RADIO TEST REPORT

(Class II Permissive Change)
FCC 47 CFR PART 15 SUBPART E
INDUSTRY CANADA RSS-247

Test Standard	**FCC Part 15.407+ RSS-247 issue 2 and RSS-GEN issue 5**
FCC ID	**YAI-TONAL**
IC	**20480-TONAL**
Product name	**Wireless Console Module**
Brand Name	**InnoComm Mobile**
Model No.	**Hercules**
Test Result	**Pass**
Statements of Conformity	**Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.**

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report. The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory)

Approved by:

Shawn Wu
Supervisor

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	March 9, 2022	Initial Issue	ALL	Allison Chen
01	March 15, 2022	See the following Note Rev.(01)	P.17	Allison Chen

Note:
Rev.(01)
1. Modified test result of 802.11n HT20 mode OBW(99%) and 26dB BW.

Table of contents

1. GENERAL INFORMATION

1.1 EUT INFORMATION

FCC Applicant	InnoComm Mobile Technology Corp. 3F, No. 6, Hsin Ann Rd., Hsinchu Science Park, Hsinchu , Taiwan , 30078
IC Applicant	InnoComm Mobile Technology Corp. 3F, No. 6, Hsin Ann Rd., Hsinchu ,30078,Taiwan
FCC Manufacturer	InnoComm Mobile Technology Corp. 3F, No. 6, Hsin Ann Rd., Hsinchu Science Park, Hsinchu , Taiwan , 30078
IC Manufacturer	InnoComm Mobile Technology Corp. 3F, No. 6, Hsin Ann Rd., Hsinchu ,30078,Taiwan
Equipment	Wireless Console Module
Model No.	Hercules
Model Discrepancy	N/A
Brand Name	InnoComm Mobile
Received Date	February 17, 2022
Date of Test	February 24 ~ March 1, 2022
Power Supply	1. Power by power supply (DC 15V) 2. Power by host system via USB
HW Version	v1.0
FW Version	v1.0
EUT Serial #	009

Remark:
1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

1.2 EUT CHANNEL INFORMATION

Frequency Range	**UNII-2a** IEEE 802.11a: 5260 ~ 5320 MHz IEEE 802.11n HT 20 MHz: 5260 ~ 5320 MHz IEEE 802.11n HT 40 MHz: 5270 ~ 5310 MHz **UNII-2c** IEEE 802.11a: 5500 ~ 5700 MHz IEEE 802.11n HT 20 MHz: 5500 ~ 5700 MHz IEEE 802.11n HT 40 MHz: 5510 ~ 5670 MHz
Modulation Type	1. IEEE 802.11a mode: OFDM 2. IEEE 802.11n HT 20 MHz mode: OFDM 3. IEEE 802.11n HT 40 MHz mode: OFDM

Remark:
1. Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels.
2. For Canada the EUT Frequency Range 5600~5650MHz will be disabled.

Number of frequencies to be tested

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	☐ PIFA ☐ PCB ☒ Dipole ☐ Coils
Antenna Gain	Gain: 4.66 dBi
Antenna Connector	i-pex

Notes:
1.The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203 and RSS-Gen 6.8.
2. Power Directional Gain = 10*log { [10^(Ant1/20) + 10^(Ant2/20) + … + 10^(Ant N /20)]^2 / N ANT} dBi

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

Remark:
1.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)
CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	-	Not applicable, because EUT doesn't connect to AC Main Source direct.
Radiation	Ray Li	-
RF Conducted	Jack Chen	-

Remark: The lab has been recognized as the FCC accredited lad under the KDB 974614 D01 and is listed in the FCC pubic Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

1.6 INSTRUMENT CALIBRATION

3M 966 Chamber Test Site					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Cal Date**	**Cal Due**
Bilog Antenna	Sunol Sciences	JB3	A030105	07/19/2021	07/18/2022
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/23/2022	02/22/2023
Coaxial Cable	EMCI	EMC105	190914+1111	09/17/2021	09/16/2022
Coaxial Cable	Woken	J-1099	201709090004	12/23/2021	12/22/2022
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	12/28/2021	12/27/2022
High Pass Filters	MICRO TRONICS	HPM13195	003	02/10/2022	02/09/2023
Horn Antenna	ETS LINDGREN	3116	00026370	11/30/2021	11/29/2022
Horn Antenna	ETS LINDGREN	3117	00055165	07/29/2021	07/28/2022
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/05/2021	12/04/2022
Loop Ant	COM-POWER	AL-130	121051	04/07/2021	04/06/2022
Pre-Amplifier	EMEC	EM330	060609	02/23/2022	02/22/2023
Pre-Amplifier	HP	8449B	3008A00965	12/24/2021	12/23/2022
Pre-Amplifier	MITEQ	AMF-6F-18004000-37-8P	985646	09/08/2021	09/07/2022
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	12/06/2021	12/05/2022
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180419c				

Remark: Each piece of equipment is scheduled for calibration once a year.

RF Conducted Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EXA Signal Analyzer	KEYSIGHT	N9010B	MY55460167	09/07/2021	09/06/2022
Power Meter	Anritsu	ML2496A	2136002	12/06/2021	12/05/2022
Power Seneor	Anritsu	MA2411B	1911386	08/19/2021	08/18/2022
Power Seneor	Anritsu	MA2411B	1911387	08/19/2021	08/18/2022
DC Power Supplies	GW Instek	SPS-3610	GPE880163	12/21/2021	12/20/2022
Software	Radio Test Software Ver. 21				

Dynamic Frequency Selection					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Attenuator	E-INSTRUMENT	EPA-600H	EC1400050	07/08/2021	07/07/2022
Coaxial Cable	Woken	WC12	DC004	06/28/2021	06/27/2022
Power Divider	Solvang Technology	STI08-0015	008	07/26/2021	07/25/2022
Spectrum Analyzer	R&S	FSU 26	100258	06/17/2021	06/16/2022
Vector Signal Generator	R&S	SMU 200A	102239	04/19/2021	04/18/2022
Software	GPIBShot,DFS-Aggregate-Time FSU,R&S Pulse Sequencer DFS				

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment					
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**
	N/A				

Support Equipment						
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**	**IC**
1	NB(G)	Lenovo	IBM 1951	N/A	N/A	N/A
2	NB	Lenovo	T460P	N/A	N/A	N/A
3	NB	Lenovo	20175	N/A	TX2-RTL8723AS	6317A-RTL8723AS
4	AP	ASUS	RT-AX88U	N/A	MSQ-RTAXHP00	3568A-RTAXHP00

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.407, KDB 789033 D02, KDB 905462 D02, RSS-247 Issue 2 and RSS-GEN Issue 5.

2. TEST SUMMARY

FCC Standard Sec.	IC Standard Sec.	Chapter	Test Item	Result
15.203	RSS-Gen (6.8)	1.3	Antenna Requirement	Pass
15.207	RSS-Gen (8.8)	4.1	AC Conducted Emission	N/A
15.403(i)	-	4.2	26dB Bandwidth	Pass
15.403(i)	RSS-Gen (6.7)	4.2	Occupied Bandwidth (99%)	Pass
15.407(a)	RSS-247(6.2.2.1) RSS-247(6.2.3.1)	4.3	Output Power Measurement	Pass
15.407(a)	RSS-247(6.2.2.1) RSS-247(6.2.3.1)	4.4	Power Spectral Density	Pass
15.407(b)	RSS-247(6.2.2.2) RSS-247(6.2.3.2)	4.5	Radiation Band Edge	Pass
15.407(b)	RSS-247(6.2.2.2) RSS-247(6.2.3.2)	4.5	Radiation Spurious Emission	Pass
15.407(h)	RSS-247(6.3)	4.6	Dynamic Frequency Selection	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE EUT CHANNEL NUMBER OF OPERATING CONDITION

<table>
<tr><td>Operation mode</td><td>1. IEEE 802.11a mode: 6Mbps
2. IEEE 802.11n HT 20 MHz mode: MCS0
3. IEEE 802.11n HT 40 MHz mode: MCS0</td></tr>
<tr><td>Operating Frequency</td><td>
<table>
<tr><th></th><th>Mode</th><th>Frequency Range (MHz)</th></tr>
<tr><td rowspan="3">U-NII-2a</td><td>IEEE 802.11a</td><td>5260 ~ 5320</td></tr>
<tr><td>IEEE 802.11n HT 20 MHz</td><td>5260 ~ 5320</td></tr>
<tr><td>IEEE 802.11n HT 40 MHz</td><td>5270 ~ 5310</td></tr>
<tr><td rowspan="3">U-NII-2c</td><td>IEEE 802.11a</td><td>5500 ~ 5720</td></tr>
<tr><td>IEEE 802.11n HT 20 MHz</td><td>5500 ~ 5720</td></tr>
<tr><td>IEEE 802.11n HT 40 MHz</td><td>5510 ~ 5670</td></tr>
</table>
</td></tr>
</table>

Remark:
1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. For Canada the EUT Frequency Range 5600~5650MHz will be disabled.

3.2 THE WORST MODE OF MEASUREMENT

Radiated Emission Measurement Above 1G	
Test Condition	**Radiated Emission Above 1G**
Power supply Mode	**Mode 1: EUT power by Power supply** **Mode 2: EUT power by Host System**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**
Worst Position	☐ **Placed in fixed position.** ☐ **Placed in fixed position at X-Plane (E2-Plane)** ☒ **Placed in fixed position at Y-Plane (E1-Plane)** ☐ **Placed in fixed position at Z-Plane (H-Plane)**

Radiated Emission Measurement Below 1G	
Test Condition	**Radiated Emission Below 1G**
Power supply Mode	**Mode 1: EUT power by Power supply** **Mode 2: EUT power by Host System**
Worst Mode	☒ **Mode 1** ☐ **Mode 2** ☐ **Mode 3** ☐ **Mode 4**

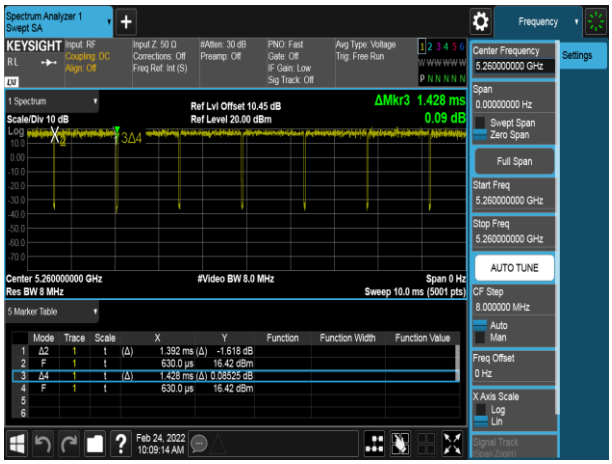
Remark:
1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Y-Plane) were recorded in this report

3.3 EUT DUTY CYCLE

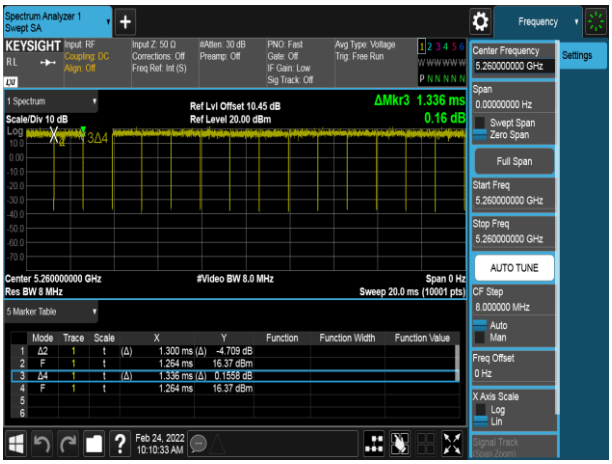
Temperature:	17.6~20.6℃	**Test date:**	February 24 ~ March 1, 2022
Humidity:	65~66% RH	**Tested by:**	Jack Chen

Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	97.48	0.11	0.72	1.00
802.11n_20	97.31	0.12	0.77	1.00
802.11n_40	95.01	0.22	1.54	2.00

