

TEST REPORT

Report No.: BCTC2606210895-4E

Applicant: Promaster Electronic LLC

Product Name: Car Stereo

Test Model: APID-302

Tested Date: 2026-06-12 to 2026-07-30

Issued Date: 2026-07-31

Shenzhen BCTC Technology Co., Ltd.



FCC ID:2A6P9-APID

Product Name: Car Stereo

Trademark: N/A

Model/Type Reference: APID-302,APID-401,725,H110M

Prepared For: Promaster Electronic LLC

Address: 25275 Budde Rd. Suite 31, Spring, TX, 77380, US

Manufacturer: SHENZHEN TAIHUA WORLD ELECTRONICS CO.,LTD

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Prepared By: Shenzhen BCTC Technology Co., Ltd.

Address: Room 101M, Unit 1, Building1, Pengyuan, No.18, Lilang Road, Shanglilang, Nanwan Subdistrict, Longgang District, Shenzhen, Guangdong, China.

Sample Received Date: 2026-06-12

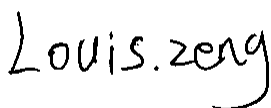
Sample Tested Date: 2026-06-12 to 2026-07-30

Report No.: BCTC2606210895-4E

Test Standards: FCC Part15 15.407
ANSI C63.10:2020

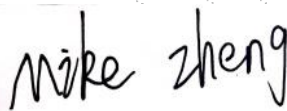
Test Results: PASS

Prepared by :



Louis Zeng

Reviewer by :



Mike Zheng

Approved by:



Sewen Guo

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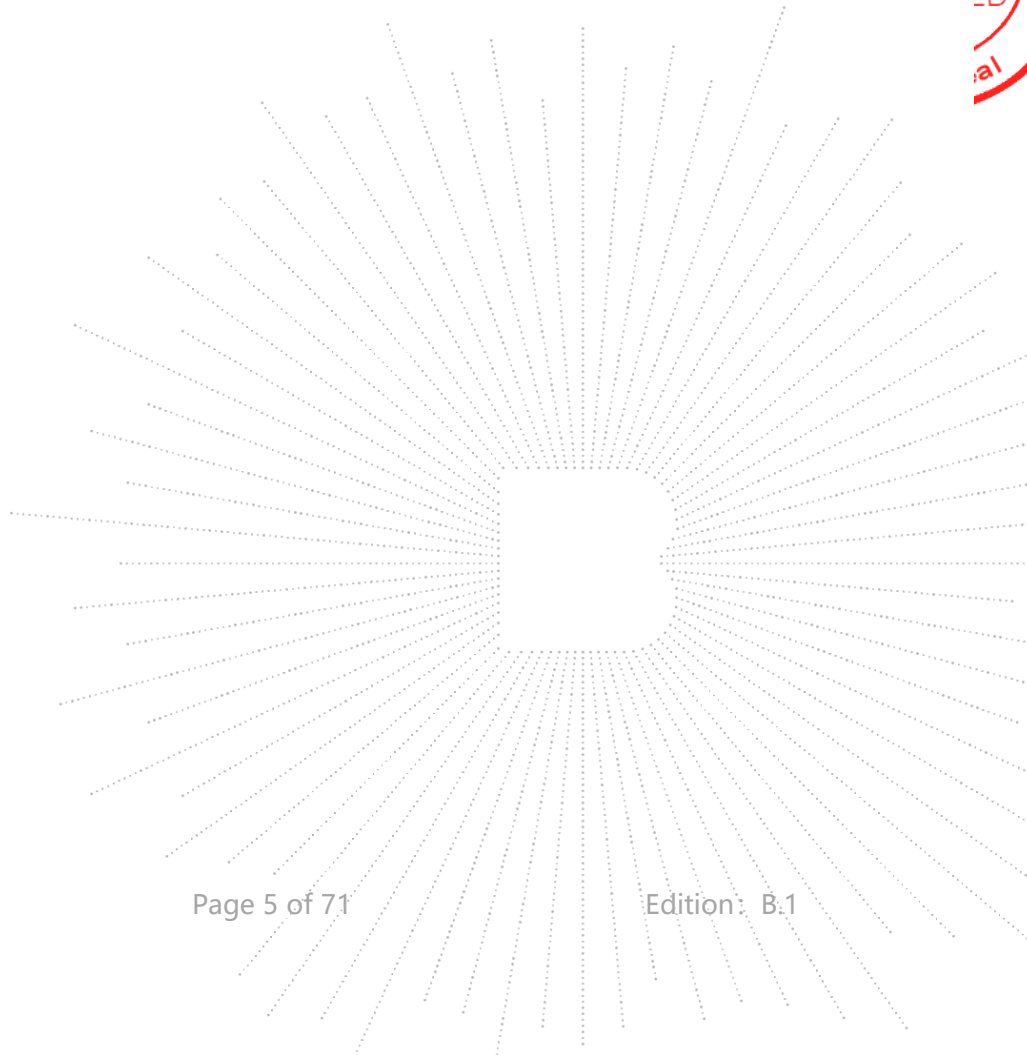
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(Note: N/A Means Not Applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2606210895-4E	2026-07-31	Original	Valid



2. Test Summary

The Product has been tested according to the following specifications:

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

NOTE1: N/A (Not Applicable)

NOTE2: According to FCC OET KDB 558074, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.

Note 3: "*" indicates that the test results are determined base on CFR 47 FCC Part 15 Subpart C (clause 15.407). And the test results are took into account measurement uncertainty(see section 3 for measurement uncertainty information)

Note 4: This equipment is a DC vehicle-mounted product and is not applicable to this test.

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3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2:2011/AMD2:2018. 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(9kHz-30MHz)	U=3.7dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=5.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=5.0dB
5	Conducted Emission(150kHz-30MHz)	U=3.0dB
6	Power Spectral Density	U=3.46dB
7	Peak Power	U=0.31dB
8	Occupied Bandwidth/Frequency Range	U=3.46%
9	Conducted output power uncertainty	U=0.55dB
10	Frequency Error	U= 53.50 Hz
11	Frequency Drift	U=0.64 KHz
12	Temperature	U= 0.59 °C
13	Humidity	U= 5.3 %

4. Product Information And Test Setup

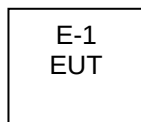
4.1 Product Information

Model/Type reference:	APID-302,APID-401,725,H110M	
Model differences:	The main model and subsequent models tested in this test differ only in model naming. All other aspects, including materials, other manufacturing processes, circuit design, and manufacturers, are exactly the same. We finally decided on the APID-302 as the test model.	
Hardware Version:	N/A	
Software Version:	N/A	
TPC Function:	☐ Applicable	☒ Not Applicable
IEEE 802.11 WLAN Mode Supported:	☒ 802.11a ☒ 802.11n(20MHz channel bandwidth) ☒ 802.11n(40MHz channel bandwidth)	
Operation Frequency:	5180-5240MHz for 802.11a/n(HT20); 5190-5230MHz for 802.11n (HT40);	
Type of Modulation:	☒ OFDM with BPSK/QPSK/16QAM/64QAM for 802.11a/n	
Antenna installation:	Internal antenna	
Antenna Gain:	7.12 dBi	
	Remark: ☒ The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. The laboratory assumes no responsibility for its authenticity. ☐ The antenna gain of the product is provided by the customer, and the test data is affected by the customer information. The laboratory assumes no responsibility for its authenticity.	
Ratings:	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.

Radiated Spurious Emission:



4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	Car Stereo	N/A	APID-302	N/A	EUT
N/A	N/A	N/A	N/A	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
N/A	N/A	N/A	N/A	N/A

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

(U-NII-1) 5180MHz-5240MHz				
Bandwidth	Channel	Frequency (MHz)	Channel	Frequency (MHz)
20MHz	36	5180	40	5200
	44	5220	48	5240
40MHz	38	5190	46	5230

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 / n20 CH36/ CH40/ CH 48
Mode 2	802.11n 40 CH38/ CH 46
Mode 3	Transmitting (Radiated emission)

Note:

Notes:

1. The measurements are performed at the highest, middle, lowest available channels.
2. The measurements are performed at all Bit Rate of Transmitter, the worst data was reported
3. According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup”
1Mbps for 802.11b,6Mbps for 802.11g,13Mbps for 802.11n 20 , 54Mbps for 802.11 n 40

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

RF Function	Mode Or Modulation type	Power Class	Software For Testing
WIFI 5.1G	802.11a	14	CRT
	802.11n20	13	
	802.11n40	12	

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 Technology Co., Ltd.

Address: Room 101M, Unit 1, Building1, Pengyuan, No.18, Lilang Road, Shanglilang, Nanwan Subdistrict, Longgang District, Shenzhen, Guangdong, China.

The site and apparatus are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-1:2019 other equivalent standards.

FCC Test Firm Registration Number: 754702

ANAB certificate registration number is: CN3479

5.2 Test Instrument Used

Conducted emissions Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Receiver	R&S	ESCI	101421	2025.08.30	2026.08.29
AMN	SCHWHRZBECK	NSLK8128	05152	2026.01.22	2027.01.21
AMN	SCHWHRZBECK	NSLK8127	8127739	2025.09.16	2026.09.15
Pulse Limiter	SCHWHRZBECK	VTSD 9561-F-N	00547	2025.08.30	2026.08.29
Temperature & Humidity	Wetest	HTC-1	/	2025.09.01	2026.08.31
Software	EZ-EMC	Ver.EMC-CON 3A1	/	/	/

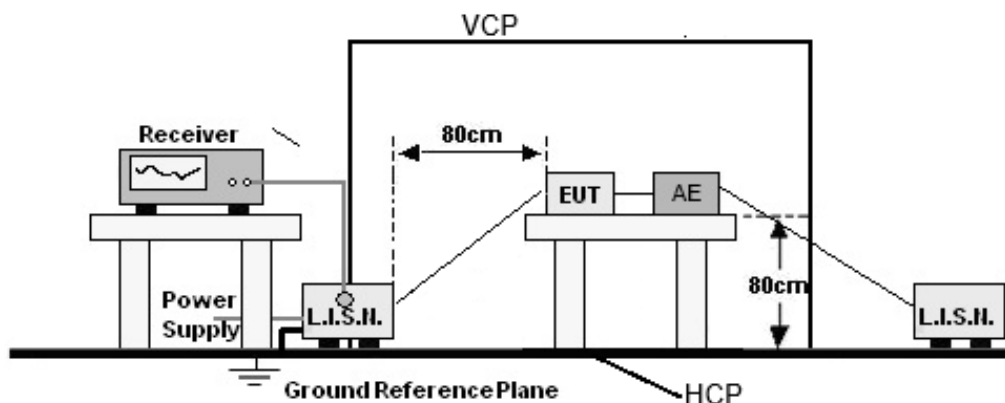
Radiated Emissions Test (966 Chamber)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	2023.09.25	2026.09.24
Loop Antenna	Schwarzbeck	FMZB1519B	00014	2026.01.05	2027.01.04
Broadband antenna	SCHWHRZBECK	VULB9168	01620	2025.08.29	2026.08.28
Horn antenna (1 GHz -18GHz)	SCHWARZBECK	BBHA 9120 D	2792	2025.08.29	2026.08.28
Horn antenna (18 GHz -40GHz)	SCHWARZBECK	BBHA9170	00822	2025.12.29	2026.12.28
Receiver	R&S	ESR	1316	2025.08.30	2026.08.29
Spectrum Analyzer	R&S	FSV40	101328	2026.01.22	2027.01.21
Amplifier	SCHWHRZBECK	BBV9744	568	2025.08.30	2026.08.29
Amplifier	EMC INSTRUMENT	EMC0518A45 SEE	EMT-SZ2233	2025.08.30	2026.08.29

	S CORPORATIO N				
Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35- HG	2034381	2026.05.09	2027.05.08
Band 2.4G-2.5G Filter	COM-MW	ZBSF6-C5150 -5350-1117	2220980	2025.08.30	2026.08.29
RF cable 3# (9kHz-6GHz)	Yunyi	10M	/	2025.08.30	2026.08.29
RF cable 9# (9kHz-1GHz)	Yunyi	2M	/	2025.10.28	2026.10.27
RF cable 5# (1GHz -18GHz)	SKET	9M	18038626	2025.08.30	2026.08.29
RF cable 6# (1GHz -18GHz)	SKET	5M	#10	2025.09.05	2026.09.04
RF cable 10# (18GHz-40GHz)	/	2M	2M	2026.05.09	2027.05.08
RF cable 11# (18GHz-40GHz)	/	2.5M	2.5M	2026.05.09	2027.05.08
Temperature & Humidity	Wetest	HTC-1	/	2025.09.05	2026.09.04
Communication test set	R&S	CMW500	157483	2025.08.30	2026.08.29
Software	EZ-EMC	Ver.FA-03A2	/	/	/

RF Conducted Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Spectrum Analyzer	Keysight	N9020A	MY51287403	2025.08.30	2026.08.29
Signal Generator	Keysight	N5182A	MY50144088	2025.08.30	2026.08.29
Power Sensor	Keysight	U2001	MY51250006	2025.10.28	2026.10.27
Temperature & Humidity	Wetest	HTC-1	/	2025.09.01	2026.08.31
Communication test set	R&S	CMW500	157483	2025.08.30	2026.08.29
Radio frequency control box	MWRFTest	MW100-RFCB	\	\	\
Software	MWRFTest	MTS 8310	V 3.0.0.0	\	\
D.C. Power Supply	Elektro-Automati k GmbH & Co.KG	D-41747 Viersen	6230316	2025.09.30	2026.08.29
Temperature and humidity test chamber	Auchno	OJN-9606-408 L	19120183	2025.07.09	2026.07.08

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:

- *Decreasing linearly with logarithm of frequency.
- 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

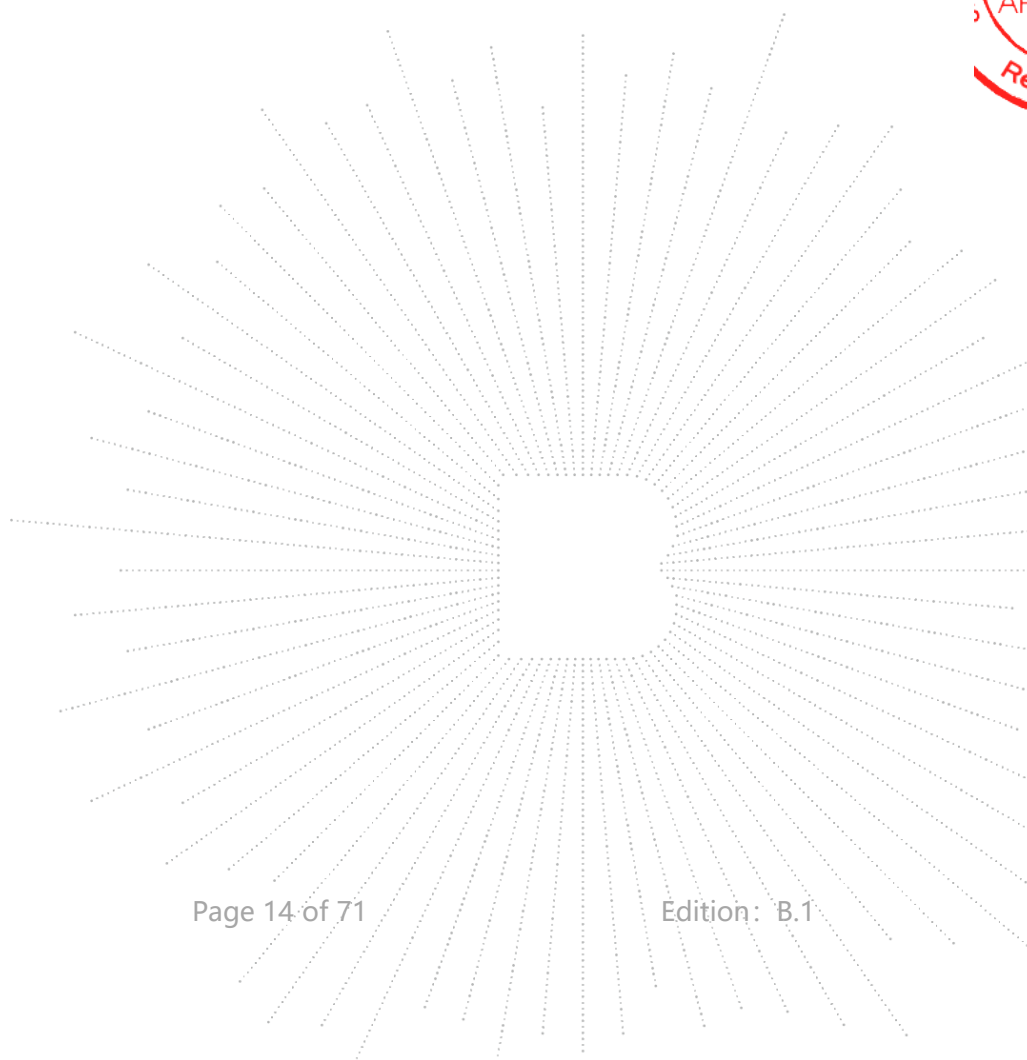
- The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stabilization Network (L.I.S.N).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with 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.
- 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.

6.5 Test Result

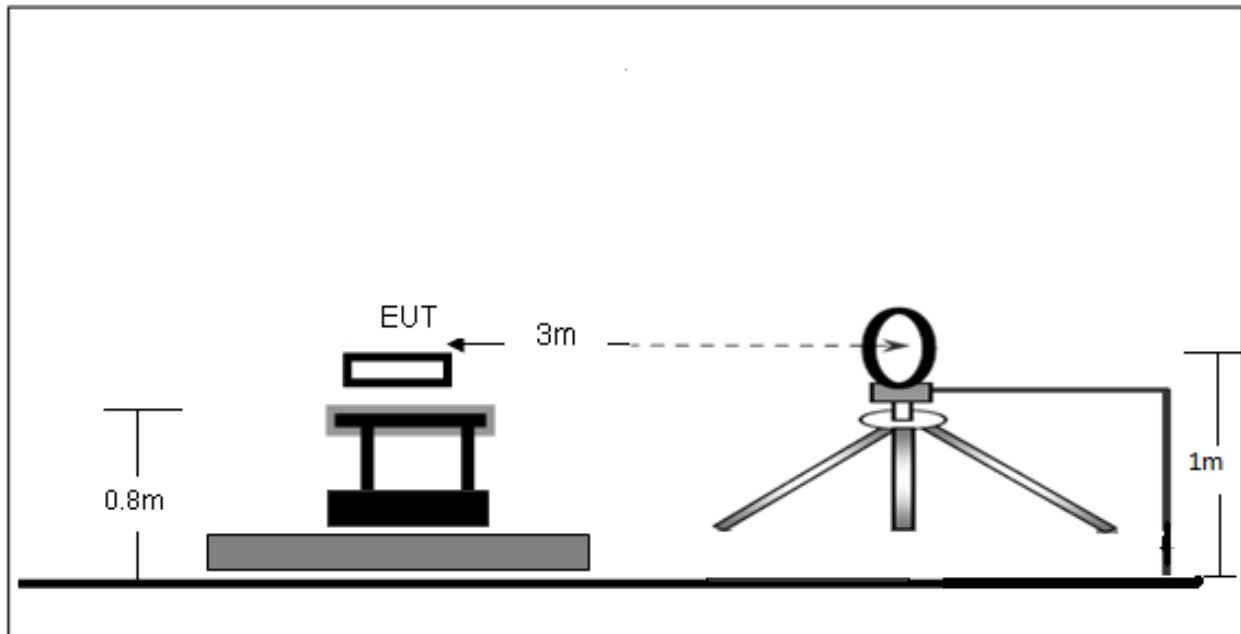
This equipment is a DC vehicle-mounted product and is not applicable to this test.



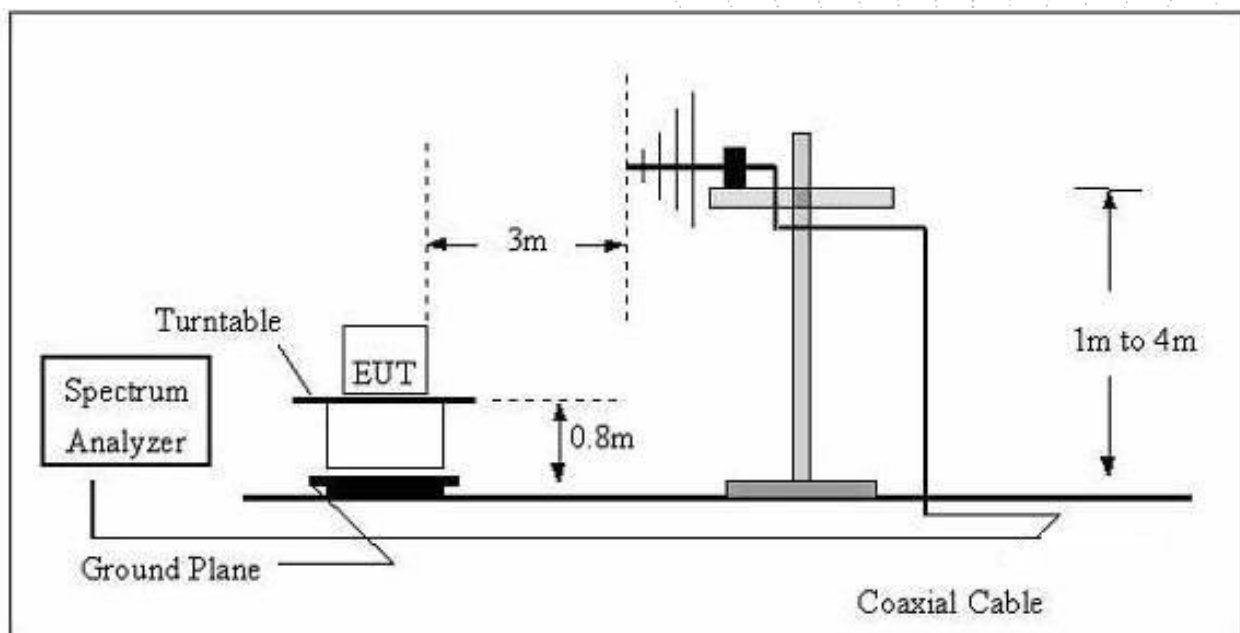
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

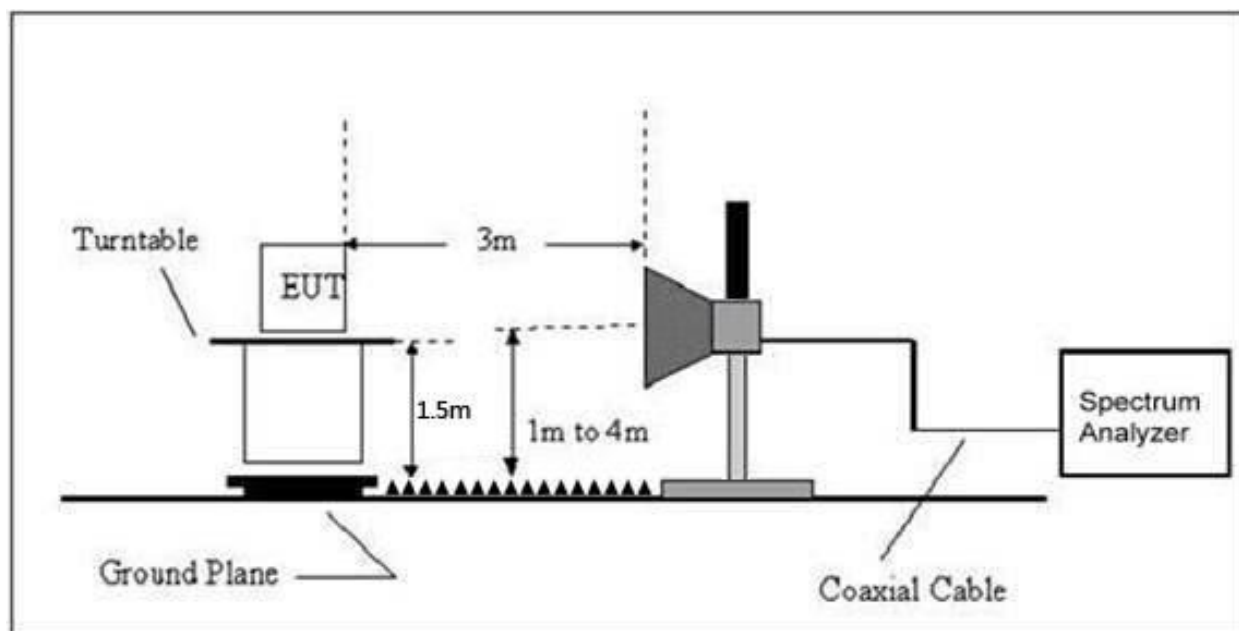
(A) Radiated Emission Test-Up Frequency Below 30MHz



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

- 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.
- 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.
- 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.
- 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.
- 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.
- 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 $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW} [kHz])$. , 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°C	Relative Humidity:	24%
Pressure:	101 kPa	Test Voltage :	DC 12V
Test Mode:	Mode 3	Polarization:	--

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State 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.

