# XETA7-M2

User Manual

XETAWAVE

CUSTOM RF SOLUTIONS

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## Warranty

XetaWave LLC warrants your XetaWave wireless data transceiver against defects in materials and manufacturing for a period of two years from the date of purchase. In the event of a product failure due to materials or workmanship, XetaWave will, at its discretion, repair or replace the product.

In no event will XetaWave LLC, its suppliers or its licensors, be liable for any damages arising from the use of or the inability to use this product. This includes business interruption, loss of business information, or other loss which may arise from the use of this product. XetaWave LLC transceivers should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. XetaWave LLC accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using the XetaWave transceiver, or for the failure of such transceiver to transmit or receive such data.

Warranty policy may not apply:

1) If product repair, adjustments, or parts replacements is required due to accident, neglect or unusual physical, electrical or electromagnetic stress.
2) If product is used outside of XetaWave specifications.
3) If product has been modified, repaired or altered by Customer unless XetaWave specifically authorized such alterations in each instance in writing.

The warranty period begins from the date of shipment and is defined per the standard warranty policy stated above.

Information in this document is subject to change without notice. The information contained in this document is proprietary and confidential to XetaWave LLC. This manual is for use by purchasers and other authorized users of the XetaWave wireless data transceiver only.



This product is licensed by the United States. Diversion contrary to U.S. law is prohibited. Shipment or re-export of this product outside of the United States may require authorization by the U.S. Bureau of Export Administration. Please contact XetaWave LLC for assistance and further information.

## FCC Notifications

**Federal Communications Commission**

This device complies with Title 47 CFR § Part 27 of the federal code. Specifically, 47CFR § 1.1310, Table 1, Limits for General Population/Uncontrolled Exposure.

This device must be operated as supplied by XetaWave LLC. Any changes or modifications made to the device without the express written approval of XetaWave LLC may void the user's authority to operate the device, pose violations and liabilities.

**Caution**

The model number Xeta7-M2 has a nominal maximum transmitted output power of 10720 mW when used in the 757-758MHz and 787-788MHz bands. The transmit antenna shall be kept at least 147.5 cm from physical space where humans may exist.

- Additional details may be found in the "RF Exposure Calculations" at the end of this section.

These limits are designed to provide reasonable protection against harmful energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1) Reorient or relocate the devices and/or antennas.
2) Increase the separation between the equipment and the receiver.
3) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
4) Consult the dealer or an experienced RF/radio/Electronics professional for help.

**Integration FCC ID:**

When the module is installed inside of another device, then the outside of the device into which the module is installed must display a label referring to the enclosed module.

The exterior label will use the wording: ‘Contains FCC ID: PEJ-9382009’

Serial # X00000000 1234  1234
Model # XETA7-M2
Contains FCC ID: PEJ-9382009
Input Voltage:  12.5 VDC

## WARNING

These radio systems shall be installed by a RF/radio professional familiar with the applicable rules. Installation of all antennas shall be performed in a manner that will provide at least the MPE Distance from the direction of maximum radiation, to any user or member of the public and consistent with the settings in the applicable antenna installation compliance section below.

FCC antenna compliance

Since professional installation is required, standard RF connectors are used. Adapters or custom coaxial cables may be required to connect the radio output connector to the desired antenna.

Any antenna from a reputable manufacturer with desired bandwidth, gain/pattern coverage, and have an input surge impedance of approximately 50 ohms can be used.

Maximum antenna gain is 11 dBi in both the 757-758MHz and 787-788 MHz bands. However, for 11 dBi antenna gain, maximum output power must be reduced at the radio output or cable with loss of at least 5dB must be employed. It is recommended to use a low gain antenna, with max gain of 6dBi in the 787-788 MHz bands.

### Exposure Compliance

**FCC ID:** PEJ-9382009

It is the responsibility of the licensee or user to guarantee compliance with the appropriate MPE regulations when operating this device in a way other than described herein. The installer of this equipment must ensure the antenna is located or oriented such that it does not emit an RF field in excess guidelines as posted in the 47 CFR Bulletin 65/47CFR § 1.1310 of the Federal Communications Commission, or the Council of European Union as appropriate.

People should not be near the antenna when the radio link is operating as general practice and maintain a safe distance as calculated below.

The following calculations are based off the Maximum Permissible Exposure requirements as outlined by the FCC.

The MPED (Maximum Permissible Exposure Distance) is calculated based on the limits for a General Population/Uncontrolled Exposure in the 300-1500 MHz frequency band using the stated MPE power density limit of F/1500 $mW/cm^2$ for General Population /Uncontrolled environment.

To calculate safe distance*:*

$$MPED = \sqrt{\frac{(ConductedPower)(DutyCycle)(AntennaGain)}{(4\pi)(ExposureLimit)}}$$

Where:
*MPED* is Maximum Permissible Exposure Distance or safe distance in cm;
$ConductedPower$ is the power delivered to antenna input in mW;
$ExposureLimit$ is a limit for General Population/ Uncontrolled exposure in mW/cm$^2$
All quantities are calculated in linear or numeric quantities.

Duty cycle is set using packet sizes for master and slave. Packet sizes are set in the radio Network Configuration Menu. At power up and with no data transmitting, the radios will transmit or beacon with a duty cycle of 6 to 10% depending upon modulation setting.

FCC MPE Calculation:

Antenna: 11 dBi (757-758 MHz band)
6 dBi (787-788 MHz band)

For 300-1500 MHz single transmitters (General use):

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Freq MHz** | **EUT Power dBm** | **EUT Power mW** | **Cable Loss dB** | **Ant Gain dBm** | **Power at Ant dBm** | **EIRP mW** | **Power Density (S) at 20 cm mW/cm2** | **MPE Limit at 20 cm mW/cm2** |
| 757.5 | 40.4 | 10964.8 | 0 | 11 | 40.4 | 138038.43 | 27.462 | 0.505 |
| 787.5 | 40.4 | 10964.8 | 0 | 6 | 40.4 | 43651.58 | 8.684 | 0.525 |

For the cases where S > the MPE Limit:

| **Freq MHz** | **Power Density (S) at 20 cm mW/cm2** | **MPE Limit at 20 cm mW/cm2** | **Distance where s<=MPE Limit cm** |
|---|---|---|---|
| 757.5 | 27.462 | .505 | 147.5 |
| 787.5 | 8.684 | .525 | 81.3 |