

TEST REPORT

Report No.: SHATBL2408006W01

Applicant : Ningbo Willen Intelligent Technology Co.,Ltd.

Product Name : Ebike

Brand Name : 

Model Name : Vika X

FCC ID : 2BKN2-WL2401

Test Standard : 47 CFR 15.247

Date of Test : 2024.8.13~2024.8.20

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Report Approved by : 
(Chris Xu)

Authorized Signatory : 
(Terry Yang)



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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised by
00	2024.8.20	Initial Release	Chris Xu

DECLARATION OF REPORT

1. The device has been tested by ATBL, and the test results show that the equipment under test (EUT) is in compliance with the requirements of 47 CFR 15.247. And it is applicable only to the tested sample identified in the report.
2. This report shall not be reproduced except in full, without the written approval of ATBL, this document only be altered or revised by ATBL, personal only, and shall be noted in the revision of the document.
3. The general information of EUT in this report is provided by the customer or manufacture, ATBL is only responsible for the test data but not for the information provided by the customer or manufacture.
4. The results in this report is only apply to the sample as tested under conditions. The customer or manufacturer is responsible for ensuring that the additional production units of this model have the same electrical and mechanical components.
5. In this report, '☐' indicates that EUT does not support content after '☐', and '☑' indicates that it supports content after '☑'.
6. Both the conducted and radiated tests are conducted using modules with a supply voltage of 3.15V.

SUMMARY OF TEST RESULT

Report Section	Standard Section	Test Item	Judgment	Remark
3.1	47 CFR 15.247(b)(3)	Maximum Peak Conducted Output Power	PASS	--
3.2	--	Duty Cycle	Report only	--
3.3	47 CFR 15.247(a)(2)	6dB Bandwidth	PASS	--
	--	99% Bandwidth	Report only	--
3.4	47 CFR 15.247(e)	Power Spectral Density	PASS	--
3.5	47 CFR 15.247(d)	Conducted Band Edge	PASS	--
3.6	47 CFR 15.247(d)	Conducted Spurious Emission	PASS	--
3.7	47 CFR 15.247(d)/15.209(a)/15.205(a)	Radiated Spurious Emission and Restricted Band	PASS	--
3.8	47 CFR 15.207(a)	AC Power-Line Conducted Emission	PASS	--
3.9	47 CFR 15.203	Antenna Requirements	PASS	--

1. GENERAL DESCRIPTION

1.1. Applicant

Name : Ningbo Willen Intelligent Technology Co.,Ltd.
Address : Room 1-1031,1/F,Building 041,Block B,no.188 Jinhua Road,High-tech
Zone,Ningbo,Zhejiang

1.2. Manufacturer

Name : Ningbo Willen Intelligent Technology Co.,Ltd.
Address : Room 1-1031,1/F,Building 041,Block B,no.188 Jinhua Road,High-tech
Zone,Ningbo,Zhejiang

1.3. Factory

Name : Ningbo Willen Intelligent Technology Co.,Ltd.
Address : No. 255 Fengcheng Road, Wangchun Industrial Park, Haishu District, Ningbo City,
Zhejiang Province

1.4. General Information of EUT

General Information	
Equipment Name	Ebike
Brand Name	
Model Name	Vika X
Series Model	SOL X
Model Difference	The differences between VIKA X and SOL X are: appearance, motor, controller, shelf size, frame size, rims, tires are different, and the instrumentation and wireless module in the instrumentation are the same
SN or IMEI Code	N/A
Adapter	Model: KYLC109V55N Input: AC110V-240V~2.5A 47-63Hz Output: DC54.6V 2.0A
Battery	Model:NEBA037 Rated Voltage:DC 46.8V Charge Limit Voltage:DC 54.6V Capacity:12.8Ah
Hardware Version	V1.0
Software Version	V1.0
Connecting I/O Port(s)	Refer to the remark below.

Remark:

The above information of EUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5. Equipment Specification

Equipment Specification		
Frequency Range	2400MHz - 2483.5MHz	
Number of Channels	40	
Carrier Frequency of Each Channel	2402 + n*2 MHz; n = 0 ~ 39	
Maximum Output Power To Antenna	☒ Bluetooth LE(1Mbps):	6.117dBm (0.0409W)
Type of Modulation	Bluetooth LE:	GFSK
Antenna Type	PIFA	
Antenna Gain	-2dBi	

1.6. Modification of EUT

No modifications are made to the EUT during all test items.

1.7. Laboratory Information

Company Name	:	Shanghai ATBL Technology Co., Ltd.
Address	:	Building 8, No.160 Basheng Road, Waigaoqiao Free Trade Zone, Pudong New Area, Shanghai
Telephone	:	+86(0)21-51298625

1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

47 CFR Part 15 Subpart C §15.247

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2013

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2. TEST CONFIGURATION OF EUT

2.1. Carrier Frequency Channel

Frequency Band	Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz
2400 - 2483.5 MHz	00	2402	14	2430	28	2458
	01	2404	15	2432	29	2460
	02	2406	16	2434	30	2462
	03	2408	17	2436	31	2464
	04	2410	18	2438	32	2466
	05	2412	19	2440	33	2468
	06	2414	20	2442	34	2470
	07	2416	21	2444	35	2472
	08	2418	22	2446	36	2474
	09	2420	23	2448	37	2476
	10	2422	24	2450	38	2478
	11	2424	25	2452	39	2480
	12	2426	26	2454	--	--
	13	2428	27	2456	--	--

Remark:

Low Channel: **CH 00_2402 MHz**; Middle Channel: **CH 19_2440 MHz**; High Channel: **CH 39_2480 MHz**.

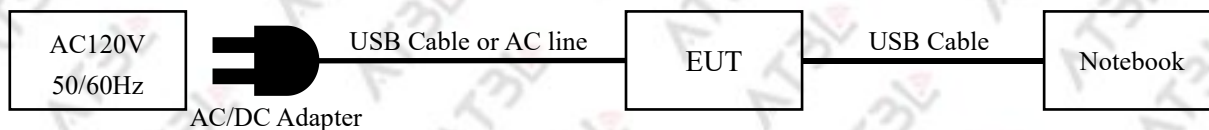
2.2. Test Modes

The table below is showing all test modes to demonstrate in compliance with the standard.

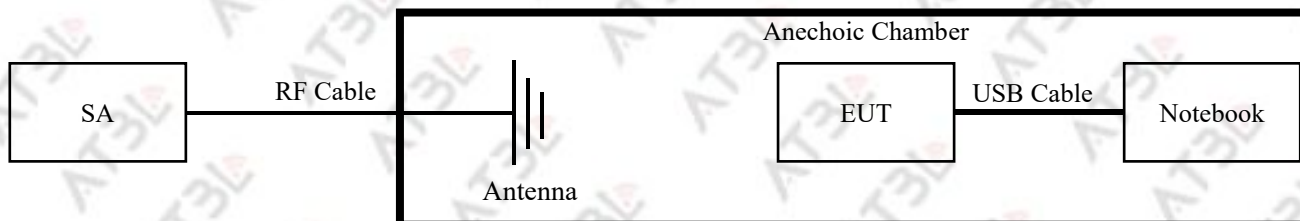
Summary Table of Test Modes	
Test Item	Data Rate / Modulation
	☒ Bluetooth LE(1Mbps)
For Conducted and Radiated Test	Mode 1: CH00_2402 MHz
	Mode 2: CH19_2440 MHz
	Mode 3: CH39_2480 MHz
For AC Power-line Conducted Emission	Mode 4: Keep Bluetooth link under the maximum output power

2.3. Block Diagram of Test System

2.3.1. For AC Power-Line Conducted Emission



2.3.2. For Radiated Spurious Emission



2.3.3. For Conducted Test



2.4. Description of Support Units

NO.	Unit	Brand	Model	Description
1	Notebook	Lenovo	DESKTOP-USDEO09	SN : YX03NVW6
2	USB Cable	N/A	100cm	Manufacturer :UGREEN

2.5. Test Software and Power Level

During the test, the channel and power control software provided by the customer is used to control the operation channel and output power level.

2.6. EUT Operating Conditions

For AC power-line conducted emission, the EUT was connected under the large package sizes transmission.

For radiated spurious emission and conducted test, the engineering test program was provided and make the EUT to continuous transmit/receive.

2.7. Equipment List

2.7.1. For AC Power-Line Conducted Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Date	Calibration Due Date
Test Receiver	R&S	ESPI	101679	SHATBL-E012	2024.03.28	2025.03.27
LISN	R&S	ENV216	100300	SHATBL-E013	2024.03.28	2025.03.27
LISN	R&S	ENV216	100333	SHATBL-E041	2024.03.28	2025.03.27
Thermometer	DeLi	N/A	N/A	SHATBL-E016	2023.09.26	2024.09.25
Test Software	FALA	EZ-EMC	N/A	SHATBL-E046	N/A	N/A

2.7.2. For Radiated Spurious Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Date	Calibration Due Date
Signal analyzer	Agilent	N9020A	MY50200811	SHATBL-E017	2024.03.28	2025.03.27
Amplifier	JPT	JPA0118-55-303 A	1910001800055000	SHATBL-E006	2024.03.28	2025.03.27
Amplifier	JPT	JPA-10M1G32	21010100035001	SHATBL-E005	2024.03.28	2025.03.27
Antenna/Turn table Controller	Brilliant	N/A	N/A	SHATBL-E007	N/A	N/A
Loop Antenna	Daze	ZN30900C	20077	SHATBL-E042	2024.05.13	2025.05.12
Bilog Antenna	SCHWARZBECK	VULB 9168	01174	SHATBL-E008	2024.05.17	2025.05.16
Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120D	02334	SHATBL-E009	2024.05.17	2025.05.16
Horn Antenna	COM-POWER	AH-1840	10100008	SHATBL-E043	2023.09.24	2024.09.23
Thermometer	DeLi	N/A	N/A	SHATBL-E015	2023.09.26	2024.09.25
Test Software	FALA	EMC-RI	N/A	SHATBL-E046	N/A	N/A

2.7.3. For Conducted Test

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Date	Calibration Due Date
Power meter	Anritsu	ML2496A	1935001	SHATBL-W030	2024.07.18	2025.07.17
Power sensor	Anritsu	MA2411B	1911006	SHATBL-W031	2024.07.18	2025.07.17
Adjustable Attenuator	Agilent	8494B	MY42144015	SHATBL-W009	2024.07.18	2025.07.17
Adjustable Attenuator	Agilent	8496B	MY42143776	SHATBL-W010	2024.07.18	2025.07.17
Environmental Test Chamber	KSON	THS-B6C-150	9159K	SHATBL-W019	2024.07.18	2025.07.17
Signal analyzer	Keysight	N9020A	MY50510136	SHATBL-W003	2024.07.18	2025.07.17
Vector signal generator	Keysight	N5182B	MY57300196	SHATBL-W005	2024.07.18	2025.07.17

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Date	Calibration Due Date
Vector signal generator	Agilent	N5182A	MY50143555	SHATBL-W037	2024.07.18	2025.07.17
Analog signal generator	Keysight	N5173B	MY60403026	SHATBL-W038	2024.07.18	2025.07.17
Wideband radio communication tester	R&S	CMW500	101331	SHATBL-W007	2024.07.18	2025.07.17
Spectrum analyzer	R&S	FSV40-N	101761	SHATBL-W036	2024.07.18	2025.07.17
Switch Box	N/A	RFSW3003328	RFSW201019	SHATBL-W029	N/A	N/A
Thermometer	DeLi	N/A	N/A	SHATBL-W012	2024.07.18	2025.07.17
Test Software	FALA	LZ-RF	N/A	SHATBL-W020	N/A	N/A

2.8. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item		Uncertainty
1	Conducted Output Power		1.266dB
2	Power spectral density		1.282dB
3	Conducted Frequency Stability		10.14Hz
4	Conducted spurious emissions		1.73dB
5	RF Cable Loss		1.22dB
6	Radiated Spurious Emission 9KHz-30MHz		2.35dB
7	Radiated Spurious Emission 30MHz-1GHz		3.60dB
8	Radiated Spurious Emission 1GHz-18GHz		5.40dB
9	Radiated Spurious Emission 18GHz - 40GHz		8.20dB
10	Occupied bandwidth		23.20Hz
11	Conducted Emissions	9kHz ~ 150kHz	3.4dB
		150kHz ~ 30MHz	3.73dB

3. TEST RESULT

3.1. Maximum Peak Conducted Output Power

3.1.1. Limit

47 CFR 15.247(b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

47 CFR 15.247(b)(4): If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

47 CFR 15.247(c)(1)(i): Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

3.1.2. Test Procedure

ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter method: The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM: Method AVGPM is a measurement using an RF average power meter, as follows:

1. As an alternative to spectrum analyzer or EMI receiver measurements, measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied:

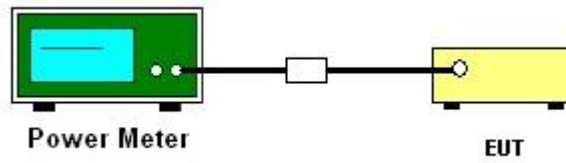
- ① The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
- ② At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
- ③ The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

2. If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal as described in ANSI C63.10-2013 clause 11.6.

3. Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.

4. Adjust the measurement in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle.

3.1.3. Test Setup



3.1.4. Test Result of Maximum Peak Conducted Output Power

Please refer to the Appendix A.

