1 Introduction

This guidance is intended to support fire and rescue services in specifying and managing fireground voice communication radio equipment for use at incidents. The guidance sets out the regulatory and operational requirements for using equipment and the frequency spectrum.

Effective fireground communications are crucial to the work of fire and rescue services in resolving incidents and ensuring firefighter safety, particularly between sectors and when breathing apparatus crews are deployed. The intraoperability of communications between services at cross-border incidents and major incidents can be critical to effective operations.

A frequency spectrum allocation and channel plan for fire and rescue services, based on using FM analogue radio technology, was agreed with the Home Office in 1993. The introduction of new technology has led to fire and rescue services procuring and using digital mobile radio (DMR) for incident ground purposes. The channel plan was reviewed and updated in 2017.

The channels are primarily intended for communications between land-based resources. The channels are UK-wide and are not geographically assigned to any service; their use must therefore be co-ordinated between fire and rescue services. During incidents fireground radio use should be managed to minimise interference between two incidents, in the same service or across borders.

Manufacturers producing radios to a standard must adhere to certain criteria to ensure compatibility of the main functions, though some manufacturers choose to add additional features. Proprietary features are not guaranteed to be compatible between different manufacturers, fire and rescue services are advised to consider intraoperability of handsets prior to procurement, this guidance will assist.

2 Fire and rescue service responsibilities

Wireless telegraphy licences are issued by the Office of Communications (Ofcom) under Section 8 of the Wireless Telegraphy Act 2006. The Act authorises the licensee to establish and use stations or install or use apparatus for wireless telegraphy, subject to certain terms, provisions and limitations. Fire and rescue services pay for a licence to use a set of frequencies in the Ultra High Frequency (UHF) 450-470MHz band.

For further information see: Wireless Telegraphy Act 2006
2.1 **General regulatory requirements**

- Equipment should only be programmed with the licensed channels available for voice and interoperability.
- Any equipment procured to provide voice communications using the UHF at-incident channels must be capable of transmitting and receiving on any frequency in the 450-470MHz band, and capable of transmitting and receiving channels with a bandwidth of 12.5 and 25 kHz.
- Mobile base stations are permitted; the aerial height of UHF mobile base stations must not be such that they could cause interference beyond the fireground.
- Fixed base stations may be allowed; where agreed the frequencies and other technical details must be recorded.
- Voice channels can be used by non-local authority fire and rescue services, subject to certain terms and conditions.

An example Ofcom licence can be found in Appendix B.

A copy of the Wireless Telegraphy General Licence Conditions booklet can be seen on the Ofcom website: General Licence Conditions Booklet.

2.2 **VHF fireground radio channels**

VHF channels in the 80MHz band are no longer licensed to fire and rescue services for fireground use; consequently, using such channels is illegal. Fire and rescue services should disregard any previously published guidance relating to fireground VHF channels.

2.3 **Ofcom**

Ofcom is the UK communications regulator. Ofcom regulates TV, radio and video-on-demand sectors, fixed-line telecoms, mobile phones and postal services, plus the airwaves over which wireless devices operate. Ofcom operates under a number of Acts of Parliament, particularly the Communications Act 2003 and the Wireless Telegraphy Act 2006. It also has powers to enforce competition law alongside the Competition and Markets Authority.

For further information see: Ofcom.org.uk

2.4 **Public Safety Spectrum Policy Group (PSSPG)**

The Public Safety Spectrum Policy Group (PSSPG) is a standing government inter-departmental committee on emergency and public safety spectrum matters. It reports to the UK Spectrum Strategy Committee. The PSSPG comprises representatives from Ofcom, government departments and devolved administrations. Other relevant organisations are invited to attend as required.

UK fire and rescue services are represented by the Home Office for England and Wales, Scottish Government and Police Service Northern Ireland (PSNI) for their respective nations.
For further information see: Public Safety Spectrum Policy Group: Terms of reference

2.5 Licence fees

Fire and rescue services pay a fee to Ofcom to use licensed frequencies. For further information on licensing fees contact Ofcom.

