|  |  |  |
| --- | --- | --- |
| U.S. Radiocommunications Sector  Fact Sheet | | |
| **Working Party:** ITU-R WP 5B | **Document No:** USWP5B26-12R1 | |
| **Ref:** 5B/225-E Annex 23 | **Date:** March 3, 2021 | |
| **Document Title:** Working Document towards a Preliminary Draft New Recommendation ITU-R M.[AMRS-VDL], “Characteristics and protection criteria for the International Civil Aviation Organization standardized VHF datalink Mode 2 systems operating in the aeronautical mobile (route) service in the frequency band 136-137 MHz” | | |
| **Author(s)/Contributors(s):**  Chris Tourigny  FAA Spectrum Engineering Services  Michael Tran  MITRE | | Phone: 202-267-3071  Email: chris.tourigny@faa.gov  Phone: 703-983-1295  Email : mtran@mitre.org |
| **Purpose/Objective:** The purpose of this contribution is to provide updates to Document 5B/225 Annex 23 to mature the technical characteristics and protection criteria for the VHF datalink (VDL) systems operating in the frequency band 136 – 137 MHz, allocated to the aeronautical mobile (route) service. VDLM2 is internationally standardized by ICAO. | | |
| **Abstract:** This contribution provides updates to document 5B/225 Annex 23 on the technical characteristics and protection criteria for the VHF datalink Mode 2 (VDLM2) systems operating in the 136 – 137 MHz frequency band, allocated to the AM(R)S. | | |

|  |  |
| --- | --- |
| **Radiocommunication Study Groups** |  |
|  |  |
|  |  |
| Source: 5B/225-E Annex 23  Subject: AM(R)S VDLM2 in 136 – 137 MHz | **Document 5B/** |
| **10 May 2021** |
| **English only** |
| United States of America | |
| working document towards a preliminary draft neW recommendation itu-r m.[amRS-VDL]  **Characteristics and protection criteria for the International Civil Aviation Organization standardized VHF datalink Mode 2 systems operating in the aeronautical mobile (route) service in the frequency band 136 – 137 MHz** | |
|  | |

**Introduction**

This contribution provides updates to Document 5B/225 Annex 23, on the technical characteristics and protection criteria for ICAO standardized VHF datalink (VDL) Mode 2 (VDLM2) operating in the aeronautical mobile (route) service in the frequency band 136 - 137 MHz.

Attachment: 1

ATTACHMENT

Working document towards a preliminary draft new recommendation ITU-r m.[amrs-vDL]

**Characteristics and protection criteria for the International Civil Aviation Organization standardized VHF datalink Mode 2 systems operating in the aeronautical mobile (route) service in the frequency band 136-137 MHz**

Scope

This Recommendation provides the technical characteristics and protection criteria for the International Civil Aviation Organization (ICAO) standardized VHF datalink (VDL) Mode 2 (VDL M2) communications systems operating in the aeronautical mobile (route) service (AM(R)S) in the frequency band 136-137 MHz. These technical characteristics and protection criteria should be used for compatibility studies with VDLM2 systems.

Keywords

AM(R)S, VHF, VDL, CSC, protection criteria, air-to-ground communications, ground-to-air communications

Abbreviations/Glossary

AM(R)S: Aeronautical mobile (route) service

CSC: Common signaling channel

ICAO: International Civil Aviation Organization

VDL: VHF data link

VDLM2: VHF data link Mode 2

VHF: Very high frequency

Related ITU Recommendations and Reports

Recommendation

ITU-R [SM.1535](https://www.itu.int/rec/R-REC-SM.1535/en) The protection of safety services from unwanted emissions

The ITU Radiocommunication Assembly,

considering

*a)* that the frequency band 136-137 MHz is currently used by International Civil Aviation Organization (ICAO)-standardized VHF data link Mode 2 (VDLM2) data communications worldwide for air-to-ground, air-to-air, and ground-to-air aeronautical safety communications;

