



REPORT No. : SZ21010304W01

TEST REPORT

APPLICANT : Bunka Shutter Co., Ltd.

PRODUCT NAME : Transceiver for waterstop shutter

MODEL NAME : SRX2131-100

BRAND NAME : Bunka

STANDARD(S) : ARIB STD-67

RECEIPT DATE : 2021-03-02

TEST DATE : 2021-03-17 to 2021-03-18

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Change History		
Version	Date	Reason for change
1.0	2021-03-29	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Bunka Shutter Co., Ltd.
Applicant Address:	1-17-3, Nishikata, Bunkyo-ku, Tokyo 113-8535, Japan
Manufacturer:	Aoyagi Nekken Denshi (Shenzhen) Limited
Manufacturer Address:	No.401, 4/F of Attachment Building & 3/F of Main building, N0.514 Si Li Road, Po Tou Xia Community, Guanlan, Longhua New District, Shenzhen City, Guangdong Province, China

1.2. Equipment Under Test (EUT) Description

Product Name:	Transceiver for waterstop shutter	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	SRX2131-100 V1.0	
Software Version:	SRX2131-100-V1.0.hex	
Modulation Type:	FSK	
Frequency Range:	429.1750MHz-429.7375MHz	
Channel Number:	46	
Power Supply:	External Power Supply	
Test Voltage:	Normal(NV):	100V
	Lowest(LV):	90V
	Highest(HV):	110V

Note 1: The EUT operates in 429.1750MHz to 429.7375MHz, it transmits in manual.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3. Table for Filed Antenna

Antenna Manufacture:	Aoyagi Nekken Denshi (Shenzhen) Limited
Brand Name:	N/A
Model Name:	N/A
Antenna Type:	Nickel plated carbon steel wire Antenna
Antenna Gain:	0.239dBi

1.4. The Channel Number and Frequency of EUT

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	429.1750	17	429.3750	33	429.5750
2	429.1875	18	429.3875	34	429.5875
3	429.2000	19	429.4000	35	429.6000
4	429.2125	20	429.4125	36	429.6125
5	429.2250	21	429.4250	37	429.6250
6	429.2375	22	429.4375	38	429.6375
7	429.2500	23	429.4500	39	429.6500
8	429.2625	24	429.4625	40	429.6625
9	429.2750	25	429.4750	41	429.6750
10	429.2875	26	429.4875	42	429.6875
11	429.3000	27	429.5000	43	429.7000
12	429.3125	28	429.5125	44	429.7125
13	429.3250	29	429.5250	45	429.7250
14	429.3375	30	429.5375	46	429.7375
15	429.3500	31	429.5500		
16	429.3625	32	429.5625		

Note 1: The black bold channels were selected for test.

1.5. Summary of the Test Result

Applied Standard: ARIB STD-67			
Description of Test	Test Engineer	Result	Method determination /Remark
Antenna power	Liu Bo	PASS	No deviation
Tolerances for antenna power	Liu Bo	PASS	No deviation
Frequency tolerance	Liu Bo	PASS	No deviation
Adjacent-channel leakage power	Liu Bo	PASS	No deviation
Permissible value for occupied bandwidth	Liu Bo	PASS	No deviation
Permissible value of intensity of spurious emission or unwanted emission	Liu Bo	PASS	No deviation
Operating Frequency and Transmission Time restriction	Liu Bo	PASS	No deviation
Secondary Radiated Emissions	N/A	N/A ^{Note1}	N/A
Carrier sensing Function	Liu Bo	PASS	No deviation
Note 1: The EUT do not support the receiver. Note 2: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table. Note 3: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% risk level.			

1.6. Environmental Conditions

Temperature (°C):	5-35
Relative Humidity (%):	45-85
Atmospheric Pressure (kPa):	86-106



2. Test Results

2.1. Frequency Tolerance and Permissible Value for Occupied Bandwidth

2.1.1. Limit

Item	Limits
Frequency tolerance	$\pm 4 \times 10^{-6}$
Permissible value for occupied bandwidth	<8.5KHz or <16KHz

2.1.2. Measuring Instruments and Setting

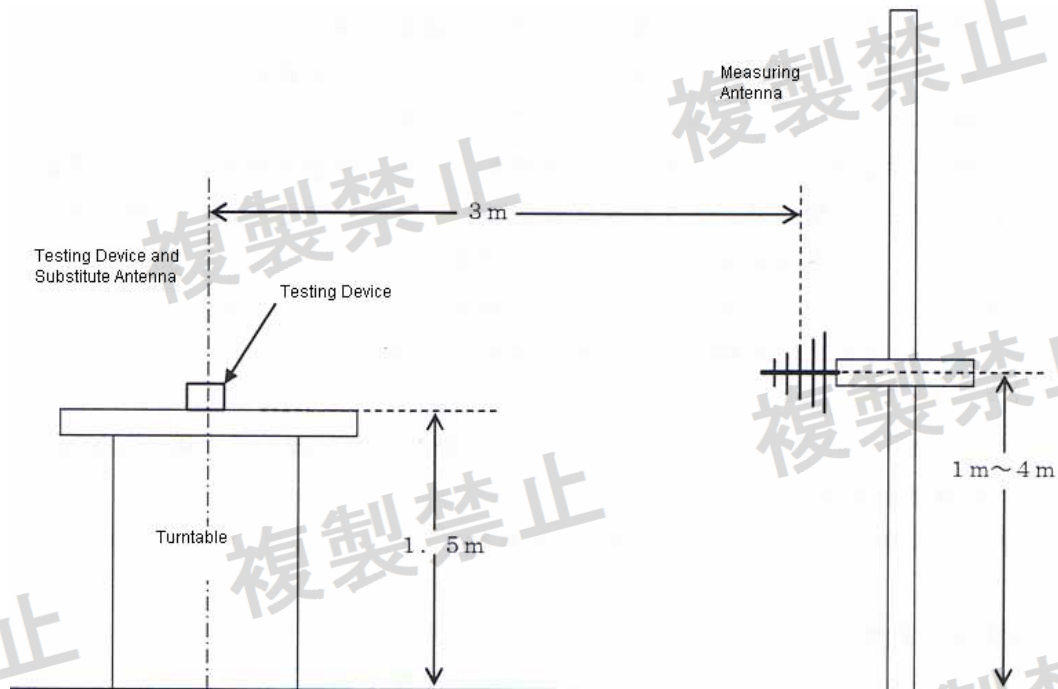
The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Sweep frequency width	2 to 3.5 times of allowance
Resolution bandwidth	Less than 3% of allowance
Video bandwidth	Same as resolution bandwidth
Y scale	10 dB/Div
Input level	Carrier wave level sufficiently higher than spectrum analyzer noise level
Sweep time	Minimum time ensuring measurement accuracy
Data points	401
Sweep mode	Continuous
Detection mode	Positive peak
Display mode	Max hold

