



FCC ID NO: QGK-DT-200

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### FCC Notice

Demarc Technology Group, LLC wireless equipment described herein complies with FCC radiation exposure limits set forth for an uncontrolled environment when installed as directed. The equipment should be installed and operated as fix-mounted system such that the main lobe(s) of these antennas are located a minimum of 8 feet between the antenna and all persons during normal operation.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

**Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.**

### Federal Communications Commission (FCC) Statement

This Equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency 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.

### FCC Output Power Restrictions

The FCC does not require licensing to implement this device. However, the FCC has established restrictions regarding maximum output power and the adjustments required when employing directional gain antennas. These restrictions are detailed in FCC Part 15.247 (b)(1), (b)(3)(i), and (3)(iii). It is the responsibility of the individuals designing and implementing the radio system to assure compliance with these and any other pertinent FCC Rules and Regulations.

### FCC RF Radiation Exposure Statement:

The DT-200 is designed for 2.4 GHz @ 200mW. This level of RF energy are below the Maximum Permissible Exposure (MPE) levels specified in FCC OET 65:97-01. This is only approved with the antenna gains as listed in this document with the maximum antenna gain of 18dBi. A separation distance of 33 cm between the antenna and humans must be maintained.

### The following precautions must be taken during installation of this equipment:

- The installed antenna must not be located in a manner that allows exposure of the general population to the direct beam path of the antenna at a distance less than 33cm. Installation on towers, masts, or rooftops not accessible to the general population is recommended; or
- Mount the antenna in a manner that prevents any personnel from entering the area within 33 cm from the front of the antenna.
- During antenna installation, be sure that power to the DT-200 equipment is turned *off* in order to prevent any energy presence on the coaxial connector.
- During installation and alignment of the antenna, do not stand in front of the antenna assembly.
- During installation and alignment of the antenna, do not handle or touch the front of the antenna.

These simple precautions must be taken to prevent personnel from exposure to RF energy in excess of specified MPE levels.



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## Feedline Loss

Feedline loss is a function of feedline type and length. Feedline loss per 100 feet for several types of coax at 2.4Ghz is detailed in the table below. The RF loss applies to BBP/RFC interconnection, and the RF loss applies to RFC/antenna interconnection.

**RF Loss per 100 feet at 2.4GHz**

| Cable    | dB Loss/100 feet |
|----------|------------------|
| LMR-100  | 40 dB            |
| LMR-195  | 19 dB            |
| LMR-200  | 16.9 dB          |
| LMR-240  | 12.9 dB          |
| LMR-300  | 10.4 dB          |
| LMR-400  | 6.8 dB           |
| LMR-500  | 5.48 dB          |
| LMR-600  | 4.42 dB          |
| LMR-900  | 2.98 dB          |
| LMR-1200 | 2.26 dB          |
| LMR-1700 | 1.71 dB          |

## TRANSMITTER POWER

The FCC specifies the maximum transmitter power that may be used for antennae of a given gain. FCC rules Part 15, Subpart 247 for a point-to-point system allows for a maximum power of 1 watt into antennae of a gain less than or equal to 6 dBi. For every 3 dB of gain over 6 dBi, the transmitter must be reduced by 1 dB.

## Authorized Antennas and Antenna Gain

Best performance will result from the use of high gain antennas. DT-200 is intended to be coupled with an antenna that is directional and provides signal gain as the FCC provides no recourse in this band in the event of nearby interference, so a highly directional antenna reduces the likelihood of interference in the antenna pattern.

A unique style (reverse MMCX) connector is provided on the DT-200 to prevent the use of non-approved antennas.

The following table is a list of Demarc antenna models that are approved to be used with this device: All antennas are the same type antenna. Only the panel design is changed between the different models. The Omni directional antennas do not have panels installed.



