
Improving access to 5.8 GHz spectrum for broadband fixed wireless access

STATEMENT:

Publication Date: 29 November 2017

About this document

This document sets out our decision to remove a restriction on Broadband Fixed Wireless Access (BFWA) use in part of the 5.8 GHz band.

BFWA uses radio signals rather than fixed lines to deliver broadband internet access to consumers and businesses, particularly those in difficult to reach areas.

This decision will enable BFWA to use more channels in the 5.8 GHz band and provide the potential for an increase in the capacity and speed of BFWA services.

Contents

Section

| | |
|--|---|
| 1. Executive summary | 1 |
| 2. Introduction | 2 |
| 3. Decision to extend BFWA use in the 5.8 GHz band | 4 |

Annex

| | |
|--|----|
| A1. 5.8 GHz Fixed Wireless Access licence template | 12 |
|--|----|

1. Executive summary

- 1.1 On 27 July 2017, we consulted on a proposal to remove a restriction on broadband fixed wireless access (BFWA) use in part of the 5725-5850 MHz band (the '5.8 GHz' band).
- 1.2 Broadband fixed wireless access (BFWA) is widely used to deliver broadband to consumers and businesses, particularly those in difficult to reach areas. There are around twelve thousand terminals currently registered under Ofcom's light licensing scheme within the 5.8 GHz band.
- 1.3 Currently, BFWA is restricted from using the frequencies between 5795-5815 MHz to protect road tolling systems. However, road tolling systems make light use of these frequencies in the UK.
- 1.4 In our July consultation, we proposed to remove this restriction and allow BFWA to use these frequencies. We explained that this would enable additional, wider, channels for BFWA use, thereby increasing the capacity and/or speed that could be achieved by broadband services in this band.
- 1.5 We received 21 responses to our consultation. Most respondents supported our proposal but a number of respondents raised concerns about impacts on road tolling and amateur use in the 5.8 GHz band.
- 1.6 We have carefully reviewed these responses but do not consider that these have identified new information or substantive issues which give us cause to revise our proposal. We have therefore decided to proceed to remove the restriction for BFWA use in 5795-5815 MHz.

2. Introduction

- 2.1 On 27 July 2017, we published a consultation (the “July 2017 consultation”) on improving consumer access to the 5.8 GHz band for broadband fixed wireless access (BFWA) use.
- 2.2 Currently, BFWA users are licensed to operate in the 5725-5850 MHz band (the ‘5.8 GHz band’) except in a frequency ‘notch’ between 5795 and 5815 MHz. This notch has historically been used to protect road tolling systems.
- 2.3 In the July 2017 consultation we noted that road tolling has for some time made light use of these frequencies in the UK and suggested that the notch was no longer a proportionate approach to managing coexistence in these frequencies. We explained that removing the notch would enable the use of a greater number of higher capacity channels for BFWA use within the 5.8 GHz band and that this should enable increased broadband speeds for consumers and businesses that rely on BFWA, without causing disruption to existing road tolling.
- 2.4 In this Statement we summarise and respond to issues raised by respondents to the consultation, and set out our decision on the removal of the notch.

Legal framework

- 2.5 As explained in our consultation, Ofcom’s responsibilities for spectrum management are set out primarily in two Acts of Parliament which confer on Ofcom specific duties and powers in respect of spectrum (and the other sectors we regulate): the Communications Act 2003 (the ‘2003 Act’) and the Wireless Telegraphy Act 2006 (the ‘WT Act’).
- 2.6 Our principal duties under the 2003 Act are to further the interests of citizens and consumers, where appropriate by promoting competition. In doing so, we are also required (among other things) to secure the optimal use of spectrum.
- 2.7 In carrying out our spectrum functions, we have a duty under section 3 of the WT Act to have regard in particular to: (i) the extent to which the spectrum is available for use or further use for wireless telegraphy, (ii) the demand for use of that spectrum for wireless telegraphy and (iii) the demand that is likely to arise in future for the use of that spectrum for wireless telegraphy. We also have a duty to have regard, in particular, to the desirability of promoting: (i) the efficient management and use of the spectrum for wireless telegraphy, (ii) the economic and other benefits that may arise from the use of wireless telegraphy, (iii) the development of innovative services and (iv) competition in the provision of electronic communications services.
- 2.8 In line with these duties, our July 2017 consultation and this Statement set out our assessment of the current and likely future use of the notch frequencies and why we consider that removing the notch should result in more efficient use of the spectrum.

