

CTC Laboratories, Inc.

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TEST REPORT					
Report No:	CTC20211300E04				
FCC ID	2AR24-AIBOX30UM				
Applicant:	Shenzhen Absen Optoelectronic C	co.,Ltd			
Address	18-20F Building 3A, Cloud Park, Bar Shenzhen, China	ntian, Longgang District,			
Manufacturer	Shenzhen Absen Optoelectronic Co.	,Ltd			
Address:	18-20F Building 3A, Cloud Park, Bar Shenzhen, China	ntian, Longgang District,			
Product Name:	LED Multimedia Processor				
Trade Mark:	/				
Model/Type reference:	Ai Box3.0 UM				
Listed Model(s):	/				
Standard:	FCC Part 15, Subpart E 15. 407				
Date of receipt of test sample:	Aug. 02, 2021				
Date of testing	Aug. 02, 2021 to Aug. 20, 2021				
Date of issue	Aug. 25, 2021				
Result:	PASS				
Compiled by:		I and land			
(Printed name+signature)	Lucy Lan	Miller Ma			
Supervised by:		niller Ma			
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Approved by:		water chis			
(Printed name+signature)	Walter Chen	Munnins			
Testing Laboratory Name:	CTC Laboratories, Inc.				
Address	1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China				
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sample. The test report shall be invalid without all the signatures of testing engineers, reviewer and approver. Any objections must be raised to CTC within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit. The test report merely correspond to the test sample.



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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

<u>FCC Part 15, Subpart E(15.407)</u> — for 802.11a/n/ac, the test procedure follows the FCC KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

<u>RSS-247_Issue 2 February 2017</u> — Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen — General Requirements for Compliance of Radio Apparatus

1.2. Report Version

Revised No.	Date of issue	Description
01	Aug. 25, 2021	Original



1.3. Test Description

FCC Part 15 Subpart E (15.407) / RSS-247 Issue 2 February 2017						
Test How	Test r	equire	Decult	Test		
Test Item	FCC	IC	Result	Engineer		
Antenna Requirement	15.203	/	Pass	Lucy Lan		
Conducted Emission	15.207	RSS-Gen 8.8	Pass	Lucy Lan		
Band Edge Emissions	15.407(b)	RSS-247 6.2.1.2 RSS-247 6.2.2.2 RSS-247 6.2.4.2	Pass	Lucy Lan		
26dB Bandwidth & 99% Bandwidth	15.407(a) (5)	RSS-247 6.2.1.2	Pass	Lucy Lan		
6dB Bandwidth (only for UNII-3)	15.407(e)	RSS-247 6.2.4.1	Pass	Lucy Lan		
Peak Output Power	15.407(a)	RSS-247 6.2.1.1 RSS-247 6.2.4.1	Pass	Lucy Lan		
Power Spectral Density	15.407(a)	RSS-247 6.2	Pass	Lucy Lan		
Transmitter Radiated Spurious Emission	15.407(b) &15.209	RSS-Gen 8.9 RSS-247 6.2.1.2 RSS-247 6.2.4.2	Pass	Lucy Lan		
Frequency Stability	15.407(g)	/	Pass	Lucy Lan		
Dynamic Frequency Selection (DFS)	15.407(h)	RSS-247 6.3	N/A	N/A		
Automatically DiscontinueTransmission	15.407(c)	/	Pass	Note(3)		

Note:

(1)"N/A" is not applicable.

(2)The measurement uncertainty is not included in the test result.

(3)During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. the EUT can detect the controlling sianal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

(4)The test data except AC conducted emission and Radiated emission below 1GHz refer to CTC20211289E04(FCC ID: 2AR24-AIBOX30US; Equipment code: NII). The EUT wireless module, antenna, PCB layout and electrical circuit are the same, the difference is EUT size.



1.4. Test Facility

CTC Laboratories, Inc.

Add: 1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China

Laboratory accreditation

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

CNAS-Lab Code: L5365

CTC Laboratories, Inc. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation. Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug. 26, 2017.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties radio equipment characteristics; Part 2" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for CTC Laboratories, Inc.



Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.42 dB	(1)
Transmitter power Radiated	2.14 dB	(1)
Conducted spurious emissions 9kHz~40GHz	1.60 dB	(1)
Radiated spurious emissions 9kHz~40GHz	2.20 dB	(1)
Conducted Emissions 9kHz~30MHz	3.08 dB	(1)
Radiated Emissions 30~1000MHz	4.51 dB	(1)
Radiated Emissions 1~18GHz	5.84 dB	(1)
Radiated Emissions 18~40GHz	6.12 dB	(1)
Occupied Bandwidth		(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

1.6. Environmental Conditions

		Temperature	21°C~27°C
Normal Conditio	Normal Condition	Relative humidity	40%~60%
	Condition	Voltage	The equipment shall be the nominal voltage for which the equipment was designed.
	Extreme	Temperature	Measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.
	Condition	Voltage	Measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.

Normal Condition T _N =Normal Temperature		21°C~27°C
Extreme Condition	T _L =Lower Temperature	-10 °C
Extreme Condition	T _H =Higher Temperature	40 °C



2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Shenzhen Absen Optoelectronic Co.,Ltd
Address:	18-20F Building 3A, Cloud Park, Bantian, Longgang District, Shenzhen, China
Manufacturer:	Shenzhen Absen Optoelectronic Co.,Ltd
Address:	18-20F Building 3A, Cloud Park, Bantian, Longgang District, Shenzhen, China

2.2. General Description of EUT

Product Name:	LED	D Multimedia F	Processor				
Trade Mark:	/	/					
Model/Type reference:	Ai E	Box3.0 UM					
Listed Model(s):	/						
Model Difference:	/						
Power supply:	100	-240V~ 50/60	Hz 23W				
RF Module Model:	ZK-	7632A					
Hardware version:	/						
Software version:	/						
Remark:	EUT is a fixed point-to-point access points operating device. According to the power limit for 5150~5250MHz band, ZK-7632A can operating in client mode.						
Technical index for 5G WIF	-1						
Operation Band:		⊠U-NII-1	U-NII-2A	U-NII-2C		⊠U-NII	-3
Operation Frequency Range		U-NII-1:	5150MHz~5250MHz				
	•	U-NII-3:	5725MHz~5850MHz				
Support bondwidth		802.11a	🛛 20MHz				
Support bandwidth:		802.11n	🛛 20MHz	🛛 40MHz			
Modulation:	Modulation: 802.11a: OFDM (BIT/SK, QPSK, BPSK, 16QAM) 802.11n: OFDM (BIT/SK, QPSK, BPSK, 16QAM, 64QAM))	
Bit Rate of Transmitter:		802.11a: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 300Mbps					
Antenna 1 or 2 type: PCB Antenna							
Antenna 1 or 2 gain:		5dBi					



2.3. Accessory Equipment Information

Equipment Information							
Name	Model	S/N	Manufacturer				
Notebook	X220	/	Lenovo				
Cable Information	Cable Information						
Name	Shielded Type	Ferrite Core	Length				
USB Cable	Unshielded	NO	150cm				
AC Cable	Unshielded	NO	120cm				
Test Software Information	Test Software Information						
Name	Software version	/	/				
QA Tool	0.0.1.88	/	/				

2.4. Operation State

Operation Frequency List:

	20MHz E	Bandwidth	40MHz Bandwidth		
Band (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
	36	5180	38	5400	
U-NII-1	40	5200	30	5190	
	44	5220	46	5230	
	48	5240	40		
	149	5745	151	5755	
	153	5765	151		
U-NII-3	157	5785			
	161	5805	159	5795	
	165	5825			

Test channel is below:

EN

Operating	Test	20)MHz	40MHz		
Band	Channel	Channel	Frequency (MHz)	Channel	Frequency (MHz)	
	CH_{L}	36	5180	38	5190	
U-NII-1	CH _M	40	5200	/	/	
	СН _Н	48	5240	46	5230	
	CH∟	149	5745	151	5755	
U-NII-3	CH _M	157	5785	/	/	
	CH _H	165	5825	159	5795	

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Data Rated

Preliminary tests were performed in different data rate, and found which the below bit rate is worst case mode, so only show data which it is a worst case mode.

Mode	Data rate (worst mode)
802.11a	6Mbps
802.11n(HT20)/ 802.11n(HT40)	HT-MCS0

Test mode

For RF test items

The engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions:

The EUT was set to connect with the WLAN AP under large package sizes transmission.

For Radiated spurious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data Recorded in the report.



Measurement Instruments List 2.5.

