
KONA ENTERPRISE GATEWAY

ANTENNA SELECTION GUIDE

Document Type:	Antenna Deployment Guide
Document Number:	T0007323_ASG
Document Issue:	0.5
Document Status:	Release
Product Name:	Kona Enterprise Gateway
Product Code:	See Table 1
Issue Date:	Oct 14 th , 2021

PROPRIETARY:

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Document Revision

Revision	Issue Date	Status	Editor	Comments
0.1	May 14, 2021	Draft	C. A.	First release
0.2	June 22, 2021	Draft	C. A.	Integrate comments from D.T. & T.D.
0.3	June 29, 2021	Draft	C. A.	Integrate more comments from D.T.
0.4	July 16, 2021	Release	C. A.	Integrate more comments from T.D.
0.5	July 28 th , 2021	Release	C. A.	Add GPS Internal Antenna Section

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1 Product Description

1.1 Overview

The Kona Enterprise Gateway module, is a low-power micro-cell gateway with wide-area coverage (up to 500 km²). The module consists of 1 Semtech SX1301 base-band processor multiplexed through an FPGA to provide 8 simultaneous narrowband channels. The design offers both downlink and uplink operations in time-duplex mode. The gateway supports internal LoRaWAN antenna, internal GPS, copper Ethernet backhaul, and optional 3G/4G wireless backhaul with internal Cellular antennas. The gateway also supports external LoRaWAN and Main Cellular antennas via switched-N bulkhead connector. The Kona Enterprise Gateway is powered through Power Over Ethernet (POE 802.3at).

This document will cover the requirements and considerations that are required when deploying LTE and LoRaWAN antennas for the Kona Enterprise Gateway. Radiation patterns will be outlined so that customers can use the best antenna for their use case.

Table 1 presents the currently available Kona Enterprise Gateway antennas.

Table 1: Kona Enterprise Gateway Antenna Models

Model	Type	Frequency Band	XZ Half Power Beamwidth	XY Polarization	Physical Length
T0005195	LTE 2dBi	698 – 960 MHz 1710 – 2680 MHz	Omni	Omni	230mm
T0007468	LoRaWAN 2.5dBi	860 – 870 MHz 900 – 930 MHz	45°	Omni	500mm
T0007469	LoRaWAN 6dBi	860 – 870 MHz 900 – 930 MHz	20°	Omni	800mm
T0007265	LoRaWAN 8.5dBi	860 – 870 MHz 900 – 930 MHz	14°	Omni	1270mm

Error! Reference source not found. 1 illustrate the Kona Enterprise Gateway LoRaWAN antenna external form-factors.



Figure 1: LoRaWAN Antenna

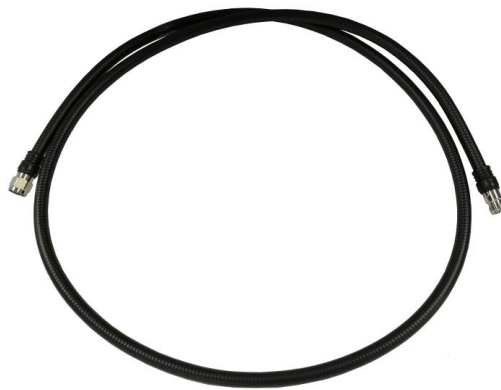


Figure 2: 50 Ohm Cable to connect Antenna to Kona Enterprise Gateway

2 Use Case

2.1 Why use an external Antenna?

The primary reason to use the external antenna over the internal antenna is for the improved omni-directional coverage. As outlined in Figure 3, the Kona Enterprise gateway has a metal backing for heat sink and mounting. Since Radio Waves are reflected by metal, the radiation pattern of the internal antenna will not be fully omni-directional.

