



RADIO TEST REPORT

MIC Public Notice 88

Test report
On Behalf of

株式会社ファンクストレーディング

For

フードコート呼び出しベル

Model No.: GPYS-18, GPYS-16, GPYR-15, GPYR-30

Prepared for : 株式会社ファンクストレーディング
群馬県高崎市上滝町 238

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Date of Test: Jan. 10, 2020 ~ Mar. 02, 2020

Date of Report: Mar. 02, 2020

Report Number: HK2001100151-E



TEST RESULT CERTIFICATION

Applicant's name : 株式会社ファンクストレーディング

Address..... : 群馬県高崎市上滝町238

Manufacture's Name..... : 重慶劍濤テクノロジー株式会社

Address..... : 重慶江北区江安二路2号4号館10-1

Product description

Trade Mark: 呼び丸

Product name..... : フードコート呼び出しベル

Model and/or type reference : GPYS-18, GPYS-16, GPYR-15, GPYR-30

Standards : Article 2 Paragraph 1 of Item 8, annex 22-1

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Date of Test..... :

Date (s) of performance of tests : Jan. 10, 2020 ~ Mar. 02, 2020

Date of Issue..... : Mar. 02, 2020

Test Result..... : **Pass**

Prepared by:

Project Engineer

Reviewed by:

Project Supervisor

Approved by:

Technical Director

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

Test procedures according to the technical standards:

Rule Section	Description of Test	Result
Transmitter Parameters		
3.2	Transmission power(e.i.r.p)	Complies
3.2	Tolerances for transmission power	Complies
3.2	Frequency tolerance	Complies
3.2	Occupied bandwidth	Complies
3.2	Unwanted emission intensity measurement- transmission	Complies
3.3	Spurious emissions – receiver	Complies
3.4	Transmission time	Complies

NOTE:

- 1) "N/A" denotes test is not applicable in this Test Report
- 2) Article 2 Paragraph 1 of Item 8, annex 22-1



1.2 TEST FACILITY

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.
Certificated by CNAS, Registration No.: L9589

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,
Heping Community, Fuhai Street, Bao'an District, Shenzhen, China

1.3 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 Emission Test	$\pm 3.2\text{dB}$
2	Radiated Emission Test	$\pm 4.7\text{dB}$
3	RF power,conducted	$\pm 0.16\text{dB}$
4	Spurious emissions,conducted	$\pm 0.21\text{dB}$
5	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
6	All emissions,radiated(>1G)	$\pm 5.0\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	フードコート呼び出しベル
Model Name	GPYS-18
Serial No	GPYS-16, GPYR-15, GPYR-30
Model Difference	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: GPYS-18
Antenna Type	External Antenna
Antenna Gain	2dBi
Operation frequency	315MHz
Number of Channels	1CH
Modulation Type	OOK
Firmware Version	V2.0
Hardware Version	V2.0
Power Source	DC 12V 2A from Adapter with AC100-240V 50/60Hz, 0.8A
Power Rating	DC 12V 2A from Adapter with AC100-240V 50/60Hz, 0.8A

Note:

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

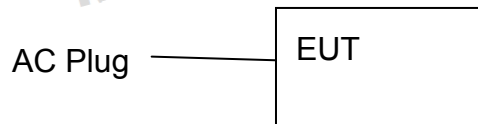
Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	Antenna	external Antenna	N/A	2	ANT.



2.2 DESCRIPTION OF THE TEST MODES

Worst Mode	Description
Mode 1	TX Mode

2.3 DESCRIPTION OF TEST SETUP



2.4 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.

Power Supply Voltage Fluctuation Test

Voltage mode	Input Voltage	Radio Unit Voltage
Battery	DC 10.8V	3.31V
	DC 12V	3.30V
	DC 13.2V	3.30V
Note: 1 The radio unit Voltage with the module regulator IC regulator. 2 The radio unit less than 1%, so the test only rated voltage (Normal voltage) with the battery.		

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.



