TCT 通测检测 TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID. ..... :	2A6B4-FIGF52
Test Report No..... :	TCT221014E054
Date of issue..... :	Nov. 21, 2022
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..... :	Mulberry tech group LLC
Address..... :	108 Wall st, lakewood, New Jersey, 08701, USA
Manufacturer's name ... :	Shenzhen Qimei Electronic Technology Co., Ltd
Address..... :	B307, Building G, No. 13, Second Industrial Zone, Xiacun Community, Gongming Street, Guangming District, Shenzhen, China
Standard(s) ..... :	FCC CFR Title 47 Part 15 Subpart E Section 15.407 KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Product Name..... :	Mobile Phone
Trade Mark ..... :	fig
Model/Type reference..... :	F52
Rating(s)..... :	Rechargeable Li-ion Battery DC 3.8V
Date of receipt of test item ..... :	Oct. 14, 2022
Date (s) of performance of test..... :	Oct. 14, 2022 - Nov. 21, 2022
Tested by (+signature) ... :	Brews XU
Check by (+signature).... :	Beryl ZHAO
Approved by (+signature):	Tomsin

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Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

1. General Product Information

1.1. EUT description

Product Name.....:	Mobile Phone
Model/Type reference.....:	F52
Hardware Version.....:	K62-MB-V1.1
Software Version.....:	F52_ U01_V1.0.0
Sample Number.....:	TCT221014E007-0101
Operation Frequency.....:	Band 1: 5150 MHz -5250 MHz
Channel Bandwidth.....:	802.11a: 20MHz 802.11n: 20MHz, 40MHz 802.11ac: 20MHz, 40MHz, 80MHz
Modulation Technology.....:	Orthogonal Frequency Division Multiplexing (OFDM)
Modulation Type.....:	256QAM, 64QAM, 16QAM, BPSK, QPSK
Antenna Type.....:	FPC Antenna
Antenna Gain.....:	-1.61dBi
Rating(s).....:	Rechargeable Li-ion Battery DC 3.8V

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		80MHz	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180	38	5190	42	5210
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(a)	PASS
Radiated Emission	§15.407(a)	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.

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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:	Engineering Mode
Power Level:	16
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations
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	6 Mbps
802.11n(HT20)	6.5 Mbps
802.11n(HT40)	13.5 Mbps
802.11ac(VHT20)	6.5 Mbps
802.11ac(VHT40)	13.5 Mbps
802.11ac(VHT80)	29.3 Mbps

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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
Adapter	JD-050200	2012010907576735	/	JD

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-1

  SHENZHEN TONGCE TESTING LAB

  CAB identifier: CN0031

  The testing lab has been registered by Certification and Engineering Bureau of Industry 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

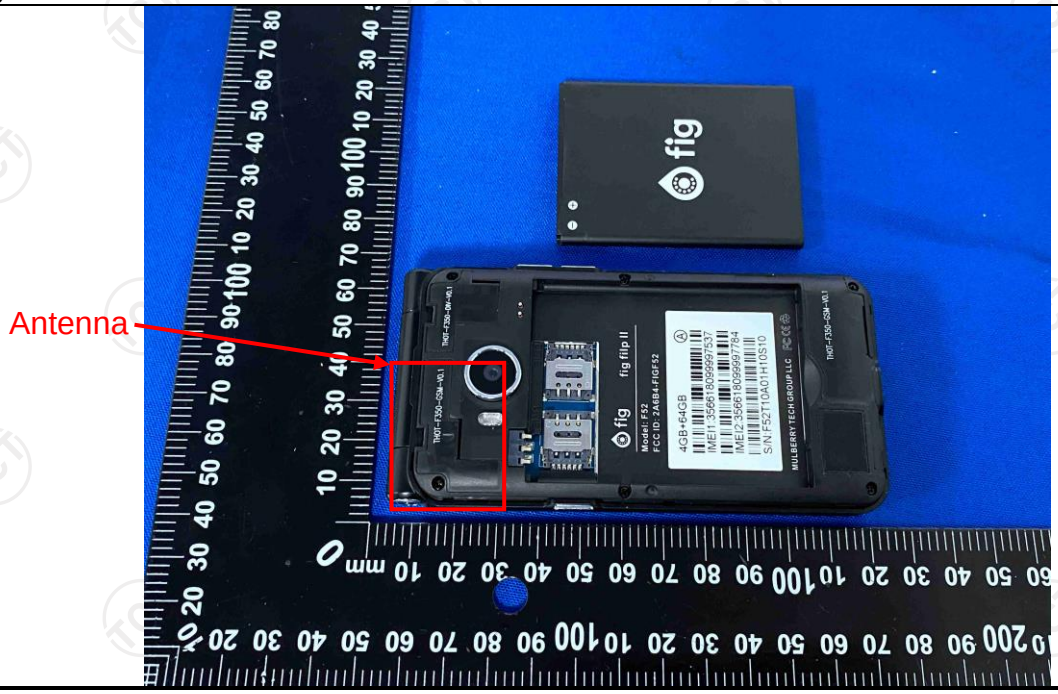
The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

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

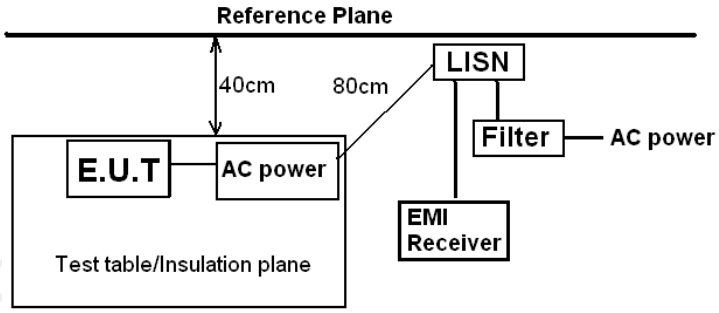
5.1. Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
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 WIFI antenna is FPC antenna which permanently attached, and the best case gain of the antenna is -1.61dBi.	



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 C63.10:2013</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>Charging + 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: 2013 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

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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	Jul. 03, 2023
Line Impedance Stabilisation Newtork(LISN)	Schwarzbeck	NSLK 8126	8126453	Feb. 24, 2023
Line-5	TCT	CE-05	/	Jul. 03, 2024
EMI Test Software	Shurple Technology	EZ-EMC	/	/

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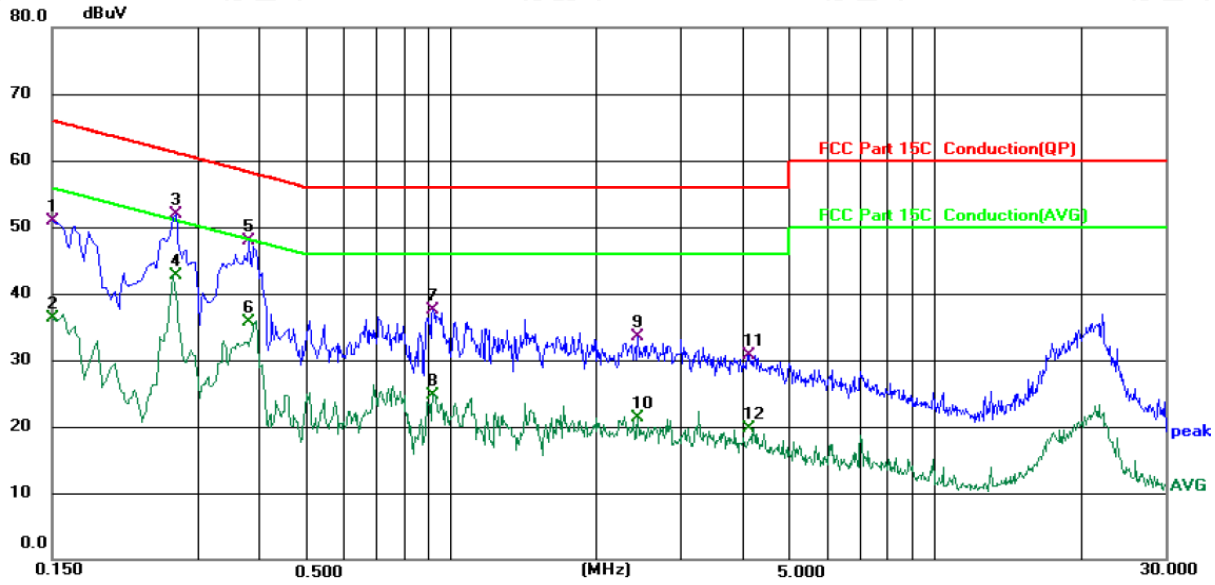
5.2.3. Test data

Please refer to following diagram for individual

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



Site 844 Shielding Room | Phase: *L1* | Temperature: 23.4 (℃) | Humidity: 49 %

Limit: FCC Part 15C Conduction(QP) | Power: DC 5V(Adapter Input AC 120V/60Hz)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	41.40	9.58	50.98	66.00	-15.02	QP	
2		0.1500	26.64	9.58	36.22	56.00	-19.78	AVG	
3		0.2700	42.28	9.58	51.86	61.12	-9.26	QP	
4	*	0.2700	33.20	9.58	42.78	51.12	-8.34	AVG	
5		0.3820	38.33	9.63	47.96	58.24	-10.28	QP	
6		0.3820	26.15	9.63	35.78	48.24	-12.46	AVG	
7		0.9220	27.79	9.74	37.53	56.00	-18.47	QP	
8		0.9220	15.00	9.74	24.74	46.00	-21.26	AVG	
9		2.4380	23.65	9.87	33.52	56.00	-22.48	QP	
10		2.4380	11.39	9.87	21.26	46.00	-24.74	AVG	
11		4.1500	20.91	9.87	30.78	56.00	-25.22	QP	
12		4.1500	9.82	9.87	19.69	46.00	-26.31	AVG	

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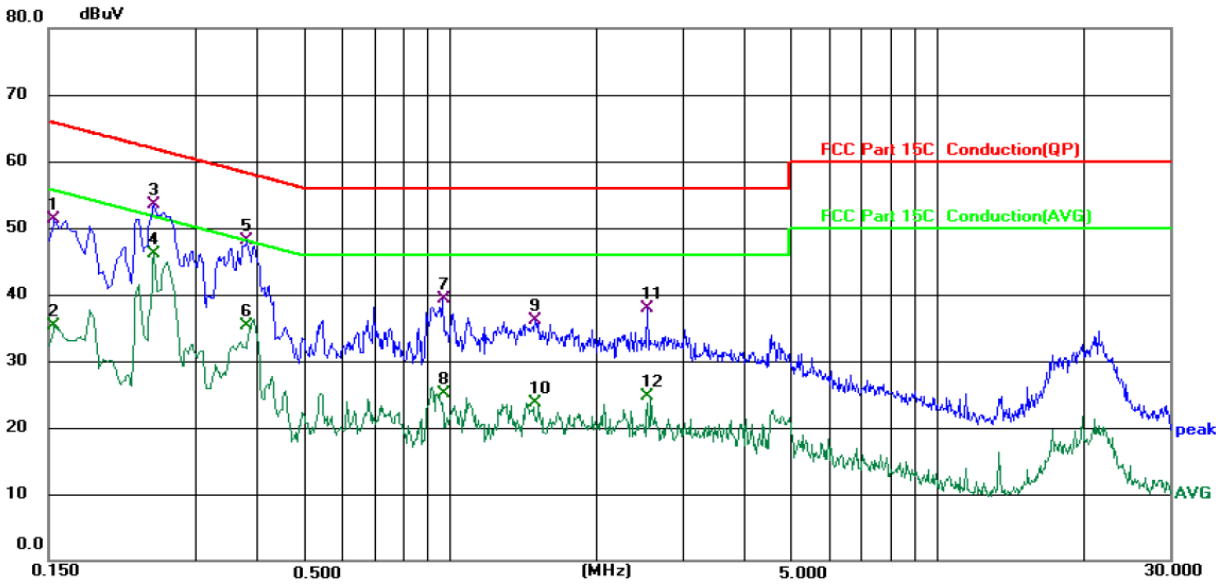
Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site 844 Shielding Room Phase: N Temperature: 23.4 (℃) Humidity: 49 %

Limit: FCC Part 15C Conduction(QP) Power: DC 5V(Adapter Input AC 120V/60Hz)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	41.53	9.68	51.21	65.79	-14.58	QP	
2		0.1539	25.66	9.68	35.34	55.79	-20.45	AVG	
3		0.2459	44.02	9.56	53.58	61.89	-8.31	QP	
4	*	0.2459	36.56	9.56	46.12	51.89	-5.77	AVG	
5		0.3820	38.54	9.63	48.17	58.24	-10.07	QP	
6		0.3820	25.67	9.63	35.30	48.24	-12.94	AVG	
7		0.9659	29.56	9.74	39.30	56.00	-16.70	QP	
8		0.9659	15.27	9.74	25.01	46.00	-20.99	AVG	
9		1.5020	26.29	9.75	36.04	56.00	-19.96	QP	
10		1.5020	13.91	9.75	23.66	46.00	-22.34	AVG	
11		2.5459	28.12	9.78	37.90	56.00	-18.10	QP	
12		2.5459	14.94	9.78	24.72	46.00	-21.28	AVG	

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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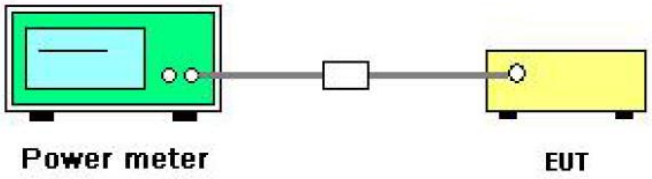
5.3. Maximum Conducted Output Power

5.3.1. Test Specification

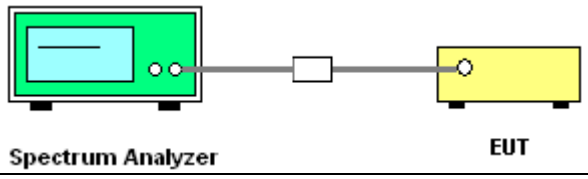
<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407(a)& Part 2 J Section 2.1046</td></tr>
<tr><td>Test Method:</td><td>KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency Band (MHz)</td><td>Limit</td></tr>
<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 and attenuator. 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	MY49100619	Jul. 04, 2023
Power Meter	Agilent	E4418B	MY45100357	Jul. 04, 2023
Power Sensor	Agilent	8481A	MY41091497	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

5.4. 6dB Emission Bandwidth

5.4.1. Test Specification

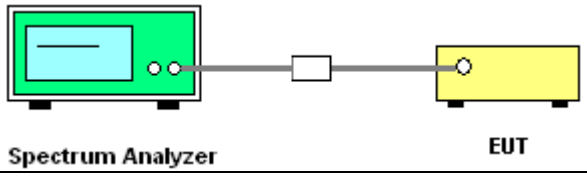
Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)& Part 2 J Section 2.1049
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	>500kHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New 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	MY49100619	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

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:	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) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. 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	MY49100619	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

5.6. Power Spectral Density

5.6.1. Test Specification

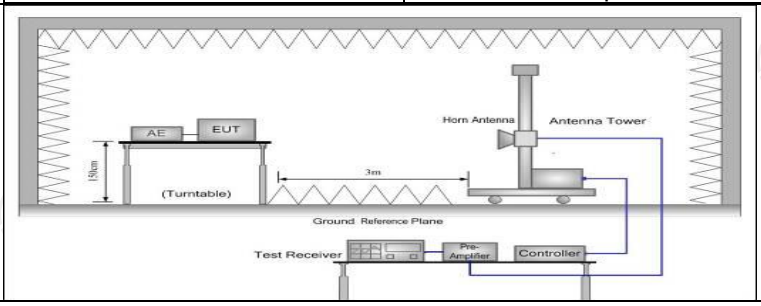
Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
Limit:	≤11.00dBm/MHz for Band 1 5150MHz-5250MHz(client device) ≤11.00dBm/MHz for Band 2A&2C 5250-5350&5470-5725 ≤30.00dBm/500KHz for Band 3 5725MHz-5850MHz The e.i,r,p 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.
Test Result:	PASS

5.6.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100619	Jul. 04, 2023
Combiner Box	Ascentest	AT890-RFB	/	/

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 2013</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>< 5650</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 Mode.</td></tr>
</table>

	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

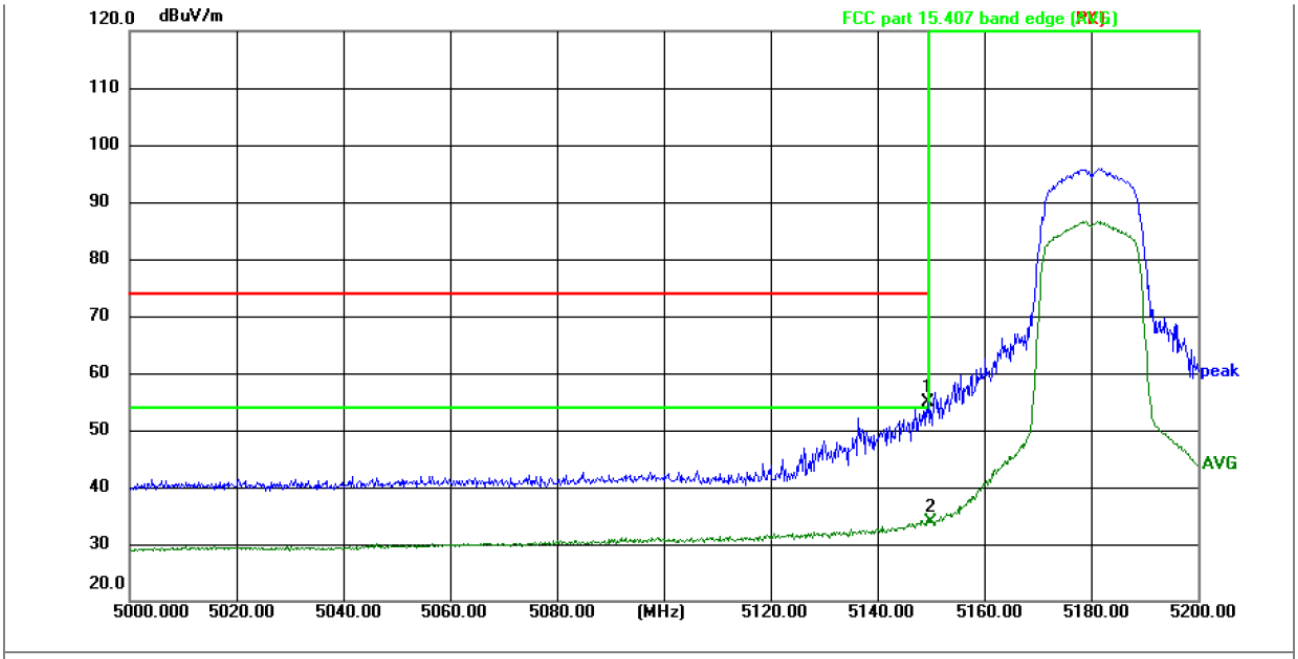
5.7.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESIB7	100197	Jul. 03, 2023
Spectrum Analyzer	R&S	FSQ40	200061	Jul. 03, 2023
Spectrum Analyzer	Agilent	N9020A	MY49100619	Jul. 04, 2023
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	Feb. 24, 2023
Pre-amplifier	SKET	LNPA_1840G-50	SK202109203500	Feb. 24, 2023
Pre-amplifier	HP	8447D	2727A05017	Jul. 03, 2023
Loop antenna	Schwarzbeck	FMZB1519B	00191	Jun. 11, 2024
Broadband Antenna	Schwarzbeck	VULB9163	340	Jul. 05, 2024
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Jul. 05, 2024
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Apr. 10, 2023
Coaxial cable	SKET	RC-18G-N-M	/	Feb. 24, 2024
Coaxial cable	SKET	RC_40G-K-M	/	Feb. 24, 2024
Antenna Mast	Keleto	CC-A-4M	/	/
EMI Test Software	Shurple Technology	EZ-EMC	/	/

Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

5.7.3. Test Data

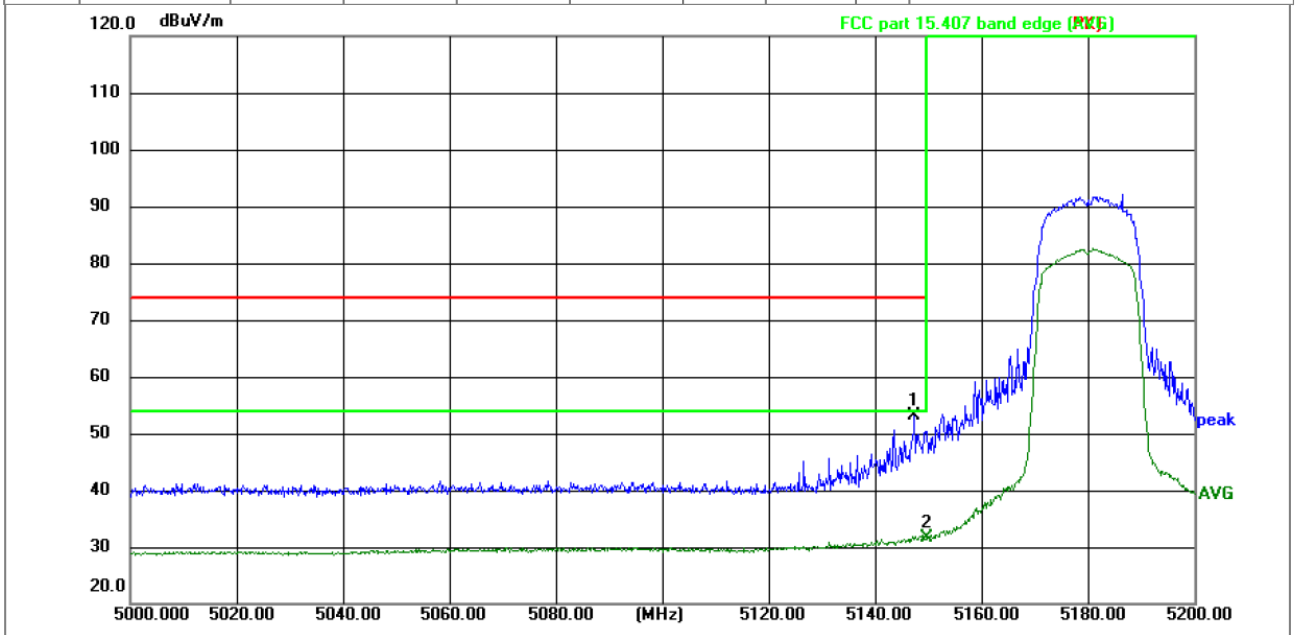
AC20-5180



Site: #3 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	5149.500	64.81	-9.85	54.96	74.00	-19.04	peak	P	
2	5150.000	43.62	-9.85	33.77	54.00	-20.23	AVG	P	

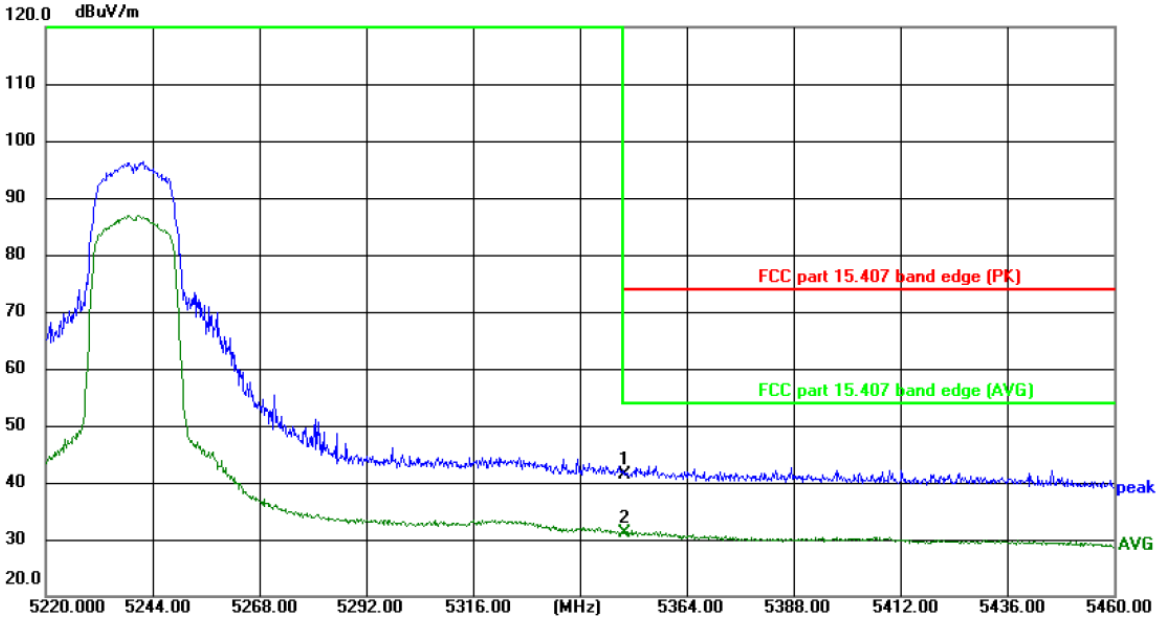


Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	5147.500	62.87	-9.85	53.02	74.00	-20.98	peak	P	
2	5150.000	41.45	-9.85	31.60	54.00	-22.40	AVG	P	

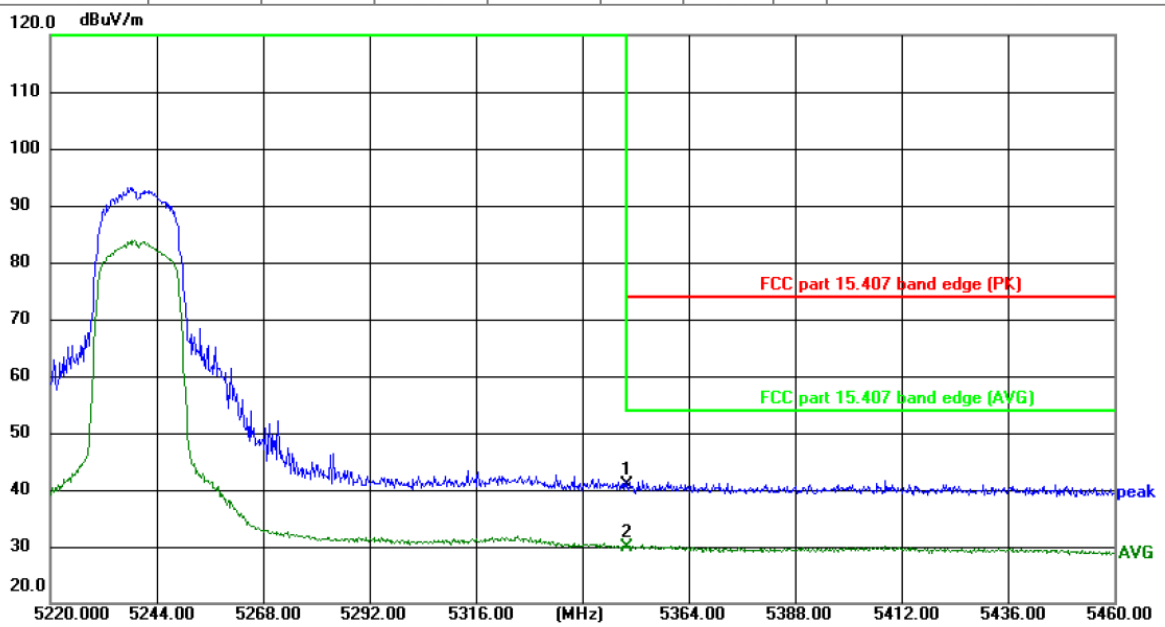
AC20-5240



Site: #3 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	5350.000	50.90	-9.43	41.47	74.00	-32.53	peak	P	
2 *	5350.000	40.44	-9.43	31.01	54.00	-22.99	AVG	P	

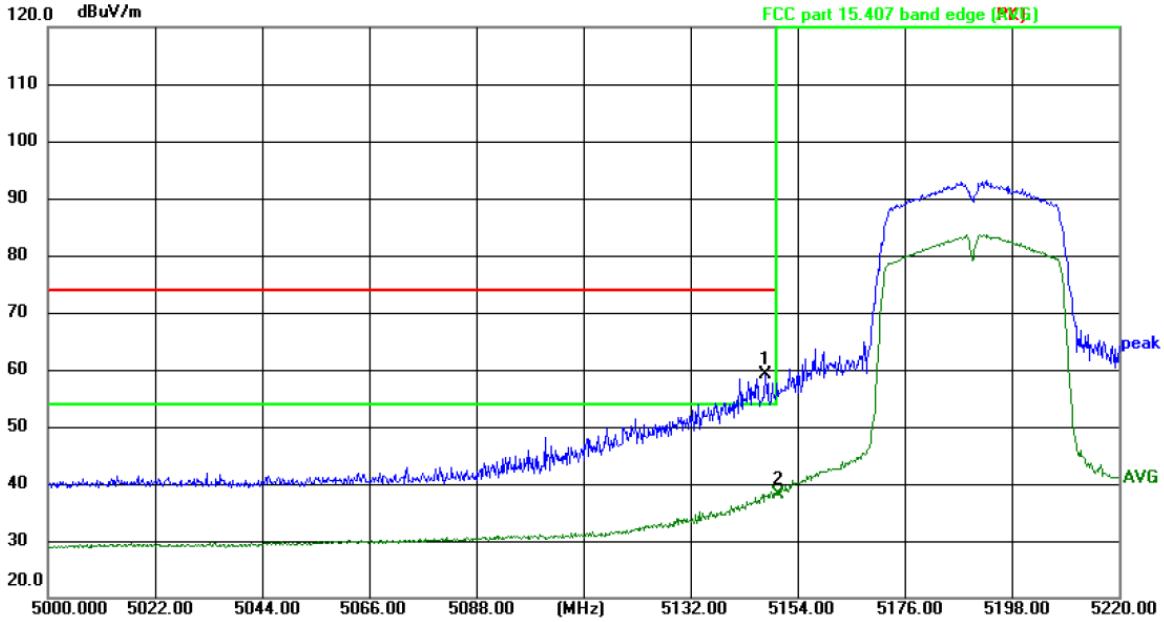


Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	5350.000	50.24	-9.43	40.81	74.00	-33.19	peak	P	
2 *	5350.000	39.22	-9.43	29.79	54.00	-24.21	AVG	P	

