

# TEST REPORT

Report No..... : KS2212S5859E01  
FCC ID..... : 2A9HH-DT8PRO  
Applicant..... : Shenzhen Xinkeyun Technology Co., Ltd  
Address..... : 8/F, Block C, Han's Innovation Building, Xili Road, Nanshan District, Shenzhen, China  
Manufacturer..... : Shenzhen Xinkeyun Technology Co., Ltd  
Address..... : 8/F, Block C, Han's Innovation Building, Xili Road, Nanshan District, Shenzhen, China  
Product Name..... : Sports smart watch  
Trademark..... : DTNO.1  
Model/Type reference..... : DT8 Pro, C112T, DT8 Pro max, DT8 Pro+  
Standard..... : 47 CFR Part 15.247  
Date of Receipt..... : December 23, 2022  
Date of Test Date..... : December 23, 2022 to January 4, 2023  
Date of issue..... : January 5, 2023  
**Test result..... : Pass**

Prepared by:  
( Printed name + Signature ) Pai Zheng



Approved by:  
( Printed name + Signature ) Sky Dong



**Testing Laboratory Name...: KSIGN(Guangdong) Testing Co., Ltd.**

Address..... : West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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# 1. TEST SUMMARY

## 1.1. Test Standards

The tests were performed according to following standards:

**47 CFR Part 15.247:** Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

## 1.2. Report Version

Revised No.	Date of issue	Description
01	January 5, 2023	Original

### 1.3. Test Description

Test Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	Part 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	Pass
Occupied Bandwidth	47 CFR Part 15.247	47 CFR 15.247(a)(2)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(3)	Pass
Power Spectral Density	47 CFR Part 15.247	47 CFR 15.247(e)	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (above 1GHz)	47 CFR Part 15.247	15.247(c)&15.209	Pass

## 1.4. Test Facility

### **KSIGN(Guangdong) Testing Co., Ltd.**

West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

The test facility is recognized, certified, or accredited by the following organizations:

#### **CNAS-Lab Code: L13261**

KSIGN(Guangdong) Testing Co., Ltd. has been assessed and proved to be in Compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

#### **A2LA-Lab Cert. No.: 5457.01**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing

#### **ISED#: 25693 CAB identifier.: CN0096**

KSIGN(Guangdong) Testing Co., Ltd. has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

#### **FCC-Registration No.: 294912 Designation Number: CN1328**

KSIGN(Guangdong) Testing Co., Ltd. EMC Laboratory has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

## 1.5. Measurement Uncertainty

Test Items	Measurement Uncertainty
Conducted Emission (150k-30MHz)	± 3.34dB
Output Power, Conducted	± 1.4dB
PSD, Conducted	± 1.0dB
RSE (1-18GHz)	± 4.68dB
RSE (30-1000MHz)	± 5.7dB
RSE (18-40GHz)	± 5.18dB

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

## 2. GENERAL INFORMATION

### 2.1. General Description Of EUT

Test Sample Number:	1-1(Normal Sample), 1-2(Engineering Sample)
Product Name:	Sports smart watch
Trademark:	DTNO.1
Model / Type reference:	DT8 Pro,C112T,DT8 Pro max,DT8 Pro+
Model Difference:	The difference between the product model is only the color and appearance is not the same, the different model name is for the market demand. Other power supply mode, internal structure, circuit and key components are the same, does not affect the safety and electromagnetic compatibility performance.
Power Supply(battery):	DC 3.7V
Power Adaptor:	DC 5V
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	40
Modulation Type:	GFSK
Antenna Type:	Internal Antenna
Antenna Gain:	-2.09dBi

### 2.2. Accessory Equipment Information

Title	Manufacturer	Model No.	Serial No.
Adapter	MCDODO	CH-810 Pro	6921002681032

### 2.3. Description of Test Modes

No.	Title	Description of Mode
Test Mode1	TX mode	Keep the EUT connect to AC power line and works in continuously transmitting mode with GFSK modulation.

## 2.4. Measurement Instruments List

Conducted Emission at AC power line				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
LISN	R&S	ENV432	1326.6105.02	2023-03-04
EMI Test Receiver	R&S	ESR	102524	2023-03-04
Manual RF Switch	JS TOYO	/	MSW-01/002	2023-03-04
ISN CAT6	Schwarzbeck	CAT5 8158	227	2023-03-04
Color Signal Generator	Philips	PM5418	672926	2023-03-04
Power Absorbing Clamp	R&S	MDS-21	100925	2023-03-26

Occupied Bandwidth				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wideband Radio Communication Tester	R&S	CMU200	115297	2023-03-04
Audio Analyzer	R&S	UPL16	100001	2023-03-04
Shielding box	Gxiong	GX-5915A	2201113	2023-04-23
High Pass Filter	COM-MW Technology Co., Ltd	ZHPF-M1.2-9G-1 87	09203403	2023-03-04
Band Stop Filter	COM-MW Technology Co., Ltd	ZBSF6-C820-920 -188	09203401	2023-03-04
Splitter	COM-MW Technology Co., Ltd	ZPD-M1-8-2103	09203407	2023-03-04
Coaxial Cable	BEBES	A40-2.92M2.92F-4.5M	1907021	2023-03-04
Hygrothermograph	Anymetre	JB913	/	2023-03-07
Climate Chamber	Angul	AGNH80L	1903042120	2023-03-04
Spectrum Analyzer	HP	8593E	3831U02087	2023-03-04
Dual Output DC Power Supply	Agilent	E3646A	MY40009992	2023-03-04
RF Control Unit	Tonscend	JS0806-2	/	2023-03-04
Analog Signal Generator	HP	83752A	3344A00337	2023-03-04
Vector Signal Generator	Agilent	N5182A	MY50142520	2023-03-04
Wideband Radio Communication Tester	R&S	CMW500	157282	2023-03-04
Spectrum Analyzer	R&S	FSV40-N	101798	2023-03-04

Maximum Conducted Output Power				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wideband Radio Communication Tester	R&S	CMU200	115297	2023-03-04
Audio Analyzer	R&S	UPL16	100001	2023-03-04
Shielding box	Gxiong	GX-5915A	2201113	2023-04-23
High Pass Filter	COM-MW Technology Co., Ltd	ZHPF-M1.2-9G-1 87	09203403	2023-03-04
Band Stop Filter	COM-MW Technology Co., Ltd	ZBSF6-C820-920 -188	09203401	2023-03-04
Splitter	COM-MW Technology Co., Ltd	ZPD-M1-8-2103	09203407	2023-03-04
Coaxial Cable	BEBES	A40-2.92M2.92F-4.5M	1907021	2023-03-04
Hygrothermograph	Anymetre	JB913	/	2023-03-07

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Climate Chamber	Angul	AGNH80L	1903042120	2023-03-04
Spectrum Analyzer	HP	8593E	3831U02087	2023-03-04
Dual Output DC Power Supply	Agilent	E3646A	MY40009992	2023-03-04
RF Control Unit	Tonscend	JS0806-2	/	2023-03-04
Analog Signal Generator	HP	83752A	3344A00337	2023-03-04
Vector Signal Generator	Agilent	N5182A	MY50142520	2023-03-04
Wideband Radio Communication Tester	R&S	CMW500	157282	2023-03-04
Spectrum Analyzer	R&S	FSV40-N	101798	2023-03-04

Power Spectral Density				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wideband Radio Communication Tester	R&S	CMU200	115297	2023-03-04
Audio Analyzer	R&S	UPL16	100001	2023-03-04
Shielding box	Gxiong	GX-5915A	2201113	2023-04-23
High Pass Filter	COM-MW Technology Co., Ltd	ZHPF-M1.2-9G-187	09203403	2023-03-04
Band Stop Filter	COM-MW Technology Co., Ltd	ZBSF6-C820-920-188	09203401	2023-03-04
Splitter	COM-MW Technology Co., Ltd	ZPD-M1-8-2103	09203407	2023-03-04
Coaxial Cable	BEBES	A40-2.92M2.92F-4.5M	1907021	2023-03-04
Hygrothermograph	Anymetre	JB913	/	2023-03-07
Climate Chamber	Angul	AGNH80L	1903042120	2023-03-04
Spectrum Analyzer	HP	8593E	3831U02087	2023-03-04
Dual Output DC Power Supply	Agilent	E3646A	MY40009992	2023-03-04
RF Control Unit	Tonscend	JS0806-2	/	2023-03-04
Analog Signal Generator	HP	83752A	3344A00337	2023-03-04
Vector Signal Generator	Agilent	N5182A	MY50142520	2023-03-04
Wideband Radio Communication Tester	R&S	CMW500	157282	2023-03-04
Spectrum Analyzer	R&S	FSV40-N	101798	2023-03-04

Band edge emissions (Radiated)				
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	1230	2023-04-12
Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	2023-03-04
Color Signal Generator	Philips	PM5418	672926	2023-03-04
Broadcast Television Signal Generator	R&S	SFE100	141038	2023-03-04
Analog Signal Generator	Agilent	8648A	3847M00445	2023-03-04
EMI Test Receiver	R&S	ESR	102525	2023-03-04
Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	2023-03-29
Pre-Amplifier	EMCI	EMC051835SE	980662	2023-03-04
Spectrum Analyzer	Keysight	N9020A	MY46471971	2023-03-04

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Loop Antenna	Beijin ZHINAN	ZN30900C	18050	2023-03-05
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**Emissions in restricted frequency bands (below 1GHz)**

Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	1230	2023-04-12
Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	2023-03-04
Color Signal Generator	Philips	PM5418	672926	2023-03-04
Broadcast Television Signal Generator	R&S	SFE100	141038	2023-03-04
Analog Signal Generator	Agilent	8648A	3847M00445	2023-03-04
EMI Test Receiver	R&S	ESR	102525	2023-03-04
Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	2023-03-29
Pre-Amplifier	EMCI	EMC051835SE	980662	2023-03-04
Spectrum Analyzer	Keysight	N9020A	MY46471971	2023-03-04
Loop Antenna	Beijin ZHINAN	ZN30900C	18050	2023-03-05

**Emissions in restricted frequency bands (above 1GHz)**

Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Ultra-Broadband logarithmic period Antenna	Schwarzbeck	VULB 9163	1230	2023-04-12
Pre-Amplifier	Schwarzbeck	BBV 9745	9745#129	2023-03-04
Color Signal Generator	Philips	PM5418	672926	2023-03-04
Broadcast Television Signal Generator	R&S	SFE100	141038	2023-03-04
Analog Signal Generator	Agilent	8648A	3847M00445	2023-03-04
EMI Test Receiver	R&S	ESR	102525	2023-03-04
Horn Antenna	Schwarzbeck	BBHA 9120 D	2023	2023-03-29
Pre-Amplifier	EMCI	EMC051835SE	980662	2023-03-04
Spectrum Analyzer	Keysight	N9020A	MY46471971	2023-03-04
Loop Antenna	Beijin ZHINAN	ZN30900C	18050	2023-03-05

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### 3. Evaluation Results (Evaluation)

#### 3.1. Antenna requirement

Test 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 shall be considered sufficient to comply with the provisions of this section.
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##### 3.1.1. Conclusion:

The antenna gain is -2.09dB, the directional gain of the antenna less than 6dBi. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used. Antenna structure please refer to the EUT internal photographs antenna photo.
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## 4. Radio Spectrum Matter Test Results (RF)

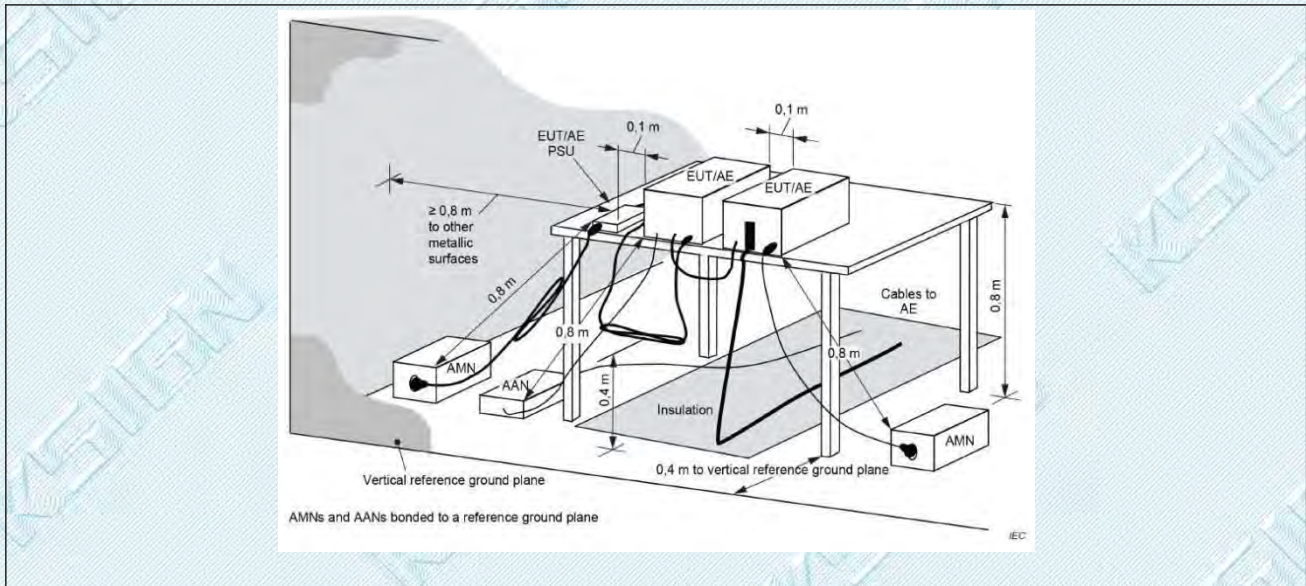
### 4.1. Conducted Emission at AC power line

Test Requirement:	Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN).		
Test Limit:	Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	*Decreases with the logarithm of the frequency.		
Test Method:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices		

#### 4.1.1. E.U.T. Operation:

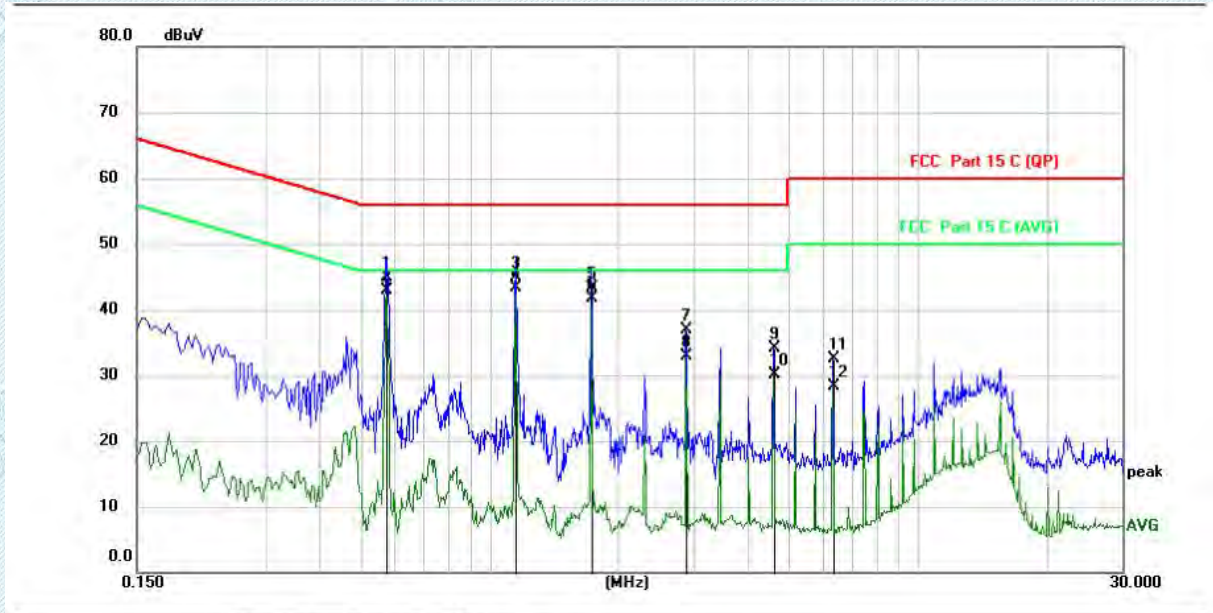
Operating Environment:	
Temperature:	23.5 °C
Humidity:	53.1 %
Atmospheric Pressure:	101 kPa
Final test mode:	Test Mode 1

#### 4.1.2. Test Setup Diagram:



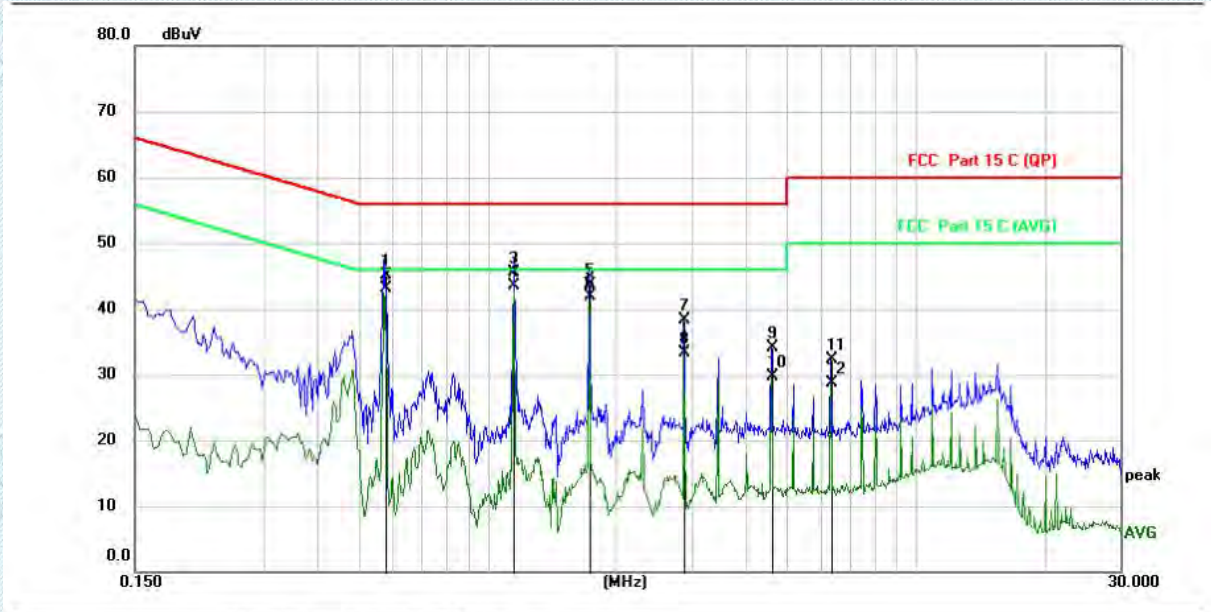
4.1.3. Test Data:

Test Mode1 / Line: Line / Band: 2.4G / BW: 1 / CH: L



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.5757	34.38	10.46	44.84	56.00	-11.16	QP	
2	0.5757	32.48	10.46	42.94	46.00	-3.06	AVG	
3	1.1521	34.54	10.43	44.97	56.00	-11.03	QP	
4 *	1.1521	32.92	10.43	43.35	46.00	-2.65	AVG	
5	1.7279	32.72	10.49	43.21	56.00	-12.79	QP	
6	1.7279	31.13	10.49	41.62	46.00	-4.38	AVG	
7	2.8780	26.35	10.61	36.96	56.00	-19.04	QP	
8	2.8780	22.35	10.61	32.96	46.00	-13.04	AVG	
9	4.6100	23.48	10.63	34.11	56.00	-21.89	QP	
10	4.6100	19.57	10.63	30.20	46.00	-15.80	AVG	
11	6.3339	21.83	10.60	32.43	60.00	-27.57	QP	
12	6.3339	17.63	10.60	28.23	50.00	-21.77	AVG	

Test Mode1 / Line: Neutral / Band: 2.4G / BW: 1 / CH: L



No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.5762	34.64	10.47	45.11	56.00	-10.89	QP	
2	0.5762	32.70	10.47	43.17	46.00	-2.83	AVG	
3	1.1510	34.94	10.48	45.42	56.00	-10.58	QP	
4 *	1.1510	33.10	10.48	43.58	46.00	-2.42	AVG	
5	1.7270	33.18	10.53	43.71	56.00	-12.29	QP	
6	1.7270	31.38	10.53	41.91	46.00	-4.09	AVG	
7	2.8780	27.65	10.59	38.24	56.00	-17.76	QP	
8	2.8780	22.80	10.59	33.39	46.00	-12.61	AVG	
9	4.6059	23.56	10.61	34.17	56.00	-21.83	QP	
10	4.6059	19.07	10.61	29.68	46.00	-16.32	AVG	
11	6.3339	21.75	10.58	32.33	60.00	-27.67	QP	
12	6.3339	18.14	10.58	28.72	50.00	-21.28	AVG	

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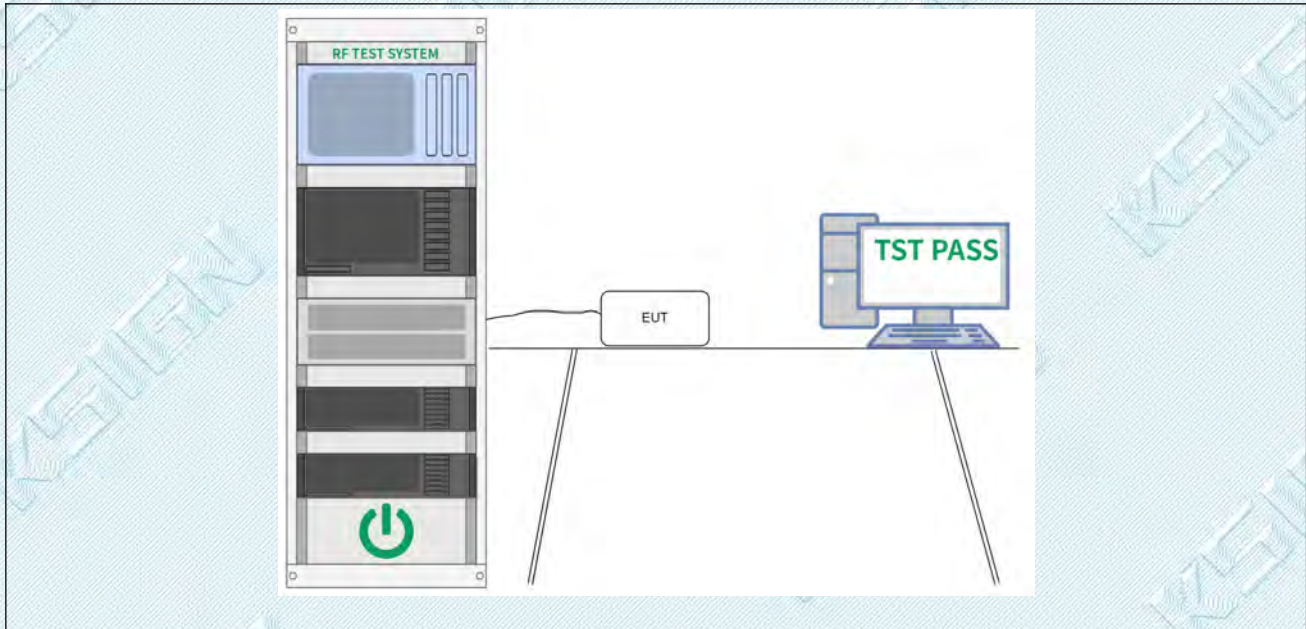
## 4.2. Occupied Bandwidth

Test Requirement:	Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Limit:	Section (a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.
Test Method:	DTS bandwidth
Procedure:	<ul style="list-style-type: none"> <li>a) Set RBW = 100 kHz.</li> <li>b) Set the VBW <math>\geq</math> [3 × RBW].</li> <li>c) Detector = peak.</li> <li>d) Trace mode = max hold.</li> <li>e) Sweep = auto couple.</li> <li>f) Allow the trace to stabilize.</li> <li>g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.</li> </ul>

### 4.2.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.5 °C
Humidity:	53.1 %
Atmospheric Pressure:	101 kPa
Final test mode:	Test Mode 1

### 4.2.2. Test Setup Diagram:



### 4.2.3. Test Data:

Please Refer to Appendix for Details.

