


RF EXPOSURE EVALUATION REPORT

FCC ID : GZ5NVG558
Equipment : Fixed Broadband Gateway
Brand Name : ARRIS
Model Name : NVG558H
Applicant : Arris
101 Tournament Drive, Horsham PA, 19044
Manufacturer : Arris
101 Tournament Drive, Horsham PA, 19044
Standard : 47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC has been evaluated this product in accordance with 47 CFR Part 2.1091 and it complies with applicable limit.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

1. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	4
2. MAXIMUM RF AVERAGE OUTPUT POWER AMONG PRODUCTION UNITS	5
3. RF EXPOSURE LIMIT INTRODUCTION	6
4. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	7
4.1. Power Density Calculation.....	7
4.2. Collocated Power Density Calculation.....	8



History of this test report

Report No.	Version	Description	Issued Date
FA190926002	Rev. 01	Initial issue of report	Oct. 29, 2019

**1. Description of Equipment Under Test (EUT)**

Product Feature & Specification	
EUT Type	Fixed Broadband Gateway
Brand Name	ARRIS
Model Name	NVG558H
FCC ID	GZ5NVG558
Integrated WWAN Module	Brand Name: Quectel Model Name: EM12-G
Integrated WLAN Module	Brand Name: ARRIS Model Name: NVG5XDBAC
Wireless Technology and Frequency Range	LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 30: 2305 MHz ~ 2315 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2496 MHz ~ 2690 MHz LTE Band 66: 1710.7 MHz ~ 1779.3 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	LTE: QPSK, 16QAM WLAN: 802.11a/b/g/n/ac HT20 / HT40 / VHT20 / VHT40 / VHT80 / VHT160
EUT Stage	Identical Prototype

Reviewed by: Jason Wang**Report Producer: Daisy Peng**

2. Maximum RF average output power among production units

Mode		Maximum Average power(dBm)
LTE	Band 2	21
	Band 4	21
	Band 5	22
	Band 7	21
	Band 12	22
	Band 13	22
	Band 14	21.5
	Band 17	22
	Band 25	21
	Band 26	22
	Band 30	21
	Band 38	21
	Band 41	21
	Band 66	21

3. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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				
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

The MPE was calculated at 30 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna

4. Radio Frequency Radiation Exposure Evaluation

4.1. Power Density Calculation

Note

1. For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.
2. WLAN module (Brand Name: ARRIS, Model Name: NVG5XDBAC, FCC ID: PGR-NVG5XDBAC) is integrated into this host and the rated output power and the antenna gain were consider in this report for MPE calculation, which can be referred to TUV Rheinland Precisely Right Report, Report No: MPE Calculation and theresults are used simultaneous transmission analysis.

<Non-Beamforming Mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 30cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
LTE Band 2	1850.7	5.20	21.00	26.200	0.417	416.869	0.037	1.000	0.037
LTE Band 4	1710.7	5.00	21.00	26.000	0.398	398.107	0.035	1.000	0.035
LTE Band 5	824.7	1.60	22.00	23.600	0.229	229.087	0.020	0.550	0.037
LTE Band 7	2500.0	3.70	21.00	24.700	0.295	295.121	0.026	1.000	0.026
LTE Band 12	699.7	1.20	22.00	23.200	0.209	208.930	0.018	0.466	0.040
LTE Band 13	779.5	2.90	22.00	24.900	0.309	309.030	0.027	0.520	0.053
LTE Band 14	788.0	2.80	21.50	24.300	0.269	269.153	0.024	0.525	0.045
LTE Band 17	706.5	1.20	22.00	23.200	0.209	208.930	0.018	0.471	0.039
LTE Band 26	814.7	2.10	22.00	24.100	0.257	257.040	0.023	0.543	0.042
LTE Band 25	1850.7	5.20	21.00	26.200	0.417	416.869	0.037	1.000	0.037
LTE Band 30	2305.0	5.50	21.00	26.500	0.447	446.684	0.040	1.000	0.040
LTE Band 38	2572.5	3.90	21.00	24.900	0.309	309.030	0.027	1.000	0.027
LTE Band 41	2496.0	5.30	21.00	26.300	0.427	426.580	0.038	1.000	0.038
LTE Band 66	1710.7	5.00	21.00	26.000	0.398	398.107	0.035	1.000	0.035
2.4GHz WLAN	2412.0	3.80	28.39	32.190	1.656	1655.770	0.146	1.000	0.146
5GHz WLAN	5180.0	4.60	25.80	30.400	1.096	1096.478	0.097	1.000	0.097

Note: For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band

<Beamforming Mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 30cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
5GHz WLAN	5180.0	8.80	27.15	35.950	3.936	3935.501	0.348	1.000	0.348

**4.2. Collocated Power Density Calculation**

WWAN Power Density / Limit	2.4GHz WLAN Power Density / Limit	5GHz WLAN Power Density / Limit	Σ (Power Density / Limit) of WWAN+ 2.4GHz WLAN+5GHz WLAN
0.053	0.146	0.348	0.547

Note:

1. For collocation analysis, LTE Band 13 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + 2.4GHz WLAN + 5GHz WLAN.
3. Considering the WWAN module collocation with the 2.4GHz WLAN and 5GHz WLAN transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 3 collocated transmitters is compliant

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.