FCC TEST REPORT
FCC ID:2BDS2-RPL819

Report Number	ZKT-240528L5893E-1
Date of Test	May 28 to July 01, 2024
Date of issue	July 01, 2024
Total number of pages	61
Test Result	PASS
Testing Laboratory	Shenzhen ZKT Technology Co., Ltd.
Address	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name	**Hypertechnologie Ciara Inc. Ciara Technologies Inc**
Address	5555, Rue Cypihot, Saint-Laurent, QC, H4S 1R3
Manufacturer's name	**Hypertechnologie Ciara Inc. Ciara Technologies Inc**
Address	5555, Rue Cypihot, Saint-Laurent, QC, H4S 1R3
Factory's name	**Dongguan Mingzhi Precision Manufacturing Co., LTD**
Address	Room 301, Building 1, No.4 Jizhi North Road, Humen Town, Dongguan City, Guangdong Province
Test specification:	
Standard	FCC CFR Title 47 Part 15 Subpart C Section 15.407 ANSI C63.10:2013 KDB 789033 D02 v01r02
Test procedure	/
Non-standard test method	N/A
Test Report Form No	TRF-EL-113_V0
Test Report Form(s) Originator	ZKT Testing
Master TRF	Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Product name	**Notebook**
Trademark	CIARA
Model/Type reference	RPL819(Please refer to page8)

Ratings..... :	DC20V from adapter AC120V/60Hz or DC11.4V from battery

Testing procedure and testing location:

Testing Laboratory..... :	Shenzhen ZKT Technology Co., Ltd.
Address..... :	1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Tested by (name + signature)..... :	Alen He
Reviewer (name + signature)..... :	Joe Liu
Approved (name + signature)..... :	Lake Xie

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1. VERSION

Report No.	Version	Description	Approved
ZKT-240528L5893E-1	Rev.01	Initial issue of report	July 01, 2024

2.SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.209(a), 15.407 (b)(1)	Spurious Radiated Emissions	PASS	
15.207, 15.407 (b)(9)	Conducted Emission	PASS	
15.407 (a)(12)	26 dB and 99% Emission Bandwidth	PASS	
15.407 (a)(1)	Maximum Conducted Output Power	PASS	
15.407(b)(1)	Band Edge	PASS	
15.407 (a)(1)	Power Spectral Density	PASS	
15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.
Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225
Designation Number: CN1299
IC Registered No.: 27033
CAB identifier: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U · where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2 · providing a level of confidence of approximately 95 % ◦

No.	Item	Uncertain
	3m camber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59℃

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Notebook
Model No.:	RPL819,CRIUS CO100-G1,CRIUS CO100-GY,CRIUS CO105-G1, CRIUS CO110-G1,CRIUS CO115-G1,CRIUS CO120-G1,CRIUS CO125-G1,CRIUS CO200-G1,CRIUS CO205-G1,CRIUS CO210-G1, CRIUS CO215-G1,CRIUS CO220-G1,CRIUS CO225-G1,CRIUS CO300-G1,CRIUS CO305-G1,CRIUS CO310-G1,CRIUS CO315-G1, CRIUS CO320-G1,CRIUS CO325-G1
Model Different.:	All models covered in this report are the same with each other, except for different model No. and appearance (for color, silk-screen only) for trading purpose.
Sample ID	ZKT-240528L5893E-1
Sample(s) Status:	Engineer sample
Product Description	IEEE 802.11 WLAN Mode Supported: ☒ 802.11a/ac/n (20MHz channel bandwidth) ☒ 802.11ac/n (40MHz channel bandwidth) ☒ 802.11ac(80MHz channel bandwidth) Data Rate: 802.11a 802.11/ac/n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT80):NSS1, MCS0-MCS9 Modulation: OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac; Operating Frequency Range: ☒ 5180-5240MHz for 802.11a/ac/n(HT20); 5190-5230MHz for 802.11ac/n(HT40); 5210MHz for 802.11 ac80; Number of Channels: ☒ 4 channels for 802.11a/ac/n20 in the 5180-5240MHz band ; 2 channels for 802.11 ac/n40 in the 5190-5230 MHz band ; 1 channels for 802.11 ac80 in the 5210MHz band ;;
Channel List	Please refer to the Note 2.
Antenna Type:	FPCB Antenna
Antenna gain:	The 5G WIFI 802.11a, working in SISO model, then the antenna gain as below: 802.11a: FPCB Antenna 2.5dBi 802.11a: FPCB Antenna 2.5dBi
	The 5G WIFI 802.11n20, 802.11n40 802.11ac20 802.11ac40 802.11ac80 can MIMO model, then the antenna gain as below: Directional gain=2.5dBi+10×log(2/1)dB=5.5dBi
Power supply:	DC20V from adapter AC120V/60Hz or DC11.4V from battery
SWITCHING POWER	Model: JHD-AP065U-BA-PD05

ADAPTER:	Input: 100-240V~ 50/60Hz 1.5A Output: 5V⎓3A; 9V⎓3A; 12V⎓3A; 15V⎓3A; 20V⎓2.25A
Battery:	DC11.4V 4825mAh

Note:
For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

802.11a/ac/n(20MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	-	-	-	-
40	5200	48	5240	-	-	-	-

802.11ac/n(40MHz) Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	-	-	-	-
46	5230	-	-	-	-	-	-

802.11ac (80MHz) Frequency Channel	
Channel	Frequency (MHz)
42	5210

3.2 DESCRIPTION OF TEST MODES

Transmitting mode	Keep the EUT in continuously transmitting mode
Remark: During the test, the duty cycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Pretest Mode	Description
Mode 1	802.11a /ac / n 20 CH36/ CH40/ CH 48
Mode 2	802.11ac / n 40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42
Mode 4	Link Mode

Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a /ac / n 20 CH36/ CH40/ CH 48
Mode 2	802.11ac / n 40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42

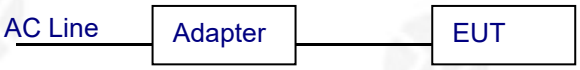
Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

Test Software	Realtek Test Tool
Power level setup	<10dBm

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission



Radiated Emission

Conducted Spurious

3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Notebook	CIARA	RPL819	Notebook	EUT
E-2	Adapter	N/A	JHD-AP065U-BA-PD05		

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.2M	DC Line

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation emissions& Radio Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Nov. 02, 2023	Nov. 01, 2024
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Nov. 02, 2023	Nov. 01, 2024
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	100969	4.32	Nov. 02, 2023	Nov. 01, 2024
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	N/A	Nov. 13, 2023	Nov. 12, 2024
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Nov. 13, 2023	Nov. 12, 2024
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Nov. 13, 2023	Nov. 12, 2024
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Nov. 16, 2023	Nov. 15, 2024
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	60747	N/A	Nov. 02, 2023	Nov. 01, 2024
9	Amplifier (1GHz-26.5GHz)	HuiPu	8449B	3008A00315	N/A	Nov. 02, 2023	Nov. 01, 2024
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Nov. 02, 2023	Nov. 01, 2024
11	Test Cable	N/A	R-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
12	Test Cable	N/A	R-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
13	Test Cable	N/A	R-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
14	Test Cable	N/A	RF-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
15	Test Cable	N/A	RF-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
16	Test Cable	N/A	RF-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
17	ESG Signal Generator	Agilent	E4421B	N/A	B.03.84	Nov. 02, 2023	Nov. 01, 2024
18	Signal Generator	Agilent	N5182A	N/A	A.01.87	Nov. 02, 2023	Nov. 01, 2024
19	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Nov. 16, 2023	Nov. 15, 2024
20	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Nov. 02, 2023	Nov. 01, 2024
21	MWRF Power Meter Test system	MW	MW100-RF CB	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
22	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
23	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
24	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\
25	Turntable	MF	MF-7802BS	N/A	N/A	\	\
26	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\
27	Power Meter	KEYSIGHT	N1912AP	N/A	A.05.00	Nov. 02, 2023	Nov. 01, 2024

