

UK Interface Requirement 2060

**Ground based VHF radio equipment at Aeronautical
Stations of the Aeronautical Mobile (R) Service for
Mode 2 and/or Mode 4 data link communications.**

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Section 1

References

- 1.1 Annex 10 to the Convention on International Civil Aviation (ICAO) Aeronautical Telecommunications Volume V - Aeronautical Radio Frequency Spectrum Utilization as amended.
- 1.2 ICAO EUR Frequency Management Manual EUR Doc 011 Appendix K.
- 1.3 ICAO Annex 10 Aeronautical Telecommunications Volume III – Communication Systems (Part I – Digital Data Communication Systems Part II Voice Communication Systems)
- 1.4 ICAO Doc 9694-AN/955 Manual of Air Traffic Services Data Link Applications
- 1.5 ICAO Doc 9776 Manual on VHF Digital Link (VDL) Mode 2
- 1.6 ICAO Doc 9816 Manual on VHF Digital Link (VDL) Mode 4
- 1.7 EUROCAE ED-78A Guidelines for approval of the provision and use of ATS supported by data communications
- 1.8 EUROCAE ED-100A Interoperability Requirements for ATS Applications using Arinc 622 Data Communications
- 1.9 EUROCAE ED-120 Safety and Performance Requirements Standard For Initial Air Traffic DLS In Continental Airspace
- 1.10 Statutory Instrument 2003 No. 1902, The Wireless Telegraphy (Limitation of Number of Licences) Order 2003

Section 2

Foreword

- 2.1 The Radio Equipment and Telecommunications Terminal Equipment Directive 99/5/EC (R&TTE Directive) was implemented in the United Kingdom (UK) on the 8 April 2000 by The Radio Equipment and Telecommunications Terminal Equipment Regulations 2000, Statutory Instrument 2000 No. 730. In accordance with Articles 4.1 and 7.2 of Directive 1999/5/EC, this UK Interface Requirement contains the requirements for the licensing and use of ground based VHF aeronautical Mobile (R) Service (AM(R)S) radio equipment in the specified frequency bands.
- 2.2 Nothing in this UK Radio Interface Requirement shall preclude the need for equipment to comply with Directive 1999/5/EC.
- 2.3 Nothing in this UK Radio Interface Requirement shall preclude the need for equipment to comply with Annex 10 to the convention on International Civil Aviation, where appropriate.
- 2.4 It is required by the Wireless Telegraphy Act 2006 that no radio equipment is installed or used in the UK except under the authority of a licence granted by or otherwise exempted by regulations made by Ofcom. It is a condition of such a licence or exemption regulations as appropriate that, in order to be installed or used in the UK, the equipment must meet the minimum requirements specified in this UK Interface Requirement for the stated equipment types and for the stated frequency bands. Nothing in this UK Interface Requirement shall preclude equipment from being placed on the market in the UK that complies with the 'essential requirements' specified in Directive 1999/5/EC.
- 2.5 The requirements given in the main body of this UK Radio Interface Requirement will apply to ground based VHF AM(R)S radio equipment in the UK.
- 2.6 This UK Radio Interface Requirement will be revised as necessary, for example to follow:
 - i) current technology developments for reasons related to the effective and appropriate use of the spectrum in particular maximising spectrum utilisation; and
 - ii) changes to the available spectrum allocated for aeronautical mobile (R) services.
- 2.7 All UK Radio Interface Requirements notified under Directive 1998/34/EC will be published and will be made available free of charge from the Ofcom web-site at <http://www.ofcom.org.uk>
- 2.8 Further information on this UK Radio Interface Requirement can be obtained from the technical enquiry contact given at the back of this document.

Section 3

Minimum requirements for operation within the UK

- 3.1 The minimum requirements in this document are made for reasons related to the effective and appropriate use of the radio spectrum, in particular maximising spectrum utilisation.
- 3.2 This UK Radio Interface Requirement gives a high level description of how the spectrum in the UK is used for ground based VHF radio equipment in the aeronautical mobile (R) service. It does not prescribe technical interpretation of the 'essential requirements' of Directive 1999/5/EC.
- 3.3 This UK Radio Interface Requirement therefore stipulates the necessary equipment parameters for the licensing of ground based VHF AM(R)S radio equipment in the UK. Table 3.1 contains the relevant equipment parameters. These taken together with the 'essential requirements' detailed in Article 3.2 of Directive 1999/5/EC constitute the minimum requirements for the installation and use of ground based VHF AM(R)S radio equipment in the aeronautical mobile (R) service within the UK. Nothing in this UK Interface Requirement shall preclude equipment from being placed on the market in the UK that complies with the 'essential requirements' specified in Directive 1999/5/EC.
- 3.4 The technical parameters specified in the UK Radio Interface Requirement are applied to achieve the desired level of compatibility within the aeronautical mobile (R) service and with other radiocommunications services, whilst promoting enterprise, innovation and competition.
- 3.5 This UK Radio Interface requirement provides the necessary technical information which facilitates access to the aeronautical mobile (R) spectrum by making clear the assumptions that are made in planning the use of the aeronautical mobile (R) spectrum in the UK. It is not the intention of this UK Radio Interface Requirement to duplicate or impose any additional 'essential requirements' of the Directive 1999/5/EC on products. Any specified parameters within this document are for the purpose of identifying product options and not as a national de facto product requirement.

