

# Necessary Bandwidth Description

The radar sensor (EA-XRN-9000) is designed to operate over the frequency band 10.0 – 10.5 GHz. This frequency band is divided into 8 channels that is 100 MHz wide each. The table below lists the frequency channels. The radar sensor operates within one of these channels at any given time, depending on the available frequencies for a particular site.

**Table 1. Frequency Channel Specifications**

<b>Name</b>	<b>Low Frequency (MHz)</b>	<b>High Frequency (MHz)</b>
<b>Channel 1</b>	10005.00	10105.00
<b>Channel 2</b>	10060.75	10160.75
<b>Channel 3</b>	10116.5	10216.5
<b>Channel 4</b>	10172.25	10272.25
<b>Channel 5</b>	10228	10328
<b>Channel 6</b>	10283.75	10383.75
<b>Channel 7</b>	10339.5	10439.5
<b>Channel 8</b>	10395.25	10495.25

The FMCW radar sensor sweeps over a 100 MHz bandwidth. This sweep bandwidth drives the range resolution of the radar sensor, and is thus a limiting factor in determining how the sensor system scales for very large and busy driving ranges (many balls in the air simultaneously). The selected bandwidth of 100MHz is a trade-off between better range resolution and reduced sensitivity due to lower processing gain. Channel bandwidths smaller than 100MHz will make it very difficult to uniquely track simultaneous shots at a large, busy driving range.