2.1.3. Test Procedures

- Set spectrum analyzer as in 2.1.2.
- Repeat sweep until variations are not observed in the display, and input all the data point values to the computer array variable.
- Transform dB value to dimensional power antilogarithm, for all the data.
- Summation of all power data, and register the result as "Total Power".
- Starting from the minimum frequency data, power is added in increasing order, this value should be 0.5% of the "Total Power", and the critical (limit) data is obtained. The critical point is converted to frequency and registered as "Lower limit frequency".
Starting from the maximum frequency data, power is added in decreasing order, this value should be 0.5% of the "Total Power", and the critical (limit) data is obtained. The critical point is converted to frequency and registered as "Upper limit frequency".

2.1.4. Test Setup Layout



- Anechoic chamber shielded with 5 surfaces and wave reflection.
- The testing device installed on the turntable that is at 1.5 m height from ground, and substitute antenna is 1.5 m height. The material of the base and the equipment conditions are described in the "Announcement of the Ministry of Posts and Telecommunications No. 127, February 25th, 1988" "Emission Wave Notorious Weak Radio Station Electric Field measurement Method" Enforcement Regulation Article 6, Clause 2).



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- c) Measuring antenna is installed at 1m to 4 m variable height from ground.
- d) Distance between receiver and measuring antenna is basically 3 m.

Measuring antenna and substitute antenna are directional, have wide band characteristic, and is preferable that they have the same polarization as the testing device.

2.1.5. Test Deviation

There is no deviation with the original standard.

2.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.1.7. Test Result

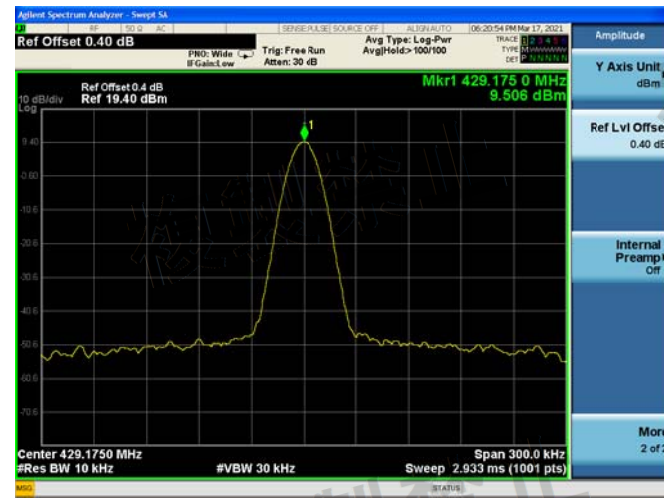
Frequency Tolerance

Frequency f_c (MHz)	Test Frequency f (MHz)	Frequency Error (ppm)	Verdict
429.1750	429.1750	0.00	PASS
429.4500	429.4500	0.00	PASS
429.7375	429.7375	0.00	PASS