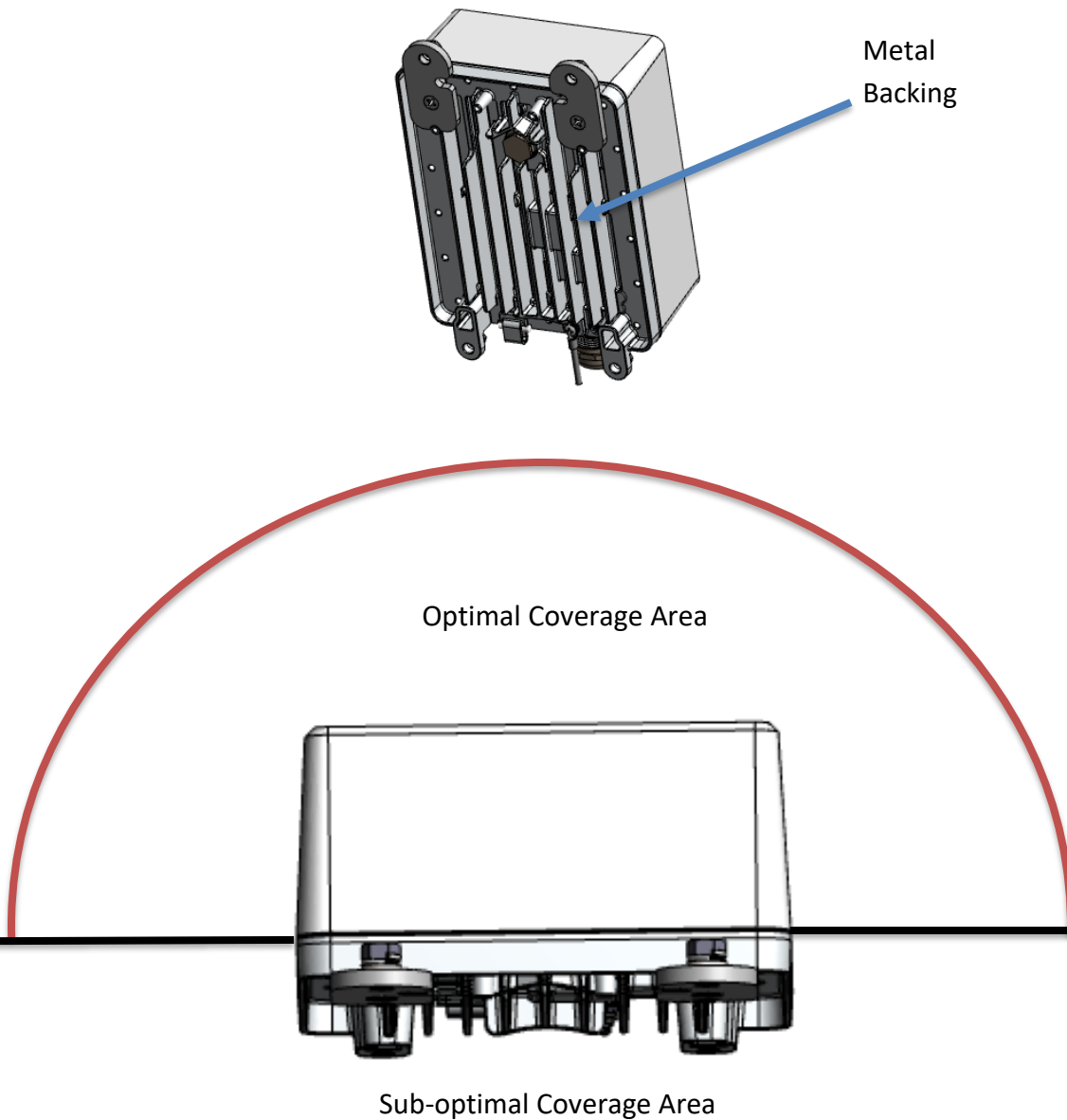


Figure 3: Internal Antenna Coverage Area

On the other hand, when using an external antenna, the user can decide which antenna works best for their use case. External antennas will provide a more omni-directional pattern and provide a larger area of coverage as outlined in Figure 4. In general, the following information can be used to select an antenna for the appropriate use case:

- 3dBi antenna is very general purpose, smallest for ease of installation
- 6dBi antenna is a medium sized antenna optimal for deployment in sub-urban areas
- 9dBi antenna is a large antenna and best used for rural tower installations that are attempting to maximize coverage range at the horizon

