FCC TEST REPORT

Report No.:	AB26030044FW04
FCC ID.:	**2ARVJ-PL26**
Applicant.:	Beijing Babel Technology Co., Ltd.
Address.:	4th Floor,Room 409,Block C I-M-WAY,45Cheng fu Rd.,Haidian District, Beijing, China
Manufacturer.:	Beijing Babel Technology Co., Ltd.
Address.:	4th Floor,Room 409,Block C I-M-WAY,45Cheng fu Rd.,Haidian District, Beijing, China
Product Name.:	JoneR Translator 5.0
Trade Mark.:	JoneR
Test Model.:	PL26
Additional Model(s).:	/
Standard.:	FCC 47 CFR Part 15 Subpart E (Part 15.407) IEEE/ANSI/USEMCSC C63.10-2020
Date of Receipt.:	2026.03.04
Date of Test Date.:	2026.03.05-2026.04.01
Date of Issue.:	2026.04.02
Test Result.:	Pass

Compiled by: (Printed Name + Signature)	Huaijie Li	Huaijie Li
Supervised by: (Printed Name + Signature)	David Huang	David Huang
Approved by: (Printed Name + Signature)	Jay Liu	Jay Liu

Testing Laboratory Name.:	Aibo Standard Technology (Shenzhen) Co., Ltd.
Address.:	101, Building B, Tuori New Energy Industrial Park, High-tech Park, Tianliao Community, Yutang Street, Guangming District, Shenzhen City, Guangdong Province, China

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FCC TEST REPORT

EUT.....	: JoneR Translator 5.0
Test Model.....	: PL26
Applicant.....	**: Beijing Babel Technology Co., Ltd.**
Address.....	: 4th Floor,Room 409,Block C I-M-WAY,45Cheng fu Rd.,Haidian District, Beijing, China
Manufacturer.....	**: Beijing Babel Technology Co., Ltd.**
Address.....	: 4th Floor,Room 409,Block C I-M-WAY,45Cheng fu Rd.,Haidian District, Beijing, China

Test Result	**Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

REPORT VERSION

Version No.	Issue Date	Description
01	2026.04.02	Initial Issue

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1. GENERAL INFORMATION

1.1. GENERAL DESCRIPTION OF EUT

Product Name:	JoneR Translator 5.0		
Trade Mark:	JoneR		
Test Model:	PL26		
Additional Model(s):	/		
Model Difference:	/		
Hardware Version:	BBZN_F4_MB_V1.1		
Software Version:	Android 8.1		
Power Supply	Input :DC 5V 1A		
Battery	DC3.7V/2000mAh		
EUT Supports Function: (Provided by the customer)	5GHz U-NII Bands	5725MHz~5850MHz	IEEE 802.11a
Test Sample(s) Number:	AB26030044-01 (Engineer Sample) AB26030044-02 (Normal Sample)		
Radio Specification Subject to this Report			
Radio Specification:	IEEE 802.11a		
Frequency Range:	5745MHz~5825MHz for U-NII Band3		
Modulation Type:	IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channel Spacing:	IEEE 802.11a: 20MHz		
Channel Number(s):	**U-NII Band3:** 5 for IEEE 802.11a(HT20)		
Antenna Type:	Integral Antenna		
Antenna Gain:	U-NII Band3:	0.3dBi	
TPC Function:	Not Support		
DFS Function:	Slave without radar detection		

1.2. DESCRIPTION OF SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	Supplied by
Adapter	Shenzhen Keyu Power Technology Co., Ltd.	KA20A-CN	2415	Applicant

1.3. DESCRIPTION OF EXTERNAL I/O

I/O Port Description	Quantity	Cable
USB Type-C Interface	1	0.8m, unshielded

1.4. GENERAL DESCRIPTION OF APPLIED STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.407 - General technical requirements of Unlicensed National Information Infrastructure Devices.

IEEE/ANSI/USEMCSC C63.10-2020 - American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 - Guidelines For Compliance Testing Of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E

KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02 - U-NII Client Devices Without Radar Detection Capability.

1.5. DESCRIPTION OF TEST FACILITY

Test Lab: Aibo Standard Technology (Shenzhen) Co., Ltd.

Address: 101, Building B, Tuori New Energy Industrial Park, High-tech Park, Tianliao Community, Yutang Street, Guangming District, Shenzhen City, Guangdong Province, China

Tel.: +86 755 85250797

E-mail: aibo@aibonorm.com

Website: www.aibonorm.com

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

A2LA-Lab Certificate No.: 7514.01

Aibo Standard Technology (Shenzhen) Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1411

Test Firm Registration Number: 567066

ISED Wireless Device Testing Laboratories

Company Number: 33924

CAB identifier: CN0185

1.6. MEASUREMENT UNCERTAINTY

The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Items	Measurement Uncertainty
Power Line Conducted Emission (9kHz~150kHz)	±3.62dB
Power Line Conducted Emission (150kHz~30MHz)	±3.38dB
Radiated Emission (9kHz~30MHz)	±3.10dB
Radiated Emission (30MHz~1GHz)	±4.90dB
Radiated Emission (1GHz~18GHz)	±3.88dB
Radiated Emission (8GHz~40GHz)	±5.32dB
RF Conducted Power	±0.57dB
Conducted Spurious Emissions	±1.60dB
RF Frequency	±6.0 x 10^{-7}
Occupied Channel Bandwidth	±28.87KHz
Maximum Power Spectral Density Level	±0.59dB

Note: All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

1.7. ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	+15°C ~ +35°C
Lative Humidity	20 % ~ 75 %
Air Pressure	98KPa ~ 101KPa

1.8. DESCRIPTION OF TEST MODES

Mode	Tx/Rx Frequency (MHz)	Test Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11a	5725MHz~5850MHz	Channel 149	Channel 157	Channel 165
		5745MHz	5785MHz	5825MHz

For portable device, radiated emission was verified over X, Y, Z Axis, and shown the worst case in this report. The following operating modes were applied for the related test items. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data packets and antenna ports (if EUT with antenna diversity architecture), only the result of the worst case was recorded in the report.

List of Test Modes	
Test Mode(s)	Description
TM1	Keep the EUT works in continuously transmitting mode (IEEE 802.11a)

Power setting during the test:

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Mode	U-NII Band3
	Power Setting
IEEE 802.11a	Default

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. Following data rate was (were) selected for the final test as listed below:

Mode	Worst-case data rates
IEEE 802.11a	6Mbps

2. SUMMARY OF TEST RESULT

FCC 47 CFR Part 15 Subpart E Test Cases			
FCC Rule	**Description of Test Item(s)**	**Result**	**Test Engineer**
Part 15.203 Part 15.407(a)	Antenna Requirement	Pass	Jacey Fu
Part 15.407(a)	Duty Cycle	Pass	Jacey Fu
Part 15.407(a)	Maximum Conducted Output Power	Pass	Jacey Fu
Part 15.407(a)	26dB Bandwidth and Occupied Bandwidth	Pass	Jacey Fu
Part 15.407(e)	6dB Bandwidth	Pass	Jacey Fu
Part 15.407(a)	Power Spectral Density	Pass	Jacey Fu
Part 15.407(b) Part 15.205 Part 15.209	Radiated Emissions and Radiated Band Edges Measurement	Pass	He Chen
Part 15.407(g)	Frequency Stability	Pass	Jacey Fu
Part 15.407(h)	Dynamic Frequency Selection	N/A	/
Part 15.207	Power Line Conducted Emissions	Pass	He Chen
Part 15.407(f)	RF Exposure (see the RF Exposure Report)	Pass	Jacey Fu