3.2. Duty Cycle

3.2.1. Limit

There is no limit requirement for Duty Cycle.

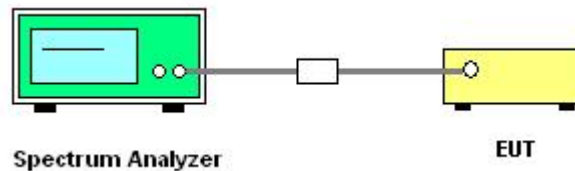
3.2.2. Test Procedure

ANSI C63.10-2013 clause 11.6: Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

1. A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.
2. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

- ① Set the center frequency of the instrument to the center frequency of the transmission.
- ② Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
- ③ Set $VBW \geq RBW$. Set detector = peak or average.
- ④ The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7 \mu s$.)

3.2.3. Test Setup



3.2.4. Test Result of Duty Cycle

Please refer to the Appendix A.

3.3. 6dB Bandwidth and 99% Bandwidth

3.3.1. Limit

47 CFR 15.247(a)(2): 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.

There is no limit requirement for 99% Bandwidth.

3.3.2. Test Procedure

1. The testing of 6dB Bandwidth follows ANSI C63.10-2013 clause 11.8.1: The steps for the first option are as follows:

- ① Set RBW = 100 kHz.
- ② Set the VBW $\geq [3 \times \text{RBW}]$.
- ③ Detector = peak.
- ④ Trace mode = max hold.
- ⑤ Sweep = auto couple.
- ⑥ Allow the trace to stabilize.
- ⑦ Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

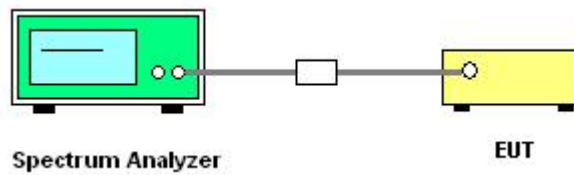
2. The testing of 99% Bandwidth follows ANSI C63.10-2013 clause 6.9.3: The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

- ① The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- ② The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- ③ Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in ANSI C63.10-2013 clause 4.1.5.2.
- ④ Step a) through step c) might require iteration to adjust within the specified range.
- ⑤ Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- ⑥ Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- ⑦ If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at

the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

⑧ The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

3.3.3. Test Setup



3.3.4. Test Result of 6dB Bandwidth and 99% Bandwidth

Please refer to the Appendix A.

3.4. Power Spectral Density

3.4.1. Limit

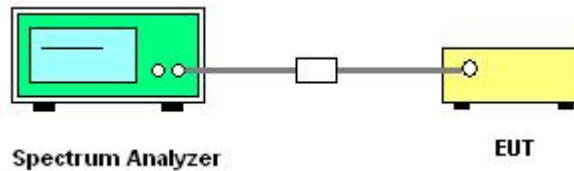
47 CFR 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

3.4.2. Test Procedure

ANSI C63.10-2013 clause 11.10.2: 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:

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to 3 kHz.
4. Set the VBW $\geq [3 \times \text{RBW}]$.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.

3.4.3. Test Setup



3.4.4. Test Result of Power Spectral Density

Please refer to the Appendix A.

3.5. Conducted Band Edge

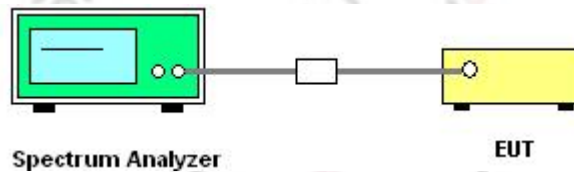
3.5.1. Limit

47 CFR 15.247(d): 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.

3.5.2. Test Procedure

1. The testing follows ANSI C63.10-2013 clause 11.13.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Conducted Band Edge measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the 100 kHz bandwidth within the band that contains the highest level of the desired power when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.5.3. Test Setup



3.5.4. Test Result of Conducted Band Edge

Please refer to the Appendix A.

3.6. Conducted Spurious Emission

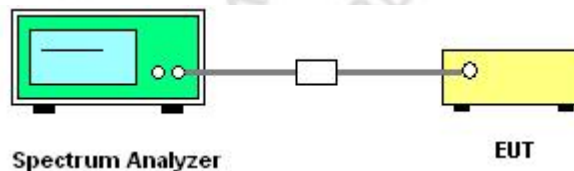
3.6.1. Limit

47 CFR 15.247(d): 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.

3.6.2. Test Procedure

1. The testing follows ANSI C63.10-2013 clause 7.8.8.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.6.3. Test Setup



3.6.4. Test Result of Conducted Spurious Emission

Please refer to the Appendix A.

3.7. Radiated Spurious Emission and Restricted Band

3.7.1. Limit

47 CFR 15.247(d): 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.

47 CFR 15.205(a): Only spurious emissions are permitted in any of the frequency bands listed below:

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
0.090-0.110	12.29-12.293	149.9-150.05	1660-1710	8.025-8.5
0.495-0.505	12.51975-12.52025	156.52475-156.52525	1718.8-1722.2	9.0-9.2
2.1735-2.1905	12.57675-12.57725	156.7-156.9	2200-2300	9.3-9.5
4.125-4.128	13.36-13.41	162.0125-167.17	2310-2390	10.6-12.7
4.17725-4.17775	16.42-16.423	167.72-173.2	2483.5-2500	13.25-13.4
4.20725-4.20775	16.69475-16.69525	240-285	2690-2900	14.47-14.5
6.215-6.218	16.80425-16.80475	322-335.4	3260-3267	15.35-16.2
6.26775-6.26825	25.5-25.67	399.9-410	3332-3339	17.7-21.4
6.31175-6.31225	37.5-38.25	608-614	3345.8-3358	22.01-23.12
8.291-8.294	73-74.6	960-1240	3600-4400	23.6-24.0
8.362-8.366	74.8-75.2	1300-1427	4500-5150	31.2-31.8
8.37625-8.38675	108-121.94	1435-1626.5	5350-5460	36.43-36.5
8.41425-8.41475	123-138	1645.5-1646.5	7250-7750	Above 38.6

47 CFR 15.209(a): The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

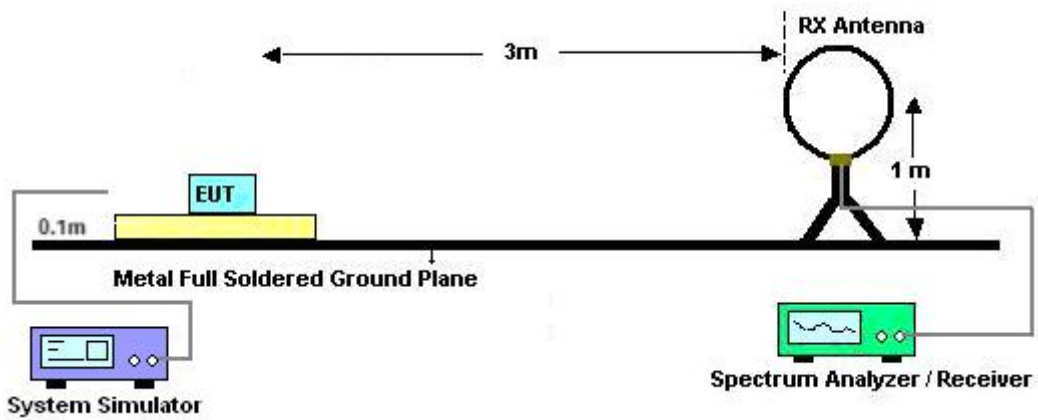
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

3.7.2. Test Procedure

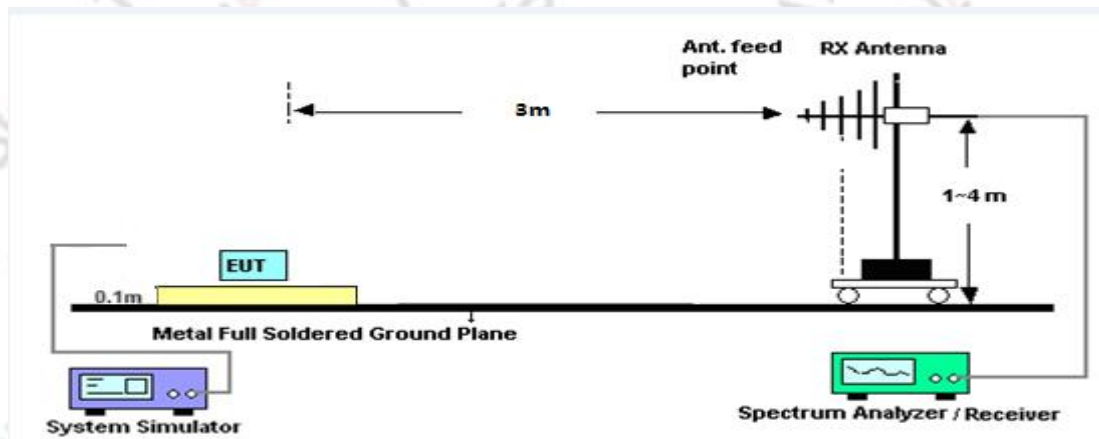
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Pre-amp Factor = Level.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
 - ① Span shall wide enough to fully capture the emission being measured;
 - ② When frequency < 1 GHz:
 - Set RBW=100 kHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - ③ When frequency $\geq$ 1 GHz:
 - Set RBW = 1 MHz; VBW = 3 MHz for peak measurement;
 - Set RBW = 1 MHz; VBW = 10 Hz, when duty cycle is no less than 98 percent or VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.7.3. Test Setup

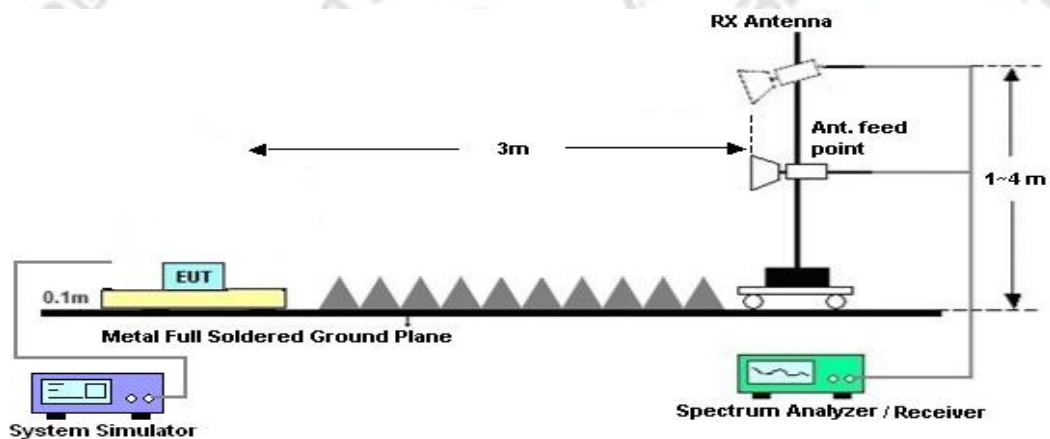
3.7.3.1. For radiated emissions below 30MHz



3.7.3.2. For radiated emissions from 30MHz to 1GHz



3.7.3.3. For radiated emissions above 1GHz



3.7.4. Test Result of Radiated Spurious Emission

3.7.4.1. For 9 kHz ~ 30 MHz

Please refer to the Appendix B.

3.7.4.2. For 30 MHz ~ 1 GHz

Please refer to the Appendix B.

3.7.4.3. For 1 GHz ~ 18GHz

Please refer to the Appendix B.

3.7.4.4. For above 18GHz

Please refer to the Appendix B.

3.7.5. Test Result of Restricted Band

Please refer to the Appendix B.

3.8. AC Power-Line Conducted Emission

3.8.1. Limit

47 CFR 15.207(a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table:

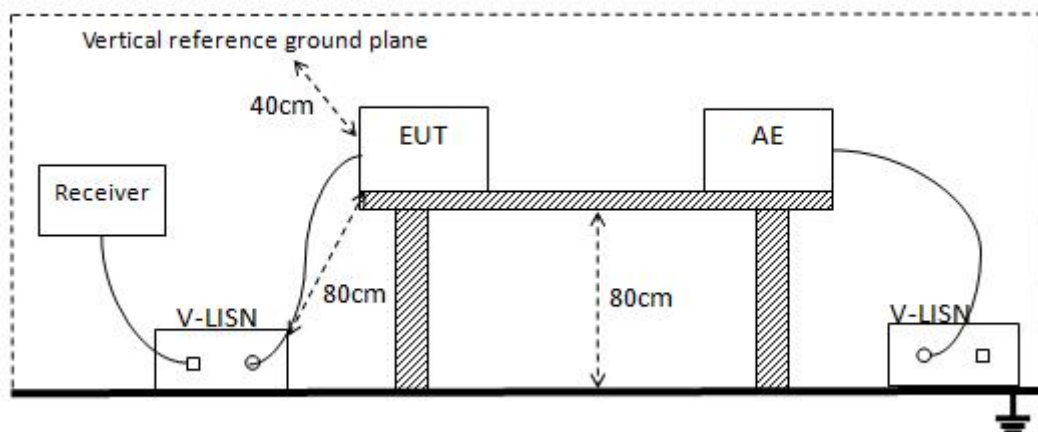
Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

3.8.2. Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.8.3. Test Setup



3.8.4. Test Result of AC Power-Line Conducted Emission

Please refer to the Appendix C.

