



Release of the 59 – 64 GHz band

A consultation on a licence exempt approach for Fixed
Wireless Systems in the 60 GHz Band

Consultation

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Closing Date for Responses: 25 September 2009

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Section 1

Executive summary

- 1.1 This document sets out Ofcom's proposals to open spectrum in the 59 – 64 GHz band for Fixed Wireless applications and to combine this with the existing 57 – 59 GHz band under one overall licence exempt authorisation approach for Fixed Wireless Systems (FWS) using the whole 60 GHz band (57 – 64 GHz).
- 1.2 Currently the 59 – 64 GHz band is unavailable for commercial use. However, new 60 GHz technologies are now starting to emerge that can utilise this spectrum and take advantage of the high gaseous attenuation exhibited at these frequencies to provide high speed data transmission (100Mbps/sec & above) over short hop link lengths (typically <1km link lengths at high availability) with minimal risk of interference. In addition, recent national and international discussions have highlighted that this frequency band is becoming the subject of increased interest for commercial use for Fixed Wireless Systems.
- 1.3 At this stage there are two main groups of applications identified for this band:
- Low power wide band short range devices; these will be predominately indoor devices and are dealt with by a European Commission (EC) mandatory licence exempt regulation process. Ofcom has made regulations following a public consultation on authorising these devices in the national licence exemption regulations¹; and
 - Short hop high capacity (100Mbps/sec & above), higher power, Fixed Wireless Systems (FWS) applications with link lengths of around 1 km. This consultation is concerned solely with this second type of application.
- 1.4 The 60 GHz band has unique propagation characteristics with a peak gaseous attenuation of 15dB/km – i.e. the radiation from a particular radio transmitter is quickly reduced. Annex 6 provides more information. Such high attenuation allows a high re-use of channels with a minimal risk of interference. The technical characteristics of the FWS applications that are likely to be deployed (generally narrow beam-width signal characteristics) and the high gaseous absorption are such that multiple different users of FWS could co-exist without causing adverse interference.
- 1.5 Therefore, in order to maximise the opportunities for effective use of the spectrum, keep regulation to a minimum and taking into account the technical characteristics in the 57 – 64 GHz band Ofcom proposes to adopt a licence exempt approach to enable the deployment of FWS applications in a rapid and flexible way.
- 1.6 The 59 – 64 GHz band is jointly managed by Ofcom for Fixed Service applications and the Ministry of Defence (MoD) for Mobile and Radiolocation applications. In order to facilitate commercial access to this band and at the same time to protect MoD Radiolocation Systems against potential harmful interference, licence exempt use will not be permitted in three small geographical areas.

¹ <http://www.ofcom.org.uk/consult/condocs/shortrange09/statement/>

Timing

- 1.7 Ofcom invites written views and comments on the issues raised in this document, to be made by 5pm on 25 September 2009.

Section 2

Background

Introduction

- 2.1 Within the UK the 59 – 64 GHz band is currently not available for commercial Fixed Wireless Systems (FWS). However, new 60 GHz technologies are now starting to emerge that can utilise this spectrum and take advantage of the high gaseous attenuation exhibited at these frequencies to provide high speed data transmission over short hop link lengths (typically <1km link lengths at high availability) with minimal risk of interference. In addition, recent national and international discussions have highlighted that this frequency band is becoming the subject of increased interest for commercial use for fixed wireless systems. At this stage there are two main groups of applications identified for this band:
- Low power wide band short range devices; these will be predominately indoor devices and are dealt with by a European Commission (EC) mandatory licence exempt regulation process. Ofcom has made regulations following a public consultation on authorising these devices in the national licence exemption regulations exemption regulations¹; and
 - Short hop high capacity (100Mbits/sec & above), higher power, Fixed Wireless Systems (FWS) with link lengths of around 1 km. This consultation is concerned solely with this second type of application.
- 2.2 The band immediately below 59 – 64 GHz is the 57 – 59 GHz band which is currently available for FWS under a licence exempt approach with a 50/100MHz channel plan specified.
- 2.3 This consultation sets out Ofcom's proposals to open spectrum in the 59 – 64 GHz band for FWS and combine this with the existing 57 – 59 GHz band under one overall licence exempt authorisation approach to form one new band, the '60GHz band' to support short hop high capacity (100Mbits/sec & above) FWS applications of around 1 km link length.
- 2.4 We believe that the combining of the 57 – 59 GHz and 59 – 64 GHz bands under the same technical/authorisation conditions to form one new '60 GHz band' offers the possibility of increased flexibility for wide bandwidth technology while simplifying the regulation required.

