

## **TEST REPORT**

Report No.: SHATBL2312001W01

Applicant :	Jiangsu Niu Electric	Technology Co., Ltd
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- NIU Kick Scooter **Product Name**
- NIU **Brand Name**
- KQi 300X **Model Name**
- FCC ID 2AZ6G-K3LSD4BT
- **Test Standard** 47 CFR 15.247
- **Date of Test** 2023.12.01-2023.12.07

**Report Prepared by** 

'nris (Chris Xu) Quality

**Report Approved by** 

Ghost Li (Ghost Li)

**Authorized Signatory** 

(Terry Yang)

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## Report No.:SHATBL2312001W01

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### **REVISION HISTORY**

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Rev.	Issue Date	Revisions	Revised by
00	2023.12.08	Initial Release	Ghost Li
1	D' S	F B F B	7
54	T B S	F 3	S & T
2º	N B	NY F B	F as
P X	3	S & F D	F 3
1	D' a	F B F B	No P
N	T D'	F 3	S & N
13	T B	N F B	S SI
F	34 1	S & F B	
	254	5 × F 2	No. F
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### **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, ' $\Box$ ' indicates that EUT does not support content after ' $\Box$ ', and ' $\Box$ ' indicates that it supports content after ' $\Box$ '

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ReportStandardSectionSection		Test Item	Judgment	Remark	
3.1	47 CFR 15.247(b)(3)	Maximum Peak Conducted Output Power	PASS	20	
3.2	3 -	Duty Cycle	Report only	P-	
3.3	47 CFR 15.247(a)(2)	6dB Bandwidth	PASS		
3.3	V - 2"	99% Bandwidth	Report only	s	
3.4	47 CFR 15.247(e)	Power Spectral Density	PASS		
3.5	47 CFR 15.247(d)	Conducted Band Edge	PASS	P	
3.6	47 CFR 15.247(d)	Conducted Spurious Emission	PASS	- 7	
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	5	

## SUMMARY OF TEST RESULT

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### **1. GENERAL DESCRIPTION**

### 1.1. Applicant

Name:Jiangsu Niu Electric Technology Co., LtdAddress:No.387 Changting Road, West Taihu Science and Technology Industrial Park, Changzhou<br/>City,Jiangsu P.R. China

### 1.2. Manufacturer

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Name	:	Jiangsu Niu Electric Technology Co., Ltd
Address	:	No.387 Changting Road, West Taihu Science and Technology Industrial Park, Changzhou City, Jiangsu P.R. China
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### 1.3. Factory

Address

No.387 Changting Road, West Taihu Science and Technology Industrial Park, Changzhou City, Jiangsu P.R. China

## 1.4. General Information of EUT

General Information				
Equipment Name	NIU Kick Scooter			
Brand Name	NIU			
Model Name	KQi 300X			
Series Model	KQi 300P			
Model Difference	The motor power of the model KQi 300X is 500w, and the power of KQi 300P is 450w, others are same.			
SN or IMEI Code	202311220011002			
Power Input	DC 54.6V 2A			
Hardware Version	K3E13P01			
Software Version	K3E13G07			
Connecting I/O Port(s)	Refer to the remark below.			
D 1.				

#### 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	S T B		
Number of Channels	40			
Carrier Frequency of Each Channel	2402 + $n*2$ MHz; $n = 0 \sim 3$	39		
	☑Bluetooth LE(1Mbps):	-3.49dBm (0.000448W)		
Maximum Output Power To Antenna	□Bluetooth LE(2Mbps):	dBm ( W)		
Type of Modulation	Bluetooth LE:	GFSK		
Antenna Type	PCB Antenna	B F N		
Antenna Gain	-3.40dBi	F BY S		

### 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 st.

test.

### 2. TEST CONFIGURATION OF EUT

### 2.1. Carrier Frequency Channel

1 1 1						
Frequency Band	Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency 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
2400 - 2483.5	06	2414	20	2442	34	2470
MHz	07	2416	21	2444	35	2472
	08	2418	22	2446	36	2474
	09	2420	23	2448	37	2476
	10	2422	24	2450	38	2478
	5 11 V	2424	25	2452	39	2480
	12	2426	26	2454	- 🔊	V 20
	13	2428	27	2456	2 -	P

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.

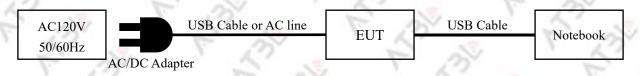
Summary Table of Test Modes				
T 4 14	Data Rate / Modulation			
Test Item	☑Bluetooth LE(1Mbps)	□Bluetooth LE(2Mbps)		
For Conducted and Radiated Test	Mode 1: CH00_2402 MHz	Mode 4: CH00_2402 MHz		
	Mode 2: CH19_2440 MHz	Mode 5: CH19_2440 MHz		
	Mode 3: CH39_2480 MHz	Mode 6: CH39_2480 MHz		
For AC Power-line Conducted Emission	Mode 7: Keep Bluetooth link under the max	imum output power		

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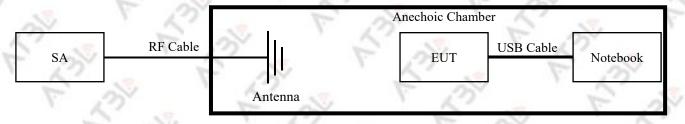
#### Report No.:SHATBL2312001W01

### 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

SA	RF Cable	FUT	USB Cable	Notebook
SA	6	EOT	V	Notebook

### 2.4. Description of Support Units

NO.	Unit	Brand	Model	Description
1	Notebook	Lenovo	DESKTOP-USDE009	N/A
2	USB Cable	N/A	100cm	N/A

### 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.

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### 2.7. Equipment List

### 2.7.1. For AC Power-Line Conducted Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Test Receiver	R&S	ESPI	101679	SHATBL-E012	2024.07.09
LISN	R&S	ENV216	100300	SHATBL-E013	2024.07.09
LISN	R&S	ENV216	100333	SHATBL-E041	2024.07.09
Thermometer	DeLi	N/A	N/A	SHATBL-E016	2024.07.09
Test Software	FALA	EZ-EMC	N/A	SHATBL-E046	N/A

### 2.7.2. For Radiated Spurious Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Signal analyzer	Agilent	N9020A	MY50200811	SHATBL-E017	2024.07.09
Amplifier	JPT	JPA0118-55-303A	1910001800055000	SHATBL-E006	2024.07.09
Amplifier	JPT	JPA-10M1G32	21010100035001	SHATBL-E005	2024.07.09
Antenna/Turn table Controller	Brilliant	N/A	N/A	SHATBL-E007	N/A
Loop Antenna	Daze	ZN30900C	20077	SHATBL-E042	2024.07.09
Bilog Antenna	SCHWARZBECK	VULB 9168	01174	SHATBL-E008	2024.07.09
Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120D	02334	SHATBL-E009	2024.07.09
Horn Antenna	COM-POWER	AH-1840	10100008	SHATBL-E043	2024.07.09
Thermometer	DeLi	N/A	N/A	SHATBL-E015	2024.07.09
Test Software	FALA	EMC-RI	N/A	SHATBL-E046	N/A

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## 2.7.3. For Conducted Test

