

EMC TEST REPORT



Report No.: Q181203S001-FCC-E

Supersede Report No: N/A

Applicant	Remote Solution Co., Ltd.	
Product Name	REMOTE CONTROL UNIT	
Model No.	Nagra	
Serial No.	RC98XBB (X stands for A~Z, BB stands for 00~99)	
Test Standard	FCC Part 15 Subpart B Class B, ANSI C63.4: 2014	
Test Date	January 03 to 04 , 2019	
Issue Date	January 04, 2019	
Test Result	☒ Pass ☐ Fail	
Equipment complied with the specification ☒		
Equipment did not comply with the specification ☐		
Evans He Test Engineer	David Huang Checked By	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only		

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
Q181203S001-FCC-E	NONE	Original	January 04, 2019

2. Customer information

Applicant Name	Remote Solution Co., Ltd.
Applicant Add	92, Chogokri, Nammyun, Kimchon City, Kyungbuk, South Korea
Manufacturer	Remote Solution Co., Ltd.
Manufacturer Add	92, Chogokri, Nammyun, Kimchon City, Kyungbuk, South Korea

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software of Radiated Emission	Radiated Emission Program-To Shenzhen v2.0
Test Software of Conducted Emission	EZ-EMC(ver.lcp-03A1)

4. Equipment under Test (EUT) Information

Description of EUT:	REMOTE CONTROL UNIT
Main Model:	Nagra
Serial Model:	RC98XBB (X stands for A~Z, BB stands for 00~99)
Antenna Gain:	-1.7dBi
Antenna Type:	Chip antenna
Equipment Category :	JAB
Type of Modulation:	BLE: GFSK
RF Operating Frequency (ies):	BLE: 2402-2480 MHz
Number of Channels:	BLE: 40CH
Input Power:	Battery: Spec: DC 3V
Port:	Please refer to the user' s manual
Trade Name :	N/A
FCC ID:	TX4RC98B
Date EUT received:	December 07, 2018
Test Date(s):	January 03 to 04 , 2019

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.107; ANSI C63.4: 2014	AC Power Line Conducted Emissions	N/A
§15.109; ANSI C63.4: 2014	Radiated Emissions	Compliance

Measurement Uncertainty

Parameter	Uncertainty
AC Power Line Conducted Emissions (150kHz~30MHz)	±3.11dB
Radiated Emission(30MHz~1GHz)	±5.12dB
Radiated Emission(1GHz~6GHz)	±5.34dB

6. Measurements, Examination And Derived Results

6.1 AC Power Line Conducted Emissions

Temperature	--
Relative Humidity	--
Atmospheric Pressure	--
Test date :	--
Tested By :	--

Requirement(s):

Spec	Item	Requirement	Applicable														
47CFR§15.107	a)	For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 [mu] H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequencies ranges.															
		<table><tr><th rowspan="2">Frequency ranges (MHz)</th><th colspan="2">Limit (dBµV)</th></tr><tr><th>QP</th><th>Average</th></tr><tr><td>0.15 ~ 0.5</td><td>66 – 56</td><td>56 – 46</td></tr><tr><td>0.5 ~ 5</td><td>56</td><td>46</td></tr><tr><td>5 ~ 30</td><td>60</td><td>50</td></tr></table>		Frequency ranges (MHz)	Limit (dBµV)		QP	Average	0.15 ~ 0.5	66 – 56	56 – 46	0.5 ~ 5	56	46	5 ~ 30	60	50
		Frequency ranges (MHz)			Limit (dBµV)												
				QP	Average												
		0.15 ~ 0.5		66 – 56	56 – 46												
		0.5 ~ 5		56	46												
5 ~ 30	60	50															

Test Setup	Note: 1. Support units were connected to second LISN. 2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.
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Procedure	- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table. - The power supply for the EUT was fed through a 50Ω /50mH EUT LISN, connected to filtered mains.
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	3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable. 4. All other supporting equipment were powered separately from another main supply. 5. The EUT was switched on and allowed to warm up to its normal operating condition. 6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver. 7. High peaks, relative to the limit line, The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. 8. Step 7 was then repeated for the LIVE line (for AC mains) or DC line (for DC power).
Remark	The EUT was powered by battery.
Result	☐ Pass ☐ Fail ☒ N/A

Test Data ☐ Yes ☒ N/A

Test Plot ☐ Yes (See below) ☒ N/A

6.2 Radiated Emissions

Temperature	26°C
Relative Humidity	59%
Atmospheric Pressure	1015mbar
Test date :	January 03, 2019
Tested By :	Evans He

Requirement(s):