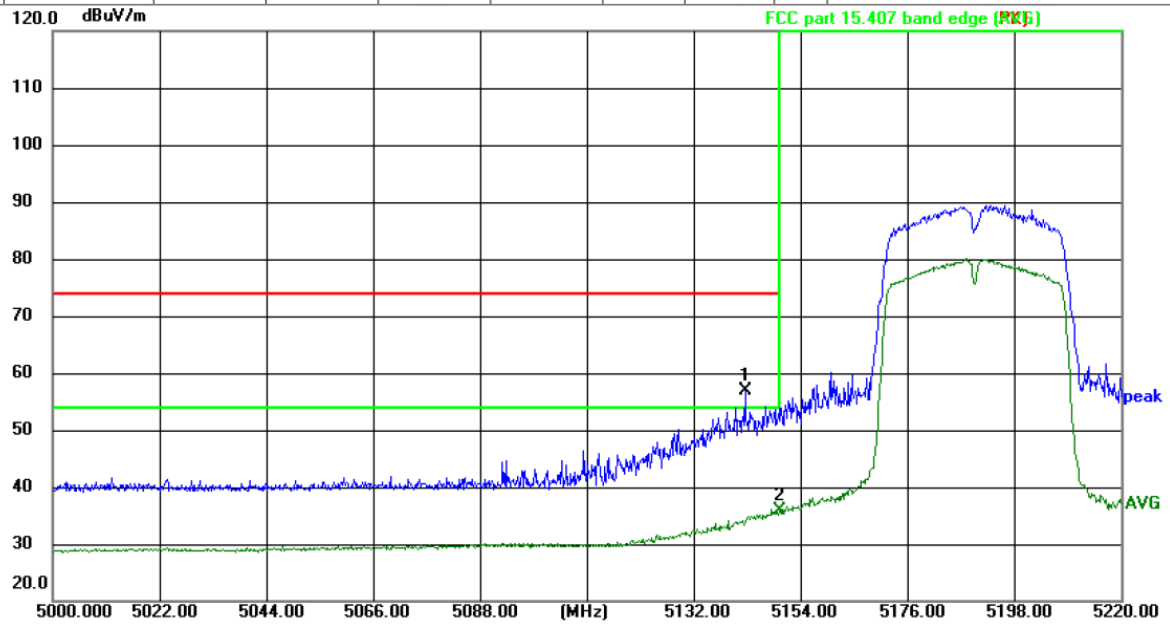
AC40-5190



Site: #3 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

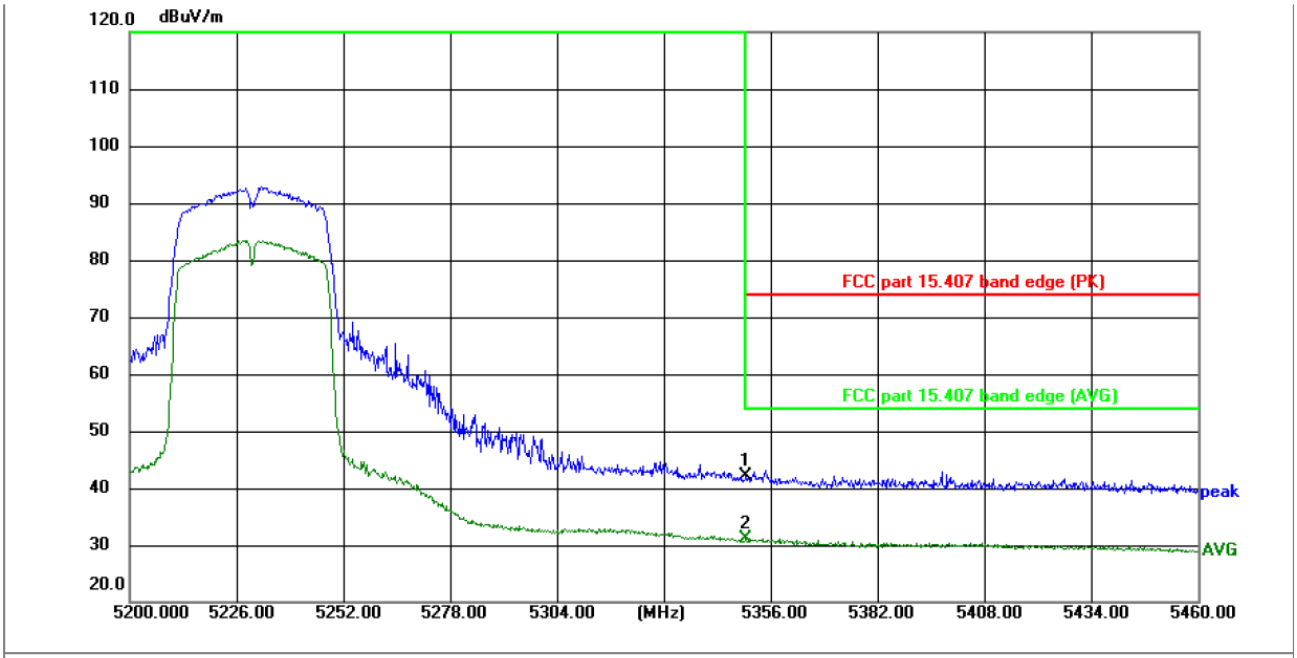
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	5147.620	69.03	-9.85	59.18	74.00	-14.82	peak	P	
2	5150.000	48.05	-9.85	38.20	54.00	-15.80	AVG	P	



Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

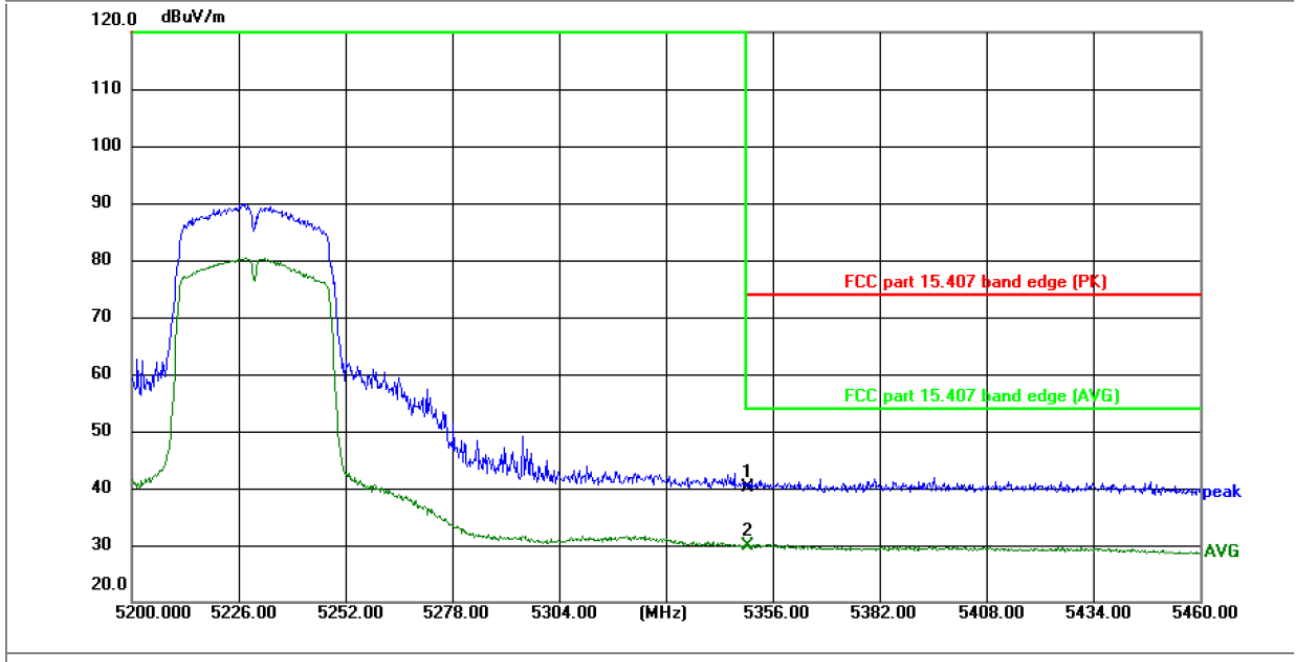
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	5142.780	66.61	-9.85	56.76	74.00	-17.24	peak	P	
2	5150.000	45.61	-9.85	35.76	54.00	-18.24	AVG	P	



Site: #3 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	5350.000	51.53	-9.43	42.10	74.00	-31.90	peak	P	
2 *	5350.000	40.63	-9.43	31.20	54.00	-22.80	AVG	P	

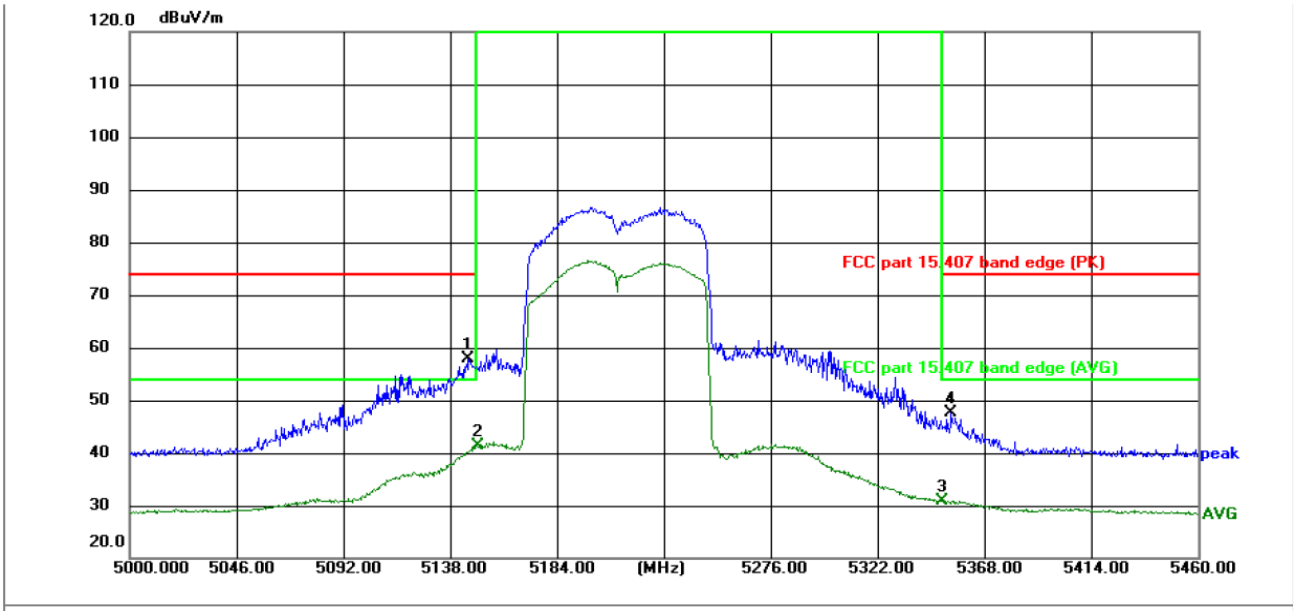


Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	5350.000	49.53	-9.43	40.10	74.00	-33.90	peak	P	
2 *	5350.000	39.33	-9.43	29.90	54.00	-24.10	AVG	P	

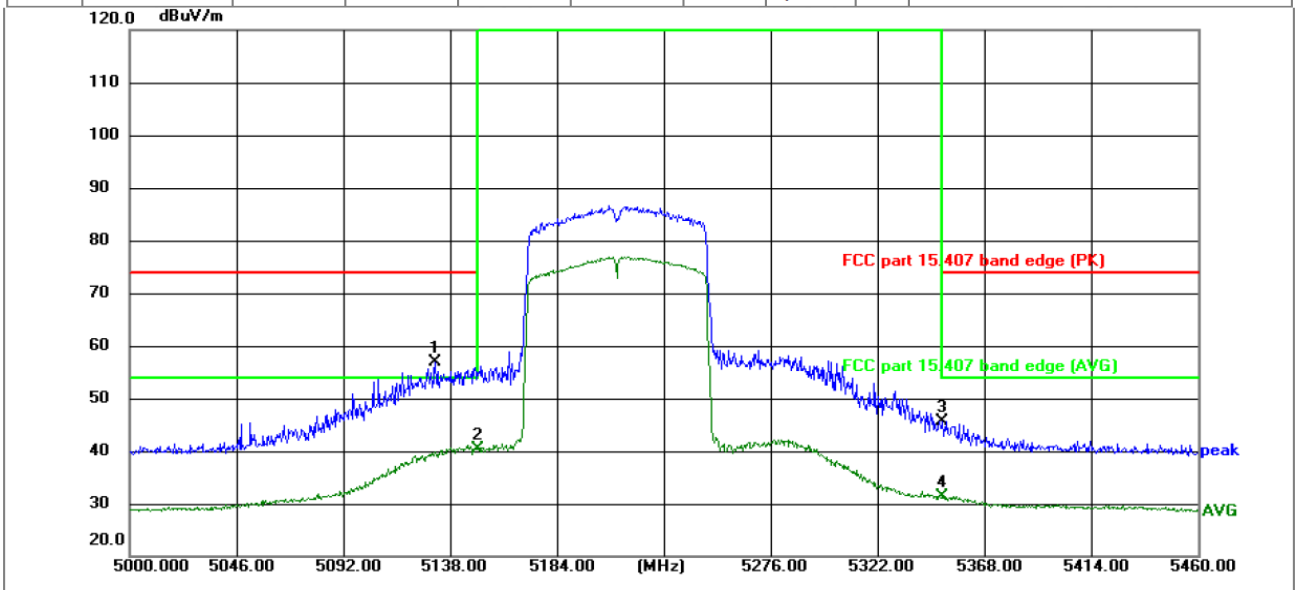
AC80-5210



Site: #3 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	5146.280	67.61	-9.85	57.76	74.00	-16.24	peak	P	
2 *	5150.000	51.28	-9.85	41.43	54.00	-12.57	AVG	P	
3	5350.000	40.33	-9.43	30.90	54.00	-23.10	AVG	P	
4	5353.970	57.10	-9.42	47.68	74.00	-26.32	peak	P	



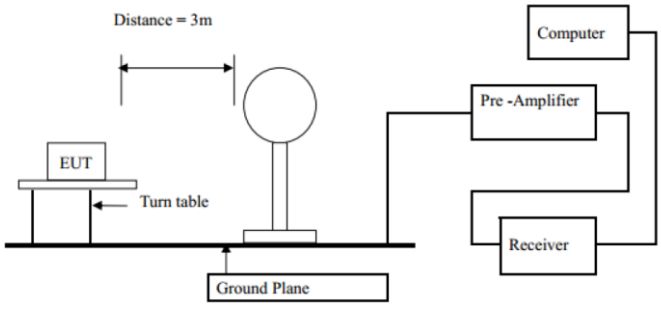
Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24(℃) Humidity: 52 %

Limit: FCC part 15.407 band edge (PK) Power:DC 3.8 V

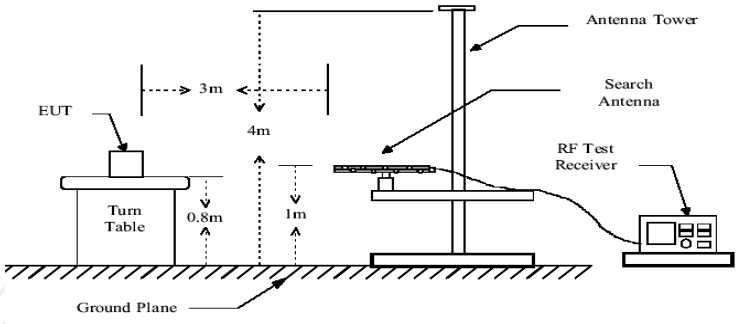
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	5131.790	66.82	-9.87	56.95	74.00	-17.05	peak	P	
2 *	5150.000	50.28	-9.85	40.43	54.00	-13.57	AVG	P	
3	5350.000	55.14	-9.43	45.71	74.00	-28.29	peak	P	
4	5350.000	40.80	-9.43	31.37	54.00	-22.63	AVG	P	

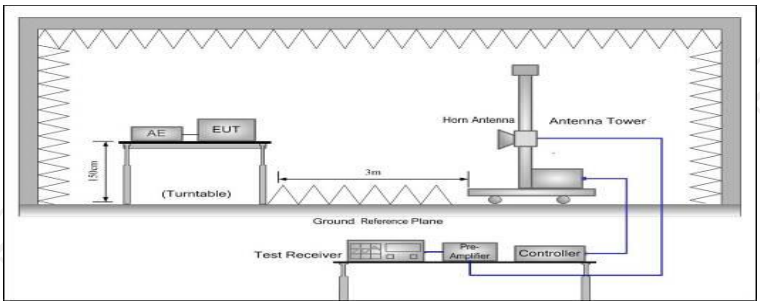
5.8. Unwanted Emission

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,
<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>30</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>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Detector</td></tr>
<tr><td rowspan="2">Above 1G</td><td>74.0</td><td>Peak</td></tr>
<tr><td>54.0</td><td>Average</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions below 30MHz


30MHz to 1GHz</td></tr>
</table>

<table>
<tr><td></td><td> 

Above 1GHz

</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 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.</td></tr>
<tr><td>Test results:</td><td>PASS</td></tr>
</table>

5.8.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESIB7	100197	Jul. 03, 2023
Spectrum Analyzer	R&S	FSQ40	200061	Jul. 03, 2023
Pre-amplifier	SKET	LNPA_0118G-45	SK2021012102	Feb. 24, 2023
Pre-amplifier	SKET	LNPA_1840G-50	SK202109203500	Feb. 24, 2023
Pre-amplifier	HP	8447D	2727A05017	Jul. 03, 2023
Loop antenna	Schwarzbeck	FMZB1519B	00191	Jun. 11, 2024
Broadband Antenna	Schwarzbeck	VULB9163	340	Jul. 05, 2024
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Jul. 05, 2024
Horn Antenna	Schwarzbeck	BBHA 9170	00956	Apr. 10, 2023
Antenna Mast	Keleto	RE-AM	/	/
Coaxial cable	SKET	RC-18G-N-M	/	Feb. 24, 2024
Coaxial cable	SKET	RC_40G-K-M	/	Feb. 24, 2024
EMI Test Software	Shurple Technology	EZ-EMC	/	/

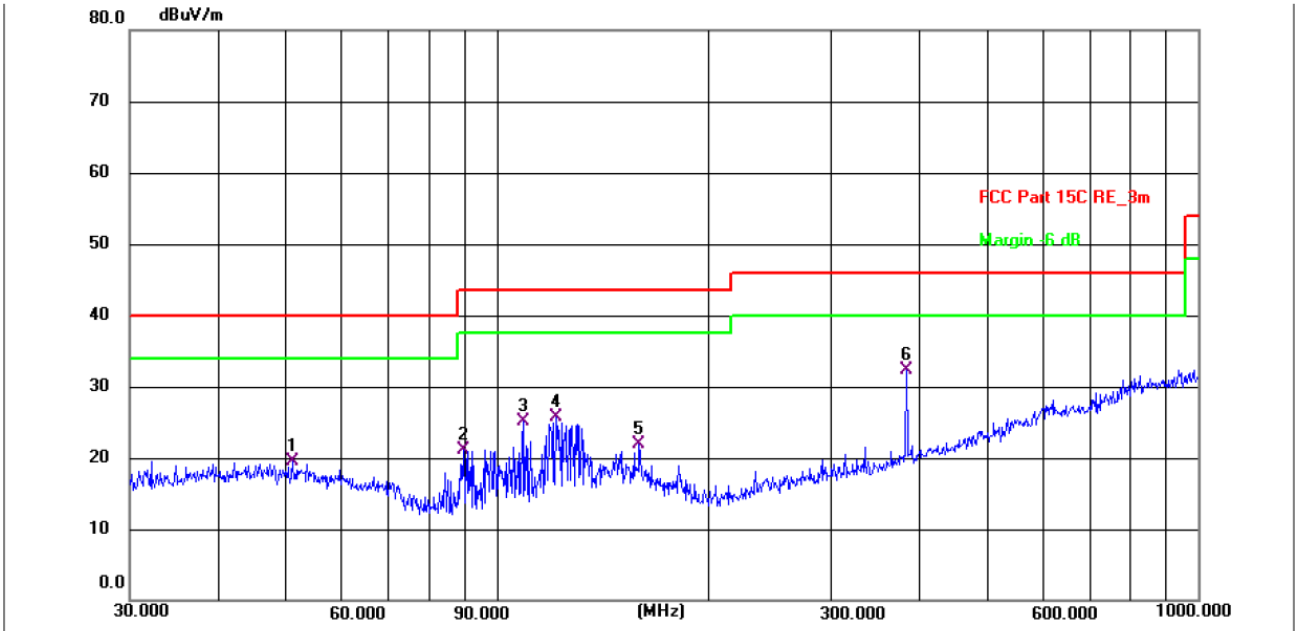
Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

5.8.3. Test Data

Please refer to following diagram for individual

Below 1GHz

Horizontal:

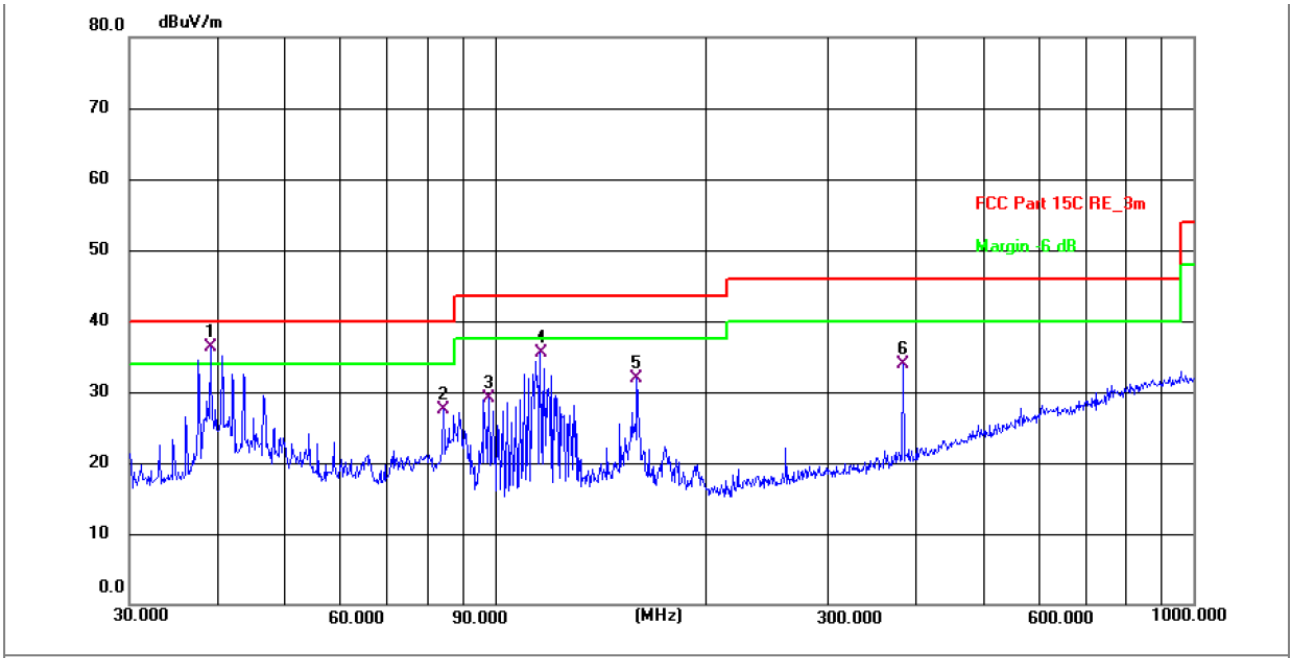


Site #1 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 24.8(C) Humidity: 54 %

Limit: FCC Part 15C RE 3m Power: DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	51.1208	6.23	13.31	19.54	40.00	-20.46	QP	P	
2	89.9046	12.64	8.55	21.19	43.50	-22.31	QP	P	
3	109.4116	14.42	10.69	25.11	43.50	-18.39	QP	P	
4	121.5485	14.01	11.69	25.70	43.50	-17.80	QP	P	
5	159.7844	8.52	13.37	21.89	43.50	-21.61	QP	P	
6 *	383.9318	16.70	15.64	32.34	46.00	-13.66	QP	P	

Vertical:



Site #1 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24.8(C) Humidity: 54 %

Limit: FCC Part 15C RE_3m Power: DC 3.8 V

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	39.1615	22.65	13.65	36.30	40.00	-3.70	QP	P	
2	84.4054	18.80	8.71	27.51	40.00	-12.49	QP	P	
3	98.1418	19.42	9.63	29.05	43.50	-14.45	QP	P	
4	116.1321	24.14	11.27	35.41	43.50	-8.09	QP	P	
5	159.7844	18.45	13.37	31.82	43.50	-11.68	QP	P	
6	383.9318	18.26	15.64	33.90	46.00	-12.10	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), 802.11ac(VHT20), 802.11ac(VHT40), 802.11nac(VHT80), and the worst case Mode (Highest channel and 802.11ac(HT20)) was submitted only.

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

Modulation Type: Band 1									
11a CH36: 5180MHz									
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)			
10360	H	38.36	---	8.02	46.38	---	68.2	---	-21.82
15540	H	38.72	---	9.87	48.59	---	74	54	-5.41
---	H	---	---	---	---	---	---	---	---
10360	V	38.15	---	8.02	46.17	---	68.2	---	-22.03
15540	V	38.93	---	9.87	48.8	---	74	54	-5.2
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	40.05	---	7.97	48.02	---	68.2	---	-20.18
15600	H	38.68	---	9.83	48.51	---	74	54	-5.49
---	H	---	---	---	---	---	---	---	---
10400	V	41.07	---	7.97	49.04	---	68.2	---	-19.16
15600	V	38.24	---	9.83	48.07	---	74	54	-5.93
---	V	---	---	---	---	----	---	---	---
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	38.55	---	7.97	46.52	---	68.2	---	-21.68
15720	H	37.96	---	9.83	47.79	---	74	54	-6.21
---	H	---	---	---	---	---	---	---	---
10480	V	38.78	---	7.97	46.75	---	68.2	---	-21.45
15720	V	36.56	---	9.83	46.39	---	74	54	-7.61
---	V	---	---	---	---	----	---	---	---
11n(HT20) CH36: 5180MHz									
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)			
10360	H	41.35	---	8.02	49.37	---	68.2	---	-18.83
15540	H	37.74	---	9.87	47.61	---	74	54	-6.39
---	H	---	---	---	---	---	---	---	---
10360	V	42.47	---	8.02	50.49	---	68.2	---	-17.71
15540	V	38.02	---	9.87	47.89	---	74	54	-6.11
---	V	---	---	---	---	----	---	---	---

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11n(HT20) 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	40.97	---	7.97	48.94	---	68.2	---	-19.26
15600	H	38.63	---	9.83	48.46	---	74	54	-5.54
---	H	---	---	---	---	---	---	---	---
10400	V	40.52	---	7.97	48.49	---	68.2	---	-19.71
15600	V	38.11	---	9.83	47.94	---	74	54	-6.06
---	V	---	---	---	---	----	---	---	---

11n(HT20) 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	41.88	---	7.97	49.85	---	68.2	---	-18.35
15720	H	40.09	---	9.83	49.92	---	74	54	-4.08
---	H	---	---	---	---	---	---	---	---
10480	V	40.99	---	7.97	48.96	---	68.2	---	-19.24
15720	V	39.58	---	9.83	49.41	---	74	54	-4.59
---	V	---	---	---	---	----	---	---	---

11n(HT40) CH38: 5190MHz									
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)			
10380	H	40.12	---	7.75	47.87	---	68.2	---	-20.33
15570	H	37.85	---	9.87	47.72	---	74	54	-6.28
---	H	---	---	---	---	---	---	---	---
10380	V	40.91	---	7.75	48.66	---	68.2	---	-19.54
15570	V	38.14	---	9.87	48.01	---	74	54	-5.99
---	V	---	---	---	---	----	---	---	---

11n(HT40) CH46: 5230MHz									
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)			
10460	H	42.06	---	7.97	50.03	---	68.2	---	-18.17
15690	H	38.39	---	9.83	48.22	---	74	54	-5.78
---	H	---	---	---	---	---	---	---	---
10460	V	41.89	---	7.97	49.86	---	68.2	---	-18.34
15690	V	39.18	---	9.83	49.01	---	74	54	-4.99
---	V	---	---	---	---	----	---	---	---

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11ac(VHT20) CH36: 5180MHz									
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)			
10360	H	40.95	---	8.02	48.97	---	68.2	---	-19.23
15540	H	38.12	---	9.87	47.99	---	74	54	-6.01
---	H	---	---	---	---	---	---	---	---
10360	V	38.93	---	8.02	46.95	---	68.2	---	-21.25
15540	V	39.67	---	9.87	49.54	---	74	54	-4.46
---	V	---	---	---	---	----	---	---	---
11ac(VHT20) 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	40.25	---	7.97	48.22	---	68.2	---	-19.98
15600	H	38.96	---	9.83	48.79	---	74	54	-5.21
---	H	---	---	---	---	---	---	---	---
10400	V	39.87	---	7.97	47.84	---	68.2	---	-20.36
15600	V	38.59	---	9.83	48.42	---	74	54	-5.58
---	V	---	---	---	---	----	---	---	---
11ac(VHT20) CH48:5240									
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	37.74	---	7.97	45.71	---	68.2	---	-22.49
15720	H	37.89	---	9.83	47.72	---	74	54	-6.28
---	H	---	---	---	---	---	---	---	---
10480	V	39.17	---	7.97	47.14	---	68.2	---	-21.06
15720	V	39.09	---	9.83	48.92	---	74	54	-5.08
---	V	---	---	---	---	----	---	---	---
11ac(VHT40) CH38:5190									
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)			
10380	H	40.94	---	7.75	48.69	---	68.2	---	-19.51
15570	H	39.72	---	9.87	49.59	---	74	54	-4.41
---	H	---	---	---	---	---	---	---	---
10380	V	38.46	---	7.75	46.21	---	68.2	---	-21.99
15570	V	39.06	---	9.87	48.93	---	74	54	-5.07
---	V	---	---	---	---	----	---	---	---

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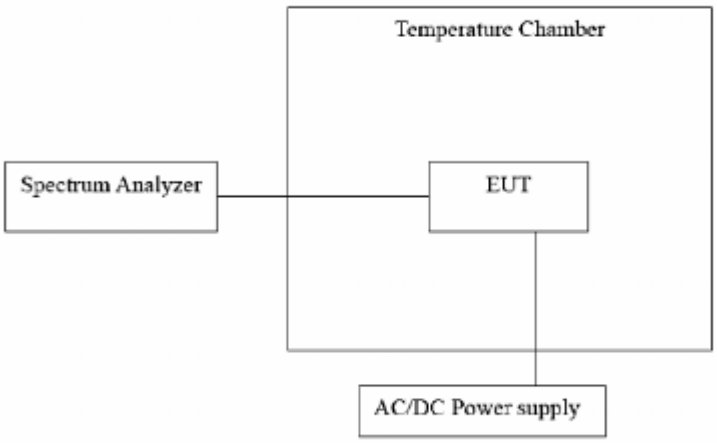
11ac(VHT40) CH46:5230									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBµV)	AV reading (dBµV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBµV/m)	AV limit (dBµV/m)	Margin (dB)
					Peak (dBµV/m)	AV (dBµV/m)			
10460	H	38.91	---	7.97	46.88	---	68.2	---	-21.32
15690	H	38.62	---	9.83	48.45	---	74	54	-5.55
---	H	---	---	---	---	---	---	---	---
10460	V	39.53	---	7.97	47.5	---	68.2	---	-20.7
15690	V	37.94	---	9.83	47.77	---	74	54	-6.23
---	V	---	---	---	---	----	---	---	---
11ac(VHT80) CH42:5210									
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)			
10420	H	41.37	---	7.96	49.33	---	68.2	---	-18.87
15630	H	39.97	---	9.84	49.81	---	74	54	-4.19
---	H	---	---	---	---	---	---	---	---
10420	V	42.08	---	7.96	50.04	---	68.2	---	-18.16
15630	V	39.76	---	9.84	49.6	---	74	54	-4.4
---	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.*

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: 2013
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
Remark:	Pre-scan was performed at all models(11a,11n,11ac), the worst case (11ac) was found and test data was shown in this report.

