



FCC RF Test Report

APPLICANT : Motorola Solutions Inc.
EQUIPMENT : WAVE Two-Way Mobile Radio
BRAND NAME : Motorola Solutions
MODEL NAME : TLK 150
MODEL NUMBER : HK2131A
FCC ID : AZ492FT7127
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure
TEST DATE(S) : Jan. 08, 2020 ~ Oct. 14, 2022

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia



Approved by: Jason Jia

Sporton International Inc. (Kunshan)

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR9N0421-08A	Rev. 01	Initial issue of report	Nov. 10, 2022



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
3.3	15.407(a)	Power Spectral Density	≤ 11 dBm	Pass	-
3.4	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 4.14 dB at 5149.92 MHz
-	15.207	AC Conducted Emission	15.207(a)	Not Required	-
3.5	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.6	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.7	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

Remark: Not required means after assessing, the test item is not necessary to carry out.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Motorola Solutions Inc.
8000 West Sunrise Boulevard, Fort Lauderdale, Florida

1.2 Manufacturer

Motorola Solutions Malaysia Sdn. Bhd.
Plot 2A, Medan Bayan Lepas, Mukim 12, S.W.D. 11900 Bayan Lepas, Penang, Malaysia.

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	WAVE Two-Way Mobile Radio
Brand Name	Motorola Solutions
Model Name	TLK 150
Model Number	HK2131A
FCC ID	AZ492FT7127
EUT supports Radios application	WCDMA/LTE/GNSS WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11 a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
IMEI Code	Conducted: 352704110003325 Radiation: 352704119172311
HW Version	P3
SW Version	TLK150_BASE_ENG_R03.05.01
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz 5260 MHz ~ 5320 MHz 5500 MHz ~ 5720 MHz
Maximum Output Power to Antenna	<p><5180 MHz ~ 5240 MHz> 802.11a : 14.42 dBm / 0.0277 W 802.11n HT20 : 12.26 dBm / 0.0168 W 802.11n HT40 : 11.72 dBm / 0.0149 W 802.11ac VHT20 : 11.49 dBm / 0.0141 W 802.11ac VHT40 : 10.72 dBm / 0.0118 W 802.11ac VHT80 : 10.03 dBm / 0.0101 W</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 14.38 dBm / 0.0274 W 802.11n HT20 : 12.24 dBm / 0.0167 W 802.11n HT40 : 11.66 dBm / 0.0147 W 802.11ac VHT20 : 11.34 dBm / 0.0136 W 802.11ac VHT40 : 10.65 dBm / 0.0116 W 802.11ac VHT80 : 9.92 dBm / 0.0098 W</p> <p><5500 MHz ~ 5720 MHz > 802.11a : 14.30 dBm / 0.0269 W 802.11n HT20 : 12.25 dBm / 0.0168 W 802.11n HT40 : 11.73 dBm / 0.0149 W 802.11ac VHT20 : 11.34 dBm / 0.0136 W 802.11ac VHT40 : 10.62 dBm / 0.0115 W 802.11ac VHT80 : 10.03 dBm / 0.0101 W</p>
99% Occupied Bandwidth	<p><5180 MHz ~ 5240 MHz> 802.11a : 16.78 MHz 802.11n HT20 : 17.78 MHz 802.11n HT40 : 35.96 MHz 802.11ac VHT80 : 74.81 MHz</p> <p><5260 MHz ~ 5320 MHz> 802.11a : 16.78 MHz 802.11n HT20 : 17.73 MHz 802.11n HT40 : 36.06 MHz 802.11ac VHT80 : 74.81 MHz</p> <p><5500 MHz ~ 5720 MHz > 802.11a : 16.83 MHz 802.11n HT20 : 17.73 MHz 802.11n HT40 : 36.06 MHz 802.11ac VHT80 : 74.93 MHz</p>
Antenna Type / Gain	<p><5180 MHz ~ 5240 MHz > Chip Antenna with gain 1.9 dBi</p> <p><5260 MHz ~ 5320 MHz > Chip Antenna with gain 1.8 dBi</p> <p><5500 MHz ~ 5720 MHz > Chip Antenna with gain 0.9 dBi</p>
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

Note: For 802.11n HT20/HT40& 802.11ac VHT20/VHT40 mode, the whole testing has assessed only



802.11n HT20/HT40 by referring to the higher output power.

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH05-KS 03CH06-KS TH01-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH05-KS	AUDIX	E3	6.2009-8-24
2.	03CH06-KS	AUDIX	E3	6.2009-8-24a1

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

- a. The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz U-NII-1	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42 [#]	5210		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5260-5320 MHz U-NII-2A	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	58 [#]	5290		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5500- 5720 MHz MHz U-NII-2C	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	106 [#]	5530	134*	5670
	108	5540	136	5680
	110*	5550	140	5700



Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
TDWR Channel	118*	5590	124	5620
	120	5600	126*	5630
	122 [#]	5610	128	5640

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	138 [#]	5690	144	5720
	142*	5710		

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "[#]" were 802.11ac VHT80.



2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

Remark: test mode: DC power supply + EUT + TC1

TC1: External speaker(AC000240A01)+ External Mic (PMMN4129A)+ Footswitch (RLN4836AR)+ Footswitch (RLN4856A)+ Ignition Sense Cable with Housing Connector(HKN9327BR)

Co-location
WLAN + WWAN: WLAN 802. 11n HT40_Ch38 + WWAN LTE B7 QPSK 20M(BW)
Remark: Co-location test mode choose the worst RSE link mode of WWAN (GSM/WCDMA/LTE) and the worst RSE link mode of WLAN (2.4G/5G) to perform the combination testing

For 802.11ac VHT20/ VHT40 / VHT80 RSE testing, only worse cases were recorded in this report.

Ch. #		U-NII-1 : 5180-5240 MHz	U-NII-2A : 5260-5320 MHz	U-NII-2C : 5500- 5720 MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

Ch. #		U-NII-1 : 5180-5240 MHz	U-NII-2A : 5260-5320 MHz	U-NII-2C : 5500- 5720 MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144



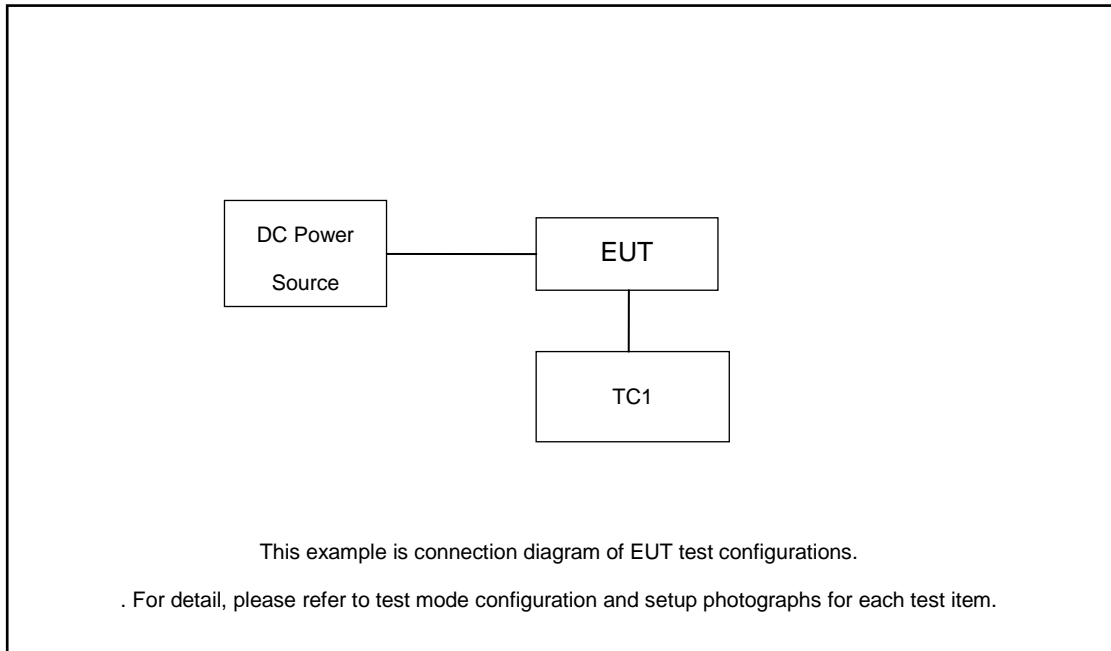
Ch. #		U-NII-1 : 5180-5240 MHz	U-NII-2A : 5260-5320 MHz	U-NII-2C : 5500- 5720 MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134
Straddle		-	-	142

Ch. #		U-NII-1 : 5180-5240 MHz	U-NII-2A : 5260-5320 MHz	U-NII-2C : 5500- 5720 MHz
		802.11ac VHT20	802.11ac VHT20	802.11ac VHT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

