



10. Maximum Conducted Output Power

10.1 Block Diagram Of Test Setup



10.2 Limit

According to FCC §15.407

The maximum conduced output power should not exceed:

Frequency Band(MHz)	Limit
5150~5250	250mW
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 \geq 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 \geq 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 \geq 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

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

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

10.4 EUT Operating Conditions

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



10.5 Test Result

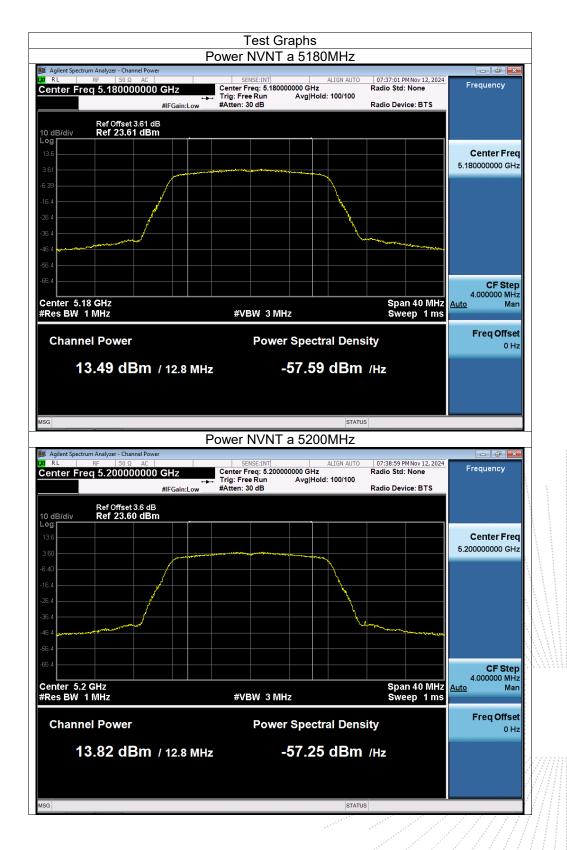
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Voltage :	DC 3.8V
	TX (5.1G) Mode Frequency U-NII- TX (5.8G) Mode Frequency U-NII-	,	

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	а	5180	13.49	24	Pass
NVNT	а	5200	13.82	24	Pass
NVNT	а	5240	12.93	24	Pass
NVNT	n20	5180	11.62	24	Pass
NVNT	n20	5200	11.49	24	Pass
NVNT	n20	5240	12.7	24	Pass
NVNT	n40	5190	10.09	24	Pass
NVNT	n40	5230	9.75	24	Pass
NVNT	ac20	5180	12.4	24	Pass
NVNT	ac20	5200	12.04	24	Pass
NVNT	ac20	5240	12.41	24	Pass
NVNT	ac40	5190	10.18	24	Pass
NVNT	ac40	5230	10.16	24	Pass
NVNT	ac80	5210	8.2	24	Pass

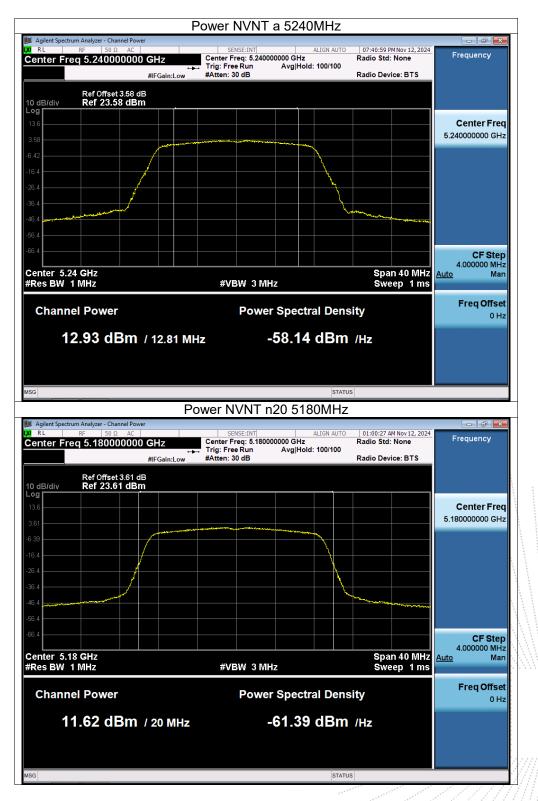
Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	а	5745	9.6	30	Pass
NVNT	а	5785	9.97	30	Pass
NVNT	а	5825	9.14	30	Pass
NVNT	n20	5745	9.2	30	Pass
NVNT	n20	5785	8.85	30	Pass
NVNT	n20	5825	8.06	30	Pass
NVNT	n40	5755	8.31	30	Pass
NVNT	n40	5795	7.75	30	Pass
NVNT	ac20	5745	9.22	30	Pass
NVNT	ac20	5785	8.86	30	Pass
NVNT	ac20	5825	8.07	30	Pass
NVNT	ac40	5755	8.42		Pass
NVNT	ac40	5795		30	Pass
NVNT	ac80	5775	7.93	30	Pass



