

Test Report

Verified code: 582980

Report No.: E20230331478001-10

Customer: Lumi United Technology Co., Ltd

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

Sample Name: Hub M3

Sample Model: HM-G01E

Receive Sample Date: Aug.02,2023

Test Date: Sep.05,2023 ~ Dec.13,2023

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

Test Result: Pass

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Reviewed by: Jiang Tao
Jiang Tao

Approved by: Xiao Liang
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GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2024-01-09

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20230331478001-10	Original Issue	2023-12-21

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1. TEST RESULT SUMMARY

Technical Requirements		
47 CFR, FCC Part 15 Subpart C 15.247 ANSI C63.10-2020 KDB 558074 D01 15.247 measurement guidance v05r02		
Limit / Severity	Item	Result
§15.203	Antenna Requirement	Pass
§15.207(a)	Conducted Emission	Pass
§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)The antenna is PIFA antenna. The max gain of antenna is -0.5dBi.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: Hub M3
Model No.: HM-G01E
Adding Model: HM-G01D
Models Difference: The model NO. HM-G01E & HM-G01D have the same technical construction including circuit diagram, PCB LAYOUT, hardware version and software version identical, except sales area and packaging are different.

Trade Name: Aqara
FCC ID: 2AKIT-HMG01
Power supply: DC 5V/2A or PoE input 48V/0.27A
Frequency Band: 2402MHz-2480MHz
Transmit Power: GFSK for 1Mbps:5.5dBm
GFSK for 2Mbps:5.5dBm
Modulation type: GFSK for 1Mbps
GFSK for 2Mbps
Channel space: 2MHz
Antenna Specification: PIFA antenna with -0.5dBi gain (Max.)
Temperature Range: -10 °C ~ 50 °C
Hardware Version: V2.0.5_1060
Software Version: T0
Sample No: E20230331478001-0002, E20230331478001-0006

Note 1: The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.

Note 2: All the tests were performed on the model HM-G01E.

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	/	/	/	/
Adapter	Jian Aohai	A70-050200U-EU1	/	/
PoE Adapter	UE	PoE35-54A	/	/

No.	Cable Type	Qty.	Shielded Type	Ferrite Core(Qty.)	Length
1	Serial cable	1	No	0	0.3m
2	USB-MINI cable	1	Yes	0	1.0m
3	USB-C cable	1	Yes	0	0.8m
4	RJ45 cable	1	No	0	1.5m

2.7 CONFIGURATION OF SYSTEM UNDER TEST

For 6 dB Bandwidth & Maximum Peak Output Power & Power Spectral Density & Conducted band edges and Spurious Emission



For Conducted Emissions Measurement & Restricted bands of operation & Radiated Spurious Emission



Test software:

Software version	Test level
EMI_Test_Tool	default

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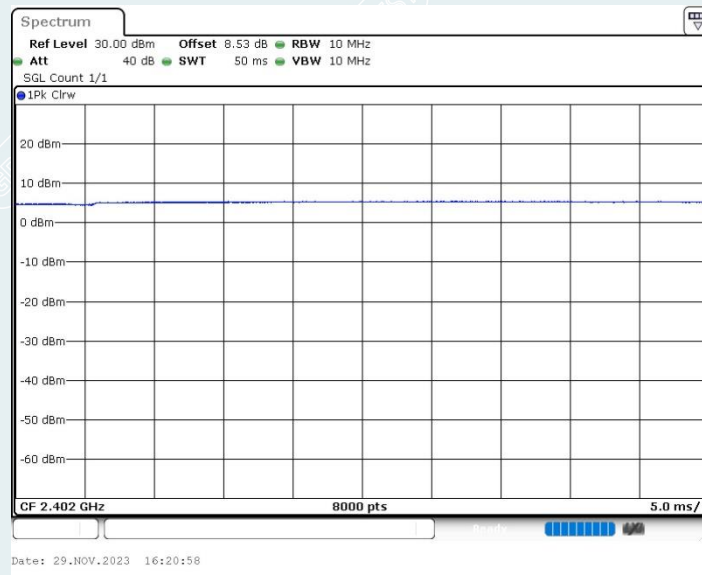
2.8 DUTY CYCLE

Environment: 27.1°C/49%RH/101.0kPa
 Tested By: Huang Tianmei

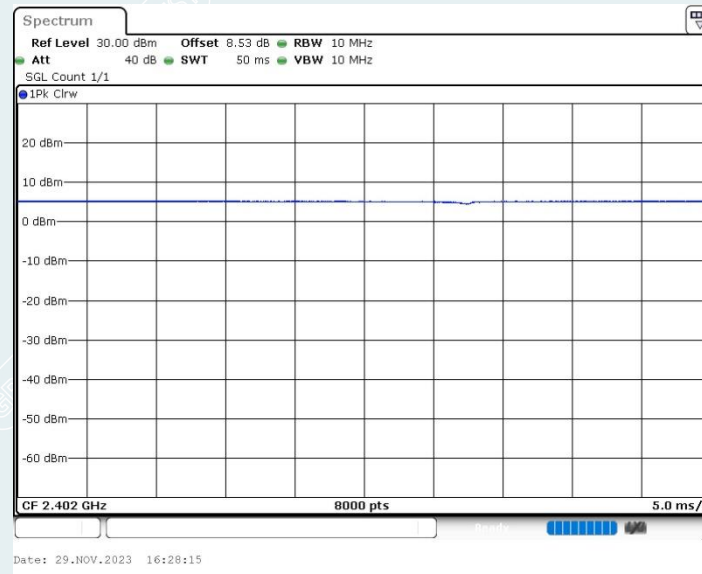
Voltage: DC 5V
 Date: 2023-11-29

Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	DC [%]	T [s]
BLE_1M	Ant1	2402	50.00	50.00	100.00	/
BLE_2M	Ant1	2402	50.00	50.00	100.00	/

BLE_1M_2402MHz



BLE_2M_2402MHz



3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

Add.: No.1301 Guangang Road Xinlan Community, Guanlan Street, Longhua District
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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)

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

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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	Coplanar	9kHz~30MHz	4.4dB ¹⁾
	Coaxial	9kHz~30MHz	4.4dB ¹⁾
	Horizontal	30MHz~200MHz	4.6dB ¹⁾
		200MHz~1000MHz	4.8dB ¹⁾
		1GHz~18GHz	5.0dB ¹⁾
		18GHz~26.5GHz	5.2dB ¹⁾
	Vertical	30MHz~200MHz	4.7dB ¹⁾
		200MHz~1000MHz	4.7dB ¹⁾
		1GHz~18GHz	5.1dB ¹⁾
		18GHz~26.5GHz	5.4dB ¹⁾
Conduction Emission		150kHz~30MHz	3.3dB ¹⁾

