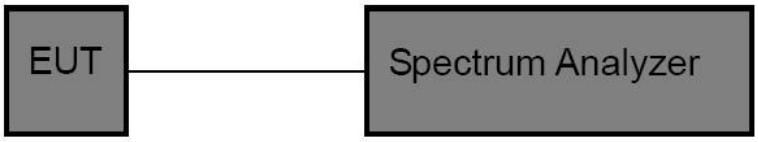
11 Number of Hopping Channel Test

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.

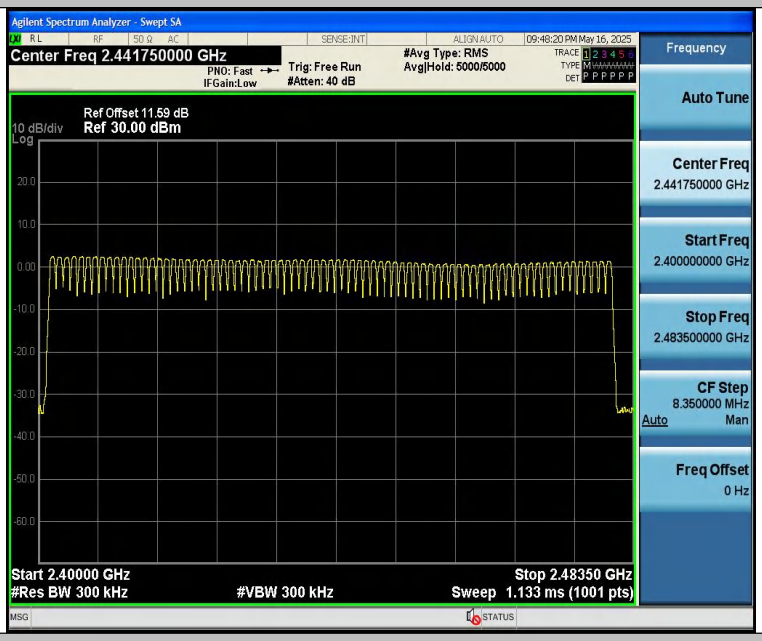
11.4 Test Data

Test Item	:	Number of Hopping Frequency	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3.7V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	55%RH

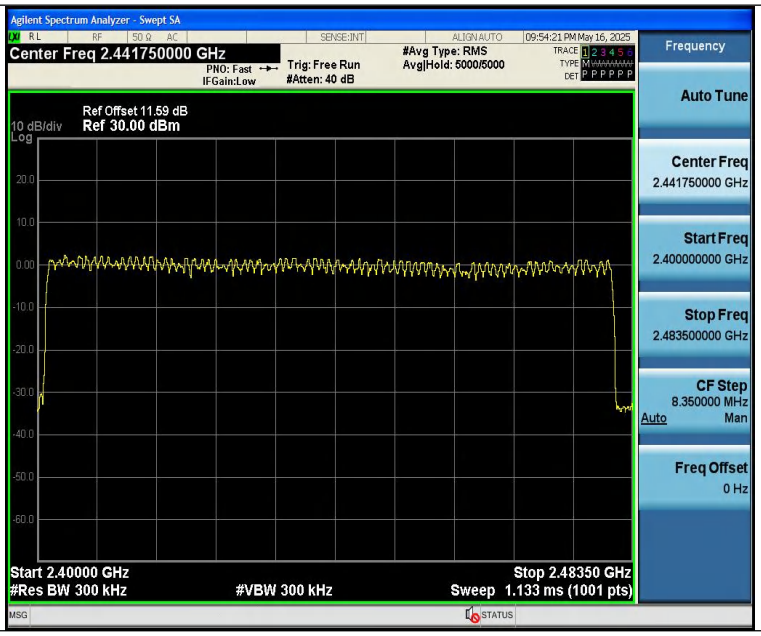
TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
2DH5	Ant1	Hop	79	≥15	PASS

Test Graphs:

DH5-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS

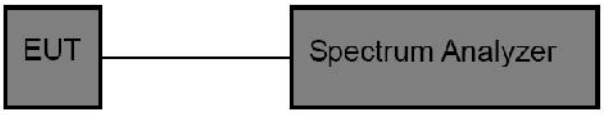

Agilent Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 40 dB
#Avg Type: RMS
Avg|Hold: 5000/5000
09:54:21 PM May 16, 2025
Ref Offset 11.59 dB
10 dB/div
Ref 30.00 dBm
Log
Start 2.40000 GHz
#Res BW 300 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 1.133 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz

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	:	DC 3.7V	Temperature	:	24.5℃
Test Result	:	PASS	Humidity	:	55%RH

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Hop	2.884	106.67	0.308	≤0.4	PASS
2DH5	Ant1	Hop	2.889	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:

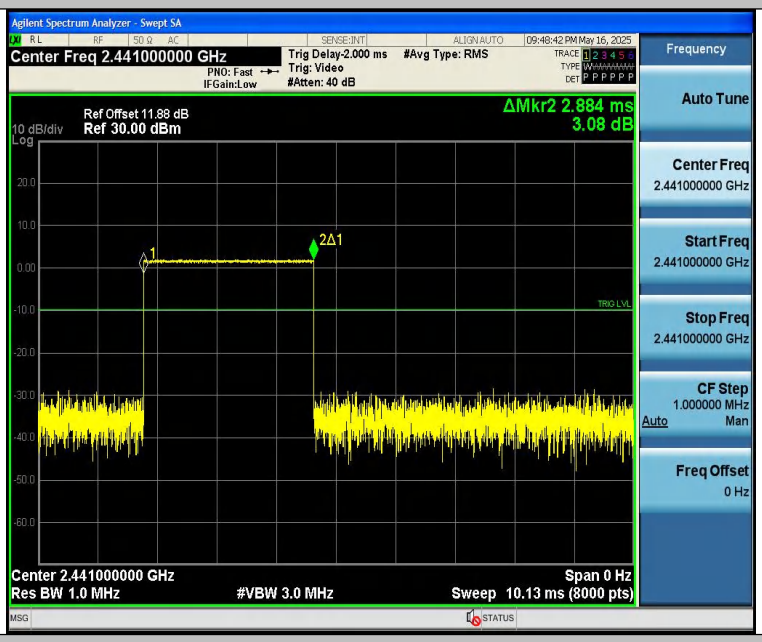
1.DH1/2DH1 Dwell Time: Reading * (1600/2)*31.6/(channel number).

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

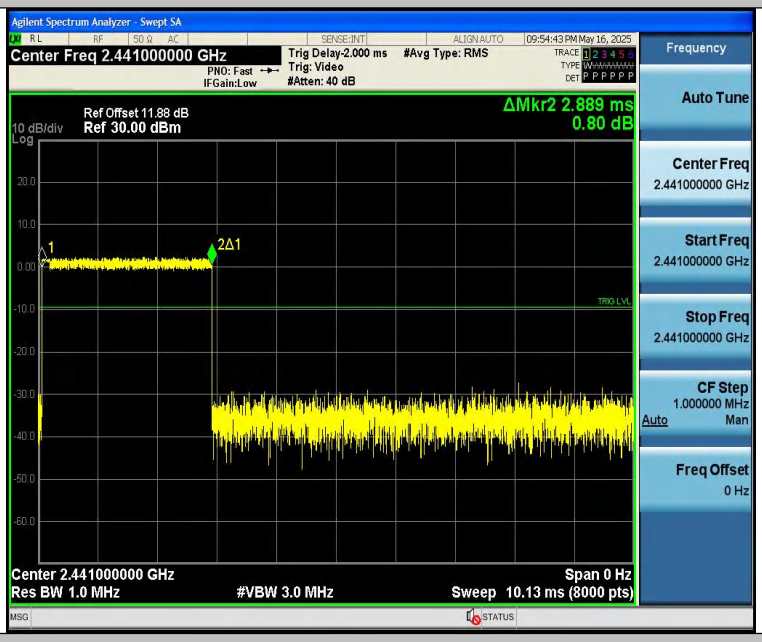
3.DH5/2DH5 Dwell Time: Reading * (1600/6)*31.6/(channel number).