2.5 MEASUREMENT INSTRUMENTS LIST

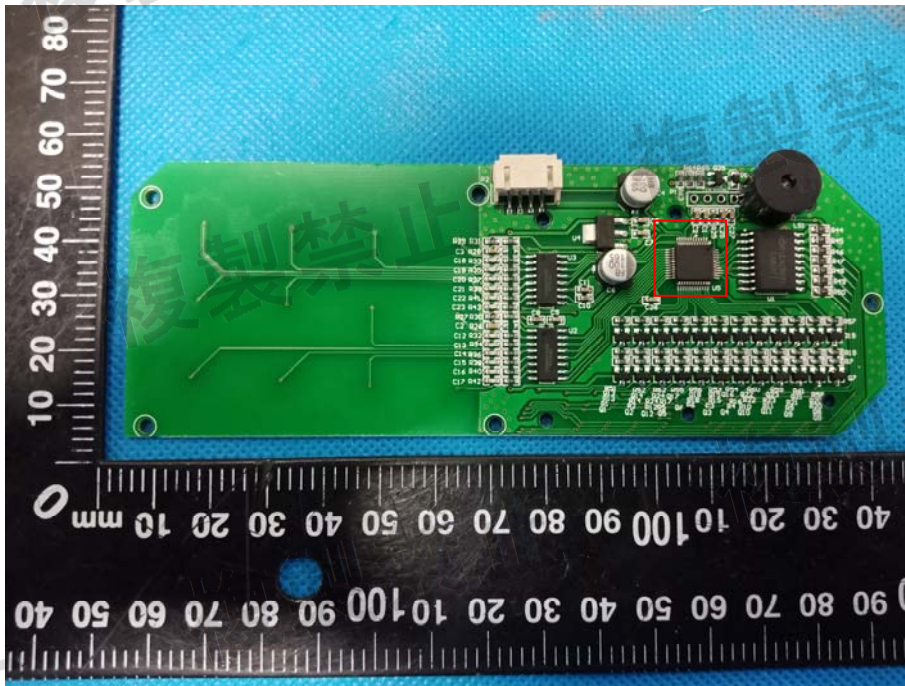
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Receiver	Rohde & Schwarz	ESCI	100627	2019.12.26	1 Year
2.	LISN	SchwarzBeck	NSLK 8126	8126377	2019.12.26	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	2019.12.26	1 Year
4.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
5.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	2019.12.26	1 Year
6.	Trilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	2019.12.26	1 Year
7.	Pre-amplifier	Compliance Direction	PAP-0203	22008	2019.12.26	1 Year
8.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
9.	EMI Receiver	Rohde & Schwarz	ESCI	100627	2019.12.26	1 Year
10.	LISN	SchwarzBeck	NSLK 8126	8126377	2019.12.26	1 Year
11.	RF Switching Unit	Compliance Direction	RSU-M2	38303	2019.12.26	1 Year
12.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
13.	EMI Receiver	Rohde & Schwarz	ESCI	100627	2019.12.26	1 Year
14.	EMI Receiver	Rohde & Schwarz	ESCI	100627	2019.12.26	1 Year
15.	LISN	SchwarzBeck	NSLK 8126	8126377	2019.12.26	1 Year
16.	RF Switching Unit	Compliance Direction	RSU-M2	38303	2019.12.26	1 Year
17.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
18.	Power Meter	R&S	NRVD	SEL0069	2019.12.26	1 Year
19.	Power Sensor	R&S	URV5-Z2	SEL0071	2019.12.26	1 Year
20.	Power Sensor	R&S	URV5-Z2	SEL0072	2019.12.26	1 Year
21.	Software EMC32	R&S	EMC32-S	SEL0082	N/A	N/A
22.	Log-periodic Antenna	Amplifier Reasearch	AIFS-IP780	SEL0073	N/A	N/A
23.	Antenna Tripod	Amplifier Reasearch	TP1000A	SEL0074	N/A	N/A
24.	High Gain Horn Antenna(0.8-5GHz)	Amplifier Reasearch	AT4002A	SEL0075	N/A	N/A
25.	Spectrum analyzer	Agilent	N9020A	MY499110 048	2019.12.26	1 Year
26.	Spectrum analyzer	Agilent	E4407B	MY461843 26	2019.12.26	1 Year
27.	DC power supply	Agilent	E3646A	N/A	2019.12.26	1 Year



3 RF SHIELDING METHOD

We apply the product for Japan RF certification. Number of terminals is 48, Terminal pitch is 1 mm. It is not easily removed. Please refer to following for photo for details.

Red circle part of the RF module soldered on the PCB.





4 TRANSMISSION POWER (E.I.R.P)

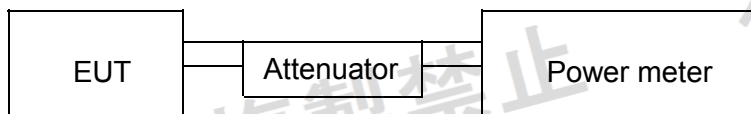
4.1 LIMIT

Item	Limits
Transmission power (e.i.r.p)	312MHz~315.05MHz: 250uW 315.05MHz~315.25MHz: 25uW
Power tolerance	+20% (Base on manufacturer declare power)

4.2 TEST PROCEDURES

- (1) Set the test frequency and transmit continuously.
- (2) Modulate with standard encoded test signal. If it can not be set as the standard encoded test signal, it shall be the modulation code used for the normal operation state.
- (3) If it can not be set for continuous transmission, set the continuous burst transmission state. In the case of the antenna integrated type, it is possible to set the transmission pause time which does not hinder the search in the maximum radiation direction.
- (4) Connected the EUT such as clause 4.4.
- (5) Recorded the antenna power "P" in the power meter.
- (6) EIRP power="P"+antenna gain

4.3 TEST SETUP



4.4. EUT OPERATION DURING TEST

The EUT was placed on the test table and Modulate with standard encoded test signal.