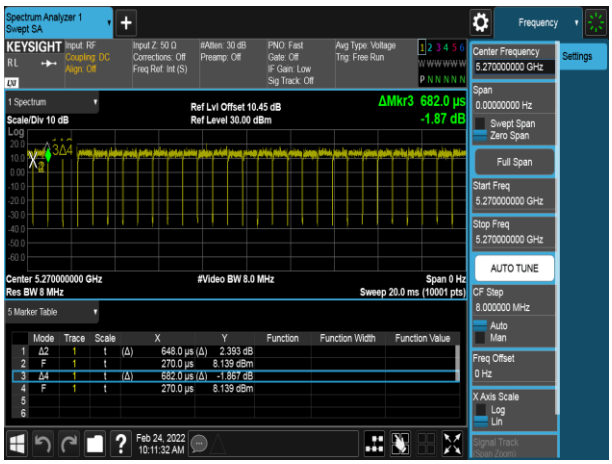
802.11a



802.11n HT20



802.11n HT40



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

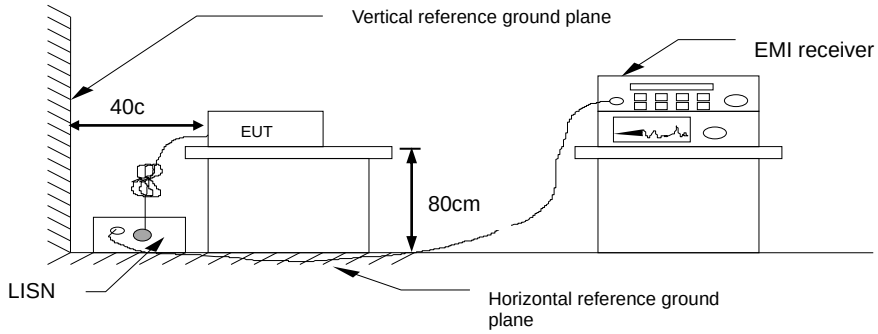
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-Peak and Average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup



4.1.4 Test Result

Not applicable, because EUT doesn't connect to AC Main Source direct.

4.2 26dB BANDWIDTH, 6dB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

4.2.1 Test Limit

26 dB Bandwidth ：For reporting purposes only.

Occupied Bandwidth(99%) ： For reporting purposes only.

4.2.2 Test Procedure

26dB

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

2. Set RBW: approximately 1% of the emission bandwidth.

3. Set the VBW>RBW.

4. Detoctor = Peak.

5. Trace mode = max hold.

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

99%

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.

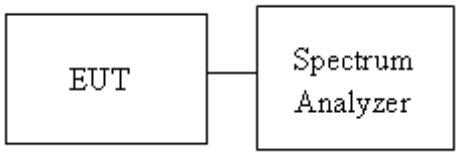
2. Set center frequency to the nominal EUT channel center frequency.

3. Set span = 1.5 times to 5.0 times the OBW.

4. Set RBW = 1 % to 5% of the OBW.

5. Set VBW ≧ 3 xRBW

4.2.3 Test Setup



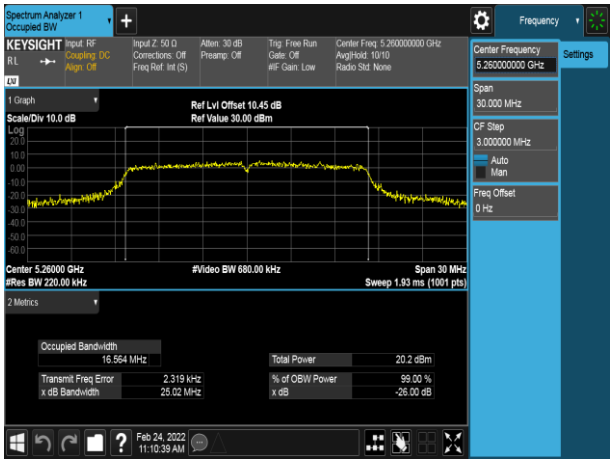
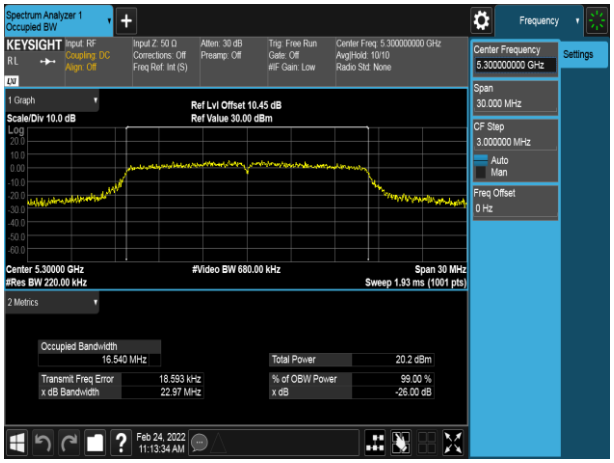
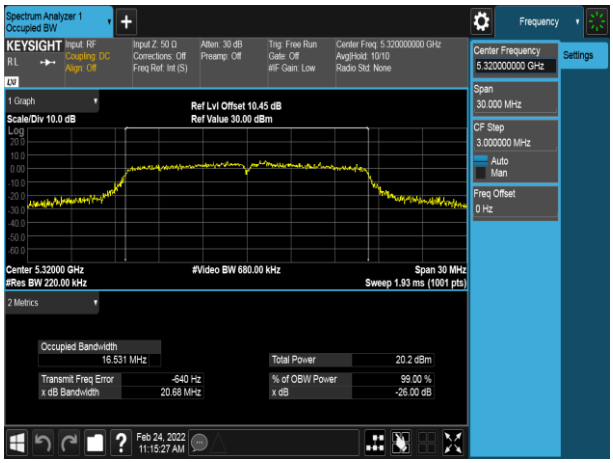
4.2.4 Test Result

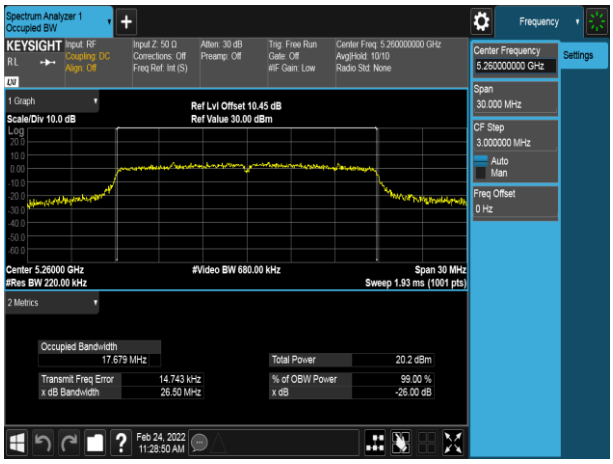
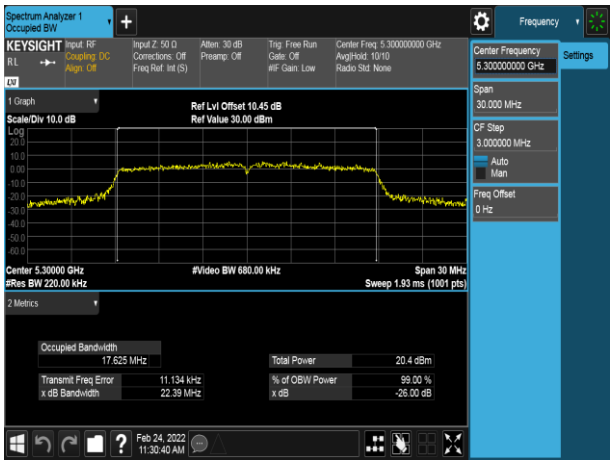
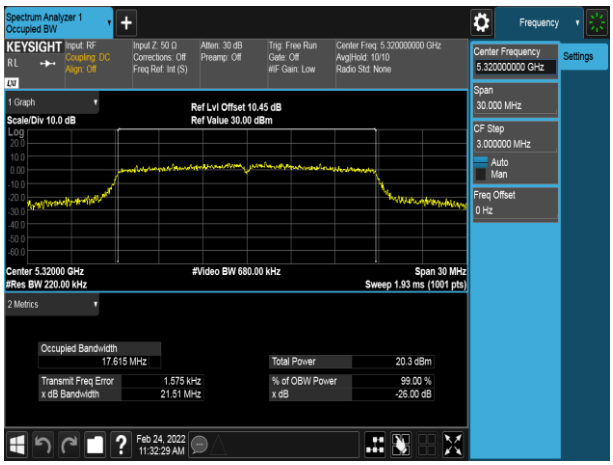
Temperature:	17.6~20.6℃	**Test date:**	February 24 ~ March 1, 2022
Humidity:	65~66% RH	**Tested by:**	Jack Chen

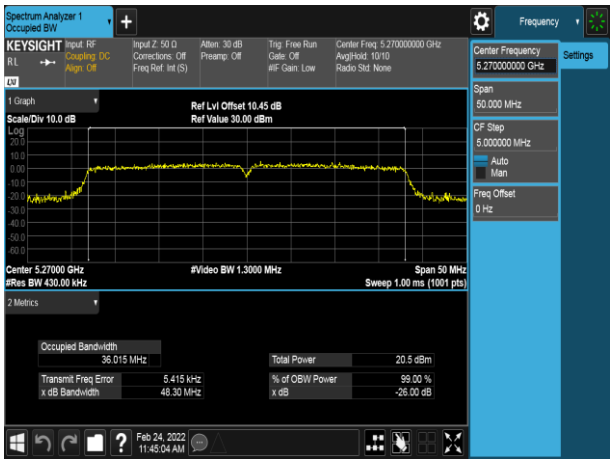
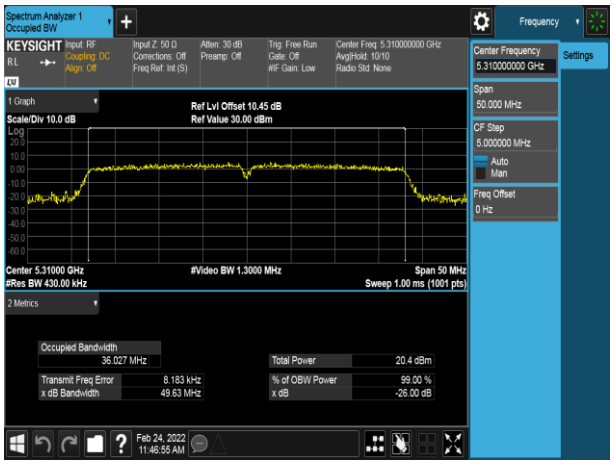
UNII-2a 5250-5350 MHz			
Test mode: IEEE 802.11a mode			
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 0 26dB BW (MHz)**
Low	5260	16.564	21.72
Mid	5300	16.540	22.67
High	5320	16.531	24.16
Test mode: IEEE 802.11n HT20 mode			
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 0 26dB BW (MHz)**
Low	5260	17.679	22.63
Mid	5300	17.625	22.15
High	5320	17.615	24.62
Test mode: IEEE 802.11n HT40 mode			
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 0 26dB BW (MHz)**
Low	5270	36.015	49.61
High	5310	36.027	48.52

UNII-2c 5475-5725 MHz			
Test mode: IEEE 802.11a mode			
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 0 26dB BW (MHz)**
Low	5500	16.542	20.24
Mid	5580	16.607	22.22
High	5700	17.644	29.97
Test mode: IEEE 802.11n HT20 mode			
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 0 26dB BW (MHz)**
Low	5500	17.615	22.57
Mid	5580	17.669	24.21
High	5700	18.280	30.00
Test mode: IEEE 802.11n HT40 mode			
Channel	**Frequency (MHz)**	**Chain 0 OBW (99%) (MHz)**	**Chain 0 26dB BW (MHz)**
Low	5510	35.984	48.77
Mid	5550	35.969	48.34
High	5670	36.199	50.00