Conducted emissions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Nov. 14, 2023	Nov. 13, 2024
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Nov. 02, 2023	Nov. 01, 2024
3	Test Cable	N/A	C-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
4	Test Cable	N/A	C-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
5	Test Cable	N/A	C-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
6	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Nov. 02, 2023	Nov. 01, 2024
7	Triple-Loop Antenna	N/A	RF300	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
8	Absorbing Clamp	DZ	ZN23201	15034	N/A	Nov. 07, 2023	Nov. 06, 2024
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

4.EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

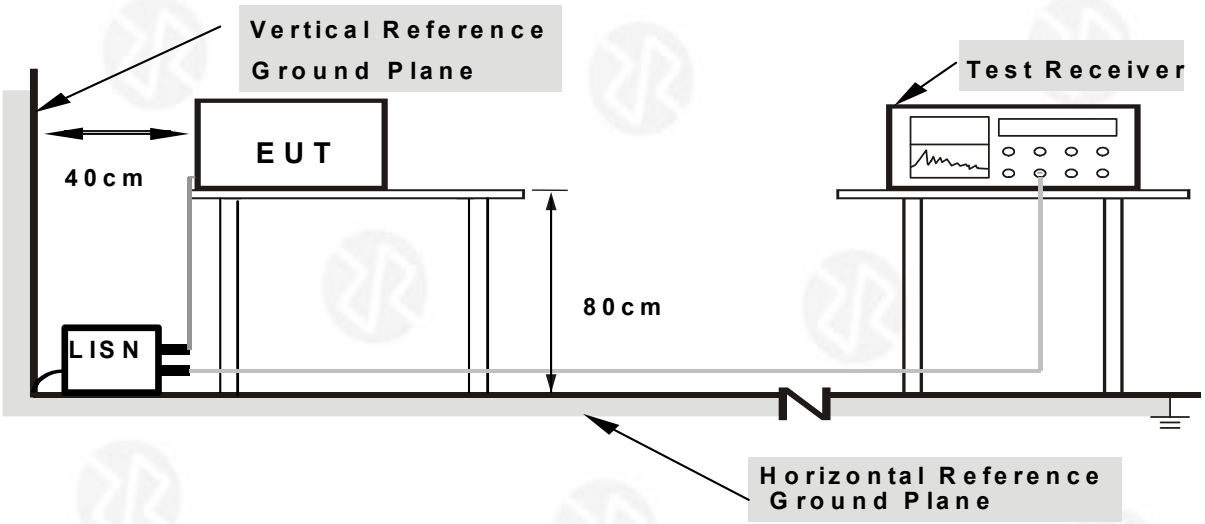
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation

4.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

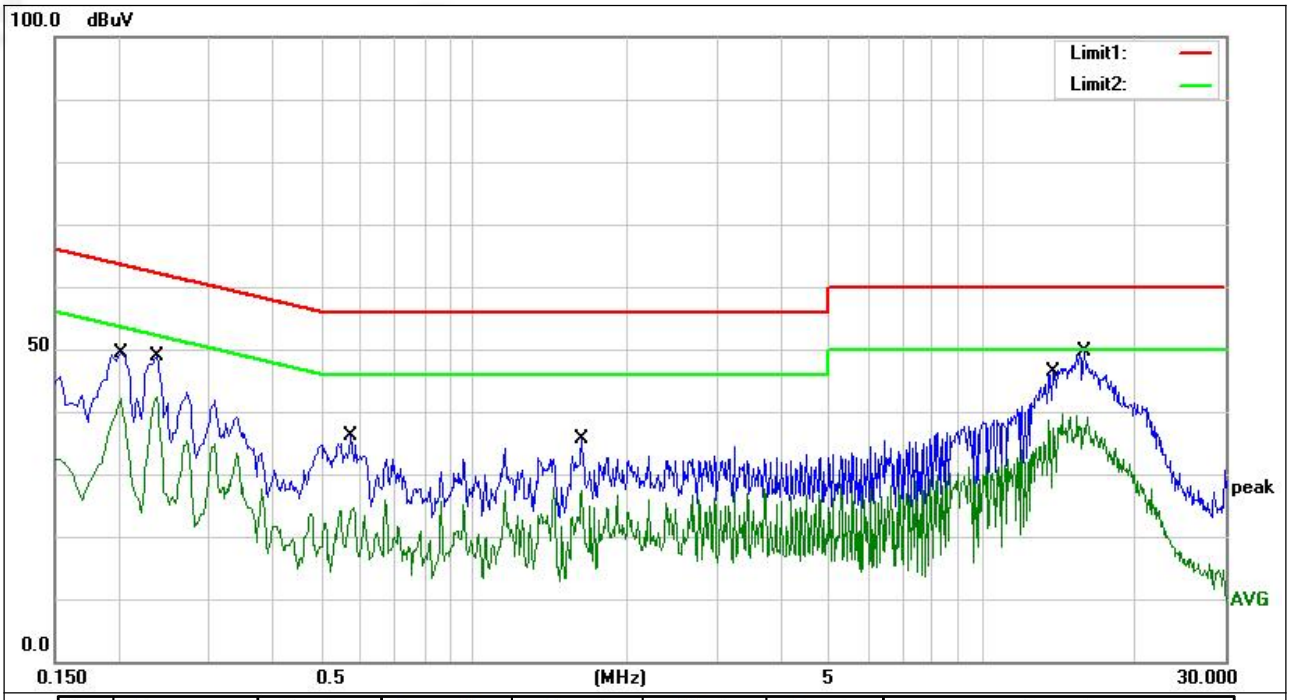
4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

4.1.6 TEST RESULT

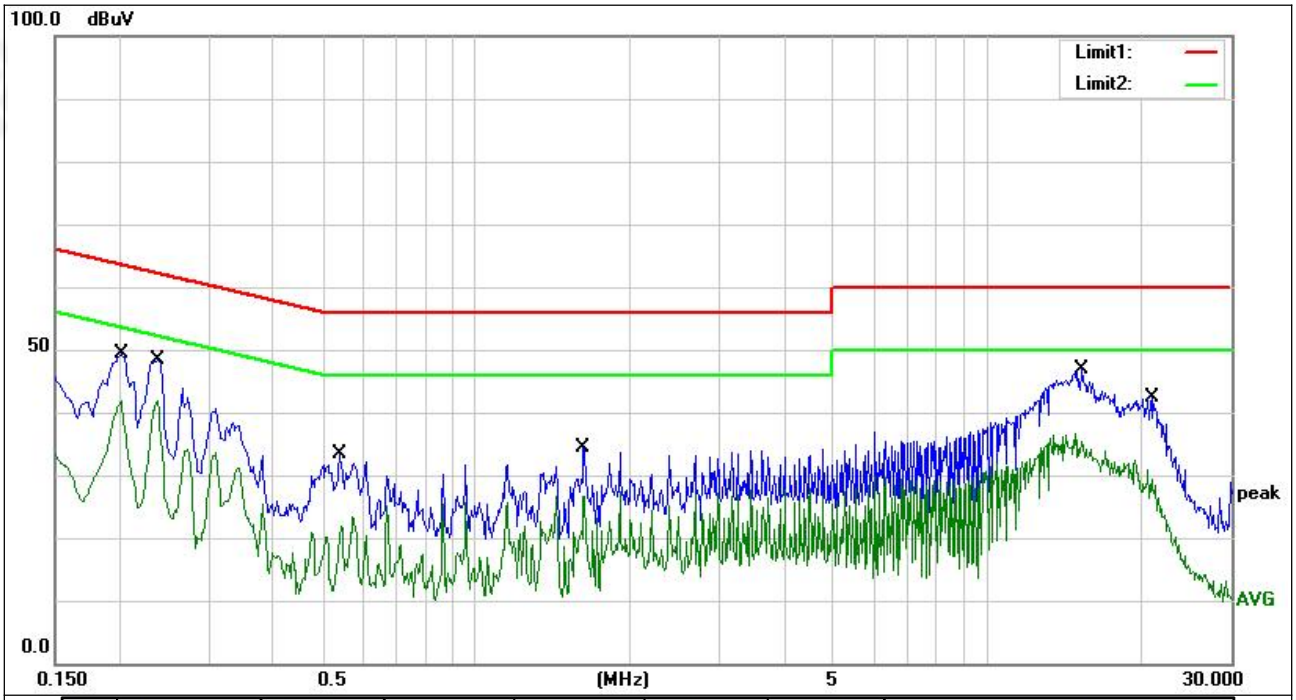
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase：	L
Test Voltage ：	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2020	39.12	10.32	49.44	63.53	-14.09	QP
2	0.2020	31.92	10.32	42.24	53.53	-11.29	AVG
3	0.2380	38.34	10.48	48.82	62.17	-13.35	QP
4	0.2380	31.97	10.48	42.45	52.17	-9.72	AVG
5	0.5740	25.68	10.47	36.15	56.00	-19.85	QP
6	0.5740	14.05	10.47	24.52	46.00	-21.48	AVG
7	1.6300	25.43	10.30	35.73	56.00	-20.27	QP
8	1.6300	17.63	10.30	27.93	46.00	-18.07	AVG
9	13.8140	34.84	11.60	46.44	60.00	-13.56	QP
10	13.8140	28.13	11.60	39.73	50.00	-10.27	AVG
11	15.8260	37.60	11.92	49.52	60.00	-10.48	QP
12	15.8260	27.55	11.92	39.47	50.00	-10.53	AVG