2.7.3. For Cond	ucted Test	5	N N	2	- F
Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Power meter	Anritsu	ML2496A	1935001	SHATBL-W030	2024.07.09
Power sensor	Anritsu	MA2411B	1911006	SHATBL-W031	2024.07.09
Power sensor	DARE	RPR3006W	16I00054SN016	SHATBL-W008	2024.07.09
Power sensor	DARE	RPR3006W	RPR6W-2001005	SHATBL-W032	2024.07.09
Power sensor	Rediteq	RPR3006W	RPR6W-2201002	SHATBL-W033	2024.07.09
Power sensor	Rediteq	RPR3006W	RPR6W-2201003	SHATBL-W034	2024.07.09
Power sensor	Keysight	U2021XA	MY59120004	SHATBL-W035	2024.07.09
Adjustable Attenuator	Agilent	8494B	MY42144015	SHATBL-W009	2024.07.09
Adjustable Attenuator	Agilent	8496B	MY42143776	SHATBL-W010	2024.07.09
Environmental Test Chamber	KSON	THS-B6C-150	9159K	SHATBL-W019	2024.07.09
Signal analyzer	Keysight	N9020A	MY50510136	SHATBL-W003	2024.07.09
Vector signal generator	Keysight	N5182B	MY57300196	SHATBL-W005	2024.07.09
Vector signal generator	Agilent	N5182A	MY50143555	SHATBL-W037	2024.07.09
Analog signal generator	Keysight	N5173B	MY60403026	SHATBL-W038	2024.07.09
Wideband radio communication tester	R&S	CMW500	101331	SHATBL-W007	2024.07.09
Spectrum analyzer	R&S	FSV40-N	101761	SHATBL-W036	2024.07.09
Switch Box	N/A	RFSW3003328	RFSW201019	SHATBL-W029	N/A
Thermometer	DeLi	N/A	N/A	SHATBL-W012	2024.01.16
Test Software	FALA	LZ-RF	N/A	SHATBL-W020	N/A

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# **AT3**

### 2.8. Measurement Uncertainty

The reported uncertainty of measurement y $\pm$ U, where expended 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	RF output power, conducted	±0.958dB
2	Conducted spurious emissions	±2.988dB
3	All emissions, radiated 30MHz-1GHz	±2.50dB
4	All emissions, radiated 1GHz-18GHz	±3.51dB
5	Occupied bandwidth	±23.20Hz
6	Power spectral density	±0.886dB

# **AT3**

### 3. TEST RESULT

### 3.1. Maximum Peak Conducted Output Power

### 3.1.1. Limit

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

<u>47 CFR 15.247(b)(4)</u>: 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.

<u>47 CFR 15.247(c)(1)(i)</u>: 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

<u>ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter method</u>: 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.

<u>ANSI C63.10-2013 clause 11.9.2.3.1 Method AVGPM</u>: 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.

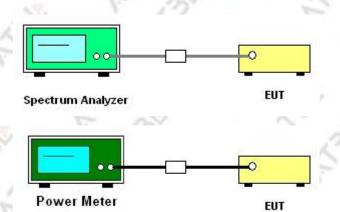
2. If the transmitter does not transmit continuously, measure the duty cycle, D, of the transmitter output signal as described in <u>ANSI C63.10-2013 clause 11.6</u>.

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



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3.1.4. Test Result of Maximum Peak Conducted Output Power

Please refer to the Appendix A.

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### 3.2. Duty Cycle

### 3.2.1. Limit

There is no limit requirement for Duty Cycle.

### 3.2.2. Test Procedure

<u>ANSI C63.10-2013 clause 11.6</u>: 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.

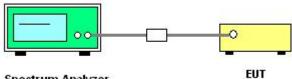
2. The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

① Set the center frequency of the instrument to the center frequency of the transmission.

- (2) Set  $RBW \ge OBW$  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  $T \le 16.7$  µs.)

### 3.2.3. Test Setup



Spectrum Analyzer

### 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

<u>47 CFR 15.247(a)(2)</u>: 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 <u>ANSI C63.10-2013 clause 11.8.1</u>: The steps for the first option are as follows:

- (1) Set RBW = 100 kHz.
- (2) Set the VBW  $\geq$  [3 × RBW].
- $\bigcirc$  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 <u>ANSI C63.10-2013 clause 6.9.3</u>: 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 (OBW/RBW)] below the reference level. Specific guidance is given in <u>ANSI</u> <u>C63.10-2013 clause 4.1.5.2</u>.

(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.

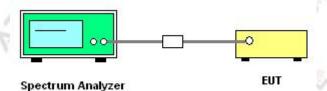
(7) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at

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

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

Please refer to the Appendix A.

## **AT3**

### 3.4. Power Spectral Density

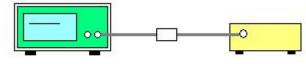
### 3.4.1. Limit

<u>47 CFR 15.247(e)</u>: 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

<u>ANSI C63.10-2013 clause 11.10.2</u>: 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 × 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



Spectrum Analyzer

EUT

### 3.4.4. Test Result of Power Spectral Density

Please refer to the Appendix A.

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### 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.

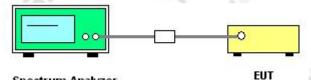
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Conducted Band Edge measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the 100 kHz bandwidth within the band that contains the highest level of the desired power when maximum peak 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.

Spectrum Analyzer

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.

## **AT3**

### 3.6. Conducted Spurious Emission

### 3.6.1. Limit

<u>47 CFR 15.247(d)</u>: 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 <u>ANSI C63.10-2013 clause 7.8.8</u>.

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.

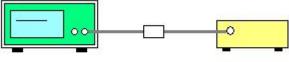
3. Set to the maximum power setting and enable the EUT transmit continuously.

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



Spectrum Analyzer

EUT

### 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

<u>47 CFR 15.247(d)</u>: 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.

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

	1.4.3.	and the second s		11
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

<u>47 CFR 15.209(a)</u>: 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

## **AT3**

### 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;

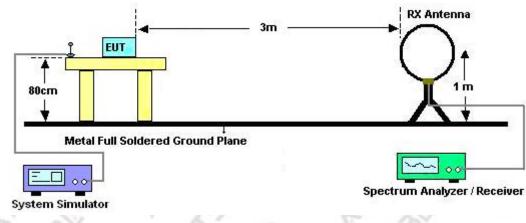
• Set RBW = 1 MHz; VBW = 10 Hz, when duty cycle is no less than 98 percent or VBW  $\geq$  1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



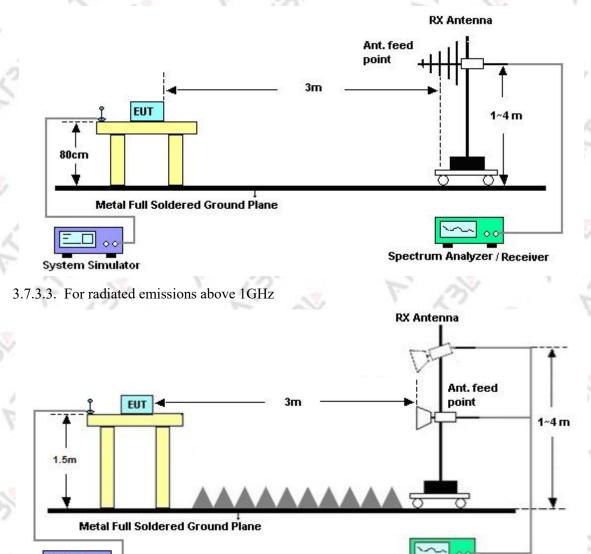
3.7.3. Test Setup

System Simulator

3.7.3.1. For radiated emissions below 30MHz



3.7.3.2. For radiated emissions from 30MHz to 1GHz



Spectrum Analyzer / Receiver

- 3.7.4. Test Result of Radiated Spurious Emission
  - 3.7.4.1. For 9 kHz ~ 30 MHz Please refer to the Appendix B.

AT3L

- 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.

Please refer to the Appendix B.

### 3.8. AC Power-Line Conducted Emission

### 3.8.1. Limit

<u>47 CFR 15.207(a)</u>: 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 amission (MHz)	Conducted limit (dBµV)		
Frequency of emission (MHz)	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.

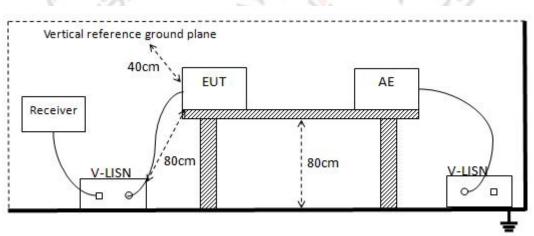
### 3.8.2. Test Procedure

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





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3.8.4. Test Result of AC Power-Line Conducted Emission Please refer to the Appendix C. P

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## **AT3**

### 3.9. Antenna Requirement

### 3.9.1. Standard Requirement

According to <u>47 CFR 15.203</u>, 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 PCB antenna, which meets the antenna requirements.