3. MEASUREMENT INSTRUMENTS LIST

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until
1	Loop Antenna	Schwarzbeck	FMZB 1519	1519-025	01/18/2026	01/17/2028
2	ESCI EMI TEST RECEIVER	ROHDE & SCHWARZ	ESPI 7	/	01/20/2026	01/19/2027
3	Power Amplifier	HZEMC	HPA-9K0133	HYPA23029	01/20/2026	01/19/2027
4	Broadband Antenna	Schwarzbeck	VULB 9168	01763	01/29/2026	01/28/2028
5	Attenuator	PRM	ATT50-6-3	ATT50-6-3	01/20/2026	01/19/2027
6	Spectrum Analyzer	R&S	FSV40-N	101365	01/20/2026	01/19/2027
7	Horn Antenna	Schwarzbeck	BBHA 9120 D	02786	02/19/2026	02/18/2028
8	Horn Antenna	Schwarzbeck	ZLB7-18-40G-77	072410839	02/19/2026	02/18/2028
9	Power Amplifier	HZEMC	PA0118-43	HYPA23030	01/20/2026	01/19/2027
10	Power Amplifier	HZEMC	PA01840-45	HYPA23031	01/20/2026	01/19/2027
11	EMI Test Receiver	R&S	ESCI	101196	01/20/2026	01/19/2027
12	LISN	R&S	ENV216	102374	01/20/2026	01/19/2027
13	Pulse Limiter	Schwarzbeck	ESH3-Z2	0357.8810.54	01/20/2026	01/19/2027
14	MXA Signal Analyzer	Keysight	N9020A	MY52091389	01/20/2026	01/19/2027
15	Power Sensor	Agilent	U2021XA	MY54110007	01/20/2026	01/19/2027
16	Power Sensor	Agilent	U2021XA	MY54110009	01/20/2026	01/19/2027
17	MXG Vector Signal Generator	Agilent	N5182A	MY47070153	01/20/2026	01/19/2027
18	Analog Signal Source	Keysight	N5173B	MY60403029	01/20/2026	01/19/2027
19	Vector Signal Generator	R&S	SMCV100B	106103	01/20/2026	01/19/2027
20	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW500	118780	01/20/2026	01/19/2027
21	DC POWER SUPPLY	MAISHENG	MT-305DS	2021040016	02/28/2026	02/27/2027
22	Const Temp. & Humidity Chamber	GRT	GR-HWX-150L	GR25010601	01/20/2026	01/19/2027

Test Software		
Software name	Model	Version
Conducted Emission Measurement Software	FASLAB	V4.1
Radiated Emission Measurement Software	FASLAB	V4.1
Bluetooth and WIFI Test System	MTS 8310	V3.0.0.0

4. ANTENNA REQUIREMENT

1) Standard Requirement

15.203 requirement:

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.

15.407(a)(1) (2) requirement:

The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2) Conclusion

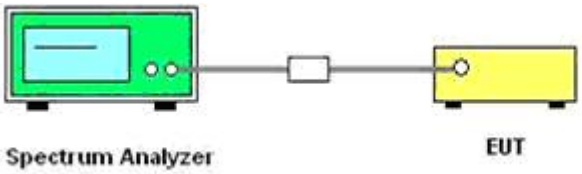
Antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna isSee section 1.1(page 6). It complies with the standard requirement.

5. DUTY CYCLE

5.1. LIMIT

All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

5.2. TEST SETUP



5.3. TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

a) Set the Centre frequency of the spectrum analyzer to the transmitting frequency;

b) Set RBW >= EBW if possible; otherwise, set RBW to the largest available value(8MHz);

c) Set VBW >= RBW, Span = 0, Detector = Peak;

d) Trace Mode = Clear Write;

e) When the trace is complete, measure the sending time of 1 burst and the duty cycle of 1 burst cycle.

5.4. TEST RESULT

Pass.

Please refer to the Appendix G 5G WiFi RF Conducted Test Data.

Please refer to the Appendix I 5G WiFi ANT2 RF Conducted Test Data.

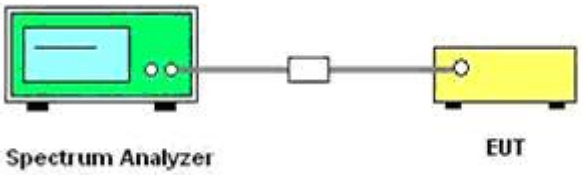
Note: 1) The test results including the cable lose.
2) Duty cycle= On Time/ Period;
3) Duty Cycle factor = 10*log(1/Duty cycle)

6. 26DB BANDWIDTH AND OCCUPIED BANDWIDTH

6.1. LIMIT

None; for reporting purposes only.

6.2. TEST SETUP



6.3. TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

For 26dB Bandwidth Measurement:

a) Set RBW = approximately 1% of the emission bandwidth.

b) Set the VBW > RBW.

c) Detector = Peak.

d) Detector = Peak.

e) Trace mode = max hold.

f) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

For 99% Occupied Bandwidth Measurement:

a) Set center frequency to the nominal EUT channel center frequency.

b) Set span = 1.5 times to 5.0 times the OBW.

c) Set RBW = 1 % to 5 % of the OBW.

d) Set VBW ≥ 3 x RBW.

e) Detector function = peak

f) Trace = max hold

g) Use the 99% power bandwidth function of the instrument to measure the Occupied Bandwidth and recoded.

6.4. TEST RESULT

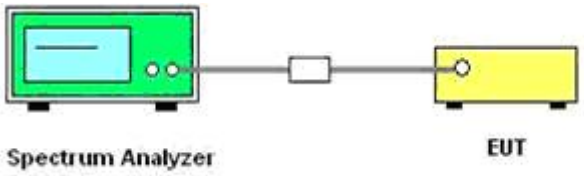
Please refer to the Appendix G 5G WiFi RF Conducted Test Data.

7. 6DB BANDWIDTH

7.1. LIMIT

According to FCC 47 CFR Part 15 Subpart C Section 15.407(e), Within the 5.725-5.85GHz band, the minimum 6dB bandwidth of U-NII devices shall be at least 500kHz.

7.2. TEST SETUP



7.3. TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 * RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.4. TEST RESULT

Please refer to the Appendix G 5G WiFi RF Conducted Test Data.

8. CONDUCTED OUTPUT POWER

8.1. LIMIT

According to FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3).

For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W provided the maximum antenna gain does not exceed 6dBi. In addition, the maximum power spectral density shall not exceed 17dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125mW (21dBm).