Fire and rescue services requiring channels or frequencies in addition to those licensed for fireground voice communications should contact Ofcom. Further information on the fees for area-defined and technically-assigned licences can be found on the Ofcom website: Business Radio Licences

2.6 Channel sharing

Subject to the local chief fire officer’s approval, non-local authority fire services are permitted to use ‘at incident’ channels to allow tactical interoperability at incidents and for training. The chief fire officer must be satisfied that radio interoperability will improve operational effectiveness or personnel safety at incidents and that adequate arrangements exist to prevent the misuse of radio channels. Any use is restricted to incidents involving local authority fire and rescue services and is restricted to the permitted user, who must comply with the terms of the licence. Such organisations include:

- Defence Fire Risk Management Organisation
- Airport fire services
- Works fire services

3 European Telecommunications Standards Institute (ETSI)

The European Telecommunications Standards Institute (ETSI) is one of a number of standards bodies that produce the standards applicable to information and communications technologies. Conforming to telecommunications standards ensures interoperability across different manufacturers’ products.

All equipment should comply with the relevant ETSI or approved specifications and the Radio Equipment Directive - 2014/53/EU and be appropriately CE marked.

Several different digital standards are available for conventional two-way radios and it is important to understand that these different technologies are not compatible with each other. The two main standards are Digital Mobile Radio (DMR) and Digital Private Mobile Radio (dPMR). Both are based on open digital radio standards produced by the European Telecommunication Standards Institute (ETSI).

For further information see: ETSI Standards: Digital Mobile Radio

For further information see: ETSI Standards: Private Mobile Radio
A number of other digital technologies are used by a small number of manufacturers, such as NXDN. NXDN is an open standard common air interface (CAI) technical protocol for mobile communications developed jointly by Icom Incorporated and Kenwood Corporation.

For further information see: NXDN Forum

4 Reporting interference

Interference can arise from a number of sources, not all of which can be controlled by regulation (atmospheric conditions, for example). Symptoms of interference can include reduced range, messages not being received, distortion, unwanted signals or noises (typically whistling, popping or buzzing). If detrimental interference arises, it is important to first establish that the source is not locally generated (e.g. faulty equipment) before reporting it to Ofcom.

For further information on reporting interference to Ofcom see Appendix C

5 Fireground radio frequencies

Eight frequencies are available in the 450-470Mhz UHF band for ‘at incident’ voice communications; four simplex and two duplex channels. A frequency is also allocated to BA telemetry. Each frequency is currently the centre of a 25 kHz band of the spectrum. See table below:

<table>
<thead>
<tr>
<th>Tx Frequency (Mhz)</th>
<th>Rx Frequency (Mhz)</th>
<th>Power (W)</th>
<th>Emissions</th>
<th>Band</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>457.0375</td>
<td>457.0375</td>
<td>5</td>
<td>16K0F3EJN</td>
<td>UHF2</td>
<td>At-incident channel</td>
</tr>
<tr>
<td>457.0875</td>
<td>462.5875</td>
<td>5</td>
<td>16K0F3EJN</td>
<td>UHF2</td>
<td>At-incident channel</td>
</tr>
<tr>
<td>457.4875</td>
<td>457.4875</td>
<td>5</td>
<td>16K0F3EJN</td>
<td>UHF2</td>
<td>At-incident channel</td>
</tr>
<tr>
<td>457.1875</td>
<td>457.1875</td>
<td>5</td>
<td>16K0F3EJN</td>
<td>UHF2</td>
<td>At-incident channel</td>
</tr>
<tr>
<td>457.1375</td>
<td>462.6375</td>
<td>5</td>
<td>16K0F3EJN</td>
<td>UHF2</td>
<td>At-incident channel</td>
</tr>
<tr>
<td>457.2375</td>
<td>457.2375</td>
<td>5</td>
<td>16K0F3EJN</td>
<td>UHF2</td>
<td>At-incident channel</td>
</tr>
<tr>
<td>469.9000</td>
<td>469.9000</td>
<td>1</td>
<td>25 kHz</td>
<td>UHF2</td>
<td>BA Telemetry</td>
</tr>
</tbody>
</table>

