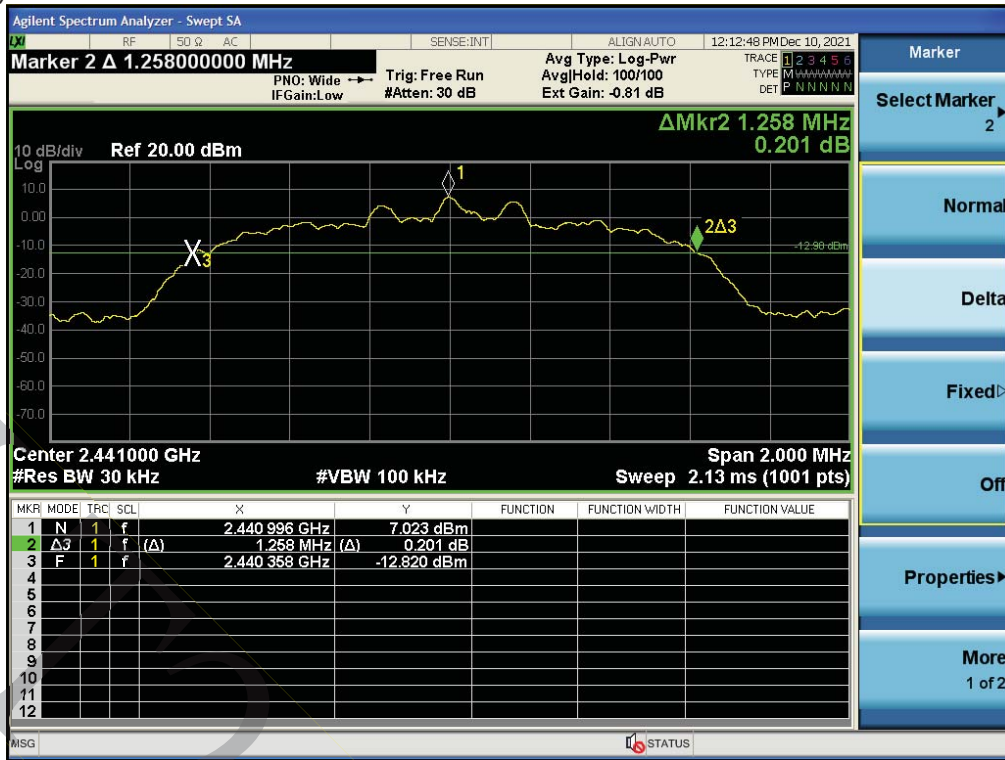
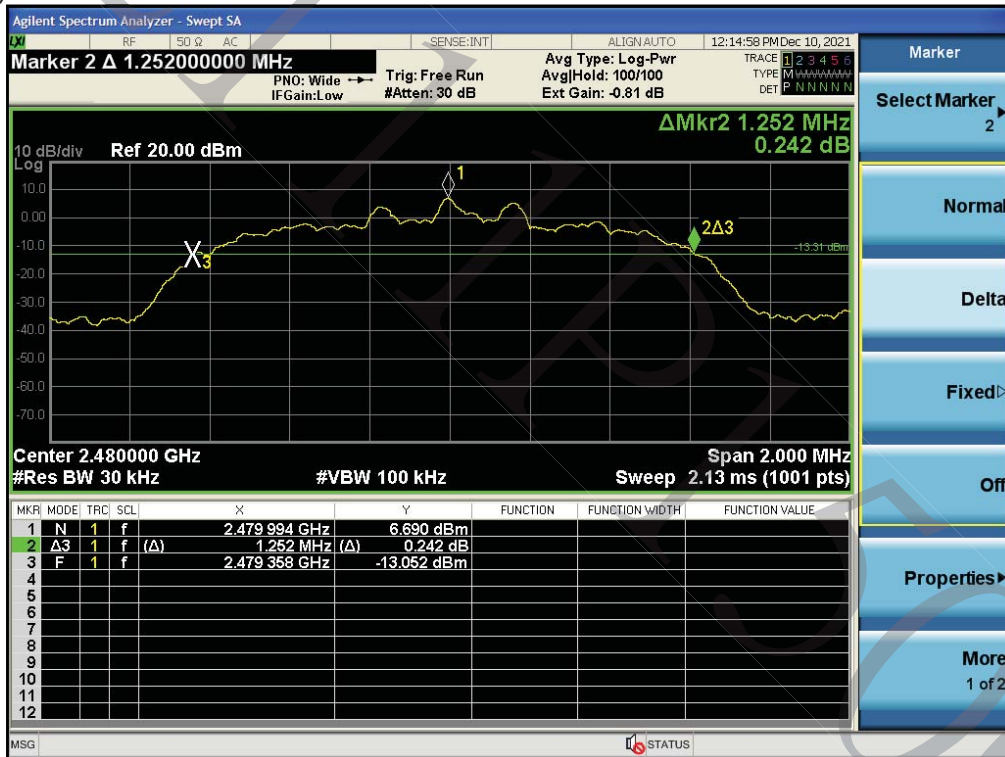


(2441MHz)



(2480MHz)



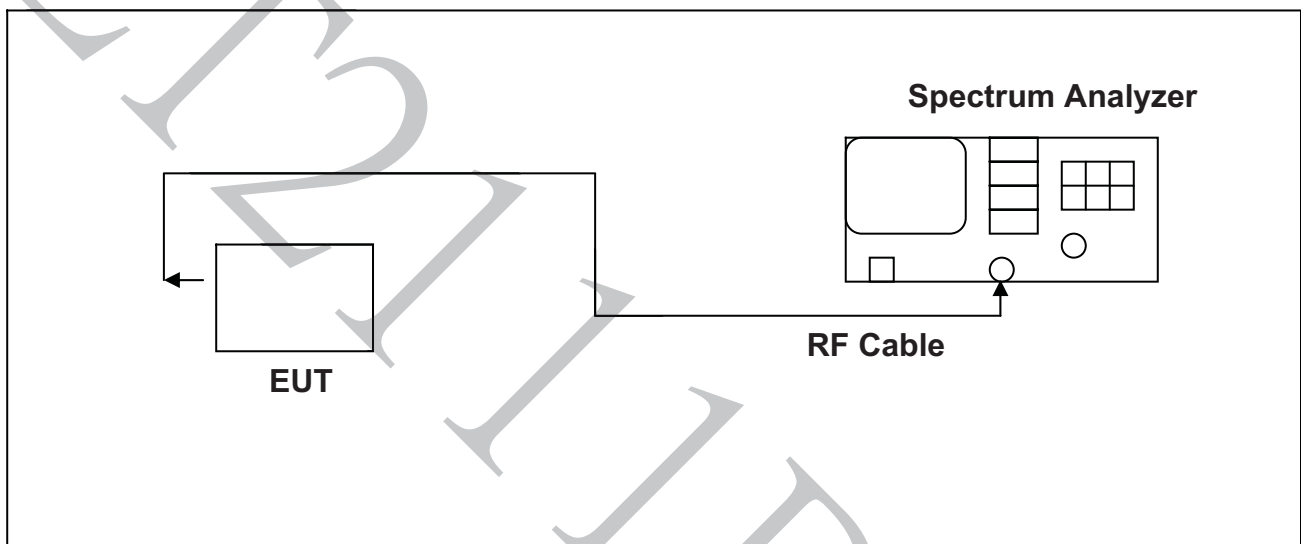
5. Hopping Frequency Separation Requirements

5.1 Test Condition & Setup:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW set to 30 kHz .VBW set to 100kHz. The Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.2) for this testing.

