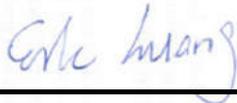


RF Exposure Evaluation Report

APPLICANT : FIBOCOM WIRELESS INC.
EQUIPMENT : LTE Module
BRAND NAME : Fibocom
MODEL NAME : L830-EA
FCC ID : ZMOL830
STANDARD : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL (SHENZHEN) 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(SHENZHEN) INC., the test report shall not be reproduced except in full.



Reviewed by: Eric Huang / Deputy Manager



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (SHENZHEN) INC.

**1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town,
Nanshan District, Shenzhen, Guangdong, P. R. 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	13
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	14
5.1. Standalone Power Density Calculation	14
5.2. Collocated Power Density Calculation.....	15



1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	SPORTON International (SHENZHEN) Inc.
Test Site Location	1F & 2F, Building A, Morning Business Center, No. 4003 ShiGu Rd., Xili Town, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: 86-755-8637-9589 FAX: 86-755-8637-9595

Applicant	
Company Name	FIBOCOM WIRELESS INC.
Address	5/F, Tower A, Technology Building II, 1057# Nanhai Blvd, Shenzhen, P. R. China

Manufacturer	
Company Name	FIBOCOM WIRELESS INC.
Address	5/F, Tower A, Technology Building II, 1057# Nanhai Blvd, Shenzhen, P. R. China



2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	LTE Module
Brand Name	Fibocom
Model Name	L830-EA
FCC ID	ZMOL830
IMEI Code	867603020009216
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV : 1712.4 MHz ~ 1752.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz
Mode	<ul style="list-style-type: none"> • GPRS/EGPRS • RMC12.2Kbps • HSDPA • HSUPA • DC-HSDPA • HSPA+(16QAM uplink is not supported) • LTE
Antenna Type	Fixed External Antenna
HW Version	V1.0.2
SW Version	L830_V3E.1C.01.00
EUT Stage	Identical Prototype
Note:	
1. This device has no voice function	
2. This device supports GPRS/EDGE Class 33; DC-HSDPA R10; LTE Release R10, Supports CA technology.	



3. Maximum RF average output power among production units

Mode	GSM 850	GSM 1900
	Average power(dBm)	
GPRS/EDGE (GMSK, 1 Tx slot)	33.0	30.0
GPRS/EDGE (GMSK, 2 Tx slots)	33.0	30.0
GPRS/EDGE (GMSK, 3 Tx slots)	32.0	29.0
GPRS/EDGE (GMSK, 4 Tx slots)	30.0	28.0
EDGE (8PSK, 1 Tx slot)	28.0	27.0
EDGE (8PSK, 2 Tx slots)	28.0	27.0
EDGE (8PSK, 3 Tx slots)	27.0	26.0
EDGE (8PSK, 4 Tx slots)	26.0	25.0

Mode	WCDMA Band V	WCDMA Band II	WCDMA Band IV
	average power(dBm)		
UMTS	24	24	24

LTE Band 17 average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	10	≤ 12	0	23
QPSK	10	> 12	1	22
16QAM	10	≤ 12	1	22
16QAM	10	> 12	2	21
QPSK	5	≤ 8	0	23
QPSK	5	> 8	1	22
16QAM	5	≤ 8	1	22
16QAM	5	> 8	2	21

LTE Band 13 average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	10	≤ 12	0	23
QPSK	10	> 12	1	22
16QAM	10	≤ 12	1	22
16QAM	10	> 12	2	21
QPSK	5	≤ 8	0	23
QPSK	5	> 8	1	22
16QAM	5	≤ 8	1	22
16QAM	5	> 8	2	21



LTE Band 5				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	10	≤ 12	0	23
QPSK	10	> 12	1	22
16QAM	10	≤ 12	1	22
16QAM	10	> 12	2	21
QPSK	5	≤ 8	0	23
QPSK	5	> 8	1	22
16QAM	5	≤ 8	1	22
16QAM	5	> 8	2	21
QPSK	3	≤ 4	0	23
QPSK	3	> 4	1	22
16QAM	3	≤ 4	1	22
16QAM	3	> 4	2	21
QPSK	1.4	≤ 5	0	23
QPSK	1.4	> 5	1	22
16QAM	1.4	≤ 5	1	22
16QAM	1.4	> 5	2	21

