

TEST REPORT

Report No.: BCTC2506224080-3E

Applicant: Huizhou Dudu Pet Products Co., Ltd.

Product Name: Automatic Pet Feeder

Test Model: DU-F05V

Tested Date: 2025-06-04 to 2025-07-23

Issued Date: 2025-07-23

Shenzhen BCTC Testing Co., Ltd.



FCC ID: 2A55Q-DU-F05V

Product Name: Automatic Pet Feeder

Trademark: N/A

Model/Type reference: DU-F05V
F05, DU-F05, DU-F05K, DU-F05W, DU-F05A, DU-F05B, DU-F05C, KB-M-03

Prepared For: Huizhou Dudu Pet Products Co., Ltd.

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Manufacturer: Huizhou Dudu Pet Products Co., Ltd.

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Prepared By: Shenzhen BCTC Testing Co., Ltd.

Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Sample Received Date: 2025-06-04

Sample tested Date: 2025-06-04 to 2025-07-23

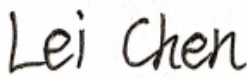
Issue Date: 2025-07-23

Report No.: BCTC2506224080-3E

Test Standards: FCC Part15 15.407
ANSI C63.10-2013
KDB 789033 D02 v02r01

Test Results: PASS

Tested by:



Lei Chen/Project Handler

Approved by:



Zero Zhou/Reviewer

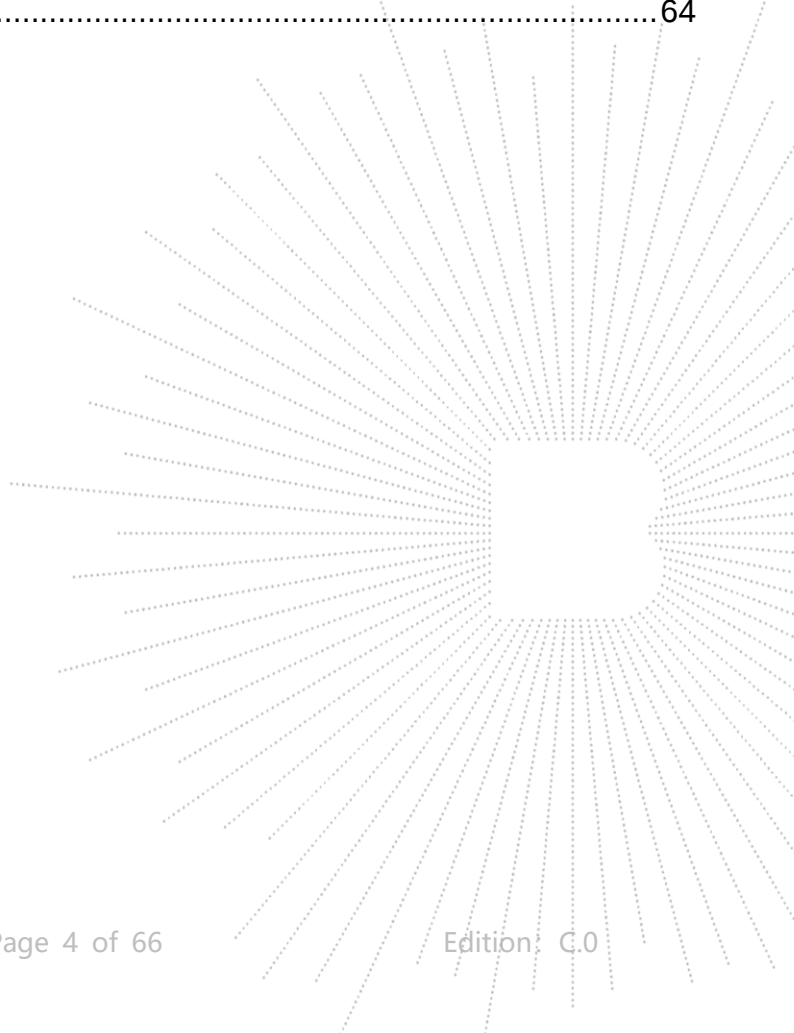
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(Note: N/A Means Not Applicable)



1. Version

Report No.	Issue Date	Description	Approved
BCTC2506224080-3E	2025-07-23	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)(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)	PASS
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(9kHz-30MHz)	U=3.7dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
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°C

4. Product Information And Test Setup

4.1 Product Information

Model/Type reference:	DU-F05V F05, DU-F05, DU-F05K, DU-F05W, DU-F05A, DU-F05B, DU-F05C, KB-M-03
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(20MHz channel bandwidth) 802.11n(40MHz channel bandwidth)
Operation Frequency:	5180-5240MHz for 802.11a/n (HT20); 5190-5230MHz for 802.11n (HT40);
Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15;
Type of Modulation:	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n;
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 ;
Antenna installation:	FPC antenna 3.55 dBi
Antenna Gain:	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 antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 5V from adapter, DC 4.5V(3*1.5V) from battery
Adapter Information:	Model No.: TPA-418N050200UU01 Input: AC 100-240V 50/60Hz 0.3A Output: DC 5V 2A 10W

4.2 Test Setup Configuration

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

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	Automatic Pet Feeder	N/A	DU-F05V	N/A	EUT
E-2	Adapter	N/A	TPA-418N050200UU01	N/A	Auxiliary

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	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

5.1G

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

4.5 Test Mode

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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/ CH48
Mode 2	802.11n40 CH38/ CH46
Mode 3	WIFI Linking

Note:

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

4.6 Table Of Parameters Of Test 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	altobeamWifi ETF_V2.10.124		
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, Zhancheng, 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

A2LA certificate registration number is: CN1212

ISED Registered No.: 23583

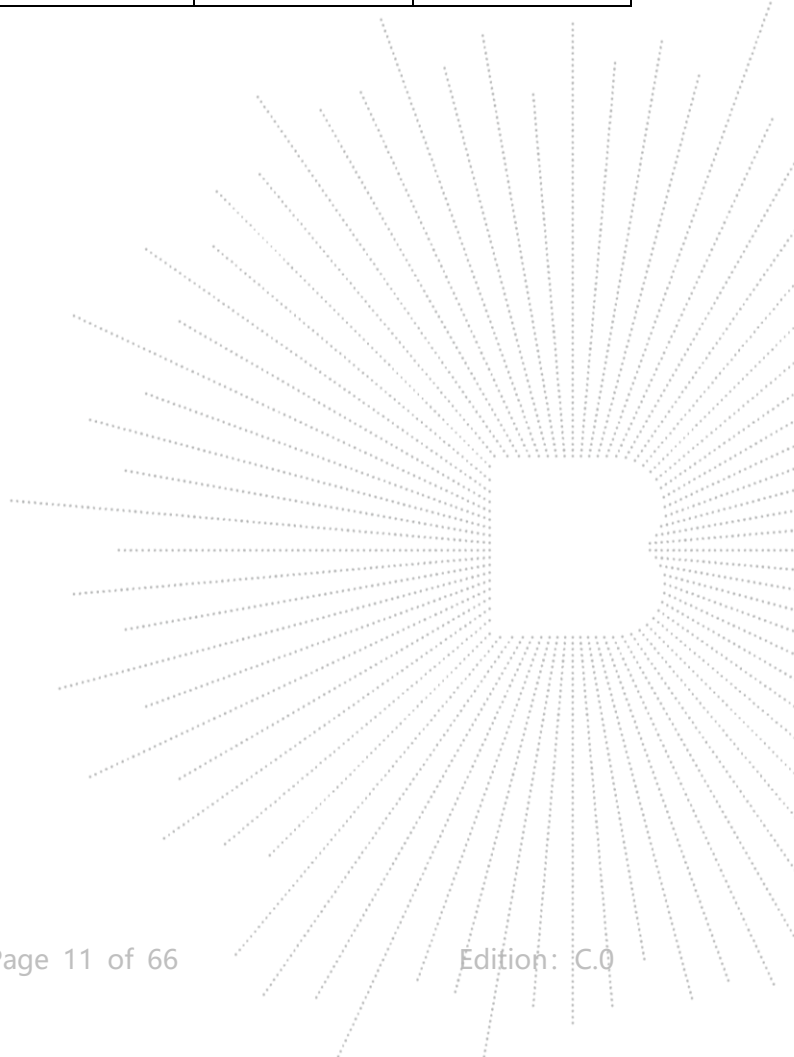
ISED CAB identifier: CN0017

5.2 Test Instrument Used

Conducted Emissions Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Receiver	R&S	ESR3	102075	May 08, 2025	May 07, 2026
LISN	R&S	ENV216	101375	May 14, 2025	May 13, 2026
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\
Pulse limiter	Schwarzbeck	VTSD9561-F	01323	May 14, 2025	May 13, 2026

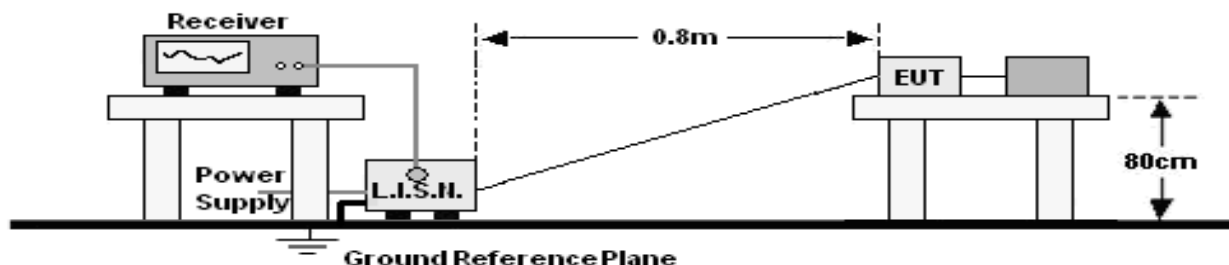
RF Conducted Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Power meter	Keysight	E4419	\	May 14, 2025	May 13, 2026
Power Sensor (AV)	Keysight	E9300A	\	May 14, 2025	May 13, 2026
Signal Analyzer20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 14, 2025	May 13, 2026
Spectrum Analyzer9kHz-40GHz	R&S	FSP40	100363	May 14, 2025	May 13, 2026
Radio frequency control box	MAIWEI	MW100-RFC B	\	\	\
Software	MAIWEI	MTS 8310	\	\	\

Radiated Emissions Test (966 Chamber01)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026
Receiver	R&S	ESR3	102075	May 08, 2025	May 07, 2026
Receiver	R&S	ESR3P	101154	May 14, 2025	May 13, 2026
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 14, 2025	May 13, 2026
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 24, 2025	May 23, 2026
Loop Antenna(9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	May 24, 2025	May 23, 2026
Amplifier	SKET	LAPA_01G18 G-45dB	SK2021040901	May 14, 2025	May 13, 2026
Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 24, 2025	May 23, 2026
Amplifier(18G Hz-40GHz)	MITEQ	TTA1840-35-HG	2034381	May 24, 2025	May 23, 2026
Horn Antenna(18G Hz-40GHz)	Schwarzbeck	BBHA9170	00822	May 24, 2025	May 23, 2026
Spectrum Analyzer9kHz-40GHz	R&S	FSP40	100363	May 14, 2025	May 13, 2026
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:

- *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

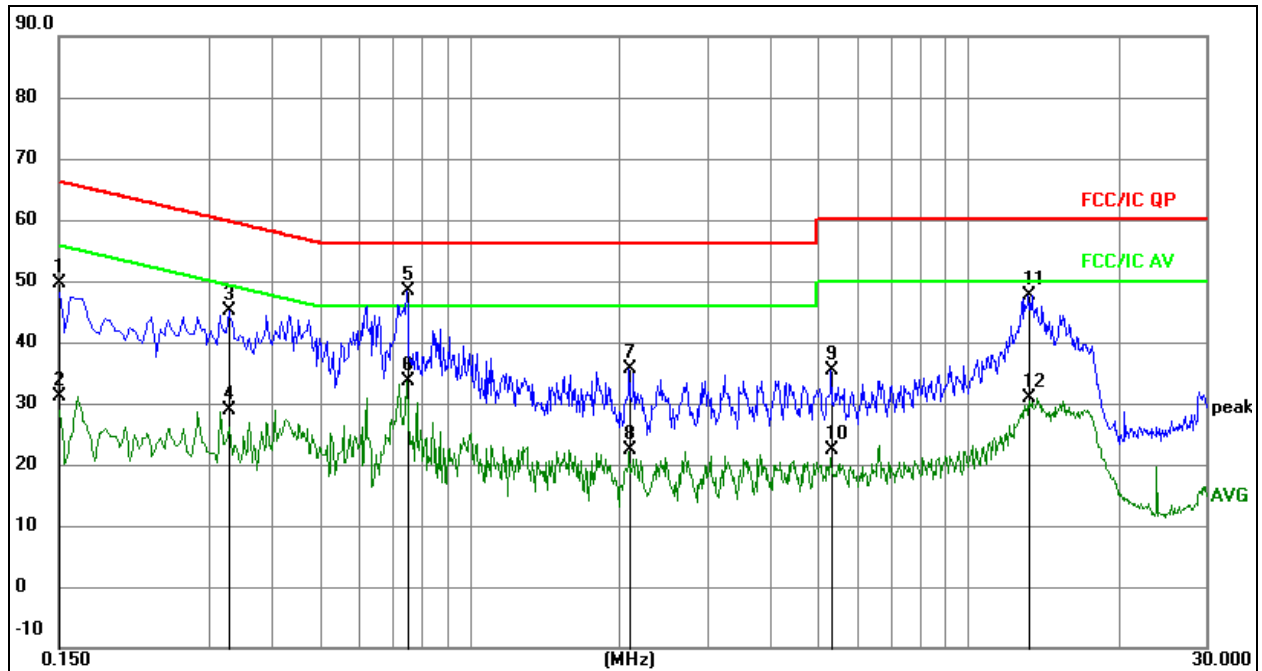
- The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
- The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak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

Temperature:	24.3 °C	Relative Humidity:	53 %
Pressure:	101KPa	Phase :	L
Test Mode:	Mode 3	Test Voltage :	AC 120V/60Hz

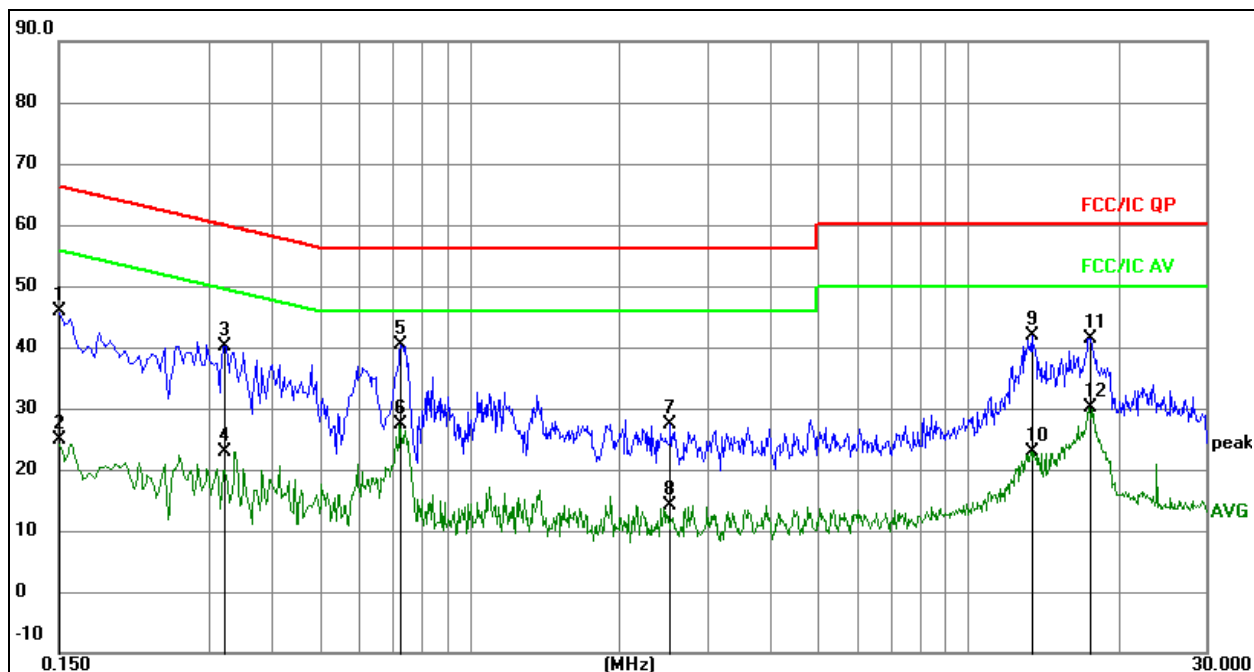


Remark:

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. MHz	Reading Level dB	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1500	29.67	20.04	49.71	66.00	-16.29	QP
2		0.1500	11.03	20.04	31.07	56.00	-24.93	AVG
3		0.3300	24.98	20.05	45.03	59.45	-14.42	QP
4		0.3300	8.84	20.05	28.89	49.45	-20.56	AVG
5	*	0.7485	28.18	20.26	48.44	56.00	-7.56	QP
6		0.7485	13.26	20.26	33.52	46.00	-12.48	AVG
7		2.0895	15.53	20.20	35.73	56.00	-20.27	QP
8		2.0895	2.28	20.20	22.48	46.00	-23.52	AVG
9		5.3295	14.51	20.75	35.26	60.00	-24.74	QP
10		5.3295	1.53	20.75	22.28	50.00	-27.72	AVG
11		13.2630	25.60	22.09	47.69	60.00	-12.31	QP
12		13.2630	8.76	22.09	30.85	50.00	-19.15	AVG

Temperature:	24.3 °C	Relative Humidity:	53 %
Pressure:	101KPa	Phase :	N
Test Mode:	Mode 3	Test Voltage :	AC 120V/60Hz



Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement=Reading Level+ Correct Factor
4. Over1 Measurement-Limit

No.	Mk.	Freq. MHz	Reading Level dB	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1500	25.96	20.04	46.00	66.00	-20.00	QP
2		0.1500	4.80	20.04	24.84	56.00	-31.16	AVG
3		0.3200	20.14	20.05	40.19	59.71	-19.52	QP
4		0.3200	2.93	20.05	22.98	49.71	-26.73	AVG
5	*	0.7273	20.05	20.26	40.31	56.00	-15.69	QP
6		0.7273	7.04	20.26	27.30	46.00	-18.70	AVG
7		2.5266	7.19	20.29	27.48	56.00	-28.52	QP
8		2.5266	-6.10	20.29	14.19	46.00	-31.81	AVG
9		13.4080	19.82	22.12	41.94	60.00	-18.06	QP
10		13.4080	0.81	22.12	22.93	50.00	-27.07	AVG
11		17.4750	18.40	23.03	41.43	60.00	-18.57	QP
12		17.4750	7.12	23.03	30.15	50.00	-19.85	AVG

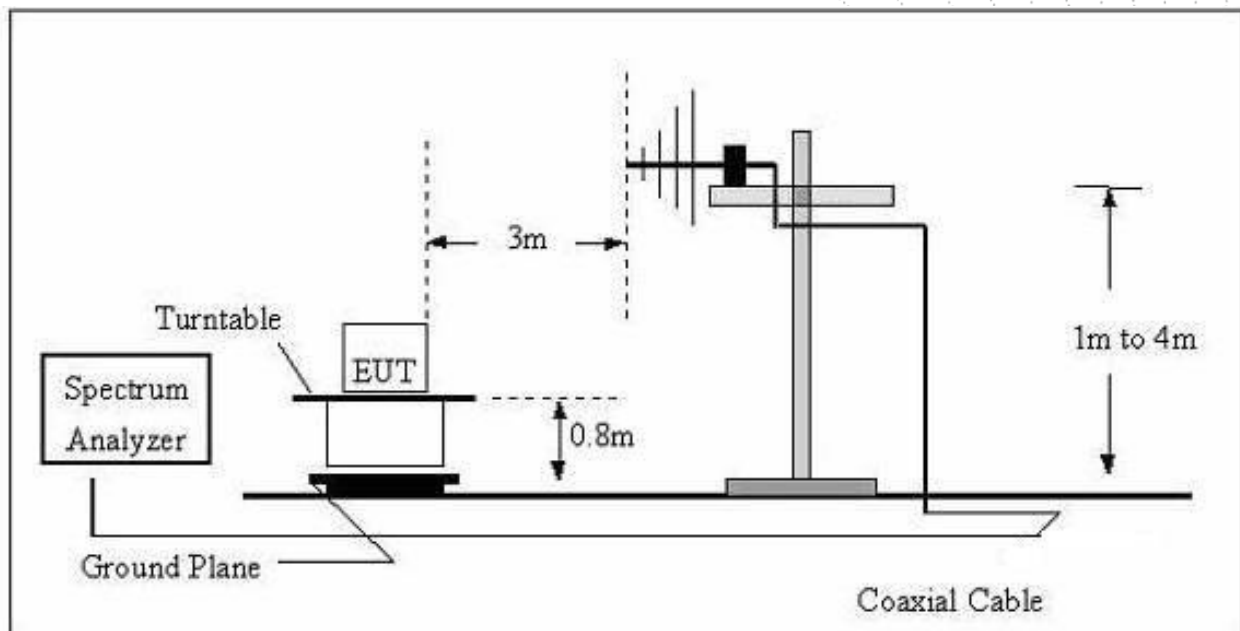
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