Spec	Item	Requirement	Applicable	
47CFR§15.109(d)	a)	Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges	☒	
		Frequency range (MHz)		Field Strength (µV/m)
		30 – 88		100
		88 – 216		150
		216 - 960		200
		Above 960		500

Test Setup	
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Procedure	- The EUT was switched on and allowed to warm up to its normal operating condition. - The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: - Vertical or horizontal polarization (whichever gave the higher emission level
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	over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth with Peak detection for Average Measurement as below at frequency above 1GHz. ■ 1 kHz (Duty cycle < 98%) □ 10 Hz (Duty cycle > 98%) 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	We tested the infrared function with a frequency less than 108MHz
Result	☒ Pass ☐ Fail

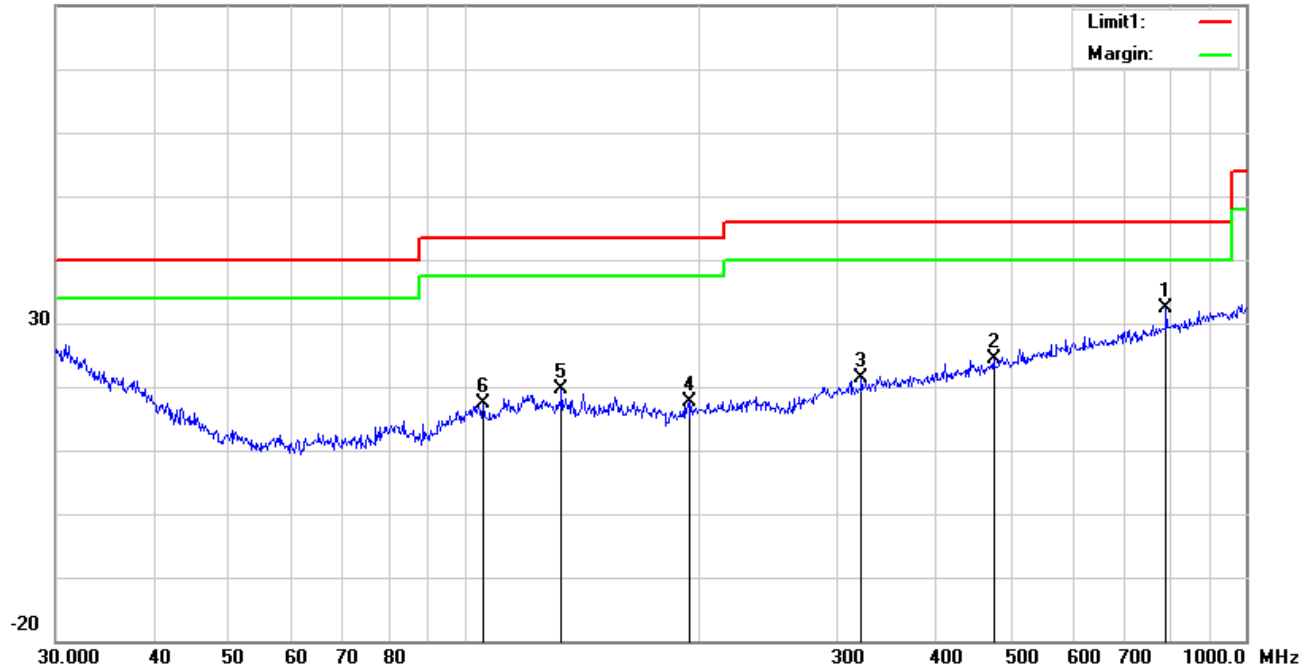
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

