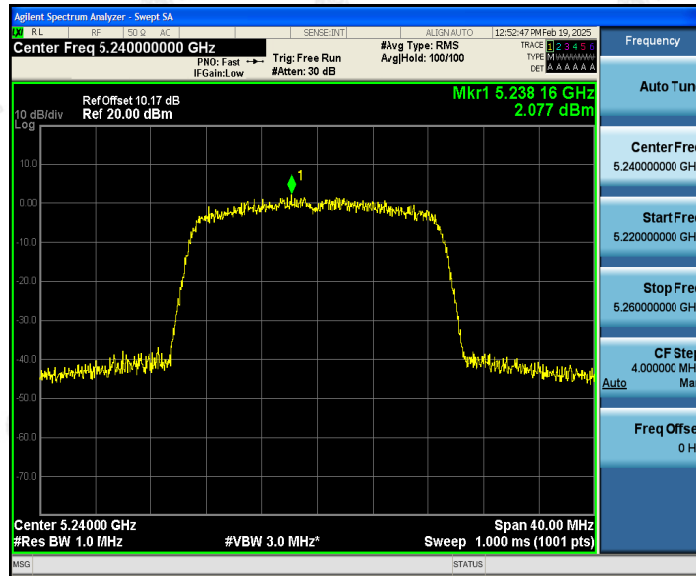


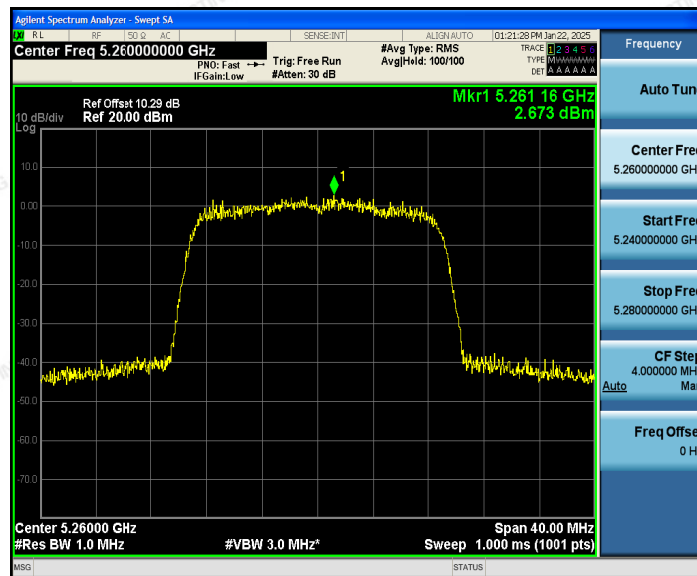


High Channel



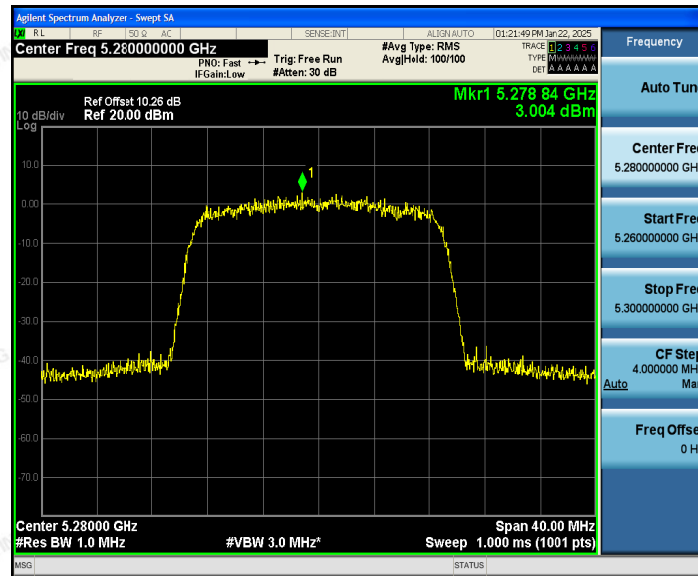
5250~5350MHz

Low Channel





Mid Channel



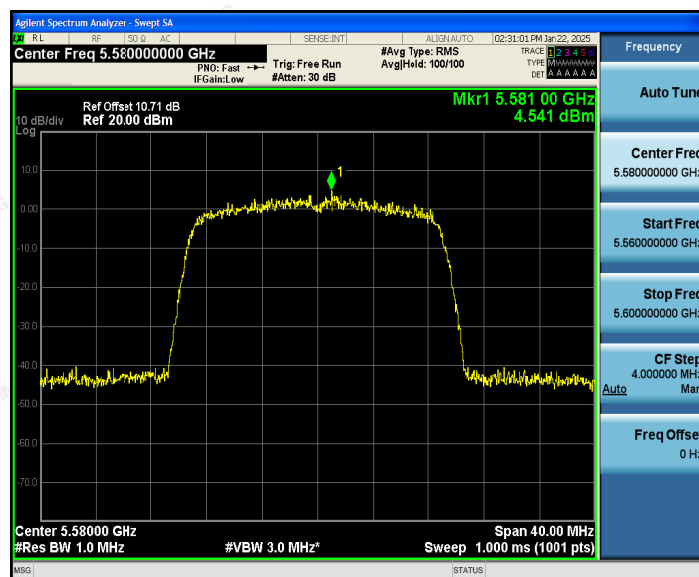
High Channel





5470~5725MHz

Low Channel



Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



High Channel



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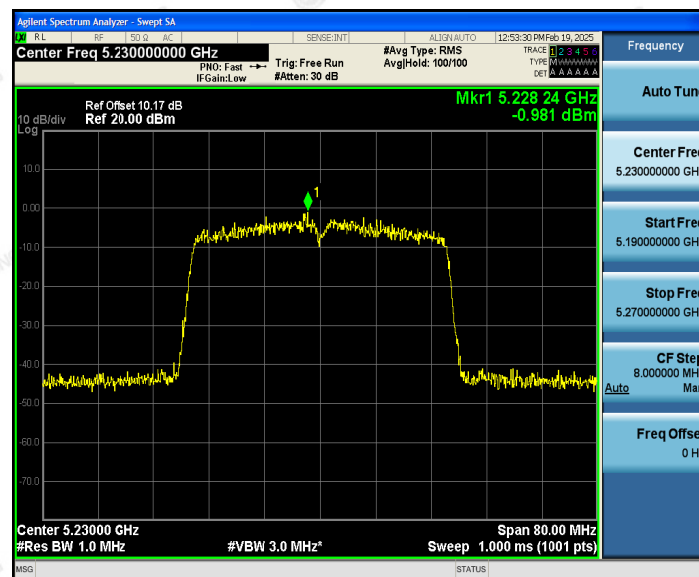
IEEE802.11ac HT40 mode

