



GRGTEST®

Page 1 of 78

Test Report

Verified code: 383339

Report No.: E20230128179401-6

Customer: Lumi United Technology Co., Ltd

Address: B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China

Sample Name: Door and Window Sensor P2

Sample Model: DW-S02E

Receive Sample Date: Jan.30,2023

Test Date: Jan.31,2023 ~ Feb.21,2023

Reference Document: CFR 47, FCC Part 15 Subpart C
RADIO FREQUENCY DEVICES:Subpart C—Intentional Radiators

Test Result: Pass

Prepared by: Chen XiaoCong

Reviewed by: Jiang Tao

Approved by: Zhao Zetian

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2023-03-13



GUANGZHOU GRG METROLOGY & TEST CO., LTD
Address: No.163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, China
Tel: (+86) 400-602-0999 FAX: (+86) 020-38698685 Web: <http://www.grgtest.com>

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TABLE OF CONTENTS

1.	TEST RESULT SUMMARY	6
2.	GENERAL DESCRIPTION OF EUT	7
2.1	APPLICANT	7
2.2	MANUFACTURER	7
2.3	BASIC DESCRIPTION OF EQUIPMENT UNDER TEST	7
2.4	CHANNELLIST	8
2.5	TEST OPERATION MODE	8
2.6	LOCAL SUPPORTIVE	8
2.7	CONFIGURATION OF SYSTEM UNDER TEST	9
2.8	DUTY CYCLE.....	10
3.	LABORATORY AND ACCREDITATIONS	11
3.1	LABORATORY	11
3.2	ACCREDITATIONS	11
4.	MEASUREMENT UNCERTAINTY	12
5.	LIST OF USED TEST EQUIPMENT AT GRGT	13
6.	RADIATED SPURIOUS EMISSIONS	14
6.1	LIMITS.....	14
6.2	TEST PROCEDURES	14
6.3	TEST SETUP	17
6.4	DATA SAMPLE	19
6.5	TEST RESULTS	20
7.	6dB BANDWIDTH.....	44
7.1	LIMITS.....	44
7.2	TEST PROCEDURES	44
7.3	TEST SETUP	44
7.4	TEST RESULTS	44
8.	MAXIMUM PEAK OUTPUT POWER	48
8.1	LIMITS.....	48
8.2	TEST PROCEDURES	48
8.3	TEST SETUP	48
8.4	TEST RESULTS	48
9.	POWER SPECTRAL DENSITY	49
9.1	LIMITS.....	49
9.2	TEST PROCEDURES	49
9.3	TEST SETUP	49
9.4	TEST RESULTS	49
10.	CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS	53
10.1	LIMITS.....	53
10.2	TEST PROCEDURES	53
10.3	TEST SETUP	53
10.4	TEST RESULTS	54

11. RESTRICTED BANDS OF OPERATION..... 66

11.1 LIMITS..... 66

11.2 TEST PROCEDURES 67

11.3 TEST SETUP 67

11.4 TEST RESULTS..... 68

APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM 78

APPENDIX B. PHOTOGRAPH OF THE EUT 78

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20230128179401-6	Original Issue	2023-02-22

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1. TEST RESULT SUMMARY

Technical Requirements		
FCC 47 CFR Part 15 Subpart C 15.247 ANSI C63.10-2013 KDB 558074 D01 15.247 measurement guidance v05r02		
Limit / Severity	Item	Result
§15.203	Antenna Requirement	Pass
§15.207(a)	Conducted Emission	N/A ¹⁾
§15.247(d)&15.205& 15.209	Radiated Spurious Emission	Pass
§15.247(b)(3)	Maximum Peak Output Power	Pass
§15.247(e)	Power Spectral Density	Pass
§15.247(a)(2)	6dB bandwidth	Pass
§15.247(d)	Conducted band edges and Spurious Emission	Pass
§15.247(d)&15.205& 15.209	Restricted bands of operation	Pass

Note:

¹⁾Test is not applicable to this Equipment. This EUT is no AC mains power ports.

2)The antenna is PIFA antenna. The max gain of antenna is1dBi.which accordance 15.203.is considered sufficient to comply with the provisions of this section.

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2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name: Lumi United Technology Co., Ltd

Address: B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.2 MANUFACTURER

Name: Lumi United Technology Co., Ltd

Address: B1, Chongwen Park, Nanshan iPark, Liuxian Avenue, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Door and Window Sensor P2

Model No.: DW-S02E

Adding Model: DW-S02D

Models Difference: DW-S02E&DW-S02D are the same on the board, schematic, hardware version, software version, structure and internal photos are same, only the model name is different.

Trade Name: Aqara

FCC ID: 2AKIT-DW-S02

Power supply: DC 3V power supplied by battery
Model:CR123A

Battery Specification: Nominal Voltage:3.0Vdc
Rated Capacity: 1400mAh

Frequency Band: 2402MHz-2480MHz

Transmit Power: GFSK for 1Mbps:8.35dBm
GFSK for 2Mbps:8.35dBm

Modulation type: GFSK for 1Mbps
GFSK for 2Mbps

Channel space: 2MHz

Antenna Specification: PIFA antenna with 1dBi gain (Max.)

Temperature Range: -10°C ~ 50°C

Hardware Version: X0

Software Version: 0.0.0.1

Sample No: E20230128179401-0005,E20230128179401-0008

Note: All the tests were performed on the model DW-S02E.

2.4 CHANNELLIST

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

* is the test frequency

2.5 TEST OPERATION MODE

Mode No.	Description of the modes
1	Bluetooth (BLE) fixed frequency transmitting

2.6 LOCAL SUPPORTIVE

Name of equipment	Manufacturer	Model	Serial number	Note
Notebook	LENOVO	TianYi 310-14ISK	MP18DLC6	/
Test board	/	/	/	/

No.	Cable Type	Qty.	Shielded Type	Ferrite Core(Qty.)	Length
1	DC cable	1	No	0	0.3m
2	DC cable	1	No	0	1.0m

2.7 CONFIGURATION OF SYSTEM UNDER TEST



Test software:

Software version	Test level
QCOM_V1.0	2402MHz: 8 2440MHz: 8 2480MHz: 8

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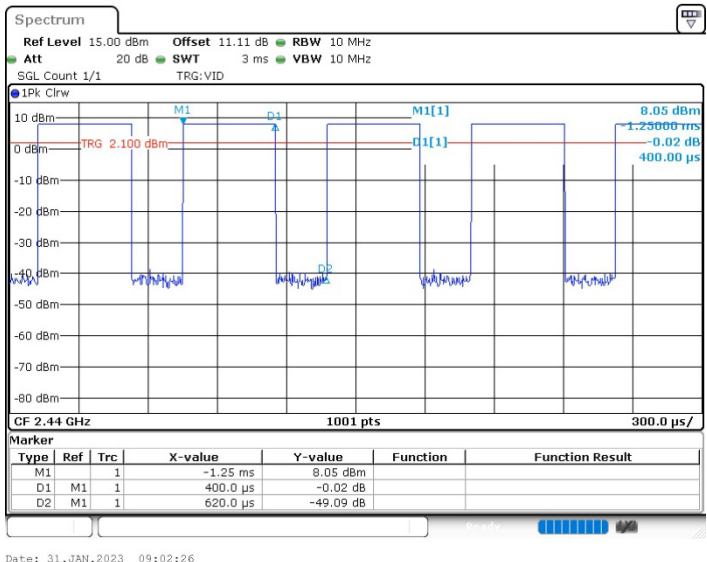
2.8 DUTY CYCLE

Environment: 23.8°C/47%RH/101.0kPa
Tested By: Yang Zhaoyun

Voltage: DC 3V
Date: 2023-01-31

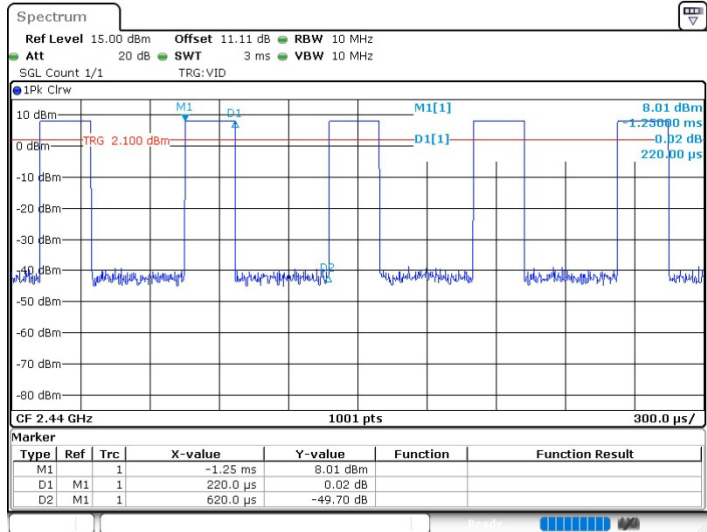
Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	DC [%]	T [s]
BLE_1M	Ant1	2440	0.40	0.62	64.52	0.00062
BLE_2M	Ant1	2440	0.22	0.62	35.48	0.00062

BLE_1M_2440MHz



Date: 31.JAN.2023 09:02:26

BLE_2M_2440MHz



Date: 31.JAN.2023 09:11:16

3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People's Republic of China
P.C.: 518110
Tel : 0755-61180008
Fax: 0755-61180008

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA A2LA(Certificate #2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada ISED (Company Number: 24897, CAB identifier:CN0069)

USA FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.grgtest.com>

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4. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	9kHz~30MHz	5.1dB ¹⁾
		30MHz~200MHz	4.5dB ¹⁾
		200MHz~1000MHz	4.4dB ¹⁾
		1GHz~18GHz	5.6dB ¹⁾
		18GHz~26.5GHz	3.7dB ¹⁾
	Vertical	9kHz~30MHz	5.1dB ¹⁾
		30MHz~200MHz	4.4dB ¹⁾
		200MHz~1000MHz	4.5dB ¹⁾
		1GHz~18GHz	5.6dB ¹⁾
		18GHz~26.5GHz	3.7dB ¹⁾
Conduction Emission		150kHz~30MHz	3.4dB ¹⁾

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
RF power conducted	0.8dB
Power spectral density conducted	0.8dB
Occupied channel bandwidth	0.4dB
Unwanted emission, conducted	0.7dB
Humidity	6%
Temperature	2°C

Note:

¹⁾ This uncertainty represents an expanded uncertainty expressed at approximately the 95%.
This uncertainty represents an expanded uncertainty factor of $k=2$.

5. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Radiated Spurious Emission&Restricted bands of operation				
Test S/W	EZ	CCS-03A1		
Test Receiver	R&S	ESR7	102444	2023-09-02
Preamplifier	EMEC	EM330	I00426	2023-03-05
Bi-log Antenna	Schwarzbeck	CBL6143A	26039	2024-10-23
Loop Antenna	TESEQ	HLA6121	52599	2023-04-02
Spectrum Analyzer	KEYSIGHT	N9010A	MY52221469	2023-06-29
Horn Antenna	Schwarzbeck	BBHA9120D	02143	2023-10-15
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170-497	2023-10-14
Amplifier	Tonscend	TAP01018048	AP20E8060075	2023-05-05
Amplifier	Tonscend	TAP184050	AP20E806071	2023-05-05
Amplifier	SHIRONG ELECTRONIC	DLNA-1G18G-G40	20200928005	2023-05-08
Test S/W	Tonscend	JS36-RE/2.5.1.5		
6dB Bandwidth&Conducted band edges and Spurious Emission&Power Spectral Density				
Spectrum Analyzer	R&S	FSV30	1321.3008K30-104381-rH	2023-11-17
BT/WIFI System	Tonscend	JS0806		
Maximum Peak Output Power				
Pulse power sensor	Anritsu	MA2411B	1126150	2023-03-01
Power meter	Anritsu	ML2495A	1204003	2023-02-28
Pulse power sensor	Anritsu	MA2411B	1126150	2024-02-12
Power meter	Anritsu	ML2495A	1204003	2024-02-12

Note: The calibration cycle of the above instruments is 12 months except for the Bi-log Antenna which is 24 months.

6. RADIATED SPURIOUS EMISSIONS

6.1 LIMITS

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required.

