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检测
TESTING
CNAS L0446



Page 1 of 51

Test Report

Verified code: 989977

Report No.: E20220309137001-6

Customer: Lumi United Technology Co., Ltd

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

Sample Name: Curtain Driver E1

Sample Model: CM-M01

Receive Sample Date: Mar.11,2022

Test Date: Mar.12,2022 ~ May.09,2022

Reference Document: CFR 47, FCC Part 15 Subpart C
RADIO FREQUENCY DEVICES:Subpart C—Intentional Radiators
ANSI C63.10-2013

Test Result: Pass

Prepared by: Yang Zhaoyun

Reviewed by: Jiang Tao

Approved by: Xiao Liang

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2022-05-24

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20220309137001-6	Original Issue	2022/05/09

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1. TEST RESULT SUMMARY

Standard	Item	Limit / Severity	Result
CFR 47, FCC Part 15 Subpart C (§15.247) KDB 558074 D01 15.247 Meas Guidance v05r02	Antenna Requirement	§15.203	PASS
	Conducted Emissions	§15.207 (a)	PASS
	Radiated Spurious Emission	§15.247(d) §15.205 §15.209	PASS
	6 dB Bandwidth	§15.247 (a)(2)	PASS
	Maximum Peak Output Power	§15.247(b)(3)	PASS
	Power Spectral Density	§15.247(e)	PASS
	Conducted band edges and Spurious Emission	§15.247(d)	PASS
	Restricted bands of operation	§15.205 §15.209 §15.247(d)	PASS

The EUT have one antenna. The antenna is FPC antenna.
 The max gain of antenna is 1dBi, 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 FACTORY

Name: SHENZHEN 3NORD DIGITAL TECHNOLOGY CO.,LTD
Address: 401,ZONE 101A,WORKSHOP 15,ZHONGFU ROAD,TANGXIAYONG COMMUNITY,YANLUO STREET,BAOAN DISTRICT,SHENZHEN CITY,GUANGDONG PROVINCE,P.R.C.

2.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Product Name: Curtain Driver E1
Product Model: CM-M01
Adding Model: /
Trade Name: Aqara
FCC ID: 2AKIT-CMM01
Power Supply: 5V $\overline{\text{---}}$ 1.5A power from USB cable or DC 3.70V power from battery
Rechargeable Lithium-ion Battery
Battery Product Model: DH0406CLM
Specification: Nominal Voltage: 3.70Vdc, Rated Capacity:6000mAh, Rated Energy: 22.2Wh
Charging Voltage Limit: 4.20Vdc
Frequency Band: 2405MHz-2475MHz
Transmit Power: 8.05 dBm
Modulation Type: O-QPSK
Antenna Specification: FPC antenna with 1dBi gain (Max)
Temperature Range: 0°C ~ +25°C
Hardware Version: T0
Software Version: V0.0.0_2424
Sample submitting way: Provided by customer Sampling
Sample No: E20220309137001-0002, E20220309137001-0003
Motor1:
Manufacturer: SHENZHEN WEIZHEN MOTOR DEVELOPMENT CO.,LTD.
Model: WRK-500CA-17280B
Note1: Technical data: DC9.0V,720mA Max.5500 \pm 10% rpm/min.

Note2: Motor2:
 Manufacturer: Peak Industrial Ltd.
 Model: PR-500EV-17280
 Technical data: DC9.0V,500mA Max.5500 ± 10% rpm/min.

Note3: This report records motor 1 (WRK-500CA-17280B) maximum current 720mA data .

2.5 CHANNEL LIST

CH11 - CH25 for Zigbee							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	15	2425	19	2445	23	2465
12	2410	16	2430	20	2450	24	2470
13	2415	17	2435	21	2455	25	2475
14	2420	18	2440	22	2460		

2.6 TEST OPERATION MODE

Mode No.	Description of the modes
1	Zigbee TX mode

2.7 LOCAL SUPPORTIVE INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Note
Notebook	LENOVO	TianYi 310-14ISK	MP18DLC6	Unshielded, 1m (AC Cable) Shielded, 1.8m (DC Cable)

Note :The notebook is just used to produce fixed frequency transmitting.

2.8 CONFIGURATION OF SYSTEM UNDER TEST

EUT

Test software:

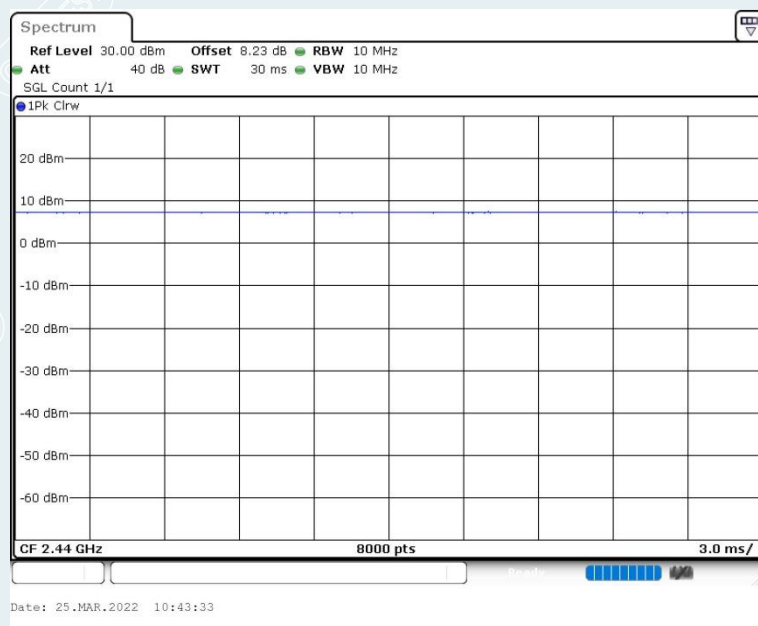
Software version	Power Setting
QCOM_V1.0	8

2.9 DUTY CYCLE

EUT Name	Curtain Driver E1	Model	CM-M01
Environmental Conditions	24.5°C/51%RH	Test Voltage	DC 3.7V
Tested By	LuWei	Tested Date	2022-03-25

Test Mode	Frequency (MHz)	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
Zigbee	2440	30	30	100

Zigbee_2440MHz



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.

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3.2 ACCREDITATIONS

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

USA A2LA(Certificate#:2861.01)

China CNAS(L0446)

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,
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3.3 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	4.46dB
		30MHz~1000MHz	4.30dB
		1GHz~18GHz	5.60dB
		18GHz~26.5GHz	3.65dB
	Vertical	9kHz~30MHz	4.46dB
		30MHz~1000MHz	4.30dB
		1GHz~18GHz	5.60dB
		18GHz~26.5GHz	3.65dB
Conduction Emission		9kHz~150kHz	2.80dB
		150kHz~10MHz	2.80dB
		10MHz~30MHz	2.20dB

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
RF power conducted	0.78 dB
Occupied channel bandwidth	0.4 dB
Unwanted emission, conducted	0.68 dB
Humidity	6 %
Temperature	2 °C

This uncertainty represents an expanded uncertainty factor of k=2.

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4. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Conducted Emissions				
EZ-EMC	EZ	CCS-3A1-CE	/	/
EMI Receiver	R&S	ESCI	100783	2022-09-13
LISN(EUT)	R&S	ENV216	101543	2022-09-14
Radiated Spurious Emission&Restricted bands of operation				
Test S/W	EZ	CCS-03A1		
Loop Antenna	TESEQ	HLA6121	52599	2023-04-02
Test Receiver	R&S	ESR7	102444	2022-09-21
Preamplifier	EMEC	EM330	I00426	2023-03-05
Bi-log Antenna	Schwarzbeck	VULB9160	VULB9160-3401	2022-10-27
Spectrum Analyzer	Agilent	N9020B	MY5712019	2022-08-08
Horn Antenna	Schwarzbeck	BBHA9120D(120 1)	02143	2022-10-22
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170-497	2022-10-16
Amplifier	Tonscend	TAP01018048	AP20E8060075	2022-05-09
Amplifier	Tonscend	TAP184050	AP20E806071	2022-05-17
Test S/W	Tonscend	JS32-RE/2.5.1.5		
6 dB Bandwidth				
Spectrum Analyzer	R&S	FSV30	104381	2022-12-10
Output Power				
Pulse power sensor	Agilent	MA2411B	1126150	2023-03-01
Power meter	Agilent	ML2495A	1204003	2023-02-28
Conducted band edges and Spurious Emission				
Spectrum Analyzer	R&S	FSV30	104381	2022-12-10
Power Spectral Density				
Spectrum Analyzer	R&S	FSV30	104381	2022-12-10

Note: The calibration interval of the above test instruments is 12 months.

5. CONDUCTED EMISSION MEASUREMENT

5.1 LIMITS

Frequency range	Limits (dB μ V)	
	Quasi-peak	Average
150kHz~0.5MHz	66~56	56~46
0.5MHz~5MHz	56	46
5MHz~30MHz	60	50

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases in line with the logarithm of the frequency in the range of 150kHz to 0.5MHz.

5.2 TEST PROCEDURES

Procedure of Preliminary Test

Test procedures follow ANSI C63.10:2013.

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

– Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

– All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

– The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

– Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

– I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

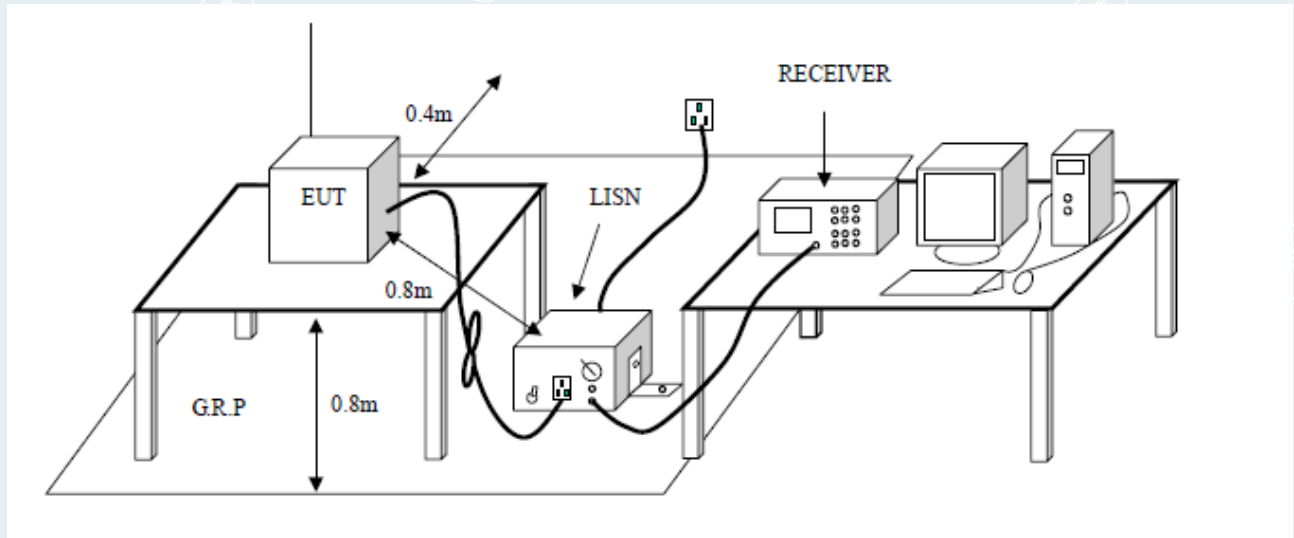
– Use serial board or connecting line to make EUT and notebook to communicate, according to the actual need to make EUT send constant frequency signal continuously.

