FCC DFS TEST REPORT

FCC ID	:	**2AEM4-5170111**
Equipment	:	**Wireless Router**
Brand Name	:	**eero**
Model Name	:	**SN10001**
Applicant	:	**eero LLC** **660 3rd Street, 4th Floor, San Francisco, CA, USA**
Manufacturer	:	**eero LLC** **660 3rd Street, 4th Floor, San Francisco, CA, USA**
Standard	:	**FCC Part 15 Subpart E**

The product was received on Aug. 05, 2024 and testing was performed from Aug. 05, 2024 to Oct. 29, 2024. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in FCC Part 15 Subpart E and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

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History of this test report

Report No.	Version	Description	Issue Date
FZ422010-02	01	Initial issue of report	Sep. 30, 2024
FZ422010-02	02	Revise section 4.2.6 This report is an updated version, replacing the report issued on Sep. 30, 2024.	Oct. 22, 2024
FZ422010-02	03	Revise DFS test result This report is an updated version, replacing the report issued on Oct. 22, 2024.	Oct. 30, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
4.2	KDB 905462 7.8.3	Channel Move Time	Pass	-
		Channel Closing Transmission Time	Pass	-
4.3	15.403(i)	26dB Bandwidth	Pass	-
4.3	2.1049	99% Occupied Bandwidth	Pass	-
4.4	15.407(a)	Maximum Conducted Output Power	Pass	-
4.5	5.407(a)	Power Spectral Density	Pass	-
Note: This is a variant report by software enabled Progressive DFS function. All the test cases were performed on original report which can be referred to Sporton Report Number FZ422010. Based on the original report, only worst case was verified.				

Conformity Assessment Condition:
The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Yun Huang
Report Producer: Clio Lo

1 General Description

1.1 Feature of Equipment Under Test

Product Feature	
General Specs	Bluetooth-LE, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax/be, Wi-Fi 5GHz 802.11a/n/ac/ax/be, and IEEE 802.15.4.
Antenna Type	WLAN: **<5G_Ant. 0>**: Dipole Antenna **<2.4G_Ant. 0 and 5G_Ant. 1>**: Dipole Antenna **<2.4G_Ant. 1 >**: Dipole Antenna Bluetooth: Dipole Antenna IEEE 802.15.4: Dipole Antenna

Antenna information		
5250 MHz ~ 5350 MHz	Peak Gain (dBi)	<5G_Ant. 0> 3.91 <5G_Ant. 1> 3.52
5470 MHz ~ 5725 MHz	Peak Gain (dBi)	<5G_Ant. 0> 4.23 <5G_Ant. 1> 3.53

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications are made to the EUT during all test items.

1.3 Testing Site

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	03CH19-HY, TH05-HY

FCC designation No.: TW3786

1.4 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01
- FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ANSI C63.10-2013
- FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02
- FCC KDB 905462 D03 UNII Clients Without Radar Detection New Rules v01r02

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. The TAF code is not including all the FCC KDB listed without accreditation.

1.5 Support Unit used in Test Configuration and System

Item	Equipment	Brand Name	Model Name	FCC ID	HW / FW Version	Power Cord
1.	Notebook	acer	N15C1	PPD-QCNFA435	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Mode	Test Configuration			
	Modulation	Test Channel	Modulation	Radar Injection frequency (MHz)
1	EHT80	58	5290	5260
2	EHT80	58	5290	5280
3	EHT160	50	5250	5260
4	EHT160	50	5250	5280
5	EHT80	106	5530	5500
6	EHT80	106	5530	5520
7	EHT80	106	5530	5560
8	EHT160	114	5570	5500
9	EHT160	114	5570	5520
10	EHT160	114	5570	5640
11	EHT240	122	5610	5500
12	EHT240	122	5610	5520
13	EHT240	122	5610	5580
14	EHT240	122	5610	5720

3 Requirements and Parameters for DFS Test

3.1 Summary of Dynamic Frequency Selection Test

UNII	Description	Limit
U-NII-2A 5250-5350 MHz	Channel Move Time	< 10 sec
	Channel Closing Transmission Time	< 200 ms + aggregate of 60 ms over remaining 10 s period
U-NII-2C 5470-5725 MHz	Channel Move Time	< 10 sec
	Channel Closing Transmission Time	< 200 ms + aggregate of 60 ms over remaining 10 s period

3.2 DFS Detection Thresholds

Table 3 below provides the DFS Detection Thresholds for Master Devices as well as Client Devices incorporating In-Service Monitoring.

Table 3: DFS Detection Thresholds for Master Devices

Maximum Transmit Power	Value (see notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note 3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

The radar *Detection Threshold* is (-64dBm) + 1 dB = -63 dBm

3.3 DFS Response Requirement Values

Table 4 provides the response requirements for Master and Client Devices incorporating DFS.

Table 4: DFS Response Requirement Values

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the 99% power bandwidth See Note 3.

Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate *Channel* changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 0 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.

3.4 Short Pulse Radar Test Waveforms

Radar Type 0 was used in the evaluation of the Client device for the purpose of measuring the Channel Move Time and the Channel Closing Transmission Time.

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1.	See Note 1.
1	1	Test A Test B	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a
Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms.

If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number (1 to 23)	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355.0	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.5	858
19	1139.0	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

3.5 Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms. Each waveform is defined as follows:

Note: The center frequency for each of the 30 trials of the Bin 5 radar shall be randomly selected within 80% of the Occupied Bandwidth.

(1) The transmission period for the Long Pulse Radar test signal is 12 seconds.

(2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.

(3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.

(4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.

(5) 5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a **transmission period** will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz

(6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.

(7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12,000,000 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse radar test waveform:

(1) The total test signal length is 12 seconds.

(2) 8 Bursts are randomly generated for the Burst_Count.

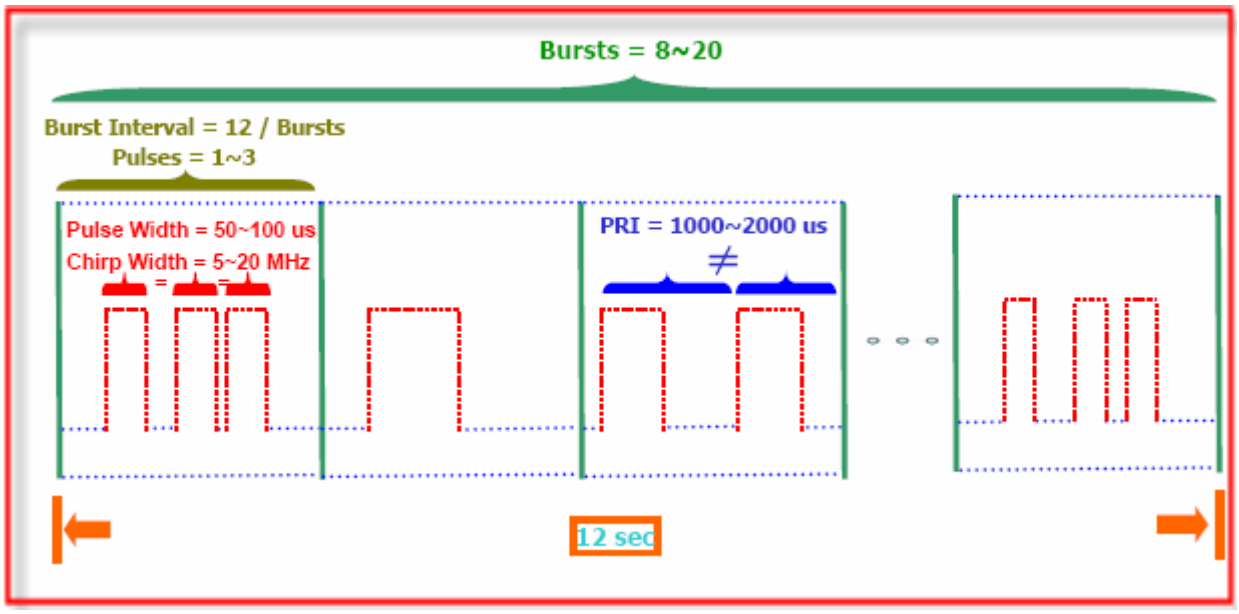
(3) Burst 1 has 2 randomly generated pulses.

(4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.

(5) The PRI is randomly selected to be at 1213 microseconds.

(6) Bursts 2 through 8 are generated using steps 3 – 5.

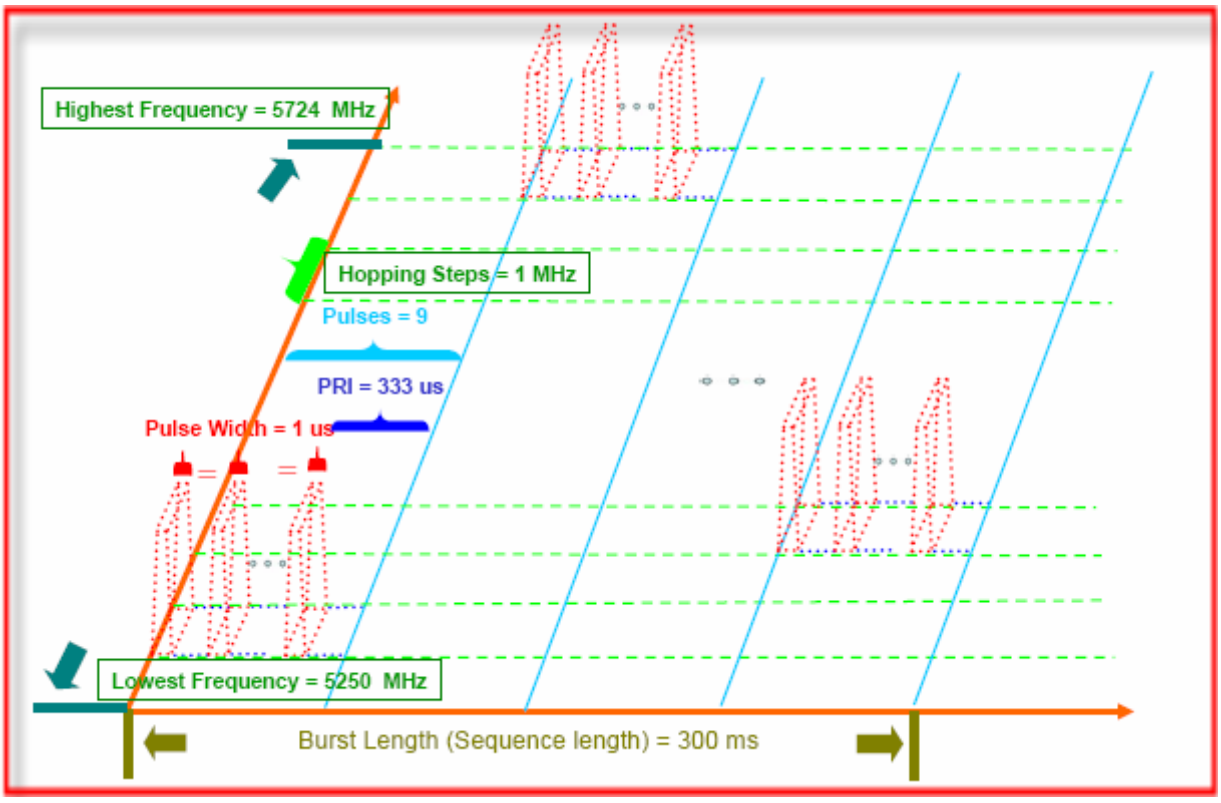
(7) Each Burst is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, Burst 1 is randomly generated (1 to 1,500,000 minus the total Burst 1 length + 1 random PRI interval) at the 325,001 microsecond step. Bursts 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. Burst 2 falls in the 1,500,001 – 3,000,000 microsecond range).



3.6 Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same Burst parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:
The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.



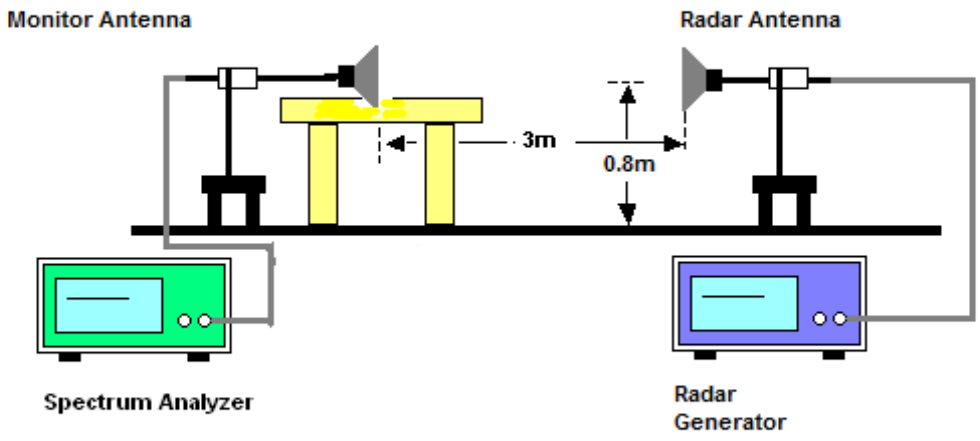
4 Calibration Setup and Test Results

4.1 Calibration of Radar Waveform

4.1.1 Radar Waveform Calibration Procedure

The Interference Radar Detection Threshold Level is (-64dBm) + 1 dB=-63 dBm. The following equipment setup was used to calibrate the radiated radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0~6. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) at the frequency of the Radar Waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz to measure the radar waveform. The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was (-64dBm) + 1 dB=-63 dBm. Capture the spectrum analyzer plots on radar waveform. The spectrum offset has included the monitor antenna gain and path loss between monitor antenna and spectrum analyzer.

