RF Exposure Evaluation Declaration

Product: 802.11n VDSL2+ 4-port Gigabit Ethernet USB Gateway

Test Item: RF Exposure Evaluation Declaration

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/cm2)	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*r2)

Where

Pd = power density in mW/cm2

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/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℃and 78％ RH.

1.3. EUT Operation condition

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

1.4. Test Result of RF Exposure Evaluation

Antenna Gain:

Ant0:
antenna type: Dipole antenna antenna
antenna gain: 5.7dBi
Ant1:
antenna type: Dipole antenna antenna
antenna gain: 5.7dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

1) 802.11b

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	84.1395	0.0621853
06	2437.00	70.9578	0.0524431
11	2462.00	67.6083	0.0499675

2) 802.11g

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	101.3911	0.0749355
06	2437.00	95.7194	0.0707437
11	2462.00	88.1049	0.0651160

3) 802.11n(20MHz) (An0)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	103.9920	0.0768578
06	2437.00	93.5406	0.0691334
11	2462.00	82.9851	0.0613321

4) 802.11n(20MHz) (An1)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	209.8940	0.1551217
06	2437.00	185.3532	0.1369897
11	2462.00	159.5879	0.1179473

3) 802.11n(20MHz) (An1 and An0)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
01	2412.00	314.0509	0.232106
06	2437.00	278.6121	0.205915
11	2462.00	242.6610	0.179344

5) 802.11n(40MHz) (An0)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
03	2422.00	139.9587	0.1034398
06	2437.00	111.1732	0.0821652
09	2452.00	114.8154	0.0848571

6) 802.11n(40MHz) (An1)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
03	2422.00	71.7794	0.0530503
06	2437.00	70.7946	0.0523225
09	2452.00	68.0769	0.0503139

7) 802.11n(40MHz) (An1 and An0)

Test date:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
03	2422.00	211.8361	0.1565626
06	2437.00	181.9701	0.1344894
09	2452.00	182.8100	0.1351101

Note:

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.