ISO TC 122/104 JWG

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Organisation internationale de normalisation
International Organization for Standardization
Международная Организация по Стандартизации

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Our ref. ISO/JWG/TC104/TC 8/IMO

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Valery Timofeev
Director, Radiocommunication Bureau (BR)
International Telecommunication Union
Place des Nations
CH-1211 Geneva 20
Switzerland

ISO Liaison statement to ITU-R

Dear Mr. Timofeev,

On behalf of ISO, ISO's technical committee 104 (Freight containers), and the joint working group (Supply chain applications of RFID) between ISO's technical committee 122 (Packaging) and 104 we are pleased to refer to WRC-07 Resolution 357, drawing our attention to the need for IMO, ISO, IEC, IALA and other concerned organization's advice on additional spectrum requirements to enhance maritime safety and ship and port security; 1) to conduct, as a matter of urgency, studies to determine the spectrum requirements and potential frequency bands suitable to support ship and port security and enhanced maritime safety systems; and, 2) that (such) studies should include the applicability of spectrum efficient technologies, and sharing and compatibility studies with services already having allocations in potential spectrum for ship safety and port security systems.

We very much appreciate the opportunity to submit comments. In consultation with representatives from the technical committee ISO/TC 8, *Ships and marine technology,* the technical committee ISO/TC 104, *Freight containers* and the Joint TC 104/TC 122 Working Group on *Supply chain applications of RFID*, we are pleased to provide you with the attached paper, explaining current status and views.

Yours sincerely,

Craig K. Harmon
Convener
ISO TC 122/104 JWG

cc. Mr. F. Abram, ISO Central Secretariat - *abram@iso.org*
Capt. Ch. Piersall, Chairman of ISO/TC 8 - *amadis@olg.com*
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LIAISON STATEMENT TO ITU-R FROM ISO

SHIP AND PORT SECURITY REQUIREMENTS FOR THE ITU WORLD RADIOCOMMUNICATION CONFERENCE 2011

OVERVIEW

Today there are approximately 18 million freight containers in service worldwide. These freight containers are loaded and unloaded with freight an average of six times per year. This translates to an estimated 108 million trips per year. These freight containers travel to all corners of the world by ship, by rail, or by truck, with the common transit location of the port.

ISO TC 104, *Freight containers,* has developed, individually or jointly with another TC, several standards addressing the use of radio frequency identification (RFID) with freight containers. These include:

- ISO 10374:1991, *Freight containers — Automatic identification*, which provides an RF tag that encodes only the unique identification of the freight container
- ISO 10891:CD2008, *Freight containers — RF automatic identification*, a revision and re-designation of ISO 10374, above, which also provides an RF tag that encodes only the unique identification of the freight container
- ISO 17363:2007, *Supply chain applications of RFID — Freight containers*, which provides a data-rich RF tag for supply chain data, e.g. a manifest of contents
- ISO 18185:2007, *Freight containers — Electronic seals*, which provides an electronic container seal with only the identity of the electronic seal and whether the seal has been compromised. ISO 18185 is comprised of the following parts
    - ISO 18185-1:2007, *Freight containers — Electronic seals — Part 1: Communication protocol*
    - ISO 18185-2:2007, *Freight containers — Electronic seals — Part 2: Application requirements*
    - ISO 18185-3:2006, *Freight containers — Electronic seals — Part 3: Environmental characteristics*
    - ISO 18185-4:2007, *Freight containers — Electronic seals — Part 4: Data protection*
    - ISO 18185-5:2007, *Freight containers — Electronic seals — Part 5: Physical layer*

It is the position of the ocean carrier community that each freight container should be equipped with three unique tags.

1. The ISO 10891 tag should not require battery power and should be affixed to the freight container for the life of the container.
2. The ISO 17363 tag should prevent unauthorized persons from viewing the data content of the tag. The responsibility of the 17363 tag should be a matter between the shipper and the consignee and should not involve the carrier.
3. The ISO 18185 tag should be a single-use tag, discarded at the conclusion of the trip and should support two unique air interfaces.

THE RADIO SPECTRUM OF EXISTING FREIGHT CONTAINER STANDARDS

The original ISO 10374 tag required support for two operating frequencies: 850 to 950 MHz and 2 400 to 2 500 MHz. It also required licensing of the technology from the holder of the intellectual property described in the standard. ISO 10374 was not widely embraced by the freight container community.