4.1.2 Radiated Calibration Setup

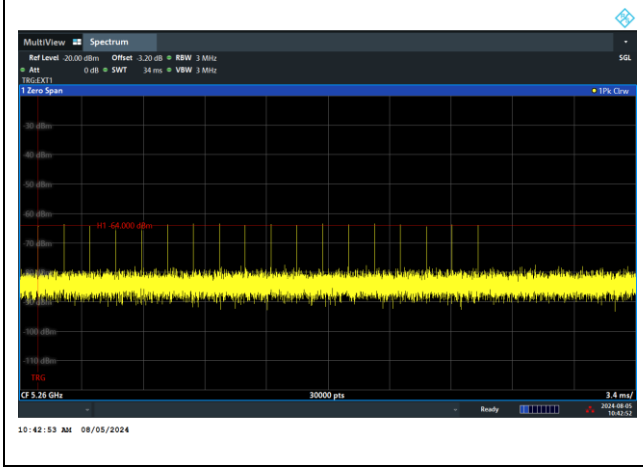
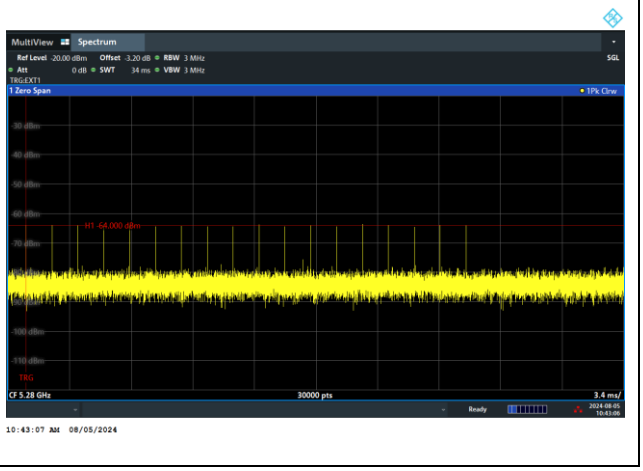


4.1.3 Calibration Deviation

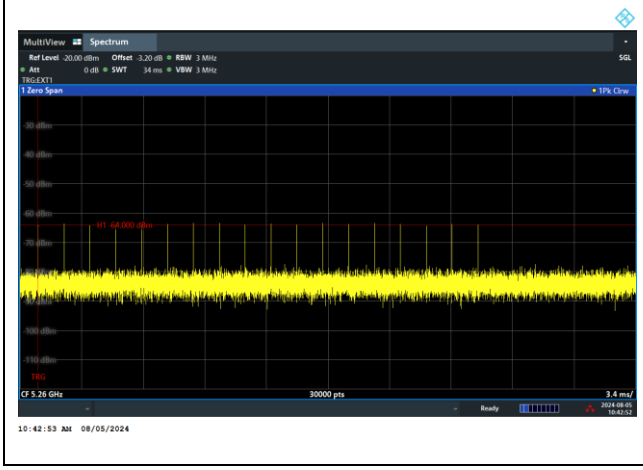
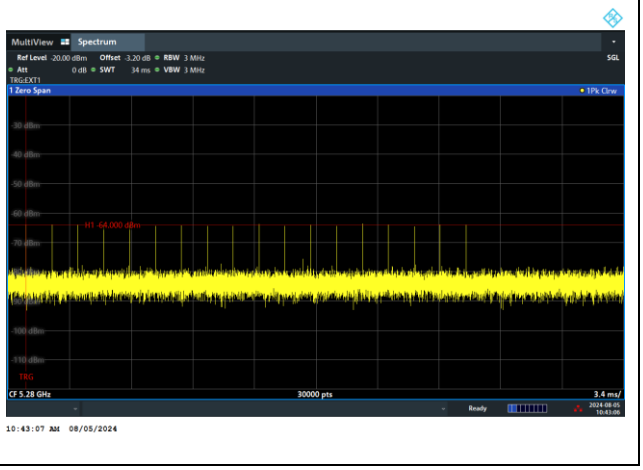
There is no deviation with the original standard.

4.1.4 Radar Waveform Calibration Result

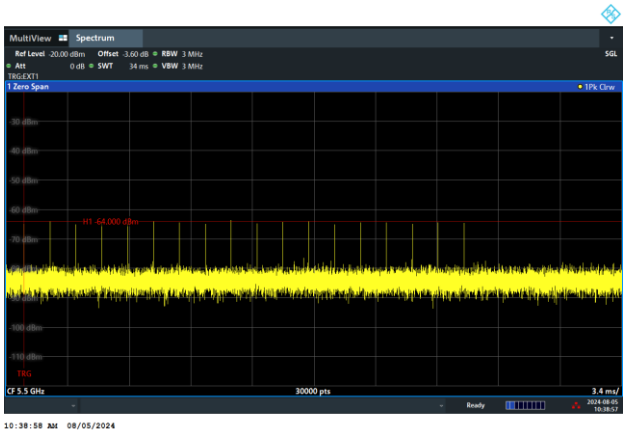
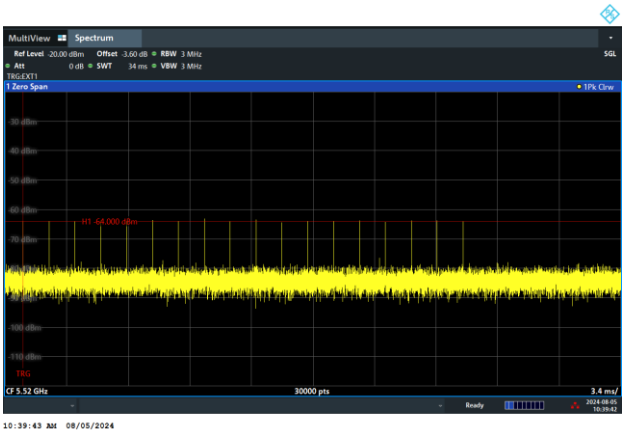
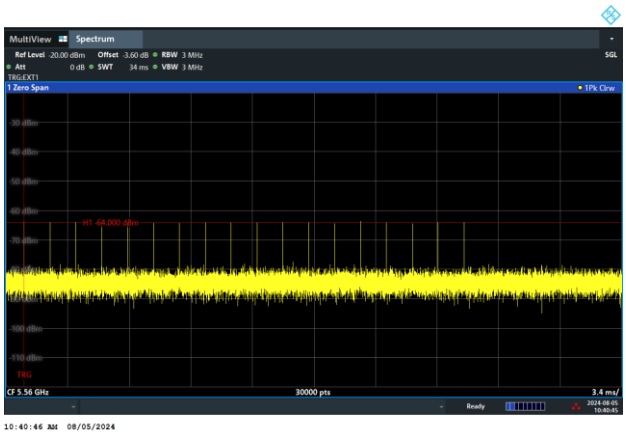
<80MHz/ 5290MHz>

Radar is injected at 5260MHz	Radar is injected at 5280MHz
	

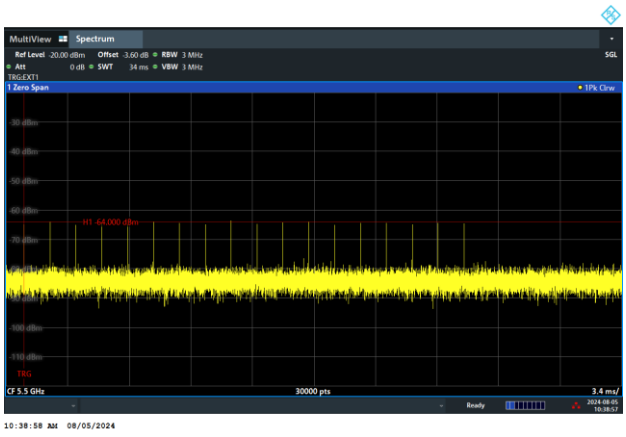
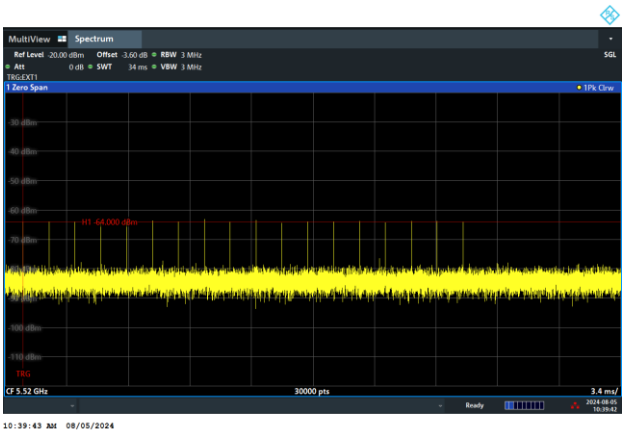
<160MHz/ 5250MHz>

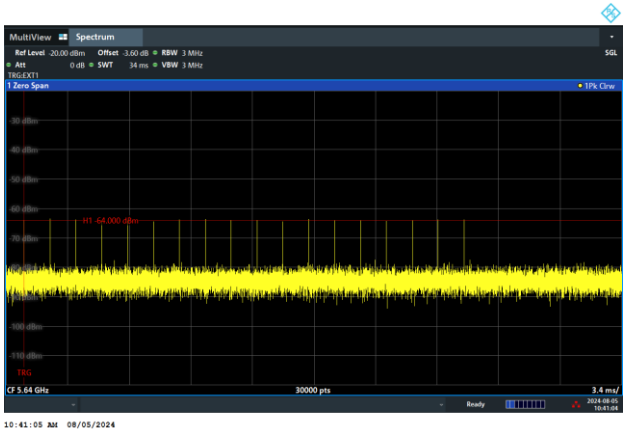
Radar is injected at 5260MHz	Radar is injected at 5280MHz
	

<80MHz/ 5530MHz>

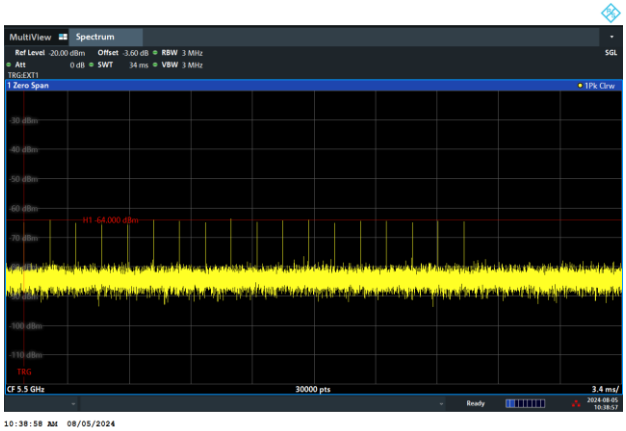
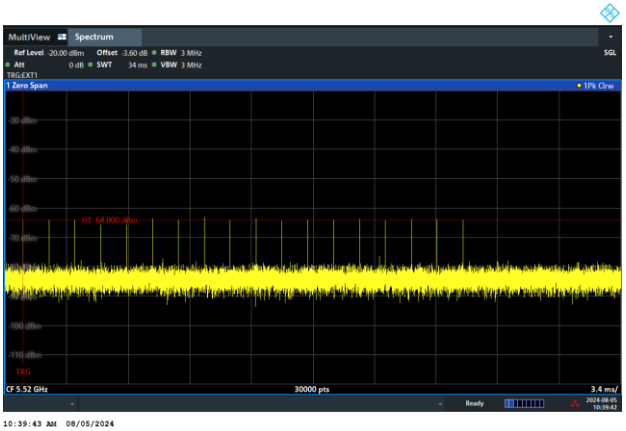
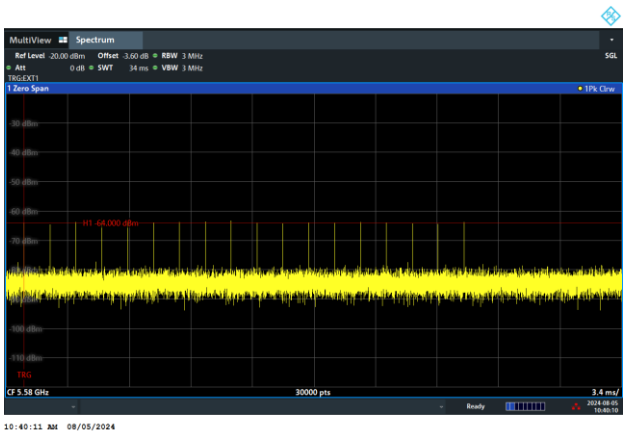
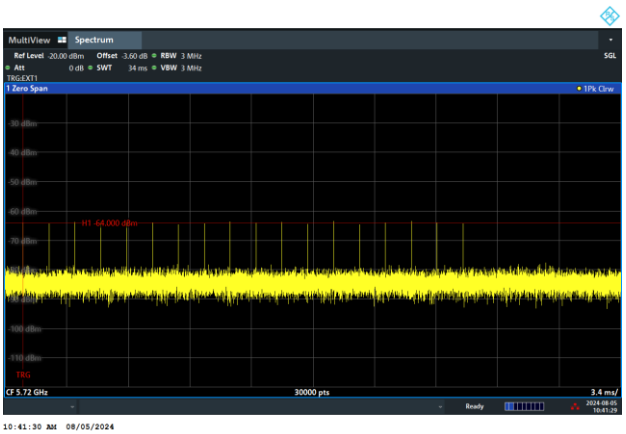
Radar is injected at 5500MHz	Radar is injected at 5520MHz
	
Radar is injected at 5560MHz	
	

<160MHz/ 5570MHz>

Radar is injected at 5500MHz	Radar is injected at 5520MHz
	

Radar is injected at 5640MHz	
	

<240MHz/ 5610MHz>

Radar is injected at 5500MHz	Radar is injected at 5520MHz
	
Radar is injected at 5580MHz	**Radar is injected at 572s0MHz**
	

4.2 In-Service Monitoring: Channel Move Time, Channel Closing Transmission Time

4.2.1 Limit of In-Service Monitoring

The EUT has In-Service Monitoring function to continuously monitor the radar signals, If radar is detected, it must leave the channel (Shutdown). The Channel Move Time to cease all transmissions on the current Channel upon detection of a Radar Waveform above the DFS Detection Threshold within 10 sec. The total duration of Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate Channel changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

4.2.2 Test Procedures

(1) One frequency will be chosen from the Operating Channels of the EUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

(2) In case the EUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the EUT (Master). For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

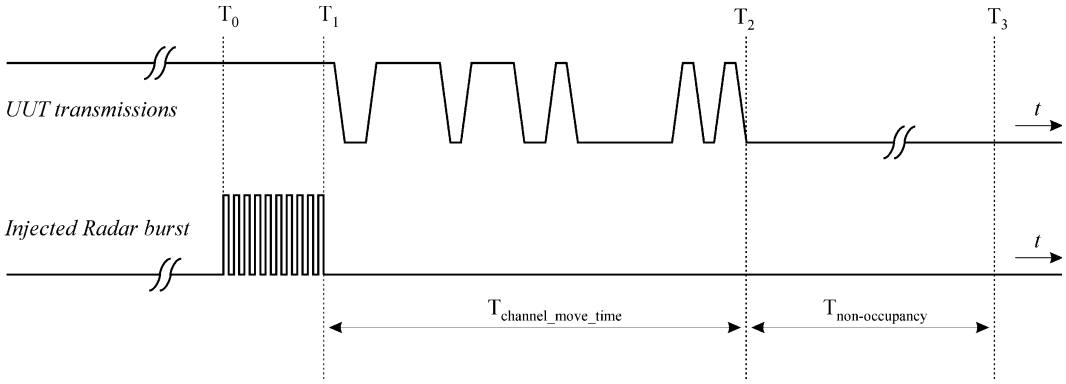
(3) The TCP protocol unicast data stream was generated by the iperf software command line with at least 17% activity ratio over any 100ms period.