The test mode(s) described in Item 2.6 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.6 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

5.3 TEST SETUP



5.4 DATA SAMPLE

Frequency (MHz)	QuasiPeak Reading (dBuV)	Average Reading (dBuV)	Correction Factor (dB)	QuasiPeak Result (dBuV)	Average Result (dBuV)	QuasiPeak Limit (dBuV)	Average Limit (dBuV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XXXX	32.69	25.65	11.52	44.21	37.17	65.78	55.79	-21.57	-18.62	Pass

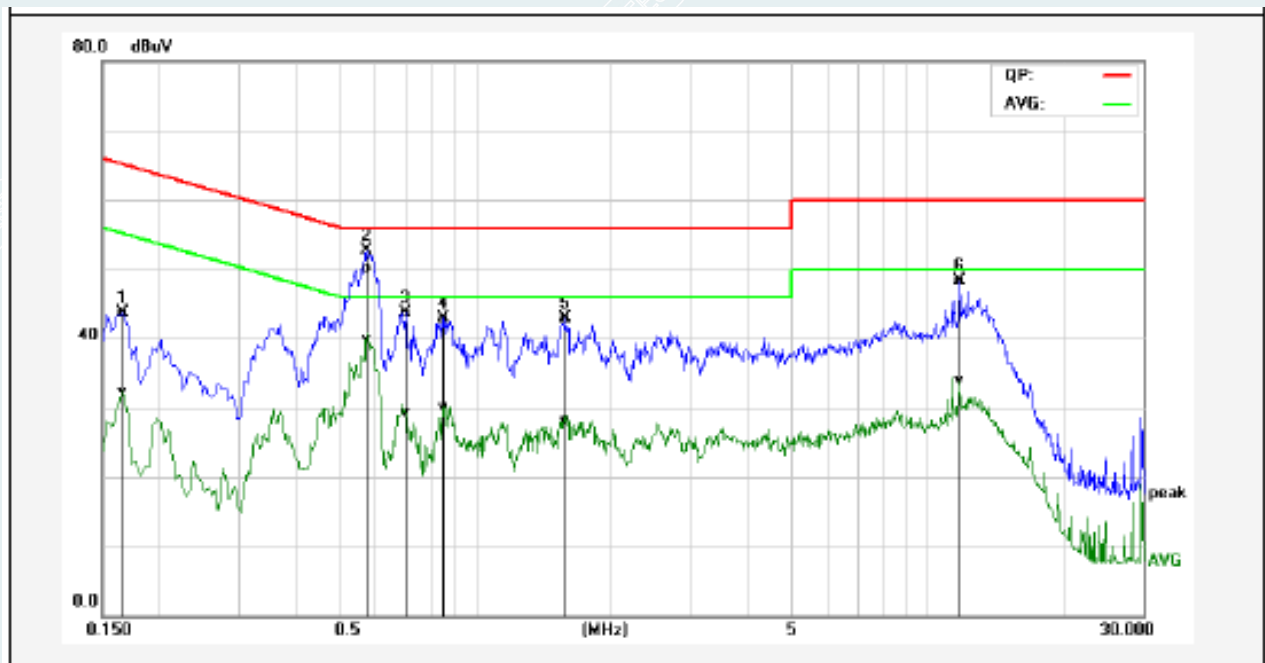
- Factor = Insertion loss of LISN + Cable Loss
- Result = Quasi-peak Reading/ Average Reading + Factor
- Limit = Limit stated in standard
- Margin = Result (dBuV) – Limit (dBuV)

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5.5 TEST RESULTS

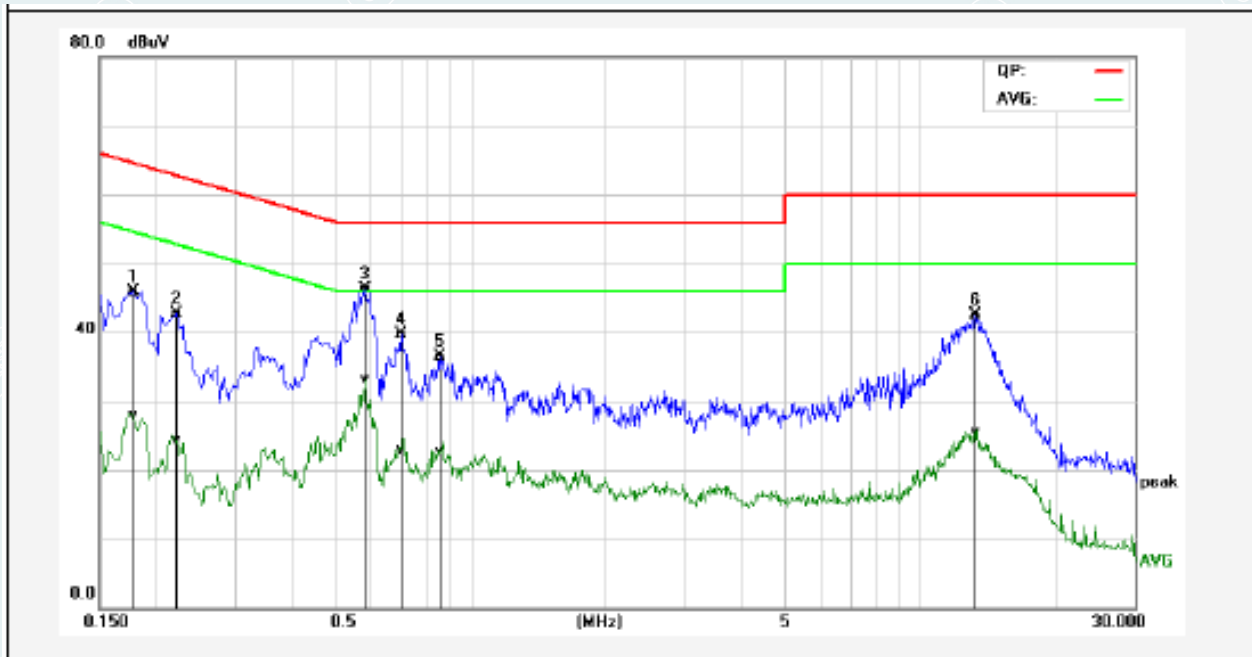
All models were pretested and only the worst modes and channels were recorded in this report. (Zigbee 2405MHz)

EUT Name	Curtain Driver E1	Model	CM-M01
Environmental Conditions	23.5°C/42%RH	Test Mode	Zigbee 2405MHz
Tested By	Tang Shenghui	Line	L1
Tested Date	2022-04-01	Test Voltage	AC120V/60Hz



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1660	34.11	22.71	9.53	43.64	32.24	65.15	55.16	-21.51	-22.92	Pass
2*	0.5780	40.53	30.43	9.57	50.10	40.00	56.00	46.00	-5.90	-6.00	Pass
3	0.7019	34.22	19.73	9.57	43.79	29.30	56.00	46.00	-12.21	-16.70	Pass
4	0.8500	33.25	20.42	9.59	42.84	30.01	56.00	46.00	-13.16	-15.99	Pass
5	1.5859	33.31	18.60	9.60	42.91	28.20	56.00	46.00	-13.09	-17.80	Pass
6	11.8060	38.42	24.01	9.81	48.23	33.82	60.00	50.00	-11.77	-16.18	Pass

EUT Name	Curtain Driver E1	Model	CM-M01
Environmental Conditions	23.5°C/42%RH	Test Mode	Zigbee 2405MHz
Tested By	Tang Shenghui	Line	N
Tested Date	2022-04-01	Test Voltage	AC120V/60Hz



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.1780	36.33	18.35	9.54	45.87	27.89	64.57	54.58	-18.70	-26.69	Pass
2	0.2220	33.09	14.63	9.58	42.67	24.21	62.74	52.74	-20.07	-28.53	Pass
3*	0.5860	36.59	23.44	9.68	46.27	33.12	56.00	46.00	-9.73	-12.88	Pass
4	0.7019	29.98	13.34	9.66	39.64	23.00	56.00	46.00	-16.36	-23.00	Pass
5	0.8540	26.79	13.00	9.65	36.44	22.65	56.00	46.00	-19.56	-23.35	Pass
6	13.3060	32.54	15.72	9.66	42.40	25.58	60.00	50.00	-17.60	-24.42	Pass

6. RADIATED SPURIOUS EMISSIONS

6.1 LIMITS

In any 100 kHz 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 20 dB below that in the 100 kHz 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 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Frequency (MHz)	Quasi-peak($\mu\text{V}/\text{m}$)	Measurement distance(m)	Quasi-peak($\text{dB}\mu\text{V}/\text{m}$)@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 9-90 kHz and 110-490 kHz 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= $74+20*\log(3/1)=83.54$ ($\text{dB}\mu\text{V}/\text{m}$).
The Avg Limit= $54+20*\log(3/1)=63.54$ ($\text{dB}\mu\text{V}/\text{m}$).

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 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Use serial board or connecting line to make EUT and notebook to communicate, according to the actual need to make EUT send constant frequency signal continuously.
- The EUT is placed on a desktop position in the center of 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 height is 1.0 meter.
- 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 0.8 m 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.

--- Use serial board or connecting line to make EUT and notebook to communicate, according to the actual need to make EUT send constant frequency signal continuously.

--- The EUT is placed on a desktop position in the center of 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 premeasurement 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 premeasurement 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 1.5 m height is used.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Use serial board or connecting line to make EUT and notebook to communicate, according to the actual need to make EUT send constant frequency signal continuously.
- The EUT is placed on a desktop position in the center of 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 premeasurement 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.
- Use serial board or connecting line to make EUT and notebook to communicate, according to the actual need to make EUT send constant frequency signal continuously.
- The EUT is placed on a desktop position in the center of the turntable.
- The measurement distance is 1 meter.
- The EUT was set into operation.

Pre measurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

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

NOTE:

(a).The frequency from 9kHz to 150kHz, Set RBW=300Hz(for Peak&AVG), RBW=300Hz(for Peak&AVG).

the frequency from 150kHz to 30MHz, Set RBW=9kHz, RBW=9kHz, (for QP Detector).

(b).The frequency from 30MHz to 1GHz, Set RBW=120kHz, RBW=300kHz, (for QP Detector).

(c).The frequency above 1GHz, for Peak detector: Set RBW=1MHz, RBW=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 10Hz. Where duty cycle is defined in section 2.9.