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
RF power conducted	0.80dB
Power spectral density conducted	0.80dB
Occupied channel bandwidth	0.40dB
Unwanted emission, conducted	0.70dB
Humidity	6.0%
Temperature	2.0°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		
Loop Antenna	Schwarzbeck	FMZB 1513-60	1513-60-56	2024-07-15
Preamplifier	SHIRONG ELECTRONIC	DLNA-30M1G-G41	20200928002	2024-10-24
Bi-log Antenna	Schwarzbeck	VULB9160	VULB9160-3402	2024-10-06
Horn Antenna	Schwarzbeck	BBHA 9120D	02143	2024-09-23
Test Receiver	R&S	ESR26	101758	2024-09-22
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170-497	2024-09-18
Amplifier	Tonscend	TAP01018048	AP20E8060075	2024-04-11
Amplifier	Tonscend	TAP184050	AP20E806071	2024-04-16
Amplifier	SHIRONG ELECTRONIC	DLNA-1G18G-G40	20200928005	2024-08-17
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	104381	2024-10-13
Automatic control unit	TONSCEND	JS0806-2	2018060317	2024-08-04
BT/WIFI System	Tonscend	JS1120-3		
Maximum peak output power				
Pulse power sensor	Anristu	MA2411B	1126150	2024-02-12
Power meter	Anristu	ML2495A	1204003	2024-02-12
Conducted Emissions				
EZ-EMC	EZ	CCS-3A1-CE	/	/
EMI Receiver	R&S	ESCI	100783	2024-08-11
LISN(EUT)	R&S	ENV216	101543	2024-09-10

Note:

- The calibration cycle of the above instruments is 12 months.

6. CONDUCTED EMISSION MEASUREMENT

6.1 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 150 kHz to 0.5MHz.

6.2 TEST PROCEDURES

Procedure of Preliminary Test

Test procedures follow ANSI C63.10:2020.

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:

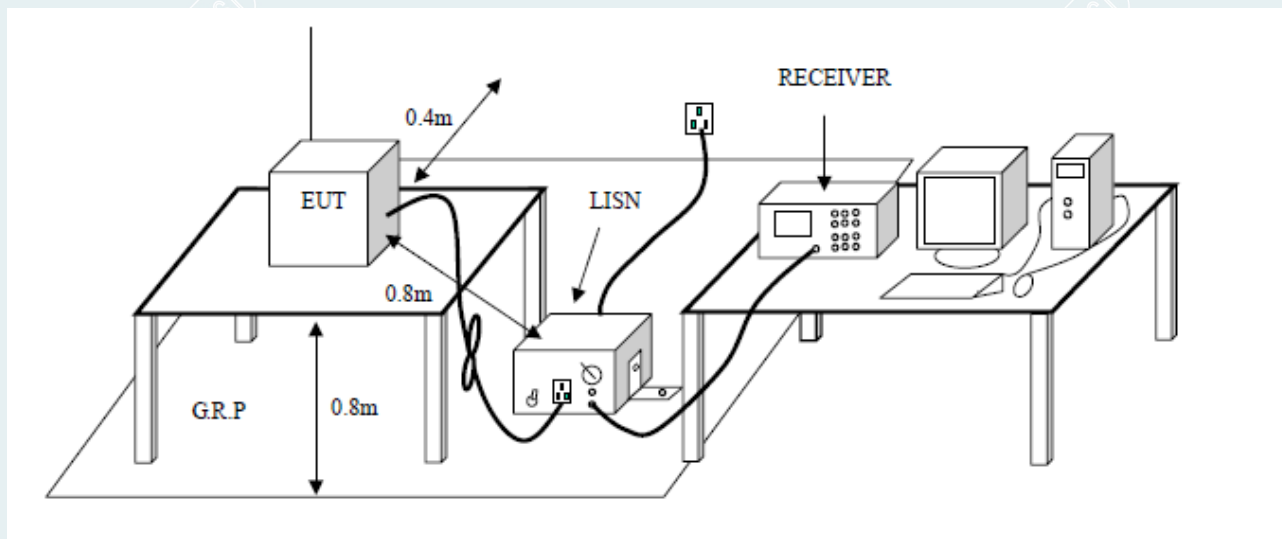
- a) Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:
 - 1) place 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;
- b) All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;
- c) 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;
- d) 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.
- e) 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.
- f) 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.

6.3 TEST SETUP



6.4 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)

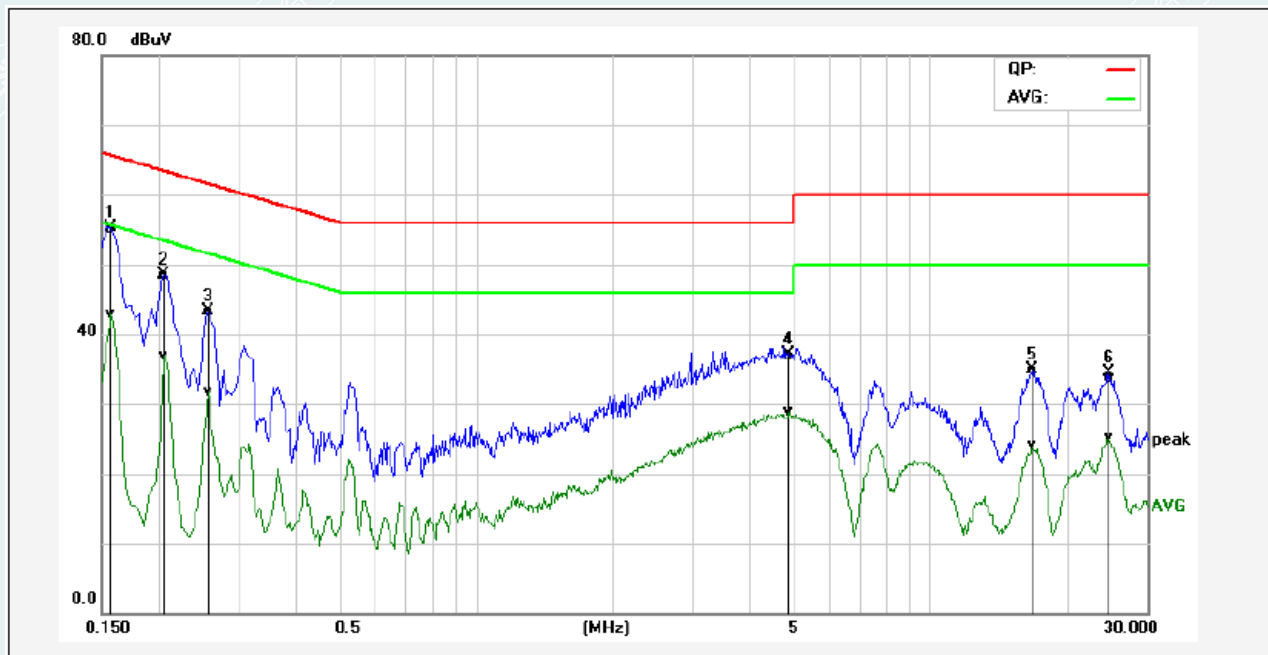
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6.5 TEST RESULTS

Note: Pre-scan all modes, the worst power supply is AC 120/60Hz(DC 5V/2A power by Adapter). In the two power supply modes, only the worst case(BLE 1M_2402MHz) in the worst power supply is recorded, in this report.

