TCT 通测检测 TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID. ..... :	2BKCK-HB734	
Test Report No..... :	TCT241101E020	
Date of issue..... :	Nov. 15, 2024	
Testing laboratory ..... :	SHENZHEN TONGCE TESTING LAB	
Testing location/ address:	2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China	
Applicant's name..... :	Dongguan World Pass Industrial Co., LTD	
Address..... :	No. 3, Chang' an Xingfa South Road, Chang' an Town, Dongguan City, Guangdong Province	
Manufacturer's name ... :	Dongguan World Pass Industrial Co., LTD	
Address..... :	No. 3, Chang' an Xingfa South Road, Chang' an Town, Dongguan City, Guangdong Province	
Standard(s) ..... :	FCC CFR Title 47 Part 15 Subpart E Section 15.407 KDB 662911 D01 Multiple Transmitter Output v02r01 KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	
Product Name..... :	Wireless Display Adapter	
Trade Mark ..... :	N/A	
Model/Type reference..... :	HB734(208444)	
Rating(s)..... :	Power supply: DC 5V	
Date of receipt of test item ..... :	Nov. 01, 2024	
Date (s) of performance of test..... :	Nov. 02, 2024 ~ Nov. 14, 2024	
Tested by (+signature) ... :	Yannie ZHONG	Yannie Zhong
Check by (+signature).... :	Beryl ZHAO	Beryl Zhao
Approved by (+signature):	Tomsin	Tomsin

SHENZHEN TONGCE TESTING LAB TCT

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1. General Product Information

1.1. EUT description

Product Name.....:	Wireless Display Adapter
Model/Type reference.....:	HB734(208444)
Sample Number.....:	TCT241101E020-0101
Operation Frequency.....:	Band 1: 5180 MHz~5240 MHz
Channel Bandwidth.....:	802.11a: 20MHz 802.11n: 20MHz, 40MHz
Modulation Technology.....:	Orthogonal Frequency Division Multiplexing (OFDM)
Modulation Type.....:	256QAM, 64QAM, 16QAM, BPSK, QPSK
Antenna Type.....:	PCB Antenna
Antenna Gain.....:	2.0dBi
Rating(s).....:	Power supply: DC 5V

Note: The antenna gain listed in this report is provided by applicant, and the test laboratory is not responsible for this parameter.

1.2. Model(s) list

None.

1.3. Test Frequency

Band 1

20MHz		40MHz	
Channel	Frequency	Channel	Frequency
36	5180	38	5190
40	5200	46	5230
48	5240		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

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2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Maximum Conducted Output Power	§15.407(a)	PASS
6dB Emission Bandwidth	§15.407(a)	PASS
26dB Emission Bandwidth& 99% Occupied Bandwidth	§15.407(a)	PASS
Power Spectral Density	§15.407(a)	PASS
Restricted Bands around fundamental frequency	§15.407(b)	PASS
Radiated Emission	§15.407(b)	PASS
Frequency Stability	§15.407(g)	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

5.For the band 5.15-5.25GHz, EUT meet the requirements of 15.407(a)(ii).

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3. General Information

3.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Software:	
Software Information:	RTL8723FU
Power Level:	10
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations with max. duty cycle.
The sample was placed 0.8m/1.5m for blow/above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11a(SISO)	6 Mbps
802.11n(HT20)	6.5 Mbps
802.11n(HT40)	13.5 Mbps
Final Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation

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3.2. Description of Support Units

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.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Notebook	S4000U	BBOR	TX2-RTL8822BE	ASUS
Adapter	EP-TA200	R37R55T6KL2SE3	/	SAMSUNG

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3. For conducted measurements (Output Power, Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

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4. Facilities and Accreditations

4.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098
  SHENZHEN TONGCE TESTING LAB
  Designation Number: CN1205
  The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A
  SHENZHEN TONGCE TESTING LAB
  CAB identifier: CN0031
  The testing lab has been registered by Innovation, Science and Economic Development Canada for radio equipment testing.

4.2. Location

SHENZHEN TONGCE TESTING LAB
Address: 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China
TEL: +86-755-27673339

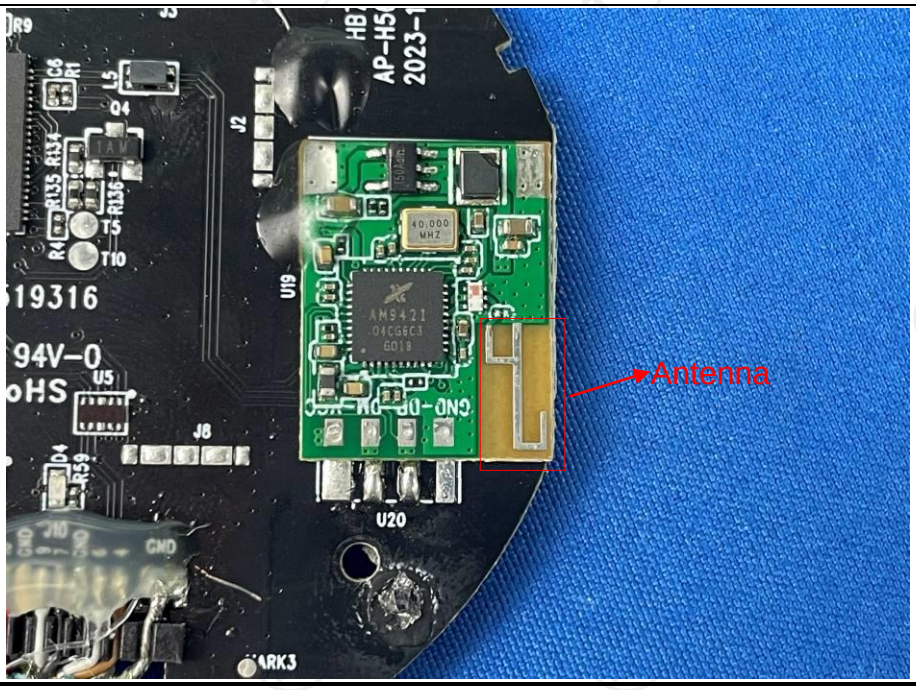
4.3. Measurement Uncertainty

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	MU
1	Conducted Emission	± 3.10 dB
2	RF power, conducted	± 0.12 dB
3	Spurious emissions, conducted	± 0.11 dB
4	All emissions, radiated(<1 GHz)	± 4.56 dB
5	All emissions, radiated(1 GHz - 18 GHz)	± 4.22 dB
6	All emissions, radiated(18 GHz- 40 GHz)	± 4.36 dB

5. Test Results and Measurement Data

5.1. Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	
The EUT antenna is PCB antenna which permanently attached, and the best case gain of the antenna is 2.0dBi.	
	

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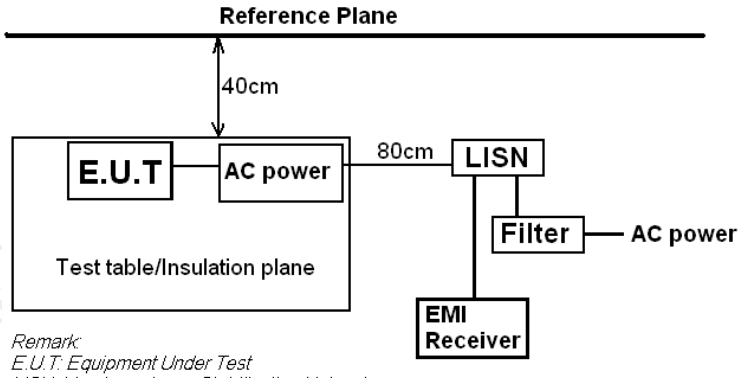
5.2. Conducted Emission

5.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2020</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Mode:</td><td>Transmitting Mode</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2020 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

5.2.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI3	100898	Jun. 26, 2025
LISN	Schwarzbeck	NSLK 8126	8126453	Jan. 31, 2025
Attenuator	N/A	10dB	164080	Jun. 26, 2025
Line-5	TCT	CE-05	/	Jun. 26, 2025
EMI Test Software	EZ_EMC	EMEC-3A1	1.1.4.2	/

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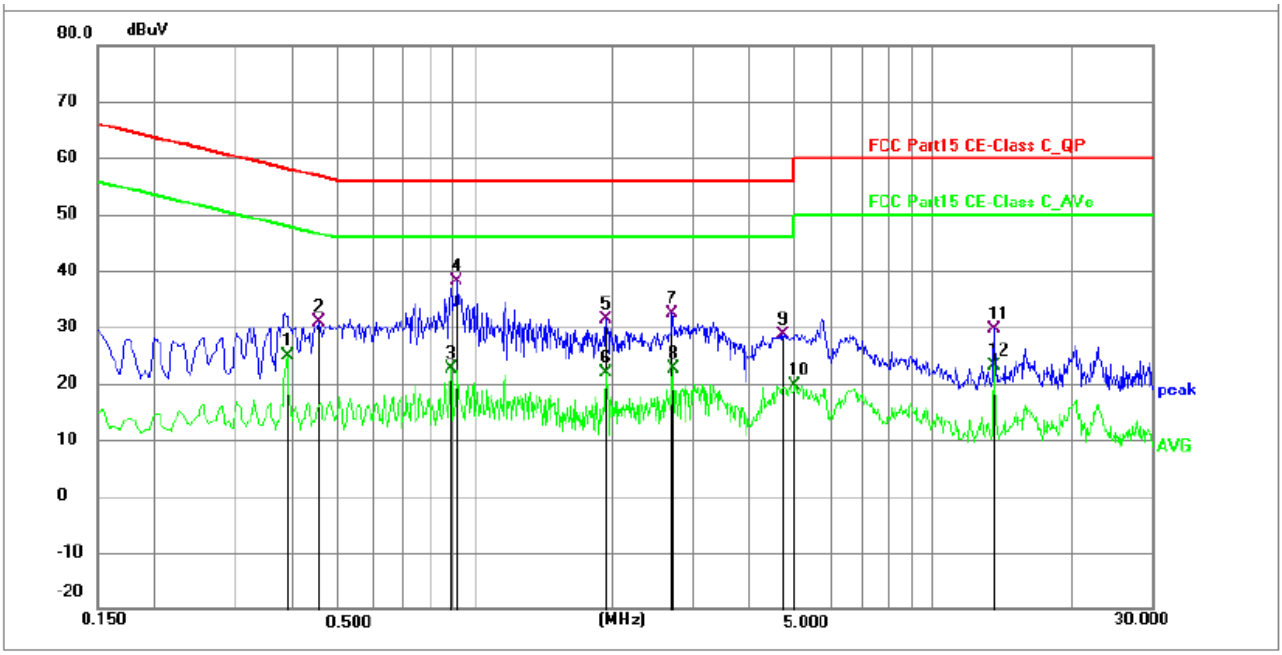
5.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3885	14.30	10.57	24.87	48.10	-23.23	AVG	P	
2	0.4560	20.42	10.57	30.99	56.77	-25.78	QP	P	
3	0.8880	11.94	10.68	22.62	46.00	-23.38	AVG	P	
4 *	0.9150	27.41	10.67	38.08	56.00	-17.92	QP	P	
5	1.9365	20.75	10.68	31.43	56.00	-24.57	QP	P	
6	1.9365	11.13	10.68	21.81	46.00	-24.19	AVG	P	
7	2.7060	21.74	10.67	32.41	56.00	-23.59	QP	P	
8	2.7105	11.99	10.67	22.66	46.00	-23.34	AVG	P	
9	4.7399	17.99	10.71	28.70	56.00	-27.30	QP	P	
10	4.9920	8.94	10.73	19.67	46.00	-26.33	AVG	P	
11	13.5600	18.71	10.91	29.62	60.00	-30.38	QP	P	
12	13.5600	12.34	10.91	23.25	50.00	-26.75	AVG	P	

