°	C)/ 33%	RH
Test Item			Harmoni	С	T	est Da	ate	Janua	ary 25, 2	2018
Polarize		Pop	Vertical			st Volt	neer	Jer 120	ry Chua	ng ⊔⊸
Delector		rea	K and Ave	erage	Te	St VOIL	aye	120	Jvac/00	
110.0 dBuV/m										
								Limit1 Limit2	: <u> </u>	
70										
70										
	1									
	Ĩ									
E										
30.0	00 61	10 00 86	50.00 11200	00 13750 00	16300 (00 1885	<u>0 00 214</u> 0	10.00	26500.00 M	H 7
30.0 1000.000 3550.	00 61	DO. OO 865	50.00 11200.	.00 13750.00	16300.0	00 1885	0.00 214	0.00	26500.00 M	Hz
30.0	00 610	DO. OO 863	50.00 11200.	.00 13750.00	16300.0	00 1885	i0.00 2140	0.00	26500.00 M	Hz
30.0 1000.000 3550. Frequency	00 611	00.00 86	50.00 11200.	.00 13750.00 Resu	16300.0	00 1885 	i0.00 2140 imit	00.00 Margin	26500.00 M	Hz
30.0 1000.000 3550. Frequency (MHz)	00 61	00.00 863 ading 3uV)	50.00 11200 Correct Factor (dB/m)	.00 13750.00 Rest (dBuV	16300.(ult //m)	00 1885 Li (dB	i0.00 2140 imit uV/m)	00.00 Margin (dB)	26500.00 M	Hz mark
30.0 1000.000 3550. Frequency (MHz) 4925.000	00 611	00.00 869 ading 3uV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Resu (dBuV 53.5	16300.0 ult //m)	00 1885 Li (dB	i0.00 214(imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M	Hz mark eak
30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A	00 611	00.00 86 ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Resu (dBuV 53.5	16300.0 ult //m)	00 1885 Li (dB	i0.00 2140 imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M	Hz mark eak
30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A	00 611	00.00 86 ading 3uV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Resu (dBuV 53.5	16300.0 .ilt .//m)	00 1885 (dB 74	i0.00 2140 imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M	Hz mark eak
30.0 30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A	00 611	00.00 869 ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Rest (dBuV 53.5	16300.0 ult //m)	00 1885 Ll (dB	i0.00 2140 imit uV/m) 1.00	00.00 Margin (dB) -20.50	26500.00 M Rei	Hz mark eak
30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A	00 611	ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Resu (dBuV 53.5	16300.0 ult //m)	00 1885 Li (dB	imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M Rei pe	Hz mark eak
30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A	00 611	ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Rest (dBuV 53.5	16300.0	00 1885 (dB 72	imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M	Hz mark eak
30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A	00 61	ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Resu (dBuV 53.5	16300.0	00 1885 (dB 74	i0.00 2140 imit uV/m) 1.00	00.00 Margin (dB) -20.50	26500.00 M	Hz mark eak
30.0 30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A	00 61	ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Resu (dBuV	16300.0 ult //m) 50	00 1885 (dB 72	imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M Rei pe	Hz mark eak
30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A 	00 61	200.00 86 ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55	.00 13750.00 Resu (dBuV 53.5	16300.0	00 1885 (dB 72	i0.00 2140 imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M	Hz mark eak
30.0 1000.000 3550. Frequency (MHz) 4925.000 N/A M/A	00 61	ading BuV) 3.95	50.00 11200 Correct Factor (dB/m) 4.55 Cies from 2ncV.	.00 13750.00 Resu (dBuV 53.5	16300.0	00 1885 (dB 72	i0.00 2140 imit uV/m) 4.00	00.00 Margin (dB) -20.50	26500.00 M	Hz mark eak

Average value compliance with the average limit



FCC ID: M82-UTC520FPIKA0E

Tes	Test Mode IEEE 802.11b High CH			High CH	Т	emp/H	lum	24(°C)/ 33%RH			
Те	st Item			Harmon	ic		Fest Da	ate	January 25, 201		2018
Po	olarize			Horizon	tal	Test Engineer			Jerry Chuang		ang
De	etector		Pea	k and Av	/erage	Test Voltage			120)Vac/60)Hz
110.0) dBu∀/m								Limit1 Limit2		
30.0 10	00.000 3550.00	* 61	00.00 865	50.00 1120	0.00 13750.00	16300	.00 188	50.00 214	0.00	26500.00	4 Hz
Freq (M	uency IHz)	Re (d	ading BuV)	Correct Factor (dB/m)	Res (dBu\	ult //m)	L (dB	imit uV/m)	Margin (dB)	Re	emark
492	5.000	4	6.89	4.55	51.4	14	74	4.00	-22.56	p	eak
N	J/A										
Domor											

