TEST REPORT

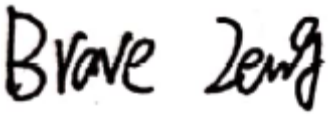
Report No.:	BCTC2202490593E
Applicant:	Dongguan Farletter Technology co., ltd.
Product Name:	WiFi Car Camera
Model/Type reference:	DX-816
Tested Date:	2022-02-16 to 2022-02-22
Issued Date:	2022-02-22

Shenzhen BCTC Testing Co., Ltd.

FCC ID:2A4ORDX-816

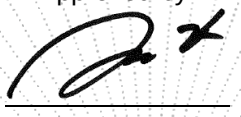
Product Name:	WiFi Car Camera
Trademark:	N/A
Model/Type reference:	DX-816 DX-806, DX-803, DX-807, DX-809, DX-815, DX-816, DX-817, DX-819, DX-821
Prepared For:	Dongguan Farletter Technology co., ltd.
Address:	Sixth floor, wengyao industrial building, houda road, dalingshan town, dongguan city, guangdong province, China
Manufacturer:	Dongguan Farletter Technology co., ltd.
Address:	Sixth floor, wengyao industrial building, houda road, dalingshan town, dongguan city, guangdong province, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2022-02-16
Sample tested Date:	2022-02-16 to 2022-02-22
Issue Date:	2022-02-22
Report No.:	BCTC2202490593E
Test Standards:	FCC Part15 15.407 ANSI C63.10-2013 KDB 662911 D01 v02r01 KDB 789033 D02 v02r01
Test Results:	PASS
Remark:	This is WIFI-5GHz band radio test report.

Tested by:



Brave Zeng/ Project Handler

Approved by:



Zero Zhou/Reviewer

Table Of Content

(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2202490593E	2022-02-22	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

1	Test Parameter	Clause No.	Results
1	Spurious Radiated Emissions	15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(8)	PASS
2	Conducted Emission	15.207	PASS
3	26 dB and 99% Emission Bandwidth	15.407 (a)(12) 15.1049	PASS
4	Minimum 6 dB bandwidth	15.407(e)	N/A
5	Maximum Conducted Output Power	15.407 (a)(1) 15.407 (a)(3)	PASS
6	Band Edge	2.1051, 15.407(b)(1) 15.407(b)(4)	PASS
7	Power Spectral Density	15.407 (a)(1) 15.407 (a)(3)	PASS
8	Spurious Emissions at Antenna Terminals	2.1051, 15.407(b)	PASS
9	Antenna Requirement	15.203	PASS

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(9KHz-30MHz)	U=3.7dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission (150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59℃

4. Product Information And Test Setup

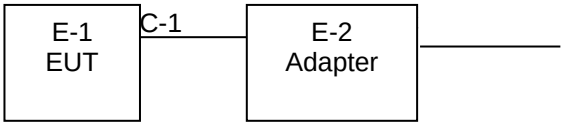
4.1 Product Information

Model/Type reference:	DX-816 DX-806, DX-803, DX-807, DX-809, DX-815, DX-816, DX-817, DX-819, DX-821
Model differences:	All the model are the same circuit and RF module, except model names.
Hardware Version:	N/A
Software Version:	N/A
IEEE 802.11 WLAN Mode Supported:	802.11a/n/ac(20MHz channel bandwidth) 802.11n/ac(40MHz channel bandwidth) 802.11ac(80MHz channel bandwidth)
Operation Frequency:	5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80
Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40/VHT80):NSS1, MCS0-MCS
Type of Modulation:	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
Number Of Channel	4 channels for 802.11a/n20 in the 5180-5240MHz band ; 2 channels for 802.11 n40 in the 5190-5230MHz band ; 1 channels for 802.11 ac80 in the 5210MHz band
Antenna installation:	Internal antenna
Antenna Gain:	2 dBi
Ratings:	DC 5V from adapter/ DC 12V

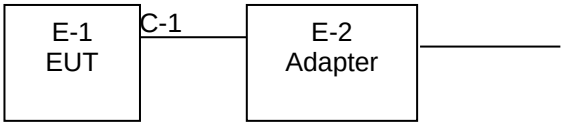
4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Conducted Emission:



Radiated Spurious Emission



4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	WiFi Car Camera	N/A	DX-816	Ref. the Section 4.1	EUT
E-2	Adapter	N/A	BCTC001	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	1M	DC cable unshielded

Notes:
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.

4.4 Channel List

Frequency and Channel list for 802.11a/n /ac (5180-5240MHz):

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

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

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

4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 2	802.11n/ ac40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42
Mode 4	Link Mode

Conducted Emission	
Final Test Mode	**Description**
Mode 4	Link Mode

For Radiated Emission	
Final Test Mode	**Description**
Mode 1	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 2	802.11n/ ac40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42

Note: The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

4.6 Table Of Parameters Of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Test software Version	CMD		
Parameters	DEF	DEF	DEF

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address:1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.
FCC Test Firm Registration Number: 712850
IC Registered No.: 23583

5.2 Test Instrument Used

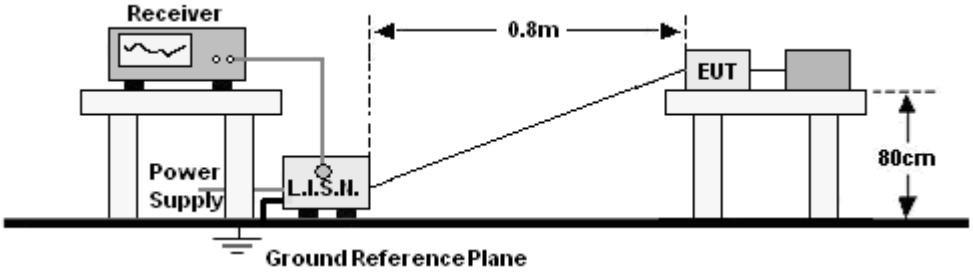
Conducted Emissions Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022
LISN	R&S	ENV216	101375	May 28, 2021	May 27, 2022
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\
Attenuator	\	10dB C-6GHz	1650	May 28, 2021	May 27, 2022

RF Conducted Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Power Metter	Keysight	E4419	\	May 28, 2021	May 27, 2022
Power Sensor (AV)	Keysight	E9300A	\	May 28, 2021	May 27, 2022
Signal Analyzer 20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 28, 2021	May 27, 2022
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	\	May 28, 2021	May 27, 2022

Radiated Emissions Test (966 Chamber)					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022
Receiver	R&S	ESRP	101154	May 28, 2021	May 27, 2022
Amplifier	SKET	LAPA_01G18G-45dB	\	May 28, 2021	May 27, 2022
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 28, 2021	May 27, 2022
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	Jun. 01, 2021	May 31, 2022
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 02, 2021	Jun. 01, 2022
Horn Antenn (18GHz-40GHz)	Schwarzbeck	BBHA9170	00822	Jun. 15, 2021	Jun. 14, 2022
Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35-HG	2034381	May 28, 2021	May 27, 2022
Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	Jun. 02, 2021	Jun. 01, 2022
RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-0008	May 28, 2021	May 27, 2022
RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	May 28, 2021	May 27, 2022
RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	May 28, 2021	May 27, 2022
Power Metter	Keysight	E4419	\	May 28, 2021	May 27, 2022
Power Sensor (AV)	Keysight	E9300A	\	May 28, 2021	May 27, 2022
Signal Analyzer 20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 28, 2021	May 27, 2022
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40	\	May 28, 2021	May 27, 2022
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

Frequency (MHz)	Limit (dBuV)	
	Quas-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00
Notes: 1. *Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.		

6.3 Test procedure

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

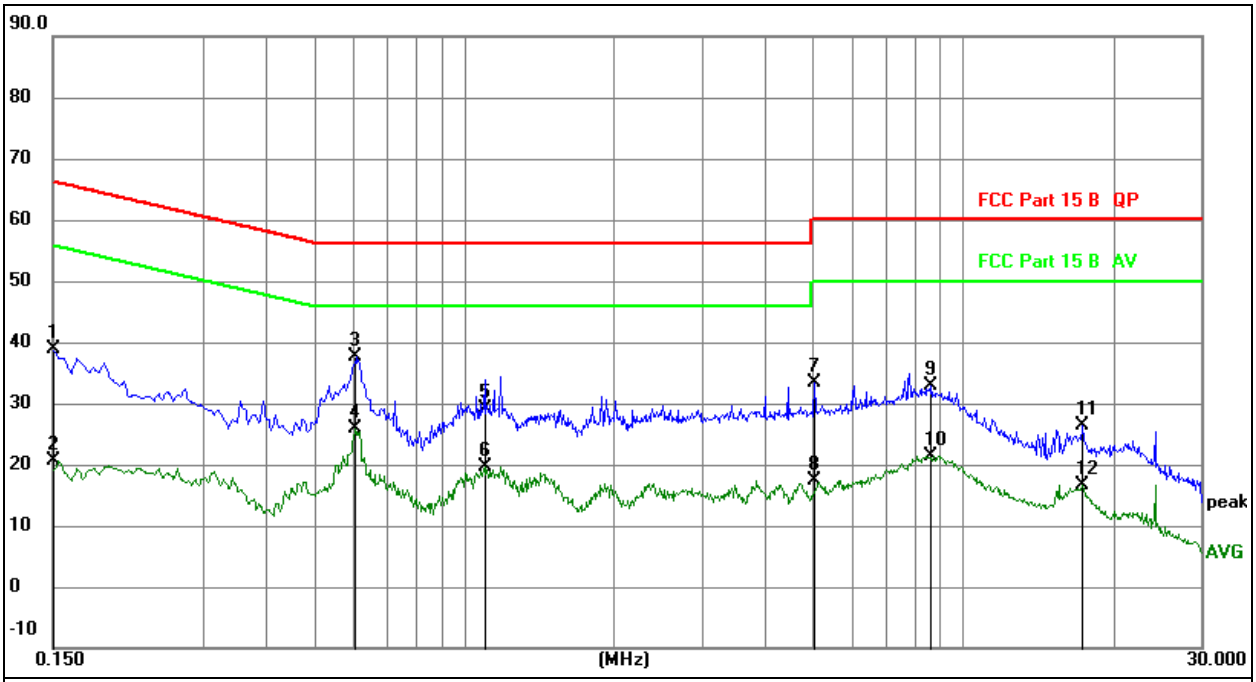
a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

6.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.
We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

6.5 Test Result

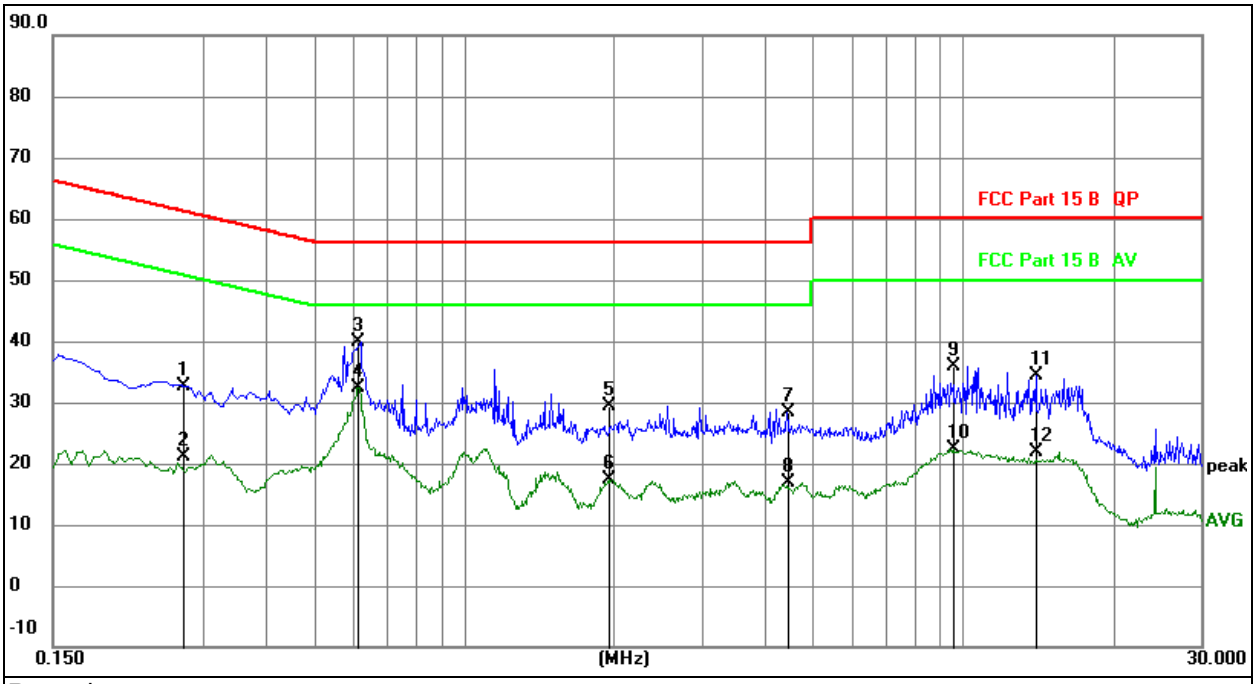
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage ：	AC120V/60Hz
Test Mode:	Mode 4	Polarization :	L



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement = Reading Level + Correct Factor
4. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1500	19.34	19.60	38.94	66.00	-27.06	QP
2		0.1500	1.04	19.60	20.64	56.00	-35.36	AVG
3	*	0.6043	18.13	19.61	37.74	56.00	-18.26	QP
4		0.6043	6.26	19.61	25.87	46.00	-20.13	AVG
5		1.0997	9.42	19.62	29.04	56.00	-26.96	QP
6		1.0997	0.02	19.62	19.64	46.00	-26.36	AVG
7		5.0312	13.59	19.70	33.29	60.00	-26.71	QP
8		5.0312	-2.29	19.70	17.41	50.00	-32.59	AVG
9		8.6373	13.23	19.76	32.99	60.00	-27.01	QP
10		8.6373	1.64	19.76	21.40	50.00	-28.60	AVG
11		17.2908	6.70	19.76	26.46	60.00	-33.54	QP
12		17.2908	-3.13	19.76	16.63	50.00	-33.37	AVG

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage ：	AC120V/60Hz
Test Mode:	Mode 4	Polarization :	N



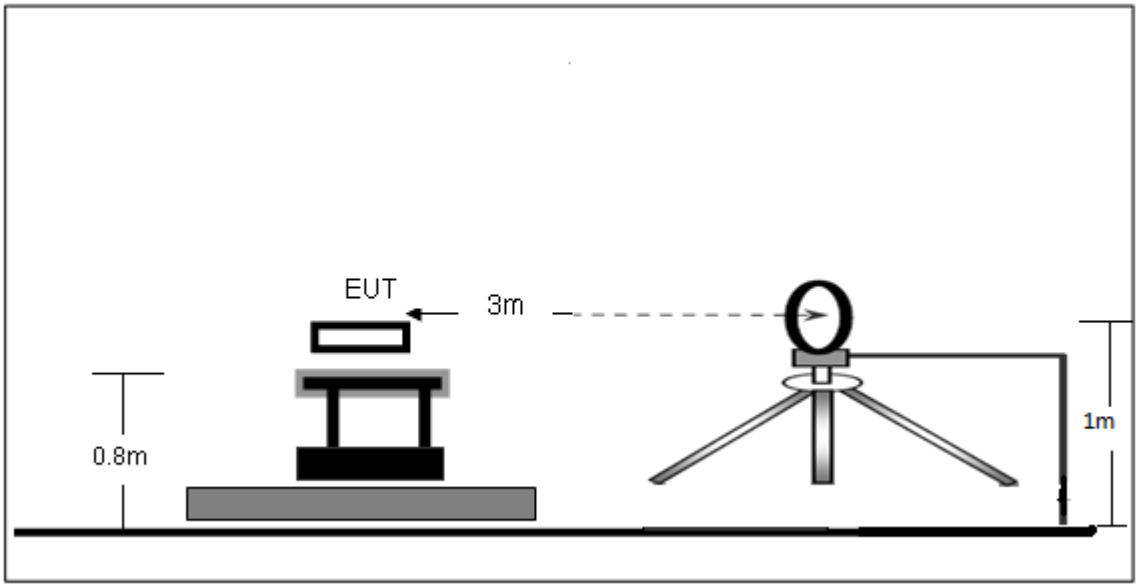
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement = Reading Level + Correct Factor
4. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.2730	13.14	19.61	32.75	61.03	-28.28	QP
2		0.2730	1.47	19.61	21.08	51.03	-29.95	AVG
3		0.6134	20.16	19.61	39.77	56.00	-16.23	QP
4	*	0.6134	12.77	19.61	32.38	46.00	-13.62	AVG
5		1.9545	9.71	19.62	29.33	56.00	-26.67	QP
6		1.9545	-2.13	19.62	17.49	46.00	-28.51	AVG
7		4.4520	8.74	19.69	28.43	56.00	-27.57	QP
8		4.4520	-2.90	19.69	16.79	46.00	-29.21	AVG
9		9.5685	16.00	19.78	35.78	60.00	-24.22	QP
10		9.5685	2.55	19.78	22.33	50.00	-27.67	AVG
11		14.0595	14.57	19.77	34.34	60.00	-25.66	QP
12		14.0595	2.16	19.77	21.93	50.00	-28.07	AVG

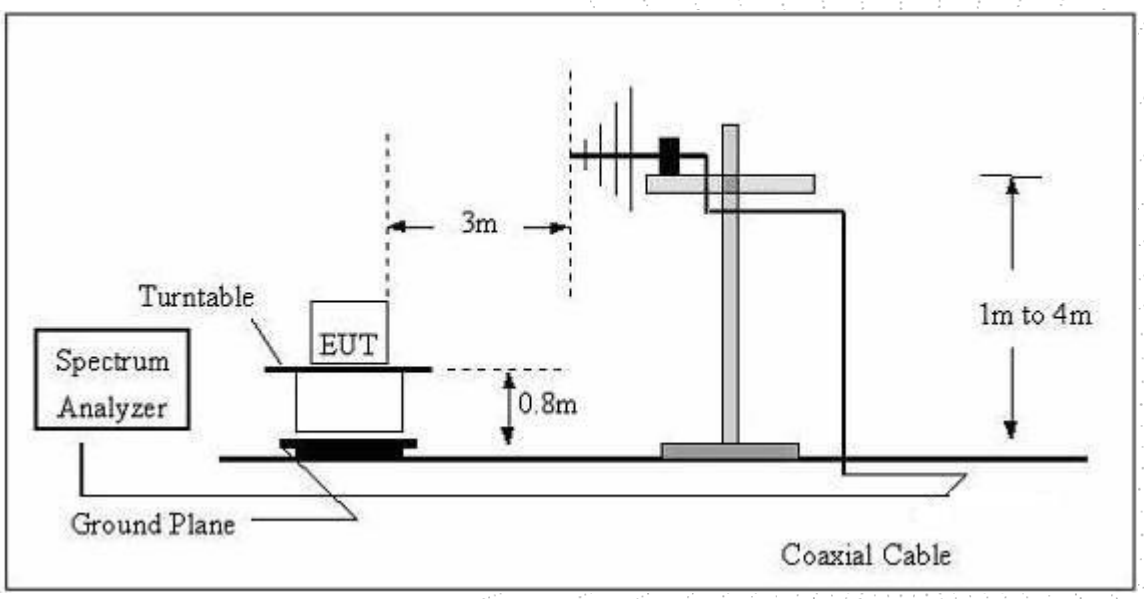
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

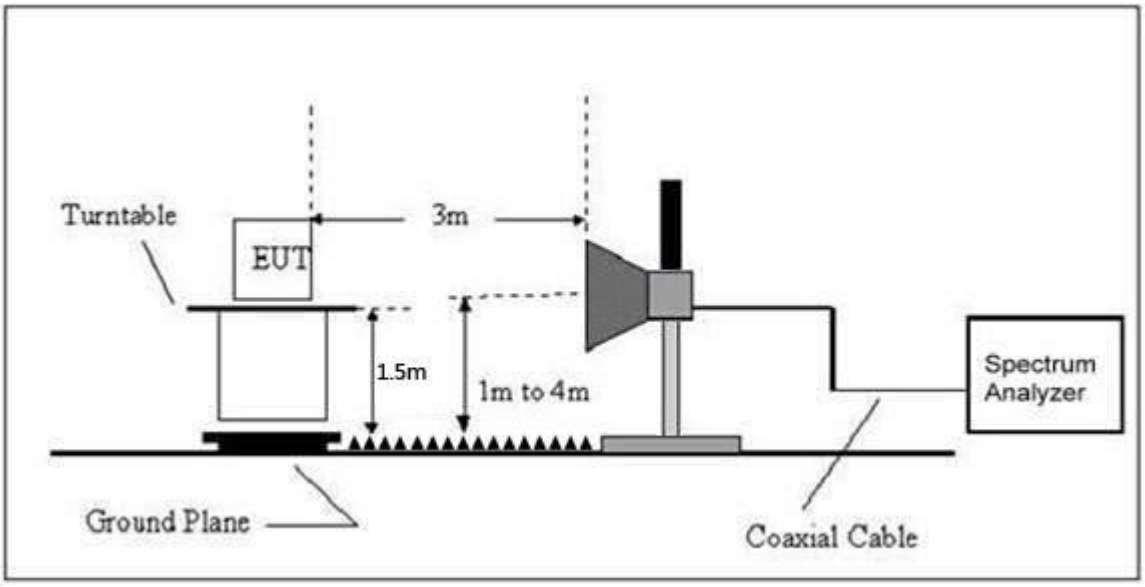
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



7.2 Limit

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

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance	
(MHz)	uV/m	(m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))}$ + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))}$ + 40
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)}$ + 40
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Limits Of Radiated Emission Measurement (Above 1000MHz)

Frequency (MHz)	Limit (dBuV/m) (at 3M)	
	Peak	Average
Above 1000	74	54

Notes:
(1)The limit for radiated test was performed according to FCC PART 15C.
(2)The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).