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

6.3 TEST SETUP

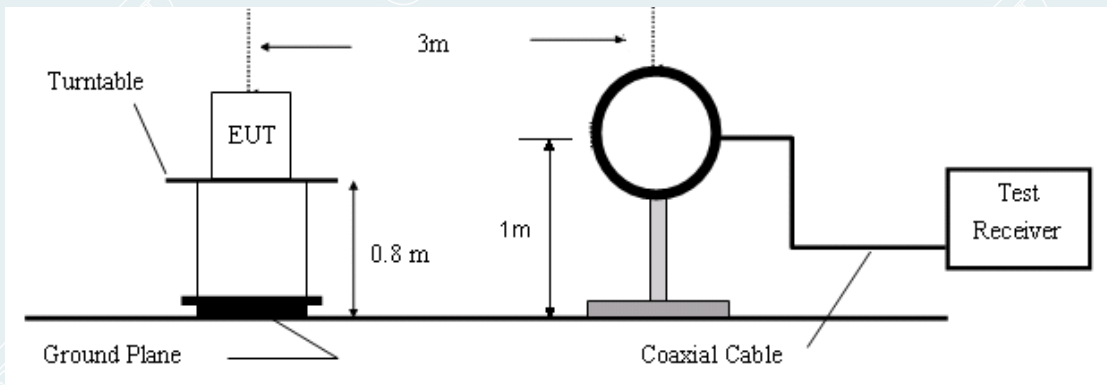


Figure 1. 9kHz to 30MHz radiated emissions test configuration

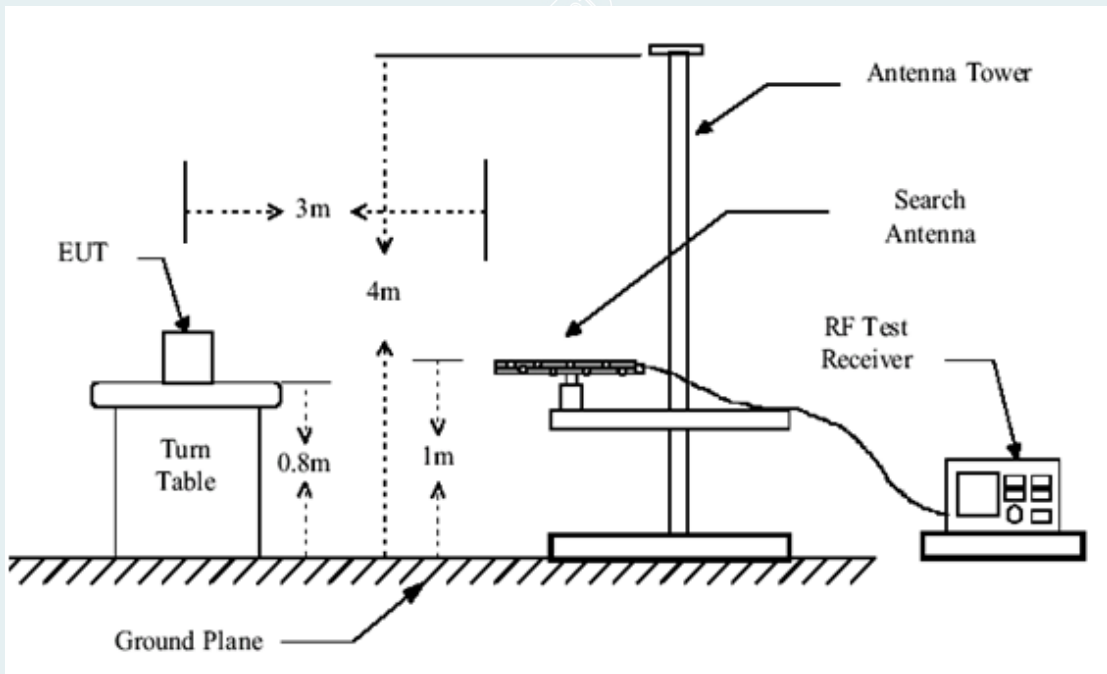


Figure 2. 30MHz to 1GHz radiated emissions test configuration

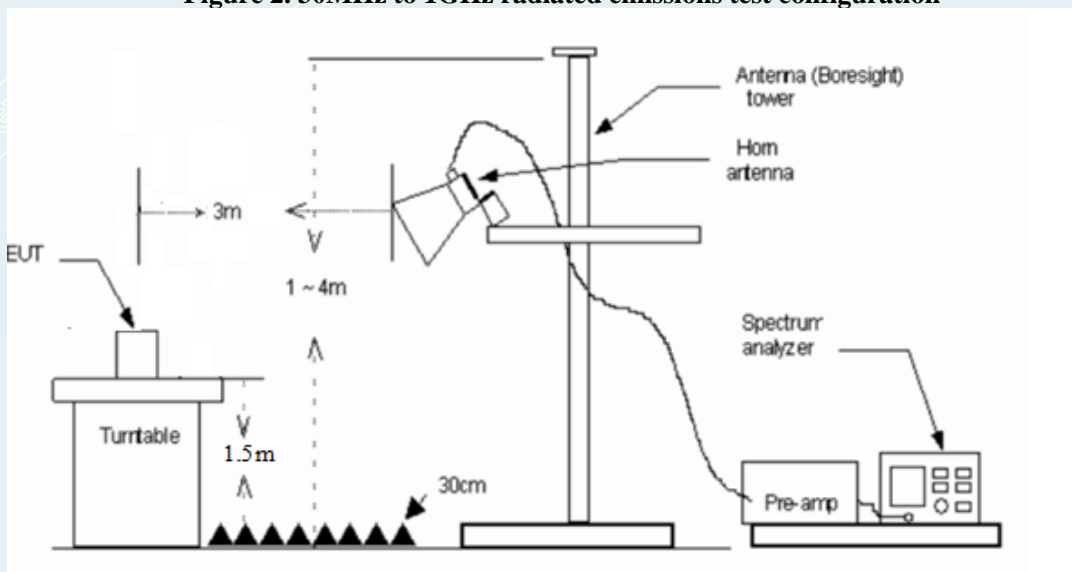


Figure 3. 1GHz to 18GHz radiated emissions test configuration

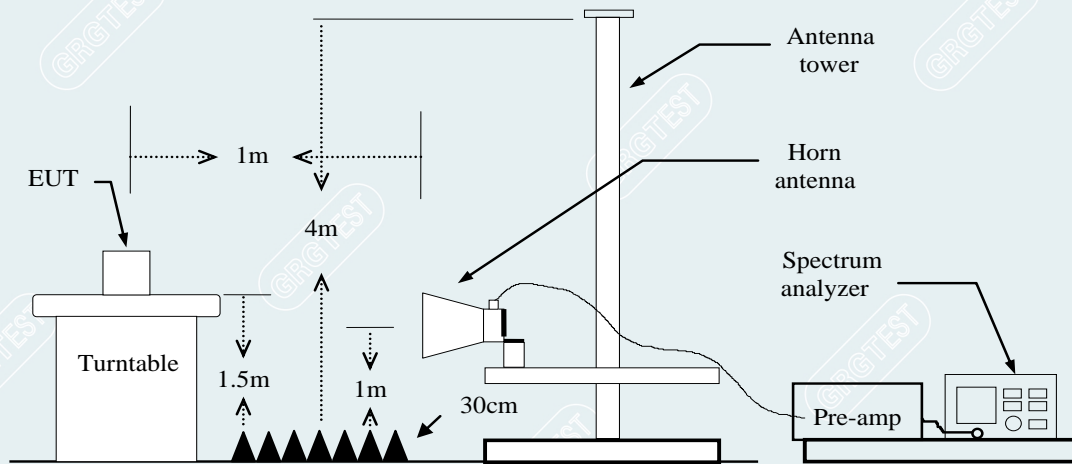


Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

6.4 DATA SAMPLE

30MHz to 1GHz

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

1GHz-18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Factor (dB)	Level (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

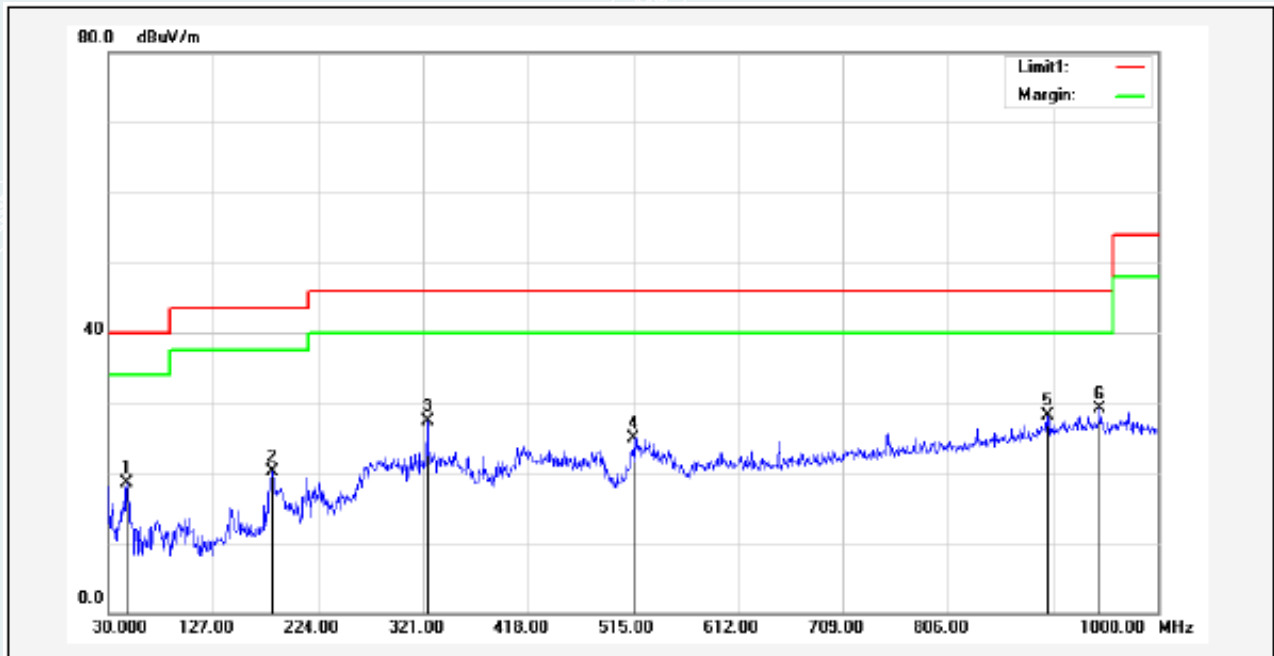
- Frequency (MHz) = Emission frequency in MHz
- Ant.Pol. (H/V) = Antenna polarization
- Reading (dBuV) = Uncorrected Analyzer / Receiver reading
- Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
- Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)
- Limit (dBuV/m) = Limit stated in standard
- Margin (dB) = Remark Result (dBuV/m) – Limit (dBuV/m)
- Peak = Peak Reading
- QP = Quasi-peak Reading
- AVG = Average Reading

6.5 TEST RESULTS

Below 1GHz

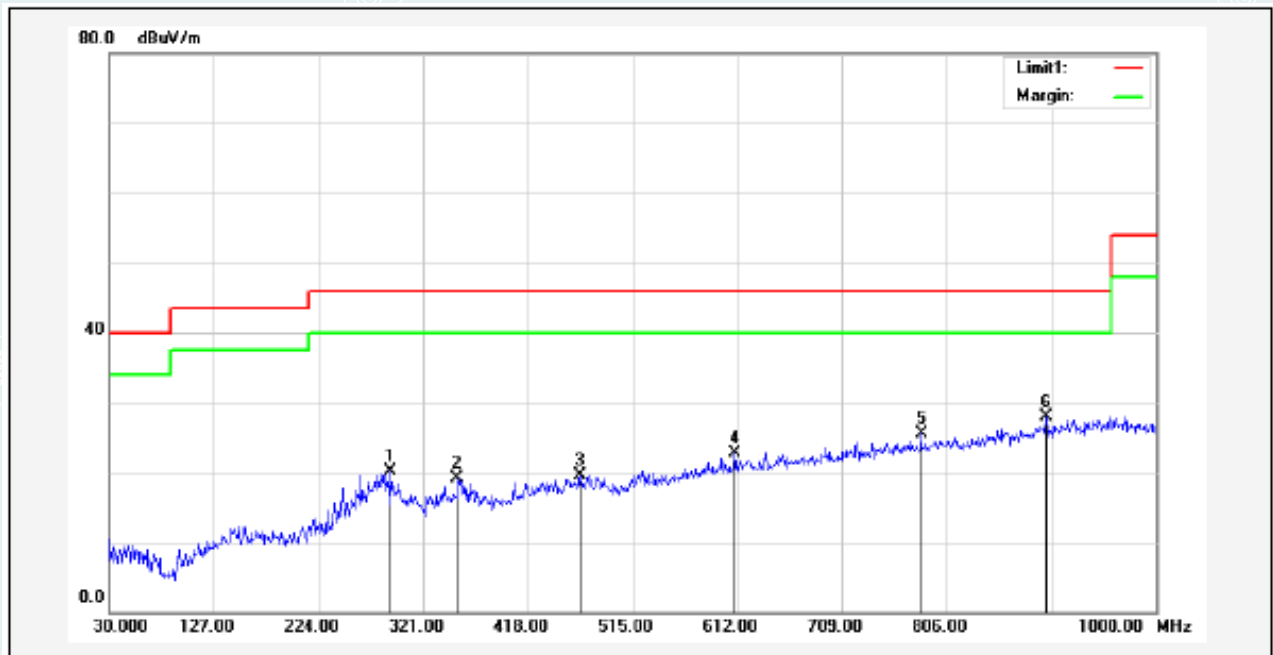
All models were pretested and only the worst modes and channels were recorded in this report. (Zigbee 2405MHz)

