



TRANSFORM-PRECODING OF A SELECTIVE SET OF DATA FOR TRANSMISSION OVER A WIRELESS COMMUNICATION

IITM Technology Available for Licensing

Problem Statement

- Communication at higher frequency bands such as **GHz/THz frequencies** pose several challenges such as higher Phase Noise (PN), extreme propagation loss, high atmospheric absorption in certain frequencies, **lower power amplifier (PA) efficiency**, etc.
- The waveform adopted in 3GPP standards is Cyclic Prefixed Orthogonal Frequency Division Multiplexing (CP-OFDM) which is composed of **superposition of multiple signals** transmitted using narrowband orthogonal subcarriers.
- However, the superposition of multiple signals results in **higher peak to average power ratio (PAPR) values**. The **cost of PA increases exponentially** for every doubling of the power. For reducing the PAPR values, the **multiple signals are converted into a single carrier waveform** by transform-precoding.

Technology Category/ Market

- Computer Sciences and Information Technology
Signal processing

Market - Next Generation Wireless Communication market size is to grow at a **CAGR of 15.4%** by **2027**.

Technology

- The technology is a method of **processing a bit stream** for transmission over a wireless communication network. The system comprises mapping by a Base Station (BS), which performs significant processing such as selection of the modulation symbols for **transform precoding**.
- This technique uses a **DFT - precoding** over a selective set of data while in combination with CP-OFDM targeting lower PAPR, to be used mainly in applications operating in frequencies **above 71 GHz** and in non-terrestrial networks (NTN).

- This technique is applied over every OFDM-symbol based on one or more decision criteria. The PAPR gain achieved by using this technique is **proportional to the part of the bandwidth** that uses DFT pre-coded transmission.
- A signal with lower PAPR can be operated closer to the saturation region, and thereby reduces the cost by **efficient utilization of the PA**. Therefore, to utilize the PA efficiently, a **waveform with low PAPR** is required.

Intellectual Property

- IN202141052050
- IITM IDF Ref. **2261**

Key Features / Value Proposition

- Signal with **low PAPR** leads to **reduce the overall cost** of managing the PA in higher frequencies (GHz / THz).
- This technology can be introduced for management of orders in an **e-commerce supply chain**.

TRL (Technology Readiness Level)

TRL – 2/3, Technology Concept formulated

Research Lab

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