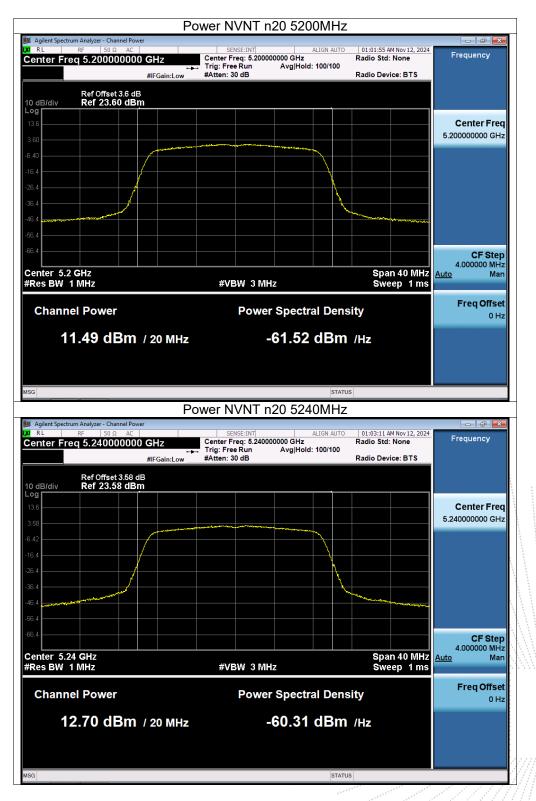




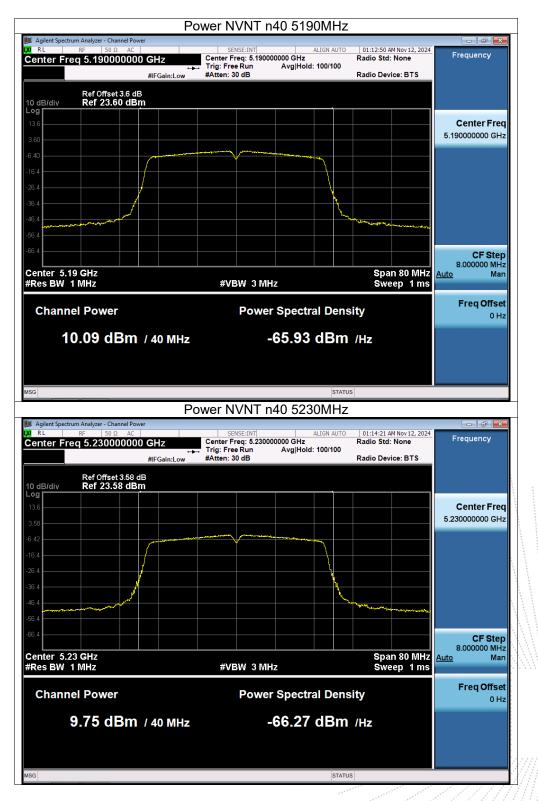




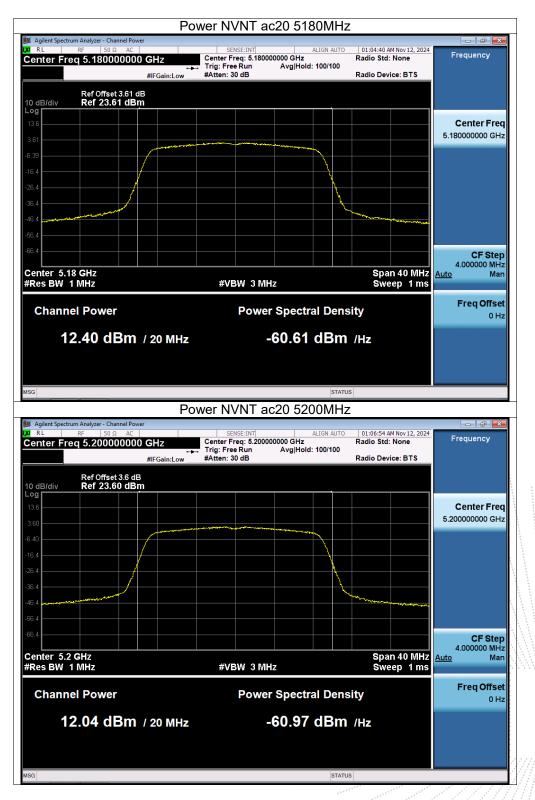




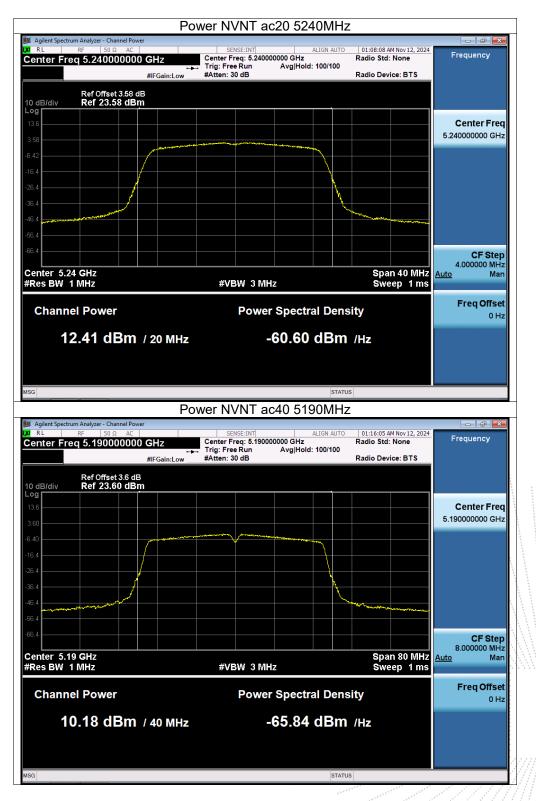