Impact assessment and equality impact assessment

- 2.9 Impact assessments provide a valuable way of assessing different options for regulation and showing why the preferred option was chosen. They form part of best practice policy-making. This is reflected in section 7 of the Communications Act, which means that generally Ofcom has to carry out impact assessments where its proposals would be likely to have a significant effect on businesses or the general public, or when there is a major change in Ofcom's activities. Our assessment of the impact of removing the road tolling notch was set out in our July 2017 consultation. This Statement explains our decision on this proposal, having considered all stakeholder representations.
- 2.10 Ofcom is separately required by statute to assess the potential impact of all our functions, policies, projects and practices on equality. Equality Impact Assessments (EIAs) also assist us in making sure that we are meeting our principal duty of furthering the interests of citizens and consumers regardless of their background or identity. In our July 2017 consultation, we noted that we had not identified any equality impacts in relation to our proposal. Additionally, respondents to the consultation did not highlight any equality impacts in their responses.

3. Decision to extend BFWA use in the 5.8 GHz band

- 3.1 In this section we discuss the responses we received to our July 2017 consultation and set out our decision to remove the restriction on broadband fixed wireless access (BFWA) use between 5795 and 5815 MHz.

Consultation responses

- 3.2 We received 21 responses to the consultation which closed on 21 September 2017, one of which was confidential. The non-confidential responses are published on our website¹. We received thirteen responses from stakeholders with interests in BFWA use, supporting our proposals. Two respondents from the Wi-Fi sector also supported our proposal to remove the notch.
- 3.3 Six respondents disagreed with our proposals, two noting concerns about impacts on road tolling use of these frequencies and four respondents from the amateur sector noting concerns about impacts on amateur use in the 5.8 GHz band.
- 3.4 We discuss the responses in more detail below and provide our response to specific comments and concerns raised by respondents.

Comments in relation to impacts on road tolling

- 3.5 ITS United Kingdom (ITS UK) and a confidential respondent did not agree with our proposal to remove the notch, arguing that this would have negative impacts on road tolling. We discuss the main points made with regard to road tolling below.

Studies on sharing between road tolling and BFWA

- 3.6 In our consultation we cited ECC Recommendation (06)04 which references sharing studies presented in ECC Report 68. We noted that the studies indicated that interference from TTT² to BFWA was more likely than vice versa, and that the risk of interference from BFWA to TTT was low.
- 3.7 ITS UK said that it was unclear how the results of the technical work quoted in Annex 4 of ECC Recommendation (06)04 were derived and that it was difficult to accept our view that TTT was more likely to interfere with BFWA than vice versa. It suggested that the studies probably neglected two important points: (a) that TTT beacons use a shaped beam aimed at the ground in front of a gantry, which would minimise interference in other directions, whereas BFWA uses omnidirectional antennae to cover as much area and as many users as possible; (b) that TTT is more sensitive to interference because of the short time window to

¹ <https://www.ofcom.org.uk/consultations-and-statements/category-2/improving-access-5.8-ghz-broadband-fixed-wireless-access>

² Transport and Traffic Telematics

complete road tolling transactions and that any interference could create a decrease in the reliable operation of the TTT system, resulting in more barrier incidents including collision. It said that, in contrast, the transaction time for BFWA would not be critical and there would be time for repeat transmissions and error corrections over a period of many seconds if not minutes.

Ofcom's response

- 3.8 We have reviewed the sharing studies and confirm that the studies presented in ECC Report 68 do take typical TTT and BFWA geometries into account; the scenario considered in Report 68 is between a road tolling transmitter using a directional antenna with downtilt and a P-MP BFWA antenna system using a directional, sector antenna which might be typical of rural broadband scenarios or urban CCTV scenarios. We also note that antenna directionality works both ways. For example, the directional antenna used for TTT not only focuses the signal on the tolling plaza but also acts to reject interference incident from locations outside of the tolling area. Therefore the conclusions of the sharing study should hold true regardless of the directionality of the antennae.
- 3.9 With regard to the time window for transactions, we note that ECC Report 68 considers both systems to be constantly transmitting which is a reasonable worst case assumption. TTT systems constantly poll for vehicles in the tolling area and a BFWA link might be constantly busy during the busy hour when it will be experiencing heavy data traffic. Additionally, while we note the concerns raised about sensitivity of TTT to interference due to the short transaction time, we do not agree with the argument that the transaction time for BFWA is less critical due to there being time for repeat transmissions over many seconds or minutes. While this might be true for coexistence between TTT and mobile systems, it does not hold true for BFWA because it is a fixed system, and TTT would be a persistent source of interference to BFWA. Consequently, a BFWA operator installing a BFWA terminal anywhere in range of a TTT station would need to avoid co-channel operation with TTT to avoid persistent interference.
- 3.10 We therefore continue to consider that the risk of interference from BFWA use to road tolling is low.

