RF Exposure Evaluation Declaration

Product Name	:	WCDMA/LTE Mobile Phone
Trade Name	:	FIH
Model No.	:	EA211002, EC211002, EC211003
FCC ID	:	RYQEA211002

Applicant	:	FIH CO., LTD.
Address	:	No.4, Minsheng St., Tu-Cheng Dist., New Taipei City 23679, Taiwan

Date of Receipt	:	May. 18, 2021
Date of Declaration	:	Jul. 12, 2021
Report No.	:	2150987R-E3082100013
Report Version	:	V1.0

Testing Laboratory
3024

RF Exposure Evaluation Declaration

Product Name	:	WCDMA/LTE Mobile Phone
Applicant	:	FIH CO., LTD.
Address	:	No.4, Minsheng St., Tu-Cheng Dist., New Taipei City 23679, Taiwan
Manufacturer	:	FIH CO., LTD.
Address	:	No.4, Minsheng St., Tu-Cheng Dist., New Taipei City 23679, Taiwan
Trade Name	:	FIH
Model No.	:	EA211002, EC211002, EC211003
FCC ID	:	RYQEA211002
EUT Voltage	:	DC 5V (adapter or host equipment) DC 3.85V for battery
Testing Voltage	:	AC 120V/60Hz (power by adapter), DC 5V
Applicable Standard	:	FCC 47 CFR Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.
Test Lab	:	Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C. TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result	:	Complied

Tested By : Scott Chang

(Scott Chang / Senior Engineer)

Approved By : Louis Hsu

(Louis Hsu / Deputy Manager)

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Jul. 12, 2021

1.1. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required	Test Site
Temperature (°C)	Peak Output Power	15 - 35	2
Humidity (%RH)		25 - 75	

Note: Test site information refers to Laboratory Information.

Laboratory Information

USA	**:**	**FCC Registration Number: TW3024**
Canada	**:**	**IC Registration Number: 22397-1 / 22397-2 / 22397-3**

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
E mail address	info.tw@dekra.com
Website	http://www.dekra.com.tw

1.2. List of Test Equipment

Conducted

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2020/11/30	2021/11/29
Pulse Power Sensor	Anritsu	MA2411B	1531043	2020/11/30	2021/11/29
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Pulse Power Sensor	Anritsu	MA2411B	1531044	2020/11/30	2021/11/29
Power Meter	Keysight	8990B	MY51000248	2021/05/21	2022/05/20
Power Sensor	Keysight	N1923A	MY57240005	2021/05/21	2022/05/20
Spectrum Analyzer	Keysight	N9030B	MY57140404	2021/05/14	2022/05/13
Spectrum Analyzer	Keysight	N9010B	MY57110159	2021/03/29	2022/03/28
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
Wideband Radio Communication Tester	R&S	CMW500	106071	2021/01/27	2022/01/26
Wireless Conn. Tester	R&S	CMW500	157118	2020/07/23	2021/07/22

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

1.3. Uncertainty

Test item	Uncertainty
Peak Output Power	± 1.27 dB

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m2)	Reference Period (minutes)
0.003-1023	170	180	-	Instantaneous*
0.1-10	-	1.6/ f	-	6**
1.29-10	193/ f 0.5	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ f 0.25	0.3444/ f 0.25	44.72/ f 0.5	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 f 0.25	0.04138 f 0.25	0.6455f0.5	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ f 1.2
150000-300000	0.354 f 0.5	9.40 x 10-4 f 0.5	3.33 x 10-4 f	616000/ f 1.2
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

2.3. Test Result of RF Exposure Evaluation

Product	WCDMA/LTE Mobile Phone		
Test Mode	Transmit Mode		
Test Condition	RF Exposure Evaluation		
Date of Test	2021/05/19 ~ 2021/06/09	Test Site	SR12-H
Temperature(°C)	23 ~ 26	Humidity (%RH)	61.0 ~ 68.0

Function	Maximum tune-up power (dBm)	Antenna Gain (dBi)	E.I.R.P (dBm)	E.I.R.P (mW)	Power Density (mW/cm^2)	Limit (mW/cm^2)	PASS / FAIL
Bluetooth	10.00	-0.50	9.500	8.913	0.002	1.000	PASS
Bluetooth LE	-1.50	-0.50	-2.000	0.631	0.000	1.000	PASS
Wi-Fi 2.4GHz	18.00	-0.50	17.500	56.234	0.011	1.000	PASS
Wi-Fi 5GHz	18.00	2.60	20.600	114.815	0.023	1.000	PASS
WCDMA Band 2	25.00	1.00	26.000	398.107	0.079	1.000	PASS
WCDMA Band 4	25.00	-1.30	23.700	234.423	0.047	1.000	PASS
WCDMA Band 5	25.00	-4.80	20.200	104.713	0.021	0.549	PASS
LTE B2	24.00	1.00	25.000	316.228	0.063	1.000	PASS
LTE B4	24.00	-1.30	22.700	186.209	0.037	1.000	PASS
LTE B5	24.00	-4.80	19.200	83.176	0.017	0.549	PASS
LTE B12	23.00	-2.50	20.500	112.202	0.022	0.466	PASS
LTE B14	23.00	-4.30	18.700	74.131	0.015	0.525	PASS
LTE B30	24.00	0.10	24.100	257.040	0.051	1.000	PASS

*Distance = 20cm

Note:

1. The antenna information is from the customer declaration.
2. The EUT description is from the customer declaration.
3. The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.
4. The results are evaluated using the maximum tune-up power.

For worst case co-location:

Function	Power Density (mW/cm^2)	Total Power Density (mW/cm^2)	Limit (mW/cm^2)	PASS / FAIL
Bluetooth	0.002	0.115	1.000	PASS
Wi-Fi 2.4GHz	0.011			
Wi-Fi 5GHz	0.023			
WCDMA Band 2	0.079			

Note:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Bluetooth + Wi-Fi 2.4GHz + Wi-Fi 5GHz + WCDMA Band 2

= 0.002 + 0.011 + 0.023 + 0.079 = 0.115 (mW/cm^2)

Therefore the maximum calculations of above situations are less than the “1” limit.