7.3 Test procedure

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

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

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

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

Note:

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

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

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

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

7.4 EUT operating Conditions

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

7.5 Test Result

Below 30MHz

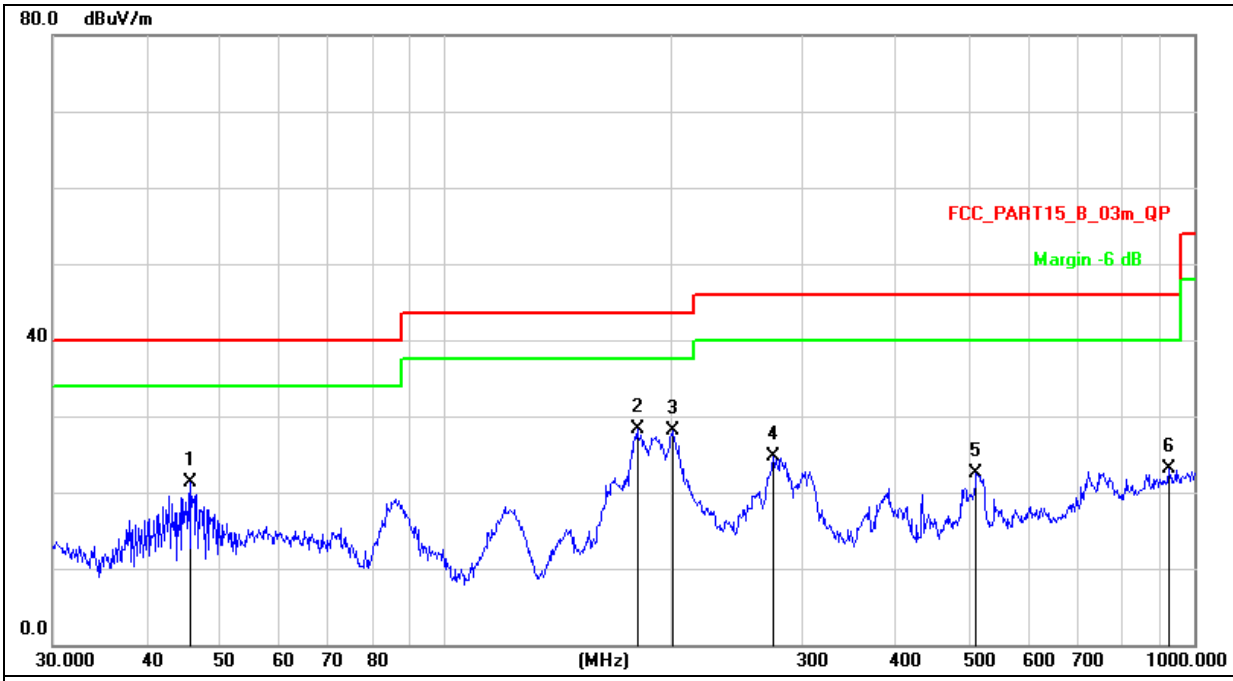
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC120V/60Hz
Test Mode:	Mode 4	Polarization:	---

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

Between 30MHz – 1GHz

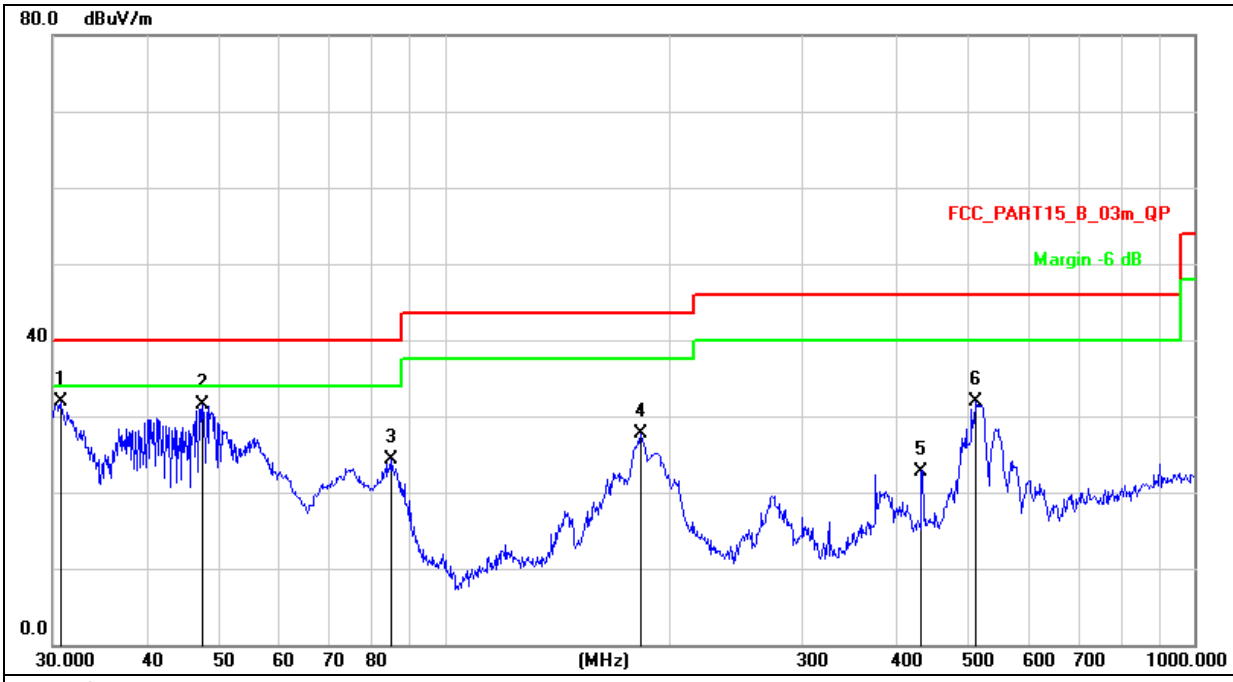
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC120V/60Hz
Test Mode:	Mode 4	Polarization:	Horizontal



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement = Reading Level + Correct Factor
3. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		45.8553	36.29	-15.08	21.21	40.00	-18.79	QP
2	*	180.6488	45.91	-17.54	28.37	43.50	-15.13	QP
3		201.3930	44.42	-16.27	28.15	43.50	-15.35	QP
4		274.1939	39.17	-14.40	24.77	46.00	-21.23	QP
5		511.8352	31.07	-8.64	22.43	46.00	-23.57	QP
6		925.7563	24.42	-1.30	23.12	46.00	-22.88	QP

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC120V/60Hz
Test Mode:	Mode 4	Polarization:	Vertical



Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Measurement = Reading Level + Correct Factor
3. Over = Measurement - Limit

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	*	30.7455	48.95	-17.14	31.81	40.00	-8.19	QP
2		47.4918	46.42	-14.99	31.43	40.00	-8.57	QP
3		84.7019	43.71	-19.32	24.39	40.00	-15.61	QP
4		182.5592	45.19	-17.42	27.77	43.50	-15.73	QP
5		432.5457	33.14	-10.36	22.78	46.00	-23.22	QP
6		511.8352	40.64	-8.64	32.00	46.00	-14.00	QP

Between 1GHz – 40GHz

Test Mode:	TX(5.1G) - 802.11a

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5180 MHz)-Above 1G									
V	4434.031	60.92	5.94	35.40	44.00	58.26	68.2	-9.94	PK
V	4434.031	43.38	5.94	35.40	44.00	40.72	54	-13.28	AV
V	10360.094	61.66	8.46	39.75	44.50	65.37	68.2	-2.83	PK
V	10360.094	43.27	8.46	39.75	44.50	46.98	54	-7.02	AV
V	15540.066	61.55	10.12	38.80	44.10	66.37	74	-7.63	PK
V	15540.066	43.58	10.12	38.80	42.70	49.80	54	-4.20	AV
H	4434.064	62.06	5.94	35.18	44.00	59.18	68.2	-9.02	PK
H	4434.064	43.39	5.94	35.18	44.00	40.51	54	-13.49	AV
H	10360.096	52.99	8.46	38.71	44.50	55.66	68.2	-12.54	PK
H	10360.096	40.59	8.46	38.71	44.50	43.26	54	-10.74	AV
H	15540.041	54.94	10.12	38.38	44.10	59.34	74	-14.66	PK
H	15540.041	41.01	10.12	38.38	44.10	45.41	54	-8.59	AV
Middle Channel (5200 MHz)-Above 1G									
V	4592.175	62.44	6.48	36.35	44.05	61.22	74	-12.78	PK
V	4592.175	43.30	6.48	36.35	44.05	42.08	54	-11.92	AV
V	10400.181	63.00	8.47	37.88	44.51	64.84	68.2	-3.36	PK
V	10400.181	43.34	8.47	37.88	44.51	45.18	54	-8.82	AV
V	15600.178	61.32	10.12	38.80	44.10	66.14	74	-7.86	PK
V	15600.178	43.93	10.12	38.80	42.70	50.15	54	-3.85	AV
H	4592.184	62.86	6.48	36.37	44.05	61.66	74	-12.34	PK
H	4592.184	43.02	6.48	36.37	44.05	41.82	54	-12.18	AV
H	10400.068	52.75	8.47	38.64	44.50	55.36	68.2	-12.84	PK
H	10400.068	43.26	8.47	38.64	44.50	45.87	54	-8.13	AV
H	15600.182	52.97	10.12	38.38	44.10	57.37	74	-16.63	PK
H	15600.182	42.76	10.12	38.38	44.10	47.16	54	-6.84	AV
High Channel (5240 MHz)-Above 1G									
V	4739.013	62.33	7.10	37.24	43.50	63.17	74	-10.83	PK
V	4739.013	43.54	7.10	37.24	43.50	44.38	54	-9.62	AV
V	10480.109	61.96	8.46	37.68	44.50	63.60	68.2	-4.60	PK
V	10480.109	43.90	8.46	37.68	44.50	45.54	54	-8.46	AV
V	15720.042	62.09	10.12	38.80	44.10	66.91	74	-7.09	PK
V	15720.042	43.56	10.12	38.80	42.70	49.78	54	-4.22	AV
H	4739.033	62.26	7.10	37.24	43.50	63.10	74	-10.90	PK
H	4739.033	43.85	7.10	37.24	43.50	44.69	54	-9.31	AV
H	10480.183	50.56	8.46	38.57	44.50	53.09	68.2	-15.11	PK
H	10480.183	40.03	8.46	38.57	44.50	42.56	54	-11.44	AV
H	15720.187	52.64	10.12	38.38	44.10	57.04	74	-16.96	PK
H	15720.187	42.73	10.12	38.38	44.10	47.13	54	-6.87	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode:	TX(5.1G) - 802.11n-HT20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5180 MHz)-Above 1G									
V	4434.169	61.65	5.94	35.40	44.00	58.99	68.2	-9.21	PK
V	4434.169	43.86	5.94	35.40	44.00	41.20	54	-12.80	AV
V	10360.093	63.72	8.46	39.75	44.50	67.43	68.2	-0.77	PK
V	10360.093	43.79	8.46	39.75	44.50	47.50	54	-6.50	AV
V	15540.068	63.24	10.12	38.80	44.10	68.06	74	-5.94	PK
V	15540.068	43.16	10.12	38.80	42.70	49.38	54	-4.62	AV
H	4434.107	62.58	5.94	35.18	44.00	59.70	68.2	-8.50	PK
H	4434.107	43.36	5.94	35.18	44.00	40.48	54	-13.52	AV
H	10360.073	53.85	8.46	38.71	44.50	56.52	68.2	-11.68	PK
H	10360.073	42.14	8.46	38.71	44.50	44.81	54	-9.19	AV
H	15540.005	50.53	10.12	38.38	44.10	54.93	74	-19.07	PK
H	15540.005	42.35	10.12	38.38	44.10	46.75	54	-7.25	AV
Middle Channel (5200 MHz)-Above 1G									
V	4592.121	62.33	6.48	36.35	44.05	61.11	74	-12.89	PK
V	4592.121	43.54	6.48	36.35	44.05	42.32	54	-11.68	AV
V	10400.106	61.63	8.47	37.88	44.51	63.47	68.2	-4.73	PK
V	10400.106	43.60	8.47	37.88	44.51	45.44	54	-8.56	AV
V	15600.102	61.71	10.12	38.80	44.10	66.53	74	-7.47	PK
V	15600.102	43.10	10.12	38.80	42.70	49.32	54	-4.68	AV
H	4592.089	64.31	6.48	36.37	44.05	63.11	74	-10.89	PK
H	4592.089	43.83	6.48	36.37	44.05	42.63	54	-11.37	AV
H	10400.183	54.68	8.47	38.64	44.50	57.29	68.2	-10.91	PK
H	10400.183	44.61	8.47	38.64	44.50	47.22	54	-6.78	AV
H	15600.118	53.18	10.12	38.38	44.10	57.58	74	-16.42	PK
H	15600.118	44.70	10.12	38.38	44.10	49.10	54	-4.90	AV
High Channel (5240 MHz)-Above 1G									
V	4739.064	60.47	7.10	37.24	43.50	61.31	74	-12.69	PK
V	4739.064	43.24	7.10	37.24	43.50	44.08	54	-9.92	AV
V	10480.093	64.50	8.46	37.68	44.50	66.14	68.2	-2.06	PK
V	10480.093	43.56	8.46	37.68	44.50	45.20	54	-8.80	AV
V	15720.135	63.54	10.12	38.80	44.10	68.36	74	-5.64	PK
V	15720.135	43.61	10.12	38.80	42.70	49.83	54	-4.17	AV
H	4739.101	62.17	7.10	37.24	43.50	63.01	74	-10.99	PK
H	4739.101	43.49	7.10	37.24	43.50	44.33	54	-9.67	AV
H	10480.087	51.74	8.46	38.57	44.50	54.27	68.2	-13.93	PK
H	10480.087	44.07	8.46	38.57	44.50	46.60	54	-7.40	AV
H	15720.157	50.47	10.12	38.38	44.10	54.87	74	-19.13	PK
H	15720.157	41.40	10.12	38.38	44.10	45.80	54	-8.20	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode:	TX(5.1G) - 802.11n-HT40

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5190 MHz)-Above 1G									
V	4434.196	60.53	5.94	35.40	44.00	57.87	68.2	-10.33	PK
V	4434.196	43.69	5.94	35.40	44.00	41.03	54	-12.97	AV
V	10380.175	61.29	8.46	39.75	44.50	65.00	68.2	-3.20	PK
V	10380.175	43.70	8.46	39.75	44.50	47.41	54	-6.59	AV
V	15570.005	64.11	10.12	38.80	44.10	68.93	74	-5.07	PK
V	15570.005	43.40	10.12	38.80	42.70	49.62	54	-4.38	AV
H	4434.137	64.21	5.94	35.18	44.00	61.33	74	-12.67	PK
H	4434.137	43.53	5.94	35.18	44.00	40.65	54	-13.35	AV
H	10380.053	50.20	8.46	38.71	44.50	52.87	68.2	-15.33	PK
H	10380.053	41.11	8.46	38.71	44.50	43.78	54	-10.22	AV
H	15570.182	54.07	10.12	38.38	44.10	58.47	74	-15.53	PK
H	15570.182	42.41	10.12	38.38	44.10	46.81	54	-7.19	AV
High Channel (5230 MHz)-Above 1G									
V	4739.166	64.76	6.48	36.35	44.05	63.54	68.2	-4.66	PK
V	4739.166	43.70	6.48	36.35	44.05	42.48	54	-11.52	AV
V	10460.141	60.97	8.47	37.88	44.51	62.81	68.2	-5.39	PK
V	10460.141	43.94	8.47	37.88	44.51	45.78	54	-8.22	AV
V	15690.028	62.29	10.12	38.80	44.10	67.11	74	-6.89	PK
V	15690.028	43.39	10.12	38.80	42.70	49.61	54	-4.39	AV
H	4739.106	61.07	6.48	36.37	44.05	59.87	68.2	-8.33	PK
H	4739.106	43.53	6.48	36.37	44.05	42.33	54	-11.67	AV
H	10460.156	52.63	8.47	38.64	44.50	55.24	68.2	-12.96	PK
H	10460.156	40.28	8.47	38.64	44.50	42.89	54	-11.11	AV
H	15690.068	50.54	10.12	38.38	44.10	54.94	74	-19.06	PK
H	15690.068	42.41	10.12	38.38	44.10	46.81	54	-7.19	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode:	TX(5.1G) - 802.11ac-HT20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5180 MHz)-Above 1G									
V	4434.041	62.21	5.94	35.40	44.00	59.55	68.2	-8.65	PK
V	4434.041	43.65	5.94	35.40	44.00	40.99	54	-13.01	AV
V	10360.020	60.17	8.46	39.75	44.50	63.88	68.2	-4.32	PK
V	10360.020	43.36	8.46	39.75	44.50	47.07	54	-6.93	AV
V	15540.036	61.11	10.12	38.80	44.10	65.93	74	-8.07	PK
V	15540.036	43.96	10.12	38.80	42.70	50.18	54	-3.82	AV
H	4434.060	64.12	5.94	35.18	44.00	61.24	68.2	-6.96	PK
H	4434.060	43.65	5.94	35.18	44.00	40.77	54	-13.23	AV
H	10360.099	54.33	8.46	38.71	44.50	57.00	68.2	-11.20	PK
H	10360.099	40.41	8.46	38.71	44.50	43.08	54	-10.92	AV
H	15540.186	51.70	10.12	38.38	44.10	56.10	74	-17.90	PK
H	15540.186	43.48	10.12	38.38	44.10	47.88	54	-6.12	AV
Middle Channel (5200 MHz)-Above 1G									
V	4592.018	60.64	6.48	36.35	44.05	59.42	74	-14.58	PK
V	4592.018	43.13	6.48	36.35	44.05	41.91	54	-12.09	AV
V	10400.130	61.37	8.47	37.88	44.51	63.21	68.2	-4.99	PK
V	10400.130	43.00	8.47	37.88	44.51	44.84	54	-9.16	AV
V	15600.176	64.62	10.12	38.80	44.10	69.44	74	-4.56	PK
V	15600.176	43.14	10.12	38.80	42.70	49.36	54	-4.64	AV
H	4592.169	61.46	6.48	36.37	44.05	60.26	74	-13.74	PK
H	4592.169	43.60	6.48	36.37	44.05	42.40	54	-11.60	AV
H	10400.133	51.90	8.47	38.64	44.50	54.51	68.2	-13.69	PK
H	10400.133	40.06	8.47	38.64	44.50	42.67	54	-11.33	AV
H	15600.143	51.82	10.12	38.38	44.10	56.22	74	-17.78	PK
H	15600.143	42.23	10.12	38.38	44.10	46.63	54	-7.37	AV
High Channel (5240 MHz)-Above 1G									
V	4739.124	60.50	7.10	37.24	43.50	61.34	74	-12.66	PK
V	4739.124	43.71	7.10	37.24	43.50	44.55	54	-9.45	AV
V	10480.094	60.98	8.46	37.68	44.50	62.62	68.2	-5.58	PK
V	10480.094	43.01	8.46	37.68	44.50	44.65	54	-9.35	AV
V	15720.137	60.77	10.12	38.80	44.10	65.59	74	-8.41	PK
V	15720.137	43.87	10.12	38.80	42.70	50.09	54	-3.91	AV
H	4739.131	62.58	7.10	37.24	43.50	63.42	74	-10.58	PK
H	4739.131	43.51	7.10	37.24	43.50	44.35	54	-9.65	AV
H	10480.149	50.11	8.46	38.57	44.50	52.64	68.2	-15.56	PK
H	10480.149	44.10	8.46	38.57	44.50	46.63	54	-7.37	AV
H	15720.125	52.49	10.12	38.38	44.10	56.89	74	-17.11	PK
H	15720.125	44.59	10.12	38.38	44.10	48.99	54	-5.01	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode:	TX(5.1G) - 802.11ac-HT40

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel (5190 MHz)-Above 1G									
V	4434.024	62.72	5.94	35.40	44.00	60.06	68.2	-8.14	PK
V	4434.024	43.04	5.94	35.40	44.00	40.38	54	-13.62	AV
V	10380.157	61.34	8.46	39.75	44.50	65.05	68.2	-3.15	PK
V	10380.157	43.41	8.46	39.75	44.50	47.12	54	-6.88	AV
V	15570.073	61.82	10.12	38.80	44.10	66.64	74	-7.36	PK
V	15570.073	43.09	10.12	38.80	42.70	49.31	54	-4.69	AV
H	4434.037	61.15	5.94	35.18	44.00	58.27	74	-15.73	PK
H	4434.037	43.07	5.94	35.18	44.00	40.19	54	-13.81	AV
H	10380.060	54.86	8.46	38.71	44.50	57.53	68.2	-10.67	PK
H	10380.060	41.07	8.46	38.71	44.50	43.74	54	-10.26	AV
H	15570.066	52.54	10.12	38.38	44.10	56.94	74	-17.06	PK
H	15570.066	42.96	10.12	38.38	44.10	47.36	54	-6.64	AV
High Channel (5230 MHz)-Above 1G									
V	4739.075	63.78	6.48	36.35	44.05	62.56	68.2	-5.64	PK
V	4739.075	43.94	6.48	36.35	44.05	42.72	54	-11.28	AV
V	10460.198	62.02	8.47	37.88	44.51	63.86	68.2	-4.34	PK
V	10460.198	43.37	8.47	37.88	44.51	45.21	54	-8.79	AV
V	15690.108	62.71	10.12	38.80	44.10	67.53	74	-6.47	PK
V	15690.108	43.09	10.12	38.80	42.70	49.31	54	-4.69	AV
H	4739.178	64.89	6.48	36.37	44.05	63.69	68.2	-4.51	PK
H	4739.178	43.09	6.48	36.37	44.05	41.89	54	-12.11	AV
H	10460.021	51.00	8.47	38.64	44.50	53.61	68.2	-14.59	PK
H	10460.021	40.84	8.47	38.64	44.50	43.45	54	-10.55	AV
H	15690.087	52.36	10.12	38.38	44.10	56.76	74	-17.24	PK
H	15690.087	43.55	10.12	38.38	44.10	47.95	54	-6.05	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

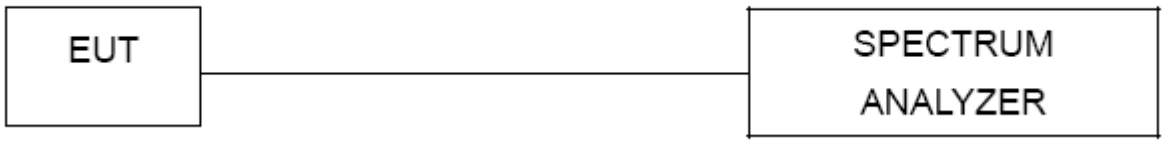
Test Mode:	TX(5.1G) - 802.11ac-HT80

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Cable loss (dB)	Antenna Factor dB/m	Preamp Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
(5210 MHz)-Above 1G									
V	4434.181	61.89	5.94	35.40	44.00	59.23	68.2	-8.97	PK
V	4434.181	43.99	5.94	35.40	44.00	41.33	54	-12.67	AV
V	10420.115	61.27	8.46	39.75	44.50	64.98	68.2	-3.22	PK
V	10420.115	43.64	8.46	39.75	44.50	47.35	54	-6.65	AV
V	15630.094	63.08	10.12	38.80	44.10	67.90	74	-6.10	PK
V	15630.094	43.58	10.12	38.80	42.70	49.80	54	-4.20	AV
H	4434.043	61.99	5.94	35.18	44.00	59.11	68.2	-9.09	PK
H	4434.043	43.03	5.94	35.18	44.00	40.15	54	-13.85	AV
H	10420.111	53.44	8.46	38.71	44.50	56.11	68.2	-12.09	PK
H	10420.111	44.65	8.46	38.71	44.50	47.32	54	-6.68	AV
H	15630.010	51.45	10.12	38.38	44.10	55.85	74	-18.15	PK
H	15630.010	40.42	10.12	38.38	44.10	44.82	54	-9.18	AV

Note: PK value is lower than the Average value limit, So average didn't record.
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.
Emission level (dBuV/m) = 20 log Emission level (uV/m).
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

8. Power Spectral Density Test

8.1 Block Diagram Of Test Setup



8.2 Limit

For the band 5.15-5.25 GHz,
(i)For an outdoor Wifi Repeater operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor Wifi Repeater operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

(iv) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional
gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
For the band 5.725-5.85 GHz

(3)For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.3 Test procedure

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

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

b) Set VBW ≥ 3 RBW.