Ch. #		U-NII-1 : 5180-5240 MHz	U-NII-2A : 5260-5320 MHz	U-NII-2C : 5500- 5720 MHz
		802.11ac VHT40	802.11ac VHT40	802.11ac VHT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134
Straddle		-	-	142

Ch. #		U-NII-1 : 5180-5240 MHz	U-NII-2A : 5260-5320 MHz	U-NII-2C : 5500- 5720 MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	122
Straddle		-	-	138

2.3 Connection Diagram of Test System



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss

$$\text{Offset} = \text{RF cable loss}$$

Following shows an offset computation example with cable loss 7.0 dB.

$$\begin{aligned} \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 7.0 \text{ (dB)} \end{aligned}$$

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

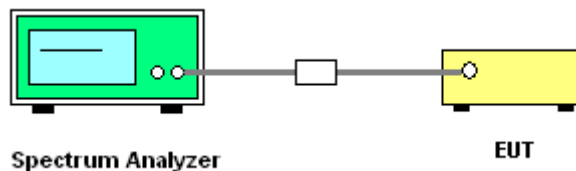
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

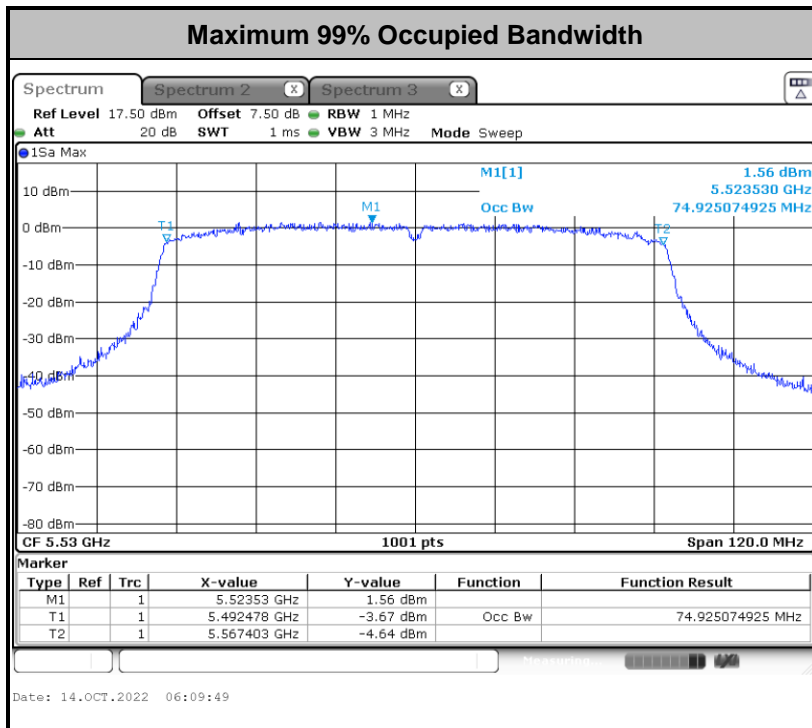
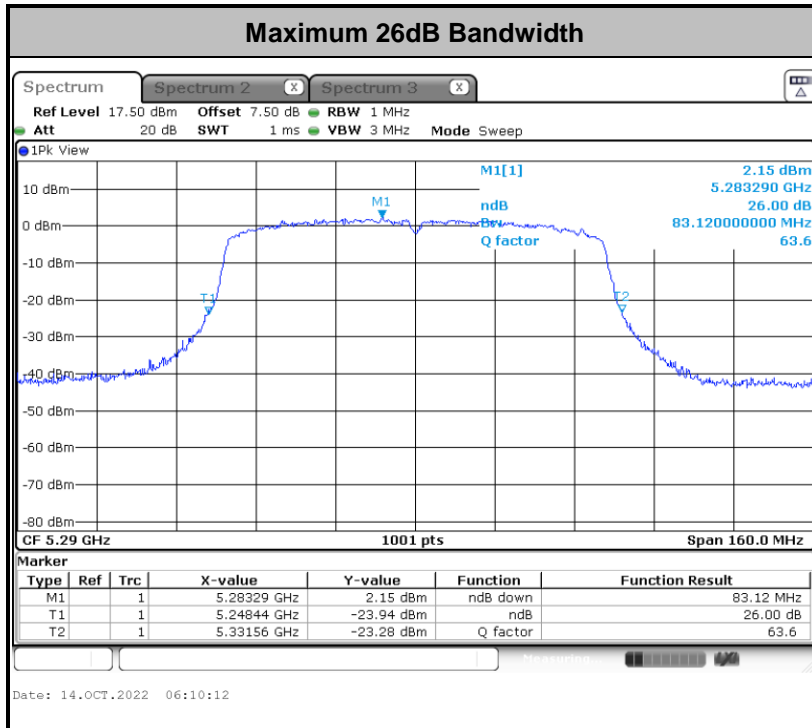
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak 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%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) $\geq 3 * RBW$.
8. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm $10 \log B$, where B is the 26 dB emission bandwidth in megahertz.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

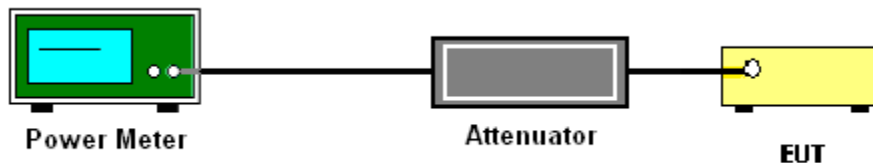
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

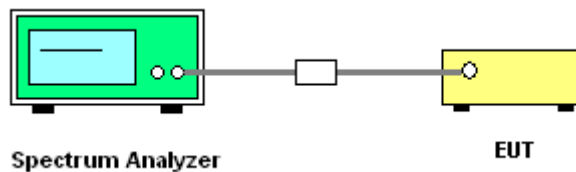
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section F) Maximum power spectral density.

Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

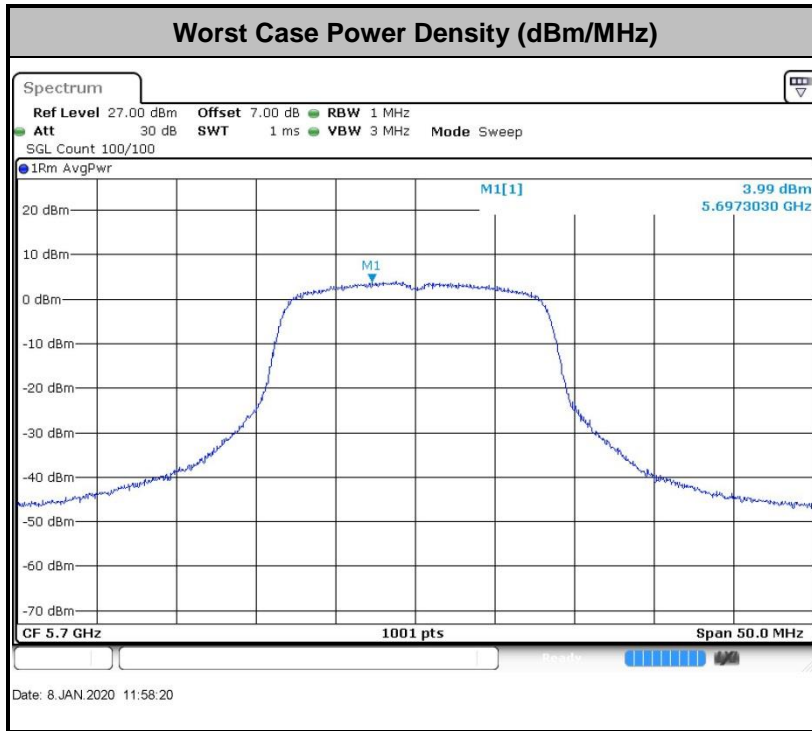
- Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW \geq 3 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
1. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
 2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



Note: Average Power Density (dB) = Measured value+ Duty Factor



3.4 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

- (2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table,

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



EIRP (dBm)	Field Strength at 3m (dBµV/m)
- 27	68.3

Note: The following formula is used to convert the EIRP to field strength.

