TEST REPORT

Report Reference No.....:	**TZ230804781-BLE**
Applicant's name.....:	**Yell Co.,Ltd**
Address .....:	1/F Kanzawa Bldg, 3-8-8 Kuramae, Taito-ku, Tokyo 111-0051, Japan
Manufacturer.....:	Shen Zhen M&I Import and Export Co., Ltd
Address..... .....:	Rm.19A03, Xin Lv Dao Building, No. 1175 Nanshan Avenue, Nanshan Street, Nanshan District, 518000, Shenzhen, Guang Dong Province, China
Test item description .....:	**Smart Tracker**
Trade Mark .....:	N/A
Model/Type reference .....:	YST-01
List Model .....:	N/A
Standard .....:	**ARIB STD T-66 Ver.3.7** **MIC Notice No.88 Appendix No.43** **Article 2, paragraph 1, item 19**
Date of receipt of test sample……..:	2023/8/28
Date of testing……:	2023/8/28-2023/9/5
Date of issue……...:	2023/9/6
Result..... ……...:	**PASS**

Compiled by (position+printed name+signature)..:	File administrators Nancy Li
Supervised by (position+printed name+signature)..:	Project Engineer Hugo Chen
Approved by (position+printed name+signature)..:	General Manager Andy Zhang

Testing Laboratory Name.....:	Shenzhen Tongzhou Testing Co.,Ltd
Address .....:	1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China

Contents

1. TEST STANDARDS AND DESCRIPTION 3

1.1. Test Standards 3
1.2. Test description 3

2. SUMMARY 4

2.1. Client Information 4
2.2. Product Description 4
2.3. EUT operation mode 5
2.4. Test Voltage 5
2.5. EUT configuration 5
2.6. Modifications 6

3. TEST ENVIRONMENT 7

3.1. Address of the test laboratory 7
3.2. Statement of the measurement uncertainty 7
3.3. Equipments Used during the Test 8

4. TEST CONDITIONS AND RESULTS 9

4.1. Antenna Power 9
4.2. Frequency Error 11
4.3. Interference Prevention Function 13
4.4. Occuipied Bandwidth (99%) 14
4.5. Spectrum bandwidth (90%) 16
4.6. Spurious emission intensity 18
4.7. Limit of secondary radiated emissions 24
4.8. Transmission Antenna Gain (EIRP antenna power) Measurement 27
4.9. Transmission Radiation Angle Width (3db Beamwidth) Measurement 29

5. TEST SETUP PHOTOS OF THE EUT 30

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT 31

1. Test Standards and description

1.1. Test Standards

The tests were performed according to following standards:

Regulation: Item I of Article 49-20 and the relevant Articles of the ordinance of Regulatory Radio Equipment.

Test Method: (1)the test method suppassed on is equal to Appendix No.43 of MIC Nofication No 88

1.2. Test description

Test Item	Test Method	Result
Antenna Power	Appendix No.43 of MIC Nofication No 88 section 6	Pass
Frequency Error	Appendix No.43 of MIC Nofication No 88 section 3	Pass
Interference prevention function	Appendix No.43 of MIC Nofication No 88 section 12	Pass
99% Occupied bandwidth	Appendix No.43 of MIC Nofication No 88 section 4	Pass
Spread spectrum bandwidth	Appendix No.43 of MIC Nofication No 88 section 4	Pass
Spurious Emissions Intensity	Appendix No.43 of MIC Nofication No 88 section 5	Pass
Limit of secondary radiated emissions	Appendix No.43 of MIC Nofication No 88 section 7	Pass
Hopping Frequency Dwell Time Measurement	Appendix No.43 of MIC Nofication No 88 section 13	N/A
Transmission Antenna Gain (EIRP antenna power)	Appendix No.43 of MIC Nofication No 88 section 10	N/A
Transmission Radiation Angle Width (3db Beamwidth)	Appendix No.43 of MIC Nofication No 88 section 11	N/A
Carrier Sensing Function	Appendix No.43 of MIC Nofication No 88 section 8	N/A

N/A: means not applicable

2. Summary

2.1. Client Information

Applicant:	Yell Co.,Ltd
Address:	1/F Kanzawa Bldg, 3-8-8 Kuramae, Taito-ku, Tokyo 111-0051, Japan
Manufacturer:	Shen Zhen M&I Import and Export Co., Ltd
Address:	Rm.19A03, Xin Lv Dao Building, No. 1175 Nanshan Avenue, Nanshan Street, Nanshan District, 518000, Shenzhen, Guang Dong Province, China
Factory:	Shen Zhen M&I Import and Export Co., Ltd
Address:	Rm.19A03, Xin Lv Dao Building, No. 1175 Nanshan Avenue, Nanshan Street, Nanshan District, 518000, Shenzhen, Guang Dong Province, China

2.2. Product Description

Name of EUT:	Smart Tracker
Trade Mark:	N/A
Model/Type reference :	YST-01
List Model:	N/A
Hardware Version:	FM-YY-V2
Software Version:	V1.0
Power supply:	DC 3V by battery
Adapter information:	N/A
Bluetooth	
Supported type:	V5.2
Modulation:	GFSK
Operation frequency:	2402MHz~2480MHz
Channel number:	40
Channel separation:	2MHz
Antenna type:	PCB Antenna
Antenna gain:	1.08 dBi

Operation Frequency List:

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	**2402**	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	**2440**	**39**	**2480**

2.3. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides software(LeKit_v2.5.2/ Power index: default) to control the EUT for staying in continous transmitting and receiving mode for testing.

2.4. Test Voltage

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input To EUT	DC 3.7V	DC 4.07V	DC 3.33 V
Voltage Variation (%)	--	+10%	-10%

2.5. EUT configuration

(1)The following peripheral devices and interface cables were connected during the measurement:

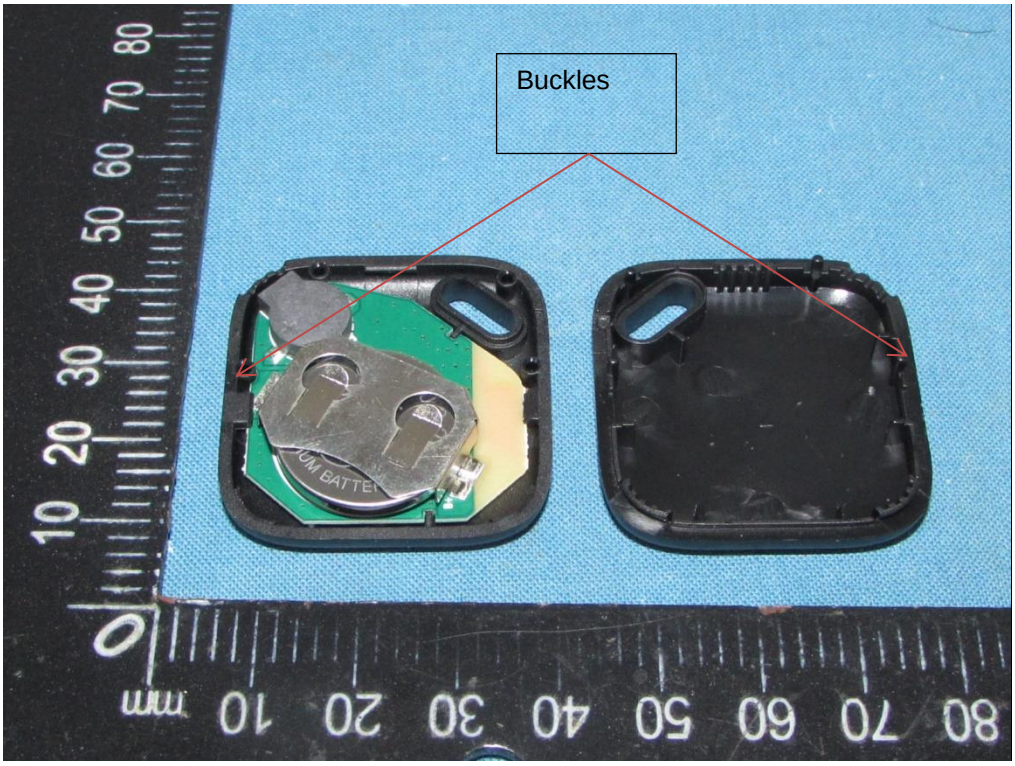
● - supplied by the manufacturer

○ - supplied by the lab

○	/	Length (m) :	/
		Shield :	/
		Detachable :	/
○	/	Manufacturer :	/
		Model No. :	/

（2）Protective Structure

The top and the bottom is connected with strong Buckles, So We can not open the it easily at the normal condition. The high-frequency section and modulation section can not be capable of being opened easily.



2.6. Modifications

No modifications were implemented to meet testing criteria.

3. Test Environment

3.1. Address of the test laboratory

Shenzhen Tongzhou Testing Co.,Ltd
1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, Shenzhen, China
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2014) and CISPR Publication 22.

3.2. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Tongzhou Testing Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Tongzhou Testing Co.,Ltd is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissiom 1~18GHz	5.16 dB	(1)
Radiated Emissiom 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	---------	(1)
Emission Mask	---------	(1)
Modulation Characteristic	---------	(1)
Transmitter Frequency Behavior	---------	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.3. Equipments Used during the Test

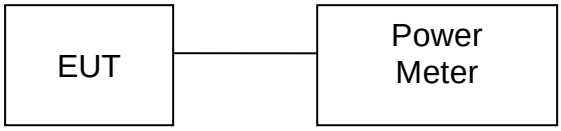
Test Equipment							
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Agency	Latest Cal.	Next Cal.
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	CCIC	2022-12-28	2023-12-27
2	EMI Test Receiver	R&S	ESCI	100849/003	CCIC	2022-12-28	2023-12-27
3	DC power supply	Chroma	RXN-305D	62012PD02811	CCIC	2022-12-28	2023-12-27
4	Power Meter	Agilent	NRVD	835843/014	CCIC	2022-12-28	2023-12-27
5	Wideband Radio Communication Tester	R&S	CMW500	101855	CCIC	2022-12-28	2023-12-27
6	Oscilloscope	Tektronix	TDS2024C	C044925	CCIC	2022-12-28	2023-12-27

Calibration by the calibration agencies listed in the table correspond to paragraph 4 (ii) (c) of Article 24-2 in the Radio Law.

4. Test conditions and Results

4.1. Antenna Power

TEST CONFIGURATION



TEST PROCEDURE

1. EUT have transmitted continuous maximum power..
2. Frequency hopping system or combined systems of direct spread and frequency hopping
   i. Connect the high frequency Power Meter or Spectrum Analyzer to the output of the attenuator and measure the total power (without bandwidth limitation)
   ii. Divide the total power by the spread bandwidth to find the “average” power per MHz. The average power per MHz is equal to the power meter value dBm + cable loss dB.
   iii. Set the antenna power as follows:
   - Continuous waves: value in ii.

