

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
Fixed and Broadcast Communications (2)

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## INTERFERENCE INTO RADIO BROADCAST SATELLITE UPLINKS

**Abstract**

Radio frequency interference into satellite transmission channels is a matter of concern. There have been many studies of this subject by the ITU (International Telecommunications Union) particularly to mobile user receivers in the satellite broadcasting services by IMT (International Mobile Telecommunication) transmitters since such receivers have high sensitivities (e.g., downlink channel system noise temperatures of under 100 deg. Kelvin) and provide audio broadcast service quality with relatively low received satellite signal levels on the ground. Recently, proposals have been made by future low orbit satellite constellations and by IMT to share radio frequency bands used by the transmission uplinks to radio broadcasting satellites. The broadcasting satellite uplink transmission channel at 7 GHz has typical system noise temperatures of 1000 deg. Kelvin followed by very high electronic and antenna amplification. The overall system transmission design is generally set so the satellite broadcast uplink C/N does not appreciably degrade the downlink C/N, since the downlink simultaneously serves more than 35 million mobile users with satellite radio service in North America. This paper illustrates the effect of potential interference into a satellite radio service from in-band and adjacent band transmissions and from associated intermodulation products by sharing uplink frequency spectrum transmitters. The analysis shows that sharing services should be carefully arranged in the radio frequencies utilized and limited in flux densities impinging the geostationary orbital arc so harmful interference to radio broadcast satellite services does not occur.