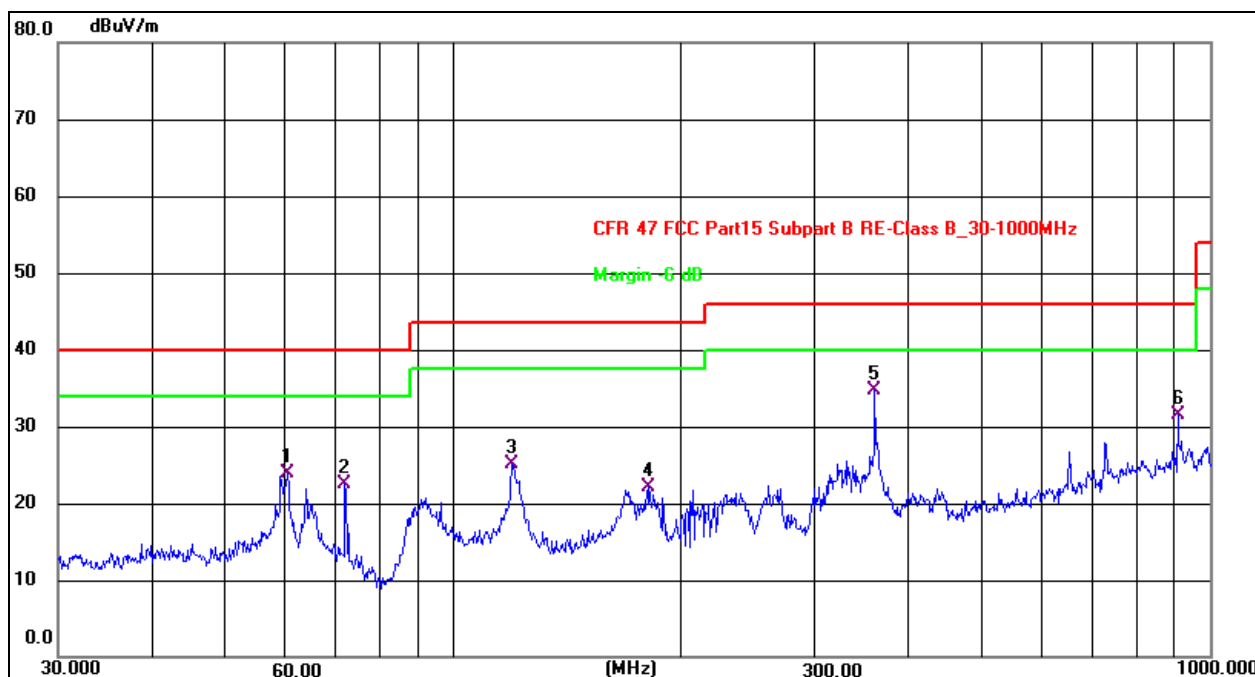
Distance extrapolation factor = $40 \log (\text{specific distance/test distance})(\text{dB})$;

Limit line = specific limits(dBuv) + distance extrapolation factor.

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Between 30MHz – 1GHz

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	Mode 3	Polarization :	Horizontal



Remark:

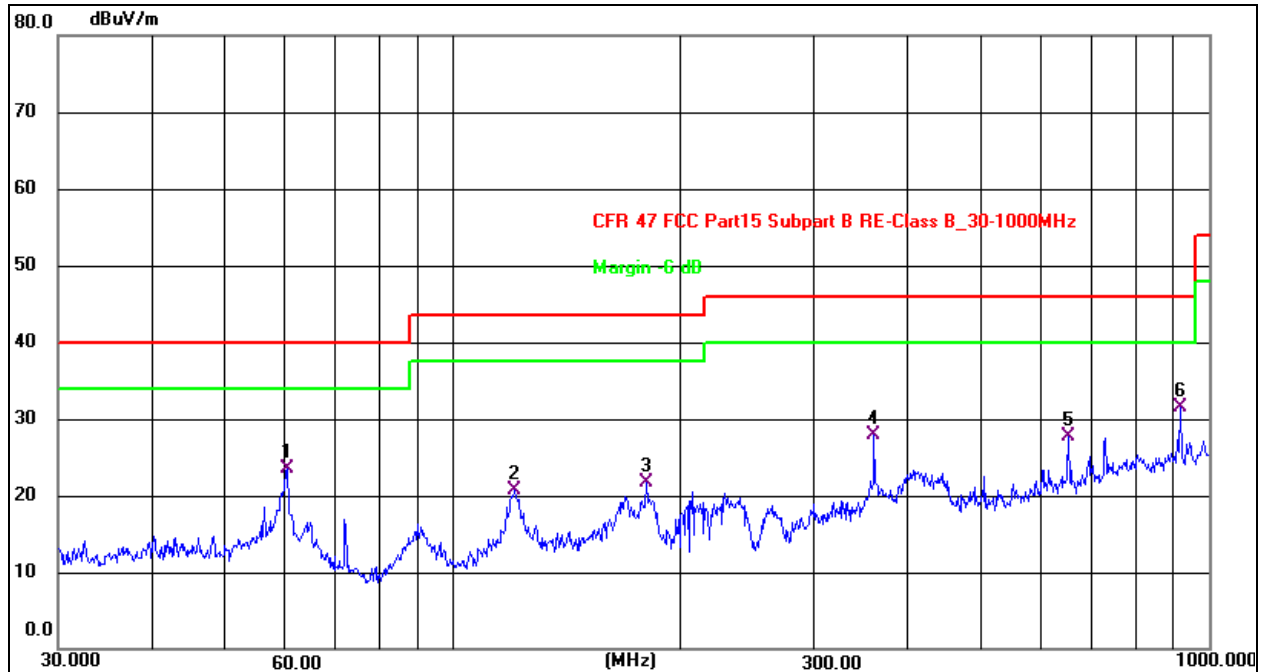
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Margin = (Reading + Factor) – Limit

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	60.2801	36.37	-12.40	23.97	40.00	-16.03	QP
2	71.8320	37.18	-14.74	22.44	40.00	-17.56	QP
3	119.4361	36.97	-11.91	25.06	43.50	-18.44	QP
4	181.2834	34.66	-12.63	22.03	43.50	-21.47	QP
5 *	360.4476	43.56	-8.89	34.67	46.00	-11.33	QP
6	906.4824	30.10	1.39	31.49	46.00	-14.51	QP

* Indicates the worst data.

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	Mode 3	Polarization :	Vertical



Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Margin = (Reading + Factor) – Limit

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	60.2801	35.81	-12.40	23.41	40.00	-16.59	QP
2	120.6991	32.85	-12.16	20.69	43.50	-22.81	QP
3	180.0165	33.99	-12.21	21.78	43.50	-21.72	QP
4	360.4476	36.84	-8.89	27.95	46.00	-18.05	QP
5	651.9417	30.80	-3.10	27.70	46.00	-18.30	QP
6 *	916.0687	29.85	1.72	31.57	46.00	-14.43	QP

* Indicates the worst data.

Test Mode:	TX(5.1G) - 802.11a
------------	--------------------

Polar	Fre- quency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector Type
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G							
Vertical	4434.00	72.36	-10.51	61.85	68.20	-6.35	PK
Vertical	4434.00	59.09	-10.51	48.58	54.00	-5.42	AV
Vertical	10360.04	64.37	-0.72	63.65	68.20	-4.55	PK
Vertical	10360.04	49.09	-0.72	48.37	54.00	-5.63	AV
Vertical	15540.12	64.71	2.59	67.30	74.00	-6.70	PK
Vertical	15540.12	49.66	2.59	52.25	54.00	-1.75	AV
Horizontal	4434.20	74.95	-10.51	64.44	68.20	-3.76	PK
Horizontal	4434.20	59.48	-10.51	48.97	54.00	-5.03	AV
Horizontal	10360.12	63.65	-0.72	62.93	68.20	-5.27	PK
Horizontal	10360.12	49.05	-0.72	48.33	54.00	-5.67	AV
Horizontal	15540.05	61.94	2.59	64.53	74.00	-9.47	PK
Horizontal	15540.05	49.75	2.59	52.34	54.00	-1.66	AV
middle Channel (5200 MHz)-Above 1G							
Vertical	4592.11	74.76	-10.20	64.56	74.00	-9.44	PK
Vertical	4592.11	59.48	-10.20	49.28	54.00	-4.72	AV
Vertical	10400.09	64.58	-0.67	63.91	68.20	-4.29	PK
Vertical	10400.09	49.43	-0.67	48.76	54.00	-5.24	AV
Vertical	15600.03	64.87	2.67	67.54	74.00	-6.46	PK
Vertical	15600.03	49.30	2.67	51.97	54.00	-2.03	AV
Horizontal	4592.10	70.13	-10.20	59.93	74.00	-14.07	PK
Horizontal	4592.10	59.90	-10.20	49.70	54.00	-4.30	AV
Horizontal	10400.03	62.75	-0.67	62.08	68.20	-6.12	PK
Horizontal	10400.03	49.99	-0.67	49.32	54.00	-4.68	AV
Horizontal	15600.00	63.44	2.67	66.11	74.00	-7.89	PK
Horizontal	15600.00	49.14	2.67	51.81	54.00	-2.19	AV
High Channel (5240 MHz)-Above 1G							
Vertical	4739.06	70.03	-9.45	60.58	74.00	-13.42	PK
Vertical	4739.06	59.10	-9.45	49.65	54.00	-4.35	AV
Vertical	10480.14	61.51	-0.64	60.87	68.20	-7.33	PK
Vertical	10480.14	49.71	-0.64	49.07	54.00	-4.93	AV
Vertical	15720.20	60.66	2.33	62.99	74.00	-11.01	PK
Vertical	15720.20	49.18	2.33	51.51	54.00	-2.49	AV
Horizontal	4739.02	71.29	-9.45	61.84	74.00	-12.16	PK
Horizontal	4739.02	59.25	-9.45	49.80	54.00	-4.20	AV
Horizontal	10480.04	63.07	-0.64	62.43	68.20	-5.77	PK
Horizontal	10480.04	49.34	-0.64	48.70	54.00	-5.30	AV
Horizontal	15720.16	60.04	2.33	62.37	74.00	-11.63	PK
Horizontal	15720.16	49.08	2.33	51.41	54.00	-2.59	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).

Correct Factor =Antenna Factor + Cable Loss - Preamp Factor

Over = Reading Level + Correct Factor - Limits

Test Mode:	TX(5.1G) - 802.11n-HT20
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Polar	Fre- quency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector Type
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G							
Vertical	4434.01	70.81	-10.51	60.30	68.20	-7.90	PK
Vertical	4434.01	59.07	-10.51	48.56	54.00	-5.44	AV
Vertical	10360.09	62.59	-0.72	61.87	68.20	-6.33	PK
Vertical	10360.09	49.88	-0.72	49.16	54.00	-4.84	AV
Vertical	15540.12	61.23	2.59	63.82	74.00	-10.18	PK
Vertical	15540.12	49.17	2.59	51.76	54.00	-2.24	AV
Horizontal	4434.07	70.59	-10.51	60.08	68.20	-8.12	PK
Horizontal	4434.07	59.43	-10.51	48.92	54.00	-5.08	AV
Horizontal	10360.15	60.34	-0.72	59.62	68.20	-8.58	PK
Horizontal	10360.15	49.34	-0.72	48.62	54.00	-5.38	AV
Horizontal	15540.07	63.16	2.59	65.75	74.00	-8.25	PK
Horizontal	15540.07	49.02	2.59	51.61	54.00	-2.39	AV
middle Channel (5200 MHz)-Above 1G							
Vertical	4592.12	71.42	-10.20	61.22	74.00	-12.78	PK
Vertical	4592.12	59.07	-10.20	48.87	54.00	-5.13	AV
Vertical	10400.17	64.73	-0.67	64.06	68.20	-4.14	PK
Vertical	10400.17	49.35	-0.67	48.68	54.00	-5.32	AV
Vertical	15600.13	64.89	2.67	67.56	74.00	-6.44	PK
Vertical	15600.13	49.20	2.67	51.87	54.00	-2.13	AV
Horizontal	4592.19	71.18	-10.20	60.98	74.00	-13.02	PK
Horizontal	4592.19	59.34	-10.20	49.14	54.00	-4.86	AV
Horizontal	10400.06	63.76	-0.67	63.09	68.20	-5.11	PK
Horizontal	10400.06	49.40	-0.67	48.73	54.00	-5.27	AV
Horizontal	15600.01	64.14	2.67	66.81	74.00	-7.19	PK
Horizontal	15600.01	49.09	2.67	51.76	54.00	-2.24	AV
High Channel (5240 MHz)-Above 1G							
Vertical	4739.20	72.80	-9.45	63.35	74.00	-10.65	PK
Vertical	4739.20	59.27	-9.45	49.82	54.00	-4.18	AV
Vertical	10480.12	63.80	-0.64	63.16	68.20	-5.04	PK
Vertical	10480.12	49.83	-0.64	49.19	54.00	-4.81	AV
Vertical	15720.07	63.40	2.33	65.73	74.00	-8.27	PK
Vertical	15720.07	49.23	2.33	51.56	54.00	-2.44	AV
Horizontal	4739.11	73.57	-9.45	64.12	74.00	-9.88	PK
Horizontal	4739.11	59.62	-9.45	50.17	54.00	-3.83	AV
Horizontal	10480.16	61.71	-0.64	61.07	68.20	-7.13	PK
Horizontal	10480.16	49.57	-0.64	48.93	54.00	-5.07	AV
Horizontal	15720.02	62.67	2.33	65.00	74.00	-9.00	PK
Horizontal	15720.02	49.51	2.33	51.84	54.00	-2.16	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).
Correct Factor =Antenna Factor + Cable Loss - Preamp Factor
Over = Reading Level + Correct Factor - Limits

Test Mode:	TX(5.1G) - 802.11n-HT40
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Polar (H/V)	Fre- quency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measure- ment (dBuV/m)	Limits (dBuV/m)	Over (dB)	Detector Type
Low Channel (5190 MHz)-Above 1G							
Vertical	4434.13	71.01	-10.52	60.49	68.20	-7.71	PK
Vertical	4434.13	59.42	-10.52	48.90	54.00	-5.10	AV
Vertical	10380.04	63.08	-0.70	62.38	68.20	-5.82	PK
Vertical	10380.04	49.53	-0.70	48.83	54.00	-5.17	AV
Vertical	15570.04	62.08	2.39	64.47	74.00	-9.53	PK
Vertical	15570.04	49.61	2.39	52.00	54.00	-2.00	AV
Horizontal	4434.01	74.57	-10.52	64.05	74.00	-9.95	PK
Horizontal	4434.01	59.02	-10.52	48.50	54.00	-5.50	AV
Horizontal	10380.16	64.25	-0.70	63.55	68.20	-4.65	PK
Horizontal	10380.16	49.44	-0.70	48.74	54.00	-5.26	AV
Horizontal	15570.04	61.58	2.39	63.97	74.00	-10.03	PK
Horizontal	15570.04	49.02	2.39	51.41	54.00	-2.59	AV
High Channel (5230 MHz)-Above 1G							
Vertical	4739.02	70.04	-9.45	60.59	68.20	-7.61	PK
Vertical	4739.02	59.47	-9.45	50.02	54.00	-3.98	AV
Vertical	10460.03	60.50	-0.65	59.85	68.20	-8.35	PK
Vertical	10460.03	49.64	-0.65	48.99	54.00	-5.01	AV
Vertical	15690.04	63.70	2.33	66.03	74.00	-7.97	PK
Vertical	15690.04	49.94	2.33	52.27	54.00	-1.73	AV
Horizontal	4739.08	74.35	-9.45	64.90	68.20	-3.30	PK
Horizontal	4739.08	59.68	-9.45	50.23	54.00	-3.77	AV
Horizontal	10460.19	60.09	-0.65	59.44	68.20	-8.76	PK
Horizontal	10460.19	49.40	-0.65	48.75	54.00	-5.25	AV
Horizontal	15690.08	61.09	2.33	63.42	74.00	-10.58	PK
Horizontal	15690.08	49.93	2.33	52.26	54.00	-1.74	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).
Correct Factor =Antenna Factor + Cable Loss - Preamp Factor
Over = Reading Level + Correct Factor - Limits

- ☒ Undesirable radiated Undesirable radiated Spurious Emission in Band Edge
- All the modes 802.11a/n has been tested and the worst result 802.11a20 recorded as below:

Test mode: 802.11a20 Frequency(MHz): 5180

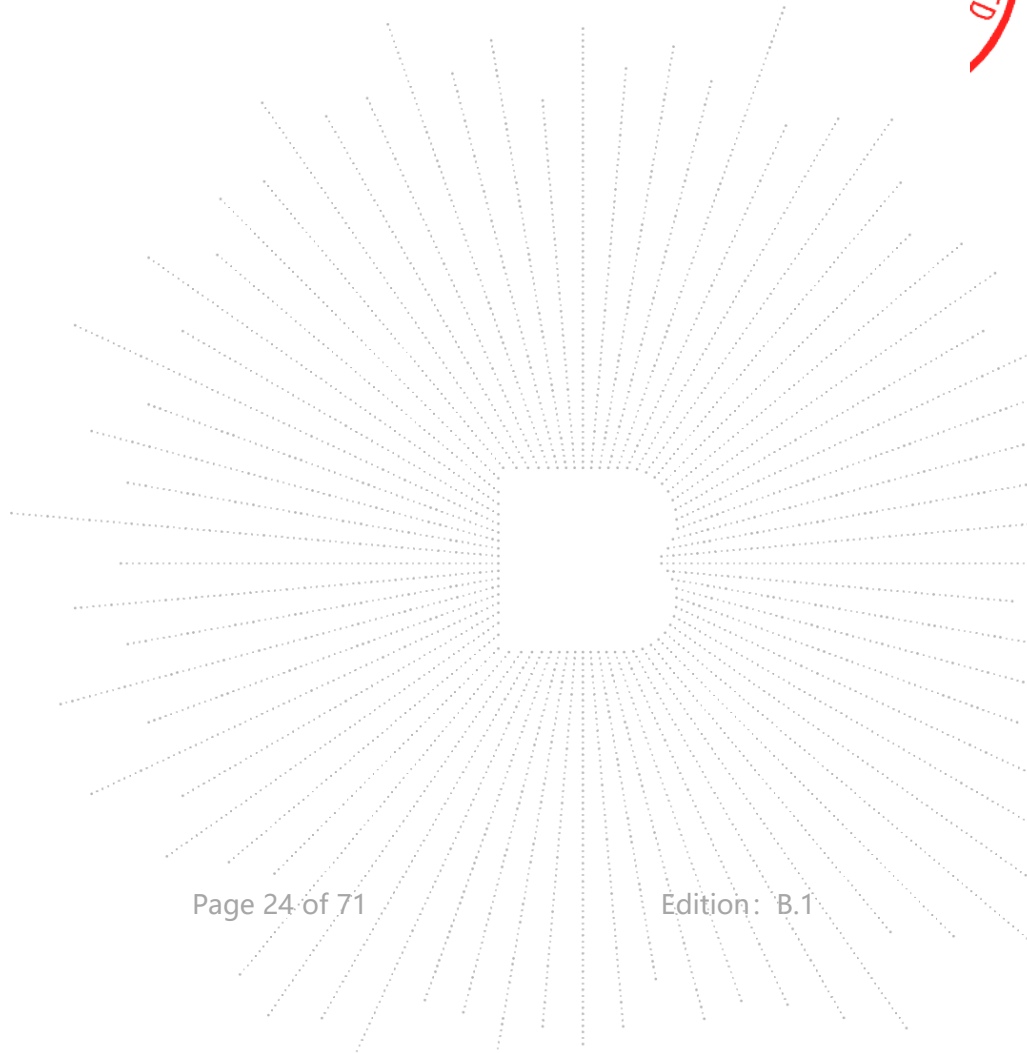
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
5150.34	H	55.63	74	47.02	54
5150.27	V	60.30	74	50.79	54

Test mode: 802.11a20 Frequency(MHz): 5240

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
5350.67	H	61.53	74	50.89	54
5350.94	V	61.03	74	52.17	54

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp

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

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

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

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

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands,

The maximum conducted output power over the frequency bands of operation shall not exceed the lesser

of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz

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 $\geq 1/T$, where T is defined in section II.B.I.a).
- b) Set VBW ≥ 3 RBW.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/\text{RBW})$ 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 $10\log(1\text{MHz}/\text{RBW})$ 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.