Future use of the 5.8 GHz band for road tolling

- 3.11 ITS UK said that there were immediate plans for additional road tolling as well as likely long-term policy changes related to road user charging which might increase the use of the road tolling notch frequencies. For the immediate term, it pointed to a number of potential road tolling schemes in the London Mayor's Draft Transport Strategy, noting that Silvertown Tunnel was likely to use 5.8 GHz alongside ANPR³ and that this could not be ruled out in advance for other schemes. For the longer term, it noted policies around Clean Air Zones, post-Brexit customs arrangements, the emerging area of Connected Vehicles, and the EC decision to implement Smart Tachograph and Weight & Dimension. It also said

³ Automatic Number Plate Recognition

there was an increasingly widely held belief that with falling revenues from fuel duty and vehicle excise duty, a future UK Government would introduce road user charging on a very wide scale. A confidential respondent said it was aware of a number of factors and initiatives that may increase the level of usage in the future, including new infrastructure such as the Lower Thames Crossing.

Ofcom's response

- 3.12 We have carefully reviewed the information provided by respondents. We note that respondents did not point to any definite plans for future use of the 5.8 GHz notch frequencies by road tolling.
- 3.13 Additionally, we do not consider that the proposal to remove the restriction on BFWA use will prevent new road tolling schemes from using the notch frequencies. As noted above and in our consultation, the sharing studies presented in ECC Report 68 indicate that sharing between TTT and BFWA is feasible, and the notch frequencies will continue to be available as an option for new TTT use.
- 3.14 We are aware that there are plans in Europe to additionally mandate the use of 5795-5815 MHz for smart tachographs, which are currently expected to be introduced in 2019. However, this is a new use of this spectrum that will need to coexist with existing users of the band, and there is no current indication that future harmonisation of this spectrum for smart tachographs would imply the need for restrictions on BFWA use.

Statutory instrument relating to road tolling

- 3.15 A confidential respondent said that any future electronic tolling scheme on the strategic road network should take into account the technical provision covered by SI 2007 No.58 The Road Tolling (Interoperability of Electronic Road User Charging and Road Tolling Systems) Regulations 2007 which it said limited the technologies that can be used and that the only short-range communication method listed in the SI is 5.8 GHz DSRC⁴.

Ofcom's response

- 3.16 We note that there are other technologies currently being used to implement road tolling including ANPR and RFID (radio-frequency identification). We also note that the removal of the notch does not prevent any future road tolling schemes from using the 5.8 GHz band on a licence exempt basis⁵. We therefore do not consider that this point impacts our proposal to remove the notch.

Comments in relation to impacts on amateur use

- 3.17 We received four responses from organisations and individuals with an interest in amateur use of the 5.8 GHz band: Radio Society of Great Britain (RSGB), UK Microwave Group, David Austen and an anonymous respondent. All amateur respondents were concerned with the

⁴ Dedicated Short Range Communications

⁵ The Wireless Telegraphy (Exemption and Amendment) Regulations 2010 authorises, on a licence exempt basis, the use of short-range devices which comply with UK Interface Requirement IR 2030. This includes TTT use in 5795-5815 MHz.

potential for BFWA use to interfere with amateur use at 5830-5850 MHz. They noted that, currently, BFWA channels overlap this band by 5 MHz but our proposal would mean that BFWA channels would fully overlap the band resulting in greater wide band noise or completely blocking the amateur use of these frequencies.