5150~5250MHz

Low Channel



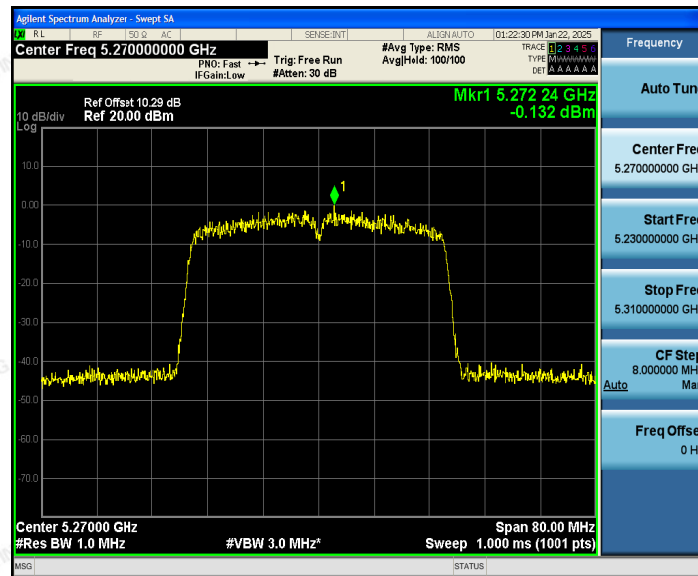
High Channel





5250~5350MHz

Low Channel



High Channel





5470~5725MHz

Low Channel



Mid Channel





High Channel



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IEEE802.11ac HT80 mode

5150~5250MHz



5250~5350MHz





5470~5725MHz

Low Channel



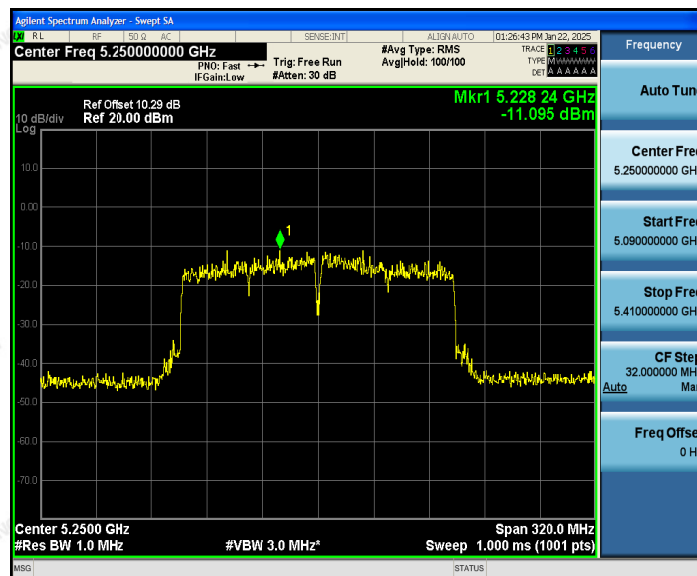
High Channel



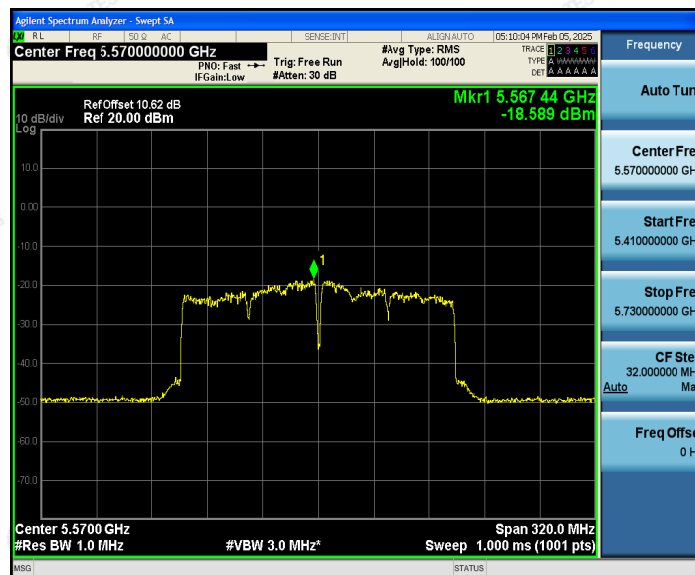


IEEE802.11ac HT160 mode

5150~5350MHz



5470~5725MHz





IEEE802.11ax HE20 mode

5150~5250MHz

Low Channel



Mid Channel





High Channel



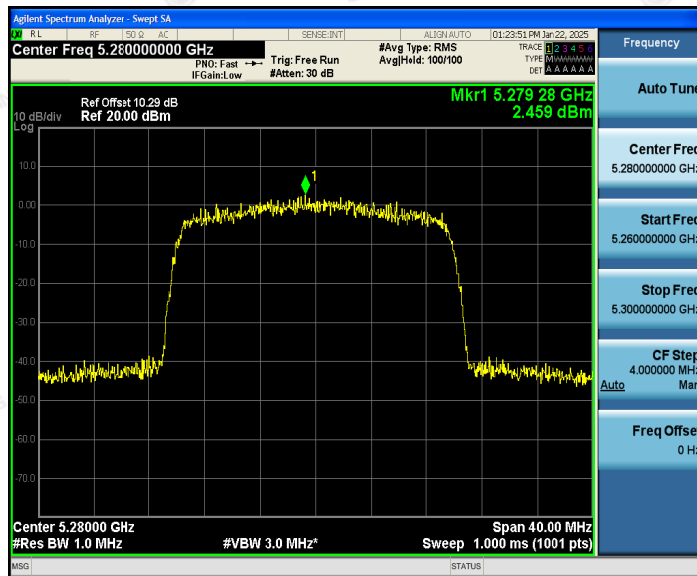
5250~5350MHz

Low Channel





Mid Channel



High Channel



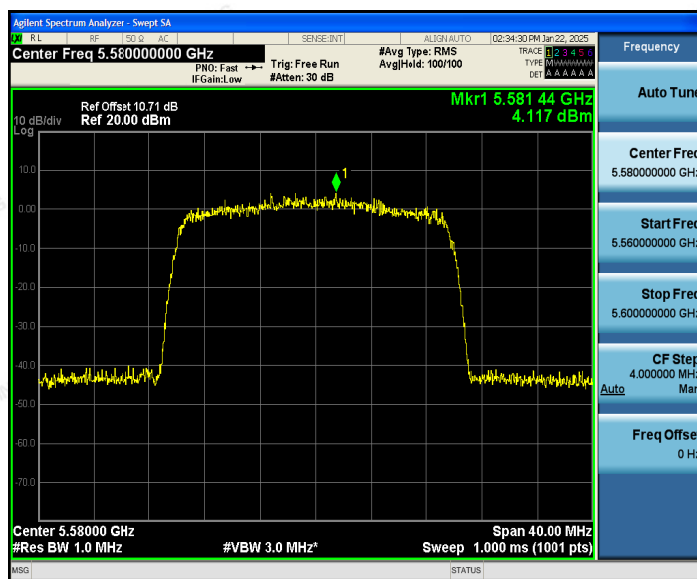


5470~5725MHz

Low Channel



Mid Channel





High Channel



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IEEE802.11ax HE40 mode

5150~5250MHz

Low Channel



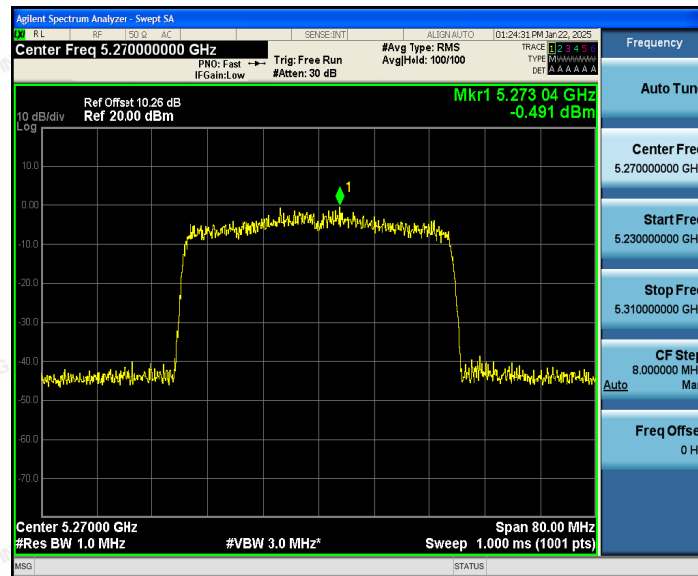
High Channel





5250~5350MHz

Low Channel



High Channel

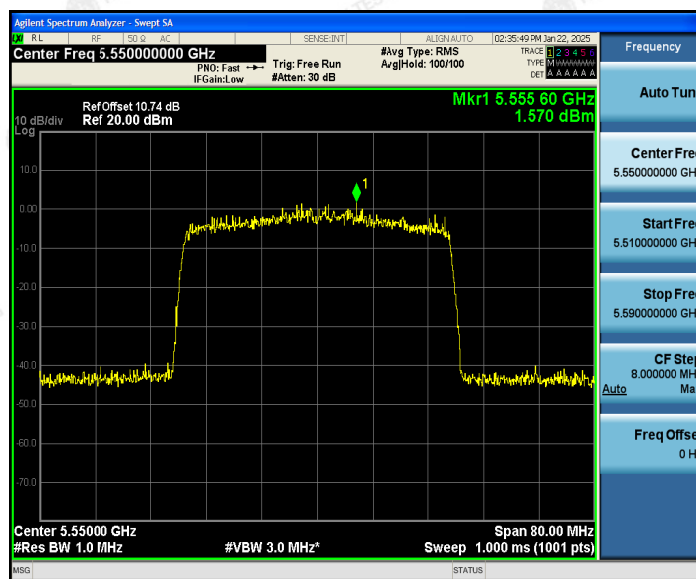


5470~5725MHz

Low Channel



Mid Channel



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High Channel



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IEEE802.11ax HE80 mode

5150~5250MHz



5250~5350MHz





5470~5725MHz

Low Channel



High Channel



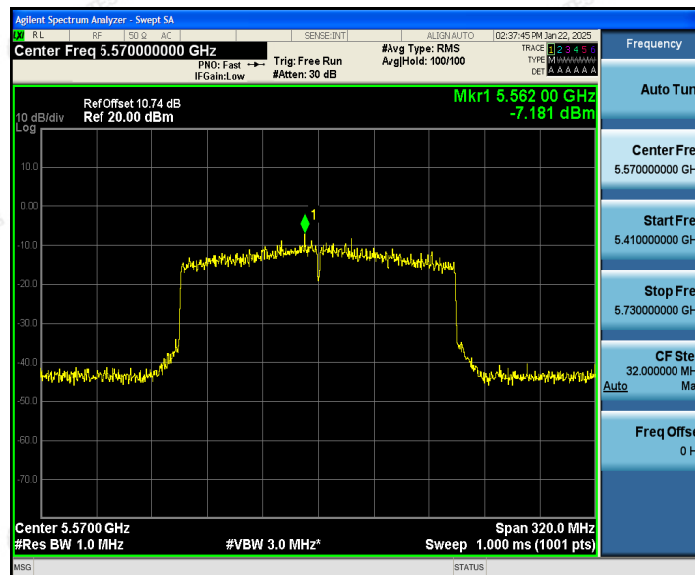


IEEE802.11ax HE160 mode

5150~5350MHz



5470~5725MHz





IEEE802.11be EHT20 mode

5150~5250MHz

Low Channel



Mid Channel





High Channel



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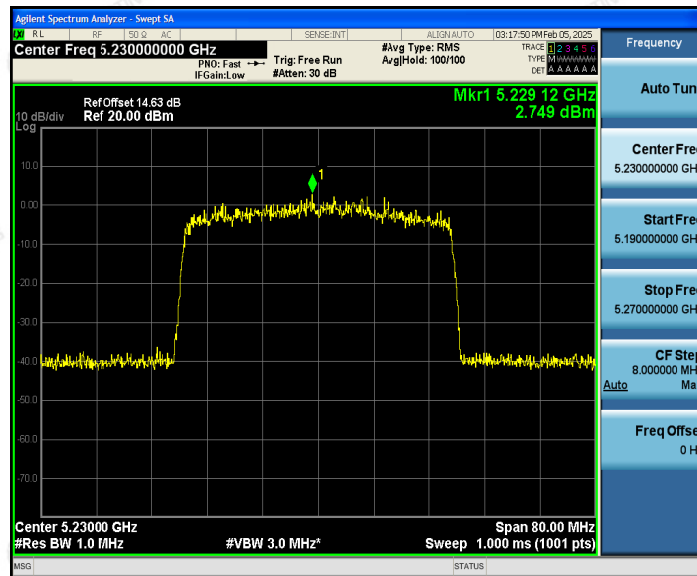
IEEE802.11be EHT40 mode

5150~5250MHz

Low Channel



High Channel





IEEE802.11be EHT80 mode

5150~5250MHz





6.5 Duty Cycle

LIMIT

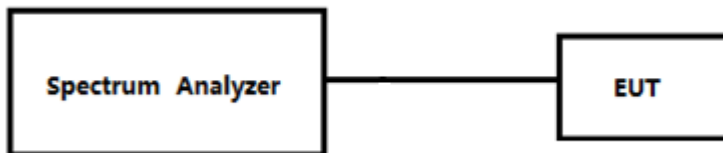
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x , and maximum-power transmission duration, T , are required for each tested mode of operation.

a) T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

b) Duty cycle (x), as used in this document, refers to the fraction of time over which the transmitter is on and is transmitting at its maximum power control level.

c) The term “maximum power control level” is intended to distinguish between operating power levels of the EUT and differences in power levels of individual symbols that occur with some modulation types such as quadrature amplitude modulation (QAM). During testing, the EUT is not required to transmit continuously its highest possible *symbol* power level. Rather, it shall transmit all of the symbols and shall do so at the highest power control level (i.e., highest operating power level) of the EUT.

TESTCONFIGURATION



TEST METHOD

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal.

789033 D02 General UNII Test Procedures New Rules v02r01 Page 3 .

b) The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq EBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

TEST RESULTS

PASS

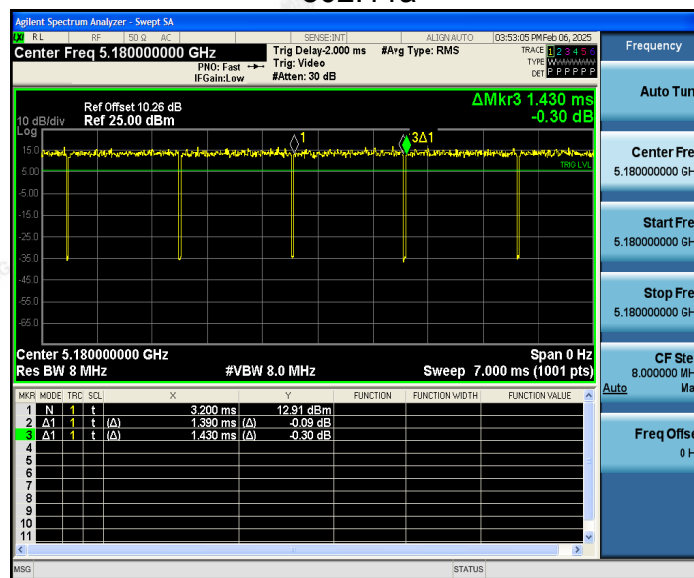


Antenna 1:

Mode Test Duty Cycle: 5150-5250MHz

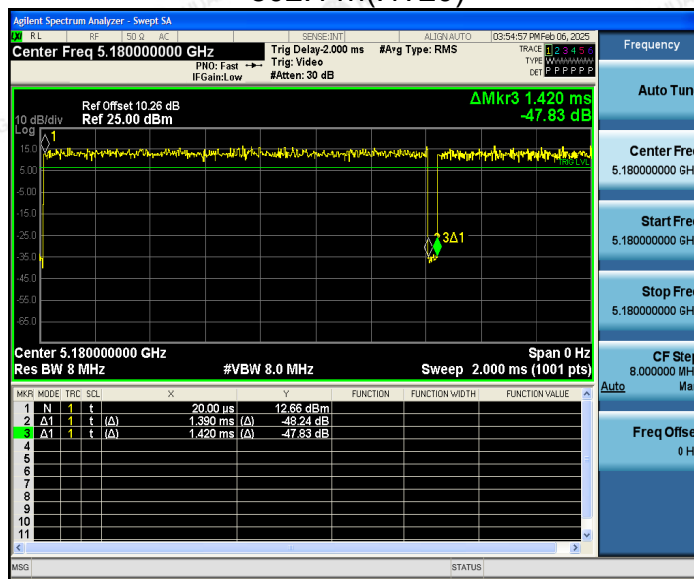
Mode	Duty Cycle
802.11a	0.972
802.11n(HT20)	0.979
802.11n(HT40)	0.979
802.11ac(HT20)	0.972
802.11ac(HT40)	0.979
802.11ac(HT80)	0.972
802.11ax(HE20)	0.972
802.11ax(HE40)	0.979
802.11ax(HE80)	0.972
802.11be(EHT20)	0.979
802.11be(EHT40)	0.972
802.11be(EHT80)	0.972

802.11a

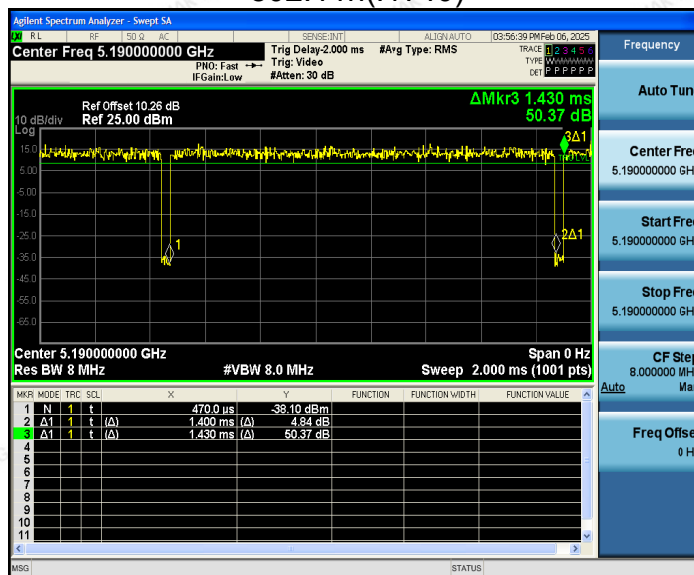




802.11n(HT20)

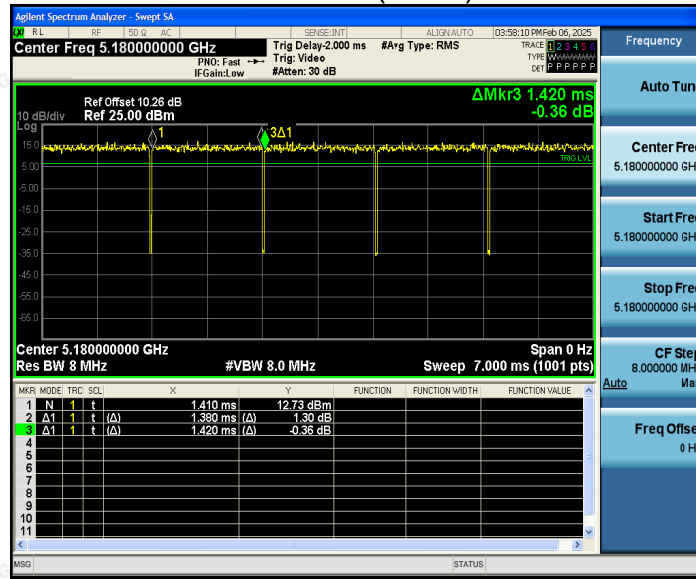


802.11n(HT40)

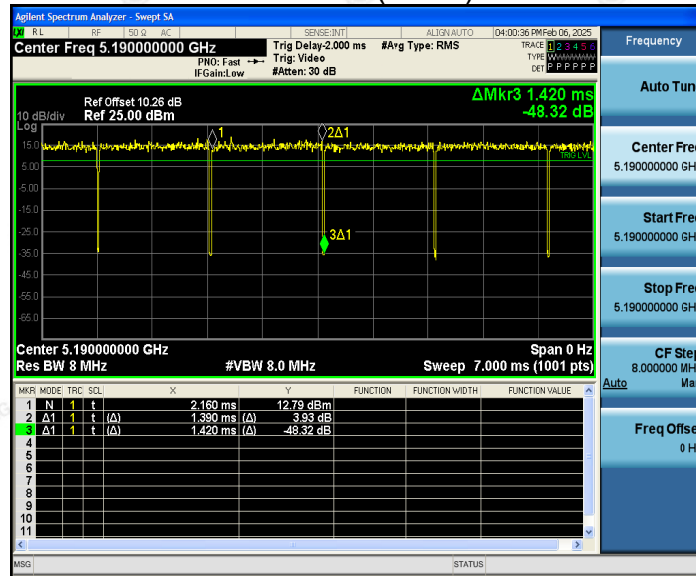




802.11ac(HT20)