LIMIT

Item	Limits
Antenna Power Density	≦ 3mW/MHz (FH form 2400~2483.5MHz) ≦ 10mW/MHz (OFDM,DS from 2400~2483.5MHz) ≦ 10mW (Other from 2400~2483.5MHz)
Antenna Power Error	+20%, -80% (Base on manufacturer declare antenna power density)

TEST RESULTS

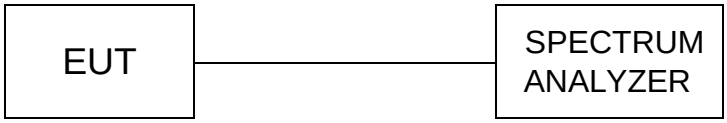
Antenna Power							
TestCondition	TestMode	Antenna	Channel	Result(dBm)	Result (mW)	Limit (mW)	Verdict
NTNV	BLE_1M	Ant1	2402	-4.43	0.3606	≤10	PASS
			2440	-3.97	0.4009	≤10	PASS
			2480	-3.97	0.4009	≤10	PASS
NTHV	BLE_1M	Ant1	2402	-4.373	0.3653	≤10	PASS
			2440	-3.719	0.4247	≤10	PASS
			2480	-3.943	0.4034	≤10	PASS
NTLV	BLE_1M	Ant1	2402	-4.409	0.3623	≤10	PASS
			2440	-3.954	0.4023	≤10	PASS
			2480	-3.627	0.4338	≤10	PASS

Tolerance								
Test Condition	Test Mode	Antenna	Channel	Power (mW)	RatedPower (mW)	Result (%)	Limit (%)	Verdict
NTNV	BLE_1M	Ant1	2402	0.3606	0.4	-9.85	-80 to +20	PASS
			2440	0.4009	0.4	0.22	-80 to +20	PASS
			2480	0.4009	0.4	0.22	-80 to +20	PASS
NTHV	BLE_1M	Ant1	2402	0.3798	0.4	-5.05	-80 to +20	PASS
			2440	0.4187	0.4	4.68	-80 to +20	PASS
			2480	0.432	0.4	8	-80 to +20	PASS
NTLV	BLE_1M	Ant1	2402	0.3653	0.4	-8.68	-80 to +20	PASS
			2440	0.4038	0.4	0.95	-80 to +20	PASS
			2480	0.4094	0.4	2.35	-80 to +20	PASS

Remark:
1, The item was tested at 25 ℃ and 55% humidity condition;
2, Result = the power meter value + cable loss

4.2. Frequency Error

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: non-modulation
Spectrum Condition:
Frequency: test frequency
Span:1MHz
Rbw:10KHz
Vbw:10KHz
Sweep time:Auto
Dectector mode: Positive peak
Indication mode: max hold

LIMIT

Tolerance of frequency shall be ±50 ppm.

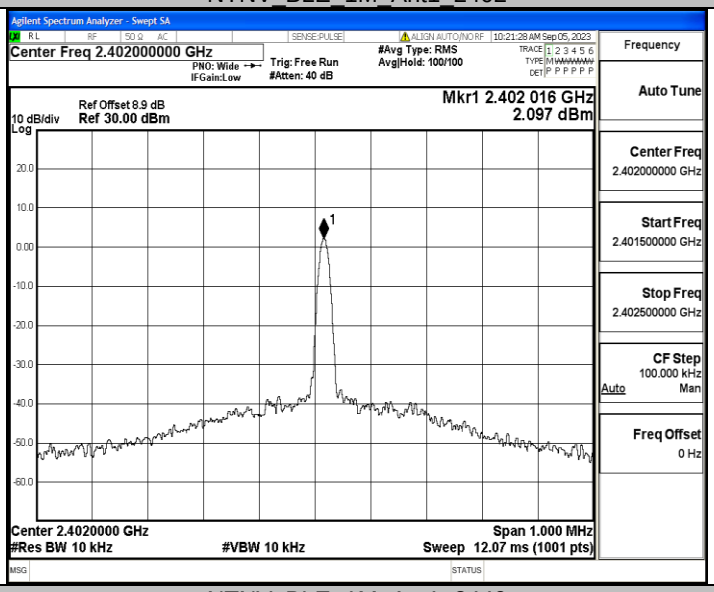
TEST RESULTS

Test Condition	Test Mode	Antenna	Freq(MHz)	Result[ppm]	Limit[ppm]	Verdict
NTNV	CW	Ant1	2402	6.66112	±50	PASS
			2441	6.55738	±50	PASS
			2480	6.85484	±50	PASS
NTHV	CW	Ant1	2402	6.37546	±50	PASS
			2441	6.0318	±50	PASS
			2480	6.35017	±50	PASS
NTLV	CW	Ant1	2402	6.43159	±50	PASS
			2441	6.0898	±50	PASS
			2480	6.62638	±50	PASS

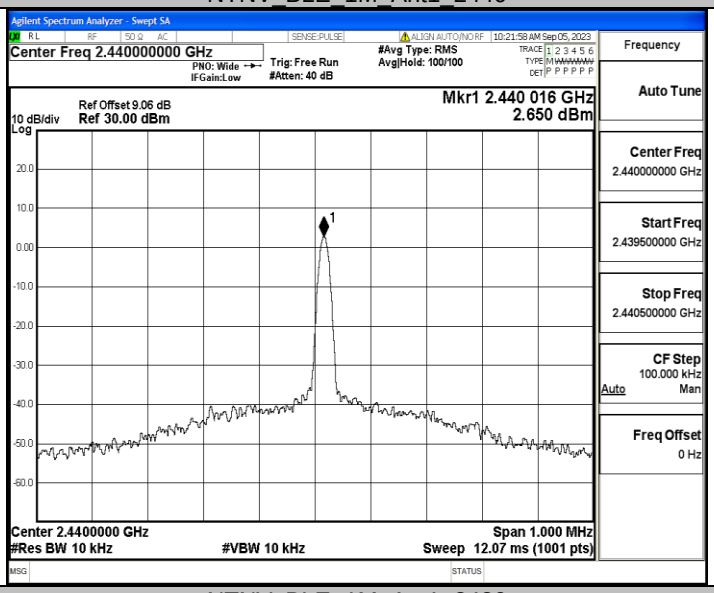
Note: 1. The test results including the cable lose.
2. The item was tested at 25℃ and 55% humidity condition;
3.All condition has been testd,list the worst case in this item

Test plot as follows:

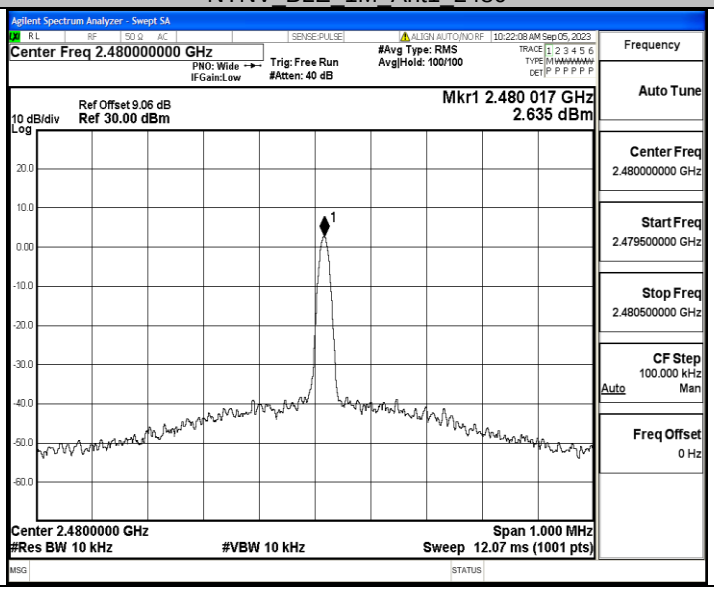
NTNV_BLE_1M_Ant1_2402



NTNV_BLE_1M_Ant1_2440



NTNV_BLE_1M_Ant1_2480



4.3. Interference Prevention Function

The device consists of the Print PCB antenna and 2.4GHz transimtter module.Component 2.4GHz transmitter module also can use the protocol function to protect interference come from outside.

TEST EQUIPMENT

Wideband Radio Communication Tester(CMW500)

TEST SOFTWARE

N/A

TEST PROCEDURE

Connect EUT to CMW500,Enter signal Mode, and read the MAC

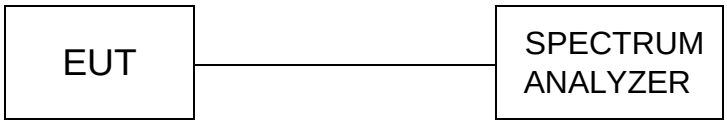
TEST RESULTS

The unit does meet the requirements.

MAC Address: 23:A6:D2:84:2C:01

4.4. Occuipied Bandwidth (99%)

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: modulation
Spectrum Condition:
Frequency: Center frequency in the band to be used
Span:4MHz
RBW: 30kHz
VBW: 30kHz
Sweep time:Auto
Dectector mode: Positive peak
Indication mode: max hold

LIMIT

Permissible value for occupied bandwidth using the FH system, a hybrid system combining DS and FH systems, or a hybrid system combining FH and OFDM systems shall be 83.5 MHz or less, while necessary bandwidth (minimum occupied bandwidth sufficient to ensure information transmission of required quality at a required transmission rate for the system used under specified conditions for a given emission type) using a system other than any of the above shall be 26 MHz or less.

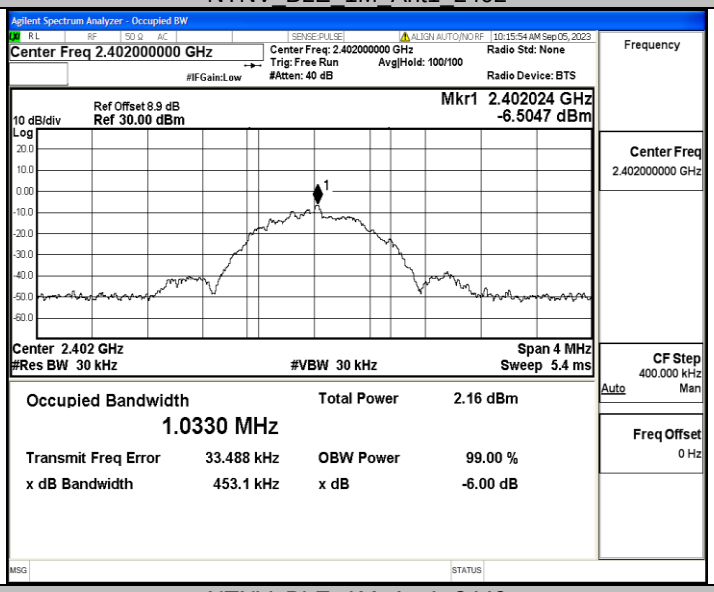
TEST RESULTS

TestCondition	TestMode	Antenna	Channel	Result [MHz]	Limit [MHz]	Verdict
NTNV	BLE_1M	Ant1	2402	1.033	≤26	PASS
			2440	1.036	≤26	PASS
			2480	1.045	≤26	PASS
NTHV	BLE_1M	Ant1	2402	1.013	≤26	PASS
			2440	1.033	≤26	PASS
			2480	1.014	≤26	PASS
NTLV	BLE_1M	Ant1	2402	0.944	≤26	PASS
			2440	0.964	≤26	PASS
			2480	0.956	≤26	PASS