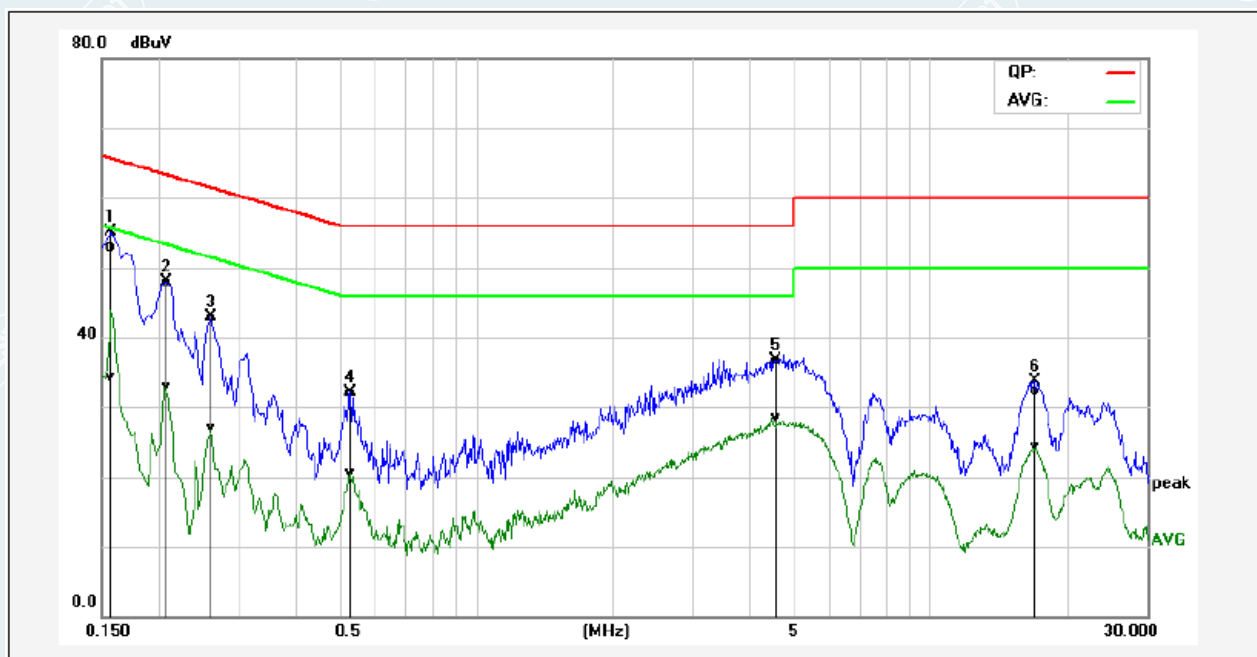
Power supply: AC 120V/60Hz (DC 5V/2A power by Adapter)

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0006
Mode:	BLE 1M_2402MHz	Voltage:	AC 120V/60Hz
Environment:	24.2°C/52%RH/101.0kPa	Engineer:	Chen Zexin
Test Date:	2023-12-13	Line	L



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*	0.1580	45.48	33.10	9.72	55.20	42.82	65.56	55.57	-10.36	-12.75	Pass
2	0.2060	38.86	27.30	9.69	48.55	36.99	63.36	53.37	-14.81	-16.38	Pass
3	0.2580	33.66	22.09	9.69	43.35	31.78	61.49	51.50	-18.14	-19.72	Pass
4	4.9020	27.07	19.14	9.75	36.82	28.89	56.00	46.00	-19.18	-17.11	Pass
5	16.7939	24.98	14.12	9.98	34.96	24.10	60.00	50.00	-25.04	-25.90	Pass
6	24.6140	23.58	14.97	10.19	33.77	25.16	60.00	50.00	-26.23	-24.84	Pass

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0006
Mode:	BLE 1M_2402MHz	Voltage:	AC 120V/60Hz
Environment:	24.2°C/52%RH/101.0kPa	Engineer:	Chen Zexin
Test Date:	2023-12-13	Line	N



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*	0.1580	43.29	24.60	9.68	52.97	34.28	65.56	55.57	-12.59	-21.29	Pass
2	0.2060	38.15	23.27	9.67	47.82	32.94	63.36	53.37	-15.54	-20.43	Pass
3	0.2620	33.28	17.26	9.67	42.95	26.93	61.36	51.37	-18.41	-24.44	Pass
4	0.5299	22.49	10.74	9.68	32.17	20.42	56.00	46.00	-23.83	-25.58	Pass
5	4.4820	26.97	18.69	9.75	36.72	28.44	56.00	46.00	-19.28	-17.56	Pass
6	17.1500	22.27	14.25	10.13	32.40	24.38	60.00	50.00	-27.60	-25.62	Pass

7. RADIATED SPURIOUS EMISSIONS

7.1 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 $\mu\text{V/m}$).

7.2 TEST PROCEDURES

a) 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.

b) 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.

c) 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.

d) 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:

- (1).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).
- (2).The frequency from 30MHz to 1GHz, Set RBW=120kHz, VBW=300kHz, (for QP Detector).
- (3).The frequency above 1GHz, for Peak detector: Set RBW=1MHz,VBW=3MHz.
- (4). 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.