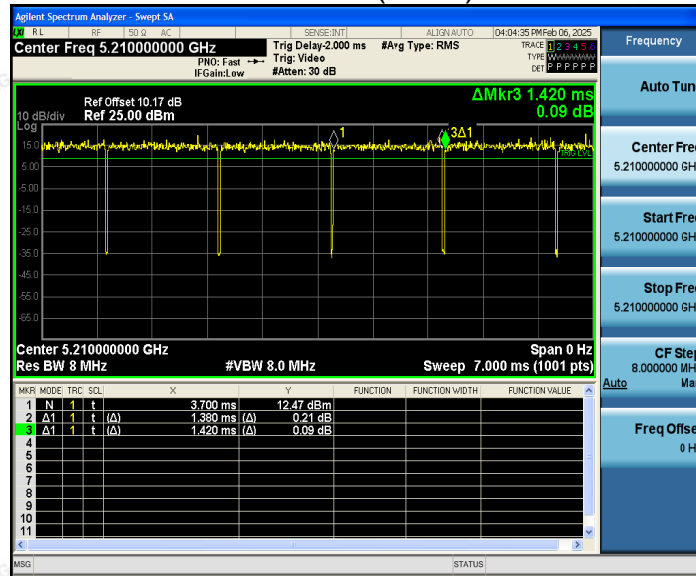


802.11ac(HT40)

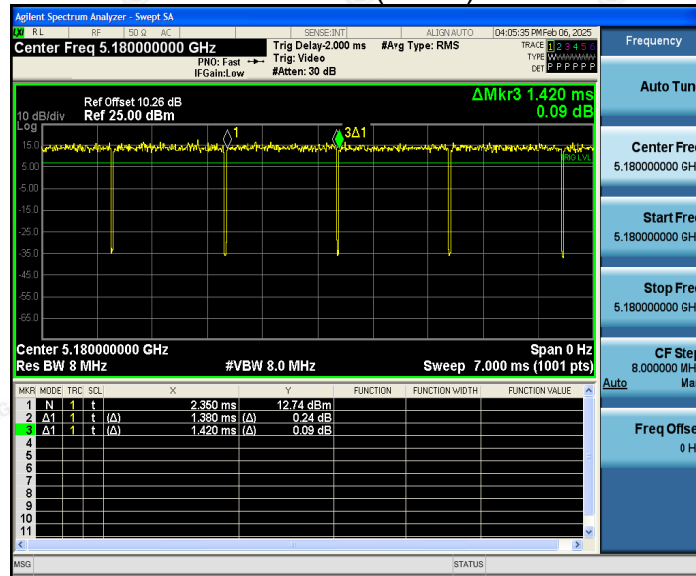




802.11ac(HT80)

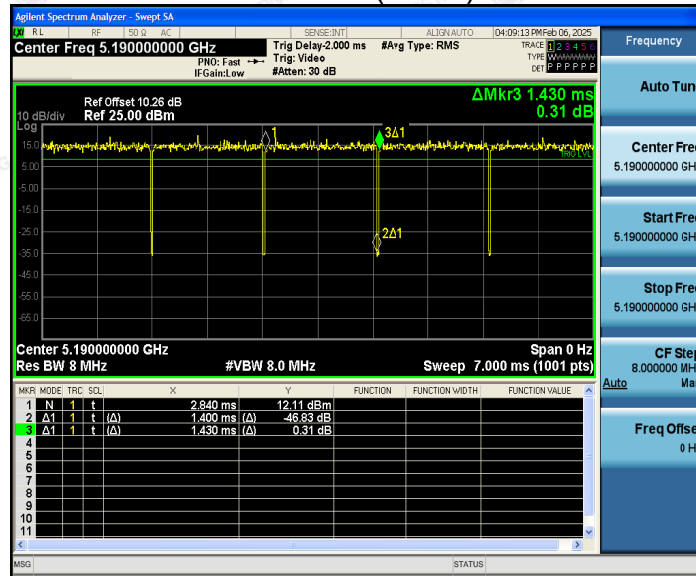


802.11ax(HE20)

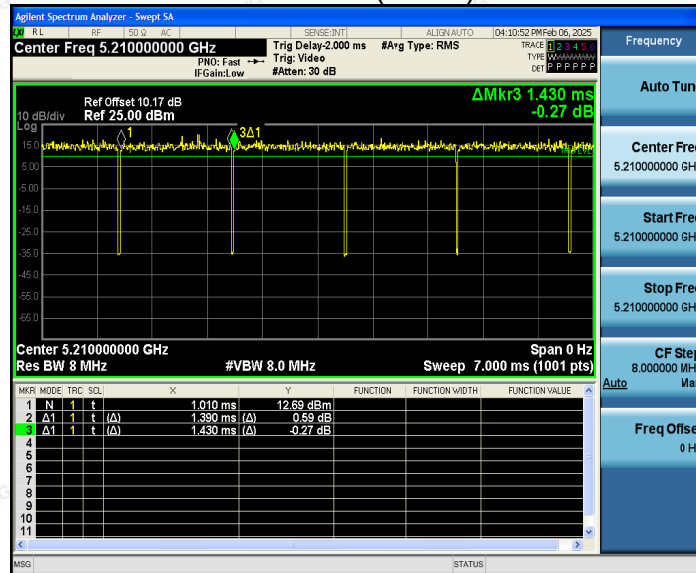




802.11ax(HE40)

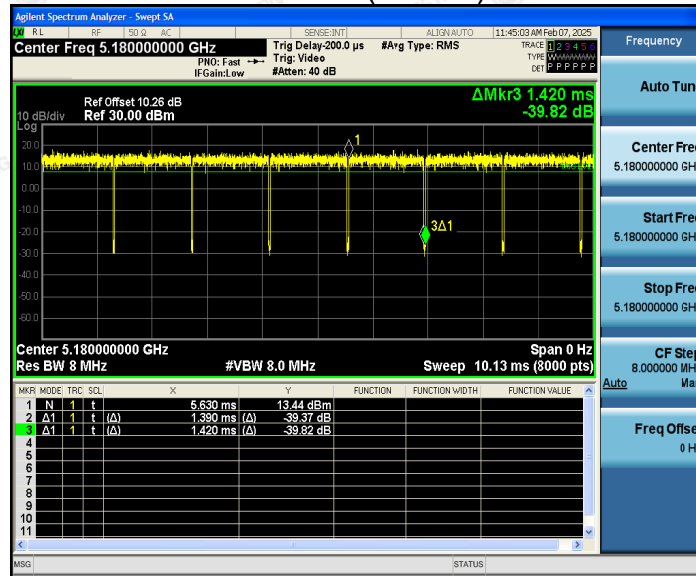


802.11ax(HE80)

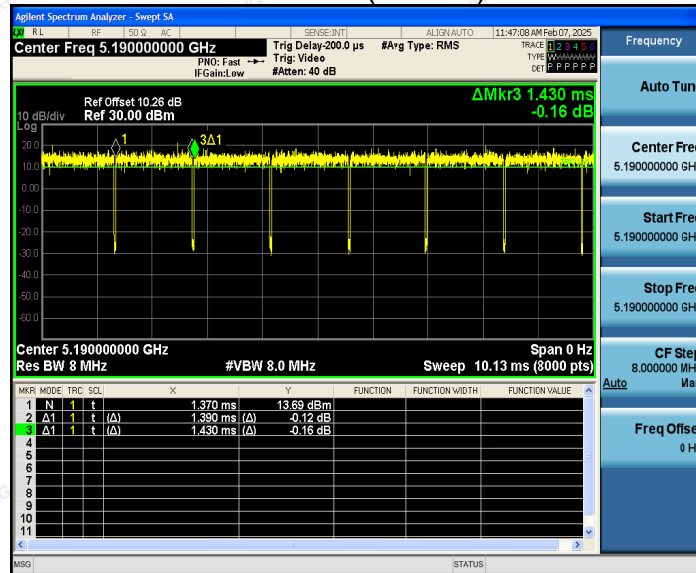




802.11be(EHT20)

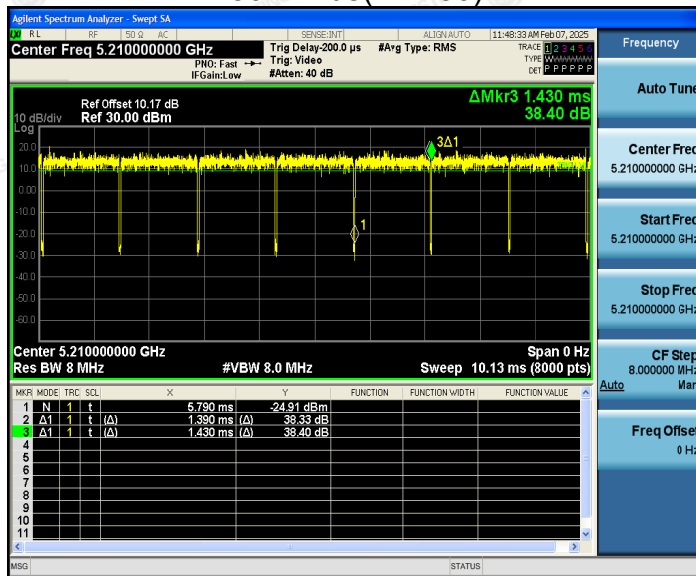


802.11be(EHT40)



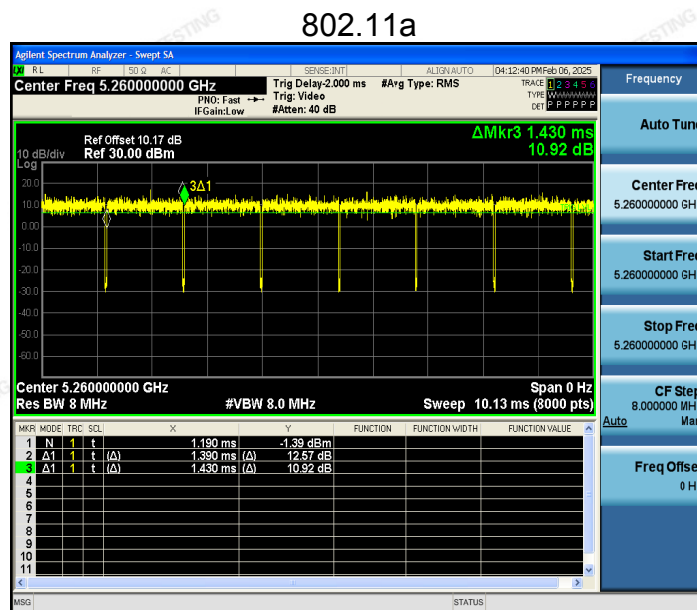


802.11be(EHT80)





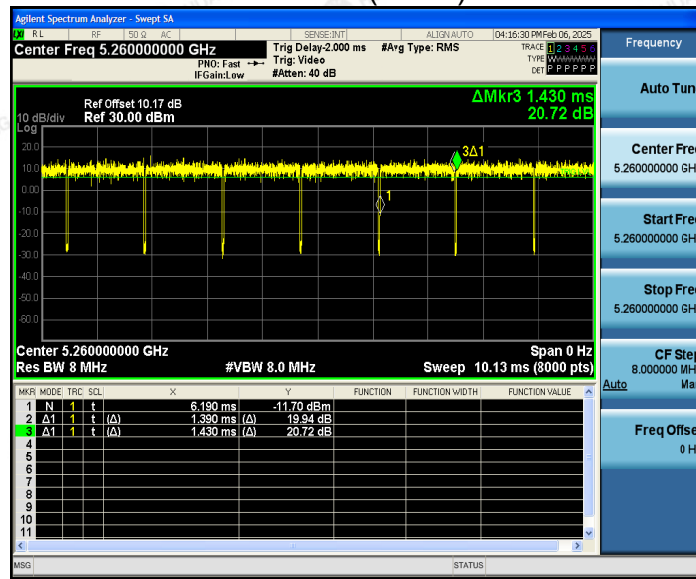
Mode	Duty Cycle
802.11a	0.972
802.11n(HT20)	0.972
802.11n(HT40)	0.972
802.11ac(HT20)	0.979
802.11ac(HT40)	0.979
802.11ac(HT80)	0.979
802.11ac(HT160)	0.979
802.11ax(HE20)	0.979
802.11ax(HE40)	0.979
802.11ax(HE80)	0.979
802.11ax(HE160)	0.979



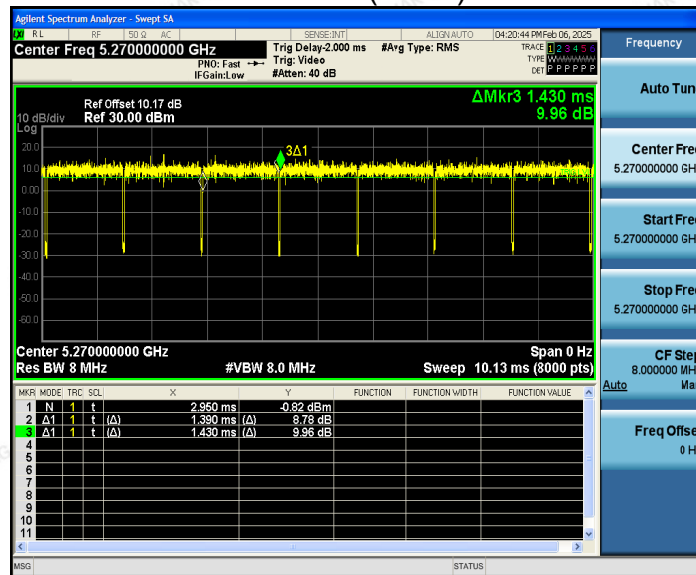
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11n(HT20)