- - 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



Report No.: T171208D05-RP1

Test Mode IEEE 802.11g Low			w CH	Tem	np/Hum	24(°C)/ 33%RF		
Test Item		Harmonic		Tes	st Date	January 25, 2018		
Polarize	Dev	Vertical	0.00	Test E		Jerry Chuang		
Detector	Pea	ak and Aver	age	lest	voltage	12008	ac/60HZ	
110.0 dBu¥/m								
						Limit1:	—	
70								
30.0	DO 6100.00 8	650.00 11200.00) 13750.00	16300.00	18850.00 214	00.00 26	500.00 MHz	
30.0 1000.000 3550.0 Frequency (MHz)	00 6100.00 8 Reading (dBuV)	650.00 11200.00 Correct Factor (dB/m)) 13750.00 Resu (dBuV/	16300.00	18850.00 214 Limit (dBuV/m)	00.00 26 Margin (dB)	5500.00 MHz Remark	
30.0 1000.000 3550.0 Frequency (MHz) 4827.000	00 6100.00 8 Reading (dBuV) 42.61	650.00 11200.00 Correct Factor (dB/m) 4.38) 13750.00 Resu (dBuV/ 46.9	16300.00 Ilt /m) 9	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -27.01	5500.00 MHz Remark peak	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A	00 6100.00 8 Reading (dBuV) 42.61	650.00 11200.00 Correct Factor (dB/m) 4.38	0 13750.00 Resu (dBuV/ 46.9	16300.00 Ilt /m) 9	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -27.01	5500.00 MHz Remark	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A	00 6100.00 8 Reading (dBuV) 42.61	650.00 11200.00 Correct Factor (dB/m) 4.38) 13750.00 Resu (dBuV/ 46.9	16300.00 Ilt /m) 9	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -27.01	Remark	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A	00 6100.00 8 Reading (dBuV) 42.61	650.00 11200.00 Correct Factor (dB/m) 4.38) 13750.00 Resu (dBuV/ 46.9	16300.00 Ilt /m) 9	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -27.01	500.00 MHz Remark	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A	00 6100.00 8 Reading (dBuV) 42.61	650.00 11200.00 Correct Factor (dB/m) 4.38	0 13750.00 Resu (dBuV/ 46.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	500.00 MHz Remark peak	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A	00 6100.00 8 Reading (dBuV) 42.61	650.00 11200.00 Correct Factor (dB/m) 4.38	0 13750.00 Resu (dBuV/ 46.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -27.01	5500.00 MHz Remark	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A	00 6100.00 8	650.00 11200.00 Correct Factor (dB/m) 4.38) 13750.00 Resu (dBuV/ 46.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	Soo.oo MHz	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A	00 6100.00 8	650.00 11200.00 Correct Factor (dB/m) 4.38) 13750.00 Resu (dBuV/ 46.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	500.00 MHz Remark peak	
30.0 1000.000 3550.1 Frequency (MHz) 4827.000 N/A M/A mark: 1. Measu	00 6100.00 8 Reading (dBuV) 42.61	650.00 11200.00 Correct Factor (dB/m) 4.38 1 1 1 1 1 1 1 1 1 1 1 1	2 13750.00 Resu (dBuV/ 46.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -27.01	500.00 MHz Remark peak	
30.0 Trequency (MHz) 4827.000 N/A Mark: 1. Measu funda	00 6100.00 8 Reading (dBuV) 42.61 uring frequental freq	650.00 11200.00 Correct Factor (dB/m) 4.38 	0 13750.00 Resu (dBuV/ 46.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	S500.00 MHz	

