

RF Exposure Evaluation Report

APPLICANT : Eroad, Ltd.
EQUIPMENT : Ehubo
BRAND NAME : EROAD
MODEL NAME : Ehubo2.2
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

The product was installed a WWAN module (FCC ID: 2AA93-ELS61-US) and a Bluetooth module (FCC ID: 2AA93-1316) during evaluation.

We, Sporton International (Kunshan) Inc., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: Mark Qu / Manager



Sporton International (Kunshan) Inc.
No. 1098, Pengxi North Road, Kunshan Economic Development Zone,
Jiangsu Province 215335, China

Table of Contents

1. ADMINISTRATION DATA	4
1.1. Testing Laboratory	4
2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	5
3. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	6
4. RF EXPOSURE LIMIT INTRODUCTION	7
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	8
5.1. Standalone Power Density Calculation for WWAN module	8
5.2. Standalone Power Density Calculation for Bluetooth module	8
5.3. Collocated Power Density Calculation.....	9



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA8D0502	Rev. 01	Initial issue of report	Feb. 20, 2019



1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	Sporton International (Kunshan) Inc.
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958

Applicant	
Company Name	Eroad, Ltd.
Address	Level 3, 260 Oteha Valley Road Albany, Auckland, 0757 New Zealand

Manufacturer	
Company Name	Eroad, Ltd.
Address	Level 3, 260 Oteha Valley Road Albany, Auckland, 0757 New Zealand

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Ehubo
Brand Name	EROAD
Model Name	Ehubo2.2
FCC ID	Contains FCC ID : 2AA93-ELS61-US for WWAN module Contains FCC ID : 2AA93-1316 for Bluetooth module
Wireless Technology and Frequency Range	WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 12: 699 MHz ~ 716 MHz Bluetooth: 2402MHz~2480MHz
Mode	RMC 12.2Kbps HSDPA HSUPA LTE: QPSK/16QAM Bluetooth: BR/EDR/LE
HW Version	Rev E1
SW Version	1.46
EUT Stage	Production Unit
Remark: 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

3. Maximum RF average output power among production units

<WCDMA/LTE > For WWAN Module

Mode		Maximum Average power(dBm)
WCDMA	Band II	25.00
	Band IV	25.00
	Band V	25.00
LTE	Band 2	25.00
	Band 4	25.00
	Band 5	25.00
	Band 12	25.00

<Bluetooth > For Bluetooth Module

Band / Mode	Average Power (dBm)			
	BR / EDR			LE
	1M	2M	3M	GFSK
Bluetooth	9.00	7.00	7.00	6.00

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
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

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation for WWAN module

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
WCDMA Band II	1852.4	2.68	25.00	27.68	0.59	586.14	0.117	1.000	0.117
WCDMA Band IV	1712.4	2.68	25.00	27.68	0.59	586.14	0.117	1.000	0.117
WCDMA Band V	826.4	0.01	25.00	25.01	0.32	316.96	0.063	0.551	0.115
LTE Band 2	1850.7	2.68	25.00	27.68	0.59	586.14	0.117	1.000	0.117
LTE Band 4	1710.7	2.68	25.00	27.68	0.59	586.14	0.117	1.000	0.117
LTE Band 5	824.7	0.01	25.00	25.01	0.32	316.96	0.063	0.550	0.115
LTE Band 12	699.7	0.01	25.00	25.01	0.32	316.96	0.063	0.466	0.135

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band
2. Chose the maximum power density to do MPE analysis.

5.2. Standalone Power Density Calculation for Bluetooth module

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
Bluetooth	2402.0	0.90	9.00	9.90	0.01	9.77	0.002	1.000	0.002

5.3. Collocated Power Density Calculation

WWAN Power Density / Limit	Bluetooth Power Density / Limit	Σ (Power Density / Limit) of WWAN+Bluetooth
0.135	0.002	0.137

Note:

1. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + Bluetooth.
2. Considering the WWAN module collocation with the Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.