TEST REPORT

For

GravaStar Mercury K98 Full-size (98%) Wireless Mechanical Gaming Keyboard

Model Number: GS K98

Prepared for	:	ZhuoYe ChuangYi Co., Ltd.
Address	:	B01, 11F, Block B, Building 2, Shenzhen Bay Technology Ecological Park, No. 1809 Shahe West Road, Nanshan District, Shenzhen, Guangdong, China

Prepared by	:	Shenzhen NTT Testing Technology Co.,Ltd.
Address	:	1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang Industrial Park, No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district, Bao 'an District, Shenzhen City, Guangdong, China

Report No.	:	SZNTT26027325E1-2
Date of Test	:	Jul. 06, 2026 to Jul. 31, 2026
Date of Report	:	Aug. 03, 2026

Shenzhen NTT Testing Technology Co.,Ltd.

Applicant: **Address:**	ZhuoYe ChuangYi Co., Ltd. B01, 11F, Block B, Building 2, Shenzhen Bay Technology Ecological Park, No. 1809 Shahe West Road, Nanshan District, Shenzhen, Guangdong, China
Manufacturer: **Address:**	ZhuoYe ChuangYi Co., Ltd. B01, 11F, Block B, Building 2, Shenzhen Bay Technology Ecological Park, No. 1809 Shahe West Road, Nanshan District, Shenzhen, Guangdong, China
E.U.T:	GravaStar Mercury K98 Full-size (98%) Wireless Mechanical Gaming Keyboard
Model Number:	GS K98
Trade Name:	GravaStar **Serial No.:** -----
Date of Receipt:	Jul. 06, 2026 **Date of Test:** Jul. 07, 2026 to Jul. 31, 2026
Test Specification:	Article2 Paragraph 1, item 19 MIC Notice No.88 Appendix No.43
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. **Issue Date: Aug. 03, 2026**

Tested by: Cindy Qin Reviewed by: Ken Wu Approved by: Abel Yu

Cindy Qin / Engineer Ken Wu / Supervisor Abel Yu / Supervisor

Other Aspects:

None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen NTT Testing Technology Co.,Ltd.

Table of Contents **Page**

1. SUMMARY OF TEST RESULTS 5
1.1. TEST PROCEDURES ACCORDING TO THE TECHNICAL STANDARDS 5
1.2. TEST FACILITY 6
1.3. MEASUREMENT UNCERTAINTY 6
2. GENERAL INFORMATION 7
2.1. GENERAL DESCRIPTION OF EUT 7
2.2. DESCRIPTION OF TEST MODES 8
2.3. TEST CONDITIONS 9
2.4. TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING 9
2.5. BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 10
2.6. DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE) 10
2.7. EQUIPMENTS LIST FOR ALL TEST ITEMS 11
3. RF SHIELDING METHOD 12
4. TEST RESULT FOR BLUETOOTH 13
4.1. FREQUENCY ERROR 13
4.2. LIMIT 13
4.3. MEASURING INSTRUMENTS AND SETTING 13
4.4. TEST PROCEDURES 13
4.5. TEST SETUP LAYOUT 13
4.6. TEST RESULT 13
5. ANTENNA POWER 14
5.1. LIMIT 14
5.2. TEST PROCEDURES 14
5.3. TEST SETUP LAYOUT 14
5.4. EST DEVIATION 14
5.5. TEST RESULT 14
6. OCCUPIED BANDWITH (99%) 15
6.1. LIMIT 15
6.2. MEASURING INSTRUMENTS AND SETTING 15
6.3. TEST PROCEDURES 15
6.4. TEST SETUP LAYOUT 15
6.5. TEST DEVIATION 15
6.6. EUT OPERATION DURING TEST 15
6.7. TEST RESULT 15
7. UNWANTED EMISSION INTENSITY MEASUREMENT 16
7.1. LIMIT 16