Tonscei	nd JS0806-2 Test syste	m			
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Rohde & Schwarz	FSU26	100105	Dec. 25, 2021
2	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	101331	Mar. 15, 2022
3	Spectrum Analyzer	KEYSIGHT	N9020A	100231	Dec. 25, 2021
4	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 25, 2021
5	Signal Generator	Agilent	E8257D	MY46521908	Dec. 25, 2021
6	Power Sensor	Agilent	U2021XA	MY5365004	Dec. 25, 2021
7	Power Sensor	Agilent	U2021XA	MY5365006	Dec. 25, 2021
8	Simultaneous Sampling DAQ	Agilent	U2531A	TW54493510	Dec. 25, 2021
9	Climate Chamber	TABAI	PR-4G	A8708055	Dec. 25, 2021
10	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	116410	Dec. 25, 2021
11	Climate Chamber	ESPEC	MT3065	/	Dec. 25, 2021
12	300328 v2.2.2 test system	TONSCEND	v2.6	/	/

Radiate	ed Emission and Transmi	tter spurious emissior	าร		
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	EMI Test Receiver	Rohde & Schwarz	ESCI	100658	Dec. 25, 2021
2	High pass filter	micro-tranics	HPM50111	142	Dec. 25, 2021
3	Log-Bicon Antenna	Schwarzbeck	CBL6141A	4180	Dec. 25, 2021
4	Ultra-Broadband Antenna	ShwarzBeck	BBHA9170	25841	Dec. 25, 2021
5	Loop Antenna	LAPLAC	RF300	9138	Dec. 25, 2021
6	Spectrum Analyzer	Rohde & Schwarz	FSU26	100105	Dec. 25, 2021
7	Horn Antenna	Schwarzbeck	BBHA 9120D	647	Dec. 25, 2021
8	Pre-Amplifier	HP	8447D	1937A03050	Dec. 25, 2021
9	Pre-Amplifier	EMCI	EMC051835	980075	Dec. 25, 2021
10	Antenna Mast	UC	UC3000	N/A	N/A
11	Turn Table	UC	UC3000	N/A	N/A
12	Cable Below 1GHz	Schwarzbeck	AK9515E	33155	Dec. 25, 2021
13	Cable Above 1GHz	Hubersuhner	SUCOFLEX 102	DA1580	Dec. 25, 2021
14	Splitter	Mini-Circuit	ZAPD-4	400059	Dec. 25, 2021
15	RF Connection Cable	HUBER+SUHNER	RE-7-FL	N/A	Dec. 25, 2021

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EB 中国国家认证认可监督管理委员会

1-2/F., Building 2, Jiaquan Building, Guanlan High-Tech Park, Shenzhen, Guangdong, China Tel.: (86)755-27521059 Fax: (86)755-27521011 Http://www.sz-ctc.org.cn 证认可监督管理委员会 For anti-fake verification, please visit the official website of Certification and Accreditation Administration of the People's Republic of China : yz.cnca.cn



16	RF Connection Cable	Chengdu E-Microwave			Dec. 25, 2021
17	High pass filter	Compliance Direction systems	BSU-6	34202	Dec. 25, 2021
18	Attenuator	Chengdu E-Microwave	EMCAXX-10 RNZ-3		Dec. 25, 2021
19	High and low temperature box	ESPEC	MT3065	12114019	Dec. 25, 2021

Conduc	Conducted Emission								
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until				
1	LISN	R&S	ENV216	101112	Dec. 25, 2021				
2	LISN	R&S	ENV216	101113	Dec. 25, 2021				
3	EMI Test Receiver	R&S	ESCI	100658	Dec. 25, 2021				

Note: 1. The Cal. Interval was one year.

2. The cable loss has calculated in test result which connection between each test instruments.



3. TEST ITEM AND RESULTS

3.1. Conducted Emission

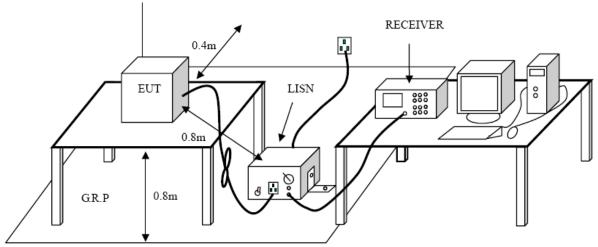
<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS – Gen 8.8:

	Limit (dBuV)				
Frequency range (MHz)	Quasi-peak	Average			
0.15-0.5	66 to 56*	56 to 46*			
0.5-5	56	46			
5-30	60	50			

* Decreases with the logarithm of the frequency.

Test Configuration



Test Procedure

- 1. The EUT was setup according to ANSI C63.10:2013 requirements.
- 2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
- 3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.

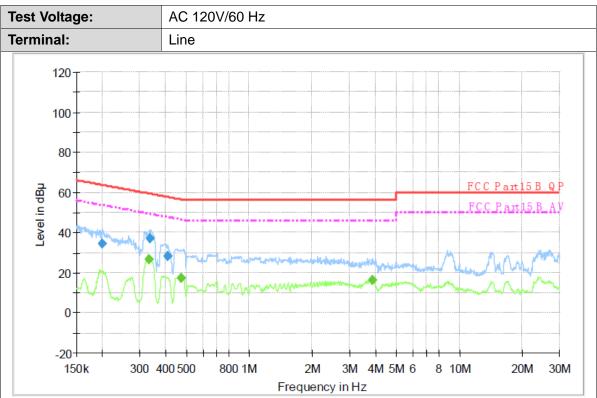
The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

- 4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
- 5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- 6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
- 7. During the above scans, the emissions were maximized by cable manipulation.

Test Mode

Please refer to the clause 2.4.





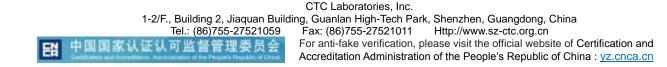
Final Measurement Detector 1

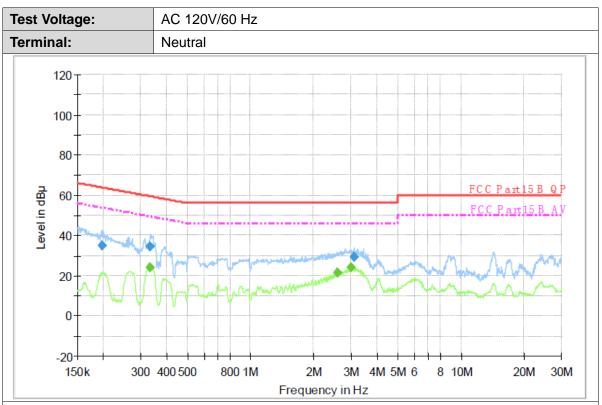
Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.199950	34.7	1000.00	9.000	On	L1	9.7	28.9	63.6	
0.335970	37.2	1000.00	9.000	On	L1	9.7	22.1	59.3	
0.410190	28.0	1000.00	9.000	On	L1	9.7	29.6	57.6	

Final Measurement Detector 2

Frequency (MHz)	Average (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.334630	26.6	1000.00	9.000	On	L1	9.7	22.7	49.3	
0.471700	17.6	1000.00	9.000	On	L1	9.7	28.9	46.5	
3.851240	16.4	1000.00	9.000	On	L1	9.7	29.6	46.0	

Emission Level= Read Level+ Correct Factor





Final Measurement Detector 1

	Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
ſ	0.197570	35.2	1000.00	9.000	On	Ν	10.0	28.5	63.7	
	0.334630	34.3	1000.00	9.000	On	Ν	10.0	25.0	59.3	
Ī	3.092050	29.3	1000.00	9.000	On	Ν	10.0	26.7	56.0	

Final Measurement Detector 2

	quency MHz)	Average (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.	333300	23.9	1000.00	9.000	On	Ν	10.0	25.5	49.4	
2	593960	21.4	1000.00	9.000	On	Ν	10.0	24.6	46.0	
3.	018860	24.0	1000.00	9.000	On	Ν	10.0	22.0	46.0	

Emission Level= Read Level+ Correct Factor



3.2. Radiated Emission

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS-Gen 8.9

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

	dB(uV/m) (a	at 3 meters)
Frequency (MHz)	Peak	Average
Above 1000	74	54

Note:

(1) The tighter limit applies at the band edges.

(2) Emission Level (dBuV/m)= 20log Emission Level (uV/m).