Note:

Freq. = Emission frequency in MHz
Reading level (dBμV) = Receiver reading
Corr. Factor (dB) = LISN factor + Cable loss
Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)
Limit (dBμV) = Limit stated in standard
Margin (dB) = Measurement (dBμV) – Limits (dBμV)
Q.P. =Quasi-Peak
AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

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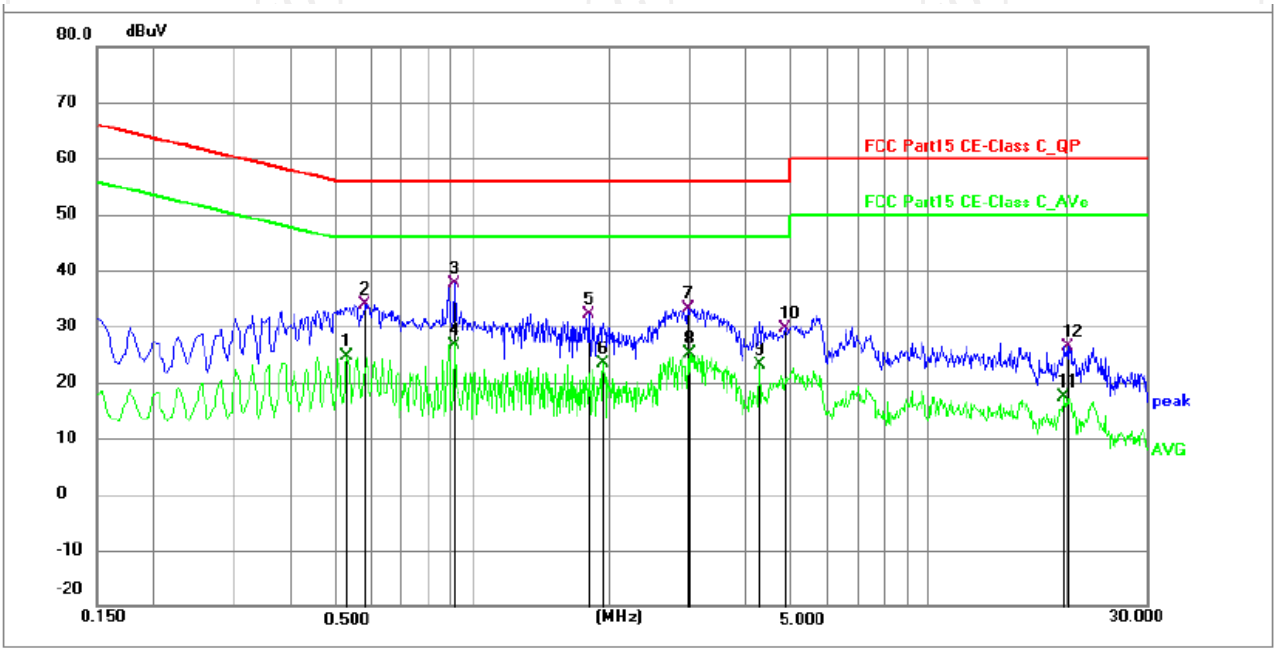
Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5280	13.99	10.59	24.58	46.00	-21.42	AVG	P	
2	0.5792	23.28	10.62	33.90	56.00	-22.10	QP	P	
3 *	0.9102	26.86	10.67	37.53	56.00	-18.47	QP	P	
4	0.9150	16.08	10.67	26.75	46.00	-19.25	AVG	P	
5	1.7970	21.56	10.67	32.23	56.00	-23.77	QP	P	
6	1.9365	12.70	10.68	23.38	46.00	-22.62	AVG	P	
7	2.9624	22.51	10.68	33.19	56.00	-22.81	QP	P	
8	3.0164	14.48	10.68	25.16	46.00	-20.84	AVG	P	
9	4.2583	12.40	10.69	23.09	46.00	-22.91	AVG	P	
10	4.8390	18.95	10.72	29.67	56.00	-26.33	QP	P	
11	19.7700	6.29	11.04	17.33	50.00	-32.67	AVG	P	
12	20.1252	15.41	11.04	26.45	60.00	-33.55	QP	P	

Note: *1. Freq. = Emission frequency in MHz*

Reading level (dBμV) = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)

Limit (dBμV) = Limit stated in standard

Margin (dB) = Measurement (dBμV) – Limits (dBμV)

Q.P. =Quasi-Peak

AVG =average

** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

2. Measurements were conducted in all three channels (high, middle, low) and all modulation (802.11a, 802.11n(HT20), 802.11n(HT40) and the worst case Mode (Lowest channel and 802.11a) was submitted only.

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5.3. Maximum Conducted Output Power

5.3.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407(a)& Part 2 J Section 2.1046</td></tr>
<tr><td>Test Method:</td><td>KDB662911 D01 Multiple Transmitter Output v02r01
KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency Band (MHz)</td><td>Limit</td></tr>
<tr><td>5180 - 5240</td><td>24dBm(250mW) for client device</td></tr>
<tr><td>5260 - 5320</td><td>24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz</td></tr>
<tr><td>5470 - 5725</td><td>24dBm(250mW) or 11 dBm + 10 log B, B is the 26 dB emission bandwidth in megahertz</td></tr>
<tr><td>5745 - 5825</td><td>30dBm(1W)</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td> 
</td></tr>
<tr><td>Test Mode:</td><td>Transmitting mode with modulation</td></tr>
<tr><td>Test Procedure:</td><td>1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E, 3, a
2. The RF output of EUT was connected to the power meter by RF cable. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
5. Measure the conducted output power and record the results in the test report.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
<tr><td>Remark:</td><td>Conducted output power= measurement power +10log(1/x), X is duty cycle=1, so 10log(1/1)=0
Conducted output power= measurement power</td></tr>
</table>

5.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY50101018	Jun. 26, 2025
Power Meter	Agilent	E4418B	MY45100357	Jun. 26, 2025
Power Sensor	Agilent	8184A	MY41096530	Jun. 26, 2025
Test Software	TST Pass	/	/	/

5.4. 6dB Emission Bandwidth

5.4.1. Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)& Part 2 J Section 2.1049
Test Method:	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	>500kHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report.
Test Result:	PASS

5.4.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY50101018	Jun. 26, 2025
Test Software	TST Pass	/	/	/

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5.5. 26dB Bandwidth and 99% Occupied Bandwidth

5.5.1. Test Specification

Test Requirement:	47 CFR Part 15C Section 15.407 (a)& Part 2 J Section 2.1049
Test Method:	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section D
Limit:	No restriction limits
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section D 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 1% to 5% of the OBW. Set the Video bandwidth (VBW) = 3 *RBW. In order to make an accurate measurement. 4. Measure and record the results in the test report.
Test Result:	PASS

5.5.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY50101018	Jun. 26, 2025
Test Software	TST Pass	/	/	/

5.6. Power Spectral Density

5.6.1. Test Specification

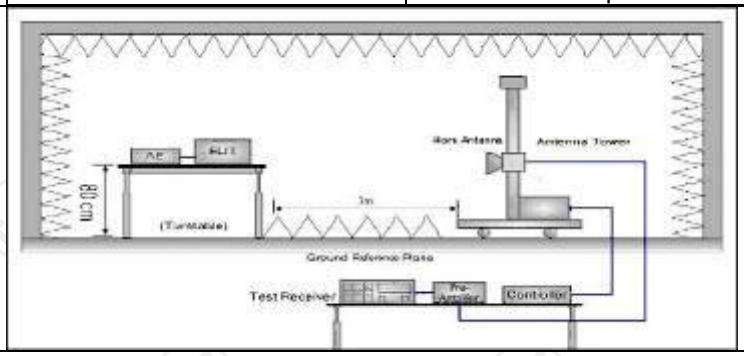
Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
Limit:	≤11.00dBm/MHz for Band 1 5150MHz-5250MHz(client device) ≤11.00dBm/MHz for Band 2A&2C 5250-5350&5470-5725 ≤30.00dBm/500KHz for Band 3 5725MHz-5850MHz The e.i,r,p spectral density for Band 1 5150MHz – 5250 MHz should not exceed 10dBm/MHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth. 1. Set RBW = 510 kHz/1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS. 2. Allow the sweeps to continue until the trace stabilizes. 3. Use the peak marker function to determine the maximum amplitude level. 4. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.
Test Result:	PASS

5.6.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY50101018	Jun. 26, 2025
Test Software	TST Pass	/	/	/

5.7. Band edge

5.7.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC CFR47 Part 15E Section 15.407</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2020</td></tr>
<tr><td>Limit:</td><td>In un-restricted band:
For Band 1&2A&2C: -27dBm/MHz
For Band 3:
<table>
<tr><td>Frequency (MHz)</td><td>Limit (dBm/MHz)</td><td>Frequency (MHz)</td><td>Limit (dBm/MHz)</td></tr>
<tr><td>< 650</td><td>-27</td><td>5850~5855</td><td>27~15.6</td></tr>
<tr><td>5650~5700</td><td>-27~10</td><td>5855~5875</td><td>15.6~10</td></tr>
<tr><td>5700~5720</td><td>10~15.6</td><td>5875~5925</td><td>10~-27</td></tr>
<tr><td>5720~5725</td><td>15.6~27</td><td>> 5925</td><td>-27</td></tr>
</table>
E[dBμV/m] = EIRP[dBm] + 95.2 @3m
In restricted band:
<table>
<tr><td>Detector</td><td>Limit@3m</td></tr>
<tr><td>Peak</td><td>74dBμV/m</td></tr>
<tr><td>AVG</td><td>54dBμV/m</td></tr>
</table></td></tr>
<tr><td>Test Setup:</td><td> 
</td></tr>
<tr><td>Test Mode:</td><td>Transmitting mode with modulation</td></tr>
<tr><td>Test Procedure:</td><td>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold</td></tr>
</table>

	Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasipeak or average method as specified and then reported in a data sheet.
Test Result:	PASS

5.7.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI7	100529	Jan. 31, 2025
Spectrum Analyzer	R&S	FSQ40	200061	Jun. 26, 2025
Spectrum Analyzer	Agilent	N9020A	MY50101018	Jun. 26, 2025
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	Jan. 31, 2025
Pre-amplifier	SKET	LNPA_1840G-50	SK202109203500	Jan. 31, 2025
Pre-amplifier	HP	8447D	2727A05017	Jun. 26, 2025
Loop antenna	Schwarzbeck	FMZB1519B	00191	Jun. 26, 2025
Broadband Antenna	Schwarzbeck	VULB9163	340	Jun. 28, 2025
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Jun. 28, 2025
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Feb. 02, 2025
Coaxial cable	SKET	RE-03-D	/	Jun. 26, 2025
Coaxial cable	SKET	RE-03-M	/	Jun. 26, 2025
Coaxial cable	SKET	RE-03-L	/	Jun. 26, 2025
Coaxial cable	SKET	RE-04-D	/	Jun. 26, 2025
Coaxial cable	SKET	RE-04-M	/	Jun. 26, 2025
Coaxial cable	SKET	RE-04-L	/	Jun. 26, 2025
Antenna Mast	Keleto	RE-AM	/	/
EMI Test Software	EZ_EMC	FA-03A2 RE+	1.1.4.2	/

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5.7.3. Test Data

Band 1: 5180 MHz - 5240 MHz, Test Mode: 802.11a Test Channel: Lowest channel, Test Polarization: Vertical								
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
1	5054.380	41.08	5.28	46.36	74.00	-27.64	Peak	Pass
2	5150.000	43.75	5.33	49.08	74.00	-24.92	Peak	Pass
Test Channel: Lowest channel, Test Polarization: Horizontal								
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
1	5029.380	41.85	5.35	47.20	74.00	-26.80	Peak	Pass
2	5150.000	44.96	5.33	50.29	74.00	-23.71	Peak	Pass
Test Channel: Highest channel, Test Polarization: Vertical								
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
1	5350.000	42.33	5.45	47.78	74.00	-26.22	Peak	Pass
2	5460.000	45.15	5.52	50.67	74.00	-23.33	Peak	Pass
Test Channel: Highest channel, Test Polarization: Horizontal								
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Marging (dB)	Detector	Result
1	5350.000	41.59	5.45	47.04	74.00	-26.96	Peak	Pass
2	5460.000	46.24	5.52	51.76	74.00	-22.24	Peak	Pass
Remark: Test frequency up to 40GHz and the emission levels of other frequencies are lower than the limit 20dB, not show in test report.								

Note: *All modulation (802.11a, 802.11n) have been tested, only the worst case in 802.11a be reported.*

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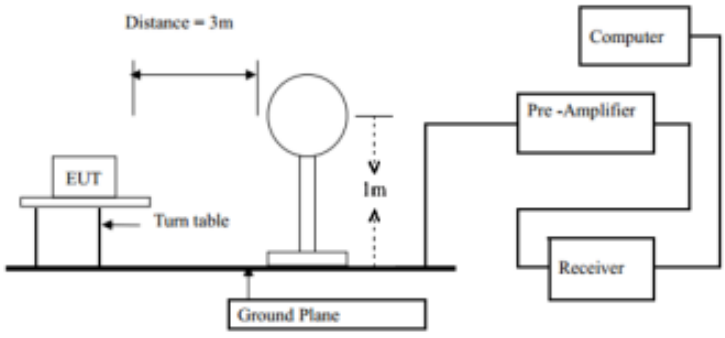
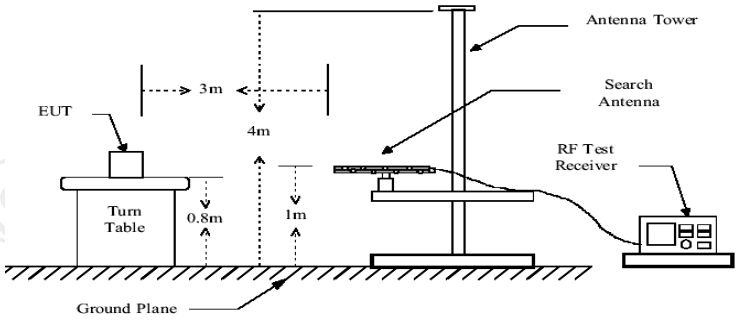
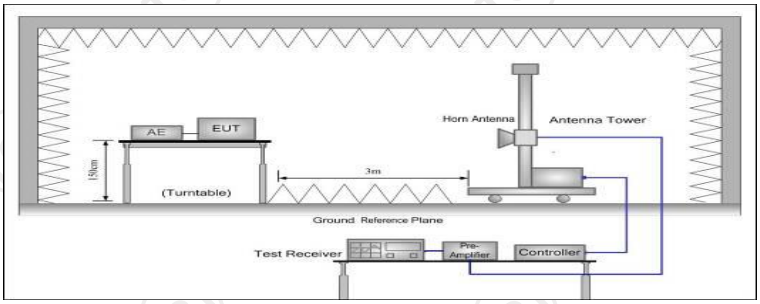
5.8. Unwanted Emissions

5.8.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205</td></tr>
<tr><td>Test Method:</td><td>KDB 789033 D02 v02r01</td></tr>
<tr><td>Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Measurement Distance:</td><td>3 m</td></tr>
<tr><td>Antenna Polarization:</td><td>Horizontal & Vertical</td></tr>
<tr><td>Operation mode:</td><td>Transmitting mode with modulation</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>9kHz- 150kHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,
In restricted bands:
<table>
<tr><td>Frequency</td><td>Detector</td><td>Limit@3m</td></tr>
<tr><td rowspan="2">Above 1G</td><td>Peak</td><td>74dBμV/m</td></tr>
<tr><td>AVG</td><td>54dBμV/m</td></tr>
</table>
<table>
<tr><td>Frequency</td><td>Field Strength (microvolts/meter)</td><td>Measurement Distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(KHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(KHz)</td><td>3</td></tr>
<tr><td>1.705-30</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100</td><td>3</td></tr>
<tr><td>88-216</td><td>150</td><td>3</td></tr>
<tr><td>216-960</td><td>200</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
In un-restricted bands: 68.2dBuV/m</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions below 30MHz
 
</td></tr>
</table>

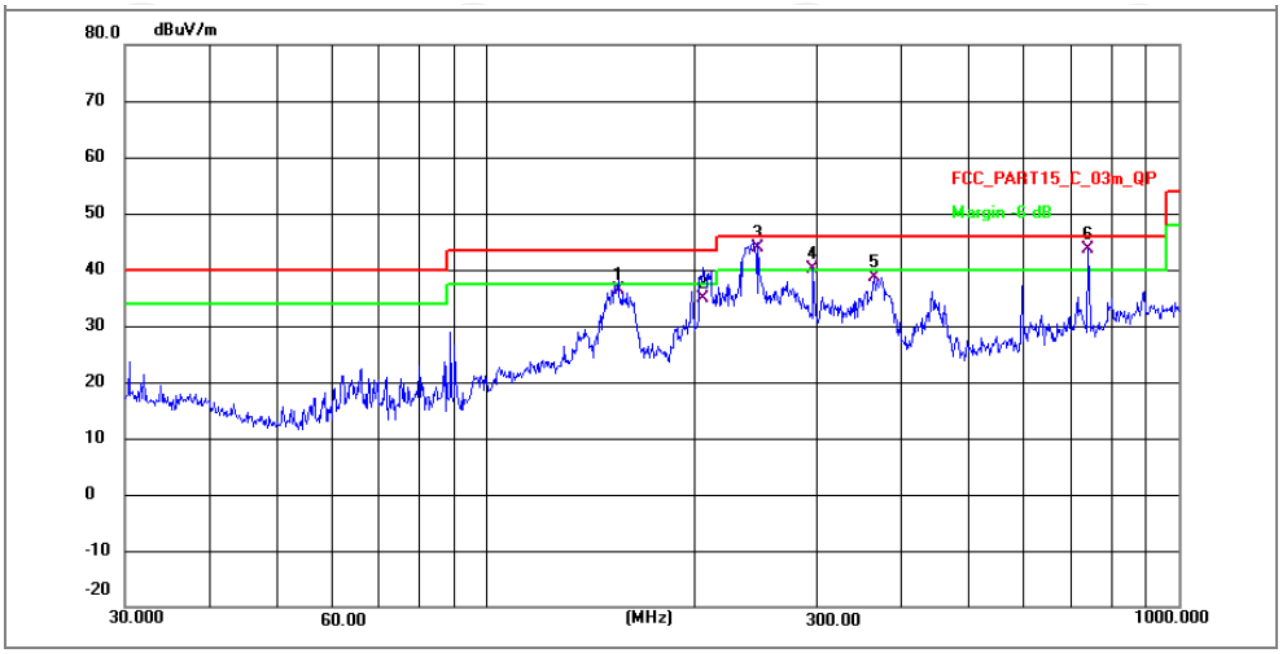
	30MHz to 1GHz  Above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table 0.8 meters above the groundat a 3 meter camber. The table was rotated 360 degrees todetermine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, whichwas mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and thenthe antenna was tuned to heights from 1 meter to 4 meters and the rotatablewas turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and SpecifiedBandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limitspecified, then testing could be stopped and the peak values of the EUT wouldbe reported. Otherwise the emissions that did not have 10dB margin would bere-tested one by one using peak, quasi-peak or average method as specified andthen reported in a data sheet.
Test results:	PASS

5.8.2. Test Data

Please refer to following diagram for individual

Below 1GHz

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	155.3644	58.36	-21.96	36.40	43.50	-7.10	QP	P
2	205.6751	56.48	-21.48	35.00	43.50	-8.50	QP	P
3 *	247.2480	65.08	-21.08	44.00	46.00	-2.00	QP	P
4 !	296.7034	60.77	-20.64	40.13	46.00	-5.87	QP	P
5	363.6214	58.79	-20.12	38.67	46.00	-7.33	QP	P
6 !	742.2586	61.46	-17.73	43.73	46.00	-2.27	QP	P