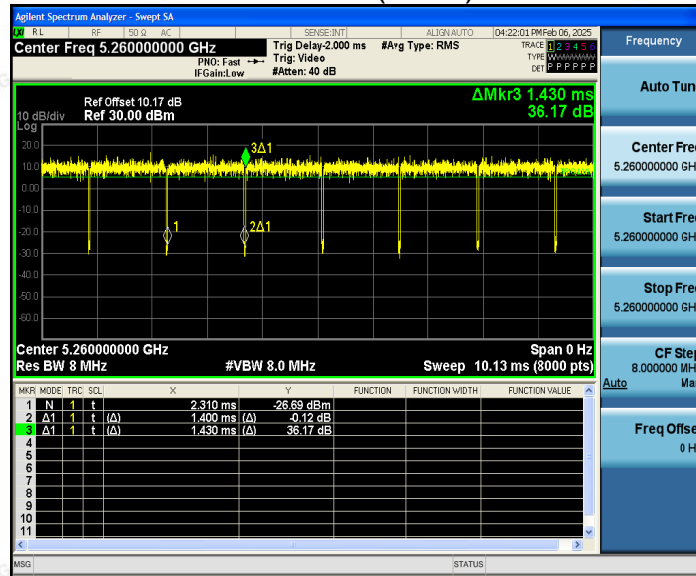


802.11n(HT40)

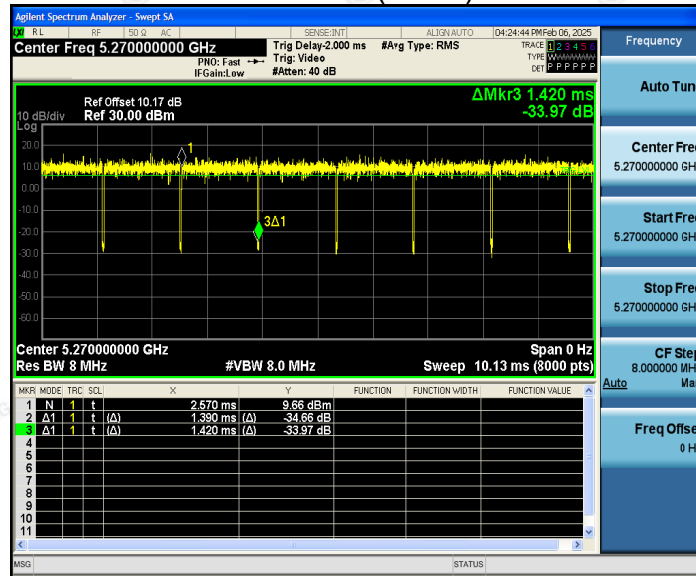




802.11ac(HT20)

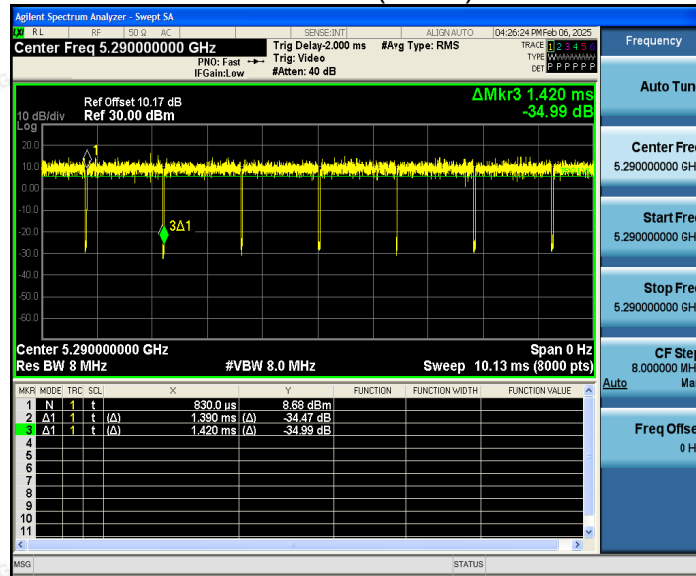


802.11ac(HT40)

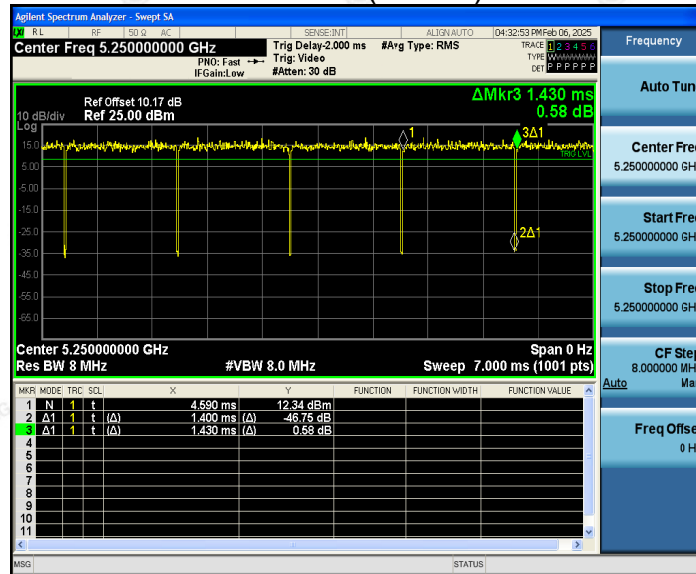




802.11ac(HT80)

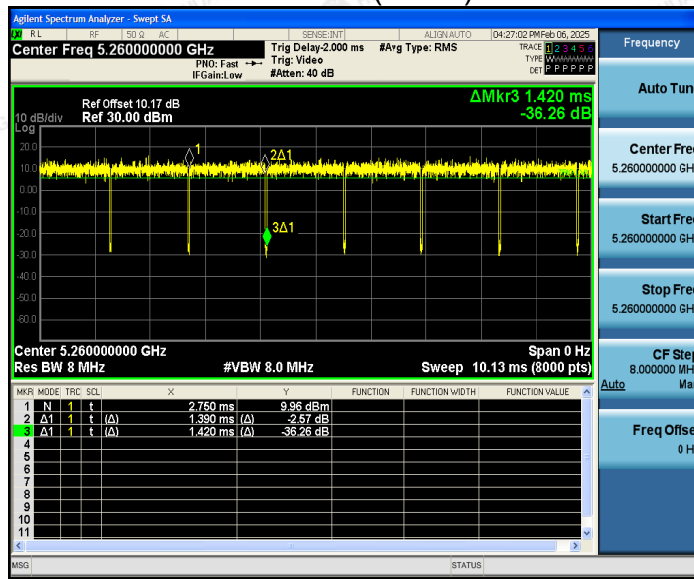


802.11ac(HT160)

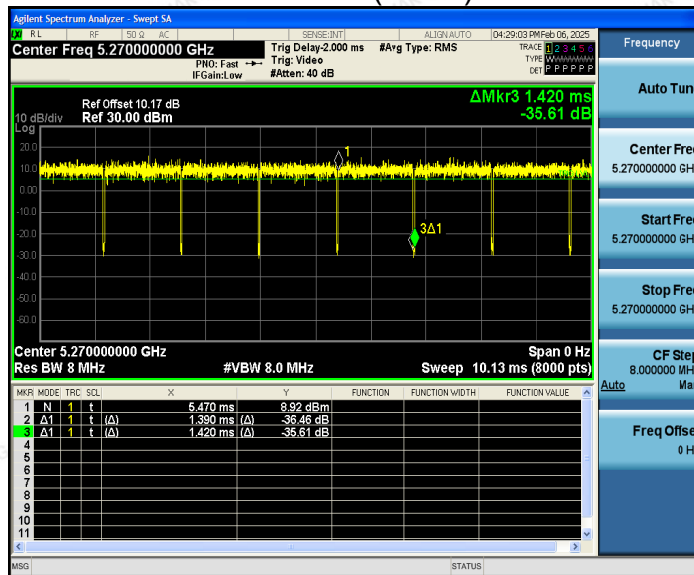




802.11ax(HE20)

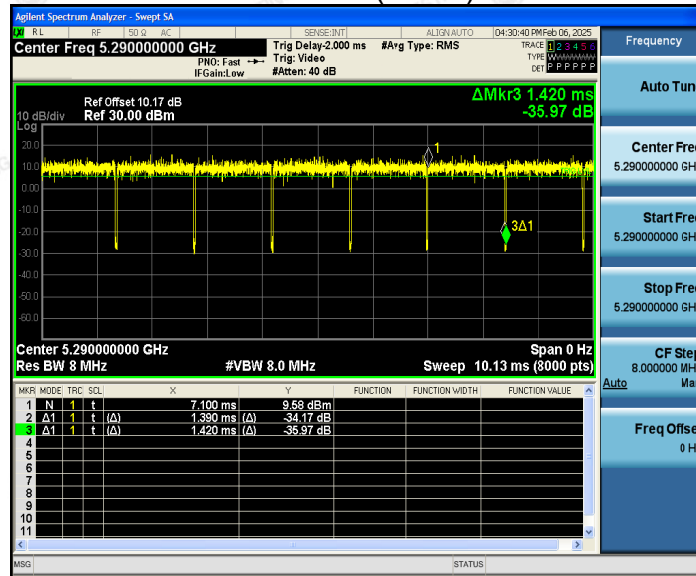


802.11ax(HE40)

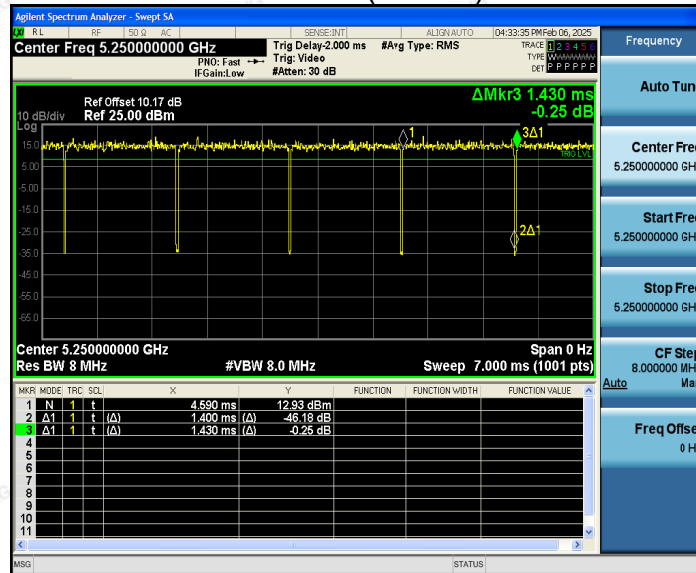




802.11ax(HE80)



802.11ax(HE160)

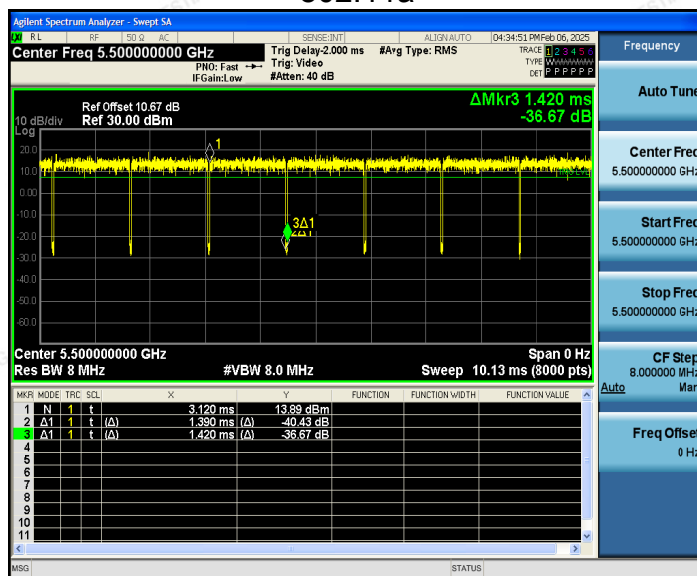




Mode Test Duty Cycle: 5500-5700MHz

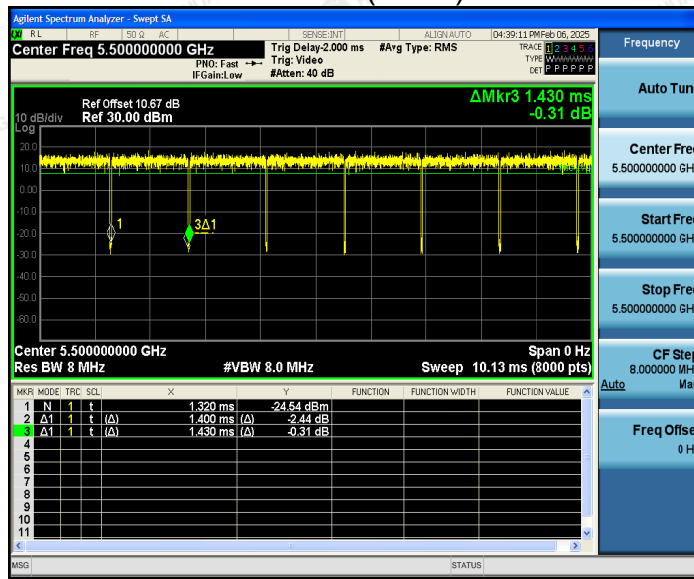
Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.979	-0.09
802.11n(HT20)	0.979	-0.09
802.11n(HT40)	0.959	-0.18
802.11ac(HT20)	0.979	-0.09
802.11ac(HT40)	0.979	-0.09
802.11ac(HT80)	0.972	-0.12
802.11ac(HT160)	0.979	-0.09
802.11ax(HE20)	0.972	-0.12
802.11ax(HE40)	0.972	-0.12
802.11ax(HE80)	0.972	-0.12
802.11ax(HE160)	0.979	-0.09

