

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 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/cm^2

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/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°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 ²) |
| 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 ²) |
| 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 ²) |
| 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 ²) |
|-------------------------|------------------------------|--|
| 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 ²) |
|-------------------------|------------------------------|--|
| 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/cm².