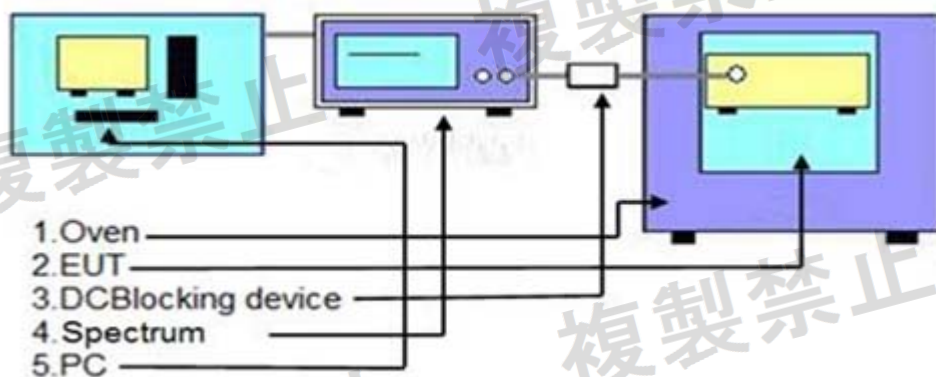


5 FREQUENCY TOLERANCE AND OCCUPIED BANDWIDTH

5.1 Limit

Item	Limits
Frequency tolerance	312MHz~315.25MHz
Occupied bandwidth	$\leq 1\text{MHz}$

5.2 Test Setup



5.3 Test Procedure

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
SPAN	1MHz
RBW	100KHz
VBW	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 TEST DEVIATION

- (1) Set to the test frequency and set the continuous transmission state or continuous (constant period and constant burst length) burst transmission state.
- (2) Modulation code is modulated with standard encoded test signal. However, if it can not be set as the standard encoded test signal, it shall be the modulation code with the maximum occupied frequency bandwidth in the communication operating state.



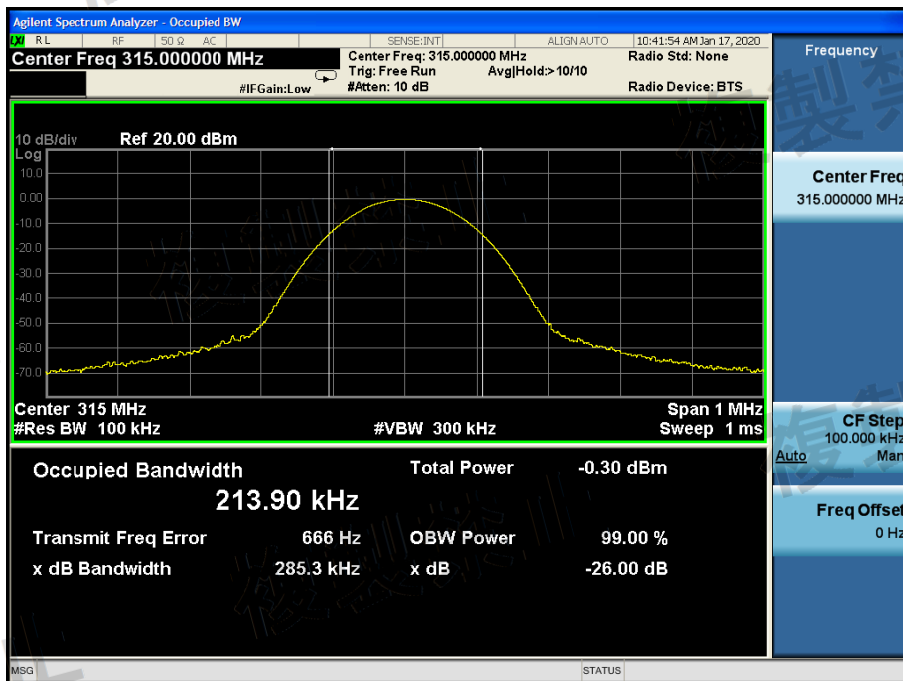
5.4 Test Result

EUT :	フードコート呼び出しベル	Test Date:	2020.01.17
Temperature:	25°C	Tested by:	Gary Qian
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Carrier Tx mode		

TEST CONDITIONS		CHANNEL FREQUENCY (MHz)	OCCUPIED BANDWIDTH (KHz)	FL (MHz)	FH (MHz)	LIMIT	PASS/FAIL
Vnom(V)	12.0	315.0	213.9	314.9015	315.0374	FL > 312 MHz FH < 315.25 MHz	PASS
Vmax(V)	13.2	315.0	208.47	314.9024	315.0389		PASS
Vmin(V)	10.8	315.0	209.45	314.9036	315.0332		PASS

NOTE: FL is the lowest frequency of the 99% occupied bandwidth of power envelope.

FH is the highest frequency of the 99% occupied bandwidth of power envelope.



