

TEST REPORT

Report No.: BCTC2312929228-2E

Applicant: Jiangsu Nicetown Intelligent Energy Co., Ltd

Product Name: AC EV CHARGER

Test Model: EVHome 50A

Tested Date: 2023-12-07 to 2023-12-29

Issued Date: 2023-12-29



Shenzhen **BCTC** Testing Co., Ltd.



FCC ID: 2BCJ4-EVHOME50A

Product Name: AC EV CHARGER

Trademark: NURZVIY

Model/Type Reference: EVHome 50A
EVHome 32A, EVHome 40A, EVHome 48A, EVHome 50A 14-50,
EVHome 50A 6-50, EVHome 48A 14-50, EVHome 48A 6-50,
EVHome 40A 14-50, EVHome 40A 6-50, EVHome 32A 14-50,
EVHome 32A 6-50

Prepared For: Jiangsu Nicetown Intelligent Energy Co., Ltd

Address: Room 1, Building 519, Chengxin Road, Jiangning District, Nanjing, Jiangsu, China

Manufacturer: Jiangsu Nicetown Intelligent Energy Co., Ltd

Address: Room 1, Building 519, Chengxin Road, Jiangning District, Nanjing, Jiangsu, China

Prepared By: Shenzhen BCTC Testing Co., Ltd.

Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road,
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Sample Received Date: 2023-12-07

Sample Tested Date: 2023-12-07 to 2023-12-29

Issue Date: 2023-12-29

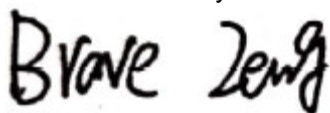
Report No.: BCTC2312929228-2E

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

Test Results: PASS

Remark: This is WIFI-5GHz band radio test report.

Tested by:



Brave Zeng/ Project Handler

Approved by:



Zero Zhou/Reviewer

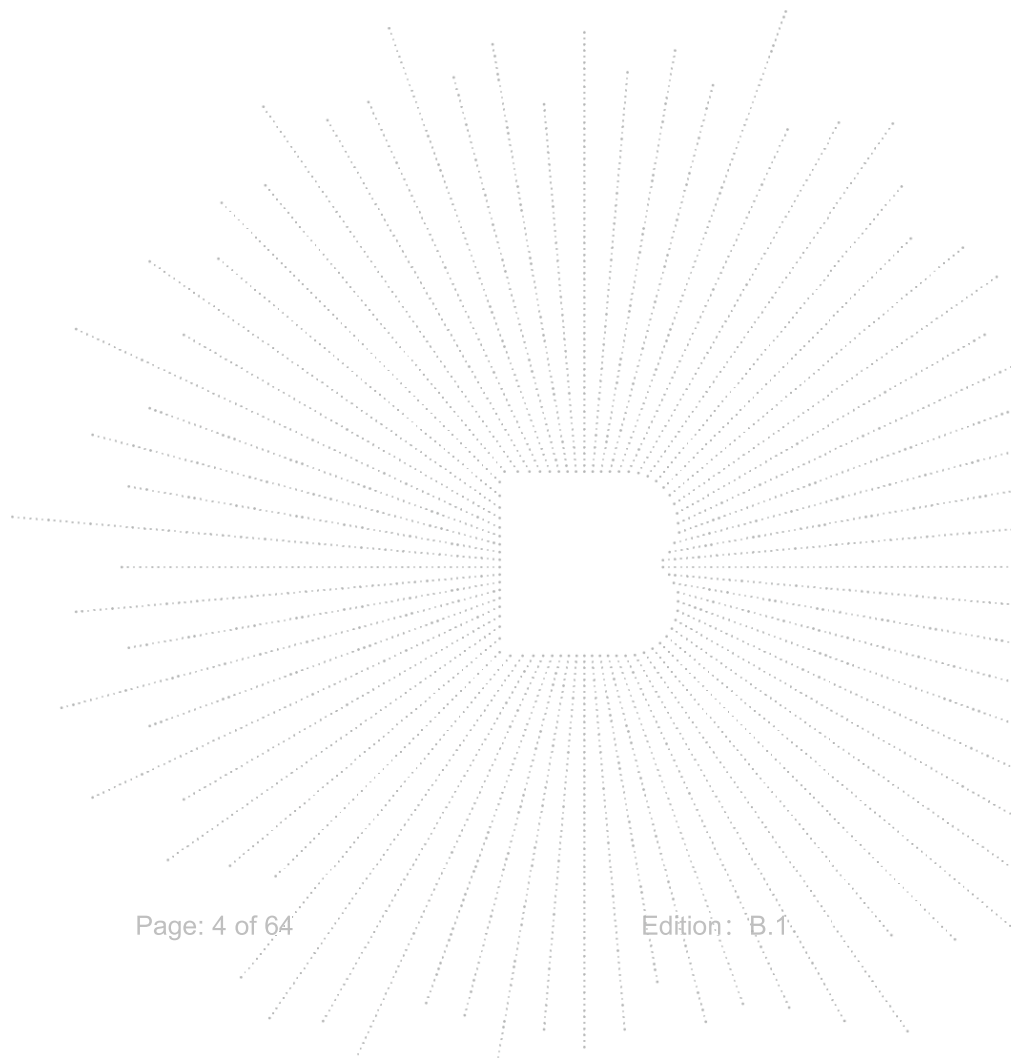
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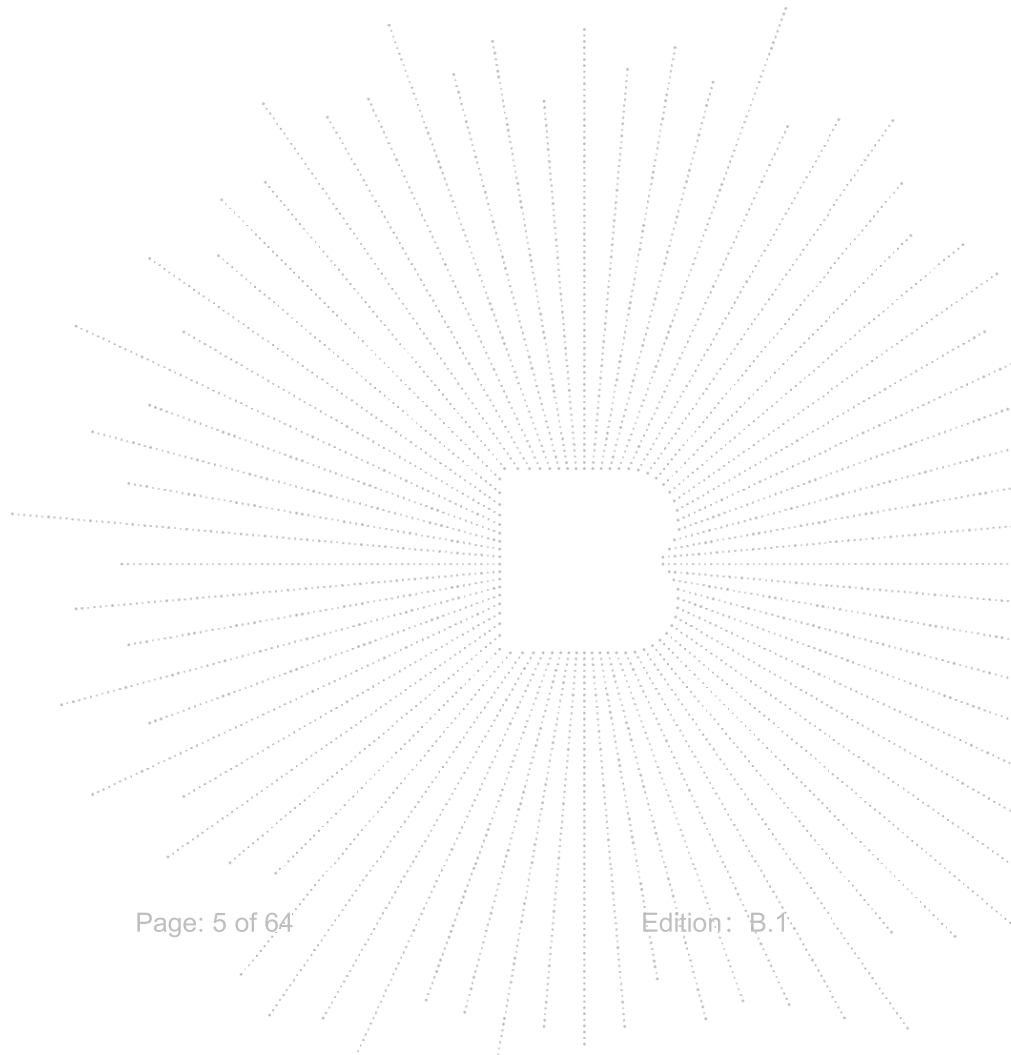
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(Note: N/A Means Not Applicable)



1. Version

Report No.	Issue Date	Description	Approved
BCTC2312929228-2E	2023-12-29	Original	Valid



2. Test Summary

The Product has been tested according to the following specifications:

1	Test Parameter	Clause No.	Results
1	Spurious Radiated Emissions	15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(8)	PASS
2	Conducted Emission	15.207	PASS
3	26 dB and 99% Emission Bandwidth	15.407 (a)(12) 15.1049	PASS
4	Minimum 6 dB bandwidth	15.407(e)	PASS
5	Maximum Conducted Output Power	15.407 (a)(1) 15.407 (a)(3)	PASS
6	Band Edge	2.1051, 15.205 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

Note: The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure.

3. Measurement Uncertainty

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

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

4. Product Information And Test Setup

4.1 Product Information

Model/Type Reference:	EVHome 50A EVHome 32A,EVHome 40A,EVHome 48A, EVHome 50A 14-50, EVHome 50A 6-50,EVHome 48A 14-50,EVHome 48A 6-50, EVHome 40A 14-50,EVHome 40A 6-50,EVHome 32A 14-50, EVHome 32A 6-50
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	802.11a/n (20MHz channel bandwidth)
Mode Supported:	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 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:	Internal antenna
Antenna Gain:	-0.43 dBi
Ratings:	AC 90-260V
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.

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	AC EV CHARGER	NURZVIY	EVHome 50A	/	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	0.3M	DC cable unshielded

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Channel List

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

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

Pretest Mode	Description
Mode 1	802.11a / n 20 CH36/ CH40/ CH 48
Mode 2	802.11n40 CH38/ CH 46
Mode 3	Link Mode

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

4.6 Table Of Parameters Of Text Software Setting

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

Test software Version	CMD		
Parameters	DEF	DEF	DEF

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address:1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, 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

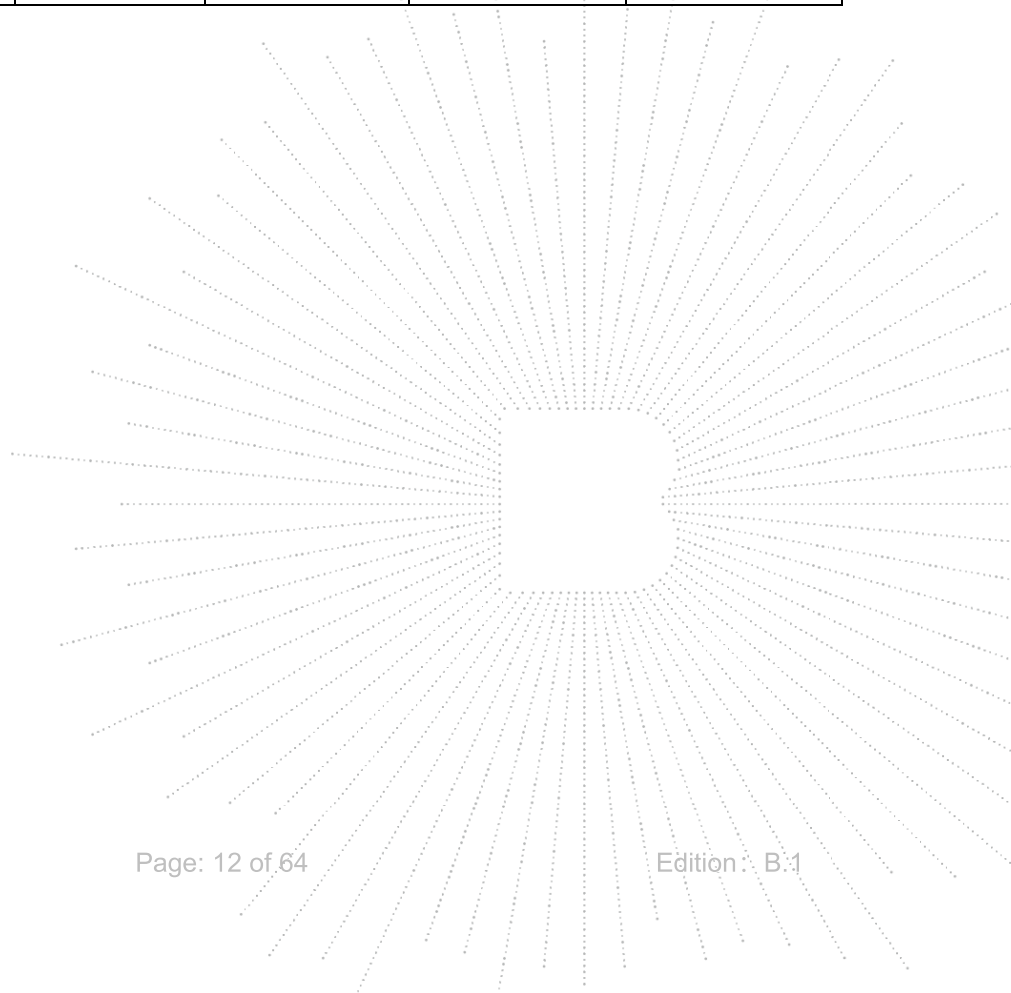
ISED CAB identifier: CN0017

5.2 Test Instrument Used

Conducted Emissions Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024
LISN	R&S	ENV216	101375	May 15, 2023	May 14, 2024
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\
Pulse limiter	Schwarzbeck	VTSD9561-F	01323	Sept. 22, 2023	Sept. 21, 2024

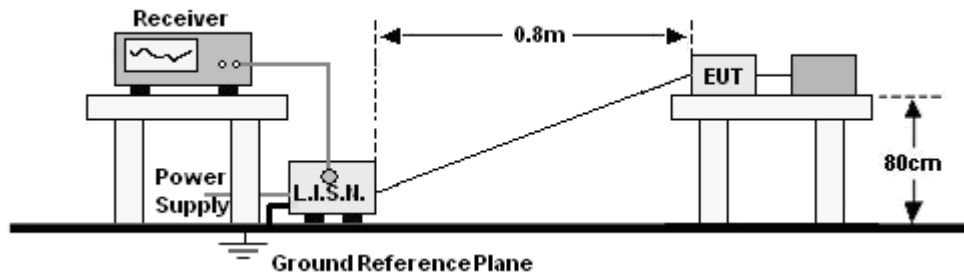
RF Conducted Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Power Metter	Keysight	E4419	\	May 15, 2023	May 14, 2024
Power Sensor (AV)	Keysight	E9300A	\	May 15, 2023	May 14, 2024
Signal Analyzer20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 15, 2023	May 14, 2024
Spectrum Analyzer9kHz-40GHz	R&S	FSP40	100363	May 15, 2023	May 14, 2024
Radio frequency control box	MAIWEI	MW100-RFC B	\	\	\
Software	MAIWEI	MTS 8310	\	\	\

Radiated Emissions Test (966 Chamber02)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	SKET	966 Room	966	Nov. 02. 2021	Nov. 01.2024
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024
Receiver	R&S	ESRI7	100010	Nov. 13. 2023	Nov. 12, 2024
Amplifier	SKET	LNPA-30M01 G-30	SK2021082004	Nov. 13. 2023	Nov. 12, 2024
TRILOG Broadband Antenna	Schwarzbeck	VULB9168	1323	Mar. 06, 2022	Mar. 05, 2024
Loop Antenna(9KHz -30MHz)	Schwarzbeck	FMZB1519B	00014	May 31, 2023	May 30, 2024
Amplifier	SKET	LAPA_01G1 8G-45dB	SK2021040901	May 15, 2023	May 14, 2024
Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 31, 2023	May 30, 2024
Amplifier(18G Hz-40GHz)	MITEQ	TTA1840-35- HG	2034381	May 15, 2023	May 14, 2024
Horn Antenn(18GH z-40GHz)	Schwarzbeck	BBHA9170	00822	May 31, 2023	May 30, 2024
Spectrum Analyzer9kHz- 40GHz	R&S	FSP40	100363	May 15, 2023	May 14, 2024
Software	Frad	EZ-EMC	FA-03A2 RE	\	\



6. Conducted Emissions

6.1 Block Diagram Of Test Setup



6.2 Limit

Frequency (MHz)	Limit (dBuV)	
	Quas-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Notes:
1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

6.3 Test procedure

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

- 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.

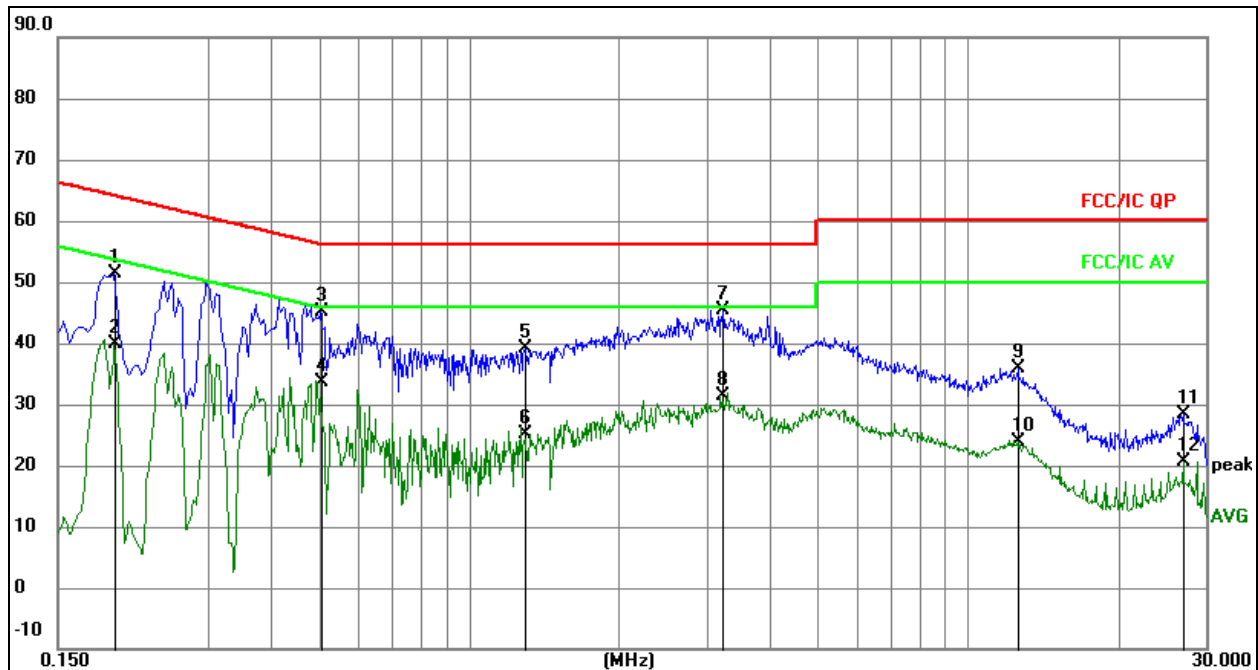
6.4 EUT operating Conditions

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.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

6.5 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	Mode 13	Polarization:	L1

