FCC TEST REPORT

Client Name	:	Xunison.,Ltd
Address	:	25A, Kilcarbery Business Park, Upper Nangor Rd, Kilcarbery, Dublin 22, Ireland
Product Name	:	Contact Sensor
Date	:	Nov. 27, 2021

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant	:	Xunison.,Ltd
Manufacturer	:	Xunison.,Ltd
Product Name	:	Contact Sensor
Model No.	:	ZBXSDW-2
Trade Mark	:	N.A.
Rating(s)	:	Input: DC 3V by battery

Test Standard(s)	:	**FCC Part15 Subpart C, Section 15.247**
Test Method(s)	:	**ANSI C63.10: 2020, KDB558074 D01 DTS Meas Guidance v05r02**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt	Oct. 26, 2021
Date of Test	Oct. 26~Nov. 03, 2021
Prepared By	(Ella Liang)
Approved & Authorized Signer	(Kingkong Jin)

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Hotline 400-003-0500
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1. General Information

1.1. Client Information

Applicant	:	Xunison.,Ltd
Address	:	25A, Kilcarbery Business Park, Upper Nangor Rd, Kilcarbery, Dublin 22, Ireland
Manufacturer	:	Xunison.,Ltd
Address	:	25A, Kilcarbery Business Park, Upper Nangor Rd, Kilcarbery, Dublin 22, Ireland

1.2. Description of Device (EUT)

Product Name	:	Contact Sensor	
Model No.	:	ZBXSDW-2	
Trade Mark	:	N.A.	
Test Power Supply	:	DC 3V battery inside	
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)	
Product Description	:	Operation Frequency:	2405~2480 MHz
		Number of Channel:	16 Channels
		Modulation Type:	O-QPSK
		Antenna Type:	PCB Antenna
		Antenna Gain(Peak):	1.78dBi (Provided by customer)
		Adapter:	N/A
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2)This report is for Zigbee module.			

1.3. Auxiliary Equipment Used During Test

N/A		

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description	
Mode 1	CH11	Charging Mode/ TX Only
Mode 2	CH19	
Mode 3	CH26	

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

1.5. List of channels

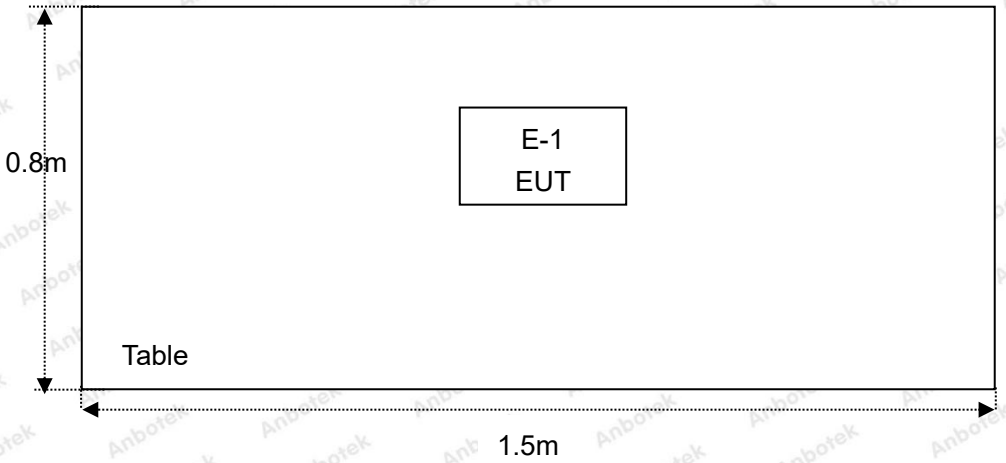
Channel	Freq. (MHz)	Channel	Freq. (MHz)
11	2405	20	2450
12	2410	21	2455
13	2415	22	2460
14	2420	23	2465
15	2425	24	2470
16	2430	25	2475
17	2435	26	2480
18	2440		
19	2445		

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT built-in battery-powered, fully-charged battery use of the test battery.

1.6. Description Of Test Setup

RE



1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul 05, 2021	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 22, 2021	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 22, 2021	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2021	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 22, 2021	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Oct. 22, 2021	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Oct. 22, 2021	2 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Oct. 22, 2021	2 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 22, 2021	2 Year
10.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Oct. 22, 2021	2 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 22, 2021	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Oct. 22, 2021	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Oct. 22, 2021	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Oct. 22, 2021	1 Year
16.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 22, 2021	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 22, 2021	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 22, 2021	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 22, 2021	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Oct. 22, 2021	1 Year

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

1.9. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102

2. Summary of Test Results

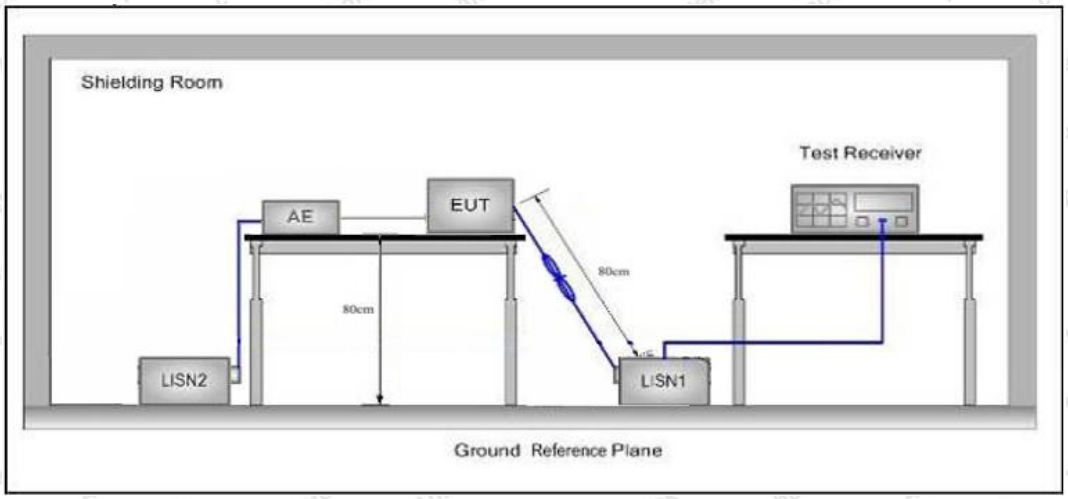
Standard Section	Test Item	Result
15.203/15.247(c)	Antenna Requirement	PASS
15.207	Conducted Emission	N/A
15.205/15.209	Spurious Emission	PASS
15.247(b)(3)	Conducted Peak Output Power	PASS
15.247(a)(2)	6dB Occupied Bandwidth	PASS
15.247(e)	Power Spectral Density	PASS
15.247(d)	Band Edge	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		

3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Not applicable for equipment operated with DC power supply.

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:
(1)The lower limit shall apply at the transition frequency.
(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