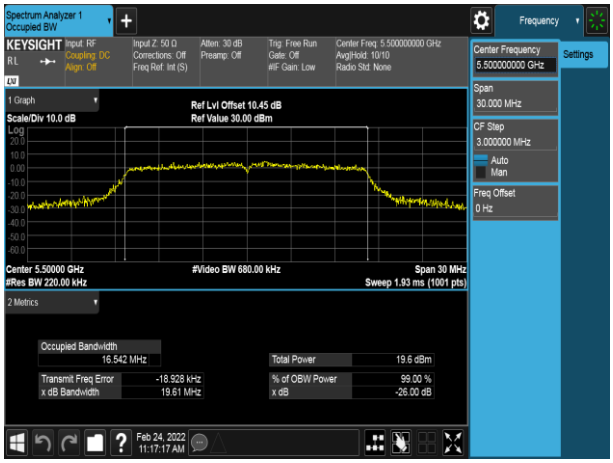
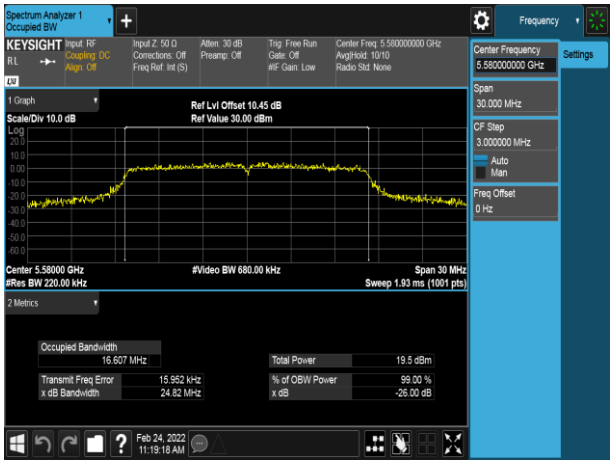
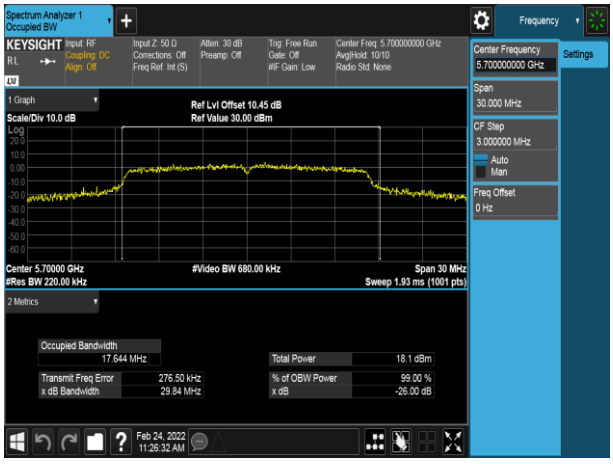
Test Data (99% OBW)

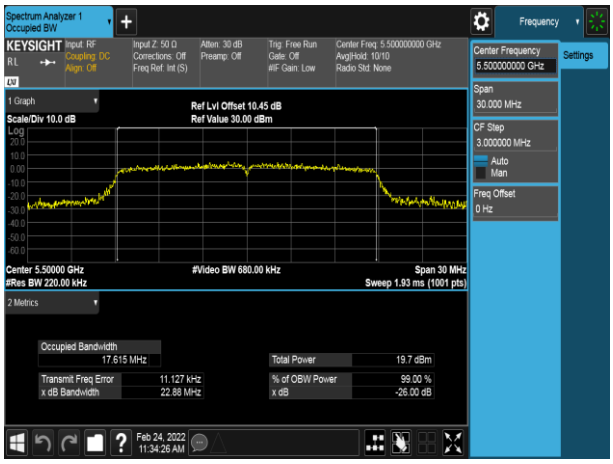
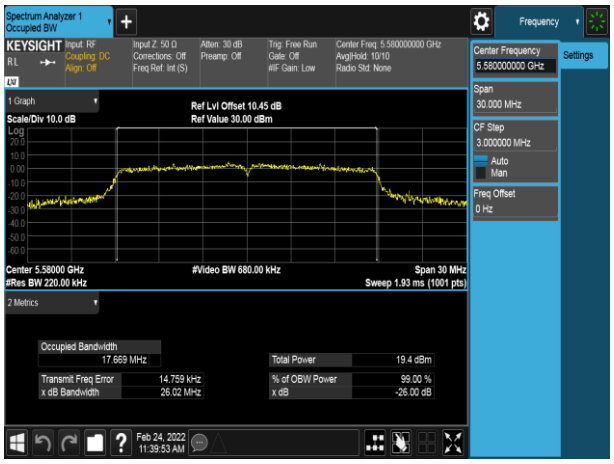
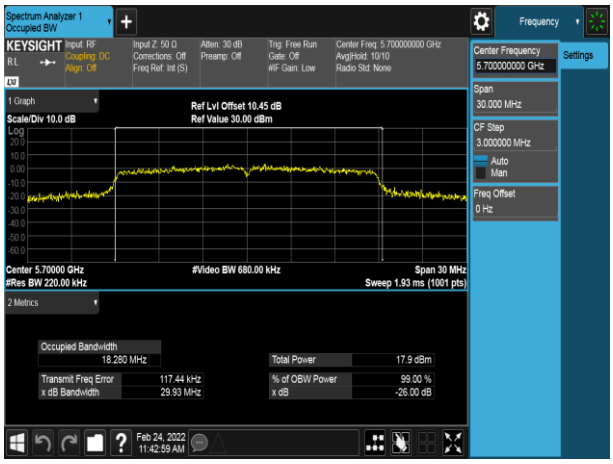
UNII-2a IEEE 802.11a mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

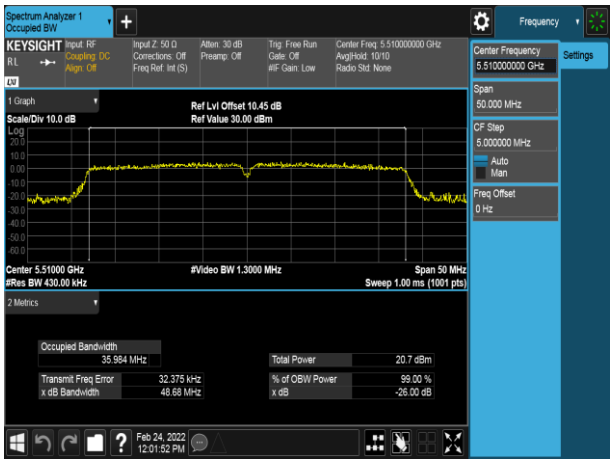
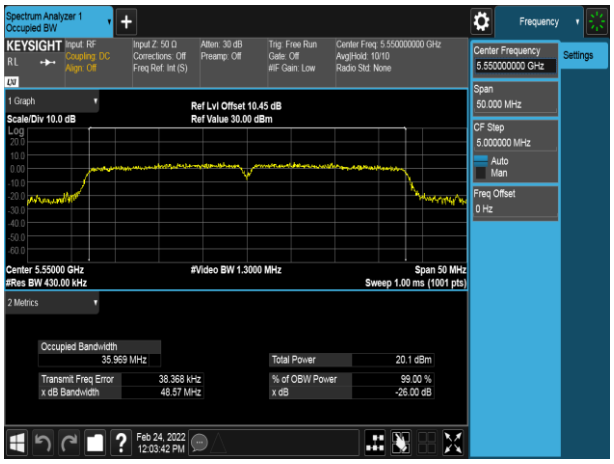
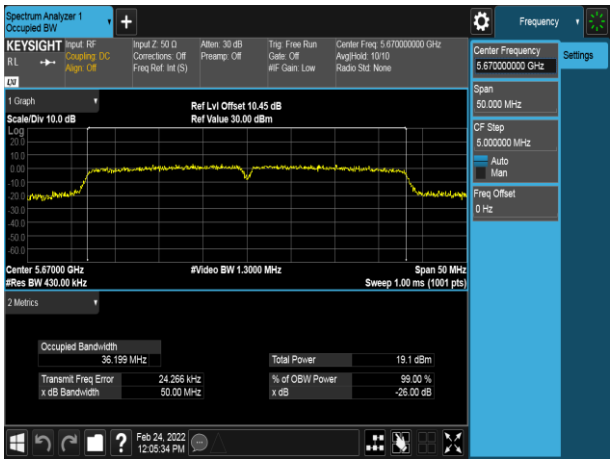
UNII-2a IEEE 802.11n HT20 mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2a IEEE 802.11n HT40 mode- Chain 0	
Low CH	High CH
	

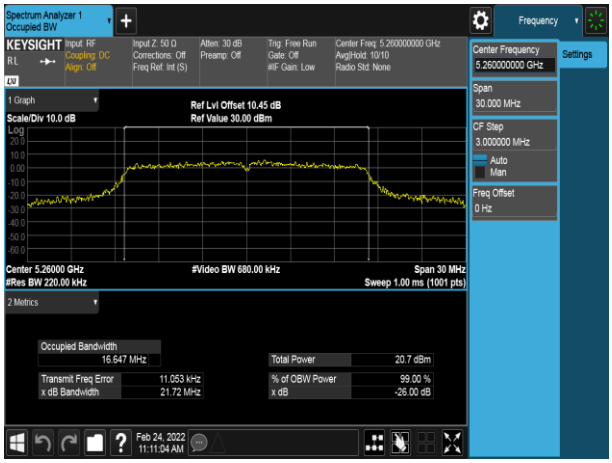
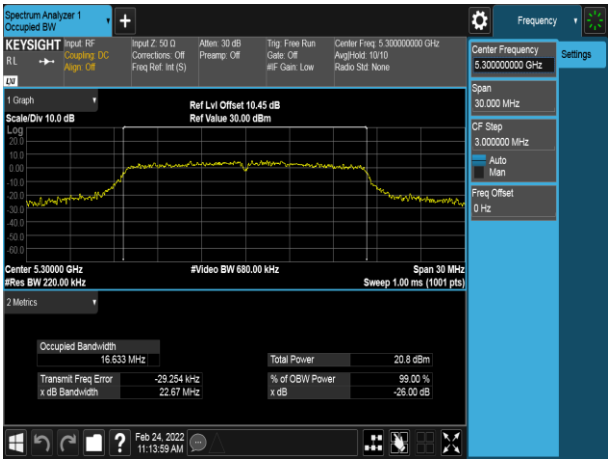
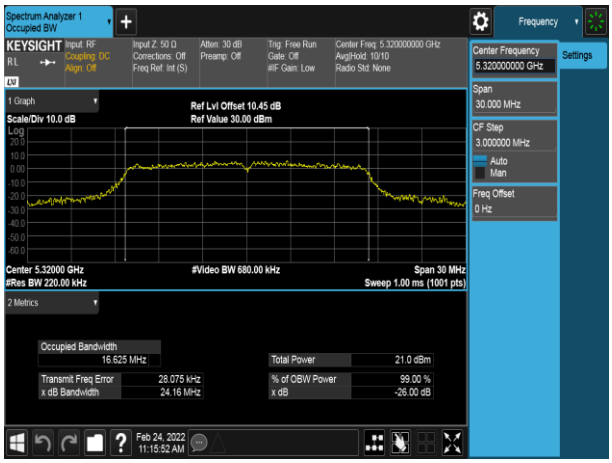
Test Data (99% OBW)