Test Mode IE		IEEE 802.11g Low CH			p/Hum	24(°C)/ 33%RH	
Test Item		Harmonic	;	Tes	t Date	January	/ 25, 2018
Polarize		Horizonta		Test E	Ingineer	Jerry Chuang	
Detector	P	eak and Ave	rage	Test	Voltage	120Va	ac/60Hz
110.0 dBu¥/m							
						Limit1:	—
70							
30.0							
30.0 1000.000 3550.	00 6100.00	8650.00 11200.0	00 13750.00	16300.00	18850.00 214	00.00 26	500.00 MHz
30.0 1000.000 3550. Frequency (MHz)	00 6100.00 Reading (dBuV)	8650.00 11200.0	00 13750.00 Resu (dBuV	16300.00 Jlt //m)	18850.00 214 Limit (dBuV/m)	00.00 26 Margin (dB)	S500.00 MHz Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0 Correct Factor (dB/m) 4.38	00 13750.00 Resu (dBuV 44.9	16300.00 Jlt //m)	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -29.03	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0 Correct Factor (dB/m) 4.38	00 13750.00 Resu (dBuV 44.9	16300.00 JIt //m))7	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0 Correct Factor (dB/m) 4.38	00 13750.00 Rest (dBuV 44.9	16300.00 ult //m)	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -29.03	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0 Correct Factor (dB/m) 4.38	00 13750.00 Resu (dBuV 44.9	16300.00 ult //m) 07	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -29.03	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0 Correct Factor (dB/m) 4.38	00 13750.00 Rest (dBuV 44.9	16300.00 ult //m) 07	18850.00 214 Limit (dBuV/m) 74.00	00.00 26 Margin (dB) -29.03	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0 Correct Factor (dB/m) 4.38	00 13750.00 Resu (dBuV 44.9	16300.00 Ilt //m) 17 17 17	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0	00 13750.00 Rest (dBuV 44.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A	00 6100.00 Reading (dBuV) 40.59	8650.00 11200.0	00 13750.00 Resu (dBuV 44.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	Remark
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A Meas 1. Meas	00 6100.00	8650.00 11200.0	00 13750.00 Resu (dBuV 44.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00	00.00 26	S500.00 MHz Remark peak
30.0 1000.000 3550. Frequency (MHz) 4824.000 N/A Mark: 1. Meas funda	00 6100.00 Reading (dBuV) 40.59 uring freque mental freque	8650.00 11200.1 Correct Factor (dB/m) 4.38	00 13750.00 Rest (dBuV 44.9	16300.00	18850.00 214 Limit (dBuV/m) 74.00 n harmonic	00.00 26	S500.00 MHz Remark peak

Test Mode			IEEE	Temp/Hum			24(°C)/ 33%RH		1		
Te	est Item			Harmon	ic	Test Date			January 25, 201		8
<u> </u>	olarize			Vertica	Vertical Test Engineer			Jer	Jerry Chuang		
D	etector		Pea	k and Av	Test Voltage			120	0Vac/60Hz		
110.0) dBuV/m								Limit	: <u> </u>	
70		1	3X								
30.0											
10	00.000 3550.00) 6	100.00 86	50.00 1120	0.00 13750.00	16300	.00 188	50.00 214	DO.OO	26500.00 MHz	
Freq (N	luency IHz)	Re (d	ading IBuV)	Correct Factor (dB/m)	Res (dBu\	ult //m)	L (dB	imit uV/m)	Margir (dB)	Remarl	k
487	6.000	5	4.61	4.47	59.0)8	7	4.00	-14.92	2 peak	
487	6.000	4	3.66	4.47	48.2	13	5	4.00	-5.87	AVG	
731	2.000	4	4.76	10.44	55.2	20	7	4.00	-18.80) peak	
731	2.000	3	3.45	10.44	43.8	39	5	4.00	-10.11	AVG	
Ν	I/A										
D											

- 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 802.11g Mid CH			1id CH	Temp/Hum			24(°C)/ 33%RH			
Test Item			Harmonic	,	Т	est Date	e	January 25, 2018		
Polarize			Horizonta		Test Engineer			Jerry Chuang		
Detector		Pea	ik and Ave	cand Average To			ge	120V	ac/60Hz	
110.0 dBuV/m										
								Limit1: Limit2:	_	
70										
	1 ¥	3								
	2	4								
30.0 1000.000 3550.	00 6	100.00 86	50.00 11200.0	00 13750.00	16300.	00 18850.1	00 214	0.00 2	6500.00 MHz	
			-							
Frequency (MHz)	Re (c	eading IBuV)	Correct Factor (dB/m)	Resu (dBuV	ult //m)	Lim (dBu\	nit //m)	Margin (dB)	Remark	
4869.000	5	2.06	4.45	56.5	51	74.(00	-17.49	peak	
4869.000	4	0.36	4.45	44.8	31	54.0	00	-9.19	AVG	
7305.000	4	4.11	10.44	54.5	55	74.0	00	-19.45	peak	
7305.000	3	3.31	10.44	43.7	75	54.0	00	-10.25	AVG	
N/A										
emark:	uring	froquer	ning from	1 СЦ- +-	the 1	Oth har	monio	ofhiches	4	
funda	ment	al freque	ency.			Jurnan	TOTIC	or mynes	L	

