

EMC Test Report





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Product: Remote Control
Model: RC411, RC4111801/01R,
RC411XXXX/XXR,
RC411XXXX/XXBR('X' can be 0-9;
'B' means packed with dry battery)

Applicant: HCS (Suzhou) Limited
19F-20F, Building B-3rd, No.209 Zhuyuan
Road, New District, 215011 Suzhou
PEOPLE'S REPUBLIC OF CHINA

In accordance with FCC Part 15 Subpart B and
ICES-003 Issue 7

Issue Date: September 18, 2024
Report No. 709502402070-00A

RESPONSIBLE FOR	NAME	SIGNATURE	DATE
Approved By	Jiaxi XU		Sep. 18. 2024
Prepared By	Zhining ZHANG		Sep. 18. 2024

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service control rules.

EXECUTIVE SUMMARY

The product was tested and found to be in compliance with test specification in chapter 1.2.

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1 Report Summary


1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Report No.	Description of Change	Date of Issue
709502402070-00A	First Issue	Sep. 18, 2024

1.2 Introduction

The information contained in this report is intended to show verification of the EMC Qualification Approval Testing of the requirements of the standards for the tests listed in Section 1.3.

Applicant	HCS (Suzhou) Limited
Address	19F-20F, Building B-3rd, No.209 Zhuyuan Road, New District, 215011 Suzhou PEOPLE'S REPUBLIC OF CHINA
Manufacturer	HCS (Suzhou) Limited
Address	19F-20F, Building B-3rd, No.209 Zhuyuan Road, New District, 215011 Suzhou PEOPLE'S REPUBLIC OF CHINA
Factory	Himit (Yueyang) Technology Ltd.
Address	Building 4, Lingang High-tech Industrial Park, Yueyang Area, China (Hunan) Free Trade Pilot Zone
Model Number(s)	RC411, RC4111801/01R, RC411XXXX/XXR, RC411XXXX/XXBR('X' can be 0-9; 'B' means packed with dry battery) for FCC RC411, RC4111801/01R for ISED
Brand Name	
Rated Input Voltage	3V DC (2x1.5V DC AAA dry battery)
Protection class	III
FCC ID	2AGOFRC411A
Standards	FCC Part 15 Subpart B, 10-1-2023 Edition, ICES-003 Issue 7 Oct 2020
Sample Source	Samples delivered by manufacturer
Sample Number(s)	SHA-803388-6
Sample received	04/08/2024
Start of Test	04/15/2024
Finish of Test	04/15/2024
Name of Engineer(s)	Zhining ZHANG



The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

1.3 Test Specification and Results Summary

Summary of the tests is shown below:

Specification	Clause	Test Description	Result	Comments/Base Standard
FCC Part 15 Subpart B,10-1-2023 Edition	FCC Part 15 Subpart B §15.109	Radiated Emission	Pass (Min. Margin: >6 dB)	ANSI C63.4a-2017 (Amendment to ANSI C63.4-2014)
ICES-003 Issue 7 Oct 2020	ICES-003 Clause 3.2.2	Radiated Emission	Pass (Min. Margin: >6 dB)	ANSI C63.4a-2017 (Amendment to ANSI C63.4-2014)

Note: Conducted emission is not apply for battery operated device.

1.4 Product Information

The EUT is a Remote Control supports BLE functions.

All models are identical in electrical structure, mechanical structure. There is only model difference.

So all the tests were applied on RC411, other models deemed to fulfil the requirement without further testing.

According to the Section 15.33 of FCC part 15, the work frequency is between 2402MHz – 2480MHz, so the radiated emission range is 30MHz to 15GHz.

1.4.1 EUT Port/Cable Identification

Port	Specified Cable Length	Screened (Yes/No)
N/A	NA	NA

1.4.2 Modes of Operation

Mode No.	Mode Description	Test Item
Mode1	DC power on mode, BLE receiving	Radiated Emission

1.4.3 Auxiliary Equipment (cable) Used during Test

Equipment	Brand	Model/Type No.	Remark
--	--	--	--

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 Environmental Conditions

Ambient Temperature 15-35 °C
 Relative Humidity 30-60 %
 Atmospheric Pressure 860 – 1060 hPa