Test plots as follows:

Test mode:	802.11ac(VHT20)	Frequency(MHz):	5180

Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5179.98	-20000	PASS
35		5180	0	PASS
25		5179.98	-20000	PASS
15		5180	0	PASS
5		5180	0	PASS
0		5180	0	PASS
20	3.3	5180	0	PASS
	3.8	5180	0	PASS
	4.35	5180	0	PASS

Test mode:	802.11ac(VHT20)	Frequency(MHz):	5240

Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5240	0	PASS
35		5240	0	PASS
25		5240	0	PASS
15		5239.98	-20000	PASS
5		5240	0	PASS
0		5240	0	PASS
20	3.3	5240	0	PASS
	3.8	5240.04	40000	PASS
	4.35	5240	0	PASS

Test mode:	802.11ac(VHT40)	Frequency(MHz):	5190

Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5190	0	PASS
35		5190	0	PASS
25		5190	0	PASS
15		5190	0	PASS
5		5190	0	PASS
0		5190	0	PASS
20	3.3	5190	0	PASS
	3.8	5190	0	PASS
	4.35	5190.04	40000	PASS

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Test mode:	802.11ac(VHT40)	Frequency(MHz):	5230

Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5230	0	PASS
35		5230	0	PASS
25		5230.16	160000	PASS
15		5230.12	120000	PASS
5		5230	0	PASS
0		5230	0	PASS
20	3.3	5230	0	PASS
	3.8	5230	0	PASS
	4.35	5230	0	PASS

Test mode:	802.11ac(VHT80)	Frequency(MHz):	5210

Temperature (°C)	Voltage(VDC)	Measurement Frequency(MHz)	Delta Frequency(Hz)	Result
45	3.8V	5210.08	80000	PASS
35		5210.08	80000	PASS
25		5210	0	PASS
15		5210.08	80000	PASS
5		5210.16	160000	PASS
0		5210.16	160000	PASS
20	3.3	5210.08	80000	PASS
	3.8	5210	0	PASS
	4.35	5210	0	PASS

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Appendix A: Test Result of Conducted Test

Duty Cycle

Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)
NVNT	a	5180	100	0
NVNT	a	5200	100	0
NVNT	a	5240	100	0
NVNT	n20	5180	100	0
NVNT	n20	5200	100	0
NVNT	n20	5240	100	0
NVNT	n40	5190	100	0
NVNT	n40	5230	100	0
NVNT	ac20	5180	100	0
NVNT	ac20	5200	100	0
NVNT	ac20	5240	100	0
NVNT	ac40	5190	100	0
NVNT	ac40	5230	100	0
NVNT	ac80	5210	100	0

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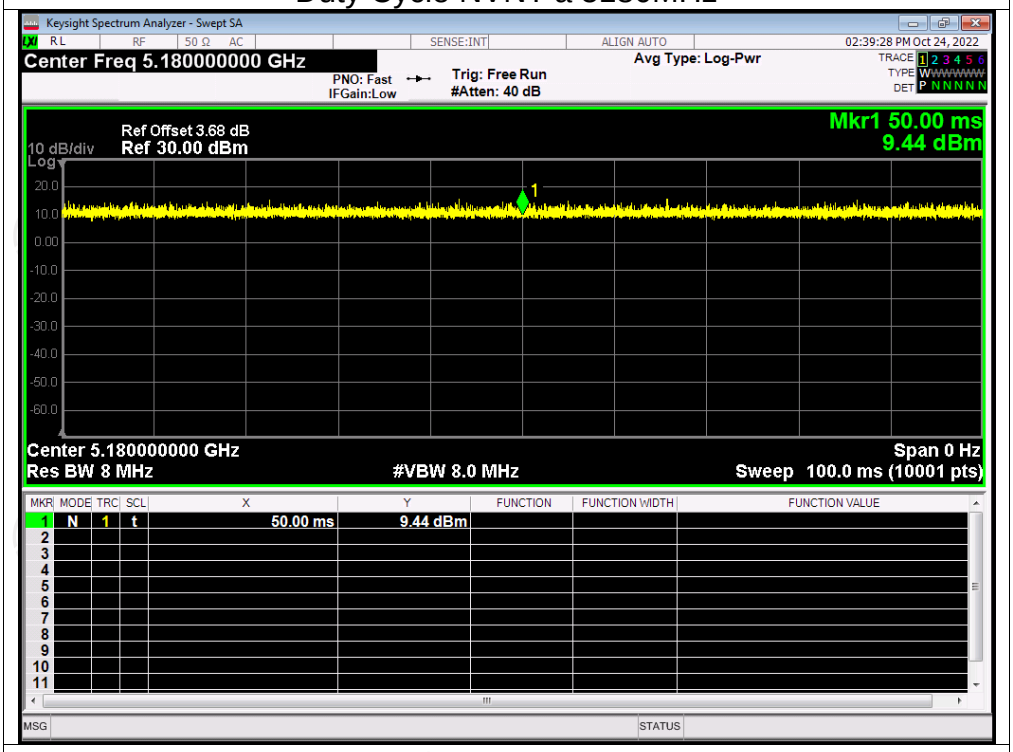
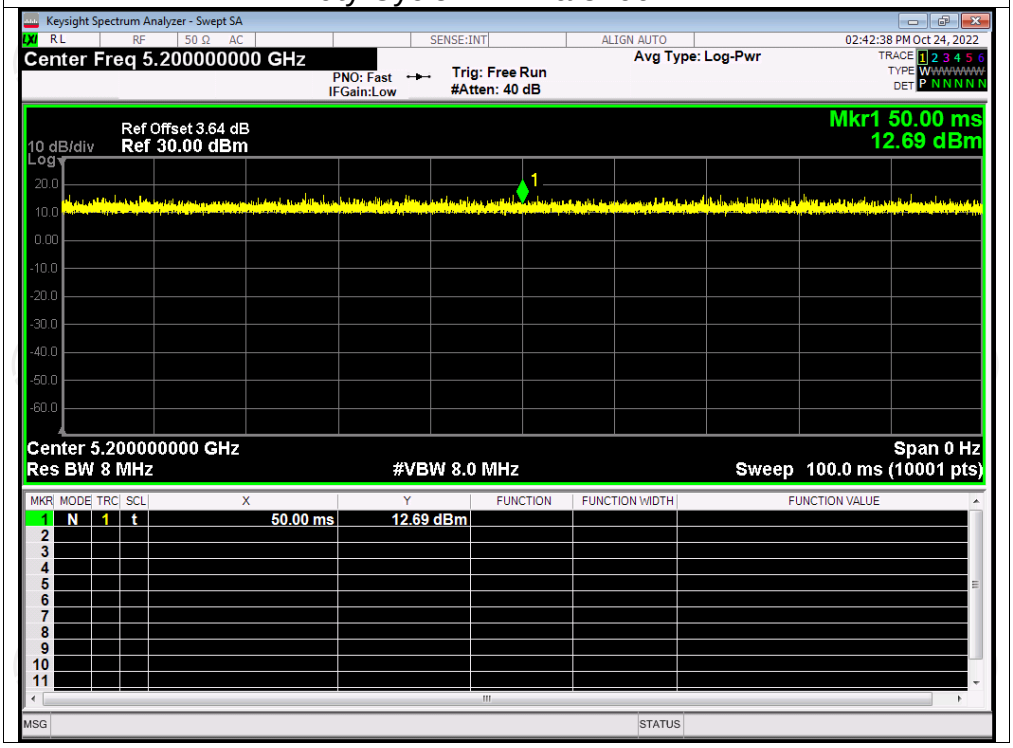
Test Graphs