*b)* that aeronautical safety communications are used in all areas that aircraft operate and land, and in all phases of flight;

*c)* that aircraft may be equipped with up to three aeronautical mobile (route) service (AM(R)S) radio stations utilizing a combination of voice and data radios,

recognizing

*a)* that in high aircraft density areas, such as in Europe and North America, the utilization of VHF channels in the 117.975-137 MHz is highly congested;

*b)* that the ICAO develops standards and recommended practices for civil aviation;

*c)* that Annex 10 to the Convention on International Civil Aviation contains standards and recommended practices for aeronautical radiocommunication systems used by civil aviation;

*d)* that the AM(R)S is a safety service;

*e)* that RR No. **4.10** provides recognition that safety services require special measures to ensure their freedom from harmful interference;

*f)* that Recommendation ITU-R SM.1535 provides a guideline for the protection of safety services from unwanted emissions,

recommends

1 that the technical and operational characteristics of the VHF data link (VDL) Mode 2 (VDL M2) systems operating in the 136-137 MHz frequency band, allocated to the AM(R)S and described in Annex 1, should be considered representative of those systems and should be used for compatibility studies with systems operating in other services;

2 that the criterion of interfering signal power to receiver noise power level, *I/N = −10 dB*, should be used as the required protection level for the VDL M2 systems operating in the AM(R)S in the frequency range 136-137 MHz, and that this represents the aggregate protection level if multiple interferers are present.

Annex 1

Technical and operational characteristics of the VHF datalink Mode 2 systems operating in the aeronautical mobile (route) service  
in the frequency band 136-137 MHz

# A1.1 Introduction

The frequency band 136-137 MHz is allocated to the AM(R)S and is the principle communications band for aeronautical safety data communications in the air-to-ground, air-to-air, and ground-to-air directions. These systems are internationally standardized by the ICAO for VDL M2. These communications are used in all airspaces where air traffic services are available and in all phases of flight.

# A1.2 Technical characteristics of the VHF datalink Mode 2 systems operating in the aeronautical mobile (route) service in the frequency band 136‑137 MHz

The technical characteristics of representative VDL M2 systems operating in the frequency band 136-137 MHz are presented in Table A1-1. Some stations use different antennas to transmit and to receive signals.

Table A1-1

Characteristics of VHF data link mode 2 systems operating in the frequency band 136-137 MHz

| Platform | Units | Aircraft | Base station |
| --- | --- | --- | --- |
| Type of emission |  | Data | Data |
| Modulation type |  | D8PSK | D8PSK |
| Type of operation |  | Simplex | Simplex |
| Max antenna height | m | 15 240 (MSL) | 15 – 50 (AGL)  (15 typical) |
| **Transmitter** | | | |
| Power | W | 18 to 25 | 25 |
| Coverage radius | km | 370 | 370 |
| Bandwidth | kHz | 25 | 25 |
| Antenna gain | dBi | 0 | 2.2 |
| Radiation pattern |  | Omni | Omni |
| Antenna polarization |  | Vertical | Vertical |
| **Transmitter Mask** | | | |
| **See ICAO SARPs, Annex 10, Vol. III, Part 1, Section** 6.2.4 - Adjacent channel emissions | | | |
| **Receiver Rejection**  **See ICAO SARPs, Annex 10, Vol. III, Part 1, Section 6.3.4 - Receiver Rejection** | | | |
| **Receiver** | | | |
| Noise figure | dB | 6-14 (note 1) | 6-10 (note 1) |
| IF bandwidth | kHz | 25 | 25 |
| Antenna gain | dBi | 0 | 2.2 |
| Radiation pattern |  | Omni | Omni |
| Antenna polarization |  | Vertical | Vertical |
| Note 1: A range is provided for the value of Noise Figure. Studies that investigate the performance of the link would typically use the higher end of the range and studies that determine the potential for interference would typically use the lower end of the range. | | | |