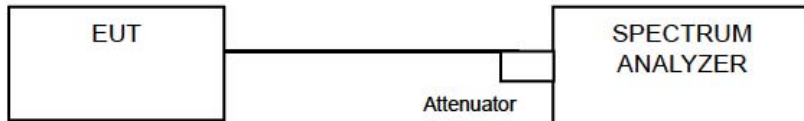


3.5 26dB Bandwidth & 6dB Bandwidth Measurement

3.5.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

3.5.2 Test Setup



3.5.3 Test Instruments

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2003	EMI Test Receiver	Keysight	N9030B	11/01/2022	11/01/2023

3.5.4 Test Procedure

26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz)

- Allow the trace to stabilize.
- Use the spectrum analyzer built-in measurement function to determine the 26dB BW.
Set RBW = around 1% of emission bandwidth
Set VBW > RBW
Detector = Peak
Trace mode = max hold
- Capture the plot.
- Repeat above steps for different test channel and other modulation type.

6 dB Minimum emission bandwidth measurement procedure

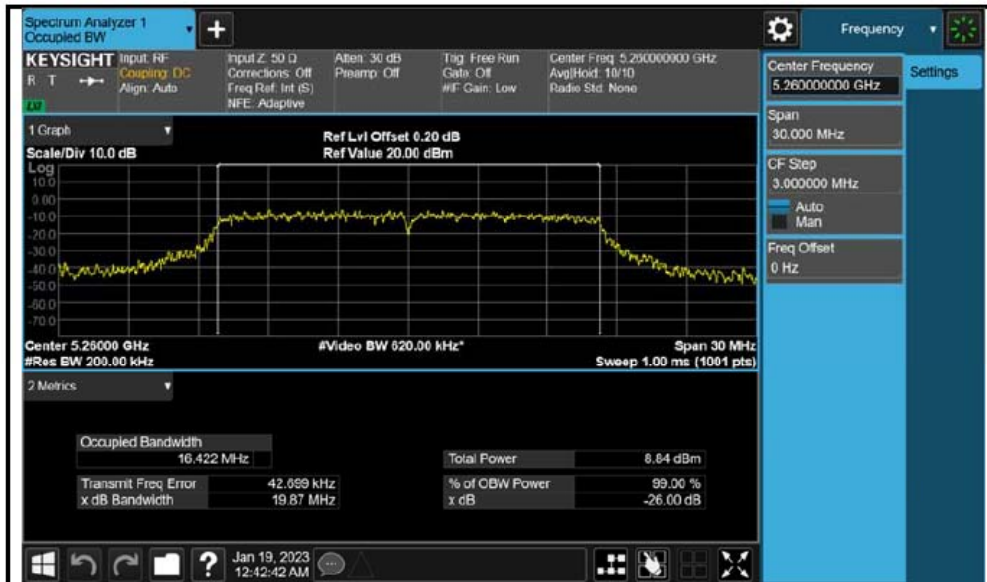
- Allow the trace to stabilize.
- Use the spectrum analyzer built-in measurement function to determine the 6dB BW.
Set RBW = 100 KHz
Set VBW $\geq 3 \times$ RBW
Detector = Peak
Trace mode = max hold
Sweep = auto couple
- Capture the plot.
- Repeat above steps for different test channel and other modulation type.

3.5.5 Test Results

26dB Bandwidth measurement result for UNII-2 Band

Type	Test mode	Freq (MHz)	CH	99% OBW(MHz)	26 dB OBW(MHz)
26dB BW	802.11a	5260	Low	16.422	19.869
		5280	Mid	16.486	20.467
		5320	High	16.461	20.852
		5500	Low	16.430	19.661
		5600	Mid	16.508	22.241
		5700	High	16.492	24.283
	802.11n-HT20	5260	Low	17.615	20.775
		5280	Mid	17.572	20.964
		5320	High	17.643	21.221
		5500	Low	17.629	21.104
		5600	Mid	17.687	21.175
		5700	High	17.667	25.107