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

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

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

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

8.4 EUT operating Conditions

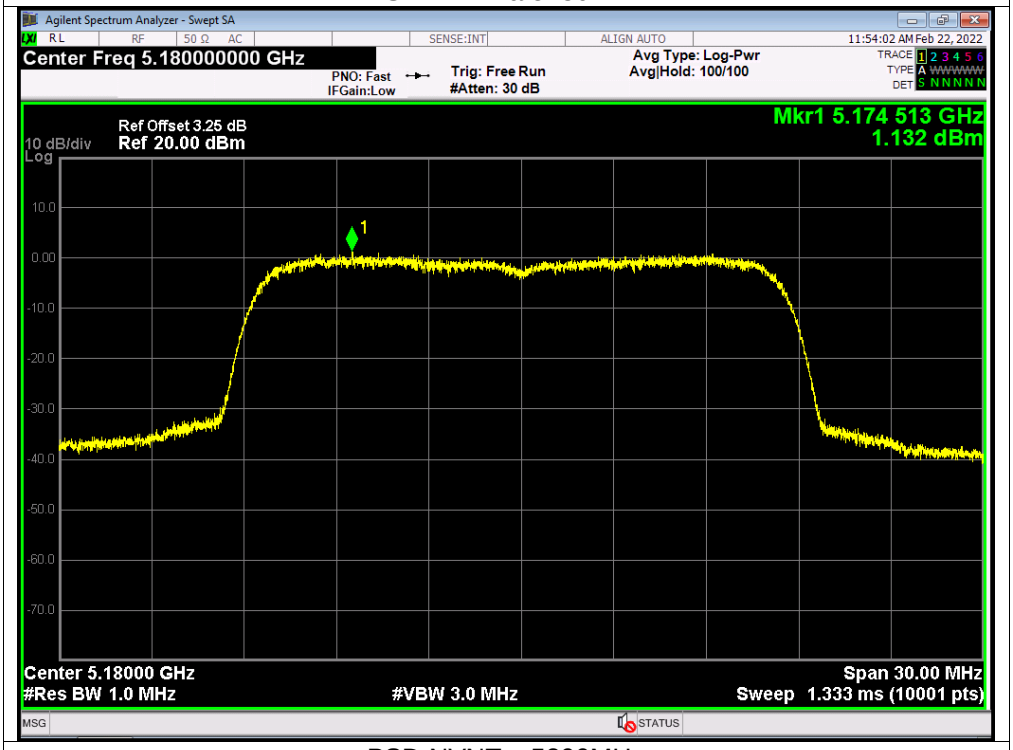
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

8.5 Test Result

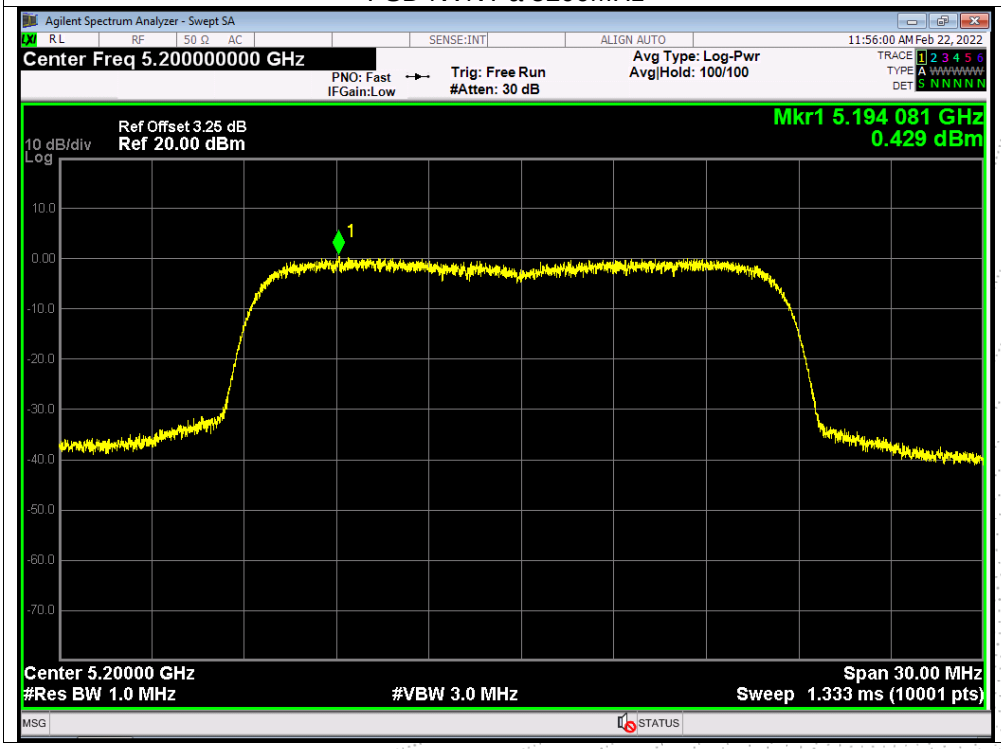
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC120V/60Hz
Test Mode:	(5180-5240MHz		

Condition	Mode	Frequency (MHz)	Conducted PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	1.13	11	Pass
NVNT	a	5200	0.43	11	Pass
NVNT	a	5240	0.9	11	Pass
NVNT	n20	5180	-0.83	11	Pass
NVNT	n20	5200	-0.84	11	Pass
NVNT	n20	5240	-0.15	11	Pass
NVNT	n40	5190	-6.49	11	Pass
NVNT	n40	5230	-1.83	11	Pass
NVNT	ac20	5180	-0.35	11	Pass
NVNT	ac20	5200	-0.57	11	Pass
NVNT	ac20	5240	-0.32	11	Pass
NVNT	ac40	5190	-6.09	11	Pass
NVNT	ac40	5230	-1.44	11	Pass
NVNT	ac80	5210	-7.69	11	Pass