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## 4. Test Setup Photographs

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# **AT3**

### Appendix A \_ Conducted Test Data

### 3.1.4. Test Result of Maximum Peak Conducted Output Power

Temperature:	23.4 °C	Relative Humidity:	55%RH
Test Voltage:	DC 3.3V	Test Mode:	TX Mode 1/2/3

	L L	Average Conducted	Peak Conducted		
Test Channel	Frequency	Output Power	Output Power	LIMIT	
	(MHz)	(dBm)	(dBm)	dBm	
Mode1 CH00	2402	-0.22	-0.15	30	
Mode2 CH19	2440	-0.17	-0.09	30	
Mode3 CH39	2480	-0.18	-0.12	30	

#### **EIRP** Power

Test Channel	Frequency	Peak Conducted Output Power	Antenna Gain	EIRP Power	LIMIT
	(MHz)	(dBm)	(dBi)	(dBm)	dBm
Mode1 CH00	2402	-0.15	-3.4	-3.55	36
Mode2 CH19	2440	-0.09	-3.4	-3.49	36
Mode3 CH39	2480	-0.12	-3.4	-3.52	36

Note: Our power sensor test AVG power has no duty cycle display. The power sensor measures AVG power is Burst power. The software has considered the factor of the duty cycle factor, so it is unnecessary to add it again.

### 3.2.4. Test Result of Duty Cycle

1	Temperature:	23.4 °C	Relative Humidity:	55%RH
V	Test Voltage:	DC 3.3V	Test Mode:	TX Mode 2

Spectrum ₩ RefLevel 20.80 dBm Att 30 dB (	Offset 0.80 dB SWT 20 ms	<ul> <li>RBW 1 Mi</li> <li>VBW 1 Mi</li> </ul>				
1Pk Max			MI	41[1]		12.41 dB
10 dBm		_		-		10.8116 m
0 dBm		_				
-10 dBm-						
-20 dBm						
-30 dBm-						
-40 dBm-						
-50 dBm-						
-60 dBm-						
-70 dBm-						
CF 2.44 GHz		69	1 pts			2.0 ms
T T				Ready	1,00	0.12.515

#### Report No.:SHATBL2312001W01

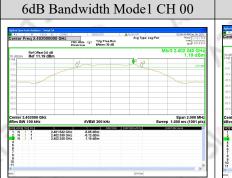
### 3.3.4. Test Result of 6dB Bandwidth and 99% Bandwidth

Temperature:	23.4°C	Relative Humidity:	55%RH
Test Voltage:	DC 3.3V	Test Mode:	TX Mode1/2/3

2

Fre	quency	6dB Bandwidth (kHz)	99% Bandwidth (MHz)	6dB Bandwidth Limit(kHz)	Result
2	2402 MHz	688	1.0204	≥500kHz	PASS
1Mbps	2440 MHz	690	1.0164	≥ <mark>500kHz</mark>	PASS
5	2480 MHz	704	1.0305	≥500kHz	PASS

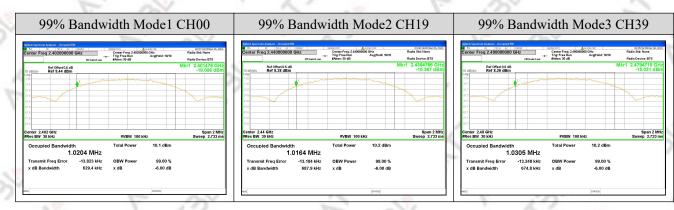
#### 6dB Bandwidth



1	03:00:15 PM Dec 05, 2023 194/02 1 2 3 4 5 0 1990 Dec 05, 2023 1990 Dec 05, 2023	Type: Log-Pwr	Avg Type	skil) tig: Free Run Atten: 30 dB	NC: Wide 🗣	PI	2.44000000	eq	er f
	r3 2.439 726 GHz 1.19 dBm	Mk				dB Bm	r Offset 0.5 dB rf 11.19 dBm	Ref	/div
	4.01.000	A <sup>2</sup>	A2		A1 3				
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				1	-5.07 dB -5.01 dB	2.439 644 GHz 2.440 334 GHz	24	f	N
				•	1.19 dB	2.439 726 GHz	2.4	1	N
	~								
	2		STATUS						

				100	
Relati Spectrum Analyser - Swa RL IS Solo Center Freq 2.480000	0000 GHz	SDARE MT	un .	e: Log-Pur	02/05/25 PHOre 06, 202 19402 1 2 3 4 5 1196 100000000 100000000000000000000000
Ref Offset 0.5				Mkr3 :	2.479 746 GH: 1.31 dBn
1.31	0	1_13		2	40.0
18.7					
38.7					
43.7					
88.7					
Center 2.480000 GHz Res BW 100 kHz		#VBW 300 kHz		Sweep 1.0	Span 2.000 MH 000 ms (1001 pts
1 N 1 F 2 N 1 F 3 N 1 F	2,479 636 GHz 2,480 340 GHz 2,479 746 GHz	4.93 dBm 5.02 dBm 1.31 dBm	RUMCTION WIDTH	PUNCTIO	4W408
6 6 7 8 9					
11					

### 99% Bandwidth





## 3.4.4. Test Result of Power Spectral Density

Temperature:	23.4 °C	Relative Humidity:	55%RH
Test Voltage:	DC 3.3V	Test Mode:	TX Mode1/2/3
		- A	

Frequency		Power Density	$L_{inv}$ (2) $L_{inv}$ (2) $L_{inv}$	Degult
		(dBm/3kHz)	– Limit (3kHz/dBm)	Result
2	2402 MHz	-8.30	≤8	PASS
1M bps	2440 MHz	-9.11	≤8	PASS
S S	2480 MHz	-6.91	≤8	PASS

Mode2 CH19	Mode3 CH39
PPP Conter Freq 2.44000000 GHz Avg type: Lop-tor Prec 2.44000000 GHz Avg type: Lop-tor Prec 2.44000000 GHz Avg type: Lop-tor Prec 2.440000000 GHz Avg type: Lop-tor Prec 2.44000000 GHz Avg type: Lop-tor Prec 2.440000000 GHz Avg type: Lop-tor Prec 2.440000000 GHz Avg type: Lop-tor Prec 2.440000000 GHz Avg type: Lop-tor Prec 2.	State Service Roder:         State M()         Autorial         State M()         Base M
10 dB/dv Ref 0.89 dBm9.11 dBm	10 dtildiv Ref 3.09 dBm -6.91 dl
	© 3 Center 2.4500000 GHz Span 1.656
	Annual Street Freed 24000000000000000000000000000000000000

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## 3.5.4. TEST RESULTS of Conducted Band Edge

Temperature:	23.4 °C	Relative Humidity:	55%RH
Test Voltage:	DC 3.3V	Test Mode:	TX Mode 1/2/3

