## A Multiple Beam LTE Base Station Antenna with Simultaneous Vertical and Horizontal Sectorization

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**Abstract :** A low wind-load light-weight broad-band multi-beam base station antenna has been developed. It can generate any required number of beams with the required beamwidths. It can have horizontal and vertical sectorization at the same time. Vertical sectorization doubles the overall number of beams. It will be very valuable in LTE-A and 5G. It can be used to serve vertically split inner and outer cells, which improves system performance. The intersection between the beams of the proposed multi-beam antenna can be controlled by optimizing the design parameters of the antenna. The gain at the points of intersection between the beams, the null filling and the overlap between the beams can all be modified. The proposed multi-beam base station antenna can cover an unlimited number of wireless applications, regardless of their frequency bands. It can simultaneously cover all, current and future, wireless technology generations such as 2G, 3G, 4G (LTE), --- etc. For example, in LTE, it covers the bands 450-470 MHz, 690-960 MHz, 1.4-2.7 GHz and 3.3-3.8 GHz. It has at least 2 ports for each band in each beam for ±45° polarizations. It can include up to 72 ports or even more, which could facilitate any further needed capacity expansions.

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Keywords : base station antenna, multi-beam antenna, smart antenna, vertical sectorization

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