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

Temperature :	26℃	Relative Humidity:	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Correction (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2020	39.08	10.32	49.40	63.53	-14.13	QP
2	0.2020	31.63	10.32	41.95	53.53	-11.58	AVG
3	0.2380	37.83	10.48	48.31	62.17	-13.86	QP
4	0.2380	31.48	10.48	41.96	52.17	-10.21	AVG
5	0.5420	22.75	10.50	33.25	56.00	-22.75	QP
6	0.5420	12.90	10.50	23.40	46.00	-22.60	AVG
7	1.6260	23.97	10.30	34.27	56.00	-21.73	QP
8	1.6260	16.45	10.30	26.75	46.00	-19.25	AVG
9	15.3260	35.04	11.80	46.84	60.00	-13.16	QP
10	15.3260	24.79	11.80	36.59	50.00	-13.41	AVG
11	20.9740	29.42	12.85	42.27	60.00	-17.73	QP
12	20.9740	18.04	12.85	30.89	50.00	-19.11	AVG

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

4.2 RADIATED EMISSION MEASUREMENT

4.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

4.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

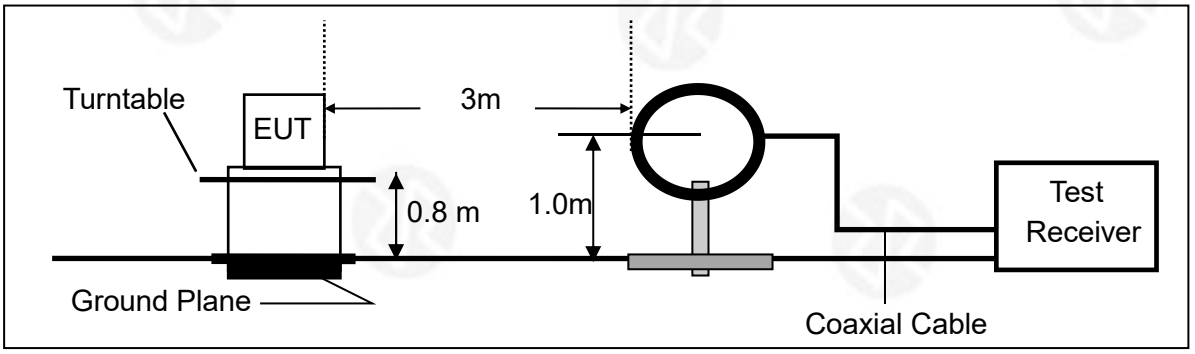
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

4.2.3 MEASURING INSTRUMENTS

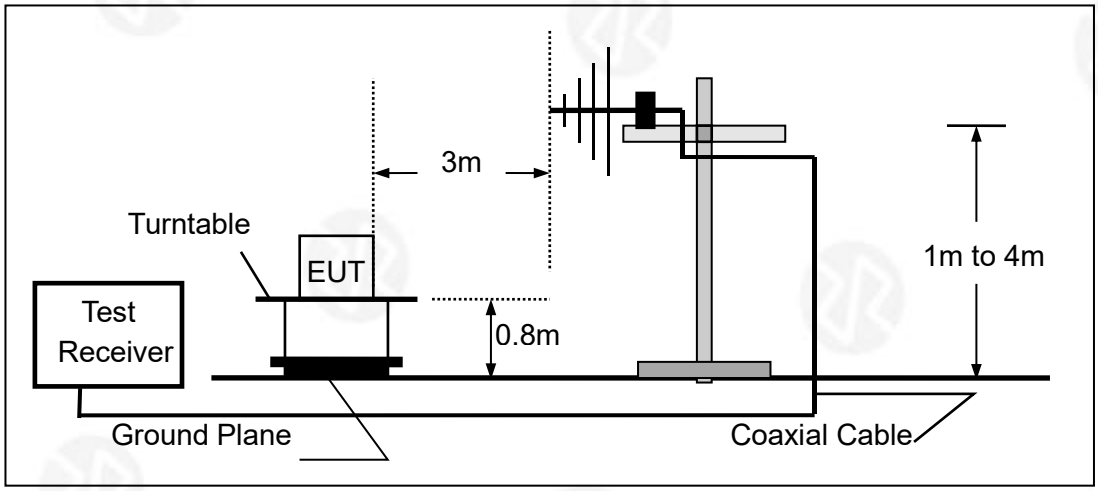
The Measuring equipment is listed in the section 6.3 of this test report.

4.2.4 TEST CONFIGURATION

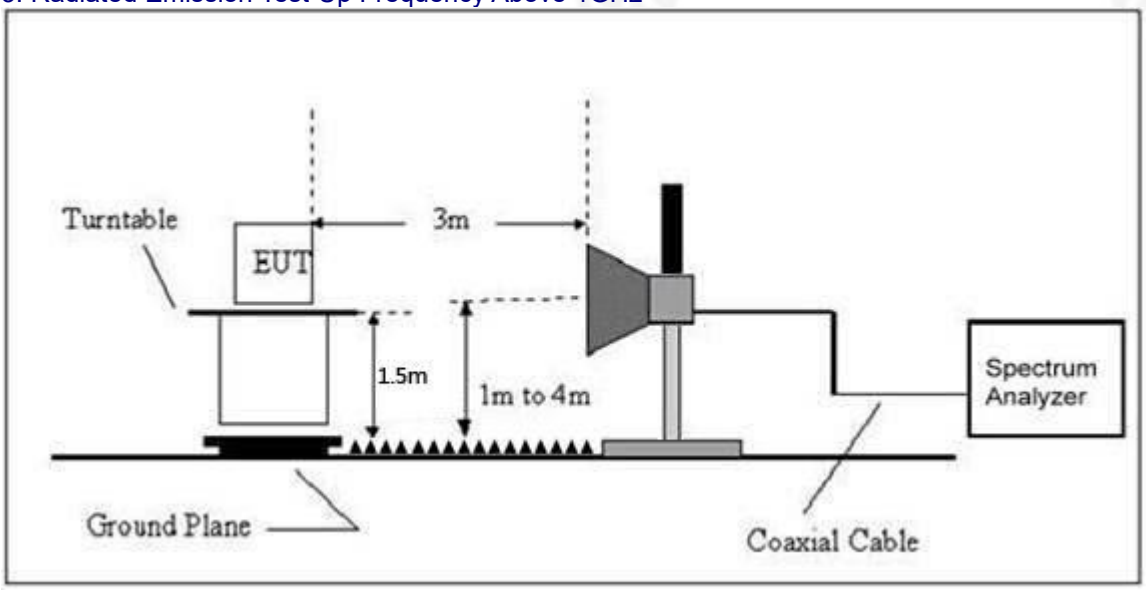
1.For radiated emissions below 30MHz



2.For radiated emissions from 30MHz to 1000MHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

