

dPMR™ PRESENTATION FOR IALA ENAV 23 SINGAPORE



Introduction

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Author of the original dPMR Air Interface standard, **ETSI TS 102 490**

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Chairman of **ETSI TG Marine** (TG26)

For many years, ETSI TG Marine has discussed the lack of marine VHF channels.

The introduction of **VDES** and **AIS** have further reduced the number of voice channels available.

- As a first step, all the ETSI VHF radio standards were revised to include 12,5 kHz channels.
- Technology has now overtaken this and 6,25 kHz operation is commonplace for Land Mobile.

6,25 kHz channels are already defined by **ITU-RM.1084**

6,25 kHz digital operation accepted for on-board use in
ITU-RM.1174 with 4FSK, same as dPMR

Discussion in ETSI TG Marine showed that the consensus preferred FDMA operation as this was most appropriate to **Peer to Peer operation**, which represents almost 100% of all marine voice communications. Also, after extensive search, it was found that no essential IPR was applicable to the dPMR protocol.

The TDMA option was not supported because it is not efficient without a synchronizing infrastructure, and any peer to peer operation would likely require licensing of some kind.

The logical choice would be to use an existing Land Mobile standard for digital voice and dPMR represented the simplest low cost option.

It also has over 10 years of infield operation giving the protocol plenty of time to mature and gain proven real-world use.

Use of this period has also driven product pricing down to a near equivalent level as analogue equipment.

In common with other Land Mobile digital standards, the number of addresses supported was not enough for maritime use and the dPMR standard was revised to expand the address space to support direct use of existing MMSIs.

These changes have also allowed a freeing up of protocol frame space (bits) to improve error correction and thus robustness of communication over distance

We are already in discussions with administrations for operational trials of dPMR equipment in a maritime use case.

Current, '**off the shelf**' dPMR VHF radios operate over 136-174 MHz with both 6,25 kHz digital and 25 kHz analogue voice operation.

Within ETSI, the **first draft dPMR Marine V1.1.0 Nov 2017** has now been revised following engineer's comments about FEC as mentioned just now (above).

The latest version with improved FEC is V1.1.1 Jan 2019

dPMR radios comply with **EN301 166** which is the European standard for narrowband radios (channels less than 12,5 kHz).

Compliance at 6,25 kHz also requires better fundamental emission mask characteristics, thus guaranteeing a high level of standard engineering quality.

dPMR uses a standard voice **CODEC** from **DVSI (AMBE+2™)**

This was chosen by members of the **dPMR Association** as the best voice quality, most widely used offering available (Including Inmarsat for example).

Again as mentioned earlier, dPMR was specifically drafted to avoid any essential IPR.

Only the **DVSI Codec** is subject to license due to IPR of the AMBE+2 technology, (which applies to all digital two-way radio protocols that use a Codec).

The **dPMR standard** can be considered as **LEGO kit** that can be assembled into many different applications:

- Digital voice calls, individual and group
- Appended data (attach enhanced position data to all calls)
- Short data calls (Text messaging)
- Voice calls with embedded data.
- All equivalent call types to ITU-RM.493-15

MIGRATION

An individual call is a call made to a unique MMSI address that is not identified as a group address and shall be placed according to **ITU-RM.493-15** (Individual, Routine, Data):

Format specifier = 120

Address = MMSI of called station

Category = 100 (Routine)

Self ID = MMSI of calling station

1st Telecommand = 106 (Data)

2nd Telecommand = 126 (No information)

Frequency = Proposed 6,25kHz Channel

Note : As a default, all voice transmissions can use Appended data format to attach the vessel's enhanced position to every call

Note: where a group of vessels have an agreed working channel, they can call each other directly using this protocol without calling with DSC on CH70.

No changes to ITU-RM.493-15 are needed to implement this.

- All radios employ a polite protocol, they listen before transmitting and will not transmit over any existing analogue or digital traffic.
- Eventually a calling channel for dPMR will need defining.
- Further, dPMR radios are “dual-mode” meaning they can interpret a digital or analogue call on the same channel, and can automatically switch the radio to the mode received during the call. This means there is no need to change channels and allows for use of both digital and analogue channels seamlessly.



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