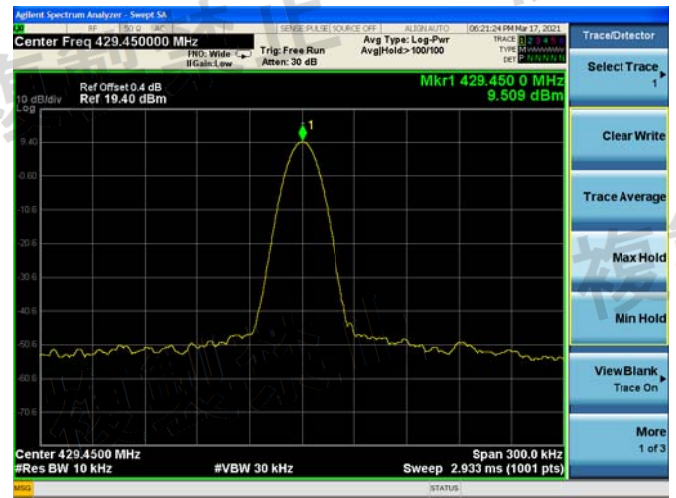


Frequency Error

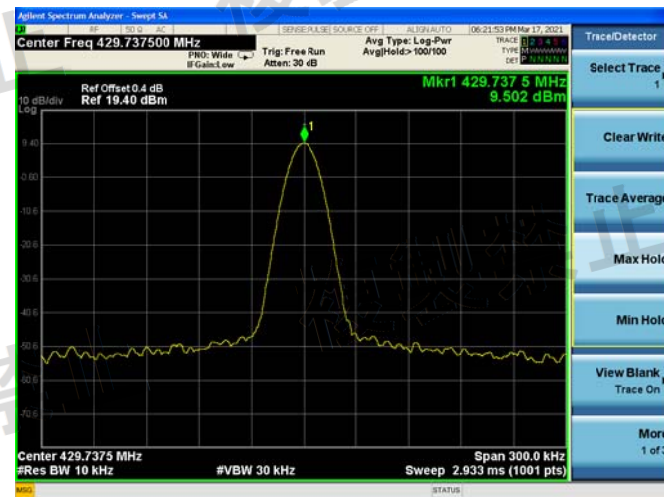
429.1750MHz



429.4500MHz



429.7375MHz





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Occupied Bandwidth

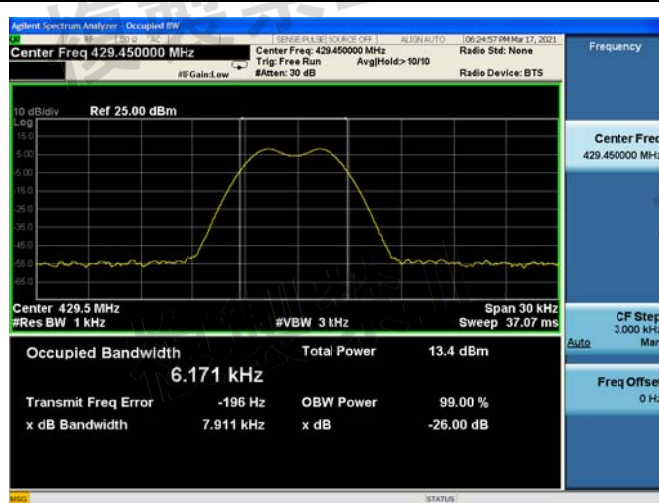
Frequency fc (MHz)	Result (kHz)	Limits	Verdict
429.1750	6.172	<8.5kHz or <16kHz	PASS
429.4500	6.171	<8.5kHz or <16kHz	PASS
429.7375	6.171	<8.5kHz or <16kHz	PASS

Occupied Bandwidth

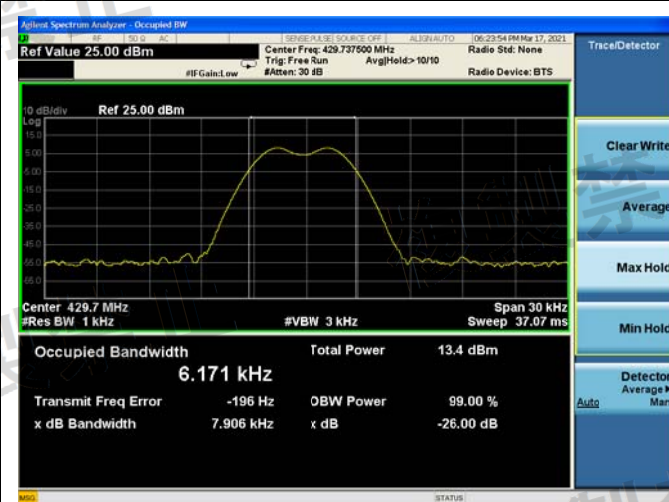
429.1750MHz



429.4500MHz



429.7375MHz





2.2. Adjacent-channel Leakage Power

2.2.1. Limit

Test object	Test conditions	Limits
429.1750MHz, 429.4500MHz, 429.7375MHz	Interval: 12.5KHz Occupied Bandwidth: 8.5KHz or less	< -40dBc

2.2.2. Measuring Instruments and Setting

The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Sweep frequency width	Provisions bandwidth
Resolution bandwidth	0.5%~2.5% of Provisions bandwidth
Video bandwidth	Same as resolution bandwidth
Y scale	10 dB/Div
Input level	Carrier wave level sufficiently higher than spectrum analyzer noise level
Sweep time	Minimum time ensuring measurement accuracy
Data points	401
Sweep mode	Continuous
Detection mode	Positive peak
Display mode	Max hold

2.2.3. Test Setup Layout

Refer to section 2.1.4

2.2.4. Test Deviation

There is no deviation with the original standard.

2.2.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

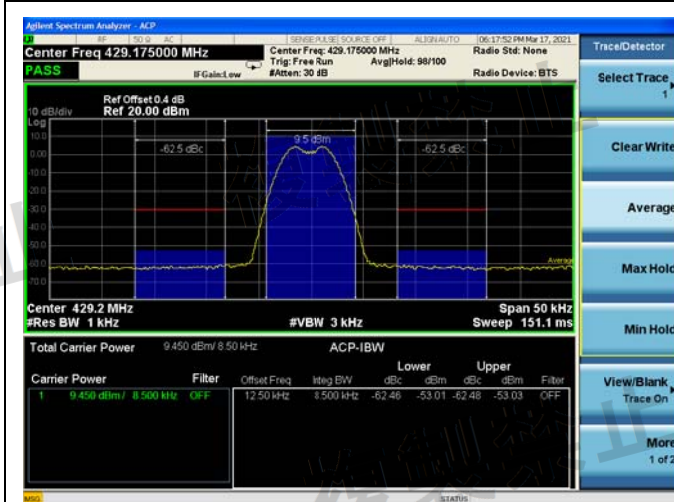


2.2.6. Test Result

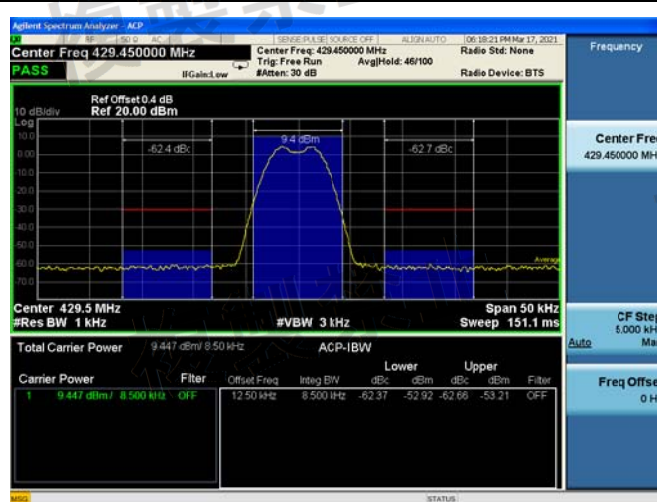
Frequency (MHz)	Test Result	Limit	Verdict
429.1750	Refer to Test Plot	< -40dBc	PASS
429.4500		< -40dBc	PASS
429.7375		< -40dBc	PASS

