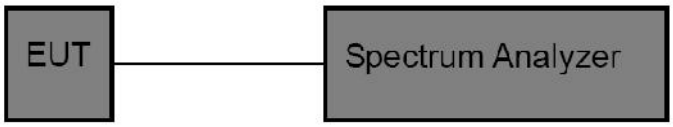
10 Carrier Frequency Separation Test

10.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	>25KHz or >two-thirds of the 20 dB bandwidth

10.2 Test Setup



10.3 Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:

1. Span= Wide enough to capture the peaks of two adjacent channels

2. Set the RBW = 30 kHz.

3. Set the VBW = 100 kHz.

4. Sweep time = auto couple.

5. Detector function = peak.

6. Trace mode = max hold.

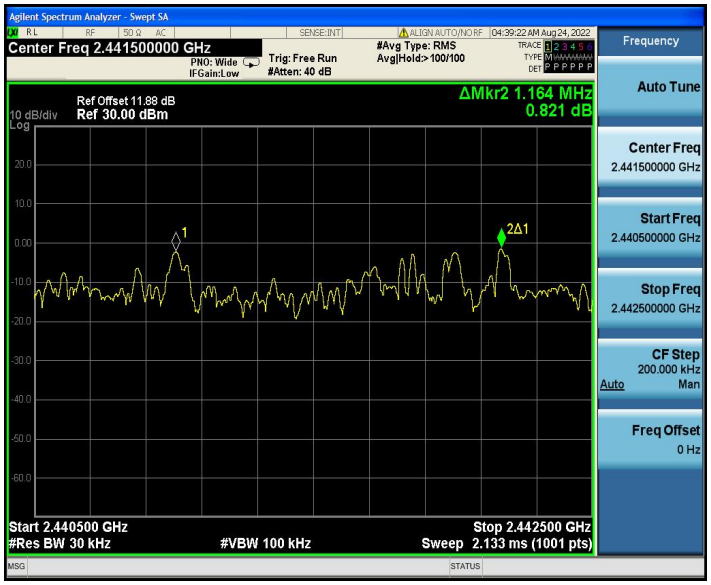
7. Allow trace to fully stabilize.

10.4 Test Data

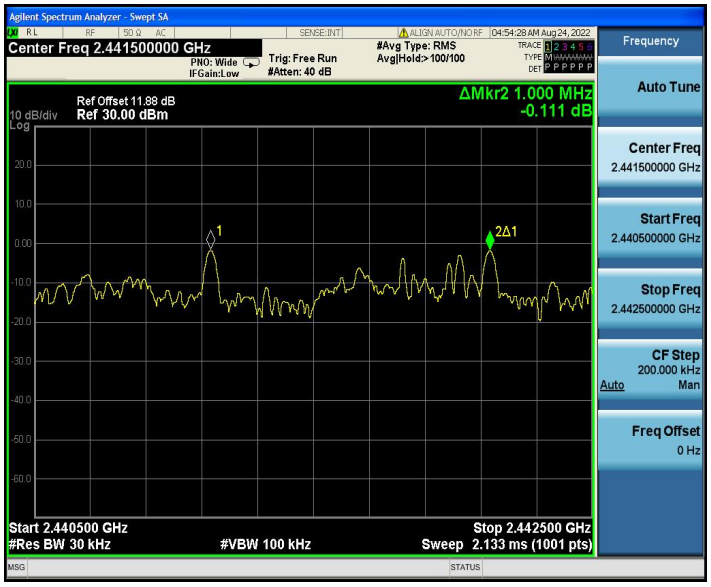
Test Item	:	Frequency Separation	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	55%RH

TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.164	≥0.870	PASS
2DH5	Ant1	Hop	1	≥0.878	PASS
3DH5	Ant1	Hop	1	≥0.870	PASS

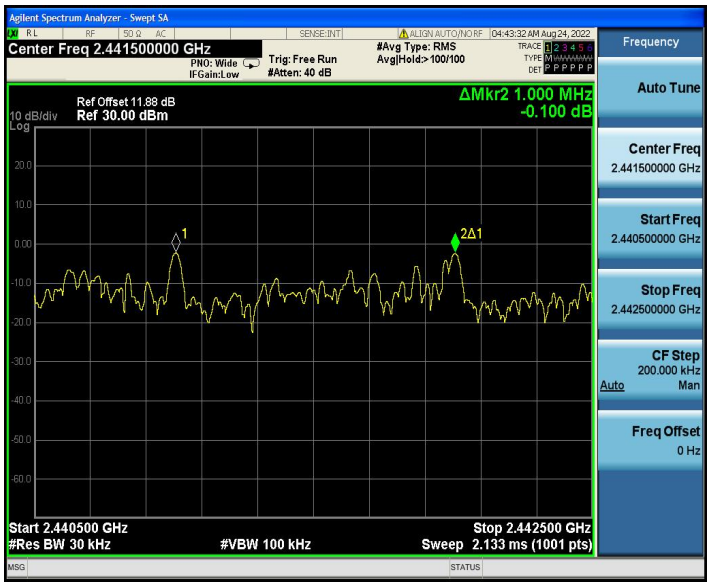
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop