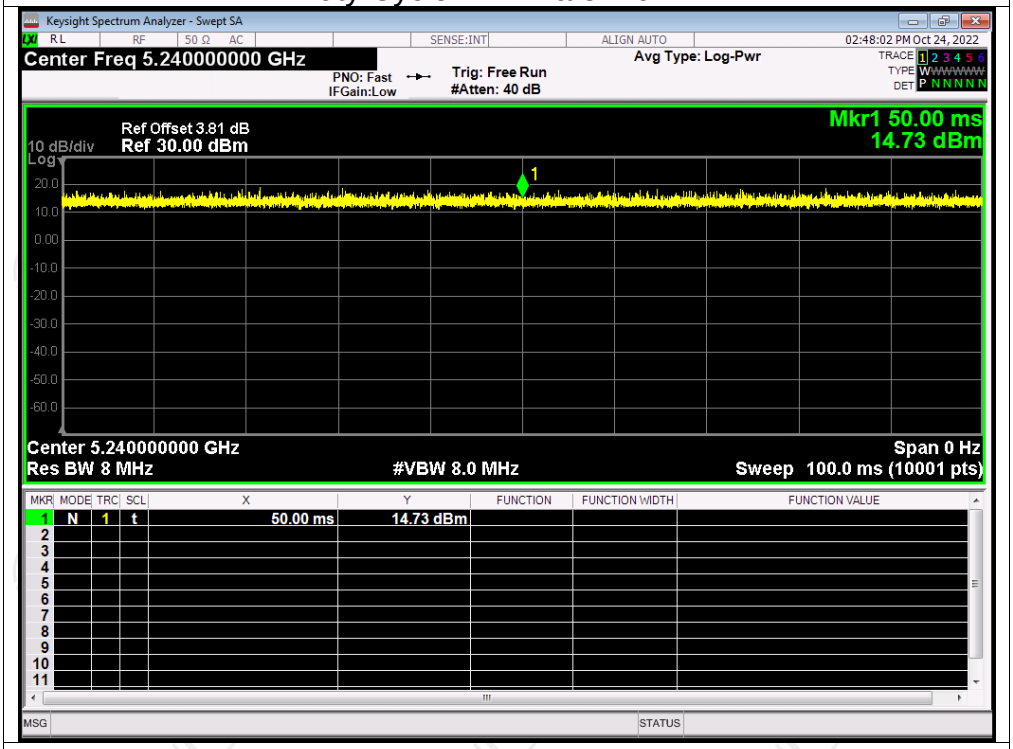
Duty Cycle NVNT a 5180MHz



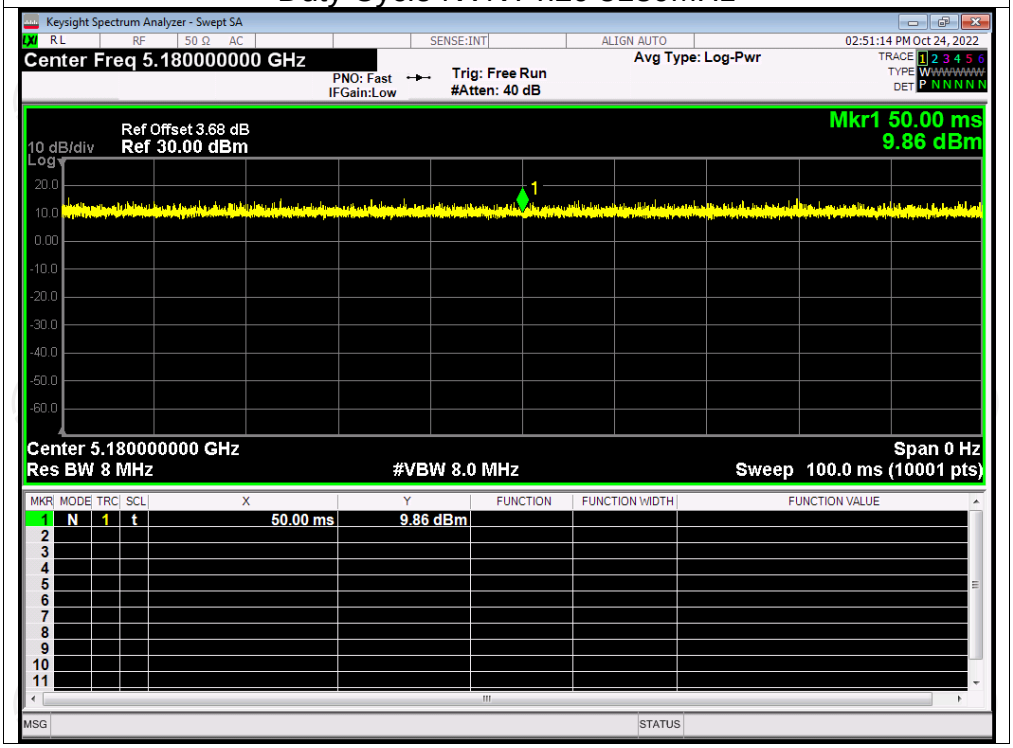
Duty Cycle NVNT a 5200MHz



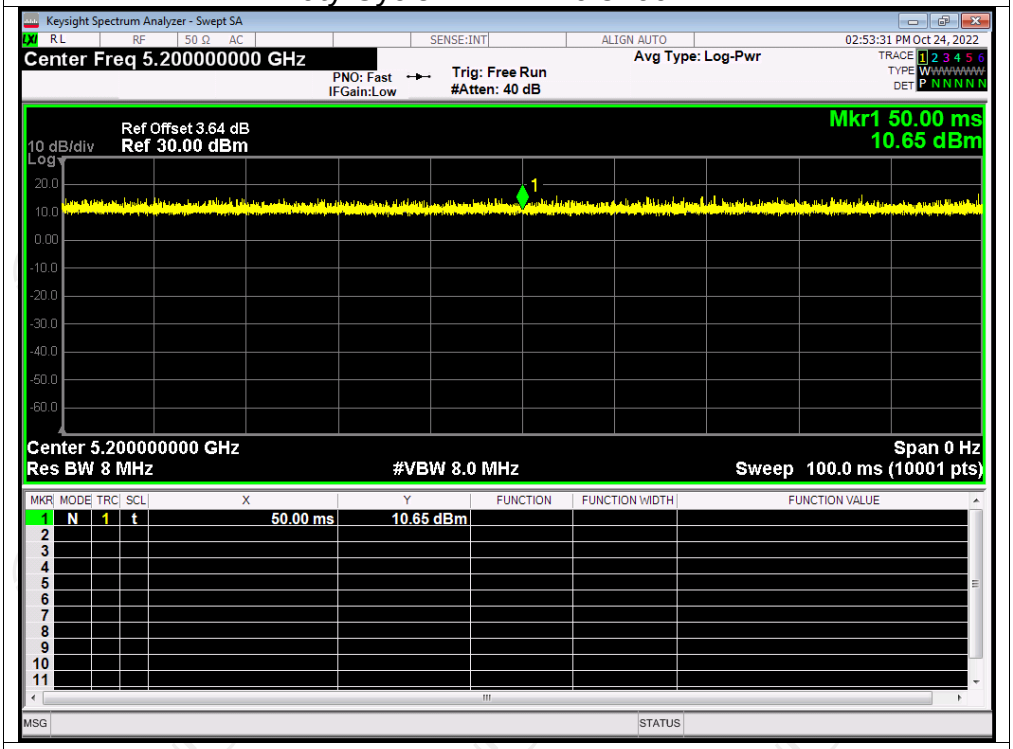
Duty Cycle NVNT a 5240MHz



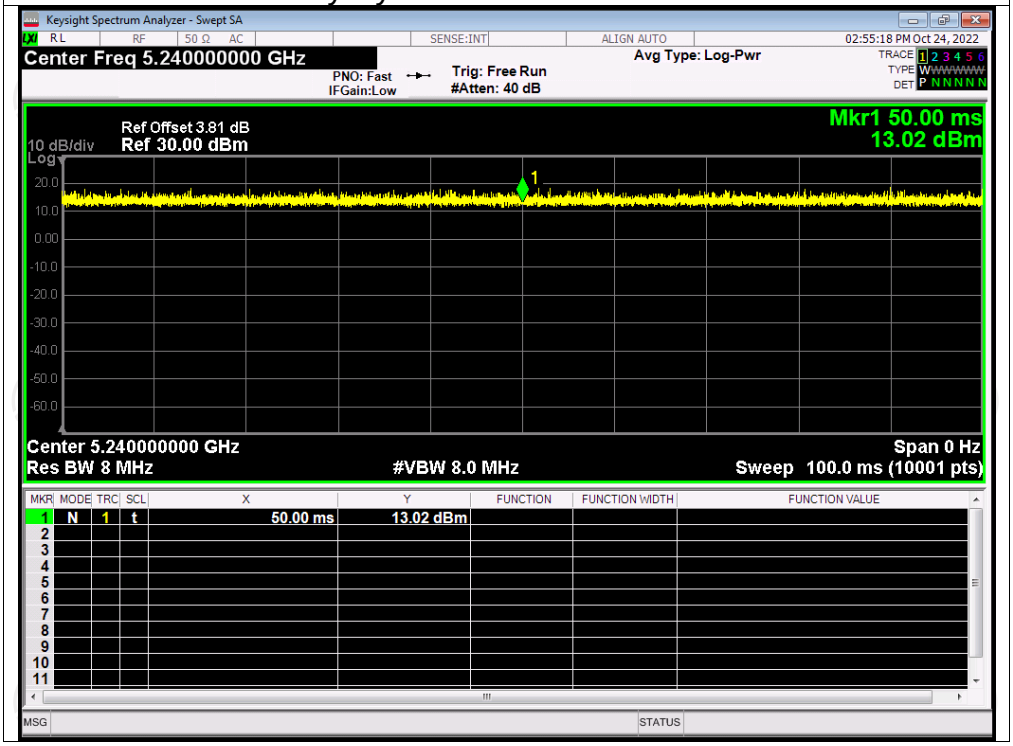
Duty Cycle NVNT n20 5180MHz



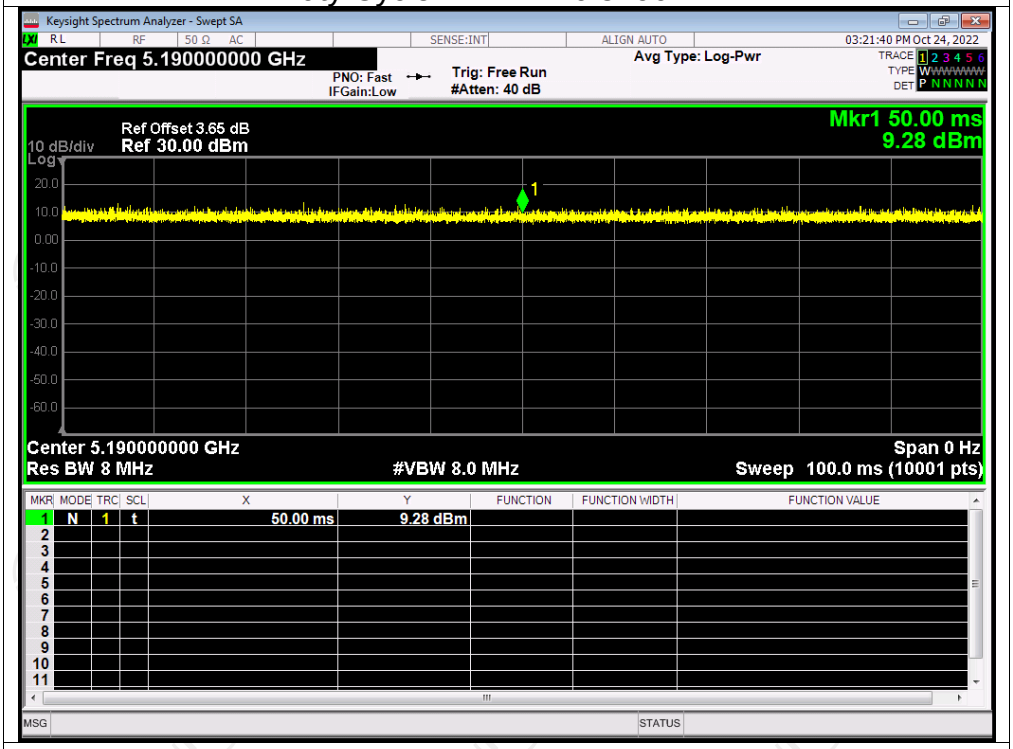
Duty Cycle NVNT n20 5200MHz



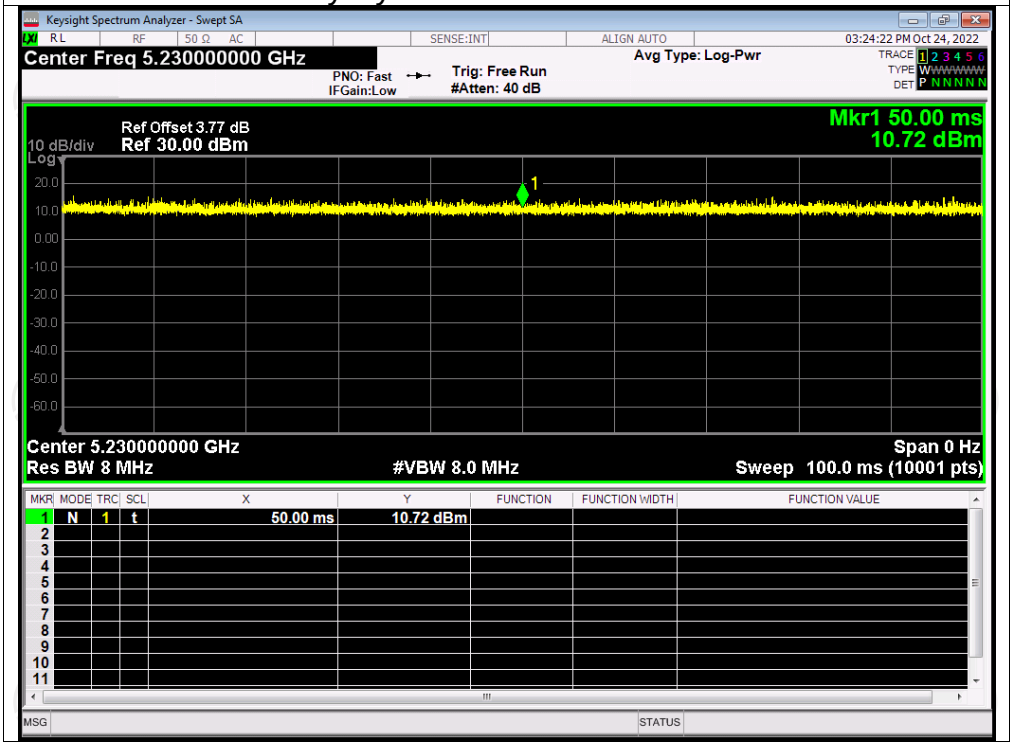
Duty Cycle NVNT n20 5240MHz



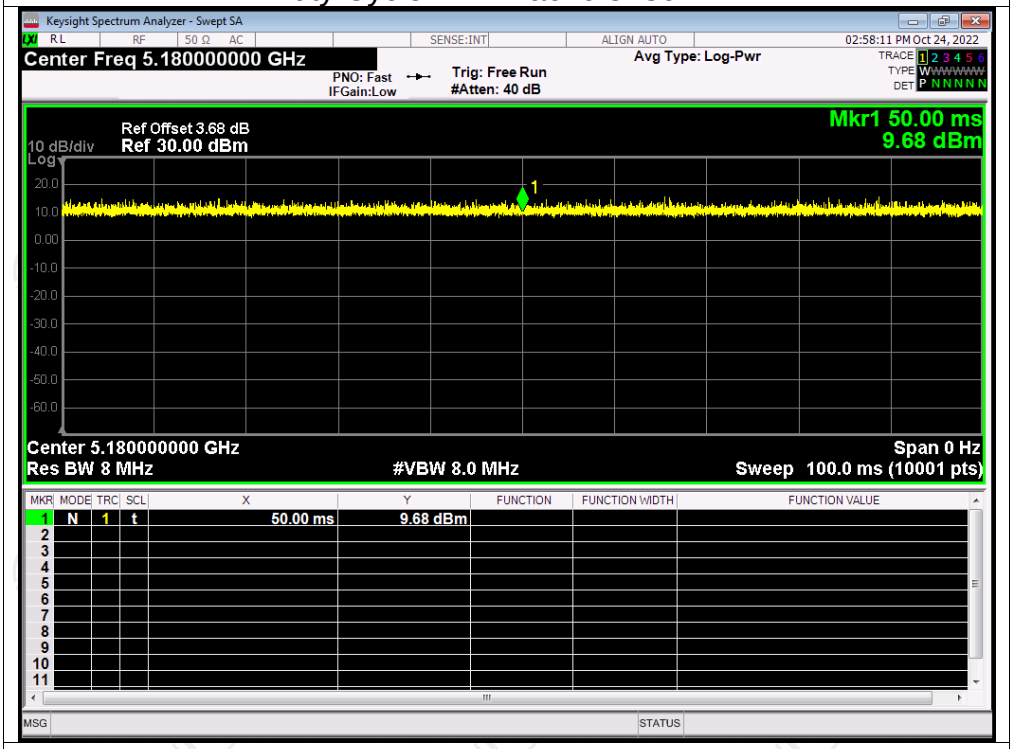
Duty Cycle NVNT n40 5190MHz



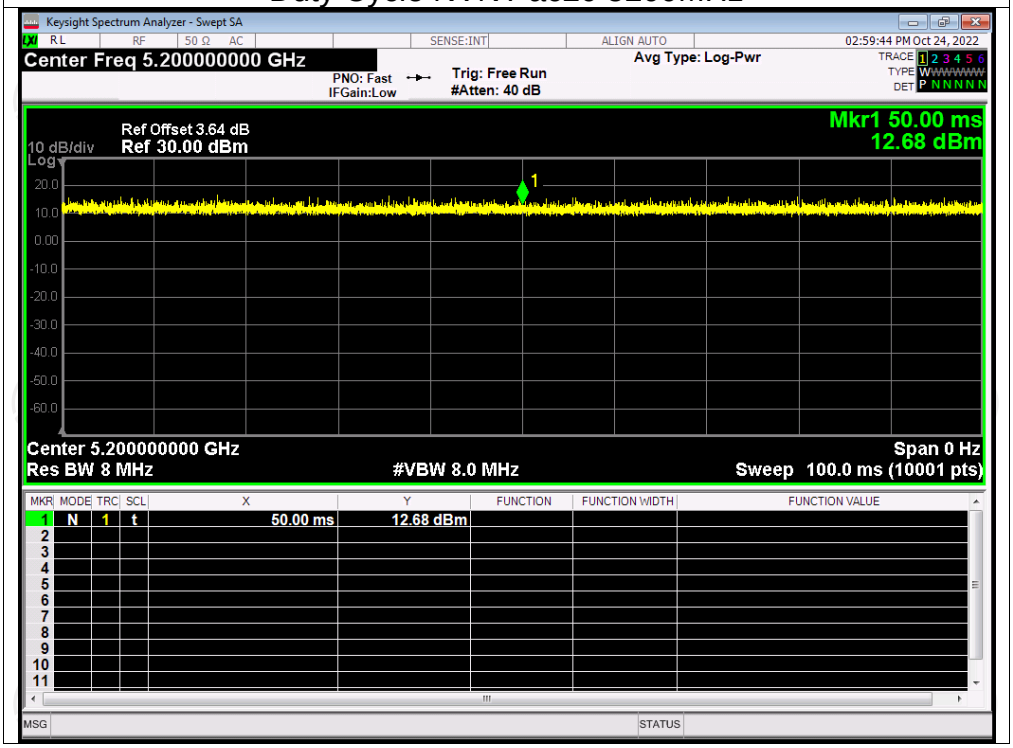
Duty Cycle NVNT n40 5230MHz



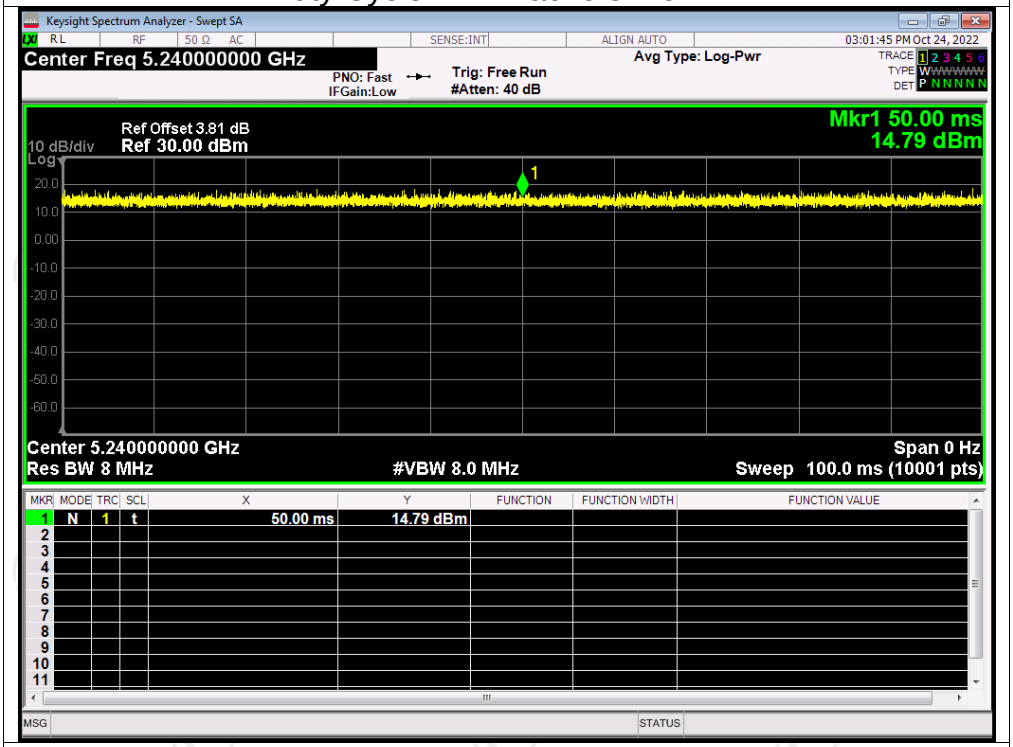
Duty Cycle NVNT ac20 5180MHz



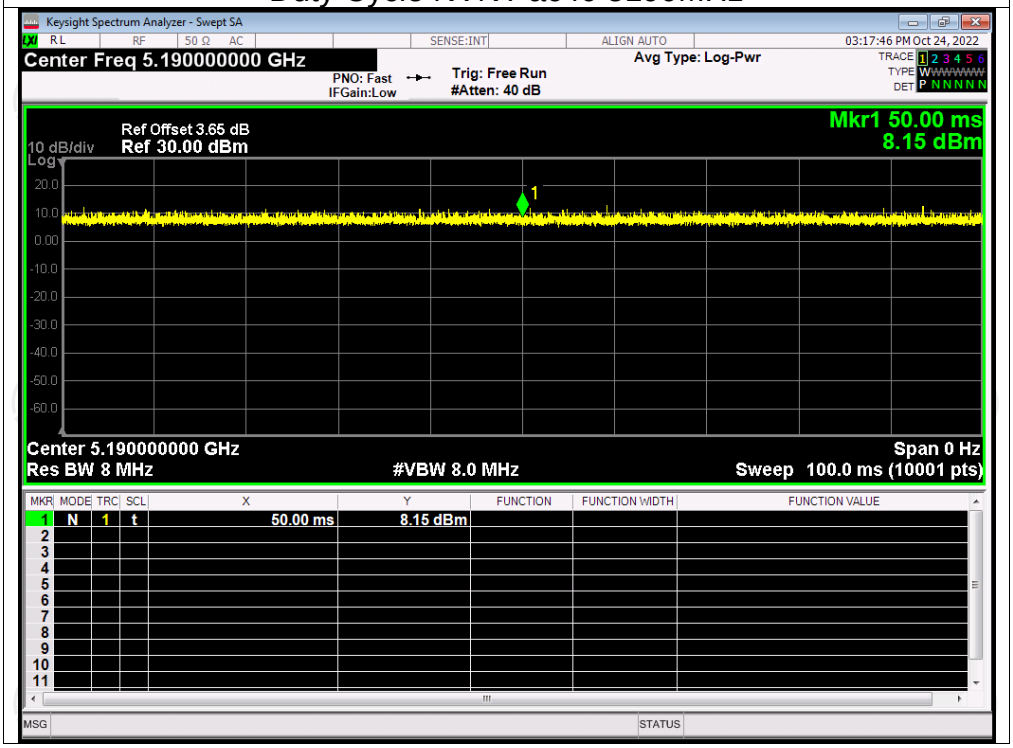
Duty Cycle NVNT ac20 5200MHz



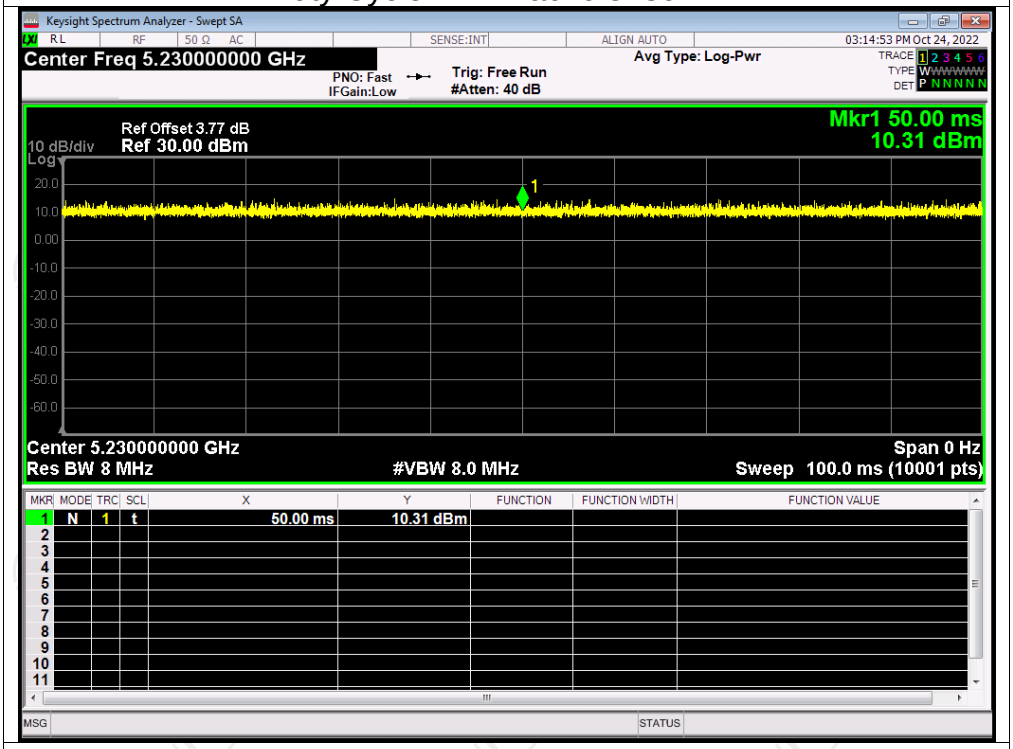
Duty Cycle NVNT ac20 5240MHz



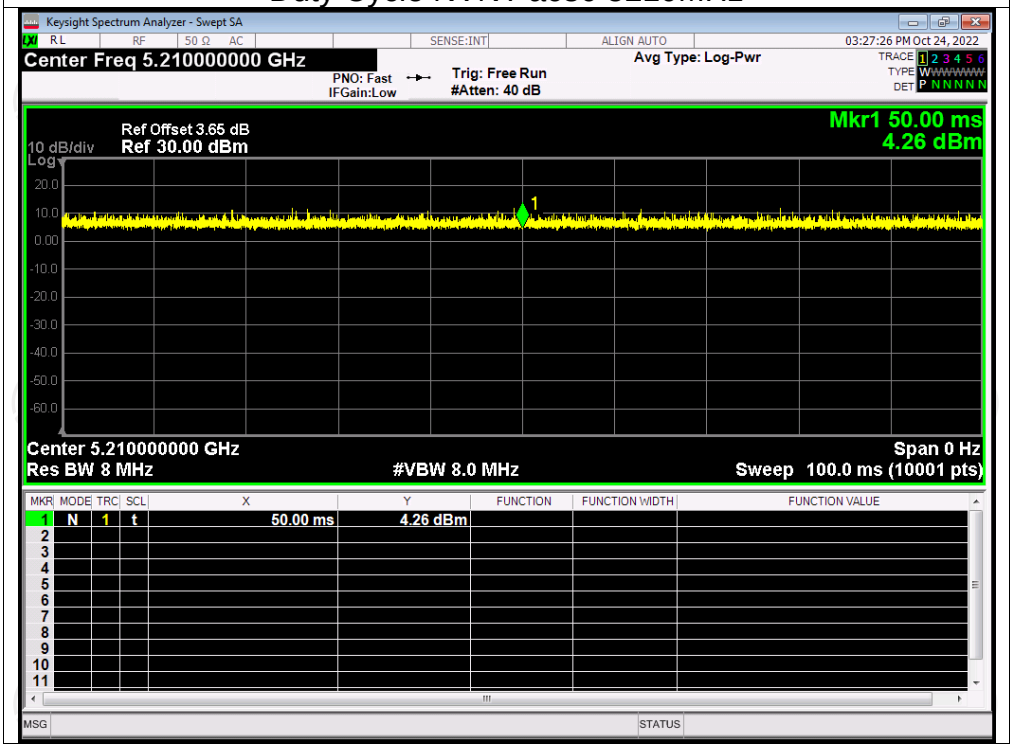
Duty Cycle NVNT ac40 5190MHz



Duty Cycle NVNT ac40 5230MHz



Duty Cycle NVNT ac80 5210MHz

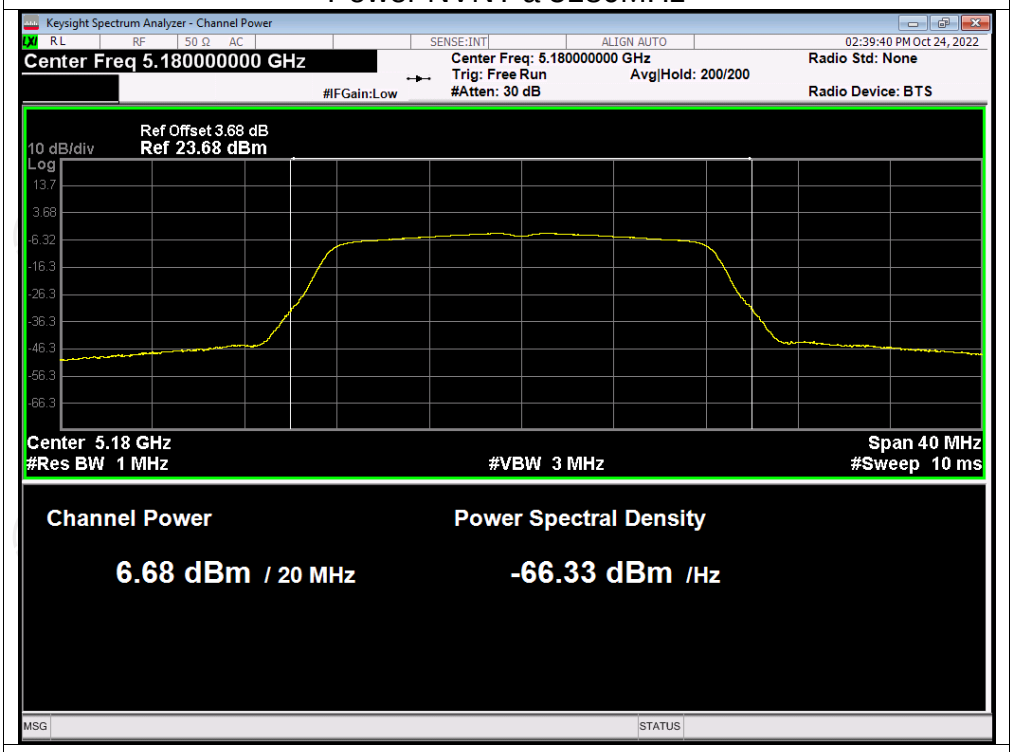


Maximum Conducted Output Power

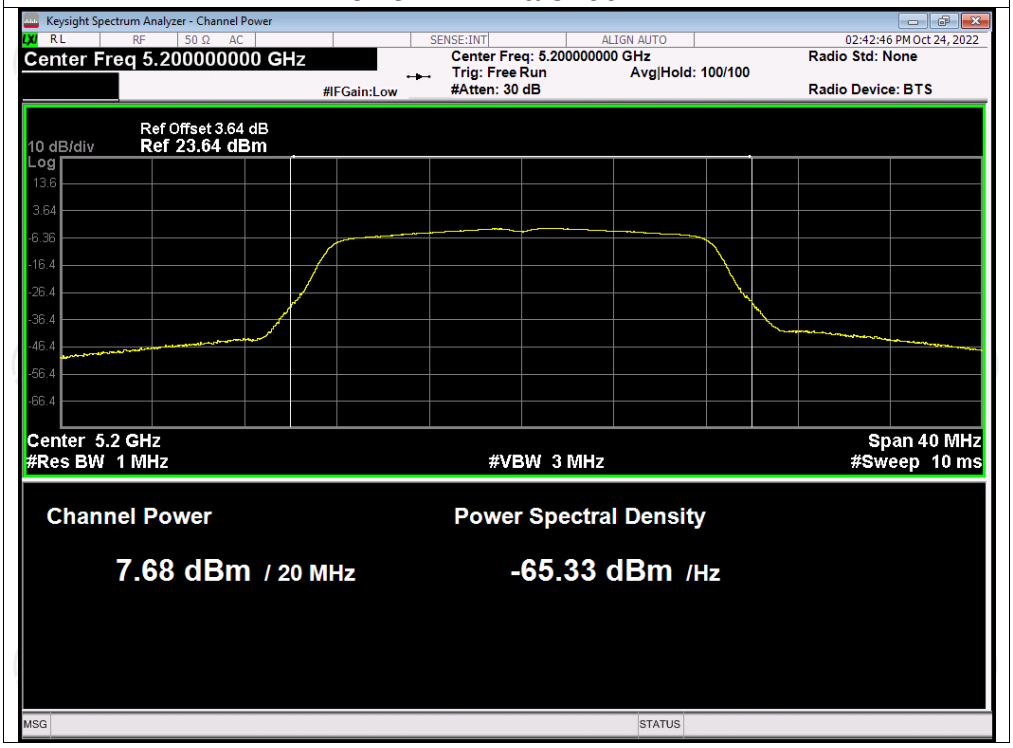
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	6.68	24	Pass
NVNT	a	5200	7.68	24	Pass
NVNT	a	5240	9.90	24	Pass
NVNT	n20	5180	6.70	24	Pass
NVNT	n20	5200	7.56	24	Pass
NVNT	n20	5240	10.05	24	Pass
NVNT	n40	5190	7.58	24	Pass
NVNT	n40	5230	9.72	24	Pass
NVNT	ac20	5180	6.97	24	Pass
NVNT	ac20	5200	7.66	24	Pass
NVNT	ac20	5240	10.12	24	Pass
NVNT	ac40	5190	7.09	24	Pass
NVNT	ac40	5230	9.33	24	Pass
NVNT	ac80	5210	8.84	24	Pass