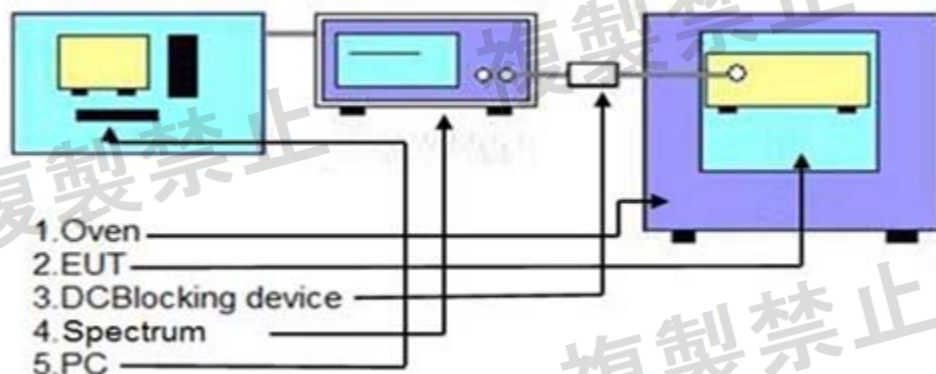


6 UNWANTED EMISSION INTENSITY MEASUREMENT- TRANSMISSION

6.1 Limit

Item	Limits
TX Spurious Emission	$\leq 250 \text{ nW (e.i.r.p)} (f \leq 1\text{GHz})$
	$\leq 1 \text{ }\mu\text{W (e.i.r.p)} (f \geq 1\text{GHz})$

6.2 Test Setup



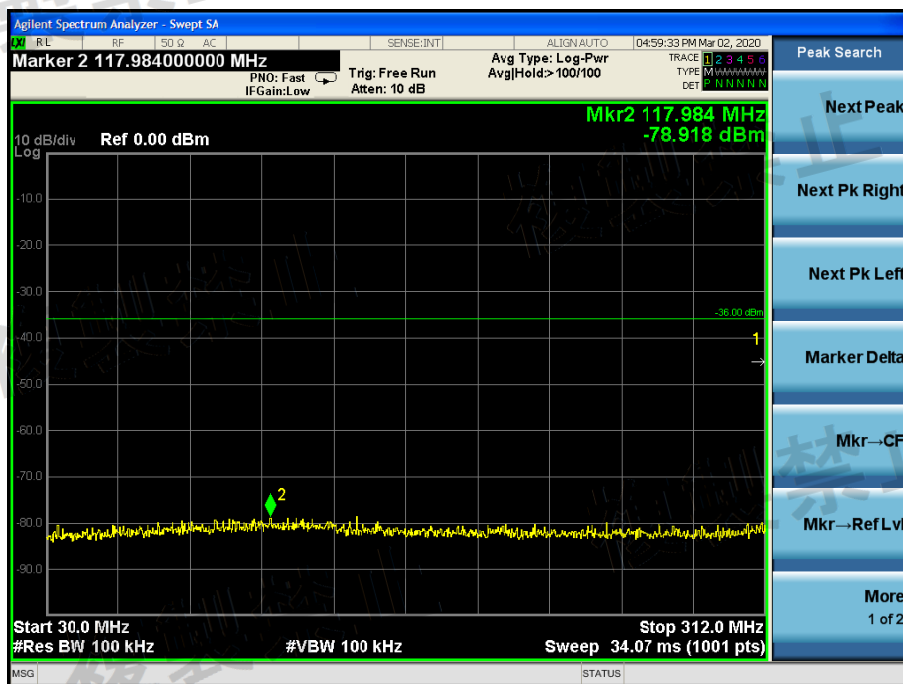
6.3 Test Procedure

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	100KHz / 100KHz (Below 1GHz)
RB / VB	1MHz / 1MHz (Above 1GHz)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