LTE Band 4				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	20	≤ 18	0	23
QPSK	20	> 18	1	22
16QAM	20	≤ 18	1	22
16QAM	20	> 18	2	21
QPSK	15	≤ 16	0	23
QPSK	15	> 16	1	22
16QAM	15	≤ 16	1	22
16QAM	15	> 16	2	21
QPSK	10	≤ 12	0	23
QPSK	10	> 12	1	22
16QAM	10	≤ 12	1	22
16QAM	10	> 12	2	21
QPSK	5	≤ 8	0	23
QPSK	5	> 8	1	22
16QAM	5	≤ 8	1	22
16QAM	5	> 8	2	21
QPSK	3	≤ 4	0	23
QPSK	3	> 4	1	22
16QAM	3	≤ 4	1	22
16QAM	3	> 4	2	21
QPSK	1.4	≤ 5	0	23
QPSK	1.4	> 5	1	22
16QAM	1.4	≤ 5	1	22
16QAM	1.4	> 5	2	21



LTE Band 2				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	20	≤ 18	0	23
QPSK	20	> 18	1	22
16QAM	20	≤ 18	1	22
16QAM	20	> 18	2	21
QPSK	15	≤ 16	0	23
QPSK	15	> 16	1	22
16QAM	15	≤ 16	1	22
16QAM	15	> 16	2	21
QPSK	10	≤ 12	0	23
QPSK	10	> 12	1	22
16QAM	10	≤ 12	1	22
16QAM	10	> 12	2	21
QPSK	5	≤ 8	0	23
QPSK	5	> 8	1	22
16QAM	5	≤ 8	1	22
16QAM	5	> 8	2	21
QPSK	3	≤ 4	0	23
QPSK	3	> 4	1	22
16QAM	3	≤ 4	1	22
16QAM	3	> 4	2	21
QPSK	1.4	≤ 5	0	23
QPSK	1.4	> 5	1	22
16QAM	1.4	≤ 5	1	22
16QAM	1.4	> 5	2	21



LTE Band 26				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	15	≤ 16	0	23
QPSK	15	> 16	1	22
16QAM	15	≤ 16	1	22
16QAM	15	> 16	2	21
QPSK	10	≤ 12	0	23
QPSK	10	> 12	1	22
16QAM	10	≤ 12	1	22
16QAM	10	> 12	2	21
QPSK	5	≤ 8	0	23
QPSK	5	> 8	1	22
16QAM	5	≤ 8	1	22
16QAM	5	> 8	2	21
QPSK	3	≤ 4	0	23
QPSK	3	> 4	1	22
16QAM	3	≤ 4	1	22
16QAM	3	> 4	2	21
QPSK	1.4	≤ 5	0	23
QPSK	1.4	> 5	1	22
16QAM	1.4	≤ 5	1	22
16QAM	1.4	> 5	2	21

LTE Band 7				
average power(dBm)				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	20	≤ 18	0	23.5
QPSK	20	> 18	1	22.5
16QAM	20	≤ 18	1	22.5
16QAM	20	> 18	2	21.5
QPSK	15	≤ 16	0	23.5
QPSK	15	> 16	1	22.5
16QAM	15	≤ 16	1	22.5
16QAM	15	> 16	2	21.5
QPSK	10	≤ 12	0	23.5
QPSK	10	> 12	1	22.5
16QAM	10	≤ 12	1	22.5
16QAM	10	> 12	2	21.5
QPSK	5	≤ 8	0	23.5
QPSK	5	> 8	1	22.5
16QAM	5	≤ 8	1	22.5
16QAM	5	> 8	2	21.5



The table below summarized necessary items addressed in KDB 941225 D05 v02.

