Comité International Radio-Maritime
International association for marine electronics

Position Paper

Digital voice over VHF

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Position summary

The 2027 World Radiocommunication Conference has a draft agenda item to consider improving the utilization of the VHF maritime frequencies in Appendix 18 of the Radio Regulations.

One solution currently under consideration by some industry bodies is to switch the Appendix 18 voice channels to digital technologies.

Such a switch would constitute a major global programme with a long implementation period. Studies should be undertaken by IMO and ITU to determine the costs and benefits of such a switch and an appropriate technical implementation programme that is fit for purpose for all affected maritime users and environments.

Background

The 2019 ITU World Radiocommunication Conference (WRC-19) in November 2019 set the *Preliminary agenda for the 2027 World Radiocommunication Conference* in Resolution 812 (WRC-19), which included the following item:

> *2.10 to consider improving the utilization of the VHF maritime frequencies in Appendix 18, in accordance with Resolution 363 (WRC-19);*

If it is decided at WRC-23 to place this item on the agenda of WRC-27, then changes to Appendix 18 of the Radio Regulations will be considered to enable implementation of new technologies in the maritime mobile service aimed at improving the efficiency of the maritime frequency bands[1].

Discussion

One approach to improving the utilization of the VHF maritime frequencies currently under consideration by IALA (and related technical studies at ETSI) is to switch the Appendix 18 voice channels to digital technologies.

A switch to VHF digital voice channels would constitute a massive global programme with a long implementation period. It would require global agreement on the specific technologies used to implement the digital VHF channels. Whatever is agreed would need to be implemented as one uniform global system so that it works for all shipping and other maritime users all around the world.

CIRM has observed that the conversation on VHF digital voice channels has already moved to considering specific technologies; for example, ETSI TGMARINE is developing a Technical Report on Digital Maritime Mobile Radio (TR 103 784) to support the replacement of, or co-existence with, VHF voice channels in the 156-163 MHz marine band.

[1] IMO/ITU EG 16/3 - Outcome of the ITU World Radiocommunication Conference, 2019 (WRC-19)

CIRM's view is that work towards such a switch-over should be driven by IMO and ITU. When IMO and ITU agree on an approach, then the technical implementation can be explored by standards bodies such as IALA, ETSI, IEC and RTCM.

Some trials have already been done using related technologies, such as those conducted in the Port of Rotterdam using dPMR (https://dpmrassociation.org/), but more trials are needed in a range of maritime environments and using a range of candidate technologies. Onboard UHF communications could be used as a testbed for digital voice channels.

Licensing and patents are important considerations when selecting appropriate technologies. Use of technology should not involve patents unless a patent owner is prepared to donate or sell the patent. For example, two of the most widely used vocoders for mobile radio at present are AMBE+2 and ACELP. AMBE+2 is used by DMR and dPMR, and ACELP is used by TETRA. CIRM notes that both AMBE+2 and ACELP are covered by patents.

CIRM position on digital voice over VHF

CIRM holds the following positions:

- IMO should determine whether a switch to VHF digital voice channels is something that can and should be done, and if so, when and how. This should include a cost/benefit analysis covering the entire maritime community, i.e. VHF coast stations, commercial shipping, recreational boating, ports, harbours and marinas, etc.
- ITU should determine which technology to use globally, and which frequency band it will be in. The related studies should consider:
    - the relative merits of TDMA vs. FDMA (e.g. in terms of frequency spectrum efficiency);
    - the management of co-existence of digital and analogue channels;
    - whether a separate channel digital channel should be allocated for digital distress, safety and calling (or should Channel 16 or Channel 70 take on this role?);
    - the future relationship between digital voice and DSC (e.g. could the same technology be used for DSC?);
    - whether digitisation could create an opportunity for SMS on VHF channels and position information with low overhead;
    - an implementation plan that clearly sets out how digitization would be introduced and the impact of each stage on the maritime community; and
    - what ITU alignment issues are involved.

  Recommendation ITU-R M.1084-5 (*Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service*) should be the starting point for this work.
- Extensive testing in a wide range of maritime environments and using a range of candidate technologies is required before deciding on a suitable technology to implement.
- Licensing and patents are important considerations when selecting an appropriate technologies. Use of technology should not involve patents unless a patent owner was prepared to donate or sell the patent.