



FCC RF Test Report

APPLICANT : Tabletop Media, LLC d/b/a Ziosk
EQUIPMENT : Ziosk Aurizon
BRAND NAME : Ziosk
MODEL NAME : Z500
FCC ID : XOX-Z500
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Jan. 10, 2020 and testing was completed on Mar. 14, 2020. We, Sporton International (ShenZhen) Inc., 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 (ShenZhen) Inc., the test report shall not be reproduced except in full.

Reviewed by: Derreck Chen / Supervisor

Approved by: Eric Shih / Manager



Sporton International (ShenZhen) Inc.

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055
People's Republic of China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR011014E	Rev. 01	Initial issue of report	Mar. 25, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
3.2	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 3.77 dB at 15720.000 MHz
3.3	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.4	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

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

Tabletop Media, LLC d/b/a Ziosk
12404 Park Central Dr, Suite 350, Dallas, TX 75251

1.2 Manufacturer

SMTC de Chihuahua SA. DE C.V.
Washington 3701 building 20. Parque Industrial Las Americas, Chihuahua, Chih. 31200

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Ziosk Aurizon
Brand Name	Ziosk
Model Name	Z500
FCC ID	XOX-Z500
EUT supports Radios application	NFC WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	5.1.R
SW Version	Android 5.1.1
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report for Z500. The change note could be referred to the product equality declaration which is exhibit separately. Based on the similarity between current and previous project, only the related test cases from original test report (Sporton Report Number FR820812E) were verified for the differences.

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 ~ 5700 MHz		
Maximum Output Power to Antenna	<5180 MHz ~ 5240 MHz> 802.11a : 19.48 dBm / 0.0887 W MIMO<Ant.1+2>: 802.11n HT20 : 18.19 dBm / 0.0659 W 802.11n HT40 : 17.66 dBm / 0.0583 W 802.11ac VHT20 : 18.12 dBm / 0.0649 W 802.11ac VHT40 : 17.60 dBm / 0.0575 W 802.11ac VHT80 : 15.77 dBm / 0.0378 W <5260 MHz ~ 5320 MHz> 802.11a : 19.57 dBm / 0.0906 W MIMO<Ant.1+2>: 802.11n HT20 : 18.53 dBm / 0.0713 W 802.11n HT40 : 18.25 dBm / 0.0668 W 802.11ac VHT20 : 18.40 dBm / 0.0692 W 802.11ac VHT40 : 18.14 dBm / 0.0652 W 802.11ac VHT80 : 15.87 dBm / 0.0386 W <5500 MHz ~ 5700 MHz > 802.11a : 17.38 dBm / 0.0547 W MIMO<Ant.1+2>: 802.11n HT20 : 18.60 dBm / 0.0724 W 802.11n HT40 : 18.06 dBm / 0.0640 W 802.11ac VHT20 : 18.53 dBm / 0.0713 W 802.11ac VHT40 : 18.00 dBm / 0.0631 W 802.11ac VHT80 : 15.93 dBm / 0.0392 W		
Antenna Type / Gain	<5150 MHz ~ 5250 MHz> <Ant. 1> : PIFA Antenna with gain 2.77 dBi <Ant. 2> : PIFA Antenna with gain 2.27 dBi <5250 MHz ~ 5350 MHz> <Ant. 1> : PIFA Antenna with gain 3.40 dBi <Ant. 2> : PIFA Antenna with gain 2.62 dBi <5470 MHz ~ 5725 MHz> <Ant. 1> : PIFA Antenna with gain 3.06 dBi <Ant. 2> : PIFA Antenna with gain 3.49 dBi		
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)		
Antenna Function Description		Ant. 1	Ant. 2
	802.11 a/n/ac SISO	V	V
	802.11 n/ac MIMO	V	

Note: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11 n HT20/ HT40 by referring to their maximum conducted power.



1.5 Modification of EUT

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

1.6 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	TH01-SZ	CN1256	421272

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH02-SZ	CN1256	421272

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-SZ	AUDIX	E3	6.2009-8-24a



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.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output 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 (Y plane) were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (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)
5250-5350 MHz Band 2 (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)
5470-5725 MHz Band 3 (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

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.