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

(iii) For fixed point-to-point access points operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23dBi, a 1dB reduction in maximum conducted output power and maximum power spectral density is required for each 1dB of antenna gain in excess of 23dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

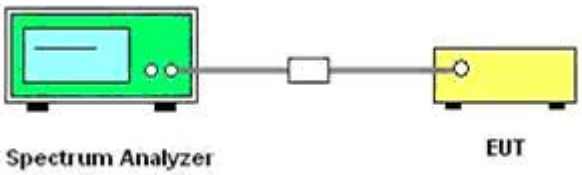
(iv) For client devices in the 5.15-5.25GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For the 5.25-5.35GHz and 5.47-5.725GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm + 10logB, where B is the 26dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

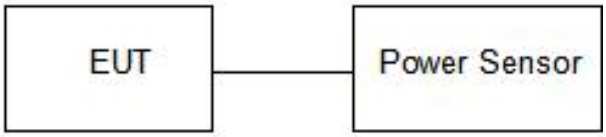
For the band 5.725-5.85GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

8.2. TEST SETUP

☒ **Using a Spectrum Analyzer for Testing:**



☐ **Using a Broadband Power Meter for Testing:**



8.3. TEST PROCEDURE

☒ **Using a Spectrum Analyzer for Testing:**

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

a) Set span to encompass the entire 26dB EBW or 99% OBW of the signal.

b) Set RBW = 1 MHz, Set VBW >= 3MHz, Number of points in sweep >= [2*span / RBW]. (This gives bin-to-bin spacing <= RBW / 2, so that narrowband signals are not lost between frequency bins.)

c) Set Sweep time = auto, Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

d) Do not use sweep triggering. Allow the sweep to “free run.”.

e) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.

f) Compute power by integrating the spectrum across the 26dB EBW or 99% OBW of the signal using the instrument’s band power measurement function with band limits set equal to the EBW or OBW band edges. If the

instrument does not have a band power function, then sum the spectrum levels (in power units) at 1MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.

g) Add [10*log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add [10 log (1 / 0.25)] = 6dB if the duty cycle is 25%.

☐ **Using a Broadband Power Meter for Testing:**

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the broadband power meter and measure the average output power. Add [10*log (1 / D)] to calculate the final result.

8.4. TEST RESULT

Pass.

Please refer to the Appendix G 5G WiFi RF Conducted Test Data.

9. POWER SPECTRAL DENSITY

9.1. LIMIT

According to FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3):

For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W provided the maximum antenna gain does not exceed 6dBi. In addition, the maximum power spectral density shall not exceed 17dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125mW (21dBm).

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

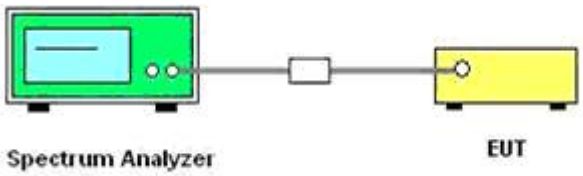
(iii) For fixed point-to-point access points operating in the band 5.15-5.25GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23dBi, a 1dB reduction in maximum conducted output power and maximum power spectral density is required for each 1dB of antenna gain in excess of 23dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For the 5.25-5.35GHz and 5.47-5.725GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm + 10logB, where B is the 26dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

For the band 5.725-5.85GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1W. In addition, the maximum power spectral density shall not exceed 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

9.2. TEST SETUP



9.3. TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2

a) Set span to encompass the entire emission bandwidth (EBW) of the signal.

b) Set RBW = 1 MHz, Set VBW ≥ 3 RBW, Detector = RMS

c) Sweep time = auto, trigger set to “free run”.

d) Trace average at least 100 traces in power averaging mode.

e) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

a) Set span to encompass the entire emission bandwidth (EBW) of the signal.

b) Set RBW = 500 kHz, Set VBW ≥ 3 RBW, Detector = RMS

c) Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.

d) Sweep time = auto, trigger set to “free run”.

e) Trace average at least 100 traces in power averaging mode.

f) Record the max value and add 10 log (1/duty cycle)

9.4. TEST RESULT

Pass.

Please refer to the Appendix G 5G WiFi RF Conducted Test Data.

10. OUT OF BAND EMISSIONS(CONDUCTED)

10.1. LIMIT

According to §15.407(b), *Undesirable emission limits.* Except as shown in paragraph (b)(10) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25GHz band: All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.

(2) For transmitters operating in the 5.25-5.35GHz band: All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.

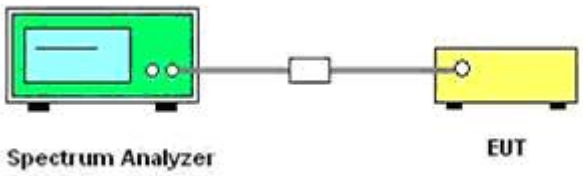
(3) For transmitters operating in the 5.47-5.725GHz band: All emissions outside of the 5.47-5.725GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.

(4) For transmitters operating solely in the 5.725-5.850GHz band:

(i) All emissions shall be limited to a level of −27dBm/MHz at 75MHz 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 15.6dBm/MHz at 5MHz 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.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

10.2. TEST SETUP



10.3. TEST PROCEDURE

(1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

(2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

(3) Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.

(4) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

(5) Repeat above procedures until all measured frequencies were complete.

10.4. TEST RESULT

Pass.

Please refer to the Appendix G 5G WiFi RF Conducted Test Data.

11. RADIATED EMISSIONS AND RADIATED BAND EDGES MEASUREMENT

11.1. LIMIT

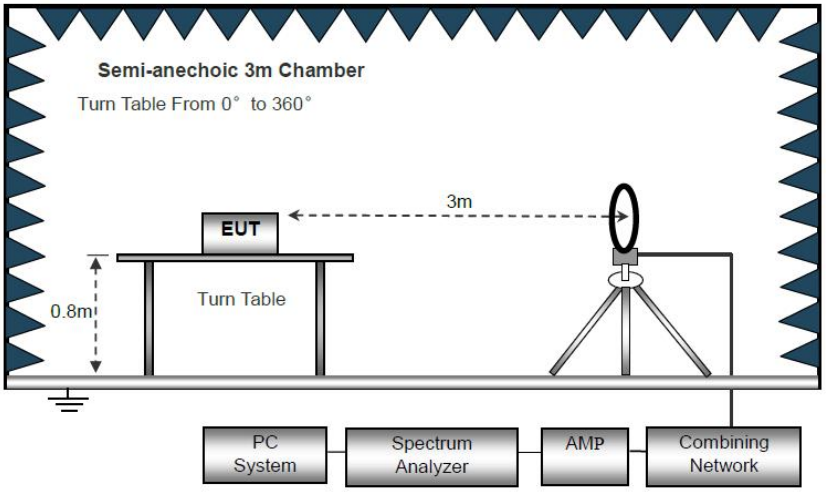
Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limits of Spurious Emissions				
Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009MHz~0.490MHz	2400/F(kHz)	---	---	300
0.490MHz~1.705MHz	24000/F(kHz)	---	---	30
1.705MHz~30MHz	30	---	---	30
30MHz~88MHz	100	40.0	Quasi-peak	3
88MHz~216MHz	150	43.5	Quasi-peak	3
216MHz~960MHz	200	46.0	Quasi-peak	3
960MHz~1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