1.7 Test Location

Test Site 1:
 TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai branch
 No.16, Lane 1951, Duhui Road Shanghai, 201108, P.R.China
 Test Firm FCC Registration Number: 820234
 Designation number: CN1183
 Telephone: +86 21 6141 0123
 Fax: +86 21 6140 8600

Test Name	Test date	Name of Engineer(s)	Test Area
Radiated Emission	04/15/2024	Chengjie GUO	Z116

2 Test Details

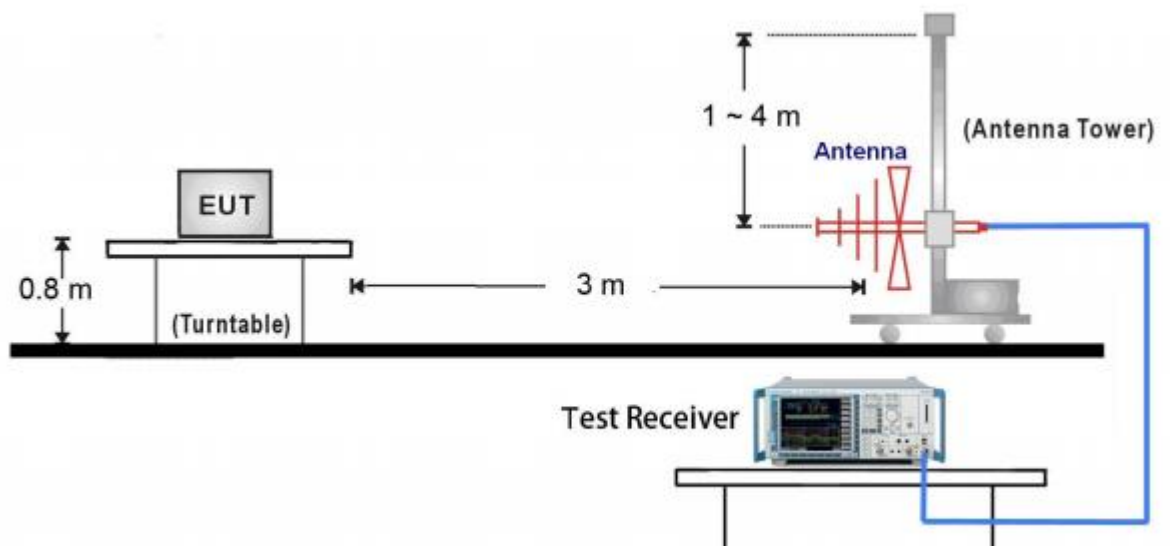
2.1 Radiated Emission

2.1.1 Test Method

Below 1 GHz:

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable. Table top EUT was placed at 0,8 m above the reference plane. Floor standing EUT was placed at 0.1 m above the reference plane.

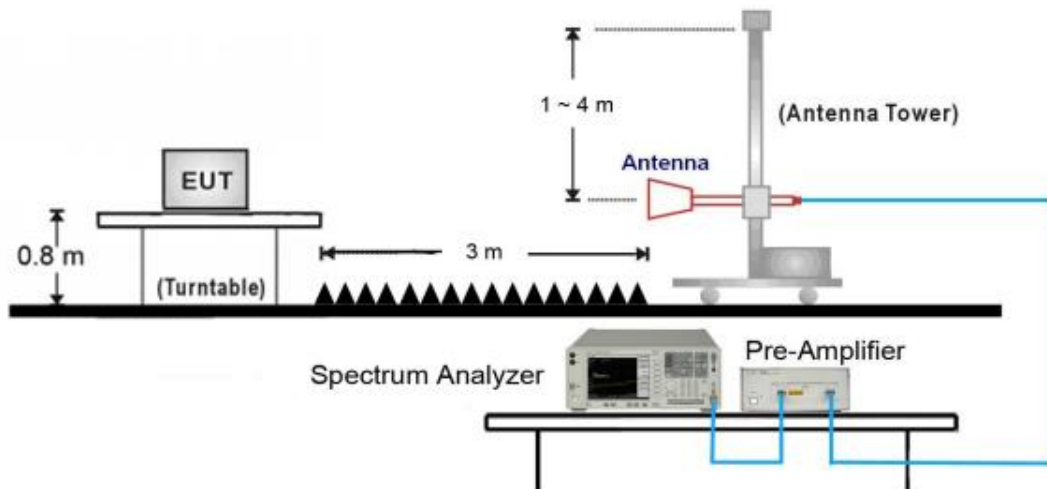
A prescan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using a Quasi-Peak detector. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification.