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

Test Mode	IEEE	802.11g Hig	gh CH	Temp/Hum	24(°C)	/ 33%RH
Test Item		Harmonic		Test Date	January	/ 25, 2018
Polarize	Da	Vertical		Test Engineer	Jerry	Chuang
Detector	Pe	ak and Aver	age	Test voltage	1200	ac/60HZ
110.0 dBuV/m					Limit1:	—
70	1 X .00 6100.00	8650.00 11200.00	D 13750.00 1	6300.00 18850.00	21400.00 Limit2:	5500.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4932.000	44.42	4.57	48.99	74.00	-25.01	peak
N/A						



FCC ID: M82-UTC520FPIKA0E

Test Mode			IEEE	Temp/Hum			24(°C)/ 33%RH				
Tes	st Item			Harmor	nic	1	lest Da	ate	January 25, 201		18
Pc	olarize			Horizon	tal	Test Engineer			Jerry Chuang		
De	etector		Pea	k and A	Test Voltage			120Vac/60Hz			
110.0	dBuV/m								Limit1:		
		1 X									
30.0 100	0.000 3550.00	61	100.00 86	50.00 112	00.00 13750.00) 16300	.00 188	50.00 214	00.00	26500.00 MHz	
							•				
Frequ (MI	uency Hz)	Re (d	eading IBuV)	Correct Factor (dB/m)	Res (dBu)	ult //m)	L (dB	imit uV/m)	Margin (dB)	Rema	rk
4925	5.000	3	9.61	4.55	44.1	16	74	4.00	-29.84	peak	(
N	/A										

- 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	ow CH	Temp/Hum			24(°C)/ 33%RH			
Test Item	H	armonic		Т	est Da	ite	January 25, 2018		
Polarize	۱	/ertical		Tes	st Engi	neer	Jerry Chuang		
Detector	Peak a	and Average	е	Test Voltage			120\	/ac/60Hz	
110.0 dBuV/m							Limit1: Limit2:		
70									
30.0									
1000.000 3550	0.00 6100.00 86	50.00 11200.00	0 13750.00	16300.	00 1885	0.00 214	0.00 2	26500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ult //m)	Li (dBi	mit uV/m)	Margin (dB)	Remark	
4827.000	42.65	4.38	47.0	3	74	.00	-26.97	peak	
N/A									

- 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	n 20MHz L	_ow CH	Te	mp/Hum	2	24(°C)/ 33%RH		
Test Item	Ha	armonic		Te	est Date	Ja	January 25, 2018		
Polarize	Ho	orizontal		Test	Enginee	r ,	Jerry Chuang		
Detector	Peak a	and Averag	e	Tes	t Voltage		120Vac/60Hz		
110.0 dBuV/m							Limit1:	—	
70	1 1 2 30.00 6100.00 86	50.00 11200.0	0 13750.00	16300.0	0 18850.00	21400.00	Limit2:	500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor	Resu (dBuV	ult //m)	Limit (dBuV/m) Ma	rgin 1B)	Remark	
4824.000	37.69	(dB/m) 4.38	42.0)7	74.00	-3	, 1.93	peak	
N/A									
Remark: 1. Mea	suring frequer	ncies from	1 GHz to	the 10)th harmo	nic of hi	ghest		
2. For Aver	above 1GHz,th rage value con	ne EUT pea npliance wi	ak value ith the av	was ui /era <u>g</u> e	nder aver limit	age limit	, there	efore the	

Test Mode	IEEE 802. ⁻	11n 20MHz	Mid CH	Т	emp/Hum	24(°C)/ 33%RH		
Test Item	ŀ	Harmonic			Test Date	January	/ 25, 2018	
Polarize		Vertical		Tes	st Engineer	Jerry	Chuang	
Detector	Peak	and Avera	ge	Test Voltage 120Vac/60Hz				
110.0 dBuV/m						Limit1: Limit2:		
30.0		50.00 11200.0	0 13750.00	16300.1	00 18850.00 21	400.00 20	3500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/r	: n)	Limit (dBuV/m)	Margin (dB)	Remark	
4876.000	56.47	4.47	60.94		74.00	-13.06	peak	
4876.000	45.57	4.47	50.04		54.00	-3.96	AVG	
7305.000	44.27	10.44	54.71		74.00	-19.29	peak	
7305.000	35.34	35.34 10.44			54.00	-8.22	AVG	
N/A								

