

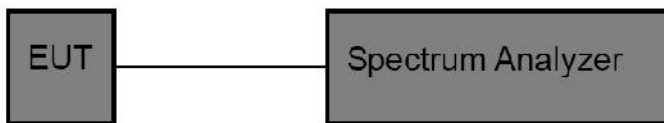


## 10 Carrier Frequency Separation Test

### 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.

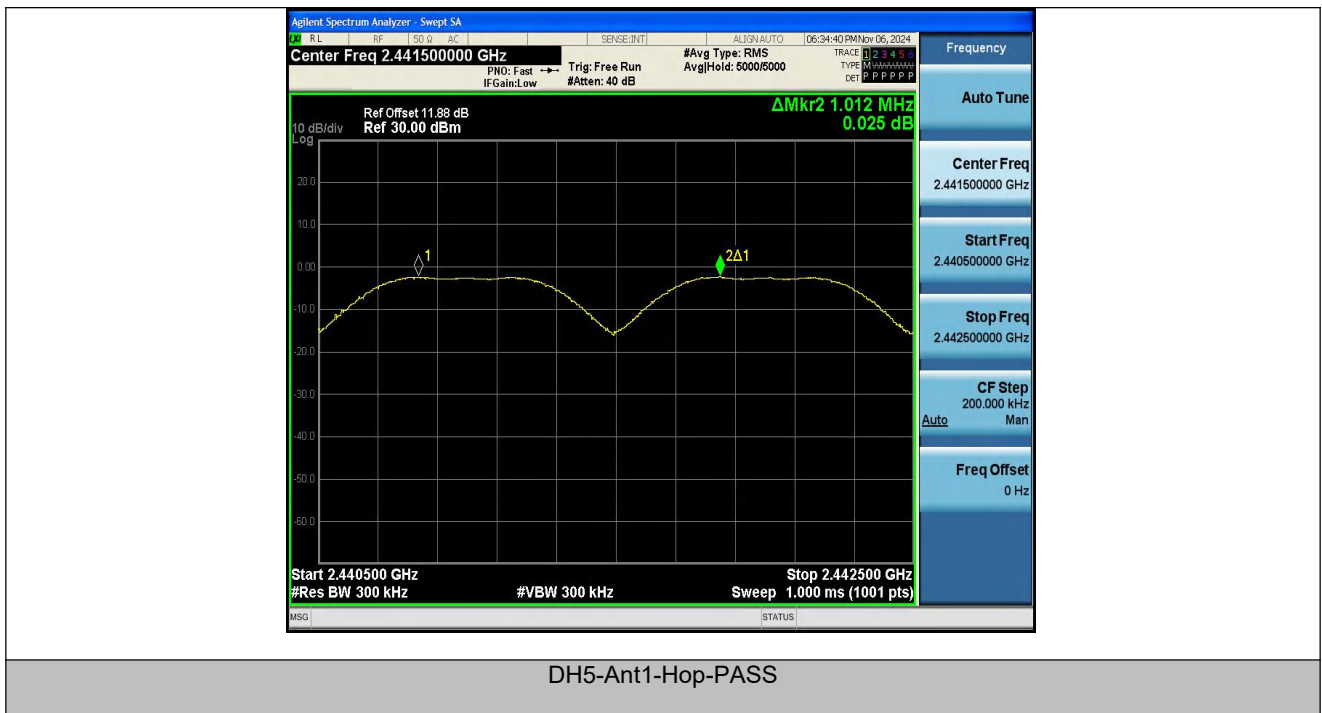
### 10.4 Test Data

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



TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.012	≥0.641	PASS
2DH5	Ant1	Hop	0.994	≥0.888	PASS