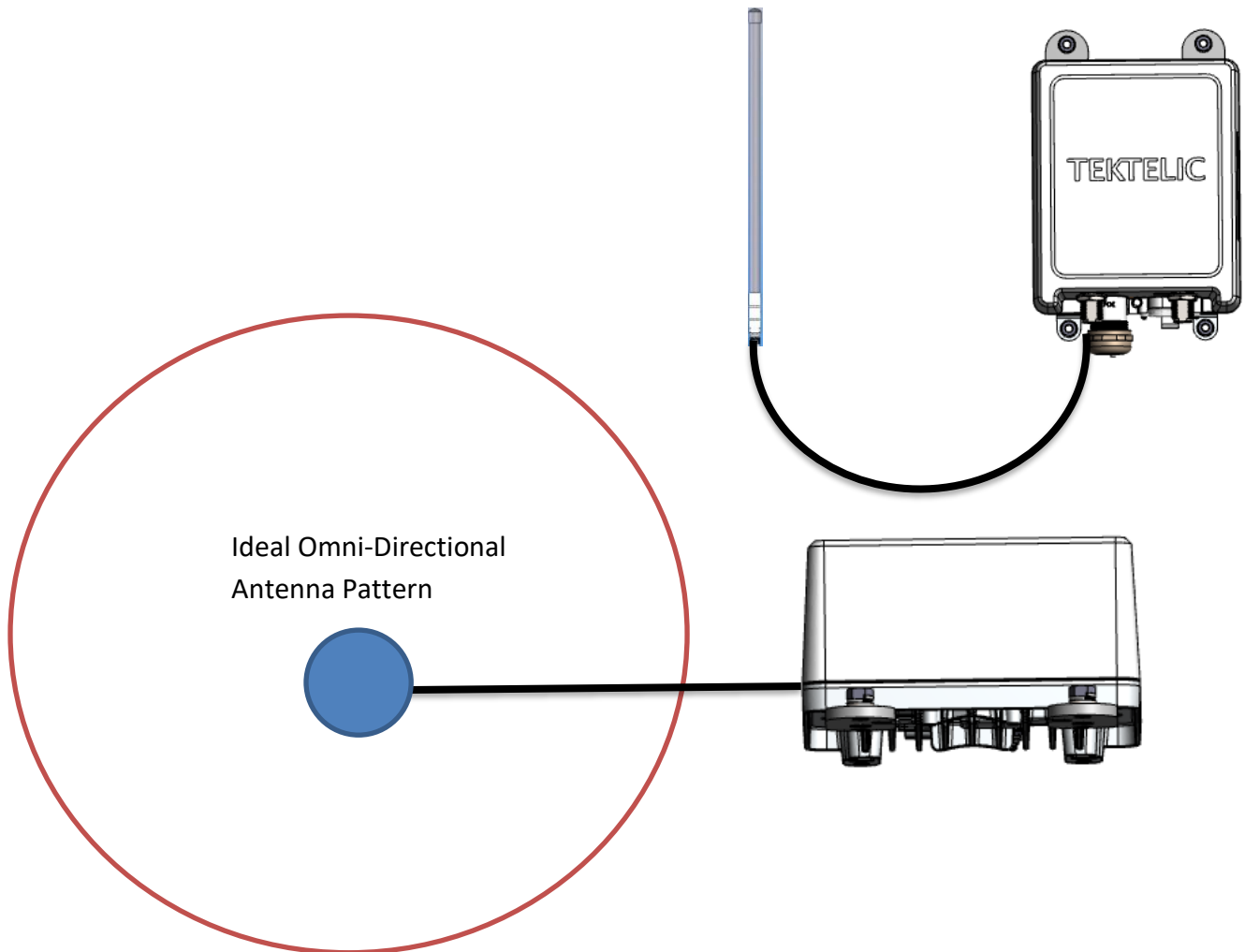


Figure 4: External Antenna Coverage Area

3 Radiation Patterns

3.1 LoRaWAN 2.5dBi antenna

A low-gain, omnidirectional antenna (in XZ plane) which is used in 860 – 930MHz frequency band.