To allow for the possibility of services being rearranged in the future, any equipment procured must be capable of transmitting and receiving on any frequency in the 450-470MHz band, and capable of transmitting and receiving channels with a bandwidth of 12.5 and 25 kHz.
5.1 Analogue fireground radios channel plan

<table>
<thead>
<tr>
<th>Channel</th>
<th>Primary Use</th>
<th>Tx Frequency (Mhz)</th>
<th>Rx Frequency (Mhz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>General incident</td>
<td>457.0375</td>
<td>457.0375</td>
</tr>
<tr>
<td>2</td>
<td>UHF – VHF relay</td>
<td>462.5875</td>
<td>457.0875</td>
</tr>
<tr>
<td>3</td>
<td>Breathing apparatus</td>
<td>457.4875</td>
<td>457.4875</td>
</tr>
<tr>
<td>4</td>
<td>Command support</td>
<td>457.1875</td>
<td>457.1875</td>
</tr>
<tr>
<td>5</td>
<td>Mobile or licensed fixed base stations</td>
<td>462.6375</td>
<td>457.1375</td>
</tr>
<tr>
<td>6</td>
<td>Breathing apparatus</td>
<td>457.2375</td>
<td>457.2375</td>
</tr>
</tbody>
</table>

5.2 Digital fireground radios channel plan

[Insert digital fireground radio channel plan once agreed between UK FRS and Ofcom]

6 Fireground considerations

Incident commanders should ensure that an effective telecommunication strategy is in place at incidents and communicate the use of fireground radio channels to all personnel. The risk of interference from nearby fire service incidents, analogue / digital radios and other users of the frequency spectrum should be managed to minimise risk of telecommunication problems affecting safety.

For further information see National Operational Guidance: Incident command - Have a communication strategy

7 Power output

The current licensing condition from Ofcom for DMR is five Watts of radiated power for handheld devices. Radio coverage can generally be improved by increasing radiated power, but this affects battery life.

Radio waves spread from an antenna horizontally and in a straight line, reducing in intensity by a factor of four each time the distance doubles; this is known as free space path loss. Obstructions such as hills, trees and buildings will affect the radio waves, weakening the signal.

The relationship between power output and radio propagation is complex and services should seek specialist technical advice on the subject.

8 Analogue and digital radios

Fireground radios for voice communications were originally operated using analogue radio technology. From 1993, fire and rescue services have operated handheld fireground radios according to an analogue channel plan agreed with the Home Office. The introduction of new
technology has led to fire and rescue services procuring and using digital mobile radio, though the analogue channel plan will continue to operate for services that choose not to adopt digital technology.

Analogue and digital radios operating on the same frequency within range of each other will cause interference; messages sent are unlikely to be received. To ensure cross-border interoperability it is essential that all personnel are aware that transmitting on an analogue radio using the same frequency as a digital radio is likely to generate issues for one or both services.

At incidents where both analogue and digital radio technologies are in use, an effective communications plan is essential and should be implemented at the earliest opportunity. It should clearly define the channels nominated, including whether they are analogue or digital.

9 **Fixed site and portable repeaters**

It may be impossible to use radios in Simplex mode (direct radio-to-radio) to cover an entire incident ground – the signal coverage may weaken because of the distance and the number of obstruction between radios. Repeaters, also called ‘talk-through base stations’, can be used to extend the range of handsets; they act as a ‘middle agent’ to rebroadcast radio messages.

In simplex mode, radios transmit and receive on the same frequency. When radios use a repeater to communicate, they operate in half-duplex mode. In half-duplex mode, the radios transmit and receive using different frequencies, although this is invisible to the user.

![Radios operating in Simplex mode (direct radio to radio)](image)

![Repeaters](image)
Radios operating in in Half Duplex mode (via a repeater)

For optimum coverage, repeaters are usually positioned in a central position between the radio users. Radios must be within the coverage range to access a repeater. If two radios have selected a half-duplex channel and no repeater is available, they will not be able to communicate, no matter how close they are.

Depending on the model, repeaters may be operated in analogue or DMR mode; the radios accessing the repeater must be using the same mode.

