



RADIO EXPOSURE TEST REPORT

FCC ID : RAS-MT7920

Equipment : 2TX 11ax (WiFi6) BW80 + BT/BLE Combo Card

Brand Name : MediaTek

Model Name : MT7920

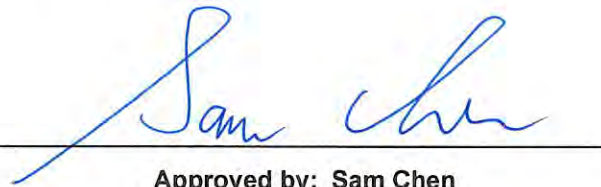
Applicant : MediaTek Inc.
No.1, Dusing 1st Rd., Hsinchu Science Park, Hsinchu City
30078, Taiwan

Manufacturer : MediaTek Inc.
No.1, Dusing 1st Rd., Hsinchu Science Park, Hsinchu City
30078, Taiwan

Standard : 47 CFR Part 2.1091

The product was received on Mar. 13, 2024, and testing was started from Mar. 19, 2024 and completed on May 13, 2024. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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Photographs of EUT v01



History of this test report

TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A1_1 Ver1.1

Page Number : 3 of 11
Issued Date : May 29, 2024
Report Version : 01



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Cathy Chiu



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2472	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850 5725-5895	5180-5240 5260-5320 5500-5720 5745-5825 5835-5885	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Bluetooth	2400-2483.5	2402-2480	BR / EDR: FHSS (GFSK / $\pi/4$ -DQPSK / 8DPSK)
	2400-2483.5	2402-2480	LE: GFSK
		2404-2478	



1.2 Antenna Information

Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	Bluetooth					
1	1/2	1/2	1	Walsin	RFMTA340718EMLB302	PIFA	MHF4L	Note1
2	1/2	1/2	1	Cortec	AN2450-4902BRS	Dipole	Reversed-SMA	
3	1/2	1/2	1	Changshu HongBo Telecommunication	260-25095_20240201	Monopole	MHF4L	

Note1:

Ant.	Port			Antenna Gain (dBi)		
	WLAN 2.4GHz	WLAN 5GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
1	1/2	1/2	1	3.18	4.92	3.18
3	1/2	1/2	1	3.11	4.91	3.11

Ant.	Port			Antenna Gain (dBi)			Cable Loss (dBm)			Net Gain (dBi)		
	WLAN 2.4GHz	WLAN 5GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz	Bluetooth	WLAN 2.4GHz	WLAN 5GHz	Bluetooth
2	1/2	1/2	1	2.92	4.67	2.92	0.47	0.94	0.47	2.45	3.73	2.45

Note2: The EUT has three antennas, only the highest gain antenna 1 was selected to test and record in this report.

Note3: The above information was declared by manufacturer.

Note4: Directional gain information

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{SS}} S_{j,k} \right)^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{SS}} S_{j,k} \right)^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{SS}} S_{j,k} \right)^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{ANT}} \left(\sum_{k=1}^{N_{SS}} S_{j,k} \right)^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20} ; NSS1(g1,2) = 10^{G3/20} ; NSS1(g1,2) = 10^{G4/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2$$

$$DG = 10 \log[(NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2 / N_{ANT}] \Rightarrow 10$$

$$\log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / N_{ANT}]$$

Where ;

$$2.4G \ G1 = 3.18 \text{ dBi} ; G2 = 3.18 \text{ dBi} ;$$

$$5G \text{ UNII-1} \ G1 = 4.92 \text{ dBi} ; G2 = 4.92 \text{ dBi} ;$$

$$5G \text{ UNII-2A} \ G1 = 4.92 \text{ dBi} ; G2 = 4.92 \text{ dBi} ;$$

$$5G \text{ UNII-2C} \ G1 = 4.92 \text{ dBi} ; G2 = 4.92 \text{ dBi} ;$$

$$5G \text{ UNII-3} \ G1 = 4.92 \text{ dBi} ; G2 = 4.92 \text{ dBi} ;$$

$$5G \text{ UNII-4} \ G1 = 4.92 \text{ dBi} ; G2 = 4.92 \text{ dBi} ;$$

$$2.4G \ DG = 6.19 \text{ dBi}$$

$$5G \text{ UNII-1} \ DG = 7.93 \text{ dBi}$$

$$5G \text{ UNII-2A} \ DG = 7.93 \text{ dBi}$$

$$5G \text{ UNII-2C} \ DG = 7.93 \text{ dBi}$$

$$5G \text{ UNII-3} \ DG = 7.93 \text{ dBi}$$

$$5G \text{ UNII-4} \ DG = 7.93 \text{ dBi}$$

<WLAN 2.4GHz Function>

For IEEE 802.11b/g/n/VHT/ax (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

<WLAN 5GHz Function>

For IEEE 802.11a/n/ac/ax (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

<Bluetooth Function> (1TX/1RX):

Only Port 1 can be used as transmitting/receiving.



1.3 Accessories

N/A

1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2.1091
 - ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01
- The following reference test guidance is not within the scope of accreditation of TAF.
- ♦ 47 CFR Part 1.1307
 - ♦ 47 CFR Part 1.1310

1.5 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
	Test site Designation No. TW3787 with FCC.
	Conformity Assessment Body Identifier (CABID) TW3787 with ISED.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*(100)	<6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1500	-	-	f/300	<6
1500-100,000	-	-	5	<6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= Pth.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance

R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.
Note: R is in meters, f is in MHz.	



2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
2.4G;G1D	3.18	25.61	26.64	0.50	517.607	20	B	3060.0	0.1692
5.2G;D1D	4.92	22.39	25.16	0.50	368.129	20	B	3060.0	0.1203
5.3G;D1D	4.92	22.43	25.20	0.50	371.535	20	B	3060.0	0.1215
5.6G;D1D	4.92	23.87	26.64	0.50	517.607	20	B	3060.0	0.1692
5.8G;D1D	4.92	26.79	29.56	0.50	1013.911	20	B	3060.0	0.3315
5.81G;D1D	4.92	21.79	24.56	0.50	320.627	20	B	3060.0	0.1048
2.4G;BT-BR	3.18	12.78	13.81	0.50	26.977	20	B	3060.0	0.0088
2.4G;BT-LE	3.18	12.98	14.01	0.50	28.249	20	B	3060.0	0.0092

Simultaneous Transmission Analysis Mode: WLAN 5GHz + Bluetooth

Mode	DG (dBi)	Power (dBm)	ERP (dBm)	Tolerance (dB)	Tune-up ERP (mW)	Distance (cm)	Option	TL ERP (mW)	TL Ratio
5.8G;D1D	4.92	26.79	29.56	0.50	1013.911	20	B	3060.0	0.3315
2.4G;BT-LE	3.18	12.98	14.01	0.50	28.249	20	B	3060.0	0.0092
Sum TL Ratio_B	0.3407								
Ratio Limit	1								

Note: The above antenna gain was declared by manufacturer.

————THE END————