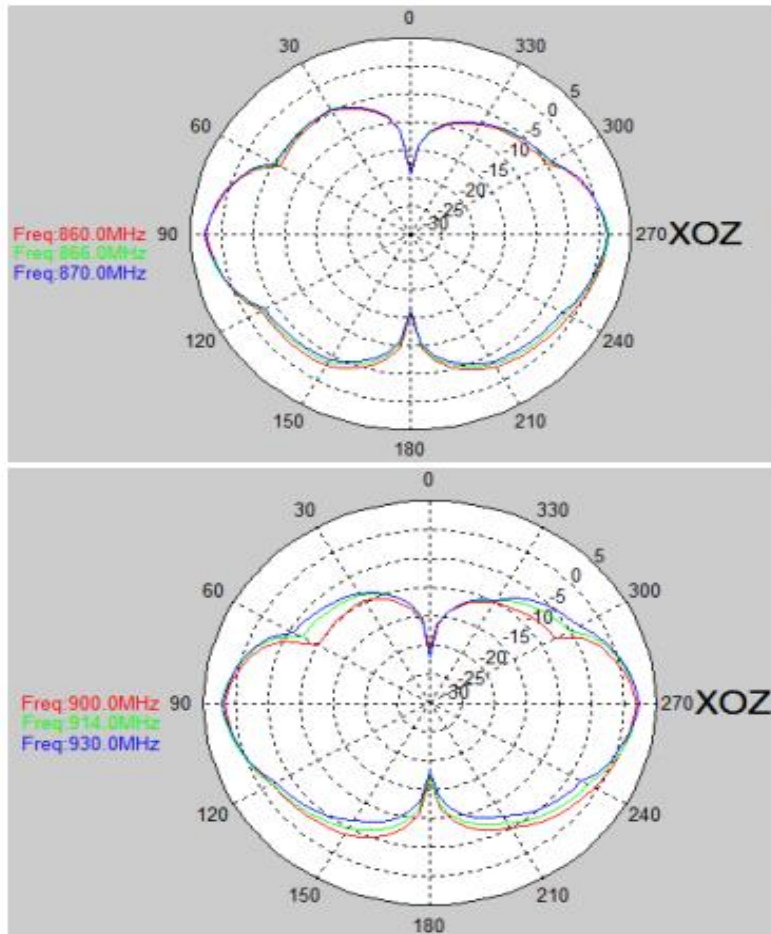


Figure 5: LoRaWAN 2.5dBi Antenna Radiation Pattern for XZ plane

3.2 LoRaWAN 6dBi Antenna

A mid-gain, omnidirectional antenna (in XZ plane) which is used in 860 – 930MHz frequency band.

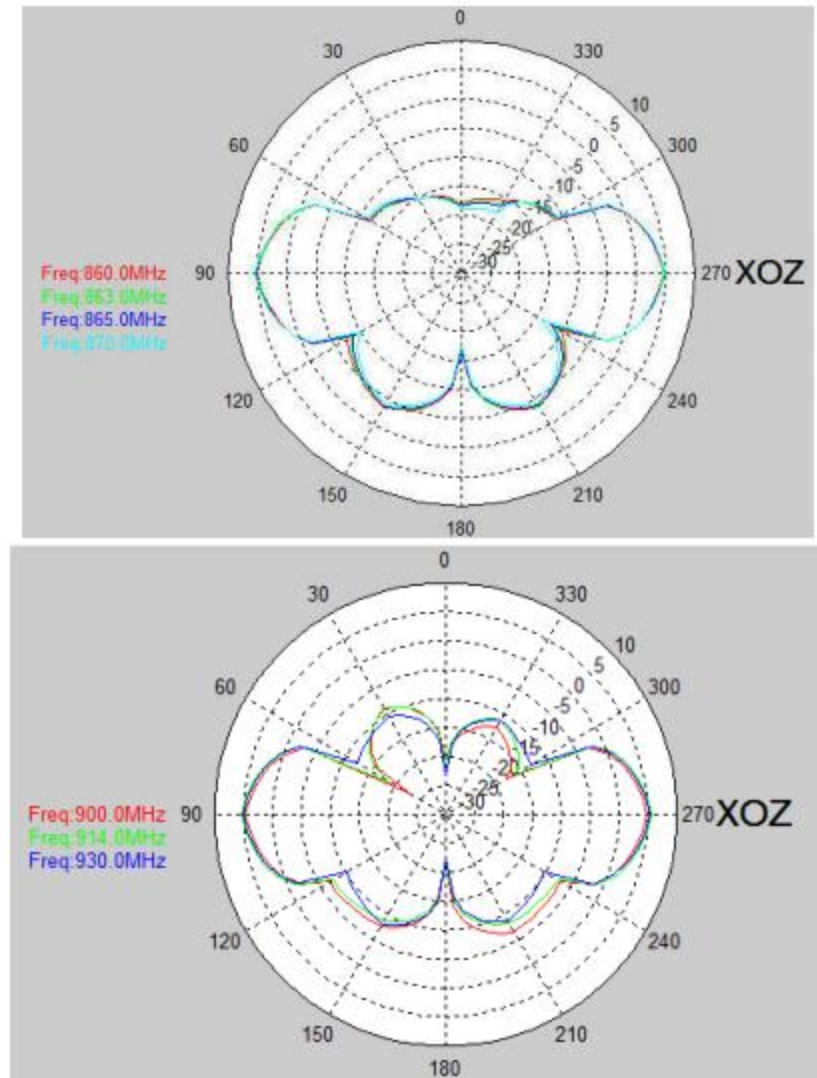


Figure 6: LoRaWAN 6dBi Antenna Radiation Pattern for XZ plane

3.3 LoRaWAN 8.5dBi Antenna

A high-gain, omnidirectional antenna (in XZ plane) which is used in 860 – 930MHz frequency band.