	Model CI	H00				Mode3 C	H39	
	- A. C.		10.0	1201				
Ient Spectrum Analyzer - Swept SA RL RF 50 & AC CORR enter Freq 2.375000000 GH	EC SENSE:INT Z PNO: Fast IFGain:Low #Atten: 36 dB	Aug Type: Log-Pwr	02:59:23 PMDec 06, 2023 TRACE 2 3 4 5 6 TYPE MWWWW Det P P P P P	Agilent Spectrum Analyzer - So W RL RF 50 0 Center Freq 2.5050	AC CORREC	sense:m/T t - Trig: Free Run #Atten: 30 dB	ALIGN OFF Avg Type: Log-Pw	03:07:15 PMDec 06, 2 r TRACE 1 2 3 4 TYPE NAME DET P P F
dB/div Ref 0ffset 0.5 dB			Mkr2 2.399 90 GHz -53.24 dBm	Ref Offset 0 10 dB/div Ref 11.39	.5 dB dBm			Mkr2 2.569 05 G -55.53 dE
07		1		1.39	The second secon			
.9			-18.93 dBn	-8.61				-18.61
9				-28.6				
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3				-68.6				
art 2.30000 GHz es BW 100 kHz	#VBW 300 kHz	Sw	Stop 2.45000 GHz eep 14.40 ms (1001 pts)	Start 2.43000 GHz #Res BW 100 kHz		#VBW 300 kHz	s	Stop 2.58000 G Sweep 14.40 ms (1001 p
E 12009 TRC SEL X	ү FUNITION GHz -50.25 dBm	FUNCTION WIDTH	FUNCTION VALUE	MKE KODE TRG SCU 1 N 1 f	2.483.55 GHz	Y FUNCTION 58.69 dBm	FUNCTION WIDTH	FUNCTION VALUE
1 N 1 f 2,346 50 2 N 1 f 2,399 90	GHz -53.24 dBm			2 N 1 F	2.483 55 GHz 2.569 05 GHz	65.53 dBm		
j 8				4 5 6				
				7 8 9				
			×	10 11				
	N.	STATUS	>	K MSG		11	STATUS	

### 3.6.4. Test Result of Conducted Spurious Emission

Temperature:	23.4 °C	Relative Humidity:	55%RH
Test Voltage:	DC 3.3V	Test Mode:	TX Mode 1/2/3

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Mode1 CH00	Mode2 CH19	Mode3 CH39
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etfortune kutyor / See 23 4. アーマーマン - マンマン マンマン - マン - マ - マン - マン	Applicat Spectrum Andywer Swegt SA         Dote: Dot	Activity         Control         Contro         Contro         Contro
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		30 a
130 MHz Stop es BW 100 kHz SWeep 2.387 s (	0 GHz Start 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.387 s (32001 pts)	Start 30 MHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.337 s (320
U2021[U203         U         V         AttackS0         Filter/Vortex           N         I         f         2.0014         648.0         0.001           N         I         f         2.0022         642.         0.00 dBm           N         I         f         2.002         642.         63.04 dBm	Table Cost (in 1.6.1)         Cost (in 1.6.1)         Cost (in 1.6.1)         Panetawate           1         N         F         2.0.6.00         F         Cost (in 1.6.1)         Panetawate           3         N         F         2.0.6.00         F         Cost (in 1.6.1)         Panetawate           3         N         F         4.0.90         OH         Cost (in 1.6.1)         Panetawate           9         N         F         4.0.90         OH         Cost (in 1.6.1)         Panetawate           9         N         F         4.0.90         OH         Cost (in 1.6.1)         Panetawate           9         N         F         4.0.90         OH         Cost (in 1.6.1)         Panetawate	Image: December 201         X         X         Image: December 201         Bit Machine         <
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\*\*\*\*\*\*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:	23.4°C	Relative Humidity	52%RH	12
Test Voltage:	DC 3.3V	Polarization:		1
Test Mode:	TX Mode	A SA	25	

### 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 (specific distance/test distance)(dB);

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

#### Report No.:SHATBL2312001W01

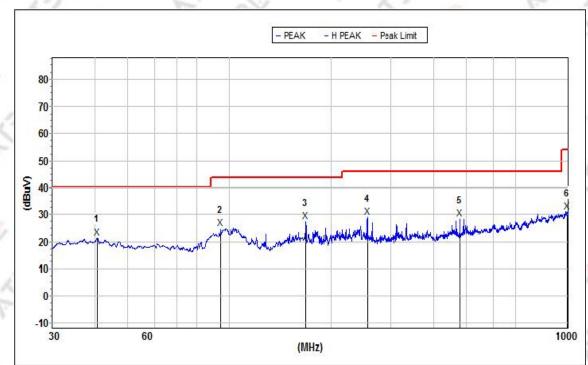
### 3.7.4.2. For 30 MHz ~ 1 GHz

(30MHz -1000MHz)	D' N		No.
Temperature:	23.4°C	Relative Humidity:	52%RH
Test Voltage:	DC 3.3V	Phase:	HTD
Test Mode:	TX Mode 1	N R	N. F

Remark:

1. Margin = Result (Result = Reading + Factor )–Limit

2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



### Mode 1 Horizontal

	1.1		1	× . /	2		1	12	
Freq.	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
Mk. (MHz)	(dBuV)	(dBuV)	(dB)	(deg.)	(cm)	(dB)	(dB)	(dB)	POI.
~	1.	2	2		1	2		A	2
40.630322	21.7	40.0	18.3	360	300	16.4	26.5	0.6	Н
94.428394	25.0	43.5	18.5	277	200	11.3	27.0	1.0	Н
168.118752	27.5	43.5	16.0	258	200	13.6	26.8	1.5	Н
255.175356	29.0	46.0	17.0	80	100	14.2	27.0	1.9	Н
479.685845	28.3	46.0	17.7	258	200	17.5	26.4	2.8	Н
993.011419	31.1	54.0	22.9	336	100	22.6	26.9	4.1	Н
	(MHz) 40.630322 94.428394 168.118752 255.175356 479.685845	(MHz)(dBuV)40.63032221.794.42839425.0168.11875227.5255.17535629.0479.68584528.3	(MHz)(dBuV)(dBuV)(MHz)(dBuV)(dBuV)40.63032221.740.094.42839425.043.5168.11875227.543.5255.17535629.046.0479.68584528.346.0	(MHz)     (dBuV)     (dBuV)     (dBuV)       40.630322     21.7     40.0     18.3       94.428394     25.0     43.5     18.5       168.118752     27.5     43.5     16.0       255.175356     29.0     46.0     17.0       479.685845     28.3     46.0     17.7	(MHz)     (dBuV)     (dBuV)     (dBuV)     (dB)     (deg.)       40.630322     21.7     40.0     18.3     360       94.428394     25.0     43.5     18.5     277       168.118752     27.5     43.5     16.0     258       255.175356     29.0     46.0     17.0     80       479.685845     28.3     46.0     17.7     258	(MHz)     (dBuV)     (dBuV)     (dB)     (deg.)     (cm)       40.630322     21.7     40.0     18.3     360     300       94.428394     25.0     43.5     18.5     277     200       168.118752     27.5     43.5     16.0     258     200       255.175356     29.0     46.0     17.0     80     100       479.685845     28.3     46.0     17.7     258     200	(MHz)     (dBuV)     (dBuV)     (dB)     (deg.)     (cm)     (dB)       40.630322     21.7     40.0     18.3     360     300     16.4       94.428394     25.0     43.5     18.5     277     200     11.3       168.118752     27.5     43.5     16.0     258     200     13.6       255.175356     29.0     46.0     17.0     80     100     14.2       479.685845     28.3     46.0     17.7     258     200     17.5	(MHz)       (dBuV)       (dBuV)       (dB)       (deg.)       (cm)       (dB)       (dB)         40.630322       21.7       40.0       18.3       360       300       16.4       26.5         94.428394       25.0       43.5       18.5       277       200       11.3       27.0         168.118752       27.5       43.5       16.0       258       200       13.6       26.8         255.175356       29.0       46.0       17.0       80       100       14.2       27.0         479.685845       28.3       46.0       17.7       258       200       17.5       26.4	(MHz)       (dBuV)       (dBuV)       (dB)       (deg.)       (cm)       (dB)       (dB)       (dB)         40.630322       21.7       40.0       18.3       360       300       16.4       26.5       0.6         94.428394       25.0       43.5       18.5       277       200       11.3       27.0       1.0         168.118752       27.5       43.5       16.0       258       200       13.6       26.8       1.5         255.175356       29.0       46.0       17.0       80       100       14.2       27.0       1.9         479.685845       28.3       46.0       17.7       258       200       17.5       26.4       2.8