3.9. Antenna Requirement

3.9.1. Standard Requirement

According to 47 CFR 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

3.9.2. EUT Antenna

The antenna used for the EUT is PIFA antenna, which meets the antenna requirements.

4. Test Setup Photographs

Please refer to the Appendix D.

*****END OF THE REPORT*****

Appendix A _ Conducted Test Data

3.1.4. Test Result of Maximum Peak Conducted Output Power

Temperature:	23.5 °C	Relative Humidity:	50%RH
Test Voltage:	DC 3.15V	Test Mode:	TX Mode 1/2/3
Power Setting :	10.00		

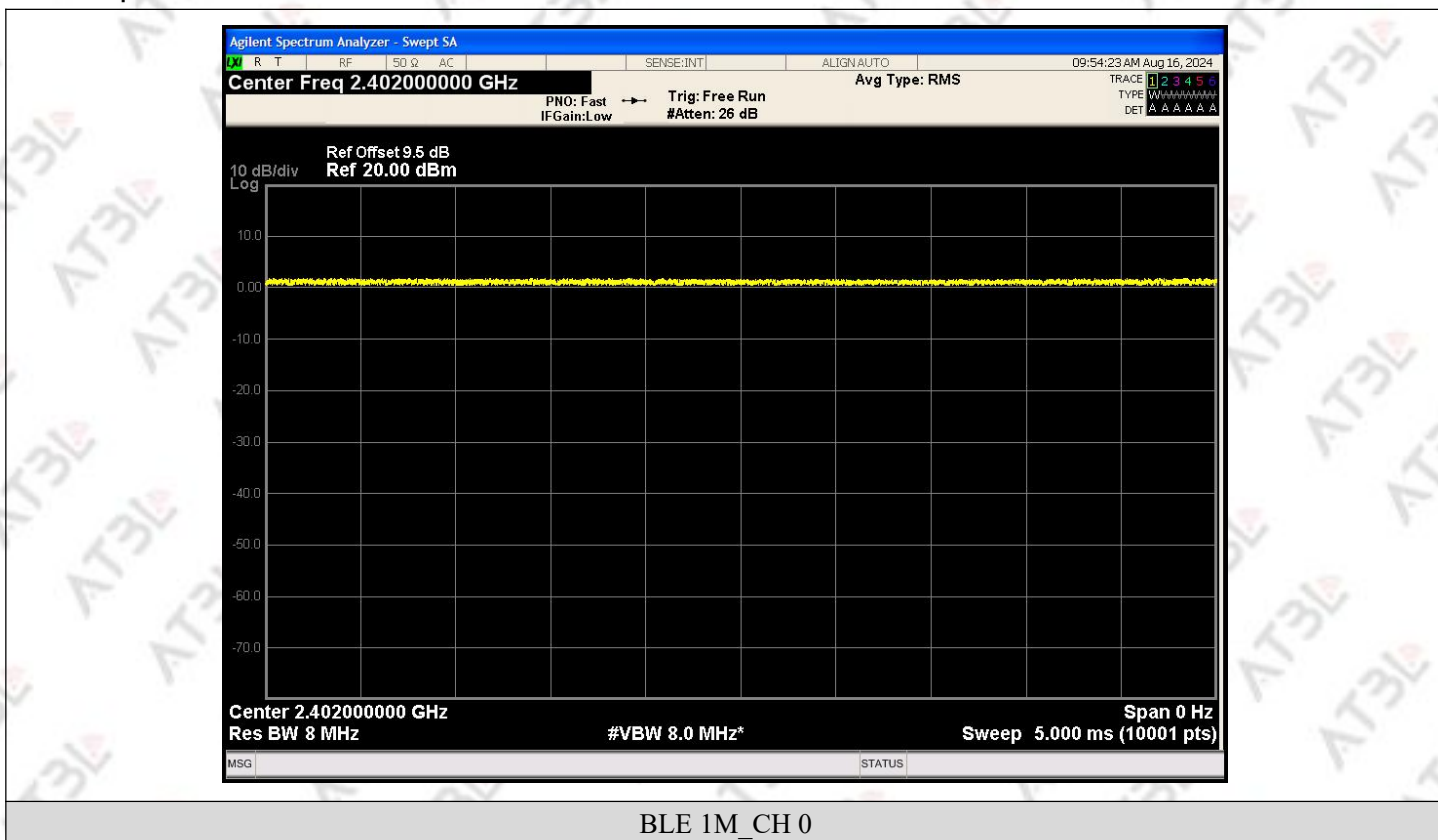
Test Channel	Frequency(MHz)	Peak Conducted Output Power(dBm)	Limit(dBm)	Antenna Gain(dBi)
Mode1 CH00	2402	4.470	30	-2
Mode2 CH19	2440	5.884	30	-2
Mode3 CH39	2480	6.117	30	-2

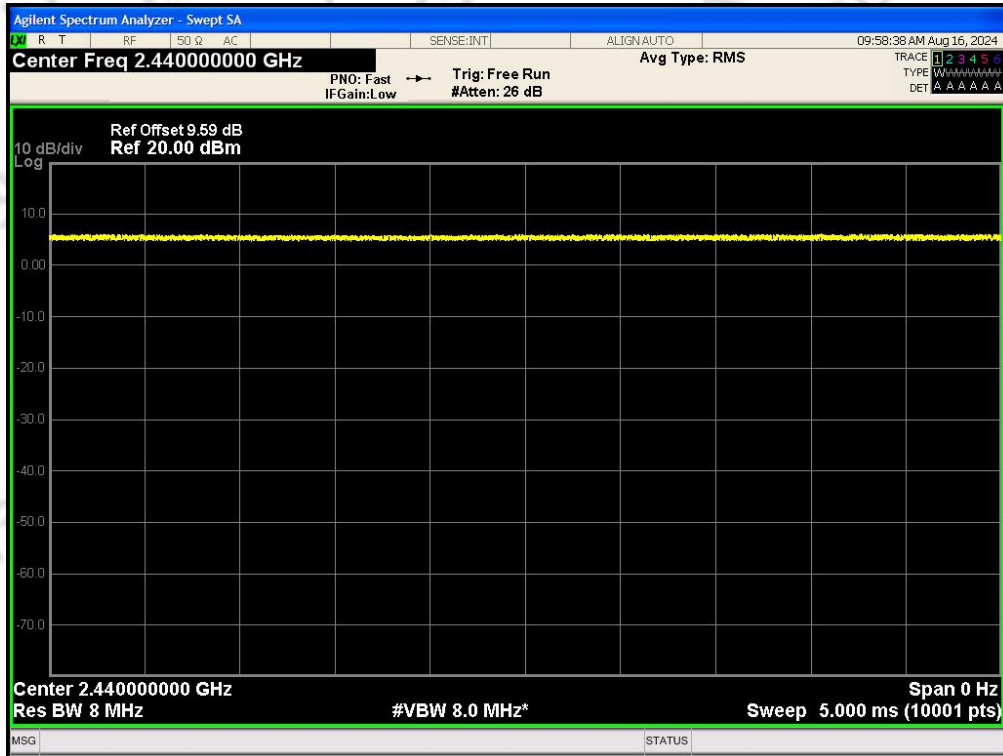
3.2.4.Test Result of Duty cycle

Temperature:	23.5°C	Relative Humidity:	50%RH
Test Voltage:	DC 3.15V	Test Mode:	TX Mode1/2/3

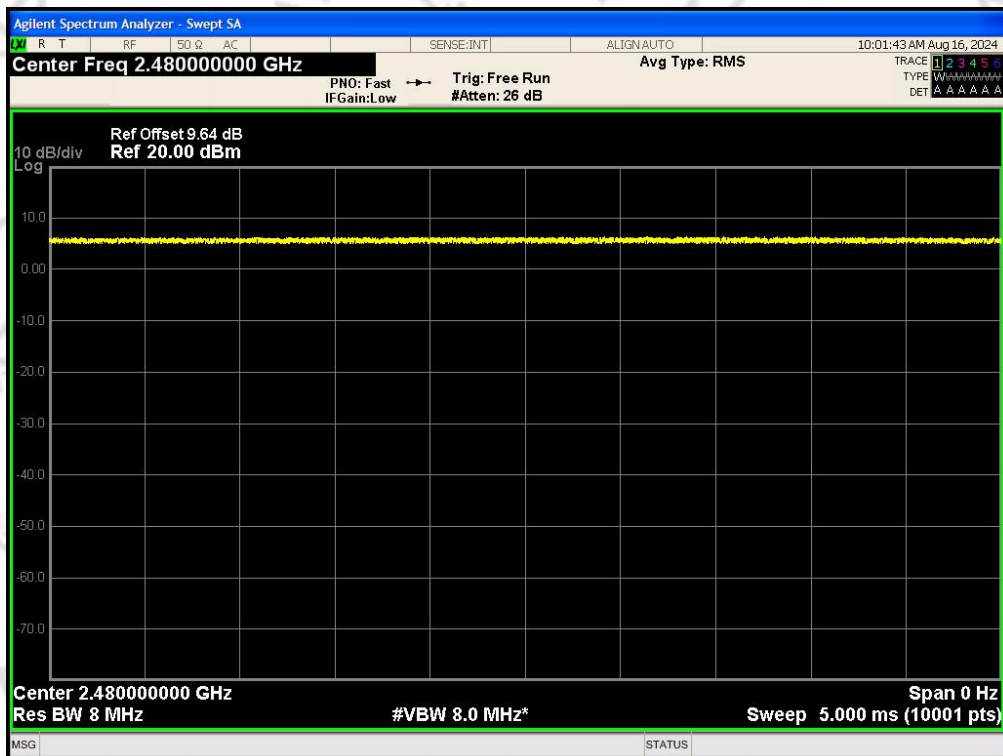
Mode	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
BLE 1M	0	5.000	5.000	100	1	0.0
	19	5.000	5.000	100	1	0.0
	39	5.000	5.000	100	1	0.0

Test Graphs





BLE 1M_CH 19



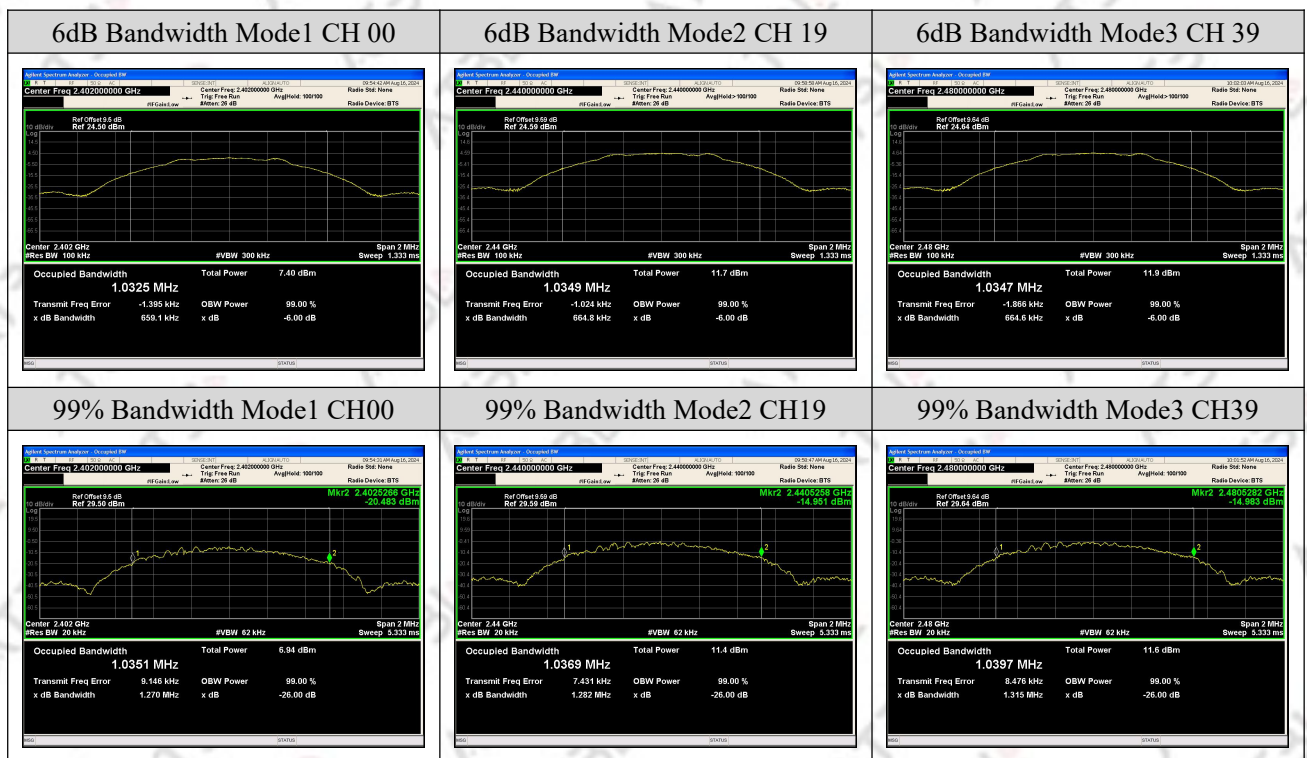
BLE 1M_CH 39

3.3.4. Test Result of 6dB Bandwidth and 99% Bandwidth

Temperature:	23.4°C	Relative Humidity:	50%RH
Test Voltage:	DC 3.15V	Test Mode:	TX Mode1/2/3