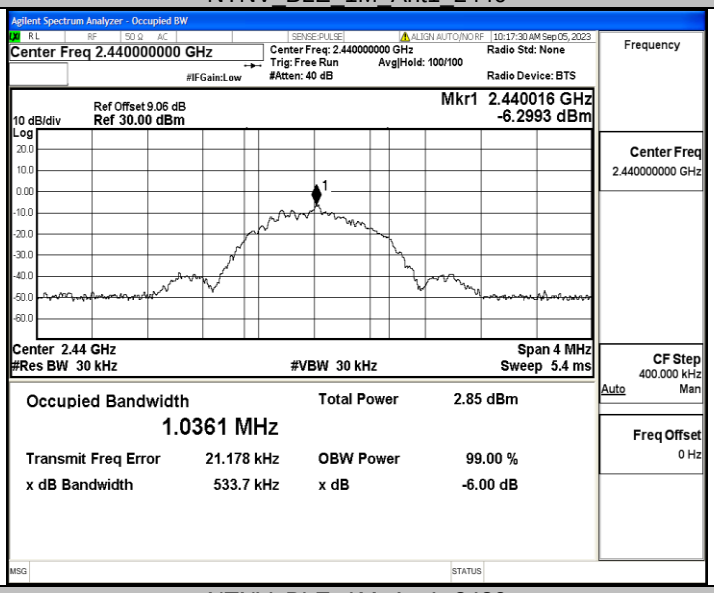
Note: 1. The test results including the cable lose.
2. The item was tested at 25℃ and 55% humidity condition;
3.All condition has been testd,list the worst case in this item

Test plot as follows:

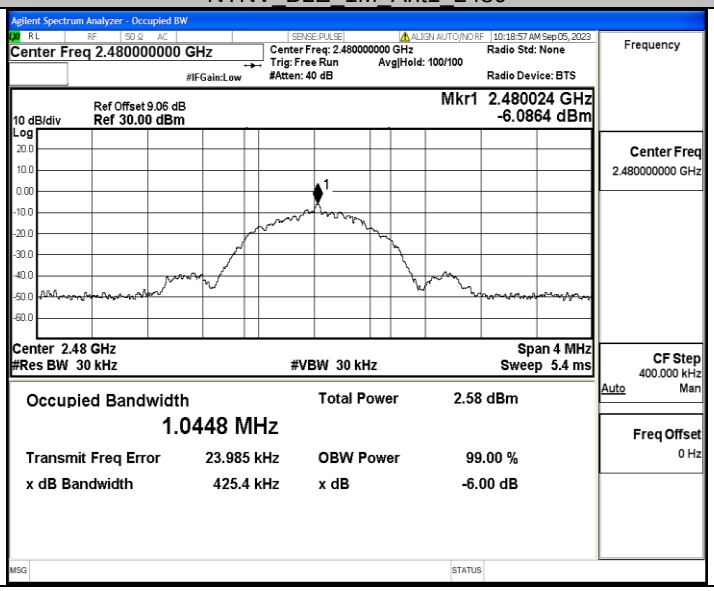
NTNV_BLE_1M_Ant1_2402



NTNV_BLE_1M_Ant1_2440

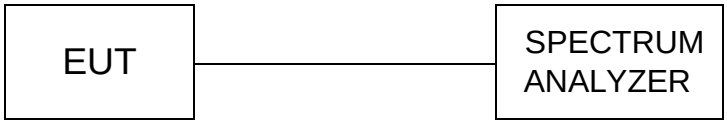


NTNV_BLE_1M_Ant1_2480



4.5. Spectrum bandwidth (90%)

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: modulation
Spectrum Condition:
Frequency: Center frequency in the band to be used
Span:4MHz
RBW:30kHz
VBW: 30kHz
Sweep time:Auto
Dectector mode: Positive peak
Indication mode: max hold
Spread Factor =Spread Bandwidth/ Transsmission rate

LIMIT

In spread spectrum systems, spread bandwidth (which refers to a frequency bandwidth with an upper limit and lower limit such that each of the mean powers radiated above the upper frequency limit and below the lower frequency limit is equal to 5 % of the total mean power radiated; this also applies hereafter) shall be 500 kHz or more.

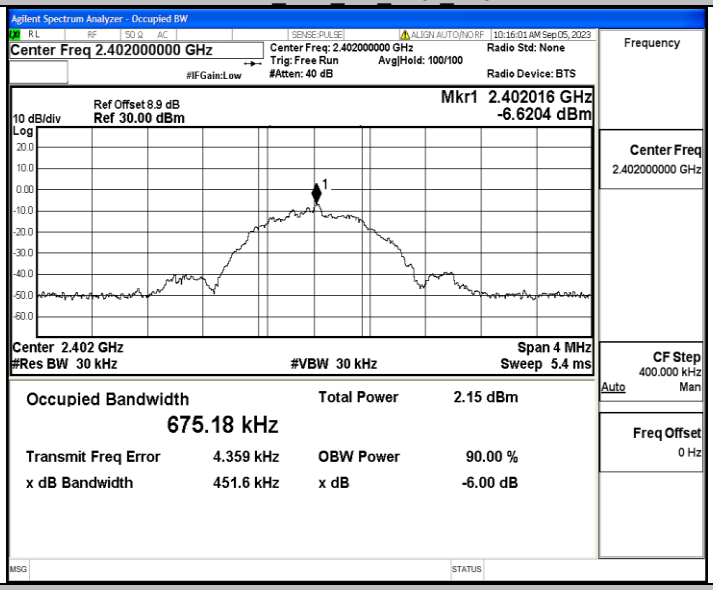
TEST RESULTS

TestCondition	TestMode	Antenna	Channel	Result [MHz]	Limit [MHz]	Verdict
NTNV	BLE_1M	Ant1	2402	0.675	≥0.5	PASS
			2440	0.667	≥0.5	PASS
			2480	0.684	≥0.5	PASS
NTHV	BLE_1M	Ant1	2402	0.66	≥0.5	PASS
			2440	0.643	≥0.5	PASS
			2480	0.677	≥0.5	PASS
NTLV	BLE_1M	Ant1	2402	0.629	≥0.5	PASS
			2440	0.609	≥0.5	PASS
			2480	0.652	≥0.5	PASS

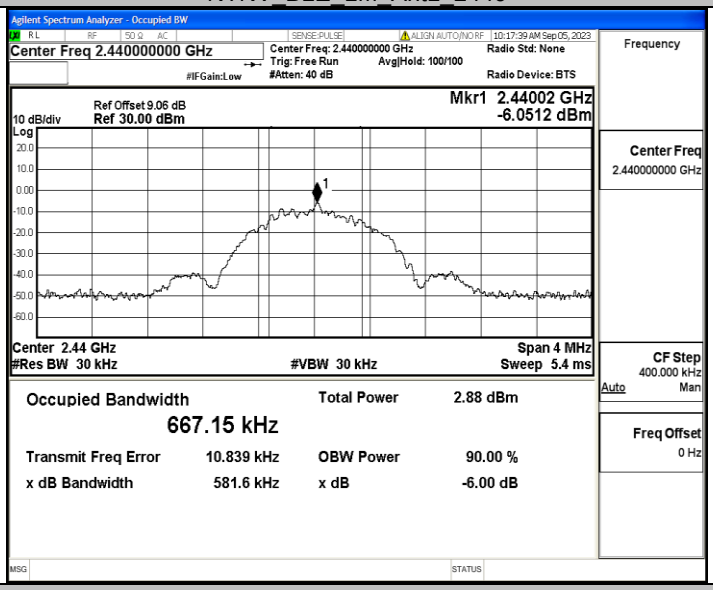
Note: 1. The test results including the cable lose.
2. The item was tested at 25℃ and 55% humidity condition;
3.All condition has been testd,list the worst case in this item

Test plot as follows:

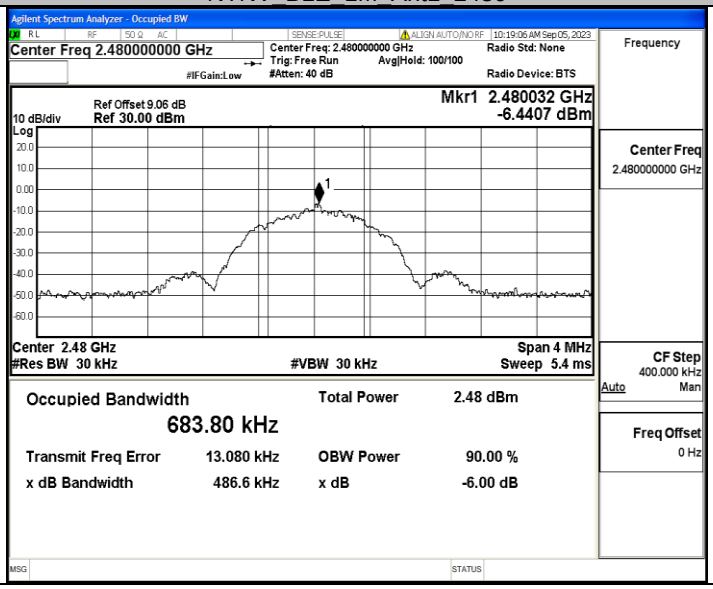
NTNV_BLE_1M_Ant1_2402



NTNV_BLE_1M_Ant1_2440

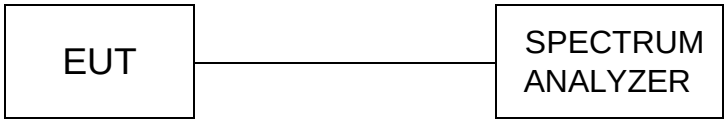


NTNV_BLE_1M_Ant1_2480



4.6. Spurious emission intensity

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: modulation
Spectrum Condition:
Frequency: 30MHz-13GHz
RBW: 1MHz (30MHz-13GHz)
VBW: 1MHz (30MHz-13GHz)
Sweep time:Auto
Dectector mode: Positive peak
Indication mode: max hold

LIMIT

Permissible mean power of spurious emission of each frequency supplied to a feeder, that is, mean power of spurious emission in the 1 MHz bandwidth at frequency f other than frequency band used shall be as follows:
a. 2,387 MHz ⩽ f ⩽ 2,400 MHz and 2,483.5 MHz < f ⩽ 2,496.5 MHz 25 μW(-16dBm) or less
b. 2,387 MHz > f and 2,496.5 MHz < f 2.5 μW(-26dBm) or less

TEST RESULTS

Test Condition	Test Mode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Verdict
NTNV	BLE_1M	Ant1	2402	30~2387	-50.05	≤-26	PASS
				2387~2400	-41.14	≤-16	PASS
				2483.5~2496.5	-50.15	≤-16	PASS
				2496.5~13000	-48.12	≤-26	PASS
			2440	30~2387	-49.75	≤-26	PASS
				2387~2400	-50.95	≤-16	PASS
				2483.5~2496.5	-50.86	≤-16	PASS
				2496.5~13000	-47.04	≤-26	PASS
			2480	30~2387	-50.37	≤-26	PASS
				2387~2400	-50.8	≤-16	PASS
				2483.5~2496.5	-50.66	≤-16	PASS
				2496.5~13000	-48.06	≤-26	PASS
NTHV	BLE_1M	Ant1	2402	30~2387	-50.72	≤-26	PASS
				2387~2400	-42.7	≤-16	PASS
				2483.5~2496.5	-50.82	≤-16	PASS
				2496.5~13000	-49.46	≤-26	PASS
			2440	30~2387	-51.07	≤-26	PASS
				2387~2400	-52.55	≤-16	PASS
				2483.5~2496.5	-51.71	≤-16	PASS
				2496.5~13000	-48.37	≤-26	PASS
			2480	30~2387	-52.32	≤-26	PASS