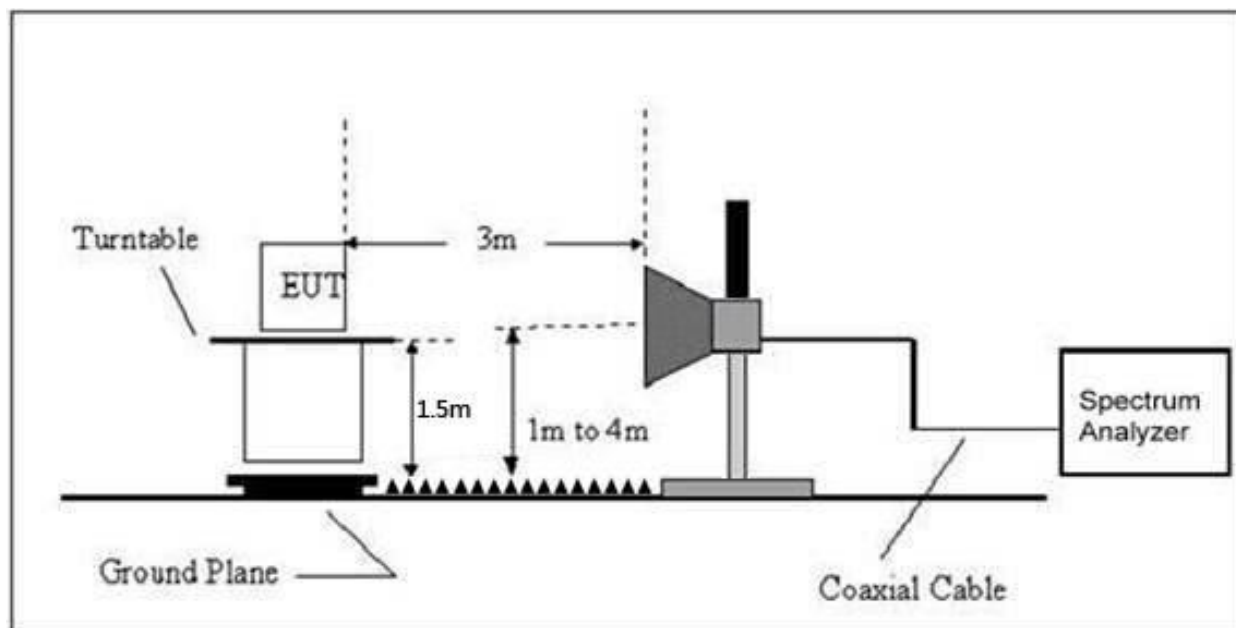
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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 (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:	24.8 °C	Relative Humidity:	54 %
Pressure:	101KPa	Test Voltage:	AC 120V/60Hz
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 = $40 \log (\text{specific distance/test distance})$ (dB);

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

Between 30MHz – 1GHz

Temperature:	24.8 °C	Relative Humidity:	54 %
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 3	Test Voltage :	AC 120V/60Hz

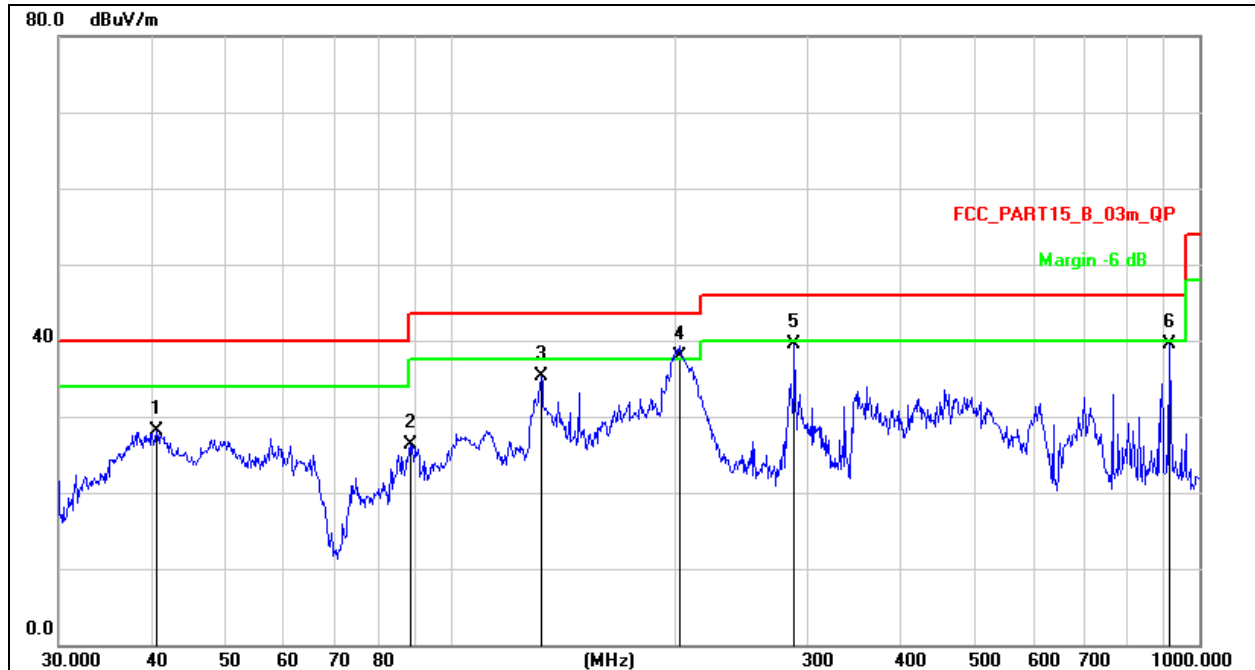


Remark:

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

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		30.0000	48.44	-15.20	33.24	40.00	-6.76	QP
2		195.1365	51.56	-14.71	36.85	43.50	-6.65	QP
3	*	287.9904	52.08	-12.29	39.79	46.00	-6.21	QP
4		336.0352	50.25	-11.06	39.19	46.00	-6.81	QP
5		638.3686	35.97	-5.21	30.76	46.00	-15.24	QP
6		779.6068	40.40	-3.07	37.33	46.00	-8.67	QP

Temperature:	24.8 °C	Relative Humidity:	54 %
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 3	Test Voltage :	AC 120V/60Hz



Remark:

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

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		40.5591	42.05	-13.99	28.06	40.00	-11.94	QP
2		88.3421	41.68	-15.40	26.28	43.50	-17.22	QP
3		132.2206	51.89	-16.59	35.30	43.50	-8.20	QP
4	*	202.1005	52.24	-14.35	37.89	43.50	-5.61	QP
5		287.9904	51.74	-12.29	39.45	46.00	-6.55	QP
6		912.8620	40.60	-1.18	39.42	46.00	-6.58	QP

Between 1GHz – 40GHz

Test Mode:	TX(5.1G) - 802.11a
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Polar	Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector Type
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G							
Vertical	4434.083	71.34	-20.73	50.60	68.20	-17.60	PK
Vertical	4434.083	59.95	-20.73	39.22	54.00	-14.78	AV
Vertical	10360.080	62.50	-9.36	53.14	68.20	-15.06	PK
Vertical	10360.080	49.92	-9.36	40.56	54.00	-13.44	AV
Vertical	15540.089	60.03	-7.84	52.19	74.00	-21.81	PK
Vertical	15540.089	49.81	-7.84	41.97	54.00	-12.03	AV
Horizontal	4434.057	71.53	-20.73	50.80	68.20	-17.40	PK
Horizontal	4434.057	59.19	-20.73	38.46	54.00	-15.54	AV
Horizontal	10360.002	60.65	-9.36	51.29	68.20	-16.91	PK
Horizontal	10360.002	49.59	-9.36	40.23	54.00	-13.77	AV
Horizontal	15540.198	61.09	-7.84	53.25	74.00	-20.75	PK
Horizontal	15540.198	49.23	-7.84	41.39	54.00	-12.61	AV
Middle Channel (5200 MHz)-Above 1G							
Vertical	4592.113	70.73	-20.42	50.31	74.00	-23.69	PK
Vertical	4592.113	59.30	-20.42	38.88	54.00	-15.12	AV
Vertical	10400.154	60.19	-9.30	50.89	68.20	-17.31	PK
Vertical	10400.154	49.21	-9.30	39.91	54.00	-14.09	AV
Vertical	15600.132	63.83	-7.82	56.01	74.00	-17.99	PK
Vertical	15600.132	49.63	-7.82	41.81	54.00	-12.19	AV
Horizontal	4592.176	70.58	-20.42	50.16	74.00	-23.84	PK
Horizontal	4592.176	59.74	-20.42	39.33	54.00	-14.67	AV
Horizontal	10400.130	61.64	-9.30	52.34	68.20	-15.86	PK
Horizontal	10400.130	49.28	-9.30	39.98	54.00	-14.02	AV
Horizontal	15600.111	60.28	-7.82	52.46	74.00	-21.54	PK
Horizontal	15600.111	49.06	-7.82	41.24	54.00	-12.76	AV
High Channel (5240 MHz)-Above 1G							
Vertical	4739.005	71.62	-20.12	51.50	74.00	-22.50	PK
Vertical	4739.005	59.44	-20.12	39.31	54.00	-14.69	AV
Vertical	10480.028	64.10	-9.18	54.92	68.20	-13.28	PK
Vertical	10480.028	49.07	-9.18	39.89	54.00	-14.11	AV
Vertical	15720.130	64.83	-7.78	57.05	74.00	-16.95	PK
Vertical	15720.130	49.08	-7.78	41.30	54.00	-12.70	AV
Horizontal	4739.006	72.43	-20.12	52.31	74.00	-21.69	PK
Horizontal	4739.006	59.09	-20.12	38.97	54.00	-15.03	AV
Horizontal	10480.186	63.69	-9.18	54.51	68.20	-13.69	PK
Horizontal	10480.186	49.23	-9.18	40.05	54.00	-13.95	AV
Horizontal	15720.185	63.96	-7.78	56.18	74.00	-17.82	PK
Horizontal	15720.185	49.74	-7.78	41.96	54.00	-12.04	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
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Polar	Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector Type
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G							
Vertical	4434.084	74.66	-20.73	53.93	68.20	-14.27	PK
Vertical	4434.084	59.60	-20.73	38.87	54.00	-15.13	AV
Vertical	10360.122	60.49	-9.36	51.13	68.20	-17.07	PK
Vertical	10360.122	49.68	-9.36	40.32	54.00	-13.68	AV
Vertical	15540.200	64.40	-7.84	56.56	74.00	-17.44	PK
Vertical	15540.200	49.44	-7.84	41.60	54.00	-12.40	AV
Horizontal	4434.040	74.77	-20.73	54.04	68.20	-14.16	PK
Horizontal	4434.040	59.53	-20.73	38.80	54.00	-15.20	AV
Horizontal	10360.057	61.96	-9.36	52.60	68.20	-15.60	PK
Horizontal	10360.057	49.85	-9.36	40.49	54.00	-13.51	AV
Horizontal	15540.068	63.87	-7.84	56.03	74.00	-17.97	PK
Horizontal	15540.068	49.59	-7.84	41.75	54.00	-12.25	AV
Middle Channel (5200 MHz)-Above 1G							
Vertical	4592.028	74.80	-20.42	54.39	74.00	-19.61	PK
Vertical	4592.028	59.53	-20.42	39.12	54.00	-14.88	AV
Vertical	10400.124	60.83	-9.30	51.53	68.20	-16.67	PK
Vertical	10400.124	49.65	-9.30	40.35	54.00	-13.65	AV
Vertical	15600.161	63.75	-7.82	55.93	74.00	-18.07	PK
Vertical	15600.161	49.69	-7.82	41.87	54.00	-12.13	AV
Horizontal	4592.198	70.07	-20.42	49.65	74.00	-24.35	PK
Horizontal	4592.198	59.56	-20.42	39.14	54.00	-14.86	AV
Horizontal	10400.034	62.61	-9.30	53.31	68.20	-14.89	PK
Horizontal	10400.034	49.14	-9.30	39.84	54.00	-14.16	AV
Horizontal	15600.134	62.28	-7.82	54.46	74.00	-19.54	PK
Horizontal	15600.134	49.42	-7.82	41.60	54.00	-12.40	AV
High Channel (5240 MHz)-Above 1G							
Vertical	4739.015	72.96	-20.12	52.84	74.00	-21.16	PK
Vertical	4739.015	59.48	-20.12	39.35	54.00	-14.65	AV
Vertical	10480.036	64.11	-9.18	54.93	68.20	-13.27	PK
Vertical	10480.036	49.69	-9.18	40.51	54.00	-13.49	AV
Vertical	15720.152	63.60	-7.78	55.82	74.00	-18.18	PK
Vertical	15720.152	49.73	-7.78	41.95	54.00	-12.05	AV
Horizontal	4739.023	73.93	-20.12	53.81	74.00	-20.19	PK
Horizontal	4739.023	59.96	-20.12	39.84	54.00	-14.16	AV
Horizontal	10480.043	62.40	-9.18	53.22	68.20	-14.98	PK
Horizontal	10480.043	49.78	-9.18	40.60	54.00	-13.40	AV
Horizontal	15720.171	60.08	-7.78	52.30	74.00	-21.70	PK
Horizontal	15720.171	49.51	-7.78	41.73	54.00	-12.27	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
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Polar	Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector Type
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5190 MHz)-Above 1G							
Vertical	4434.103	72.01	-20.73	51.28	68.20	-16.92	PK
Vertical	4434.103	59.18	-20.73	38.45	54.00	-15.55	AV
Vertical	10380.120	61.24	-9.33	51.91	68.20	-16.29	PK
Vertical	10380.120	49.05	-9.33	39.72	54.00	-14.28	AV
Vertical	15570.169	62.91	-7.83	55.08	74.00	-18.92	PK
Vertical	15570.169	50.00	-7.83	42.17	54.00	-11.83	AV
Horizontal	4434.154	71.99	-20.73	51.26	74.00	-22.74	PK
Horizontal	4434.154	59.93	-20.73	39.20	54.00	-14.80	AV
Horizontal	10380.124	63.47	-9.33	54.14	68.20	-14.06	PK
Horizontal	10380.124	49.10	-9.33	39.77	54.00	-14.23	AV
Horizontal	15570.005	61.46	-7.83	53.63	74.00	-20.37	PK
Horizontal	15570.005	49.92	-7.83	42.09	54.00	-11.91	AV
Middle Channel (5230 MHz)-Above 1G							
Vertical	4739.047	72.10	-20.12	51.98	68.20	-16.22	PK
Vertical	4739.047	59.38	-20.12	39.26	54.00	-14.74	AV
Vertical	10460.183	63.21	-9.21	54.00	68.20	-14.20	PK
Vertical	10460.183	49.02	-9.21	39.81	54.00	-14.19	AV
Vertical	15690.007	63.90	-7.79	56.11	74.00	-17.89	PK
Vertical	15690.007	49.33	-7.79	41.54	54.00	-12.46	AV
Horizontal	4739.166	72.35	-20.12	52.23	68.20	-15.97	PK
Horizontal	4739.166	59.23	-20.12	39.11	54.00	-14.89	AV
Horizontal	10460.193	62.88	-9.21	53.67	68.20	-14.53	PK
Horizontal	10460.193	49.65	-9.21	40.44	54.00	-13.56	AV
Horizontal	15690.154	64.75	-7.79	56.96	74.00	-17.04	PK
Horizontal	15690.154	49.70	-7.79	41.91	54.00	-12.09	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.

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

Test mode: 802.11a Frequency(MHz): 5180

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
5150.27	H	54.68	74	42.33	54
5149.85	V	51.39	74	40.14	54

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 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 $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ KHz})$ 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 $10\log(1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ 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 $RBW=100 \text{ KHz}$ is available on nearly all spectrum analyzers.