(4) Timing plots are reported with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time).

(5) At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 at DFS Detection Threshold levels on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

(6) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs.

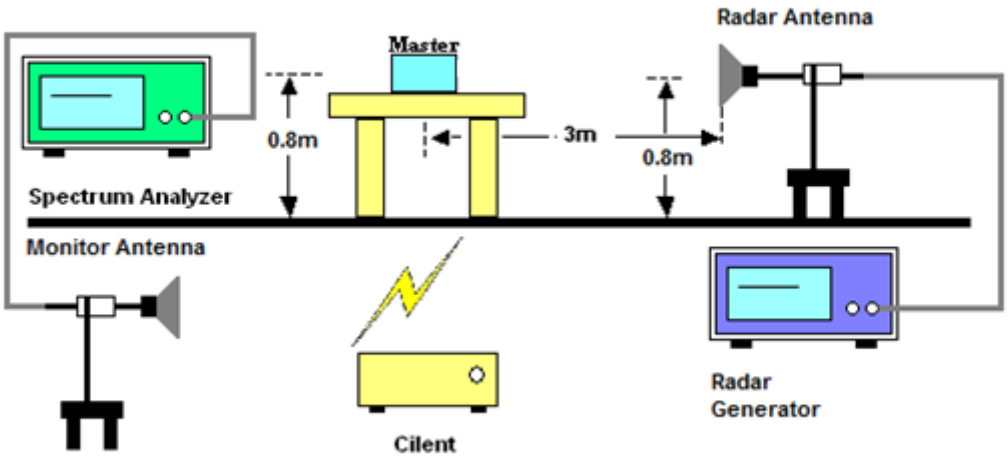
(7) When operating as a Master Device, monitor the EUT for more than 30 minutes following instant T2 to verify that the EUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.



(8) One 12 seconds plot is reported for the Short Pulse Radar Type 0.

(9) Measurement of the aggregate duration of the Channel Closing Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: Dwell (0.4ms)= S (12000ms) / B (30000); where Dwell is the dwell time per spectrum analyzer sampling bin, S is the sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: C (ms)= N X Dwell (0.4 ms); where C is the Closing Time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.

4.2.3 Test Setup



4.2.4 Test Deviation

There is no deviation with the original standard.

4.2.5 Result of Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Test

Test Mode :	Master	Temperature :	22.1 ~25.6℃
Test Engineer :	Rebecca Li	Relative Humidity :	47.8 ~55.2%

BW / Channel	Radar	Test Item	Test Result	Limit	Pass/Fail
<80MHz / 5290MHz>	5260	Channel Move Time	0.998033 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 6.4 ms	< 260ms	Pass
	5280	Channel Move Time	1.006427 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 12 ms	< 260ms	Pass
<160MHz / 5250MHz>	5260	Channel Move Time	1.009234 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 5.2 ms	< 260ms	Pass
	5280	Channel Move Time	2.498643 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 32.4 ms	< 260ms	Pass
<80MHz / 5530MHz>	5500	Channel Move Time	0.996833 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 13.2 ms	< 260ms	Pass
	5520	Channel Move Time	0.999633 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 2.4 ms	< 260ms	Pass
	5560	Channel Move Time	0.0056 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 0 ms	< 260ms	Pass
<160MHz / 5570MHz>	5500	Channel Move Time	1.040835 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 9.6 ms	< 260ms	Pass
	5520	Channel Move Time	1.036435 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 2.4 ms	< 260ms	Pass
	5640	Channel Move Time	0.0094 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 0 ms	< 260ms	Pass
<240MHz / 5610MHz>	5500	Channel Move Time	1.036435 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 9.6 ms	< 260ms	Pass
	5520	Channel Move Time	1.037635 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 8.4 ms	< 260ms	Pass
	5580	Channel Move Time	1.49325 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 5.2 ms	< 260ms	Pass
	5720	Channel Move Time	0.015201 s	< 10s	Pass
		Channel Closing Transmission Time	200ms + 0 ms	< 260ms	Pass

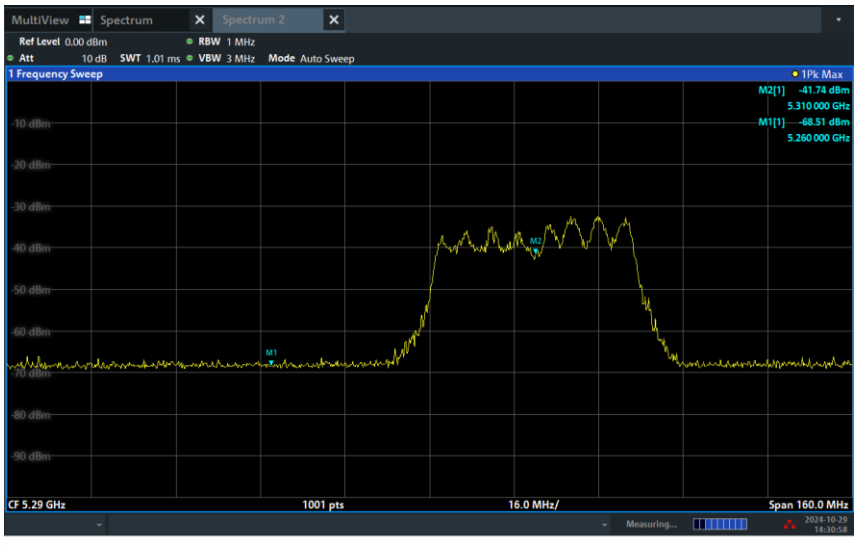
4.2.6 Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period Test Plots

<80MHz / 5290MHz >In-Service Monitoring
Radar is injected at 5260 MHz
Channel Move Time & Channel Closing Transmission Time

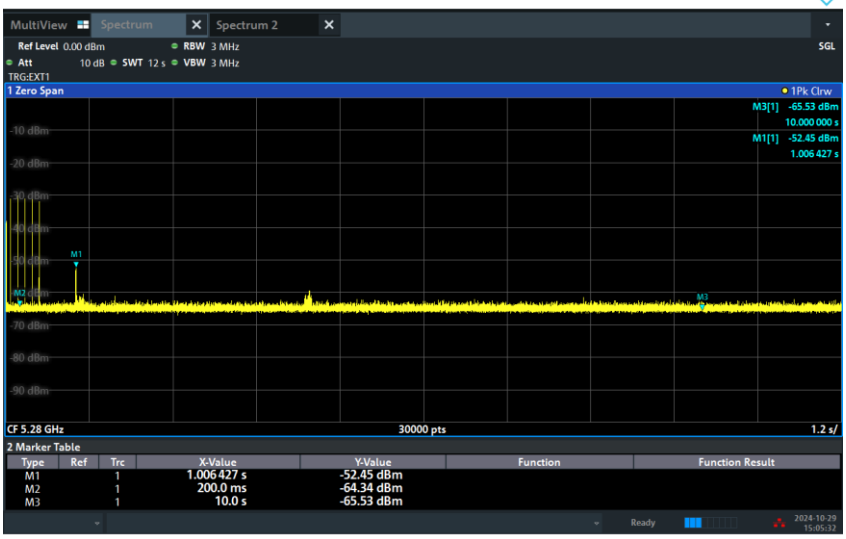
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 6.4 ms) = 200 + Number (16) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining Active Signal



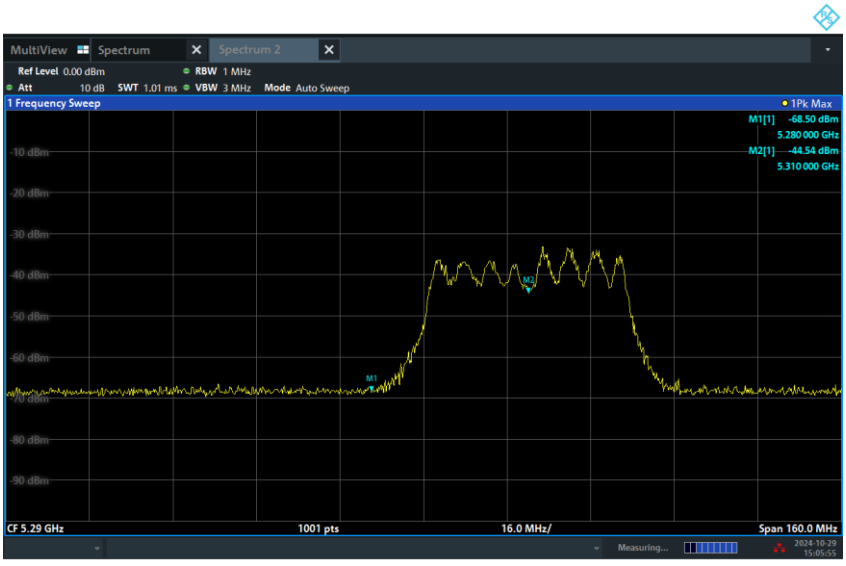
<80MHz / 5290MHz >In-Service Monitoring
Radar is injected at 5280 MHz
Channel Move Time & Channel Closing Transmission Time



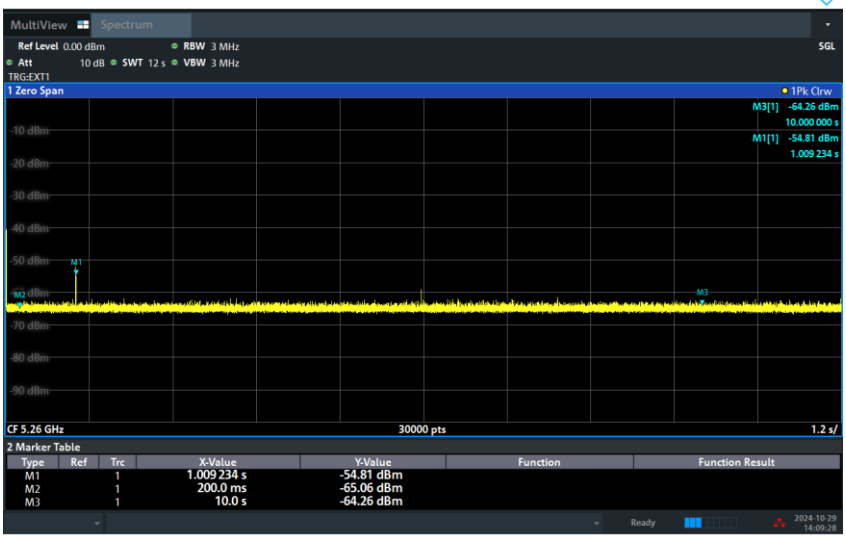
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 12 ms) = 200 + Number (30) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

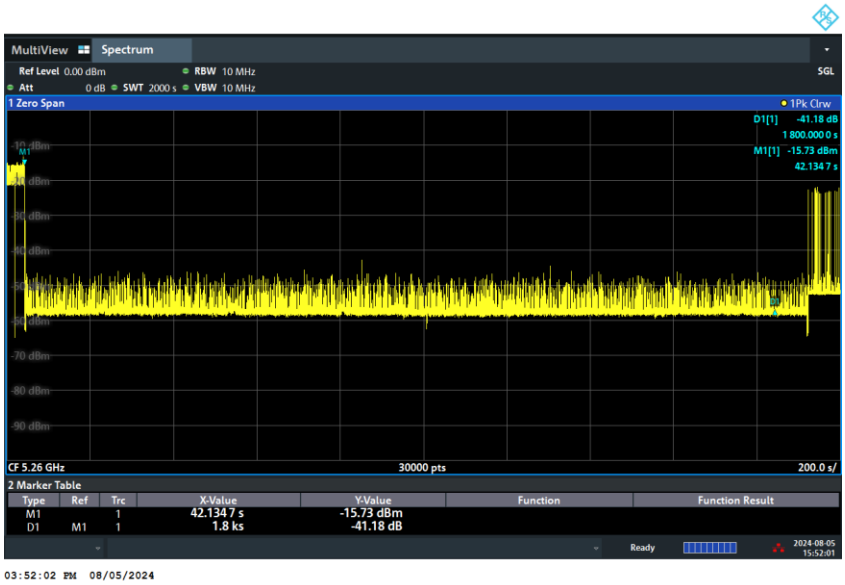
Remaining active signal



<160MHz / 5250MHz >In-Service Monitoring
Radar is injected at 5260 MHz
Channel Move Time & Channel Closing Transmission Time



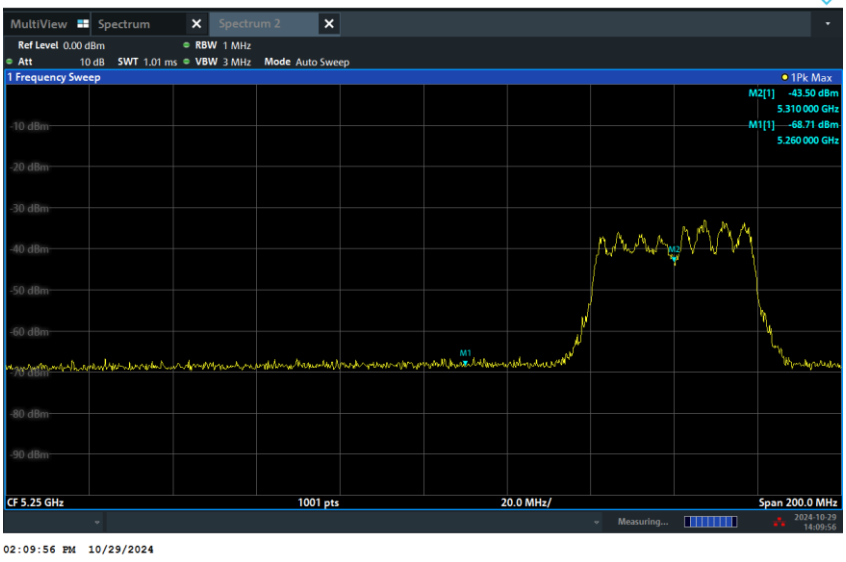
Non-Occupancy Period



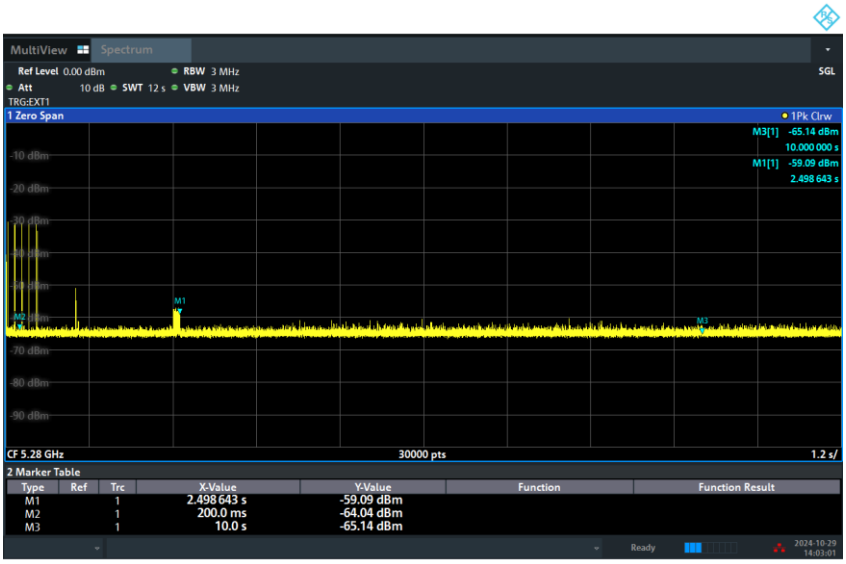
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 5.2 ms) = 200 + Number (13) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



