

Japan - TEST REPORT

Report Number : **68.910.22.0092.01** Date of Issue: 2023-02-23

Model : **QS-151**

Product Type : Remote controller

Applicant : QUADS INC.

Address : 2-9-5 Meguro Meguroku, Tokyo, 153-0063 JAPAN

Manufacturer : QUADS INC.

Address : 2-9-5 Meguro Meguroku, Tokyo, 153-0063 JAPAN

Production Facility : Huizhou Topband Electrical Technology Co., LTD

Address : Dongxing Road 113, Dongjiang High-tech Industrial,
Zhongkai District, 516055 Huizhou, Guangdong Province,
PEOPLE'S REPUBLIC OF CHINA

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : **27**

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1 General Information

1.1 Notes

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Report Modification Record:

This report is based on report (68.910.22.0092.01, issued on: 2023-01-03) for issuing co-license with following changes, which were considered non-technical modifications, therefore, no additional tests were considered necessary:

a) The applicant was changed from:

Shenzhen Tengyi Shiye Ltd.

6th floor of building 2, Topband Industrial Park, shiyan town, Bao'an District, 518108 Shenzhen, Guangdong, PEOPLE'S REPUBLIC OF CHINA

To:

QUADS INC.

2-9-5 Meguro Meguroku, Tokyo, 153-0063 JAPAN

b) The models were changed from "QS253, B1Dvwxyz, B1Tvwxyz, QS-151 (PCB layout - B)vwxyz, A1Tvwxyz (Where v, w, x, y, z denotes -, A-Z, 0-9 or blank, stands for different pattern and colour on the enclosure of product" to "QS-151".

Prepared By
Project Engineer

2023-02-23

Date

Myron Yu

Name

Signature



Approved By
Project Manager

2023-02-23

Date

Jessie He

Name

Signature

1.2 Testing Laboratory

Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13, Zhiheng Wisdomland Business Park, Guankou Erlu, Nantou,
Nanshan District, Shenzhen, 518052, China

Telephone: 86 755 8828 6998
Fax: 86 755 8828 5299

1.3 Details of Applicant

Client: QUADS INC.
Address: 2-9-5 Meguro Meguroku, Tokyo, 153-0063 JAPAN
Product Description: Remote controller
Submitted Model No.: QS-151

1.4 Application Details

Date of receipt of order: 2022-06-07
Date of receipt of test item: 2022-06-10
Date of test: 2022-06-16 to 2022-11-04

1.5 Test Item

Refer to table 1

1.6 Applied Standard

APPLIED PRODUCT STANDARD ARIB STD-T93 Version 1.1/September 26th, 2007

1.7 Test Summary

Table 1. Summary of results

Conformance requirement according to ARIB STD-T93 Version 1.1		Result	Test Site
Essential parameter	Corresponding technical requirements		
Transmitter requirements	3.2 (1) Antenna Power	PASS	Site 1
	3.2 (2) Tolerance for Antenna Power	PASS	Site 1
	3.2 (4) Frequency Tolerance	PASS	Site 1
	3.2 (10) Permissible Values for occupied frequency bandwidth	PASS	Site 1
	3.2 (11) Permissible Values of Unwanted Emission Intensity	PASS	Site 1
Receiver requirements	3.3 (1) Limit of Secondary Radiated Emissions	N/A	Site 1
Others	3.4 (1) Interference Prevention Function	PASS	Site 1
	3.4 (2) Transmission Time Restricting Device	PASS	Site 1

NOTE 1: Measurement taken is within the measurement uncertainty of measurement system.

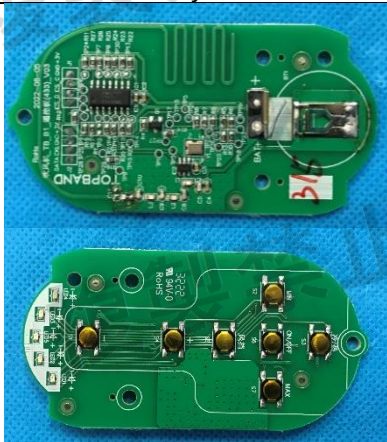
NOTE 2: "*" N/A is an abbreviation for Not Applicable.

2 Equipment Specification

2.1 General Description

This Equipment Under Test is a Remote controller with 315MHz wireless remote functions. The TX and RX frequency is 315MHz.

Model difference as below:

Model No.	Remote control	PCB layout
QS-151	 <p>Remote controller – Type A</p>	 <p>PCB layout - A</p>
	 <p>Remote controller - Type B</p>	 <p>PCB layout - B</p>
The products have the same circuit with two PCB layouts.		

Unless otherwise specified, model QS-151 (PCB layout - A) and QS-151 (PCB layout - B) were chosen as representative samples to performing all testing.

2.2 Technical Data

Product Type:	Remote controller
Model(s):	QS-151 (PCB layout - A), QS-151 (PCB layout - B)
Ratings:	3VDC (CR2032 Lithium battery)
Transmit Frequency:	315MHz (OOK)
Receiver Frequency:	315MHz (OOK)
Antenna Gain:	-1.0 dBi (for QS-151 (PCB layout - A)) -1.5 dBi (for QS-151 (PCB layout - B))
Maximum RF Transmit Power:	19.05 μ W (E.I.R.P.)



Remote controller – A



Remote controller - B

2.3 Test conditions and test Connections

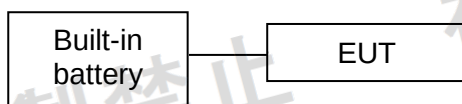
2.3.1 Test Conditions

The EUT will be connected to test system in order to simulate normal operating conditions (with reference to the guidance given in the standard for this type of equipment).