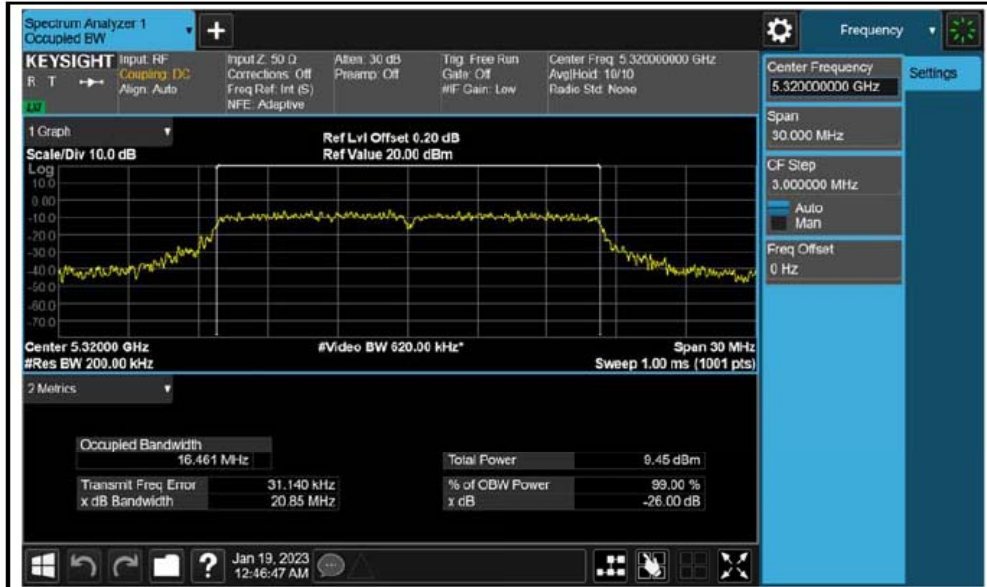
Occupied Bandwidth Test Plots
UNII-2 Band