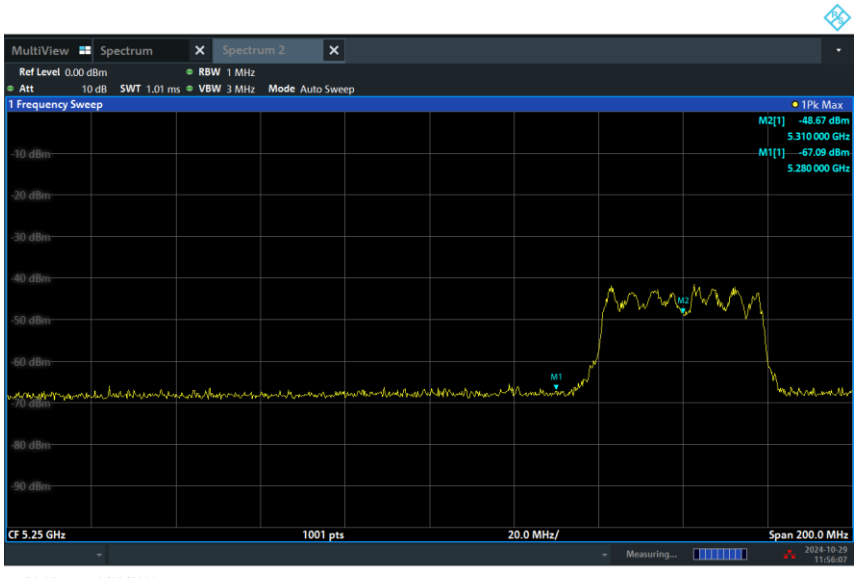
<160MHz / 5250MHz >In-Service Monitoring
Radar is injected at 5280 MHz
Channel Move Time & Channel Closing Transmission Time



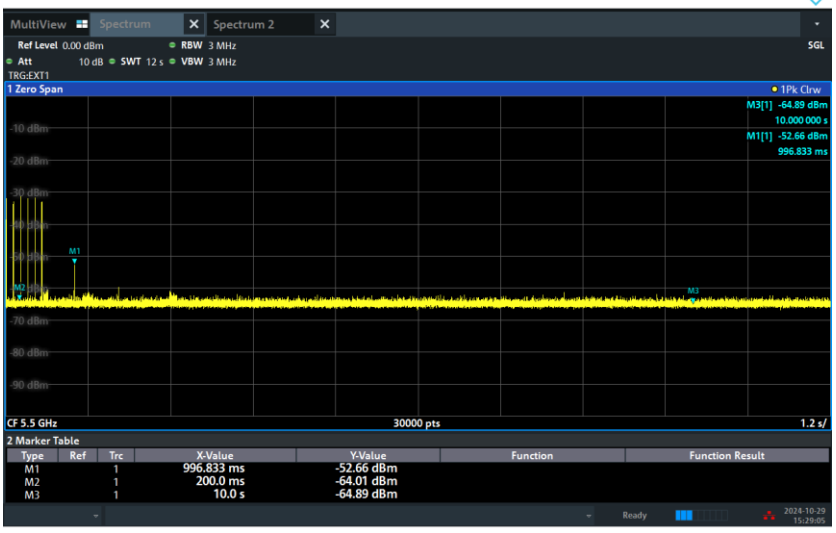
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 32.4 ms) = 200 + Number (81) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



<80MHz / 5530MHz >In-Service Monitoring
Radar is injected at 5500 MHz
Channel Move Time & Channel Closing Transmission Time

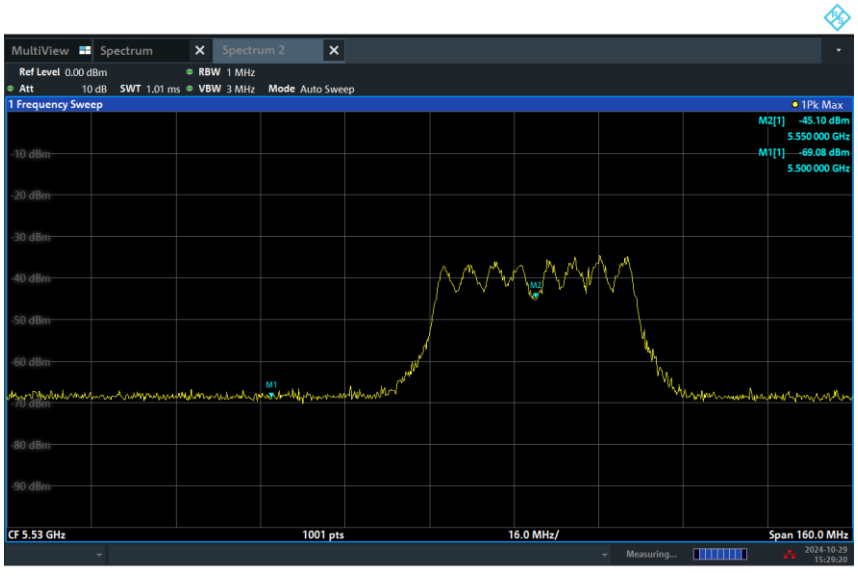


03:29:06 PM 10/29/2024

Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 13.2 ms) = 200 + Number (33) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



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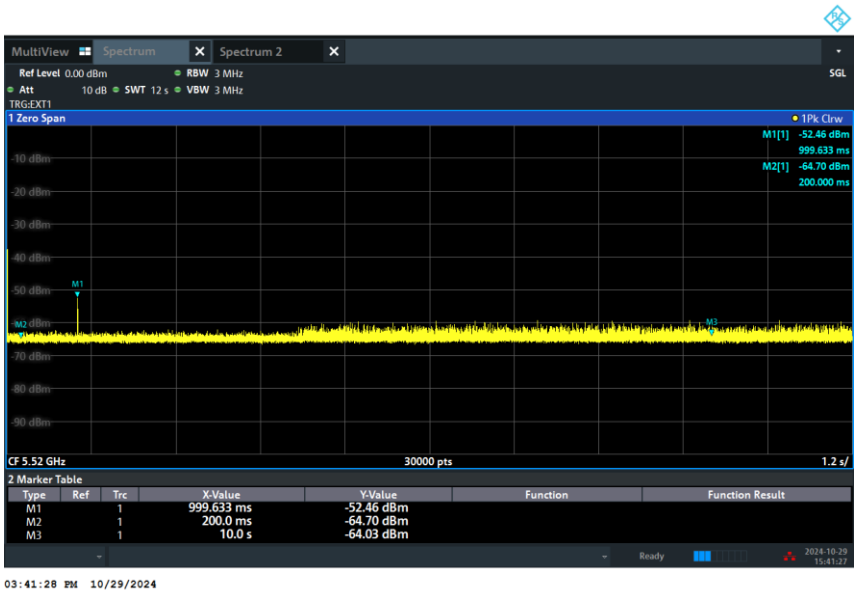
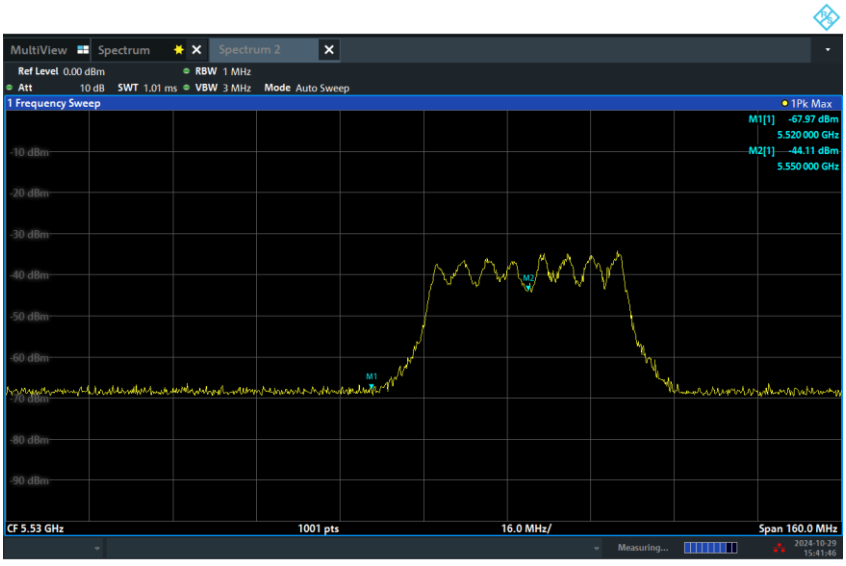
<80MHz / 5530MHz >In-Service Monitoring
Radar is injected at 5520 MHz
Channel Move Time & Channel Closing Transmission Time



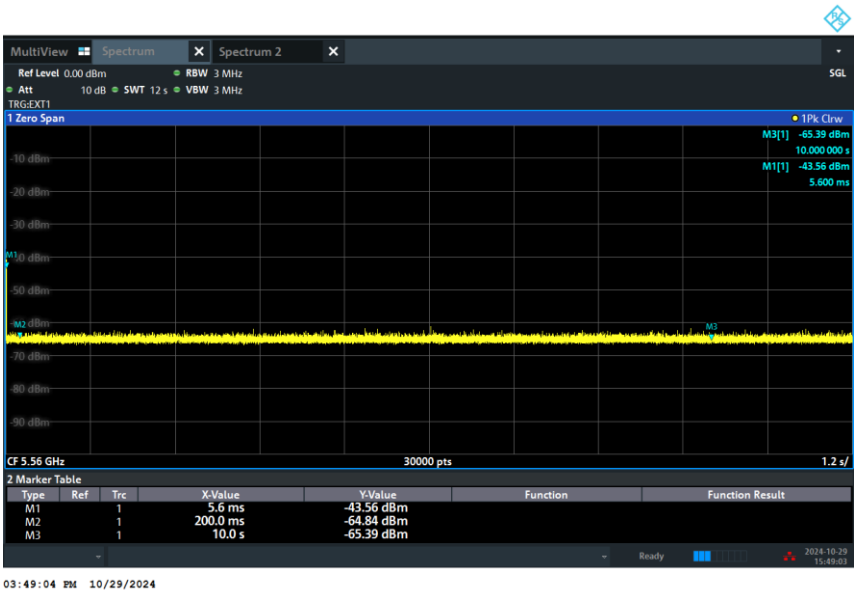
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 2.4 ms) = 200 + Number (6) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



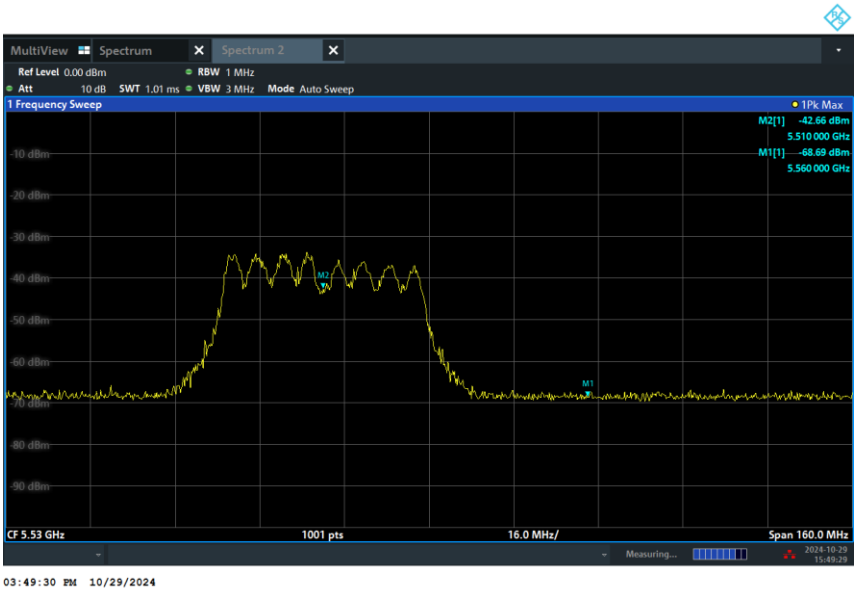
<80MHz / 5530MHz >In-Service Monitoring
Radar is injected at 5560 MHz
Channel Move Time & Channel Closing Transmission Time



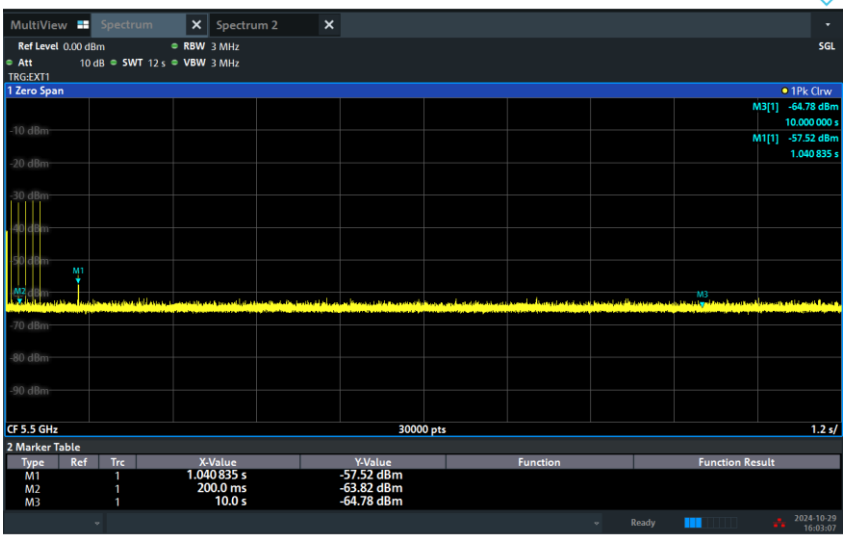
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 0 ms) = 200 + Number (0) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



