FCC RF Test Report

APPLICANT	:	Honeywell International Inc. Honeywell Safety and Productivity Solutions
EQUIPMENT	:	RT10A
BRAND NAME	:	Honeywell
MODEL NAME	:	RT10AL0N
FCC ID	:	HD5-RT10AL0N
STANDARD	:	FCC Part 15 Subpart E §15.407
CLASSIFICATION	:	(NII) Unlicensed National Information Infrastructure

The product was received on May 23, 2020 and testing was completed on Aug. 25, 2020. We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Jason Jia

Reviewed by: Jason Jia / Supervisor

James Huang

Approved by: James Huang / Manager

ACCREDITED Cert #5145.02

Sporton International (Kunshan) Inc.
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
FR052309E	Rev. 01	Initial issue of report	Aug. 27, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	2.1049 & 15.403(i)	26dB & 99% Bandwidth	-	-	1
3.1	15.407(a)	Maximum Conducted Output Power	≤ 24 dBm	Pass	-
-	15.407(a)	Power Spectral Density	≤ 11 dBm	-	1
3.2	15.407(b)	Unwanted Emissions	15.407(b) & 15.209(a)	Pass	Under limit 3.30 dB at 5149.440 MHz
3.3	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.52 dB at 0.440 MHz
3.4	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.5	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

Remark:

1. All conducted test items were leveraged from module RF report which can refer to Report No. “RF171130C26-6”.

2. DFS test items were leveraged from module RF report which can refer to Report No. “RF171130C26-7”.

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

Honeywell International Inc.
Honeywell Safety and Productivity Solutions
9680 Old Bailes Rd. Fort Mill, SC 29707 United States

1.2 Manufacturer

Honeywell International Inc.
Honeywell Safety and Productivity Solutions
9680 Old Bailes Rd. Fort Mill, SC 29707 United States

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	RT10A
Brand Name	Honeywell
Model Name	RT10AL0N
FCC ID	HD5-RT10AL0N
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC
HW Version	V1.0
SW Version	WLAN.HL.1.0.1.c2.3
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 product installed a RF module (Brand Name: Honeywell, Model Name: SOM660W, FCC ID: HD5-660W) during the test, only Conducted power, Conduction and RSE test items are tested in this report, all the other test results are referred to module RF report “RF171130C26-6” and DFS test items were leveraged from module RF report which can refer to Report No. “RF171130C26-7”.

1.4 Product Specification of Equipment Under Test

<table>
<tr><th colspan="2">Standards-related Product Specification</th></tr>
<tr><td>Tx/Rx Frequency Range</td><td>5180 MHz ~ 5240 MHz
5260 MHz ~ 5320 MHz
5500 MHz ~ 5720 MHz</td></tr>
<tr><td>Maximum Output Power to Antenna</td><td><MIMO Ant.1+2>
<5180 MHz ~ 5240 MHz>
802.11a : 15.01 dBm / 0.0317 W
802.11n HT20 : 14.90 dBm / 0.0309 W
802.11n HT40 : 15.81 dBm / 0.0381 W
802.11ac VHT20 : 14.99 dBm / 0.0316 W
802.11ac VHT40 : 15.96 dBm / 0.0394 W
802.11ac VHT80 : 6.10 dBm / 0.0041 W
<5260 MHz ~ 5320 MHz>
802.11a : 14.88 dBm / 0.0308 W
802.11n HT20 : 14.76 dBm / 0.0299 W
802.11n HT40 : 15.63 dBm / 0.0366 W
802.11ac VHT20 : 14.81 dBm / 0.0303 W
802.11ac VHT40 : 15.67 dBm / 0.0369 W
802.11ac VHT80 : 6.09 dBm / 0.0049 W
<5500 MHz ~ 5720 MHz >
802.11a : 14.12 dBm / 0.0258 W
802.11n HT20 : 13.88 dBm / 0.0244 W
802.11n HT40 : 13.21 dBm / 0.0209 W
802.11ac VHT20 : 13.96 dBm / 0.0249 W
802.11ac VHT40 : 13.31 dBm / 0.0214 W
802.11ac VHT80 : 13.45 dBm / 0.0221 W</td></tr>
<tr><td>Antenna Type / Gain</td><td><5180 MHz ~ 5240 MHz>
<Ant. 1> : PIFA Antenna with gain 1.30 dBi
<Ant. 2> : PIFA Antenna with gain 2.50 dBi
<5260 MHz ~ 5320 MHz>
<Ant. 1> : PIFA Antenna with gain 0.80 dBi
<Ant. 2> : PIFA Antenna with gain 1.50 dBi
<5500 MHz ~ 5720 MHz>
<Ant. 1> : PIFA Antenna with gain 1.30 dBi
<Ant. 2> : PIFA Antenna with gain 1.40 dBi</td></tr>
<tr><td>Type of Modulation</td><td>802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)
802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)</td></tr>
<tr><td>.Antenna Function Description</td><td>
<table>
<tr><th></th><th>Ant. 1</th><th>Ant. 2</th></tr>
<tr><td>802.11 a/n/ac SISO</td><td>V</td><td>V</td></tr>
<tr><td>802.11 a/n/ac MIMO</td><td>V</td><td>V</td></tr>
</table>
</td></tr>
</table>

Remark: For 802.11n HT20 / ac VHT20 and 802.11n HT40 / ac VHT40 mode, the whole testing have assessed only 802.11ac VHT20, 802.11n 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 (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
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.**
	TH01-KS CO01-KS 03CH06-KS	CN1257	314309

1.7 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH06-KS	AUDIX	E3	6.2009-8-24al
2.	CO01-KS	AUDIX	E3	6.2009-8-24

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: conduction emission (150 kHz to 30 MHz), 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.

b. AC power line Conducted Emission was tested under maximum output power.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 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)
5260-5320 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)
5500-5720 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

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.

MIMO Mode

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

Test Cases	
AC Conducted Emission	Mode 1 : Bluetooth Link + WLAN Link(5G) + Battery 1 + Earphone + Smart Reader With Read Card + USB Link With Notebook (Type-c Port) + USB Link With U Disk + Adapter
Remark: For Radiated Test Cases, The tests were performed with Adapter, Battery 1 and Earphone	

Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz	Band III : 5500-5720MHz
		802.11a	802.11a	802.11a
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

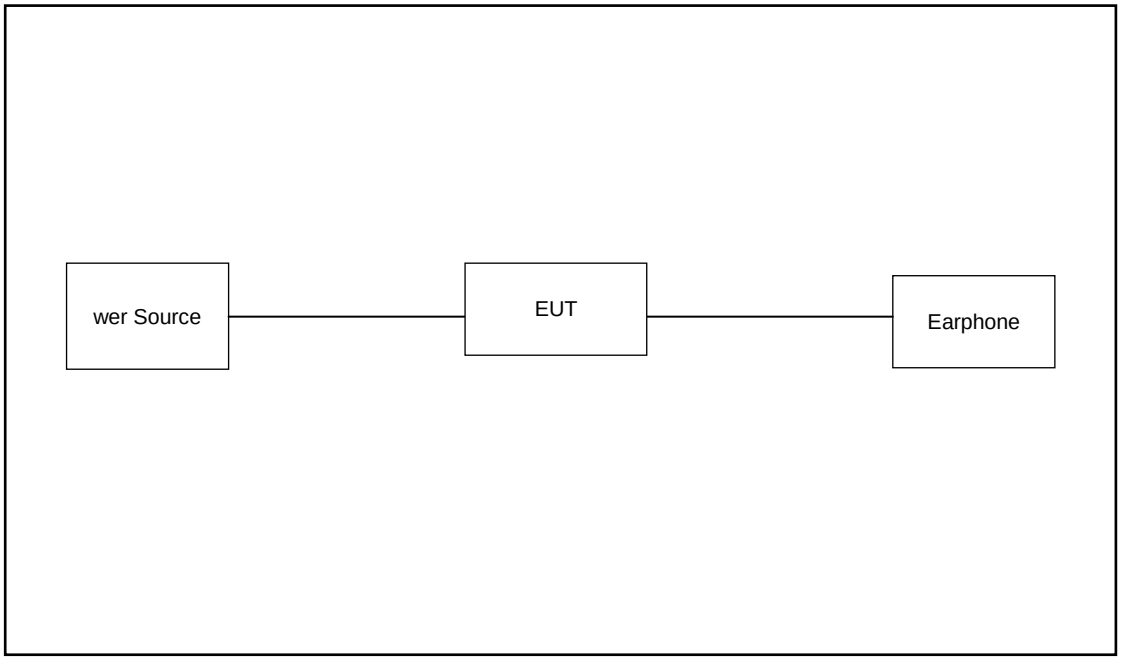
Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz	Band III : 5500-5720MHz
		802.11ac VHT20	802.11ac VHT20	802.11ac VHT20
L	Low	36	52	100
M	Middle	44	60	116
H	High	48	64	140
Straddle		-	-	144

Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz	Band III : 5500-5720MHz
		802.11ac VHT40	802.11ac VHT40	802.11ac VHT40
L	Low	38	54	102
M	Middle	-	-	110
H	High	46	62	134
Straddle		-	-	142