Single Mode

Modulation	Data Rate
802.11a	6 Mbps

MIMO Mode

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT80	MCS0



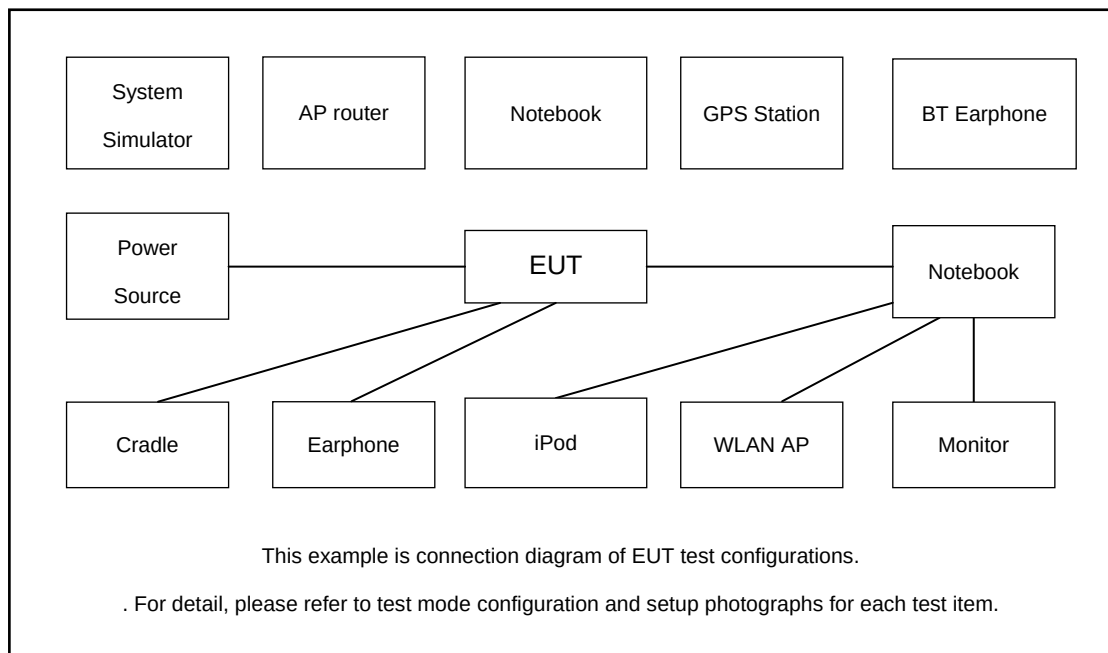
Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT20	802.11n HT20	802.11n HT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT40	802.11n HT40	802.11n HT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	-

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.	BT Base Station	Anritus	8852B	N/A	N/A	Unshielded,1.8m

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.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 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 $11 + 10 \log B$, dBm, where B is the 26 dB emission bandwidth in megahertz.

For the 5.47–5.6 GHz and 5.65–5.725 GHz band, the maximum conducted output power shall not exceed 250 mW or $11 + 10 \log_{10} B$, dBm, whichever power is less. The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

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.

3.1.2 Measuring Instruments

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

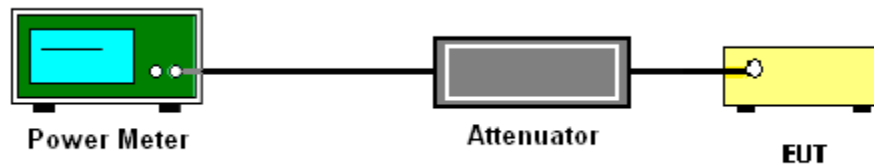
3.1.3 Test Procedures

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.

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.2 Unwanted Emissions Measurement

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

3.2.1 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	68.2

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

$$\text{EIRP} = E_{\text{Meas}} + 20\log(d_{\text{Meas}}) - 104.7$$

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

3.2.2 Measuring Instruments

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



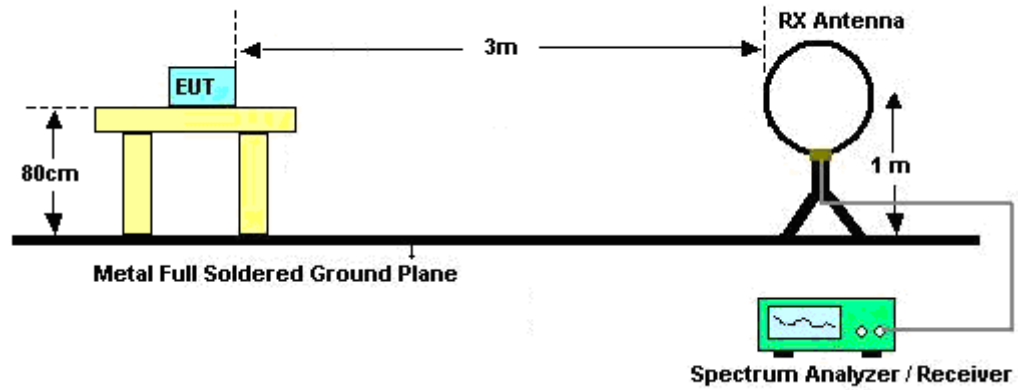
3.2.3 Test Procedures

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.