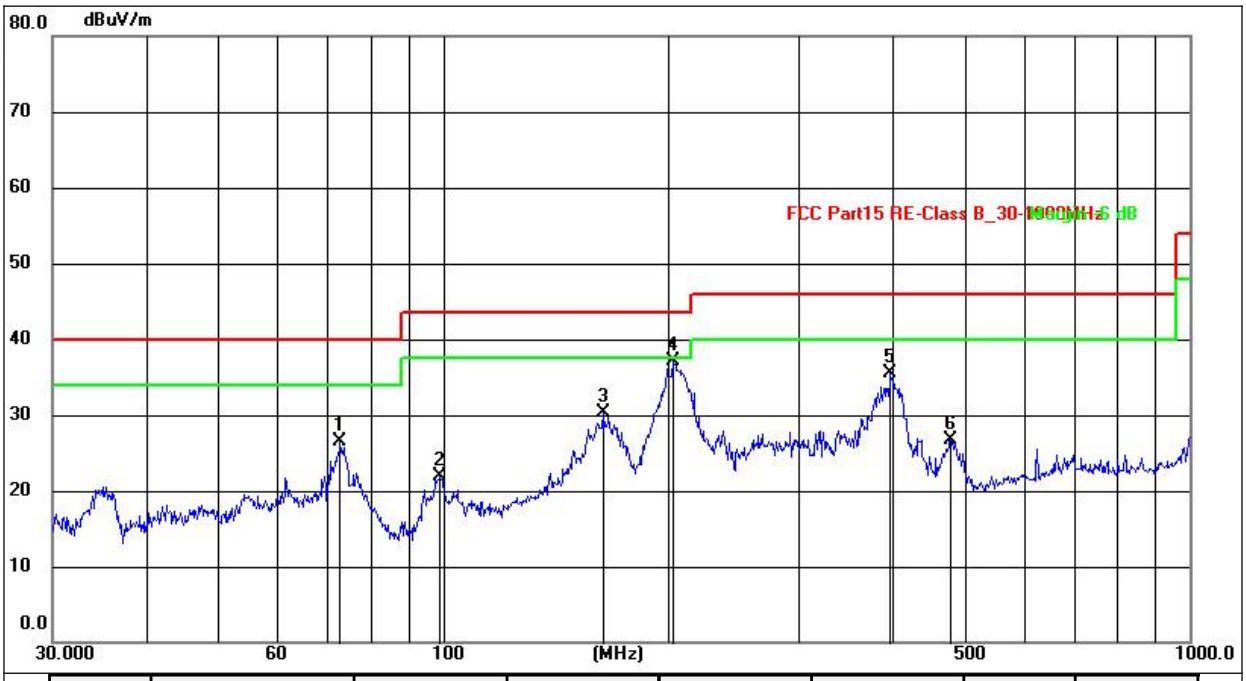
4.2.6 TEST RESULT

Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.

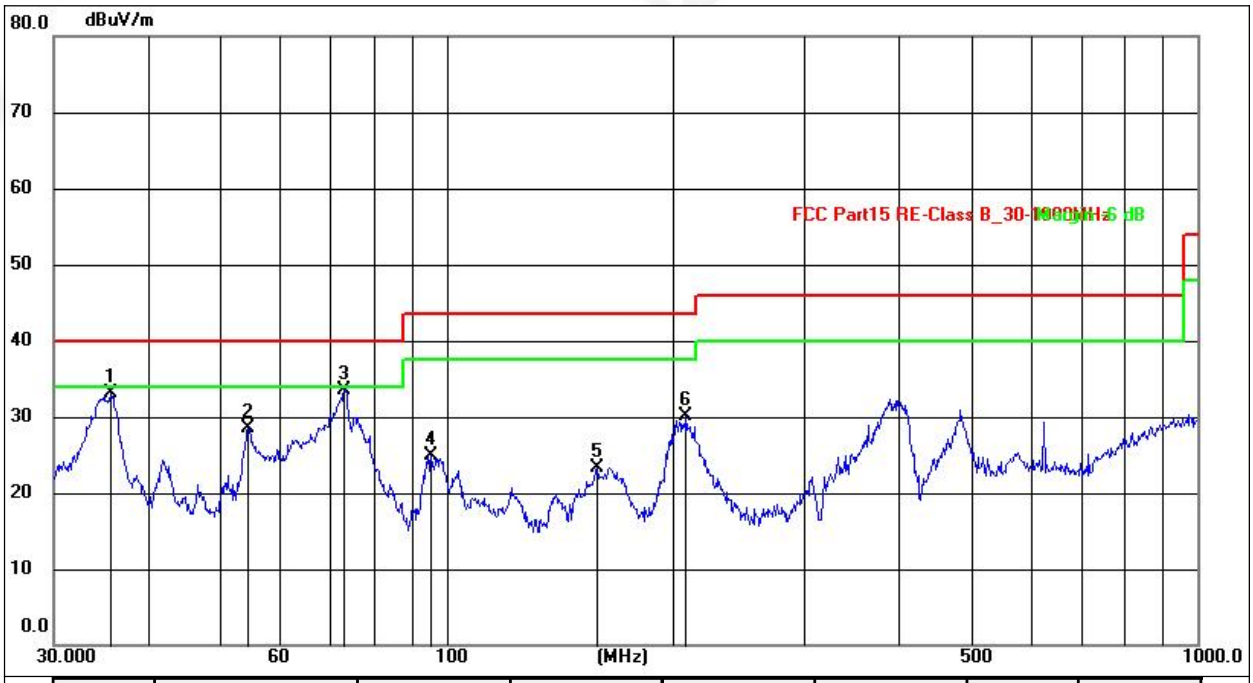
Between 30MHz – 1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	72.8465	44.07	-17.62	26.45	40.00	-13.55	QP
2	99.1795	41.69	-19.85	21.84	43.50	-21.66	QP
3	163.7547	46.79	-16.50	30.29	43.50	-13.21	QP
4	203.5226	55.74	-18.62	37.12	43.50	-6.38	QP
5	397.6333	51.99	-16.58	35.41	46.00	-10.59	QP
6	478.8455	39.43	-12.66	26.77	46.00	-19.23	QP

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	35.7490	50.66	-17.49	33.17	40.00	-6.83	QP
2	54.4515	46.28	-17.75	28.53	40.00	-11.47	QP
3	73.1025	53.68	-20.13	33.55	40.00	-6.45	QP
4	95.4269	46.32	-21.34	24.98	43.50	-18.52	QP
5	158.6673	43.64	-20.24	23.40	43.50	-20.10	QP
6	208.5800	50.59	-20.56	30.03	43.50	-13.47	QP

Remarks:
1.Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2.The emission levels of other frequencies are very lower than the limit and not show in test report.
3.The test data shows only the worst case 802.11n20 mode

Between 1GHz – 40GHz

Temperature :	26℃	Relative Humidity :	54%
Pressure :	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	5.2G TX- 802.11n20		