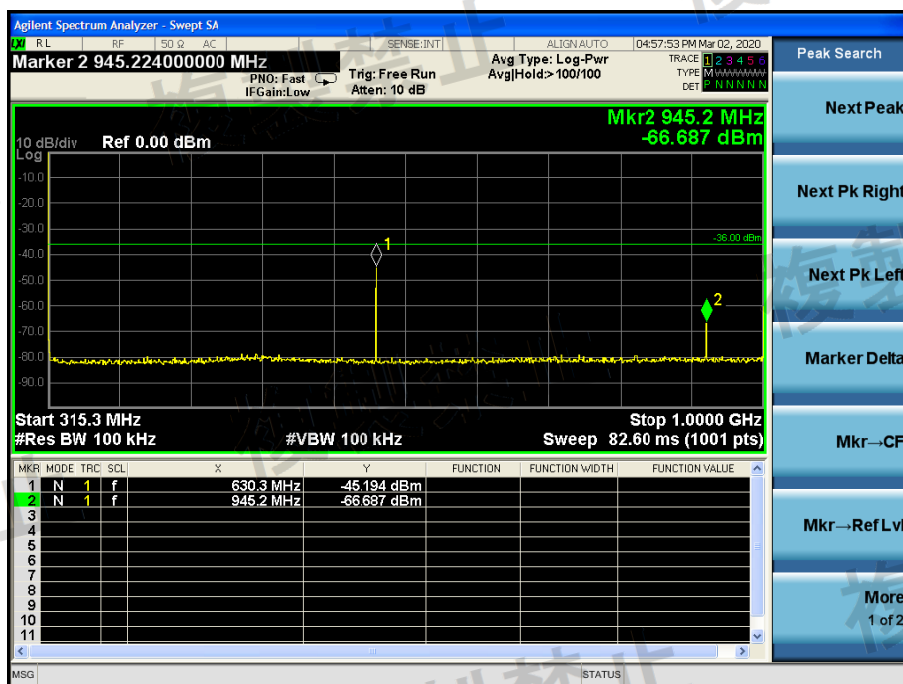
1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto
Sweep Mode: Continuous sweep / Detect mode: Positive peak Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 312MHz Then to mark peak reading value + cable loss+antenna gain shall be less than 250nW.
4. Setting of SA is following as 315.25MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss+antenna gain shall be less than 250nW.
5. SA adjusted to start frequency 1000MHz and stop frequency 4000MHz. Then to mark peak reading value + cable loss+antenna gain shall be less than 1μW.
6. 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.

6.4 Test Result

EUT :	フードコート呼び出しベル	Test Date:	2020.01.17
Temperature:	25°C	Tested by:	Gary Qian
Humidity:	55 % RH	Test Voltage	Normal Voltage

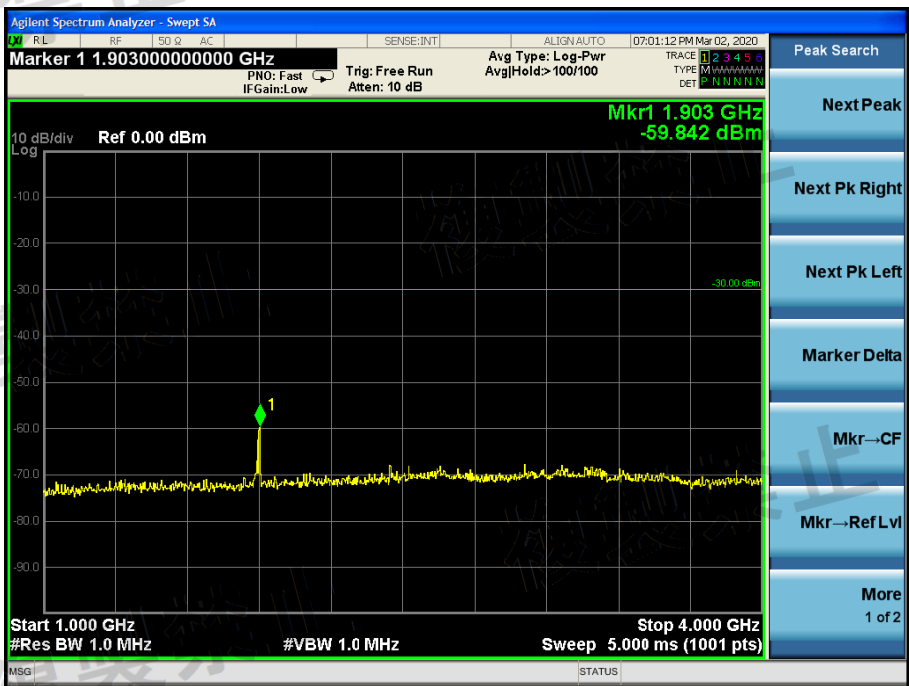
(TX mode) - Frequency Band 1 (30 MHz \leq f \leq 312 MHz) Worst Mode

TX mode - Frequency Band 2 (315.3 MHz < f ≤ 1000 MHz) Worst Mode





CH 37 TX mode - Frequency Band 3 (1000 MHz \leq f < 4000 MHz) Worst Mode

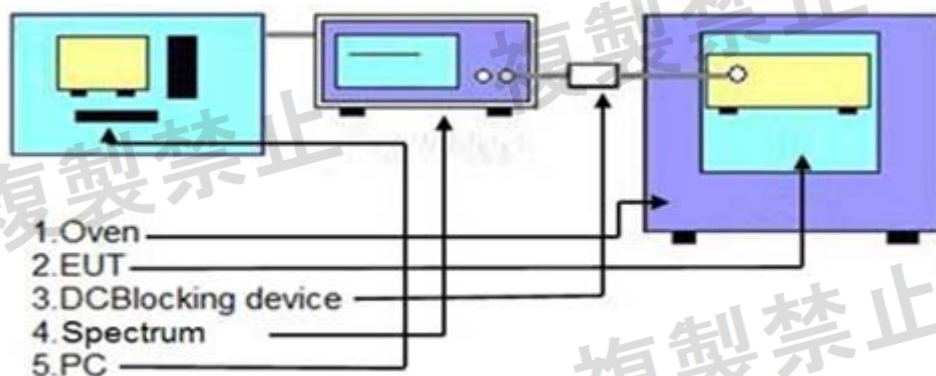


7 SPURIOUS EMISSIONS – RECEIVER

7.1 Limit

Item	Limits
RX Spurious Emission:	$\leq 4\text{nW}$ (e.i.r.p) ($f < 1\text{GHz}$)
	$\leq 4\text{nW}$ (e.i.r.p) ($1\text{GHz} \leq f$)