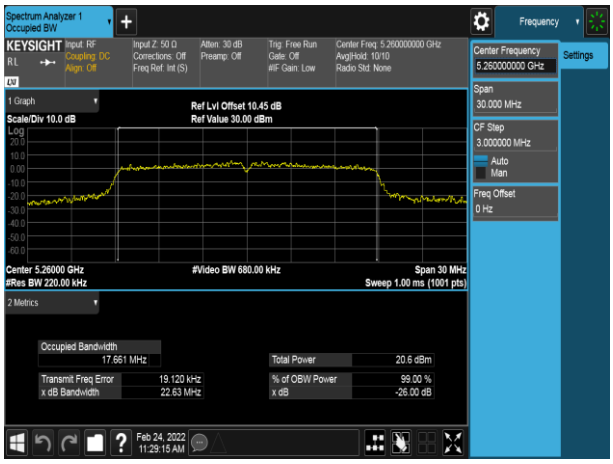
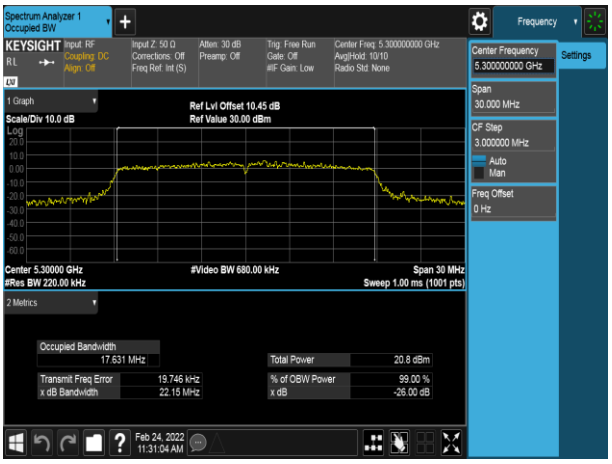
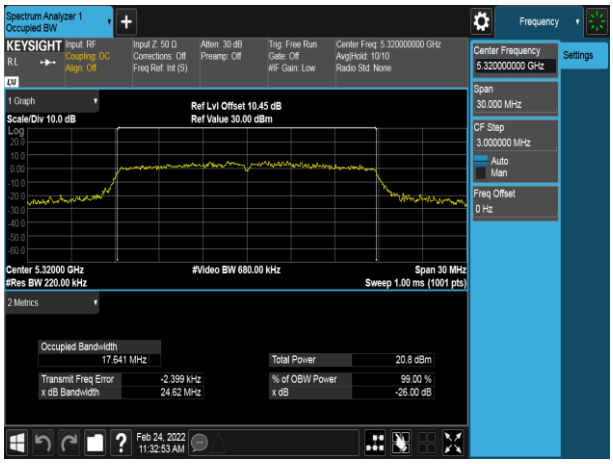
UNII-2c IEEE 802.11a mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

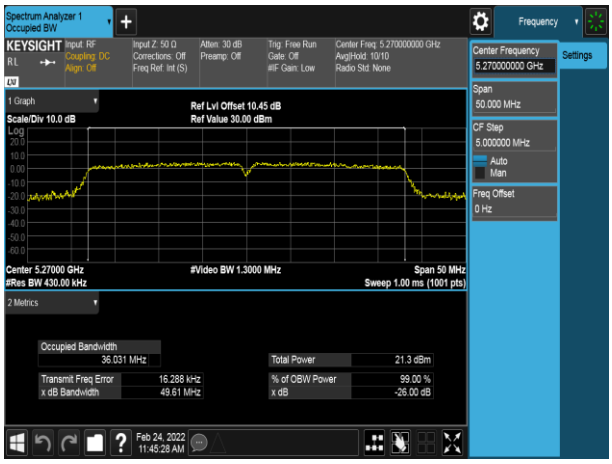
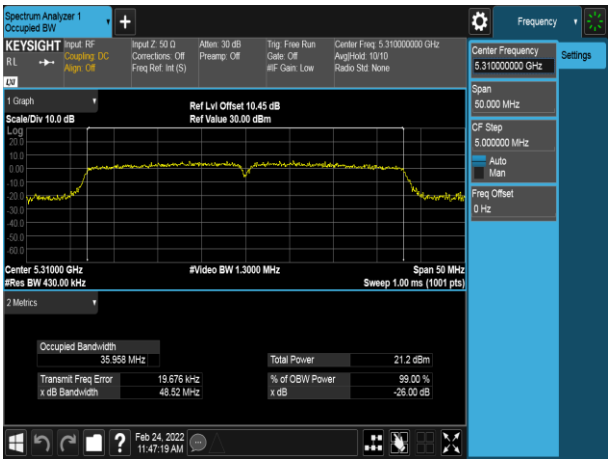
UNII-2c IEEE 802.11n HT20 mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2c IEEE 802.11n HT40 mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

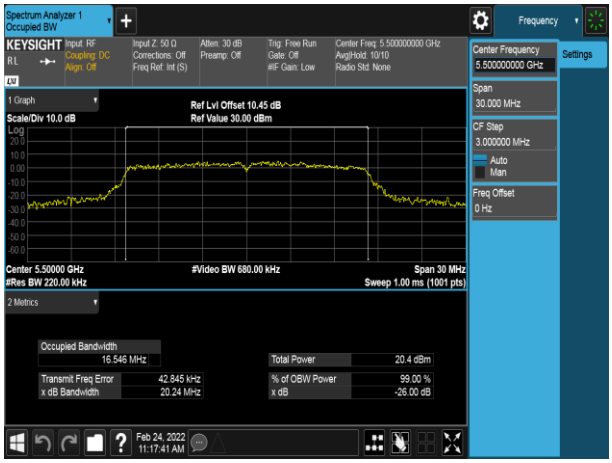
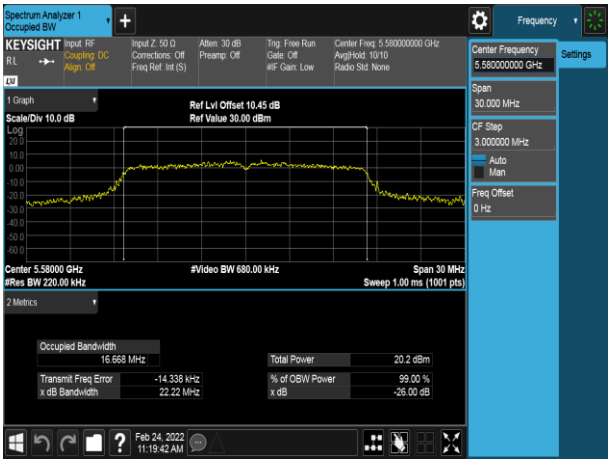
Test Data (26dB BANDWIDTH)

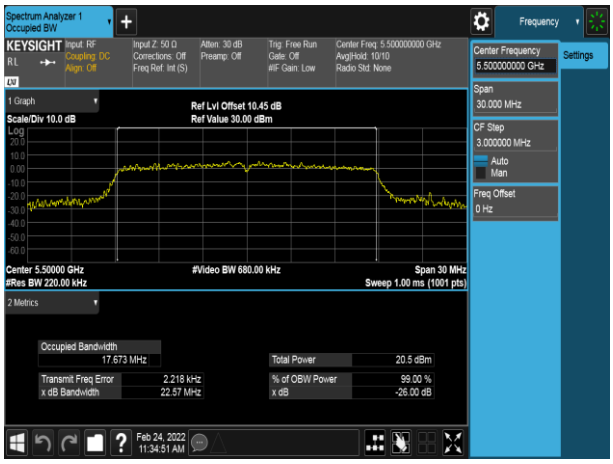
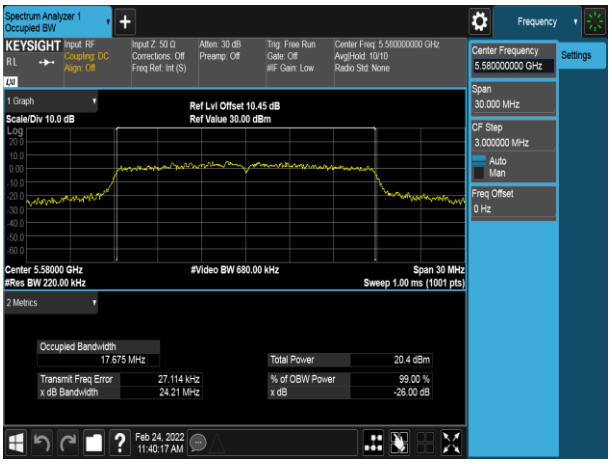
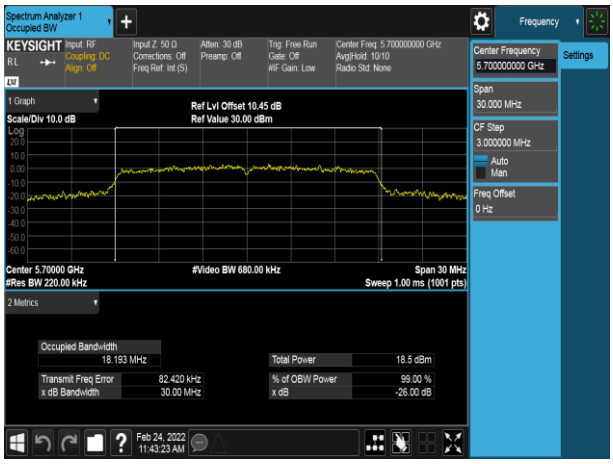
UNII-2a IEEE 802.11a mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

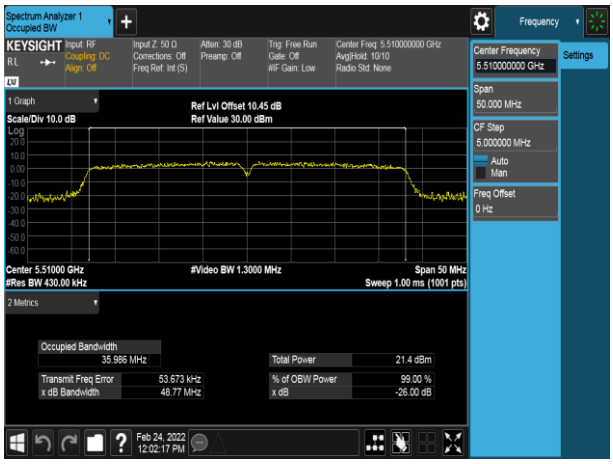
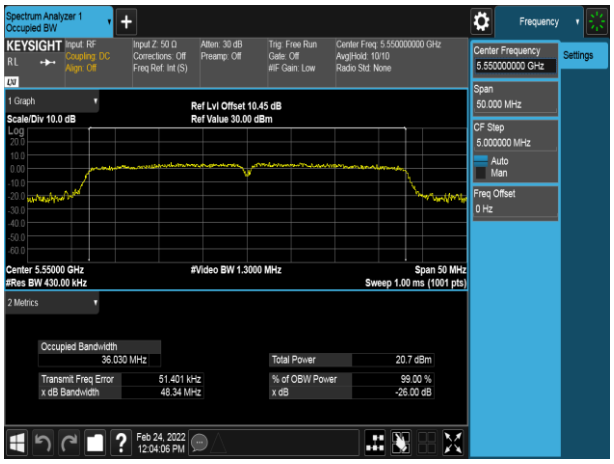
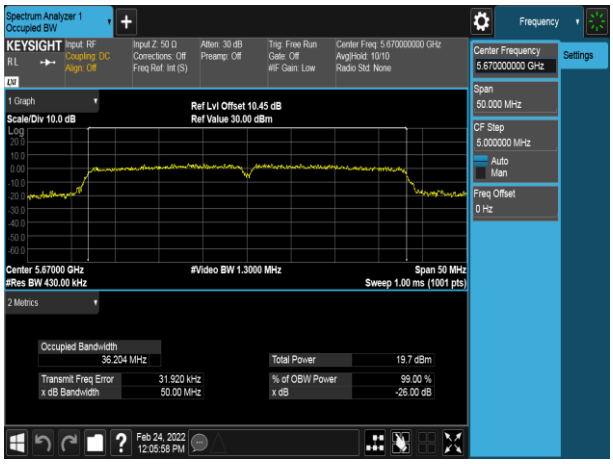
UNII-2a IEEE 802.11n HT20 mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2a IEEE 802.11n HT40 mode- Chain 0	
Low CH	**High CH**
	

Test Data (26dB BANDWIDTH)

UNII-2c IEEE 802.11a mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2c IEEE 802.11n HT20 mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2c IEEE 802.11n HT40 mode- Chain 0	
Low CH	**Mid CH**
	
High CH	
	

4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.407(a)(2).

According to RSS-247 section 6.2.2.1, section 6.2.3.1.

FCC:

UNII-2a and 2c:

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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC:

UNII-2a (5250-5350 MHz)

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 log10B, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.
Devices, other than devices installed in vehicles, shall comply with the following:
The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;
The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that 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.

UNII-2c (5470-5600 MHz and 5650-5725 MHz)

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.
The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that 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.

UNII-2a/2c Limit	☒ Antenna not exceed 6 dBi：24dBm ☐ Antenna with DG greater than 6 dBi： [Limit = 24 – (DG – 6)]

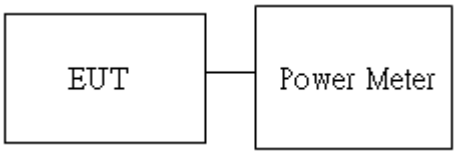
4.3.2 Test Procedure

Test method Refer as KDB 789033 D02, Section E.3.b for BW 20MHz and 40MHz, E.2.b for BW 80MHz.