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| Model No.                                                 | Frequency<br>Mhz | Gain dBi | HB/VB<br>Degree |
|-----------------------------------------------------------|------------------|----------|-----------------|
| <b>180° Sector Panel Base Station Antennas (Vertical)</b> |                  |          |                 |
| SPDG11H                                                   | 2400-2483        | 3.5      | 180/70          |
| SPDG12H                                                   | 2400-2483        | 6        | 180/40          |
| SPDG13H                                                   | 2400-2483        | 7.5      | 180/24          |
| SPDG14H                                                   | 2400-2483        | 8        | 180/20          |
| SPDG16H                                                   | 2400-2483        | 9.5      | 180/14          |
| SPDG18H                                                   | 2400-2483        | 10.5     | 180/10          |
| SPDG112H                                                  | 2400-2483        | 11.5     | 180/8           |

|                                                                             |           |      |        |
|-----------------------------------------------------------------------------|-----------|------|--------|
| <b>180° Sector Panel Base Station Antennas (Vertical) with F/B&lt;-22dB</b> |           |      |        |
| SPDG14H22                                                                   | 2400-2483 | 9.1  | 180/20 |
| SPDG16H22                                                                   | 2400-2483 | 10.6 | 180/14 |
| SPDG18H22                                                                   | 2400-2483 | 11.6 | 180/10 |
| SPDG112H22                                                                  | 2400-2483 | 12.6 | 180/8  |

|                                                                         |           |      |        |
|-------------------------------------------------------------------------|-----------|------|--------|
| <b>120 degree Sector Panel Antennas with -30dB F/B Ratio (Vertical)</b> |           |      |        |
| SPDG11T2                                                                | 2400-2483 | 7.1  | 120/60 |
| SPDG14T2                                                                | 2400-2483 | 11   | 120/20 |
| SPDG16T2                                                                | 2400-2483 | 12.2 | 120/14 |
| SPDG18T2                                                                | 2400-2483 | 13   | 120/10 |
| SPDG112T2                                                               | 2400-2483 | 14   | 120/8  |

|                                                           |           |      |        |
|-----------------------------------------------------------|-----------|------|--------|
| <b>120° Sector Panel Base Station Antennas (Vertical)</b> |           |      |        |
| SPDG11T                                                   | 2400-2483 | 7    | 120/60 |
| SPDG12T                                                   | 2400-2483 | 9    | 120/40 |
| SPDG13T                                                   | 2400-2483 | 10   | 120/24 |
| SPDG14T                                                   | 2400-2483 | 11   | 120/19 |
| SPDG16T                                                   | 2400-2483 | 12.2 | 120/12 |
| SPDG18T                                                   | 2400-2483 | 13   | 120/10 |
| SPDG112T                                                  | 2400-2483 | 14   | 120/8  |

|                                                          |           |     |       |
|----------------------------------------------------------|-----------|-----|-------|
| <b>90° Sector Panel Base Station Antennas (Vertical)</b> |           |     |       |
| SPDG11F                                                  | 2400-2483 | 7.5 | 90/60 |
| SPDG12F                                                  | 2400-2483 | 9.5 | 90/38 |
| SPDG13F                                                  | 2400-2483 | 11  | 90/22 |
| SPDG14F                                                  | 2400-2483 | 12  | 90/20 |
| SPDG16F                                                  | 2400-2483 | 13  | 90/12 |
| SPDG18F                                                  | 2400-2483 | 14  | 90/10 |
| SPDG112F                                                 | 2400-2483 | 15  | 90/8  |

|                                                          |           |      |       |
|----------------------------------------------------------|-----------|------|-------|
| <b>60° Sector Panel Base Station Antennas (Vertical)</b> |           |      |       |
| SPLG11F                                                  | 2400-2483 | 9.3  | 60/65 |
| SPLG11                                                   | 2400-2483 | 10   | 60/65 |
| SPLG12                                                   | 2400-2483 | 12   | 60/33 |
| SPDG24                                                   | 2400-2483 | 14   | 60/14 |
| SPDG14S                                                  | 2400-2483 | 14.5 | 60/12 |
| SPDG16S                                                  | 2400-2483 | 16.5 | 60/9  |

|                                                          |           |      |       |
|----------------------------------------------------------|-----------|------|-------|
| <b>45° Sector Panel Base Station Antennas (Vertical)</b> |           |      |       |
| SPDG15E                                                  | 2400-2483 | 15.8 | 45/12 |
| SPDG17E                                                  | 2400-2483 | 17.8 | 45/9  |

| Model No.                                                | Frequency<br>Mhz | Gain dBi | HB/VB<br>Degree |
|----------------------------------------------------------|------------------|----------|-----------------|
| <b>Omni Directional Base Station Antennas (Vertical)</b> |                  |          |                 |
| SPDG11O                                                  | 2400-2483        | 2        | 360/90          |
| SPDG12O                                                  | 2400-2483        | 4.5      | 360/55          |
| SPDG13O                                                  | 2400-2483        | 5.5      | 360/30          |
| SPDG14O                                                  | 2400-2483        | 6.5      | 360/24          |
| SPDG16O                                                  | 2400-2483        | 8        | 360/18          |

