

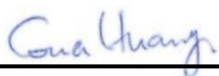
FCC SAR TEST REPORT

FCC ID : MCLT77W968
Equipment : LTE M.2 Module
Brand Name : FOXCONN
Model Name : T77W968
Applicant : HON HAI Precision Ind. Co., Ltd.
5F-1, 5, Hsin-An Road Hsinchu Science-Based
Industrial Park, Hsinchu, Taiwan
Manufacturer : HON HAI Precision Ind. Co., Ltd.
5F-1, 5, Hsin-An Road Hsinchu Science-Based
Industrial Park, Hsinchu, Taiwan
Standard : FCC 47 CFR Part 2 (2.1093)

The product was installed into Notebook Computer (Brand Name DELL, Model Name: P149G, P149G001) during test.

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provided by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been passed the FCC requirement.

The test results in this 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. Wensan Laboratory

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History of this test report

Report No.	Version	Description	Issued Date
FA171603-03	01	Initial issue of report	Jan. 18, 2022



1. Equipment Under Test (EUT) Information

1.1 General Information

Product Feature & Specification	
Equipment Name	LTE M.2 Module
Brand Name	FOXCONN
Model Name	T77W968
FCC ID	MCLT77W968
Wireless Technology and Frequency Range	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710 MHz ~ 1780 MHz RFID : 13.56 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM RFID: ASK
Remark: 1. Based on original report FCC ID: MCLT77W968, Report No.: FA171603-02 to additional Sim-Tx analysis with Qualcomm QCNFA726, FCC ID: J9C-QCNFA765.	

Host Information	
Equipment Name	Notebook Computer
Brand Name	DELL
Model Name	P149G ,P149G001
EUT Stage	Design Verification Test

WLAN Module Information	
FCC ID	J9C-QCNFA765
Integrated WLAN Module	Brand Name: Qualcomm Model Name: QCNFA765
Wireless Technology and Frequency Range	WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
Remark: 1. The Qualcomm QCNFA765 (FCC ID: J9C-QCNFA765) WLAN/BT module is also integrated into DELL P149G, P149G001 host. The WLAN/BT SAR refer to Sporton SAR Report No.: FA171603-04, FCC ID: J9C-QCNFA765 to evaluated Sim-Tx analysis with WWAN transmitter.	

Reviewed by: **Jason Wang**
Report Producer: **Carlie Tsai**

2. Guidance Applied

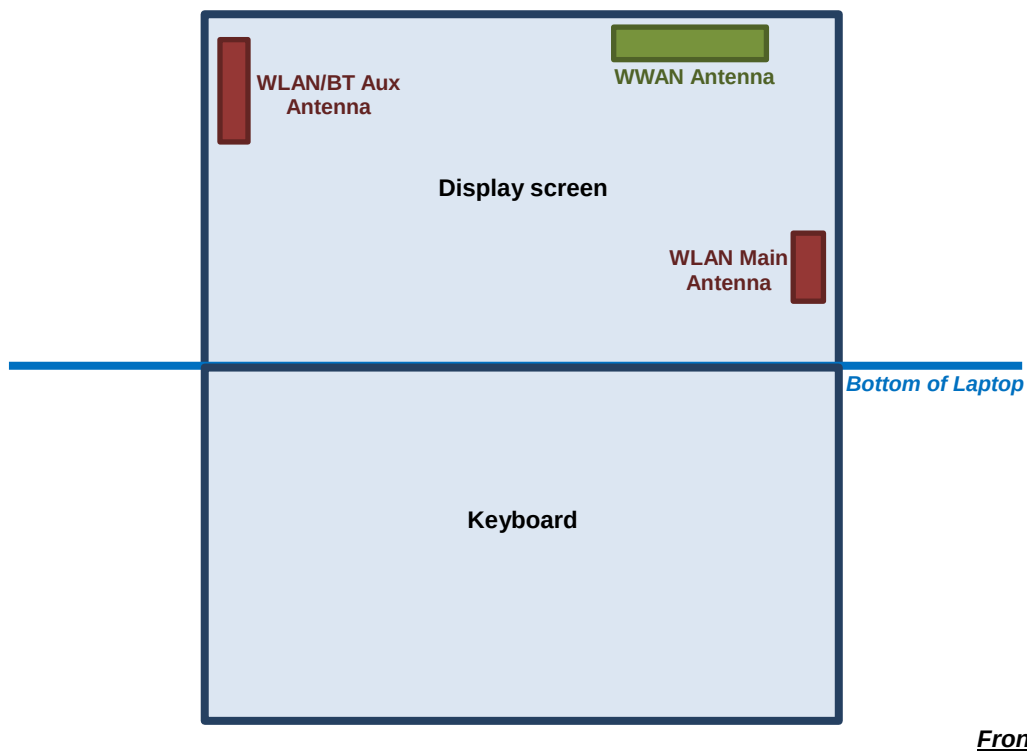
The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02