5.2 Test Instruments Configuration:



5.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	MY46471764	N9020A	2020/12/31	2021/12/31

5.4 Test Result:

Data Rate (Mbps)	Channel	Frequency (MHz)	Results (kHz)	Limit
1	0	2402	998.00	separated by 25 kHz or two-thirds of the 20 dB bandwidth
	39	2441	998.00	
	78	2480	996.00	
2	0	2402	1000.00	
	39	2441	1000.00	
	78	2480	1000.00	
3	0	2402	1000.00	
	39	2441	1000.00	
	78	2480	1000.00	

Data Rate : 1Mbps
(2402MHz)



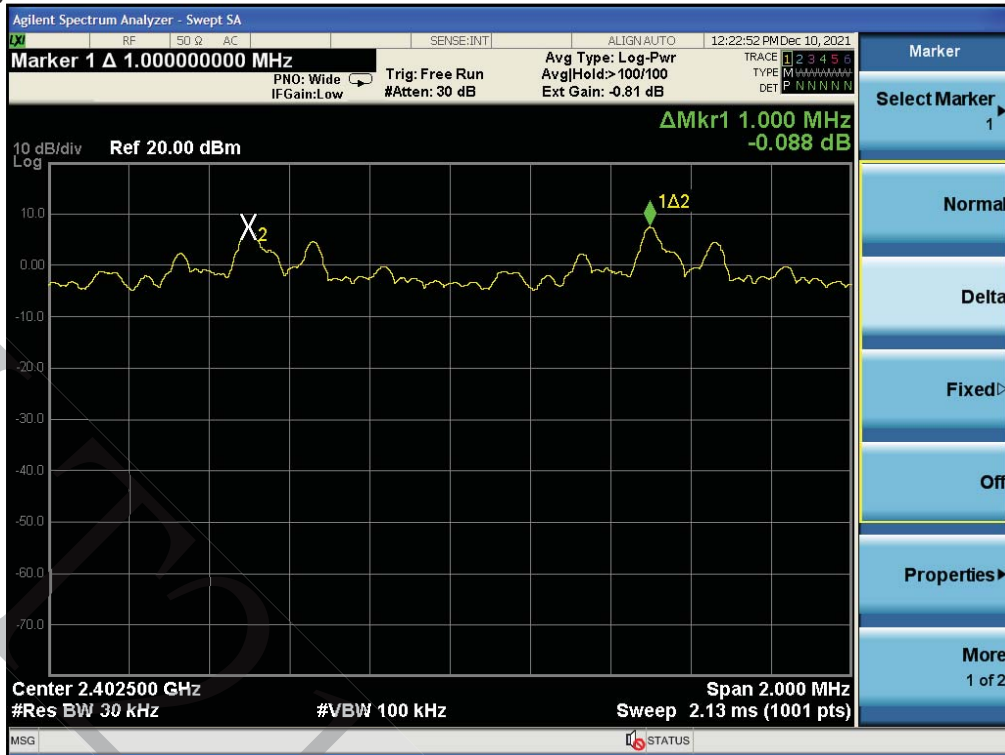
(2441MHz)



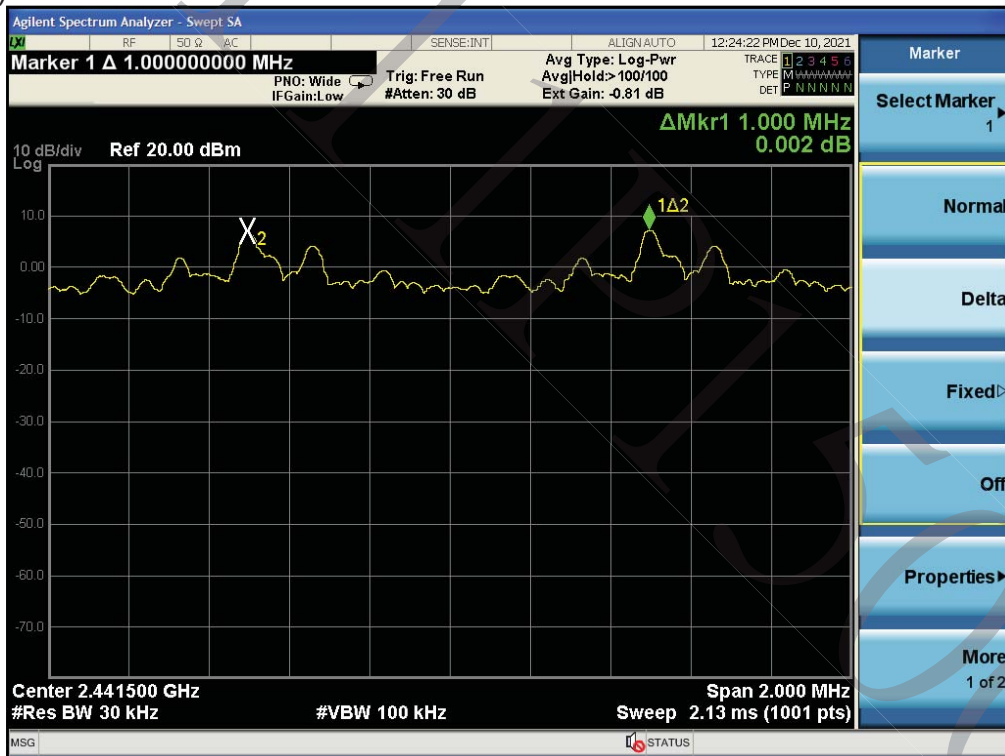
(2480MHz)



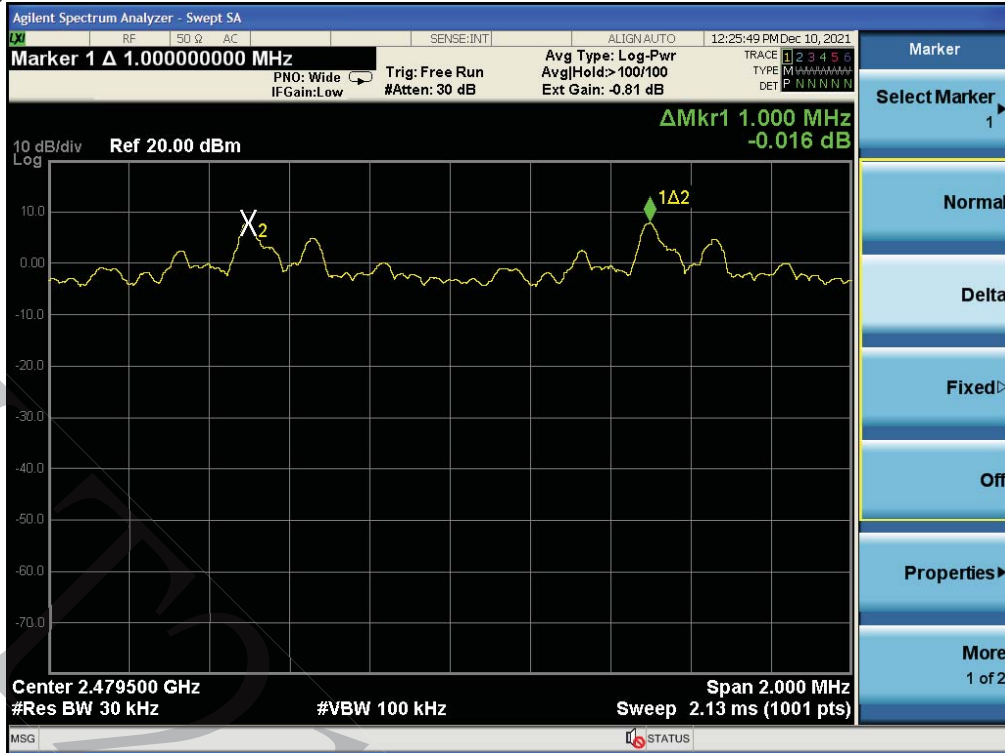
Data Rate : 2Mbps
(2402MHz)



