

## RF Exposure Report

**Report No.:** SA201119E01-2

**FCC ID:** J9C-QCNFA765

**Test Model:** QCNFA765

**Received Date:** Nov. 19, 2020

**Test Date:** Mar. 30 to July 05, 2021

**Issued Date:** Sep. 30, 2021

**Applicant:** Qualcomm Technologies, Inc.

**Address:** 5775 Morehouse Drive, San Diego, CA 92121-1714

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwa.

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan.

**FCC Registration /  
Designation Number:** 723255 / TW2022

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### Release Control Record

Issue No.	Description	Date Issued
SA201119E01-2	Original release.	Sep. 30, 2021

## 1 Certificate of Conformity

**Product:** Wi-Fi 6E BT 5.2 M.2 2230 Module

**Brand:** Qualcomm

**Test Model:** QCNFA765

**Sample Status:** Engineering sample

**Applicant:** Qualcomm Technologies, Inc.

**Test Date:** Mar. 30 to July 05, 2021

**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.3-2002

The above equipment 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:** Sep. 30, 2021  
Phoenix Huang / Specialist

**Approved by :** Clark Lin , **Date:** Sep. 30, 2021  
Clark Lin / Technical Manager

## 2 RF Exposure

### 2.1 Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (minutes)
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 <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * pi * r^2)$$

where

Pd = power density in mW/cm<sup>2</sup>

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

### 2.3 Classification

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

## 2.4 Antenna Gain

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
1	Chain0/1	HONGBO	260-25094	3.53	2.4~2.4835 GHz	0.76	PIFA	i-pex(MHF 4L)	300mm
				3.06	5.15~5.25 GHz	1.16			
				3.07	5.25~5.35 GHz	1.18			
				4.81	5.47~5.725 GHz	1.2			
				4.2	5.725~5.850 GHz	1.27			
2	Chain0/1	HONGBO	260-25083	5.09	5.850~5.895 GHz	1.29	PIFA	i-pex(MHF 4L)	300mm
				5.14	5.925~6.425 GHz	1.32			
				5.09	6.425~6.525 GHz	1.35			
				5.16	6.525~6.875 GHz	1.4			
				5.12	6.875~7.125 GHz	1.45			
3	Chain0/1	HONGBO	260-25084	3.22	2.4~2.4835 GHz	0.5	Monopole	i-pex(MHF 4L)	200mm
				3.35	5.150~5.250 GHz	0.76			
				3.42	5.250~5.350 GHz	0.78			
				4.77	5.470~5.725 GHz	0.81			
				4.72	5.725~5.850 GHz	0.85			
				4.71	5.850~5.895 GHz	0.86			
				4.75	5.925~6.425 GHz	0.87			
				4.29	6.425~6.525 GHz	0.91			
				4.81	6.525~6.875 GHz	0.96			
				4.74	6.875~7.125 GHz	0.98			

Note: The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

## 2.5 Calculation Result

For 2.4GHz, 5GHz, 6GHz and Bluetooth data was copied from the original test report (Report No.: SA201119E01)

Operation Mode	Max Avg. Power (dBm)	Max Avg. Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WLAN 2.4GHz	24.50	281.838	6.54	20	0.25277	1
WLAN 5GHz	22.50	177.828	7.82	20	0.21416	1
WLAN 5.9GHz	20	100	8.1	20	0.12845	1
WLAN 6GHz	22.50	177.828	8.17	20	0.23213	1
Bluetooth	16	39.811	3.53	20	0.01785	1

### NOTE:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: Directional gain = 3.53dBi + 10log(2) = 6.54dBi  
 5GHz:  
 U-NII-1: Directional gain = 3.35dBi + 10log(2) = 6.36dBi  
 U-NII-2A: Directional gain = 3.42dBi + 10log(2) = 6.43dBi  
 U-NII-2C: Directional gain = 4.81dBi + 10log(2) = 7.82dBi  
 U-NII-3: Directional gain = 4.72dBi + 10log(2) = 7.73dBi  
 U-NII-4: Directional gain = 5.09dBi + 10log(2) = 8.1dBi  
 6GHz:  
 U-NII-5: Directional gain = 5.14dBi + 10log(2) = 8.15dBi  
 U-NII-6: Directional gain = 5.09dBi + 10log(2) = 8.10dBi  
 U-NII-7: Directional gain = 5.16dBi + 10log(2) = 8.17dBi  
 U-NII-8: Directional gain = 5.12dBi + 10log(2) = 8.13dBi
- This power include tune-up tolerance range that specified in QCNFA765 Tune Up power table.
- BT-LE and BT-EDR can't transmit simultaneously.

**Conclusion:**

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

Simultaneously transmission condition.

Condition	Technology	
1	WLAN(2.4GHz)	WLAN(6GHz)
2	WLAN(2.4GHz)	WLAN(5GHz)
3	WLAN(2.4GHz)	WLAN(5.9GHz)
4	WLAN(6GHz)	Bluetooth
5	WLAN(5GHz)	Bluetooth
6	WLAN(5.9GHz)	Bluetooth

$WLAN\ 2.4GHz + WLAN\ 6GHz = 0.25277 / 1 + 0.23213 / 1 = 0.48490$

$WLAN\ 2.4GHz + WLAN\ 5GHz = 0.25277 / 1 + 0.21416 / 1 = 0.46693$

$WLAN\ 2.4GHz + WLAN\ 5.9GHz = 0.25277 / 1 + 0.12845 / 1 = 0.38122$

$WLAN\ 6GHz + Bluetooth = 0.23213 / 1 + 0.01785 / 1 = 0.24998$

$WLAN\ 5GHz + Bluetooth = 0.21416 / 1 + 0.01785 / 1 = 0.23201$

$WLAN\ 5.9GHz + Bluetooth = 0.12845 / 1 + 0.01785 / 1 = 0.14630$

**Therefore the maximum calculations of above situations are less than the "1" limit.**

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