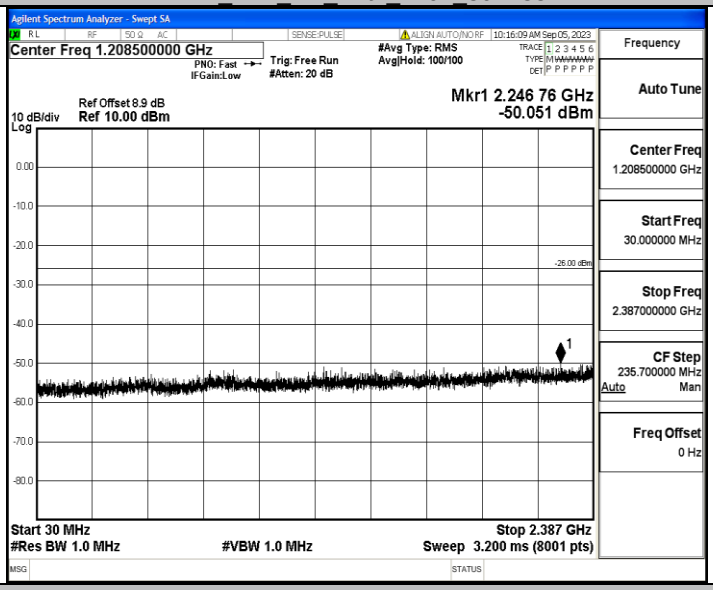
				2387~2400	-51.88	≤-16	PASS
				2483.5~2496.5	-51.33	≤-16	PASS
				2496.5~13000	-49.1	≤-26	PASS
NTLV	BLE_1M	Ant1	2402	30~2387	-51.33	≤-26	PASS
				2387~2400	-42.18	≤-16	PASS
				2483.5~2496.5	-50.9	≤-16	PASS
				2496.5~13000	-49.3	≤-26	PASS
			2440	30~2387	-51.59	≤-26	PASS
				2387~2400	-52.29	≤-16	PASS
				2483.5~2496.5	-52.24	≤-16	PASS
				2496.5~13000	-48.77	≤-26	PASS
			2480	30~2387	-51.12	≤-26	PASS
				2387~2400	-51.61	≤-16	PASS
				2483.5~2496.5	-52.29	≤-16	PASS
				2496.5~13000	-49.51	≤-26	PASS

Note: *1.The product was tested at 25℃ and 55% humidity condition;*

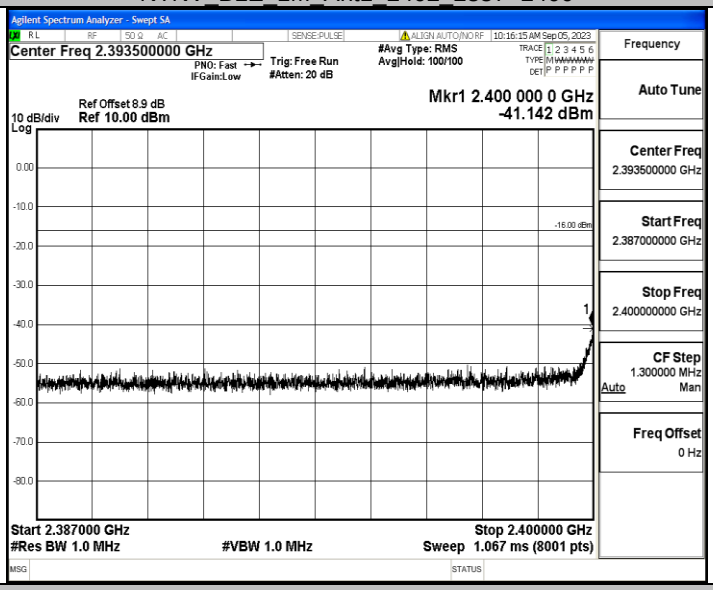
2.All condition has been testd,list the worst case in this item