Test Graphs

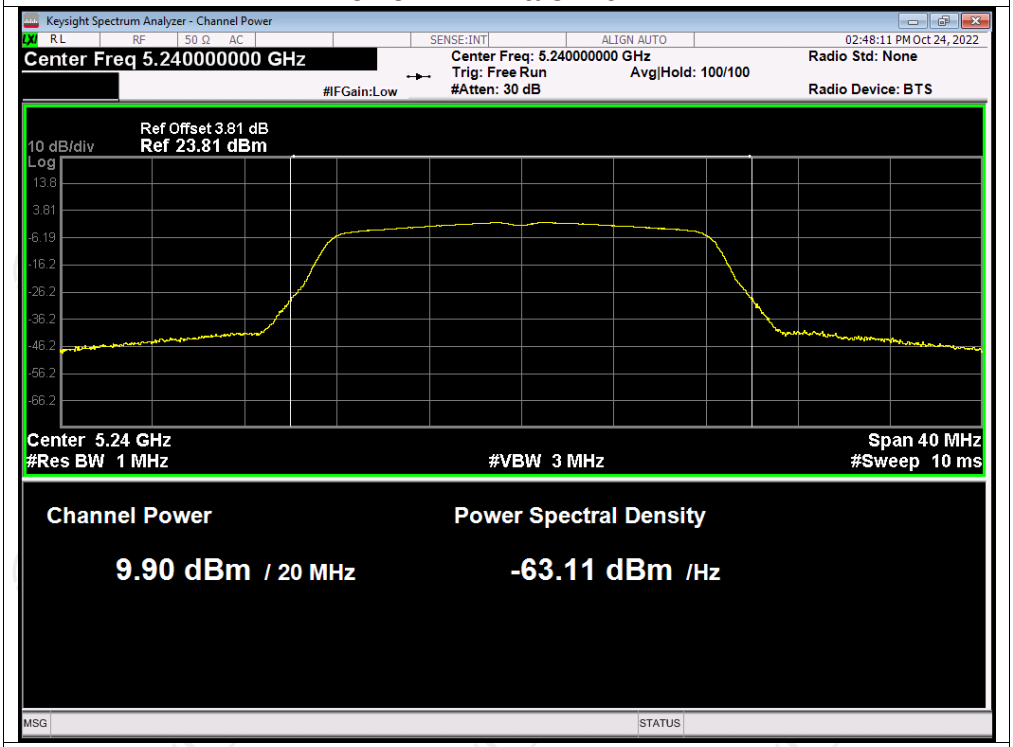
Power NVNT a 5180MHz



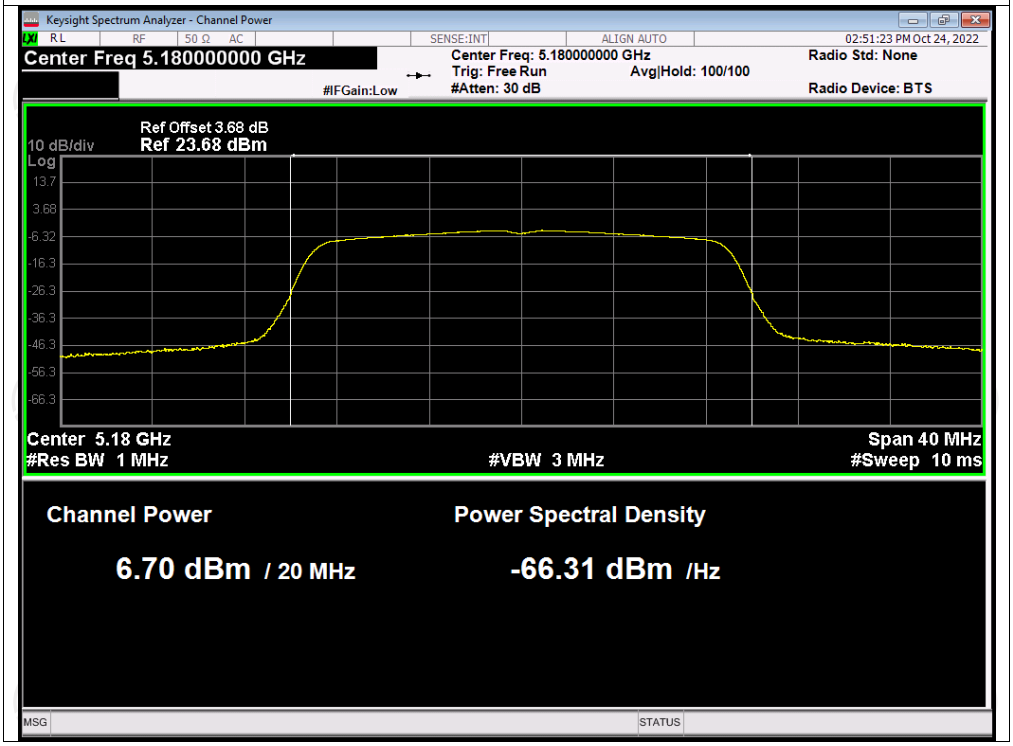
Power NVNT a 5200MHz



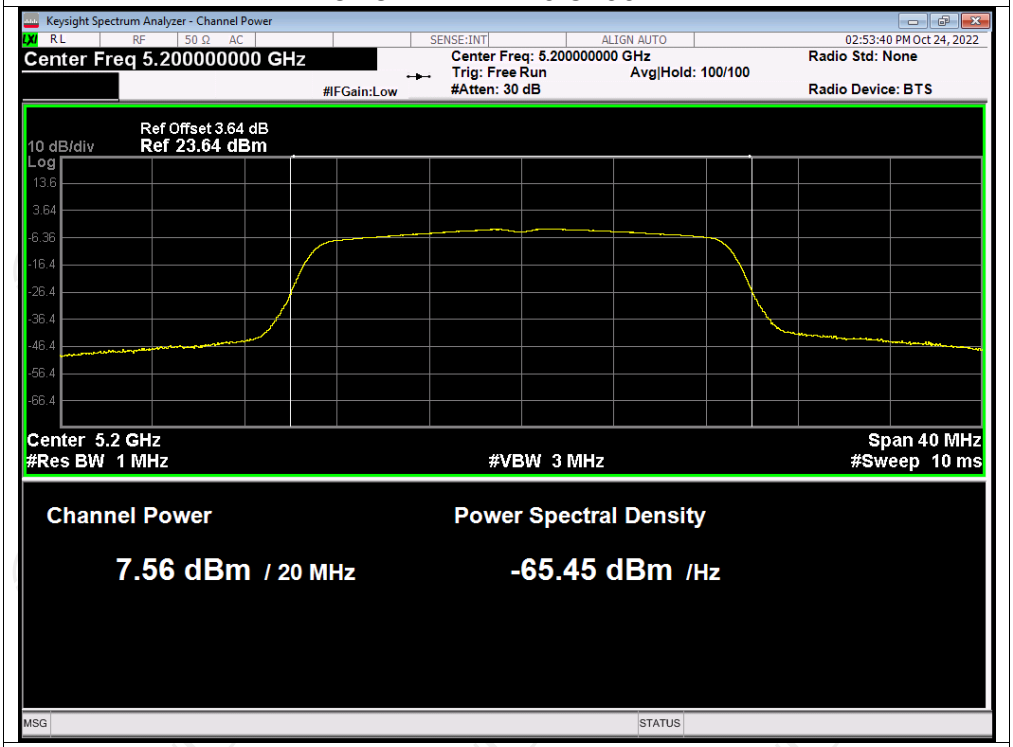
Power NVNT a 5240MHz



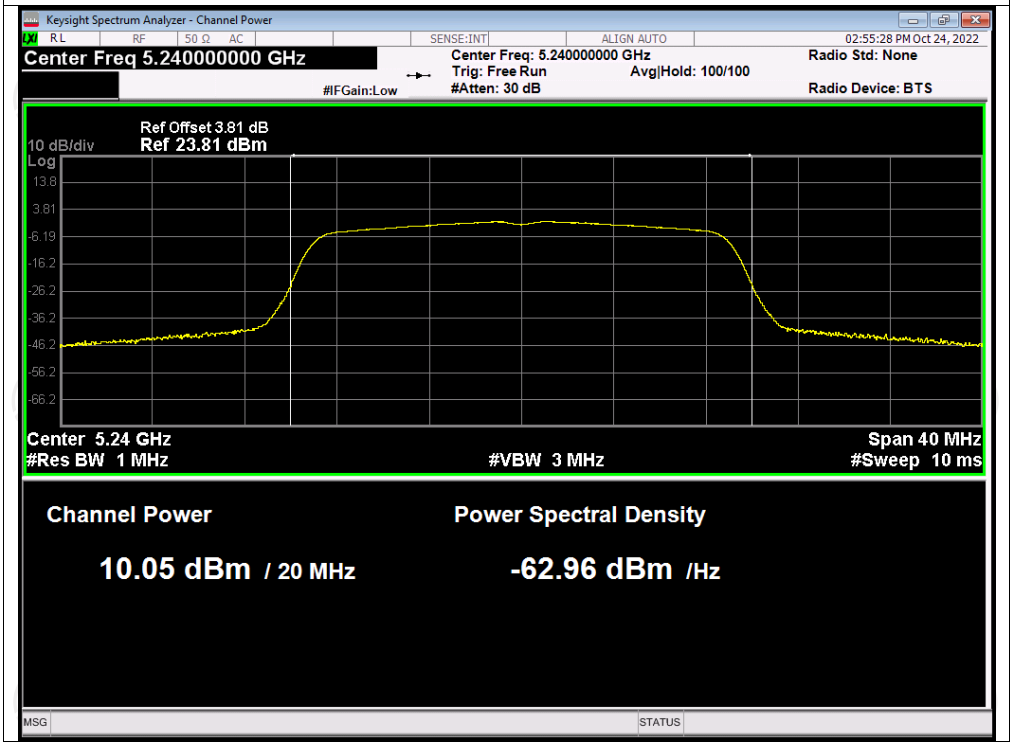
Power NVNT n20 5180MHz



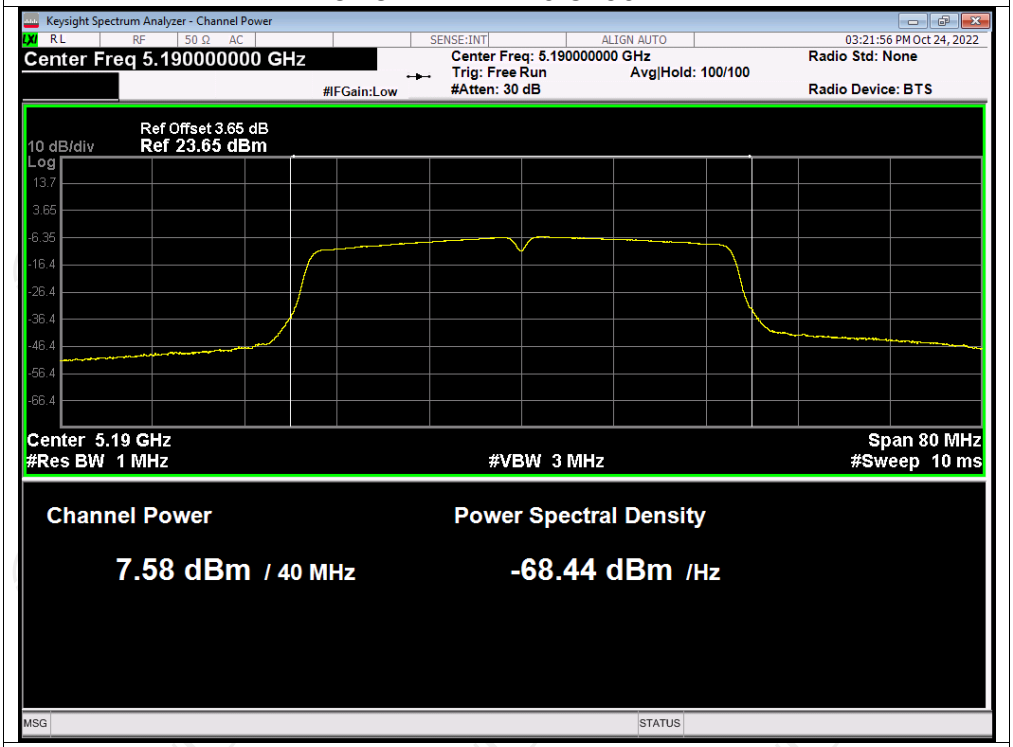
Power NVNT n20 5200MHz



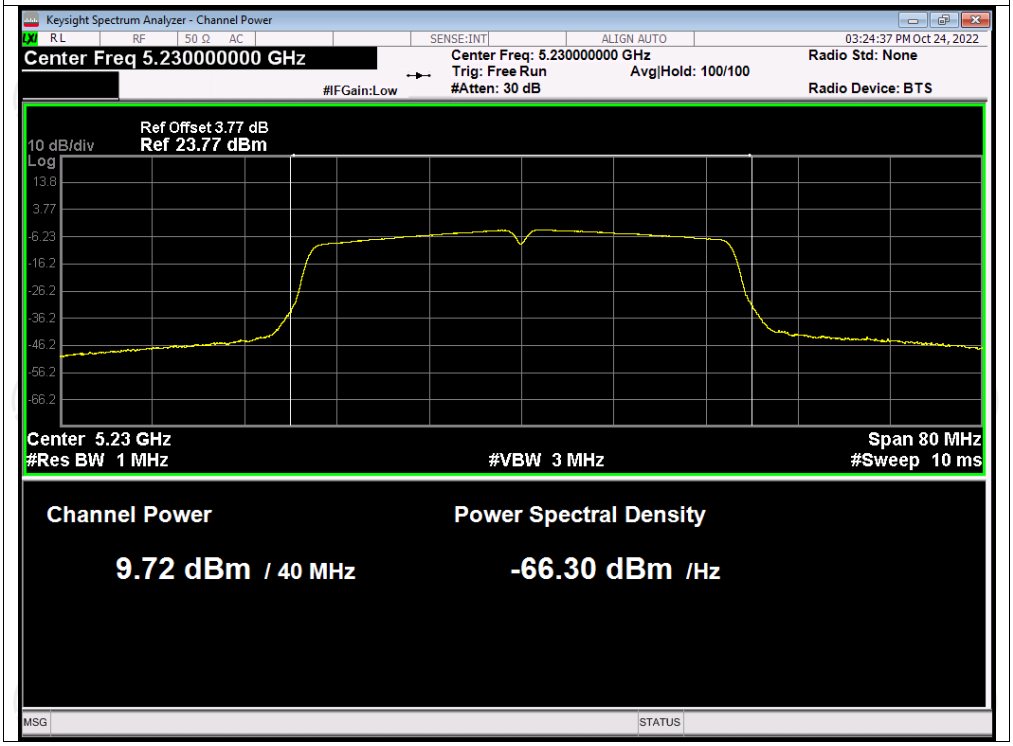
Power NVNT n20 5240MHz



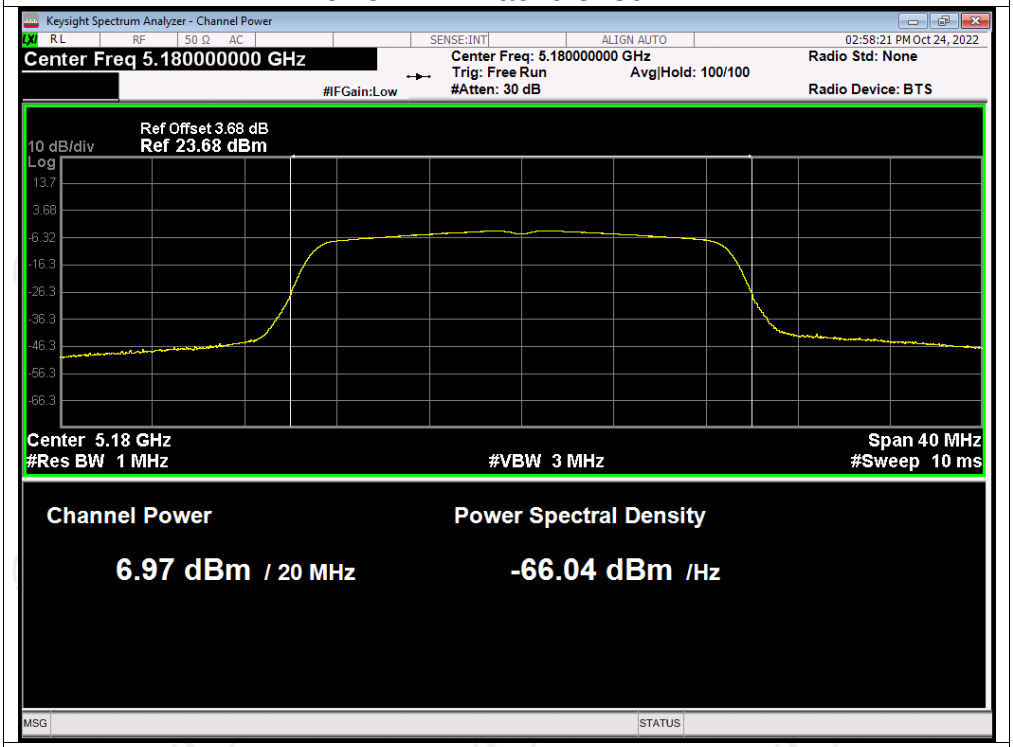
Power NVNT n40 5190MHz



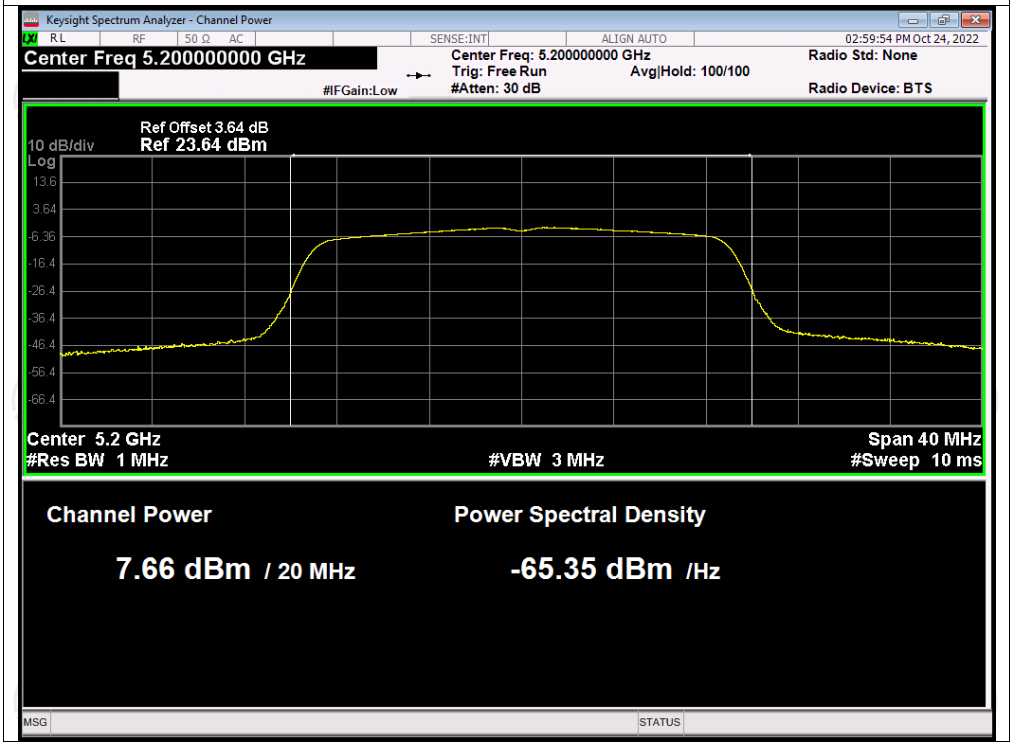
Power NVNT n40 5230MHz



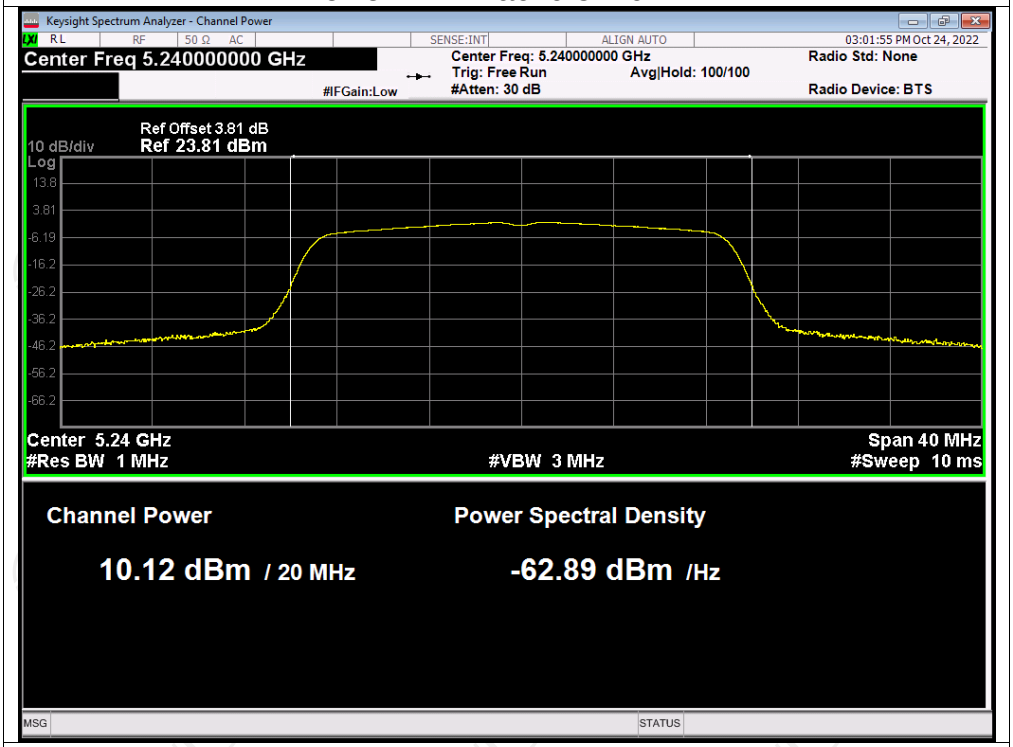
Power NVNT ac20 5180MHz



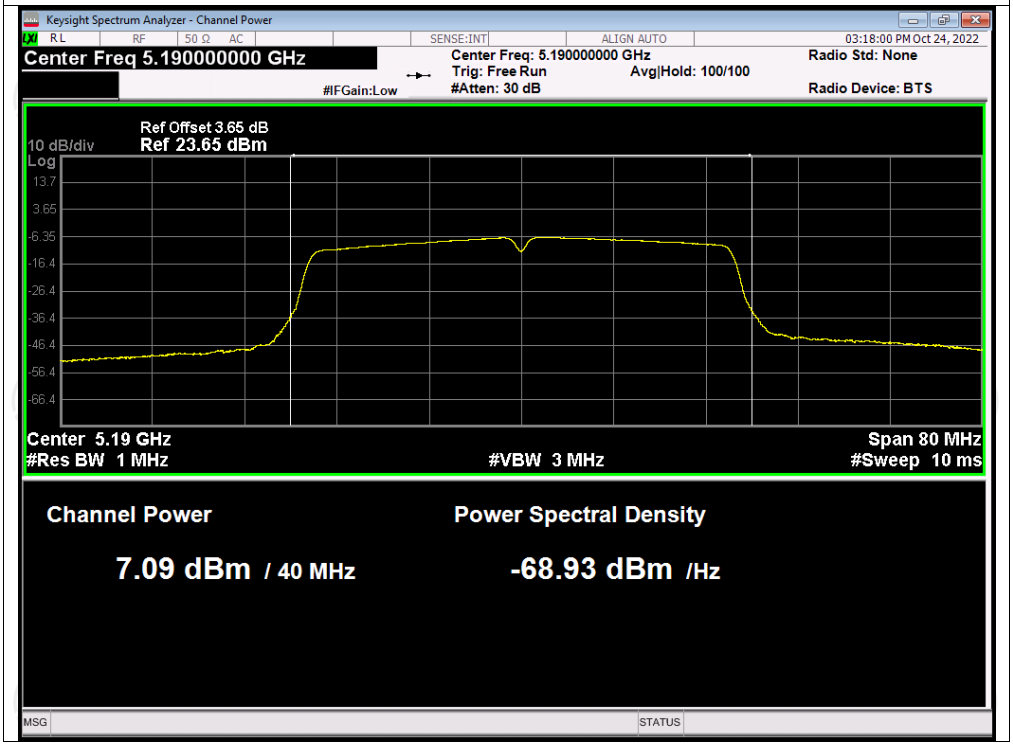
Power NVNT ac20 5200MHz



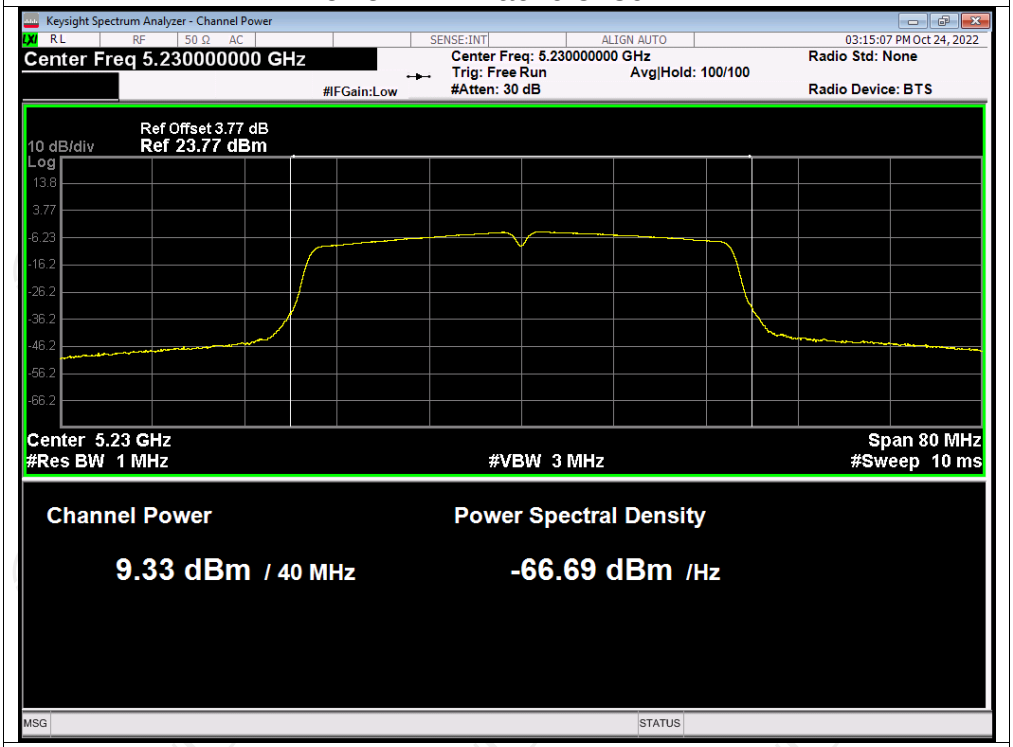
Power NVNT ac20 5240MHz



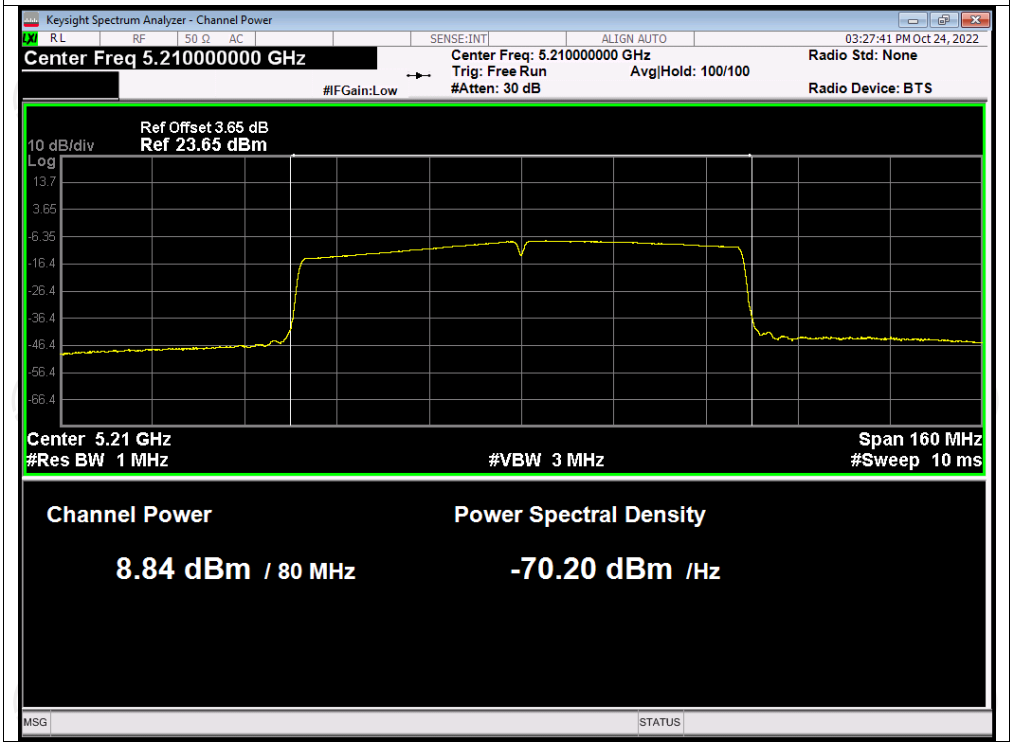
Power NVNT ac40 5190MHz



Power NVNT ac40 5230MHz



Power NVNT ac80 5210MHz



-26dB Bandwidth

Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	20.813	Pass
NVNT	a	5200	20.812	Pass
NVNT	a	5240	20.401	Pass
NVNT	n20	5180	20.719	Pass
NVNT	n20	5200	23.707	Pass
NVNT	n20	5240	20.795	Pass
NVNT	n40	5190	40.881	Pass
NVNT	n40	5230	40.822	Pass
NVNT	ac20	5180	20.708	Pass
NVNT	ac20	5200	20.633	Pass
NVNT	ac20	5240	21.857	Pass
NVNT	ac40	5190	41.371	Pass
NVNT	ac40	5230	40.905	Pass
NVNT	ac80	5210	88.710	Pass

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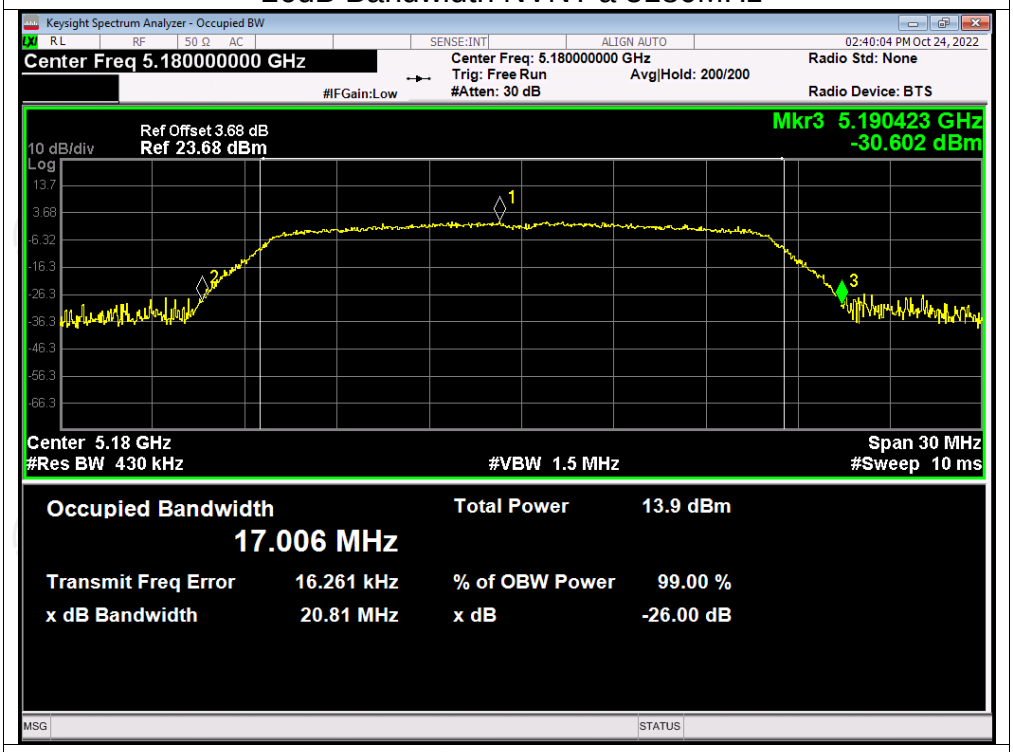
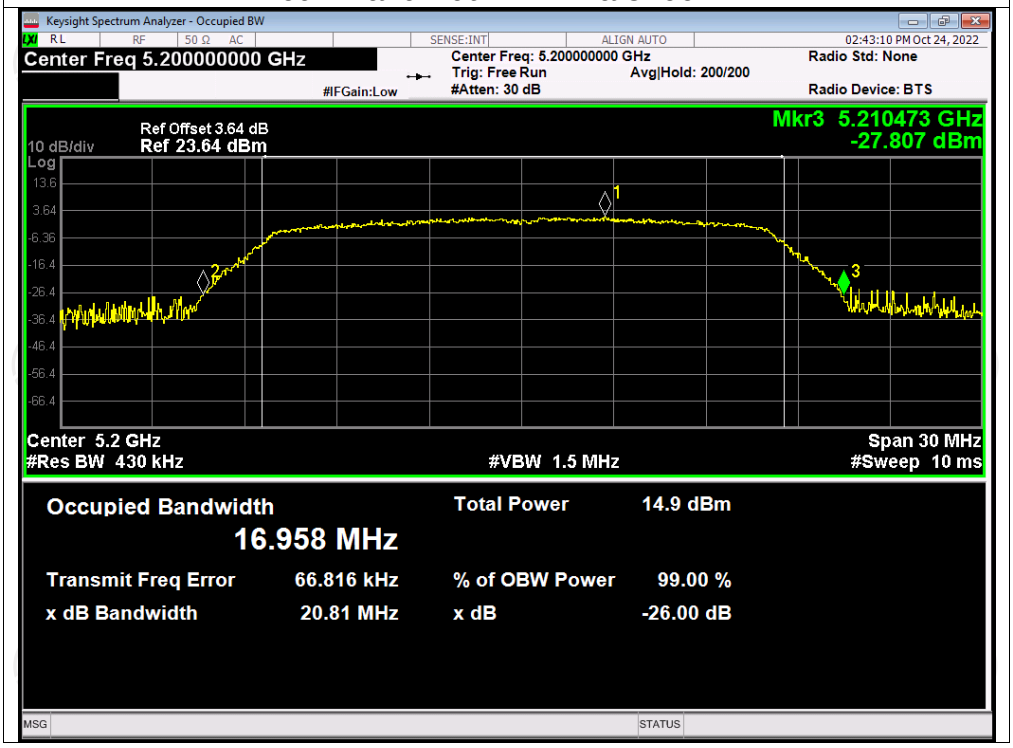
Test Graphs

