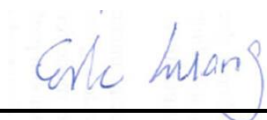


RF Exposure Evaluation Report

APPLICANT : BandRich Inc.
EQUIPMENT : LTE/EVDO Rev. A module
BRAND NAME : BandLuxe
MODEL NAME : M535U
FCC ID : UZI-35M168
STANDARD : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Eric Huang / Deputy Manager



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



Table of Contents

1. ADMINISTRATION DATA	4
1.1. Testing Laboratory	4
1.2. Applicant	4
1.3. Manufacturer	4
2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	5
3. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	5
4. RF EXPOSURE LIMIT INTRODUCTION	7
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	8
5.1. Standalone Power Density Calculations.....	8
5.2. Collocated Power Density Calculations.....	8



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA421186	Rev. 01	Initial issue of report	Feb. 19, 2014

1. Administration Data

1.1. Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

1.2. Applicant

Company Name	BandRich Inc.
Address	6F., No. 71, Zhouzi St., Neihu Dist., Taipei City 11493, Taiwan (R.O.C.)

1.3. Manufacturer

Company Name	FAIR GOAL ELECTRONIC CO.
Address	1F., No.97-1, Haihu, Luzhu Township, Taoyuan County 338, Taiwan (R.O.C.)

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	LTE/EVDO Rev. A module
Brand Name	BandLuxe
Model Name	M535U
FCC ID	UZI-35M168
Wireless Technology and Frequency Range	CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz
Mode	- CDMA2000 : 1xRTT/1xEv-Do(Rel.0)/1xEv-Do(Rev.A) - LTE: QPSK, 16QAM
Antenna Type	Fixed External Antenna
HW Version	V1614E01
SW Version	QC 2_00016739_3_001_0001
EUT Stage	Production Unit

Remark: 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

Band	Average Power (dBm)
CDMA BC0	25.0
CDMA BC1	25.0
LTE Band 12	22.5
LTE Band 5	22.5
LTE Band 4	22.5
LTE Band 2	22.5



The table below summarized necessary items addressed in KDB 941225 D05 v02r03.

FCC ID				UZI-35M168																
EUT				LTE/EVDO Rev. A module																
Operating Frequency Range of each LTE transmission band				LTE Band 12: 699.7 MHz ~ 715.3 MHz LTE Band 05: 824.7 MHz ~ 848.3 MHz LTE Band 04: 1710.7 MHz ~ 1754.3 MHz LTE Band 02: 1850.7 MHz ~ 1909.3 MHz																
Channel Bandwidth				LTE Band 12: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 05: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 04: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 02: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz																
Transmission (H, M, L) channel numbers and frequencies in each LTE band																				
LTE Band 12																				
	Bandwidth 1.4 MHz			Bandwidth 3 MHz			Bandwidth 5 MHz			Bandwidth 10 MHz										
	Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)									
L	23017	699.7		23025	700.5		23035	701.5		23060	704									
M	23095	707.5		23095	707.5		23095	707.5		23095	707.5									
H	23173	715.3		23165	714.5		23155	713.5		23130	711									
LTE Band 5																				
	Bandwidth 1.4 MHz			Bandwidth 3 MHz			Bandwidth 5 MHz			Bandwidth 10 MHz										
	Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)		Ch. #	Freq. (MHz)									
L	20407	824.7		20415	825.5		20425	826.5		20450	829									
M	20525	836.5		20525	836.5		20525	836.5		20525	836.5									
H	20643	848.3		20635	847.5		20625	846.5		20600	844									
LTE Band 4																				
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720								
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5								
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745								
LTE Band 2																				
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz									
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)								
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860								
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880								
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900								
E category, uplink modulations used				Category 3, QPSK, and 16QAM																
LTE Voice / Data requirements				Data only																
LTE MPR permanently built-in by design				Yes, per 3GPP TS 36.101 v11.0.0																
				Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3																
				Modulation							Channel bandwidth / Transmission bandwidth (RB)		MPR (dB)							
QPSK							> 5		> 4		> 8		> 12		> 16		> 18		≤ 1	
16 QAM							≤ 5		≤ 4		≤ 8		≤ 12		≤ 16		≤ 18		≤ 1	
16 QAM							> 5		> 4		> 8		> 12		> 16		> 18		≤ 2	