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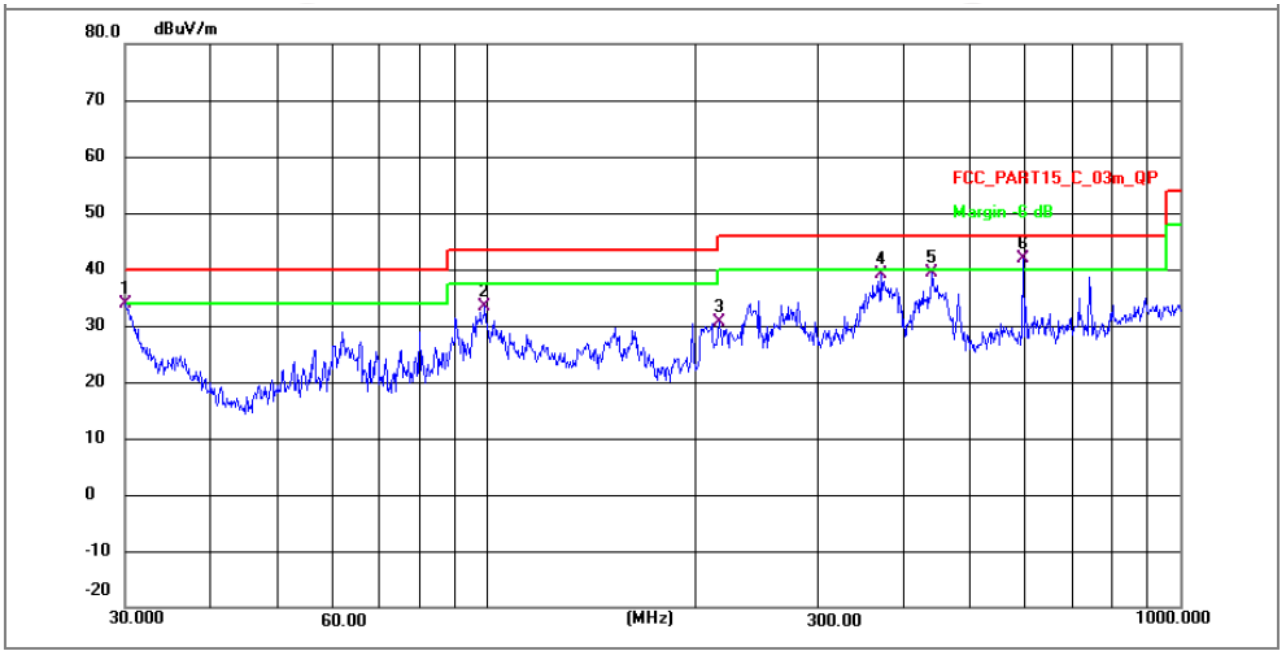
Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	30.1582	43.77	-9.97	33.80	40.00	-6.20	QP	P
2	99.5281	55.74	-22.48	33.26	43.50	-10.24	QP	P
3	216.0240	52.09	-21.38	30.71	46.00	-15.29	QP	P
4	370.0530	59.12	-20.07	39.05	46.00	-6.95	QP	P
5	440.1963	58.91	-19.49	39.42	46.00	-6.58	QP	P
6 *	594.0904	60.29	-18.38	41.91	46.00	-4.09	QP	P

Note: *1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported*

2. Measurements were conducted in all three channels (high, middle, low) and all modulation (802.11a, 802.11n(HT20), 802.11n(HT40) and the worst case Mode (Lowest channel and 802.11a) was submitted only.

3.Measurement (dBμV) = Reading level + Correction Factor, correction Factor= Antenna Factor + Cable loss – Pre-amplifier.

Above 1GHz

Modulation Type: Band1									
802.11a CH36:5180MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10360	H	42.36	---	1.78	44.14	---	68.2	---	-24.06
15540	H	40.25	---	5.21	45.46	---	74	54	-8.54
---	H	---	---	---	---	---	---	---	---
10360	V	42.88	---	1.78	44.66	---	68.2	---	-23.54
15540	V	41.09	---	5.21	46.30	---	74	54	-7.70
---	V	---	---	---	---	---	---	---	---

802.11a CH40:5200MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10400	H	41.53	---	1.83	43.36	---	68.2	---	-24.84
15600	H	40.89	---	5.23	46.12	---	74	54	-7.88
---	H	---	---	---	---	---	---	---	---
10400	V	42.21	---	1.83	44.04	---	74	---	-29.96
15600	V	41.18	---	5.23	46.41	---	74	54	-7.59
---	V	---	---	---	---	----	---	---	---

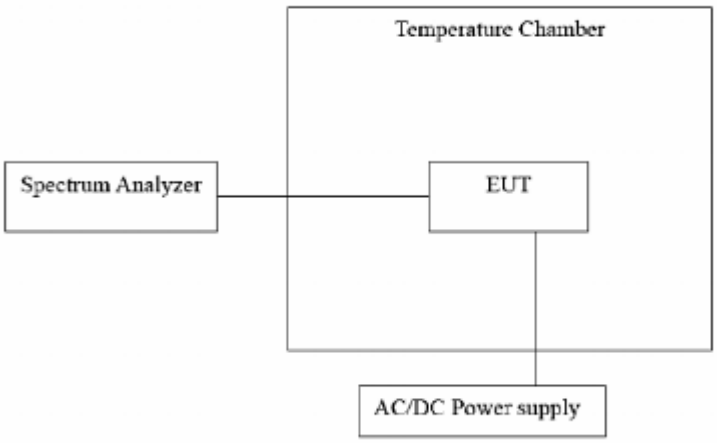
802.11a CH48:5240MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
10480	H	42.71	---	1.85	44.56	---	68.2	---	-23.64
15720	H	41.53	---	5.25	46.78	---	74	54	-7.22
---	H	---	---	---	---	---	---	---	---
10480	V	43.09	---	1.85	44.94	---	68.2	---	-23.26
15720	V	41.34	---	5.25	46.59	---	74	54	-7.41
---	V	---	---	---	---	---	---	---	---

Note:

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.*
5. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*
6. *All modulation (802.11a, 802.11n) have been tested, only the worst case in 802.11a be reported.*

5.9. Frequency Stability Measurement

5.9.1. Test Specification

Test Requirement:	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
Test Method:	ANSI C63.10:2020
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 45 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Test Setup:	
Test Procedure:	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test Result:	PASS

Appendix A: Test Result of Conducted Test

1. Duty Cycle

1.1 Test Result

1.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
802.11a	SISO	5180	1.409	1.619	87.03	0.60	6.80
		5200	1.409	1.637	86.07	0.65	6.65
		5240	1.409	1.637	86.07	0.65	7.73
802.11n (HT20)	SISO	5180	1.316	1.545	85.18	0.70	7.01
		5200	1.317	1.536	85.74	0.67	6.49
		5240	1.317	1.527	86.25	0.64	6.62
802.11n (HT40)	SISO	5190	0.653	0.864	75.58	1.22	10.82
		5230	0.653	0.872	74.89	1.26	10.59

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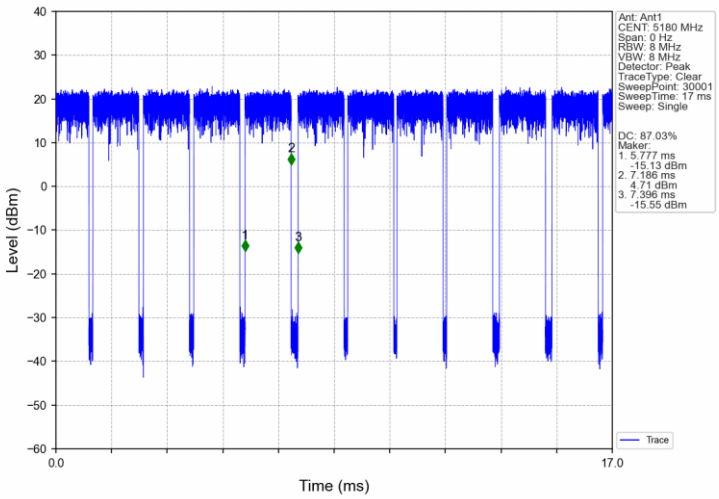
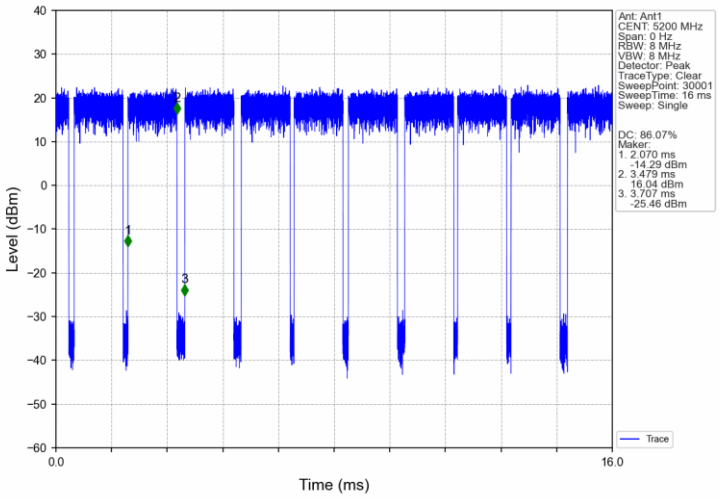
1.2 Test Graph