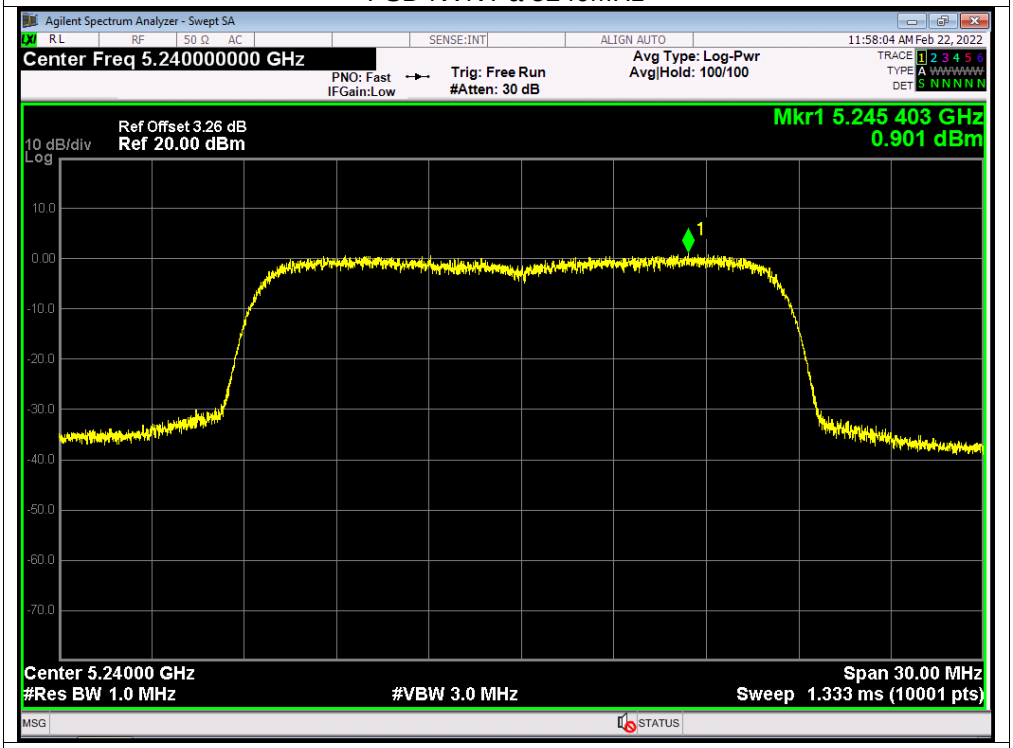
Test Graphs
PSD NVNT a 5180MHz



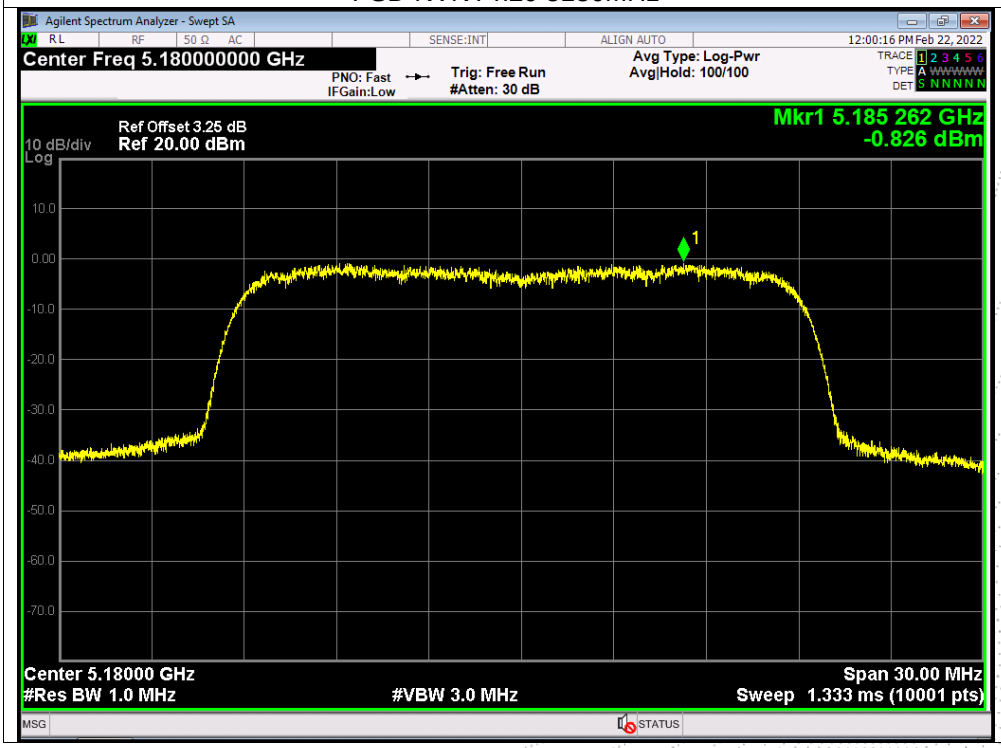
PSD NVNT a 5200MHz



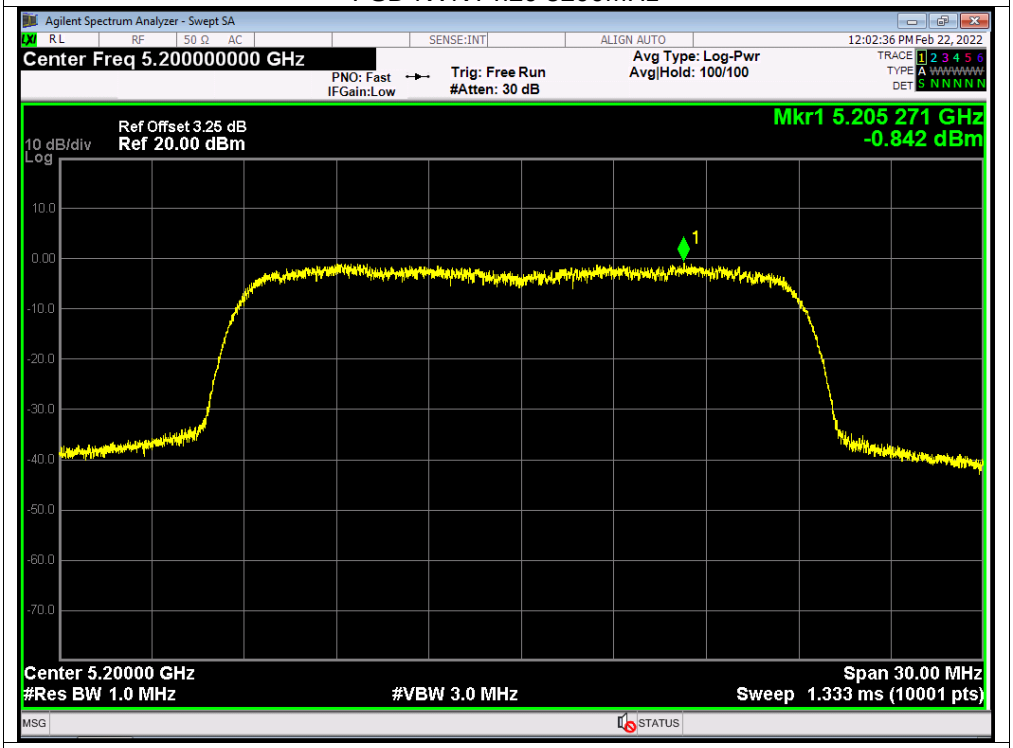
PSD NVNT a 5240MHz



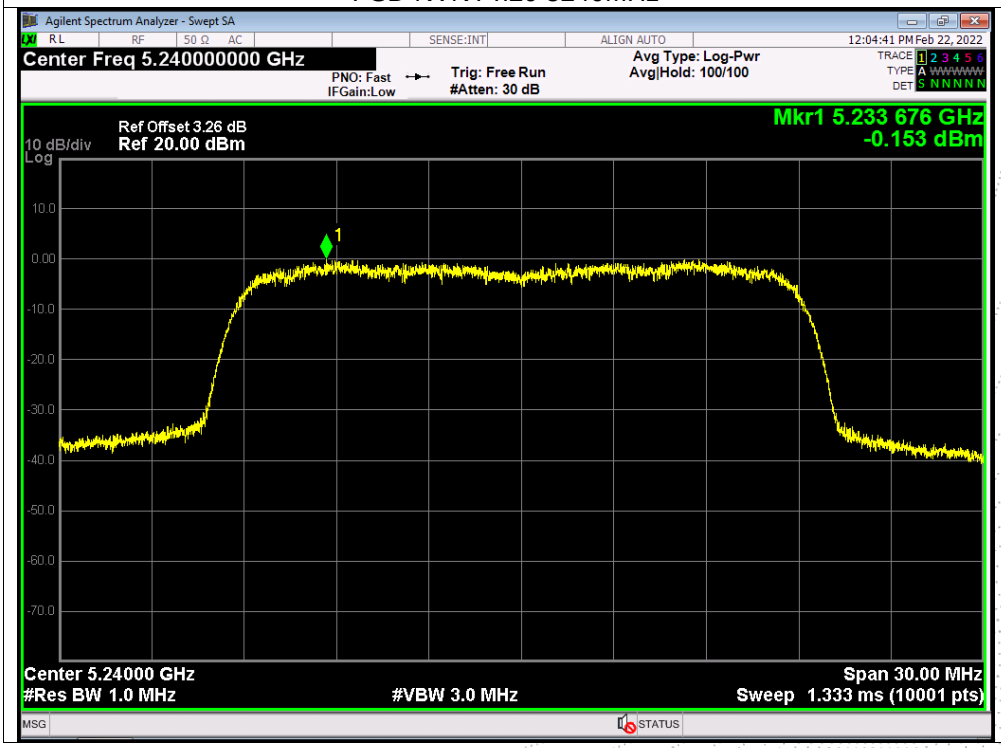
PSD NVNT n20 5180MHz



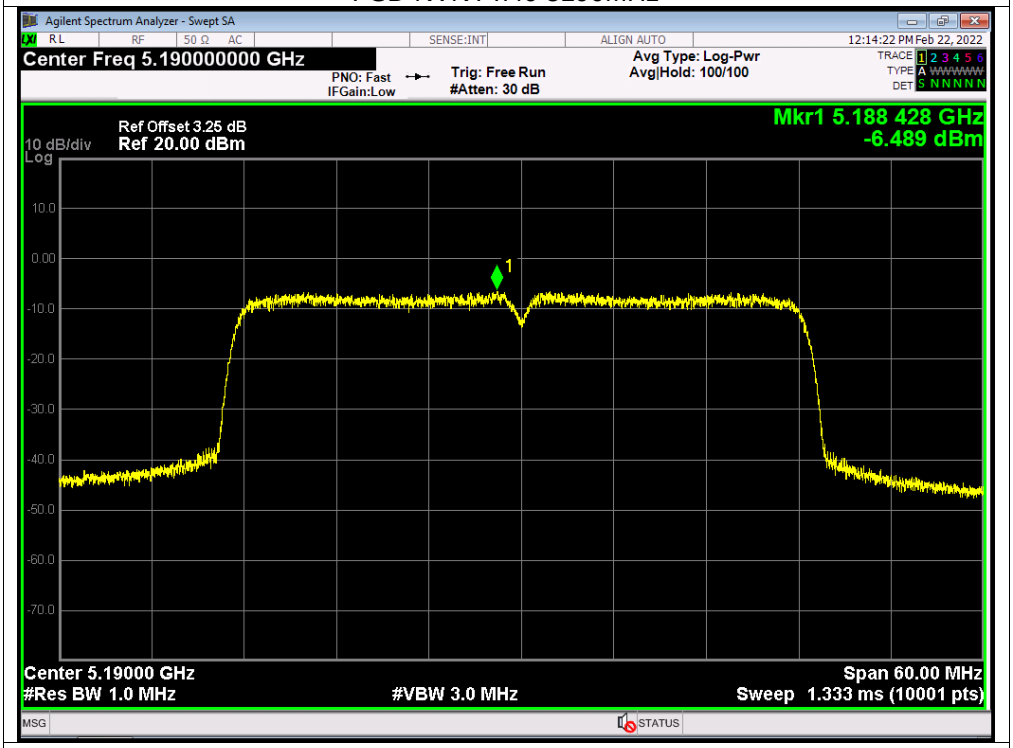
PSD NVNT n20 5200MHz



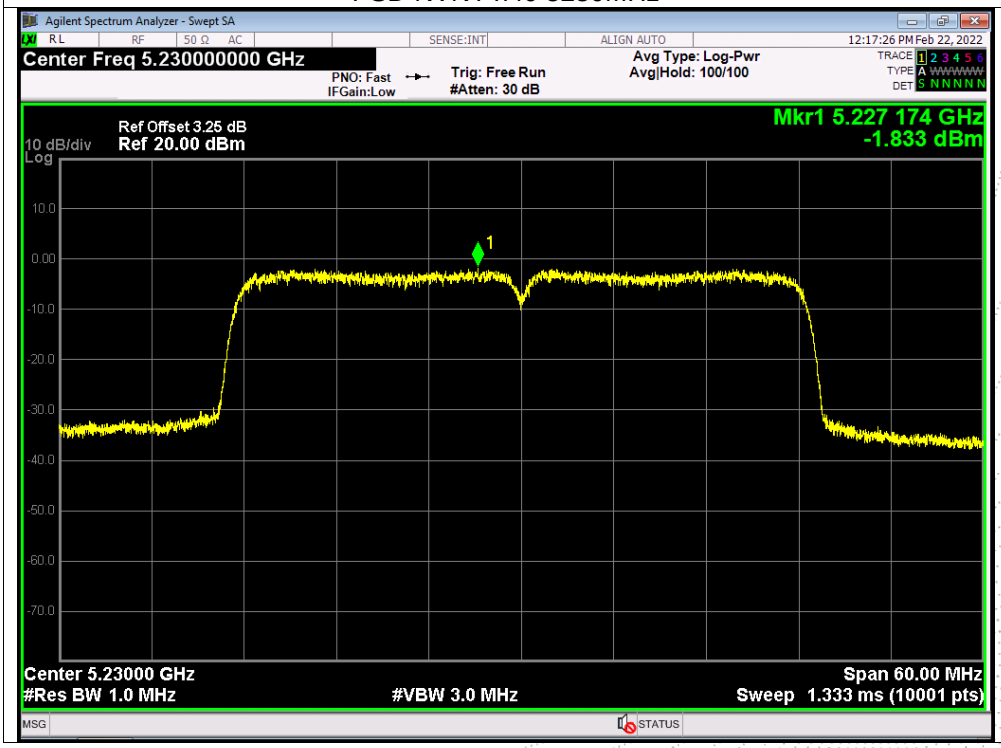
PSD NVNT n20 5240MHz



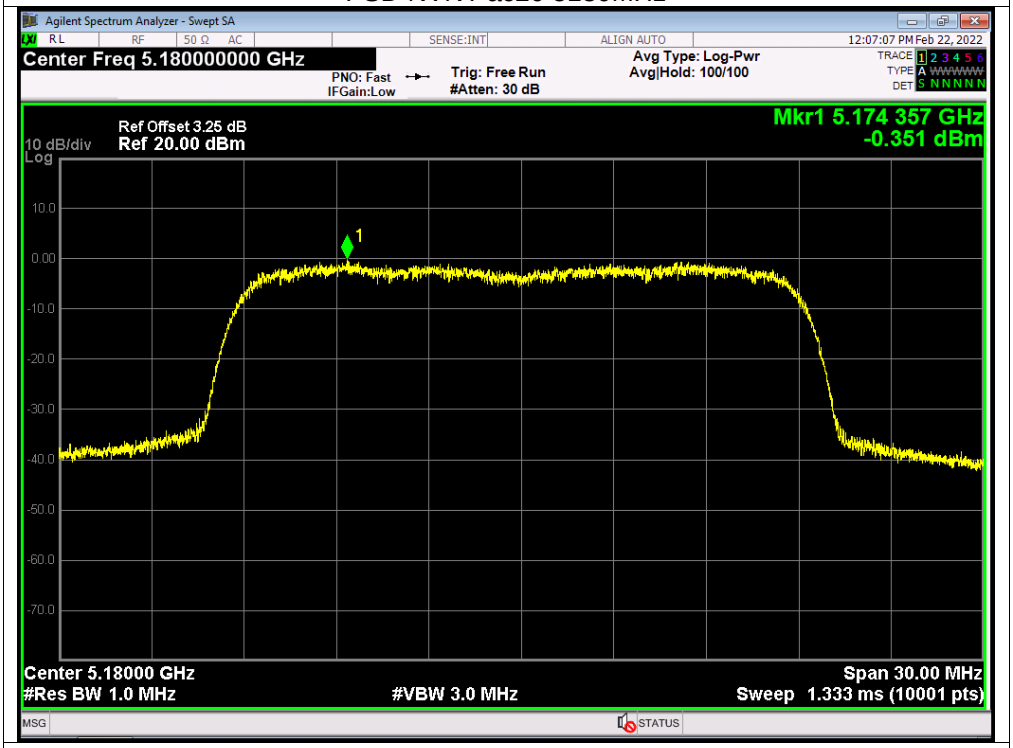
PSD NVNT n40 5190MHz



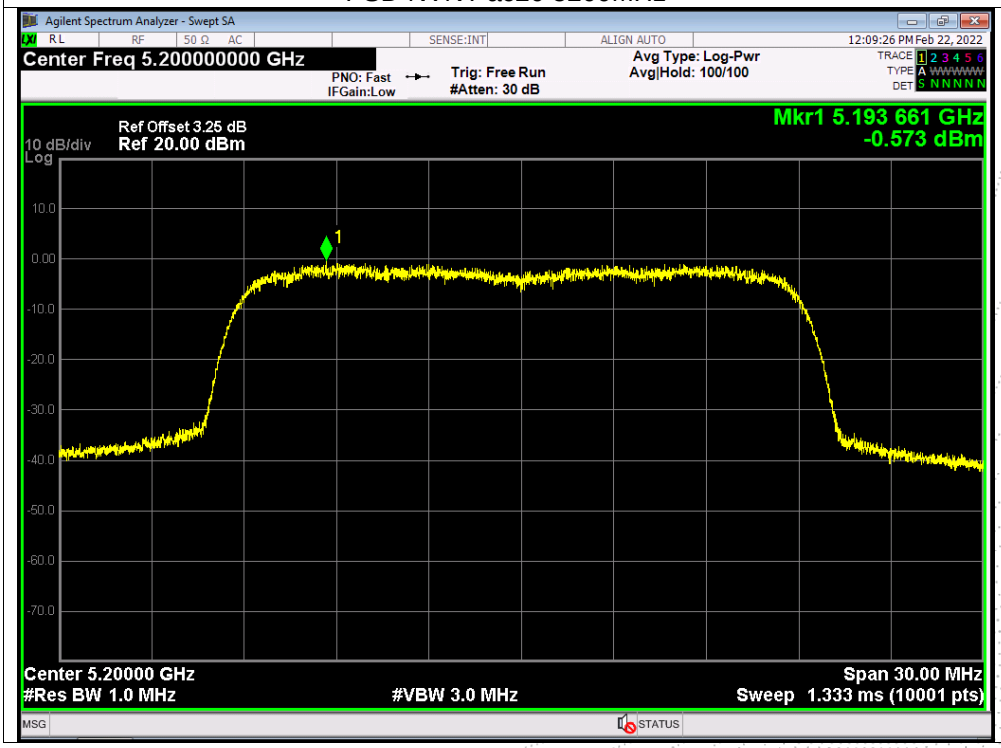
PSD NVNT n40 5230MHz



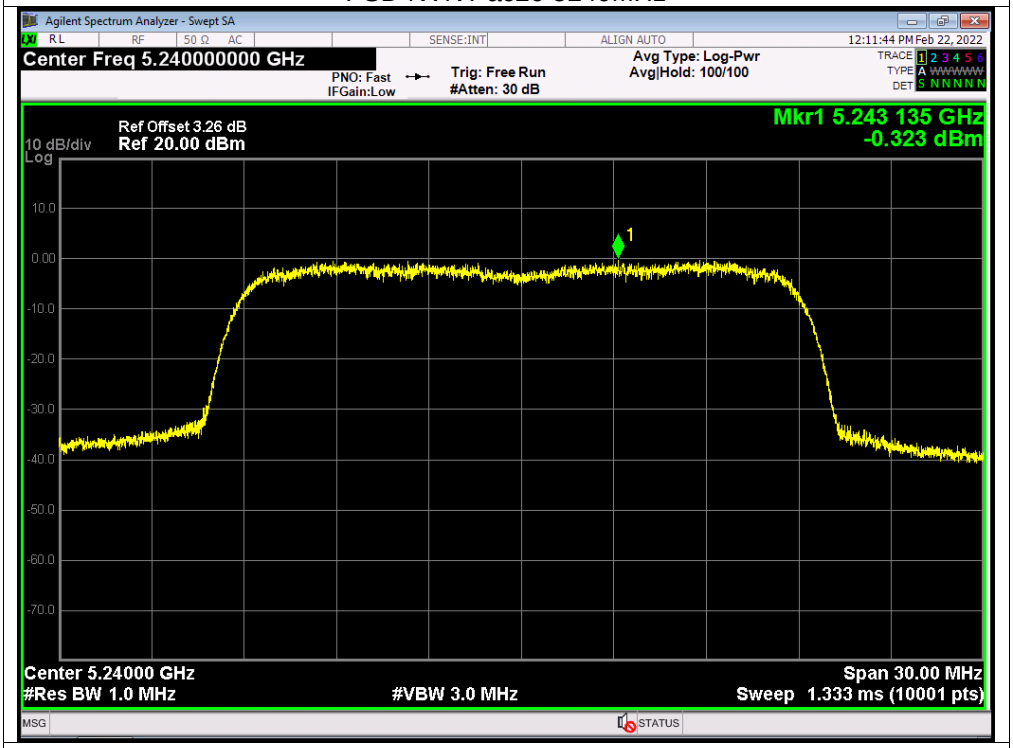
PSD NVNT ac20 5180MHz



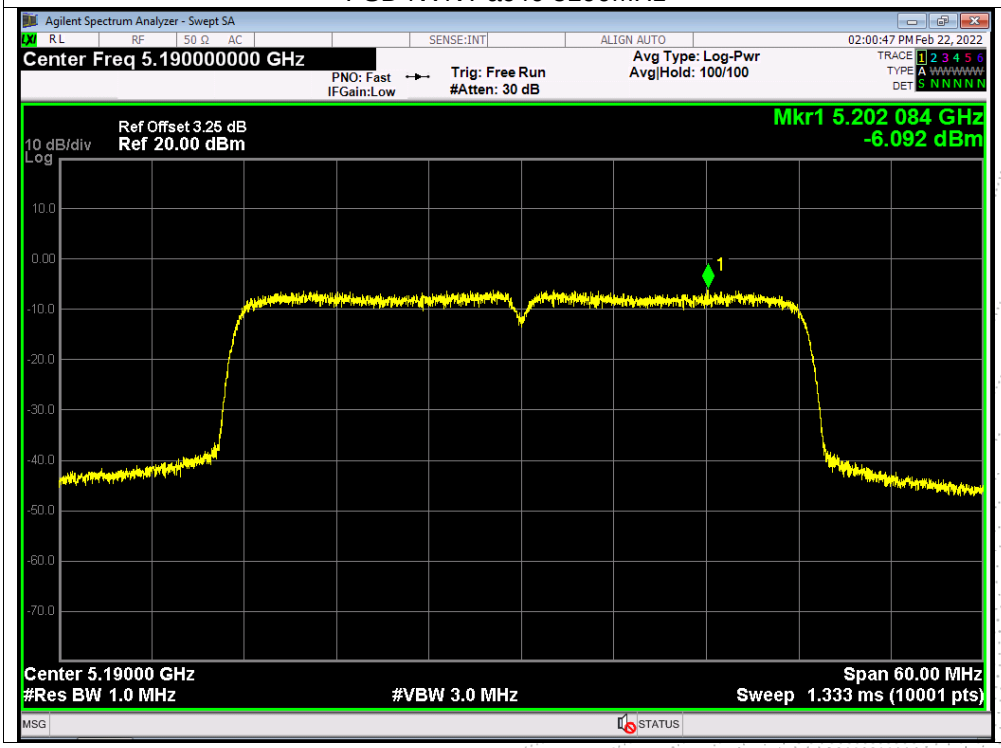
PSD NVNT ac20 5200MHz



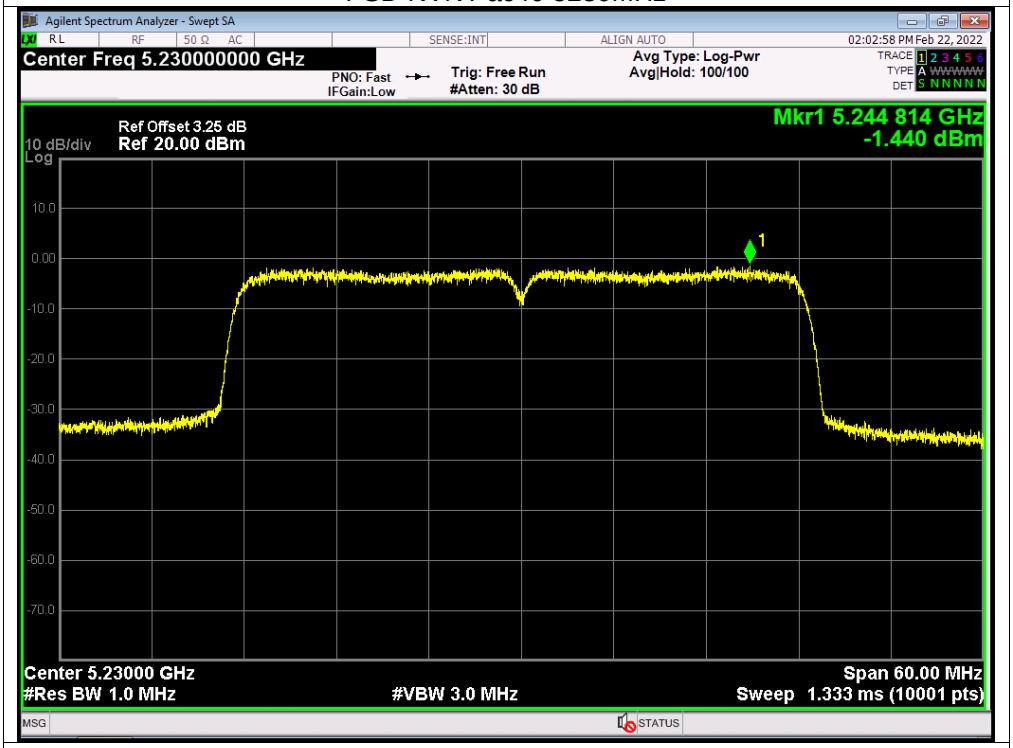
PSD NVNT ac20 5240MHz



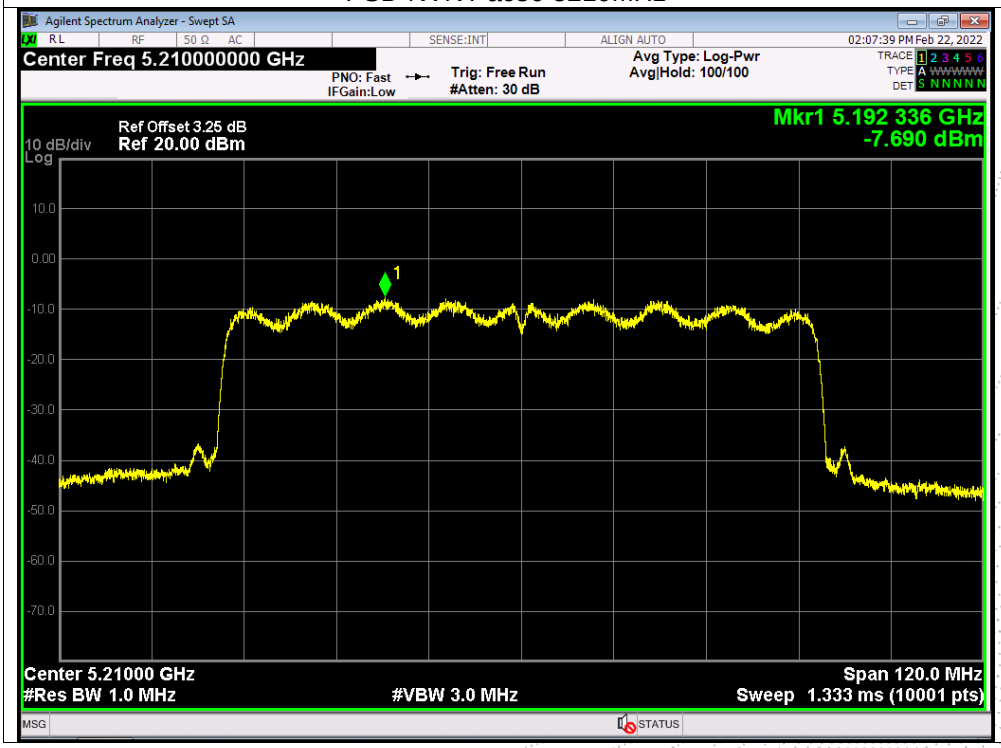
PSD NVNT ac40 5190MHz



PSD NVNT ac40 5230MHz

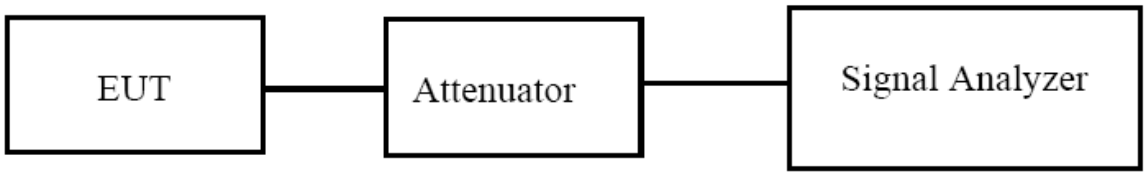


PSD NVNT ac80 5210MHz



9. 26dB & 6dB & 99% Emission Bandwidth

9.1 Block Diagram Of Test Setup



9.2 Limit

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power
is integrated over the full reference bandwidth.

9.3 Test procedure

a) Set RBW = approximately 1% of the emission bandwidth.

b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
The following procedure shall be used for measuring (99 %) power bandwidth:
1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

9.4 EUT operating Conditions

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

9.5 Test Result

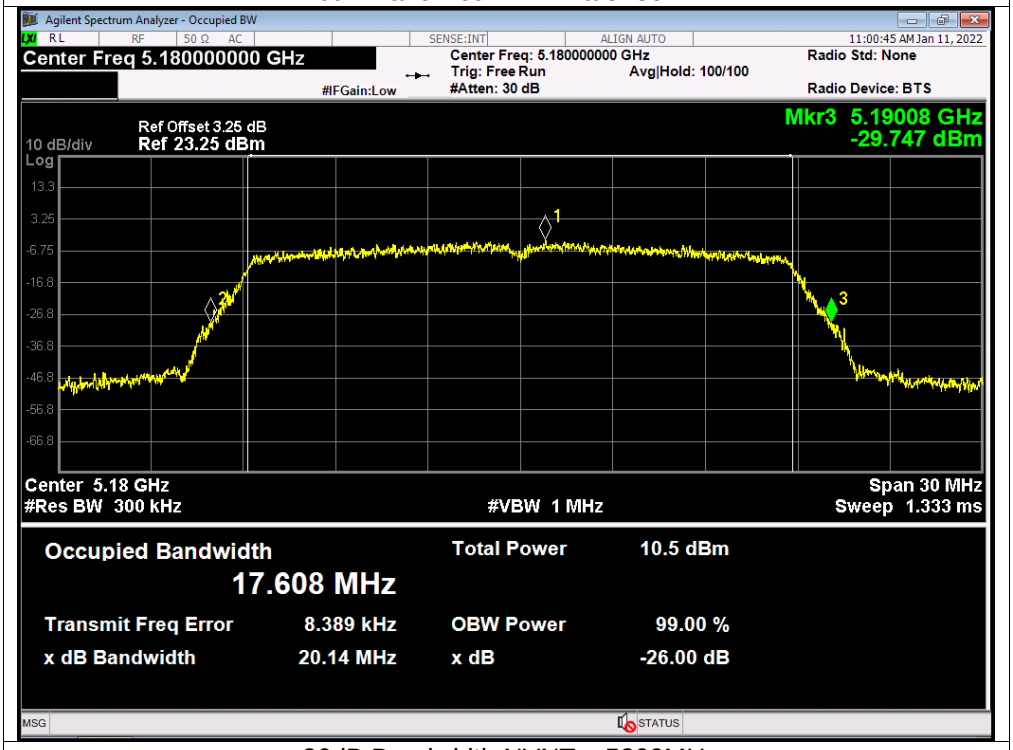
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC120V/60Hz
Test Mode:	(5180-5240MHz)		

Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)	Limit -26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	20.484	N/A	N/A
NVNT	a	5200	20.329	N/A	N/A
NVNT	a	5240	21.072	N/A	N/A
NVNT	n20	5180	20.958	N/A	N/A
NVNT	n20	5200	21.051	N/A	N/A
NVNT	n20	5240	21.127	N/A	N/A
NVNT	n40	5190	41.305	N/A	N/A
NVNT	n40	5230	45.021	N/A	N/A
NVNT	ac20	5180	20.979	N/A	N/A
NVNT	ac20	5200	21.204	N/A	N/A
NVNT	ac20	5240	21.114	N/A	N/A
NVNT	ac40	5190	41.572	N/A	N/A
NVNT	ac40	5230	49.742	N/A	N/A
NVNT	ac80	5210	80.33	N/A	N/A

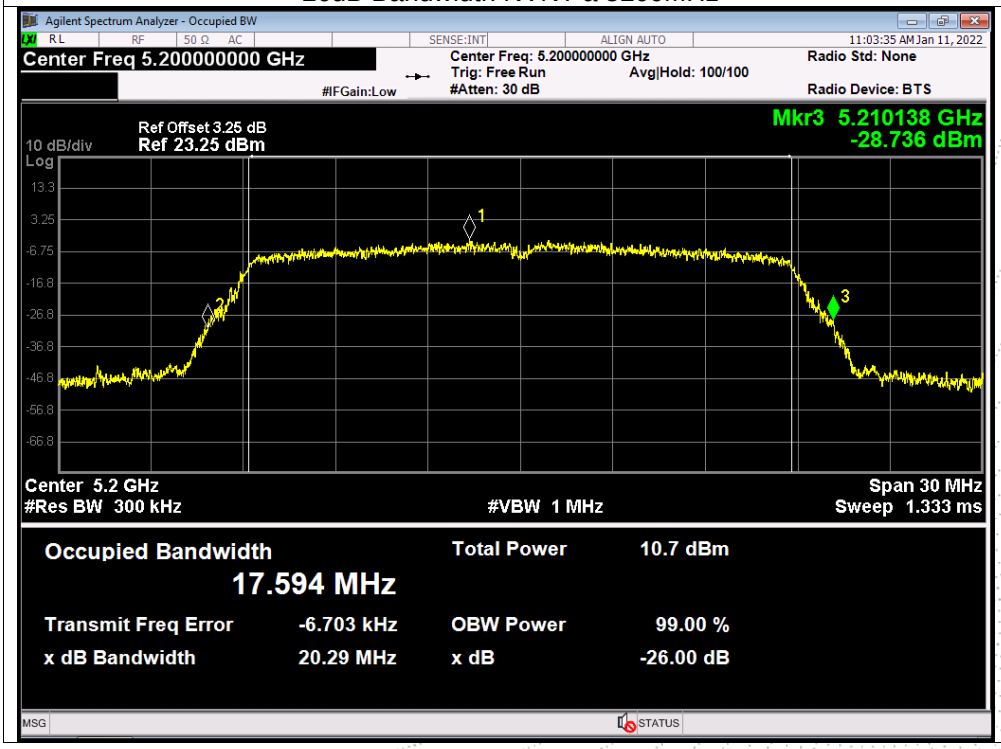
Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5180	16.46
NVNT	a	5200	16.485
NVNT	a	5240	16.466
NVNT	n20	5180	17.591
NVNT	n20	5200	17.599
NVNT	n20	5240	17.6
NVNT	n40	5190	36.217
NVNT	n40	5230	36.321
NVNT	ac20	5180	17.591
NVNT	ac20	5200	17.589
NVNT	ac20	5240	17.594
NVNT	ac40	5190	36.245
NVNT	ac40	5230	36.325
NVNT	ac80	5210	75.282

