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Committee Draft for Vote

RTCM (DRAFT) STANDARD 12301.0

VHF-FM Digital Small Message Services

DEVELOPED BY
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RADIO TECHNICAL COMMISSION FOR MARITIME SERVICES

RTCM (DRAFT) STANDARD 12301.0

VHF-FM Digital Small Message Services

1 Scope

This standard specifies the minimum functional and technical requirements for VHF-FM Digital Small Message Services (VDSMS).

VDSMS are intended to provide for short messaging from ship-to-ship, shore-to-ship and ship-to-shore.

VDSMS are intended to operate on frequencies in the international VHF Marine Band defined in Appendix 18 of the International Radio Regulations (RR Ap 18), unless otherwise restricted by regulation. VDSMS may share channels with other services (e.g. voice services) on a non-interference basis. The VHF Data Link (VDL) access method for VDSMS is intended to ensure that a call in progress is not disrupted.

VDSMS transmissions have a limited duration and a limited duty cycle to ensure the availability of the channel for other users. VDSMS transmitter emissions masking is intended to protect the users of the adjacent channels.

The body of this standard includes general requirements for VDSMS, e.g. operating frequencies, channel access method, limitations on the use of white space in the radio channels, transmitter emissions mask, receiver characteristics, and electromagnetic compatibility (EMC) with other radio systems in the geographical/spectral vicinity of the VDSMS. Requirements for the two specific technology implementations (the 9600 BPS modulation used in Recommendation ITU-R M.1371-3 and the 43200 BPS π/8 D8PSK modulation used in Recommendation ITU-R M.1842 Annex 1) will be contained in separate Annexes that will include packet data structure, message types, error detection/correction and other technical details associated with each technology.

2 Normative references

The following referenced documents apply to this standard only to the extent specified herein.

IEC 61993-2, *Maritime navigation and radiocommunication equipment and systems – Automatic identification systems (AIS) – Part 2: Class A shipborne equipment of the universal automatic identification system (AIS) – Operational and performance requirements, methods of test and required test results*

IEC 62238, *Maritime navigation and radiocommunication equipment and systems – VHF radiotelephone equipment incorporating Class "D" Digital Selective Calling (DSC) – Methods of testing and required test results*

IEC 62287-1, *Maritime navigation and radiocommunication equipment and systems – Class B shipborne equipment of the automatic identification system (AIS) – Part 1: Carrier-sense time division multiple access (CSTDMA) techniques*

International Radio Regulations (RR)

Recommendation ITU-R M.1080, *Digital selective calling system enhancement for multiple equipment installations*

Recommendation ITU-R M.1084-4, *Interim solutions for improved efficiency in the use of the band 156-174 MHz by stations in the maritime mobile service*

Recommendation ITU-R M.1371-3, *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band*

Recommendation ITU-R M.1842, *Characteristics of VHF radio system and equipment for the exchange of data and electronic mail in the maritime mobile service RR Appendix 18 channels*

Report ITU-R M.2122, *EMC assessment of shore-based electronic navigation (eNAV) infrastructure and new draft Standards for data exchange in the VHF maritime mobile band (156-174 MHz)*

Recommendation ITU-R M.585, Assignment and use of maritime mobile service identities (MMSI)

3 Definitions, acronyms and abbreviations

3.1 Definitions

The following new terms are used in this standard:

3.1.1 Shall
describes attributes which RTCM considers necessary to meet the standard. However, the use of the term "shall" is not intended to limit the possibility of amending the standard through the language of a regulation or contract which incorporates this standard by reference. If a VDSMS is implemented to such an amended standard, any claim of compliance with this standard shall also be accompanied by a description of the modification.

3.1.2 Should
describes attributes recommended by RTCM, but not mandatory to claim compliance with this standard.

3.1.3 VHF-FM Digital Small Message Services (VDSMS)
a maritime digital small messaging service that uses white space and limited duty cycle in a channel in the VHF maritime mobile band to transmit and receive digital messages between ships and between ships and shore stations.