7.2. MEASURING INSTRUMENTS AND SETTING 16
7.3. TEST PROCEDURES 16
7.4. TEST SETUP LAYOUT 17
7.5. TEST DEVIATION 17
7.6. TEST RESULT 17
8. IMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT 18
8.1. LIMIT 18
8.2. MEASURING INSTRUMENTS AND SETTING 18
8.3. TEST PROCEDURES 18
8.4. TEST RESULT 18
9 INTERFERENCE PREVENTION FUNCTION 19
9.1. TEST SETUP 19
9.2. RADIO INTERFERENCE PREVENTION FUNCTION 19
10 CARRIER SENSE 20
11. EUT TEST PHOTO 21
12.EUT CONSTRUCTIONAL DETAILS 22

1. SUMMARY OF TEST RESULTS

1.1. TEST PROCEDURES ACCORDING TO THE TECHNICAL STANDARDS

article 49.20			
Standard Section	Test Item	Judgment	Remark
General provisions			
5	Frequency Error	PASS	
6	Occupied Bandwidth	PASS	
7	Spurious Emissions Intensity	PASS	
Transmitting equipment			
14	Antenna Power	PASS	
Transmitting antenna			
20	Type, Configuration, etc., of Transmitting Antenna	PASS	
22	Direction Pattern of Transmitting Antenna (Provided at Individual Antenna Report)	PASS	
Receiving antenna			
24	Limitation of Collateral Emission of Receiver	PASS	
26	Refer to All Articles for Transmitting Antenna	PASS	
Operating frequency 2400~2483MHz			
49.20(1);a	RF Shielding Method	PASS	
49.20(1);a	Communication Method	PASS	
49.20(1);b	Spread-spectrum Method	PASS	
49.20(1);c	Antenna Power	PASS	
4.10	Construction Protection Confirmation	PASS	
49.20	Carrier Sensing Function(1)	N/A(See Note3)	
49.20	Carrier Sensing Function(2)	N/A(See Note4)	
49.20	Half Power Beam Angle (Radiation angle of antenna)	N/A(See Note5)	
49.20	Interference Prevention Function	PASS	

NOTE:

(1) ” N/A” denotes test is not applicable in this Test Report
(2) MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20
(3) Application to transmiting devices which E.I.R.P. is less than [2.14dBi+antenna power limit] and the shortage of E.I.R.P. is compensated by the antenna power.
(4) Application to transmitting devices with OFDM modulation and the occupied bandwidth greater than 26MHz.
(5) It is unnecessary to testing, when a E.I.R.P. is less than 12.14dBm.

1.2. TEST FACILITY

Site Description

EMC Lab. : Accredited by CNAS, 2026.03.30
The certificate is valid until 2032.03.29
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017)
The Certificate Registration Number is L25606
Designation Number: CN3446
Test Firm Registration Number: 129414
Accredited by ANAB, Dec. 19, 2025
The Certificate Registration Number is AT-3446

Name of Firm : Shenzhen NTT Testing Technology Co., Ltd.
Site Location : 1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang Industrial Park, No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district, Bao 'an District, Shenzhen City, Guangdong, China

1.3. MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10-6
Bandwidth	± 1.5 x 10-6
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9KHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark:When making a conformity declaration based on test results for regulations/standards or specifications,the default is to use Clause 4.2.1of ILAC-G8:09/2019 and the guidelines on decision rules and conformity declaration in IEC Guide 115:2023.	