802.11n20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:5180MHz									
V	5150.00	44.12	30.45	8.77	38.66	61.10	74.00	-12.90	PK
V	5150.00	34.56	30.45	8.77	38.66	51.54	54.00	-2.46	AV
V	10360.00	53.84	30.55	5.77	24.66	53.72	74.00	-20.28	PK
V	10360.00	43.59	30.55	5.77	24.66	43.47	54.00	-10.53	AV
V	15540.00	51.98	30.33	6.32	24.55	52.52	74.00	-21.48	PK
V	15540.00	43.03	30.33	6.32	24.55	43.57	54.00	-10.43	AV
V	20720.00	50.09	30.85	7.45	24.69	51.38	74.00	-22.62	PK
V	20720.00	43.09	30.85	7.45	24.69	44.38	54.00	-9.62	AV
V	25900.00	50.56	31.02	8.99	25.57	54.10	74.00	-19.90	PK
V	25900.00	43.27	31.02	8.99	25.57	46.81	54.00	-7.19	AV
H	5150.00	42.06	30.45	8.77	38.66	59.04	74.00	-14.96	PK
H	5150.00	32.42	30.45	8.77	38.66	49.40	54.00	-4.60	AV
H	10360.00	54.04	30.55	5.77	24.66	53.92	74.00	-20.08	PK
H	10360.00	43.62	30.55	5.77	24.66	43.50	54.00	-10.50	AV
H	15540.00	52.91	30.33	6.32	24.55	53.45	74.00	-20.55	PK
H	15540.00	43.25	30.33	6.32	24.55	43.79	54.00	-10.21	AV
H	20720.00	51.59	30.85	7.45	24.69	52.88	74.00	-21.12	PK
H	20720.00	43.76	30.85	7.45	24.69	45.05	54.00	-8.95	AV
H	25900.00	51.78	31.02	8.99	25.57	55.32	74.00	-18.68	PK
H	25900.00	42.93	31.02	8.99	25.57	46.47	54.00	-7.53	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:5200MHz									
V	5150.00	42.08	30.45	8.77	38.66	59.06	74.00	-14.94	PK
V	5150.00	32.42	30.45	8.77	38.66	49.40	54.00	-4.60	AV
V	10400.00	53.30	30.55	5.77	24.66	53.18	74.00	-20.82	PK
V	10400.00	42.75	30.55	5.77	24.66	42.63	54.00	-11.37	AV
V	15600.00	53.72	30.33	6.32	24.55	54.26	74.00	-19.74	PK
V	15600.00	43.67	30.33	6.32	24.55	44.21	54.00	-9.79	AV
V	20800.00	52.33	30.85	7.45	24.69	53.62	74.00	-20.38	PK
V	20800.00	42.74	30.85	7.45	24.69	44.03	54.00	-9.97	AV
V	26000.00	51.29	31.02	8.99	25.57	54.83	74.00	-19.17	PK
V	26000.00	43.72	31.02	8.99	25.57	47.26	54.00	-6.74	AV
H	5150.00	42.99	30.45	8.77	38.66	59.97	74.00	-14.03	PK
H	5150.00	33.18	30.45	8.77	38.66	50.16	54.00	-3.84	AV
H	10400.00	52.83	30.55	5.77	24.66	52.71	74.00	-21.29	PK
H	10400.00	42.73	30.55	5.77	24.66	42.61	54.00	-11.39	AV
H	15600.00	51.14	30.33	6.32	24.55	51.68	74.00	-22.32	PK

H	15600.00	43.58	30.33	6.32	24.55	44.12	54.00	-9.88	AV
H	20800.00	53.72	30.85	7.45	24.69	55.01	74.00	-18.99	PK
H	20800.00	43.05	30.85	7.45	24.69	44.34	54.00	-9.66	AV
H	26000.00	52.27	31.02	8.99	25.57	55.81	74.00	-18.19	PK
H	26000.00	43.47	31.02	8.99	25.57	47.01	54.00	-6.99	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:5240MHz									
V	5350.00	42.79	30.45	8.77	38.66	59.77	74.00	-14.23	PK
V	5350.00	32.31	30.45	8.77	38.66	49.29	54.00	-4.71	AV
V	10480.00	52.81	30.55	5.77	24.66	52.69	74.00	-21.31	PK
V	10480.00	43.64	30.55	5.77	24.66	43.52	54.00	-10.48	AV
V	15720.00	54.05	30.33	6.32	24.55	54.59	74.00	-19.41	PK
V	15720.00	43.74	30.33	6.32	24.55	44.28	54.00	-9.72	AV
V	20960.00	50.22	30.85	7.45	24.69	51.51	74.00	-22.49	PK
V	20960.00	43.51	30.85	7.45	24.69	44.80	54.00	-9.20	AV
V	26200.00	52.50	31.02	8.99	25.57	56.04	74.00	-17.96	PK
V	26200.00	43.83	31.02	8.99	25.57	47.37	54.00	-6.63	AV
H	5350.00	42.02	30.45	8.77	38.66	59.00	74.00	-15.00	PK
H	5350.00	32.39	30.45	8.77	38.66	49.37	54.00	-4.63	AV
H	10480.00	50.65	30.55	5.77	24.66	50.53	74.00	-23.47	PK
H	10480.00	43.56	30.55	5.77	24.66	43.44	54.00	-10.56	AV
H	15720.00	53.55	30.33	6.32	24.55	54.09	74.00	-19.91	PK
H	15720.00	43.71	30.33	6.32	24.55	44.25	54.00	-9.75	AV
H	20960.00	51.22	30.85	7.45	24.69	52.51	74.00	-21.49	PK
H	20960.00	43.79	30.85	7.45	24.69	45.08	54.00	-8.92	AV
H	26200.00	50.55	31.02	8.99	25.57	54.09	74.00	-19.91	PK
H	26200.00	42.93	31.02	8.99	25.57	46.47	54.00	-7.53	AV

Remark:
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4. The worst mode is 802.11n20 ANT1, only the worst data is recorded.

5.POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(3)

Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 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.

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

(iv) For client devices in the 5.15-5.25 GHz band, 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.

(2) For the 5.25-5.35 GHz and 5.47-5.725 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. 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.

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

5.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP

5.5 EUT OPERATION CONDITIONS

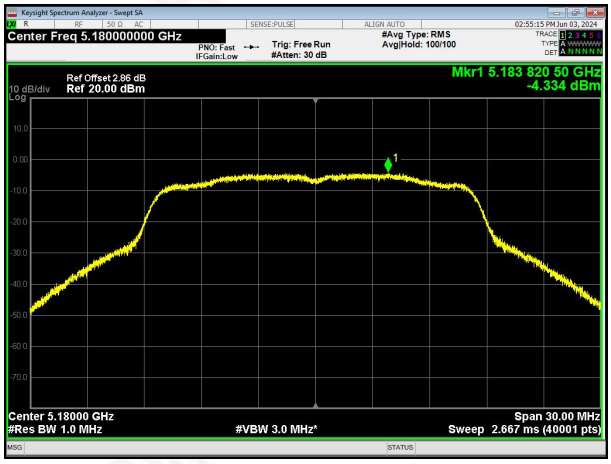
The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

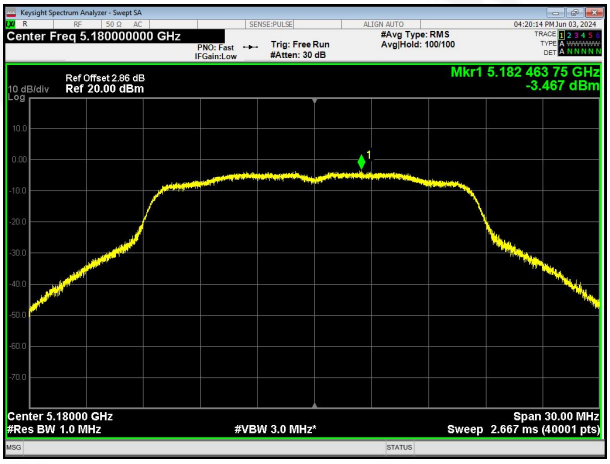
Temperature :	26 ℃	Relative Humidity :	54%
Pressure :	1015 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX		

Test mode	Test Channel (MHz)	PSD [dBm/MHz]			Limit (dBm/MHz)	Result
		ANT1	ANT2	Total		
802.11a	5180	-4.334	-3.467	\	11	Pass
	5200	-4.337	-3.98	\	11	Pass
	5240	-3.859	-3.163	\	11	Pass
802.11n(HT20)	5180	-4.469	-3.632	-1.020	11	Pass
	5200	-4.410	-4.105	-1.243	11	Pass
	5240	-3.913	-3.538	-0.711	11	Pass
802.11n(HT40)	5190	-7.751	-6.849	-4.271	11	Pass
	5230	-7.149	-6.887	-4.001	11	Pass
802.11ac(VH20)	5180	-4.464	-3.998	-1.214	11	Pass
	5200	-4.659	-4.225	-1.426	11	Pass
	5240	-3.659	-3.487	-0.560	11	Pass
802.11ac(VH40)	5190	-7.725	-7.527	-4.609	11	Pass
	5230	-7.157	-7.337	-4.236	11	Pass
802.11ac(VH80)	5210	-10.303	-10.16	-7.212	11	Pass