4.2. Test Setup

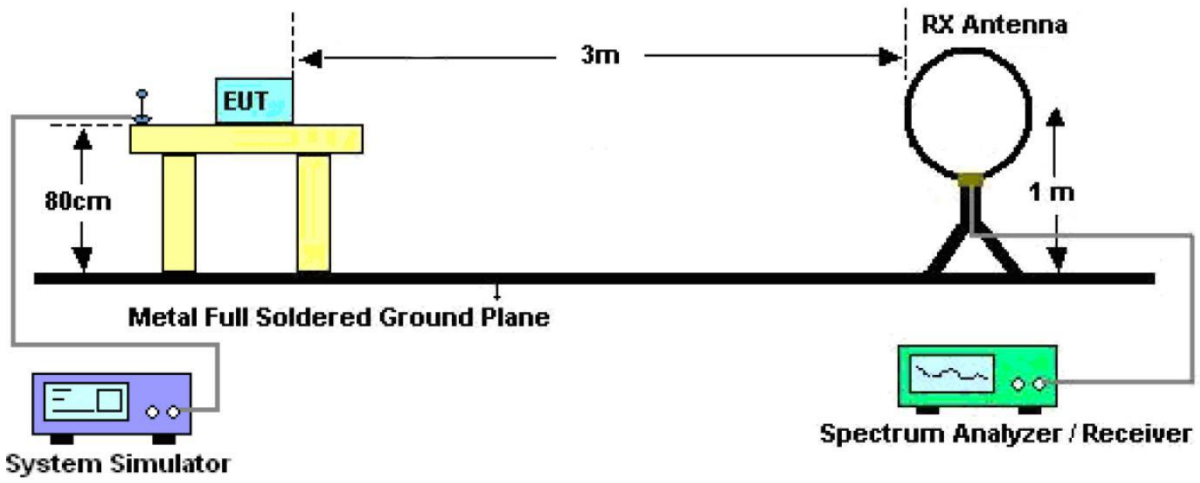


Figure 1. Below 30MHz

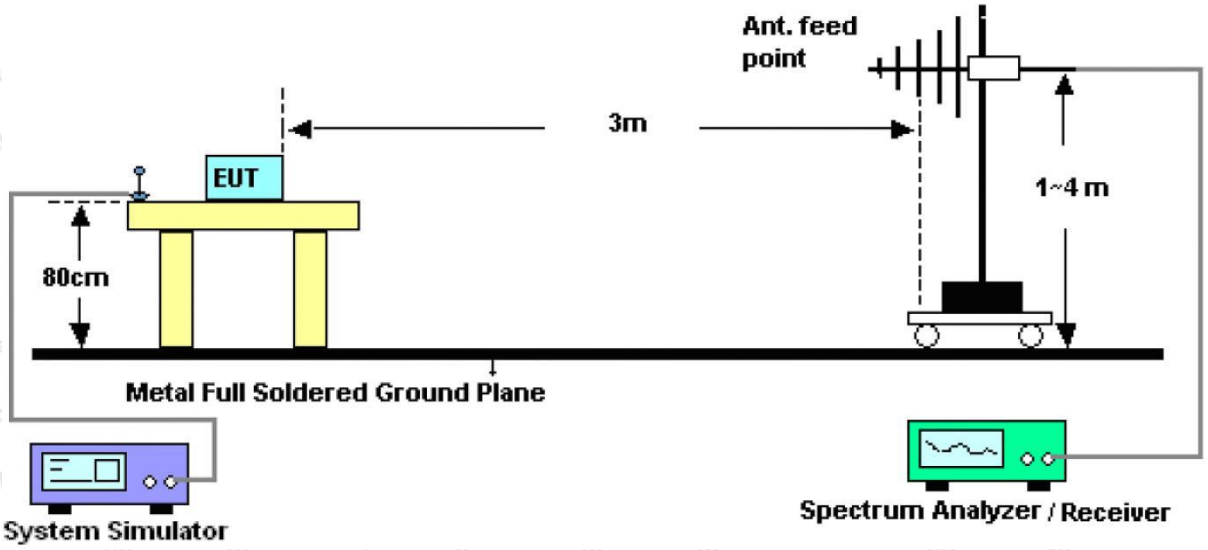


Figure 2. 30MHz to 1GHz

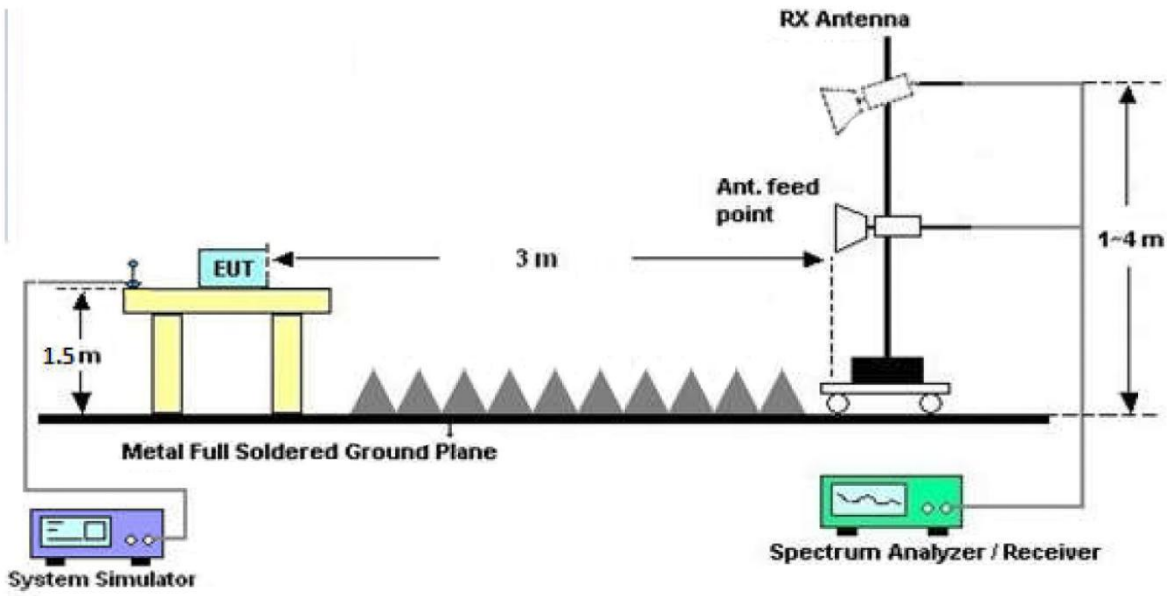


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.
For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.
The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:
RBW = 100kHz, VBW =300kHz,Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz,Set the spectrum analyzer as:
RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.
RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

PASS

During the test, pre-scan all the modes, and found the Low channel(TX Mode) which is the worst case, only the worst case is recorded in the report.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

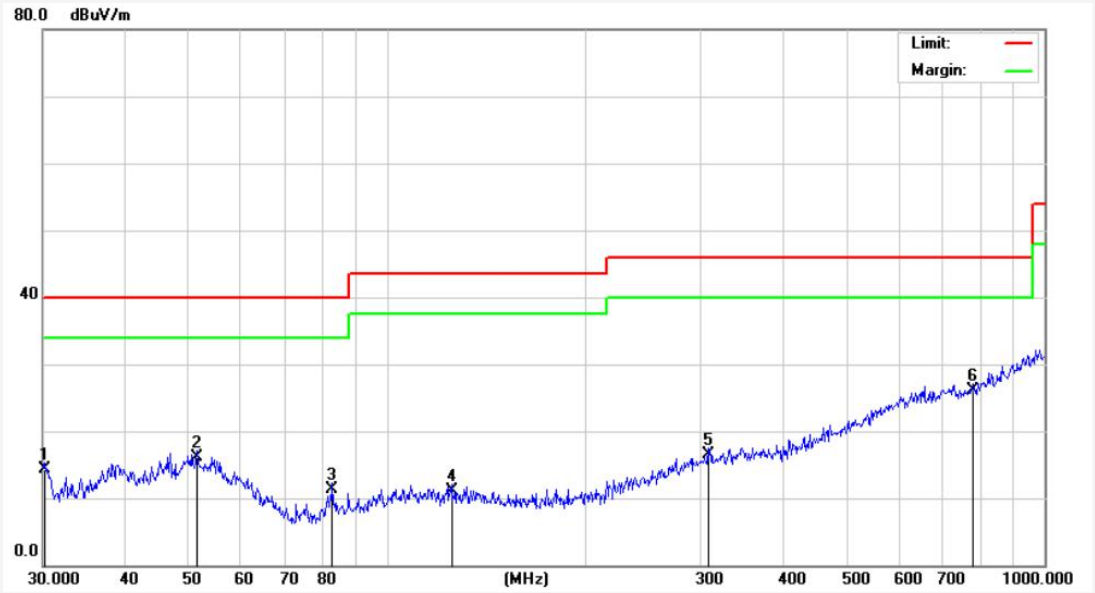
Test Results (30~1000MHz)

Test Mode: Mode 1

Power Source: DC 3V battery inside

Polarization: Horizontal

Temp.(℃)/Hum.(%RH): 22.7℃/45%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.2111	33.63	-19.42	14.21	40.00	-25.79	QP	100	360	
2	51.4807	31.38	-15.35	16.03	40.00	-23.97	QP	100	0	
3	82.6482	32.16	-20.94	11.22	40.00	-28.78	QP	100	360	
4	125.4457	32.13	-21.12	11.01	43.50	-32.49	QP	100	0	
5	307.8313	30.61	-14.09	16.52	46.00	-29.48	QP	100	360	
6	779.6068	30.77	-4.60	26.17	46.00	-19.83	QP	100	0	

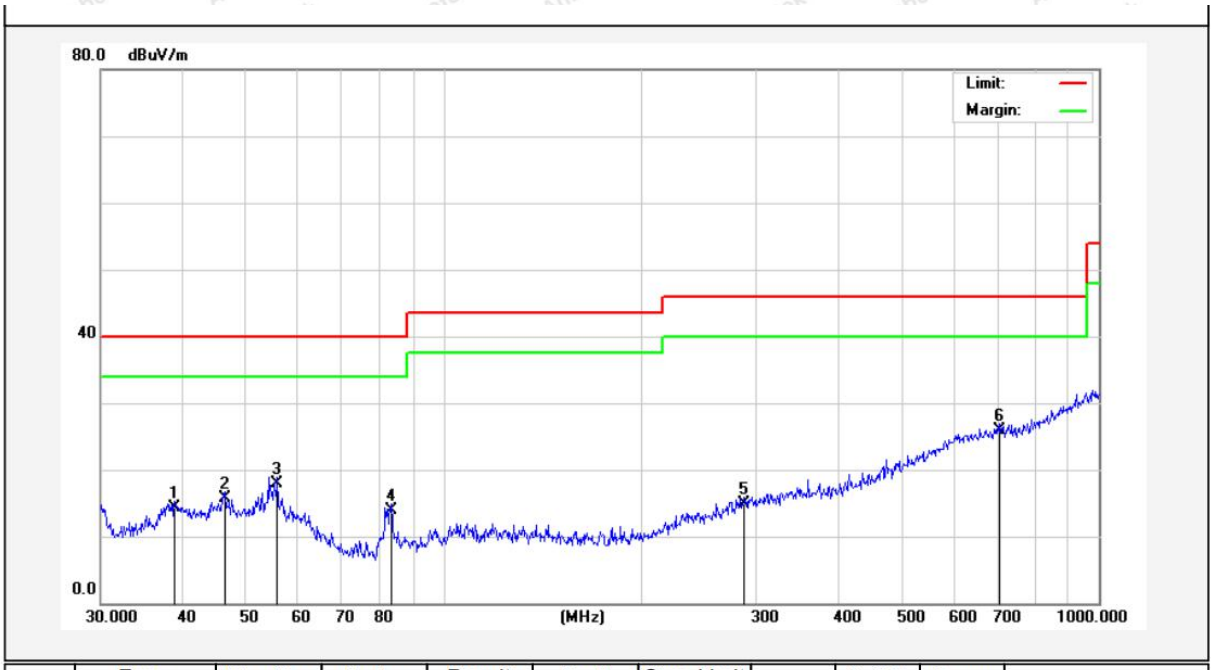
Test Results (30~1000MHz)

Test Mode: Mode 1

Power Source: DC 3V battery inside

Polarization: Vertical

Temp.(℃)/Hum.(%RH): 22.7℃/45%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	38.8878	28.39	-14.18	14.21	40.00	-25.79	QP	100	360	
2	46.3402	30.02	-14.30	15.72	40.00	-24.28	QP	100	0	
3	55.8047	34.40	-16.47	17.93	40.00	-22.07	QP	100	360	
4	83.2298	30.99	-17.13	13.86	40.00	-26.14	QP	100	0	
5	287.9904	28.85	-13.86	14.99	46.00	-31.01	QP	100	360	
6	704.2261	31.78	-5.94	25.84	46.00	-20.16	QP	100	0	

Test Results (1GHz-25GHz)

Test Mode: CH11	Test channel: Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4810.00	39.44	34.04	45.97	74.00	-28.03	Vertical
7215.00	33.25	37.11	43.59	74.00	-30.41	Vertical
9620.00	32.73	39.31	46.48	74.00	-27.52	Vertical
12025.00	*			74.00		Vertical
14430.00	*			74.00		Vertical
4810.00	44.16	34.04	50.69	74.00	-23.31	Horizontal
7215.00	35.19	37.11	45.53	74.00	-28.47	Horizontal
9620.00	32.35	39.31	46.10	74.00	-27.90	Horizontal
12025.00	*			74.00		Horizontal
14430.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4810.00	27.85	34.04	34.38	54.00	-19.62	Vertical
7215.00	21.69	37.11	32.03	54.00	-21.97	Vertical
9620.00	20.64	39.31	34.39	54.00	-19.61	Vertical
12025.00	*			54.00		Vertical
14430.00	*			54.00		Vertical
4810.00	32.32	34.04	38.85	54.00	-15.15	Horizontal
7215.00	24.01	37.11	34.35	54.00	-19.65	Horizontal
9620.00	20.54	39.31	34.29	54.00	-19.71	Horizontal
12025.00	*			54.00		Horizontal
14430.00	*			54.00		Horizontal

