

FCC RF Exposure Report

FCC ID : FKGEM7355
Applicant : Twinhead International Corp.
Address : 11F,550, Ruiguang Rd Neihu, Taipei, Taiwan
114, ROC
Standard : 47 CFR FCC Part 2.1091
Received Date : Aug. 06, 2015
Evaluation Date : Aug. 10, 2015

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:



Gary Chang / Manager



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Release Record

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FA572101	Rev. 01	Initial issue	Aug. 17, 2015
FA572101	Rev. 02	Modified brand name (Page 5)	Aug. 24, 2015

1 MPE EVALUATION OF MOBILE DEVICES

Human exposure to RF emissions from mobile devices (47 CFR §2.1091) may be evaluated based on the MPE limits adopted by the FCC for electric and magnetic field strength and/or power density, as appropriate, since exposures are assumed to occur at distances of 20 cm or more from persons.

1.1 LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

Frequency Range (MHz)	Power Density (mW /cm ²)	Averaging Time (minutes)
300~1500	F/1500	30
1500~100000	1.0	30

1.2 MPE EVALUATION FORMULA

$$Pd = \frac{Pt}{4 * Pi * R^2}$$

Where

Pd= Power density in mW/cm²

Pt= EIRP in Mw

Pi= 3.1416

R= Measurement distance

1.3 MPE EVALUATION RESULTS

The EUT will be installed in below hosts

Brand Name	Model Name	Product Name	Remark
DURABOOK	S15AB	Rugged Notebook PC	For marketing different
	S15ABXXXXXX(X=0~9,A~Z,and Blank)	Rugged Notebook PC	

Note 1: Above hosts contain 2 certified wireless modules as below.

1. WWAN module: FCC ID: FKGEM7355(EUT)
2. WLAN module: FCC ID: PD97265NG

1.3.1 Antenna Details of Host

WLAN Antenna

Ant. No.	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
			2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	PIFA	UFL	-0.09	1.39	1.39	0.94	0.94
2	PIFA	UFL	-0.65	1.83	0.28	0.42	0.44

WWAN Antenna

Ant. No.	Type	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)					
			704~716	777~787	817~824	824~849	1710~1755	1850~1915
1	Monopole	UFL	1.9	1.83	1.01	1.71	2.18	3.41

1.4 MPE Evaluation of Single Transmission

Evaluation result of EUT (FCC ID: PD97265NG)

Mode	Frequency Range (MHz)	Maximum Conducted Power (W)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio (Power density / Limit)
BT EDR	2402 ~2480	0.003	-0.09	20	0.0006	1	0.0006
BT LE	2402 ~2480	0.002	-0.09	20	0.0004	1	0.0004
Wi-Fi 2.4GHz	2412 ~ 2462	0.104	-0.09	20	0.0203	1	0.0203
Wi-Fi 5GHz	5150 ~ 5250	0.044	1.83	20	0.0133	1	0.0133
Wi-Fi 5GHz	5250 ~ 5350	0.092	1.39	20	0.0252	1	0.0252
Wi-Fi 5GHz	5470 ~ 5725	0.091	0.94	20	0.0225	1	0.0225
Wi-Fi 5GHz	5725 ~ 5850	0.089	0.94	20	0.0220	1	0.0220

Evaluation result of FCC ID: FKGEM7355

Mode	Frequency (MHz)	Maximum conducted power (dBm)	Duty cycle	Antenna gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio (Power density / Limit)
GPRS 2 UL	824-849	33	0.25	1.71	20	0.147	0.549	0.268
EDGE 2 UL	824-849	28	0.25	1.71	20	0.047	0.549	0.085
EDGE 3 UL	824-849	26.2	0.375	1.71	20	0.046	0.549	0.084
EDGE 4UL	824-849	25	0.5	1.71	20	0.047	0.549	0.085
GPRS 2 UL	1850-1910	30	0.25	3.41	20	0.109	1.000	0.109
EDGE 2 UL	1850-1910	27	0.25	3.41	20	0.055	1.000	0.055
EDGE 3 UL	1850-1910	25.2	0.375	3.41	20	0.054	1.000	0.054
EDGE 4UL	1850-1910	24	0.5	3.41	20	0.055	1.000	0.055
CDMA BC0	824-849	25	1	1.71	20	0.093	0.549	0.170
CDMA BC1	1850-1910	25	1	3.41	20	0.138	1.000	0.138
CDMA BC10	816.0-823.975	25	1	1.01	20	0.079	0.544	0.146
UMTS	824 - 849	24	1	1.71	20	0.074	0.549	0.135
UMTS	1710-1755	24	1	2.18	20	0.083	1.000	0.083
UMTS	1850 - 1910	24	1	3.41	20	0.110	1.000	0.110
LTE	704 - 716	24	1	1.9	20	0.077	0.469	0.165
LTE	777 - 787	24	1	1.83	20	0.076	0.518	0.147
LTE	824 - 849	24	1	1.71	20	0.074	0.549	0.135
LTE	1710 - 1755	24	1	2.18	20	0.083	1.000	0.083
LTE	1850- 1910	24	1	3.41	20	0.110	1.000	0.110
LTE	1850- 1915	24	1	3.41	20	0.110	1.000	0.110

1.5 MPE Evaluation of Simultaneous Transmission

WWAN and WLAN/BT can transmit at the same time, MPE evaluation is as below formula

$PD1 / \text{Limit}1 + PD2 / \text{Limit} 2 + \dots < 1$, PD = Power density

MPE Evaluation = Maximum MPE of WWAN + Maximum MPE of Wi-Fi + Maximum MPE of BT
 $= 0.147 / 0.549 + 0.0252 / 1 + 0.0006 / 1$
 $= 0.2938 < 1$

Conclusion

MPE evaluations of single and simultaneous transmission meet the requirement of standard.

2 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website <http://www.icertifi.com.tw>.

Linkou

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