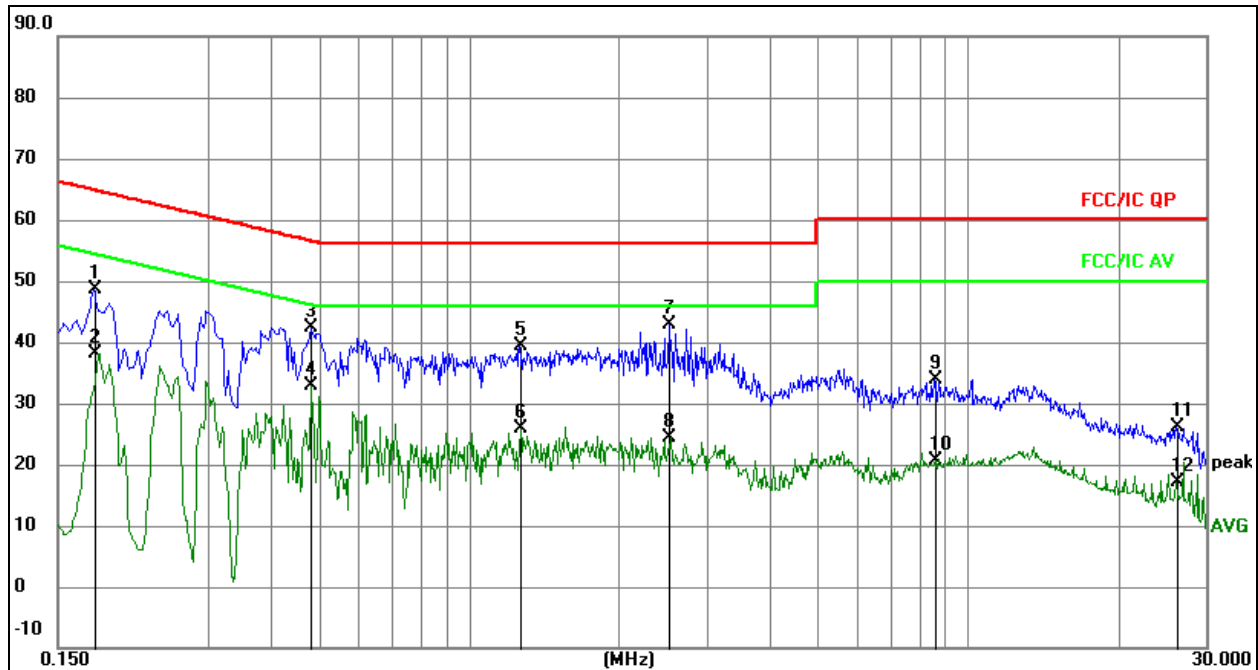


Remark:

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	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1945	41.75	9.60	51.35	63.84	-12.49	QP
2		0.1945	30.28	9.60	39.88	53.84	-13.96	AVG
3		0.5047	35.40	9.62	45.02	56.00	-10.98	QP
4		0.5047	23.97	9.62	33.59	46.00	-12.41	AVG
5		1.2960	29.43	9.73	39.16	56.00	-16.84	QP
6		1.2960	15.45	9.73	25.18	46.00	-20.82	AVG
7	*	3.2239	35.58	9.80	45.38	56.00	-10.62	QP
8		3.2239	21.49	9.80	31.29	46.00	-14.71	AVG
9		12.5821	26.16	9.66	35.82	60.00	-24.18	QP
10		12.5821	14.11	9.66	23.77	50.00	-26.23	AVG
11		26.9836	18.71	9.72	28.43	60.00	-31.57	QP
12		26.9836	10.80	9.72	20.52	50.00	-29.48	AVG

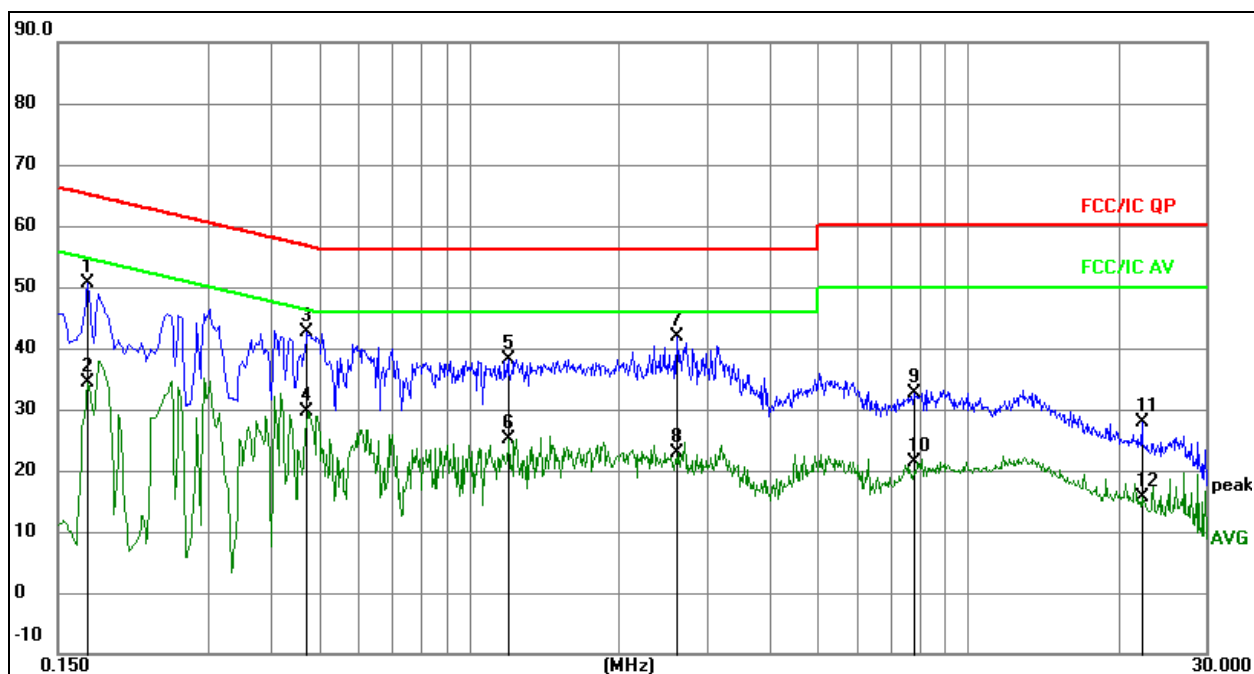
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	Mode 13	Polarization:	L2


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		0.1770	39.18	9.56	48.74	64.63	-15.89	QP
2		0.1770	28.54	9.56	38.10	54.63	-16.53	AVG
3		0.4830	32.87	9.62	42.49	56.29	-13.80	QP
4		0.4830	23.21	9.62	32.83	46.29	-13.46	AVG
5		1.2660	29.71	9.73	39.44	56.00	-16.56	QP
6		1.2660	16.08	9.73	25.81	46.00	-20.19	AVG
7	*	2.5215	33.02	9.76	42.78	56.00	-13.22	QP
8		2.5215	14.62	9.76	24.38	46.00	-21.62	AVG
9		8.5470	24.22	9.70	33.92	60.00	-26.08	QP
10		8.5470	11.01	9.70	20.71	50.00	-29.29	AVG
11		26.2050	16.35	9.73	26.08	60.00	-33.92	QP
12		26.2050	7.36	9.73	17.09	50.00	-32.91	AVG

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	Mode 13	Polarization:	L3

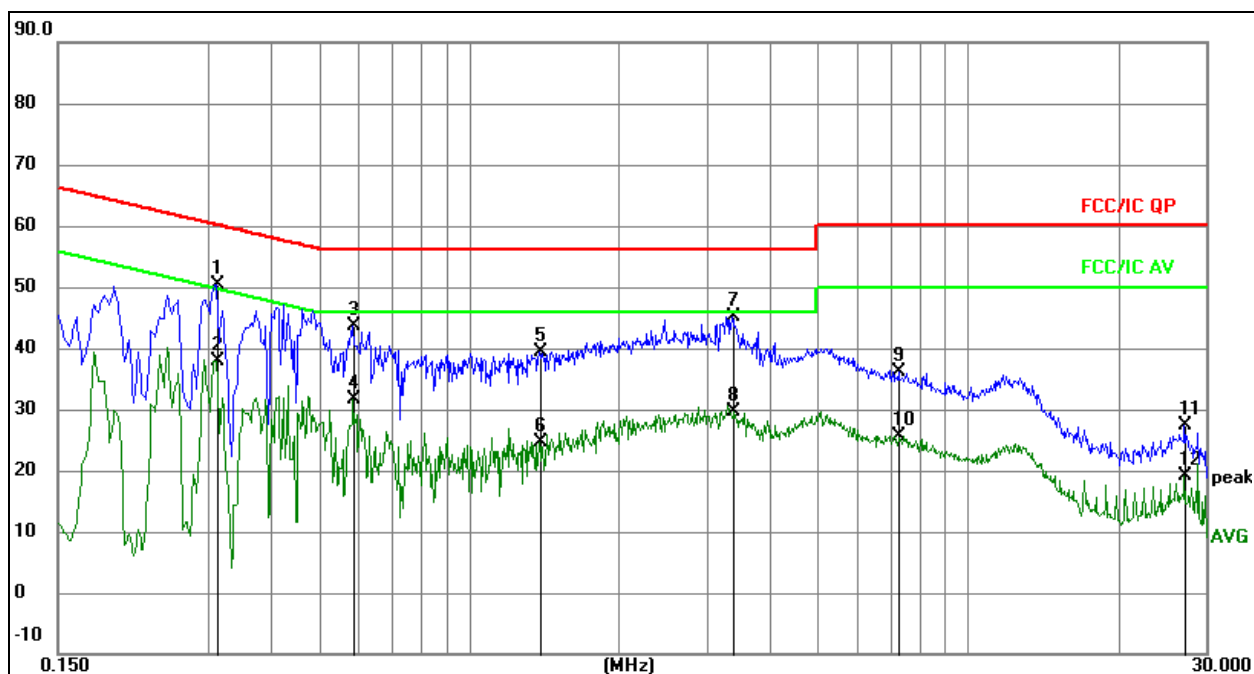


Remark:

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	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	0.1720	40.98	9.55	50.53	64.86	-14.33	QP
2	0.1720	24.71	9.55	34.26	54.86	-20.60	AVG
3 *	0.4736	32.94	9.62	42.56	56.45	-13.89	QP
4	0.4736	19.92	9.62	29.54	46.45	-16.91	AVG
5	1.1970	28.38	9.73	38.11	56.00	-17.89	QP
6	1.1970	15.41	9.73	25.14	46.00	-20.86	AVG
7	2.6082	32.13	9.76	41.89	56.00	-14.11	QP
8	2.6082	13.11	9.76	22.87	46.00	-23.13	AVG
9	7.8101	22.80	9.72	32.52	60.00	-27.48	QP
10	7.8101	11.57	9.72	21.29	50.00	-28.71	AVG
11	22.2977	18.17	9.76	27.93	60.00	-32.07	QP
12	22.2977	5.81	9.76	15.57	50.00	-34.43	AVG

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	Mode 13	Polarization:	N


Remark:

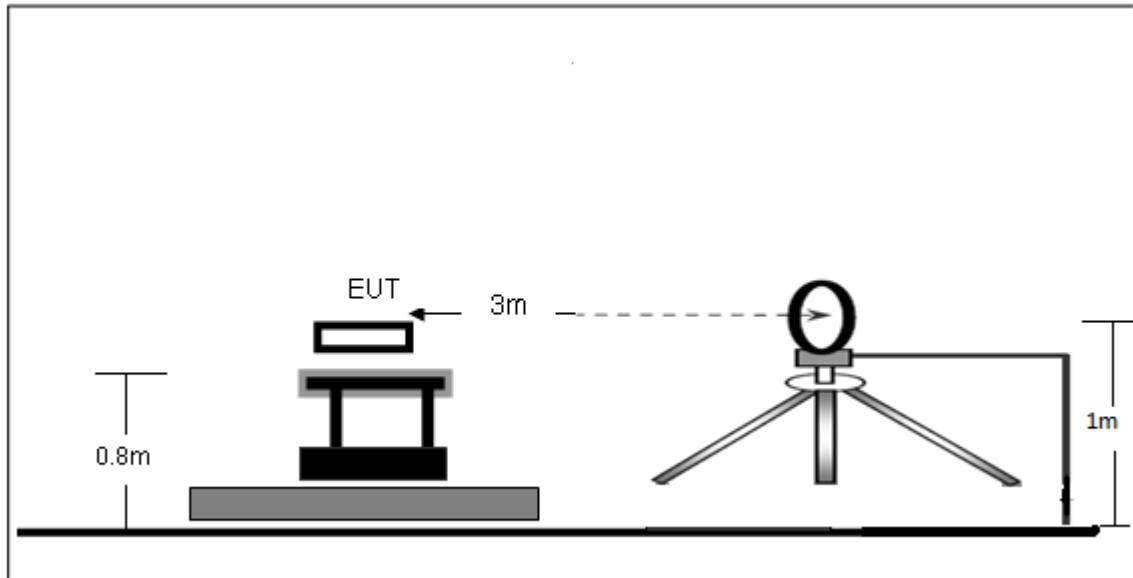
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. Measurement = Reading Level + Correct Factor
4. Over = Measurement - Limit

No.	Mk.	Freq. MHz	Reading Level	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.3120	40.86	9.61	50.47	59.92	-9.45	QP
2		0.3120	28.32	9.61	37.93	49.92	-11.99	AVG
3		0.5864	34.08	9.62	43.70	56.00	-12.30	QP
4		0.5864	22.11	9.62	31.73	46.00	-14.27	AVG
5		1.3874	29.75	9.73	39.48	56.00	-16.52	QP
6		1.3874	14.81	9.73	24.54	46.00	-21.46	AVG
7		3.3765	35.33	9.81	45.14	56.00	-10.86	QP
8		3.3765	19.93	9.81	29.74	46.00	-16.26	AVG
9		7.2600	26.32	9.73	36.05	60.00	-23.95	QP
10		7.2600	16.01	9.73	25.74	50.00	-24.26	AVG
11		27.1410	17.69	9.72	27.41	60.00	-32.59	QP
12		27.1410	9.32	9.72	19.04	50.00	-30.96	AVG

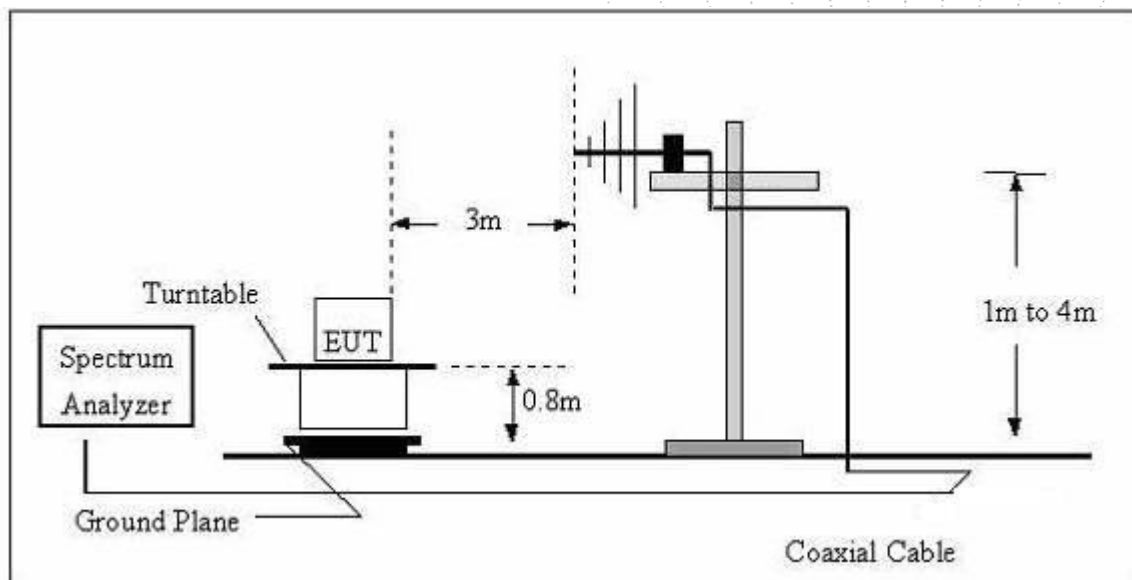
7. Radiated Emissions

7.1 Block Diagram Of Test Setup

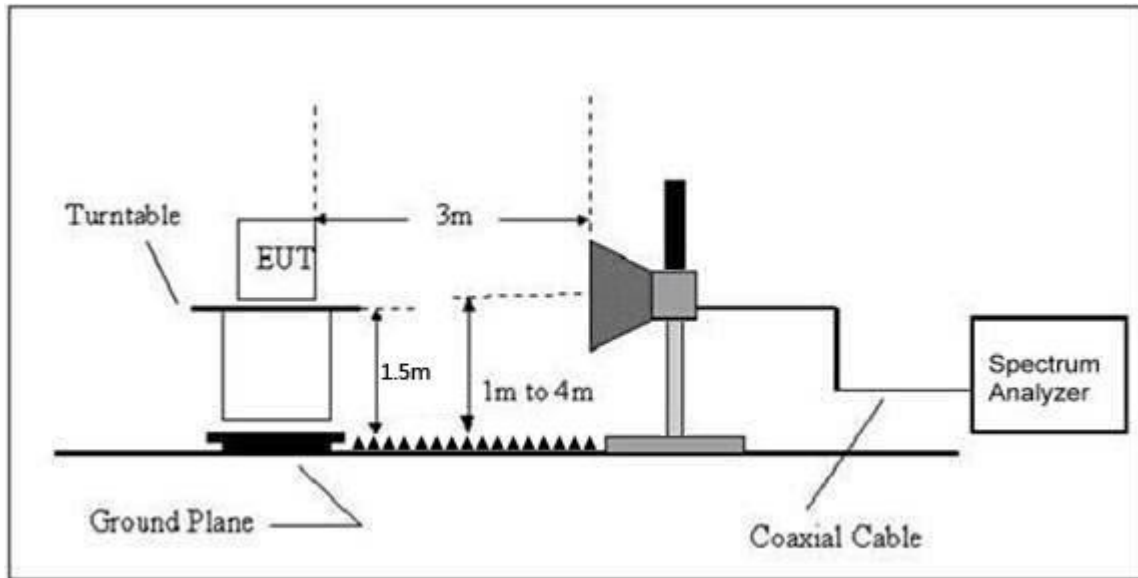
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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(kHz)	300	$10000 * 2400/F(\text{kHz})$	$20\log(2400/F(\text{kHz})) + 80$
0.490 ~ 1.705	24000/F(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).

The provisions of §15.205 apply to intentional radiators operating under this section, 15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

- Remark:
1. Emission level in dBuV/m=20 log (uV/m)
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

7.3 Test procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205.

It must be performed with the highest gain of each type of antenna proposed for use with the EUT.

Use the following spectrum analyzer settings:

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

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

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.

