

RF Exposure Report

Report No.: MFBCKS-WTW-P21030822A

FCC ID: UDX-60083011

Test Model: MR56-HW

Received Date: 2018/7/5

Test Date: 2018/10/18 ~ 2018/10/19 ; 2022/8/26

Issued Date: 2022/11/3

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



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Release Control Record

Issue No.	Description	Date Issued
MFBCKS-WTW-P21030822A	Original release.	2022/11/3

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/cm²

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 34cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna No.	Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type
Dual_Ant 1 (Red)	5.44	2.4~2.4835	PIFA	i-pex
	4.88	5.15~5.25		
	5.45	5.25~5.35		
	5.54	5.47~5.725		
	5.87	5.725~5.85		
Dual_Ant 2 (Orange)	4.67	2.4~2.4835	PIFA	i-pex
	6.2	5.15~5.25		
	6.44	5.25~5.35		
	5.69	5.47~5.725		
	6.39	5.725~5.85		
Dual_Ant 3 (Yellow)	4.9	2.4~2.4835	PIFA	i-pex
	5.18	5.15~5.25		
	5.94	5.25~5.35		
	5.34	5.47~5.725		
	5.58	5.725~5.85		
Dual_Ant 4 (Green)	5.54	2.4~2.4835	PIFA	i-pex
	5.25	5.15~5.25		
	5.5	5.25~5.35		
	4.27	5.47~5.725		
	5.16	5.725~5.85		
5G_Ant 1 (Blue)	5.35	5.15~5.25	PIFA	i-pex
	5.28	5.25~5.35		
	4.96	5.47~5.725		
	5.66	5.725~5.85		
5G_Ant 2 (White)	5.95	5.15~5.25	PIFA	i-pex
	5.81	5.25~5.35		
	5.29	5.47~5.725		
	5.57	5.725~5.85		
5G_Ant 3 (Grey)	4.65	5.15~5.25	PIFA	i-pex
	5.4	5.25~5.35		
	4.92	5.47~5.725		
	4.27	5.725~5.85		
5G_Ant 4 (Black)	5.67	5.15~5.25	PIFA	i-pex
	5.19	5.25~5.35		
	5.8	5.47~5.725		
	5.7	5.725~5.85		
Scanning Ant.	3.69	2.4~2.4835	PIFA	i-pex
	5.43	5.15~5.25		
	4.97	5.25~5.35		
	4,71	5.47~5.725		
	5.01	5.725~5.85		
Bluetooth Ant.	3.61	2.4~2.4835	PIFA	i-pex

WLAN Directional gain table – 8TX

Frequency range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
5.15 ~ 5.25	9.29	PIFA	i-pex(MHF)
5.25 ~ 5.35	9.34		
5.47 ~ 5.725	8.88		
5.725 ~ 5.85	9.2		

WLAN Directional gain table – 4TX

Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	Dual_1+Dual_2+Dual_3+Dual_4	6.57	PIFA	i-pex(MHF)
5.15 ~ 5.25	Single_1+Single_2+Single_3+Single_4	10.73		
5.25 ~ 5.35		10.71		
5.47 ~ 5.725		10.33		
5.725 ~ 5.85		10.68		

WLAN Directional gain table – 2TX

Frequency range (GHz)	Antenna Combine Type	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4 ~ 2.4835	Dual_1+Dual_3	6.33	PIFA	i-pex(MHF)
5.15 ~ 5.25	Dual_2+Dual_3	8.47		
5.25 ~ 5.35		8.92		
5.47 ~ 5.725		8.16		
5.725 ~ 5.85		8.59		

Bluetooth antenna spec.

Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Antenna Connector
3.61	2.4~2.4835	PIFA	i-pex(MHF)

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2.5 Calculation Result of Maximum Conducted Power

All Max Power (except Bluetooth) was refer to the original FCC ID: UDX-60083010

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 (4TX)	2437	864.55	6.57	34	0.27016	1
WLAN 2.4GHz (2TX)	2437	456.82	6.33	34	0.13508	1
WLAN 2.4GHz (1TX)	2437	204.174	5.54	34	0.05033	1
WLAN U-NII-1 (8TX)	5180	432.724	9.29	34	0.25295	1
WLAN U-NII-1 (4TX)	5230	430.677	10.73	34	0.35074	1
WLAN U-NII-1 (2TX)	5200	376.099	8.47	34	0.18203	1
WLAN U-NII-1 (1TX)	5200	224.905	6.2	34	0.06454	1
WLAN U-NII-2A (8TX)	5290	112.582	9.34	34	0.06657	1
WLAN U-NII-2A (4TX)	5270	156.395	10.71	34	0.12678	1
WLAN U-NII-2A (2TX)	5270	224.418	8.92	34	0.12047	1
WLAN U-NII-2A (1TX)	5300	110.662	6.44	34	0.03356	1
WLAN U-NII-2C (8TX)	5550	127.845	8.88	34	0.06800	1
WLAN U-NII-2C (4TX)	5610	238.486	10.33	34	0.17713	1
WLAN U-NII-2C (2TX)	5670	227.318	8.16	34	0.10244	1
WLAN U-NII-2C (1TX)	5580	110.662	5.8	34	0.02896	1
WLAN U-NII-3 (8TX)	5825	412.219	9.2	34	0.23603	1
WLAN U-NII-3 (4TX)	5825	902.442	10.68	34	0.72653	1
WLAN U-NII-3 (2TX)	5745	440.884	8.59	34	0.21936	1
WLAN U-NII-3 (1TX)	5745	238.781	6.39	34	0.07159	1
BT-LE	2402	4.592	3.61	34	0.00071	1

Note:

1. The Max. Power = Max. tune up power including tolerance.

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 + WLAN 5GHz + Bluetooth = $0.27016 / 1 + 0.72653 / 1 + 0.00073 / 1 = 0.99742$

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

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