2.3.2 Test Connections



Test Configuration 1 (Conducted method)



Test Configuration 2 (Radiated method)

2.4 Auxiliary Equipment Used during Test

Auxiliary Equipment Used during Test

Description	Manufacturer	Model no.	Serial no.	Cal. Due Date
---	---	---	---	---

2.5 Lists of Test Instruments

Lists of Test Instruments

TS8997 Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	68-4-48-14-001	108272	1	2023-5-27
Vector Signal Generator	Rohde & Schwarz	SMBV100A	68-4-48-18-001	262825	1	2023-5-27
Communication Synthetical Test Instrument	Rohde & Schwarz	CMW 270	68-4-48-18-003	101251	1	2023-5-27
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	1	2023-5-27
Vector Signal Generator	Rohde & Schwarz	SMU 200A	68-4-48-14-003	105324	1	2023-5-27
RF Switch Module	Rohde & Schwarz	OSP120/OS P-B157	68-4-93-14-003	101226/100851	1	2023-5-27
Power Splitter	Weinschel	1580	68-4-85-14-001	SC319	1	2023-5-28
10dB Attenuator	Weinschel	4M-10	68-4-81-14-003	43152	1	2023-5-28
10dB Attenuator	R&S	DNF	68-4-81-14-004	DNF-001	1	2023-5-27
10dB Attenuator	R&S	DNF	68-4-81-14-005	DNF-002	1	2023-5-27
10dB Attenuator	R&S	DNF	68-4-81-14-006	DNF-003	1	2023-5-27
10dB Attenuator	R&S	DNF	68-4-81-14-007	DNF-004	1	2023-5-27
Test software	Rohde & Schwarz	EMC32	68-4-48-14-003-A10	Version 10.60.10	N/A	N/A
Test software	Tonscend	System for BT/WIFI	68-4-74-14-006-A13	Version 2.6.77.0518	N/A	N/A
Shielding Room	TDK	TS8997	68-4-90-19-003	----	3	2025-10-15

Radiated Spurious Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-003	101031	1	2023-5-27
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	68-4-80-14-003	708	1	2023-6-20
Horn Antenna	Rohde & Schwarz	HF907	68-4-80-14-004	102295	1	2023-7-20
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	1	2023-7-12
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	1	2023-5-28
Pre-amplifier	Rohde & Schwarz	SCU 18	68-4-29-14-001	102230	1	2023-5-28
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	1	2023-7-27
Fully Anechoic Chamber	TDK	8X4X4	68-4-90-14-002	--	2	2023-9-2
Test software	Rohde & Schwarz	EMC32	68-4-90-14-002-A10	Version 9.15.00	N/A	N/A

2.6 Measurement Uncertainty

For the test methods, according to the harmonized standard and conformance testing standard, the measurement uncertainty figures shall be calculated in accordance with TR 100 028 and shall correspond to an expansion factor (coverage factor) $k = 1.96$ (which provides a confidence level of 95 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.31dB Frequency test involved: 0.6×10^{-8} or 1%
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.33dB; Vertical: 4.41dB
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.27dB; Vertical: 4.26dB

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115:2021, clause 4.4.3 and 4.5.1.

3 Measurements Result

3.1 Antenna Power

3.1.1 Test condition

Test Mode:	Transmitting
Ambient Temperature:	23.1 °C
Relative Humidity:	52.2 %
Atmosphere Pressure:	101.3 kPa

3.1.2 Limit

Frequency	Antenna Power
312 MHz<f<315.05 MHz	250μW (e.i.r.p.)
315.05 MHz<f<315.25 MHz	25μW (e.i.r.p.)

(e.i.r.p.: Equivalent Isotropically Radiated Power)

3.1.3 Test result

EUT: QS-151 (PCB layout - A)

Modulation	Frequency (MHz)	Operation Voltage (VDC)	E.I.R.P. (μW)	Limits (μW)
OOK	315	3.0	19.05	25
Conclusion: PASS				

EUT: QS-151 (PCB layout - B)

Modulation	Frequency (MHz)	Operation Voltage (VDC)	E.I.R.P. (μW)	Limits (μW)
OOK	315	3.0	15.49	25
Conclusion: PASS				

3.1.4 Result

The equipment met the requirements of clause 3.2 (1).

3.2 Tolerances for Antenna Power

3.2.1 Test condition

Test Mode:	Transmitting
Ambient Temperature:	23.6 °C
Relative Humidity:	57.2 %
Atmosphere Pressure:	101.3 kPa

3.2.2 Limit

Tolerance for antenna power, which is the maximum permissible tolerance from assigned or rated antenna power, shall be +20% in the upper limit, without the lower limit.

3.2.3 Test result

EUT: QS-151 (PCB layout - A)

Modulation	Frequency (MHz)	Voltage (VDC)	Declared Output Power (μW)	E.I.R.P. (μW)	Tolerances (%)	Limit (%)
OOK	315	3.0	25	19.05	-23.8%	<+20%
Conclusion: PASS						

EUT: QS-151 (PCB layout - B)

Modulation	Frequency (MHz)	Voltage (VDC)	Declared Output Power (μW)	E.I.R.P. (μW)	Tolerances (%)	Limit (%)
OOK	315	3.0	25	15.49	-38.04%	<+20%
Conclusion: PASS						

Note: Deviation = (Output power – Declared Output Power) / Declared Output Power * 100%

3.2.4 Result

The equipment met the requirement of clause 3.2 (2).

3.3 Frequency Tolerance

3.3.1 Test condition

Test Mode:	Transmitting
Ambient Temperature:	23.6 °C
Relative Humidity:	51.2 %
Atmosphere Pressure:	101.3 kPa

3.3.2 Limit

Frequency tolerance shall be within the assigned frequency band (more than 312 MHz and 315.25 MHz or less).

3.3.3 Test Result

EUT: QS-151 (PCB layout - A)

Modulation	Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
OOK	315	3.0	314.97 to 315.02	312 to 315.25
Conclusion: PASS				

EUT: QS-151 (PCB layout - B)

Modulation	Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
OOK	315	3.0	314.87 to 315.12	312 to 315.25
Conclusion: PASS				

3.3.4 Result

The equipment met the requirement of clause 3.2 (4).

