

Microwave Bandpass Filter Tuning Competition: Evaluation Criteria

Total: 100 points

1. Final Filter Performance – Post-Tuning (30 points)

- **Min. Insertion Loss in Passband & at Band-edges (5 pts):**
Measured at both band-edge frequencies (per specification). Lower is better.
- **Passband Return Loss (10 pts):**
S11/S22 in the passband. Higher return loss (i.e., better matching) scores higher.
- **Out-of-band Rejection (10 pts):**
Attenuation outside passband at key frequencies.
- **Meets All Specs (5 pts, required):**
Filter must satisfy all defined electrical specifications.

2. Tuning Efficiency (30 points)

- **Total Tuning Time (20 pts):**
Shorter total tuning time from start to finish scores higher. Use a formula or a tiered system (e.g., fastest = 20, next = 17, etc.).
- **Number of Tuning Steps (10 pts):**
Fewer tuning actions/iterations to reach target; efficiency of adjustment process.

3. Tuning Process/Technique (25 points)

- **Innovative Tuning Approach (20 pts):**
Use of effective algorithms, rational model-based extraction, neural modeling, or creative human intuition; alignment with trends like CAT/RAT.
- **Instrumentation and Setup (5 pts):**
Efficient choice and use of tuning tools/automation and measurement system.

4. Presentation and CAT Tool (15 points)

- **User Friendliness of CAT Software (10 pts):**
Quality of CAT software and industrial features.
- **Oral Explanation (5 pts):**
Ability to explain tuning methods, difficulties, and challenges in front of judges.

Additional Rules/Details:

- **Disqualification criteria:**
Filter does not meet any defining specifications, or tuning time exceeds 30 min.
- **Bonus (+5):**
Exceptional demonstration of future-ready CAT/RAT approaches, or breakthrough reduction in required tuning steps.