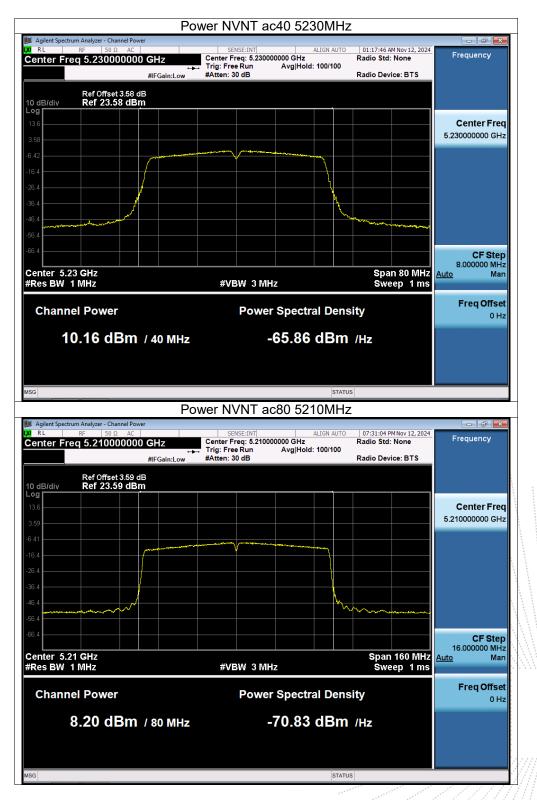






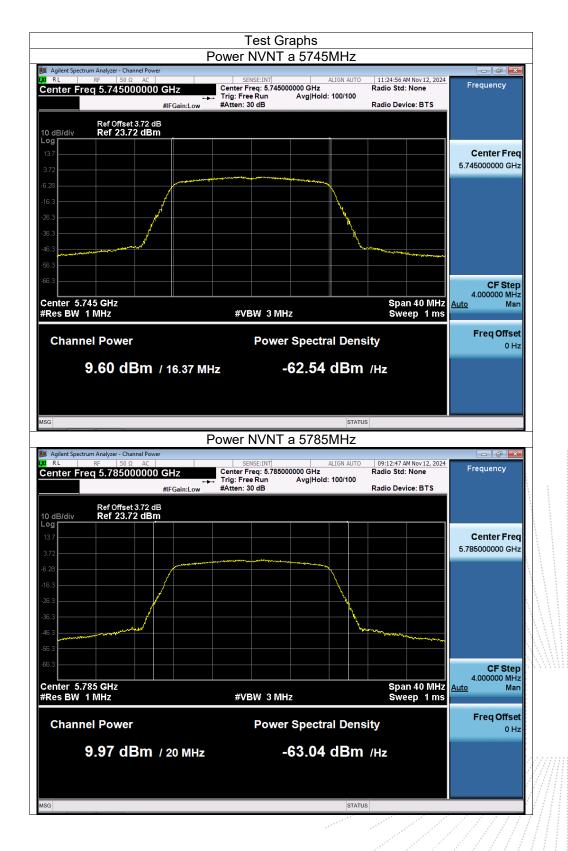




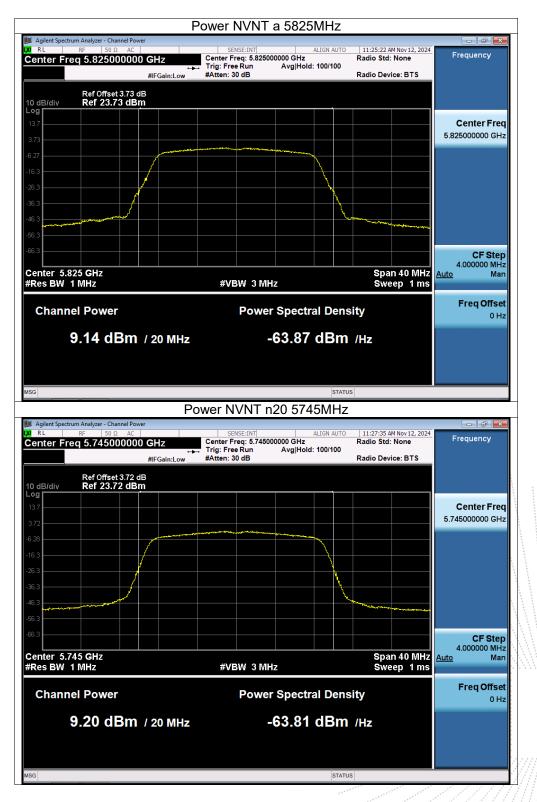




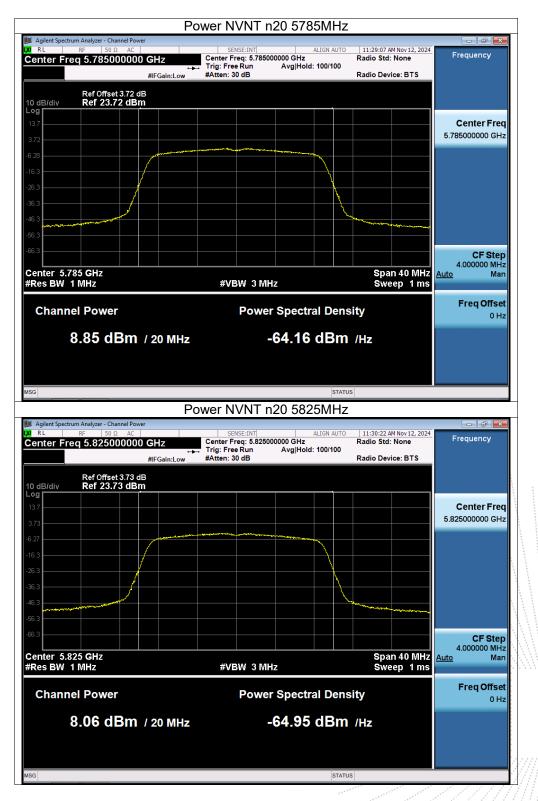