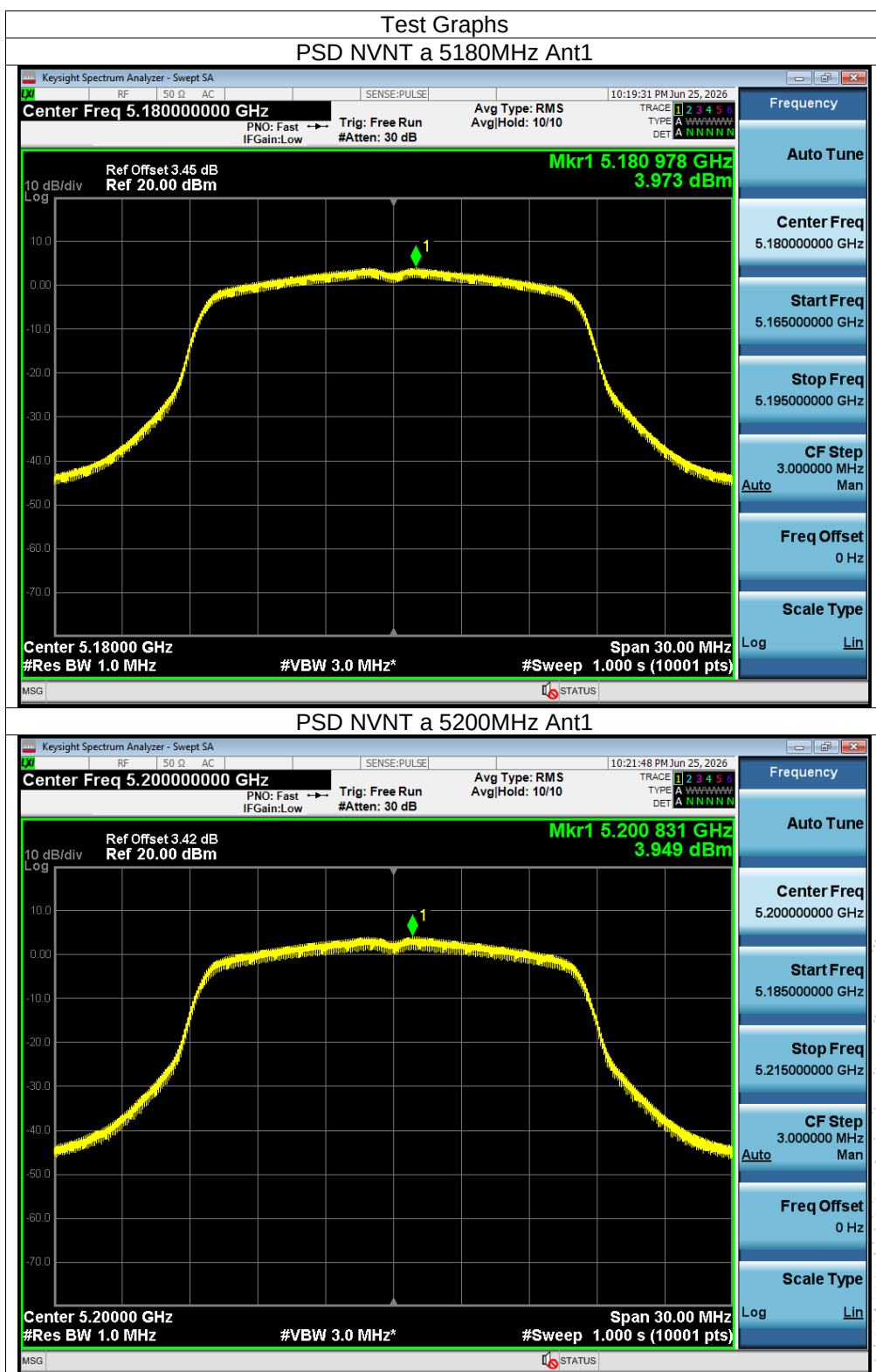
8.4 EUT Operating Conditions

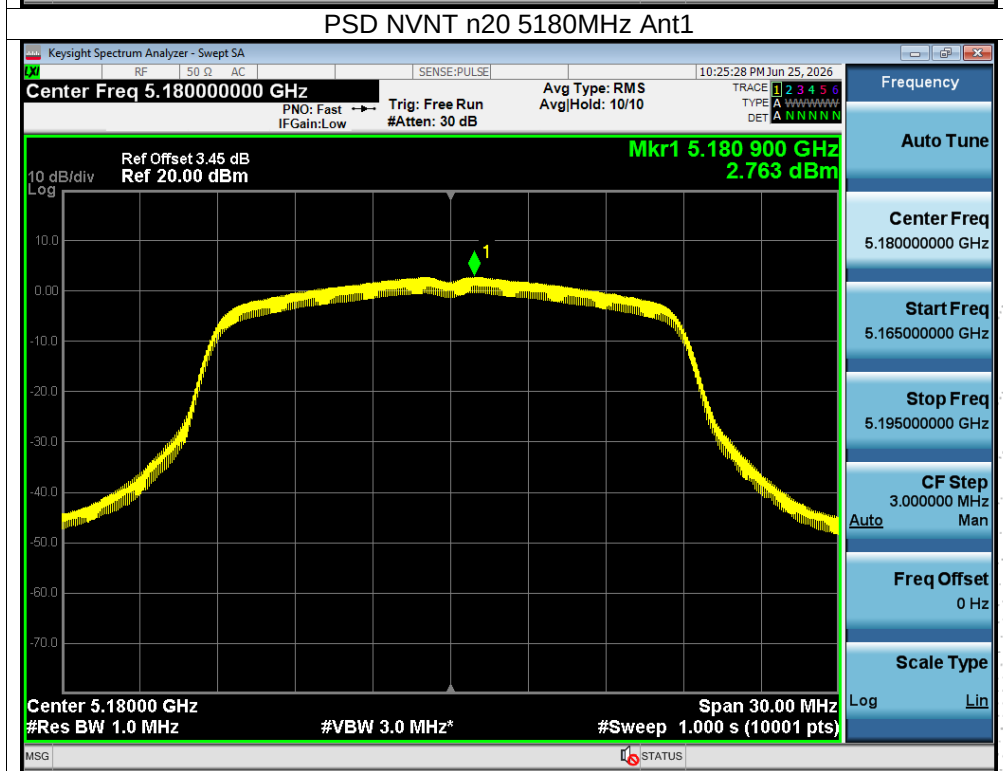
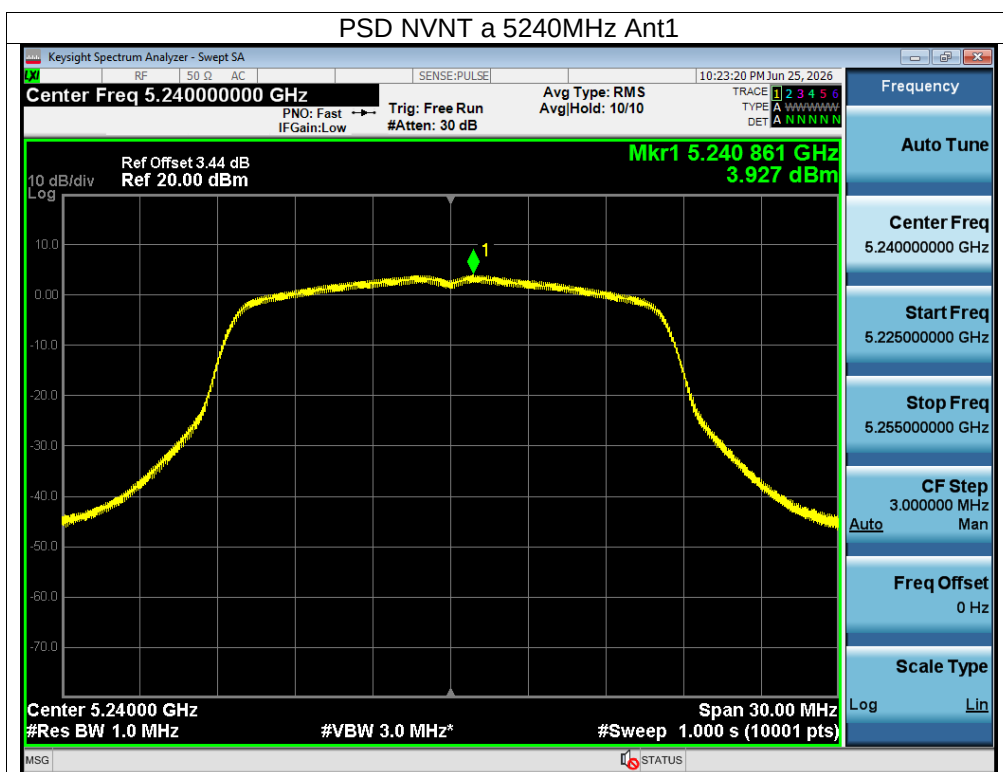
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

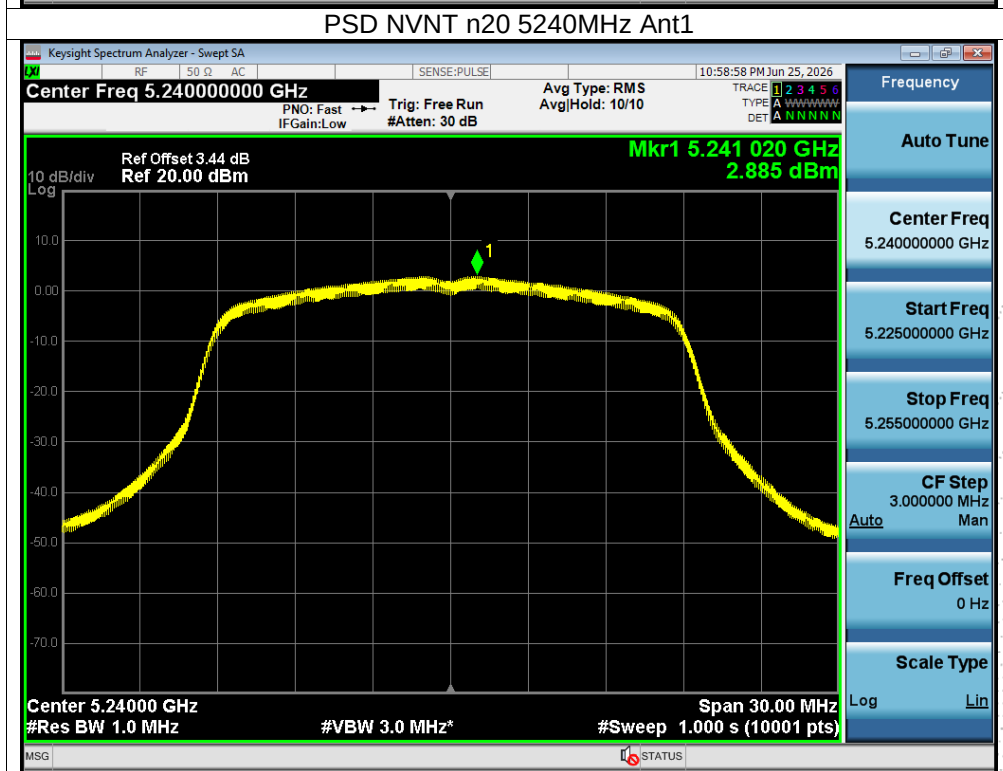
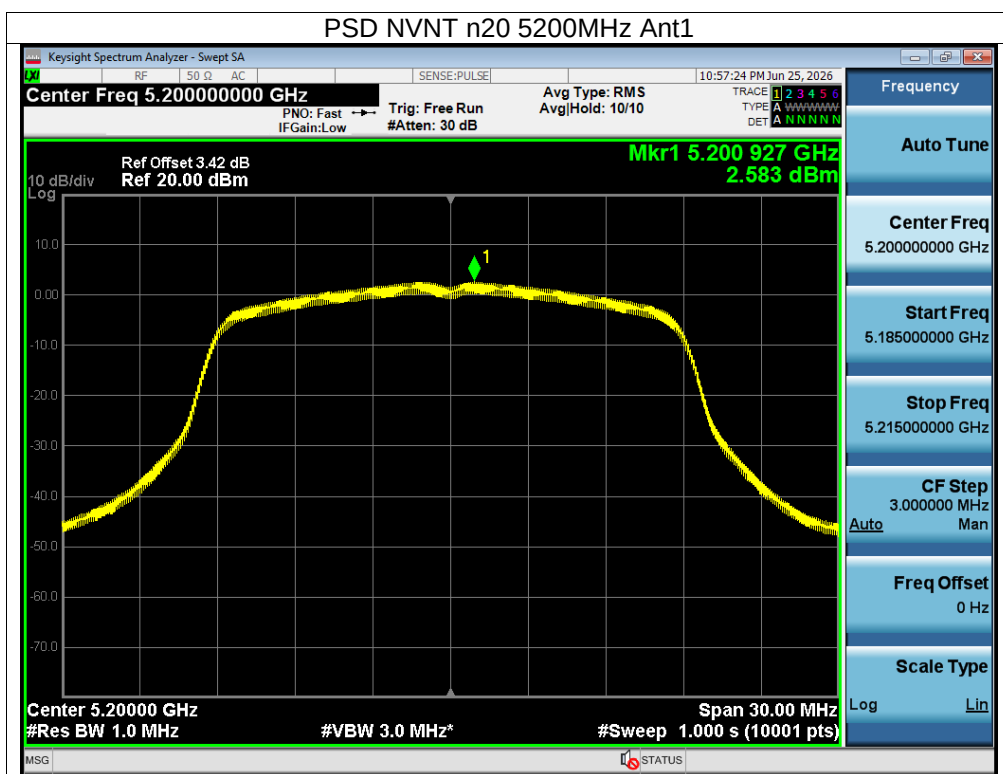
8.5 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	(5180-5240MHz)		

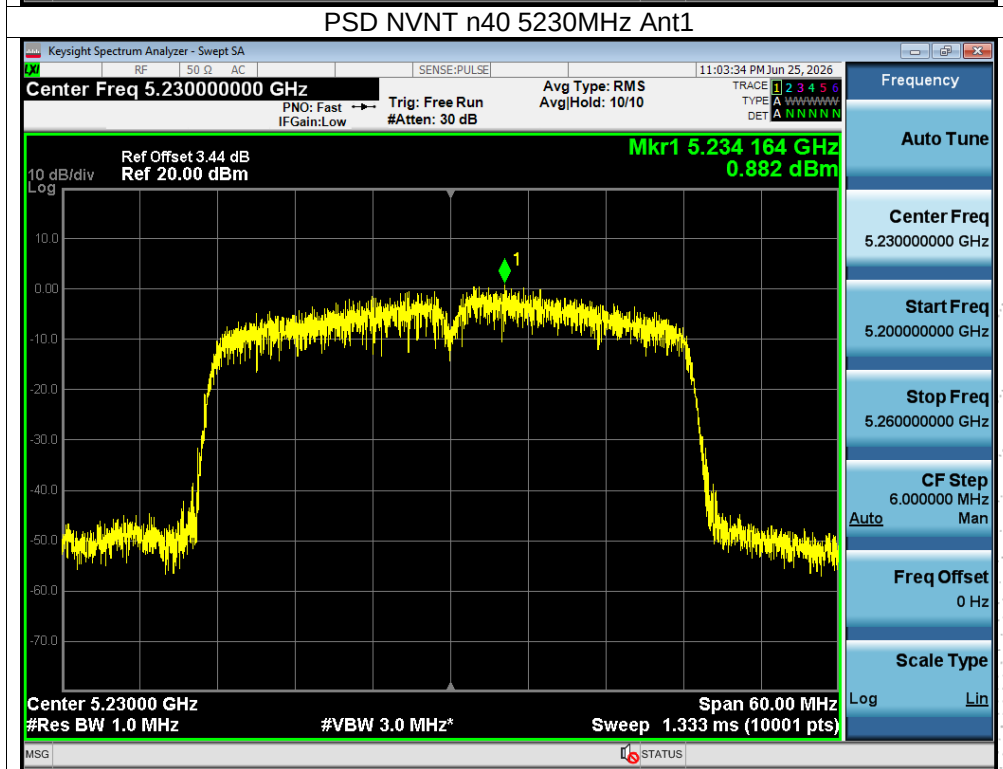
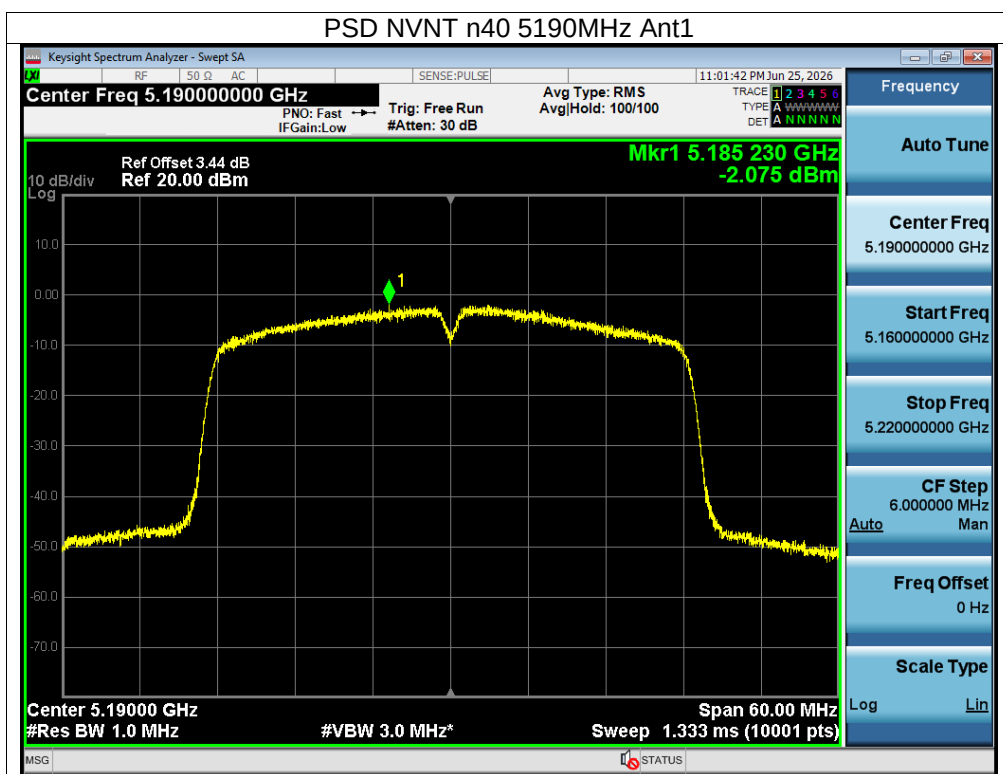
Condition	Mode	Frequency (MHz)	Conducted PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	3.97	0.96	4.93	11	Pass
NVNT	a	5200	3.95	0.96	4.91	11	Pass
NVNT	a	5240	3.93	0.96	4.89	11	Pass
NVNT	n20	5180	2.76	1.02	3.78	11	Pass
NVNT	n20	5200	2.58	1.02	3.6	11	Pass
NVNT	n20	5240	2.89	1.02	3.91	11	Pass
NVNT	n40	5190	-2.08	1.87	-0.21	11	Pass
NVNT	n40	5230	0.88	1.87	2.75	11	Pass





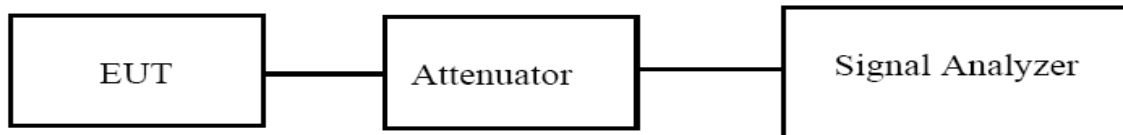


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9. 26dB & 6dB & 99% Emission Bandwidth

9.1 Block Diagram Of Test Setup



9.2 Limit

For the band 5.15-5.25 GHz.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.3 Test Procedure

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is in the range of 1% to 5%.

The following procedure shall be used for measuring (99 %) power bandwidth:

- Set center frequency to the nominal EUT channel center frequency.
- Set span = 1.5 times to 5.0 times the OBW.
- Set RBW = 1 % to 5 % of the OBW
- Set VBW $\geq 3 \cdot$ RBW
- 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.
- Use the 99 % power bandwidth function of the instrument (if available).
- 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.

Emission bandwidth for the band 5.725 GHz to 5.85 GHz

The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max-hold.
- e) Sweep = No faster than coupled (auto) time.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

9.4 EUT Operating Conditions

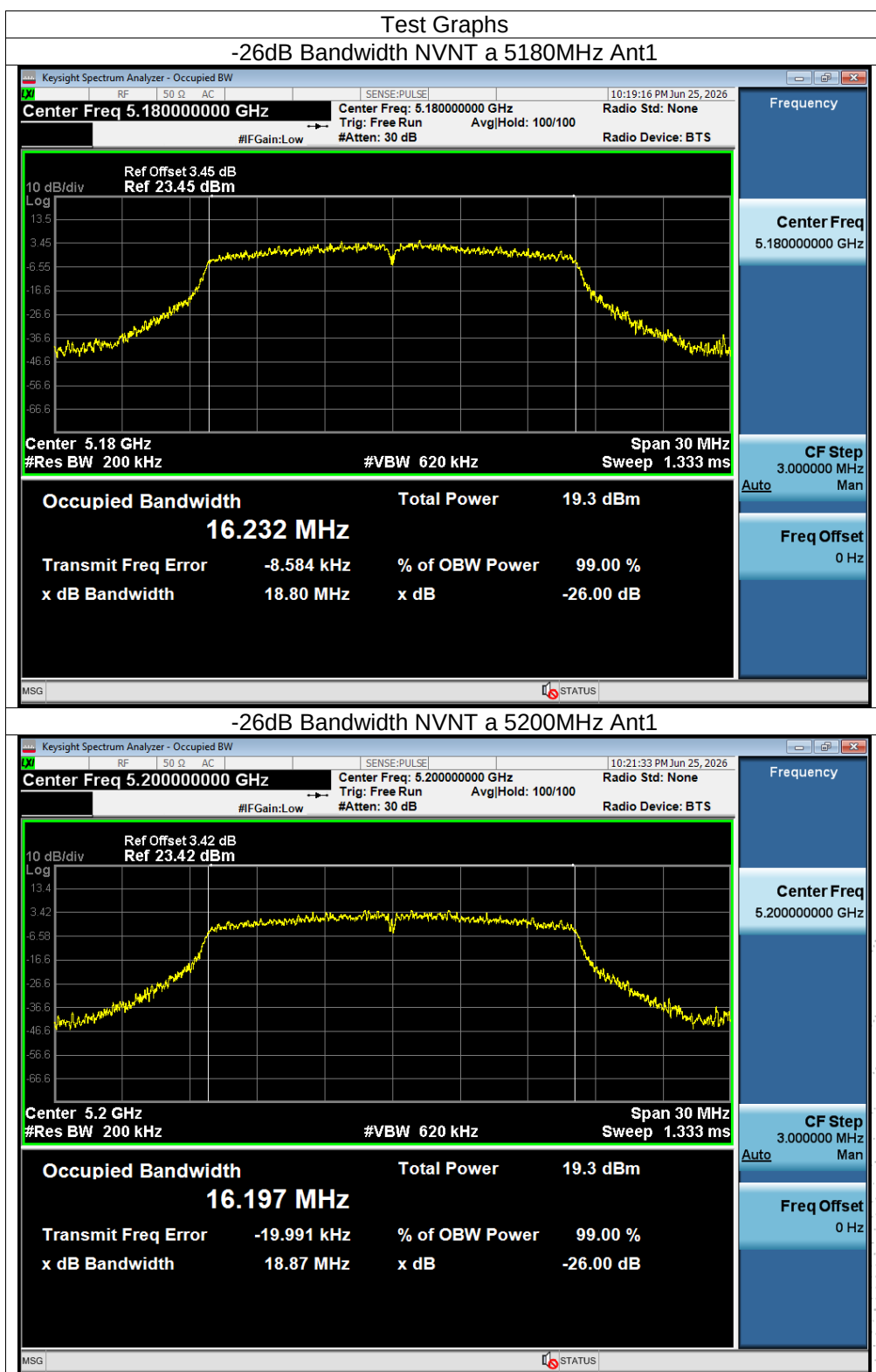
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