EUT Name	Curtain Driver E1	Model	CM-M01
Environmental Conditions	24.1°C/48%RH	Test Voltage	DC 3.7V
Test Mode	Zigbee 2405MHz	Polarity	Vertical
Tested By	Zeng Xianglong	Tested Date	2022-03-31



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	47.4600	45.52	-26.99	18.53	40.00	-21.47	115	100	QP
2	182.2900	46.42	-26.25	20.17	43.50	-23.33	267	100	QP
3	324.8800	50.24	-22.95	27.29	46.00	-18.71	137	100	QP
4	515.9700	42.44	-17.50	24.94	46.00	-21.06	89	100	QP
5	898.1500	38.33	-10.13	28.20	46.00	-17.80	149	200	QP
6*	946.6500	38.63	-9.44	29.19	46.00	-16.81	0	109	QP

EUT Name	Curtain Driver E1	Model	CM-M01
Environmental Conditions	24.1°C/48%RH	Test Voltage	DC 3.7V
Test Mode	Zigbee 2405MHz	Polarity	Horizontal
Tested By	Zeng Xianglong	Tested Date	2022-03-31



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	290.9300	43.91	-23.89	20.02	46.00	-25.98	64	200	QP
2	353.0100	41.40	-22.24	19.16	46.00	-26.84	84	398	QP
3	466.5000	37.94	-18.47	19.47	46.00	-26.53	360	302	QP
4	610.0600	37.58	-14.90	22.68	46.00	-23.32	106	398	QP
5	782.7200	37.37	-11.77	25.60	46.00	-20.40	111	200	QP
6*	898.1500	38.04	-10.13	27.91	46.00	-18.09	319	398	QP

Remark:

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Radiated emissions measured in frequency range from 9 kHz to 1GHz were made with an instrument using Quasi-peak detector mode.
- 3 Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 The IF bandwidth of Receiver between 30MHz to 1GHz was 120 kHz.

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: Zigbee

Lowest Frequency (2405MHz)

Environment: 25°C/60%RH

Tested By: Lu Qiang

Date: 2022-05-09

Voltage: DC 3.7V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1302.0378	56.80	34.56	-22.24	74.00	39.44	200	120	Horizontal
2	3549.4437	54.35	38.80	-15.55	74.00	35.20	200	204	Horizontal
3	4811.4764	51.57	38.95	-12.62	74.00	35.05	200	237	Horizontal
4	7866.2333	47.63	44.25	-3.38	74.00	29.75	100	74	Horizontal
5	8732.5916	47.58	46.17	-1.41	74.00	27.83	200	2	Horizontal
6	14723.9655	39.78	48.02	8.24	74.00	25.98	100	0	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	1365.0456	57.11	35.59	-21.52	74.00	38.41	100	217	Vertical
2	3669.4587	54.41	38.99	-15.42	74.00	35.01	100	179	Vertical
3	4811.4764	53.11	40.22	-12.89	74.00	33.78	200	297	Vertical
4	7213.6517	48.34	44.57	-3.77	74.00	29.43	100	275	Vertical
5	9473.3092	46.62	47.29	0.67	74.00	26.71	100	173	Vertical
6	14752.094	40.48	48.39	7.91	74.00	25.61	200	72	Vertical

Mode: Zigbee
 Middle Frequency (2440MHz)
 Environment: 25°C/60%RH
 Tested By: Lu Qiang

Date: 2022-05-09
 Voltage: DC 3.7V
 /

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1304.038	57.04	34.78	-22.26	74.00	39.22	100	180	Horizontal
2	2860.9826	54.87	37.58	-17.29	74.00	36.42	100	318	Horizontal
3	4331.4164	52.67	38.56	-14.11	74.00	35.44	200	330	Horizontal
4	4880.8601	52.45	40.35	-12.10	74.00	33.65	200	81	Horizontal
5	7864.358	47.48	44.09	-3.39	74.00	29.91	100	45	Horizontal
6	12198.0248	44.15	48.83	4.68	74.00	25.17	200	121	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	12201.4402	4.68	33.92	38.60	54.00	15.40	200	121.2	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	1371.5464	56.47	34.96	-21.51	74.00	39.04	200	43	Vertical
2	3463.1829	55.19	38.47	-16.72	74.00	35.53	200	60	Vertical
3	4878.9849	52.48	40.38	-12.10	74.00	33.62	200	353	Vertical
4	7858.7323	47.93	44.90	-3.03	74.00	29.10	100	328	Vertical
5	11260.4076	43.63	47.80	4.17	74.00	26.20	100	224	Vertical
6	12196.1495	42.95	47.54	4.59	74.00	26.46	100	167	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	12201.5158	4.59	32.99	37.58	54.00	16.42	190	216.5	Vertical

Mode: Zigbee
 Highest Frequency (2475MHz)
 Environment: 25°C/60%RH
 Tested By: Lu Qiang

Date: 2022-05-09
 Voltage: DC 3.7V
 /

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1778.0973	57.75	35.15	-22.60	74.00	38.85	200	215	Horizontal
2	3526.9409	53.90	38.06	-15.84	74.00	35.94	100	328	Horizontal
3	4948.3685	52.24	40.89	-11.35	74.00	33.11	200	251	Horizontal
4	7853.1066	48.02	44.62	-3.40	74.00	29.38	200	335	Horizontal
5	9208.9011	46.81	47.20	0.39	74.00	26.80	100	299	Horizontal
6	12372.4216	44.10	48.34	4.24	74.00	25.66	200	308	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	12376.5045	4.24	34.21	38.45	54.00	15.55	200	51.3	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1371.0464	56.68	35.17	-21.51	74.00	38.83	200	299	Vertical
2	3007.5009	54.61	38.01	-16.60	74.00	35.99	100	260	Vertical
3	4950.2438	52.71	41.68	-11.03	74.00	32.32	200	311	Vertical
4	7841.8552	48.33	45.13	-3.20	74.00	28.87	200	31	Vertical
5	9242.6553	46.40	46.51	0.11	74.00	27.49	100	229	Vertical
6	12372.4216	43.31	47.37	4.06	74.00	26.63	200	104	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dB μ V/m]	AV Value [dB μ V/m]	AV Limit [dB μ V/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	12376.5045	4.06	33.57	37.63	54.00	16.37	200	58.2	Vertical

Remark:

- 1 Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2 Measurements above show only up to 6 maximum emissions noted, or would be lesser 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.
- 3 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

18GHz-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: Zigbee

Lowest Frequency (2405MHz)

Environment: 25°C/60%RH

Tested By: Lu Qiang

Date: 2022-03-30

Voltage: DC 3.7V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18427.5500	57.78	45.41	-12.37	83.54	38.13	150	358	Horizontal
2	19432.6750	56.33	44.76	-11.57	83.54	38.78	150	40	Horizontal
3	21589.5500	54.79	45.02	-9.77	83.54	38.52	150	285	Horizontal
4	23598.5250	53.97	45.06	-8.91	83.54	38.48	150	358	Horizontal
5	25048.2000	53.83	46.30	-7.53	83.54	37.24	150	358	Horizontal
6	26223.3250	54.09	46.17	-7.92	83.54	37.37	150	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	18340.0000	56.89	44.41	-12.48	83.54	39.13	150	139	Vertical
2	19383.3750	56.23	44.58	-11.65	83.54	38.96	150	212	Vertical
3	20619.7000	55.48	45.03	-10.45	83.54	38.51	150	359	Vertical
4	22853.5000	53.88	44.98	-8.90	83.54	38.56	150	22	Vertical
5	24452.3500	54.88	46.74	-8.14	83.54	36.80	150	107	Vertical
6	26232.6750	53.89	46.09	-7.80	83.54	37.45	150	12	Vertical

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

Mode: Zigbee
 Middle Frequency (2440MHz)
 Environment: 25°C/60%RH
 Tested By: Lu Qiang

Date: 2022-03-30
 Voltage: DC 3.7V
 /

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18250.3250	57.96	45.51	-12.45	83.54	38.03	150	85	Horizontal
2	20033.6250	56.00	44.89	-11.11	83.54	38.65	150	160	Horizontal
3	21746.3750	55.16	45.40	-9.76	83.54	38.14	150	255	Horizontal
4	23834.8250	53.99	45.26	-8.73	83.54	38.28	150	43	Horizontal
5	25035.4500	53.84	46.30	-7.54	83.54	37.24	150	255	Horizontal
6	26226.7250	54.36	46.45	-7.91	83.54	37.09	150	351	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	18871.2500	56.57	44.49	-12.08	83.54	39.05	150	42	Vertical
2	20018.7500	56.00	44.86	-11.14	83.54	38.68	150	201	Vertical
3	21740.4250	54.55	44.79	-9.76	83.54	38.75	150	253	Vertical
4	22406.4000	54.13	44.74	-9.39	83.54	38.80	150	253	Vertical
5	23859.4750	54.25	45.60	-8.65	83.54	37.94	150	253	Vertical
6	26258.1750	53.61	45.87	-7.74	83.54	37.67	150	127	Vertical

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

Mode: Zigbee
 Highest Frequency (2475MHz)
 Environment: 25°C/60%RH
 Tested By: Lu Qiang

Date: 2022-04-19
 Voltage: DC 3.7V
 /

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18448.8000	57.24	44.88	-12.36	83.54	38.66	150	85	Horizontal
2	19836.0000	57.22	45.96	-11.26	83.54	37.58	150	284	Horizontal
3	21608.6750	54.18	44.42	-9.76	83.54	39.12	150	284	Horizontal
4	22522.4250	54.39	44.96	-9.43	83.54	38.58	150	116	Horizontal
5	24143.3750	54.26	45.86	-8.40	83.54	37.68	150	31	Horizontal
6	26240.7500	54.07	46.19	-7.88	83.54	37.35	150	190	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dB μ V/m]	Level [dB μ V/m]	Factor [dB]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18425.0000	57.24	44.84	-12.40	83.54	38.70	150	206	Vertical
2	20140.7250	55.52	44.50	-11.02	83.54	39.04	150	12	Vertical
3	21688.1500	55.02	45.26	-9.76	83.54	38.28	150	142	Vertical
4	23260.6500	53.83	45.01	-8.82	83.54	38.53	150	344	Vertical
5	24407.3000	54.30	46.11	-8.19	83.54	37.43	150	280	Vertical
6	26243.3000	53.76	45.99	-7.77	83.54	37.55	150	56	Vertical