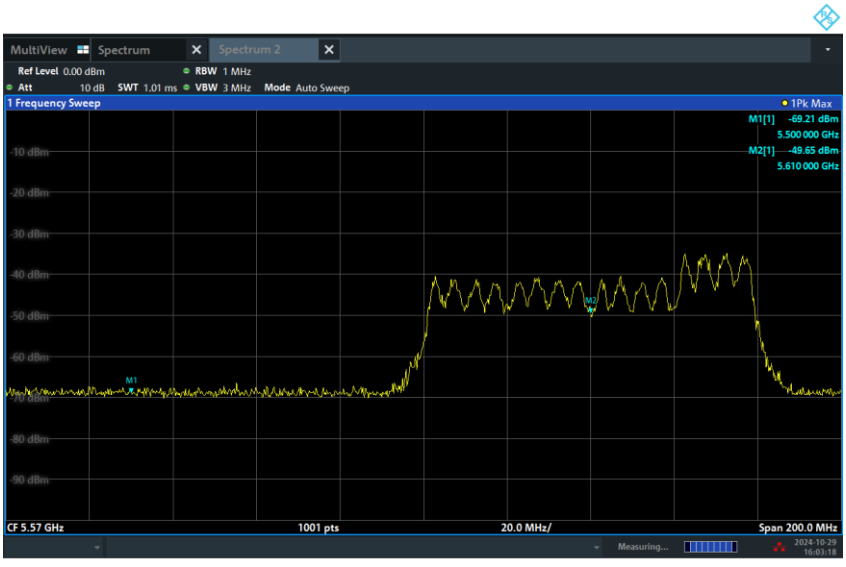
<160MHz / 5570MHz >In-Service Monitoring
Radar is injected at 5500 MHz
Channel Move Time & Channel Closing Transmission Time



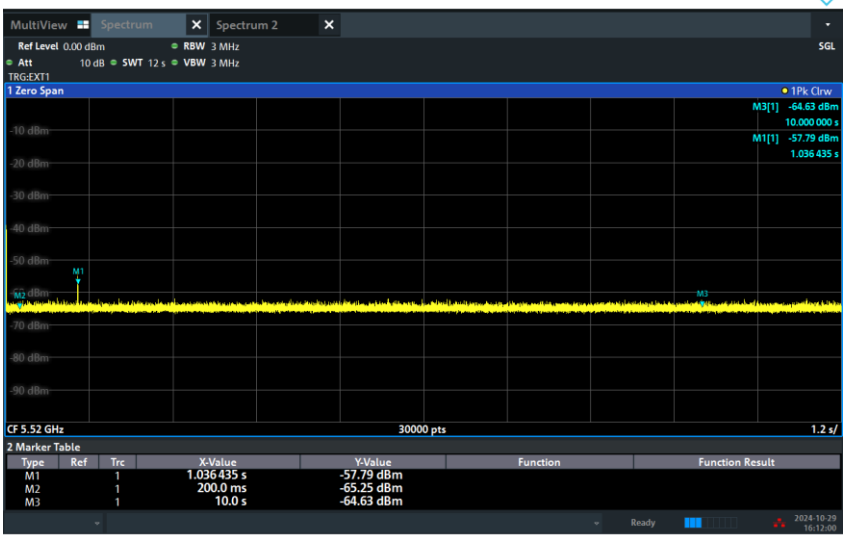
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 9.6 ms) = 200 + Number (24) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



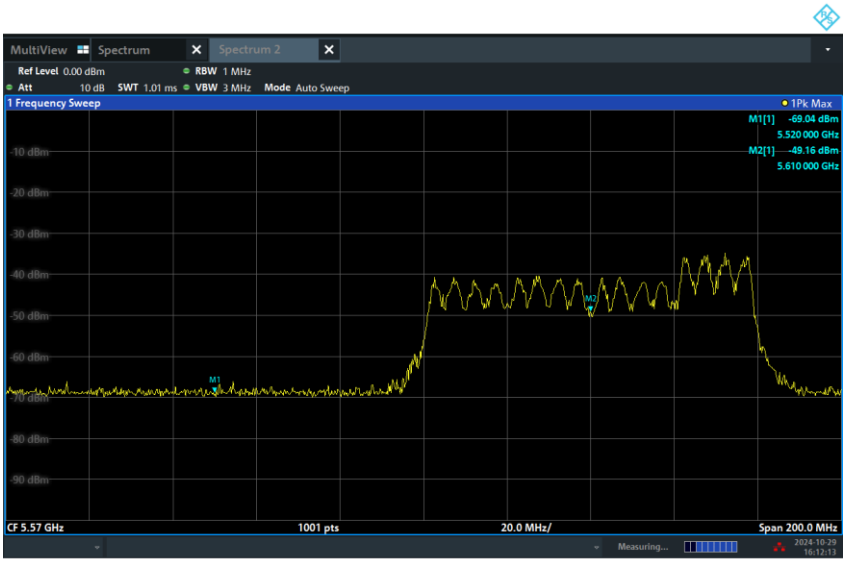
<160MHz / 5570MHz >In-Service Monitoring
Radar is injected at 5520 MHz
Channel Move Time & Channel Closing Transmission Time



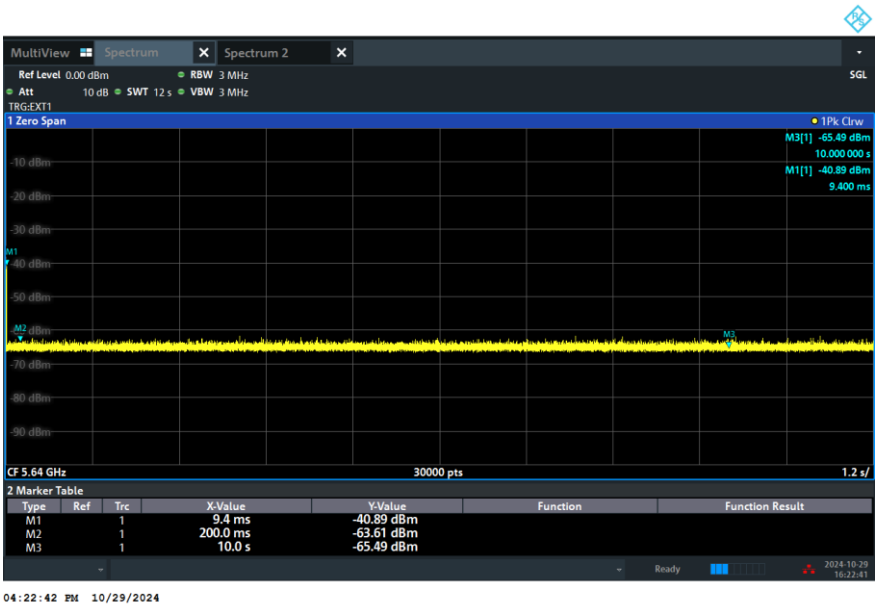
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 2.4 ms) = 200 + Number (6) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



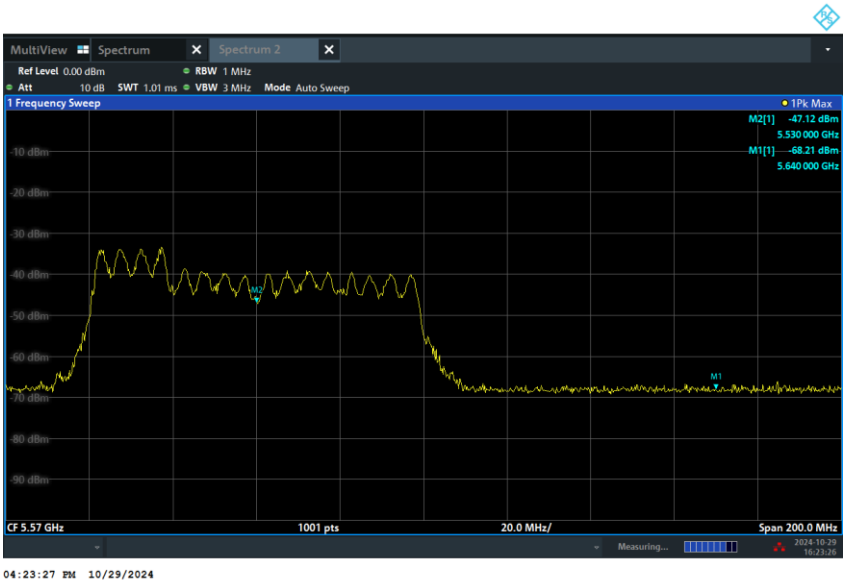
<160MHz / 5570MHz >In-Service Monitoring
Radar is injected at 5640 MHz
Channel Move Time & Channel Closing Transmission Time



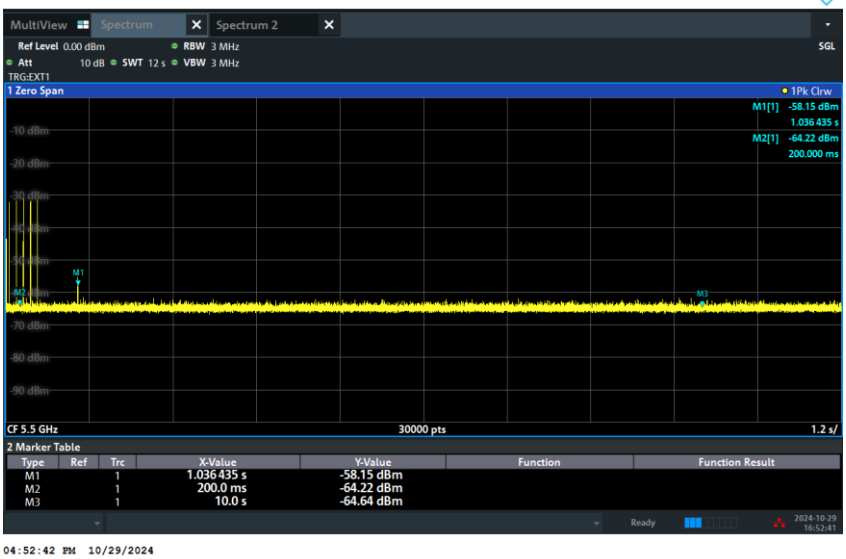
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 0 ms) = 200 + Number (0) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

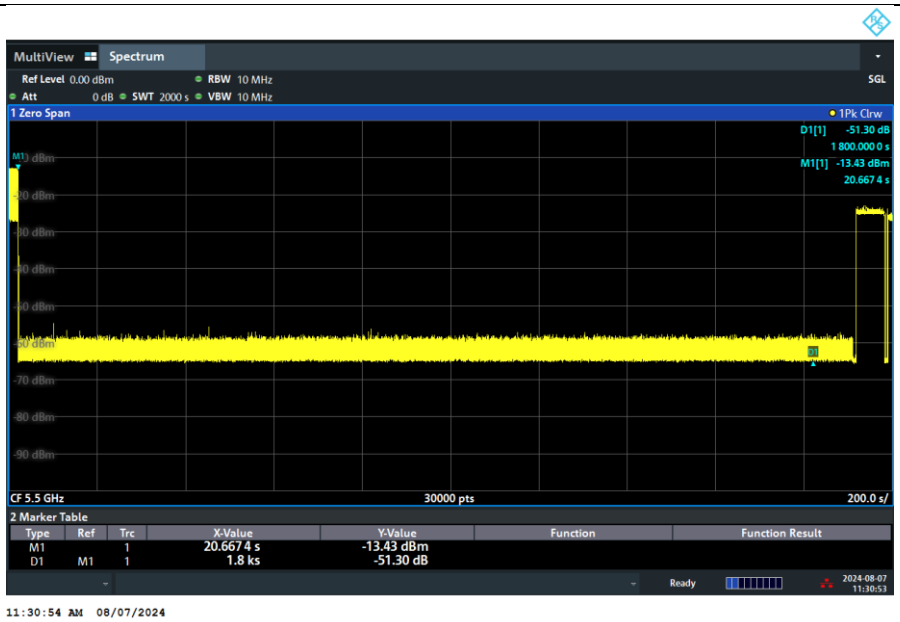
Remaining active signal



<240MHz / 5610MHz >In-Service Monitoring
Radar is injected at 5500 MHz
Channel Move Time & Channel Closing Transmission Time



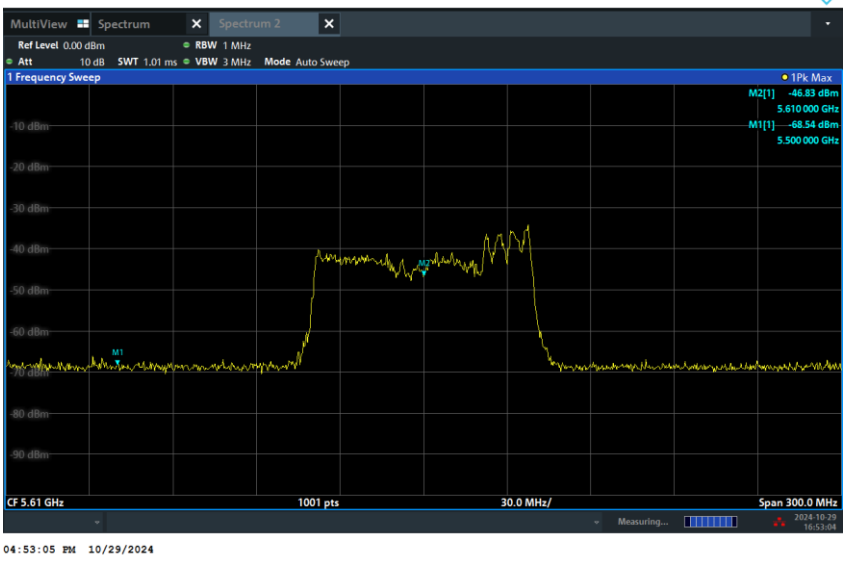
Non-Occupancy Period



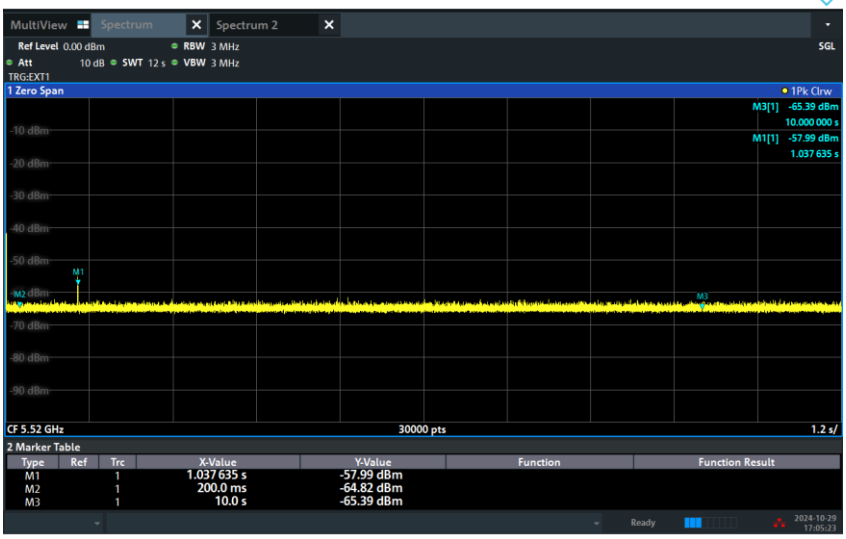
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 9.6 ms) = 200 + Number (24) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