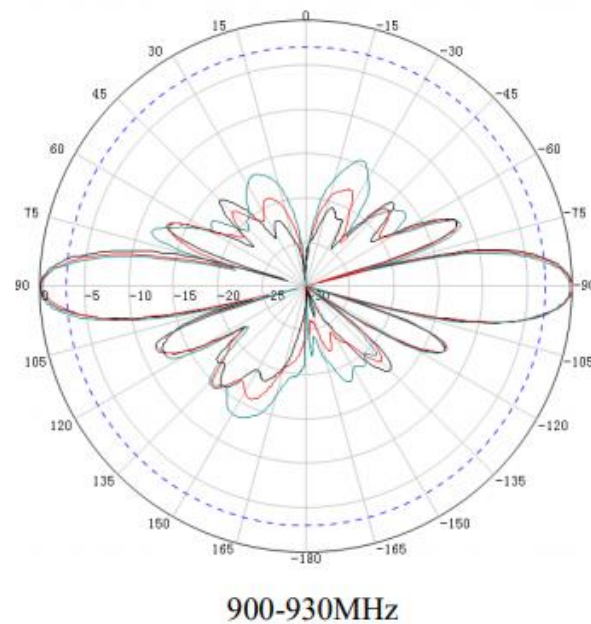
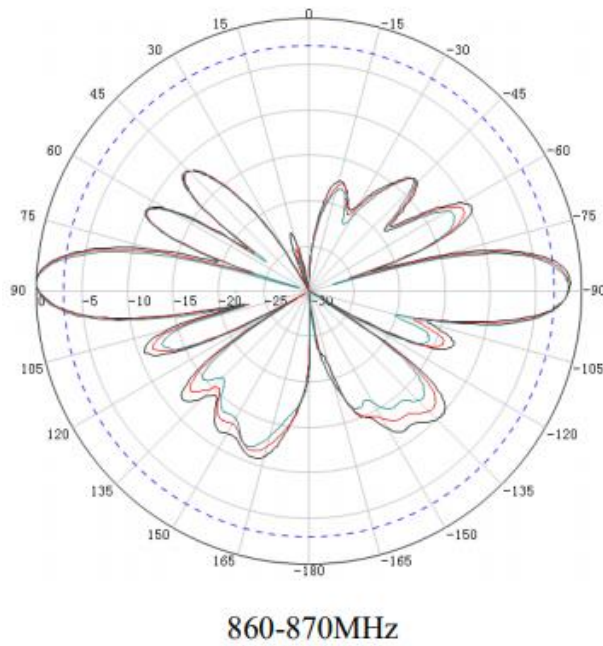