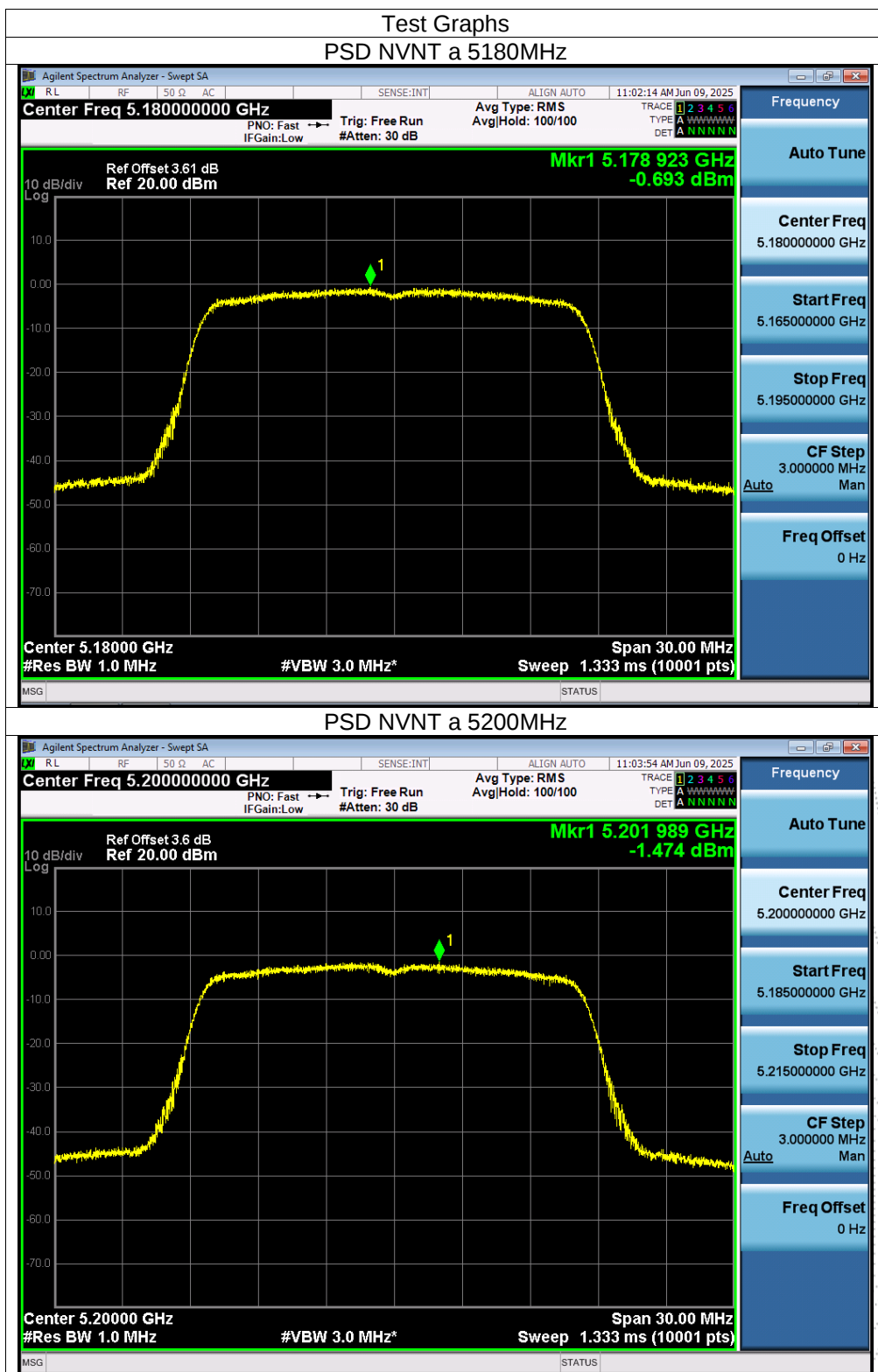
8.4 EUT Operating Conditions

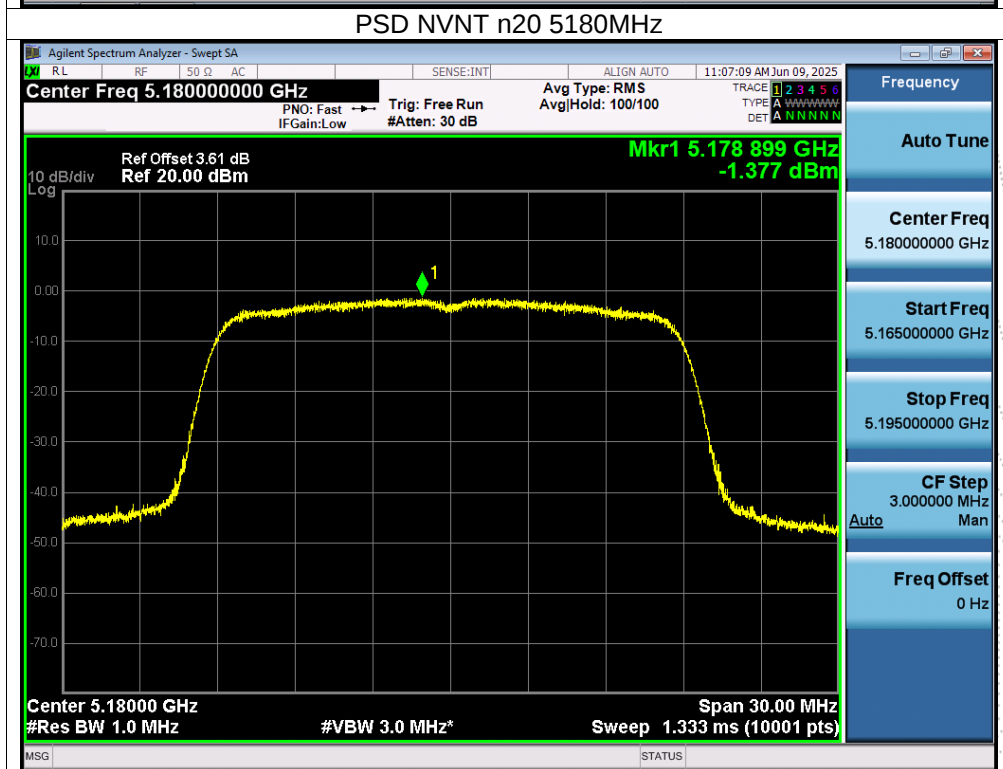
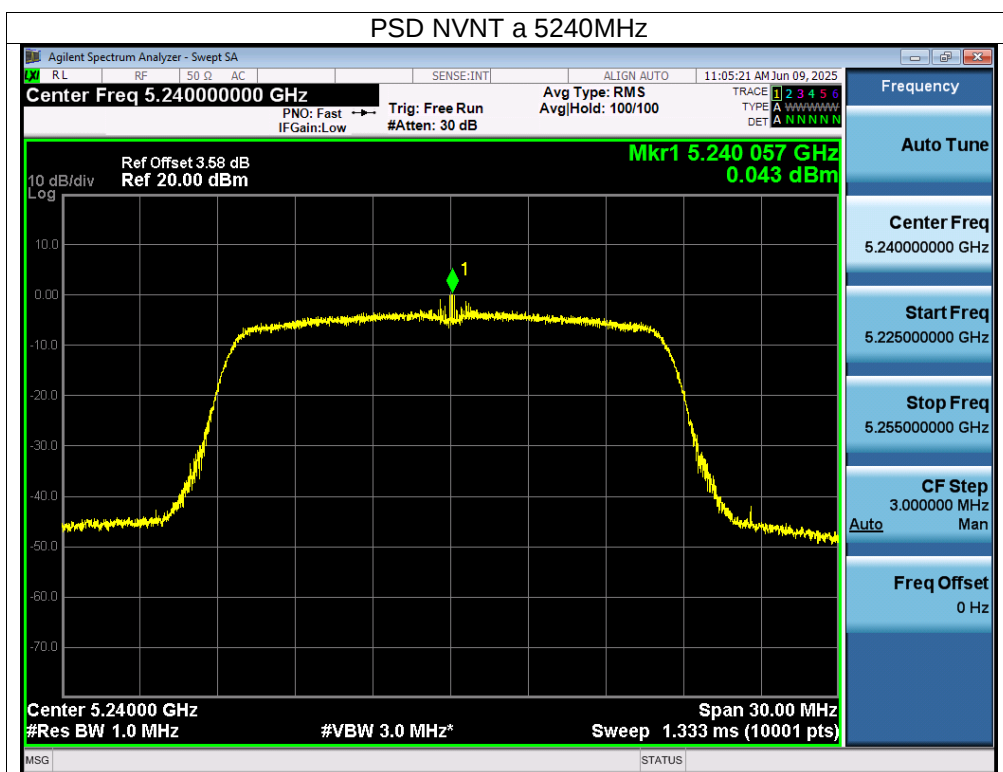
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

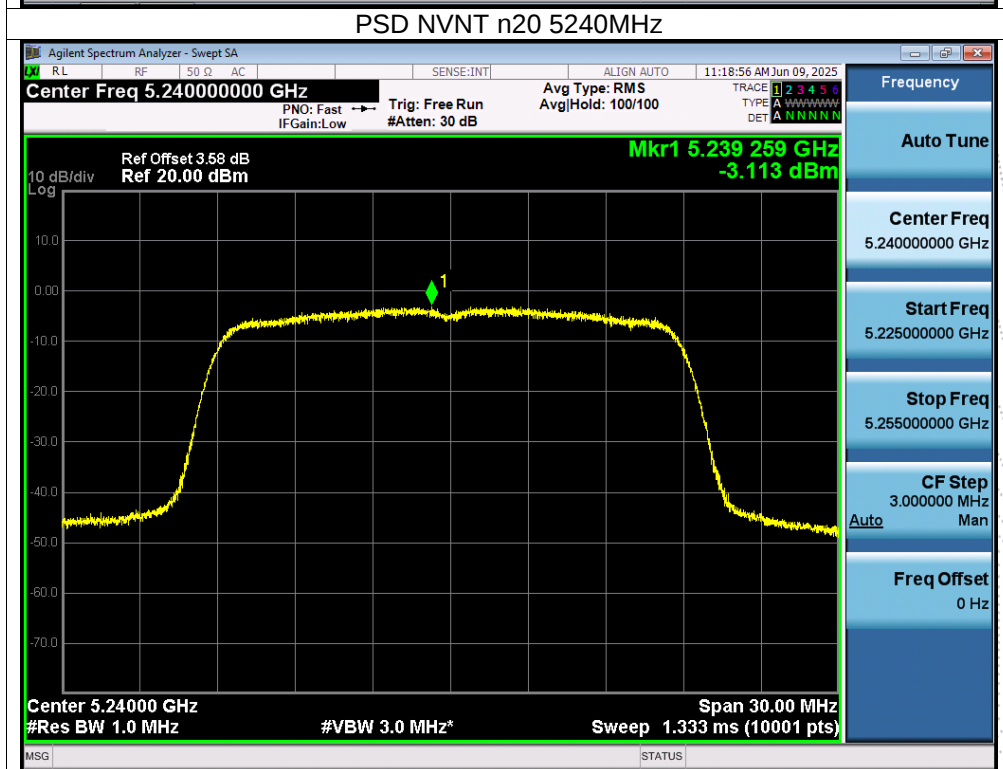
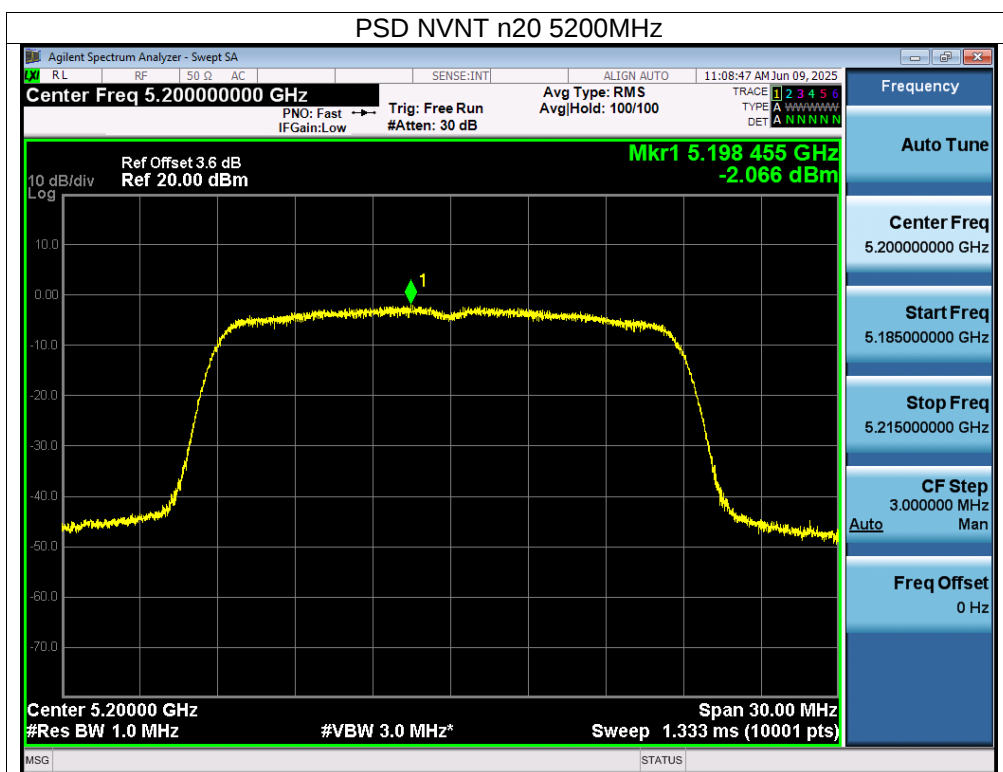
8.5 Test Result

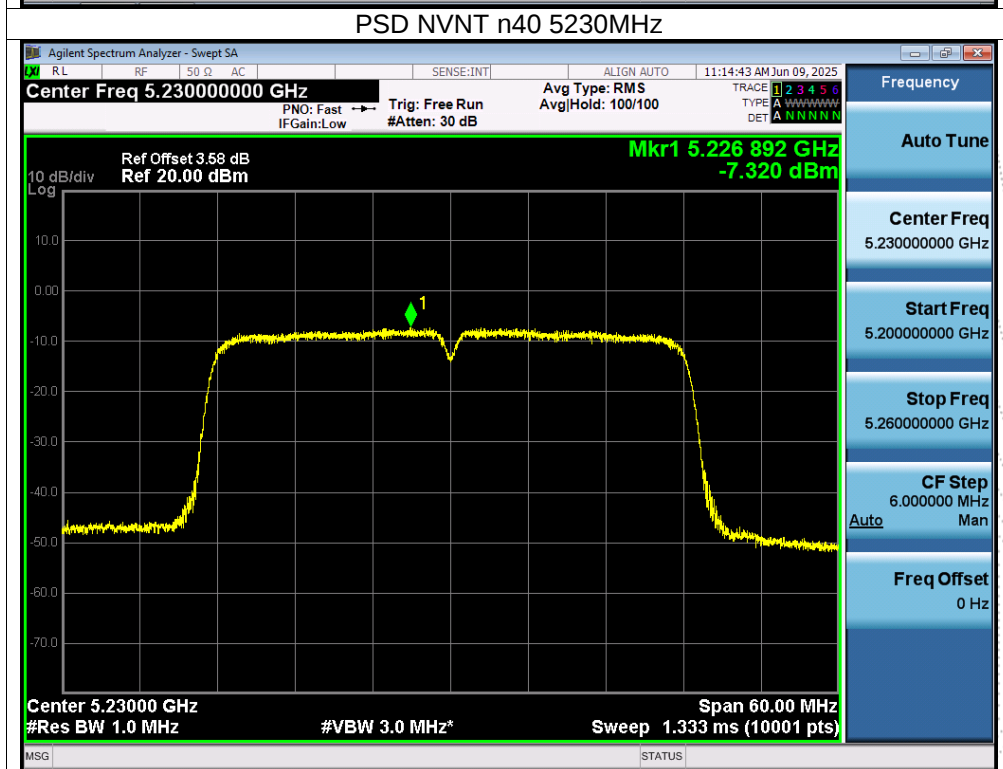
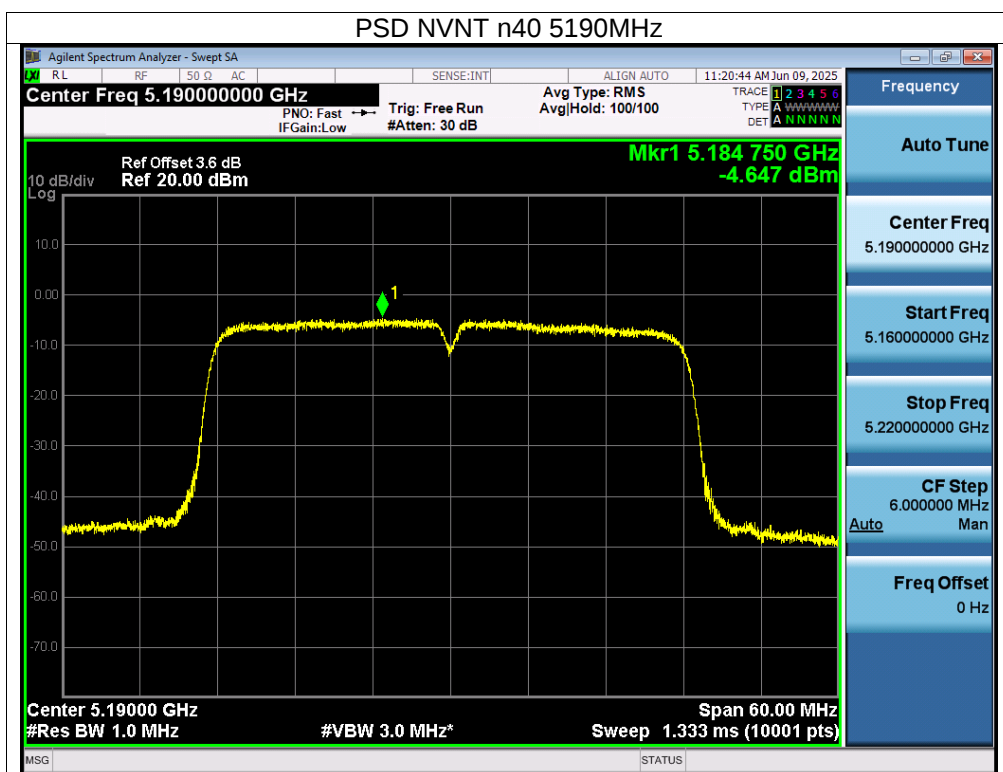
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 4.5V
Test Mode:	(U-NII-1) 5180MHz-5240MHz		

Condition	Mode	Frequency (MHz)	Conducted PSD (dBm/1MHz)	Limit (dBm/1MHz)	Verdict
NVNT	a	5180	-0.69	11	Pass
NVNT	a	5200	-1.47	11	Pass
NVNT	a	5240	0.04	11	Pass
NVNT	n20	5180	-1.38	11	Pass
NVNT	n20	5200	-2.07	11	Pass
NVNT	n20	5240	-3.11	11	Pass
NVNT	n40	5190	-4.65	11	Pass
NVNT	n40	5230	-7.32	11	Pass



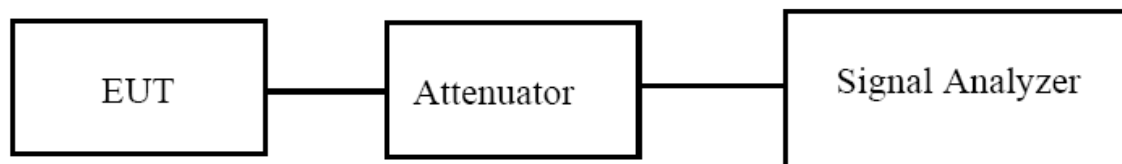






9. 26dB & 6dB & 99% Emission Bandwidth

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.
(6dB bandwidth)>500kHz

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 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:

- 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.

6dB

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times RBW$.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.

6. Allow the trace to stabilize.

7. 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.