802.11a

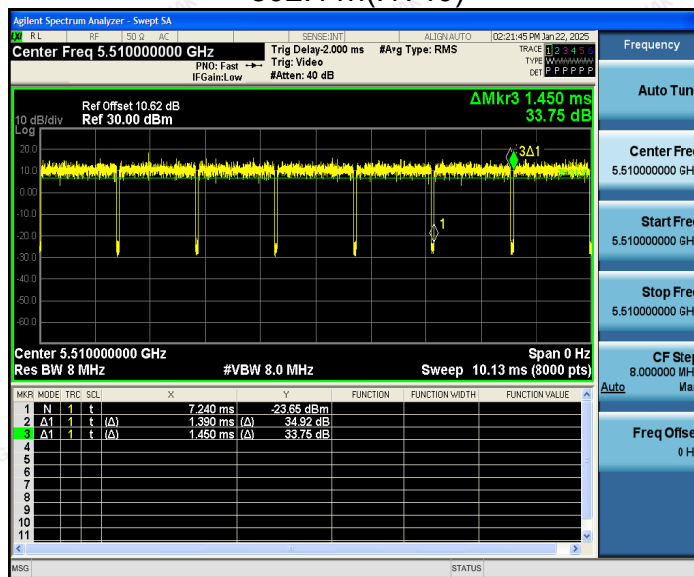




802.11n(HT20)

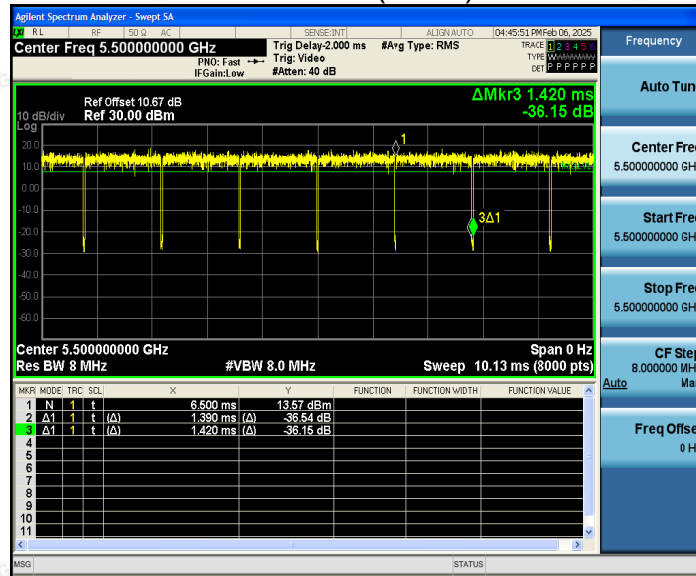


802.11n(HT40)

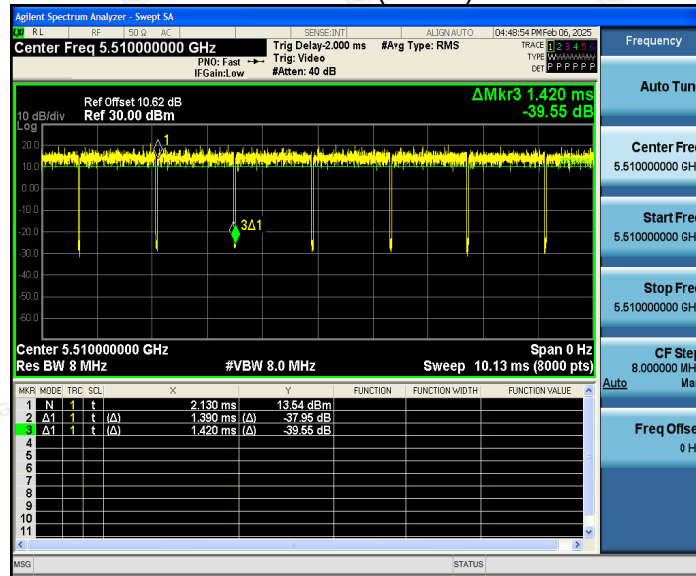




802.11ac(HT20)



802.11ac(HT40)





Agilent Spectrum Analyzer - Sweep SA

RL IF SSB AC

Center Freq 5.500000000 GHz

Trig Delay: 2.000 ms #Arg Type: RMS

Trace Type: WWWWWWWW
Def: P P P P P P

PMO: Fast → IF Gain: 1.0w #Atten: 40 dB

Frequency

Auto Tun

Center Freq 5.500000000 GHz

Start Freq 5.500000000 GHz

Stop Freq 5.500000000 GHz

CF Step 8.000000 MHz

Auto

Freq Offset 0 Hz

10 dBmV Log

Ref Offset 10.67 dB
Ref 30.00 dBm

Δ Mkr 3 1.430 ms
37.72 dB

3A1

1

Center 5.500000000 GHz Span 0 Hz
Res BW 8 MHz #VBW 8.0 MHz Sweep 10.13 ms (8000 pts)

MkR	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	t	4.360 ms	-24.26 dBm		
2	Δ 1	1	t (Δ)	1.390 ms (Δ)	40.11 dB		
3	Δ 1	1	t (Δ)	1.430 ms (Δ)	37.72 dB		
4							
5							
6							
7							
8							
9							
10							
11							

MSG

STATUS

Agilent Spectrum Analyzer - Sweep SA

RL	RF	SQ	QC	SENSE(UNIT)	ALIGN(AUTO)	DATE/TIME
						05/02/47 PM Feb 06, 2005

Center Freq 5.510000000 GHz **Trig Delay-2.000 ms** **#Arg Type: RMS** **TRACE 1 [2 3 4 5 6]**
PNO: Fast → **IF Gain: Low** **Trig: Video** **#Atten: 40 dB** **TWE (dB) [1 2 3 4 5 6]**
OCT [P P P P P P]

Ref Offset 10.62 dB **ΔMkr3 1.430 ms**
Ref 30.00 dBm **0.09 dB**

The main display shows a spectrum plot with a yellow trace. The y-axis is labeled "10 dB/div Log" and ranges from -80.00 to 20.00. The x-axis represents frequency. A peak is visible at approximately 5.51 GHz, marked with a green circle and labeled "3d1". Below the plot, there are several measurement fields:

- Center 5.510000000 GHz**
- Res BW 8 MHz**
- #VBW 8.0 MHz**
- Span 0 Hz**
- Sweep 10.13 ms (8000 pts)**

MKR	MODE	TRG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	t	t	5.690 ms	14.15 dBm			
2	A1	t	(Δ)	1.390 ms (Δ)	-1.96 dB			
3	A1	t	(Δ)	1.430 ms (Δ)	0.09 dB			
4								
5								
6								
7								
8								
9								
10								
11								

On the right side of the screen, there is a sidebar with additional settings and information:

- Frequency**: Auto Tuning
- Center Freq**: 5.510000000 GHz
- Start Freq**: 5.510000000 GHz
- Stop Freq**: 5.510000000 GHz
- CF Step**: 8.00000000 GHz
- Auto**: Ma
- Freq Offset**: 0 Hz

Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

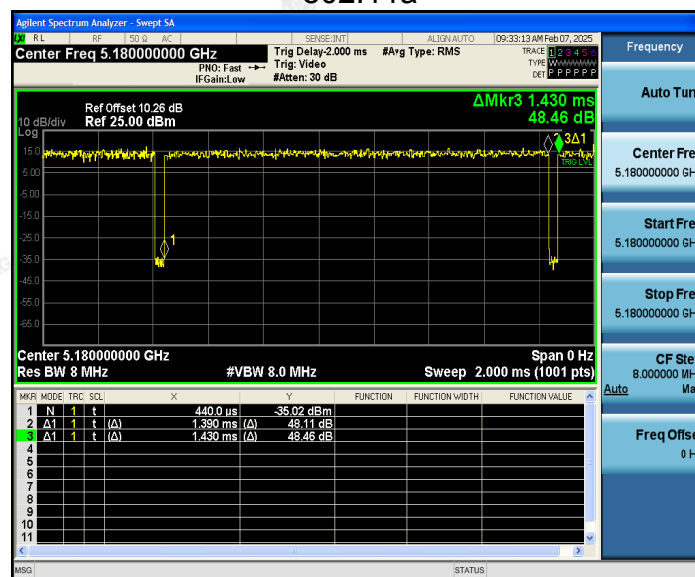


Antenna 2:

Mode Test Duty Cycle: 5150-5250MHz

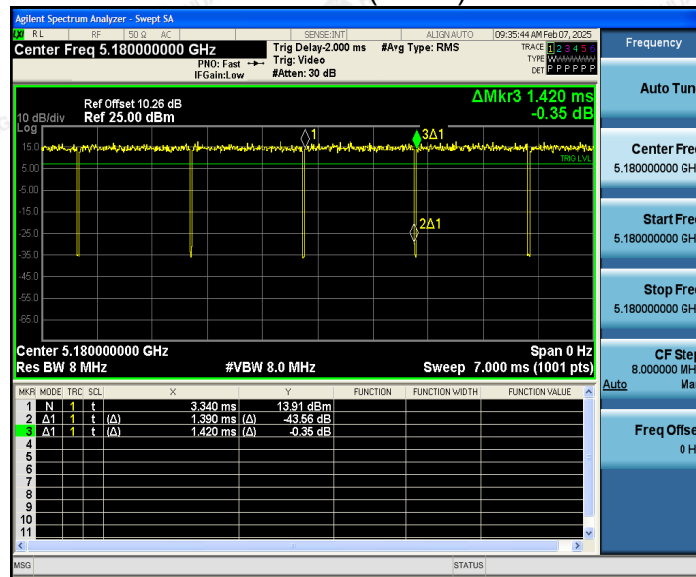
Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.972	-0.12
802.11n(HT20)	0.979	-0.09
802.11n(HT40)	0.972	-0.12
802.11ac(HT20)	0.979	-0.09
802.11ac(HT40)	0.979	-0.09
802.11ac(HT80)	0.979	-0.09
802.11ax(HE20)	0.972	-0.12
802.11ax(HE40)	0.972	-0.12
802.11ax(HE80)	0.972	-0.12
802.11be(EHT20)	0.972	-0.12
802.11be(EHT40)	0.979	-0.09
802.11be(EHT80)	0.972	-0.12

802.11a

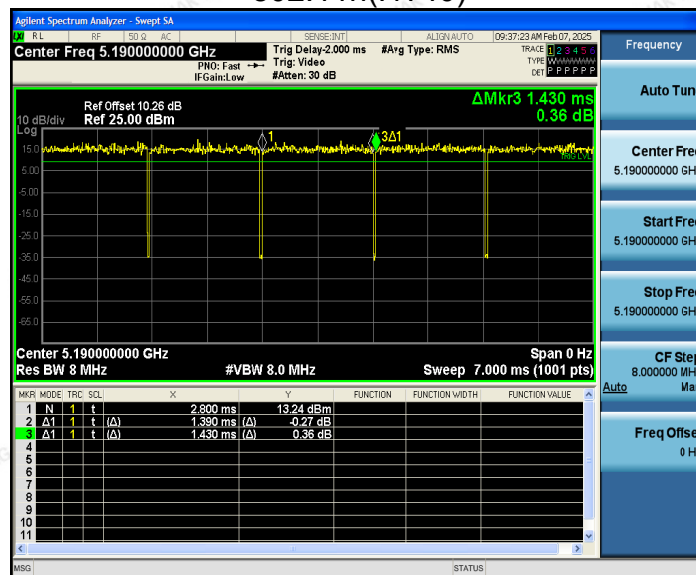




802.11n(HT20)

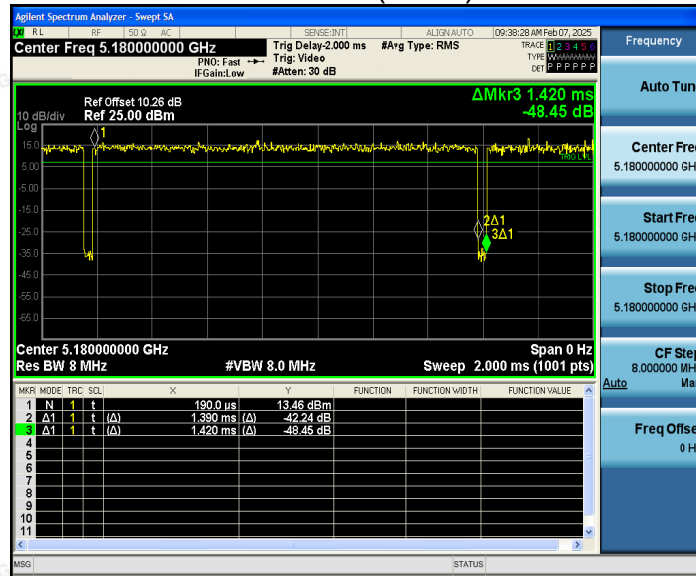


802.11n(HT40)

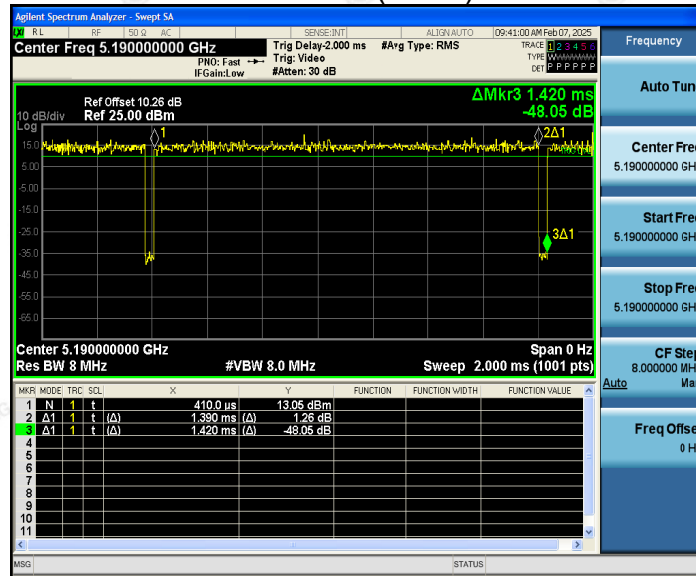




802.11ac(HT20)