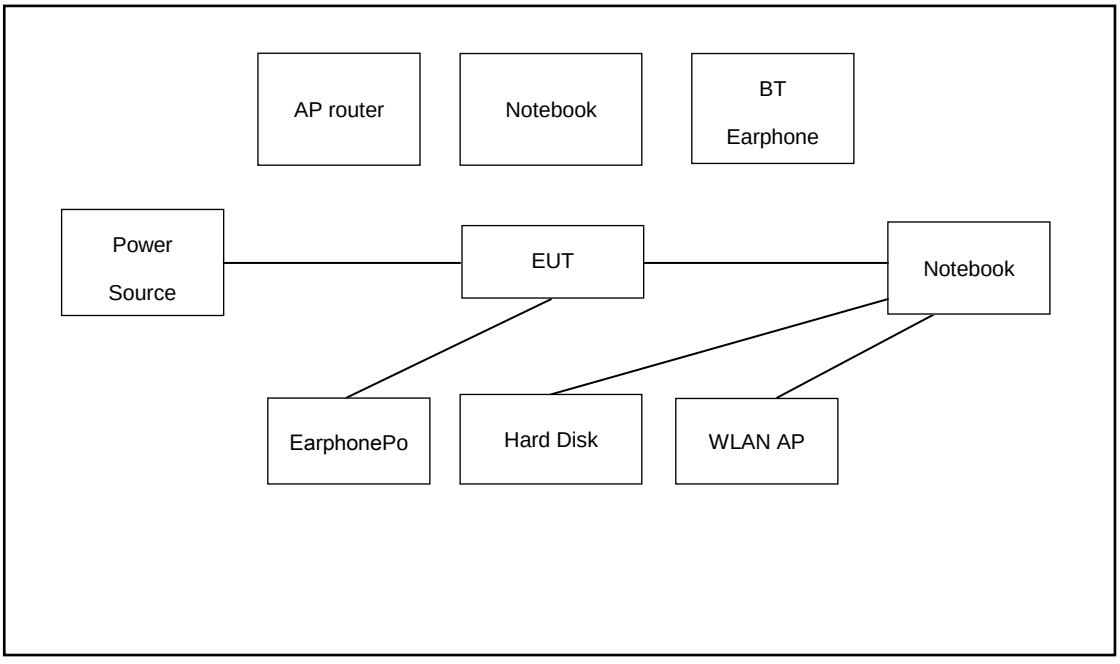
Ch. #		Band I : 5180-5240 MHz	Band II : 5260-5320 MHz	Band III : 5500-5720MHz
		802.11ac VHT80	802.11ac VHT80	802.11ac VHT80
L	Low	-	-	106
M	Middle	42	58	-
H	High	-	-	122
Straddle		-	-	138

2.3 Connection Diagram of Test System

For Radiation



For Conduction



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	BT Earphone	Lenovo	LBH308	N/A	N/A	N/A
2.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
3.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
4.	Router	D-Link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
5.	SD Card	Kingston	8GB	N/A	N/A	N/A
6.	Hard Disk	Lenovo	F310	DoC	Shielded, 1.2m	N/A
7.	U Disk	Kingston	N/A	N/A	N/A	N/A
8.	Earphone	Lenovo	P121	N/A	Unshielded,1.2m	N/A

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 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.

3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

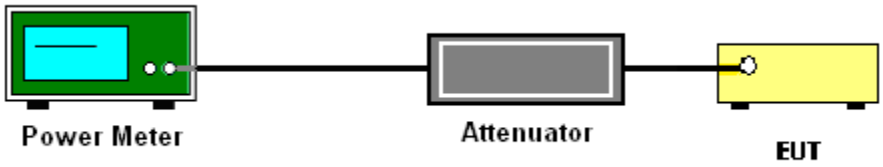
The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

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.

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.

3.1.4 Test Setup



3.1.5 Test Result of Maximum Conducted Output Power

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	2	36	5180	0.15	0.18	11.89	11.81	14.86	24.00		2.50		Pass
11a	6Mbps	2	44	5220	0.15	0.18	12.00	12.01	15.01	24.00		2.50		Pass
11a	6Mbps	2	48	5240	0.15	0.18	12.07	11.90	14.99	24.00		2.50		Pass
HT20	MCS0	2	36	5180	0.19	0.22	11.86	11.80	14.84	24.00		2.50		Pass
HT20	MCS0	2	44	5220	0.19	0.22	11.91	11.85	14.89	24.00		2.50		Pass
HT20	MCS0	2	48	5240	0.19	0.22	11.97	11.80	14.90	24.00		2.50		Pass
HT40	MCS0	2	38	5190	0.32	0.38	10.13	9.90	13.03	24.00		2.50		Pass
HT40	MCS0	2	46	5230	0.32	0.38	12.96	12.64	15.81	24.00		2.50		Pass
VHT20	MCS0	2	36	5180	0.21	0.21	11.91	11.81	14.87	24.00		2.50		Pass
VHT20	MCS0	2	44	5220	0.21	0.21	11.97	11.94	14.96	24.00		2.50		Pass
VHT20	MCS0	2	48	5240	0.21	0.21	12.06	11.91	14.99	24.00		2.50		Pass
VHT40	MCS0	2	38	5190	0.35	0.38	10.13	9.92	13.04	24.00		2.50		Pass
VHT40	MCS0	2	46	5230	0.35	0.38	13.00	12.90	15.96	24.00		2.50		Pass
VHT80	MCS0	2	42	5210	0.67	0.64	3.48	2.66	6.10	24.00		2.50		Pass

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	2	52	5260	0.15	0.18	11.93	11.82	14.88	24.00		1.50		26.99	Pass
11a	6Mbps	2	60	5300	0.15	0.18	11.63	12.00	14.83	24.00		1.50		26.99	Pass
11a	6Mbps	2	64	5320	0.15	0.18	11.47	11.86	14.68	24.00		1.50		26.99	Pass
HT20	MCS0	2	52	5260	0.19	0.22	11.77	11.73	14.76	24.00		1.50		26.99	Pass
HT20	MCS0	2	60	5300	0.19	0.22	11.44	11.83	14.65	24.00		1.50		26.99	Pass
HT20	MCS0	2	64	5320	0.19	0.22	11.41	11.75	14.60	24.00		1.50		26.99	Pass
HT40	MCS0	2	54	5270	0.32	0.38	12.68	12.55	15.63	24.00		1.50		26.99	Pass
HT40	MCS0	2	62	5310	0.32	0.38	5.80	5.86	8.84	24.00		1.50		26.99	Pass
VHT20	MCS0	2	52	5260	0.21	0.21	11.82	11.79	14.81	24.00		1.50		26.99	Pass
VHT20	MCS0	2	60	5300	0.21	0.21	11.56	11.83	14.70	24.00		1.50		26.99	Pass
VHT20	MCS0	2	64	5320	0.21	0.21	11.43	11.75	14.60	24.00		1.50		26.99	Pass
VHT40	MCS0	2	54	5270	0.35	0.38	12.70	12.63	15.67	24.00		1.50		26.99	Pass
VHT40	MCS0	2	62	5310	0.35	0.38	5.83	5.94	8.89	24.00		1.50		26.99	Pass
VHT80	MCS0	2	58	5290	0.67	0.64	3.45	2.68	6.09	24.00		1.50		26.99	Pass

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	2	100	5500	0.15	0.18	10.88	10.73	13.81	24.00		1.40		26.99	Pass
11a	6Mbps	2	116	5580	0.15	0.18	10.75	10.76	13.76	24.00		1.40		26.99	Pass
11a	6Mbps	2	140	5700	0.15	0.18	10.98	11.24	14.12	24.00		1.40		26.99	Pass
11a	6Mbps	2	144	5720	0.15	0.18	10.91	11.20	14.07	24.00		1.40		26.99	Pass
HT20	MCS0	2	100	5500	0.19	0.22	10.61	10.66	13.65	24.00		1.40		26.99	Pass
HT20	MCS0	2	116	5580	0.19	0.22	10.70	10.64	13.68	24.00		1.40		26.99	Pass
HT20	MCS0	2	140	5700	0.19	0.22	10.79	10.94	13.88	24.00		1.40		26.99	Pass
HT20	MCS0	2	144	5720	0.19	0.22	10.78	10.84	13.82	24.00		1.40		26.99	Pass
HT40	MCS0	2	102	5510	0.32	0.38	8.83	9.57	12.23	24.00		1.40		26.99	Pass
HT40	MCS0	2	110	5550	0.32	0.38	10.30	10.10	13.21	24.00		1.40		26.99	Pass
HT40	MCS0	2	134	5670	0.32	0.38	10.31	9.96	13.15	24.00		1.40		26.99	Pass
HT40	MCS0	2	142	5710	0.32	0.38	10.34	9.89	13.13	24.00		1.40		26.99	Pass
VHT20	MCS0	2	100	5500	0.21	0.21	10.69	10.69	13.70	24.00		1.40		26.99	Pass
VHT20	MCS0	2	116	5580	0.21	0.21	10.79	10.67	13.74	24.00		1.40		26.99	Pass
VHT20	MCS0	2	140	5700	0.21	0.21	10.84	11.07	13.96	24.00		1.40		26.99	Pass
VHT20	MCS0	2	144	5720	0.21	0.21	10.82	11.05	13.94	24.00		1.40		26.99	Pass
VHT40	MCS0	2	102	5510	0.35	0.38	8.74	9.54	12.17	24.00		1.40		26.99	Pass
VHT40	MCS0	2	110	5550	0.35	0.38	10.47	10.13	13.31	24.00		1.40		26.99	Pass
VHT40	MCS0	2	134	5670	0.35	0.38	10.47	10.02	13.26	24.00		1.40		26.99	Pass
VHT40	MCS0	2	142	5710	0.35	0.38	10.44	10.00	13.23	24.00		1.40		26.99	Pass
VHT80	MCS0	2	106	5530	0.67	0.64	6.49	7.25	9.90	24.00		1.40		26.99	Pass
VHT80	MCS0	2	122	5610	0.67	0.64	10.74	10.12	13.45	24.00		1.40		26.99	Pass
VHT80	MCS0	2	138	5690	0.67	0.64	10.54	9.98	13.28	24.00		1.40		26.99	Pass