- 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

est Mode	IEEE 802.11n 20MHz Mid CH Temp/Hum					Jm	24(°C)/ 33%RH		
Test Item	H	armonic		Te	est Da	te	January 25, 201		2018
Polarize	H	orizontal		Test	t Engir	neer	Jerry Chuang		ng
Detector	Peak a	and Average	e	Test Voltage 120Vac/60Hz					
110.0 dBuV/m									
							Limit	1: — 2: —	
70									
	* *								
	X								
30.0	0.00 0100.00 00	CE0.00 11200.00	12750.00	10200.0	0 1005	0 00 214	00.00	20500.00 M	U -
1000.000 333		50.00 11200.00	1 13730.00	10300.0		J.UU 214		20300.00 M	ΠZ
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resul (dBuV/	t m)	Liı (dBı	mit ıV/m)	Margir (dB)	n Re	mark
4862.000	52.88	4.44	57.32	2	74	.00	-16.68	3 р	eak
4862.000	42.24	4.44	46.68	}	54	.00	-7.32	A	VG
N/A									
		<u> </u>							

- 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 20MHz High C			Tem	p/Hum	24(°C)/ 33%RH		
Test Item	F	larmonic		Tes	t Date	January 25, 2018		
Polarize		Vertical		Test E	Ingineer	Jerry Chuang		
Detector	Peak	and Average	e	Test	Voltage	120Vac/60Hz		
110.0 dBuV/	'n						1	
						Limit1: Limit2:	_	
70								
	1 ¥							
30.0								
1000.000	3550.00 6100.00	8650.00 11200.0	0 13750.00	16300.00	18850.00 214	DO.OO 26	500.00 MHz	
		Correct						
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Resu (dBuV	ılt /m)	Limit (dBuV/m)	Margin (dB)	Remark	
4925.000	42.78	4.55	47.3	3	74.00	-26.67	peak	
N/A								
Remark:								
1. Me fur	easuring freque	encies from a	1 GHz to	the 10th	h harmonic	of highest		
2. Fo	r above 1GHz,	the EUT pea	ak value	was uno	ler average	e limit, ther	efore the	
	erade value co	ompliance wi	ith the av	/erage lii	mıt			

Test Mode	IEEE 802.1	IEEE 802.11n 20MHz High CH				24(°C)/ 33%RH		
Test Item	F	larmonic		Test I	Date	January 25, 2018		
Polarize	H	orizontal		Test En	gineer	Jerry	Chuang	
Detector	Peak	and Averag	ge	lest Vo	oltage	120Va	ac/60Hz	
110.0 dBu∀/m						Limit1:	_	
70		50.00 11200.0	0 13750.00	16300.00 18	850.00 214		5500.00 MHz	
Frequency	Reading	Correct Factor	Result		Limit	Margin	Remark	
(MHz)	(dBuV)	(dB/m)	(dBuV/r	n) (dl	BuV/m)	(dB)		
4925.000	40.53	4.55	45.08	7	74.00	-28.92	peak	
N/A								
Remark: 1. Mea fund 2. For a Aver	suring frequer amental frequ above 1GHz,tl age value con	ncies from ency. ne EUT pea npliance wi	1 GHz to t ak value w ith the ave	he 10th h vas under erage limit	armonic average	of highest limit, ther	efore the	

Test Mode	IEEE 802.11	IEEE 802.11n 40MHz Low CH				um	24(°C)/ 33%RH	
Test Item	H	Test Date			January 25, 2018			
Polarize	Vertical Test Engineer					Jerr	y Chuang	
Detector	Peak a	and Averag	е	Tes	st Volta	age	120	Vac/60Hz
110.0 dBu∀/m					Limit1:	—		
70		50.00 11200.0	0 13750.00	16300.1	00 1885(0.00 214	Limit2:	26500.00 MHz
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resi (dBuV	ult //m)	Liı (dBu	mit ıV/m)	Margin (dB)	Remark
4844.000	37.69	4.41	42.1	0	74	.00	-31.90	peak
N/A								
1. Mea fund 2. For a Aver	suring frequer amental frequ above 1GHz,tl age value con	ncies from : ency. he EUT pea npliance wi	1 GHz to ak value ith the av	o the 1 was u verage	0th hai Inder a Pilmit	rmonic verage	of highes e limit, the	st erefore the