Frequency (MHz)	Quasi-peak($\mu\text{V/m}$)	Measurement distance(m)	Quasi-peak(dB $\mu\text{V/m}$)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE:

- (1) The emission limits for the ranges 9-90kHz and 110-490kHz are based on measurements employing a linear average detector.
- (2) The lower limit shall apply at the transition frequencies.
- (3) Above 18GHz test distance is 1m, so the Peak Limit=74+20*log(3/1)=83.54 (dB $\mu\text{V/m}$).
The Avg Limit=54+20*log(3/1)=63.54 (dB $\mu\text{V/m}$).

6.2 TEST PROCEDURES

1) Sequence of testing 9kHz to 30MHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate fixed frequency transmitting conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3meter.
- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0° to 360°.
- The antenna height is 1.0 meter.
- The antenna is polarized X,Y and Z.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- Identified emissions during the pre measurement the software maximizes by rotating the turntable

position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30MHz to 1GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate fixed frequency transmitting conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0° to 360°.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 4 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of pre measurement the software maximize the peaks by changing turntable rotates from 0° to 360° and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1GHz to 18GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate fixed frequency transmitting conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0° to 360°.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 4 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of pre measurement the software maximize the peaks by changing turntable rotates from 0° to 360° and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18GHz**Setup:**

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables were positioned to simulate fixed frequency transmitting conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

Pre measurement:

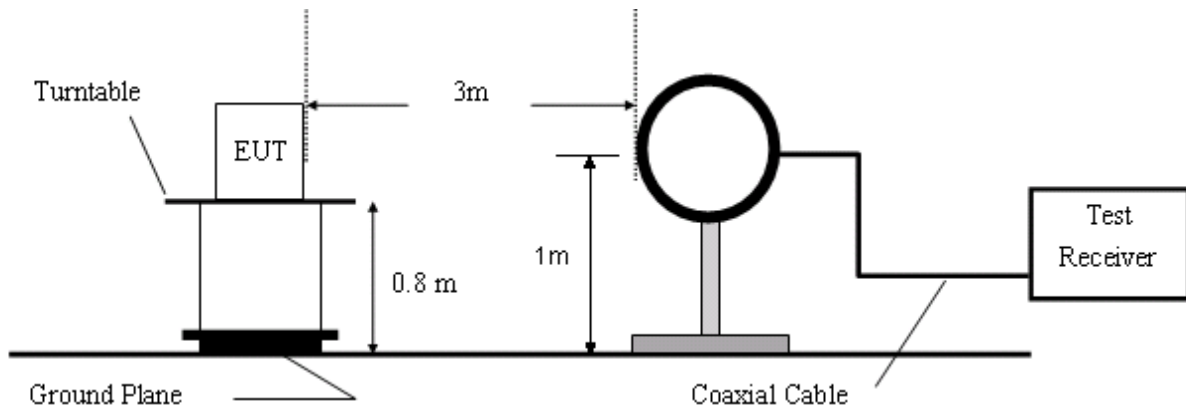
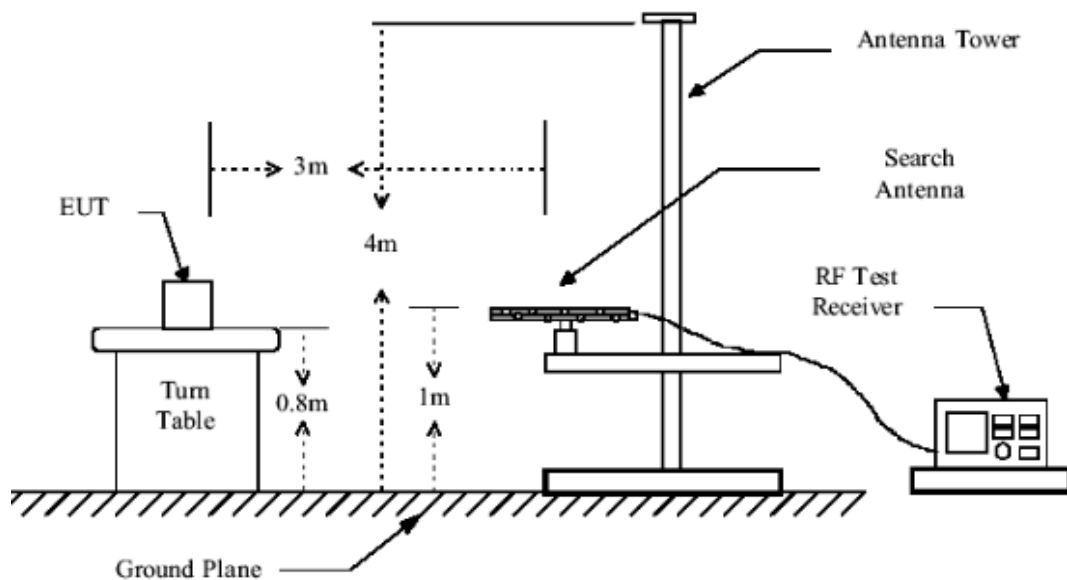
- The turntable rotates from 0° to 360°.
- The antenna is polarized vertical and horizontal.
- The antenna height scan range is 1 meter to 4 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

- The final measurement will be performed with minimum the six highest peaks.
- According to the maximum antenna and turntable positions of pre measurement the software maximize the peaks by changing turntable rotates from 0° to 360° and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.
- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

NOTE:

- (a).The frequency from 9kHz to 150kHz, Set RBW=300Hz(for Peak&AVG), VBW=300Hz(for Peak&AVG). The frequency from 150kHz to 30MHz, Set RBW=9kHz, VBW=9kHz, (for QP Detector).
- (b).The frequency from 30MHz to 1GHz, Set RBW=120kHz, VBW=300kHz, (for QP Detector).
- (c).The frequency above 1GHz, for Peak detector: Set RBW=1MHz,VBW=3MHz.
- (d). The frequency above 1GHz, for Avg detector: Set RBW=1MHz,if the EUT is configured to transmit with duty cycle $\geq 98\%$, set $VBW \leq RBW/100$ (i.e.,10kHz) but not less than 10 Hz. If the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$, Where T is defined in section 2.8.

6.3 TEST SETUP**Figure 1. 9kHz to 30MHz radiated emissions test configuration****Figure 2. 30MHz to 1GHz radiated emissions test configuration**

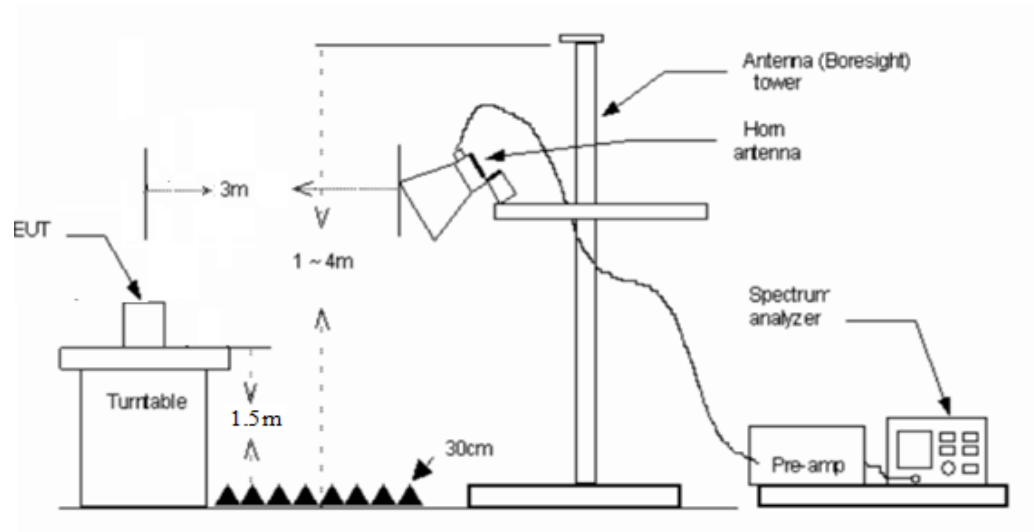


Figure 3. 1GHz to 18GHz radiated emissions test configuration

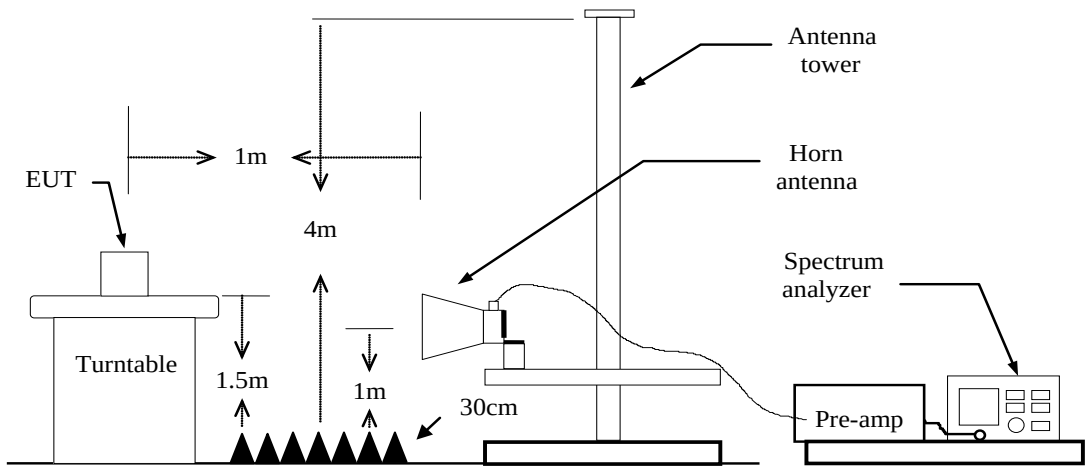


Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

6.4 DATA SAMPLE**30MHz to 1GHz**

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	37.06	-15.48	21.58	40.00	-18.42	QP	Vertical

1GHz to 18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	65.45	-11.12	54.33	74.00	-19.67	Peak	Vertical
xxx	xxx	63.00	-11.12	51.88	54.00	-2.12	AVG	Vertical

Above 18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	68.86	57.66	-11.20	83.54	25.88	peak	Vertical
xxx	xxx	68.89	-11.20	57.69	63.54	5.85	AVG	Vertical

Frequency (MHz) = Emission frequency in MHz

Ant.Pol. (H/V) = Antenna polarization

Reading (dBuV) = Uncorrected Analyzer / Receiver reading

Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain

Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

Limit (dBuV/m) = Limit stated in standard

Margin (dB) = Remark Result (dBuV/m) – Limit (dBuV/m)

