



Misuse of Int'l Standards Processes To Impose Spectrum Use Requirements On GPS/GNSS Receivers As "Resilience"

GPS Innovation Alliance (GPSIA) presentation
to the
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Spectrum Use Decisions Belong In Spectrum Management Fora

- RNSS frequency band use: restricted to maintain stringent accuracy, availability, integrity, and continuity parameters to **meet service provider and end user performance requirements.**
- Careful consideration made of U.S. and international regulatory environments in terms of spectrum allocations and management.
- Broadcast PNT systems cause U.S. regulators to go beyond domestic boundaries to coordinate with other nations in fora, e.g., ITU. -- where WRC final resolutions hold treaty status; *spectrum allocations stay relatively consistent worldwide.*
 - Ensures end users similar RF environments for PNT equipment independent of where they operate.
 - Non-interference with RNSS spectrum is crucial; domestic and international PNT services depend on uninterrupted broadcast, reception, and processing of radio frequencies in protected radio bands.

Federal Radionavigation Plan (FRP) 2017: “Radiofrequency Spectrum Considerations”

Why Vigilant Monitoring of Int'l Standards Processes Matters

- The 2004 EU-US Joint “Agreement on the Promotion, Provision and Use of Galileo and GPS Satellite-based Navigation Systems and Related Applications” is signed by twenty-five (25) EU Member States;
- **Article 5:** Standards, Certification, Regulatory Measures, and Mandates

“The Parties agree to consult with each other before the establishment of any measures:

(1) establishing, directly or indirectly (such as through a regional organization), design or performance standards, certification requirements applicable to civil satellite-based navigation and timing signals or services, augmentations, value-added services, global navigation and timing equipment, civil satellite-based navigation and timing or service providers, or value-added service providers; or

(2) That have the effect, directly or indirectly, of mandating the use of any civil satellite-based navigation and timing signals or service, value-added service, augmentation or global navigation and timing equipment within its respective territory (**unless the mandating of such use is expressly authorized by ICAO or IMO.**)

Broadcast Radionavigation (GPS) Is Unlike Radiocommunication Stable Spectrum Environment Enables User-driven GNSS Innovation

- Radiocommunication: two-way; system design coordinates **both** transmission and receiving equipment
- Radionavigation (GNSS): one-way broadcast is fixed for long-term life cycle of each constellation, ***independent*** of receiving equipment
 - **GNSS signals are authorized/governed by multilateral int'l agreements, including those endorsed by ITU member states.**
- GNSS Interface Control Document (ICD):
 - Specifies stable signal in space; power on ground
 - Receiver manufacturers design to a stable ICD
- GNSS receiver characteristics and interference protection criteria (IPC) are
 - **Developed in an int'l forum (ITU-R; ITU) endorsed by ITU member states.**

GPS/GNSS has shown that rapid ***user-driven changes*** (improvements) in signal processing significantly benefit performance without changing transmissions. Misuse of int'l standards to impose spectrum use requirements could harm this successful GNSS paradigm.

GPS/GNSS Receivers Conform To *Established* Spectrum Allocations and Interference Environment

GPS/GNSS receivers, effectively and efficiently use RNSS spectrum to avoid harmful interference. This spectrum use conforms to:

- ITU Int'l Radio Regulations spectrum allocations and established interference environment
- ITU-Radio Sector Recommendations established technical characteristics and interference protection criteria (IPC) for RNSS receivers (e.g., ITU-R M.1902/3/, etc.)

Careful consideration of electromagnetic compatibility analysis, must be made in U.S. and international regulatory environments in terms of spectrum allocations and management.

IEC TC 80

Maritime Navigation And Radiocommunication Equipment And Systems

- At a recent IEC TC 80 meeting, addressing IMO Resolution MSC.401(95) participants adopted a European proposal to rename a draft standard from “Multi-GNSS” to “Multi-PNT” receivers
 - A European proposal on “PNT Guidelines” was also adopted.
- Subsequent to this meeting, GPSIA joined the American National Standards Institute (ANSI), representing the US Admin to IEC TC 80
 - To ensure that any spectrum use, non-conforming to ITU Int'l Radio Regulations is not proposed in this forum as “PNT resilience” (spectrum use) requirements on GPS/GNSS receivers.
- Multi-PNT receivers and PNT Guidelines should conform to
 - ITU Int'l Radio Regulations spectrum allocations and interference environment
 - ITU-Radio Sector Recommendations technical characteristics and interference protection criteria (IPC) for RNSS receivers (e.g., ITU-R M.1902/3/, etc.)