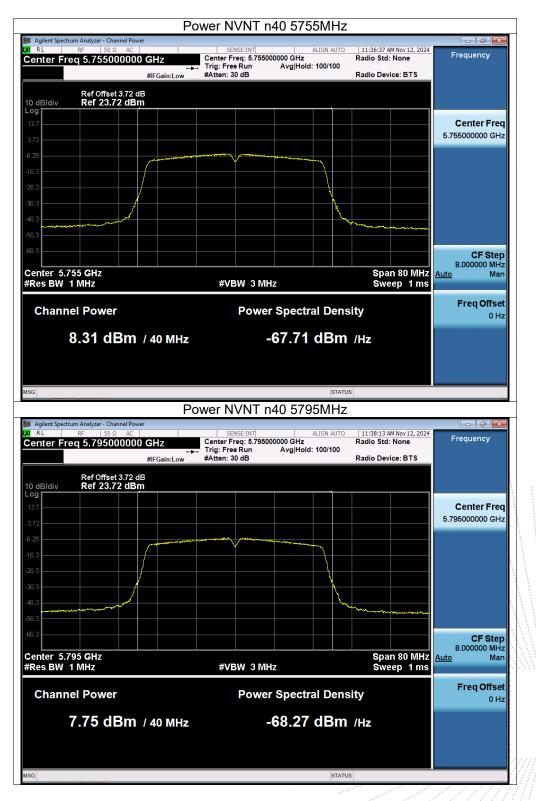




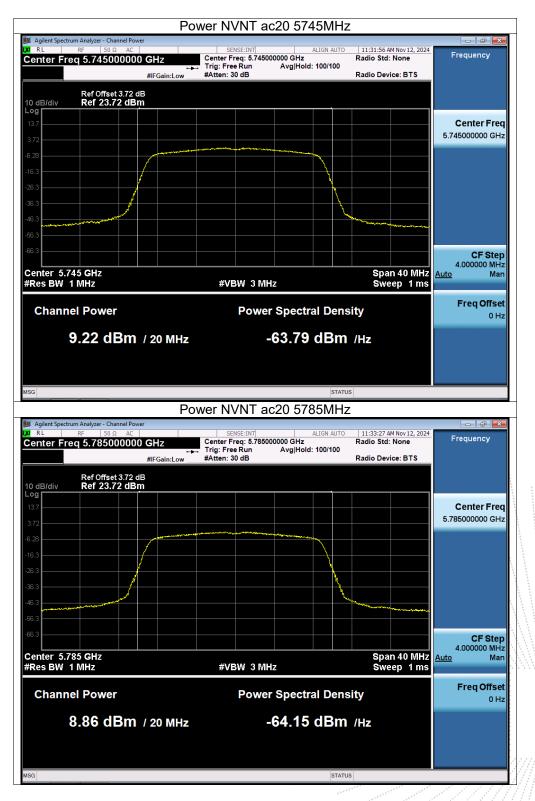




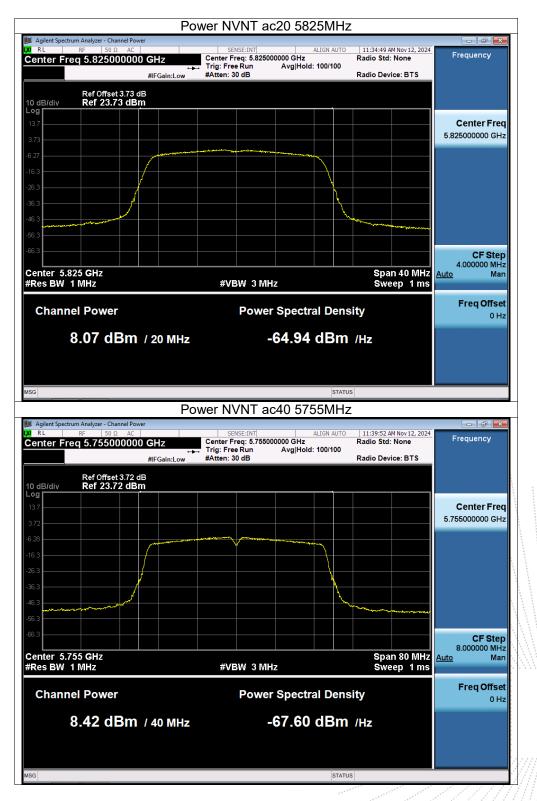




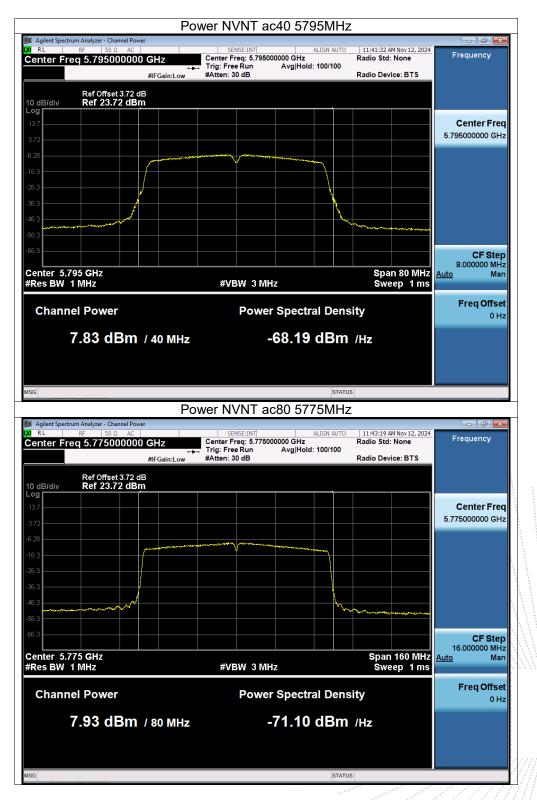