- 3.18 The respondents from this sector provided background information on the nature of the amateur use in the 5.8 GHz band. For example, the UK Microwave Group explained that, within the 5.8 GHz band, 5755-5765 MHz and 5830-5850 MHz are used for very weak signal communications and that this part of the spectrum is unique in exhibiting extremely low antenna (sky) noise, allowing the use of advanced weak signal (signal to noise limited) digital and analogue communications techniques for propagation mode scatter and space communications. David Austen said that there are many licensed amateurs in the UK using segments of the band for weak signal communications, including terrestrial, satellites and moon bounce.
- 3.19 The respondents also presented a number of arguments for not allowing BFWA use across the whole of the 5.8 GHz band:
- no compatibility studies have been carried out between BFWA operation and the amateur satellite service;
 - the proposal is inconsistent with the recent decision on Wi-Fi use, which has been limited to indoor operation at 200mW;
 - Ofcom highlights its duties relating to spectrum demand but there is no evidence of demand for BFWA use provided in the consultation;
 - the frequency range 5830-5850 MHz is globally allocated to the amateur-satellite service on a secondary basis in Article 5 of the ITU Radio Regulations (ITU-RR) whereas there is no allocation for the fixed service applicable to the UK;
 - a footnote in the European Table of Frequency Allocations calls on CEPT administrations to maintain amateur allocations “in such a way as to facilitate the reception of amateur emissions with minimal power flux densities”;
 - characteristics for 40 MHz BFWA channels are not included in the European ETSI harmonised standard EN 302 502 or the UK Interface Requirement.
- 3.20 The RSGB also made an alternative proposal for expanding the number of BFWA channels available while protecting amateur use with a new frequency notch at 5830-5850 MHz.
- 3.21 The RSGB and an anonymous respondent additionally noted that, in the case of interference from BFWA to amateur use, the source of interference may not be obvious to the amateur user and the BFWA operator may also be unaware of the amateur use. They asked Ofcom to consider implementing the following measures:
- to include a note on Ofcom’s BFWA webpage noting that amateur and amateur-satellite services also have legitimate access to certain parts of the band;
 - to provide public data on the locations of registered 5.8 GHz BFWA links;
- 3.22 The RSGB also requested that Ofcom liberalise the 5765-5820 MHz block for the amateur service.

Ofcom's response

- 3.23 We note the concerns raised by respondents with an interest in amateur use, and are grateful for the detailed responses provided. However, the current 5.8 GHz Fixed Wireless Access (FWA) licence already allows access to all of the frequencies available for amateur use in the band including the allocation at 5830-5850 MHz. While it is true that the BFWA channels shown in our consultation (e.g. in Figure 3.1) only show an overlap of 5 MHz with the 5830-5850 MHz frequencies, this channel arrangement was presented to illustrate our understanding of how BFWA licensees currently choose to use the band, and use of this channel arrangement is not a licence requirement. The alternative proposal from RSGB to block BFWA access to frequencies at 5830-5850 MHz would require us to vary existing 5.8 GHz FWA licences to remove access to these frequencies and this is outside of the scope of the consultation.
- 3.24 We recognise that the proposal to remove the notch could indirectly result in increased BFWA use in parts of the 5.8 GHz band which are currently not used as much due to current channeling arrangements adopted by licensees, including in part of the 5830-5850 MHz frequencies. However, as noted in two responses, the amateur operations have coexisted largely without problem with the current BFWA operations and ISM⁶ applications, including in the 5755-5765 MHz frequencies used by amateurs which overlap fully with the BFWA channel arrangements shown in our consultation. We therefore do not consider that our proposed approach will result in a high risk of harmful interference to amateur use and do not consider it is necessary to undertake further sharing studies between BFWA operation and the amateur satellite service.
- 3.25 In relation to Wi-Fi, we recognise that technical conditions for BFWA use in the 5.8 GHz band are different from those agreed for Wi-Fi. However this is because each use case is different. We consider technical conditions for each type of use on a case by case basis, taking into account the specific parameters of the use type and how it interacts with other existing uses of the band. We therefore do not agree that the technical conditions for BFWA use are inconsistent with the decisions on technical conditions for Wi-Fi.
- 3.26 With regard to demand, as noted in our consultation there are currently over 12,000 terminals registered for BFWA use in the 5.8 GHz band, with a steady increase in the number of terminals each year. This contrasts with the light use of the notch frequencies for TTT, which has seen little growth over a number of years. We also note that our statutory duties require us to secure optimal use of the spectrum and have regard to efficient use of the spectrum. As set out in our consultation and highlighted in some responses from BFWA operators, the current position of the notch within the 5.8 GHz band limits the size and number of channels for BFWA that can be accommodated within the band, thereby limiting the broadband speeds that can be delivered to consumers. We therefore consider that the proposal in our consultation is clearly in line with our statutory duties.