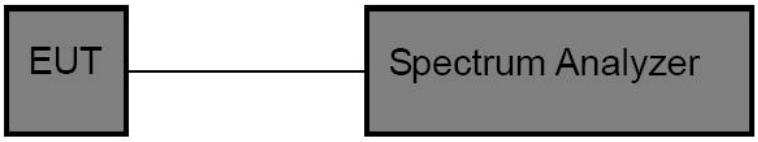


11 Number of Hopping Channel Test

11.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	>15 channels

11.2 Test Setup



11.3 Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer setting:

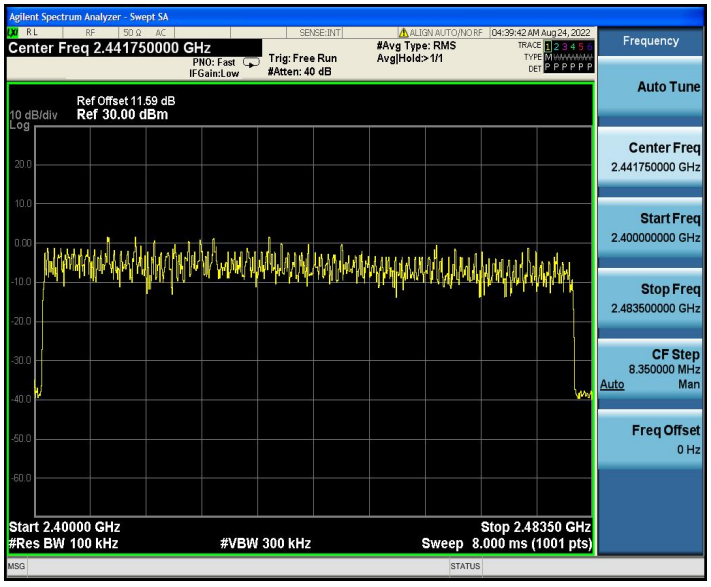
1. Span= the frequency band of operation
2. Set the RBW = 100kHz.
3. Set the VBW = 300kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

11.4 Test Data

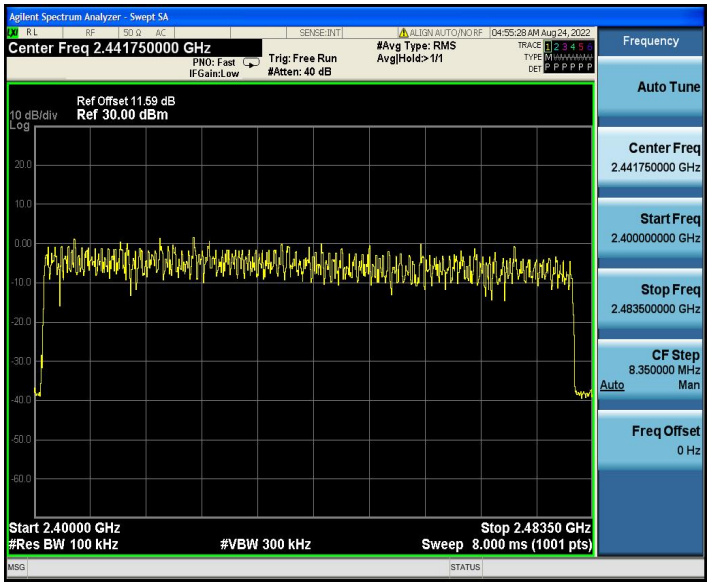
Test Item	:	Number of Hopping Frequency	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	55%RH

TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

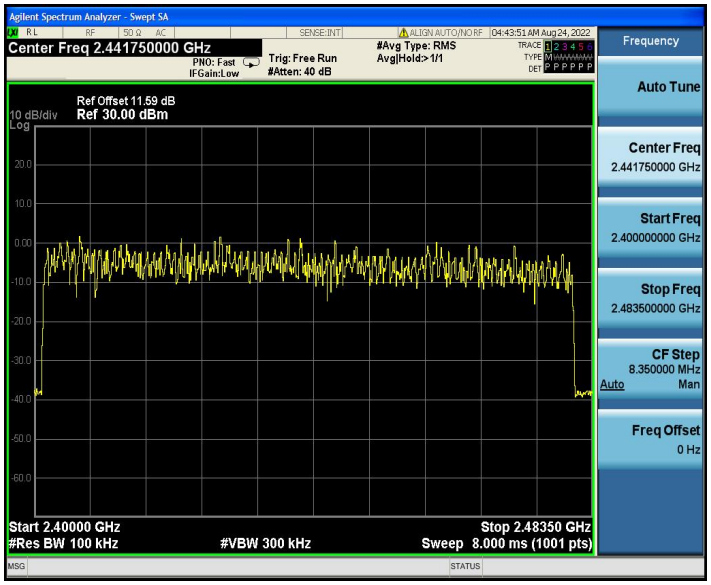
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop

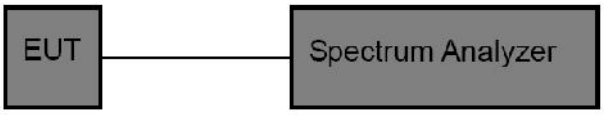


12 Dwell Time Test

12.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	0.4 sec

12.2 Test Setup



12.3 Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span= zero span, centered on a hopping channel
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Sweep time = as necessary to capture the entire dwell time per hopping channel.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

12.4 Test Data

Test Item	:	Time of Occupancy	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	55%RH

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.39	0.123	≤0.4	PASS
DH3	Ant1	Hop	1.64	0.262	≤0.4	PASS
DH5	Ant1	Hop	2.89	0.308	≤0.4	PASS
2DH1	Ant1	Hop	0.39	0.124	≤0.4	PASS
2DH3	Ant1	Hop	1.64	0.262	≤0.4	PASS
2DH5	Ant1	Hop	2.89	0.308	≤0.4	PASS
3DH1	Ant1	Hop	0.39	0.124	≤0.4	PASS
3DH3	Ant1	Hop	1.64	0.262	≤0.4	PASS
3DH5	Ant1	Hop	2.89	0.308	≤0.4	PASS

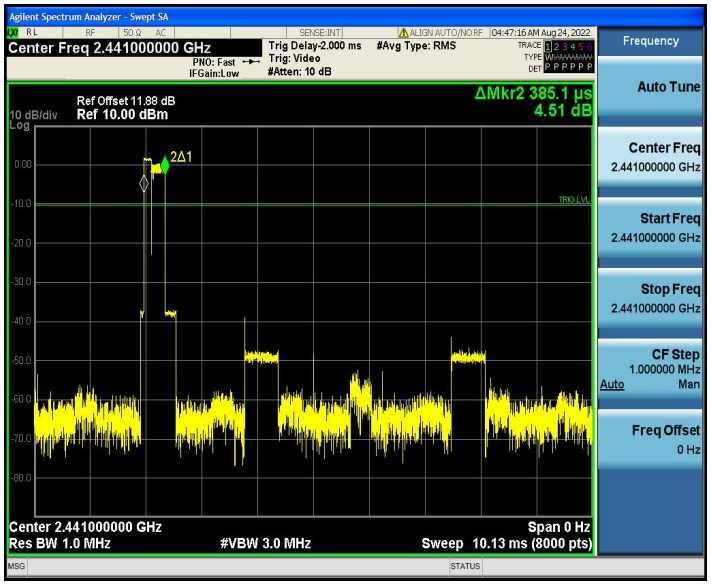
Note:

1.DH1/2DH1 Dwell Time: Reading * (1600/2)*31.6/(channel number).

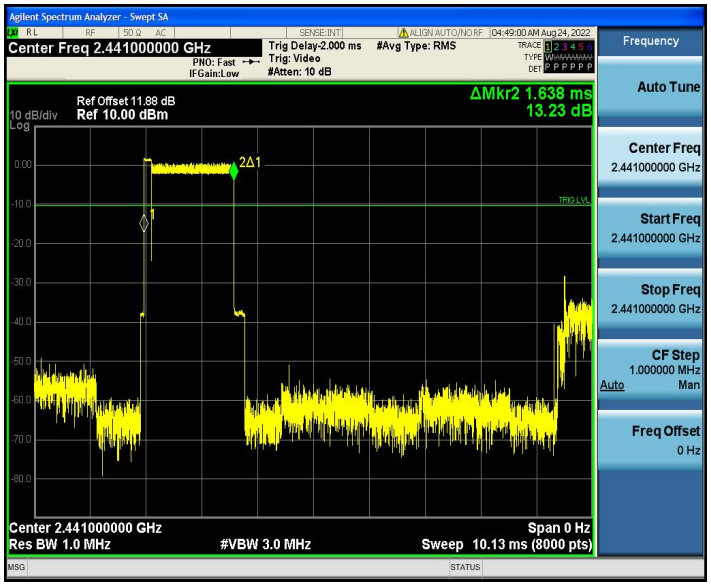
2.DH3/2DH3 Dwell Time: Reading * (1600/4)*31.6/(channel number).

3.DH5/2DH5 Dwell Time: Reading * (1600/6)*31.6/(channel number).