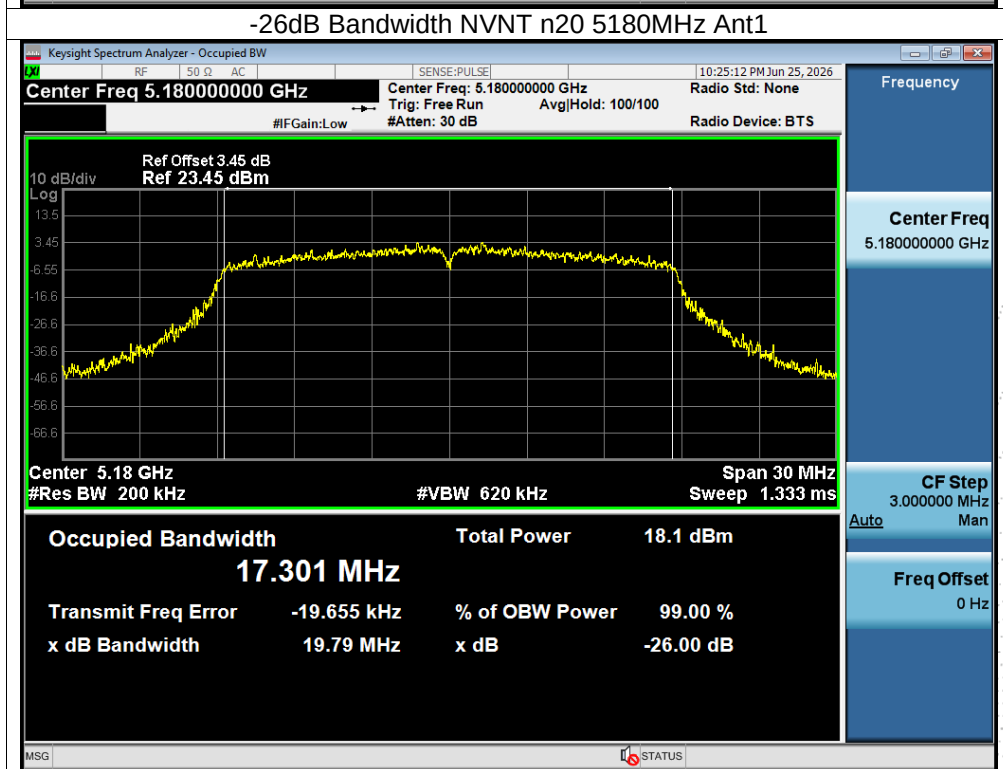
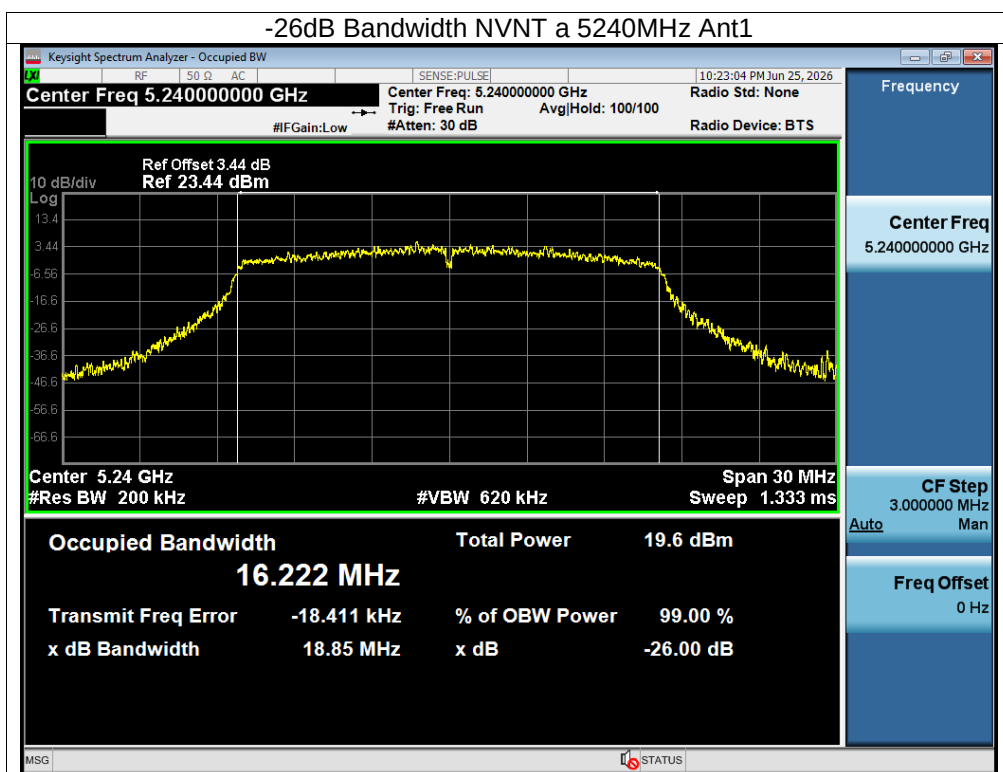
9.5 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	(5180-5240MHz)		

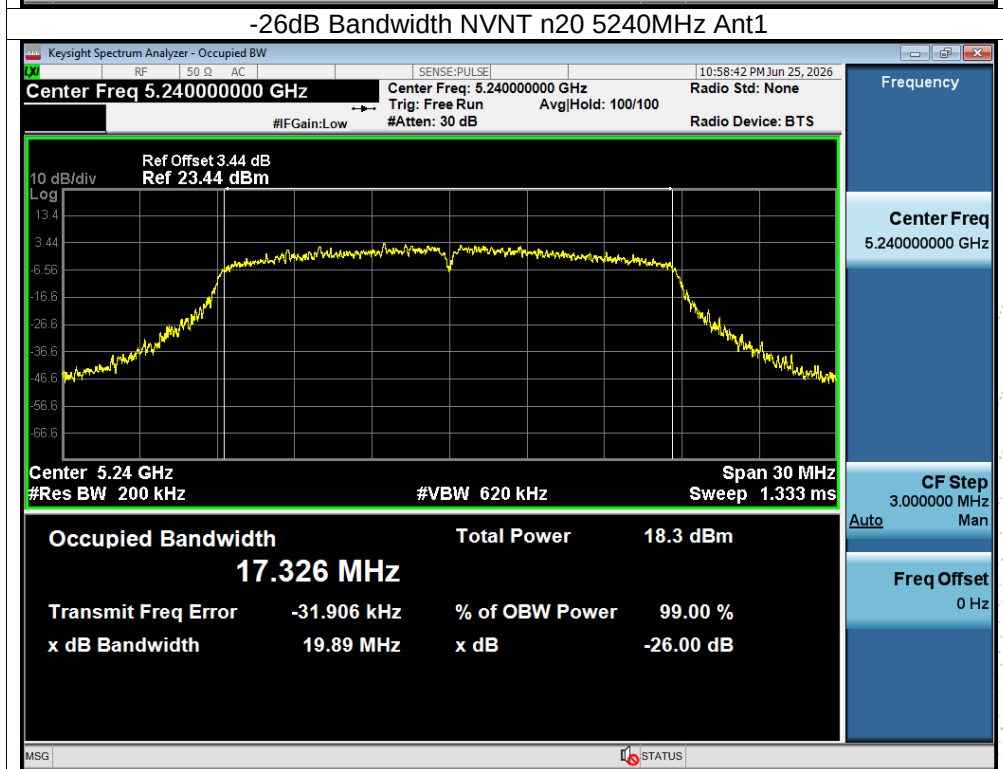
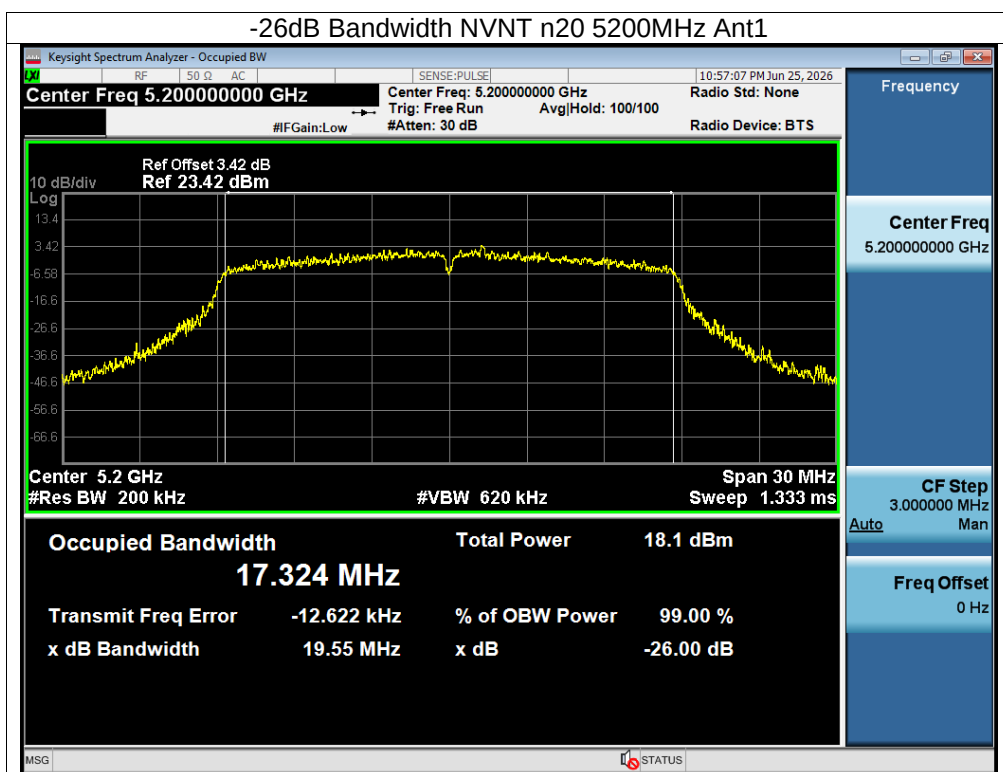
Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)	Verdict
NVNT	a	5180	18.804	Pass
NVNT	a	5200	18.871	Pass
NVNT	a	5240	18.853	Pass
NVNT	n20	5180	19.789	Pass
NVNT	n20	5200	19.545	Pass
NVNT	n20	5240	19.888	Pass
NVNT	n40	5190	37.875	Pass
NVNT	n40	5230	37.965	Pass

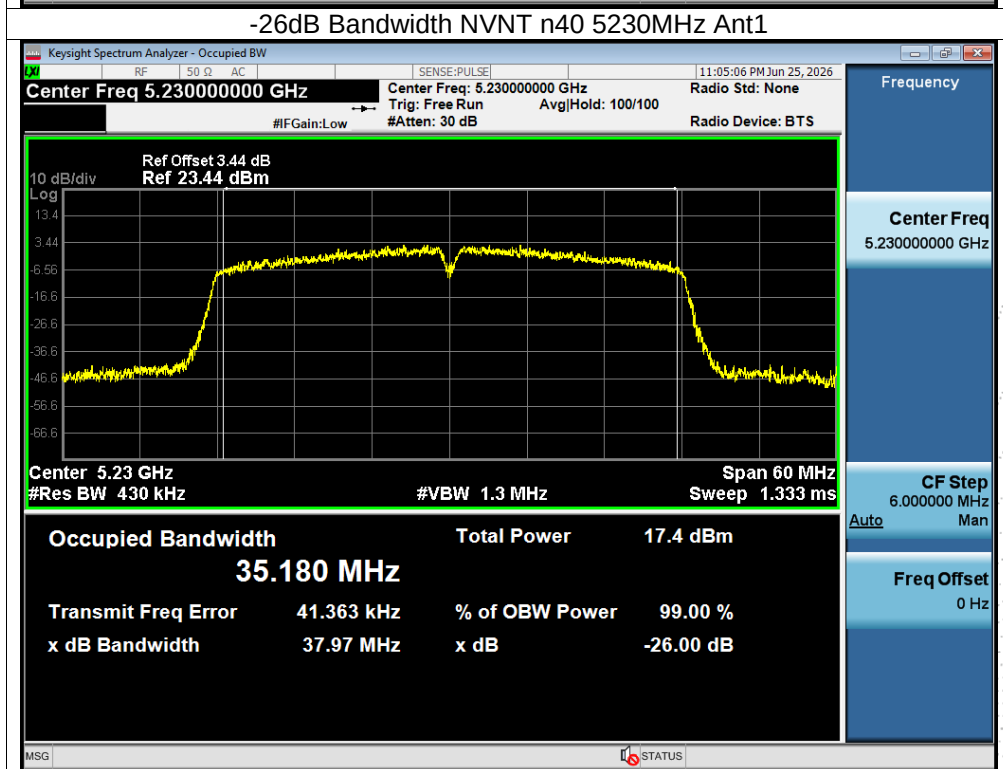
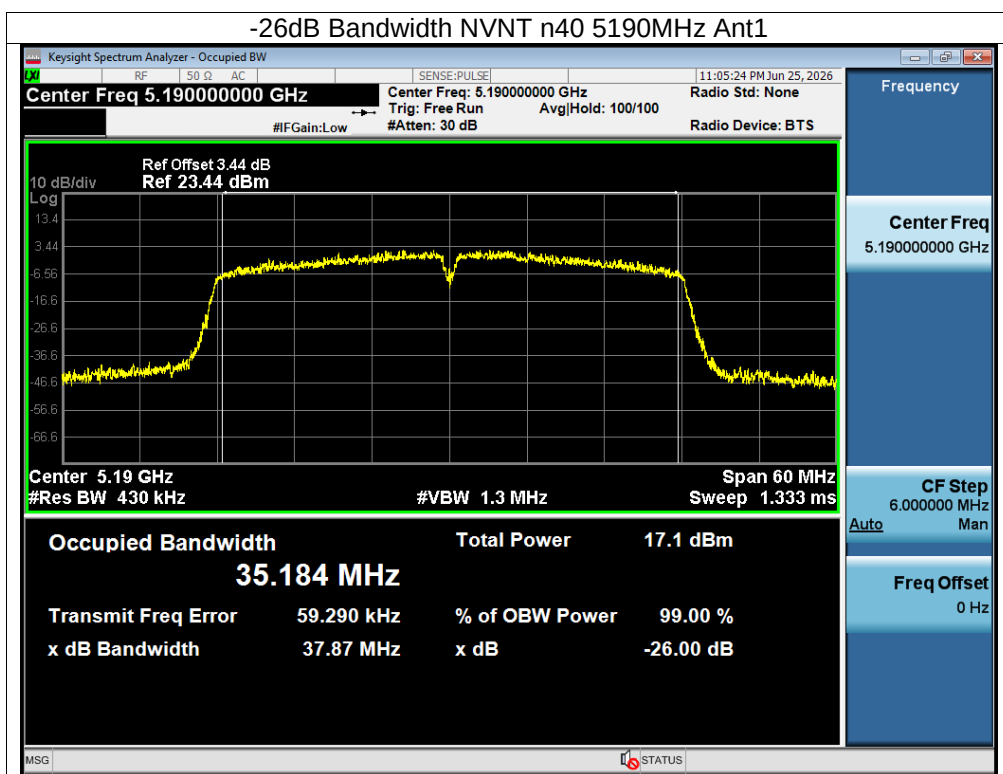
Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5180	16.221
NVNT	a	5200	16.197
NVNT	a	5240	16.192
NVNT	n20	5180	17.312
NVNT	n20	5200	17.329
NVNT	n20	5240	17.328
NVNT	n40	5190	35.193
NVNT	n40	5230	35.15

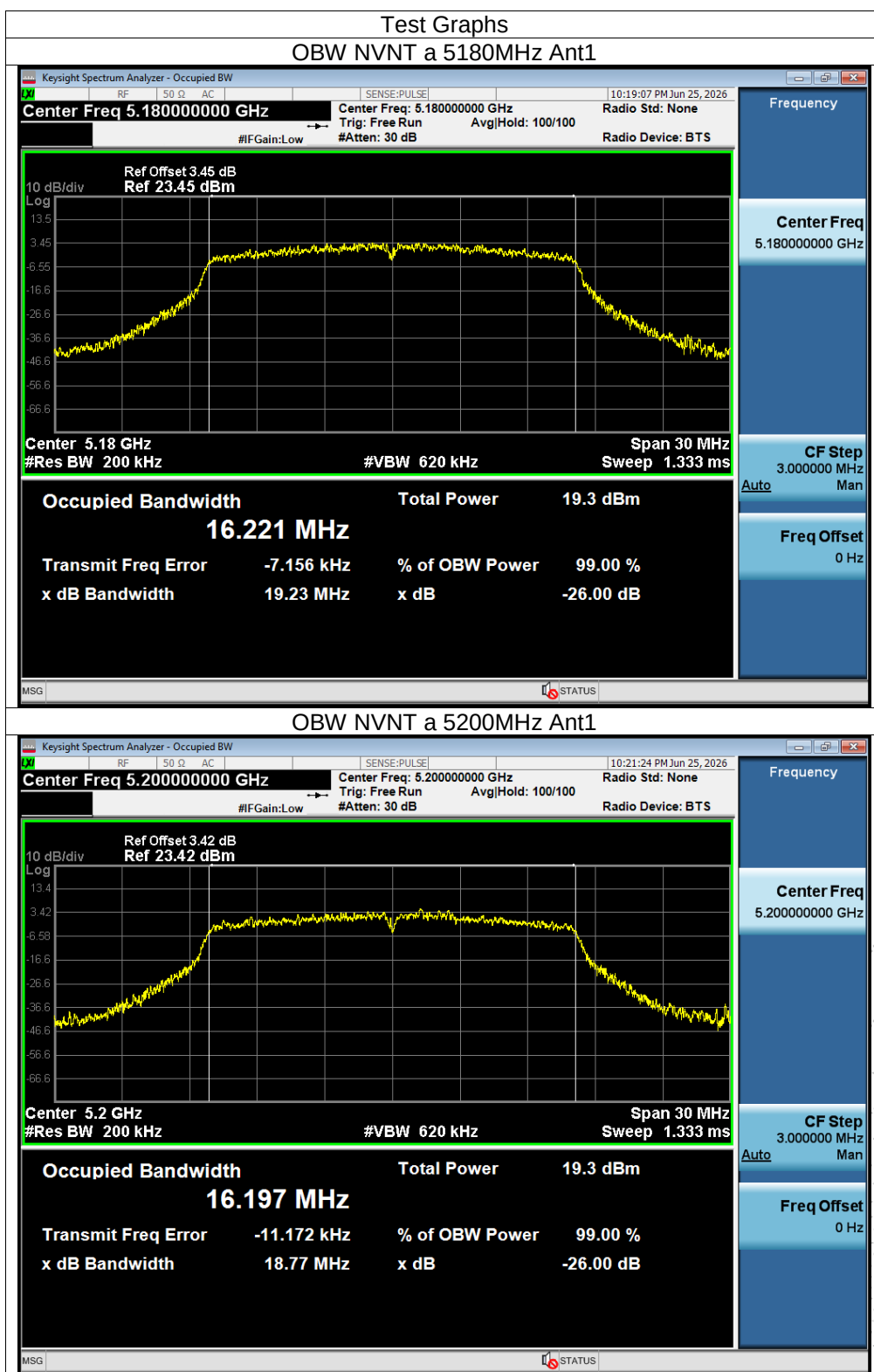


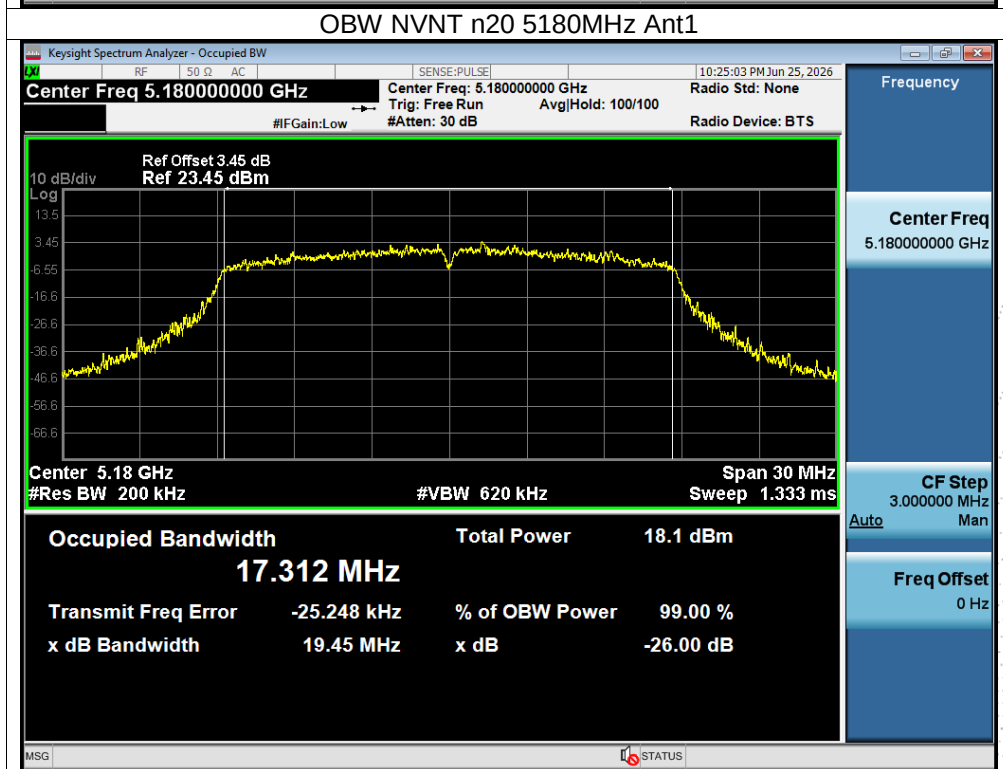
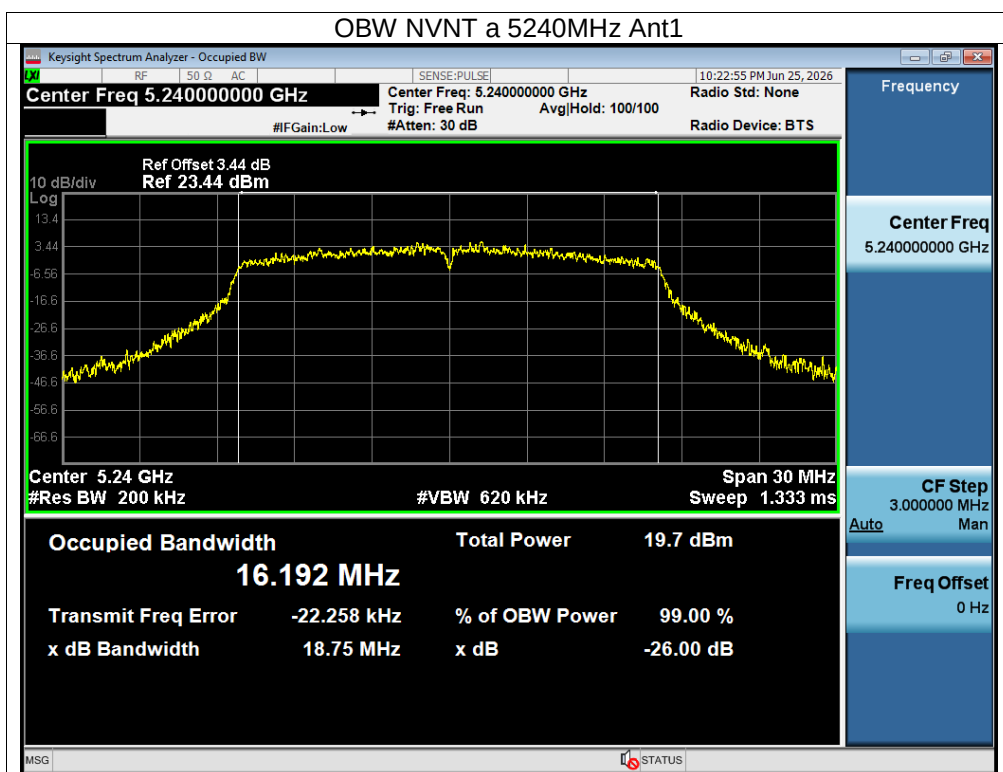


