

## Attestation of Duty Cycle Limit

Date: 10-04-2024

RC Mowers attests that the product L915-7XQ9 containing FCC ID: 2BF8N-RCM7XQ9 shall have a duty cycle less than 25.5%.

This device has fixed duty cycles that are not adjustable by the end user. This factor was calculated by first determining the worst-case scenario for system operation; worst case being defined as the scenario when the L915-7XQ9 is continuously sending its default heartbeat message at a fixed interval. The L915-7XQ9 maintains this duty cycle via microcontroller timing logic and is verified below.

### Calculating Time-on-Air

The Time-on-Air of each transmission was calculated according to the manufacturer datasheet. The following equation is in Semtech SX1262 datasheet section 6.1.4 LoRa® Time-on-Air.

$$N_{symbol\_preamble} = 8$$

$$N_{byte\_payload} = 16$$

$$N_{bit\_CRC} = 16$$

$$N_{symbol\_header} = 20$$

$$SF = 7$$

$$CR = 1$$

$$BW = 125$$

$$N_{symbol} = N_{symbol\_preamble} + 4.25 + 8 + \text{ceil} \left( \frac{\max(8 \cdot N_{byte\_payload} + N_{bit\_CRC} - 4 \cdot SF + 8 + N_{symbol\_header}, 0)}{4 \cdot SF} \right) * (CR + 4)$$

$$N_{symbol} = 51$$

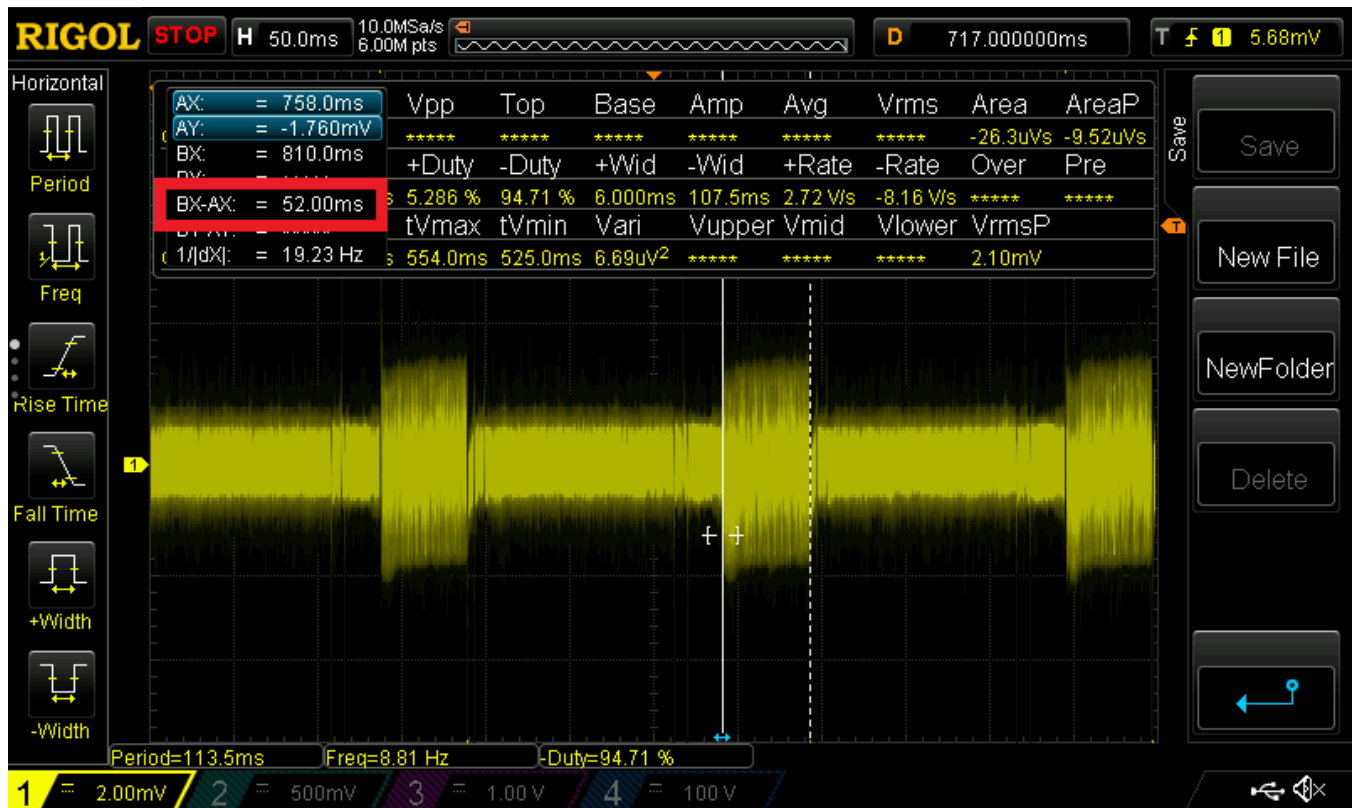
$$ToA = \frac{2^{SF}}{BW} * N_{symbol} = 52 \text{ ms}$$

The calculated Time-on-Air using equation provided by manufacturer is 52ms.