- c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

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

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

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

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where $RBWCF [dB] = 10 \cdot \lg(100 [kHz] / \text{narrower RBW [kHz]})$. , 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:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	Mode 3		

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

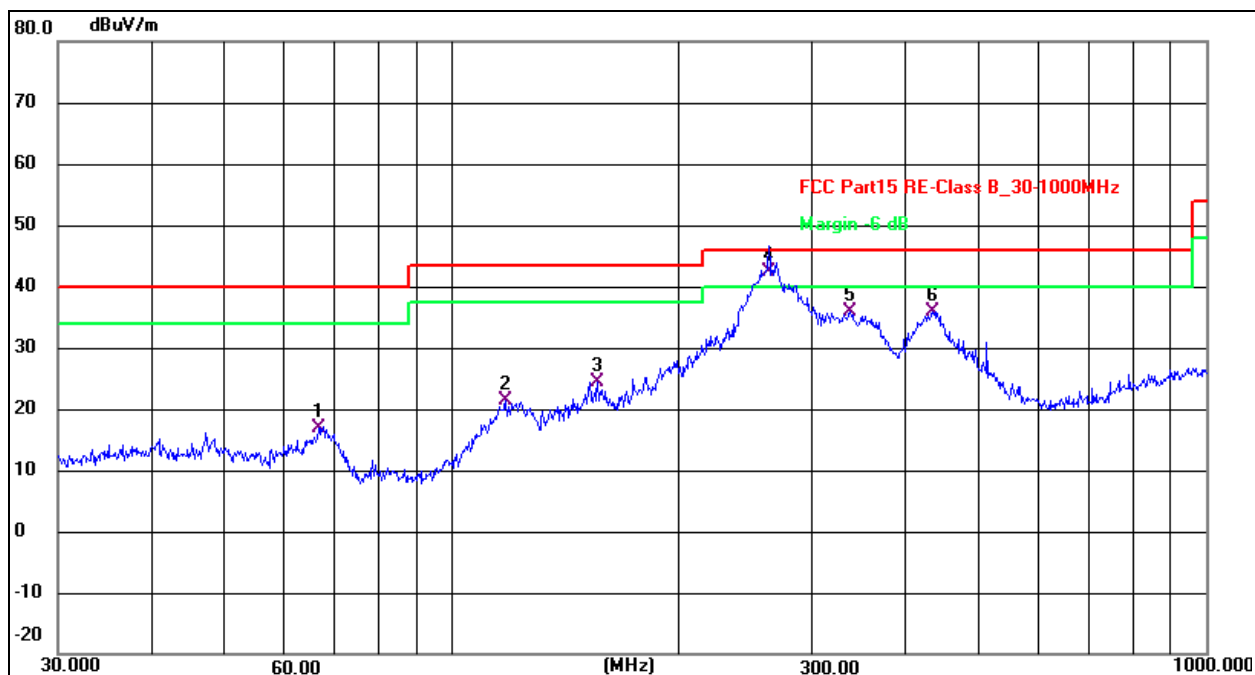
Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	Mode 3	Polarization:	Horizontal

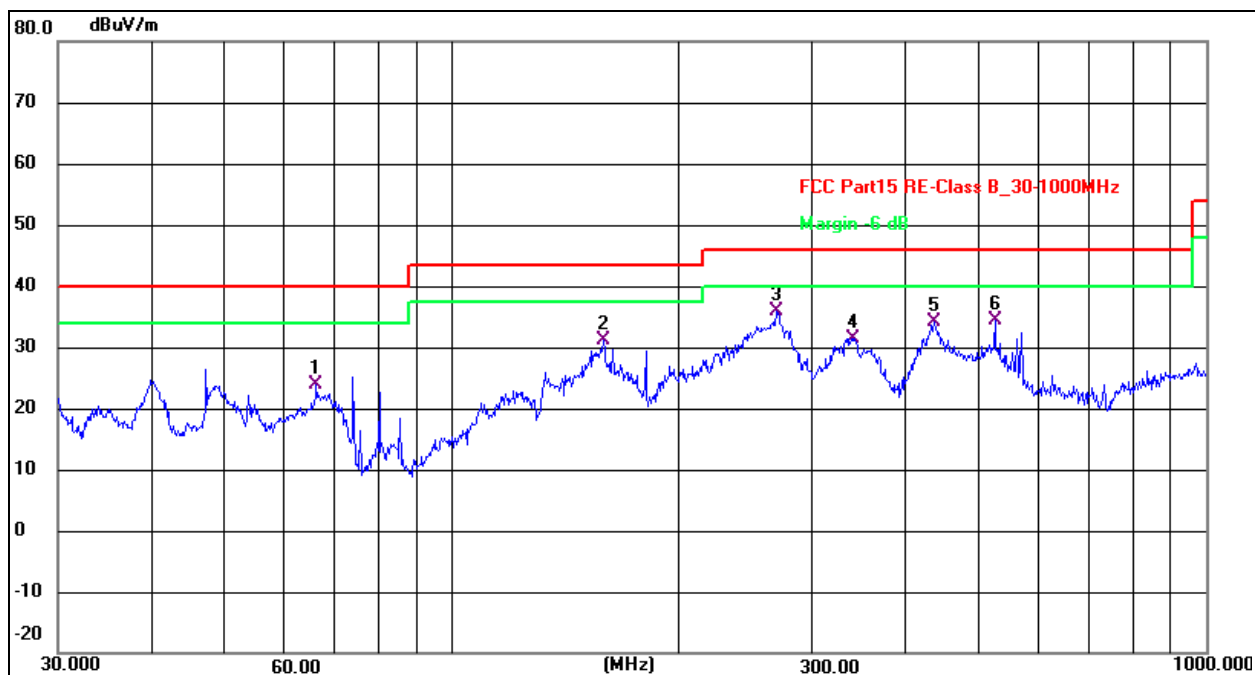


Remark:

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

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	66.4989	32.89	-15.89	17.00	40.00	-23.00	QP
2	117.7725	38.32	-17.05	21.27	43.50	-22.23	QP
3	155.9101	39.22	-14.72	24.50	43.50	-19.00	QP
4 *	262.8955	56.65	-14.31	42.34	46.00	-3.66	QP
5	337.2155	48.31	-12.34	35.97	46.00	-10.03	QP
6	434.0651	45.22	-9.24	35.98	46.00	-10.02	QP

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	Mode 3	Polarization:	Vertical



Remark:

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

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	66.0342	39.70	-15.84	23.86	40.00	-16.14	QP
2	158.6677	46.07	-14.86	31.21	43.50	-12.29	QP
3 *	269.4284	49.85	-14.07	35.78	46.00	-10.22	QP
4	340.7817	43.74	-12.28	31.46	46.00	-14.54	QP
5	435.5898	43.21	-9.19	34.02	46.00	-11.98	QP
6	524.5541	39.57	-5.28	34.29	46.00	-11.71	QP

Test Mode:	TX(5.1G) - 802.11a
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Polar (H/V)	Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measurement (dBuV/m)	Limits (dBuV/m)	Over (dB)	Detector Type
Low Channel (5180 MHz)-Above 1G							
V	4434.137	73.20	-20.73	52.47	68.2	-15.73	PK
V	4434.137	59.32	-20.73	38.59	54	-15.41	AV
V	10360.187	61.36	-9.36	52.00	68.2	-16.20	PK
V	10360.187	49.72	-9.36	40.36	54	-13.64	AV
V	15540.190	61.47	-7.84	53.63	74	-20.37	PK
V	15540.190	49.68	-7.84	41.84	54	-12.16	AV
H	4434.028	70.74	-20.73	50.01	68.2	-18.19	PK
H	4434.028	59.53	-20.73	38.80	54	-15.20	AV
H	10360.050	60.59	-9.36	51.23	68.2	-16.97	PK
H	10360.050	49.52	-9.36	40.16	54	-13.84	AV
H	15540.160	60.35	-7.84	52.51	74	-21.49	PK
H	15540.160	49.97	-7.84	42.13	54	-11.87	AV
Middle Channel (5200 MHz)-Above 1G							
V	4592.169	71.97	-20.42	51.55	74	-22.45	PK
V	4592.169	59.61	-20.42	39.19	54	-14.81	AV
V	10400.168	64.01	-9.30	54.71	68.2	-13.49	PK
V	10400.168	49.70	-9.30	40.40	54	-13.60	AV
V	15600.110	63.79	-7.82	55.97	74	-18.03	PK
V	15600.110	49.58	-7.82	41.76	54	-12.24	AV
H	4592.198	74.27	-20.42	53.86	74	-20.14	PK
H	4592.198	59.30	-20.42	38.88	54	-15.12	AV
H	10400.181	63.17	-9.30	53.87	68.2	-14.33	PK
H	10400.181	49.24	-9.30	39.94	54	-14.06	AV
H	15600.150	64.38	-7.82	56.56	74	-17.44	PK
H	15600.150	49.45	-7.82	41.63	54	-12.37	AV
High Channel (5240 MHz)-Above 1G							
V	4739.058	71.46	-20.12	51.34	74	-22.66	PK
V	4739.058	59.87	-20.12	39.74	54	-14.26	AV
V	10480.074	64.02	-9.18	54.84	68.2	-13.36	PK
V	10480.074	49.94	-9.18	40.76	54	-13.24	AV
V	15720.029	64.03	-7.78	56.25	74	-17.75	PK
V	15720.029	49.10	-7.78	41.32	54	-12.68	AV
H	4739.154	74.66	-20.12	54.54	74	-19.46	PK
H	4739.154	59.01	-20.12	38.89	54	-15.11	AV
H	10480.163	64.03	-9.18	54.85	68.2	-13.35	PK
H	10480.163	49.70	-9.18	40.52	54	-13.48	AV
H	15720.178	64.57	-7.78	56.79	74	-17.21	PK
H	15720.178	49.58	-7.78	41.80	54	-12.20	AV

Note: PK value is lower than the Average value limit, So average didn't record.

The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode:	TX(5.1G) - 802.11n-HT20
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Polar (H/V)	Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector Type
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G							
V	4434.057	71.93	-20.73	51.20	68.2	-17.00	PK
V	4434.057	59.78	-20.73	39.05	54	-14.95	AV
V	10360.113	62.91	-9.36	53.55	68.2	-14.65	PK
V	10360.113	49.39	-9.36	40.03	54	-13.97	AV
V	15540.035	64.89	-7.84	57.05	74	-16.95	PK
V	15540.035	49.28	-7.84	41.44	54	-12.56	AV
H	4434.079	72.88	-20.73	52.15	68.2	-16.05	PK
H	4434.079	59.91	-20.73	39.18	54	-14.82	AV
H	10360.052	60.17	-9.36	50.81	68.2	-17.39	PK
H	10360.052	49.41	-9.36	40.05	54	-13.95	AV
H	15540.042	61.46	-7.84	53.62	74	-20.38	PK
H	15540.042	49.87	-7.84	42.03	54	-11.97	AV
Middle Channel (5200 MHz)-Above 1G							
V	4592.137	71.41	-20.42	50.99	74	-23.01	PK
V	4592.137	59.53	-20.42	39.11	54	-14.89	AV
V	10400.064	60.33	-9.30	51.03	68.2	-17.17	PK
V	10400.064	49.37	-9.30	40.07	54	-13.93	AV
V	15600.180	64.71	-7.82	56.89	74	-17.11	PK
V	15600.180	49.04	-7.82	41.22	54	-12.78	AV
H	4592.164	71.99	-20.42	51.57	74	-22.43	PK
H	4592.164	59.72	-20.42	39.31	54	-14.69	AV
H	10400.181	62.14	-9.30	52.84	68.2	-15.36	PK
H	10400.181	49.15	-9.30	39.85	54	-14.15	AV
H	15600.091	63.12	-7.82	55.30	74	-18.70	PK
H	15600.091	49.51	-7.82	41.69	54	-12.31	AV
High Channel (5240 MHz)-Above 1G							
V	4739.188	74.57	-20.12	54.45	74	-19.55	PK
V	4739.188	59.25	-20.12	39.13	54	-14.87	AV
V	10480.091	64.67	-9.18	55.49	68.2	-12.71	PK
V	10480.091	49.25	-9.18	40.07	54	-13.93	AV
V	15720.161	60.26	-7.78	52.48	74	-21.52	PK
V	15720.161	49.92	-7.78	42.14	54	-11.86	AV
H	4739.093	74.34	-20.12	54.22	74	-19.78	PK
H	4739.093	59.14	-20.12	39.02	54	-14.98	AV
H	10480.158	62.48	-9.18	53.30	68.2	-14.90	PK
H	10480.158	49.02	-9.18	39.84	54	-14.16	AV
H	15720.198	63.03	-7.78	55.25	74	-18.75	PK
H	15720.198	49.09	-7.78	41.31	54	-12.69	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 (H/V)	Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector Type
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5190 MHz)-Above 1G							
V	4434.194	70.94	-20.73	50.21	68.2	-17.99	PK
V	4434.194	59.81	-20.73	39.08	54	-14.92	AV
V	10380.159	61.56	-9.33	52.23	68.2	-15.97	PK
V	10380.159	49.10	-9.33	39.77	54	-14.23	AV
V	15570.098	61.16	-7.83	53.33	74	-20.67	PK
V	15570.098	49.69	-7.83	41.86	54	-12.14	AV
H	4434.042	71.49	-20.73	50.75	74	-23.25	PK
H	4434.042	59.67	-20.73	38.94	54	-15.06	AV
H	10380.151	62.65	-9.33	53.32	68.2	-14.88	PK
H	10380.151	49.03	-9.33	39.70	54	-14.30	AV
H	15570.155	64.64	-7.83	56.81	74	-17.19	PK
H	15570.155	49.57	-7.83	41.74	54	-12.26	AV
High Channel (5230 MHz)-Above 1G							
V	4739.073	74.00	-20.12	53.88	68.2	-14.32	PK
V	4739.073	59.80	-20.12	39.68	54	-14.32	AV
V	10460.063	63.03	-9.21	53.82	68.2	-14.38	PK
V	10460.063	49.29	-9.21	40.08	54	-13.92	AV
V	15690.118	61.53	-7.79	53.74	74	-20.26	PK
V	15690.118	49.36	-7.79	41.57	54	-12.43	AV
H	4739.065	71.59	-20.12	51.47	68.2	-16.73	PK
H	4739.065	59.98	-20.12	39.86	54	-14.14	AV
H	10460.008	61.56	-9.21	52.35	68.2	-15.85	PK
H	10460.008	49.19	-9.21	39.98	54	-14.02	AV
H	15690.169	62.89	-7.79	55.10	74	-18.90	PK
H	15690.169	49.52	-7.79	41.73	54	-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).

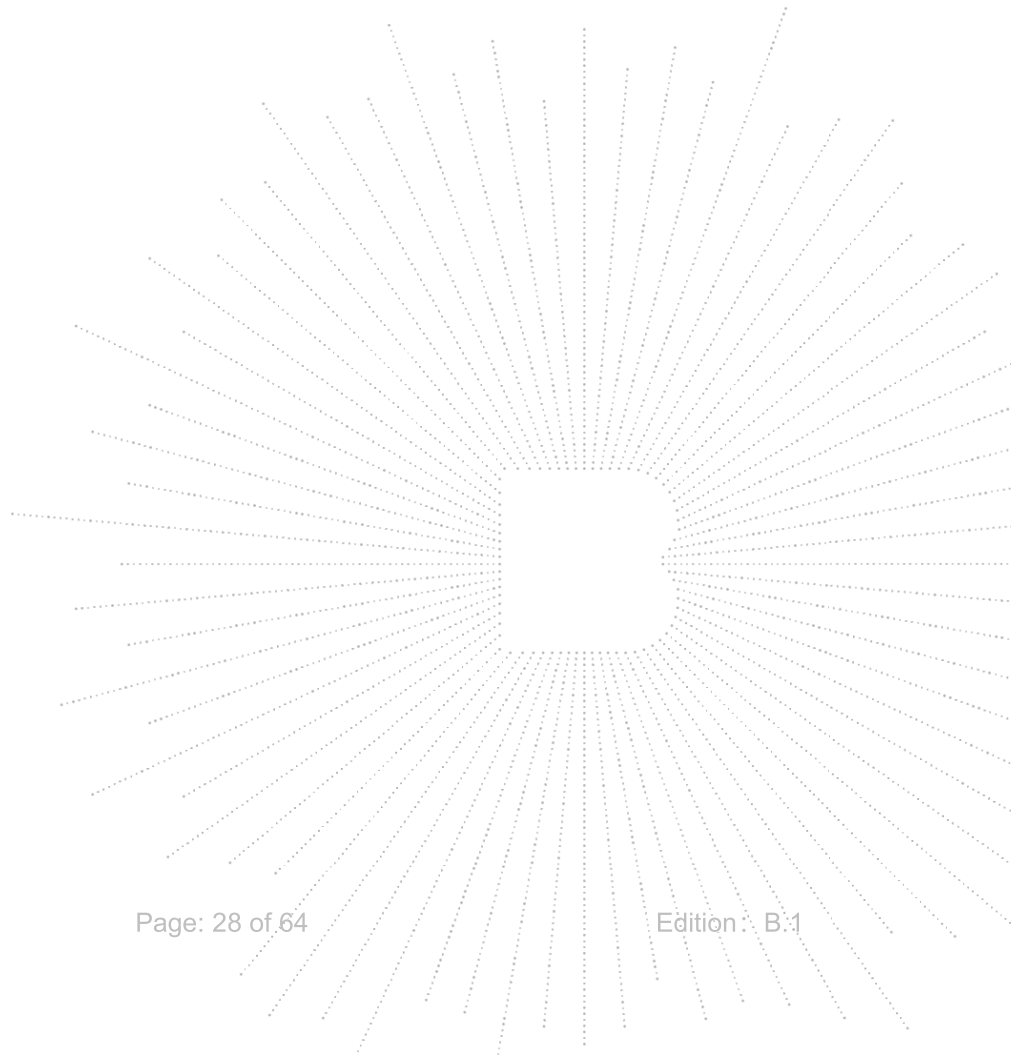
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

- ☒ Undesirable radiated Undesirable radiated Spurious Emission in Band Edge
- All the modes 802.11a/n has been tested and the worst result 802.11n20 recorded as below:

Test mode	Polar (H/V)	Frequency (MHz)	Reading Level (dBuV/m)	Correct Factor (dB)	Measurement (dBuV/m)	Limits (dBuV/m)		Over	Result
					PK	PK	AV	PK	
802.11n20	Low Channel 5180MHz								
	H	5150	70.25	-18.65	51.6	74.00	54.00	-22.4	PASS
	V	5350	64.59	-18.41	46.18	74.00	54.00	-27.82	PAS
	High Channel 5240MHz								
	H	5150	71.36	-18.65	52.71	74.00	54.00	-21.29	PASS
	V	5350	64.34	-18.41	45.93	74.00	54.00	-28.07	PASS

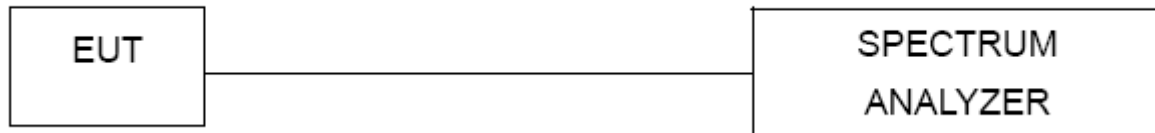
Remark:

1. Measurement = Reading Level + Correct Factor, Correct Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.
- 3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB
4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



8. Power Spectral Density Test

8.1 Block Diagram Of Test Setup



8.2 Limit

For the band 5.15-5.25 GHz,

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

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

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

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

For the band 5.725-5.85 GHz

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

8.3 Test procedure

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

- a) Set $RBW \geq 1/T$, 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 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 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.