Limits of unwanted emission out of the restricted bands FCC CFR Title 47 Part 15 Subpart C Section 15.407(b)/ RSS-247 6.2.1.2 & RSS-247 6.2.4.2

Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)				
5150~5250	-27	68.2				
5250~5350	-27	68.2				
5470~5725	-27	68.2				
	-27(Note 2)	68.2				
E705 5005	10(Note 2)	105.2				
5725~5825	15.6(Note 2)	110.8				
	27(Note 2)	122.2				

Note: 1. The following formula is used to convert the equipment isotropic radiated power (eirp) to field

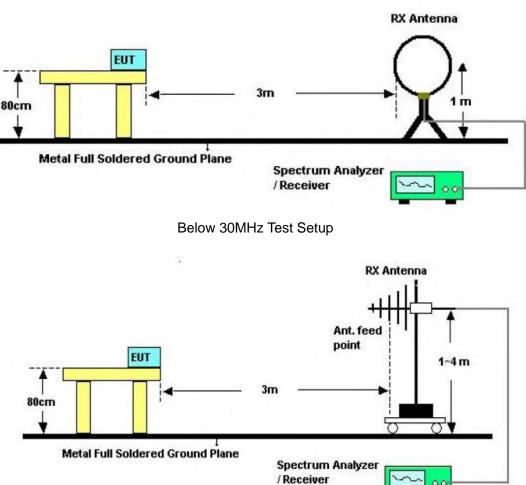
 $\frac{1000000\sqrt{30P}}{2}$ uV/m, where P is the eirp (Watts) strength: E=

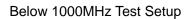
2. According to FCC 16-24, All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

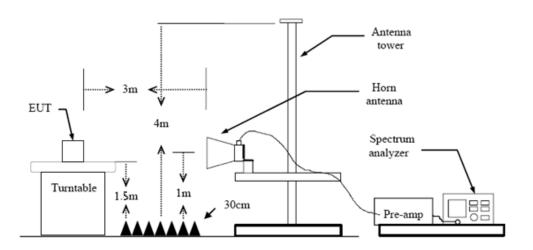
CTC Laboratories, Inc.











Above 1GHz Test Setup

Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013
- 2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.



- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
- 4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
- 5. Set to the maximum power setting and enable the EUT transmit continuously.
- 6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(3) From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW \ge 1/T Peak detector for Average value.

Note 1: For the 1/T& Duty Cycle please refer to clause Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Result

9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Pre-scan all antenna, only show the test data for worse case antenna on the test report.



Ant	No.:				Ant	1										
Ant.	Pol.				Hori	lorizontal										
Test	t Mod	le:			802	302.11a Mode 5180MHz (U-NII-1)										
Rem	nark:				Only	y w	ors	e ca	ase is report	ed						
90.0	dBu¥	/m														
80 -																
70 -																
60 -											FCC Part	15 RE-Cla	iss B 3	:0-1000M	4	
50 -						_	_				Margin -6	dB				
40 -						_						5		5	6 X	
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1	1	53	9267	,		42	.07		-14.97	27.10	40	.00	-12	2.90	C	P

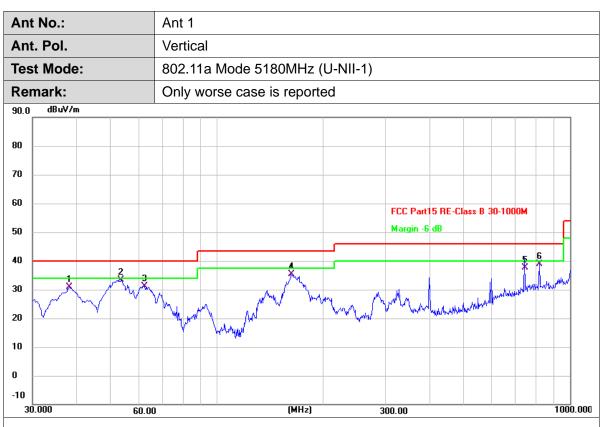
No.	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	53.9267	42.07	-14.97	27.10	40.00	-12.90	QP
2	61.0400	41.18	-15.49	25.69	40.00	-14.31	QP
3	177.1167	50.60	-15.79	34.81	43.50	-8.69	QP
4	200.0733	51.21	-17.89	33.32	43.50	-10.18	QP
5	399.8933	50.19	-11.85	38.34	46.00	-7.66	QP
6 *	742.6267	44.63	-3.93	40.70	46.00	-5.30	QP
-							

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value





No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.0833	45.39	-14.62	30.77	40.00	-9.23	QP
2 *	53.6033	48.32	-14.93	33.39	40.00	-6.61	QP
3	62.3333	46.94	-15.69	31.25	40.00	-8.75	QP
4	162.5667	50.04	-14.58	35.46	43.50	-8.04	QP
5	742.6267	41.53	-3.93	37.60	46.00	-8.40	QP
6	821.5200	41.38	-2.58	38.80	46.00	-7.20	QP

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value



Ant No.:	Ant 1
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11a Mode 5180MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1	10359.540	40.50	14.96	55.46	74.00	-18.54	peak
2 *	10361.780	28.52	14.96	43.48	54.00	-10.52	AVG

Remarks:



Ant No.:	Ant 1
Ant. Pol.:	Vertical
Test Mode:	TX 802.11a Mode 5180MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	10360.036	28.06	14.96	43.02	54.00	-10.98	AVG
2	10360.428	40.73	14.95	55.68	74.00	-18.32	peak

Remarks:



Ant No.:	Ant 1
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11a Mode 5200MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)		Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10397.890	39.39	15.02	54.41	74.00	-19.59	peak
2 *	10399.230	27.29	15.02	42.31	54.00	-11.69	AVG

Remarks:



Ant No.:	Ant 1
Ant. Pol.:	Vertical
Test Mode:	TX 802.11a Mode 5200MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)		Level (dBuV/m)	Limit (dBuV/m)		Detector
1	10399.446	37.73	15.02	52.75	74.00	-21.25	peak
2 *	10400.808	25.97	15.02	40.99	54.00	-13.01	AVG

Remarks:



Ant No.:	Ant 1
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11a Mode 5240MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

	No.	Frequency (MHz)	Reading (dBuV)		Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	10480.440	38.99	15.13	54.12	74.00	-19.88	peak
Ī	2 *	10482.070	26.37	15.13	41.50	54.00	-12.50	AVG

Remarks:



Ant No.:	Ant 1
Ant. Pol.:	Vertical
Test Mode:	TX 802.11a Mode 5240MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)		Level (dBuV/m)		Margin (dB)	Detector
1	10479.598	38.93	15.13	54.06	74.00	-19.94	peak
2 *	10479.912	25.86	15.13	40.99	54.00	-13.01	AVG

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11n(HT20) Mode 5180MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	10359.844	28.05	14.96	43.01	54.00	-10.99	AVG
2	10360.564	39.29	14.95	54.24	74.00	-19.76	peak

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Vertical
Test Mode:	TX 802.11n(HT20) Mode 5180MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1 *	10360.226	28.04	14.96	43.00	54.00	-11.00	AVG
2	10360.842	40.35	14.96	55.31	74.00	-18.69	peak

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11n(HT20) Mode 5200MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1	10399.326	38.48	15.02	53.50	74.00	-20.50	peak
2 *	10399.398	26.08	15.02	41.10	54.00	-12.90	AVG

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Vertical
Test Mode:	TX 802.11n(HT20) Mode 5200MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10399.022	38.20	15.02	53.22	74.00	-20.78	peak
2 *	10400.480	25.95	15.02	40.97	54.00	-13.03	AVG

Remarks:



Ant No.:	Ant 1 + Ant 2		
Ant. Pol.:	Horizontal		
Test Mode: TX 802.11n(HT20) Mode 5240MHz (U-NII-1)			
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)		Level (dBuV/m)		Margin (dB)	Detector
1 *	10479.154	26.05	15.13	41.18	54.00	-12.82	AVG
2	10480.046	38.36	15.13	53.49	74.00	-20.51	peak

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Vertical
Test Mode:	TX 802.11n(HT20) Mode 5240MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10479.484	38.12	15.13	53.25	74.00	-20.75	peak
2 *	10480.886	26.12	15.13	41.25	54.00	-12.75	AVG

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11n(HT40) Mode 5190MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	10379.704	38.85	14.99	53.84	74.00	-20.16	peak
2 *	10380.612	26.54	14.99	41.53	54.00	-12.47	AVG

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Vertical
Test Mode:	TX 802.11n(HT40) Mode 5190MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1	10379.374	38.32	14.99	53.31	74.00	-20.69	peak
2 *	10379.962	26.35	14.99	41.34	54.00	-12.66	AVG

Remarks:



Ant No.:	Ant 1 + Ant 2		
Ant. Pol.:	Horizontal		
Test Mode: TX 802.11n(HT40) Mode 5230MHz (U-NII-1)			
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Frequency (MHz)	Reading (dBuV)		Level (dBuV/m)	Limit (dBuV/m)		Detector
1 *	10459.290	25.83	15.10	40.93	54.00	-13.07	AVG
2	10460.306	37.97	15.10	53.07	74.00	-20.93	peak

Remarks:



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Vertical
Test Mode:	TX 802.11n(HT40) Mode 5230MHz (U-NII-1)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)		Level (dBuV/m)		Margin (dB)	Detector
1	10459.624	38.52	15.10	53.62	74.00	-20.38	peak
2 *	10459.704	25.84	15.10	40.94	54.00	-13.06	AVG