Test Graphs:

DH5-Ant1-Hop-PASS

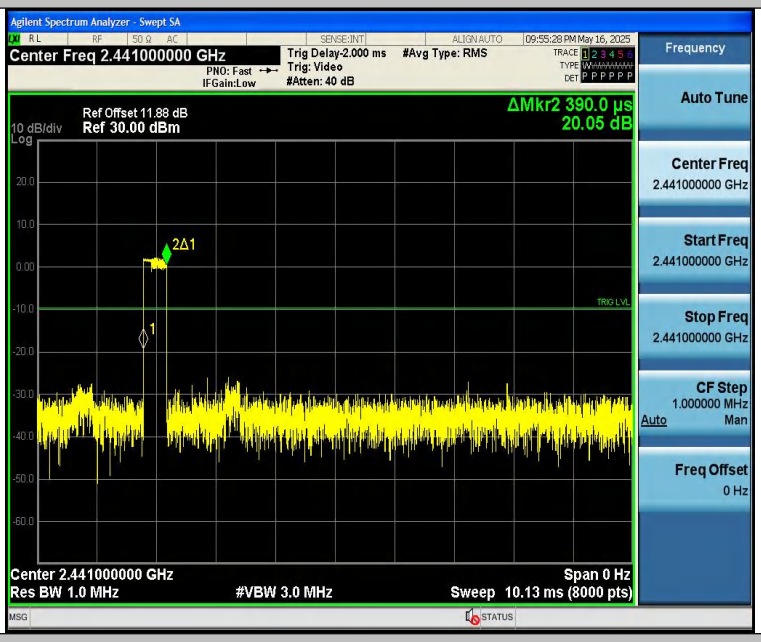


2DH5-Ant1-Hop-PASS



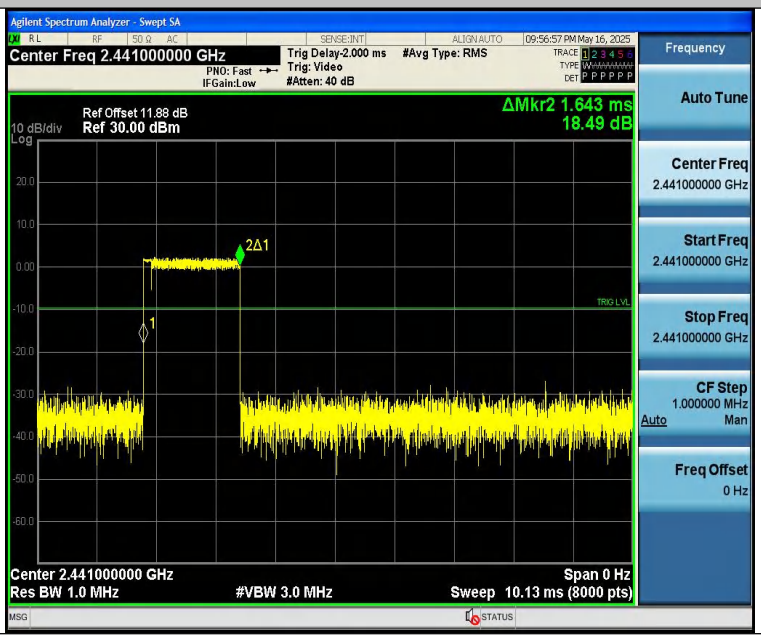
DH1-Ant1-Hop-PASS

2DH1-Ant1-Hop-PASS



DH3-Ant1-Hop-PASS

2DH3-Ant1-Hop-PASS

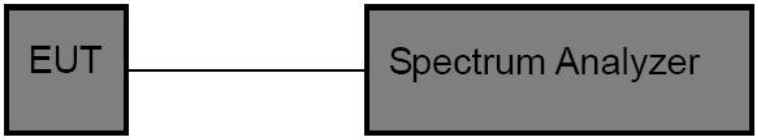


13 100kHz Bandwidth of Frequency Band Edge Requirement

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 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.

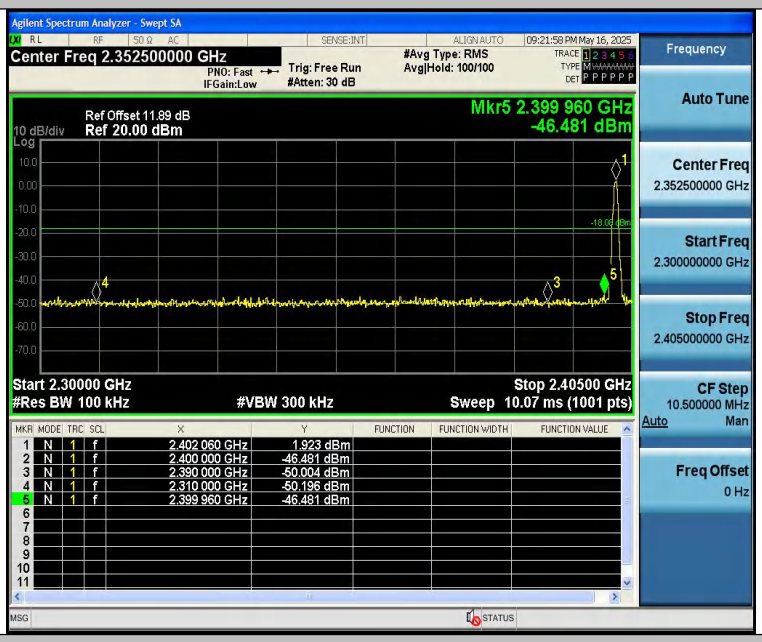
13.4 Test Data

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

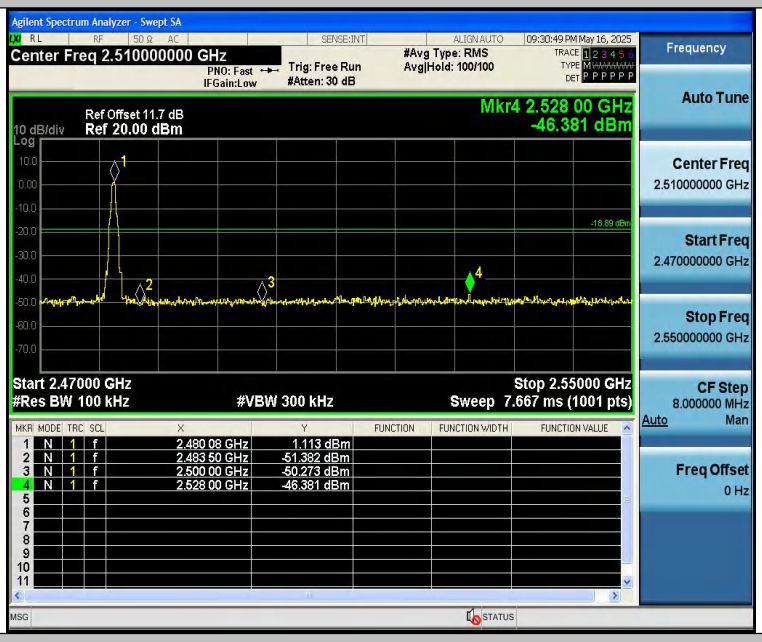
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	1.92	-46.48	≤-18.08	PASS
DH5	Ant1	High	2480	1.11	-46.38	≤-18.89	PASS
DH5	Ant1	Low	Hop_2402	1.53	-46.11	≤-18.47	PASS
DH5	Ant1	High	Hop_2480	0.91	-45.94	≤-19.09	PASS
2DH5	Ant1	Low	2402	2.42	-45.89	≤-17.58	PASS
2DH5	Ant1	High	2480	-1.64	-46.6	≤-21.64	PASS
2DH5	Ant1	Low	Hop_2402	-1.93	-46.6	≤-21.93	PASS
2DH5	Ant1	High	Hop_2480	-2.13	-46.5	≤-22.13	PASS

Test Graphs:

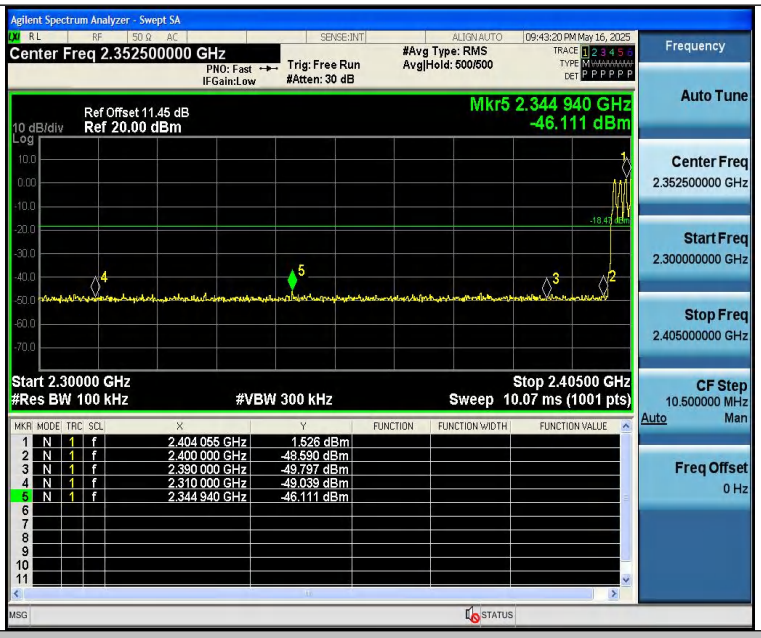
DH5-Ant1-2402-PASS



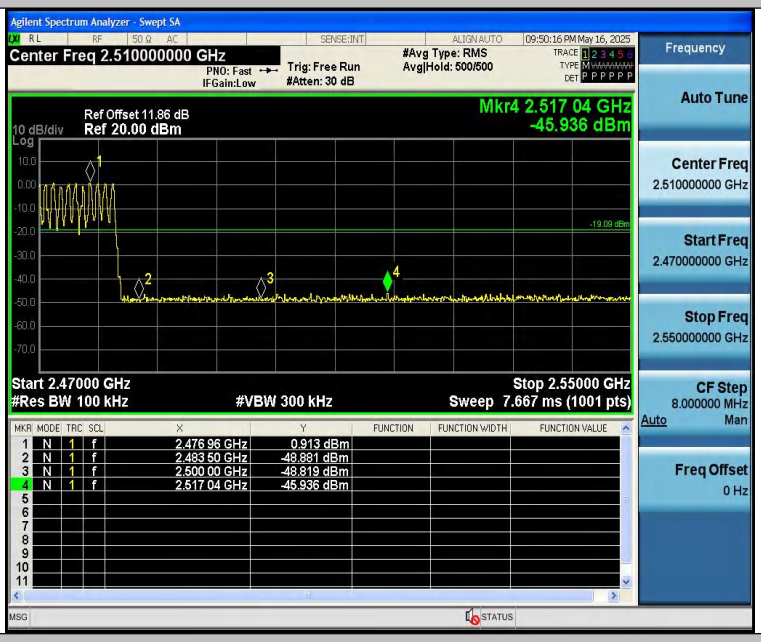
DH5-Ant1-2480-PASS



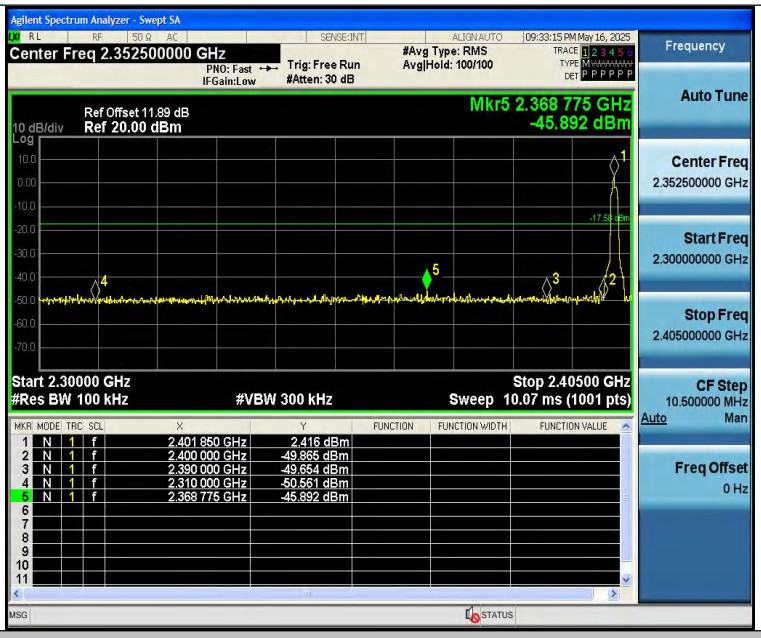
DH5-Ant1-Hop_2402-PASS



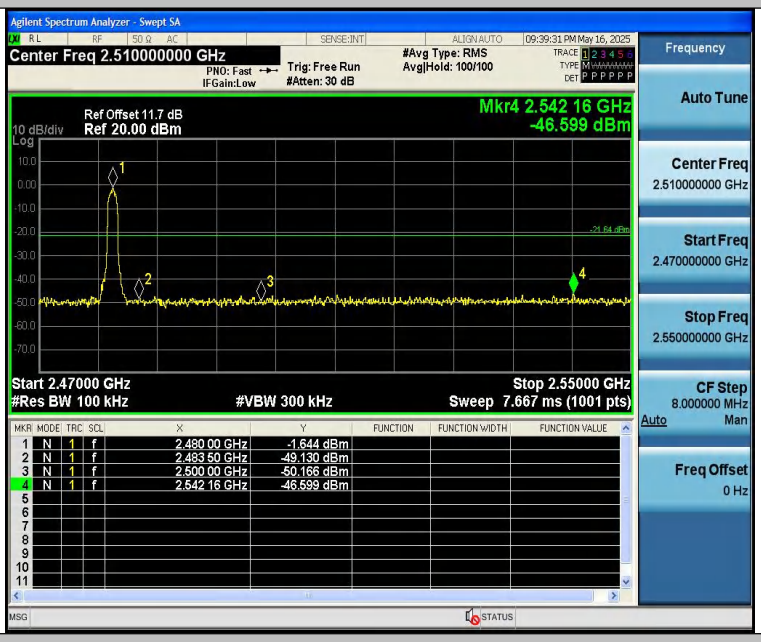
DH5-Ant1-Hop_2480-PASS



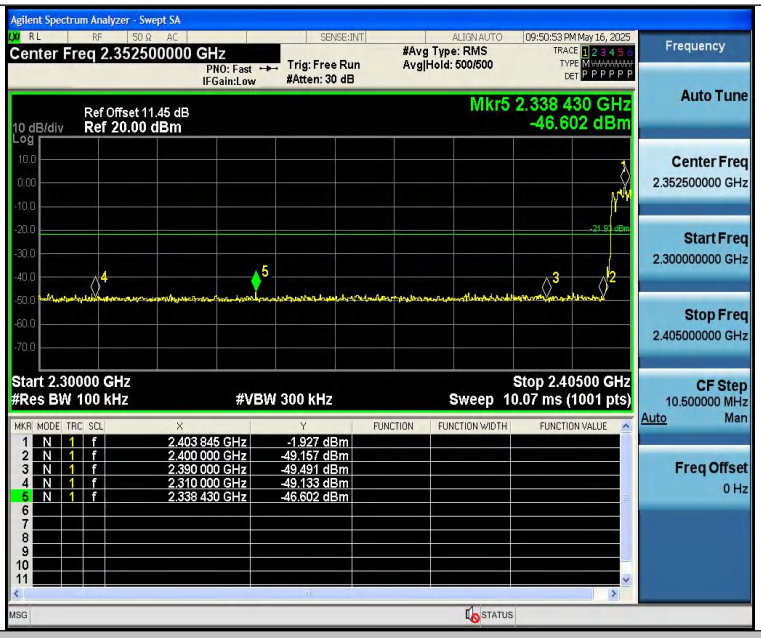
2DH5-Ant1-2402-PASS



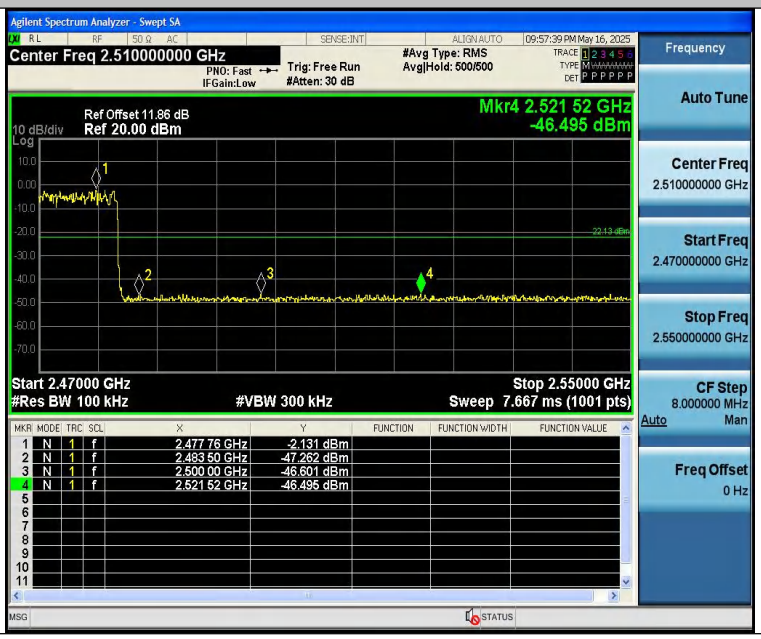
2DH5-Ant1-2480-PASS



2DH5-Ant1-Hop_2402-PASS



2DH5-Ant1-Hop_2480-PASS



Conducted Emission Method

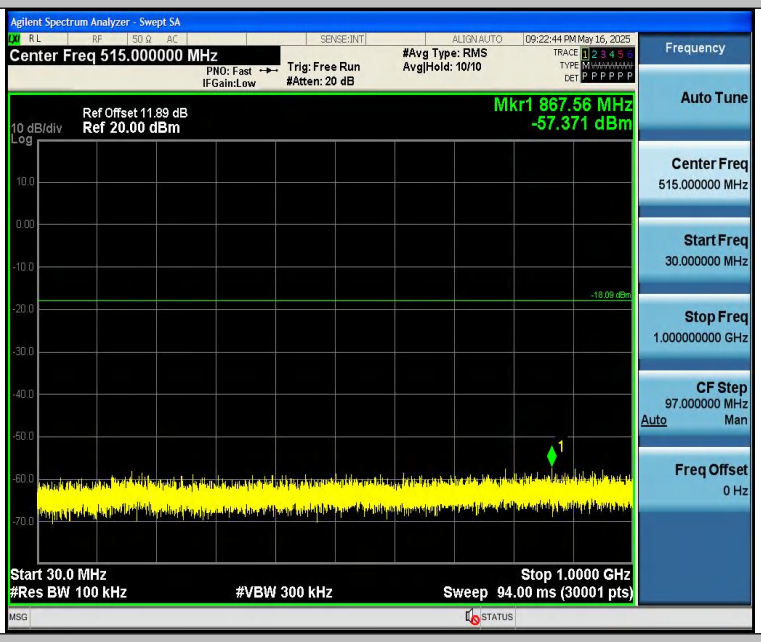
Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	0~Reference	1.91	1.91	---	PASS
DH5	Ant1	2402	30~1000	1.91	-57.37	≤-18.09	PASS
DH5	Ant1	2402	1000~26500	1.91	-41.58	≤-18.09	PASS
DH5	Ant1	2441	0~Reference	1.39	1.39	---	PASS
DH5	Ant1	2441	30~1000	1.39	-57.38	≤-18.61	PASS
DH5	Ant1	2441	1000~26500	1.39	-42.16	≤-18.61	PASS
DH5	Ant1	2480	0~Reference	0.99	0.99	---	PASS
DH5	Ant1	2480	30~1000	0.99	-57.3	≤-19.01	PASS
DH5	Ant1	2480	1000~26500	0.99	-41.01	≤-19.01	PASS
2DH5	Ant1	2402	0~Reference	2.24	2.24	---	PASS
2DH5	Ant1	2402	30~1000	2.24	-57.35	≤-17.76	PASS
2DH5	Ant1	2402	1000~26500	2.24	-40.55	≤-17.76	PASS
2DH5	Ant1	2441	0~Reference	0.08	0.08	---	PASS
2DH5	Ant1	2441	30~1000	0.08	-56.92	≤-19.92	PASS
2DH5	Ant1	2441	1000~26500	0.08	-42.49	≤-19.92	PASS
2DH5	Ant1	2480	0~Reference	1.07	1.07	---	PASS
2DH5	Ant1	2480	30~1000	1.07	-57.53	≤-18.93	PASS
2DH5	Ant1	2480	1000~26500	1.07	-41.07	≤-18.93	PASS