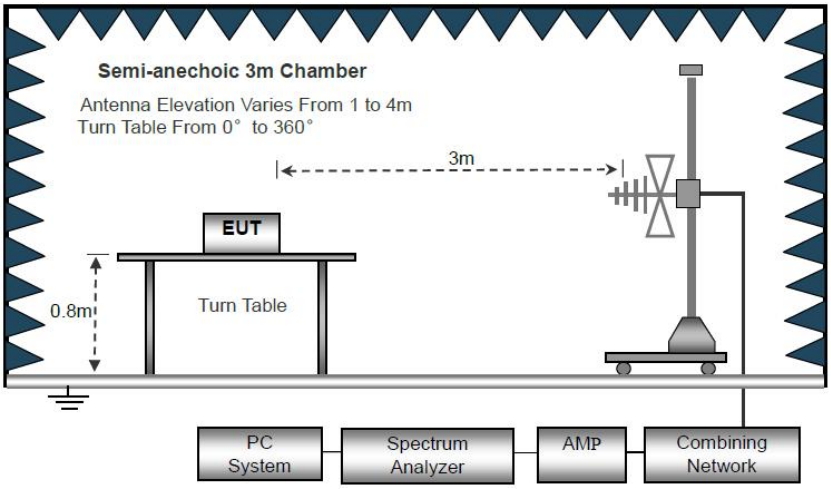
Remark:
a) The lower limit shall apply at the transition frequencies.
b) Emission level (dBuV/m) = 20*log Emission level (uV/m).
c) For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
d) Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

Limits of Unwanted Emission Out of the Restricted Bands		
Applicable To	**Limit**	
KDB 789033 D02 General UNII Test Procedures New Rules v02r01	**Field Strength at 3 m**	
	PK: 74 (dBμV/m)	**AV: 54 (dBμV/m)**
Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
FCC Part 15.407 (b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
FCC Part 15.407 (b)(2)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
FCC Part 15.407 (b)(3)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
FCC Part 15.407 (b)(4)	27dBm/MHz at frequencies from the band edges decreasing linearly to 15.6dBm/MHz at 5MHz above or below the band edges;	PK: 68.2 (dBμV/m)
	15.6dBm/MHz at 5MHz above or below the band edges decreasing linearly to 10dBm/MHz at 25MHz above or below the band edges;	
	10dBm/MHz at 25MHz above or below the band edges decreasing linearly to -27dBm/MHz at 75MHz above or below the band edges;	
	-27dBm/MHz at frequencies more than 75MHz above or below the band edges.	

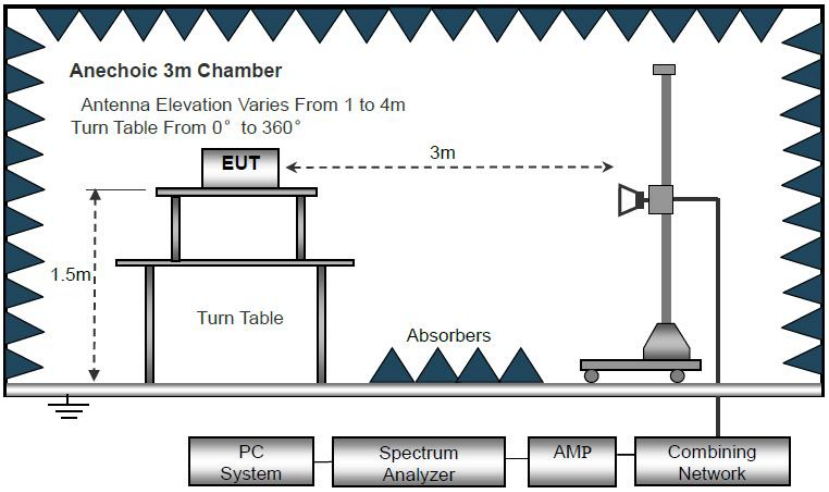
11.2. TEST SETUP



Block Diagram of Radiated Emission Below 30MHz



Block Diagram of Radiated Emission From 30MHz to 1GHz



Block Diagram of Radiated Emission Above 1GHz

11.3. TEST PROCEDURE

a) Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.

b) Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0 degree to 360 degree to acquire the highest emissions from EUT.

c) And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

d) Repeat above procedures until all frequency measurements have been completed.

e) Radiated emission test frequency band from 9KHz to 40GHz.

f) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and record the worst case in this report.

g) The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz~30MHz	Active Loop Antenna	3
30MHz~1GHz	Bilog Antenna	3
1GHz~18GHz	Horn Antenna	3
18GHz~25GHz	Horn Anternna	1

h) Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz~150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz~30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz~1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz~40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

11.4. TEST RESULT

Pass.

Remark:

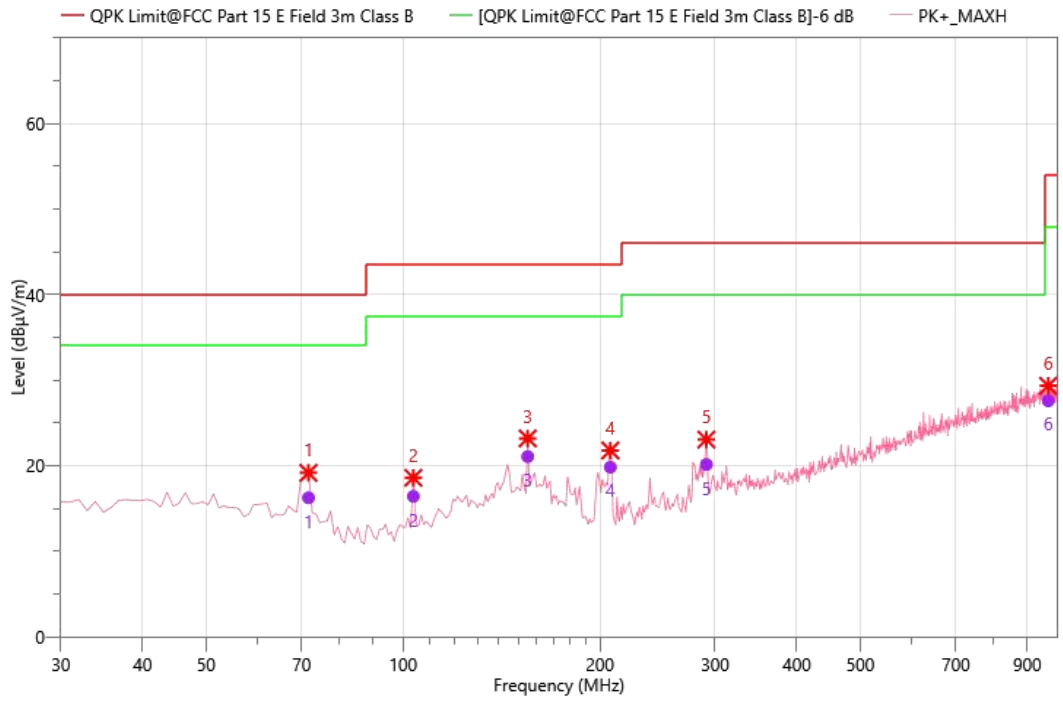
a) Pre-scan all modes and recorded the worst case in this report.

b) Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, and the emission levels from 9kHz to 30MHz are attenuated 20dB below the limit and not recorded in report.

For Radiated Spurious Emissions 9kHz~1GHz, the worst case a mode and lowest channel in the Radiated Spurious Emissions above 1GHz was tested.