Remarks:



Ant No.:			Ant 1						
Ant. Pol.:			Horizontal						
Test Mode:			TX 802.11a Mode 5745MHz (U-NII-3)						
Remark:			No report for the emission which more than 20 dB below the prescribed limit.						
									_
	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)		Limit (dBuV/m)	Margin (dB)	Detector	

1	11489.614	38.10	16.27	54.37	74.00	-19.63	peak
2 *	11490.160	26.44	16.27	42.71	54.00	-11.29	AVG
					_		
Remarks							

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value



Ant No.:	Ant 1
Ant. Pol.:	Vertical
Test Mode:	TX 802.11a Mode 5745MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)			Detector
1 *	11489.572	26.37	16.27	42.64	54.00	-11.36	AVG
2	11490.964	38.53	16.27	54.80	74.00	-19.20	peak

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor



Ant No.:		Ant 1	Ant 1						
Ant. Pol.	.:	Horizontal							
Test Mo	de:	TX 802.11a Mode 5785MHz (U-NII-3)							
Remark:							е		
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1 *	11569.446	26.30	16.35	42.65	54.00	-11.35	AVG		
2	11570.542	38.21	16.35	54.56	74.00	-19.44	peak		
	: (dB/m) = Anter value = Level	· ·	3/m)+Cable I	Factor (dB)-F	Pre-amplifier	Factor			



Ant No.:	Ant No.: Ant 1							
Ant. Pol.	.:	Vertical						
Test Mo	de:	TX 802.11a Mode 5785MHz (U-NII-3)						
Remark: No report for the emission which more than 20 dB below the prescribed limit.					е			
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBu\//m)	Limit (dBuV/m)	Margin (dB)	Detector	
1 *	11570.144		16.35	42.53	54.00	-11.47	AVG	
2	11570.462	38.23	16.35	54.58	74.00	-19.42	peak	
	:: (dB/m) = Anter value = Level	•	/m)+Cable F	Factor (dB)-F	Pre-amplifier	Factor		



Ant No.: Ant 1							
Ant. Pol.: Horizontal							
lest Mo	Mode: TX 802.11a Mode 5825MHz (U-NII-3)						
Remark		No report for prescribed lin		n which more	e than 20 dB	below the	e
No	Frequency	Reading	Factor	Level	Limit	Margin	Detector
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)		-	Detector
No. 1						-	Detector peak



Ant No.:	Ant 1
Ant. Pol.:	Vertical
Test Mode:	TX 802.11a Mode 5825MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	11649.502	37.90	16.43	54.33	74.00	-19.67	peak
2 *	11650.300	26.17	16.44	42.61	54.00	-11.39	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11n(HT20) Mode 5745MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1 *	11489.244	26.27	16.27	42.54	54.00	-11.46	AVG
2	11489.938	38.23	16.27	54.50	74.00	-19.50	peak



Ant No.: Ant 1 + Ant 2								
nt. Po	l.:	Vertical						
est Mc	ode:	TX 802.11n(HT20) Mode 5745MHz (U-NII-3)						
Remark	::	No report for prescribed lin		n which more	e than 20 dB	below th	е	
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
No. 1 *						-	Detector AVG	

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11n(HT20) Mode 5785MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	11569.118	38.45	16.35	54.80	74.00	-19.20	peak
2 *	11570.432	26.09	16.35	42.44	54.00	-11.56	AVG



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Vertical
Test Mode:	TX 802.11n(HT20) Mode 5785MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	11569.190	26.27	16.35	42.62	54.00	-11.38	AVG
2	11570.592	38.23	16.35	54.58	74.00	-19.42	peak

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11n(HT20) Mode 5825MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	11649.336	26.25	16.43	42.68	54.00	-11.32	AVG
2	11650.092	38.31	16.44	54.75	74.00	-19.25	peak



Ant No.:		Ant 1 + Ant 2						
Ant. Pol.	.:	Vertical						
Test Mod	de:	TX 802.11n(H	HT20) Mode	5825MHz (L	J-NII-3)			
Remark:		No report for prescribed lin		n which more	e than 20 dB	below th	е	
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
No.		· · · ·				-	Detector AVG	

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor



Ant No.:	Ant 1 + Ant 2			
Ant. Pol.:	Horizontal			
Test Mode: TX 802.11n(HT40) Mode 5755MHz (U-NII-3)				
Remark:	No report for the emission which more than 20 dB below the prescribed limit.			

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1	11509.824	38.52	16.28	54.80	74.00	-19.20	peak
2 *	11510.532	26.06	16.28	42.34	54.00	-11.66	AVG



Α	nt No.:		Ant 1 + Ant 2					
Ant. Pol.: Vertical								
T	est Mod	de:	TX 802.11n(H	IT40) Mode	5755MHz (L	J-NII-3)		
Remark:			No report for prescribed lim		n which more	e than 20 dB	below th	e
	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1 *	11509.602	26.23	16.28	42.51	54.00	-11.49	AVG
	2	11510.508	38.20	16.28	54.48	74.00	-19.52	peak
1		: (dB/m) = Anter value = Level	•	/m)+Cable I	Factor (dB)-F	Pre-amplifier	Factor	



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11n(HT40) Mode 5795MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)			Detector
1	11590.240	37.76	16.37	54.13	74.00	-19.87	peak
2 *	11590.536	26.17	16.37	42.54	54.00	-11.46	AVG



Ant No.:	Ant 1 + Ant 2
Ant. Pol.:	Vertical
Test Mode:	TX 802.11n(HT40) Mode 5795MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBu∀)		Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	11589.242	38.18	16.37	54.55	74.00	-19.45	peak
2 *	11590.022	25.99	16.37	42.36	54.00	-11.64	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor



3.3. Band Edge Emissions

Limit

Limits of unwanted emission out of the restricted bands

FCC CFR Title 47 Part 15 Subpart C Section 15.407(b)/ RSS-247 6.2.1.2 & RSS-247 6.2.4.2

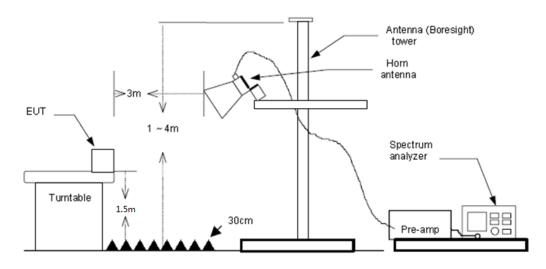
Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5150~5250	-27	68.2
5250~5350	-27	68.2
5470~5725	-27	68.2
	-27(Note 2)	68.2
5725~5825	10(Note 2)	105.2
5725~5625	15.6(Note 2)	110.8
	27(Note 2)	122.2

Note: 1. The following formula is used to convert the equipment isotropic radiated power (eirp) to field $1000000 \sqrt{20 p}$

strength:
$$E = \frac{1000000\sqrt{30P}}{2}$$
 uV/m, where P is the eirp (Watts)

2. According to FCC 16-24, All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

Test Configuration



Test Procedure

- 1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
- The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 2. degrees to determine the position of the maximum emission level.
- The EUT was positioned such that the distance from antenna to the EUT was 3 meters. 3.
- 4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

CTC Laboratories, Inc.





The receiver set as follow: 5.

RBW=1MHz, VBW=3MHz PEAK detector for Peak value. RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause Appendix E: Duty Cycle

Test Mode

Please refer to the clause 2.4.

Test Results

Pre-scan all antenna, only show the test data for worse case antenna on the test report.

Ant	No.:			Ant 1										
Ant	. Pol.	:		Horiz	ontal									
	t Moc	le:				Mode 51								
Ren	nark:				eport for cribed lir	the emi nit.	ssio	n whic	h more	e than 2	20 dB	below	/ the	
120.0 Г	dBuV	7m			1									
110														
100														
90												(~~	-
80										FCC F	art15 C	- Above '	1G PK	
70														
60										FCC F		and and		
50										X		- Above		
40		ha san that a san that have a s						terror Materia		2	ed a			
30														
20														
10														
0.0			5030 5								5100		175.50	
504	40.500	5055.50	5070.5	0 508	5.50 5	100.50	(MHz)	513	0.50	5145.50	5160	1.50 5	175.50	5190.50
N	lo.	Frequ (MI	-		ading BuV)	Fact (dB/r			vel V/m)	Lim (dBu\		Marg (dB		Detector
	1	5150	.000	1	4.22	37.1	5	51	.37	74.0	00	-22.6	3	peak
2	<u>*</u>	5150	.000	3	3.21	37.1	5	40	.36	54.0	00	-13.6	64	AVG
1.Fa						3/m)+Ca	ble l	Factor	(dB)-F	Pre-amp	olifier	Facto	r	