802.11a-5260MHz



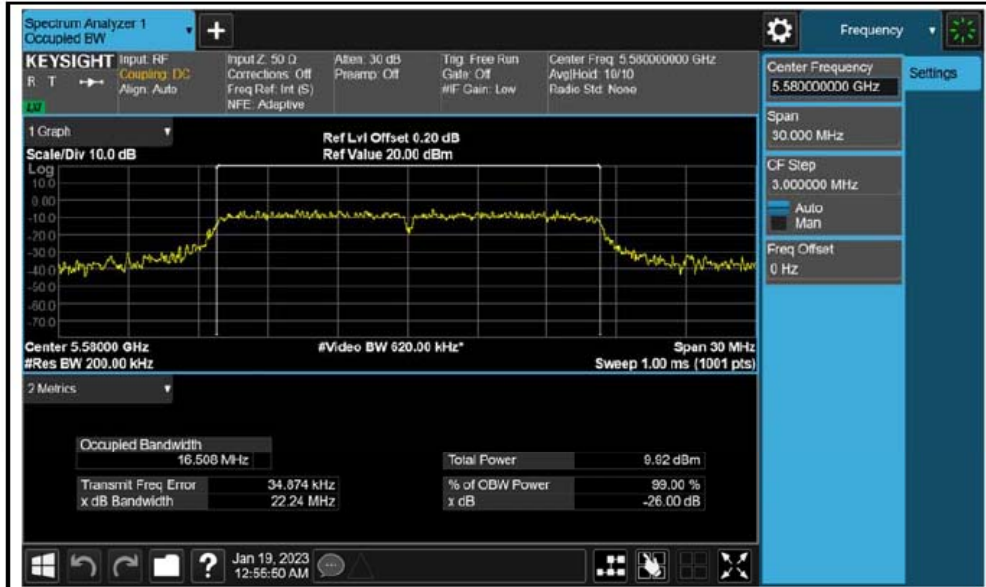
802.11a-5280MHz



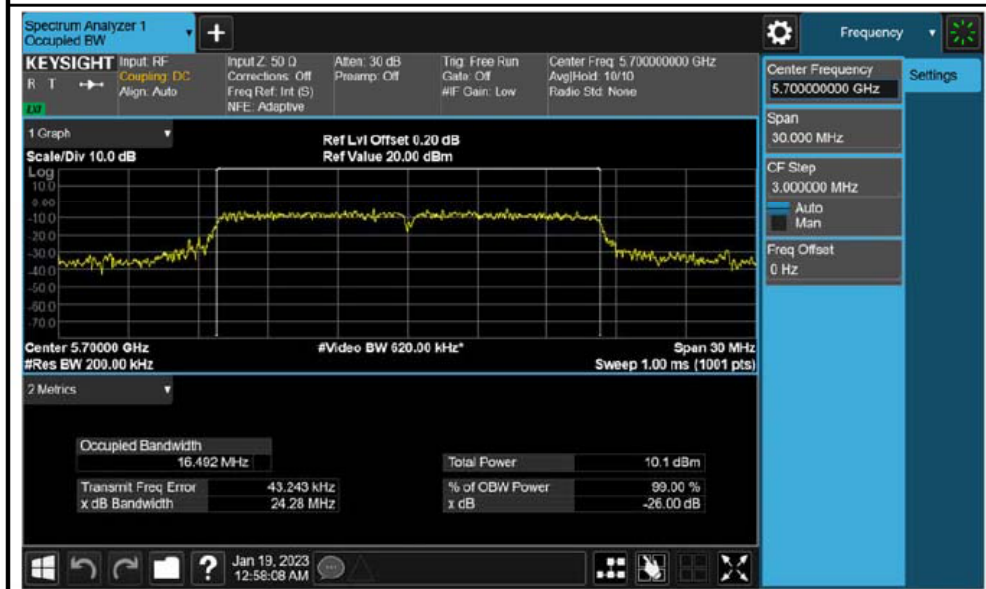
802.11a-5320MHz



802.11a-5500MHz



802.11a-5600MHz



802.11a-5700MHz



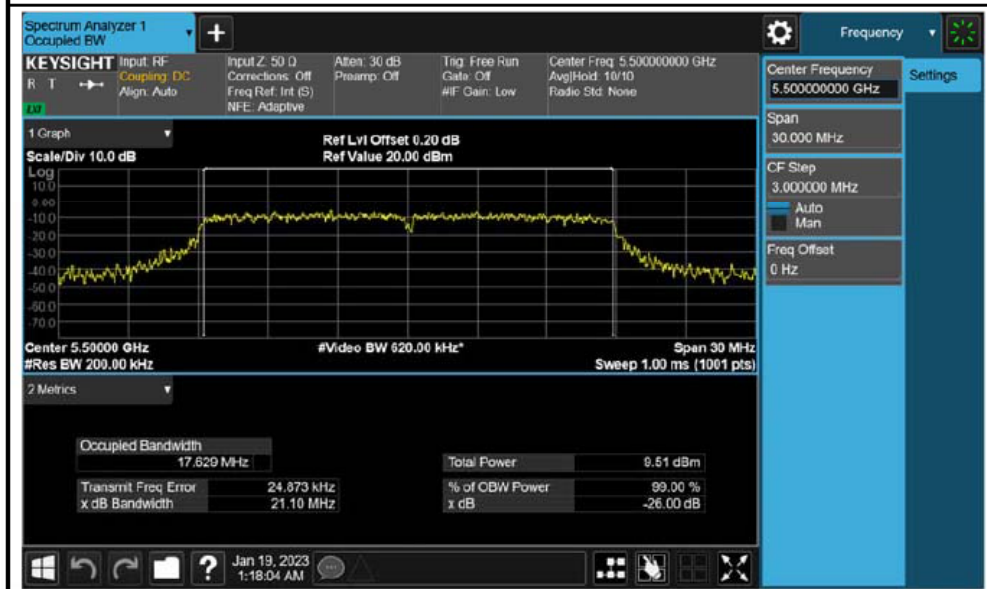
802.11n HT20-5260MHz



802.11n HT20-5280MHz



802.11n HT20-5320MHz



802.11n HT20-5500MHz



802.11n HT20-5600MHz



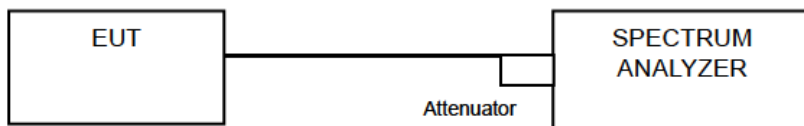
802.11n HT20-5700MHz

3.6 Peak Power Spectral Density Measurement

3.6.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Client device	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C	√		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

3.6.2 Test Setup



3.6.3 Test Instruments

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2003	EMI Test Receiver	Keysight	N9030B	11/01/2022	11/01/2023

3.6.4 Test Procedure

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to “free run”.
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value

For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500\text{ kHz}/300\text{kHz})$
5. Sweep time = auto, trigger set to “free run”.
6. Trace average at least 100 traces in power averaging mode.
7. Record the max value

3.6.5 Deviation from Test Standard

No deviation.

3.6.6 EUT Operating Condition

Same as Item 4.3.6.