Above 1 GHz:

The EUT was set up in a fully-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8 m above a reference ground plane.

A prescan of the EUT emissions profile was made while varying the antennae-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the prescan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using Peak and Average detectors, as appropriate. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification.



Note: $\theta_{3\text{ dB}}$ The dimension of the line tangent to the EUT formed by $\theta_{3\text{ dB}}$ at the measurement distance 3m

$\theta_{3\text{ dB}}$ value	Measurement frequency band	Antenna Model
1.6m	1~18GHz	HF907
1.95m	18~26.5GHz	3116C-PA
0.74m	26.5~40GHz	3116C-PA

2.1.2 Specification Limits

Class B Radiated emission at a measuring distance of 3 m FCC Part 15 Subpart B,10-1-2023 Edition			
Frequency range MHz	limits dB($\mu\text{V/m}$)		
	QP	PK	AV
30-88	40	---	---
88-216	43.5	---	---
216-960	46	---	---
960-1000	54	---	---
Above 1000	---	74	54

Class B Radiated emission at a measuring distance of 3 m ICES-003 Issue 7			
Frequency range MHz	limits dB($\mu\text{V/m}$)		
	QP	PK	AV
30-88	40	---	---
88-216	43.5	---	---
216-230	46	---	---
230-960	47	---	---
960-1000	54	---	---
Above 1000	---	74	54

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Antenna Factor + Cable Loss-Amplifier Factor

(The Reading Level is recorded by software which is not shown in the sheet)

The test results meet FCC part 15B limits requirement can also meet the ICES-003 limit requirement.



2.1.3 Test Setup Photos

Refer to the < Test Setup photos >.

2.1.4 Test Results

30-1000MHz Radiated Emission

EUT Information

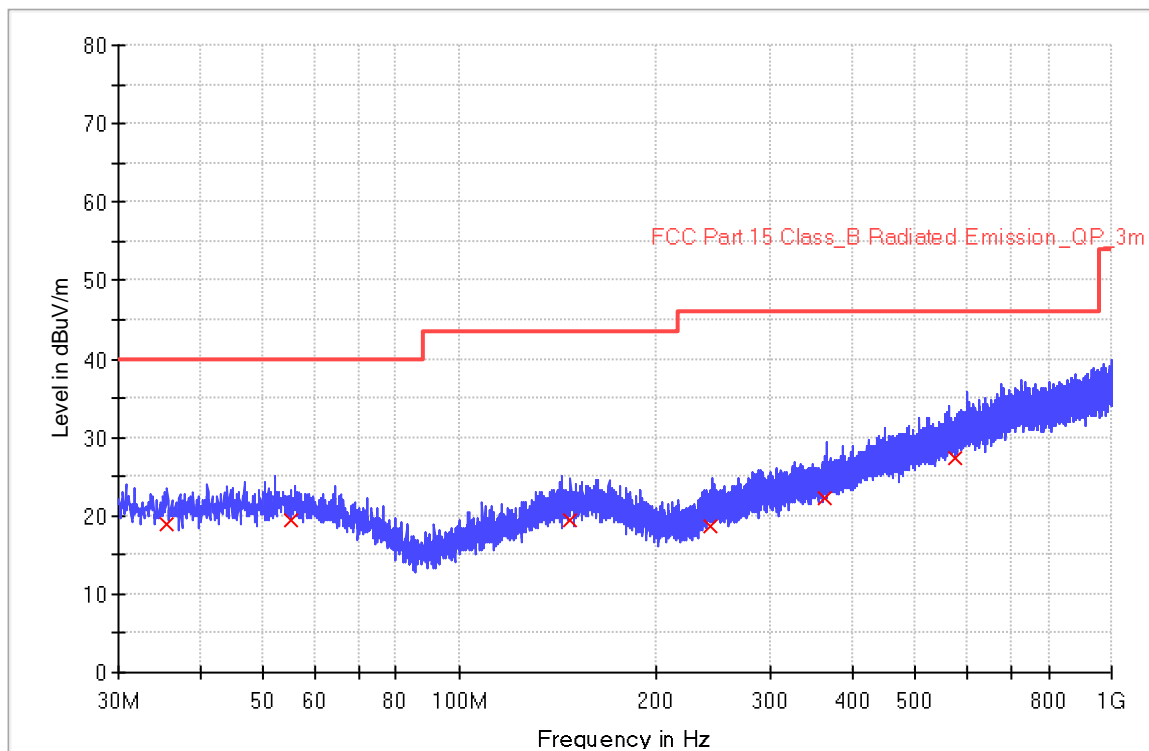
EUT Name:	Remote Control
Model:	RC411
Client:	HCS (Suzhou) Limited
Op Cond:	Mode 1
Operator:	Chengjie GUO
Test Spec:	FCC Part 15B 15.109
Comment:	Horizontal
Sample No:	SHA-803388-6