3.4 Occupied Frequency Bandwidth

3.4.1 Test condition

Test Mode:	Transmitting
Ambient Temperature:	23.6 °C
Relative Humidity:	51.2 %
Atmosphere Pressure:	101.3 kPa

3.4.2 Limit

The permissible value for occupied frequency bandwidth, which is a frequency band width in which the mean power emitted below the lower and above the upper frequency limits are respectively equal to 0.5% of the total mean power of a given emission, shall be 1MHz, if modulated by standard coding test signal having the same transmission rate as that of the modulation rate.

3.4.3 Test Result

EUT: QS-151 (PCB layout - A)

Modulation	Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
OOK	315	3.0	0.045	<1
Conclusion: PASS				

EUT: QS-151 (PCB layout - B)

Modulation	Test Frequency (MHz)	Voltage (VDC)	Result (MHz)	Limit (MHz)
OOK	315	3.0	0.249	<1
Conclusion: PASS				

3.4.4 Result

The equipment met the requirement of clause 3.2 (10).

3.5 Permissible Values of Unwanted Emission Intensity

3.5.1 Test condition

Test Mode:	Transmitting
Ambient Temperature:	22.1 °C
Relative Humidity:	53.5 %
Atmosphere Pressure:	101.1 kPa

3.5.2 Limit

Frequency band	Permissible Values of Unwanted Emission Intensity	Reference bandwidth
1GHz or less	250 nW=-30.0dBm (e.i.r.p.) or less	100 kHz
more than 1GHz	1 µW=-36dBm (e.i.r.p.) or less	1 MHz

(e.i.r.p.: Equivalent Isotropically Radiated Power)

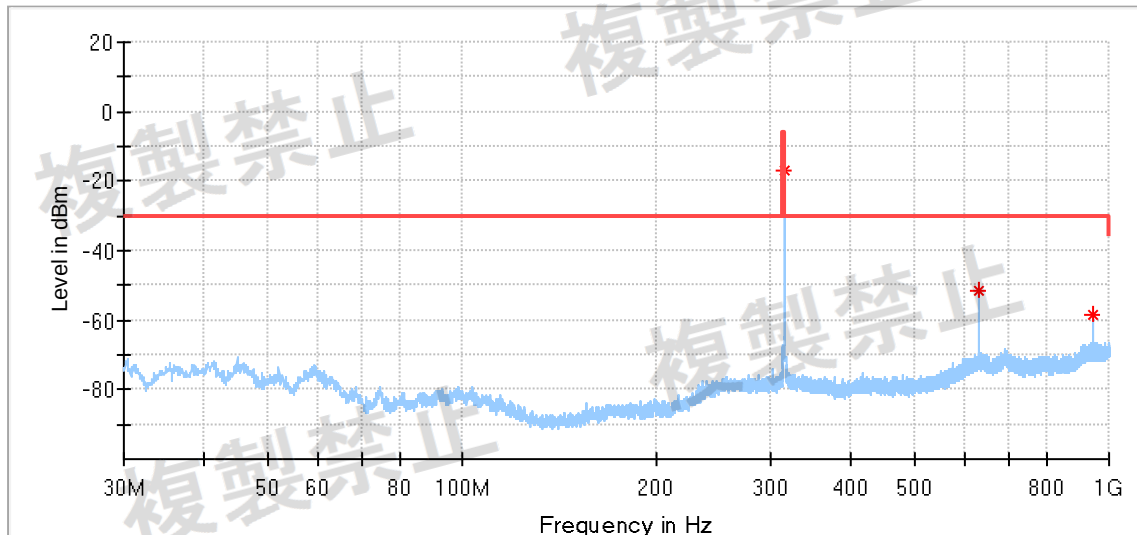
3.5.3 Test Result

EUT: Remote controller

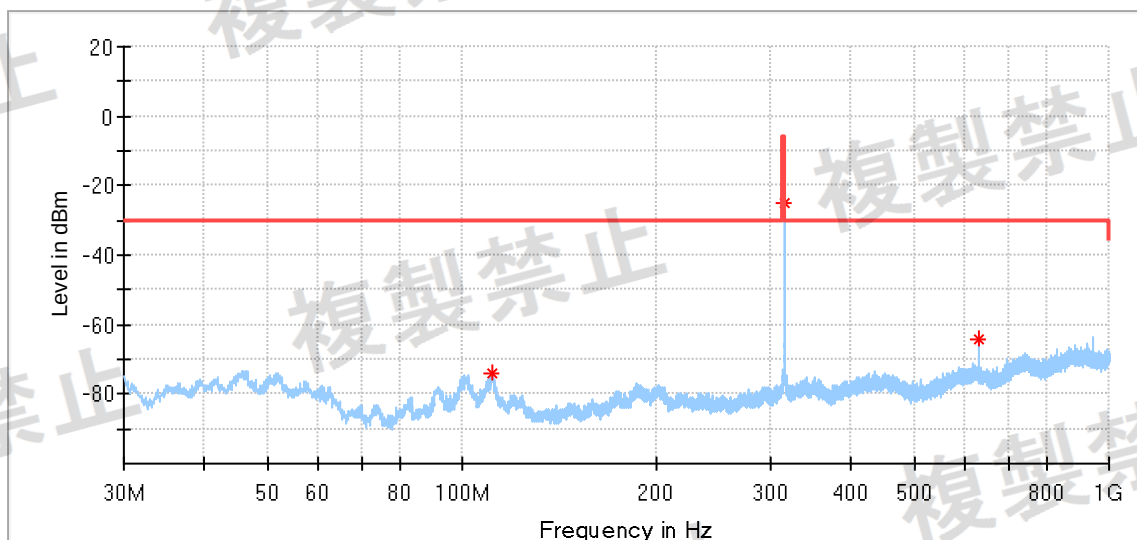
Model: QS-151 (PCB layout - A)