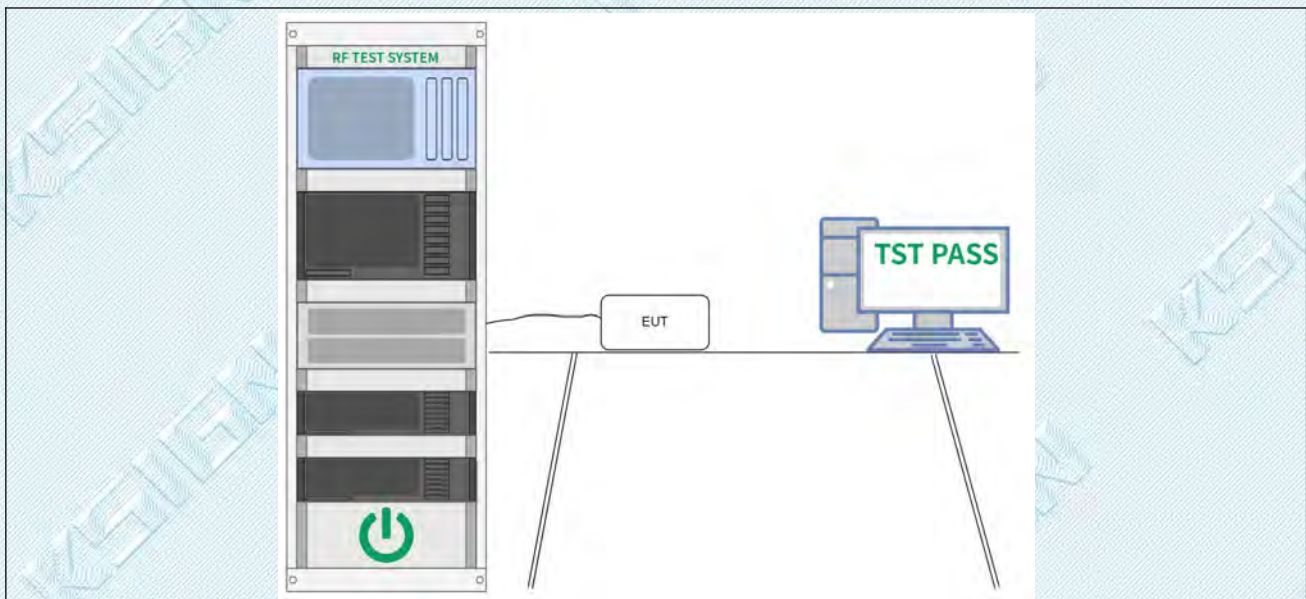
### 4.3. Maximum Conducted Output Power

Test Requirement:	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Limit:	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.
Test Method:	Maximum peak conducted output power
Procedure:	ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power

#### 4.3.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.5 °C
Humidity:	53.1 %
Atmospheric Pressure:	101 kPa
Final test mode:	Test Mode 1

#### 4.3.2. Test Setup Diagram:





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#### 4.3.3. Test Data:

Please Refer to Appendix for Details.

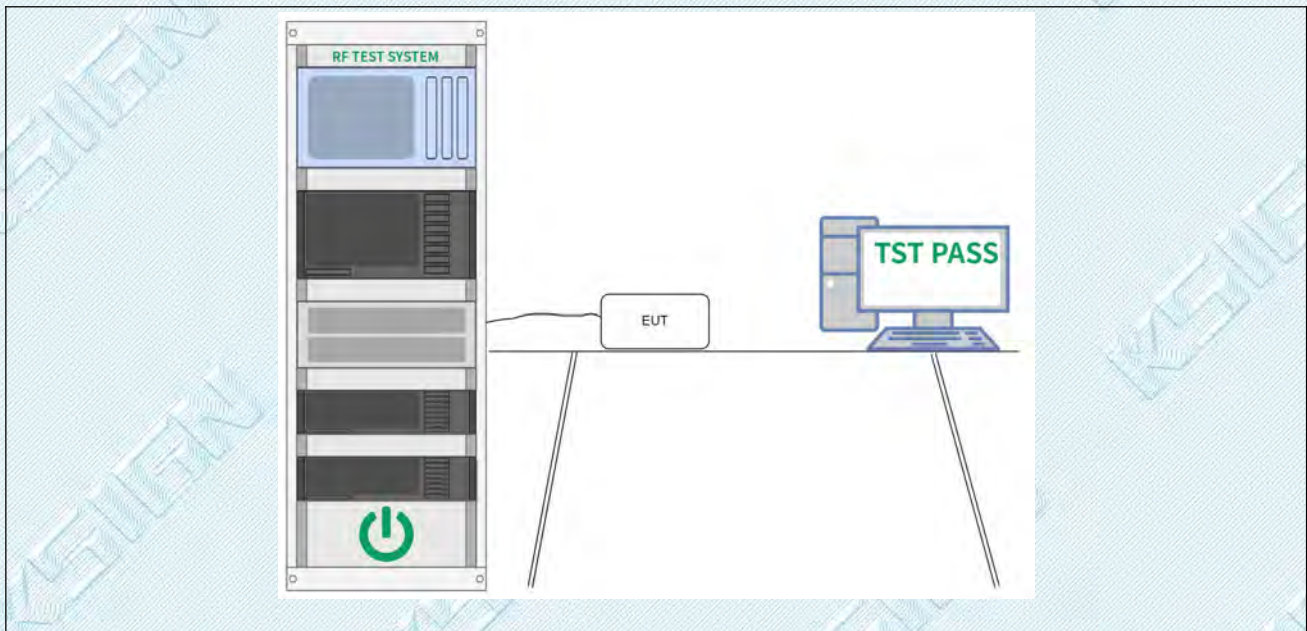
#### 4.4. Power Spectral Density

Test Requirement:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Limit:	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.
Test Method:	Maximum power spectral density level in the fundamental emission

##### 4.4.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.5 °C
Humidity:	53.1 %
Atmospheric Pressure:	101 kPa
Final test mode:	Test Mode1

##### 4.4.2. Test Setup Diagram:



##### 4.4.3. Test Data:

Please Refer to Appendix for Details.

#### 4.5. Band edge emissions (Radiated)

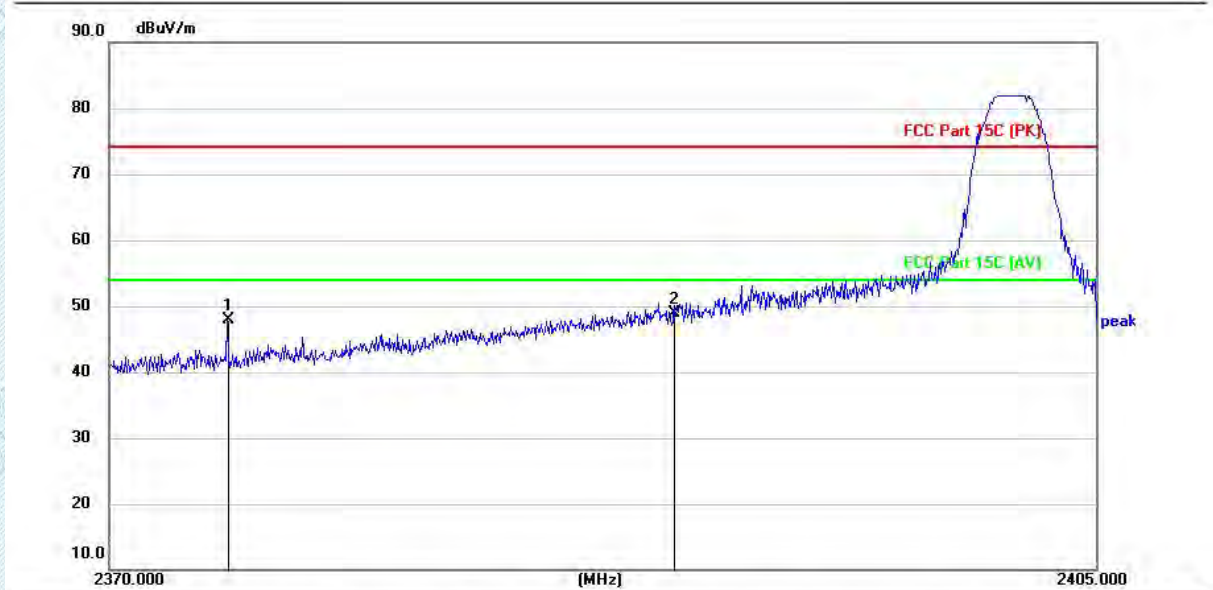
Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
Test Method:	Radiated emissions tests		
Procedure:	ANSI C63.10-2013 section 6.6.4		

##### 4.5.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.5 °C
Humidity:	53.1 %
Atmospheric Pressure:	101 kPa
Final test mode:	Test Mode 1

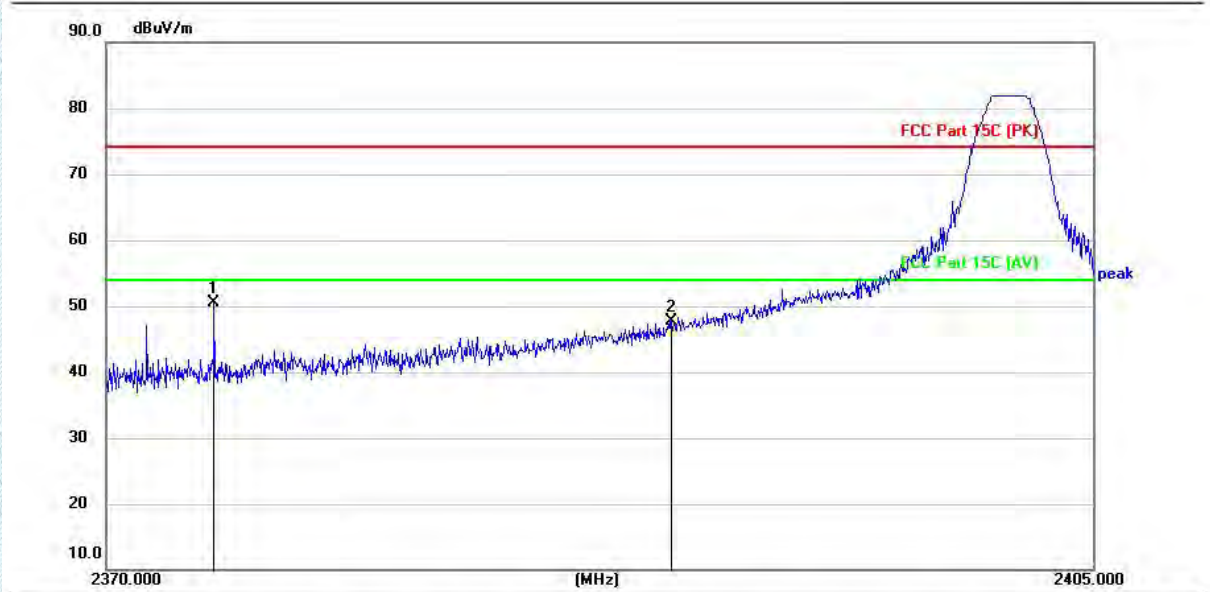
4.5.2. Test Data:

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2374.155	58.92	-10.93	47.99	74.00	26.01	peak
2	*	2390.000	59.81	-10.92	48.89	74.00	25.11	peak

**Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L**



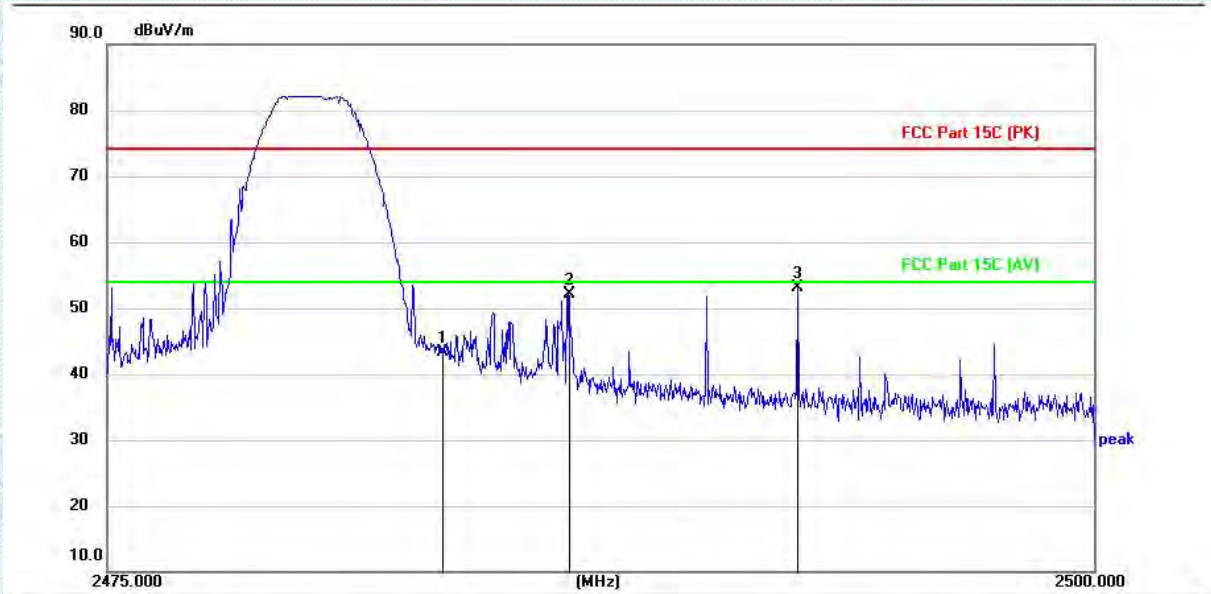
No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	*	2373.811	61.51	-10.93	50.58	74.00	23.42	peak
2		2390.000	58.58	-10.92	47.66	74.00	26.34	peak

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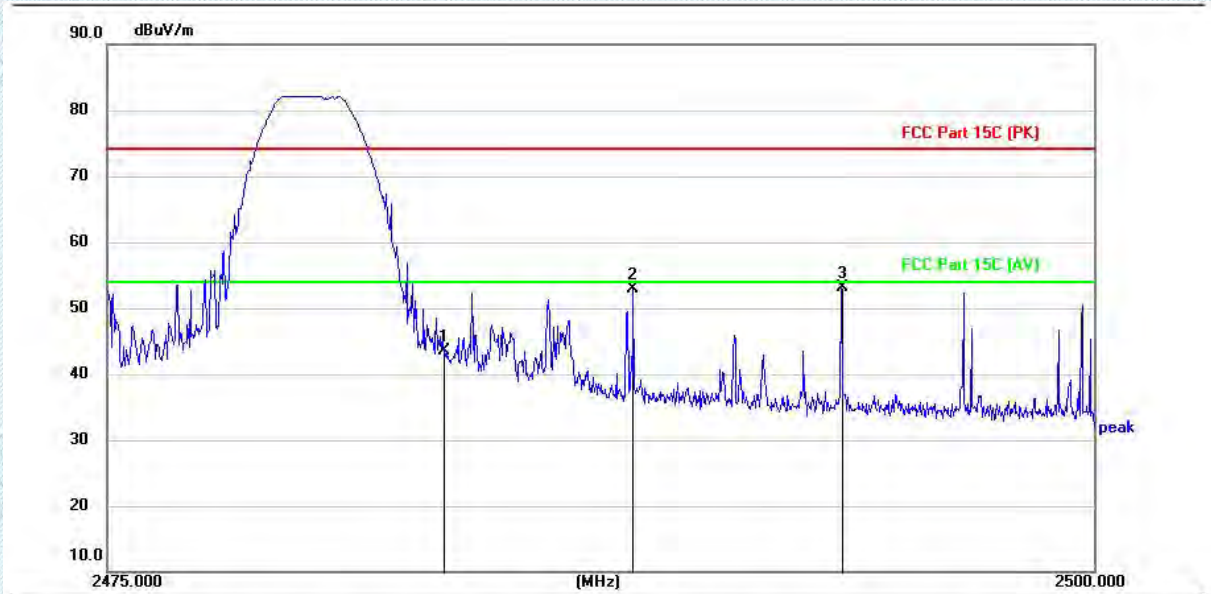
Tel: +(86) 0755-2985 2678 Fax: +(86) 0755-2985 2397 E-mail: info@gdkesign.cn Web: www.gdkesign.com

**Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H**



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2483.500	54.28	-10.88	43.40	74.00	30.60	peak
2		2486.645	62.93	-10.88	52.05	74.00	21.95	peak
3	*	2492.450	64.00	-10.89	53.11	74.00	20.89	peak

**Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H**



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2483.500	54.40	-10.88	43.52	74.00	30.48	peak
2		2488.300	63.79	-10.88	52.91	74.00	21.09	peak
3	*	2493.573	64.02	-10.89	53.13	74.00	20.87	peak

**Note:**

- 1.Measurement = Reading level + Correct Factor
- 2.Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
- 3.Both modes of BLE 1Mbps and 2Mbps were tested at Low and High channel and recorded worst mode at BLE 1Mbps.