3.1.4 White space
an interval of time in which a radio channel is unused.

3.2 Acronyms and abbreviations

The following acronyms and abbreviations are used in this standard.

AIS	Automatic Identification System
EMC	Electromagnetic Compatibility
FM	Frequency Modulation
IEC	International Electrotechnical Commission
ITU	International Telecommunications Union
MMSI	Maritime Mobile Service Identity
PEP	Peak Envelope Power
VDL	VHF Data Link
VDSMS	VHF-FM Digital Small Message Service
VHF	Very High Frequency

4 General Requirements

4.1 Operating frequencies

VDSMS is intended to operate on frequencies in the VHF Marine Band 156-162 MHz.

VDSMS is intended to operate from ship-to-ship, ship-to-shore and shore-to-ship.

4.2 Operating channels

VDSMS may operate on both simplex and duplex channels as specified in Recommendation ITU-R M.1084-4.

VDSMS may share a channel with other services (e.g. voice services).

VDSMS equipment shall have the capability to select the operating channel.

4.2.1 Determining the availability of a channel

VDSMS shall use the carrier-sense detection method described in Recommendation ITU-R M.1371-3 Annex 7 to determine the availability of a channel for transmission.

VDSMS shall monitor a channel for availability for at least four seconds.

When VDSMS determines by carrier-sense that a channel is occupied, it shall delay its pending transmission attempt by a pseudo-random time period of between 5 milliseconds and 100 milliseconds, in one millisecond increments. Each transmission attempt shall be preceded by carrier-sense determination of availability of the channel.

In response to a message requesting acknowledgement of delivery, VDSMS shall acknowledge receipt of a message without carrier-sense or monitor delay.

For hand-shakes for transmission set-up, VDSMS shall respond without carrier-sense or monitor delay.

4.2.2 Limiting the use of a channel

VDSMS shall limit the duration of each transmission to a maximum of 150 milliseconds.

VDSMS shall wait at least one second between successive transmissions except in the case of acknowledgements and one hand-shake for transmission set-up.

4.3 Transmitter

4.3.1 Emissions spectrum

VDSMS shall use the transmitter modulation emissions mask specified in IEC 61993-2 to protect adjacent channels.

VDSMS transmitter attack and decay times shall be as specified in IEC 62287-1.

Transmitter power for VDSMS mobile equipment shall not exceed 25 watts PEP, measured at the output connector of the equipment.

Transmitter power for VDSMS base station equipment shall not exceed 50 watts PEP, measured at the base of the antenna.

4.3.2 Modulation

Transmitter modulation for VDSMS equipment shall be as specified in Recommendation ITU-R M.1371-3 or ITU-R M.1842 Annex 1.

4.3.3 Automatic shutdown

VDSMS transmitter equipment shall automatically shut down in the case of a fault where the transmitter does not discontinue its transmission within 1 second of the end of its nominal transmission.

4.4 Receiver

Receiver performance for VDSMS transmit/receive equipment shall be as specified in IEC 62238 including Annex D, unless otherwise specified herein.

Minimum static carrier-sense receiver sensitivity for VDSMS transmit-only equipment shall be as specified in Recommendation ITU-R M.1842 Annex 1 for the applicable transmitter modulation.

4.5 Electromagnetic compatibility

Electromagnetic compatibility (EMC) with other services in RR Ap 18 shall be assured in accordance with Report ITU-R M.2122. Implementation issues between the services (e.g. timing and protocol) shall also be considered in accordance with the relevant standards for the other services.

4.6 Identification

VDSMS shall use the Maritime Mobile Service Identity (MMSI) number to identify of the maritime mobile service station in accordance with Recommendation ITU-R M.585, including the use of the tenth digit as specified in Recommendation ITU-R M.1080.

4.7 Indications

At a minimum, VDSMS transmit/receive equipment shall provide the following indications:

a) Power On/Off

b) Standby/Ready