$$EIRP = E_{Meas} + 20\log (d_{Meas}) - 104.77$$

where

EIRP is the equivalent isotropically radiated power, in dBm

E_{Meas} is the field strength of the emission at the measurement distance, in dBµV/m

d_{Meas} is the measurement distance, in m

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

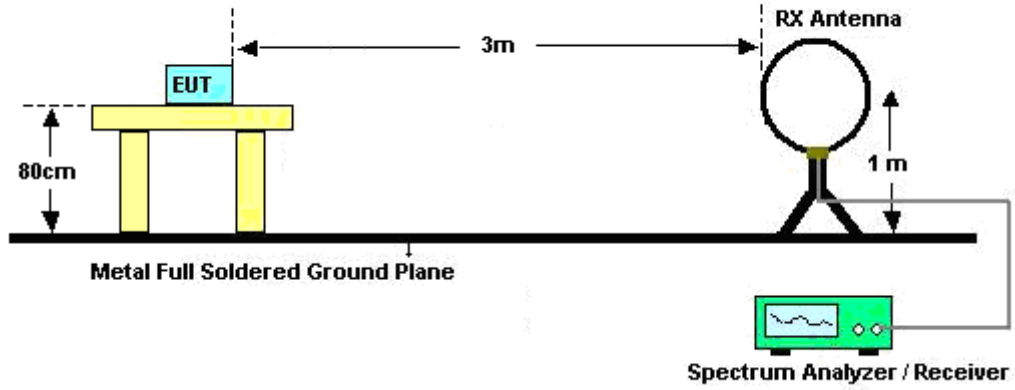


3.4.3 Test Procedures

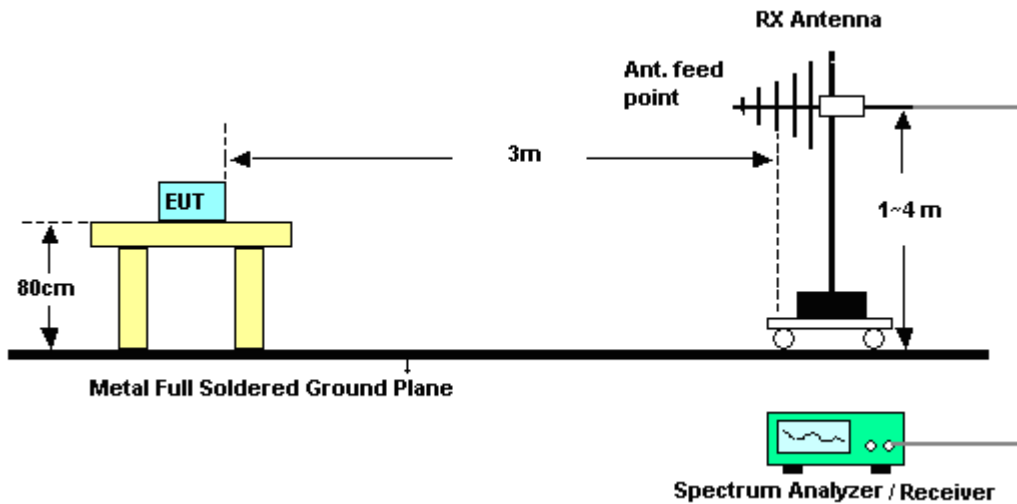
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW \geq 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

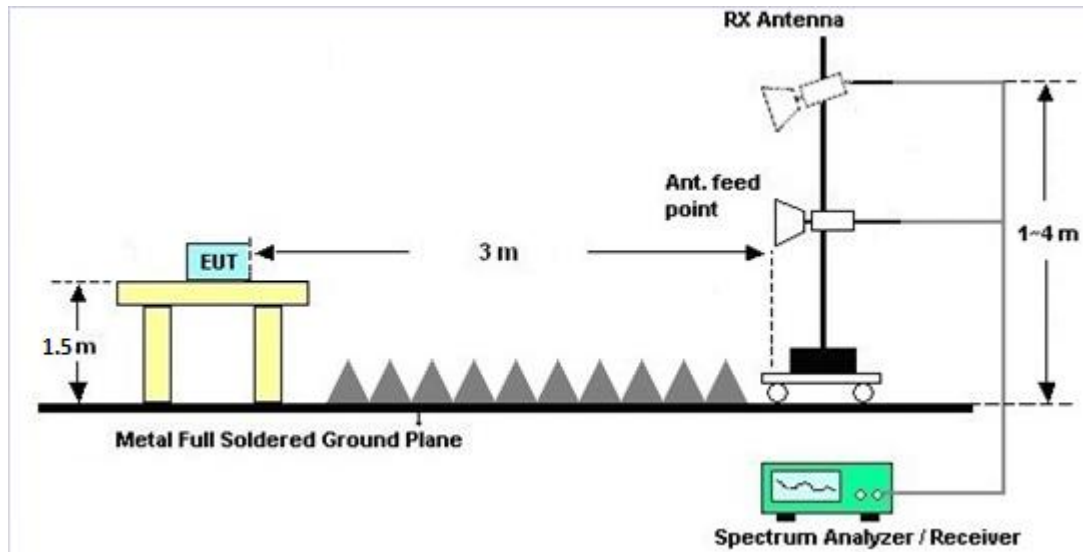
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.4.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.4.7 Duty Cycle

Please refer to Appendix C.

3.4.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix B.

3.5 Frequency Stability Measurement

3.5.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

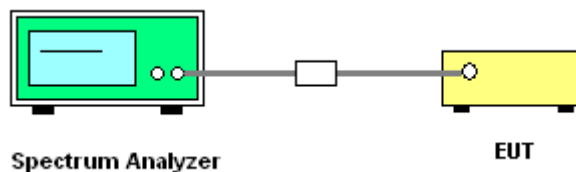
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.5.4 Test Setup



3.5.5 Test Result of Frequency Stability

Please refer to Appendix A.



3.6 Automatically Discontinue Transmission

3.6.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.



3.7 Antenna Requirements

3.7.1 Standard Applicable

If transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2019	Jan. 08, 2020	Aug. 06, 2020	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 14, 2019	Jan. 08, 2020	Jan. 13, 2020	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 14, 2019	Jan. 08, 2020	Jan. 13, 2020	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 13, 2022	Oct. 14, 2022	Oct. 12, 2023	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 05, 2022	Oct. 14, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 05, 2022	Oct. 14, 2022	Jan. 04, 2023	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 26, 2021	Oct. 14, 2022	Oct. 25, 2022	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44GHz	Apr. 16, 2019	Jan. 15, 2020	Apr. 18, 2020	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	May 30, 2019	Jan. 15, 2020	May 29, 2020	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Jan. 27, 2019	Jan. 15, 2020	Jan. 26, 2020	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 08, 2020	Jan. 15, 2020	Jan. 07, 2021	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Aug. 06, 2019	Jan. 15, 2020	Aug. 05, 2020	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Apr. 17, 2019	Jan. 15, 2020	Apr. 16, 2020	Radiation (03CH06-KS)
Amplifier	MITEQ	TTA1840-35-HG	2014749	18~40GHz	Jan. 14, 2020	Jan. 15, 2020	Jan. 13, 2021	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 15, 2019	Jan. 15, 2020	Apr. 14, 2020	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jan. 15, 2020	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jan. 15, 2020	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jan. 15, 2020	NCR	Radiation (03CH06-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 16, 2021	Oct. 12, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz-44G,MAX 30dB	Mar. 24, 2022	Oct. 12, 2022	Mar. 23, 2023	Radiation (03CH05-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Oct. 12, 2022	Oct. 29, 2022	Radiation (03CH05-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	May 24, 2022	Oct. 12, 2022	May 23, 2023	Radiation (03CH05-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2021	Oct. 12, 2022	Nov. 07, 2022	Radiation (03CH05-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	Oct. 12, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
Amplifier	SONOMA	310N	380826	9KHz-1GHz	Jul. 11, 2022	Oct. 12, 2022	Jul. 10, 2023	Radiation (03CH05-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	Oct. 12, 2022	Jan. 04, 2023	Radiation (03CH05-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2012228	1Ghz-18Ghz	Oct. 16, 2021	Oct. 12, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
Amplifier	Keysight	83017A	MY53270316	500MHz~26.5GHz	Oct. 16, 2021	Oct. 12, 2022	Oct. 15, 2022	Radiation (03CH05-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Oct. 12, 2022	NCR	Radiation (03CH05-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Oct. 12, 2022	NCR	Radiation (03CH05-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Oct. 12, 2022	NCR	Radiation (03CH05-KS)

NCR: No Calibration Required.



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. 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.