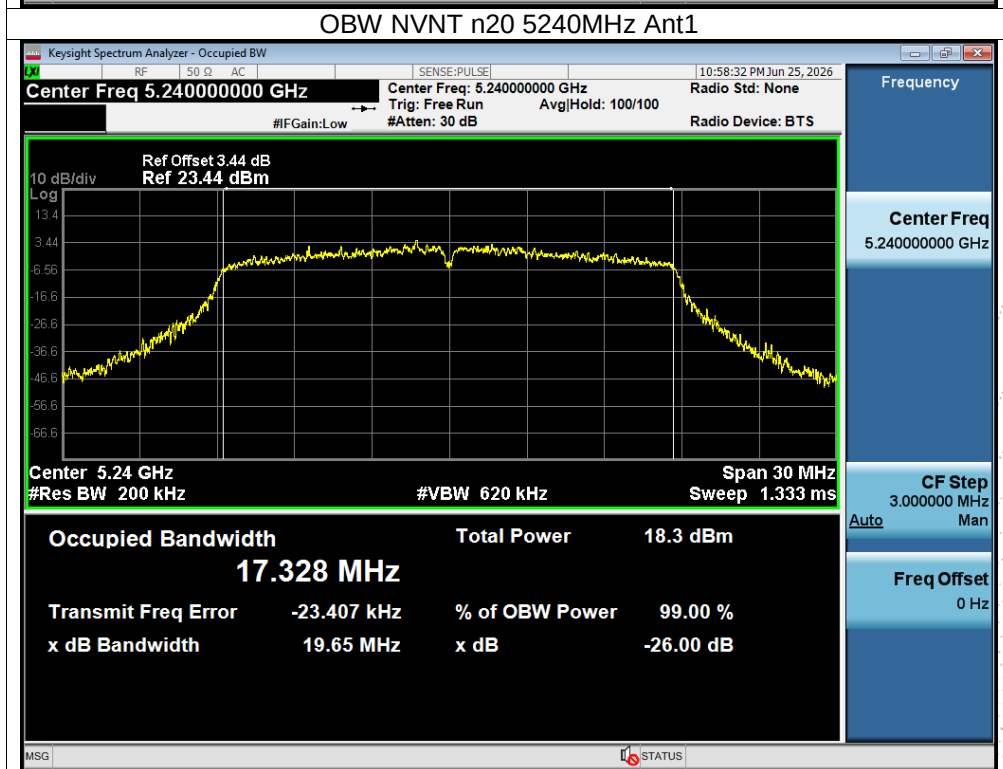
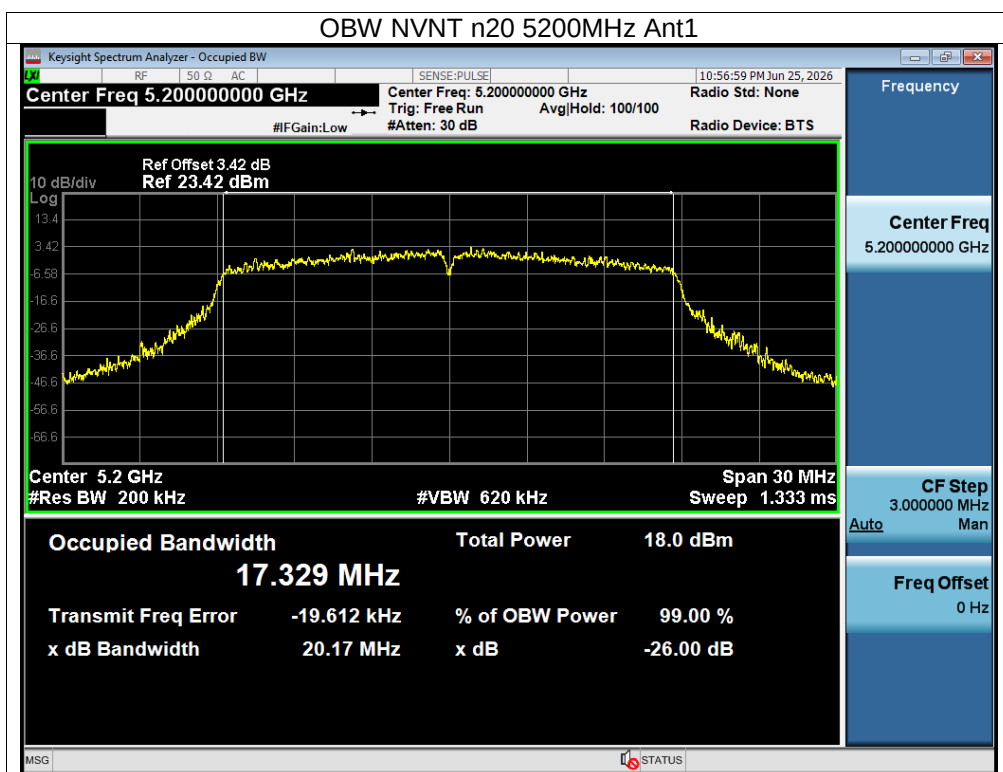
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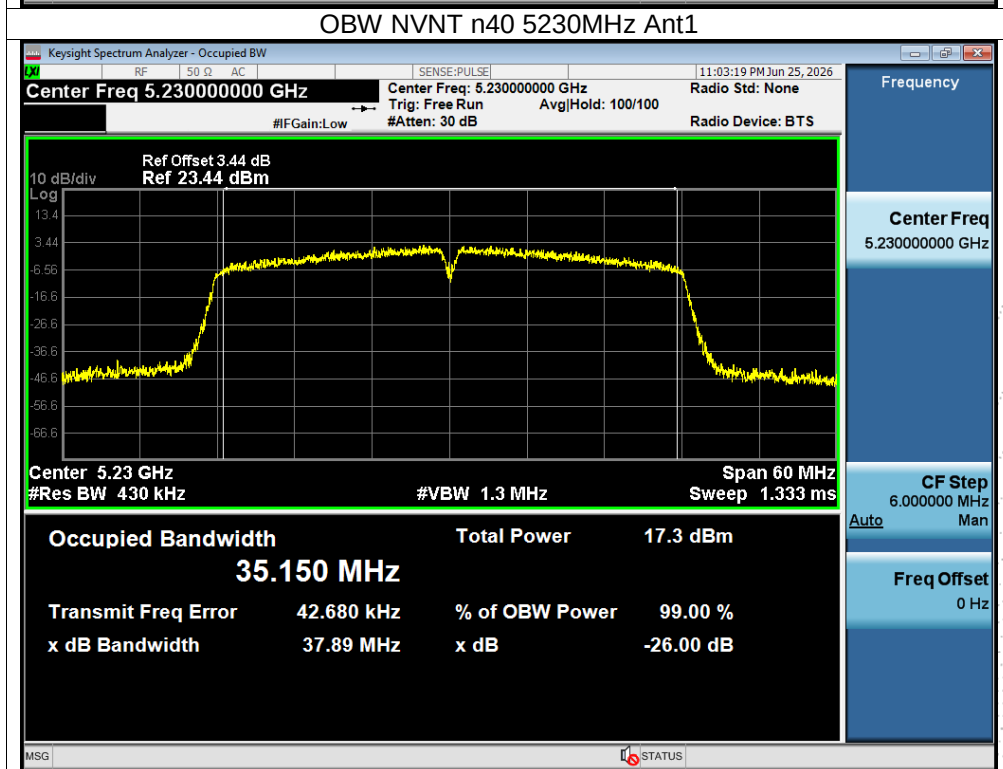
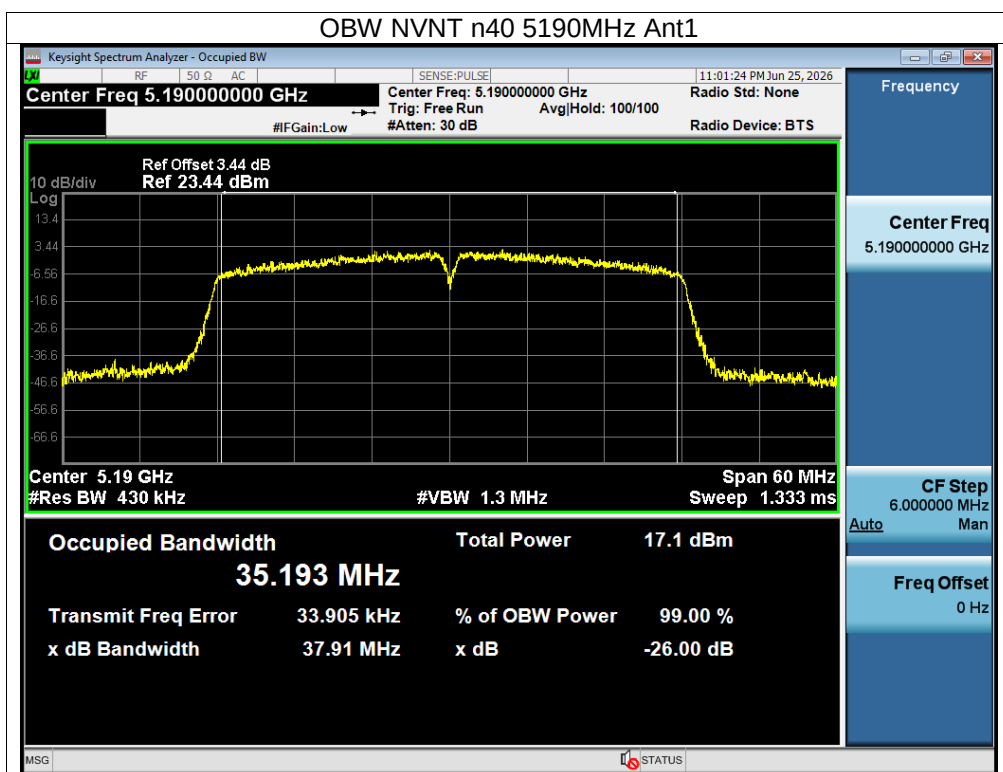












10. Maximum Conducted Output Power

10.1 Block Diagram Of Test Setup



10.2 Limit

According to FCC §15.407

The maximum conducted output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	0.25W
5250~5350	250 mW or 11 dBm + 10log B, whichever is less.
5470~5725	250 mW or 11 dBm + 10log B, whichever is less.
5725~5850	1W
Note: Where "B" is the 26 dB emissions bandwidth in MHz.	

10.3 Test Procedure

Method SA-1 or method SA-1A (alternative) shall be applied if either of the following conditions can be satisfied:

1) The EUT transmits continuously (or with a $D \geq 98\%$).

Method SA-1 uses trace averaging with the EUT transmitting at full power throughout each sweep. The procedure for this method is as follows:

a) Set span to encompass the entire 99% OBW of the signal.

b) Set RBW = 1 MHz.

c) Set VBW ≥ 3 MHz.

d) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)

e) Sweep time = auto.

f) Detector = Power averaging (rms), if available. Otherwise, use sample detector mode.

g) If transmit duty cycle $< 98\%$, use a video trigger with the trigger level set to enable triggering only on full power pulses. The transmitter shall 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 $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.”

- h) Trace average at least 100 traces in power averaging (rms) mode.
- i) Compute power by integrating the spectrum across the 99% OBW of the signal using the instrument's band-power measurement function, with band limits set equal to the OBW band-edges. If the instrument does not have a band-power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 99% OBW of the spectrum.

Method SA-2 or method SA-2A (alternative) shall be applied if the conditions of the preceding item a) 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 $\pm 2\%$. Method SA-2 uses trace averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction. The procedure for this method is as follows:

- a) Measure the duty cycle D of the transmitter output signal as described in 12.2.
- b) Set span to encompass the entire 99% OBW of the signal.
- c) Set RBW = 1 MHz.
- d) Set VBW ≥ 3 MHz.
- e) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- f) Sweep time = auto.
- g) Detector = Power averaging (rms), if available. Otherwise, use sample detector mode.
- h) Do not use sweep triggering. Allow the sweep to “free run.”
- i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
- j) Compute power by integrating the spectrum across the 99% OBW of the signal using the instrument's band-power measurement function with band limits set equal to the EBW or OBW band-edges. If the instrument does not have a band-power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 99% OBW of the spectrum.
- k) Add $[10 \log (1 / D)]$, where D is the duty cycle, to the measured power to compute the average power during the actual transmission times (because the measurement represents an average over both the ON and OFF times of the transmission). For example, add $[10 \log (1 / 0.25)] = 6$ dB if the duty cycle is 25%.

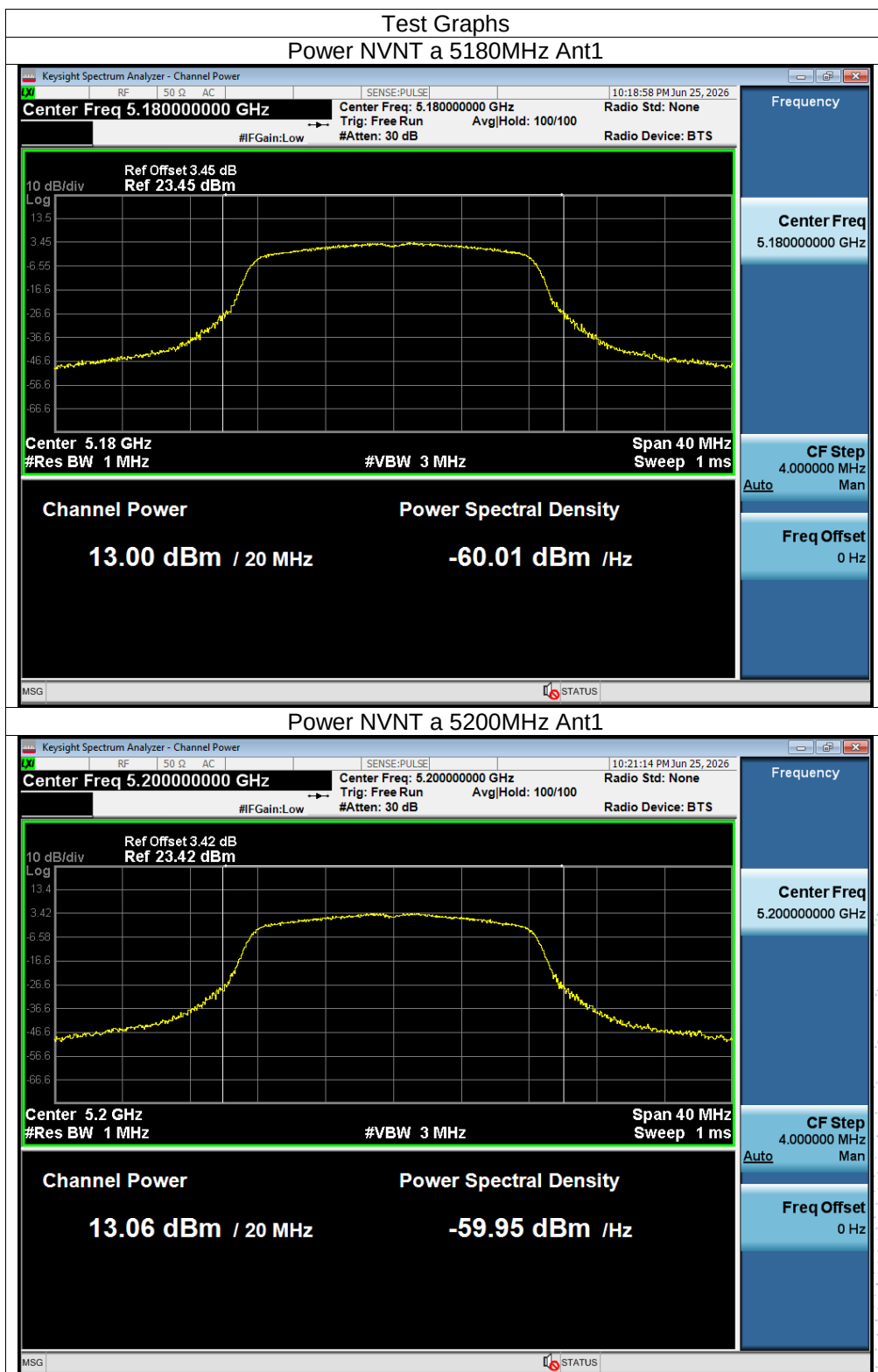
10.4 EUT Operating Conditions

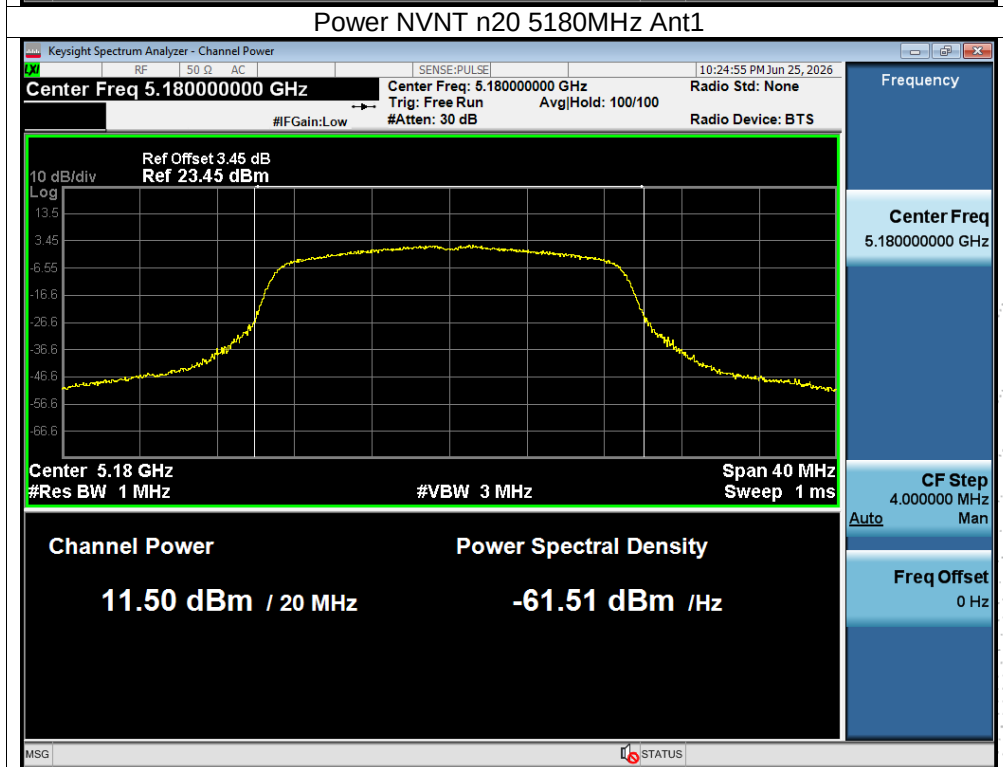
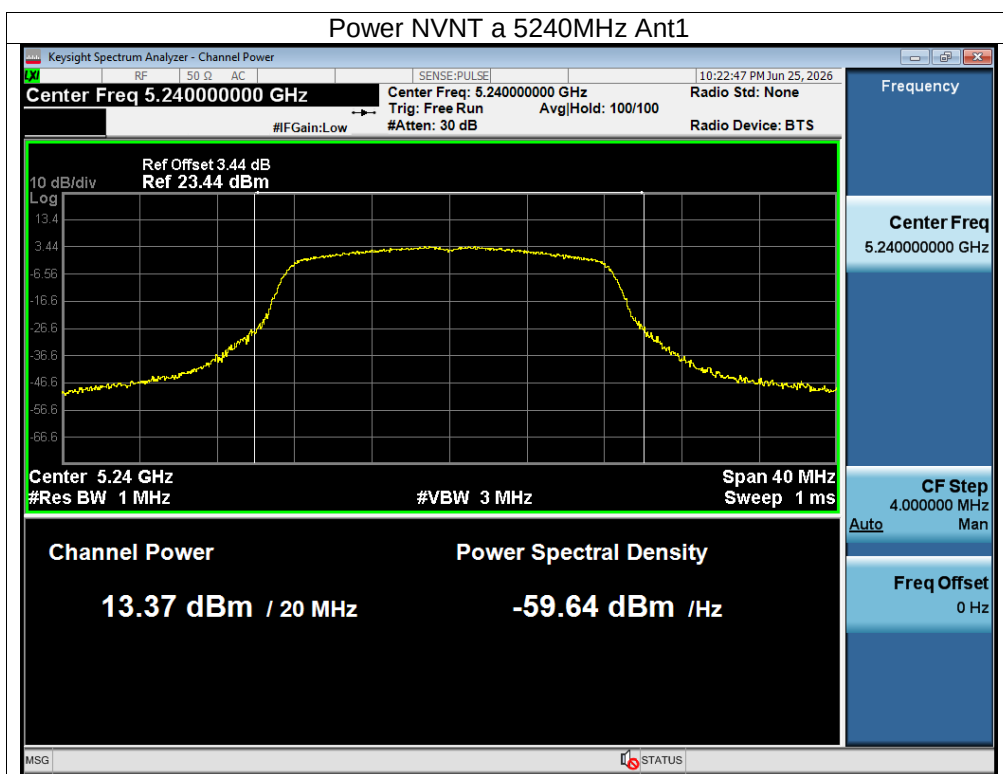
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

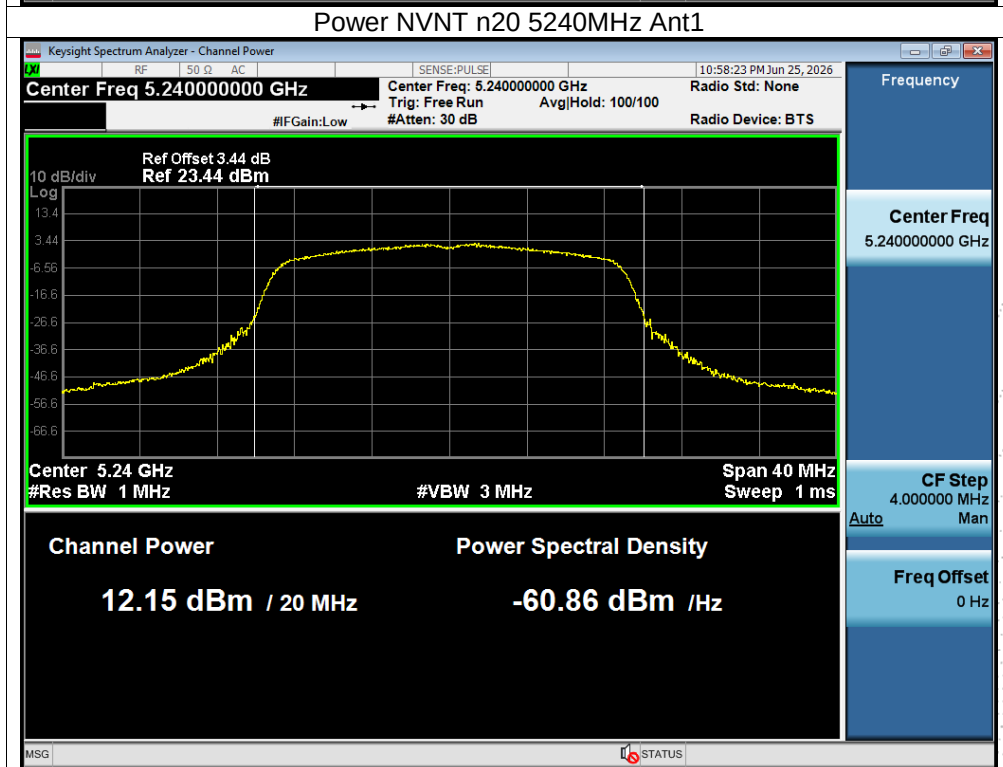
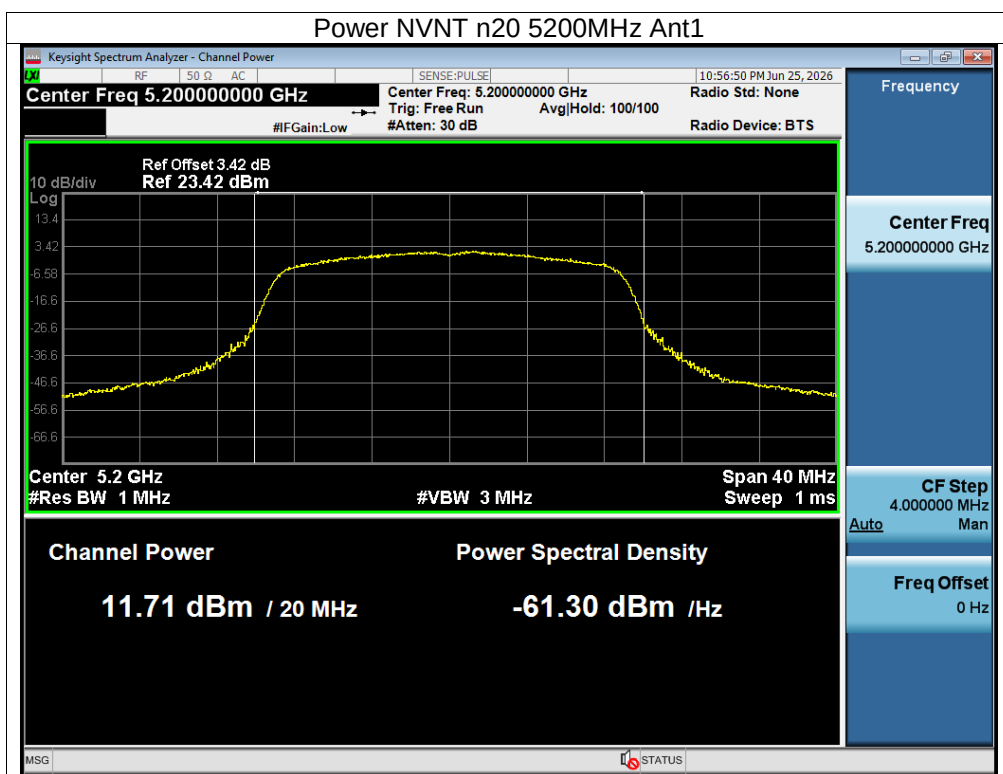
10.5 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	5180-5240MHz		

