

Test Report

Verified code: 709762

Report No.: E20230331478001-14

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: Aug.08,2023 ~ Dec.18,2023

Reference Document: 47 CFR, FCC Parts 15 Subpart E Unlicensed National Information Infrastructure
Devices

Test Result: Pass

Prepared by: Chen Xiacong
Chen Xiacong

Reviewed by: Jiang Tao
Jiang Tao

Approved by: Xiao Liang
Xiao Liang

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2024-01-09

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5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

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Table of Contents

1.	TEST RESULT SUMMARY.....	6
2.	GENERAL DESCRIPTION OF EUT.....	7
2.1	APPLICANT.....	7
2.2	MANUFACTURER.....	7
2.3	BASIC DESCRIPTION OF EQUIPMENT UNDER TEST.....	7
2.4	CHANNEL LIST AND POWER SETTING.....	9
2.5	TEST OPERATION MODE.....	9
2.6	LOCAL SUPPORTIVE INSTRUMENTS.....	10
2.7	CONFIGURATION OF SYSTEM UNDER TEST.....	10
2.8	DUTY CYCLE.....	11
3.	LABORATORY AND ACCREDITATIONS AND MEASUREMENT UNCERTAINTY.....	14
3.1	LABORATORY.....	14
3.2	ACCREDITATIONS.....	14
3.3	MEASUREMENT UNCERTAINTY.....	15
4.	LIST OF USED TEST EQUIPMENT AT GRGT.....	16
5.	AC POWER LINE CONDUCTED EMISSIONS.....	18
5.1	LIMITS.....	18
5.2	TEST PROCEDURES.....	18
5.3	TEST SETUP.....	19
5.4	DATA SAMPLE.....	19
5.5	TEST RESULTS.....	20
6.	UNWANTED EMISSIONS.....	22
6.1	LIMITS.....	22
6.2	TEST PROCEDURES.....	23
6.3	TEST SETUP.....	25
6.4	DATA SAMPLE.....	26
6.5	TEST RESULTS.....	28
7.	RESTRICTED BANDS OF OPERATION.....	62
7.1	LIMITS.....	62
7.2	TEST PROCEDURES.....	62
7.3	TEST SETUP.....	63
7.4	TEST RESULTS.....	64
8.	6dB BANDWIDTH & 26dB BANDWIDTH & 99% OCCUPIED BANDWIDTH.....	98
8.1	LIMITS.....	98
8.2	TEST PROCEDURES.....	98
8.3	TEST SETUP.....	99
8.4	TEST RESULTS.....	100
9.	OUTPUT POWER.....	123
9.1	LIMITS.....	123
9.2	TEST PROCEDURES.....	123
9.3	TEST SETUP.....	123

9.4	TEST RESULTS	124
10.	POWER SPECTRAL DENSITY	126
10.1	LIMITS.....	126
10.2	TEST PROCEDURES	126
10.3	TEST SETUP	126
10.4	TEST RESULTS	127
11.	FREQUENCY STABILITY	139
11.1	LIMITS.....	139
11.2	TEST PROCEDURES	139
11.3	TEST SETUP	140
11.4	TEST RESULTS	141
	APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM	150
	APPENDIX B. PHOTOGRAPH OF THE EUT	150

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20230331478001-14	Original Issue	2024-01-05

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1. TEST RESULT SUMMARY

Standard	Item	Limit / Severity	Result
47 CFR, FCC Parts 15 Subpart E (§15.407)	6dB Bandwidth & 26dB Bandwidth & 99% Occupied Bandwidth	15.407(a) 15.407(e)	PASS
	AC Power Line Conducted Emissions	15.207 15.407(b)(9)	PASS
	Unwanted Emissions and Band Edge	15.205 15.209 15.407(b)	PASS
	Output Power	15.407(a)	PASS
	Peak Power Spectral Density	15.407(a)	PASS
	Frequency Stability	15.407(g)	PASS
	Antenna Requirement	15.203	PASS ¹⁾

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

Product Name: Hub M3
Product Model: 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.
FCC ID: 2AKIT-HMG01
Trade Name: Aqara
Power Supply: DC 5V/2A or PoE input 48V/0.27A
Frequency Band: U-NII-1: 5180MHz~5240MHz
U-NII-3: 5745MHz~5825MHz
Modulation Type: IEEE 802.11a: OFDM
IEEE 802.11n: OFDM
IEEE 802.11ac: OFDM
Antenna Specification: U-NII-1: PIFA antenna with 0.5dBi antenna gain(max)
U-NII-3: PIFA antenna with 0.2dBi antenna gain(max)
Channels Spacing: IEEE 802.11a: 20MHz
IEEE 802.11n HT20: 20MHz
IEEE 802.11n HT40: 40MHz
IEEE 802.11acVHT20: 20MHz
IEEE 802.11acVHT40: 40MHz
IEEE 802.11acVHT80: 80MHz
Transmit Power: U-NII-1:
12.58dBm for IEEE 802.11a
12.23dBm for IEEE 802.11n HT20
12.41dBm for IEEE 802.11acVHT20
12.64dBm for IEEE 802.11n HT40
12.33dBm for IEEE 802.11acVHT40
12.05dBm for IEEE 802.11ac VHT80
U-NII-3:
13.87dBm for IEEE 802.11a

14.03dBm for IEEE 802.11n HT20
14.31dBm for IEEE 802.11acVHT20
14.35dBm for IEEE 802.11n HT40
14.44dBm for IEEE 802.11acVHT40
12.10dBm for IEEE 802.11ac VHT80

Temperature Range: -10°C~+50°C

Hardware Version: V2.0.5_1060

Software Version: T0

Sample submitting way: Provided by customer Sampling

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.