FCC ID	ZMOL830																																						
EUT	LTE Module																																						
Operating Frequency Range of each LTE transmission band	LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 13: 779.5 MHz ~ 784.5 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 LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 7: 2506.5 MHz ~ 2567.5 MHz																																						
Channel Bandwidth	LTE Band 17: 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz																																						
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 <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> </tbody> </table>	Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	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
Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)																																
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																	
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																																
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing.																																						
Base station simulator used for Testing	Anritsu MT8820C																																						
Power reduction applied to satisfy SAR compliance	No.																																						
LTE Release	R10																																						
LTE Carrier Aggregation Combinations	Inter-Band and Intra-Band possible combinations as page 12.																																						



Transmission (H, M, L) channel numbers and frequencies in each LTE band												
Band 17												
	Bandwidth 5 MHz					Bandwidth 10 MHz						
	Channel #		Frequency (MHz)			Channel #		Frequency (MHz)				
L	23755		706.5			23780		709				
M	23790		710			23790		710				
H	23825		713.5			23800		711				
Band 13												
	Bandwidth 5 MHz					Bandwidth 10 MHz						
	Channel #		Frequency (MHz)			Channel #		Frequency (MHz)				
L	23205		779.5			23230		782				
M	23230		782									
H	23255		784.5									
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)	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
LTE Band 26												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5		
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5		
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5		
LTE Band 7												
	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)		
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535				
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				



LTE Carrier Aggregation Combinations																					
(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)	(PCC)	(SCC)
B2	B4	B2	B5	B2	B13	B2	B17	B4	B29	B4	B4	B4	B5	B4	B13	B4	B17	B4	B29	B7	B20
1.4M+5M	5M+5M	5M+10M	5M+5M	5M+3M	5M+5M	5M+5M	5M+10M	5M+5M	5M+3M	10M+5M											
1.4M+10M	5M+10M	10M+10M	5M+10M	5M+5M	5M+10M	5M+10M	10M+10M	5M+10M	5M+5M	5M+10M											
1.4M+15M	10M+5M	15M+10M	10M+5M	5M+10M	5M+15M	10M+5M	15M+10M	10M+5M	5M+10M	5M+15M											
1.4M+20M	10M+10M	20M+10M	10M+10M	10M+3M	5M+20M	10M+10M	20M+10M	10M+10M	10M+3M	5M+20M											
3M+5M	15M+5M								10M+5M	10M+5M	15M+5M									10M+5M	15M+5M
3M+10M	15M+10M								10M+10M	10M+10M	15M+10M									10M+10M	15M+10M
3M+15M	20M+5M								15M+3M	10M+15M	20M+5M									15M+3M	15M+15M
3M+20M	20M+10M								15M+5M	10M+20M	20M+10M									15M+5M	15M+20M
5M+5M									15M+10M	15M+5M										15M+10M	20M+5M
5M+10M									20M+3M	15M+10M										20M+3M	20M+10M
5M+15M									20M+5M	15M+15M										20M+5M	20M+15M
5M+20M									20M+10M	15M+20M										20M+10M	20M+20M
10M+5M										20M+5M											
10M+10M										20M+10M											
10M+15M										20M+15M											
10M+20M										20M+20M											
15M+5M																					
15M+10M																					
15M+15M																					
15M+20M																					
20M+5M																					
20M+10M																					
20M+15M																					
20M+20M																					