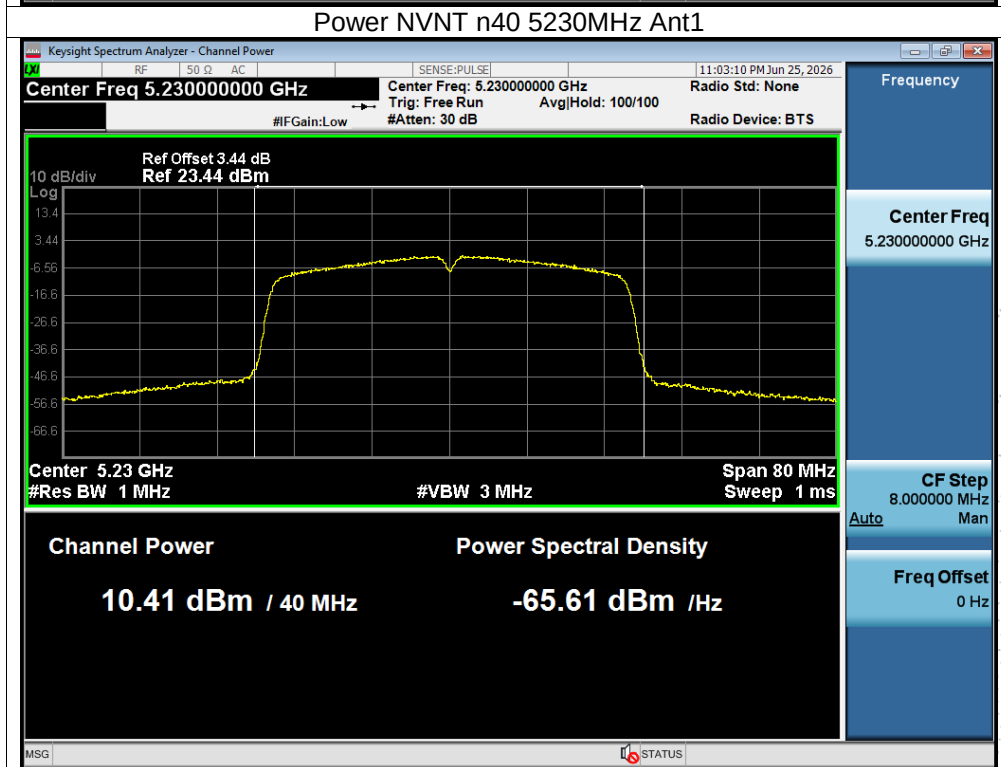
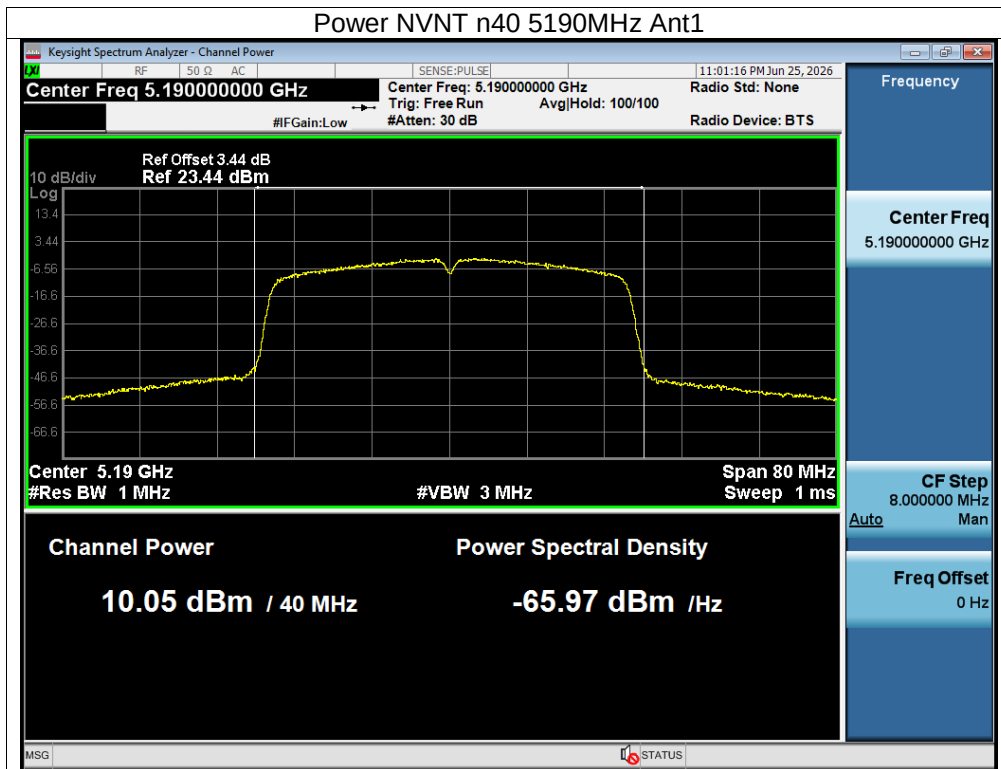
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	13	0.96	13.96	24	Pass
NVNT	a	5200	13.06	0.96	14.02	24	Pass
NVNT	a	5240	13.37	0.96	14.33	24	Pass
NVNT	n20	5180	11.5	1.02	12.52	24	Pass
NVNT	n20	5200	11.71	1.02	12.73	24	Pass
NVNT	n20	5240	12.15	1.02	13.17	24	Pass
NVNT	n40	5190	10.05	1.87	11.92	24	Pass
NVNT	n40	5230	10.41	1.87	12.28	24	Pass







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11. Out Of Band Emissions

11.1 Block Diagram Of Test Setup



11.2 Limit

According to FCC §15.407(b)

Undesirable emission limits. Except as shown in paragraph (b)(10) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz (68.2 dBuV/m@3m).
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz (68.2 dBuV/m@3m).
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz (68.2 dBuV/m@3m).
- (4) For transmitters operating solely in the 5.725-5.850 GHz band:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

11.3 Test Procedure

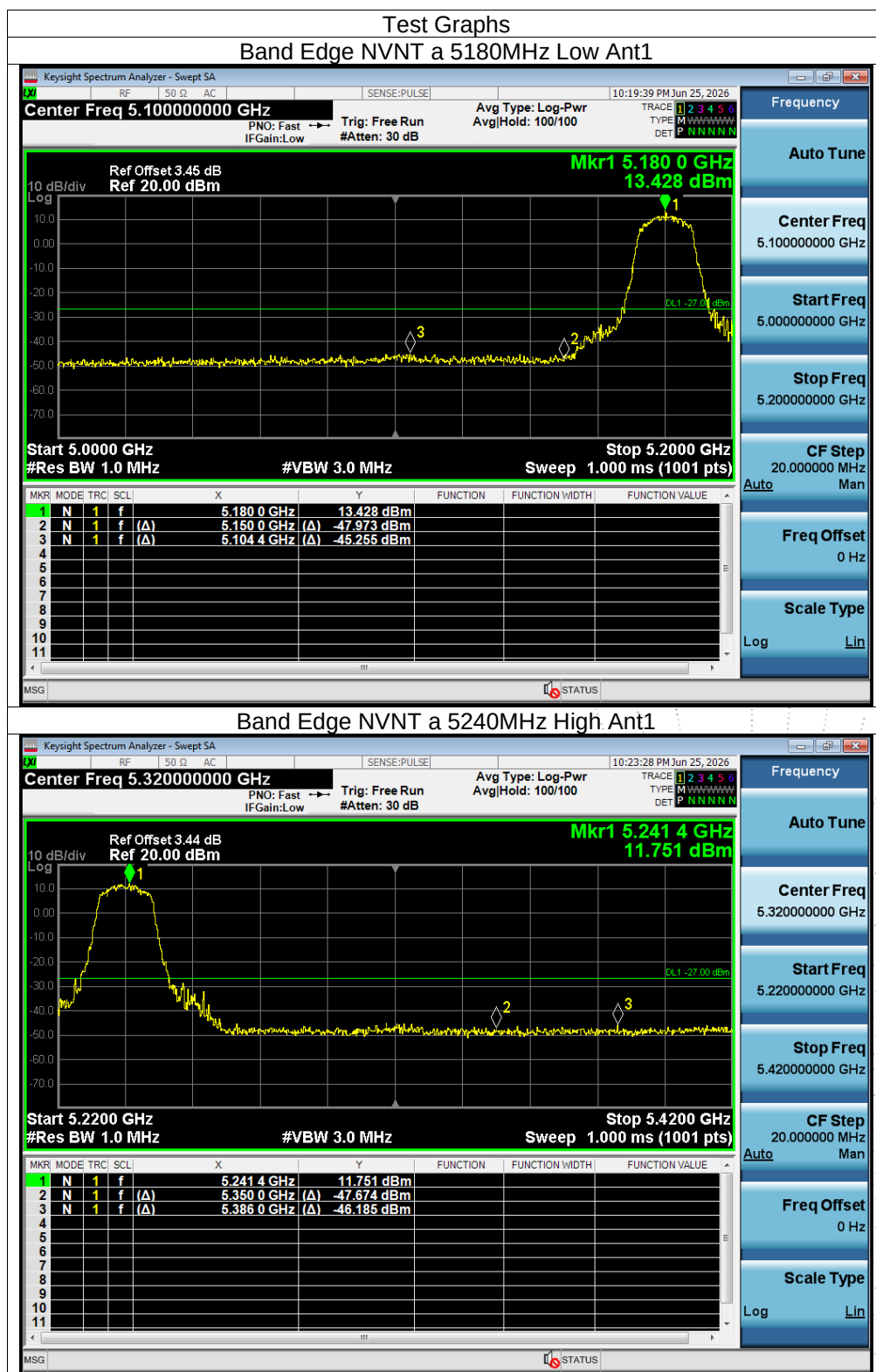
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

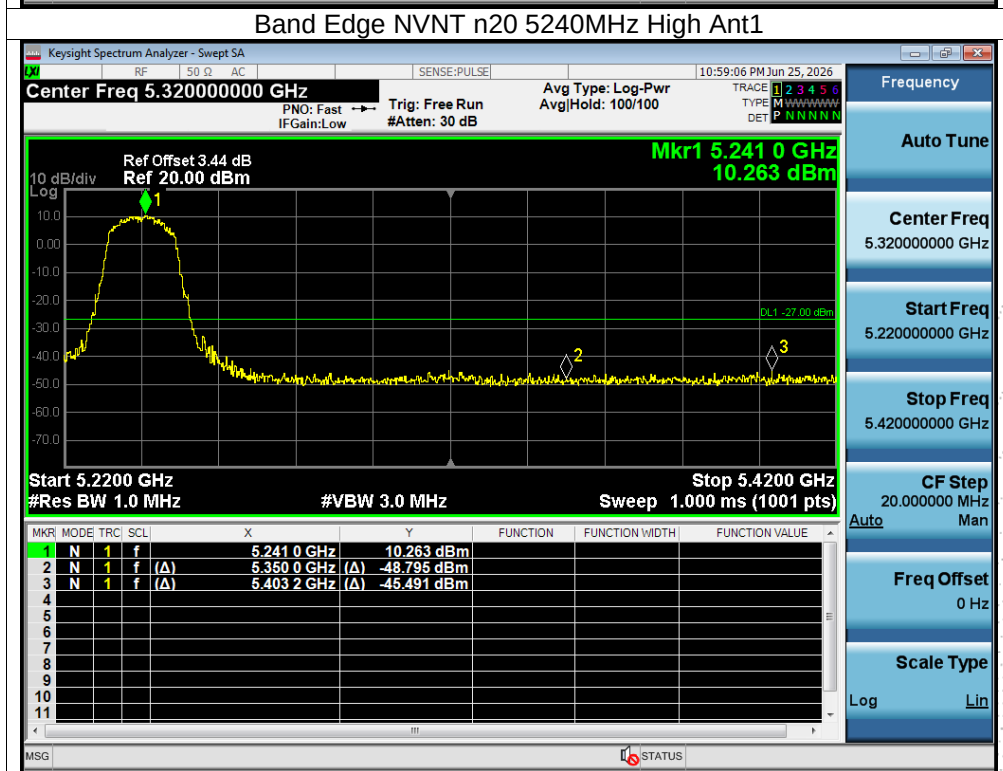
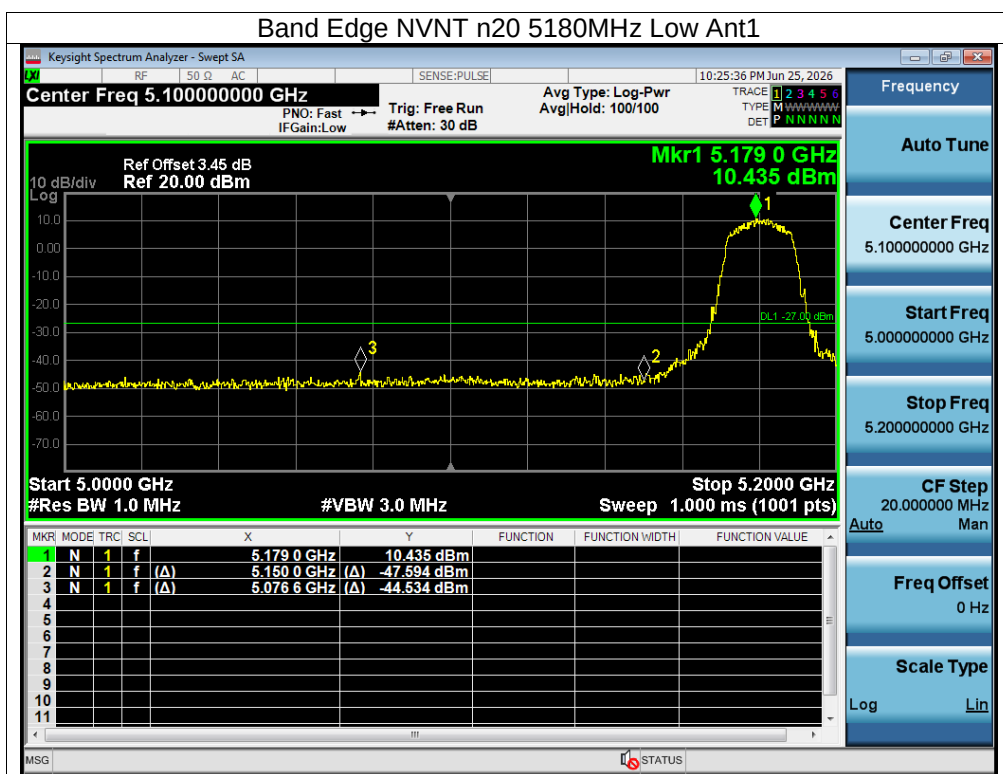
11.4 EUT Operating Conditions

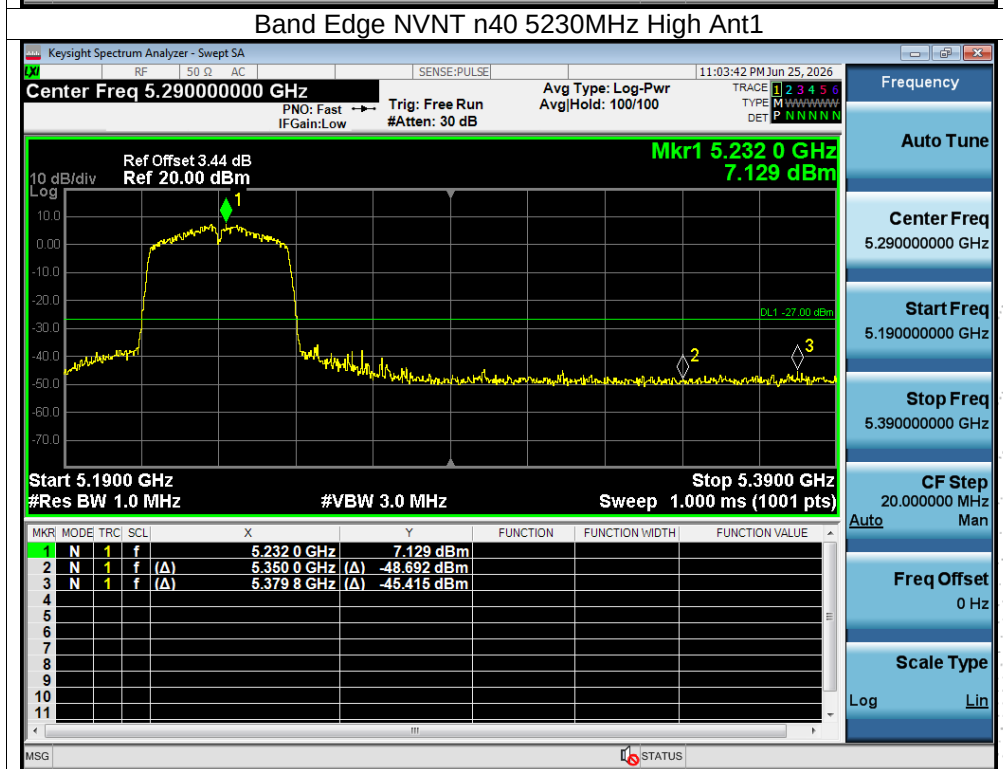
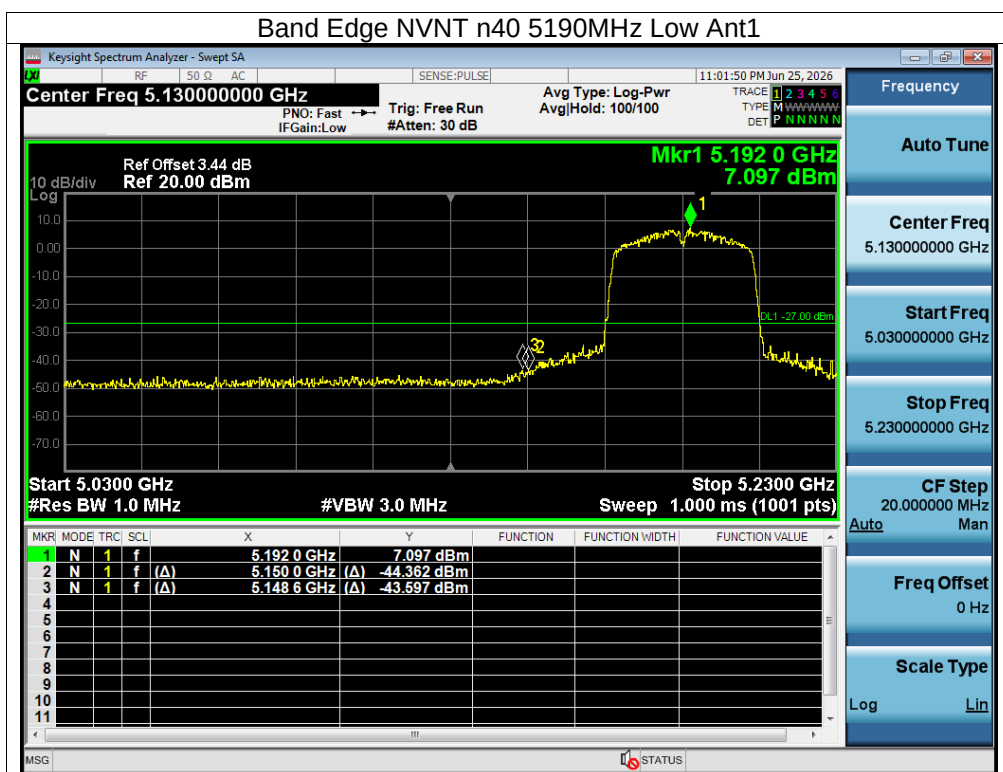
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data

11.5 Test Result

Test Mode:	5180-5240MHz
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12. Spurious RF Conducted Emissions

12.1 Block Diagram Of Test Setup



12.2 Limit

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits: For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

12.3 Test Procedure

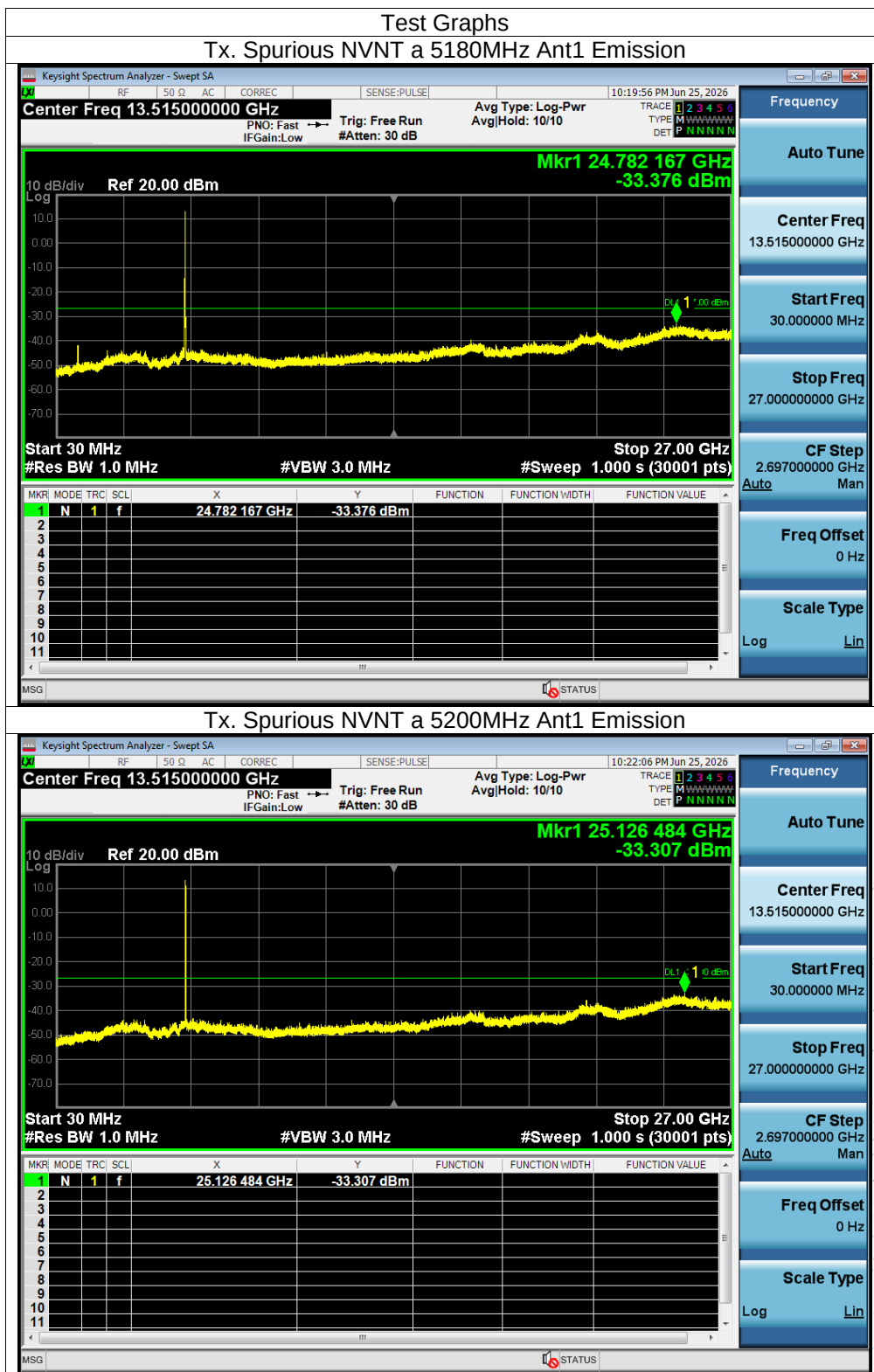
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

