



Kona Macro FAQ

#1 Why is minimum reported RSSI -125dBm?

The RSSI value is reporting the sum of the receive power plus the noise in the channel. So for the cases of low or negative SNR, the RSSI value will be dominated by the thermal noise in the channel (+ noise figure). Using the received SNR value, an enhanced RSSI can be calculated using the following equation:

$$S_dBm = RSSI_dBm - 10 * \text{Log}_{10}(1 + 10^{(-SNR_dB/10)})$$

The equation reduces to the following at extreme values:

$$S_dBm = RSSI_dBm \text{ for large } SNR_dB \text{ values}$$

$$S_dBm = RSSI_dBm + SNR_dB \text{ for small } SNR_dB \text{ values}$$

#2 How can I install and run Lorient PF on my Kona Macro GW?

Please see the LORIENT section found [in the FAQ here](#).

#3 Does Kona Macro GW require any lightning arrester or surge protector?

- All interfaces on Kona Macro are protected to primary levels except for the 3G/4G modem antenna port. The Kona Macro Gateway contains primary lightning surge suppression on the Direct DC power port, the Copper Ethernet port, the GPS antenna port and the LoRa RF antenna ports.
- Ground cable among GW accessories protects GW from lightning strikes or the power surges. Also GW has Lightning protection plate, inbuilt in GW. Thus, it won't require any additional lightning arrester or surge protector.

#4 What is the difference between "tmms" and "tmst" timestamps in the Rx packet?

- **tmms** is available only when Gateway connects with GPS. It is basically GPS time.
- **tmst** is created by SX1301 when the Gateway receives packet from the device.

#5 How do outdoor gateways achieve IP67 ingress protection?

- On the Outdoor Kona Macro GW, there is a screw-on type boot to maintain the IP67 rating. The unit achieves the IP67 rating on the Ethernet cable by field installing this “boot” over the cable and then crimping the RJ45 connector to the outdoor rated ethernet cable.

#6 What are the typical Rx sensitivity and SNR values as a function of LoRaWAN data-rate for Kona Macro gateway supporting US915 and EU868 ISM bands?

- Kona Macro gateway has a custom RF front-end that optimizes RF linearity and noise figure performance.
- Below table provides information on typical Rx sensitivity and SNR values as a function of LoRaWAN data rate for US915 and EU868 ISM bands.

| North America (US915) | | | | | | | |
|-----------------------|-----------|----|------------------------------|---------------------------|-----------------------------------|-------------------------|--------------------------------------|
| BW (kHz) | Data Rate | SF | Required SNR (dB) at 10% PER | Thermal Noise Floor (dBm) | Typical Gateway Noise Figure (dB) | Total Noise Floor (dBm) | Typical Gateway Rx Sensitivity (dBm) |
| 125 | 0 | 10 | -15 | -123.0 | 3 | -120.0 | -135.0 |
| 125 | 1 | 9 | -12.5 | -123.0 | 3 | -120.0 | -132.5 |
| 125 | 2 | 8 | -10 | -123.0 | 3 | -120.0 | -130.0 |
| 125 | 3 | 7 | -7.5 | -123.0 | 3 | -120.0 | -127.5 |
| 500 | 4 | 8 | -10 | -117.0 | 3 | -114.0 | -124.0 |
| Europe (EU868) | | | | | | | |
| BW (kHz) | Data Rate | SF | Required SNR (dB) @ 10% PER | Thermal Noise Floor (dBm) | Typical Gateway Noise Figure (dB) | Total Noise Floor (dBm) | Typical Gateway Rx Sensitivity (dBm) |

| | | | | | | | |
|-----|---|----|-------|--------|---|--------|--------|
| 125 | 0 | 12 | -20 | -123.0 | 3 | -120.0 | -140.0 |
| 125 | 1 | 11 | -17.5 | -123.0 | 3 | -120.0 | -137.5 |
| 125 | 2 | 10 | -15 | -123.0 | 3 | -120.0 | -135.0 |
| 125 | 3 | 9 | -12.5 | -123.0 | 3 | -120.0 | -132.5 |
| 125 | 4 | 8 | -10 | -123.0 | 3 | -120.0 | -130.0 |
| 125 | 5 | 7 | -7.5 | -123.0 | 3 | -120.0 | -127.5 |
| 250 | 6 | 7 | -7.5 | -120.0 | 3 | -117.0 | -124.5 |

#7 How can I insert a SIM card in a Kona Macro gateway?

Please see the Kona Macro section found [in the FAQ here](#).