RF EXPOSURE REPORT

Report No.: 16020308-FCC-H1
Supersede Report No.: N/A

Applicant	Beijing Jia An Electronics Technology Co.,Ltd.
Product Name	BLE module
Model No.	BTRS-Uart
Test Standard	FCC 2.1091
Test Date	April 12 to April 21, 2016
Issue Date	April 27, 2016
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Amos Xia		
Amos Xia Test Engineer	Herve Idoko Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
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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
16020308-FCC-H1	NONE	Original	April 27, 2016

2 Customer information

Applicant Name	Beijing Jia An Electronics Technology Co.,Ltd.
Applicant Add	No.19 GuCheng West Street,Shi Jing Shan District,Beijing 100043, China
Manufacturer	Beijing Jia An Electronics Technology Co.,Ltd.
Manufacturer Add	No.19 GuCheng West Street,Shi Jing Shan District,Beijing 100043,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	Labview of SIEMIC version 1.0

4 Equipment under Test (EUT) Information

Description of EUT:	BLE module
Main Model:	BTRS-Uart
Serial Model:	N/A
Date EUT received:	April 08,2016
Test Date(s):	April 12 to April 21, 2016
Antenna Gain:	BLE: -2.3 dBi
Type of Modulation:	BLE: GFSK
RF Operating Frequency (ies):	BLE: 2402-2480 MHz
Number of Channels:	BLE: 40CH
Port:	N/A
Input Power:	DC 5-15V
Trade Name :	N/A
FCC ID:	VVJ-BTRS

5 FCC §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^2)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	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/cm2)
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	BLE	Low	2402	-1.165	-1±1
		Mid	2440	-0.348	
		High	2480	-0.154	

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

BLE
The maximum peak output power (turn-up power) in low channel of BLE is 0dBm
Maximum peak output power (turn-up power) at antenna input terminal: 1 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2402(MHz) lowest frequency
Antenna Gain (typical): -2.3 (dBi)
Antenna Gain (typical): 0.59 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.00012 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of BLE is 0dBm
Maximum peak output power (turn-up power) at antenna input terminal: 1 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2440(MHz) lowest frequency
Antenna Gain (typical): -2.3 (dBi)
Antenna Gain (typical): 0.59 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.00012 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of BLE is 0dBm
Maximum peak output power (turn-up power) at antenna input terminal: 1 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2480(MHz) lowest frequency
Antenna Gain (typical): -2.3 (dBi)
Antenna Gain (typical): 0.59 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.00012 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0 (mW/cm^2) < 1(mW/cm^2)

Result: Pass