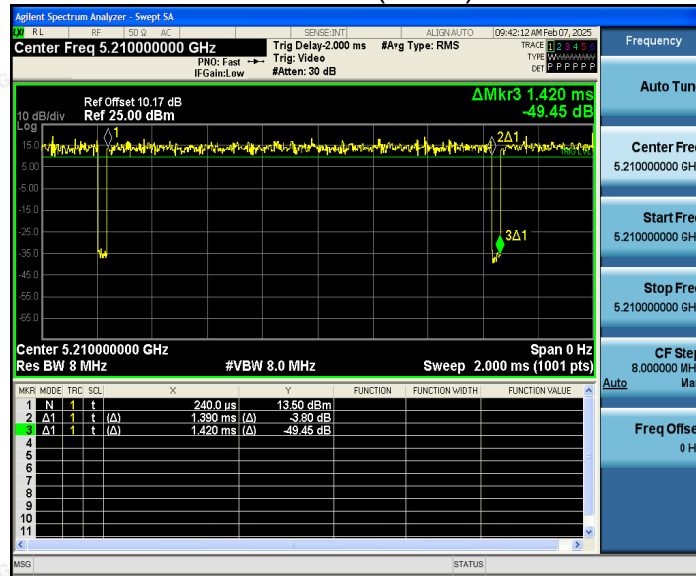


802.11ac(HT40)

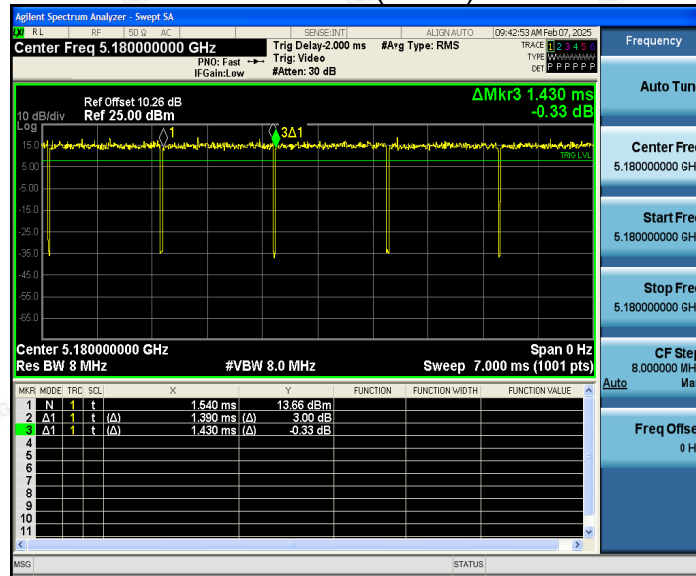




802.11ac(HT80)

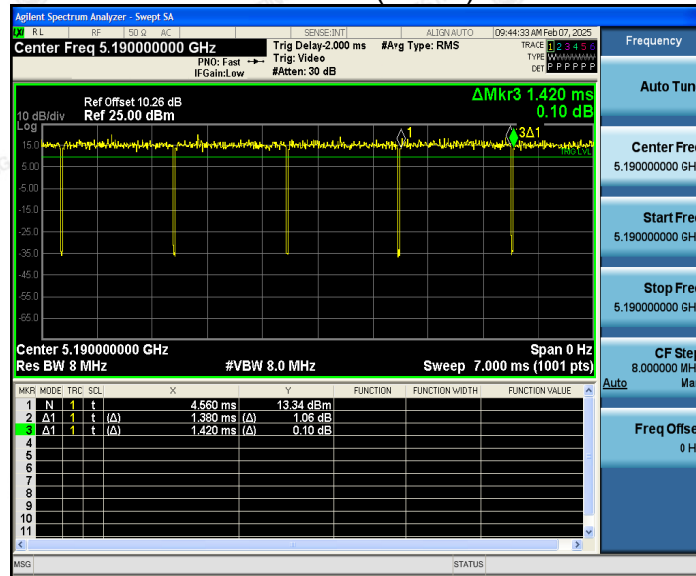


802.11ax(HE20)

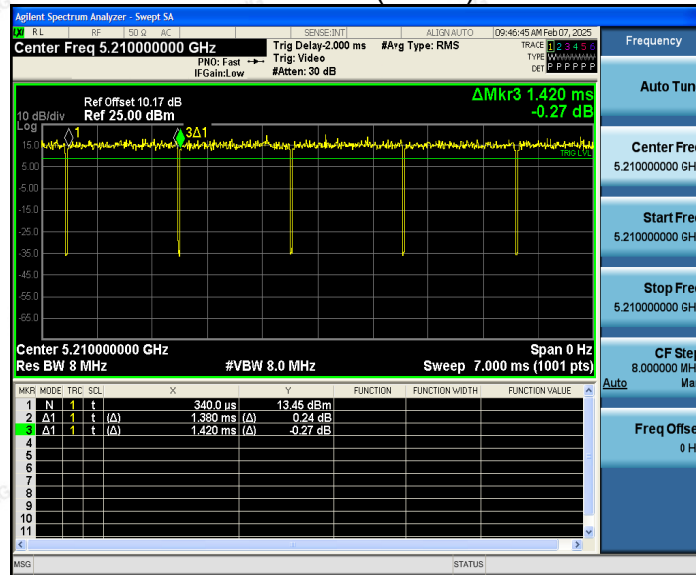




802.11ax(HE40)

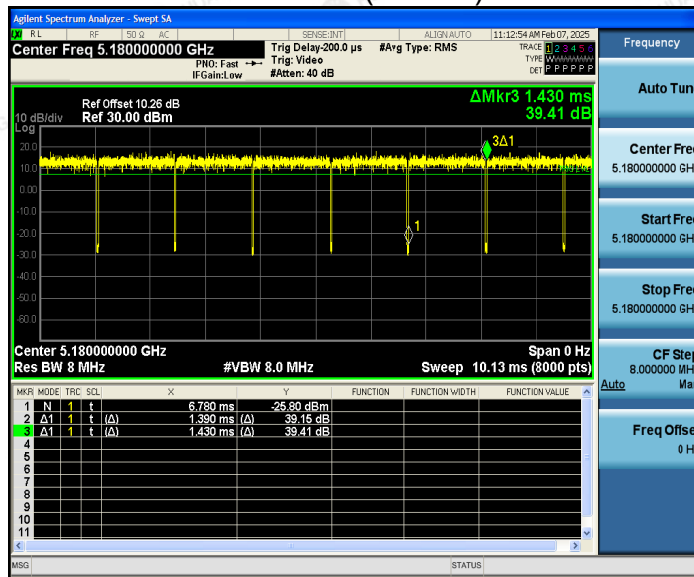


802.11ax(HE80)

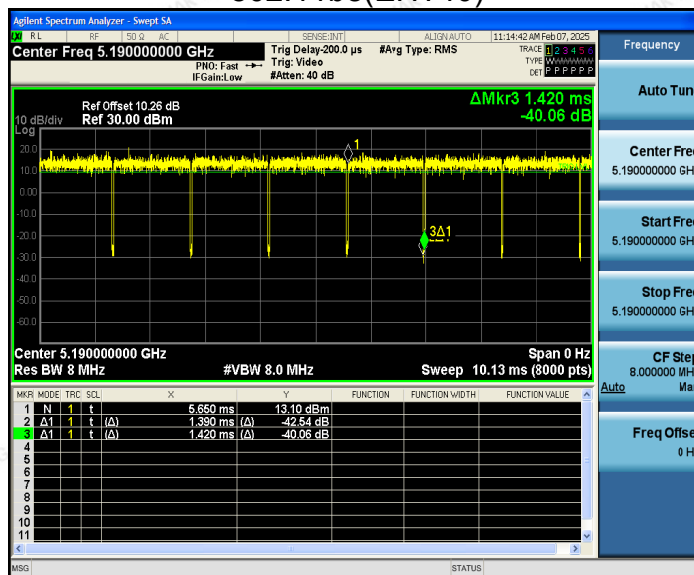




802.11be(EHT20)

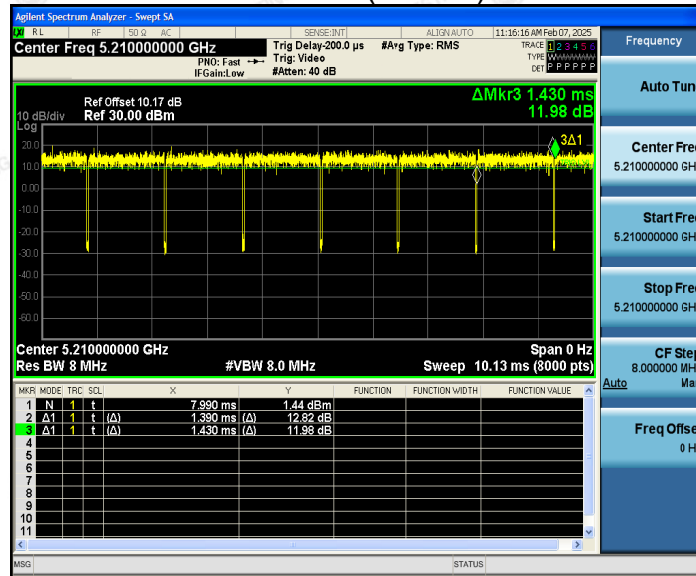


802.11be(EHT40)





802.11be(EHT80)

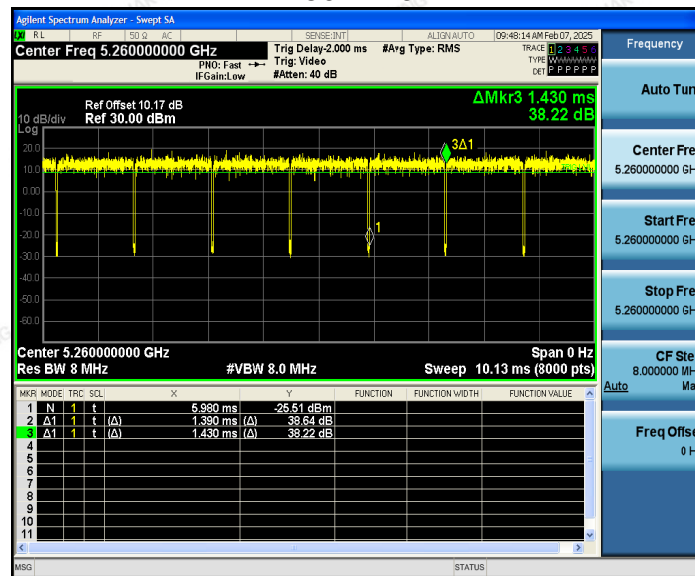




Mode Test Duty Cycle: 5260-5320MHz

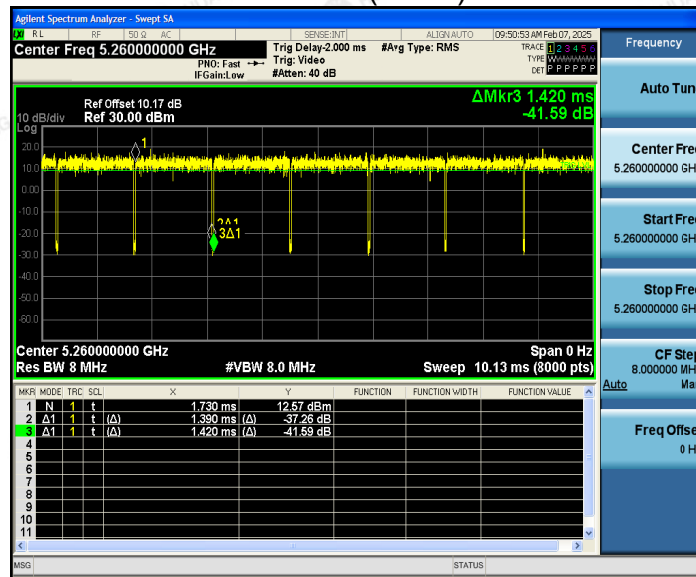
Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.972	-0.12
802.11n(HT20)	0.979	-0.09
802.11n(HT40)	0.979	-0.09
802.11ac(HT20)	0.972	-0.12
802.11ac(HT40)	0.972	-0.12
802.11ac(HT80)	0.979	-0.09
802.11ac(HT160)	0.972	-0.12
802.11ax(HE20)	0.979	-0.09
802.11ax(HE40)	0.979	-0.09
802.11ax(HE80)	0.979	-0.09
802.11ax(HE160)	0.972	-0.12

802.11a

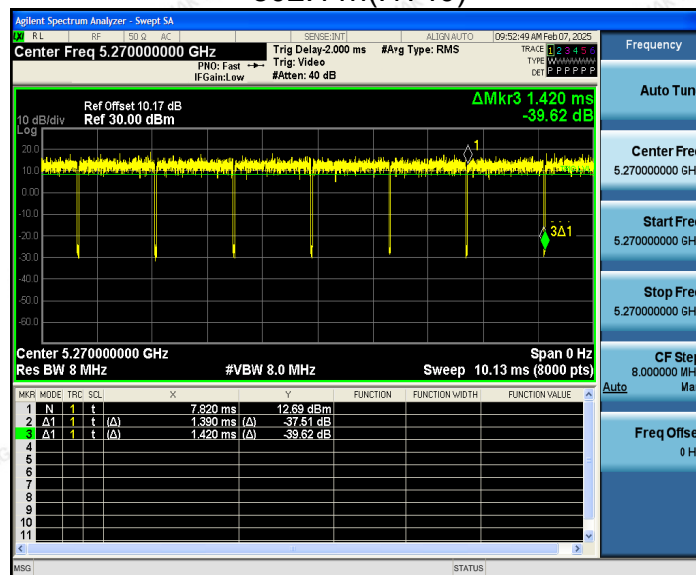




802.11n(HT20)