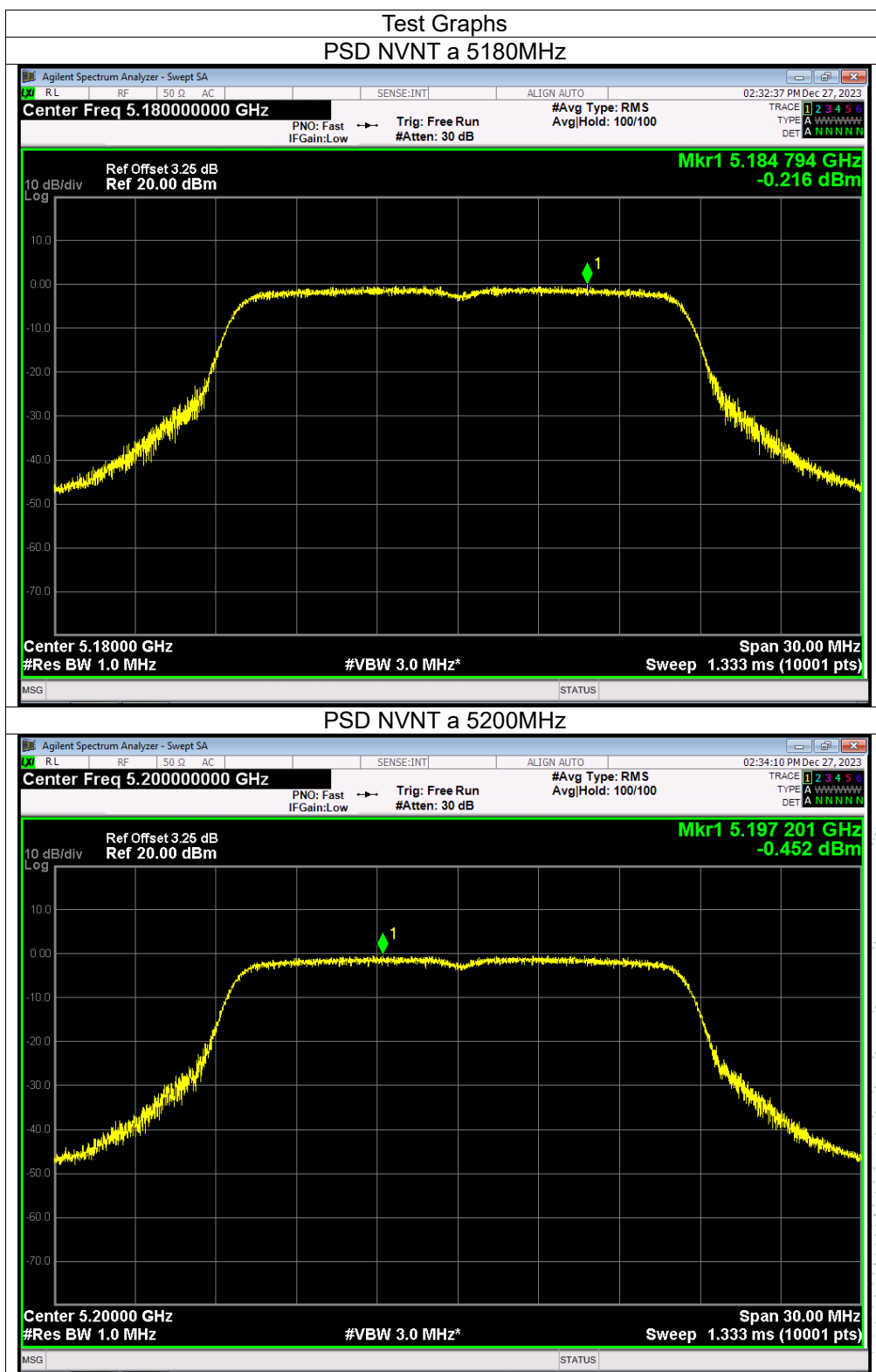
8.4 EUT operating Conditions

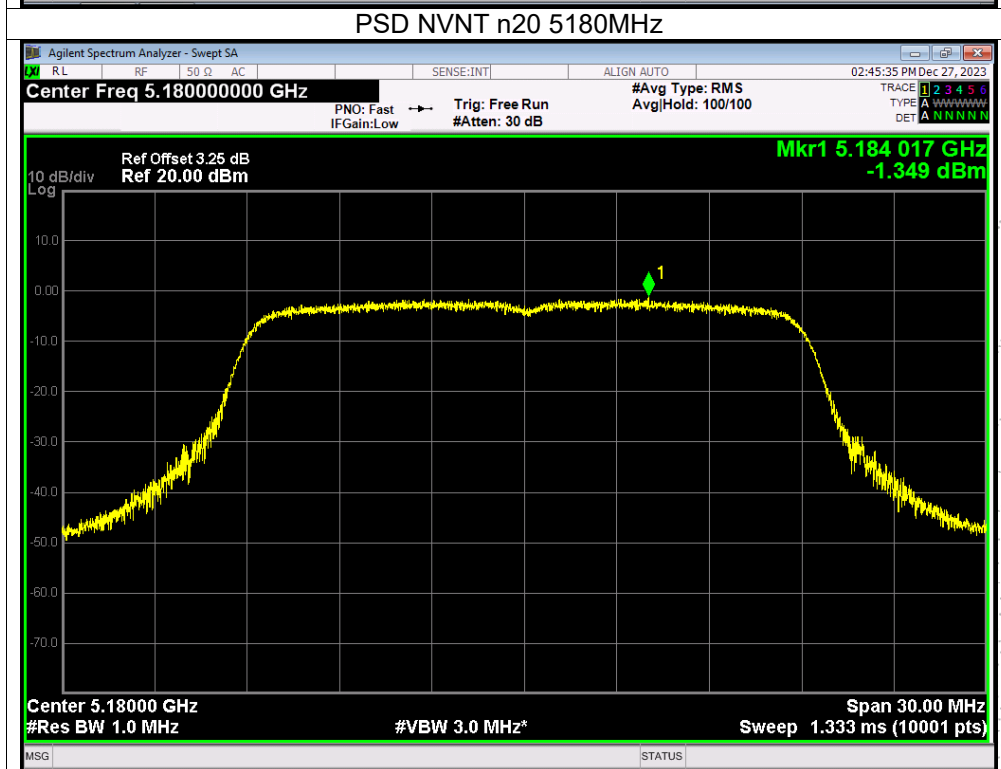
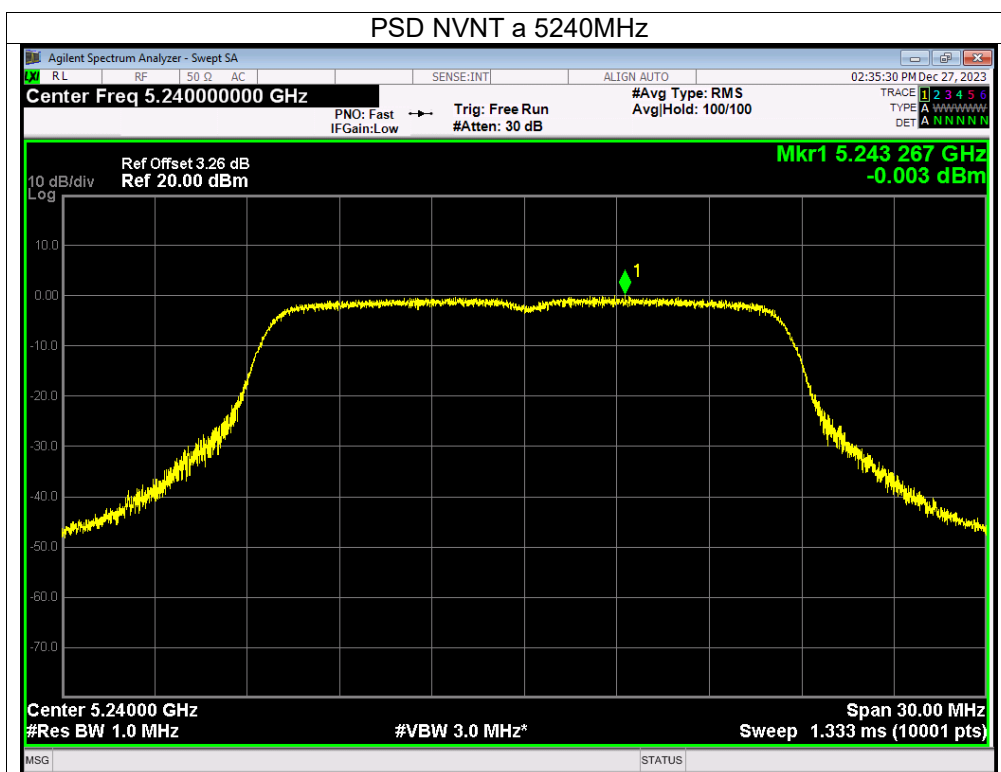
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

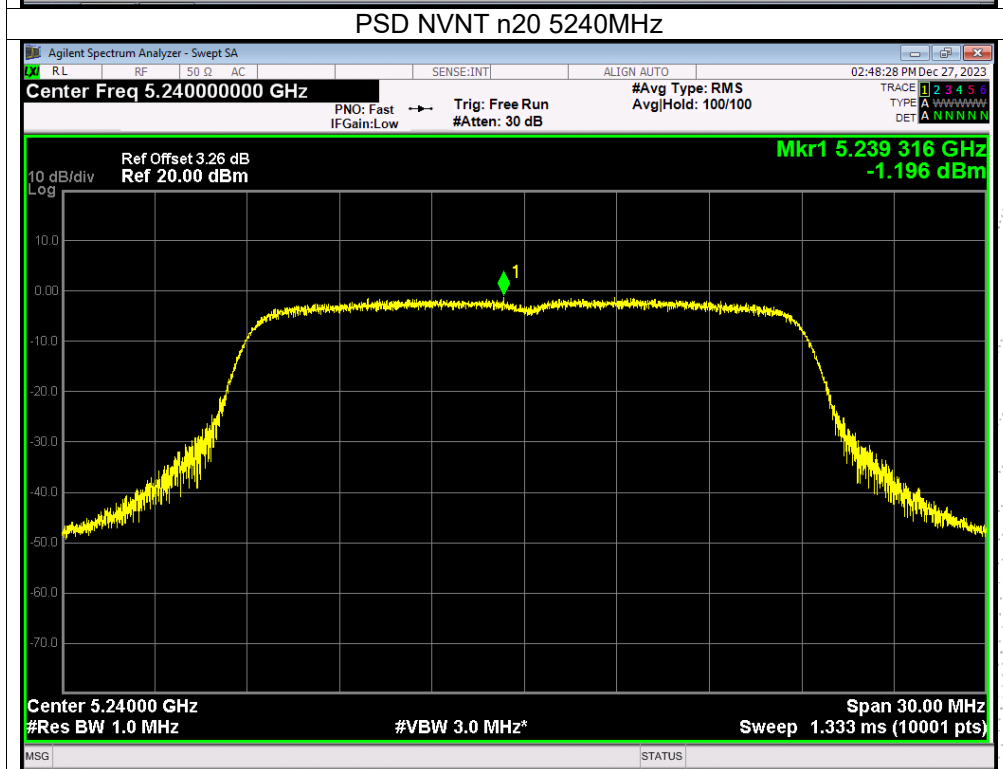
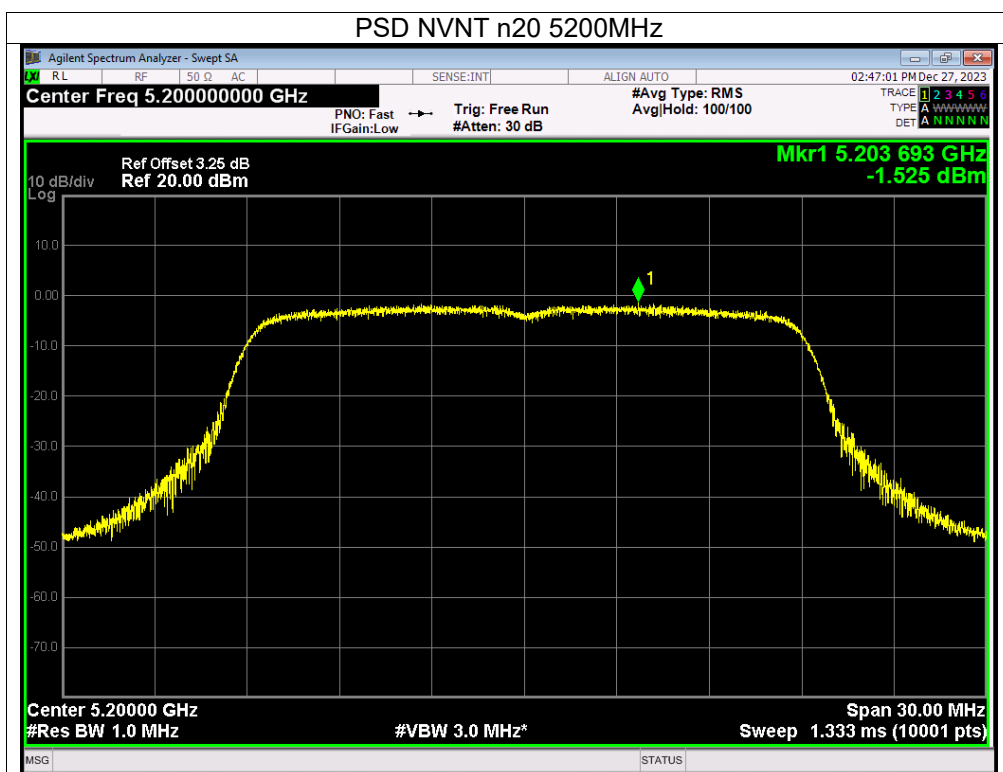
8.5 Test Result

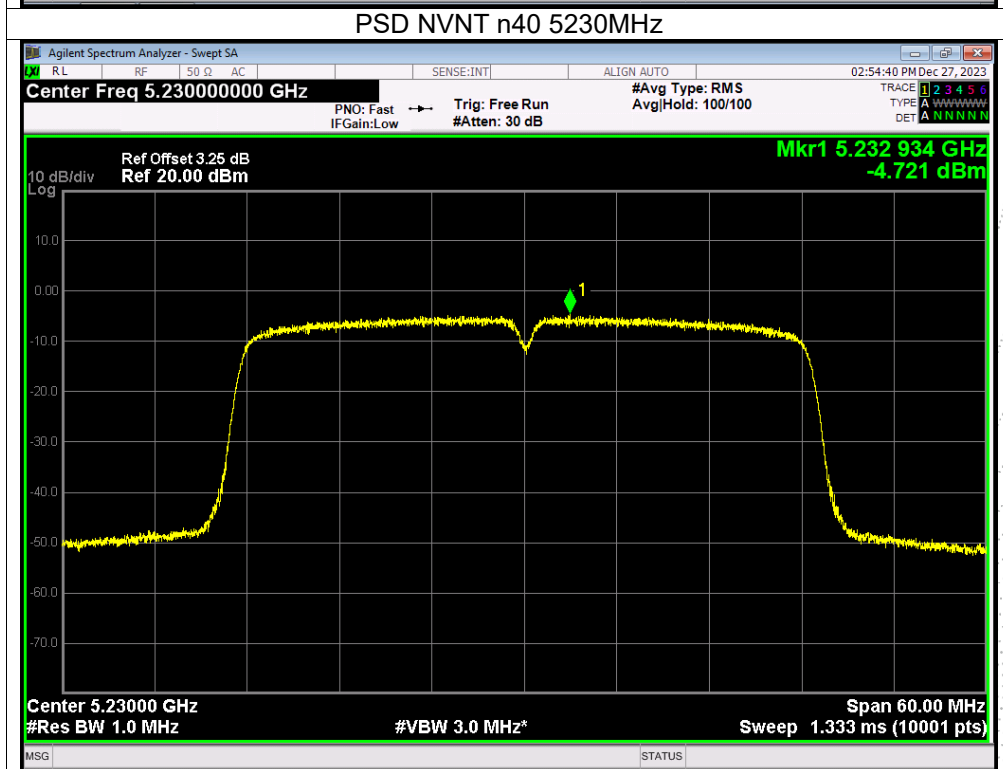
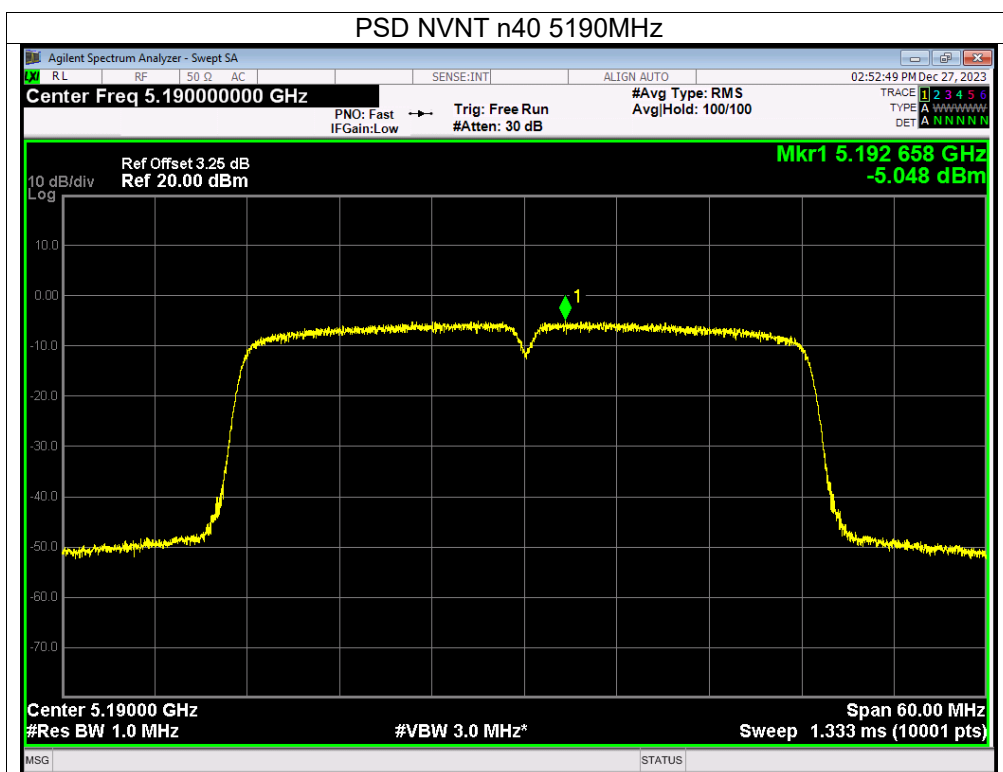
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	(5180-5240MHz)		

Condition	Mode	Frequency (MHz)	Conducted PSD (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	-0.22	11	Pass
NVNT	a	5200	-0.45	11	Pass
NVNT	a	5240	0.00	11	Pass
NVNT	n20	5180	-1.35	11	Pass
NVNT	n20	5200	-1.53	11	Pass
NVNT	n20	5240	-1.20	11	Pass
NVNT	n40	5190	-5.05	11	Pass
NVNT	n40	5230	-4.72	11	Pass



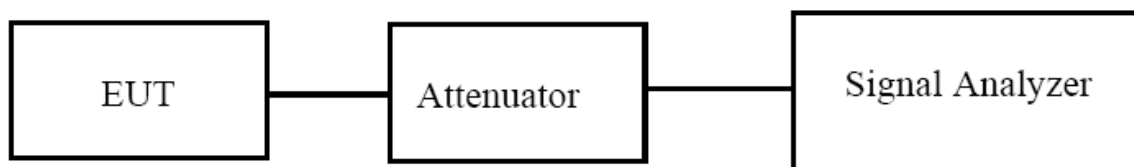






9. 26dB & 6dB & 99% Emission Bandwidth

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.