7.2 Test Setup



7.3 Test Procedure

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

- EUT have the continuous reception mode and fixed only one channelize.
- Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
- 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+antenna gain shall be less than 4nW
- SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 4000MHz. Search to mark peak reading value + cable loss+ antenna gain shall be less than 4nW

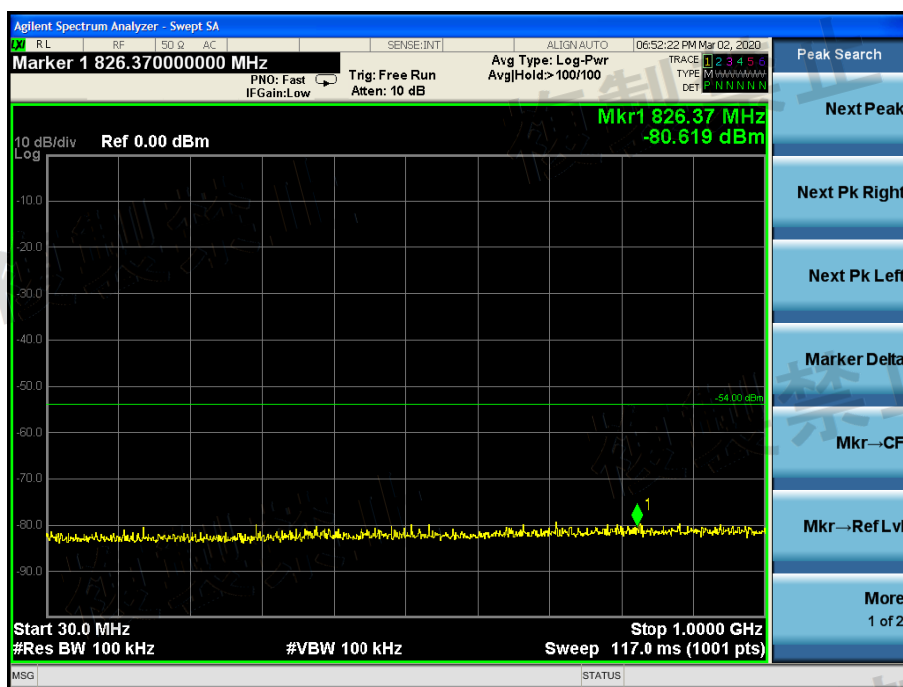


7.4 Test Result

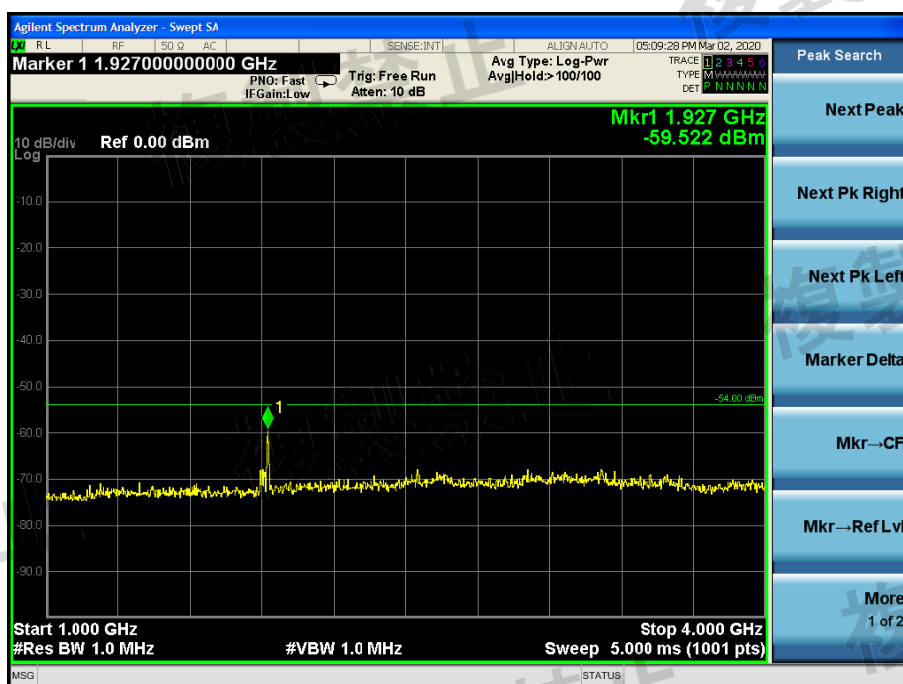
EUT :	フードコート呼び出しベル	Test Date:	2020.01.17
Temperature:	25°C	Tested by:	Gary Qian
Humidity:	55 % RH	Test Voltage	Normal Voltage