Repeaters may be permanently installed in fixed locations, such as shopping centres, tunnels and hospitals. Fixed repeaters give fire and rescue services the benefit of knowing the coverage they provide before they need to be used. Some repeater manufactures have designed portable repeaters that are battery powered and easy to deploy. These portable repeaters can be deployed quickly and easily in areas that have no power sources. Fixed repeaters will usually give better coverage through better planning and installation.

Some DMR manufactures produce repeaters that can be connected together over an IT network to allow wide-area radio coverage. In this design, the radios will choose the closest/best repeaters to communicate, and the messages are relayed across the IT networks to be rebroadcast via the other connected repeaters. Not all radios have this capability, and a great deal of planning is required.

10 ATEX radios

Two European Union directives relate to using equipment in potentially explosive atmospheres – the ATEX Manufacturers Directive 94/9/EC and the ATEX User Directive 1999/92/EC. These directives have been adopted into law in each of the member states; in the UK that is by Statutory Instrument 1996 No. 192, The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 1996 and Statutory Instrument 2002 No. 2776 The Dangerous Substances and Explosive Atmospheres Regulations 2002 respectively. From 1 July 2003, all products placed on the market or put into service for use in potentially explosive atmospheres within the European Union must comply with the ATEX Manufacturers' Directive.

For further information see: [HSE - The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)]

Previously published national fire and rescue service guidance on UHF handheld radios intended for use with breathing apparatus suggested they should be explosion-protected and so certified by an approved certification body for use in ‘zone 1’ with gas group IIC and a minimum temperature requirement of T4. These radios will be marked ‘EEx ib IIC T4’ (or T5 or T6). This guidance is currently under review, until such time as the guidance is revised services should consider the following extant guidance in relation to ATEX radios.

[Dear Chief Officer Letter 8*/1995, 1. A Radio equipment for use with breathing apparatus]
11 Factors to be considered during radio procurement

Fire and rescue services should consider compatibility issues when procuring digital radio equipment, including repeaters and vehicle mounted devices. They should also ensure that any standard or specification used by the manufacturer is fully understood and tested. A 2017 survey identified that all fire and rescue services currently operating digital radios have adopted the DMR Tier II standard.

For more information on Digital Mobile Radio (DMR) Tier II see Appendix A

Fire and rescue services need to consider the benefit of retaining the intraoperability provided by the existing analogue fireground radio channels when migrating to digital fireground radios. It is important that the following steps are considered where practical:

- Procure digital radios that are capable of operating in both analogue and digital modes.
- Ensure that at least one channel can be configured as an analogue interoperability channel, to enable fireground voice communications with fire and rescue services that have analogue-only radios.
- Consider any neighbouring fire and rescue service’s existing fireground radio configurations.
- Clearly identify the most suitable analogue fall-back channel.
- Ensure that the radio code plug is compatible with neighbouring services already using DMR.

The Fire Service Consortium has a framework agreement for purchasing fireground radios. See The consortium: Fire and rescue
# 12 Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Acronym</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code plug</td>
<td>S</td>
<td>Software programme that contains the operating frequencies and other parameters that define a radio's operating and control mechanisms.</td>
</tr>
<tr>
<td>European Telecommunications Standards Institute</td>
<td>ETSI</td>
<td>Produces globally-applicable standards for information and communications technologies (ICT), including fixed, mobile, radio, converged, broadcast and Internet technologies.</td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td>Number of waves that pass a fixed point in unit time; also, the number of cycles or vibrations a body in periodic motion undergoes during one unit of time. Represented as a numerical value.</td>
</tr>
<tr>
<td>Ofcom</td>
<td></td>
<td>The UK’s communications regulator</td>
</tr>
<tr>
<td>Propagation</td>
<td></td>
<td>Transmission of motion, light, sound, etc. in a particular direction or through a medium.</td>
</tr>
<tr>
<td>Public Safety Spectrum Policy Group</td>
<td>PSSPG</td>
<td>A standing government inter-departmental committee on emergency and public safety spectrum matters.</td>
</tr>
<tr>
<td>Spectrum</td>
<td></td>
<td>A collective term referring to the entire range and scope of frequencies of electromagnetic radiation and their respective associated photon wavelengths</td>
</tr>
</tbody>
</table>
## Bibliography