**Test Graphs:**



DH5-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS

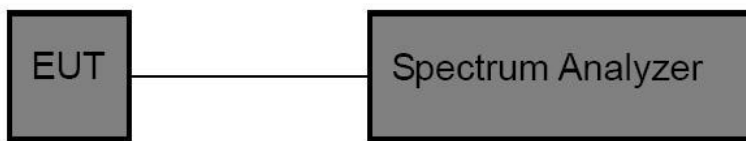


## 11 Number of Hopping Channel Test

### 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.

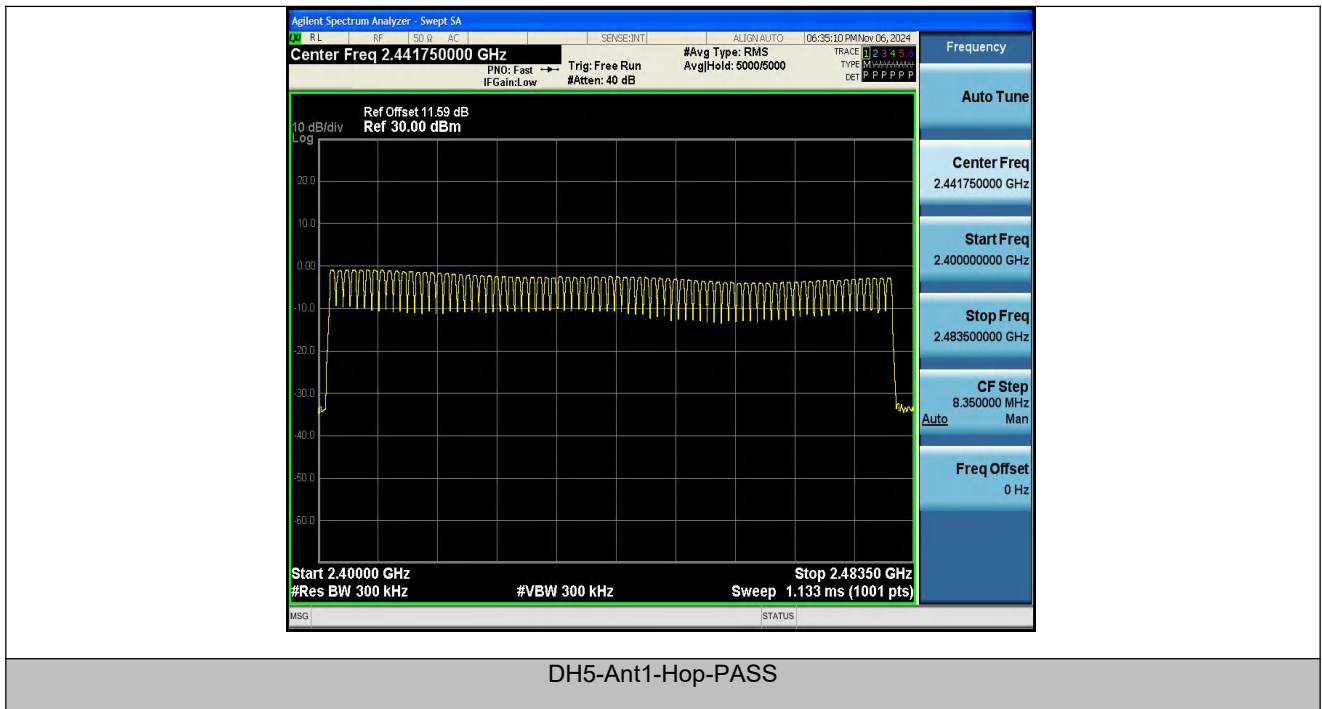


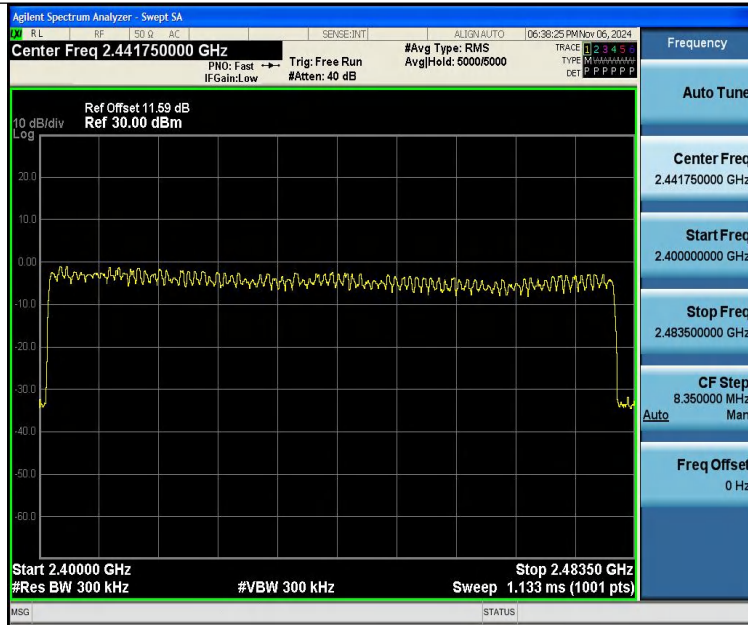
### 11.4 Test Data

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

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

### Test Graphs:





2DH5-Ant1-Hop-PASS

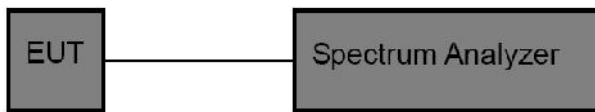


## 12 Dwell Time Test

### 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

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	2.891	106.67	0.308	≤0.4	PASS
DH1	Ant1	Hop	0.381	320	0.122	≤0.4	PASS
2DH1	Ant1	Hop	0.390	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

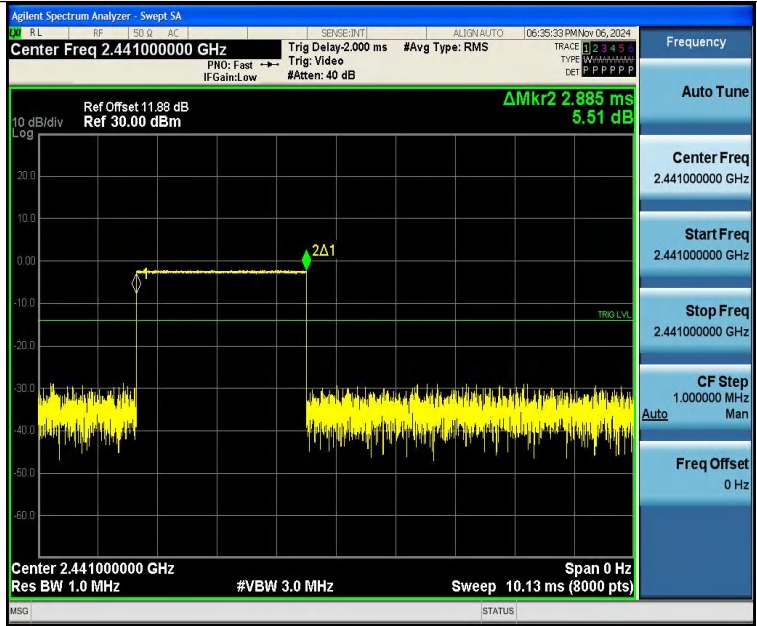
**Note:**

- 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).

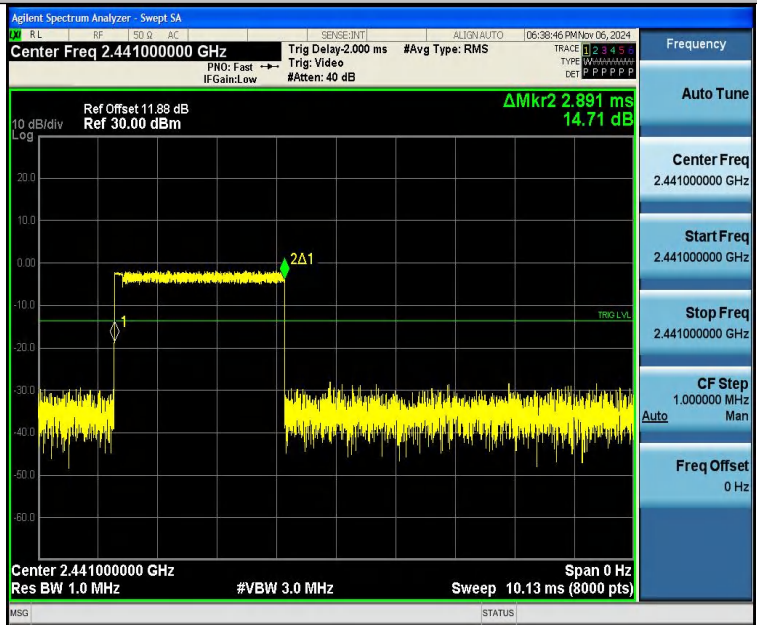




Test Graphs:

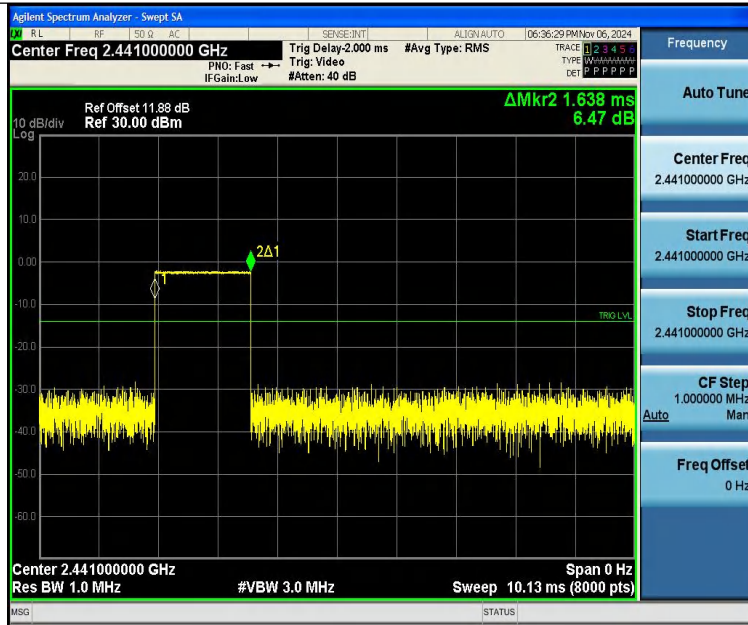


DH5-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS





DH3-Ant1-Hop-PASS



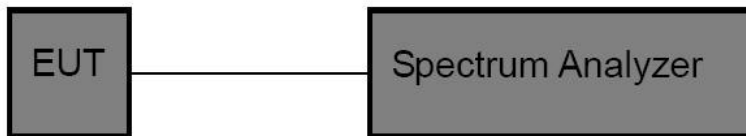
2DH3-Ant1-Hop-PASS

### 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 is 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.



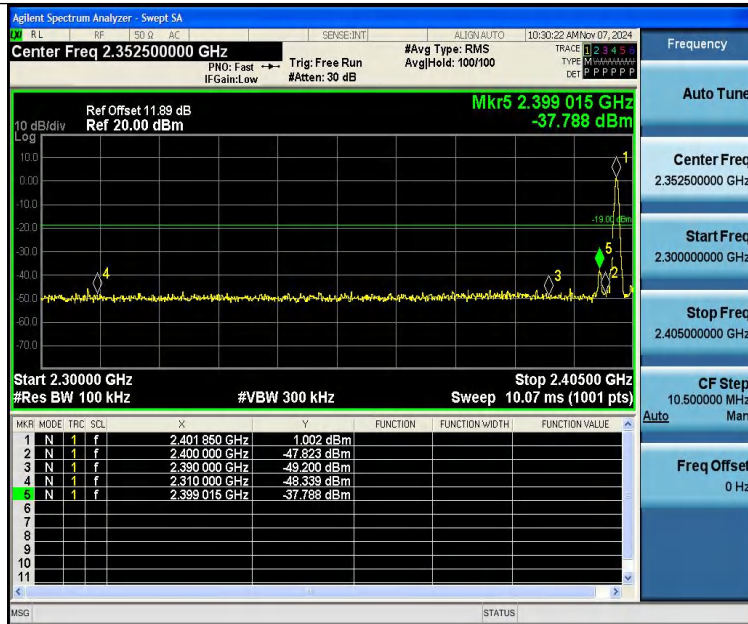
**13.4 Test Data**

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

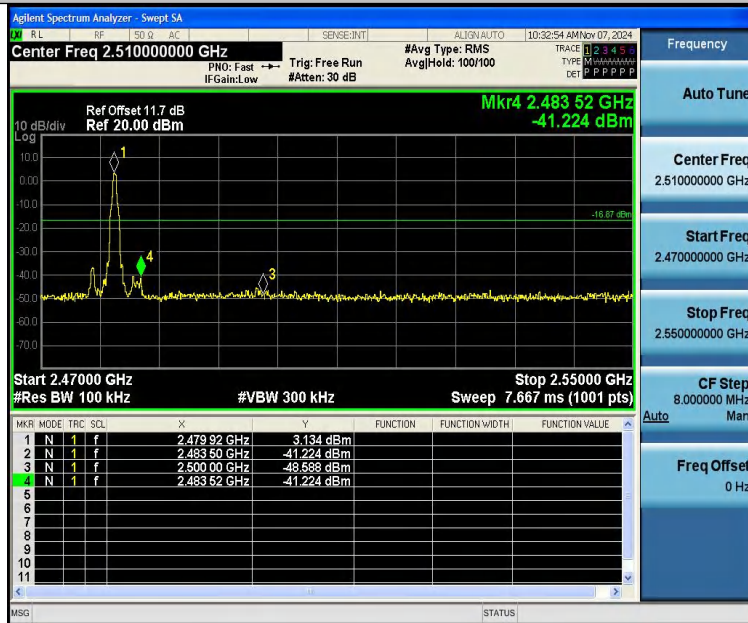
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	1.00	-37.79	≤-19	PASS
DH5	Ant1	High	2480	3.13	-41.22	≤-16.87	PASS
DH5	Ant1	Low	Hop_2402	0.70	-39.9	≤-19.3	PASS
DH5	Ant1	High	Hop_2480	3.22	-44.87	≤-16.78	PASS
2DH5	Ant1	Low	2402	0.85	-38.66	≤-19.15	PASS
2DH5	Ant1	High	2480	3.29	-45.63	≤-16.71	PASS
2DH5	Ant1	Low	Hop_2402	-2.74	-41.71	≤-22.74	PASS
2DH5	Ant1	High	Hop_2480	0.23	-45.89	≤-19.77	PASS



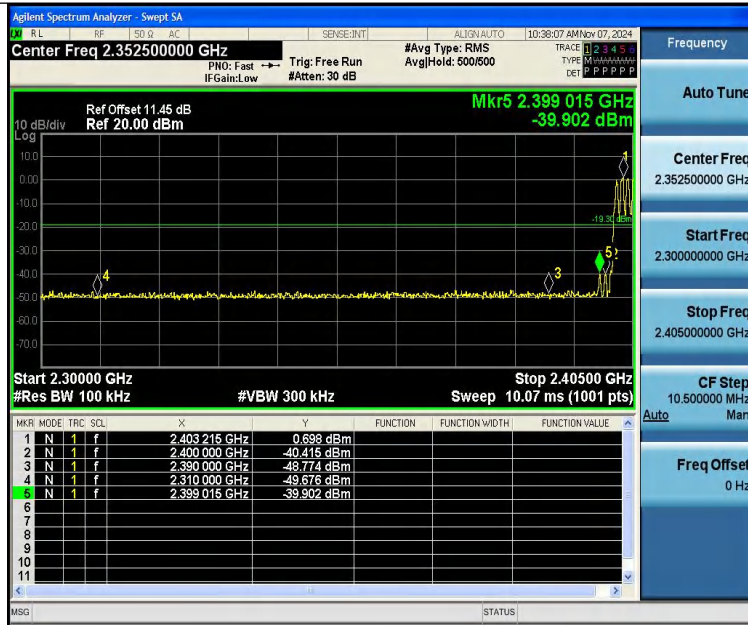
Test Graphs:



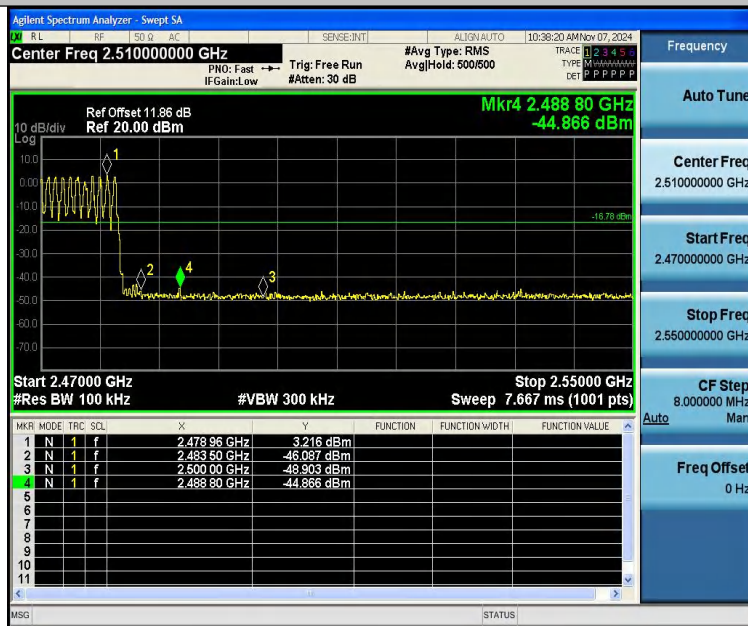
DH5-Ant1-2402-PASS



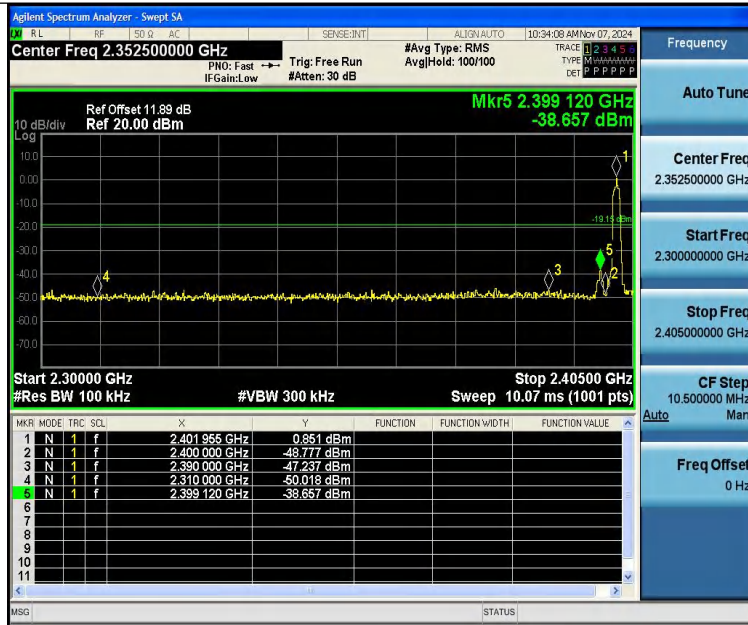
DH5-Ant1-2480-PASS



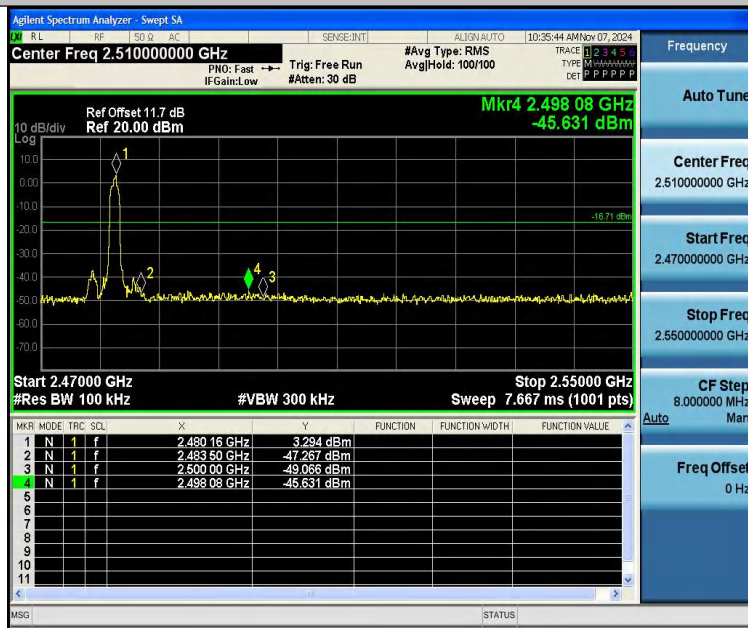
DH5-Ant1-Hop\_2402-PASS



DH5-Ant1-Hop\_2480-PASS

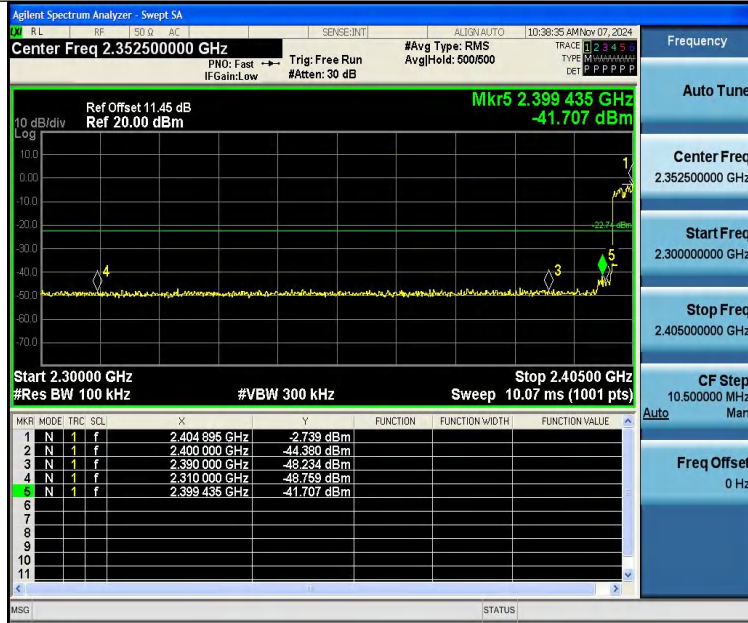


2DH5-Ant1-2402-PASS

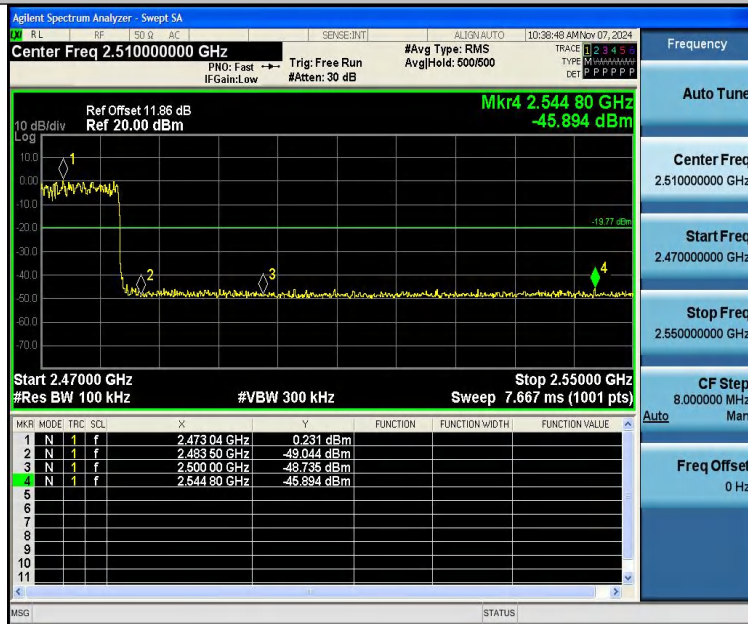


2DH5-Ant1-2480-PASS





2DH5-Ant1-Hop\_2402-PASS



2DH5-Ant1-Hop\_2480-PASS



Conducted Emission Method

Test Result

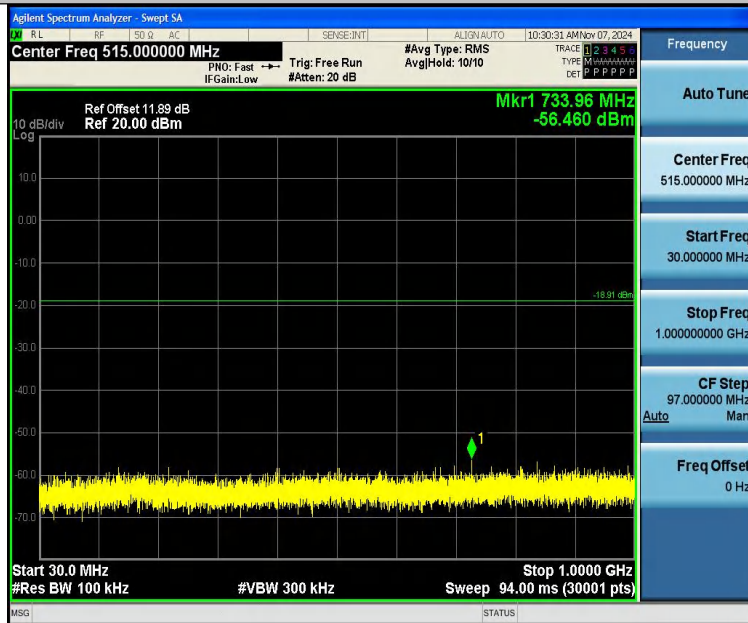
TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	0~Reference	1.09	1.09	---	PASS
DH5	Ant1	2402	30~1000	1.09	-56.46	≤-18.91	PASS
DH5	Ant1	2402	1000~26500	1.09	-41.9	≤-18.91	PASS
DH5	Ant1	2441	0~Reference	2.21	2.21	---	PASS
DH5	Ant1	2441	30~1000	2.21	-57.62	≤-17.79	PASS
DH5	Ant1	2441	1000~26500	2.21	-41.56	≤-17.79	PASS
DH5	Ant1	2480	0~Reference	3.18	3.18	---	PASS
DH5	Ant1	2480	30~1000	3.18	-58.68	≤-16.82	PASS
DH5	Ant1	2480	1000~26500	3.18	-41.31	≤-16.82	PASS
2DH5	Ant1	2402	0~Reference	1.01	1.01	---	PASS
2DH5	Ant1	2402	30~1000	1.01	-58.45	≤-18.99	PASS
2DH5	Ant1	2402	1000~26500	1.01	-41.55	≤-18.99	PASS
2DH5	Ant1	2441	0~Reference	2.14	2.14	---	PASS
2DH5	Ant1	2441	30~1000	2.14	-57.92	≤-17.86	PASS
2DH5	Ant1	2441	1000~26500	2.14	-41.38	≤-17.86	PASS
2DH5	Ant1	2480	0~Reference	0.17	0.17	---	PASS
2DH5	Ant1	2480	30~1000	0.17	-58.51	≤-19.83	PASS
2DH5	Ant1	2480	1000~26500	0.17	-41.27	≤-19.83	PASS



