

RF EXPOSURE REPORT

REPORT NO.: SA140515E03B

MODEL NO.: J20H086

FCC ID: MCLJ20H086

RECEIVED: May 16, 2014

TESTED: May 16, 2014 to June 11, 2015

ISSUED: July 24, 2015

APPLICANT: HON HAI PRECISION IND.CO.,LTD

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA140515E03B	Original release	July 24, 2015

1. CERTIFICATION

PRODUCT: WLAN Module
BRAND NAME: FOXCONN
MODEL NO.: J20H086
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: HON HAI PRECISION IND.CO.,LTD
TESTED DATE: May 16, 2014 to June 11, 2015
STANDARDS: FCC Part 2 (Section 2.1091)
KDB 447498 D03
IEEE C95.1

The above equipment (Model: J20H086) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Phoenix Huang , Date: July 24, 2015
(Phoenix Huang, Specialist)

Approved by : May Chen , Date: July 24, 2015
(May Chen, Manager)

2. RF EXPOSURE LIMIT

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm ²)	AVERAGE TIME (minutes)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

3. MPE CALCULATION FORMULA

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

5. ANTENNA GAIN

The antennas provided to the EUT, please refer to the following table:

For WLAN								
Ant. No.	Transmitter Circuit	Brand	Ant. Model	Ant. Gain(dBi) <Including cable loss>	Freq. range (GHz)	Ant. Type	Connector Type	Cable Length (mm)
1	Chain (0)	Foxconn WiFi	J20H086	2.81	2.4	PCB printing	NA	NA
				3.03	2.45			
				3.40	2.5			
				3.47	5.15			
				3.2	5.45			
				3.79	5.85			
2	Chain (1)	Foxconn WiFi	J20H086	2.93	2.4	PCB printing	NA	NA
				2.91	2.45			
				2.76	2.5			
				2.96	5.15			
				2.57	5.45			
				2.82	5.85			
For Bluetooth								
Ant. No.	Brand	Ant. Model	Ant. Gain(dBi) <Excluding cable loss>	Freq. range (GHz)	Ant. Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
3	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.86	220 (Model No.: 822EKQ2200000001H1)
				2.45			0.89	
				2.5			0.89	
4	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.89	230 (Model No.: 822EKQ2300000001H1)
				2.45			0.92	
				2.5			0.92	
5	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.92	240 (Model No.: 822EKQ2400000001H1)
				2.45			0.95	
				2.5			0.95	

Ant. No.	Brand	Ant. Model	Ant. Gain(dBi) <Excluding cable loss>	Freq. range (GHz)	Ant. Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
6	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.95	250 (Model No.: 822EKQ2500000001H1)
				2.45			0.98	
				2.5			0.98	
7	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.98	260 (Model No.: 822EKQ2600000001H1)
				2.45			1.00	
				2.5			1.01	
8	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.01	270 (Model No.: 822EKQ2700000001H1)
				2.45			1.03	
				2.5			1.04	
9	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.04	280 (Model No.: 822EKQ2800000001H1)
				2.45			1.06	
				2.5			1.06	
10	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.07	290 (Model No.: 822EKQ2900000001H1)
				2.45			1.09	
				2.5			1.09	
11	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.10	300 (Model No.: 822EKQ3000000001H1)
				2.45			1.12	
				2.5			1.12	
12	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.13	310 (Model No.: 822EKQ3100000001H1)
				2.45			1.15	
				2.5			1.15	
13	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.16	320 (Model No.: 822EKQ3200000001H1)
				2.45			1.18	
				2.5			1.18	
14	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.19	330 (Model No.: 822EKQ3300000001H1)
				2.45			1.21	
				2.5			1.21	
15	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.21	340 (Model No.: 822EKQ3400000001H1)
				2.45			1.23	
				2.5			1.24	



A D T

Ant. No.	Brand	Ant. Model	Ant. Gain(dBi) <Excluding cable loss>	Freq. range (GHz)	Ant. Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
16	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.24	350 (Model No.: 822EKQ3500000001H1)
				2.45			1.26	
				2.5			1.27	
17	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.27	360 (Model No.: 822EKQ3600000001H1)
				2.45			1.29	
				2.5			1.30	
18	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.30	370 (Model No.: 822EKQ3700000001H1)
				2.45			1.32	
				2.5			1.33	
19	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.33	380 (Model No.: 822EKQ3800000001H1)
				2.45			1.35	
				2.5			1.36	
20	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.36	390 (Model No.: 822EKQ3900000001H1)
				2.45			1.38	
				2.5			1.39	
21	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.39	400 (Model No.: 822EKQ4000000001H1)
				2.45			1.41	
				2.5			1.41	
22	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.42	410 (Model No.: 822EKQ4100000001H1)
				2.45			1.44	
				2.5			1.44	
23	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.45	420 (Model No.: 822EKQ4200000001H1)
				2.45			1.46	
				2.5			1.47	
24	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.48	430 (Model No.: 822EKQ4300000001H1)
				2.45			1.49	
				2.5			1.50	
25	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.51	440 (Model No.: 822EKQ4400000001H1)
				2.45			1.52	
				2.5			1.53	