Peak = Peak Reading

QP = Quasi-peak Reading

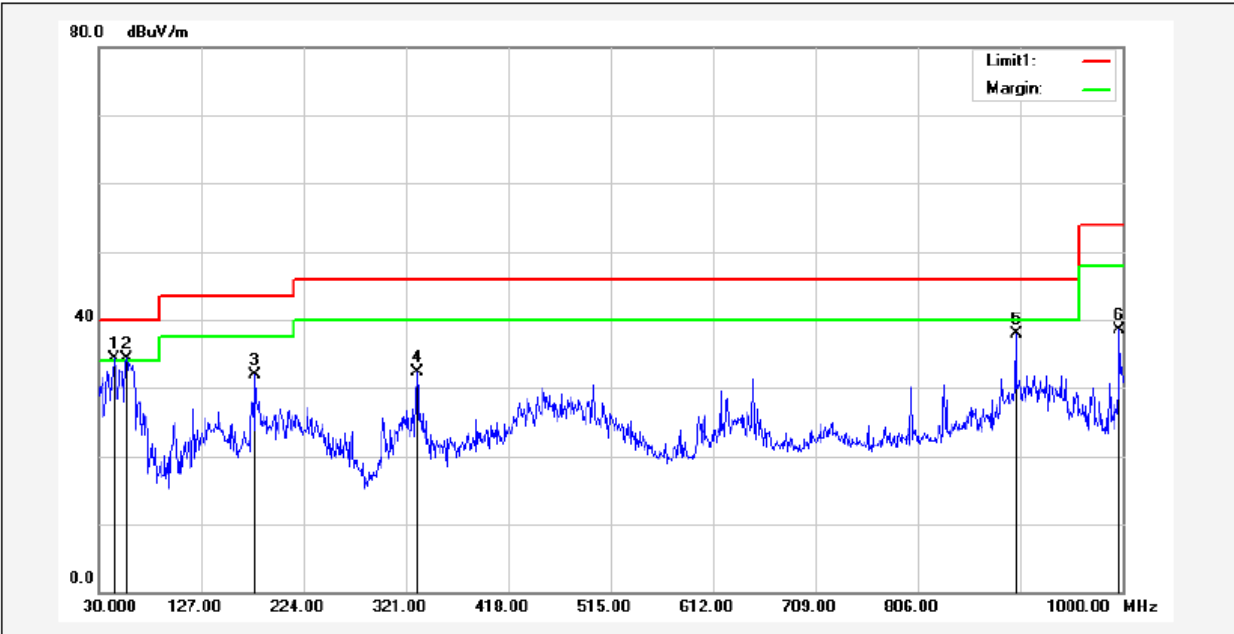
AVG = Average Reading

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6.5 TEST RESULTS

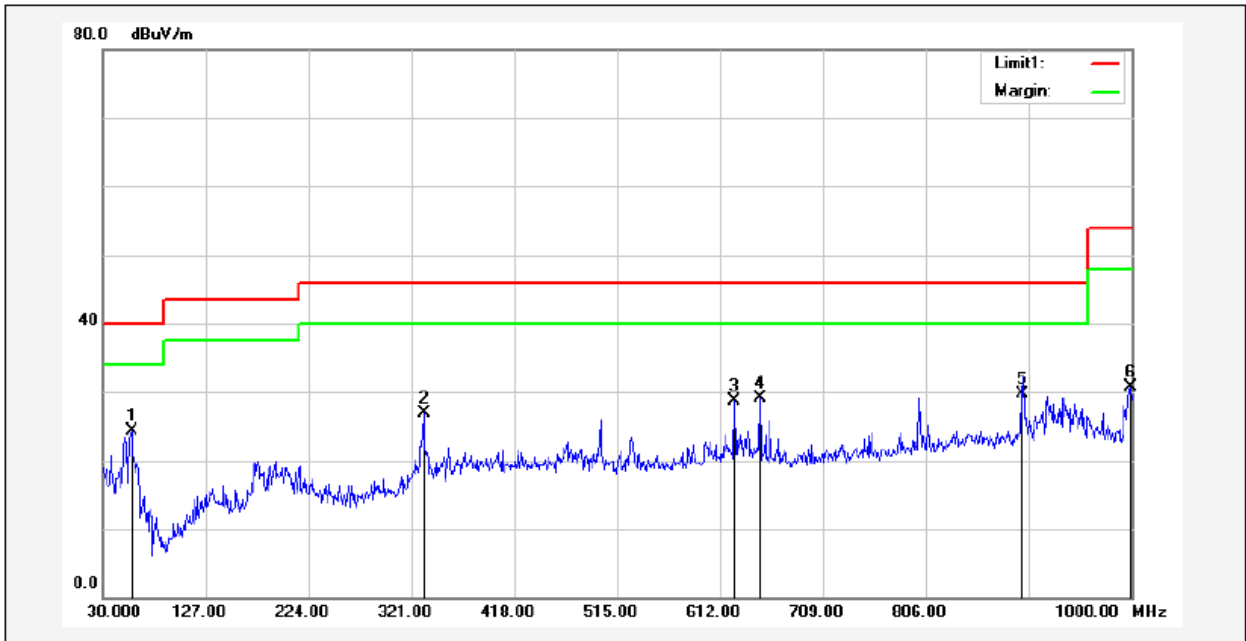
Below 1GHz

EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2402MHz(TX/ BLE_1M)	Polarity:	Vertical



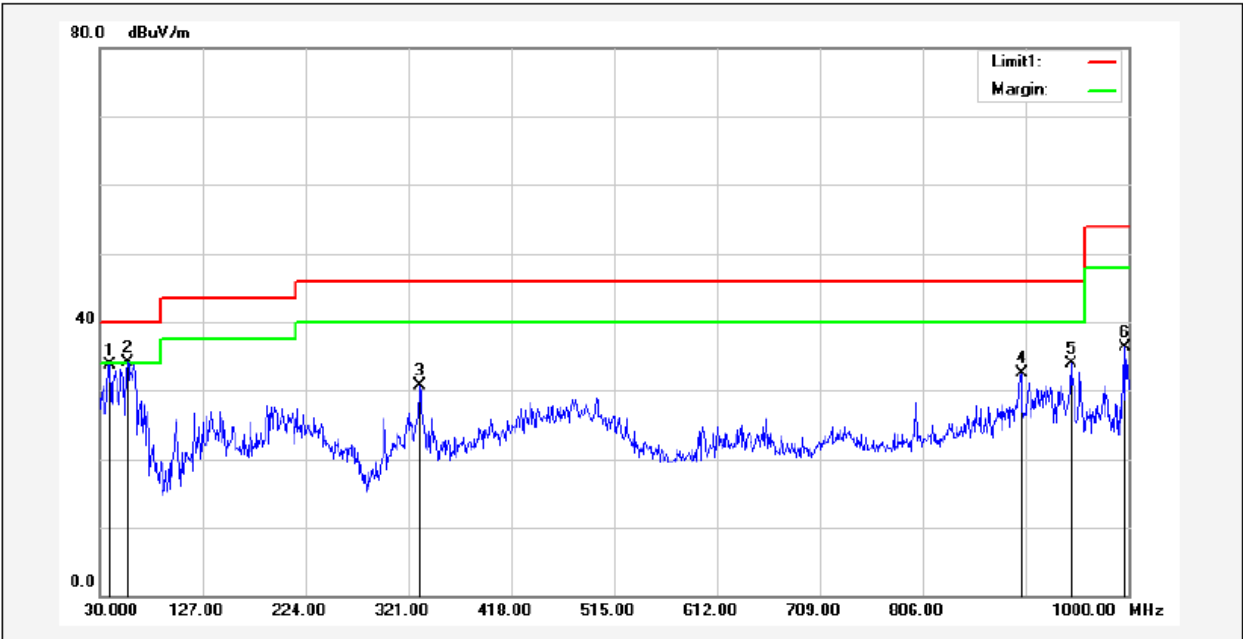
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1!	44.5500	57.81	-23.58	34.23	40.00	-5.77	175	100	QP
2*	56.1900	62.21	-27.89	34.32	40.00	-5.68	167	100	QP
3	178.4100	59.49	-27.54	31.95	43.50	-11.55	0	105	QP
4	331.6700	55.23	-22.88	32.35	46.00	-13.65	43	100	QP
5	899.1200	50.99	-13.11	37.88	46.00	-8.12	351	100	QP
6	997.0900	50.57	-12.05	38.52	54.00	-15.48	122	100	QP

EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2402MHz(TX/ BLE_1M)	Polarity:	Horizontal



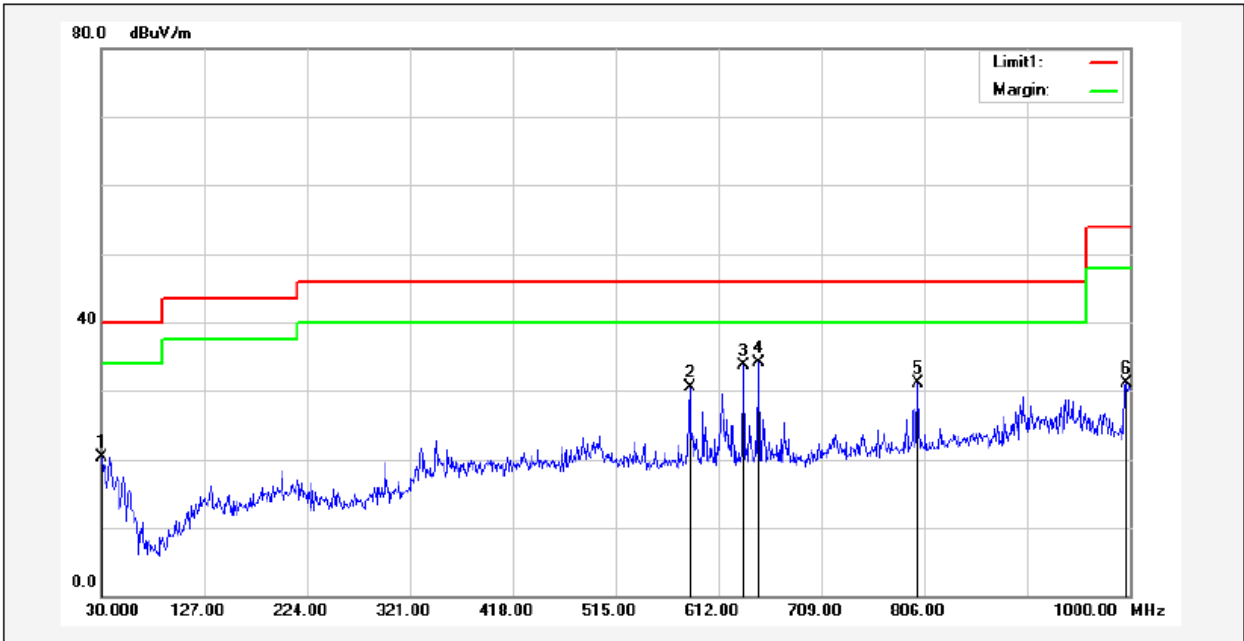
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1*	57.1600	52.53	-28.18	24.35	40.00	-15.65	160	300	QP
2	332.6400	49.83	-22.87	26.96	46.00	-19.04	360	301	QP
3	625.5800	44.88	-16.11	28.77	46.00	-17.23	358	200	QP
4	649.8300	45.17	-15.98	29.19	46.00	-16.81	295	100	QP
5	897.1800	42.76	-13.14	29.62	46.00	-16.38	43	300	QP
6	999.0300	42.78	-12.02	30.76	54.00	-23.24	68	100	QP

EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2440MHz(TX/ BLE_1M)	Polarity:	Vertical



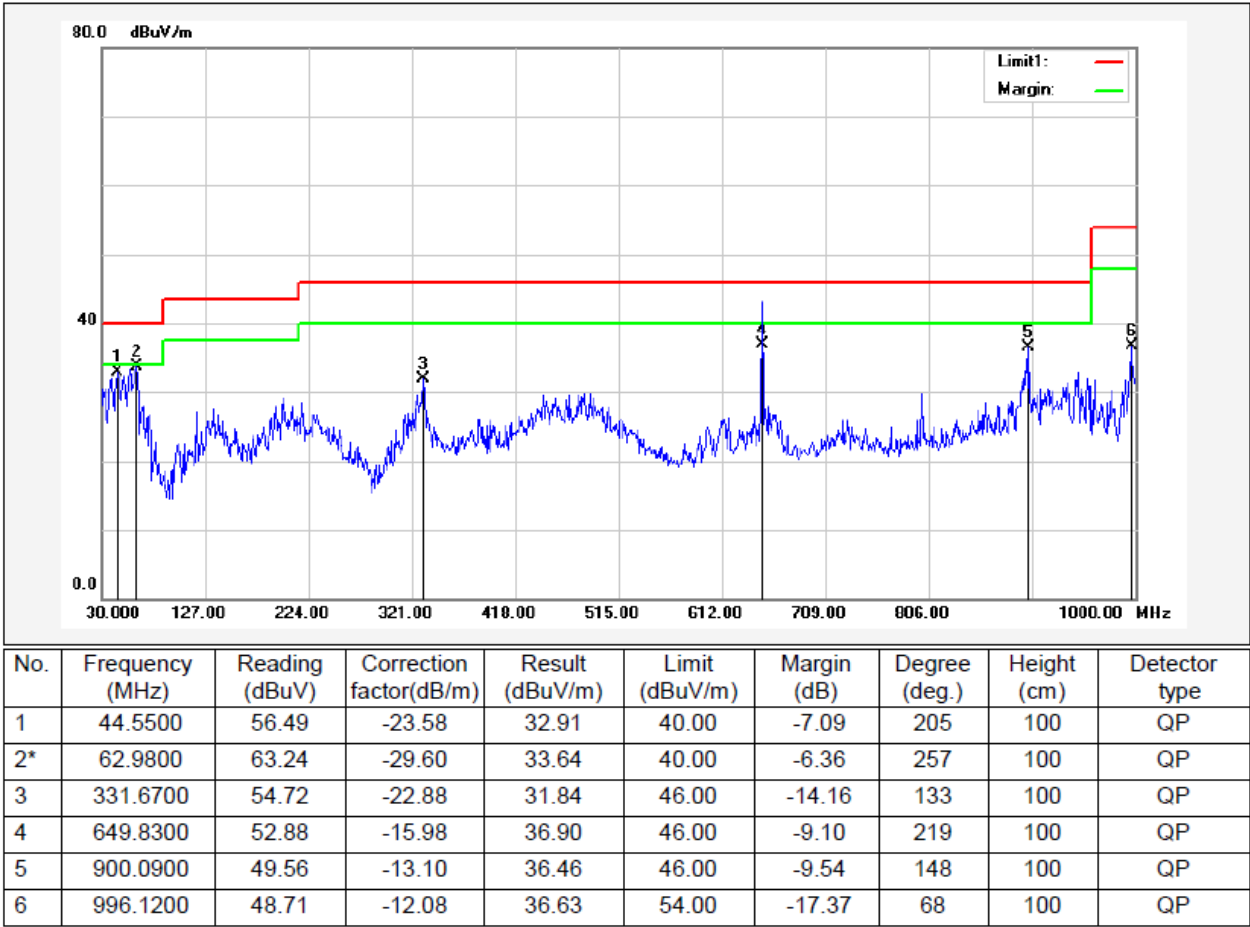
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	39.7000	55.02	-21.35	33.67	40.00	-6.33	39	100	QP
2*	56.1900	62.04	-27.89	34.15	40.00	-5.85	1	100	QP
3	331.6700	53.58	-22.88	30.70	46.00	-15.30	154	100	QP
4	899.1200	45.54	-13.11	32.43	46.00	-13.57	331	100	QP
5	945.6800	46.74	-12.83	33.91	46.00	-12.09	130	100	QP
6	996.1200	48.33	-12.08	36.25	54.00	-17.75	104	100	QP

EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2440MHz(TX/ BLE_1M)	Polarity:	Horizontal

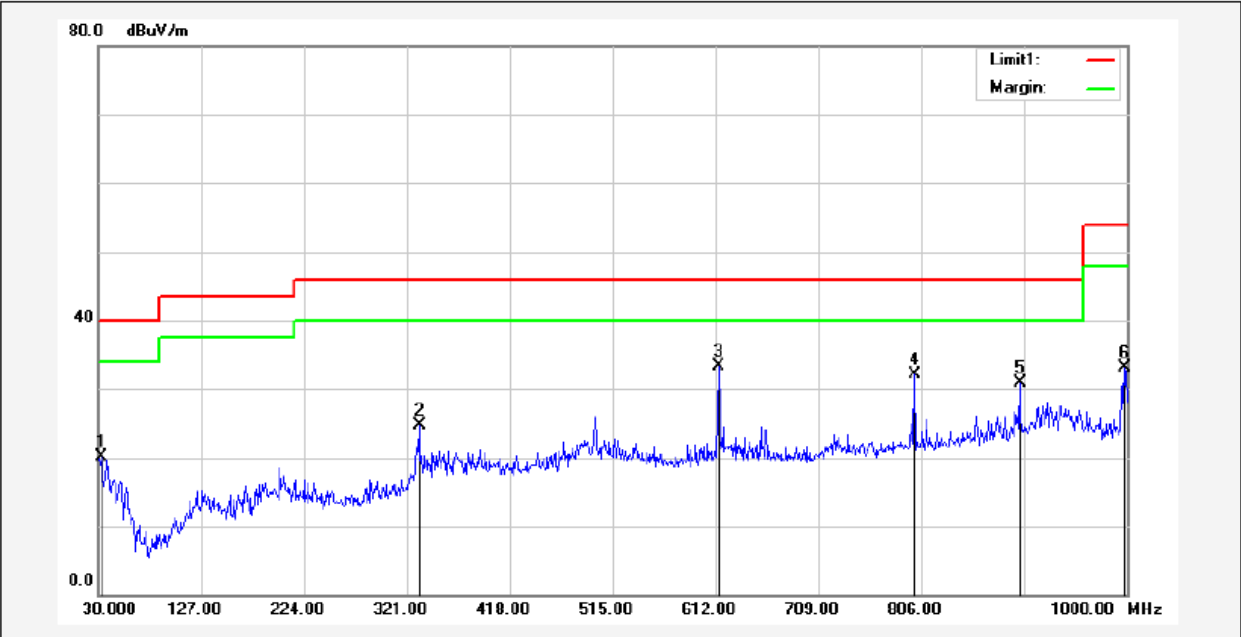


No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	30.9700	37.43	-17.11	20.32	40.00	-19.68	139	100	QP
2	584.8400	46.89	-16.36	30.53	46.00	-15.47	65	300	QP
3	636.2500	49.73	-16.05	33.68	46.00	-12.32	38	300	QP
4*	649.8300	49.99	-15.98	34.01	46.00	-11.99	117	300	QP
5	800.1800	45.04	-13.92	31.12	46.00	-14.88	79	100	QP
6	996.1200	43.26	-12.08	31.18	54.00	-22.82	116	100	QP

EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2480MHz(TX/ BLE_1M)	Polarity:	Vertical

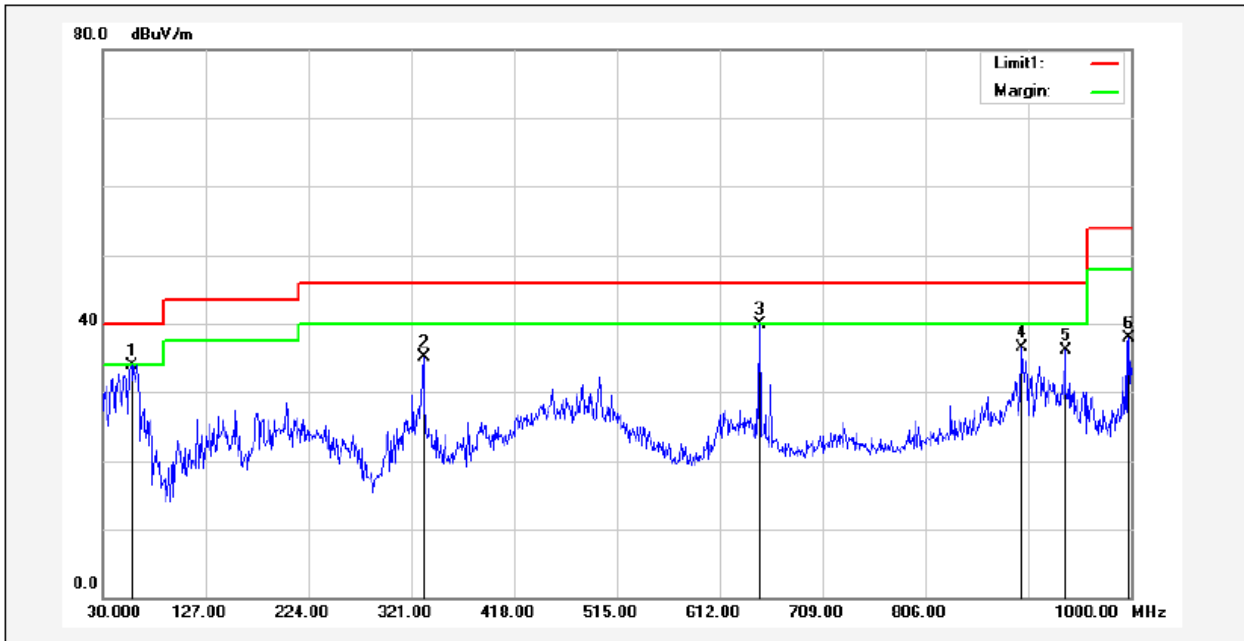


EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2480MHz(TX/ BLE_1M)	Polarity:	Horizontal



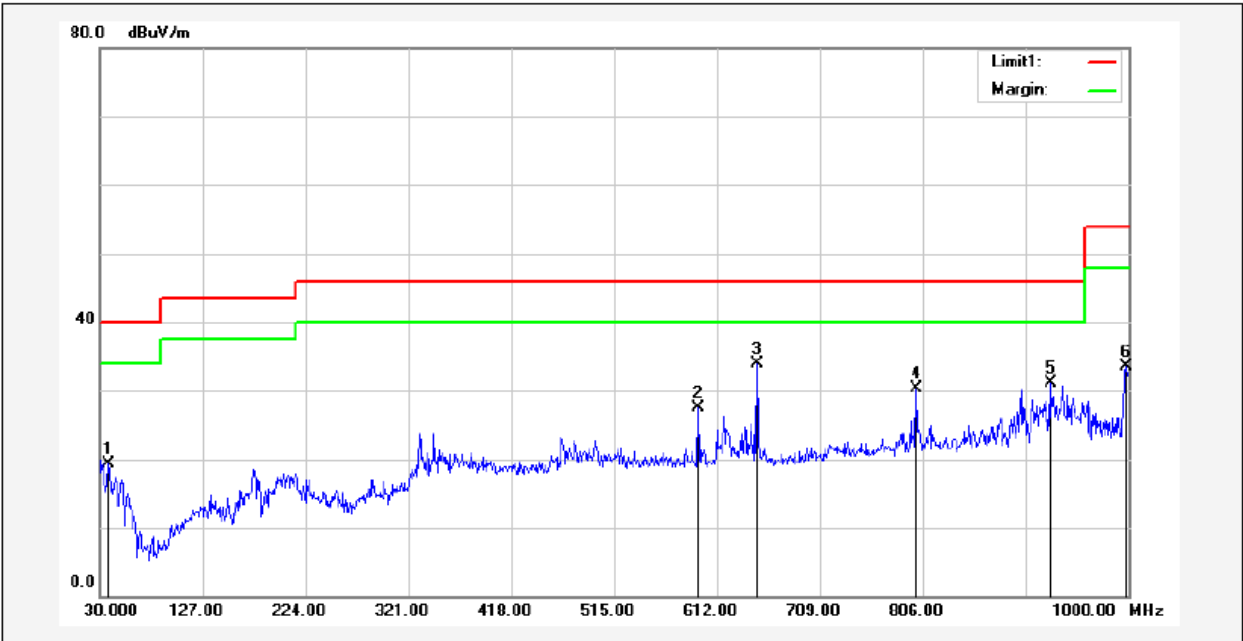
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	32.9100	38.15	-18.06	20.09	40.00	-19.91	115	100	QP
2	332.6400	47.58	-22.87	24.71	46.00	-21.29	187	200	QP
3*	614.9100	49.53	-16.17	33.36	46.00	-12.64	168	100	QP
4	800.1800	46.00	-13.92	32.08	46.00	-13.92	64	200	QP
5	899.1200	44.05	-13.11	30.94	46.00	-15.06	99	300	QP
6	998.0600	45.07	-12.04	33.03	54.00	-20.97	102	200	QP

EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2402MHz(TX/ BLE_2M)	Polarity:	Vertical