5.8GWIFI

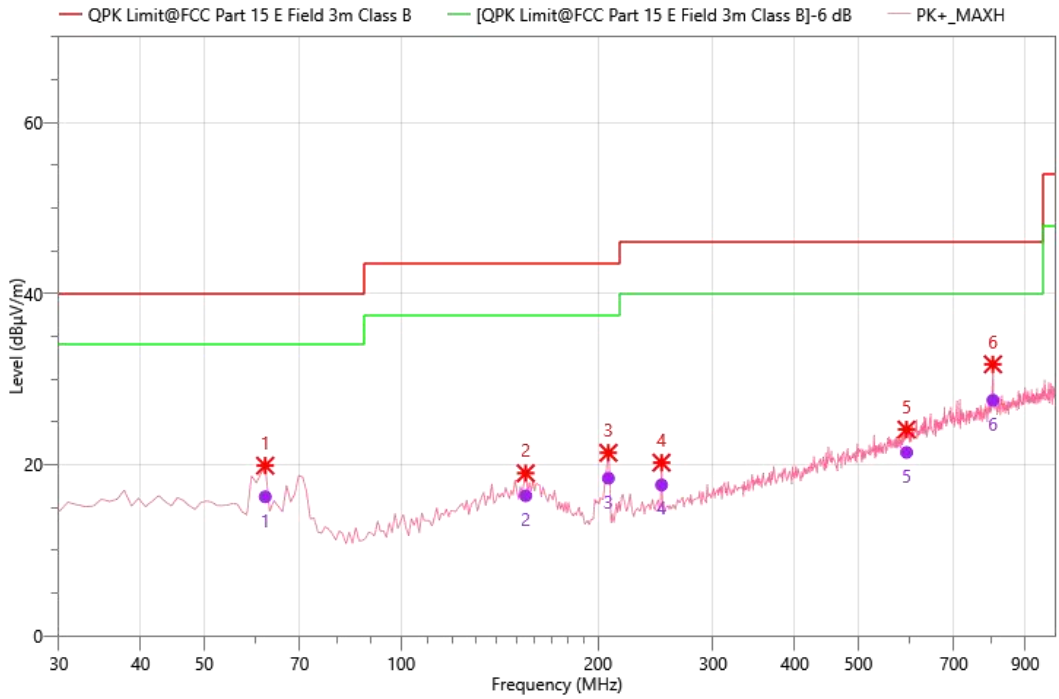
Radiated Emission Test Data (30MHz to 1GHz)Lowest Channel			
Environmental Conditions	24.6℃, 53.4% RH	Test Engineer	He Chen
Worst Test Mode:	802.11a(Channel 149)	Polarity:	Horizontal



No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	71.710	32.28	-16.03	16.25	40.00	23.75	QPK	100	H	236.3	PASS
2	103.720	32.28	-15.86	16.42	43.50	27.08	QPK	100	H	13.9	PASS
3	155.130	32.78	-11.71	21.07	43.50	22.43	QPK	100	H	184.7	PASS
4	207.510	35.23	-15.4	19.83	43.50	23.67	QPK	100	H	173.6	PASS
5	290.930	32.45	-12.31	20.14	46.00	25.86	QPK	100	H	295.5	PASS
6	968.960	27.82	-0.24	27.58	53.90	26.32	QPK	100	H	33.4	PASS

Remark:
Emission Level = Reading + Factor;
Factor = Antenna Factor + Cable Loss – Pre-amplifier;
Margin= Limit- Emission Level .

Radiated Emission Test Data (30MHz to 1GHz)Lowest Channel			
Environmental Conditions	24.6℃, 53.4% RH	Test Engineer	He Chen
Worst Test Mode:	802.11a(Channel 149)	Polarity:	Vertical



No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	62.010	30.44	-14.19	16.25	40.00	23.75	QPK	100	V	27.8	PASS
2	155.130	28.08	-11.71	16.37	43.50	27.13	QPK	100	V	234.3	PASS
3	207.510	33.82	-15.4	18.42	43.50	25.08	QPK	100	V	0.5	PASS
4	250.190	31.06	-13.43	17.63	46.00	28.37	QPK	100	V	358.5	PASS
5	592.600	26.90	-5.46	21.44	46.00	24.56	QPK	100	V	360.0	PASS
6	803.090	29.78	-2.24	27.54	46.00	18.46	QPK	100	V	0.5	PASS

Remark:
Emission Level = Reading + Factor;
Factor = Antenna Factor + Cable Loss – Pre-amplifier;
Margin= Limit- Emission Level .

Radiated Emission Test Data (Above 1GHz): Worst Case Configuration							
Environmental Conditions	24.6℃, 53.4% RH		Test Engineer		He Chen		
5.8GWIFI IEEE 802.11a_Channel 149							
Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (PEAK/AVG)	Polar (H/V)
1258.500	40.23	-11.22	29.01	54.00	24.99	AVG	H
1269.500	47.70	-11.18	36.52	74.00	37.48	PK+	H
2259.500	41.04	-8.78	32.26	54.00	21.74	AVG	H
2562.000	47.06	-8.67	38.39	74.00	35.61	PK+	H
4272.500	39.60	-2.62	36.98	54.00	17.02	AVG	H
4349.500	46.87	-2.74	44.13	74.00	29.87	PK+	H
6324.000	40.34	2.33	42.67	54.00	11.33	AVG	H
6439.500	46.34	3.15	49.49	74.00	24.51	PK+	H
10617.000	45.25	-1.81	43.44	74.00	30.56	PK+	H
11111.500	33.20	-1.36	31.84	54.00	22.16	AVG	H
17885.000	31.44	6.17	37.61	54.00	16.39	AVG	H
18000.000	40.61	7.1	47.71	74.00	26.29	PK+	H
1396.000	49.05	-10.99	38.06	74.00	35.94	PK+	V
1396.000	42.16	-10.99	31.17	54.00	22.83	AVG	V
2210.000	41.09	-8.78	32.31	54.00	21.69	AVG	V
2243.000	48.42	-8.79	39.63	74.00	34.37	PK+	V
3871.000	39.61	-3.96	35.65	54.00	18.35	AVG	V
3904.000	46.15	-3.62	42.53	74.00	31.47	PK+	V
6500.000	46.43	3.2	49.63	74.00	24.37	PK+	V
6500.000	39.64	3.2	42.84	54.00	11.16	AVG	V
10686.000	43.83	-1.69	42.14	74.00	31.86	PK+	V
11054.000	32.91	-1.14	31.77	54.00	22.23	AVG	V
17988.500	30.21	7	37.21	54.00	16.79	AVG	V
18000.000	40.52	7.1	47.62	74.00	26.38	PK+	V
IEEE 802.11a_Channel 157							
Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (PEAK/AVG)	Polar (H/V)
1286.000	46.53	-11.12	35.41	74.00	38.59	PK+	H
1286.000	39.82	-11.12	28.70	54.00	25.30	AVG	H
2232.000	39.80	-8.8	31.00	54.00	23.00	AVG	H
2254.000	47.28	-8.78	38.50	74.00	35.50	PK+	H
3959.000	46.57	-3.37	43.20	74.00	30.80	PK+	H
4003.000	39.35	-3.44	35.91	54.00	18.09	AVG	H
6434.000	39.37	3.14	42.51	54.00	11.49	AVG	H
6456.000	45.67	3.18	48.85	74.00	25.15	PK+	H
11226.500	33.26	-1.22	32.04	54.00	21.96	AVG	H
11399.000	44.20	-1.36	42.84	74.00	31.16	PK+	H
17862.000	31.43	6.01	37.44	54.00	16.56	AVG	H
17942.500	41.13	6.61	47.74	74.00	26.26	PK+	H
1379.500	40.83	-10.98	29.85	54.00	24.15	AVG	V
1385.000	47.39	-10.98	36.41	74.00	37.59	PK+	V
2182.500	40.59	-8.79	31.80	54.00	22.20	AVG	V
2188.000	47.22	-8.78	38.44	74.00	35.56	PK+	V
4168.000	38.71	-3.23	35.48	54.00	18.52	AVG	V
4201.000	45.90	-2.99	42.91	74.00	31.09	PK+	V
6489.000	45.66	3.2	48.86	74.00	25.14	PK+	V
6494.500	39.21	3.2	42.41	54.00	11.59	AVG	V
9996.000	44.83	-2.72	42.11	74.00	31.89	PK+	V
10214.500	33.77	-2.44	31.33	54.00	22.67	AVG	V
17873.500	31.37	6.11	37.48	54.00	16.52	AVG	V
17885.000	41.40	6.17	47.57	74.00	26.43	PK+	V