#### 4.6. Emissions in restricted frequency bands (below 1GHz)

Test Requirement:	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)(see § 15.205(c)).`		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
Test Method:	Radiated emissions tests		
Procedure:	ANSI C63.10-2013 section 6.6.4		

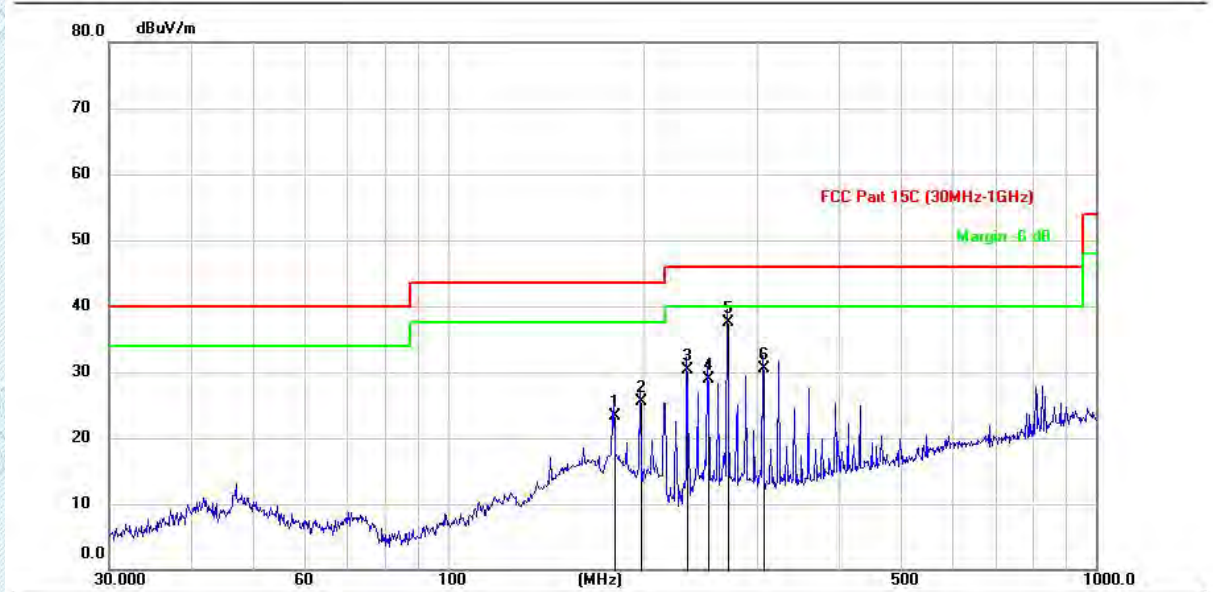
##### 4.6.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.5 °C
Humidity:	53.1 %
Atmospheric Pressure:	101 kPa
Final test mode:	Test Mode 1



4.6.2. Test Data:

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		180.0165	42.38	-19.05	23.33	43.50	-20.17	QP
2		198.0316	43.57	-18.09	25.48	43.50	-18.02	QP
3		234.0042	46.70	-16.42	30.28	46.00	-15.72	QP
4		251.9744	44.56	-15.69	28.87	46.00	-17.13	QP
5	*	269.9958	52.84	-15.36	37.48	46.00	-8.52	QP
6		306.0017	44.85	-14.41	30.44	46.00	-15.56	QP

**Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L**



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		180.0165	46.81	-19.05	27.76	43.50	-15.74	QP
2		197.9622	48.43	-18.09	30.34	43.50	-13.16	QP
3		234.0042	49.38	-16.42	32.96	46.00	-13.04	QP
4		269.9958	48.33	-15.36	32.97	46.00	-13.03	QP
5	*	360.0687	48.05	-12.21	35.84	46.00	-10.16	QP
6		395.9638	44.44	-11.04	33.40	46.00	-12.60	QP

#### 4.7. Emissions in restricted frequency bands (above 1GHz)

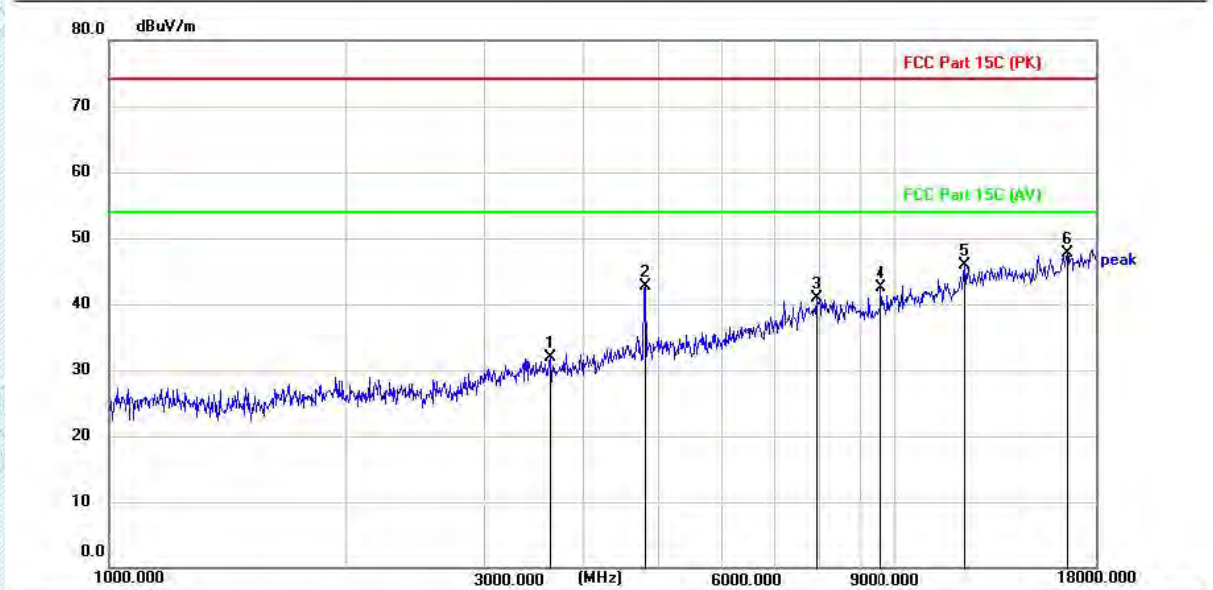
Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`		
Test Limit:	Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
	0.009-0.490	2400/F(kHz)	300
	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.			
Test Method:	Radiated emissions tests		
Procedure:	ANSI C63.10-2013 section 6.6.4		

##### 4.7.1. E.U.T. Operation:

Operating Environment:	
Temperature:	23.5 °C
Humidity:	53.1 %
Atmospheric Pressure:	101 kPa
Final test mode:	Test Mode 1

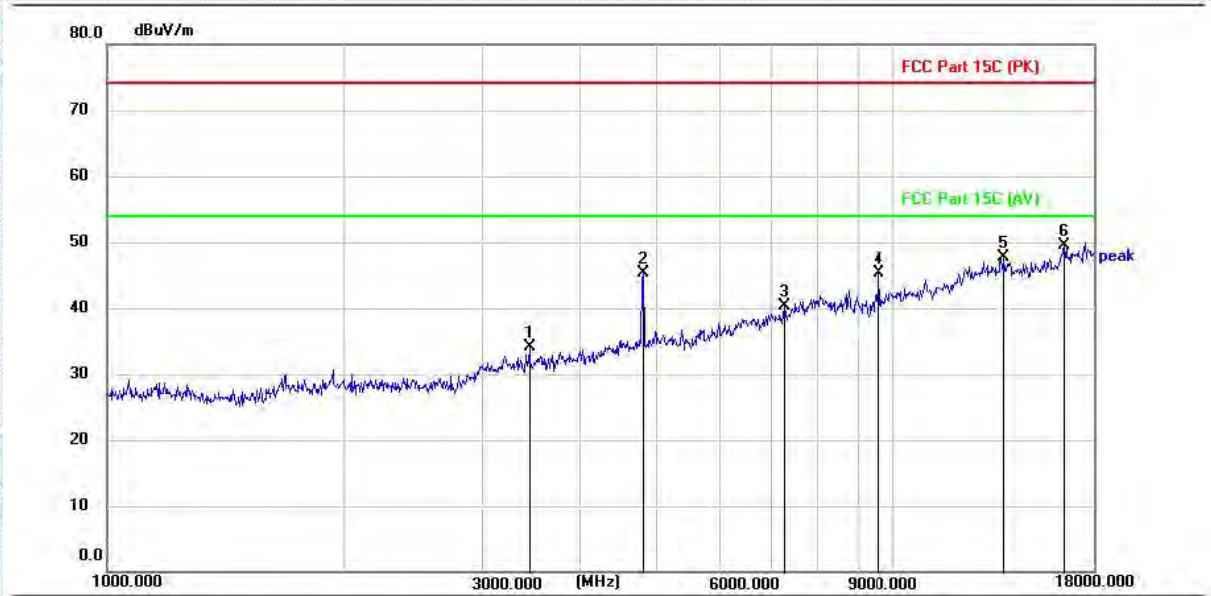
4.7.2. Test Data:

Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		3650.300	41.24	-9.30	31.94	74.00	42.06	peak
2		4804.600	48.65	-5.92	42.73	74.00	31.27	peak
3		7944.500	38.93	1.93	40.86	74.00	33.14	peak
4		9607.100	39.27	3.20	42.47	74.00	31.53	peak
5		12271.000	37.48	8.47	45.95	74.00	28.05	peak
6	*	16566.900	33.96	13.71	47.67	74.00	26.33	peak

**Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L**



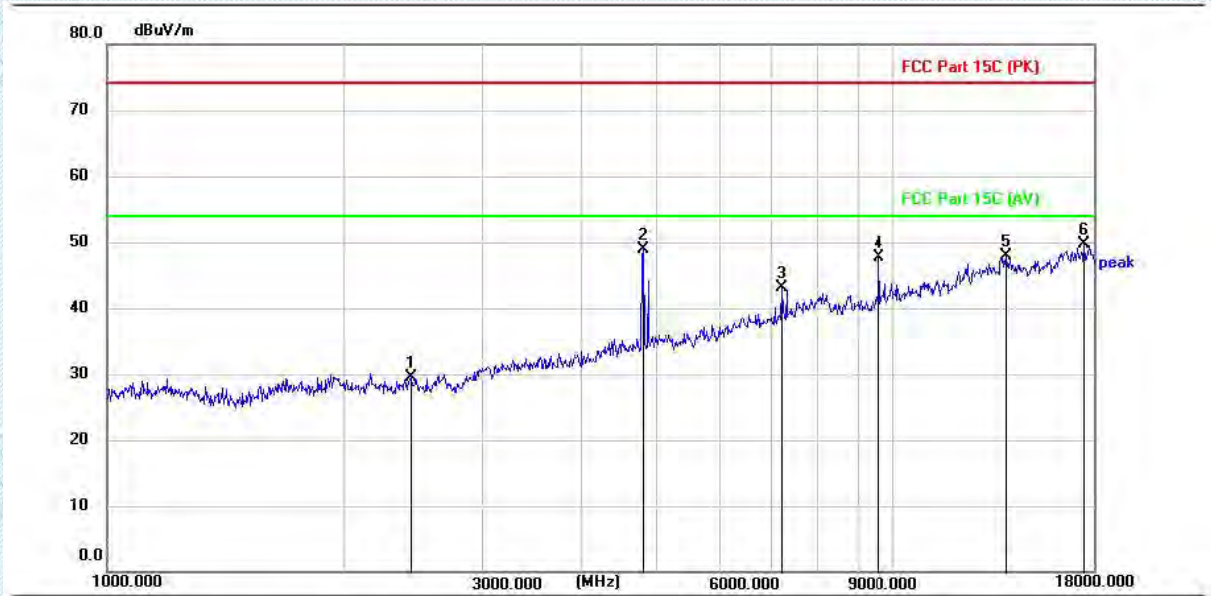
No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		3448.000	43.97	-9.78	34.19	74.00	39.81	peak
2		4804.600	51.16	-5.92	45.24	74.00	28.76	peak
3		7264.500	40.13	0.10	40.23	74.00	33.77	peak
4		9608.800	42.17	3.21	45.38	74.00	28.62	peak
5		13841.800	36.73	11.03	47.76	74.00	26.24	peak
6	*	16548.200	35.80	13.73	49.53	74.00	24.47	peak

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**Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: M**



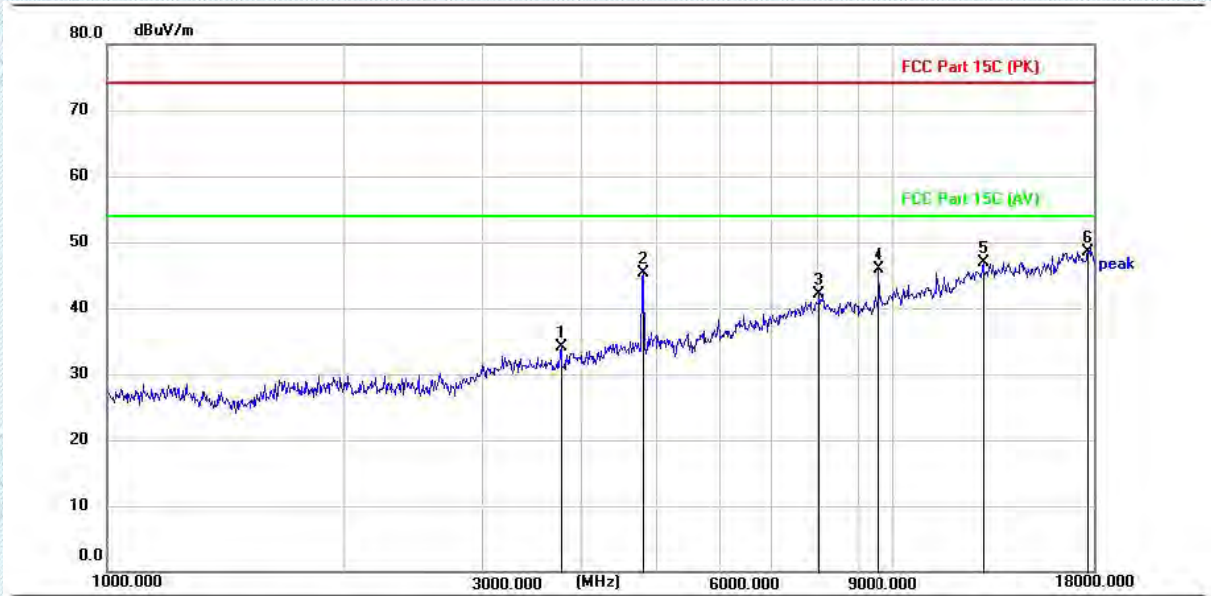
No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		2443.300	40.45	-10.91	29.54	74.00	44.46	peak
2		4804.600	54.82	-5.92	48.90	74.00	25.10	peak
3		7205.000	43.22	-0.09	43.13	74.00	30.87	peak
4		9608.800	44.59	3.21	47.80	74.00	26.20	peak
5		13938.700	36.69	11.16	47.85	74.00	26.15	peak
6	*	17495.100	36.26	13.40	49.66	74.00	24.34	peak

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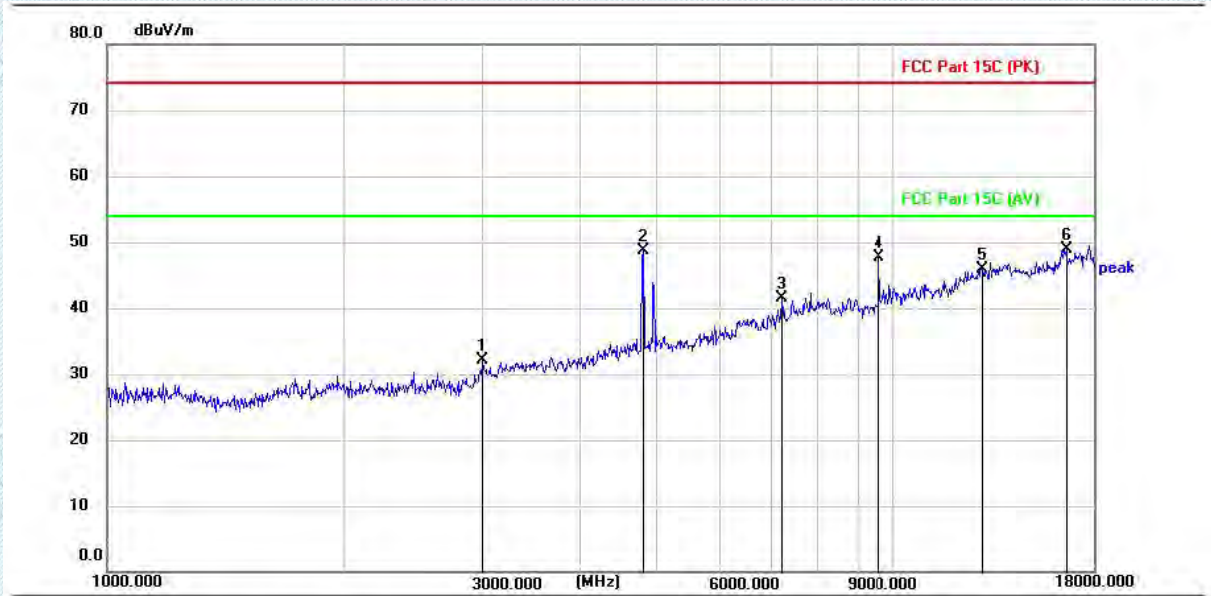
No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		3782.900	43.17	-8.97	34.20	74.00	39.80	peak
2		4804.600	51.26	-5.92	45.34	74.00	28.66	peak
3		8036.300	40.09	2.06	42.15	74.00	31.85	peak
4		9608.800	42.66	3.21	45.87	74.00	28.13	peak
5		13041.100	36.92	9.98	46.90	74.00	27.10	peak
6	*	17697.400	35.07	13.49	48.56	74.00	25.44	peak

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**Test Mode1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H**



No. Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1	3016.200	42.66	-10.56	32.10	74.00	41.90	peak
2	4804.600	54.57	-5.92	48.65	74.00	25.35	peak
3	7205.000	41.56	-0.09	41.47	74.00	32.53	peak
4	9607.100	44.44	3.20	47.64	74.00	26.36	peak
5	12993.500	35.91	9.93	45.84	74.00	28.16	peak
6 *	16645.100	35.40	13.58	48.98	74.00	25.02	peak

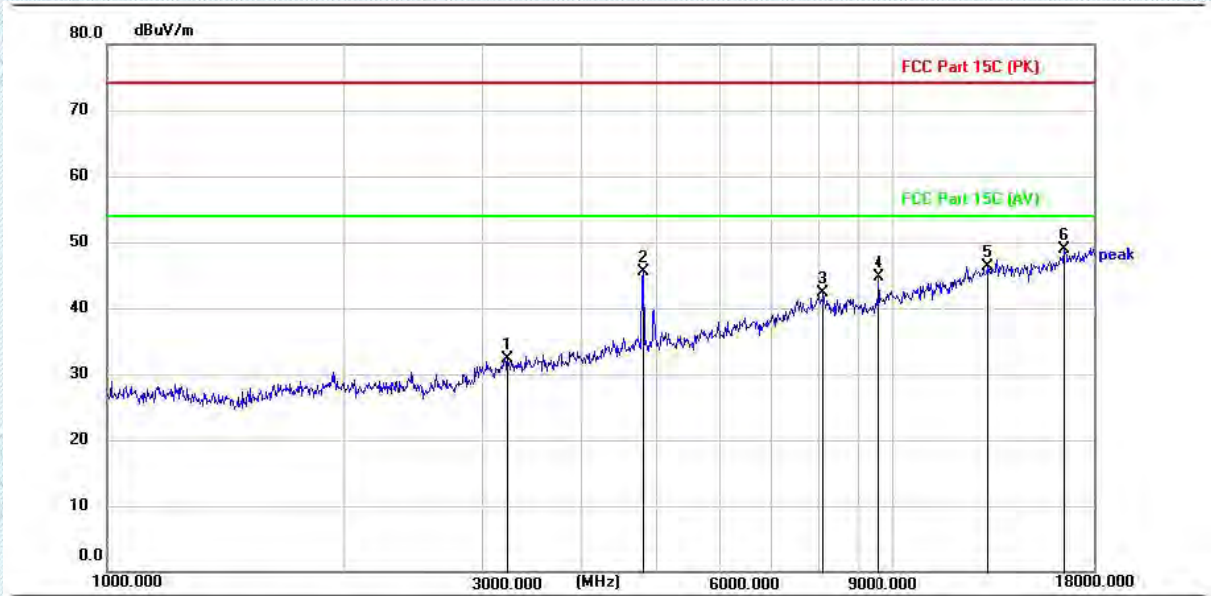
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**Test Mode1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H**



No.	Mk.	Freq. MHz	Reading Level (dBuV)	Correct Factor (dB/m)	Measurement (dBuV/m)	Limit (dBuV/m)	Over (dB)	Detector
1		3235.500	42.50	-10.16	32.34	74.00	41.66	peak
2		4804.600	51.43	-5.92	45.51	74.00	28.49	peak
3		8151.900	40.23	2.03	42.26	74.00	31.74	peak
4		9608.800	41.40	3.21	44.61	74.00	29.39	peak
5		13182.200	36.09	10.19	46.28	74.00	27.72	peak
6	*	16532.900	35.19	13.76	48.95	74.00	25.05	peak

**Note:**

1. From 18GHz to 26.5GHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Since the peak value is less than the limit of the AVG value, there is no AVG data.

