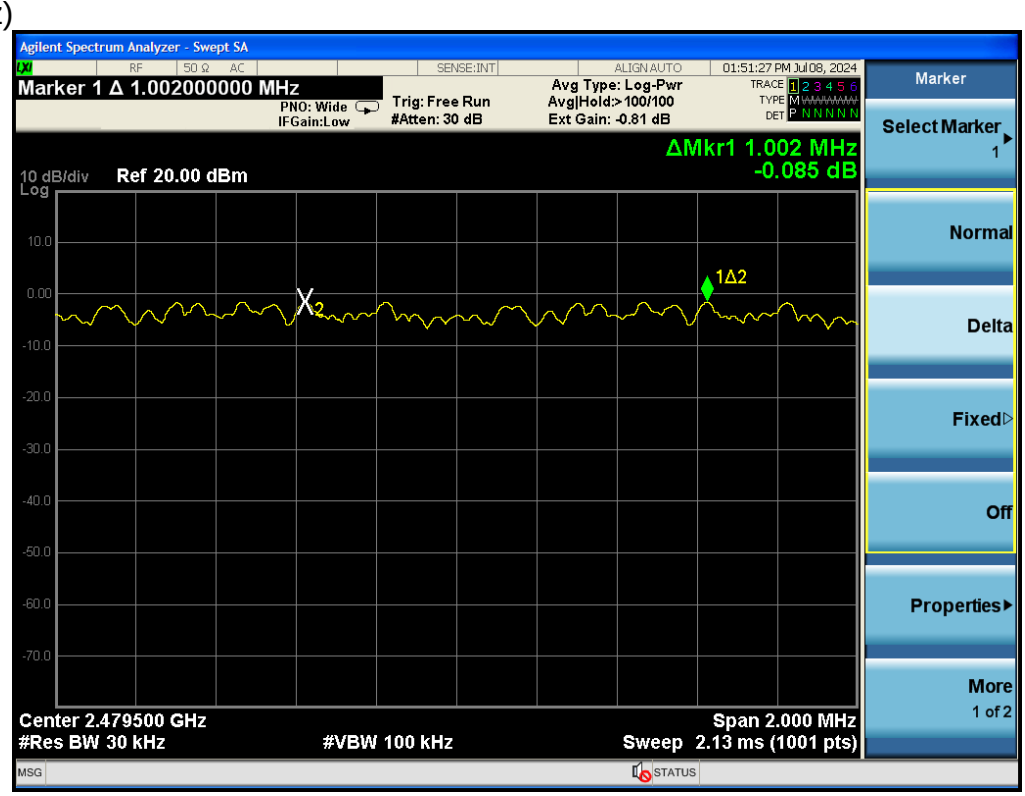
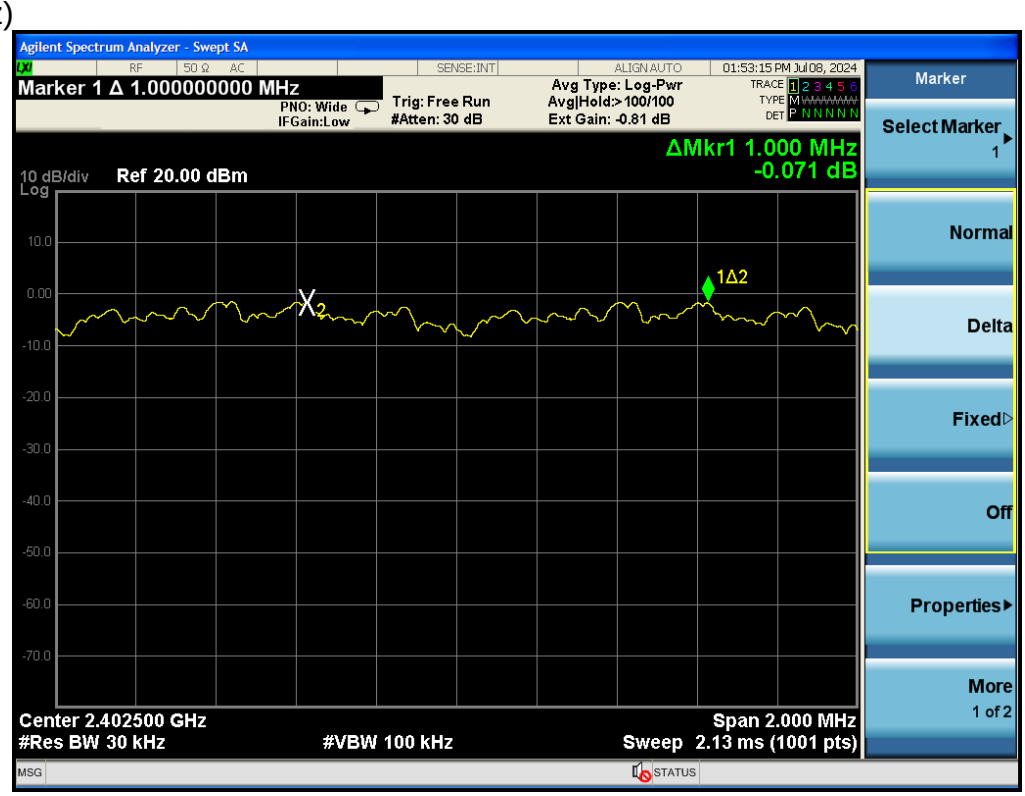
(2480MHz)