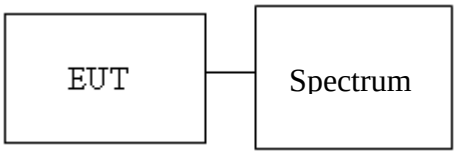
1. The EUT RF output connected to the power meter or spectrum by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Average output power. in the test report.

4.3.3 Test Setup

For BW 20MHz and 40MHz



For BW 80MHz



4.3.4 Test Result

Temperature:	17.6~20.6℃	**Test date:**	February 24 ~ March 1, 2022
Humidity:	65~66% RH	**Tested by:**	Jack Chen

Peak Output Power：

802.11a_Ch0

CH	Frequency (MHz)	Data Rate	Power set	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	6	17	**15.40**	34.680	23.98	PASS
60	5300	6	17	15.29	33.813	23.98	PASS
64	5320	6	17	15.31	33.969	23.98	PASS
100	5500	6	17	**15.18**	32.967	23.98	PASS
116	5580	6	17	14.63	29.046	23.98	PASS
140	5700	6	17	13.80	23.993	23.98	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	Data Rate	Power set	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	MCS0	17	**15.40**	34.661	23.98	PASS
60	5300	MCS0	17	15.36	34.343	23.98	PASS
64	5320	MCS0	17	15.30	33.872	23.98	PASS
100	5500	MCS0	17	**15.18**	32.949	23.98	PASS
116	5580	MCS0	17	14.75	29.843	23.98	PASS
140	5700	MCS0	17	13.79	23.924	23.98	PASS

802.11n_HT40_Ch0

CH	Frequency (MHz)	Data Rate	Power set	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
54	5270	MCS0	17	**15.46**	35.175	23.98	PASS
62	5310	MCS0	15.5	14.01	25.190	23.98	PASS
102	5510	MCS0	15	13.74	23.672	23.98	PASS
110	5550	MCS0	17	**14.95**	31.277	23.98	PASS
134	5670	MCS0	17	14.03	25.306	23.98	PASS

AVG Power：

802.11a		Set	Average Power Output(dBm)	Average Power + factor(dBm)
5.2G/5.5G/5.8G				
CH	Frequency (MHz)		Data Rate (Mbps)	Data Rate (Mbps)
			6	6
52	5260	17	15.29	15.40
60	5300	17	15.18	15.29
64	5320	17	15.20	15.31
100	5500	17	15.07	15.18
116	5580	17	14.52	14.63
140	5700	17	13.69	13.80

802.11n HT20		Set	Average Power Output (dBm)	Average Power + factor(dBm)
5.2G/5.5G/5.8G				
CH	Frequency (MHz)		Data Rate (Mbps)	Data Rate (Mbps)
			MCS 0	MCS 0
52	5260	17	15.28	15.40
60	5300	17	15.24	15.36
64	5320	17	15.18	15.30
100	5500	17	15.06	15.18
116	5580	17	14.63	14.75
140	5700	17	13.67	13.79

802.11n HT40		Set	Average Power Output (dBm)	Average Power + factor(dBm)
5.2G/5.5G/5.8G				
CH	Frequency (MHz)		Data Rate (Mbps)	Data Rate (Mbps)
			MCS 0	MCS 0
54	5270	17	15.24	15.46
62	5310	15.5	13.79	14.01
102	5510	15	13.52	13.74
110	5550	17	14.73	14.95
134	5670	17	13.81	14.03

IC AVG Power:

802.11a_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	**15.40**	**34.680**	23.19	PASS
60	5300	15.29	33.813	23.19	PASS
64	5320	15.31	33.969	23.18	PASS
100	5500	15.18	**32.967**	23.19	PASS
116	5580	14.63	29.046	23.20	PASS
140	5700	13.80	**23.993**	23.47	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	**15.40**	**34.661**	23.47	PASS
60	5300	15.36	34.343	23.46	PASS
64	5320	15.30	33.872	23.46	PASS
100	5500	**15.18**	**32.949**	23.46	PASS
116	5580	14.75	29.843	23.47	PASS
140	5700	**13.79**	**23.924**	23.62	PASS

802.11n_HT40_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
54	5270	**15.46**	**35.175**	23.98	PASS
62	5310	14.01	25.190	23.98	PASS
102	5510	13.74	23.672	23.98	PASS
110	5550	**14.95**	**31.277**	23.98	PASS
134	5670	**14.03**	**25.306**	23.98	PASS

IC EIRP Power:

802.11a_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	**15.40**	4.66	**20.06**	**101.391**	29.19	PASS
60	5300	15.29	4.66	19.95	98.855	29.19	PASS
64	5320	15.31	4.66	19.97	99.312	29.18	PASS
100	5500	**15.18**	4.66	**19.84**	**96.383**	29.19	PASS
116	5580	14.63	4.66	19.29	84.918	29.2	PASS
140	5700	**13.80**	4.66	**18.46**	**70.146**	29.47	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
52	5260	**15.40**	4.66	**20.06**	**101.391**	29.47	PASS
60	5300	15.36	4.66	20.02	100.462	29.46	PASS
64	5320	15.30	4.66	19.96	99.083	29.46	PASS
100	5500	**15.18**	4.66	**19.84**	**96.383**	29.46	PASS
116	5580	14.75	4.66	19.41	87.297	29.47	PASS
140	5700	**13.79**	4.66	**18.45**	**69.984**	29.62	PASS

802.11n_HT40_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)	RESULT
54	5270	**15.46**	4.66	**20.12**	**102.802**	30	PASS
62	5310	14.01	4.66	18.67	73.621	30	PASS
102	5510	13.74	4.66	18.40	69.183	30	PASS
110	5550	**14.95**	4.66	**19.61**	**91.411**	30	PASS
134	5670	**14.03**	4.66	**18.69**	**73.961**	30	PASS

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.407(a)(2)

According to RSS-247 section 6.2.2.1 and section 6.2.3.1.

UNII-2a and 2c:

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

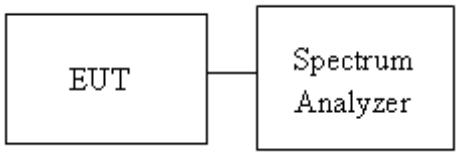
UNII-2a Limit	☒ Antenna not exceed 6 dBi：11 dBm/MHz ☐ Antenna with DG greater than 6 dBi： [Limit = 11 – (DG – 6)]
UNII-2c Limit	☒ Antenna not exceed 6 dBi：11 dBm/MHz ☐ Antenna with DG greater than 6 dBi： [Limit = 11 – (DG – 6)]

4.4.2 Test Procedure

Test method Refer as KDB 789033 D02

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c, SA set RBW = 1MHz, VBW = 3MHz and Detector = RMS, to measurement Power Density.
4. UNII-3, SA set RBW = 300kHz, VBW = 1MHz and Detector = RMS, to measurement Power Density
5. The path loss and Duty Factor were compensated to the results for each measurement by SA.
6. Mark the maximum level.
7. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup



4.4.4 Test Result

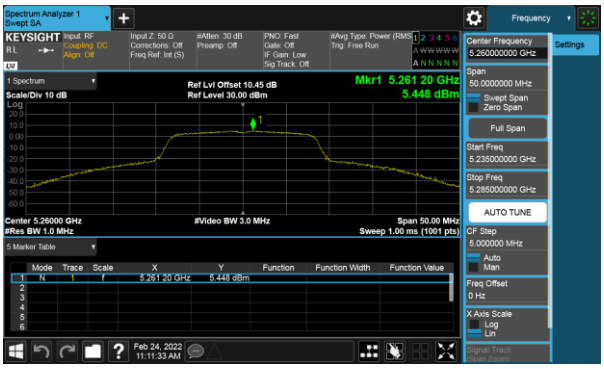
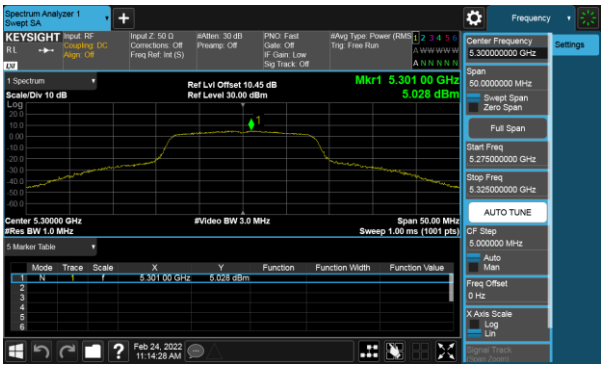
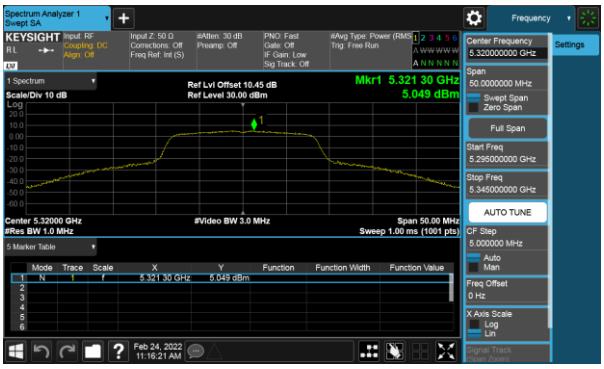
Temperature:	17.6~20.6℃	**Test date:**	February 24 ~ March 1, 2022
Humidity:	65~66% RH	**Tested by:**	Jack Chen

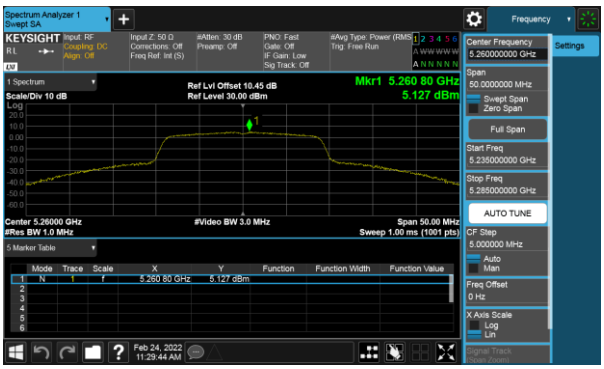
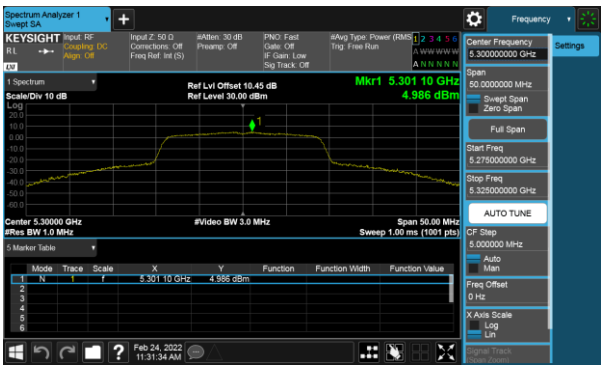
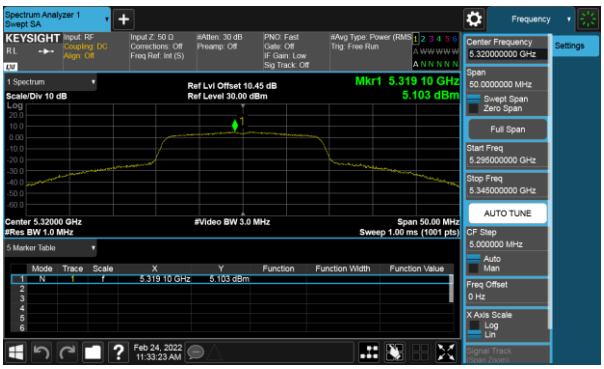
POWER DENSITY 802.11a MODE					
Frequency (MHz)	**Ch0 meas PSD (dBm/MHz)**	**Duty Factor (dB)**	**Maxmum Corr'd PSD (dBm/MHz)**	**Limit (dBm/MHz)**	**Margin (dB)**
5260	5.448	0.11	5.56	11.00	-5.44
5300	5.028	0.11	5.14	11.00	-5.86
5320	5.049	0.11	5.16	11.00	-5.84
5500	4.901	0.11	5.01	11.00	-5.99
5580	4.273	0.11	4.38	11.00	-6.62
5700	2.877	0.11	2.99	11.00	-8.01