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2.4 CHANNEL LIST AND POWER SETTING

Mode	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
IEEE 802.11a	5180	48	5745	48
	5200	48	5785	48
	5240	48	5825	48

Mode	Frequency (MHz)	Power Setting	Mode	Frequency (MHz)	Power Setting
IEEE 802.11n HT20	5180	48	IEEE 802.11ac VHT20	5180	48
	5200	48		5200	48
	5240	48		5240	48
	5745	48		5745	48
	5785	48		5785	48
	5825	48		5825	48

Mode	Frequency (MHz)	Power Setting	Mode	Frequency (MHz)	Power Setting
IEEE 802.11n HT40	5190	34	IEEE 802.11ac VHT40	5190	44
	5230	34		5230	44
	5755	38		5755	44
	5795	38		5795	44

Mode	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
IEEE 802.11ac VHT80	5210	36	5775	36

Test software:

Software version
QCOM_V1.0

2.5 TEST OPERATION MODE

Mode No.	Description of the modes
1	5GHz Wi-Fi TX mode

2.6 LOCAL SUPPORTIVE INSTRUMENTS

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 & Peak power spectral density & Duty cycle & Output power & Frequency stability



For Unwanted Emissions & Restricted bands of operation & AC power line Conducted Emissions



2.8 DUTY CYCLE

Environment: 26.9°C/67%RH 101.0kPa

Voltage:DC 5V

Tested By: Huang Tianmei

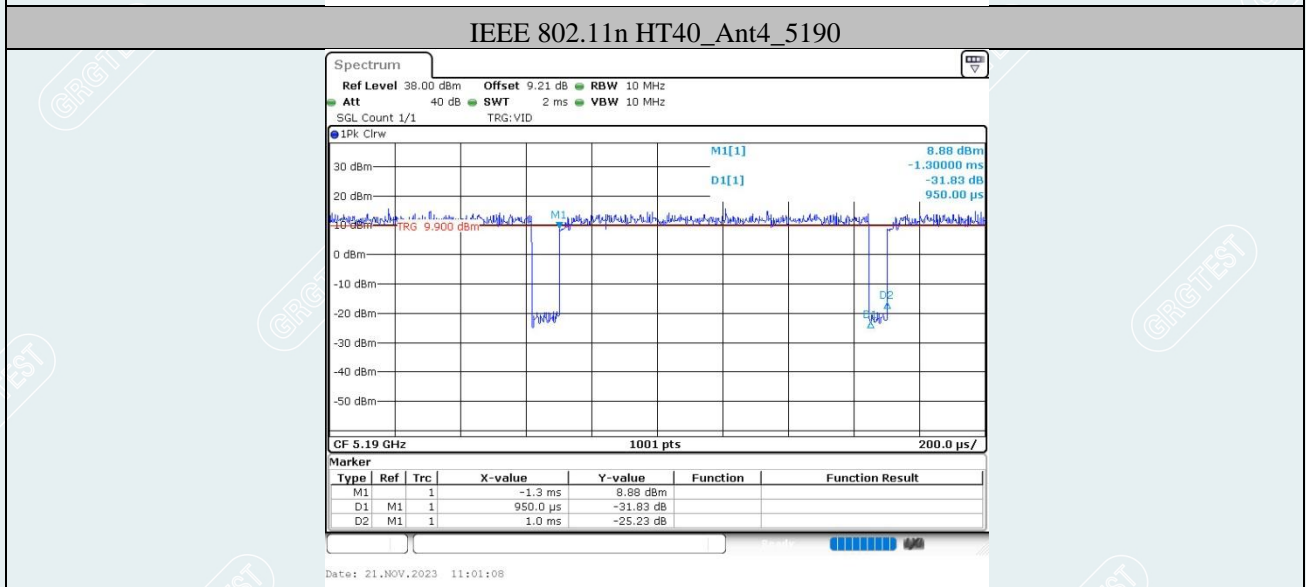
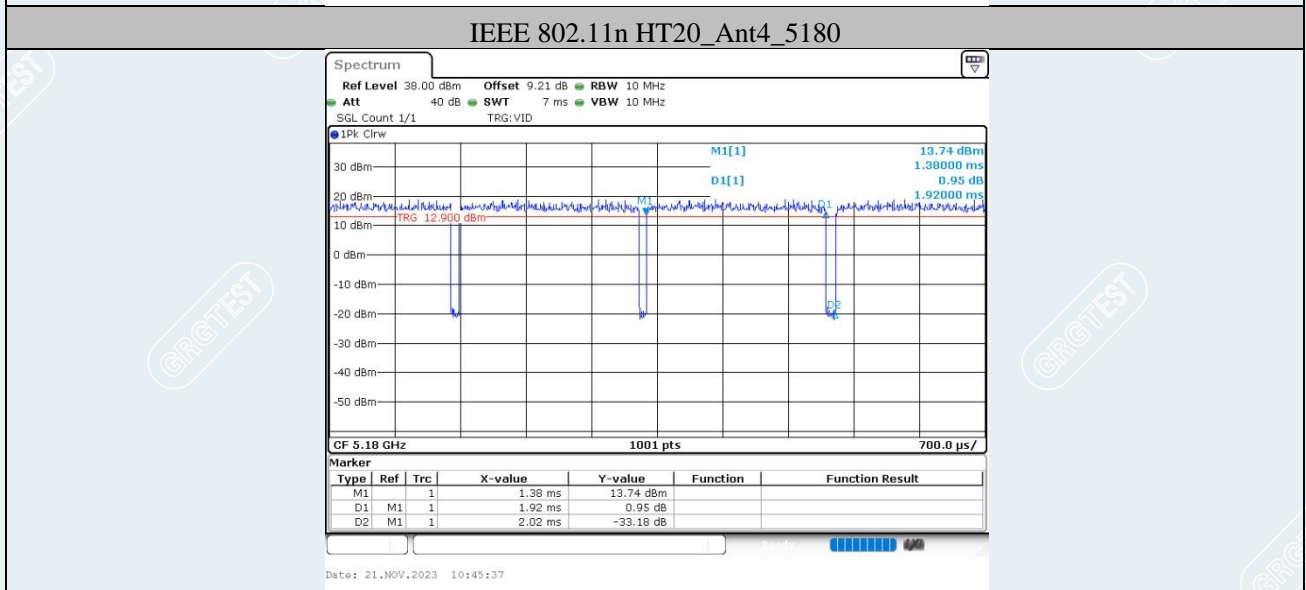
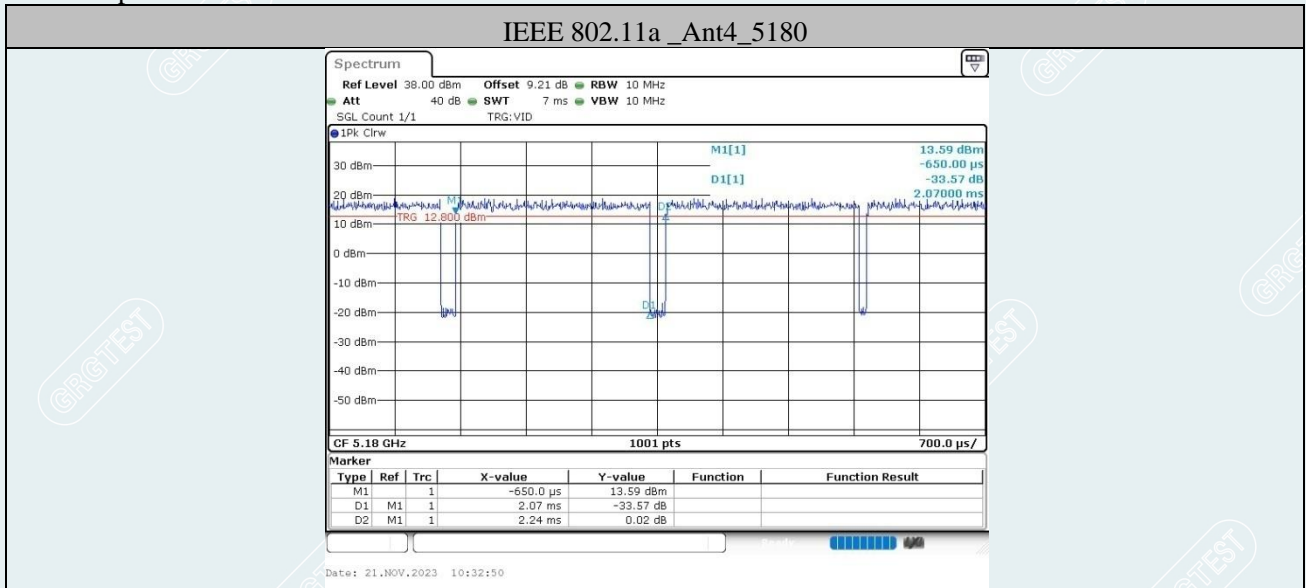
Date: 2023-11-21