7.3 TEST SETUP

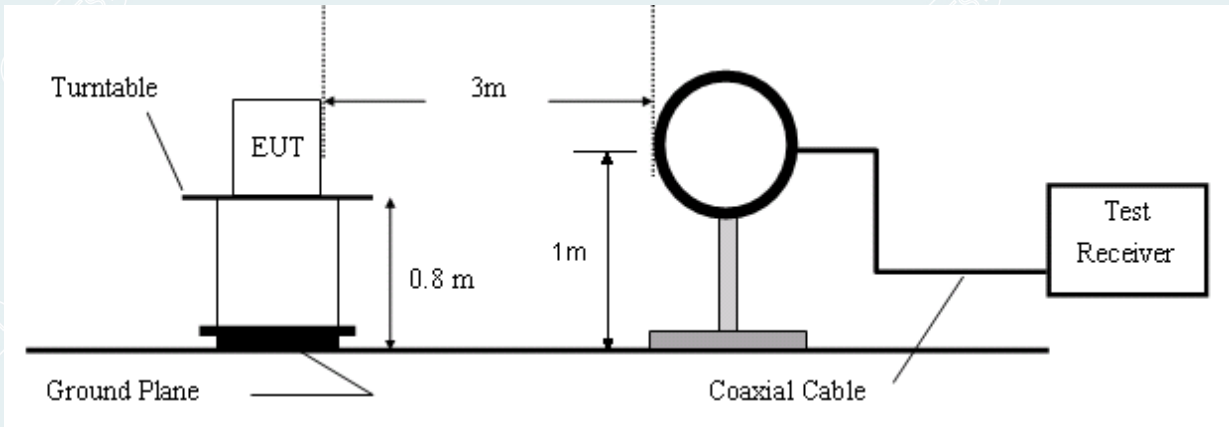


Figure 1. 9kHz to 30MHz radiated emissions test configuration

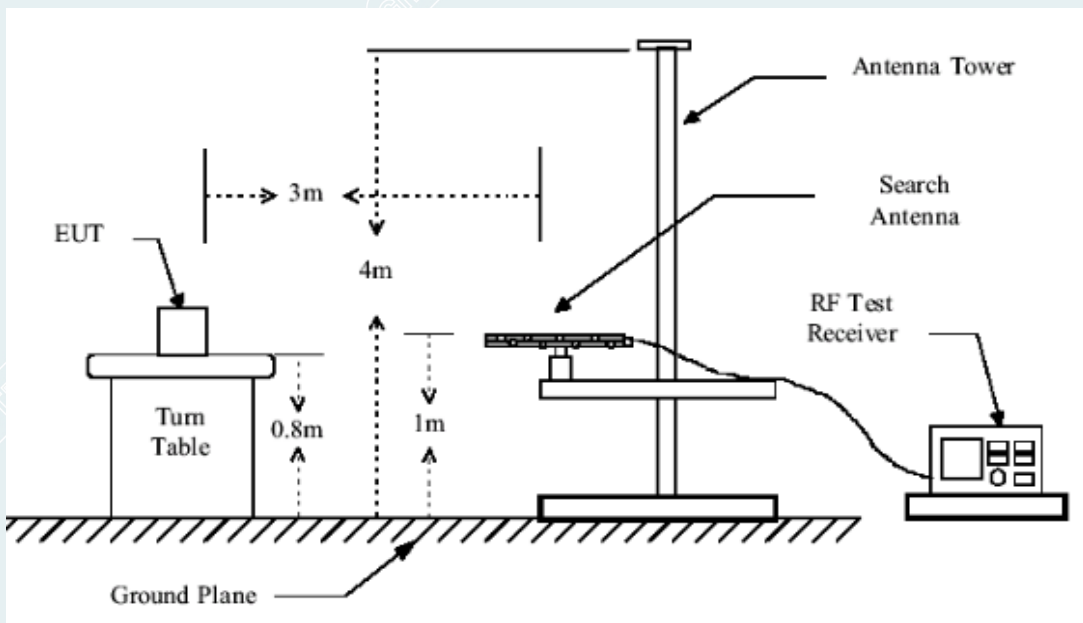


Figure 2. 30MHz to 1GHz radiated emissions test configuration

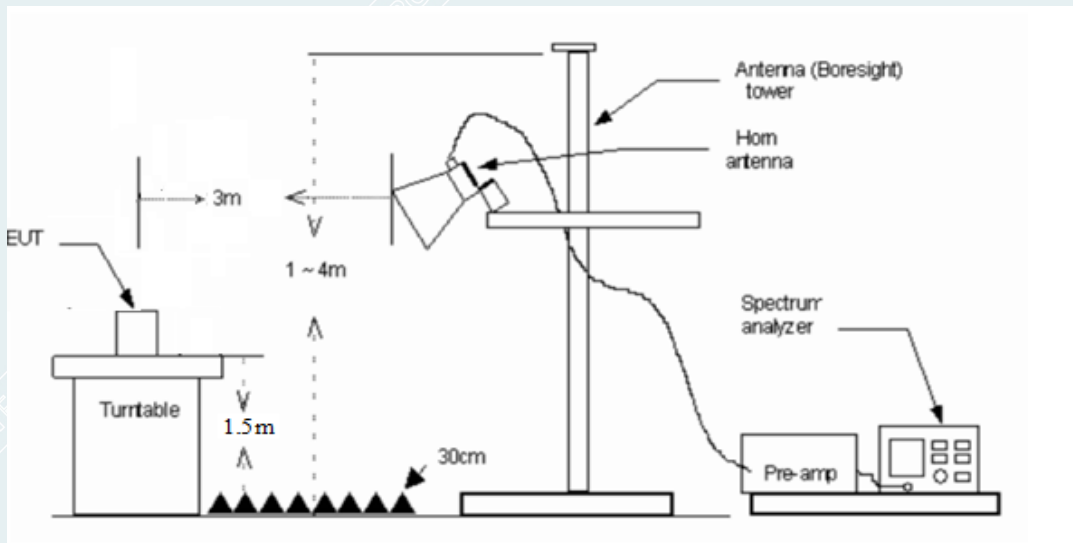


Figure 3. 1GHz to 18GHz radiated emissions test configuration

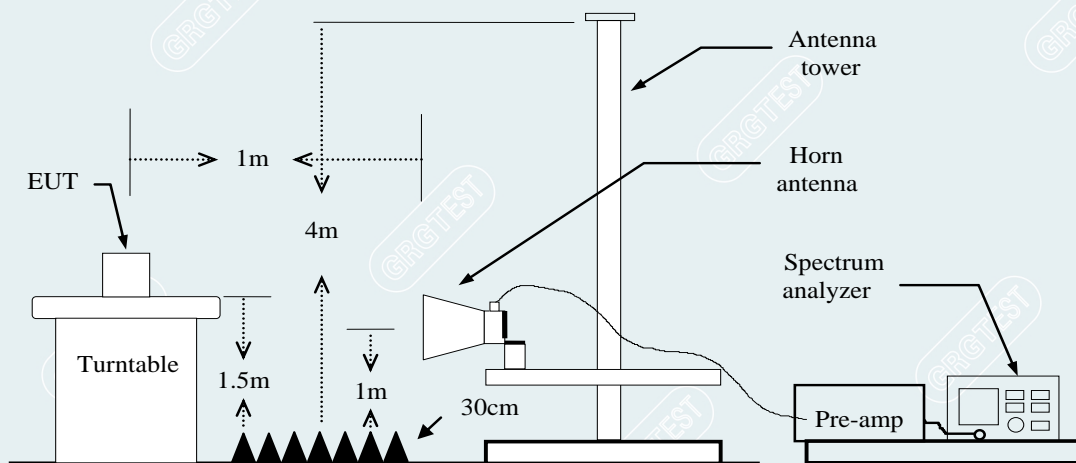


Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

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

7.4 DATA SAMPLE

30MHz to 1GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Detectortype
XXX.XXXX	48.49	-9.91	38.58	47.00	-8.42	100	108	QP