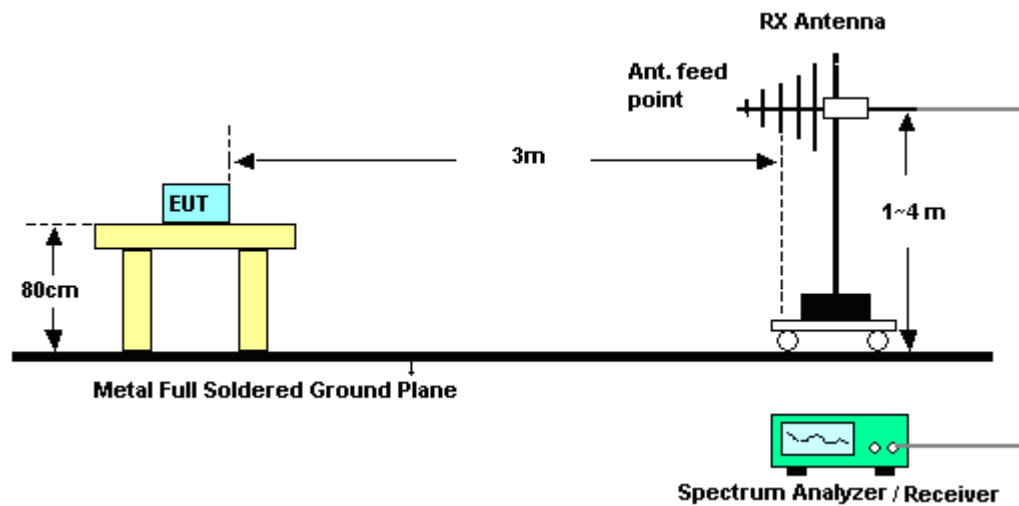


3.2.4 Test Setup

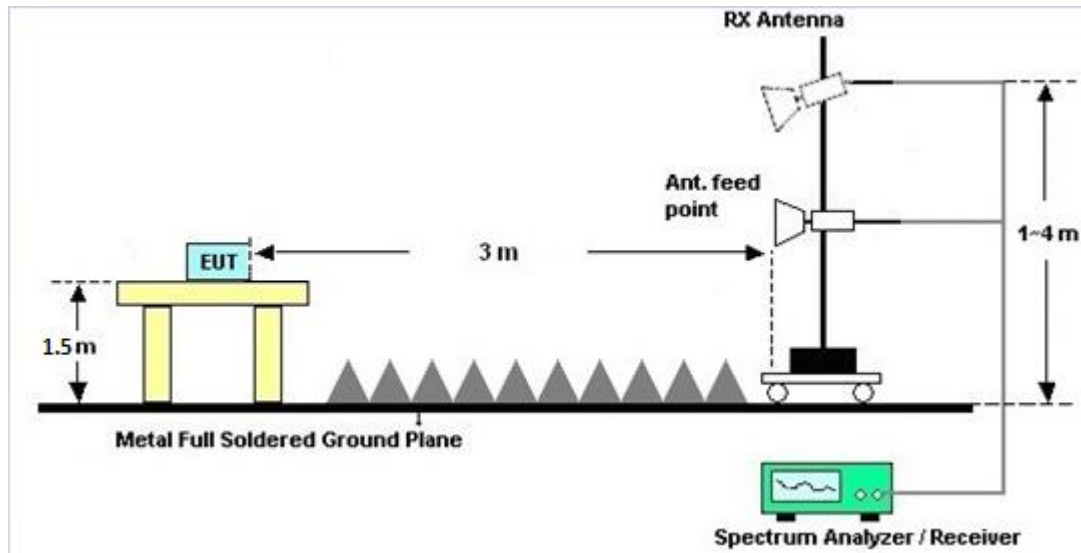
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.2.5 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.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.2.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix B.



3.3 Automatically Discontinue Transmission

3.3.1 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.

3.3.2 Measuring Instruments

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

3.3.3 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.

3.4 Antenna Requirements

3.4.1 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.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(\text{NANT}/\text{NSS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $\text{NANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
			DG for Power	DG for PSD	Power Limit Reduction	PSD Limit Reduction
	Ant. 1 (dBi)	Ant. 2 (dBi)	(dBi)	(dBi)	(dB)	(dB)
Band I	2.77	2.27	2.77	5.53	0.00	0.00
Band II	3.40	2.62	3.40	6.03	0.00	0.03
Band III	3.06	3.49	3.49	6.29	0.00	0.29

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)



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	Nov. 02, 2019	Feb. 29, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 13, 2020	Feb. 29, 2020	Jan. 12, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 13, 2020	Feb. 29, 2020	Jan. 12, 2021	Conducted (TH01-KS)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 19, 2019	Mar. 07, 2020~Mar. 14, 2020	Apr. 18, 2020	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 29, 2018	Mar. 07, 2020~Mar. 14, 2020	May 28, 2020	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jul. 19, 2019	Mar. 07, 2020~Mar. 14, 2020	Jul. 18, 2020	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Aug. 27, 2019	Mar. 07, 2020~Mar. 14, 2020	Aug. 26, 2020	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 22, 2019	Mar. 07, 2020~Mar. 14, 2020	Jul. 21, 2020	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz-40GHz	Apr. 18, 2019	Mar. 07, 2020~Mar. 14, 2020	Apr. 17, 2020	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 18, 2019	Mar. 07, 2020~Mar. 14, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2019	Mar. 07, 2020~Mar. 14, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5GHz	Oct. 18, 2019	Mar. 07, 2020~Mar. 14, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	Mar. 07, 2020~Mar. 14, 2020	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Mar. 07, 2020~Mar. 14, 2020	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Mar. 07, 2020~Mar. 14, 2020	NCR	Radiation (03CH02-SZ)

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 Radiated Emission Measurement (30 MHz ~ 1000 MHz)

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.4 dB
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Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Sam Zhang	Temperature:	21~25	°C
Test Date:	2020/2/29	Relative Humidity:	51~54	%