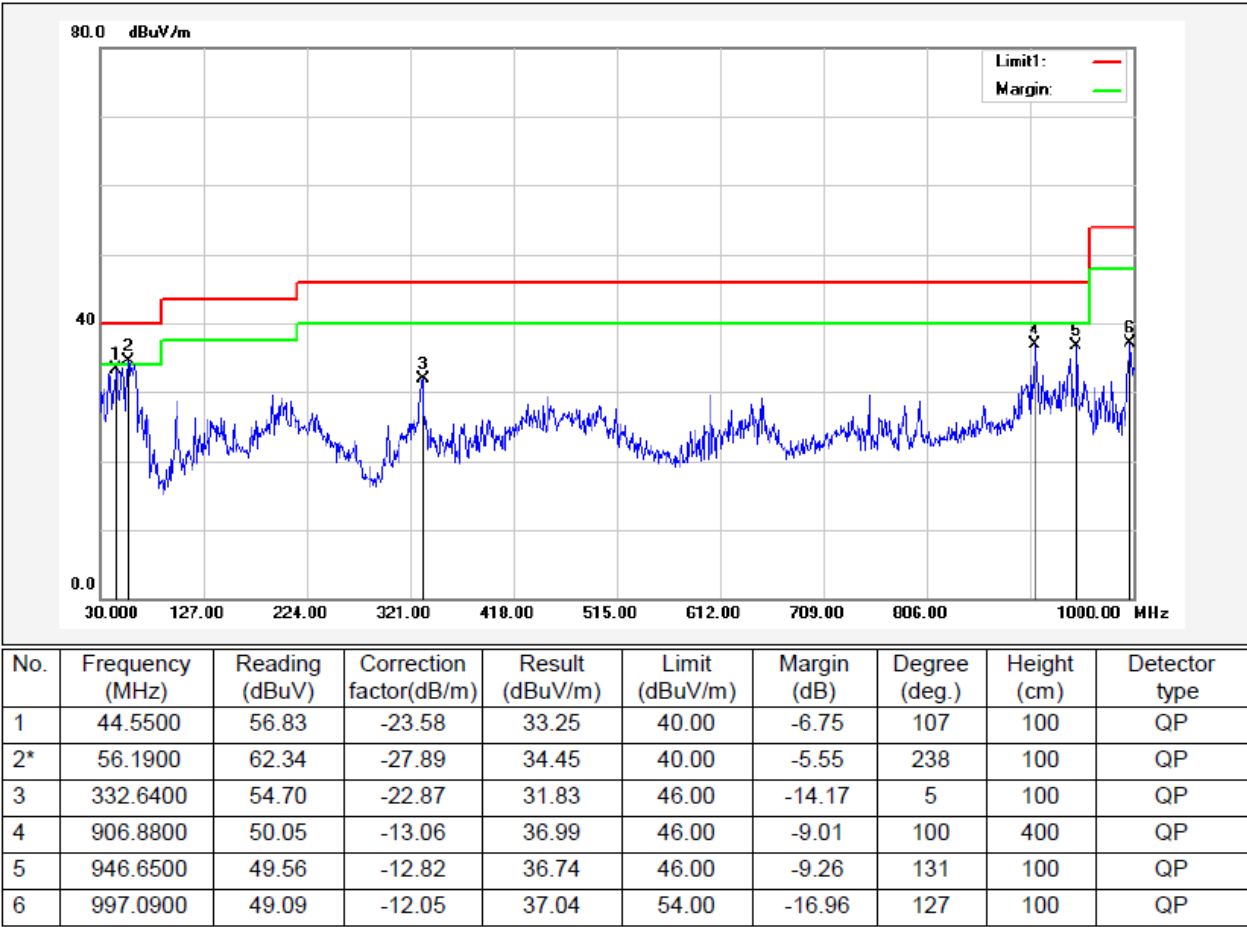
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1*	57.1600	62.15	-28.18	33.97	40.00	-6.03	360	100	QP
2	332.6400	58.06	-22.87	35.19	46.00	-10.81	45	100	QP
3	649.8300	55.88	-15.98	39.90	46.00	-6.10	241	100	QP
4	897.1800	49.59	-13.14	36.45	46.00	-9.55	24	100	QP
5	937.9200	48.88	-12.87	36.01	46.00	-9.99	139	100	QP
6	998.0600	50.03	-12.04	37.99	54.00	-16.01	116	100	QP

EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2402MHz(TX/ BLE_2M)	Polarity:	Horizontal

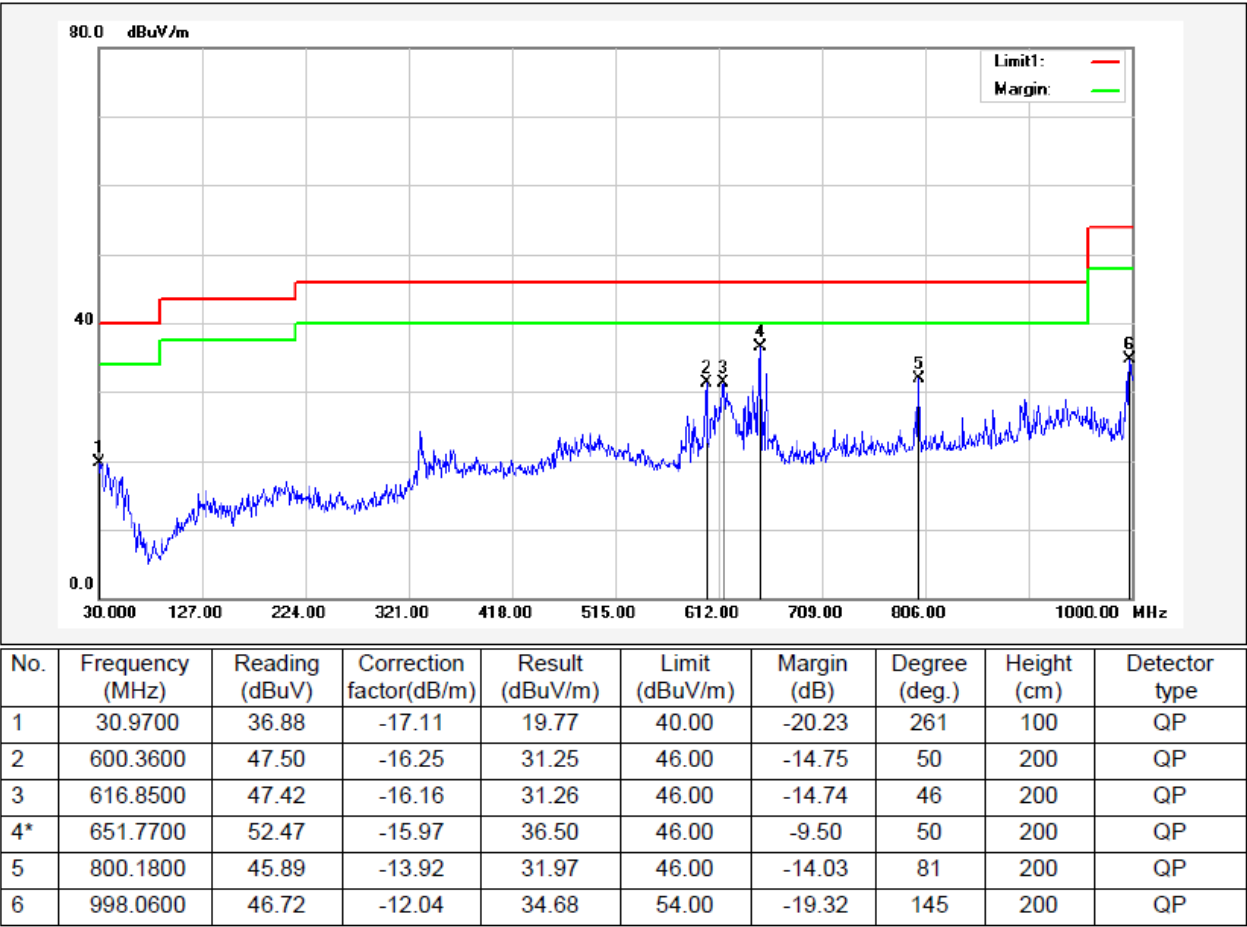


No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	38.7300	40.24	-20.88	19.36	40.00	-20.64	193	100	QP
2	594.5400	43.82	-16.29	27.53	46.00	-18.47	3	400	QP
3*	649.8300	49.88	-15.98	33.90	46.00	-12.10	0	263	QP
4	800.1800	44.24	-13.92	30.32	46.00	-15.68	0	299	QP
5	926.2800	44.05	-12.94	31.11	46.00	-14.89	93	100	QP
6	998.0600	45.57	-12.04	33.53	54.00	-20.47	137	200	QP

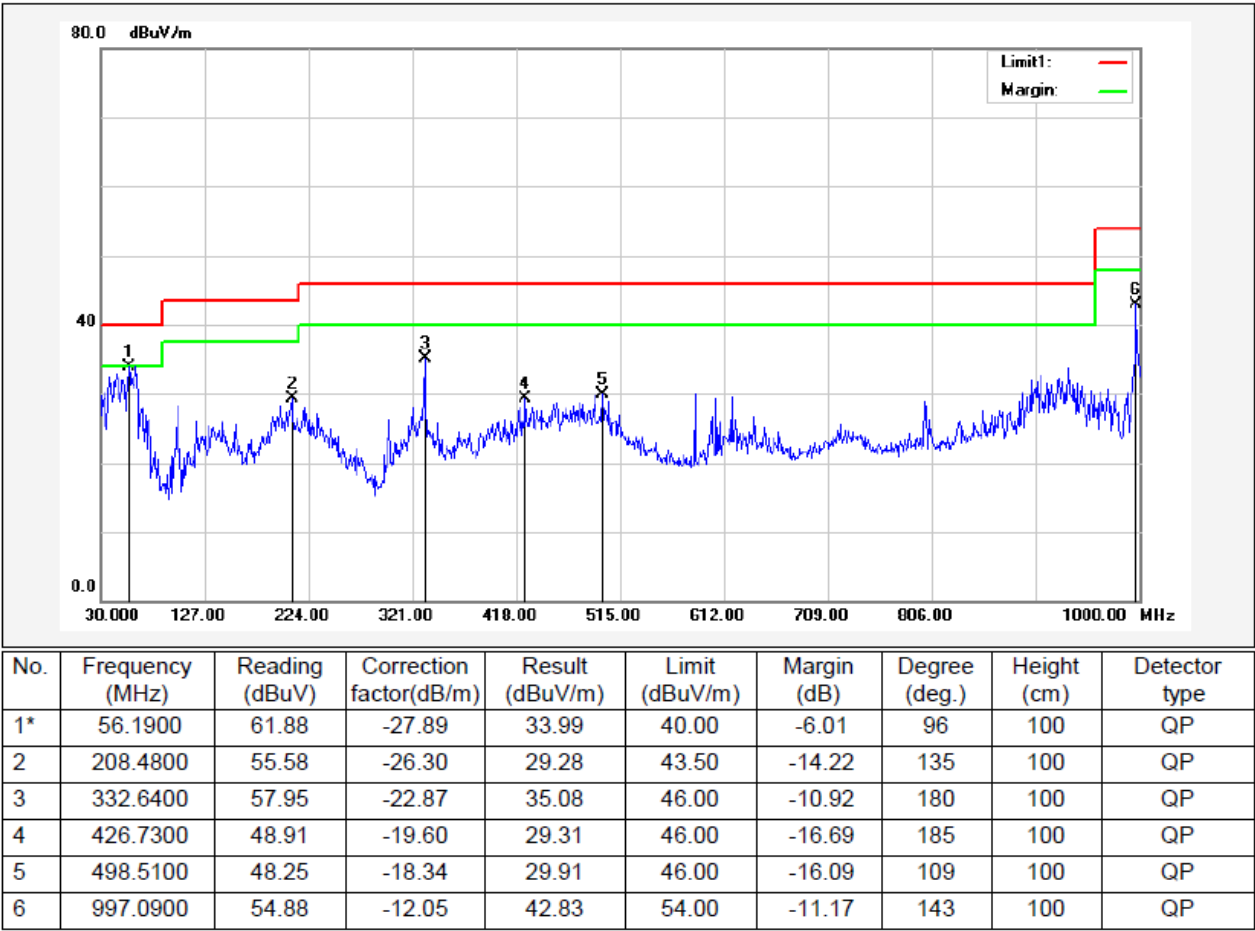
EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2440MHz(TX/ BLE_2M)	Polarity:	Vertical



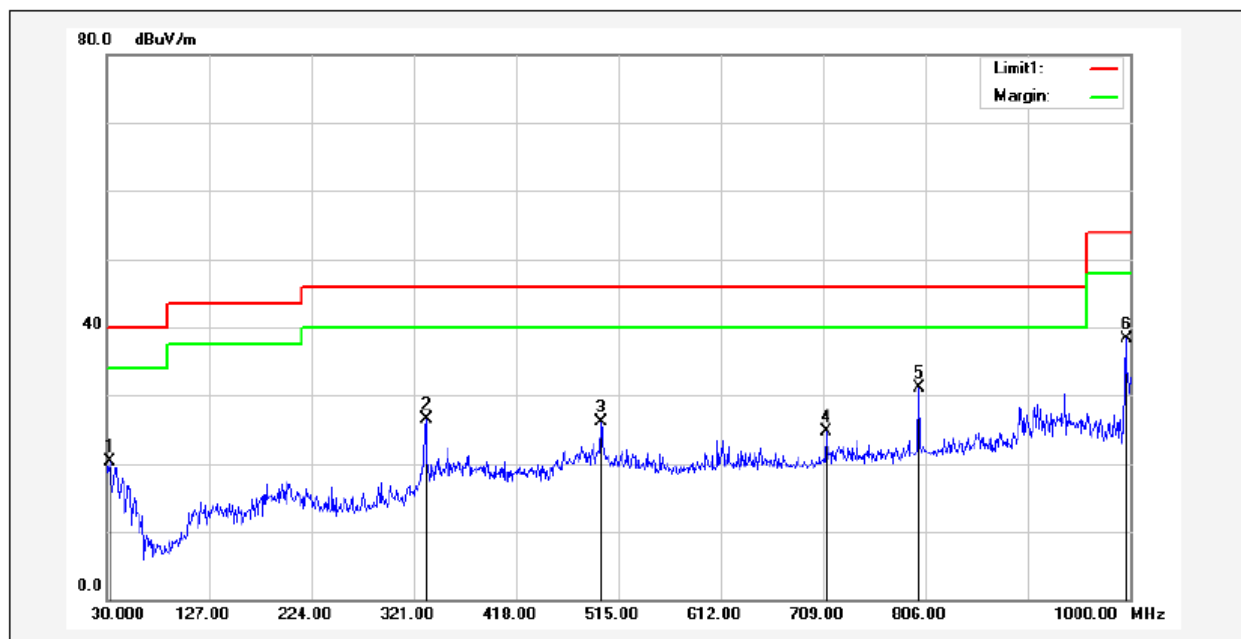
EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2440MHz(TX/ BLE_2M)	Polarity:	Horizontal



EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2480MHz(TX/ BLE_2M)	Polarity:	Vertical



EUT Name:	Door and Window Sensor P2	Test Mode:	Mode 1
Model:	DW-S02E	Sample No:	E20230128179401-0008
Power supply:	DC 3V	Environmental Conditions:	23.8°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-02-03
Channel	2480MHz(TX/ BLE_2M)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detector type
1	32.9100	38.28	-18.06	20.22	40.00	-19.78	85	100	QP
2	332.6400	49.44	-22.87	26.57	46.00	-19.43	210	200	QP
3	498.5100	44.35	-18.34	26.01	46.00	-19.99	139	100	QP
4	711.9100	40.13	-15.37	24.76	46.00	-21.24	36	300	QP
5*	800.1800	44.97	-13.92	31.05	46.00	-14.95	71	100	QP
6	996.1200	50.32	-12.08	38.24	54.00	-15.76	109	100	QP

Remark:

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 9kHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.