Adjacent-channel Leakage Power

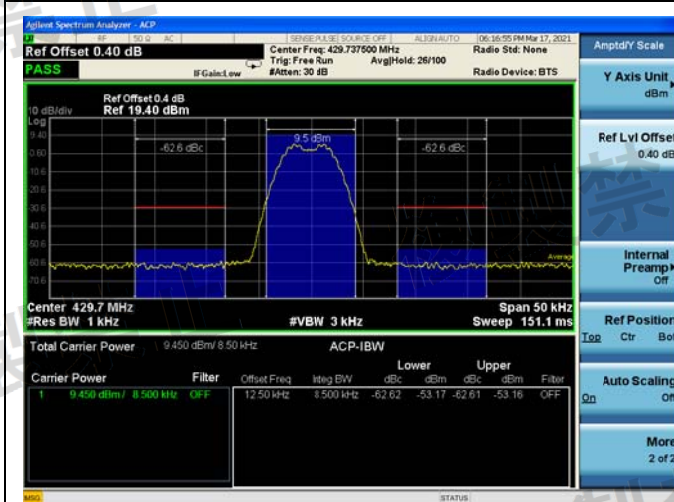
429.1750MHz



429.4500MHz



429.7375MHz



2.3. Permissible Value of Intensity of Spurious Emission or Unwanted Emission

2.3.1. Limit

Item	Limits
Unwanted emission intensity	$\leq 2.5 \mu\text{W/MHz}$

2.3.2. Measuring Instruments and Setting

The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Sweep frequency width	30 MHz to 426 MHz and 427 MHz to 3 GHz
Resolution bandwidth	f < 1 GHz: 100kHz f > 1 GHz: 1 MHz
Video bandwidth	Same as resolution bandwidth
Y scale	10 dB/Div
Input level	Maximum dynamic range
Sweep time	Minimum time ensuring measurement accuracy
Data points	401
Sweep mode	Single sweep
Detection mode	Positive peak

2. Spectrum analyzer setting in unwanted emission detection excluding carrier wave and near carrier wave frequency and carrier wave is as follows:

Central frequency	Carrier wave or unwanted emission frequency
Sweep frequency width	0 Hz
Resolution bandwidth	f < 1 GHz: 100kHz f > 1 GHz: 1 MHz
Video bandwidth	Same as resolution bandwidth
Y scale	10 dB/Div
Input level	Maximum dynamic range
Sweep time	Minimum time ensuring measurement accuracy
Data points	401
Sweep mode	Single sweep
Detection mode	Sample



3. Spectrum analyzer setting in unwanted emission detection for near carrier wave frequency is as follows:

Sweep frequency width	429MHz to 430MHz
Resolution bandwidth	3 kHz
Video bandwidth	Same as resolution bandwidth
Y scale	10 dB/Div
Input level	Maximum dynamic range
Sweep time	Minimum time ensuring measurement accuracy
Data points	401
Sweep mode	Single sweep
Detection mode	Positive peak

4. Spectrum analyzer setting in near carrier wave frequency of unwanted emission detection is as follows:

Central frequency	Unwanted emission frequency
Sweep frequency width	97 kHz
Resolution bandwidth	3 kHz
Video bandwidth	Same as resolution bandwidth
Y scale	10 dB/Div
Input level	Maximum dynamic range
Sweep time	Minimum time ensuring measurement accuracy
Data points	401
Sweep mode	Single sweep
Detection mode	Positive peak

2.3.3.Test Procedures

(1) Unwanted emission detection excluding near carrier wave frequency

(a) Measuring antenna is horizontal and vertical polarization; height and direction of receiver and measuring antenna are almost opposite one from the other.

(b) Set the spectrum analyzer as in 3.2.2 (1), detect unwanted emission, and estimate spectrum necessary for level measurement. To increase spectrum analyzer frequency accuracy, the sweep frequency width is ordered from 100MHz, 10MHz to 1MHz and obtains unwanted emission frequency.

(2) Unwanted emission level measurement excluding near carrier wave frequency

If permissible value is less than < 10 dB then is considered as measurement value, then using an alternative measurement as detailed in steps (a) to (e)

(a) Set spectrum analyzer as in 3.2.2 (2).

(b) Rotate testing device and adjust to receiving power maximum direction of unwanted emission.

(c) Measuring antenna is installed at 1m to 4 m variable height from ground. Moreover, adjust measuring antenna direction, detect the location where unwanted emission receiving power is at



maximum level, this point of the spectrum analyzer reading is "E". In the case that unwanted emission is burst wave, average value in burst is "E".

(d) Calculate unwanted emission power (EIRP dBm) using the following formula.

Unwanted emission power = PSA – GSA + LFA – 13.3 + 20 log F

PSA = Spectrum analyzer measurement value (unit: dBm)

GSA = Measuring antenna absolute gain (unit: dBi)

LFA = Feeding loss between spectrum analyzer and measuring antenna (unit: dB)

F = Unwanted emission frequency (MHz)

Moreover, each value corresponds to unwanted emission frequency, and the value and formula has been written in software, just the final result show in test report.

(e) If herein obtained unwanted emission power is less than < 10 dB respecting with permissible value, then this value is considered as measurement value. If is less than < 10 dB, then obtain value with alternative method described in the following pages.

(f) Uninstall the receiver from the base, substitute antenna location and receiver installation location should be similar, and emit and receive from the substitute standard signal generator the same frequency wave.

(g) Rotate substitute antenna and adjust power maximum direction.

(h) Install measuring antenna at 1m to 4 m variable height from ground, adjust measuring antenna direction, and detect the location where receiving power is at maximum level.

(i) Adjust standard signal generator output so as to register power Ps that is the same as "E" or register a value close to "E" (± 1 dB), where Ps is obtained considering difference with "E".

(j) Calculate unwanted emission power (EIRP dBm) using the following formula.

Unwanted emission power = PS – GS + LF

PS = Standard signal generator output (unit: dBm)

GS = Substitute antenna absolute gain (unit: dBi)

LF = Feeding loss between standard signal generator and substitute antenna (unit: dB)

(3) Near carrier wave frequency unwanted emission detection

Register maximum indicated value and maximum radiation direction for carrier wave frequency considered as central frequency, following steps 3.3.4 (2) (a) to (c). Set spectrum analyzer as in 3.2.2 (3), calculate the unwanted value (amplitude measurement value + resolution wide bandwidth conversion value) detected in near carrier wave frequency range. If the obtained EIRP, using formula detailed in 3.3.4 (2) d, is less than permissible value at < 10 dB, then is considered as measurement value.