TEST RESULTS DATA
Average Power Table

FCC Band I														
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	1	36	5180	0.08	0.08	18.42	18.86		23.98	23.98	2.77	2.27	Pass
11a	6Mbps	1	44	5220	0.08	0.08	18.45	18.95		23.98	23.98	2.77	2.27	Pass
11a	6Mbps	1	48	5240	0.08	0.08	18.96	19.48		23.98	23.98	2.77	2.27	Pass
HT20	MCS0	2	36	5180	0.10	0.10	14.61	15.40	18.03	23.98		2.77		Pass
HT20	MCS0	2	44	5220	0.10	0.10	14.10	14.98	17.57	23.98		2.77		Pass
HT20	MCS0	2	48	5240	0.10	0.10	14.68	15.63	18.19	23.98		2.77		Pass
HT40	MCS0	2	38	5190	0.08	0.08	14.22	15.04	17.66	23.98		2.77		Pass
HT40	MCS0	2	46	5230	0.08	0.08	13.50	14.38	16.98	23.98		2.77		Pass
VHT20	MCS0	2	36	5180	0.10	0.10	14.52	15.31	17.94	23.98		2.77		Pass
VHT20	MCS0	2	44	5220	0.10	0.10	14.03	14.90	17.50	23.98		2.77		Pass
VHT20	MCS0	2	48	5240	0.10	0.10	14.60	15.56	18.12	23.98		2.77		Pass
VHT40	MCS0	2	38	5190	0.08	0.10	14.14	15.00	17.60	23.98		2.77		Pass
VHT40	MCS0	2	46	5230	0.08	0.10	13.41	14.31	16.90	23.98		2.77		Pass
VHT80	MCS0	2	42	5210	0.08	0.08	12.40	13.09	15.77	23.98		2.77		Pass

TEST RESULTS DATA
Average Power Table

FCC Band II															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	52	5260	0.08	0.08	19.18	19.57		23.98	23.98	3.40	2.62	26.99	Pass
11a	6Mbps	1	60	5300	0.08	0.08	18.64	18.80		23.98	23.98	3.40	2.62	26.99	Pass
11a	6Mbps	1	64	5320	0.08	0.08	16.20	16.50		23.98	23.98	3.40	2.62	26.99	Pass
HT20	MCS0	2	52	5260	0.10	0.10	15.10	15.90	18.53	23.98		3.40		26.99	Pass
HT20	MCS0	2	60	5300	0.10	0.10	14.54	14.96	17.77	23.98		3.40		26.99	Pass
HT20	MCS0	2	64	5320	0.10	0.10	14.42	15.16	17.82	23.98		3.40		26.99	Pass
HT40	MCS0	2	54	5270	0.08	0.08	14.81	15.62	18.25	23.98		3.40		26.99	Pass
HT40	MCS0	2	62	5310	0.08	0.08	14.46	14.83	17.66	23.98		3.40		26.99	Pass
VHT20	MCS0	2	52	5260	0.10	0.10	14.99	15.75	18.40	23.98		3.40		26.99	Pass
VHT20	MCS0	2	60	5300	0.10	0.10	14.50	14.92	17.73	23.98		3.40		26.99	Pass
VHT20	MCS0	2	64	5320	0.10	0.10	14.35	15.10	17.75	23.98		3.40		26.99	Pass
VHT40	MCS0	2	54	5270	0.08	0.10	14.73	15.50	18.14	23.98		3.40		26.99	Pass
VHT40	MCS0	2	62	5310	0.08	0.10	14.42	14.71	17.58	23.98		3.40		26.99	Pass
VHT80	MCS0	2	58	5290	0.08	0.08	12.50	13.19	15.87	23.98		3.40		26.99	Pass

TEST RESULTS DATA
Average Power Table

FCC Band III															
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			FCC Conducted Power Limit (dBm)		DG (dBi)		EIRP Power Limit (dBm)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2		
11a	6Mbps	1	100	5500	0.08	0.08	16.40	17.11		23.98	23.98	3.06	3.49	26.99	Pass
11a	6Mbps	1	116	5580	0.08	0.08	17.04	17.38		23.98	23.98	3.06	3.49	26.99	Pass
11a	6Mbps	1	140	5700	0.08	0.08	15.77	16.36		23.98	23.98	3.06	3.49	26.99	Pass
HT20	MCS0	2	100	5500	0.10	0.10	14.68	15.26	17.99	23.98		3.49		26.99	Pass
HT20	MCS0	2	116	5580	0.10	0.10	15.38	15.78	18.60	23.98		3.49		26.99	Pass
HT20	MCS0	2	140	5700	0.10	0.10	14.14	14.99	17.60	23.98		3.49		26.99	Pass
HT40	MCS0	2	102	5510	0.08	0.08	13.73	14.65	17.23	23.98		3.49		26.99	Pass
HT40	MCS0	2	110	5550	0.08	0.08	14.25	15.04	17.68	23.98		3.49		26.99	Pass
HT40	MCS0	2	134	5670	0.08	0.08	14.67	15.40	18.06	23.98		3.49		26.99	Pass
VHT20	MCS0	2	100	5500	0.10	0.10	14.60	15.18	17.91	23.98		3.49		26.99	Pass
VHT20	MCS0	2	116	5580	0.10	0.10	15.32	15.71	18.53	23.98		3.49		26.99	Pass
VHT20	MCS0	2	140	5700	0.10	0.10	14.09	14.91	17.53	23.98		3.49		26.99	Pass
VHT40	MCS0	2	102	5510	0.08	0.10	13.68	14.61	17.18	23.98		3.49		26.99	Pass
VHT40	MCS0	2	110	5550	0.08	0.10	14.18	15.00	17.62	23.98		3.49		26.99	Pass
VHT40	MCS0	2	134	5670	0.08	0.10	14.60	15.35	18.00	23.98		3.49		26.99	Pass
VHT80	MCS0	2	106	5530	0.08	0.08	11.95	12.81	15.42	23.98		3.49		26.99	Pass
VHT80	MCS0	2	122	5610	0.08	0.08	12.70	13.12	15.93	23.98		3.49		26.99	Pass