Fest Mode	IEEE 802.	.11n 40MHz	z Low CH	Temp/Hum		24(°C)/ 33%RH	
Test Item	Harmonic Test Date January 25					/ 25, 2018	
Polarize		Horizontal		Test En	gineer	Jerry	Chuang
Detector	Pea	k and Avera	age	lest Vo	oltage	120Va	ac/60Hz
110.0 dBuV/m							
						Limit1:	-
						Limit2:	
70							
10							
	1 X						
	*						
30.0	* 						
30.0	1 .00 6100.00 84	650.00 11200.00	0 13750.00 1	6300.00 188	50.00 2140	10.00 26	5500.00 MHz
30.0 1000.000 3550	1 × .00 6100.00 80	650.00 11200.00	0 13750.00 1	6300.00 189	50.00 2140	0.00 26	5500.00 MHz
30.0 1000.000 3550		650.00 11200.00	0 13750.00 1	6300.00 188	50.00 2140	10.00 26	5500.00 MHz
30.0 1000.000 3550 Frequency	1 .00 6100.00 84 Reading	650.00 11200.00 Correct Factor	0 13750.00 1 Result	6300.00 188	50.00 2140 .imit	0.00 26 Margin	5500.00 MHz
30.0 1000.000 3550 Frequency (MHz)	1 .00 6100.00 8 Reading (dBuV)	650.00 11200.00 Correct Factor (dB/m)	0 13750.00 1 Result (dBuV/m)	6300.00 188	50.00 2140 .imit 3uV/m)	0.00 26 Margin (dB)	S500.00 MHz Remark
30.0 1000.000 3550 Frequency (MHz) 4844.000	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	-imit 3uV/m) 4.00	0.00 26 Margin (dB) -32.13	Remark
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 189	50.00 2140 .imit 3uV/m) 4.00	0.00 26 Margin (dB) -32.13	S500.00 MHz Remark peak
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140 Limit BuV/m)	0.00 26 Margin (dB) -32.13	S500.00 MHz Remark
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140 -imit 3uV/m) 4.00	0.00 26 Margin (dB) -32.13	S500.00 MHz Remark peak
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140 -imit 3uV/m) 4.00	0.00 26 Margin (dB) -32.13	S500.00 MHz Remark peak
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140 -imit 3uV/m) 4.00	0.00 26 Margin (dB) -32.13	S500.00 MHz Remark peak
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140 .imit 3uV/m) 4.00	0.00 26 Margin (dB) -32.13	Remark
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140 -imit 3uV/m) 4.00	0.00 26 Margin (dB) -32.13	S500.00 MHz Remark peak
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140	0.00 26 Margin (dB) -32.13	S500.00 MHz Remark peak
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A mark: 1 Moas	1 1.00 6100.00 8 Reading (dBuV) 37.46	650.00 11200.00	0 13750.00 1 Result (dBuV/m) 41.87	6300.00 188	50.00 2140	0.00 26	5500.00 MHz Remark peak
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A MA Mark: 1. Meas funda	Reading (dBuV) 37.46	650.00 11200.00 Correct Factor (dB/m) 4.41 	0 13750.00 1 Result (dBuV/m) 41.87 	6300.00 188	50.00 2140	0.00 26	S500.00 MHz
30.0 1000.000 3550 Frequency (MHz) 4844.000 N/A Mark: 1. Meas funda 2. For a	1 1.00 6100.00 8 Reading (dBuV) 37.46 Suring frequer Suring frequer	650.00 11200.00 Correct Factor (dB/m) 4.41 	0 13750.00 1 Result (dBuV/m) 41.87 41.87 1 GHz to th ak value w	6300.00 188	50.00 2140	0.00 26	Remark