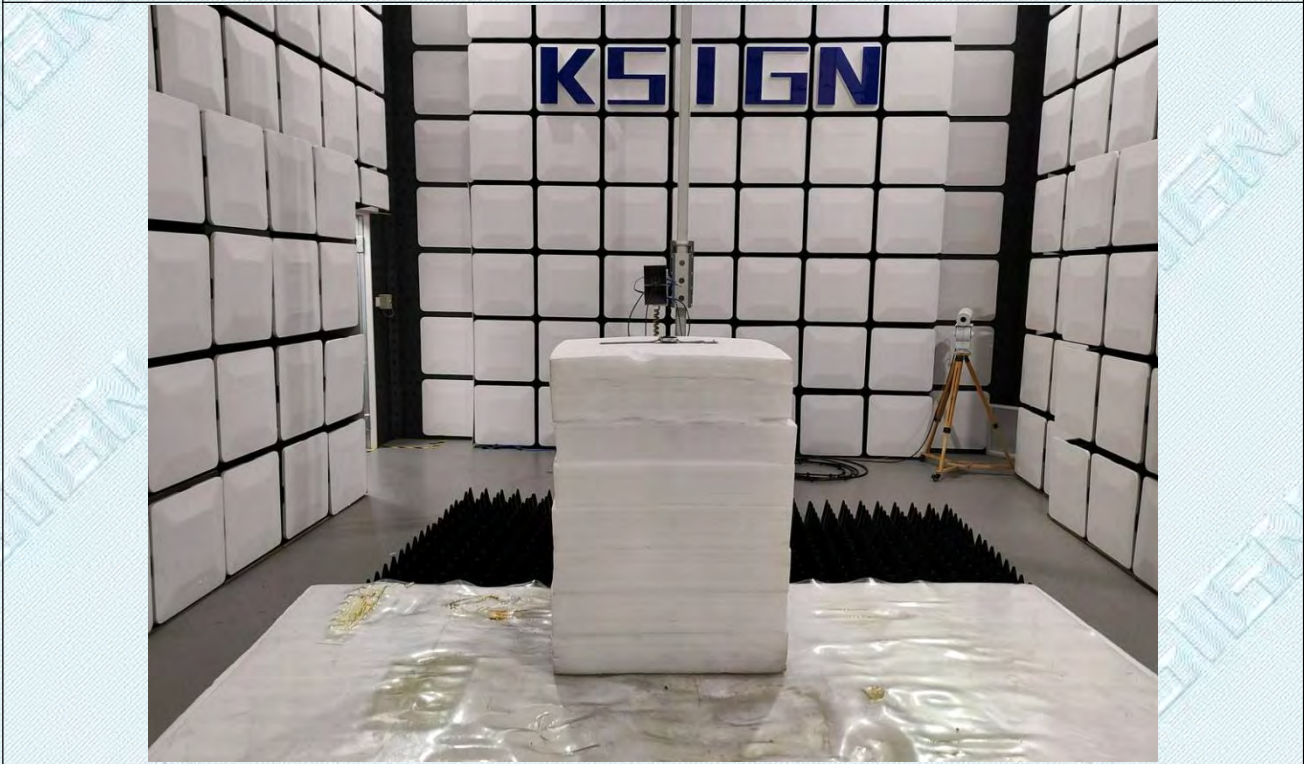
## 5. EUT TEST PHOTOS

Conducted Emission at AC power line



Emissions in restricted frequency bands (below 1GHz)



**Emissions in restricted frequency bands (above 1GHz)**

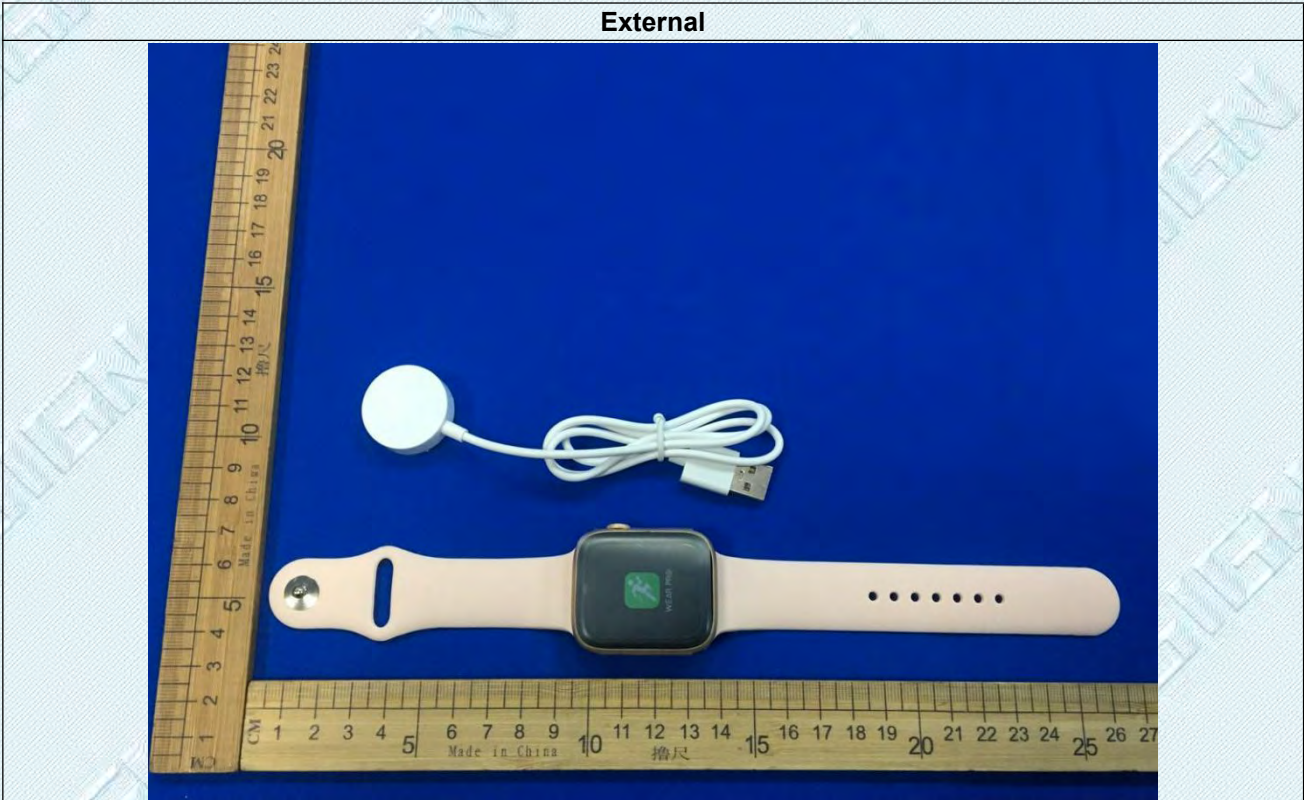
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External





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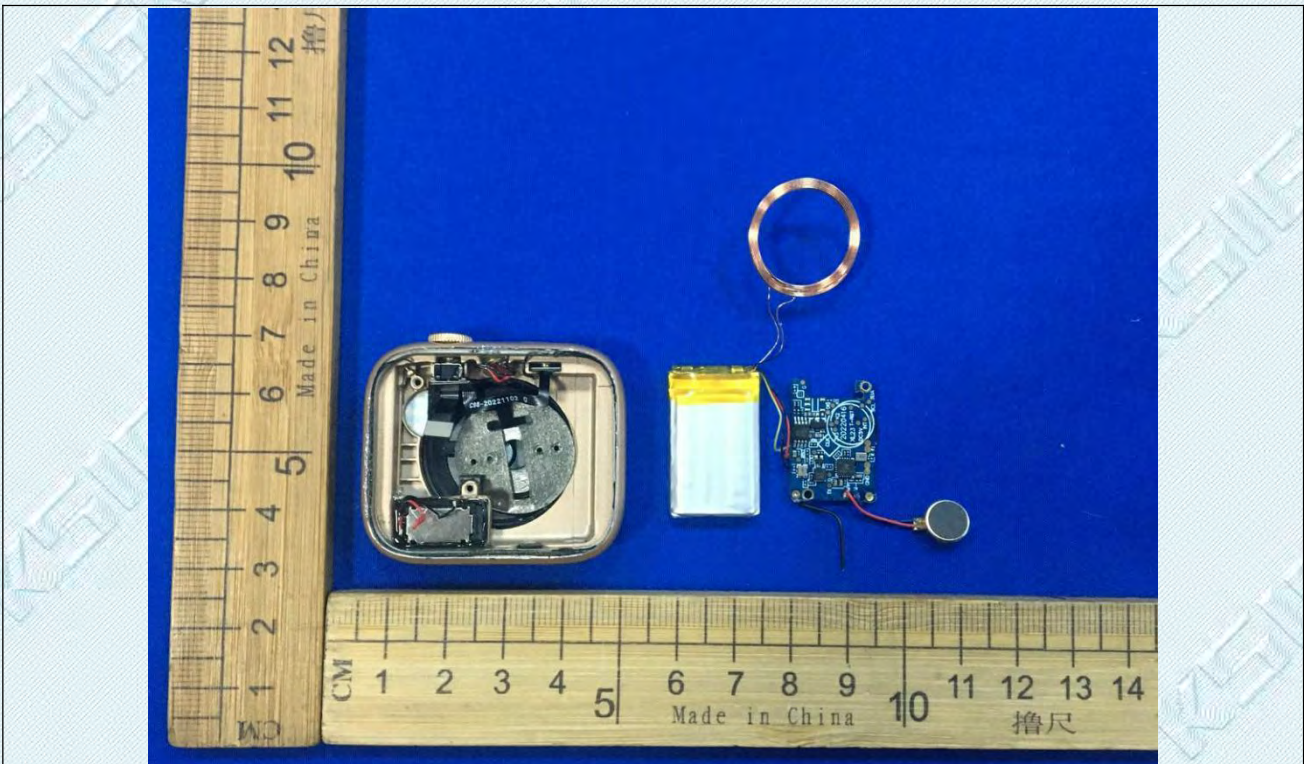
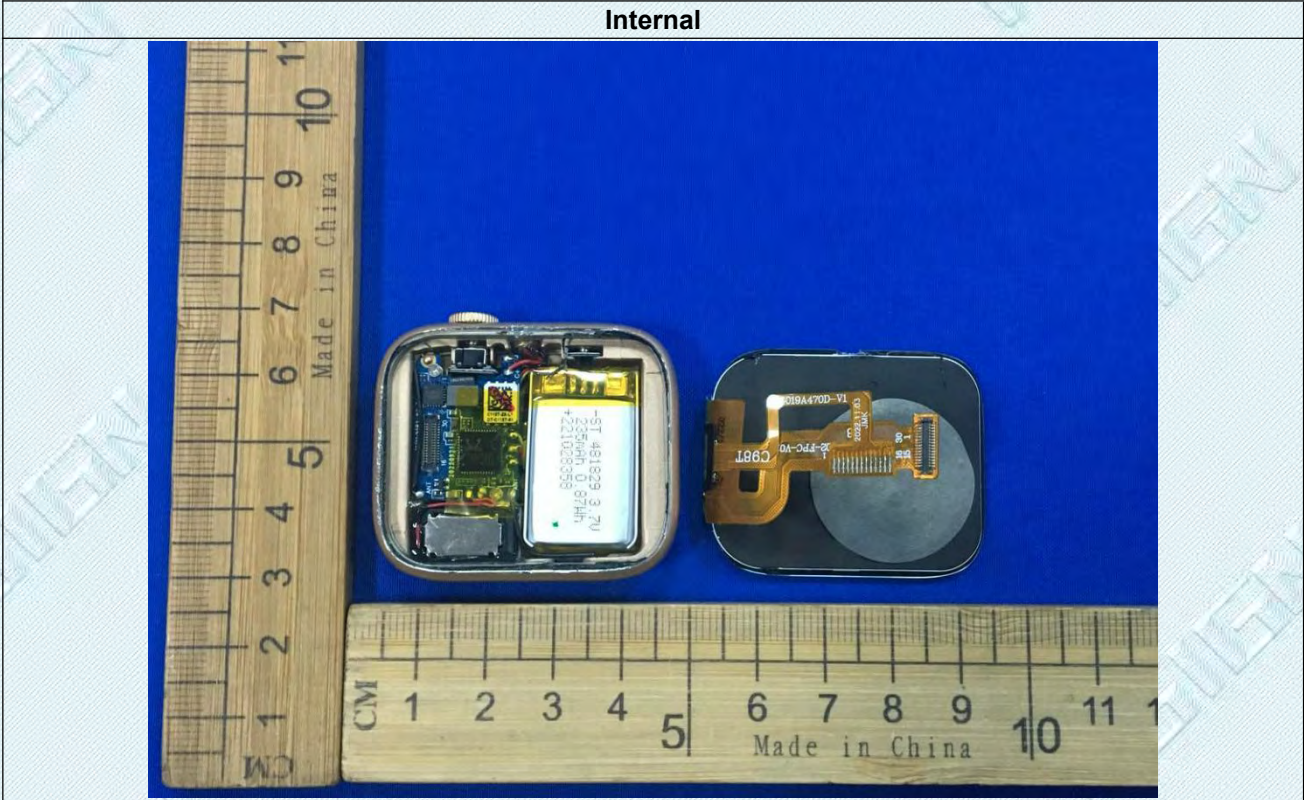


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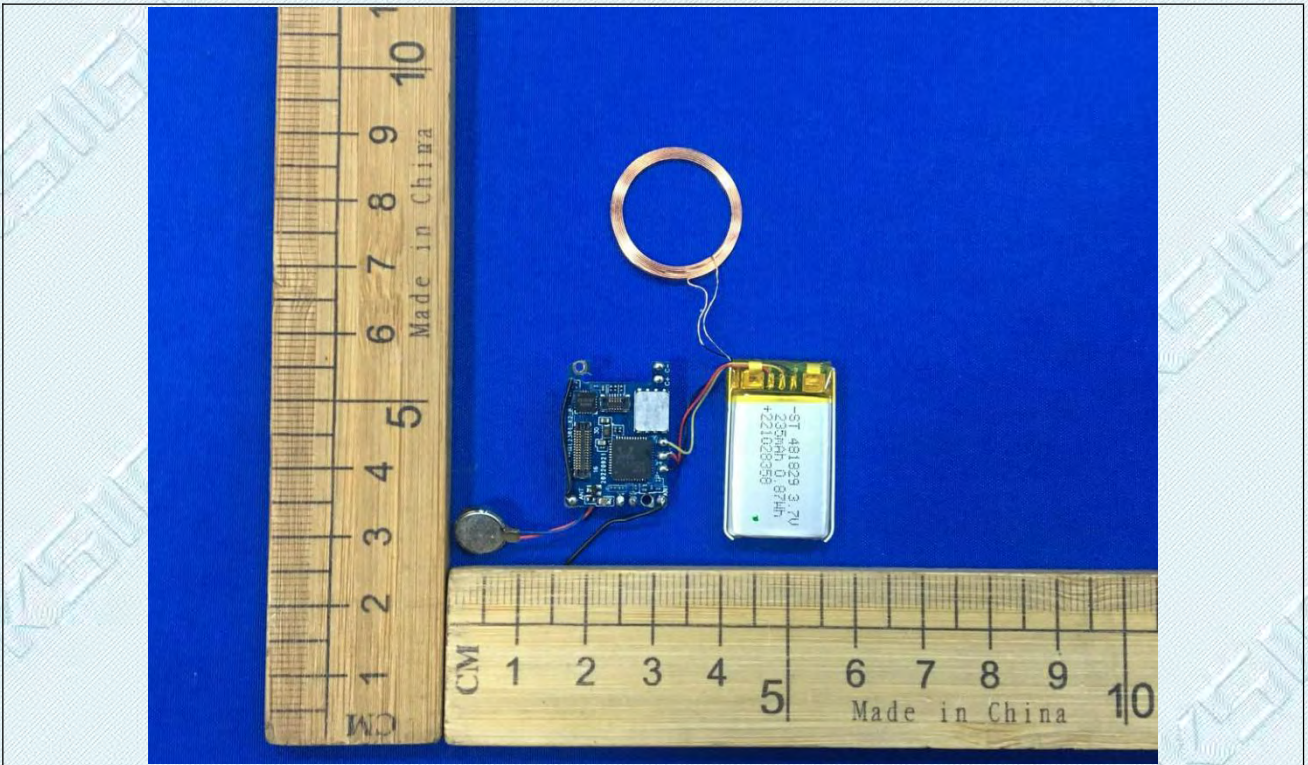
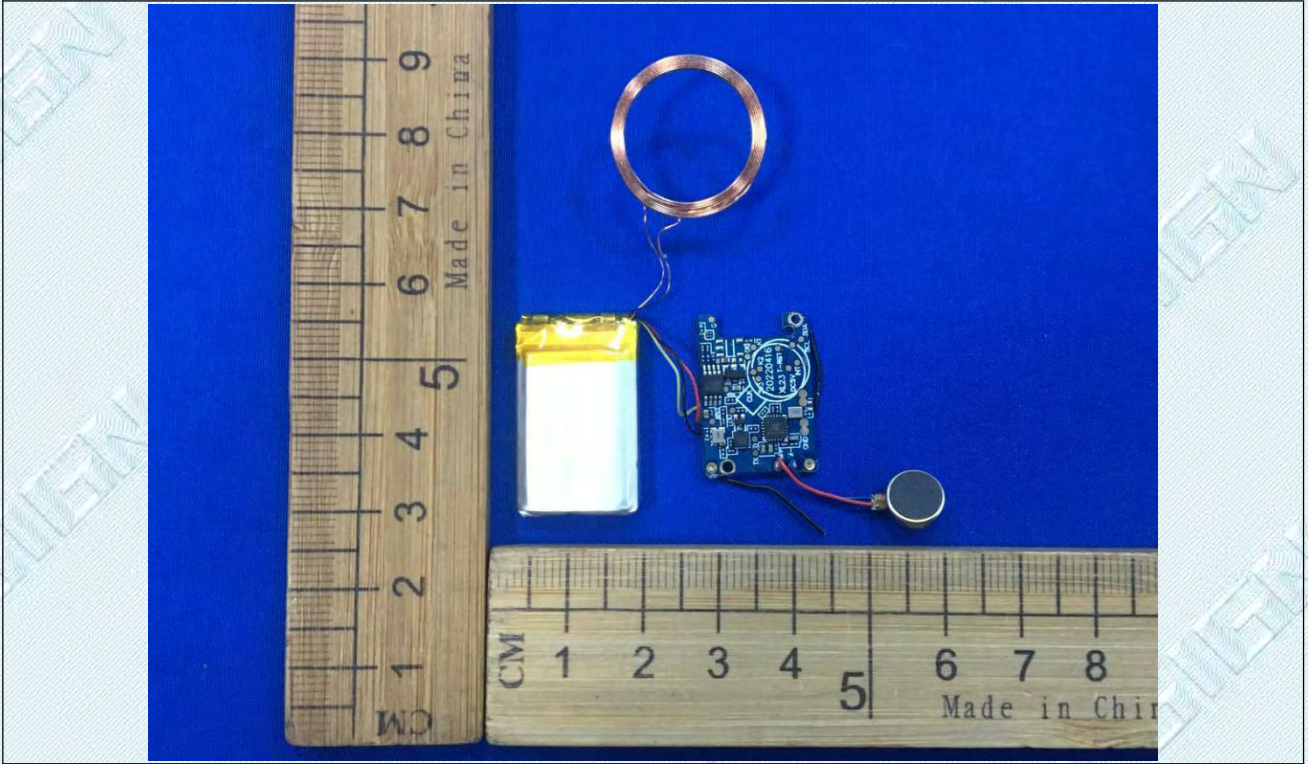
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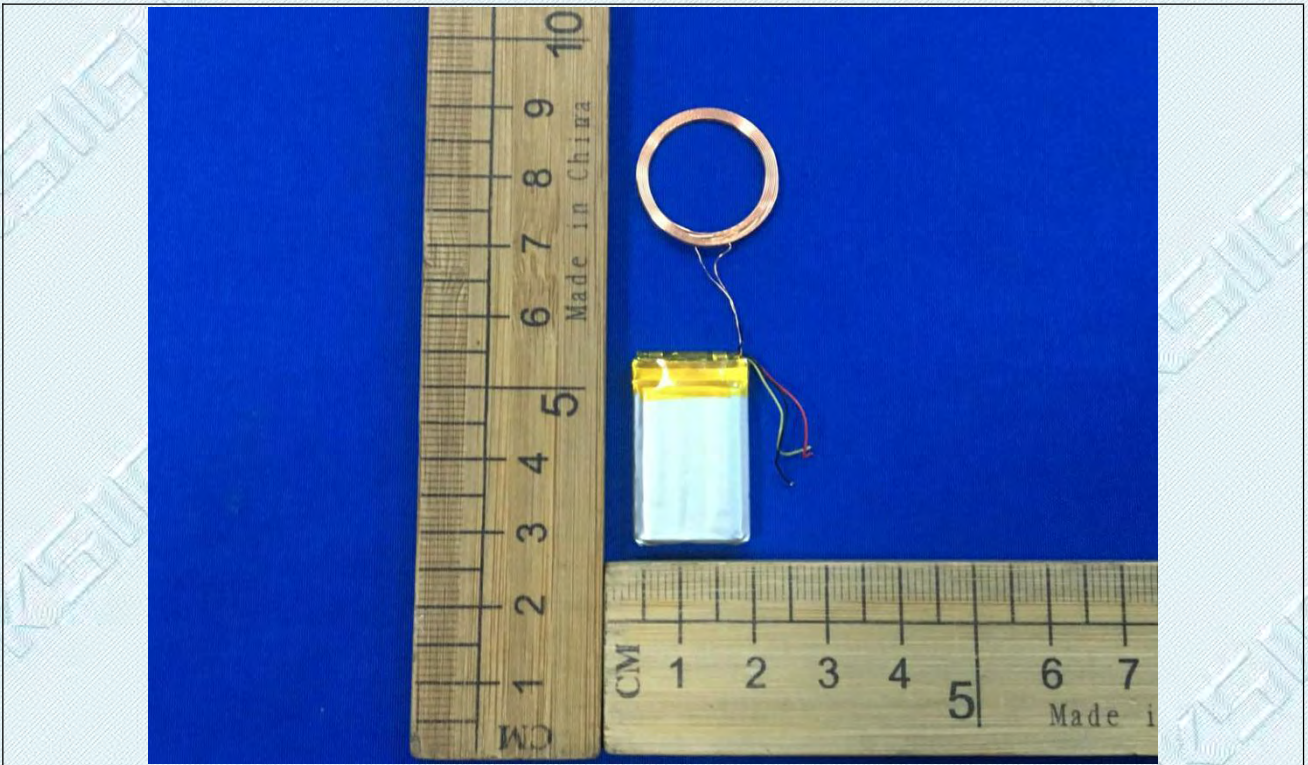
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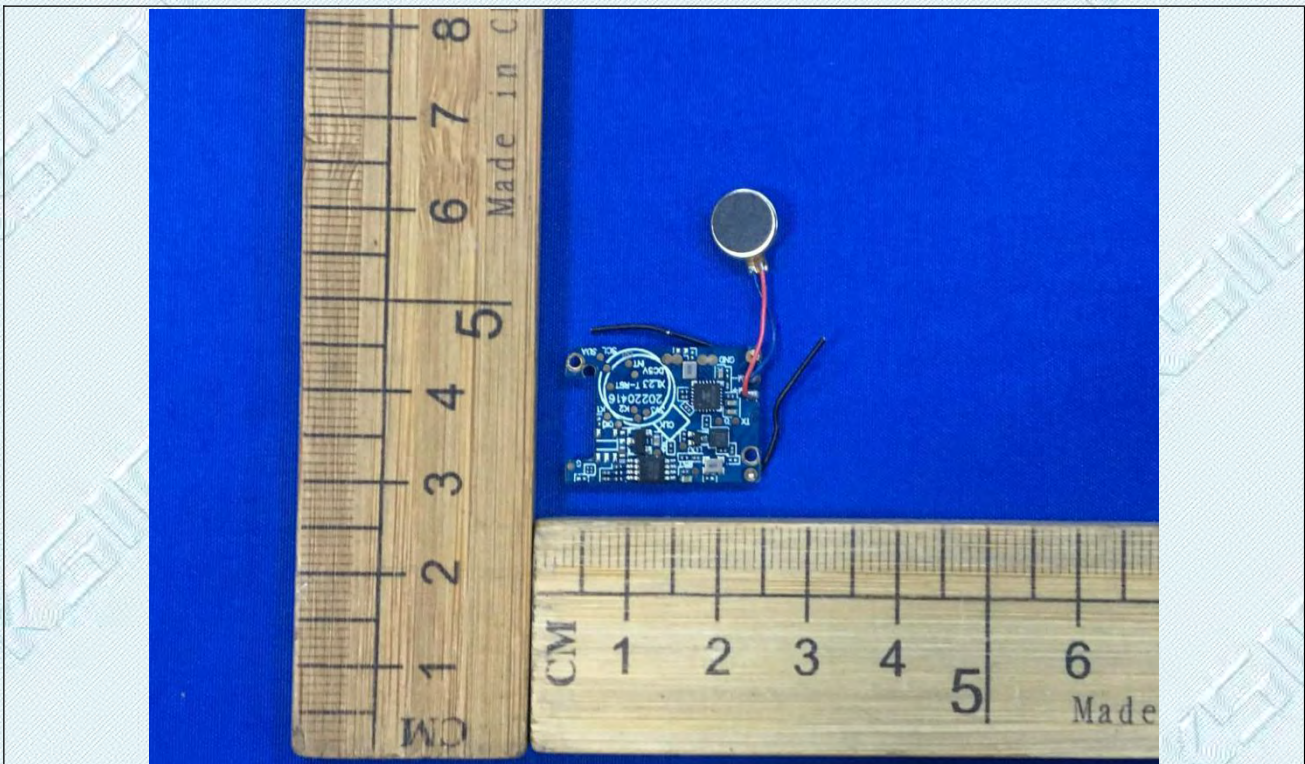
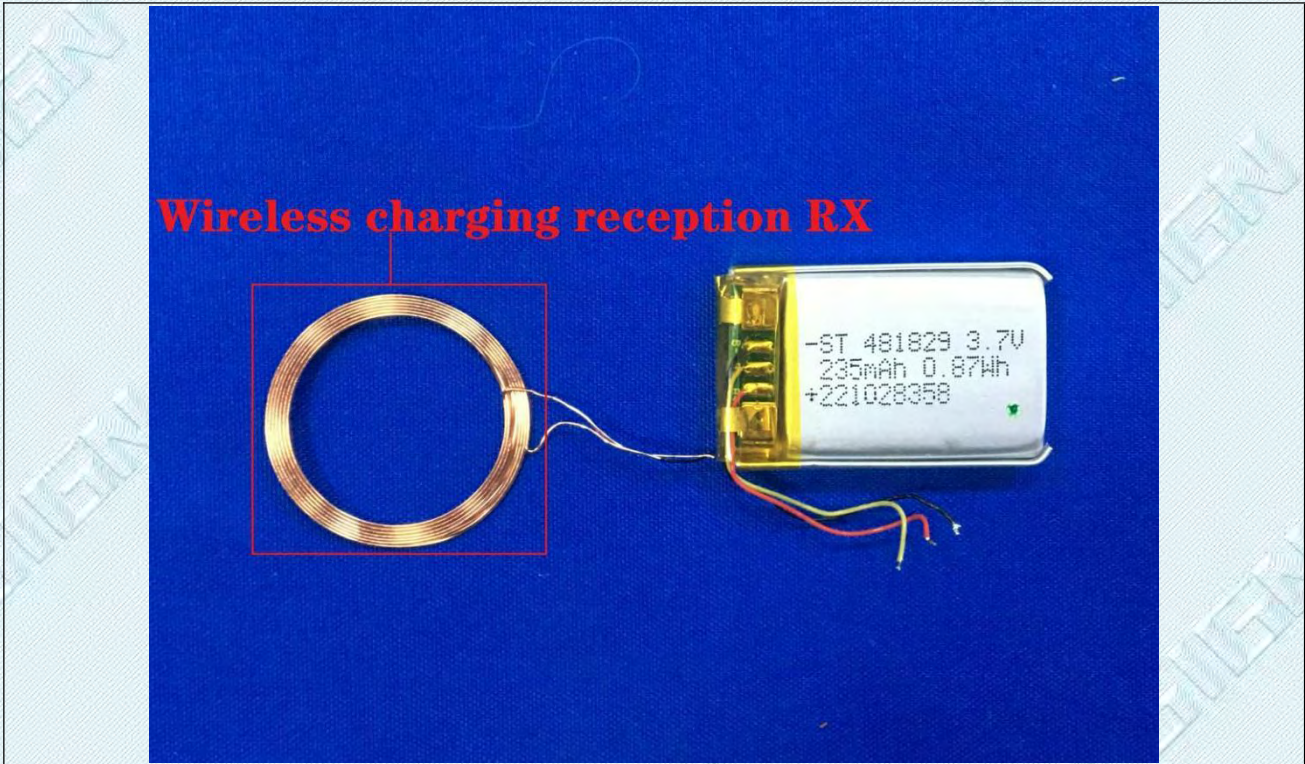
**Internal**

