

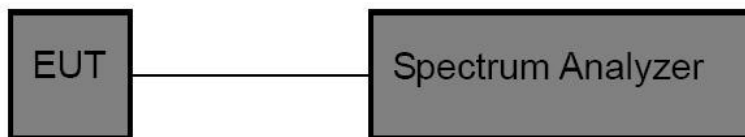


9 20DB Occupy Bandwidth Test

9.1 Test Standard

Test Standard	FCC Part15 C Section 15.247 (a)(1)
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9.2 Test Setup



9.3 Test Procedure

Using the following spectrum analyzer settings:

1. Span= approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel.
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.

9.4 Test Data

Test Item	:	20dB BW	Test Mode	:	CH Low ~ CH High
Test Voltage	:	3.7V	Temperature	:	24.5°C
Test Result	:	PASS	Humidity	:	55%RH



L:

TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.954	2401.631	2402.585	---	---
DH5	Ant1	2441	0.954	2440.637	2441.591	---	---
DH5	Ant1	2480	0.942	2479.646	2480.588	---	---
2DH5	Ant1	2402	1.359	2401.427	2402.786	---	---
2DH5	Ant1	2441	1.359	2440.427	2441.786	---	---
2DH5	Ant1	2480	1.281	2479.475	2480.756	---	---
3DH5	Ant1	2402	1.308	2401.448	2402.756	---	---
3DH5	Ant1	2441	1.272	2440.457	2441.729	---	---
3DH5	Ant1	2480	1.317	2479.448	2480.765	---	---

R:

TestMode	Antenna	Frequency[MHz]	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.963	2401.628	2402.591	---	---
DH5	Ant1	2441	0.963	2440.631	2441.594	---	---
DH5	Ant1	2480	0.957	2479.640	2480.597	---	---
2DH5	Ant1	2402	1.317	2401.439	2402.756	---	---
2DH5	Ant1	2441	1.284	2440.469	2441.753	---	---
2DH5	Ant1	2480	1.287	2479.472	2480.759	---	---
3DH5	Ant1	2402	1.305	2401.454	2402.759	---	---
3DH5	Ant1	2441	1.296	2440.457	2441.753	---	---
3DH5	Ant1	2480	1.356	2479.421	2480.777	---	---



Test Graphs:

L:

DH5-Ant1-2402



DH5-Ant1-2441



DH5-Ant1-2480



2DH5-Ant1-2402



2DH5-Ant1-2441



2DH5-Ant1-2480



3DH5-Ant1-2402



3DH5-Ant1-2441



3DH5-Ant1-2480



R:

DH5-Ant1-2402





DH5-Ant1-2441



DH5-Ant1-2480



2DH5-Ant1-2402



2DH5-Ant1-2441



2DH5-Ant1-2480



3DH5-Ant1-2402



3DH5-Ant1-2441



3DH5-Ant1-2480



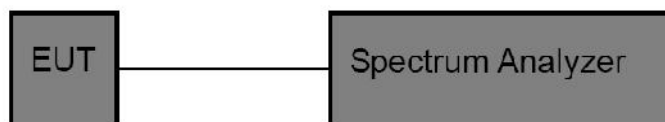


10 Carrier Frequency Separation Test

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 = 300 kHz.
3. Set the VBW = 300 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	:	3.7V	Temperature	:	24.5°C
Test Result	:	PASS	Humidity	:	55%RH



L:

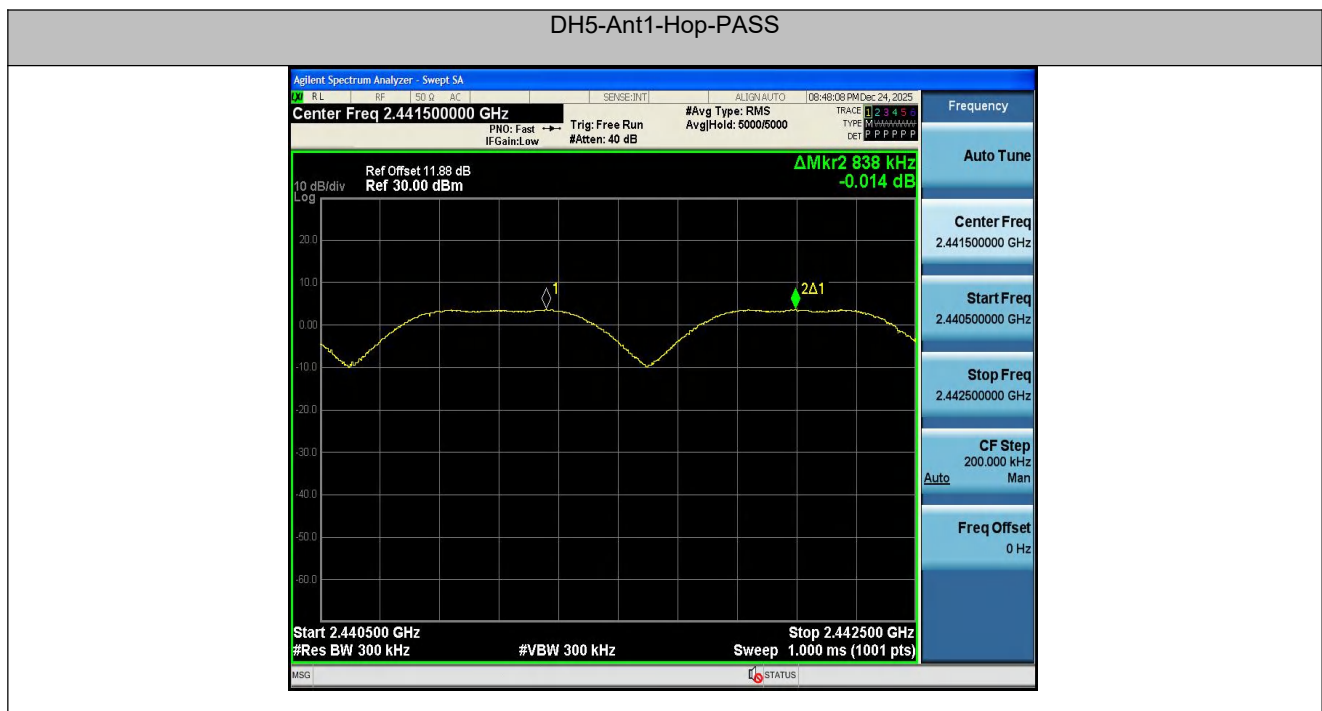
TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.838	≥ 0.636	PASS
2DH5	Ant1	Hop	1.264	≥ 0.906	PASS
3DH5	Ant1	Hop	1.016	≥ 0.878	PASS

R:

TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.002	≥ 0.642	PASS
2DH5	Ant1	Hop	1.306	≥ 0.878	PASS
3DH5	Ant1	Hop	1.342	≥ 0.904	PASS

Test Graphs:

L:





2DH5-Ant1-Hop-PASS



3DH5-Ant1-Hop-PASS





R:

DH5-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS



3DH5-Ant1-Hop-PASS



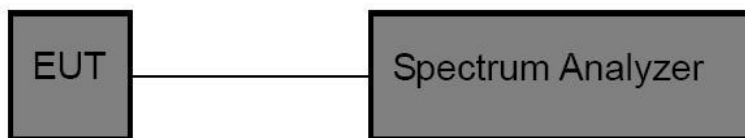


11 Number of Hopping Channel Test

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 = 300kHz.
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	: 3.7V	Temperature	: 24.5°C
Test Result	: PASS	Humidity	: 55%RH

L:

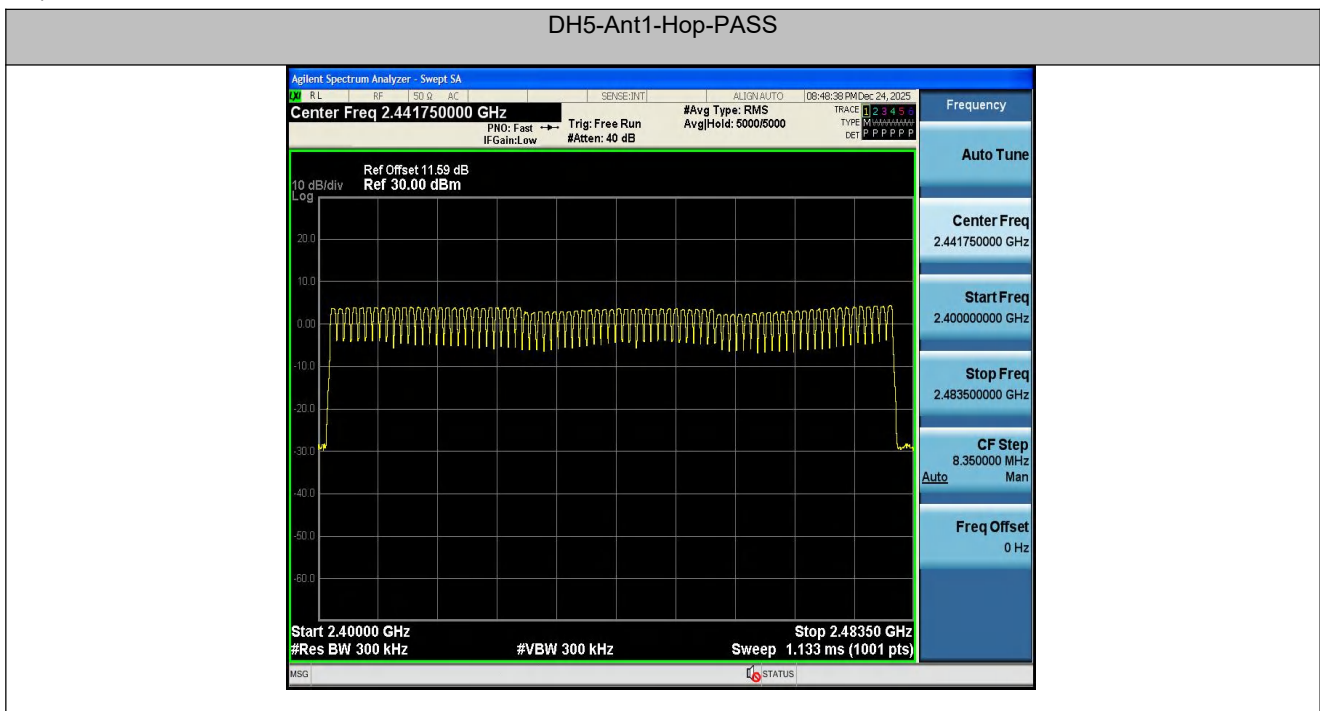
TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

R:

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

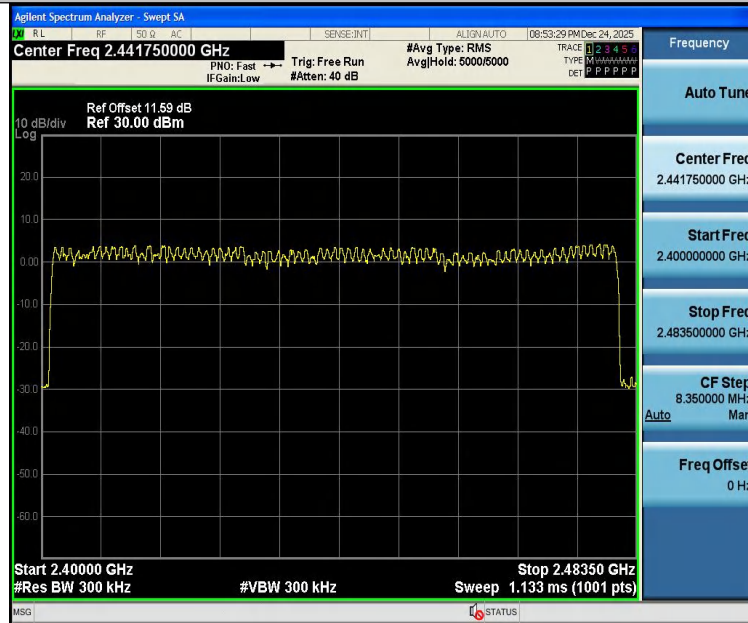
Test Graphs:

L:

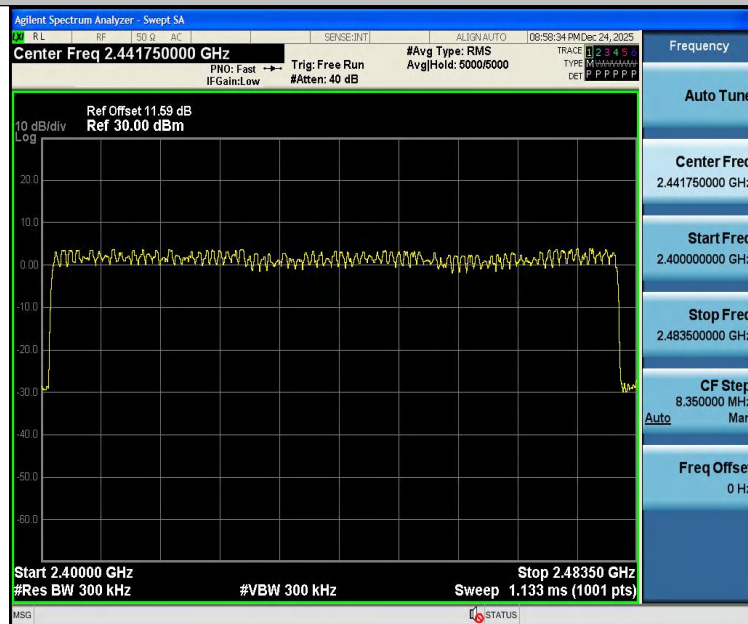




2DH5-Ant1-Hop-PASS



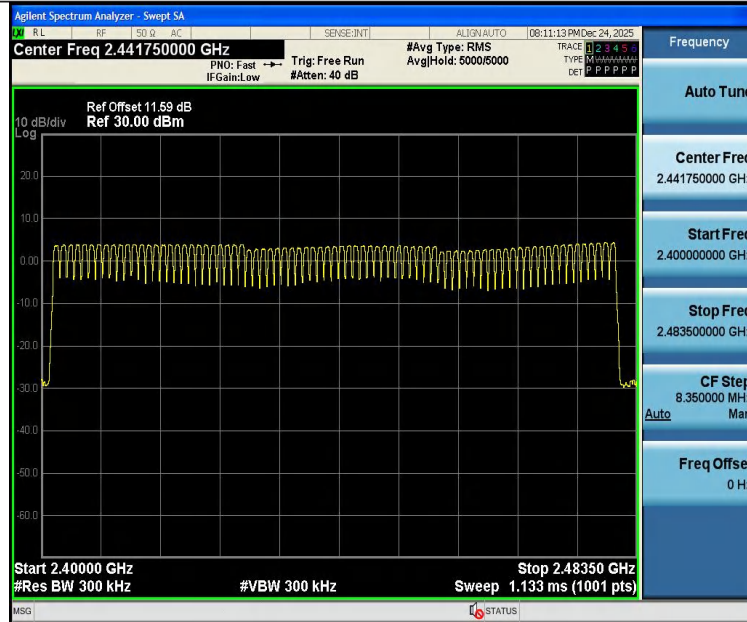
3DH5-Ant1-Hop-PASS



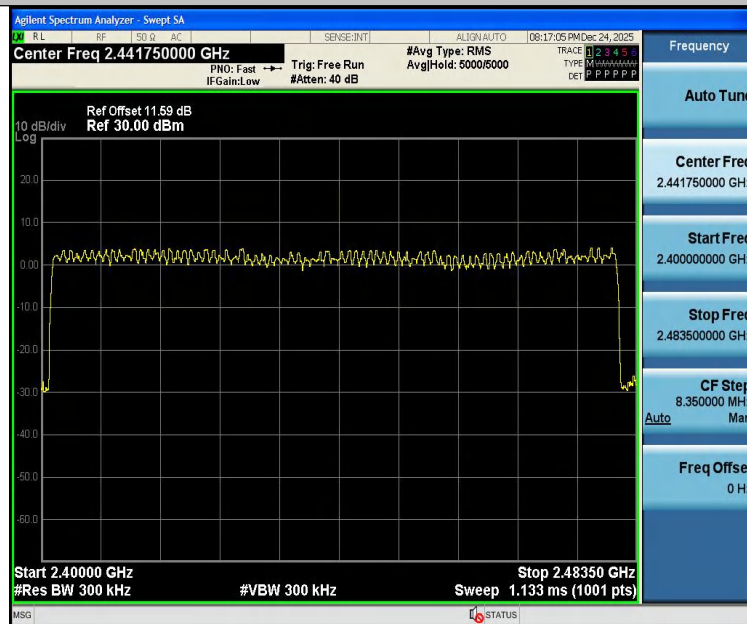


R:

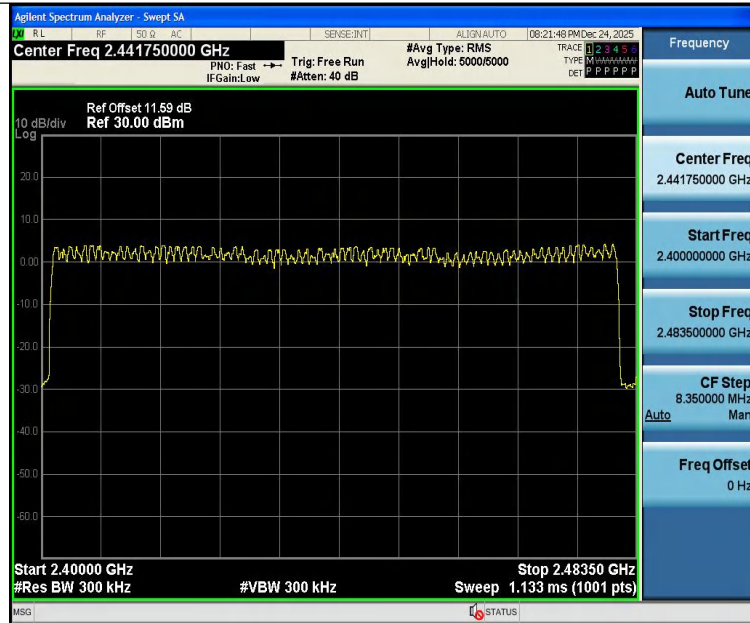
DH5-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS



3DH5-Ant1-Hop-PASS



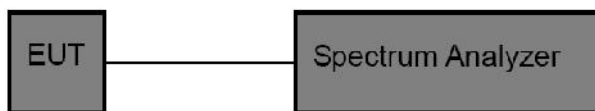


12 Dwell Time Test

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 = clear write.
7. Allow trace to fully stabilize.

**12.4 Test Data**

Test Item	: Time of Occupancy	Test Mode	: CH Low ~ CH High
Test Voltage	: 3.7V	Temperature	: 24.5°C
Test Result	: PASS	Humidity	: 55%RH

L:

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.887	106.67	0.308	≤0.4	PASS
2DH5	Ant1	Hop	2.890	106.67	0.308	≤0.4	PASS
3DH5	Ant1	Hop	2.894	106.67	0.309	≤0.4	PASS
DH1	Ant1	Hop	0.383	320	0.123	≤0.4	PASS
2DH1	Ant1	Hop	0.391	320	0.125	≤0.4	PASS
3DH1	Ant1	Hop	0.391	320	0.125	≤0.4	PASS
DH3	Ant1	Hop	1.639	160	0.262	≤0.4	PASS
2DH3	Ant1	Hop	1.643	160	0.263	≤0.4	PASS
3DH3	Ant1	Hop	1.643	160	0.263	≤0.4	PASS

R:

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.885	106.67	0.308	≤0.4	PASS
2DH5	Ant1	Hop	2.892	106.67	0.308	≤0.4	PASS
3DH5	Ant1	Hop	2.894	106.67	0.309	≤0.4	PASS
DH1	Ant1	Hop	0.381	320	0.122	≤0.4	PASS
2DH1	Ant1	Hop	0.393	320	0.126	≤0.4	PASS
3DH1	Ant1	Hop	0.391	320	0.125	≤0.4	PASS
DH3	Ant1	Hop	1.638	160	0.262	≤0.4	PASS
2DH3	Ant1	Hop	1.643	160	0.263	≤0.4	PASS
3DH3	Ant1	Hop	1.643	160	0.263	≤0.4	PASS

Note:

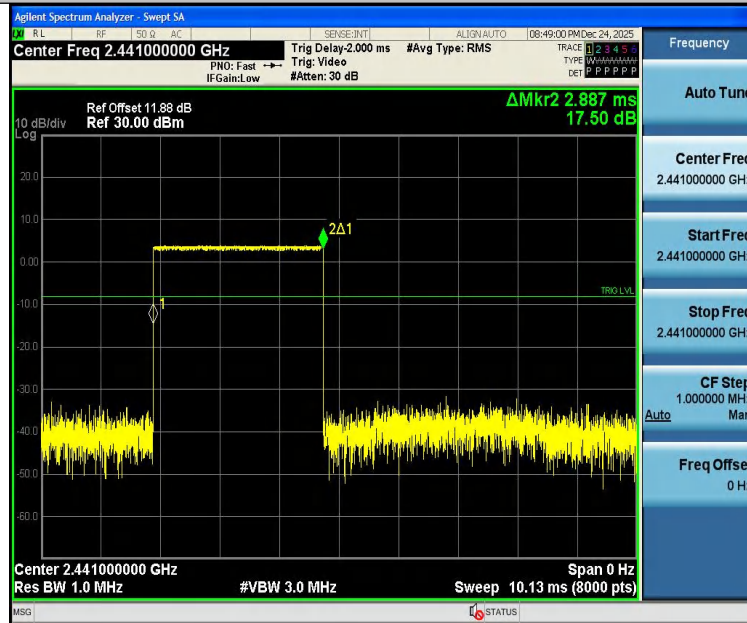
- 1.DH1/2DH1/3DH1 Dwell Time: Reading * (1600/2)*31.6/(channel number).
- 2.DH3/2DH3/3DH3 Dwell Time: Reading * (1600/4)*31.6/(channel number).
- 3.DH5/2DH5/3DH5 Dwell Time: Reading * (1600/6)*31.6/(channel number).



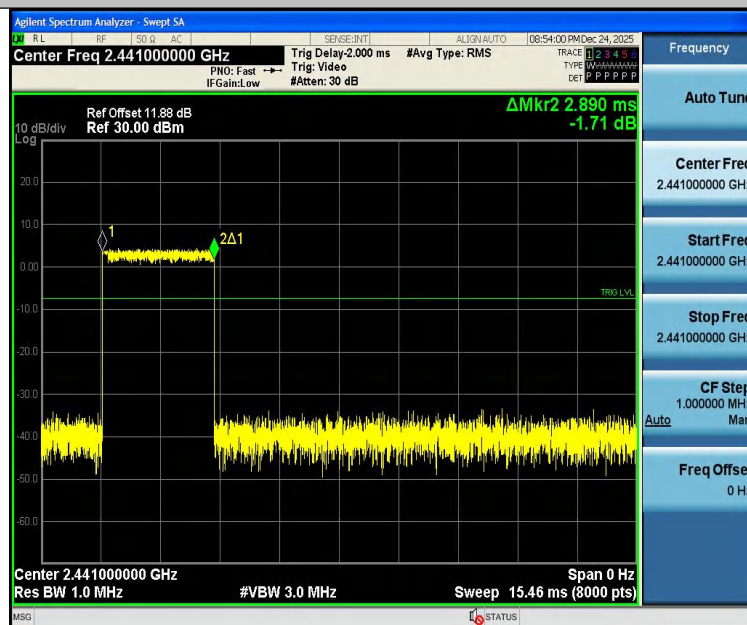
Test Graphs:

L:

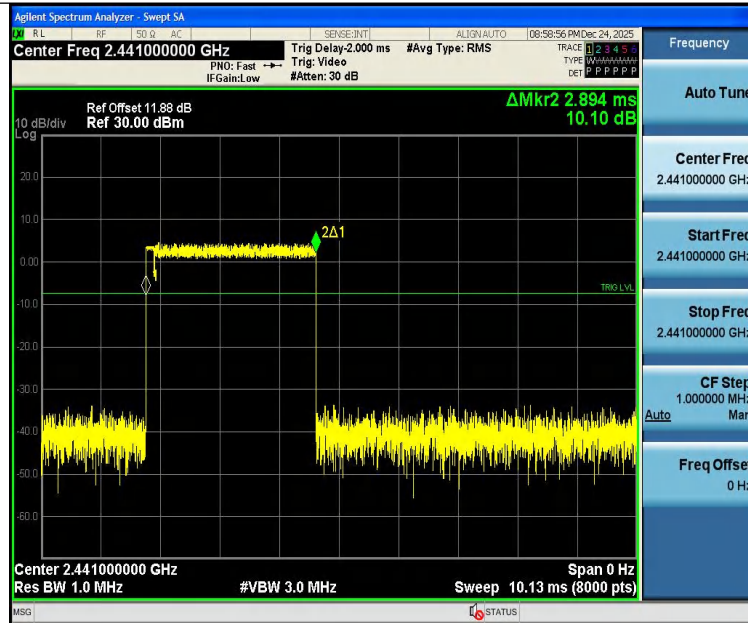
DH5-Ant1-Hop-PASS



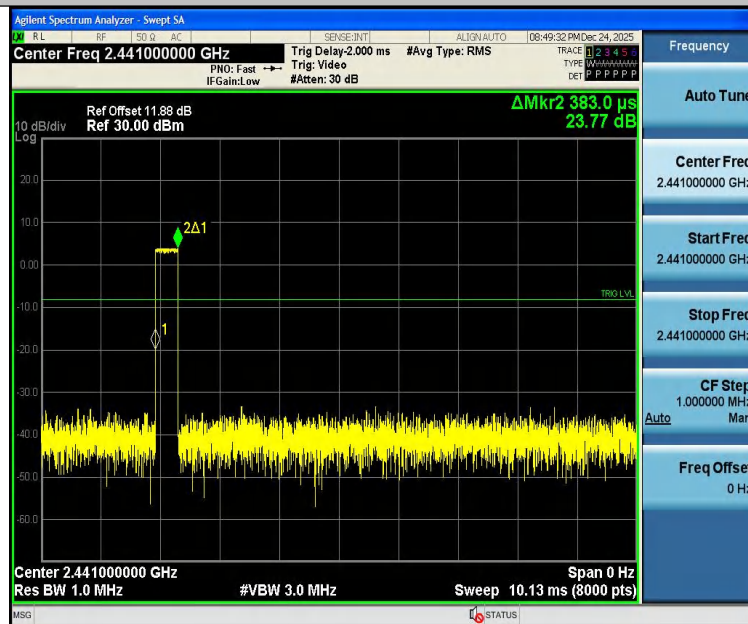
2DH5-Ant1-Hop-PASS



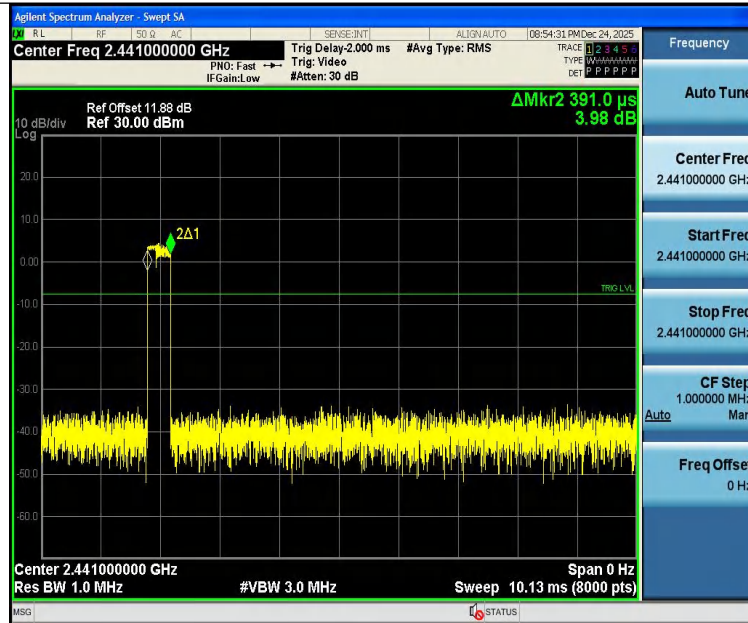
3DH5-Ant1-Hop-PASS



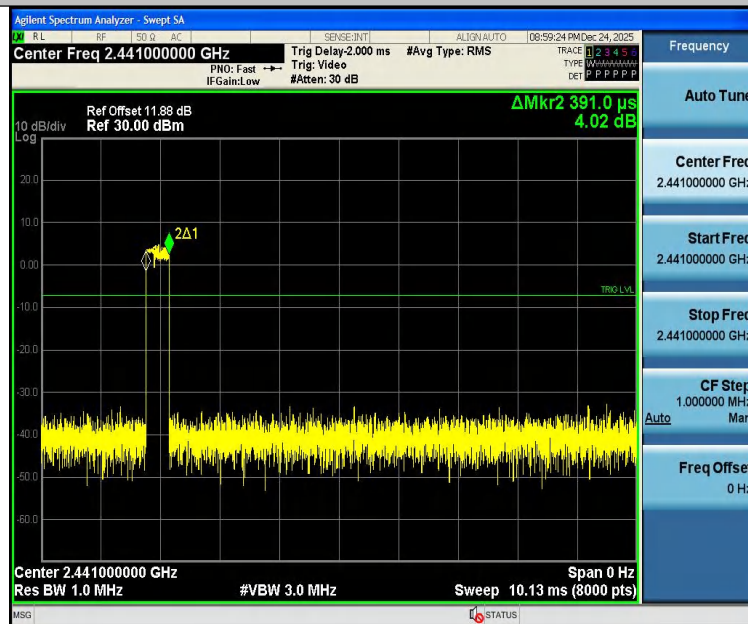