Frequency		6dB Bandwidth (kHz)	99% Bandwidth (MHz)	6dB Bandwidth Limit(kHz)	Result
1Mbps	2402 MHz	659.1	1.0351	≥500	PASS
	2440 MHz	664.8	1.0369	≥500	PASS
	2480 MHz	664.6	1.0397	≥500	PASS

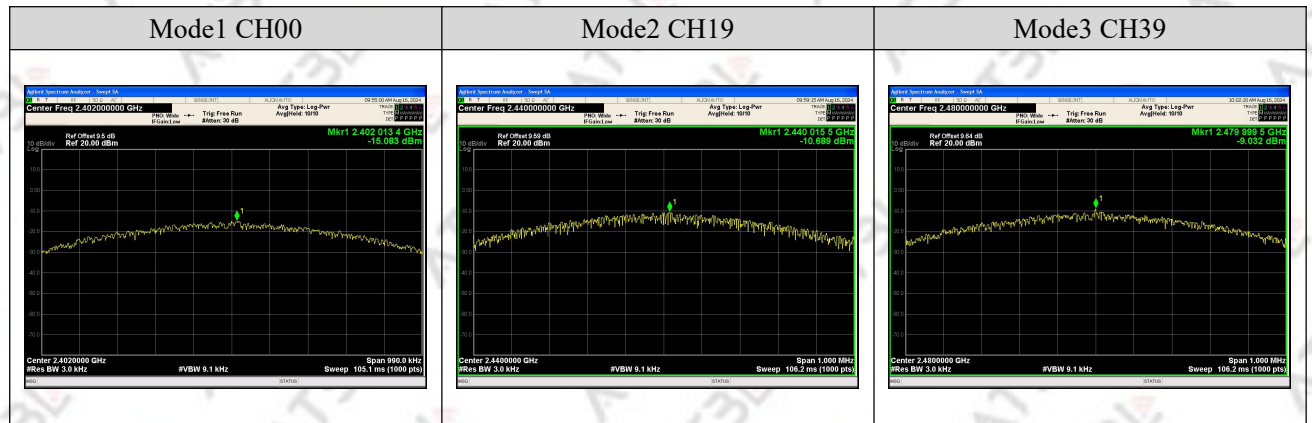
Test Plot



3.4.4. Test Result of Power Spectral Density

Temperature:	23.4 °C	Relative Humidity:	50%RH
Test Voltage:	DC 3.15V	Test Mode:	TX Mode1/2/3

Frequency		Power Density(dBm/3kHz)	Limit (dBm/3kHz)	Result
1M bps	2402 MHz	-15.083	≤8	PASS
	2440 MHz	-10.689	≤8	PASS
	2480 MHz	-9.032	≤8	PASS



3.5.4. Test Result of Conducted Band Edge

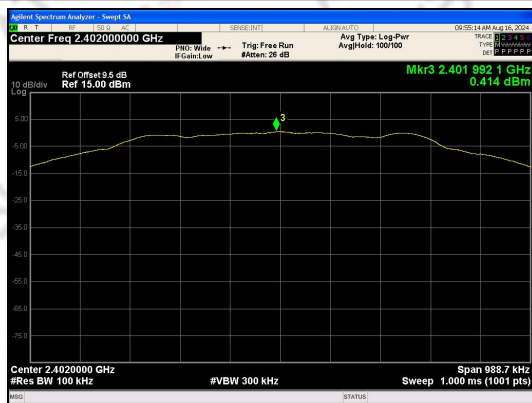
Temperature:	23.4 °C	Relative Humidity:	55%RH
Test Voltage:	DC 3.15V	Test Mode:	TX Mode 1/3



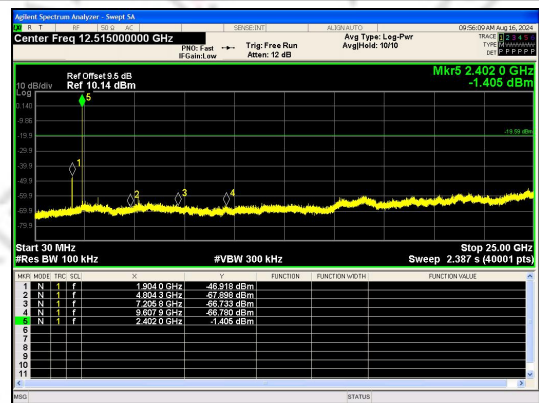
3.6.4. Test Result of Conducted Spurious Emission

Temperature:	23.4 °C	Relative Humidity:	55%RH
Test Voltage:	DC 3.15V	Test Mode:	TX Mode 1/2/3

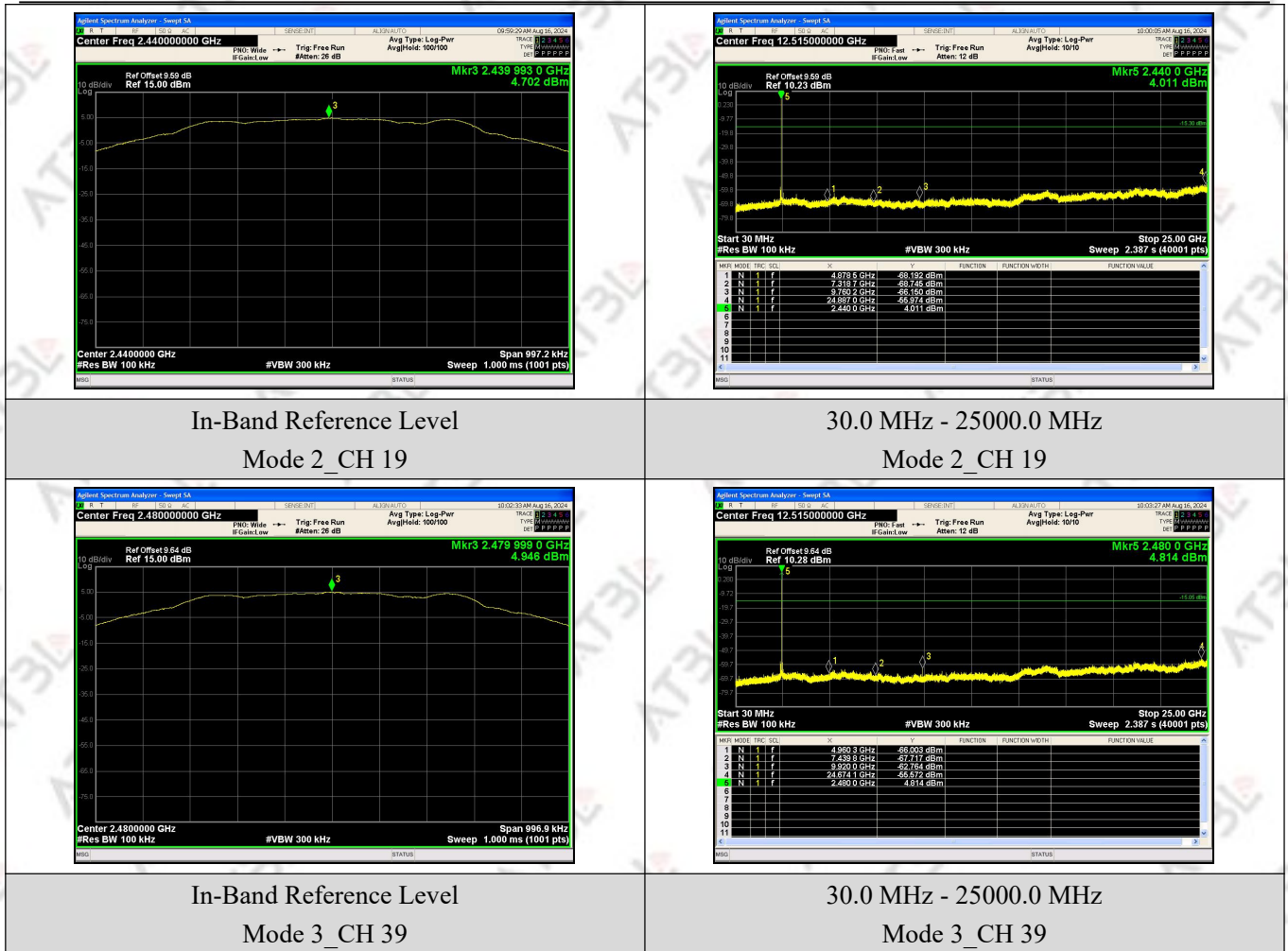
Mode	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
BLE 1M	0	1904.00	-46.918	-19.59	-27.328	PASS
		2368.57	-51.953	-19.59	-32.362	PASS
		2400.00	-52.505	-19.59	-32.915	PASS
		4804.30	-67.898	-19.59	-48.308	PASS
		7205.80	-66.733	-19.59	-47.143	PASS
		9607.90	-66.780	-19.59	-47.190	PASS
	19	4878.55	-68.192	-15.3	-52.892	PASS
		7318.74	-68.745	-15.3	-53.445	PASS
		9760.18	-66.150	-15.3	-50.850	PASS
		24887.0	-55.974	-15.3	-40.674	PASS
	39	2483.50	-51.228	-15.05	-36.178	PASS
		4960.33	-66.003	-15.05	-50.953	PASS
		7439.85	-67.717	-15.05	-52.667	PASS
		9919.99	-62.764	-15.05	-47.714	PASS
		24674.1	-55.572	-15.05	-40.522	PASS



In-Band Reference Level
Mode1_CH 00



30.0 MHz - 25000.0 MHz
Mode1_CH 00



*****END OF APPENDIX A*****

Appendix B _ Radiated Test Data**3.7.4. Test Result of Radiated Spurious Emission**

3.7.4.1. For 9 kHz ~ 30 MHz

(9kHz -30MHz)

Temperature:	23.3°C	Relative Humidity	55%RH
Test Voltage:	DC 3.15V	Polarization:	TX Mode
Test Mode:	TX Mode		

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBμV) + distance extrapolation factor.

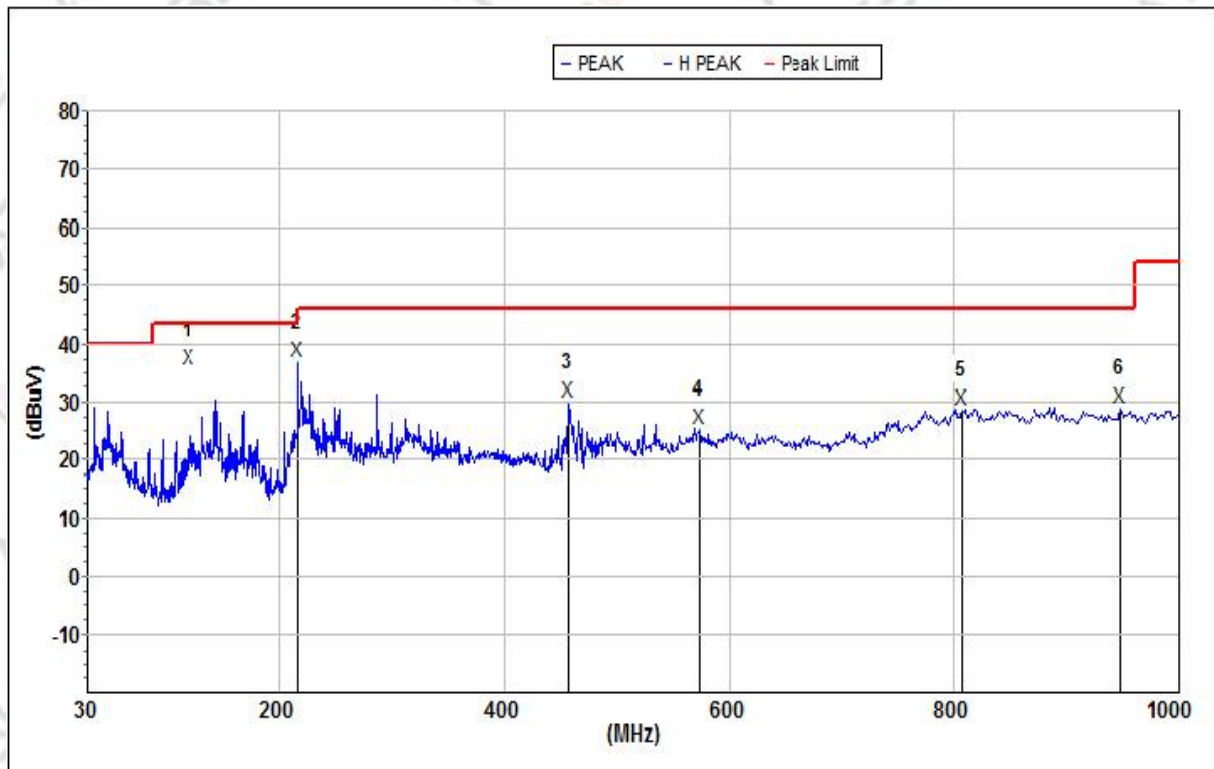
3.7.4.2. For 30 MHz ~ 1 GHz (30MHz -1000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Horizontal
Test Mode:	TX Mode 1		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 1 Horizontal