Appendix B. Radiated Spurious Emission

Band 1 - 5150~5250MHz

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.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5149.5	53.9	-20.1	74	45.11	31.9	10.06	33.17	179	316	P	H
		5150	46.52	-7.48	54	37.73	31.9	10.06	33.17	179	316	A	H
	*	5180	104.2	-	-	95.57	31.7	10.09	33.16	179	316	P	H
		5180	97.08	-	-	88.45	31.7	10.09	33.16	179	316	A	H
		5055.38	47.77	-26.23	74	39.24	31.73	9.99	33.19	241	89	P	V
		5150	39.88	-14.12	54	31.09	31.9	10.06	33.17	241	89	A	V
	*	5180	97.01	-	-	88.38	31.7	10.09	33.16	241	89	P	V
		5180	90.16	-	-	81.53	31.7	10.09	33.16	241	89	A	V
802.11a CH 44 5220MHz		5138.32	49.86	-24.14	74	41.1	31.87	10.06	33.17	172	317	P	H
		5148.98	40.88	-13.12	54	32.09	31.9	10.06	33.17	172	317	A	H
	*	5220	105.94	-	-	97.47	31.5	10.13	33.16	172	317	P	H
		5220	98.68	-	-	90.21	31.5	10.13	33.16	172	317	A	H
		5381.28	47.38	-26.62	74	38.63	31.57	10.3	33.12	172	317	P	H
		5370	39.28	-14.72	54	30.68	31.43	10.3	33.13	172	317	A	H
		5079.56	48.37	-25.63	74	39.76	31.77	10.02	33.18	253	86	P	V
		5019.76	37.81	-16.19	54	29.48	31.57	9.95	33.19	253	86	A	V
	*	5220	97.8	-	-	89.33	31.5	10.13	33.16	253	86	P	V
		5220	90.89	-	-	82.42	31.5	10.13	33.16	253	86	A	V
		5377.68	46.37	-27.63	74	37.62	31.57	10.3	33.12	253	86	P	V
		5454	36.95	-17.05	54	27.98	31.7	10.38	33.11	253	86	A	V



802.11a CH 48 5240MHz		5149.99	49.47	-24.53	74	40.68	31.9	10.06	33.17	188	312	P	H
		5149.76	39.95	-14.05	54	31.16	31.9	10.06	33.17	188	312	A	H
	*	5240	105.72	-	-	97.3	31.4	10.17	33.15	188	312	P	H
		5240	98.78	-	-	90.36	31.4	10.17	33.15	188	312	A	H
		5401.44	47.27	-26.73	74	38.35	31.7	10.34	33.12	188	312	P	H
		5389.68	38.98	-15.02	54	30.19	31.57	10.34	33.12	188	312	A	H
		5017.68	47.37	-26.63	74	39.04	31.57	9.95	33.19	249	88	P	V
		5007.02	37.83	-16.17	54	29.51	31.57	9.95	33.2	249	88	A	V
	*	5240	96.17	-	-	87.75	31.4	10.17	33.15	249	88	P	V
		5240	89.65	-	-	81.23	31.4	10.17	33.15	249	88	A	V
		5421.12	46.79	-27.21	74	37.87	31.7	10.34	33.12	249	88	P	V
		5458.56	36.85	-17.15	54	27.88	31.7	10.38	33.11	249	88	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 2	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 5180MHz		10360	48.09	-20.11	68.2	47.58	39.67	14.23	53.39	152	260	P	H
		15540	46.96	-27.04	74	41.51	38.5	18.86	51.91	189	238	P	H
		10360	50.17	-18.03	68.2	49.66	39.67	14.23	53.39	196	175	P	V
		15540	45.97	-28.03	74	40.52	38.5	18.86	51.91	142	186	P	V
802.11a CH 44 5220MHz		10440	47.79	-20.41	68.2	47.15	39.8	14.29	53.45	150	230	P	H
		15660	48.64	-25.36	74	43.53	38.2	18.87	51.96	160	225	P	H
		10440	48.87	-19.33	68.2	48.23	39.8	14.29	53.45	175	296	P	V
		15660	47.66	-26.34	74	42.55	38.2	18.87	51.96	185	236	P	V
802.11a CH 48 5240MHz		10480	46.98	-21.22	68.2	46.35	39.8	14.32	53.49	153	242	P	H
		15720	53.94	-20.06	74	49.08	37.98	18.87	51.99	196	210	P	H
		15720	50.23	-3.77	54	45.37	37.98	18.87	51.99	196	210	A	H
		10480	45.89	-22.31	68.2	45.26	39.8	14.32	53.49	150	289	P	V
		15720	48.98	-25.02	74	44.12	37.98	18.87	51.99	150	291	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1+2	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 36 5180MHz		5148.72	53.5	-20.5	74	44.71	31.9	10.06	33.17	178	315	P	H
		5149.24	45.65	-8.35	54	36.86	31.9	10.06	33.17	178	315	A	H
	*	5180	105.93	-	-	97.3	31.7	10.09	33.16	178	315	P	H
		5180	99.05	-	-	90.42	31.7	10.09	33.16	178	315	A	H
		5101.14	49	-25	74	40.36	31.8	10.02	33.18	270	87	P	V
		5149.24	41.04	-12.96	54	32.25	31.9	10.06	33.17	270	87	A	V
	*	5180	98.15	-	-	89.52	31.7	10.09	33.16	270	87	P	V
		5180	90.99	-	-	82.36	31.7	10.09	33.16	270	87	A	V
802.11n HT20 CH 44 5220MHz		5143.52	48.8	-25.2	74	40.01	31.9	10.06	33.17	179	318	P	H
		5146.38	40.44	-13.56	54	31.65	31.9	10.06	33.17	179	318	A	H
	*	5220	105.15	-	-	96.68	31.5	10.13	33.16	179	318	P	H
		5220	98.42	-	-	89.95	31.5	10.13	33.16	179	318	A	H
		5458.32	47.88	-26.12	74	38.91	31.7	10.38	33.11	179	318	P	H
		5452.8	39.64	-14.36	54	30.67	31.7	10.38	33.11	179	318	A	H
		5062.14	47.48	-26.52	74	38.95	31.73	9.99	33.19	277	90	P	V
		5062.14	38.76	-15.24	54	30.23	31.73	9.99	33.19	277	90	A	V
	*	5220	97.16	-	-	88.69	31.5	10.13	33.16	277	90	P	V
		5220	90.7	-	-	82.23	31.5	10.13	33.16	277	90	A	V
		5385.6	46.34	-27.66	74	37.59	31.57	10.3	33.12	277	90	P	V
		5448.24	38.19	-15.81	54	29.22	31.7	10.38	33.11	277	90	A	V