Operating Condition: Continuous Transmitting

Test Specification: 30MHz to 1000MHz

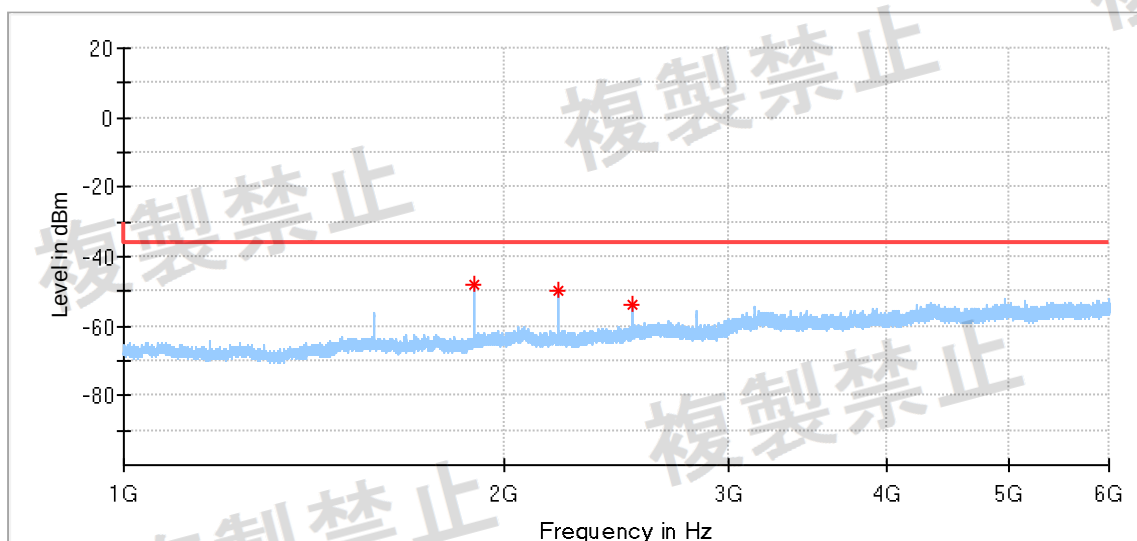


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
314.964445	-17.20	-6.02	11.18	---	---	154.0	H	250.0	-121.2
629.998889	-51.51	-30.00	21.51	---	---	154.0	H	244.0	-116.5
944.979444	-58.52	-30.00	28.52	---	---	154.0	H	160.0	-114.2

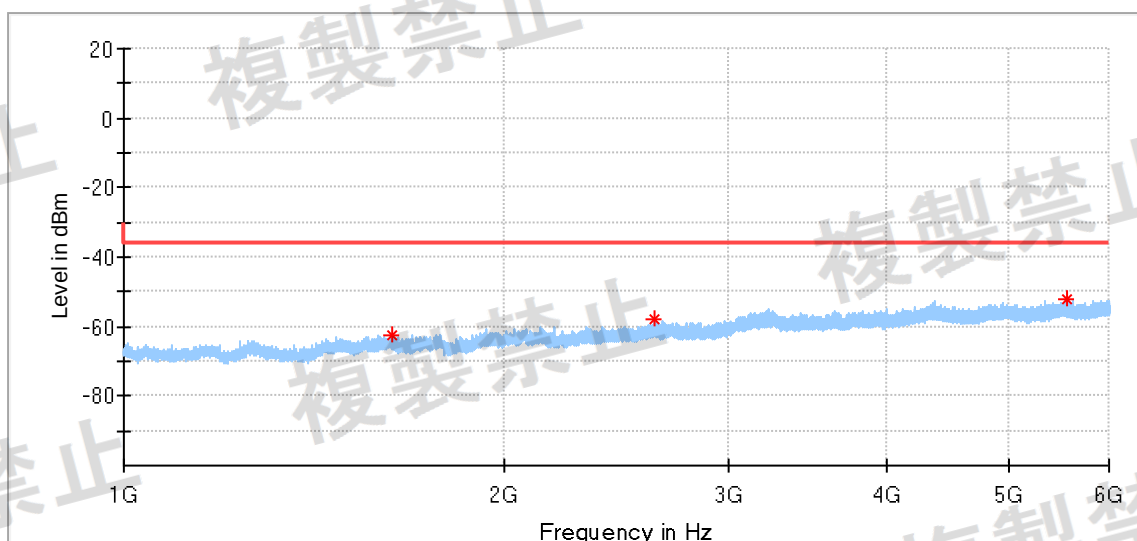


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
111.264445	-73.83	-30.00	43.83	---	---	154.0	V	62.0	-118.2
314.964445	-25.21	-6.02	19.19	---	---	154.0	V	318.0	-122.5
629.998889	-64.46	-30.00	34.46	---	---	154.0	V	226.0	-118.5

EUT: Remote controller
 Model: QS-151 (PCB layout - A)
 Operating Condition: Continuous Transmitting
 Test Specification: 1000MHz to 6000MHz