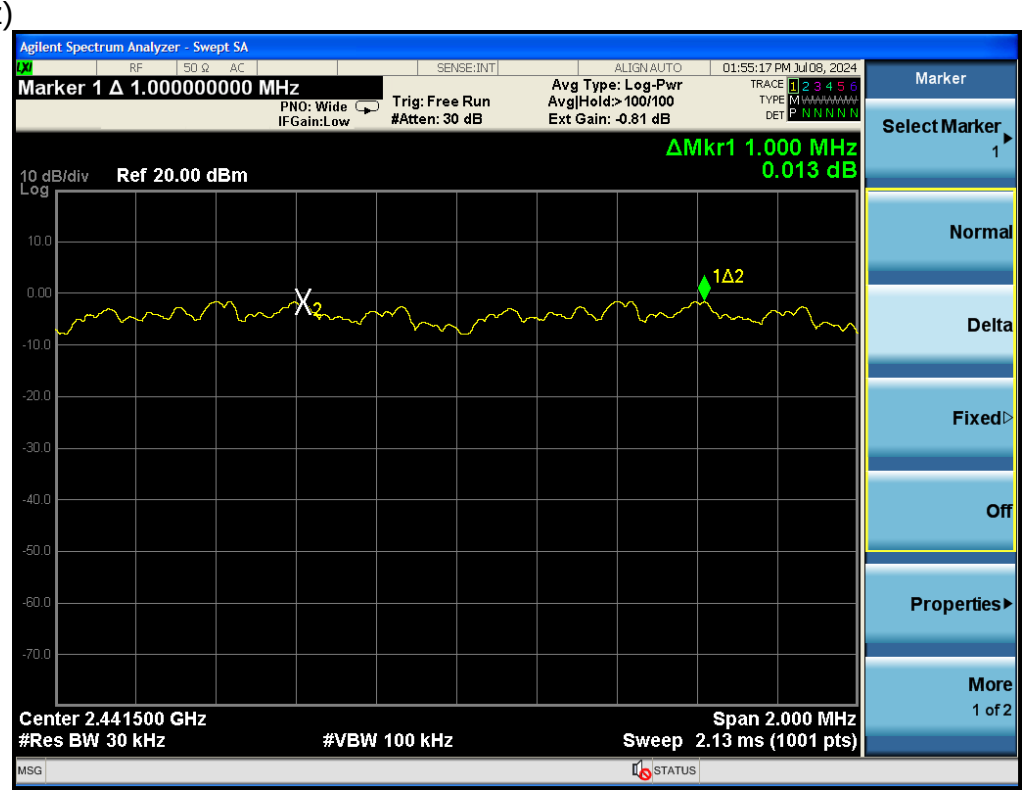


Data Rate : 3Mbps

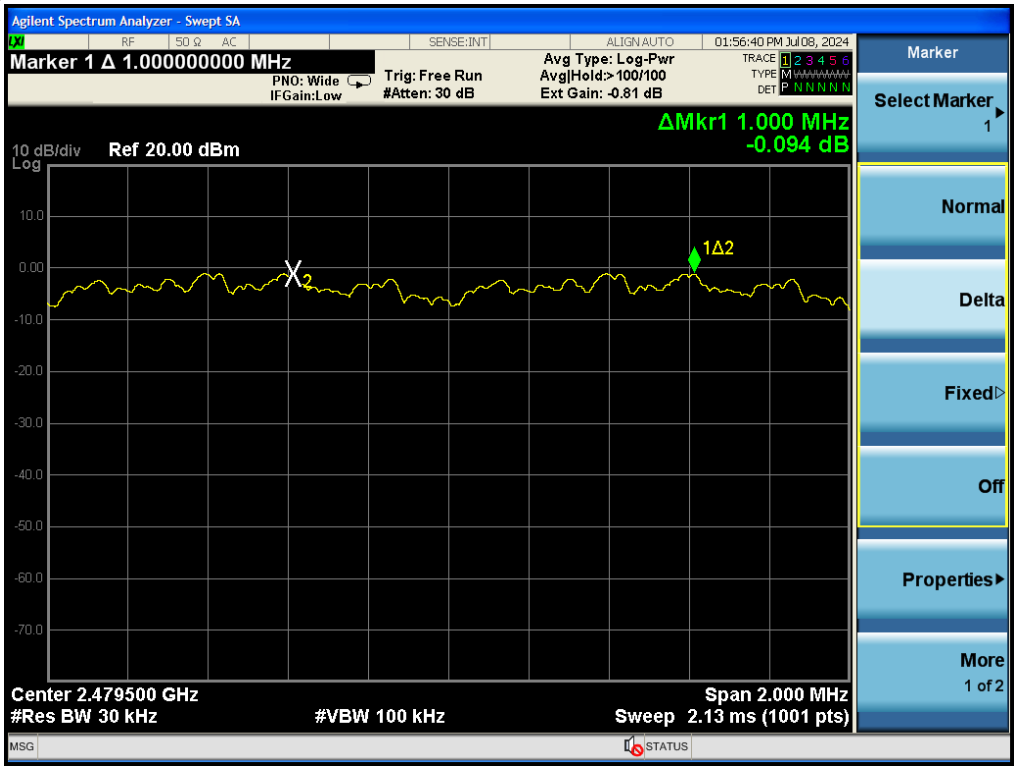
(2402MHz)



(2441MHz)



(2480MHz)



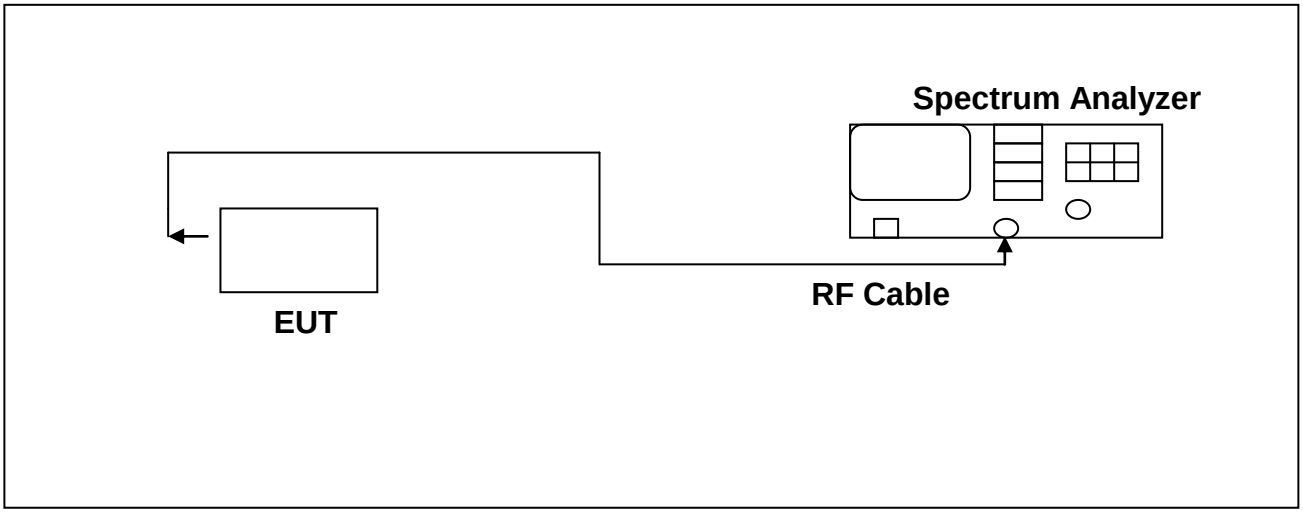
6. Number of Hopping Channels Requirements

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:



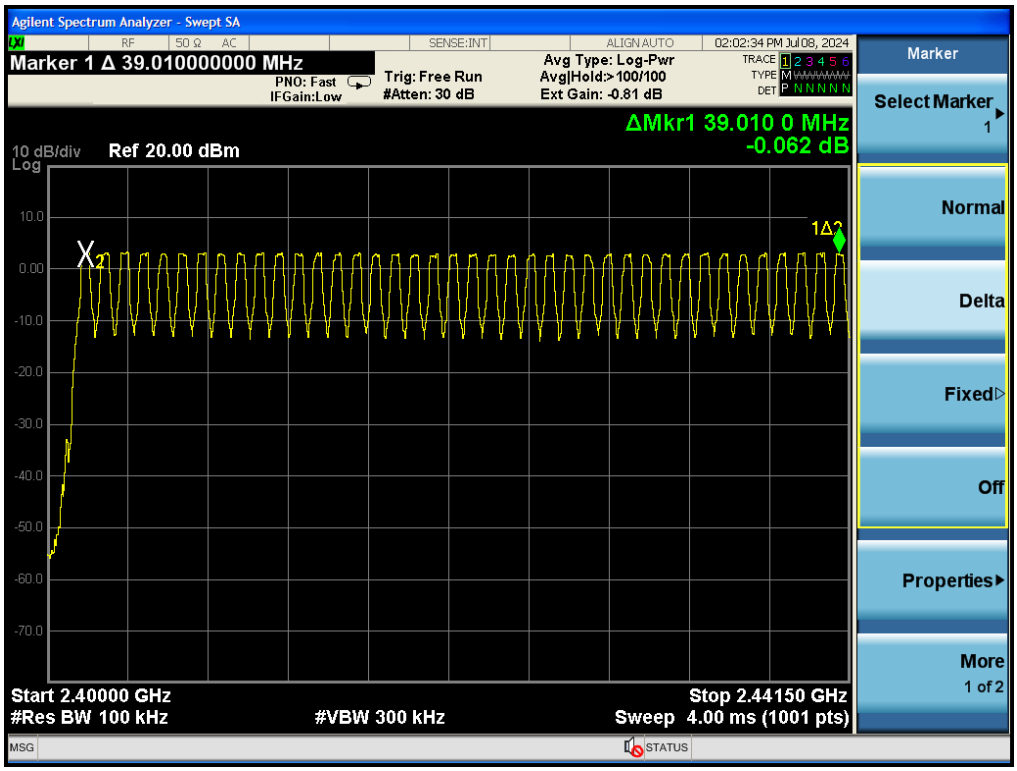
6.3 Test Equipment List:

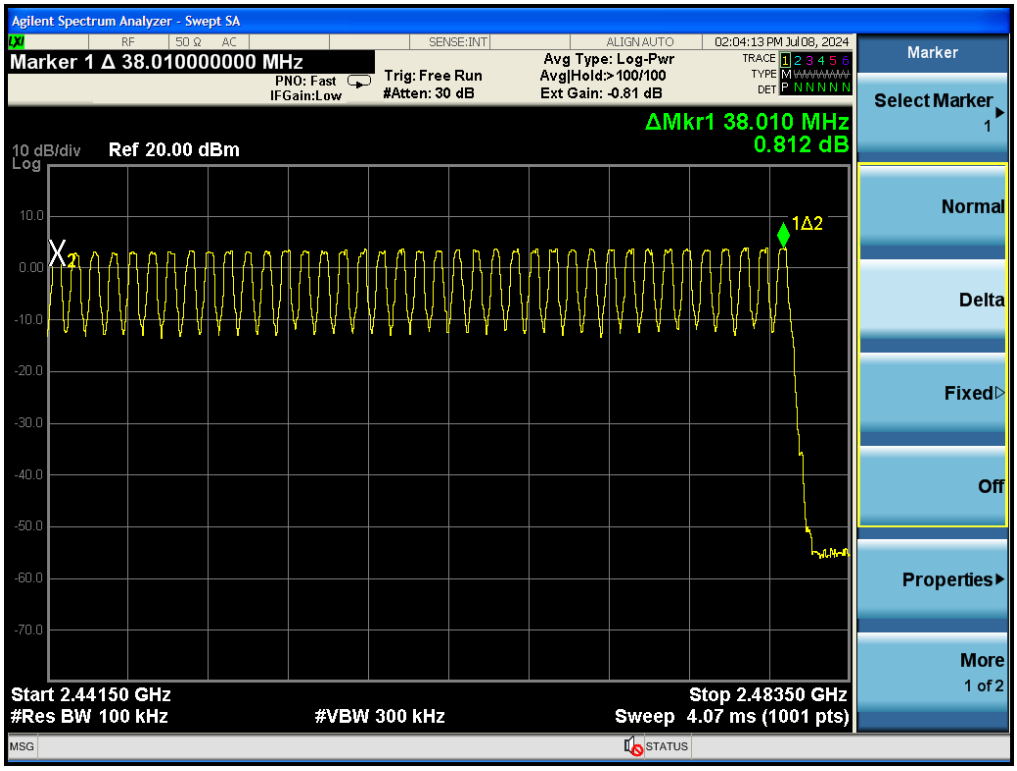
Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	MY46471764	N9020A	2023/12/22	2024/12/22

6.4 Test Result:

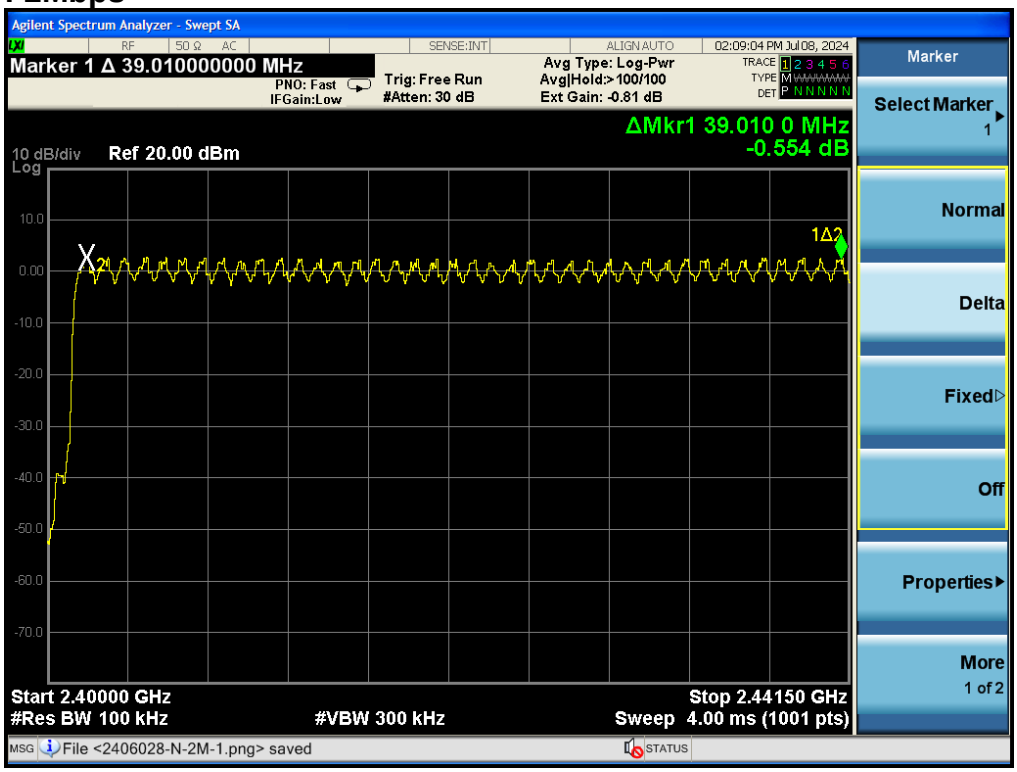
Result (Channel)	Limit (Channel)	Pass / Fail
79	≧15	Pass