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	68.3

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

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

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 ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

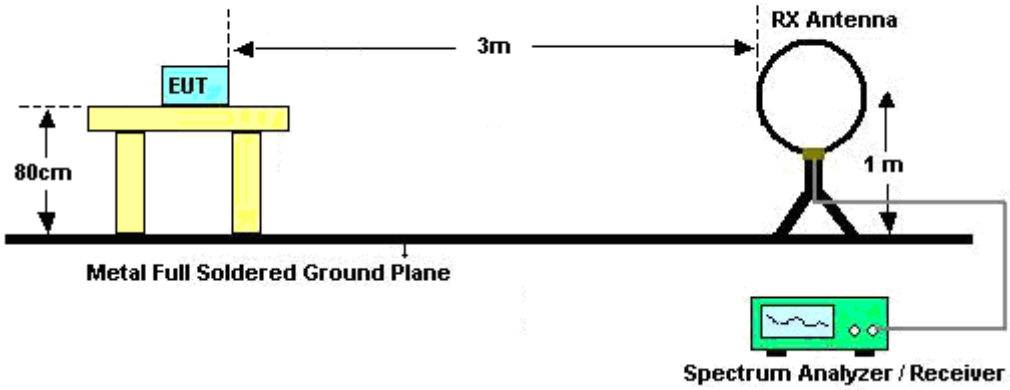
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 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.

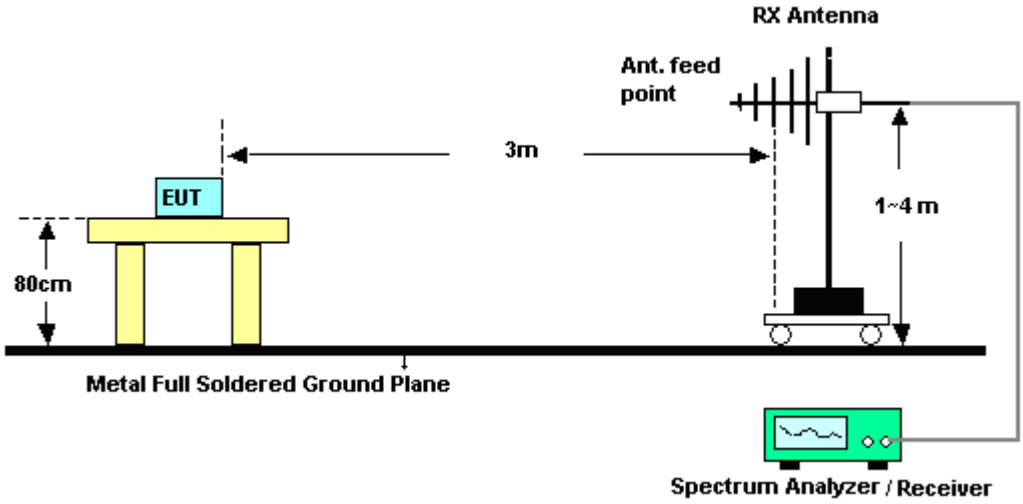
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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

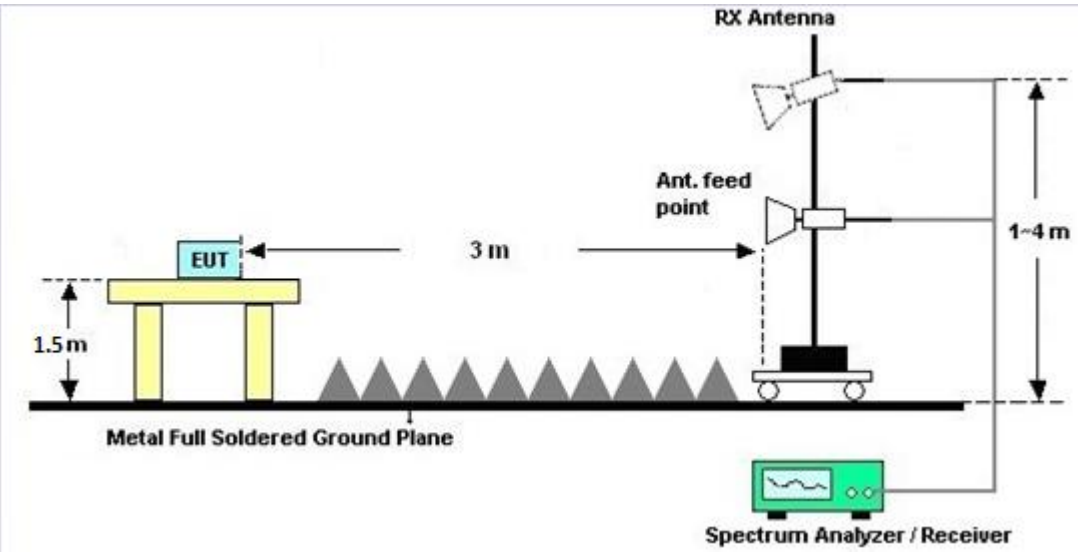
For radiated emissions below 30MHz



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 AC Conducted Emission Measurement

3.3.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

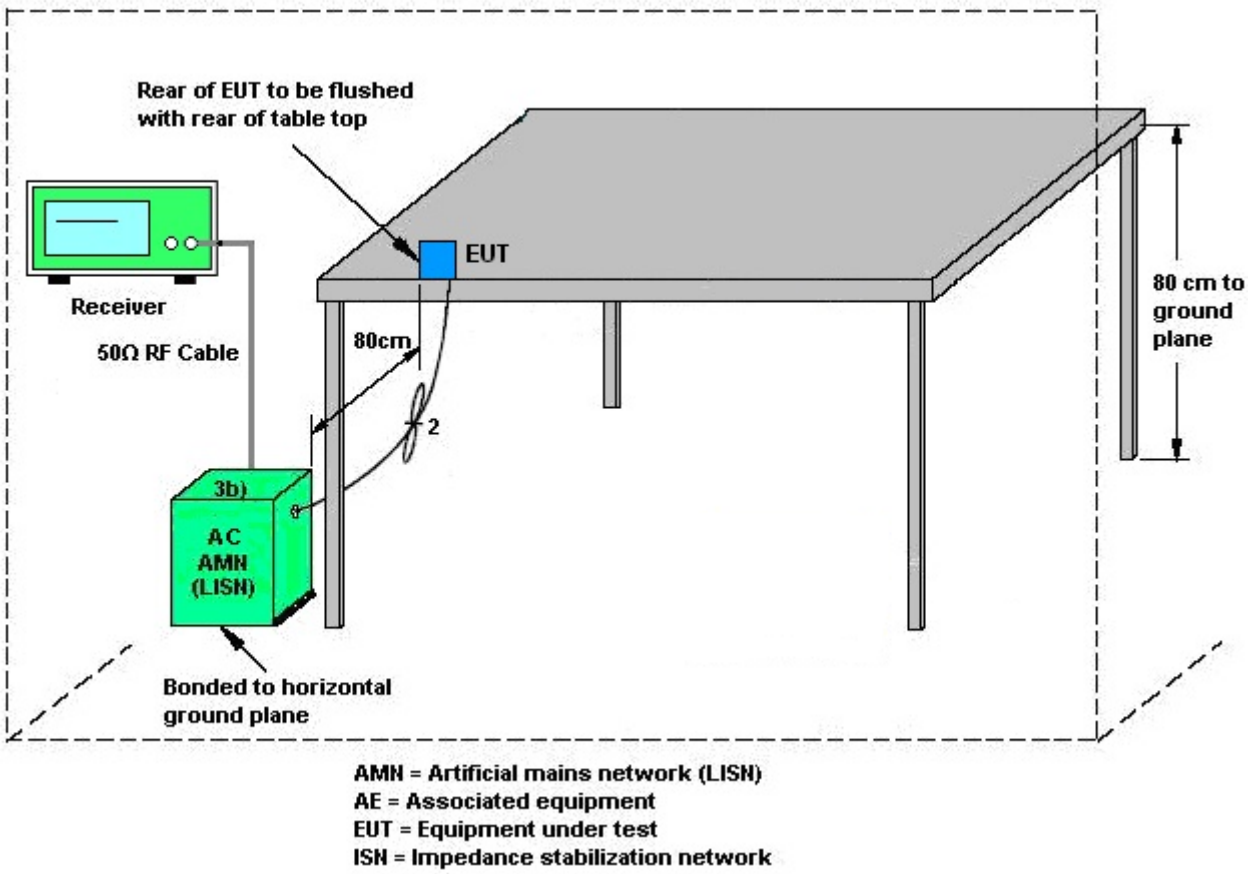
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.3.4 Test Setup



3.3.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

3.4 Automatically Discontinue Transmission

3.4.1 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.