Tel.: (86)755-27521059 可监督管理委员会 中国国家认证



		Ant 1											
Ant. Pol.	:	Vertic	al										
est Moc	de:	TX 80)2.11a N	/lode 518	юM	Hz (U	-NII-1)						
Remark:			port for ribed lin	the emis nit.	sior	n whic	h more	e tha	n 20 d	B belo	ow th	е	
20.0 dBuV	//m												
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0.0 5041.250	5056.25 5071.3	25 500	6.25 51	01.25 (M	IHz)	E1 2	1.25	5146.2	5 51	61.25	5176.	<u> 25 E.</u>	191.3
No.	Frequency (MHz)		eading BuV)	Facto (dB/m			vel V/m)		imit uV/m		rgin B)	Deteo	:tor
1	5150.000	1	7.44	37.15	5	54	.59	74	4.00	-19	.41	pea	ık
2 *	5150.000	3	3.53	37.15	5	40	.68	54	4.00	-13	.32	AV	G



nt No.:	:		Ant ²									
nt. Pol	l.:		Horiz	zontal								
est Mo	de:		TX 8	02.11a	Mode 5	240M	Hz (U	-NII-1)				
emark	:			eport fo	or the en limit.	nissior	n whic	h more	e than	20 dE	B below 1	the
20.0 dBu	V/m	1			1				1			
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).0 5228.750	5243.75	5258.7	75 52	73.75	5288.75	(MHz)	531	8.75	5333.75	5348	3.75 536	53.75 5 378
No.	Frequ	uency Hz)	Re	eading IBuV)		ctor	Le	vel	Lin (dBu)	nit	Margir	
1	5350	0.000	1	5.72	37.	41	53.	.13	74.	00	-20.87	7 peak
2 *	5350	0.000		3.29	37.	41	40.	.70	54.	00	-13.30	AVG
-				0.20	07.	71	-0.		04.		-10.00	



nt No.:	:		Ant 1									
nt. Pol	.:		Vertio	cal								
est Mo	de:		TX 8	02.11a I	Mode 524	0MI	Hz (U∙	·NII-1)				
emark	:			eport for cribed lin	the emis nit.	sion	whicl	h more	e than 20	dB b	elow tł	he
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5229.500	5244.50	5259.	50 527	74.50 5	289.50 (M	Hz)	531	9.50	5334.50	5349.50	5364	1.50 537
No.	1	quenc <u>y</u> 1Hz)		eading IBuV)	Facto (dB/m		Le (dBu	vel V/m)	Limit (dBuV/r		/largin (dB)	Detecto
1	535	0.000	1	6.76	37.41		54.	.17	74.00) -	19.83	peak
2 *	535	0.000		3.43	37.41		40.	.84	54.00) -	13.16	AVG



nt No.:			Ant 1 +	Ant 2										
nt. Pol	l.:		Horizor	ntal										
est Mo	de:	-	TX 802	.11n(H	IT20) M	ode	5180N	/Hz (L	J-NII-1])				
Remark	:		No repo prescril		the emis nit.	ssior	ר whic	h more	e than :	20 dB	belc	ow th	е	
20.0 dBu	V/m													٦
10														
00														
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									FCC	Part15 C	- Abov	e 16 P	К	
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o						_								-
0.0 5041.250	5056.25	5071.25	5086.2	ю Б1	01.25 (í	MHz)	512	1.25	5146.25	5161	25	5176.2	25 51	91.2
No.		uency Hz)	Rea (dB	-	Fact (dB/n			vel V/m)	Lin (dBu'			rgin B)	Detec	tor
1	5150	000.	17.	79	37.1	5	54	.94	74.	00	-19	.06	pea	k
2 *	5150	000.0	4.(03	37.1	5	41	.18	54.	00	-12	.82	AVG	3
Remarks														



Ant. Pol.: Fest Mode: Remark: 20.0 dBuV/m 10 10 10 10 10 10 10 10 10 10		No re)2.11n(H				than 20 dE	3 below th	'K
Remark: 20.0 dBuV/m 10 00 00 00 00 00 00 00 00 00		No re	port for	the emissi			FCC Part15	C - Above 1G P	'K
20.0 dBuV/m 10 00 00 00 00 00 00 00 00 00					on whic	ch more	FCC Part15	C - Above 1G P	'K
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n									
0.0 5042.750 5057	.75 5072.7	<i>'</i> 5 508	7.75 51	02.75 (MH	2) 51:	32.75 51	147.75 516	2.75 5177.	75 5192.7
	equency (MHz)		ading BuV)	Factor (dB/m)		vel iV/m) (Limit (dBuV/m)	Margin (dB)	Detector
1 5	150.000	14	4.21	37.15	51	.36	74.00	-22.64	peak
2 * 5	150.000	3	3.86	37.15	41	.01	54.00	-12.99	AVG
Remarks:		·							



nt No.:		Ant 1 +	- Ant 2									
nt. Pol	.:	Horizo	ntal									
est Mo	de:	TX 802	2.11n(H	IT20) Mo	de	5240N	/Hz (L	J-NII-1)			
emark	:	No rep prescri		the emiss nit.	sion	whic	h more	e than	20 dl	3 below 1	the	
20.0 dBu ¹	V/m											
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								FCC	Part15	C - Above 16	PK	
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I												
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).0 5229.500	5244.50 5259.	50 5274.	50 50	B9.50 (MI			9.50	5334.50		9.50 536	64.50	5379.
No.	Frequenc (MHz)		ding uV)	Facto (dB/m		Le (dBu	vel V/m)		mit ıV/m	Margi (dB)	n _D	etector
1	5350.000	14	.46	37.41		51	.87	74	.00	-22.13	3	peak
2 *	5350.000	3.	99	37.41		41	.40	54	.00	-12.60	ם כ	AVG
Remarks	<u>.</u>											



Ant No.	:	ļ	Ant 1 +	Ant 2									
Ant. Po	l.:	\	/ertica	I									
Test Mo	de:		FX 802										
Remark	:		No repo prescril			missio	n whic	h more	e than	20 dB	below t	he	
20.0 dBu	W/m							1					_
10													
00													
יייק נ	my												_
)									FCC	Part15 C	- Above 16	PK	_
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5228.750	5243.75 52	58.75	5273.7	75 52	288.75	(MHz)	531	8.75	5333.75	5348.	.75 536	3.75	5378.7
No.	Frequen (MHz)	-	1	ding uV)	1	ictor 3/m)		vel iV/m)	Lir (dBu	nit V/m)	Margi (dB)	n _{Det}	ector
1	5350.00	0	13.	.87	37	.41	51	.28	74	.00	-22.72	2 pe	eak
2 *	5350.00	0	4.	12	37	.41	41	.53	54	.00	-12.4	7 A'	VG
	s: (dB/m) = Ar value = Lev				3/m)+(Cable I	actor	(dB)-F	Pre-am	plifier	Factor		



Ant No.:		A	Ant 1 + Ant	2				
Ant. Pol.	:	ŀ	Iorizontal					
Fest Mod	le:	Г	X 802.11n	(HT40) Mode	5190MHz (L	J-NII-1)		
Remark:			No report fo prescribed li	r the emission imit.	n which more	e than 20 dB	below the	e
120.0 dBuV	/m							
10								
00								
0								
80						FCC Part15 C	About 16 P	
70 							- ADOVE TO F	
50					1 X			
50					Ž	EPC Part15 C	- Above 1G A	<u>v</u>
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20								
IO								
0.0								
5030.700	5048.70	5066.70	5084.70	5102.70 (MHz)	5138.70	5156.70 5174.	.70 5192.3	70 5210.7
No.	Frequ (MF		Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	5150.	.000	27.23	37.15	64.38	74.00	-9.62	peak
1	5150	000	12.69	37.15	49.84	54.00	-4.16	AVG



nt No.	:	Ant 2	1 + Ant 2						
nt. Po	l.:	Verti	cal						
est Mo	de:	TX 8	02.11n(H	HT40) Mod	e 5190l	MHz (U	-NII-1)		
Remark	:		eport for cribed lin	the emissi nit.	on whic	h more	than 20	dB below	the
20.0 dBu	W/m								
10									
00									
o									
0							FCC Parl	15 C - Above	G PK
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0.0 5030.700	5048.70 506	6.70 50	84.70 51	02.70 (MH:	0 513	38.70	5156.70	5174.70 5	192.70 5210.7
No.	Frequence (MHz)	(0	eading dBuV)	Factor (dB/m)	(dBu		Limit (dBuV/	m) (dB)
1	5150.00	0 1	17.50	37.15	54	.65	74.00) -19.3	35 peak
2 *	5150.00	0	5.07	37.15	42	.22	54.00) -11.7	78 AVG
_									



nt No.:		A	Ant 1 +	- Ant 2									
nt. Pol	:	ŀ	Horizo	ntal									
est Mo	de:	٦	TX 802	2.11n(F	HT40) Mo	bde	5230N	/Hz (L	J-NII-1)				
emark:	1			ort for bed lin	the emis nit.	sior	ו whic	h more	e than 2	0 dE	below t	he	
20.0 dBu\	//m				1								
10													
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	V												
									FCC P	art15 C	: - Above 1G	РК	
			and the second s	n.					FCC P	art15 C	- Above 1G	AV	
				Marken B	man and the second		Anna an	aka		ş	And the same same		