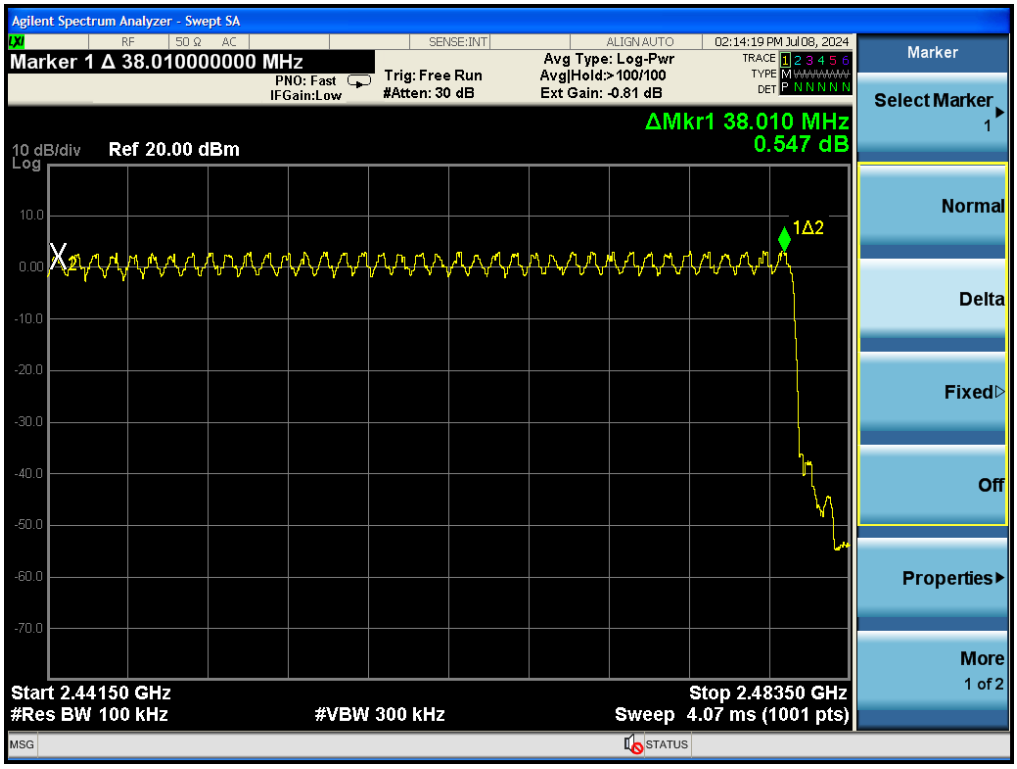
Data Rate : 1Mbps



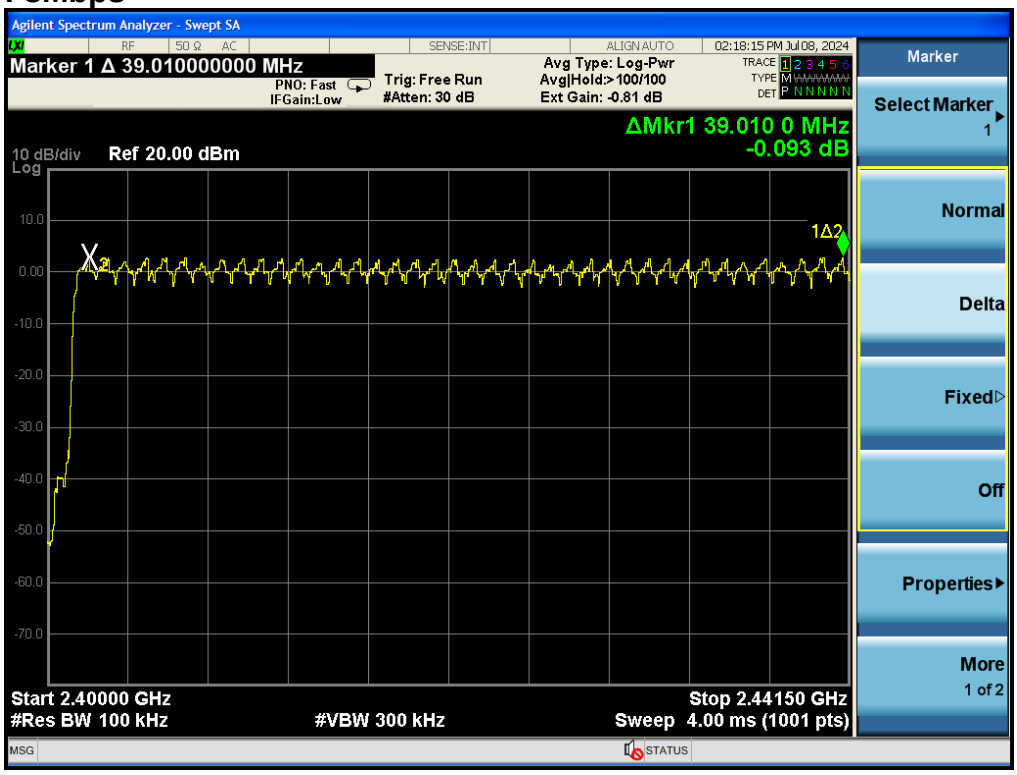


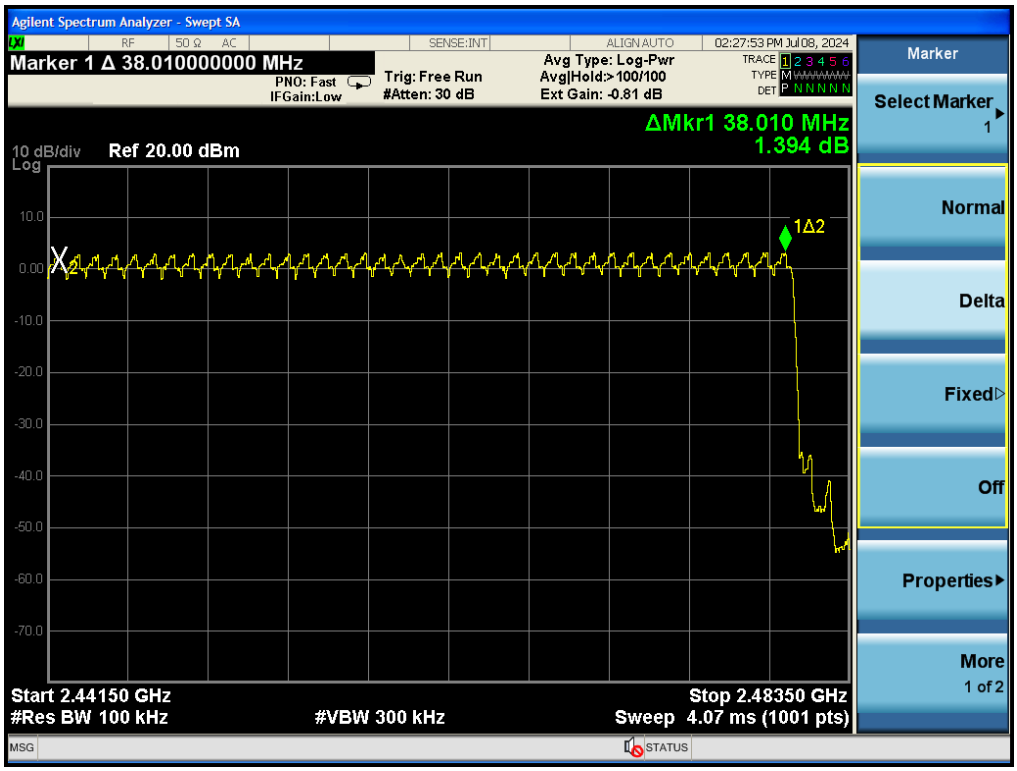
Data Rate : 2Mbps





Data Rate : 3Mbps





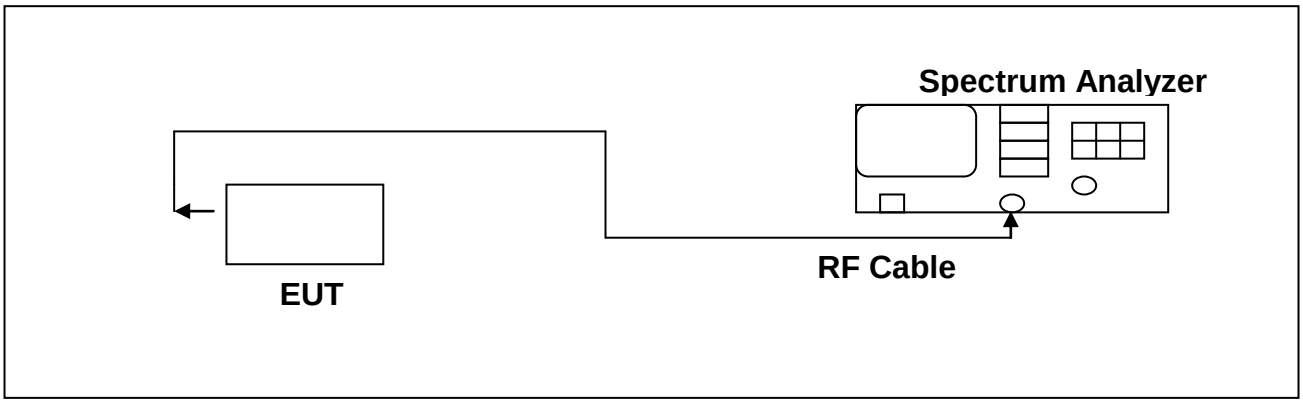
7. Dwell Time of Each Channel Requirements

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	2023/12/22	2024/12/22

7.4 Test Result:

Mode	Number of transmission per channel in the cycle times times	Length of transmission m sec	Result m sec	Limit m sec
DH1	320	0.377	120.64	400
DH3	160	1.632	261.12	400
DH5	106.6	2.880	307.01	400

