Maritime Spectrum Requirements in the US and Globally (WRC-2012 Agenda Item 1.10)

Where this comes from:

RESOLUTION 357 (WRC-07)

Consideration of regulatory provisions and spectrum allocations for use by enhanced maritime safety systems for ships and ports considering

a) that there is increasing need, on a global basis, to enhance ship and cargo identification, tracking, and surveillance as well as ship and port security and safety;

f) that use of existing maritime mobile allocations, where practicable, for ship and port security and enhanced maritime safety would be preferable, particularly where international interoperability is required;

g) that additional studies within ITU-R on spectrum efficient radio technologies may be required to resolve these multifaceted spectrum requirements;
Maritime Spectrum Requirements in the US and Globally (WRC-2012 Agenda Item 1.10)

Where this comes from (WRC-07 Res.357, cont’d):

recognizing

\(a\) that there is a global requirement to enhance maritime safety, ship and port security via spectrum dependent systems;

\(b\) that existing and future technologies for Ship Security and Alerting Systems (SSAS), introduced as a result of the ISPS Code referred to in considering \(b\), will require long-range communication links and networks between mobile ships and shore-based stations;

\(c\) that due to the importance of these radio links in ensuring the safe and secure operation of international shipping and commerce, they must be resilient to interference;

\(d\) that studies will be required to provide a basis for considering regulatory changes, including additional allocations and recommendations, designed to accommodate spectrum requirements of ship and port security, consistent with the protection of incumbent services;

\(e\) that the ITU and international standards organizations have initiated related studies on spectrum efficient technology,
Maritime Spectrum Requirements in the US and Globally (WRC-2012 Agenda Item 1.10)

Where this comes from (WRC-07 Res.357, cont’d):

resolves

1 that WRC-11 consider amendments to provisions of the Radio Regulations necessary to provide for the operation of ship and port security and maritime safety systems;

2 that WRC-11 consider additional allocations to the maritime mobile service below 1 GHz to support the requirements identified in resolves 1;

3 that WRC-11 consider additional allocations to the maritime mobile-satellite service in frequency bands allocated to the maritime mobile service between 156 and 162.025 MHz to support the requirements identified in resolves 1,
Maritime Spectrum Requirements in the US and Globally (WRC-2012 Agenda Item 1.10)

Where this comes from (WRC-07 Res.357, cont’d):

_Invites ITU-R_

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;

2 that the studies referred to in _Invites ITU-R_ 1 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,

_invites_

all members of the Radiocommunication Sector, the International Maritime Organization (IMO), International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) to contribute to these studies,
Maritime Spectrum Requirements in the US and Globally (WRC-2012 Agenda Item 1.10)

What this includes:

1. Designation of AIS 1 & AIS 2 as safety communications frequencies.
2. Satellite detection of AIS, possibly on separate frequencies if necessary.
3. VHF data transmission, ship-shore and ship-ship, both single-channel and multi-channel wideband.
4. Spectrum-efficient use of the channels. The introduction of digital voice communications technology (using TDMA) in the VHF marine band. Note this issue was previously addressed by a proposal to narrowband the channels.
Maritime Spectrum Requirements in the US and Globally (WRC-2012 Agenda Item 1.10)

1. IALA has formed an E-Navigation Committee (RTCM is now represented) to further define the requirements and to identify the technologies and the necessary spectrum.

2. ITU-R has ongoing studies on satellite detection of AIS and a draft new Report with frequency recommendations.


4. IALA (with support from RTCM) has an active liaison with ITU-R WP5B addressing the allocation of spectrum to support Rec. ITU-R M.1842 (note that ITU Rec. 1842-1 caters to footnote o) of Appendix 18, the VHF Public Correspondence service (this is MariTEL in the US)).