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

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)
GPRS 850 (1 Tx slot)	824-849	5.0	33.0	35.850	3.846	38.000	6.310	7.000	794.328	0.158	0.549
GPRS 850 (2 Tx slots)	824-849	5.0	33.0	35.850	3.846	38.000	6.310	7.000	1577.393	0.314	0.549
GPRS 850 (3 Tx slots)	824-849	5.0	32.0	34.850	3.055	37.000	3.055	7.000	1879.317	0.374	0.549
GPRS 850 (4 Tx slots)	824-849	5.0	30.0	32.850	1.928	35.000	1.928	7.000	1584.893	0.315	0.549
EGPRS 850 (1 Tx slot)	824-849	5.0	28.0	30.850	1.216	33.000	1.219	7.000	251.189	0.050	0.549
EGPRS 850 (2 Tx slots)	824-849	5.0	28.0	30.850	1.216	33.000	1.995	7.000	498.816	0.099	0.549
EGPRS 850 (3 Tx slots)	824-849	5.0	27.0	29.850	0.966	32.000	1.585	7.000	594.335	0.118	0.549
EGPRS 850 (4 Tx slots)	824-849	5.0	26.0	28.850	0.767	31.000	1.259	7.000	629.463	0.125	0.549
GPRS 1900 (1 Tx slot)	1850-1910	3.0	30.0	30.850	1.216	33.000	1.995	2.000	251.189	0.050	1.000
GPRS 1900 (2 Tx slots)	1850-1910	3.0	30.0	30.850	1.216	33.000	1.995	2.000	498.816	0.099	1.000
GPRS 1900 (3 Tx slots)	1850-1910	3.0	29.0	29.850	0.966	32.000	1.585	2.000	594.292	0.118	1.000
GPRS 1900 (4 Tx slots)	1850-1910	3.0	28.0	28.850	0.767	31.000	1.259	2.000	630.957	0.126	1.000
EGPRS 1900 (1 Tx slot)	1850-1910	3.0	27.0	27.850	0.610	30.000	1.000	2.000	125.893	0.025	1.000
EGPRS 1900 (2 Tx slots)	1850-1910	3.0	27.0	27.850	0.610	30.000	1.000	2.000	250.000	0.050	1.000
EGPRS 1900 (3 Tx slots)	1850-1910	3.0	26.0	26.850	0.484	29.000	0.794	2.000	297.873	0.059	1.000
EGPRS 1900 (4 Tx slots)	1850-1910	3.0	25.0	25.850	0.385	28.000	0.631	2.000	315.479	0.063	1.000
WCDMA Band V	824-849	5.0	24.0	26.850	0.484	29.000	0.794	7.000	794.328	0.158	0.536
WCDMA Band IV	1710-1755	3.0	24.0	24.850	0.305	27.000	0.501	1.000	501.187	0.100	1.000
WCDMA Band II	1850-1910	3.0	24.0	24.850	0.305	27.000	0.501	2.000	501.187	0.100	1.000
LTE Band 17	704 - 716	5.0	23.0	25.850	0.385	28.000	0.631	3.000	630.957	0.126	0.469
LTE Band 13	777- 787 -	5.0	23.0	25.850	0.385	28.000	0.631	3.000	630.957	0.126	0.518
LTE Band 26	814 - 849	5.0	23.0	25.850	0.385	28.000	0.631	7.000	630.957	0.126	0.550
LTE Band 5	824- 849	5.0	23.0	25.850	0.385	28.000	0.631	7.000	630.957	0.126	0.549
LTE Band 4	1710 -1755	3.0	23.0	23.850	0.243	26.000	0.398	1.000	398.107	0.079	1.000
LTE Band 2	1850 -1910	3.0	23.0	23.850	0.243	26.000	0.398	2.000	398.107	0.079	1.000
LTE Band 7	2500 -2570	3.0	23.5	24.350	0.272	26.500	0.447	2.000	446.684	0.089	1.000



5.2. Collocated Power Density Calculation

General Note:

1. This MPE analysis is applicable to any collocated transmitters with EIRP for WLAN is less than or equal to 26dBm and EIRP for Bluetooth is less than or equal to 21dBm.
2. A maximum antenna gain of 6dBi for WLAN/BT has been assumed for all collocated antennas.