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

7. 6DB BANDWIDTH

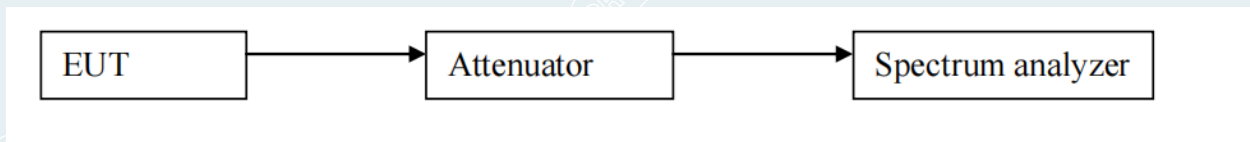
7.1 LIMITS

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

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) $\geq 3 \times$ 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



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

7.4 TEST RESULTS

Environment: 24.5°C/51%RH

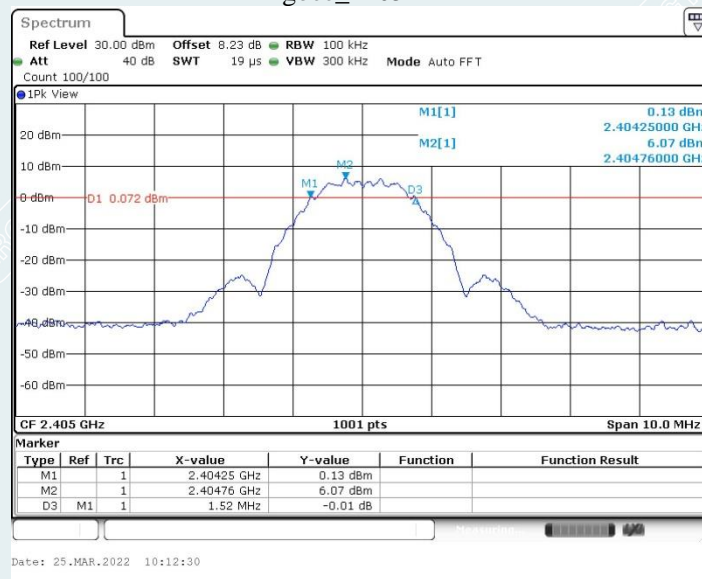
Voltage:DC3.7V

Tested By:LuWei

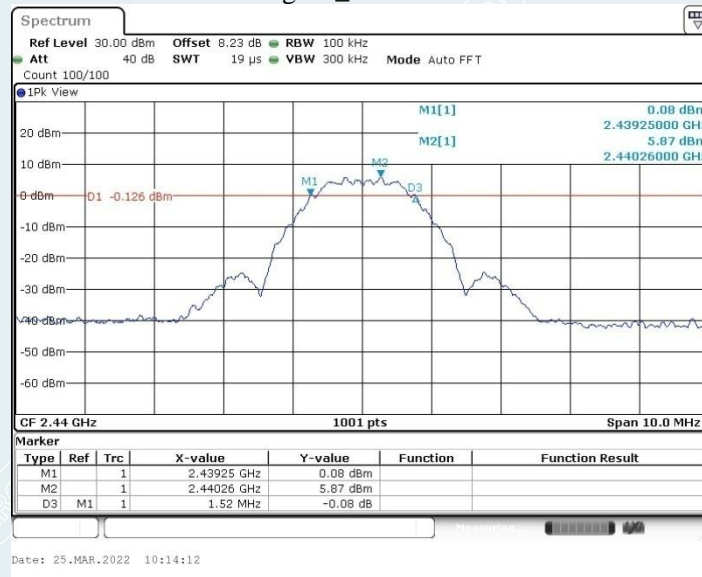
Date: 2022-03-25

Test Mode	Antenna	Frequency[MHz]	DTS BW[MHz]	Limit[MHz]	Verdict
Zigbee	Ant1	2405	1.520	≥0.5	PASS
	Ant1	2440	1.520	≥0.5	PASS
	Ant1	2475	1.520	≥0.5	PASS

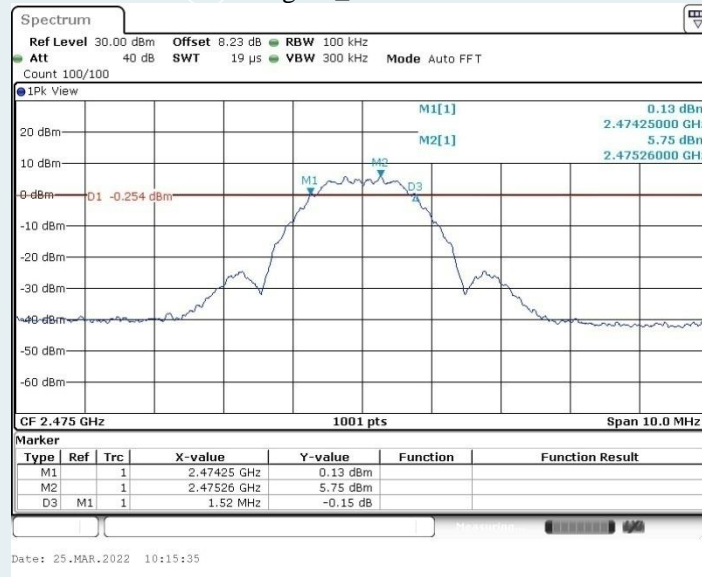
Zigbee_2405MHz



Zigbee_2440MHz



Zigbee_2475MHz



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

8. MAXIMUM PEAK OUTPUT POWER

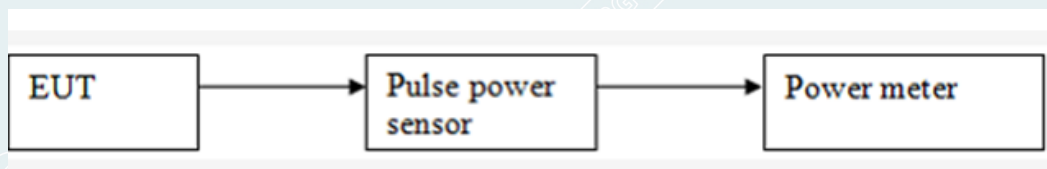
8.1 LIMITS

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 and attenuator. 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 RESULT

Environment: 24.5°C/51%RH
 Tested By: LuWei

Voltage:DC3.7V
 Date: 2022-03-25

Channel No.	Frequency (MHz)	Measured Channel Power (dBm)	Peak / AVG	Limit	Result
11	2405	8.05	Peak	30dBm	Pass
18	2440	8.00			Pass
25	2475	7.94			Pass

9. POWER SPECTRAL DENSITY

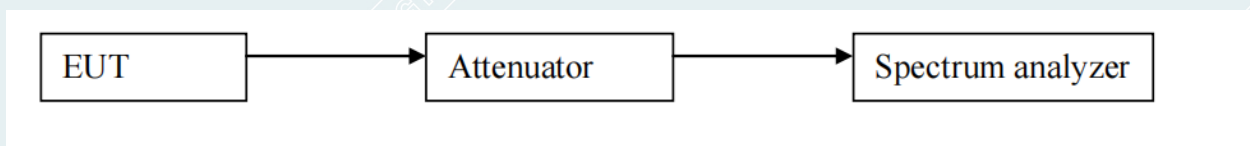
9.1 LIMITS

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 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.

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) The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:
 - a) Set analyzer center frequency to DTS channel center frequency.
 - b) Set the span to 1.5 times the DTS bandwidth.
 - c) Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
 - d) Set the VBW $\geq [3 \times \text{RBW}]$.
 - e) Detector = Peak
 - f) Sweep time = auto couple.
 - g) Trace mode = max hold.
 - h) Allow trace to fully stabilize.
 - i) Use the peak marker function to determine the maximum amplitude level within the RBW.
 - j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.
- 4) Repeat above procedures until all frequencies measured were complete.

9.3 TEST SETUP



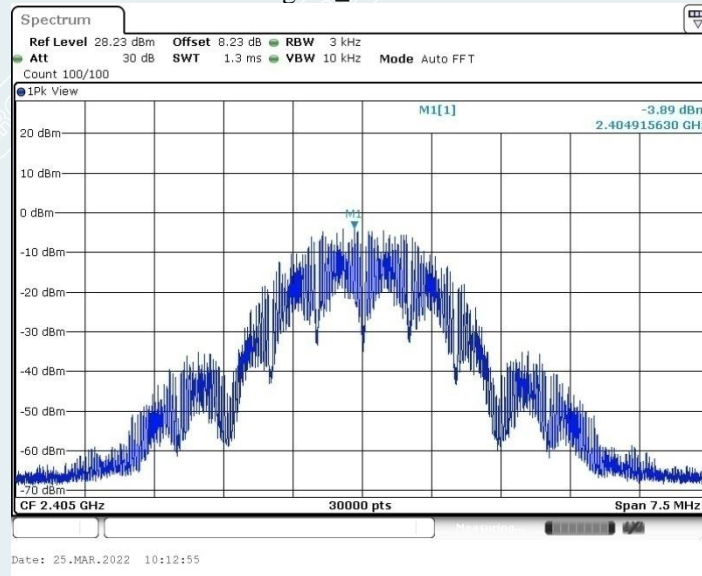
9.4 TEST RESULTS

Environment: 24.5°C/51%RH
 Tested By: LuWei

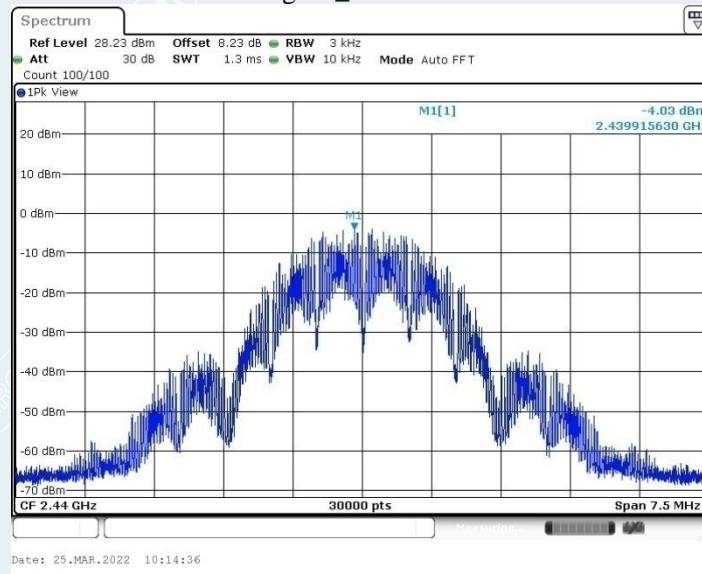
Voltage:DC3.7V
 Date: 2022-03-25

Channel No.	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
11	2405	-3.89	8.00	Pass
18	2440	-4.03	8.00	Pass
25	2475	-4.20	8.00	Pass

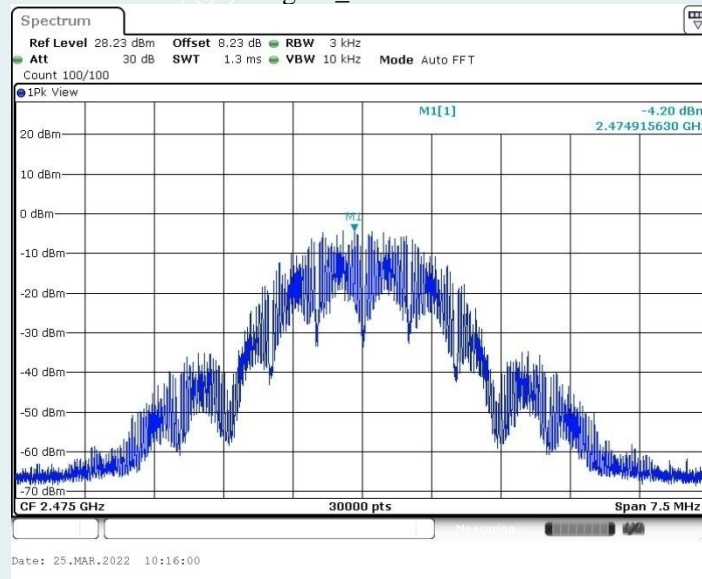
Zigbee_2405MHz



Zigbee_2440MHz



Zigbee_2475MHz



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

10. CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS

10.1 LIMITS

In any 100 kHz 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 20 dB below that in the 100 kHz 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 30 dB instead of 20 dB.