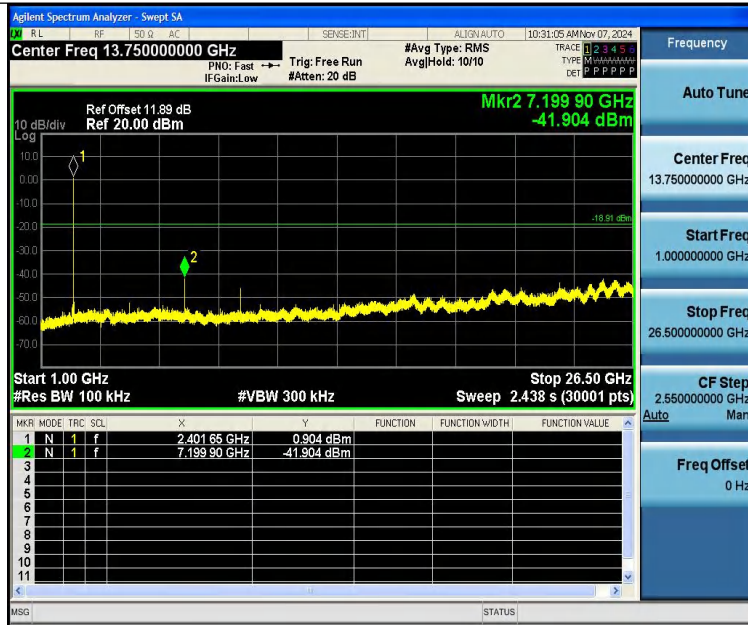
Test Graphs:



DH5-Ant1-2402-0~Reference-PASS



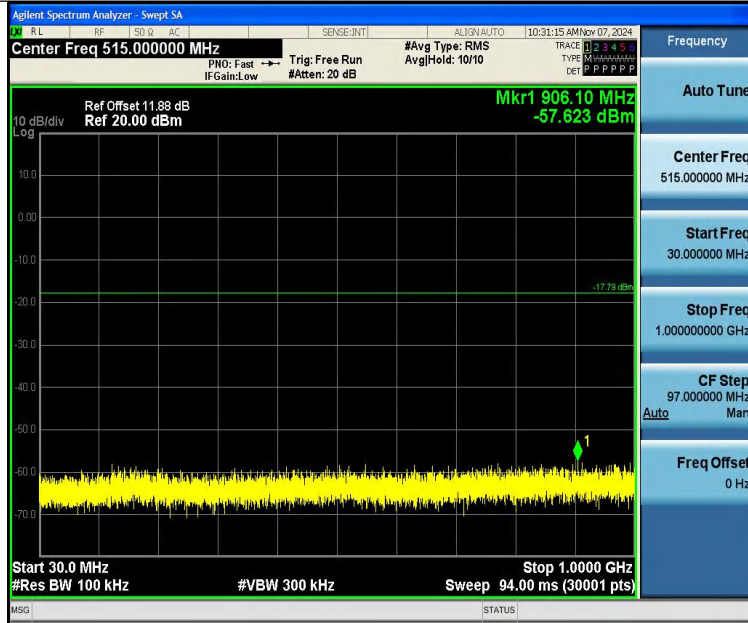
DH5-Ant1-2402-30~1000-PASS



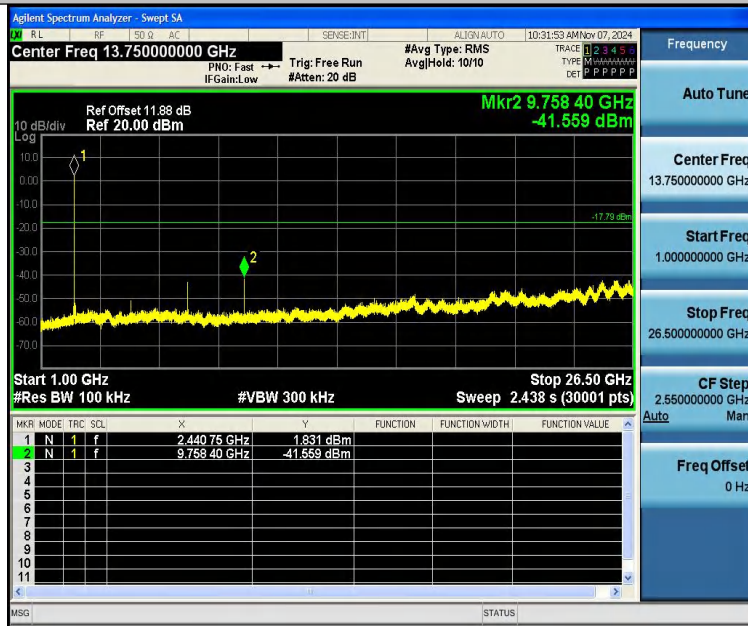
DH5-Ant1-2402-1000~26500-PASS



DH5-Ant1-2441-0~Reference-PASS



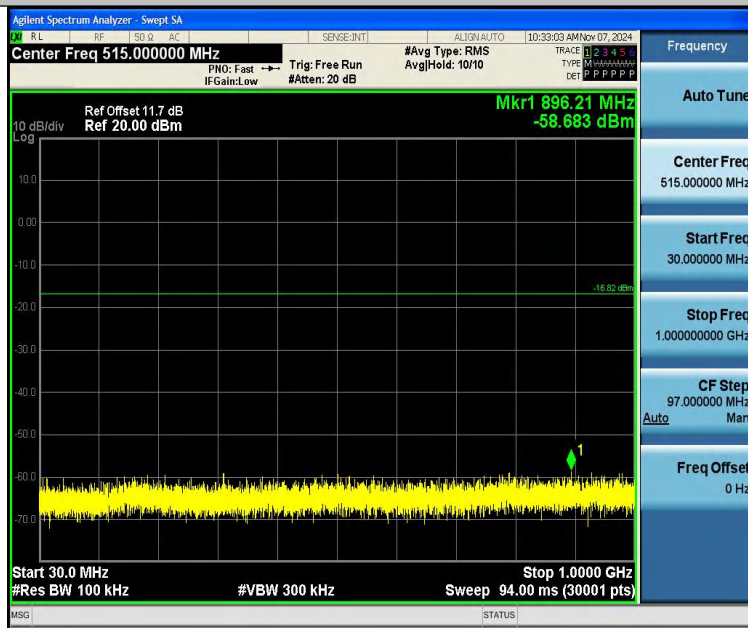
DH5-Ant1-2441-30~1000-PASS



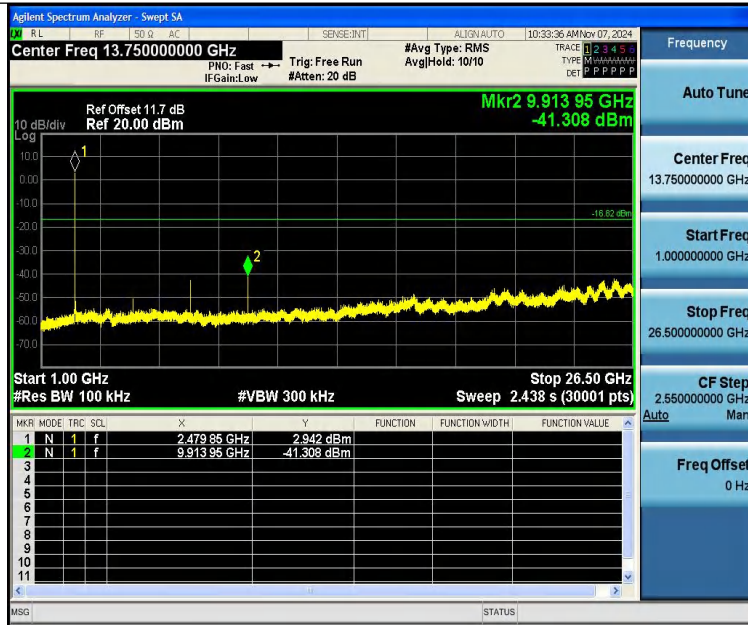
DH5-Ant1-2441-1000~26500-PASS



DH5-Ant1-2480-0~Reference-PASS



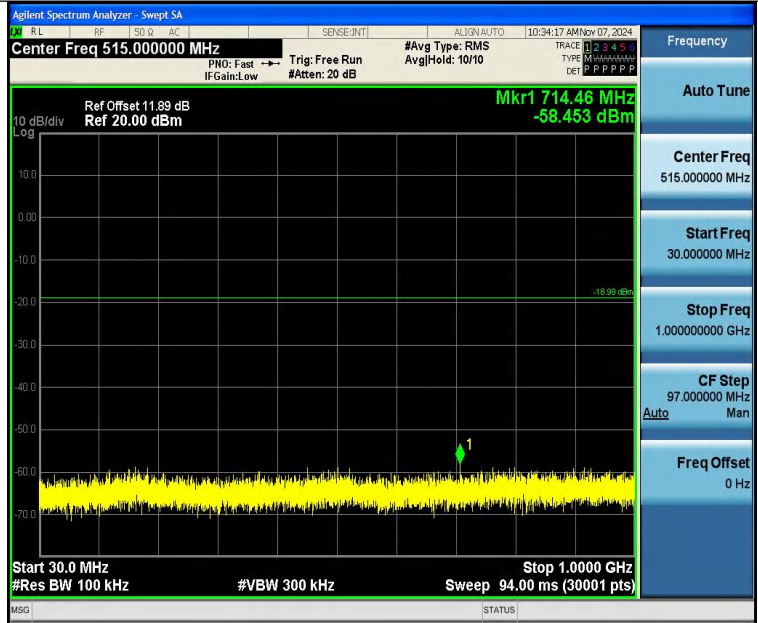
DH5-Ant1-2480-30~1000-PASS



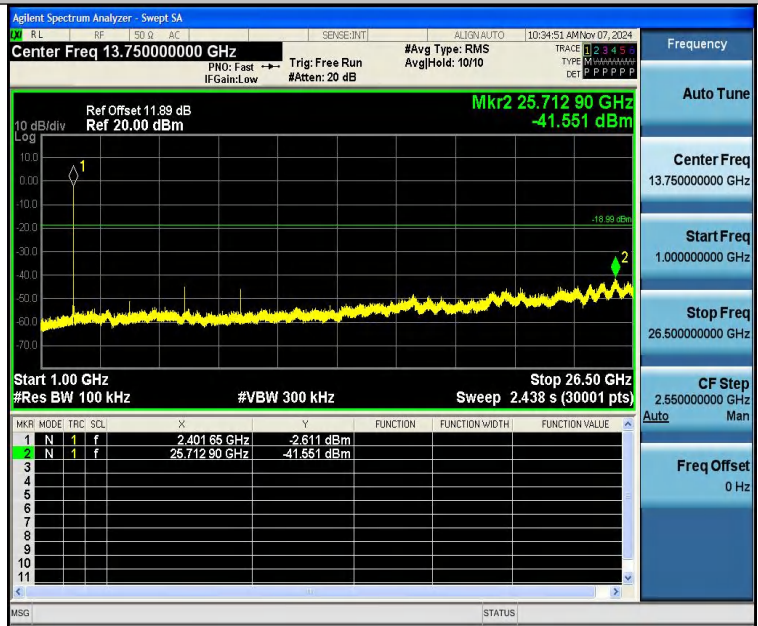
DH5-Ant1-2480-1000~2650-PASS



2DH5-Ant1-2402-0~Reference-PASS



2DH5-Ant1-2402-30~1000-PASS

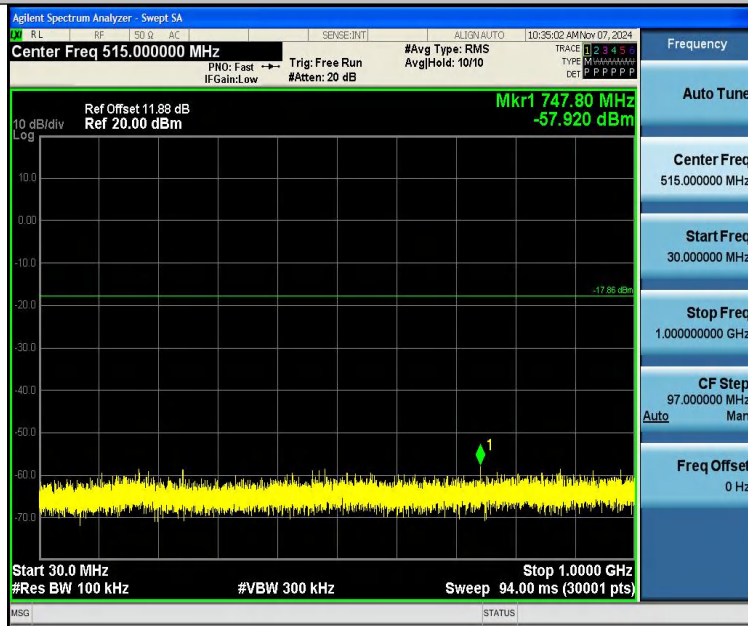


2DH5-Ant1-2402-1000~26500-PASS

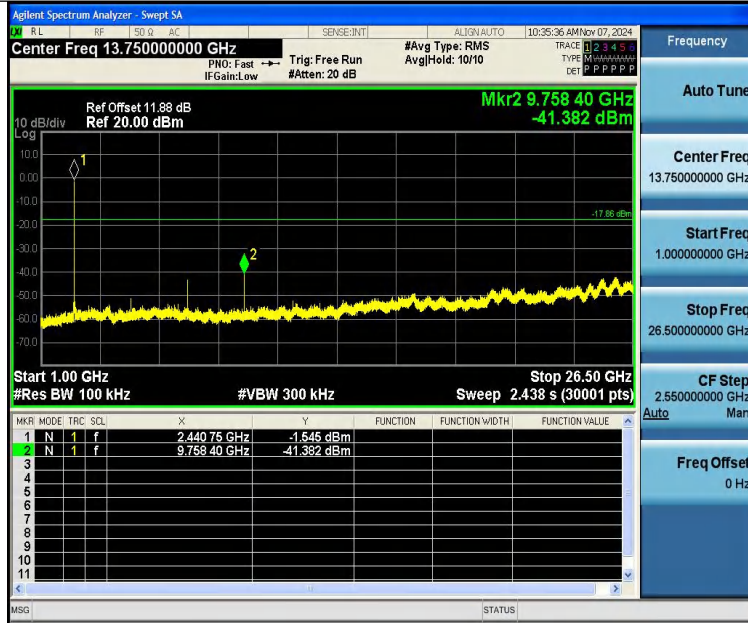




2DH5-Ant1-2441-0~Reference-PASS



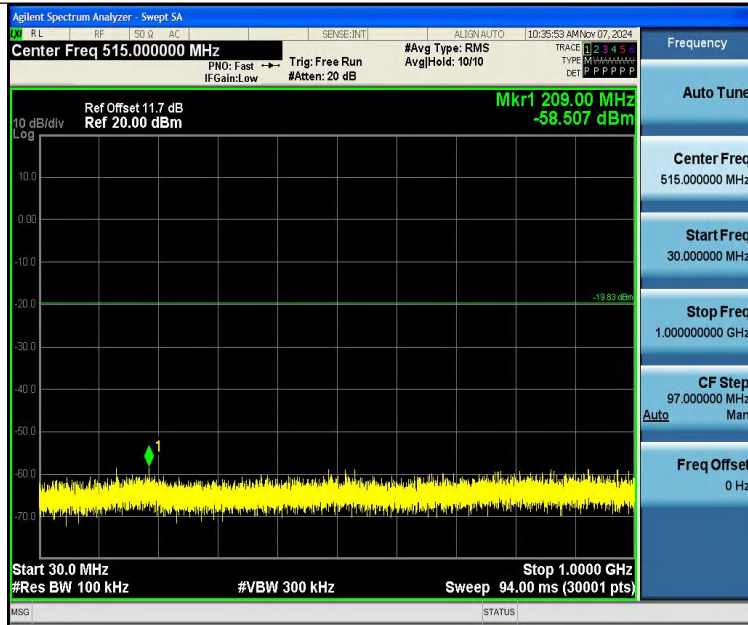
2DH5-Ant1-2441-30~1000-PASS



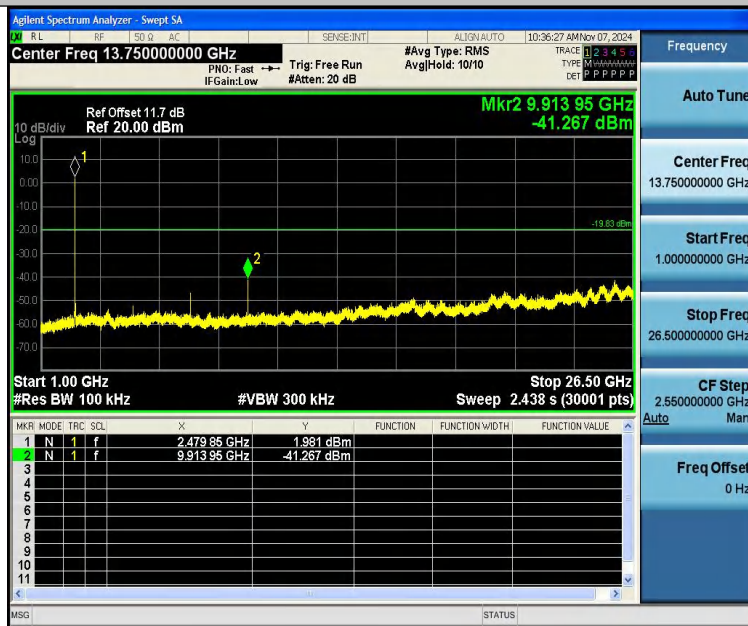
