

RF Exposure Report

Report No.: SABDHL-WTW-P20080206A

FCC ID: GZ5NVG578HLX

Test Model: NVG578HLX

Series Model: NVG568HLX

Received Date: Aug. 11, 2020

Test Date: Oct. 26, 2020 to Apr. 13, 2021

Issued Date: May 24, 2021

Applicant: ARRIS

Address: 2500 Walsh Ave., Santa Clara, CA 95051 United States

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

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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SABDHL-WTW-P20080206A	Original release.	May 24, 2021

1 Certificate of Conformity

Product: 2.5G PON GATEWAY
Brand: ARRIS
Test Model: NVG578HLX
Series Model: NVG568HLX
Sample Status: ENGINEERING SAMPLE
Applicant: ARRIS
Test Date: Oct. 26, 2020 to Apr. 13, 2021
Standards: FCC Part 2 (Section 2.1091)
References Test KDB 447498 D01 General RF Exposure Guidance v06
Guidance:

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:** May 24, 2021
Claire Kuan / Specialist

Approved by :  , **Date:** May 24, 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

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

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

2.4 Antenna Gain

1. The antenna provided to the EUT, please refer to the following table:

Ant. Set	RF Chain No.	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)
0	5G Chain0	3.93	5.15~5.25	PIFA	RF switch	on-board no cable
		3.45	5.25~5.35			
		4.15	5.47~5.725			
		4.33	5.725~5.85			
1	5G Chain1 / 2.4G Chain 2	4.69	2.4~2.4835	PIFA	RF switch	on-board no cable
		2.77	5.15~5.25			
		3.33	5.25~5.35			
		4.33	5.47~5.725			
2	5G Chain2 / 2.4G Chain 1	4.54	5.725~5.85	Dipole	i-pex(MHF)	200
		2.27	2.4~2.4835			
		2.65	5.15~5.25			
		2.86	5.25~5.35			
3	5G Chain3 / 2.4G Chain 0	3.12	5.47~5.725	Dipole	i-pex(MHF)	200
		3.12	5.725~5.85			
		3.36	2.4~2.4835			
		2.83	5.15~5.25			
		2.77	5.25~5.35			
		2.65	5.47~5.725			
		2.83	5.725~5.85			

2. The directional antenna gain, please refer to the following table:

Frequency Range (GHz)	Directional Antenna Gain (dBi) (Total Polarization)	Antenna Type	Antenna Connector
5.25 ~ 5.35	6.98	Ant. 0/1: PIFA Ant. 2/3: Dipole	Ant. 0/1: RF switch Ant. 2/3: i-pex(MHF)
5.47 ~ 5.725	7.09		

Note: More detailed information, please refer to antenna specification.

Note: 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

For 2.4GHz and 5GHz (U-NII-1 and U-NII-3 band) data was copied from the original test report (Report No.: SABDHL-WTW-P20080206)

Operation Mode	Evaluation Frequency (MHz)	Max. Average Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN 2.4GHz	2412~2462	349.696	8.27	33	0.17157	1
WLAN 5GHz (U-NII-1)	5180~5250	913.035	9.08	33	0.53982	1
WLAN 5GHz (U-NII-2A)	5250~5320	249.035	6.98	33	0.09079	1
WLAN 5GHz (U-NII-2C)	5500~5720	248.995	7.09	33	0.0931	1
WLAN 5GHz (U-NII-3)	5745~5825	993.722	9.76	33	0.68711	1

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 8.27 \text{ dBi}$
- 5GHz:
 - For U-NII-1: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 9.08 \text{ dBi}$
 - For U-NII-2A: The directional gain = 6.98 dBi
 - For U-NII-2C: The directional gain = 7.09 dBi
 - For U-NII-3: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 9.76 \text{ dBi}$

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

$$\text{WLAN 2.4GHz} + \text{WLAN 5GHz (U-NII-3)} = 0.17157 / 1 + 0.68711 / 1 = 0.85868$$

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

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