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Conducted Power	±0.46 dB
Conducted Emissions	±0.48 dB
Occupied Channel Bandwidth	±0.1 %
Conducted Power Spectral Density	0.40dB

For 03CH05-KS& 03CH06-KS

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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Appendix A. Conducted Test Results

Report Number : FR9N0421-08A

Test Engineer:	Aly Cao	Temperature:	21~25	°C
Test Date:	2020/1/8~2022/10/14	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

U-NII-1										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)		
11a	6Mbps	1	36	5180	16.78	20.63	-	22.25		
11a	6Mbps	1	44	5220	16.73	20.83	-	22.24		
11a	6Mbps	1	48	5240	16.68	20.78	-	22.22		
HT20	MCS0	1	36	5180	17.78	21.53	-	22.50		
HT20	MCS0	1	44	5220	17.73	21.38	-	22.49		
HT20	MCS0	1	48	5240	17.68	21.38	-	22.48		
HT40	MCS0	1	38	5190	35.96	41.63	-	23.01		
HT40	MCS0	1	46	5230	35.96	41.27	-	23.01		

TEST RESULTS DATA
Average Power Table

U-NII-1										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	0.22	14.42	24.00	1.90		Pass
11a	6Mbps	1	44	5220	0.22	14.37	24.00	1.90		Pass
11a	6Mbps	1	48	5240	0.22	14.34	24.00	1.90		Pass
HT20	MCS0	1	36	5180	0.24	12.26	24.00	1.90		Pass
HT20	MCS0	1	44	5220	0.24	12.15	24.00	1.90		Pass
HT20	MCS0	1	48	5240	0.24	12.25	24.00	1.90		Pass
HT40	MCS0	1	38	5190	0.50	11.72	24.00	1.90		Pass
HT40	MCS0	1	46	5230	0.50	11.69	24.00	1.90		Pass

TEST RESULTS DATA
Power Spectral Density

U-NII-1										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)	-	Pass/Fail
11a	6Mbps	1	36	5180	0.22	4.03	11.00	1.90		Pass
11a	6Mbps	1	44	5220	0.22	4.16	11.00	1.90		Pass
11a	6Mbps	1	48	5240	0.22	4.20	11.00	1.90		Pass
HT20	MCS0	1	36	5180	0.24	2.13	11.00	1.90		Pass
HT20	MCS0	1	44	5220	0.24	2.34	11.00	1.90		Pass
HT20	MCS0	1	48	5240	0.24	2.38	11.00	1.90		Pass
HT40	MCS0	1	38	5190	0.50	-1.82	11.00	1.90		Pass
HT40	MCS0	1	46	5230	0.50	-1.68	11.00	1.90		Pass

TEST RESULTS DATA
26dB and 99% OBW

U-NII-2A										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)	FCC 26dB Bandwidth Power Limit (dBm)	Note
11a	6M bps	1	52	5260	16.78	20.68	23.25	29.25	23.98	
11a	6M bps	1	60	5300	16.73	20.88	23.24	29.24	23.98	
11a	6M bps	1	64	5320	16.68	20.88	23.22	29.22	23.98	
HT20	MCS 0	1	52	5260	17.73	21.58	23.49	29.49	23.98	
HT20	MCS 0	1	60	5300	17.68	21.68	23.48	29.48	23.98	
HT20	MCS 0	1	64	5320	17.68	21.58	23.48	29.48	23.98	
HT40	MCS 0	1	54	5270	35.96	41.72	23.98	30.00	23.98	
HT40	MCS 0	1	62	5310	36.06	41.27	23.98	30.00	23.98	

TEST RESULTS DATA
Average Power Table

U-NII-2A										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	52	5260	0.22	14.36	23.98	1.80	26.99	Pass
11a	6M bps	1	60	5300	0.22	14.38	23.98	1.80	26.99	Pass
11a	6M bps	1	64	5320	0.22	14.23	23.98	1.80	26.99	Pass
HT20	MCS 0	1	52	5260	0.24	12.24	23.98	1.80	26.99	Pass
HT20	MCS 0	1	60	5300	0.24	12.19	23.98	1.80	26.99	Pass
HT20	MCS 0	1	64	5320	0.24	12.05	23.98	1.80	26.99	Pass
HT40	MCS 0	1	54	5270	0.50	11.61	23.98	1.80	26.99	Pass
HT40	MCS 0	1	62	5310	0.50	11.66	23.98	1.80	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

U-NII-2A										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)		Pass/Fail
11a	6M bps	1	52	5260	0.22	3.68	11.00	1.80		Pass
11a	6M bps	1	60	5300	0.22	3.68	11.00	1.80		Pass
11a	6M bps	1	64	5320	0.22	4.19	11.00	1.80		Pass
HT20	MCS 0	1	52	5260	0.24	2.04	11.00	1.80		Pass
HT20	MCS 0	1	60	5300	0.24	1.91	11.00	1.80		Pass
HT20	MCS 0	1	64	5320	0.24	1.95	11.00	1.80		Pass
HT40	MCS 0	1	54	5270	0.50	-1.82	11.00	1.80		Pass
HT40	MCS 0	1	62	5310	0.50	-1.63	11.00	1.80		Pass

TEST RESULTS DATA
26dB and 99% OBW

U-NII-2C										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)	FCC 26dB Bandwidth Power Limit (dBm)	Note
11a	6M bps	1	100	5500	16.83	21.08	23.26	29.26	23.98	
11a	6M bps	1	116	5580	16.73	21.03	23.24	29.24	23.98	
11a	6M bps	1	140	5700	16.78	20.78	23.25	29.25	23.98	
11a	6Mbps	1	144	5720	16.68	20.63	23.22	29.22	23.98	
HT20	MCS 0	1	100	5500	17.73	21.58	23.49	29.49	23.98	
HT20	MCS 0	1	116	5580	17.68	21.68	23.48	29.48	23.98	
HT20	MCS 0	1	140	5700	17.73	21.63	23.49	29.49	23.98	
HT20	MCS0	1	144	5720	14.73	21.48	22.68	28.68	23.98	
HT40	MCS 0	1	102	5510	35.96	41.63	23.98	30.00	23.98	
HT40	MCS 0	1	110	5550	36.06	41.63	23.98	30.00	23.98	
HT40	MCS 0	1	134	5670	35.96	41.63	41.00	30.00	23.98	
HT40	MCS0	1	142	5710	36.06	41.72	41.00	30.00	23.98	

TEST RESULTS DATA
Average Power Table

U-NII-2C										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	100	5500	0.22	14.25	23.98	0.90	26.99	Pass
11a	6M bps	1	116	5580	0.22	14.26	23.98	0.90	26.99	Pass
11a	6M bps	1	140	5700	0.22	14.28	23.98	0.90	26.99	Pass
11a	6Mbps	1	144	5720	0.22	14.30	23.98	0.90	26.99	Pass
HT20	MCS 0	1	100	5500	0.24	12.07	23.98	0.90	26.99	Pass
HT20	MCS 0	1	116	5580	0.24	12.25	23.98	0.90	26.99	Pass
HT20	MCS 0	1	140	5700	0.24	12.12	23.98	0.90	26.99	Pass
HT20	MCS0	1	144	5720	0.24	12.17	23.98	0.90	26.99	Pass
HT40	MCS 0	1	102	5510	0.50	11.58	23.98	0.90	26.99	Pass
HT40	MCS 0	1	110	5550	0.50	11.47	23.98	0.90	26.99	Pass
HT40	MCS 0	1	134	5670	0.50	11.73	23.98	0.90	26.99	Pass
HT40	MCS0	1	142	5710	0.50	11.65	23.98	0.90	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

U-NII-2C										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)		Pass/Fail
11a	6M bps	1	100	5500	0.22	3.67	11.00	0.90		Pass
11a	6M bps	1	116	5580	0.22	3.98	11.00	0.90		Pass
11a	6M bps	1	140	5700	0.22	4.21	11.00	0.90		Pass
11a	6Mbps	1	144	5720	0.22	3.63	11.00	0.90		Pass
HT20	MCS 0	1	100	5500	0.24	1.89	11.00	0.90		Pass
HT20	MCS 0	1	116	5580	0.24	1.94	11.00	0.90		Pass
HT20	MCS 0	1	140	5700	0.24	2.02	11.00	0.90		Pass
HT20	MCS0	1	144	5720	0.24	1.78	11.00	0.90		Pass
HT40	MCS 0	1	102	5510	0.50	-2.16	11.00	0.90		Pass
HT40	MCS 0	1	110	5550	0.50	-1.88	11.00	0.90		Pass
HT40	MCS 0	1	134	5670	0.50	-1.86	11.00	0.90		Pass
HT40	MCS0	1	142	5710	0.50	-2.72	11.00	0.90		Pass

TEST RESULTS DATA
Frequency Stability

U-NII-1										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	60	13.2	
11a	6Mbps	1	36	5180	5180.025	0.025	4.83	-20	13.2	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	25	33.1	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	25	10.5	
11a	6Mbps	1	36	5180	5180.000	0.000	0.00	25	13.2	

U-NII-2A										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	64	5320	5320.025	0.025	4.70	60	13.2	
11a	6Mbps	1	64	5320	5320.025	0.025	4.70	-20	13.2	
11a	6Mbps	1	64	5320	5320.000	0.000	0.00	25	33.1	
11a	6Mbps	1	64	5320	5320.025	0.025	4.70	25	10.5	
11a	6Mbps	1	64	5320	5320.025	0.025	4.70	25	13.2	