⁶ Industrial, scientific and medical

- 3.27 We note the point made by two respondents that the frequency range 5830-5850 MHz is globally allocated to the amateur-satellite service on a secondary basis in the ITU R Radio Regulations (ITU-RR) but that there is no allocation for the fixed service applicable to the UK. We agree that the ITU-RR does not reflect the current fixed service use of the band in the UK, but note that this is the case for the whole of the 5.8 GHz band and not just for the 5830-5850 MHz frequency range. Administrations are able to deviate from the ITU-RR main table of frequency allocations provided that services in neighbouring countries are not interfered with, and there are examples of where the UK has done this previously. As indicated in paragraph 1.9 of the UK Frequency Allocation Table, the document does not represent all uses of the spectrum that is authorised in the UK and is not legally binding. However, we note the comments made and, in order to provide more information on the use of the band, we plan to update the UK Frequency Allocation Table to reflect current usage of this band by BFWA.
- 3.28 We agree with RSGB that test methods and limits for 40 MHz channels are not currently included in the ETSI standard EN 302 502, which gives a presumption of conformity for BFWA equipment with the Radio Equipment Directive (RED). However, the requirement on manufacturers is to put equipment on the market which complies with the Essential Requirements of the RED. Compliance with standards is voluntary and is only one method of achieving compliance with the Directive. In the absence of a suitable harmonised standard manufacturers can demonstrate conformance directly with the Essential Requirements of the RED by submitting a technical file (as defined in the Directive) to a notified body who may issue a type examination certificate. Manufacturers are also free to develop a standard or revise the existing standard in ETSI to cover 40 MHz channels.
- 3.29 With regard to the provision of more information about BFWA and amateur use of the 5.8 GHz band, it is our policy to publish information about spectrum use except where an exemption or exceptions apply. In line with this, and as part of ongoing projects within Ofcom, we have published data on the locations of registered 5.8 GHz FWA terminals on the open data section of our website⁷. Additionally, we are currently reviewing information on our website related to the 5.8 GHz FWA licence and will consider what additional information about other band users can be included. However, opening additional frequencies for amateur use is outside of the scope of our consultation.

Other points raised in responses

- 3.30 Intel and the Wi-Fi Alliance supported our proposal to remove the road tolling notch but asked Ofcom to consider extending Wi-Fi operations in the 5.8 GHz band consistent with the proposal for BFWA.
- 3.31 The Wi-Fi Alliance additionally asked Ofcom to provide an update on the MOD use of radars in the 5.8 GHz band, while TxRx Communications Ltd asked Ofcom to review DFS⁸ requirements in the 5.8 GHz band.

⁷ <https://www.ofcom.org.uk/research-and-data/data/opendata>

⁸ Dynamic Frequency Selection

Ofcom's response

- 3.32 We published a Statement setting out our decision to make regulations that will allow Wi-Fi use in the 5.8 GHz band, including the technical conditions relating to this use, in July 2017⁹. The rationale for our decisions regarding the technical conditions for Wi-Fi is presented in that document.
- 3.33 The current DFS requirements relating to use of the 5.8 GHz band are set out in the relevant interface requirements on our website (IR 2030 for Wi-Fi and IR 2007 for BFWA). These requirements are out of scope of this document.

Conclusion and next steps

- 3.34 Having carefully reviewed responses to our consultation, we remain of the view that a notch for road tolling at 5795-5815 MHz is no longer a proportionate approach to managing coexistence in these frequencies.
- 3.35 While we note the concerns raised by respondents with an interest in amateur and road tolling use, we do not consider that the responses have identified new information or substantive issues which give us cause to revise our proposal to remove restrictions on BFWA use in the 5795-5815 MHz frequency range.
- 3.36 As noted above, we consider that the risk of interference from BFWA use to road tolling is low and new road tolling use in the 5.8 GHz band will continue to be possible. Additionally, our consultation did not propose any change to access of 5830-5850 MHz for either BFWA or amateur use and our view is that removal of the notch at 5795-5815 MHz will not have any material impact on amateur use.
- 3.37 Removing the notch and allowing BFWA licensees to additionally use this spectrum should enable BFWA to make more efficient use of the 5.8 GHz band and deliver faster broadband speeds to consumers and businesses.
- 3.38 We have therefore decided to proceed with our proposal to remove the restriction for BFWA use in 5795-5815 MHz.
- 3.39 We will implement this by:
- **removing the notch restriction from new 5.8 GHz Fixed Wireless Access licences**
With effect from the date of publication of this Statement, new 5.8 GHz Fixed Wireless Access licences issued will not include restrictions on use of the notch frequencies;
 - **commencing a licence variation process to propose to remove the notch from existing 5.8 GHz Fixed Wireless Access licences**
Following publication of this Statement, we plan to send a notice of proposed licence variation to all current 5.8 GHz FWA licensees, notifying them of our proposal to remove the notch from licences. Licensees will have one month (beginning with the day after the one on which the notification was given) to make representations about

⁹ https://www.ofcom.org.uk/__data/assets/pdf_file/0016/104362/decision-wireless-telegraphy-exemption-regulations.pdf

our proposed changes. Following this period, Ofcom will have one month to decide whether or not to vary licences in accordance with the proposal. A copy of the revised licence template is included at annex 1 of this document.