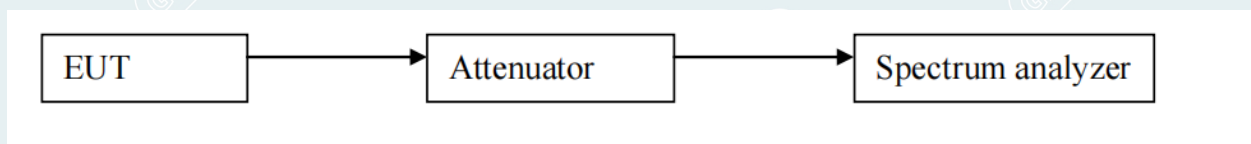
10.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance.

Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.

- 1) Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer: RBW =100kHz; VBW =300kHz, Frequency range = 30MHz to 26.5GHz; Sweep = auto; Detector Function = Peak; Trace = Max hold.
- 3) Measure and record the results in the test report.
- 4) The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

10.3 TEST SETUP



10.4 TEST RESULTS

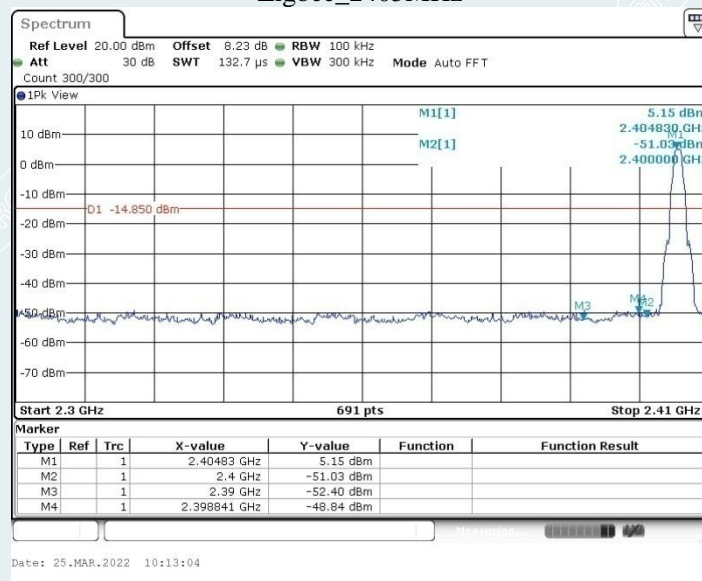
Environment: 24.5°C/51%RH
 Tested By: LuWei

Voltage:DC3.7V
 Date: 2022-03-25

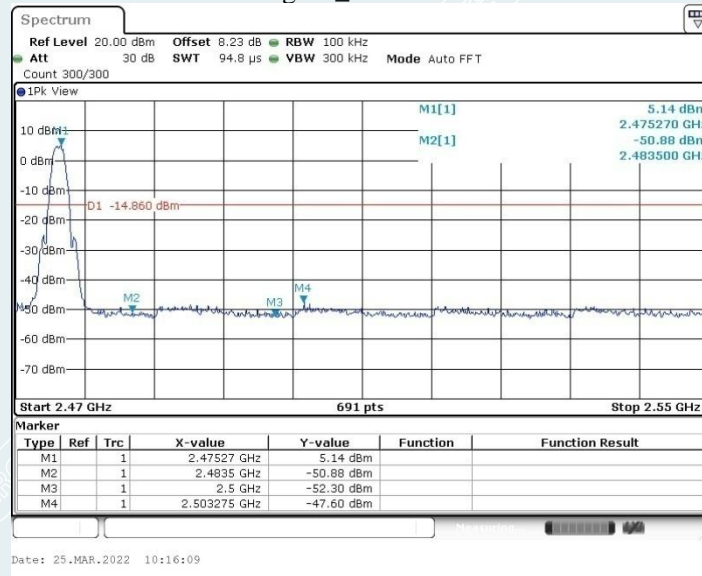
Band edge

Test Mode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
Zigbee	Ant1	Low	2405	5.15	-48.84	≤-12.07	PASS
	Ant1	High	2475	5.14	-47.6	≤-11.46	PASS

Zigbee_2405MHz



Zigbee_2475MHz

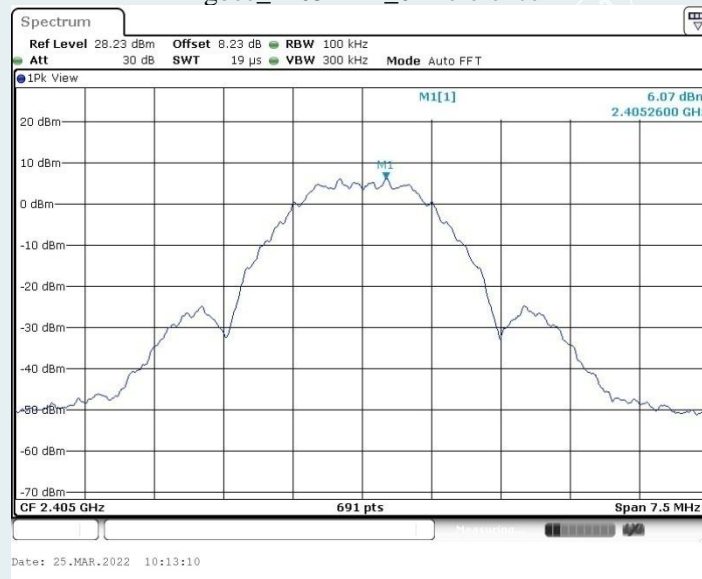


Conducted Spurious Emission:
 Test Result
 Environment: 24.5°C/51%RH
 Tested By: LuWei

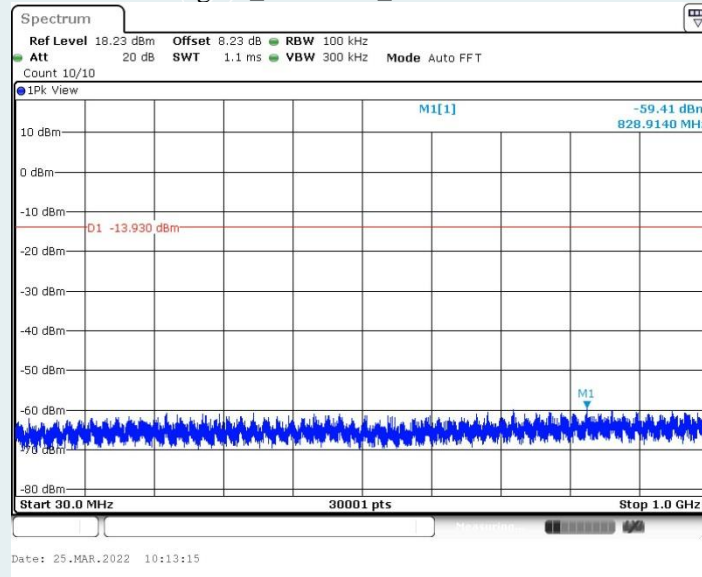
Voltage:DC3.7V
 Date: 2022-03-25

Test Mode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
Zigbee	Ant1	2405	Reference	6.07	6.07	---	PASS
			30~1000	6.07	-59.41	≤-13.93	PASS
			1000~26500	6.07	-51.1	≤-13.93	PASS
	Ant1	2440	Reference	5.93	5.93	---	PASS
			30~1000	5.93	-59.22	≤-14.07	PASS
			1000~26500	5.93	-50.86	≤-14.07	PASS
	Ant1	2475	Reference	5.72	5.72	---	PASS
			30~1000	5.72	-59.51	≤-14.28	PASS
			1000~26500	5.72	-51.26	≤-14.28	PASS