A D T

Ant. No.	Brand	Ant. Model	Ant. Gain(dBi) <Excluding cable loss>	Freq. range (GHz)	Ant. Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
26	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.54	450 (Model No.: 822EKQ4500000001H1)
				2.45			1.55	
				2.5			1.56	
27	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.88	220 (Model No.: 822MN82200000001H1)
				2.45			0.93	
				2.5			0.93	
28	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.91	230 (Model No.: 822MN82300000001H1)
				2.45			0.95	
				2.5			0.96	
29	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.94	240 (Model No.: 822MN82400000001H1)
				2.45			0.98	
				2.5			0.99	
30	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	0.97	250 (Model No.: 822MN82500000001H1)
				2.45			1.01	
				2.5			1.02	
31	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.00	260 (Model No.: 822MN82600000001H1)
				2.45			1.04	
				2.5			1.05	
32	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.03	270 (Model No.: 822MN82700000001H1)
				2.45			1.07	
				2.5			1.08	
33	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.07	280 (Model No.: 822MN82800000001H1)
				2.45			1.10	
				2.5			1.11	
34	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.10	290 (Model No.: 822MN82900000001H1)
				2.45			1.13	
				2.5			1.14	
35	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.13	300 (Model No.: 822MN83000000001H1)
				2.45			1.16	
				2.5			1.17	

Ant. No.	Brand	Ant. Model	Ant. Gain(dBi) <Excluding cable loss>	Freq. range (GHz)	Ant. Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
36	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.16	310 (Model No.: 822MN83100000001H1)
				2.45			1.19	
				2.5			1.20	
37	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.19	320 (Model No.: 822MN83200000001H1)
				2.45			1.22	
				2.5			1.23	
38	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.22	330 (Model No.: 822MN83300000001H1)
				2.45			1.25	
				2.5			1.26	
39	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.25	340 (Model No.: 822MN83400000001H1)
				2.45			1.29	
				2.5			1.30	
40	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.28	350 (Model No.: 822MN83500000001H1)
				2.45			1.32	
				2.5			1.33	
41	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.31	360 (Model No.: 822MN83600000001H1)
				2.45			1.35	
				2.5			1.36	
42	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.34	370 (Model No.: 822MN83700000001H1)
				2.45			1.38	
				2.5			1.39	
43	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.37	380 (Model No.: 822MN83800000001H1)
				2.45			1.41	
				2.5			1.42	
44	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.40	390 (Model No.: 822MN83900000001H1)
				2.45			1.44	
				2.5			1.45	
45	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.44	400 (Model No.: 822MN84000000001H1)
				2.45			1.47	
				2.5			1.48	

Ant. No.	Brand	Ant. Model	Ant. Gain(dBi) <Excluding cable loss>	Freq. range (GHz)	Ant. Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
46	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.47	410 (Model No.: 822MN84100000001H1)
				2.45			1.50	
				2.5			1.51	
47	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.50	420 (Model No.: 822MN84200000001H1)
				2.45			1.53	
				2.5			1.54	
48	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.53	430 (Model No.: 822MN84300000001H1)
				2.45			1.56	
				2.5			1.57	
49	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.56	440 (Model No.: 822MN84400000001H1)
				2.45			1.59	
				2.5			1.60	
50	SONY	BT-1504 (1-980-185-11)	1.71	2.4	PCB	MHF	1.59	450 (Model No.: 822MN84500000001H1)
				2.45			1.62	
				2.5			1.63	
Note: From the above antennas for BT used, the Ant. No.: 3 (BT max antenna gain: 0.85dBi) was selected as representative value for the test and its data was recorded in this report.								

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For WLAN: 15.247(2.4GHz)

802.11b

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
2412 - 2462	325.835	6.18	20	0.26898	1.00

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.18\text{dBi}$.

802.11g

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
2412 - 2462	709.261	6.18	20	0.58551	1.00

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.18\text{dBi}$.

802.11n (HT20)

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
2412 - 2462	700.427	6.18	20	0.57822	1.00

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.18\text{dBi}$.

For WLAN: 15.407(5GHz)

802.11a

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
5180 - 5240, 5260 - 5320, 5500 - 5700 & 5745 - 5825	233.91	6.33	20	0.19988	1.00

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.33\text{dBi}$.

802.11n (HT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
5180 - 5240, 5260 - 5320, 5500 - 5700 & 5745 - 5825	328.794	6.33	20	0.28097	1.00

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.33\text{dBi}$.

802.11n (HT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm ²)	LIMIT (mW/cm ²)
5190 - 5230, 5270 - 5310, 5510 - 5670 & 5755 - 5795	145.631	6.33	20	0.12445	1.00

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 6.33\text{dBi}$.

For Bluetooth:

BT-EDR (GFSK)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2402-2480	6.714	0.85	20	0.00162	1.00

BT-EDR (8DPSK)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2402-2480	7.907	0.85	20	0.00191	1.00

BT-LE (GFSK)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
2402 - 2480	12.05	0.85	20	0.00292	1.00

CONCLUSION:

Both of the Bluetooth and WLAN can transmit simultaneously, the formula of calculated the MPE is:

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

For WLAN (2.4G) and Bluetooth:

Therefore, the worst-case situation is $0.58551 / 1 + 0.00292 / 1 = 0.588$, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

For WLAN (5G) and Bluetooth:

Therefore, the worst-case situation is $0.28097 / 1 + 0.00292 / 1 = 0.284$, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

--- END ---