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup:	RE_VULB9168
Receiver:	[ESR 3]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.2 s	20 dB

RE_VULB9168_pre_Cont_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)
35.640000	18.9	1000.0	120.000	164.0	H	132.0	19.6	21.1
55.320000	19.4	1000.0	120.000	221.0	H	112.0	20.4	20.6
147.280000	19.4	1000.0	120.000	175.0	H	241.0	20.9	24.2
242.240000	18.5	1000.0	120.000	214.0	H	164.0	19.7	27.5
363.600000	22.1	1000.0	120.000	146.0	H	214.0	23.1	23.9
576.880000	27.3	1000.0	120.000	214.0	H	124.0	28.0	18.7

(continuation of the "Limit and Margin" table from column 16 ...)

Frequency (MHz)	Limit - QPK (dBuV/m)	Comment
35.640000	40.0	
55.320000	40.0	
147.280000	43.5	
242.240000	46.0	
363.600000	46.0	
576.880000	46.0	



30-1000MHz Radiated Emission

EUT Information

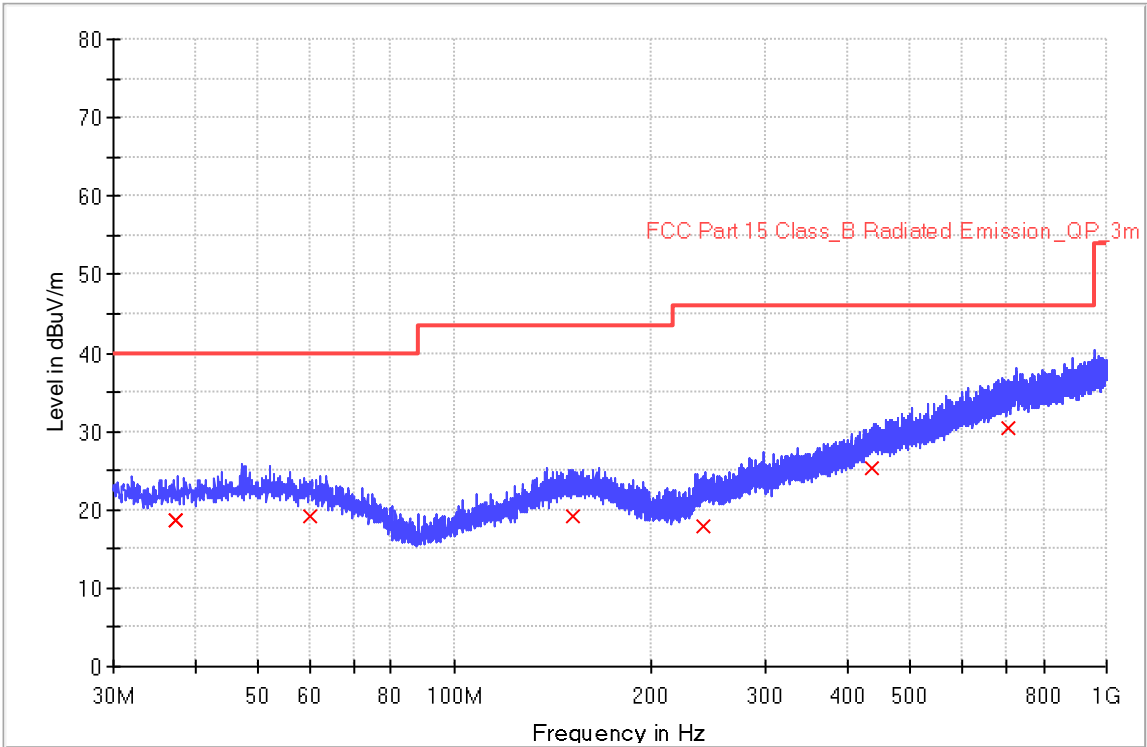
EUT Name: Remote Control
Model: RC411
Client: HCS (Suzhou) Limited
Op Cond: Mode 1
Operator: Chengjie GUO
Test Spec: FCC Part 15B 15.109
Comment: Vertical
Sample No: SHA-803388-6