Test Graphs

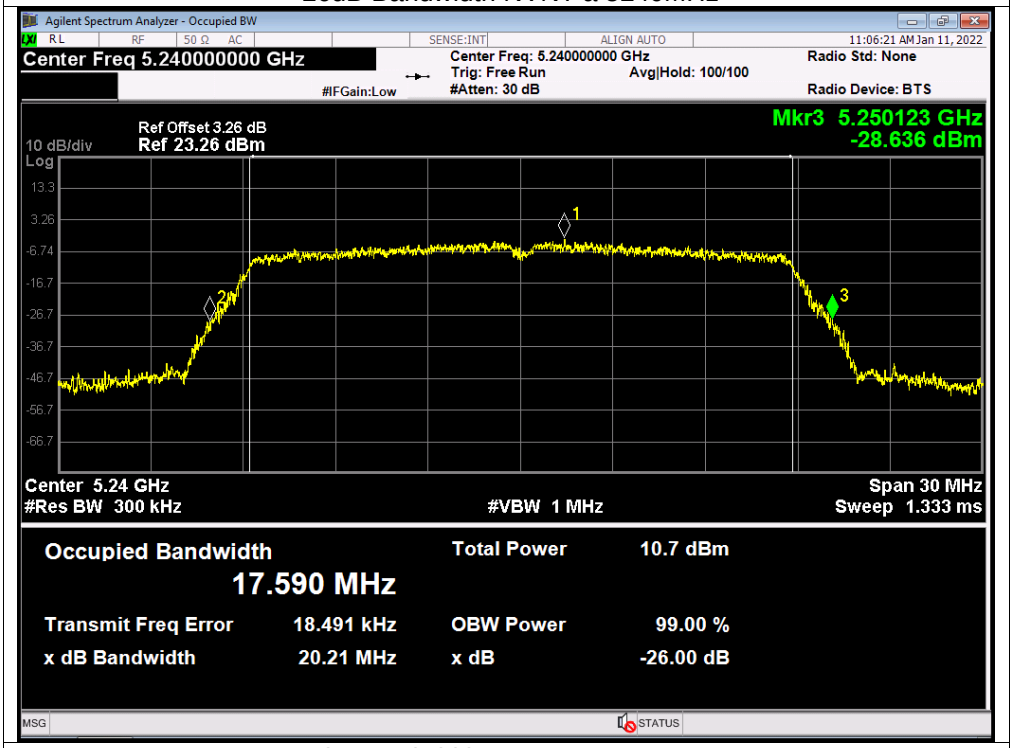
-26dB Bandwidth NVNT a 5180MHz



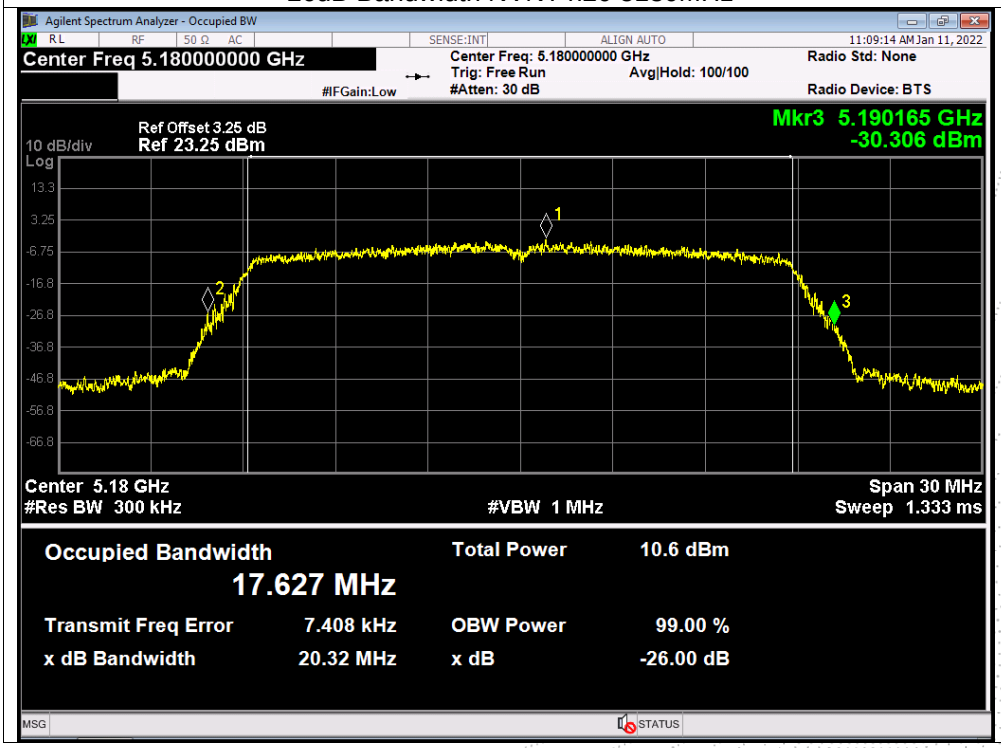
-26dB Bandwidth NVNT a 5200MHz



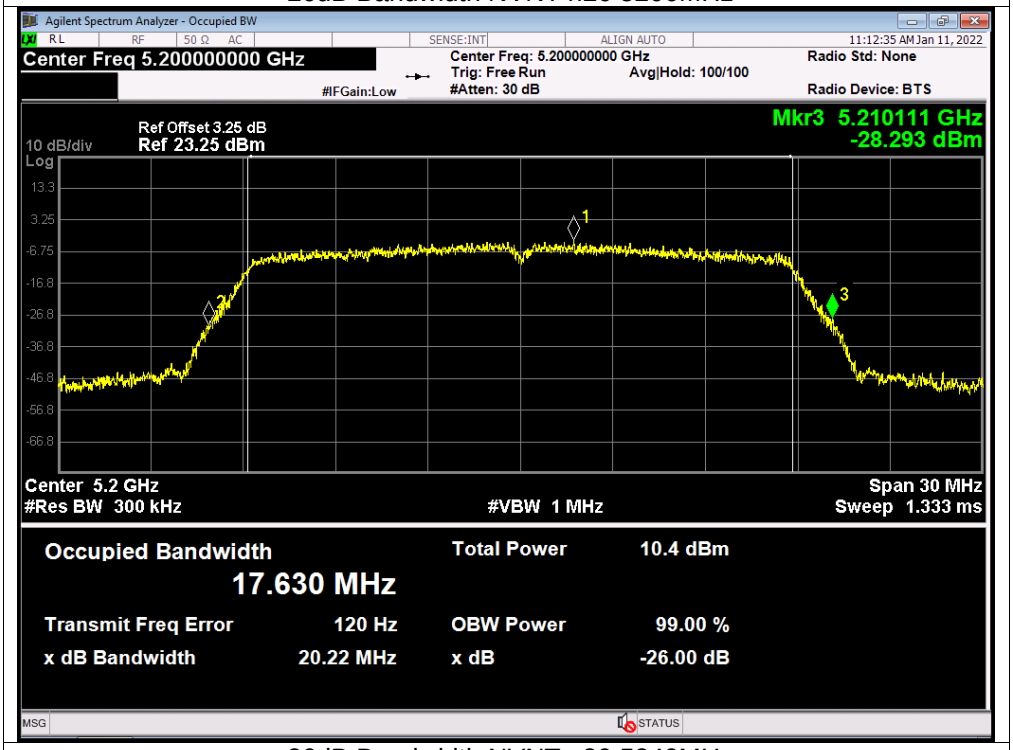
-26dB Bandwidth NVNT a 5240MHz



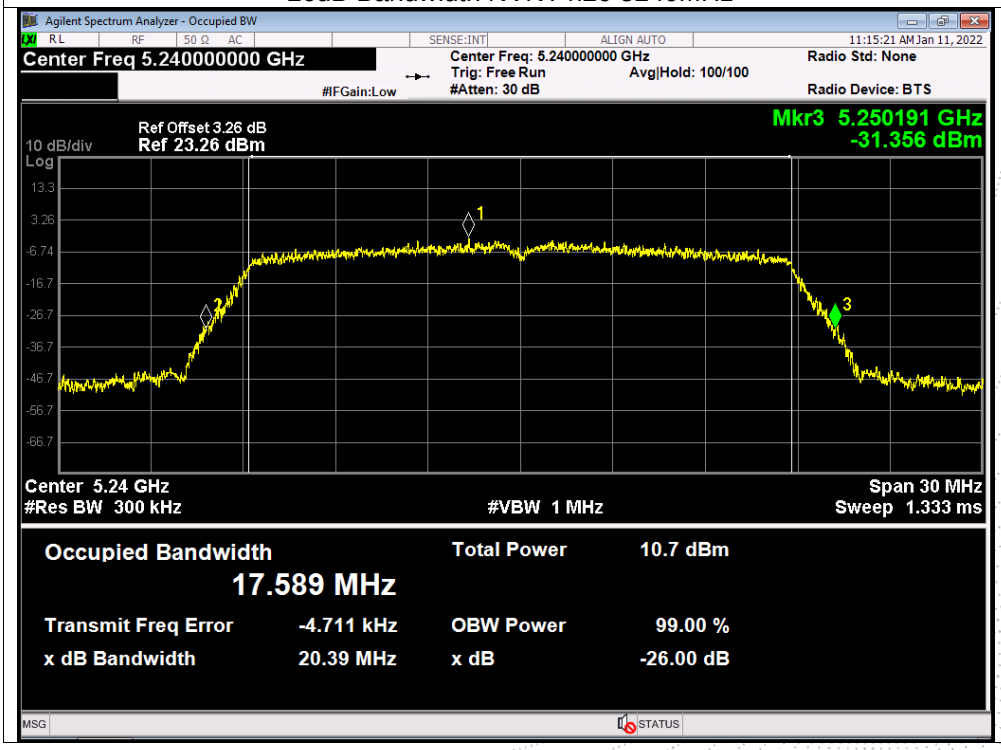
-26dB Bandwidth NVNT n20 5180MHz



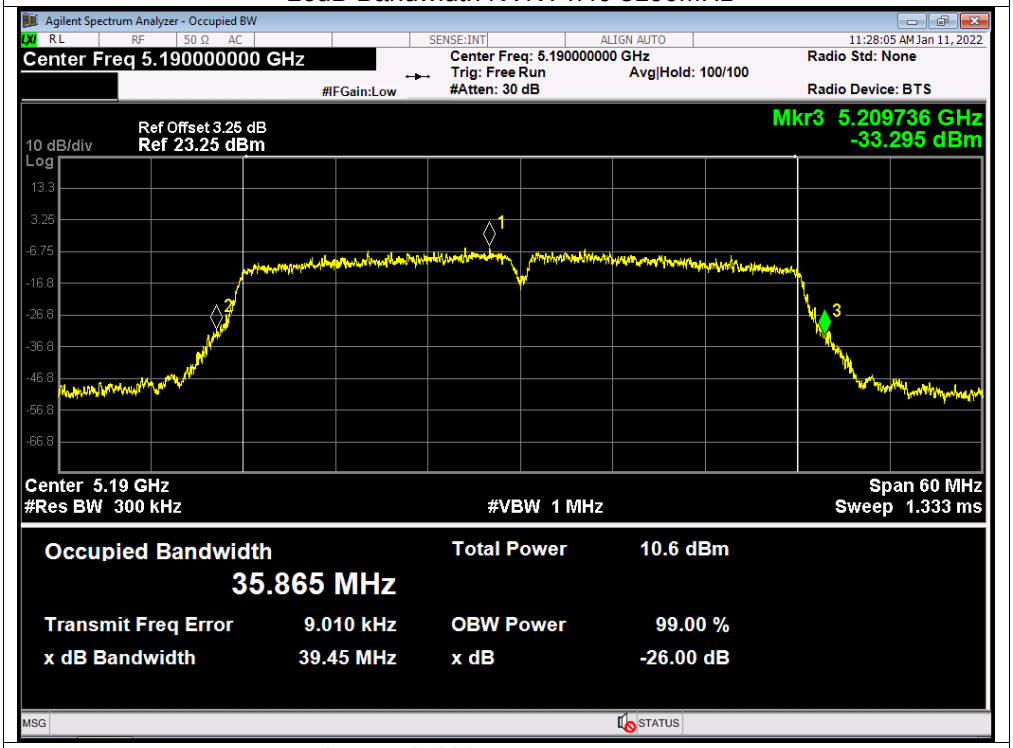
-26dB Bandwidth NVNT n20 5200MHz



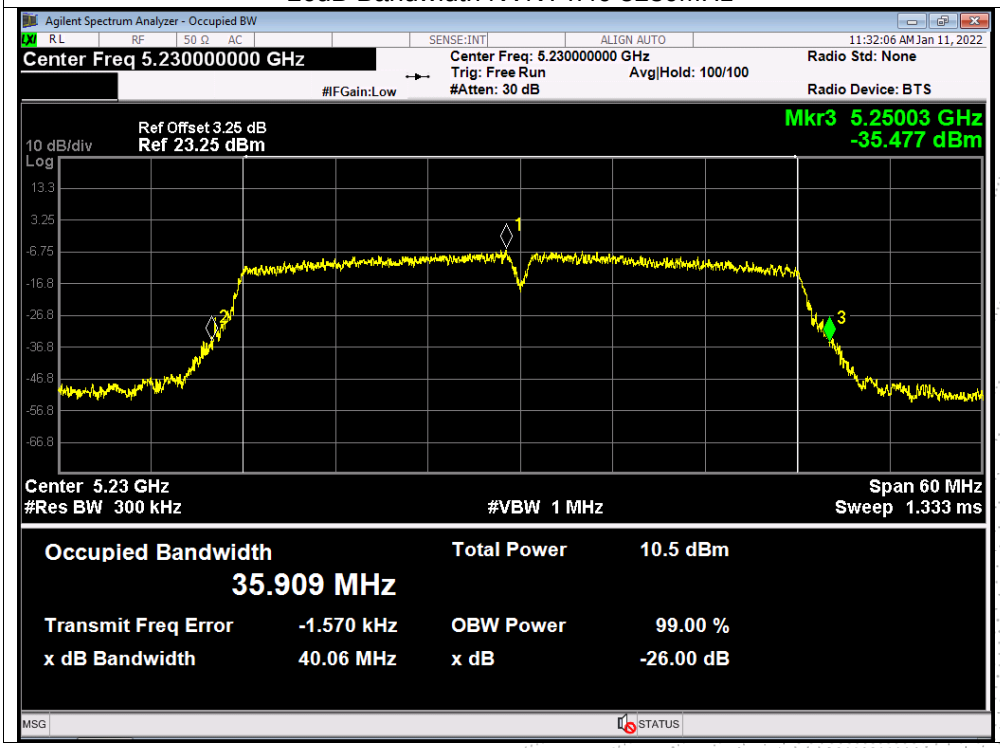
-26dB Bandwidth NVNT n20 5240MHz



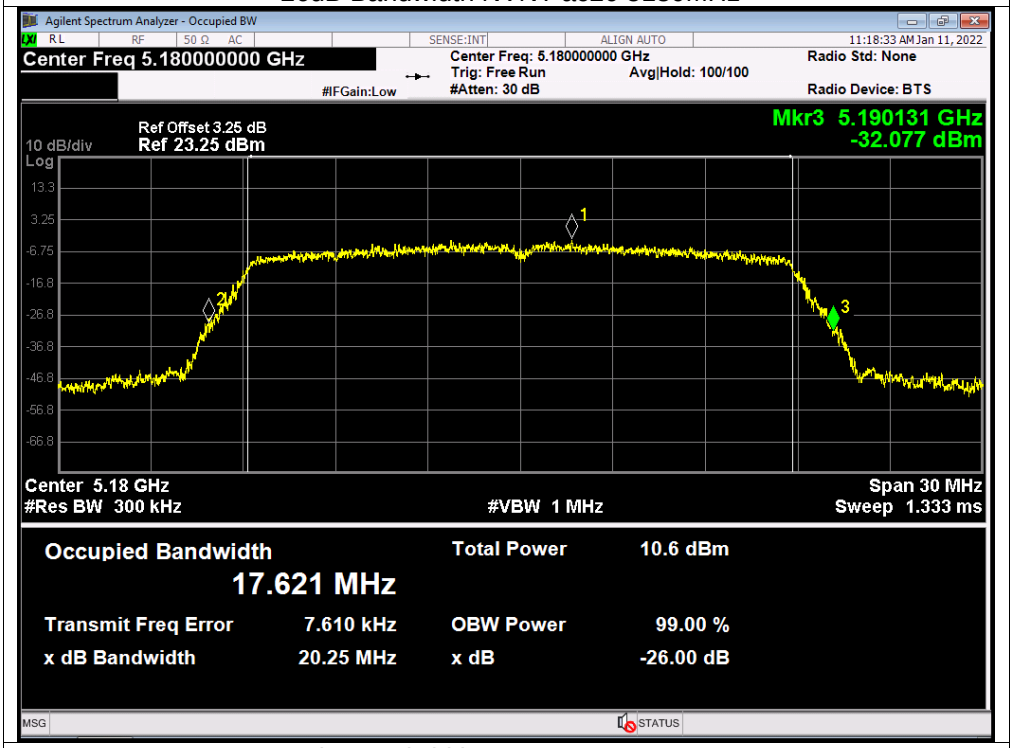
-26dB Bandwidth NVNT n40 5190MHz



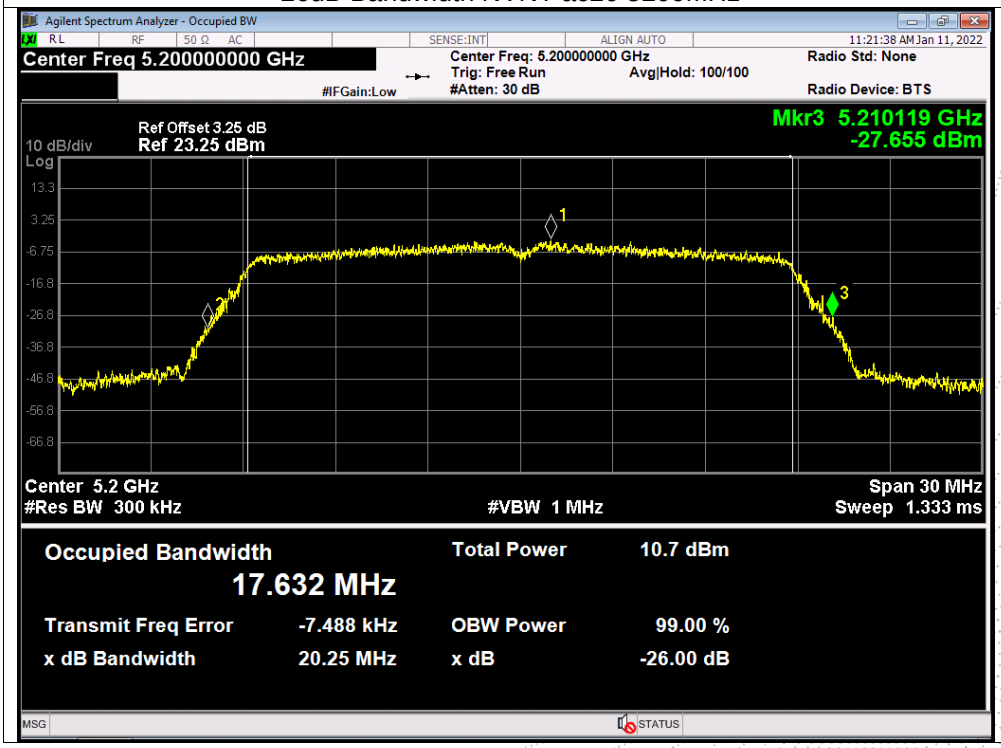
-26dB Bandwidth NVNT n40 5230MHz



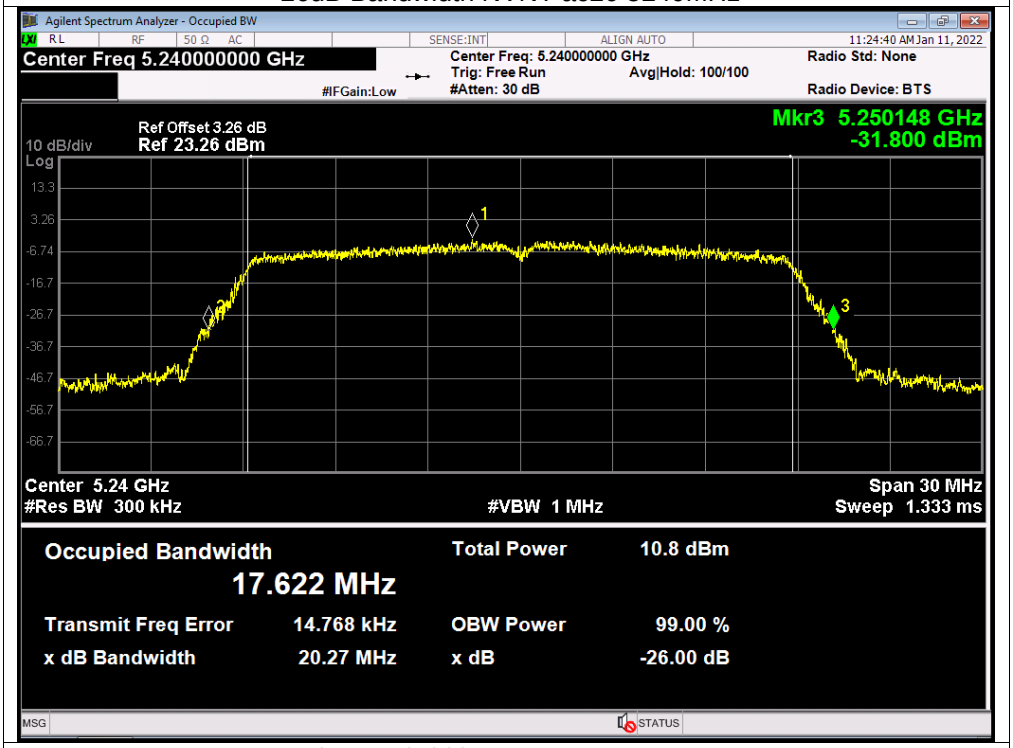
-26dB Bandwidth NVNT ac20 5180MHz



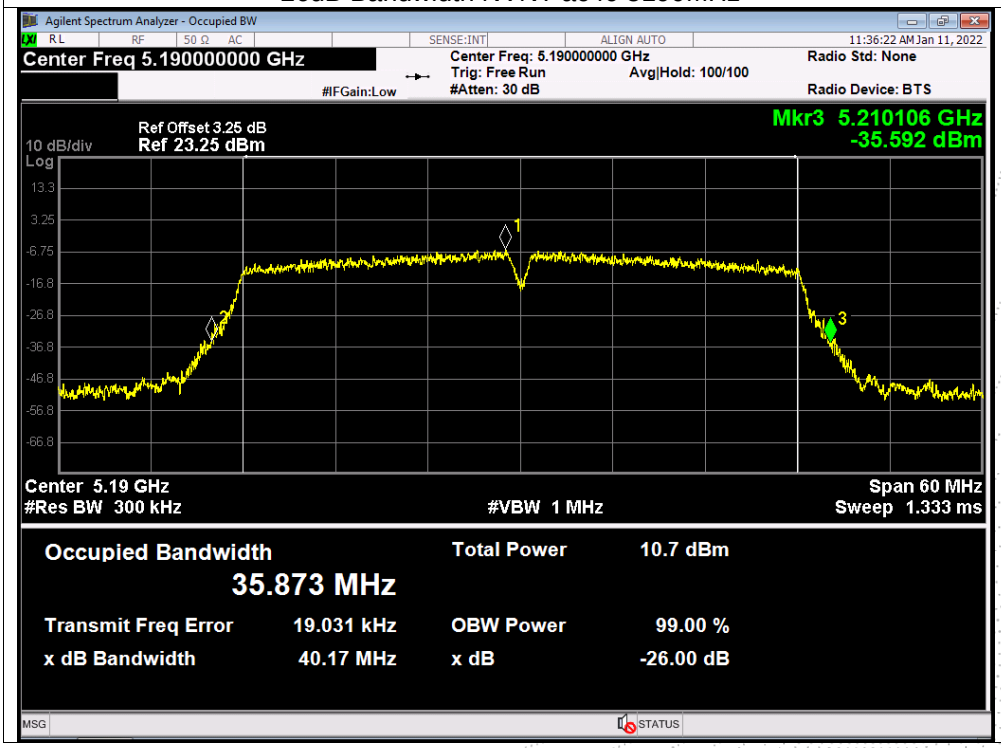
-26dB Bandwidth NVNT ac20 5200MHz



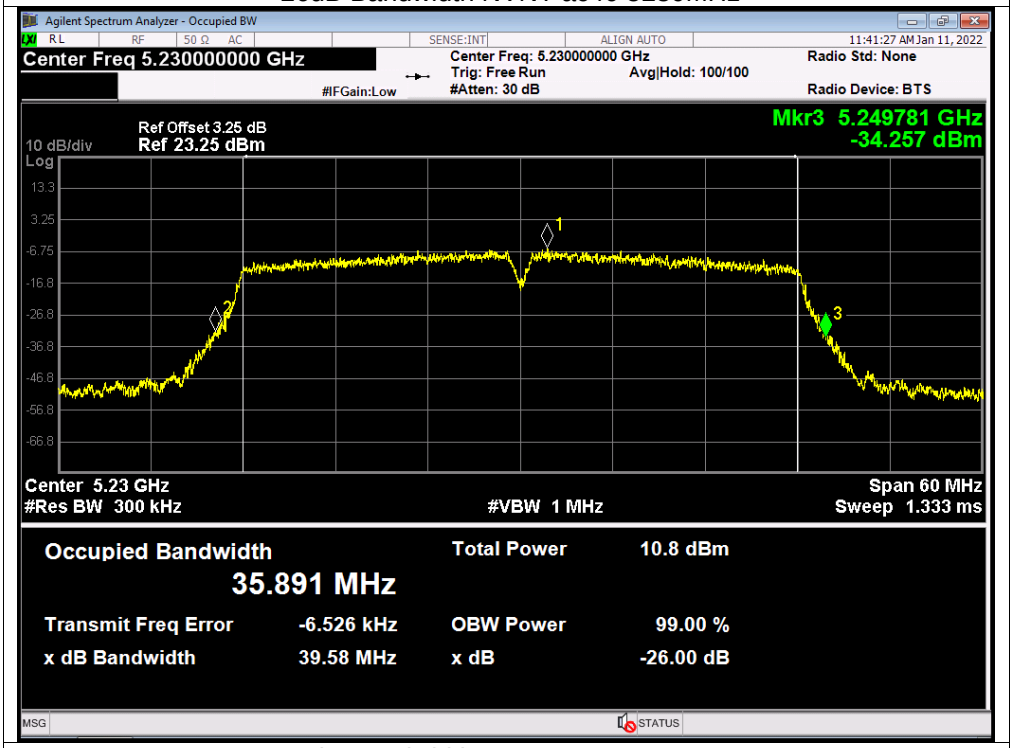
-26dB Bandwidth NVNT ac20 5240MHz



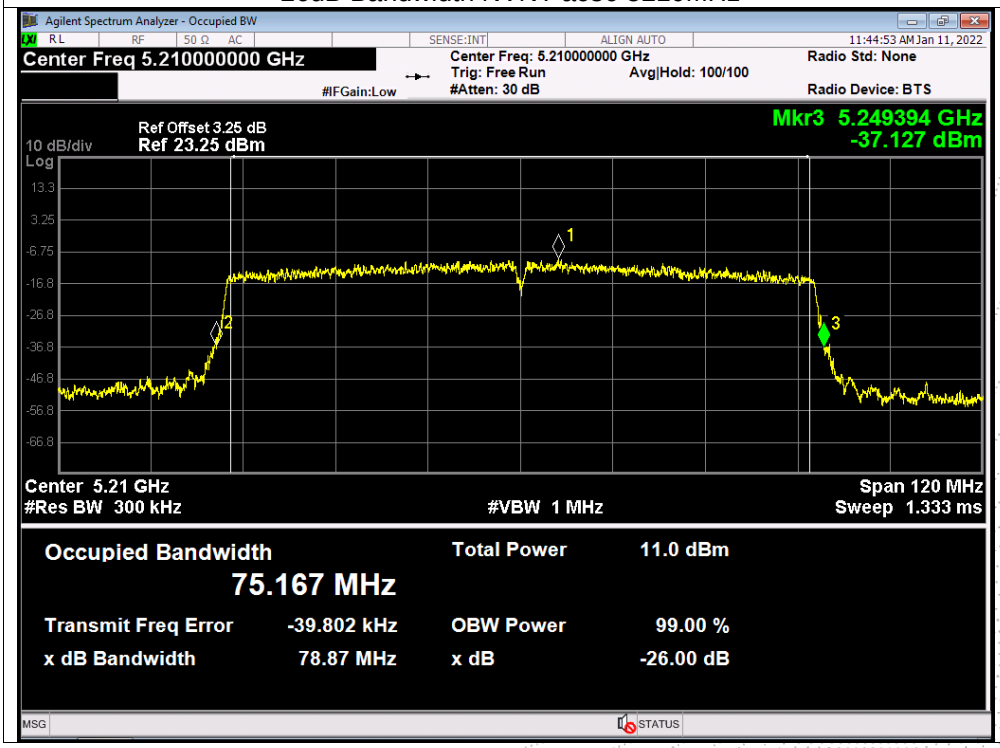
-26dB Bandwidth NVNT ac40 5190MHz



-26dB Bandwidth NVNT ac40 5230MHz

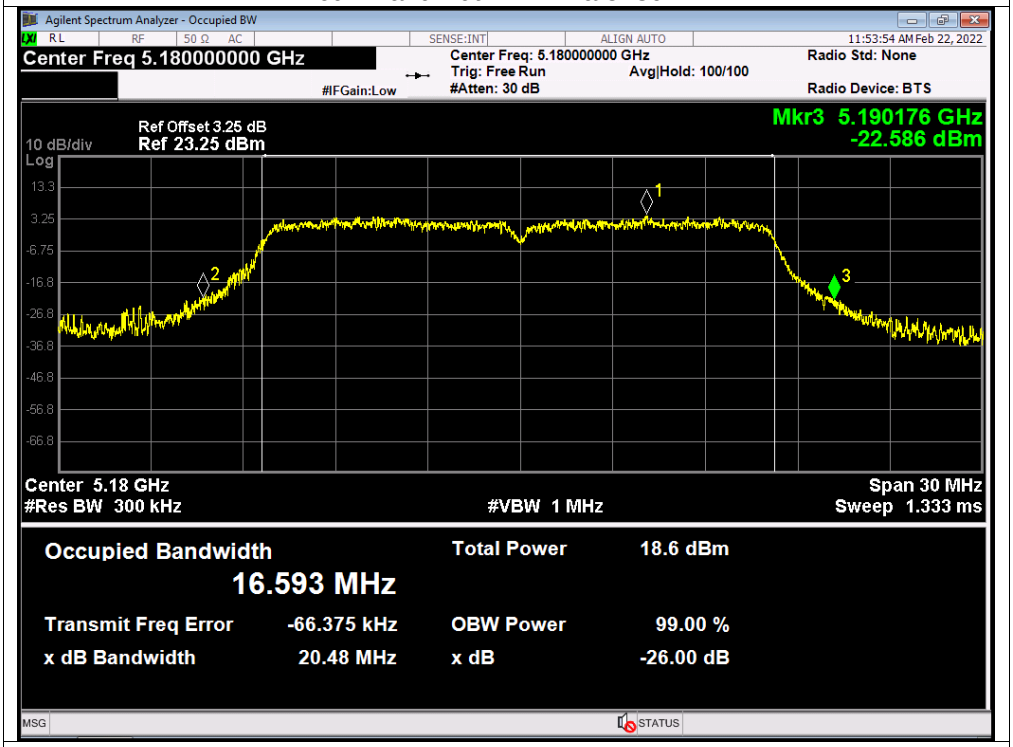


-26dB Bandwidth NVNT ac80 5210MHz

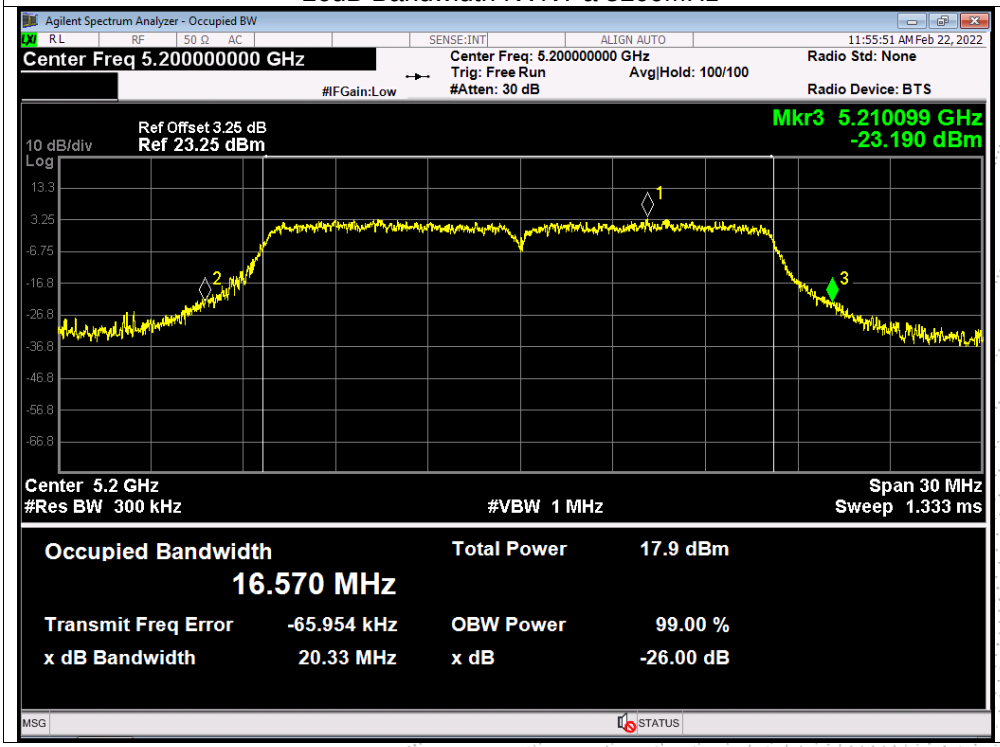


Test Graphs

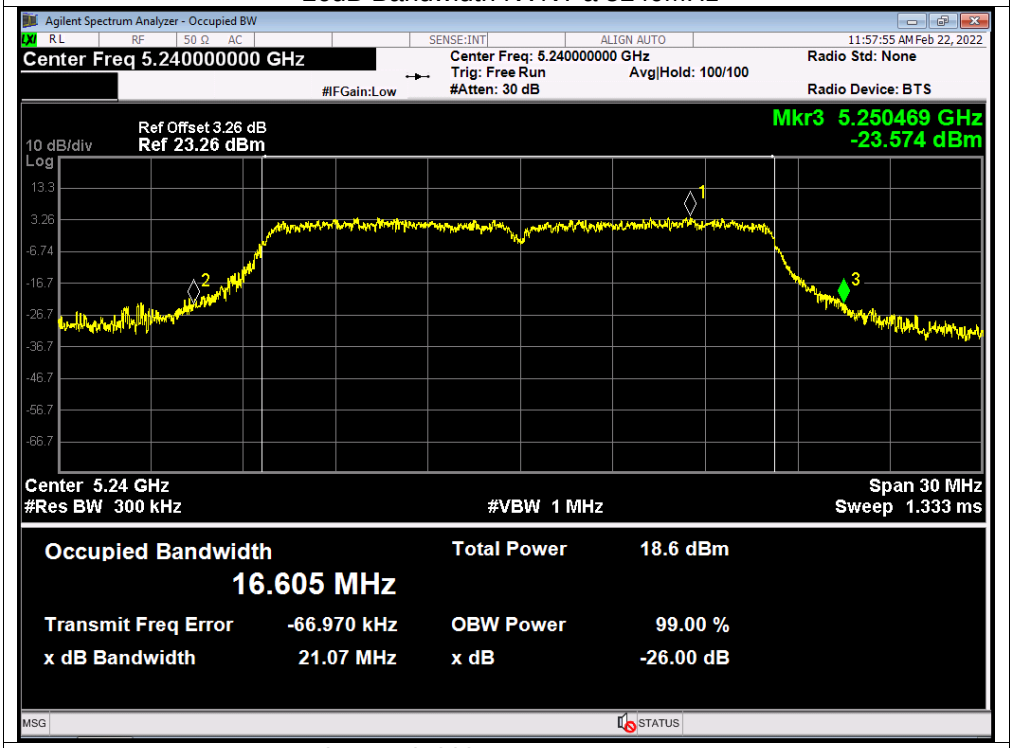
-26dB Bandwidth NVNT a 5180MHz



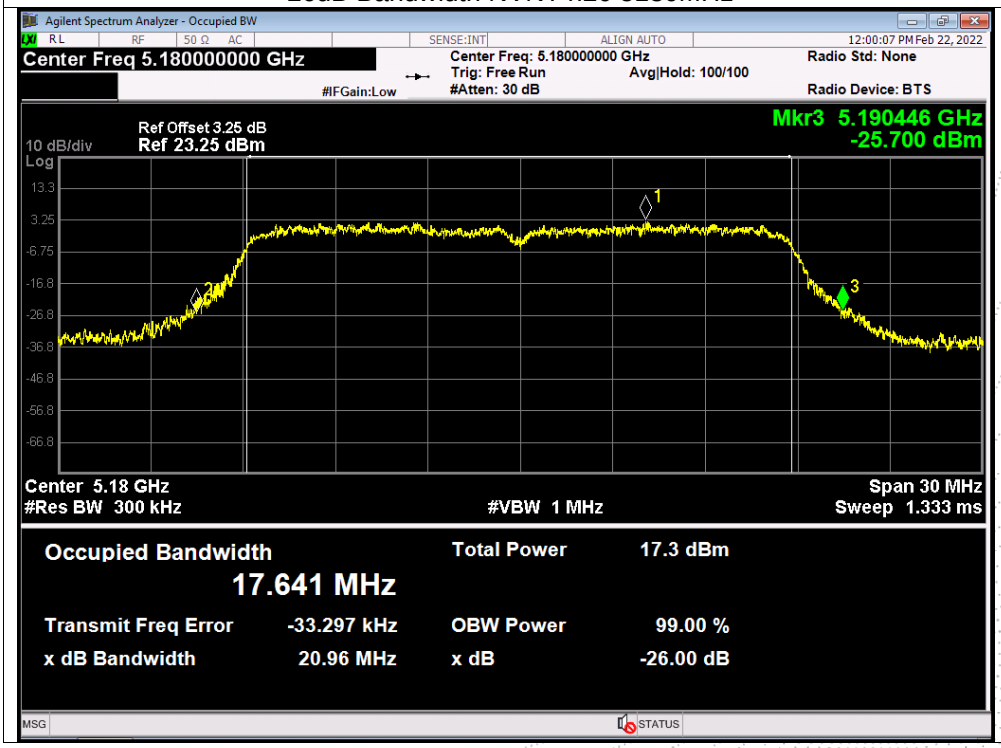
-26dB Bandwidth NVNT a 5200MHz



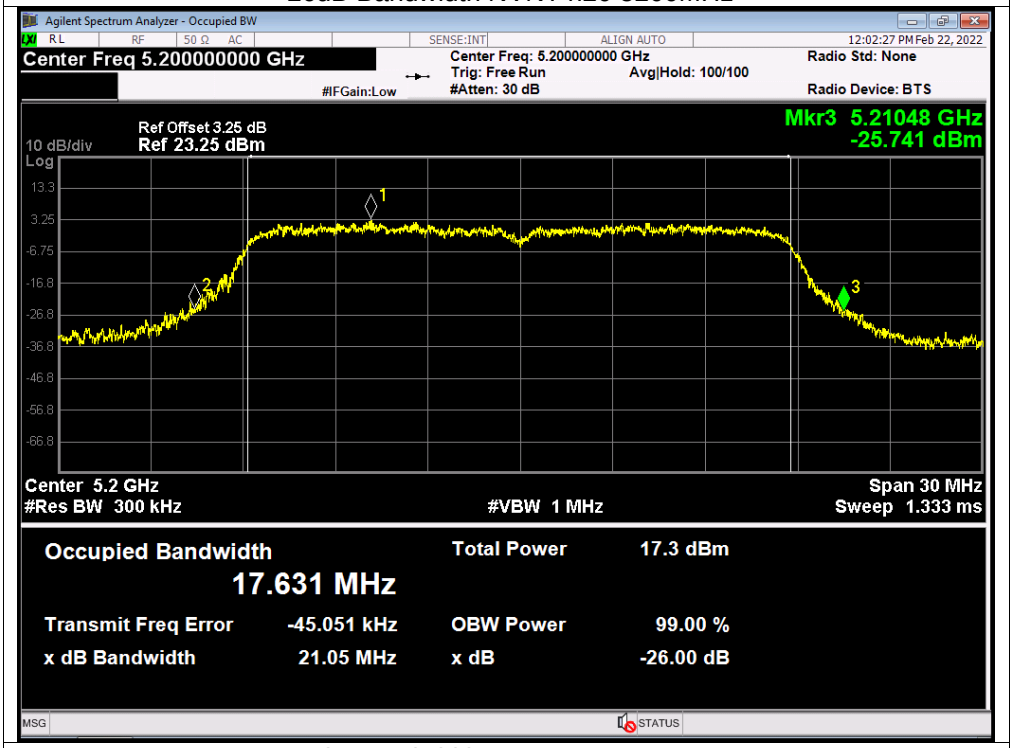
-26dB Bandwidth NVNT a 5240MHz



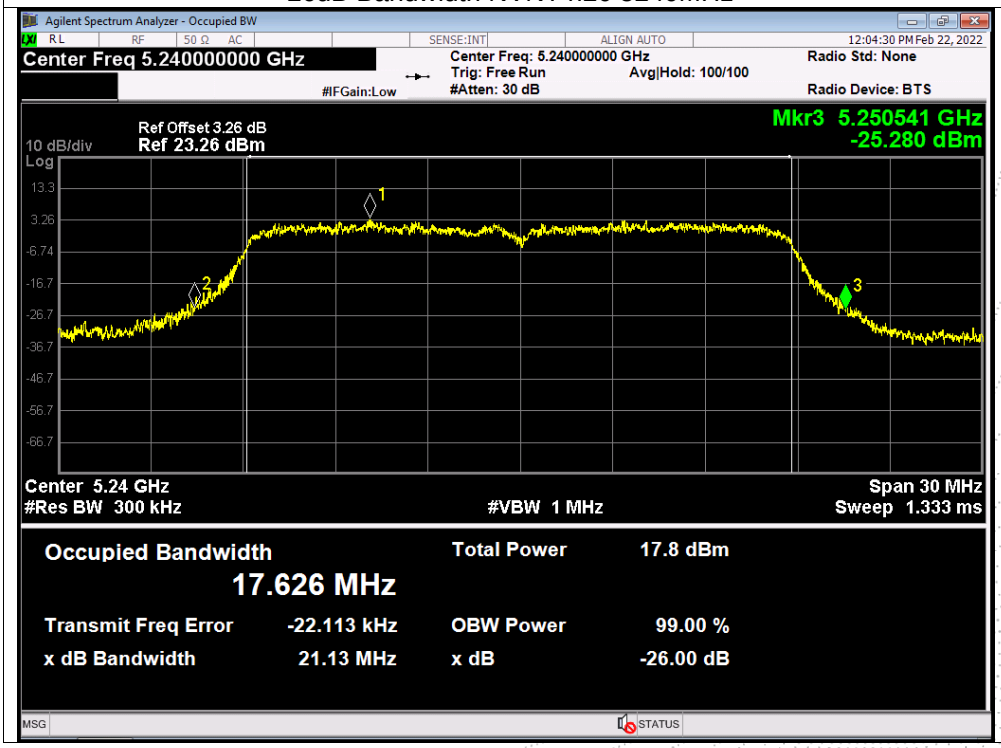
-26dB Bandwidth NVNT n20 5180MHz



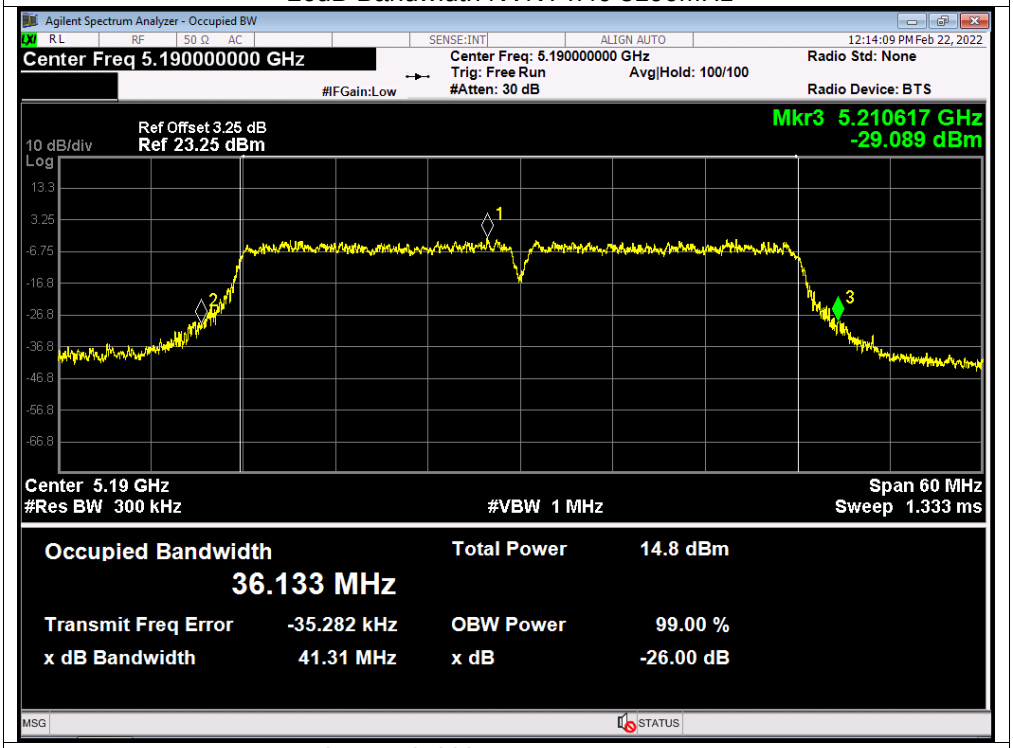
-26dB Bandwidth NVNT n20 5200MHz



