

## RECOMMENDATION ITU-R M.1312\*

**A LONG-TERM SOLUTION FOR IMPROVED EFFICIENCY  
IN THE USE OF THE BAND 156-174 MHz BY STATIONS  
IN THE MARITIME MOBILE SERVICE**

(Question ITU-R 96/8)

(1997)

**Summary**

The long-term requirement within the international maritime mobile community is for an advanced spectrally efficient digital system to provide improved efficiency in the use of the band 156-174 MHz. This Recommendation provides administrations with an example of such a technology which is being implemented for land mobile communications in certain areas.

The ITU Radiocommunication Assembly,

*considering*

- a) that Recommendation No. 318 of the World Administrative Radio Conference for the mobile services (Geneva, 1987) (WARC Mob-87) seeks the most appropriate means to improve efficiency in the use of the Radio Regulations (RR) Appendix 18 (S18) VHF frequency spectrum for maritime mobile communications;
- b) that the ITU-R is conducting studies on the improved efficiency in the use of this band;
- c) that the ITU-R is conducting studies on the improved efficiency in land mobile communications through the use of digital and narrow-band technology;
- d) that the maritime mobile communications sector does not enjoy the economies of scale experienced by the land mobile sector;
- e) that the studies to date indicate the greatest long-term benefits in spectrum efficiency will be gained by using the latest digital or narrow-band transmission techniques;
- f) that changes to RR Appendix 18 (S18) were considered by World Radiocommunication Conference (Geneva, 1997) (WRC-97);
- g) that a common international system is essential for maritime communications to ensure the safety of life at sea;
- h) that the introduction of new technology to the maritime mobile service shall not disrupt the distress and safety communications in the VHF band, including those established by the International Convention of Safety of Life at Sea, (SOLAS) 1974 as amended;
- j) that any new equipment need to be compatible or be able to coexist with existing equipment conforming to relevant parts of Recommendation ITU-R M.489 (former RR Appendix 19) already in widespread use;
- k) that the introduction of new technology should not interrupt the continuous availability of RR Appendix 18 (S18) maritime mobile distress and safety communications in the VHF bands for all users;
- l) that the introduction of new technology or replanning of frequency bands will be a significant exercise involving a long period of transition,

*recommends*

- 1** that administrations should, as far as possible, look to the implementation of the latest digital or narrow-band techniques to meet future operational requirements and achieve the efficient use of the band 156-174 MHz;

---

\* This Recommendation should be brought to the attention of International Maritime Organization (IMO).

2 that the international maritime community should look to developments within the land mobile communications sector in future digital and narrow-band communications in order to benefit from the economies of scale within that sector. (A relevant ITU-R Recommendation for digital land mobile technologies is still under development.);

3 that the international maritime community should consider amongst others (see comment), the use of an advanced spectrum efficient technology, an example of which is described in Annex 1; this technology has been adopted for land mobile communications in certain areas to provide improved spectrum efficiency and system capabilities. (*Comment* – For land mobile communications different technologies are available, utilising other types of modulation and other access methods than the one described in Annex 1; these should also be analyzed to see whether they serve the needs of the maritime community, taking into account the economic aspect.)

## ANNEX 1

### Example of an advanced spectrally efficient digital system

The following characteristics could be considered by the international community for implementation as an advanced spectrum efficient technology within the maritime mobile service in the band 156-174 MHz.

RF carrier spacing:	25 kHz
Maximum base station effective radiated power (e.r.p.):	25 W peak 25 W average
Mobile stations transmit power:	10 W to 0.25 W
Area coverage technique:	– Cellular channel reuse – Quasi-synchronous (simulcast) – Time sharing transmission – Diversity receivers
Designation of emission:	
– Traffic channels:	25K0D7W/25KWDW
– Control channels:	25K0D7W/25KWDW
Access method:	TDMA (Time Division Multiple Access)
Number of traffic channels per RF carrier:	4-8
Data transmission rate:	36 kbit/s
Modulation:	DQPSK ( $\pi/4$ Differentially Coherent Quaternary Phase Shift Keying)
Traffic channel structure:	
– Bit rate:	4.567 kbit/s
– Error protection:	2.633
– Coding algorithm:	ACELP (Algebraic Codebook Excited Linear Prediction)
Control channel structure:	
– Common control channel:	2 channel types
– Associated control channel:	3 channel types
– Broadcast control channel:	2 channel types
Delay spread spectrum equalization capability:	
– Class A single tx operation:	No equalization
– Class B single tx operation:	55.5 $\mu$ s
– Class Q quasi-synchronous operation:	111.1 $\mu$ s
Channel coding:	Convolutional codes with interleaving plus error detection