Note: Resolution bandwidth conversion value : 15.2 dB

(4) New carrier wave frequency unwanted emission level measurement

If unwanted emission EIRP detected near carrier frequency range is not less than permissible value plus < 10 dB, and for frequencies that exceed permissible value minus 10 dB, then implement the measure procedure detailed above from (a) to (e).

(a) Spectrum analyzer is set as in 3.2.2 (4). The spectrum analyzer central frequencies are the frequencies that exceed the permissible value minus 10dB.

(b) Sweep spectrum analyzer and input all the data point values to the computer array variable

(c) Transform dB value to dimensional power antilogarithm, for all the data.

(d) Summation of all power data, this is considered as Ps

(e) Eliminate the carrier amplitude value obtained with the method shown in (f) on below, measure the attenuation value from the carrier wave amplitude related to each unwanted emission frequency. Attenuation value multiplied by antenna power is considered as the measurement value.

(f) Central frequency is the maximum amplitude frequency and sweep frequency width is 2 or 3 times the occupied frequency bandwidth, when spectrum analyzer is set as in 3.2.2 (4). Follow the same procedure from (b) to (d) as described above, the value obtained from the summation of all



power data (Note 8) is the carrier wave amplitude.

$$P_s = \left(\sum_{i=1}^n E_i \right) \times \frac{S_w}{RBW \times k \times n}$$

Ps: Measurement value obtained from summation of power of reference bandwidth for each frequency (W)

Ei: Measurement value of 1 sample (W)

Sw: Sweep frequency width (MHz)

n: Sample points in reference bandwidth

k: EIRP corrected value

RBW: Resolution bandwidth (MHz)

(g) If herein obtained unwanted emission power is less than < 10 dB respecting to permissible value, then this value is considered as measurement value. If is not less than < 10 dB, then value is obtained

based on an alternative method following steps 3.3.4 (2) (f) to (j). However, if measuring antenna gain difference respecting with carrier frequency and unwanted emission frequency is less than 3 dB, and if unwanted emission power is less than < 3 dB to permissible value, then the herein obtained value is the measurement value.

2.3.4. Test Setup Layout

Refer to section 2.1.4

2.3.5. Test Deviation

There is no deviation with the original standard.

2.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



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2.3.7. Test Result

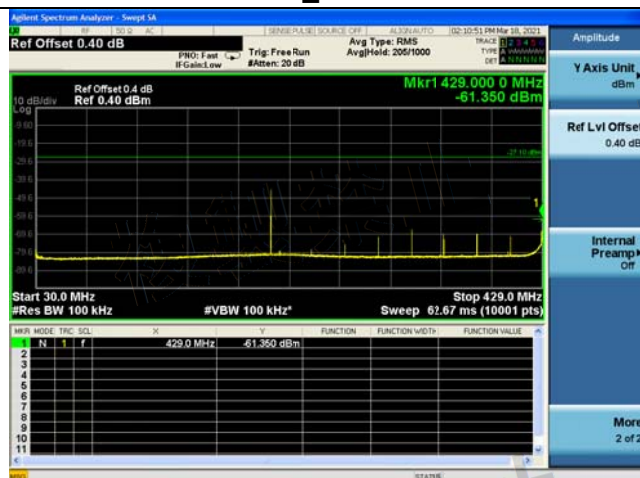
Frequency (MHz)	Test Frequency (MHz)	Test Result Value	Limit	Verdict
429.1750	30~429	Refer to test plots	$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
	430~1000		$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
	1000~6000		$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
429.4500	30~429	Refer to test plots	$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
	430~1000		$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
	1000~6000		$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
429.7375	30~429	Refer to test plots	$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
	430~1000		$\leq 2.5\mu\text{W}/\text{MHz}$	PASS
	1000~6000		$\leq 2.5\mu\text{W}/\text{MHz}$	PASS



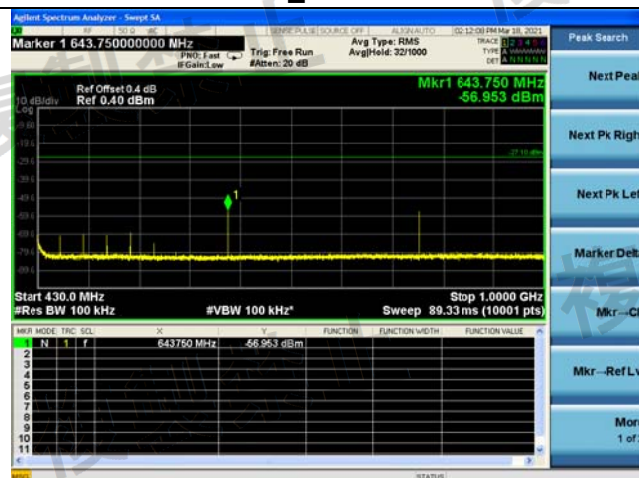
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Unwanted Emission Intensity

