RF Exposure Report

Report No.: SABARR-WTW-P20110181K

FCC ID: RAS-MT7921K

Test Model: MT7921K

Received Date: 2021/10/21

Test Date: 2021/12/20

Issued Date: 2022/1/18

Applicant: MediaTek Inc.

Address: No. 1, Dusing 1st Rd., Hsinchu Science Park Hsinchu City 30078 Taiwan

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
SABARR-WTW-P20110181K	Original release.	2022/1/18

1   Certificate of Conformity

Product:	2TX 11ax (WiFi6E) + BT/BLE Combo Card
Brand:	MediaTek
Test Model:	MT7921K
Sample Status:	Engineering sample
Applicant:	MediaTek Inc.
Test Date:	2021/12/20
Standards:	FCC Part 2 (Section 2.1091)
	KDB 447498 D01 General RF Exposure Guidance v06

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 :   _Vivian Huang_   , **Date:**   2022/1/18

Vivian Huang / Specialist

Approved by : _____   , **Date:**   2022/1/18

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^2)	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^2)*	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^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

2.3 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**.

2.4 Antenna Gain

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
1	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA	150	2.4~2.4835GHz : 0.5 5.15~5.85GHz : 0.8	2.92 4.67
	Chain1	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA	150	2.4~2.4835GHz : 0.5 5.15~5.85GHz : 0.8	2.92 4.67
2	Chain0	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
	Chain1	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
3	Chain0	PSA	RFMTA311020EMMB301	1.71 4.82 3.31	2.4~2.4835 5.15~5.85 5.92~7.125	PIFA	i-pex(MHF)	200	-	-
	Chain1	PSA	RFMTA311020EMMB301	1.71 4.82 3.31	2.4~2.4835 5.15~5.85 5.92~7.125	PIFA	i-pex(MHF)	200	-	-
4	Chain0	PSA	RFMTA311020EMMB301_V02	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)	200	-	-
	Chain1	PSA	RFMTA311020EMMB301_V02	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)	200	-	-
5	Chain0	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG	40	-	-
	Chain1	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG	40	-	-

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
6	Chain0	Luxshare-ICT	LA9RF059-CS-H (Main)	0.3 1.3 1.2	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	925	-	-
	Chain1	Luxshare-ICT	LA9RF059-CS-H (Aux)	-1.10 -1.10 1.4	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	876	-	-
7	Chain0	ASUS	14008-02650500 Main ant.	1.03 2.07 2.80	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	800	-	-
	Chain1	ASUS	14008-02650500 Aux ant.	2.27 2.01 3.08	2.4~2.4835 5.15~5.85 5.925~7.125	Dipole	RP SMA PLUG	800	-	-

∗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 of Maximum Conducted Power

All data (except WLAN U-NII-4) was copied from the original test report (Report No.: SABARR-WTW-P21030485F).

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm²)	Limit (mW/cm²)
WLAN 2.4GHz	2412-2472	170.373	6.19	20	0.14097	1
WLAN U-NII-1	5280-5240	143.816	7.93	20	0.17764	1
WLAN U-NII-2A	5260-5320	147.866	7.93	20	0.18264	1
WLAN U-NII-2C	5500-5720	156.514	7.93	20	0.19332	1
WLAN U-NII-3	5745-5825	193.138	7.93	20	0.23856	1
WLAN U-NII-4	5845~5885	191.013	7.93	20	0.23594	1
WLAN U-NII-5	5955-6415	15.491	6.32	20	0.01321	1
WLAN U-NII-6	6435-6525	15.333	6.32	20	0.01307	1
WLAN U-NII-7	6525-6875	14.896	6.32	20	0.0127	1
WLAN U-NII-8	6875-7115	14.749	6.32	20	0.01257	1
Bluetooth (BT-EDR)	2402-2480	15.596	3.18	20	0.00645	1
Bluetooth (BT-LE)	2402-2480	15.959	3.18	20	0.00660	1

NOTE:
1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz: Directional gain = 3.18dBi + 10log(2) = 6.19dBi
   5GHz: Directional gain = 4.92dBi + 10log(2) = 7.93dBi
   6GHz: Directional gain = 3.31dBi + 10log(2) = 6.32dBi
3. 2.4GHz & 5GHz/6GHz technology cannot transmit at same time.

Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + Bluetooth = 0.14097 / 1 + 0.00660 / 1 = 0.14757

WLAN 5GHz + Bluetooth = 0.23856 / 1 + 0.00660 / 1 = 0.24516

WLAN 6GHz + Bluetooth = 0.01321 / 1 + 0.00660 / 1 = 0.01981

WLAN 5.9GHz + Bluetooth = 0.23594 / 1 + 0.00660 / 1 = 0.24254

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

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