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 Calculations

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP (dBm)	Maximum ERP (W)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum Output Power Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
CDMA2000 BC0	824.7	9.0	25.0	31.860	1.535	34.000	2.512	7.0W ERP	2511.886	0.500	0.550
CDMA2000 BC1	1851.3	8.0	25.0	30.860	1.219	33.000	1.995	2.0 W EIRP	1995.262	0.397	1.000
LTE Band 12	699.7	11.0	22.5	31.360	1.368	33.500	2.239	3.0 W ERP	2238.721	0.446	0.466
LTE Band 5	824.7	9.0	22.5	29.360	0.863	31.500	1.413	7.0W ERP	1412.538	0.281	0.550
LTE Band 4	1710.7	7.5	22.5	27.860	0.611	30.000	1.000	1.0 W EIRP	1000.000	0.199	1.000
LTE Band 2	1850.7	8.0	22.5	28.360	0.685	30.500	1.122	2.0 W EIRP	1122.018	0.223	1.000

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band

5.2. Collocated Power Density Calculations

Note:

1. This MPE analysis is applicable to any collocated transmitters with EIRP for WLAN/WiMax is less than or equal to 34dBm and EIRP for Bluetooth is less than or equal to 20dBm.
2. A maximum antenna gain of 5 dBi for WLAN/WiMAX/BT has been assumed for all collocated antennas.

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
CDMA2000 BC0	824	6.0	25.0	31.0	1.26	1258.93	0.251	0.549	0.456
CDMA2000 BC1	1850	8.0	25.0	33.0	2.00	1995.26	0.397	1.000	0.397
LTE Band 12	700	7.5	22.5	30.0	1.00	1000.00	0.199	0.466	0.427
LTE Band 5	824	6.0	22.5	28.5	0.71	707.95	0.141	0.549	0.257
LTE Band 4	1710	7.5	22.5	30.0	1.00	1000.00	0.199	1.000	0.199
LTE Band 2	1850	8.0	22.5	30.5	1.12	1122.02	0.223	1.000	0.223
WLAN2.4GHz Band	2412	5.0	29.0	34.0	2.51	2511.89	0.500	1.000	0.500
WLAN5GHz Band	5180	5.0	29.0	34.0	2.51	2511.89	0.500	1.000	0.500
WiMax2.6GHz	2500	5.0	29.0	34.0	2.51	2511.89	0.500	1.000	0.500
WiMax3.5GHz	3400	5.0	29.0	34.0	2.51	2511.89	0.500	1.000	0.500
WiMax3.7GHz	3600	5.0	29.0	34.0	2.51	2511.89	0.500	1.000	0.500
Bluetooth	2402	5.0	15.0	20.0	0.10	100.00	0.020	1.000	0.020

<Collocated analysis>
Note:

1. For collocation analysis, CDMA BC0 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. 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 + WLAN + Bluetooth, and for WWAN + WiMax + Bluetooth.
3. Considering the WWAN module collocation with the other transmitters of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant

Max WLAN Power Density / Limit	Max Bluetooth Power Density / Limit	Max WWAN Power Density / Limit	Σ (Power Density / Limit) of WWAN + WLAN + Bluetooth
0.500	0.020	0.456	0.976

Max WiMax Power Density / Limit	Max Bluetooth Power Density / Limit	Max WWAN Power Density / Limit	Σ (Power Density / Limit) of WWAN + WiMax + Bluetooth
0.500	0.020	0.456	0.976

Conclusion:

Based on 47 CFR §2.1091, the analysis concludes that this product when transmitting in standalone within a host device, is compliant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Device	Technology	Band	Frequency (MHz)	Maximum Conducted Power (dBm)	Stanalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
M535U	CDMA	BC0	824.7	25.0	9.0	6.0
		BC1	1851.3	25.0	8.0	8.0
	LTE	Band 12	699.7	22.5	11.0	7.5
		Band 5	824.7	22.5	9.0	6.0
		Band 4	1710.7	22.5	7.5	7.5
		Band 2	1850.7	22.5	8.0	8.0