9.3 Test procedure

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

b) Set the VBW > RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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

1. Set center frequency to the nominal EUT channel center frequency.

2. Set span = 1.5 times to 5.0 times the OBW.

3. Set RBW = 1 % to 5 % of the OBW

4. Set VBW $\geq 3 \cdot$ RBW

5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

6. Use the 99 % power bandwidth function of the instrument (if available).

7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

9.4 EUT operating Conditions

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

9.5 Test Result

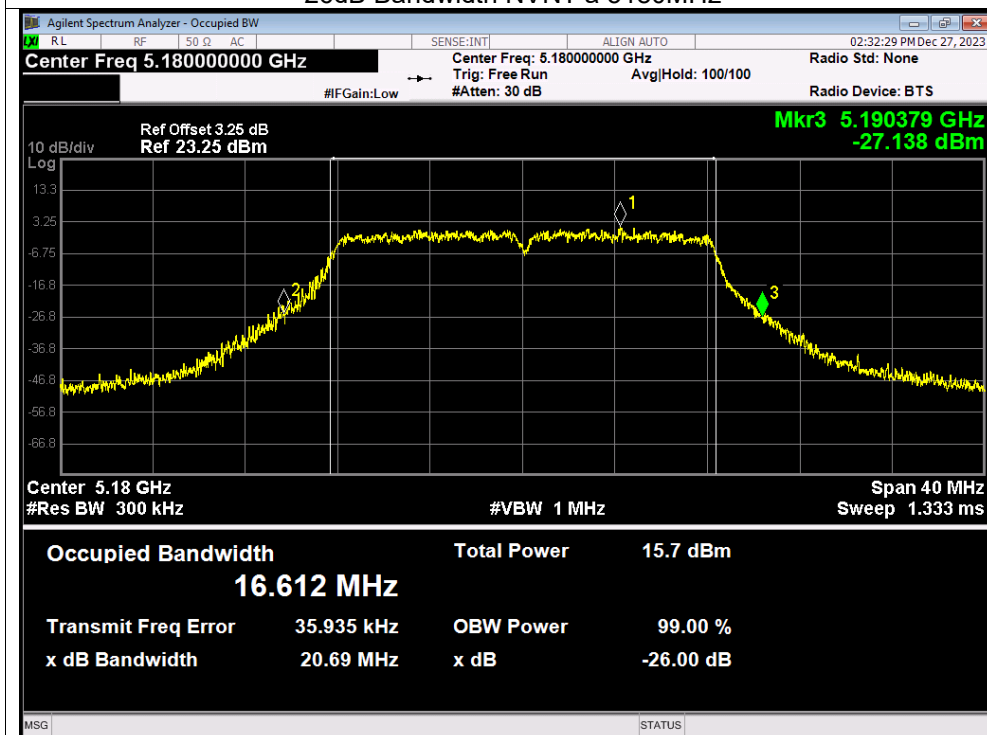
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	(5180-5240MHz)		

Condition	Mode	Frequency (MHz)	-26 dB Bandwidth (MHz)
NVNT	a	5180	20.686
NVNT	a	5200	21.006
NVNT	a	5240	20.756
NVNT	n20	5180	21.024
NVNT	n20	5200	21.201
NVNT	n20	5240	21.529
NVNT	n40	5190	39.234
NVNT	n40	5230	39.422

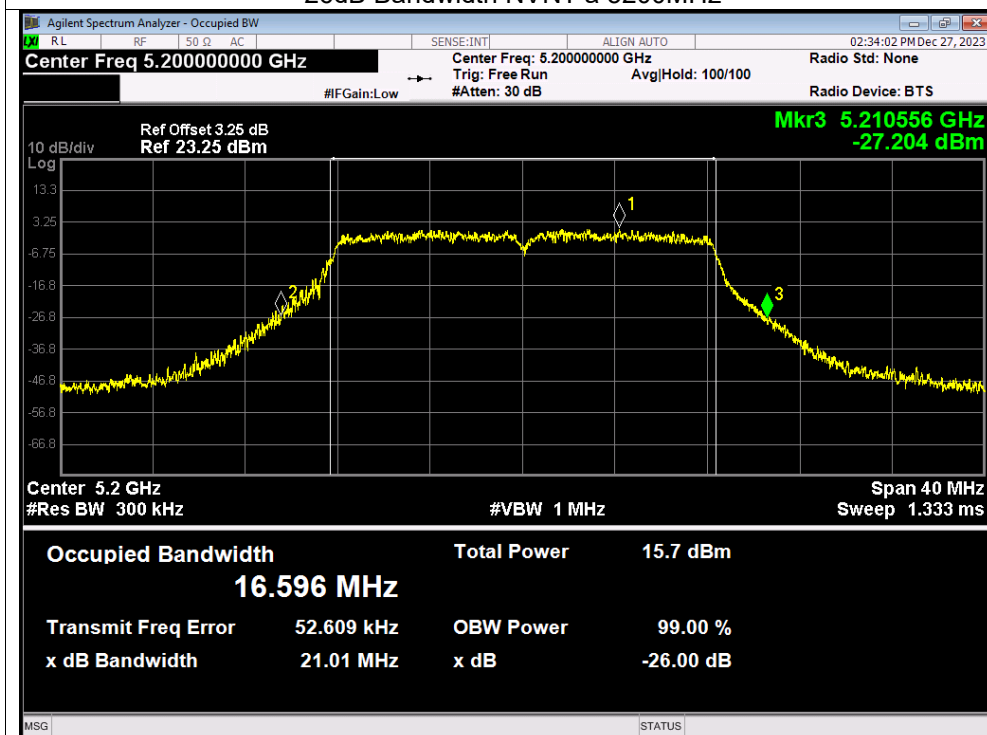
Condition	Mode	Frequency (MHz)	99% OBW (MHz)
NVNT	a	5180	16.472
NVNT	a	5200	16.482
NVNT	a	5240	16.475
NVNT	n20	5180	17.593
NVNT	n20	5200	17.602
NVNT	n20	5240	17.587
NVNT	n40	5190	35.634
NVNT	n40	5230	35.656

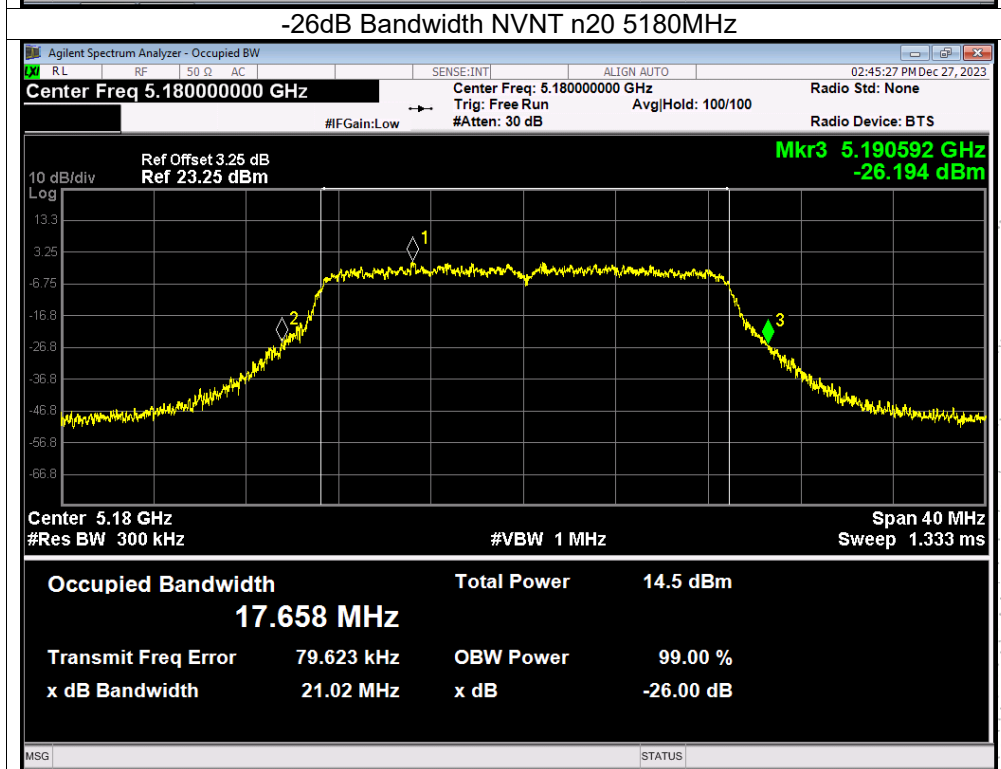
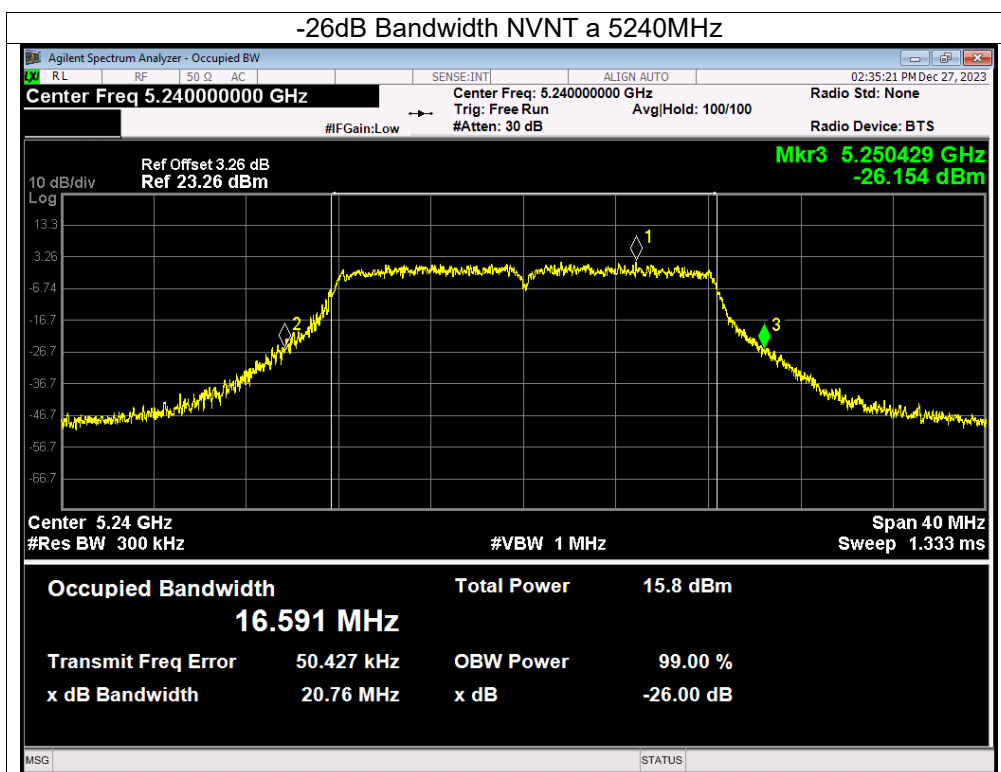
Test Graphs

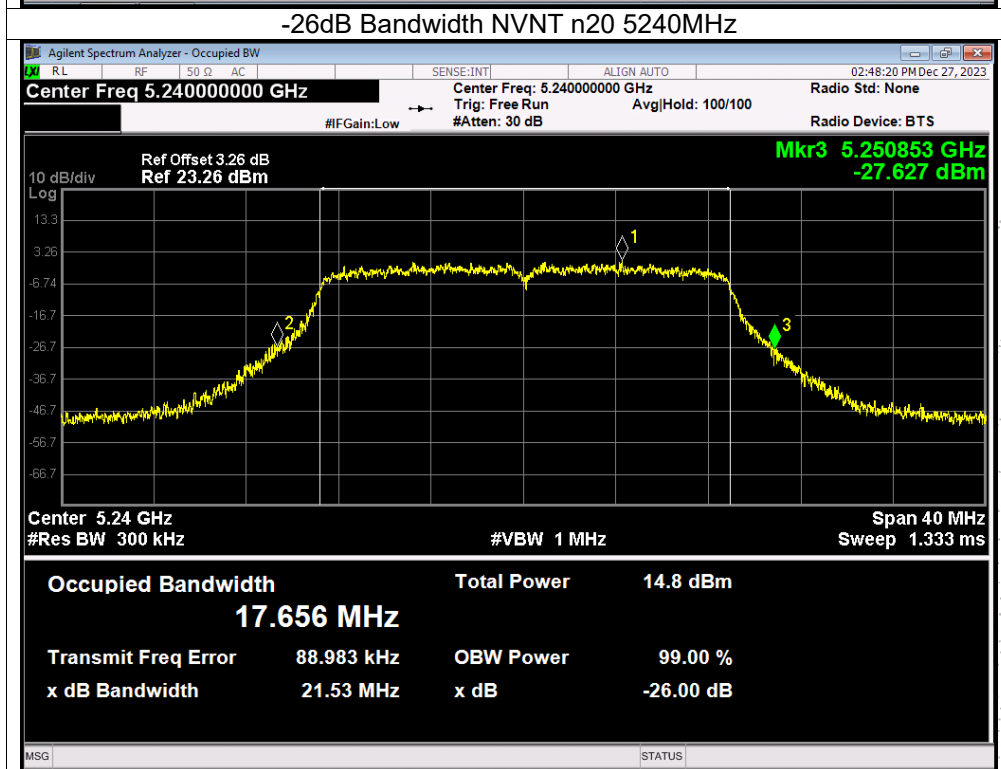
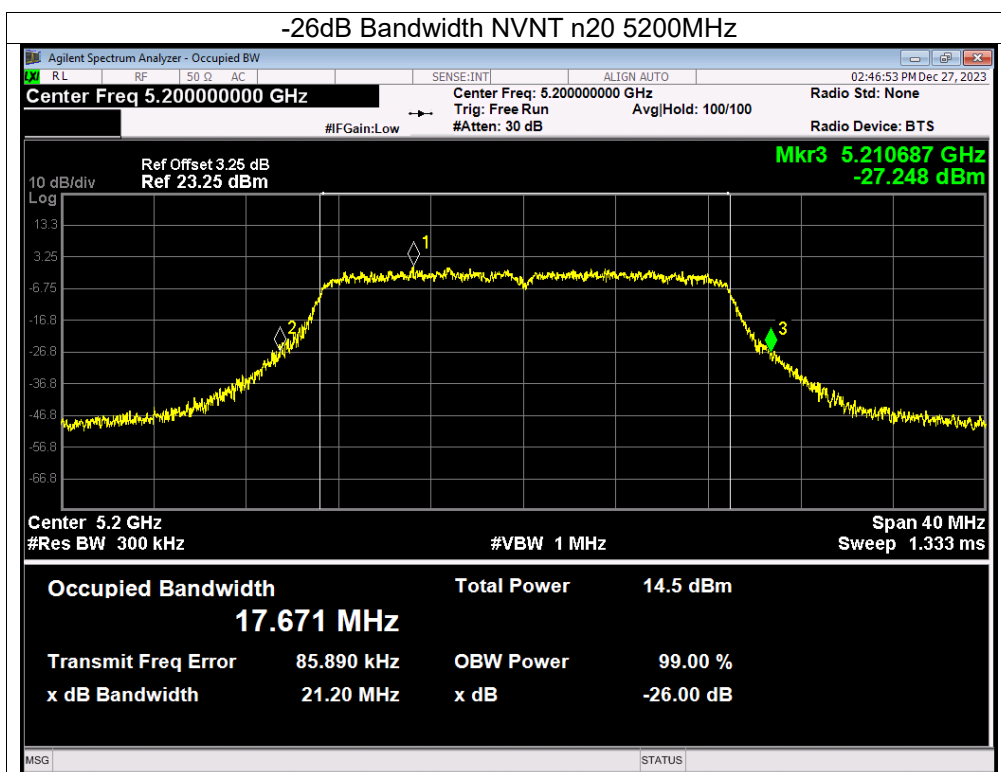
-26dB Bandwidth NVNT a 5180MHz

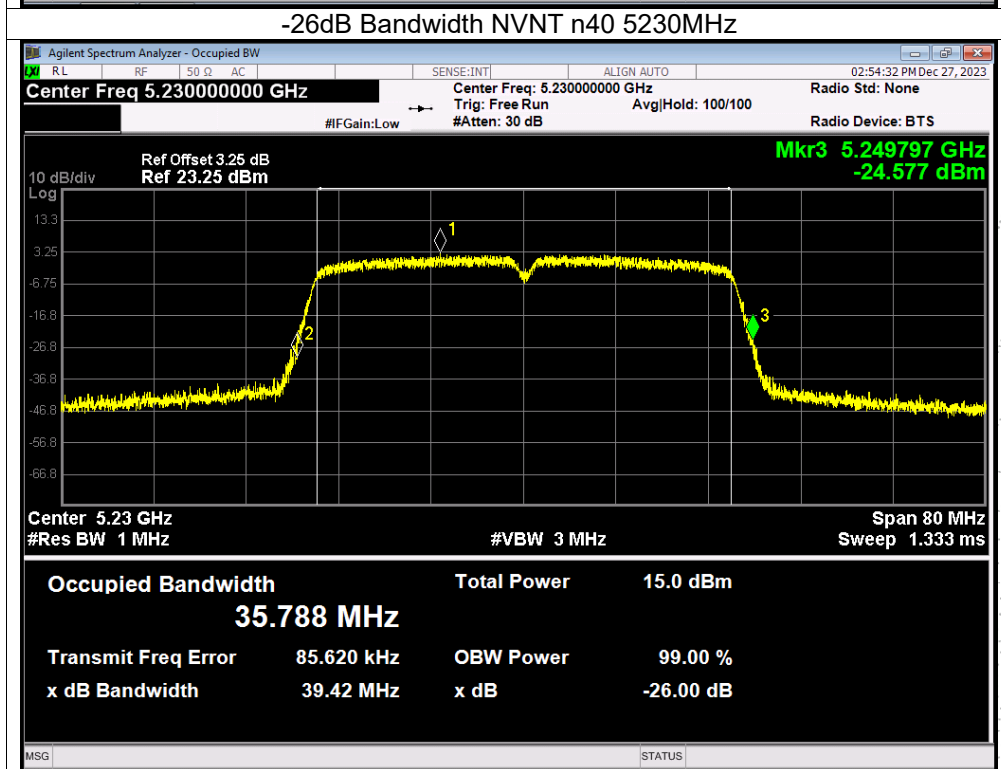
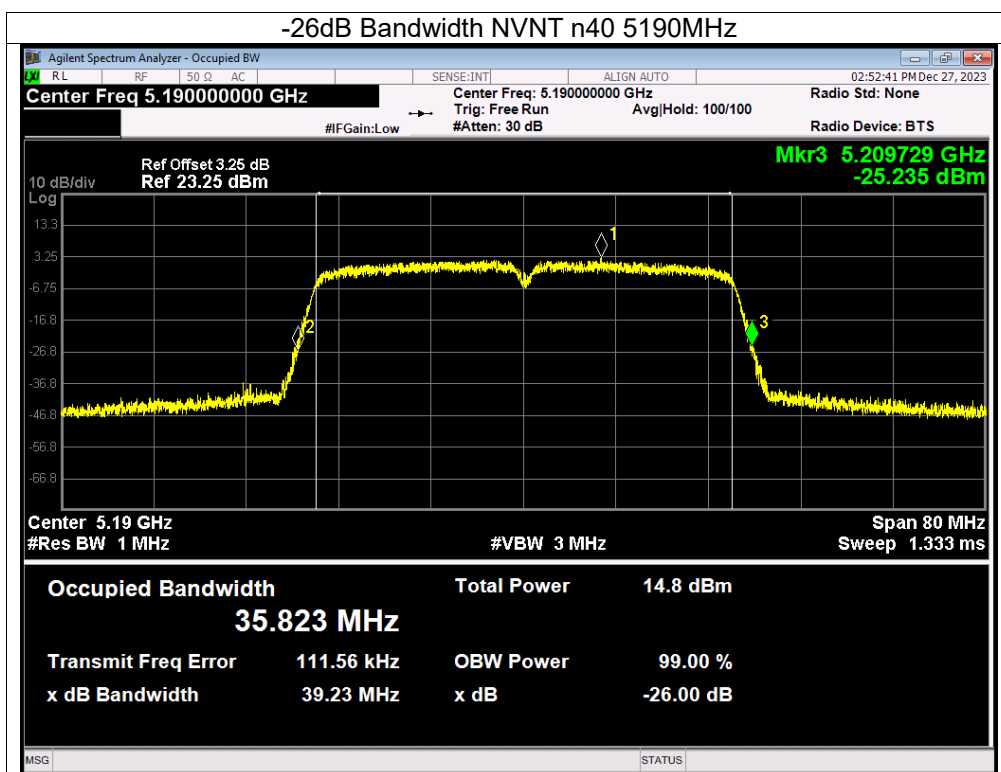