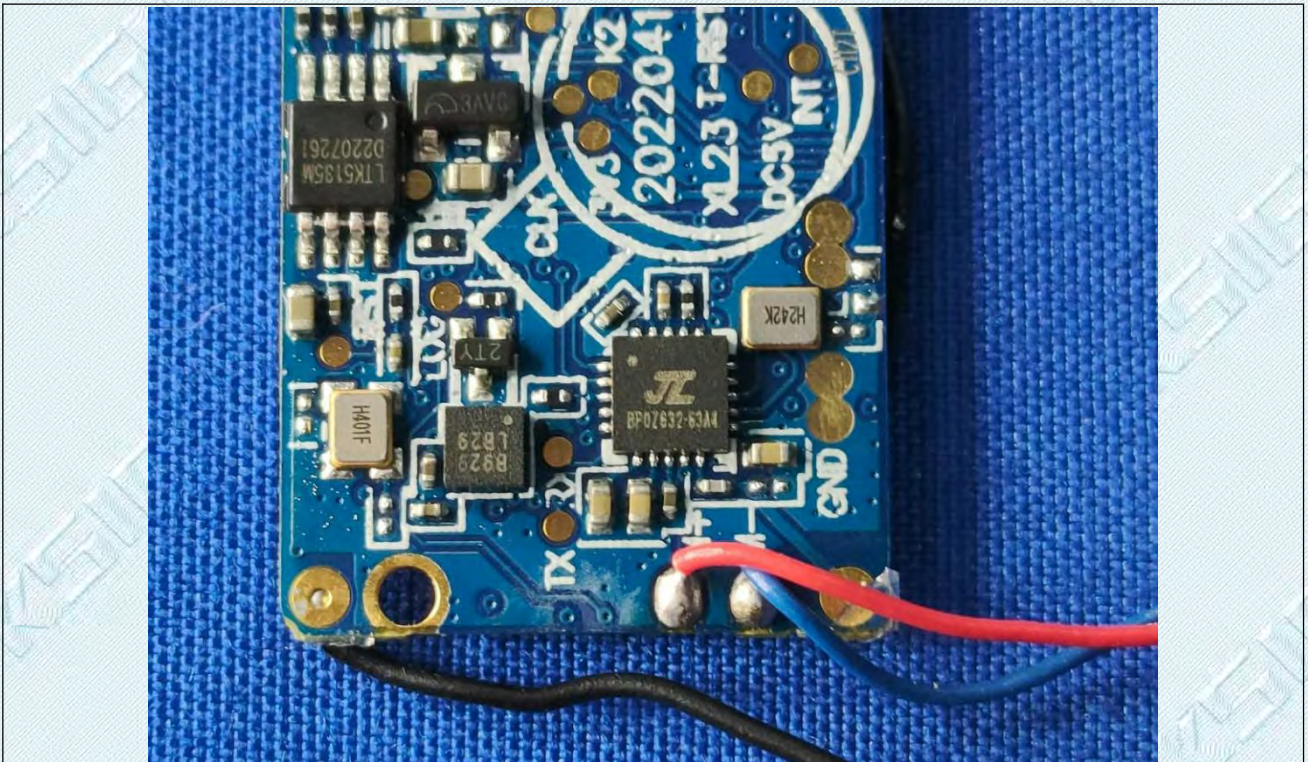
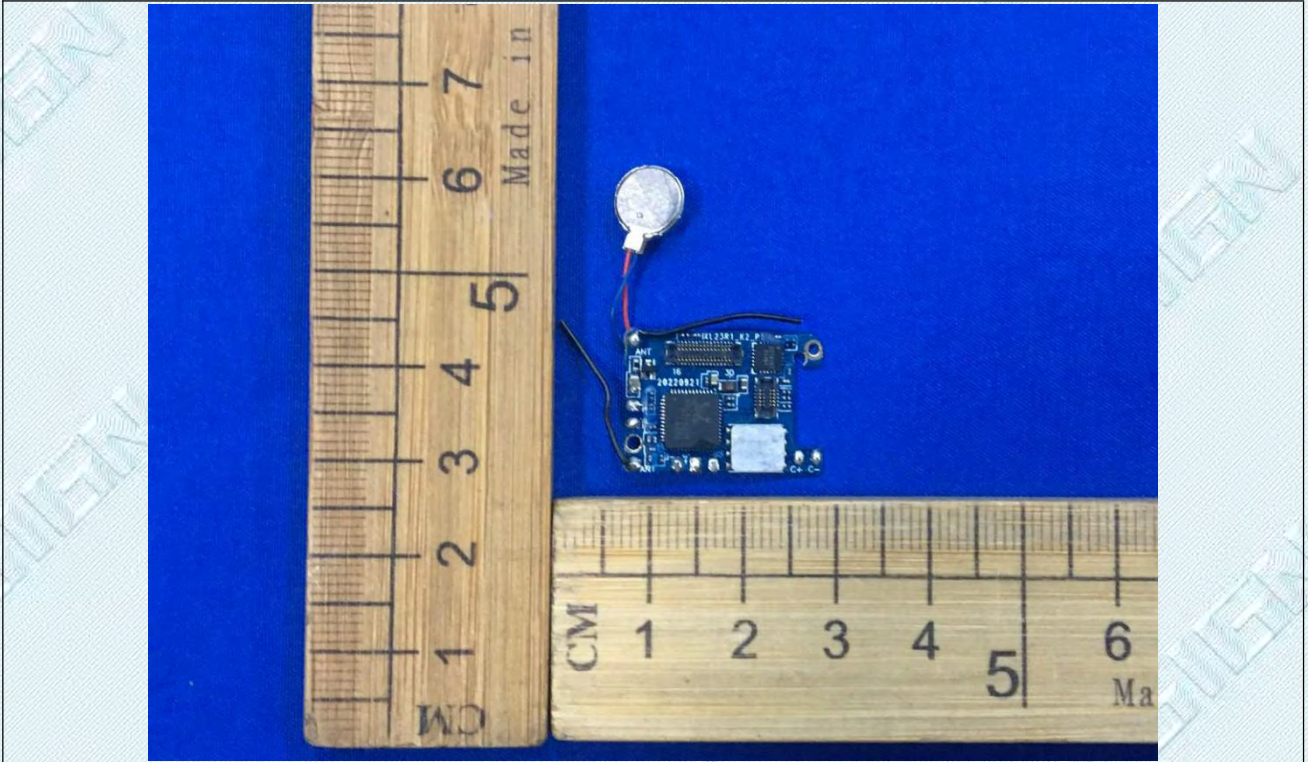








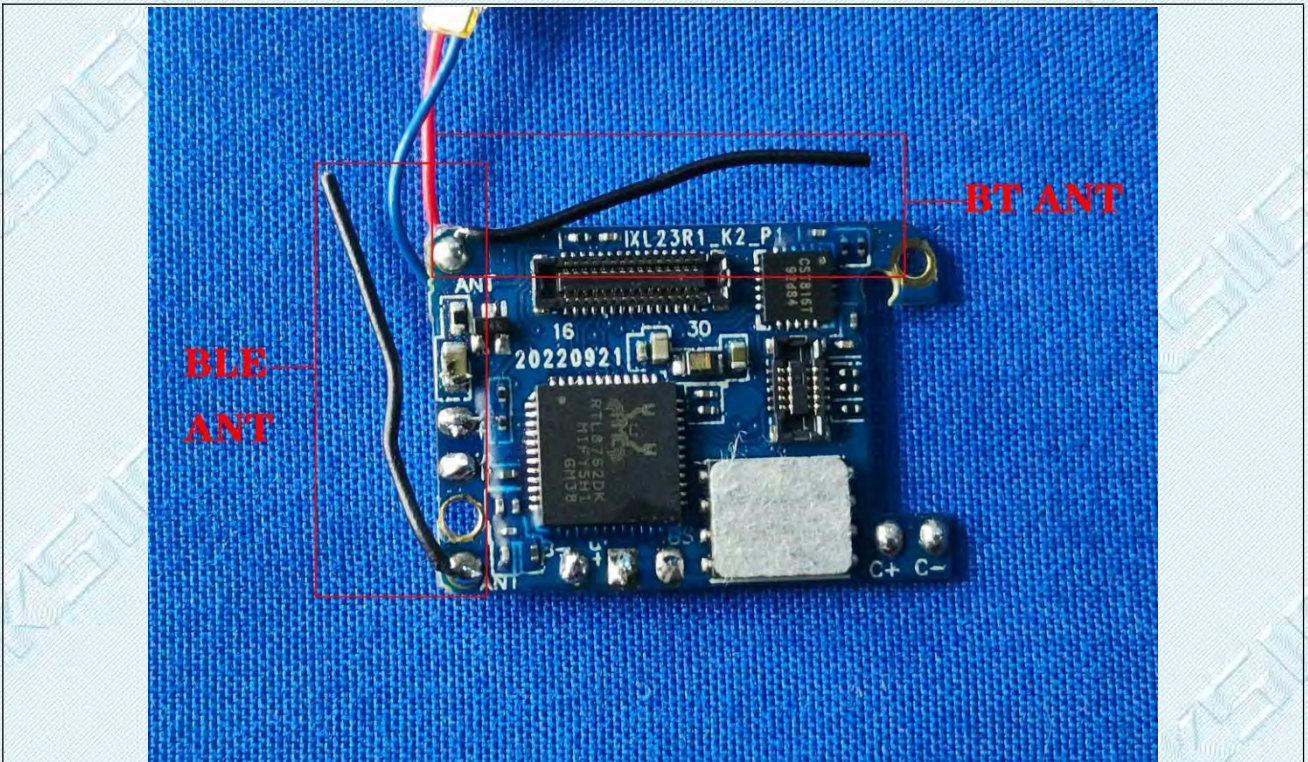
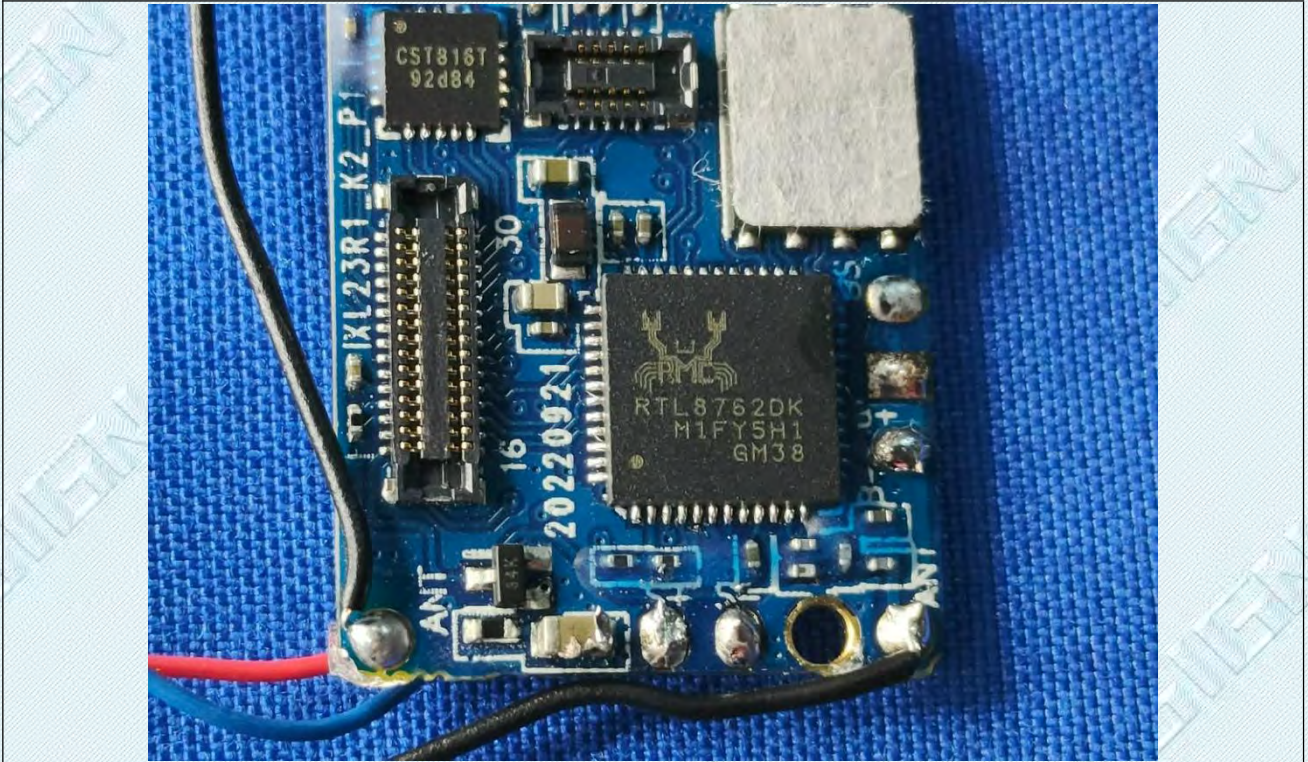




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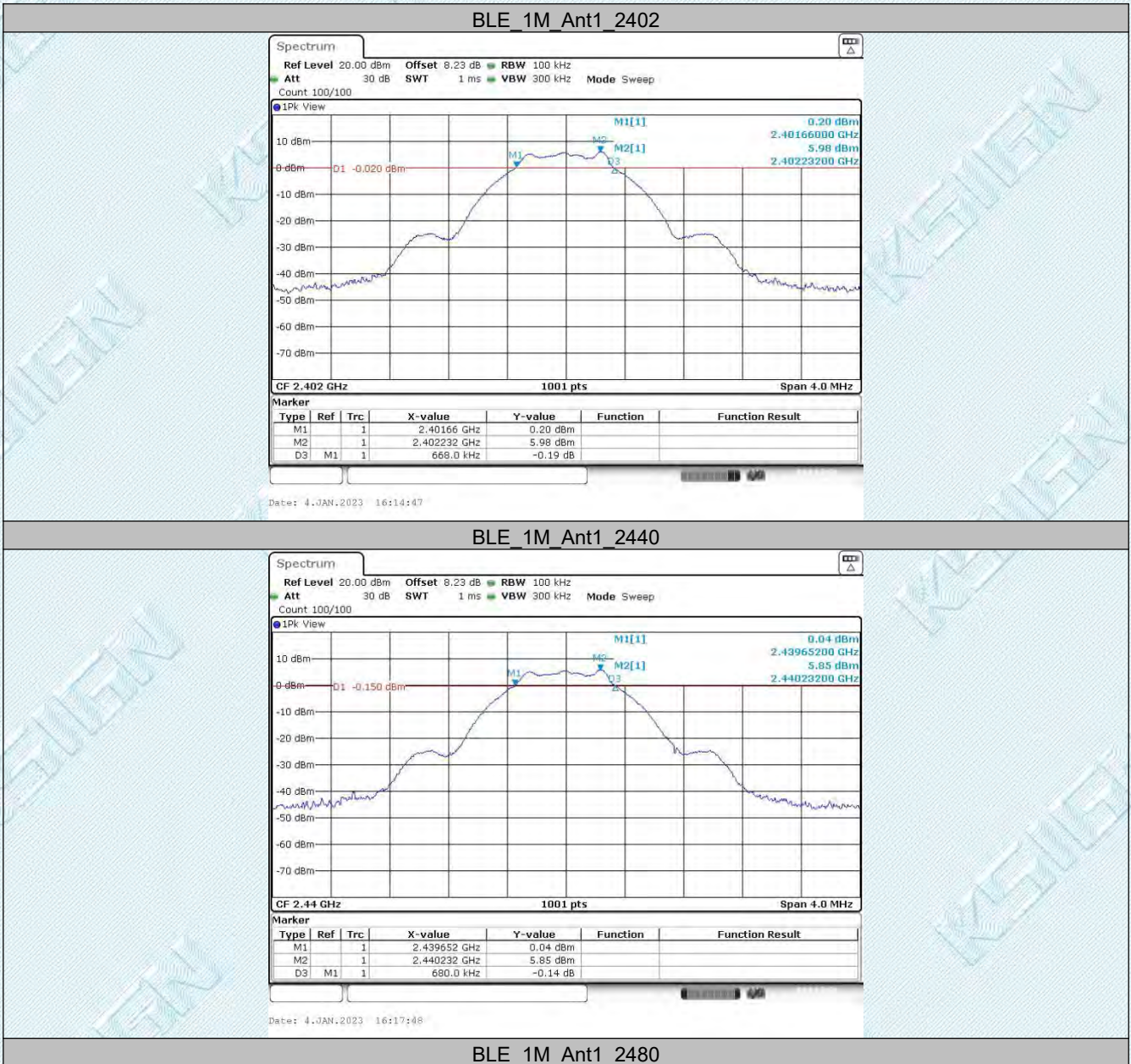
# Appendix

## 6.1. Appendix A: DTS Bandwidth

### 6.1.1. Test Result

TestMode	Antenna	Freq(MHz)	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.67	2401.66	2402.33	0.5	PASS
		2440	0.68	2439.65	2440.33	0.5	PASS
		2480	0.69	2479.63	2480.32	0.5	PASS
BLE_2M	Ant1	2402	1.14	2401.43	2402.56	0.5	PASS
		2440	1.14	2439.42	2440.56	0.5	PASS
		2480	1.14	2479.42	2480.56	0.5	PASS