1.2.1 Ant1

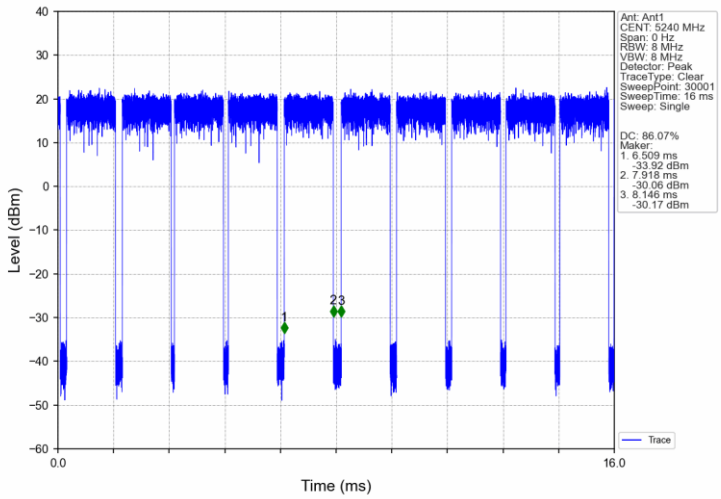
802.11a_LCH_5180MHz_Ant1_NTNV



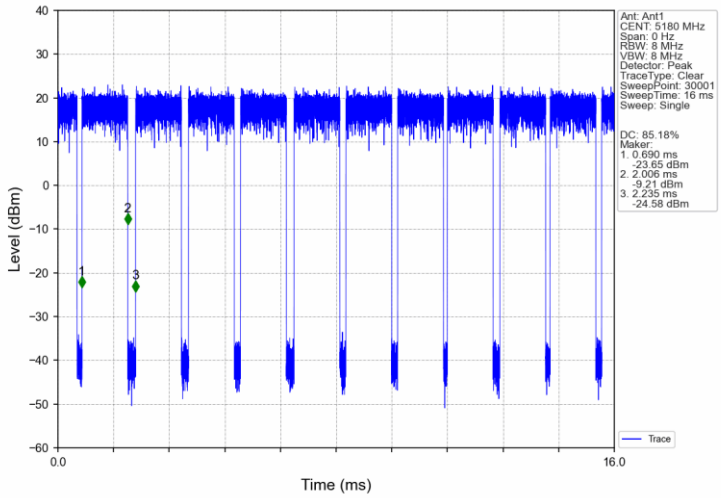
802.11a_MCH_5200MHz_Ant1_NTNV



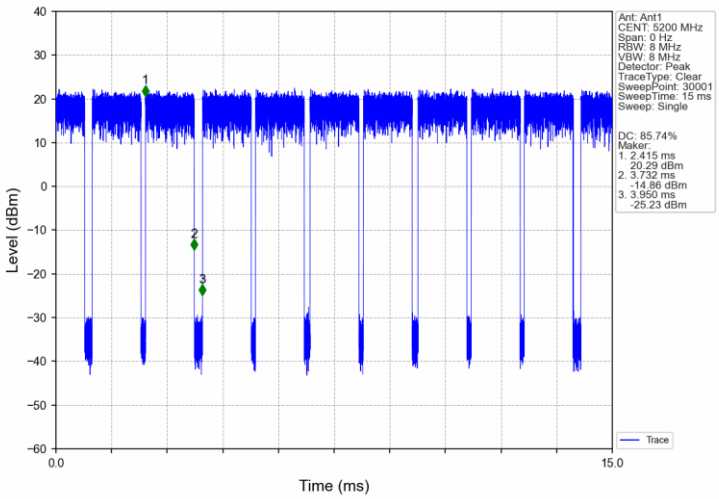
802.11a_HCH_5240MHz_Ant1_NTNV



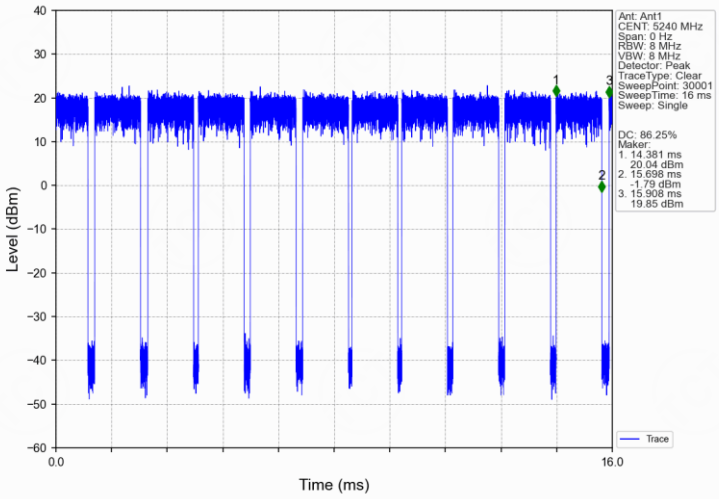
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



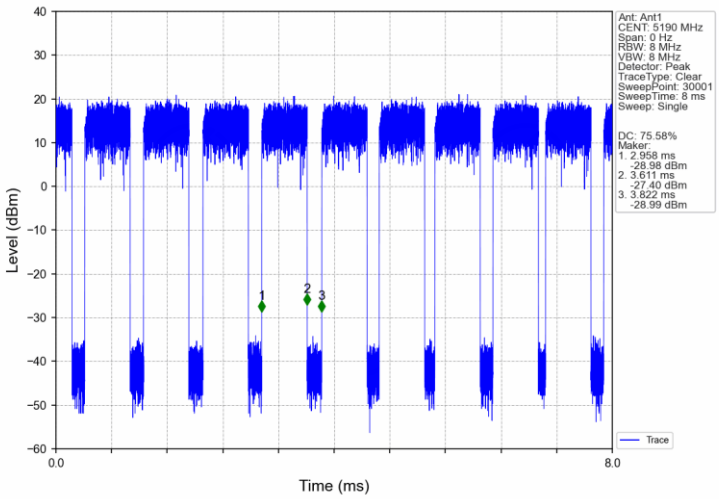
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



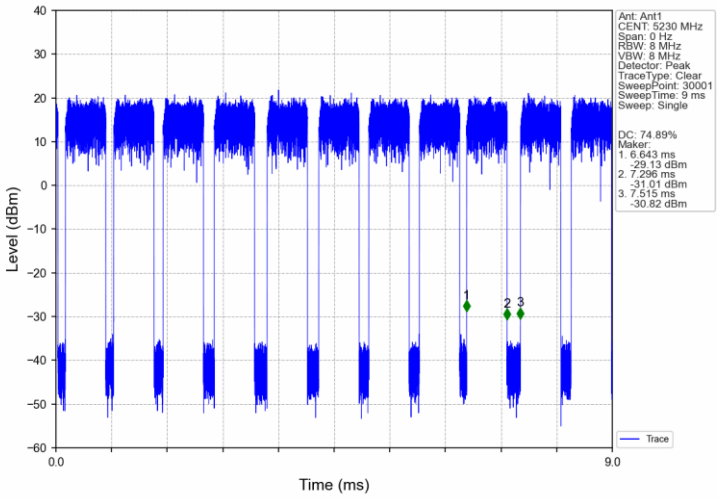
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	SISO	5180	1	25.223	/	Pass
		5200	1	21.528	/	Pass
		5240	1	22.321	/	Pass
802.11n (HT20)	SISO	5180	1	23.436	/	Pass
		5200	1	23.289	/	Pass
		5240	1	22.806	/	Pass
802.11n (HT40)	SISO	5190	1	42.461	/	Pass
		5230	1	46.020	/	Pass

2.1.2 26dB BW

Mode	TX Type	Frequency (MHz)	ANT	26dB Bandwidth (MHz)		Verdict
				Result	Limit	
802.11a	SISO	5180	1	34.994	/	Pass
		5200	1	33.967	/	Pass
		5240	1	33.444	/	Pass
802.11n (HT20)	SISO	5180	1	35.242	/	Pass
		5200	1	35.631	/	Pass
		5240	1	34.515	/	Pass
802.11n (HT40)	SISO	5190	1	69.976	/	Pass
		5230	1	76.432	/	Pass

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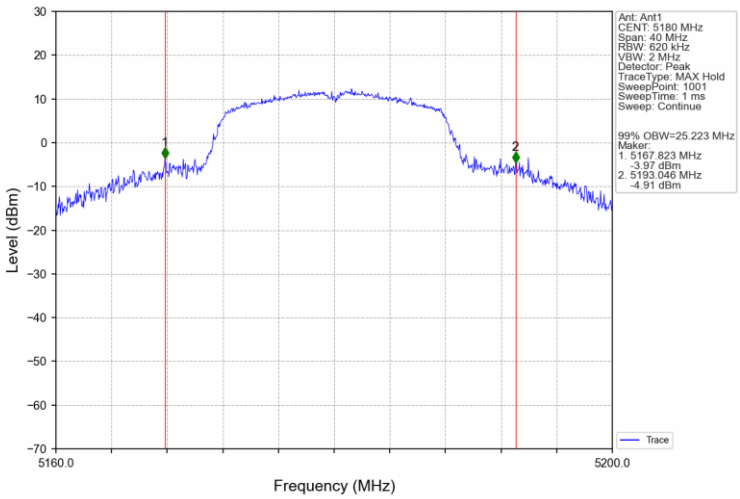
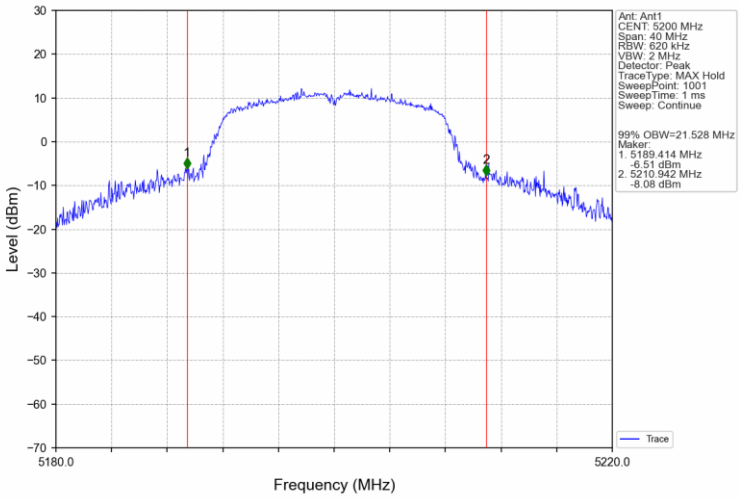
2.2 Test Graph