2DH5-Ant1-2441-1000~26500-PASS



2DH5-Ant1-2480-0~Reference-PASS



2DH5-Ant1-2480-30~1000-PASS



2DH5-Ant1-2480-1000~26500-PASS



## 14 Antenna Requirement

### 14.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(c)
Requirement	<p>1) 15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> <p>2) 15.247(c) (1)(i) requirement:</p> <p>Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.</p>

### 14.2 Antenna Connected Construction

The antenna is Ceramic Antenna which permanently attached, and the best case gain of the antenna is 2.78 dBi. It complies with the standard requirement.

## 15 APPENDIX I -- TEST SETUP PHOTOGRAPH

Radiated Emissions  
From 30M-1GHz



Above 1GHz



## 16 APPENDIX II -- EUT PHOTOGRAPH



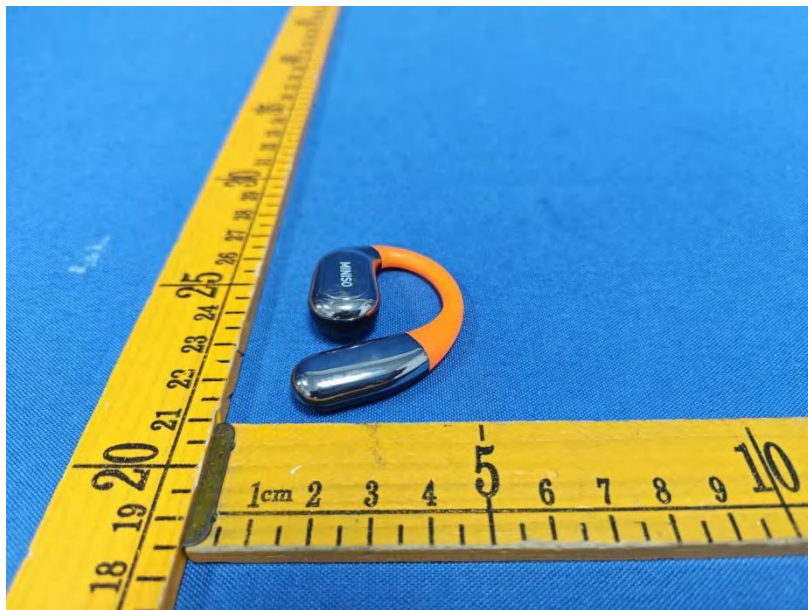


L:

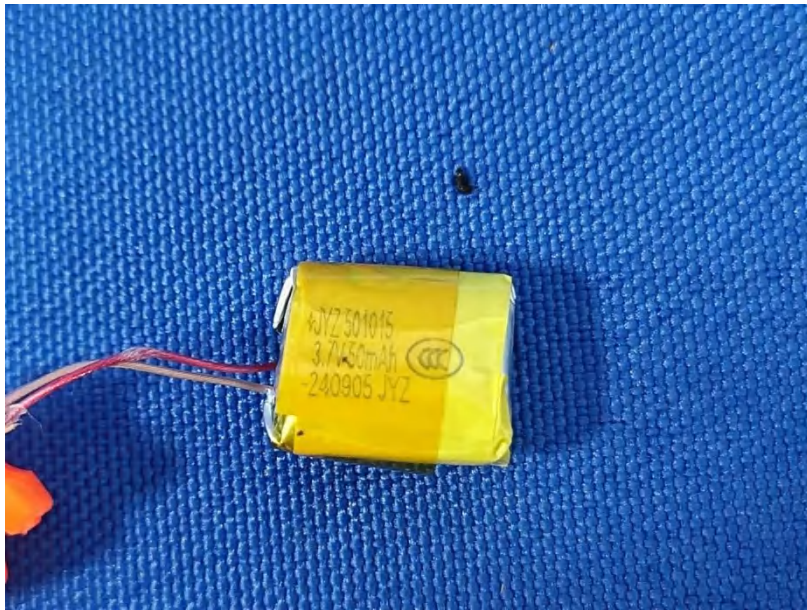
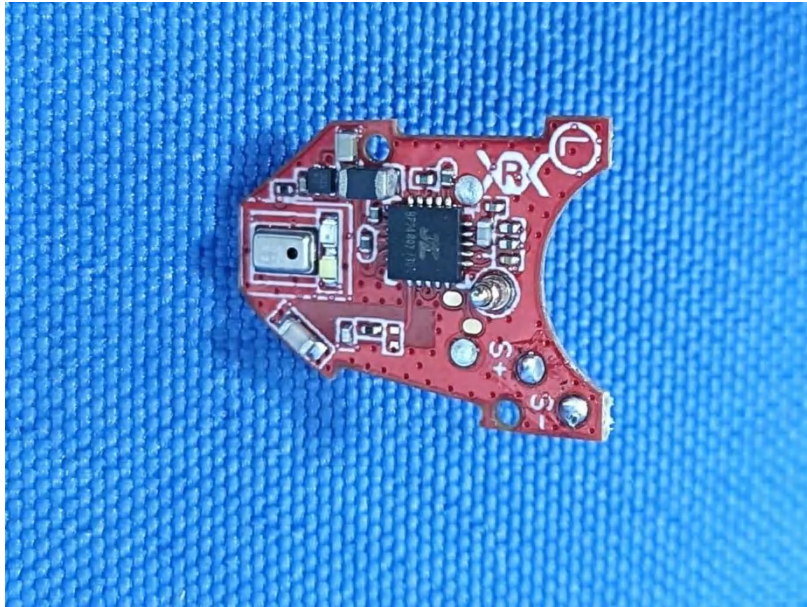