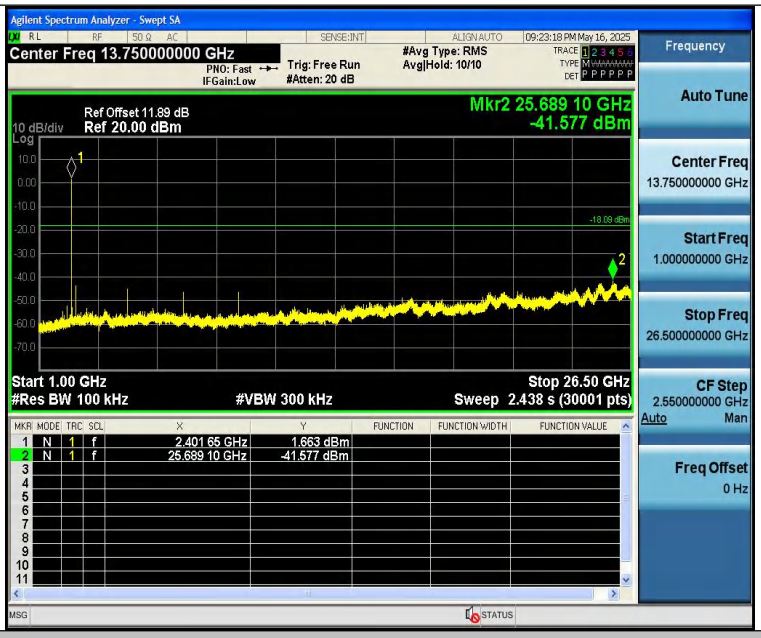
Test Graphs:

DH5-Ant1-2402-0~Reference-PASS

DH5-Ant1-2402-30~1000-PASS

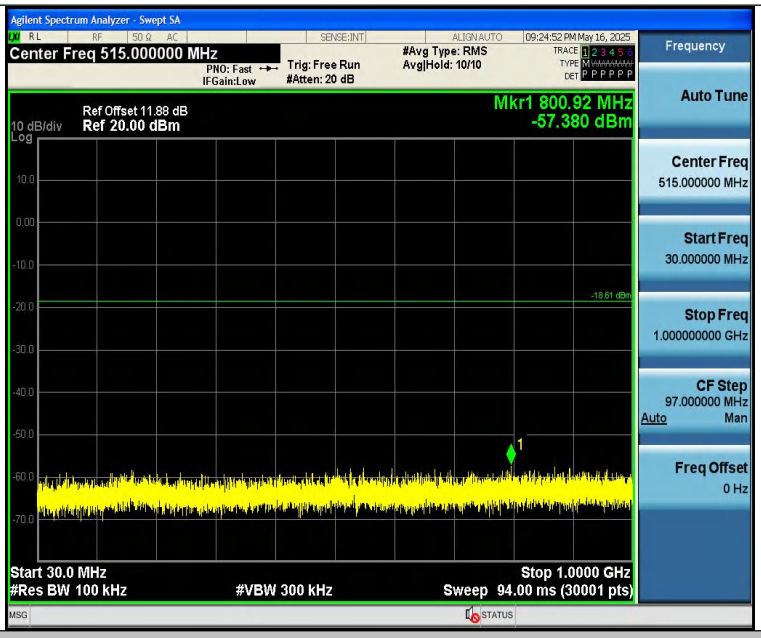


DH5-Ant1-2402-1000~26500-PASS

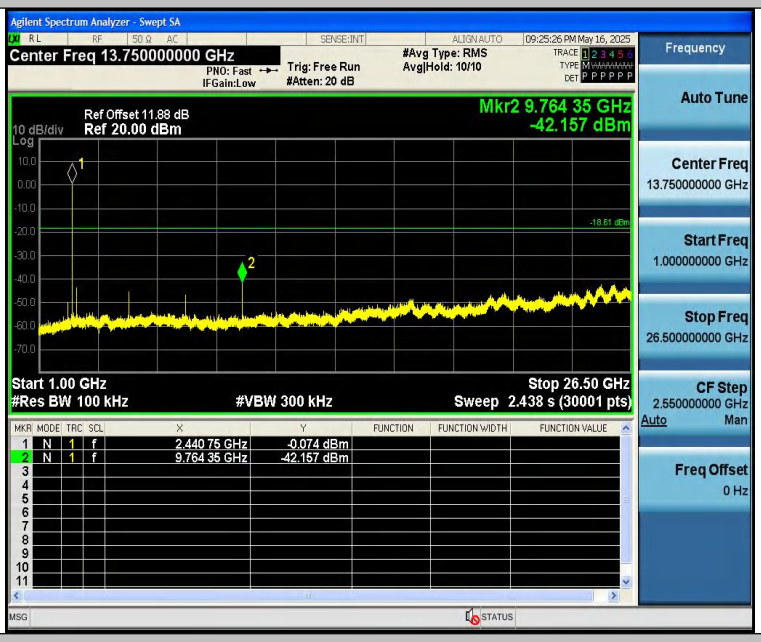


DH5-Ant1-2441-0~Reference-PASS

DH5-Ant1-2441-30~1000-PASS

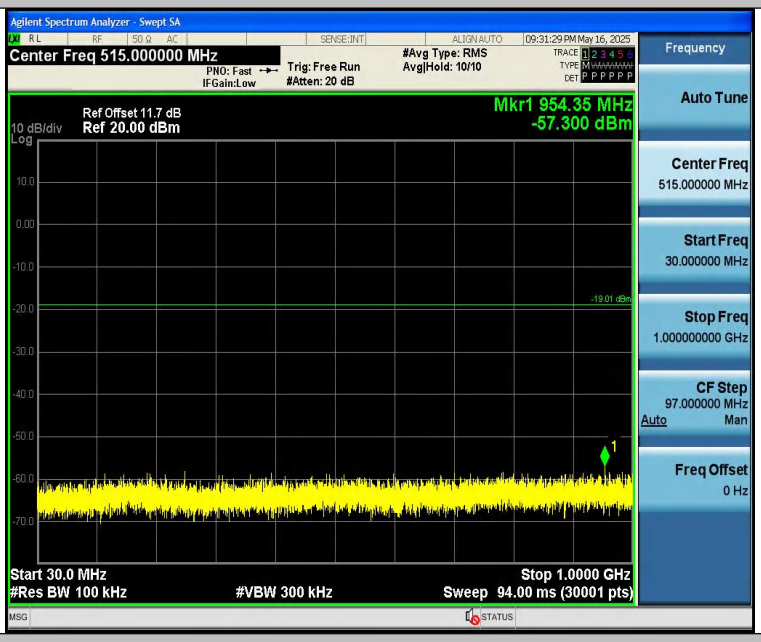


DH5-Ant1-2441-1000~26500-PASS

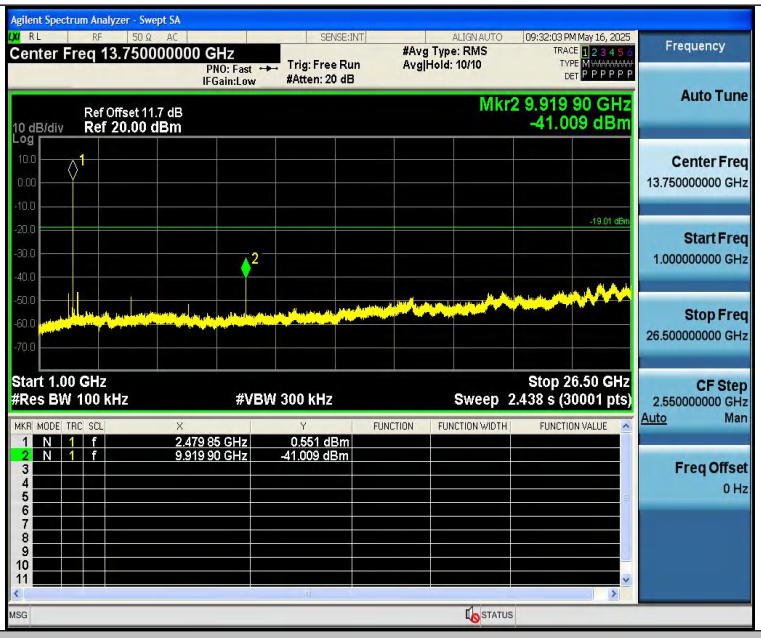


DH5-Ant1-2480-0~Reference-PASS

DH5-Ant1-2480-30~1000-PASS

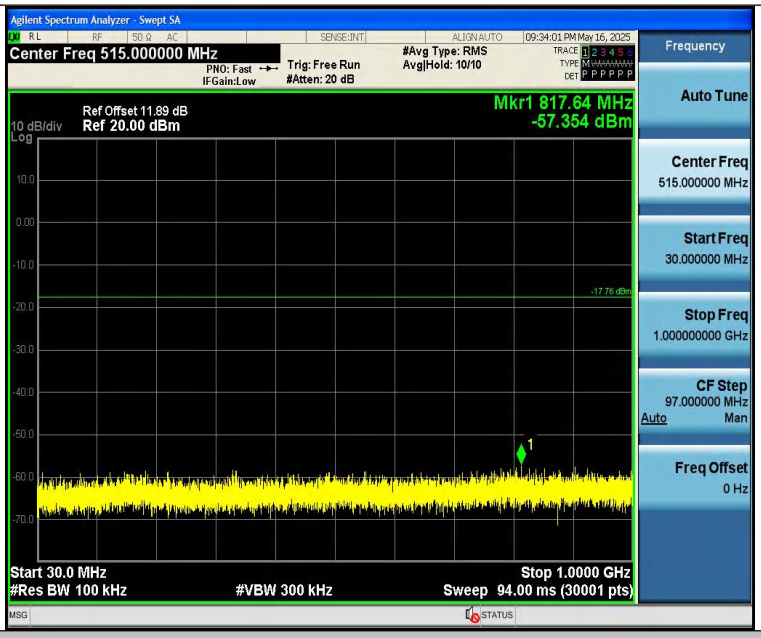


DH5-Ant1-2480-1000~26500-PASS

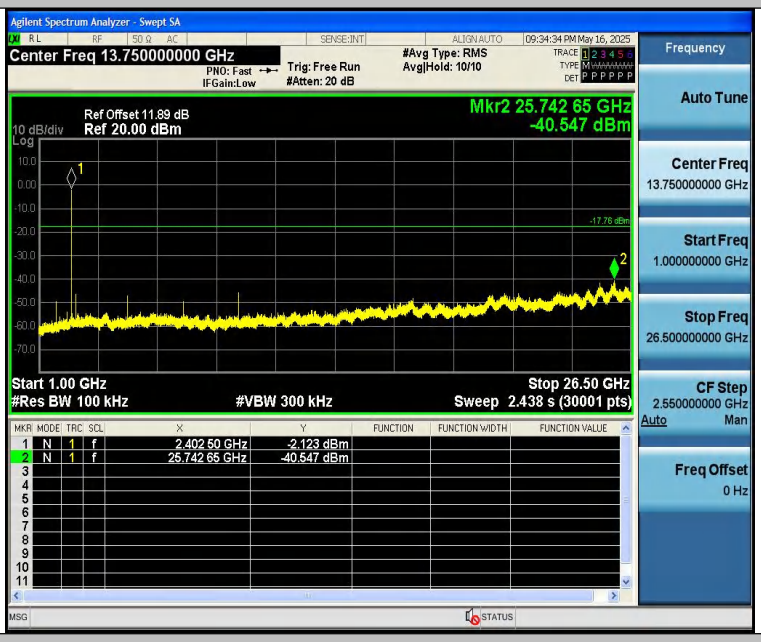


2DH5-Ant1-2402-0~Reference-PASS

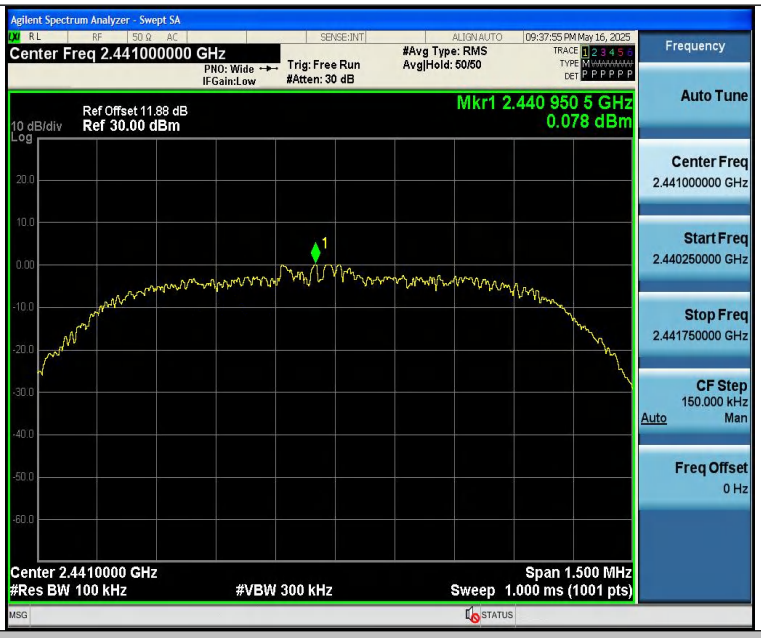
2DH5-Ant1-2402-30~1000-PASS



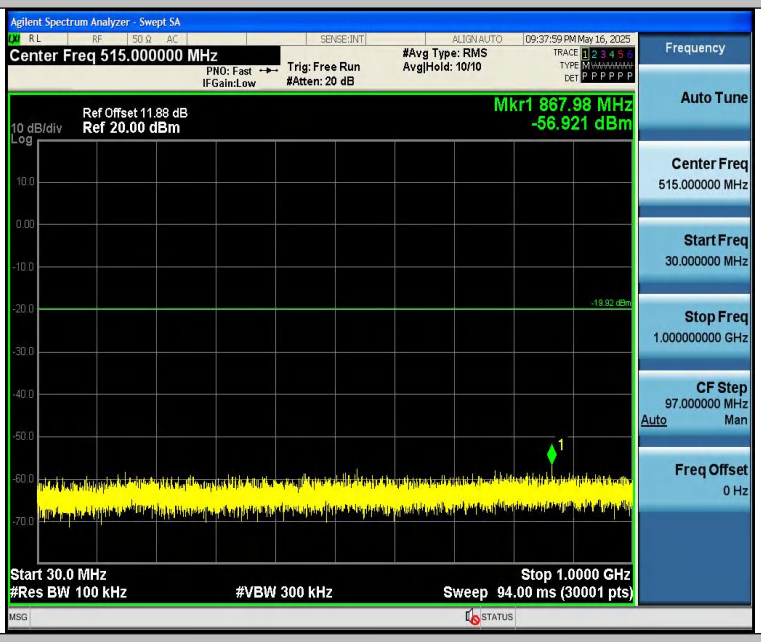
2DH5-Ant1-2402-1000~26500-PASS