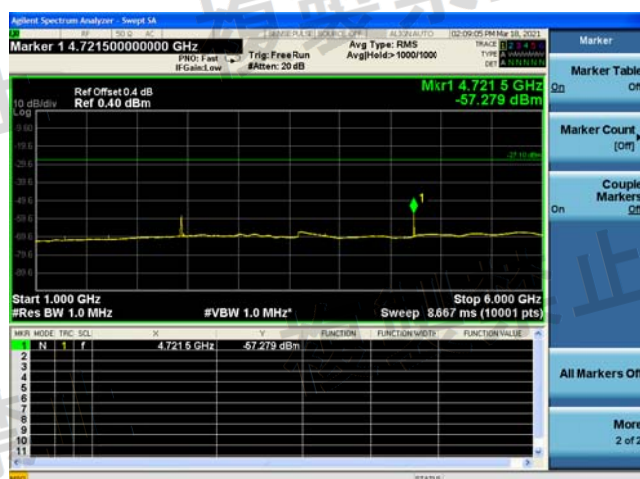
429.1750MHz_30MHz-429MHz



429.1750MHz_429MHz-1000MHz



429.1750MHz_1000MHz-6000MHz



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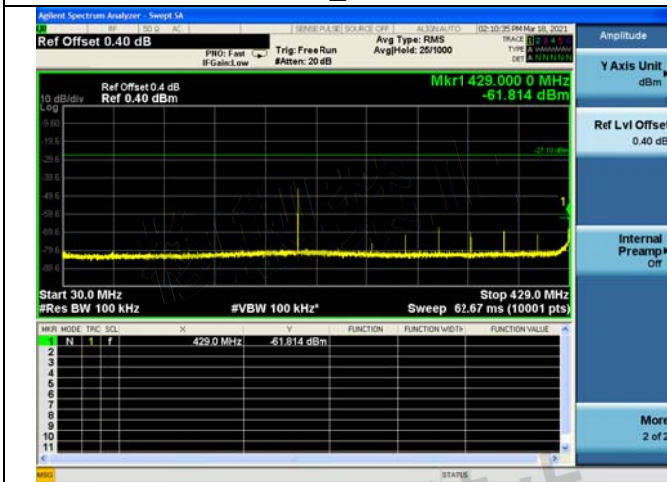
E-mail: service@morlab.cn



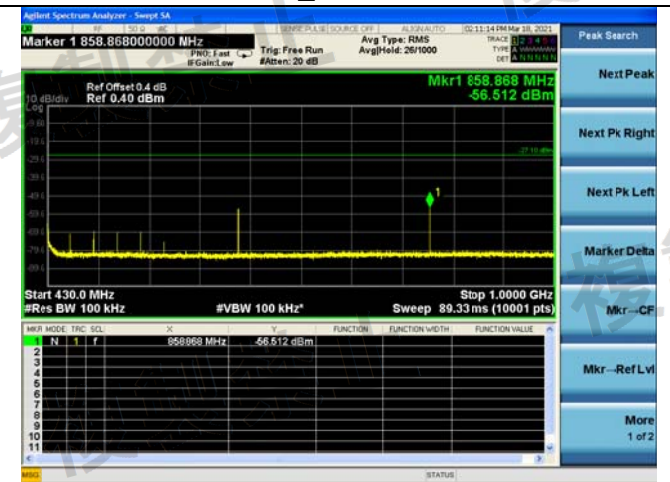
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Unwanted Emission Intensity

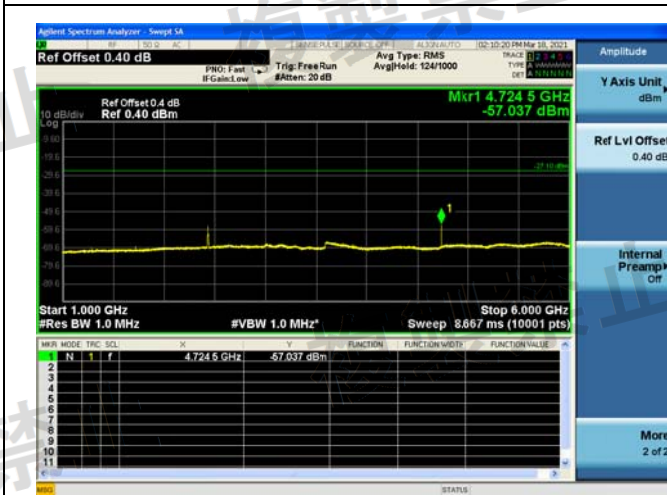
429.4500MHz_30MHz-429MHz



429.4500MHz_429MHz-1000MHz



429.4500MHz_1000MHz-6000MHz



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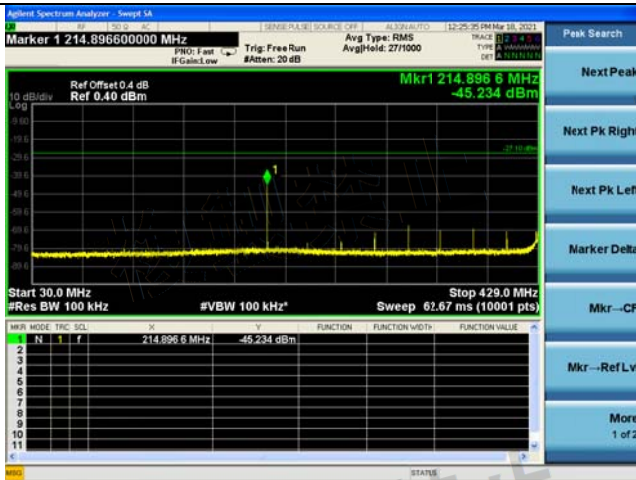
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Fax: 86-755-36698525
E-mail: service@morlab.cn