TestMode	Antenna	Freq (MHz)	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty Factor	T(s)
IEEE 802.11a	Ant4	5180	2.07	2.24	92.41	0.34	0.00207
IEEE 802.11n HT20	Ant4	5180	1.92	2.02	95.05	0.22	0.00192
IEEE 802.11n HT40	Ant4	5190	0.95	1.00	95.00	0.22	0.00095
IEEE 802.11ac VHT20	Ant4	5180	1.93	2.10	91.91	0.37	0.00193
IEEE 802.11ac VHT40	Ant4	5190	0.96	1.04	92.31	0.35	0.00096
IEEE 802.11ac VHT80	Ant4	5210	0.46	0.56	82.14	0.85	0.00046

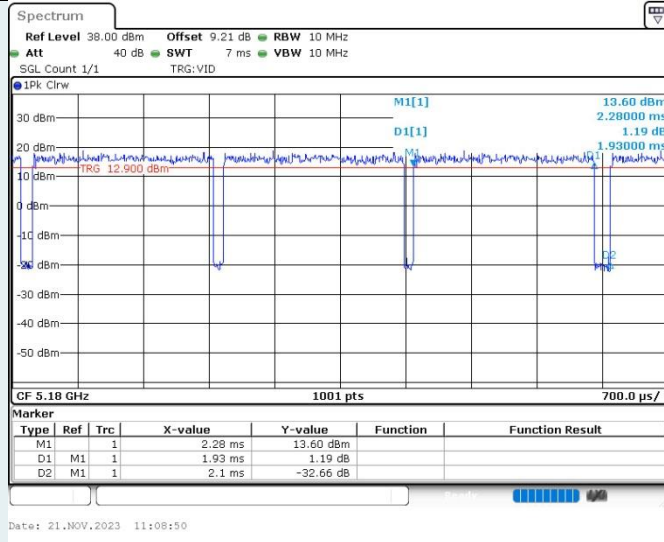
Note:Duty Factor=10log(1/Duty Cycle).

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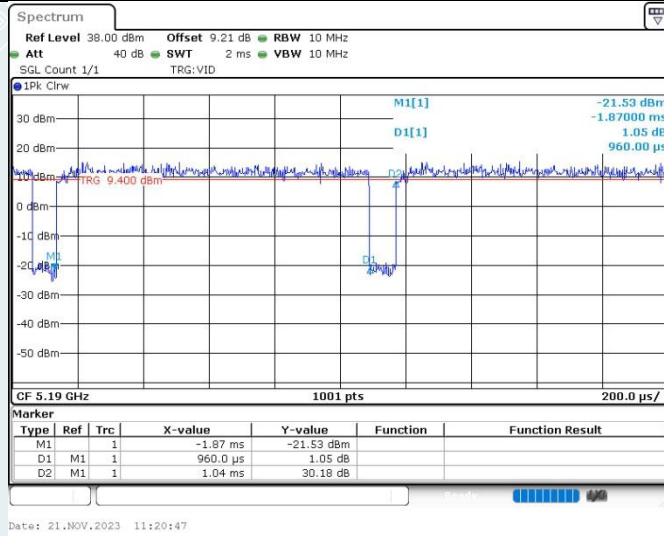
Test Graphs



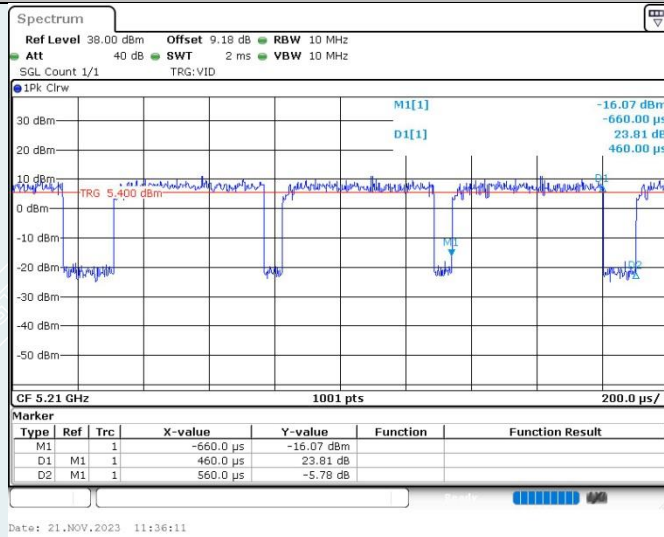
IEEE 802.11ac VHT20_Ant4_5180



IEEE 802.11ac VHT40_Ant4_5190



IEEE 802.11ac VHT80_Ant4_5210



3. LABORATORY AND ACCREDITATIONS AND MEASUREMENT UNCERTAINTY

3.1 LABORATORY

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

Address: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People’s Republic of China