) 1.0													
5209.300	5227.30 5	5245.30	5263.	30 52	81.30 (M	(Hz)	531	7.30	5335.30	5353	3.30 537	1.30 5	389.3
No.	Freque (MHz	-	1	iding suV)	Facto (dB/m		Le ^r (dBu		Lim (dBu∀		Margir (dB)	n _{Detec}	ctor
1	5350.0	000	16	.68	37.41	1	54.	.09	74.0	0	-19.91	l pea	ak
2 *	5350.0	000	4.	07	37.41	1	41	.48	54.0	0	-12.52	2 AV	G



nt No.:		A	Ant 1 + Ar	nt 2								
nt. Pol	.:	١	/ertical									
est Mo	de:		TX 802.11n(HT40) Mode 5230MHz (U-NII-1)									
emark	:		No report for the emission which more than 20 dB below the prescribed limit.							he		
20.0 dBu	V/m				i			1				
0												
0												
	$\neg \gamma \neg$	\sim										
								FCC F	'art15 C	- Above 1G	РК	-
		- La						FCC P	art15 C X	- Above 1G	AV	-
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,).0												
5209.300	5227.30	5245.30	5263.30	5281.30	(MHz)	531	7.30	5335.30	5353	.30 537	1.30 53	89.3
No.	Freque (MH	-	Readir (dBu∖		actor B/m)		vel V/m)	Lim (dBu\		Margi (dB)	n _{Detec}	tor
1	5350.	000	14.01	3	37.41	51	.42	74.	00	-22.58	3 pea	k
2 *	5350.	000	3.39	3	37.41	40	.80	54.	00	-13.20) AVO	3



Ant No.:		Ant 1					
Ant. Pol.:	:	Horizontal					
Test Mod	e:	TX 802.11a M	Node 5745M	Hz (U-NII-3)			
Remark:		No report for prescribed lir		n which more	e than 20 dB	below th	е
120.0 dBuV/	/m						
110		\int					
100		processing					
90							
80							
70		1	WW		FCC Par	t15.407 U-NII	3
					Margin -		
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0.0 5650.000	5677.50 5705.0	0 5732.50 5	760.00 (MHz)	5815.00	5842.50 5870.	00 5897.	50 5925.00
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	35.23	38.07	73.30	122.20	-48.90	peak
		nna Factor (dE	3/m)+Cable F	Factor (dB)-F	Pre-amplifier	Factor	

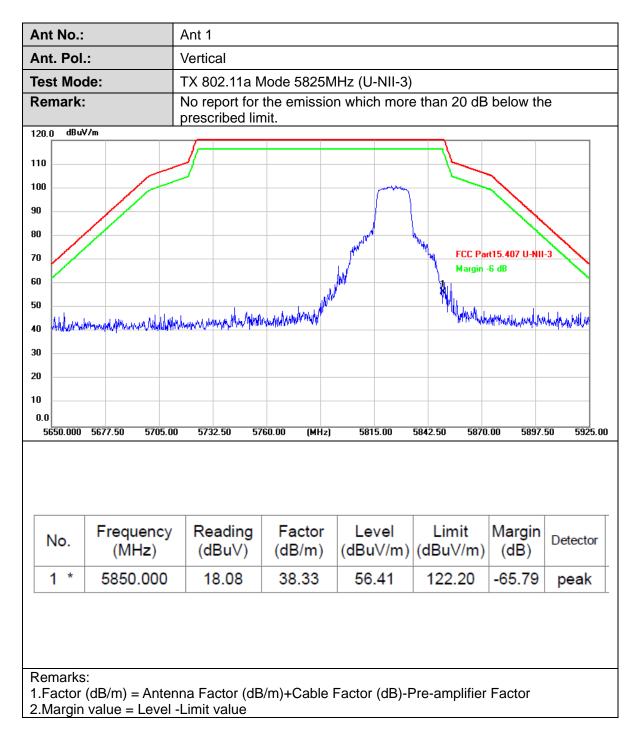


Ant No.:		Ant 1					
Ant. Pol.	:	Vertical					
Test Mod	de:	TX 802.11a N	/lode 5745M	Hz (U-NII-3)			
Remark:		No report for prescribed lir		n which more	e than 20 dB	below th	е
120.0 dBuV	//m						
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		al l			FCC Par	t15.407 U-NII	3
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0.0 5650.000	5677.50 5705.0	0 5732.50 57	760.00 (MHz)	5815.00	5842.50 5870	.00 5897.	50 5925.00
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	23.84	38.07	61.91	122.20	-60.29	peak
		nna Factor (dE	3/m)+Cable I	Factor (dB)-F	Pre-amplifier	Factor	



Ant No.:	Ant 1
Ant. Pol.:	Horizontal
Test Mode:	TX 802.11a Mode 5825MHz (U-NII-3)
Remark:	No report for the emission which more than 20 dB below the
120.0 dBuV/m	prescribed limit.
110	
100	
90	
80	
70	FCC Part15.407 U-NII-3 Margin -6 dB
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5650.000 5677.50 5705.00) 5732.50 5760.00 (MHz) 5815.00 5842.50 5870.00 5897.50 5925.00
No. Frequency	Reading Factor Level Limit Margin
(MHz)	(dBuV) (dB/m) (dBuV/m) (dBuV/m) (dB)
1 * 5850.000	15.76 38.33 54.09 122.20 -68.11 peak
Remarks: 1.Factor (dB/m) = Anter 2.Margin value = Level	nna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor







Ant No.:		Ant 1 + Ant 2					
Ant. Pol.	:	Horizontal					
Test Mod	le:	TX 802.11n(H	HT20) Mode	5745MHz (L	J-NII-3)		
Remark:		No report for		n which more	e than 20 dB	below th	е
120.0 dBuV	/m	prescribed lin	nit.				
110							
100		Munimum					
90							
80		*	N				
70		, ar	N.		FCC Par Margin -	t15.407 U-NII 6 dB	-3
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40 Approx	Maran Alla Marat, JAata, A. D. a		a dude dia	whadkhalk water while	Anish all and a share where the	MWWWWWWWWW	rmanningn
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5650.000	5677.50 5705.0	0 5732.50 57	'60.00 (MHz)	5815.00	5842.50 5870.	.00 5897.	50 5925.00
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	36.38	38.07	74.45	122.20	-47.75	peak
		nna Factor (dB	3/m)+Cable F	Factor (dB)-F	Pre-amplifier	Factor	



Ant No.:		Ant 1 + Ant 2					
Ant. Pol	.:	Vertical					
Test Mo	de:	TX 802.11n(ł	HT20) Mode	5745MHz (L	I-NII-3)		
Remark	:	No report for prescribed lir		n which more	e than 20 dB	below the	e
120.0 dBu	V/m						
110		\mathcal{I}					
100							
90		m				\sim	
80							
70					FCC Par	15.407 U-NII	3
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		M.					
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0.0 5650.000	5677.50 5705.	00 5732.50 57	760.00 (MHz)	5815.00	5842.50 5870.	00 5897.	50 5925.00
No.	Frequency (MHz)	v Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5725.000	22.89	38.07	60.96	122.20	-61.24	peak



Ant No.:		Ant 1 + Ant 2	
Ant. Pol.:		Horizontal	
Test Mod	e:	TX 802.11n(HT20) Mode 5825MHz (U-N	
Remark:		No report for the emission which more the prescribed limit.	an 20 dB below the
120.0 dBuV/	'n		
110			
100		manung	
90			
80			
		Jun have	FCC Part15.407 U-NII-3
70			Margin -6 dB
60			a1.
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10			
0.0 5650.000	5677.50 5705.0	5732.50 5760.00 (MHz) 5815.00 584	2.50 5870.00 5897.50 5925.00
No.	Frequency (MHz)	Reading (dBuV)Factor (dB/m)Level (dBuV/m)	Limit Margin IBuV/m) (dB) Detector
1 *	5850.000	10.85 38.33 49.18	122.20 -73.02 peak
		na Factor (dB/m)+Cable Factor (dB)-Pre	-amplifier Factor