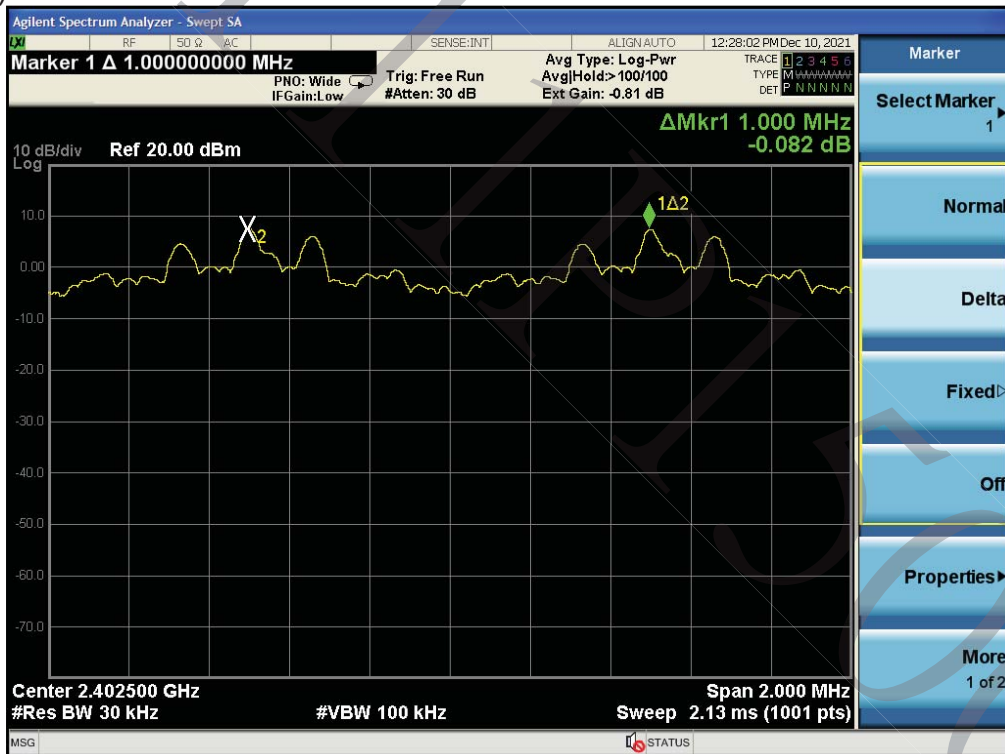
(2441MHz)



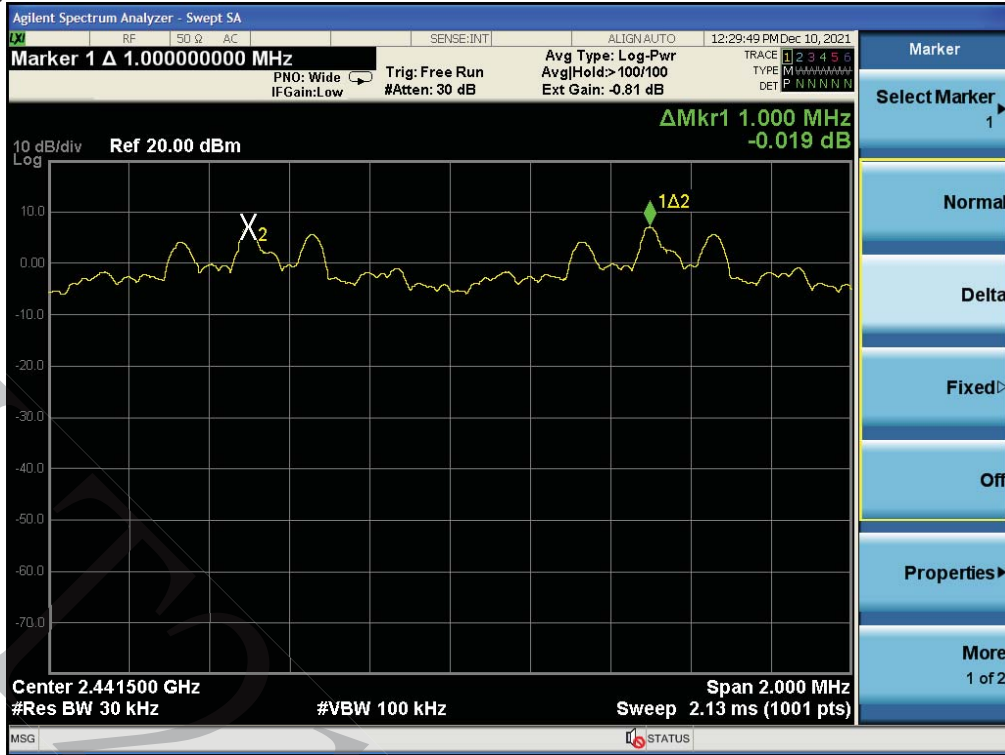
(2480MHz)



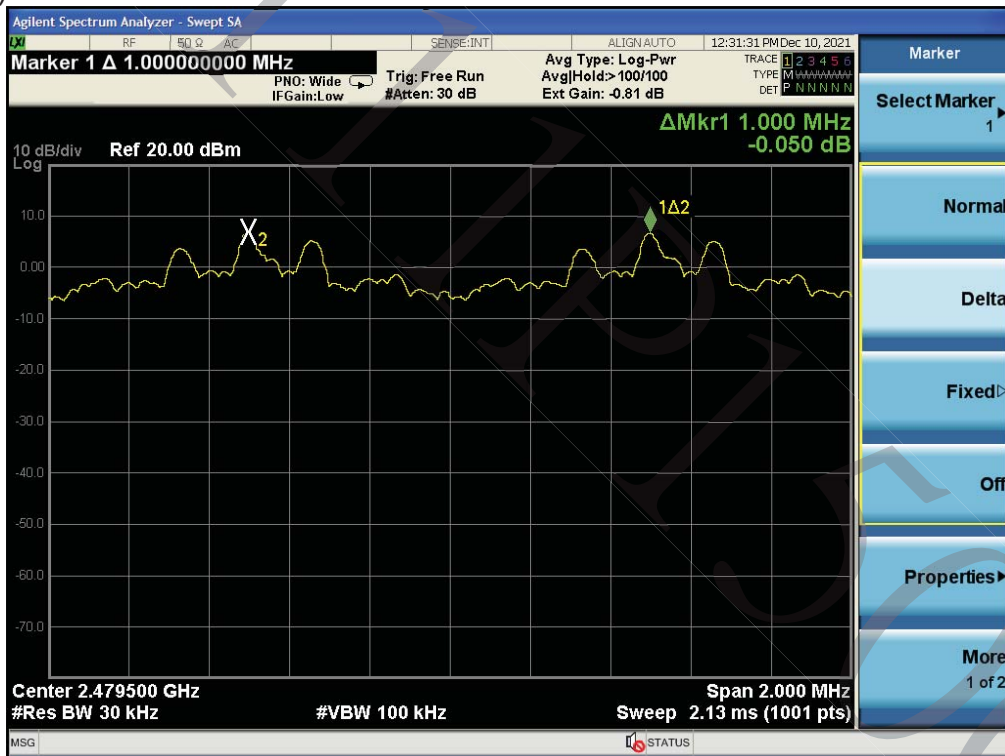
Data Rate : 3Mbps
(2402MHz)



