

ABSTRACT

The application of 1024-QAM modulation on Wi-Fi 6 requires good signal modulation accuracy in order to maintain the quality of the data received by the receiver. Error vector magnitude (EVM) is an important parameter and feature in measuring the transmit signal quality of wireless communication. In particular, a WLAN tester device nowadays can simplify measuring and testing the root mean square (RMS) value of the EVM as it simultaneously acts as a traffic generator and spectrum analyzer.

The submission of additional EVM test parameter in the Regulation of the Director General of Resources and Equipment of Post and Information Technology No. 2 of 2019 concerning Technical Requirements for Wireless Local Area Network Telecommunication Equipments and/or Devices, as an EVM conformity requirement on outdoor and indoor WLAN telecommunication equipments and/or devices, is important considering the extensive implementation of M-QAM modulation in future technologies. The EVM measurement results which can also be converted into bit error rate (BER) will simplify the testing and measurement of access point devices for WLAN needs in Indonesia.

The measurements using Anritsu MT8862A WLAN tester was directly connected with an access point (AP) device in an anechoic chamber. We verified the spectrum of 5 GHz (Ch. 36, Ch. 52, and Ch. 60), using a bandwidth of 20 MHz, 40 MHz, and 80 MHz. The data are categorized based on the comparison of bandwidth, modulation and coding rate schemes, and comparison of performance between 2 manufacturers. The EVM measurement results are converted as bit error rate (BER), by applying the additive white Gaussian noise (AWGN) noise function, and also comparing it to the throughput which is specifically performed on one of the APs. Technical recommendations are given regarding the value of EVM as a technical requirement for WLAN equipment and/or devices in Indonesia.

EVM measurement results meet the Wi-Fi 6 standard of -35 dB or 1.8%, with gain imbalance in the range of ± 0.08 dB and phase imbalance $\pm 0.8^\circ$. It is recommended that the BER threshold being adjusted to 10^{-7} according to the measurement results and reference references, which will revise the regulations in Indonesia that set the BER at 10^{-8} . These results meet the throughput requirements designed in a single spatial stream for the Wi-Fi 6 standard.

Kata kunci: Wi-Fi 6, EVM, BER, Perdirjen No. 02 Tahun 2019.