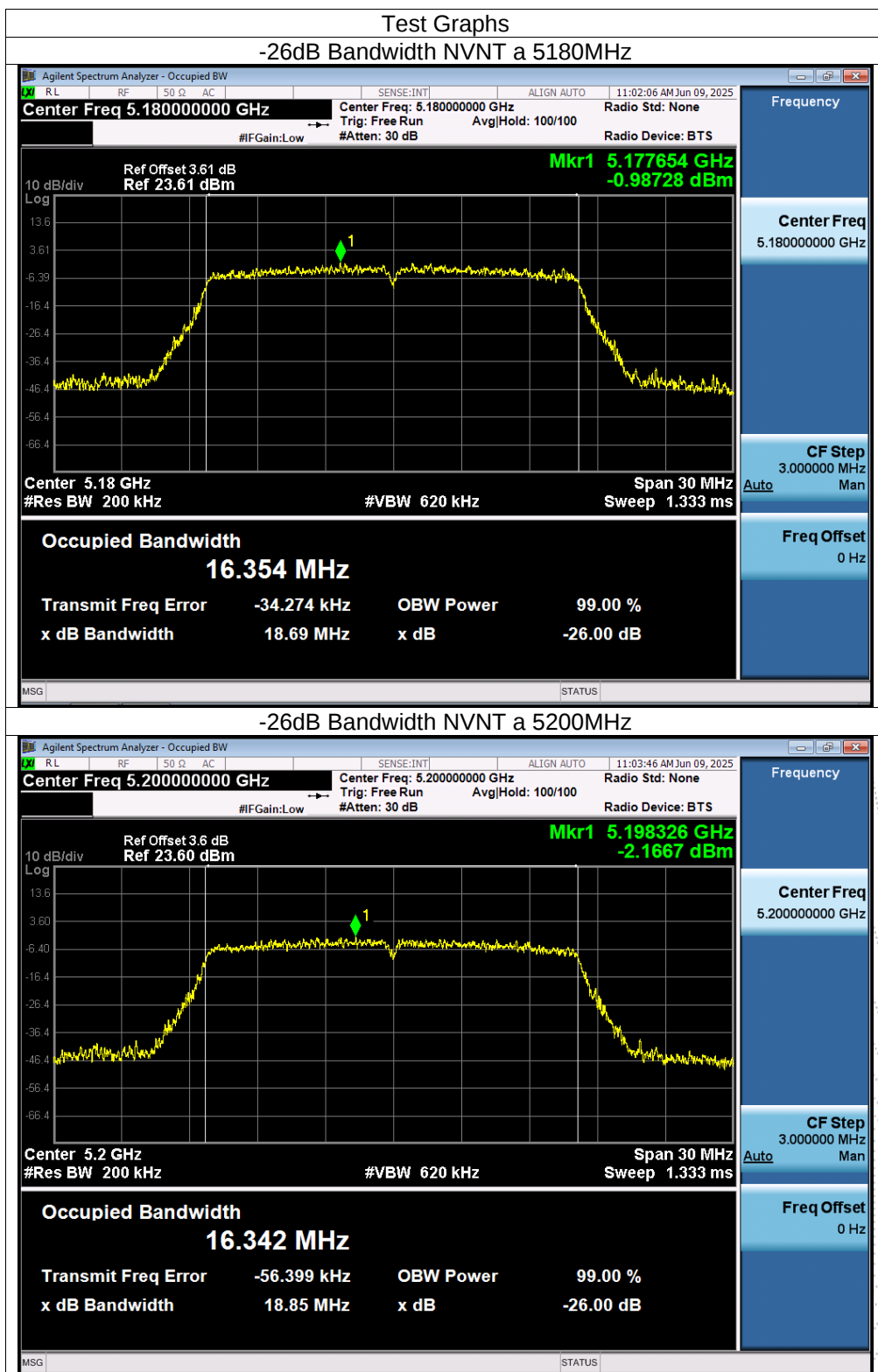
9.4 EUT Operating Conditions

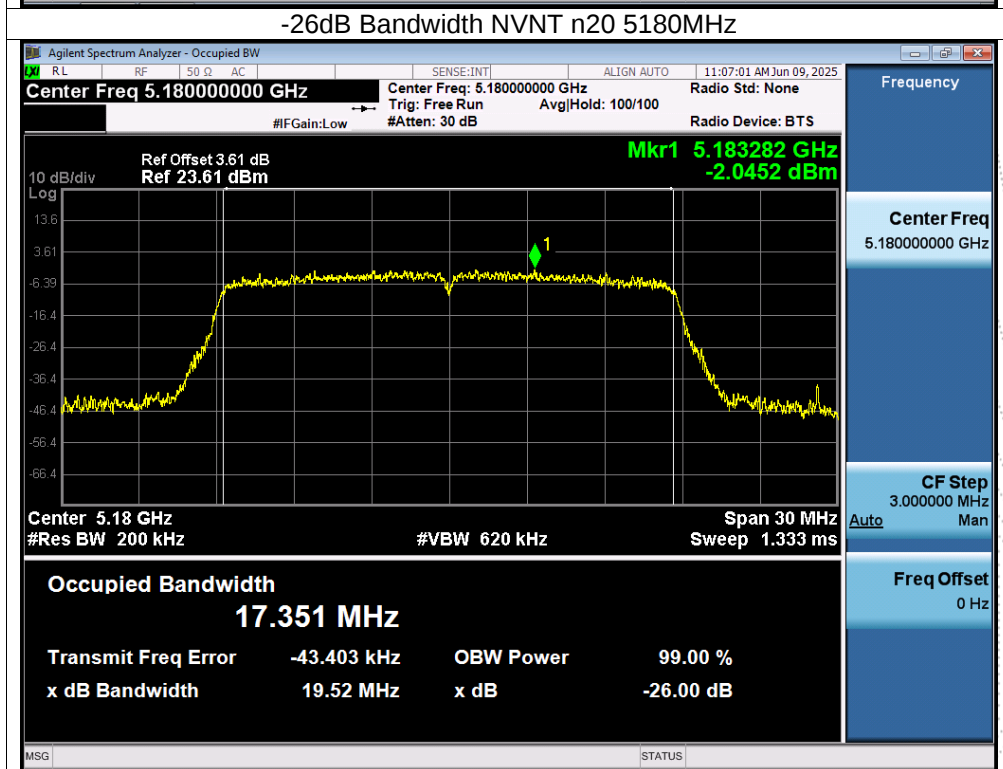
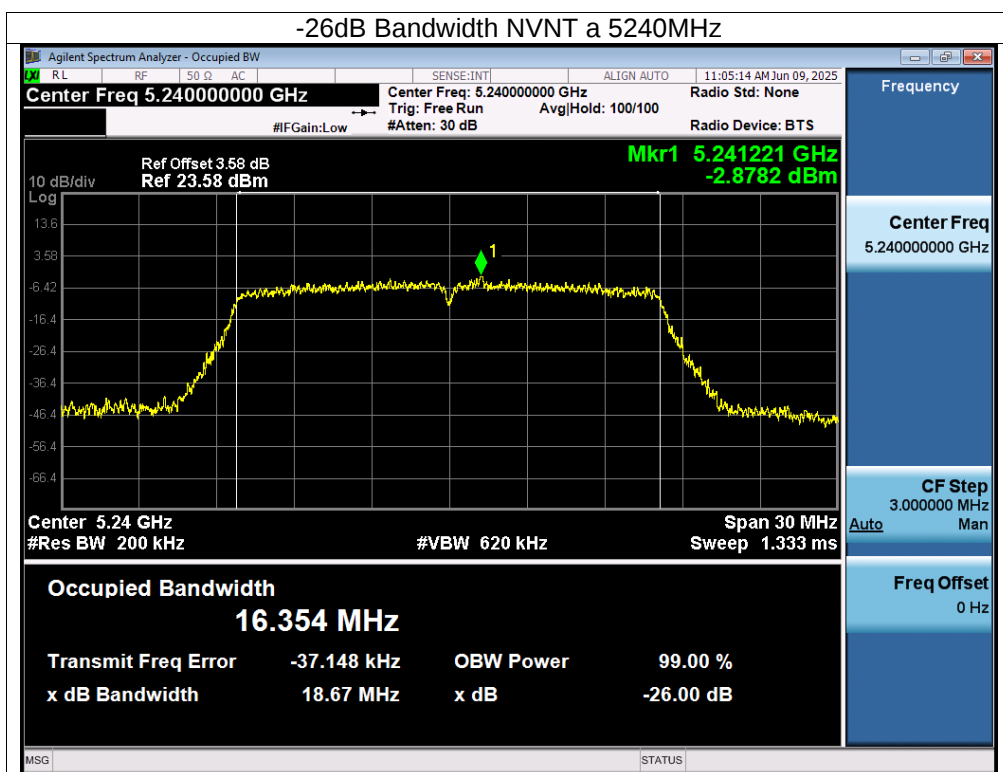
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

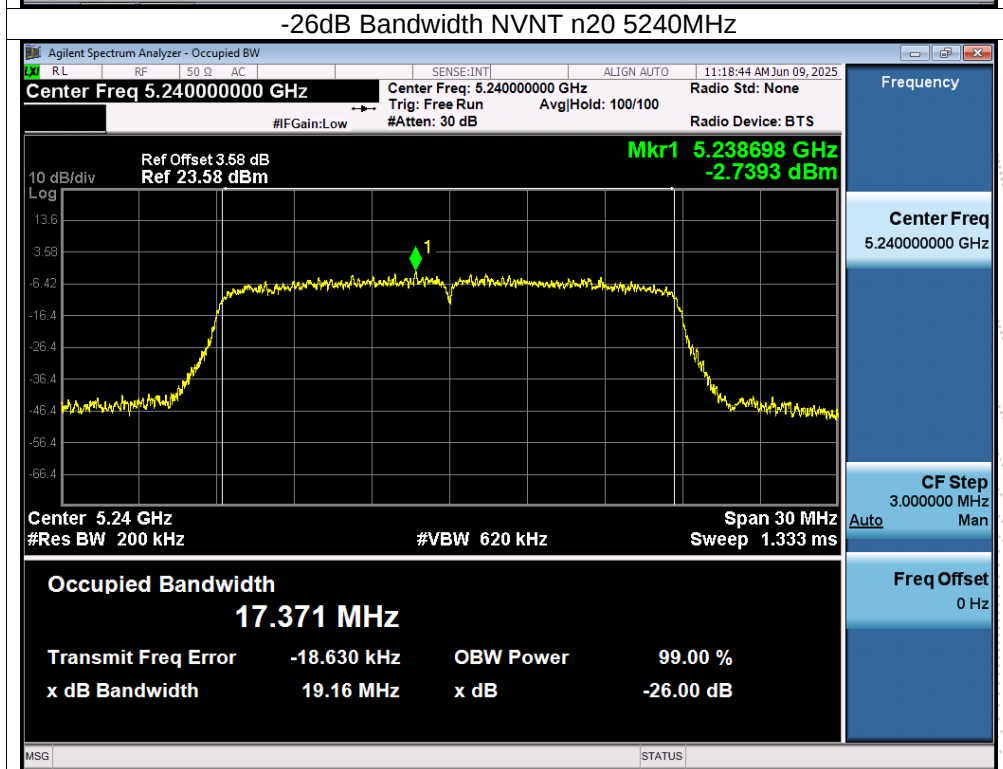
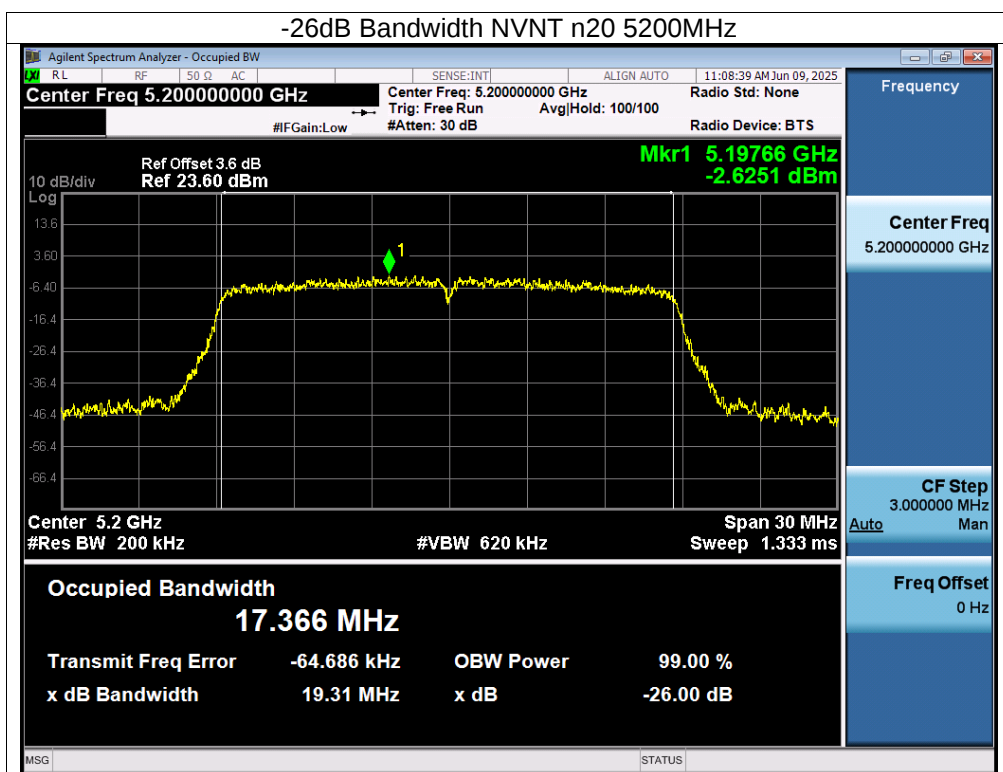
9.5 Test Result

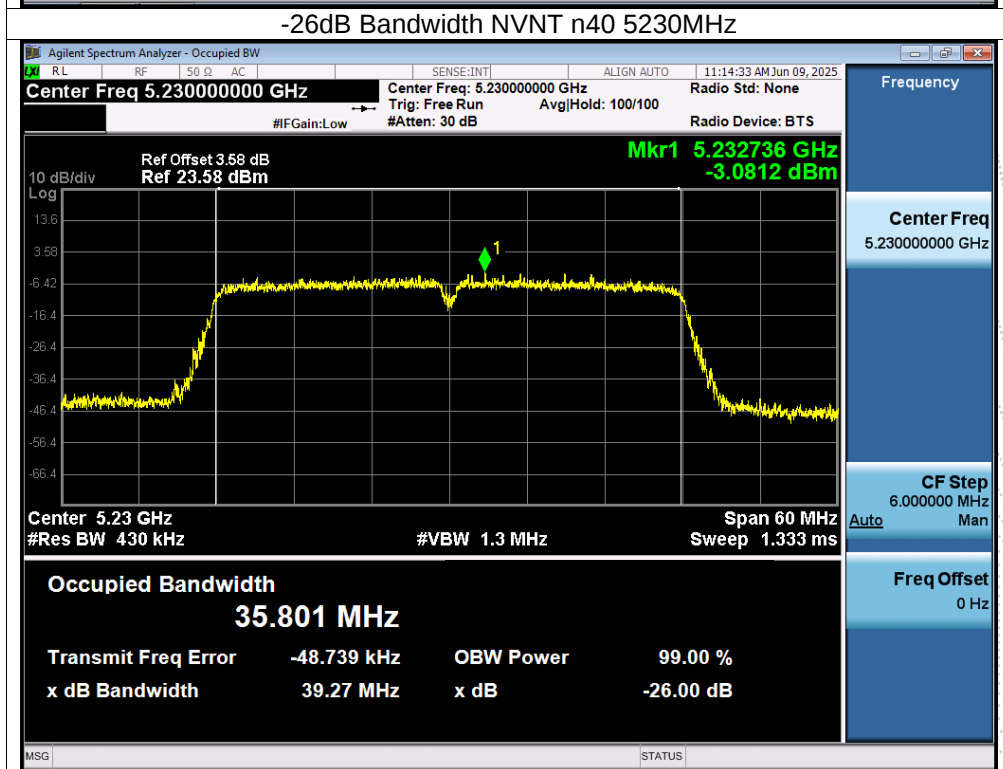
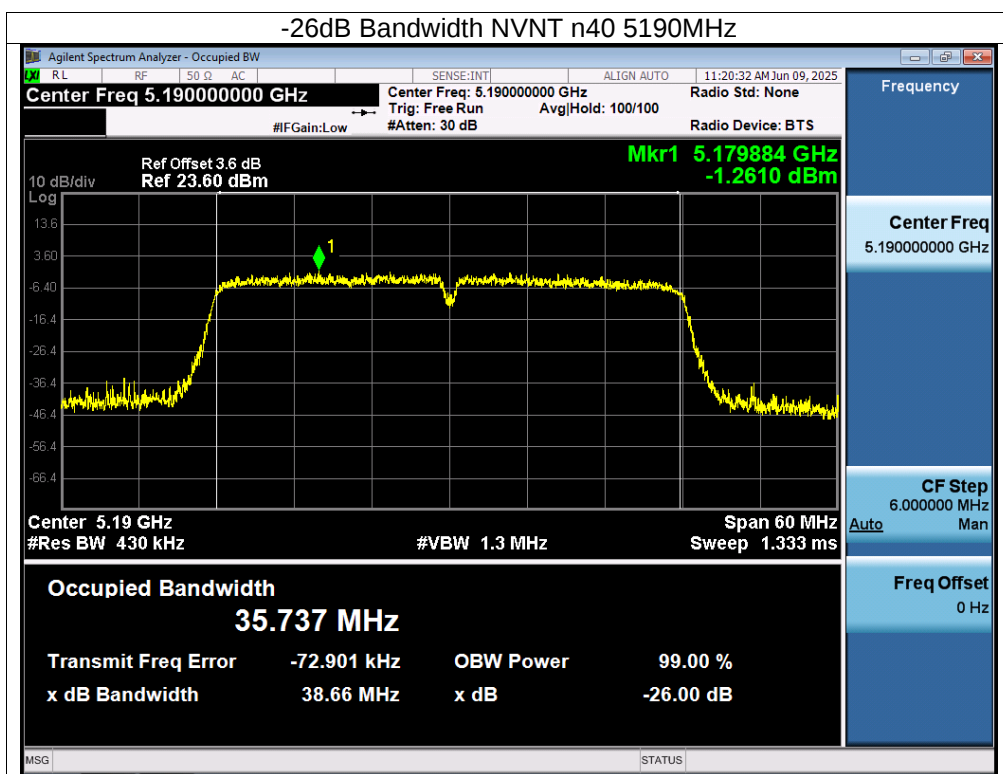
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 4.5V
Test Mode:	(U-NII-1) 5180MHz-5240MHz		

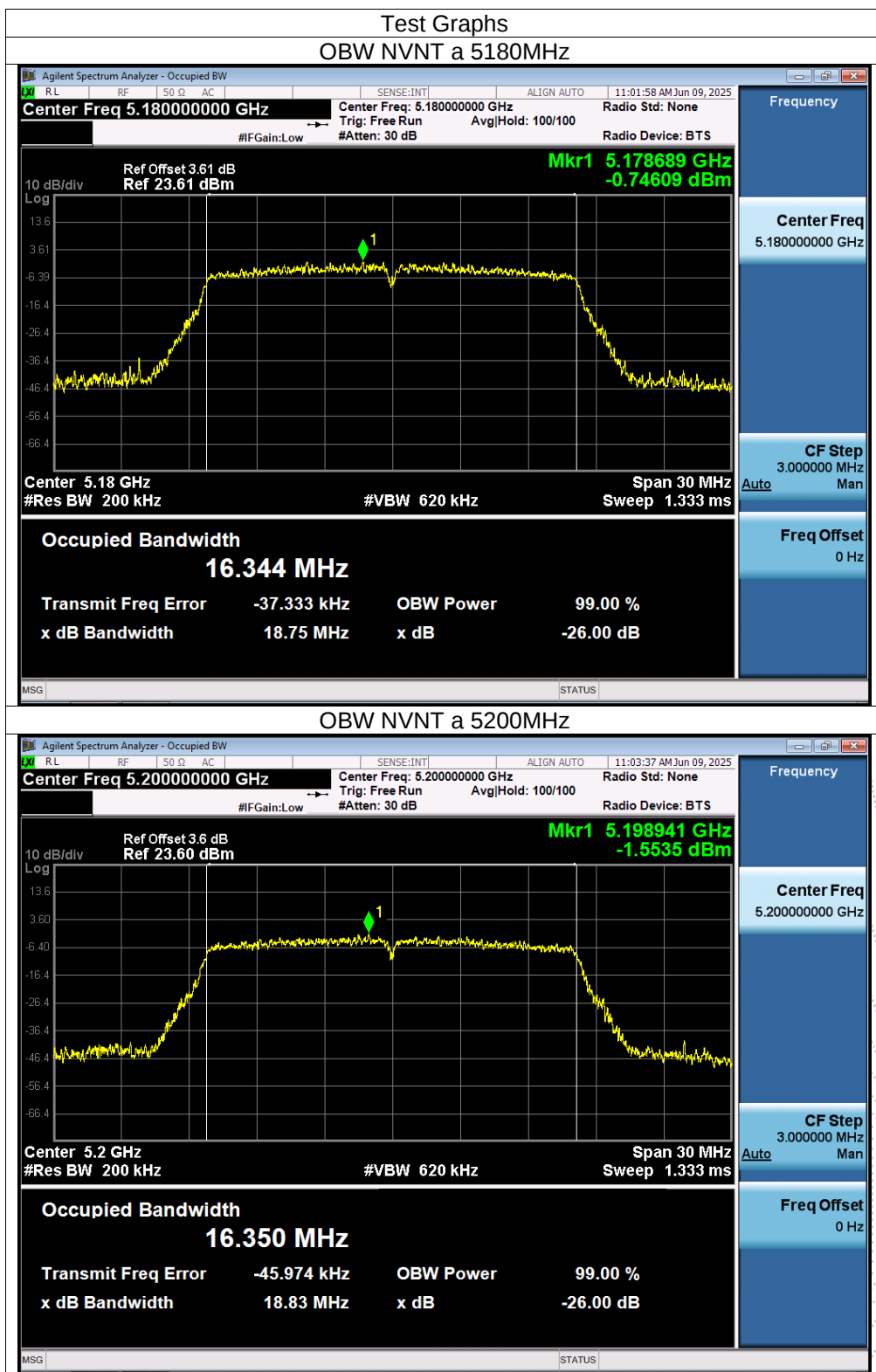
Condition	Mode	Frequency (MHz)	99% bandwidth (MHz)	-26dB bandwidth (MHz)	Result
NVNT	a	5180	16.344	18.694	Pass
NVNT	a	5200	16.35	18.851	Pass
NVNT	a	5240	16.351	18.673	Pass
NVNT	n20	5180	17.356	19.516	Pass
NVNT	n20	5200	17.352	19.308	Pass
NVNT	n20	5240	17.371	19.164	Pass
NVNT	n40	5190	35.681	38.664	Pass
NVNT	n40	5230	35.787	39.272	Pass