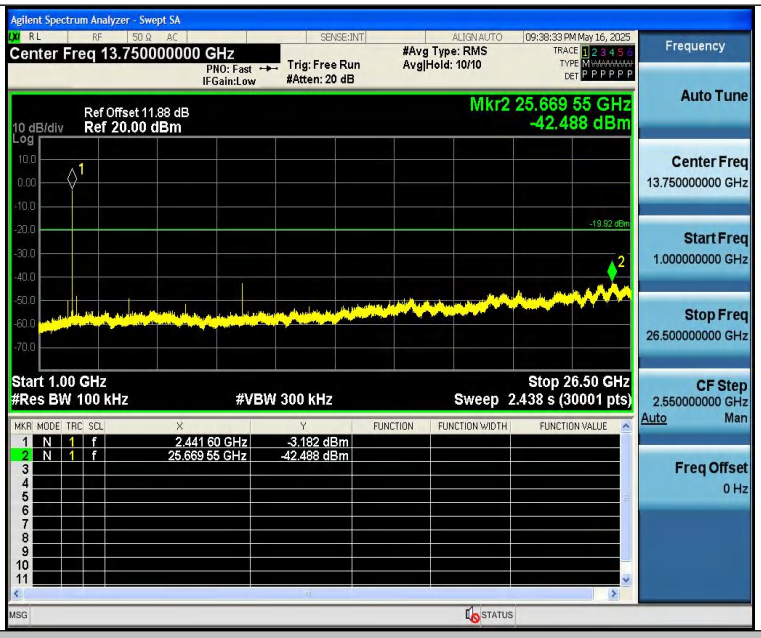
2DH5-Ant1-2441-0~Reference-PASS



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

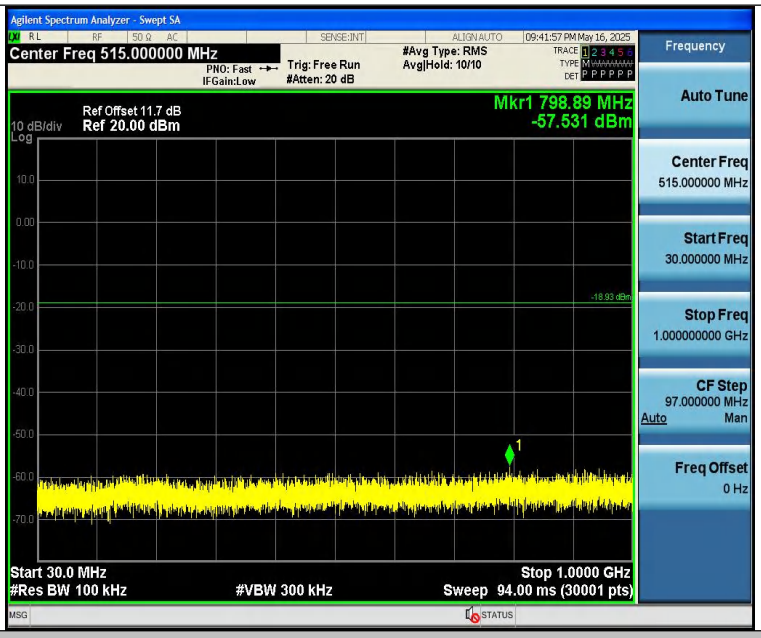


2DH5-Ant1-2441-1000~26500-PASS

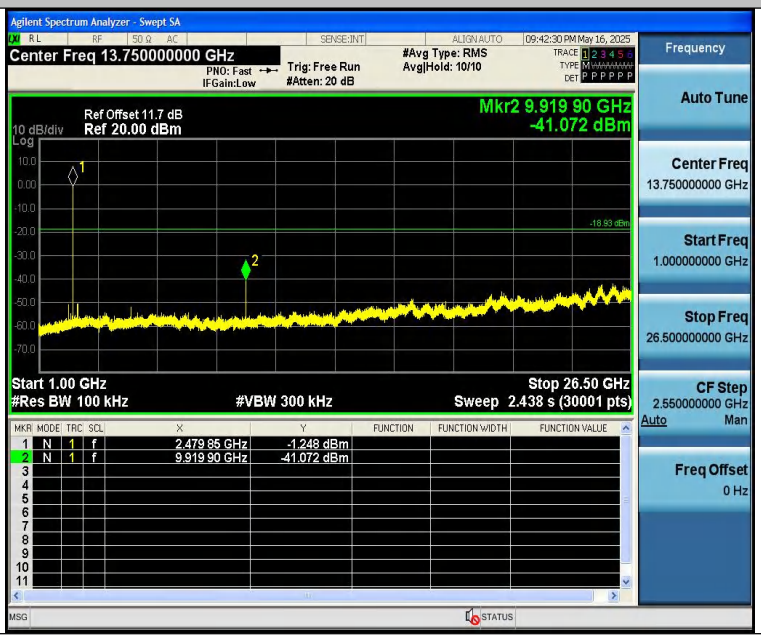


2DH5-Ant1-2480-0~Reference-PASS

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	1) 15.203 requirement: 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. 2) 15.247(c) (1)(i) requirement: 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.

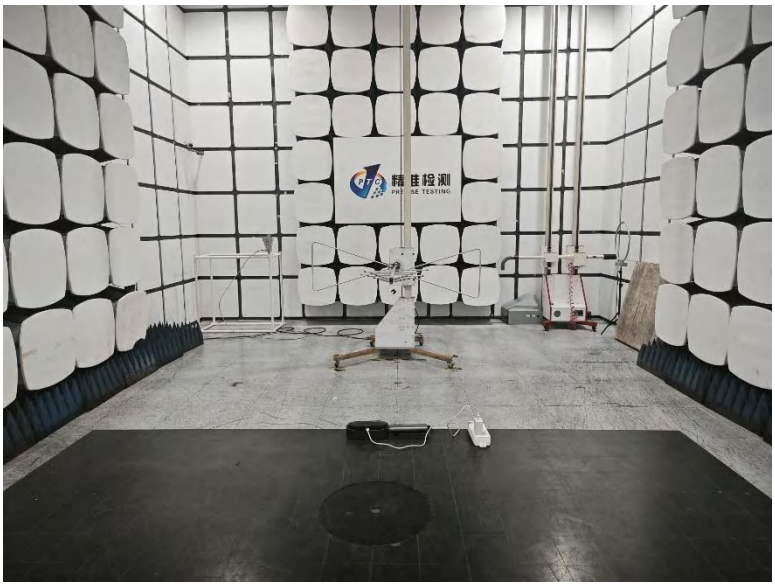
14.2 Antenna Connected Construction

The antenna is PCB Antenna which permanently attached, and the best case gain of the antenna is 1.04 dBi. It complies with the standard requirement.