- Frequency (MHz) = Emission frequency in MHz
- Reading (dBuV) = Uncorrected Analyzer / Receiver reading
- Correct Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
- Result (dBuV/m) = Reading (dBuV) + Correct Factor (dB/m)
- Limit (dBuV/m) = Limit stated in standard
- Margin (dB) = Result (dBuV/m)-Limit (dBuV/m)
- Peak = Peak Reading
- QP = Quasi-peak Reading

1GHz-18GHz

No.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
xxx	xxxx	78.01	55.30	-22.71	74.00	18.70	100	50	Horizontal	Peak
xxx	xxxx	66.37	43.66	-22.71	54.00	10.34	100	50	Horizontal	AVG

Above 18GHz

NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity	Remark
xxx	xxxx	54.49	42.38	32.84	-12.11	74	41.16	100	211	Horizontal	Peak
xxx	xxxx	43.99	31.88	22.34	-12.11	54	31.66	100	211	Horizontal	AVG

- Frequency (MHz) = Emission frequency in MHz
- Reading (dBuV/m) = Uncorrected Analyzer / Receiver reading
- Factor (dB) = Antenna factor + Cable loss – Amplifier gain
- Level for 1m (dBuV/m) = Reading (dBuV/m) + Factor (dB)
- Level for 3m (dBuV/m) = Level for 1m (dBuV/m) + 20*log(1/3)
- Limit (dBuV/m) = Limit stated in standard
- Margin (dB) = Limit (dBuV/m) – Level (dBuV/m)
- Polarity = Antenna polarization
- Peak = Peak Reading
- AVG = Average Reading

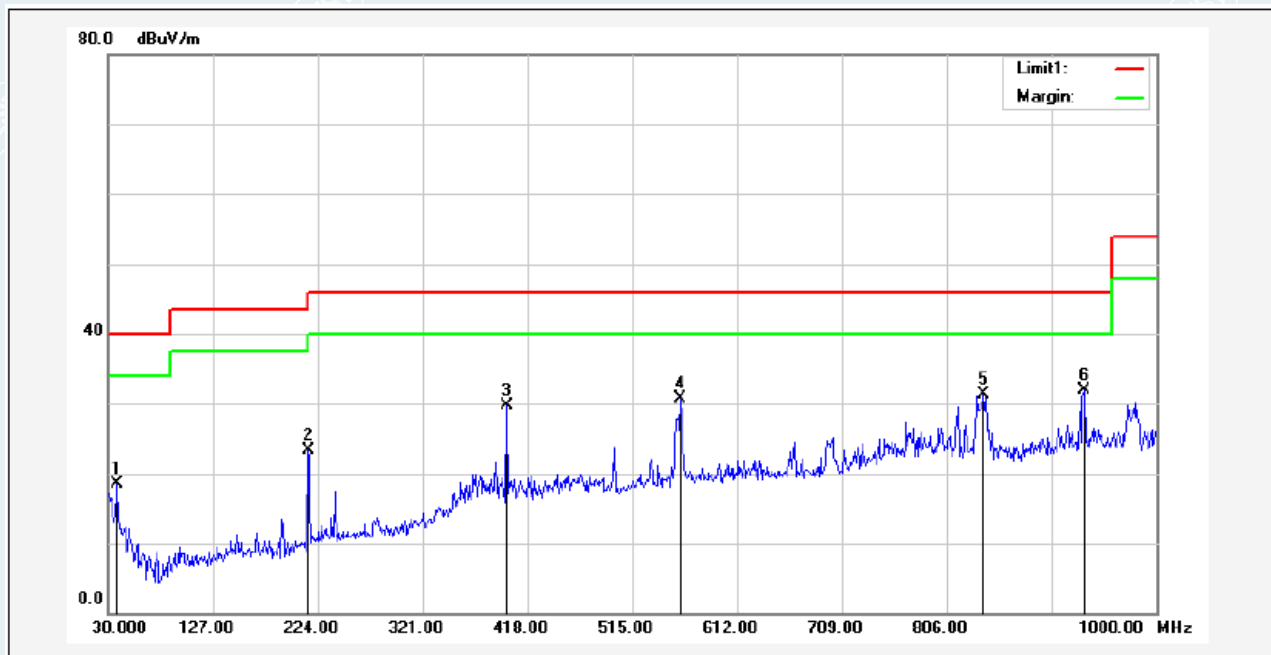
7.5 TEST RESULTS

Below 1GHz

Note: Pre-scan all modes, the worst power supply is AC 120/60Hz(DC 5V/2A power by Adapter). In the two power supply modes, only the worst case(TX_BLE_2M_2402MHz) in the worst power supply is recorded, in this report.

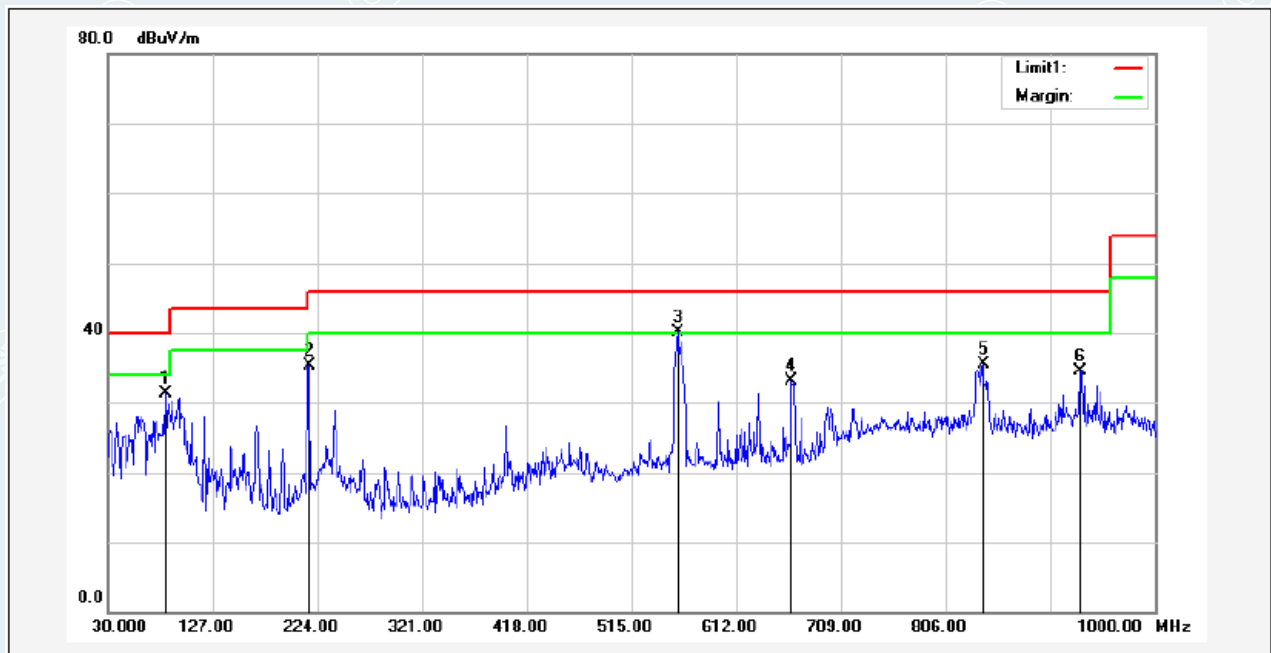
Power supply: AC 120V/60Hz (DC 5V/2A power by Adapter)