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup: RE_VULB9168
Receiver: [ESR 3]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.2 s	20 dB

RE_VULB9168_pre_Cont_30-1000



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)
37.240000	18.7	1000.0	120.000	123.0	V	185.0	19.7	21.3
37.240000	18.7	1000.0	120.000	185.0	V	215.0	19.7	21.3
59.920000	19.3	1000.0	120.000	115.0	V	42.0	20.1	20.7
151.920000	19.1	1000.0	120.000	136.0	V	196.0	20.9	24.4
241.080000	17.9	1000.0	120.000	159.0	V	345.0	19.6	28.1
437.800000	25.2	1000.0	120.000	149.0	V	112.0	25.6	20.8
704.800000	30.4	1000.0	120.000	119.0	V	187.0	30.4	15.6

(continuation of the "Limit and Margin" table from column 16 ...)

Frequency (MHz)	Limit - QPK (dBuV/m)	Comment
37.240000	40.0	
37.240000	40.0	
59.920000	40.0	
151.920000	43.5	
241.080000	46.0	
437.800000	46.0	
704.800000	46.0	

1-15GHz Radiated Emission

EUT Information

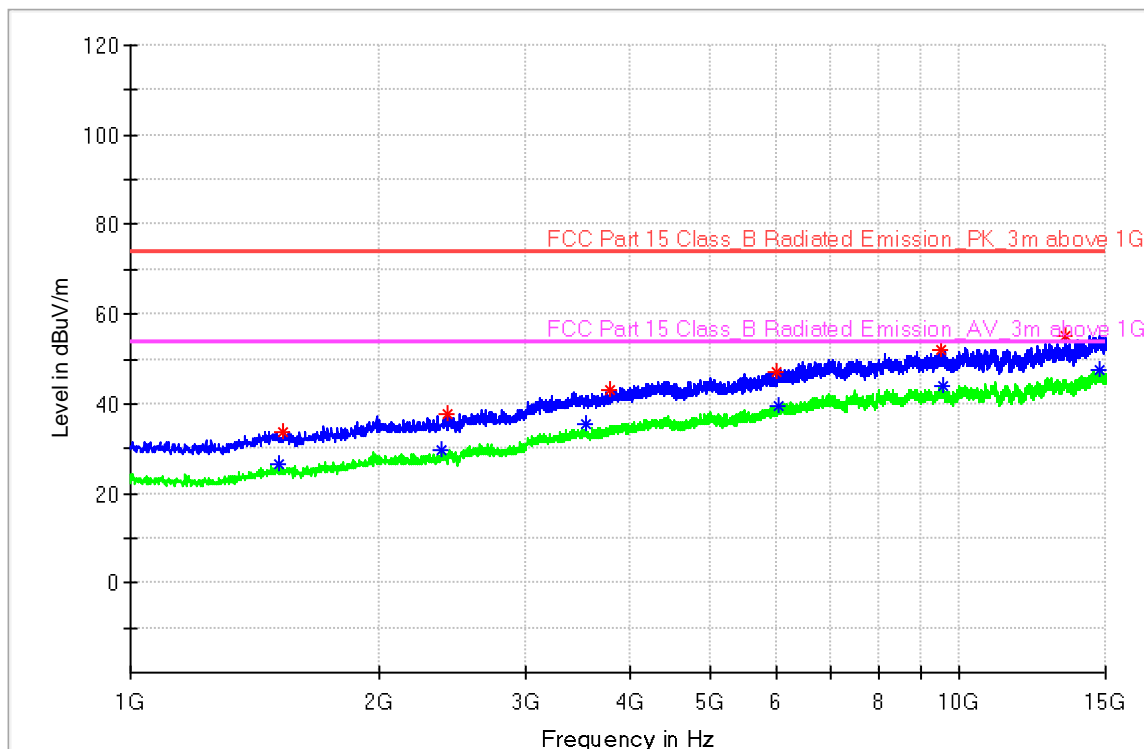
EUT Name: Remote Control
Model: RC411
Client: HCS (Suzhou) Limited
Op Cond: Mode 1
Operator: Chengjie GUO
Test Spec: FCC Part 15B 15.109
Comment: Horizontal
Sample No: SHA-803388-6