3. Maximum Tune-up limit (Unit: dBm)

Frequency Band		Tune-up Limit
WCDMA	WCDMA Band II	24.5
	WCDMA Band IV	24.5
	WCDMA Band V	24.5
LTE	Band 2	24.5
	Band 4	24.5
	Band 5	24.5
	Band 7	24.5
	Band 12	24.5
	Band 13	24.5
	Band 14	24.5
	Band 17	24.5
	Band 25	24.5
	Band 26	24.5
	Band 30	23.0
	Band 38	24.5
	Band 41	24.5
	Band 66	24.5

4. Antenna Location



The separation distance for antenna to edge:

Antenna	To Bottom of Laptop (mm)
WWAN Main Antenna	226.6
WLAN Main Antenna	53.3
WLAN/BT Aux Antenna	179.3



<SAR test exclusion table>

General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR}$$
 - f(GHz) is the RF channel transmit frequency in GHz
 - Power and distance are rounded to the nearest mW and mm before calculation
 - The result is rounded to one decimal place for comparison
6. Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
 - a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · (f(MHz)/150)] mW, at 100 MHz to 1500 MHz
 - b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · 10] mW at > 1500 MHz and ≤ 6 GHz

Exposure Position	Wireless Interface	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE Band 12	LTE Band 13	LTE Band 14	LTE Band 17	LTE Band 5	LTE Band 26	LTE Band 4	LTE Band 66	LTE Band 2	LTE Band 25	LTE Band 30	LTE Band 7	LTE Band 38	LTE Band 41
	Calculated Frequency (MHz)	846	1750	1907	715	784	795	713	848	848	1754	1779	1909	1914	2312	2567	2617	2687
	Maximum power (dBm)	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	23.0	24.5	24.5	24.5
	Maximum rated power(mW)	281.84	281.84	281.84	281.84	281.84	281.84	281.84	281.84	281.84	281.84	281.84	281.84	281.84	199.53	281.84	281.84	281.84
Bottom of Laptop	Separation distance(mm)	226.6																
	exclusion threshold	1159.0	1879.0	1875.0	1019.0	1092.0	1104.0	1017.0	1161.0	1161.0	1879.0	1878.0	1875.0	1874.0	1865.0	1860.0	1859.0	1858.0
	Testing required?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

5. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body
1.	WWAN + 2.4GHz WLAN Main + 2.4GHz WLAN Aux + WLAN 5G/6GHz Main + WLAN 5G/6GHz Aux	Yes
2.	WWAN + WLAN 5G/6GHz Main + WLAN 5G/6GHz Aux + Bluetooth Aux	Yes

General Note:

- Based on original report FCC ID: MCLT77W968, Report No.: FA171603-02 to additional Sim-Tx analysis with Qualcomm QCNFA726, FCC ID: J9C-QCNFA765.
- According to KDB 447498 D01v06, an estimated 0.4 W/kg for 1-g SAR, when the test separation distance is > 50 mm is used for Sim-Tx analysis.
- The Scaled SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - Scalar SAR summation < 1.6W/kg.
 - $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.

5.1 Body Exposure Conditions

Exposure Position	1	2	3	4	5	6	1+2+3+4+5 Summed 1g SAR (W/kg)	1+4+5+6 Summed 1g SAR (W/kg)
	WWAN	2.4GHz WLAN Main	2.4GHz WLAN Aux	5G/6G Hz WLAN Main	5G/6G Hz WLAN Aux	Bluetooth Aux		
	Estimated 1g SAR(W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
Bottom of Laptop at 0mm	0.400	0.009	0.001	0.032	0.001	0.001	0.443	0.434

6. References

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [6] FCC KDB 616217 D04 v01r02, "SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers", Oct 2015
- [7] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [8] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.