P.C.: 518110

Tel : 0755-61180008

Fax: 0755-61180008

3.2 ACCREDITATIONS

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

USA	A2LA(Certificate #2861.01)
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The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	ISED (Company Number: 24897, CAB identifier:CN0069)
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USA	FCC (Registration Number: 759402, Designation Number:CN1198)
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Copies of granted accreditation certificates are available for downloading from our web site, <http://www.grgtest.com>

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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	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~40GHz	5.2dB ¹⁾
	Vertical	30MHz~200MHz	4.7dB ¹⁾
		200MHz~1000MHz	4.7dB ¹⁾
		1GHz~18GHz	5.1dB ¹⁾
		18GHz~40GHz	5.4dB ¹⁾
Conduction Emission		150kHz~30MHz	3.3dB ¹⁾

Measurement	Uncertainty
RF frequency	6.0×10 ⁻⁶
RF power conducted	0.78dB
Power spectral density	0.78dB
Occupied channel bandwidth	0.4dB
Unwanted emission, conducted	0.68dB
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 $k=2$.

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4. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
AC power line 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
Unwanted Emissions & Restricted bands of operation				
Loop Antenna	Schwarzbeck	FMZB 1513-60	1513-60-56	2024-07-15
Preamplifier	SHIRONG	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
Spectrum Analyzer	Agilent	N9010A	MY52221469	2024-05-15
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	DLNA-1G18G-G40	20200928005	2024-08-17
Test S/W	Tonscend	JS32-RE/5.0.0		
99% Bandwidth & 6 dB Bandwidth & 26dB BANDWIDTH & Peak power spectral density & Duty cycle				
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	/	/
Output Power				
Pulse power sensor	Anristu	MA2411B	1126150	2024-02-12
Power meter	Anristu	ML2495A	1204003	2024-02-12
Frequency Stability				
Spectrum Analyzer	R&S	FSV30	104381	2024-10-13
Automatic control unit	TONSCEND	JS0806-2	2018060317	2024-08-04

DC source	KEYSIGHT	E36131A	MY59001135	2024-09-22
Programmable constant temperature and humidity test chamber	FC	FPHC-23AW-40	FD202306015	2024-09-10
BT/WIFI System	TONSCEND	JS1120-3	/	/

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

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5. AC POWER LINE CONDUCTED EMISSIONS

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

5.2 TEST PROCEDURES

Procedure of Preliminary Test

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:

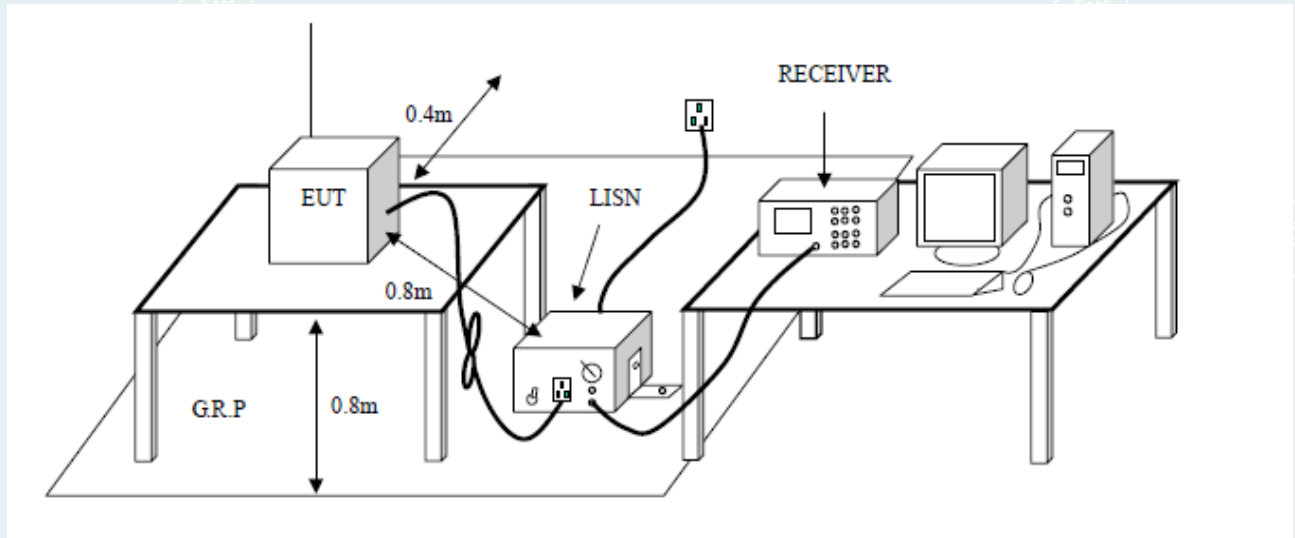
- a) Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:
 - 1) Place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

The test mode(s) described in Item 2.5 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.5 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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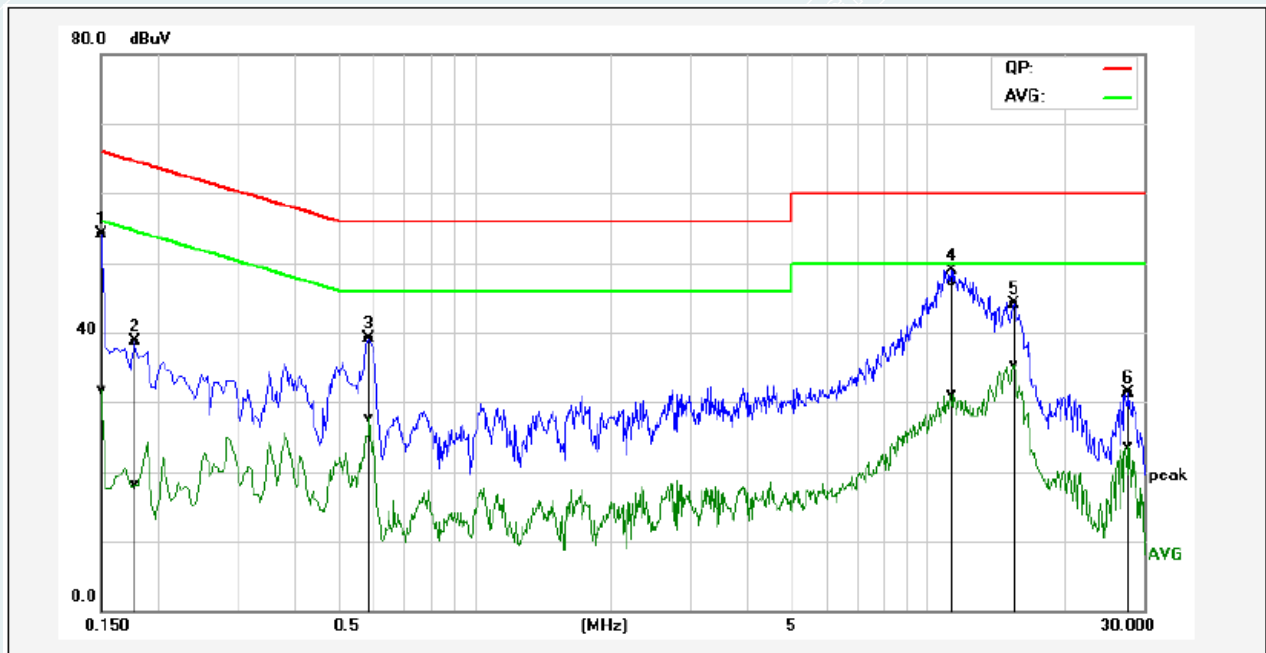
5.5 TEST RESULTS