#### Report No.:SHATBL2312001W01

### (30MHz -1000MHz)

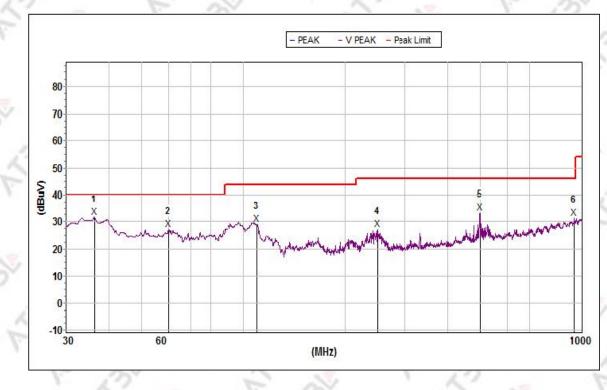
Temperature:	23.4°C	Relative Humidity:	52%RH		
Test Voltage:	DC 3.3V	Phase:	Vertical		
Test Mode:	TX Mode 1	5 3	F 23		

Remark:

1. Margin = Result (Result = Reading + Factor )–Limit

2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 1 Vertical



				( A)					
Freq. (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
2	× 7	2	-	1	2	1	1 2	< · ·	5
36.254065	31.8	40.0	8.2	241	100	18.8	26.7	0.5	V
60.069117	27.0	40.0	13.0	337	100	17.8	26.9	0.8	V
109.411636	29.0	43.5	14.5	98	201	12.5	27.0	1.1	V
248.988092	27.3	46.0	18.7	274	201	14.7	27.0	1.9	V
499.424690	33.3	46.0	12.7	299	100	18.3	26.2	2.8	V
950.425890	31.4	46.0	14.6	360	300	22.6	26.9	4.1	V
	(MHz) 36.254065 60.069117 109.411636 248.988092 499.424690	(MHz)     (dBuV)       36.254065     31.8       60.069117     27.0       109.411636     29.0       248.988092     27.3       499.424690     33.3	(MHz)     (dBuV)     (dBuV)       36.254065     31.8     40.0       60.069117     27.0     40.0       109.411636     29.0     43.5       248.988092     27.3     46.0       499.424690     33.3     46.0	(MHz)     (dBuV)     (dBuV)     (dBuV)       36.254065     31.8     40.0     8.2       60.069117     27.0     40.0     13.0       109.411636     29.0     43.5     14.5       248.988092     27.3     46.0     18.7       499.424690     33.3     46.0     12.7	(MHz)     (dBuV)     (dBuV)     (dBuV)     (dB)     (deg.)       36.254065     31.8     40.0     8.2     241       60.069117     27.0     40.0     13.0     337       109.411636     29.0     43.5     14.5     98       248.988092     27.3     46.0     18.7     274       499.424690     33.3     46.0     12.7     299	(MHz)     (dBuV)     (dBuV)     (dBuV)     (dB)     (deg.)     (cm)       36.254065     31.8     40.0     8.2     241     100       60.069117     27.0     40.0     13.0     337     100       109.411636     29.0     43.5     14.5     98     201       248.988092     27.3     46.0     18.7     274     201       499.424690     33.3     46.0     12.7     299     100	(MHz)       (dBuV)       (dBuV)       (dB)       (deg.)       (cm)       (dB)         36.254065       31.8       40.0       8.2       241       100       18.8         60.069117       27.0       40.0       13.0       337       100       17.8         109.411636       29.0       43.5       14.5       98       201       12.5         248.988092       27.3       46.0       18.7       274       201       14.7         499.424690       33.3       46.0       12.7       299       100       18.3	(MHz)       (dBuV)       (dBuV)       (dB)       (deg.)       (cm)       (dB)       (dB)         36.254065       31.8       40.0       8.2       241       100       18.8       26.7         60.069117       27.0       40.0       13.0       337       100       17.8       26.9         109.411636       29.0       43.5       14.5       98       201       12.5       27.0         248.988092       27.3       46.0       18.7       274       201       14.7       27.0         499.424690       33.3       46.0       12.7       299       100       18.3       26.2	(MHz)       (dBuV)       (dBuV)       (dB)       (deg.)       (cm)       (dB)       (d)       (d)

### Report No.:SHATBL2312001W01

(30MHz -1000MHz)

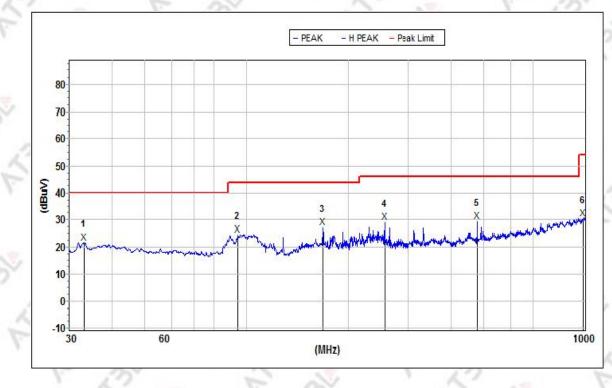
	(501/11/2 -10001/11/2)		- A -	
	Temperature:	23.4°C	Relative Humidity:	52%RH
2	Test Voltage:	DC 3.3V	Phase:	Horizontal
Ÿ	Test Mode:	TX Mode 3	5 3	5 8 3

Remark:

1. Margin = Result (Result = Reading + Factor )–Limit

2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 3 Horizontal



				( <b>1</b> )					
Freq. (MHz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
~	× 7	2	-	1	2	1	0.2	$\langle \cdot \rangle$	5
33.269493	21.6	40.0	18.4	281	300	15.2	26.9	0.5	Н
94.428394	24.5	43.5	19.0	254	400	11.3	27.0	1.0	Н
168.118752	27.3	43.5	16.2	273	201	13.6	26.8	1.5	Н
255.175356	29.2	46.0	16.8	105	100	14.2	27.0	1.9	Н
479.685845	29.5	46.0	16.5	253	201	17.5	26.4	2.8	Н
982.620016	30.6	54.0	23.4	346	400	22.6	26.9	4.1	Н
	(MHz) 33.269493 94.428394 168.118752 255.175356 479.685845	(MHz)(dBuV)33.26949321.694.42839424.5168.11875227.3255.17535629.2479.68584529.5	Image: Minipage of Minipag	Image: Minipage stress of the stress of t	(MHz)     (dBuV)     (dBuV)     (dBuV)     (dB)     (deg.)       33.269493     21.6     40.0     18.4     281       94.428394     24.5     43.5     19.0     254       168.118752     27.3     43.5     16.2     273       255.175356     29.2     46.0     16.8     105       479.685845     29.5     46.0     16.5     253	(MHz)     (dBuV)     (dBuV)     (dBuV)     (dB)     (deg.)     (cm)       33.269493     21.6     40.0     18.4     281     300       94.428394     24.5     43.5     19.0     254     400       168.118752     27.3     43.5     16.2     273     201       255.175356     29.2     46.0     16.8     105     100       479.685845     29.5     46.0     16.5     253     201	(MHz)     (dBuV)     (dBuV)     (dB)     (deg.)     (cm)     (dB)       33.269493     21.6     40.0     18.4     281     300     15.2       94.428394     24.5     43.5     19.0     254     400     11.3       168.118752     27.3     43.5     16.2     273     201     13.6       255.175356     29.2     46.0     16.8     105     100     14.2       479.685845     29.5     46.0     16.5     253     201     17.5	(MHz)       (dBuV)       (dBuV)       (dB)       (deg.)       (cm)       (dB)       (dB)         33.269493       21.6       40.0       18.4       281       300       15.2       26.9         94.428394       24.5       43.5       19.0       254       400       11.3       27.0         168.118752       27.3       43.5       16.2       273       201       13.6       26.8         255.175356       29.2       46.0       16.8       105       100       14.2       27.0         479.685845       29.5       46.0       16.5       253       201       17.5       26.4	(MHz)       (dBuV)       (dBuV)       (dB)       (deg.)       (cm)       (dB)       (dB)       (dB)         33.269493       21.6       40.0       18.4       281       300       15.2       26.9       0.5         94.428394       24.5       43.5       19.0       254       400       11.3       27.0       1.0         168.118752       27.3       43.5       16.2       273       201       13.6       26.8       1.5         255.175356       29.2       46.0       16.8       105       100       14.2       27.0       1.9         479.685845       29.5       46.0       16.5       253       201       17.5       26.4       2.8