Commercial use of high frequency band

- 2.5 The 60 GHz band is becoming the subject of increasing interest for commercial use due to its unique propagation characteristics and the wide bandwidth available for carrying communications traffic. New technology is now starting to emerge that offers the possibility of using this band, thereby taking advantage of the wide bandwidths available to support applications such as high speed Ethernet data transmission (100 Mbit/s & above) for short hop (around 1km) communication.
- 2.6 The 60 GHz band has unique propagation characteristics with a peak gaseous attenuation of 15dB/km – i.e. the radiation from a particular radio transmitter is quickly reduced. Annex 6 provides more information. Such high attenuation allows a high re-use of channels with a minimal risk of interference. The technical

characteristics of the FWS applications that are likely to be deployed (generally narrow beam-width signal characteristics) and the high gaseous absorption are such that multiple different users of FWS can co-exist without causing adverse interference.

2.7 The availability of wide bandwidths also provides an option to cater for future market demands for increasingly high capacity access, in particular for internet-based applications.

2.8 The main features of operating fixed radio systems in the 60 GHz band can be summarised as follows:

- Availability of wide bandwidths supporting large capacity data rates;
- Fixed Service equipment operating at distances of around 800 to 1000 m with high (>99.9%) availability;
- Possibility of extensive channel re-use, due to the propagation conditions and use of directional antennas which significantly minimise the risk of interference;
- Possibility of using lower order modulation schemes allowing low cost equipment; and
- Reduced installation time compared to other methods of broadband delivery. Fixed radio links can often be deployed more quickly than either wired or fibre networks.

International and UK Frequency Allocations

2.9 The following table provides the UK frequency allocations for the 59 – 64 GHz frequency range. The full UK Frequency Allocation Table can be accessed through the following link: <http://www.ofcom.org.uk/radiocomms/isu/ukfat/>.

Frequency range	UK Allocations	Application in the UK
59 – 59.3 GHz	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	Mobile and Radiolocation Services (Defence system) Fixed Services (Ofcom)
59.3 – 64 GHz	FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	Mobile and Radiolocation services (Defence system) Fixed Services (Ofcom) RTTT devices operate in the band 63 – 64 GHz

- 2.10 As can be seen from the above table within the UK the 59 – 64 GHz band is co-managed by Ofcom for Fixed Services and the Ministry of Defence (MoD) for Mobile and Radiolocation Services. The MoD have specified three 6km radius geographical exclusion areas where licence exempt use will not be permitted. However, these three exclusion zones are in remote areas or where terminals are highly unlikely to be deployed and therefore these exclusion areas/locations are considered negligible and are not considered to impact on the band's viability for commercial use.

Standards and International Recommendations

- 2.11 Within Europe, the European Telecommunications Standards Institute (“ETSI”) is revising the multipart harmonised standard, EN 302 217, for fixed point to point systems to incorporate the technical specification for equipment operating in the higher frequency bands which includes the 59 – 64 GHz band. This draft final standard is currently being progressed through the ETSI approval process. This revised specification has been developed for radio equipment and antennas for use in point to point millimetre wave applications in the fixed service and covers a range of equipment types including different modulation types and radio interface capacities.
- 2.12 CEPT has recently developed and published (February 2009) a new recommendation, ECC/REC/(09)01², which covers the extended 57 – 64GHz band. This new recommendation supersedes the old recommendation ERC/REC 12-09 which only covers the 57 – 59 GHz band. The new recommendation provides a number of flexible options for the 57 – 64 GHz band including the option of not having specific channels or adopting a channel plan. Other technical parameters are also provided in an annex which include a maximum EIRP limit of 55dBm and a transmit power limit (at the antenna port) of +10dBm and a minimum antenna gain of 30dBi.

