

# RF EXPOSURE REPORT



Report No.: 16021423-FCC-H1

Supersede Report No.: N/A

Applicant	FrSky Electronic Co., Ltd.	
Product Name	2.4G Receiver	
Main Model No.	RX8R	
Serial Model No.	X8R, XSR, X4R, X6R, X12R, L9R, L12R, S6R, S8R, S8R-Pro	
Test Standard	FCC 2.1091	
Test Date	January 03 to January 04, 2017	
Issue Date	January 05, 2017	
Test Result	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail	
Equipment complied with the specification	<input checked="" type="checkbox"/>	
Equipment did not comply with the specification	<input type="checkbox"/>	
Deon Dai	Miro Bao	
Deon Dai Test Engineer	Miro Bao 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 (Nanjing-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
16021423-FCC-H1	NONE	Original	January 05, 2017

## 2 Customer information

Applicant Name	FrSky Electronic Co., Ltd.
Applicant Add	No.100 Jinxi Road ,Wuxi,Jiangsu,China
Manufacturer	FrSky Electronic Co., Ltd.
Manufacturer Add	No.100 Jinxi Road ,Wuxi,Jiangsu,China

## 3 Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	EZ_EMU

## 4 Equipment under Test (EUT) Information

Description of EUT: 2.4G Receiver

Main Model: RX8R

Serial Model: X8R, XSR, X4R, X6R, X12R, L9R, L12R, S6R, S8R, S8R-Pro

Date EUT received: November 21, 2016

Test Date(s): January 03 to January 04, 2017

Max. Output Power: ANT1#: 13.546dBm  
ANT2#: 13.780dBm

Antenna Gain: ANT1#: 2 dBi  
ANT2#: 2 dBi

Type of Modulation: 2-FSK

RF Operating Frequency (ies): 2405.1-2474.1 MHz

Number of Channels: 47CH

Port: N/A

Power: 4~10V(5V@100mA)

Trade Name : FrSky

FCC ID: XYFN2409R

Note: the difference between these models please refers to 6. DECLARATION OF SIMILARITY in this report.

## 5 ECC §2.1091 - Maximum Permissible exposure (MPE)

### Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

#### Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

### Test Data

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

Where: S = power density (in appropriate units, e.g. mW/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Output Power	2-FSK ANT1#	Low	2405	11.621	11±1
		Mid	2440	12.258	11.5±1
		High	2474	13.546	13±1
	2-FSK ANT2#	Low	2405	11.788	11±1
		Mid	2440	12.427	11.5±1
		High	2474	13.780	13±1

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test.  
The MPE evaluation as below:

### 2-FSK ANT1#

The maximum peak output power (turn-up power) in low channel of BT is 12 dBm

Maximum peak output power (turn-up power) at antenna input terminal: 15.849(mW)

Predication distance: >20 (cm)

Predication frequency: 2405(MHz) lowest frequency

Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)

The worst case is power density at predication frequency at 20 cm: 0.0050(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm<sup>2</sup>)

0.0050 (mW/cm<sup>2</sup>) < 1(mW/cm<sup>2</sup>)

The maximum peak output power (turn-up power) in Middle channel of BT is 12.5dBm

Maximum peak output power (turn-up power) at antenna input terminal: 17.783 (mW)

Predication distance: >20 (cm)

Predication frequency: 2440(MHz) lowest frequency

Antenna Gain (typical): 2(dBi)

Antenna Gain (typical): 1.585numeric

The worst case is power density at predication frequency at 20 cm: 0.0056(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm<sup>2</sup>)

0.0056 (mW/cm<sup>2</sup>) < 1(mW/cm<sup>2</sup>)

The maximum peak output power (turn-up power) in High channel of BT is 14 dBm

Maximum peak output power (turn-up power) at antenna input terminal: 25.119 (mW)

Predication distance: >20 (cm)

Predication frequency: 2474(MHz) lowest frequency

Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0079(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm<sup>2</sup>)

0.0079 (mW/cm<sup>2</sup>) < 1(mW/cm<sup>2</sup>)

## 2-FSK ANT2#

The maximum peak output power (turn-up power) in low channel of BT is 12 dBm

Maximum peak output power (turn-up power) at antenna input terminal: 15.849(mW)

Prediction distance: >20 (cm)

Predication frequency: 2405(MHz) lowest frequency

Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585(numeric)

The worst case is power density at predication frequency at 20 cm: 0.0050(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm<sup>2</sup>)

$0.0050 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

The maximum peak output power (turn-up power) in Middle channel of BT is 12.5dBm

Maximum peak output power (turn-up power) at antenna input terminal: 17.783 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2440(MHz) lowest frequency

Antenna Gain (typical): 2(dBi)

Antenna Gain (typical): 1.585numeric

The worst case is power density at predication frequency at 20 cm: 0.0056(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm<sup>2</sup>)

$0.0056 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

The maximum peak output power (turn-up power) in High channel of BT is 14 dBm

Maximum peak output power (turn-up power) at antenna input terminal: 25.119 (mW)

Prediction distance: >20 (cm)

Predication frequency: 2474(MHz) lowest frequency

Antenna Gain (typical): 2 (dBi)

Antenna Gain (typical): 1.585 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.0079(mW/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mW/cm<sup>2</sup>)

$0.0079 \text{ (mW/cm}^2\text{)} < 1 \text{ (mW/cm}^2\text{)}$

**Result: Pass**

## 6 DECLARATION OF SIMILARITY

FrSky Electronic Co., Ltd

To: SIEMIC INC.

### Declaration letter

Dear Sir,

For our business issue and marketing requirement, we would like to list different models numbers on the FCC/CE certificates and reports, as following:

Model No.: RX8R, XSR, X8R, X4R, X6R, X12R, L9R, L12R, S6R, S8R, S8R-Pro

The difference between RX8R and XSR, X8R, X4R, X6R, X12R, L9R, L12R, S6R, S8R, S8R-Pro are as follows:

The Serial Model Name XSR, X8R, X4R, X6R, X12R, L9R, L12R, S6R, S8R, S8R-Pro Different model name only, like all the other.

Thank you!

  
Signature:

Printed name/title: Bryan Shao/ Manager

Contact information / address    FrSky Electronic Co., Ltd.

No.100 Jinxi Road ,Wuxi,Jiangsu,China