1GHz-18GHz:

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Mode: TX/ BLE_1M
Lowest Frequency (2402MHz)
Environment: 25.0°C/60%RH/101.0kPa
Tested By:Zhang Zishan

Voltage: DC 3V
Date: 2023-02-02

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1118.0148	69.01	43.69	-25.32	74.00	30.31	100	63	Horizontal
2	1749.3437	70.66	47.70	-22.96	74.00	26.30	100	34	Horizontal
3	2382.1728	68.85	48.75	-20.10	74.00	25.25	200	139	Horizontal
4	3495.0619	62.40	46.21	-16.19	74.00	27.79	100	26	Horizontal
5	5724.7156	56.98	47.19	-9.79	74.00	26.81	100	309	Horizontal
6	7204.2755	62.44	59.31	-3.13	74.00	14.69	200	240	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBµV/m]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.1489	-20.10	48.73	28.63	54.00	25.37	102	133.3	Horizontal
2	7206.1471	-3.13	52.83	49.70	54.00	4.30	200	257.9	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1120.015	69.06	46.14	-22.92	74.00	27.86	200	208	Vertical
2	1999.1249	67.80	47.30	-20.50	74.00	26.70	100	276	Vertical
3	2381.9227	71.48	52.63	-18.85	74.00	21.37	200	139	Vertical
4	4254.5318	60.18	45.88	-14.30	74.00	28.12	100	281	Vertical
5	6381.0476	58.57	51.45	-7.12	74.00	22.55	100	271	Vertical
6	7206.1508	56.61	54.35	-2.26	74.00	19.65	100	85	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBµV/m]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.2321	-18.85	47.62	28.77	54.00	25.23	173	148.9	Vertical
2	6381.6854	-7.12	51.88	44.76	54.00	9.24	100	248.1	Vertical
3	7206.655	-2.26	46.19	43.93	54.00	10.07	106	25	Vertical

Mode: TX/ BLE_1M
Middle Frequency (2440MHz)
Environment: 25.0°C/60%RH/101.0kPa
Tested By:Zhang Zishan

Voltage: DC 3V
Date: 2023-02-02

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1121.0151	68.95	43.66	-25.29	74.00	30.34	100	65	Horizontal
2	2212.4016	61.29	43.22	-18.07	74.00	30.78	100	354	Horizontal
3	2942.4928	61.79	44.34	-17.45	74.00	29.66	100	123	Horizontal
4	3196.8996	62.22	46.51	-15.71	74.00	27.49	100	119	Horizontal
5	4878.9849	58.62	46.98	-11.64	74.00	27.02	200	78	Horizontal
6	7318.6648	62.69	59.67	-3.02	74.00	14.33	200	235	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	7320.0535	-3.02	52.32	49.30	54.00	4.70	200	233.5	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1118.7648	68.77	45.89	-22.88	74.00	28.11	200	202	Vertical
2	1667.5834	65.66	43.34	-22.32	74.00	30.66	100	34	Vertical
3	2368.6711	63.75	45.01	-18.74	74.00	28.99	100	161	Vertical
4	2655.957	63.10	45.32	-17.78	74.00	28.68	200	182	Vertical
5	3195.0244	63.15	46.72	-16.43	74.00	27.28	100	101	Vertical
6	7318.6648	56.28	53.30	-2.98	74.00	20.70	100	62	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	7319.9805	-2.98	46.29	43.31	54.00	10.69	100	47.2	Vertical

Mode: TX/ BLE_1M
Highest Frequency (2480MHz)
Environment: 25.0°C/60%RH/101.0kPa
Tested By:Zhang Zishan

Voltage: DC 3V
Date: 2023-02-02

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1121.0151	70.15	44.86	-25.29	74.00	29.14	100	227	Horizontal
2	2199.3999	62.49	44.56	-17.93	74.00	29.44	200	200	Horizontal
3	2496.6871	68.52	49.81	-18.71	74.00	24.19	100	129	Horizontal
4	3472.5591	63.68	47.63	-16.05	74.00	26.37	100	84	Horizontal
5	4959.62	57.79	46.26	-11.53	74.00	27.74	200	221	Horizontal
6	7440.5551	61.25	58.22	-3.03	74.00	15.78	200	162	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2496.1447	-18.71	47.90	29.19	54.00	24.81	101	128.2	Horizontal
2	7440.1223	-3.03	52.20	49.17	54.00	4.83	199	190.5	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1118.7648	68.66	45.78	-22.88	74.00	28.22	100	207	Vertical
2	1994.8744	66.54	45.91	-20.63	74.00	28.09	100	188	Vertical
3	2496.187	68.94	49.38	-19.56	74.00	24.62	100	169	Vertical
4	4247.0309	62.73	48.35	-14.38	74.00	25.65	100	290	Vertical
5	6384.7981	57.99	50.87	-7.12	74.00	23.13	100	251	Vertical
6	7440.5551	54.01	51.13	-2.88	74.00	22.87	100	270	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2496.1151	-19.56	47.25	27.69	54.00	26.31	100	170.7	Vertical
2	4264.1787	-14.38	47.59	33.21	54.00	20.79	108	278.3	Vertical
3	6376.5741	-7.12	43.74	36.62	54.00	17.38	101	244.5	Vertical
4	7440.0123	-2.88	45.15	42.27	54.00	11.73	100	287.7	Vertical

Mode: TX/ BLE_2M
Lowest Frequency (2402MHz)
Environment: 25.0°C/60%RH/101.0kPa
Tested By:Zhang Zishan

Voltage: DC 3V
Date: 2023-02-02

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1117.7647	69.35	44.02	-25.33	74.00	29.98	100	60	Horizontal
2	1493.0616	63.84	41.10	-22.74	74.00	32.90	100	246	Horizontal
3	1998.1248	63.62	42.45	-21.17	74.00	31.55	100	158	Horizontal
4	2381.9227	70.09	49.99	-20.10	74.00	24.01	100	139	Horizontal
5	4803.9755	58.82	46.22	-12.60	74.00	27.78	200	75	Horizontal
6	7204.2755	61.93	58.80	-3.13	74.00	15.20	200	242	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.1371	-20.10	47.29	27.19	54.00	26.81	107	188.7	Horizontal
2	7204.8511	-3.13	46.92	43.79	54.00	10.21	200	241	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1119.0149	69.28	46.39	-22.89	74.00	27.61	200	216	Vertical
2	1673.5842	65.46	43.31	-22.15	74.00	30.69	200	146	Vertical
3	2378.1723	70.77	51.95	-18.82	74.00	22.05	100	188	Vertical
4	3195.0244	61.50	45.07	-16.43	74.00	28.93	100	103	Vertical
5	4937.1171	56.42	45.29	-11.13	74.00	28.71	100	261	Vertical
6	7206.1508	56.32	54.06	-2.26	74.00	19.94	200	16	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2382.2344	-18.82	46.70	27.88	54.00	26.12	114	187.6	Vertical
2	7204.855	-2.26	42.63	40.37	54.00	13.63	109	63.1	Vertical

Mode: TX/ BLE_2M
Middle Frequency (2440MHz)
Environment: 25.0°C/60%RH/101.0kPa
Tested By:Zhang Zishan

Voltage: DC 3V
Date: 2023-02-02

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1120.7651	68.44	43.15	-25.29	74.00	30.85	100	67	Horizontal
2	2234.1543	61.44	43.05	-18.39	74.00	30.95	100	126	Horizontal
3	2573.6967	62.42	44.04	-18.38	74.00	29.96	100	135	Horizontal
4	3193.1491	60.11	44.37	-15.74	74.00	29.63	100	123	Horizontal
5	4880.8601	59.25	47.67	-11.58	74.00	26.33	200	253	Horizontal
6	7318.6648	62.85	59.83	-3.02	74.00	14.17	200	244	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	7318.8115	-3.02	46.81	43.79	54.00	10.21	199	242.9	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1118.7648	68.61	45.73	-22.88	74.00	28.27	200	215	Vertical
2	2005.6257	63.70	43.32	-20.38	74.00	30.68	100	116	Vertical
3	2649.9562	65.10	47.25	-17.85	74.00	26.75	100	78	Vertical
4	3198.7748	61.09	44.70	-16.39	74.00	29.30	100	106	Vertical
5	6392.299	59.96	52.84	-7.12	74.00	21.16	100	250	Vertical
6	7318.6648	56.29	53.31	-2.98	74.00	20.69	200	34	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	6400.4725	-7.12	45.08	37.96	54.00	16.04	134	241.7	Vertical
2	7318.9575	-2.98	42.07	39.09	54.00	14.91	111	63	Vertical

Mode: TX/ BLE_2M
Highest Frequency (2480MHz)
Environment: 25.0°C/60%RH/101.0kPa
Tested By:Zhang Zishan

Voltage: DC 3V
Date: 2023-02-02

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1120.7651	68.93	43.64	-25.29	74.00	30.36	100	65	Horizontal
2	2211.1514	62.30	44.24	-18.06	74.00	29.76	100	291	Horizontal
3	2504.4381	62.03	43.40	-18.63	74.00	30.60	200	133	Horizontal
4	2829.7287	60.66	43.89	-16.77	74.00	30.11	100	114	Horizontal
5	4918.3648	59.54	48.35	-11.19	74.00	25.65	200	71	Horizontal
6	7378.6723	62.19	59.31	-2.88	74.00	14.69	200	247	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBµV/m]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4920.871	-11.19	47.74	36.55	54.00	17.45	194	79	Horizontal
2	7379.1149	-2.88	46.78	43.90	54.00	10.10	198	226.7	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1119.765	68.72	45.81	-22.91	74.00	28.19	200	200	Vertical
2	2496.187	67.59	48.03	-19.56	74.00	25.97	100	181	Vertical
3	3185.6482	63.40	46.86	-16.54	74.00	27.14	100	98	Vertical
4	4269.5337	62.19	48.14	-14.05	74.00	25.86	100	148	Vertical
5	6366.0458	62.06	54.95	-7.11	74.00	19.05	100	247	Vertical
6	7380.5476	56.30	52.99	-3.31	74.00	21.01	200	72	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBµV/m]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	2495.9871	-19.56	47.18	27.62	54.00	26.38	100	186.8	Vertical
2	4255.586	-14.05	50.27	36.22	54.00	17.78	100	303.4	Vertical
3	6376.4756	-7.11	50.85	43.74	54.00	10.26	100	249.1	Vertical
4	7379.0729	-3.31	42.40	39.09	54.00	14.91	110	64.4	Vertical

- Remark:**
- 1 Measuring frequencies from 1GHz to the 10th harmonic of highest fundamental frequency.
 - 2 Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
 - 3 Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
 - 4 Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

18GHz to 26.5GHz

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Mode: TX/ BLE_1M
Lowest Frequency (2402MHz)
Environment: 24.5°C/59%RH/101.0kPa
Tested By: Zhang Zishan