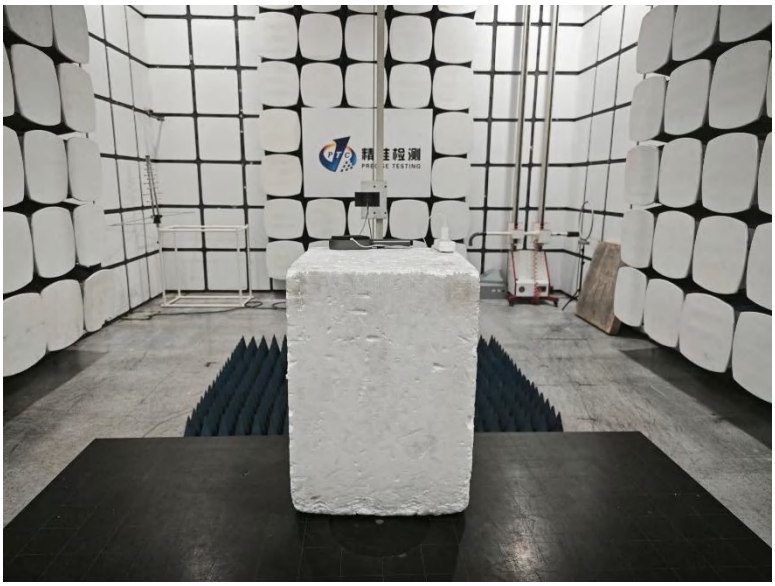
15 APPENDIX I -- TEST SETUP PHOTOGRAPH

Conducted Emissions

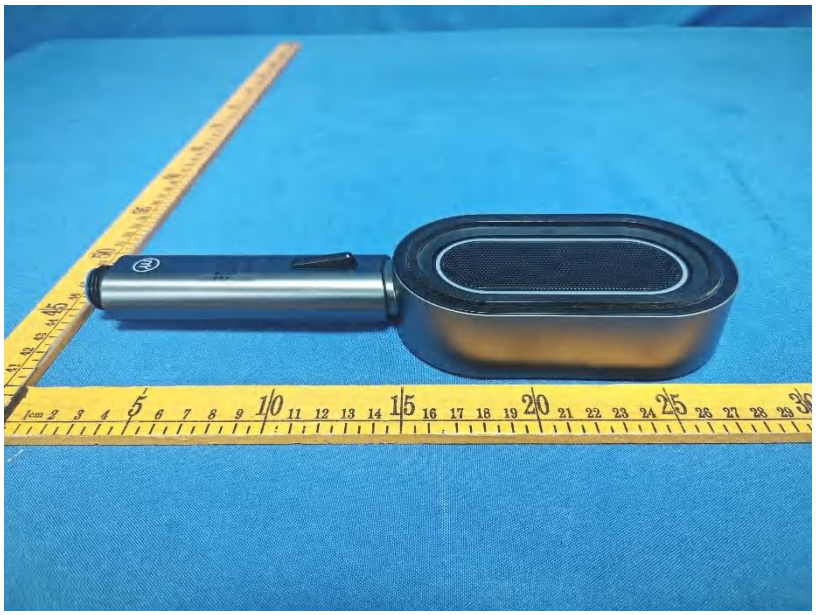
Radiated Emissions
From 30M-1GHz

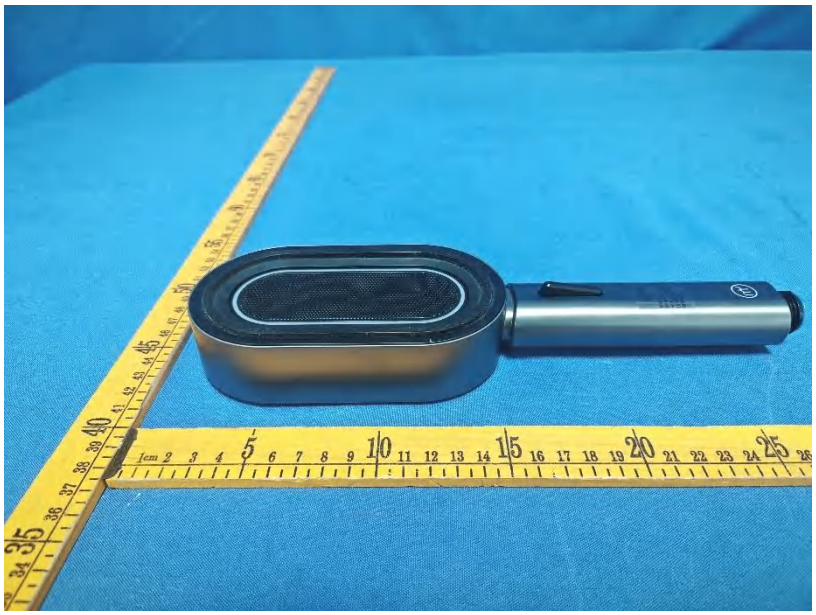


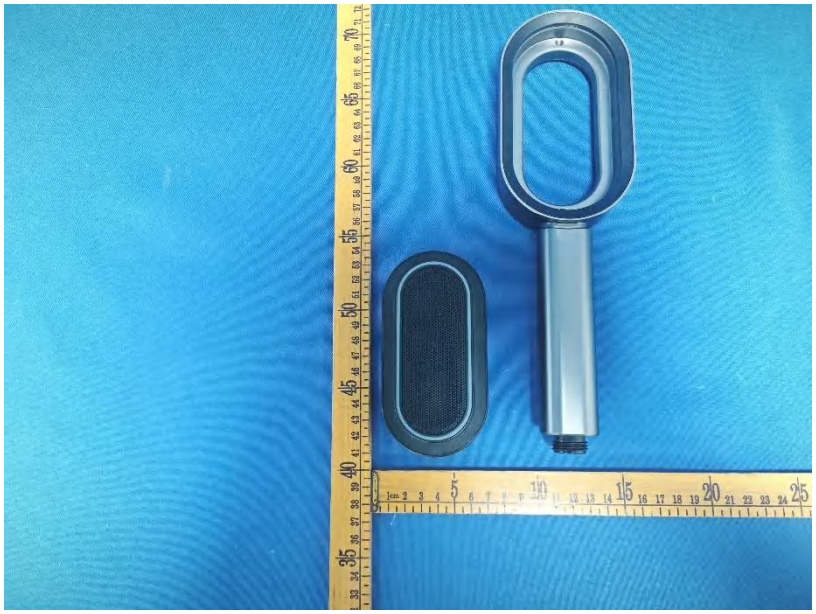
Above 1GHz

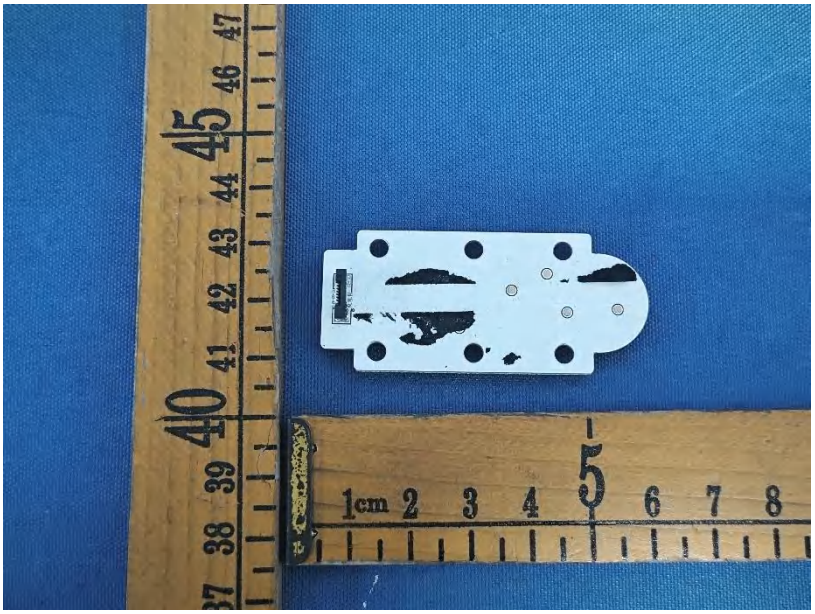


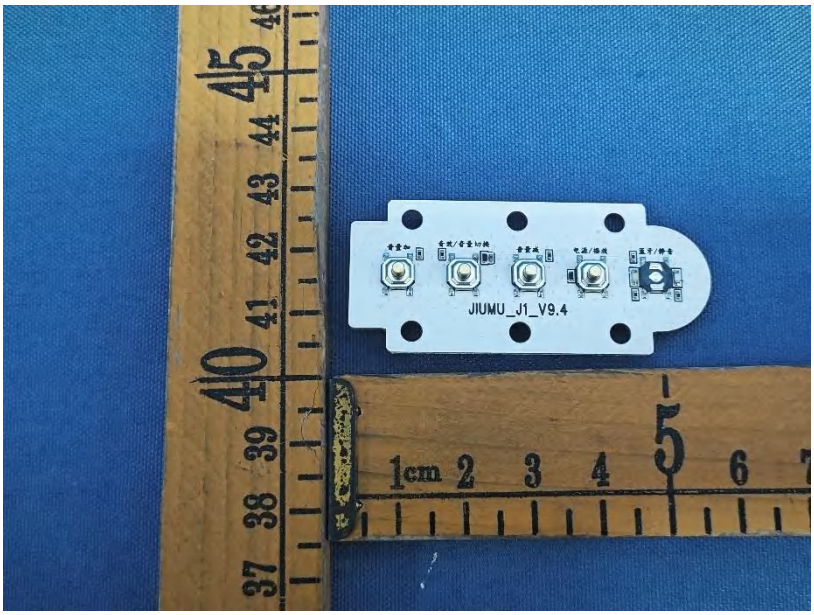
16 APPENDIX II -- EUT PHOTOGRAPH

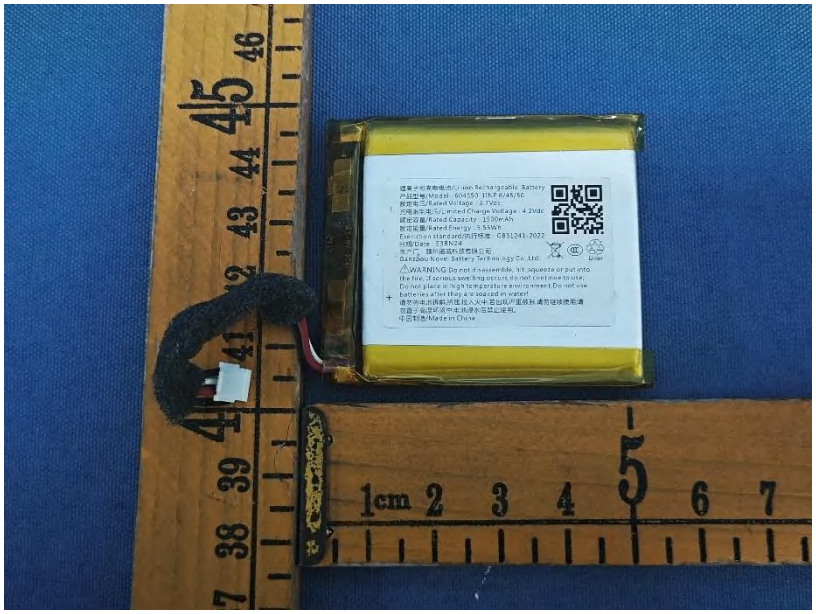


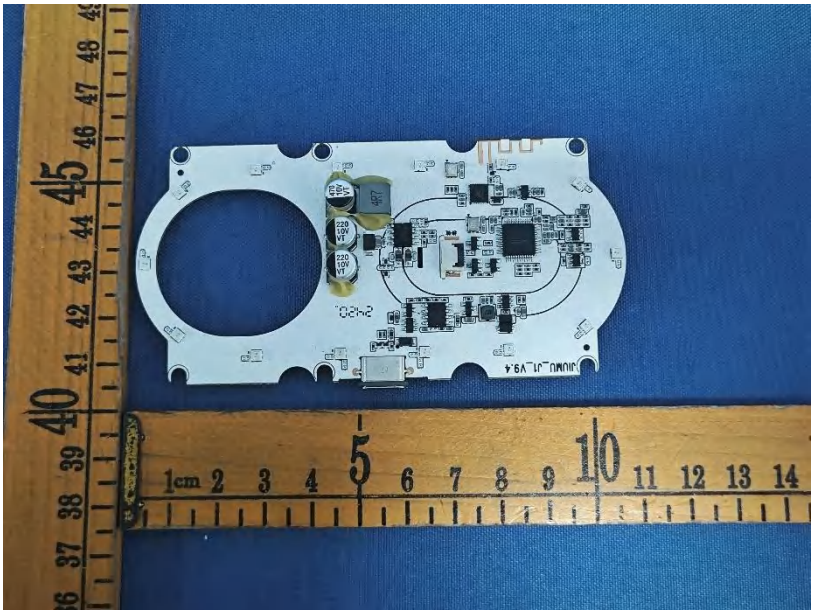


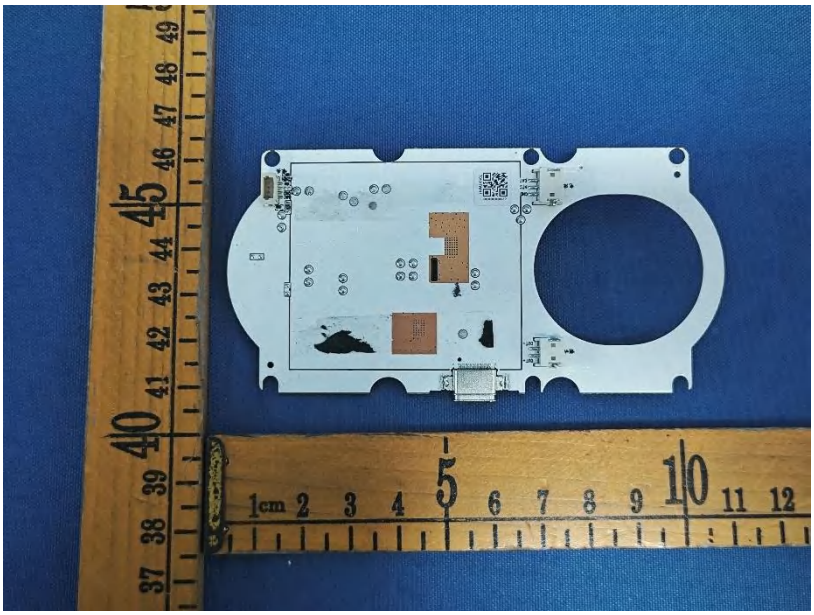


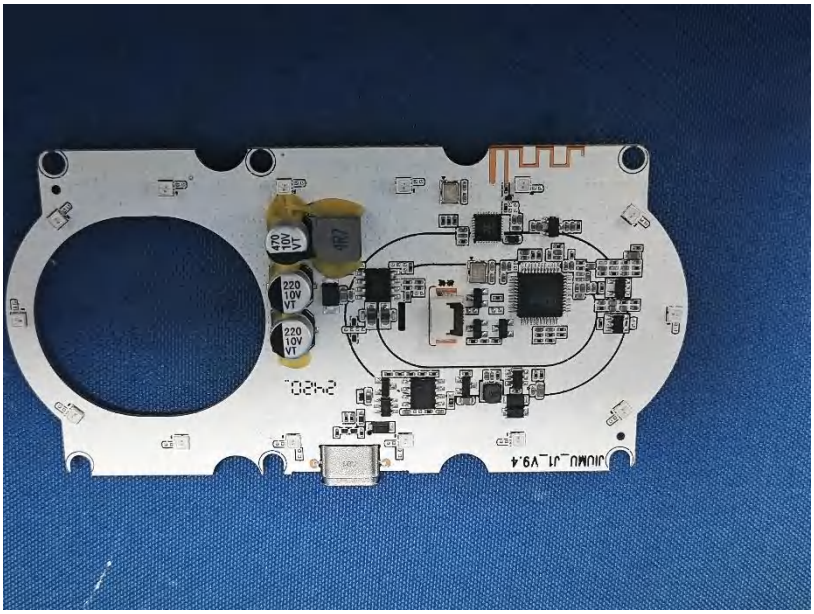


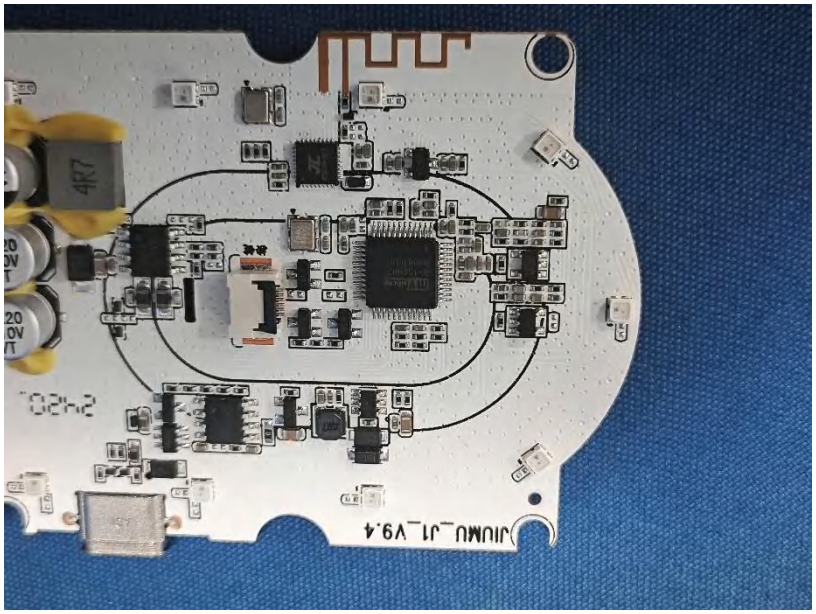

JIUMU_J1_V9.4