Figure 7: LoRaWAN 8.5dBi Antenna Radiation Pattern for XZ plane

3.4 Antenna Gain and Beamwidth

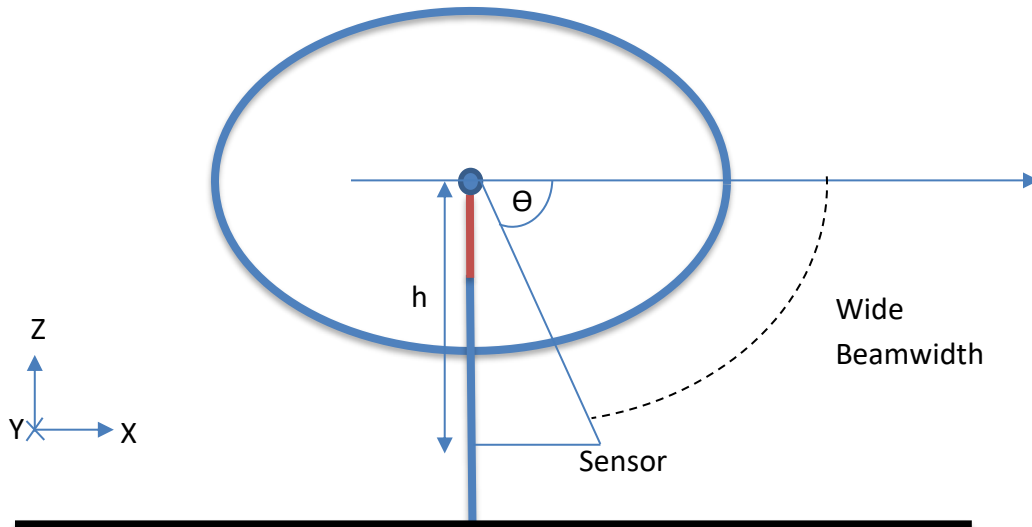


Figure 8: Gain & BW for low-gain LoRaWAN Antenna

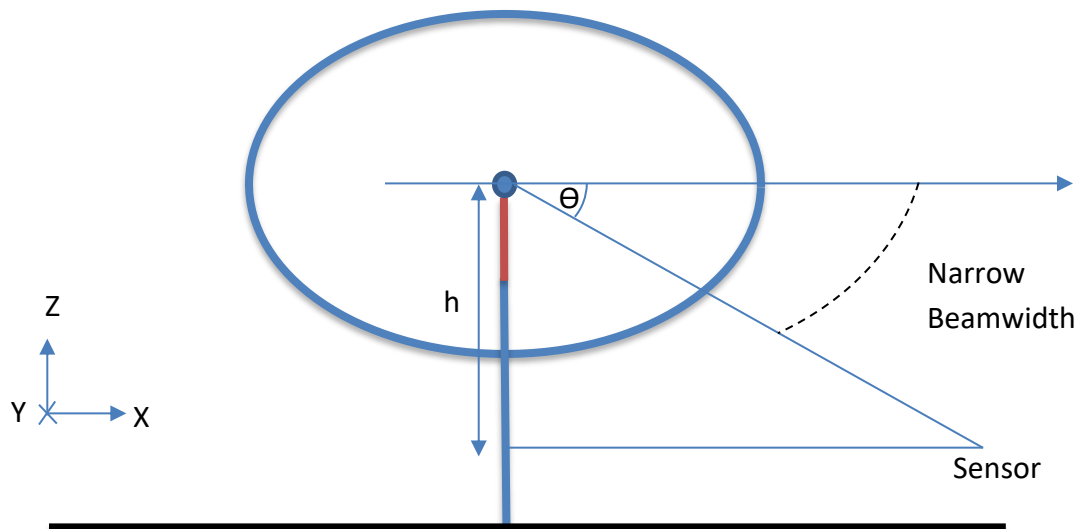


Figure 9: Gain & BW for high-gain LoRaWAN Antenna

As antenna gain increases, the elevation beamwidth decreases and physical length increases (as shown in Table 1). A good all-around choice is the 6dBi antenna which balances elevation beamwidth and gain. A higher gain antenna will increase the range of the gateway, but could reduce signal to noise ratio closer to the antenna. The low gain antenna should be used where available physical space is the primary concern.

4 GPS Antenna

The gateway must be orientated as indicated in Figure 10 for the strongest possible GPS Reception.