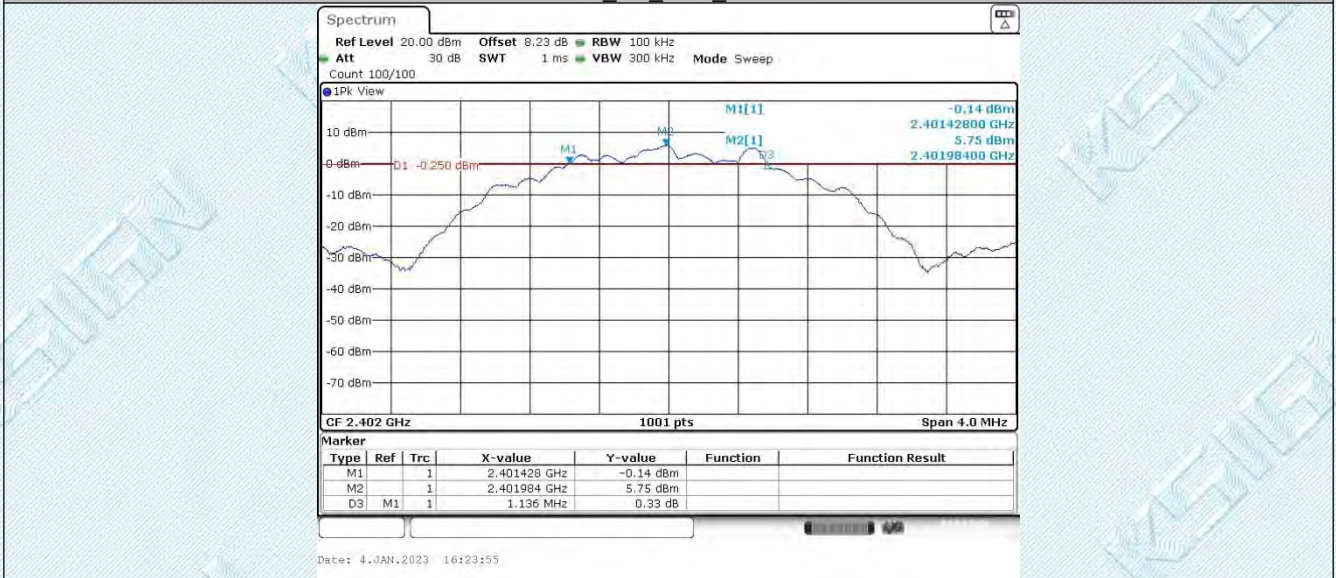
### 6.1.2. Test Graphs



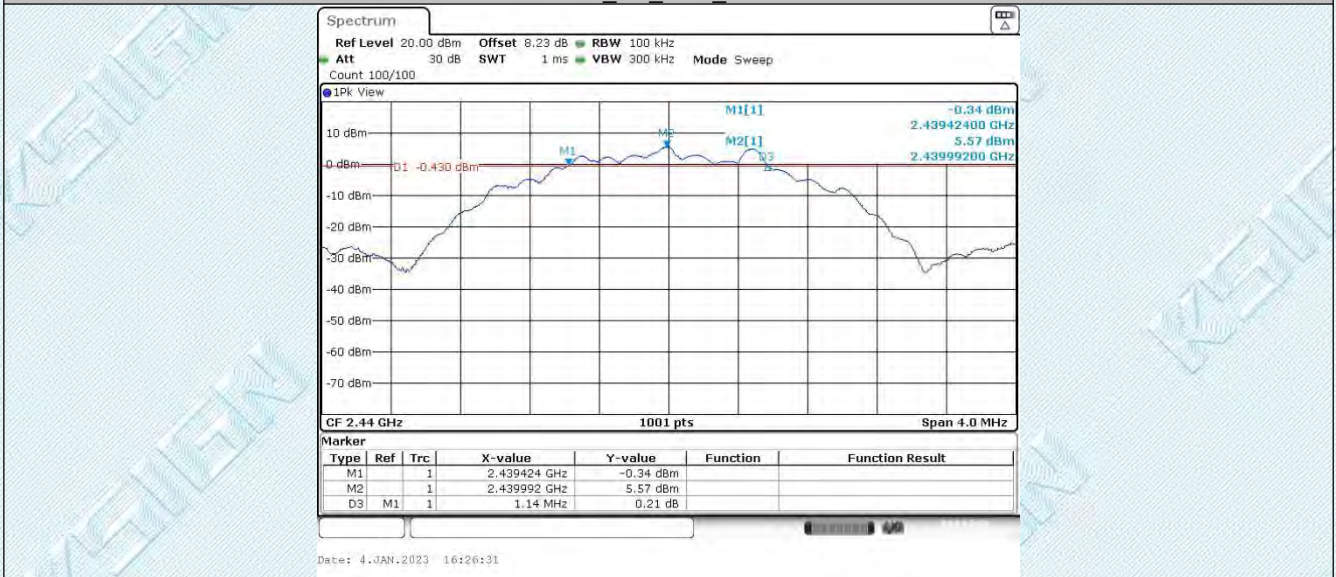




BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440

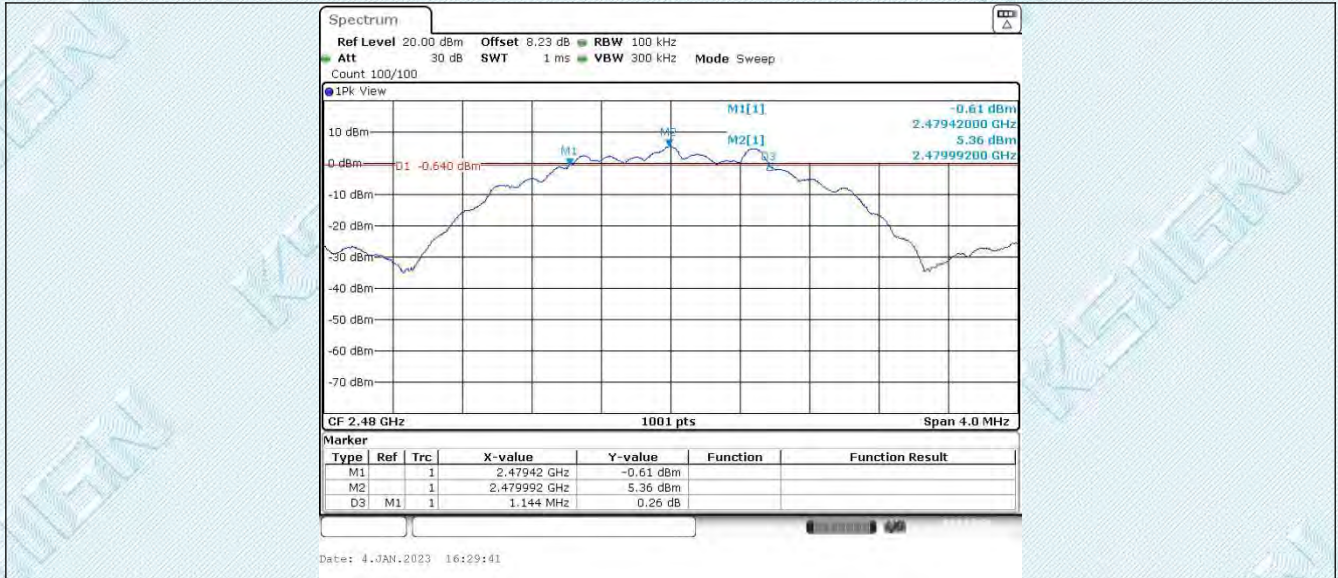


BLE\_2M\_Ant1\_2480

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## 6.2. Appendix B: Occupied Channel Bandwidth

### 6.2.1. Test Result

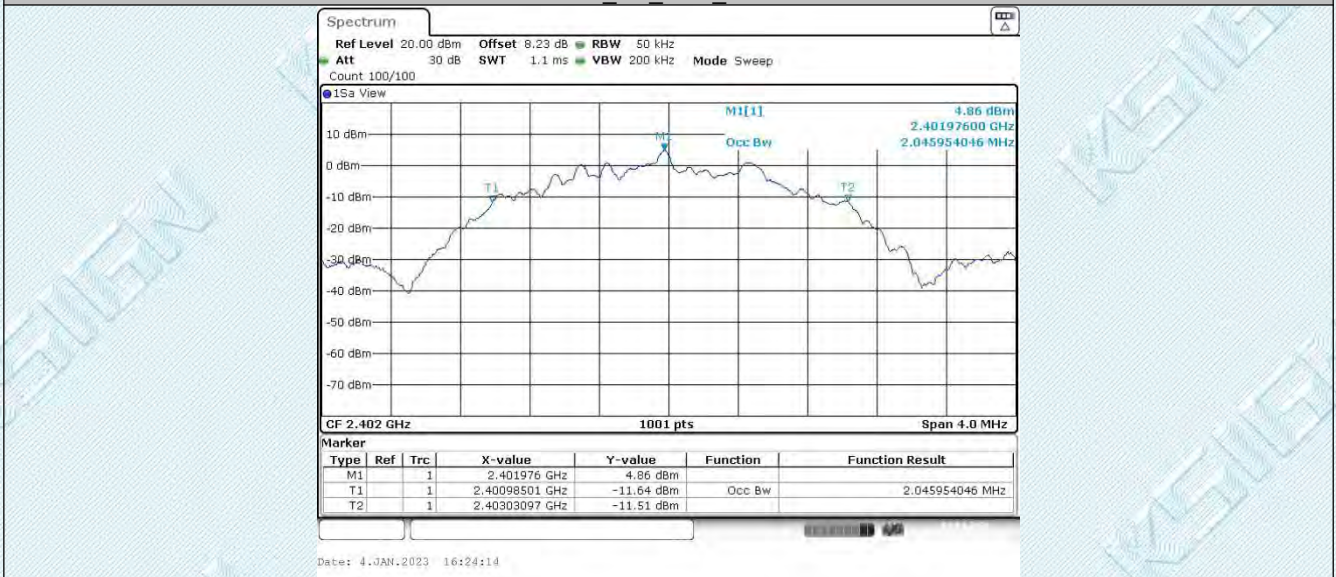
TestMode	Antenna	Freq(MHz)	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.027	2401.481	2402.507	---	PASS
		2440	1.031	2439.477	2440.507	---	PASS
		2480	1.051	2479.477	2480.527	---	PASS
BLE_2M	Ant1	2402	2.046	2400.985	2403.031	---	PASS
		2440	2.05	2438.981	2441.031	---	PASS
		2480	2.046	2478.985	2481.031	---	PASS

### 6.2.2. Test Graphs

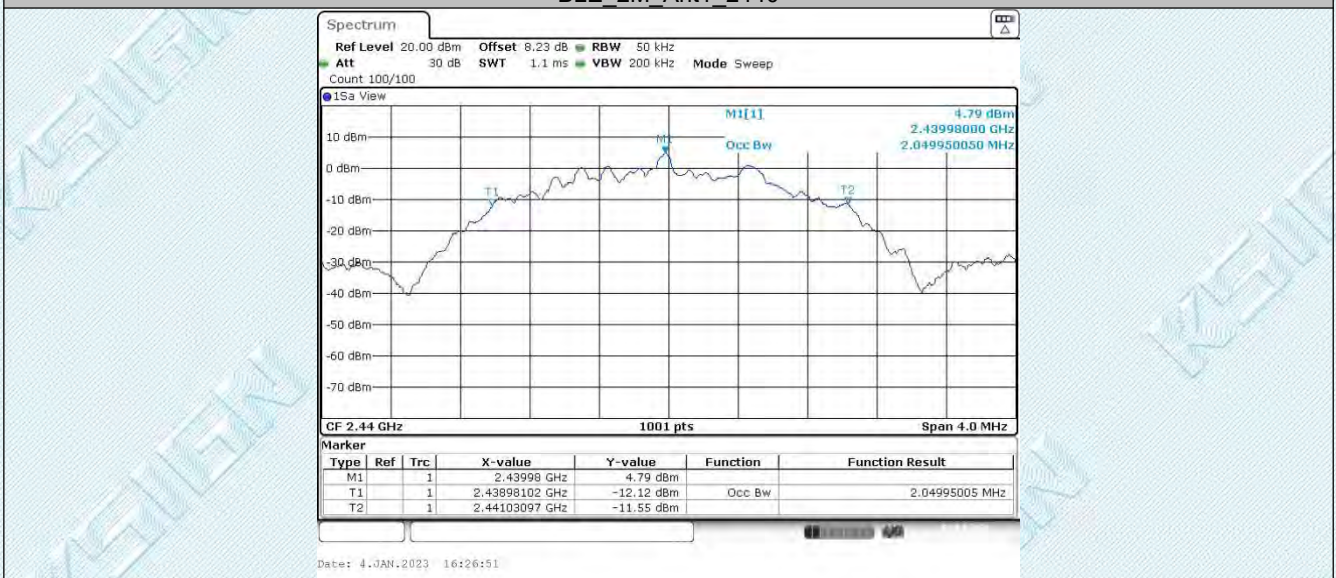




BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440

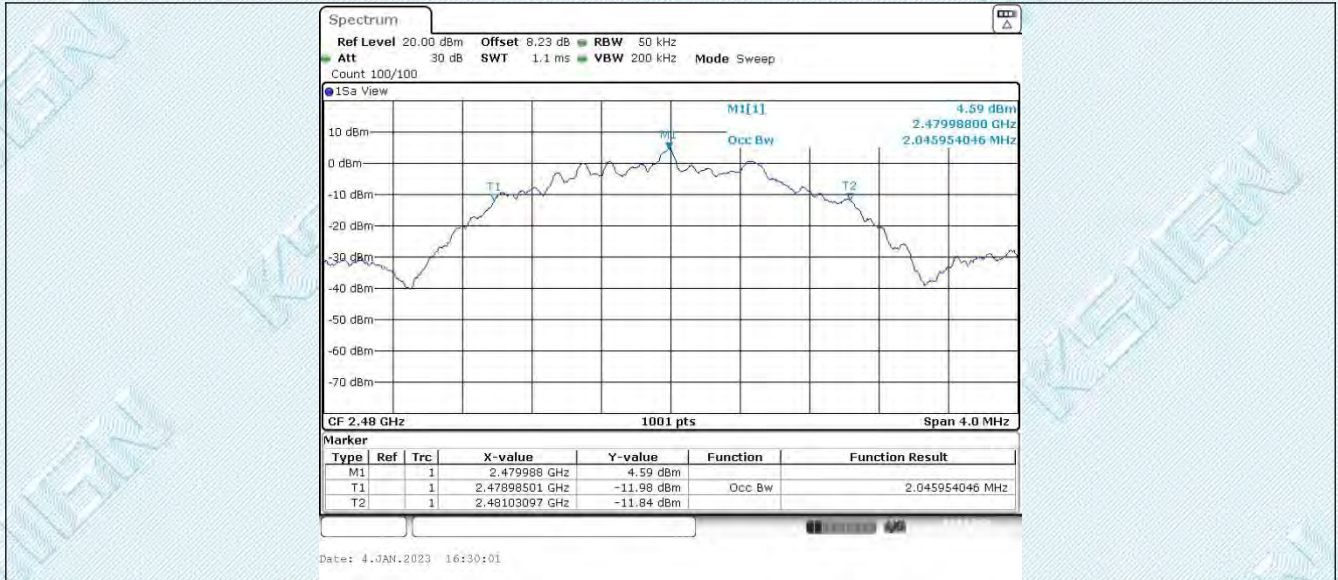


BLE\_2M\_Ant1\_2480

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### 6.3. Appendix C: Maximum conducted output power

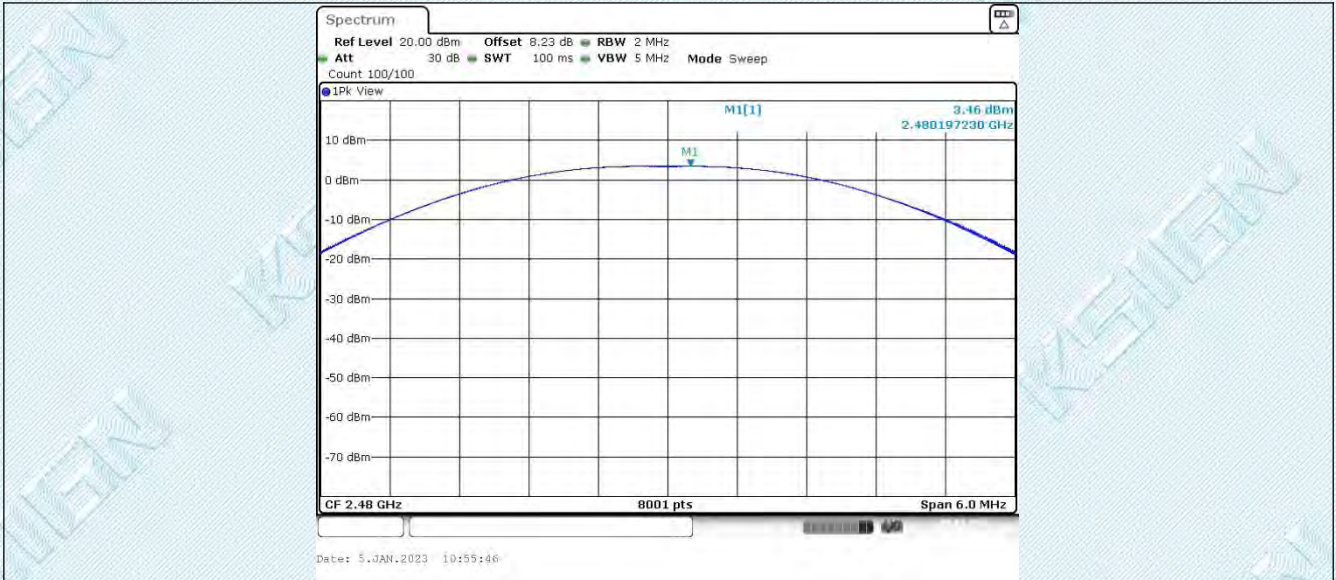
#### 6.3.1. Test Result Peak

TestMode	Antenna	Freq(MHz)	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
BLE_1M	Ant1	2402	3.67	≤30	PASS
		2440	3.56	≤30	PASS
		2480	3.46	≤30	PASS
BLE_2M	Ant1	2402	3.66	≤30	PASS
		2440	3.57	≤30	PASS
		2480	3.5	≤30	PASS

