

MPE Exhibit
For
Energy Aware Models
PTMK2USB and PTMK2URT

FCC ID: W72-PTMK2
IC: 8253A-PTMK2

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

1.0 INTRODUCTION

1.1 PURPOSE

This Maximum Permissible Exposure report demonstrates compliance with FCC CFR 47 1.1310, 2.1091 and RSS-102 Issue 4, RF Exposure evaluation for Models PTMK2USB and PTMK2URT which are categorized as “mobile”. The mobile classification applies when 20 cm or greater separation distance is maintained between the end user and all transmission antennas.

The user documentation available to consumers indicates that the Module and antenna must not be used closer than 20 cm to head or body.

1.2 ANTENNA SPECIFICATIONS

The Models PTMK2USB and PTMK2URT have the following antenna gain specifications:

- 0.4dbi Antenna Integral antenna

2.0 RF EXPOSURE LIMITS AND EQUATIONS

In compliance with FCC CFR 47 1.1310, the criteria listed in the table below shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1303 (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 (f=frequency)				
30-300	61.4	0.2	1.0	6.0
300-1500	-	-	f/300	6.0
1500-100,000	-	-	5.0	6.0
(B) Limits for General Population/Uncontrolled Exposure (f=frequency)				
30-300	27.5	0.1	0.2	30.0
300-1500	-	-	f/1500	30.0
1500-100,000	-	-	1.0	30.0

Friis Transmission Formula:

$$Pd = (Pout * G) / (4\pi R^2)$$

Where,

Pd = power density (mW/cm²)

Pout = output power to antenna (mW)

G = gain of antenna in linear scale

R = distance between observation point and center of the radiator (cm)

The resulted power density at a distance of 20cm can be calculated as follows:

$$\text{Power Density} = (\text{EIRP} * \text{Duty cycle}) / (4\pi R^2)$$

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3.0 MPE FIGURE

For the purposes of this report worst case MPE value is provided for highest gain antenna

3.1 CALCULATION OF WORST CASE MPE FIGURE

Maximum EIRP = Conducted power + Antenna gain = 18.43 (dbm) + 0.4 dbi = 18.83 dBm or 76.384 mW

Transmitter Duty Cycle = 42.06 % duty cycle

S (power density) = (EIRP * Duty Cycle) / (4 π R²) = (76.384 mW * .4206) / (4 π * 20²) = 0.006391 mW/cm²

S (power density) = 0.0639145 W/m²

The table below contains MPE Values for all measured channels

Freq MHz	Conducted EUT Power (dBm)	Ant. Gain	TX Duty cycle %	EIRP (dBm)	EIRP (mW)	Duty cycle Corrected max EIRP (mw)	Power Density (s) @ 20 cm mW/cm ²	FCC MPE Limit @ d=20 cm mW/cm ²	Power Density (s) @d= 20 cm W/M ²	IC MPE Limit @ d=20 cm W/M ²
2405	18.430	0.400	42.060	18.830	76.384	32.127	0.006391	1.000	0.0639145	10
2440	17.860	0.400	42.060	18.260	66.988	28.175	0.005605	1.000	0.0560531	10
2480	2.240	0.400	42.060	2.640	1.837	0.772	0.000154	1.000	0.0015367	10

Result

Compliant.

4.0 RSS-102 ISSUE 4, RF EXPOSURE EVALUATION

2.5.1 Exemption from Routine Evaluation Limits – SAR Evaluation

Page 26 of the Product User Manual defines the distance as;

This device must be installed to ensure a separation distance of at least 20 cm (8 inches) from the antenna to a person.

2.5.2 Exemption from Routine Evaluation Limits – RF Exposure Evaluation

The peak power output of the device is 18.43 dBm at 2405 MHz

The maximum antenna gain is 0.4 dBi

The calculated maximum radiated e.i.r.p. is 18.83 dBm (0.07638W) which is less than 5 W

Therefore the unit is exempt from RSS-102 Issue 4, routine evaluation limits

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