### Report No.:SHATBL2312001W01

(30MHz -1000MHz)

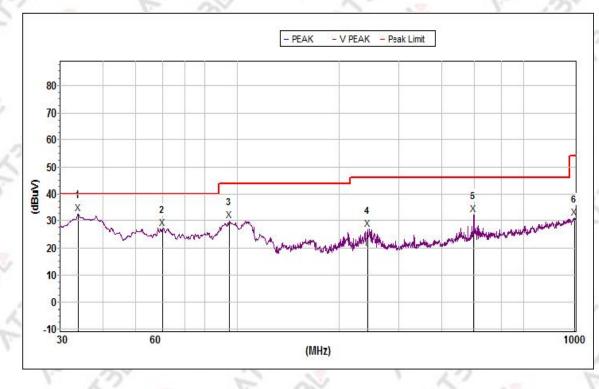
	Temperature:	23.4°C	Relative Humidity:	52%RH
2	Test Voltage:	DC 3.3V	Phase:	Vertical
Ÿ	Test Mode:	TX Mode 3	5	5 F 3

Remark:

1. Margin = Result (Result = Reading + Factor )-Limit

2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

### Mode 3 Vertical



Freq. (MHz)	Level (dBuV)	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	3
	(ubuv)	(dBuV)	(dB)	(deg.)	(cm)	(dB)	(dB)	(dB)	Pol.
	N 7	2	_	F	25	1	0 2	$\leq \sim$	5
.857943	32.8	40.0	7.2	332	100	18.4	26.9	0.5	V
0.069117	27.1	40.0	12.9	0	100	17.8	26.9	0.8	V
.926381	30.0	43.5	13.5	157	100	13.1	27.0	1.0	V
1.676325	26.8	46.0	19.2	282	199	14.4	26.9	1.9	V
8.549826	32.3	46.0	13.7	262	199	18.3	26.2	2.8	V
					- A -				V
)	.069117 .926381 676325 3.549826	.069117         27.1           .926381         30.0          676325         26.8	.069117         27.1         40.0           .926381         30.0         43.5           .676325         26.8         46.0	.06911727.140.012.9.92638130.043.513.567632526.846.019.2	.069117         27.1         40.0         12.9         0           .926381         30.0         43.5         13.5         157           .676325         26.8         46.0         19.2         282           3.549826         32.3         46.0         13.7         262	.069117         27.1         40.0         12.9         0         100           .926381         30.0         43.5         13.5         157         100           .676325         26.8         46.0         19.2         282         199           3.549826         32.3         46.0         13.7         262         199	.06911727.140.012.9010017.8.92638130.043.513.515710013.1.67632526.846.019.228219914.4.8.54982632.346.013.726219918.3	.06911727.140.012.9010017.826.9.92638130.043.513.515710013.127.0.67632526.846.019.228219914.426.9.8.54982632.346.013.726219918.326.2	.06911727.140.012.9010017.826.90.8.92638130.043.513.515710013.127.01.0.67632526.846.019.228219914.426.91.9

#### Report No.:SHATBL2312001W01

### 3.7.4.3. For 1 GHz ~ 18GHz

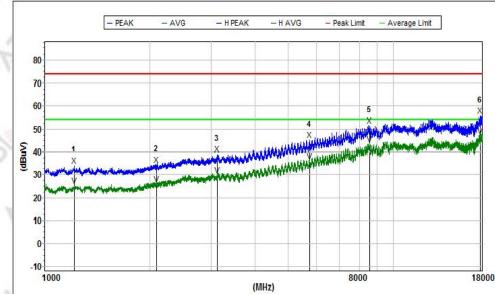
#### (1000MHz-18000MHz)

1000 C		Y (0)	
Temperature:	23.4°C	Relative Humidity:	52%RH
Test Voltage:	DC 3.3V	Phase:	Horizontal
Test Mode:	TX Mode	N K	T IS

#### Remark:

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

Mode 1 Horizontal



	M1.	Freq.	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Dal
	Mk.	(MHz)	(dBuV)	(dBuV)	(dB)	(deg.)	(cm)	(dB)	(dB)	(dB)	Pol.
	Peak:										
į.	1	1213.350000	33.9	74.0	40.1	0	300	25.7	60.9	2.3	Н
	2	2091.400000	34.4	74.0	39.6	340	100	27.1	60.9	2.7	Н
j.	3	3113.100000	38.9	74.0	35.1	0	399	29.7	58.7	3.0	Н
	4	5737.900000	45.3	74.0	28.7	192	300	33.5	58.1	4.0	Н
	5	8537.800000	51.6	74.0	22.4	0	200	37.8	56.2	5.1	Н
	6	17801.100000	55.6	74.0	18.4	264	100	41.1	57.8	7.0	Н
	Avg										
2	1	1213.350000	25.3	54.0	28.7	0	300	25.7	60.9	2.3	Н
1	2	2091.400000	25.7	54.0	28.3	340	100	27.1	60.9	2.7	Н
	3	3113.100000	29.9	54.0	24.1	0	399	29.7	58.7	3.0	Н
1	4	5737.900000	36.1	54.0	17.9	192	300	33.5	58.1	4.0	Н
V	5	8537.800000	43.3	54.0	10.7	0	200	37.8	56.2	5.1	Н
	6	17801.100000	47.0	54.0	7.0	264	100	41.1	57.8	7.0	Н

### Report No.:SHATBL2312001W01

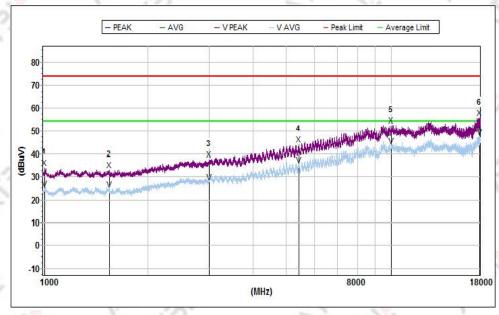
### (1000MHz-18000MHz)

			No. Carl	
Temperature:	23.4°C	Relative Humidity:	52%RH	~
Test Voltage:	DC 3.3V	Phase:	Vertical	2
Test Mode:	TX Mode	D' F	2 V	R

#### Remark:

- 3. Margin = Result (Result = Reading + Factor )–Limit
- 4. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 1 Vertical



S			· · · · ·			S	10		1000	
MI	Freq.	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Dal
Mk.	(MHz)	(dBuV)	(dBuV)	(dB)	(deg.)	(cm)	(dB)	(dB)	(dB)	Pol.
Peak:										
1	1014.450000	34.0	74.0	40.0	360	201	25.2	60.2	2.1	V
2	1549.950000	33.2	74.0	40.8	246	300	25.3	61.3	2.5	V
3	3003.450000	37.7	74.0	36.3	36	400	29.4	58.8	3.0	V
4	5427.650000	44.2	74.0	29.8	0	201	32.7	58.0	3.9	V
5	9983.650000	52.5	74.0	21.5	360	100	38.5	60.1	5.4	V
6	17900.550000	55.6	74.0	18.4	246	100	41.7	57.7	7.0	V
Avg										
1	1014.450000	24.7	54.0	29.3	360	201	25.2	60.2	2.1	V
2	1549.950000	24.5	54.0	29.5	246	300	25.3	61.3	2.5	V
3	3003.450000	27.7	54.0	26.3	36	400	29.4	58.8	3.0	V
4	5427.650000	35.4	54.0	18.6	0	201	32.7	58.0	3.9	V
5	9983.650000	43.6	54.0	10.4	360	100	38.5	60.1	5.4	V
6	17900.550000	47.6	54.0	6.4	246	100	41.7	57.7	7.0	V
	1							A		