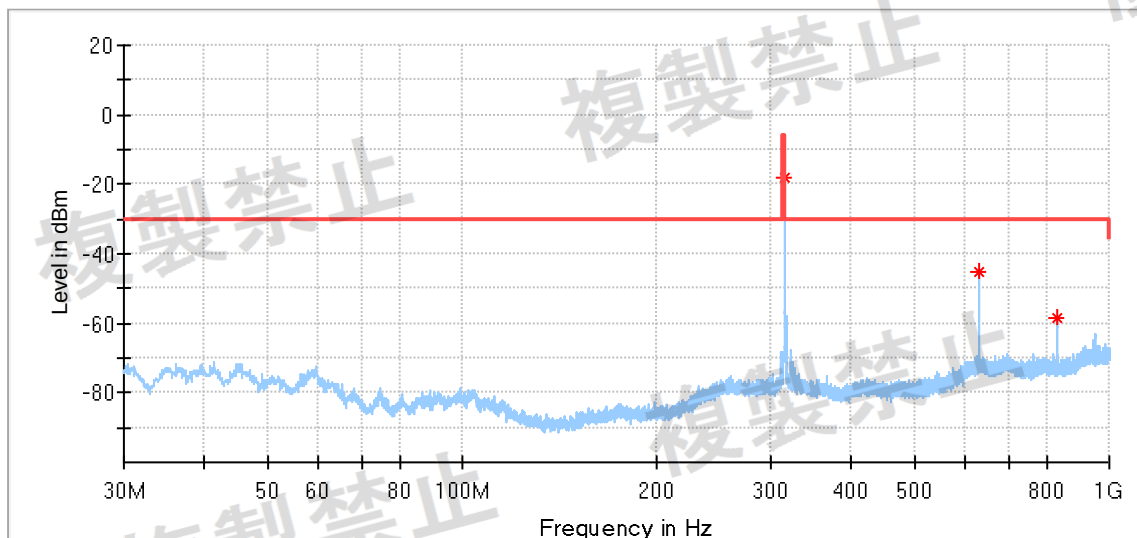


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1890.000000	-48.13	-36.00	12.13	---	---	154.0	H	261.0	-108.3
2205.156250	-49.73	-36.00	13.73	---	---	154.0	H	216.0	-107.0
2519.531250	-53.90	-36.00	17.90	---	---	154.0	H	117.0	-105.1

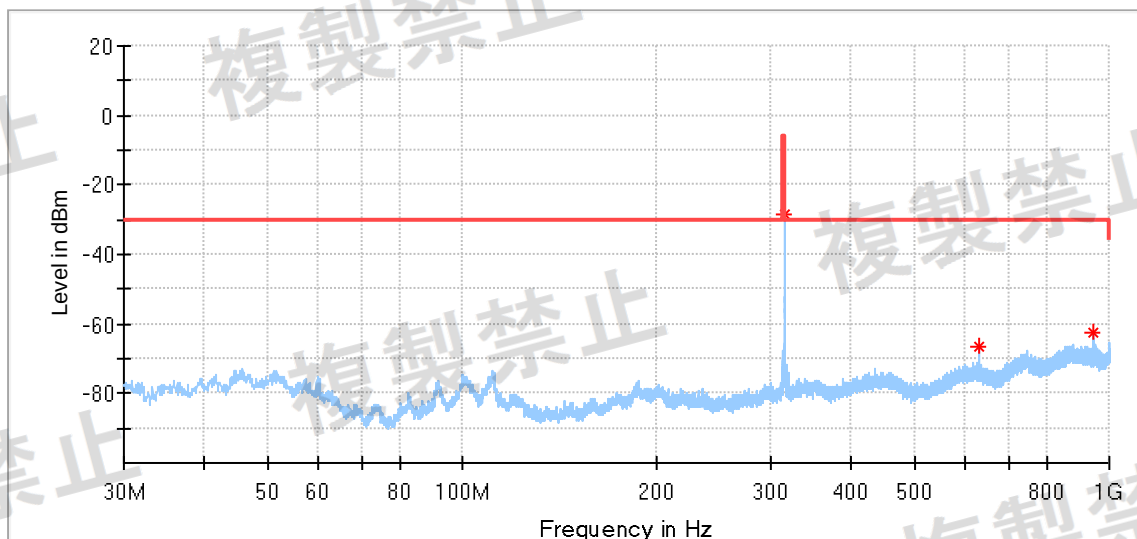


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1631.406250	-62.57	-36.00	26.57	---	---	154.0	V	0.0	-109.0
2626.875000	-57.85	-36.00	21.85	---	---	154.0	V	105.0	-104.3
5548.750000	-52.04	-36.00	16.04	---	---	154.0	V	50.0	-97.8

EUT: Remote controller
 Model: QS-151 (PCB layout - B)
 Operating Condition: Continuous Transmitting
 Test Specification: 30MHz to 1000MHz

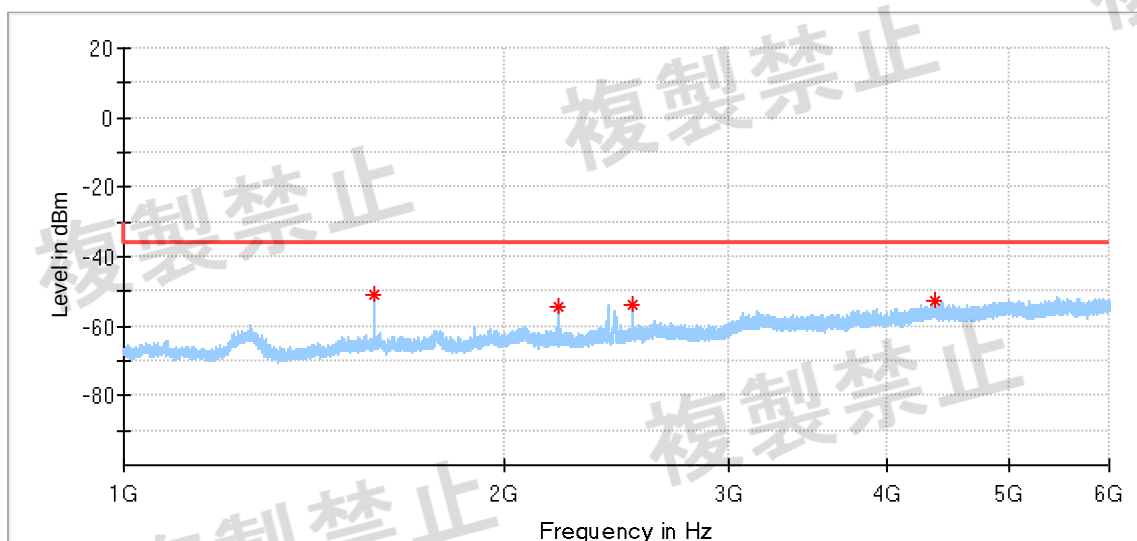


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
315.018333	-18.10	-6.02	12.08	---	---	154.0	H	328.0	-121.2
629.998889	-45.27	-30.00	15.27	---	---	154.0	H	276.0	-116.5
832.028333	-58.64	-30.00	28.64	---	---	154.0	H	1.0	-117.1