2. GENERAL INFORMATION

2. 1. GENERAL DESCRIPTION OF EUT

Equipment	GravaStar Mercury K98 Full-size (98%) Wireless Mechanical Gaming Keyboard
Model Name	GS K98
Series Model:	N/A
Model Different.:	N/A
Product Description	The EUT is a GravaStar Mercury K98 Full-size (98%) Wireless Mechanical Gaming Keyboard. Operation Frequency: 2405~2475MHz Bit Rate of Transmitter: GFSK Number Of Channel: 16 CH Data Rate: 1Mbps Antenna Type: PCB Antenna Antenna Gain(Peak): 1.2dBi
Channel List	Please refer to the Note 2.
Power Source	DC 3.7V from battery or DC 5V
Hardware Version	N/A
Software Version	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	7	2436	13	2463
2	2408	8	2439	14	2466
3	2414	9	2440	15	2470
4	2419	10	2445	16	2475
5	2422	11	2453		
6	2426	12	2459		

3. Table for Filed Antenna

ANT	Brand	Model Name	Antenna Type	Gain (dBi)	NOTE
1	N/A	N/A	PCB Antenna	1.2dBi	N/A

4. Testing environment

Temperature range: 25℃, Humdity range: 55%. Atmospheric Pressure(mbar):1015

2.2. DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode1	2405MHz
Mode2	2440MHz
Mode3	2475MHz
Mode4	RX

For Conducted Emission	
Final Test Mode	Description
Mode1	2405MHz
Mode2	2440MHz
Mode3	2475MHz
Mode4	RX

2.3. TEST CONDITIONS

The BT module was tested while in a continuous transmitter/receiver mode.
The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all Modes to determine worst case levels.

Voltage Fluctuation Test		Normal Voltage	High Voltage + 10% of Normal Voltage	Low Voltage - 10% of Normal Voltage
Test Voltage		DC3.7V	DC4.07V	DC3.33V
Module Voltage		DC 3.33V	DC 3.32V	DC 3.31V
Voltage error	Result	Ref.level	0.00303	0.006006

Note:
Voltage Variation (%)
= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.

2.4. TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of BLE

Test software Version	keyboardTester		
Frequency	2405MHz	2440 MHz	2475 MHz
Parameters	DEF	DEF	DEF

2.5. BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Mode :

2.6. DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Serial	Equipment	Brand	Model/Type No.	Series No.	Note
1	GravaStar Mercury K98 Pro Full-size (98%) Wireless Mechanical Gaming Keyboard	GravaStar	GS K98 PRO	/	EUT

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

(3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

2. 7. EQUIPMENTS LIST FOR ALL TEST ITEMS

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Cal. Date	Calibration Lab	Calibration Method
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2025/9/08	2026/9/07	Guangzhou LiSai Metrology & Test Co. ,Ltd.	c
MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2025/9/08	2026/9/07	Guangzhou LiSai Metrology & Test Co. ,Ltd.	c
Attenuation	PCL-10dB	221126	HTEC	2025/9/08	2026/9/07	Guangzhou LiSai Metrology & Test Co. ,Ltd.	c
MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2025/9/08	2026/9/07	Guangzhou LiSai Metrology & Test Co. ,Ltd.	c
Power Sensor	TR1029-2	512364	Techoy	2025/9/08	2026/9/07	Guangzhou LiSai Metrology & Test Co. ,Ltd.	c
RF Swith	TR1029-1	512364	Techoy	2025/9/08	2026/9/07	Guangzhou LiSai Metrology & Test Co. ,Ltd.	c
Power Meter	ML2495A	10084	Anritu	2025/9/08	2026/9/07	Guangzhou LiSai Metrology & Test Co. ,Ltd.	c

Test Equipment

Note: Calibration Method

a)：Calibration conducted by the National Institute of Information and Communications Technology(NICT) or a designated calibration agency under Article 102-18 paragraph (1) of the Radio Law.

b)：Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.

