RF Exposure Report

Report No.:	SABCKS-WTW-P20110426
FCC ID:	K7S-03685
Test Model:	MX8500
Series Model:	MX85EC, MX85WH, MX85MS
Received Date:	Nov. 12, 2020
Test Date:	Dec. 08, 2020
Issued Date:	Mar. 02, 2021
Applicant:	Belkin International, Inc.
Address:	12045 East Waterfront Drive, Playa Vista, CA 90094
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, Taiwan
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
SABCKS-WTW-P20110426	Original release.	Mar. 02, 2021

1 Certificate of Conformity

Product:	Linksys Tri-Band 802.11ax Wireless Router
Brand:	Linksys
Test Model:	MX8500
Series Model:	MX85EC, MX85WH, MX85MS
Sample Status:	Engineering sample
Applicant:	Belkin International, Inc.
Test Date:	Dec. 08, 2020
Standards:	FCC Part 2 (Section 2.1091) IEEE C95.3 -2002
References Test Guidance:	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 : _____ , **Date:** Mar. 02, 2021

Claire Kuan / Specialist

Approved by : _____ , **Date:** Mar. 02, 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^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 30 cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

For WLAN(2.4 GHz)

Antenna Type	Dipole on PCB
Antenna Connector	i-pex (MHF)
Antenna No.	Gain (dBi)
	2.4~2.4835GHz
Ant1	2.5
Ant2	3.1
Ant3	3.1
Ant4	2.8

The following antenna allocation table was provided to the EUT.

2G Antenna port		2G Antenna port		TX Function	
Degree -45°	2GA1	Degree +45°	2GB1	MIMO	Correlated
Degree -45°	2GA2	Degree +45°	2GB2	MIMO	

For WLAN(5GHz)

Antenna Type	Dipole on PCB	
Antenna Connector	i-pex (MHF)	
Antenna No.	Gain (dBi)	
	5150MHz ~ 5250MHz	5745MHz ~ 5825MHz
Ant1	4.9	5.4
Ant2	5.1	4.8
Ant3	4.1	5.7
Ant4	3.0	5.8

The following antenna allocation table was provided to the EUT.

5G Antenna port		5G Antenna port		TX Function	
Degree -45°	5GC	Degree +45°	5GD	MIMO	Correlated
Degree -45°	5GA	Degree +45°	5GB	MIMO	

For WLAN(6GHz)

Antenna Type	Dipole on PCB			
Antenna Connector	i-pex (MHF)			
Antenna No.	Gain (dBi)			
	5105MHz~6425MHz	6425MHz~6525MHz	6525MHz~6875MHz	6875MHz~7125MHz
Ant1	5.3	4.3	3.6	4.1
Ant2	4.8	4.1	3.4	4.4
Ant3	5.1	5.1	4.5	4.8
Ant4	3.2	4.5	5.4	5.9

The following antenna allocation table was provided to the EUT.

6G Antenna port		6G Antenna port		TX Function	
Degree -45°	6GD	Degree +45°	6GC	MIMO	Correlated
Degree -45°	6GB	Degree +45°	6GA	MIMO	

For BT-LE

Frequency Range (GHz)	Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4~2.4835	2	PCB	i-pex(MHF)

Note:

All antennas are dipole type. Thus antennas are all used the same type, the difference is only in the placement direction. According this condition, 2GA1 / 2GA2 are cross-polarization, 2GB1 / 2GB2 are cross-polarization, 5GA / 5GC are cross-polarization, 5GB / 5GD are cross-polarization, 6GA / 6GC are cross-polarization, 6GB / 6GD are cross-polarization.

*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

Operation Mode	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Pass / Fail
WLAN 2.4GHz	993.158	5.96	30	0.34639	1	Pass
WLAN 5GHz U-NII-1	653.703	8.01	30	0.36553	1	Pass
WLAN 5GHz U-NII-3	689.979	8.76	30	0.45855	1	Pass
BT-LE	9.354	2	30	0.00131	1	Pass
Operation Mode	Max. EIRP (mW)		Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Pass / Fail
WLAN 6GHz U-NII-5	509.33		30	0.04508	1	Pass
WLAN 6GHz U-NII-6	249.459		30	0.02204	1	Pass
WLAN 6GHz U-NII-7	518.8		30	0.04589	1	Pass
WLAN 6GHz U-NII-8	522.396		30	0.04619	1	Pass

Note: 1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. For WLAN 2.4GHz_802.11b: Directional gain = 10 log[$(10^{G1/20} + 10^{G3/20})^2$ / 2] = 5.96dBi
3. For WLAN 2.4GHz_802.11g: Directional gain = 10 log[$(10^{G2/20} + 10^{G3/20})^2$ / 2] = 5.96dBi
4. For WLAN 2.4GHz_802.11n (HT20), VHT20, 802.11ax (HE20): Directional gain = 10 log[$(10^{G2/20} + 10^{G3/20})^2$ / 2] = 5.96dBi
5. For WLAN 2.4GHz_802.11n (HT40), VHT40, 802.11ax (HE40): Directional gain = 10 log[$(10^{G2/20} + 10^{G3/20})^2$ / 2] = 5.96dBi
6. For WLAN 5GHz U-NII-1: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$/4] = 8.01dBi
9. For WLAN 5GHz U-NII-3: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$/4] = 8.76dBi
10. For WLAN 6GHz U-NII-5: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 8.06dBi
11. For WLAN 6GHz U-NII-6: Directional gain = 10 log[$(10^{G2/20} + 10^{G3/20})^2$ / 2] = 7.82dBi
12. For WLAN 6GHz U-NII-7: Directional gain = 10 log[$(10^{G2/20} + 10^{G3/20})^2$ / 2] = 7.97dBi
13. For WLAN 6GHz U-NII-8: Directional gain = 10 log[$(10^{G2/20} + 10^{G3/20})^2$ / 2] = 8.38dBi

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 + WLAN 5GHz + BT-LE + WLAN 6GHz =

0.34639 / 1 + 0.45855 / 1 + 0.0.00131 / 1 + 0.4619 / 1= 0.85244

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

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