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(IEEE 802.11a 5180MHz) in the worst power supply is recorded, in this report.

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

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0006
Mode:	IEEE 802.11a 5180MHz	Voltage:	AC 120V/60Hz
Environment:	24.2°C/52%RH/101.0kPa	Engineer:	Chen Zexin
Test Date:	2023-12-13	Line	L

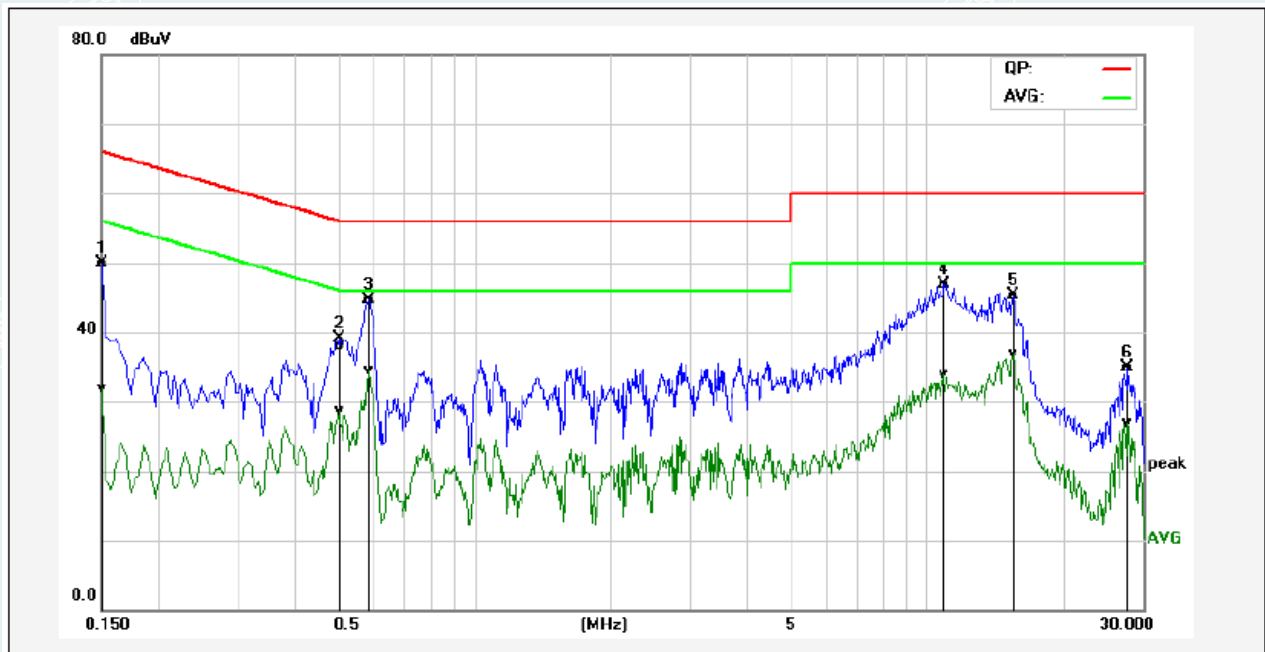
(The chart below shows the highest readings taken from the final data.)



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*	0.1500	44.30	21.99	9.75	54.05	31.74	65.99	56.00	-11.94	-24.26	Pass
2	0.1780	29.06	8.41	9.69	38.75	18.10	64.57	54.58	-25.82	-36.48	Pass
3	0.5860	29.31	17.90	9.71	39.02	27.61	56.00	46.00	-16.98	-18.39	Pass
4	11.1980	37.45	21.24	9.85	47.30	31.09	60.00	50.00	-12.70	-18.91	Pass
5	15.5220	34.17	25.44	9.92	44.09	35.36	60.00	50.00	-15.91	-14.64	Pass
6	27.8380	21.00	13.53	10.23	31.23	23.76	60.00	50.00	-28.77	-26.24	Pass

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0006
Mode:	IEEE 802.11a 5180MHz	Voltage:	AC 120V/60Hz
Environment:	24.2°C/52%RH/101.0kPa	Engineer:	Chen Zexin
Test Date:	2023-12-13	Line	N

(The chart below shows the highest readings taken from the final data.)



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	0.1500	40.24	22.14	9.70	49.94	31.84	65.99	56.00	-16.05	-24.16	Pass
2	0.5020	28.51	18.93	9.68	38.19	28.61	56.00	46.00	-17.81	-17.39	Pass
3*	0.5860	34.98	24.75	9.68	44.66	34.43	56.00	46.00	-11.34	-11.57	Pass
4	10.9580	37.04	23.91	9.90	46.94	33.81	60.00	50.00	-13.06	-16.19	Pass
5	15.5220	35.26	26.81	10.07	45.33	36.88	60.00	50.00	-14.67	-13.12	Pass
6	27.8020	24.53	16.61	10.30	34.83	26.91	60.00	50.00	-25.17	-23.09	Pass

6. UNWANTED EMISSIONS

6.1 LIMITS

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

The unwanted emissions which fall in Restricted bands shall not exceed the field strength levels specified in the following table:

15.209 Radiated emission limits

Frequency (MHz)	Field Strength(μ V/m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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

6.2 TEST PROCEDURES

- EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test, and which is 1.5 meter high above ground for above 1GHz test.
- EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- Set the EUT transmit continuously with maximum output power.
- The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- Spectrum analyzer setting parameters please see the below table.
- Repeat above procedures until all channels were measured.
- Record the results in the test report.