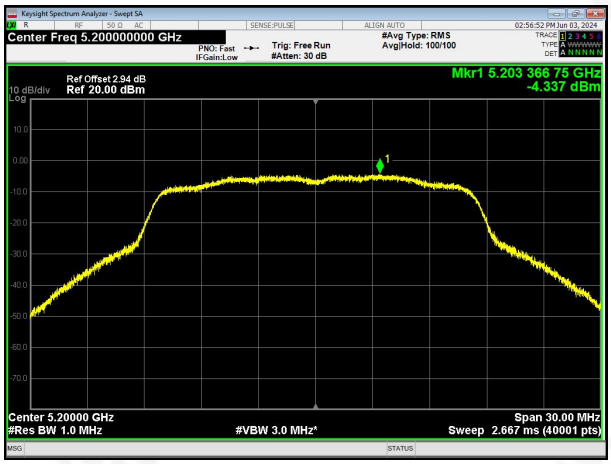
ANT1 (802.11a) PSD plot on channel 36



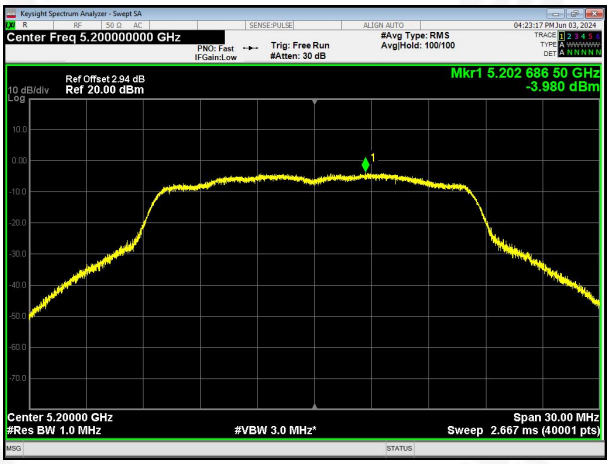
ANT2 (802.11a) PSD plot on channel 36



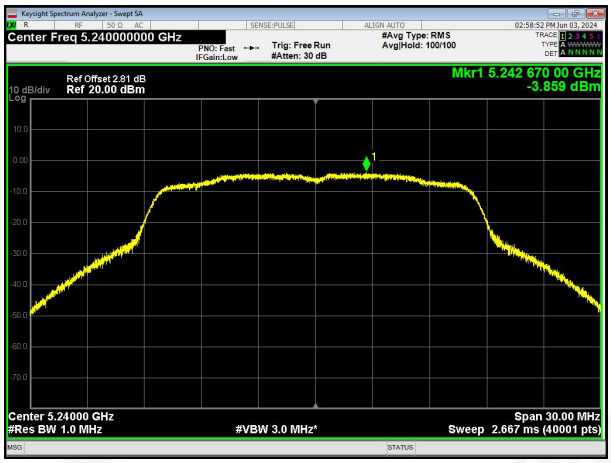
(802.11a) PSD plot on channel 40



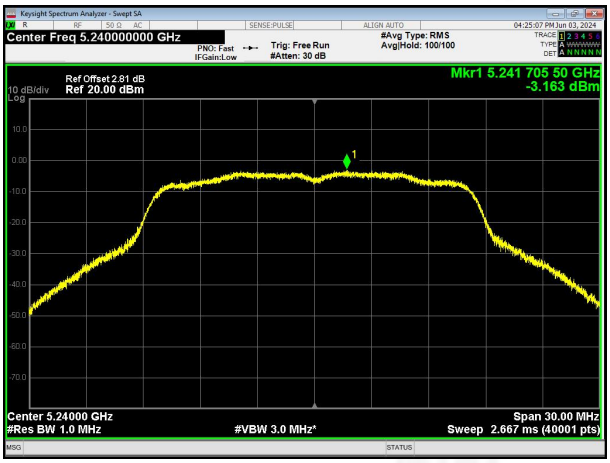
(802.11a) PSD plot on channel 40



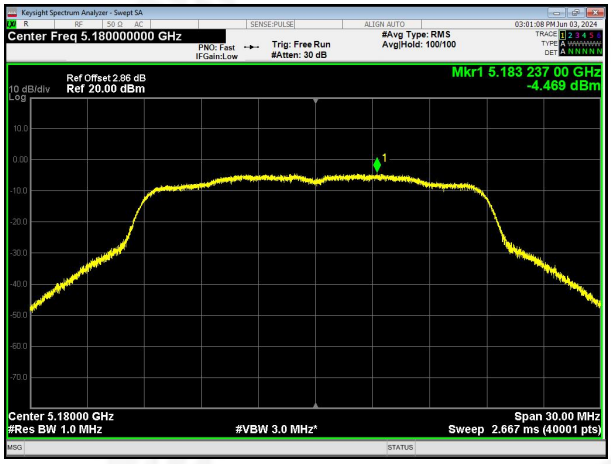
(802.11a) PSD plot on channel 48



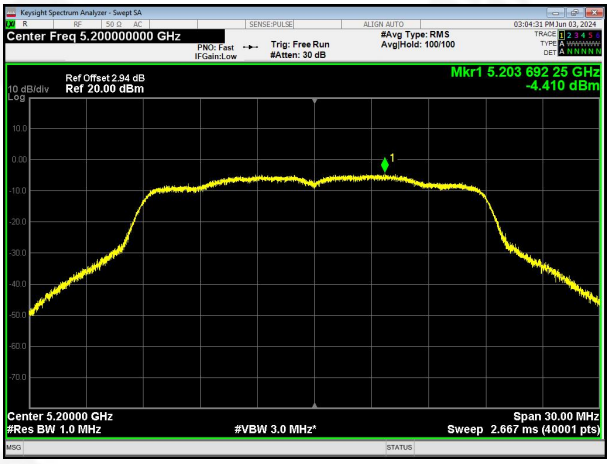
(802.11a) PSD plot on channel 48



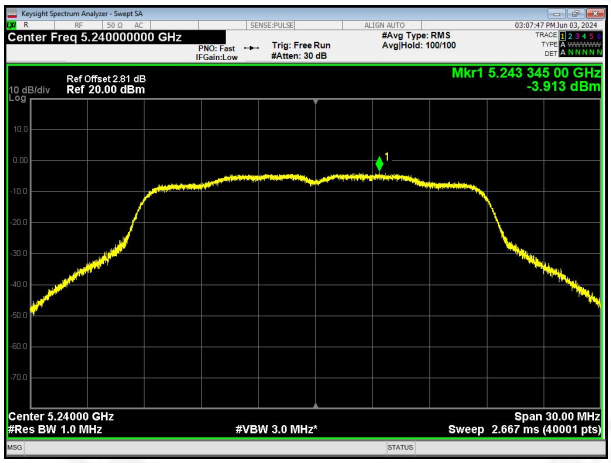
ANT1 (802.11n20) PSD plot on channel 36



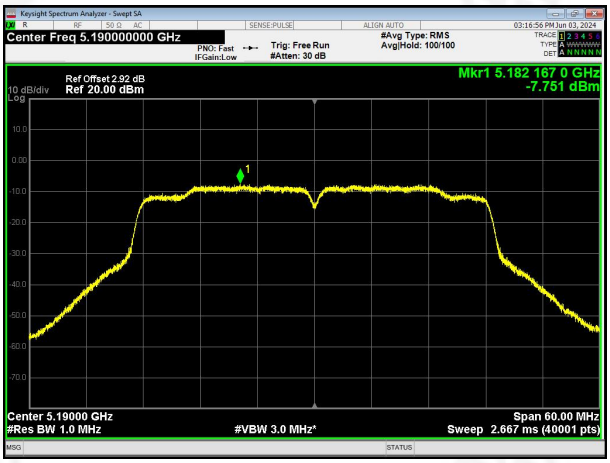
ANT1 (802.11n40) PSD plot on channel 38



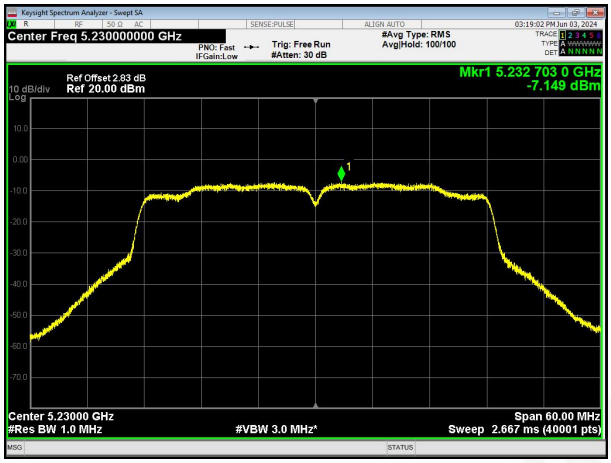