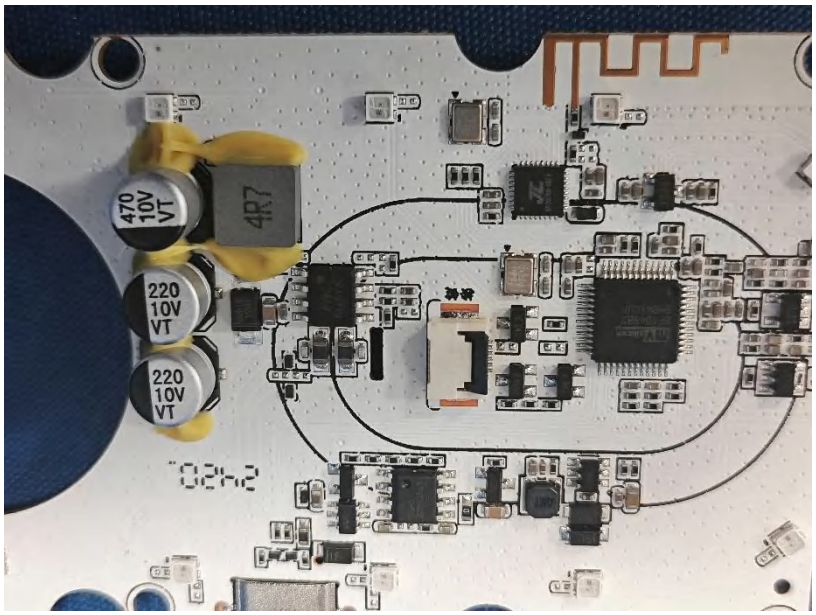

Rated Voltage: 3.7VDC
Limited Charge Voltage: 4.2VDC
Rated Capacity: 1150mAh
Rated Energy: 5.55Wh
Type: E3IN24
Dongguan Nicore Battery Technology Co.,Ltd.
WARNING Do not disassemble, hit, squeeze or put into the fire. If serious swelling occurs, do not continue to use. Do not place in high temperature environment. Do not use batteries after they are soaked in water!
Made in China

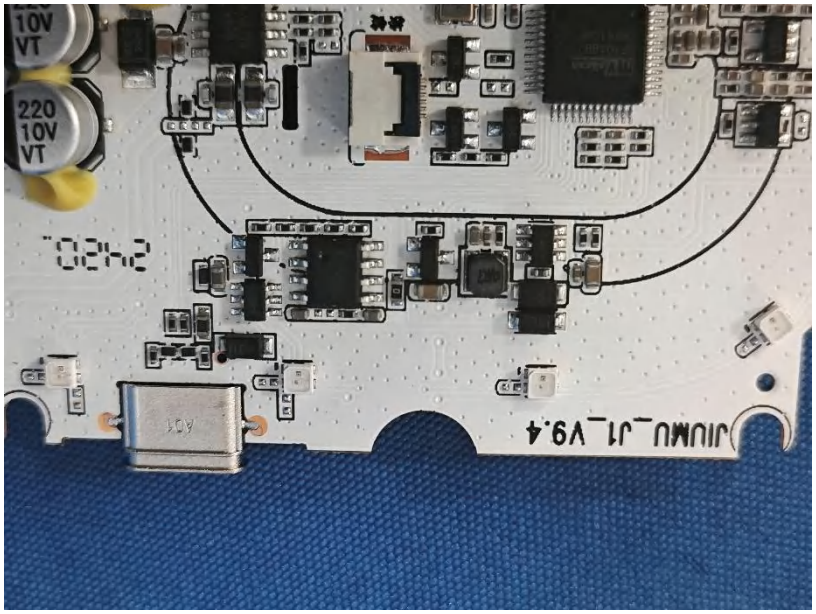


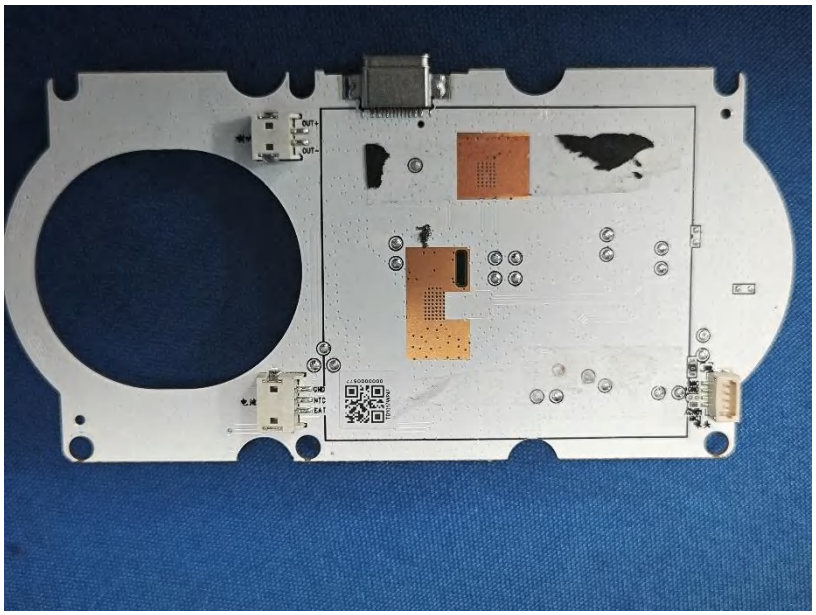





4R7
JIUMU_J1_V9.4


470
10V
VT
4R7
220
10V
VT
220
10V
VT





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