For 9kHz-150kHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9kHz
Stop frequency	150kHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

Note : For 9kHz-90kHz&110kHz-150kHz,the detector is average,other frequency is CISPR QP detector.

For 150kHz-30MHz

Spectrum Parameters	Setting
RBW	9kHz
VBW	9kHz
Start frequency	150kHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

Note : For 150kHz-490kHz,the detector is average,other frequency is CISPR QP detector.

For 30MHz-1GHz

Spectrum Parameters	Setting
RBW	120kHz
VBW	300kHz
Start frequency	30MHz
Stop frequency	1GHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For Above 1GHz

Spectrum Parameters	Setting	
RBW	1MHz	
VBW	PEAK Measurement	AVG Measurement
	3MHz	Duty cycle ≥ 98%, VBW = 10Hz Duty cycle < 98%, VBW ≥ 1/T Video bandwidth mode = RMS (power averaging)
Start frequency	1GHz	
Stop frequency	40GHz	
Sweep Time	Auto	
Detector	PEAK	
Trace Mode	Max Hold	

Note :

- (1) T is the on-time time of the duty cycle, when EUT transmit continuously with maximum output power, unit is seconds. reference section 2.8 for the on-time time.
- (2) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20\log D + 104.8$$
 where:
 E = electric field strength in dBμV/m,
 EIRP = equivalent isotropic radiated power in dBm
 D = specified measurement distance in meters.
 So: $E = -27 - 20\log 3 + 104.8 = 68.3 \text{ (dB}\mu\text{V/m)}$
- (3) The unwanted emissions which fall in Restricted bands shall not exceed the field strength, Above 18G test distance is 1m, so the Peak Limit = $74 + 20 * \log(3/1) = 83.54 \text{ (dB}\mu\text{V/m)}$.
 The Avg Limit = $54 + 20 * \log(3/1) = 63.54 \text{ (dB}\mu\text{V/m)}$.
- (4) The maximum emissions of the operation frequency bands, Above 18G test distance is 1m, so the Peak Limit = $68.3 + 20 * \log(3/1) = 77.84 \text{ (dB}\mu\text{V/m)}$.