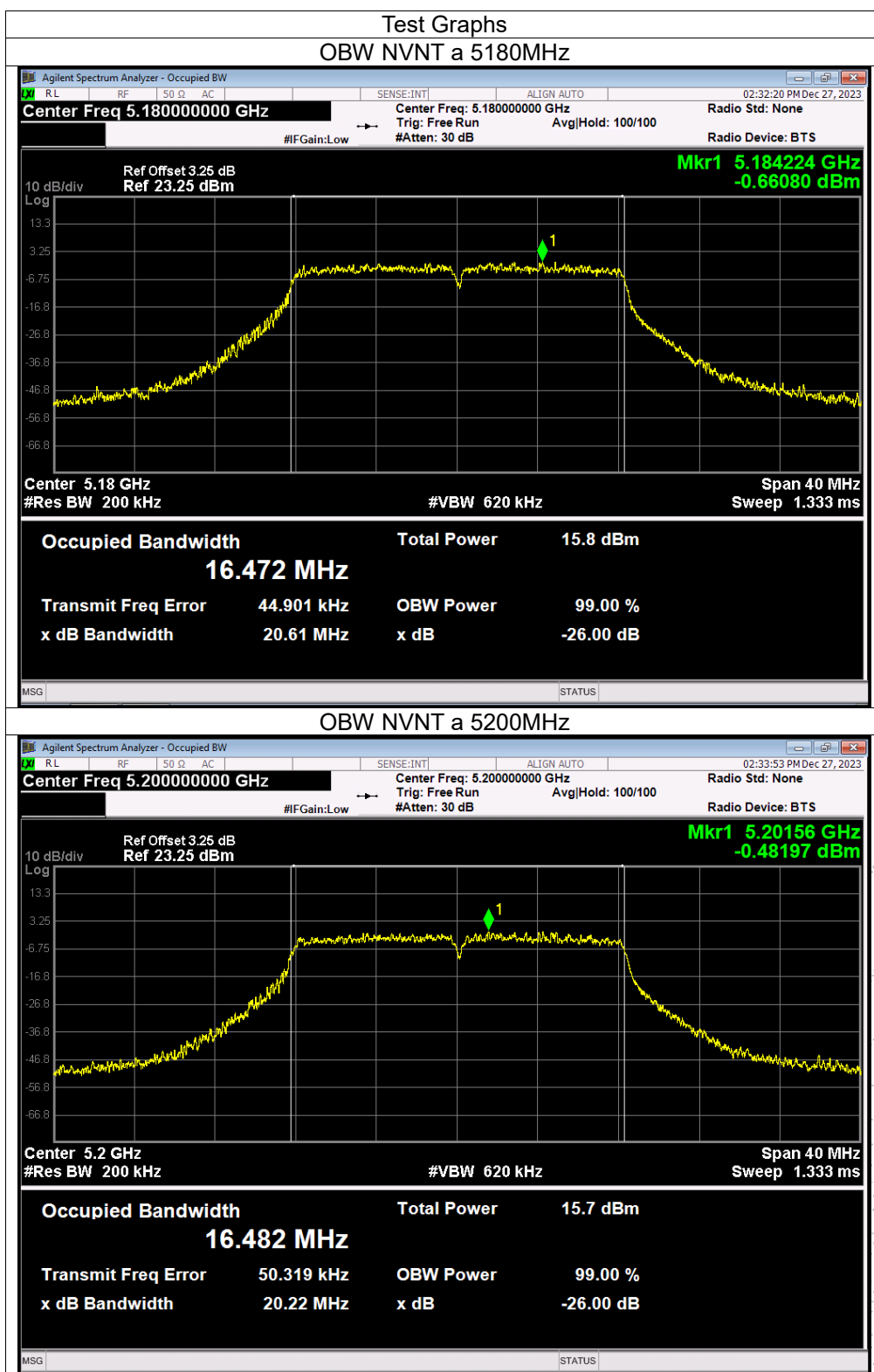
-26dB Bandwidth NVNT a 5200MHz

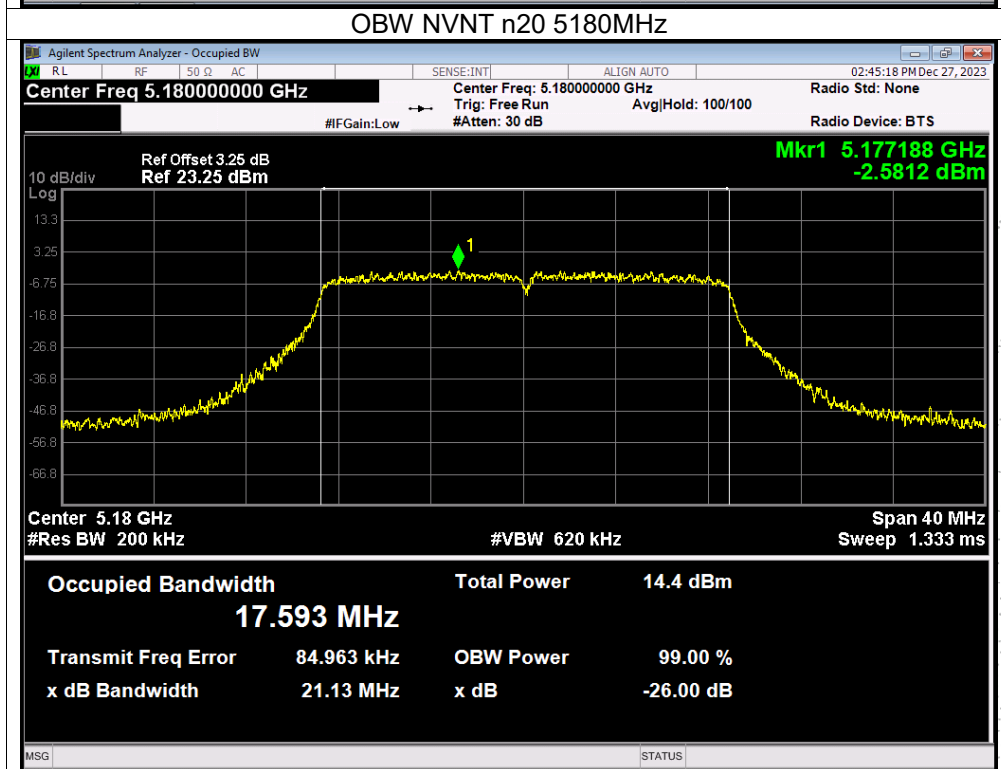
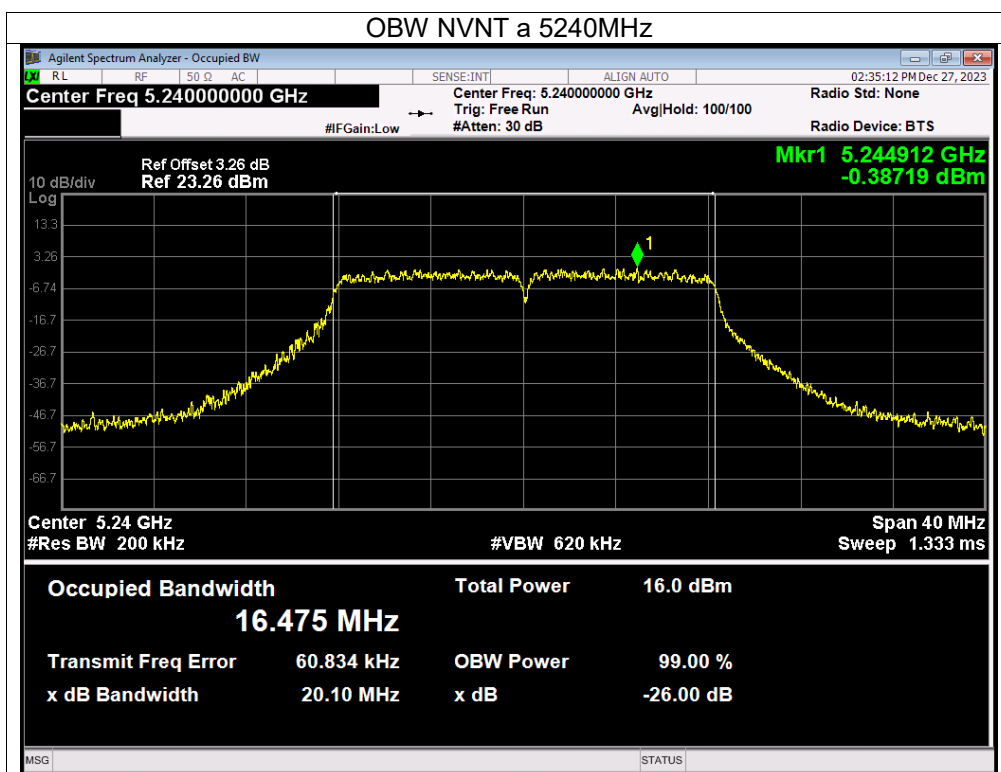


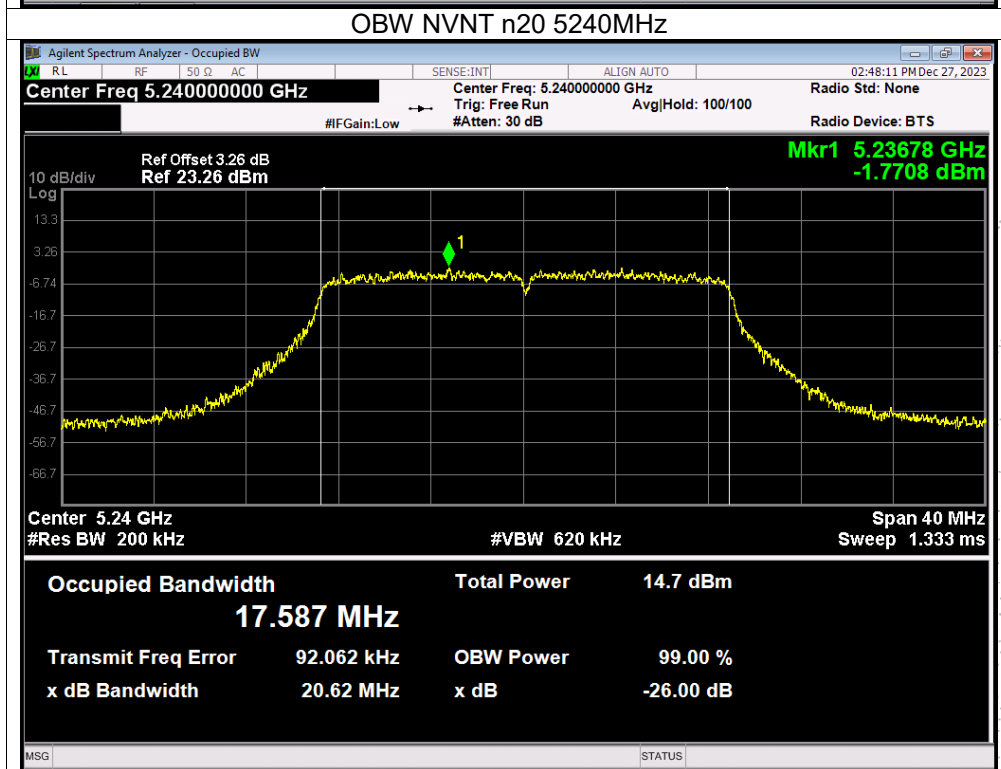
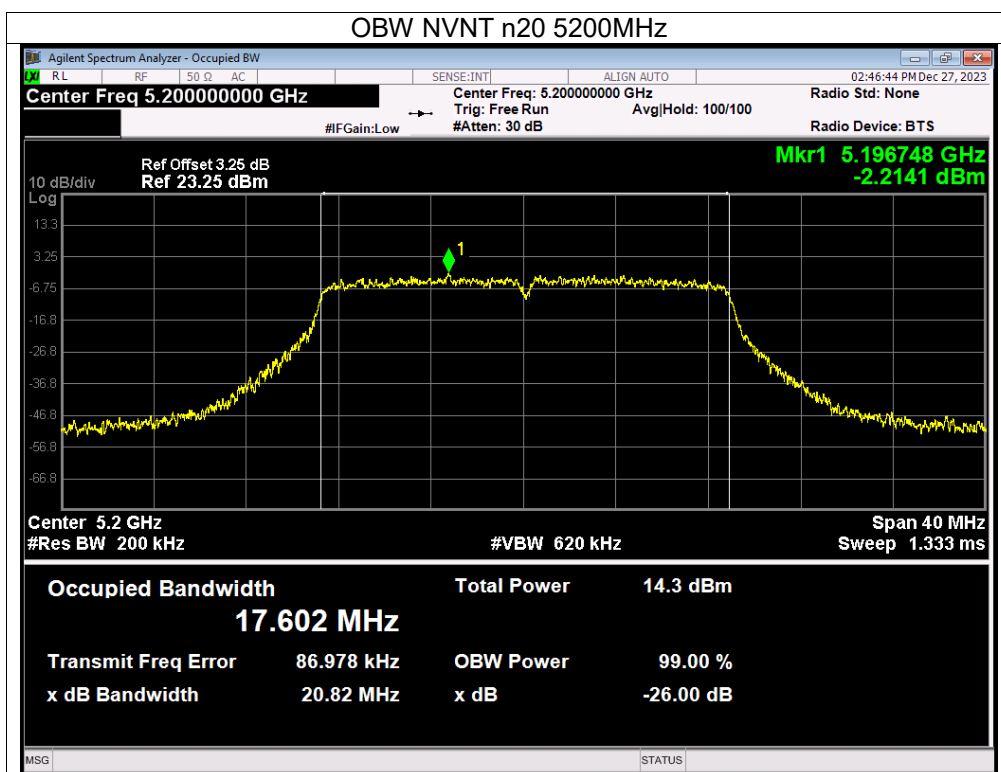


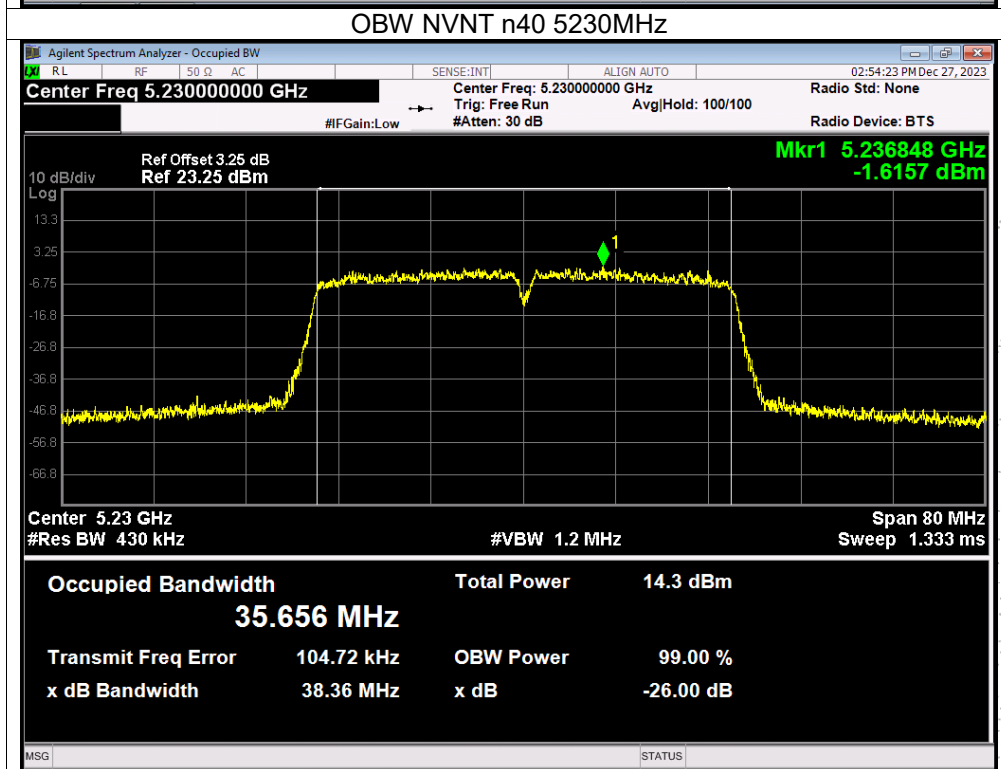
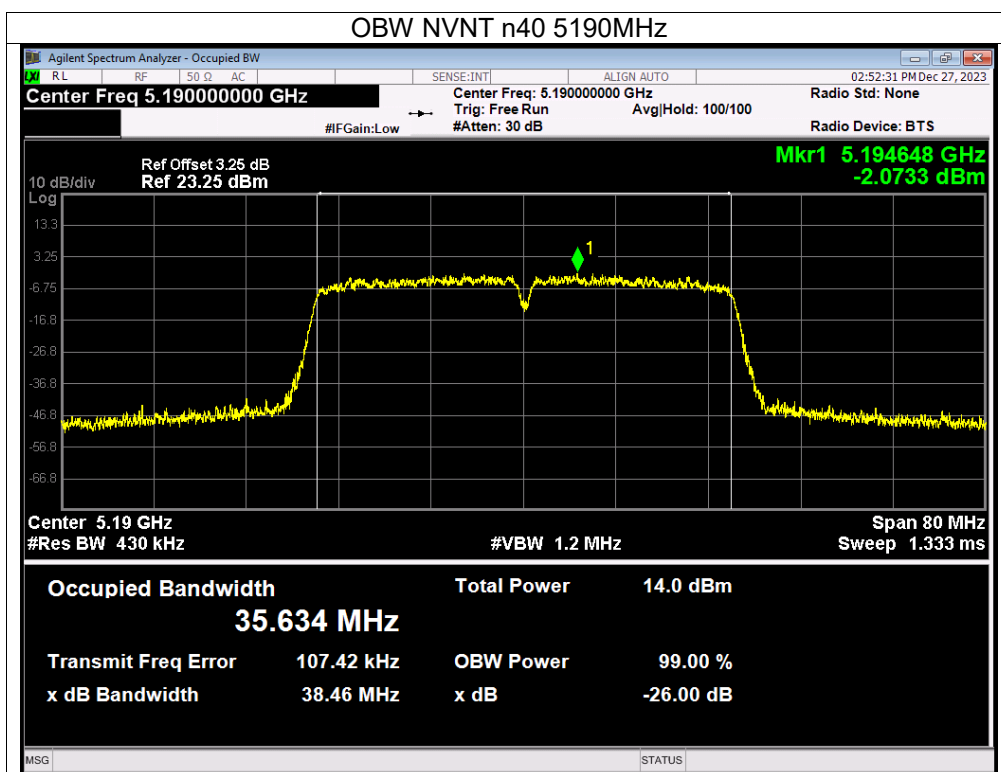












10. Maximum Conducted Output Power

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.).

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

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

2. Measurement using a Spectrum Analyzer or EMI Receiver (SA)

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

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

- The EUT transmits continuously (or with a duty cycle ≥ 98 percent).
- Sweep triggering or gating can be implemented in a way that the device transmits at the maximum power control level throughout the duration of each of the instrument sweeps to be averaged. This condition can generally be achieved by triggering the instrument's sweep if the duration of the sweep (with the analyzer configured as in Method SA-1, below) is equal to or shorter than the duration T of each transmission from the EUT and if those transmissions exhibit full power throughout their durations.

(ii) Method SA-2 or SA-2 Alternative (averaging across on and off times of the EUT transmissions, followed by duty cycle correction) shall be applied if the conditions of (i) cannot be achieved and the

transmissions exhibit a constant duty cycle during the measurement duration. Duty cycle will be considered to be constant if variations are less than ± 2 percent.

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

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

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is $\leq$ 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.