3.4.2 Measuring Instruments

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

3.4.3 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.

3.5 Antenna Requirements

3.5.1 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.

3.5.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.5.3 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(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 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>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
Band I	1.30	2.50	2.50	4.93	0.00	0.00
Band II	0.80	1.50	1.50	4.17	0.00	0.00
Band III	1.30	1.40	1.40	4.36	0.00	0.00

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	Aug. 25, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Pulse Power Senor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 15, 2020	Aug. 25, 2020	Jan. 14, 2021	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 08, 2020	Aug. 25, 2020	Jan. 07, 2021	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz;Max 30dBm	Oct. 18, 2019	Jul. 29, 2020	Oct. 17, 2020	Radiation (03CH06-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150208	10Hz-44GHz	Apr. 15, 2020	Jul. 29, 2020	Apr. 14, 2021	Radiation (03CH06-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 10, 2019	Jul. 29, 2020	Nov. 09, 2020	Radiation (03CH06-KS)
Bilog Antenna	TeseQ	CBL6111D	49921	30MHz-1GHz	May 29, 2020	Jul. 29, 2020	May 28, 2021	Radiation (03CH06-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00218652	1GHz~18GHz	Apr. 27, 2020	Jul. 29, 2020	Apr. 26, 2021	Radiation (03CH06-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Jul. 29, 2020	Nov. 09, 2020	Radiation (03CH06-KS)
Amplifier	SONOMA	310N	187289	9KHz ~1GHZ	Apr. 14, 2020	Jul. 29, 2020	Apr. 13, 2021	Radiation (03CH06-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 08, 2020	Jul. 29, 2020	Jan. 07, 2021	Radiation (03CH06-KS)
high gain Amplifier	MITEQ	AMF-7D-00101800-30-10P	2025788	1Ghz-18Ghz	Jan. 02, 2020	Jul. 29, 2020	Jan. 01, 2021	Radiation (03CH06-KS)
Amplifier	Keysight	83017A	MY53270203	500MHz~26.5GHz	Apr. 15, 2020	Jul. 29, 2020	Apr. 14, 2021	Radiation (03CH06-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Jul. 29, 2020	NCR	Radiation (03CH06-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Jul. 29, 2020	NCR	Radiation (03CH06-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Jul. 29, 2020	NCR	Radiation (03CH06-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 14, 2020	Jul. 03, 2020	Apr. 13, 2021	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 18, 2019	Jul. 03, 2020	Oct. 17, 2020	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060105	9kHz~30MHz	Oct. 28, 2019	Jul. 03, 2020	Oct. 27, 2020	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 18, 2019	Jul. 03, 2020	Oct. 17, 2020	Conduction (CO01-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 Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.9dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

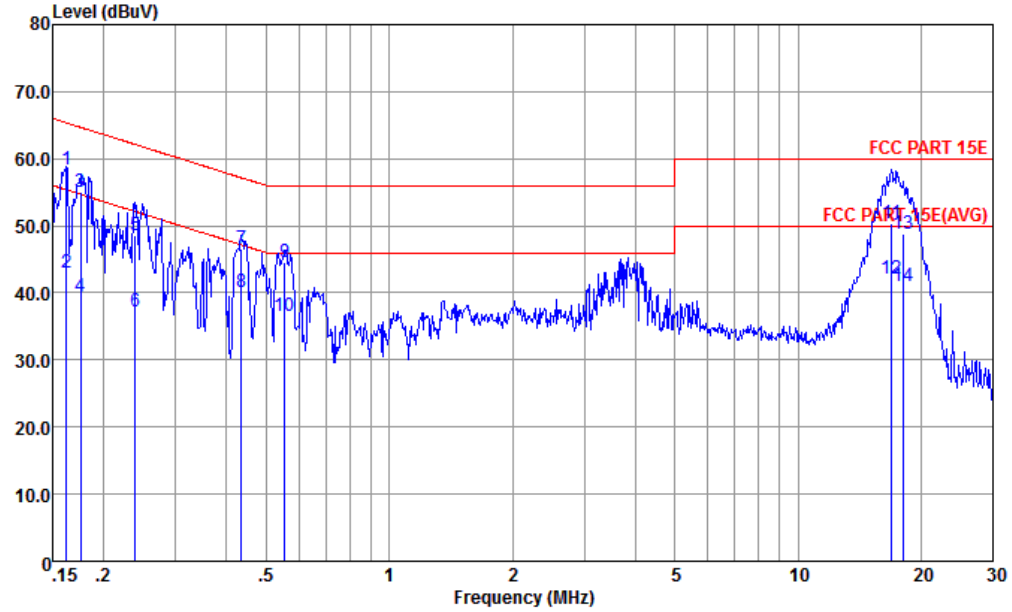
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0dB**

Appendix A. AC Conducted Emission Test Results

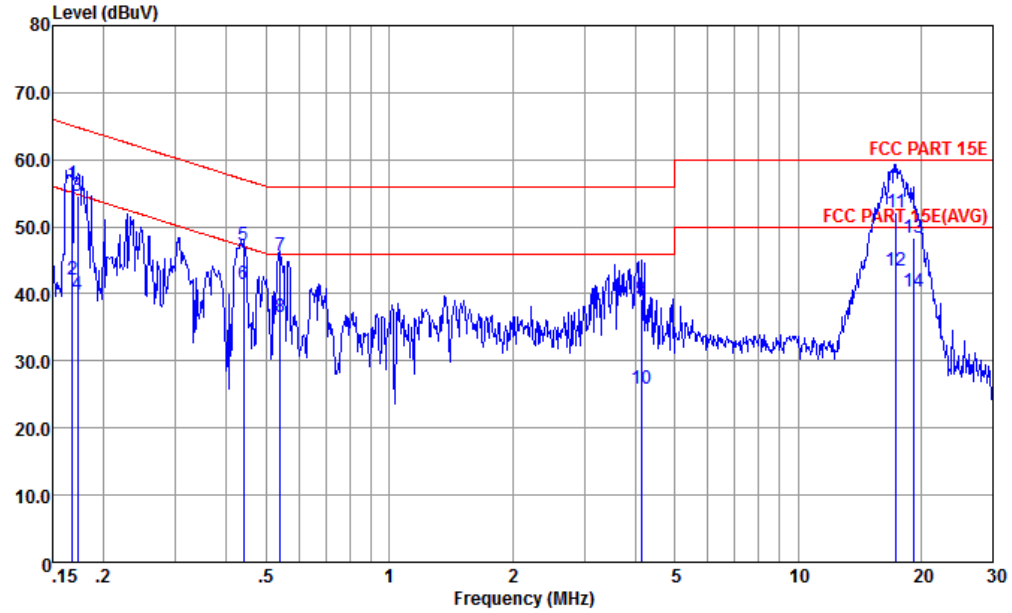
Test Engineer :	Amos Zhang	Temperature :	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line



Site : CO01-KS
Condition : FCC PART 15E LISN-L-191028-060105 LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.162	58.28	-7.06	65.34	47.80	0.03	10.45	QP
2		0.162	43.08	-12.26	55.34	32.60	0.03	10.45	Average
3		0.176	54.95	-9.73	64.68	44.49	0.04	10.42	QP
4		0.176	39.35	-15.33	54.68	28.89	0.04	10.42	Average
5		0.239	48.68	-13.45	62.13	38.30	0.04	10.34	QP
6		0.239	37.28	-14.85	52.13	26.90	0.04	10.34	Average
7		0.435	46.51	-10.64	57.15	36.20	0.06	10.25	QP
8	*	0.435	40.21	-6.94	47.15	29.90	0.06	10.25	Average
9		0.555	44.50	-11.50	56.00	34.20	0.06	10.24	QP
10		0.555	36.60	-9.40	46.00	26.30	0.06	10.24	Average
11		16.928	50.42	-9.58	60.00	39.50	0.48	10.44	QP
12		16.928	42.12	-7.88	50.00	31.20	0.48	10.44	Average
13		18.135	48.91	-11.09	60.00	37.90	0.55	10.46	QP
14		18.135	41.11	-8.89	50.00	30.10	0.55	10.46	Average

Test Engineer :	Amos Zhang	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral



Site : CO01-KS
Condition : FCC PART 15E LISN-N-191028-060105 NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.168	56.31	-8.77	65.08	45.80	0.08	10.43	QP
2		0.168	42.11	-12.97	55.08	31.60	0.08	10.43	Average
3		0.173	54.70	-10.11	64.81	44.20	0.08	10.42	QP
4		0.173	39.80	-15.01	54.81	29.30	0.08	10.42	Average
5		0.440	47.25	-9.82	57.07	36.90	0.10	10.25	QP
6	*	0.440	41.55	-5.52	47.07	31.20	0.10	10.25	Average
7		0.541	45.64	-10.36	56.00	35.30	0.10	10.24	QP
8		0.541	36.64	-9.36	46.00	26.30	0.10	10.24	Average
9		4.136	39.31	-16.69	56.00	28.91	0.15	10.25	QP
10		4.136	25.91	-20.09	46.00	15.51	0.15	10.25	Average
11		17.383	52.05	-7.95	60.00	41.09	0.51	10.45	QP
12		17.383	43.55	-6.45	50.00	32.59	0.51	10.45	Average
13		19.122	48.26	-11.74	60.00	37.19	0.59	10.48	QP
14		19.122	40.36	-9.64	50.00	29.29	0.59	10.48	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

Appendix B. Radiated Spurious Emission

Band 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+2		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 36 5180MHz		5149.28	63.88	-10.12	74	50.51	35.33	11.36	33.32	119	0	P	H
		5149.44	50.7	-3.3	54	37.33	35.33	11.36	33.32	119	0	A	H
	*	5176	111.73	-	-	98.29	35.36	11.4	33.32	119	0	P	H
		5176	104.66	-	-	91.22	35.36	11.4	33.32	119	0	A	H
		5139.36	61.19	-12.81	74	47.86	35.31	11.34	33.32	122	54	P	V
		5150	48.23	-5.77	54	34.86	35.33	11.36	33.32	122	54	A	V
	*	5176	109.09	-	-	95.65	35.36	11.4	33.32	122	54	P	V
		5176	102.08	-	-	88.64	35.36	11.4	33.32	122	54	A	V

Band 1 5150~5250MHz

WIFI 802.11a (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)
802.11a CH 36 5180MHz		10360	47.17	-21.13	68.3	53.82	39.6	15.83	62.08	300	0	P	H
		10360	45.99	-22.31	68.3	52.64	39.6	15.83	62.08	100	360	P	V
802.11a CH 44 5220MHz		10440	46.91	-21.39	68.3	53.44	39.63	15.89	62.05	100	360	P	H
		10440	45.98	-22.32	68.3	52.51	39.63	15.89	62.05	100	360	P	V
802.11a CH 48 5240MHz		10480	45.26	-23.04	68.3	51.68	39.66	15.94	62.02	100	360	P	H
		10480	45.25	-23.05	68.3	51.67	39.66	15.94	62.02	100	360	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 VHT20 (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)
		5148.64	65.17	-8.83	74	51.8	35.33	11.36	33.32	144	289	P	H
		5150	50.62	-3.38	54	37.25	35.33	11.36	33.32	144	289	A	H
802.11ac	*	5188	112.15	-	-	98.71	35.36	11.4	33.32	144	289	P	H
VHT20		5188	104.52	-	-	91.08	35.36	11.4	33.32	144	289	A	H
CH 36		5148.48	62.32	-11.68	74	48.95	35.33	11.36	33.32	100	72	P	V
5180MHz		5150	48.47	-5.53	54	35.1	35.33	11.36	33.32	100	72	A	V
	*	5182	109	-	-	95.56	35.36	11.4	33.32	100	72	P	V
		5182	101.51	-	-	88.07	35.36	11.4	33.32	100	72	A	V

Band 1 5150~5250MHz

WIFI 802.11ac VHT20 (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 VHT20 CH 36 5180MHz		10360	45.43	-22.87	68.3	52.08	39.6	15.83	62.08	300	0	P	H
		10360	45.72	-22.58	68.3	52.37	39.6	15.83	62.08	100	360	P	V
802. 11ac VHT20 CH 44 5220MHz		10440	45.53	-22.77	68.3	52.06	39.63	15.89	62.05	100	360	P	H
		10440	45.31	-22.99	68.3	51.84	39.63	15.89	62.05	100	360	P	V
802. 11ac VHT20 CH 48 5240MHz		10480	46.12	-22.18	68.3	52.54	39.66	15.94	62.02	100	360	P	H
		10480	44.98	-23.32	68.3	51.4	39.66	15.94	62.02	100	360	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 VHT40 (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 VHT40 CH 38 5190MHz		5148.96	62.99	-11.01	74	49.62	35.33	11.36	33.32	116	360	P	H
		5150	50.3	-3.7	54	36.93	35.33	11.36	33.32	116	360	A	H
	*	5188	105.13	-	-	91.69	35.36	11.4	33.32	116	360	P	H
		5188	97.71	-	-	84.27	35.36	11.4	33.32	116	360	A	H
		5369.76	53.57	-20.43	74	39.75	35.54	11.6	33.32	116	360	P	H
		5394.78	45.08	-8.92	54	31.22	35.57	11.6	33.31	116	360	A	H
		5149.8	58.77	-15.23	74	45.4	35.33	11.36	33.32	113	80	P	V
		5149.6	47.41	-6.59	54	34.04	35.33	11.36	33.32	113	80	A	V
	*	5200	103.6	-	-	90.13	35.38	11.41	33.32	113	80	P	V
		5200	97.36	-	-	83.89	35.38	11.41	33.32	113	80	A	V
		5384.88	53.89	-20.11	74	40.04	35.56	11.6	33.31	113	80	P	V
		5374.62	45.08	-8.92	54	31.25	35.54	11.6	33.31	113	80	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 VHT40 (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 VHT40 CH 38 5190MHz		10380	44.77	-23.53	68.3	51.39	39.61	15.84	62.07	100	360	P	H
		10380	44.29	-24.01	68.3	50.91	39.61	15.84	62.07	100	360	P	V
802.11ac VHT40 CH 46 5230MHz		10460	44.82	-23.48	68.3	51.31	39.64	15.91	62.04	100	360	P	H
		10460	44.82	-23.48	68.3	51.31	39.64	15.91	62.04	100	360	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		5148.64	59.07	-14.93	74	45.7	35.33	11.36	33.32	101	0	P	H
		5150	49.28	-4.72	54	35.91	35.33	11.36	33.32	101	0	A	H
	*	5230	93.45	-	-	79.88	35.41	11.48	33.32	101	0	P	H
		5230	86.63	-	-	73.06	35.41	11.48	33.32	101	0	A	H
		5394.6	52.96	-21.04	74	39.1	35.57	11.6	33.31	101	0	P	H
		5392.98	45.08	-8.92	54	31.23	35.56	11.6	33.31	101	0	A	H
		5149.28	57.13	-16.87	74	43.76	35.33	11.36	33.32	101	48	P	V
		5146.88	47.95	-6.05	54	34.58	35.33	11.36	33.32	101	48	A	V
	*	5242	92.72	-	-	79.09	35.43	11.52	33.32	101	48	P	V
		5242	85.5	-	-	71.87	35.43	11.52	33.32	101	48	A	V
		5394.24	53.68	-20.32	74	39.83	35.56	11.6	33.31	101	48	P	V
		5382.18	45.24	-8.76	54	31.39	35.56	11.6	33.31	101	48	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 VHT80 CH 42 5210MHz		10420	45.15	-23.15	68.3	51.71	39.62	15.88	62.06	100	360	P	H
		10420	45.5	-22.8	68.3	52.06	39.62	15.88	62.06	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 - 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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 64 5320MHz		5353.1	64.74	-9.26	74	50.93	35.52	11.61	33.32	150	0	P	H
		5350.1	49.91	-4.09	54	36.1	35.52	11.61	33.32	150	0	A	H
	*	5320	110.37	-	-	96.58	35.49	11.62	33.32	150	0	P	H
		5320	103.03	-	-	89.24	35.49	11.62	33.32	150	0	A	H
		5361.6	58.71	-15.29	74	44.89	35.54	11.6	33.32	299	320	P	V
		5351.8	46.97	-7.03	54	33.16	35.52	11.61	33.32	299	320	A	V
	*	5320	107.67	-	-	93.88	35.49	11.62	33.32	299	320	P	V
		5320	100.37	-	-	86.58	35.49	11.62	33.32	299	320	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11a (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)
802.11a CH 52 5260MHz		7015.015	51.07	-17.23	68.3	63.19	36.8	13.17	62.09	300	0	P	H
		10520	46.03	-22.27	68.3	52.38	39.68	15.98	62.01	300	0	P	H
		7015.015	52.55	-15.75	68.3	64.67	36.8	13.17	62.09	100	360	P	V
		10520	45.32	-22.98	68.3	51.67	39.68	15.98	62.01	100	360	P	V
802.11a CH 60 5300MHz		7066	51.44	-16.86	68.3	63.5	36.81	13.29	62.16	100	360	P	H
		10600	44.88	-29.12	74	51.07	39.72	16.06	61.97	100	360	P	H
		7066	49.84	-18.46	68.3	61.9	36.81	13.29	62.16	100	360	P	V
		10600	46.11	-27.89	74	52.3	39.72	16.06	61.97	100	360	P	V
802.11a CH 64 5320MHz		7095.095	49.78	-18.52	68.3	61.8	36.82	13.37	62.21	100	360	P	H
		10640	44.65	-29.35	74	50.77	39.74	16.09	61.95	100	360	P	H
		7095.095	48.95	-19.35	68.3	60.97	36.82	13.37	62.21	100	360	P	V
		10640	45.38	-28.62	74	51.5	39.74	16.09	61.95	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT20 (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 VHT20 CH 64 5320MHz		5352.6	64.03	-9.97	74	50.22	35.52	11.61	33.32	101	10	P	H
		5350.2	49.63	-4.37	54	35.82	35.52	11.61	33.32	101	10	A	H
	*	5320	110.3	-	-	96.51	35.49	11.62	33.32	101	10	P	H
		5320	103.07	-	-	89.28	35.49	11.62	33.32	101	10	A	H
		5363.1	60.43	-13.57	74	46.61	35.54	11.6	33.32	133	70	P	V
		5350.2	48.25	-5.75	54	34.44	35.52	11.61	33.32	133	70	A	V
	*	5326	109.46	-	-	95.67	35.49	11.62	33.32	133	70	P	V
		5326	101.85	-	-	88.06	35.49	11.62	33.32	133	70	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT20 (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		7022	51.58	-16.72	68.3	63.7	36.8	13.17	62.09	100	360	P	H
VHT20		10520	45.28	-23.02	68.3	51.63	39.68	15.98	62.01	100	360	P	H
CH 52		7022	51.97	-16.33	68.3	64.09	36.8	13.17	62.09	100	360	P	V
5260MHz		10520	44.97	-23.33	68.3	51.32	39.68	15.98	62.01	100	360	P	V
802.11ac		7065.065	51.27	-17.03	68.3	63.33	36.81	13.29	62.16	100	360	P	H
VHT20		10600	45.33	-28.67	74	51.52	39.72	16.06	61.97	100	360	P	H
CH 60		7065.065	49.57	-18.73	68.3	61.63	36.81	13.29	62.16	100	360	P	V
5300MHz		10600	44.57	-29.43	74	50.76	39.72	16.06	61.97	100	360	P	V
802.11ac		7095.095	49.94	-18.36	68.3	61.96	36.82	13.37	62.21	100	360	P	H
VHT20		10640	44.8	-29.2	74	50.92	39.74	16.09	61.95	100	360	P	H
CH 64		7095.095	49.38	-18.92	68.3	61.4	36.82	13.37	62.21	100	360	P	V
5320MHz		10640	44.85	-29.15	74	50.97	39.74	16.09	61.95	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT40 (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 VHT40 CH 62 5310MHz		5109.76	54.79	-19.21	74	41.5	35.3	11.32	33.33	101	11	P	H
		5127.68	45.69	-8.31	54	32.37	35.31	11.34	33.33	101	11	A	H
	*	5314	100.89	-	-	87.1	35.49	11.62	33.32	101	11	P	H
		5314	95.04	-	-	81.25	35.49	11.62	33.32	101	11	A	H
		5350.7	61.45	-12.55	74	47.64	35.52	11.61	33.32	101	11	P	H
		5350	49.83	-4.17	54	36.02	35.52	11.61	33.32	101	11	A	H
		5103.52	55.02	-18.98	74	41.77	35.28	11.3	33.33	119	72	P	V
		5120.48	45.71	-8.29	54	32.42	35.3	11.32	33.33	119	72	A	V
	*	5320	100.2	-	-	86.41	35.49	11.62	33.32	119	72	P	V
		5320	94.11	-	-	80.32	35.49	11.62	33.32	119	72	A	V
		5353.3	61.17	-12.83	74	47.36	35.52	11.61	33.32	119	72	P	V
		5354	48.42	-5.58	54	34.61	35.52	11.61	33.32	119	72	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