|                                                                  |           |     |        |
|------------------------------------------------------------------|-----------|-----|--------|
| <b>Omni Directional Base Station Antennas (Vertical) (Panel)</b> |           |     |        |
| SPDG12OP                                                         | 2400-2483 | 4.5 | 360/55 |
| SPDG13OP                                                         | 2400-2483 | 5.5 | 360/30 |
| SPDG14OP                                                         | 2400-2483 | 6.5 | 360/24 |
| SPDG16OP                                                         | 2400-2483 | 8   | 360/18 |

|                                                  |           |      |       |
|--------------------------------------------------|-----------|------|-------|
| <b>CPE Directional Panel Antennas (Vertical)</b> |           |      |       |
| SPLG11F                                          | 2400-2483 | 9.3  | 60/65 |
| SPLG11                                           | 2400-2483 | 10   | 60/65 |
| SPFPG9                                           | 2400-2483 | 9.6  | 55/65 |
| SPLG14B                                          | 2400-2483 | 14.2 | 27/33 |
| SPLG22                                           | 2400-2483 | 14   | 33/33 |
| SPDG26                                           | 2400-2483 | 17.5 | 33/12 |
| SPFPG13                                          | 2400-2483 | 13   | 20/65 |
| SPFPG15                                          | 2400-2483 | 15   | 20/33 |
| SPFPG16                                          | 2400-2483 | 16.2 | 16/30 |
| SPFPG18                                          | 2400-2483 | 18   | 17/18 |

|                                                                |           |      |       |
|----------------------------------------------------------------|-----------|------|-------|
| <b>CPE Low Side lobe Directional Panel Antennas (Vertical)</b> |           |      |       |
| SPFPG12                                                        | 2400-2483 | 12.5 | 22/65 |
| SPPGL13                                                        | 2400-2483 | 13   | 22/65 |
| SPFPG14                                                        | 2400-2483 | 14.5 | 22/33 |
| SPPGL15                                                        | 2400-2483 | 15   | 22/33 |

|                                                                       |           |     |        |
|-----------------------------------------------------------------------|-----------|-----|--------|
| <b>Range Extender Omni Directional Antennas for 2.4GHz (Vertical)</b> |           |     |        |
| SPDGRE4                                                               | 2400-2483 | 4.5 | 360/55 |
| SPDGRE5                                                               | 2400-2483 | 5.5 | 360/30 |

|                                                            |           |      |       |
|------------------------------------------------------------|-----------|------|-------|
| <b>60° Sector Panel Base Station Antennas (Horizontal)</b> |           |      |       |
| SPFPGH9S                                                   | 2400-2483 | 9.6  | 60/55 |
| SPFPGH12S                                                  | 2400-2483 | 12.5 | 60/22 |
| SPFPGH14S                                                  | 2400-2483 | 14   | 60/18 |

|                                                             |           |   |        |
|-------------------------------------------------------------|-----------|---|--------|
| <b>120° Sector Panel Base Station Antennas (Horizontal)</b> |           |   |        |
| SPHSG2T                                                     | 2400-2483 | 9 | 120/40 |

|                                                    |           |      |       |
|----------------------------------------------------|-----------|------|-------|
| <b>CPE Directional Panel Antennas (Horizontal)</b> |           |      |       |
| SPFPGH9S                                           | 2400-2483 | 9.6  | 60/55 |
| SPFPGH13                                           | 2400-2483 | 13.2 | 18/65 |
| SPLGH22                                            | 2400-2483 | 14   | 33/33 |
| SPFPGH15                                           | 2400-2483 | 15   | 30/20 |
| SPFPGH16                                           | 2400-2483 | 16.2 | 30/16 |
| SPFPGH18                                           | 2400-2483 | 18   | 18/17 |

|                                                            |           |     |        |
|------------------------------------------------------------|-----------|-----|--------|
| <b>Omni Directional Base Station Antennas (Horizontal)</b> |           |     |        |
| SPHSG1O                                                    | 2400-2483 | 3.2 | 360/45 |
| SPHSG2O                                                    | 2400-2483 | 5.5 | 360/30 |
| SPHSG4O                                                    | 2400-2483 | 7.5 | 360/18 |
| SPHSG6O                                                    | 2400-2483 | 8.5 | 360/12 |