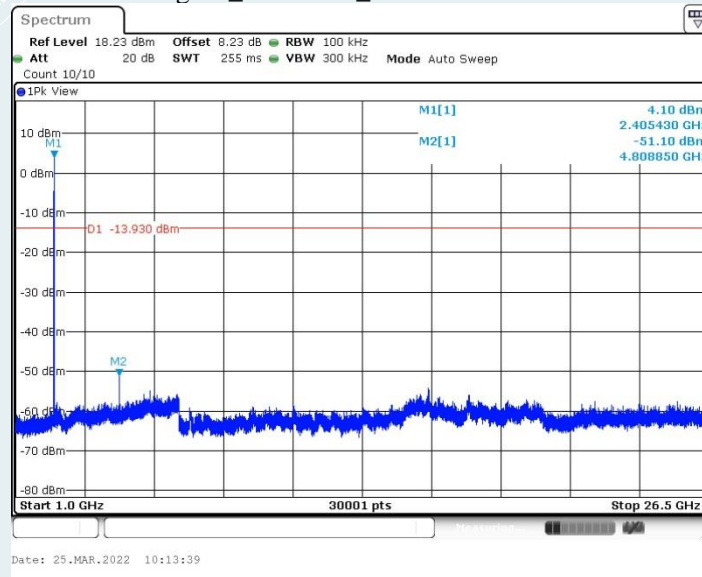
Zigbee_2405MHz_0~Reference



Zigbee_2405MHz_30~1000MHz



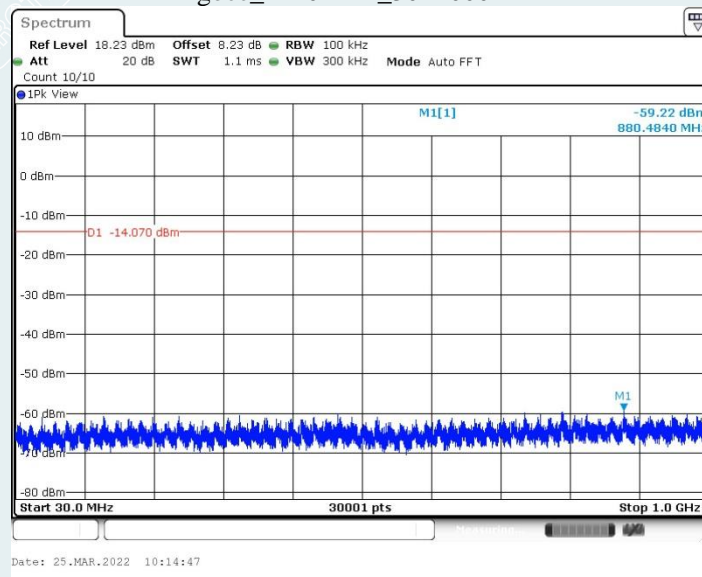
Zigbee_2405MHz_1000~26500MHz



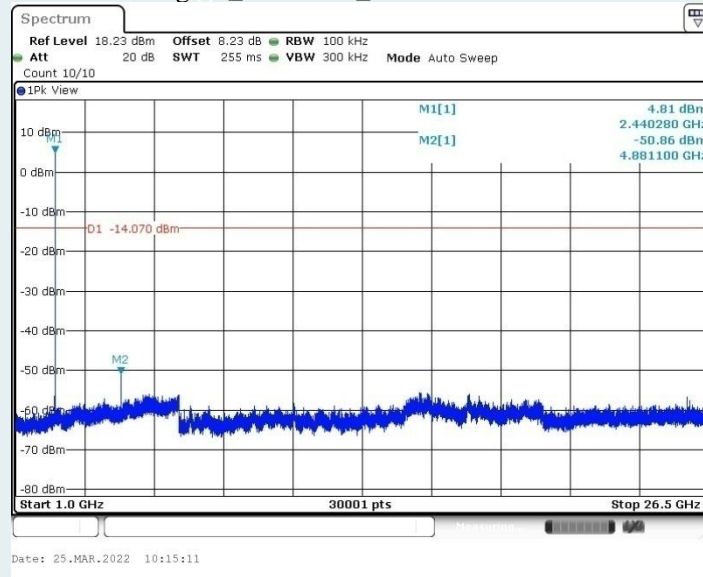
Zigbee_2440MHz_0~Reference



Zigbee_2440MHz_30~1000MHz



Zigbee_2440MHz_1000~26500MHz



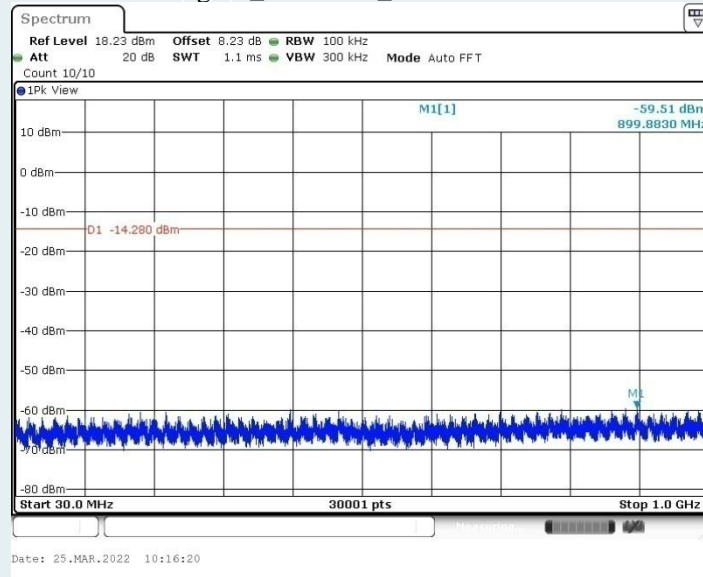
Date: 25.MAR.2022 10:15:11

Zigbee_2475MHz_0~Reference

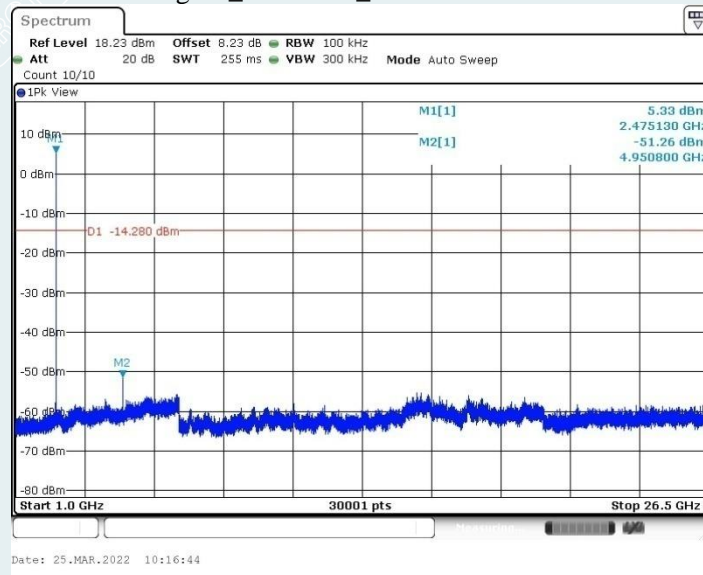


Date: 25.MAR.2022 10:16:15

Zigbee_2475MHz_30~1000MHz



Zigbee_2475MHz_1000~26500MHz



11. RESTRICTED BANDS OF OPERATION

11.1 LIMITS

Section 15.247(d) 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)).

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

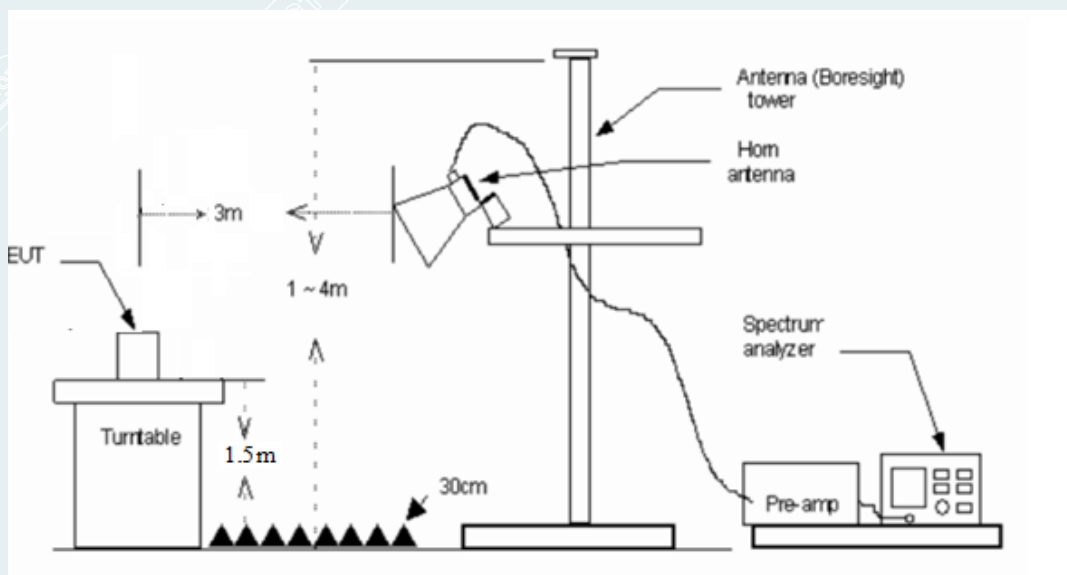
Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

11.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance.

- 1) The EUT is placed on a turntable, which is 1.5m above the ground plane.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - a) The frequency above 1GHz, for Peak detector: Set RBW=1MHz, RBW=3MHz.
 - b) 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., 10Hz) but not less than 10 Hz, Where duty cycle is defined in section 2.9.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus polarization are measured.

11.3 TEST SETUP



11.4 TEST RESULTS

Zigbee

Lowest Channel

Frequency 2405MHz

Environment: 25°C/60%RH

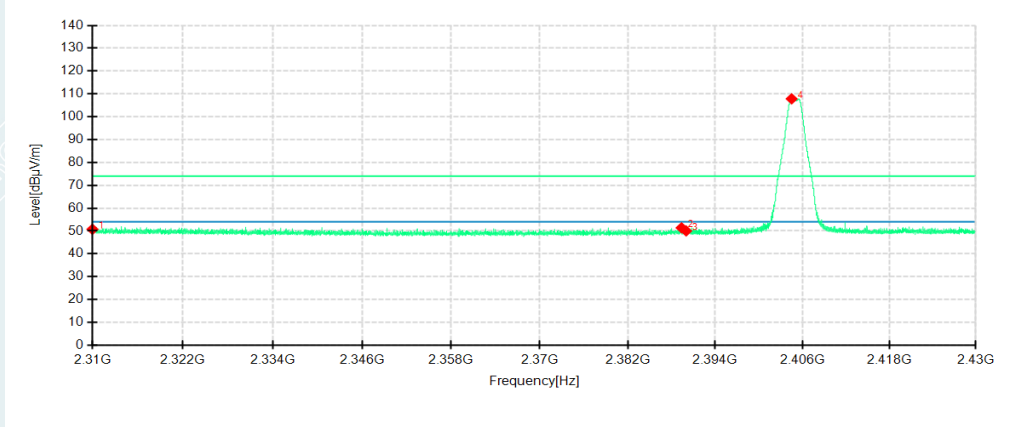
Tested By: Zhang ZiShan

Detector mode: Peak

Voltage: AC120V/60Hz

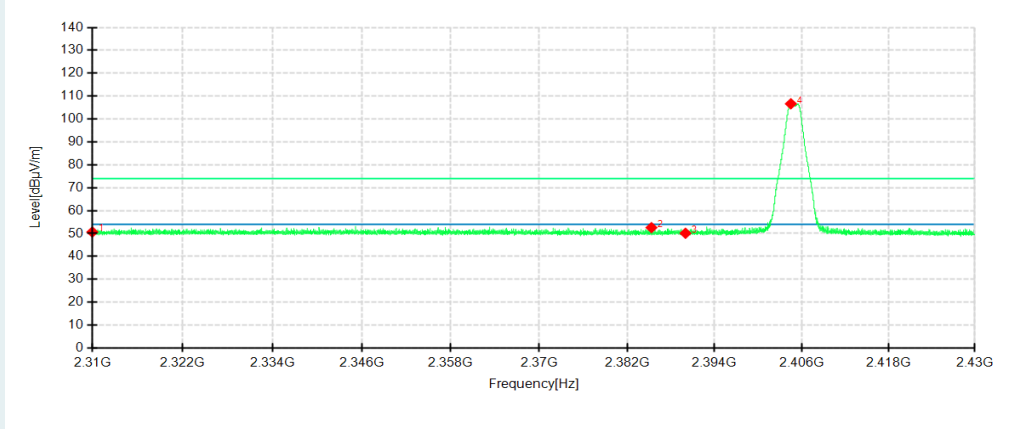
Date: 2022-03-27

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical



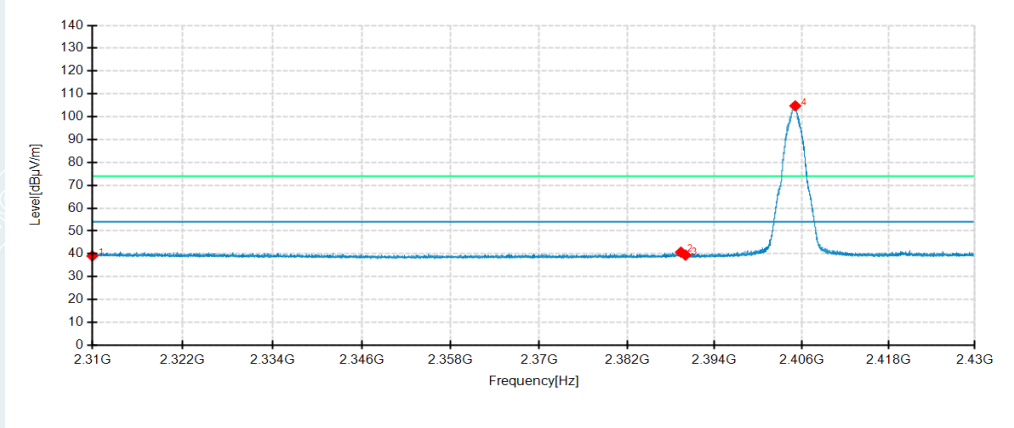
No	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Comment
1	2310.0000	46.80	50.73	3.93	74.00	23.27	200	202	Horizontal	/
2	2389.3680	48.25	51.38	3.13	74.00	22.62	100	159	Horizontal	/
3	2390.0000	46.88	50.01	3.13	74.00	23.99	100	339	Horizontal	/
4	2404.5000	104.62	107.84	3.22	74.00	-33.84	100	159	Horizontal	No limit
1	2310.0000	46.14	50.65	4.51	74.00	23.35	200	336	Vertical	/
2	2385.3360	48.26	52.58	4.32	74.00	21.42	100	201	Vertical	/
3	2390.0000	45.84	50.11	4.27	74.00	23.89	100	149	Vertical	/
4	2404.5000	102.53	106.66	4.13	74.00	-32.66	200	315	Vertical	No limit