WIFI 802.11ac VHT40 (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		7025.025	51.08	-17.22	68.3	63.2	36.8	13.17	62.09	100	360	P	H
VHT40		10540	45.64	-22.66	68.3	51.96	39.69	15.99	62	100	360	P	H
CH 54		7025.025	51.63	-16.67	68.3	63.75	36.8	13.17	62.09	100	360	P	V
5270MHz		10540	45.45	-22.85	68.3	51.77	39.69	15.99	62	100	360	P	V
802. 11ac		7080.08	50.12	-18.18	68.3	62.16	36.82	13.33	62.19	100	360	P	H
VHT40		10620	44.8	-29.2	74	50.95	39.73	16.08	61.96	100	360	P	H
CH 62		7080.08	49.1	-19.2	68.3	61.14	36.82	13.33	62.19	100	360	P	V
5310MHz		10620	45.57	-28.43	74	51.72	39.73	16.08	61.96	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

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)
		5146.56	55.26	-18.74	74	41.89	35.33	11.36	33.32	100	332	P	H
		5117.92	45.93	-8.07	54	32.64	35.3	11.32	33.33	100	332	A	H
	*	5314	94.94	-	-	81.15	35.49	11.62	33.32	100	332	P	H
		5314	86.79	-	-	73	35.49	11.62	33.32	100	332	A	H
802.11ac		5350.9	58.64	-15.36	74	44.83	35.52	11.61	33.32	100	332	P	H
VHT80		5354.7	49.84	-4.16	54	36.03	35.52	11.61	33.32	100	332	A	H
CH 58		5106.24	55.19	-18.81	74	41.9	35.3	11.32	33.33	102	46	P	V
5290MHz		5124.16	45.85	-8.15	54	32.53	35.31	11.34	33.33	102	46	A	V
	*	5314	92.02	-	-	78.23	35.49	11.62	33.32	102	46	P	V
		5314	84.61	-	-	70.82	35.49	11.62	33.32	102	46	A	V
		5370.6	56.66	-17.34	74	42.84	35.54	11.6	33.32	102	46	P	V
		5352.7	48.31	-5.69	54	34.5	35.52	11.61	33.32	102	46	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 2 5250~5350MHz