Mk.	Freq. (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	120.066	35.5	43.5	8.0	326	200	16.6	32.2	1.4	H
2	216.024	36.9	46.0	9.1	277	300	16.3	33.0	1.8	H
3	457.507	29.9	46.0	16.1	0	300	23.0	33.6	2.6	H
4	574.626	25.4	46.0	20.6	326	100	25.3	32.3	2.9	H
5	807.429	28.8	46.0	17.2	213	400	28.5	31.6	3.4	H
6	947.099	28.9	46.0	17.1	24	200	29.4	33.2	3.7	H

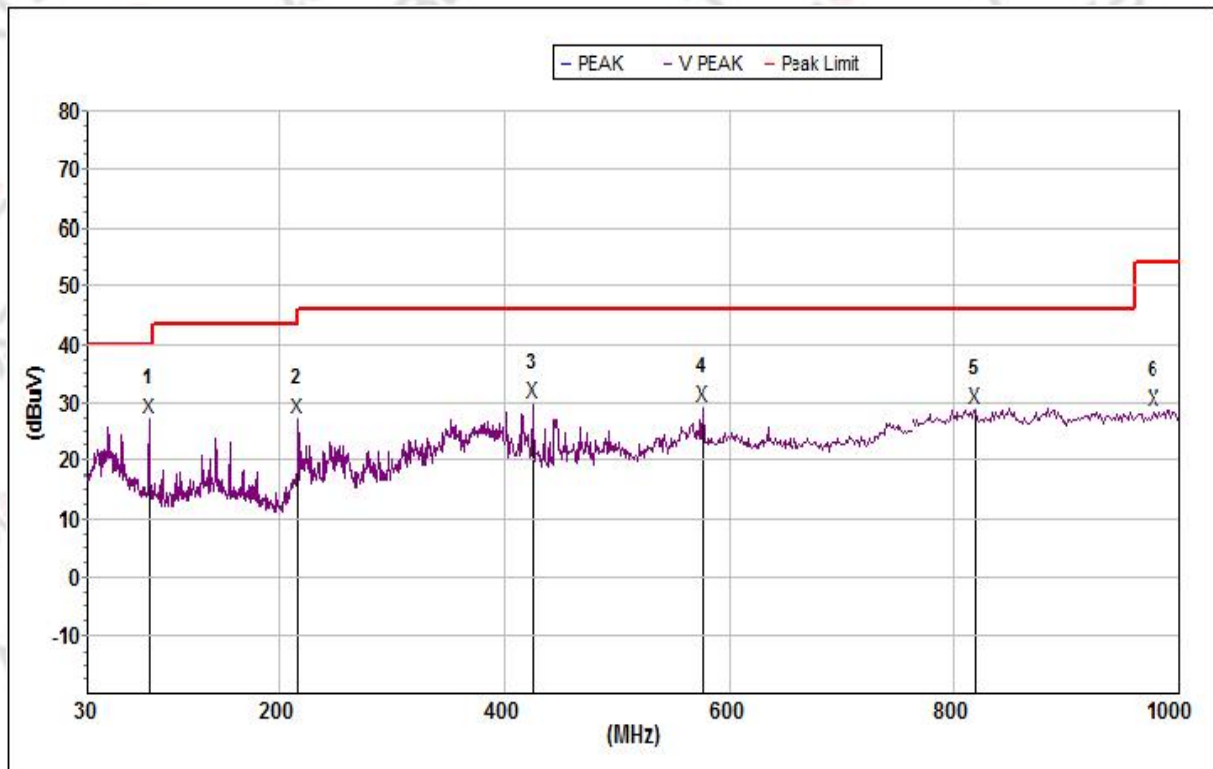
(30MHz -1000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Vertical
Test Mode:	TX Mode 1		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 1 Vertical



Mk.	Freq. (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	84.258	27.3	40.0	12.7	310	200	14.8	29.6	1.2	V
2	216.403	27.3	46.0	18.7	277	100	16.3	33.0	1.8	V
3	425.028	29.9	46.0	16.1	261	200	22.2	32.9	2.5	V
4	576.644	29.5	46.0	16.5	246	300	25.4	32.3	2.9	V
5	818.834	28.9	46.0	17.1	214	100	28.6	31.7	3.4	V
6	977.465	28.7	54.0	25.3	360	100	29.7	33.5	3.8	V

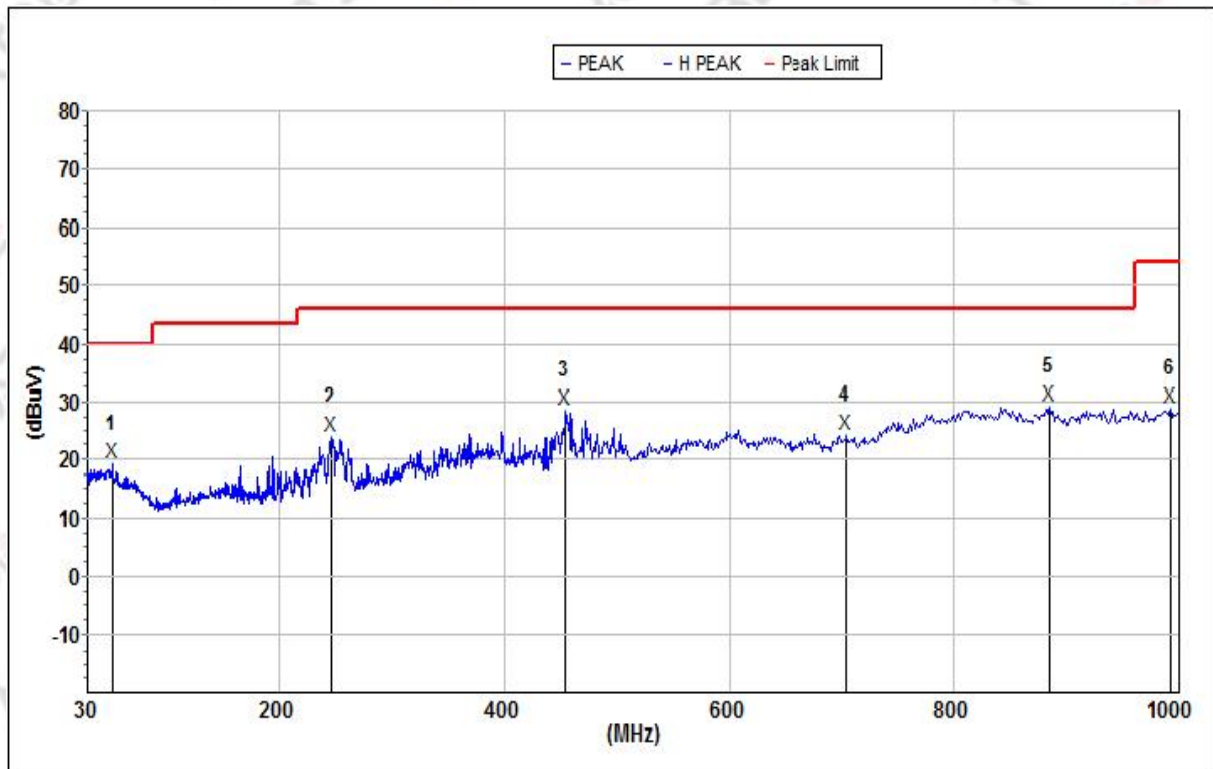
(30MHz -1000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Horizontal
Test Mode:	TX Mode 3		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 3 Horizontal



Mk.	Freq. (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	51.752	19.4	40.0	20.6	87	0	19.3	29.8	1.0	H
2	247.248	24.0	46.0	22.0	350	0	17.5	32.4	2.0	H
3	455.107	28.8	46.0	17.2	359	0	23.0	33.6	2.6	H
4	704.226	24.4	46.0	21.6	198	0	26.8	33.8	3.2	H
5	884.503	29.2	46.0	16.8	87	0	28.9	32.6	3.6	H
6	993.011	29.0	54.0	25.0	293	0	29.8	33.6	3.8	H

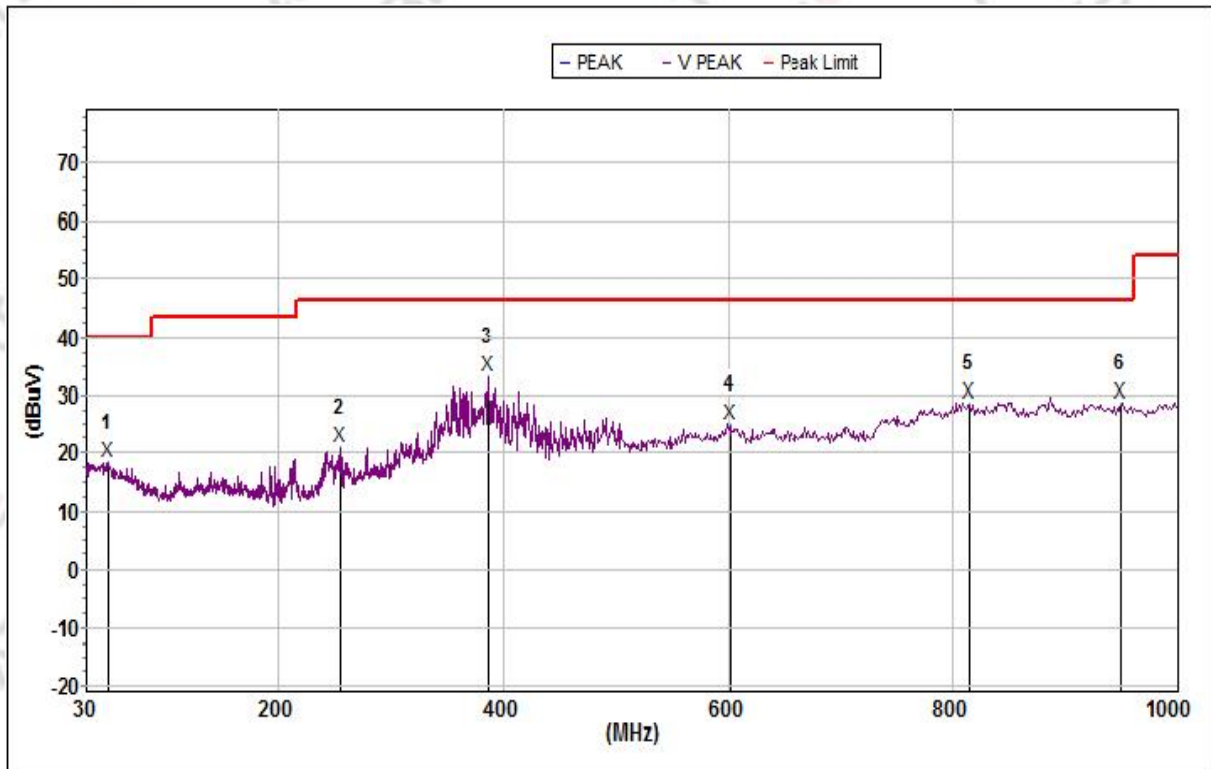
(30MHz -1000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Vertical
Test Mode:	TX Mode 3		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 3 Vertical



Mk.	Freq. (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	48.843	18.4	40.0	21.6	163	200	19.5	29.8	1.0	V
2	256.072	21.0	46.0	25.0	261	300	17.8	32.3	2.0	V
3	386.634	33.3	46.0	12.7	243	200	21.1	32.1	2.4	V
4	601.427	25.2	46.0	20.8	163	400	26.0	32.3	3.0	V
5	814.538	28.8	46.0	17.2	181	300	28.6	31.7	3.4	V
6	948.761	28.8	46.0	17.2	360	400	29.4	33.2	3.7	V

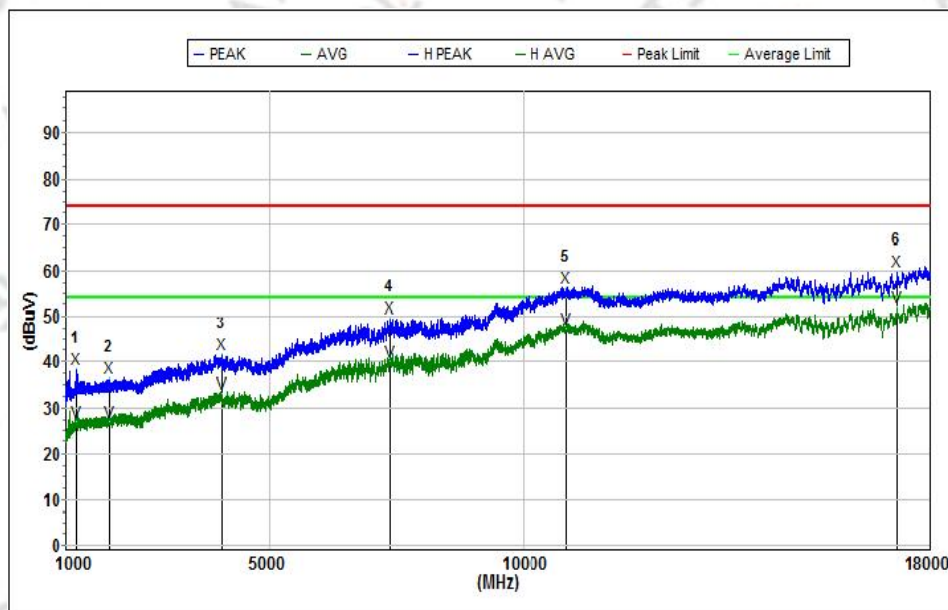
3.7.4.3. For 1 GHz ~ 18GHz (1000MHz-18000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Horizontal
Test Mode:	TX Mode 1		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 1 Horizontal