Normal mode test period: 0.4(second/ channel) x 79 channel= 31.6 second

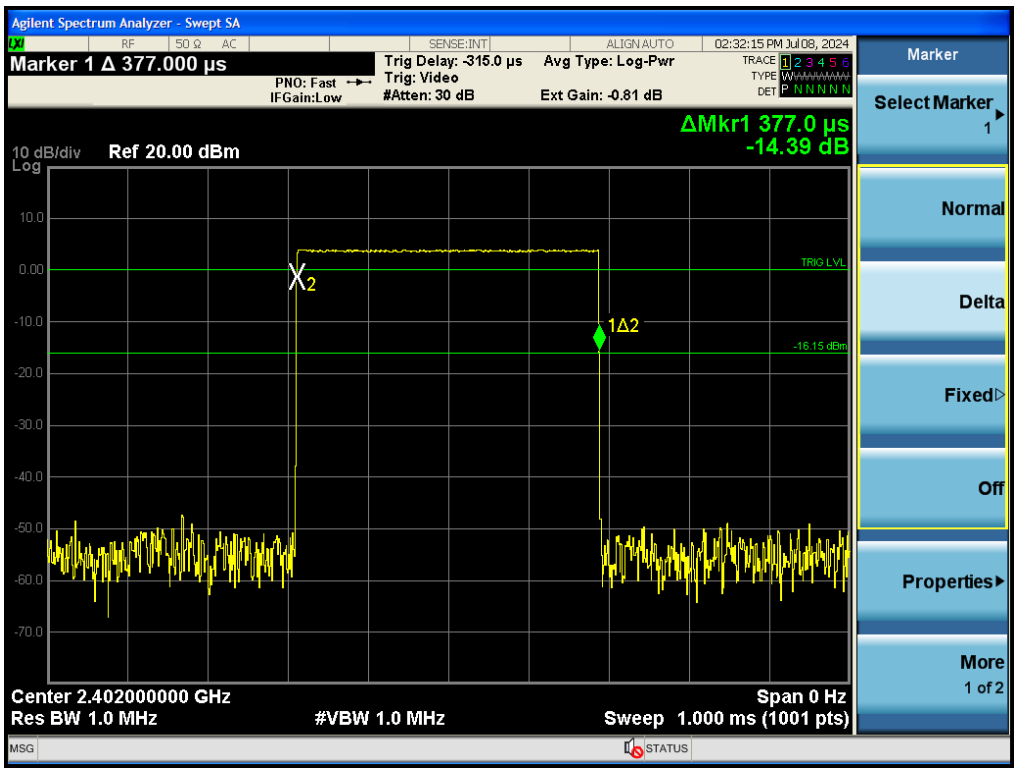
The DH1 packet can cover a single time slot. A maximum length packet has duration of 1 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 1/1600 seconds, or 0.625ms. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 10.12 x 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 x 31.6 = 160 within 31.6 seconds.

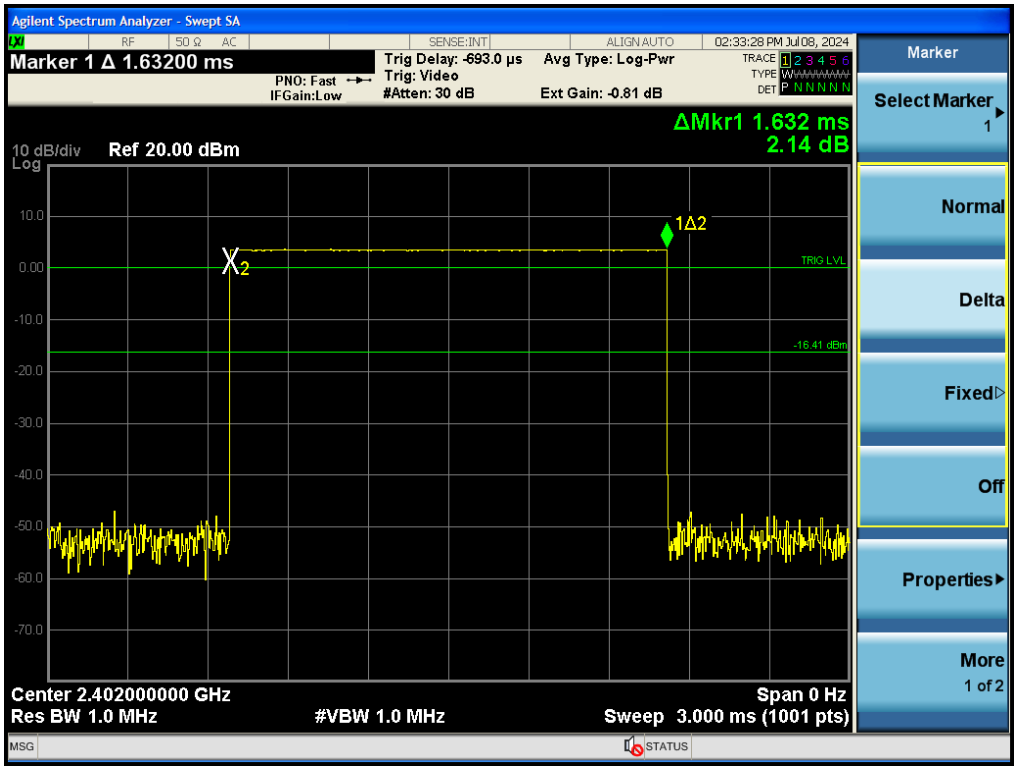
The DH5 packet can cover up to 5 time slots. A maximum length packet has duration of 5 time slots. The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots TX, 1 time slot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

Example:
CH0,DH1 mode = 0.377 (ms)*(1600/79/2)*31.6 = 120.64 (ms)
CH0,DH3 mode = 1.632 (ms)*(1600/79/4)*31.6 = 261.12 (ms)
CH0,DH5 mode = 2.880 (ms)*(1600/79/6)*31.6 = 307.01 (ms)

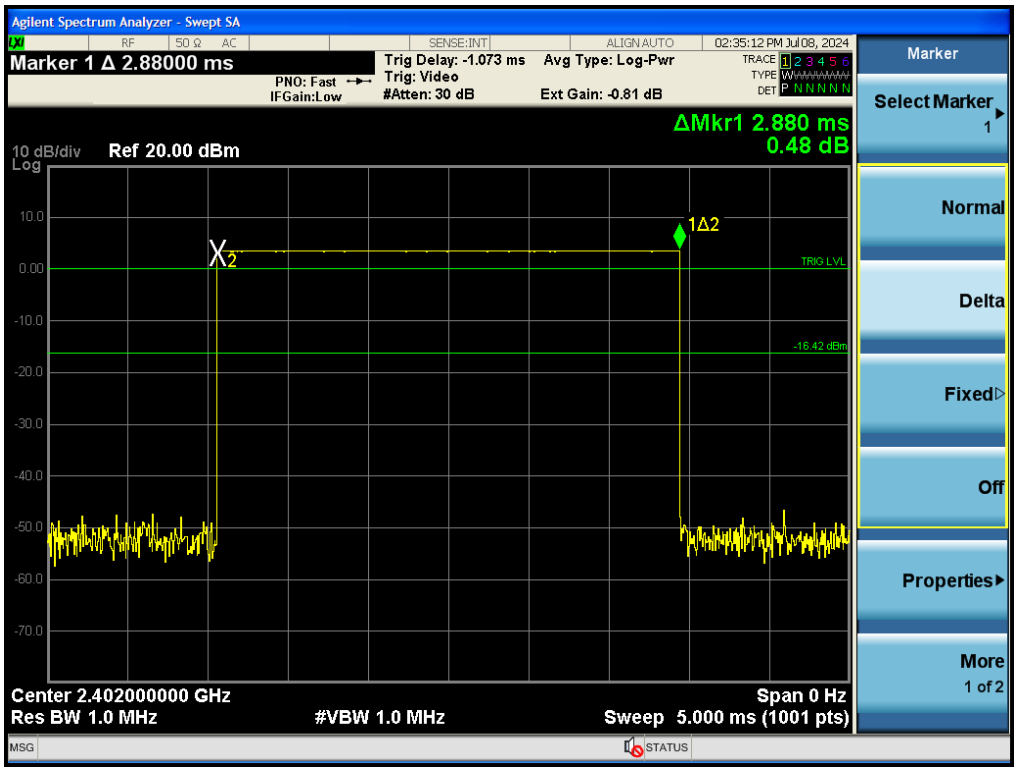
DH1


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 377.000 µs
PNO: Fast
IFGain:Low
Trig Delay: -315.0 µs
Trig: Video
#Atten: 30 dB
Avg Type: Log-Pwr
Ext Gain: -0.81 dB
02:32:15 PM Jul 08, 2024
ΔMkr1 377.0 µs
-14.39 dB
10 dB/div
Log
Ref 20.00 dBm
TRIG LVL
-16.15 dBm
X2
1Δ2
Center 2.402000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