Voltage: DC 3V
Date: 2023-02-04

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18790.075	53.12	41.19	-11.93	83.54	42.35	100	255	Horizontal
2	20371.075	51.34	40.69	-10.65	83.54	42.85	100	63	Horizontal
3	21299.7	50.69	40.71	-9.98	83.54	42.83	100	143	Horizontal
4	23408.975	49.59	40.88	-8.71	83.54	42.66	100	285	Horizontal
5	25118.75	47.80	40.63	-7.17	83.54	42.91	100	350	Horizontal
6	26337.65	46.85	39.58	-7.27	83.54	43.96	100	239	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18812.175	53.04	41.12	-11.92	83.54	42.42	100	107	Vertical
2	19835.15	52.98	41.92	-11.06	83.54	41.62	100	170	Vertical
3	21222.35	50.60	40.66	-9.94	83.54	42.88	100	29	Vertical
4	22884.95	49.20	40.51	-8.69	83.54	43.03	100	296	Vertical
5	25305.75	46.81	39.70	-7.11	83.54	43.84	100	233	Vertical
6	26366.975	46.97	39.90	-7.07	83.54	43.64	100	233	Vertical

----- The following blanks -----

Mode: TX/ BLE_1M
Middle Frequency (2440MHz)
Environment: 24.5°C/59%RH/101.0kPa
Tested By: Zhang Zishan

Voltage: DC 3V
Date: 2023-02-04

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18130.05	52.50	40.04	-12.46	83.54	43.50	100	128	Horizontal
2	18970.7	53.45	41.64	-11.81	83.54	41.90	100	160	Horizontal
3	20165.8	52.63	41.73	-10.90	83.54	41.81	100	143	Horizontal
4	21284.4	50.67	40.68	-9.99	83.54	42.86	100	208	Horizontal
5	24065.175	49.09	40.70	-8.39	83.54	42.84	100	128	Horizontal
6	26284.1	47.19	39.80	-7.39	83.54	43.74	100	32	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18441.15	53.51	41.32	-12.19	83.54	42.22	100	329	Vertical
2	20496.875	51.54	41.15	-10.39	83.54	42.39	100	299	Vertical
3	22539.425	49.07	39.96	-9.11	83.54	43.58	100	46	Vertical
4	24834.85	48.93	41.57	-7.36	83.54	41.97	100	237	Vertical
5	25813.625	47.43	39.67	-7.76	83.54	43.87	100	329	Vertical
6	26396.3	46.59	39.59	-7.00	83.54	43.95	100	251	Vertical

----- The following blanks -----

Mode: TX/ BLE_1M
Highest Frequency (2480MHz)
Environment: 24.5°C/59%RH/101.0kPa
Tested By: Zhang Zishan

Voltage: DC 3V
Date: 2023-02-04

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18599.675	53.43	41.32	-12.11	83.54	42.22	100	285	Horizontal
2	20067.625	52.35	41.36	-10.99	83.54	42.18	100	238	Horizontal
3	22564.5	49.36	40.29	-9.07	83.54	43.25	100	161	Horizontal
4	23801.25	48.65	40.07	-8.58	83.54	43.47	100	48	Horizontal
5	25225.85	48.75	41.64	-7.11	83.54	41.90	100	17	Horizontal
6	26393.75	46.88	39.72	-7.16	83.54	43.82	100	64	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18413.95	53.39	41.17	-12.22	83.54	42.37	100	234	Vertical
2	19572.075	52.48	41.17	-11.31	83.54	42.37	100	328	Vertical
3	21269.525	51.69	41.79	-9.90	83.54	41.75	100	172	Vertical
4	22831.825	49.74	41.02	-8.72	83.54	42.52	100	62	Vertical
5	25276.425	47.64	40.57	-7.07	83.54	42.97	100	77	Vertical
6	26402.25	46.79	39.80	-6.99	83.54	43.74	100	343	Vertical

----- The following blanks -----

Mode: TX/ BLE_2M
Lowest Frequency (2402MHz)
Environment: 24.5°C/59%RH/101.0kPa
Tested By: Zhang Zishan

Voltage: DC 3V
Date: 2023-02-04

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18556.325	52.34	40.19	-12.15	83.54	43.35	100	319	Horizontal
2	20833.05	50.31	40.10	-10.21	83.54	43.44	100	225	Horizontal
3	22270.4	49.33	39.85	-9.48	83.54	43.69	100	301	Horizontal
4	23074.925	49.16	40.50	-8.66	83.54	43.04	100	319	Horizontal
5	24397.1	48.10	40.16	-7.94	83.54	43.38	100	255	Horizontal
6	26283.25	46.54	39.15	-7.39	83.54	44.39	100	143	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18694.45	52.67	40.69	-11.98	83.54	42.85	100	345	Vertical
2	21019.2	50.53	40.53	-10.00	83.54	43.01	100	142	Vertical
3	22163.725	49.49	39.99	-9.50	83.54	43.55	100	236	Vertical
4	22872.2	49.66	40.97	-8.69	83.54	42.57	100	15	Vertical
5	24315.075	48.60	40.60	-8.00	83.54	42.94	100	15	Vertical
6	26339.35	46.92	39.78	-7.14	83.54	43.76	100	283	Vertical

----- The following blanks -----

Mode: TX/ BLE_2M
Middle Frequency (2440MHz)
Environment: 24.5°C/59%RH/101.0kPa
Tested By: Zhang Zishan

Voltage: DC 3V
Date: 2023-02-04

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18968.575	52.84	41.02	-11.82	83.54	42.52	100	220	Horizontal
2	21340.925	50.49	40.53	-9.96	83.54	43.01	100	346	Horizontal
3	22887.925	48.64	39.96	-8.68	83.54	43.58	100	252	Horizontal
4	23391.975	49.01	40.29	-8.72	83.54	43.25	100	79	Horizontal
5	24579	48.61	40.90	-7.71	83.54	42.64	100	268	Horizontal
6	26413.3	46.50	39.34	-7.16	83.54	44.20	100	141	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18957.1	52.76	40.94	-11.82	83.54	42.60	100	217	Vertical
2	20355.775	51.66	41.09	-10.57	83.54	42.45	100	231	Vertical
3	21209.175	50.61	40.66	-9.95	83.54	42.88	100	27	Vertical
4	22955.5	49.31	40.65	-8.66	83.54	42.89	100	44	Vertical
5	25829.35	47.20	39.42	-7.78	83.54	44.12	100	263	Vertical
6	26367.825	47.30	40.23	-7.07	83.54	43.31	100	345	Vertical

----- The following blanks -----

Mode: TX/ BLE_2M
Highest Frequency (2480MHz)
Environment: 24.5°C/59%RH/101.0kPa
Tested By: Zhang Zishan

Voltage: DC 3V
Date: 2023-02-04

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18914.175	52.38	40.53	-11.85	83.54	43.01	100	142	Horizontal
2	20433.975	51.92	41.35	-10.57	83.54	42.19	100	254	Horizontal
3	21304.8	51.51	41.53	-9.98	83.54	42.01	100	360	Horizontal
4	21868.775	49.51	39.74	-9.77	83.54	43.80	100	16	Horizontal
5	22994.6	49.15	40.51	-8.64	83.54	43.03	100	301	Horizontal
6	25366.525	47.94	40.69	-7.25	83.54	42.85	100	301	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18870.4	52.55	40.67	-11.88	83.54	42.87	100	1	Vertical
2	21082.525	49.99	40.00	-9.99	83.54	43.54	100	188	Vertical
3	22295.475	48.72	39.35	-9.37	83.54	44.19	100	220	Vertical
4	24178.225	48.60	40.44	-8.16	83.54	43.10	100	188	Vertical
5	25794.075	47.21	39.47	-7.74	83.54	44.07	100	344	Vertical
6	26399.7	46.18	39.19	-6.99	83.54	44.35	100	297	Vertical

7. 6dB BANDWIDTH

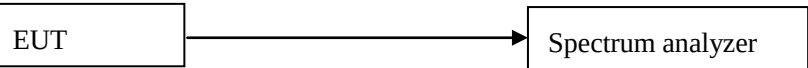
7.1 LIMITS

Systems using digital modulation techniques may operate in the 902–928MHz, 2400–2483.5MHz, and 5725–5850MHz bands. The minimum 6dB bandwidth shall be at least 500kHz.

7.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Set resolution bandwidth (RBW) = 100kHz.Set the video bandwidth (VBW) ≥ 3 x RBW. Detector = Peak. Trace mode = max hold. Sweep = auto couple. Allow the trace to stabilize, record 6dB bandwidth value.
- 3) Repeat above procedures until all frequencies measured were complete.

7.3 TEST SETUP



7.4 TEST RESULTS

Environment: 23.8°C/47%RH/101.0kPa
Tested By: Yang Zhaoyun

Voltage: DC 3V
Date: 2023-01-31

BLE_1M

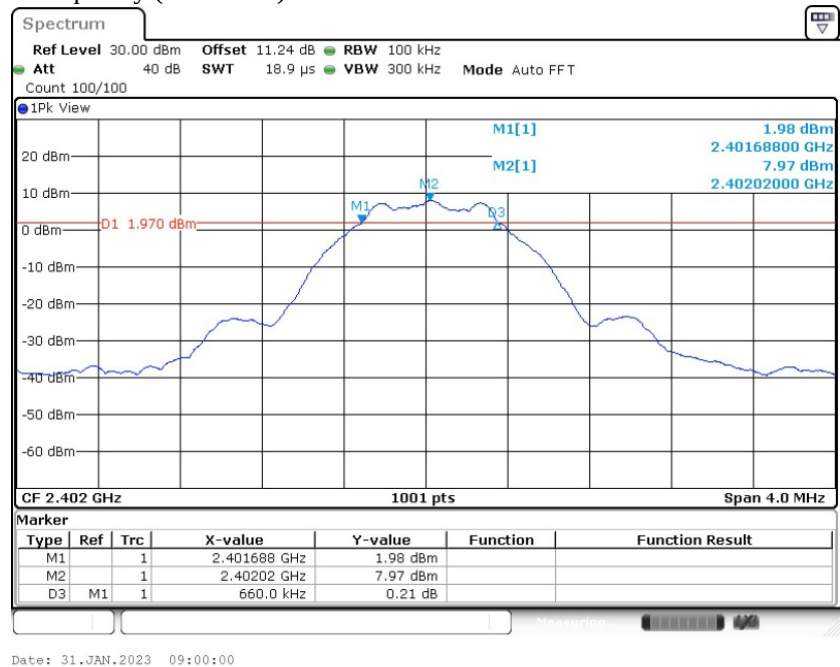
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Lowest	2402	660	≥500	PASS
Middle	2440	660		PASS
Highest	2480	660		PASS

BLE_2M

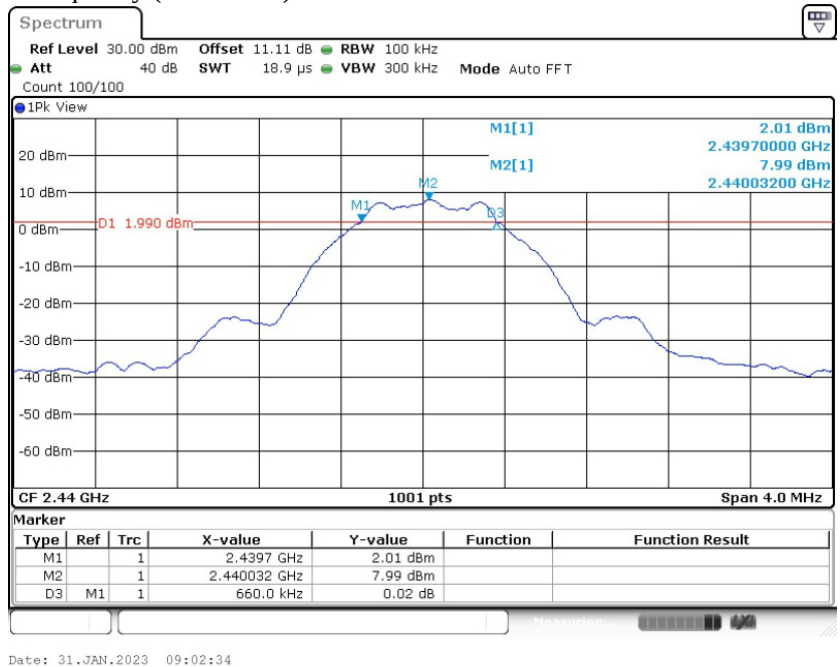
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Lowest	2402	1120	≥500	PASS
Middle	2440	1130		PASS
Highest	2480	1120		PASS