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		7055	52.34	-15.96	68.3	64.42	36.81	13.25	62.14	100	360	P	H
VHT80		10580	44.74	-23.56	68.3	50.97	39.71	16.04	61.98	100	360	P	H
CH 58		7055	50.73	-17.57	68.3	62.81	36.81	13.25	62.14	100	360	P	V
5290MHz		10580	44.69	-23.61	68.3	50.92	39.71	16.04	61.98	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 100 5500MHz		5458	56.56	-17.44	74	42.65	35.62	11.6	33.31	159	335	P	H
		5468.72	63.41	-4.89	68.3	49.47	35.64	11.61	33.31	159	335	P	H
		5458.48	48.04	-5.96	54	34.13	35.62	11.6	33.31	159	335	A	H
	*	5494	111.54	-	-	97.59	35.65	11.61	33.31	159	335	P	H
		5494	104.76	-	-	90.81	35.65	11.61	33.31	159	335	A	H
		5458.64	58.32	-15.68	74	44.41	35.62	11.6	33.31	102	80	P	V
		5468.72	61.44	-6.86	68.3	47.5	35.64	11.61	33.31	102	80	P	V
		5460	47.15	-6.85	54	33.24	35.62	11.6	33.31	102	80	A	V
	*	5506	108.6	-	-	94.63	35.67	11.61	33.31	102	80	P	V
		5506	101.39	-	-	87.42	35.67	11.61	33.31	102	80	A	V
802.11a CH 140 5700MHz		5727.64	64.57	-3.73	68.3	50.16	35.84	11.95	33.38	100	311	P	H
	*	5704	109.71	-	-	95.3	35.83	11.95	33.37	100	311	P	H
		5704	102.74	-	-	88.33	35.83	11.95	33.37	100	311	A	H
		5725.56	63.29	-5.01	68.3	48.88	35.84	11.95	33.38	284	311	P	V
	*	5704	108.89	-	-	94.48	35.83	11.95	33.37	284	311	P	V
		5704	101.12	-	-	86.71	35.83	11.95	33.37	284	311	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11a (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)
802.11a CH 100 5500MHz		11000	45.19	-28.81	74	50.6	39.93	16.45	61.79	100	360	P	H
		11000	45.9	-28.1	74	51.31	39.93	16.45	61.79	100	360	P	V
802.11a CH 116 5580MHz		11160	47.83	-26.17	74	52.93	40.02	16.72	61.84	100	360	P	H
		11160	45.93	-28.07	74	51.03	40.02	16.72	61.84	100	360	P	V
802.11a CH 140 5700MHz		11400	46.85	-27.15	74	51.51	40.15	17.1	61.91	100	360	P	H
		11400	45.73	-28.27	74	50.39	40.15	17.1	61.91	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT20 (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)
		5451.6	56.56	-17.44	74	42.65	35.62	11.6	33.31	172	338	P	H
		5469.52	63.43	-4.87	68.3	49.49	35.64	11.61	33.31	172	338	P	H
		5452.72	47.67	-6.33	54	33.76	35.62	11.6	33.31	172	338	A	H
802.11ac	*	5494	111.28	-	-	97.33	35.65	11.61	33.31	172	338	P	H
VHT20		5494	102.9	-	-	88.95	35.65	11.61	33.31	172	338	A	H
CH 100		5455.76	58.54	-15.46	74	44.63	35.62	11.6	33.31	100	31	P	V
5500MHz		5468.24	60.09	-8.21	68.3	46.15	35.64	11.61	33.31	100	31	P	V
		5452.88	46.87	-7.13	54	32.96	35.62	11.6	33.31	100	31	A	V
	*	5500	108.74	-	-	94.77	35.67	11.61	33.31	100	31	P	V
		5500	101.07	-	-	87.1	35.67	11.61	33.31	100	31	A	V
		5727.8	64.39	-3.91	68.3	49.98	35.84	11.95	33.38	184	342	P	H
802. 11ac	*	5698	110.95	-	-	96.55	35.82	11.95	33.37	184	342	P	H
VHT20		5698	103.09	-	-	88.69	35.82	11.95	33.37	184	342	A	H
CH 140		5725	63.72	-4.58	68.3	49.31	35.84	11.95	33.38	168	360	P	V
5700MHz	*	5698	106.75	-	-	92.35	35.82	11.95	33.37	168	360	P	V
		5698	99.85	-	-	85.45	35.82	11.95	33.37	168	360	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT20 (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 VHT20 CH 100 5500MHz		11000	45.01	-28.99	74	50.42	39.93	16.45	61.79	100	360	P	H
		11000	45	-29	74	50.41	39.93	16.45	61.79	100	360	P	V
802. 11ac VHT20 CH 116 5580MHz		11160	45.53	-28.47	74	50.63	40.02	16.72	61.84	100	360	P	H
		11160	46.97	-27.03	74	52.07	40.02	16.72	61.84	100	360	P	V
802. 11ac VHT20 CH 140 5700MHz		11400	45.47	-28.53	74	50.13	40.15	17.1	61.91	100	360	P	H
		11400	46.16	-27.84	74	50.82	40.15	17.1	61.91	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT40 (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)
		5452.88	59.77	-14.23	74	45.86	35.62	11.6	33.31	115	332	P	H
		5466.96	64.21	-4.09	68.3	50.27	35.64	11.61	33.31	115	332	P	H
		5459.6	47.48	-6.52	54	33.57	35.62	11.6	33.31	115	332	A	H
	*	5518	104.79	-	-	90.76	35.69	11.66	33.32	115	332	P	H
802.11ac		5518	97.98	-	-	83.95	35.69	11.66	33.32	115	332	A	H
VHT40		5751.4	55.48	-12.82	68.3	41.06	35.85	11.96	33.39	115	332	P	H
CH 102		5456.72	56.16	-17.84	74	42.25	35.62	11.6	33.31	100	76	P	V
5510MHz		5465.2	60.43	-7.87	68.3	46.49	35.64	11.61	33.31	100	76	P	V
		5458.16	46.75	-7.25	54	32.84	35.62	11.6	33.31	100	76	A	V
	*	5500	101.89	-	-	87.92	35.67	11.61	33.31	100	76	P	V
		5500	93.33	-	-	79.36	35.67	11.61	33.31	100	76	A	V
		5742.28	55.85	-12.45	68.3	41.43	35.85	11.96	33.39	100	76	P	V
		5365.36	55.03	-18.97	74	41.21	35.54	11.6	33.32	108	340	P	H
		5466.96	53.88	-14.42	68.3	39.94	35.64	11.61	33.31	108	340	P	H
		5452.56	45.66	-8.34	54	31.75	35.62	11.6	33.31	108	340	A	H
	*	5674	107.34	-	-	92.95	35.82	11.94	33.37	108	340	P	H
802. 11ac		5674	100.74	-	-	86.35	35.82	11.94	33.37	108	340	A	H
VHT40		5732.84	62.37	-5.93	68.3	47.96	35.84	11.95	33.38	108	340	P	H
CH 134		5449.36	54.87	-19.13	74	40.96	35.62	11.6	33.31	100	33	P	V
5670MHz		5465.2	54.35	-13.95	68.3	40.41	35.64	11.61	33.31	100	33	P	V
		5451.28	45.74	-8.26	54	31.83	35.62	11.6	33.31	100	33	A	V
	*	5662	104.81	-	-	90.42	35.81	11.94	33.36	100	33	P	V
		5662	97.55	-	-	83.16	35.81	11.94	33.36	100	33	A	V
		5725.24	63.8	-4.5	68.3	49.39	35.84	11.95	33.38	100	33	P	V

Remark

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

Band 3 - 5470~5725MHz

WIFI 802.11ac VHT40 (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 VHT40 CH 102 5510MHz		11020	45.24	-28.76	74	50.63	39.94	16.47	61.8	100	360	P	H
		11020	44.91	-29.09	74	50.3	39.94	16.47	61.8	100	360	P	V
802. 11ac VHT40 CH 110 5550MHz		11100	45.88	-28.12	74	51.11	39.98	16.61	61.82	100	360	P	H
		11100	45.52	-28.48	74	50.75	39.98	16.61	61.82	100	360	P	V
802. 11ac VHT40 CH 134 5670MHz		11340	47.74	-26.26	74	52.53	40.11	16.99	61.89	100	360	P	H
		11340	46.09	-27.91	74	50.88	40.11	16.99	61.89	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - 5470~5725MHz

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)
		5458.32	58.64	-15.36	74	44.73	35.62	11.6	33.31	191	339	P	H
		5461.52	59.47	-8.83	68.3	45.56	35.62	11.6	33.31	191	339	P	H
		5459.6	50.45	-3.55	54	36.54	35.62	11.6	33.31	191	339	A	H
	*	5554	99.12	-	-	84.96	35.72	11.77	33.33	191	339	P	H
802.11ac		5554	91.87	-	-	77.71	35.72	11.77	33.33	191	339	A	H
VHT80		5732.36	54.67	-13.63	68.3	40.26	35.84	11.95	33.38	191	339	P	H
CH 106		5456.88	57.1	-16.9	74	43.19	35.62	11.6	33.31	124	5	P	V
5530MHz		5462.32	60.43	-7.87	68.3	46.52	35.62	11.6	33.31	124	5	P	V
		5460	49.16	-4.84	54	35.25	35.62	11.6	33.31	124	5	A	V
	*	5566	97.11	-	-	82.88	35.74	11.82	33.33	124	5	P	V
		5566	90.43	-	-	76.2	35.74	11.82	33.33	124	5	A	V
		5745.64	55.34	-12.96	68.3	40.92	35.85	11.96	33.39	124	5	P	V
		5449.2	55.68	-18.32	74	41.77	35.62	11.6	33.31	107	337	P	H
		5469.04	57.44	-10.86	68.3	43.5	35.64	11.61	33.31	107	337	P	H
		5448.88	47.27	-6.73	54	33.36	35.62	11.6	33.31	107	337	A	H
	*	5602	104.86	-	-	90.5	35.77	11.93	33.34	107	337	P	H
802.11ac		5602	97.77	-	-	83.41	35.77	11.93	33.34	107	337	A	H
VHT80		5742.92	59.37	-8.93	68.3	44.95	35.85	11.96	33.39	107	337	P	H
CH 122		5455.28	55.3	-18.7	74	41.39	35.62	11.6	33.31	113	5	P	V
5610MHz		5468.72	56.39	-11.91	68.3	42.45	35.64	11.61	33.31	113	5	P	V
		5458	47.48	-6.52	54	33.57	35.62	11.6	33.31	113	5	A	V
	*	5614	102.35	-	-	87.99	35.77	11.93	33.34	113	5	P	V
		5614	95.73	-	-	81.37	35.77	11.93	33.34	113	5	A	V
		5731.64	58.73	-9.57	68.3	44.32	35.84	11.95	33.38	113	5	P	V

Remark

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

Band 3 5470~5725MHz

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 VHT80 CH 106 5530MHz		11060	45.92	-28.08	74	51.2	39.97	16.56	61.81	100	360	P	H
		11060	45.91	-28.09	74	51.19	39.97	16.56	61.81	100	360	P	V
802.11ac VHT80 CH 122 5610MHz		11220	45.79	-28.21	74	50.8	40.05	16.8	61.86	100	360	P	H
		11220	46.39	-27.61	74	51.4	40.05	16.8	61.86	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 144 5720MHz	*	5722	109.82	-	-	95.41	35.84	11.95	33.38	100	340	P	H
	*	5722	102.81	-	-	88.4	35.84	11.95	33.38	100	340	A	H
	*	5722	107.35	-	-	92.94	35.84	11.95	33.38	114	207	P	V
	*	5722	100.42	-	-	86.01	35.84	11.95	33.38	114	207	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