DH3


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.63200 ms
PNO: Fast
IFGain:Low
Trig Delay: -693.0 µs
Trig: Video
#Atten: 30 dB
Avg Type: Log-Pwr
Ext Gain: -0.81 dB
02:33:28 PM Jul 08, 2024
ΔMkr1 1.632 ms
2.14 dB
10 dB/div
Log
Ref 20.00 dBm
1Δ2
X2
TRIG LVL
-16.41 dBm
Center 2.402000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 3.000 ms (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

DH5


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 2.88000 ms
PNO: Fast
IFGain:Low
Trig Delay: -1.073 ms
Trig: Video
#Atten: 30 dB
Avg Type: Log-Pwr
Ext Gain: -0.81 dB
02:35:12 PM Jul 08, 2024
ΔMkr1 2.880 ms
0.48 dB
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
TRIG LVL
-16.42 dBm
X2
1Δ2
Center 2.402000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS

8. Out of Band Conducted Spurious Emissions Requirements

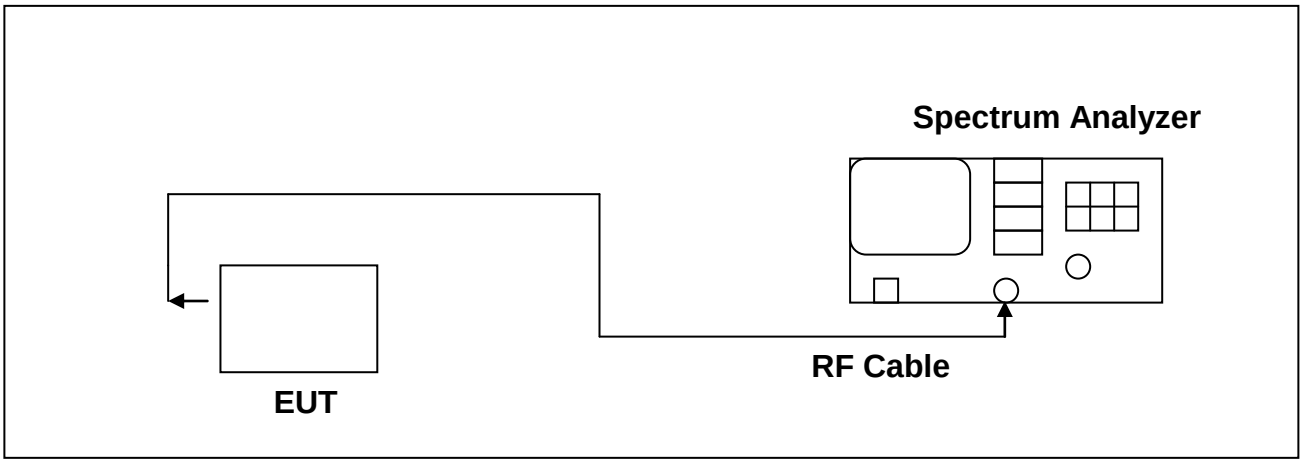
8.1 Test Condition & Setup:

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:



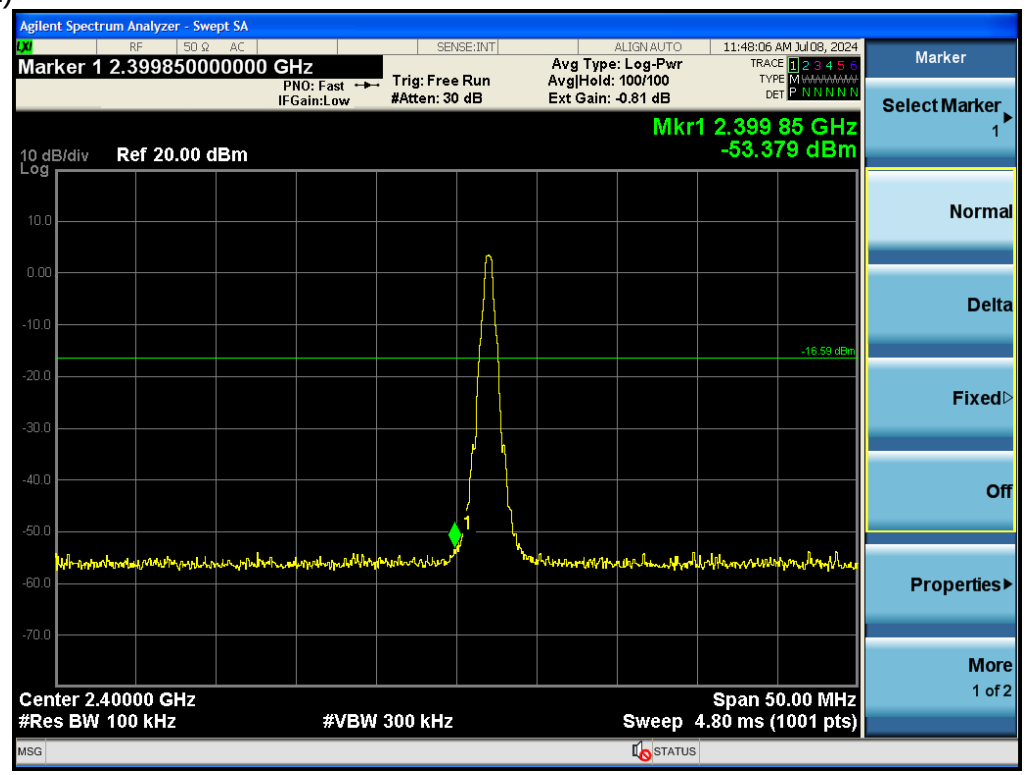
8.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	MY46471764	N9020A	2023/12/22	2024/12/22

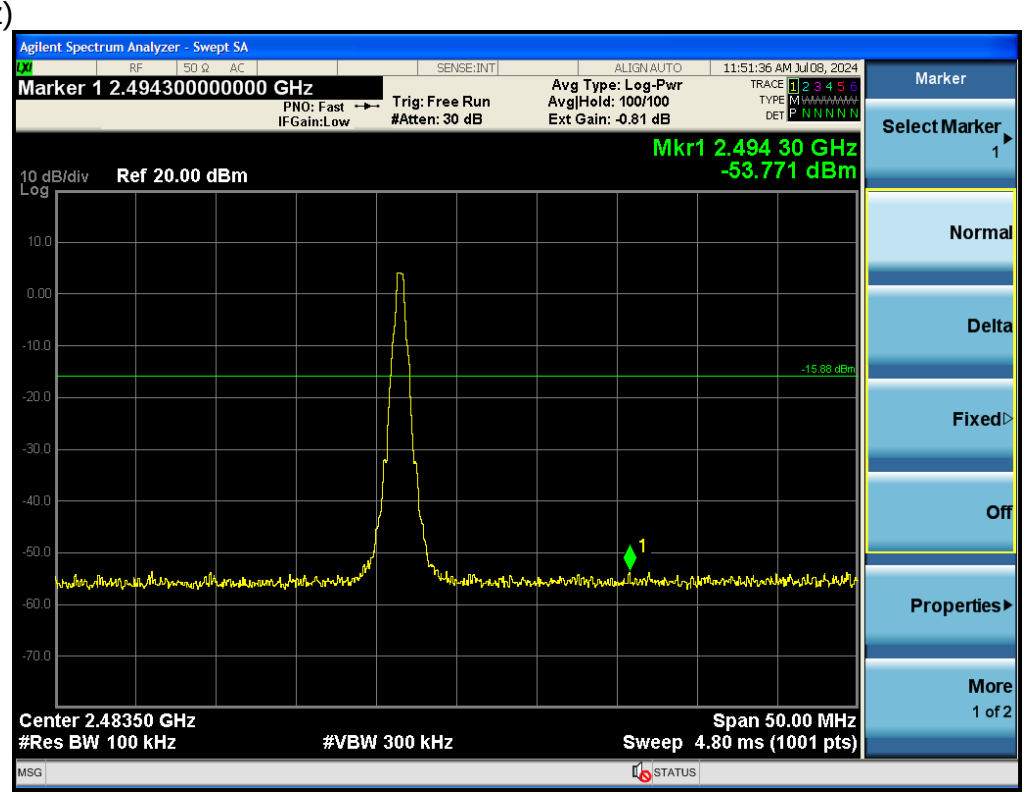
8.4 Test Result:

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)

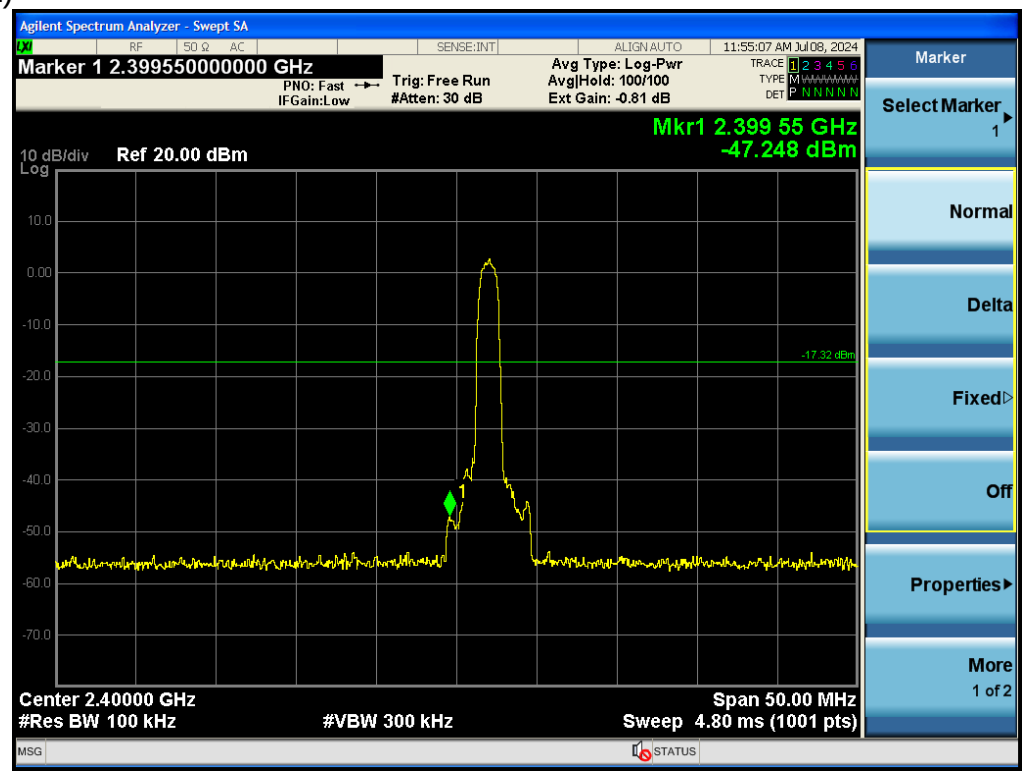


(2480MHz)

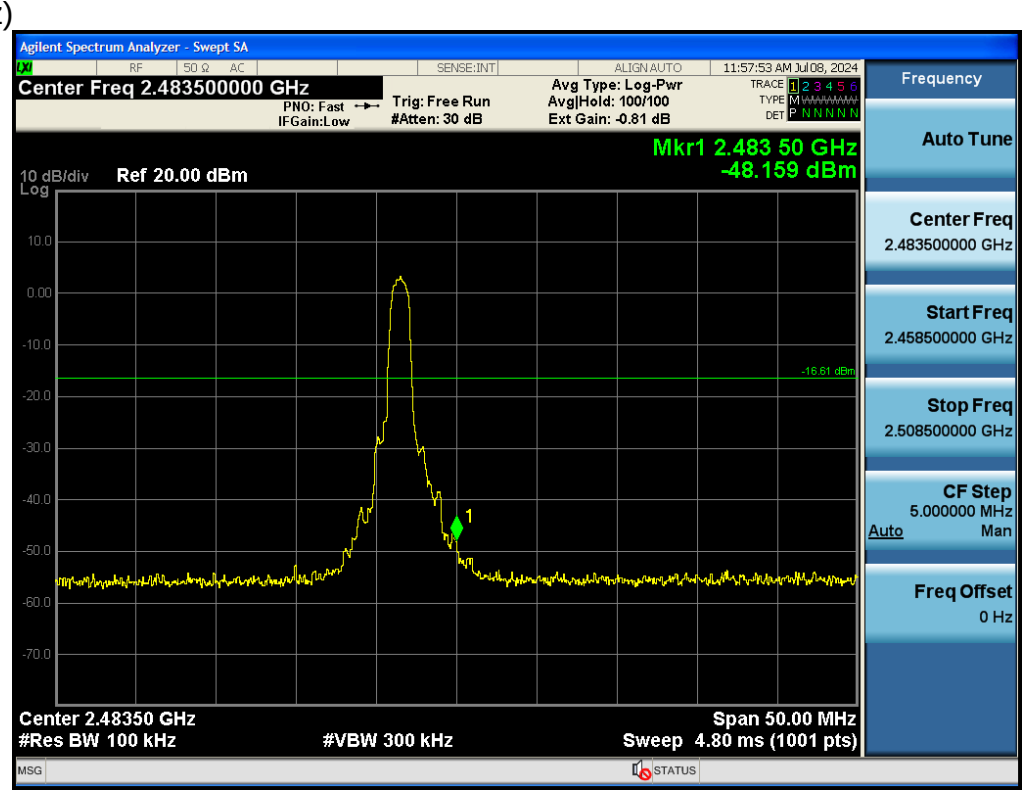

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.494300000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
Ext Gain: -0.81 dB
11:51:36 AM Jul 08, 2024
Mkr1 2.494 30 GHz
-53.771 dBm
10 dB/div
Log
Ref 20.00 dBm
-15.88 dBm
Center 2.48350 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 50.00 MHz
Sweep 4.80 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 1 24.725330000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 11/100
Ext Gain: -0.81 dB
11:53:25 AM Jul 08, 2024
Mkr1 24.725 GHz
-37.002 dBm
10 dB/div
Log
Ref 20.00 dBm
-15.88 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.39 s (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

Data Rate : 2Mbps
(2402MHz)

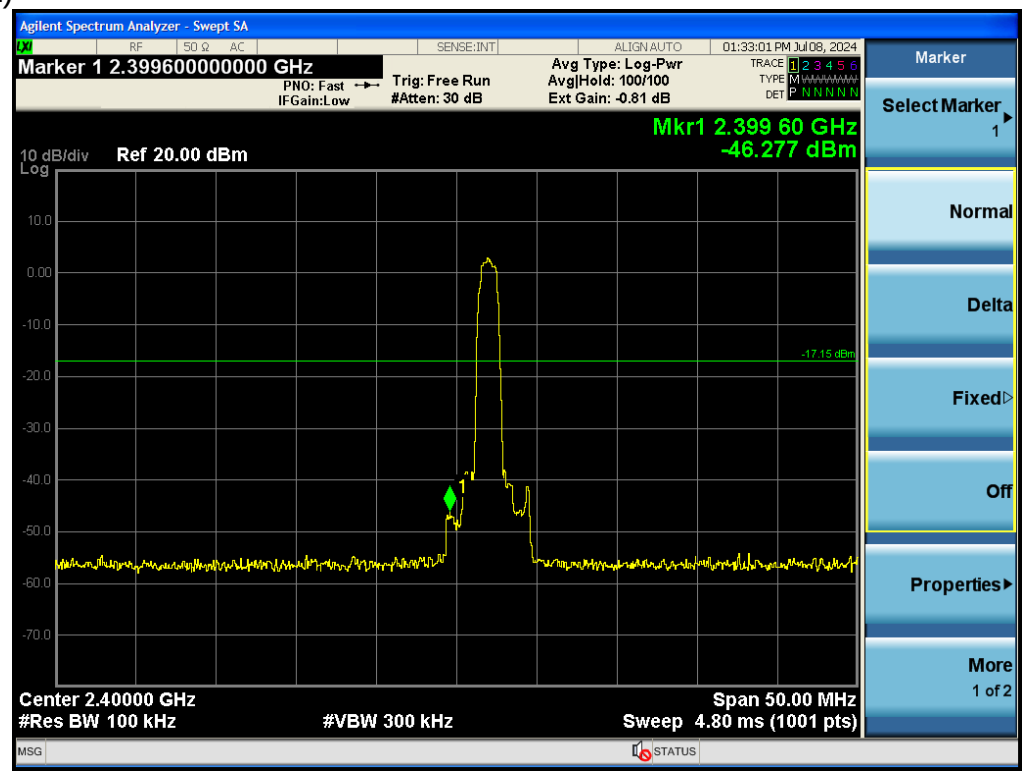


(2480MHz)