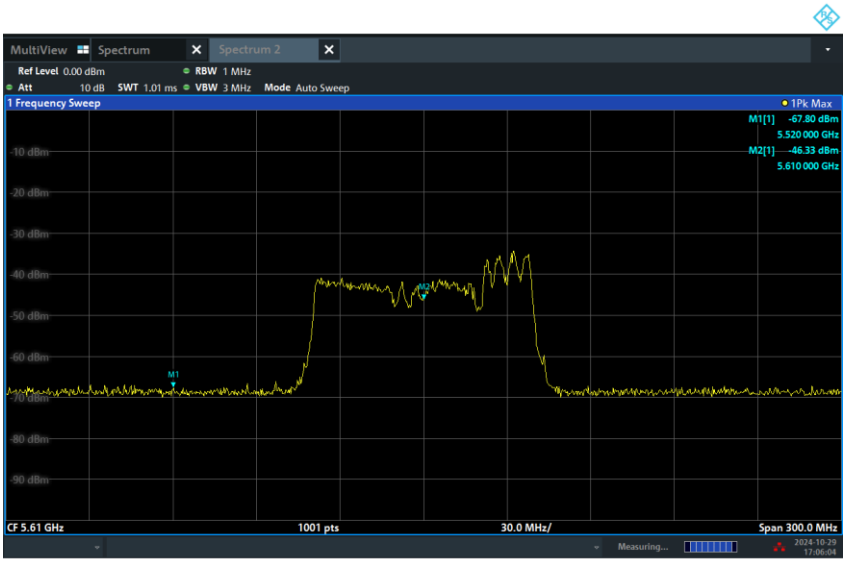
<240MHz / 5610MHz >In-Service Monitoring
Radar is injected at 5520 MHz
Channel Move Time & Channel Closing Transmission Time



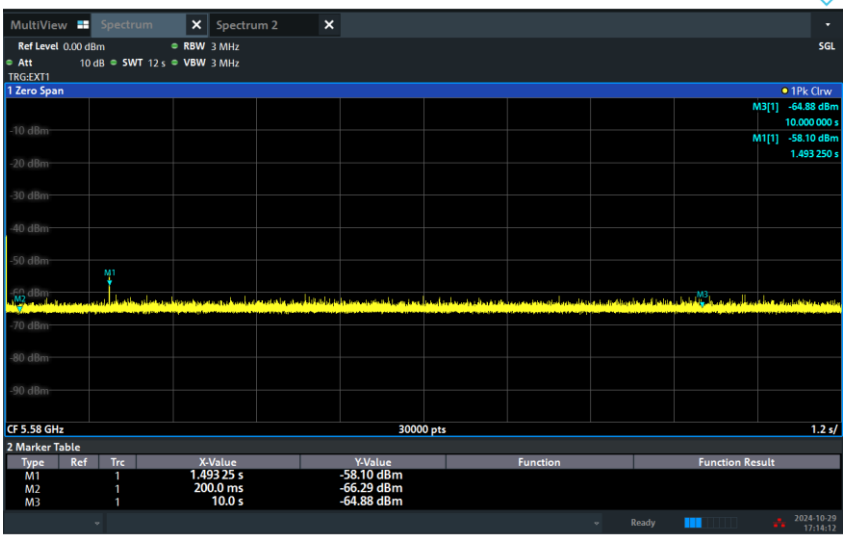
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 8.4 ms) = 200 + Number (21) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



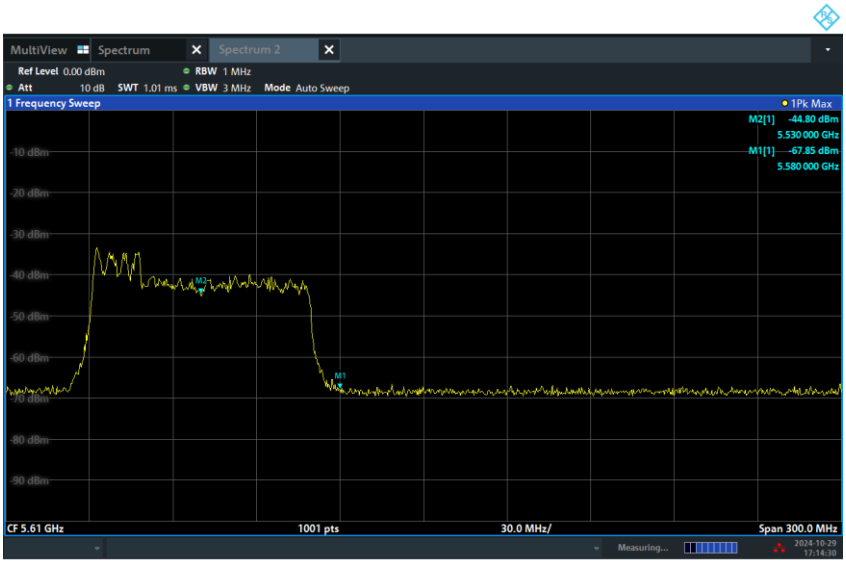
<240MHz / 5610MHz >In-Service Monitoring
Radar is injected at 5580 MHz
Channel Move Time & Channel Closing Transmission Time



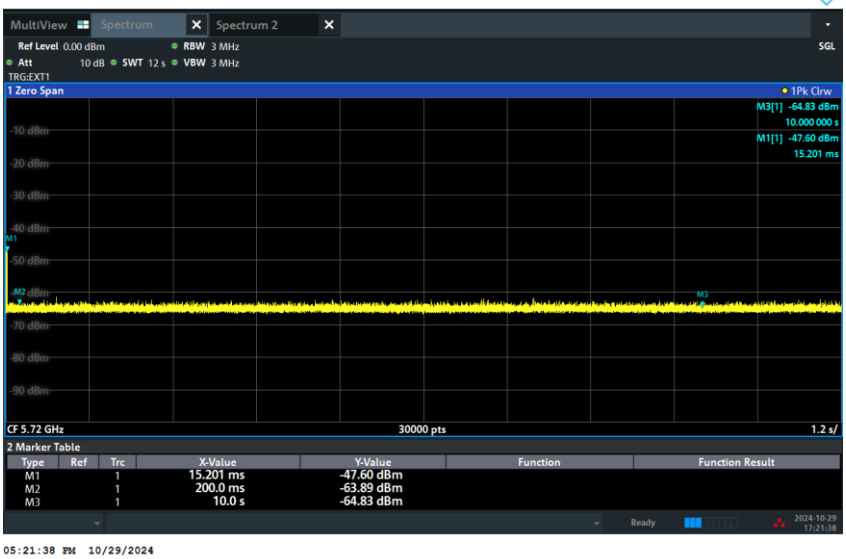
Note:

1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 5.2 ms) = 200 + Number (13) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



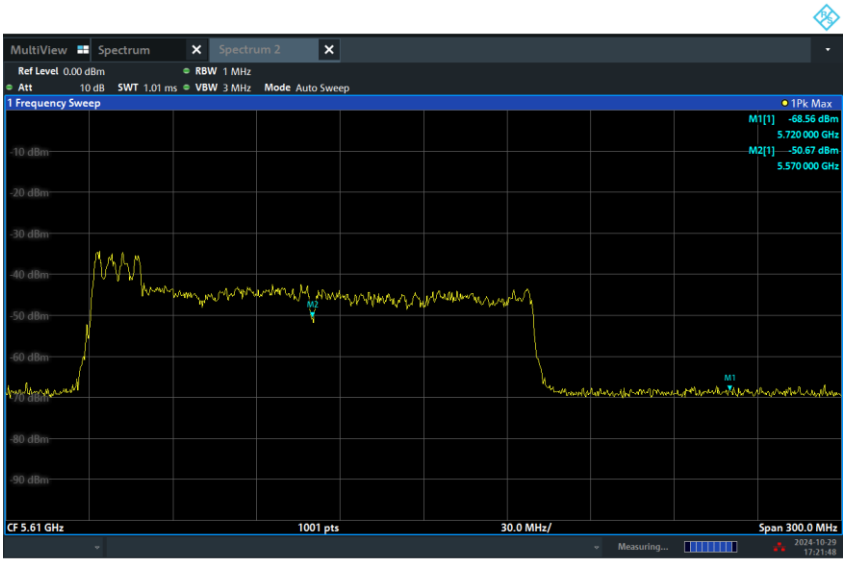
<240MHz / 5610MHz >In-Service Monitoring
Radar is injected at 5720 MHz
Channel Move Time & Channel Closing Transmission Time



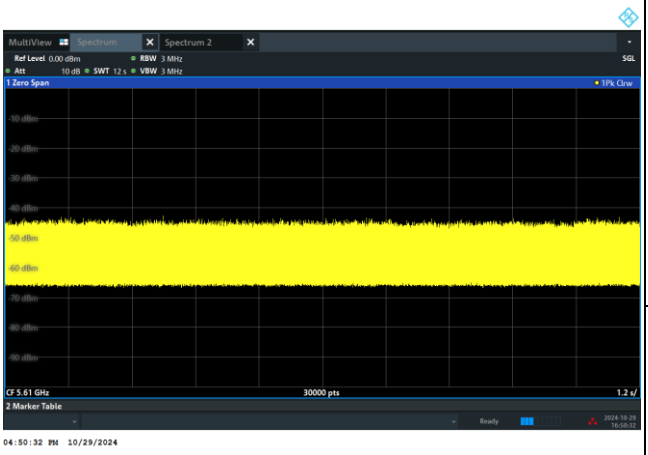
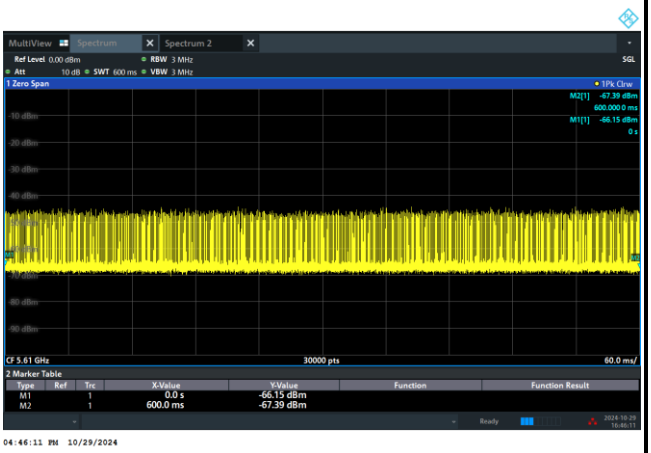
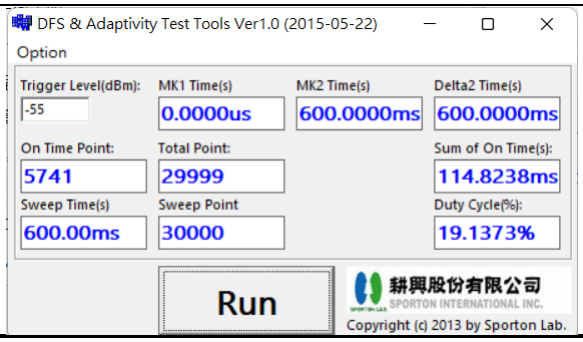
Note:

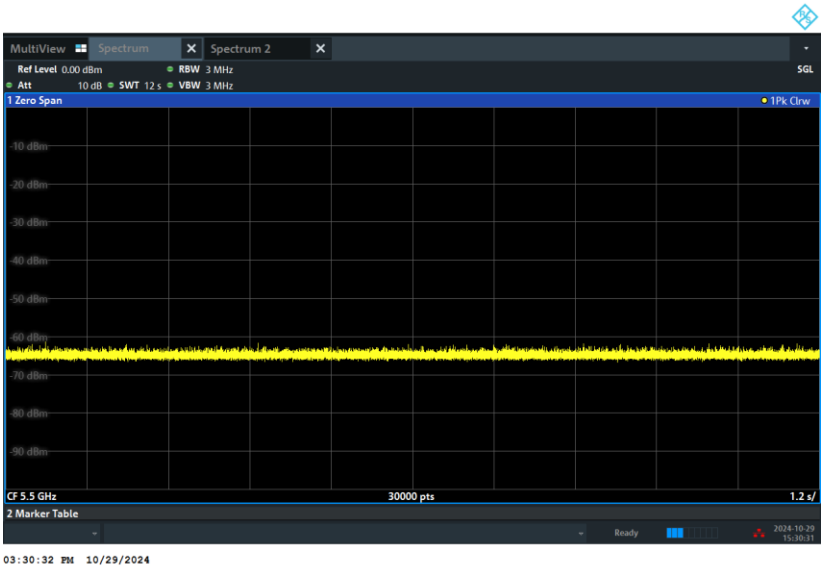
1. Dwell (0.4 ms)= Sweep Time (12000 ms) / Sweep Point Bins (30000)
2. Channel Closing Transmission Time (200 + 0 ms) = 200 + Number (0) X Dwell (0.4 ms) < 260ms
3. The 99%OBW of Remaining Active Signal does not fall within the notched band.

Remaining active signal



4.2.7 Data Traffic Channel Loading and Noise Floor Plots

EUT data traffic (Master)	Channel Loading > 19% (Master)
	 

Noise Floor (No transmission)


4.3 26dB & 99% Occupied Bandwidth Measurement

4.3.1 Description of 26dB & 99% Occupied Bandwidth

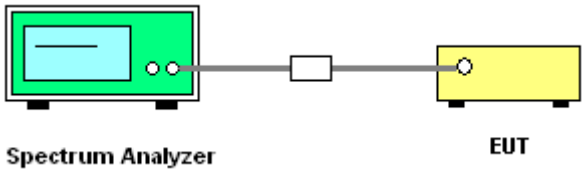
This section is for reporting purpose only.

