RF Exposure Evaluation Report

Product Name : Network Appliance
Model No. : BNHW030
FCC ID : 2AHVQ-BNHW030

Applicant : Barracuda Networks Inc.
Address : 5710 Fontanoso Way, San Jose, CA 95138,United States

Date of Receipt : Dec. 01, 2017
Date of Declaration : Feb. 21, 2018
Report No. : 17C0009R-SAUSP03V00

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Network Appliance
Trade Name	Barracuda
Model No.	BNHW030
FCC ID.	2AHVQ-BNHW030
Contains FCC ID	XPYTOBYL210
Frequency Range	802.11b//g/n-20MHz: 2412-2462MHz 802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz, 5745-5825MHz 802.11n-40MHz: 5190-5310, 5510-5670MHz, 5755-5795MHz 802.11ac-20MHz: 5720, 802.11ac-40MHz: 5710 802.11ac-80MHz: 5210-5290MHz, 5530-5690MHz, 5775MHz
Number of Channels	802.11b/g/n-20MHz: 11 802.11a/n-20MHz: 24; 802.11n-40MHz: 11 802.11ac-20MHz: 1, 802.11ac-40MHz: 1, 802.11ac-80MHz: 6
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 144.4Mbps 802.11a: 6 - 54Mbps , 802.11n: up to 300Mbps 802.11ac-80MHz: up to 866.7MHz
Channel separation	802.11b/g/n: 5 MHz
Type of Modulation	802.11b:DSSS (DBPSK, DQPSK, CCK) 802.11g/n:OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna Type	Dipole Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
Contain WLAN Module	AMPAK/AP6354

1.2. Antenna List :

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	HSIEN JINN	KO-EX-2450-D-006-RSM	Dipole Antenna	1.10 dBi for 2.4 GHz 2.03 dBi For 5.15~5.25GHz 2.03 dBi For 5.25~5.35GHz 2.03 dBi For 5.47~5.725GHz 1.70 dBi For 5.725~5.825GHz
2	HSIEN JINN	KO-EX-2170-D-010	Dipole Antenna	2.5 dBi for 698-960 MHz 2.5 dBi for 1710-2690 MHz

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission 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

Pd id the limit of MPE, 1 mW/cm^2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 21℃and 55％ RH.

2.3. Test Result of RF Exposure Evaluation

Product : Network Appliance
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS

WWAN

Peak Gain: 2.5 dBi for 698-960 MHz/ 2.5 dBi for 1710-2690 MHz

Mode	Band	Maximum Conducted Peak Power (dBm)	Maximum ERP/EIRP (W)	Maximum ERP/EIRP Limit (W)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
GSM	850	33.25	2.2909	7	50	30.24	1056.7	0.37	0.57	Pass
GSM	1900	30.20	1.8621	2	50	27.19	523.6	0.19	1.00	Pass
WCDMA	Band 2	24.50	0.5012	2	100	24.50	281.8	0.10	1.00	Pass
WCDMA	Band 5	24.50	0.3055	7	100	24.50	281.8	0.10	0.57	Pass
LTE	Band 5	24.00	0.2723	7	100	24.00	251.2	0.09	0.57	Pass
LTE	Band 7	24.00	0.4467	1	100	24.00	251.2	0.08	1.00	Pass

Note: The conducted output power is refer to Original RF Exposure Report for FCC ID: XPYTOBYL210.

WLAN 2.4G Peak Gain: 1.1dBi

Band	Frequency	Maximum Conducted Peak Power (dBm)	Duty Cycle (%)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
802.11b	2462	21.68	100	147.2	0.038	1	Pass
802.11g	2437	22.40	97.23	169.0	0.043	1	Pass
802.11n-20M	2437	21.60	94.29	136.3	0.035	1	Pass

Note: The conducted output power is refer to report No.: 17C0009R-RFUSP34V00 from the DEKRA.

WLAN 5G Peak Gain: 2.03dBi

Band	Frequency	Maximum Conducted Peak Power (dBm)	Duty Cycle (%)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
802.11a	5180	16.20	98.27	41.0	0.013	1	Pass
802.11 n-20M	5180	15.74	96.29	36.1	0.011	1	Pass
802.11n-40M	5230	16.43	93.95	41.3	0.013	1	Pass
802.11ac-80M	5290	12.91	94.10	18.4	0.006	1	Pass

Note: The conducted output power is refer to report No.: 17C0009R-RFUSP49V00 from the DEKRA.

2.4. Calculations for Multi-Transsmitter

Mode	Exposure Calculations	result	Limit	Pass/Fail
WLAN	0.043	0.703	1	Pass
WWAN	0.660			