2.2.1 OBW

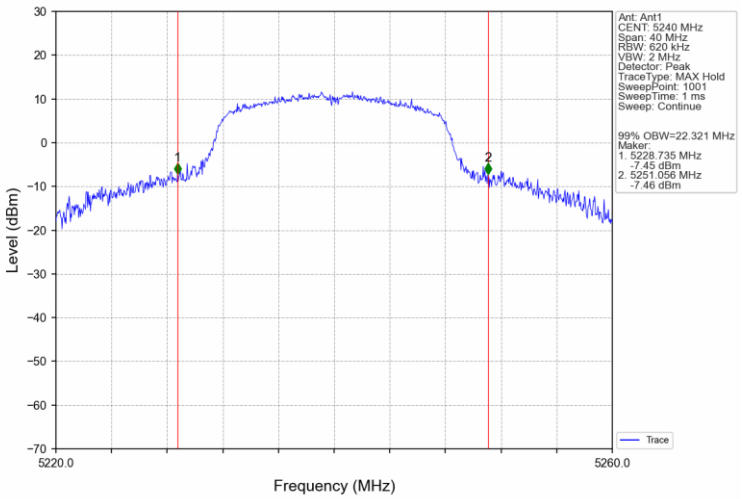
802.11a_LCH_5180MHz_Ant1_NTNV



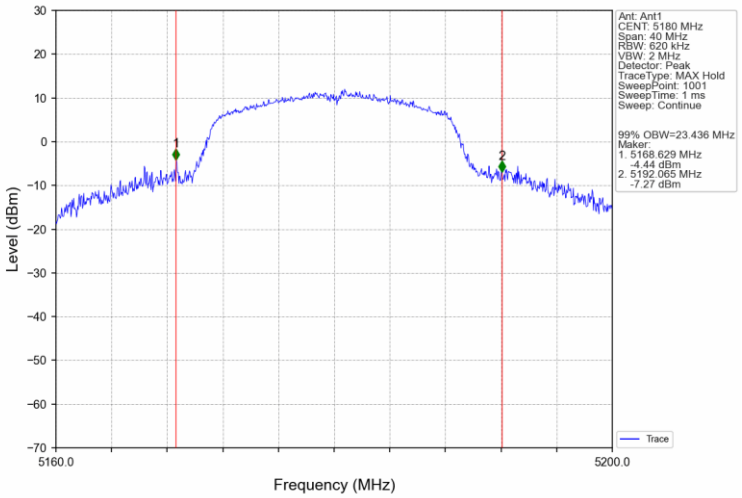
802.11a_MCH_5200MHz_Ant1_NTNV



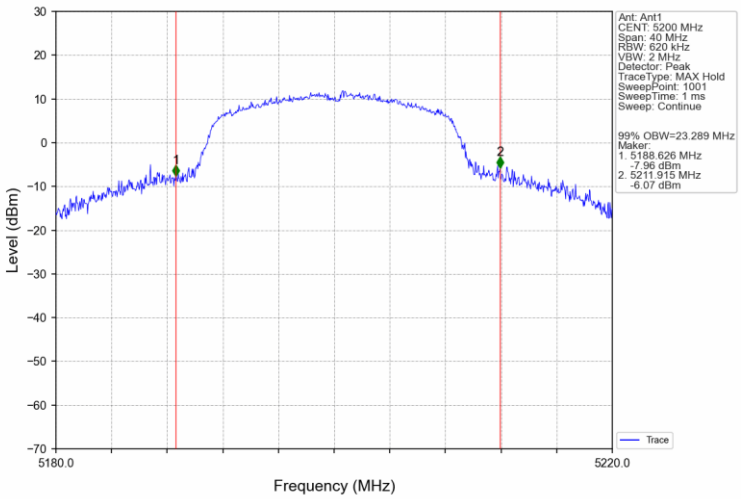
802.11a_HCH_5240MHz_Ant1_NTNV



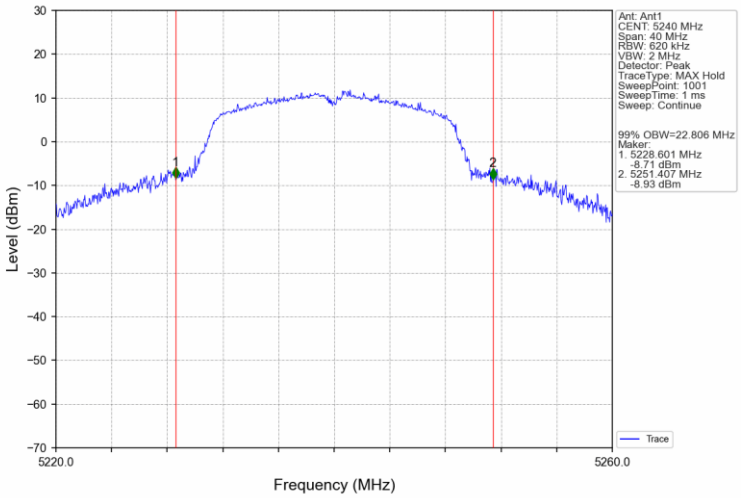
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



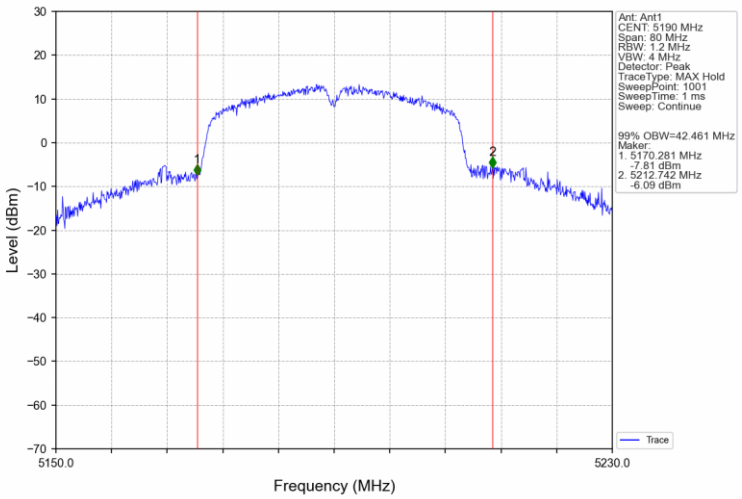
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



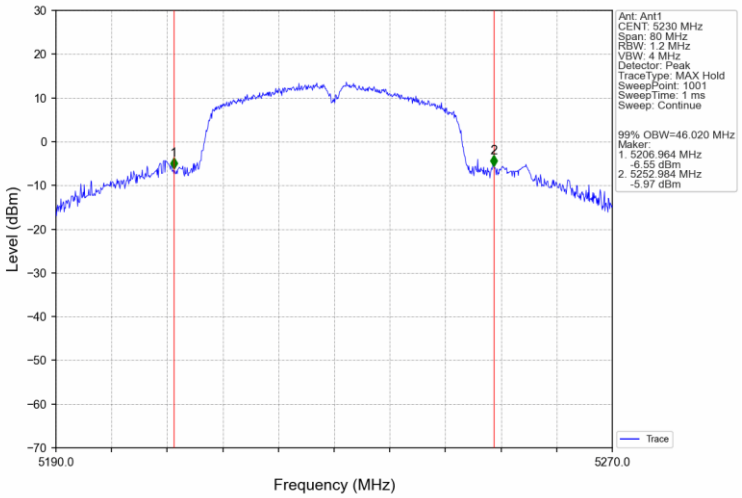
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