BLE_1M

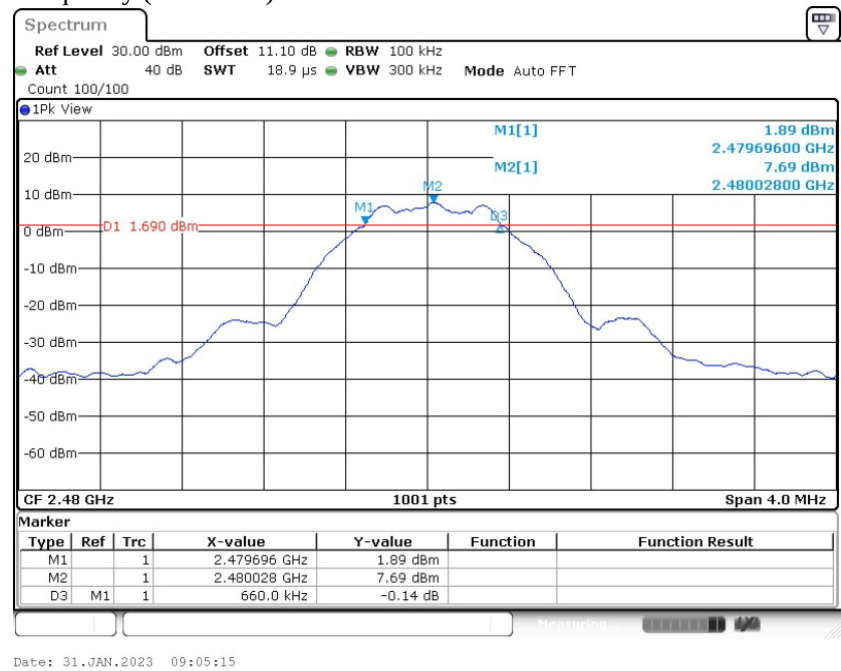
Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)

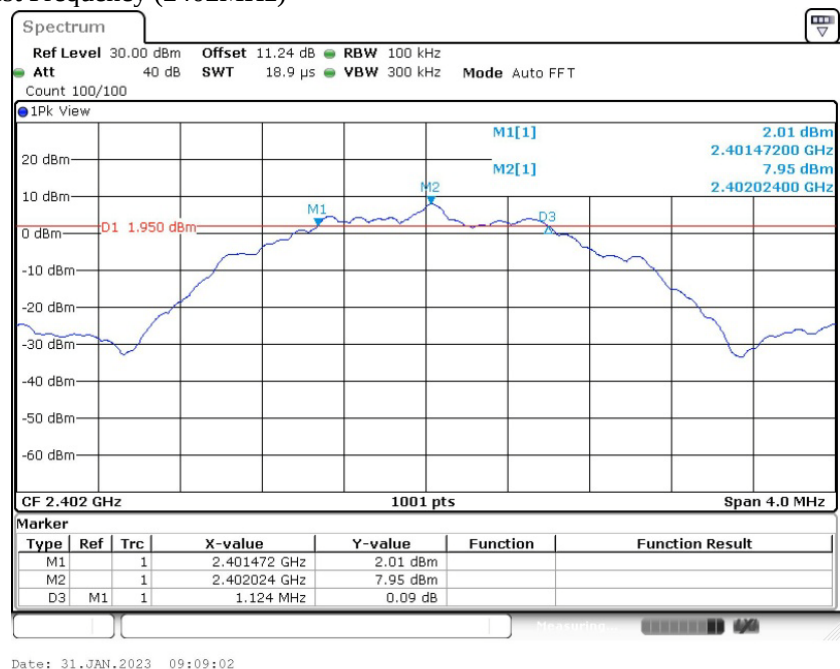


Highest Frequency (2480MHz)

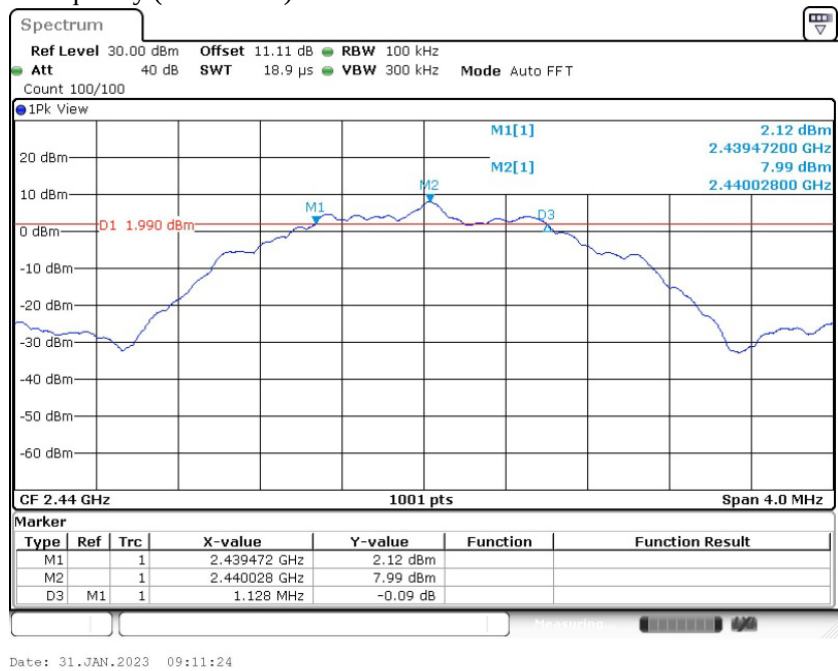


BLE_2M

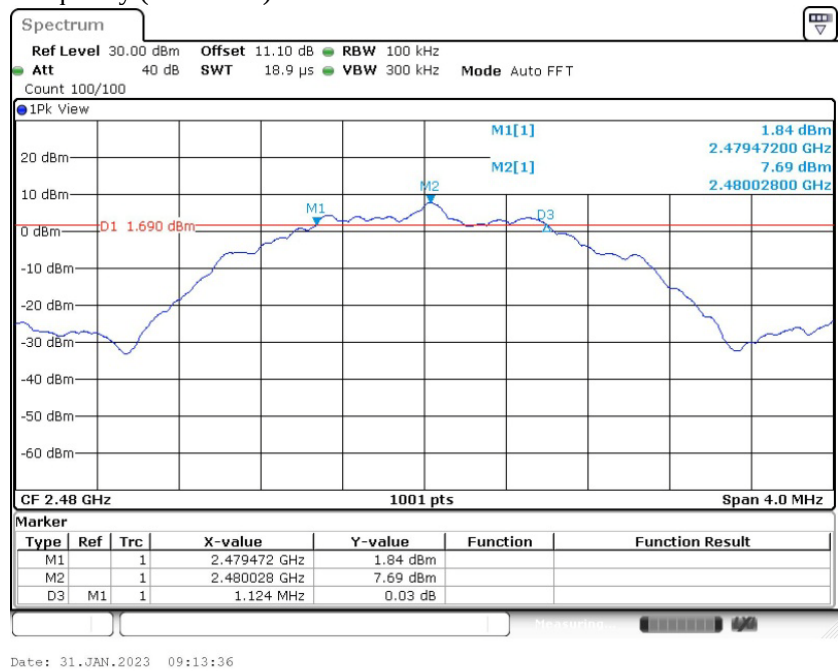
Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)



Highest Frequency (2480MHz)



8. MAXIMUM PEAK OUTPUT POWER

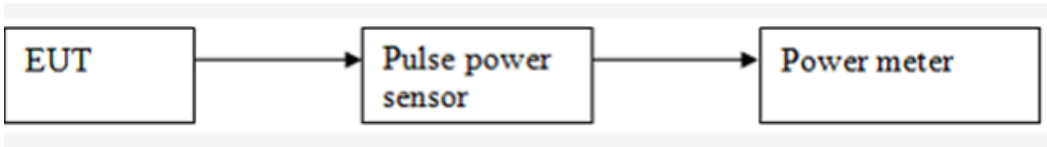
8.1 LIMITS

The maximum Peak output power measurement is 1W

8.2 TEST PROCEDURES

- 1) RF output of EUT was connected to the broadband peak RF power meter by RF cable. The path loss was compensated to the results for each measurement.
- 2) Set to the maximum power setting and enable the EUT transmit continuously.
- 3) Measure the conducted output power and record the results in the test report.

8.3 TEST SETUP



8.4 TEST RESULTS

Environment: 23.8°C/47%RH/101.0kPa
Tested By: Yang Zhaoyun

Voltage: DC 3V
Date: 2023-01-31

BLE_1M

Channel	Frequency (MHz)	Measured Channel Power (dBm)	Limit	Peak/ Average	Result
Lowest	2402	8.35	1W (30dBm)	Peak	Pass
Middle	2440	8.11			Pass
Highest	2480	7.85			Pass

BLE_2M

Channel	Frequency (MHz)	Measured Channel Power (dBm)	Limit	Peak/ Average	Result
Lowest	2402	8.35	1W (30dBm)	Peak	Pass
Middle	2440	8.12			Pass
Highest	2480	7.85			Pass

9. POWER SPECTRAL DENSITY

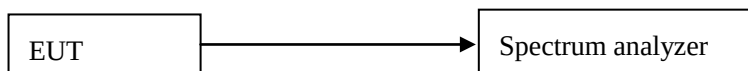
9.1 LIMITS

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz 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.

9.2 TEST PROCEDURES

- 1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
- 2) Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- 3) Set the analyzer span to 1.5 times the DTS bandwidth. Set the RBW to $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$. Set the VBW $\geq [3 \times \text{RBW}]$. Detector = peak. Sweep time = auto couple. Trace mode = max hold. Allow trace to fully stabilize. Use the peak marker function to determine the maximum amplitude level within the RBW. If measured value exceeds requirement, then reduce RBW (but no less than 3kHz) and repeat.
- 4) Repeat above procedures until all frequencies measured were complete.

9.3 TEST SETUP



9.4 TEST RESULTS

Environment: 23.8°C/47%RH/101.0kPa
 Tested By: Yang Zhaoyun

Voltage: DC 3V
 Date: 2023-01-31

BLE_1M

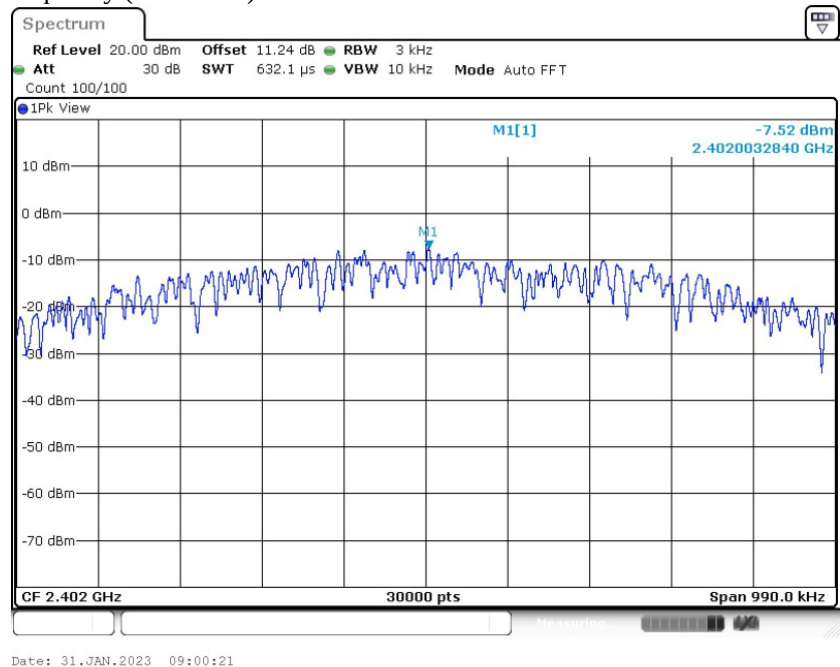
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Test Result
Lowest	2402	-7.52	8.00	PASS
Middle	2440	-7.34		PASS
Highest	2480	-7.99		PASS

BLE_2M

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Test Result
Lowest	2402	-9.57	8.00	PASS
Middle	2440	-9.36		PASS
Highest	2480	-9.67		PASS

BLE_1M

Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)