6.3 TEST SETUP

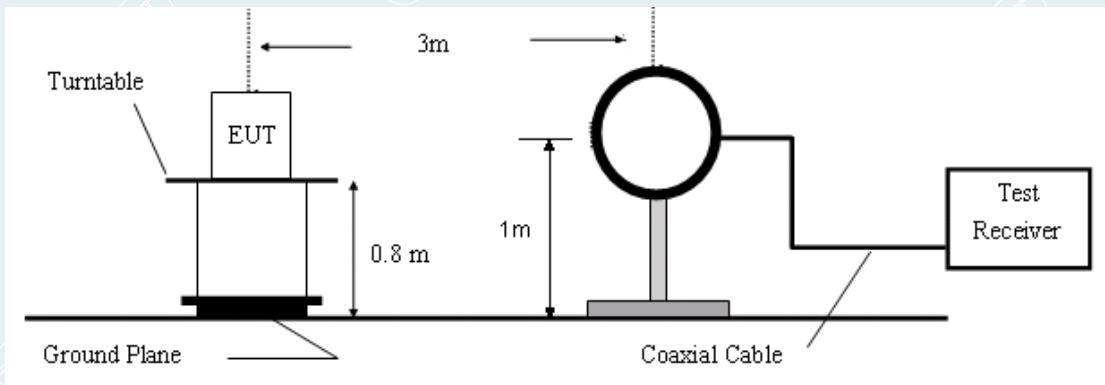


Figure 1. 9kHz to 30MHz radiated emissions test configuration

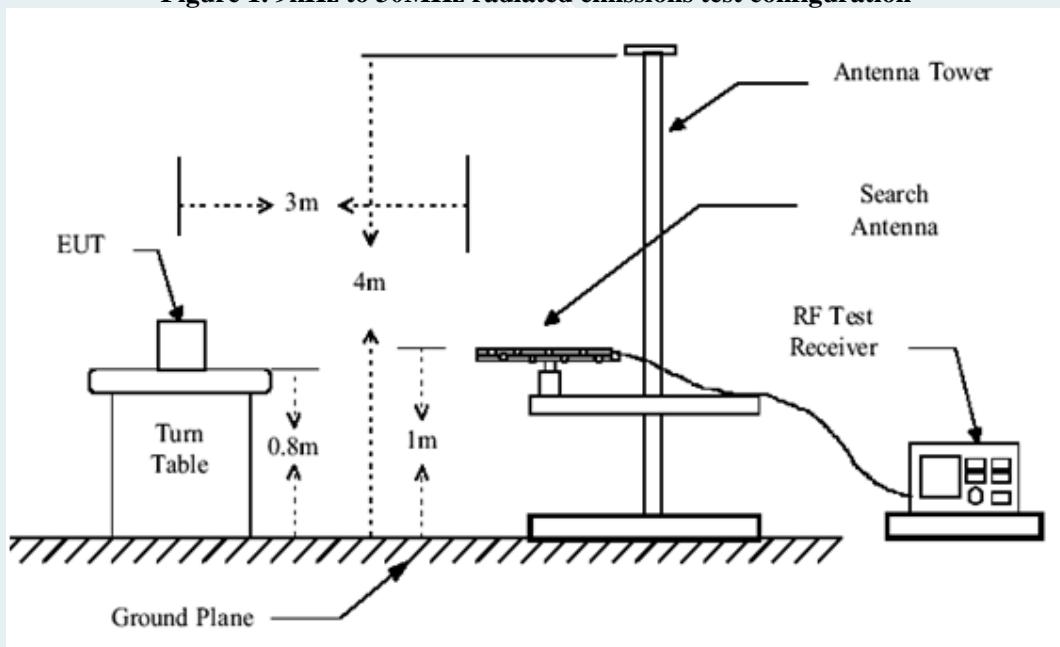


Figure 2. 30MHz to 1GHz radiated emissions test configuration

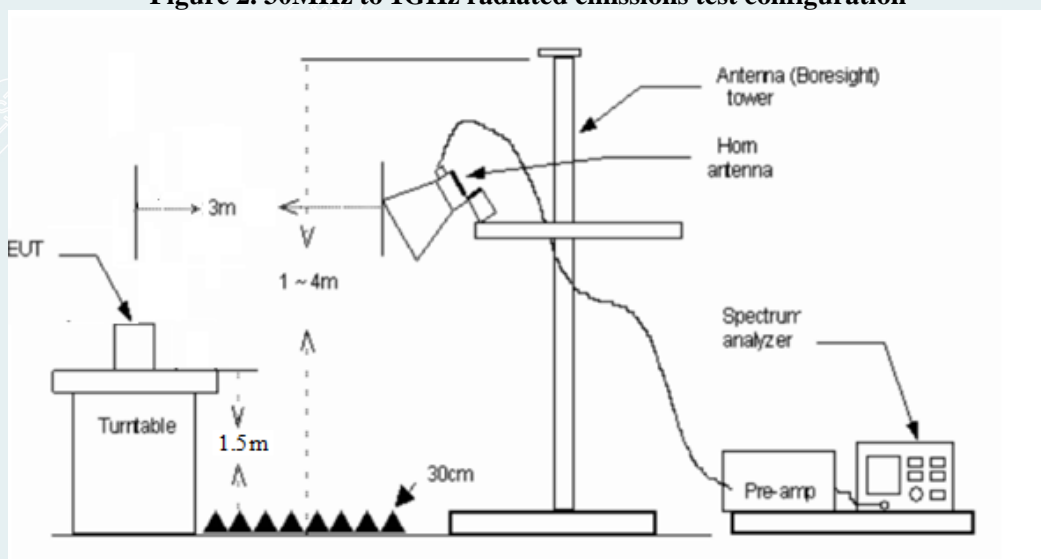


Figure 3. 1GHz to 18GHz radiated emissions test configuration

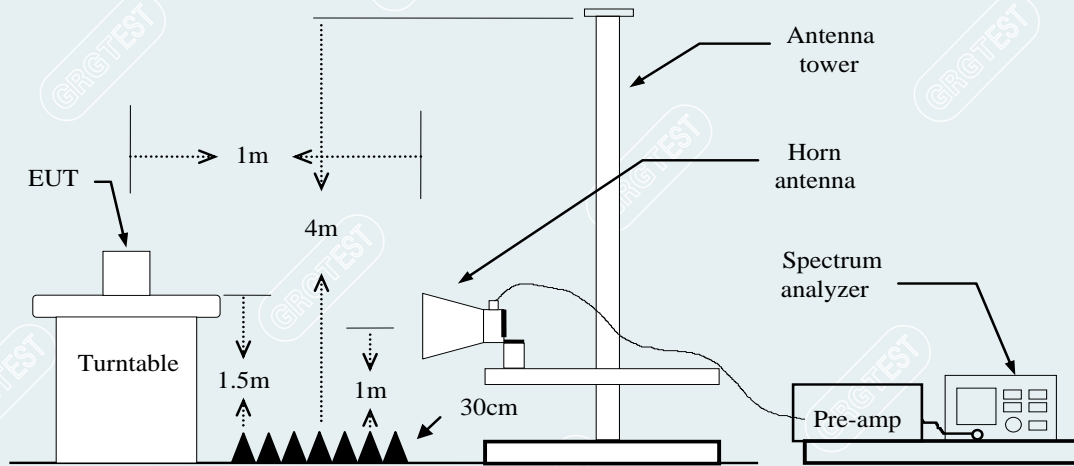


Figure 4. Above 18GHz radiated emissions test configuration

6.4 DATA SAMPLE

30MHz to 1GHz

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Heigh (cm)	Detector type
XXX.XXXX	54.95	-28.84	26.11	43.50	-17.39	78	200	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

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	Remark
xxx	xxxx	54.49	42.38	32.84	-12.11	74.00	41.16	100	211	Horizontal	Peak
xxx	xxxx	43.99	31.88	22.34	-12.11	54.00	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

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

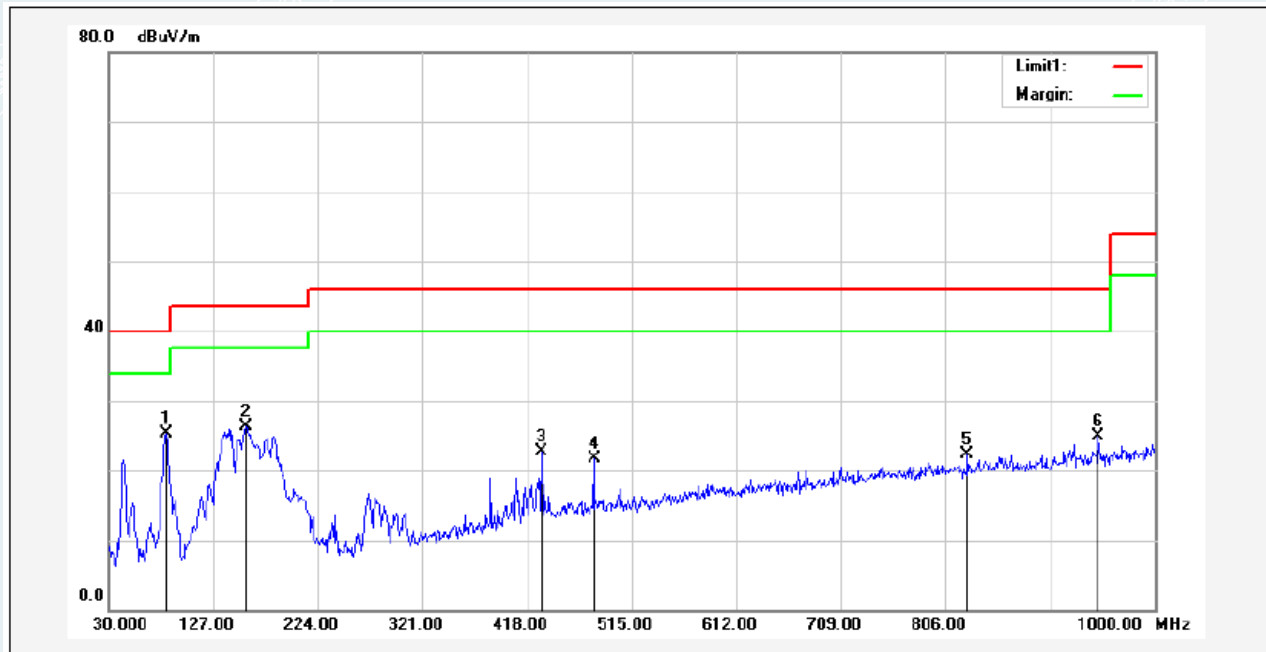
6.5 TEST RESULTS

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(IEEE 802.11n HT40 5230MHz) in the worst power supply is recorded, in this report.