802.11n HT20 CH 48 5240MHz		5122.72	49.05	-24.95	74	40.29	31.87	10.06	33.17	182	314	P	H
		5145.34	40.53	-13.47	54	31.74	31.9	10.06	33.17	182	314	A	H
	*	5240	106.32	-	-	97.9	31.4	10.17	33.15	182	314	P	H
		5240	98.94	-	-	90.52	31.4	10.17	33.15	182	314	A	H
		5389.2	47.64	-26.36	74	38.85	31.57	10.34	33.12	182	314	P	H
		5396.4	40.1	-13.9	54	31.18	31.7	10.34	33.12	182	314	A	H
		5107.64	47.87	-26.13	74	39.2	31.83	10.02	33.18	277	87	P	V
		5081.12	38.82	-15.18	54	30.21	31.77	10.02	33.18	277	87	A	V
	*	5240	97.99	-	-	89.57	31.4	10.17	33.15	277	87	P	V
		5240	91.05	-	-	82.63	31.4	10.17	33.15	277	87	A	V
		5388	46.85	-27.15	74	38.06	31.57	10.34	33.12	277	87	P	V
		5397.12	38.08	-15.92	54	29.16	31.7	10.34	33.12	277	87	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1+2	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 36 5180MHz		10360	48.82	-19.38	68.2	48.31	39.67	14.23	53.39	152	260	P	H
		15540	47.82	-26.18	74	42.37	38.5	18.86	51.91	189	238	P	H
		10360	48.27	-19.93	68.2	47.76	39.67	14.23	53.39	152	260	P	V
		15540	47.34	-26.66	74	41.89	38.5	18.86	51.91	189	96	P	V
802.11n HT20 CH 44 5220MHz		10440	48.3	-19.9	68.2	47.66	39.8	14.29	53.45	150	189	P	H
		15660	48.79	-25.21	74	43.68	38.2	18.87	51.96	160	49	P	H
		10440	46.2	-22	68.2	45.56	39.8	14.29	53.45	175	296	P	V
		15660	48.68	-25.32	74	43.57	38.2	18.87	51.96	185	236	P	V
802.11n HT20 CH 48 5240MHz		10480	47.52	-20.68	68.2	46.89	39.8	14.32	53.49	150	289	P	H
		15720	48.44	-25.56	74	43.58	37.98	18.87	51.99	150	291	P	H
		10480	47.44	-20.76	68.2	46.81	39.8	14.32	53.49	153	242	P	V
		15720	48.99	-25.01	74	44.13	37.98	18.87	51.99	196	99	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1+2	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 38 5190MHz		5149.24	49.55	-24.45	74	40.76	31.9	10.06	33.17	184	317	P	H
		5150	42.8	-11.2	54	34.01	31.9	10.06	33.17	184	317	A	H
	*	5190	102.46	-	-	93.83	31.7	10.09	33.16	184	317	P	H
		5190	94.19	-	-	85.56	31.7	10.09	33.16	184	317	A	H
		5416.88	47.27	-26.73	74	38.35	31.7	10.34	33.12	184	317	P	H
		5350.24	38.52	-15.48	54	30.05	31.3	10.3	33.13	184	317	A	H
		5149.5	48.77	-25.23	74	39.98	31.9	10.06	33.17	216	94	P	V
		5150	40.16	-13.84	54	31.37	31.9	10.06	33.17	216	94	A	V
	*	5190	94.76	-	-	86.13	31.7	10.09	33.16	216	94	P	V
		5190	88.99	-	-	80.36	31.7	10.09	33.16	216	94	A	V
		5386.64	47.01	-26.99	74	38.26	31.57	10.3	33.12	216	94	P	V
		5432	37.12	-16.88	54	28.15	31.7	10.38	33.11	216	94	A	V
802.11n HT40 CH 46 5230MHz		5003.64	49.49	-24.51	74	41.17	31.57	9.95	33.2	184	315	P	H
		5148.72	39.72	-14.28	54	30.93	31.9	10.06	33.17	184	315	A	H
	*	5230	102.85	-	-	94.47	31.4	10.13	33.15	184	315	P	H
		5230	94	-	-	85.62	31.4	10.13	33.15	184	315	A	H
		5417.04	47.18	-26.82	74	38.26	31.7	10.34	33.12	184	315	P	H
		5373.12	38.03	-15.97	54	29.43	31.43	10.3	33.13	184	315	A	H
		5033.02	47.58	-26.42	74	39.19	31.63	9.95	33.19	275	87	P	V
		5088.92	37.95	-16.05	54	29.31	31.8	10.02	33.18	275	87	A	V
	*	5230	94.43	-	-	86.05	31.4	10.13	33.15	275	87	P	V
		5230	87.74	-	-	79.36	31.4	10.13	33.15	275	87	A	V
		5428.56	46.01	-27.99	74	37.04	31.7	10.38	33.11	275	87	P	V
		5448.96	37.25	-16.75	54	28.28	31.7	10.38	33.11	275	87	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1+2	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 38 5190MHz		10380	47.89	-20.31	68.2	47.31	39.73	14.26	53.41	150	188	P	H
		15570	47.99	-26.01	74	42.66	38.4	18.86	51.93	155	360	P	H
		10380	48.27	-19.93	68.2	47.69	39.73	14.26	53.41	150	360	P	V
		15570	49.54	-24.46	74	44.21	38.4	18.86	51.93	155	186	P	V
802.11n HT40 CH 46 5230MHz		10460	48.3	-19.9	68.2	47.64	39.8	14.32	53.46	142	160	P	H
		15690	48.82	-25.18	74	43.8	38.13	18.87	51.98	150	225	P	H
		10460	46.51	-21.69	68.2	45.85	39.8	14.32	53.46	150	163	P	V
		15690	49.61	-24.39	74	44.59	38.13	18.87	51.98	150	91	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1+2	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)
802.11ac VHT80 CH 42 5210MHz		5145.6	50.08	-23.92	74	41.29	31.9	10.06	33.17	196	312	P	H
		5146.38	41.73	-12.27	54	32.94	31.9	10.06	33.17	196	312	A	H
	*	5210	96.03	-	-	87.56	31.5	10.13	33.16	196	312	P	H
		5210	88.1	-	-	79.63	31.5	10.13	33.16	196	312	A	H
		5429.04	46.53	-27.47	74	37.56	31.7	10.38	33.11	196	312	P	H
		5448.24	37.31	-16.69	54	28.34	31.7	10.38	33.11	196	312	A	H
		5148.98	48.17	-25.83	74	39.38	31.9	10.06	33.17	318	104	P	V
		5146.38	39.73	-14.27	54	30.94	31.9	10.06	33.17	318	104	A	V
	*	5210	89.02	-	-	80.55	31.5	10.13	33.16	318	104	P	V
		5210	81.76	-	-	73.29	31.5	10.13	33.16	318	104	A	V
		5436.72	46.58	-27.42	74	37.61	31.7	10.38	33.11	318	104	P	V
		5460	36.97	-17.03	54	28	31.7	10.38	33.11	318	104	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

