Instrument Landing System Receiver Standards: A Case Study of Receiver Regulation and Its Difficulties

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The Instrument Landing System[1] (ILS), used worldwide by aviation users, has two bands, one of which is just above the FM broadcast band at 108.1 -112 MHz. This safety-related landing system has been standardized by both FAA and ICAO, the ITU's aviation counterpart. Unfortunately the adjacency to the FM broadcast band results in a possible vulnerability to receiver-generated intermodulation interference. This vulnerability was confirmed in FCC Lab measurements.[2] FAA and FCC have had a long standing disagreement on the best public policy approach to prevent such interference and NTIA has generally taken a neutral role with respect to this issue and has not been directly involved.

ICAO adopted immunity standards for ILS receivers that were effective international in 1998.[3] FAA has implemented the ICAO regulation but still allows use of the previous generation of receivers and users its powers under the Airways Facilities Act to threaten new or modified FM broadcast facilities for "hazard determinations" if they apply for a location, frequency, or power that would cause interference to the earlier generation receivers.

FCC proposed in 1993 to require only ICAO-complaint receivers in all US aircraft after the 1998 effectiveness date.[4] This NPRM was opposed by aviation interests[5] that felt they should not be burdened with replacing receivers in order to facilitate the use of

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1 http://en.wikipedia.org/wiki/Instrument_landing_system
http://www.navfltsm.addr.com/ils.htm

2 transition.fcc.gov/bureaus/oet/info/documents/technical/tm87-5.pdf
transition.fcc.gov/bureaus/oet/info/documents/technical/tm90-1.pdf

3 These standards are mentioned by NTIA on p. 29 of its receiver standards compilation: www.ntia.doc.gov/files/ntia/publications/ntiareport03-404.pdf; The specifics of the ICAO regulation can be found in this document from the South African FAA counterpart: http://www.caa.co.za/resource center/AIC'S/25-3.pdf

4 http://apps.fcc.gov/ecfs/comment/view?id=119187 the NPRM was in response to this petition from broadcast interests:
http://apps.fcc.gov/ecfs/comment/view?id=120100

5 http://ecfsdocs.fcc.gov/filings/1991/03/11/120110.html
http://apps.fcc.gov/ecfs/comment/view?id=123053
http://apps.fcc.gov/ecfs/comment/view?id=120103

broadcast spectrum. FCC took no further action on this NPRM until the docket was closed in a 2002 housekeeping action for being “stale”.

It is generally felt that airliners and corporate jets are not affected by this issue since, for practical purposes, they must be equipped to fly outside the US and therefore have ICAO-complaint receivers. However, there are small general aviation aircraft that are not actually required to be ILS-equipped that may well have the previous generation receivers and their trade association, AOPA, has vociferously objected to a mandated upgrade.

This receiver standard issue is a classic economic externality. The aviation users who would incur the cost of a new receiver would get no direct benefit. The benefits would accrue to broadcasters who could modify their facilities to better serve the public though power or siting changes and to the public that would receive addition FM stations if present FAA objections to some new allotments were dropped.

As in the GPS/LightSquared issue, this also falls squarely on the FCC/NTIA jurisdictional fault line, although complicated by the role of FAA and its partially overlapping jursidiction.

Developing receiver standards is a technically complex issue. But in this case there is a specific international standard that was developed with participation of all affected parties. The US ambivalence towards receiver standards has left that standard in limbo in the US in the 2 decades since it was developed and has limited the utilization of FM broadcast spectrum in order to avoid putting any increased regulatory burdens on an ever decreasing number of small aircraft with obsolescent receivers that could not be used in most other countries.

It is not clear how this issue can ever be resolved due to the jurisdictional issues unless the Executive Branch takes a more holistic approach to such spectrum issues.