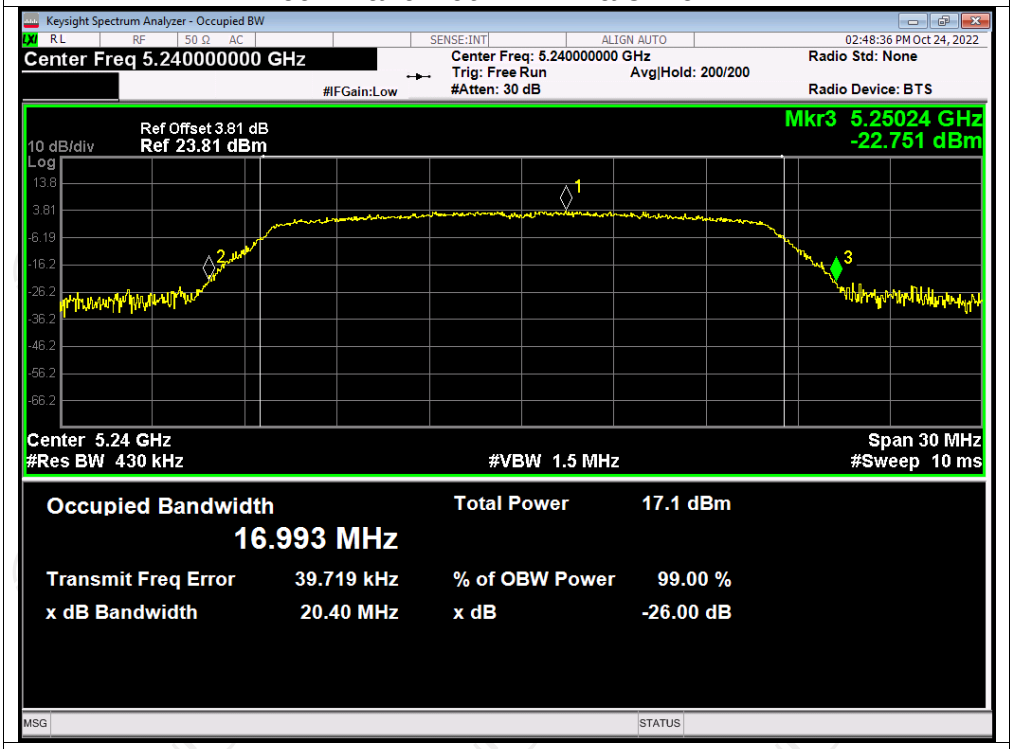
-26dB Bandwidth NVNT a 5180MHz



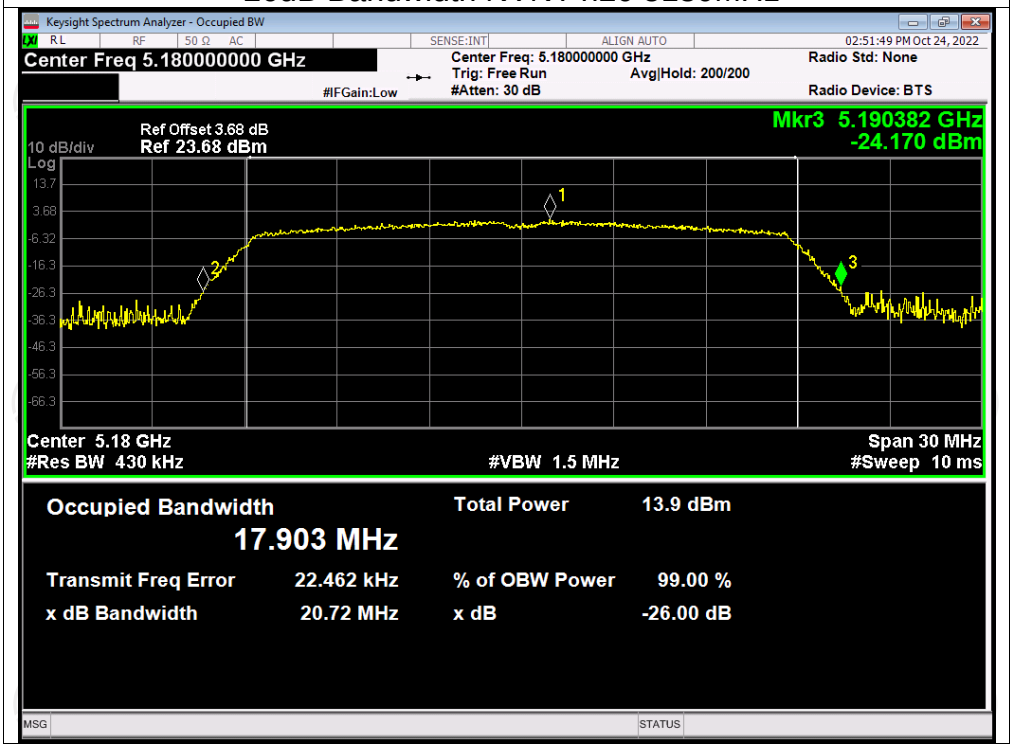
-26dB Bandwidth NVNT a 5200MHz



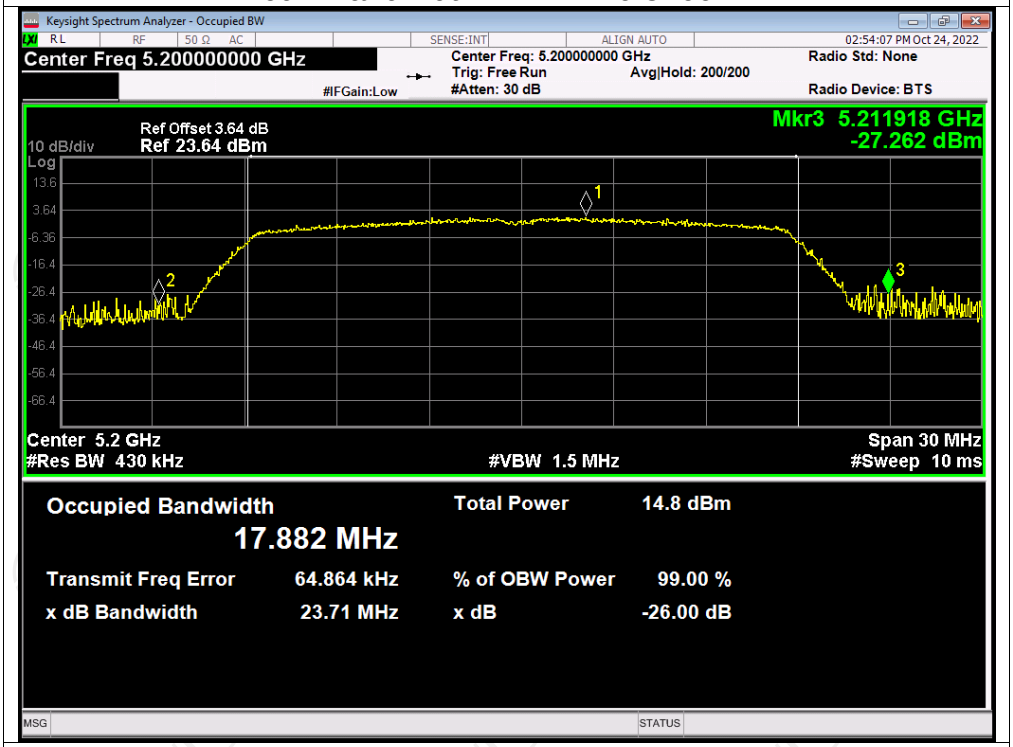
-26dB Bandwidth NVNT a 5240MHz



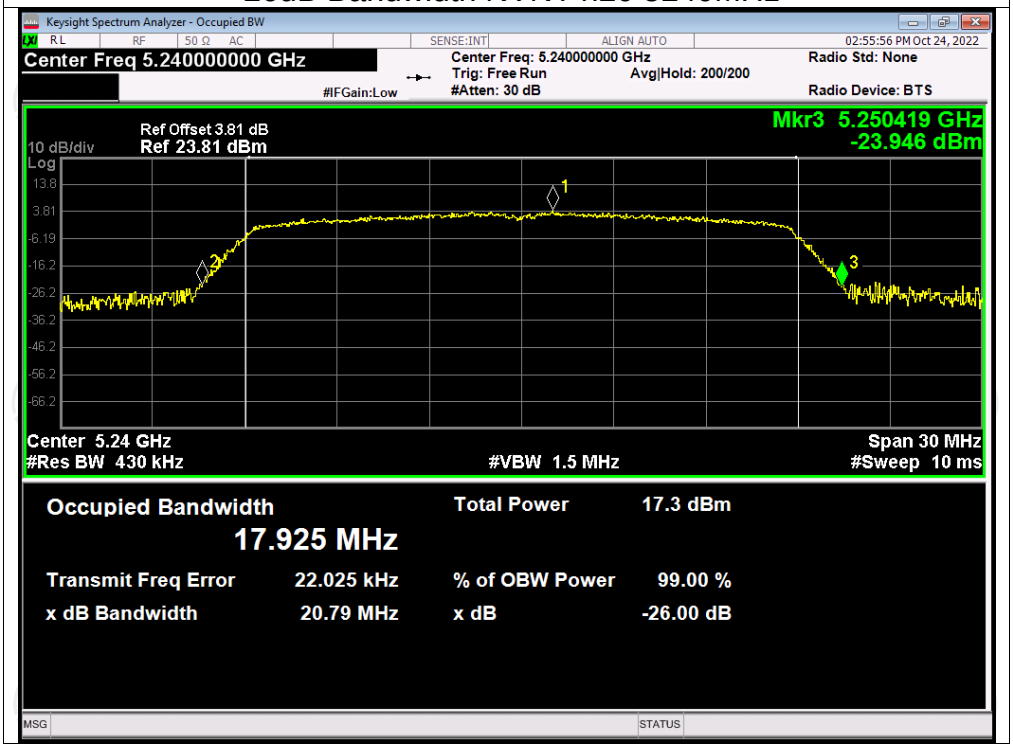
-26dB Bandwidth NVNT n20 5180MHz



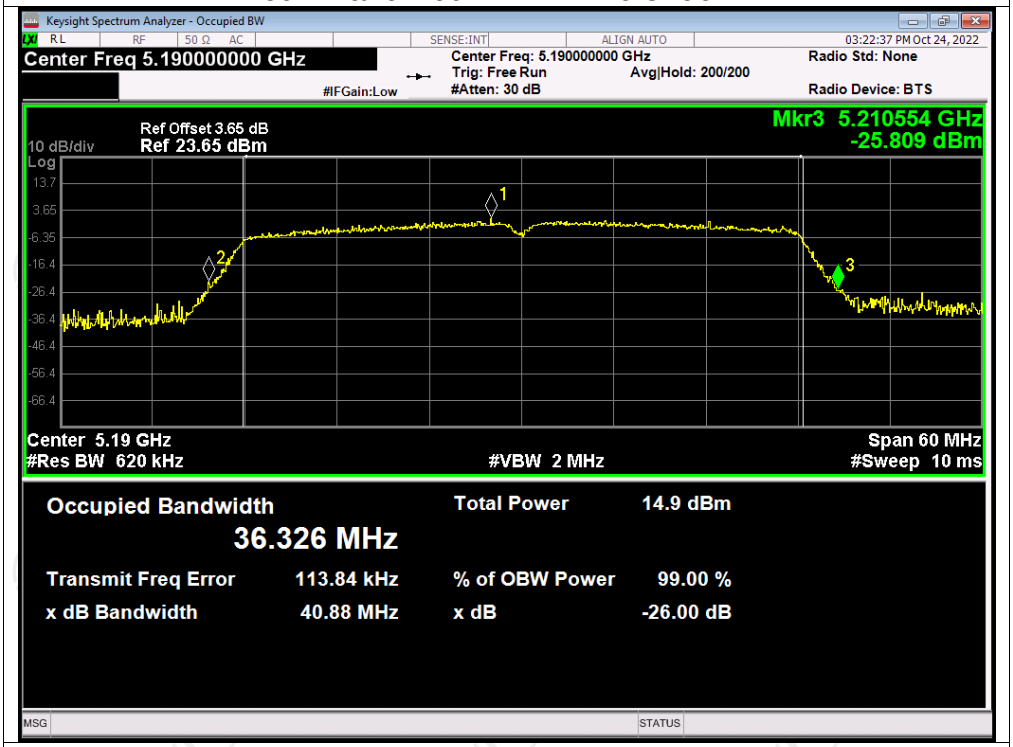
-26dB Bandwidth NVNT n20 5200MHz



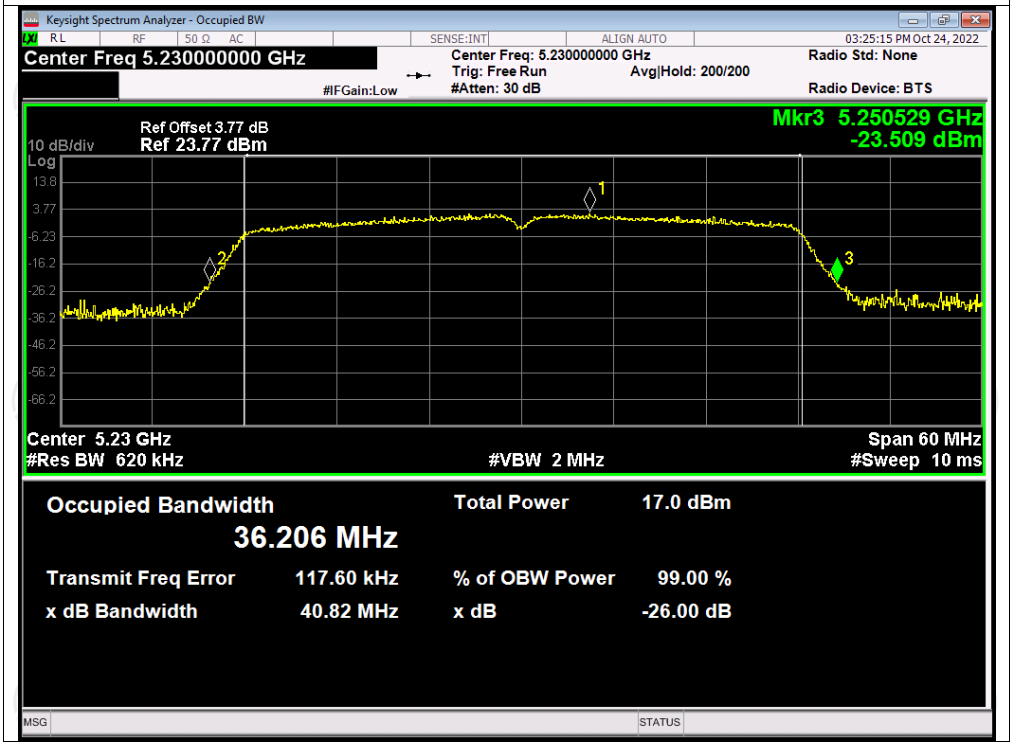
-26dB Bandwidth NVNT n20 5240MHz



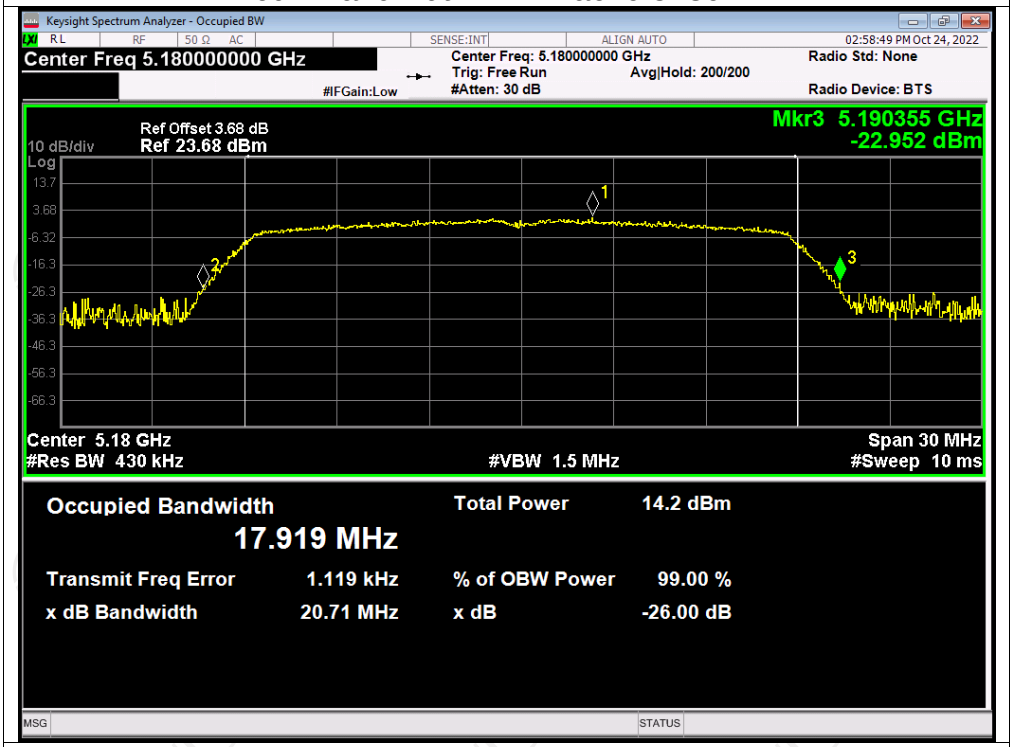
-26dB Bandwidth NVNT n40 5190MHz



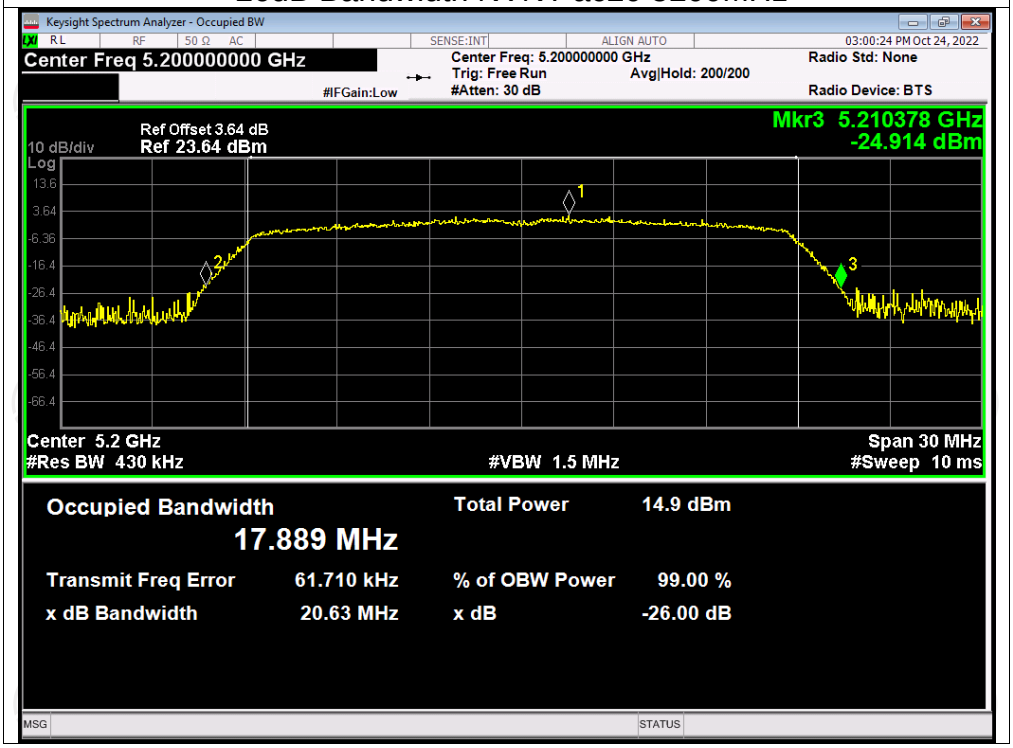
-26dB Bandwidth NVNT n40 5230MHz



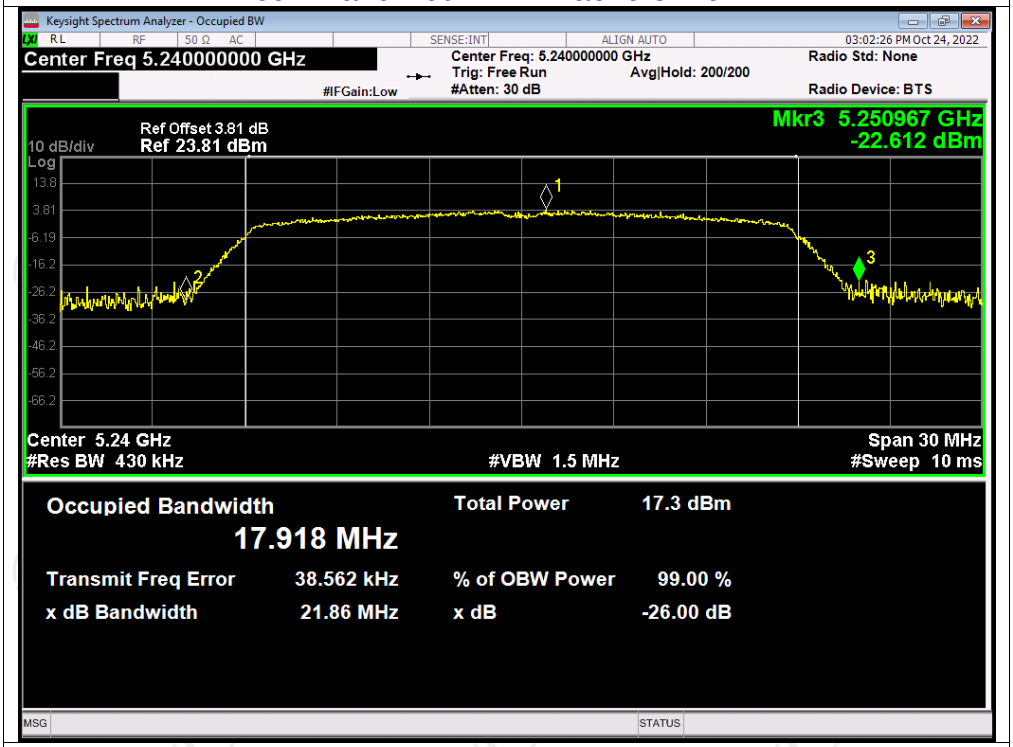
-26dB Bandwidth NVNT ac20 5180MHz



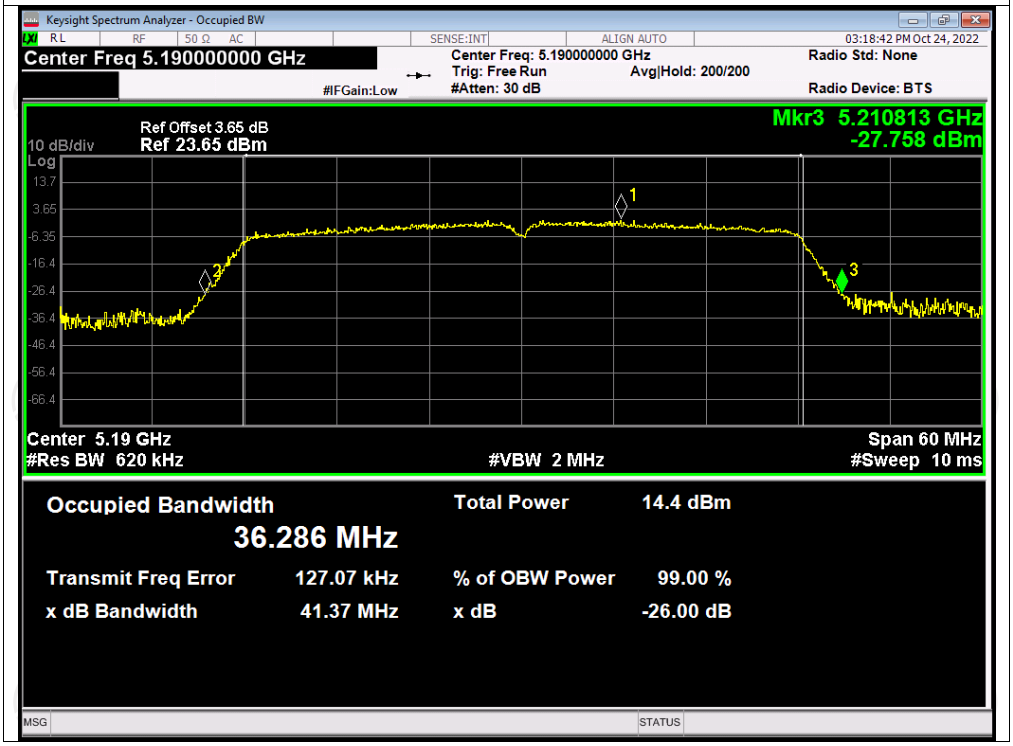
-26dB Bandwidth NVNT ac20 5200MHz



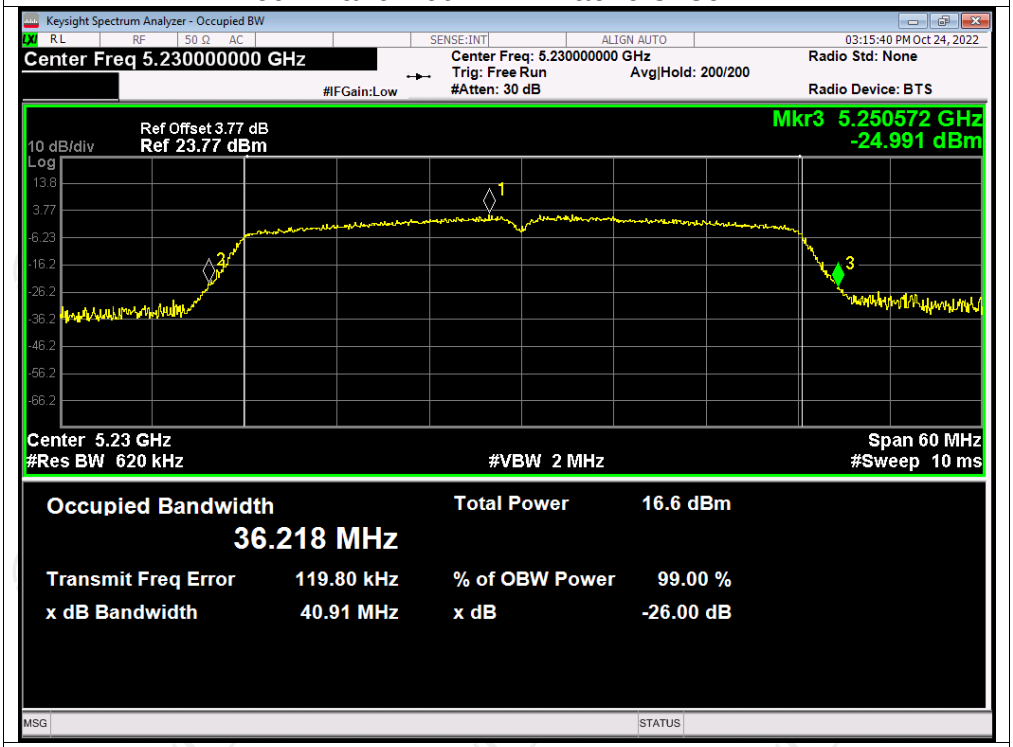
-26dB Bandwidth NVNT ac20 5240MHz



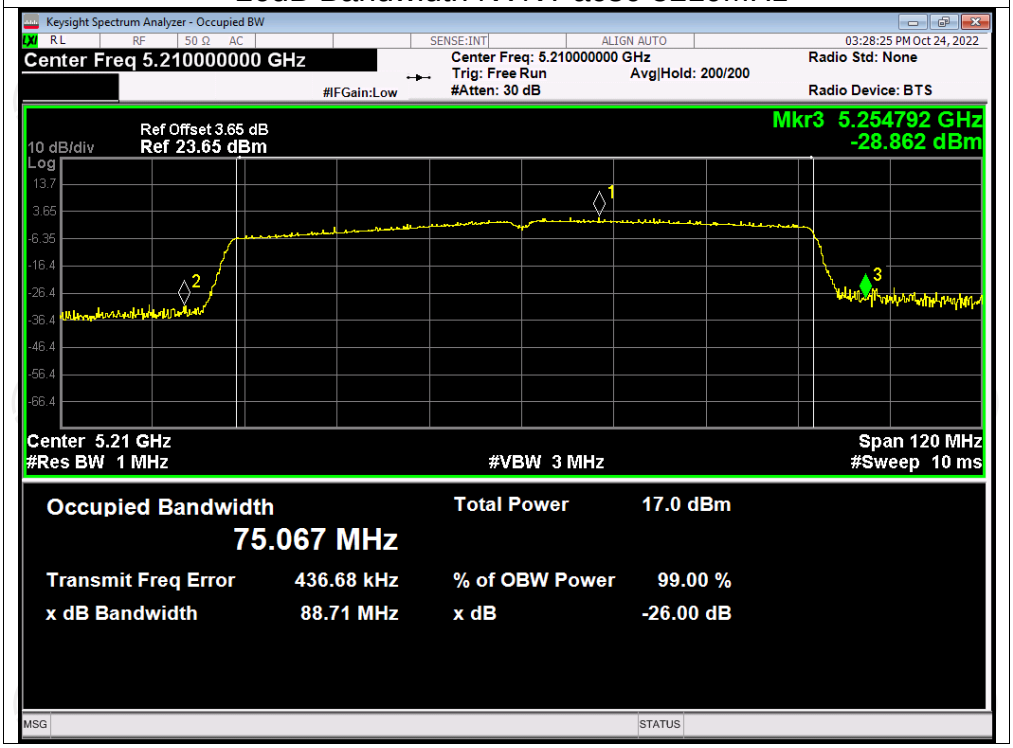
-26dB Bandwidth NVNT ac40 5190MHz



-26dB Bandwidth NVNT ac40 5230MHz



-26dB Bandwidth NVNT ac80 5210MHz

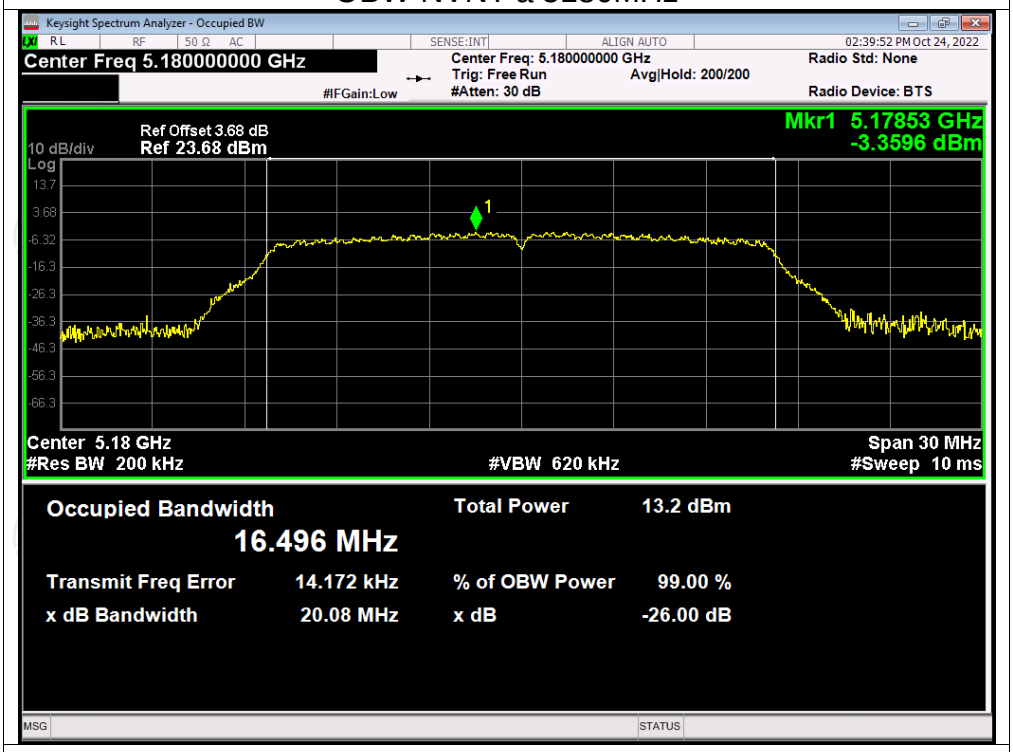


Occupied Channel Bandwidth

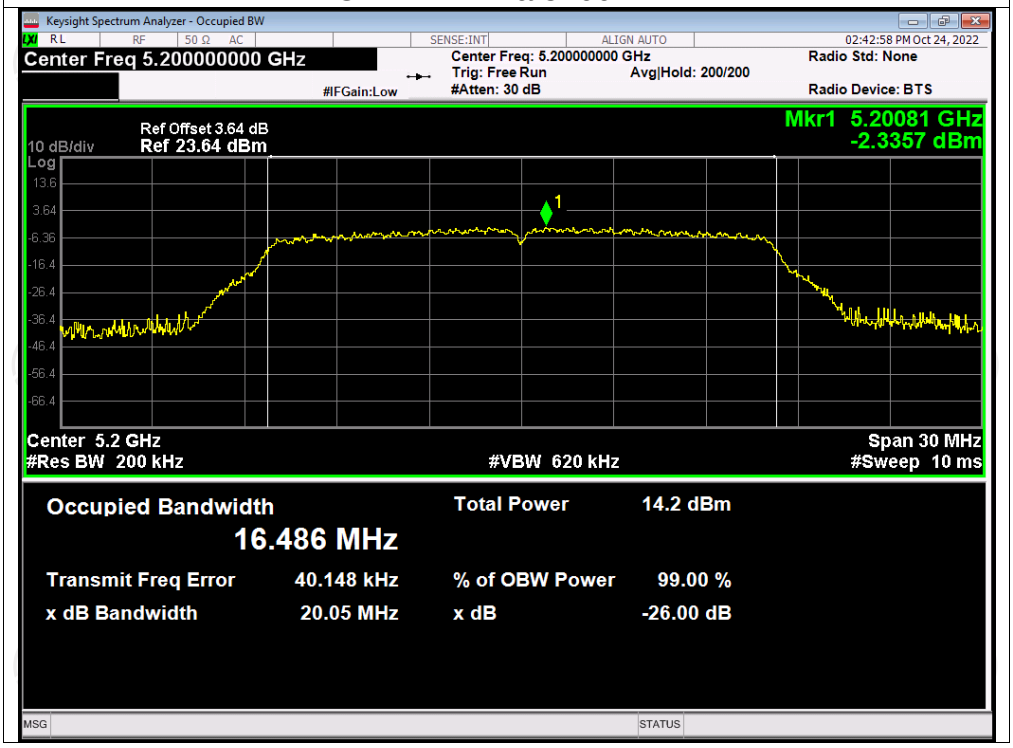
Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5180	16.496
NVNT	a	5200	16.486
NVNT	a	5240	16.498
NVNT	n20	5180	17.585
NVNT	n20	5200	17.588
NVNT	n20	5240	17.601
NVNT	n40	5190	36.041
NVNT	n40	5230	35.981
NVNT	ac20	5180	17.599
NVNT	ac20	5200	17.592
NVNT	ac20	5240	17.601
NVNT	ac40	5190	36.081
NVNT	ac40	5230	36.006
NVNT	ac80	5210	75.110