	:	Ant 1 + Ant	2				
Ant. Pol	.:	Vertical					
Test Mo	de:	TX 802.11n	(HT20) Mode	5825MHz (L	J-NII-3)		
Remark	:	No report fo prescribed I	or the emission imit.	n which more	e than 20 dB	below the	e
120.0 dBu	V/m						
110							
100				whether			
90							
80							
70				ball	FCC Par	t15.407 U-NII-	3
				Merrie	Margin -		
60				ſ	<u>)</u>		
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30							
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0.0	E077 E0 E70E	0 5722 50	5760.00 (MHz)	F01F 00	5842.50 5870.	00 5897.5	50 5925.00
5650.000	5677.50 5705.0	00 5732.50	5700.00 (M112)	5815.00			000000
5650.000 No.	Frequency (MHz)			Level	Limit (dBuV/m)	Margin (dB)	Detector
	Frequency	/ Reading	Factor	Level	Limit		



Ant No.:		Ant 1 + Ant 2						
Ant. Pol.	.:	Horizontal	Horizontal					
Test Mod	de:	TX 802.11n(H	HT40) Mode	5755MHz (L	J-NII-3)			
Remark:	1	No report for		n which more	e than 20 dB	below th	е	
120.0 dBu\	//m	prescribed lin	nit.					
		1						
110						`		
100		minney	money					
90								
80		1.4						
70		Wardenson	WWW AN			t15.407 U-NII	-3	
60	/	W° 1	Manungh	Wwg	Margin -	6 dB		
50	WIN			M				
40	ternil shall when a man when a			ruber the line for the	Andred Henderic Andre		n/when a line	
30								
20								
10								
0.0 5650.000	5677.50 5705.	00 5732.50 57	/60.00 (MHz)	5815.00	5842.50 5870.	00 5897.	50 5925.00	
No.	Frequency (MHz)	/ Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1 *	5725.000	34.99	38.07	73.06	122.20	-49.14	peak	
Remarks		nna Factor (dE	3/m)+Cable F	Factor (dB)-F	Pre-amplifier	Factor		



Ant No.:		Ant 1 + Ant 2					
Ant. Pol.:		Vertical					
Test Mode:		TX 802.11n(HT40) Mode	5755MHz (U	-NII-3)		
Remark:		No report for prescribed li	r the emissior mit.	n which more	than 20 dB	below th	e
120.0 dBu¥/m							
110							
100							
90		manuel	market			\sim	
80							
70					FCC Par	t15.407 U-NII	.3
60		www.sauth	manager		Margin -	6 dB	
	₩4	KHAPPER AND					
40 humphmilling	while with			MANINA MANA ANA ANA	Manufananaphan	a strugtling allowed	with had allow
30							
20							
10							
0.0 5650.000 5677.9	50 5705.0	0 5732.50 5	5760.00 (MHz)	5815.00	5842.50 5870.	00 5897.	50 5925.00
	equency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
INO. (-					Detector peak



Ant No.:		Ant 1 + Ant 2					
Ant. Pol	.:	Horizontal					
Test Mo	de:	TX 802.11n(ł	HT40) Mode	5795MHz (L	J-NII-3)		
Remark:	:	No report for prescribed lir		n which more	e than 20 dB	below th	е
120.0 dBu\	V/m						
110							
100			phina	man			
90							
80							
70			www.www.we.kow		FCC Pa	t15.407 U-NII	-3
60		Johnson	porterand	"WANN	Margin ·	6 dB	
		<i>IIIIIIIIIIIII</i>					
	1441Narihola/rowshilaroonal-endideree	hand the second s			FCC Par Margin	MAN WANT	Merdenth althought when
30							
20							
10							
0.0 5650.000	5677.50 5705.0	0 5732.50 57	760.00 (MHz)	5815.00	5842.50 5870	.00 5897.	50 5925.00
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	5850.000	14.80	38.33	53.13	122.20	-69.07	peak
	s: (dB/m) = Ante value = Level		3/m)+Cable I	Factor (dB)-F	Pre-amplifier	Factor	



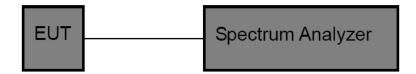


3.4. Bandwidth Test

<u>Limit</u>

FCC Part 15 Subpart C(15.407)/ RSS-247						
Test Item	Limit	Frequency Range (MHz)				
		5150~5250				
26 dB Bandwidth	N/A	5250~5350				
		5500~5700				
6 dB Bandwidth	>500kHz	5725~5850				

Test Configuration



Test Procedure

EN

Please refer to According to KDB789033 D02, for the measurement methods.

The setting of the spectrum analyser as below:

26dB Bandwidth Test			
Spectrum Parameters	Setting		
Attenuation	Auto		
Span	>26 dB Bandwidth		
RBW	Approximately 1% of the emission bandwidth		
VBW	VBW>RBW		
Detector	Peak		
Trace	Max Hold		
Sweep Time	Auto		



6dB Bandwidth Test				
Spectrum Parameters	Setting			
Attenuation	Auto			
Span	>6 dB Bandwidth			
RBW	100 kHz			
VBW	VBW≥ 3*RBW			
Detector	Peak			
Trace	Max Hold			
Sweep Time	Auto			
	99% Occupied Bandwidth Test			
Spectrum Parameters	Setting			
Attenuation	Auto			
RBW	1% to 5% of the OBW			
VBW	≥ 3RBW			
Detector	Peak			
Trace	Max Hold			

Note: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.4.

Test Results

Please see the Appendix A1, A2, A3.



3.5. Output Power Test

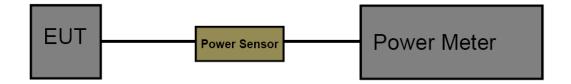
<u>Limit</u>

FCC Part 15 Subpart E (15.407)						
Test Item	Limit	Frequency Range(MHz)				
	Fixed: 1 Watt (30dBm) Mobile and Portable: 250mW (24dBm)	5150~5250				
Conducted Output Power	250mW (24dBm)	5250~5350				
	250mW (24dBm)	5500~5700				
	1 Watt (30dBm)	5725~5850				

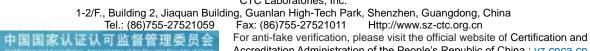
		it			
Frequency	Type of devices	Maximum Conducted Output Power	EIRP Output Power	Conducted Power Spectral Density	EIRP Power Spectral Density
5150MHz-5250MHz	in vehicles		30mW or 1.76 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)	\ge	
	Other Devices		200mW or 10 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)	\ge	10dBm/MHz
	in vehicles		30mW or 1.76 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)	\ge	
5250MHz-5350MHz	Other Devices	250mW or 11 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)	1W or 17 + 10 ×log10B dBm, whichever is less (B=99% OBW in MHz)	11 dBm/Mhz	
5470MHz-5600MHz 5650MHz-5725MHz	ALL Devices	250mW or 11 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)	1W or 17 + 10 ×log10B dBm, whichever is less (B=99% OBW in MHz)	11 dBm/Mhz	\ge
5725MHz-5850MHz	ALL Devices	1₩		30dBm/500KHz	

Test Configuration

EN



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Test Procedure

The measurement is according to section 3 of KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

Test Mode

Please refer to the clause 2.4.

<u>Test Result</u>

EN

Please see the Appendix B.



3.6. Power Spectral Density Test

<u>Limit</u>

FCC Part 15 Subpart E(15.407)/ RSS-247

For the 5.15~5.25GHz band:

Outdoor AP

The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. If G_{Tx} >6dBi, then PSD =17-(G_{Tx} -6).

Indoor AP

The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. If G_{Tx} >6dBi, then PSD =17-(G_{Tx} -6).

Point-to-point AP

The peak power spectral density (PSD) shall not exceed the lesser of 17dBm/MHz. If G_{Tx} >23dBi, then PSD =17-(G_{Tx} -23).

Client devices

The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. If G_{Tx} >6dBi, then PSD =11-(G_{Tx} -6).

For the 5.25~5.35GHz band:

The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. If G_{Tx} >6dBi, then PSD =11-(G_{Tx} -6).

For the 5.47~5.725GHz band:

The peak power spectral density (PSD) shall not exceed the lesser of 11dBm/MHz. If G_{Tx} >6dBi, then PSD =11-(G_{Tx} -6).

For the 5.725~5.85GHz band:

- Point-to-multipoint systems (P2M)
 The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.
 If G_{Tx}>6dBi, then PSD =30-(G_{Tx}-6).
- Point-to-point systems (P2P)

The peak power spectral density (PSD) shall not exceed the lesser of 30dBm/500kHz.