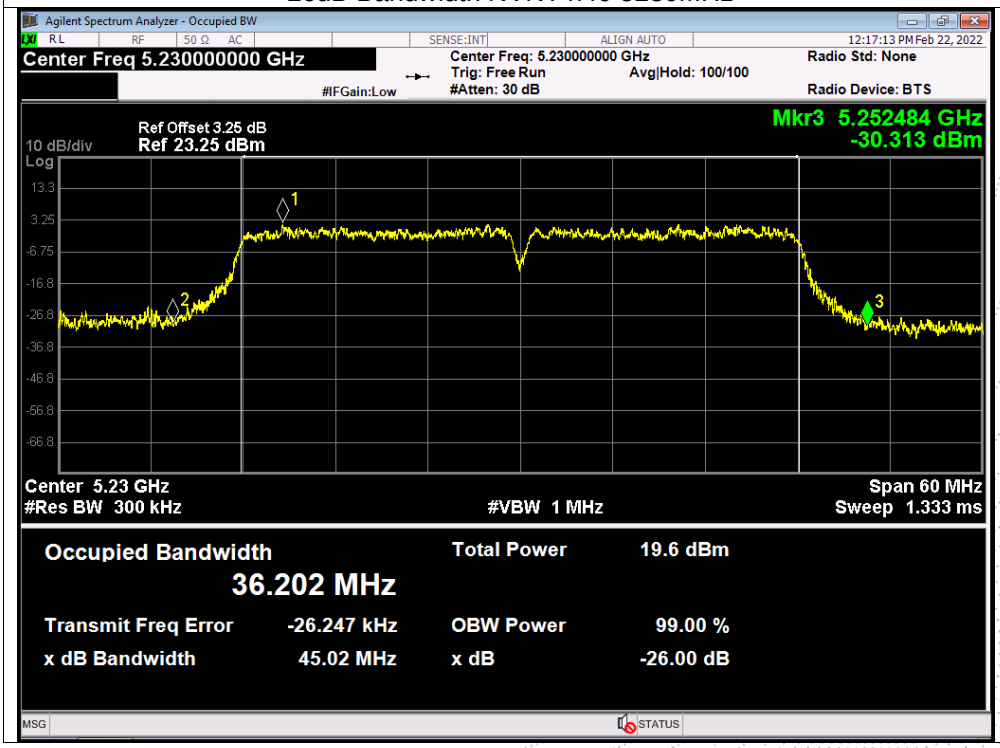
-26dB Bandwidth NVNT n20 5240MHz



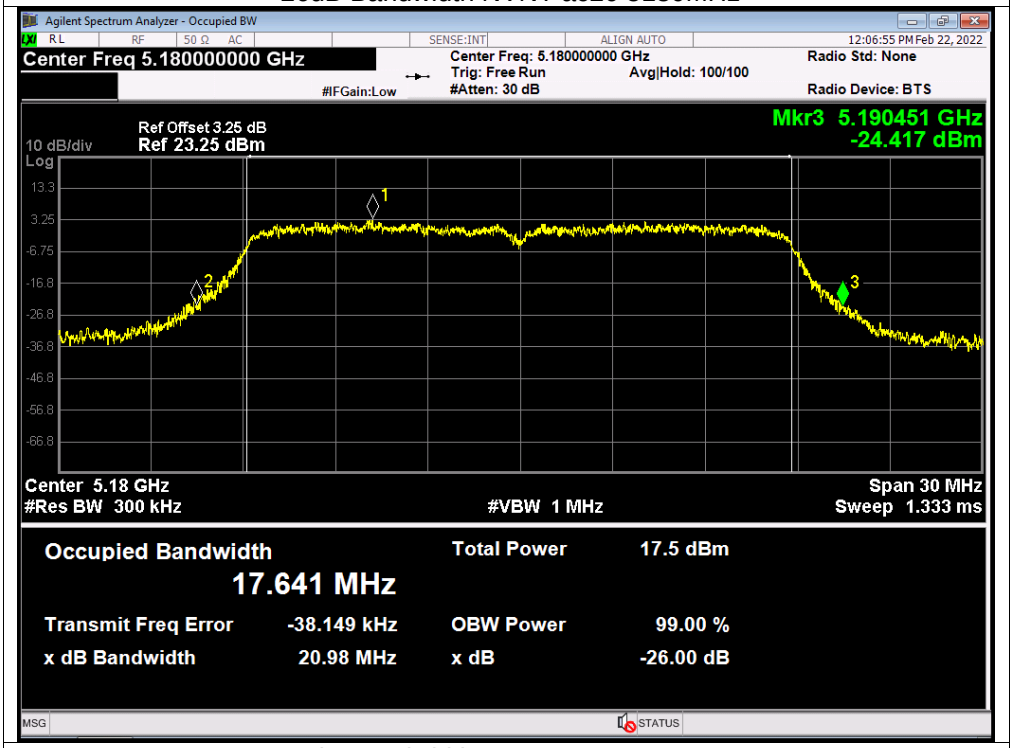
-26dB Bandwidth NVNT n40 5190MHz



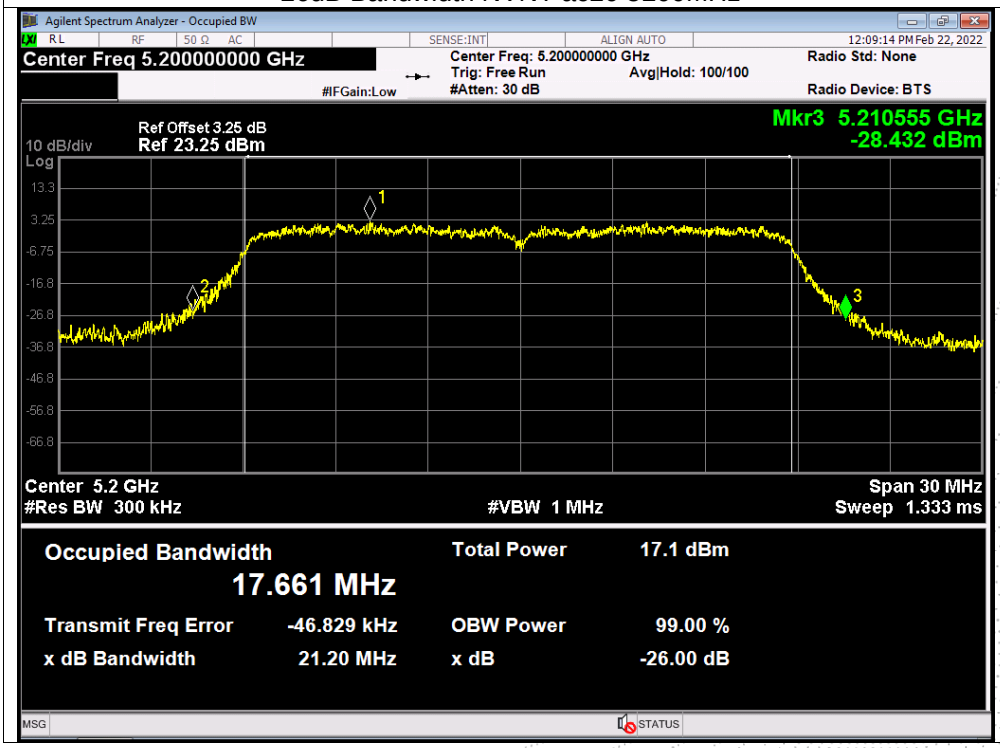
-26dB Bandwidth NVNT n40 5230MHz



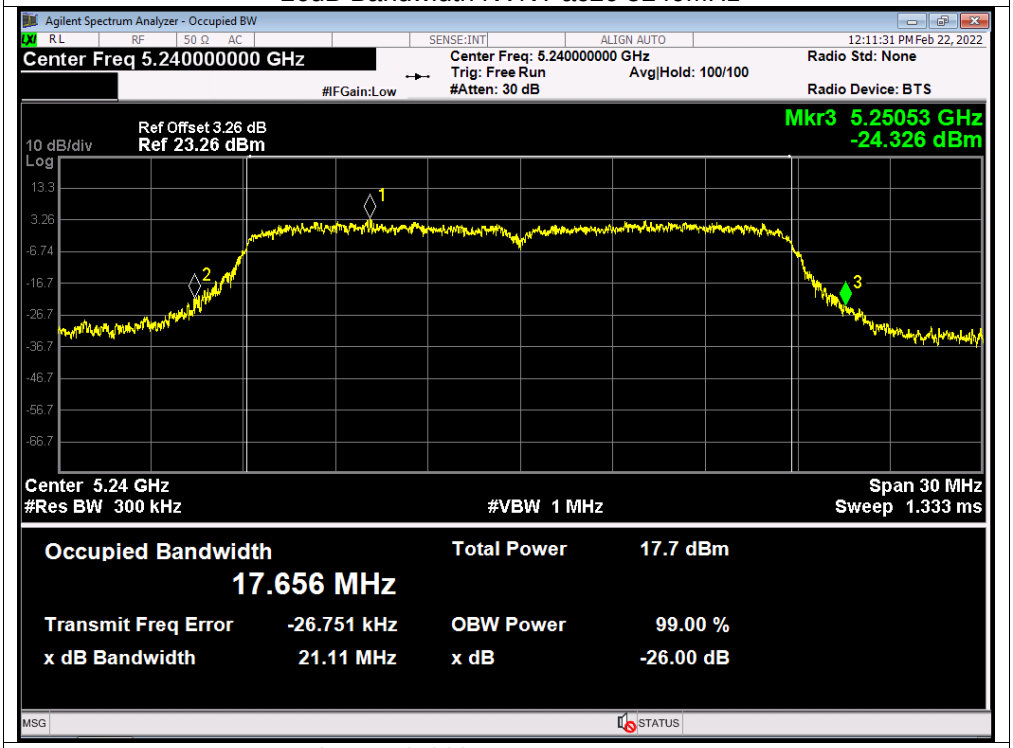
-26dB Bandwidth NVNT ac20 5180MHz



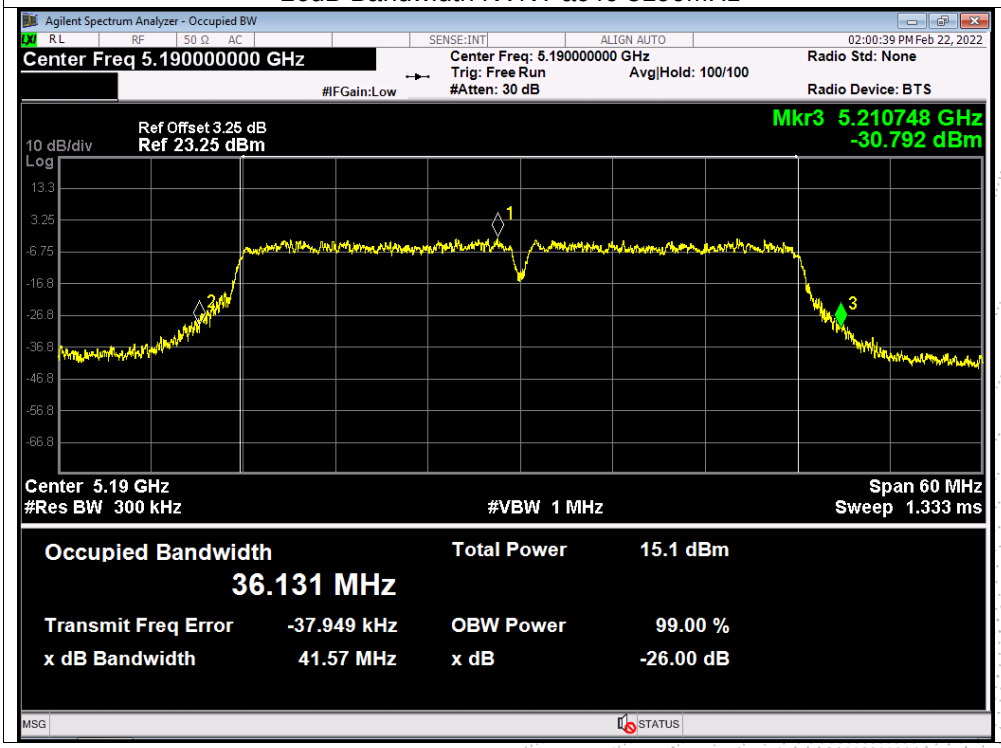
-26dB Bandwidth NVNT ac20 5200MHz



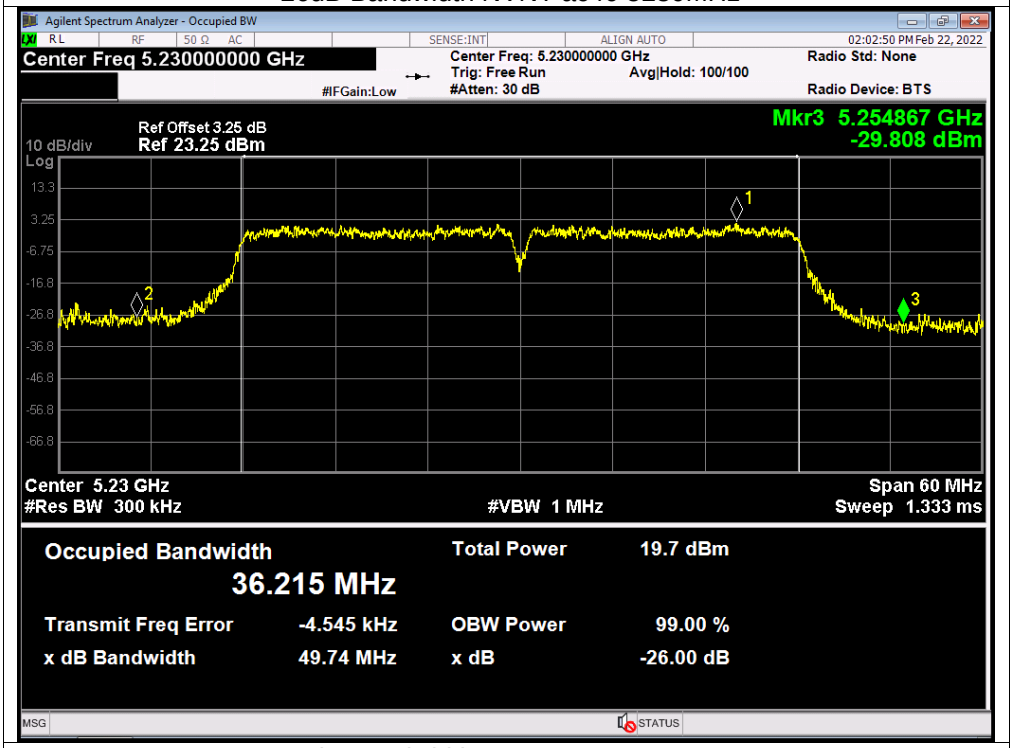
-26dB Bandwidth NVNT ac20 5240MHz



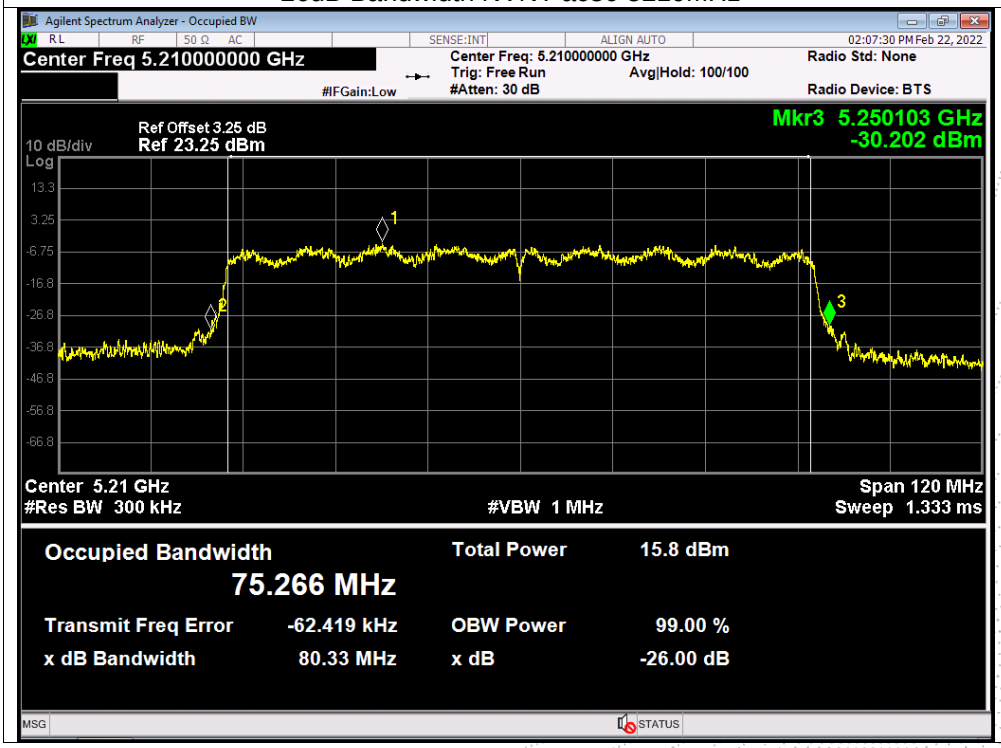
-26dB Bandwidth NVNT ac40 5190MHz



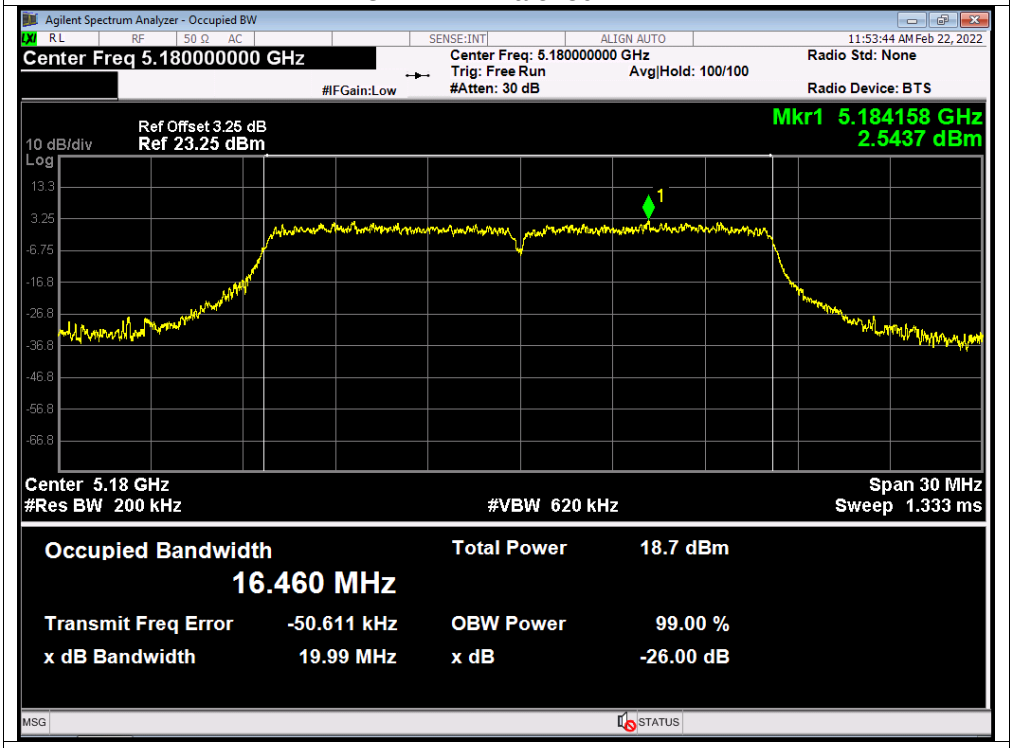
-26dB Bandwidth NVNT ac40 5230MHz



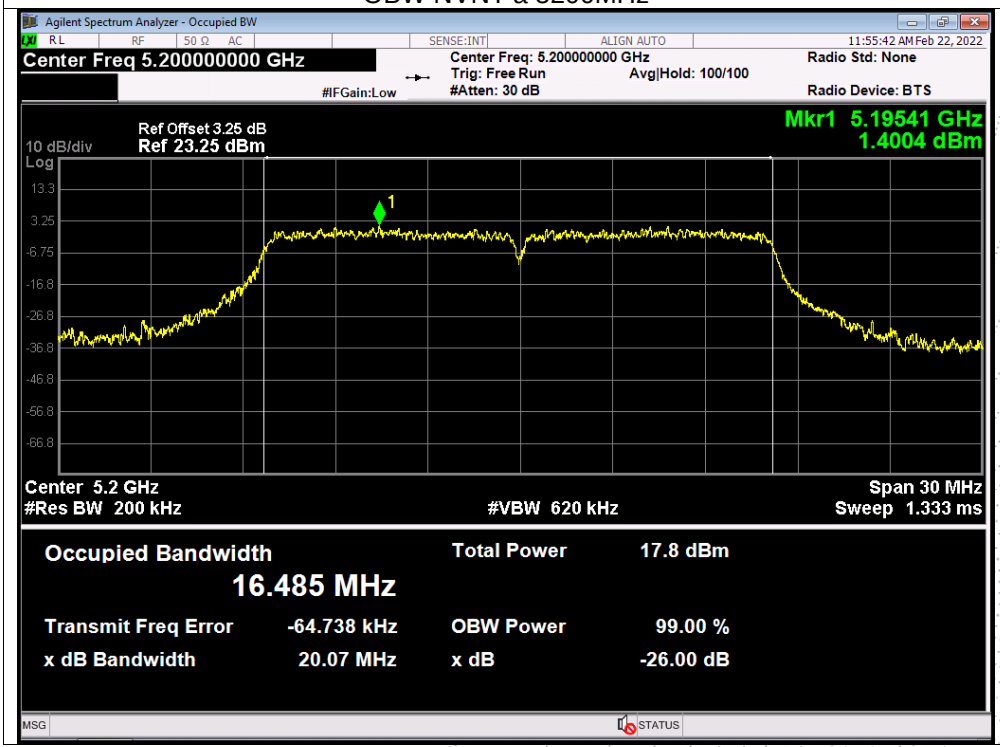
-26dB Bandwidth NVNT ac80 5210MHz



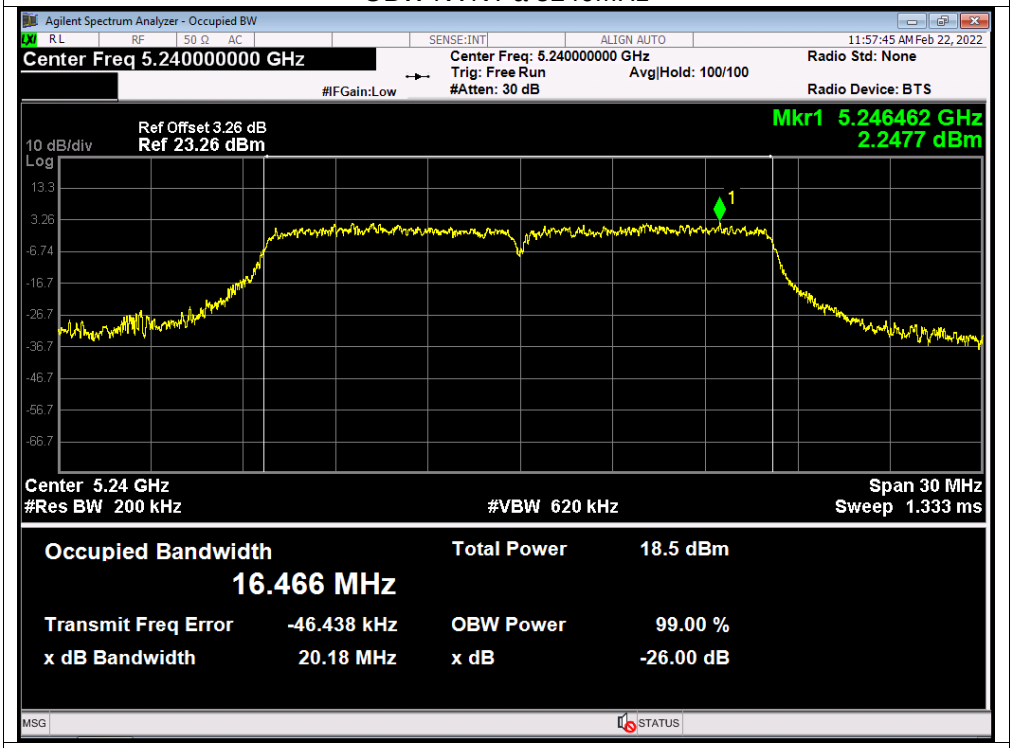
Test Graphs
OBW NVNT a 5180MHz



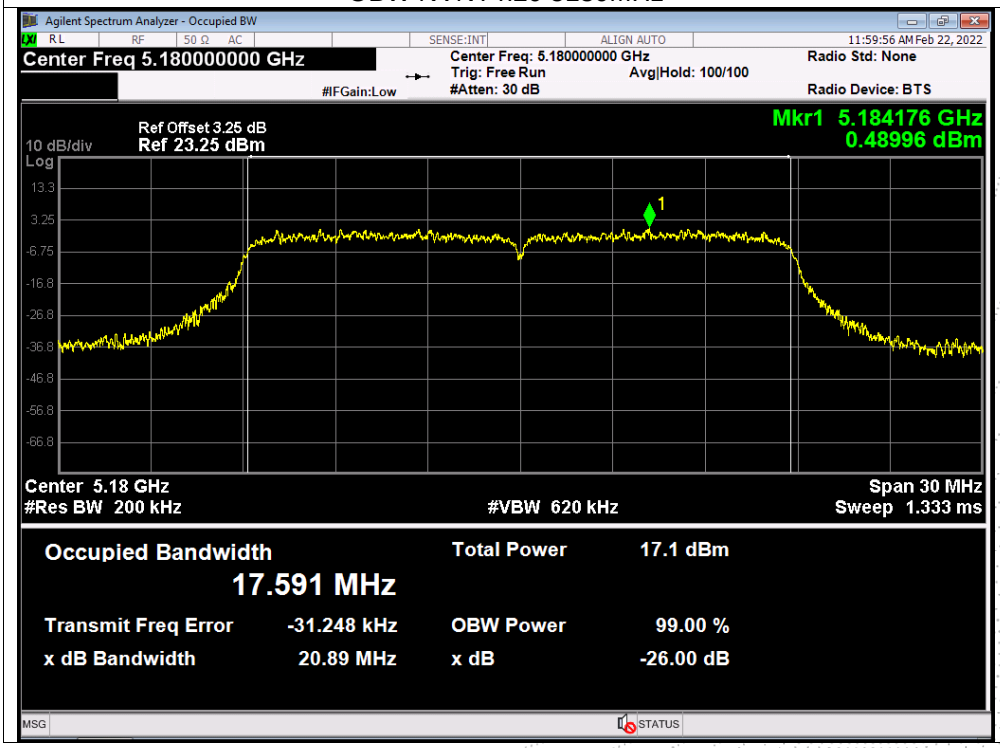
OBW NVNT a 5200MHz



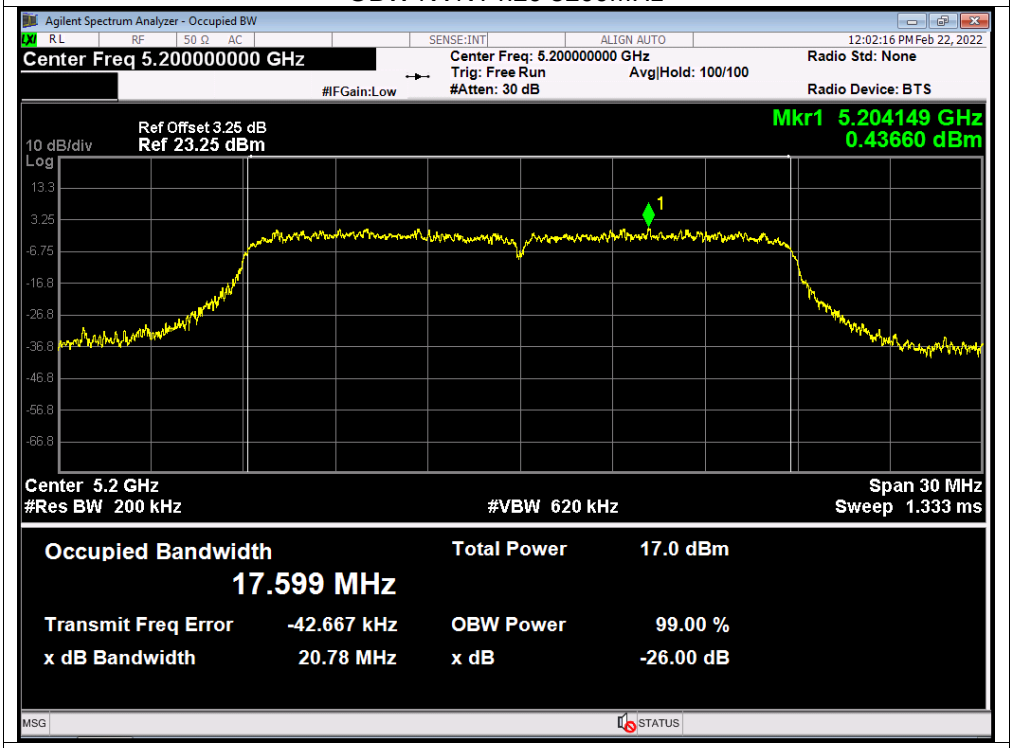
OBW NVNT a 5240MHz



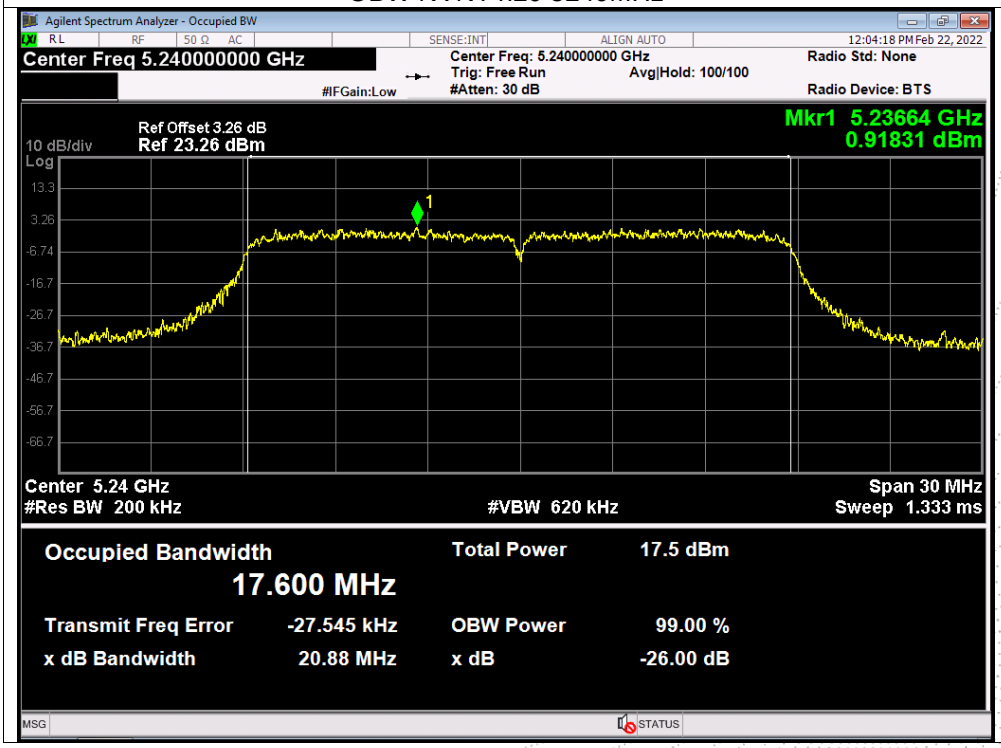
OBW NVNT n20 5180MHz



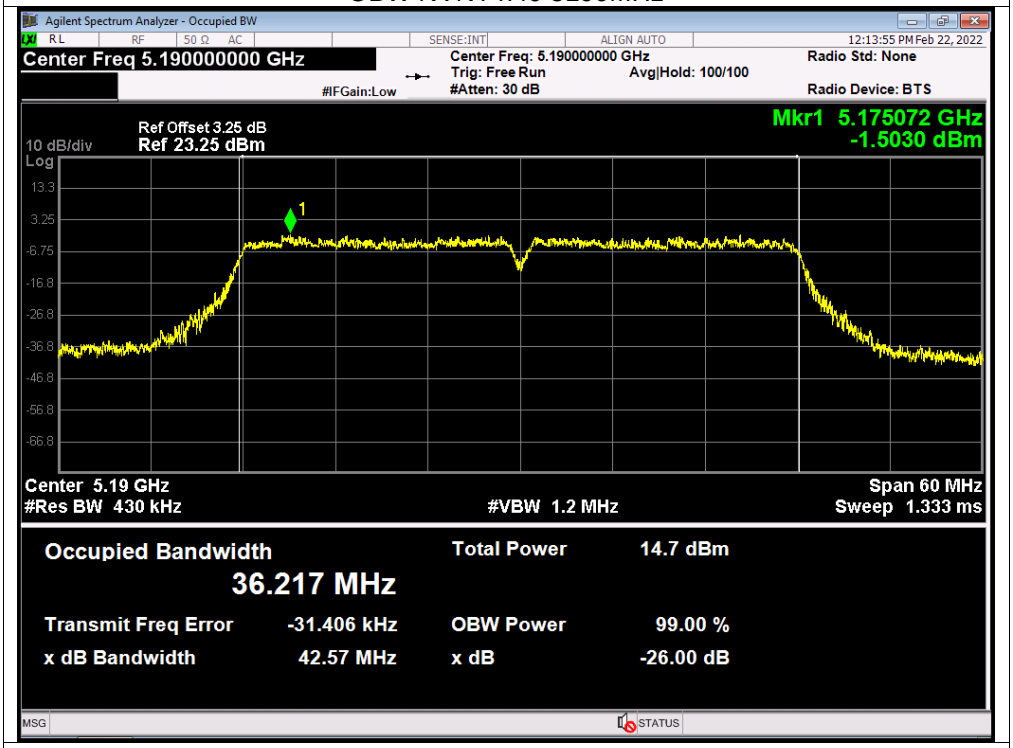
OBW NVNT n20 5200MHz



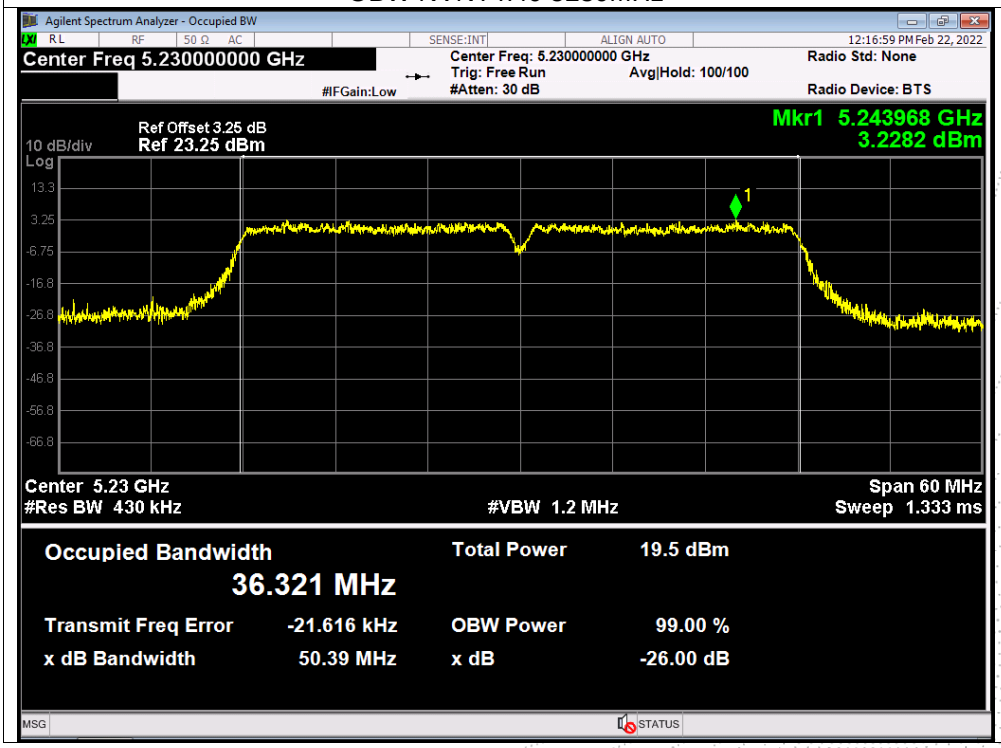
OBW NVNT n20 5240MHz



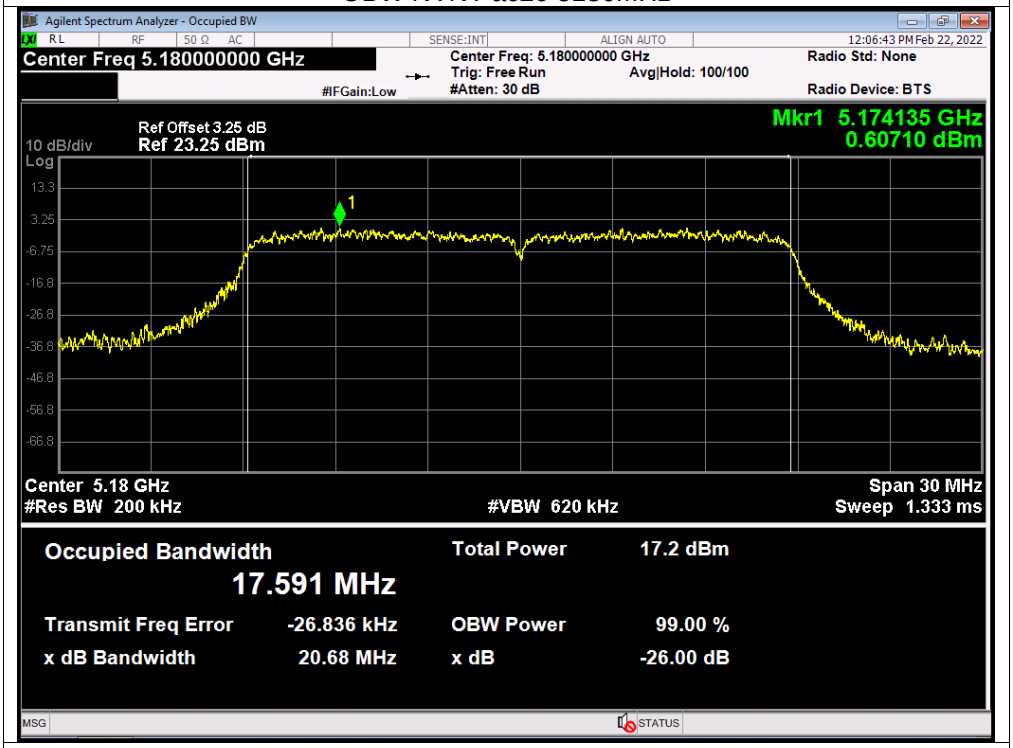
OBW NVNT n40 5190MHz



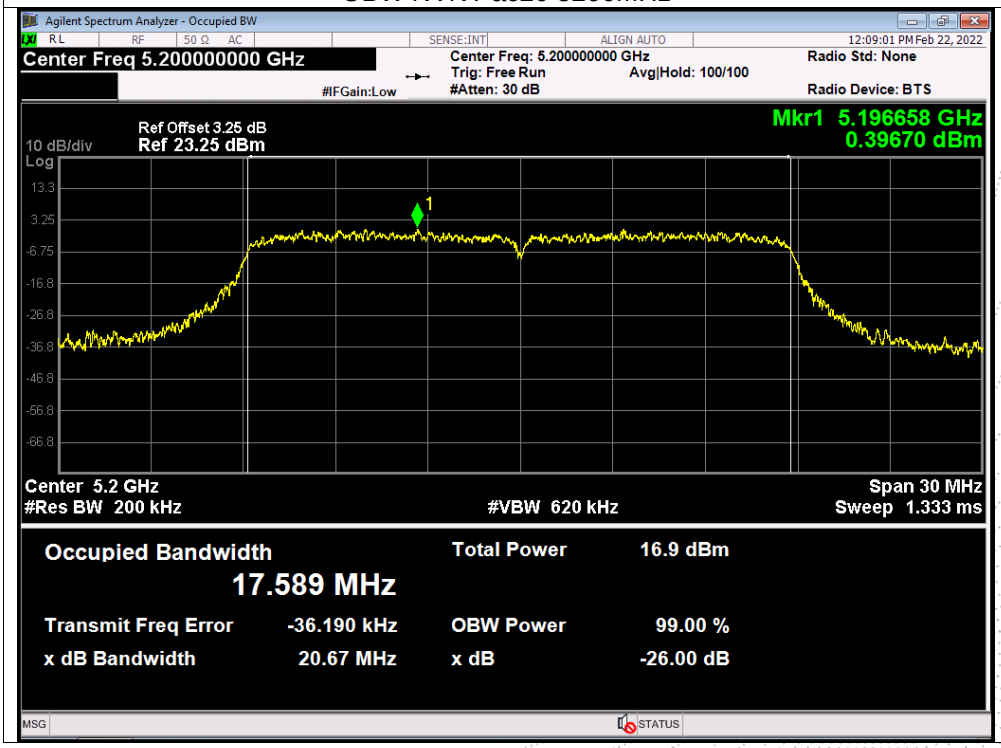
OBW NVNT n40 5230MHz



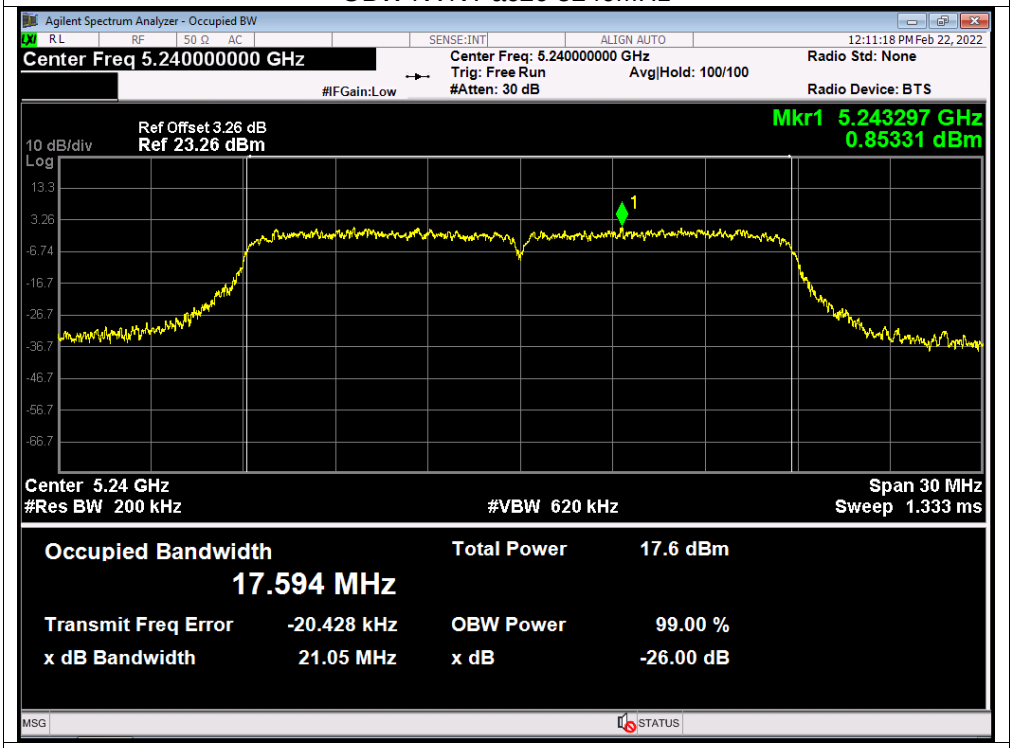
OBW NVNT ac20 5180MHz



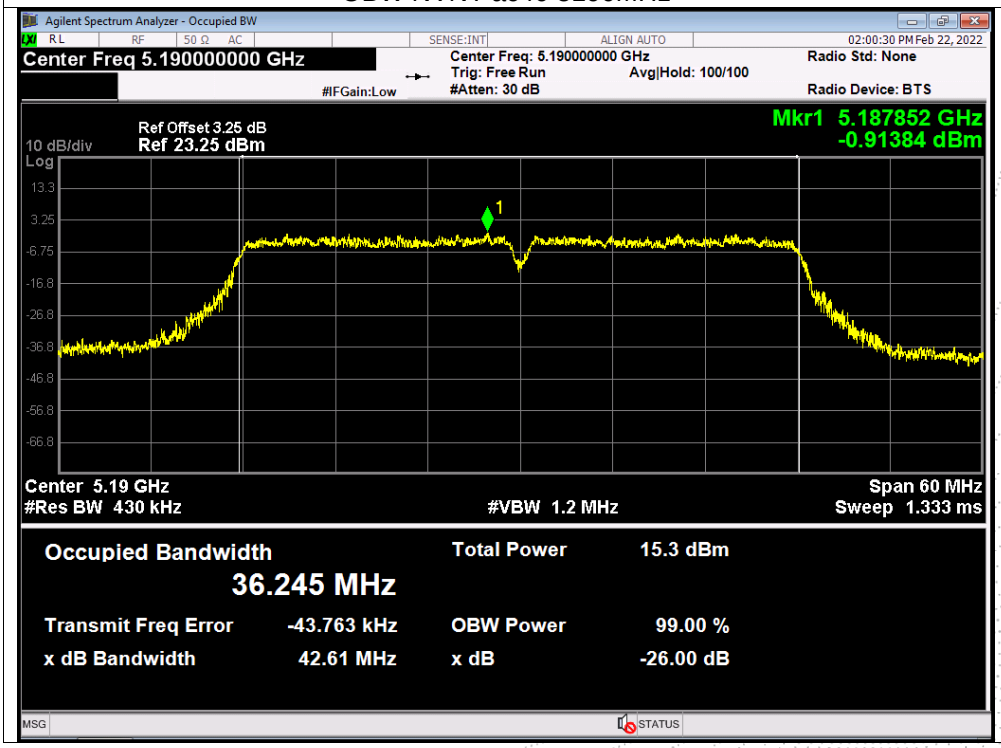
OBW NVNT ac20 5200MHz



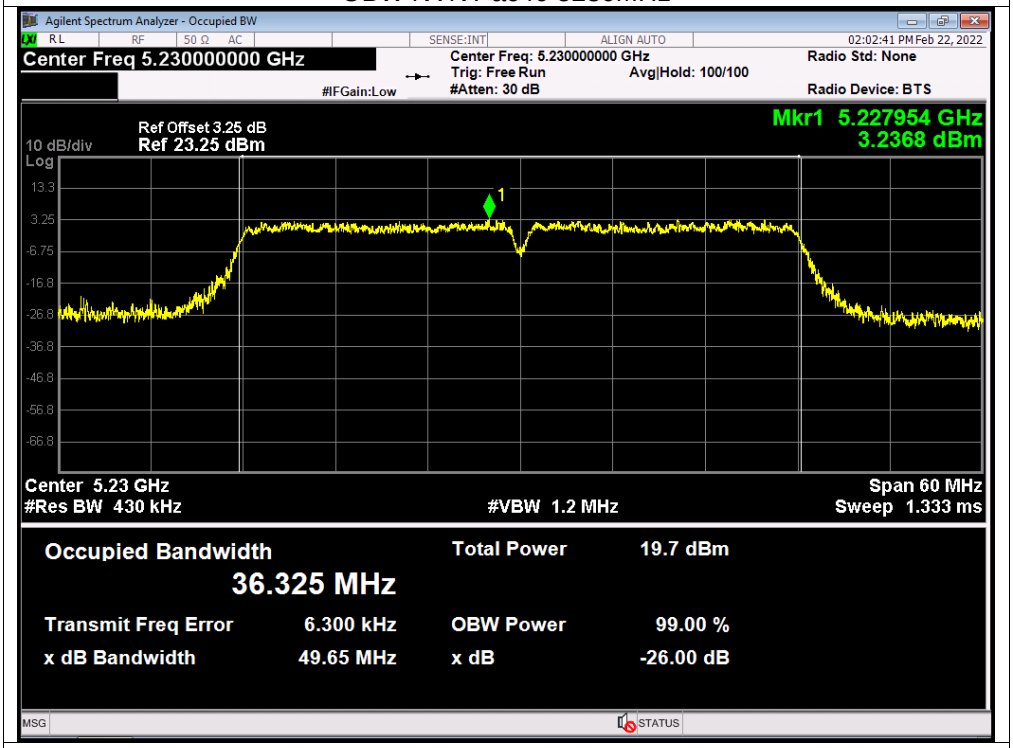
OBW NVNT ac20 5240MHz



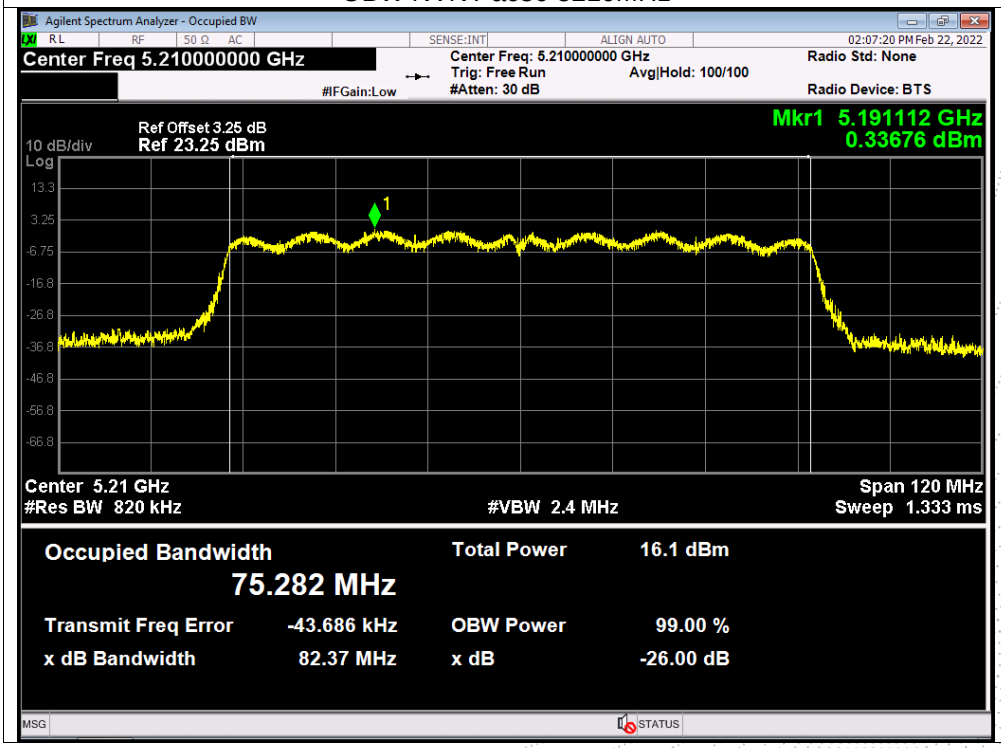
OBW NVNT ac40 5190MHz