- **amending the Interface Requirement (IR 2007) to remove the notch for road tolling systems.**

IR 2007 sets out the technical requirements for use of the 5.8 GHz band by Fixed Broadband Systems and is referred to in licences. A draft revision to this document was notified to the EC on 22 August 2017 and the standstill period ended on 23 November 2017. We did not receive any comments from other administrations. Following the publication of this Statement, we will communicate with the EC to confirm that we intend to proceed with bringing the revised IR 2007 into use.

A1. 5.8 GHz Fixed Wireless Access licence template

A1.1 A sample copy of the revised licence template for the 5.8 GHz Fixed Wireless Access licence is presented in the following pages of this annex.

5.8 GHz Fixed Wireless Access

| | |
|--------------------------|--|
| Sector/class/product | Fixed Wireless Access / Light / 401510 |
| Licence number | [LICENCE NUMBER] |
| Licensee | [LICENSEE NAME] |
| Licensee address | [LICENSEE ADDRESS] |
| Licence first issue date | DD/MM/YYYY |
| Licence version date | DD/MM/YYYY |
| Payment interval | 1 year |

1. This Licence is issued by the Office of Communications ("Ofcom") on **[DATE]** 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 **[LICENSEE NAME]** ("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

5.8 GHz Fixed Wireless Access

SCHEDULE 1 TO LICENCE NUMBER [LICENCE NUMBER]

DESCRIPTION OF RADIO EQUIPMENT COVERED BY THIS LICENCE

This schedule forms part of Licence [LICENCE NUMBER], issued to [LICENSEE NAME], the Licensee on [DATE], 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

In this Licence, the Radio Equipment means registered Fixed Wireless Access sending and receiving station(s) ("terminals") for wireless telegraphy.

2. Purpose of the Radio Equipment

Subject to the administrative and technical requirements set out in this and the subsequent schedule(s) to this Licence, the Licensee and any person authorised by the licensee to use the terminals under authority of this Licence are hereby authorised to send and receive transmissions between terminals for Fixed Wireless Access purposes.

3. Conformity Assessment Requirements

The Radio Equipment covered by this Licence shall be subject to and comply with Interface Requirement IR2007 - Fixed Broadband Services operating in the frequency range 5725-5850 MHz band

4. Special conditions relating to the activities of the Licensee

The Licensee shall ensure that:

- (a) the Radio Equipment is only used for the purpose of Fixed Wireless Access; and
- (b) the location of each terminal forming part of the Radio Equipment is registered with Ofcom in accordance with Ofcom's registration procedures prior to installation and use.

5. Terminals

The Licensee shall ensure that terminals:

- (a) are fixed and only used at the registered location; and
- (b) are only installed or used in accordance with the conditions defined in Schedule 2 of this licence

6. Interpretation

In this and the subsequent schedule(s):

- (a) "Fixed Wireless Access" is a system used to connect two or more fixed points for the purpose of sending or receiving data. The system can

include a point to point network, a point to multi-point network, a MESH network or any other network configuration;

- (b) "IR" means the United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 4.1 of Directive 1999/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment (R&TTE) and mutual recognition of their conformity. The Directive was implemented in the UK by the Radio Equipment and Telecommunications Terminal Equipment Regulations (S.I. 2000/730).

SAMPLE

5.8 GHz Fixed Wireless Access

SCHEDULE 2

1. Use of radio equipment is permitted in the frequency bands between 5725MHz to 5850MHz in the United Kingdom, except where exclusion zones have been applied through the online registration system.
2. Please use the 5.8 GHz registration tool on the Ofcom website to register the location of terminals.
3. This licence is issued on the basis that interference is not caused by the radio equipment to other authorised spectrum users and that the Radio Equipment will not be protected from interference caused by other authorised spectrum users.

SAMPLE