WIFI Ant. 1+2	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)
802.11ac		10420	47.95	-20.25	68.2	47.29	39.8	14.29	53.43	150	230	P	H
VHT80		15630	47.71	-26.29	74	42.57	38.23	18.87	51.96	160	225	P	H
CH 42		10420	46.7	-21.5	68.2	46.04	39.8	14.29	53.43	230	300	P	V
5210MHz		15630	48.62	-25.38	74	43.48	38.23	18.87	51.96	123	260	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

WIFI 802.11a (LF @ 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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		31.94	24.91	-15.09	40	32.89	23.24	0.75	31.97	-	-	P	H
		119.24	21.71	-21.79	43.5	34	17.94	1.42	31.65	-	-	P	H
		327.79	38.09	-7.91	46	47.03	19.88	2.39	31.21	100	106	P	H
		376.29	37.37	-8.63	46	44.96	21.04	2.57	31.2	-	-	P	H
		415.09	37.35	-8.65	46	43.99	21.88	2.7	31.22	-	-	P	H
		886.51	33.77	-12.23	46	34.46	26.46	4.02	31.17	-	-	P	H
		30	23.05	-16.95	40	29.89	24.4	0.73	31.97	-	-	P	V
		159.01	22.25	-21.25	43.5	36.05	16.07	1.64	31.51	-	-	P	V
		409.27	33.63	-12.37	46	40.39	21.77	2.68	31.21	100	193	P	V
		508.21	31.08	-14.92	46	35.84	23.49	2.98	31.23	-	-	P	V
		639.16	31.36	-14.64	46	34.57	24.66	3.37	31.24	-	-	P	V
		827.34	31.7	-14.3	46	32.73	26.28	3.87	31.18	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**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	P eak or A verage
H/V	H orizontal or V ertical



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

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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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