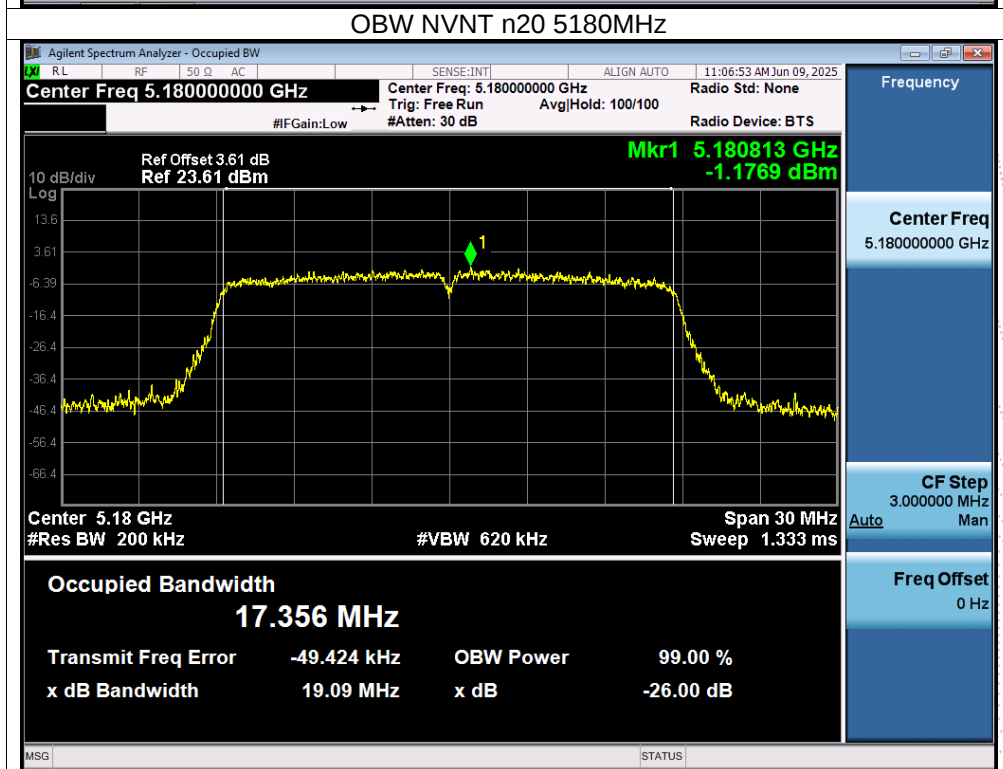
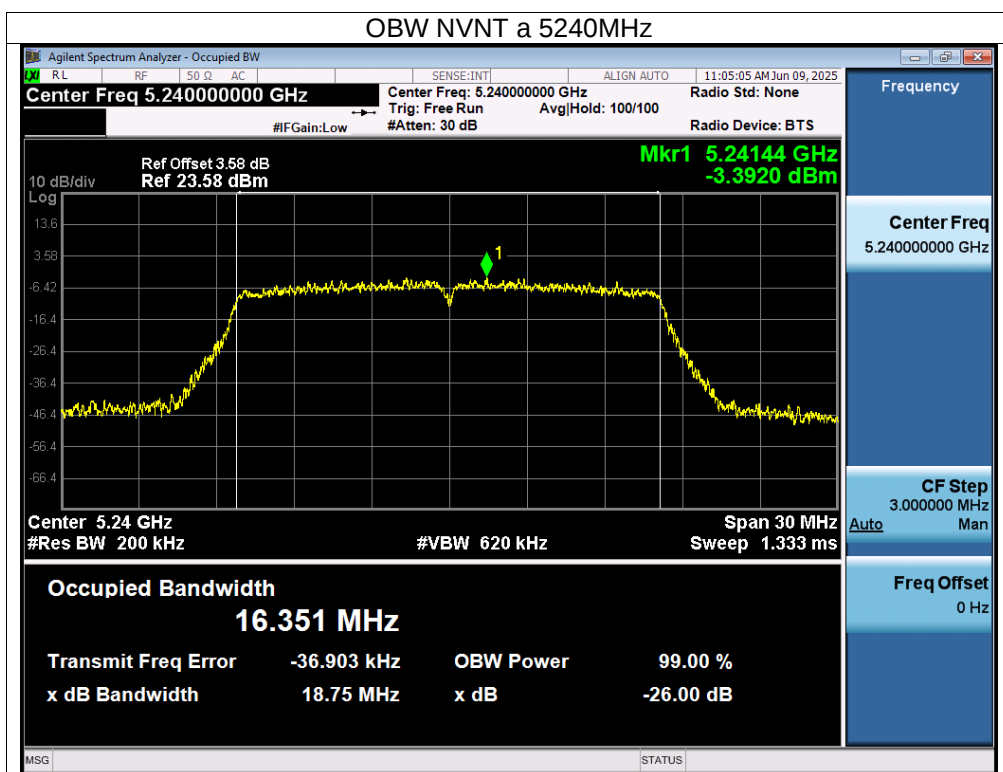


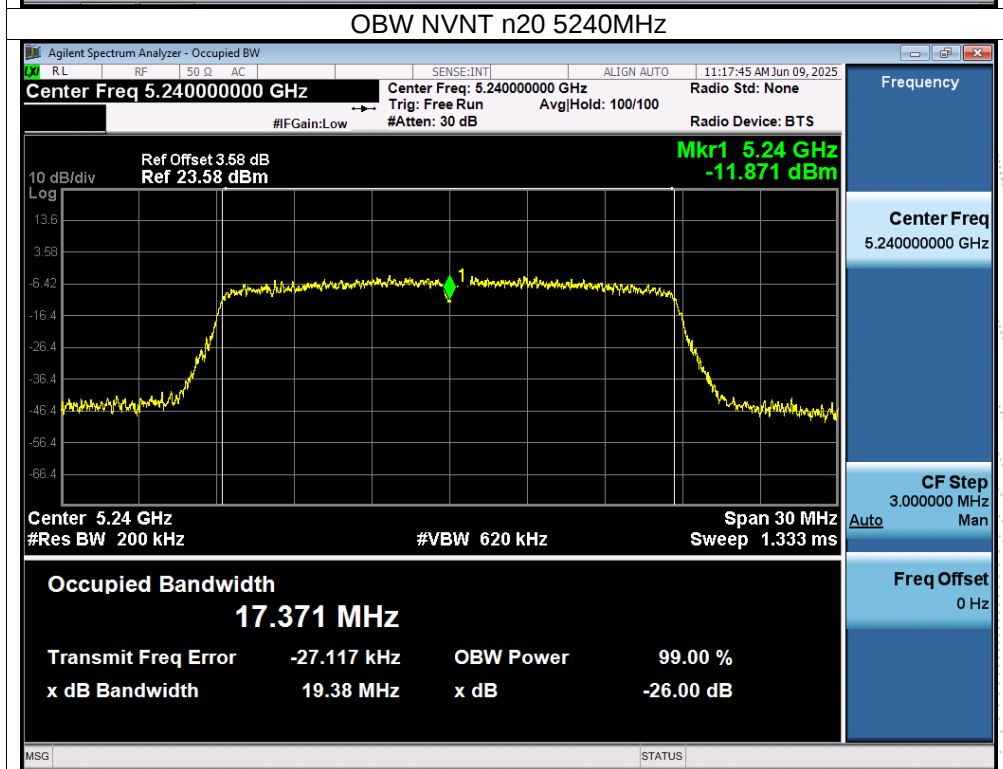
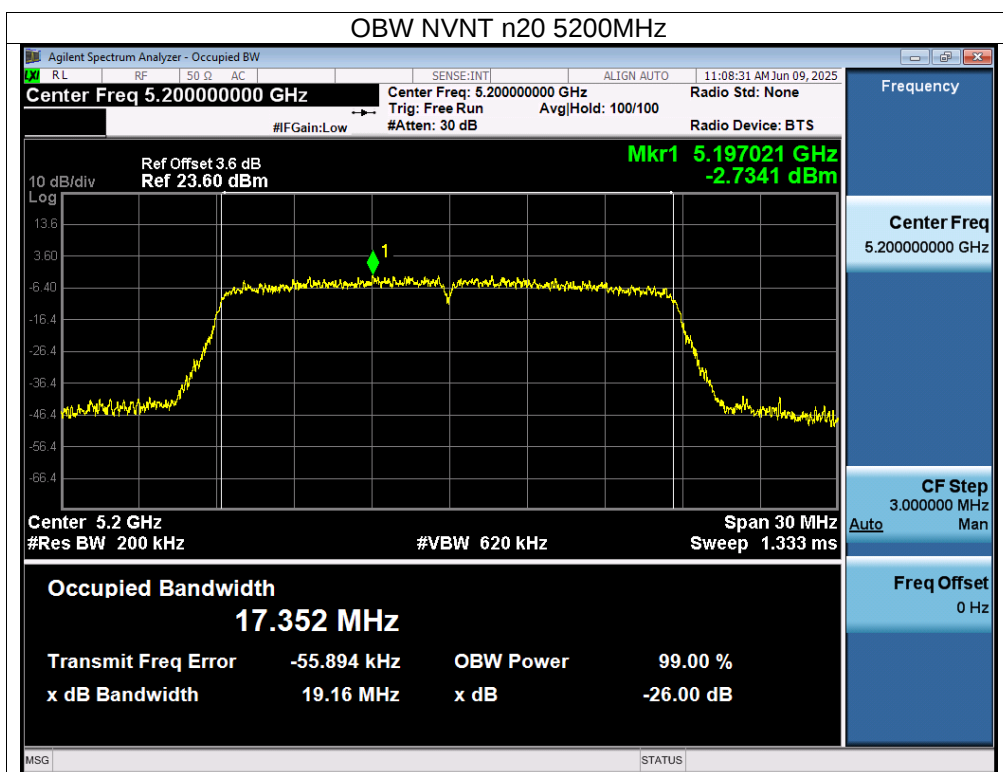


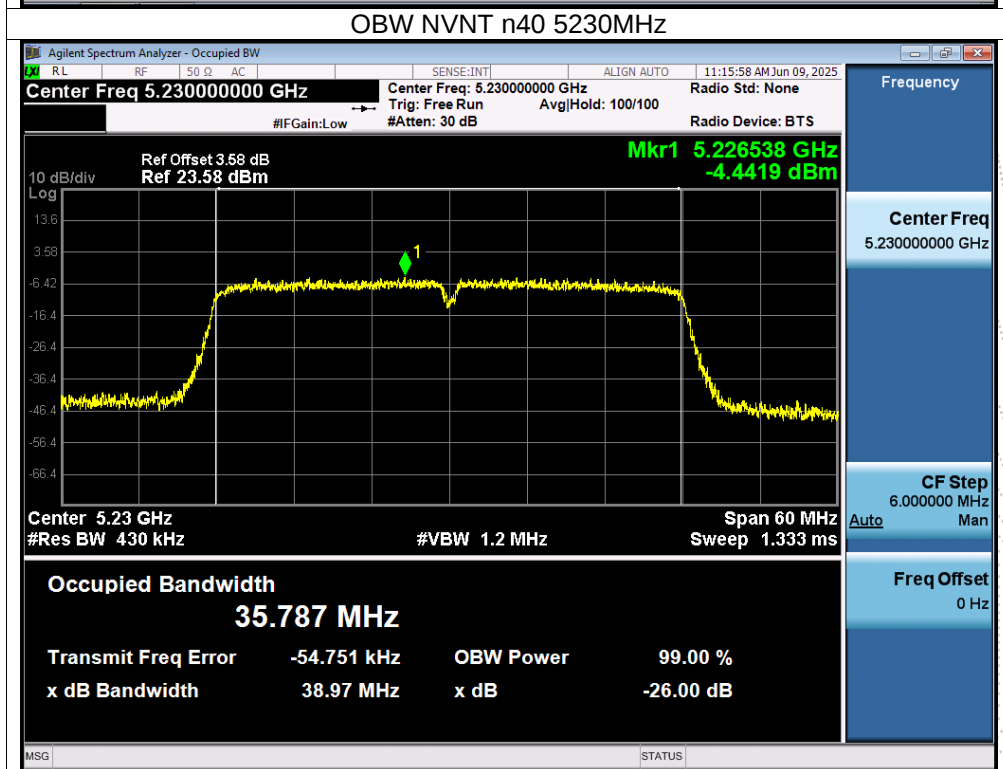
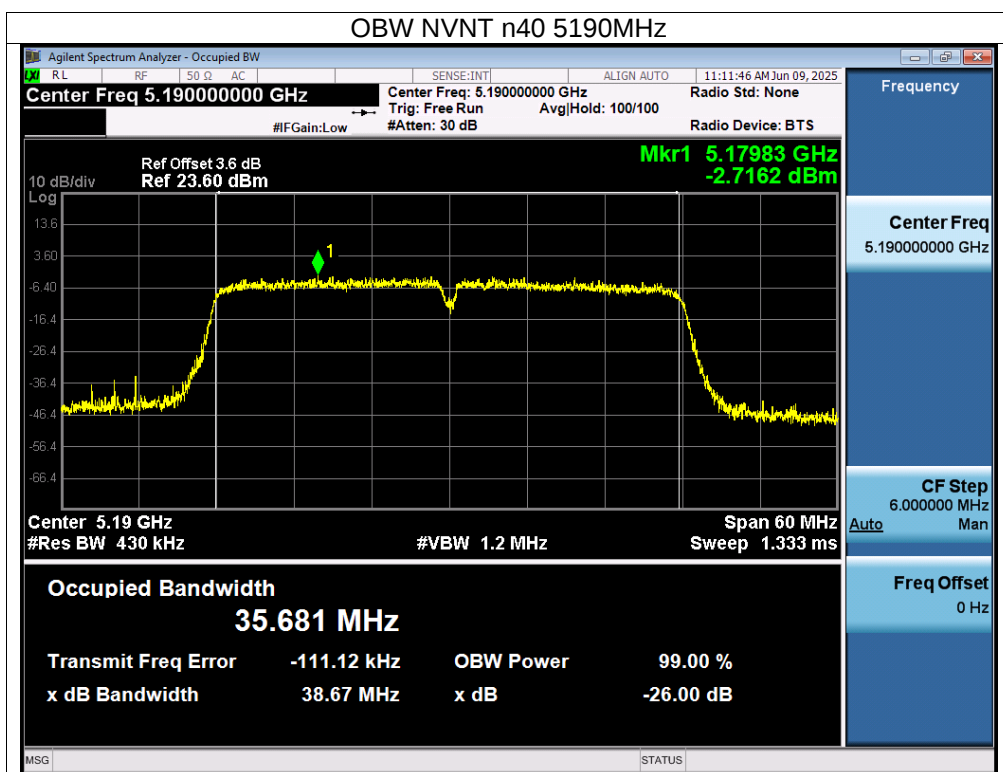












10. Maximum Conducted Output Power

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	250mW
5725~5850	1W

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.).

- 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.
- 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 $\leq$ 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.

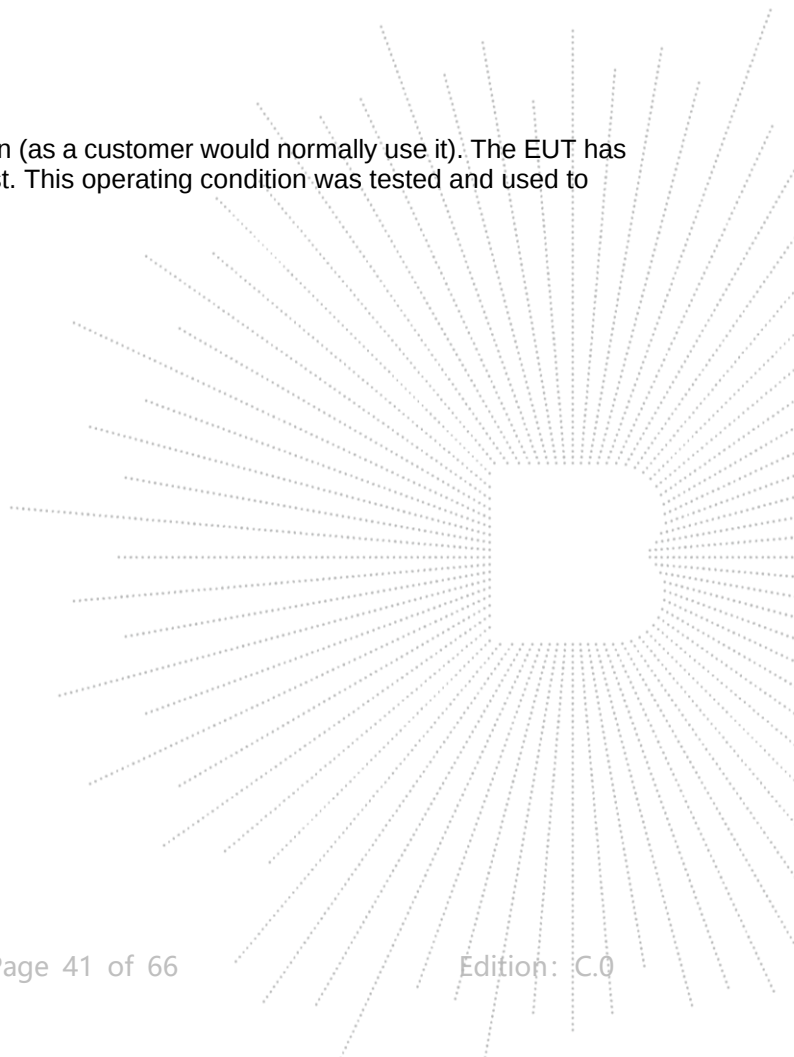
(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or 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 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage :	DC 4.5V
Test Mode :	(U-NII-1) 5180MHz-5240MHz		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	12.39	24	Pass
NVNT	a	5200	11.3	24	Pass
NVNT	a	5240	9.73	24	Pass
NVNT	n20	5180	11.89	24	Pass
NVNT	n20	5200	10.89	24	Pass
NVNT	n20	5240	9.43	24	Pass
NVNT	n40	5190	9.86	24	Pass
NVNT	n40	5230	9.58	24	Pass

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)(7) 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.
- (2) 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.

