Recent Development in Wideband Antenna Array for Sub-6GHz 5G Smartphones

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Due to the fast-approaching development in the 5G (fifth generation) mobile communication system, its related user equipment such as the 5G smartphone has been recently released by many smartphone companies. To accommodate very large data transmission of >10 Gbps, the multiple-input multiple-output (MIMO) technology is applied to the 5G New Radio (NR) network, in which multiple antenna array are built into the 5G base-station and smartphone. Amid the two released 5G NR bands, namely, FR1 and FR2, the FR1 (450–6000 MHz, also known as the Sub-6GHz band) should be released ahead of the FR2 (mmWave, 24250–52600 MHz), as many technical issues are still required to be resolved in this band. In the Sub-6GHz band, three bands are identified, namely the NR band n77 (3300–4200 MHz), n78 (3300–3800 MHz) and n79 (4400–5000 MHz). Hence, there is a prerequisite requirement at the moment for its related (MIMO) antenna array designs to cover these bands. As such, most of the single-band array design reported in [1-3] or those with metal-rimmed [4, 5] may not be feasible for real smartphone application. Even though the work in [6] has reported an 8-antenna MIMO array with dual-band operation that can cover the NR band n77/n78 (3300–4200 MHz), its higher operating band of 4800–5000 MHz can only cover the 5G China higher band operation. Recently, several works have reported very wideband 8-antenna arrays that can cover the entire 5G NR band n77/78/79 [7, 8], however the impedance bandwidth of these antennas were measured at 6-dB return loss. In this presentation, I will discuss a novel wide bandwidth 8-antenna array for 5G smartphone that can exhibit good 10-dB impedance bandwidth covering the 5G NR band n77/78/79 [9], and its radiation performances and user's hand effects will be presented as well.

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