EUT Name:	Hub M3	Test Mode:	Mode 1
Model:	HM-G01E	Sample No:	E20230331478001-0006
Power supply:	AC 120V/60Hz	Environmental Conditions:	25.6°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-09-05
Frequency	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	39.99	-21.41	18.58	40.00	-21.42	272	100	QP
2	215.2700	48.92	-25.67	23.25	43.50	-20.25	162	200	QP
3	398.6000	49.34	-19.73	29.61	46.00	-16.39	360	189	QP
4	559.6200	46.96	-16.19	30.77	46.00	-15.23	93	200	QP
5	839.9500	44.57	-13.23	31.34	46.00	-14.66	360	196	QP
6*	933.0700	44.23	-12.26	31.97	46.00	-14.03	360	119	QP

EUT Name:	Hub M3	Test Mode:	Mode 1
Model:	HM-G01E	Sample No:	E20230331478001-0006
Power supply:	AC 120V/60Hz	Environmental Conditions:	25.6°C/58%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-09-05
Frequency	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	83.3500	62.55	-31.23	31.32	40.00	-8.68	248	100	QP
2	216.2400	60.92	-25.64	35.28	46.00	-10.72	204	100	QP
3*	557.6800	56.37	-16.21	40.16	46.00	-5.84	0	100	QP
4	663.4100	48.41	-15.30	33.11	46.00	-12.89	342	100	QP
5	840.9200	48.78	-13.22	35.56	46.00	-10.44	42	100	QP
6	930.1600	46.85	-12.31	34.54	46.00	-11.46	20	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.

Pre-scan all modes, the worst power supply is AC 120/60Hz(DC 5V/2A power by Adapter). In the two power supply modes, only the worst power supply mode is recorded in this report.

Mode: TX/ BLE_1M

Lowest Frequency (2402MHz)

Environment: 25.8°C/53%RH/101.0kPa

Tested By:Zhang Zishan

Voltage: AC 120V/60Hz

Date: 2023-09-05

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1112.8000	56.50	46.99	-9.51	74.00	27.01	100	140	Horizontal
2	1784.0000	51.63	44.06	-7.57	74.00	29.94	100	77	Horizontal
3	2543.4000	49.45	47.15	-2.30	74.00	26.85	100	150	Horizontal
4	3370.5000	61.10	49.42	-11.68	74.00	24.58	100	221	Horizontal
5	7204.5000	46.99	50.23	3.24	74.00	23.77	100	138	Horizontal
6	15676.5000	39.04	50.65	11.61	74.00	23.35	100	16	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	3378.2555	-11.68	41.30	29.62	54.00	24.38	114	216.5	Horizontal
2	7205.9575	3.24	40.97	44.21	54.00	9.79	100	135.5	Horizontal
3	15752.9575	11.61	27.48	39.09	54.00	14.91	100	310	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	1120.2000	56.32	45.44	-10.88	74.00	28.56	100	210	Vertical
2	1248.0000	55.30	47.95	-7.35	74.00	26.05	100	231	Vertical
3	1783.8000	54.57	47.00	-7.57	74.00	27.00	100	281	Vertical
4	2520.6000	50.94	47.98	-2.96	74.00	26.02	100	231	Vertical
5	4803.0000	53.33	50.98	-2.35	74.00	23.02	100	324	Vertical
6	7204.5000	50.13	53.34	3.21	74.00	20.66	100	128	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	4803.9730	-2.35	51.76	49.41	54.00	4.59	112	303.5	Vertical
2	7205.9575	3.21	43.44	46.65	54.00	7.35	120	124.3	Vertical

Mode: TX/ BLE_1M
 Middle Frequency (2440MHz)
 Environment: 25.8°C/53%RH/101.0kPa
 Tested By:Zhang Zishan

Voltage: AC 120V/60Hz
 Date: 2023-09-05

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1118.0000	54.80	45.34	-9.46	74.00	28.66	100	140	Horizontal
2	1920.8000	54.22	47.54	-6.68	74.00	26.46	100	119	Horizontal
3	2915.0000	47.92	47.13	-0.79	74.00	26.87	100	171	Horizontal
4	4879.5000	50.37	48.24	-2.13	74.00	25.76	200	344	Horizontal
5	7318.5000	46.78	49.83	3.05	74.00	24.17	100	129	Horizontal
6	15673.5000	39.10	50.86	11.76	74.00	23.14	200	210	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	4879.9945	-2.13	44.01	41.88	54.00	12.12	159	128.2	Horizontal
2	7319.9875	3.05	40.10	43.15	54.00	10.85	115	131.4	Horizontal
3	15750.6225	11.76	27.50	39.26	54.00	14.74	118	221.3	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	1119.2000	56.57	45.67	-10.90	74.00	28.33	100	312	Vertical
2	3193.5000	59.26	46.96	-12.30	74.00	27.04	100	98	Vertical
3	4242.0000	52.98	46.12	-6.86	74.00	27.88	100	263	Vertical
4	4879.5000	54.82	52.27	-2.55	74.00	21.73	100	119	Vertical
5	7318.5000	49.27	52.38	3.11	74.00	21.62	100	128	Vertical
6	17994.0000	38.66	52.14	13.48	74.00	21.86	200	159	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	4879.9945	-2.55	52.48	49.93	54.00	4.07	101	143.8	Vertical
2	7319.8775	3.11	43.31	46.42	54.00	7.58	142	110	Vertical
3	17880.3400	13.48	26.06	39.54	54.00	14.46	118	199.7	Vertical

Mode: TX/ BLE_1M
 Highest Frequency (2480MHz)
 Environment: 25.8°C/53%RH/101.0kPa
 Tested By:Zhang Zishan