Test Mode : Normal Working Mode

Below 1GHz

80.0 dBuV/m

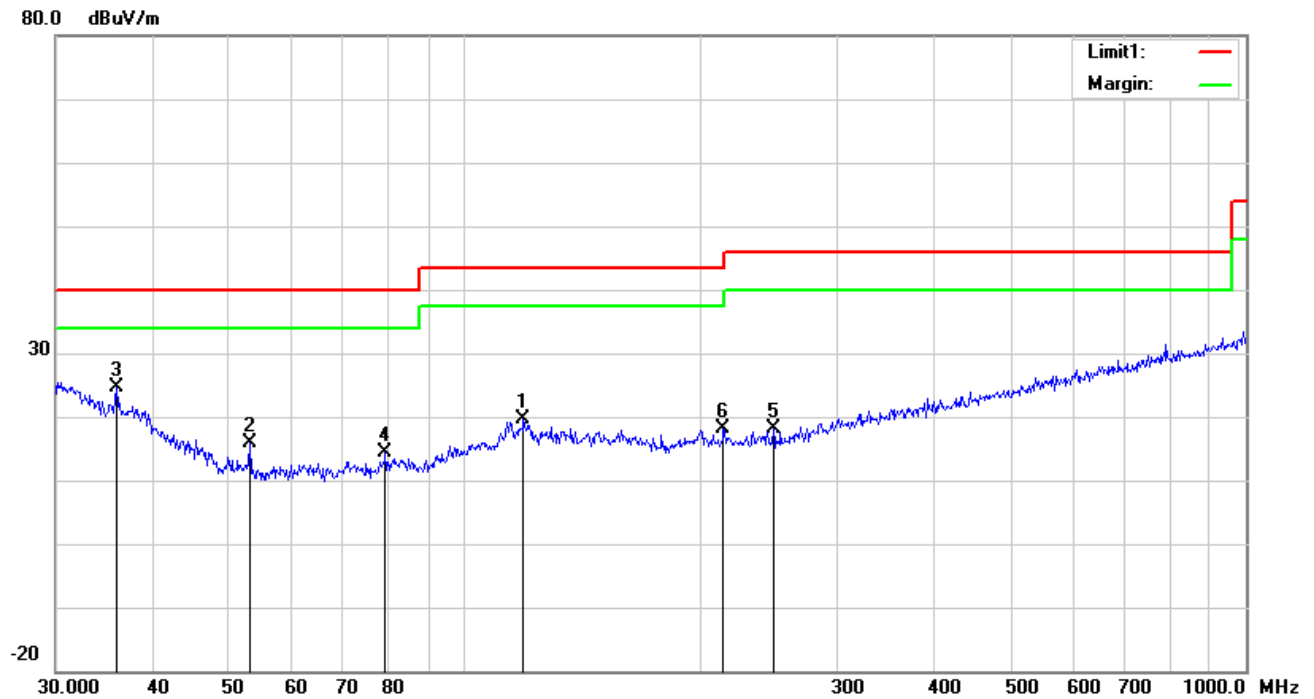


Test Data

Horizontal Polarity Plot @3m

No.	P/L	Frequency	Reading	Ant_F	PA_G	Cab_L	Result	Limit	Margin
		(MHz)	(dBuV/m)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
1	H	790.6188	29.36	21.29	21.17	2.94	32.42	46.00	-13.58
2	H	475.4991	26.80	17.21	21.86	2.28	24.43	46.00	-21.57
3	H	322.1886	27.62	14.07	22.23	1.90	21.36	46.00	-24.64
4	H	193.7728	26.63	11.76	22.34	1.54	17.59	43.50	-25.91
5	H	133.1511	27.74	13.05	22.39	1.22	19.62	43.50	-23.88
6	H	105.6415	27.05	11.39	22.33	1.15	17.26	43.50	-26.24

Below 1GHz



Test Data

Vertical Polarity Plot @3m

No.	P/L	Frequency	Reading	Ant_F	PA_G	Cab_L	Result	Limit	Margin
		(MHz)	(dBuV/m)	(dB/m)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
1	V	119.0180	27.09	13.73	22.36	1.16	19.62	43.50	-23.88
2	V	53.1313	29.31	8.06	22.39	0.79	15.77	40.00	-24.23
3	V	35.8747	29.20	16.91	22.26	0.77	24.62	40.00	-15.38
4	V	79.2426	28.22	7.62	22.42	1.04	14.46	40.00	-25.54
5	V	248.5519	27.33	11.42	22.29	1.70	18.16	46.00	-27.84
6	V	214.5143	26.87	11.90	22.35	1.59	18.01	43.50	-25.49