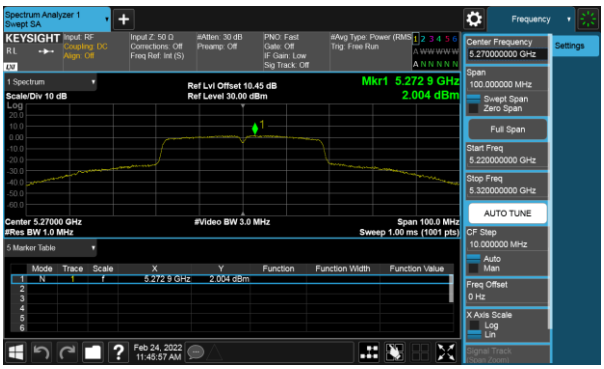
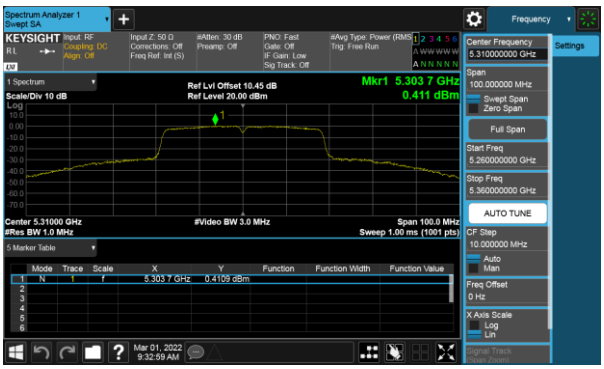
POWER DENSITY 802.11n HT20 MODE					
Frequency (MHz)	**Ch0 meas PSD (dBm/MHz)**	**Duty Factor (dB)**	**Maxmum Corr'd PSD (dBm/MHz)**	**Limit (dBm/MHz)**	**Margin (dB)**
5260	5.127	0.12	5.25	11.00	-5.75
5300	4.986	0.12	5.11	11.00	-5.89
5320	5.103	0.12	5.22	11.00	-5.78
5500	4.681	0.12	4.80	11.00	-6.20
5580	4.583	0.12	4.70	11.00	-6.30
5700	2.741	0.12	2.86	11.00	-8.14

POWER DENSITY 802.11n HT40 MODE					
Frequency (MHz)	**Ch0 meas PSD (dBm/MHz)**	**Duty Factor (dB)**	**Maxmum Corr'd PSD (dBm/MHz)**	**Limit (dBm/MHz)**	**Margin (dB)**
5270	2.004	0.22	2.22	11.00	-8.78
5310	0.411	0.22	0.63	11.00	-10.37
5510	-0.709	0.22	-0.49	11.00	-11.49
5550	1.201	0.22	1.42	11.00	-9.58
5670	-0.219	0.22	0.00	11.00	-11.00

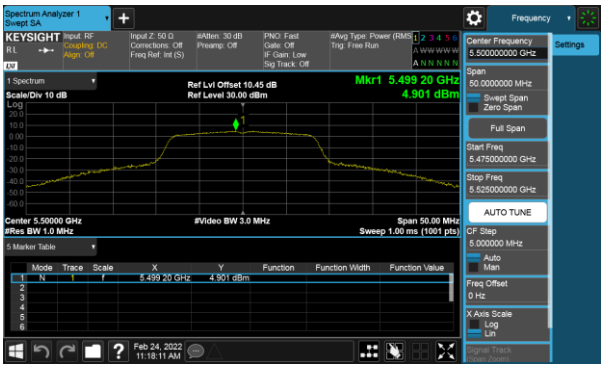
Test Data

UNII-2a IEEE 802.11a mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2a IEEE 802.11n HT20 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2a IEEE 802.11n HT40 mode- chain 0	
Low CH	**High CH**
	

Test Data

UNII-2c IEEE 802.11a mode- chain 0	
Low CH	**Mid CH**
	
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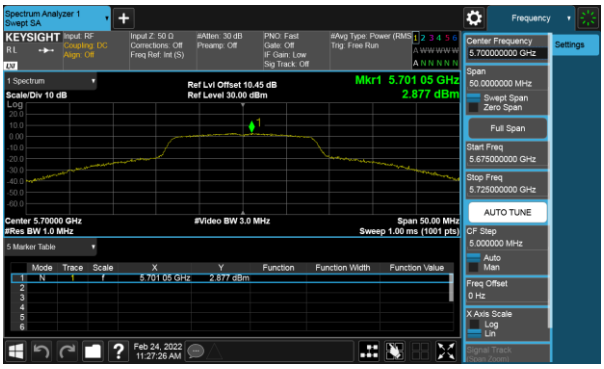
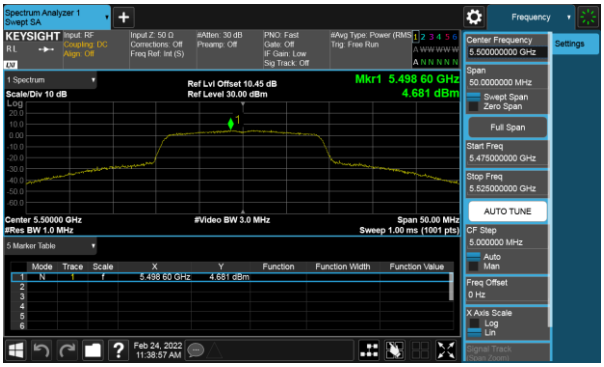
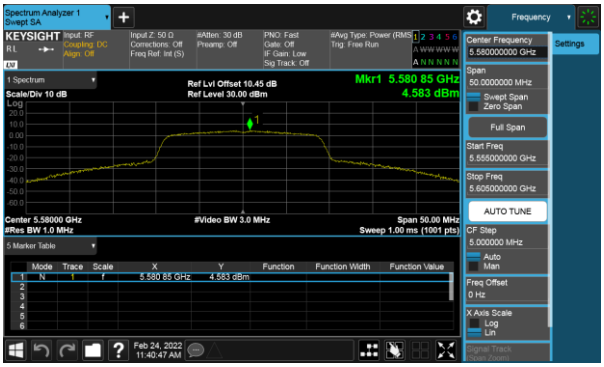
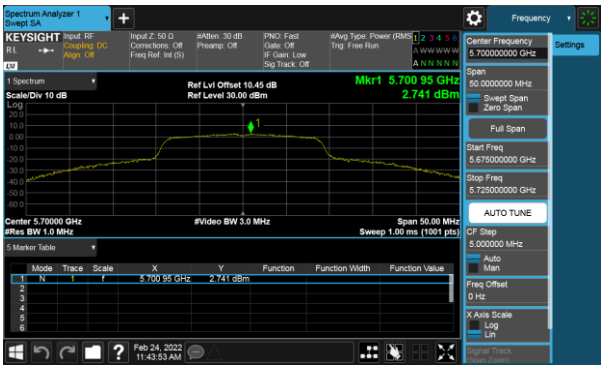
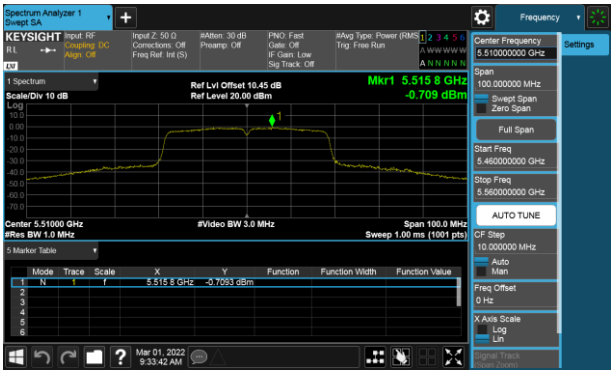
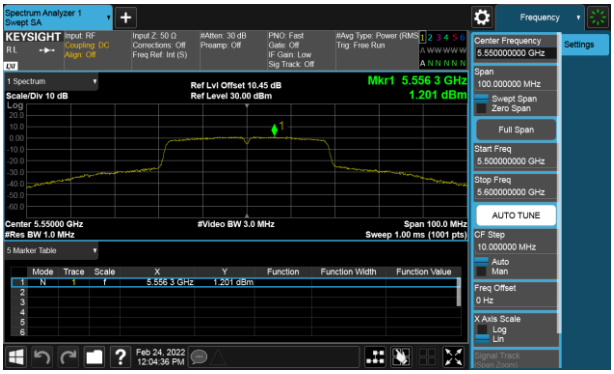
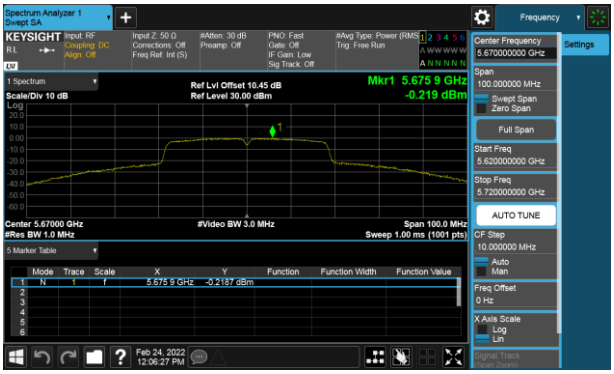
	

UNII-2c IEEE 802.11n HT20 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

UNII-2c IEEE 802.11n HT40 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

4.5 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to §15.407, §15.209 and §15.205,
According to RSS-247 section 6.2.1.2, section 6.2.4.2, section 6.2.2.2 and section 6.2.3.2

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

RSS-Gen Table 3 and Table 5 – General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz (Note)

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: Measurements for compliance with the limits in table 3 may be performed at distances other than 3 metres, in accordance with Section 6.6.

RSS-Gen Table 6: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency	Magnetic field strength (H-Field) (μA/m)	Measurement Distance (m)
9-490 kHz Note	6.37/F (F in kHz)	300
490-1,705 kHz	63.7/F (F in kHz)	30
1.705-30 MHz	0.08	30

Note: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector..

UNII-2a and 2c :

For devices with operating frequencies in the band 5250-5350 MHz but having a channel bandwidth that overlaps the band 5150-5250 MHz, the devices' unwanted emission shall not exceed -27 dBm/MHz e.i.r.p. outside the band 5150-5350 MHz and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device shall be labelled "for indoor use only." Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

4.5.2 Test Procedure

Test method Refer as KDB 789033 D02.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10: 2013, and the EUT set in a continuous mode.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.

3. Span shall wide enough to full capture the emission measured. The SA from 9kHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.

4. No emission found between lowest internal used/generated frequency to 30MHz (9KHz~30MHz)

5. The SA setting following：

(1) Below 1G：RBW = 100kHz, VBW ≥ 3*RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2) Above 1G：

(2.1) For Peak measurement：RBW = 1MHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.

(2.2) For Average measurement：RBW = 1MHz, VBW

- If Duty Cycle ≥ 98%, VBW=10Hz.
- If Duty Cycle < 98%, VBW=1/T.