(2441MHz)



(2480MHz)



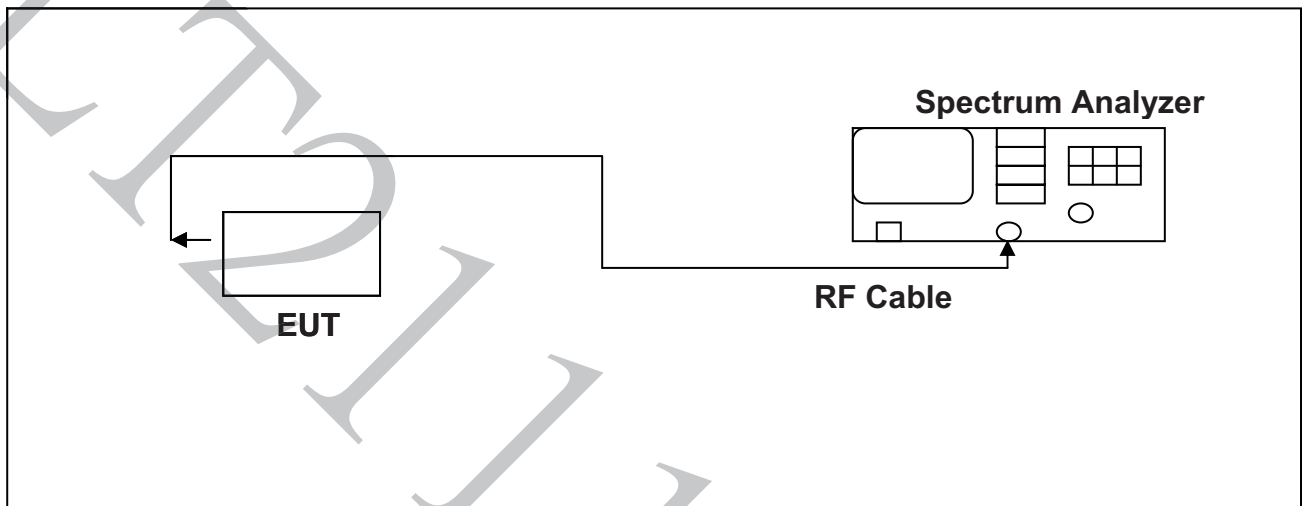
6. Number of Hopping Channels Requirements

6.1 Test Condition & Setup:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW set to 100 kHz and VBW set to 300 kHz. The hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.3) for this testing.

6.2 Test Instruments Configuration:



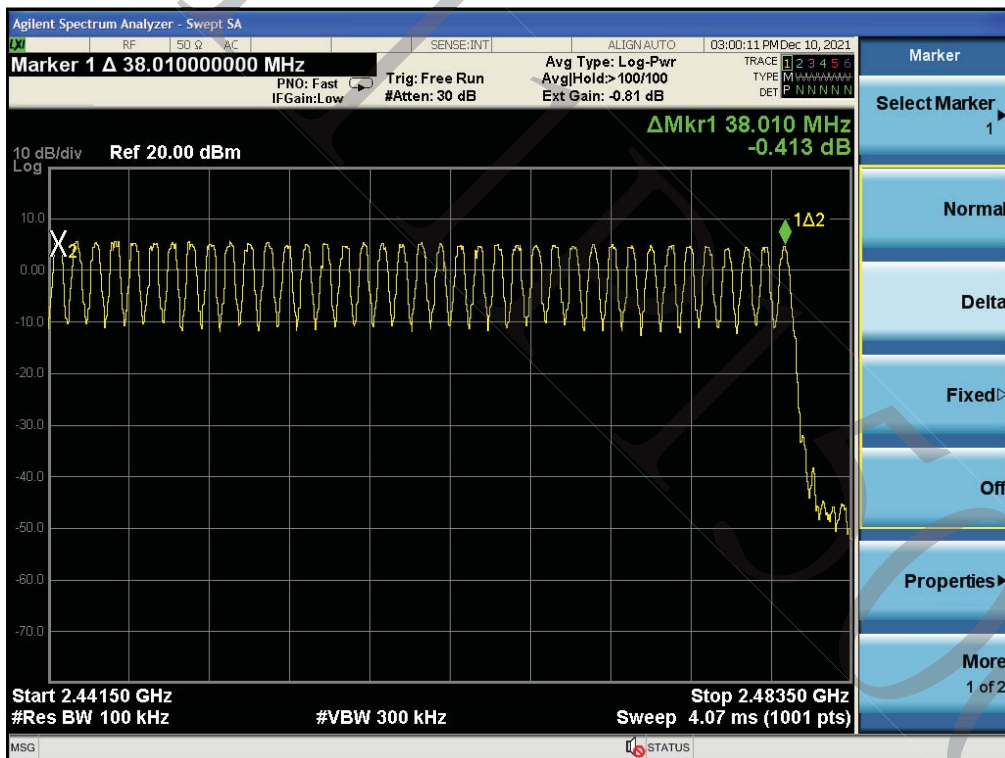
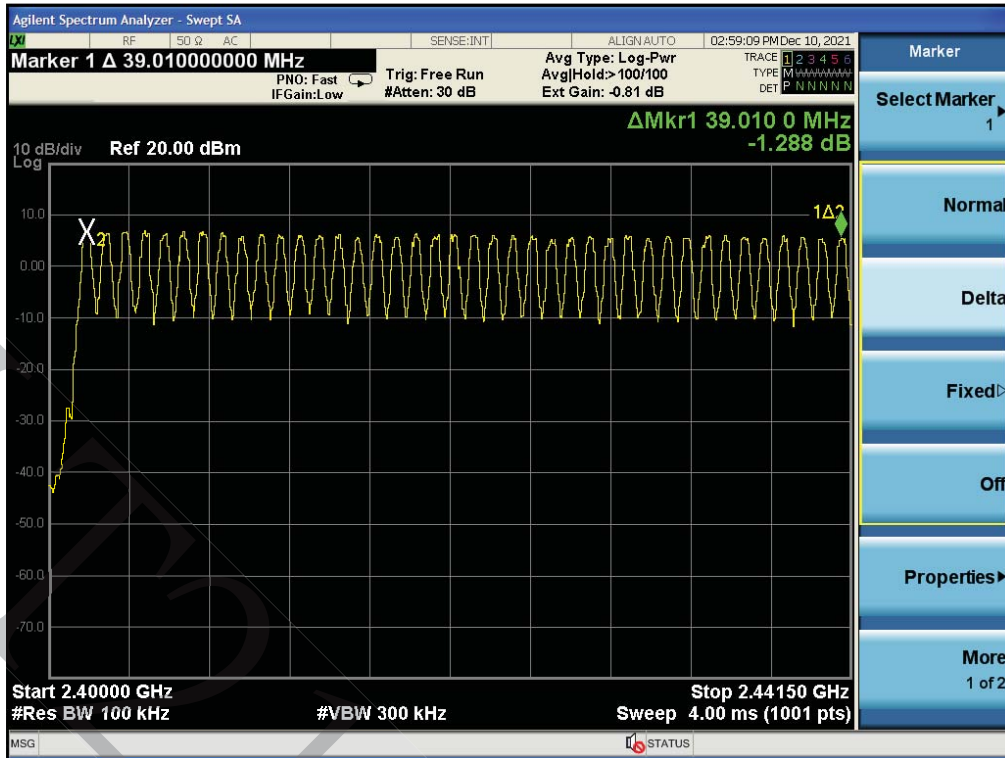
6.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	MY46471764	N9020A	2020/12/31	2021/12/31