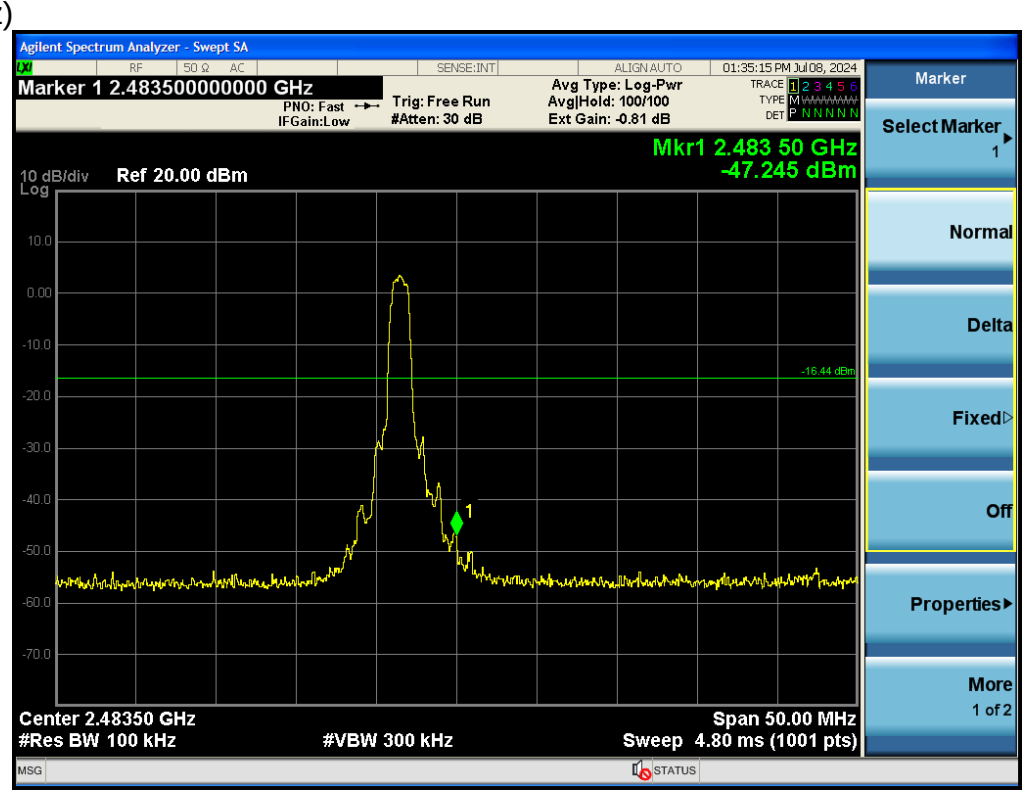

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.483500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
Ext Gain: -0.81 dB
11:57:53 AM Jul 08, 2024
Mkr1 2.483 50 GHz
-48.159 dBm
10 dB/div
Log
Ref 20.00 dBm
-16.81 dBm
Center 2.48350 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 50.00 MHz
Sweep 4.80 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.458500000 GHz
Stop Freq
2.508500000 GHz
CF Step
5.000000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Marker 1 24.700360000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 10/100
Ext Gain: -0.81 dB
11:58:39 AM Jul 08, 2024
Mkr1 24.700 GHz
-37.755 dBm
10 dB/div
Log
Ref 20.00 dBm
-16.81 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.39 s (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

Data Rate : 3Mbps
(2402MHz)



(2480MHz)


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.483500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
Ext Gain: -0.81 dB
01:35:15 PM Jul 08, 2024
Mkr1 2.483 50 GHz
-47.245 dBm
10 dB/div
Log
Ref 20.00 dBm
-16.44 dBm
Center 2.48350 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 50.00 MHz
Sweep 4.80 ms (1001 pts)
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 1 24.800240000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 18/100
Ext Gain: -0.81 dB
01:36:20 PM Jul 08, 2024
Mkr1 24.800 GHz
-37.911 dBm
10 dB/div
Log
Ref 20.00 dBm
-16.44 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.39 s (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

9. Maximum Conducted Output Power Requirements

9.1 Test Condition & Setup:

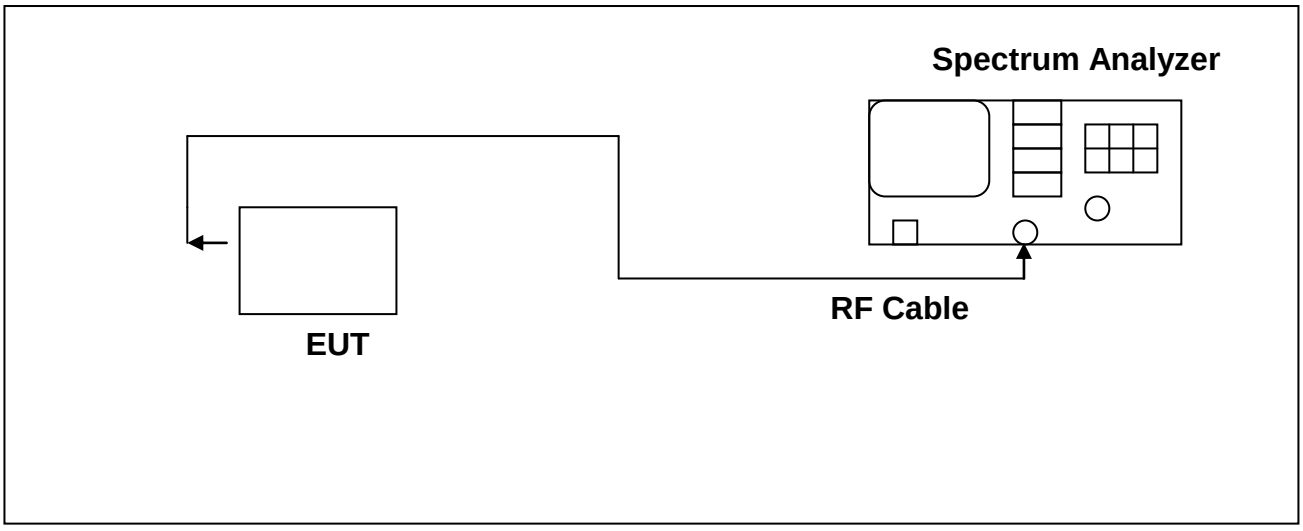
While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to spectrum analyzer. The maximum peak output power shall not exceed 1 watt.

The antenna port of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6)/3 dBm.

This test method according to the techniques described in Measurement procedure ANSI C63.10-2013 (7.8.5) for this testing.

9.2 Test Instruments Configuration:



9.3 Test Equipment List:

Item	Mfr/Brand	Instruments	Serial No.	Model/Type No.	Calibrated Date	Next Cal. Date
1.	Agilent	Spectrum Analyzer	MY46471764	N9020A	2023/12/22	2024/12/22

9.4 Test Result:

Channel	Frequency (MHz)	Data Rate (Mbps)	Results (dBm)	Limit (dBm)
0	2402	1	3.767	<30
		2	6.492	<30
		3	6.989	<30
39	2441	1	3.611	<30
		2	6.623	<30
		3	6.997	<30
78	2480	1	4.391	<30
		2	7.089	<30
		3	7.484	<30

Note : 1. Cable Loss = 0.5dB.
2. Result= Instrument reading value + Cable Loss.

Data Rate : 1Mbps
(2402MHz)