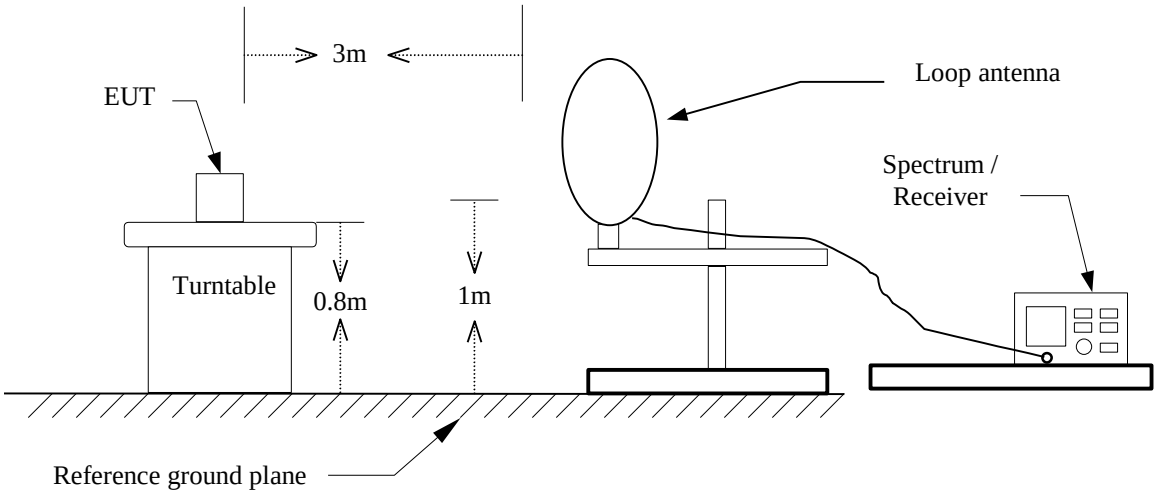
6. Data result

Actual FS=Spectrum Reading Level + Factor

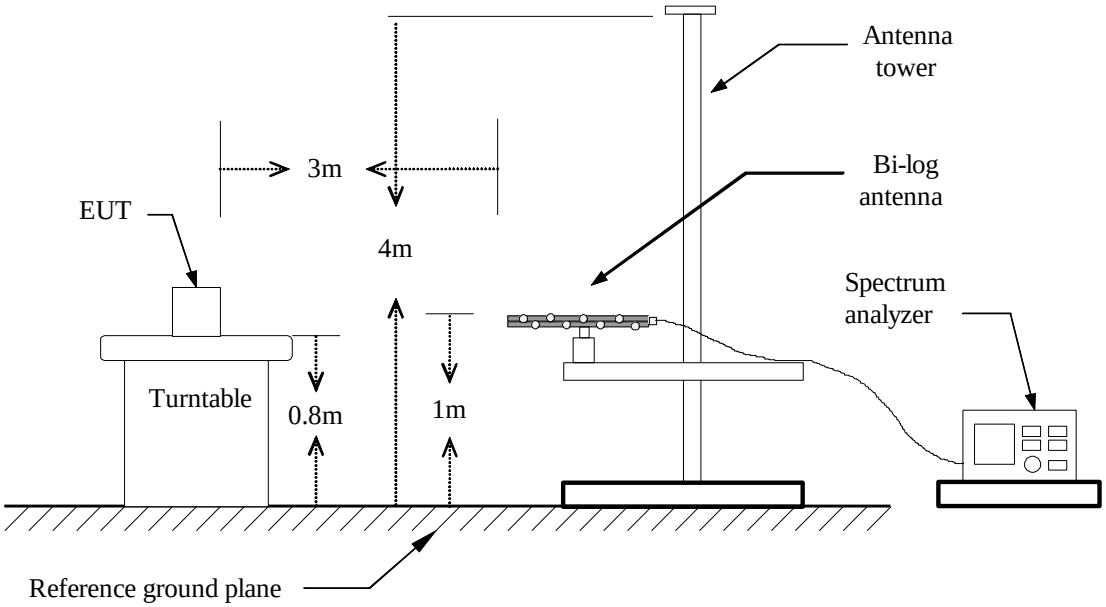
Margin=Actual FS- Limit

4.5.3 Test Setup

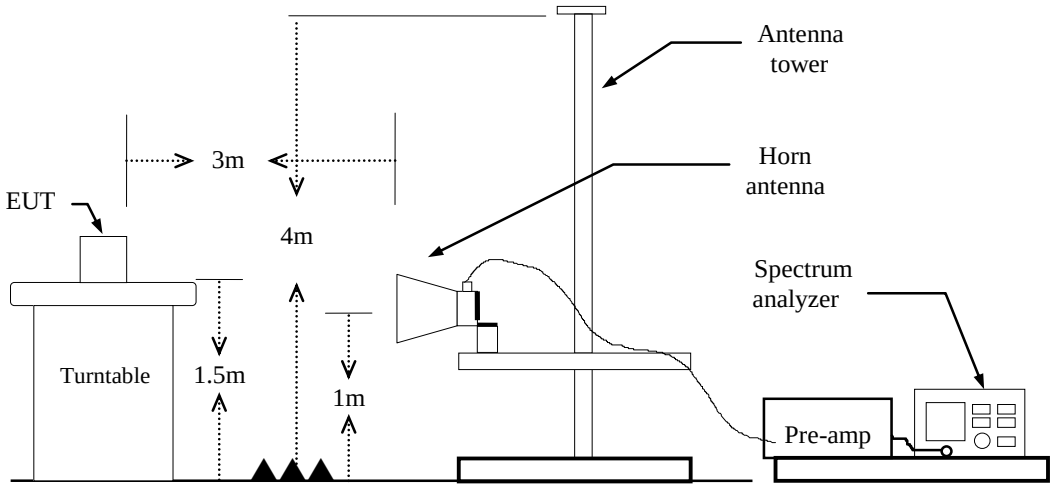
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz

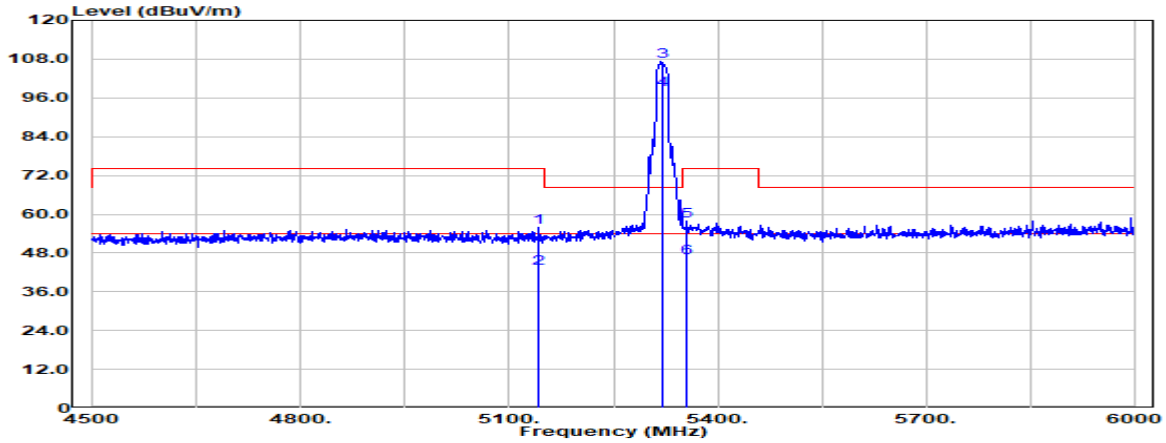


4.5.4 Test Result

Band Edge Test Data

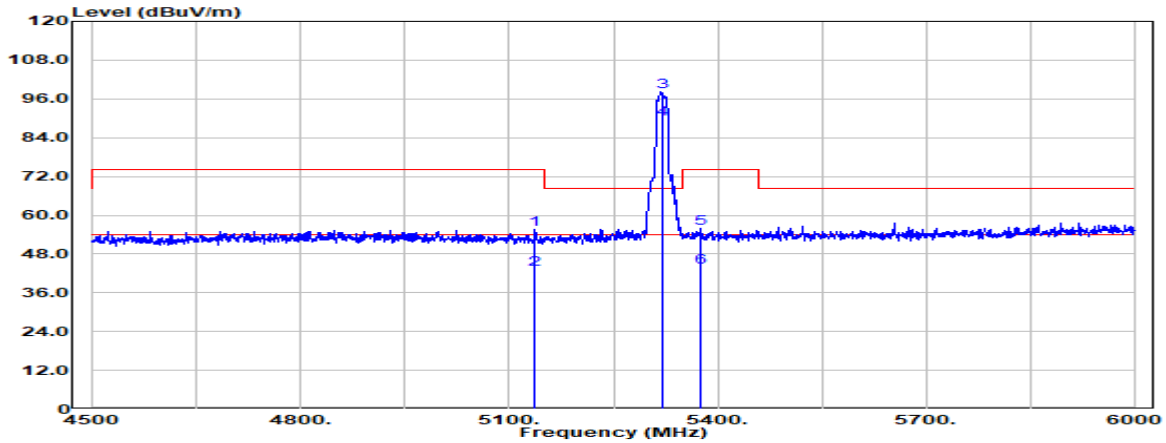
Test Data for UNII-2a

Test Mode	IEEE 802.11a / 5320 MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak / Average		



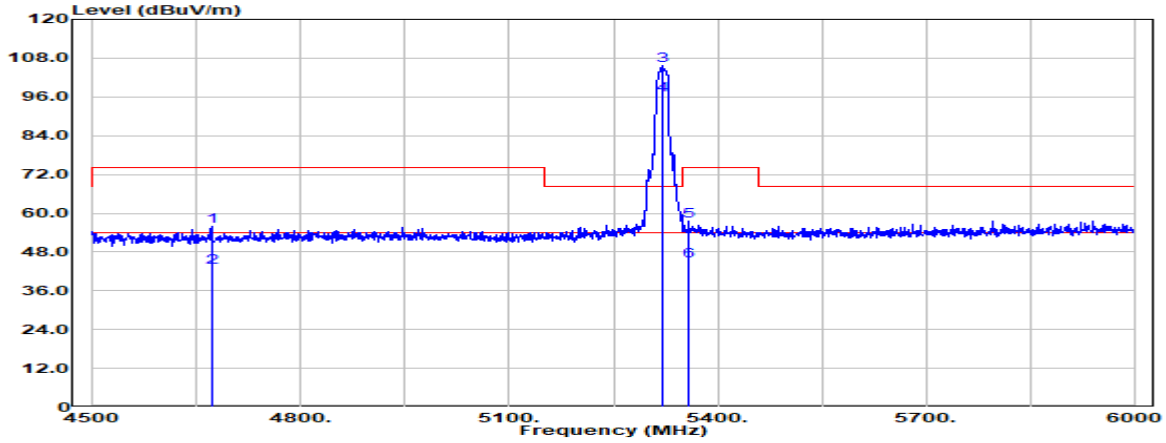
Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
5142.00	Peak	37.09	18.97	56.06	74.00	-17.94
5142.00	Average	24.37	18.97	43.35	54.00	-10.65
5320.00	Peak	87.60	19.81	107.41	-	-
5320.00	Average	78.77	19.81	98.58	-	-
5355.75	Peak	38.06	19.85	57.91	74.00	-16.09
5355.75	Average	26.55	19.85	46.40	54.00	-7.60

Test Mode	IEEE 802.11a / 5320 MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak / Average		



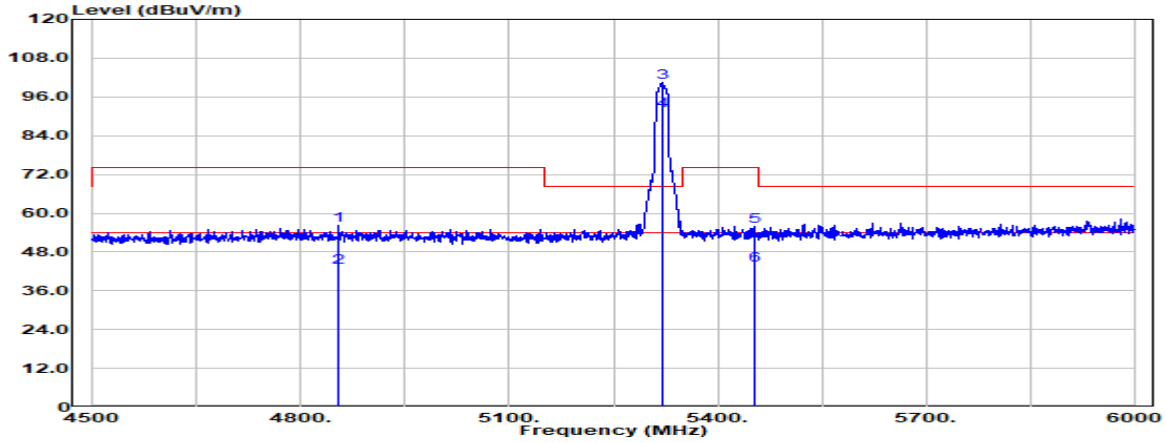
Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
5137.50	Peak	36.65	18.96	55.61	74.00	-18.39
5137.50	Average	24.35	18.96	43.31	54.00	-10.69
5320.00	Peak	78.38	19.81	98.20	-	-
5320.00	Average	69.83	19.81	89.65	-	-
5376.00	Peak	36.11	19.94	56.05	74.00	-17.95
5376.00	Average	23.87	19.94	43.82	54.00	-10.18