U-NII-2C										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	100	5500	5500.025	0.025	4.55	60	13.2	
11a	6Mbps	1	100	5500	5500.025	0.025	4.55	-20	13.2	
11a	6Mbps	1	100	5500	5500.025	0.025	4.55	25	33.1	
11a	6Mbps	1	100	5500	5500.025	0.025	4.55	25	10.5	
11a	6Mbps	1	100	5500	5500.025	0.025	4.55	25	13.2	

TEST RESULTS DATA
26dB and 99% OBW

U-NII-1 single antenna													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
VHT80	MCS0	1	42	5210	74.81	-	82.64	-	-	-	23.01	-	

TEST RESULTS DATA
Average Power Table

FCC U-NII-1 single antenna														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)				Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2			
VHT20	MCS0	1	36	5180	11.49	-		24.00	-	1.90	-			Pass
VHT20	MCS0	1	44	5220	11.29	-		24.00	-	1.90	-			Pass
VHT20	MCS0	1	48	5240	11.25	-		24.00	-	1.90	-			Pass
VHT40	MCS0	1	38	5190	10.72	-		24.00	-	1.90	-			Pass
VHT40	MCS0	1	46	5230	10.50	-		24.00	-	1.90	-			Pass
VHT80	MCS0	1	42	5210	10.03	-		24.00	-	1.90	-			Pass

TEST RESULTS DATA
Power Spectral Density

FCC U-NII-1 single antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
VHT80	MCS0	1	42	5210	-7.91	-		11.00	-	1.90	-	Pass

TEST RESULTS DATA
26dB and 99% OBW

U-NII-2A single antenna															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		FCC 26dB Bandwidth Power Limit (dBm)		Note
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
VHT80	MCS0	1	58	5290	74.81	-	83.12	-	23.98	-	30.00	-	23.98	-	

TEST RESULTS DATA
Average Power Table

FCC U-NII-2A single antenna													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
VHT20	MCS0	1	52	5260	11.34	-		23.98	-	1.80	-	26.99	Pass
VHT20	MCS0	1	60	5300	11.24	-		23.98	-	1.80	-	26.99	Pass
VHT20	MCS0	1	64	5320	11.28	-		23.98	-	1.80	-	26.99	Pass
VHT40	MCS0	1	54	5270	10.65	-		23.98	-	1.80	-	26.99	Pass
VHT40	MCS0	1	62	5310	10.50	-		23.98	-	1.80	-	26.99	Pass
VHT80	MCS0	1	58	5290	9.92	-		23.98	-	1.80	-	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

U-NII-2A single antenna												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
VHT80	MCS0	1	58	5290	-7.62	-		11.00	-	1.80	-	Pass

TEST RESULTS DATA
26dB and 99% OBW

U-NII-2C single antenna																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth In U-NII 2C (MHz)		26 dB Bandwidth In U-NII 2C (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		FCC 26dB Bandwidth Power Limit (dBm)		6 dB Bandwidth for Straddle Channel (MHz)	
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
VHT80	MCS0	1	106	5530	74.93	-	82.48	-	23.98	-	30.00	-	23.98	-	----	----
VHT80	MCS0	1	122	5610	74.93	-	82.96	-	23.98	-	30.00	-	23.98	-	----	----

U-NII-2C straddle channel single antenna																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth In U-NII 2C (MHz)		26 dB Bandwidth In U-NII 2C (MHz)		IC 99% Bandwidth Power Limit (dBm)		IC 99% Bandwidth EIRP Limit (dBm)		FCC 26dB Bandwidth Power Limit (dBm)		6 dB Bandwidth for Straddle Channel (MHz)	
					Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
VHT80	MCS0	1	138	5690	74.93	-	82.80	-	23.98	-	30.00	-	23.98	-	-	-

TEST RESULTS DATA
Average Power Table

FCC U-NII-2C single antenna													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
VHT20	MCS0	1	100	5500	11.17	-		23.98	-	0.90	-	26.99	Pass
VHT20	MCS0	1	116	5580	11.29	-		23.98	-	0.90	-	26.99	Pass
VHT20	MCS0	1	140	5700	11.34	-		23.98	-	0.90	-	26.99	Pass
VHT40	MCS0	1	102	5510	10.31	-		23.98	-	0.90	-	26.99	Pass
VHT40	MCS0	1	110	5550	10.39	-		23.98	-	0.90	-	26.99	Pass
VHT40	MCS0	1	134	5670	10.50	-		23.98	-	0.90	-	26.99	Pass
VHT80	MCS0	1	106	5530	9.75	-		23.98	-	0.90	-	26.99	Pass
VHT80	MCS0	1	122	5610	9.99	-		23.98	-	0.90	-	26.99	Pass

FCC U-NII-2C straddle channel single antenna													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power with duty factor (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
VHT20	MCS0	1	144	5720	11.04	-		23.98	-	0.90	-	26.99	Pass
VHT40	MCS0	1	142	5710	10.62	-		23.98	-	0.90	-	26.99	Pass
VHT80	MCS0	1	138	5690	10.03	-		23.98	-	0.90	-	26.99	Pass

TEST RESULTS DATA
Power Spectral Density

U-NII-2C single antenna													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
VHT80	MCS0	1	106	5530	-7.90	-		11.00	-	0.90	-		Pass
VHT80	MCS0	1	122	5610	-7.85	-		11.00	-	0.90	-		Pass

U-NII-2C straddle channel single antenna													
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Power Density (dBm/MHz)			Average PSD Limit (dBm/MHz)		DG (dBi)			Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
VHT80	MCS0	1	138	5690	-7.77	-		11.00	-	0.90	-		Pass



Appendix B. Radiated Spurious Emission

U-NII-1 - 5150~5250MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5149.44	59.37	-14.63	74	44.64	34.3	10.89	30.46	279	221	P	H
		5150	48.95	-5.05	54	34.22	34.3	10.89	30.46	279	221	A	H
	*	5176	108.74	-	-	93.88	34.37	10.93	30.44	279	221	P	H
		5176	100.92	-	-	86.06	34.37	10.93	30.44	279	221	A	H
		5136.96	57.67	-16.33	74	43	34.27	10.87	30.47	306	146	P	V
		5150	48.53	-5.47	54	33.8	34.3	10.89	30.46	306	146	A	V
	*	5176	108.02	-	-	93.16	34.37	10.93	30.44	306	146	P	V
		5176	100.46	-	-	85.6	34.37	10.93	30.44	306	146	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36		10360	41.28	-27.02	68.3	51.11	37.67	15.07	62.57	300	0	P	H
5180MHz		10360	41.39	-26.91	68.3	51.22	37.67	15.07	62.57	100	360	P	V
802.11a CH 44		10440	41.48	-26.82	68.3	51.22	37.73	15.12	62.59	300	0	P	H
5220MHz		10440	42.01	-26.29	68.3	51.75	37.73	15.12	62.59	100	360	P	V
802.11a CH 48		10480	41.22	-27.08	68.3	50.88	37.78	15.16	62.6	300	0	P	H
5240MHz		10480	42.76	-25.54	68.3	52.42	37.78	15.16	62.6	100	360	P	V
Remark	3. No other spurious found. 4. All results are PASS against Peak and Average limit line.												



U-NII-1 5150~5250MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test results for 802.11n HT20 CH 36 5180MHz and a Remark section.



U-NII-1 5150~5250MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test results for 10360, 10440, and 10480 MHz channels.



U-NII-1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test results for 802.11n HT40 CH 38 5190MHz and a Remark section.



U-NII-1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test results for 10380 MHz and 10460 MHz channels.



U-NII-2A - 5250~5350MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 64 5320MHz		5350.6	57.46	-16.54	74	42	34.7	11.11	30.35	307	227	P	H
		5350.2	47.57	-6.43	54	32.11	34.7	11.11	30.35	307	227	A	H
		5320	107.3	-	-	91.96	34.63	11.08	30.37	307	227	P	H
		5320	99.51	-	-	84.17	34.63	11.08	30.37	307	227	A	H
		5359	56.26	-17.74	74	40.8	34.7	11.11	30.35	103	112	P	V
		5350.4	48.04	-5.96	54	32.58	34.7	11.11	30.35	103	112	A	V
		5320	107.71	-	-	92.37	34.63	11.08	30.37	103	112	P	V
		5320	100.41	-	-	85.07	34.63	11.08	30.37	103	112	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-2A 5250~5350MHz
WIFI 802.11a (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for channels 52, 60, and 64 at frequencies 10520, 10600, and 10640 MHz.