11. Out Of Band Emissions

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.

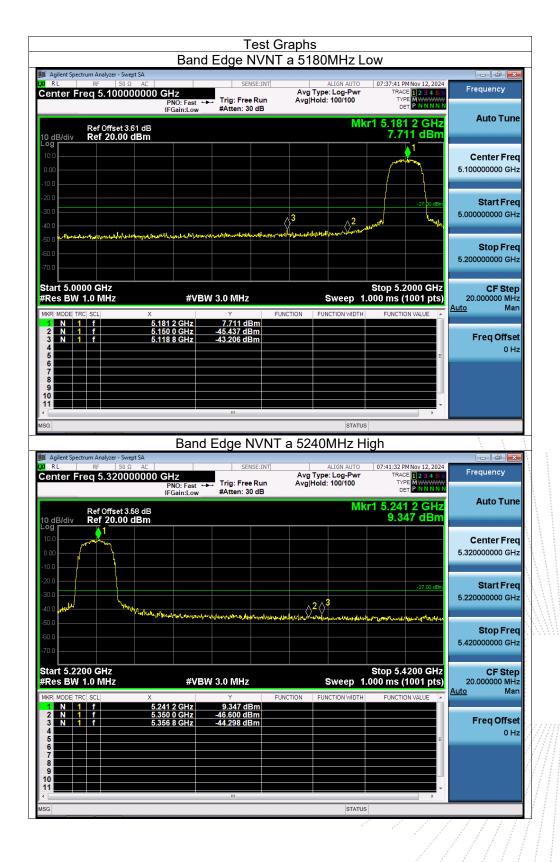
5. Repeat above procedures until all measured frequencies were complete.