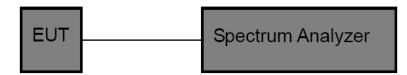
Note: G _{Tx} :	EUT	Antenna	gain.
-------------------------	-----	---------	-------

			IC Power&PSD Lim	hit	
Frequency	Type of devices	Maximum Conducted Output Power	EIRP Output Power	Conducted Power Spectral Density	EIRP Power Spectral Density
5150MHz-5250MHz	in vehicles	\geq	30mW or 1.76 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)	\geq	
	Other Devices	\geq	200mW or 10 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)		10dBm/MHz
	in vehicles	\geq	30mW or 1.76 + 10 × log:0B dBm, whichever is less (B=99% 0BW in MHz)		
5250MHz-5350MHz	Other Devices	250mW or 11 + 10 × logiOB dBm, whichever is less (B=99% OBW in MHz)	1W or 17 + 10 ×logioB dBm, whichever is less (B=99% OBW in MHz)	11dBm/Mhz	
5470MHz-5600MHz 5650MHz-5725MHz	ALL Devices	250mW or 11 + 10 × log10B dBm, whichever is less (B=99% OBW in MHz)	1W or 17 + 10 ×log10B dBm, whichever is less (B=99% OBW in MHz)	11dBm/Mhz	
5725MHz-5850MHz	ALL Devices	1₩		30 dBm/500KHz	

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Test Configuration



Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Set analyzer center frequency to transmitting frequency.

- (3) Set the span to encompass the entire emissions bandwidth (EBW)(alternatively, the entire 99% OBW) of the signal.
- (4) RBW=1MHz for devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz RBW=500kHz for devices operating in the band 5.725-5.85 GHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10 log (500 kHz/RBW) to the measured result, whereas RBW (<500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement. If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10 log (1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- (5) Set the VBW to: \geq 3 RBW
- (6) Detector: AVG
- (7) Trace: Max Hold and View
- (7) Sweep time: auto
- (8) Trace average at least 100 traces in power averaging.
- (9) User the peak marker function to determine the maximum amplitude level within the RBW. Apply correction to the result if different RBW is used.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.4.

Test Result

Please see the Appendix C.

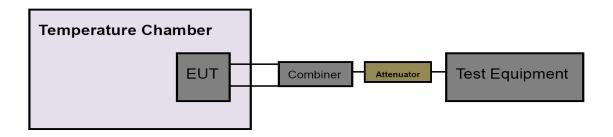


3.7. Frequency Stability Measurement

Limit

FCC Part 15 Subpart C(15.407)						
Test Item	Limit	Frequency Range(MHz)				
	Specified in the user's manual,	5150~5250				
Peak Excursion Measurement	the transmitter center frequency tolerance shall be ±20 ppm maximum for the 5 GHz band (IEEE 802.11n specification)	5250~5350				
Peak Excursion Measurement		5500~5700				
		5725~5850				

Test Configuration



Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyzer center frequency to transmitting frequency.
- (3) Set the span to encompass the entire emissions bandwidth (EBW) of the signal.
- (4) Set the RBW to: 10MHz, VBW=10MHz with peak detector and maxhold settings.
- (5) The test extreme voltage is to change the primary supply voltage from 6.66V to 8.14V percent of the nominal value.
- (6) Extreme temperature is -10°C~40°C
- NOTE: The EUT was set to continuously transmitting in continuously un-modulation transmitting mode. The limit for frequency stability is maintained within the band of operation.

Test Mode

Please refer to the clause 2.4.

Test Result

Please see the Appendix D.





3.8. Antenna Requirement

Standard Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Result

Complies

Directional gain = G_{ANT} = 5dBi

Note: All transmit signals are completely uncorrelated with each other in MIMO transmitting modes (Manufacturer's Declaration).



3.9. Dynamic Frequency Selection(DFS)

Requirement

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

	Operational Mode			
Requirement	Master	Client Without Radar Detection	Client With Radar Detection	
Non-Occupancy Period	Yes	Not required	Yes	
DFS Detection Threshold	Yes	Not required	Yes	
Channel Availability Check Time	Yes	Not required	Not required	
U-NII Detection Bandwidth	Yes	Not required	Yes	

Table 2: Applicability of DFS requirements during normal operation

	Operational Mode			
Requirement	Master Device or Client with Radar Detection	Client Without Radar Detection		
DFS Detection Threshold	Yes	Not required		
Channel Closing Transmission Time	Yes	Yes		
Channel Move Time	Yes	Yes		
U-NII Detection Bandwidth	Yes	Not required		

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

1. DFS Detection Thresholds

Table 3: DFS Detection Thresholds for Master Devices and Client Devices With Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0dBi receive antenna.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

2. DFS Response Requirements

Table 4: DFS Respo	onse Requirement Values
--------------------	-------------------------

Parameter	Value		
Non-occupancy period	Minimum 30 minutes		
Channel Availability Check Time	60 seconds		
Channel Move Time	10 seconds See Note 1.		
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.		
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.		
 Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required facilitating a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. 			

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

RADAR TEST WAVEFORMS

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.





Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
		Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\operatorname{Roundup} \left\{ \begin{matrix} \left(\frac{1}{360} \right) \\ \\ \left(\frac{19 \cdot 10^6}{\operatorname{PRI}_{\mu \operatorname{sec}}} \right) \end{matrix} \right\}$		
1	1	Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A	60%		30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
	Age	gregate (Radar Types 1	-4)	80%	120

Table 5 Short Pulse Radar Test Waveforms

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 µsec is selected, the number of pulses

$$\left\{ \left(\frac{1}{360}\right) \cdot \left(\frac{19 \cdot 10^6}{3066}\right) \right\}$$

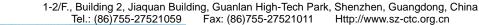
would be Round up

 $f_{j} = \text{Round up } \{17.2\} = 18.$

Table 5a - Pulse Repetition Inter	rvals Values for Test A
-----------------------------------	-------------------------

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)	
1	1930.5	518	
2	1858.7	538	
3	1792.1	558	
4	1730.1	578	
5	1672.2	598	
6	1618.1	618	
7	1567.4	638	
8	1519.8	658	
9	1474.9	678	
10	1432.7	698	

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11	1392.8	718	
12	1355	738	
13	1319.3	758	
14	1285.3	778	
15	1253.1	798	
16	1222.5	818	
17	1193.3	838	
18	1165.6	858	
19	1139	878	
20	1113.6	898	
21	1089.3	918	
22	1066.1	938	
23	326.2	3066	

Table 6 – Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveforms are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type wave forms, then each additional waveform must also be unique and not repeated from the previous waveforms.

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same Burst parameters are used for each wave form. The hopping sequence is different for each wave form and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250–5724MHz.Next,the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

Calibration of Radar Waveform

Radar Waveform Calibration Procedure

- 1) A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to place of the master
- 2) The interference Radar Detection Threshold Level is -62dBm + 0dBi +1dB = -61dBm that had been taken into account the output power range and antenna gain.
- 3) The following equipment setup was used to calibrate the conducted radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) at the frequency of the radar waveform generator. Peak detection was

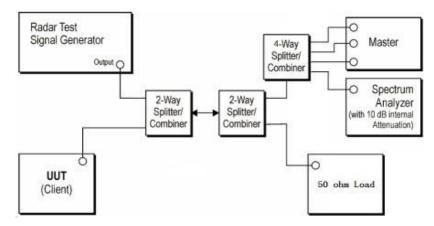


used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3

MHz. The spectrum analyzer had offset -1.0dB to compensate RF cable loss 1.0dB.

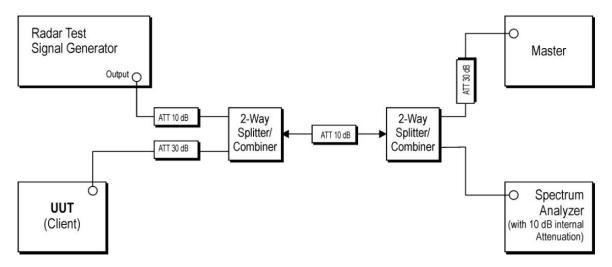
4) The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was - -62dBm + 0dBi +1dB = -61dBm. Capture the spectrum analyzer plots on short pulse radar waveform.

Conducted Calibration Setup



Test Configuration

Setup for Client with injection at the Master





Radar Waveform Calibration Result

Not Applicable

Test Procedure

- 1. The radar pulse generator is setup to provide a pulse at frequency that the master and client are operating. A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.
- 2. The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -61dBm at the antenna port of the master device
- 3. A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.
- 4. EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using Media Player Classic Ver. 6.4.8.6 in order to properly load the network for the entire period of the test.
- 5. When radar burst with a level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection Threshold +1dB.
- 6. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel Measure and record the transmissions from the UUT during the observation time (Channel Move Time). One 15 seconds plot is reported for the Short Pulse Radar Type 0. The plot for the Short Pulse Radar Types start at the end of the radar burst. The Channel Move Time will be calculated based on the zoom in 600ms plot of the Short Pulse Radar Type
- 7. Measurement of the aggregate duration of the Channel Closed Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: Dwell (0.3ms) =S (12000ms) / B (4000); where Dwell is the dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: C (ms)= N X Dwell (0.3ms); where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.
- 8. Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

Test Mode

Please refer to the clause 2.4.

Test Results

Passed

Not Applicable

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