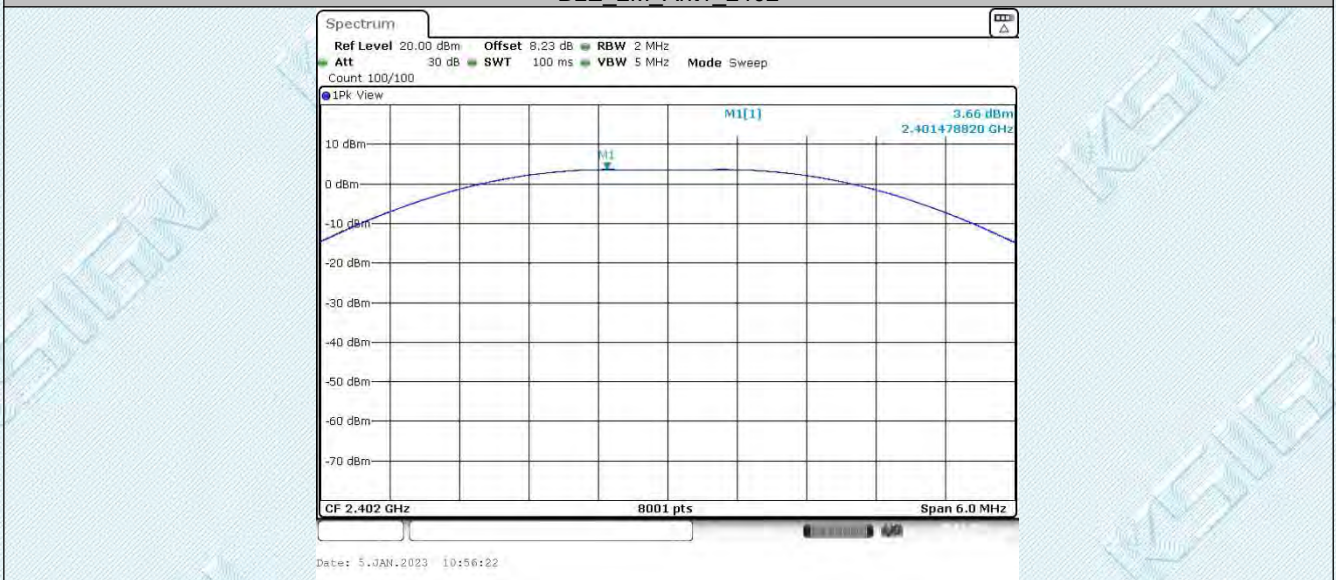
### 6.3.2. Test Graphs Peak



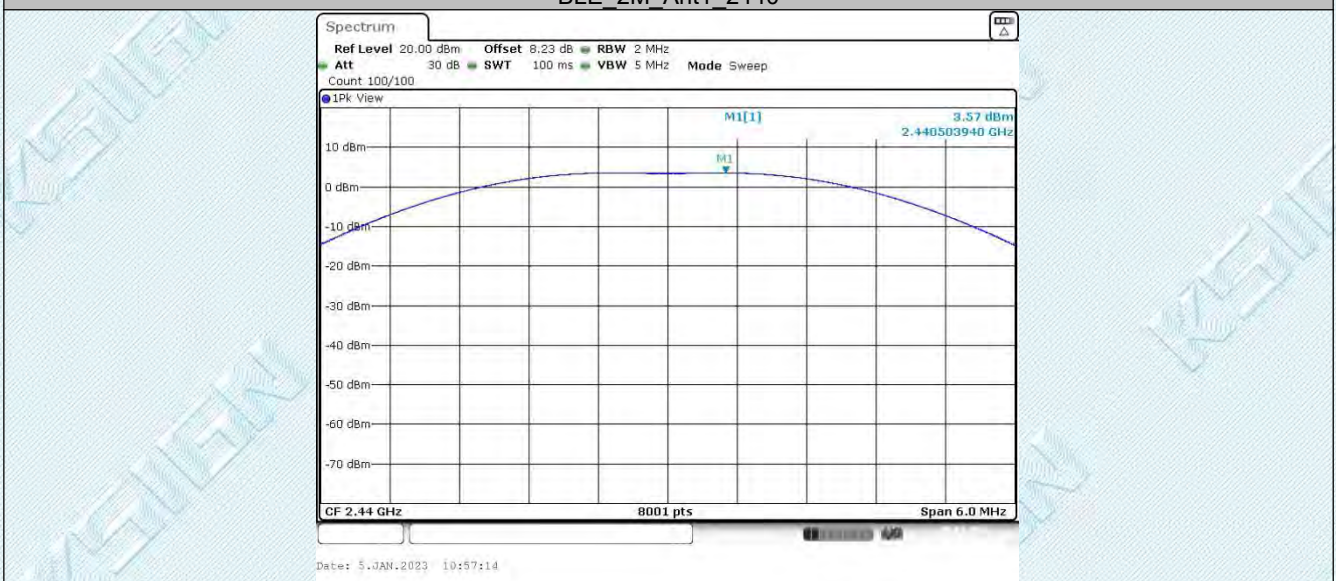




BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440

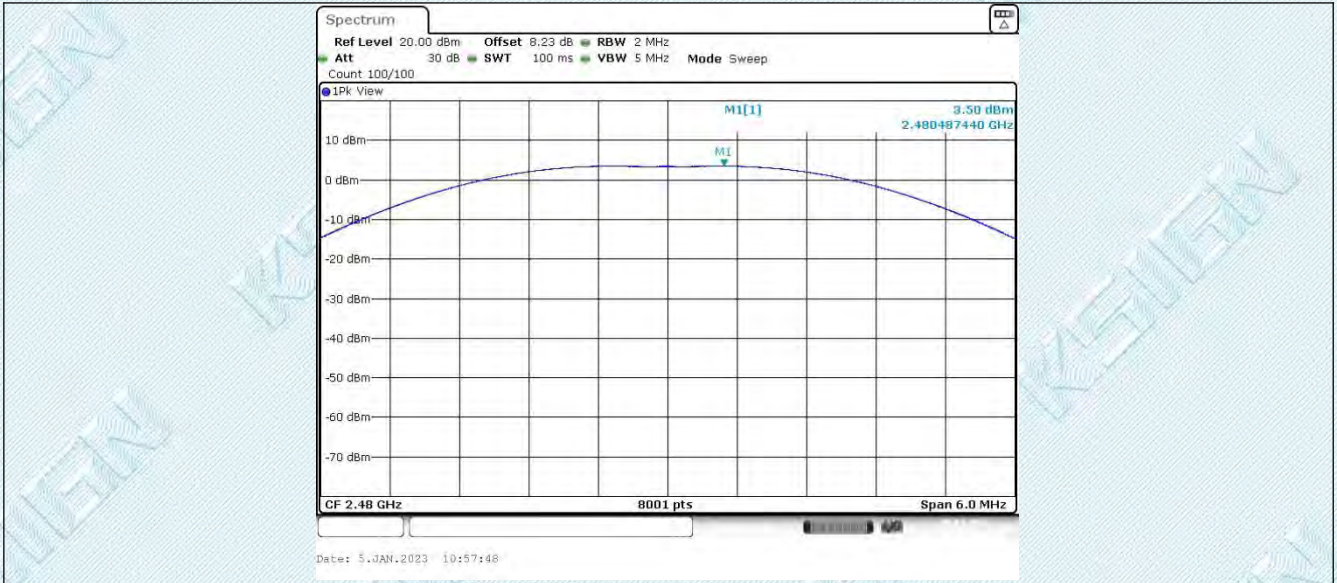


BLE\_2M\_Ant1\_2480

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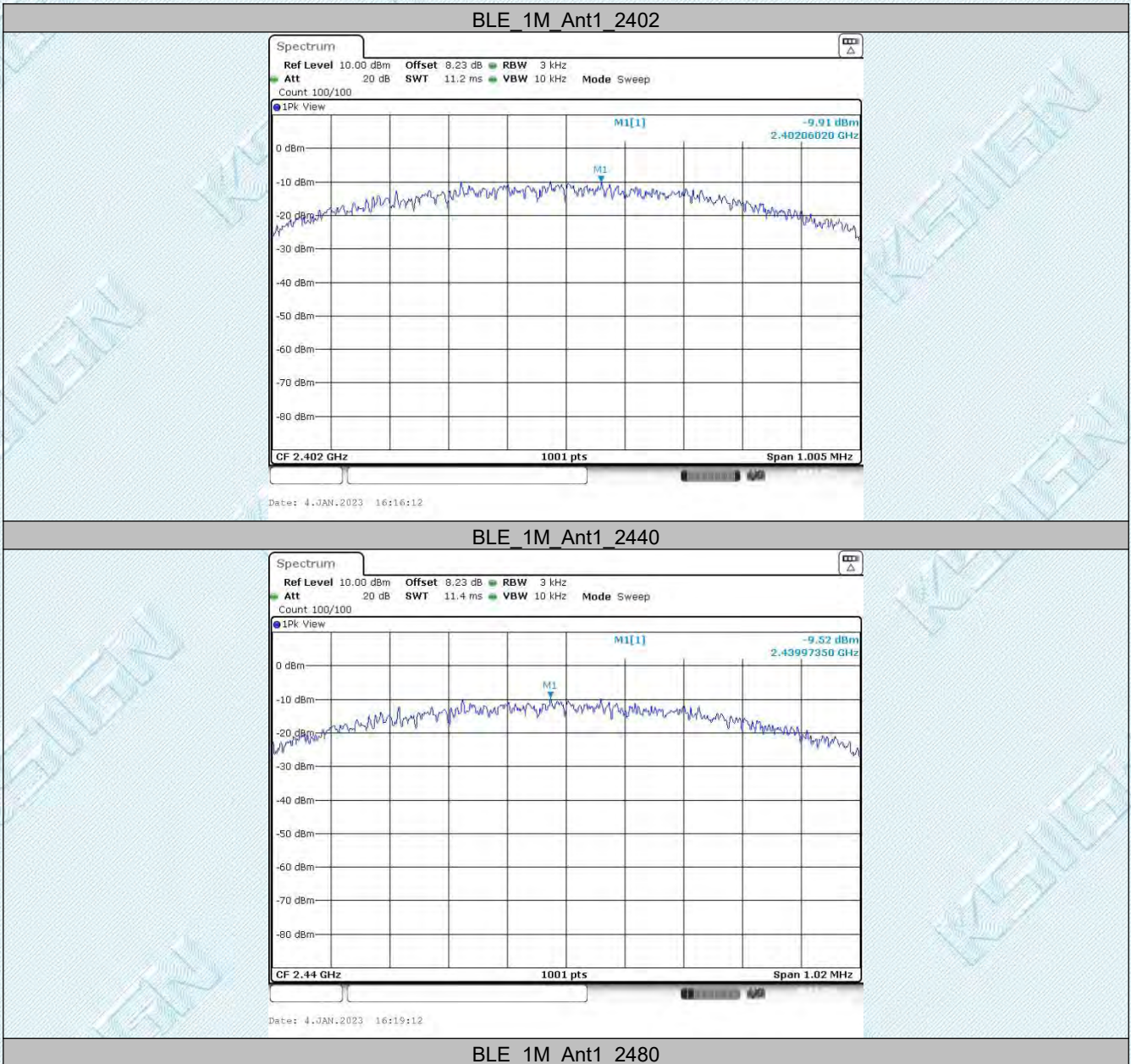
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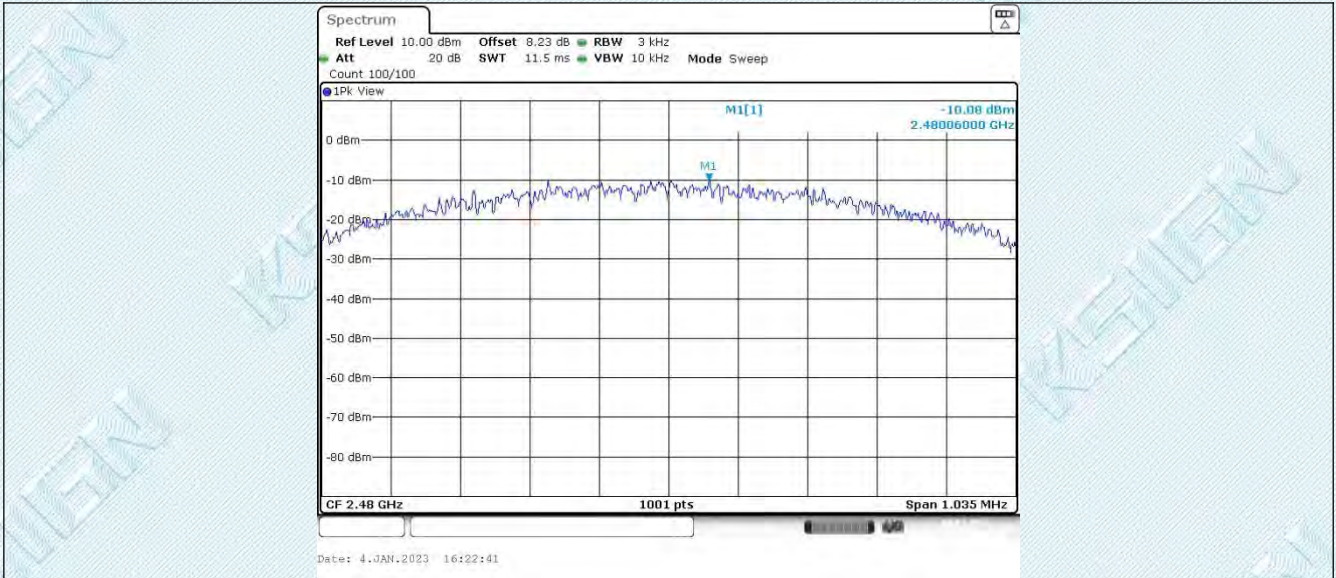
## 6.4. Appendix D: Maximum power spectral density

### 6.4.1. Test Result

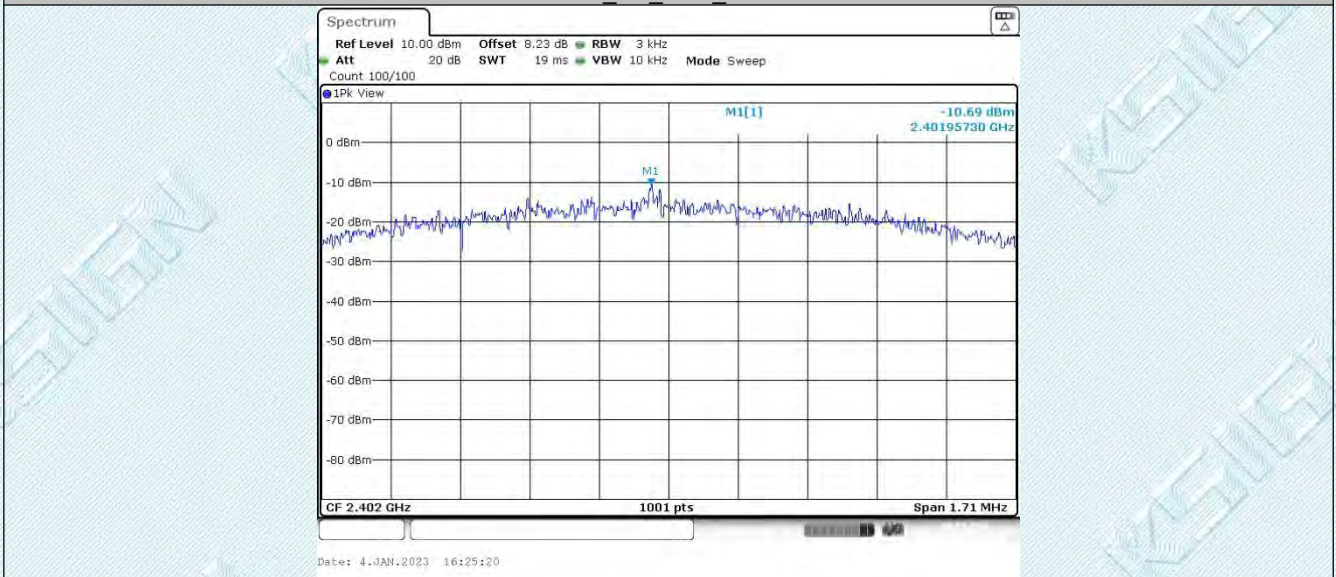
TestMode	Antenna	Freq(MHz)	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-9.91	≤8.00	PASS
		2440	-9.52	≤8.00	PASS
		2480	-10.08	≤8.00	PASS
BLE_2M	Ant1	2402	-10.69	≤8.00	PASS
		2440	-10.42	≤8.00	PASS
		2480	-11.44	≤8.00	PASS

### 6.4.2. Test Graphs

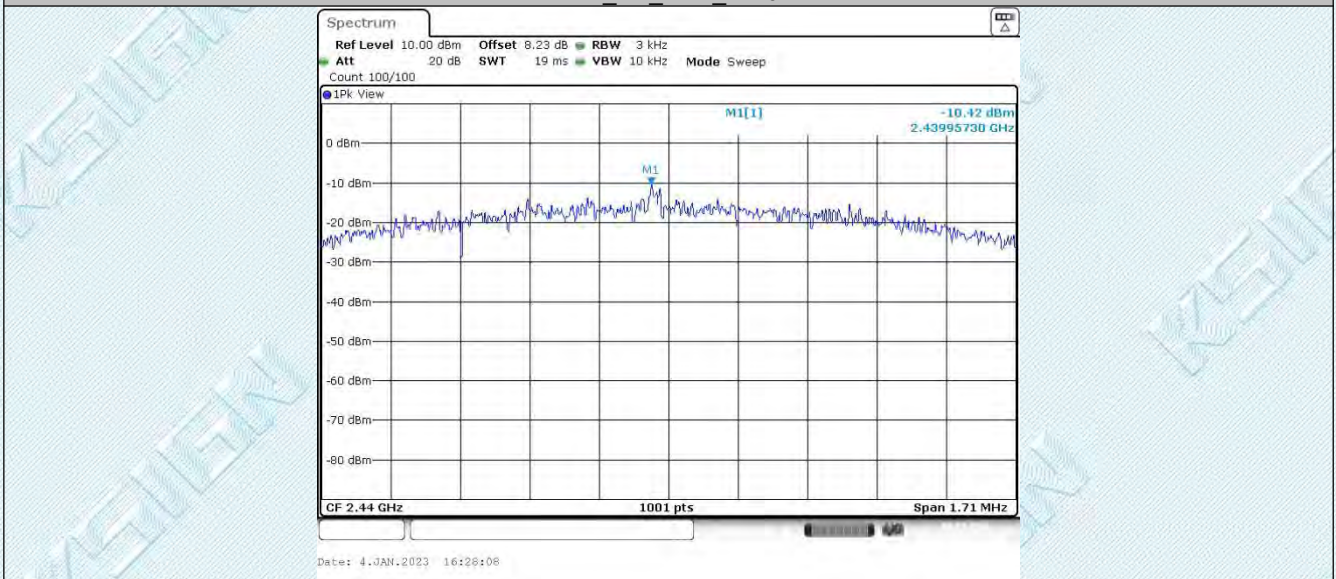




BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440

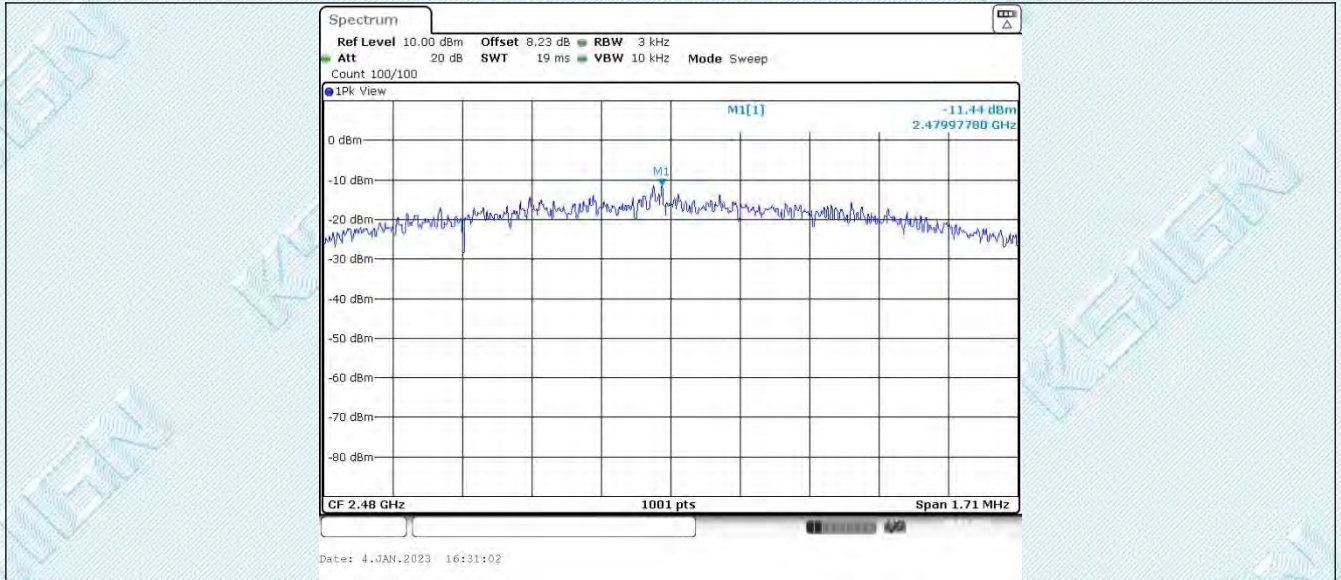


BLE\_2M\_Ant1\_2480

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## 6.5. ppendix E: Reference level measurement

### 6.5.1. Test Result

TestMode	Antenna	Freq(MHz)	Max.Point[MHz]	Result[dBm]
BLE_1M	Ant1	2402	2402.23	6.01
		2440	2440.23	5.84
		2480	2480.23	5.85
BLE_2M	Ant1	2402	2401.99	5.75
		2440	2439.99	5.57
		2480	2479.99	5.36

### 6.5.2. Test Graphs

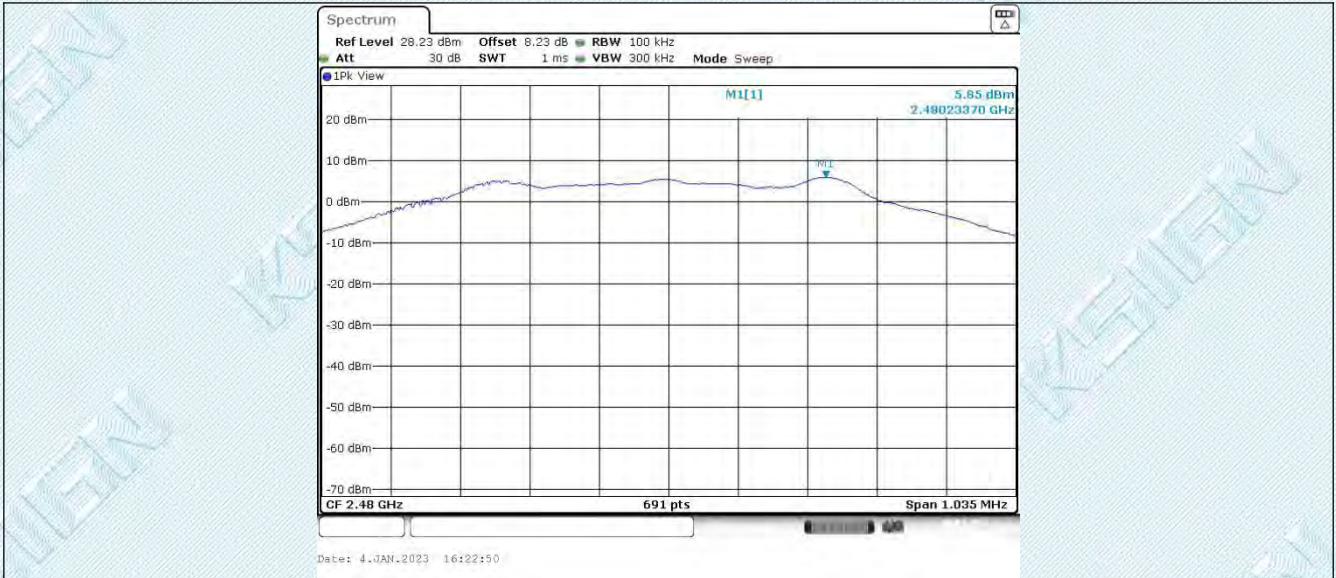


TRF EMC\_R1

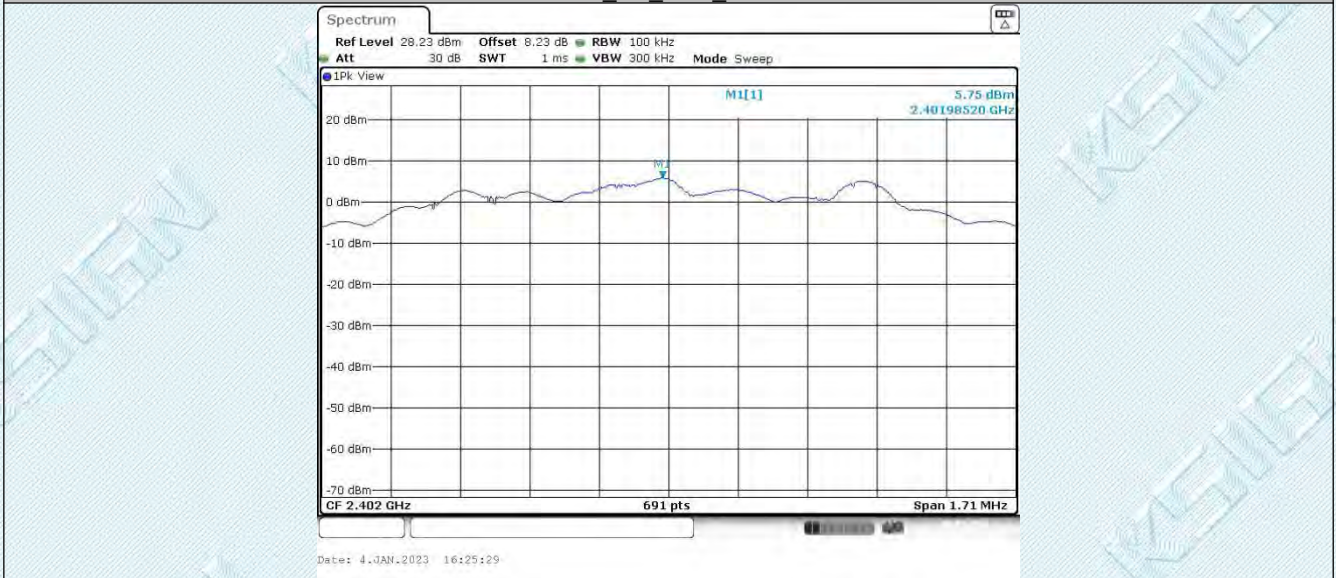
Add: West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