### Report No.:SHATBL2312001W01

### (1000MHz -18000MHz)

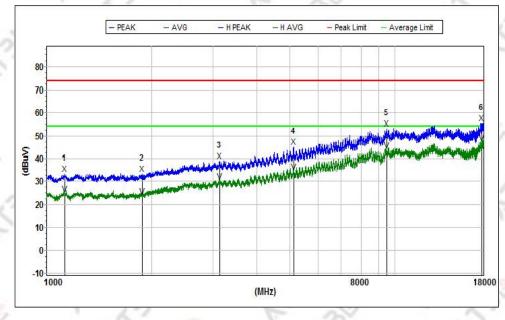
	(10000000000000000000000000000000000000		- C	
Ś	Temperature:	23.4°C	Relative Humidity:	52%RH
	Test Voltage:	DC 3.3V	Phase:	Horizontal
	Test Mode:	TX Mode 3	K	S T B

Remark:

1. Margin = Result (Result = Reading + Factor )–Limit

2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 3 Horizontal



125		-	1.1			1.1			and the second se	
ML	Freq.	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Dal
Mk.	(MHz)	(dBuV)	(dBuV)	(dB)	(deg.)	(cm)	(dB)	(dB)	(dB)	Pol.
Peak:										
1	1213.350000	33.9	74.0	40.1	0	300	25.7	60.9	2.3	Н
2	2091.400000	34.4	74.0	39.6	340	100	27.1	60.9	2.7	Н
3	3113.100000	38.9	74.0	35.1	0	399	29.7	58.7	3.0	Н
4	5737.900000	45.3	74.0	28.7	192	300	33.5	58.1	4.0	Н
5	8537.800000	51.6	74.0	22.4	0	200	37.8	56.2	5.1	Н
6	17801.100000	55.6	74.0	18.4	264	100	41.1	57.8	7.0	Н
Avg										
1	1213.350000	25.3	54.0	28.7	0	300	25.7	60.9	2.3	Н
2	2091.400000	25.7	54.0	28.3	340	100	27.1	60.9	2.7	Н
3	3113.100000	29.9	54.0	24.1	0	399	29.7	58.7	3.0	Н
4	5737.900000	36.1	54.0	17.9	192	300	33.5	58.1	4.0	Н
5	8537.800000	43.3	54.0	10.7	0	200	37.8	56.2	5.1	Н
6	17801.100000	47.0	54.0	7.0	264	100	41.1	57.8	7.0	Н

### 

#### Report No.:SHATBL2312001W01

### (1000MHz -18000MHz)

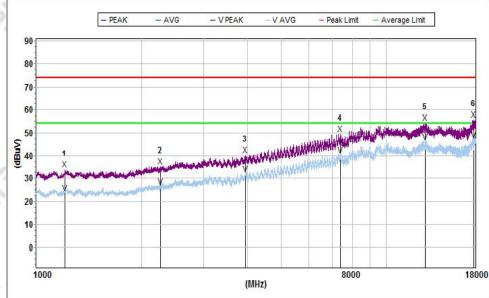
	()		1.63	
Ś	Temperature:	23.4°C	Relative Humidity:	52%RH
	Test Voltage:	DC 3.3V	Phase:	Vertical
	Test Mode:	TX Mode 3	5	S T B

Remark:

1. Margin = Result (Result = Reading + Factor )–Limit

2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

Mode 3 Vertical



		Contract of the local division of the local								
Mk.	Freq.	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
IVIK.	(MHz)	(dBuV)	(dBuV)	(dB)	(deg.)	(cm)	(dB)	(dB)	(dB)	F01.
Peak:										
1	1014.450000	34.0	74.0	40.0	360	201	25.2	60.2	2.1	V
2	1549.950000	33.2	74.0	40.8	246	300	25.3	61.3	2.5	V
3	3003.450000	37.7	74.0	36.3	36	400	29.4	58.8	3.0	V
4	5427.650000	44.2	74.0	29.8	0	201	32.7	58.0	3.9	V
5	9983.650000	52.5	74.0	21.5	360	100	38.5	60.1	5.4	V
6	17900.550000	55.6	74.0	18.4	246	100	41.7	57.7	7.0	V
Avg										
1	1014.450000	24.7	54.0	29.3	360	201	25.2	60.2	2.1	V
2	1549.950000	24.5	54.0	29.5	246	300	25.3	61.3	2.5	V
3	3003.450000	27.7	54.0	26.3	36	400	29.4	58.8	3.0	V
4	5427.650000	35.4	54.0	18.6	0	201	32.7	58.0	3.9	V
5	9983.650000	43.6	54.0	10.4	360	100	38.5	60.1	5.4	V
6	17900.550000	47.6	54.0	6.4	246	100	41.7	57.7	7.0	V

Note:

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



### Report No.:SHATBL2312001W01

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E.F.

P

#### 3.7.4.4. For above 18GHz

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N.V.

R

P

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K

L.F.

EF

(above 18GHz)

Temperature:	23.4°C	Relative Humidity:	52%RH
Test Voltage:	DC 3.3V	Test Mode:	TX Mode
Note:	× 4	T No	S . 7 3

v

50

2ºF

P.

X

K

2º

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

P

Fai

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Fall

2 P

2 Prover

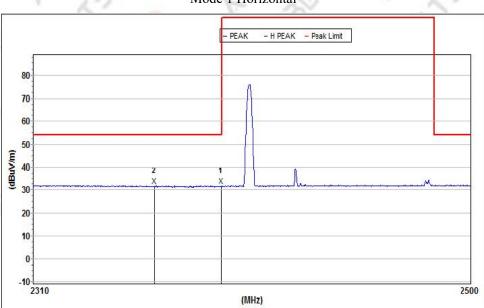
2 P

E35



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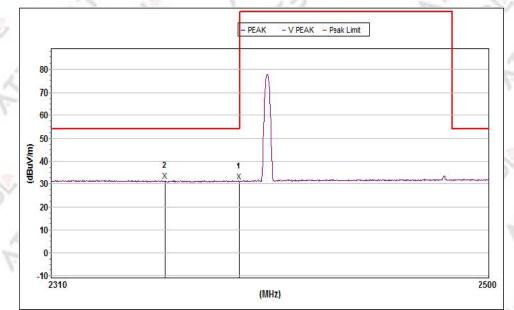
3.7.5 Test Result of Restricted Band



GFSK-Low Mode 1 Horizontal

Mk.	Freq.(MHz)	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
IVIK.	Treq.(MITZ)	(dBuV/m)	(dBuV/m)	(dB)	(deg.)	(cm)	(dB/m)	(dB)	(dB)	101.
Avg:										
1	2390.000000	31.6	54.0	22.4	360	200	27.4	56.9	6.8	Н
2	2360.948511	31.8	54.0	22.2	306	200	27.3	56.7	6.8	Н
	1.	10		Mada 1	Vartical		- P. 19	( · /		100

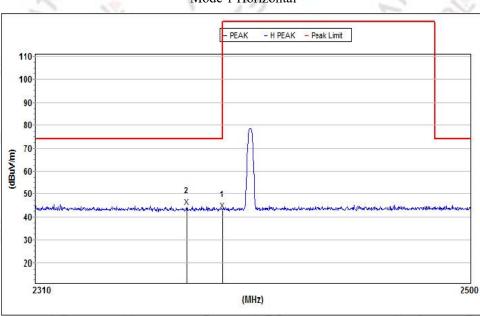
Mode 1 Vertical



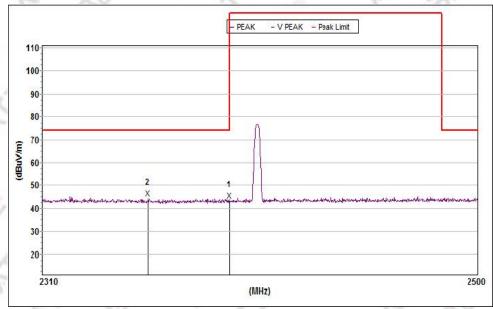
Mk.	Freq.(MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Deg. (deg.)	Hi. (cm)	Ant.F/G. (dB/m)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
Avg:				(uD)	(405.)		((12),111)	((12))	(42)	
1	2390.000000	31.2	54.0	22.8	12	200	27.1	56.9	6.8	V
2	2357.964527	31.4	54.0	22.6	177	200	26.9	56.7	6.8	V