Mk.	Freq.(MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	1203.150	38.5	74.0	35.5	182	200	25.7	58.1	4.3	H
2	1856.800	36.5	74.0	37.5	360	100	25.5	58.3	5.1	H
3	4052.350	41.9	74.0	32.1	328	400	31.0	58.1	7.3	H
4	7358.850	49.5	74.0	24.5	28	100	36.2	58.8	10.2	H
5	10840.450	56.3	74.0	17.7	360	300	38.6	58.6	11.6	H
6	17344.650	59.7	74.0	14.3	240	200	40.5	60.4	16.4	H
Avg										
1	1203.150	27.0	54.0	27.0	182	200	25.7	58.1	4.3	H
2	1856.800	27.1	54.0	26.9	360	100	25.5	58.3	5.1	H
3	4052.350	33.3	54.0	20.7	328	400	31.0	58.1	7.3	H
4	7358.850	40.1	54.0	13.9	28	100	36.2	58.8	10.2	H
5	10840.450	47.4	54.0	6.6	360	300	38.6	58.6	11.6	H
6	17344.650	52.0	54.0	2.0	240	200	40.5	60.4	16.4	H

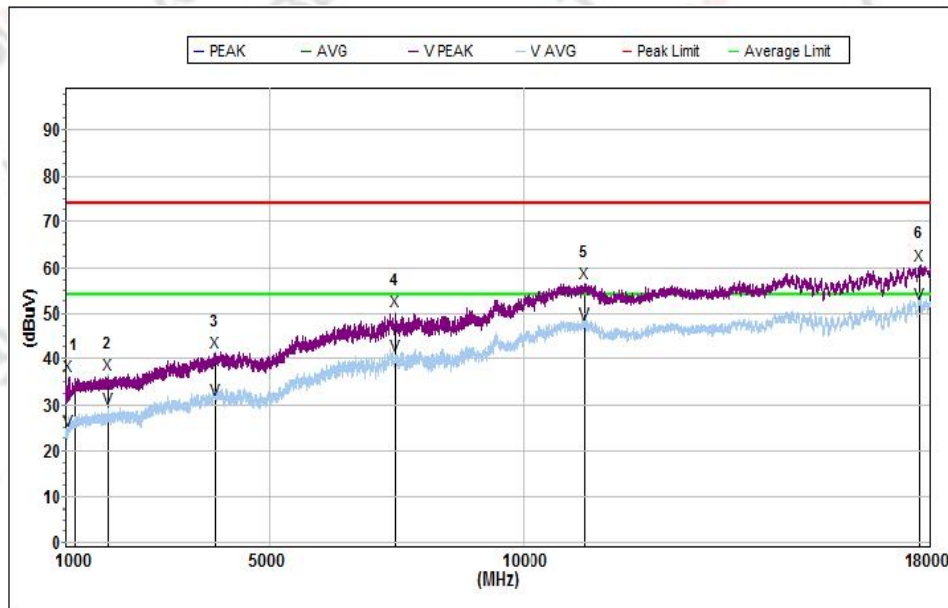
(1000MHz-18000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Vertical
Test Mode:	TX Mode 1		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 1 Vertical



Mk.	Freq.(MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	1054.400	36.3	74.0	37.7	249	100	25.1	59.2	3.9	V
2	1822.800	36.4	74.0	37.6	359	400	25.3	58.1	5.0	V
3	3937.600	41.5	74.0	32.5	0	100	30.7	58.0	7.2	V
4	7465.100	50.4	74.0	23.6	154	200	36.3	58.3	10.0	V
5	11188.100	56.6	74.0	17.4	234	300	38.7	58.6	11.9	V
6	17786.650	60.4	74.0	13.6	280	300	42.5	59.9	16.6	V
Avg										
1	1054.400	24.4	54.0	29.6	249	100	25.1	59.2	3.9	V
2	1822.800	29.3	54.0	24.7	359	400	25.3	58.1	5.0	V
3	3937.600	31.2	54.0	22.8	0	100	30.7	58.0	7.2	V
4	7465.100	40.8	54.0	13.2	154	200	36.3	58.3	10.0	V
5	11188.100	47.6	54.0	6.4	234	300	38.7	58.6	11.9	V
6	17786.650	51.9	54.0	2.1	280	300	42.5	59.9	16.6	V

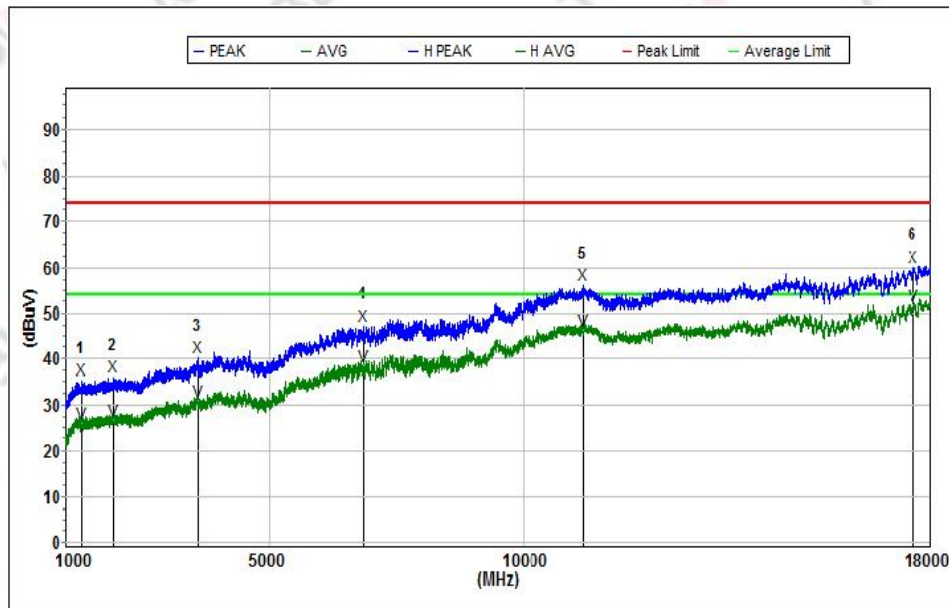
(1000MHz -18000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Horizontal
Test Mode:	TX Mode 3		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 3 Horizontal



Mk.	Freq.(MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	1298.350	35.5	74.0	38.5	30	200	25.6	58.3	4.4	H
2	1928.200	36.1	74.0	37.9	38	100	26.0	58.8	5.2	H
3	3591.650	40.6	74.0	33.4	113	300	29.8	58.2	7.0	H
4	6857.350	47.5	74.0	26.5	220	400	35.8	60.0	10.2	H
5	11168.550	56.1	74.0	17.9	250	300	38.7	58.5	11.9	H
6	17654.050	60.1	74.0	13.9	335	100	41.9	60.1	16.5	H
Avg										
1	1298.350	26.0	54.0	28.0	30	200	25.6	58.3	4.4	H
2	1928.200	26.7	54.0	27.3	38	100	26.0	58.8	5.2	H
3	3591.650	31.0	54.0	23.0	113	300	29.8	58.2	7.0	H
4	6857.350	38.6	54.0	15.4	220	400	35.8	60.0	10.2	H
5	11168.550	46.5	54.0	7.5	250	300	38.7	58.5	11.9	H
6	17654.050	51.6	54.0	2.4	335	100	41.9	60.1	16.5	H

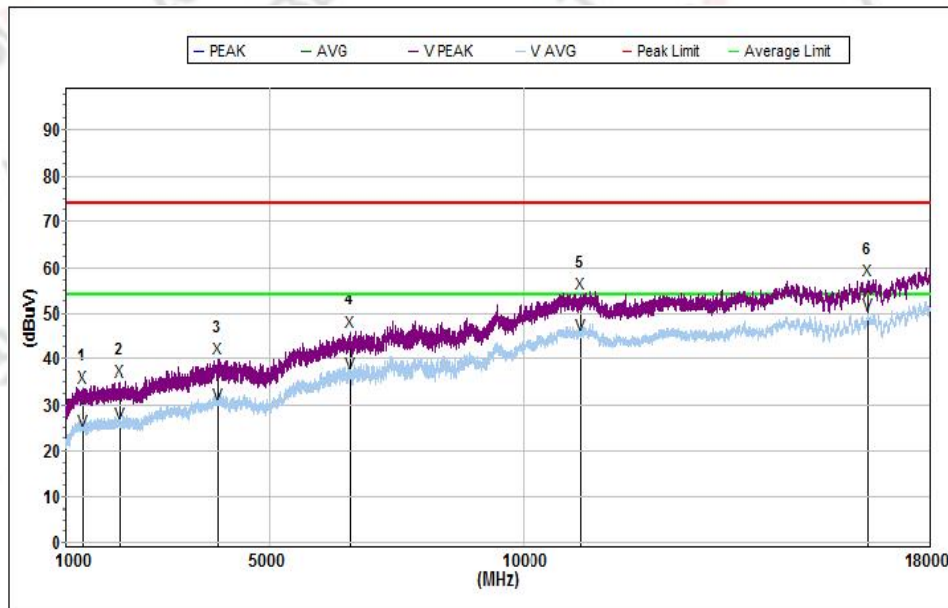
(1000MHz -18000MHz)

Temperature:	22.3°C	Relative Humidity:	51%RH
Test Voltage:	DC 3.15V	Phase:	Vertical
Test Mode:	TX Mode 3		

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 3 Vertical



Mk.	Freq.(MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak:										
1	1334.900	34.0	74.0	40.0	30	200	25.6	58.4	4.4	V
2	2059.950	35.1	74.0	38.9	54	300	26.6	59.3	5.4	V
3	3986.050	40.1	74.0	33.9	189	200	30.9	58.0	7.2	V
4	6596.400	46.2	74.0	27.8	203	100	35.4	59.0	9.5	V
5	11122.650	54.4	74.0	19.6	334	100	38.6	58.4	11.8	V
6	16773.450	57.2	74.0	16.8	251	300	38.9	60.6	15.8	V
Avg										
1	1334.900	24.4	54.0	29.6	30	200	25.6	58.4	4.4	V
2	2059.950	26.1	54.0	27.9	54	300	26.6	59.3	5.4	V
3	3986.050	30.3	54.0	23.7	189	200	30.9	58.0	7.2	V
4	6596.400	36.9	54.0	17.1	203	100	35.4	59.0	9.5	V
5	11122.650	45.3	54.0	8.7	334	100	38.6	58.4	11.8	V
6	16773.450	49.5	54.0	4.5	251	300	38.9	60.6	15.8	V

Note:

1. All TX Mode, the worst case is mode1&3, only show the worst case.

3.7.4.4. For above 18GHz

(above 18GHz)

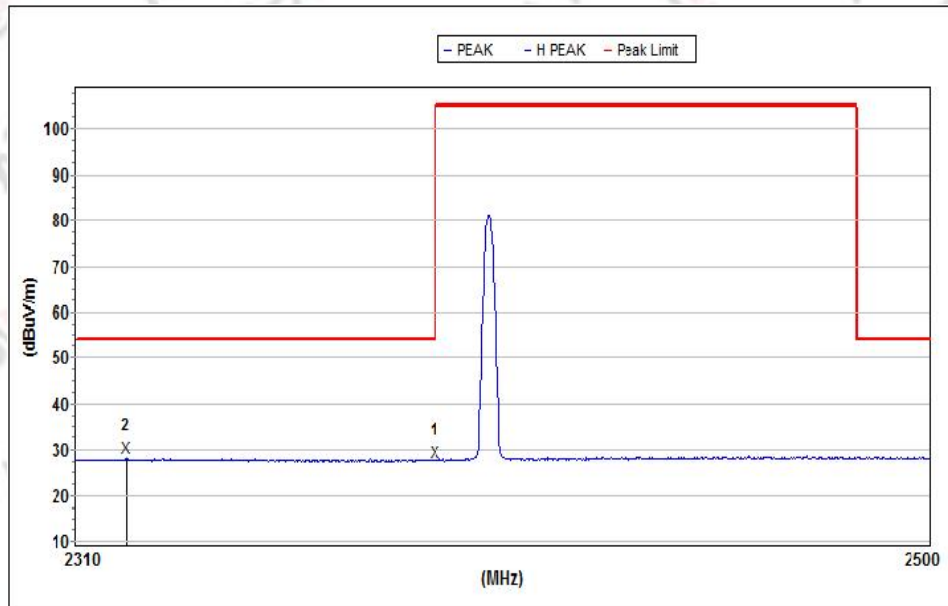
Temperature:	22.3°C	Relative Humidity:	51%
Test Voltage:	DC 3.15V	Test Mode:	TX Mode

Note:

1. Other 18G-25G Emission detected are more than 20dB below the limit.

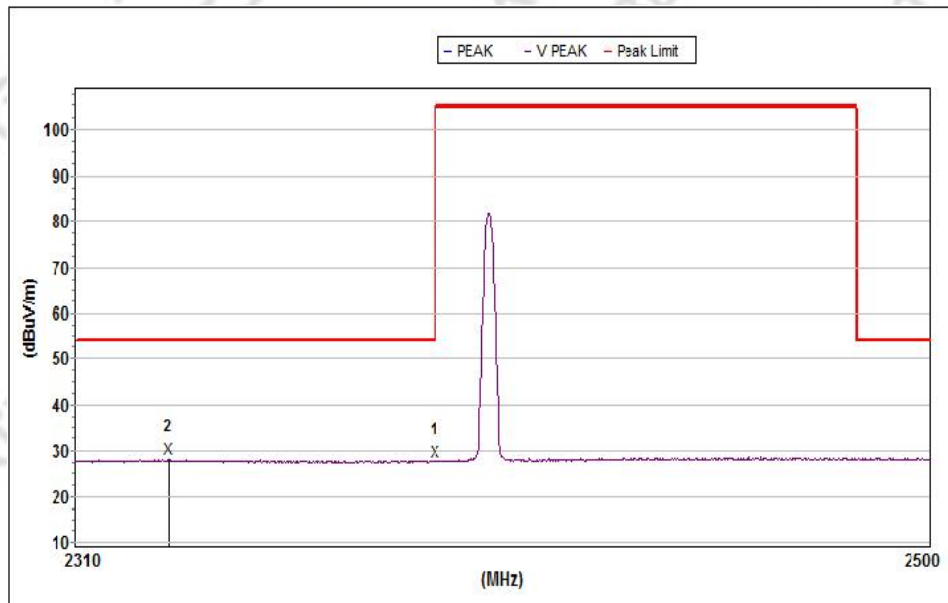
3.7.5 Test Result of Restricted Band

GFSK-Low Mode 1 Horizontal



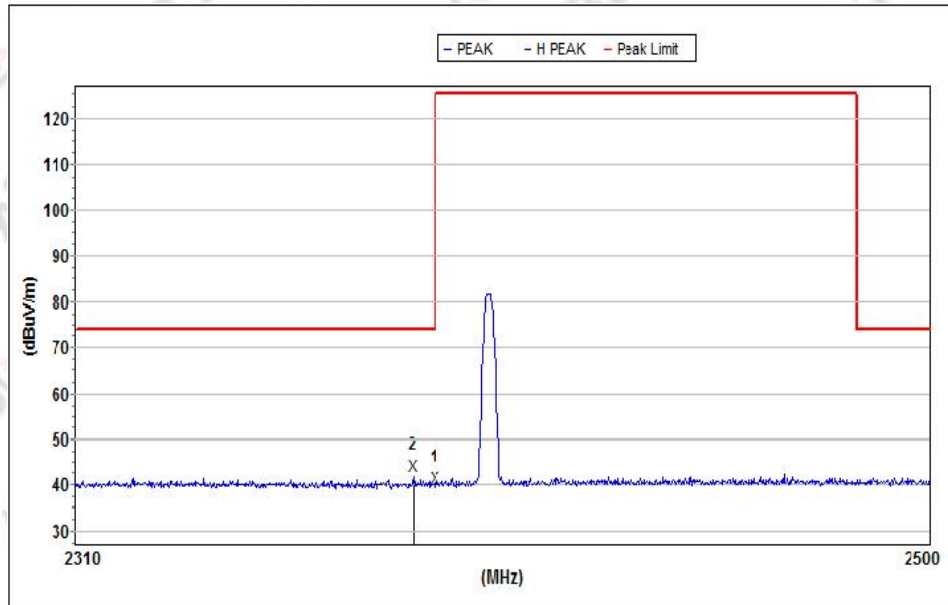
Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Avg										
1	2390.000	27.5	54.0	26.5	298	400	27.4	59.6	5.7	H
2	2321.348	28.3	54.0	25.7	360	200	27.2	59.5	5.6	H

Mode 1 Vertical



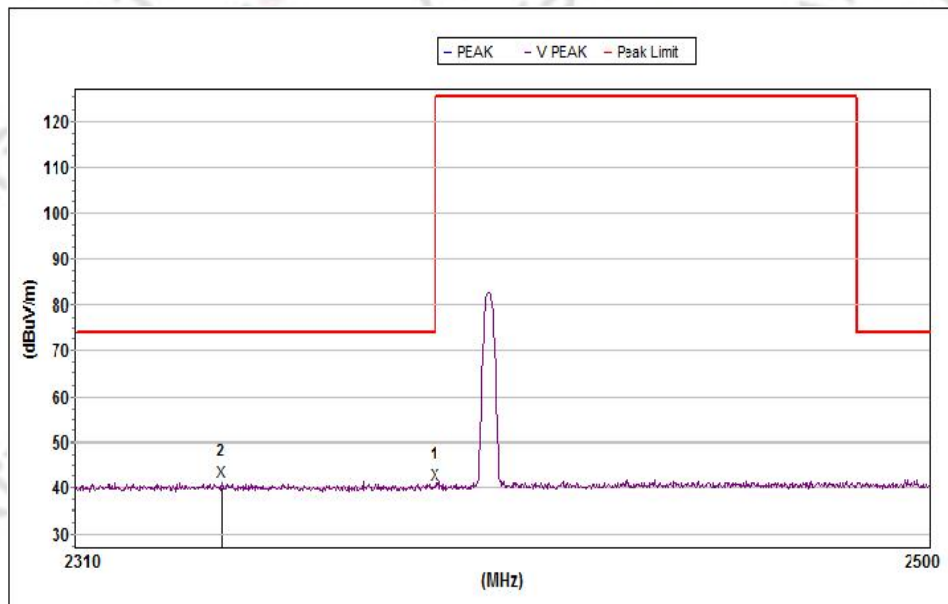
Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Avg										
1	2390.000	27.6	54.0	26.4	330	100	27.4	59.6	5.7	0.0
2	2330.909	28.4	54.0	25.6	99	200	27.2	59.5	5.6	0.0

GFSK-Low Mode 1 Horizontal



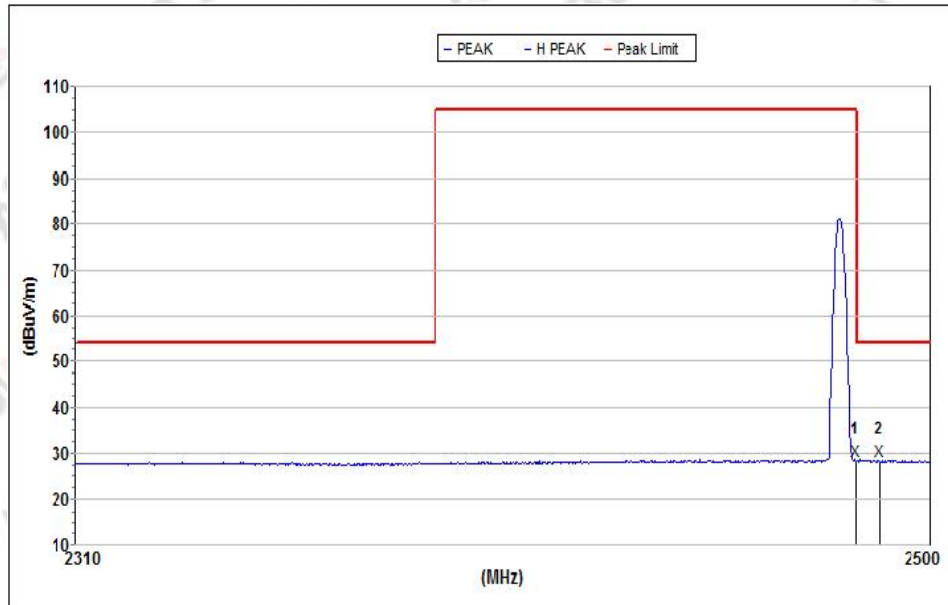
Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak										
1	2390.000	39.5	74.0	34.5	0	150	27.4	59.6	5.7	H
2	2385.145	42.0	74.0	32.0	182	400	27.3	59.6	5.7	H

Mode 1 Vertical



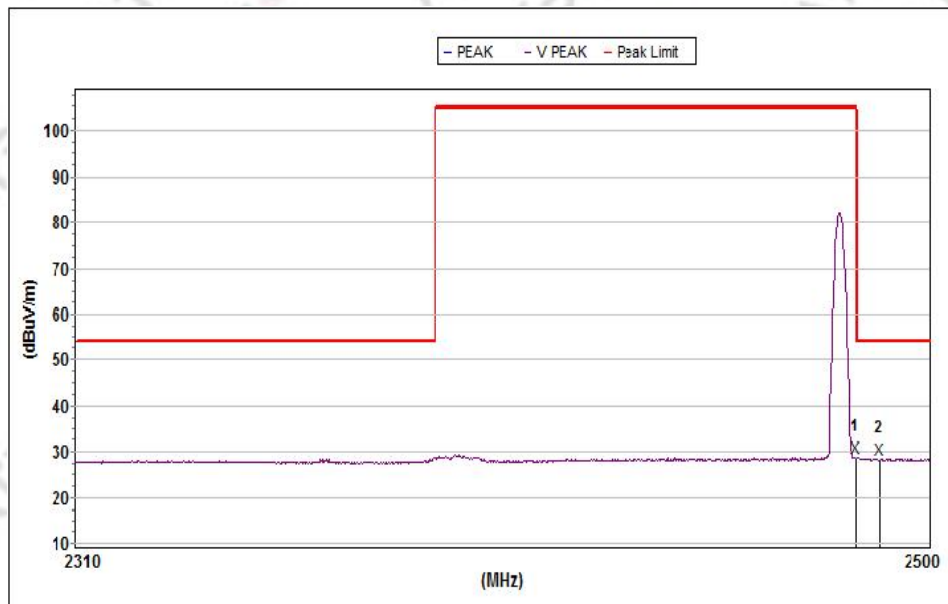
Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak										
1	2390.000	40.7	74.0	33.3	160	400	27.4	59.6	5.7	V
2	2342.360	41.6	74.0	32.4	348	300	27.3	59.5	5.6	V

GFSK-High Mode 3 Horizontal



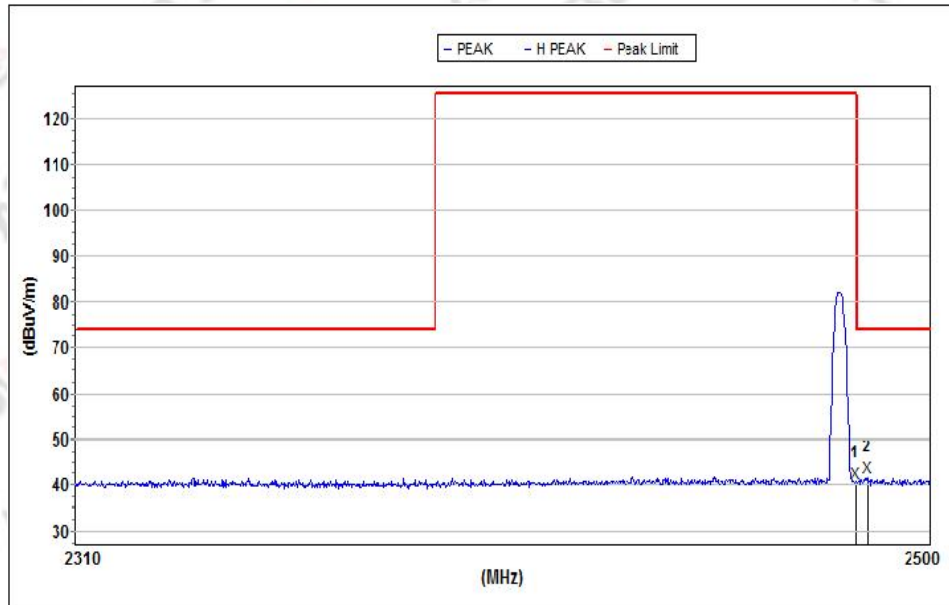
Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Avg										
1	2483.501	28.4	54.0	25.6	219	300	27.6	59.7	5.8	H
2	2488.762	28.4	54.0	25.6	112	300	27.6	59.7	5.8	H

Mode 3 Vertical



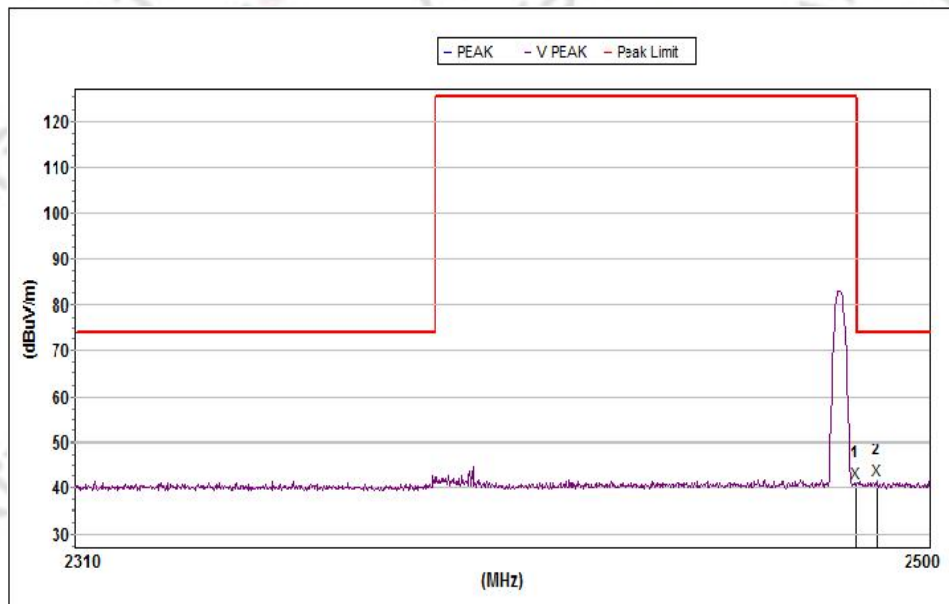
Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Avg										
1	2483.501	28.6	54.0	25.4	0	174	27.6	59.7	5.8	V
2	2488.565	28.5	54.0	25.5	359	201	27.6	59.7	5.8	V

GFSK- High Mode 3 Horizontal



Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak										
1	2483.501	40.5	74.0	33.5	100	200	27.6	59.7	5.8	H
2	2486.009	41.8	74.0	32.2	1	300	27.6	59.7	5.8	H

Mode 3 Vertical



Mk.	Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Peak										
1	2483.501	41.3	74.0	32.7	275	100	27.6	59.7	5.8	V
2	2487.975	41.9	74.0	32.1	213	100	27.6	59.7	5.8	V

Note: All TX Mode, the worst case is model1&3, only show the worst case.