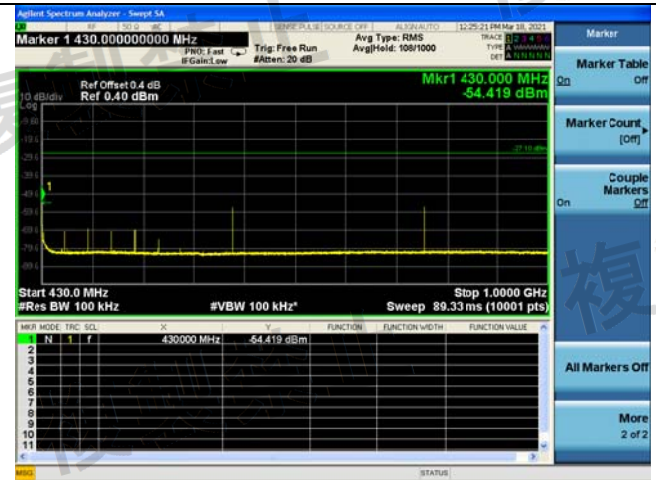


Unwanted Emission Intensity

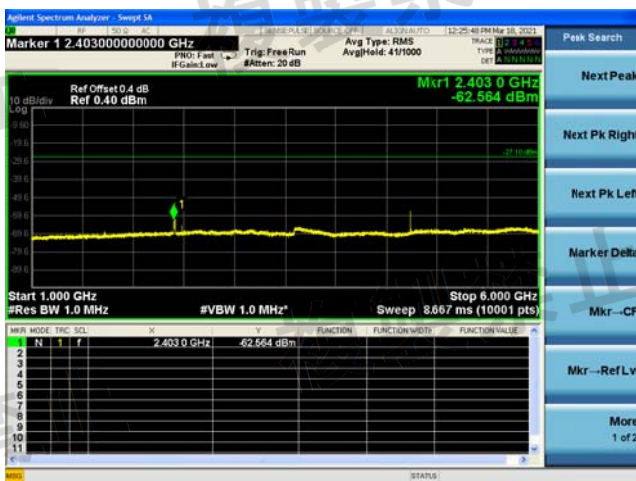
429.7375MHz_30MHz-429MHz



429.7375MHz_429MHz-1000MHz



429.7375MHz_1000MHz-6000MHz



2.4. Antenna Power Deviation

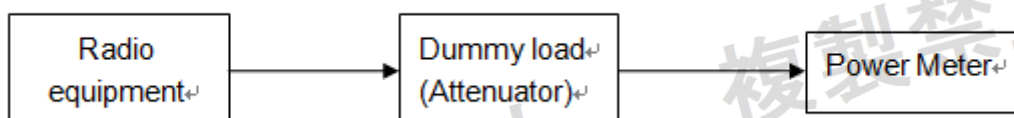
2.4.1. Limit

Item	Limits
Antenna Power (EIRP)	12.14dBm(16.368mW) or less
Permissible deviation	+20%, -50%

2.4.2. Test Procedures

The EUT sent typical signal as working normally, and the Power Meter was set as Average power meter.

2.4.3. Test Setup Layout



2.4.4. Test Deviation

There is no deviation with the original standard.

2.4.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.4.6. Test Results

Antenna Gain =0.239dBi, Manufacturer declare the conducted power =11mW

Frequency (MHz)	Test value (dBm)	EIRP (dBm)	Result (mW)	Antenna Power Error	Verdict
429.1750	7.81	7.81	6.04	-45.10%	PASS
429.4500	7.81	7.81	6.04	-45.10%	PASS
429.7375	7.77	7.77	5.98	-45.60%	PASS



2.5. Transmission Time Control

2.5.1. Limit

Item	Limits
Transmission time/transmission suspension time	Transmission ON: $\leq 40s$ Transmission OFF: $> 2s$

2.5.2. Measuring Instruments and Setting

The spectrum analyzer is set as follows.

Sweep frequency width	0 Hz
Resolution bandwidth	1 MHz
Video bandwidth	Same as resolution bandwidth
Y scale	10 dB/Div
Input level	Maximum dynamic range
Sweep time	Minimum time ensuring measurement accuracy
Data points	401
Sweep mode	Single sweep
Detection mode	Positive peak

2. External test device is a device that can be circuit connected to receiver. As an alternative, can be used an auxiliary device that establishes transmission with receiver. If transmission is manual or cannot be controlled by an external test device, then cannot be used.

2.5.3. Test Procedures

1. Verify wave emission using spectrum analyzer when circuit connected with external test device.
2. Measure maximum transmission time and minimum transmission suspension time.
3. When time division is missing, use a video trigger and measure an appropriate maximum transmission time and minimum transmission suspension time.

2.5.4. Test Setup Layout

Refer to section 2.1.4



2.5.5. Test Deviation

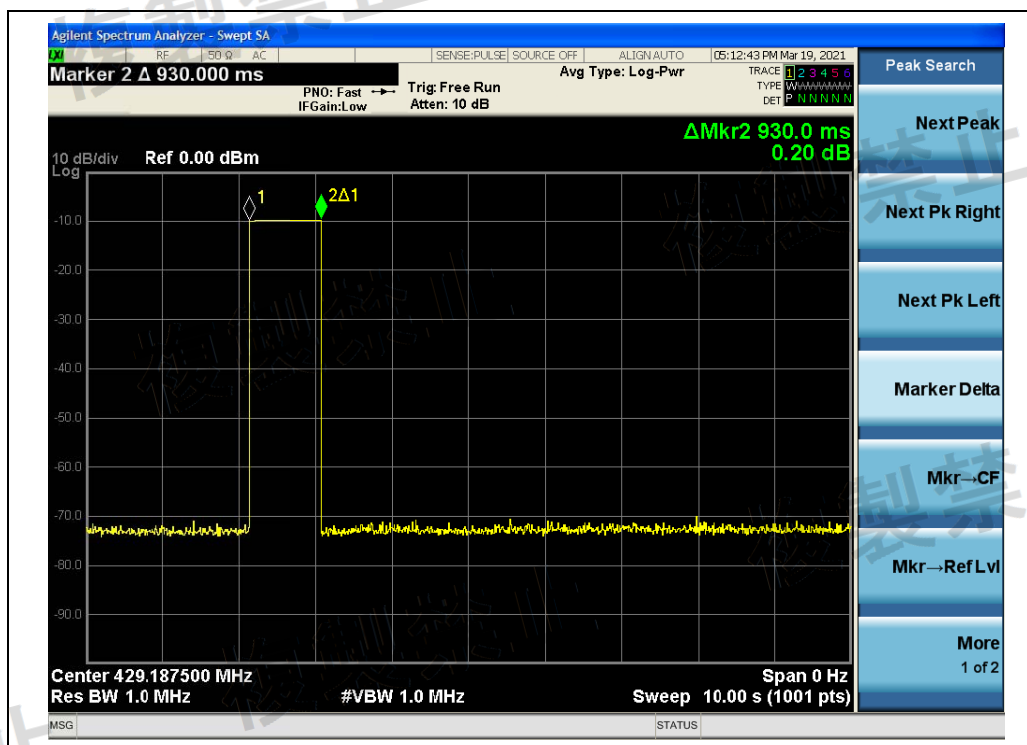
There is no deviation with the original standard.

2.5.6. EUT Operation during Test

The EUT was configured in a manually operated mode.

2.5.7. Test Result

Usage	Test Value		Verdict
	Transmission ON	Transmission OFF	
Tele-control	930ms	N/A	PASS



(429.1875MHz)



2.6. Secondary Radiated Emissions

2.6.1. Limit

Item	Limits
Secondary Radiated Emissions	$\leq 4\text{nW}$

2.6.2. Measuring Instruments and Setting

The following table is the setting of the spectrum.

