

# RF Exposure Evaluation declaration

Product Name : MMLink-G

Model No. : GWA-G10

FCC ID : AURMMLINK-G

Applicant : YASKAWA INFORMATION SYSTEMS Corporation

Address : 5-15, HIGASHI-OJI-MACHI, YAHATANISHI-KU,  
KITAKYUSHU 806-0037, JAPAN

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Date of Declaration : Apr. 02, 2012

Report No. : 1211000R-RF-US-RFEXP

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	30
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = power density in  $\text{mW/cm}^2$

$P_{out}$  = 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,  $1 \text{ mW/cm}^2$ . 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:  $21^\circ\text{C}$  and 60% RH.

### 1.3. Test Result of RF Exposure Evaluation

Product : MMLink-G  
 Test Item : RF Exposure Evaluation  
 Test Site : N/A

#### GPRS 850 (↑) Band-Peak Gain: 0 dBi

Frequency (MHz)	Conducted Peak Power (dBm)	Duty Cycle	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Pass/Fail
824.2	33.07	1/8	24.0400	253.5	0.0504	0.55	Pass
836.4	33.15	1/8	24.1200	258.2	0.0514	0.56	Pass
848.8	33.19	1/8	24.1600	260.6	0.0518	0.57	Pass

#### GPRS 850 (↑↑) Band-Peak Gain: 0 dBi

Frequency (MHz)	Conducted Peak Power (dBm)	Duty Cycle	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Pass/Fail
824.2	33.07	1/4	27.0500	506.9	0.1008	0.55	Pass
836.4	33.15	1/4	27.1300	516.3	0.1027	0.56	Pass
848.8	33.17	1/4	27.1500	518.7	0.1032	0.57	Pass

#### GPRS 1900 (↑) Band -Peak Gain: 1.6 dBi

Frequency (MHz)	Conducted Peak Power (dBm)	Duty Cycle	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Pass/Fail
1850.2	30.94	1/8	21.9100	155.2	0.0446	1	Pass
1880	30.63	1/8	21.6000	144.5	0.0416	1	Pass
1909.8	30.53	1/8	21.5000	141.2	0.0406	1	Pass

#### GPRS 1900 (↑↑) Band-Peak Gain: 1.6 dBi

Frequency (MHz)	Conducted Peak Power (dBm)	Duty Cycle	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Pass/Fail
824.2	30.92	1/4	24.9000	309.0	0.0889	1	Pass
836.4	30.50	1/4	24.4800	280.5	0.0807	1	Pass
848.8	30.50	1/4	24.4800	280.5	0.0807	1	Pass

Note: The conducted output power is refer to report No.: 1211000R-HPUSP07V01 from the QuieTek.