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Test Results (1GHz-25GHz)

Test Mode: CH19	Test channel: Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4890.00	37.99	34.38	44.97	74.00	-29.03	Vertical
7335.00	32.28	37.22	42.75	74.00	-31.25	Vertical
9780.00	31.87	39.46	45.88	74.00	-28.12	Vertical
12225.00	*			74.00		Vertical
14670.00	*			74.00		Vertical
4890.00	42.41	34.38	49.39	74.00	-24.61	Horizontal
7335.00	34.10	37.22	44.57	74.00	-29.43	Horizontal
9780.00	31.36	39.46	45.37	74.00	-28.63	Horizontal
12225.00	*			74.00		Horizontal
14670.00	*			74.00		Horizontal

Average value:

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	
4890.00	26.69	34.38	33.67	54.00	-20.33	polarization
7335.00	20.90	37.22	31.37	54.00	-22.63	Vertical
9780.00	19.94	39.46	33.95	54.00	-20.05	Vertical
12225.00	*			54.00		Vertical
14670.00	*			54.00		Vertical
4890.00	30.99	34.38	37.97	54.00	-16.03	Vertical
7335.00	23.12	37.22	33.59	54.00	-20.41	Horizontal
9780.00	19.72	39.46	33.73	54.00	-20.27	Horizontal
12225.00	*			54.00		Horizontal
14670.00	*			54.00		Horizontal

Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
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Test Results (1GHz-25GHz)

Test Mode: CH26	Test channel: Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	36.50	34.72	43.92	74.00	-30.08	Vertical
7440.00	31.30	37.34	41.89	74.00	-32.11	Vertical
9920.00	30.99	39.62	45.26	74.00	-28.74	Vertical
12400.00	*			74.00		Vertical
14880.00	*			74.00		Vertical
4960.00	40.62	34.72	48.04	74.00	-25.96	Horizontal
7440.00	32.98	37.34	43.57	74.00	-30.43	Horizontal
9920.00	30.34	39.62	44.61	74.00	-29.39	Horizontal
12400.00	*			74.00		Horizontal
14880.00	*			74.00		Horizontal

Average value:

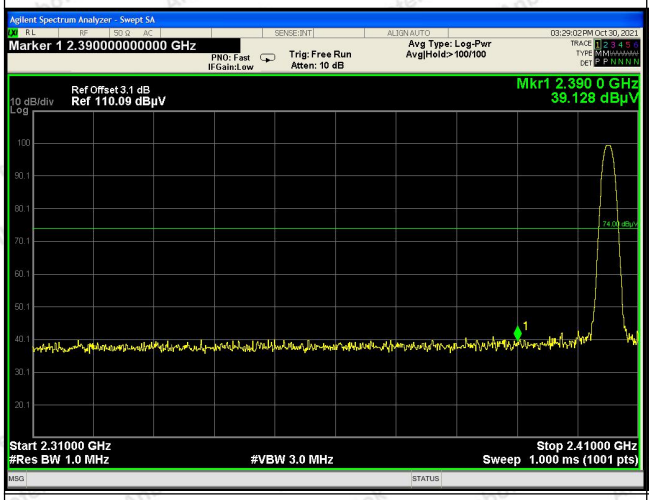
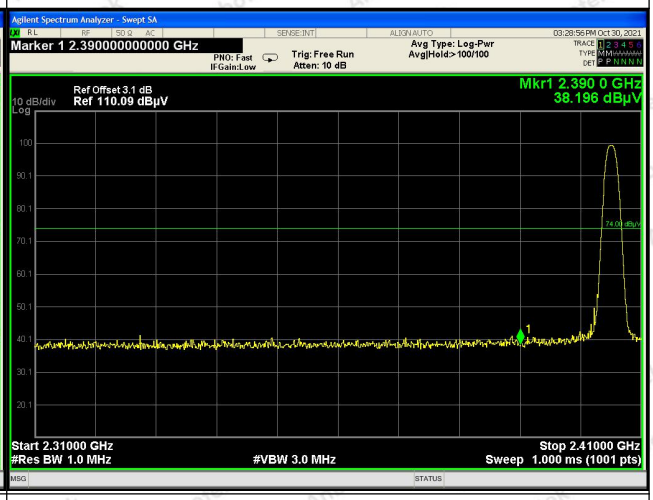
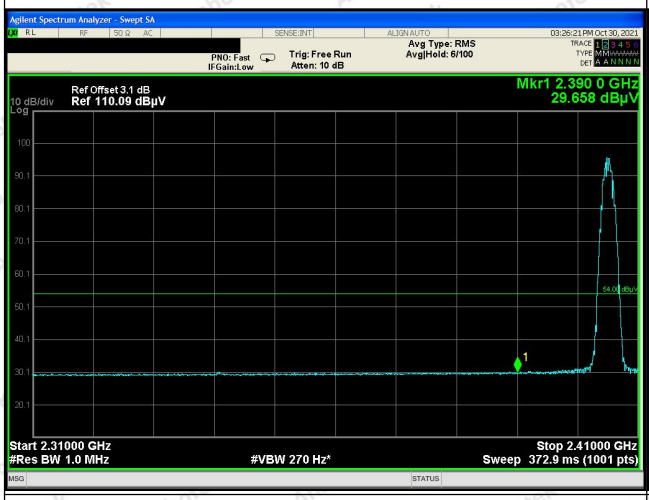
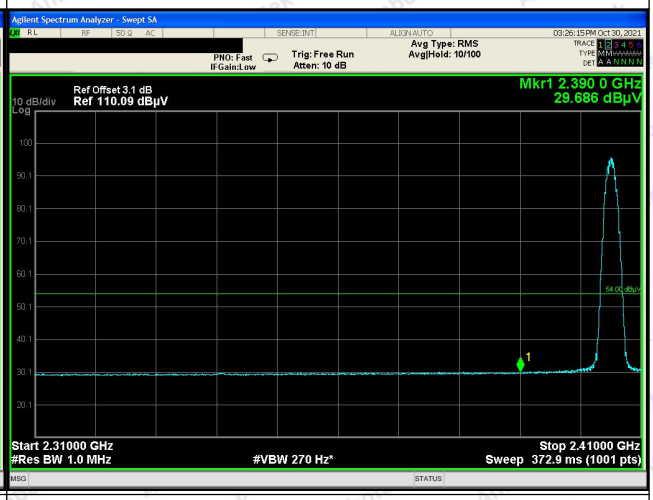
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	polarization
4960.00	25.53	34.72	32.95	54.00	-21.05	Vertical
7440.00	20.12	37.34	30.71	54.00	-23.29	Vertical
9920.00	19.24	39.62	33.51	54.00	-20.49	Vertical
12400.00	*			54.00		Vertical
14880.00	*			54.00		Vertical
4960.00	29.68	34.72	37.10	54.00	-16.90	Horizontal
7440.00	22.24	37.34	32.83	54.00	-21.17	Horizontal
9920.00	18.91	39.62	33.18	54.00	-20.82	Horizontal
12400.00	*			54.00		Horizontal
14880.00	*			54.00		Horizontal

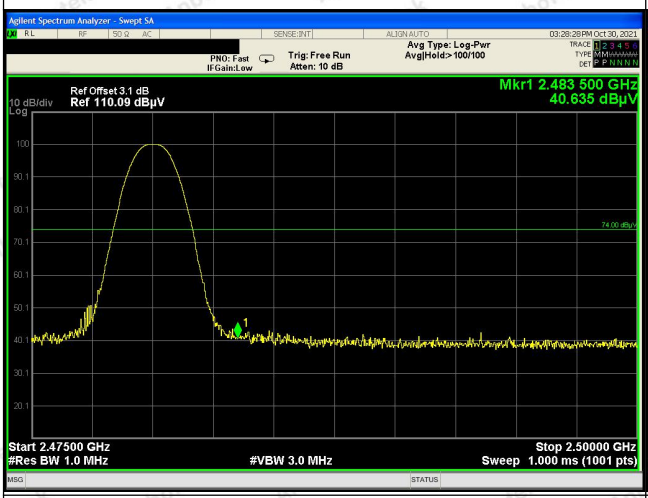
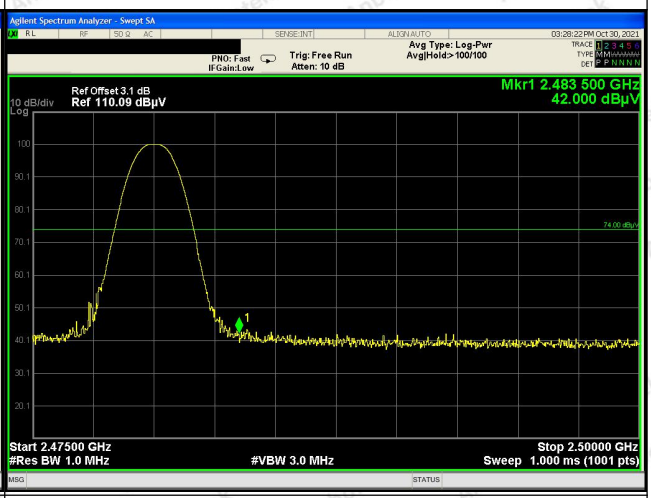
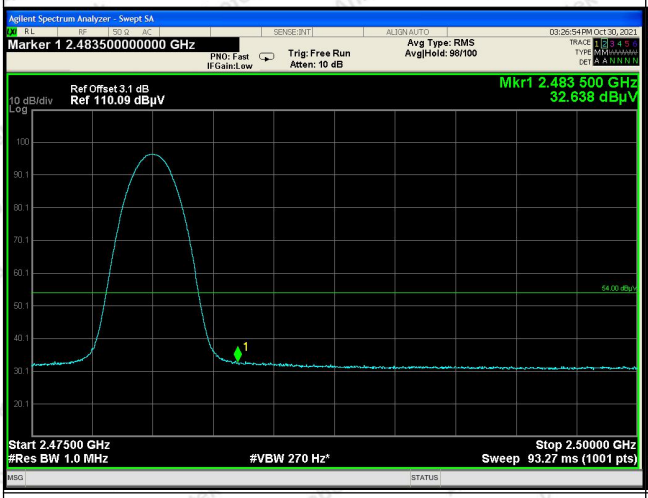
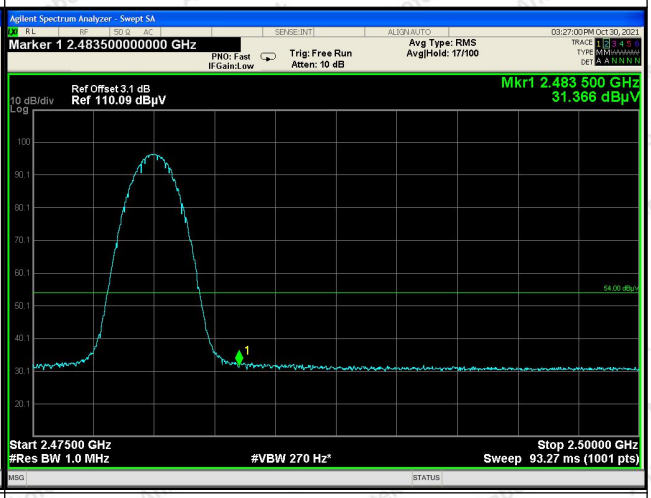
Remark:

1.Result =Read level + Factor

2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Band Edge:

Test Mode: CH11	Test channel: Lowest
	
Peak Value(Vertical)	Peak Value(Horizontal)
	
Average Value(Vertical)	Average Value(Horizontal)

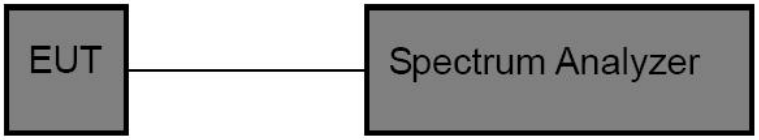
Test Mode: CH26	Test channel: Highest
	
Peak Value(Vertical)	Peak Value(Horizontal)
	
Average Value(Vertical)	Average Value(Horizontal)

5. Maximum Peak Output Power Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (b)(3)
Test Limit	30dBm

5.2. Test Setup



5.3. Test Procedure

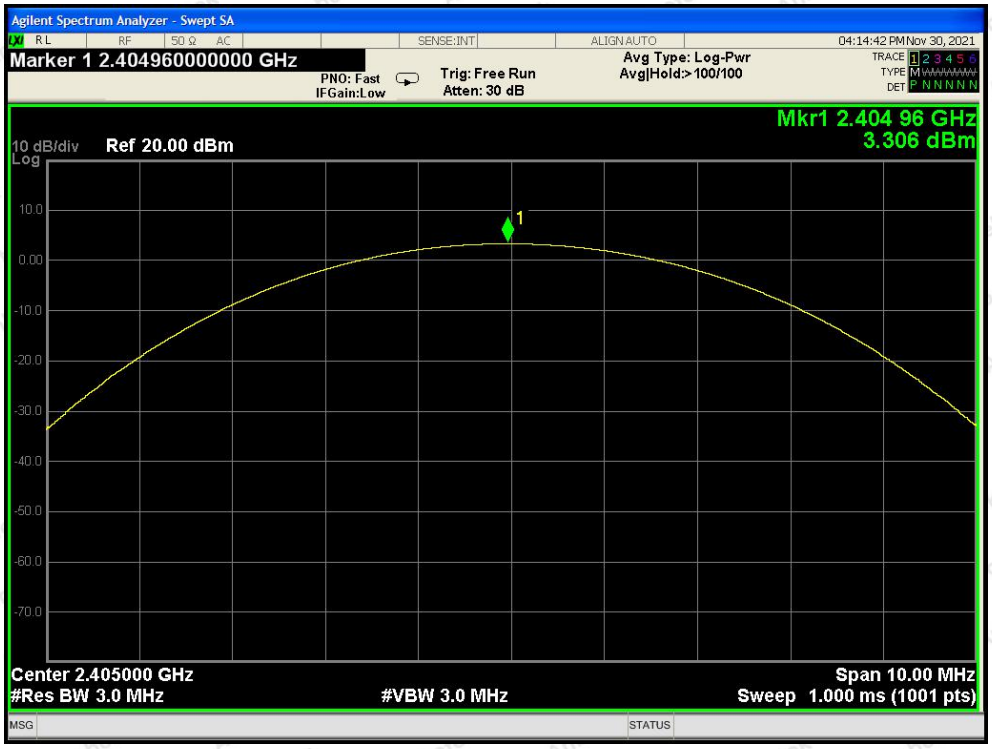
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

1. Set the RBW ≥DTS bandwidth.
2. Set the VBW≥3*RBW.
3. Set the span≥ 3*RBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use peak marker function to determine the peak amplitude level.

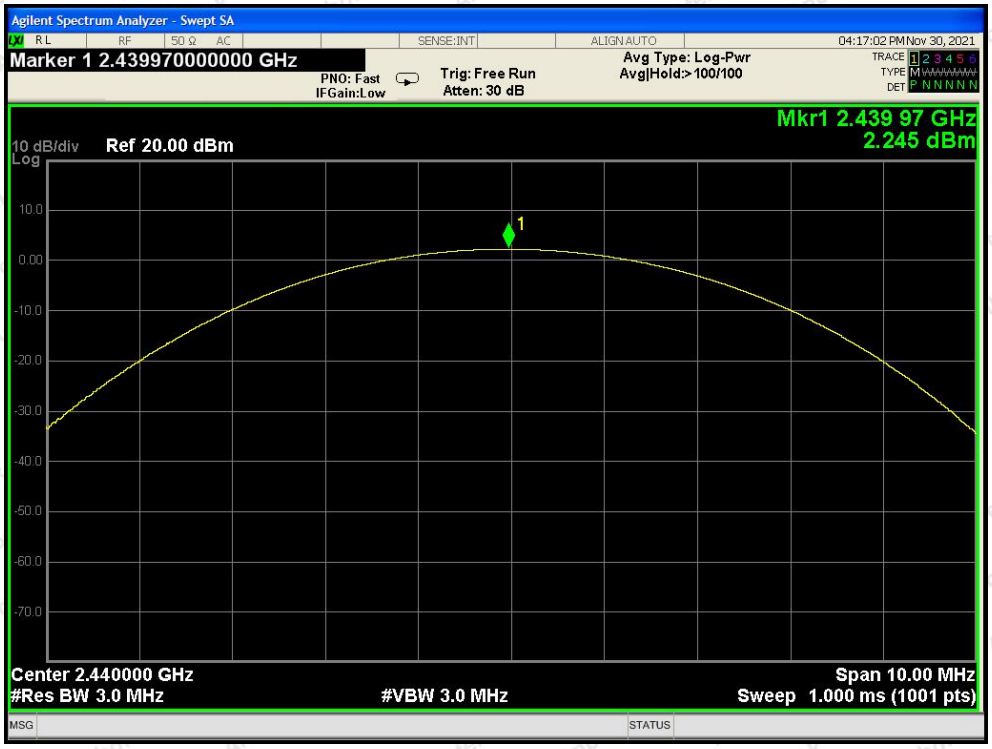
5.4. Test Data

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3V battery inside	Temperature	:	25℃
Test Result	:	PASS	Humidity	:	55%RH

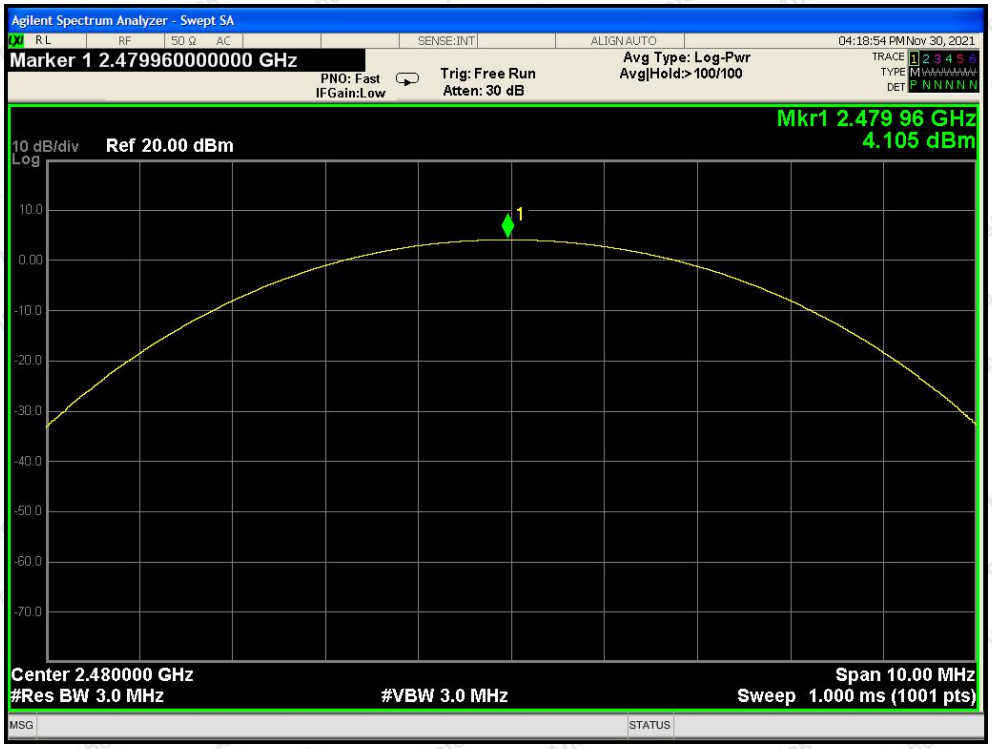
Channel Frequency (MHz)	Peak Power output (dBm)	Limit (dBm)	Results
2405	2.306	30	PASS
2445	2.245	30	PASS
2480	4.105	30	PASS



CH: Low



CH: Middle


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.479960000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
04:18:54 PM Nov 30, 2021
Mkr1 2.479 96 GHz
4.105 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.480000 GHz
#Res BW 3.0 MHz
#VBW 3.0 MHz
Span 10.00 MHz
Sweep 1.000 ms (1001 pts)