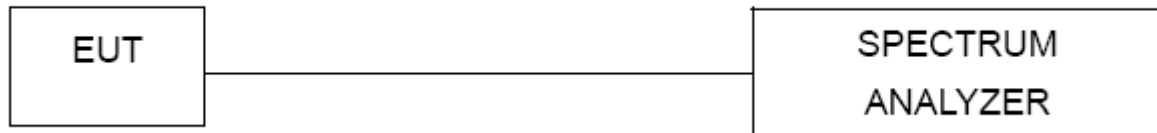
10.5 Test Result

Temperature:	26 °C	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage:	AC 240V/60Hz
Test Mode:	(5180-5240MHz)		

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	a	5180	10.30	24	Pass
NVNT	a	5200	10.18	24	Pass
NVNT	a	5240	10.45	24	Pass
NVNT	n20	5180	9.14	24	Pass
NVNT	n20	5200	9.04	24	Pass
NVNT	n20	5240	9.29	24	Pass
NVNT	n40	5190	8.47	24	Pass
NVNT	n40	5230	8.48	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

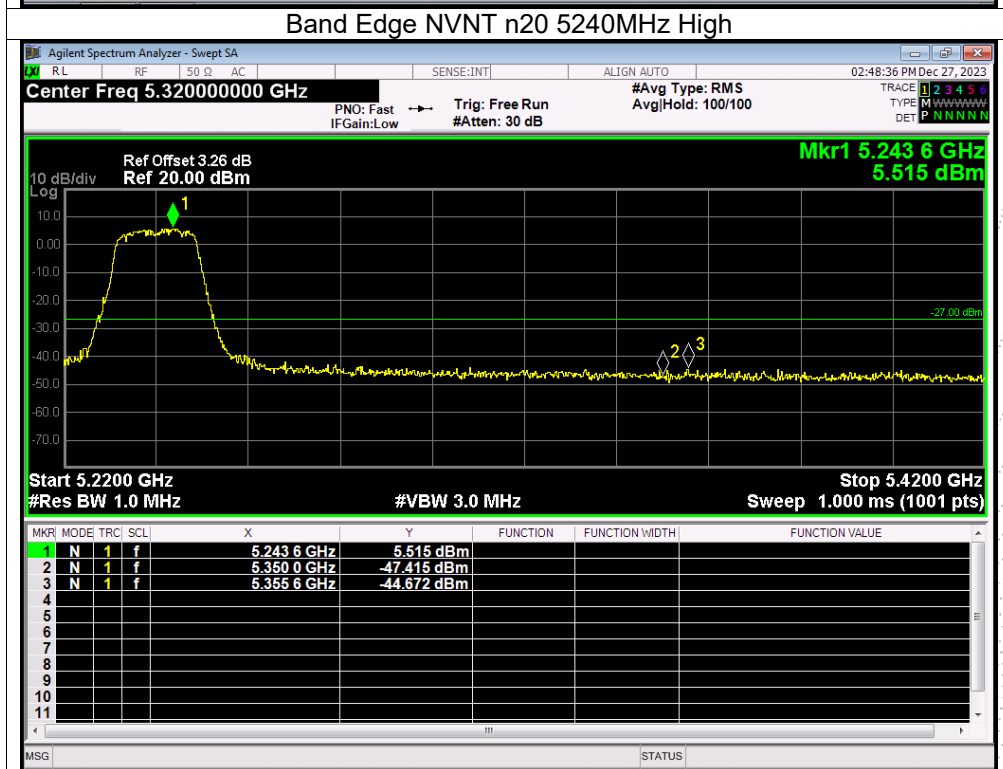
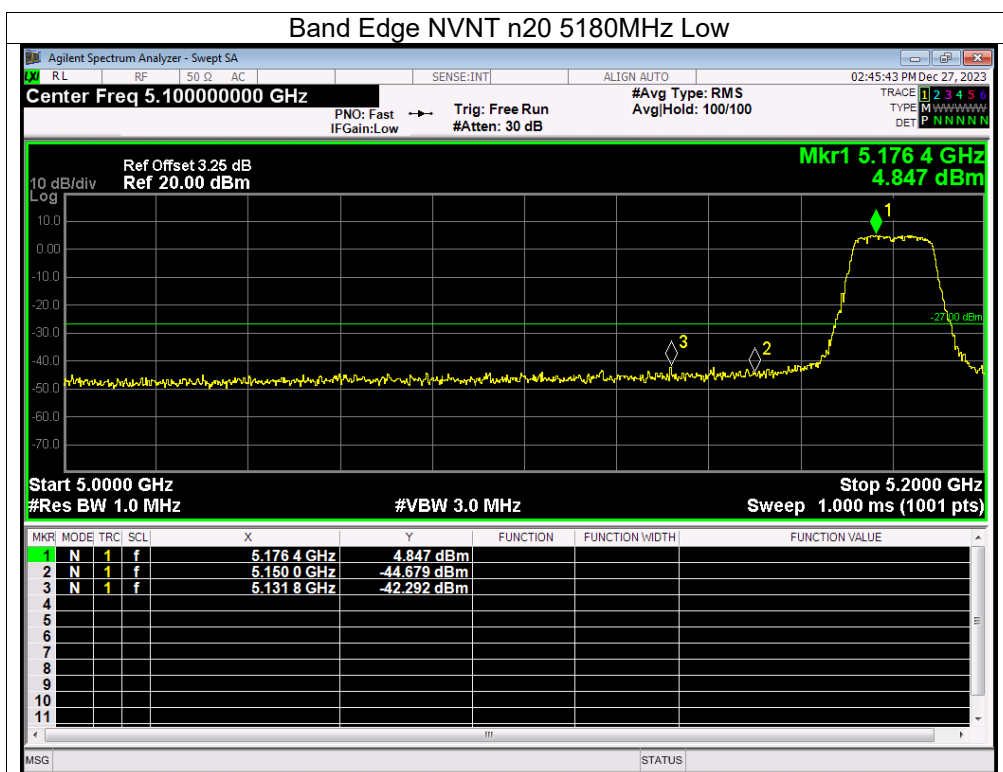
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

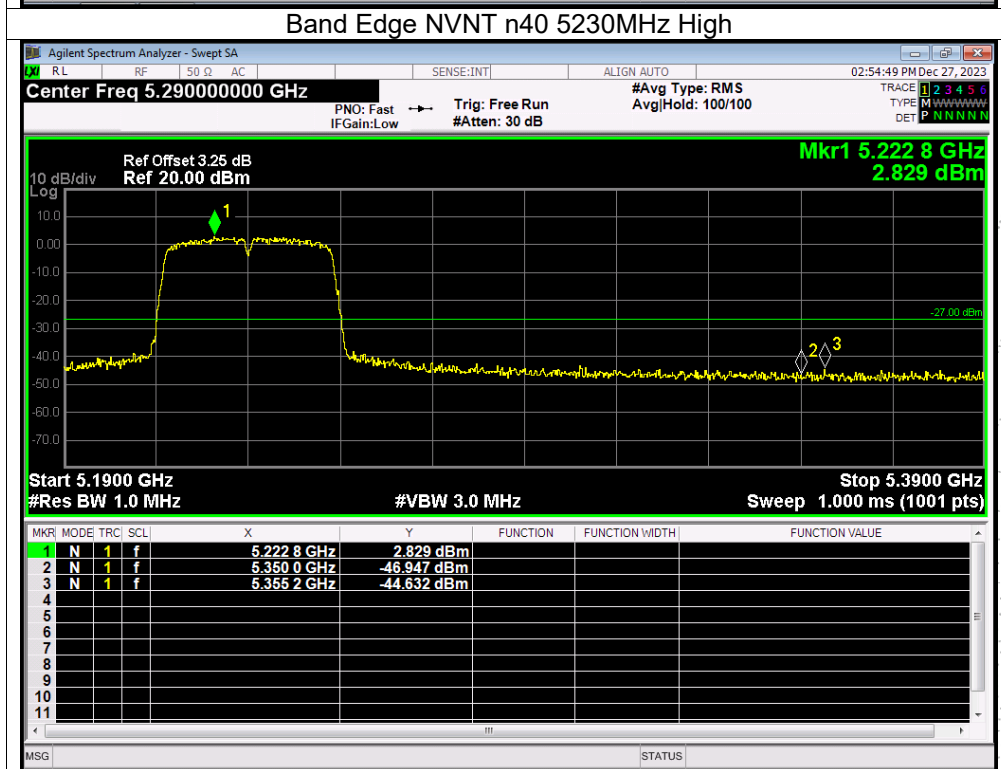
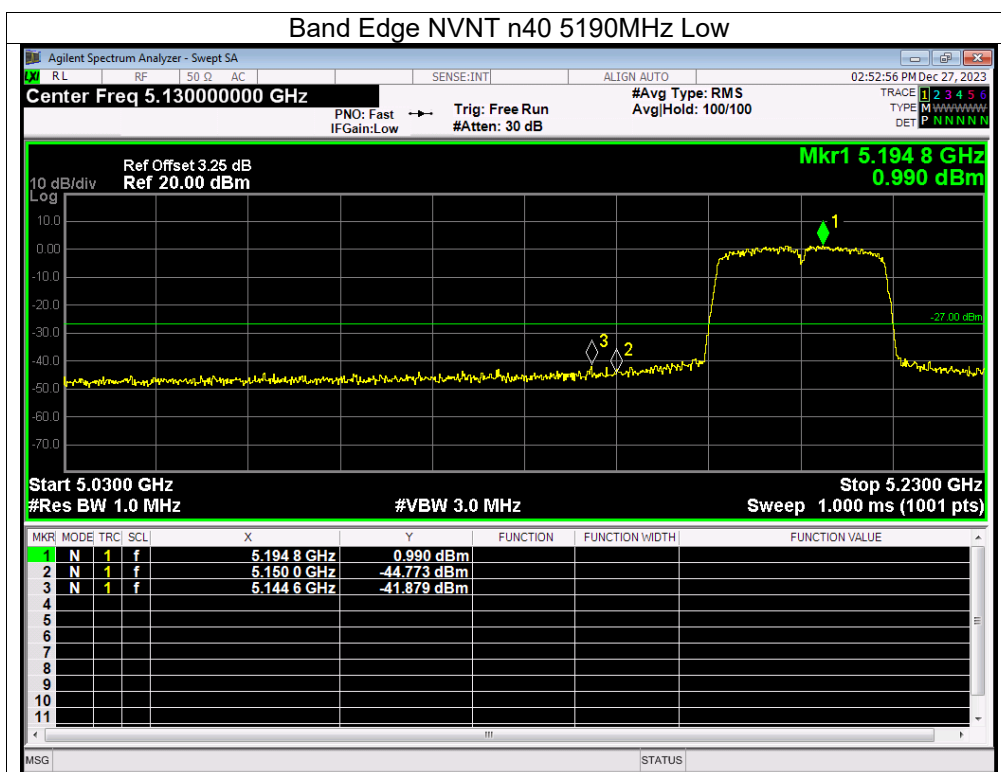
11.4 EUT operating Conditions

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

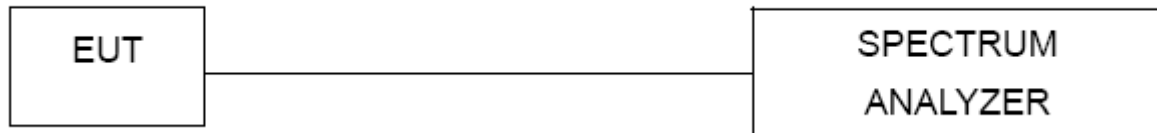






12. Spurious RF Conducted Emissions

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.

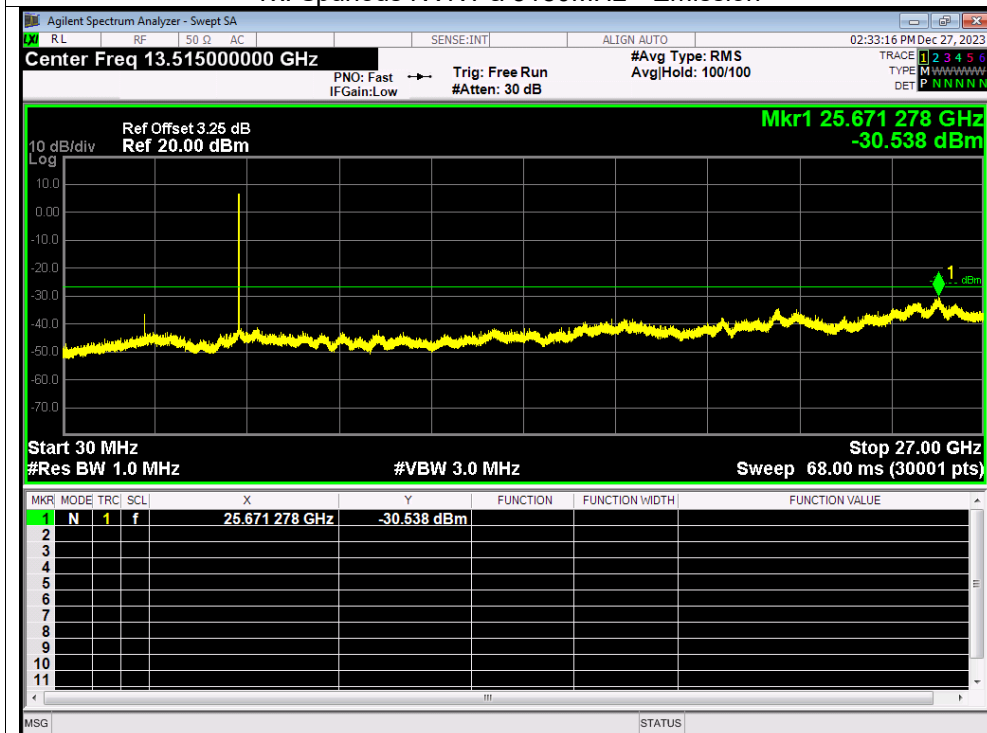
12.4 Test Result

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.

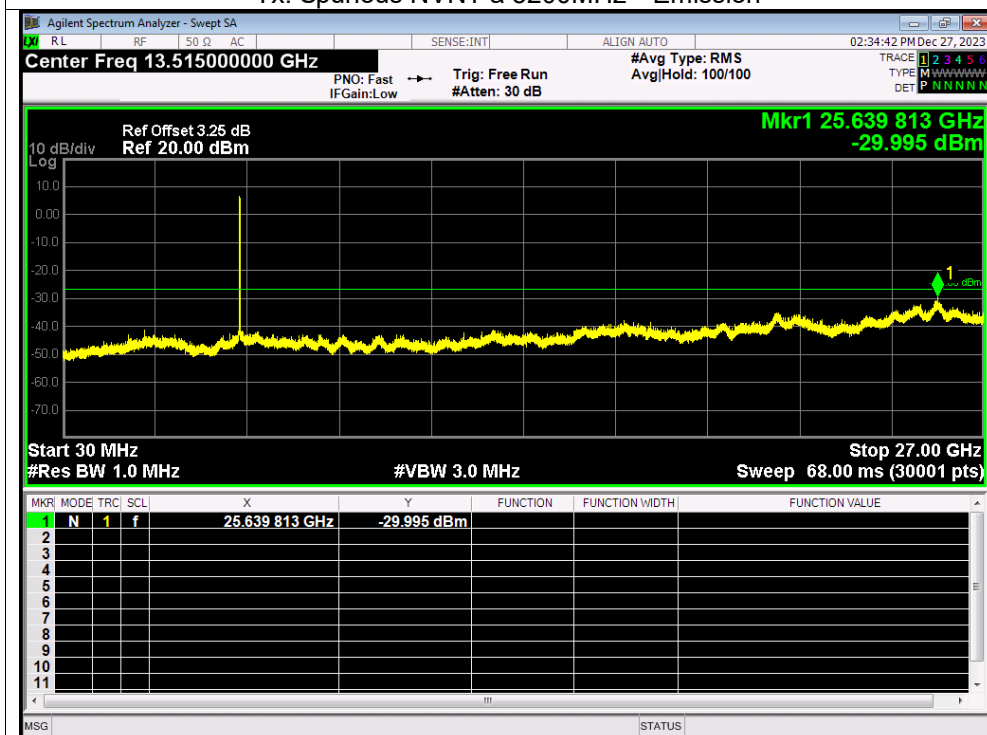
About: 26.5GHz-40GHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

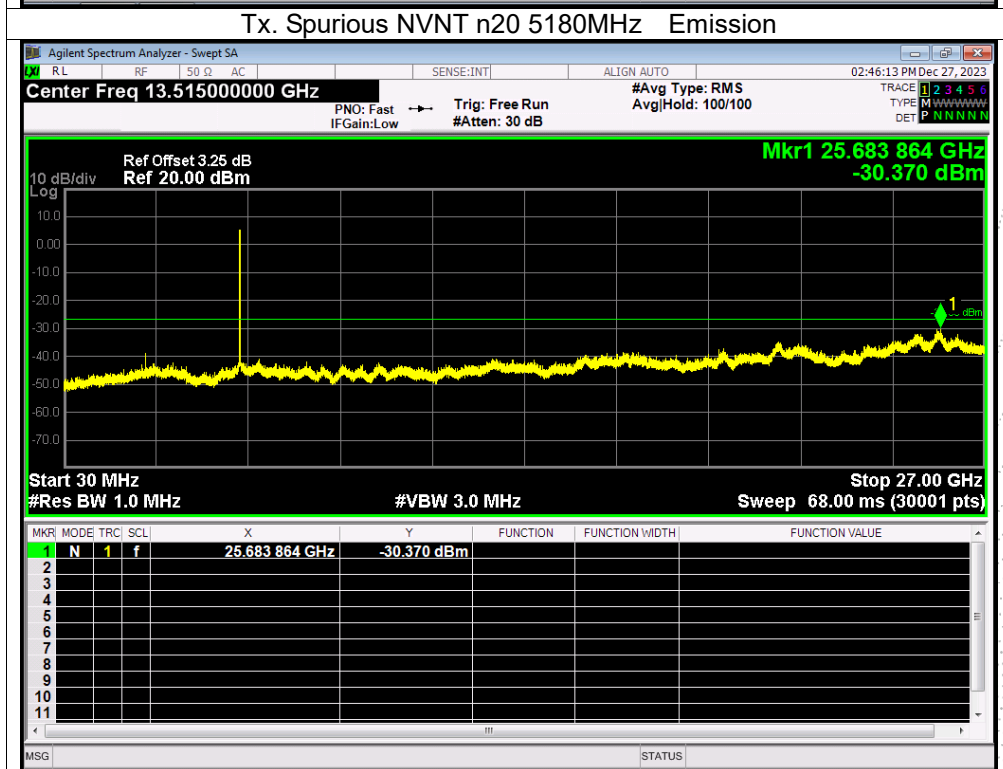
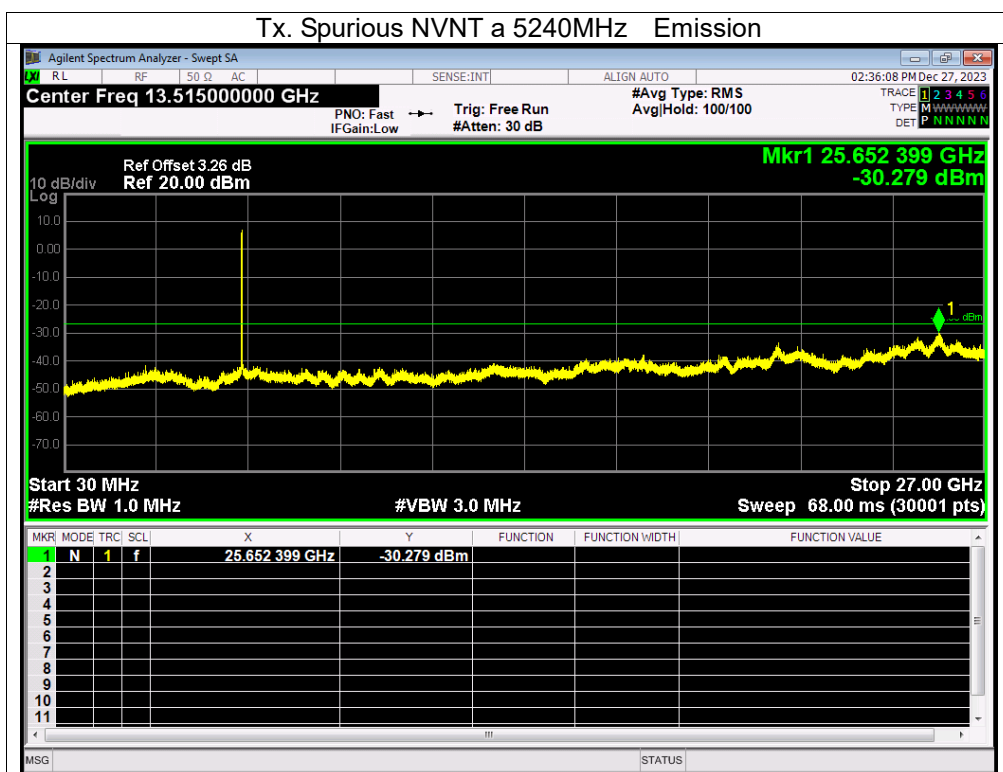
Test Graphs