Test Mode	IEEE 802.2	11n 40MHz	Mid CH	Temp/Hum			24(°C)/ 33%RH		
Test Item	ŀ	Harmonic				te	January 24, 2018		2018
Polarize	Vertical Test Engineer					neer	Jerry Chuang		ng
Detector	Peak	and Avera	ge	Te	Test Voltage 120			Vac/60	Ηz
110.0 dBuV/m						Limit1	: 		
70									
30.0 1000.000 3550.0	0 6100.00 86	50.00 11200.0	0 13750.00	16300.0)0 18850.	00 2140)0.00	26500.00 MI	Ηz
Frequency	Reading	Correct	Result		Lim	nit	Margin		
(MHz)	(dBuV)	Factor (dB/m)	(dBuV/n	n)	(dBu\	//m)	(dB)	Rer	nark
4890.000	53.33	4.49	57.82		74.(00	-16.18	pe	eak
4890.000	42.12	4.49	46.61		54.00		-7.39	A	VG
N/A									

- 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	n 40MHz I	Mid CH	Tem	p/Hum	24(°C)/ 33%RH		
Test Item	H	armonic		Tes	t Date	January 25, 2018		
Polarize	Ho	Test E	Engineer	Jerry	Chuang			
Detector	Peak and Average Test Voltage					120Va	ac/60Hz	
110.0 dBu¥/m						1:11	1	
70						Limit1: Limit2:		
1000.000 355	0.00 6100.00 86	50.00 11200.0)0 13750.00	16300.00	18850.00 214	00.00 26	500.00 MHz	
Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Resı (dBuV	ılt /m)	Limit (dBuV/m)	Margin (dB)	Remark	
4883.000	49.36	4.49	53.8	5	74.00	-20.15	peak	
N/A								
Remark: 1. Mea fund 2. For a Aver	suring frequer amental frequ above 1GHz,tl age value con	ncies from ency. ne EUT pea npliance wi	1 GHz to ak value ith the av	the 10ti was und verage li	h harmonic der average mit	of highest imit, ther	efore the	



Test Mode	IEEE 8	IEEE 802.11n 40MHz High CH				Temp/Hum			24(°C)/ 33%RH		
Test Item		Harmonic				Test Date			January 25, 2018		
Polarize		V	ertical		Test Engineer			Jerry Chuang		ng	
Detector	Peak and Average Test Voltage				120)Vac/60	Hz				
110.0 dBu	//m										
								Limit1 Limit2	l: — 2: —		
70											
70											
	1 X										
30.0	3550.00 611	00 00 86	50.00 11200	00 13750 00	16300.0	0 18850	1 00 214		26500.00 M	Hz	
1000.000	0000.00 01				10000.0			70.00	20000.001		
			Correct								
Frequenc (MHz)	/ Rea (dl	iding 3uV)	Factor (dB/m)	Resi (dBuV	ult //m)	Lir (dBu	nit ıV/m)	Margir (dB)	N Re	mark	
4904.000	38	3.27	4.51	42.7	78	74.	.00	-31.22	2 p	eak	
N/A											
				_							
Remark:	eesurina	froquor	ncies from	1 GHz to	tha 1()th hai	rmonic	of high	act		
fu	ndamenta	al freque	ency.			/11/1/10/	mome	ornight	501		
<u>о г</u>		•	-								
2. FC	or above a	1GHz, t	he EUT p	əak value) was u	inder a	averag	e limit, ti	herefore	e the	

Test Mode	IEEE 802.1	1n 40MHz	High CH	Temp	o/Hum	24(°C)/ 33%RH		
Test Item		Harmonic		Test	Date	January 25, 2018		
Polarize	H	lorizontal		Test E	ngineer	Jerry Chuang		
Detector	Peak	and Avera	ge	Test V	/oltage	120Va	ac/60Hz	
110.0 dBuV/	m							
						Limit1:	_	
							_	
70								
	1							
	×							
30.0	EE0 00 C100 00 0	000 11000	0 13750.00	10200-00 1		00.00 20	500 00 MU-	
1000.000 3	550.00 6100.00 (000.00 11200.0	10 13730.00	16300.00	10030.00 214	UU.UU 20	JUU.UU MAZ	
Frequency	Reading	Correct	Result	:	Limit	Margin	Bomark	
(MHz)	(dBuV)	(dB/m)	(dBuV/n	n) (dBuV/m)	(dB)	Remark	
4904.000	37.82	4.51	42.33		74.00	-31.67	peak	
N/A								
emark:								
1. Me	asuring freque	ncies from	1 GHz to t	he 10th	harmonic	of highest		
fun	damental frequ	iency.				Ū		
2. Foi	r above 1GHz,	the EUT pe	eak value v	was und	er averag	e limit, the	refore the	
AVE	erade value co	mpliance w	ith the ave	erage lim	nit			