802.11n(HT40)_LCH_5190MHz_Ant1_NTNV

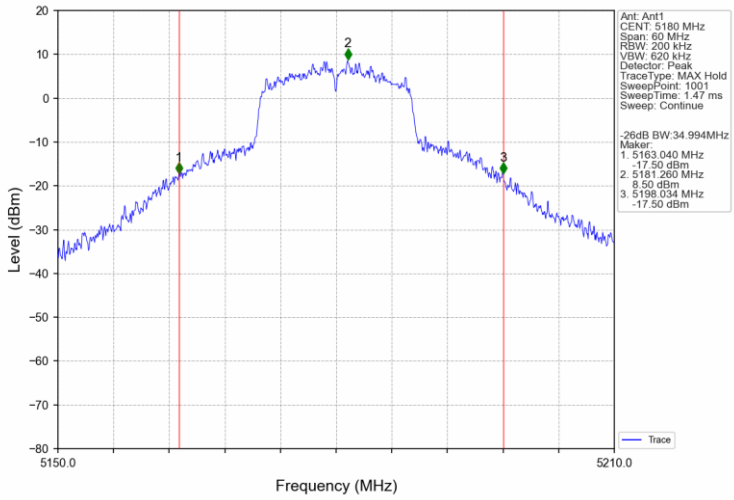


802.11n(HT40)_HCH_5230MHz_Ant1_NTNV

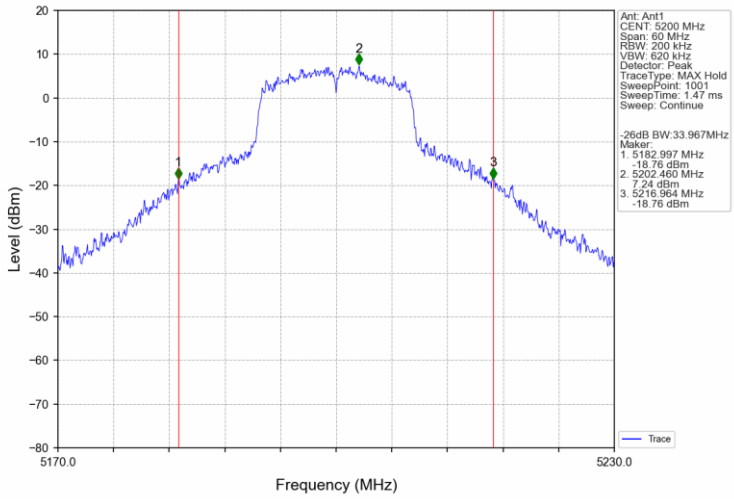


2.2.2 26dB BW

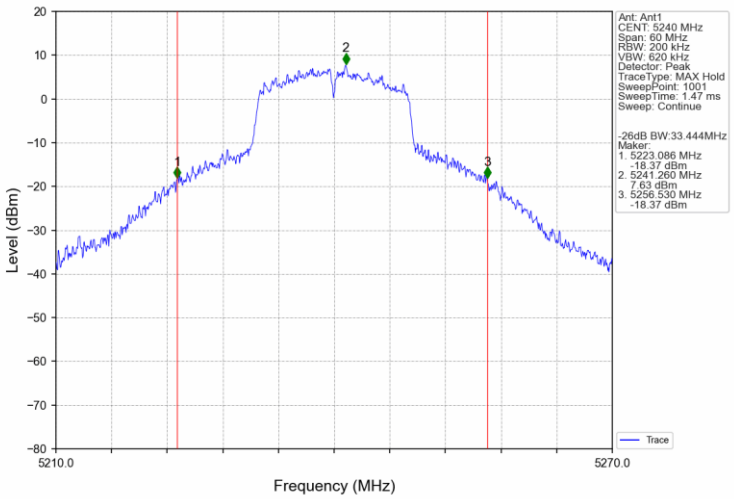
802.11a_LCH_5180MHz_Ant1_NTNV



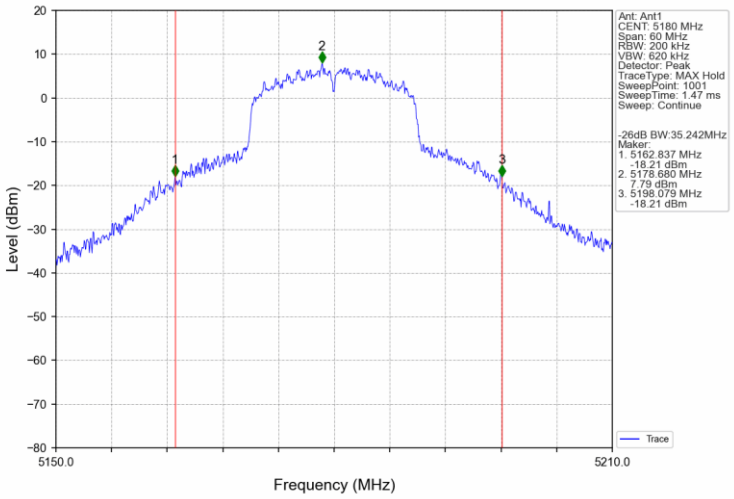
802.11a_MCH_5200MHz_Ant1_NTNV



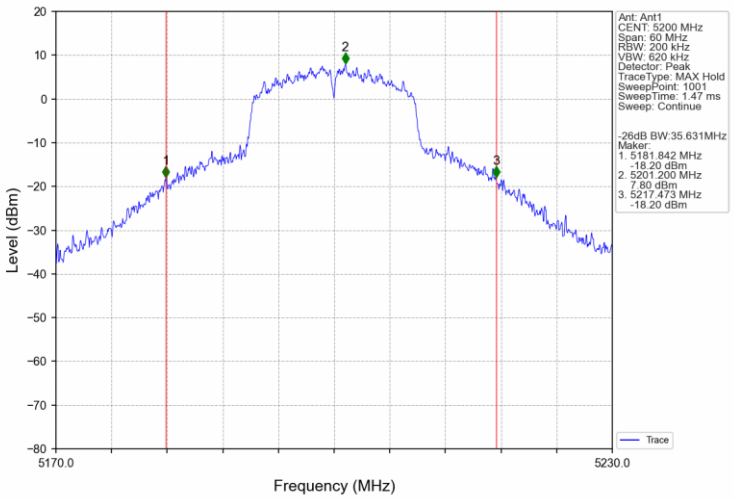
802.11a_HCH_5240MHz_Ant1_NTNV



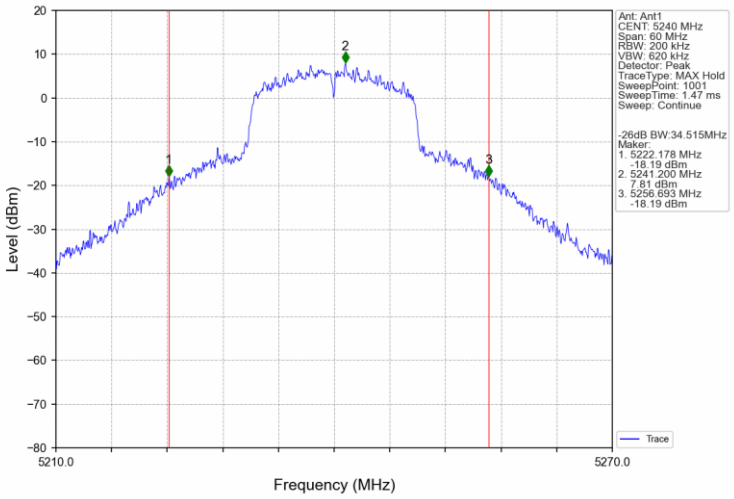
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



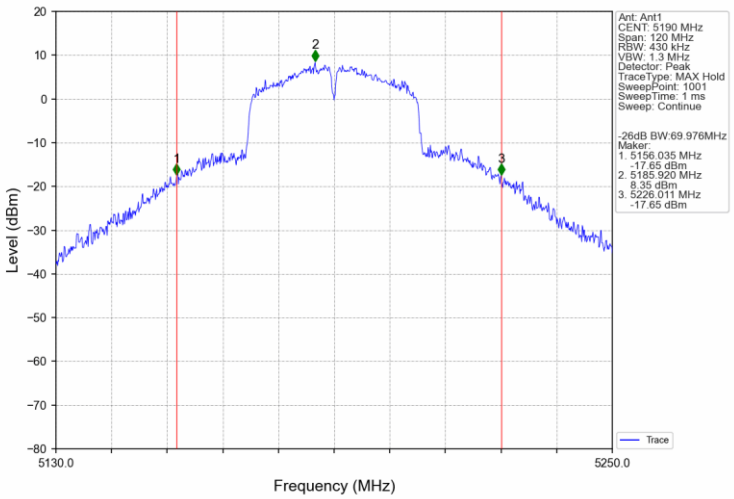
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



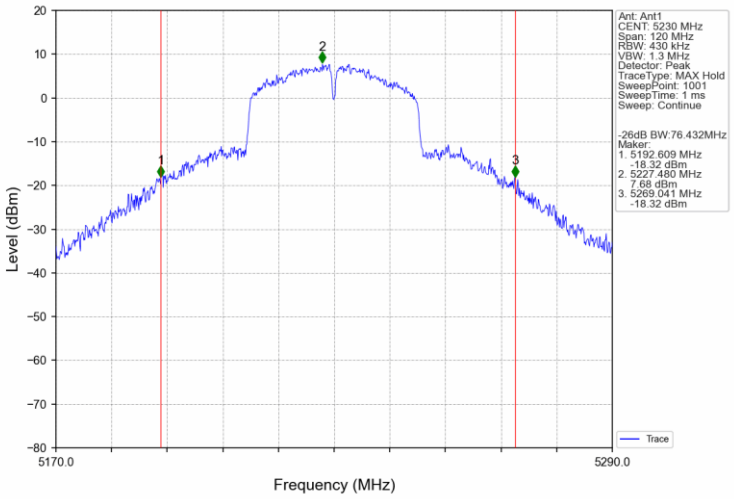
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Average Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
802.11a	SISO	5180	16.94	<=23.98	Pass
		5200	16.56	<=23.98	Pass
		5240	16.35	<=23.98	Pass
802.11n (HT20)	SISO	5180	16.48	<=23.98	Pass
		5200	16.62	<=23.98	Pass
		5240	16.30	<=23.98	Pass
802.11n (HT40)	SISO	5190	16.86	<=23.98	Pass
		5230	16.92	<=23.98	Pass
Note1: Antenna Gain: Ant1: 2.00dBi;					

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4. Maximum Power Spectral Density

4.1 Test Result

4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/MHz)		Verdict
			ANT1	Limit	
802.11a	SISO	5180	6.80	<=11	Pass
		5200	6.52	<=11	Pass
		5240	6.51	<=11	Pass
802.11n (HT20)	SISO	5180	6.22	<=11	Pass
		5200	6.30	<=11	Pass
		5240	6.06	<=11	Pass
802.11n (HT40)	SISO	5190	3.98	<=11	Pass
		5230	4.21	<=11	Pass
Note1: Antenna Gain: Ant1: 2.00dBi;					

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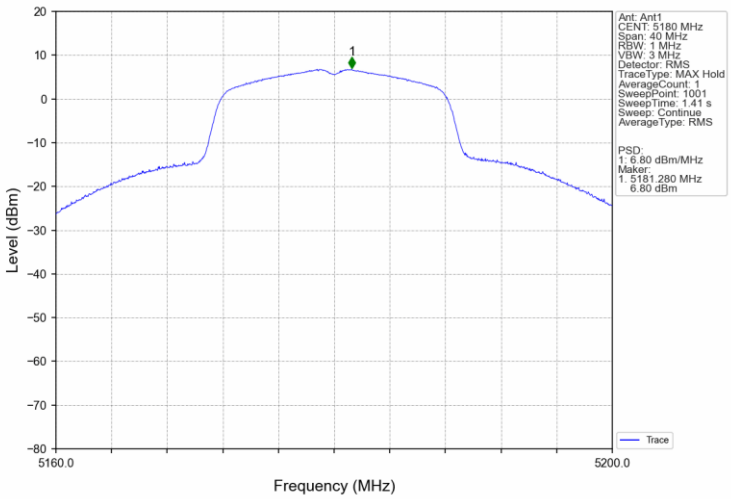
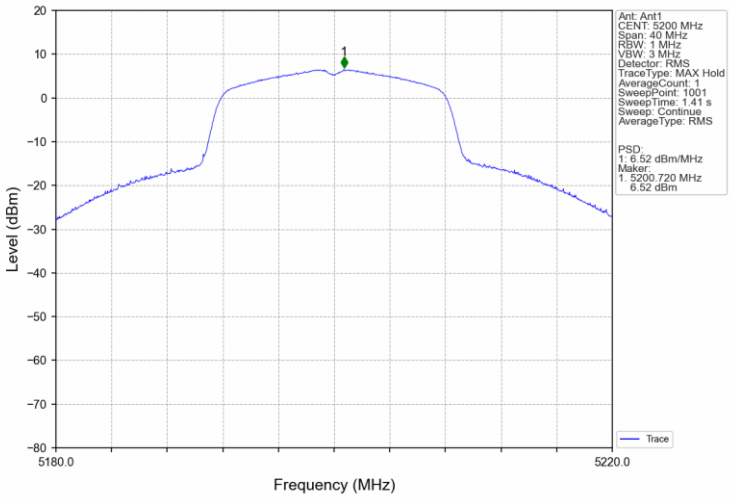
4.2 Test Graph