Remark
1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



U-NII-2A 5250~5350MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test data for 802.11n HT20 CH 64 5320MHz and a Remark section.



U-NII-2A 5250~5350MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test results for 802.11n HT20 channels 52, 60, and 64 at 10520, 10600, and 10640 MHz.



U-NII-2A 5250~5350MHz

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
WIFI 802.11n HT40		5114.4	55.7	-18.3	74	41.1	34.23	10.86	30.49	294	222	P	H
		5112.64	46.76	-7.24	54	32.16	34.23	10.86	30.49	294	222	A	H
	*	5314	100.72	-	-	85.38	34.63	11.08	30.37	294	222	P	H
		5314	93.43	-	-	78.09	34.63	11.08	30.37	294	222	A	H
		5354.6	60.81	-13.19	74	45.35	34.7	11.11	30.35	294	222	P	H
		5350.9	48.34	-5.66	54	32.88	34.7	11.11	30.35	294	222	A	H
802.11n HT40 CH 62 5310MHz		5105.44	55.33	-18.67	74	40.78	34.2	10.84	30.49	277	119	P	V
		5115.36	46.67	-7.33	54	32.07	34.23	10.86	30.49	277	119	A	V
	*	5314	103.79	-	-	88.45	34.63	11.08	30.37	277	119	P	V
		5314	95.87	-	-	80.53	34.63	11.08	30.37	277	119	A	V
		5354.2	63.04	-10.96	74	47.58	34.7	11.11	30.35	277	119	P	V
		5350.8	49.5	-4.5	54	34.04	34.7	11.11	30.35	277	119	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-2A 5250~5350MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test results for 802.11n HT40 CH 54 and CH 62 at 10540MHz and 10620MHz, and a Remark section.



U-NII-2C - 5470~5725MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 100 5500MHz		5427.6	55.61	-18.39	74	40.02	34.7	11.19	30.3	303	67	P	H
		5468.08	56.27	-12.03	68.3	40.62	34.7	11.24	30.29	303	67	P	H
		5459.12	47.18	-6.82	54	31.55	34.7	11.22	30.29	303	67	A	H
	*	5500	107.3	-	-	91.6	34.7	11.28	30.28	303	67	P	H
		5500	99.43	-	-	83.73	34.7	11.28	30.28	303	67	A	H
		5454.32	56.44	-17.56	74	40.81	34.7	11.22	30.29	108	105	P	V
		5466.64	56.91	-11.39	68.3	41.26	34.7	11.24	30.29	108	105	P	V
		5459.28	47.46	-6.54	54	31.83	34.7	11.22	30.29	108	105	A	V
	*	5500	107.12	-	-	91.42	34.7	11.28	30.28	108	105	P	V
	5500	99.83	-	-	84.13	34.7	11.28	30.28	108	105	A	V	
802.11a CH 140 5700MHz		5725.64	58.15	-10.15	68.3	42.04	34.77	11.58	30.24	304	63	P	H
	*	5698	105.53	-	-	89.54	34.7	11.52	30.23	304	63	P	H
		5698	97.77	-	-	81.78	34.7	11.52	30.23	304	63	A	H
		5727.96	60.36	-7.94	68.3	44.25	34.77	11.58	30.24	312	167	P	V
	*	5698	106.9	-	-	90.91	34.7	11.52	30.23	312	167	P	V
	5698	99.7	-	-	83.71	34.7	11.52	30.23	312	167	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-2C - 5470~5725MHz
WIFI 802.11a (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for channels 100, 116, and 140 at various frequencies and antenna positions.

Remark

- 1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



**U-NII-2C - 5470~5725MHz
WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 100 5500MHz		5410.48	55.77	-18.23	74	40.22	34.7	11.17	30.32	291	231	P	H
		5463.92	56.44	-11.86	68.3	40.79	34.7	11.24	30.29	291	231	P	H
		5458.16	47.12	-6.88	54	31.49	34.7	11.22	30.29	291	231	A	H
	*	5494	104.8	-	-	89.12	34.7	11.26	30.28	291	231	P	H
		5494	97.18	-	-	81.5	34.7	11.26	30.28	291	231	A	H
		5458.96	56.26	-17.74	74	40.63	34.7	11.22	30.29	106	106	P	V
		5466.64	57.42	-10.88	68.3	41.77	34.7	11.24	30.29	106	106	P	V
		5459.6	47.35	-6.65	54	31.72	34.7	11.22	30.29	106	106	A	V
	*	5506	105.16	-	-	89.44	34.7	11.28	30.26	106	106	P	V
	5506	97.53	-	-	81.81	34.7	11.28	30.26	106	106	A	V	
802.11n HT20 CH 140 5700MHz		5729.56	57.41	-10.89	68.3	41.3	34.77	11.58	30.24	275	65	P	H
	*	5698	103.63	-	-	87.64	34.7	11.52	30.23	275	65	P	H
		5698	96.4	-	-	80.41	34.7	11.52	30.23	275	65	A	H
		5725.32	58.79	-9.51	68.3	42.68	34.77	11.58	30.24	303	164	P	V
	*	5698	105.16	-	-	89.17	34.7	11.52	30.23	303	164	P	V
	5698	97.68	-	-	81.69	34.7	11.52	30.23	303	164	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-2C - 5470~5725MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for channels 100, 116, and 140 at various frequencies.



**U-NII-2C - 5470~5725MHz
WIFI 802.11n HT40 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 102 5510MHz		5452.08	56.66	-17.34	74	41.03	34.7	11.22	30.29	289	230	P	H
		5465.68	62.5	-5.8	68.3	46.85	34.7	11.24	30.29	289	230	P	H
		5458.8	47.64	-6.36	54	32.01	34.7	11.22	30.29	289	230	A	H
	*	5506	101.04	-	-	85.32	34.7	11.28	30.26	289	230	P	H
		5506	93.9	-	-	78.18	34.7	11.28	30.26	289	230	A	H
		5737.88	56.85	-11.45	68.3	40.7	34.8	11.61	30.26	289	230	P	H
		5456.4	57.56	-16.44	74	41.93	34.7	11.22	30.29	100	109	P	V
		5468.56	60.01	-8.29	68.3	44.36	34.7	11.24	30.29	100	109	P	V
		5457.2	47.94	-6.06	54	32.31	34.7	11.22	30.29	100	109	A	V
	*	5500	101.99	-	-	86.29	34.7	11.28	30.28	100	109	P	V
		5500	94.2	-	-	78.5	34.7	11.28	30.28	100	109	A	V
		5748.44	57.05	-11.25	68.3	40.9	34.8	11.61	30.26	100	109	P	V
802.11n HT40 CH 134 5670MHz		5428.56	56	-18	74	40.4	34.7	11.2	30.3	278	66	P	H
		5466.64	55.83	-12.47	68.3	40.18	34.7	11.24	30.29	278	66	P	H
		5448.08	46.28	-7.72	54	30.66	34.7	11.22	30.3	278	66	A	H
	*	5668	101.33	-	-	85.36	34.7	11.48	30.21	278	66	P	H
		5668	93.44	-	-	77.47	34.7	11.48	30.21	278	66	A	H
		5752.04	57.74	-10.56	68.3	41.53	34.83	11.64	30.26	278	66	P	H
		5390.48	56.68	-17.32	74	41.16	34.7	11.15	30.33	275	164	P	V
		5465.2	54.52	-13.78	68.3	38.87	34.7	11.24	30.29	275	164	P	V
		5457.68	46.32	-7.68	54	30.69	34.7	11.22	30.29	275	164	A	V
	*	5662	102.63	-	-	86.69	34.7	11.45	30.21	275	164	P	V
	5662	95.23	-	-	79.29	34.7	11.45	30.21	275	164	A	V	
	5728.84	62.37	-5.93	68.3	46.26	34.77	11.58	30.24	275	164	P	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



U-NII-2C - 5470~5725MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for channels 102, 110, and 134 at various frequencies (11020, 11100, 11340 MHz).