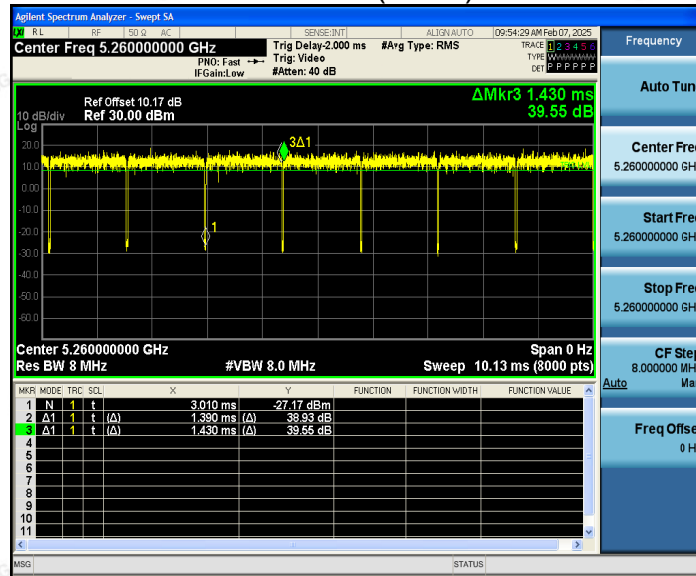


802.11n(HT40)

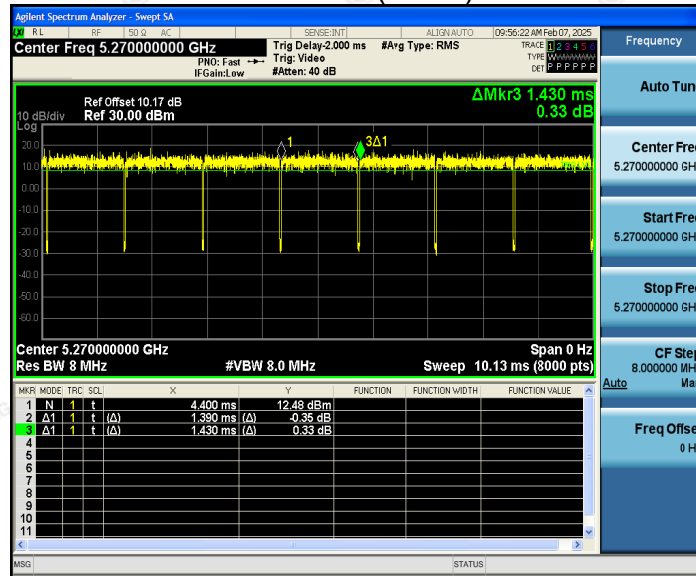




802.11ac(HT20)

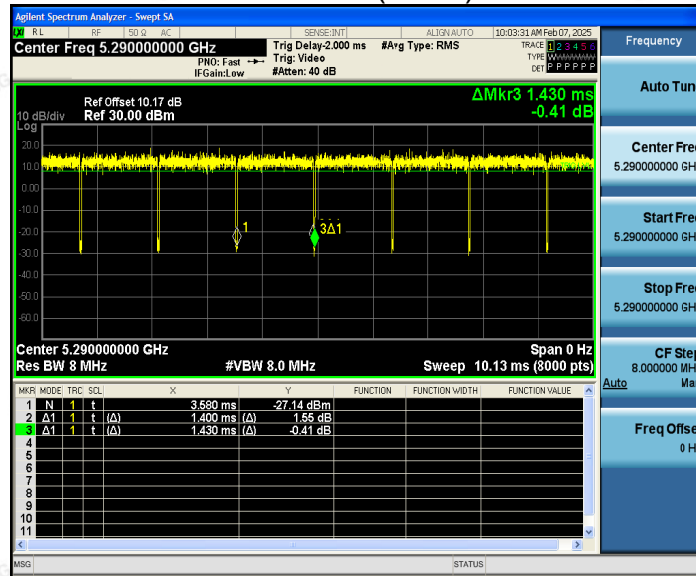


802.11ac(HT40)

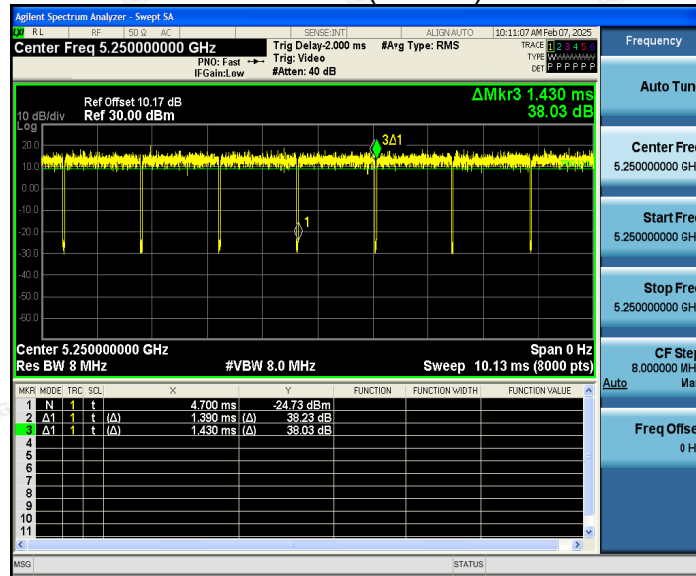




802.11ac(HT80)

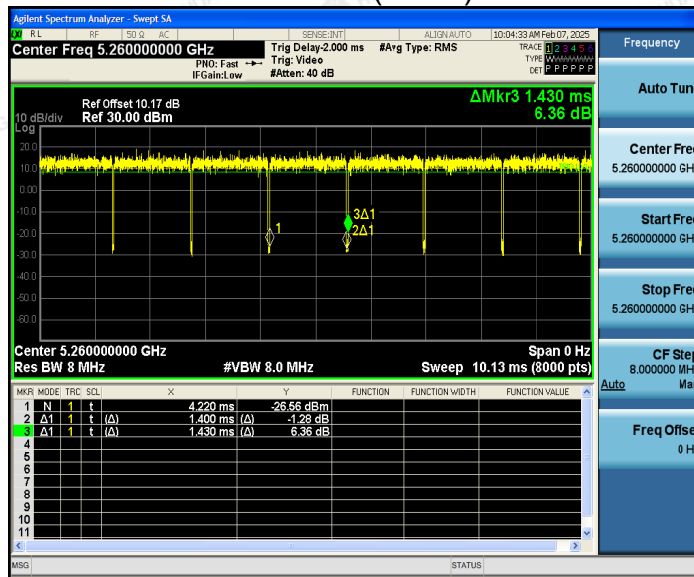


802.11ac(HT160)

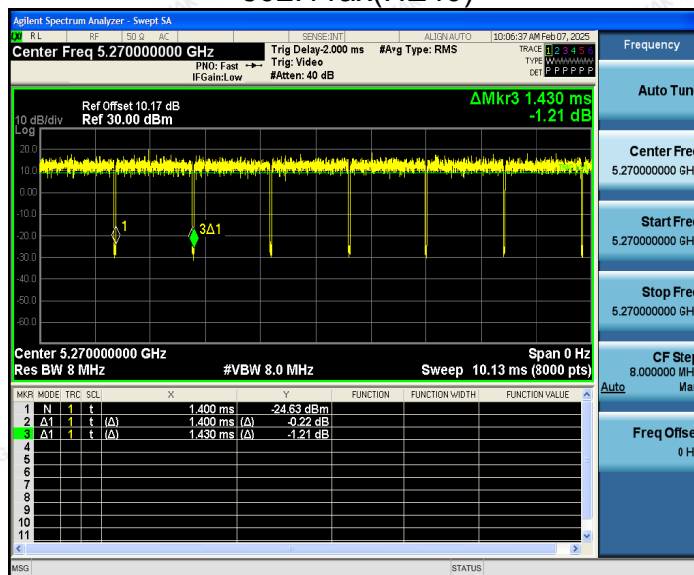




802.11ax(HE20)

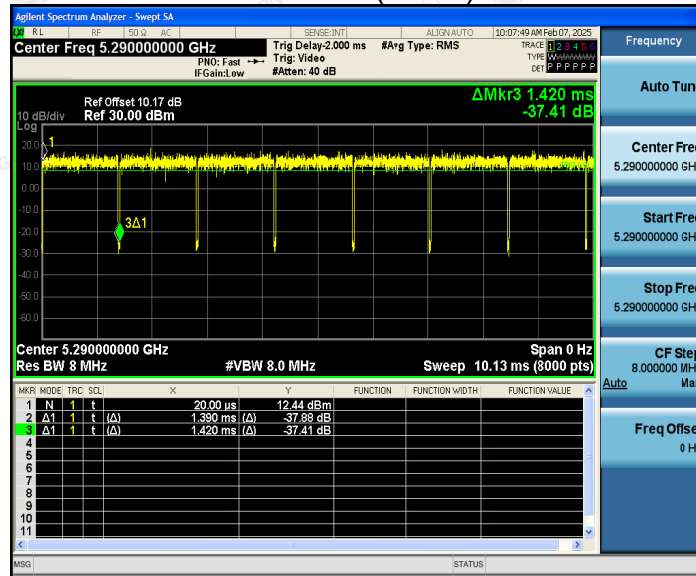


802.11ax(HE40)

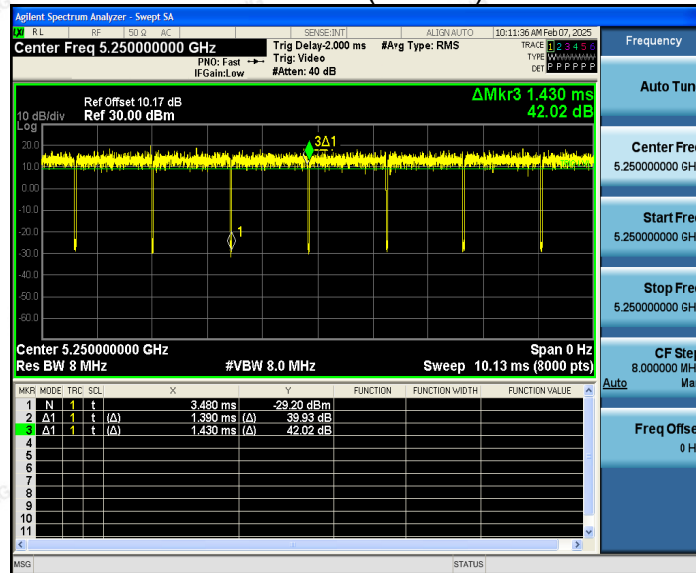




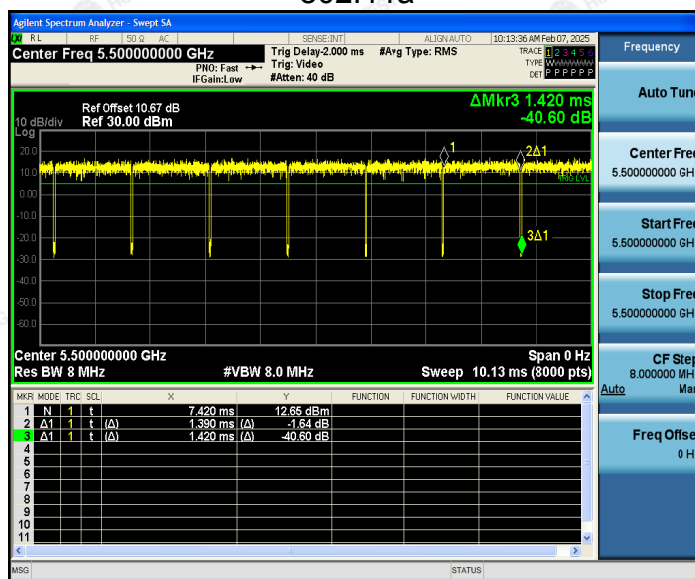
802.11ax(HE80)



802.11ax(HE160)



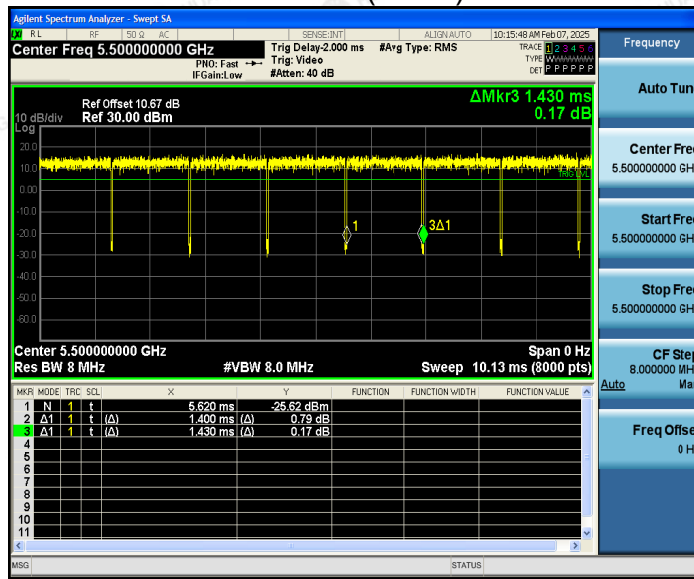
Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.979	-0.09
802.11n(HT20)	0.979	-0.09
802.11n(HT40)	0.914	-0.39
802.11ac(HT20)	0.979	-0.09
802.11ac(HT40)	0.979	-0.09
802.11ac(HT80)	0.979	-0.09
802.11ac(HT160)	0.979	-0.09
802.11ax(HE20)	0.979	-0.09
802.11ax(HE40)	0.972	-0.12
802.11ax(HE80)	0.972	-0.12
802.11ax(HE160)	0.972	-0.12



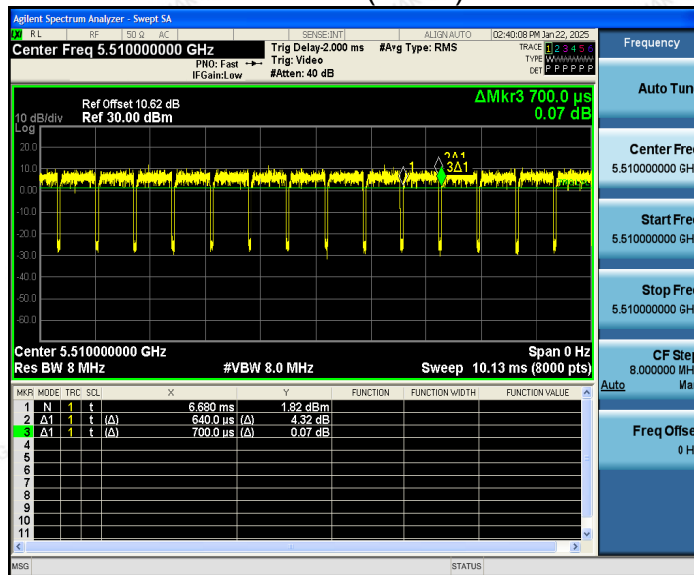
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11n(HT20)