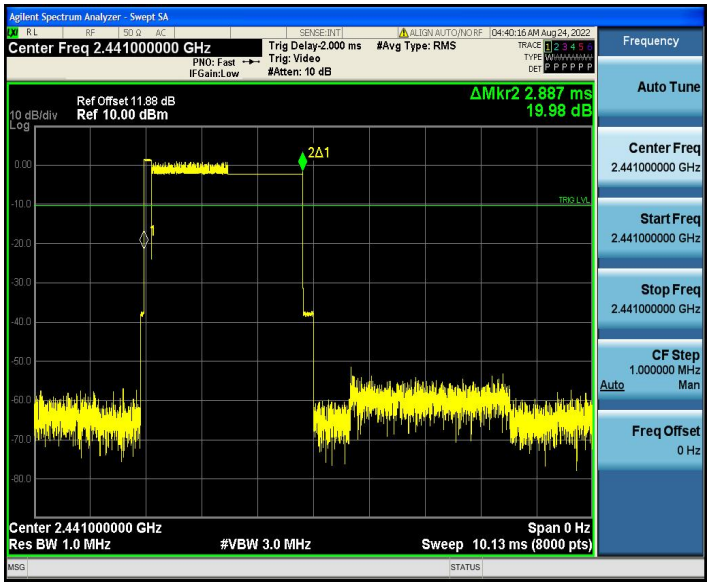
DH1_Ant1_Hop



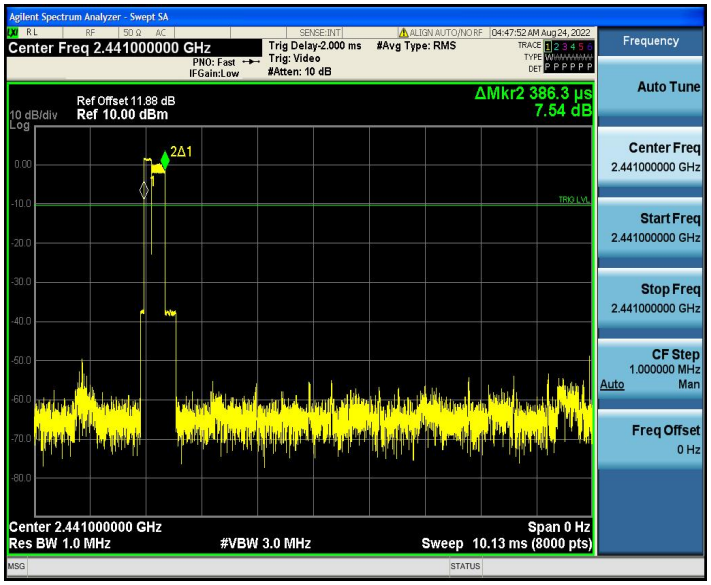
DH3_Ant1_Hop



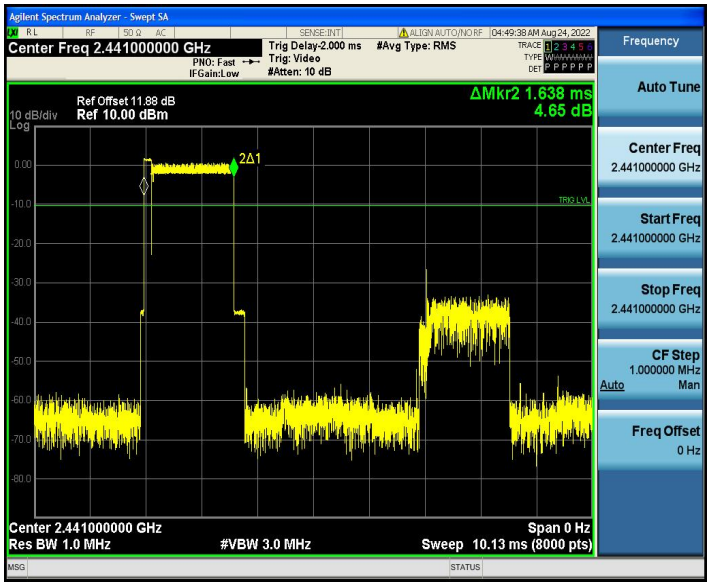
DH5_Ant1_Hop



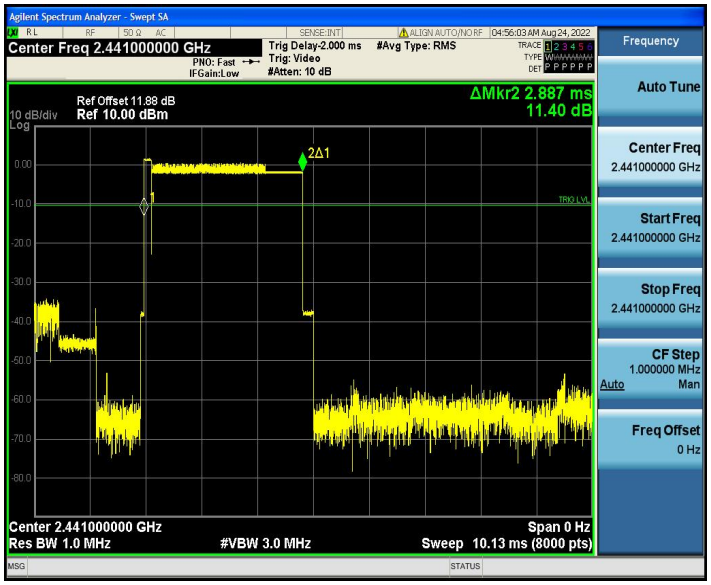
2DH1_Ant1_Hop



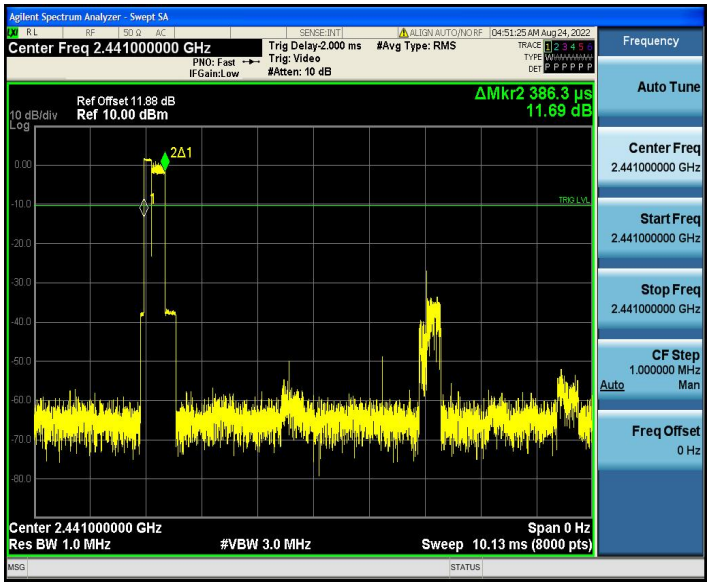
2DH3_Ant1_Hop



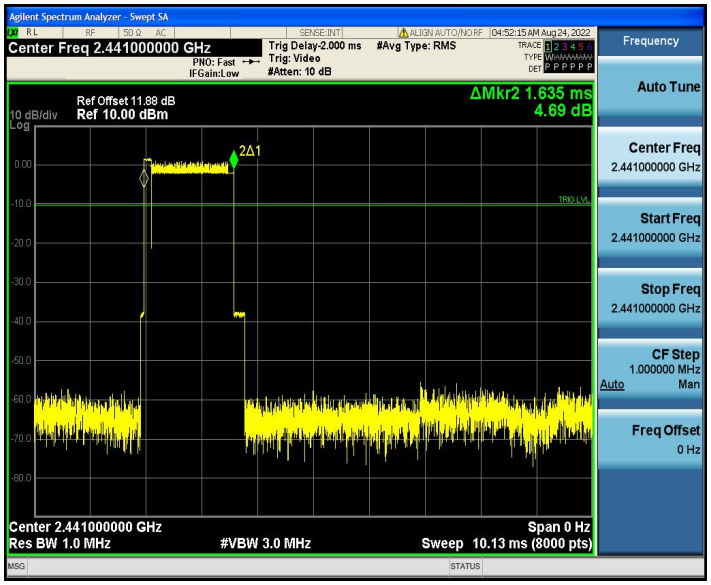
2DH5_Ant1_Hop



3DH1_Ant1_Hop



3DH3_Ant1_Hop



3DH5_Ant1_Hop

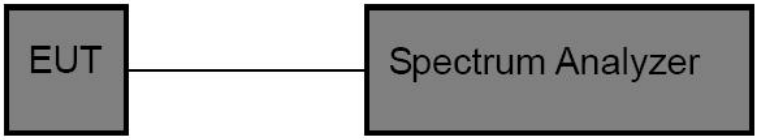

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-2.000 ms
Trig: Video
#Atten: 10 dB
#Avg Type: RMS
04:44:26 AM Aug 24, 2022
Ref Offset 11.88 dB
10 dB/div
Log
Ref 10.00 dBm
ΔMkr2 2.887 ms
13.00 dB
2Δ1
TRIG LVL
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (8000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

13 100kHz Bandwidth of Frequency Band Edge Requirement

13.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

13.2 Test Setup



13.3 Test Procedure

The EUT must have its hopping/Non-hopping function enabled. Using the following spectrum analyzer setting:

1. Set the RBW = 100kHz.

2. Set the VBW = 300kHz.

3. Sweep time = auto couple.

4. Detector function = peak.

5. Trace mode = max hold.

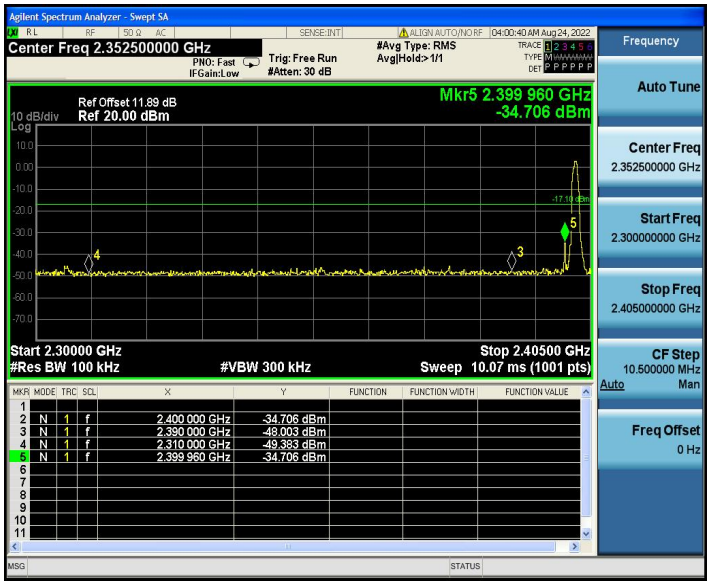
6. Allow trace to fully stabilize.

13.4 Test Data

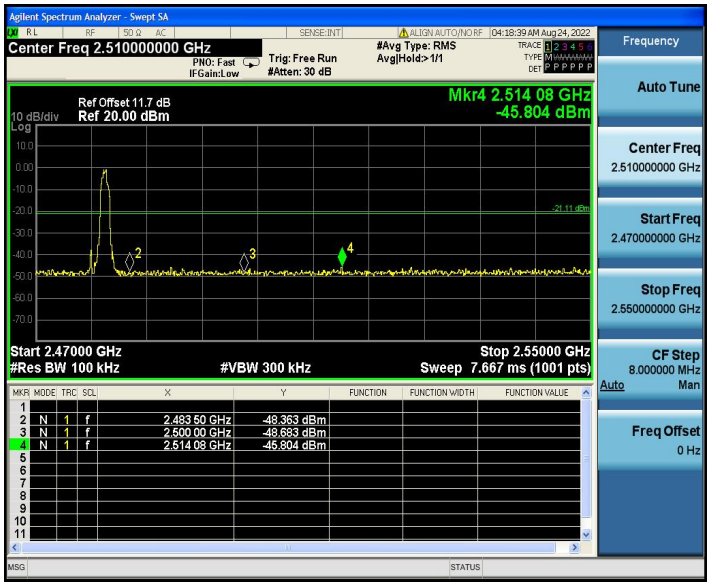
Test Item	:	Band edge	Test Mode	:	CH Low ~ CH High
Test Voltage	:	AC 120V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	55%RH

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	2.90	-34.71	≤-17.1	PASS
		High	2480	-1.11	-45.8	≤-21.11	PASS
		Low	Hop_2402	-1.37	-45.34	≤-21.37	PASS
		High	Hop_2480	-2.55	-45.6	≤-22.55	PASS
2DH5	Ant1	Low	2402	2.66	-35.13	≤-17.34	PASS
		High	2480	-1.08	-46.24	≤-21.08	PASS
		Low	Hop_2402	1.90	-45.4	≤-18.1	PASS
		High	Hop_2480	-0.76	-45.44	≤-20.76	PASS
3DH5	Ant1	Low	2402	2.81	-35.45	≤-17.19	PASS
		High	2480	-1.07	-45.37	≤-21.07	PASS
		Low	Hop_2402	1.14	-45.95	≤-18.86	PASS
		High	Hop_2480	-3.89	-45.19	≤-23.89	PASS

