

RF Exposure Evaluation Report

APPLICANT : Vantiva USA LLC
EQUIPMENT : Ethernet Gateway
BRAND NAME : Vantiva
MODEL NAME : VTER11QELxyzn (xyz: each character can be a-z or A-Z; n: 1-4 or blank)
FCC ID : G95231BX
STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

The product evaluation date was started from Dec. 02, 2024 and completed on Dec. 02, 2024. We, Sporton International Inc. (Kunshan), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.



Approved by: Si Zhang

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Table of Contents

1. ADMINISTRATION DATA	4
1.1. Testing Laboratory	4
2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	5
3. MAXIMUM RF AVERAGE OUTPUT TUNE UP POWER AMONG PRODUCTION UNITS	6
4. RF EXPOSURE LIMIT INTRODUCTION	9
5. RADIO FREQUENCY RADIATION EXPOSURE EVALUATION	10
5.1. Standalone Power Density Calculation	10
5.2. Collocated Power Density Calculation.....	11



Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA483017	Rev. 01	Initial issue of report.	Dec. 09, 2024



1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-KS	CN1257	314309

Applicant	
Company Name	Vantiva USA LLC
Address	4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

Manufacturer	
Company Name	Vantiva USA LLC
Address	4855 Peachtree Industrial Blvd. Suite 200 Norcross, Georgia 30092

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Ethernet Gateway
Brand Name	Vantiva
Model Name	VTER11QELxyzn (xyz: each character cab be a-z or A-Z; n: 1-4 or blank)
FCC ID	G95231BX
Wireless Technology and Frequency Range	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 ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz
Mode	WLAN 2.4GHz 802.11b/g WLAN 2.4GHz 802.11n HT20/HT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 2.4GHz 802.11be EHT20/EHT40 WLAN 5GHz 802.11a WLAN 5GHz 802.11n HT20/HT40 WLAN 5GHz 802.11ac/ax VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 WLAN 5GHz 802.11be EHT20/EHT40/EHT80/EHT160
Antenna Type	WLAN: Dipole Antenna
HW Version	Lab3
SW Version	2022_SPF_12_2_CS_U3
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This device support beamforming for WLAN 2.4GHz 802.11 ax/be HE20/HE40/EHT20/EHT40 and WLAN 5GHz 802.11 ac/ax/be VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160/EHT20/EHT40/EHT80/EHT160.
3. The device supports 1S4T(CDD&TXBF), 1S4T: NSS=1, MIMO 4Tx.
4. WLAN2.4GHz/WLAN5GHz all support SISO and MIMO mode, MIMO tune up power was chosen to perform MPE calculation conservatively.
5. For WLAN CDD&Beamforming mode, the MPE calculation performed separately.
6. The detail gain value please refers to following manufacturer's declared gain table.

Comments and Explanations:

1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.

For Antenna Gain:

Frequency Bands	Maximum Single Antenna gain (dBi)				Beamforming Gain (dBi)
	ANT 1	ANT 2	ANT 3	ANT 4	
WLAN 2.4GMHz	3.22	3.45	3.74	3.89	4.82
WLAN 5.2GMHz	3.39	3.99	3.38	3.93	3.71
WLAN 5.3GMHz	2.95	3.72	3.17	4.13	3.90
WLAN 5.5GMHz	3.70	4.43	3.28	4.23	4.45
WLAN 5.8GMHz	3.27	3.54	3.25	4.05	4.56

**3. Maximum RF average output tune up power among production units**

<For CDD/MIMO Mode>

<2.4GHz WLAN >

Mode		Maximum Average Power (dBm)
		Ant.1+2+3+4
2.4GHz	802.11b	30.00
	802.11g	30.00
	802.11n-HT20	29.00
	802.11n-HT40	28.00
	802.11ax-HE20	30.00
	802.11ax-HE40	29.00
	802.11be-EHT20	30.00
	802.11be-EHT40	29.00

<5GHz WLAN >

Mode		Maximum Average Power (dBm)
		Ant.1+2+3+4
5.2GHz	802.11a	30.00
	802.11n-HT20	30.00
	802.11n-HT40	30.00
	802.11ac-VHT20	30.00
	802.11ac-VHT40	30.00
	802.11ac-VHT80	27.00
	802.11ax-HE20	30.00
	802.11ax-HE40	30.00
	802.11ax-HE80	27.00
	802.11be-EHT20	30.00
	802.11be-EHT40	30.00
	802.11be-EHT80	27.00
5.3GHz	802.11a	23.50
	802.11n-HT20	23.50
	802.11n-HT40	23.98
	802.11ac-VHT20	23.98
	802.11ac-VHT40	23.98
	802.11ac-VHT80	23.98
	802.11ac-VHT160	23.98
	802.11ax-HE20	23.98
	802.11ax-HE40	23.98
	802.11ax-HE80	23.98
	802.11ax-HE160	23.98
	802.11be-EHT20	23.98
	802.11be-EHT40	23.98
	802.11be-EHT80	23.98
	802.11be-EHT160	23.98