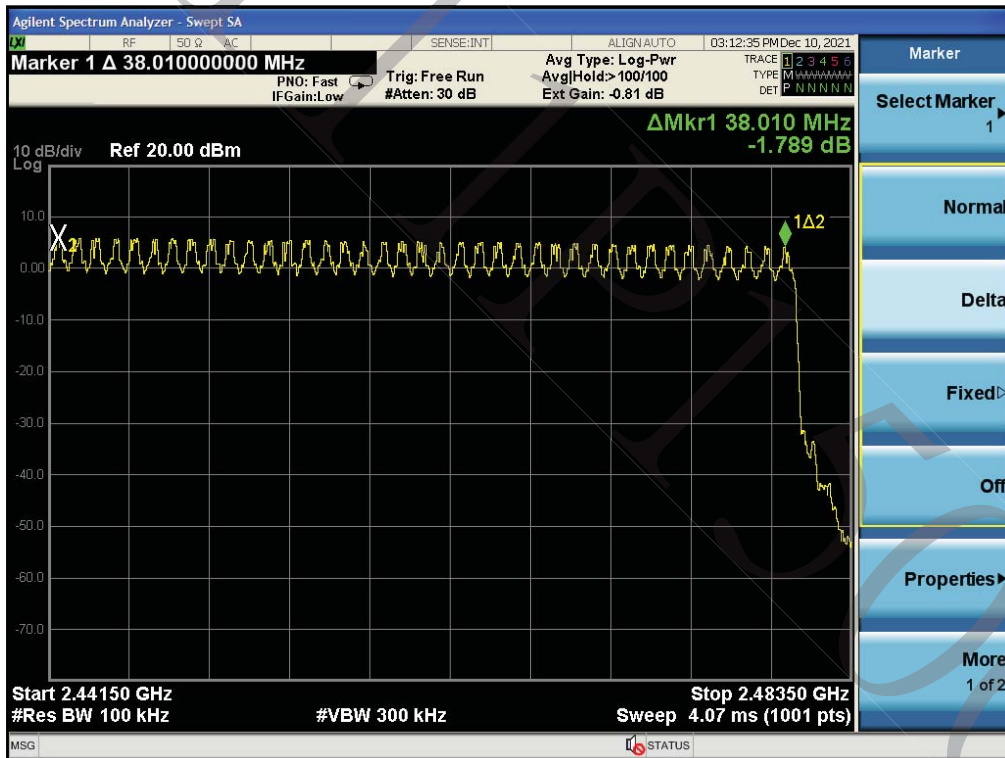
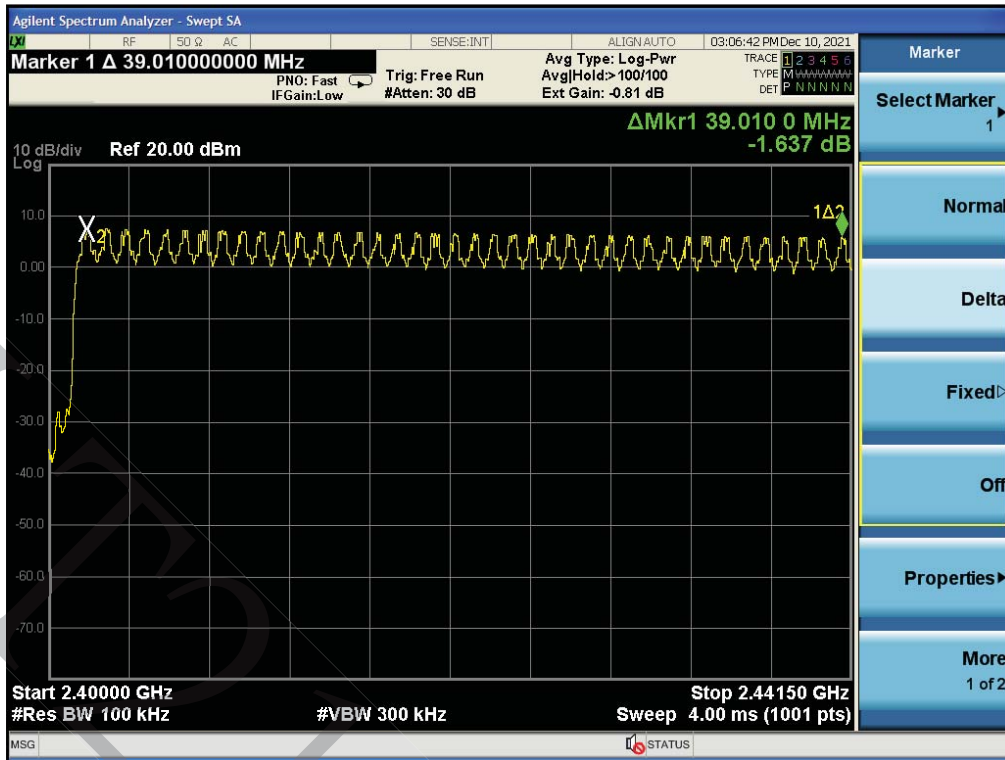
6.4 Test Result:

Result (Channel)	Limit (Channel)	Pass / Fail
79	≥ 15	Pass

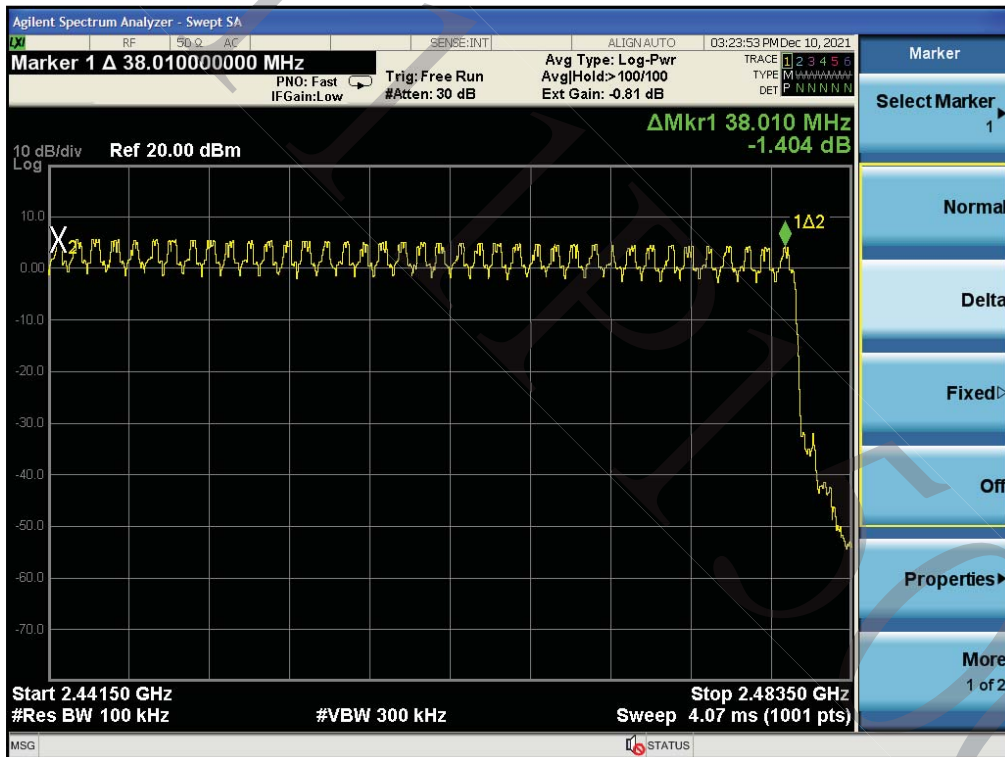
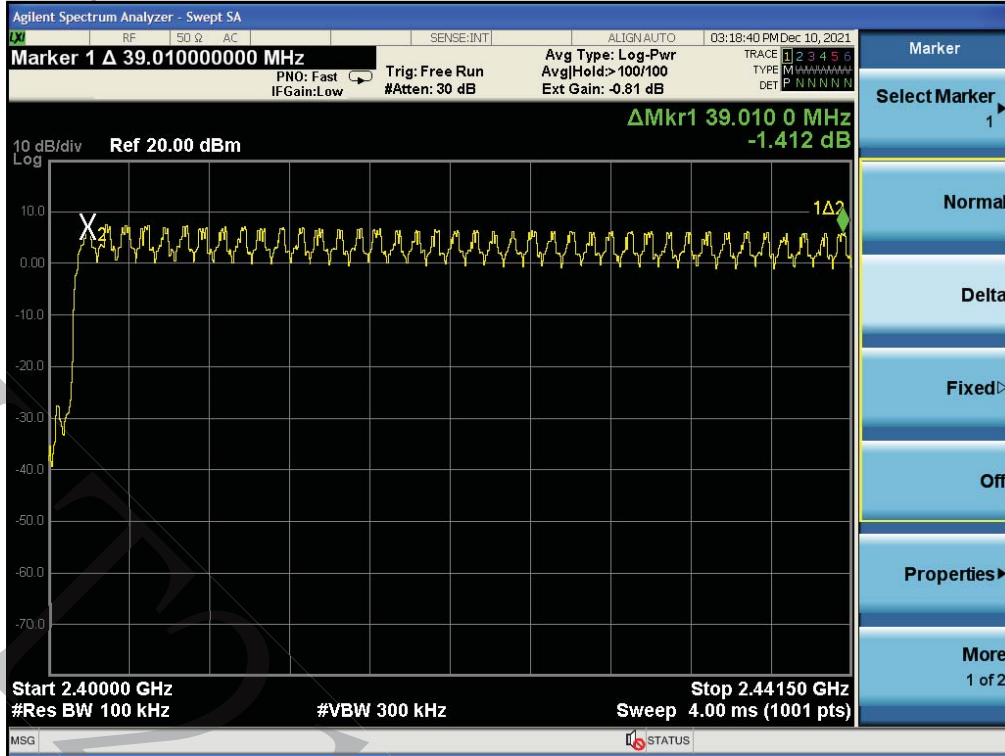
Data Rate : 1Mbps



Data Rate : 2Mbps



Data Rate : 3Mbps



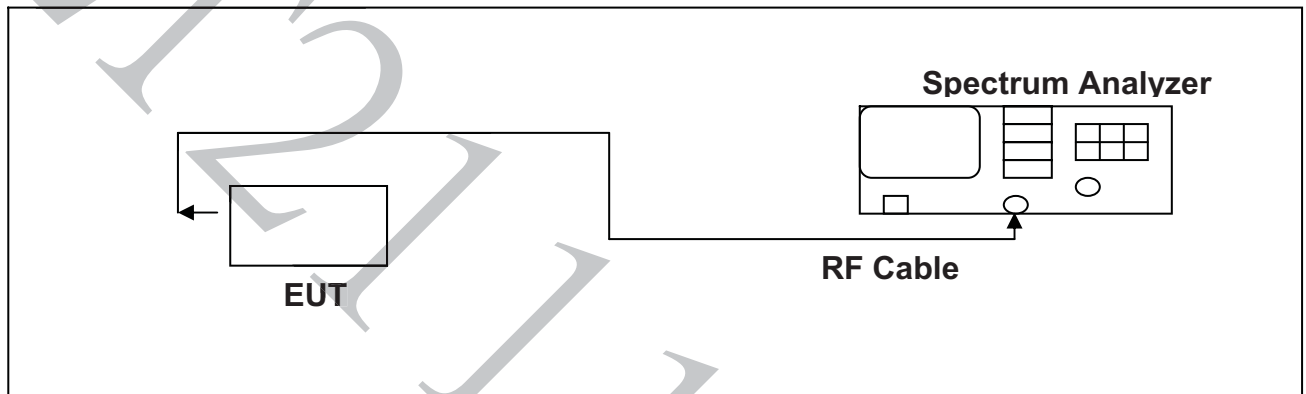
7. Dwell Time of Each Channel Requirements

7.1 Test Condition & Setup:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW set to 1000 kHz and VBW set to 1000 kHz. The hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.4) for this testing.

7.2 Test Instruments Configuration:



7.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	MY46471764	N9020A	2020/12/31	2021/12/31

7.4 Test Result:

Mode	Number of transmission per channel in the cycle times	Length of transmission m sec	Result m sec	Limit m sec
DH1	320	0.403	128.96	400
DH3	160	1.659	265.44	400
DH5	106.6	2.910	310.21	400

Normal mode test period: $0.4(\text{second}/\text{channel}) \times 79 \text{ channel} = 31.6 \text{ second}$

The DH1 packet can cover a single time slot. A maximum length packet has duration of 1 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is $1/1600$ seconds, or 0.625ms. DH1 Packet permit maximum $1600 / 79 / 2 = 10.12$ hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds.

The DH3 packet can cover up to 3 time slots. A maximum length packet has duration of 3 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is $3/1600$ seconds, or 1.875ms. DH3 Packet permit maximum $1600 / 79 / 4 = 5.06$ hops per second in each channel (3 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.