OBW NVNT ac40 5230MHz

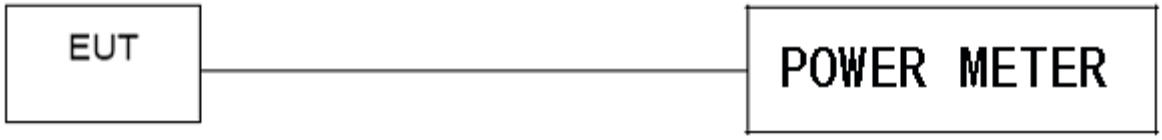


OBW NVNT ac80 5210MHz



10. Maximum Conducted Output Power

10.1 Block Diagram Of Test Setup



10.2 Limit

According to FCC §15.407
The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW

10.3 Test procedure

Maximum conducted output power may be measured using a spectrum analyzer/EMI receiver or an RF power meter.

1. Device Configuration
If possible, configure or modify the operation of the EUT so that it transmits continuously at its maximum power control level (see section II.B.).

a) The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (to no lower than 98 percent) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.

b) If continuous transmission (or at least 98 percent duty cycle) cannot be achieved due to hardware limitations (e.g., overheating), the EUT shall be operated at its maximum power control level with the transmit duration as long as possible and the duty cycle as high as possible.

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)
Measurement of maximum conducted output power using a spectrum analyzer requires integrating the spectrum across a frequency span that encompasses, at a minimum, either the EBW or the 99-percent occupied bandwidth of the signal.1 However, the EBW must be used to determine bandwidth dependent limits on maximum conducted output power in accordance with § 15.407(a).