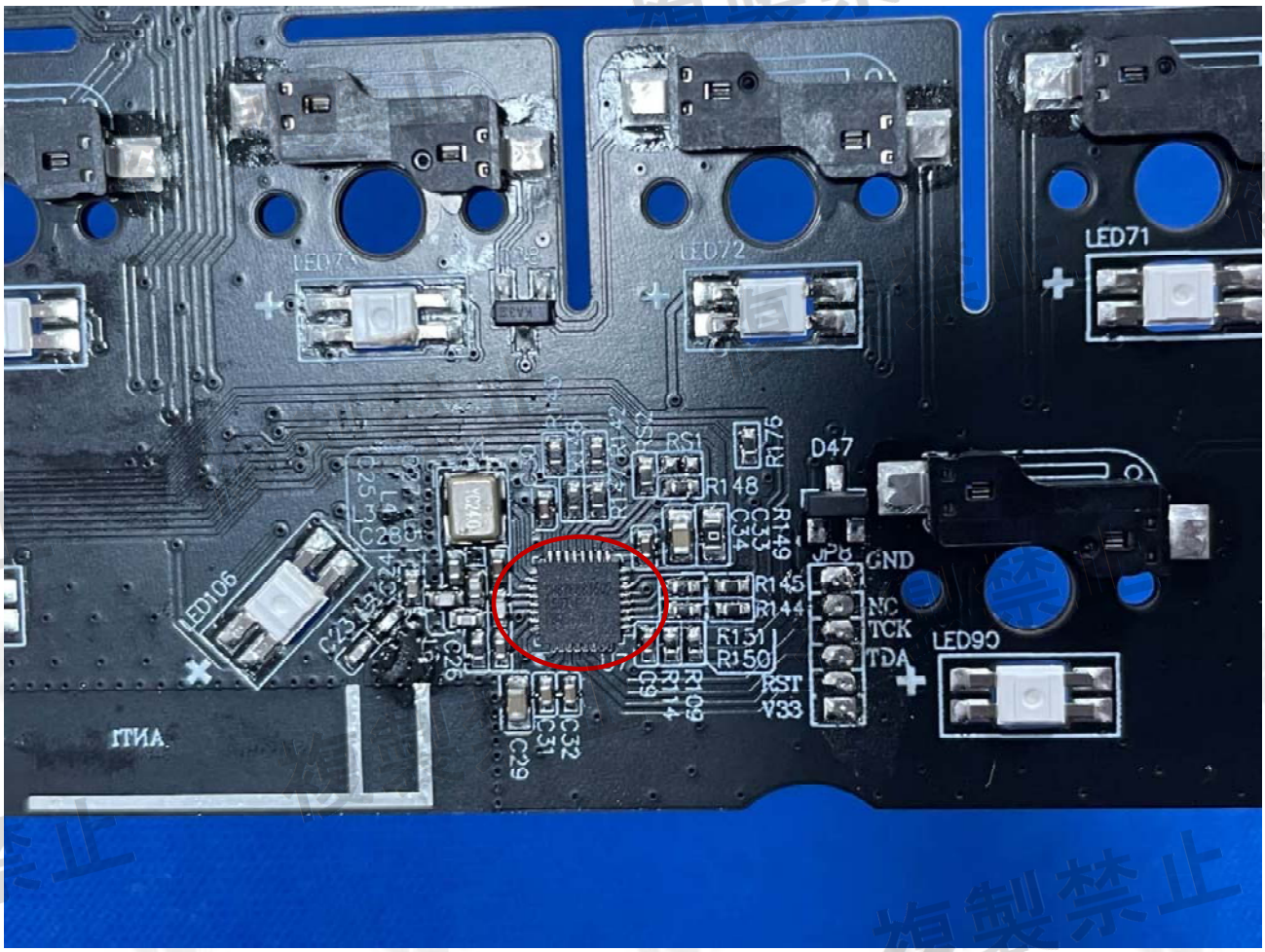
c)：Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).

d)：Calibration conducted by using other equipment that listed above from a) to c).

3. RF SHIELDING METHOD

We apply the product for Japan RF certification. The RF chip is soldered on the PCB. making it very difficult for anyone to remove it. Number of RF chip pins:32, spacing distance: 0.5 mm; Number of (please see picture).

picture



4. TEST RESULT FOR BLUETOOTH

4. 1. FREQUENCY ERROR

4. 2. LIMIT

Item	Limits
Frequency Error	±50ppm

4. 3. MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz/10KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4. 4. TEST PROCEDURES

(1)In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.