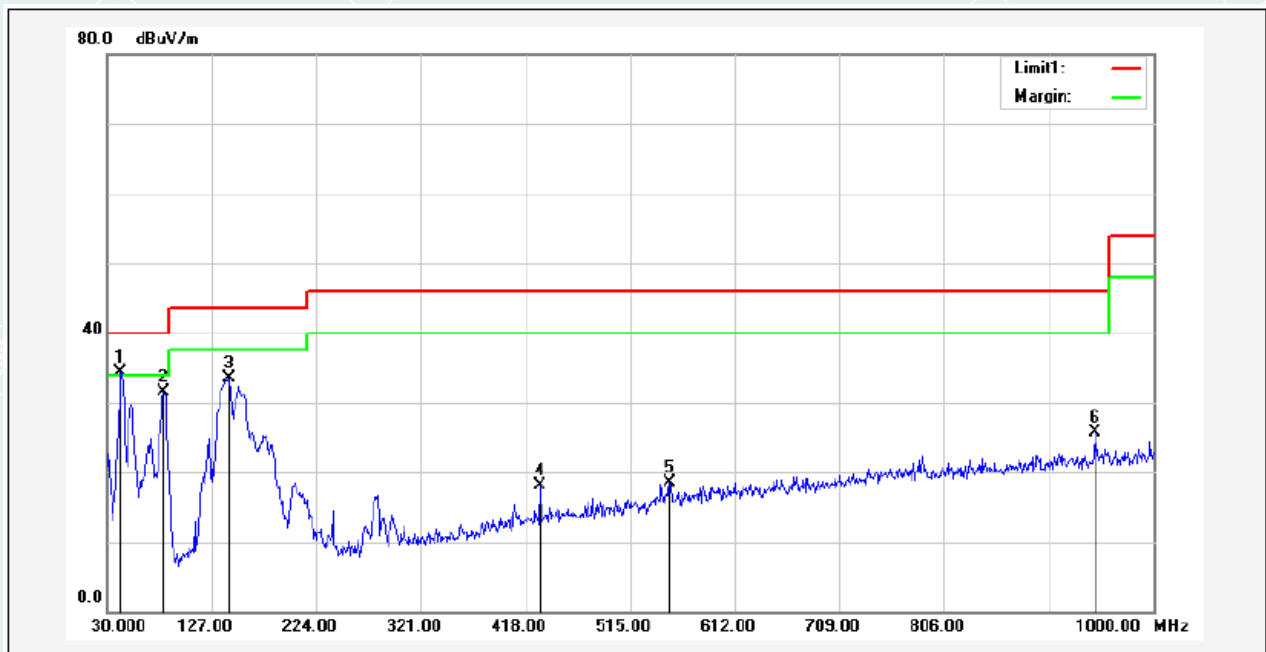
Power supply: AC 120/60Hz (DC 5V/2A power by Adapter)

EUT Name:	Hub M3	Test Mode:	Mode 1
Model:	HM-G01E	Sample No:	E20230331478001-0006
Power supply:	AC 120V/60Hz	Environmental Conditions:	24.3°C/54%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-12-18
Frequency	IEEE 802.11n HT40 5230MHz	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*	83.3500	58.88	-33.65	25.23	40.00	-14.77	341	200	QP
2	157.0700	55.25	-28.96	26.29	43.50	-17.21	198	200	QP
3	431.5800	47.03	-24.41	22.62	46.00	-23.38	118	100	QP
4	480.0800	45.02	-23.33	21.69	46.00	-24.31	26	200	QP
5	826.3700	40.98	-18.65	22.33	46.00	-23.67	0	200	QP
6	947.6200	42.06	-17.24	24.82	46.00	-21.18	158	200	QP

EUT Name:	Hub M3	Test Mode:	Mode 1
Model:	HM-G01E	Sample No:	E20230331478001-0006
Power supply:	AC 120V/60Hz	Environmental Conditions:	24.3°C/54%RH/101.0kPa
Test Engineer:	Huang Xinlong	Test Date:	2023-12-18
Frequency	IEEE 802.11n HT40 5230MHz	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*	42.6100	63.77	-29.40	34.37	40.00	-5.63	192	100	QP
2	82.3800	65.08	-33.61	31.47	40.00	-8.53	214	200	QP
3	142.5200	62.38	-28.92	33.46	43.50	-10.04	117	100	QP
4	431.5800	42.47	-24.41	18.06	46.00	-27.94	164	100	QP
5	551.8600	40.62	-22.12	18.50	46.00	-27.50	183	100	QP
6	945.6800	42.89	-17.26	25.63	46.00	-20.37	359	200	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.
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.
- 3 The IF bandwidth of Receiver between 30MHz to 1GHz was 120kHz.
- 4 If the margin of the pre test results is greater than 6db, it meets the requirements of quasipeak or average values, and final testing is no longer required.

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: IEEE 802.11a

Lowest Frequency (5180MHz)

Environment: 23.5°C/47%RH 101.0kPa

Tested By:Zhang Zishan

Date: 2023-11-25

Voltage:AC 120V/60Hz

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	1659.4500	63.17	42.79	-20.38	68.30	25.51	100	176	Horizontal
2	1799.1500	65.20	44.49	-20.71	68.30	23.81	100	243	Horizontal
3	2659.9000	65.18	48.38	-16.80	68.30	19.92	100	162	Horizontal
4	4806.5500	52.62	47.29	-5.33	74.00	26.71	100	108	Horizontal
5	5108.5000	51.09	48.19	-2.90	74.00	25.81	200	339	Horizontal
6	15758.6500	46.19	47.44	1.25	74.00	33.56	100	265	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	5108.5000	-2.90	50.21	47.31	54.00	6.69	200	339	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	1660.0000	62.66	41.52	-21.14	68.30	26.78	200	342	Vertical
2	2662.6500	62.70	45.89	-16.81	68.30	22.41	100	9	Vertical
3	3984.8500	57.60	46.64	-10.96	74.00	27.36	100	230	Vertical
4	4806.5500	52.35	46.98	-5.37	74.00	27.02	100	299	Vertical
5	5046.9000	49.89	47.29	-2.60	74.00	26.71	100	340	Vertical
6	14309.6500	45.05	46.80	1.75	68.30	28.50	200	212	Vertical