The worst test channel of all channels was showed as the follow:

RX-Frequency Band 1 ($30 \text{ MHz} \leq f < 1000 \text{ MHz}$) Worst Mode



RX-Frequency Band 2 ($1000 \text{ MHz} \leq f < 4000 \text{ MHz}$) Worst Mode



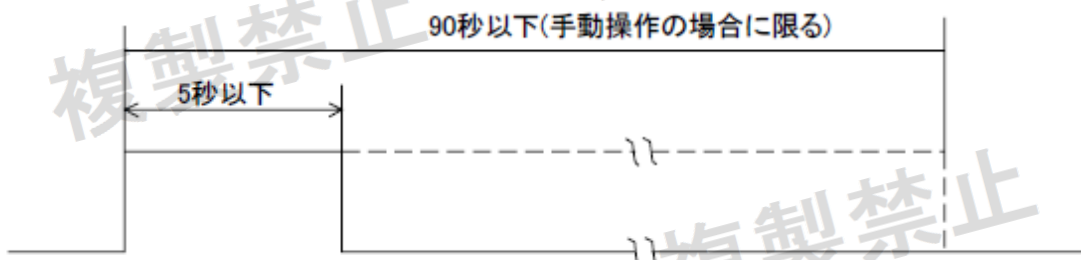


8 TRANSMISSION TIME

8.1 Limit

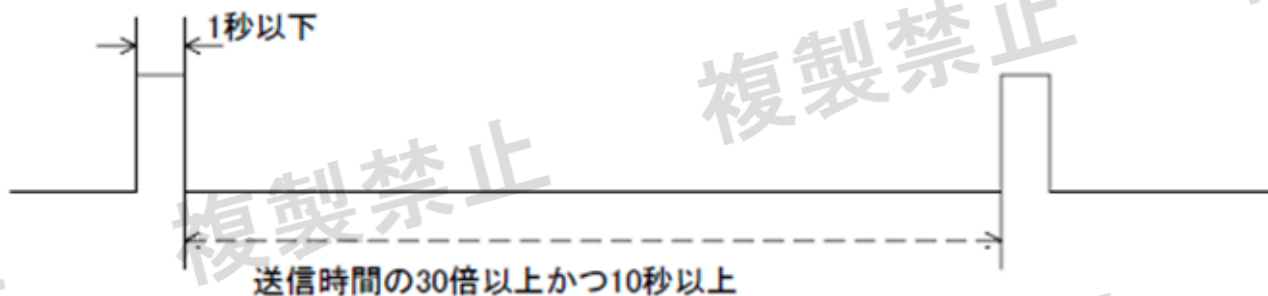
- (1) Not perform periodic transmission (or manual transmission) equipment.

One transmission time should be less than 5 seconds within 90 seconds.



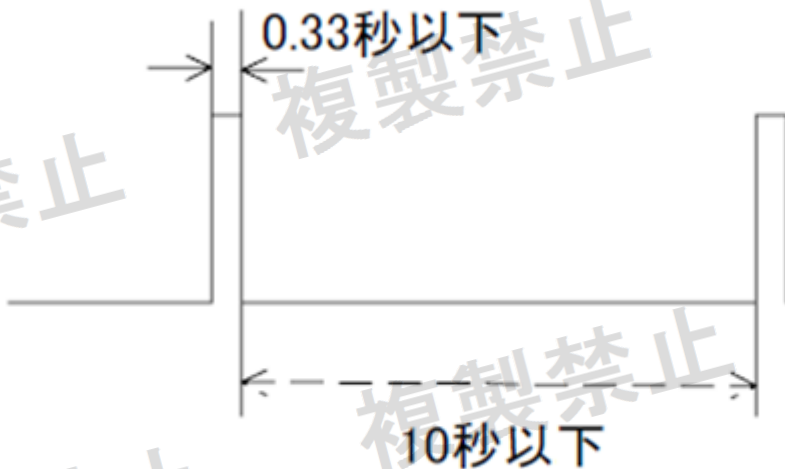
- (2) Perform periodic transmission equipment.

The duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.



- (3) Perform periodic transmission equipment (used for Vehicle safety)

Transmission time should be less than 0.33 second, the transmission pause time of the radio equipment is not required to be 10 seconds or more.