Zigbee

Lowest Channel

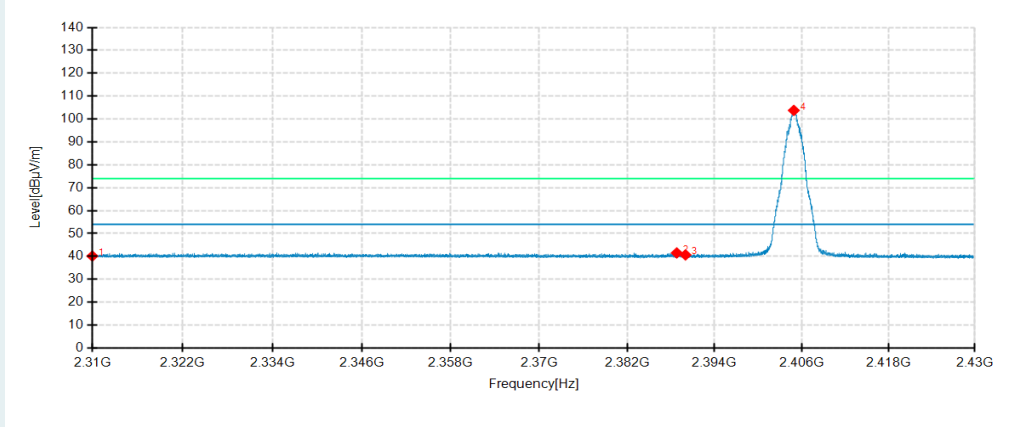
Frequency 2405MHz
 Environment: 25°C/60%RH
 Tested By: Zhang ZiShan
 Detector mode: Average

Voltage: AC120V/60Hz
 Date: 2022-03-27
 Polarity: Horizontal



Detector mode: Average

Polarity: Vertical

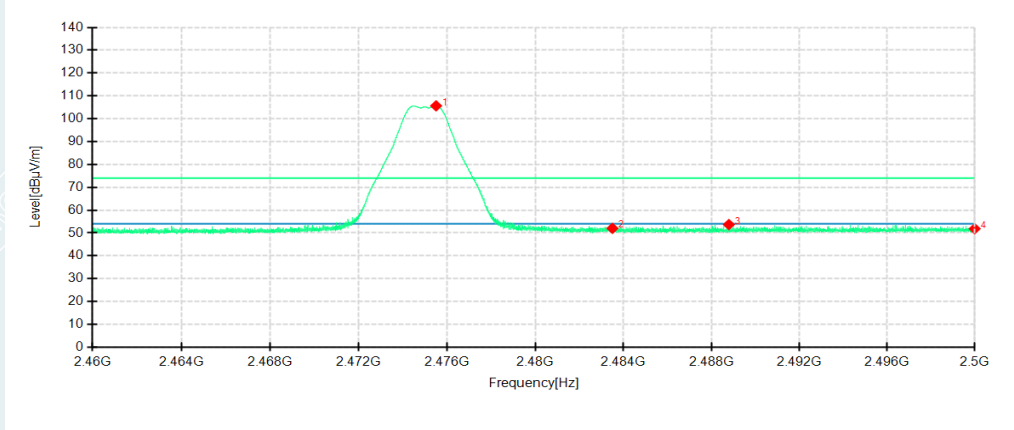


No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Comment
1	2310.0000	35.13	39.06	3.93	54.00	14.94	100	223	Horizontal	/
2	2389.3800	37.59	40.72	3.13	54.00	13.28	100	157	Horizontal	/
3	2390.0000	36.31	39.44	3.13	54.00	14.56	100	157	Horizontal	
4	2405.1120	101.54	104.77	3.23	54.00	-50.77	100	157	Horizontal	No limit
1	2310.0000	35.62	40.13	4.51	54.00	13.87	200	157	Vertical	/
2	2388.8040	37.22	41.51	4.29	54.00	12.49	200	320	Vertical	/
3	2390.0000	36.37	40.64	4.27	54.00	13.36	200	320	Vertical	/
4	2404.9080	99.65	103.77	4.12	54.00	-49.77	200	314	Vertical	No limit

Zigbee
Highest Channel

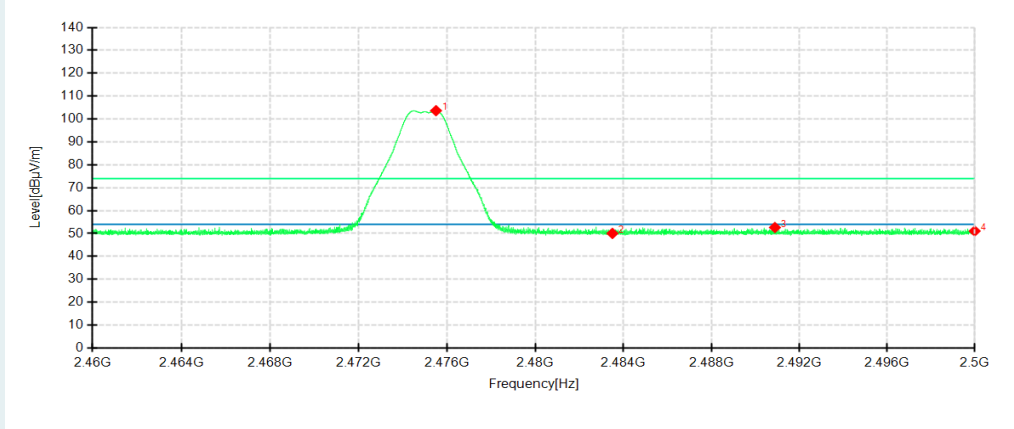
Frequency 2475MHz
Environment: 25°C/60%RH
Tested By: Zhang ZiShan
Detector mode: Peak

Voltage: AC120V/60Hz
Date: 2022-04-19
Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical

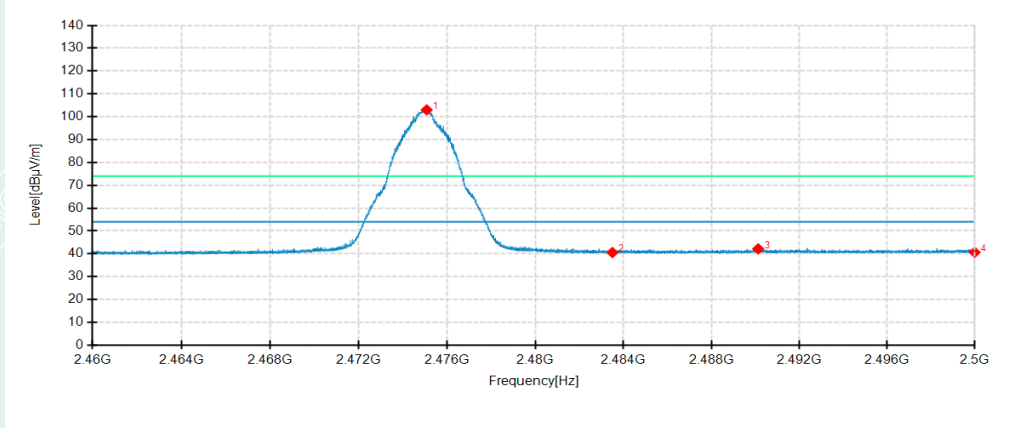


No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Comment
1	2475.5080	101.47	105.64	4.17	74.00	-31.64	100	96	Horizontal	No limit
2	2483.5000	47.70	52.03	4.33	74.00	21.97	100	193	Horizontal	/
3	2488.7920	49.26	53.69	4.43	74.00	20.31	100	96	Horizontal	/
4	2500.0000	47.20	51.85	4.65	74.00	22.15	100	216	Horizontal	/
1	2475.5040	99.99	103.65	3.66	74.00	-29.65	200	311	Vertical	No limit
2	2483.5000	46.35	50.04	3.69	74.00	23.96	200	186	Vertical	/
3	2490.8880	48.91	52.63	3.72	74.00	21.37	100	265	Vertical	/
4	2500.0000	47.32	51.07	3.75	74.00	22.93	100	255	Vertical	/

Zigbee
Highest Channel

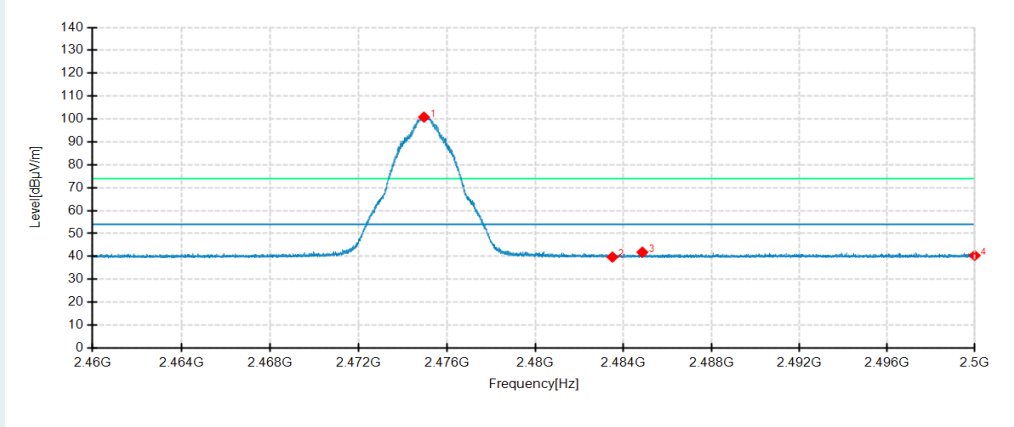
Frequency 2475MHz
Environment: 25°C/60%RH
Tested By: Lu Qiang
Detector mode: Average

Voltage: AC120V/60Hz
Date: 2022/04/19
Polarity: Horizontal



Detector mode: Average

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Comment
1	2475.0840	98.85	103.01	4.16	54.00	-49.01	100	95	Horizontal	No limit
2	2483.5000	36.24	40.57	4.33	54.00	13.43	100	95	Horizontal	/
3	2490.1280	37.72	42.18	4.46	54.00	11.82	100	95	Horizontal	/
4	2500.0000	35.99	40.64	4.65	54.00	13.36	100	140	Horizontal	/
1	2474.9600	97.15	100.81	3.66	54.00	-46.81	200	311	Vertical	No limit
2	2483.5000	36.01	39.70	3.69	54.00	14.30	200	305	Vertical	/
3	2484.8600	38.14	41.84	3.70	54.00	12.16	200	95	Vertical	/
4	2500.0000	36.64	40.39	3.75	54.00	13.61	200	160	Vertical	/

APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM

Please refer to the attached document E20220309137001-11-Test setup photo.

APPENDIX B. PHOTOGRAPH OF THE EUT

Please refer to the attached document E20220309137001-12-EUT Photo.

----- End of Report -----