Test Mode	IEEE 802.11n 20 MHz / 5320MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak / Average		



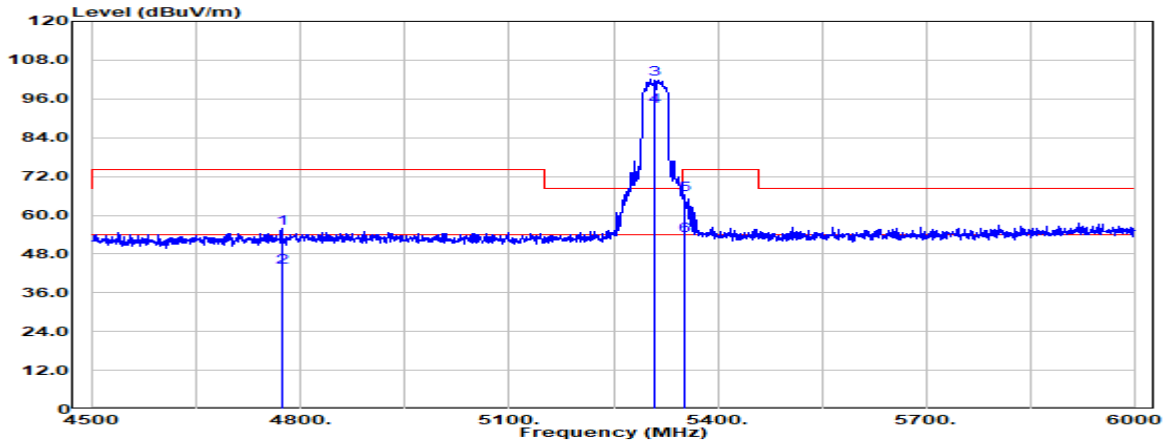
Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
4671.00	Peak	37.41	18.43	55.84	74.00	-18.16
4671.00	Average	24.97	18.43	43.40	54.00	-10.60
5320.00	Peak	85.90	19.81	105.71	-	-
5320.00	Average	76.71	19.81	96.52	-	-
5358.75	Peak	37.74	19.86	57.60	74.00	-16.40
5358.75	Average	25.37	19.86	45.23	54.00	-8.77

Test Mode	IEEE 802.11n 20 MHz / 5320MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak / Average		



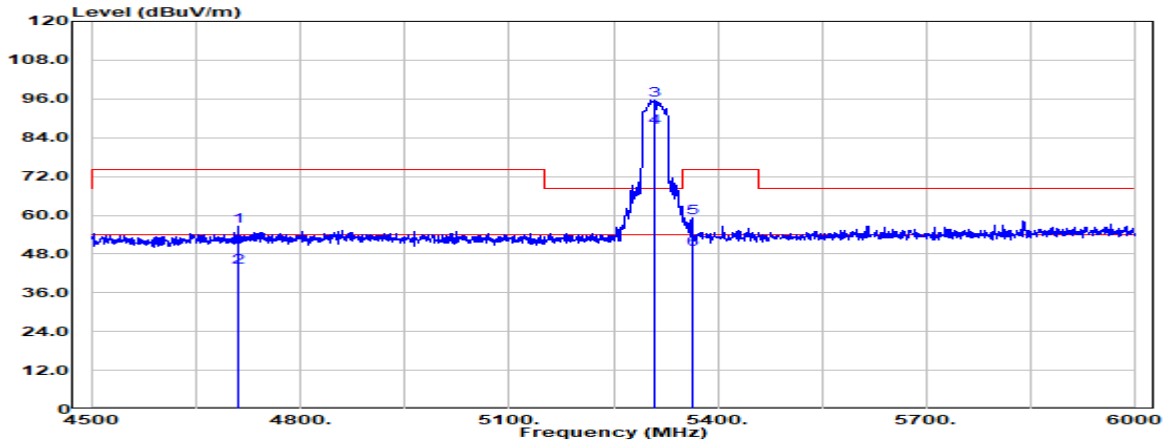
Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
4854.00	Peak	37.63	18.61	56.24	74.00	-17.76
4854.00	Average	24.76	18.61	43.37	54.00	-10.63
5320.00	Peak	80.73	19.81	100.54	-	-
5320.00	Average	71.94	19.81	91.76	-	-
5452.50	Peak	35.95	20.07	56.02	74.00	-17.98
5452.50	Average	23.86	20.07	43.93	54.00	-10.07

Test Mode	IEEE 802.11n 40 MHz / 5310MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak / Average		



Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
4771.50	Peak	37.31	18.48	55.79	74.00	-18.21
4771.50	Average	25.32	18.48	43.80	54.00	-10.20
5310.00	Peak	82.30	19.81	102.11	-	-
5310.00	Average	73.84	19.81	93.66	-	-
5353.50	Peak	46.45	19.84	66.28	74.00	-7.72
5353.50	Average	33.90	19.84	53.73	54.00	-0.27

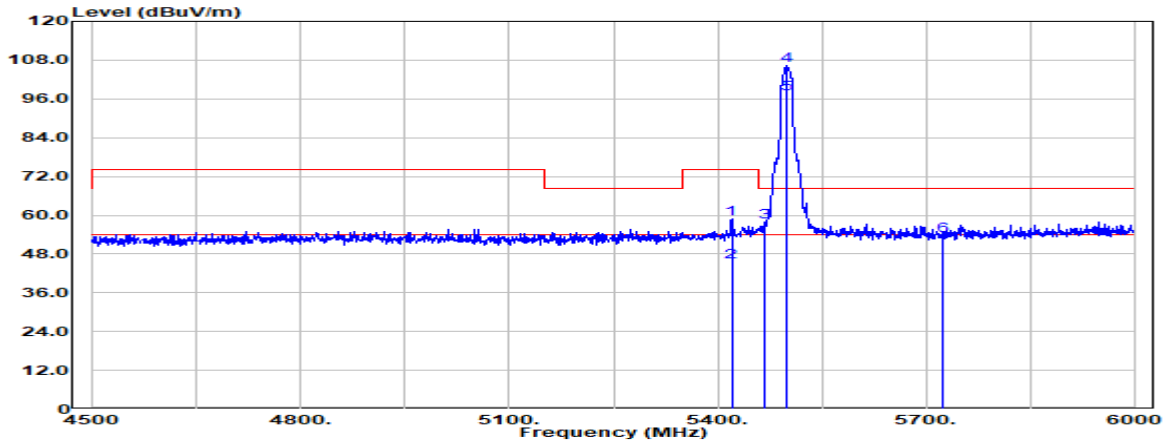
Test Mode	IEEE 802.11n 40 MHz / 5310MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak / Average		



Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
4710.00	Peak	37.99	18.46	56.45	74.00	-17.55
4710.00	Average	25.38	18.46	43.84	54.00	-10.16
5310.00	Peak	75.92	19.81	95.73	-	-
5310.00	Average	67.39	19.81	87.20	-	-
5364.00	Peak	39.44	19.89	59.33	74.00	-14.67
5364.00	Average	29.44	19.89	49.33	54.00	-4.67

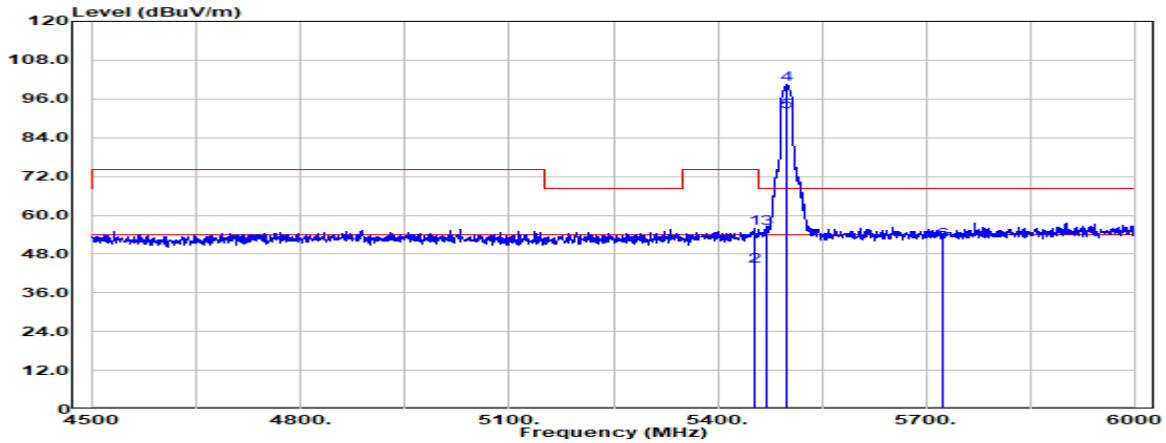
Test Data for UNII-2c

Test Mode	IEEE 802.11a / 5500MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak / Average		



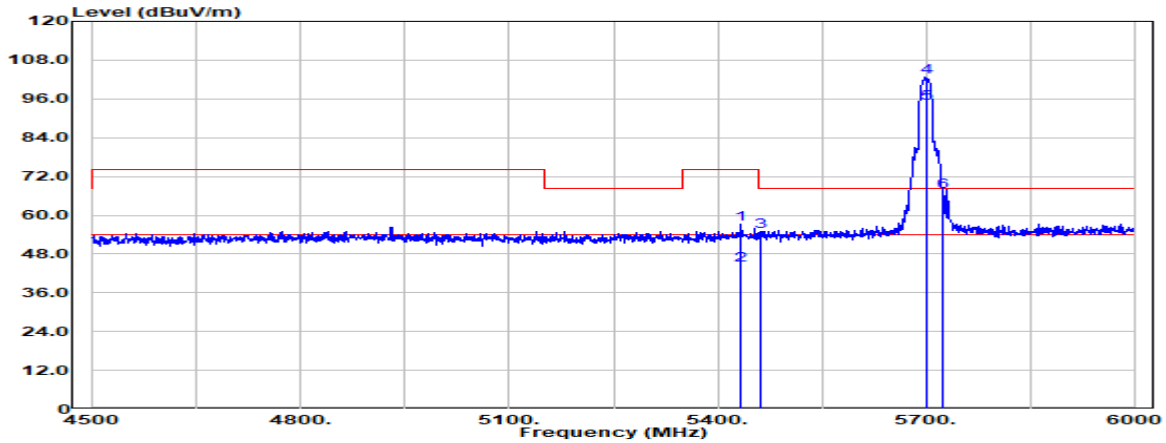
Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
5420.25	Peak	38.71	20.06	58.77	74.00	-15.23
5420.25	Average	25.37	20.06	45.44	54.00	-8.56
5467.50	Peak	37.93	20.05	57.99	68.20	-10.21
5500.00	Peak	86.30	20.02	106.32	-	-
5500.00	Average	77.62	20.02	97.64	-	-
5725.00	Peak	33.24	20.32	53.56	68.20	-14.64

Test Mode	IEEE 802.11a / 5500MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak / Average		



Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
5452.50	Peak	35.76	20.07	55.82	74.00	-18.18
5452.50	Average	24.19	20.07	44.25	54.00	-9.75
5469.75	Peak	35.88	20.05	55.93	68.20	-12.27
5500.00	Peak	80.42	20.02	100.44	-	-
5500.00	Average	71.89	20.02	91.91	-	-
5725.00	Peak	31.79	20.32	52.11	68.20	-16.09

Test Mode	IEEE 802.11a / 5700 MHz	Temp/Hum	20.0(℃)/ 62%RH
Test Item	Band Edge	Test Date	February 24, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak / Average		



Frequency (MHz)	Detector Mode (PK/QP/AV)	Spectrum Reading Level (dBµV)	Factor (dB)	Actual FS (dBµV/m)	Limit @3m (dBµV/m)	Margin (dB)
5434.50	Peak	37.05	20.07	57.12	74.00	-16.88
5434.50	Average	24.47	20.07	44.54	54.00	-9.46
5463.00	Peak	34.90	20.06	54.95	68.20	-13.25
5700.00	Peak	82.47	20.16	102.63	-	-
5700.00	Average	74.32	20.16	94.48	-	-
5725.00	Peak	46.88	20.32	67.20	68.20	-1.00