

RF Exposure Report

Report No.: SABARR-WTW-P20110181L

FCC ID: RAS-MT7921K

Test Model: MT7921K

Received Date: July 29, 2021

Test Date: Aug. 06, 2021

Issued Date: Jan. 06, 2022

Applicant: MediaTek Inc.

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

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

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Release Control Record

Issue No.	Description	Date Issued
SABARR-WTW-P20110181L	Original release.	Jan. 06, 2022

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: Aug. 06, 2021

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.

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Approved by : Clark Lin , **Date:** Jan. 06, 2022
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

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

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

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

Original

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	AN2450-4902BR S	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	AN2450-4902BR S	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	RFMTA340718E MLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
	Chain1	PSA	RFMTA340718E MLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
3	Chain0	PSA	RFMTA311020E MMB301	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	RFMTA311020E MMB301	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	RFMTA311020E MMB301_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	RFMTA311020E MMB301_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	-	-
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	-	-

8	Chain0	MSI	WA-P-LE-02-045 (Main)	2.24 2.68 3.01 -1.23 -1.96 -3.68	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	IPEX-4L	190	2.4~2.4835GHz: 0.72 5.15~5.85GHz: 1.12 5.925~6.425 GHz: 1.21 6.425~6.525 GHz: 1.19 6.525~6.875 GHz: 1.21 6.875~7.125 GHz: 1.29	2.96 3.8 4.22 0.04 0.75 2.39
	Chain1	MSI	WA-P-LE-02-046 (Aux)	-2.96 1.16 0.99 -2.31 -2.54 -7.44	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	IPEX-4L	325	2.4~2.4835GHz: 1.3 5.15~5.85GHz: 2.16 5.925~6.425 GHz: 2.2 6.425~6.525 GHz: 2.23 6.525~6.875 GHz: 2.25 6.875~7.125 GHz: 2.34	1.66 3.32 3.19 0.08 0.29 -5.1

Newly

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)
9	Chain0	PSA	RFPCA460632I MMB701	-13.20 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX	320	-	-
	Chain1	PSA	RFPCA460632I MMB701	-13.20 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX	320	-	-
10	Chain0	PSA	RFMTA421230I MMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	IPEX	300	-	-
	Chain1	PSA	RFMTA421230I MMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	IPEX	300	-	-

*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 was copied from the original test report (Report No.: SABARR-WTW-P20110181H).

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
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-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:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 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
- 2.4GHz & 5GHz/6GHz technology cannot transmit at same time.

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

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 = $0.01321 / 1 + 0.00660 / 1 = 0.01981$

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

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