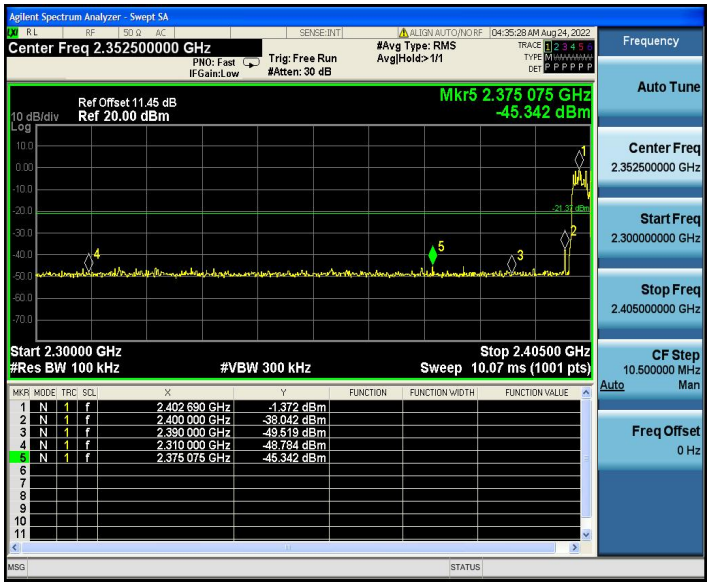
DH5_Ant1_Low_2402



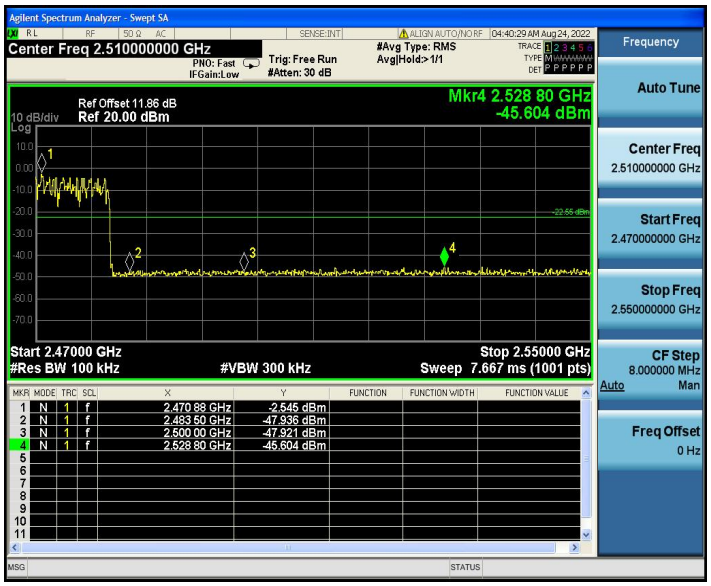
DH5_Ant1_High_2480



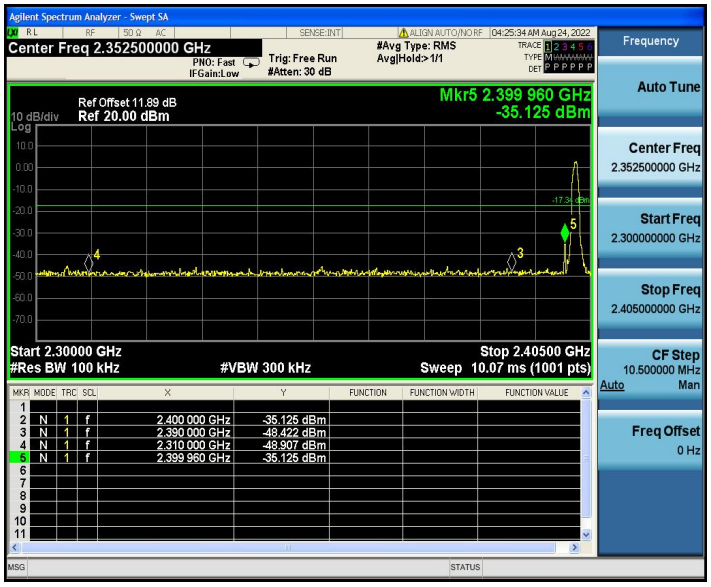
DH5_Ant1_Low_Hop_2402



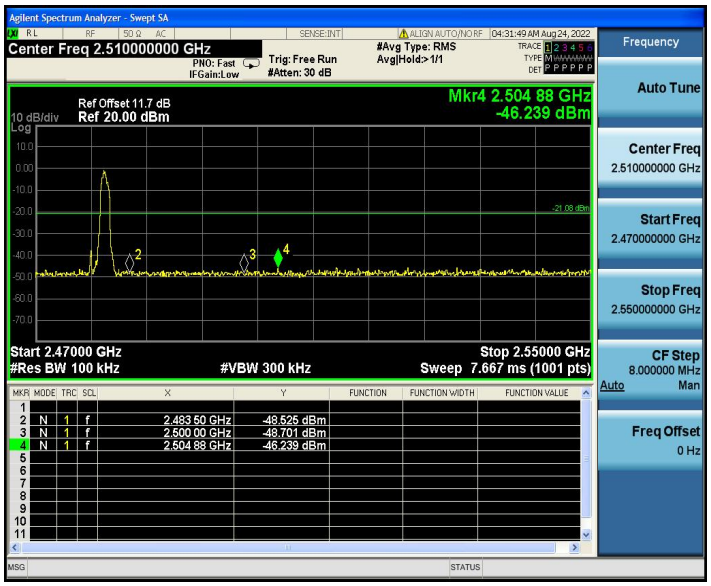
DH5_Ant1_High_Hop_2480



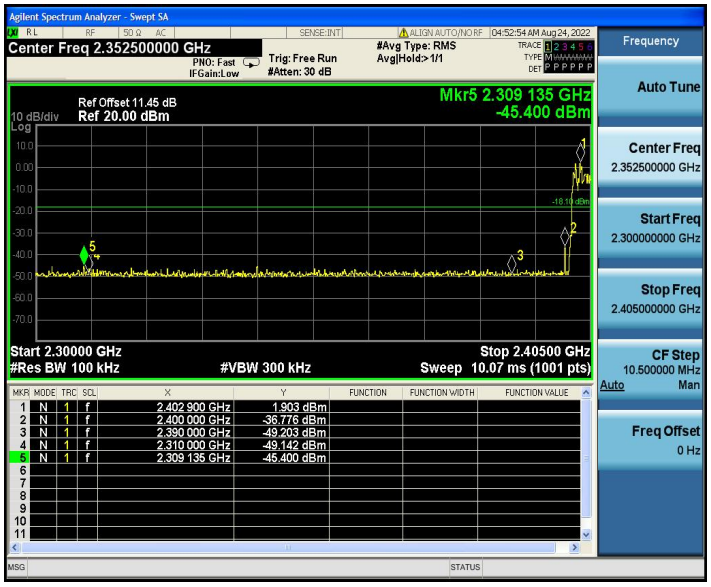
