Rules and Procedures
Student Digital Predistortion Competition
SDC-6 @ IMS 2026

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Introduction

This student design competition challenges teams to optimize Digital Predistortion (DPD) algorithms for a coupled multiband transmitter. The competition is structured around a timed procedural sequence that assesses both initial optimization capability and the adaptability of the algorithm.

Algorithms remain confidential and will be deleted from organizer systems at the end of each timeslot.

1 Competition Protocol

Each participating team is allocated a fixed **30-minute timeslot**.

Phase 1: System Configuration and Initialization (5 minutes)

This initial phase is dedicated to the physical setup and configuration of the testing environment.

1. Teams utilize the provided organizer computer to verify their algorithm is functional in Matlab (with signal processing toolbox).
2. A single, dedicated client will be provided for the competition. This client grants the team exclusive use of the remote measurement system for data collection throughout their timeslot.
3. Should compatibility issues arise with the organizer's computer, the team is permitted to switch to using their own computer/laptop for continued operation.

Technical Signal Generation Constraint

To ensure a level playing field, the input signals (designated signal and blocker signal) used throughout Phases 2 and 3 will be identical for all teams.

Phase 2: Algorithm Training and Initial Optimization (15 minutes)

In this phase, teams train and refine their DPD algorithms.

1. Teams are provided with the desired signal and the initial blocker (interferer) signal.
2. The team's primary goal is to train the algorithm and achieve the maximal possible performance metrics, evaluated by score.m, which is available on our website.

3. The team executes the measurements using the dedicated client. The client automatically returns the score for each measurement. The best score within this phase, designated as the first score, S_1, is recorded. This score will be rounded to two decimal places.

Phase 3: Adaptive Testing and Performance Validation (5 minutes)

The final phase tests the robustness of the algorithm against a dynamic change in the system conditions.

1. A new blocker signal is introduced, similar to the previous blocker, simulating a change in operating environment. The desired signal is kept the same.
2. The team must use the previously derived pre-distorter without modification for the first measurement attempt.
3. For this new blocker, the team is allowed only two measurement attempts. Changes to the predistorter are only allowed in between these two measurements.
4. The score of the first attempt, in this phase, is recorded as S_2 and the second attempt as S_3. Both scores will be rounded to two decimal places.

Phase 4: Contingency and handover (5 minutes)

At the discretion of the organizers, this period may be used for the competition, for example in case of technical difficulties.

2 Scoring Methodology

The final score is determined by a weighted average of the three scores obtained throughout the timeslot (S_1, S_2, S_3). This ensures that the final score reflects not only the initial optimization quality but also the ability of the solution to adapt to a changing system.

The Final Score (FS) is calculated as:

$$FS = W_1 \cdot S_1 + W_2 \cdot S_2 + W_3 \cdot S_3$$

where W_n represents the assigned weight for each respective score. The proposed weights are $W_1 = 0.45$, $W_2 = 0.3$, and $W_3 = 0.25$.

Disclaimer

Competition organizers reserve the right to modify any rules, protocols, or technical parameters throughout the competition only if deemed necessary to ensure the fairness and competitiveness of the competition, and only in agreement with the participating teams.