3.6.7 Test Results

PSD measurement result for UNII-2 Band

Type	Test mode	Freq (MHz)	CH	Conducted PSD (dBm/MHz)	Limit (dBm/MHz)	Result
Output Power	802.11a	5260	Low	-6.281	11	Pass
		5280	Mid	-6.044	11	Pass
		5320	High	-5.669	11	Pass
		5500	Low	-5.723	11	Pass
		5600	Mid	-5.263	11	Pass
		5700	High	-4.758	11	Pass
	802.11n-HT20	5260	Low	-6.362	11	Pass
		5280	Mid	-6.153	11	Pass
		5320	High	-6.598	11	Pass
		5500	Low	-5.778	11	Pass
		5600	Mid	-5.425	11	Pass
		5700	High	-5.079	11	Pass

Test Plot for UNII-2 Band



802.11a-5260MHz



802.11a-5280MHz



802.11a-5320MHz



802.11a-5500MHz



802.11a-5600MHz



802.11a-5700MHz



802.11n HT20-5260MHz



802.11n HT20-5280MHz



802.11n HT20-5320MHz



802.11n HT20-5500MHz



802.11n HT20-5600MHz



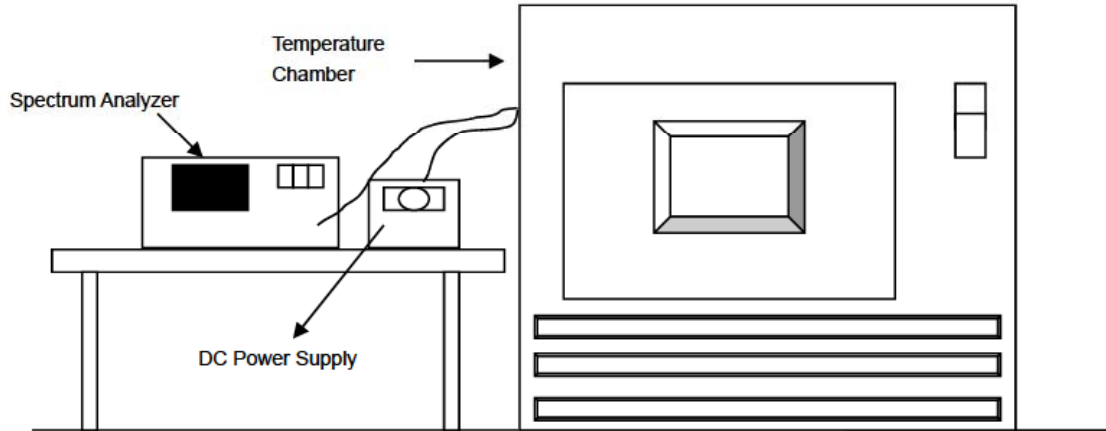
802.11n HT20-5700MHz

3.7 Frequency Stability Measurement

3.7.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation.

3.7.2 Test Setup



3.7.3 Test Instruments

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1S2003	EMI Test Receiver	Keysight	N9030B	11/01/2022	11/01/2023
1S2776	Temperature Chambers	Lunaire	BTC	Note 1	Note 1

Note 1: Verified by calibrated instrumentation at the time of testing

3.7.4 Test Procedure

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed..
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

3.7.5 Deviation from Test Standard

No deviation.

3.7.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

3.7.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5260 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	3.8	5259.971	Pass	5260.06	Pass	5259.98	Pass	5259.987	Pass
40	3.8	5260.048	Pass	5259.993	Pass	5259.999	Pass	5260.003	Pass
30	3.8	5259.989	Pass	5260.001	Pass	5259.99	Pass	5259.989	Pass
20	3.8	5259.992	Pass	5260.003	Pass	5259.992	Pass	5260.007	Pass
10	3.8	5259.974	Pass	5259.97	Pass	5259.996	Pass	5260.006	Pass
0	3.8	5260.001	Pass	5260.002	Pass	5259.969	Pass	5260.982	Pass
-10	3.8	5259.972	Pass	5259.98	Pass	5259.972	Pass	5259.994	Pass
-20	3.8	5259.903	Pass	5259.989	Pass	5260.001	Pass	5260.007	Pass
-30	3.8	5260.002	Pass	5259.986	Pass	5259.989	Pass	5259.99	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	4.37	5260.008	Pass	5259.978	Pass	5260.007	Pass	5260.002	Pass
	3.8	5259.984	Pass	5259.914	Pass	5260.021	Pass	5260.001	Pass
	3.23	5260.118	Pass	5260.01	Pass	5259.887	Pass	5259.979	Pass

4 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

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