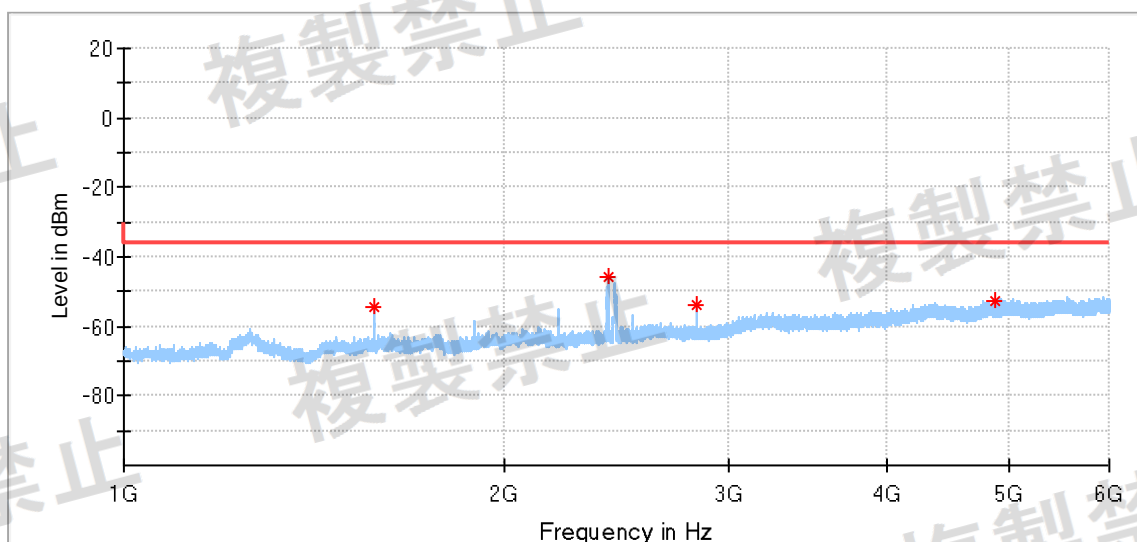


Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
314.964445	-28.60	-6.02	22.58	---	---	154.0	V	309.0	-122.5
629.998889	-66.40	-30.00	36.40	---	---	154.0	V	282.0	-118.5
945.572222	-62.36	-30.00	32.36	---	---	154.0	V	309.0	-114.3

EUT: Remote controller
 Model: QS-151 (PCB layout - B)
 Operating Condition: Continuous Transmitting
 Test Specification: 1000MHz to 6000MHz



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1575.000000	-50.72	-36.00	14.72	---	---	154.0	H	332.0	-109.0
2205.000000	-54.54	-36.00	18.54	---	---	154.0	H	335.0	-106.8
2519.843750	-53.73	-36.00	17.73	---	---	154.0	H	349.0	-105.0
4367.968750	-52.75	-36.00	16.75	---	---	154.0	H	353.0	-97.9



Frequency (MHz)	MaxPeak (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1575.000000	-54.32	-36.00	18.32	---	---	154.0	V	278.0	-109.1
2410.937500	-45.73	-36.00	9.73	---	---	154.0	V	135.0	-105.9
2835.000000	-54.03	-36.00	18.03	---	---	154.0	V	250.0	-105.0
4868.593750	-52.43	-36.00	16.43	---	---	154.0	V	161.0	-97.6

3.5.4 Result

The equipment met the requirement of clause 3.2 (11).

3.6 Interference Prevention Function

3.6.1 Test condition

Test Mode:	Transmitting
Ambient Temperature:	24.1 °C
Relative Humidity:	51.9 %
Atmosphere Pressure:	101.1 kPa

3.6.2 Limit

It means that radio equipment is primarily used in the same premises and has the function of automatically transmitting or receiving identification code.

3.6.3 Result

The transmitter consists of oscillator, transistor and encoder; the oscillator generates the 315 MHz frequency. The encoder generates a binary code set. A total of 7 code sets can be selectable via the DIP switches to avoid the interference from the same kind of transmitter. The binary code is then transmitted to the antenna by the transistor.

The equipment met the requirement of clause 3.4 (1).

3.7 Transmission Time Restricting Device

3.7.1 Test condition

Test Mode:	Transmitting
Ambient Temperature:	24.1 °C
Relative Humidity:	51.9 %
Atmosphere Pressure:	101.1 kPa

3.7.2 Limit

The transmission time restricting device is a device having functions that stop radio wave emission within the next specified transmission time after the radio wave emission and resume the subsequent transmission only after the transmission halt time has elapsed, or restrict the transmission time automatically within the next specified transmission time, and does not resume communication unless the transmission halt time has elapsed after the end of the communication. The transmission time and the transmission halt time shall have either of the following functions:

(i) The radio equipment that does not transmit periodically shall have the function to limit one transmission time within 5 seconds, although manually operated transmission allows one transmission time to be within 90 seconds.

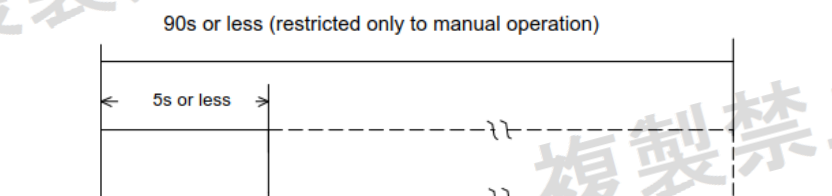


Figure 3-1 Example illustration 1 of Transmission time / Transmission halt time

(ii) The radio equipment that transmit periodically shall have the function to automatically limit the transmission time for one transmission time within 1 second, with one transmission halt time being more than 10 seconds and no less than 30 times for the transmission time. It is noted that if the radio equipment is used for safety operation of an auto vehicle or any other vehicles and in the unavoidable reason, the transmission halt time of the radio equipment does not require 10 seconds or more.