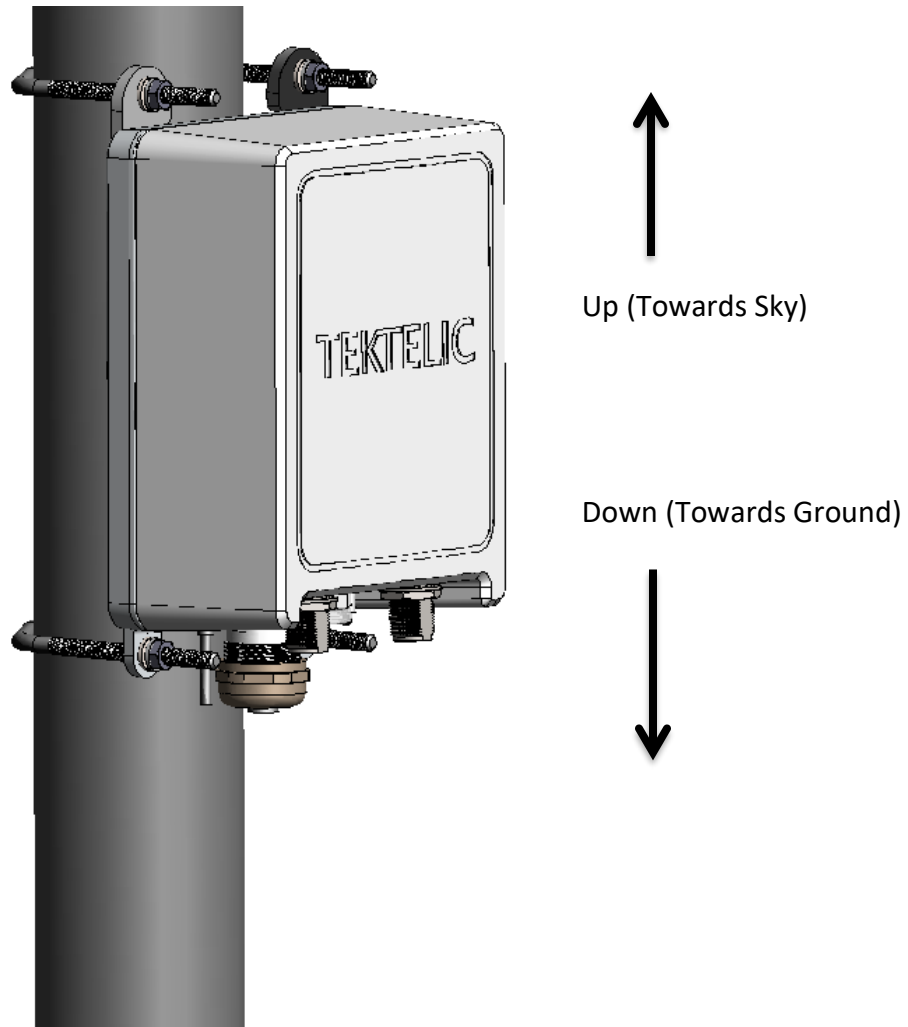


Figure 10: Proper Orientation for Kona Enterprise Gateway

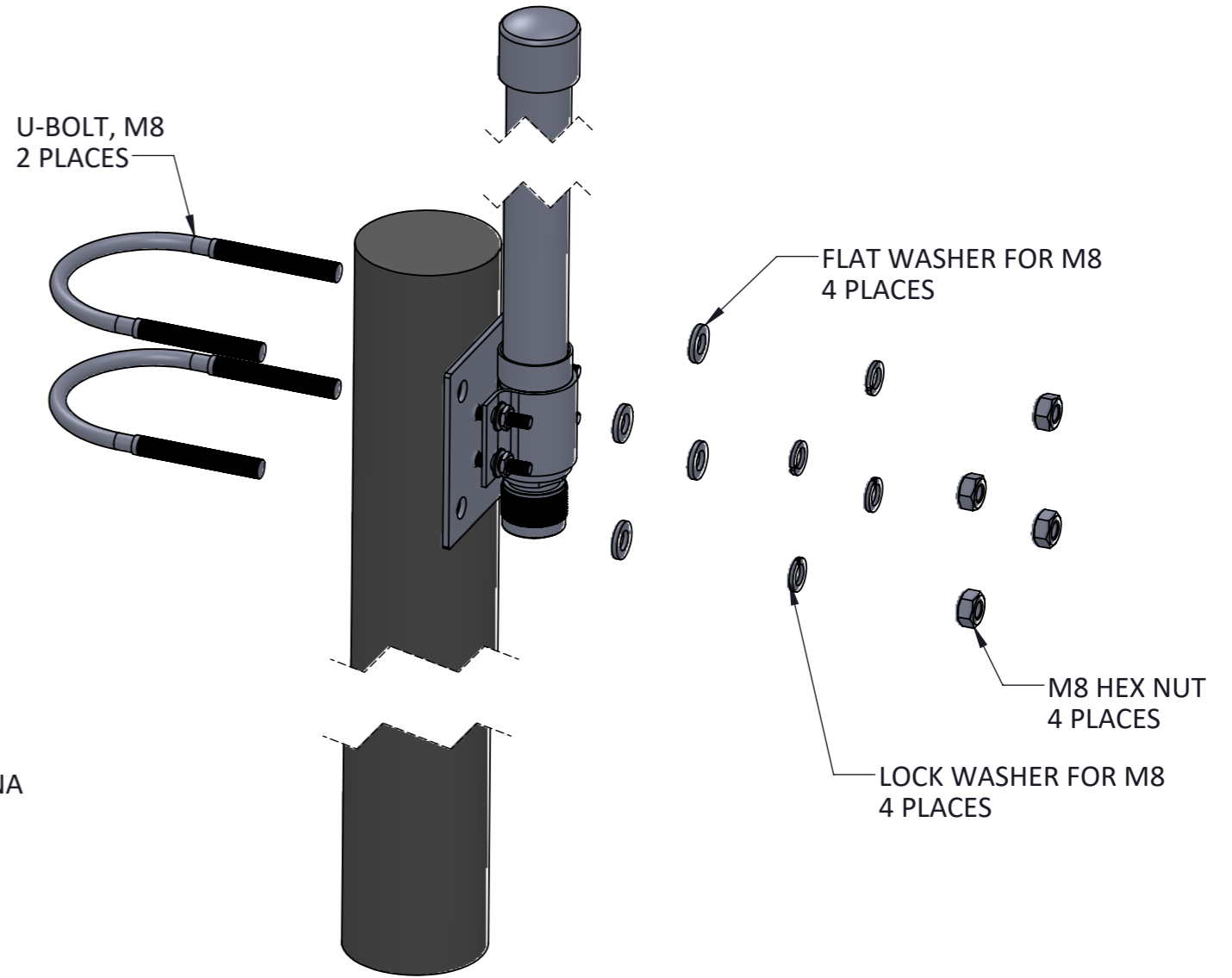
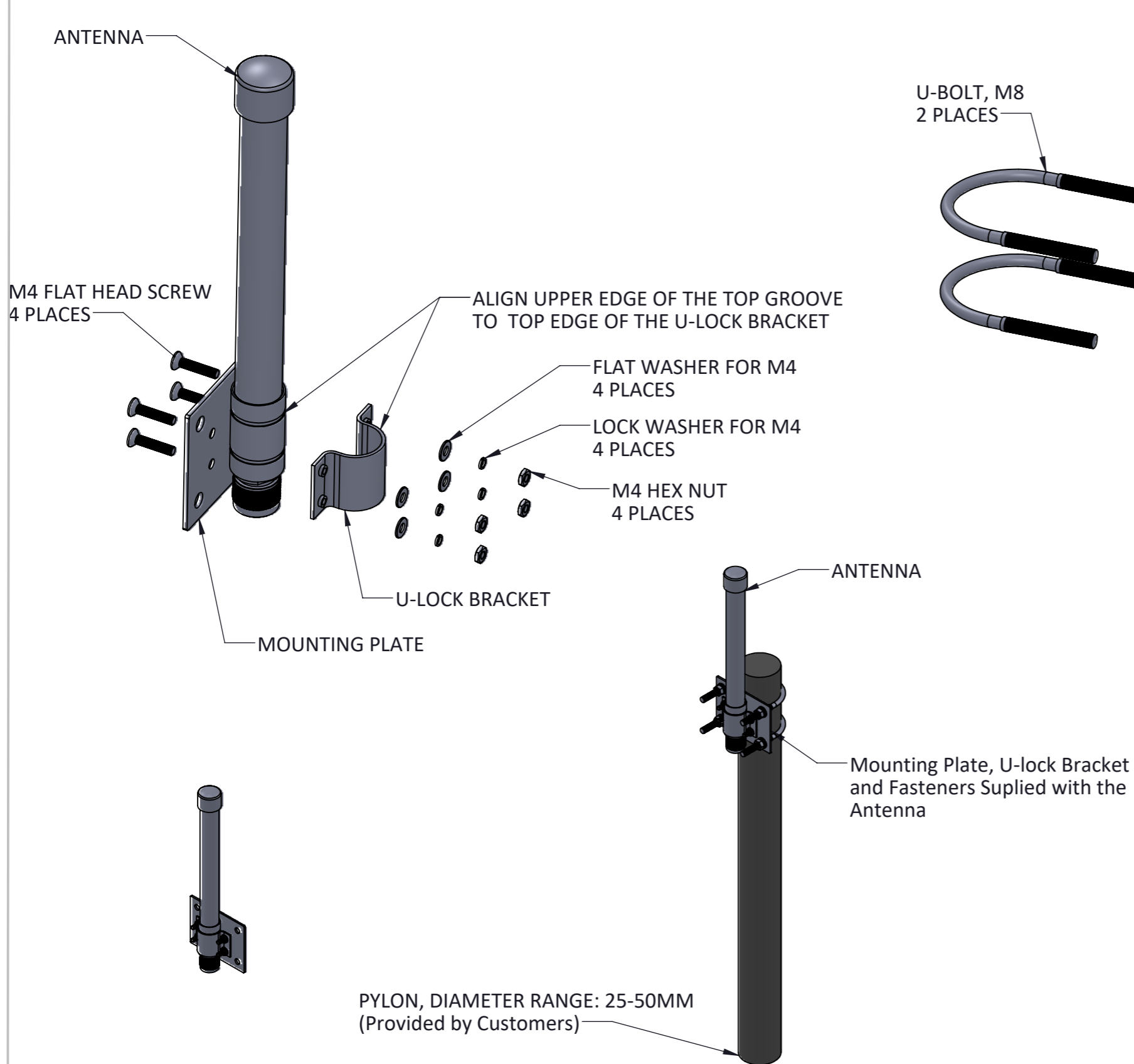
REVISIONS		
REV.	DESCRIPTION	DATE
A		17-Aug-2021

STEP #1

CLAMP ANTENNA TO THE MOUNTING PLATE WITH A U-LOCK BRACKET AND 4x M4 (FLAT HEAD SCREW, FLAT WASHER, LOCK WASHER, AND HEX NUT), TORQUE TO 2.6Nm ± 10%. ALIGN UPPER EDGE OF THE TOP GROOVE ON ANTENNA TO THE TOP EDGE OF THE U-LOCK BRACKET AS SHOWN.

STEP #2

MOUNT THE ANTENNA-MOUNTING PLATE ASSEMBLY TO A PYLON WITH 2x U-BOLT AND 4x M8 (FLAT WASHER, LOCK WASHER, AND HEX NUT), TORQUE TO 15Nm ± 10%.



TITLE: ANTENNA MOUNTING INSTRUCTION		
DWG NO. Tektelic-Antenna-Mounting	REVISION A	SIZE A3
SCALE:1:5	SHEET 1 OF 1	