a) The test method shall be selected as follows: (i) Method SA-1 or SA-1 Alternative (averaging with the EUT transmitting at full power throughout each sweep) shall be applied if either of the following conditions can be satisfied:

• The EUT transmits continuously (or with a duty cycle ≥ 98 percent).

• Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered

to be constant if variations are less than ± 2 percent.

(iii) Method SA-3 (RMS detection with max hold) or SA-3 Alternative (reduced VBW with max hold) shall be applied if the conditions of (i) and (ii) cannot be achieved.

b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep): (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum

10.4 EUT operating Conditions

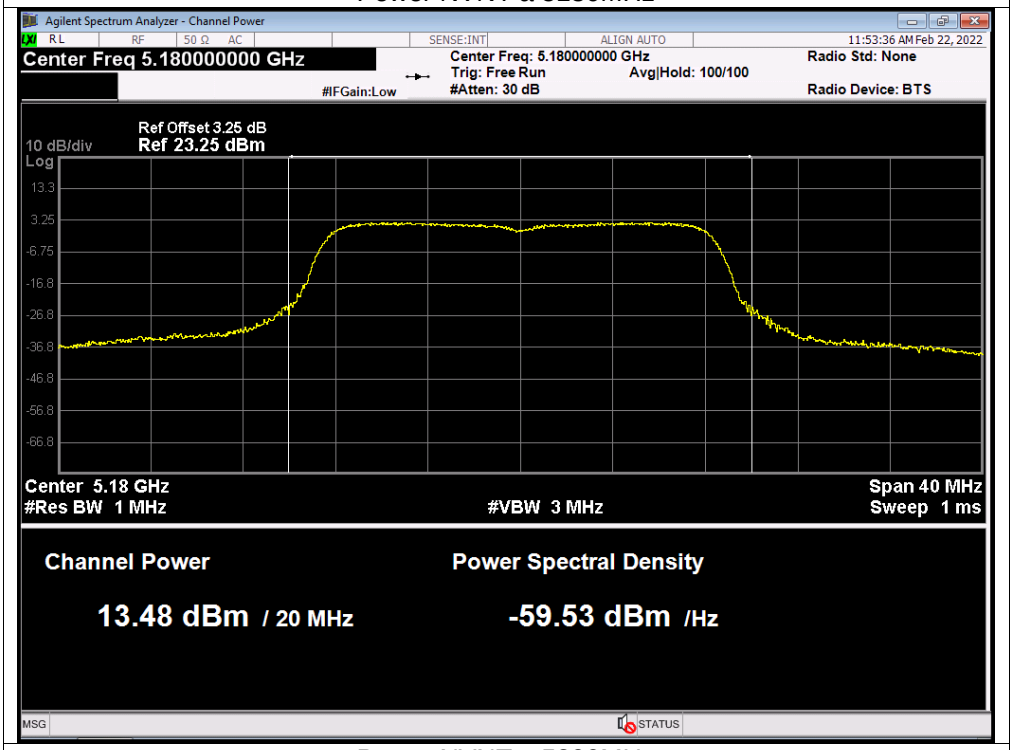
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

10.5 Test Result

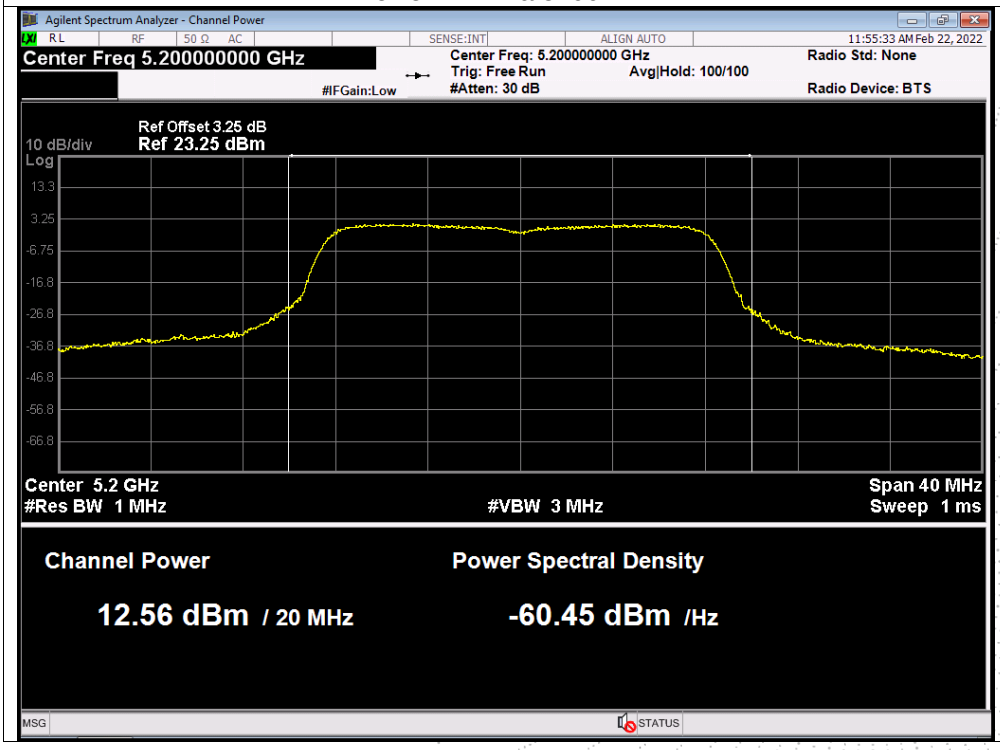
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC120V/60Hz
Test Mode:	(5180-5240MHz)		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	**13.48**	24	Pass
NVNT	a	5200	12.56	24	Pass
NVNT	a	5240	13.23	24	Pass
NVNT	n20	5180	11.91	24	Pass
NVNT	n20	5200	11.75	24	Pass
NVNT	n20	5240	12.35	24	Pass
NVNT	n40	5190	9.31	24	Pass
NVNT	n40	5230	13.85	24	Pass
NVNT	ac20	5180	11.99	24	Pass
NVNT	ac20	5200	11.78	24	Pass
NVNT	ac20	5240	12.35	24	Pass
NVNT	ac40	5190	9.89	24	Pass
NVNT	ac40	5230	10.28	24	Pass
NVNT	ac80	5210	9.28	24	Pass

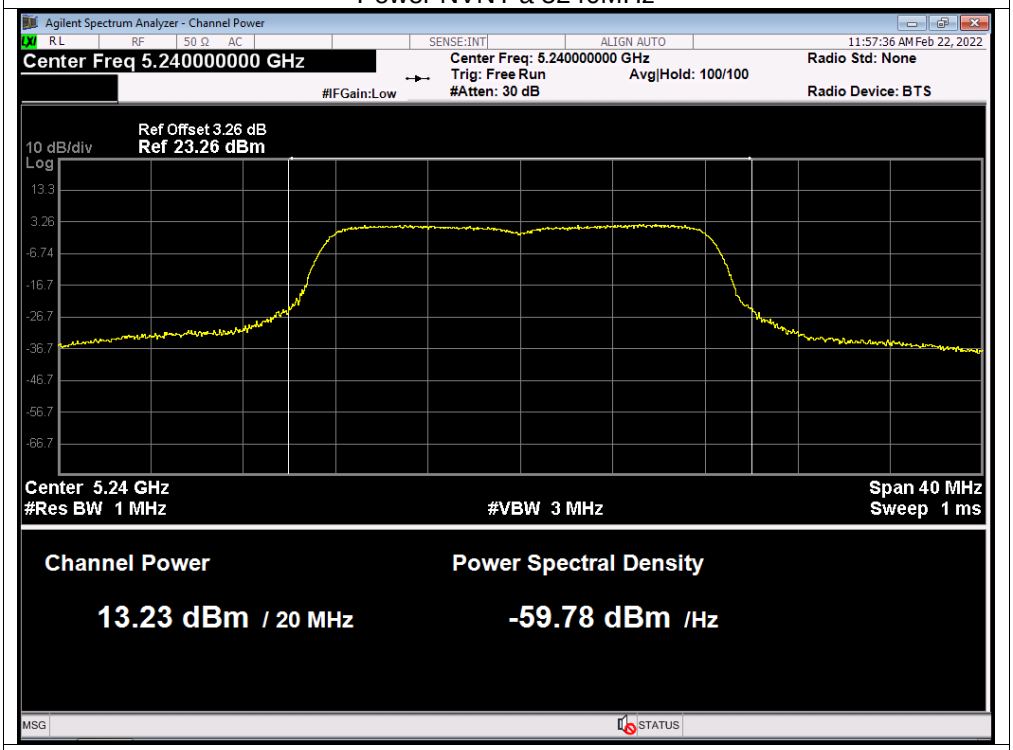
Test Graphs
Power NVNT a 5180MHz



Power NVNT a 5200MHz



Power NVNT a 5240MHz



Power NVNT n20 5180MHz