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

2.6.3. Test Procedures

1. EUT has the continuous reception mode and fixed only one channelize.
2. 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
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz.
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 3000MHz.

2.6.4. Test Deviation

There is no deviation with the original standard.

2.6.5. Test Result

Note: This test case does not apply this kind of EUT.



2.7. Carrier Sensing Function

2.7.1. Limit

- (1) Radio equipment shall check if the interference exists by the carrier sense procedure before its new emission.
- (2) Carrier sense time shall be within 20ms.
- (3) Carrier sense level, amount of received power at all of unit radio channels included in the radio channel to emit, shall be -80dBm at the antenna input. When the carrier sense level is more than -80dBm, radio equipment shall not emit any radio wave.

2.7.2. Measuring Instruments and Setting

1. Carrier sense basic operation

- a. The standard signal generator shall be set as described below:

Test frequency: Center frequency of transmission frequency band of test instrument

Modulation: No modulation

Output level: -75dBm at reception input terminal

- b. The spectrum analyzer shall be as described below:

Sweep frequency range: 6MHz

RBW: 100 kHz

VBW: 300 kHz

Trigger condition: Free run

Detection mode: Positive peak

(2) Carrier sense judgment time

- a. The standard signal generator shall be set as described below.

Test frequency Center frequency of reception frequency band of test instrument

Modulation: No modulation

Output level: -75 dBm at reception input terminal

- b. The pulse signal generator shall be set as described below.

(A) If the carrier sense judgment time is 10 ms or more:

- a. Setting of transmission available state

Setting for generating a signal that is outputted for 1 s or more after stop of the standard signal generator output for 200 ms

- b. Setting of transmission unavailable state

Setting for generating a signal that is outputted for 1 s or more after stop of the standard signal generator output for 10 ms

(B) If the carrier sense judgment time is 128 μ s or more:

- a. Setting of transmission available state



Setting for generating a signal that is outputted for 100 ms or more after stop of the standard signal generator output for 2 ms

b. Setting of transmission unavailable state

Setting for generating a signal that is outputted for 100 ms or more after stop of the standard signal generator output for 128 μ s

c. The spectrum analyzer shall be set as indicated below.

Center frequency Center frequency of reception frequency band of test instrument

Sweep frequency range 0 Hz

Resolution bandwidth 100 kHz

Video bandwidth:300 kHz

Trigger condition: Free run

Detection mode: Positive peak

2.7.3.Test Procedures

(1) Carrier sense basic operation

a. Set the output level of the standard signal generator to the value specified by the facilities regulations at the antenna connection terminal of the test instrument.

b. Keeping the output of the standard signal generator stopped, activate the test instrument to perform transmission operation and use the spectrum analyzer to verify that radio waves are emitted.

c. Set the test instrument in the reception mode.

d. Keeping the signal of the standard signal generator outputted, activate the test instrument to perform transmission operation and use the spectrum analyzer to verify that any radio wave is not emitted.

(2) Carrier sense judgment time

a. Set the standard signal generator as described in 2 (2) A.

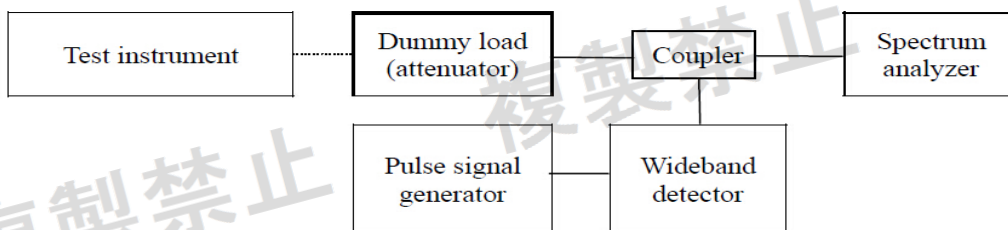
b. Set the spectrum analyzer as described in 2 (2) C.

c. Set the pulse signal generator in the transmission available mode and verify that the test instrument emits radio waves.

d. Set the pulse signal generator in the transmission unavailable mode and verify that the test instrument does not emit any radio wave.



2.7.4. Test Setup Layout



2.7.5. Test Deviation

There is no deviation with the original standard.

2.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.7.7. Test Result

Frequency MHz	Test Result	Verdict
429.1750	GOOD	PASS
429.4500	GOOD	PASS
429.7375	GOOD	PASS

2.8. Construction Protection Confirmation Method Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

2.8.1. Confirmation Method

The RF and modulation portions are protected against illegal modification as following method:

Protected Method	Description
Special screw	The radio frequency and modulation components are locked in the housing by special screws and cannot be easily opened.

2.8.2. Reference Documents

Reference Documents	Item
Photo	



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Annex A Test Uncertainty

Test Items	Uncertainty	Remark
Frequency Error / 99% & 90% Bandwidth	$\pm 0.5 \times 10^{-6}$	Confidence levels of 95%
Antenna Power	$\pm 0.849\text{dB}$	Confidence levels of 95%
TX-RX Spurious Emissions	$\pm 0.614\text{dB}$	Confidence levels of 95%
Transmission Antenna Gain	$\pm 2.49\text{dB}$	Confidence levels of 95%
Temperature	$\pm 0.8^{\circ}\text{C}$	Confidence levels of 95%
Humidity	$\pm 4.1\%$	Confidence levels of 95%
DC / AC Power Source	$\pm 0.04\%$	Confidence levels of 95%



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Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China



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3. Test Equipments Utilized

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
EXA Signal analyzer	Agilent	N9010A	MY53470836	2020.04.01	2021.03.31
DC Power Supply	IVYTECH	IV3610	1709D361010	2020.10.26	2021.10.25
Power Sensor	Agilent	U2021XA	MY54210011	2020.04.01	2021.03.31
RF cable	CB01	RF01	Morlab	N/A	N/A

Note 1: The equipments were calibrated by GUANG ZHOU LISAI CALIBRATION AND TESTING CO., LTD and Shenzhen Academy of Metrology and Quality Inspection.

Note 2: The cable loss is 0dB.

List of Software Used

Description	Manufacturer	Software Version
Test system	Tonscend	V2.6
Power Panel	Agilent	V3.8

_____ END OF REPORT _____