

## RF Exposure Evaluation declaration

Product Name : BRS/EBS Transceiver  
Model No. : TRX-221  
FCC ID. : OUP890200801

Applicant : TRANSYSTEM INC.

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

Date of Receipt : 2011/12/07  
Date of Declaration : 2012/01/20  
Report No. : 11C179R-RF-US-Exp  
Report Version : V2.0

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 <sup>2</sup> )	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/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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

Product	BRS/EBS Transceiver
Test Mode	Mode 1: Transmit
Test Condition	RF Exposure Evaluation

#### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.97dBi or 1.58 in linear scale.

#### Output Power into Antenna & RF Exposure Evaluation Distance:

16QAM (160 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
2659.0	319.1538	0.09968
2671.5	242.1029	0.07562
2687.0	240.9905	0.07527

16QAM (320 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
2659.0	252.3481	0.07882
2671.5	236.0478	0.07373
2687.0	240.9905	0.07527

16QAM (640 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
2659.0	234.9633	0.07339
2671.5	232.8091	0.07272
2687.0	232.2737	0.07255

16QAM (1280 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
2659.0	251.1886	0.07846
2671.5	236.5920	0.07390
2687.0	240.4363	0.07510

16QAM (2560 ksps)		
Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
2659.0	354.8134	0.11082
2671.5	242.6610	0.07579
2687.0	242.1029	0.07562

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<sup>2</sup>.