DH1-Ant1-Hop-PASS



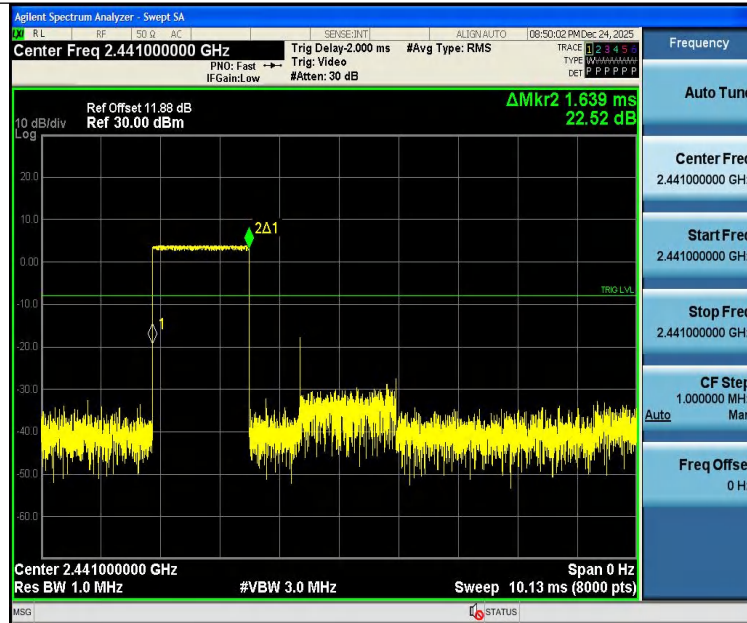
2DH1-Ant1-Hop-PASS



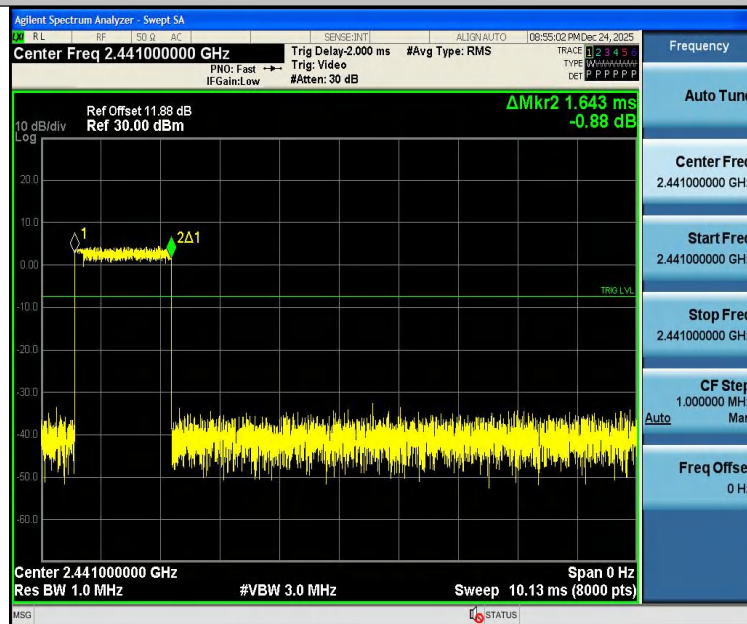
3DH1-Ant1-Hop-PASS



DH3-Ant1-Hop-PASS



2DH3-Ant1-Hop-PASS



3DH3-Ant1-Hop-PASS