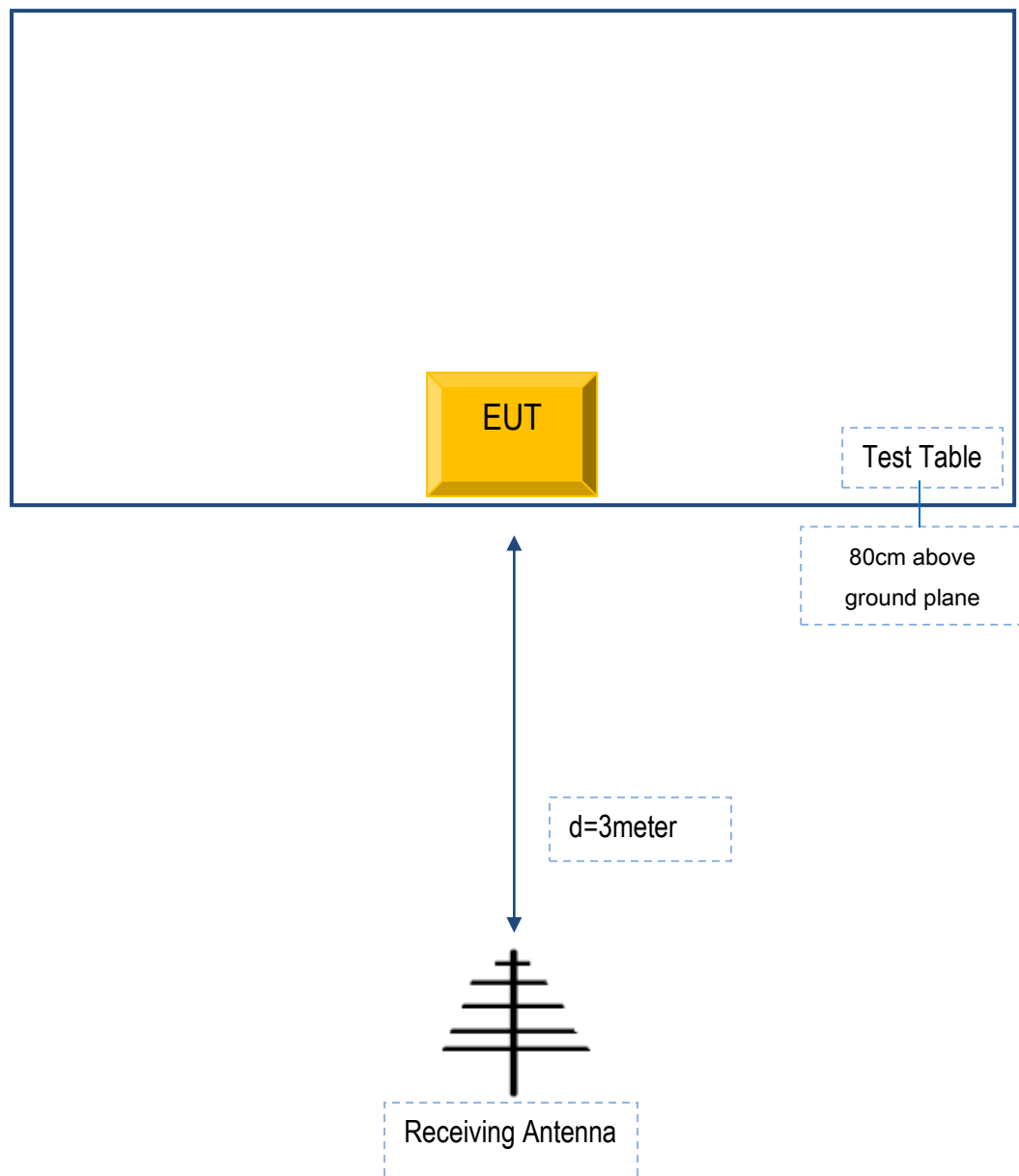
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due
AC Line Conducted Emissions				
EMI test receiver	ESCS30	8471241027	01/05/2018	01/04/2019
Artificial Mains Network	8127	8127713	01/05/2018	01/04/2019
ISN	ISN T800	34373	01/05/2018	01/04/2019
Radiated Emissions				
EMI test receiver	ESL6	1300.5001K06- 100262-eQ	01/05/2018	01/04/2019
Active Antenna	AL-130	121031	02/08/2018	02/07/2019
3m Semi-anechoic Chamber	9m*6m*6m	N/A	10/18/2018	10/17/2019
Signal Amplifier	8447E	443008	01/25/2018	01/24/2019
MXA signal analyzer	N9020A	MY49100060	01/05/2018	01/04/2019
Horn Antenna	HAH-118	71259	01/26/2018	01/25/2019
Horn Antenna	HAH-118	71283	02/02/2018	02/01/2019
AMPLIFIER	EM01G26G	60613	01/25/2018	01/24/2019
AMPLIFIER	Emc012645	980077	01/05/2018	01/04/2019
Bilog Antenna (30MHz~6GHz)	JB6	A110712	02/08/2018	02/07/2019

Annex B. TEST SETUP AND SUPPORTING EQUIPMENT

Annex B.i. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions



Annex C. ii. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
-	-	-	-

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
-	-	-	-	-

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Annex C. User Manual / Block Diagram / Schematics / Partlist

Please see the attachment

Annex D. DECLARATION OF SIMILARITY

REMOTE SOLUTION.CO.,LTD

To: 775 Montague Expressway Milpitas,CA 95035,USA

Declaration Letter

Dear Sir,

For our business issue and marketing requirement,

We declare that the model: **Nagra, RC98XBB(X is FROM A to Z, BB is 00-99)** all models the same PCB and Appearance shape, accessories ,the Simple case, printing color difference is.

Thank you!

Sincerely,

Client's signature :



Client's name / title : Byung chul, Kim / Manager

Telephone: +82-10-5533-8113

Address : 92, Chogok-ri, Nammyun, Gimchun city, Kyungsangbukdo, Korea