RF Exposure Evaluation declaration

Product Name ： 2.5GHz Integrated CPE Transmitter
Model No. ： PLC-200
FCC ID. ： OUP960710101

Applicant : TRANSYSTEM INC.
Address : No.1-2, Li-Hsin Rd. 1, Science-Based Industrial Park, Hsinchu, Taiwan R.O.C.

Date of Receipt : 2008/08/21
Date of Declaration : 2008/09/19
Report No. : 088325R-RF-US-Exp
Version : V1.0

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	2.5GHz Integrated CPE Transmitter
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Lists:

Corner Reflector antenna： gain=12dBi, which is 15.85 in linear scale.

Spotbeam antenna： gain=15dBi, which is 31.62 in linear scale.

Paraboic Mesh antenna： gain=18~25dBi, which is 63.10~316.22 in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance for antenna gain 12dBi:

16QAM (160 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	81.2830	0.256
2515	157.0363	0.495
2530	96.3829	0.304

16QAM (320 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	99.7700	0.315
2515	149.9684	0.473
2530	111.1731	0.351

16QAM (640 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	94.4060	0.298
2515	149.9684	0.473
2530	115.8777	0.365

16QAM (1280 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	103.9920	0.328
2515	153.4616	0.484
2530	119.9499	0.378

16QAM (2560 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	77.8037	0.245
2515	157.0363	0.495
2530	95.2796	0.300

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.

Output Power into Antenna & RF Exposure Evaluation Distance for antenna gain 15dBi:

16QAM (160 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	81.2830	0.489
2515	157.0363	0.988
2530	96.3829	0.599

16QAM (320 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	99.7700	0.628
2515	149.9684	0.943
2530	111.1731	0.699

16QAM (640 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	94.4060	0.594
2515	149.9684	0.943
2530	115.8777	0.729

16QAM (1280 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	103.9920	0.654
2515	153.4616	0.965
2530	119.9499	0.755

16QAM (2560 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)
2500	77.8037	0.489
2515	157.0363	0.988
2530	95.2796	0.599

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.

Output Power into Antenna & RF Exposure Evaluation Distance for antenna gain 25dBi:

16QAM (160 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 63 cm (mW/cm^2)
2500	81.2830	0.515
2515	157.0363	0.996
2530	96.3829	0.611

16QAM (320 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 63cm (mW/cm^2)
2500	99.7700	0.633
2515	149.9684	0.951
2530	111.1731	0.705

16QAM (640 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 63 cm (mW/cm^2)
2500	94.4060	0.599
2515	149.9684	0.951
2530	115.8777	0.735

16QAM (1280 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 63 cm (mW/cm^2)
2500	103.9920	0.659
2515	153.4616	0.973
2530	119.9499	0.760

16QAM (2560 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 63 cm (mW/cm^2)
2500	77.8037	0.493
2515	157.0363	0.996
2530	95.2796	0.604

The power density Pd (4th column) at a distance of 63 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm^2.