*****END OF APPENDIX B*****

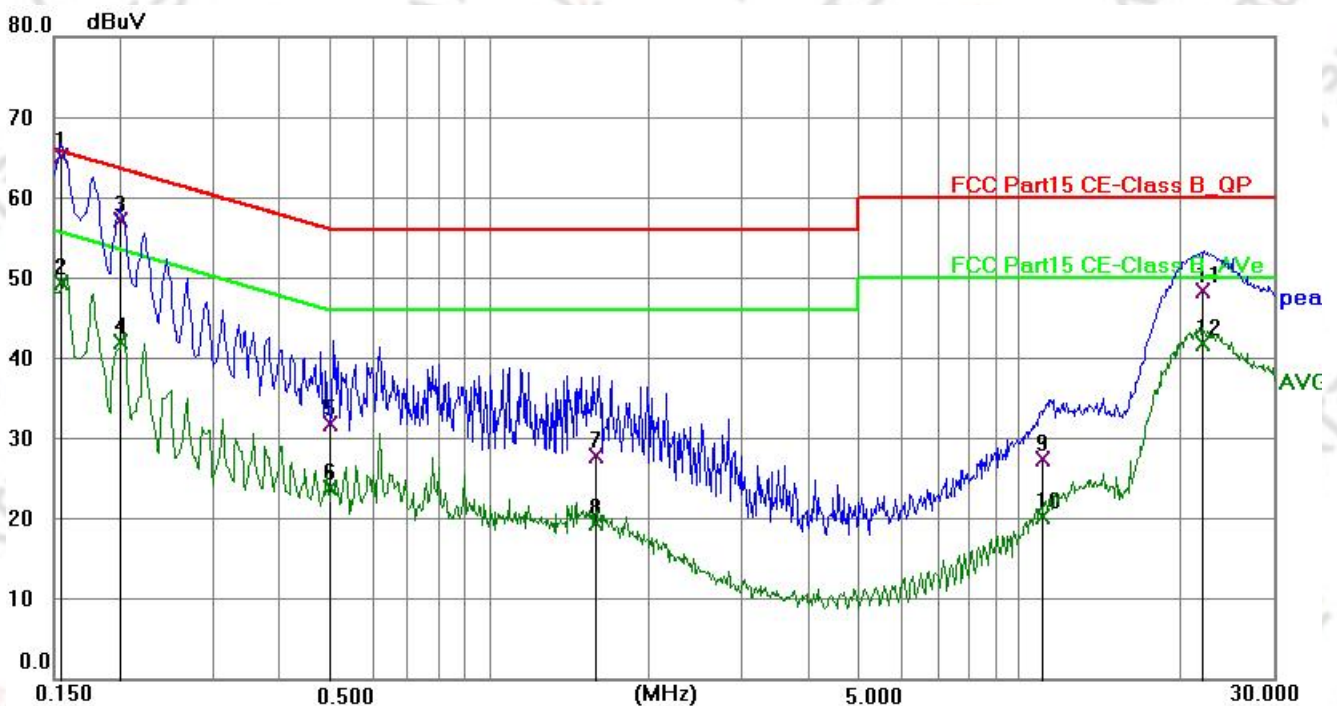
Appendix C _ AC Power-Line Conducted Emission Test Data

3.8.4. Test Result of AC Power-Line Conducted Emission

Temperature:	22.0°C	Relative Humidity:	61%RH
Test Voltage:	AC 120V/60Hz	Phase:	L1
Test Mode:	Mode 1		

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit.
3. Factor=LISN factor+Cable loss+Limiter (10dB)

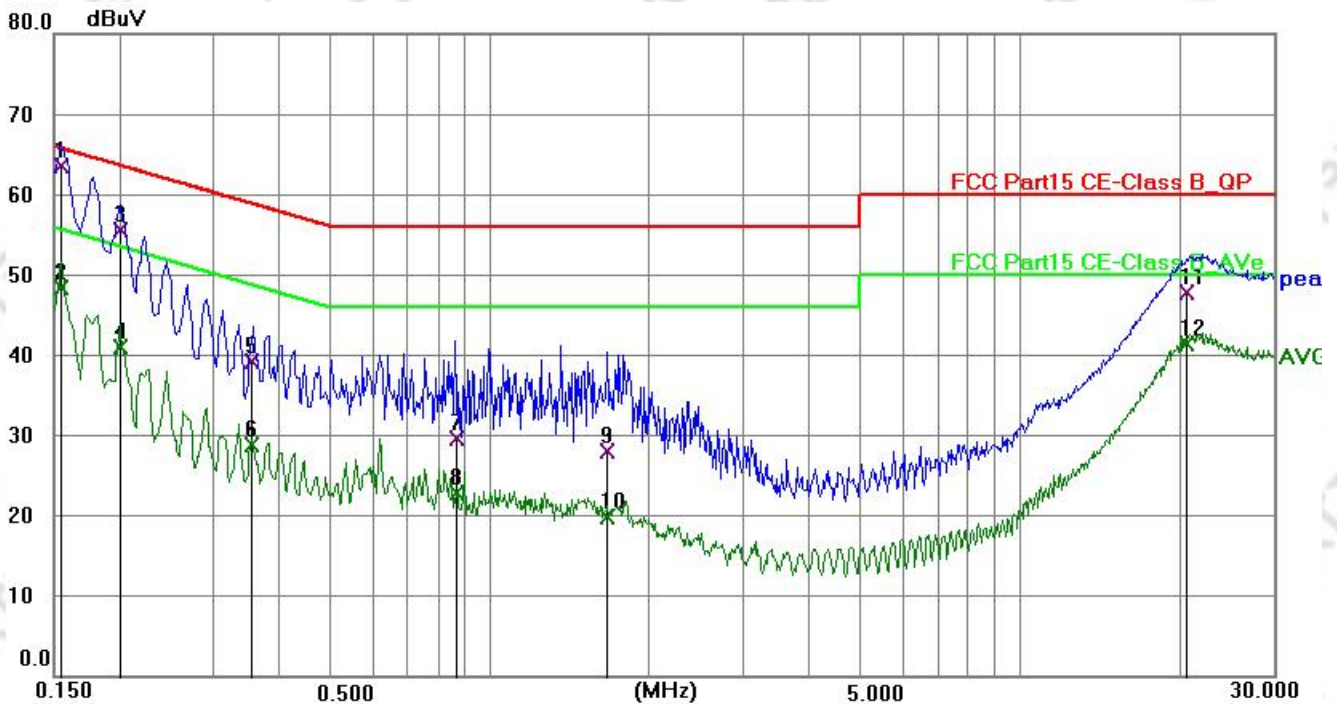


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1555	55.18	9.97	65.15	65.70	-0.55	QP
2	0.1555	39.50	9.97	49.47	55.70	-6.23	AVG
3	0.1999	46.99	10.15	57.14	63.61	-6.47	QP
4	0.1999	31.89	10.15	42.04	53.61	-11.57	AVG
5	0.4994	21.91	9.97	31.88	56.01	-24.13	QP
6	0.4994	13.92	9.97	23.89	46.01	-22.12	AVG
7	1.5869	17.73	10.06	27.79	56.00	-28.21	QP
8	1.5869	9.47	10.06	19.53	46.00	-26.47	AVG
9	10.9735	17.24	10.11	27.35	60.00	-32.65	QP
10	10.9735	10.18	10.11	20.29	50.00	-29.71	AVG
11	21.9948	37.73	10.66	48.39	60.00	-11.61	QP
12	21.9948	31.13	10.66	41.79	50.00	-8.21	AVG

Temperature:	24.6°C	Relative Humidity:	49%RH
Test Voltage:	AC120V/60Hz	Phase:	N
Test Mode:	Mode 1		

Remark:

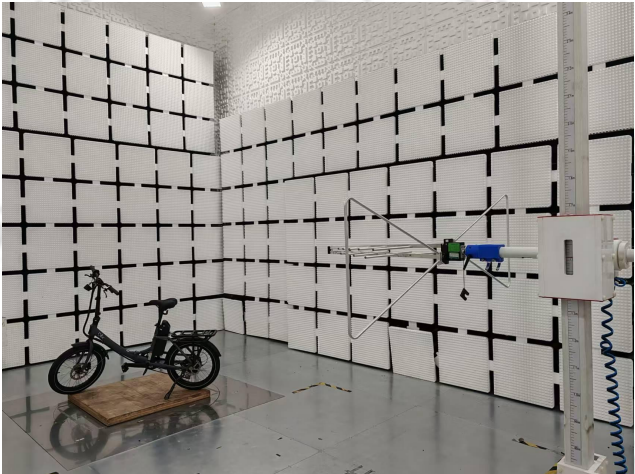
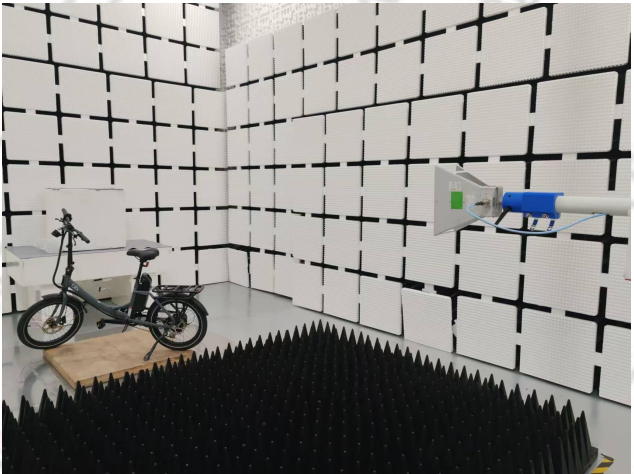
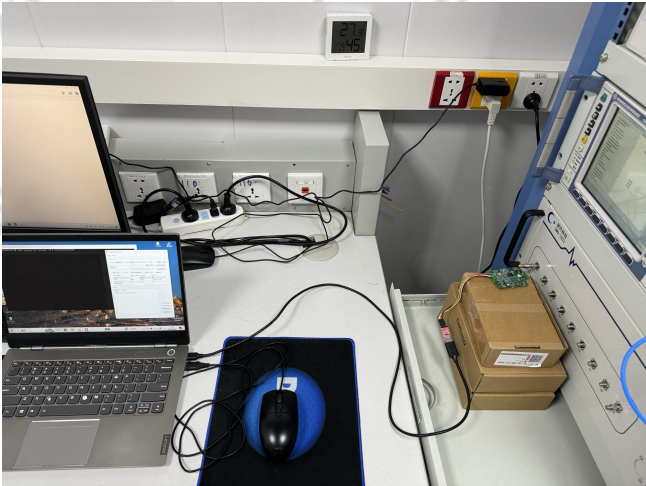
1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit.
3. Factor=LISN factor+Cable loss+Limiter (10dB)



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1554	53.79	9.83	63.62	65.71	-2.09	QP
2	0.1554	38.49	9.83	48.32	55.71	-7.39	AVG
3	0.1998	45.77	9.81	55.58	63.62	-8.04	QP
4	0.1998	31.18	9.81	40.99	53.62	-12.63	AVG
5	0.3535	29.48	9.78	39.26	58.88	-19.62	QP
6	0.3535	19.06	9.78	28.84	48.88	-20.04	AVG
7	0.8671	19.81	9.79	29.60	56.00	-26.40	QP
8	0.8671	12.98	9.79	22.77	46.00	-23.23	AVG
9	1.6715	18.10	9.86	27.96	56.00	-28.04	QP
10	1.6715	9.94	9.86	19.80	46.00	-26.20	AVG
11	20.6943	37.27	10.57	47.84	60.00	-12.16	QP
12	20.6943	30.85	10.57	41.42	50.00	-8.58	AVG

*****END OF APPENDIX C*****

Appendix D _ Test Setup

Radiated Emissions for 30MHz~1GHz 	Radiated Emissions for 1GHz~18GHz 
AC Power Line Conducted Emissions 	Conducted for RF 
Conducted Near View 	N/A

*****END OF APPENDIX D*****