5.5GHz	802.11a	23.50
	802.11n-HT20	23.50
	802.11n-HT40	23.98
	802.11ac-VHT20	23.98
	802.11ac-VHT40	23.98
	802.11ac-VHT80	23.98
	802.11ac-VHT160	23.98
	802.11ax-HE20	23.98
	802.11ax-HE40	23.98
	802.11ax-HE80	23.98
	802.11ax-HE160	23.98
	802.11be-EHT20	23.98
	802.11be-EHT40	23.98
	802.11be-EHT80	23.98
	802.11be-EHT160	23.98
5.8GHz	802.11a	30.00
	802.11n-HT20	30.00
	802.11n-HT40	30.00
	802.11ac-VHT20	30.00
	802.11ac-VHT40	30.00
	802.11ac-VHT80	30.00
	802.11ax-HE20	30.00
	802.11ax-HE40	30.00
	802.11ax-HE80	30.00
	802.11be-EHT20	30.00
	802.11be-EHT40	30.00
	802.11be-EHT80	30.00

Note: WLAN2.4GHz/WLAN5GHz all support SISO/MIMO mode, MIMO tune up power was chosen to perform MPE calculation conservatively.

<For Beamforming Mode>

<2.4GHz WLAN >

Mode		Maximum Average Power (dBm)
		Ant.1+2+3+4
2.4GHz	802.11ax-HE20	30.00
	802.11ax-HE40	28.00
	802.11be-EHT20	30.00
	802.11be-EHT40	28.00

<5GHz WLAN >

Mode		Maximum Average Power (dBm)
		Ant.1+2+3+4
5.2GHz	802.11ac-VHT20	28.00
	802.11ac-VHT40	27.00
	802.11ac-VHT80	23.98
	802.11ax-HE20	28.00
	802.11ax-HE40	27.00



	802.11ax-HE80	23.98
	802.11be-EHT20	28.00
	802.11be-EHT40	28.00
	802.11be-EHT80	23.98
5.3GHz	802.11ac-VHT20	23.00
	802.11ac-VHT40	23.50
	802.11ac-VHT80	23.98
	802.11ac-VHT160	23.98
	802.11ax-HE20	23.00
	802.11ax-HE40	23.50
	802.11ax-HE80	23.98
	802.11ax-HE160	23.98
	802.11be-EHT20	23.00
	802.11be-EHT40	23.98
	802.11be-EHT80	23.98
	802.11be-EHT160	23.98
5.5GHz	802.11ac-VHT20	23.00
	802.11ac-VHT40	23.50
	802.11ac-VHT80	23.50
	802.11ac-VHT160	23.50
	802.11ax-HE20	23.00
	802.11ax-HE40	23.50
	802.11ax-HE80	23.50
	802.11ax-HE160	23.50
	802.11be-EHT20	23.50
	802.11be-EHT40	23.98
	802.11be-EHT80	23.98
	802.11be-EHT160	23.98
5.8GHz	802.11ac-VHT20	30.00
	802.11ac-VHT40	28.00
	802.11ac-VHT80	28.00
	802.11ax-HE20	30.00
	802.11ax-HE40	28.00
	802.11ax-HE80	28.00
	802.11be-EHT20	30.00
	802.11be-EHT40	28.00
	802.11be-EHT80	28.00

Note: This device support beamforming for WLAN 2.4GHz 802.11 ax/be HE20/HE40/EHT20/EHT40 and WLAN 5GHz 802.11 ac/ax/be VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160/EHT20/EHT40/EHT80/EHT160

4. 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 22 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

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

<WLAN MIMO Mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Average EIRP (dBm)	Average EIRP (mW)	Power Density at 22cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
WLAN2.4GHz	2412	3.89	30.00	33.890	2449.063	0.403	1.000	0.403
WLAN5.2GHz	5180	3.99	30.00	33.990	2506.109	0.412	1.000	0.412
WLAN5.3GHz	5260	4.13	23.98	28.110	647.143	0.106	1.000	0.106
WLAN5.5GHz	5500	4.43	23.98	28.410	693.426	0.114	1.000	0.114
WLAN5.8GHz	5745	4.05	30.00	34.050	2540.973	0.418	1.000	0.418

<WLAN Beamforming Mode>

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Average EIRP (dBm)	Average EIRP (mW)	Power Density at 22cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
WLAN2.4GHz	2412	4.82	30.00	34.820	3033.891	0.499	1.000	0.499
WLAN5.2GHz	5180	3.71	28.00	31.710	1482.518	0.244	1.000	0.244
WLAN5.3GHz	5260	3.90	23.98	27.880	613.762	0.101	1.000	0.101
WLAN5.5GHz	5500	4.45	23.98	28.430	696.627	0.115	1.000	0.115
WLAN5.8GHz	5745	4.56	30.00	34.560	2857.591	0.470	1.000	0.470

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum RF output tune up power and the maximum antenna gain of all antennas among same frequency WLAN bands to perform MPE calculation conservatively.

5.2. Collocated Power Density Calculation

<WLAN 2.4GHz + WLAN 5GHz>:

Maximum WLAN 2.4GHz Power Density / Limit	Maximum WLAN 5GHz Power Density / Limit	Σ (Power Density / Limit) of WLAN 2.4GHz + WLAN 5GHz
0.499	0.470	0.969

Note:

1. For collocation analysis, choose the highest (power density/limit) among WLAN 2.4GHz/5GHz MIMO mode and Beamforming mode respectively.
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 WLAN 2.4GHz + WLAN 5GHz.
3. Considering all transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the equipment at least 22 cm to show compliance with the power density limit, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----