<table>
<thead>
<tr>
<th>Publisher</th>
<th>Document</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home Office</td>
<td>Dear Chief Officer Letter 7/1990</td>
<td>1990</td>
</tr>
<tr>
<td>Home Office</td>
<td>Dear Chief Officer Letter 8/1995</td>
<td>1995</td>
</tr>
<tr>
<td>Home Office</td>
<td>Fire Service Circular 15/1999, Spectrum pricing – Brigade radio licence fees</td>
<td>1999</td>
</tr>
<tr>
<td>HMFSI</td>
<td>Fire service Manual, Volume 1, Communications and Mobilising</td>
<td>1998</td>
</tr>
<tr>
<td>CFOA</td>
<td>Circular 2011-041, Ofcom Spectrum Audit</td>
<td>2011</td>
</tr>
<tr>
<td>CLG</td>
<td>FRS Radio Communications Guidance Note 8, Incident Channels (unpublished)</td>
<td>2012</td>
</tr>
<tr>
<td>CFOA</td>
<td>Circular 2014-01, Radio Communications - Reporting Interference</td>
<td>2014</td>
</tr>
<tr>
<td>CFOA</td>
<td>Circular 2015-09, Considerations when procuring digital fire-ground radios</td>
<td>2015</td>
</tr>
<tr>
<td>CFOA</td>
<td>Circular 2016-11, Digital fire-ground radio programming</td>
<td>2016</td>
</tr>
</tbody>
</table>
14 Appendix A - Digital Mobile Radio (DMR) Standards

Digital Mobile Radio (DMR) is a digital radio standard specified for business mobile radio users, developed by ETSI and first ratified in 2005.

The standards that define DMR consist of four documents covering DMR Tier I, II and III. These can be downloaded free of charge from the ETSI website. Tier II is used for fire ground communications. Tier I is designed for unlicensed radio systems and Tier III is based around digital trunked radio.

- General System Design TR 102 398
- Part 1: DMR Air Interface (AI) protocol - TS 102 361-1
- Part 2: DMR voice and generic services - TS 102 361-2
- Part 3: DMR data protocol - TS 102 361-3
- Part 4: DMR trunking protocol - TS 102 361-4

Tier II covers licensed conventional radio systems, mobile phones and hand portable radios operating in PMR frequency bands from 66-960MHz. The standard is targeted at users who need spectral efficiency, advanced voice features and integrated IP data services in licensed bands for high-power communications. ETSI DMR Tier II specifies two-slot TDMA in 12.5 kHz channels.

The DMR standard tiers (Tier I, Tier II and Tier III) are all incompatible. Tier II is the most suitable for fireground communications. Tier I is designed for unlicensed radio systems and Tier III is based around digital trunked radio.

As well as ensuring that the correct digital standard is being used, a number of other parameters need to be correct to provide compatibility on a given channel (frequency), including colour code, time slot, talk-group ID and encryption, though encryption is prohibited by regulatory requirements.

Digital fireground radios are configured by software in the radio, referred to as a code plug. The overarching procurement principle for fire and rescue services is to maintain interoperability with all neighbouring fire and rescue services, wherever possible.

Transmissions are in clear speech (i.e. not encrypted).

Fire and rescue services should consider the following when developing their radio specification for procuring DMR (Tier II) fireground radios:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Based around current allocation for fireground radios.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital colour code</td>
<td>There are 16 digital colour codes available. The code is used to allow different systems or organisations to ‘share’ a frequency</td>
</tr>
</tbody>
</table>
without hearing each other. Only one system can use the frequency time slot at any given time.

<table>
<thead>
<tr>
<th>Group ID</th>
<th>A group ID allows multiple talk groups to share the same colour code. Only one talk group can use the colour code/frequency time slot at a time.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot number</td>
<td>DMR allows a 12.5 kHz channel to be sliced into two time slots. Users on time slot one and time slot two can use the frequency simultaneously, effectively creating two channels per 12.5 kHz assignment. N.B. In Simplex mode, only time slot 1 should be used.</td>
</tr>
</tbody>
</table>

### 14.1 The DMR Association

DMR Association members are companies, organisations and individuals who use or build DMR products or those who support the DMR standard in other ways. The DMR Association has a number of members classed as ‘category one’. These manufacturers have signed a memorandum of understanding (MoU) to ensure that their products use mandatory features of the ETSI DMR standard to provide interoperability. Manufacturers may also choose a number of optional features.