3. SA set to from 2.4965GHz to 13GHz, plot shows from 2.497GHz to 13GHz as of SA's default format.

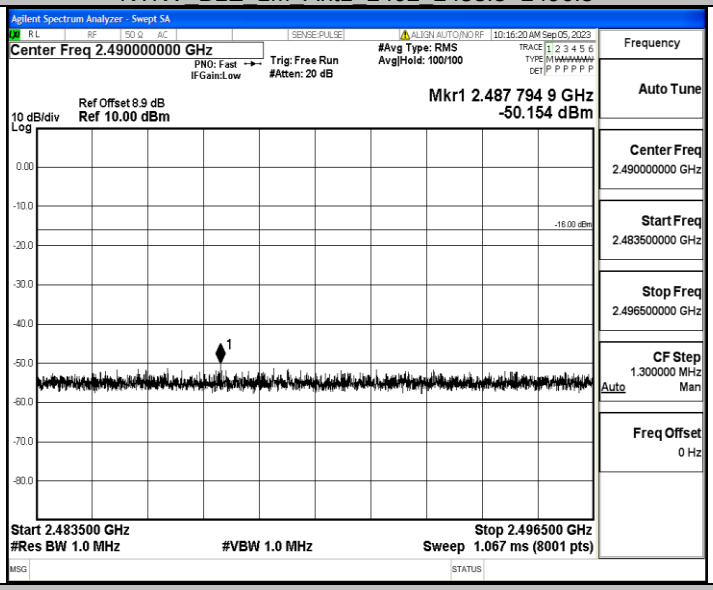
NTNV_BLE_1M_Ant1_2402_30~2387



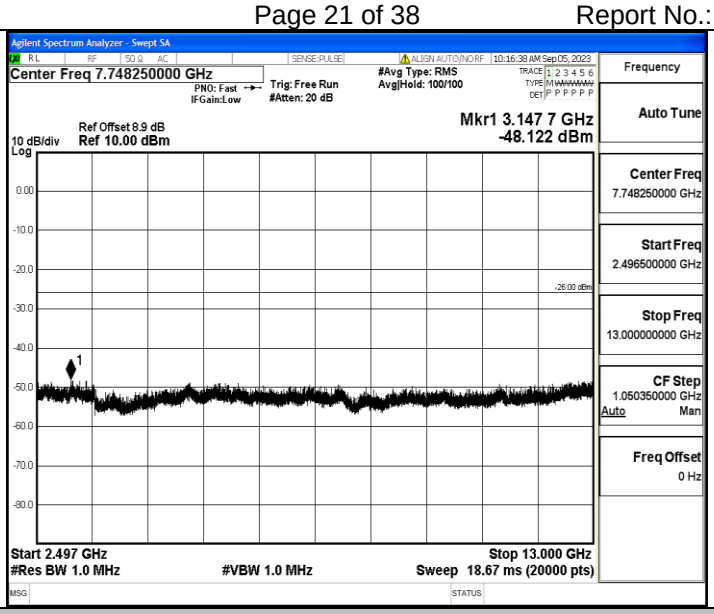
NTNV_BLE_1M_Ant1_2402_2387~2400



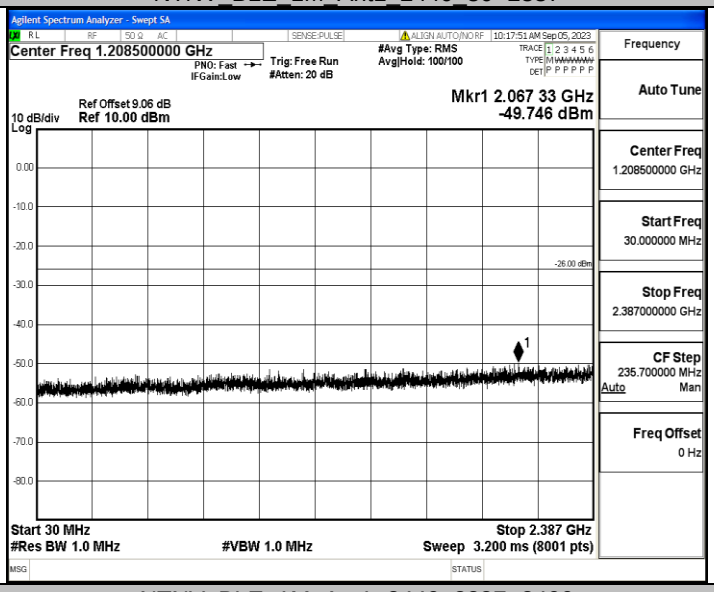
NTNV_BLE_1M_Ant1_2402_2483.5~2496.5



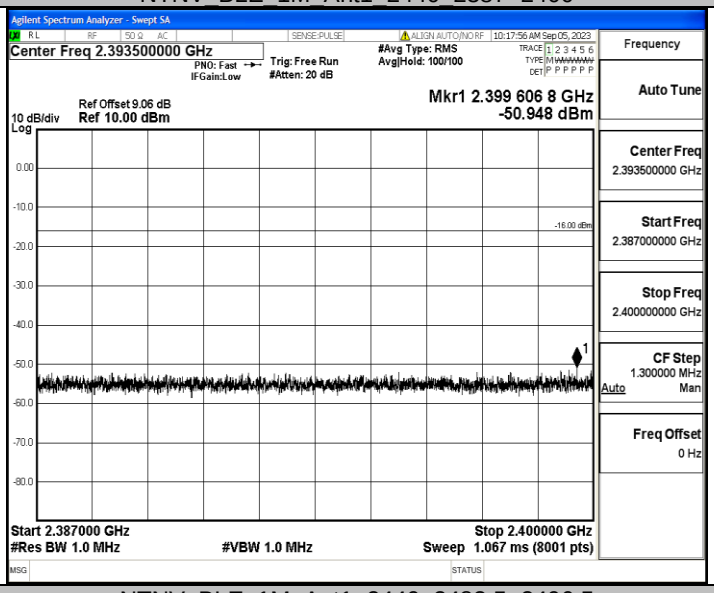
NTNV_BLE_1M_Ant1_2402_2496.5~13000



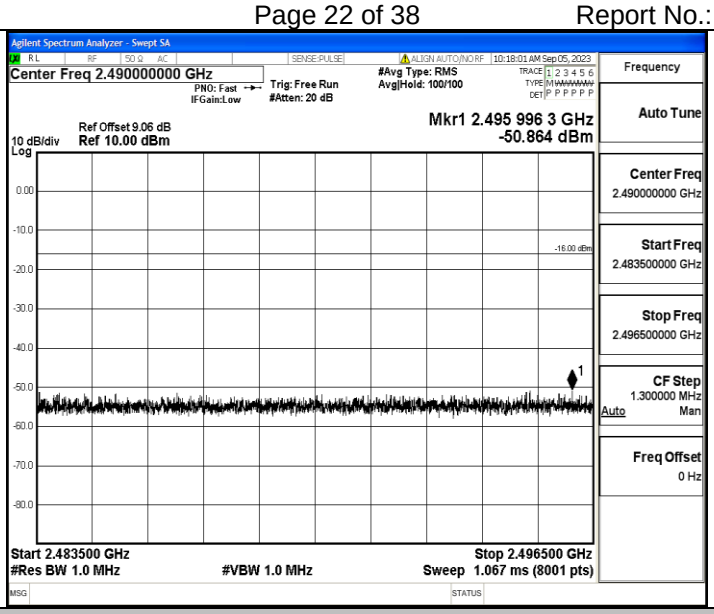
NTNV_BLE_1M_Ant1_2440_30~2387



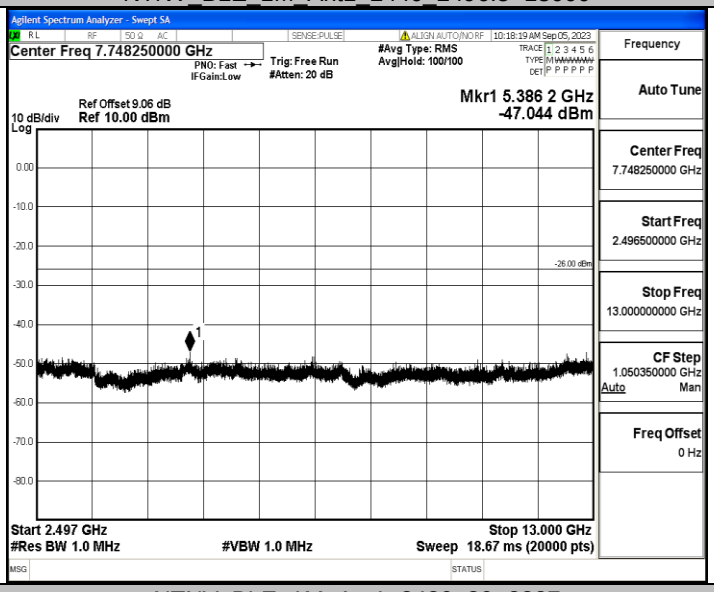
NTNV_BLE_1M_Ant1_2440_2387~2400



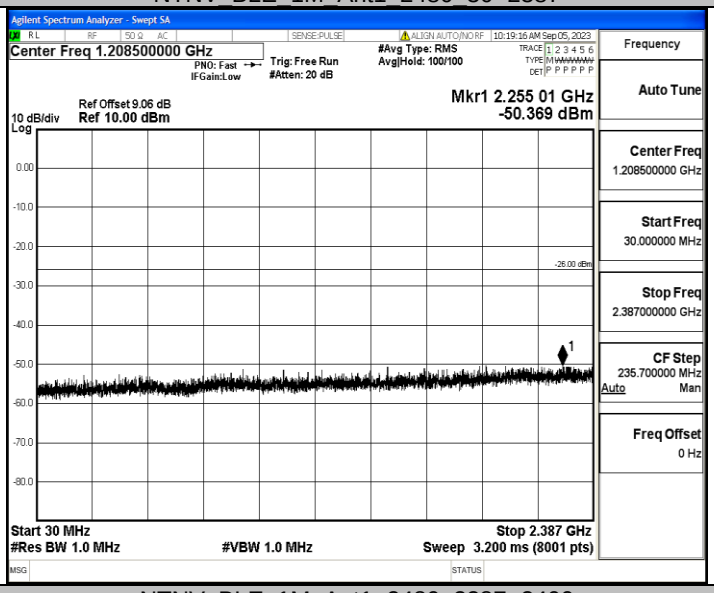
NTNV_BLE_1M_Ant1_2440_2483.5~2496.5



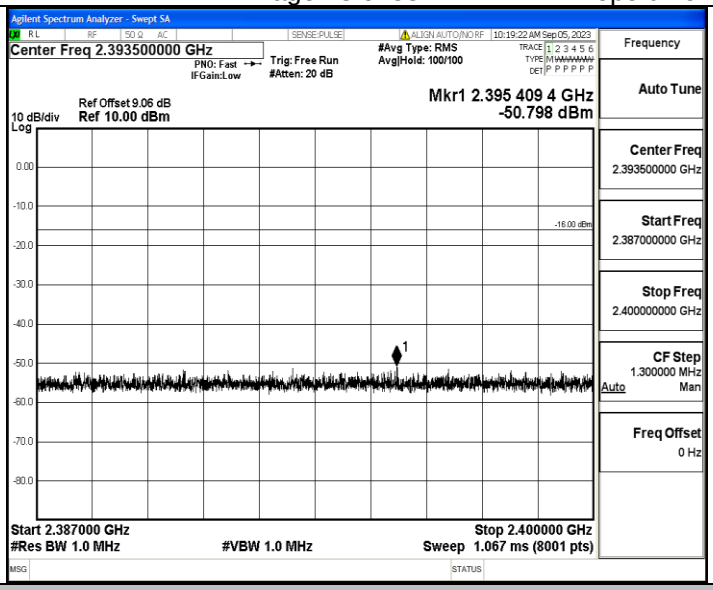
NTNV_BLE_1M_Ant1_2440_2496.5~13000



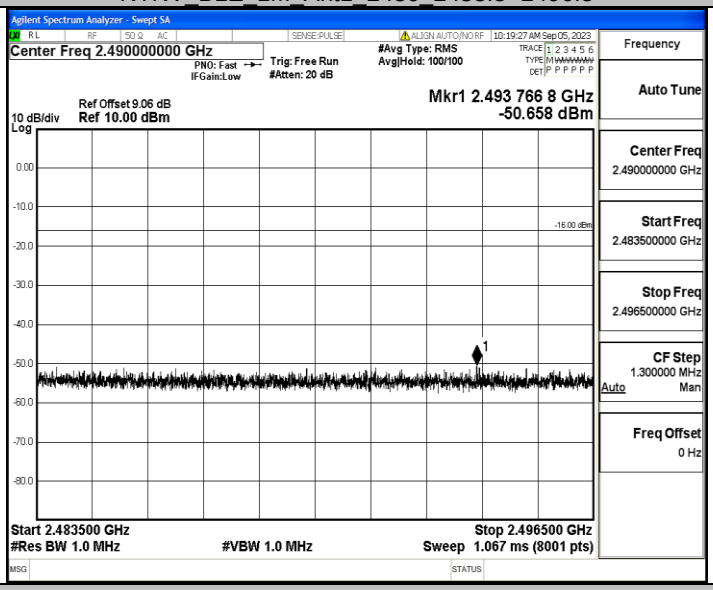
NTNV_BLE_1M_Ant1_2480_30~2387



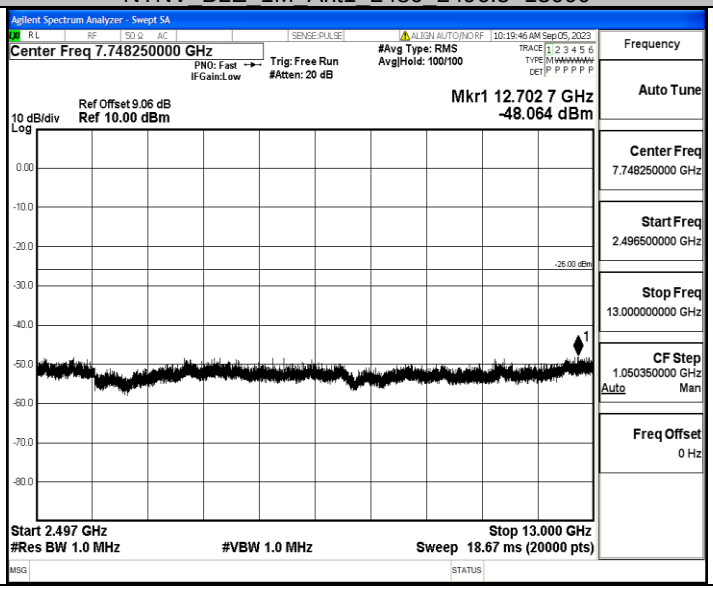
NTNV_BLE_1M_Ant1_2480_2387~2400



NTNV_BLE_1M_Ant1_2480_2483.5~2496.5

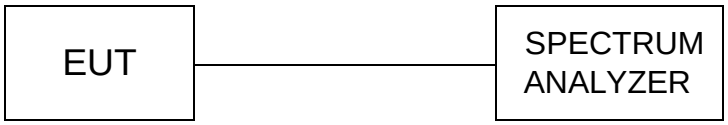


NTNV_BLE_1M_Ant1_2480_2496.5~13000



4.7. Limit of secondary radiated emissions

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.
EUT Condition: modulation
Spectrum Condition:
Frequency: 30MHz-13GHz
RBW:100KHz(30MHz-1GHz), 1MHz(1GHz-13GHz)
VBW:100KHz(30MHz-1GHz), 1MHz(1GHz-13GHz)
Sweep time:Auto
Dectector mode: Positive peak
Indication mode: max hold

LIMIT

The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4 nW or less at a frequency below 1 GHz and 20 nW or less at a frequency of 1 GHz or higher as measured using the circuit

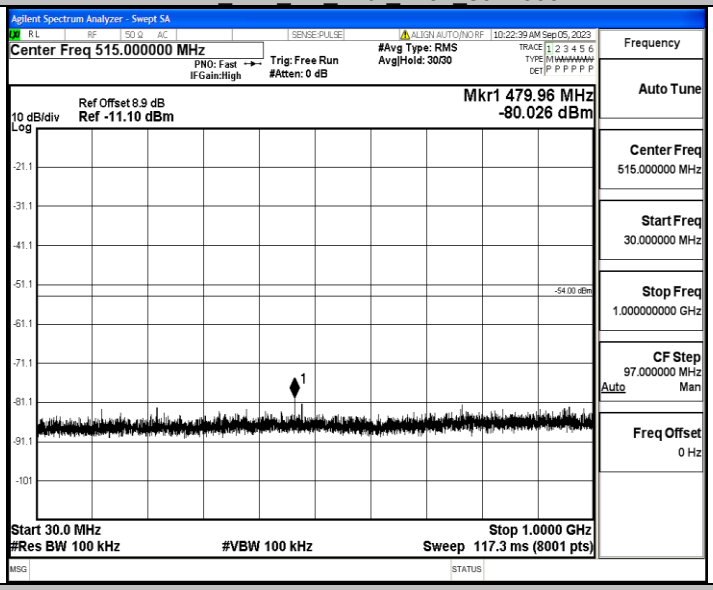
TEST RESULTS

Test Condition	Test Mode	Antenna	Freq(MHz)	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Verdict
NTNV	BLE_1M	Ant1	2402	30~1000	-80.03	≤-54	PASS
				1000~13000	-67.19	≤-47	PASS
			2440	30~1000	-79.48	≤-54	PASS
				1000~13000	-64.74	≤-47	PASS
			2480	30~1000	-80.37	≤-54	PASS
				1000~13000	-66.5	≤-47	PASS
NTHV	BLE_1M	Ant1	2402	30~1000	-78.89	≤-54	PASS
				1000~13000	-65.6	≤-47	PASS
			2440	30~1000	-78.26	≤-54	PASS
				1000~13000	-63.83	≤-47	PASS
			2480	30~1000	-79.05	≤-54	PASS
				1000~13000	-65.36	≤-47	PASS
NTLV	BLE_1M	Ant1	2402	30~1000	-78.19	≤-54	PASS
				1000~13000	-64.04	≤-47	PASS
			2440	30~1000	-76.5	≤-54	PASS
				1000~13000	-62.64	≤-47	PASS
			2480	30~1000	-78.51	≤-54	PASS
				1000~13000	-63.62	≤-47	PASS