There is no restriction limits for bandwidth.

4.3.2 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) ≥ 3 * RBW.
8. Measure and record the results in the test report.

4.3.3 Test Setup



4.3.4 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

4.4 Maximum Conducted Output Power Measurement

4.4.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

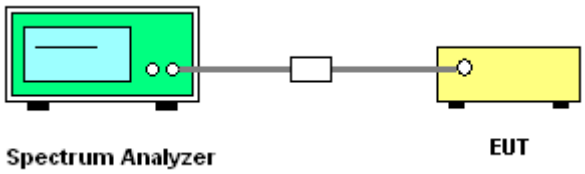
4.4.2 Test Procedures

The spectrum analyzer follows FCC KDB 789033 D02 General UNII Test Procedures New Rules **v02r01**.

Method SA-2

- Measure the duty cycle.
- Set RBW = 1MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep≧ 2 Span / RBW.
- Sweep time = auto.
- Detector = power averaging (rms)
- Trace average at least 100 traces in power averaging mode.
- Compute power by integrating the spectrum across the EBW of the signal.
- Add 10 log(1/X), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

4.4.3 Test Setup



4.4.4 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

4.5 Power Spectral Density Measurement

4.5.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.5.2 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules **v02r01**.

Section F) Maximum power spectral density.

 # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

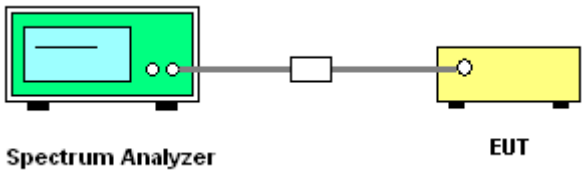
- Measure the duty cycle.
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz.
- Set VBW ≥ 3 MHz.
- Number of points in sweep ≥ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.

1. The RF output of EUT is connected to the spectrum analyzer by a low loss cable.
2. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.
3. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

   Method (a): Measure and sum the spectra across the outputs.

   The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points; the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

4.5.3 Test Setup



4.5.4 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Signal Generator	Keysight	N5182B	MY56200377	9kHz~6GHz	Apr. 18, 2024	Aug. 05, 2024~ Oct. 29, 2024	Apr. 17, 2025	DFS (03CH19-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV3013	101549	10Hz~13.6GHz	Jan. 30, 2024	Aug. 05, 2024~ Oct. 29, 2024	Jan. 29, 2025	DFS (03CH19-HY)
Double Ridged Guide Horn Antenna	COM-POWER	AH-118	071027	1GHz~18GHz	Dec. 20, 2023	Aug. 05, 2024~ Oct. 29, 2024	Dec. 19, 2024	DFS (03CH19-HY)
Double Ridged Guide Horn Antenna	COM-POWER	AH-118	071025	1GHz~18GHz	Nov. 27, 2023	Aug. 05, 2024~ Oct. 29, 2024	Nov. 26, 2024	DFS (03CH19-HY)
Software 1	Sporton	DFS & AdaptivityTest Tools	N/A	Ver 1.0	NCR	Aug. 05, 2024~ Oct. 29, 2024	NCR	DFS (03CH19-HY)
Software 2	Keysight	Keysight Signal Studio for DFS Radar Profiles	N/A	Ver 1.5.5.0	NCR	Aug. 05, 2024~ Oct. 29, 2024	NCR	DFS (03CH19-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV3013	101549	10Hz~13.6GHz	Jan. 30, 2024	Aug. 13, 2024	Jan. 29, 2025	Conducted (TH05-HY)
Power Divider	Woken	2Way Divider	DCMB1KW7A2	0.5GHz-18GHz	Calibration from System	Aug. 13, 2024	Calibration from System	Conducted (TH05-HY)
Power Divider	Woken	3Way SMA Power Divder Rated to 20W	STI08-0010 (#2)	2GHz-8GHz	Calibration from System	Aug. 13, 2024	Calibration from System	Conducted (TH05-HY)
RF Cable	EC	SS405	SS405-100cm-05	30 kHz~18GHz	Calibration from System	Aug. 13, 2024	Calibration from System	Conducted (TH05-HY)
RF Cable	EC	SS405	SS405-100cm-06	30 kHz~18GHz	Calibration from System	Aug. 13, 2024	Calibration from System	Conducted (TH05-HY)
RF Cable	EC	SLF405	EC-SFL405-100cm-#8	30 kHz~18GHz	Calibration from System	Aug. 13, 2024	Calibration from System	Conducted (TH05-HY)
RF Cable	MVE	SPF141	SPF141-100cm-#12	30 kHz~18GHz	Calibration from System	Aug. 13, 2024	Calibration from System	Conducted (TH05-HY)
Software 1	Sporton	BTWiFiTools	N/A	Ver 1.0(240703)	NCR	Aug. 13, 2024	NCR	Conducted (TH05-HY)

Appendix A. Test Result of Conducted Test Items

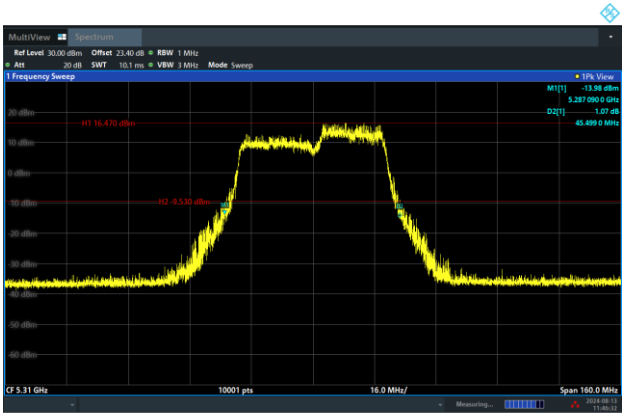
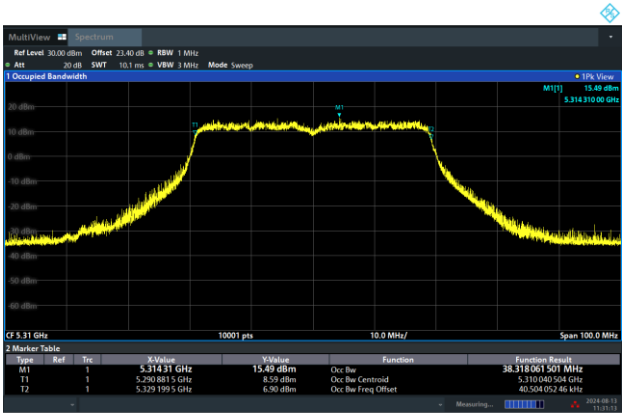
Test Engineer :	Rebecca Li	**Temperature :**	22.1~24.9℃
		Relative Humidity :	50.1~54.6%

TEST RESULTS DATA

Test Channel			Radar	Bandwidth Shrinking													
Mod.	CH.	Freq. (MHz)	Freq. (MHz)	Mod.	Freq. (MHz)	99% Bandwidth In U-NII 2C (MHz)		26 dB Bandwidth In U-NII 2C (MHz)		Average Conducted Power with Duty Factor (dBm)				Average PSD with Duty Factor (dBm/MHz)		Duty Factor (dB)	
						Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	SUM	Limit	SUM	Limit	Ant 0	Ant 1
EHT80	58	5290	5260	EHT40	5310	38.03	38.32	45.50	44.73	16.44	17.16	19.83	23.98	6.26	11.00	5.74	5.67
			5280	EHT40	5310	38.47	38.35	47.06	46.01	17.44	17.97	20.72	23.98	7.06	11.00	5.80	5.72
EHT160	50	5250	5260	EHT40	5310	38.21	38.17	45.52	45.82	17.89	18.15	21.03	23.98	7.59	11.00	6.21	6.26
			5280	EHT40	5310	38.16	38.56	45.57	46.82	17.85	18.17	21.02	23.98	7.21	11.00	6.07	6.09
EHT80	106	5530	5500	EHT40	5550	38.10	38.30	45.78	46.11	17.41	17.03	20.23	23.98	5.15	11.00	4.92	5.30
			5520	EHT40	5550	38.05	38.46	44.80	48.35	17.24	17.63	20.45	23.98	6.91	11.00	5.62	6.14
			5560	EHT40	5510	38.22	38.33	44.70	46.96	17.45	18.07	20.78	23.98	6.73	11.00	5.85	5.96
EHT160	114	5570	5500	EHT80	5610	76.95	77.50	83.62	92.38	17.40	17.63	20.53	23.98	3.99	11.00	5.28	5.39
			5520	EHT80	5610	77.03	77.47	84.64	83.39	17.60	17.57	20.60	23.98	3.94	11.00	5.28	5.59
			5640	EHT80	5530	77.17	77.57	83.78	83.68	18.26	18.37	21.33	23.98	4.17	11.00	6.03	6.45
EHT240	122	5610	5500	EHT80	5610	76.92	77.44	82.37	89.92	17.27	17.37	20.33	23.98	3.87	11.00	7.48	7.54
			5520	EHT80	5610	76.93	77.60	82.69	92.29	17.26	17.29	20.29	23.98	3.65	11.00	7.05	7.07
			5580	EHT80	5530	76.97	77.58	83.74	88.70	17.24	17.09	20.18	23.98	4.43	11.00	6.87	6.78
			5720	EHT160	5570	157.56	157.46	163.78	169.82	17.50	16.82	20.18	23.98	3.48	11.00	7.21	7.50

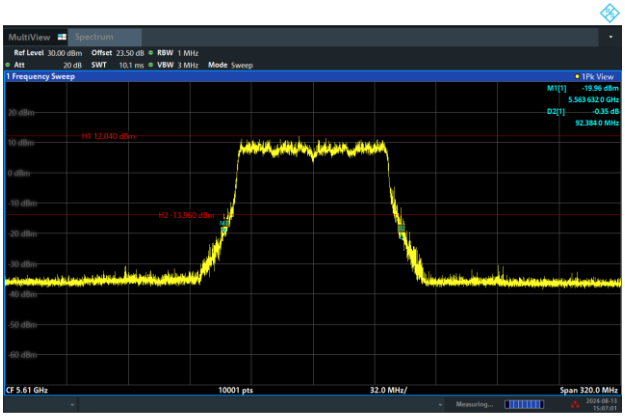
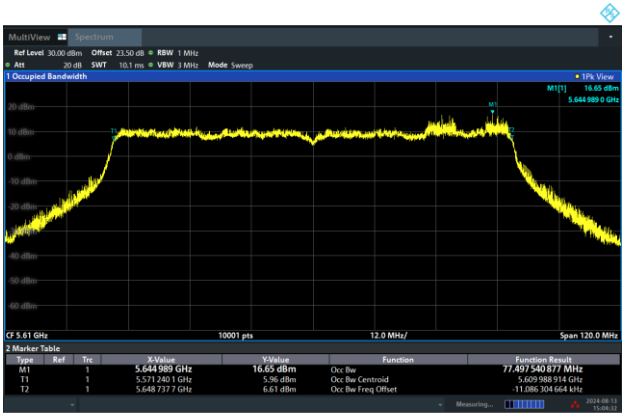
Test Result of 26dB & 99% Occupied Bandwidth

<802.11be EHT40>

26dB Bandwidth	99% Occupied Bandwidth
	

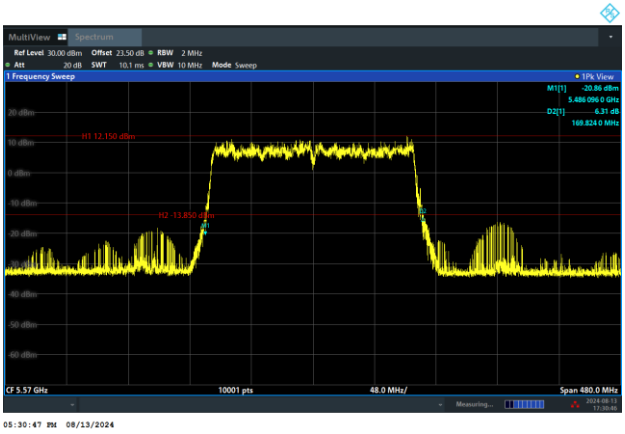
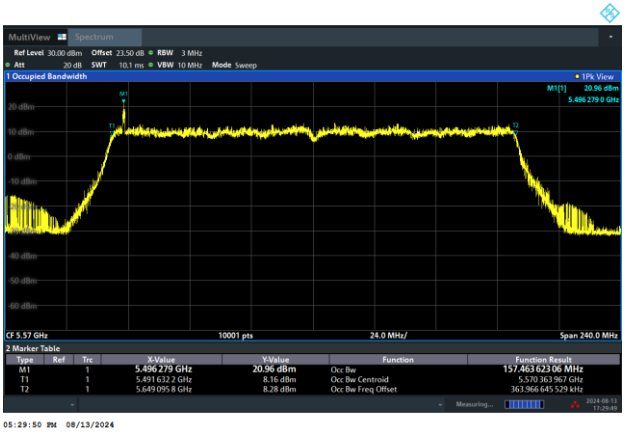
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

<802.11be EHT80>

26dB Bandwidth	99% Occupied Bandwidth
	

Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

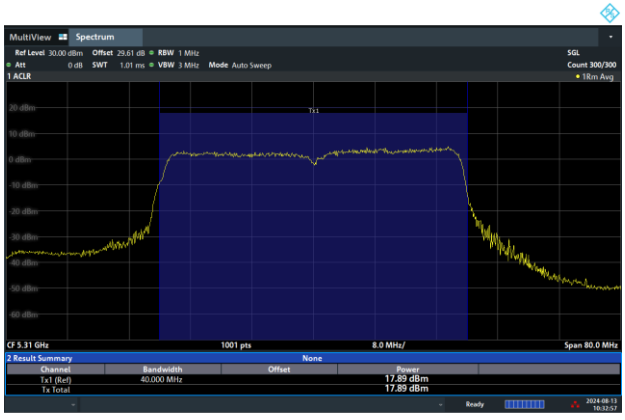
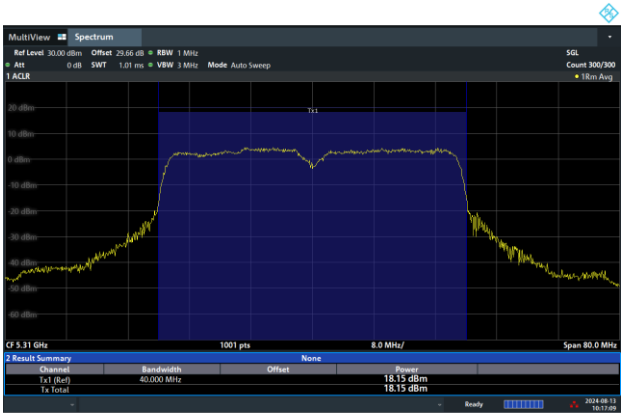
<802.11be EHT160>