Although the ETSI DMR standard does not specify the use of a particular vocoder, DMR Association members have agreed to use the Advanced Multi-Band Excitation (AMBE+2) half-rate vocoder to ensure compatibility between equipment.

For further information see: [Digital Mobile Radio Association](#)
15 Appendix B – Example Ofcom Licence

Business Radio (Police and Fire) - LICENCE

Date:
Licensing Unit: Ofcom Licensing Centre
Telephone: 020 7981 3131
0300 123 1000
Fax: 020 7981 3235
E-Mail: licensingcentre@ofcom.org.uk
Customer Ref No:

Following your recent application for a Business Radio (Police and Fire) licence, please find enclosed your licence document which contains the terms and conditions governing the legal operation of your system. Please check the document carefully to ensure the licence meets your requirements. If you consider that it does not, you should contact Ofcom within one calendar month of the date of this letter at the address shown above.

At a later date, if you wish to make any changes to your installation, you can apply to do so using an amendment form available from the Ofcom website (www.ofcom.org.uk). However, any changes to your radio system must not be carried out until you have received authorisation from Ofcom.

Similarly, if you make changes to the accounts address or any other contact address, please inform Ofcom immediately so that our records can be updated. Please always quote your Customer Account Number/Licence Number when contacting us.

Your licence is an important document. Please keep it - and any subsequent documents - in a safe place for future reference.

Ofcom’s preferred method of payment is by direct debit and a direct debit mandate is available from the Ofcom website at <http://licensing.ofcom.org.uk/binaries/spectrum/business-radio/forms/dd.pdf> should you choose to pay by this method.

Yours faithfully,

Andrew Jacks
Wireless Telegraphy Act 2006

**Business Radio (Police and Fire)**

<table>
<thead>
<tr>
<th>Sector/class/product</th>
<th>Business Radio / Externally Assigned - Type 3 / 406010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Licence number</td>
<td></td>
</tr>
<tr>
<td>Licensee</td>
<td></td>
</tr>
<tr>
<td>Licensee address</td>
<td></td>
</tr>
<tr>
<td>Licence first issue date</td>
<td></td>
</tr>
<tr>
<td>Licence version date</td>
<td></td>
</tr>
<tr>
<td>Payment interval</td>
<td></td>
</tr>
</tbody>
</table>

1. This Licence is issued by the Office of Communications (“Ofcom”) on and replaces any previous authority granted in respect of the service subject to this Licence by Ofcom or by the Secretary of State.

2. This Licence authorises (“the Licensee”) to establish, install and/or use radio transmitting and/or receiving stations and/or radio apparatus as described in the schedule(s) (hereinafter together called “the Radio Equipment”) subject to the terms set out below and subject to the terms of the General Licence Conditions booklet. (Version OF195.1).

**ISSUED BY OFCOM**
BUSINESS RADIO (POLICE AND FIRE)

SCHEDULE 1 TO LICENCE NUMBER

DESCRIPTION OF RADIO EQUIPMENT COVERED BY THIS LICENCE

This schedule forms part of Licence , issued to , and describes the Radio Equipment covered by the Licence and the purpose for which the Radio Equipment may be used.

1. Description of the Radio Equipment licensed

The Licensee may establish the fixed sending and receiving stations (the "Fixed Stations") and mobile sending and receiving stations (the "Mobile Stations") specified in the Schedule(s) to this Licence.

2. Purpose of the Radio Equipment

The Licensee shall use the Fixed Stations and Mobile Stations to send and receive wireless telegraphy for the purposes of activities related to public safety.