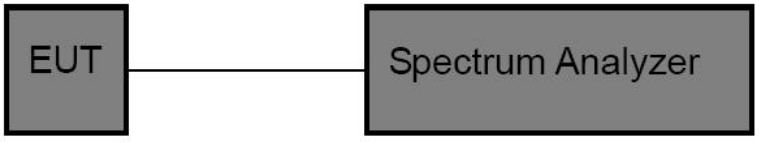
CH: High

6. 6DB Occupy Bandwidth Test

6.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(2)
Test Limit	>500kHz

6.2. Test Setup



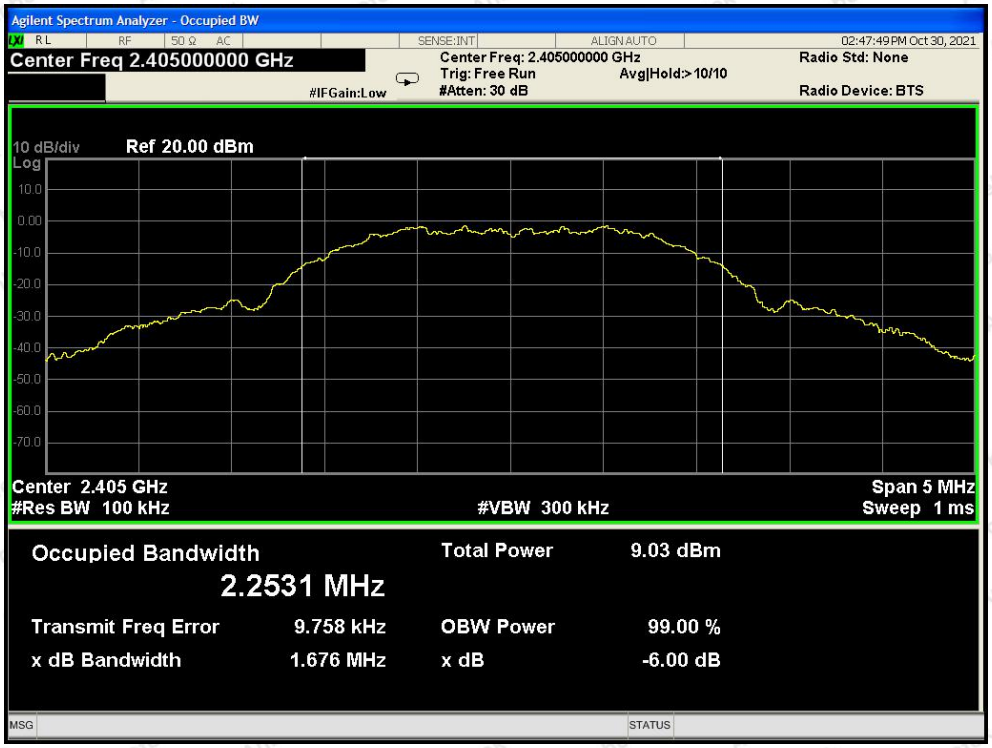
6.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
RBW = 100kHz, VBW≥3*RBW =300kHz,
Detector= Peak
Trace mode= Max hold.
Sweep- auto couple.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

6.4. Test Data

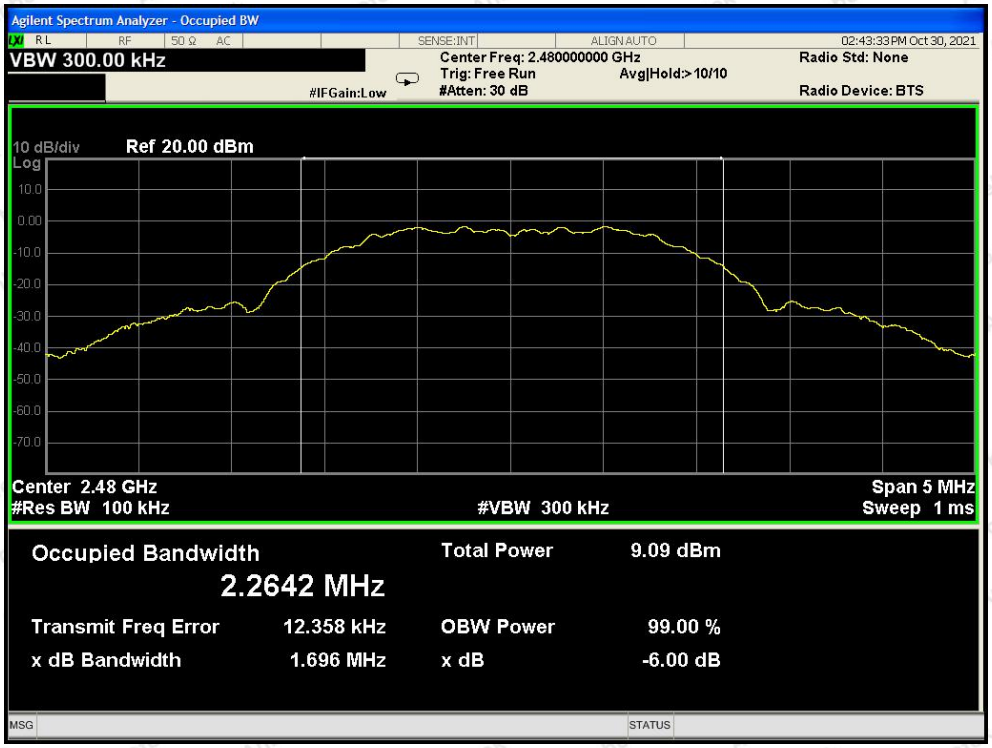
Test Item	:	6dB Bandwidth	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3V battery inside	Temperature	:	23.5℃
Test Result	:	PASS	Humidity	:	54%RH

Channel	Frequency(MHz)	Bandwidth (kHz)	Limit (kHz)	Results
Low	2405	1676	>500	PASS
Middle	2445	1675		PASS
High	2480	1696		PASS



CH: Low

CH: Middle


Agilent Spectrum Analyzer - Occupied BW
VBW 300.00 kHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
02:43:33 PM Oct 30, 2021
10 dB/div
Ref 20.00 dBm
Log
Center 2.48 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5 MHz
Sweep 1 ms
Occupied Bandwidth
2.2642 MHz
Total Power 9.09 dBm
Transmit Freq Error 12.358 kHz
OBW Power 99.00 %
x dB Bandwidth 1.696 MHz
x dB -6.00 dB
MSG
STATUS

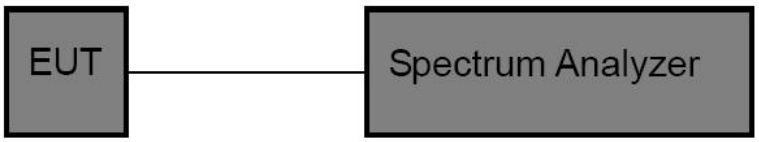
CH: High

7. Power Spectral Density Test

7.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (e)
Test Limit	8dBm/3KHz

7.2. Test Setup



7.3. Test Procedure

1. Place the EUT on the table and set it in transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 1.5xDTS BW
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

7.4. Test Data

Test Item	:	Power Spectral Density	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3V battery inside	Temperature	:	23.5℃
Test Result	:	PASS	Humidity	:	54%RH

Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Results
Low	2405	-13.084	8.00	PASS
Middle	2445	-14.311	8.00	PASS
High	2480	-13.205	8.00	PASS

CH: Low

CH: Middle

Agilent Spectrum Analyzer - Swept SA
Marker 1 2.480448272000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 39/100
03:19:03 PM Oct 30, 2021
Mkr1 2.480 448 GHz
-13.205 dBm
10 dB/div
Log
Ref 20.00 dBm
Center 2.480000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 3.396 MHz
Sweep 358.1 ms (1001 pts)

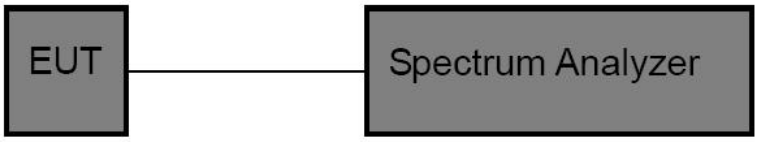
CH: High

8. 100kHz Bandwidth of Frequency Band Edge Requirement

8.1. 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 in15.209(a).

8.2. Test Setup



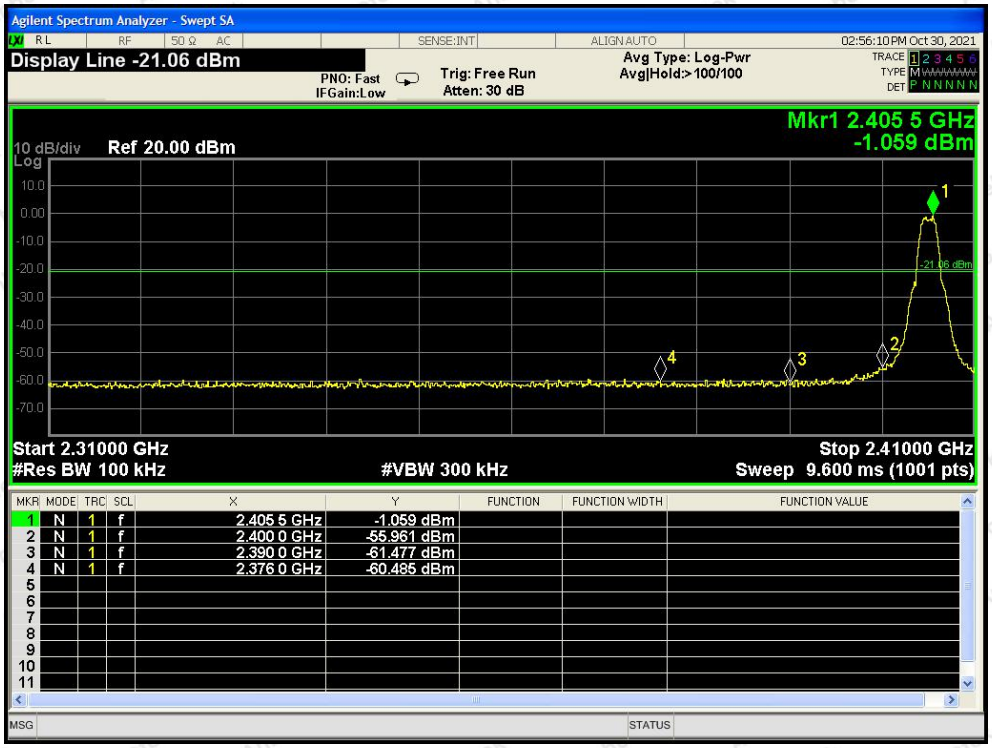
8.3. Test Procedure

Using the following spectrum analyzer setting:

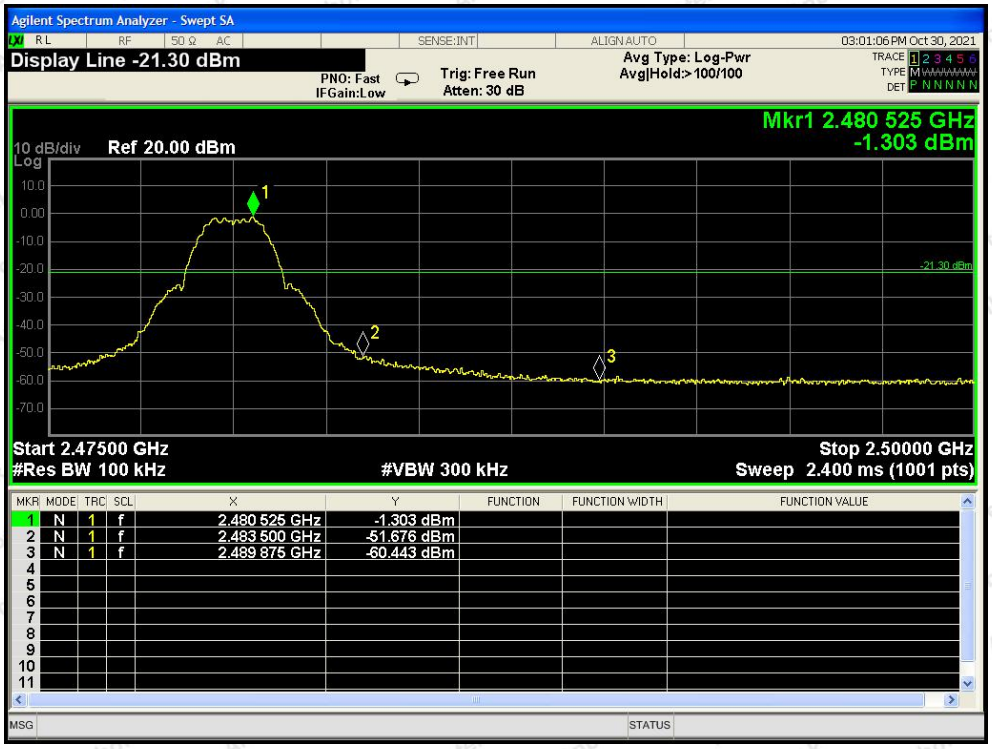
1. Set the RBW = 100KHz.
2. Set the VBW = 300KHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

8.4. Test Data

Test Item	:	Band edge	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 3V battery inside	Temperature	:	23.5℃
Test Result	:	PASS	Humidity	:	54%RH

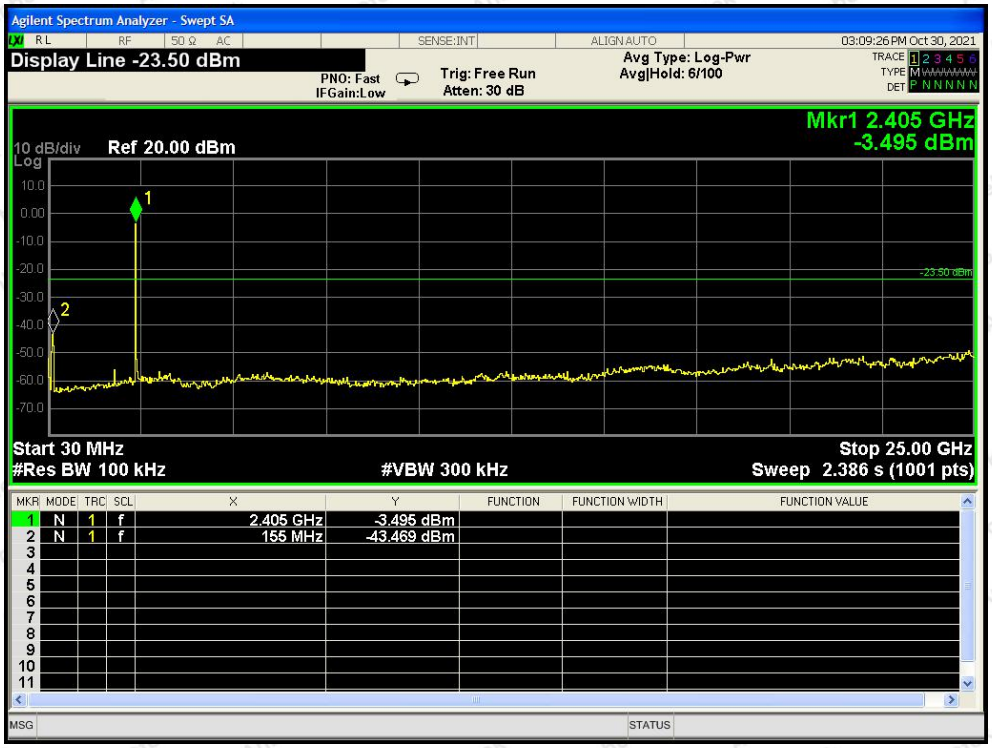


CH: Low

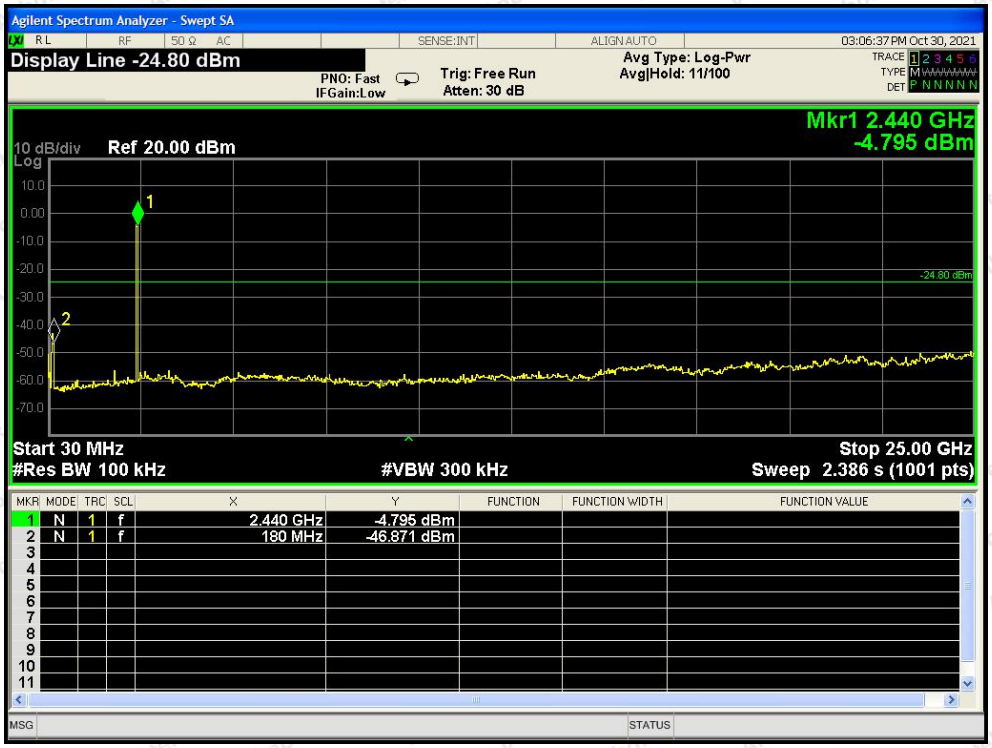


CH: High

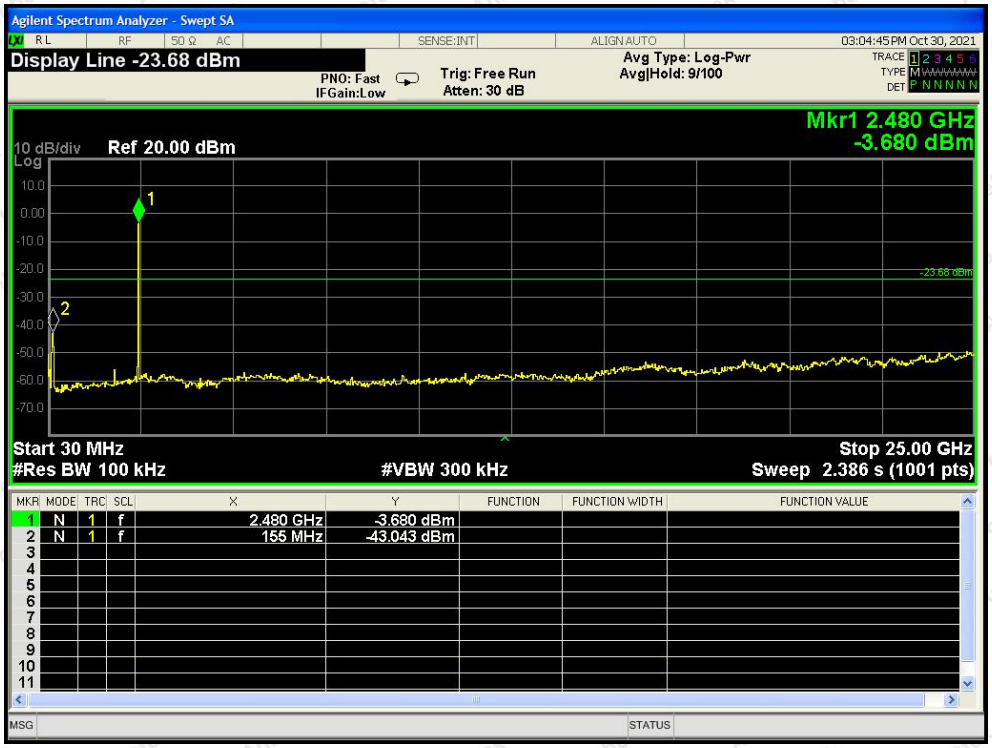
Conducted Emission Method



CH: Low



CH: Middle


Agilent Spectrum Analyzer - Swept SA
Display Line -23.68 dBm
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 9/100
03:04:45 PM Oct 30, 2021
Mkr1 2.480 GHz
-3.680 dBm
10 dB/div
Ref 20.00 dBm
Log
-23.68 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.386 s (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.480 GHz -3.680 dBm
2 N 1 f 155 MHz -43.043 dBm
MSG
STATUS