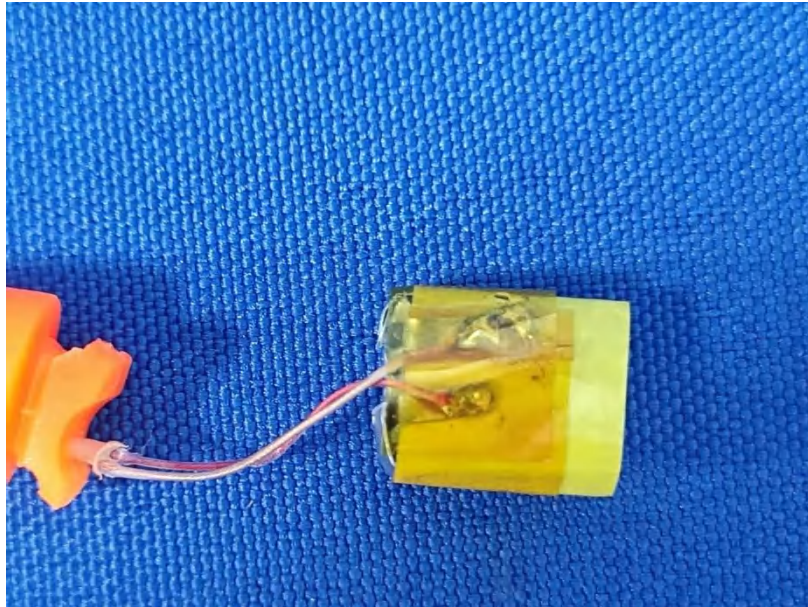












R:

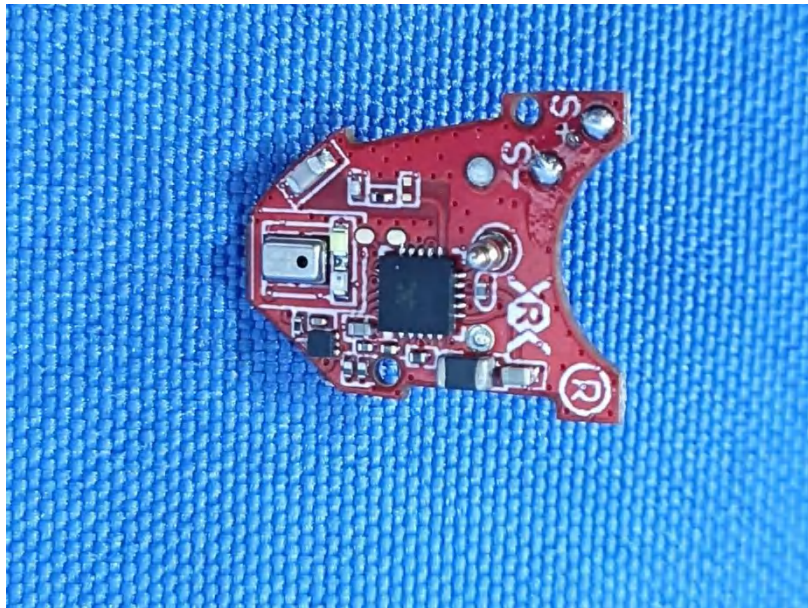
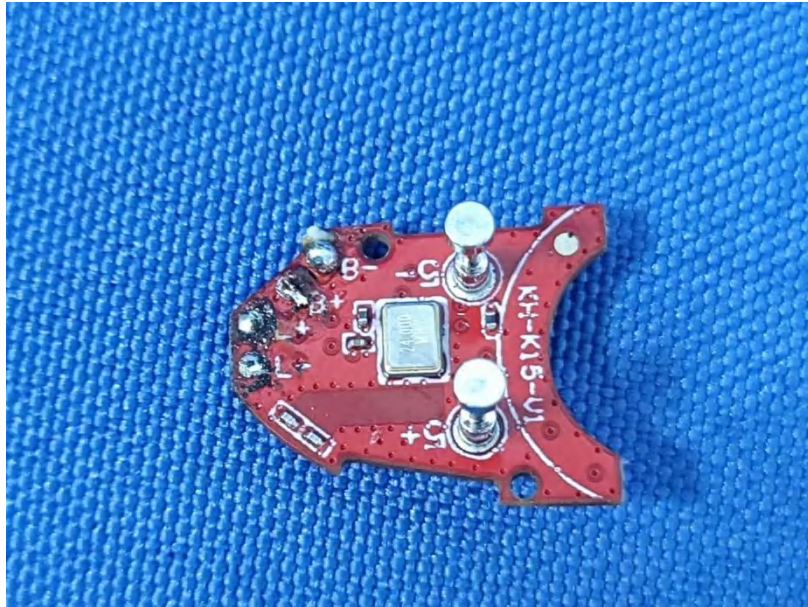


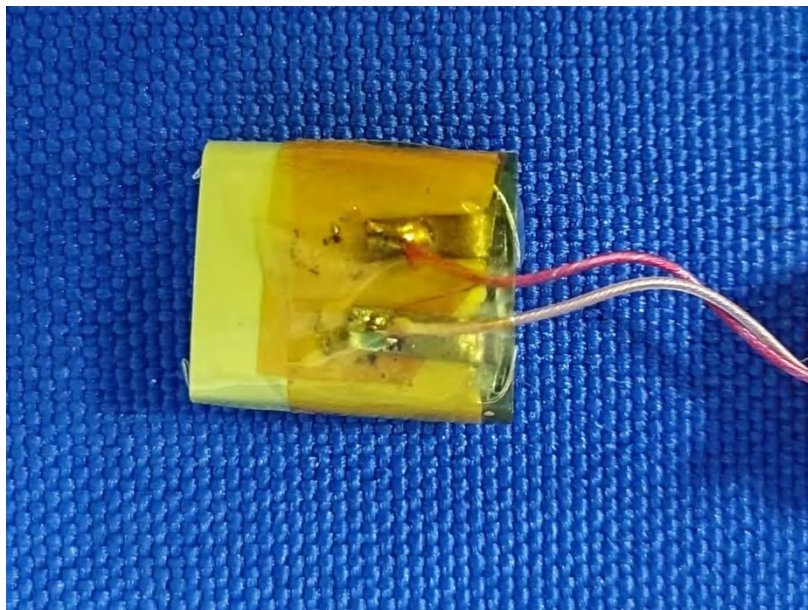
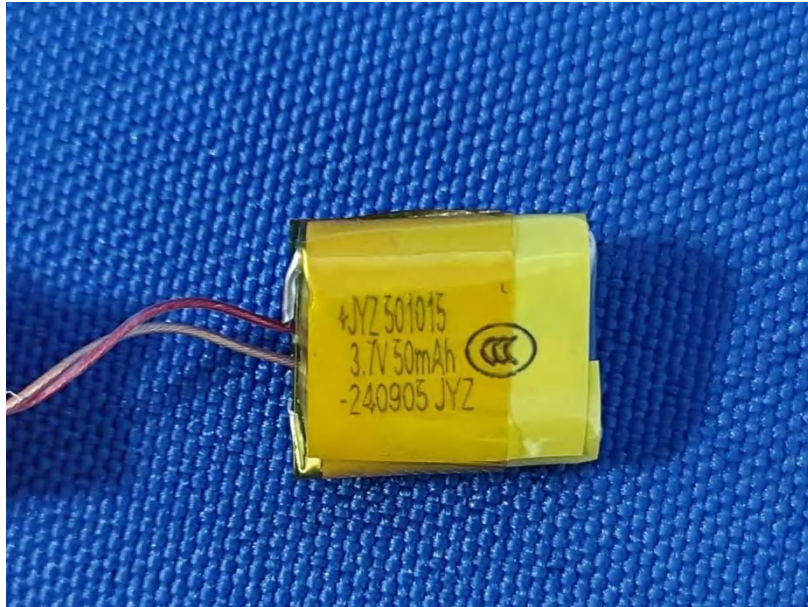












**\*\*\*\*\*THE END REPORT\*\*\*\*\***