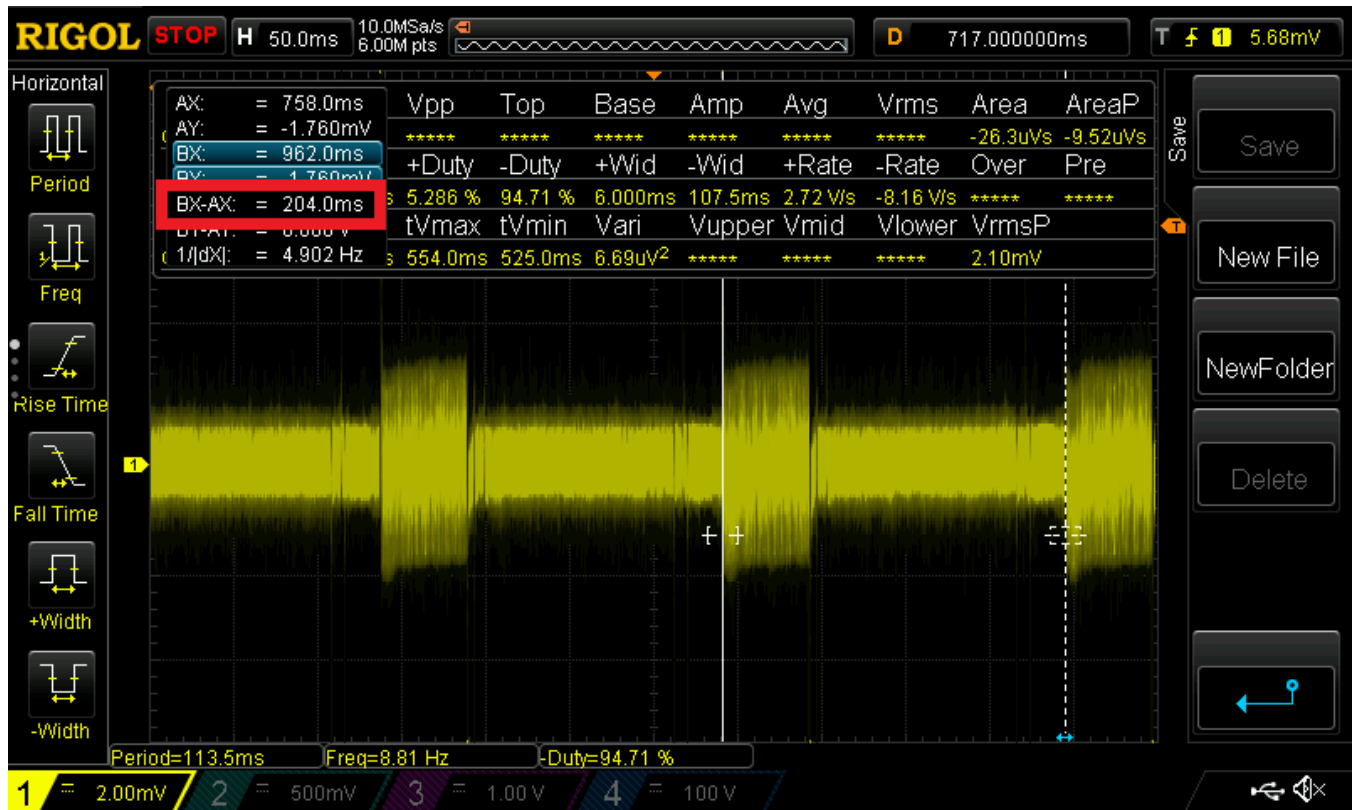
### Measuring Time-on-Air

The L915-7XQ9 was connected to an oscilloscope to verify the previous calculation.

As verified below, each transmission takes 52 ms.



As verified below, the transmission interval is 204 ms.



## Conclusion

With a transmission time of 52ms and a transmission interval of 204 ms:

$$Duty Cycle = \frac{transmission\ time}{transmission\ interval} * 100$$

$$Duty Cycle = 25.49\%$$