CH: High

9. Antenna Requirement

9.1. Test Standard and Requirement

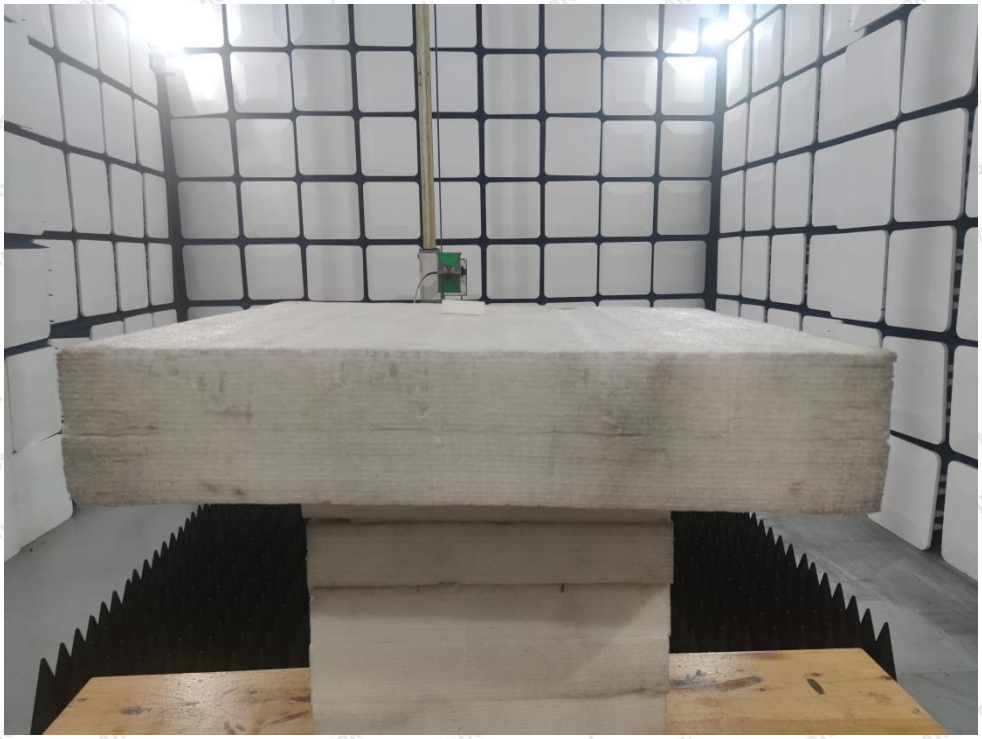
Test Standard	FCC Part15 Section 15.203 /247(c)
Requirement	1) 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses 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.

9.2. Antenna Connected Construction

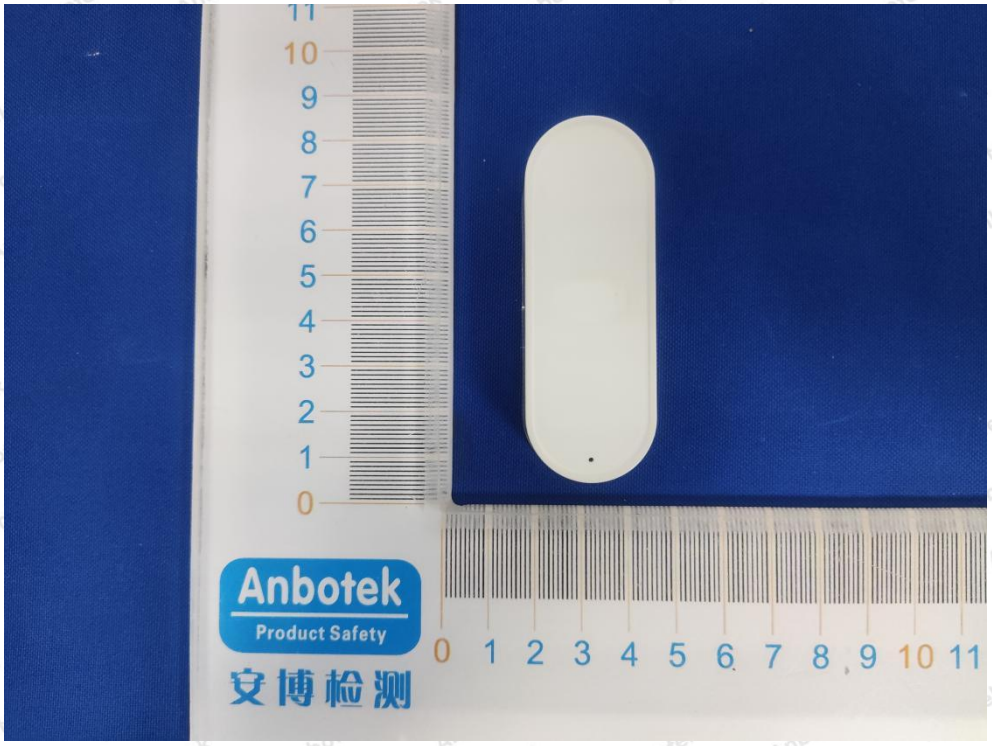
The antenna is a PCB Antenna which permanently attached, and the best case gain of the antenna is 1.78dBi . It complies with the standard requirement.