IEEE 802.11a_Channel 165							
Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (PEAK/AVG)	Polar (H/V)
1198.000	46.82	-11.45	35.37	74.00	38.63	PK+	H
1209.000	40.18	-11.41	28.77	54.00	25.23	AVG	H
2100.000	47.41	-9.02	38.39	74.00	35.61	PK+	H
2100.000	41.01	-9.02	31.99	54.00	22.01	AVG	H
3684.000	38.89	-4.97	33.92	54.00	20.08	AVG	H
3744.500	45.18	-4.9	40.28	74.00	33.72	PK+	H
6406.500	46.05	3.07	49.12	74.00	24.88	PK+	H
6456.000	39.04	3.18	42.22	54.00	11.78	AVG	H
11399.000	43.96	-1.36	42.60	74.00	31.40	PK+	H
11916.500	33.46	-1.1	32.36	54.00	21.64	AVG	H
17839.000	42.38	5.78	48.16	74.00	25.84	PK+	H
17977.000	30.36	6.91	37.27	54.00	16.73	AVG	H
1467.500	47.64	-10.97	36.67	74.00	37.33	PK+	V
1467.500	40.01	-10.97	29.04	54.00	24.96	AVG	V
3150.500	47.79	-6.62	41.17	74.00	32.83	PK+	V
3150.500	40.45	-6.62	33.83	54.00	20.17	AVG	V
6230.500	40.85	1.78	42.63	54.00	11.37	AVG	V
6346.000	46.58	2.61	49.19	74.00	24.81	PK+	V
10525.000	44.52	-2.06	42.46	74.00	31.54	PK+	V
10674.500	33.23	-1.69	31.54	54.00	22.46	AVG	V
14504.000	43.15	1.15	44.30	74.00	29.70	PK+	V
14504.000	32.44	1.15	33.59	54.00	20.41	AVG	V
17827.500	42.64	5.67	48.31	74.00	25.69	PK+	V
17873.500	31.06	6.11	37.17	54.00	16.83	AVG	V

Remark:

Emission Level = Reading + Factor;

Factor = Antenna Factor + Cable Loss – Pre-amplifier;

Margin=Limit - Emission Level.

Testing is carried out with frequency rang 9kHz to the tenth harmonics. The emission levels of other frequencies are attenuated 20dB below the limit and not recorded in report.

Radiated Band Edges Test Data: Worst-Case Configuration							
Environmental Conditions	24.6℃, 53.4% RH			Test Engineer		He Chen	
Lowest Channel (Worst Case: IEEE 802.11a)							
Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (PEAK/AVG)	Polar (H/V)
5720.000	46.67	5.29	51.96	74.00	22.04	PK+	H
5720.000	42.27	5.29	47.56	54.00	6.44	AVG	H
5745.000	81.98	5.44	87.42	-	-	PK+	H
5745.000	81.67	5.44	87.11	-	-	AVG	H
5720.000	46.64	5.29	51.93	74.00	22.07	PK+	V
5720.000	41.97	5.29	47.26	54.00	6.74	AVG	V
5745.000	77.88	5.44	83.32	-	-	PK+	V
5745.000	77.58	5.44	83.02	-	-	AVG	V
Highest Channel (Worst Case: IEEE 802.11a)							
5824.880	80.42	5.78	86.20	-	-	PK+	H
5824.880	80.03	5.78	85.81	-	-	AVG	H
5890.000	46.74	6.05	52.79	74.00	21.21	PK+	H
5890.000	42.15	6.05	48.20	54.00	5.80	AVG	H
5824.880	79.46	5.78	85.24	-	-	PK+	V
5824.880	78.91	5.78	84.69	-	-	AVG	V
5890.000	46.28	6.05	52.33	74.00	21.67	PK+	V
5890.000	42.21	6.05	48.26	54.00	5.74	AVG	V

Remark:

(1) Emission Level = Reading + Factor;

Factor = Antenna Factor + Cable Loss – Pre-amplifier;

Margin=Limit - Emission Level.

(2) “IEEE 802.11n20” mode is the worst mode. When PK value is lower than the Average value limit, average don't record.

(3) " * ": Fundamental frequency.

Note:Antenna one and antenna two were tested. Among them, the data of antenna one was the worst, so the report recorded the data of antenna one.

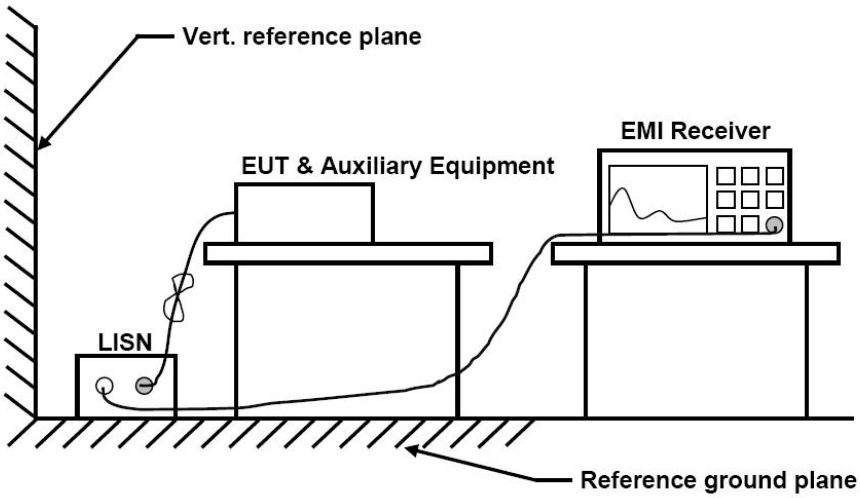
12. POWER LINE CONDUCTED EMISSIONS

12.1. LIMIT

According to the rule FCC Part 15.207, Conducted emissions limit, the limit for a wireless device as below:

Frequency Range (MHz)	Conducted emissions (dBuV)	
	Quasi-peak	Average
0.15~0.5	66 to 56	56 to 46
0.5~5	56	46
5~30	60	50
Remark: a) The lower limit shall apply at the transition frequencies. b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50MHz.		