The DH5 packet can cover up to 5 time slots. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is $5/1600$ seconds, or 3.125ms. DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel (5 time slots TX, 1 time slot RX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds

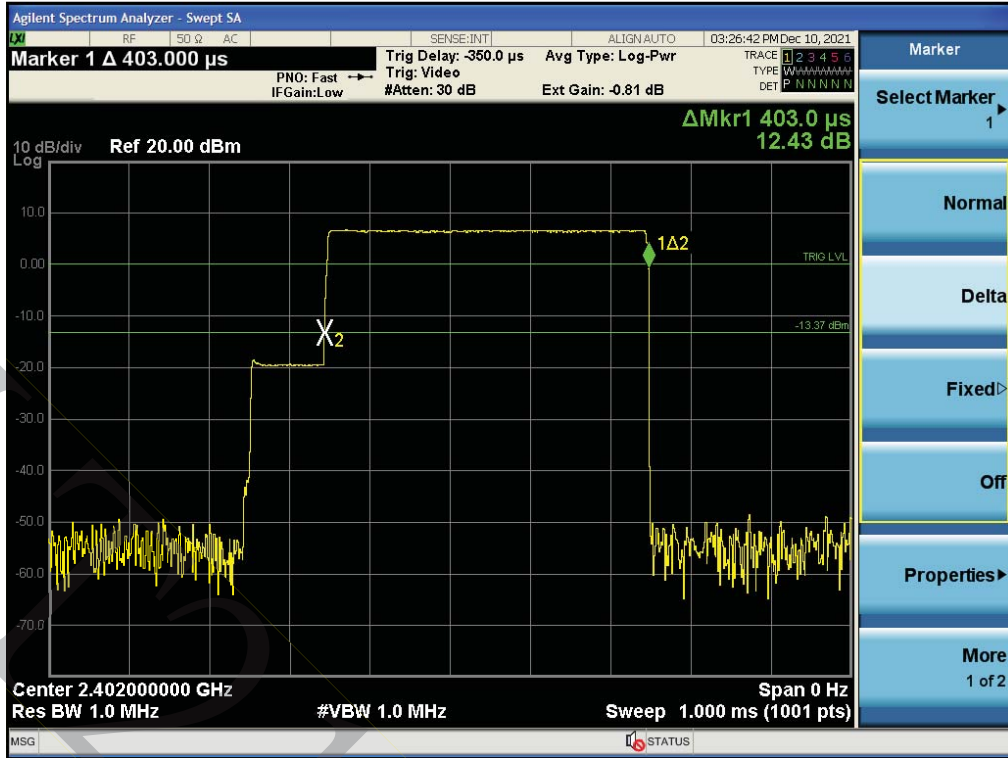
Example:

CH0,DH1 mode = $0.403 \text{ (ms)} \times (1600/79/2) \times 31.6 = 128.96 \text{ (ms)}$

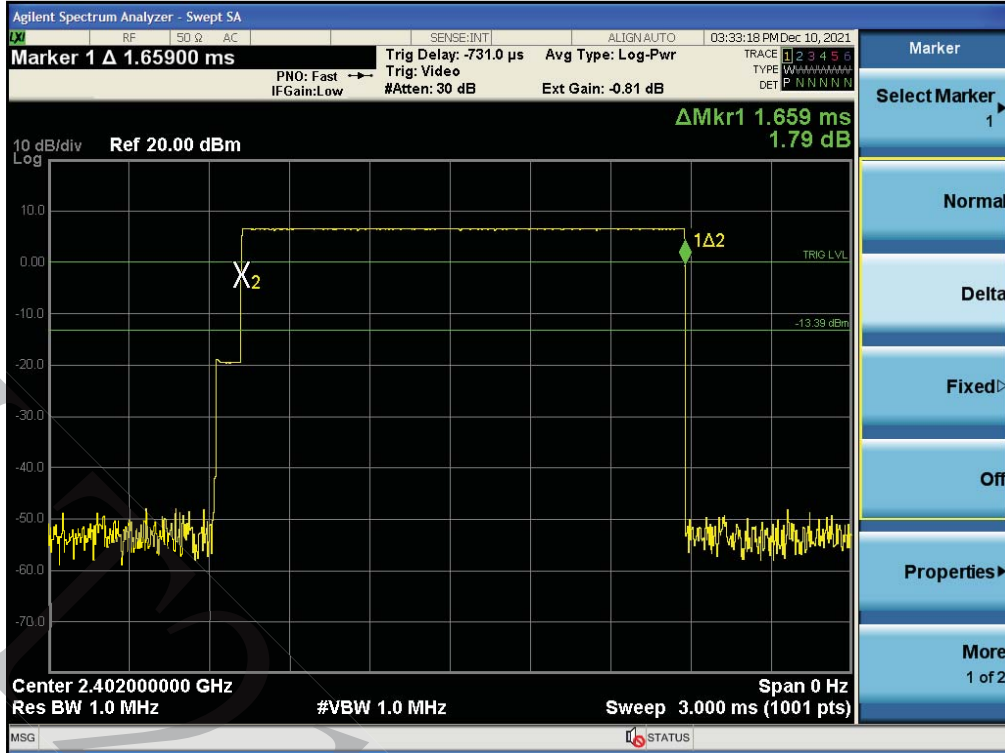
CH0,DH3 mode = $1.659 \text{ (ms)} \times (1600/79/4) \times 31.6 = 265.44 \text{ (ms)}$

CH0,DH5 mode = $2.910 \text{ (ms)} \times (1600/79/6) \times 31.6 = 310.21 \text{ (ms)}$

