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KONA MACRO/MEGA GATEWAY

ANTENNA SELECTION GUIDE

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1 Product Description

1.1 Overview

This document will cover the requirements and considerations that are required when deploying LTE, LoRaWAN and GPS antennas for the Kona Mega Gateway or the external LoRaWAN antenna for the Kona Macro (Cellular and GPS antennas are internal). Radiation patterns will be outlined so that customers can use the best antenna for their use case.

Table 1 presents the currently available Kona Gateway antennas.

Table 1: Kona Enterprise Gateway Antenna Models

Model	Type	Frequency Band	XZ Half Power Beamwidth	XY Polarization	Physical Length
T0005195	LTE 2dBi (Mega Only)	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
T0004536	GPS Antenna (Mega Only)	1575.42±1.02 3 MHz	110±10°	Right Hand Circular	82mm(Length) 98mm(Width)

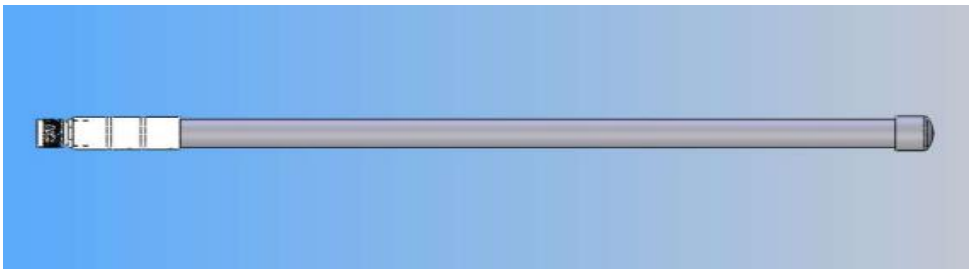


Figure 1: LoRaWAN or Cellular Antenna

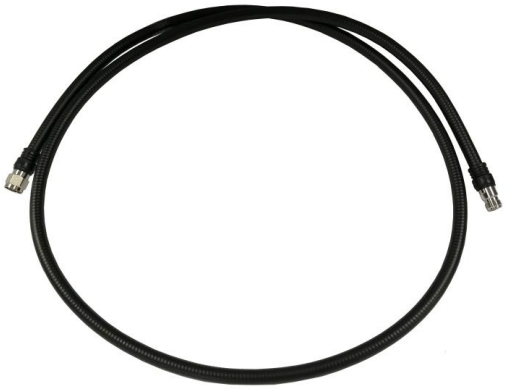


Figure 2: 50 Ohm Cable to connect Antenna to Kona Gateway

Figure 3: GPS Antenna (Mega Only)

2 Use Case

In the case of the Macro Gateway, the cellular and GPS antennas are internal to the module. External cellular and GPS antennas do not have to be provisioned, only the LoRaWAN antenna has to be selected. In the case of the Kona Mega Gateway, the use of external antennas is required as there are no internal antennas. For the GPS and cellular antennas, refer to Table 1.

When selecting an external LoRaWAN antenna, there are a number of options

In general, the following information can be used to select an antenna for the appropriate use case:

- 2.5dBi antenna is very general purpose, smallest for ease of installation
- 6dBi antenna is a medium sized antenna optimal for deployment in sub-urban areas
- 8.5dBi antenna is a large antenna and best used for rural tower installations that are attempting to maximize coverage range at the horizon

Radiation patterns for these antennas are shown in section 3.

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.