(802.11n20) PSD plot on channel 40



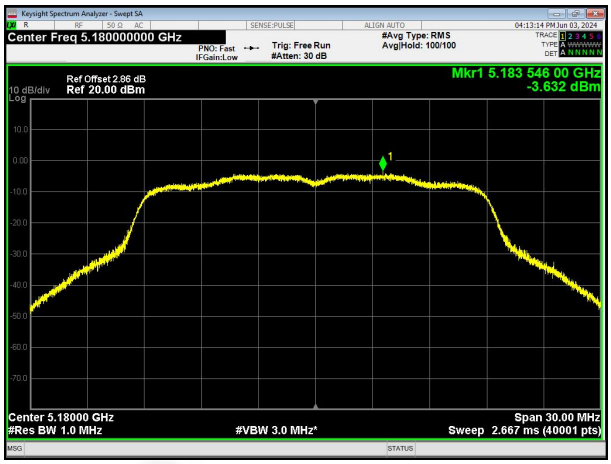
(802.11n40) PSD plot on channel 46



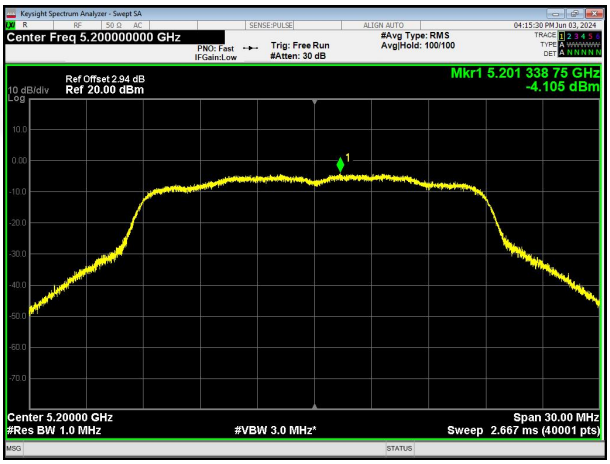
(802.11n20) PSD plot on channel 48



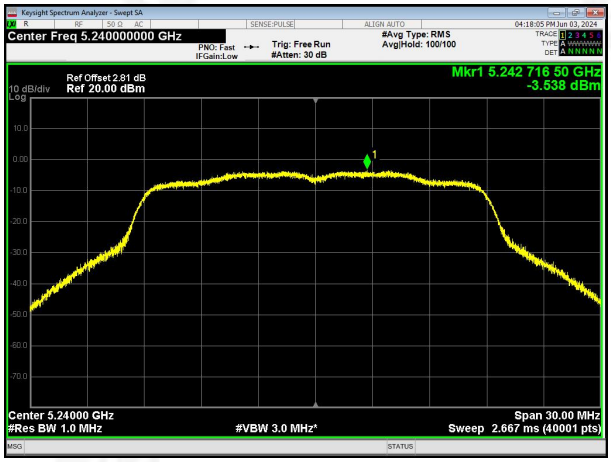
ANT2 (802.11n20) PSD plot on channel 36



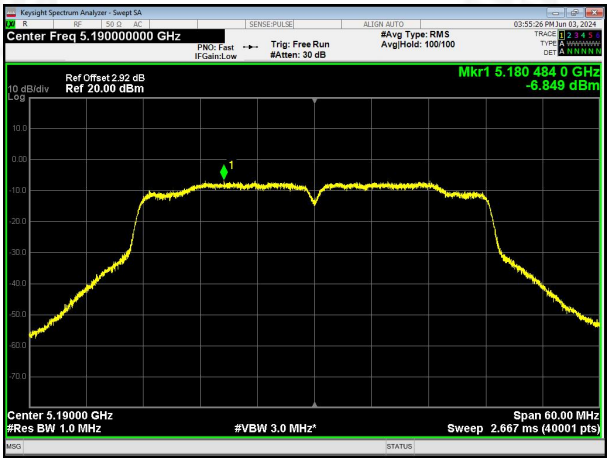
ANT2 (802.11n40) PSD plot on channel 38



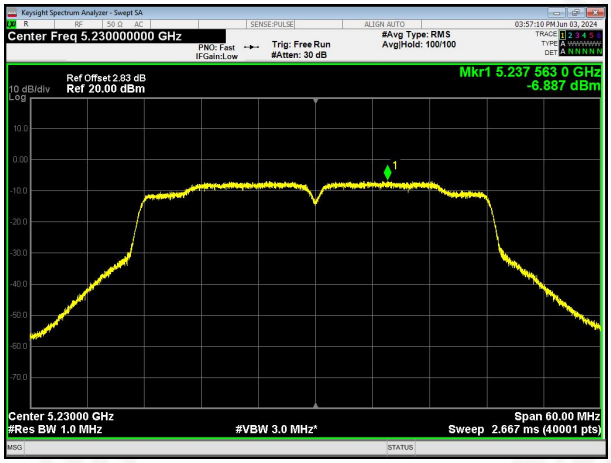
(802.11n20) PSD plot on channel 40



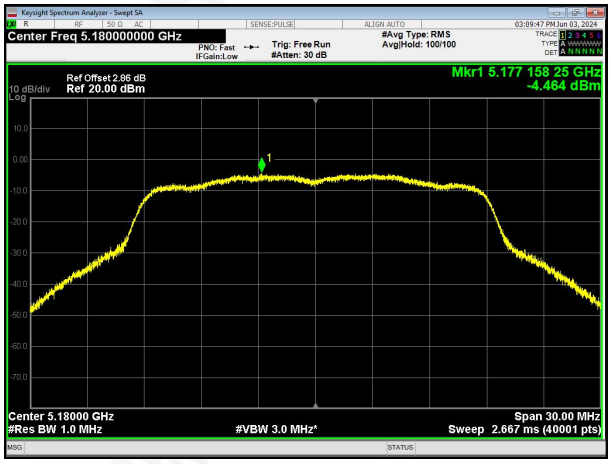
(802.11n40) PSD plot on channel 46



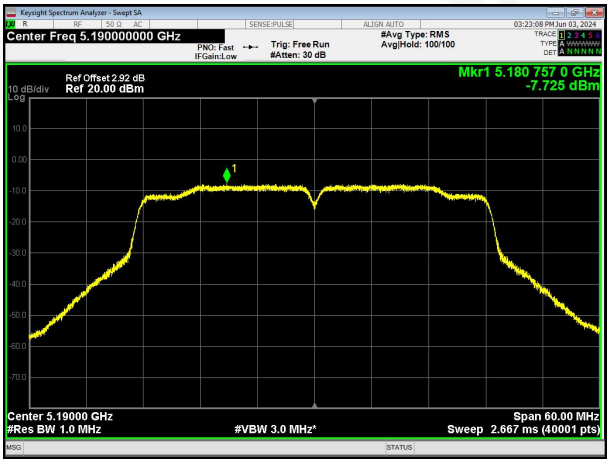
(802.11n20) PSD plot on channel 48



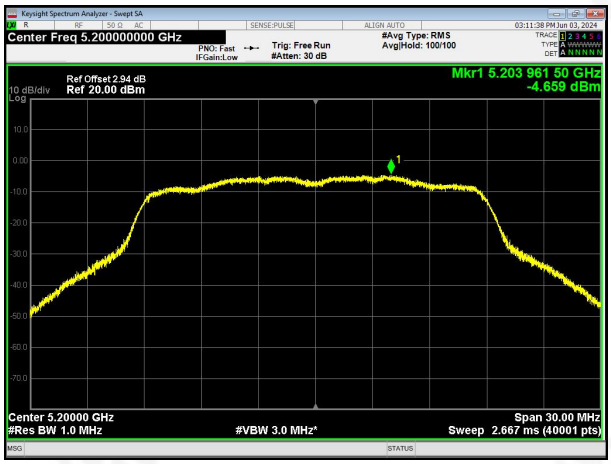
ANT1 (802.11ac20) PSD plot on channel 36



