ADVANCECRT

Centre for Research Training

Science Foundation Ireland sfi For what's next

Low Profile UWB Multiband Antennas for 4G, 5G, 6G Applications

Kok Loon Wong

Supervised by Prof. Max J. Ammann and Dr. Patrick McEvoy

Antenna and High Frequency Research Centre (AHFR), TU Dublin.

Problem Statement

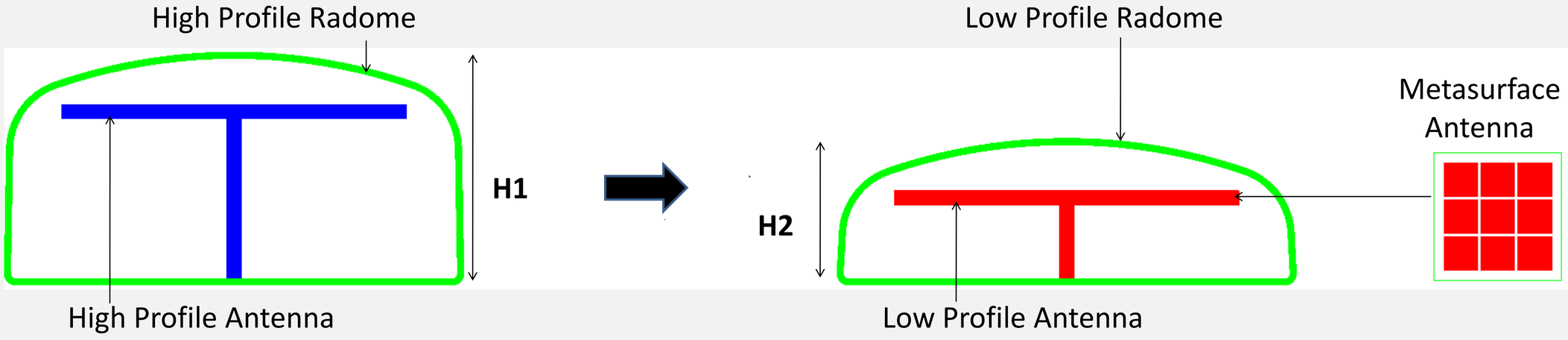
More and more antennas are fitted to a tower to accommodate different services like 4G, 5G & future 6G applications. As a result, antenna tower and support structures are being pushed to the limits of their load capacity. Furthermore, the antenna itself is heavy. A fibre glass radome is normally used to house the antennas because of it strong and durable characteristics and its weight is almost less than half of whole antenna weight. Hence, the wind loading of the antenna is increased. Because of different antennas for different services, operating costs increase as the operators pay extra rental fee to the tower owners to install additional antennas to provide 4G & 5G services. Consequently, the operators may transfer the extra cost to end users.

Solutions

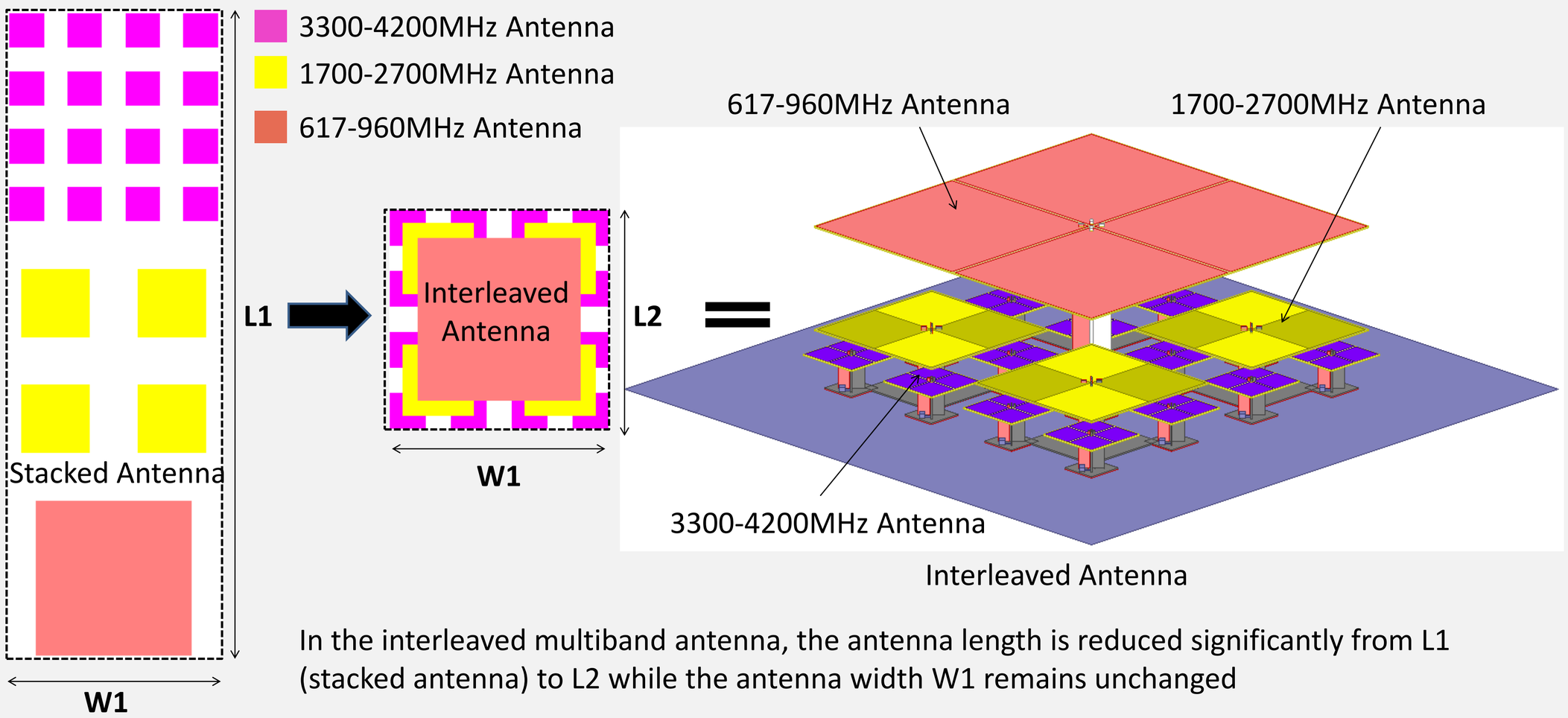
1) **Low profile UWB antenna** which leads to a low profile radome for housing the antenna. Hence, weight is decreased in both radome and antenna.
2) **Multiband antenna** which accommodate different antennas in a single antenna to provide different services for 4G, 5G applications.

State of the Art Techniques

1) **Metasurfaces** technique to be used to create a **Low profile UWB antenna** .



2) **Frequency Selective Surface/ Metamaterial** technique to be used in **interleaved Multiband antenna** to provide cloaking for different frequencies in different antennas.



Interleaved Antenna

In the interleaved multiband antenna, the antenna length is reduced significantly from L1 (stacked antenna) to L2 while the antenna width W1 remains unchanged