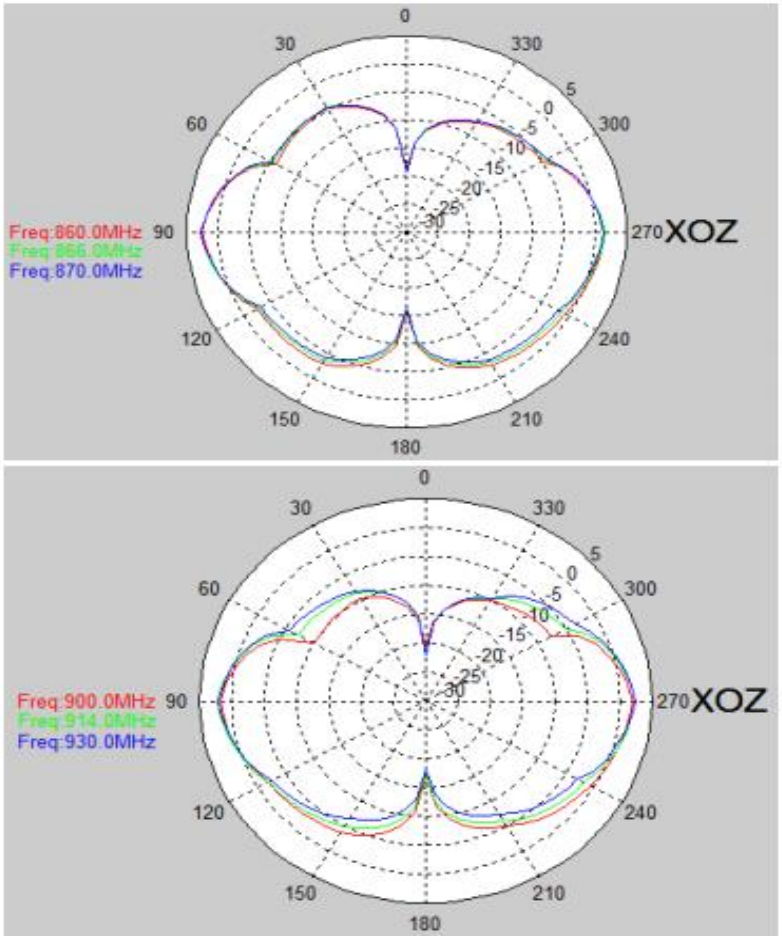


Figure 4: LoRaWAN 2.5dBi Antenna Radiation Pattern for XZ plane

3.2 LoRaWAN 6dBi Antenna

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