Sweep Setup: RE_HF907_pre [EMI radiated]

Hardware Setup: RE_HF907
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 15 GHz	500 kHz	PK+ ; AVG	1 MHz	0.1 s	0 dB

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3790.200000	42.95	---	74.00	31.05	100.0	H	122.0	10.9
1508.200000	---	26.44	54.00	27.56	150.0	H	168.0	1.5
2372.000000	---	29.67	54.00	24.33	200.0	H	186.0	5.0
9503.600000	51.93	---	74.00	22.07	100.0	H	208.0	18.0
9534.400000	---	44.02	54.00	9.98	100.0	H	263.0	18.0
13392.800000	55.14	---	74.00	18.86	200.0	H	277.0	20.5
14783.000000	---	47.50	54.00	6.50	100.0	H	292.0	21.1
3545.200000	---	35.31	54.00	18.69	100.0	H	299.0	10.0
2415.400000	37.58	---	74.00	36.42	200.0	H	321.0	5.1
6040.000000	---	39.39	54.00	14.61	100.0	H	339.0	14.3
1525.000000	33.73	---	74.00	40.27	100.0	H	357.0	1.5
6028.800000	47.06	---	74.00	26.94	200.0	H	358.0	14.2

1-15GHz Radiated Emission

EUT Information

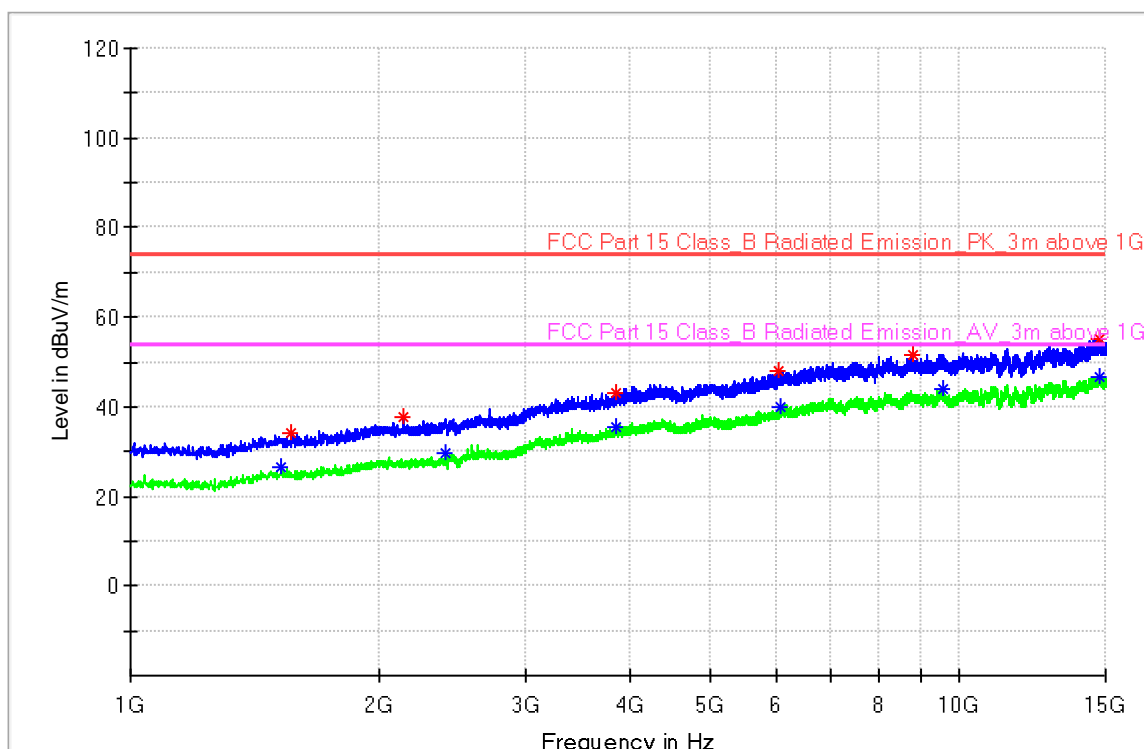
EUT Name: Remote Control
Model: RC411
Client: HCS (Suzhou) Limited
Op Cond: Mode 1
Operator: Chengjie GUO
Test Spec: FCC Part 15B 15.109
Comment: Vertical
Sample No: SHA-803388-6