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



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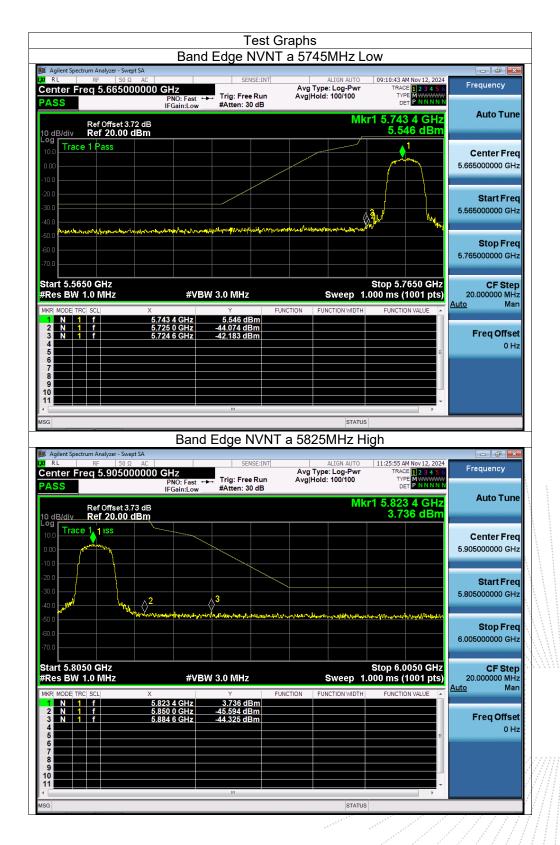
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Center Freq 5.6650000 PASS	-	→ Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNN	Frequency
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MSG			STATUS		
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Agilent Spectrum Analyzer - Swent SA			n20 5825MHz I	High	
Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC Center Freq 5.9050000 PASS	c IOO GHz PNO: Fast ↔	SENSE:INT	n20 5825MHz I ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	11:30:55 AM Nov 12, 2024 TRACE 2 3 4 5 6	Frequency
M RL RF 50 Ω A0 Center Freq 5.9050000 PASS Ref Offset 3.73 d	c GHz PN0: Fast ↔ IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	11:30:55 AM Nov 12, 2024 TRACE 2 3 4 5 6 TYPE MWWWW DET PNNNN r1 5.823 6 GHz	
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M RE S0 Q Addition Center Freq 5.9050000 PASS Ref Offset 3.73 d Ref 20.00 dBr Log Trace 1 (1) ISS	C DO GHz PN0: Fast IFGain:Low IB m	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	11:30:55 AM Nov 12, 2024 TRACE 2 3 4 5 6 TYPE MWWWW DET PNNNN r1 5.823 6 GHz	Frequency Auto Tune Center Freq 5.90500000 GHz Start Freq
XI RF 50.0 Addition Center Freq 5.9050000 PASS Ref Offset 3.73 d Addition Ref Offset 3.73 d Addition Ref Offset 3.73 d Addition	C DO GHz PN0: Fast IFGain:Low IB m	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	11:30:55 AM Nov 12, 2024	Frequency Auto Tune Center Freq 5.90500000 GHz Start Freq 5.805000000 GHz Stop Freq 6.005000000 GHz
RE S0 0 A/ Center Freq 5.9050000 PASS Ref Offset 3.73 d 10 dB/div Ref 20.00 dBr Ref 20.00 dBr 10 0 Trace 1 1 1ss 1 -20 0 -30 0 -40 0 -60 0 -60 0 -60 0	C 100 GHz PN0: Fast ← IFGain:Low IB n 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	11:30:55 AM Nov 12, 2024 TRACE 2 3 4 5 6 TYPE MWWWW DET PNNNN r1 5.823 6 GHz	Frequency Auto Tune Center Freq 5.905000000 GHz Start Freq 5.805000000 GHz Stop Freq 6.005000000 GHz CF Step 20.000000 MHz