802.11n(HT40)





Agilent Spectrum Analyzer - Swept SA

Center Freq 5.500000000 GHz

Ref Offset 10.67 dB
Ref 30.00 dBm

Trig Delay: 2.000 ms
Trig: Video
#Atten: 40 dB

ALIGN AUTO
10/19/01 AM Feb 07, 2005

TYPE WAAAAAAAA
DET P P P P P

Frequency

Auto Tun

Center Freq
5.500000000 GHz

Start Freq
5.500000000 GHz

Stop Freq
5.500000000 GHz

CF Stop
8.000000 MHz

Auto

Freq Offset
0 Hz

10 dB/div
Log

$\Delta Mkr3$ 1.430 ms
39.83 dB

3Δ1

1Δ1

2Δ1

Center 5.500000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 10.13 ms (8000 pts)

MKR	MODE	TRIG	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	t	5.450 ms	-26.59 dBm			
2	Δ1	1	t	1.400 ms (Δ)	3.34 dB			
3	Δ1	1	t	1.430 ms (Δ)	39.83 dB			
4								
5								
6								
7								
8								
9								
10								
11								

MSG

STATUS

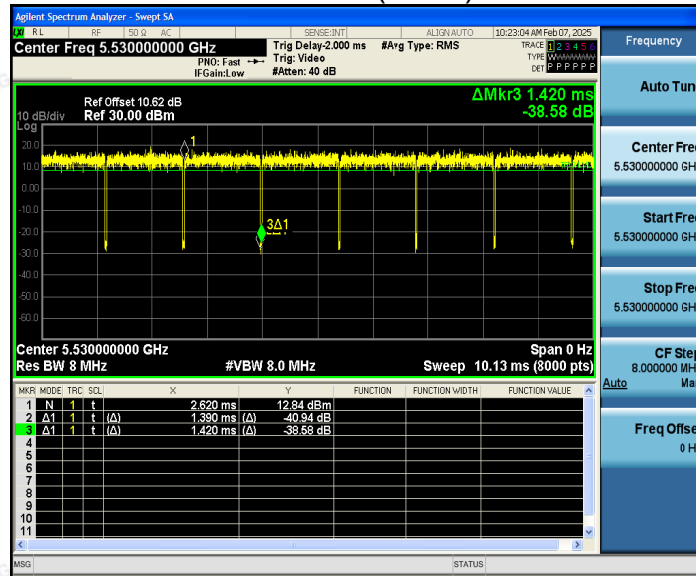
[illegible]

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com

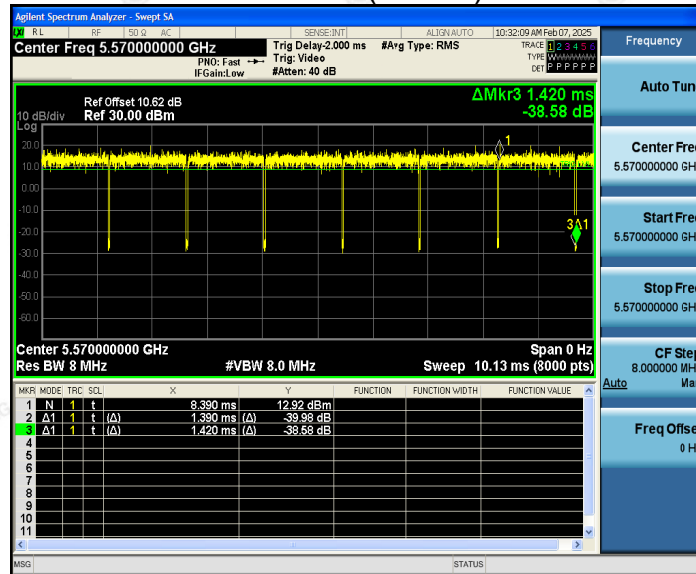
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11ac(HT80)

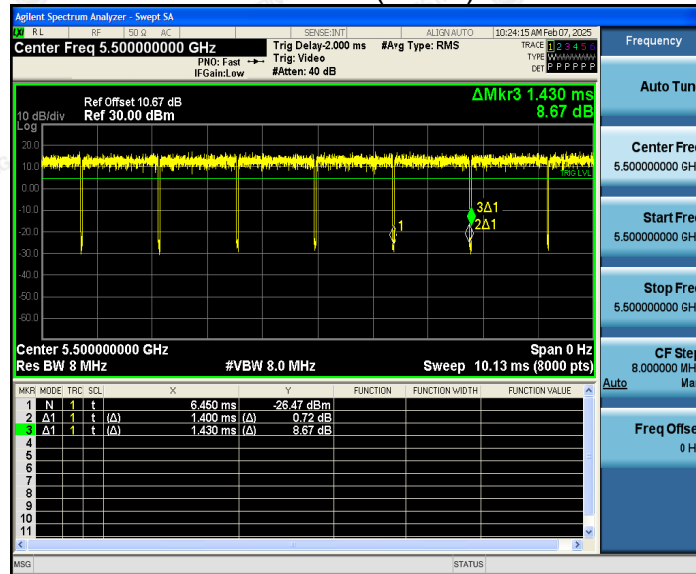


802.11ac(HT160)

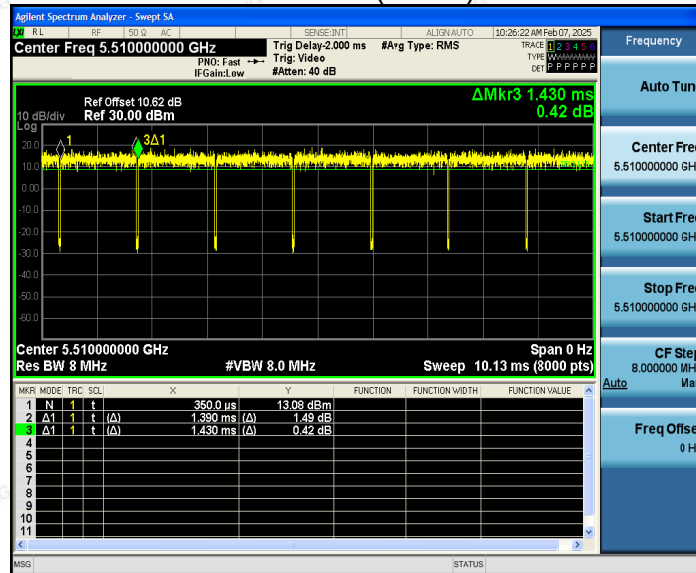




802.11ax(HE20)

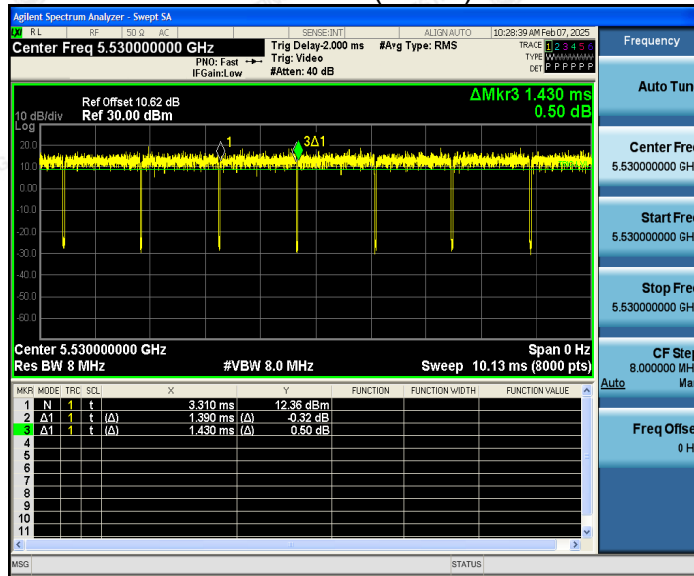


802.11ax(HE40)

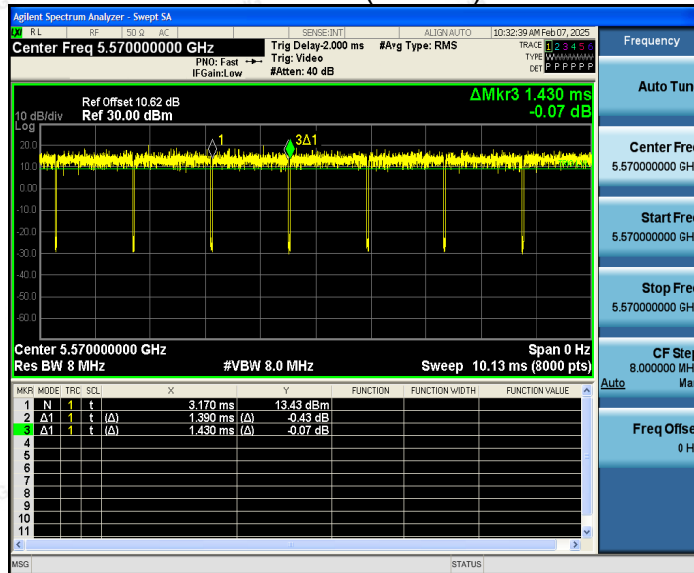




802.11ax(HE80)



802.11ax(HE160)



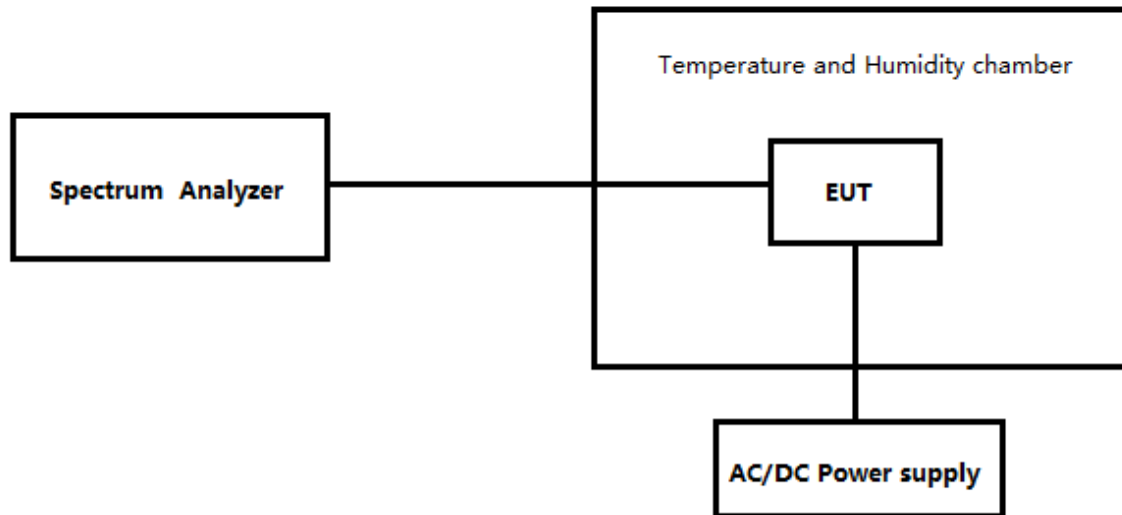


6.6 Frequency Stability Measurement

LIMIT

According to §15.407(g), Manufacturers 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.

TEST CONFIGURATION



TEST PROCEDURE

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

**TESTRESULTS**

Antenna 1

(5150MHz-5250MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5180	5179.945	-0.055	-10.618	25	V _{min}
5180	5179.962	-0.038	-7.336	25	V _{max}
5180	5179.938	-0.062	-11.969	25	V _{nor}
5180	5179.938	-0.062	-11.969	-10	V _{nor}
5180	5179.984	-0.016	-3.089	40	V _{nor}

(5250MHz-5350MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5260	5259.957	-0.043	-8.175	25	V _{min}
5260	5260.034	0.034	6.464	25	V _{max}
5260	5259.983	-0.017	-3.232	25	V _{nor}
5260	5259.943	-0.057	-10.837	-10	V _{nor}
5260	5260.073	0.073	13.878	40	V _{nor}

(5470MHz-5725MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5500	5499.934	-0.066	-12.000	25	V _{min}
5500	5500.075	0.075	13.636	25	V _{max}
5500	5499.939	-0.061	-11.091	25	V _{nor}
5500	5499.947	-0.053	-9.636	-10	V _{nor}
5500	5500.087	0.087	15.818	40	V _{nor}

**Antenna 2**

(5150MHz-5250MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5180	5179.941	-0.059	-11.390	25	V _{min}
5180	5179.968	-0.032	-6.178	25	V _{max}
5180	5179.978	-0.022	-4.247	25	V _{nor}
5180	5179.996	-0.004	-0.772	-10	V _{nor}
5180	5179.957	-0.043	-8.301	40	V _{nor}

(5250MHz-5350MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5260	5260.047	0.047	8.935	25	V _{min}
5260	5260.037	0.037	7.034	25	V _{max}
5260	5259.954	-0.046	-8.745	25	V _{nor}
5260	5259.961	-0.039	-7.414	-10	V _{nor}
5260	5260.057	0.057	10.837	40	V _{nor}

(5470MHz-5725MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5500	5500.058	0.058	10.545	25	V _{min}
5500	5500.038	0.038	6.909	25	V _{max}
5500	5499.964	-0.036	-6.545	25	V _{nor}
5500	5499.979	-0.021	-3.818	-10	V _{nor}
5500	5500.013	0.013	2.364	40	V _{nor}