RF Exposure Report

Report No.: SA190912E02C

FCC ID: 2AHBN-AP33

Test Model: AP32, AP32E, AP33

Received Date: Nov. 20, 2019

Test Date: May 30 to June 12, 2020

Issued Date: June 29, 2020

Applicant: Juniper Networks, Inc.

Address: 1133 Innovation Way Sunnyvale, CA 94089 USA

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

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
SA190912E02C	Original release.	June 29, 2020

1   Certificate of Conformity

Product:	Wi-Fi & BLE Array AP
Brand:	Mist
Test Model:	AP32, AP32E, AP33
Sample Status:	ENGINEERING SAMPLE
Applicant:	Juniper Networks, Inc.
Test Date:	May 30 to June 12, 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 : _Phoenix Huang_ , **Date:** June 29, 2020
Phoenix Huang / Specialist

Approved by : _____ , **Date:** June 29, 2020
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 44 cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Model: AP32						
Antenna No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type
Int Dual Ant 3 (WiFi 5G+BT)	-	-	5 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi Dual Ant 1	-	-	4.5 5.4	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi Dual Ant 0	-	-	4.6 5.7	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi 5G Ant 2	-	-	5.8	5.15~5.85GHz	PIFA	Ipex
Scanning Ant	-	-	5 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex

Model: AP32E						
Ant. Set 1						
Antenna No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type
Ext WiFi Dual Ant (2.4+5G)	AccelTex	ATS-OO-245-46-6RPSP-36	4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (2.4+5G)			4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (5G)			4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (5G)			4 6	2.4~2.4835GHz 5.15~5.85GHz	omnidirectional	RPSMA Plug
Ext WiFi Dual Ant (Scanning)			4 6	2.4~2.4835GHz (Scanning) 5.15~5.85GHz (Scanning)	omnidirectional	RPSMA Plug
Int Scanning Ant	-	-	5 6	2.4~2.4835GHz (Scanning) 5.15~5.85GHz (Scanning)	PIFA	Ipex
Int BT Ant	-	-	5	2.4~2.4835GHz	PIFA	Ipex
Ant. Set 2						
Antenna No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type
Ext WiFi PATCH Ant (2.4+5G)	AccelTex	ATS-OP-245-810-4RPSP-36	8 10	2.4~2.4835GHz 5.15~5.85GHz	PATCH	RPSMA Plug
Ext WiFi PATCH Ant (2.4+5G)			8 10	2.4~2.4835GHz 5.15~5.85GHz	PATCH	RPSMA Plug
Ext WiFi PATCH Ant (5G)			8 10	2.4~2.4835GHz 5.15~5.85GHz	PATCH	RPSMA Plug
Ext WiFi PATCH Ant (5G)			8 10	2.4~2.4835GHz 5.15~5.85GHz	PATCH	RPSMA Plug

Model: AP33						
Antenna No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Antenna Type	Connector Type
Int WiFi Dual Ant 0	-	-	3.7 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi Dual Ant 1	-	-	4.6 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
Int WiFi 5G Ant 2	-	-	6	5.15~5.85GHz	PIFA	Ipex
Int WiFi 5G Ant 3	-	-	5.9	5.15~5.85GHz	PIFA	Ipex
Scanning Ant	-	-	5 6	2.4~2.4835GHz 5.15~5.85GHz	PIFA	Ipex
BT Slot_Direct Antenna	-	-	6	2.402~2.480GHz	Slot_Direct	Ipex
BT Array Antenna	-	-	Beam 1 :3.9 Beam 2 :3.9 Beam 3 :4.7 Beam 4 :4.4 Beam 5 :4.8 Beam 6 :5.1 Beam 7 :5.1 Beam 8 :4.2	2.402~2.480GHz	Array Antenna	Ipex

2.5   Calculation Result of Maximum Conducted Power

The WLAN 2.4GHz and WLAN (U-NII-1, U-NII-3) maximum power was refer to the test report (Report No.: RF190912E02E, RF190912E02E-1)
The BT-LE and Scanning Radio (U-NII-1, U-NII-3) maximum power was refer to the original test report (Report No.: SA190912E02A)

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	344.448	11.01	44	0.17865	1
WLAN U-NII-1	5180~5240	194.172	16.02	44	0.31921	1
WLAN U-NII-2A	5260~5320	98.213	16.02	44	0.16146	1
WLAN U-NII-2C	5500~5720	97.976	16.02	44	0.16107	1
WLAN U-NII-3	5745~5825	393.419	16.02	44	0.64676	1
Scanning Radio_2.4GHz	2412~2462	193.642	5	44	0.02517	1
Scanning Radio_WLAN U-NII-1	5180~5240	86.896	6	44	0.01422	1
Scanning Radio_WLAN U-NII-2A	5260~5320	83.946	6	44	0.01374	1
Scanning Radio_WLAN U-NII-2C	5500~5720	81.47	6	44	0.01333	1
Scanning Radio_WLAN U-NII-3	5745~5825	111.429	6	44	0.01823	1
BT-LE	2402~2480	2.312	6	44	0.00038	1

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz: Directional gain = 8 dBi + 10log(2) = 11.01 dBi
3. 5GHz: Directional gain = 10 dBi + 10log(4) = 16.02 dBi

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 + Scanning Radio_WLAN 2.4GHz + Scanning Radio_WLAN 5GHz + BT-LE = 0.17865 / 1 + 0.64676 / 1 + 0.02517 / 1 + 0.01823 / 1 + 0.00038 / 1 = 0.86935

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

--- END ---