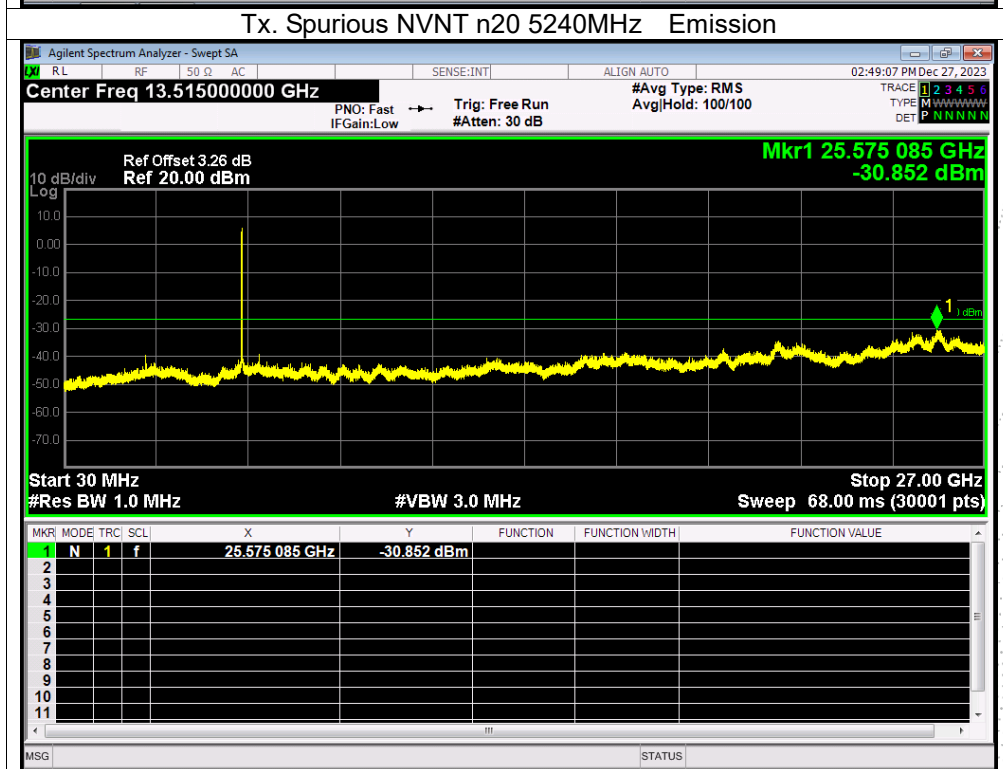
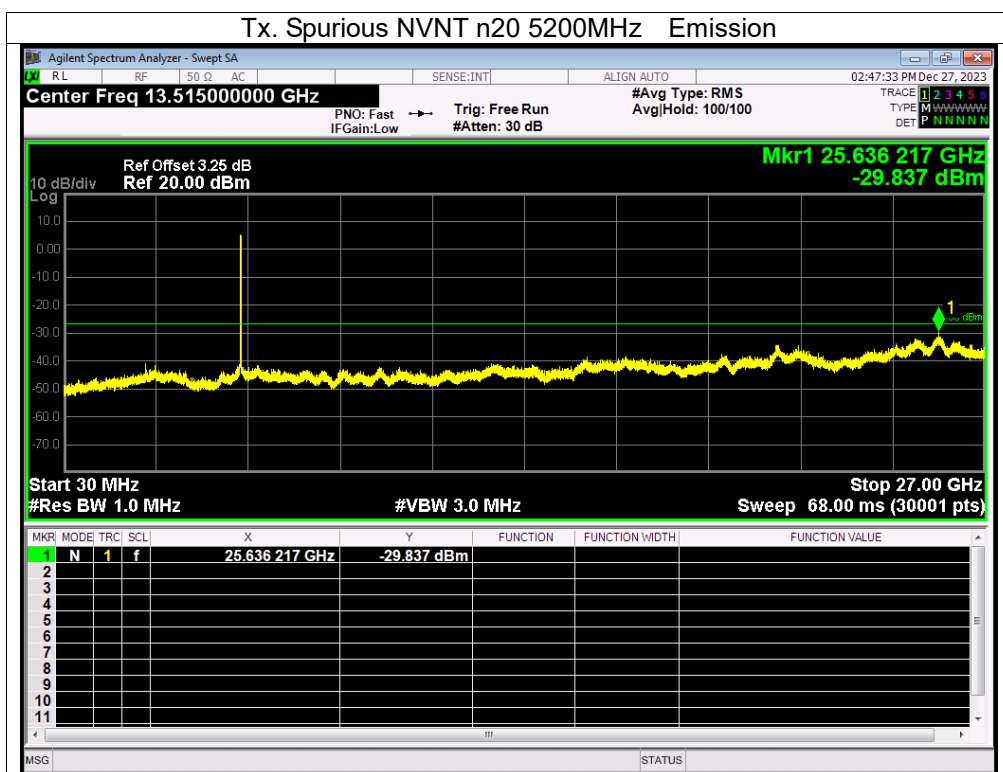
Tx. Spurious NVNT a 5180MHz Emission

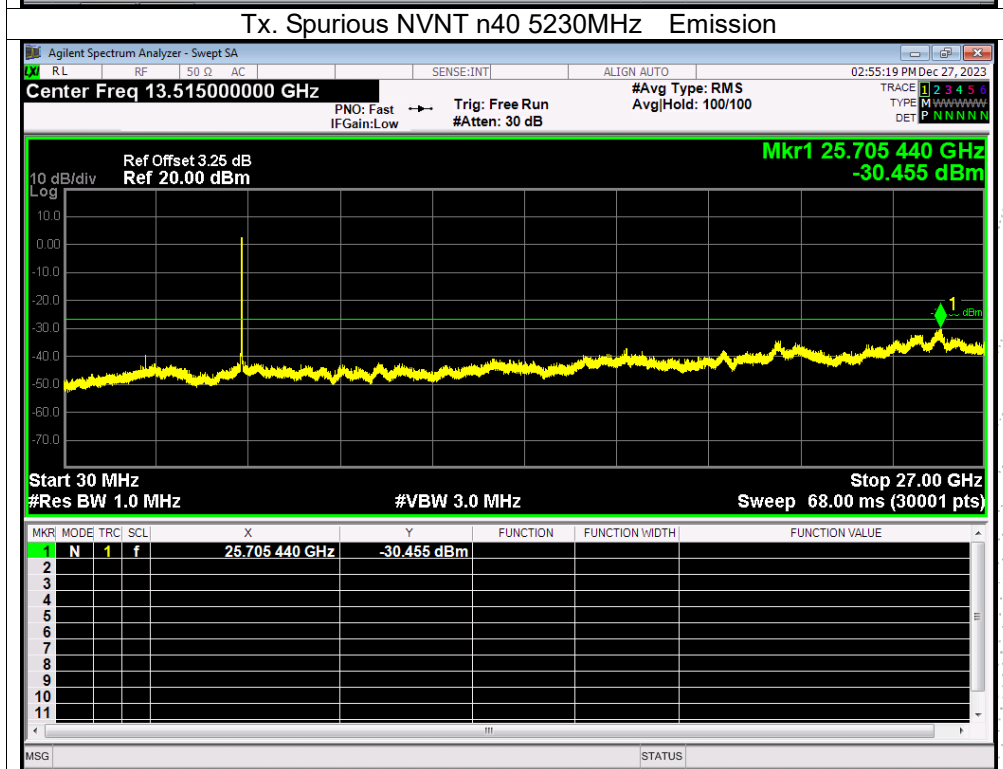
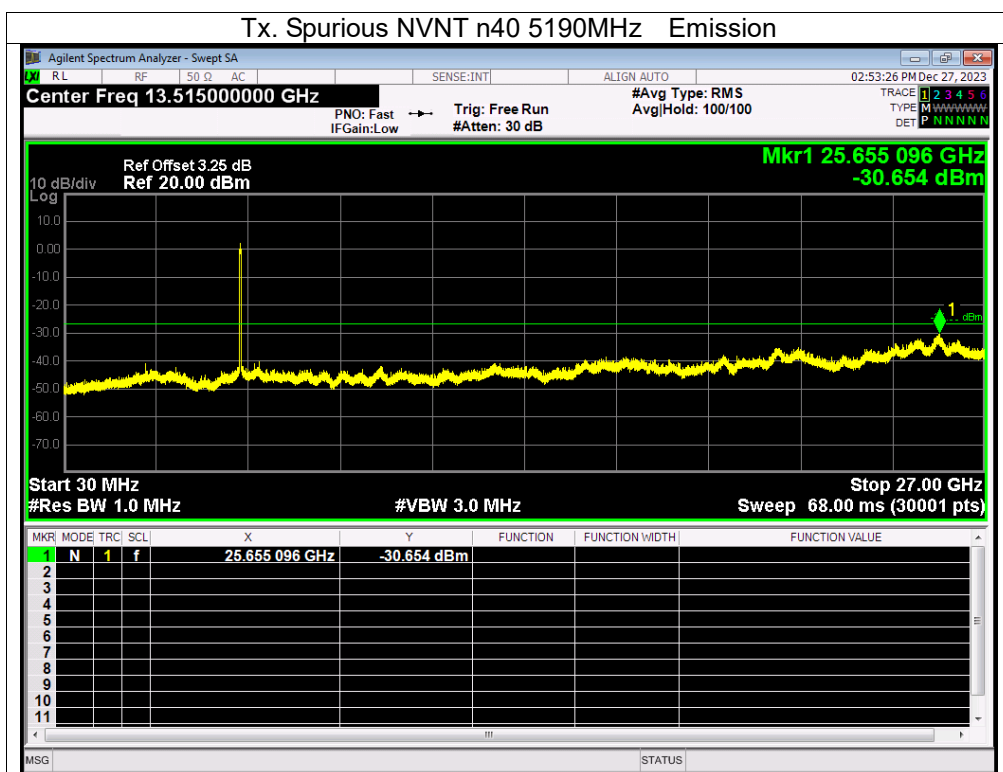


Tx. Spurious NVNT a 5200MHz Emission









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:	AC 90-260V
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)	120	5180.0001	5180	0.0001	0.0193
		V max (V)	260	5180.0110	5180	0.0110	2.1236
		V min (V)	90	5180.0103	5180	0.0103	1.9884
Limits				5150-5250 MHz			
Result				Complies			

Temperature vs. Frequency Stability

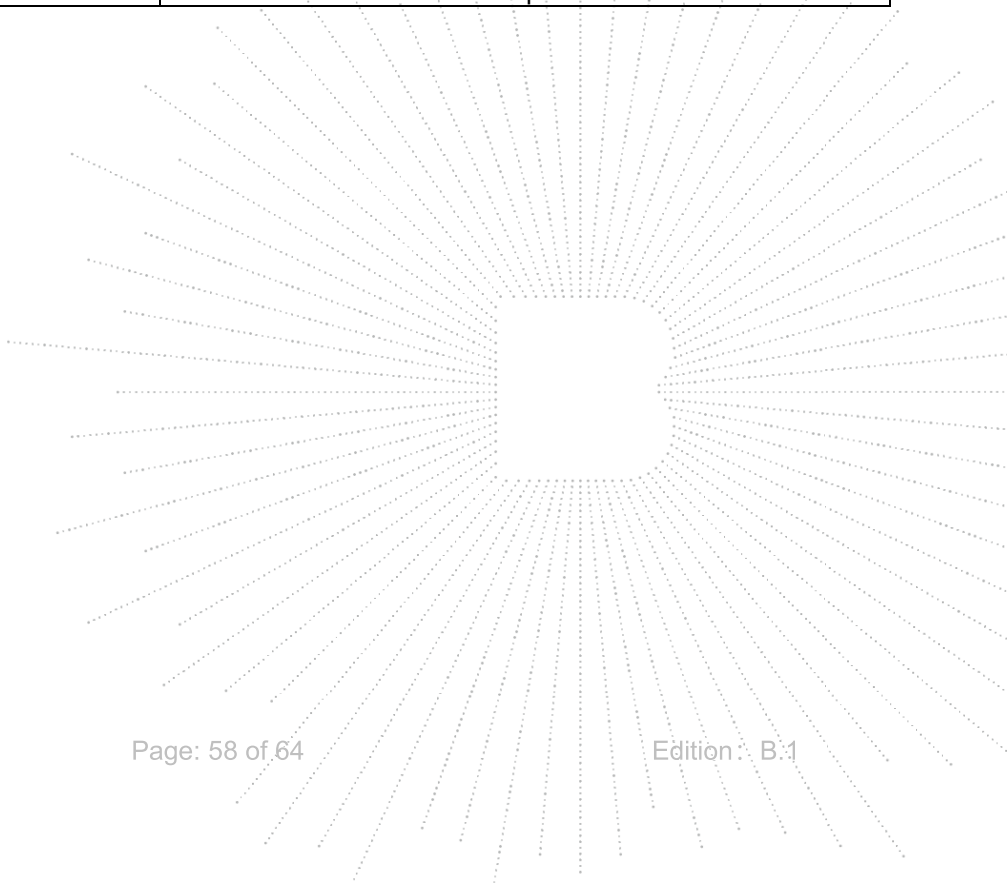
TEST CONDITIONS				Reference Frequency: 5180MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
V nom (V)	120	T (°C)	-20	5180.0116	5180	0.0116	2.2394
		T (°C)	-10	5180.0027	5180	0.0027	0.5212
		T (°C)	0	5180.0004	5180	0.0004	0.0772
		T (°C)	10	5180.0036	5180	0.0036	0.6950
		T (°C)	20	5180.0065	5180	0.0065	1.2548
		T (°C)	30	5180.0037	5180	0.0037	0.7143
		T (°C)	40	5180.0128	5180	0.0128	2.4710
		T (°C)	50	5180.0072	5180	0.0072	1.3900
		T (°C)	60	5180.0122	5180	0.0122	2.3552
		T (°C)	70	5180.0074	5180	0.0074	1.4286
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)	120	5200.0069	5200	0.0069	1.3269
		V max (V)	260	5200.0071	5200	0.0071	1.3654
		V min (V)	90	5200.0086	5200	0.0086	1.6538
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)	120	T (°C)	-20	5200.00230	5200	0.00230	0.4423
		T (°C)	-10	5200.01230	5200	0.01230	2.3654
		T (°C)	0	5200.00180	5200	0.00180	0.3462
		T (°C)	10	5200.00960	5200	0.00960	1.8462
		T (°C)	20	5200.01030	5200	0.01030	1.9808
		T (°C)	30	5200.00200	5200	0.00200	0.3846
		T (°C)	40	5200.00440	5200	0.00440	0.8462
		T (°C)	50	5200.00540	5200	0.00540	1.0385
		T (°C)	60	5200.01040	5200	0.01040	2.0000
		T (°C)	70	5200.00490	5200	0.00490	0.9423
Limits				5150-5250 MHz			
Result				Complies			

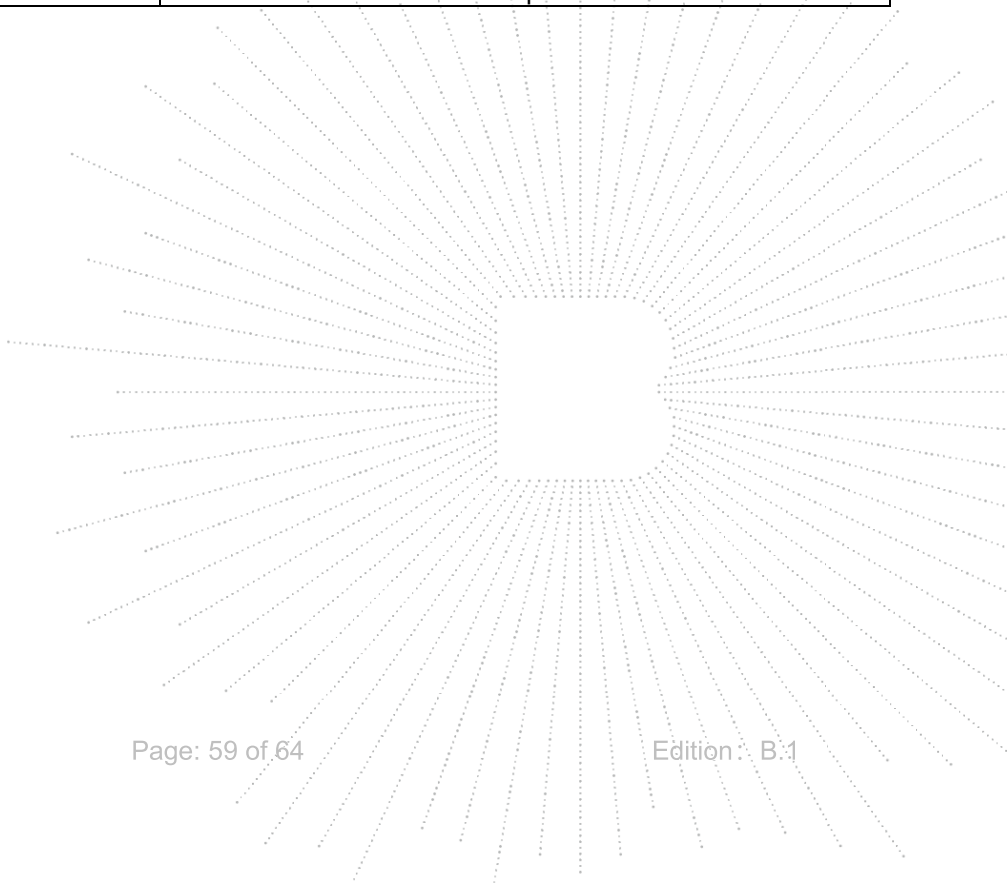


Voltage vs. Frequency Stability

TEST CONDITIONS				Reference Frequency: 5240MHz			
				f	fc	Max. Deviation (MHz)	Max. Deviation (ppm)
T nom (°C)	20	V nom (V)	120	5240.0101	5240	0.0101	1.9275
		V max (V)	260	5240.0020	5240	0.0020	0.3817
		V min (V)	90	5240.0074	5240	0.0074	1.4122
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)	120	T (°C)	-20	5240.0127	5240	0.0127	2.4237
		T (°C)	-10	5240.0016	5240	0.0016	0.3053
		T (°C)	0	5240.0076	5240	0.0076	1.4504
		T (°C)	10	5240.0070	5240	0.0070	1.3359
		T (°C)	20	5240.0075	5240	0.0075	1.4313
		T (°C)	30	5240.0071	5240	0.0071	1.3550
		T (°C)	40	5240.0063	5240	0.0063	1.2023
		T (°C)	50	5240.0079	5240	0.0079	1.5076
		T (°C)	60	5240.0093	5240	0.0093	1.7748
		T (°C)	70	5240.0012	5240	0.0012	0.2290
Limits				5150-5250 MHz			
Result				Complies			



14. Antenna Requirement

14.1 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.

14.2 Test Antenna

The EUT antenna is Internal antenna, It comply with the standard requirement.

15. EUT Photographs

EUT Photo



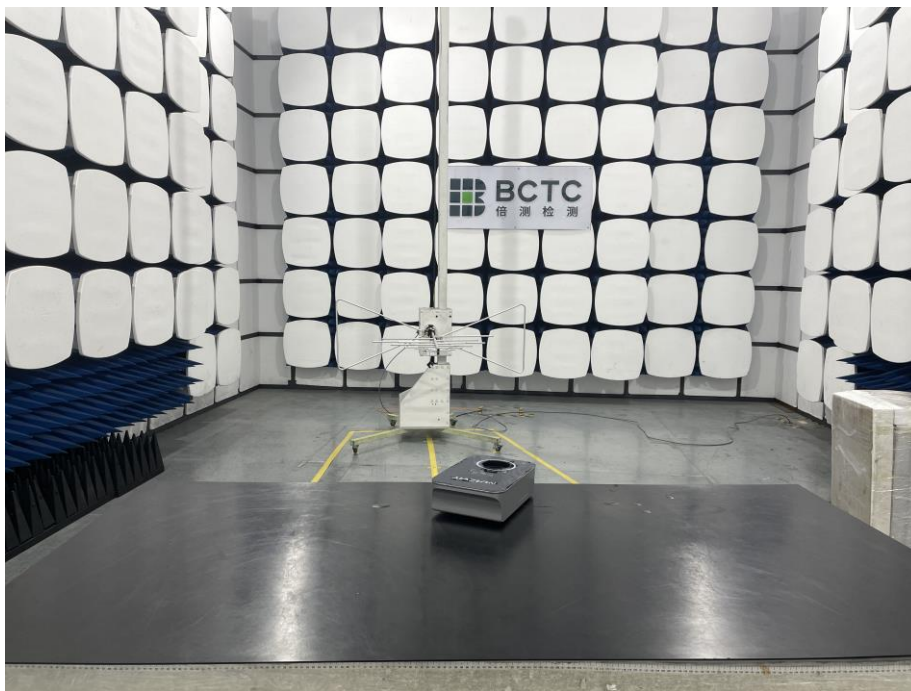
NOTE: Appendix-Photographs Of EUT Constructional Details

16. EUT Test Setup Photographs

Conducted Measurement Photos



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 *****