RF Exposure Evaluation declaration

Product Name : Secure Outdoor Ethernet Radio Link

Model No.: ExpWave 240B, GateOne 240B

FCC ID.: R3N-GATEONE240B

Applicant : ZyGATE Communications Inc.

Address : 2F No. 48, Lung-Chin Road Lung-Tan, Taoyuan, Taiwan, R.O.C.

Date of Receipt : Apr. 21, 2004

Date of Declaration : Apr. 29, 2004

Report No. : 044H050FI

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: $Pd = (Pout*G)/(4*pi*r^2)$

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.

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. Test Result of RF Exposure Evaluation

Product : Secure Outdoor Ethernet Radio Link
Test Item : RF Exposure Evaluation
Test Site : No.1 OATS
Test Mode : Mode 1: Secure Outdoor Etherent Radio Link W/Procell Antenna

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 8.0dBi or 6.31 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2412.0	24.3781	0.0306
6	2437.0	22.5944	0.0284
11	2462.0	20.7491	0.0260

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/cm^2.

Product : Secure Outdoor Ethernet Radio Link
Test Item : RF Exposure Evaluation
Test Site : No.1 OATS
Test Mode : Mode 2: Secure Outdoor Etherent Radio Link W/ZyXEL Antenna

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 16.0dBi or 39.81 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
1	2412.0	24.3781	0.1931
6	2437.0	22.5944	0.1789
11	2462.0	20.7491	0.1643

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/cm^2.