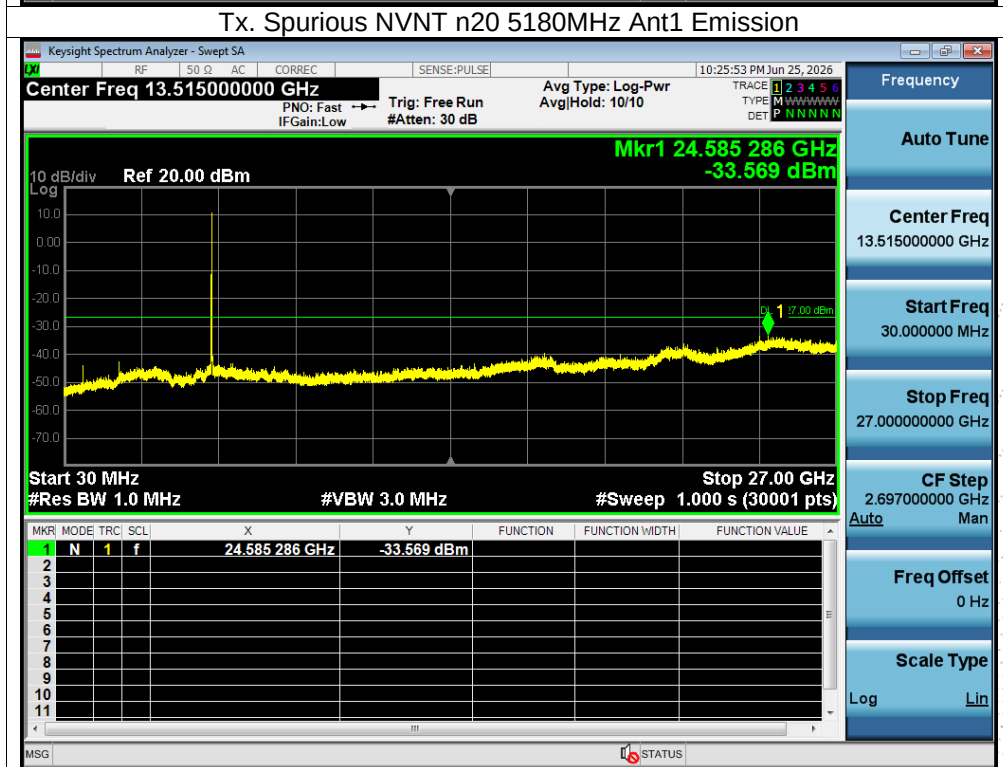
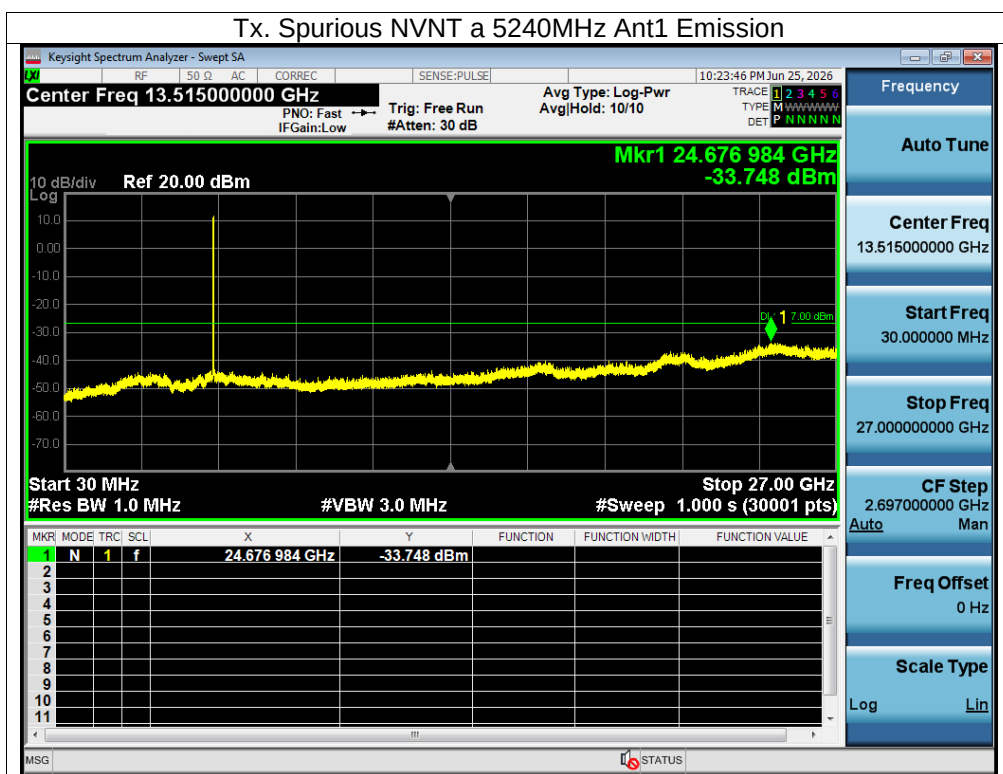
12.4 Test Result

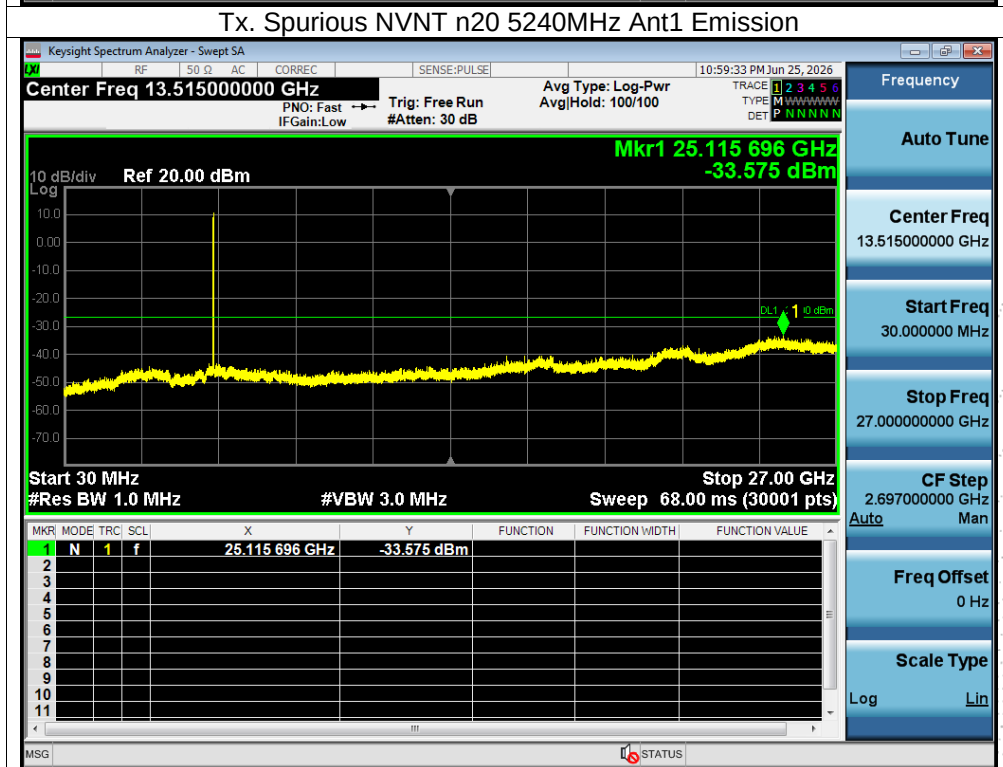
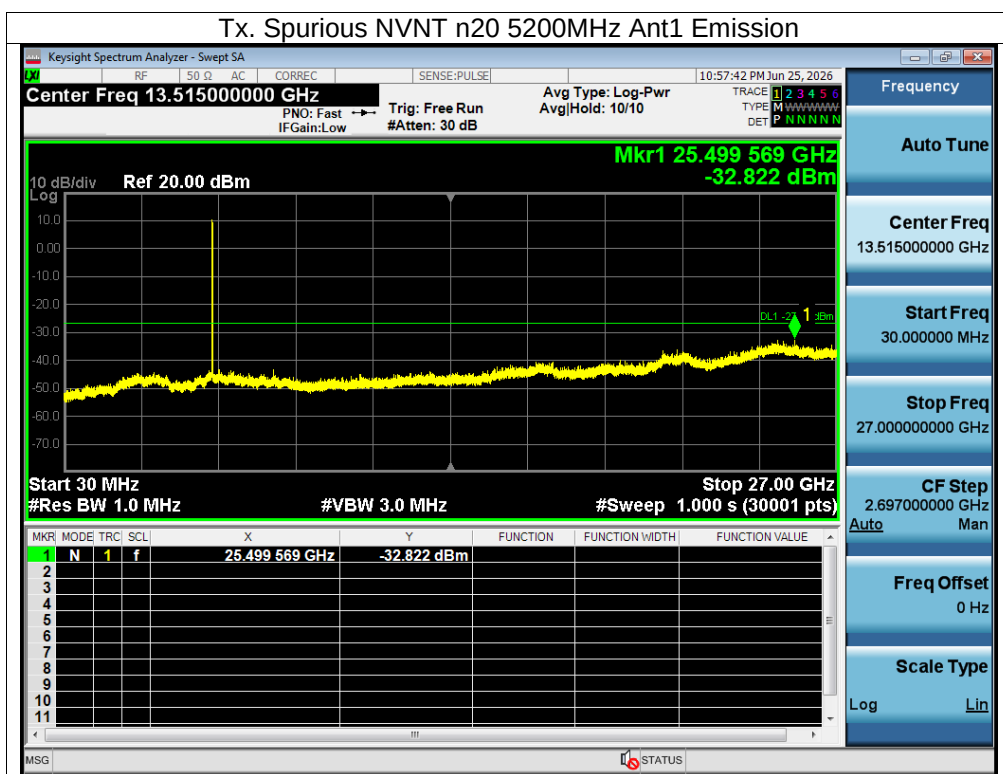
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandedge measurement data.

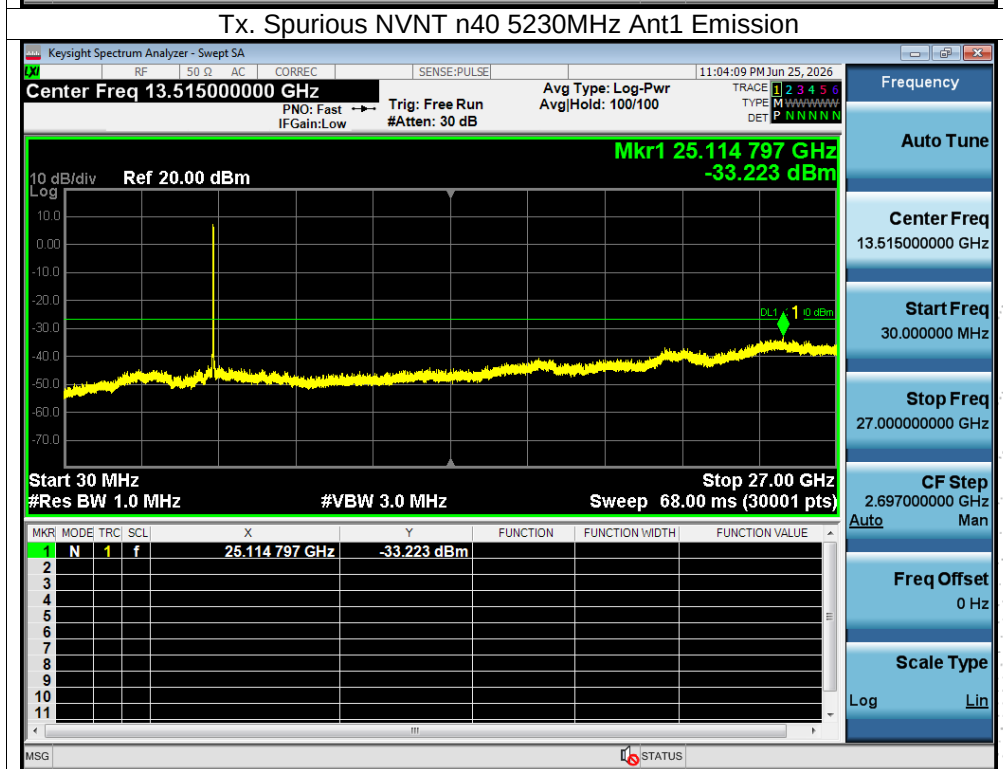
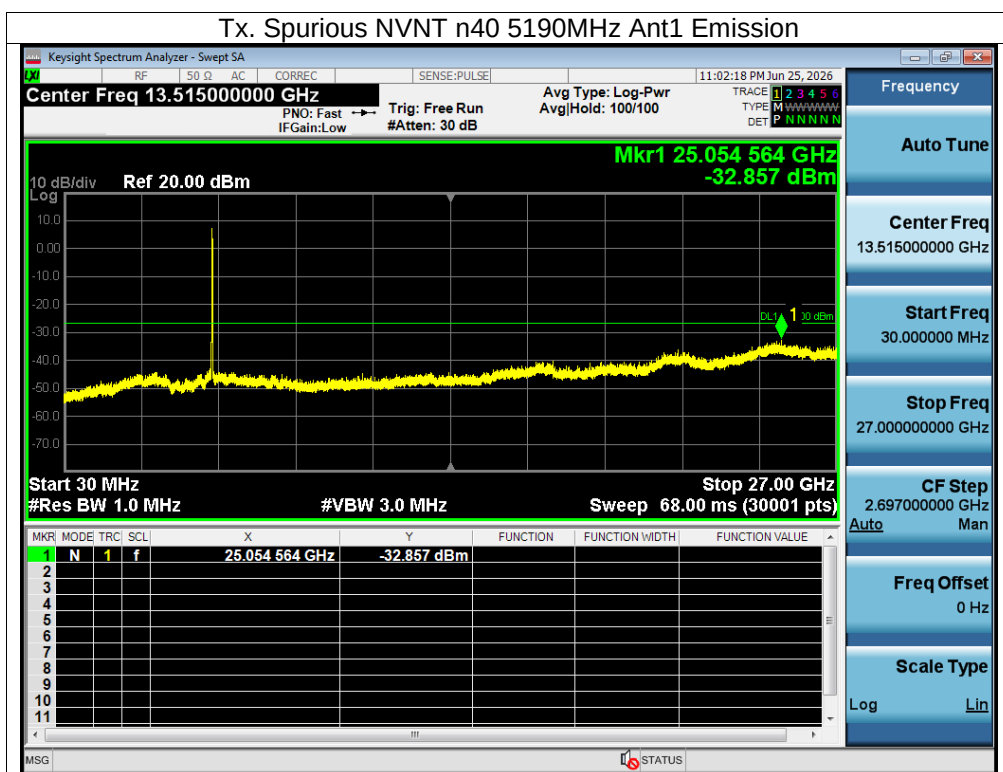
About:26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Test Mode:	5180-5240MHz
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13. Frequency Stability Measurement

13.1 Block Diagram Of Test Setup



13.2 Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification)..

13.3 Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f_c \times 10^6$ ppm and he limit is less than ± 20 ppm (IEEE 802.11n specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C ~ 70°C .

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13.4 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	DC 12V
Test Mode:	TX (5.1G) Mode Frequency U-NII-1 (5180-5240MHz)		

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5180.0188	5180	0.0188	3.6288
		V max (V)	13.80	5180.0128	5180	0.0128	2.4781
		V min (V)	10.20	5180.0169	5180	0.0169	3.2565
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

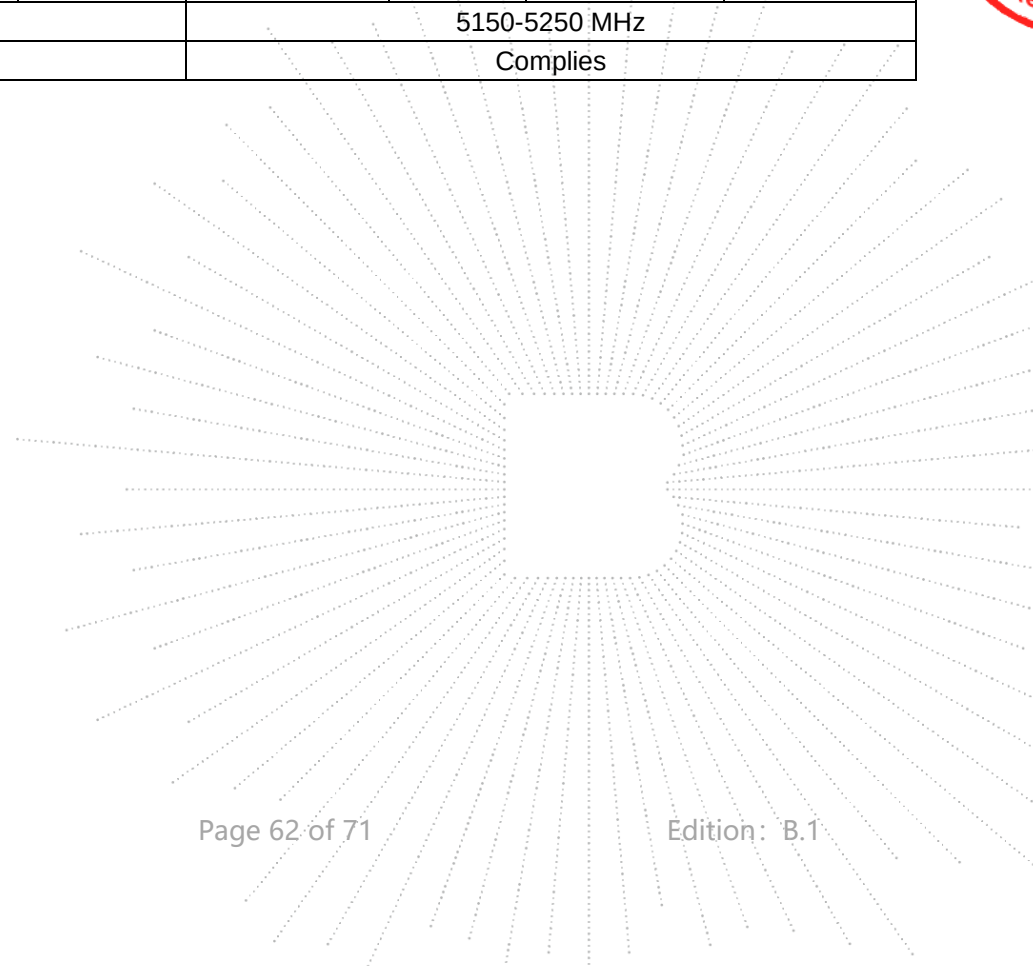
TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5180.0135	5180	0.0135	2.6114
		T (°C)	-10	5180.0081	5180	0.0081	1.5609
		T (°C)	0	5180.0036	5180	0.0036	0.7034
		T (°C)	10	5180.0075	5180	0.0075	1.4468
		T (°C)	20	5180.0006	5180	0.0006	0.1163
		T (°C)	30	5180.0032	5180	0.0032	0.6253
		T (°C)	40	5180.0074	5180	0.0074	1.4298
		T (°C)	50	5180.0094	5180	0.0094	1.8115
		T (°C)	60	5180.0088	5180	0.0088	1.7053
		T (°C)	70	5180.0091	5180	0.0091	1.7539
Limits				5150-5250 MHz			
Result				Complies			

Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5200.0122	5200	0.0122	2.3519
		V max (V)	13.80	5200.0133	5200	0.0133	2.5517
		V min (V)	10.20	5200.0096	5200	0.0096	1.8370
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5200MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5200.00315	5200	0.00315	0.6057
		T (°C)	-10	5200.00100	5200	0.00100	0.1921
		T (°C)	0	5200.00912	5200	0.00912	1.7529
		T (°C)	10	5200.00591	5200	0.00591	1.1358
		T (°C)	20	5200.00807	5200	0.00807	1.5511
		T (°C)	30	5200.01289	5200	0.01289	2.4785
		T (°C)	40	5200.00774	5200	0.00774	1.4888
		T (°C)	50	5200.00275	5200	0.00275	0.5283
		T (°C)	60	5200.00193	5200	0.00193	0.3702
		T (°C)	70	5200.00883	5200	0.00883	1.6985
Limits				5150-5250 MHz			
Result				Complies			



Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	12.00	5240.0007	5240	0.0007	0.1355
		V max (V)	13.80	5240.0007	5240	0.0007	0.1365
		V min (V)	10.20	5240.0074	5240	0.0074	1.4043
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

TEST CONDITIONS				Reference Frequency : 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	12	T (°C)	-20	5240.0079	5240	0.0079	1.5019
		T (°C)	-10	5240.0132	5240	0.0132	2.5200
		T (°C)	0	5240.0005	5240	0.0005	0.0870
		T (°C)	10	5240.0026	5240	0.0026	0.5016
		T (°C)	20	5240.0073	5240	0.0073	1.3839
		T (°C)	30	5240.0122	5240	0.0122	2.3217
		T (°C)	40	5240.0061	5240	0.0061	1.1546
		T (°C)	50	5240.0090	5240	0.0090	1.7239
		T (°C)	60	5240.0121	5240	0.0121	2.3059
		T (°C)	70	5240.0083	5240	0.0083	1.5798
Limits				5150-5250 MHz			
Result				Complies			