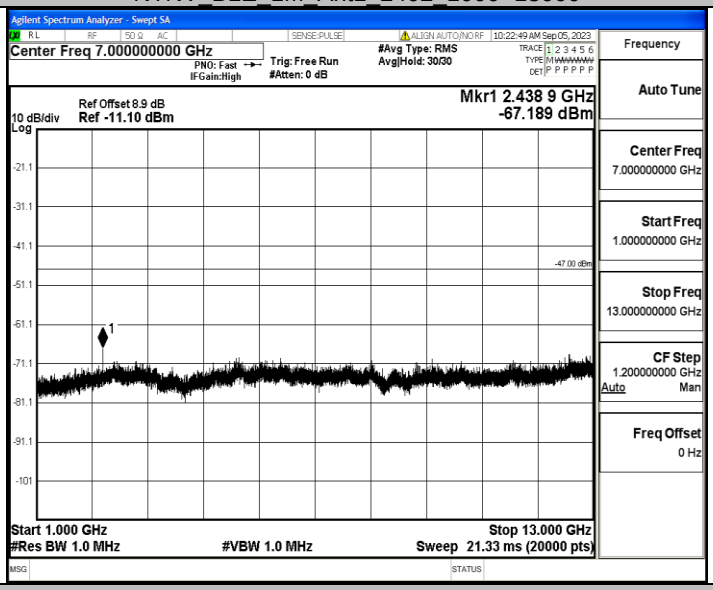
Note: *1.The product was tested at 25℃ and 55% humidity condition;*
2.All condition has been testd,list the worst case in this item

Test plot as follows:

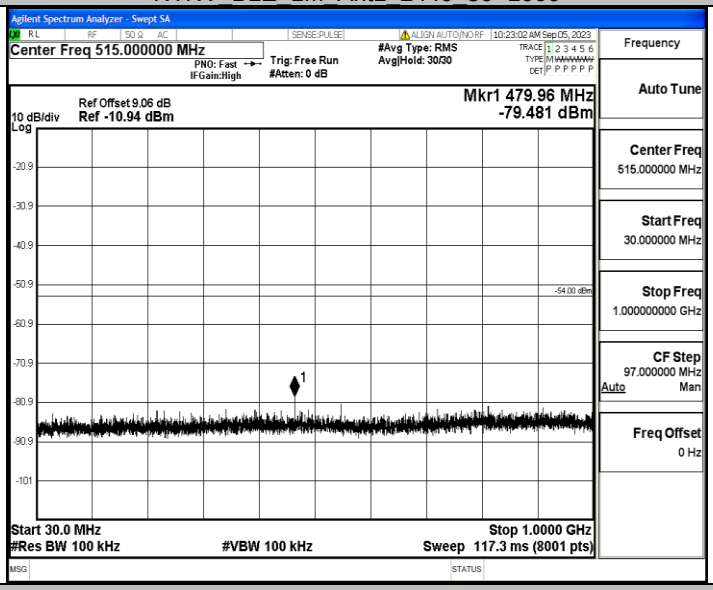
NTNV_BLE_1M_Ant1_2402_30~1000



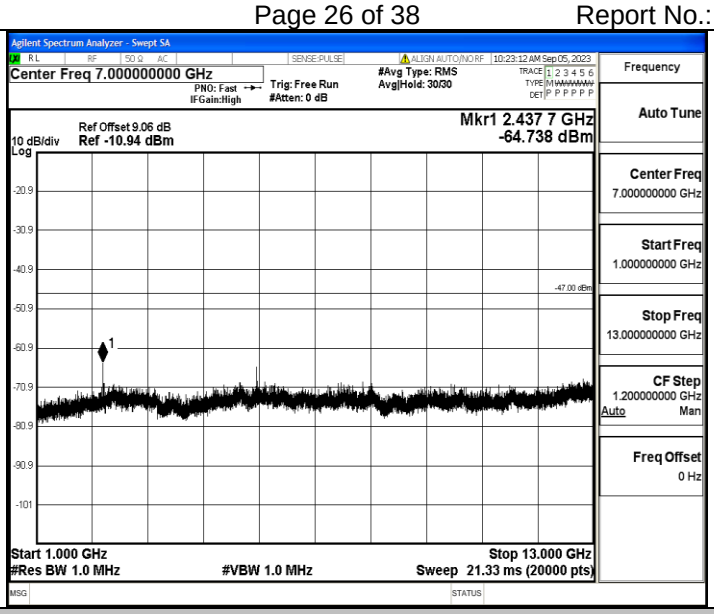
NTNV_BLE_1M_Ant1_2402_1000~13000



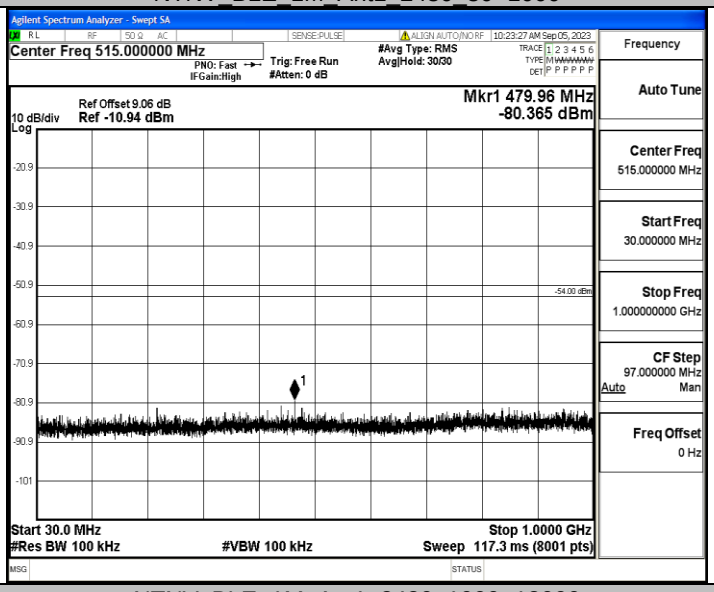
NTNV_BLE_1M_Ant1_2440_30~1000



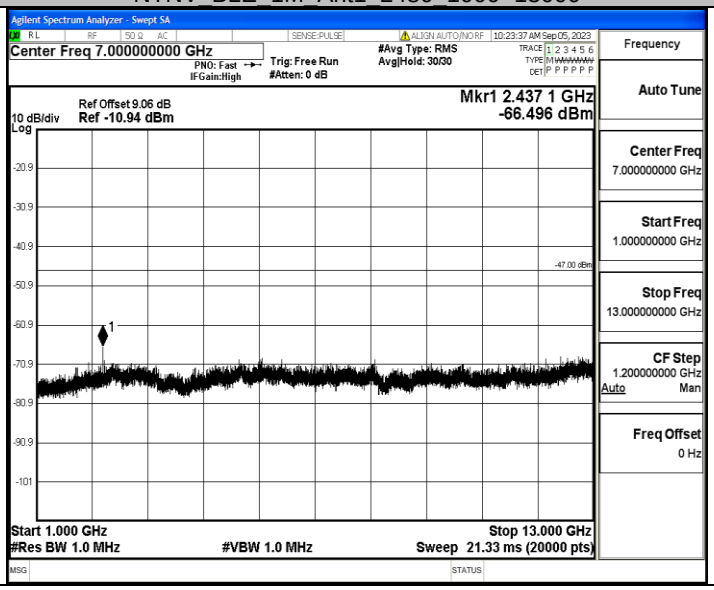
NTNV_BLE_1M_Ant1_2440_1000~13000



NTNV_BLE_1M_Ant1_2480_30~1000



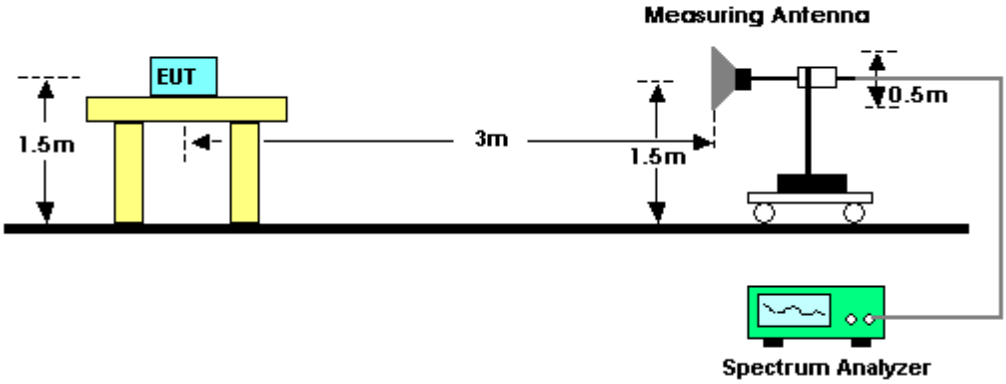
NTNV_BLE_1M_Ant1_2480_1000~13000



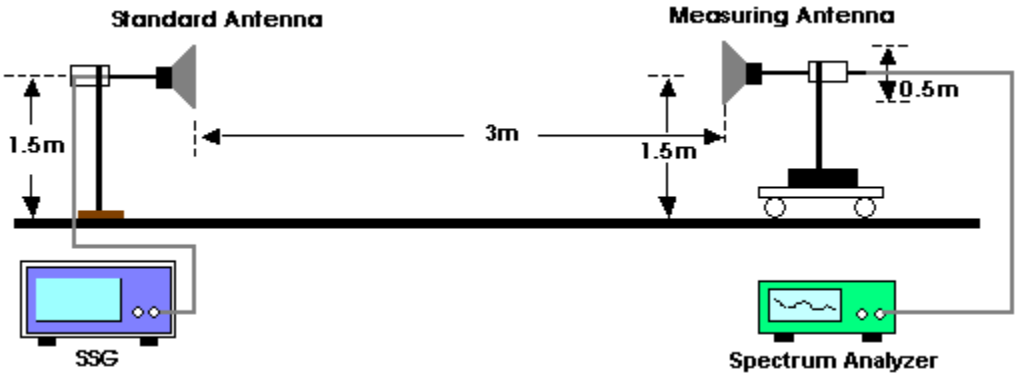
4.8. Transmission Antenna Gain (EIRP antenna power) Measurement

TEST CONFIGURATION

For EUT radiation measurement



For standard antenna measurement



TEST PROCEDURE

1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa “E“.
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within ± 50cm of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of “E” or caluate Pt with SSG output which gives the nearest of “E” and difference (± 1dB). Record the Pt.
7. Calculate EIRP by the formula below EIRP = Gt – L + Pt.
   Gt: gain of replacing antenna (dBi)
   L: feeder loss between SSG and replacing antenna
   Pt: Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field

will be result if measuring antenna is linear polarization.