Voltage: AC 120V/60Hz
 Date: 2023-09-05

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1120.0000	56.97	47.53	-9.44	74.00	26.47	100	138	Horizontal
2	1957.8000	51.51	45.23	-6.28	74.00	28.77	200	313	Horizontal
3	2990.6000	47.77	47.26	-0.51	74.00	26.74	100	232	Horizontal
4	4960.5000	51.34	50.23	-1.11	74.00	23.77	200	346	Horizontal
5	7438.5000	44.49	47.85	3.36	74.00	26.15	100	150	Horizontal
6	15667.5000	37.95	50.01	12.06	74.00	23.99	200	202	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	4959.8535	-1.11	45.89	44.78	54.00	9.22	200	343.5	Horizontal
2	15687.4525	12.06	27.42	39.48	54.00	14.52	144	230.6	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	1120.4000	56.75	45.87	-10.88	74.00	28.13	100	315	Vertical
2	1677.8000	53.27	44.79	-8.48	74.00	29.21	100	191	Vertical
3	1999.8000	52.70	45.99	-6.71	74.00	28.01	100	191	Vertical
4	3198.0000	57.69	45.40	-12.29	74.00	28.60	100	138	Vertical
5	4959.0000	56.40	54.89	-1.51	74.00	19.11	100	128	Vertical
6	7438.5000	46.94	50.42	3.48	74.00	23.58	100	118	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	4959.9330	-1.51	54.33	52.82	54.00	1.18	100	118.3	Vertical
2	7440.0075	3.48	42.65	46.13	54.00	7.87	115	130.9	Vertical

Mode: TX/ BLE_2M
 Lowest Frequency (2402MHz)
 Environment: 25.8°C/53%RH/101.0kPa
 Tested By:Zhang Zishan

Voltage: AC 120V/60Hz
 Date: 2023-09-05

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1114.6000	56.22	46.73	-9.49	74.00	27.27	100	140	Horizontal
2	1992.2000	53.80	48.24	-5.56	74.00	25.76	100	262	Horizontal
3	2538.0000	50.28	47.92	-2.36	74.00	26.08	100	180	Horizontal
4	3369.0000	60.65	48.94	-11.71	74.00	25.06	100	168	Horizontal
5	4803.0000	50.10	47.77	-2.33	74.00	26.23	200	333	Horizontal
6	7207.5000	45.90	49.13	3.23	74.00	24.87	200	179	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	1983.5510	-5.56	37.89	32.33	54.00	21.67	114	249	Horizontal
2	3384.3090	-11.71	49.43	37.72	54.00	16.28	100	196.7	Horizontal
3	7204.6825	3.23	37.65	40.88	54.00	13.12	200	176.2	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	1122.4000	55.99	45.15	-10.84	74.00	28.85	100	322	Vertical
2	1672.8000	51.98	43.51	-8.47	74.00	30.49	100	198	Vertical
3	1997.0000	52.53	45.82	-6.71	74.00	28.18	100	179	Vertical
4	2998.8000	48.02	47.04	-0.98	74.00	26.96	200	65	Vertical
5	4803.0000	53.23	50.88	-2.35	74.00	23.12	100	263	Vertical
6	7204.5000	48.90	52.11	3.21	74.00	21.89	100	130	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	4804.0430	-2.35	47.06	44.71	54.00	9.29	114	304.1	Vertical
2	7204.8175	3.21	41.23	44.44	54.00	9.56	122	126.2	Vertical

Mode: TX/ BLE_2M
 Middle Frequency (2440MHz)
 Environment: 25.8°C/53%RH/101.0kPa
 Tested By:Zhang Zishan

Voltage: AC 120V/60Hz
 Date: 2023-09-05

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1115.8000	60.46	50.98	-9.48	74.00	23.02	100	86	Horizontal
2	1685.0000	51.30	43.71	-7.59	74.00	30.29	100	118	Horizontal
3	2980.0000	47.53	46.99	-0.54	74.00	27.01	100	14	Horizontal
4	4252.5000	53.80	47.02	-6.78	74.00	26.98	100	17	Horizontal
5	5092.5000	47.88	48.08	0.20	74.00	25.92	100	6	Horizontal
6	15649.5000	38.30	51.25	12.95	74.00	22.75	100	333	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	1116.1710	-9.48	44.91	35.43	54.00	18.57	101	82.9	Horizontal
2	5104.8815	0.20	35.72	35.92	54.00	18.08	115	141	Horizontal
3	15679.8525	12.95	27.33	40.28	54.00	13.72	189	288	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	1113.4000	63.63	52.63	-11.00	74.00	21.37	100	138	Vertical
2	1816.8000	53.46	46.15	-7.31	74.00	27.85	100	106	Vertical
3	3181.5000	59.75	47.43	-12.32	74.00	26.57	100	77	Vertical
4	4878.0000	54.10	51.55	-2.55	74.00	22.45	100	231	Vertical
5	7318.5000	49.22	52.33	3.11	74.00	21.67	100	16	Vertical
6	17899.5000	37.62	51.17	13.55	74.00	22.83	100	108	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	1117.2510	-11.00	49.27	38.27	54.00	15.73	149	133.2	Vertical
2	4879.9060	-2.55	47.34	44.79	54.00	9.21	114	226.9	Vertical
3	7318.7075	3.11	39.97	43.08	54.00	10.92	100	25	Vertical
4	17873.0825	13.55	25.88	39.43	54.00	14.57	148	137.5	Vertical

Mode: TX/ BLE_2M
 Highest Frequency (2480MHz)
 Environment: 25.8°C/53%RH/101.0kPa
 Tested By:Zhang Zishan

Voltage: AC 120V/60Hz
 Date: 2023-09-05

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	1115.6000	59.37	49.88	-9.49	74.00	24.12	100	111	Horizontal
2	1666.4000	50.97	43.30	-7.67	74.00	30.70	100	100	Horizontal
3	2989.4000	47.42	46.91	-0.51	74.00	27.09	100	38	Horizontal
4	4776.0000	49.90	46.63	-3.27	74.00	27.37	200	88	Horizontal
5	6399.0000	47.69	47.31	-0.38	74.00	26.69	100	128	Horizontal
6	15652.5000	37.94	50.77	12.83	74.00	23.23	200	37	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	1119.3940	-9.49	44.34	34.85	54.00	19.15	101	122.3	Horizontal
2	15690.0975	12.83	27.39	40.22	54.00	13.78	180	102.8	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	1112.8000	58.10	47.09	-11.01	74.00	26.91	100	190	Vertical
2	1677.8000	52.80	44.32	-8.48	74.00	29.68	100	118	Vertical
3	1992.6000	52.94	46.21	-6.73	74.00	27.79	100	139	Vertical
4	4959.0000	55.66	54.15	-1.51	74.00	19.85	100	222	Vertical
5	7438.5000	46.73	50.21	3.48	74.00	23.79	100	47	Vertical
6	17919.0000	38.08	51.61	13.53	74.00	22.39	200	221	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	4960.0050	-1.51	49.15	47.64	54.00	6.36	100	226.7	Vertical
2	7438.7175	3.48	39.33	42.81	54.00	11.19	100	22	Vertical
3	17919.0000	13.53	28.58	42.11	54.00	11.89	200	221	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.