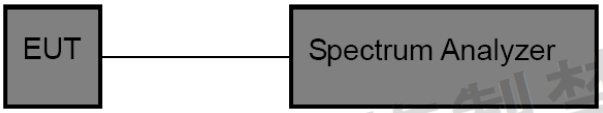
(2)In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.

(3)In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.

(4)In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.

In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

4. 5. TEST SETUP LAYOUT



4. 6. TEST RESULT

Please see the attachment for data.

5. ANTENNA POWER

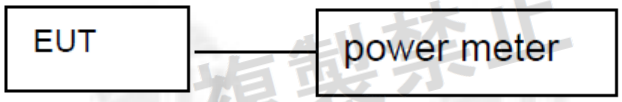
5. 1. LIMIT

Item	Limits
Antenna Power Density	≦3mW/MHz (FH form 2402 - 2480 MHz) ≦10mW/MHz (OFDM,DS from2400~2483.5MHz) ≦10mW (Other from 2400~2483.5MHz)
Antenna Power Error	≤ 20%

5. 2. TEST PROCEDURES

1. The EUT was directly connected to the power meter.
2. The EUT was set to fixed-frequency mode.

5. 3. TEST SETUP LAYOUT



5. 4. EST DEVIATION

There is no deviation with the original standard.

5. 5. TEST RESULT

Please see the attachment for data.

6. OCCUPIED BANDWITH (99%)

6. 1. LIMIT

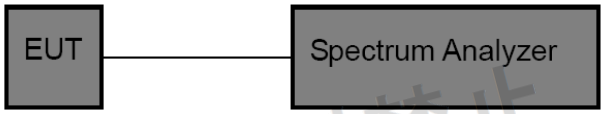
Item	Limits
Occupied Band Width:	FH 83.5MHz; OFDM,DS ≦26MHz;Others≦ 26MHz
Spreading Bandwidth:	Only test(No Limits)

6. 2. MEASURING INSTRUMENTS AND SETTING

6. 3. TEST PROCEDURES

1. Setting of SA is following as: RB: 300KHz / VB:300KHz / SPAN: 3MHz / AT: 30dB Ref: 21.96dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
2 . EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz(For DSSS or OFDM Device) or 83.5MHz(For FHSS Device).
3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth.

6. 4. TEST SETUP LAYOUT



6. 5. TEST DEVIATION

There is no deviation with the original standard.

6. 6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

6. 7. TEST RESULT

Please see the attachment for data.

7. UNWANTED EMISSION INTENSITY MEASUREMENT

7. 1. LIMIT

Item	Limits
TX Spurious Emission	≦ 2.5 μW/MHz (30MHz≦f≦1000MHz)
	≦2.5 μW/MHz (1000MHz<f≦2387MHz)
	≦25 μW/MHz (2387MHz<f≦2400MHz)
	≦25 μW/MHz (2483.5MHz≦f<2496.5MHz)
	≦2.5 μW/MHz (2496.5MHz≦f<12500MHz)

7. 2. MEASURING INSTRUMENTS AND SETTING

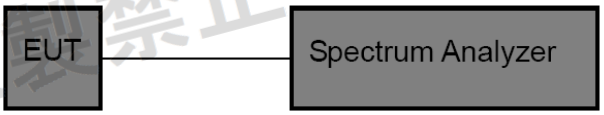
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Below 1G	Above 1G
	Setting	Setting
Attenuation	Auto	Auto
RB / VB	100kHz	1MHz
Detector	Peak	Peak
Trace	Max Hold	Max Hold
Sweep Time	Auto	Auto

7. 3. TEST PROCEDURES

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
   Above 1GHz RB:1MHz / VB:1MHz / AT: 30dB Ref: 20dBm / Sweep time: Auto
   Sweep Mode: Continuous sweep / Detect mode: Positive peak
   Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
8. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

7. 4. TEST SETUP LAYOUT



7. 5. TEST DEVIATION

There is no deviation with the original standard.