WIFI 802.11a (Harmonic @ 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 CH 144 5720MHz		11440	45.64	-28.36	74	50.24	40.16	17.16	61.92	100	360	P	H
		11440	45.82	-28.18	74	50.42	40.16	17.16	61.92	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

WIFI 802.11ac VHT20 (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	*	5728	108.37	-	-	93.96	35.84	11.95	33.38	101	342	P	H
VHT20	*	5728	101.4	-	-	86.99	35.84	11.95	33.38	101	342	A	H
CH 144	*	5728	106.43	-	-	92.02	35.84	11.95	33.38	108	206	P	V
5720MHz	*	5728	99.32	-	-	84.91	35.84	11.95	33.38	108	206	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

WIFI 802.11ac VHT20 (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 VHT20		11440	48.31	-25.69	74	52.91	40.16	17.16	61.92	100	360	P	H
CH 144 5720MHz		11440	46.09	-27.91	74	50.69	40.16	17.16	61.92	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

WIFI 802.11ac VHT40 (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	*	5710	105.38	-	-	90.98	35.83	11.95	33.38	100	337	P	H
VHT40	*	5710	98.44	-	-	84.04	35.83	11.95	33.38	100	337	A	H
CH 142	*	5710	103.78	-	-	89.37	35.83	11.95	33.37	109	208	P	V
5710MHz	*	5710	96.39	-	-	81.98	35.83	11.95	33.37	109	208	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

WIFI 802.11ac VHT40 (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 VHT40		11420	45.12	-28.88	74	49.75	40.16	17.13	61.92	100	360	P	H
CH 142 5710MHz		11420	46.47	-27.53	74	51.1	40.16	17.13	61.92	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

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	*	5692	102.32	-	-	87.92	35.82	11.95	33.37	103	342	P	H
VHT80	*	5692	96.18	-	-	81.78	35.82	11.95	33.37	103	342	A	H
CH 138	*	5692	97.89	-	-	83.49	35.82	11.95	33.37	115	206	P	V
5690MHz	*	5692	93.92	-	-	79.52	35.82	11.95	33.37	115	206	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Band 3 - Straddle Channel

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 VHT80		11380	45.65	-28.35	74	50.34	40.14	17.08	61.91	100	360	P	H
CH 138 5690MHz		11380	46.04	-27.96	74	50.73	40.14	17.08	61.91	100	360	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		77.53	28.87	-11.13	40	46.67	13.78	1.47	33.05	-	-	P	H
		118.27	25.75	-17.75	43.5	39.18	17.88	1.75	33.06	-	-	P	H
		188.11	39.3	-4.2	43.5	53.47	16.58	2.17	32.92	100	0	P	H
		234.67	35.97	-10.03	46	47.94	18.45	2.41	32.83	-	-	P	H
		257.95	33.85	-12.15	46	44.57	19.53	2.53	32.78	-	-	P	H
		441.28	27.51	-18.49	46	33.03	23.44	3.26	32.22	-	-	P	H
		81.41	32.95	-7.05	40	50.28	14.2	1.53	33.06	-	-	P	V
		116.33	34.63	-8.87	43.5	48.06	17.9	1.74	33.07	-	-	P	V
		185.2	39.12	-4.38	43.5	53.25	16.65	2.15	32.93	100	360	P	V
		252.13	32.17	-13.83	46	43.04	19.43	2.5	32.8	-	-	P	V
		370.47	32.1	-13.9	46	39.76	21.94	2.99	32.59	-	-	P	V
		449.04	34.43	-11.57	46	39.76	23.58	3.29	32.2	-	-	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 CH 01 2412MHz		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(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)

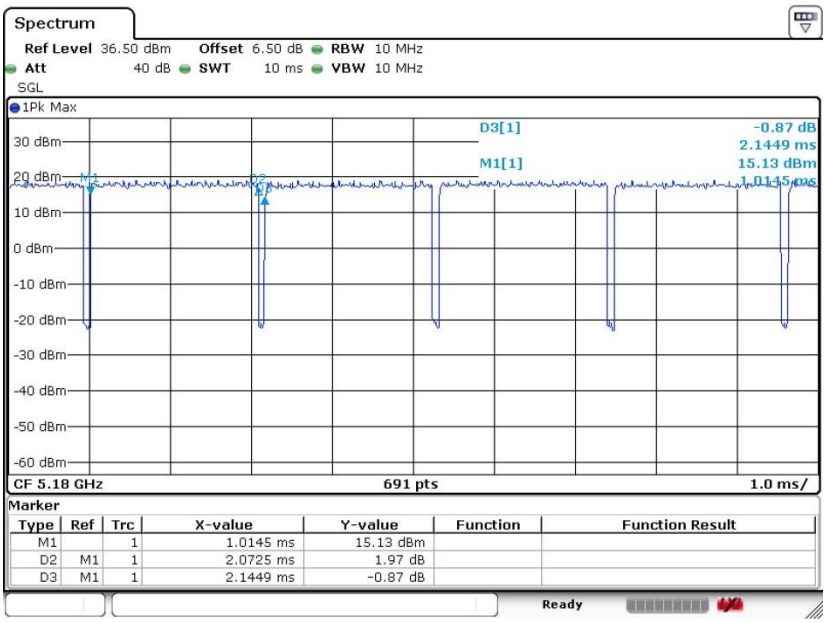
= -10.46(dB)

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

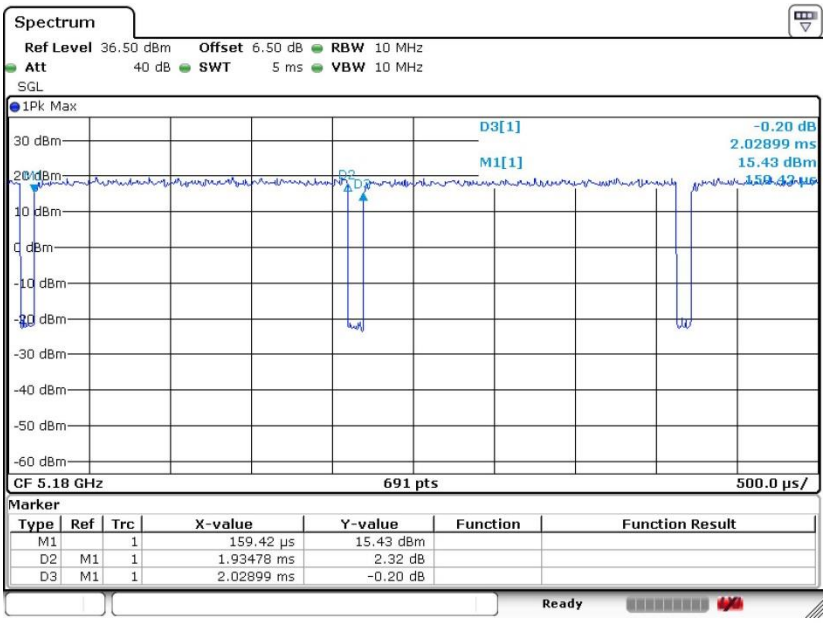
Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11a	96.62	2.073	0.483	0.51KHz
1+2	802.11ac VHT20	95.36	1.935	0.517	0.56KHz
1+2	802.11ac VHT40	92.31	0.957	1.045	1.1KHz
1+2	802.11ac VHT80	86.25	0.464	2.156	2.2KHz

802.11a



802.11ac VHT20



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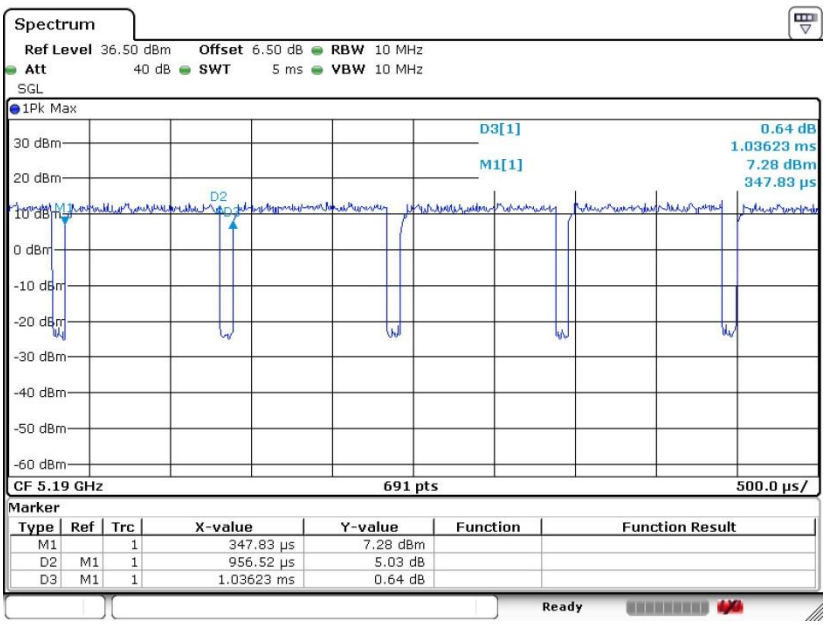

802.11ac VHT80