

RF Exposure Evaluation declaration

Product Name : Verizon Mesh Router
Trade Name : ASUS
Model No. : VZMESHROUTER, VZMESHWAR,
VZW-AC1300
FCC ID. : MSQ-RTACHQ00

Applicant : ASUSTeK COMPUTER INC.

Address : 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

Date of Receipt : Oct. 23, 2017
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Report No. : 17A0318R-RF-US-Exp
Report Version : V1.0



The declaration results relate only to the samples calculated.

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1. RF Exposure Evaluation

1.1. 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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

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

P_d is the limit of MPE, 1 mW/cm². 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.

1.2. 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: 18°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

WiFi

Product	Verizon Mesh Router
Test Mode	Transmit_CDD mode
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11b (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	606.1335	0.27614
6	2437	642.7731	0.29283
11	2462	671.6383	0.30598

IEEE 802.11g (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	237.9031	0.10838
6	2437	646.6814	0.29462
11	2462	198.6378	0.09050

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ MIMO Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	263.2316	0.11992
6	2437	644.8586	0.29378
11	2462	218.8284	0.09969

IEEE 802.11n (40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
3	2422	128.1658	0.05839
6	2437	315.1647	0.14358
9	2452	102.9572	0.04691

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ Beamforming Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.76 dBi or 1.19 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	176.9321	0.08061
6	2437	505.2013	0.23016
11	2462	59.9872	0.02733

IEEE 802.11n (40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
3	2422	54.0064	0.02460
6	2437	60.6331	0.02762
9	2452	50.5994	0.02305

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ CDD Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

5.2G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

5.8G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	155.5149	0.07085
40	5220	379.3422	0.17282
44	5240	376.6019	0.17157

IEEE 802.11a (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745	427.5773	0.19054
157	5785	352.6956	0.15717
165	5825	469.7247	0.20932

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ MIMO Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

5.2G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

5.8G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	177.0799	0.08067
40	5220	373.7124	0.17026
44	5240	361.2202	0.16456

IEEE 802.11n (20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745	405.4072	0.18066
157	5785	321.0289	0.14306
165	5825	435.2160	0.19395

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ MIMO Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

5.2G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

5.8G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190	72.6158	0.03308
46	5230	335.0028	0.15262

IEEE 802.11n (40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
151	5755	374.7904	0.16702
159	5795	425.1722	0.18947

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ MIMO Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

5.2G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

5.8G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
42	5210	80.5564	0.03670

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
155	5775	277.0129	0.12345

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ Beamforming Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

5.2G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

5.8G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	177.0799	0.08067
40	5220	373.7124	0.17026
44	5240	361.2202	0.16456

IEEE 802.11n (20MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745	405.4072	0.18470
157	5785	321.0289	0.14625
165	5825	435.2160	0.19828

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ Beamforming Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

5.2G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

5.8G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190	55.6274	0.02534
46	5230	335.0028	0.15262

IEEE 802.11n (40MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
151	5755	374.7904	0.17075
159	5795	425.1722	0.19370

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit_ Beamforming Mode
Test Condition	RF Exposure Evaluation

Antenna Gain

5.2G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.6 dBi or 2.29 in linear scale.

5.8G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.5 dBi or 2.24 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
42	5210	44.7404	0.02038

IEEE 802.11ac (80MHz) (ANT 0+1)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
155	5775	282.7483	0.12881

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

The results are evaluated using the maximum power.

Product	Verizon Mesh Router
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

Power Density (2.4GHz) (mW/cm ²)	Power Density (5GHz) (mW/cm ²)	Total Power Density (2.4GHz+5GHz) (mW/cm ²)	Limit (mW/cm ²)
0.30598	0.20932	0.5153	1

BT 2.0

Product	Verizon Mesh Router
Test Mode	Transmit mode
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.5dBi or 1.78 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

GFSK			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	7.1614	0.00254
39	2441	9.1411	0.00324
78	2480	10.7152	0.00379

$\pi/4$ DQPSK			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	12.6183	0.00447
39	2441	16.1065	0.00570
78	2480	16.1436	0.00572

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

Product	Verizon Mesh Router
Test Mode	Transmit mode
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.5dBi or 1.78 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

8DQPSK			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	14.2889	0.00506
39	2441	17.7828	0.00630
78	2480	20.3704	0.00721

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².

BT 4.0

Product	Verizon Mesh Router
Test Mode	Transmit mode
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.5dBi or 1.78 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

GFSK			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	1.1376	0.00040
19	2440	1.8793	0.00067
39	2480	2.6669	0.00094

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².