The RF tag defined ISO 10891 is currently early into development as a Technical Specification. At the 10 April 2008 meeting of the group responsible for 10891 (TC 104/SC 4/WG 2), support for continuing this past the publication of the Technical Specification and ultimately to an international standard was unanimous. Members of WG 2 believe that there are multiple technologies available and they want to see how international regulation and technology develops. The most recent draft of ISO 10891 identifies ISO/IEC 18000-6, Type C as the required air interface.

ISO 17363 requires an air interface standard compliant with ISO/IEC 18000-7 (433 MHz). These "supply chain tag" air interface requirements were driven, in a large part, by the adoption of this technology by the U.S. Department of Defense and subsequently by its NATO partners.

The ISO 18185 tag requires that the tag support both ISO/IEC 18000-7 and ISO/IEC 24730-2 (2450 MHz). It is conservatively estimated that the incremental cost of a tag supporting both air interfaces from a tag supporting only one of the protocols would be $10.00 (USD). Realizing that these tags are single-use, the incremental cost to the marine shipping industry of supporting both air interfaces in a single tag would be over $1 billion per year. One of the rationales behind such a dual frequency tag is that various ports have implemented one of the two technologies. A single frequency tag was not considered viable because of these historical implementations, which were based on the radio regulations of the country hosting the marine port. Nineteen months after publication (2007-04-26) there still exists no manufactured or marketed device compliant with ISO 18185.

	433 MHz (18000-7)	850–950 MHz*	860–960 MHz (18000-6C)	2 450 MHz (24730-2)	2 400–2 500 MHz*
ISO 10374		♦			♦
ISO 10891			♦		
ISO 17363	♦				
ISO 18185	♦			♦	
*Note: Columns without a parenthetical reference standard have no published or in process air interface standard and may be considered proprietary.					

Table 1 – Freight container standards and associated frequencies

APPLICATION REQUIREMENTS

The application requirements for freight container tracking are well addressed in ISO 18185-2 and the environmental aspects in ISO 18185-3. There are several air interfaces able to meet the application and environmental requirements. China has proposed a reusable seal that includes 868 and 915 MHz air interfaces to serve the needs of ISO 18185 and ISO 17363. New technologies such as ultra-wide band (UWB) and long wave are being introduced into the market place and may soon have internationally recognized air interface standards.

UWB systems, which operate at very low power over a wide frequency range, may have advantages over some RFID technologies with regards to the accuracy of which tags can be located within harsh RF propagation environments. However, current regulations for UWB systems differ widely across the globe, particularly with regards to frequency allocation and constraints on operation.

OPPORTUNITY FOR A GLOBAL FREIGHT CONTAINER FREQUENCY BAND

The challenges of supporting multiple frequencies and multiple devices are those of both cost and regulation. The cost factor is either that of providing complex RF tags or of providing a complex infrastructure of readers, since all three tags (Container Identity, eSeal, and Supply Chain Tag) must be read at the same choke points. The regulatory challenge is because there is no common frequency on a worldwide basis that would permit power levels to support the application requirements of freight containers.

An ideal solution would be one where permanently installed battery-less tags could be read at distances and speeds required by the application requirements, while within the same infrastructure battery-powered tags could meet the longer distance and localization requirements of eSeals and Supply Chain Tags. This same air interface could be used for integrated Container Security Devices (CSDs) that would incorporate sensor input to a wireless infrastructure.

In May 2003, ISO TC 104 petitioned the ITU for a frequency band that would provide

- a frequency hopping spread spectrum (FHSS), passive frequency; and,
- a narrow band, active frequency.

At that time we suggested ISO/IEC 18000-6 and ISO/IEC 18000-7, respectively.

It is unlikely that the currently in-place air interfaces would be selected for a common frequency band for freight containers, because:

- 433 MHz (ISO/IEC 18000-7) is an ISM band in various regions,
- 860 – 960 MHz (ISO/IEC 18000-6) is an ISM band in various regions, and
- 2 450 MHz (ISO/IEC 24730-2) is an ISM band in all regions.

It is recognized that a band in which freight containers are considered a primary user may require modifications of the existing standards.

With respect to evolving technologies, we would urge IMO to support harmonisation of UWB regulation through ITU in anticipation of UWB standardisation efforts within ISO.

CONCLUSION

ISO believes that one of the reasons that freight container tracking has been slow to adopt RFID technologies and its associated benefits is the lack of a common frequency band that could be used economically on a worldwide basis. We believe that ITU's assistance in the set-aside of a set of frequencies for freight containers as the primary user would accelerate this implementation, providing for both enhanced security and increased utility for the handling of maritime containers.