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N RF 50.0 Addition Center Freq 5.9050000 PASS Ref Offset 3.73 d Addition A	C DIO GHZ PND: Fast ← IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100 Mk	11:30:55 AM Nov 12, 2024 TRACE 1 2 3 4 5 6 TYPE MUNICIPAL OF THE POINT OF THE POI	Frequency Auto Tune Center Freq 5.905000000 GHz Start Freq 5.805000000 GHz Stop Freq 6.005000000 GHz 20.000000 MHz Auto Man Freq Offset
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	Band E	dge NVNT a	c40 5755MHz	Low	
Magilent Spectrum Analyzer - Swep		SENSE:INT	ALIGN AUTO	11:40:26 AM Nov 12, 2024	
Center Freq 5.69500		► Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE M WWWW DET P N N N N N	Frequency
Ref Offset 3.7 10 dB/div Ref 20.00 d	72 dB d B m		Mk	r1 5.758 4 GHz 0.089 dBm	Auto Tune
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0.00			All Markey and All	(Vignussing and	5.695000000 GHz
-10.0					
-20.0					Start Fred 5.595000000 GH;
-40.0		∂ 3	2		5.55500000 GH.
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-60.0					5.795000000 GH
Start 5.5950 GHz				Stop 5.7950 GHz	CF Step
Res BW 1.0 MHz	#VB	W 3.0 MHz	-	000 ms (1001 pts)	20.000000 MH: Auto Mar
MKR MODE TRC SCL	× 5.758 4 GHz	0.089 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 f 3 N 1 f 4	5.725 0 GHz 5.690 8 GHz	-44.102 dBm -43.140 dBm			Freq Offse
5				=	0 H:
7					
9 10					
11 <		m			
ISG			STATUS		
		dge NVNT a	c40 5795MHz	High	
M Agilent Spectrum Analyzer - Swep	AC	SENSE:INT	ALIGN AUTO	11:42:06 AM Nov 12, 2024	Frequency
Center Freq 5.85500	UUUUU GHZ PNO: Fast ← IFGain:Low	 Trig: Free Run #Atten: 30 dB 	Avg Type: Log-Pwr Avg Hold: 100/100	TRACE 123456 TYPE MWWWW DET PNNNN	
Ref Offset 3.7	72 dB		Mk	r1 5.793 0 GHz -0.421 dBm	Auto Tune
Log				0.421 abii	
	1				Center Free 5.855000000 GH
-10.0	Kannenand				
-20.0					Start Free
-30.0		· · · · ·	<u>3</u>		5.755000000 GH
-40.0	Laberta Laborer	Wellin and the second states and the second	an the above the main makes and a second	have a substantion of the second	
-60.0					Stop Free 5.955000000 GH
-70.0					
Start 5.7550 GHz #Res BW 1.0 MHz	#VB	W 3.0 MHz	Sweep 1.	Stop 5.9550 GHz 000 ms (1001 pts)	CF Step 20.000000 MH;
MKR MODE TRC SCL	× 5.793 0 GHz	Y FU -0.421 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
2 N 1 f 3 N 1 f	5.850 0 GHz 5.885 4 GHz	-0.421 dBm -47.483 dBm -44.629 dBm			Freq Offse
4 5				E	он:
6 7					
8					
10					
11		m		· · · ·	