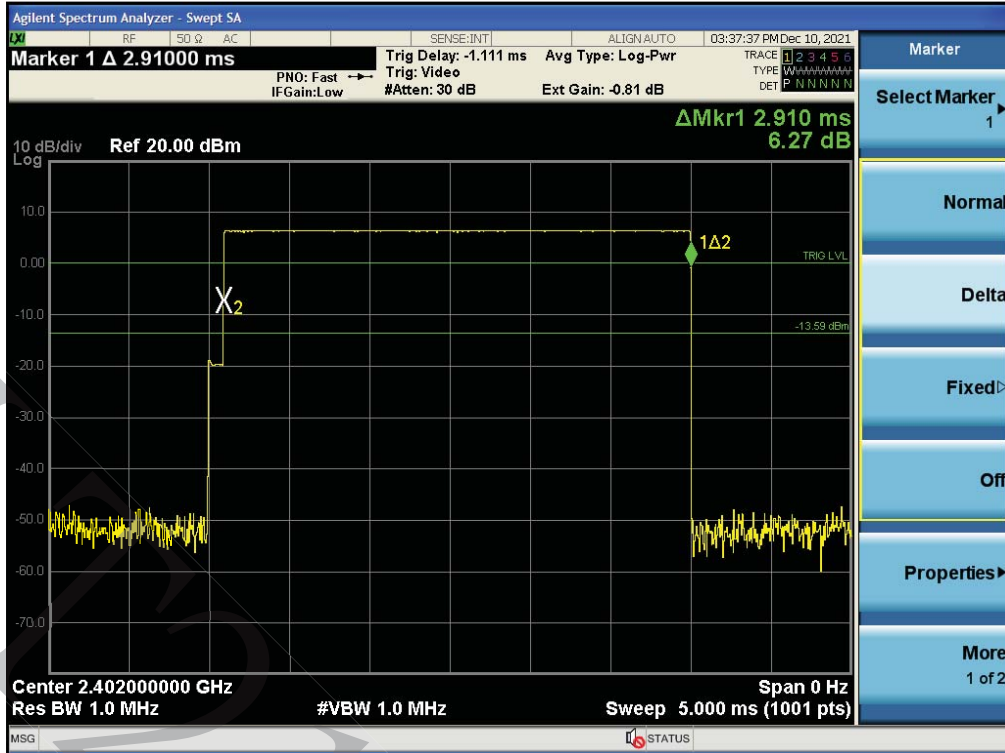
DH1



DH3



DH5



8. Out of Band Conducted Spurious Emissions Requirements

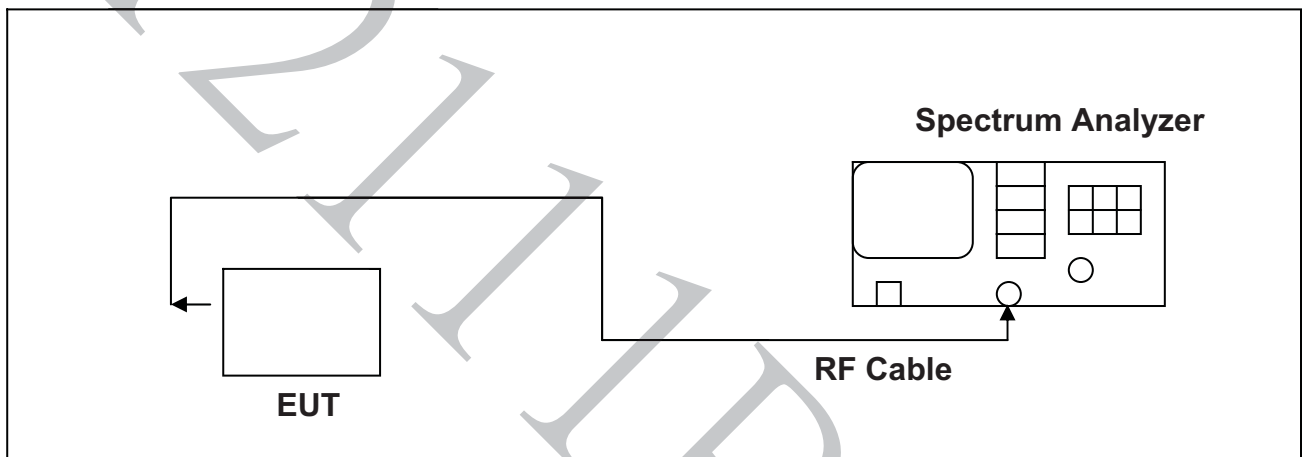
8.1 Test Condition & Setup:

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band. The test was performed at 2 channels (Channel 0, 78)

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.8) for this testing.

8.2 Test Instruments Configuration:



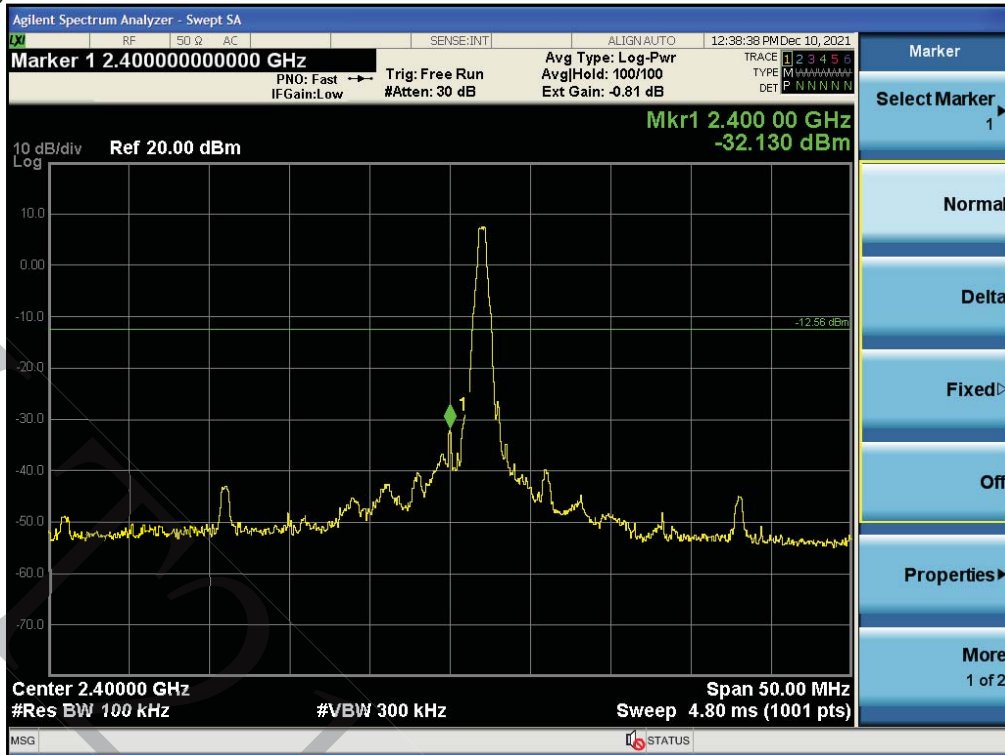
8.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	MY46471764	N9020A	2020/12/31	2021/12/31

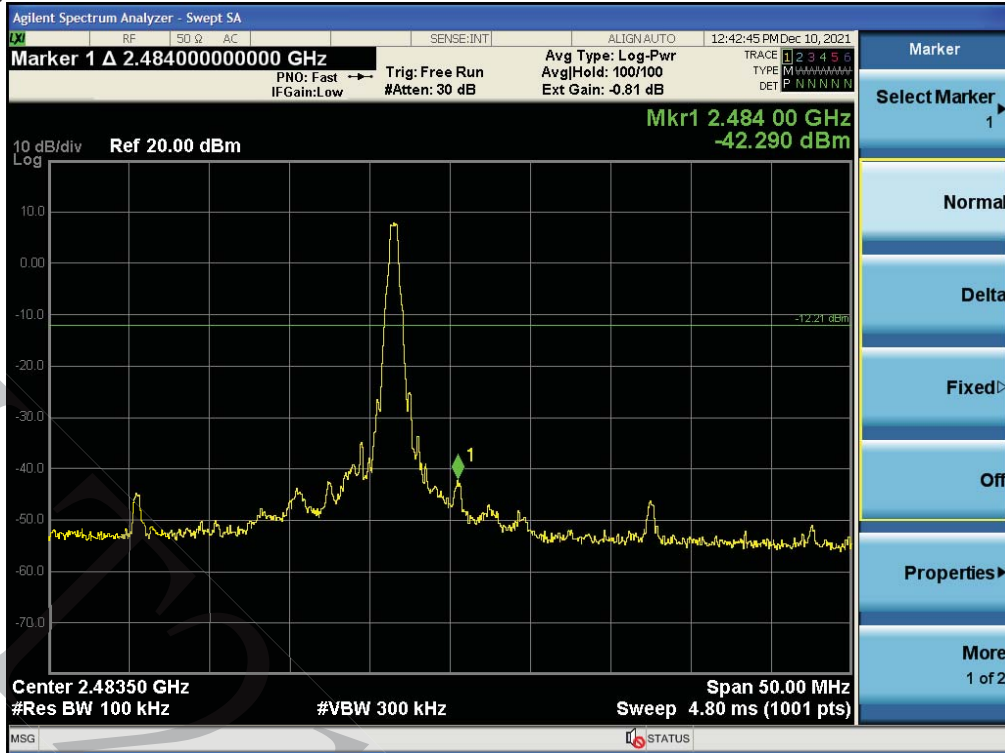
8.4 Test Result:

Refer to attached data sheets. Data shows out of band emissions are suppressed well below the -20 dB minimum required by the Rules.

Data Rate : 1Mbps
(2402MHz)



(2480MHz)



Data Rate : 2Mbps
(2402MHz)