Remark
1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



U-NII-2C - 5470~5725MHz

U-NII-2C - Straddle Channel

WIFI 802.11a (fundamental @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 144 5720MHz	*	5722	104.87	-	-	88.76	34.77	11.58	30.24	301	76	P	H
		5722	98.28	-	-	82.17	34.77	11.58	30.24	301	76	A	H
	*	5722	106.41	-	-	90.3	34.77	11.58	30.24	316	167	P	V
		5722	99.11	-	-	83	34.77	11.58	30.24	316	167	A	V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												

U-NII-2C - Straddle Channel

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 144 5720MHz		11440	41.25	-32.75	74	50.06	38.03	15.99	62.83	100	360	P	H
		11440	41.8	-32.2	74	50.61	38.03	15.99	62.83	100	360	P	V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												



U-NII-2C - Straddle Channel

WIFI 802.11n HT20 (Fundamental @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20	*	5722	102.97	-	-	86.86	34.77	11.58	30.24	274	74	P	H
CH 144		5722	96.34	-	-	80.23	34.77	11.58	30.24	274	74	A	H
5720MHz	*	5716	103.18	-	-	87.14	34.73	11.55	30.24	287	167	P	V
		5716	96.62	-	-	80.58	34.73	11.55	30.24	287	167	A	V
Remark 1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													

U-NII-2C - Straddle Channel

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20		11440	41.06	-32.94	74	49.87	38.03	15.99	62.83	100	360	P	H
CH 144		11440	42.35	-31.65	74	51.16	38.03	15.99	62.83	100	360	P	V
5720MHz													
Remark 1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



U-NII-2C - Straddle Channel

WIFI 802.11n HT40 (Fundamental @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40	*	5722	99.53	-	-	83.42	34.77	11.58	30.24	275	74	P	H
CH 142		5722	92.42	-	-	76.31	34.77	11.58	30.24	275	74	A	H
5710MHz	*	5704	100.18	-	-	84.13	34.73	11.55	30.23	287	166	P	V
		5704	93.15	-	-	77.1	34.73	11.55	30.23	287	166	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

U-NII-2C - Straddle Channel

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40		11420	41.36	-32.64	74	50.2	38.02	15.97	62.83	300	0	P	H
CH 142		11420	41.99	-32.01	74	50.83	38.02	15.97	62.83	100	360	P	V
5710MHz													
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Co-location

WIFI + WWAN (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 38 5190MHz + LTE Band7 QPSK 20M(BW)		5148.32	58.23	-15.77	74	44.98	34.07	10.43	31.25	262	4	P	H
		5149.98	47.79	-6.21	54	34.54	34.07	10.43	31.25	262	4	A	H
		5194	98.74	-	-	85.35	34.14	10.51	31.26	262	4	P	H
		5194	90.8	-	-	77.41	34.14	10.51	31.26	262	4	A	H
		5356.44	53.24	-20.76	74	39.48	34.33	10.71	31.28	262	4	P	H
		5372.82	43.89	-10.11	54	30.09	34.35	10.73	31.28	262	4	A	H
		5146.56	57.44	-16.56	74	44.19	34.07	10.43	31.25	137	178	P	V
		5149.98	48.2	-5.8	54	34.95	34.07	10.43	31.25	137	178	A	V
		5194	99.27	-	-	85.88	34.14	10.51	31.26	137	178	P	V
		5194	91.73	-	-	78.34	34.14	10.51	31.26	137	178	A	V
	5351.94	53.73	-20.27	74	39.97	34.33	10.71	31.28	137	178	P	V	
	5375.88	44.12	-9.88	54	30.32	34.35	10.73	31.28	137	178	A	V	

WIFI + WWAN (Harmonic @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 38 5190MHz + LTE Band7 QPSK 20M(BW)		10380	42.03	-26.27	68.3	51.85	37.68	15.08	62.58	300	0	P	H
		10380	40.86	-27.44	68.3	50.68	37.68	15.08	62.58	273	2	P	V

Remark

3. No other spurious found.
4. All results are PASS against Peak and Average limit line.



Emission below 1GHz
WIFI 802.11n HT40 (LF @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		75.59	23.85	-16.15	40	42.63	12.7	1.44	32.92	-	-	P	H
		145.43	31.21	-12.29	43.5	45.36	16.87	1.94	32.96	100	0	P	H
		217.21	31.68	-14.32	46	46.96	15.34	2.32	32.94	-	-	P	H
		256.98	24.32	-21.68	46	35.33	19.46	2.52	32.99	-	-	P	H
		499.48	22.15	-23.85	46	28.47	23.48	3.44	33.24	-	-	P	H
		838.98	24.63	-21.37	46	26.86	26.26	4.19	32.68	-	-	P	H
		45.52	22.35	-17.65	40	38.23	15.9	1.18	32.96	-	-	P	V
		96.93	23.77	-19.73	43.5	38.79	16.27	1.64	32.93	-	-	P	V
		116.33	27.02	-16.48	43.5	40.26	17.95	1.74	32.93	-	-	P	V
		201.69	28.68	-14.82	43.5	43.78	15.57	2.24	32.91	-	-	P	V
		262.8	34.73	-11.27	46	45.51	19.67	2.55	33	100	360	P	V
	615.88	22.26	-23.74	46	27.12	24.65	3.82	33.33	-	-	P	V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



UNII-1 - 5150~5250MHz

WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11ac VHT40 CH 38 5190MHz		5148.16	55.72	-18.28	74	47.63	34.22	10.6	36.73	282	15	P	H
		5149.92	43.67	-10.33	54	35.58	34.22	10.6	36.73	282	15	A	H
	*	5200	97.18	-	-	88.9	34.3	10.66	36.68	282	15	P	H
		5200	90.51	-	-	82.23	34.3	10.66	36.68	282	15	A	H
		5374.26	47.02	-26.98	74	38.22	34.55	10.76	36.51	282	15	P	H
		5354.64	37.91	-16.09	54	29.16	34.52	10.75	36.52	282	15	A	H
		5138.4	57.68	-16.32	74	49.62	34.2	10.6	36.74	119	281	P	V
		5150	45.19	-8.81	54	37.1	34.22	10.6	36.73	119	281	A	V
	*	5194	99.33	-	-	91.05	34.3	10.66	36.68	119	281	P	V
		5194	92.23	-	-	83.95	34.3	10.66	36.68	119	281	A	V
		5386.5	49.54	-24.46	74	40.69	34.57	10.77	36.49	119	281	P	V
	5396.04	38.26	-15.74	54	29.36	34.6	10.77	36.47	119	281	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-1 5150~5250MHz
WIFI 802.11ac VHT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11ac VHT40 CH 38 5190MHz and a Remark section.



UNII-2A - 5250~5350MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 64 5320MHz		5350	50.19	-23.81	74	41.44	34.52	10.75	36.52	100	211	P	H
		5352.5	42.16	-11.84	54	33.41	34.52	10.75	36.52	100	211	A	H
	*	5314	101.35	-	-	92.71	34.47	10.73	36.56	100	211	P	H
		5314	94.1	-	-	85.46	34.47	10.73	36.56	100	211	A	H
		5355.4	51.67	-22.33	74	42.92	34.52	10.75	36.52	100	273	P	V
		5355.8	43.01	-10.99	54	34.26	34.52	10.75	36.52	100	273	A	V
	*	5314	102.99	-	-	94.35	34.47	10.73	36.56	100	273	P	V
		5314	95.95	-	-	87.31	34.47	10.73	36.56	100	273	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



UNII-2A 5250~5350MHz
WIFI 802.11ac VHT20 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include 802.11ac VHT20 CH 64 5320MHz and a Remark section.



UNII-2A 5250~5350MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include test data for 802.11ac VHT80 CH 58 5290MHz and a Remark section.



UNII-2A 5250~5350MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Path Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11ac VHT80 CH 58 5290MHz and a Remark section.



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. $Level(dB\mu V/m) =$

$Antenna\ Factor(dB/m) + Cable\ Loss(dB) + Read\ Level(dB\mu V) - Preamp\ Factor(dB)$

2. $Over\ Limit(dB) = Level(dB\mu V/m) - Limit\ Line(dB\mu V/m)$

For Peak Limit @ 2390MHz:

1. $Level(dB\mu V/m)$

$= Antenna\ Factor(dB/m) + Cable\ Loss(dB) + Read\ Level(dB\mu V) - Preamp\ Factor(dB)$

$= 32.22(dB/m) + 4.58(dB) + 54.51(dB\mu V) - 35.86(dB)$

$= 55.45(dB\mu V/m)$

2. $Over\ Limit(dB)$

$= Level(dB\mu V/m) - Limit\ Line(dB\mu V/m)$

$= 55.45(dB\mu V/m) - 74(dB\mu V/m)$

$= -18.55(dB)$

For Average Limit @ 2390MHz:

1. $Level(dB\mu V/m)$

$= Antenna\ Factor(dB/m) + Cable\ Loss(dB) + Read\ Level(dB\mu V) - Preamp\ Factor(dB)$