Test Graphs

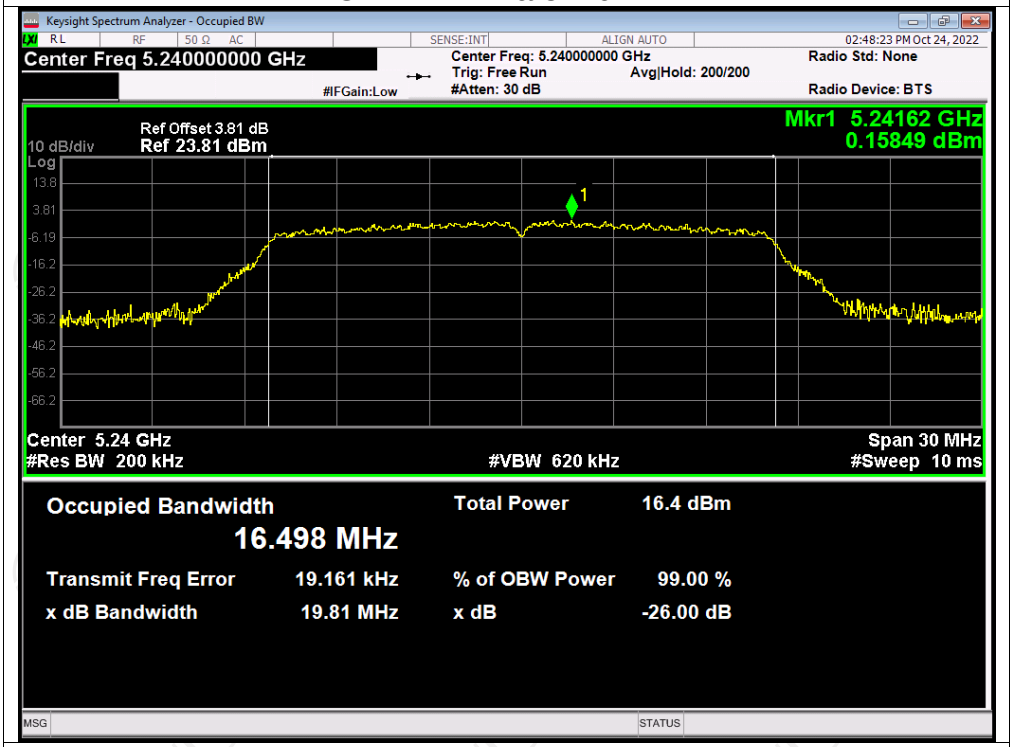
OBW NVNT a 5180MHz



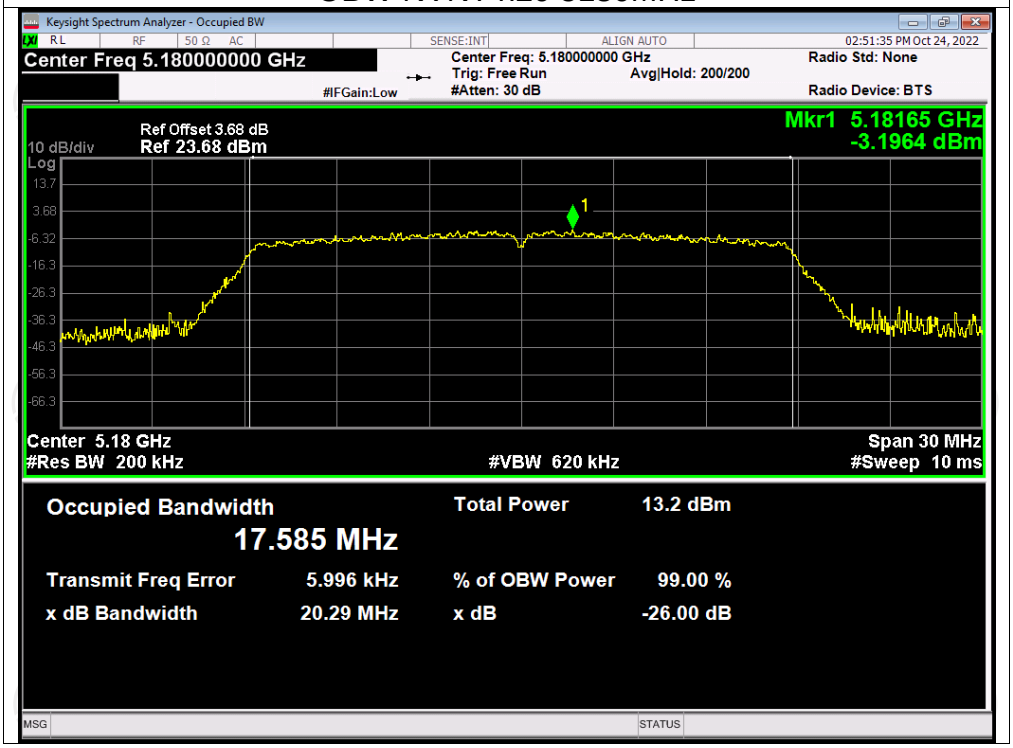
OBW NVNT a 5200MHz



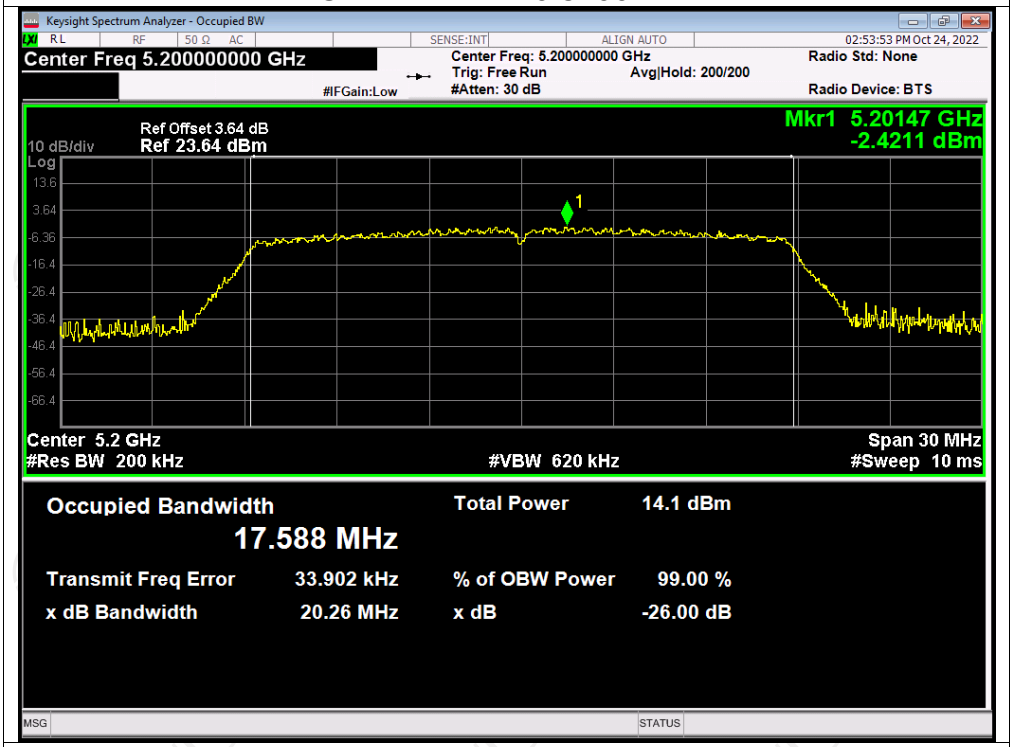
OBW NVNT a 5240MHz



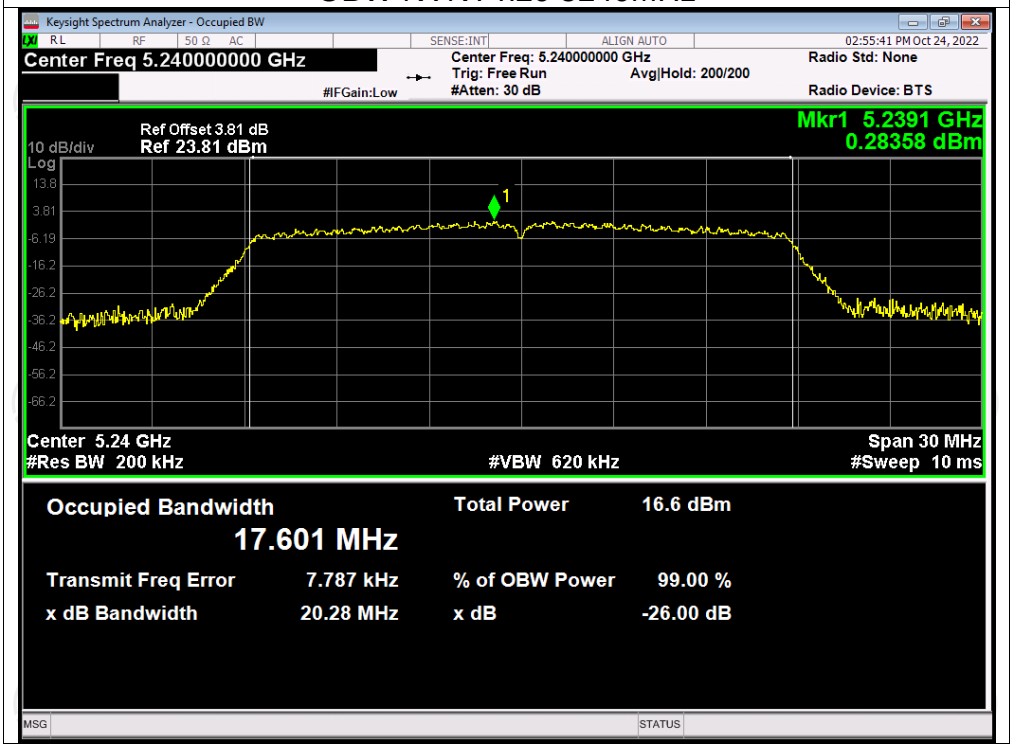
OBW NVNT n20 5180MHz



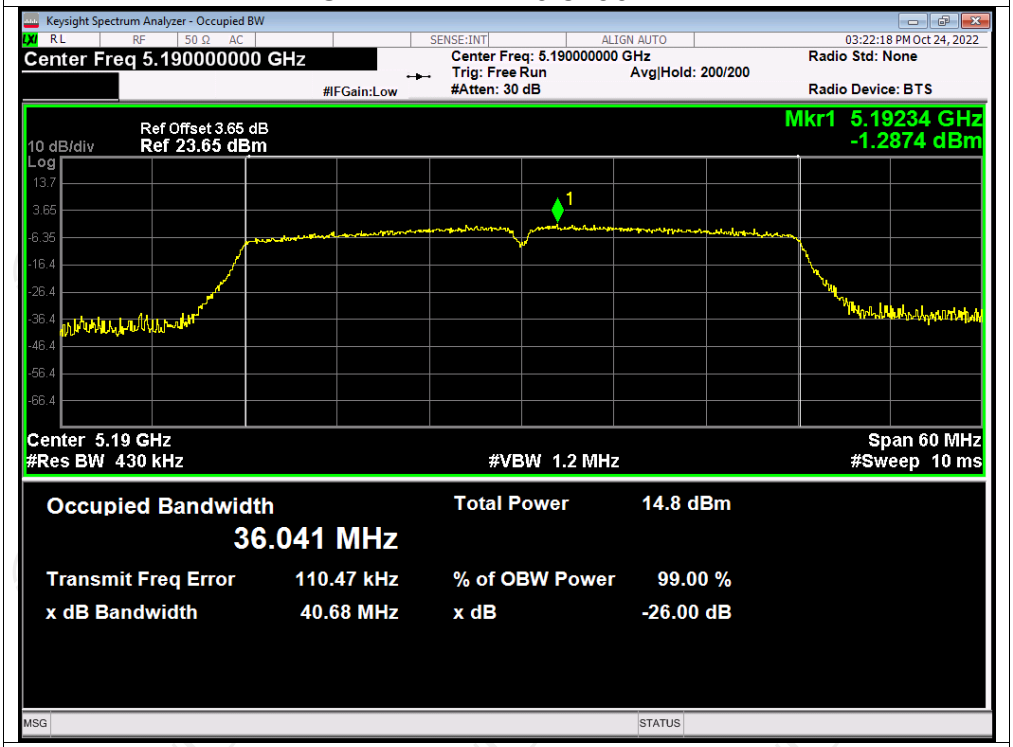
OBW NVNT n20 5200MHz



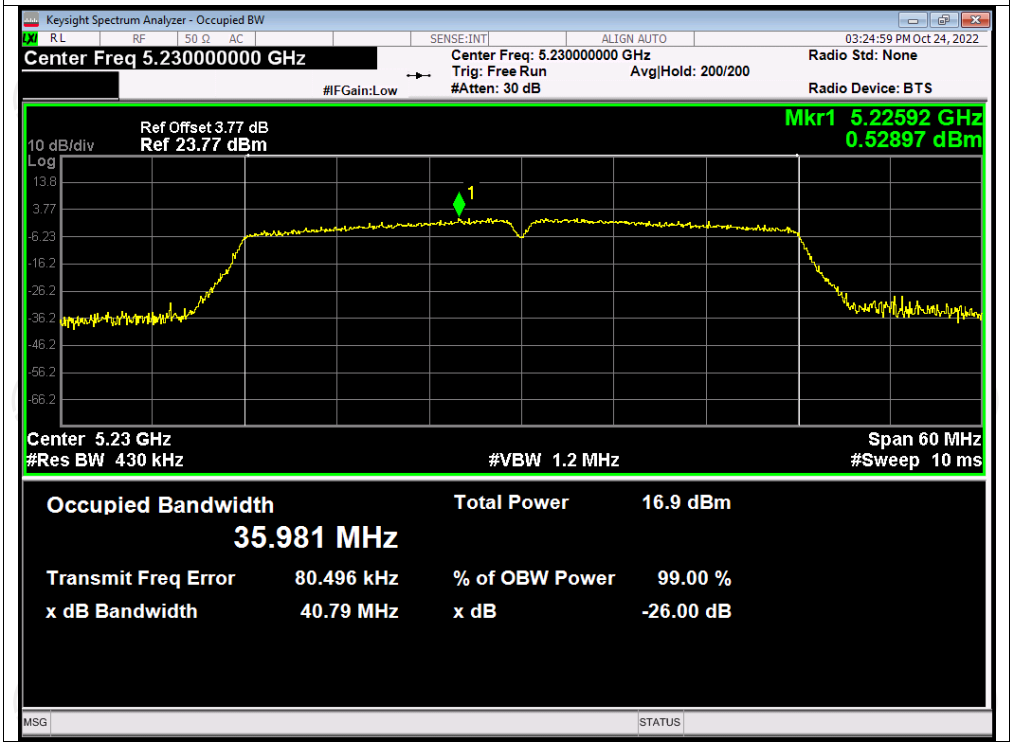
OBW NVNT n20 5240MHz



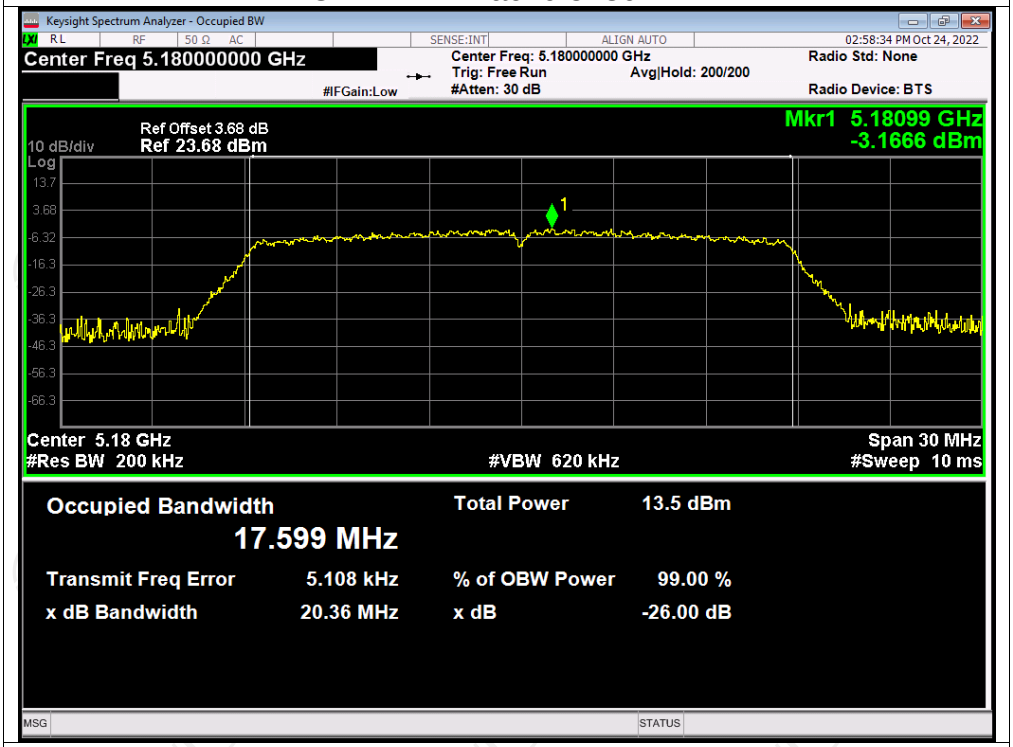
OBW NVNT n40 5190MHz



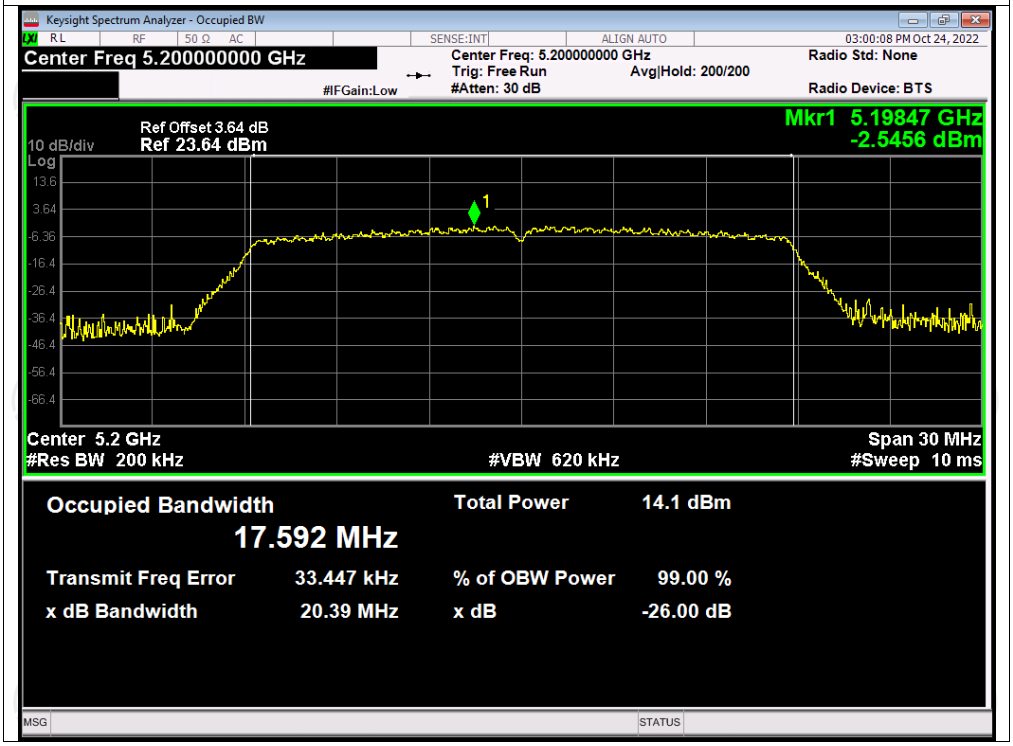
OBW NVNT n40 5230MHz



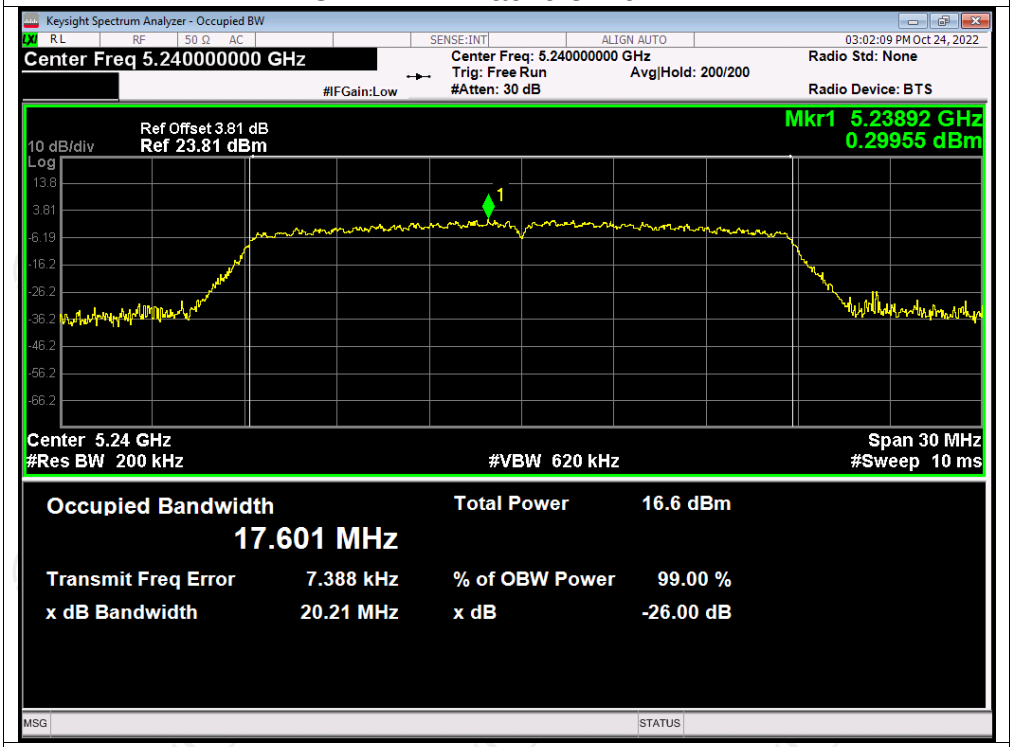
OBW NVNT ac20 5180MHz



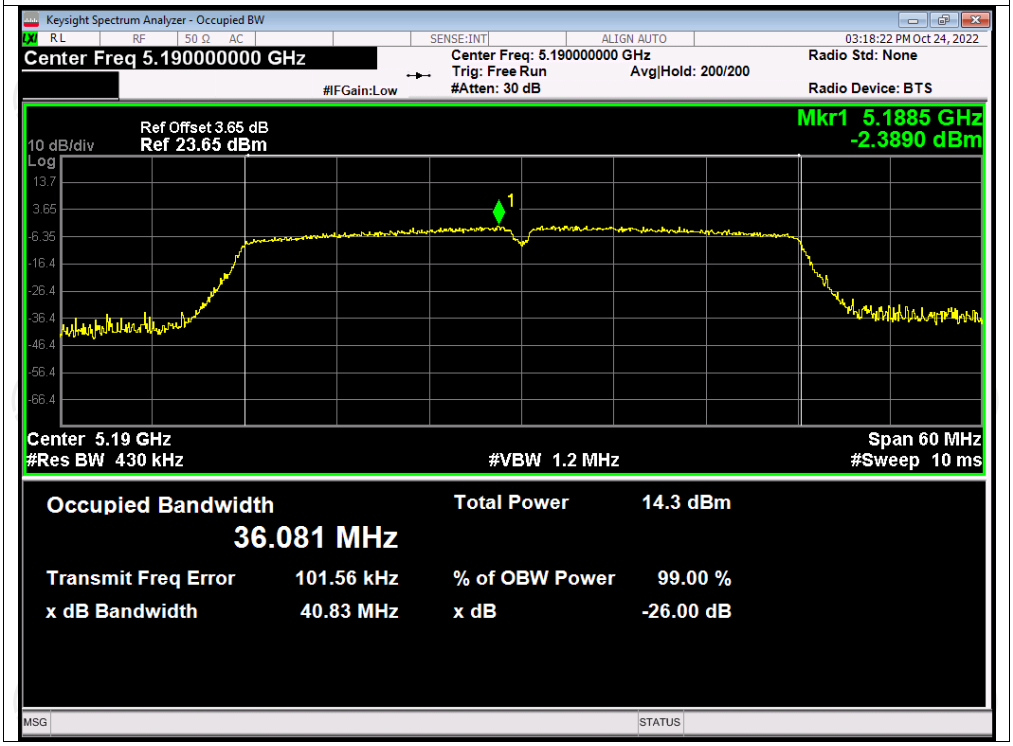
OBW NVNT ac20 5200MHz



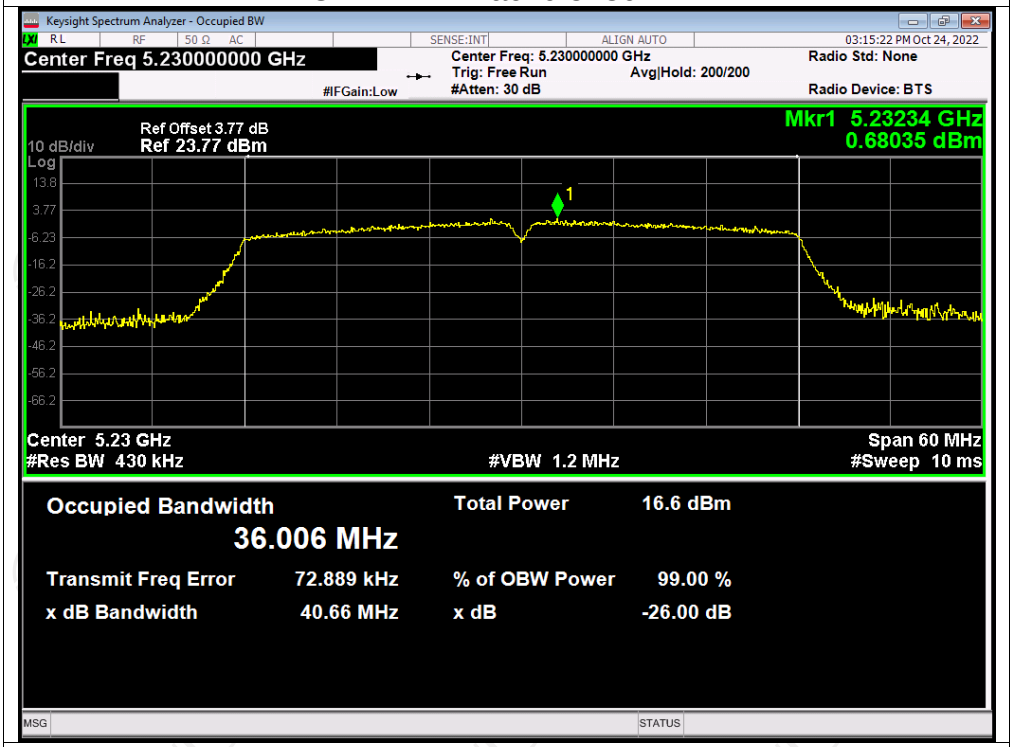
OBW NVNT ac20 5240MHz



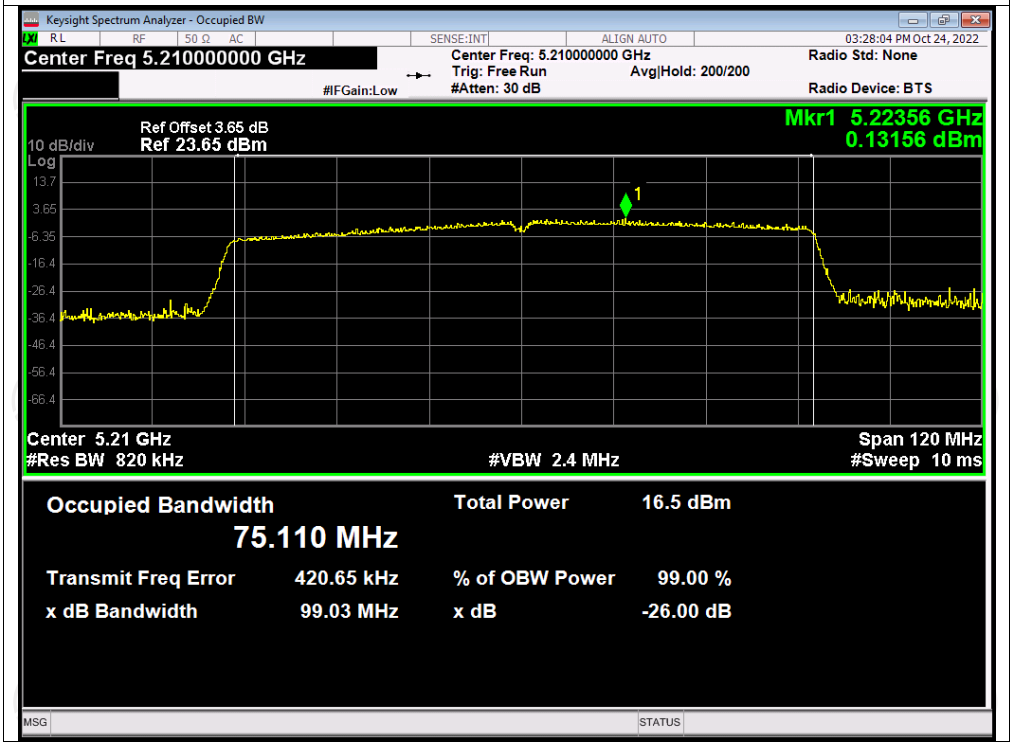
OBW NVNT ac40 5190MHz



OBW NVNT ac40 5230MHz



OBW NVNT ac80 5210MHz



Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Conducted PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NVNT	a	5180	-3.85	11	Pass
NVNT	a	5200	-2.80	11	Pass
NVNT	a	5240	-0.59	11	Pass
NVNT	n20	5180	-3.98	11	Pass
NVNT	n20	5200	-3.12	11	Pass
NVNT	n20	5240	-0.59	11	Pass
NVNT	n40	5190	-6.07	11	Pass
NVNT	n40	5230	-3.76	11	Pass
NVNT	ac20	5180	-3.78	11	Pass
NVNT	ac20	5200	-2.96	11	Pass
NVNT	ac20	5240	-0.56	11	Pass
NVNT	ac40	5190	-6.52	11	Pass
NVNT	ac40	5230	-4.14	11	Pass
NVNT	ac80	5210	-7.87	11	Pass

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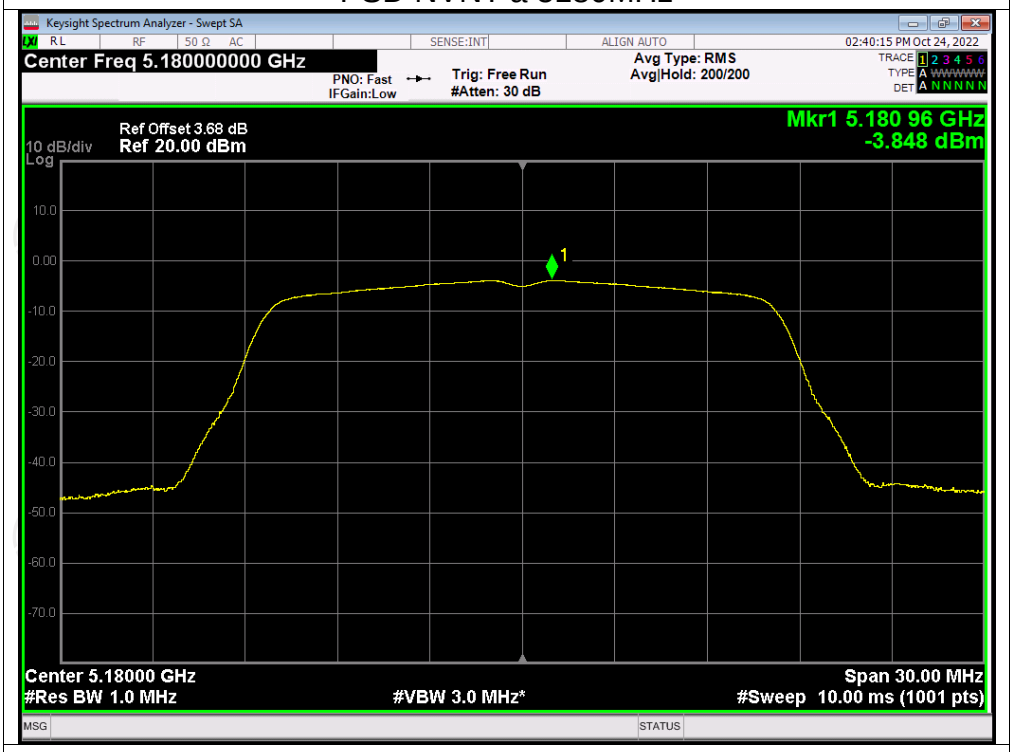
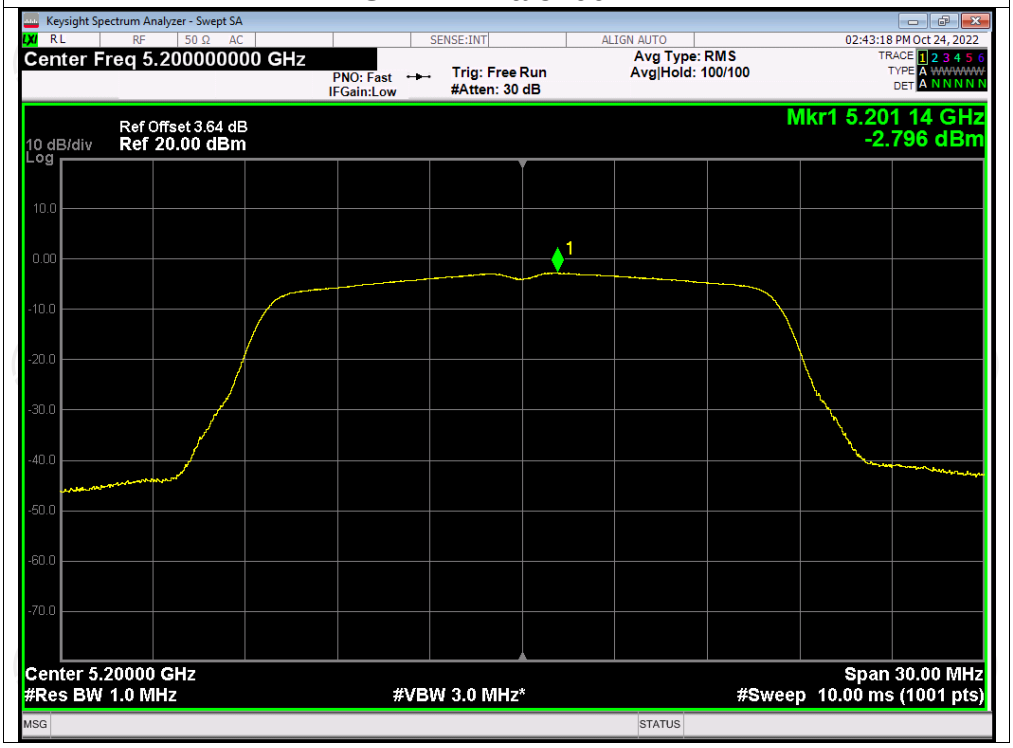
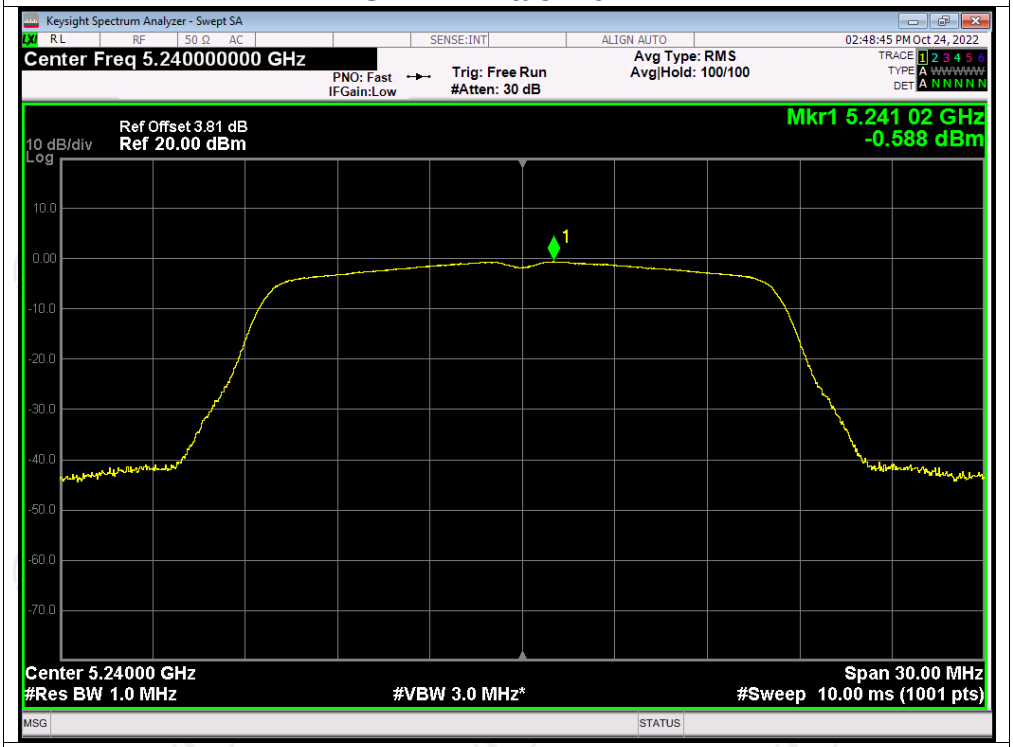
Test Graphs
PSD NVNT a 5180MHz