7. 6. TEST RESULT

Please see the attachment for data.

8. IMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT

8.1. LIMIT

Item	Limits
RX Spurious Emission:	≦4nW (f<1GHz)
	≦20nW (1GHz≦f)

8.2. MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100kHz(f<1GHz);1 MHz (1GHz≦f)
VB	100KHz(f<1GHz);1 MHz (1GHz≦f)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.3. TEST PROCEDURES

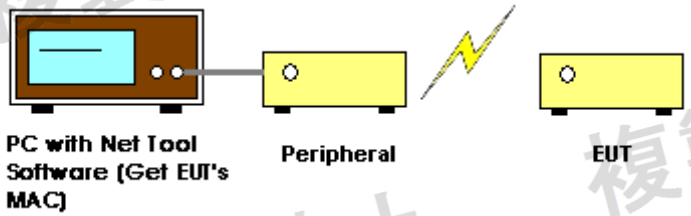
1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as:
   AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 13000MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for f < 1GHz, 2nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

8.4. TEST RESULT

Please see the attachment for data.

9 INTERFERENCE PREVENTION FUNCTION

9.1. TEST SETUP



9.2. RADIO INTERFERENCE PREVENTION FUNCTION

	Normal voltage	High voltage	Low voltage
Result	OK	OK	OK

Result: Pass
MAC:A3:2F:C1:39:83:B6

10 CARRIER SENSE

10.1 STANDARD APPLICABLE

Item	Limits
Carrier Sense	Good – EUT stop RF transmission signal after carrier inject to EUT. (On 22.79+Gr-20*log (f)[dBm] (Gr: dBi; f: MHz) or 100mV/m)

10.2 INSTRUMENTS SETTING

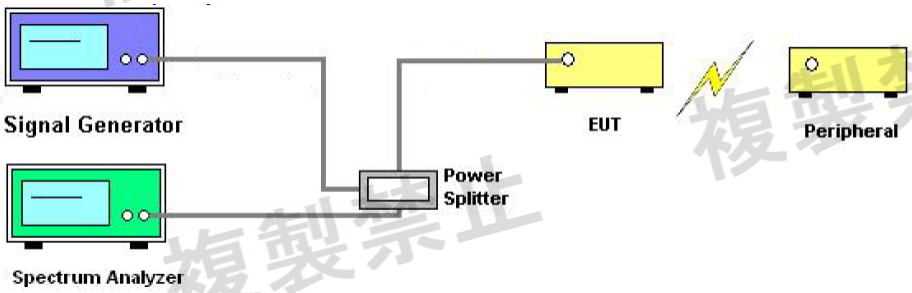
The following table is the setting of spectrum analyzer and receiver

Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1mhZ
Span	0mhZ
Sweep	Continuous
Detector	Peak
Trigger mode	Video

10.3 TEST PROCEDURES

1. SSG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SSG and power level is (On 22.79+Gr-20*log(f)[dBm] (Gr: dBi; f: MHz). Then turn off the RF signal of SSG.
2. EUT have transmitted the maximum modulation signal and fixed channelize.
3. Setting of SA is following as: RB: 1MHz / VB: 1MHz / SPAN: 50MHz / AT: 10dB /Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak.
4. SSG RF Signal On.
5. EUT shall be stop the transmitted any signal and SSG RF Signal Off. Then EUT will be continuous transmitted signal.