APPENDIX I -- TEST SETUP PHOTOGRAPH

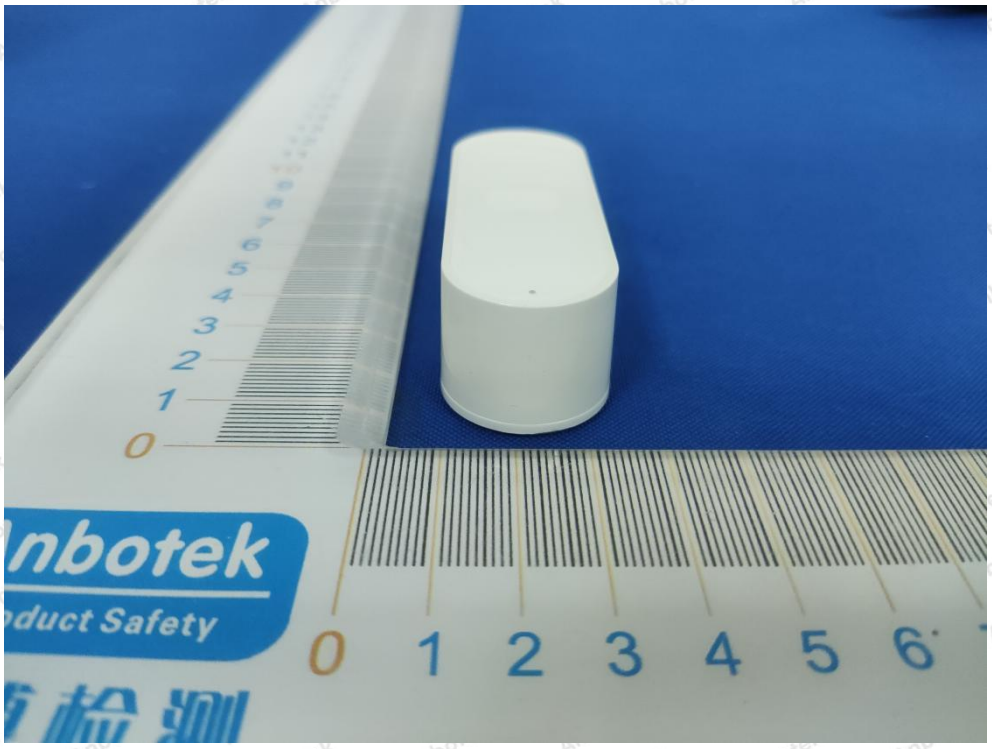
Photo of Radiation Emission Test



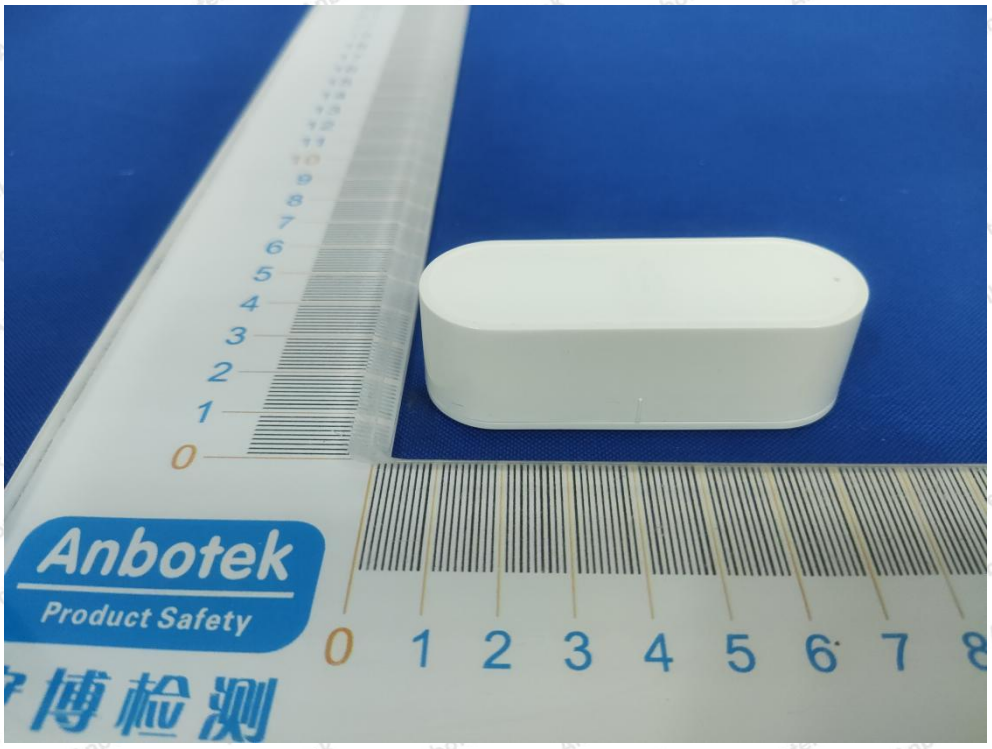
APPENDIX II -- EXTERNAL PHOTOGRAPH

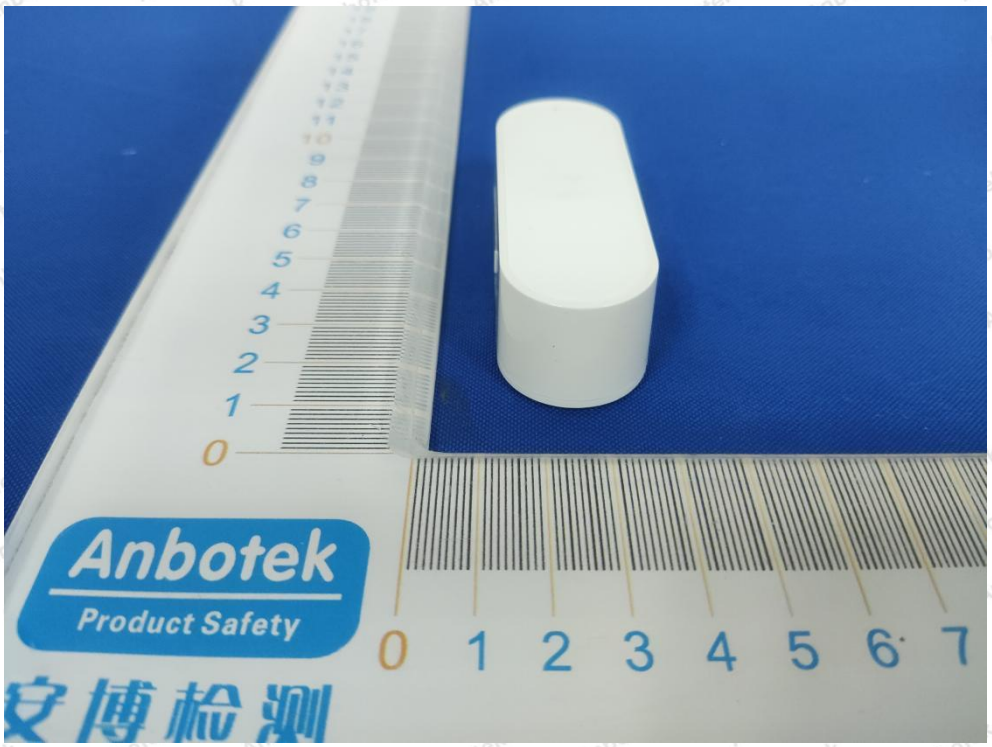


9448A
Double Coated Tissue
xunison
Anbotek
Product Safety
安博检测


nbotek
duct Safety

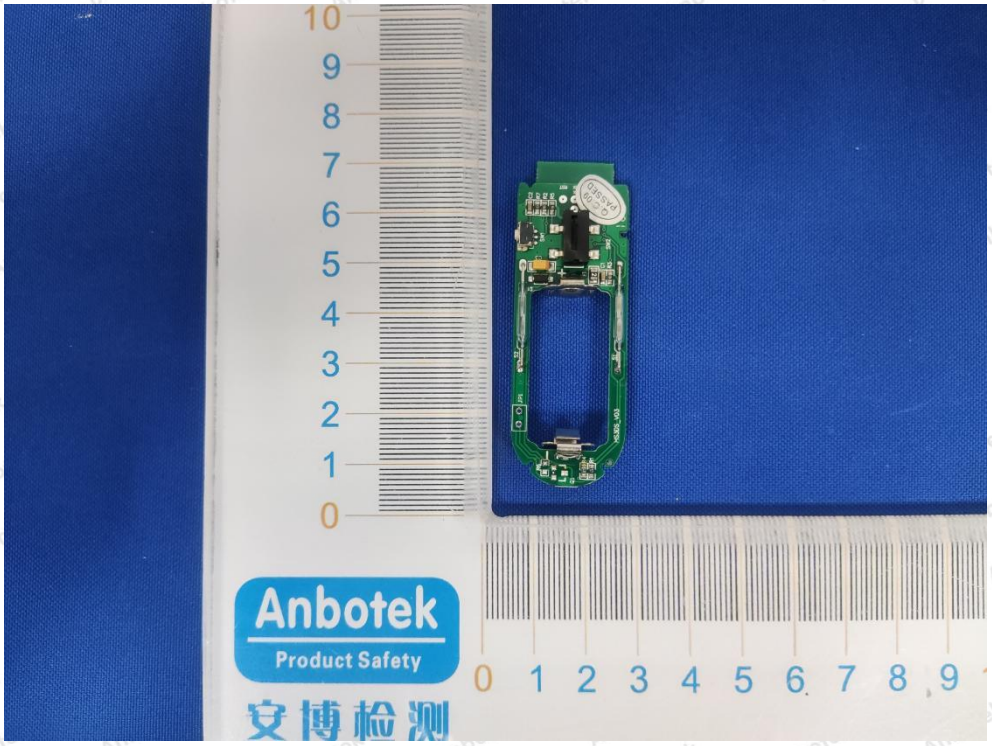
00158D0003E617AC

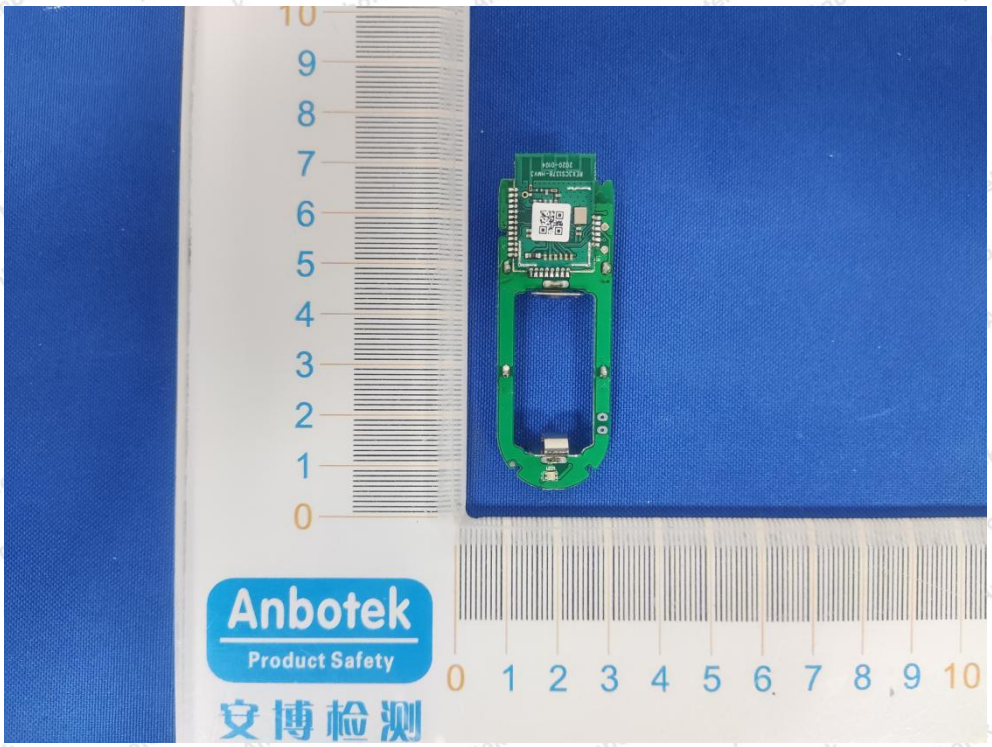

Anbotek
Product Safety

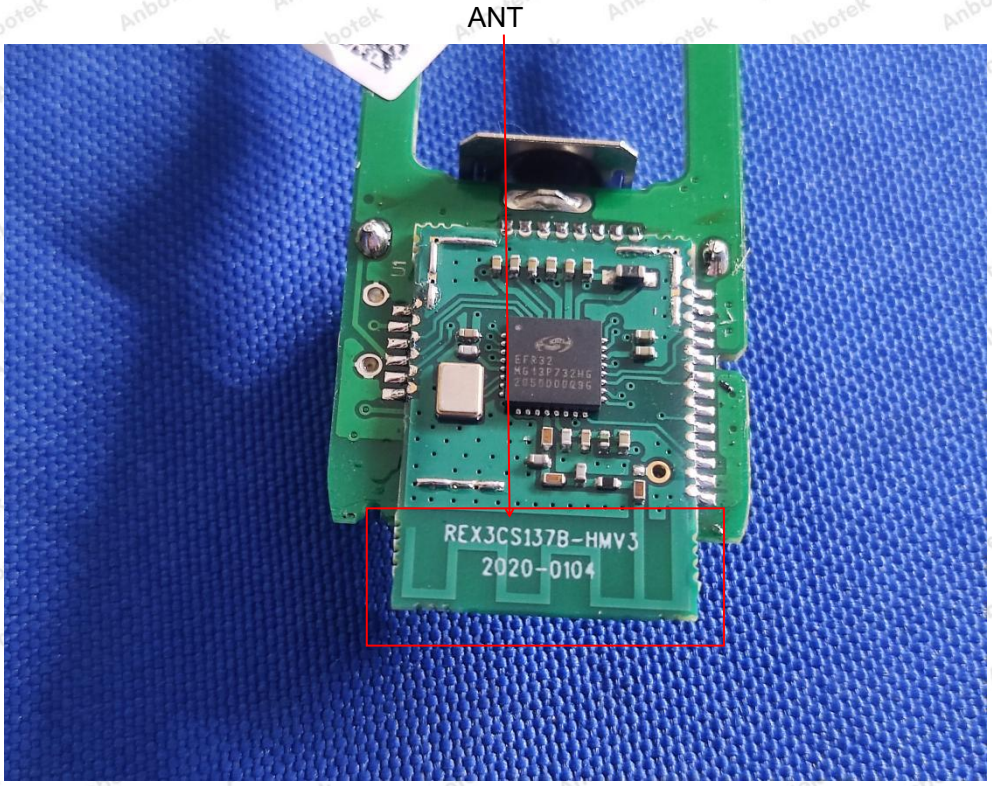

Anbotek
Product Safety
安博检测

xunison
Model: ZBXSDW-2
Contact Sensor
Made in China
RoHS
FCC ID:
2AP2FZBXSDW-2
9448A
Double Coated Tissue

APPENDIX III -- INTERNAL PHOTOGRAPH







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