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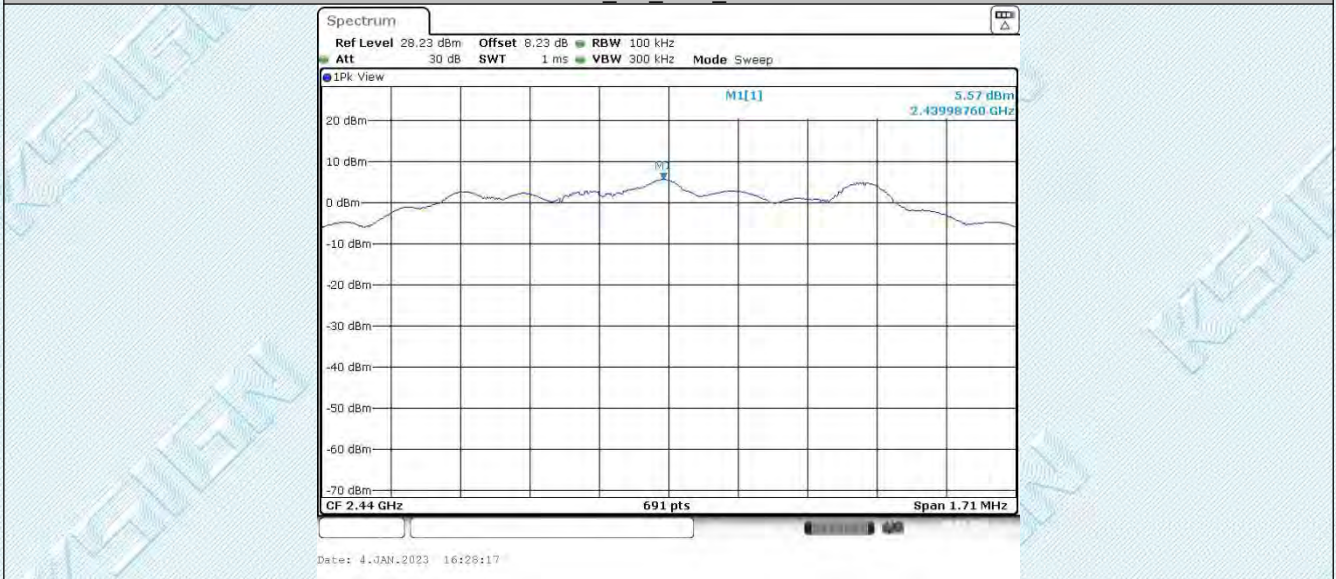




BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440

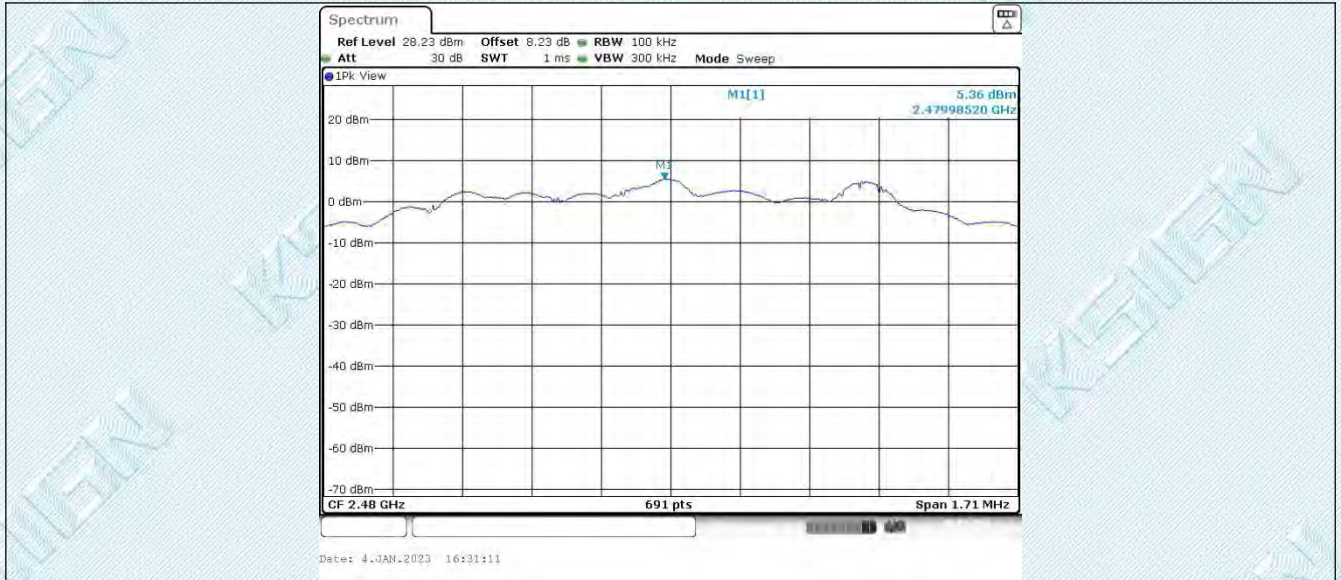


BLE\_2M\_Ant1\_2480

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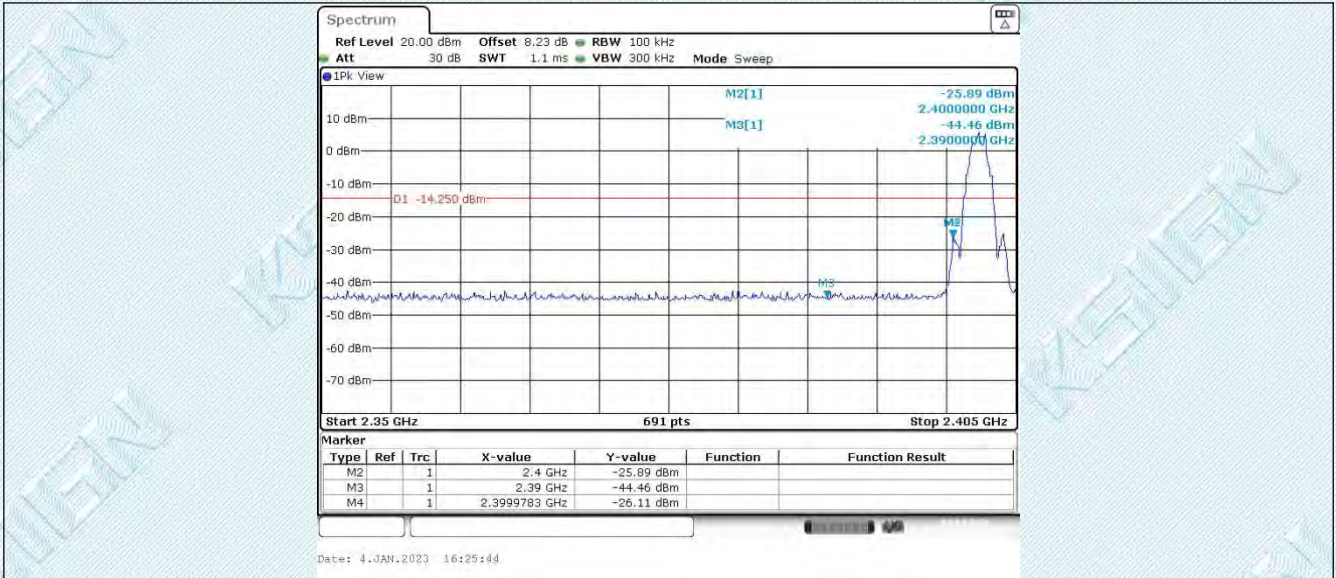
## 6.6. Appendix F: Band edge measurements

### 6.6.1. Test Result

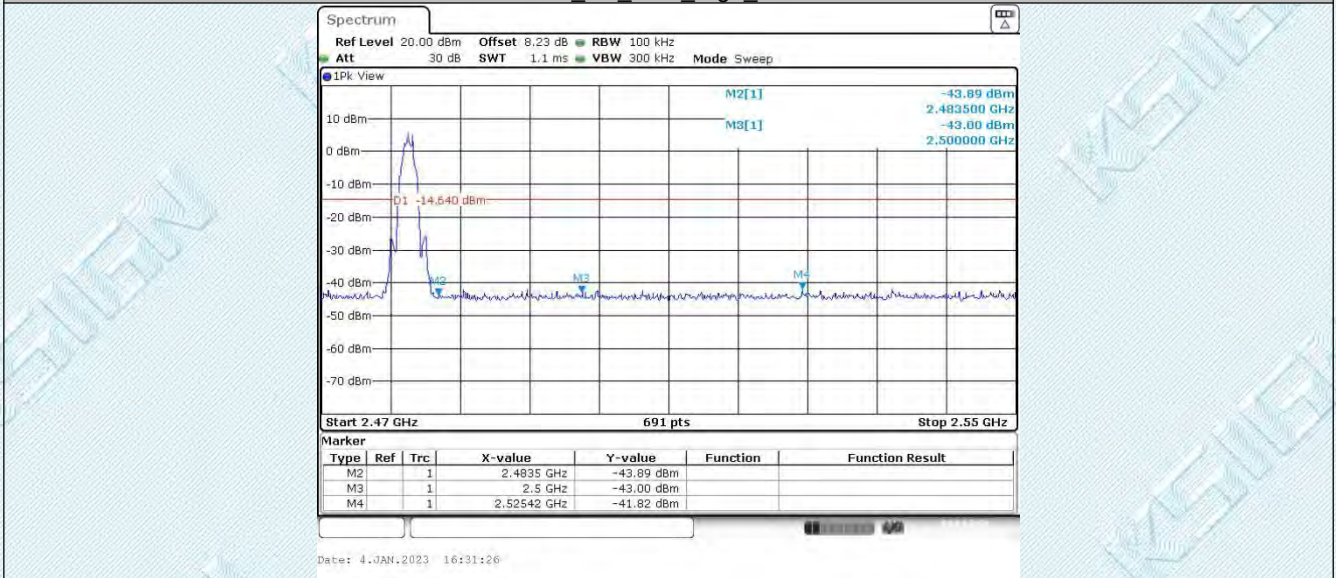
TestMode	Antenna	ChName	Freq(MHz)	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	6.01	-41.99	$\leq -13.99$	PASS
		High	2480	5.85	-42.13	$\leq -14.15$	PASS
BLE_2M	Ant1	Low	2402	5.75	-26.11	$\leq -14.25$	PASS
		High	2480	5.36	-41.82	$\leq -14.64$	PASS

### 6.6.2. Test Graphs





BLE\_2M Ant1 High 2480



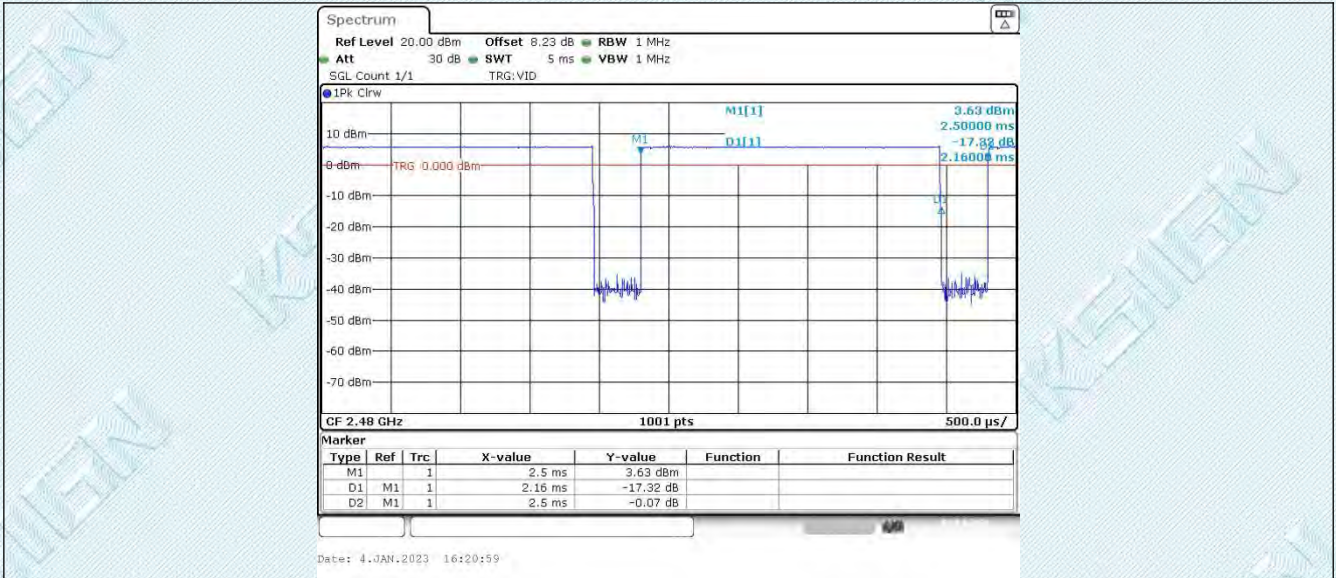
## 6.7. Appendix H: Duty Cycle

### 6.7.1. Test Result

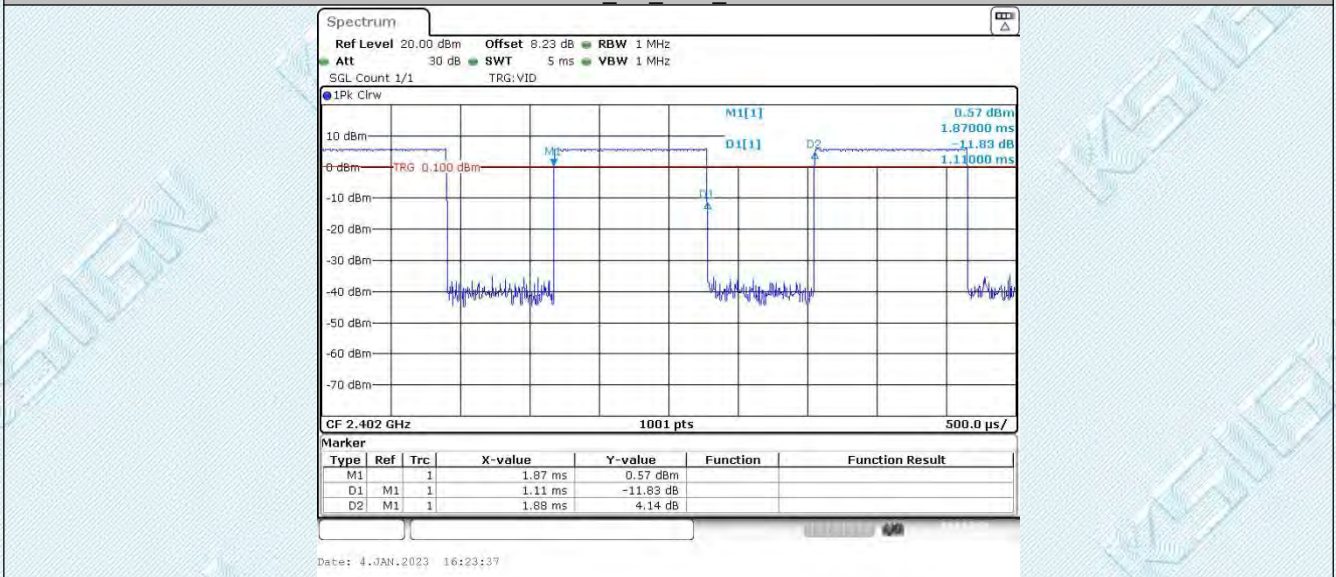
TestMode	Antenna	Freq(MHz)	ON Time [ms]	Period [ms]	DC [%]	Factor	Limit	Verdict
BLE_1M	Ant1	2402	2.16	2.50	86.40	0.63	---	PASS
		2440	2.16	2.50	86.40	0.63	---	PASS
		2480	2.16	2.50	86.40	0.63	---	PASS
BLE_2M	Ant1	2402	1.11	1.88	59.04	2.29	---	PASS
		2440	1.11	1.88	59.04	2.29	---	PASS
		2480	1.11	1.88	59.04	2.29	---	PASS

### 6.7.2. Test Graphs

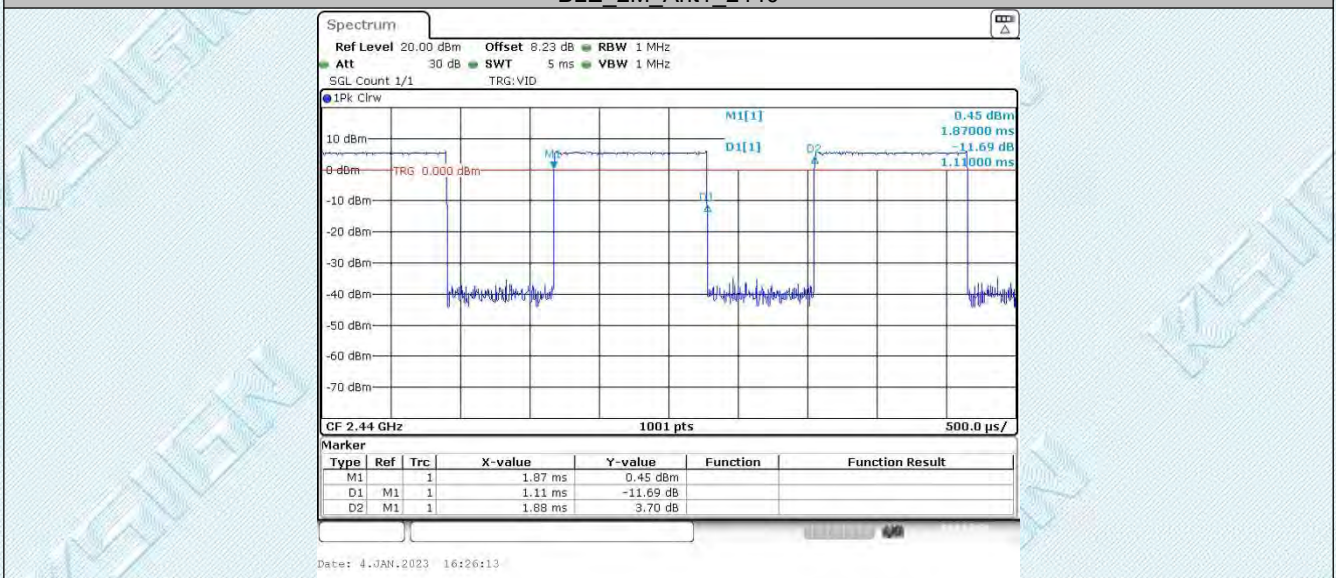




BLE\_2M\_Ant1\_2402



BLE\_2M\_Ant1\_2440



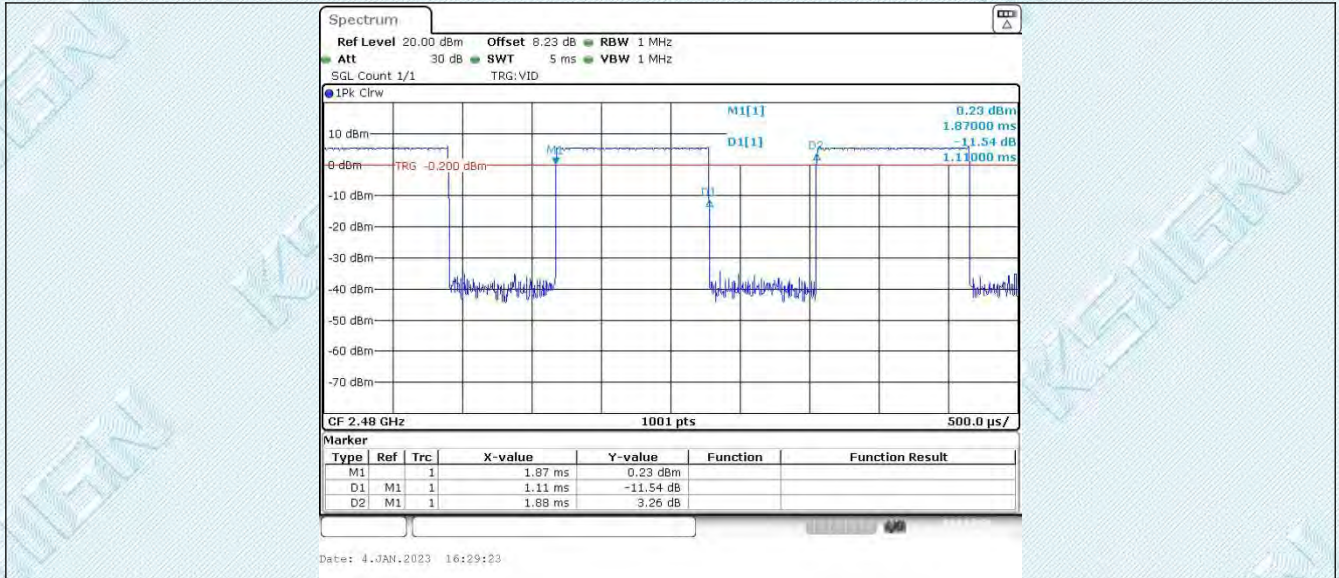
BLE\_2M\_Ant1\_2480

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--THE END--