Note: Pre-scan all modes, the worst power supply is AC 120/60Hz(DC 5V/2A power by Adapter). In the two power supply modes, only the worst case(TX/BLE_2M_2402MHz) in the worst power supply is recorded, in this report.

Mode: TX/ BLE_2M

Lowest Frequency (2402MHz)

Environment: 24.5°C/59%RH/101.0kPa

Tested By: Zhang Zishan

Voltage: AC 120V/60Hz

Date: 2023-09-05

Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18218.8750	48.70	30.59	21.05	-18.11	74	52.95	100	15	Horizontal
2	19887.8500	48.49	31.91	22.37	-16.58	74	51.63	100	102	Horizontal
3	22195.6000	45.39	29.78	20.24	-15.61	74	53.76	100	53	Horizontal
4	24120.4250	47.10	32.85	23.31	-14.25	74	50.69	100	15	Horizontal
5	24999.3250	47.21	33.38	23.84	-13.83	74	50.16	200	356	Horizontal
6	26295.1500	46.42	32.27	22.73	-14.15	74	51.27	100	344	Horizontal

Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level for 1m [dBμV/m]	Level for 3m [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18359.1250	48.02	30.17	20.63	-17.85	74	53.37	200	308	Vertical
2	19904.0000	46.89	30.06	20.52	-16.83	74	53.48	200	282	Vertical
3	20827.5250	45.52	29.29	19.75	-16.23	74	54.25	100	184	Vertical
4	22909.1750	44.93	30.03	20.49	-14.90	74	53.51	100	62	Vertical
5	24095.7750	45.25	30.75	21.21	-14.50	74	52.79	200	37	Vertical
6	25470.2250	45.76	31.71	22.17	-14.05	74	51.83	100	172	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.
- 4 Above 18G test distance is 1m, so the Level for 3m= Level for 1m + 20*log(1/3)

8. 6dB BANDWIDTH

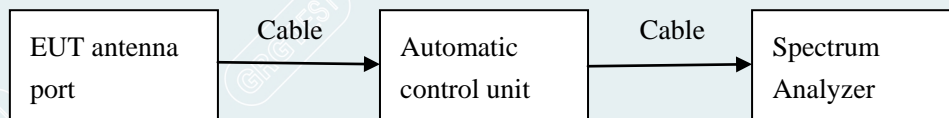
8.1 LIMITS

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.

8.2 TEST PROCEDURES

- Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the Automatic power measuring unit.
- 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.
- Repeat above procedures until all frequencies measured were complete.

8.3 TEST SETUP



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

8.4 TEST RESULTS

Environment: 27.1°C/49%RH/101.0kPa
 Tested By: Huang Tianmei

Voltage: DC 5V
 Date: 2023-11-29

BLE_1M

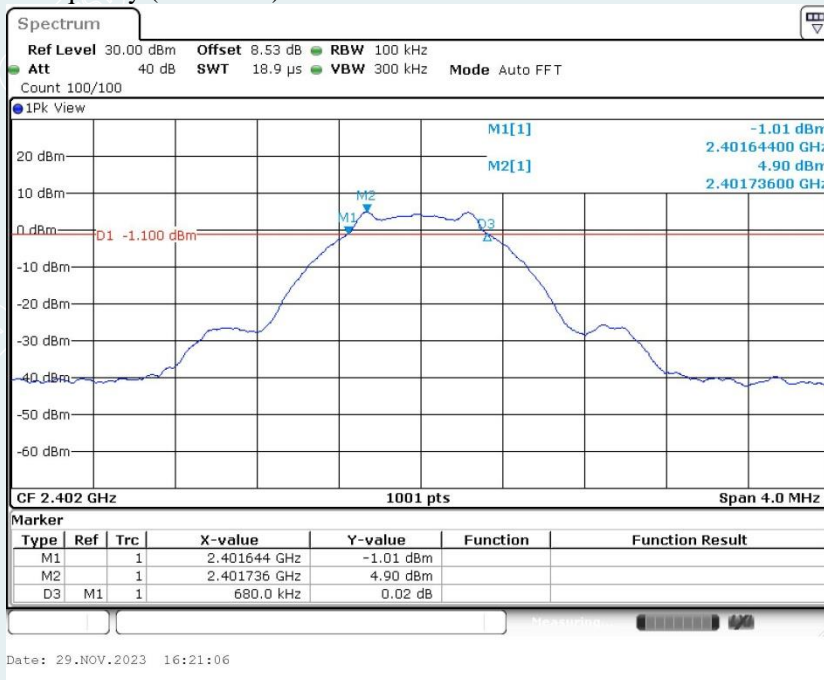
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Lowest	2402	680	≥500	PASS
Middle	2440	664		PASS
Highest	2480	656		PASS

BLE_2M

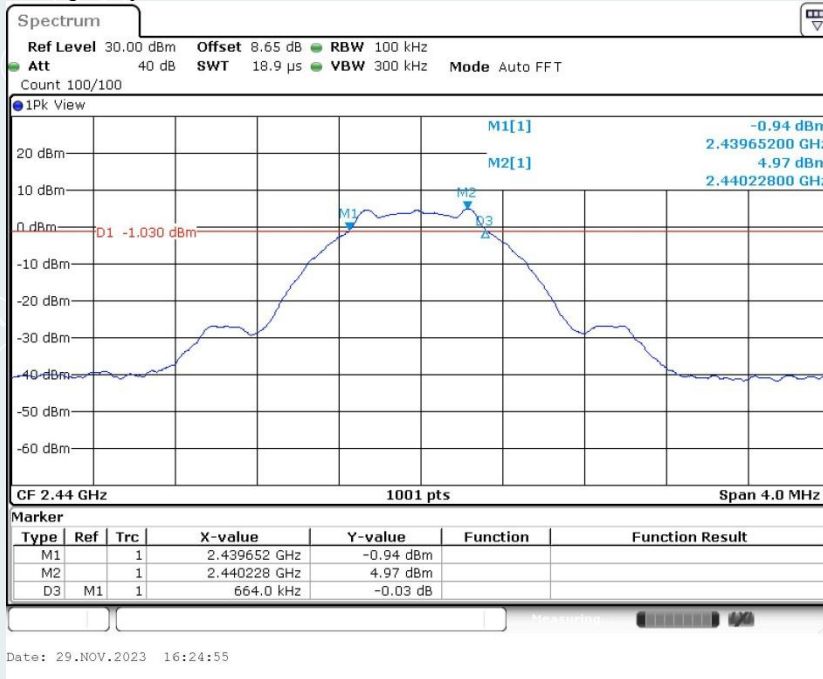
Channel	Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Test Result
Lowest	2402	1404	≥500	PASS
Middle	2440	1396		PASS
Highest	2480	1404		PASS

BLE_1M

Lowest Frequency (2402MHz)



Middle Frequency (2440 MHz)



Highest Frequency (2480MHz)