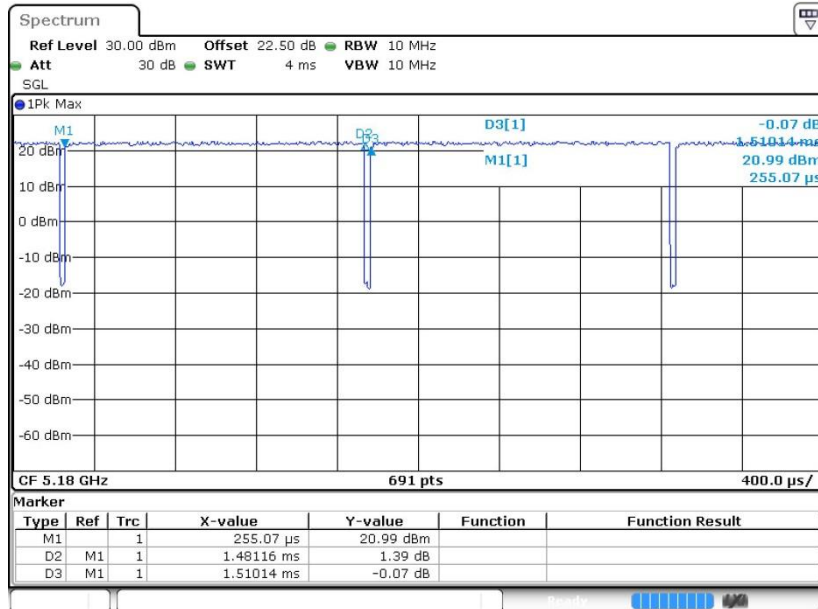
Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
2	802.11a	98.08	-	-	10Hz
1+2	802.11n HT20	97.71	1.487	0.673	1KHz
1+2	802.11n HT40	98.09	-	-	10Hz
1+2	802.11acVHT80	98.09	-	-	10Hz



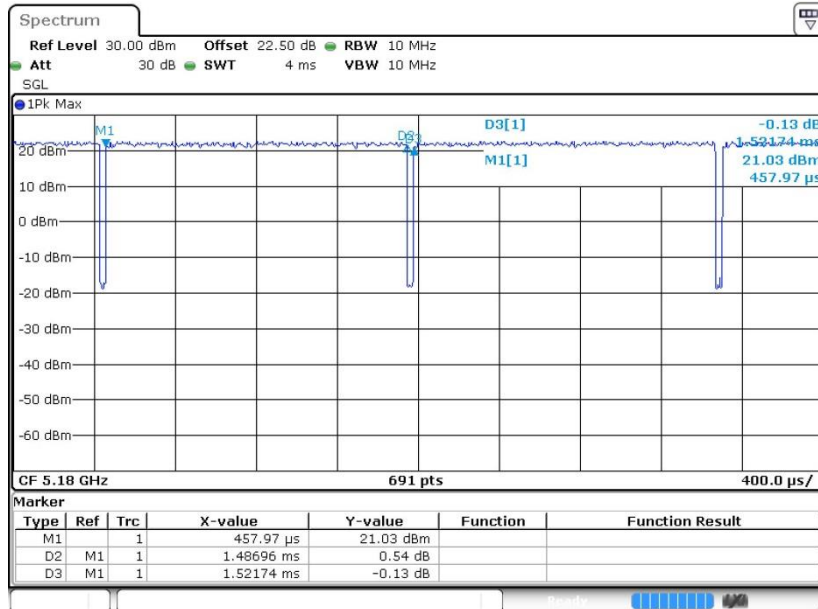
Ant2:

802.11a

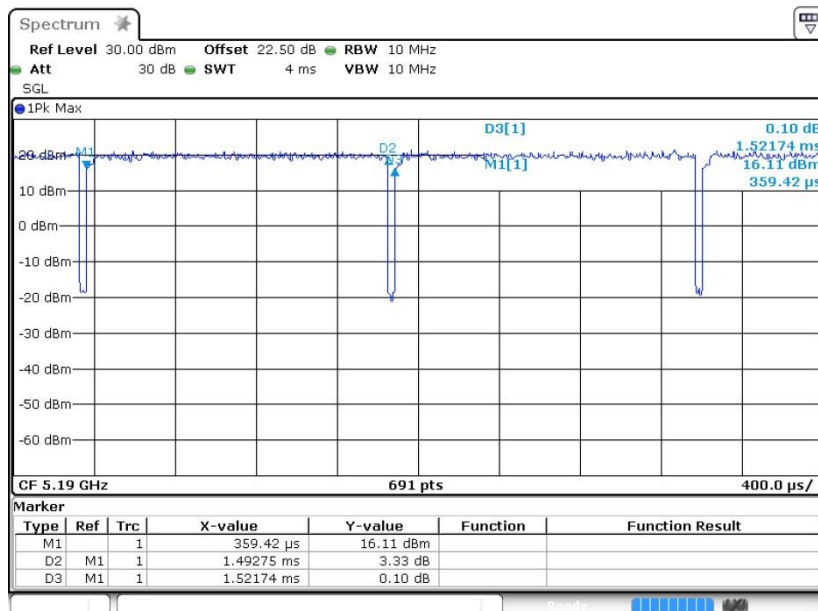


MIMO:

802.11n HT20



802.11n HT40





802.11ac VHT80