14. Duty Cycle Of Test Signal

14.1 Standard Requirement

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

14.2 Formula

Duty Cycle = $T_{on} / (T_{on} + T_{off})$

14.3 Test Procedure

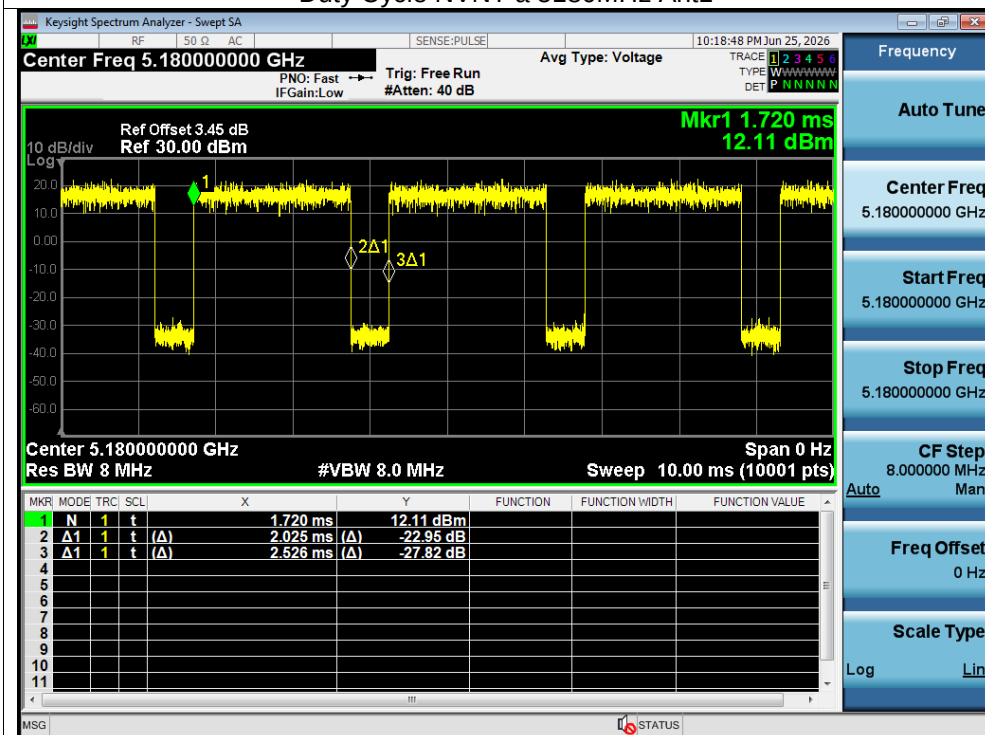
1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

14.4 Test Result

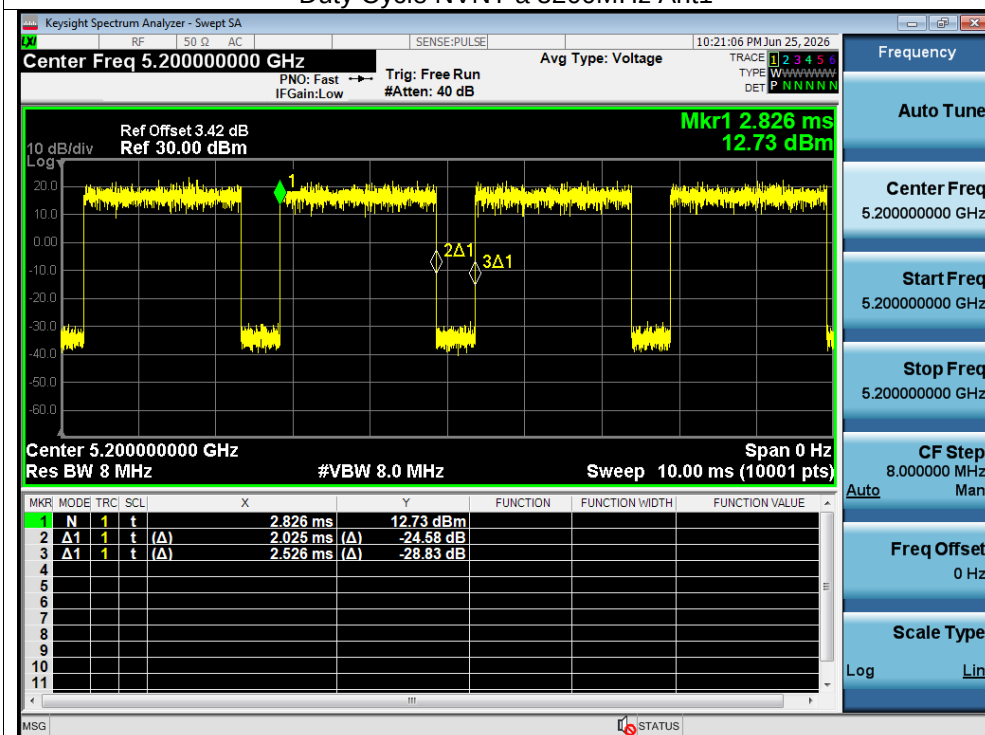
Condition	Mode	Frequency (MHz)	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	a	5180	80.17	0.96	0.49
NVNT	a	5200	80.17	0.96	0.49
NVNT	a	5240	80.17	0.96	0.49
NVNT	n20	5180	79	1.02	0.53
NVNT	n20	5200	79	1.02	0.53
NVNT	n20	5240	79	1.02	0.53
NVNT	n40	5190	65.03	1.87	1.08
NVNT	n40	5230	65.03	1.87	1.08

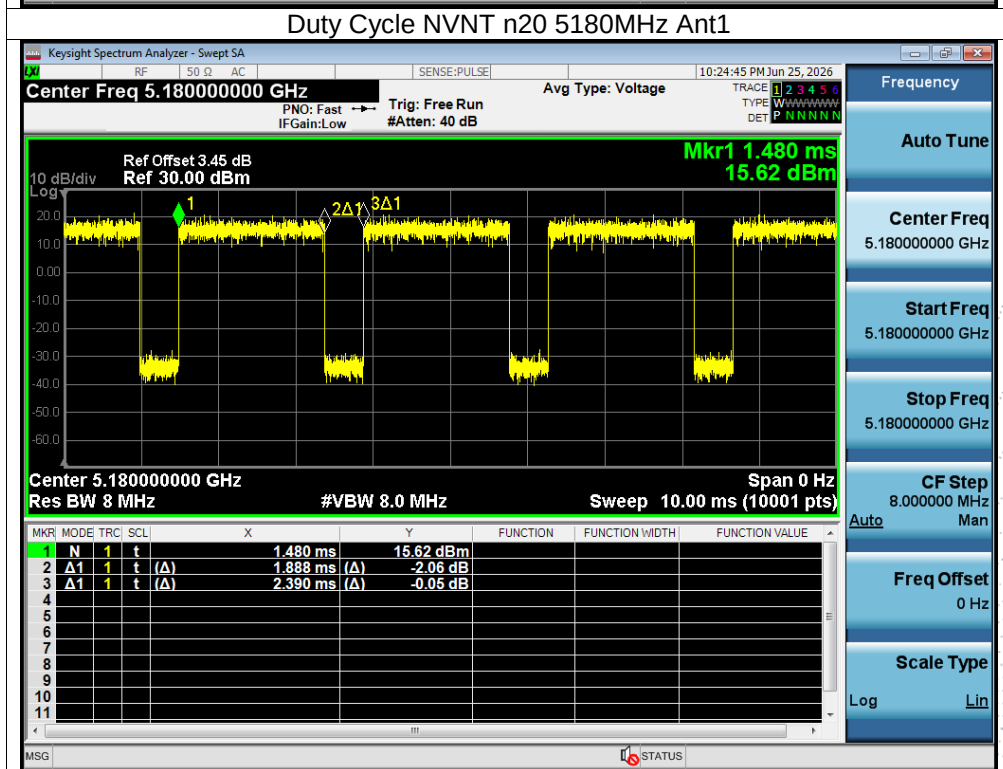
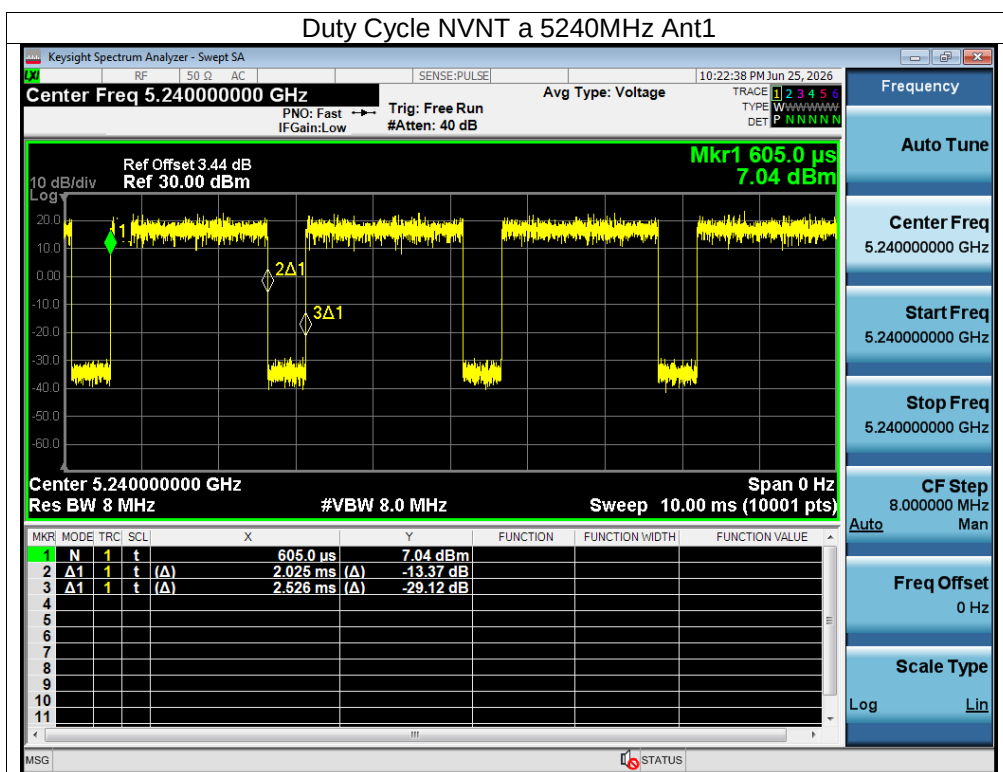
Test Graphs

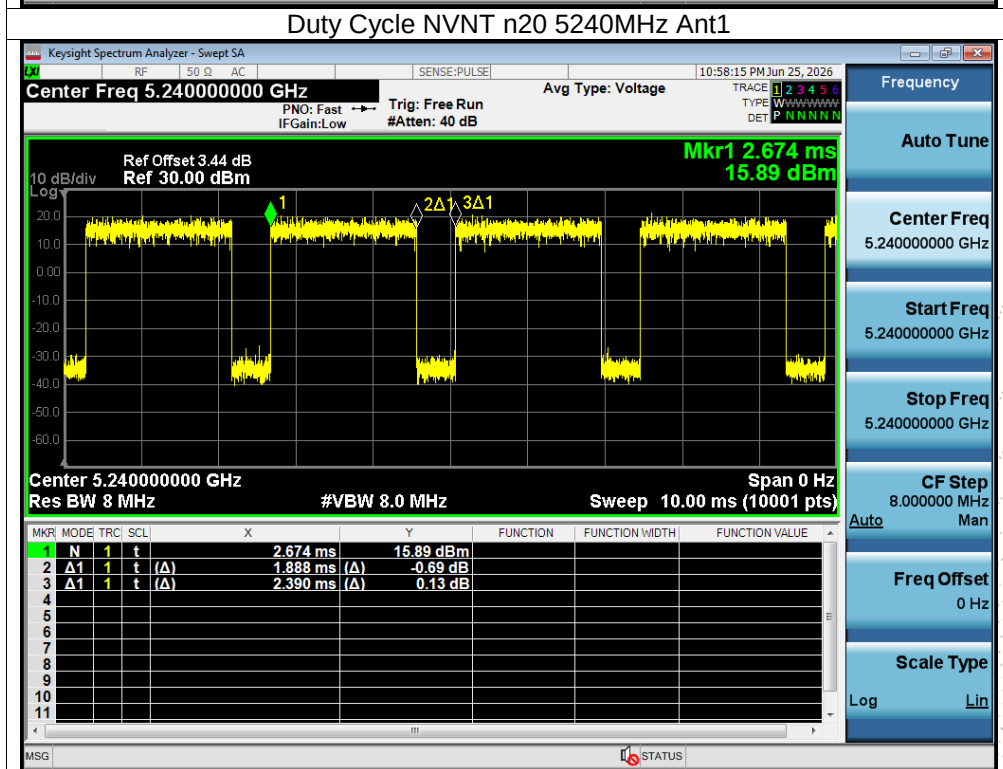
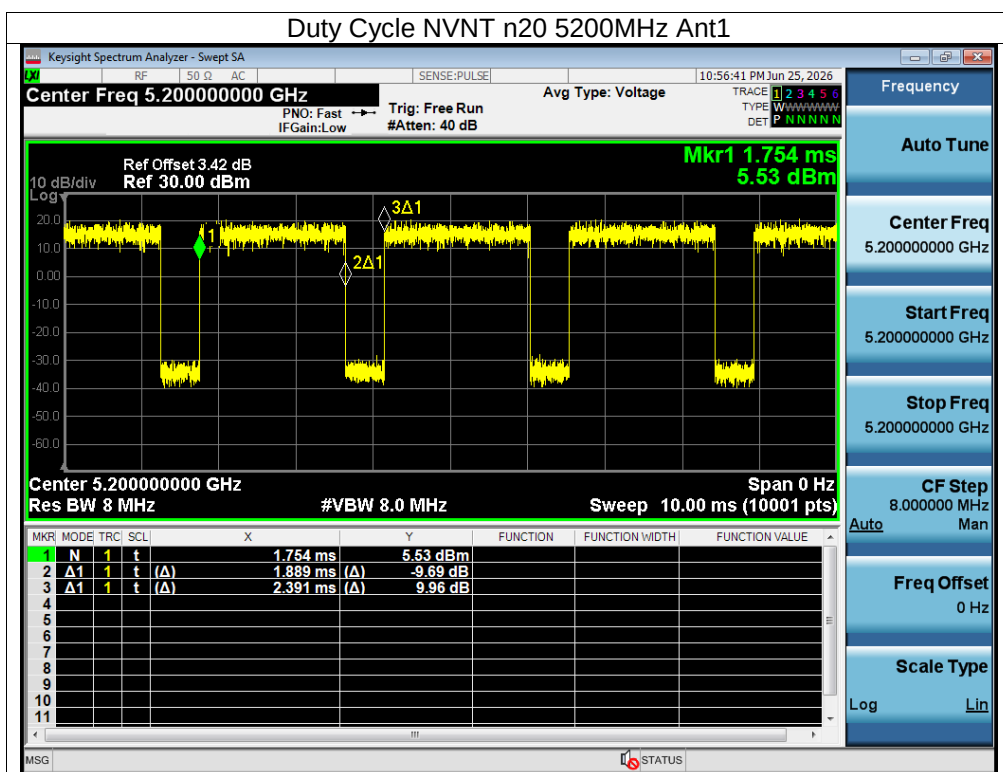
Duty Cycle NVNT a 5180MHz Ant1

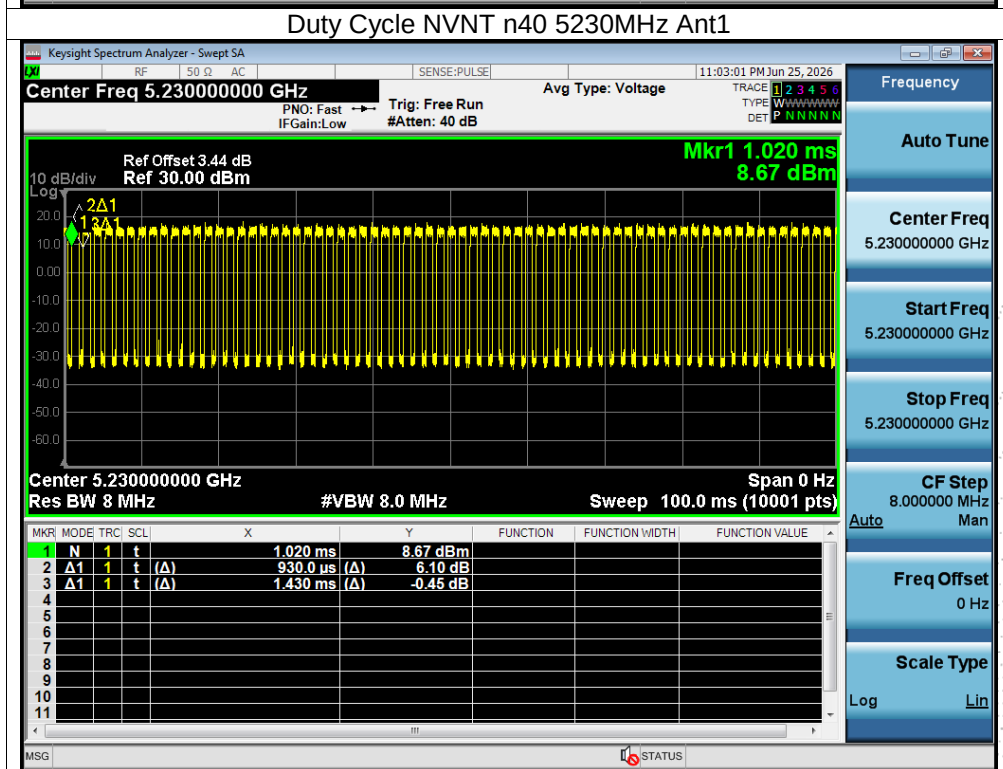
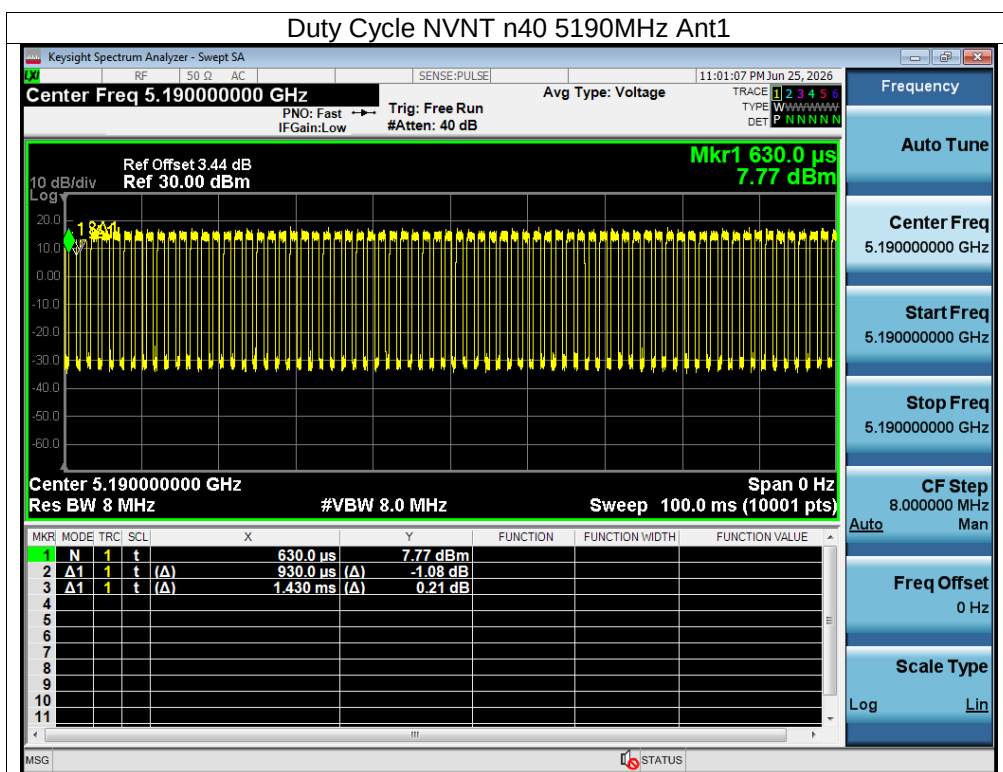


Duty Cycle NVNT a 5200MHz Ant1









15. Antenna Requirement

15.1 Limit

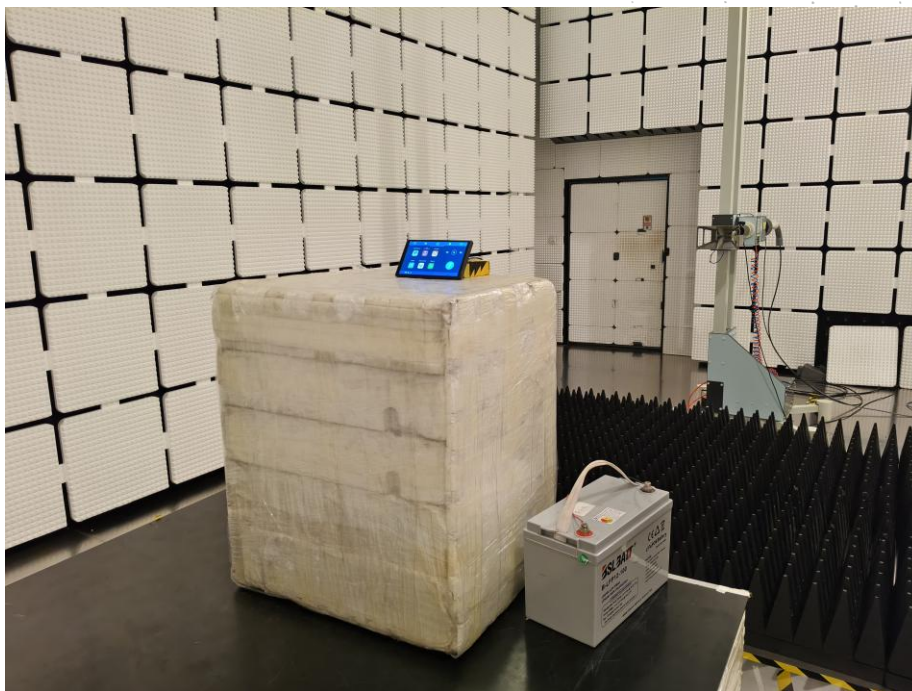
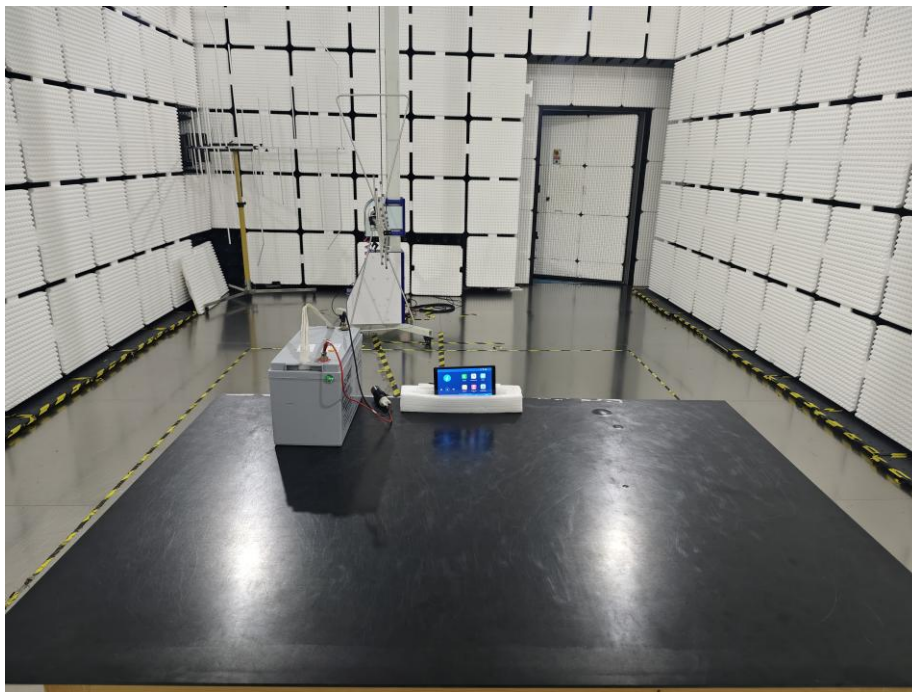
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

15.2 Test Result

The EUT antenna is internal antenna, fulfill the requirement of this section.

16. EUT Test Setup Photographs

Radiated Measurement Photos



STATEMENT

1. The equipment lists are traceable to the International System of Units (SI)
2. The test report can not be partially copied unless prior written approval is issued from our lab.
3. The test report is invalid without the "special seal for inspection and testing".
4. The test report is invalid without the signature of the approver.
5. The test process and test result is only related to the Unit Under Test.
6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.
7. The quality system of our laboratory is in accordance with ISO/IEC 17025:2017.
8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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