10.4 TEST SETUP LAYOUT



10.5 EUT OPERATION DURING TEST

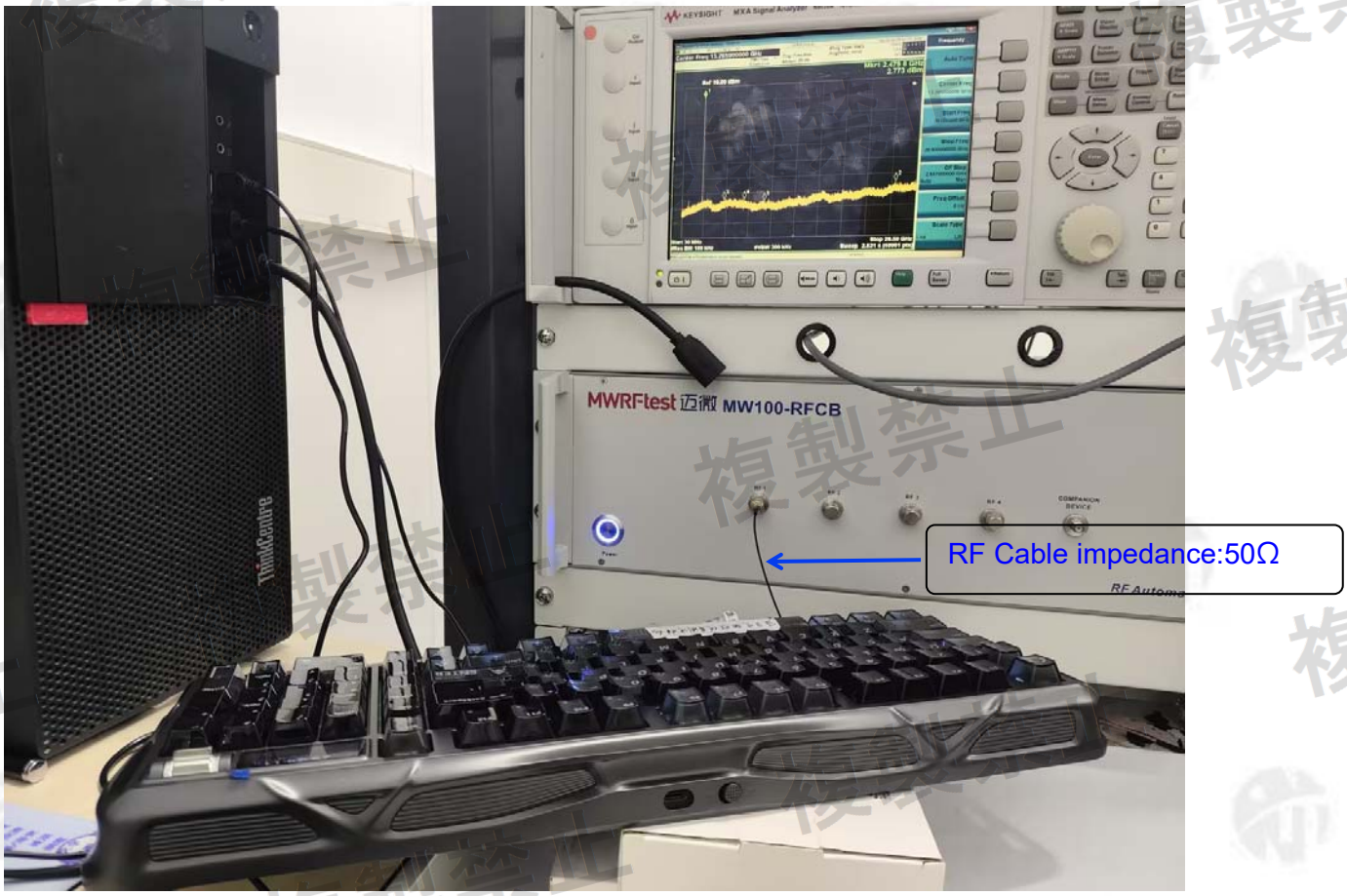
The EUT was programmed to be in normal transmitting mode.

10.6 TEST RESULT

N/A

11. EUT TEST PHOTO

Measurement Photos



12.EUT CONSTRUCTIONAL DETAILS

Please see the EUT photo for details.

*****the end of report*****