3. Limitations on Use

The Licensee shall:

(a) use the Fixed Stations and the Mobile Stations only for the purpose specified in clause 2;

(b) operate the Fixed Stations and the Mobile Stations at or with:

   (i) the call sign (if any) specified in the Schedule(s);
   (ii) the location (if any) specified in the Schedule(s);
   (iii) the frequency and maximum frequency tolerance specified in the Schedule(s);
   (iv) the single or combined classes of emission specified in the Schedule(s);
   (v) a power not exceeding that specified in the Schedule(s); and
   (vi) the antenna characteristics (if any) specified in the Schedule(s);

(c) comply with each restriction on use (if any) specified in the Schedule(s).

4. Apparatus

The Licensee shall ensure that:

(a) notwithstanding any other term of the Licence, the apparatus comprised in the Fixed Stations and the Mobile Stations (the "Apparatus") is designed and constructed, and
maintained and used, so that its use does not cause any Undue Interference or Undue Interference to any wireless telegraphy;

(b) the apparatus is type approved in accordance with the appropriate published technical performance standards authorised at the date of installation of the Radio Equipment, subject to any modifications authorised by Ofcom, (as the case may be), for the purpose of use specified in the Schedule(s); and

(c) the Apparatus complies with (and is maintained in accordance with) the performance specification (if any) specified in the Schedule(s) whether or not the specification relates to the frequency on which the Apparatus is operated.

5.  **Special conditions relating to the activities of the Licensee**

   (a) The Licensee shall not permit or suffer any person to use the Apparatus unless the person is:

      (i) under the control of the Licensee; and

      (ii) authorised by the Licensee to use the Apparatus.

   (b) Except in an emergency when no written authority is required, the Licensee may authorise a person or body (corporate or unincorporated) who or which is not under the control of the Licensee to use the Apparatus by providing written authority to that person or body.

   (c) The Licensee shall ensure that:

      (i) All persons or bodies using the Apparatus are made aware of the terms of the Licence; and

      (ii) all such persons or bodies comply with the terms of the Licence.

6.  **Other Requirements**

   The Licensee shall comply with the relevant statutes and statutory instructions made thereunder including (without limiting the generality of the foregoing) the Wireless Telegraphy Act 2006 “the Act”.

7.  **Notice of Variation or Revocation**

   Ofcom may exercise its power to vary or revoke the Licence by a written notice served on the Licensee or by a general notice applicable to holders of this class of Licence published by public broadcast or in the London, Edinburgh and Belfast Gazettes.

8.  **Inspection and Close Down**

   The Licensee shall:
(a) make available for inspection or testing any of the Fixed Stations or the Mobile Stations and the Licence at any and all reasonable times to a person authorised by Ofcom for the purpose of verifying compliance with the terms of the Licence.

When, in the opinion of Ofcom:

(i) the Licensee is in breach of the Licence; and

(ii) such breach justifies immediate restriction or close down

(b) the Licensee shall restrict the operation of, or close down and cease to operate any Fixed Station, Mobile Station or Apparatus forthwith in accordance with the demand of a person acting under the authority of Ofcom for the temporary period specified by that person.

9. **Period of Licence and Fees Due**

(a) Subject to the payment of the fee in the manner indicated, the Licence shall continue in force from year to year unless revoked by Ofcom.

(b) The Licensee shall pay to Ofcom, before the anniversary date of the Date of Issue in each year, the fee prescribed by the Regulations for the time being in force under section 12 of the Act.

(c) If the Licensee does not pay the fee in the manner described, then the Licence shall expire at the end of the day before the relevant anniversary date of the Date of Issue.

(d) The Licensee shall surrender the Licence to Ofcom forthwith upon its expiry or revocation,

(e) Any licence, however described, which Ofcom or the Secretary of State has previously granted to the Licensee under the Act in respect of any of the Fixed Stations or the Mobile Stations is revoked.

10. **Interpretation**

In this Licence:

(a) words and expressions shall have the same meaning as they have in the Act and, in particular, the words "station" and "apparatus" shall have the meanings ascribed to the expressions "station for wireless telegraphy" and "apparatus for wireless telegraphy", respectively, in section 115 of the Act;

(b) words in the singular shall include the plural and words in the plural shall include the singular;

(c) "Undue Interference" shall mean interference which endangers the functioning of a radio navigation service or of other safety services or seriously degrades, obstructs
or repeatedly interrupts a radio communication service operating in accordance with the relevant governmental requirements;

(d) "Undue Interference" shall mean interference which goes beyond that which is appropriate or warranted in all of the circumstances;

(e) the headings are for ease of reference only and shall not affect the interpretation of the Licence;

(f) any reference to a statute or performance specification shall include a reference to that statute and any statutory instrument made under that statute or that specification as any of them may be amended from time to time and to any other statute, statutory instrument or specification that has the effect of adding to, replacing or superseding the statute, statutory instrument or specification (as the case may be) whether before or after the Date of Issue; and

(g) the Schedule(s) is incorporated in, and forms a part of, the Licence.