LIMIT

Modulation system	Frequency band used	Antenna power (max.)	EIRP (max.)	
			Omnidirectional case	Directional case
DS, OFDM	2,400 - 2,483.5 MHz	10 mW/MHz	12.14 dBm/MHz	22.14 dBm/MHz
FH, DS-FH FH-OFDM	2,400 - 2,483.5 MHz	3 mW/MHz	6.91 dBm/MHz	16.91 dBm/MHz
	Excluding 2,427 - 2,470.75 MHz	10 mW/MHz	12.14 dBm/MHz	22.14 dBm/MHz
Other than the above	2,400 - 2,483.5 MHz	10 mW	12.14 dBm	22.14 dBm
Note: it is not applicable when Antenna gain do not exceed 2.14 dBi.				

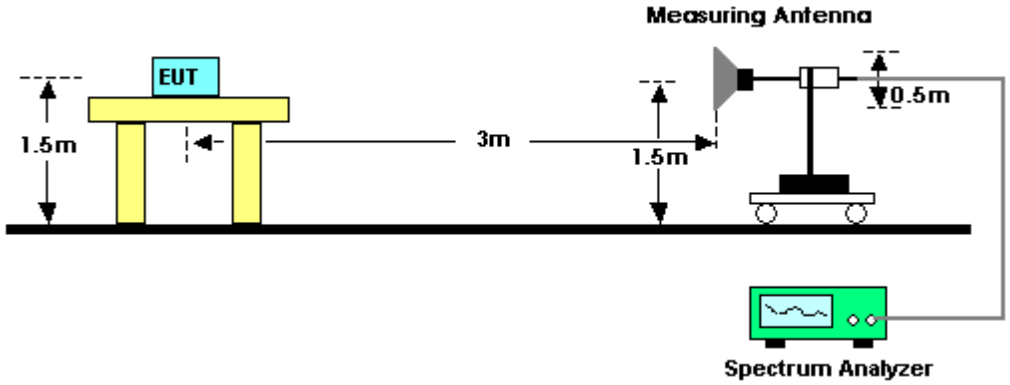
TEST RESULTS

N/A

AS:
☒Antenna gain do not exceed than 2.14 dBi

4.9. Transmission Radiation Angle Width (3db Beamwidth) Measurement

TEST CONFIGURATION



TEST PROCEDURE

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.8 and tune reference level to observe receving signal position.
3. Rotate directions of the EUT horizontally and ertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as “E”
5. Caluate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below 360/A (If A<1; then A=1).
   A = { EIRP Power [mW] / 16.36 for DS, OFDM} = { EIRP Power [dBm] / 12.14 for DS, OFDM} or
   A = { EIRP Power [mW] / 4.9 for FH}={ EIRP Power [dBm] / 6.91 for FH}

LIMIT

Item	Upper Limits
3dB antenna beam width	360/A (If A<1; then A=1) A = {EIRP [mW] / 16.36 for DS, OFDM} or A = {EIRP [mW] / 4.9 for FH}
Note: it is not applicable when Antenna gain do not exceed 2.14 dBi or EIRP do not exceed the omnidirectional EIRP upper limit..	

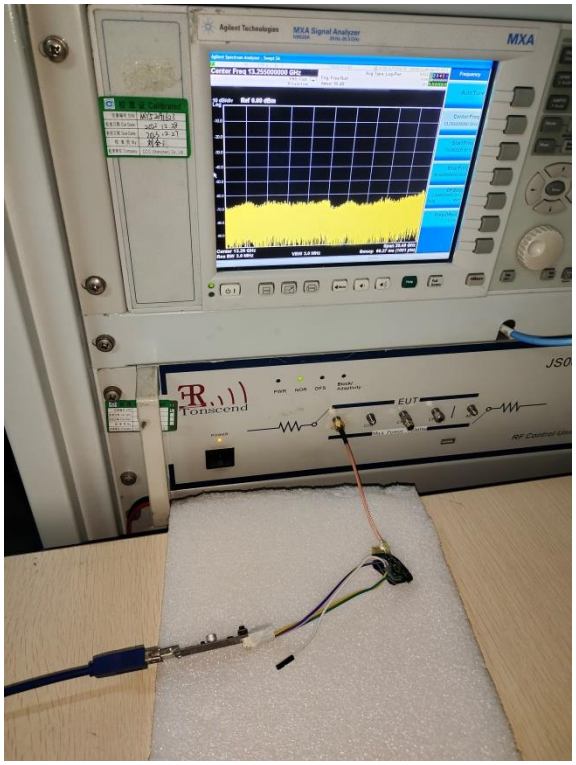
TEST RESULTS

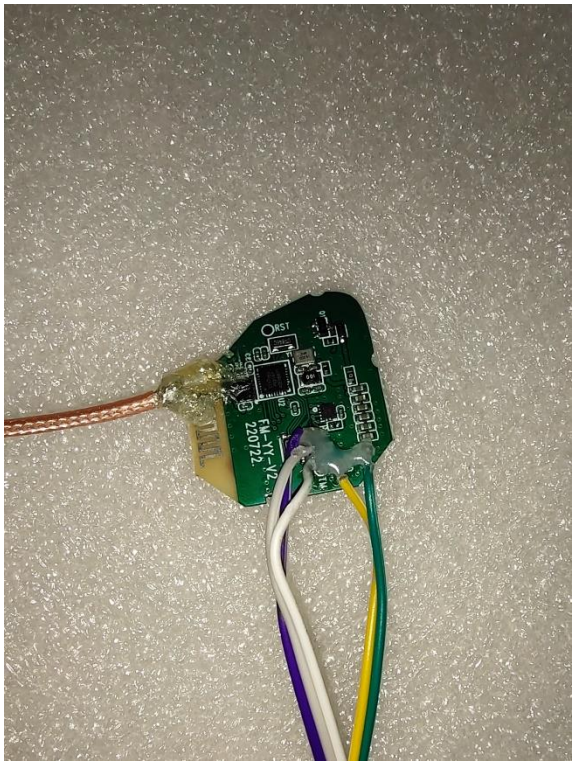
N/A

AS:

☒ Antenna gain do not exceed than 2.14 dBi
☐ EIRP do not exceed the omnidirectional EIRP upper limit