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
GPRS 850 (1 Tx slot)	824-849	5.0	33.0	38.0	6.31	794.33	0.158	0.549	0.288
GPRS 850 (2 Tx slots)	824-849	5.0	33.0	38.0	6.31	1577.39	0.314	0.549	0.572
GPRS 850 (3 Tx slots)	824-849	5.0	32.0	37.0	5.01	1879.32	0.374	0.549	0.681
GPRS 850 (4 Tx slots)	824-849	5.0	30.0	35.0	3.16	1584.89	0.315	0.549	0.574
EGPRS 850 (1 Tx slot)	824-849	5.0	28.0	33.0	2.00	251.19	0.050	0.549	0.091
EGPRS 850 (2 Tx slots)	824-849	5.0	28.0	33.0	2.00	498.82	0.099	0.549	0.181
EGPRS 850 (3 Tx slots)	824-849	5.0	27.0	32.0	1.58	594.34	0.118	0.549	0.215
EGPRS 850 (4 Tx slots)	824-849	5.0	26.0	31.0	1.26	629.46	0.125	0.549	0.228
GPRS 1900 (1 Tx slot)	1850-1910	3.0	30.0	33.0	2.00	251.19	0.050	1.000	0.050
GPRS 1900 (2 Tx slots)	1850-1910	3.0	30.0	33.0	2.00	498.82	0.099	1.000	0.099
GPRS 1900 (3 Tx slots)	1850-1910	3.0	29.0	32.0	1.58	594.29	0.118	1.000	0.118
GPRS 1900 (4 Tx slots)	1850-1910	3.0	28.0	31.0	1.26	630.96	0.126	1.000	0.126
EGPRS 1900 (1 Tx slot)	1850-1910	3.0	27.0	30.0	1.00	125.89	0.025	1.000	0.025
EGPRS 1900 (2 Tx slots)	1850-1910	3.0	27.0	30.0	1.00	250.00	0.050	1.000	0.050
EGPRS 1900 (3 Tx slots)	1850-1910	3.0	26.0	29.0	0.79	297.87	0.059	1.000	0.059
EGPRS 1900 (4 Tx slots)	1850-1910	3.0	25.0	28.0	0.63	315.48	0.063	1.000	0.063
WCDMA Band V	824-849	5.0	24.0	29.0	0.79	794.33	0.158	0.536	0.295
WCDMA Band IV	1710-1755	3.0	24.0	27.0	0.50	501.19	0.100	1.000	0.100
WCDMA Band II	1850-1910	3.0	24.0	27.0	0.50	501.19	0.100	1.000	0.100
LTE Band 17	704 - 716	5.0	23.0	28.0	0.63	630.96	0.126	0.469	0.268
LTE Band 13	777- 787 -	5.0	23.0	28.0	0.63	630.96	0.126	0.518	0.242
LTE Band 26	814 - 849	5.0	23.0	28.0	0.63	630.96	0.126	0.550	0.228
LTE Band 5	824- 849	5.0	23.0	28.0	0.63	630.96	0.126	0.549	0.229
LTE Band 4	1710 -1755	3.0	23.0	26.0	0.40	398.11	0.079	1.000	0.079
LTE Band 2	1850 -1910	3.0	23.0	26.0	0.40	398.11	0.079	1.000	0.079
LTE Band 7	2500 -2570	3.0	23.5	26.5	0.45	446.68	0.089	1.000	0.089
WLNA2.4GHz Band	2400 - 2500	6.0	20.0	26.0	0.40	398.11	0.079	1.000	0.079
WLNA5GHz Band	5150 – 5850	6.0	20.0	26.0	0.40	398.11	0.079	1.000	0.079
Bluetooth	2400 - 2500	6.0	15.0	21.0	0.13	125.89	0.025	1.000	0.025



<Collocated analysis>

General Note:

1. For collocation analysis, GPRS850 (3TX slot) 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
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
0.079	0.025	0.681	0.785

Conclusion:

Based on 47 CFR§2.1091, the analysis concludes that this product is compliant with the RF exposure requirements in mobile exposure condition, provided the peak gain of the connected WWAN antenna, the conducted power and the antenna gain of the collocated transmitter, do not exceed the limits for each frequency band listed below.

Device	Technology	Frequency (MHz)	Maximum Conducted Power (dBm)	Standalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
L830-EA	GSM	824-849	33.0	5.0	5.0
		1850 -1910	30.0	3.0	3.0
	WCDMA	824-849	24.0	5.0	5.0
		1710-1755	24.0	3.0	3.0
		1850-1910	24.0	3.0	3.0
	LTE Band 17	704 - 716	23.0	5.0	5.0
	LTE Band 13	777- 787 -	23.0	5.0	5.0
	LTE Band 26	814 - 849	23.0	5.0	5.0
	LTE Band 5	824- 849	23.0	5.0	5.0
	LTE Band 4	1710 -1755	23.0	3.0	3.0
LTE Band 2	1850 -1910	23.0	3.0	3.0	
LTE Band 7	2500 -2570	23.5	3.0	3.0	
Collocated Transmitters	WLAN	2400 - 2500	20	/	6
	WLAN	5150 - 5850	20		6
	BT	2400 - 2500	15		6