**Note**

In the event of a demand to close down or restrict the operation of any Fixed Station, Mobile Station or Apparatus under clause 8 of the Licence, the Licensee must close down or restrict the operation of the Fixed Station, Mobile Station or Apparatus immediately. He will be given oral reasons for the demand and will have an opportunity to provide reasons why the demand should not be met. If the demand is affirmed then it will be confirmed in writing to the Licensee as soon as practicable. If the Licensee does not comply with the demand or if the breach resulting in the demand is not rectified within a reasonable period of time to the satisfaction of Ofcom, then revocation or variation of Licence procedures may be commenced under schedule 1 paragraph 6 of the Act or a prosecution may be initiated (depending on the circumstances of each case).
16 Appendix C – Reporting interference

Spectrum Management Centre Services available in response to Emergency Services Interference investigation requests

Requests for interference investigation to Emergency Services should be directed to Ofcom’s Spectrum Management Centre (SMC) on 01462 428528 or via email Usmc@ofcom.org.uk.

The SMC provides triage of incoming requests on a 24/7 basis for interference resolution relating to radio communications services where Safety of Life or Critical Service is at risk.

The Duty Engineering Officer (DEO) on shift requires the following information from the reporting officer:

- Who they are, and their contact details?
- The frequency(s) and channel(s) affected;
- When did the interference first start and how long it has been occurring;
- The area/postcode of the area/users affected by the interference;
- The base station site location (NGR or Postcode will suffice) affected;
- The nature and severity of the interference – impact on service provided;
- Description of the interference identified i.e. warbling or static noise;
- If the report of interference is from engineering staff the following is required:
  - noise or modulation type;
  - if narrow or wideband;
  - spectrum analyser screenshots if available;
  - spectrum plots if available.
- Are there any site access restrictions that our engineer should be aware of.

Based on the above information, the DEO will be able to assess, in agreement with the person making the report, what priority of response will be given to the interference investigation. The priority of the response will be based on the information provided in Table 1 Case Impact Assessment v Priority Guidance and Table 2 External Key targets (below).
### Table 1 Case Impact Assessment v Priority Guidance

<table>
<thead>
<tr>
<th>Impact on consumer/stakeholder</th>
<th>Severe</th>
<th>Moderate</th>
<th>Slight (nuisance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No immediate alternative form of communication is available. Safety of Life is at risk.</td>
<td>Priority 1</td>
<td>Priority 2</td>
<td>Priority 3</td>
</tr>
<tr>
<td>No immediate alternative form of communication is available. Safety of Life is not immediately at risk. Efficient Emergency/Public Services are disrupted or jeopardised. Significant numbers of consumers are severely affected.</td>
<td>Priority 2</td>
<td>Priority 3</td>
<td>Priority 4</td>
</tr>
<tr>
<td>An alternative form of communication is available to Emergency/Public services. No alternative form of communications is available to Business/Services critical operations. Significant numbers of consumers are affected</td>
<td>Priority 3</td>
<td>Priority 3</td>
<td>Priority 4</td>
</tr>
</tbody>
</table>

### Table 2 External Key targets

<table>
<thead>
<tr>
<th>Priority</th>
<th>Time to 1st visit</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority 1</td>
<td>8 hours</td>
<td>2 calendar days</td>
</tr>
<tr>
<td>Priority 2</td>
<td><strong>18 hours</strong></td>
<td>3 calendar days</td>
</tr>
<tr>
<td>Priority 3</td>
<td>2 working days</td>
<td>6 working days</td>
</tr>
</tbody>
</table>

Issued: 30 October 2013