12.2. TEST SETUP



12.3. TEST PROCEDURE

Test frequency range :150KHz-30MHz

a) The mains terminal disturbance voltage test was conducted in a shielded room.

b) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

c) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

d) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and

bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

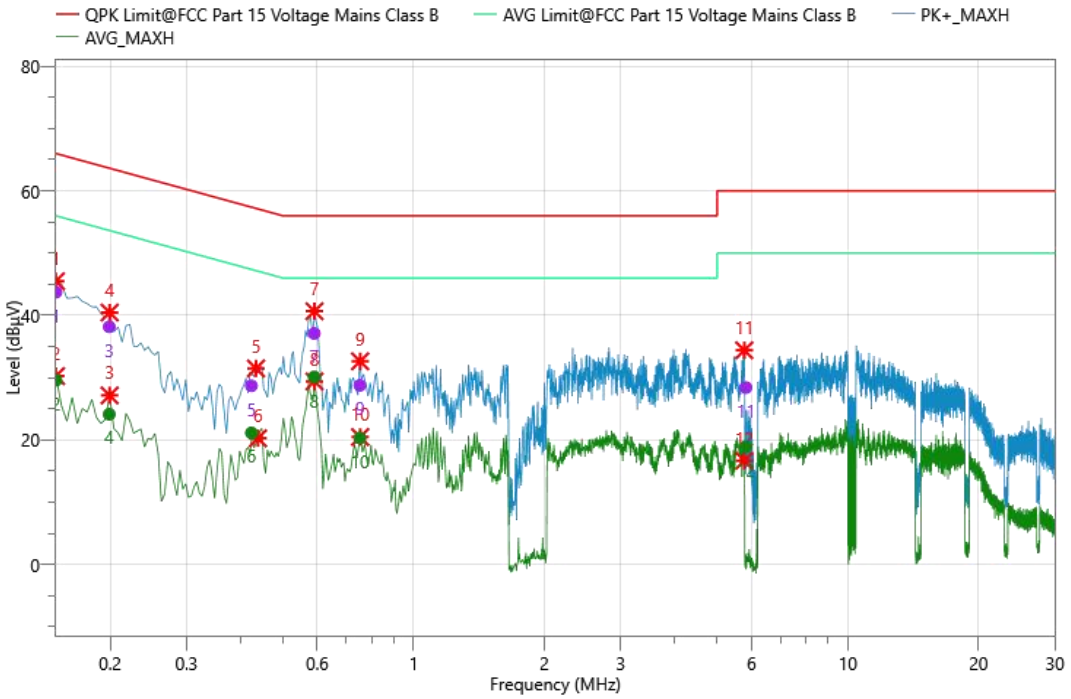
e) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

12.4. TEST RESULT

Pass.

Note 1: For AC line conducted emissions, the maximum peak output power a mode and lowest channel was tested.

Test Plots and Data of Conducted Emissions (Worst Case: IEEE 802.11a)Lowest Channel			
Environmental Conditions	24.6℃, 53.4% RH	Test Engineer	He Chen
Test Voltage:	AC 120V/60Hz	Test Power Line:	Line



No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE
1	0.150	33.70	10.03	43.73	66.00	22.27	QPK	L1	GND
2	0.150	19.57	10.03	29.60	56.00	26.40	AVG	L1	GND
3	0.199	28.17	10.01	38.18	63.65	25.47	QPK	L1	GND
4	0.199	14.12	10.01	24.13	53.65	29.52	AVG	L1	GND
5	0.423	18.59	10.11	28.70	57.39	28.69	QPK	L1	GND
6	0.423	11.03	10.11	21.14	47.39	26.25	AVG	L1	GND
7	0.590	26.98	10.13	37.11	56.00	18.89	QPK	L1	GND
8	0.590	19.99	10.13	30.12	46.00	15.88	AVG	L1	GND
9	0.752	18.55	10.22	28.77	56.00	27.23	QPK	L1	GND
10	0.752	10.11	10.22	20.33	46.00	25.67	AVG	L1	GND
11	5.824	17.65	10.77	28.42	60.00	31.58	QPK	L1	GND
12	5.824	8.18	10.77	18.95	50.00	31.05	AVG	L1	GND

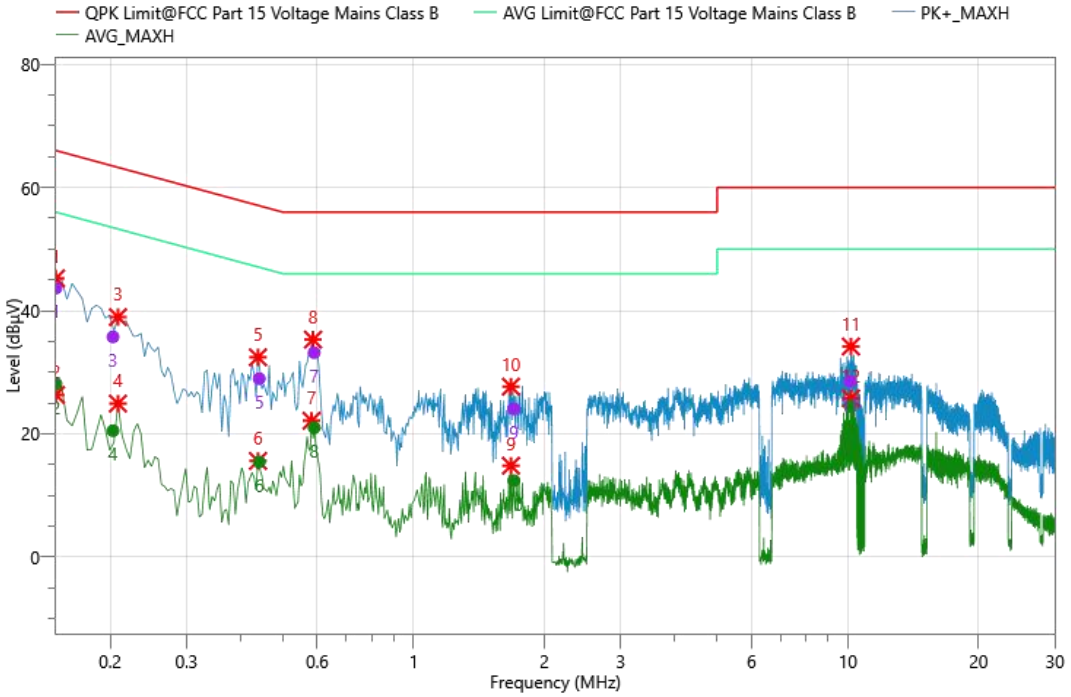
Remark:

Emission Level = Reading + Correct Factor;

Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Attenuation Factor

Margin= Limit- Emission Level .