8.2 Test Setup



8.3 Test Procedure

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	100 kHz
VB	300 kHz
Detector	Peak
Trace	Max Hold
Sweep mode	Single sweep
Sweep Time	About 100s

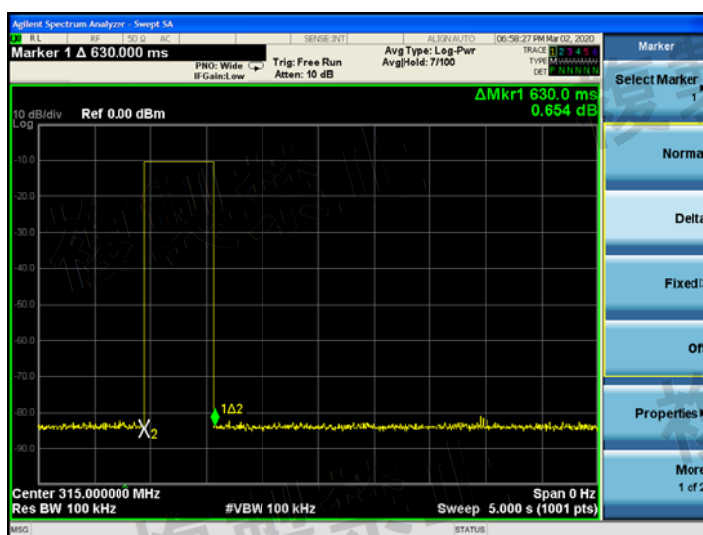
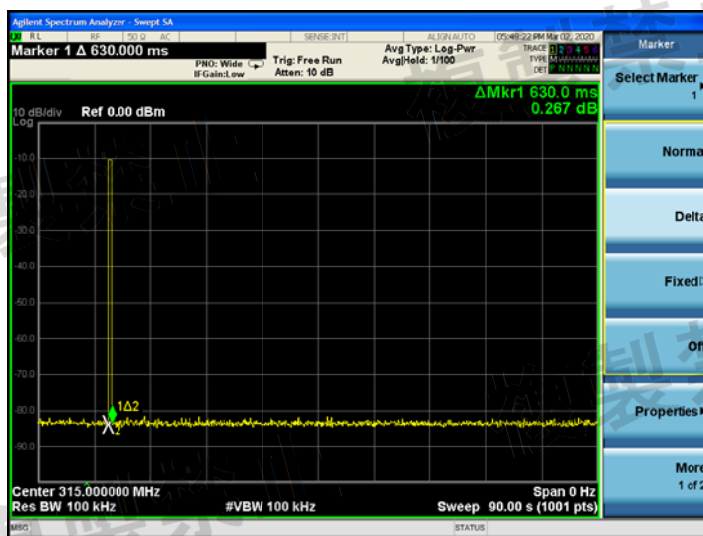


8.4 Test Result

PASS

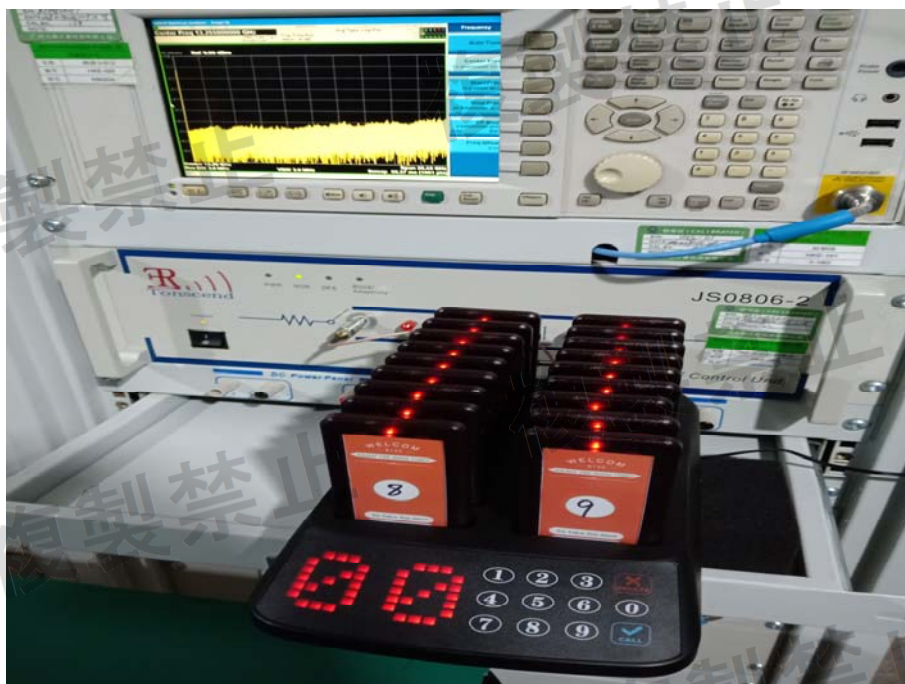
NOTE: The device of フードコート呼び出しベル belongs to manual transmission equipment. Its transmission time is 630ms less than 5 seconds within 90 seconds

CHANNEL FREQUENCY (MHz)	transmission time (ms)	LIMIT (s)	PASS/FAIL
315.0	630	5	PASS





9 PHOTOGRAPH OF TEST



-----End of report-----