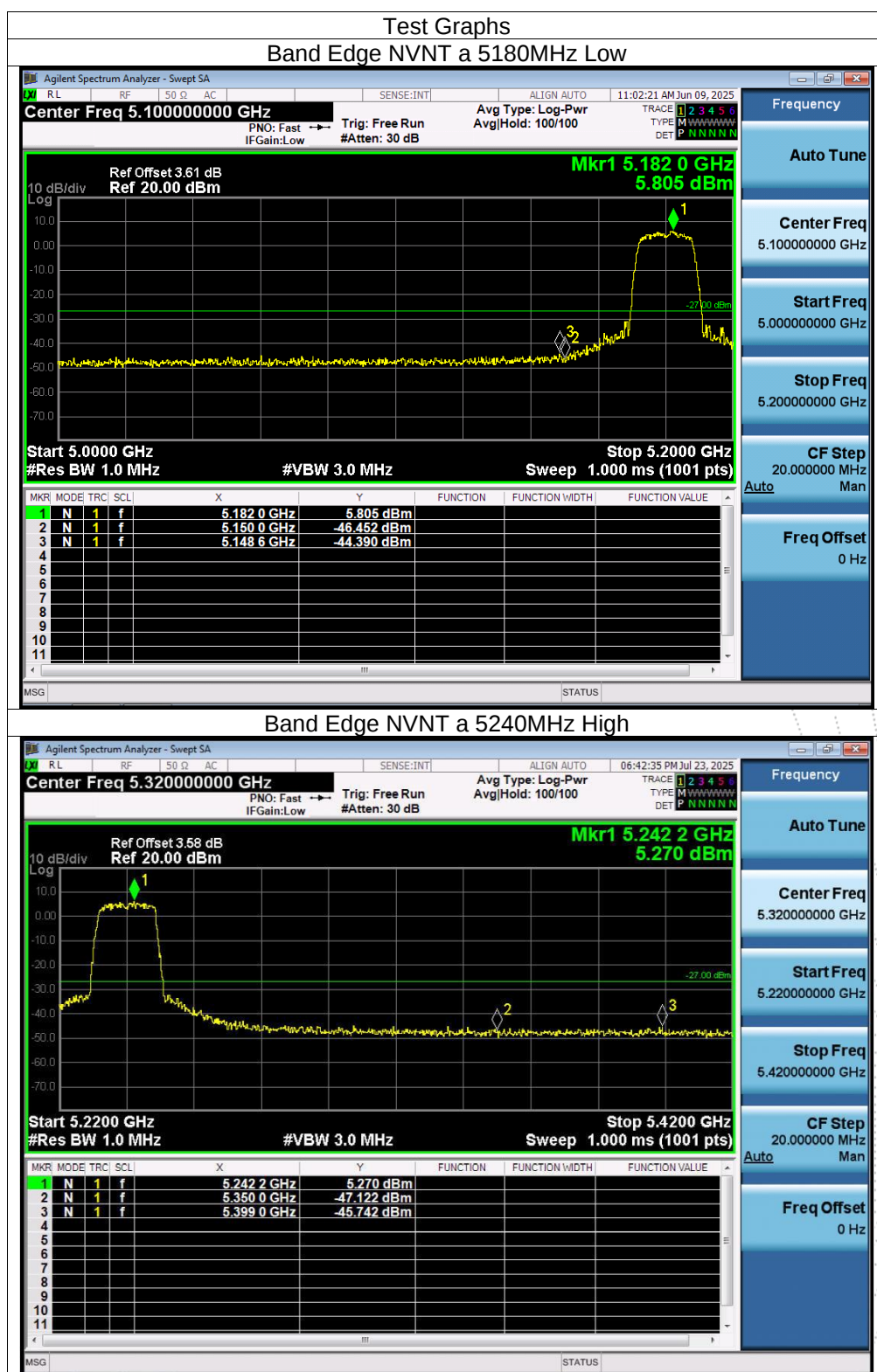
11.3 Test Procedure

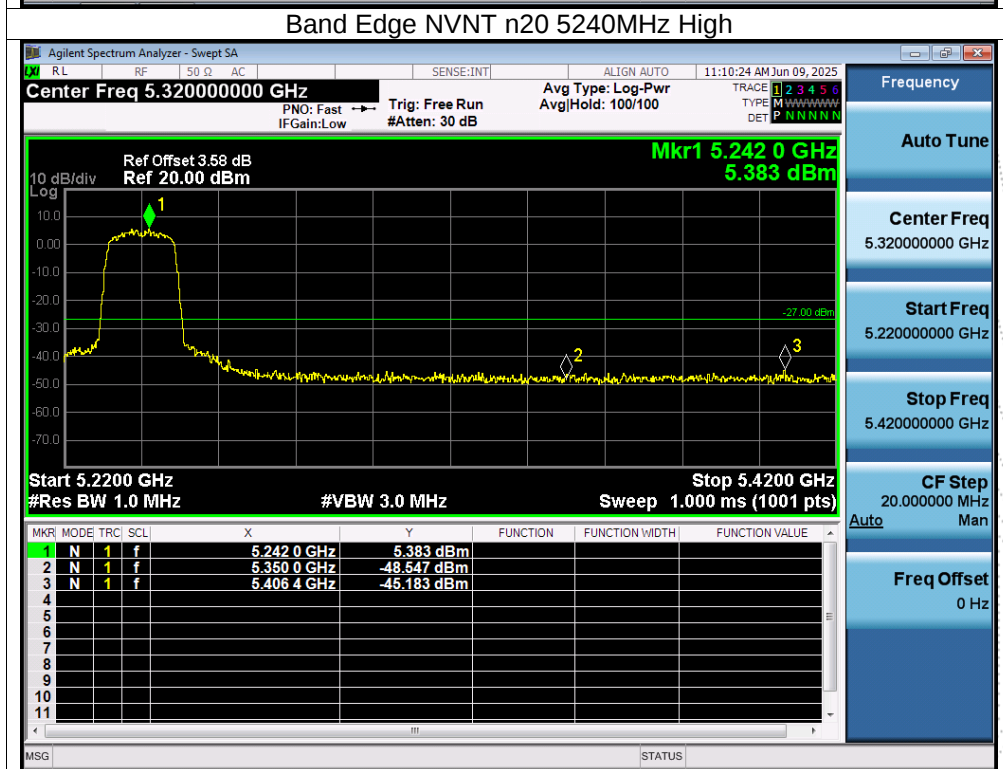
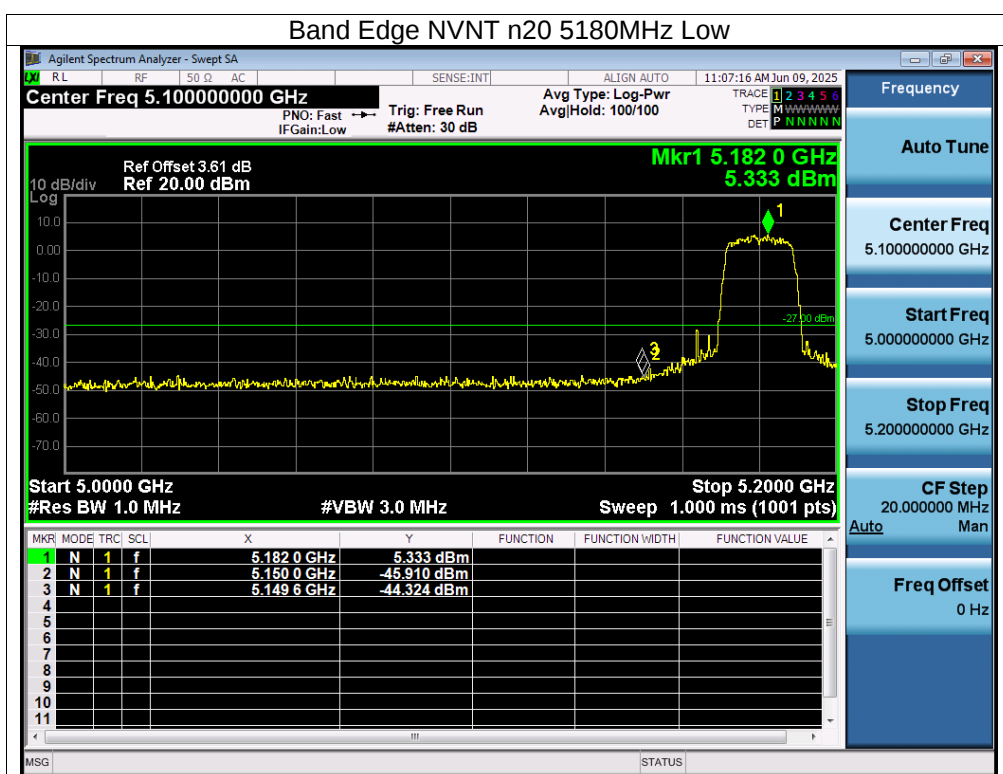
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.

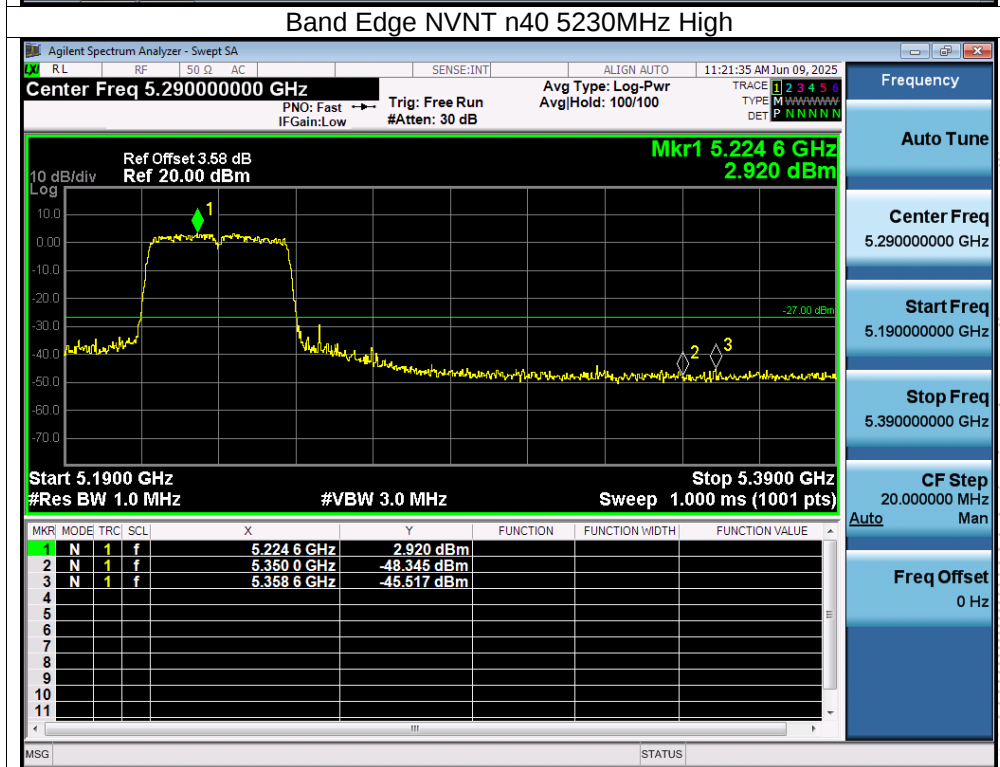
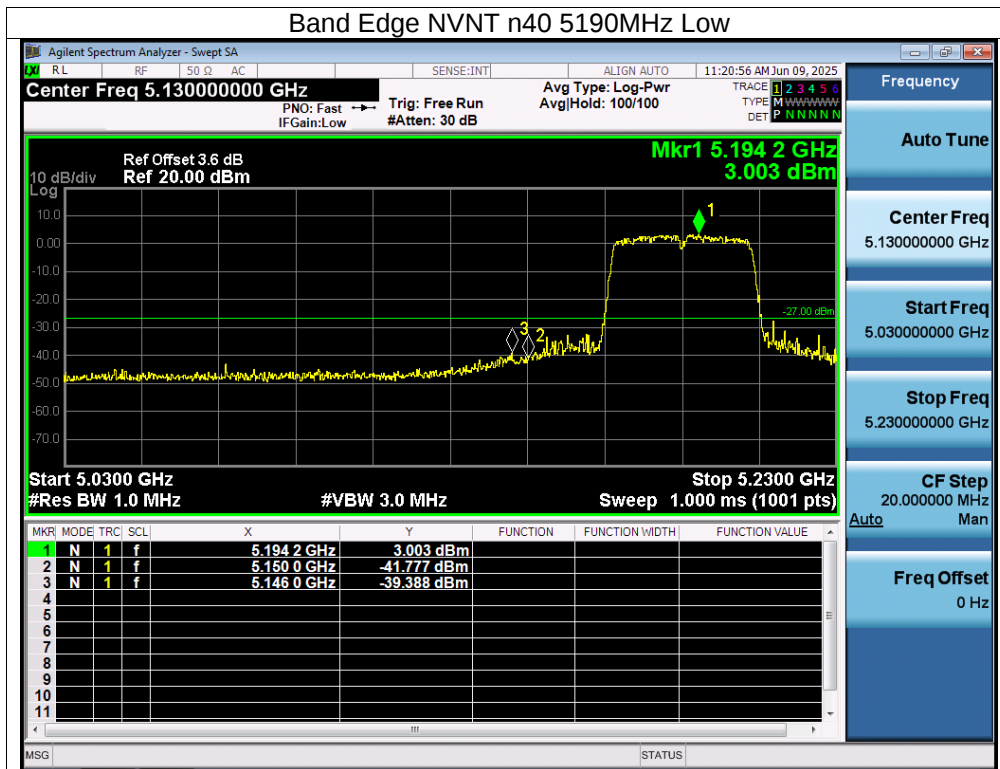
11.4 EUT Operating Conditions

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







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:

(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.

(2) For transmitters operating in the 5.725-5.85 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..

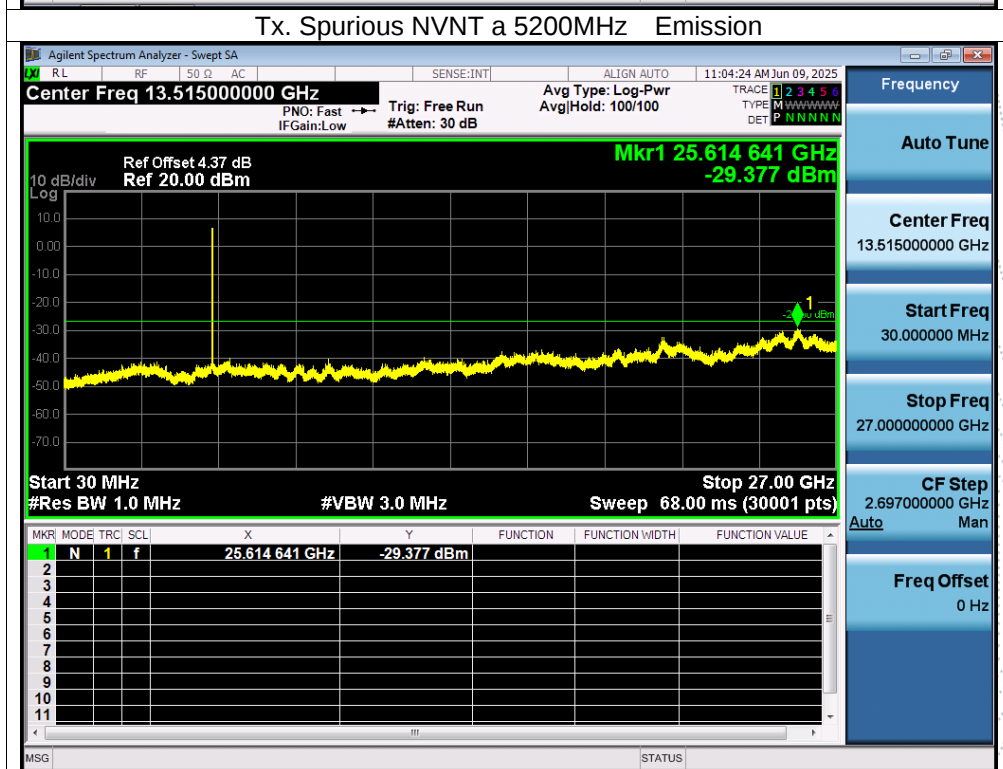
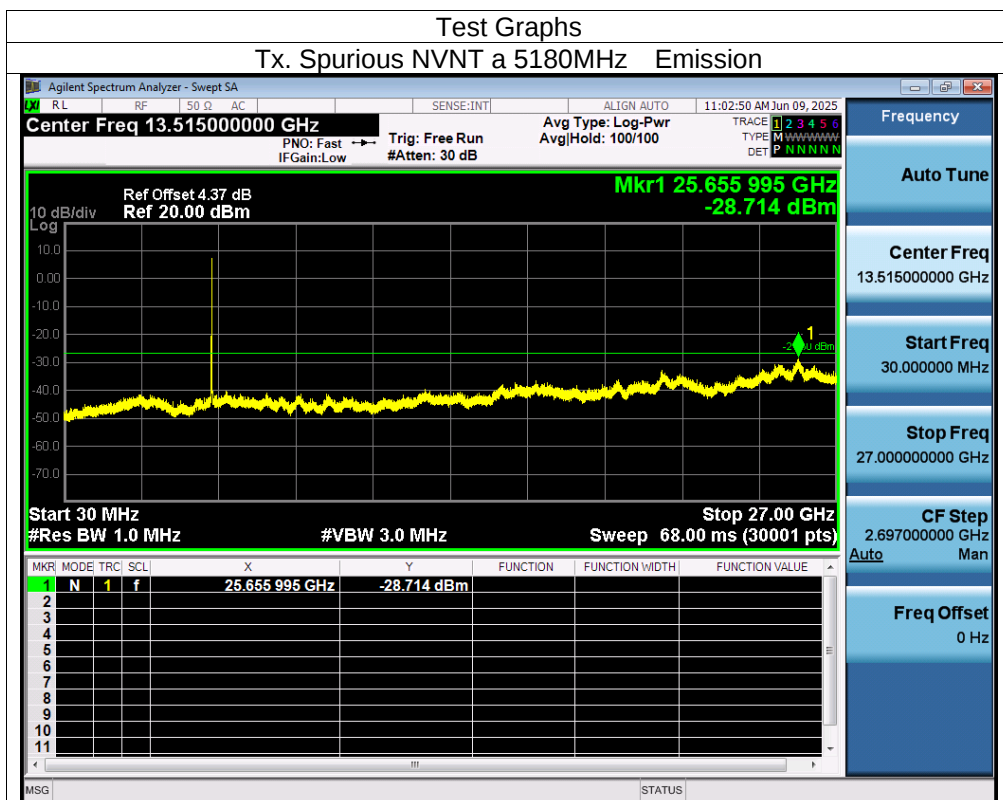
12.3 Test Procedure

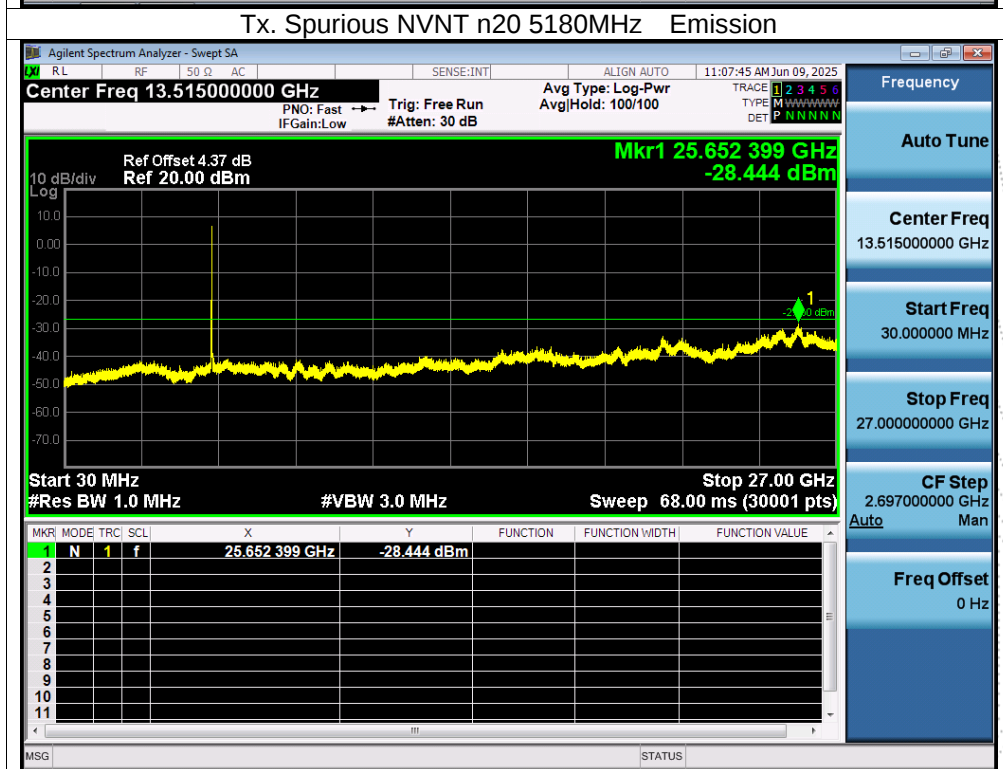
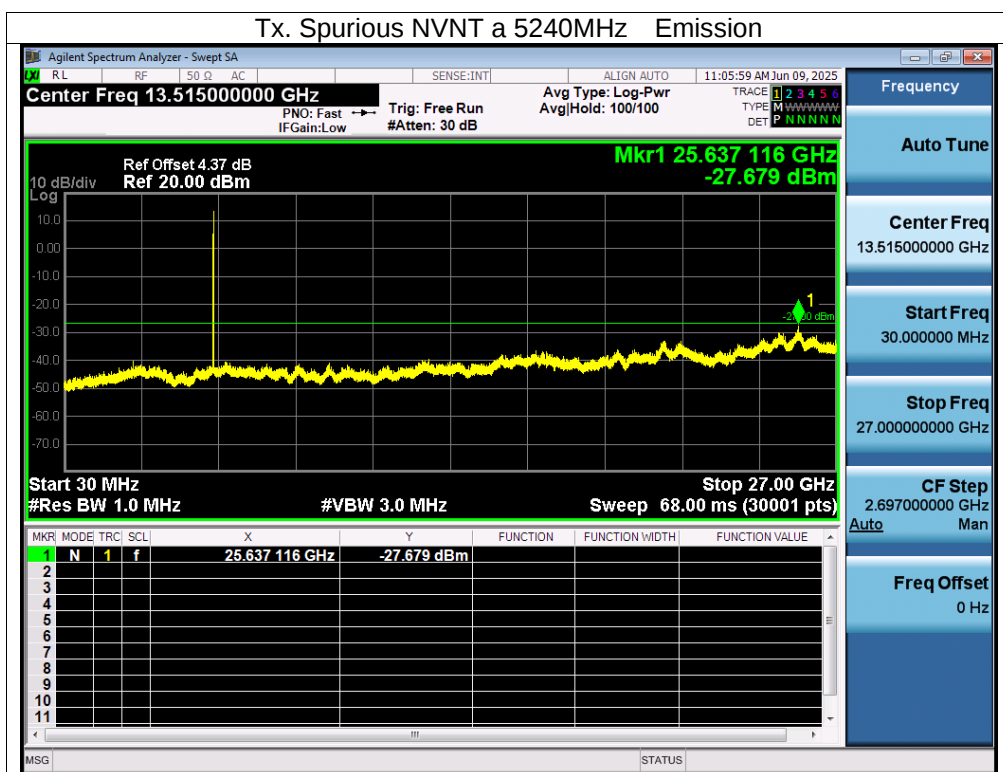
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.

