

MILLIMETER-WAVE PHASED-ARRAY FOR BROADBAND WIRELESS APPLICATIONS

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INTRODUCTION.

License free frequency bands are available in the USA, Canada, Japan, and Europe that cover most of the 57 - 65 GHz spectrum. The portion of this band in the US alone is about one hundred times the size of the 2.4 GHz wi-fi band and thereby offers a revolutionary improvement in terms of available bandwidth and data rates for broadband wireless communications. Such a wide frequency range can be used to alleviate situations where bandwidth may be scarce and be used for wide bandwidth applications including real-time video, data streaming and enterprise cloud computing . Wireless propagation in the vicinity of 60 GHz however, results in high signal attenuation of between 10 - 20 dB/km due to the atmosphere.

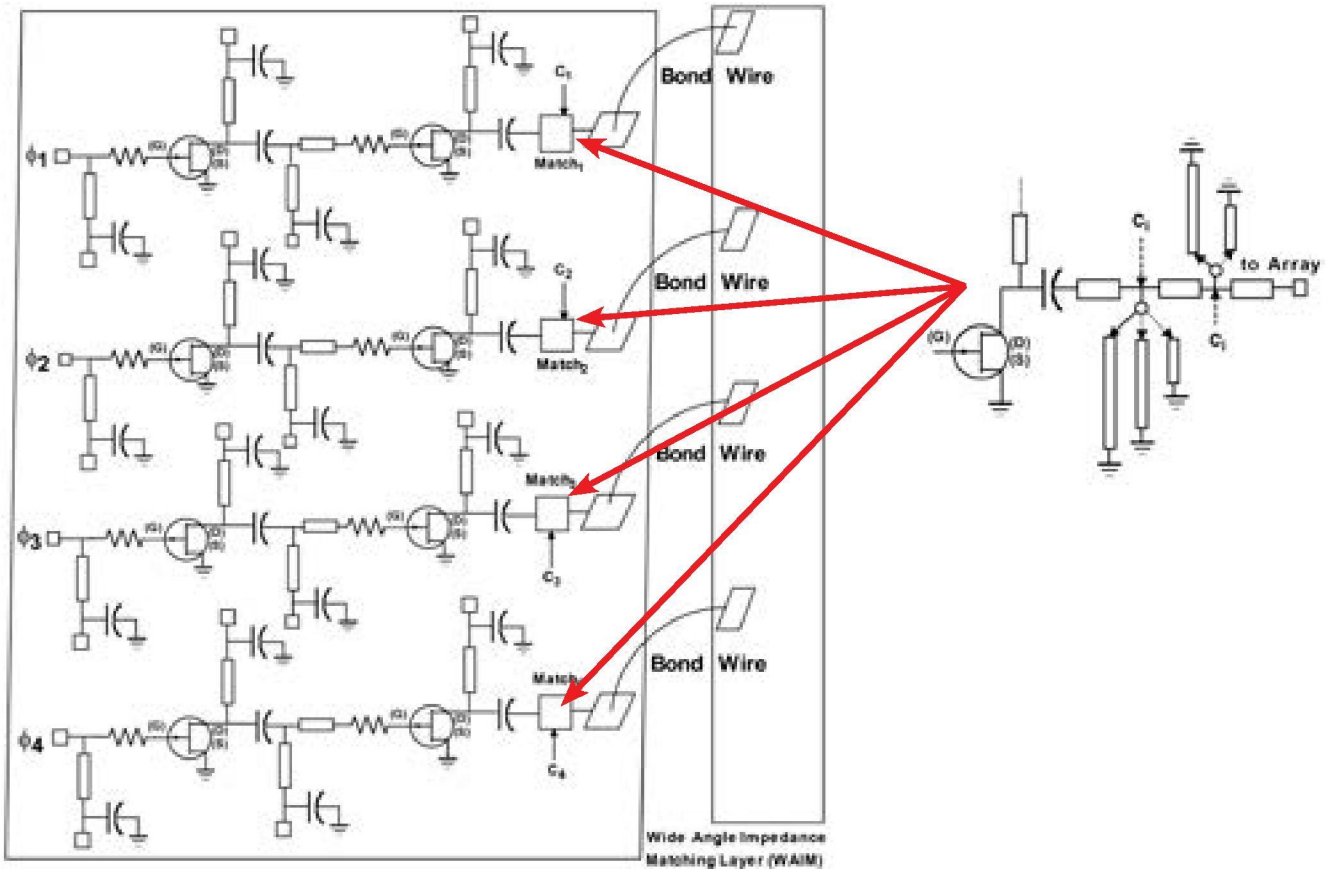


Figure 1. Tunable MMIC Amplifier Array.

METHODOLOGY.

Atmospheric attenuation can have both advantages and disadvantages. The advantages are that high attenuation can result in a physical barrier between users resulting in higher security against unintended interception of signals and the effects of multipath from buildings and other structures are minimized. The presence of multipath can result in an increase in delay spread of the received signal which limits data rate and bandwidth. Higher attenuation also helps to isolate cellular sites providing for better frequency re-use in a cellular base station environment. The disadvantage is higher attenuation of the radiated signal.

