RF Exposure Report

Report No.:	SABCKS-WTW-P21100666
FCC ID:	NKR-XIONEWN
Test Model:	WNXI11AEIBCO
Series Model:	WNXIxxAEIxCO (The fifth and sixth character “xx” can be 0 to 9, A to Z, a to z ; the tenth character “x” can be B=Black, G=Gray and W=White for external body color for product)
Received Date:	2021/10/21
Test Date:	2021/11/12
Issued Date:	2021/12/14
Applicant:	Wistron NeWeb Corp.
Address:	20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.
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

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
SABCKS-WTW-P21100666	Original release.	2021/12/14

1 Certificate of Conformity

Product:	STB (Set Top Box), XiOne-WN
Brand:	Xfinity
Test Model:	WNXI11AEIBCO
Series Model:	WNXIxxAEIxCO (The fifth and sixth character “xx” can be 0 to 9, A to Z, a to z ; the tenth character “x” can be B=Black, G=Gray and W=White for external body color for product)
Sample Status:	Engineering sample
Applicant:	Wistron NeWeb Corp.
Test Date:	2021/11/12
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:** 2021/12/14

Vivian Huang / Specialist

Approved by : , **Date:** 2021/12/14

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

2.4 Antenna Gain

Antenna NO.	RF Chain NO.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
1	0	2.93	2.4~2.4835GHz	Printed	NA
		3.84	5.15~5.85GHz		
2	1	2.7	2.4~2.4835GHz	Printed	NA
		4.03	5.15~5.85GHz		
3 (For BT/Zigbee)	2	1.17	2.4~2.4835GHz	Printed	NA

*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

CDD Mode

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Pass/ Fail
WLAN 2.4GHz	2412-2462	311.013	2.93	20	0.12148	1	Pass
WLAN 5GHz (U-NII-1)	5180-5240	212.843	4.03	20	0.1071	1	Pass
WLAN 5GHz (U-NII-2A)	5260-5320	197.055	4.03	20	0.09916	1	Pass
WLAN 5GHz (U-NII-2C)	5500-5720	197.319	4.03	20	0.09929	1	Pass
WLAN 5GHz (U-NII-3)	5745-5825	419.819	4.03	20	0.21125	1	Pass
BT-EDR	2402-2480	17.258	1.17	20	0.00449	1	Pass
BT-LE	2402-2480	16.982	1.17	20	0.00442	1	Pass
Zigbee	2425-2475	7.691	1.17	20	0.00200	1	Pass

Beamforming Mode

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Pass/ Fail
WLAN 2.4GHz	2412-2462	223.411	5.83	20	0.17015	1	Pass
WLAN 5GHz (U-NII-1)	5180-5250	199.082	6.95	20	0.19623	1	Pass
WLAN 5GHz (U-NII-2A)	5250-5320	98.957	6.95	20	0.09754	1	Pass
WLAN 5GHz (U-NII-2C)	5500-5720	99.754	6.95	20	0.09836	1	Pass
WLAN 5GHz (U-NII-3)	5745-5825	419.819	6.95	20	0.41380	1	Pass
BT-EDR	2402-2480	17.258	1.17	20	0.00449	1	Pass
BT-LE	2402-2480	16.982	1.17	20	0.00442	1	Pass
Zigbee	2425-2475	7.691	1.17	20	0.00200	1	Pass

Note:

Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

1. 2.4GHz: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 5.83 dBi
2. 5GHz: Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20})^2$ / 2] = 6.95 dBi

Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

CDD Mode

WLAN 2.4GHz + Bluetooth = 0.12148 / 1 + 0.00449 / 1 = 0.12597

WLAN 5GHz + Bluetooth = 0.21125 / 1 + 0.00449 / 1 = 0.21574

WLAN 2.4GHz + Zigbee = 0.12148 / 1 + 0.00200 / 1 = 0.12348

WLAN 5GHz + Zigbee = 0.00449 / 1 + 0.00200 / 1 = 0.21325

Beamforming Mode

WLAN 2.4GHz + Bluetooth = 0.17015 / 1 + 0.00449 / 1 = 0.17464

WLAN 5GHz + Bluetooth = 0.41380 / 1 + 0.00449 / 1 = 0.41829

WLAN 2.4GHz + Zigbee = 0.17015 / 1 + 0.00200 / 1 = 0.17215

WLAN 5GHz + Zigbee = 0.41380 / 1 + 0.00200 / 1 = 0.41580

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

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