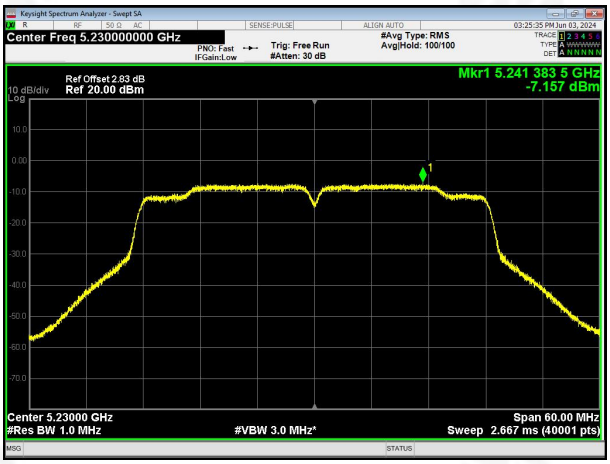
ANT1 (802.11ac40) PSD plot on channel 38



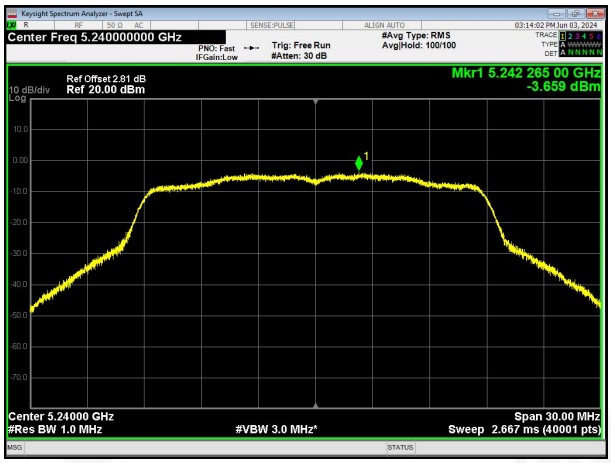
(802.11ac20) PSD plot on channel 40



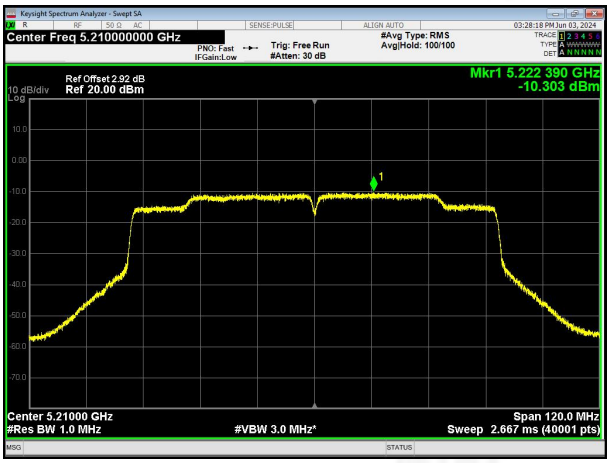
(802.11ac40) PSD plot on channel 46



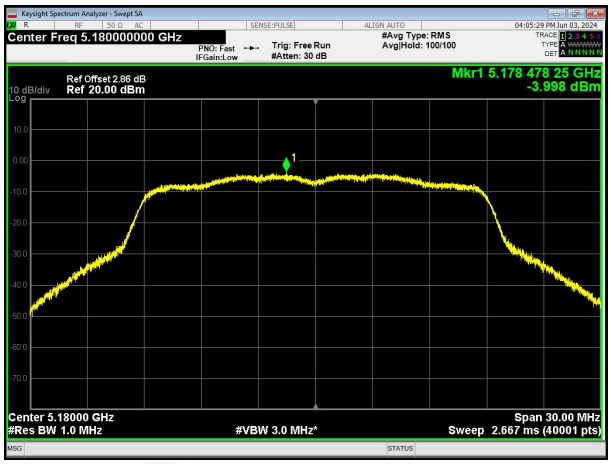
(802.11ac20) PSD plot on channel 48



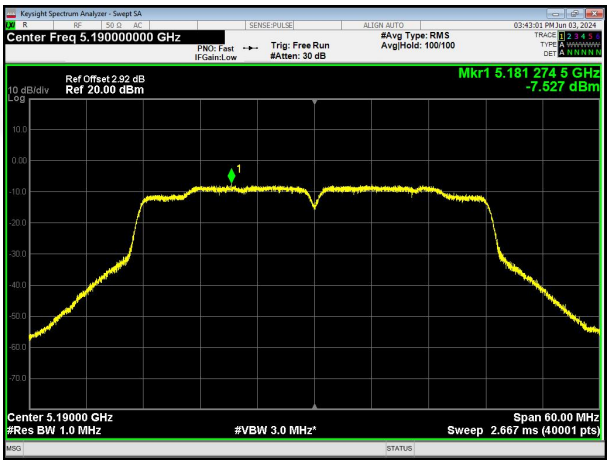
ANT1 (802.11ac80) PSD plot on channel 42



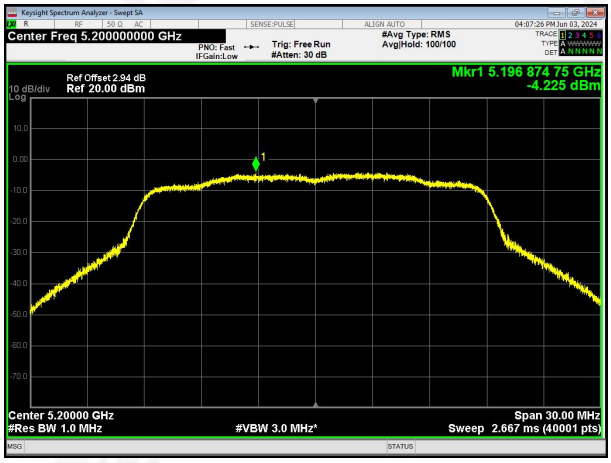
ANT2 (802.11ac20) PSD plot on channel 36



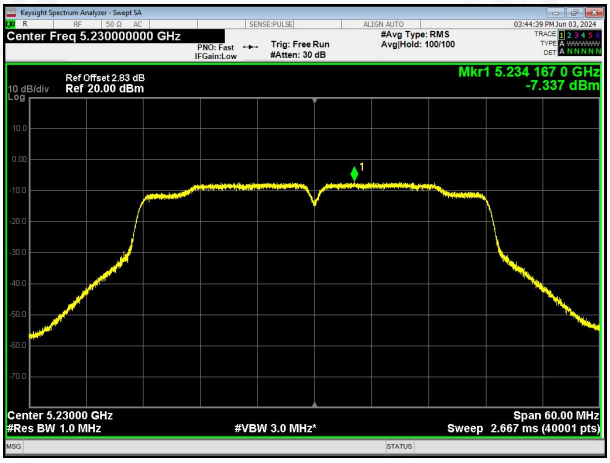
ANT2 (802.11ac40) PSD plot on channel 38



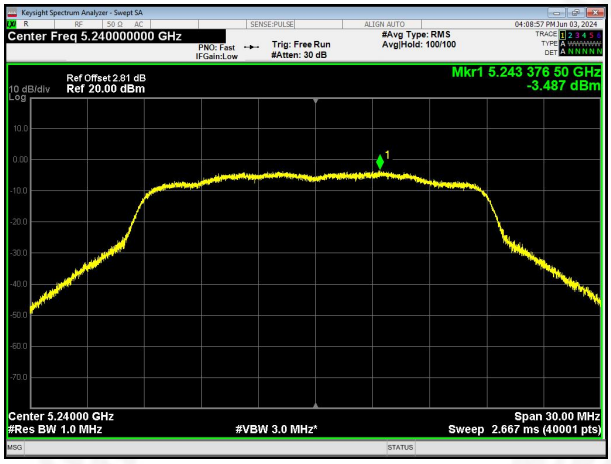
(802.11ac20) PSD plot on channel 40



(802.11ac40) PSD plot on channel 46



(802.11ac20) PSD plot on channel 48



ANT2 (802.11ac80) PSD plot on channel 42