$= 32.22(dB/m) + 4.58(dB) + 42.6(dB\mu V) - 35.86(dB)$

$= 43.54(dB\mu V/m)$

2. $Over\ Limit(dB)$

$= Level(dB\mu V/m) - Limit\ Line(dB\mu V/m)$

$= 43.54(dB\mu V/m) - 54(dB\mu V/m)$

$= -10.46(dB)$

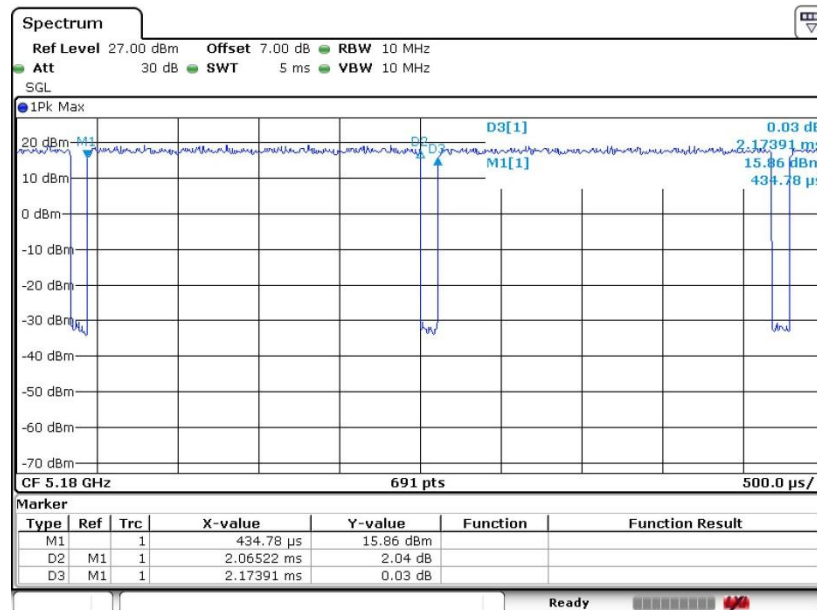
Both peak and average measured complies with the limit line, so test result is "PASS".



Appendix C. Duty Cycle Plots

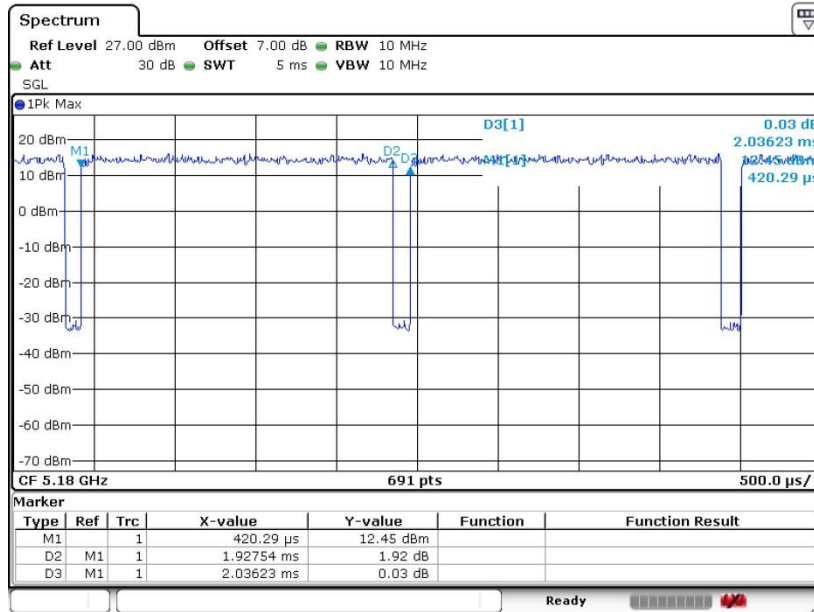
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	95.00	2.0652	0.4842	0.51KHz
802.11n HT20	94.66	1.9275	0.5188	0.56KHz
802.11n HT40	89.12	0.9493	1.0534	1.1KHz
802.11ac VHT20	93.00	1.9275	0.5188	0.56KHz
802.11ac VHT40	90.34	0.9493	1.0534	1.1KHz
802.11ac VHT80	81.73	0.467	2.143	2.2KHz

802.11a

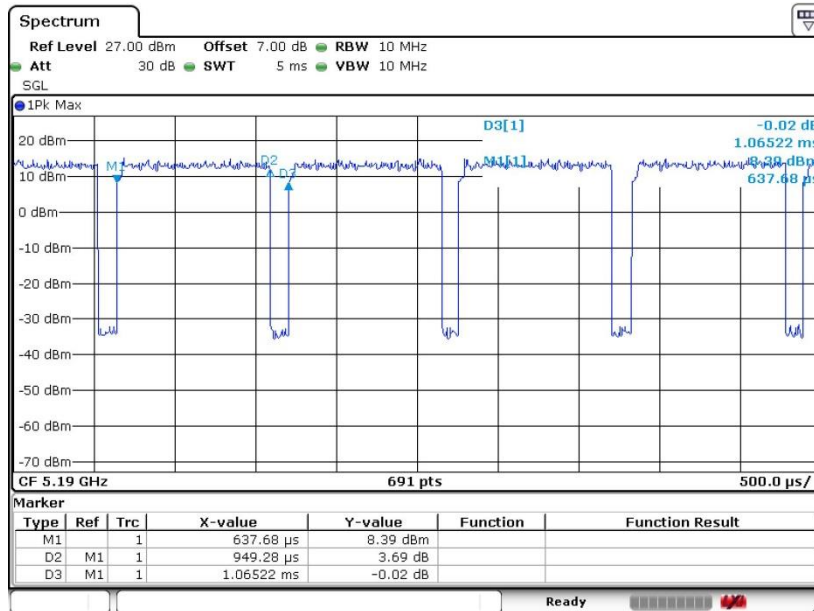




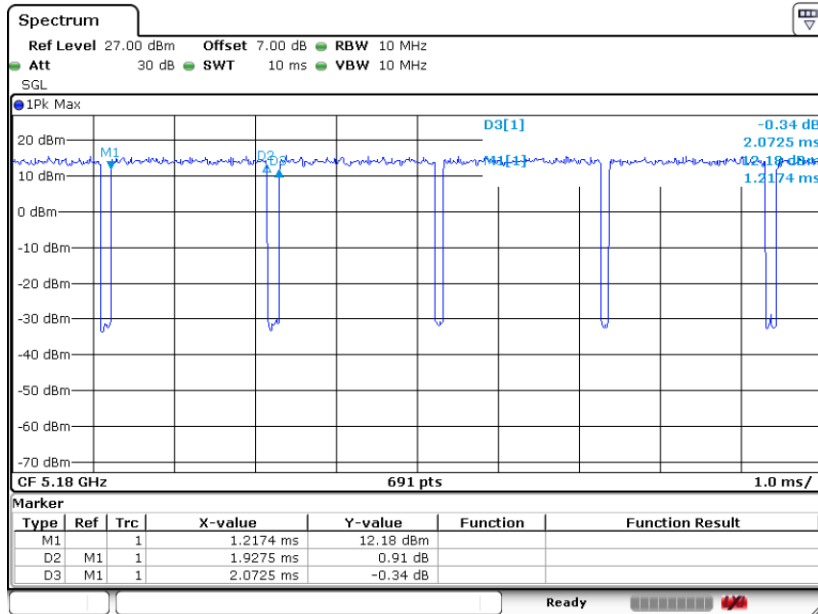
802.11n HT20



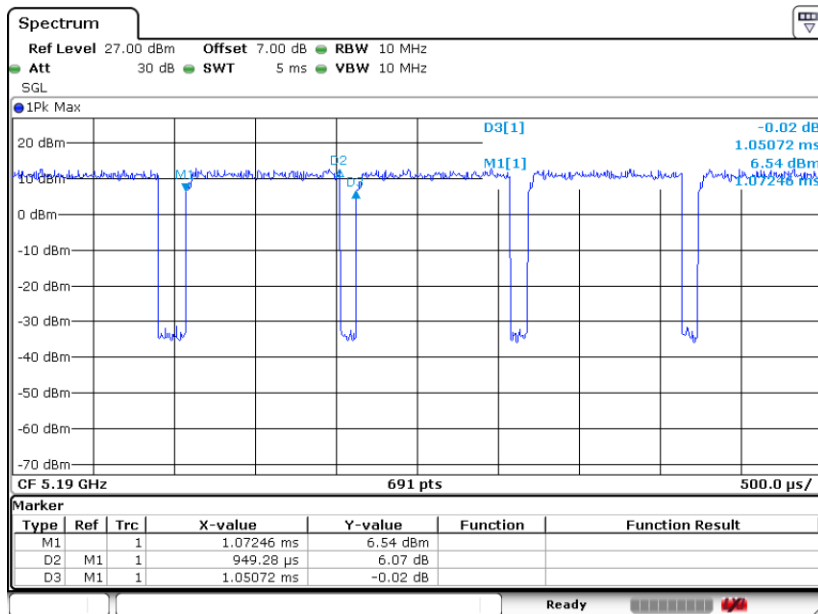
802.11n HT40



802.11ac VHT20



802.11ac VHT40





802.11ac VHT80