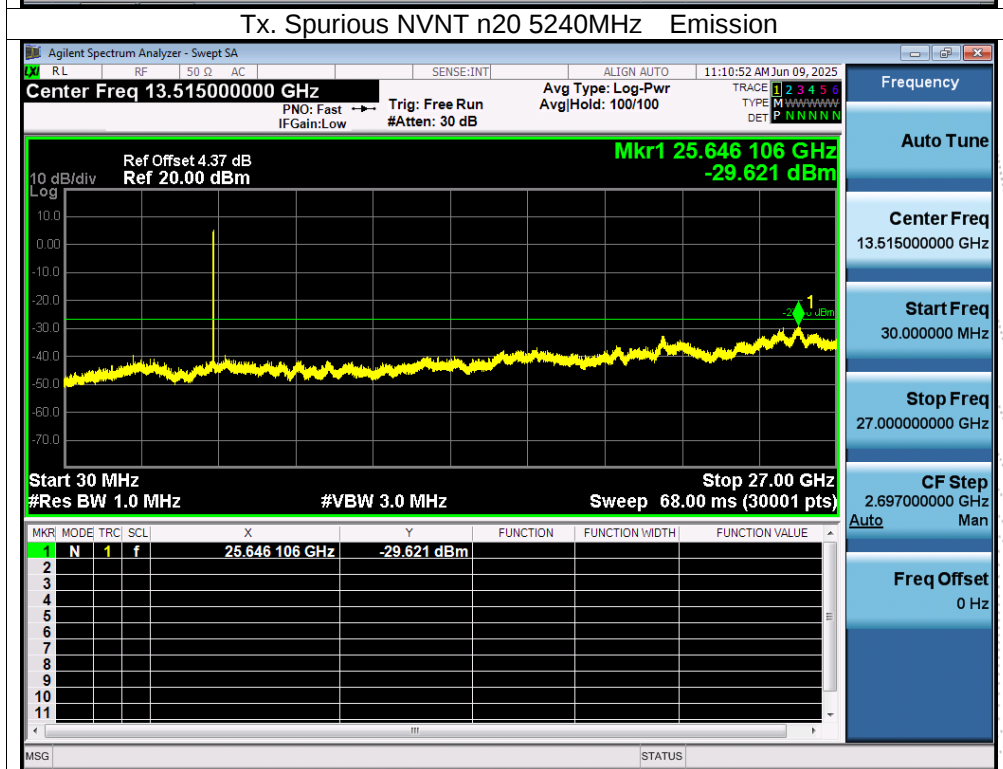
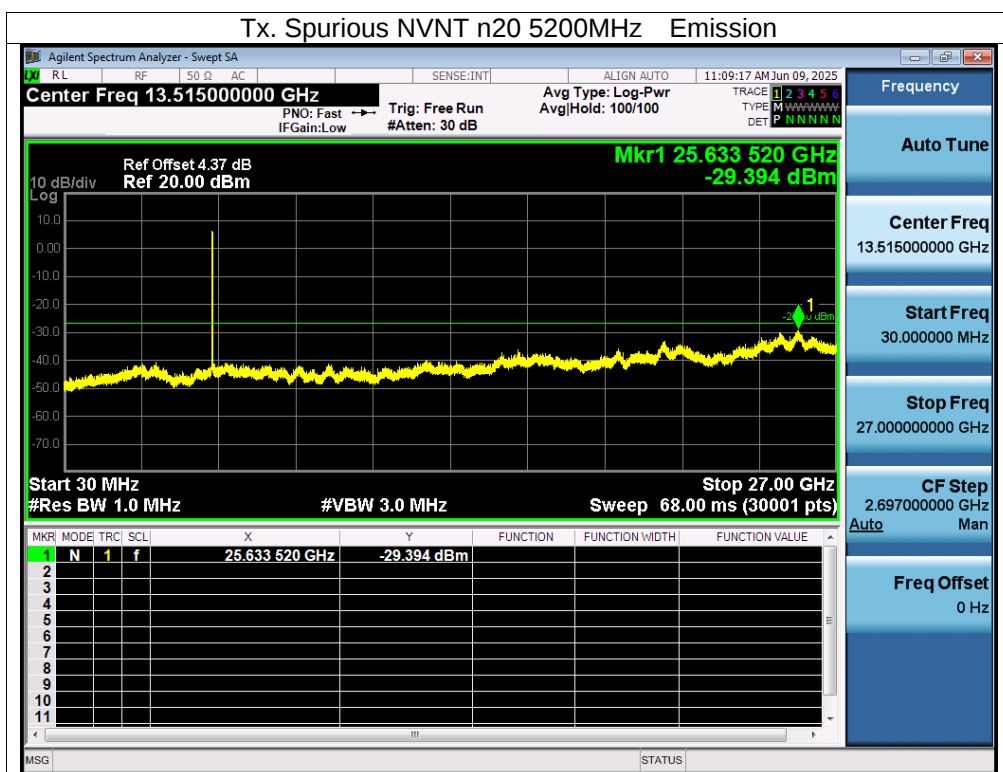
12.4 Test Result

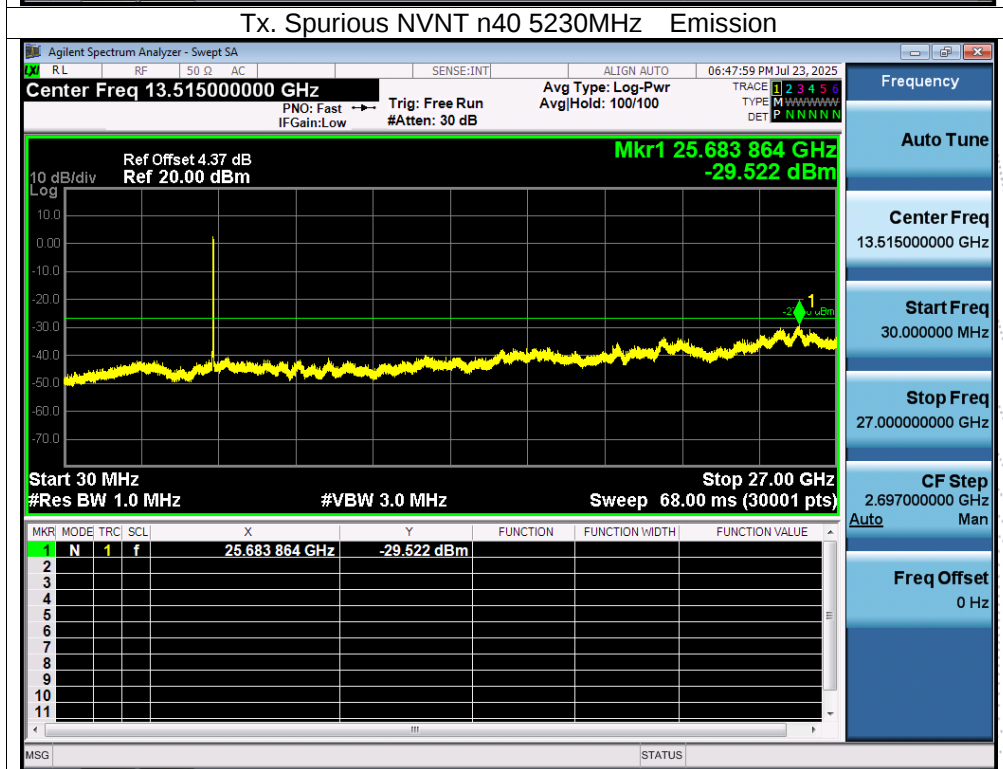
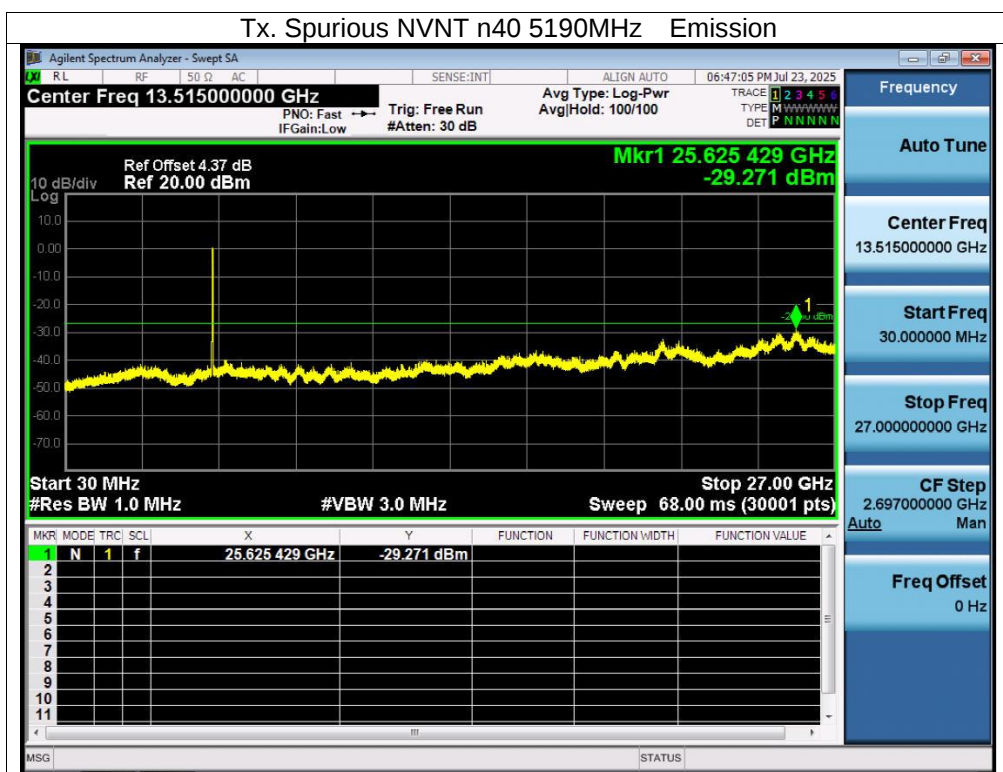
Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

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.









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 $-20^\circ\text{C} \sim 70^\circ\text{C}$.

13.4 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	DC 4.5V
Test Mode:	TX 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)	DC 4.50	5180.0119	5180	0.0119	2.2973
		V max (V)	DC 5.18	5180.0073	5180	0.0073	1.4093
		V min (V)	DC 3.83	5180.0097	5180	0.0097	1.8726
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)	DC 4.5	T (°C)	-20	5180.0010	5180	0.0010	0.1931
		T (°C)	-10	5180.0094	5180	0.0094	1.8147
		T (°C)	0	5180.0070	5180	0.0070	1.3514
		T (°C)	10	5180.0031	5180	0.0031	0.5985
		T (°C)	20	5180.0102	5180	0.0102	1.9691
		T (°C)	30	5180.0111	5180	0.0111	2.1429
		T (°C)	40	5180.0013	5180	0.0013	0.2510
		T (°C)	50	5180.0079	5180	0.0079	1.5251
		T (°C)	60	5180.0129	5180	0.0129	2.4903
		T (°C)	70	5180.0045	5180	0.0045	0.8687
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)	DC 4.50	5200.0022	5200	0.0022	0.4231
		V max (V)	DC 5.18	5200.0087	5200	0.0087	1.6731
		V min (V)	DC 3.83	5200.0035	5200	0.0035	0.6731
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)	DC 4.5	T (°C)	-20	5200.00810	5200	0.00810	1.5577
		T (°C)	-10	5200.00950	5200	0.00950	1.8269
		T (°C)	0	5200.00040	5200	0.00040	0.0769
		T (°C)	10	5200.00620	5200	0.00620	1.1923
		T (°C)	20	5200.01000	5200	0.01000	1.9231
		T (°C)	30	5200.00990	5200	0.00990	1.9038
		T (°C)	40	5200.00620	5200	0.00620	1.1923
		T (°C)	50	5200.01190	5200	0.01190	2.2885
		T (°C)	60	5200.01310	5200	0.01310	2.5192
		T (°C)	70	5200.00600	5200	0.00600	1.1538
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)	DC 4.50	5240.0022	5240	0.0022	0.4198
		V max (V)	DC 5.18	5240.0044	5240	0.0044	0.8397
		V min (V)	DC 3.83	5240.0091	5240	0.0091	1.7366
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)	DC 4.5	T (°C)	-20	5240.0006	5240	0.0006	0.1145
		T (°C)	-10	5240.0006	5240	0.0006	0.1145
		T (°C)	0	5240.0036	5240	0.0036	0.6870
		T (°C)	10	5240.0028	5240	0.0028	0.5344
		T (°C)	20	5240.0064	5240	0.0064	1.2214
		T (°C)	30	5240.0106	5240	0.0106	2.0229
		T (°C)	40	5240.0046	5240	0.0046	0.8779
		T (°C)	50	5240.0036	5240	0.0036	0.6870
		T (°C)	60	5240.0114	5240	0.0114	2.1756
		T (°C)	70	5240.0105	5240	0.0105	2.0038
Limits				5150-5250 MHz			
Result				Complies			

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage:	AC 120V
Test Mode:	TX 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)	AC 120	5180.0004	5180	0.0004	0.0772
		V max (V)	AC 138	5180.0070	5180	0.0070	1.3514
		V min (V)	AC 102	5180.0101	5180	0.0101	1.9498
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)	AC 120	T (°C)	-20	5180.0131	5180	0.0131	2.5290
		T (°C)	-10	5180.0048	5180	0.0048	0.9266
		T (°C)	0	5180.0115	5180	0.0115	2.2201
		T (°C)	10	5180.0112	5180	0.0112	2.1622
		T (°C)	20	5180.0012	5180	0.0012	0.2317
		T (°C)	30	5180.0115	5180	0.0115	2.2201
		T (°C)	40	5180.0027	5180	0.0027	0.5212
		T (°C)	50	5180.0083	5180	0.0083	1.6023
		T (°C)	60	5180.0056	5180	0.0056	1.0811
		T (°C)	70	5180.0069	5180	0.0069	1.3320
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)	AC 120	5200.0022	5200	0.0022	0.4231
		V max (V)	AC 138	5200.0040	5200	0.0040	0.7692
		V min (V)	AC 102	5200.0047	5200	0.0047	0.9038
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)	AC 120	T (°C)	-20	5200.01290	5200	0.01290	2.4808
		T (°C)	-10	5200.00080	5200	0.00080	0.1538
		T (°C)	0	5200.01260	5200	0.01260	2.4231
		T (°C)	10	5200.00440	5200	0.00440	0.8462
		T (°C)	20	5200.01190	5200	0.01190	2.2885
		T (°C)	30	5200.01320	5200	0.01320	2.5385
		T (°C)	40	5200.00080	5200	0.00080	0.1538
		T (°C)	50	5200.00460	5200	0.00460	0.8846
		T (°C)	60	5200.00560	5200	0.00560	1.0769
		T (°C)	70	5200.00060	5200	0.00060	0.1154
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)	AC 120	5240.0010	5240	0.0010	0.1908
		V max (V)	AC 138	5240.0034	5240	0.0034	0.6489
		V min (V)	AC 102	5240.0108	5240	0.0108	2.0611
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)	AC 120	T (°C)	-20	5240.0044	5240	0.0044	0.8397
		T (°C)	-10	5240.0012	5240	0.0012	0.2290
		T (°C)	0	5240.0052	5240	0.0052	0.9924
		T (°C)	10	5240.0071	5240	0.0071	1.3550
		T (°C)	20	5240.0106	5240	0.0106	2.0229
		T (°C)	30	5240.0103	5240	0.0103	1.9656
		T (°C)	40	5240.0075	5240	0.0075	1.4313
		T (°C)	50	5240.0115	5240	0.0115	2.1947
		T (°C)	60	5240.0043	5240	0.0043	0.8206
		T (°C)	70	5240.0009	5240	0.0009	0.1718
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

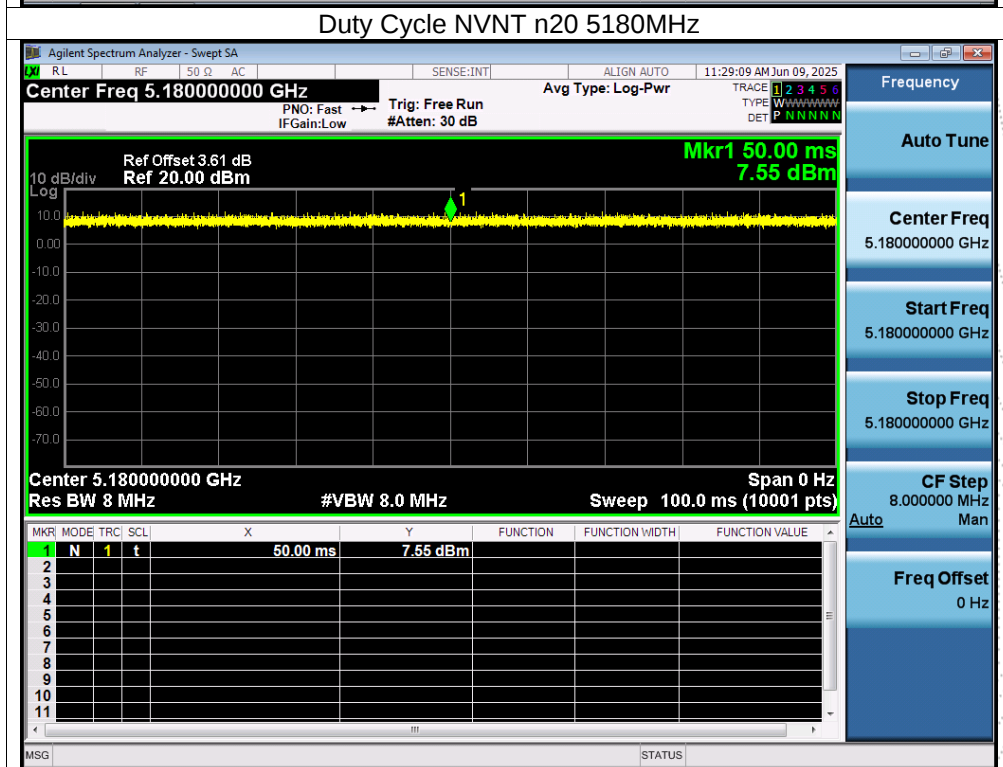
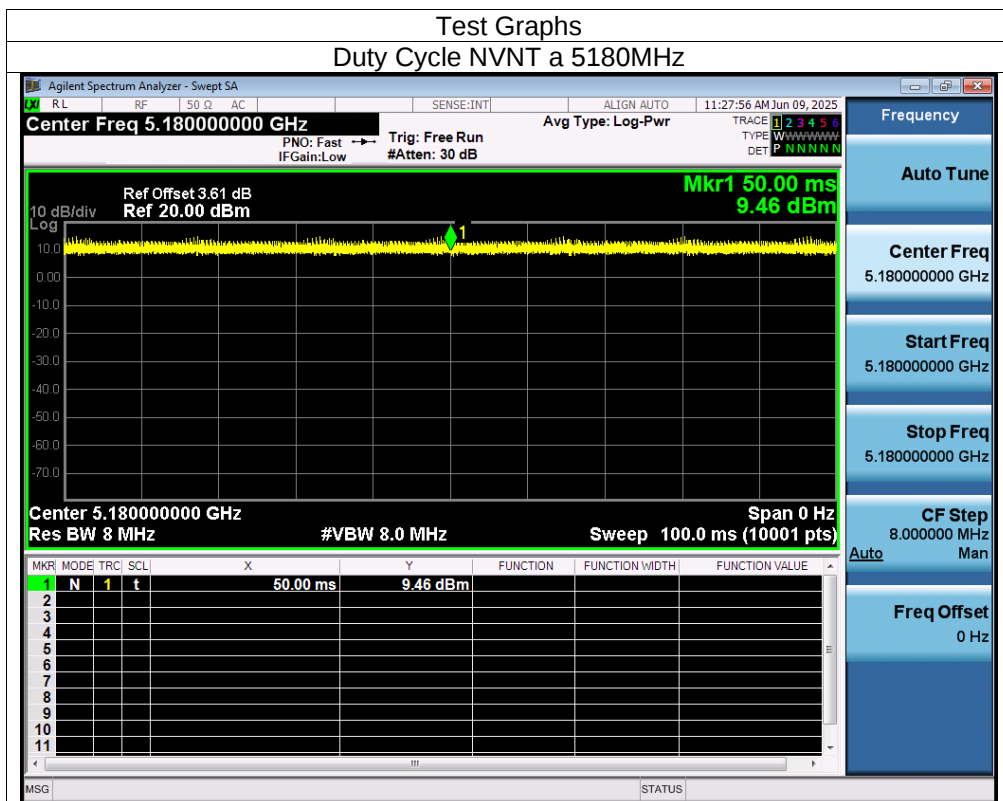
Duty Cycle = $T_{on} / (T_{on} + T_{off})$