Test Plots and Data of Conducted Emissions (IEEE 802.11a)Lowest Channel			
Environmental Conditions	24.6℃, 53.4% RH	Test Engineer	He Chen
Test Voltage:	AC 120V/60Hz	Test Power Line:	Neutral



No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE
1	0.150	33.64	10.03	43.67	66.00	22.33	QPK	N	GND
2	0.150	18.09	10.03	28.12	56.00	27.88	AVG	N	GND
3	0.203	25.75	10.01	35.76	63.49	27.73	QPK	N	GND
4	0.203	10.52	10.01	20.53	53.49	32.96	AVG	N	GND
5	0.441	18.86	10.11	28.97	57.04	28.07	QPK	N	GND
6	0.441	5.32	10.11	15.43	47.04	31.61	AVG	N	GND
7	0.590	23.06	10.13	33.19	56.00	22.81	QPK	N	GND
8	0.590	10.89	10.13	21.02	46.00	24.98	AVG	N	GND
9	1.701	13.76	10.3	24.06	56.00	31.94	QPK	N	GND
10	1.701	2.11	10.3	12.41	46.00	33.59	AVG	N	GND
11	10.115	17.02	11.5	28.52	60.00	31.48	QPK	N	GND
12	10.115	13.05	11.5	24.55	50.00	25.45	AVG	N	GND

Remark:

Emission Level = Reading + Correct Factor;

Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Attenuation Factor

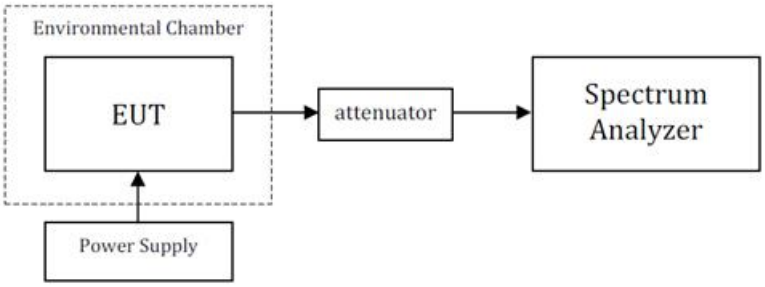
Margin= Limit- Emission Level .

13. FREQUENCY STABILITY

13.1. LIMIT

According to FCC 47 CFR Part 15 Subpart C Section 15.407(g), Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

13.2. TEST SETUP



13.3. TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Test is conducting under the description of ANSI C63.10-2013 section 6.8.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value. Extreme temperature is -20°C~70°C.

13.4. TEST RESULT

Pass.

Please refer to the Appendix G 5G WiFi RF Conducted Test Data.

14. DYNAMIC FREQUENCY SELECTION

14.1. LIMIT

According to FCC 47 CFR Part 15 Subpart C Section 15.407(h), Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. Operators shall only use equipment with a DFS mechanism that is turned on when operating in these bands.

EUT Operating Mode		
DFS Operational mode	Operating Frequency Range	
	5250 MHz to 5350 MHz	5470 MHz to 5725 MHz
Slave without radar Interference detection function	✓	✓

The following table from KDB 905462 and the lists of the applicable requirements for the DFS testing.

Applicability of DFS Requirements Prior to Use of a Channel			
Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	√	Not required	Yes
DFS Detection Threshold	√	Not required	Yes
Channel Availability Check Time	√	Not required	Not required
U-NII Detection Bandwidth	√	Not required	Yes

Applicability of DFS requirements during normal operation		
Requirement	Operational Mode	
	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.

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.	

DFS Response 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 to facilitate 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.	

DFS Radar Signal Parameter:
Radar Type 0 was used in the evaluation of the Client device for the purpose of measuring the Channel Move Time and the Channel Closing Transmission Time.

Short Pulse Radar 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
0	1	Test A	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60%	30
		Test B			
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
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a
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
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.
The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

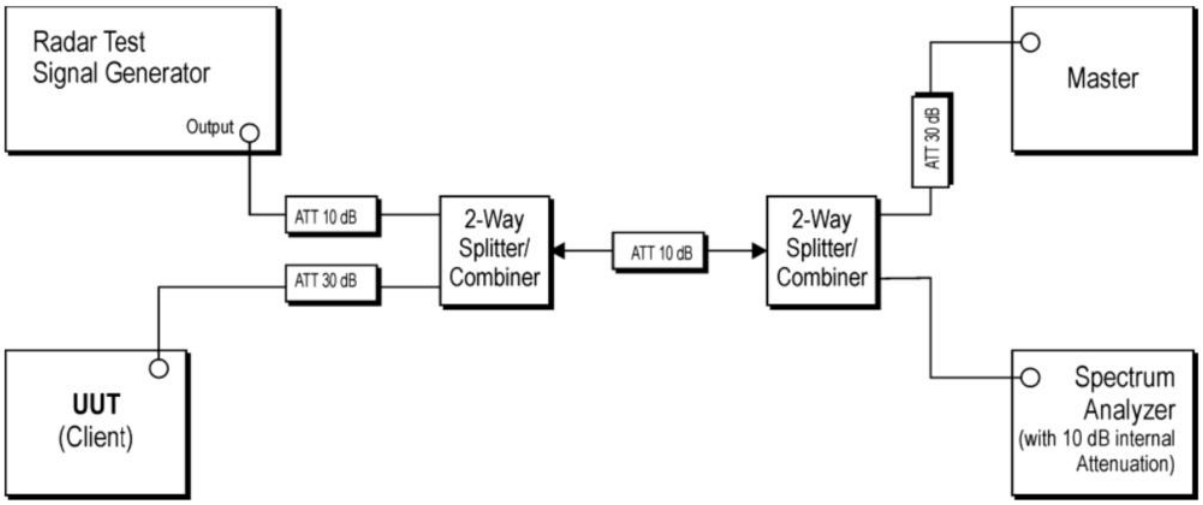
Long Pulse Radar Test Waveform							
Radar Type	**Pulse Width (μsec)**	**Chirp Width (MHz)**	**PRI (μsec)**	**Number of Pulses per Burst**	**Number of Bursts**	**Minimum Percentage of Successful Detection**	**Minimum Number of Trials**
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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

In-Service Monitoring: Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

Limit of In-Service Monitoring:
Reference to DFS Radar Signal Parameter Values.

14.2. TEST SETUP



Wireless AP	Manufacturer:	ASUSTek Computer Inc
	Model Number:	AX5400
	FCC ID:	MSQ-RTAXJ300

14.3. TEST PROCEDURE

a) One frequency will be chosen from the Operating Channels of the EUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

b) In case the EUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the EUT (Master). For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

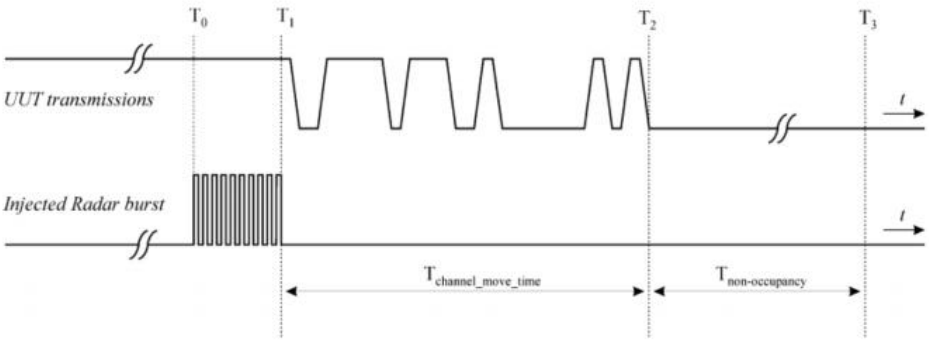
c) The TCP protocol unicast data stream was generated by the iperf software command line with at least 17% activity ratio over any 100ms period.

d) Timing plots are reported with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time).

e) At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 at DFS Detection Threshold levels on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

f) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs.

g) When operating as a Master Device, monitor the EUT for more than 30 minutes following instant T2 to verify that the EUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.



14.4. TEST RESULT

No applicable.

15. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files for Test Setup Photos of the EUT.

16. EXTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for External Photos of the EUT.

17. INTERNAL PHOTOGRAPHS OF THE EUT

Please refer to separated files for Internal Photos of the EUT.

**************************THE END**************************