4.2.1 PSD

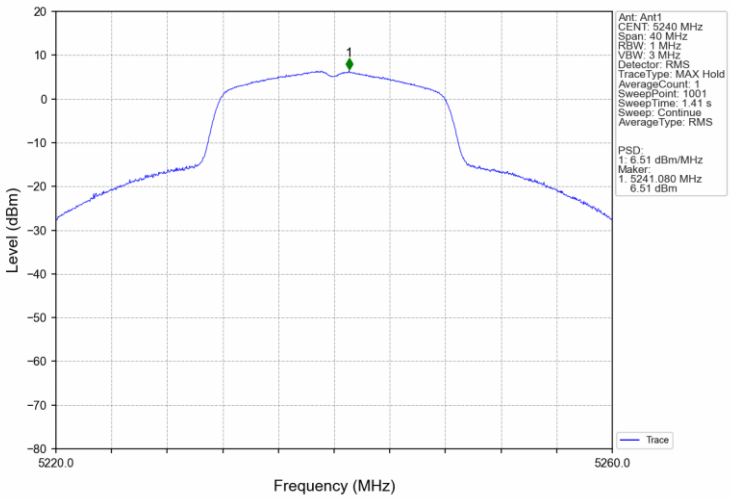
802.11a_LCH_5180MHz_Ant1_NTNV



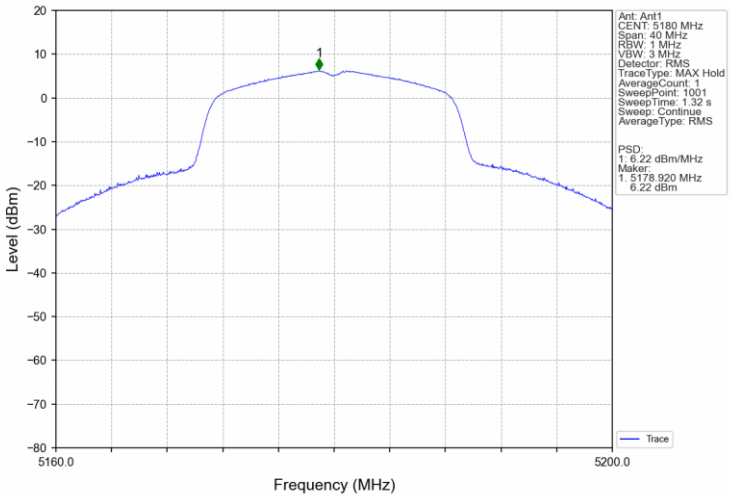
802.11a_MCH_5200MHz_Ant1_NTNV



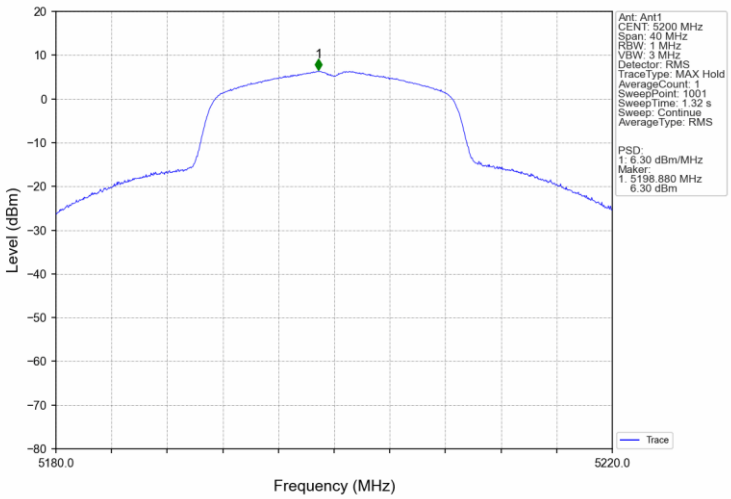
802.11a_HCH_5240MHz_Ant1_NTNV



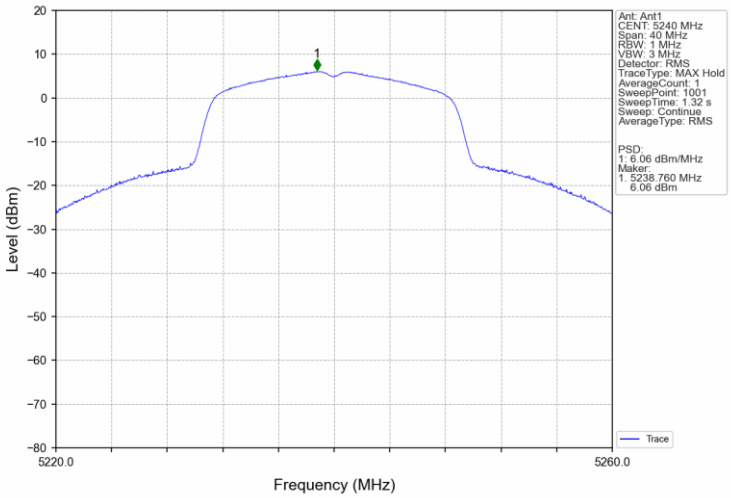
802.11n(HT20)_LCH_5180MHz_Ant1_NTNV



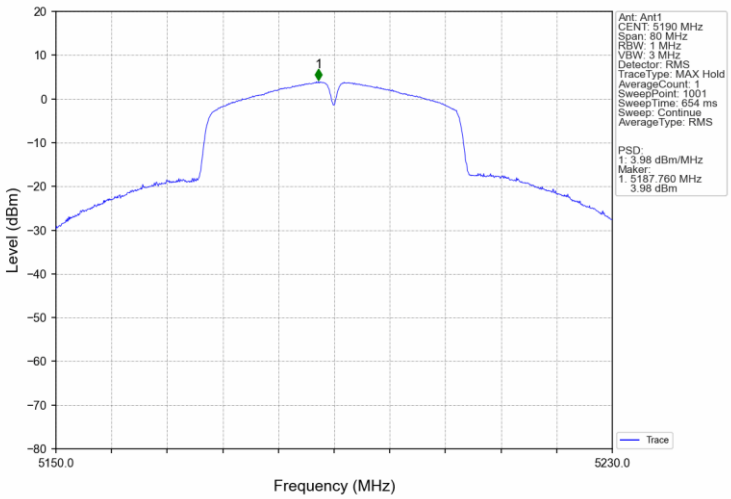
802.11n(HT20)_MCH_5200MHz_Ant1_NTNV



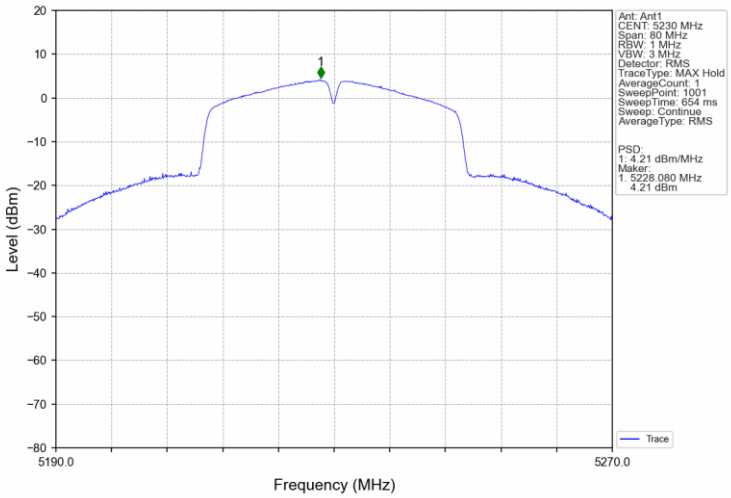
802.11n(HT20)_HCH_5240MHz_Ant1_NTNV



802.11n(HT40)_LCH_5190MHz_Ant1_NTNV



802.11n(HT40)_HCH_5230MHz_Ant1_NTNV



5. Frequency Stability

5.1 Test Result

5.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Temperature (°C)	Voltage (VAC)	Measured Frequency (MHz)	Limit (MHz)	Verdict
802.11a	SISO	5180	20	102	5180.020	5150 to 5250	Pass
				120	5180.080	5150 to 5250	Pass
				138	5179.940	5150 to 5250	Pass
			-30	120	5180.040	5150 to 5250	Pass
			-20	120	5180.000	5150 to 5250	Pass
			-10	120	5179.980	5150 to 5250	Pass
			0	120	5180.000	5150 to 5250	Pass
			10	120	5180.000	5150 to 5250	Pass
			30	120	5180.000	5150 to 5250	Pass
			40	120	5180.040	5150 to 5250	Pass
			50	120	5180.040	5150 to 5250	Pass
		5200	20	102	5199.980	5150 to 5250	Pass
				120	5200.020	5150 to 5250	Pass
				138	5199.980	5150 to 5250	Pass
			-30	120	5199.980	5150 to 5250	Pass
			-20	120	5199.960	5150 to 5250	Pass
			-10	120	5200.020	5150 to 5250	Pass
			0	120	5199.960	5150 to 5250	Pass
			10	120	5199.980	5150 to 5250	Pass
			30	120	5200.000	5150 to 5250	Pass
			40	120	5199.940	5150 to 5250	Pass
			50	120	5199.940	5150 to 5250	Pass
		5240	20	102	5239.940	5150 to 5250	Pass
				120	5239.940	5150 to 5250	Pass
				138	5239.940	5150 to 5250	Pass
			-30	120	5239.940	5150 to 5250	Pass
			-20	120	5239.960	5150 to 5250	Pass
			-10	120	5239.980	5150 to 5250	Pass
			0	120	5239.940	5150 to 5250	Pass
			10	120	5239.940	5150 to 5250	Pass
			30	120	5239.960	5150 to 5250	Pass
			40	120	5240.020	5150 to 5250	Pass
			50	120	5239.960	5150 to 5250	Pass
802.11n (HT20)	SISO	5180	20	102	5179.940	5150 to 5250	Pass
				120	5179.940	5150 to 5250	Pass
				138	5179.980	5150 to 5250	Pass
			-30	120	5179.980	5150 to 5250	Pass
			-20	120	5179.940	5150 to 5250	Pass
			-10	120	5179.980	5150 to 5250	Pass

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			0	120	5180.000	5150 to 5250	Pass
			10	120	5180.000	5150 to 5250	Pass
			30	120	5179.940	5150 to 5250	Pass
			40	120	5179.940	5150 to 5250	Pass
			50	120	5179.980	5150 to 5250	Pass
		5200	20	102	5199.980	5150 to 5250	Pass
				120	5200.020	5150 to 5250	Pass
				138	5199.940	5150 to 5250	Pass
			-30	120	5199.980	5150 to 5250	Pass
			-20	120	5199.980	5150 to 5250	Pass
			-10	120	5199.960	5150 to 5250	Pass
			0	120	5200.000	5150 to 5250	Pass
			10	120	5200.000	5150 to 5250	Pass
			30	120	5199.980	5150 to 5250	Pass
			40	120	5199.980	5150 to 5250	Pass
			50	120	5199.980	5150 to 5250	Pass
		5240	20	102	5239.980	5150 to 5250	Pass
				120	5239.960	5150 to 5250	Pass
				138	5239.940	5150 to 5250	Pass
			-30	120	5239.940	5150 to 5250	Pass
			-20	120	5239.960	5150 to 5250	Pass
			-10	120	5239.960	5150 to 5250	Pass
			0	120	5239.920	5150 to 5250	Pass
			10	120	5239.980	5150 to 5250	Pass
			30	120	5239.960	5150 to 5250	Pass
			40	120	5239.960	5150 to 5250	Pass
			50	120	5239.980	5150 to 5250	Pass
802.11n (HT40)	SISO	5190	20	102	5190.000	5150 to 5250	Pass
				120	5190.000	5150 to 5250	Pass
				138	5189.920	5150 to 5250	Pass
			-30	120	5189.960	5150 to 5250	Pass
			-20	120	5190.040	5150 to 5250	Pass
			-10	120	5189.960	5150 to 5250	Pass
			0	120	5189.960	5150 to 5250	Pass
			10	120	5189.920	5150 to 5250	Pass
			30	120	5190.000	5150 to 5250	Pass
			40	120	5190.080	5150 to 5250	Pass
			50	120	5190.000	5150 to 5250	Pass
		5230	20	102	5229.920	5150 to 5250	Pass
				120	5229.880	5150 to 5250	Pass
				138	5230.000	5150 to 5250	Pass
			-30	120	5229.960	5150 to 5250	Pass
			-20	120	5229.880	5150 to 5250	Pass
			-10	120	5229.880	5150 to 5250	Pass
			0	120	5229.880	5150 to 5250	Pass
			10	120	5229.840	5150 to 5250	Pass
			30	120	5230.000	5150 to 5250	Pass
			40	120	5229.840	5150 to 5250	Pass

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			50	120	5229.960	5150 to 5250	Pass

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Appendix B: Photographs of Test Setup

Please refer to document Appendix No.: TCT241101E020-A

Appendix C: Photographs of EUT

Please refer to document Appendix No.: TCT241101E020-B & TCT241101E020-C

*******END OF REPORT*******

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