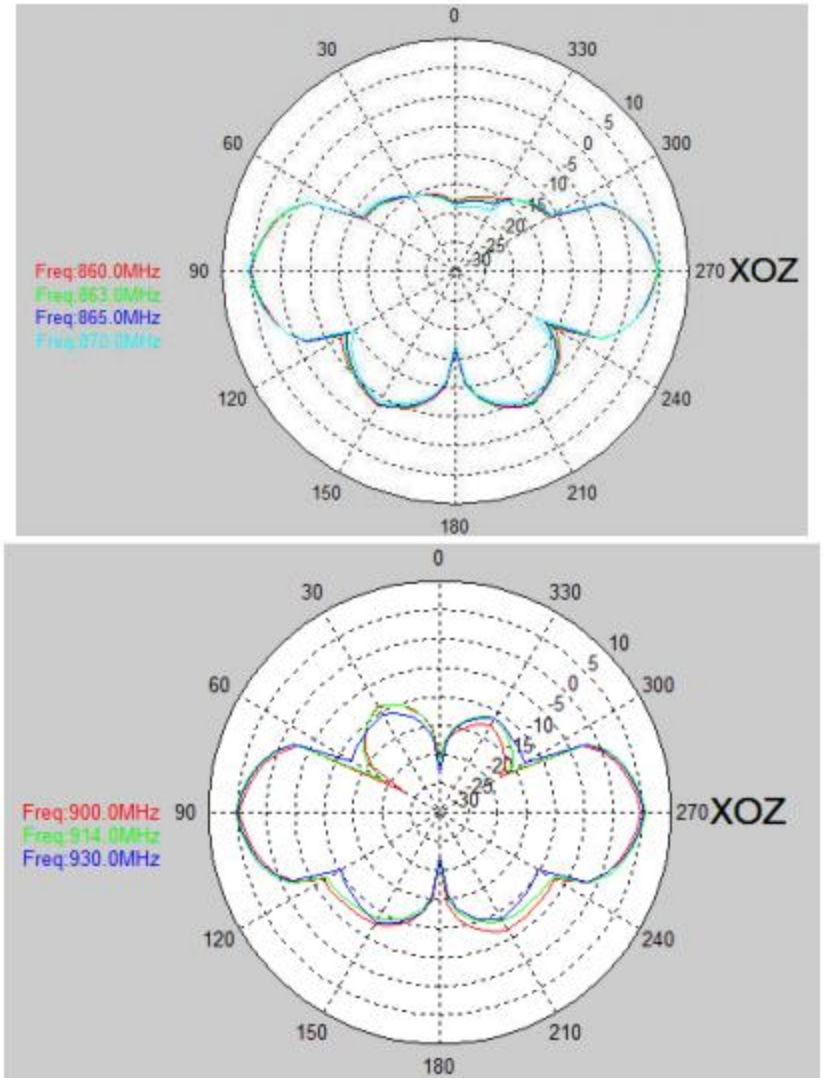
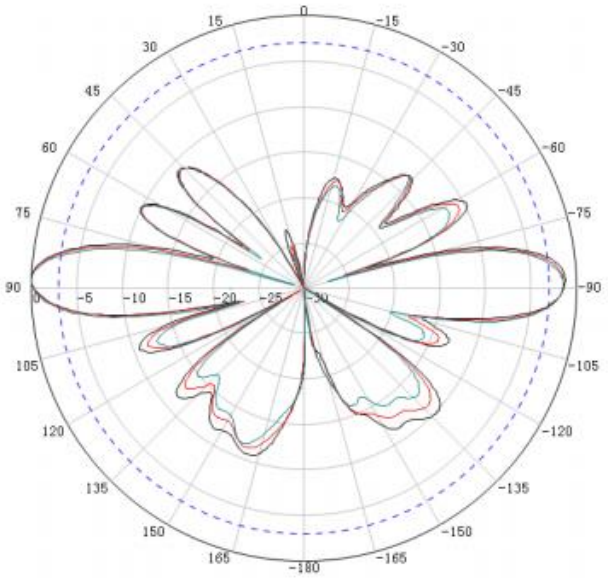


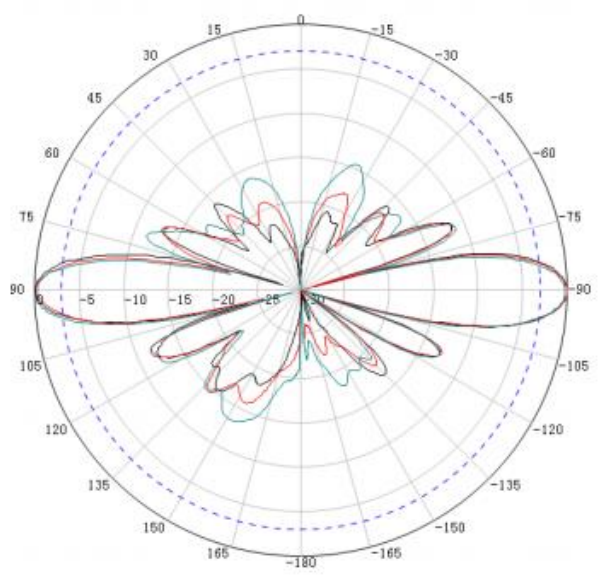
Figure 5: LoRaWAN 6dBi Antenna Radiation Pattern for XZ plane

