



The 4th Meeting of International Committee on GNSS Work Group A

Views on Compatibility and Interoperability

China Satellite Navigation Project Center
Sep. 13rd-18th, 2009, Saint Petersburg Russia

Compatibility

- ◆ **Compatibility:** the ability of multiple satellite navigation system to be used separately or together, without the generated interference to affect the navigation performance of each system.
- ◆ Each navigation system should realize compatibility with all the other systems at a minimum.
- ◆ International Telecommunication Union provides a framework for discussion on radiofrequency compatibility.
 - ◆ rational, equitable, efficient and economical use of the radio-frequency spectrum

Compatibility

- ◆ **Spectrum overlap:**
- ◆ **There actually exist some cases of frequency overlap between signals of different systems and it is feasible for navigation systems to share the same frequency spectrum.**
- ◆ **The frequency spectrum overlap of open signals is beneficial for the realization of interoperability for many applications.**

Compatibility

Spectrum separation of AS:

- ◆ **The authorized service signal spectrum separation with open service signals is beneficial.**
- ◆ **Signal design should consider many factors.**
- ◆ **Due to the very limited frequency resources, authorized signal spectrum separation is very difficult at present.**
- ◆ **It's very difficult to satisfy the frequency resource requirements of modernization signals of existing systems and the signals of new systems to be built.**
- ◆ **ICG recommends discussions among providers concerned will establish the framework for determining a mutually-acceptable solution.**

Interoperability

◆ **Interoperability:** the ability of open services of multiple satellite navigation system to be used together to provide better capabilities at the user level than would be achieved by relying solely on one service, without significantly increasing the complexity of receivers.

Interoperability

- ◆ Provide better capabilities at the user level
- ◆ Benefit gained is larger than cost paid
- ◆ Be easy for developing and manufacturing of interoperable receivers
- ◆ to publicize the signal-in-space interface control documents is necessary
 - ◆ COMPASS ICD has already been compiled and is about to be published step by step.

Interoperability

- ◆ The geodetic reference of every system be aligned as closely as possible to the ITRF
 - ◆ CGS 2000 Coincide with ITRF at 5 cm level, and for most applications the difference between CGS2000 and ITRF can be ignored
- ◆ The internal System Times (ST) of every system be synchronized as closely as possible to UTC
 - ◆ BDT is traced to UTC(NTSC), and synchronized with UTC within 100ns
- ◆ Broadcast interoperability information including the time differences between various System Time mutually

Interoperability

- ◆ Common carrier frequency, frequency spectrum is important.
- ◆ Common max/min received power level is beneficial for improving signal to noise environment for multi-system receivers
- ◆ Frequency diversity is beneficial for the improvement of anti-jamming capability
- ◆ Interoperability signal
 - ◆ B1-C : 1575.42MHz
 - ◆ B2a: 1176.45MHz
 - ◆ B2b: 1207.14MHz



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