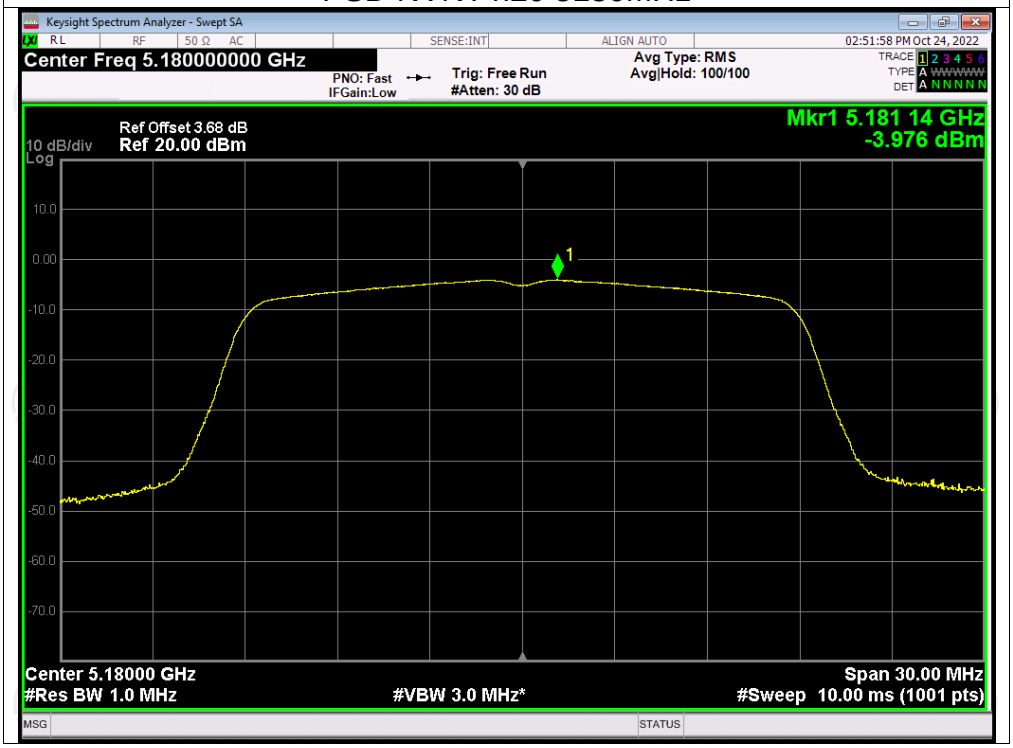
PSD NVNT a 5200MHz



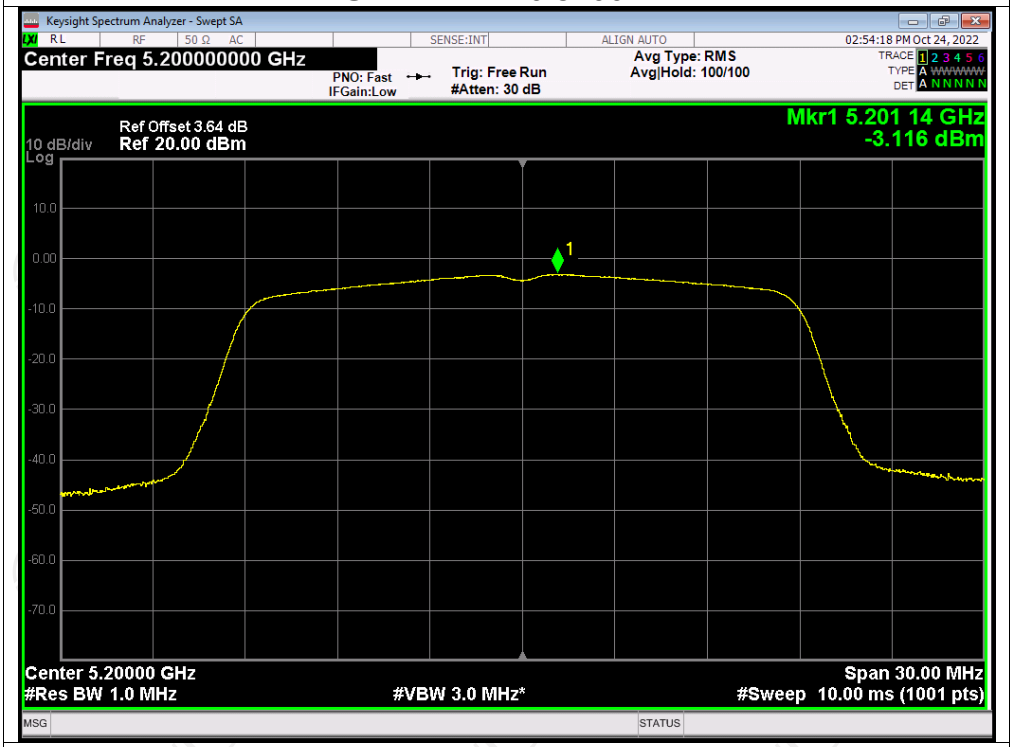
PSD NVNT a 5240MHz



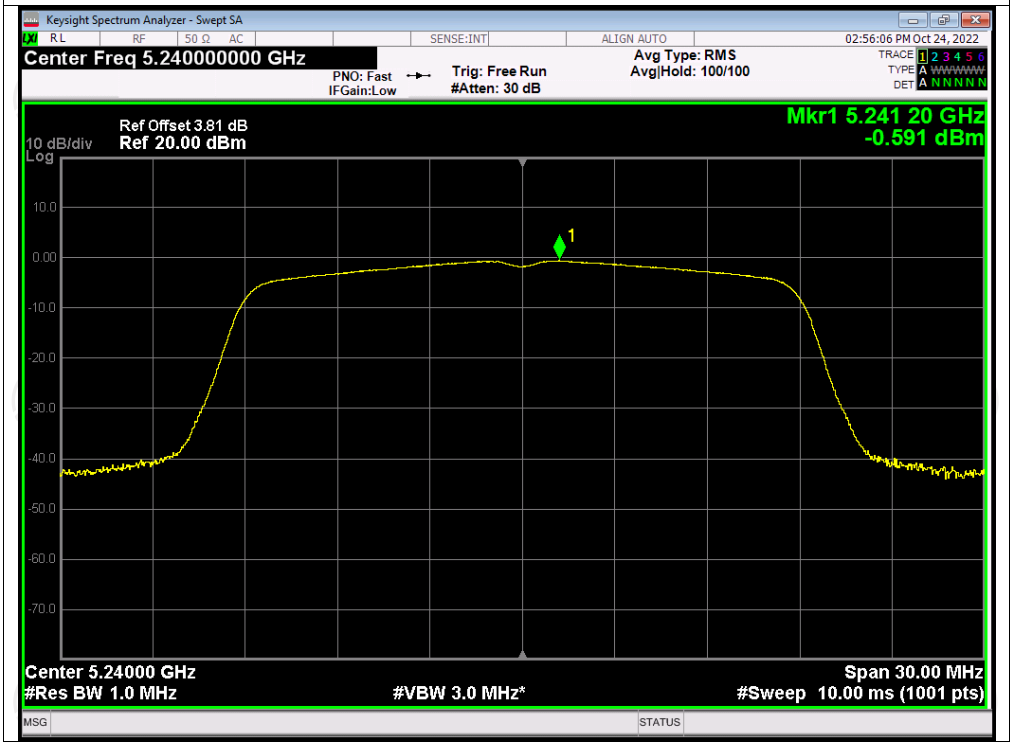
PSD NVNT n20 5180MHz



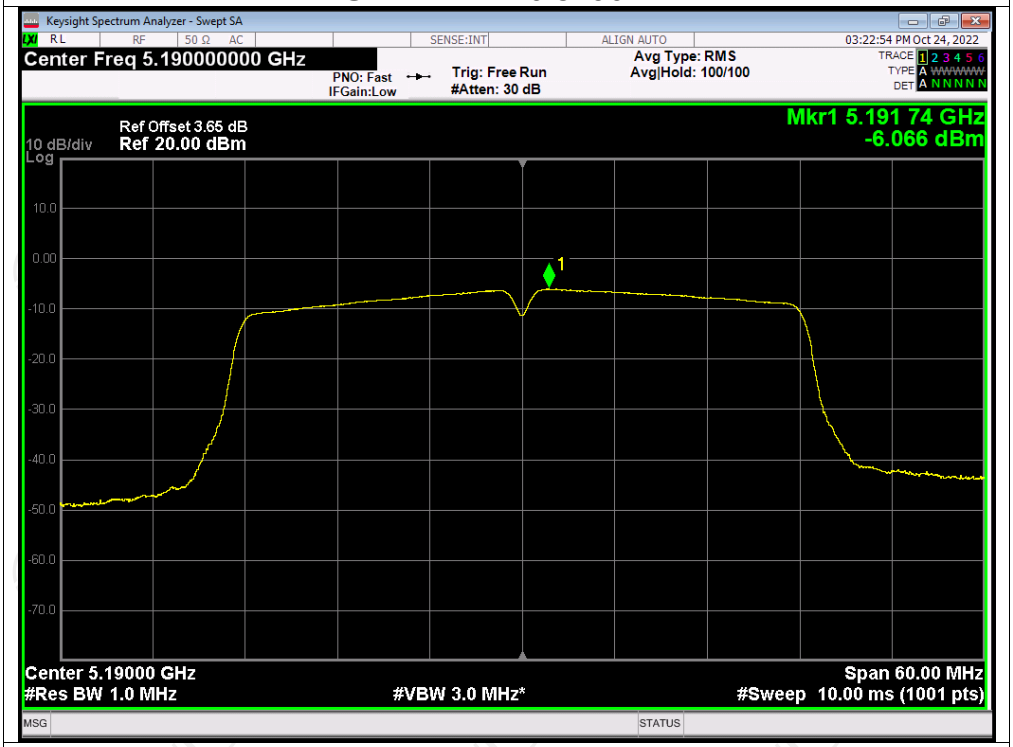
PSD NVNT n20 5200MHz



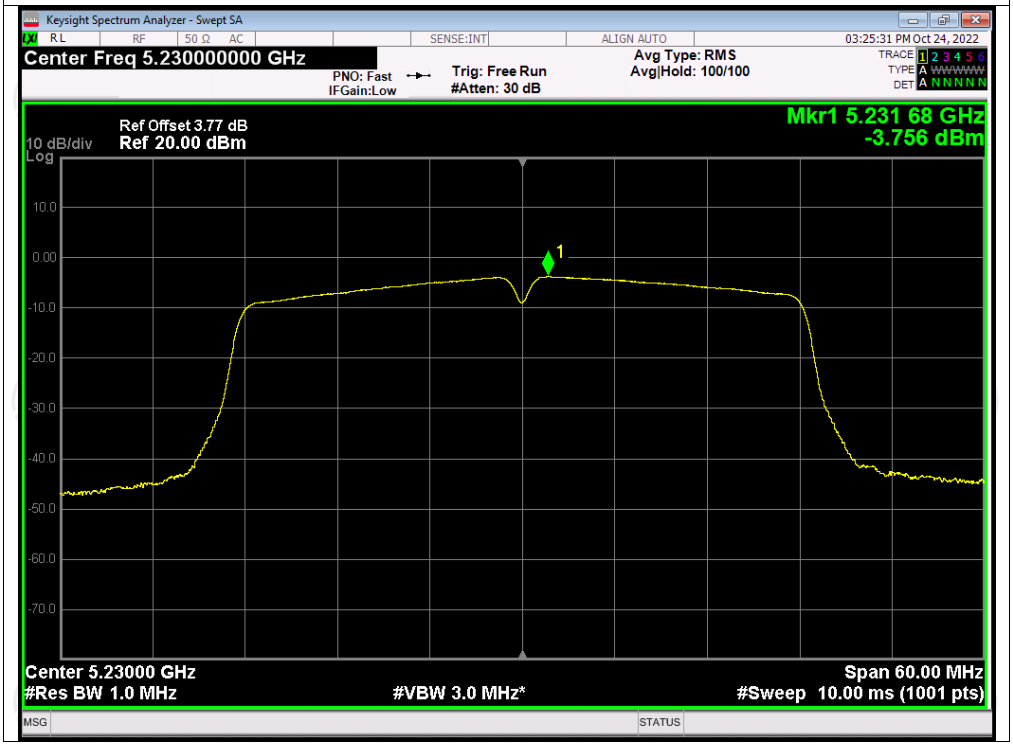
PSD NVNT n20 5240MHz



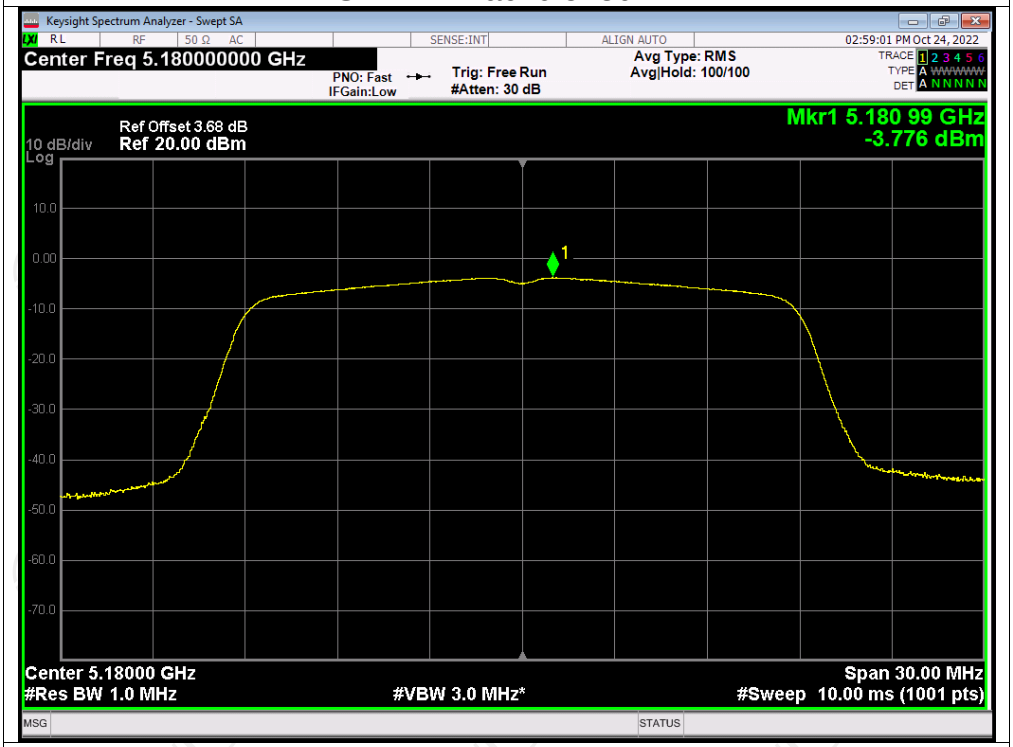
PSD NVNT n40 5190MHz



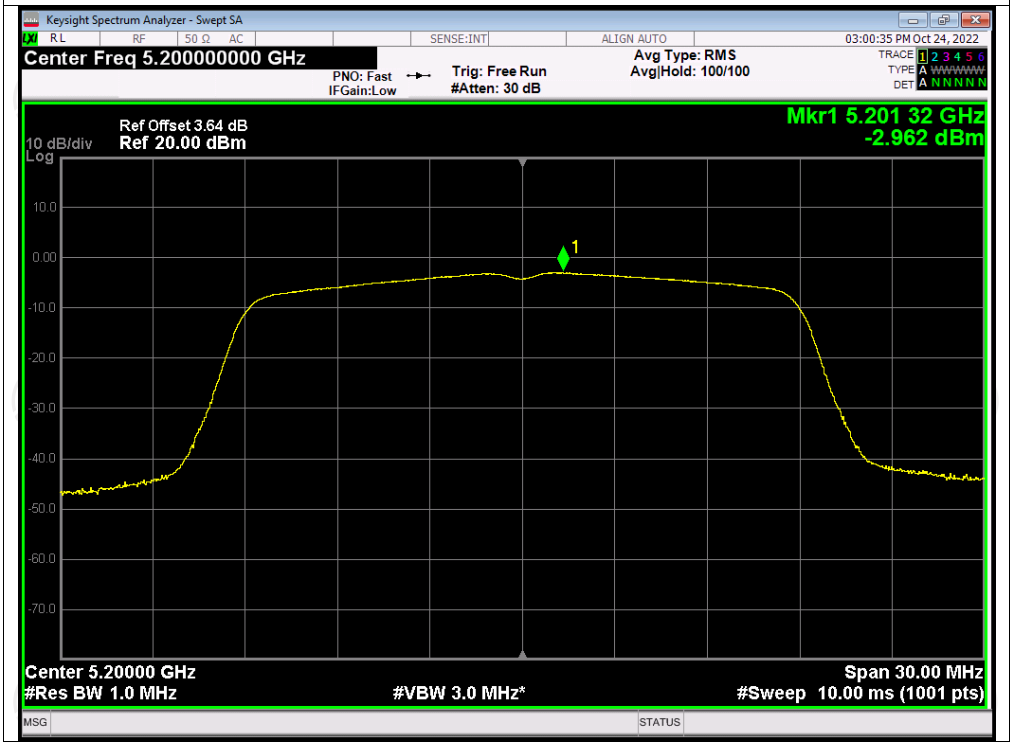
PSD NVNT n40 5230MHz



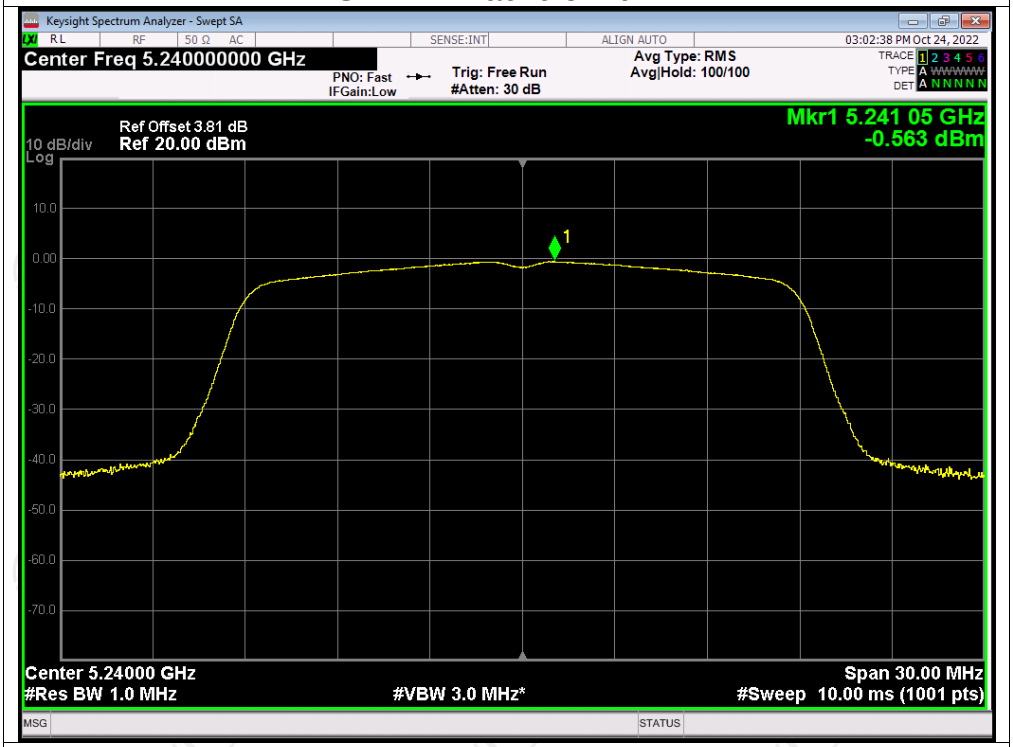
PSD NVNT ac20 5180MHz



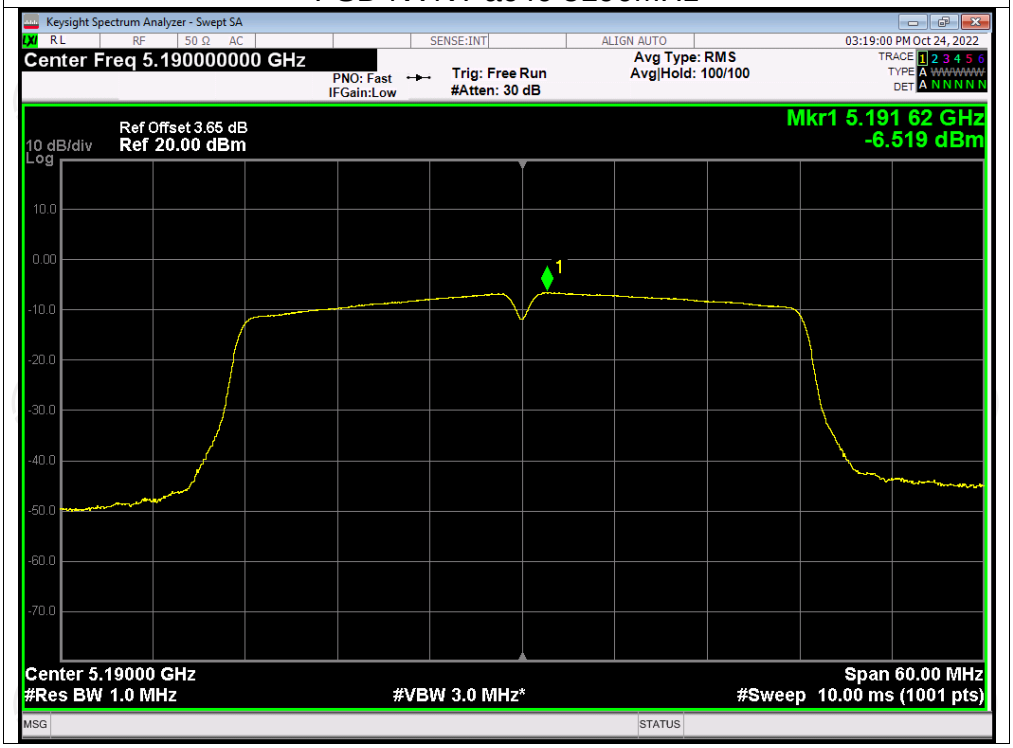
PSD NVNT ac20 5200MHz



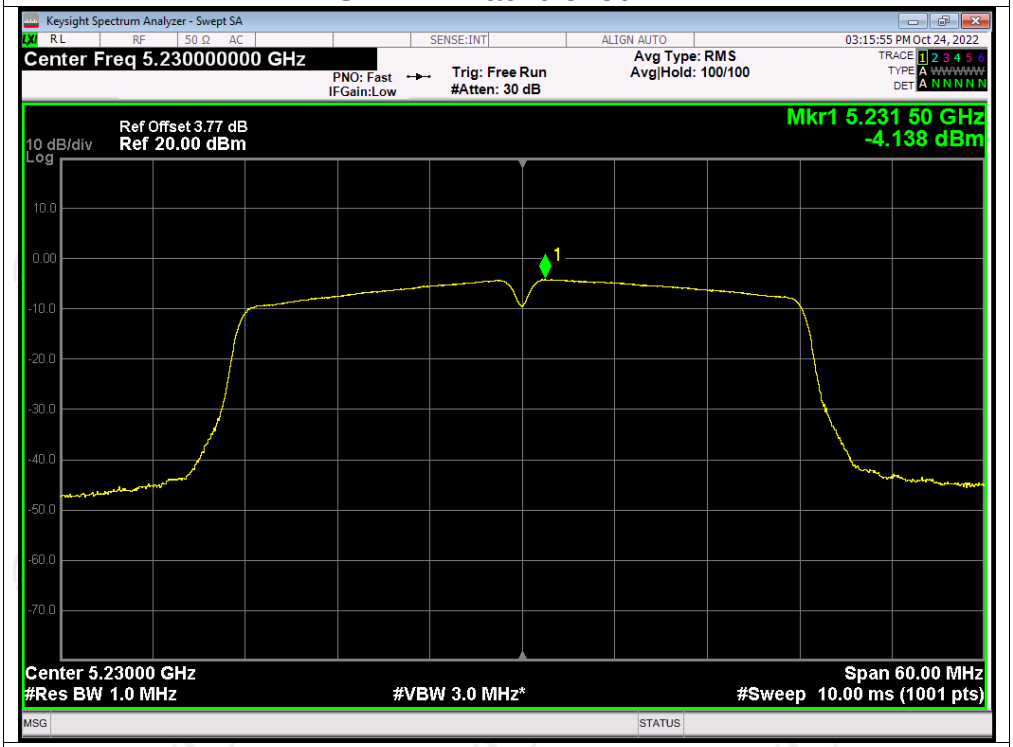
PSD NVNT ac20 5240MHz



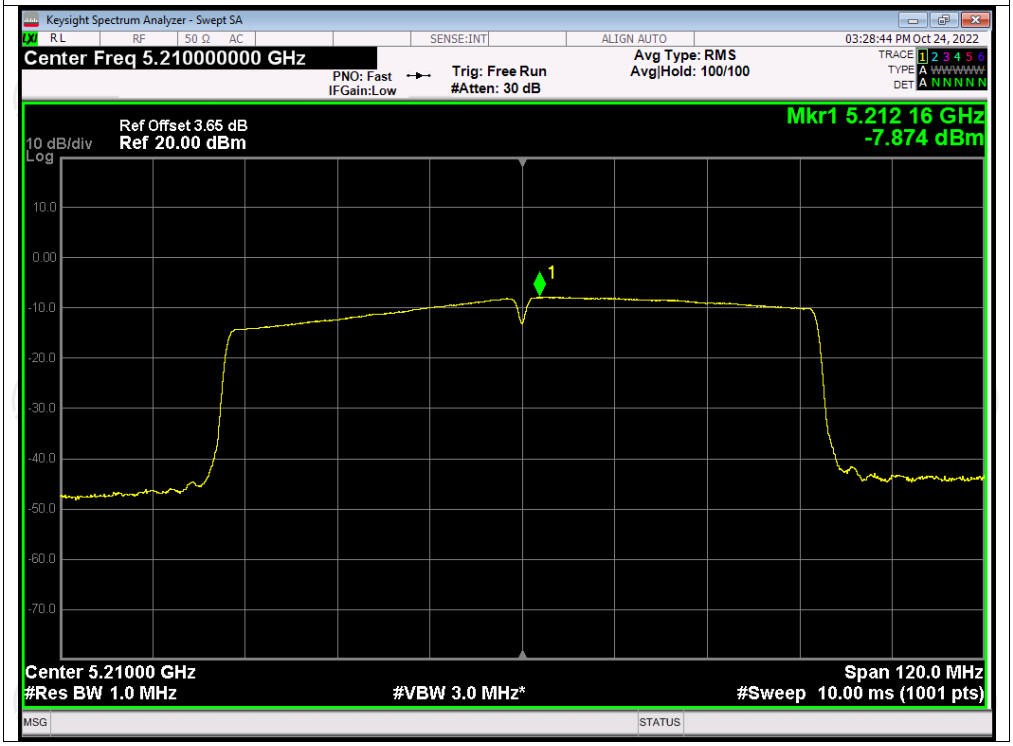
PSD NVNT ac40 5190MHz



PSD NVNT ac40 5230MHz



PSD NVNT ac80 5210MHz



Appendix B: Photographs of Test Setup

Refer to the test report No. TCT221014E007

Appendix C: Photographs of EUT

Refer to the test report No. TCT221014E007

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

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