3.3 LoRaWAN 8.5dBi Antenna

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



860-870MHz



900-930MHz

Figure 6: LoRaWAN 8.5dBi Antenna Radiation Pattern for XZ plane

3.4 Antenna Gain and Beamwidth

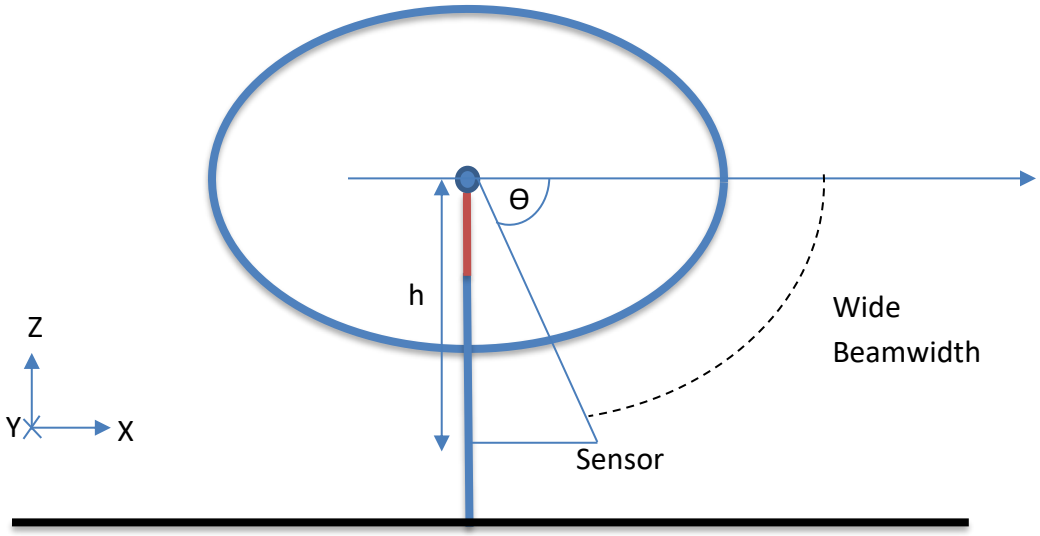


Figure 7: Gain & BW for low-gain LoRaWAN Antenna

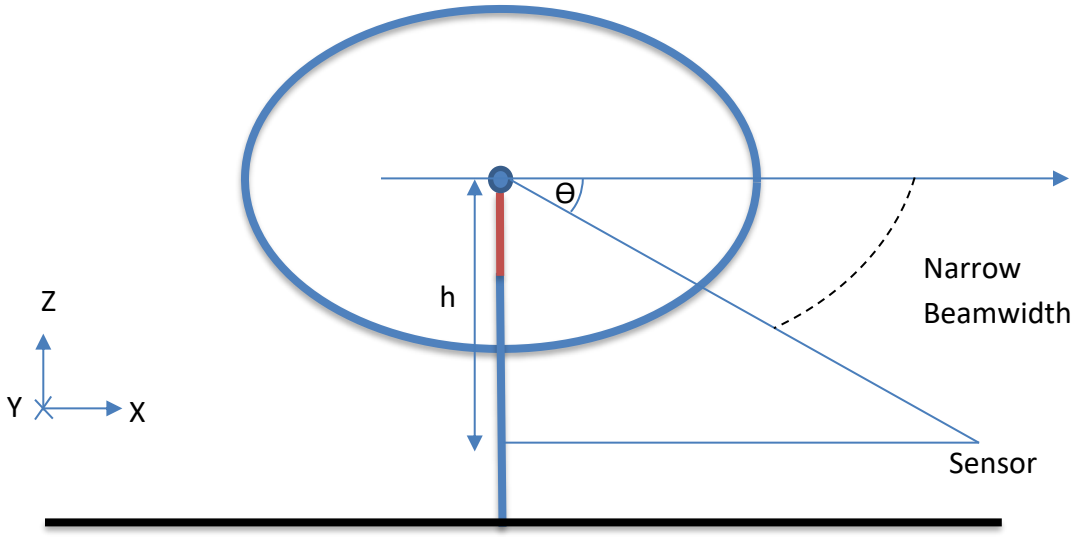


Figure 8: Gain & BW for high-gain LoRaWAN Antenna

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.