5. Rec. ITU-R M.1842-1 provides for a 1-channel (43.2 kbps), a 2-channel (153.6 kbps) and a 4-channel (307.2kbps) wideband data service.
Relevant US Regulatory Maritime Proceedings

1. RTCM has approved a 1-channel standard per Rec. ITU-R M.1842 and has petitioned FCC for approval; comments needed by 15 Oct 2009.
   a) RTCM SC123 standard to be permitted on non-safety VHF marine voice channels
   b) Polite (non-interfering) protocol for compatibility with voice services
   c) Two modes: 9600 bps (AIS packet data format) and 43.2 kbps (hi-efficiency mode)

2. RTCM, Boat US and US Coast Guard have opposed MariTEL’s FCC petition for disaggregating VHF Public Correspondence channels.
   a) MariTEL’s petition would preclude wideband data service for maritime users
   b) No other suitable spectrum is available in the US
   c) MariTEL could otherwise provide a 307.2 kbps data exchange and internet access for mariners with four contiguous channels per Rec. ITU-R M.1842-1, Annex 4

3. RTCM’s Opposition to MariTEL’s petition is based on E-Navigation
   a) RTCM’s SC123 standard could be expanded to include the wideband data service
   b) MariTEL would have to modify its FCC petition for Riverside County, CA
   c) MariTEL could then assign four of its channels for this service nationwide and thus meet the future need for E-Navigation defined by IALA in its liaison statement to ITU

4. MariTEL’s FCC petition with suggested alternative follows (next slides)
### Channels in Appendix 18 with footnote o)

<table>
<thead>
<tr>
<th>Channel designator</th>
<th>Notes</th>
<th>Transmitting frequencies (MHz)</th>
<th>Port operations and ship movement</th>
<th>Public Correspondence</th>
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### NOTE 1:

None of these international marine duplex channels is available in the United States, as all have been FCC-reassigned to terrestrial users.

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These channels may be used to provide bands for initial testing and the possible future introduction of new technologies, subject to special arrangement between interested or coordination with affected administrations. Stations using these channels or bands for the testing and the possible future introduction of new technologies shall not cause harmful interference to, and shall not claim protection from, other stations operating in accordance with Article 5. The design of such systems shall be such as to preclude the possibility of interference to the detection of AIS signals on 161.975 or 162.025 MHz. (WRC-20007)
## Channels in Appendix 18 with footnote o) (continued)

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<th>Channel designator</th>
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</table>

**NOTE 2:**
These international marine duplex channels are not available in the United States, as all have been FCC-reassigned to terrestrial users.

**NOTE 3:**
These international marine duplex channels are assigned by FCC (at auction) to MariTEL in the United States, and they are now subject to being assigned to terrestrial users.
Marine Channel Assignment Application by MariTEL to Riverside County, California

Marine Channels To Be Assigned:
25, 84, 85

Marine Channels Remaining:
24, 26, 86

Marine Channels Potentially Conflicted by AIS:
27, 28
MariTEL’s Riverside Application

From MariTEL’s FCC Application:

11 Channels to be retained by MariTEL:
424, 224, 284, 225, 285, 426, 226, 486, 286, 427, 428

3 Channels to be assigned to Riverside:
484, 425, 485

25/12.5 kHz Channel Structure for Marine/LMR Applications:

[Diagram of channel structure]

Notes:
24 = 25 kHz Marine channel; 224 = 12.5 kHz LMR channel;
484 = 12.5 kHz LMR implementation of 25 kHz marine channel 84
Alternate Riverside Proposal

For the proposed alternate FCC Application:

11 Channels to be retained by MariTEL:
24, 224, 84, 284, 25, 225, 85, 285, 286, 427, 428

3 Channels to be assigned to Riverside:
426, 226, 486

25/12.5 kHz Channel Structure for Marine/LMR Applications:

Notes: 24 = 25 kHz Marine channel; 224 = 12.5 kHz LMR channel;
426 = 12.5 kHz LMR implementation of 25 kHz marine channel 26
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Benefits of the Alternate Proposal

1. E-Navigation depends on efficient data exchange and thus needs a wideband data service in ports.
2. LA-Long Beach (a very busy port area) and San Diego will have access to the 4-channel 307.2 kbps service on channels 24, 84, 25, and 85.
3. The RTCM E-Navigation Steering Committee will maintain a constant vigil on the technology development, the technical standards and the marine spectrum required to support these.