**Hardware Modifications**

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|  | No | PN | Description | Operating freq. | Notes |
| Tx path | 1 | AD9363 | RF Agile Transceiver | 325 MHz to 3.8 GHz |  |
| 2 | LFCG-2500+ | Low Pass Filter | DC to 2500 MHz |  |
| 3 | LTC5548 | Microwave Mixer | RF 2GHz to 14GHz  IF DC–6GHz |  |
| 4 | LFCW-1062+ | Low Pass Filter | DC to 10.6 GHz | Replace with LFCW-1142+ |
| 5 | BFCN-1052+ | LTCC Band Pass Filter | 9700 - 11950 MHz | Remove  but  Can be kept temporarily |
| 6 | ADL8107 | Low Noise Amplifier | 6 GHz to 18 GHz |  |
| Rx path | 1 | ADL8107 | Low Noise Amplifier | 6 GHz to 18 GHz |  |
| 2 | ADAR1000 | 4-Channel Beamformer | 8 GHz to 16 GHz |  |
| 3 | LFCW-1062+ | Low Pass Filter | DC to 10.6 GHz | Replace with LFCW-1142+ |
| 4 | LTC5548 | Microwave Mixer | RF 2GHz to 14GHz  IF DC–6GHz |  |
| 5 | BFCN-1801+ | LTCC Band Pass Filter | 1400 - 2320 MHz |  |
| Local oscillator | 1 | ADF4159 | Frequency Synthesizer | 500MHz -13GHz |  |
| 2 | HMC735 | VCO with Divide-by-4 | 10.5 - 12.2 GHz | 9.5-12.6 |
| 3 | HMC655 | 6 dB Passive Attenuator | DC - 50 GHz |  |
| 4 | ADRF5019 | SPDT Switch, Nonreflective | 100 MHz to 13 GHz |  |
| 5 | EP2C+ | 2 Ways MMIC DC Pass Power Splitter | 1800 - 12500 MHz |  |
| Antenna | 1 |  | 8-element patch antenna | 10-10.5GHz | Replace with Vivaldi Array  8-11 GHz |

\*Tx: Replace (LFCW-1062+) with (LFCW-1142+) and remove (BFCN-1052+) then we can change the Tx frequency to be 6-14GHz.

\*Rx: Replace (LFCW-1062+) with (LFCW-143+) then we can change the Rx frequency to be 8-14GHz.

\*LO: The VCO operating frequency is 10.5 - 12.2 GHz, but according to the datasheet, this could be extended to be from 9.5- 12.6 GHz.

\*Antenna: The patch antenna array has a limited bandwidth. We can replace it with wider bandwidth elements, such as Vivaldi. The routing should be modified to the mmcx connectors instead of the patch antennas.

After the modifications, the radar could operate between 8-11 GHz with a 1.5 GHz IF frequency, offering good range resolution. Applications that require high resolution.

To enhance the SNR, another BPF centred at the IF frequency could be added between the radar board (CN0566) and the ADALM-PLUTO SDR.