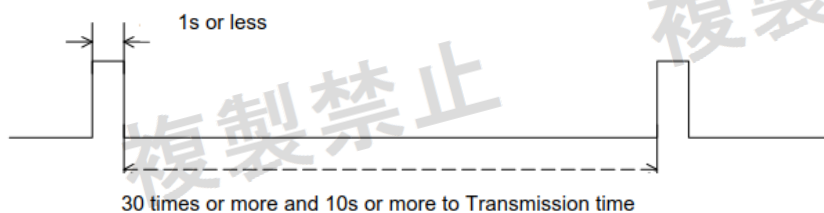


Figure 3-2 Example illustration 2 of Transmission time / Transmission halt time

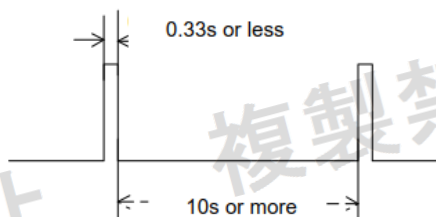


Figure 3-3 Example illustration 3 of Transmission time / Transmission halt time

3.7.3 Test Result

EUT: QS-151 (PCB layout - A)

Modulation	Test Frequency (MHz)	Voltage (VDC)	Transmission time (s)	Limit (s)
OOK	315	3.0	1.71	≤5

EUT: QS-151 (PCB layout - B)

Modulation	Test Frequency (MHz)	Voltage (VDC)	Transmission time (s)	Limit (s)
OOK	315	3.0	2.86	≤5

3.7.4 Result

The equipment met the requirement of clause 3.4 (2).

4 Photographs of Test Set-ups



Radiated Method (below 1GHz)



Radiated Method (above 1GHz)

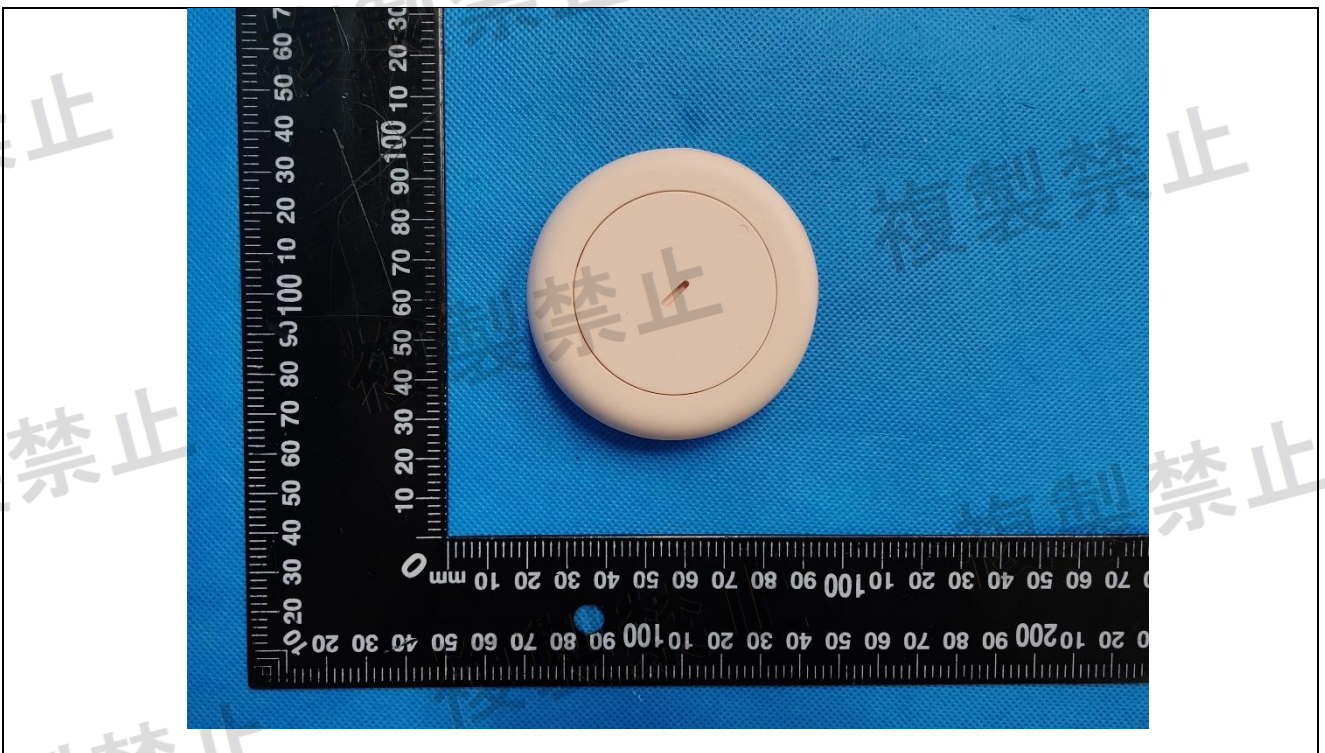
5 Photographs of EUT

Remote controller - A:

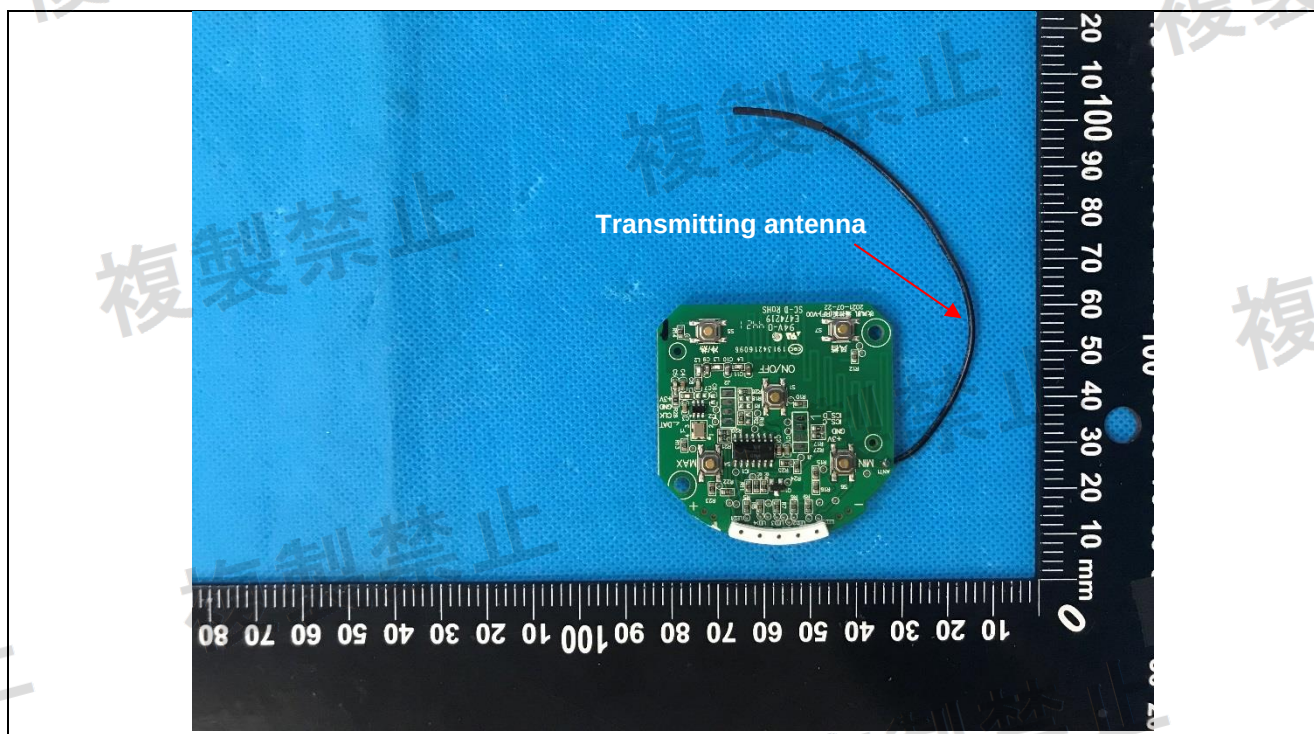
Details of: General view



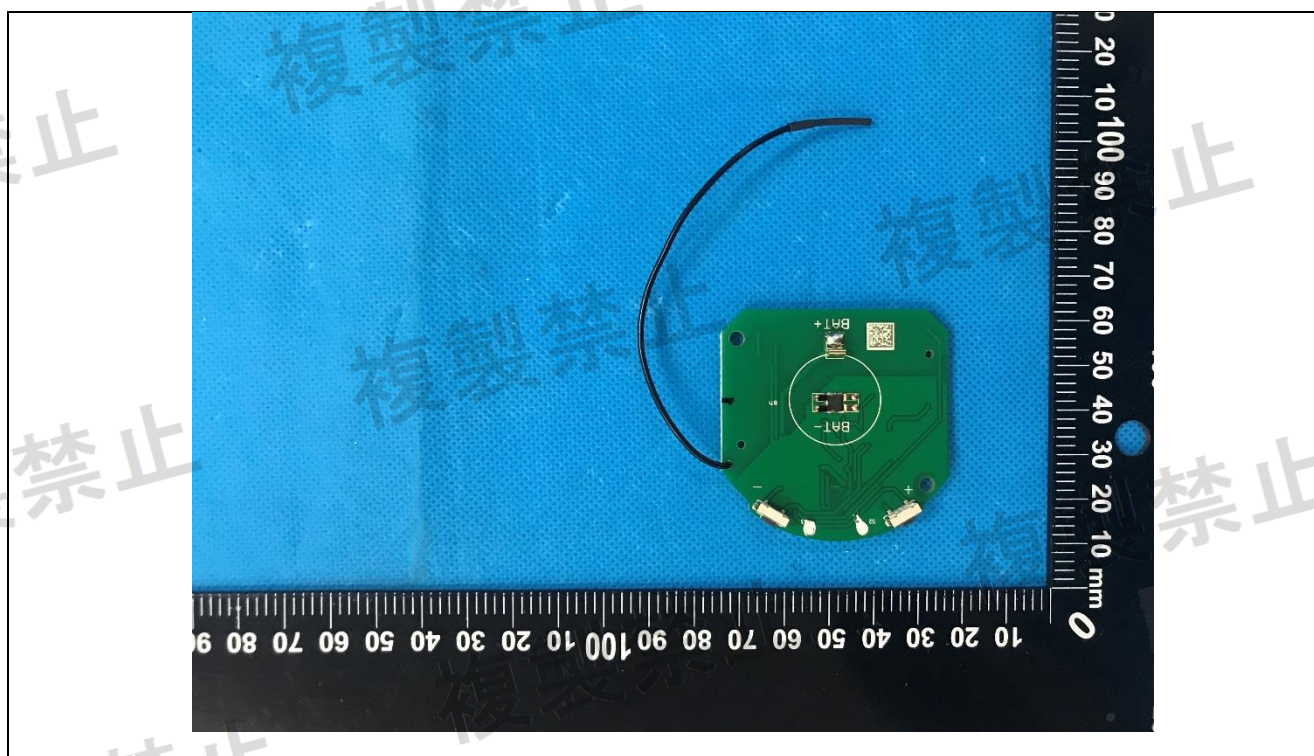
Details of: General view



Details of: General view



Details of: General view



Remote controller - B:

Details of: General view



Details of: General view



A photograph of a green printed circuit board (PCB) with a semi-circular shape, mounted on a blue textured surface. The PCB features several electronic components, including three gold-colored surface-mount components labeled 'MAX', 'ON/OFF', and 'MIN'. It also has a small white label with '3222 94V-0 RoHS' and a ruler for scale.

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