2DH5_Ant1_Low_2402



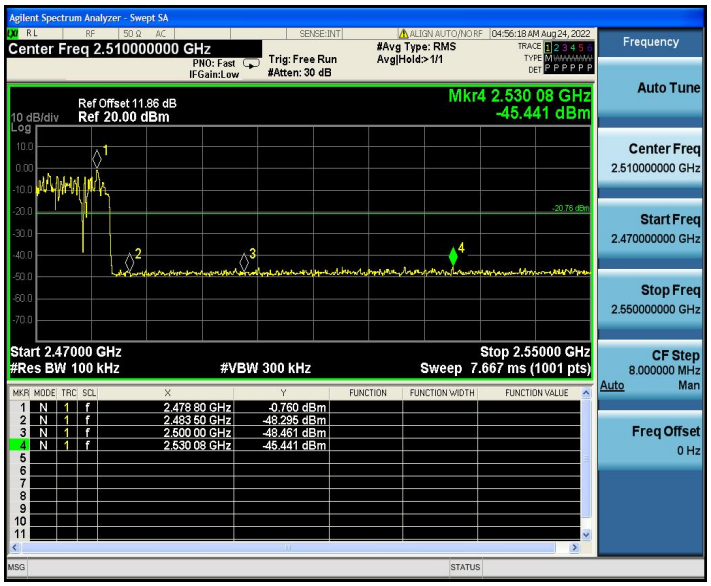
2DH5_Ant1_High_2480



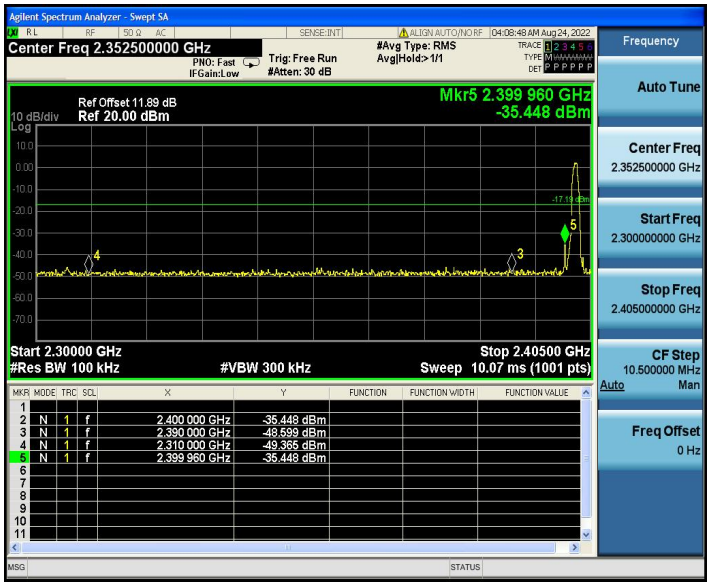
2DH5_Ant1_Low_Hop_2402



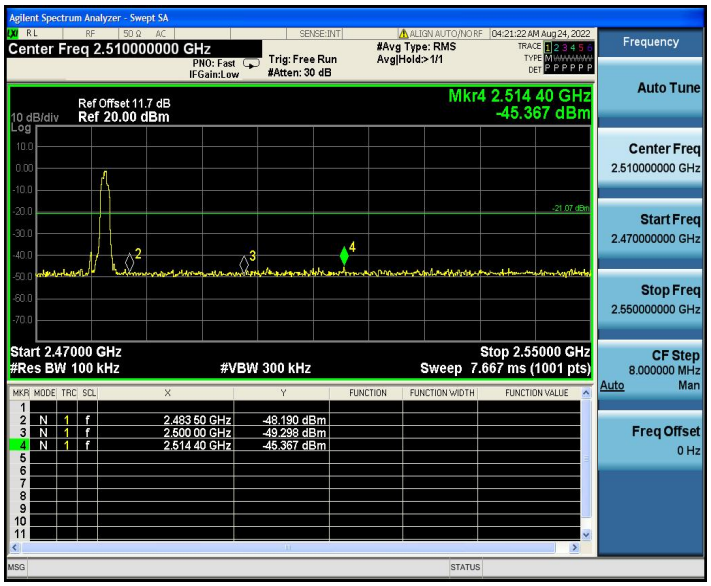
2DH5_Ant1_High_Hop_2480



3DH5_Ant1_Low_2402



3DH5_Ant1_High_2480



3DH5_Ant1_Low_Hop_2402