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GFSK-Low Mode 1 Horizontal



1 2 m V	and the second se				A 10 A				100	
Mk.		Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
IVIK.	Freq.(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(deg.)	(cm)	(dB/m)	(dB)	(dB)	POI.
Peak:										
1	2390.000000	43.0	74.0	31.0	0	300	27.4	56.9	6.8	Н
2	2374.423238	44.5	74.0	29.5	0	300	27.3	56.8	6.8	Н
P	- A		1.	Mode 1	Vertical			100	1.1	1



_											
	Mk.		Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	IVIK.	Freq.(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(deg.)	(cm)	(dB/m)	(dB)	(dB)	POI.
]	Peak:										
	1	2390.000000	43.6	74.0	30.4	228	300	27.1	56.9	6.8	V
	2	2354.798177	44.4	74.0	29.6	228	300	26.9	56.7	6.8	V

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Mode 3 Horizontal

GFSK-High

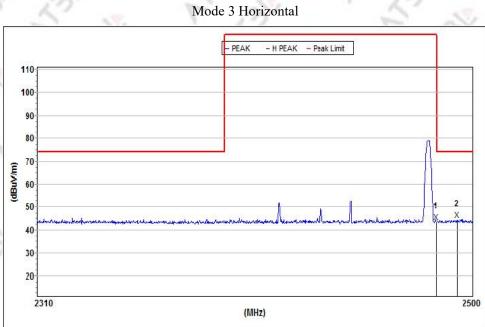
					1 4 4		100 million		100	
Mk.	Freq.(MHz)	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
IVIK.	rieq.(MHZ)	(dBuV/m)	(dBuV/m)	(dB)	(deg.)	(cm)	(dB/m)	(dB)	(dB)	FOI.
Avg:										
1	2483.501000	32.2	54.0	21.8	248	200	27.6	57.1	6.9	Н
2	2499.012155	32.2	54.0	21.8	326	200	27.6	57.1	6.9	Н
e	5	32	1.	Mode 3	Vertical		2	2	1	1

- V PEAK - Peak Limit - PEAK 80 ſ 70 60 50 (dBuV/m) 40 1 30 20 10 0 -10 2500 (MHz)

Mk.	Freq.(MHz)	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Amp.G. Cbl.L. (dB) (dB)	Pol.
		(dBuV/m)	(dBuV/m)	(dB)	(deg.)	(cm)	(dB/m)	(dB)	(dB)	
Avg:										
1	2483.501000	31.7	54.0	22.3	0	200	27.4	57.1	6.9	V
2	2491.911185	31.8	54.0	22.2	99	200	27.4	57.1	6.9	V

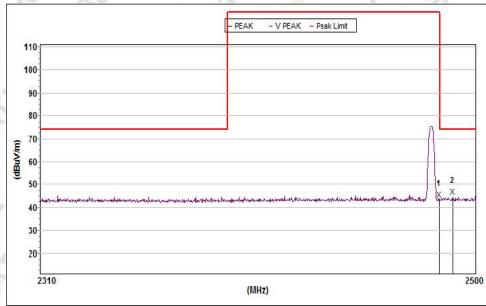
# ATBL

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**GFSK- High** 

	200					1.5.2					
4	Mk.	Erog (MUz)	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
1	IVIK.	Freq.(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(deg.)	(cm)	(dB/m)	(dB)	(dB)	POI.
	Peak:										
	1	2483.501000	43.6	74.0	30.4	122	300	27.6	57.1	6.9	Н
	2	2492.896223	44.7	74.0	29.3	245	300	27.6	57.1	6.9	Н
1		-	32	1.	Mode 3	Vertical		2	2	1	1



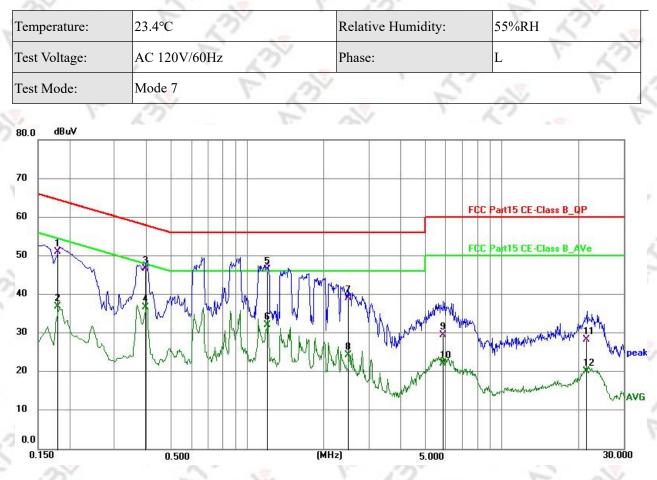
					100			and the second sec		
Mk.	Erog (MUz)	Level	Limit	Margin	Deg.	Hi.	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
IVIK.	Freq.(MHz)	(dBuV/m)	(dBuV/m)	(dB)	(deg.)	(cm)	(dB/m)	(dB)	(dB)	POI.
Peak:										
1	2483.501000	43.5	74.0	30.5	0	300	27.4	57.1	6.9	V
2	2489.351908	45.0	74.0	29.0	250	300	27.4	57.1	6.9	V

Note: All TX Mode, the worst case is mode1&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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1798	41.14	9.86	51.00	64.49	-13.49	QP
2	0.1798	27.02	9.86	36.88	54.49	-17.61	AVG
3	0.3990	36.81	9.84	46.65	57.87	-11.22	QP
4	0.3990	26.93	9.84	36.77	47.87	-11.10	AVG
5	1.2001	36.59	9.94	46.53	56.00	-9.47	QP
6	1.2001	22.26	9.94	32.20	46.00	-13.80	AVG
7	2.4997	29.02	9.99	39.01	56.00	-16.99	QP
8	2.4997	14.36	9.99	24.35	46.00	-21.65	AVG
9	5.9026	19.47	10.11	29.58	60.00	-30.42	QP
10	5.9026	12.04	10.11	22.15	50.00	-27.85	AVG
11	21.4824	17.70	10.59	28.29	60.00	-31.71	QP
12	21.4824	9.53	10.59	20.12	50.00	-29.88	AVG



### Report No.:SHATBL2312001W01

Temperature:	23.4°C	Relative Humidity:	55%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 7	S F B	5 3
80.0 dBu¥	S Y 2	n - 6	N R
70			
50			FCC Part15 CE-Class B_QP
	A M M M		FCC Part15 CE-Class B_AVe
0		Prof mar	
		W W W W WWWWWWWWWWWWWWWWWWWWWWWWWWWWW	wing with and a second se
0		1 1 M M M M M M M M M M M M M M M M M M	12 W P
0			Marannester Mar
0.0	0.500	(MHz) 5.000	30.000
0.130	0.000	(((1)2) 5.000	30.000

						Contraction of the second seco	
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1787	41.50	9.82	51.32	64.55	-13.23	QP
2	0.1787	27.36	9.82	37.18	54.55	-17.37	AVG
3	0.3666	37.91	9.77	47.68	58.58	-10.90	QP
4	0.3666	28.22	9.77	37.99	48.58	-10.59	AVG
5	0.9246	37.89	9.79	47.68	56.00	-8.32	QP
6	0.9246	25.30	9.79	35.09	46.00	-10.91	AVG
7	2.2394	32.51	9.92	42.43	56.00	-13.57	QP
8	2.2394	18.35	9.92	28.27	46.00	-17.73	AVG
9	5.9611	21.34	10.00	31.34	60.00	-28.66	QP
10	5.9611	12.47	10.00	22 <mark>.4</mark> 7	50.00	-27.53	AVG
/ 11	21.5849	17.81	10.60	28.41	60.00	-31.59	QP
12	21.5849	9.56	10.60	20.16	50.00	-29.84	AVG





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