Band Edge NVNT ac80 5775MHz High	
Agilent Spectrum Analyzer - Swept SA AL RF 50 Ω AC SENSE:INT ALIGN AUTO 11:44:45 AM Nov12, 2024	- P ×
Center Freq 5.795000000 GHz Avg Type: Log-Pwr TRACE Trace <td>Frequency</td>	Frequency
Ref Offset 3.72 dB Mkr1 5.771 8 GHz 10 dB/div Ref 20.00 dBm -3.110 dBm	Auto Tune
Log Trace-1-Pass 000 100 100	Center Freq 5.795000000 GHz
	Start Freq 5.69500000 GHz
	Stop Freq 5.895000000 GHz
Start 5.6950 GHz Stop 5.8950 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep 1.000 ms (1001 pts)	CF Step 20.000000 MHz to Man
MRR MODE TRC SCI X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE 1 N 1 f 5.7718 GHz -3.110 dBm 1 1 5.850 GHz -47.305 dBm 1 1 1 5.860 GHz -47.305 dBm 1 1 5.860 8 GHz -47.305 dBm 1 1 5.860 8 GHz -47.305 dBm 1 <	Freq Offset 0 Hz
MSG STATUS	
Band Edge NVNT ac80 5775MHz Low	
Mile Aglient Spectrum Analyzer - Swept SA Sense:INT ALIGN AUTO 11:44:34 AM Nov12, 2024 Mile RF 50 Ω AC SENSE:INT ALIGN AUTO 11:44:34 AM Nov12, 2024 Center Freq 5:755000000 GHz Trig: Free Run #Atten: 30 dB Arg Type: Log-Pwr Avg[Hold: 100/100 TRACE TYPE D2:84 5 G	Frequency
Ref Offset 3.72 dB Mkr1 5.773 2 GHz 10 dB/div Ref 20.00 dBm -3.210 dBm	Auto Tune
Log Trace 1 Pass 1 <th1< th=""> <th1< th=""> 1 <t< td=""><td>Center Freq 5.755000000 GHz</td></t<></th1<></th1<>	Center Freq 5.755000000 GHz
-20.0 A32	Start Freq
400 Warren and a house and a h	5.655000000 GHz
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500 Mining and a line of the second and a line second and a line of the second an	5.655000000 GHz Stop Freq 5.855000000 GHz CF Step 20.000000 MHz
Start 5.6550 GHz Stop 5.8550 GHz #Res BW 1.0 MHz Y FUNCTION WIDTH FUNCTION VALUE	5.655000000 GHz Stop Freq 5.85500000 GHz CF Step 20.00000 MHz
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12. Spurious RF Conducted Emissions

12.1 Block Diagram Of Test Setup



12.2 Limit

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits: (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 5 MHz above or below 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.

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 bandege 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.