Table 3.1: Minimum requirements for the use of ground based VHF aeronautical radio equipment for Mode 2 and/or Mode 4 data link communications.

Mandatory Elements (1-9)		
1	Frequency band (or bands)	108–117.975 MHz ¹ , 117.975–137 MHz, 136.975 MHz (CSC) ²
2	Radio service	Aeronautical Mobile (R) Service
3	Application	Aeronautical communications: AGA (Air-Ground-Air) communications (civil)
4	Channelling modulation	Mode 2 Data Link 25 kHz 14K0G1D and Mode 4 Data Link 25 kHz 13K0F7D. In accordance with ICAO Annex 10 (Ref 1.1), as relevant.
5	Transmit power limit ³	For each individual licence / frequency assignment, either the maximum and minimum field strength at the limit of DOC ⁴ may be specified or the maximum effective radiated power (e.r.p.)
6	Channel occupation rules	Data Link: Mode 2 uses CSMA (Carrier Sense Multiple Access) protocol and Mode 4 uses STDMA (Self-Organising Time Division Multiple Access) protocol. In accordance with ICAO Annex 10 (Ref 1.1), as relevant.
7	Duplex type/ separation	Single channel simplex and Common Signalling Channel (CSC)
8	Licensing Regime	Individual, callsigns or station identifications may also need to be issued ⁵ . Individual Aeronautical Licence required.
9	Additional essential requirements	N/A
Informative Elements (10-13)		
10	Frequency planning assumptions	Antennas vertically polarised. ICAO Annex 10 Volume V (Ref 1.1). Frequency assignments according to ICAO European agreements (Reference 1.2).
11	References	Mode 2: ETSI EN 301 841-1 and Mode 4: ETSI EN 301 842-1
12	Remarks	Fixed and vehicle equipment categories comprising transmitter, receiver and transceiver types operating in the VHF Aeronautical Mobile (R) Service allocation 118 to 136.975 MHz using Double Sideband (DSB) Amplitude Modulation full carrier with 25 kHz channel spacing, intended for data link communications.
13	Notification Number	2005/504/UK

¹ The use of this band by the Aeronautical Mobile (R) service is subject to agreement obtained under the procedures in Article 14 of the Radio Regulations. The band should not be used for this purpose until it is no longer required for Aeronautical Radionavigation.

² CSC - Common Signalling Channel reserved on a worldwide basis for VHF digital link (VDL) using Mode 2 VDL modulation scheme and carrier sense multiple access (CSMA).

³ Radio site clearance considerations may impose restrictions on maximum power use on certain frequency assignments. (Radio site clearance is required for any aeronautical station with an e.r.p. greater than 18dBW (50W) and/or antenna height greater than 30 metres above ground level, or where an existing structure is increased in height by greater than 5 metres.)

⁴ DOC - Designated operational coverage (See ITU RR 45.1.1)

⁵ See Reference 1.10 Schedule 8 Aeronautical Parts 1, 2 & 3 for limitations on WT Act Licences

Section 4

Additional performance parameters

(informative)

ETSI EN 301 841-1 V1.2.1 (2003-08) European Standard (Telecommunications series) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 2; Technical characteristics and methods of measurement for ground-based equipment; Part 1: Physical layer and MAC sub-layer VDL mode 2 physical layer.

ETSI EN 301 841-2 V1.1.1 (2004-03) European Standard (Telecommunications series) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 2; Technical characteristics and methods of measurement for ground-based equipment; Part 2: Upper layers VDL mode 2 data link layer

ETSI EN 301 842-1 V1.2.1 (2005-04) European Standard (Telecommunications series) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 1: EN for ground equipment VDL mode 4 ground equipment, physical layer

ETSI EN 301 842-2 V1.3.1 (2005-04) European Standard (Telecommunications series) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Data Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 2: Data link layer VDL mode 4 data link layer

ETSI EN 301 842-3 V1.1.1 (2005-02) European Standard (Telecommunications series) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 3: Additional broadcast aspects VDL mode 4 Additional broadcast aspects

ETSI EN 301 842-4 V1.1.1 (2005-02) European Standard (Telecommunications series) Electromagnetic compatibility and Radio spectrum Matters (ERM); VHF air-ground Digital Link (VDL) Mode 4 radio equipment; Technical characteristics and methods of measurement for ground-based equipment; Part 4: Point-to-point functions VDL mode 4 Point to Point functions.

It is suggested that manufacturers refer to the appropriate volumes of Annex 10 to the Convention on International Civil Aviation, aeronautical telecommunications, as amended, for relevant manufacturing standards and guidelines. www.icao.int.

Equipment which complies with this radio interface specification is additionally subject to the putting into service provisions of Article 10.1 of Regulation (EC) No. 552/2004 of 10 March 2004 on the interoperability of the European Air Traffic Management Network (the Interoperability Regulation)

Section 5

Contact details

Ofcom, Riverside House, 2a Southwark Bridge Road, London, SE1 9HA

Technical enquiries to the Ofcom Central Licensing Team:-

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Section 6

Document history

Version	Date	Changes
Draft	8 Aug 2005	Notified as Draft
1.0	2 Feb 2006	Initial Publication as final text.