

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
Advanced Technologies for Space Communications and Navigation (5)

Author: Dr. Tong Yang  
China Academy of Space Technology (CAST), China

ADVANCED WI-FI TRANSMISSION TECHNOLOGY INNER SATELLITE COMMUNICATION  
MODULE: PROBLEM & SOLUTION**Abstract**

Nowadays the equipments installed inner the satellite communication module are greatly increasing. The RF cables, as well as the telecommand and telemetry signal cables will be intensively distributed inner the cabined communication module, which remarkably makes the whole module much heavier.

For reducing the net weight and optimizing the layout of satellite communication module, it is expected to cut down as much cables. For those telecommand and telemetry digital signal transmitting cables, the Wi-Fi (Wireless Fidelity) transmission technology with OFDM modulation can be applied for transmitting signals wirelessly instead of signal cables; it will be reduced at most by simply setting a few RF circuits modules inside each active device such as receiver, down-converter and TWTA.

However, problems come with RF cables when applying Wi-Fi transmission. As the RF cables transmits RF signals, which would present severe microwave radiation inside the communication module, and worsen its EMC characteristics, particularly the intermodulation interference among carriers and sub-carriers. The feasible and practical solution is to append certain LNAs, passband filters and isolators at input and output port of IMUX, OMUX and LCTWTA. The input and output switch rings that used for signal path selection will be decreased a lot. Each of the TWTA is able to receive any other radioactive signals, and filter the out-of-band signal. For that intermodulation possibly interfered inside passband, the advanced coding+modulation scheme, including CDM+OFDM, Coded OFDM, Coded MCM etc, could be proposed to suppress the inner-band intermodulated signals, besides, LNA and isolator are also helped to filter any unwanted RF signals for a certain active or passive-device.

As the increasingly developing requirement for broadcasting and mobile and/or fixed communication services on telecommunication satellites, the Wi-Fi transmission inner satellite communication module will be a prevailing technology despite there still several technical and actual problems urged to be solved.