Sweep Setup: RE_HF907_pre [EMI radiated]

Hardware Setup: RE_HF907
Receiver: [FSV 40]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamplifier
1 GHz - 15 GHz	1.7 MHz	PK+ ; AVG	1 MHz	0.1 s	0 dB

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2132.600000	37.51	---	74.00	36.49	100.0	V	50.0	4.3
2400.000000	---	29.48	54.00	24.52	100.0	V	64.0	5.1
8786.800000	51.68	---	74.00	22.32	150.0	V	0.0	17.8
9530.200000	---	43.85	54.00	10.15	100.0	V	45.0	18.0
3851.800000	---	35.68	54.00	18.32	150.0	V	120.0	11.2
14766.200000	55.19	---	74.00	18.81	100.0	V	134.0	21.1
14766.200000	---	46.81	54.00	7.19	100.0	V	134.0	21.1
1561.400000	34.24	---	74.00	39.76	200.0	V	187.0	1.4
6075.000000	---	39.75	54.00	14.25	100.0	V	322.0	14.4
6063.800000	47.95	---	74.00	26.05	150.0	V	325.0	14.4
1518.000000	---	26.33	54.00	27.67	100.0	V	350.0	1.5
3860.200000	43.06	---	74.00	30.94	100.0	V	358.0	11.2

3 Test Equipment Information

Instrument	Manufacturer	Type No	TE No	Calibration Date	Calibration Due
Radiated Disturbance					
EMI test receiver	R & S	ESR3	S1503109-YQ-EMC	2023.8.1	2024.7.31
Trilog super broadband test antenna	SCHWARZBECK	VULB9168	S1808296-YQ-EMC	2021.9.23	2024.9.22
Double-ridged waveguide horn antenna	R & S	HF907	S1503009-YQ-EMC	2024.4.14	2027.4.13
Pre-amplifier	Shenzhen HzEMC	HPAP-9K0130	S2110423b-YQ-EMC	2023.8.1	2024.7.31
Signal and spectrum analyzer	R & S	FSV40	S1503003-YQ-EMC	2023.8.1	2027.7.31
3 meter semi-anechoic chamber	TDK	3m	S1503231-YQ-EMC	2024.5.8	2027.5.7
Software	R & S	EMC32 V10.50.40	NA	NA	NA



4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty	
Conducted Disturbance	150kHz to 30MHz,	3.16dB
Radiated Disturbance	30MHz to 1GHz,	5.03dB (Horizontal)
		5.12dB (Vertical)
	1GHz to 18GHz,	5.49dB
	18GHz to 40GHz,	5.63dB

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.



5 Photographs

Refer to the < External Photos > & < Internal Photos >.



6 FCC Statements

Subject: FCC Statement

To whom it may concern,

According to FCC CFR 47 § 15.19 Labeling requirements, following statement should be put in the label to the product, When the device is so small, or for such use that it is impracticable to label it with the required compliance statement in a font that is four-point or larger, and the device does not have a display that can show electronic labeling, then the information required shall be placed in the instruction manual, and on the device packaging or on a removable label attached to the device.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The instruction manual shall include the following statement, placed in a prominent location in the text of the manual:

For class B digital device:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.**
- Increase the separation between the equipment and receiver.**
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.**
- Consult the dealer or an experienced radio/TV technician for help.**

MODIFICATION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the device.



7 ISED Statements

To whom it may concern,

According to ICES-003 Issue 7 clause 4.2 Labelling and user manual requirements, following statement should be put in the label to the product, When the device is so small, or for such use that it is impracticable to label it with the required compliance statement in a font that is four-point or larger, and the device does not have a display that can show electronic labeling, then the information required shall be placed in the instruction manual, and on the device packaging or on a removable label attached to the device.

The instruction manual shall include the following statement, placed in a prominent location in the text of the manual:

For class B digital device:

CAN ICES-003(B) / NMB-003(B)

-----End of Test Report-----