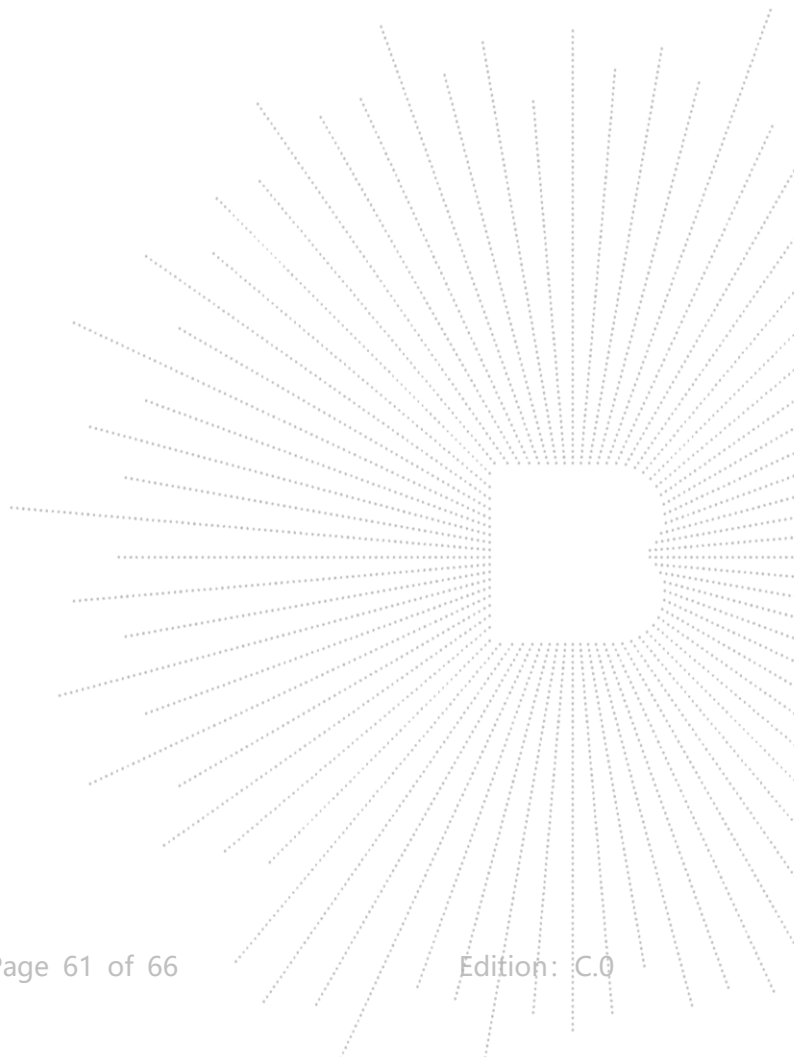
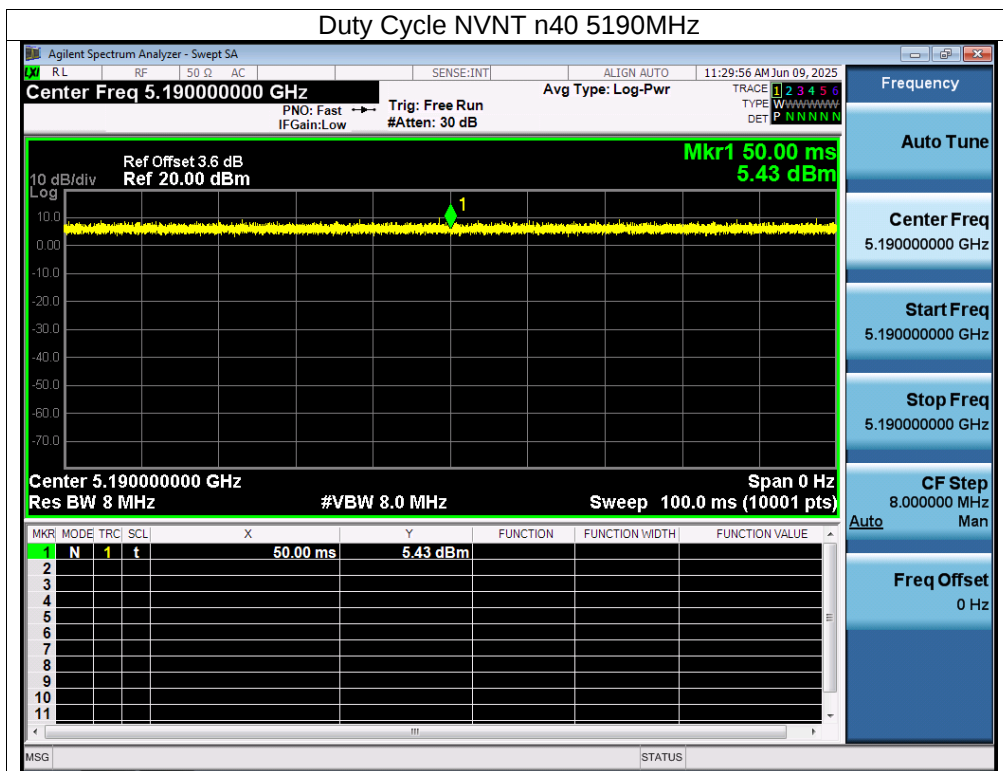
14.3 Test Procedure

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

14.4 Test Result

Condition	Mode	Frequency (MHz)	Duty Cycle (%)
NVNT	a	5180	100
NVNT	n20	5180	100
NVNT	n40	5190	100





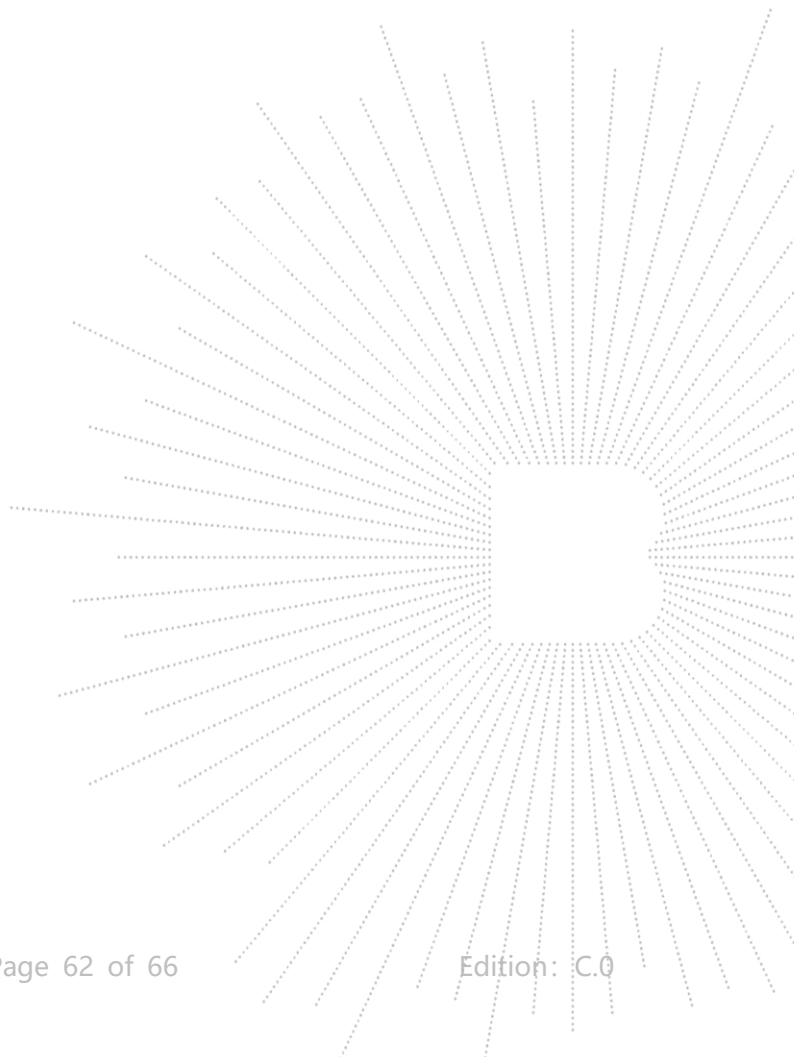
15. Antenna Requirement

15.1 Limit

15.203 requirement: For intentional device, according to 15.203: 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.

15.2 Test Result

The EUT antenna is FPC antenna, antenna connector type is IPEX, fulfill the requirement of this section.

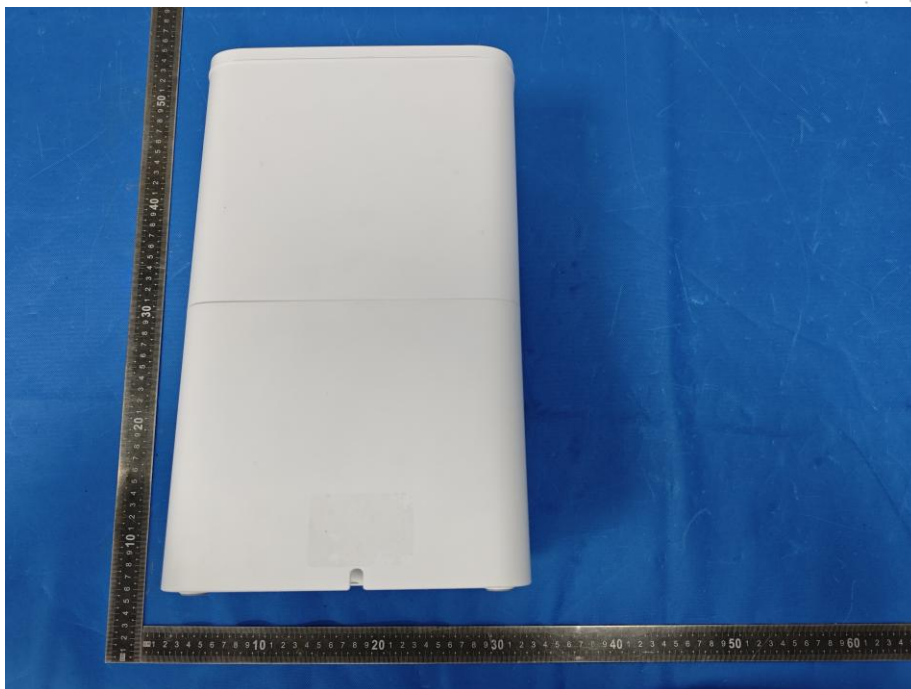


16. EUT Photographs

EUT Photo 1



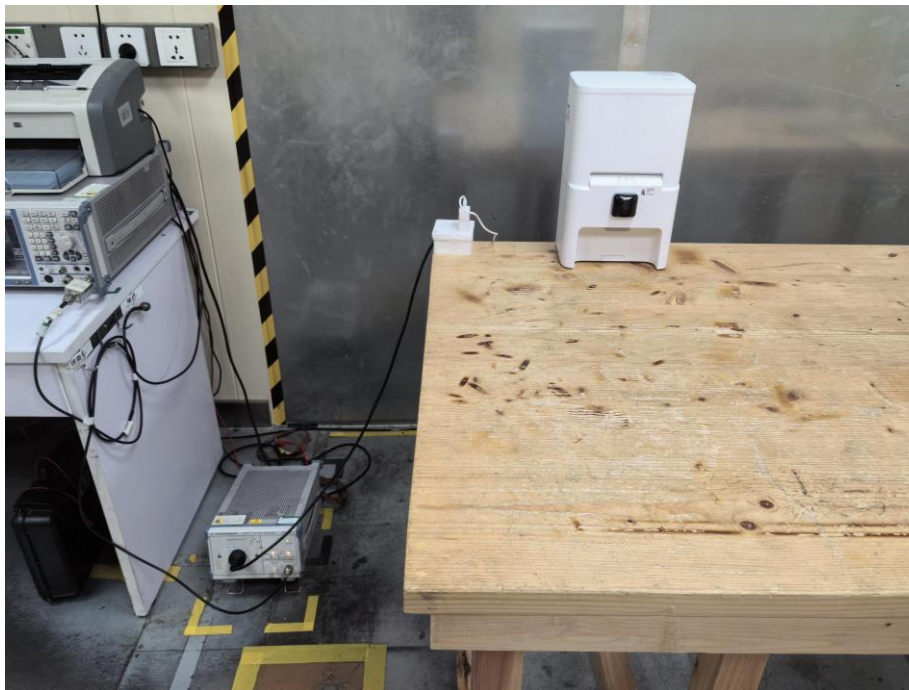
EUT Photo 2



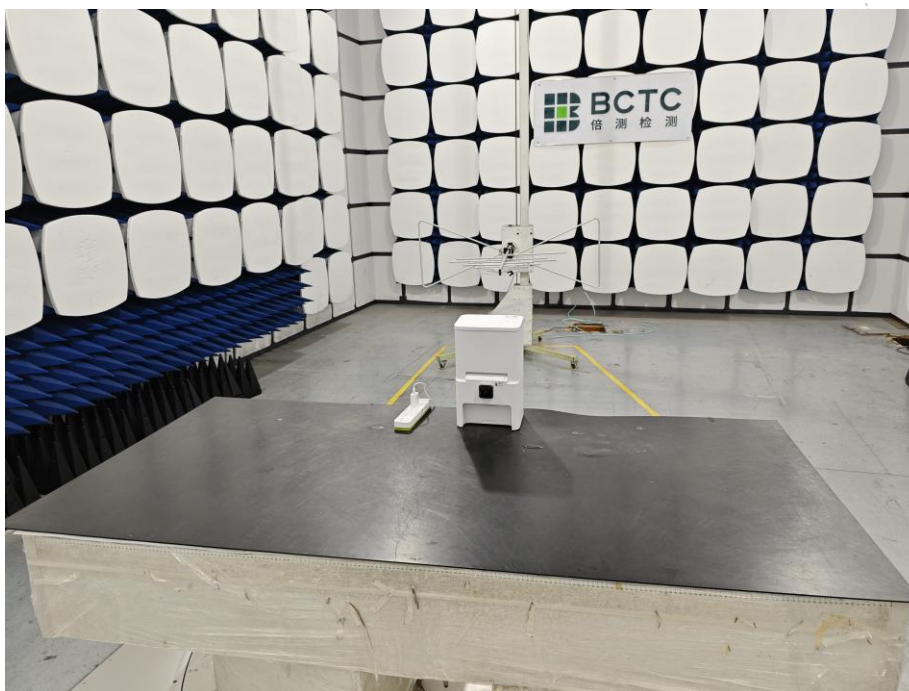
NOTE: Appendix-Photographs Of EUT Constructional Details.

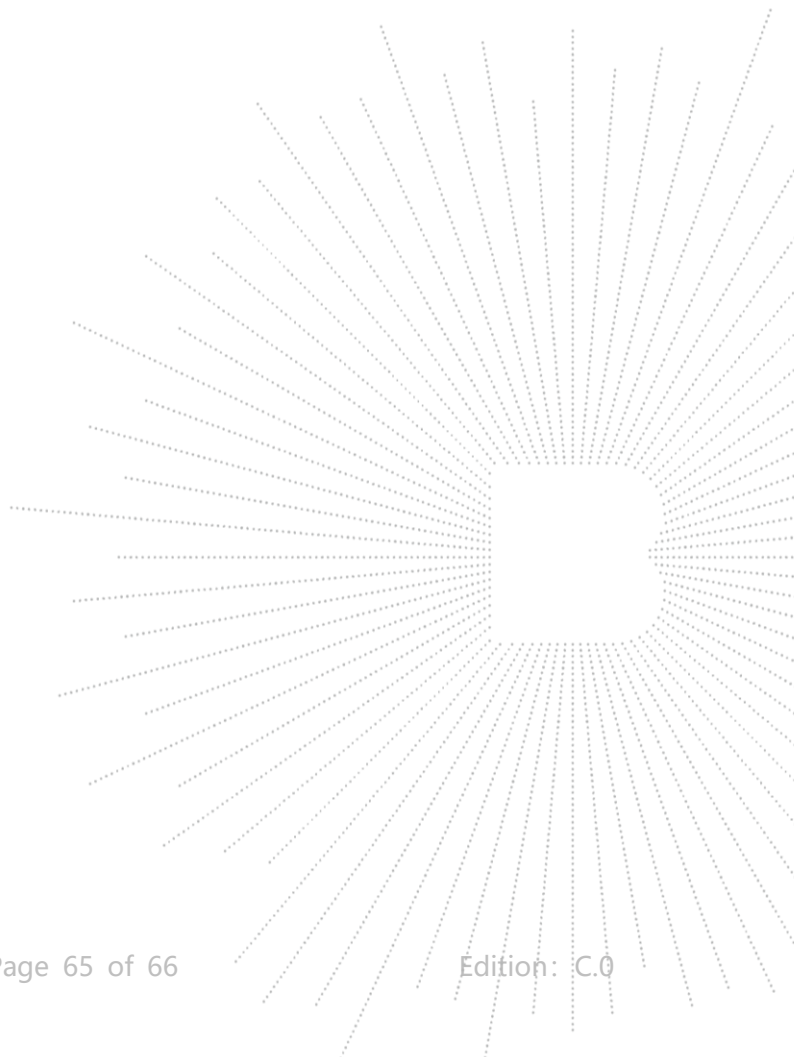
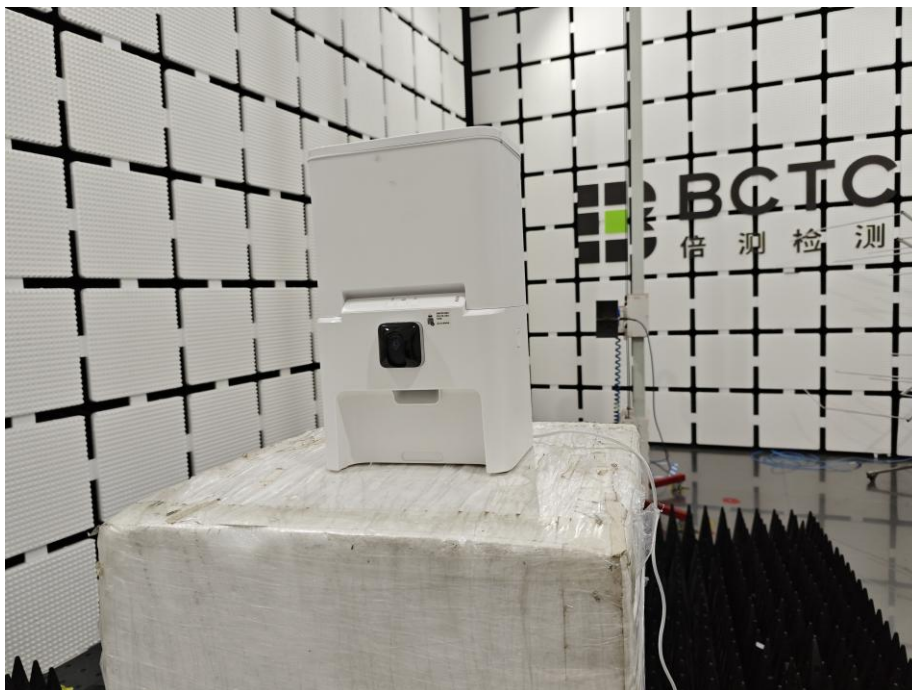
17. EUT Test Setup Photographs

Conducted Emissions Photo



Radiated Measurement Photos





STATEMENT

1. The equipment lists are traceable to the national reference standards.
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/IEC17025.
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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***** END *****