5. Test Setup Photos of the EUT





6. External and Internal Photos of the EUT

External Photos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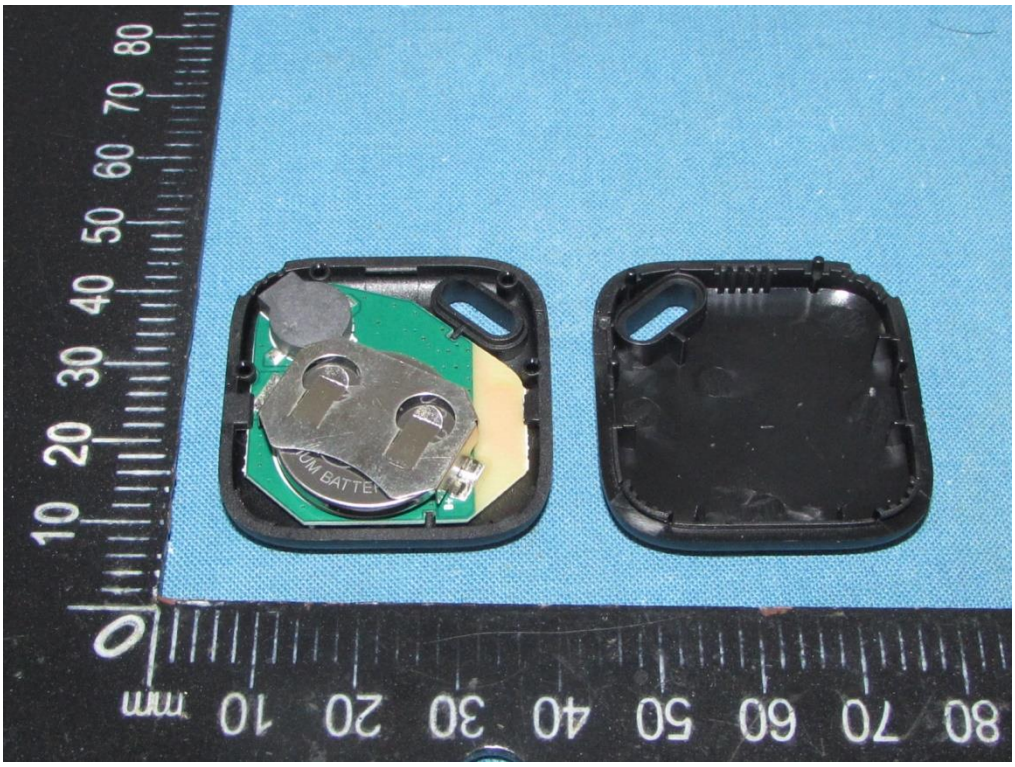
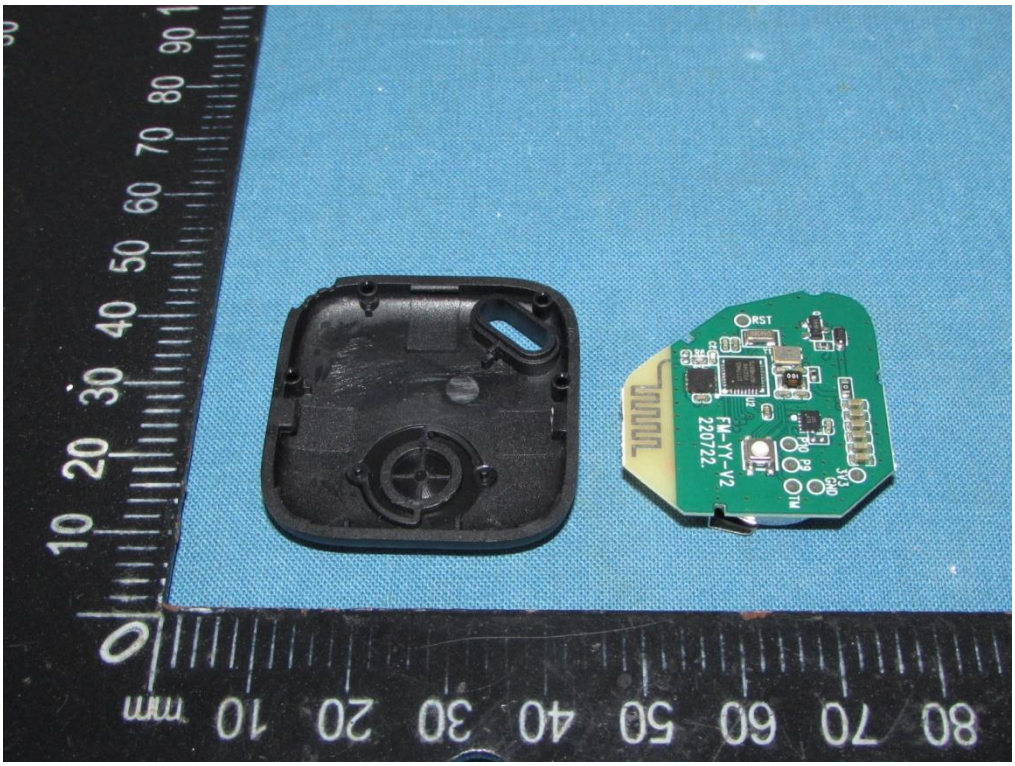
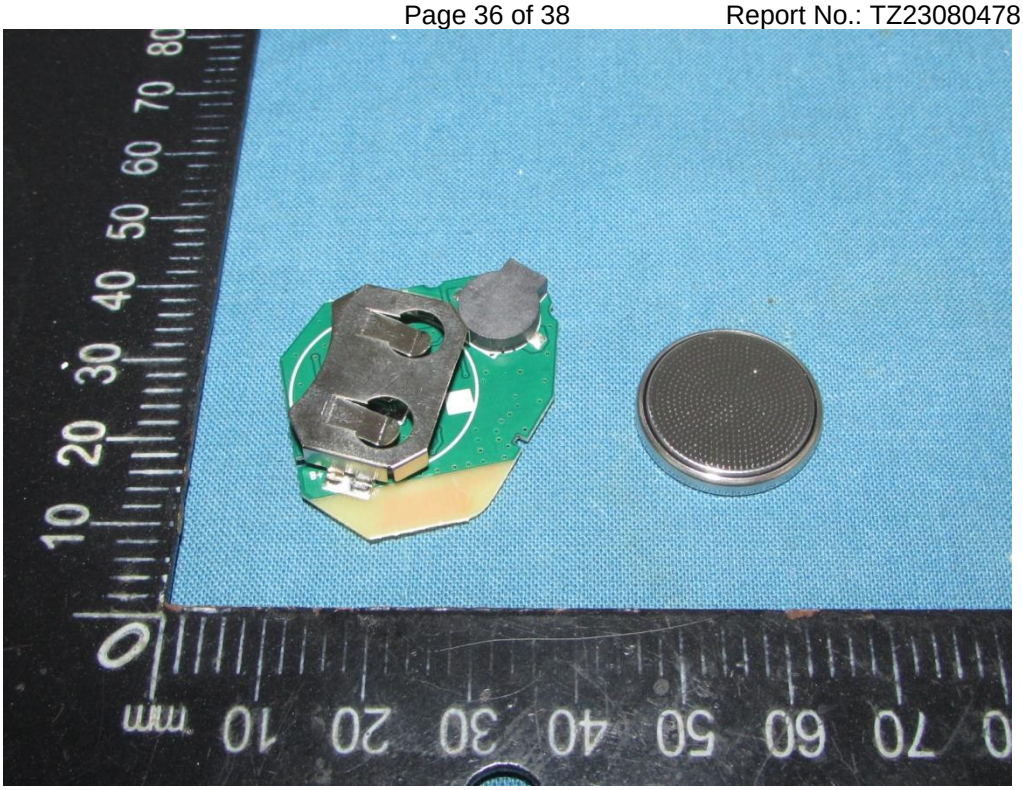
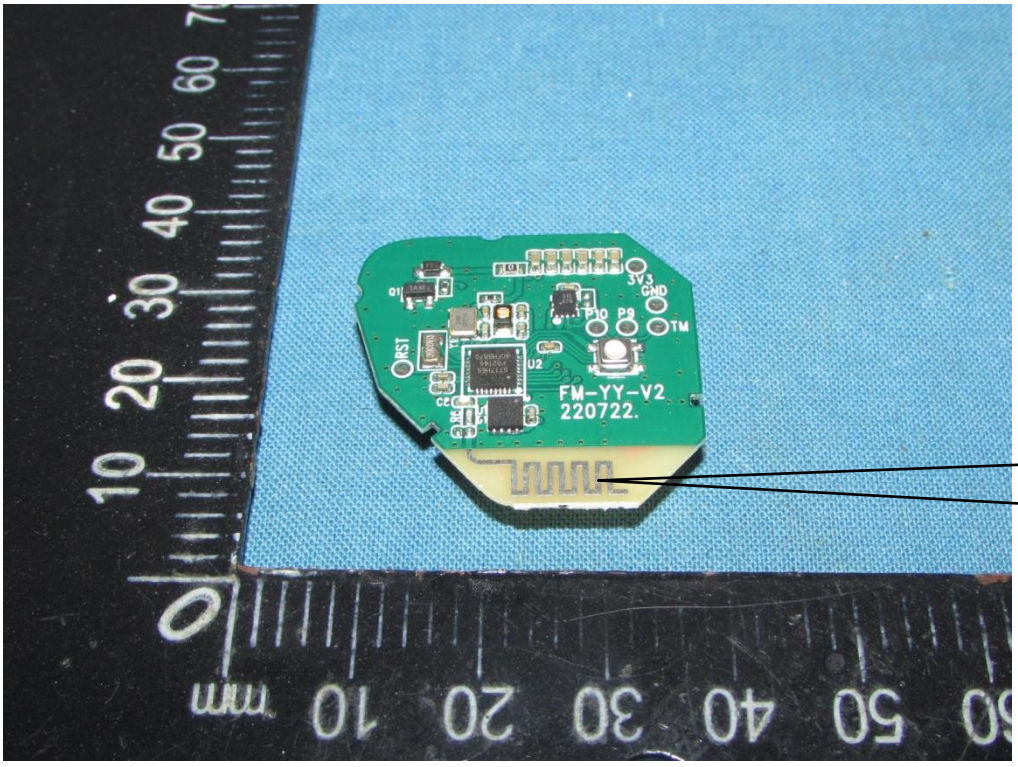
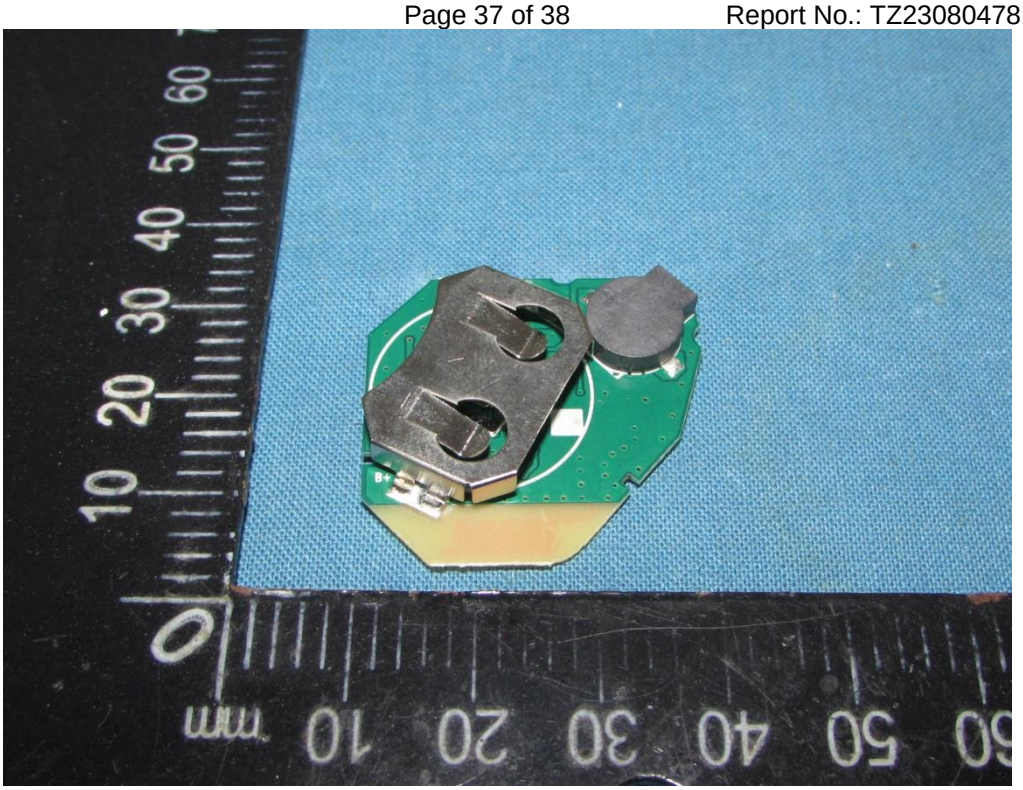
Internal Photos



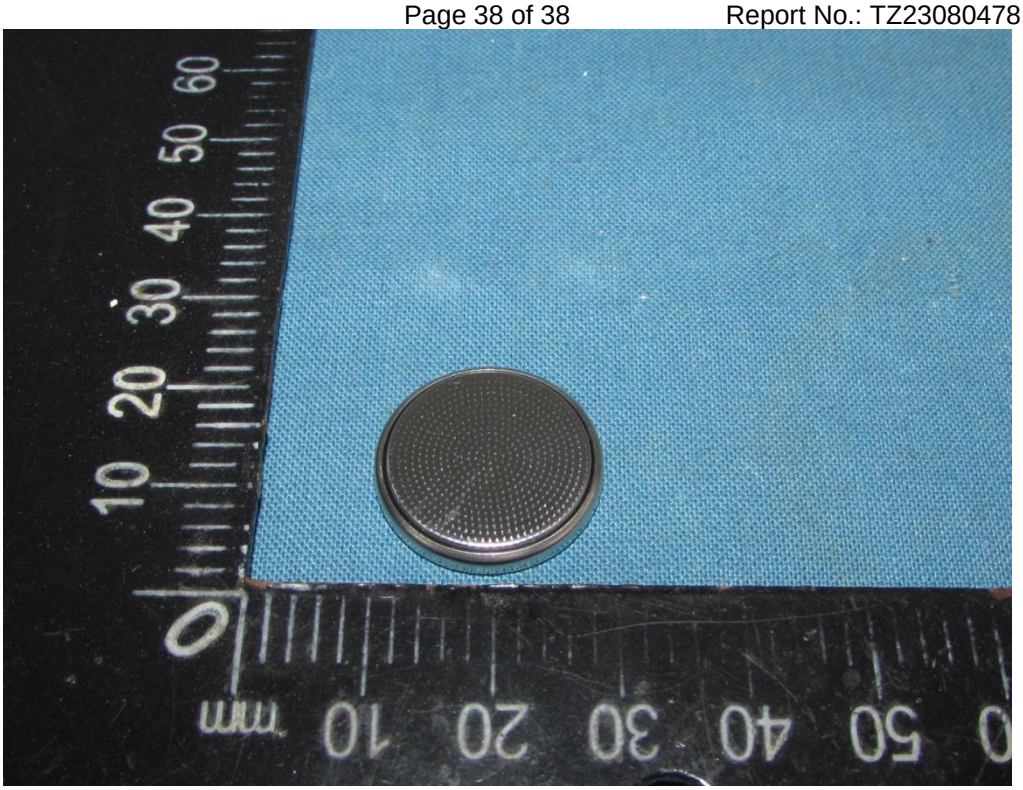





FM-YY-V2
220722.
Bluetooth
Antenna




CR2032
+
3V LITHIUM BATTERY



.....End of Report.....