26dB Bandwidth	99% Occupied Bandwidth
	

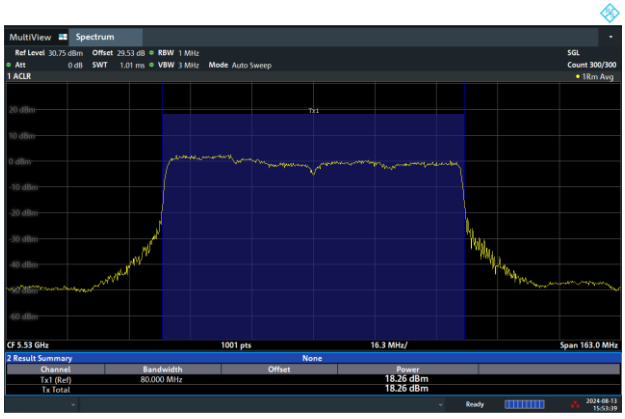
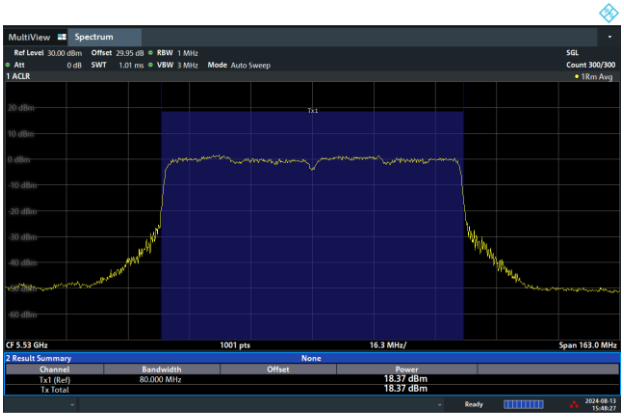
Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

Test Result of Conducted Output Power

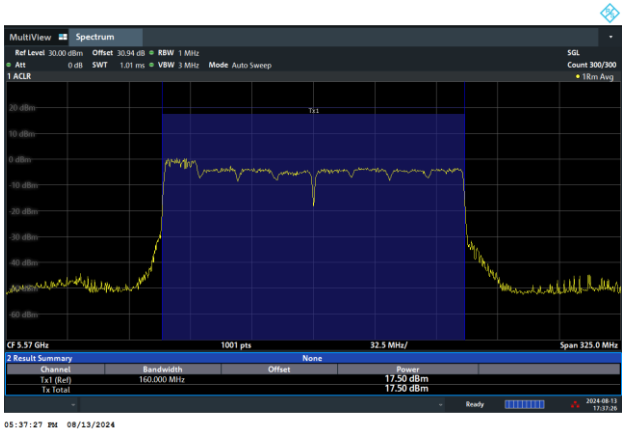
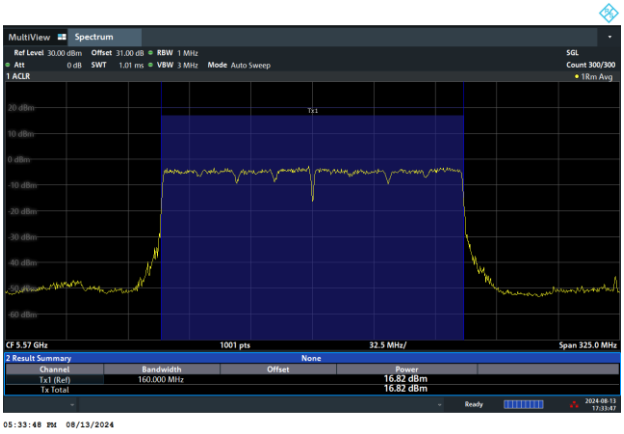
<802.11be EHT40>

Ant 0	Ant 1
	

<802.11be EHT80>

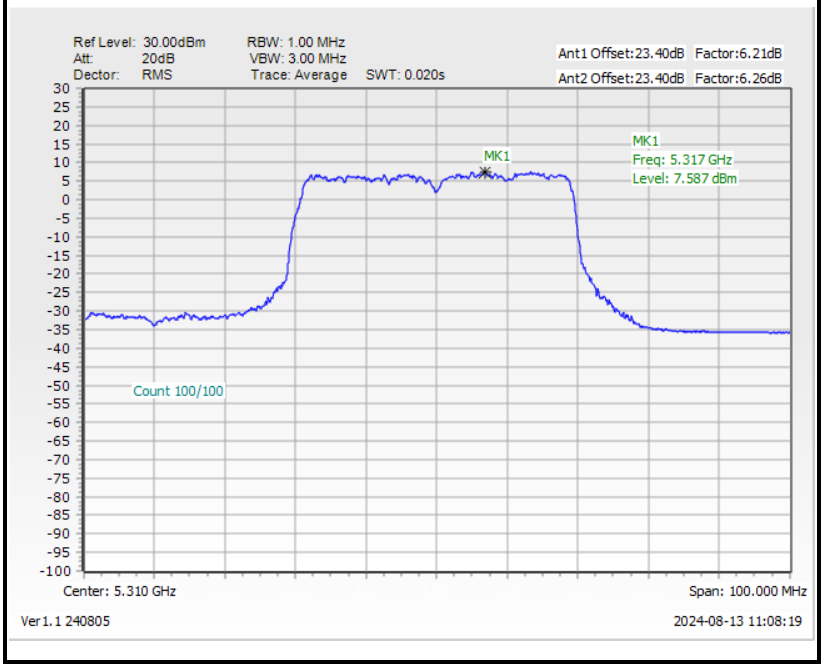
Ant 0	Ant 1
	

<802.11be EHT160>

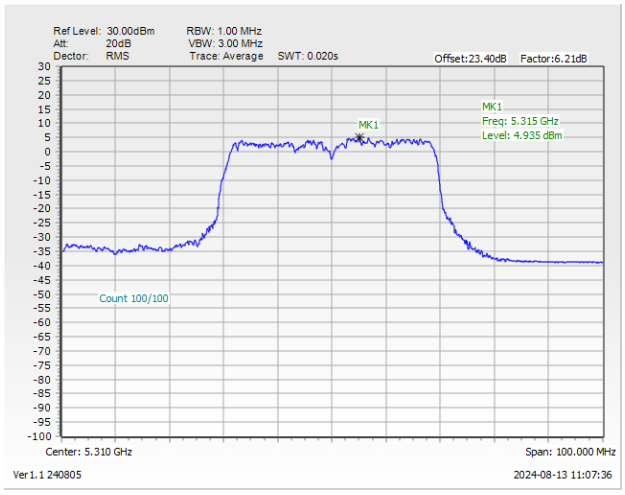
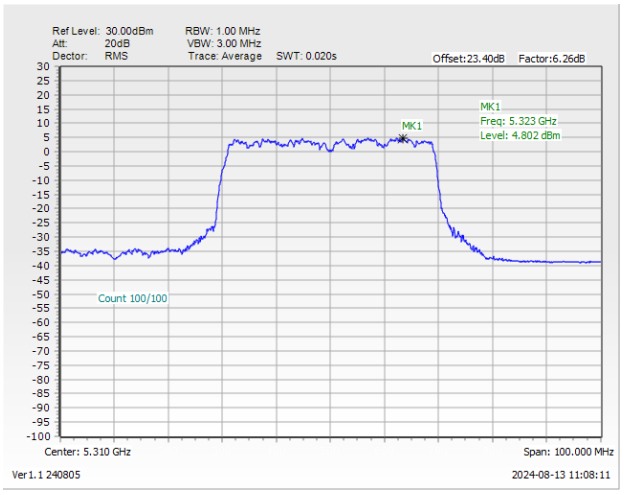
Ant 0	Ant 1
	

Test Result of Power Spectral Density

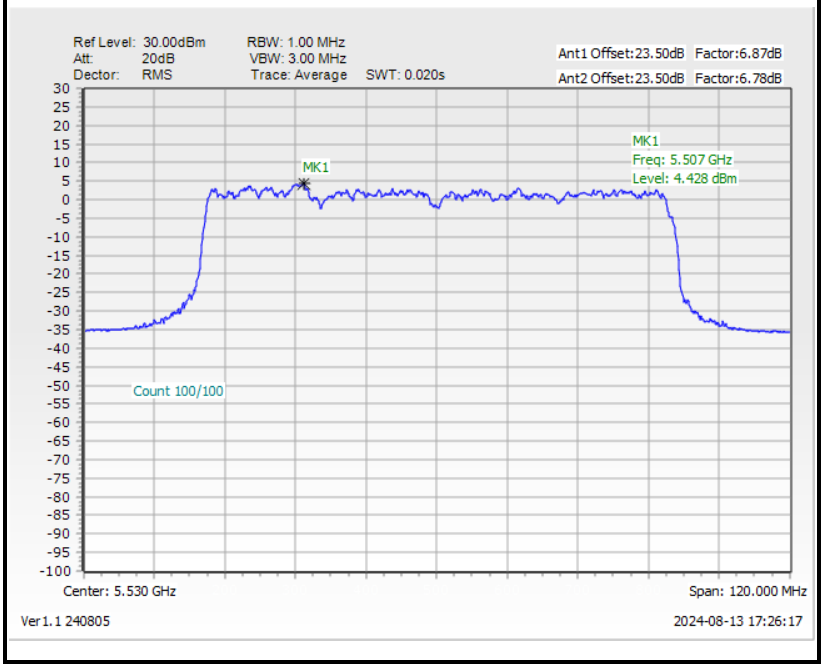
<802.11be EHT40>

Maximum Power Density Plot (dBm/MHz)


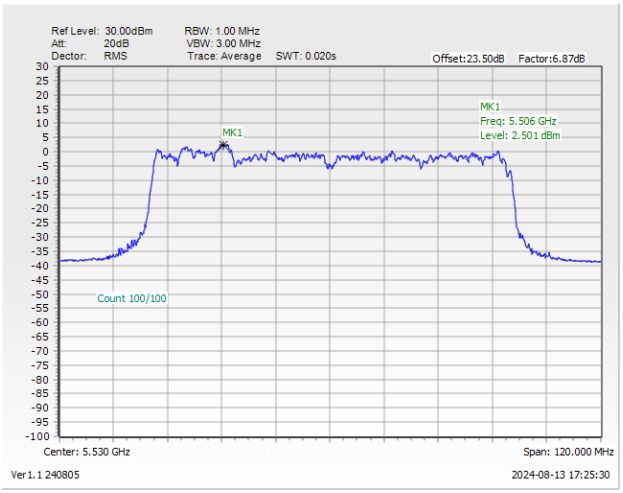
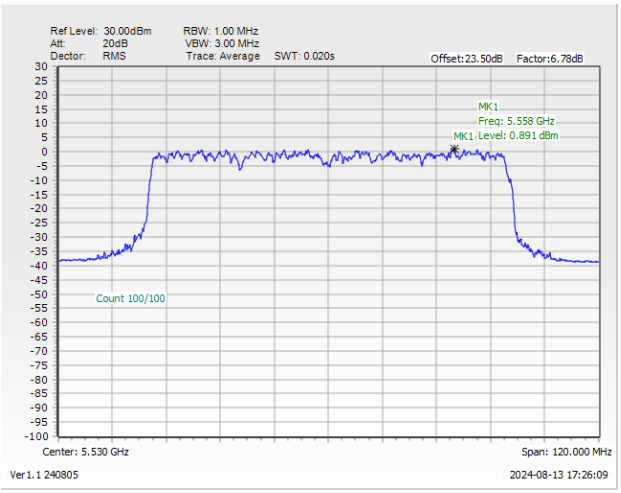
Remark: The test plot is showing a bin by bin combined result mathematically adds two traces.

Maximum Power Density Plot Trace 1 (Ant 0)	Maximum Power Density Plot Trace 2 (Ant 1)
	

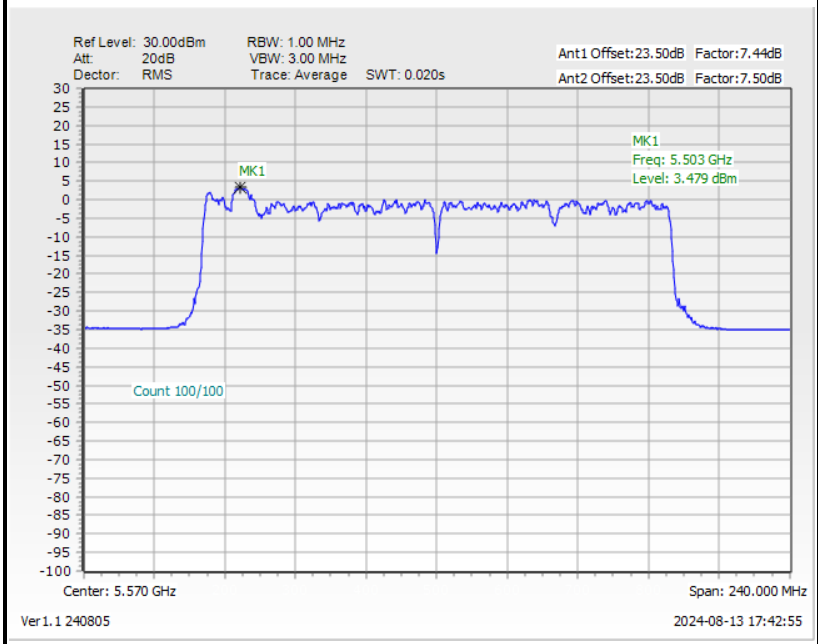
<802.11be EHT80>

Maximum Power Density Plot (dBm/MHz)


Remark: The test plot is showing a bin by bin combined result mathematically adds two traces.

Maximum Power Density Plot Trace 1 (Ant 0)	Maximum Power Density Plot Trace 2 (Ant 1)
	

<802.11be EHT160>

Maximum Power Density Plot (dBm/MHz)


Remark: The test plot is showing a bin by bin combined result mathematically adds two traces.

Maximum Power Density Plot Trace 1 (Ant 0)	Maximum Power Density Plot Trace 2 (Ant 1)