

RF EXPOSURE EVALUATION REPORT

FCC ID : MCL951993A
Equipment : LTE UE Module
Brand Name : Foxconn
Model Name : 95.1993T01
Marketing Name : 95.1993T01
Applicant : Hon Hai Precision Ind. Co., Ltd.
5F-1, 5 Hsin-An Road, Hsinchu,
Science-Based Industrial Park, Taiwan
Manufacturer : Hon Hai Precision Ind. Co., Ltd.
5F-1, 5 Hsin-An Road, Hsinchu,
Science-Based Industrial Park, Taiwan
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated in accordance with 47 CFR Part 2.1091 for the device and pass the limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

1. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
2. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	4
3. RF EXPOSURE LIMIT INTRODUCTION	5
4. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	6
4.1. Standalone Power Density Calculation	6
4.2. Collocated Power Density Calculation.....	6



History of this test report

Report No.	Version	Description	Issued Date
FA851104-01	Rev. 01	Initial issue of report	Jan. 30, 2019
FA851104-01	Rev. 02	Update section4	Feb. 20, 2019



1. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	LTE UE Module
Brand Name	Foxconn
Model Name	95.1993T01
Marketing Name	95.1993T01
FCC ID	MCL951993A
Wireless Technology and Frequency Range	LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 41L: 2496 MHz ~ 2568 MHz LTE Band 41H: 2618 MHz ~ 2690 MHz
Mode	LTE: QPSK, 16QAM, 64QAM
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Reviewed by: Eric Huang

Report Producer: Wan Liu

2. Maximum RF average output power among production units

Mode		Maximum power(dBm)
LTE	Band 25	26.5
	Band 41L	31.7
	Band 41H	31.7



3. 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

4. Radio Frequency Radiation Exposure Evaluation

4.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum Conducted (W)	Maximum EIRP (dBm)	Maximum EIRP (W)	Maximum EIRP Limit (W)	Maximum Conducted Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)
LTE Band 25	1850.0	6.50	26.50	0.447	33.000	1.995	2.000	NA	1995.262	0.397	1.000
LTE Band 41L	2496.0	11.50	31.70	1.479	43.200	20.893	NA	2.000	4763.595 ⁽²⁾	0.948	1.000
LTE Band 41H	2618.0	11.50	31.70	1.479	43.200	20.893	NA	2.000	4763.595 ⁽²⁾	0.948	1.000

Note:

- For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
- This LTE module, the TDD LTE only support network configured for type2 configuration with special sub frame7 (SSF) as uplink duty cycle is 22.8%, and the 22.8% duty cycle is consider in the TDD LTE average ERIP for the MPE evaluation

4.2. Collocated Power Density Calculation

Note:

- This LTE module, the TDD LTE only support network configured for type2 configuration with special sub frame7 (SSF) as uplink duty cycle is 22.8%, and the 22.8% duty cycle is consider in the TDD LTE average ERIP for the MPE evaluation
- This MPE analysis is applicable to any collocated transmitters with transmit power for WLAN is less than or equal to 26dBm and for Bluetooth is less than or equal to 15dBm.
- A maximum antenna gain of 5 dBi 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
LTE Band 25	1850.0	6.50	26.50	33.0	2.00	1995.26	0.397	1.000	0.397
LTE Band 41L	2496.0	10.00	31.70	41.7	14.79	3372.37 ⁽¹⁾	0.671	1.000	0.671
LTE Band 41H	2618.0	10.00	31.70	41.7	14.79	3372.37 ⁽¹⁾	0.671	1.000	0.671
WLAN2.4GHz Band	2412.0	5.0	26.0	31.0	1.26	1258.93	0.251	1.000	0.251
WLAN5GHz Band	5180.0	5.0	26.0	31.0	1.26	1258.93	0.251	1.000	0.251
Bluetooth	2402.0	5.0	15.0	20.0	0.10	100.00	0.020	1.000	0.020

<Collocated analysis>

WWAN Power Density / Limit	WLAN Power Density / Limit	Bluetooth Power Density / Limit	Σ(Power Density / Limit) of WWAN+WLAN+Bluetooth
0.671	0.251	0.020	0.942

Note:

- 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.
- Considering the WWAN module collocation with the WLAN and Bluetooth transmitter 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



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)	Standalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
LTE Module	LTE	LTE B25	1850 ~ 1915	26.5	6.5	6.5
		LTE B41L	2496 ~ 2568	31.7	11.5	10.0
		LTE B41H	2618 ~ 2690	31.7	11.5	10.0