**Microwave Photonic Link Receiver**

**Sponsoring MTT-S Technical Committees**

MTT-3 Microwave Photonics

Chongqing Optoelectronic Research Institute

**Coordinators**

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**Competition Summary**

In this competition each contestant team is required to design a 1~3 GHz optical-to-microwave receiver (see Fig. 1). For a given light signal, the receiver should have a maximum optical-to-microwave conversion efficiency, and its bandwidth should be greater than 10%. The contestants are encouraged to design their own solutions for the specified optical link receiver with two predefined photodiodes supplied by Chongqing Optoelectronic Research Institute, China.



*Figure 1: Microwave photonic link receiver*

**Detailed Competition Description and Rules**

1. The receiver must be securely mounted in a given package. It should have one optical FC/APC connectors for optical input, an SMA connector for RF output, and up to three banana plugs for DC power supply voltage input.
2. The contestants should choose the most suitable DC power supply voltages. But the maximum/minimum DC voltage is limited to ±10 volts.
3. The proposed receiver will be evaluated based on the performance between the optical FC/APC connector inputs and the SMA RF connector output. The MTT-3 committee will use an optical source with a given modulation index and an optical power up to 5 mW to evaluate the design.
4. Datasheets of the given package will be provided upon an email to pans@nuaa.edu.cn. No electronic amplifiers can be used in the converter.
5. The design specifications for the converter are:

Center frequency: 1 to 3 GHz (select one)

Relative bandwidth: >10% of center frequency

Peak RF power output: >0 dBm

Power efficiency: >5%

**Evaluation Criteria**

1. Has the converter met specifications? (Yes=50%; No =0 %)

2. Peak RF output power (25%)

The Peak RF output power is measured, and it is defined as the maximum RF output power when the optical input power is set to be 5 mW (with a given modulation index). The worst case peak RF power in passband will be recorded for comparison. (For example, if the passband RF power varies between 2 to 7dBm, then the worst case power 2 dBm will be used for comparison between the submitted designs.)

3. Power efficiency (25%)

The power efficiency is defined as the ratio between the peak RF output power over the sum of the power drawn from the DC power supply and the optical power input.

In the event of a tie, the bandwidth of the converter will be the tie-breaker and the decision of the MTT-3 committee is final and cannot be challenged.

**How to Participate**

1. This contest is open to all who are enrolled as full-time students at a university during the time the work was performed. Students may enter as individuals or as a team of no more than four (4) students.
2. The objective of the contest is to demonstrate new and effective photo receiver scheme for microwave photonics applications. Following submission of a proposal describing the potential solution, up to four (4) contestants will be selected and provided two pre-defined photo-diodes.
3. The students must submit a signed statement from their academic advisor that the work is principally the effort of the students. At least one student member from the team must register for and attend the conference to demonstrate their design and the optical-to-microwave converter at the IMS2020. The designs will be judged by members of MTT-3 using pre-defined criteria including converter efficiency, and maximum power output.
4. The students should use the email address issued by their respective institutions for all communication regarding the competitions rather than their personal emails.
5. Please also see the general IMS student design competition rules on the IMS-2020 SDC homepage.

<http://dpdcompetition.com/sdc/>

**Student Eligibility Criteria**

1. Students may enter as individuals or as a team. There may be no more than four students on a team. Each student may be a member of only one team. Each team may submit up to two entries but can receive an award for only one entry.
2. To enter a competition, the student(s) must have been full-time student(s) (enrolled for a minimum of nine hours per term as graduate students or twelve hours per term as undergraduates) during the time the work was performed. There is no restriction on age.
3. The student(s) must have a signed statement from their academic advisor that the work is principally the effort of the student(s).
4. At least one of the students on a team must register for and attend the conference to demonstrate their design for evaluation during the contest day at IMS’20.
5. The students should use the email address issued by their respective institutions for all communication regarding the competitions, rather than their personal emails (e.g., Gmail, Hotmail).

**Awards**

The First and Second place winning team will receive a prize of $1500 and $500 (US), respectively, and this will be one level competition.