Statutory framework

- 2.13 The following paragraphs set out Ofcom key principles regarding spectrum management that were followed during the development of this consultation document.
- 2.14 Ofcom's principal statutory duty is to further the interests of citizens in relation to communication matters and to further the interest of consumers in relevant markets, where appropriate, by promoting competition. Directly relevant to spectrum management, Ofcom are required to secure the optimal use for wireless telegraphy of electro-magnetic spectrum, while in carrying out their spectrum management duties Ofcom must have particular regard to the different needs and interests of all persons who wish to make use of spectrum.
- 2.15 In performing their duties, Ofcom must have regard to the principles under which regulatory activities should be transparent, accountable, proportionate and consistent and targeted only at cases in which action is needed.
- 2.16 In the UK, Ofcom are responsible for the authorisation of civil use of the radio spectrum and achieve this by granting wireless telegraphy licences under the WT Act and by making Regulations exempting users of particular equipment from the requirement to hold such a licence. Under section 8(1) of the WT Act, it is an offence

² <http://www.erodocdb.dk/doks/doccategoryECC.aspx?doccatid=2>

to install or use apparatus without holding a licence granted by Ofcom. Section 8(3) enables Ofcom to make regulations exempting apparatus from the requirement to hold a licence under Section 8(1) either absolutely or subject to such terms, provisions and limitations as may be specified. Under Section 8(4) of the WT Act Ofcom must make regulations to exempt equipment if it is unlikely to cause undue interference. For these purposes, interference with wireless telegraphy is not to be regarded as undue unless it is also harmful.

2.17 In carrying out its radio spectrum functions, Ofcom must have particular regard to:

- availability of spectrum for use, or further use, for wireless telegraphy; and
- current and likely future demand for the use of the spectrum for wireless telegraphy.

2.18 And to the desirability of promoting

- efficient management and use of the spectrum available for wireless telegraphy;
- economic and other benefits arising from the use of wireless telegraphy;
- development of innovative services; and
- competition in the provision of electronic communications services.

Section 3

Technical and Regulatory Conditions

Technical requirements

- 3.1 In May 2009, ECC finalised technical studies for the 57 – 66 GHz band including the technical and operational requirements to be associated with FWS - Short hop high capacity (>100Mbps/sec) applications. This extended frequency range (to 66 GHz) covered all applications under Multiple Gigabit Wireless Systems (MGWS) including indoor lower power devices (not covered in this consultation). ECC has produced two reports:
- EEC report 113³ which addresses compatibility studies around 63 GHz between Intelligent Transport Systems (ITS) and other systems; and
 - EEC report 114³ which addresses compatibility studies between Multiple Gigabit Wireless Systems (MGWS) in the frequency range 57 – 66 GHz and other services and systems – except Intelligent Transport Systems (ITS) in the 63 – 64 GHz band which is covered by the ECC report 113.
- 3.2 Both ECC reports deal with the various applications within the MGWS family and the associated sharing issues. However, while ECC report 113 addressed ITS applications in the 63 – 64 GHz band they are not considered further in this consultation as we consider that there is a low risk of interference and demand for such systems at 63 GHz is unlikely to occur in the immediate future. Ofcom may consult in the future in relation to the facilitation of ITS applications within the 63 – 64 GHz band.
- 3.3 ECC report 114 shows that wide band FWS can be deployed in the 57 – 59 GHz band without significant risk of interference to other FWS systems or the Earth Exploration Satellite Service (ESS) which extends to 59.3 GHz. In relation to the compatibility between high capacity FWS and Radiolocation in the 59 – 64 GHz band it was concluded that under the conditions studied a small separation distance from the Radiolocation site would be required to ensure mutual co-existence.
- 3.4 In relation to Radiolocation and FWS coexistence in the 59 – 64 GHz band in the UK, the MoD has specified three 6km radius geographical exclusion areas in order to provide protection to their Radiolocation Systems against harmful interference.

Flexible Band Plan

- 3.5 CEPT Recommendation ECC/REC/(09)01 provides a number of flexible options for this band including an option of not having specific channel or adopting a channel plan.
- 3.6 Currently within the UK, the 57 – 59 GHz band is already available for FWS point to point applications under a licence exempt approach, excluding 100 MHz as a guard band at both edges, with an EIRP limit of 55dBm, a transmit power limit (at the antenna port) of +10dBm and complying with the 50/100MHz channel plans specified in the ERC/REC/12-09.

³ <http://www.erodocdb.dk/doks/doccategoryECC.aspx?doccatid=4>

3.7 In order to provide maximum flexibility for Fixed Wireless Services applications, Ofcom proposes that a channel plan is not mandated for the new combined '60 GHz band' Instead, Ofcom proposes simply to define a 6.8 GHz block of spectrum with no mandatory channel arrangement and a 100 MHz guard band at each end to safeguard operation of other services in the adjacent bands as shown in Figure 1.

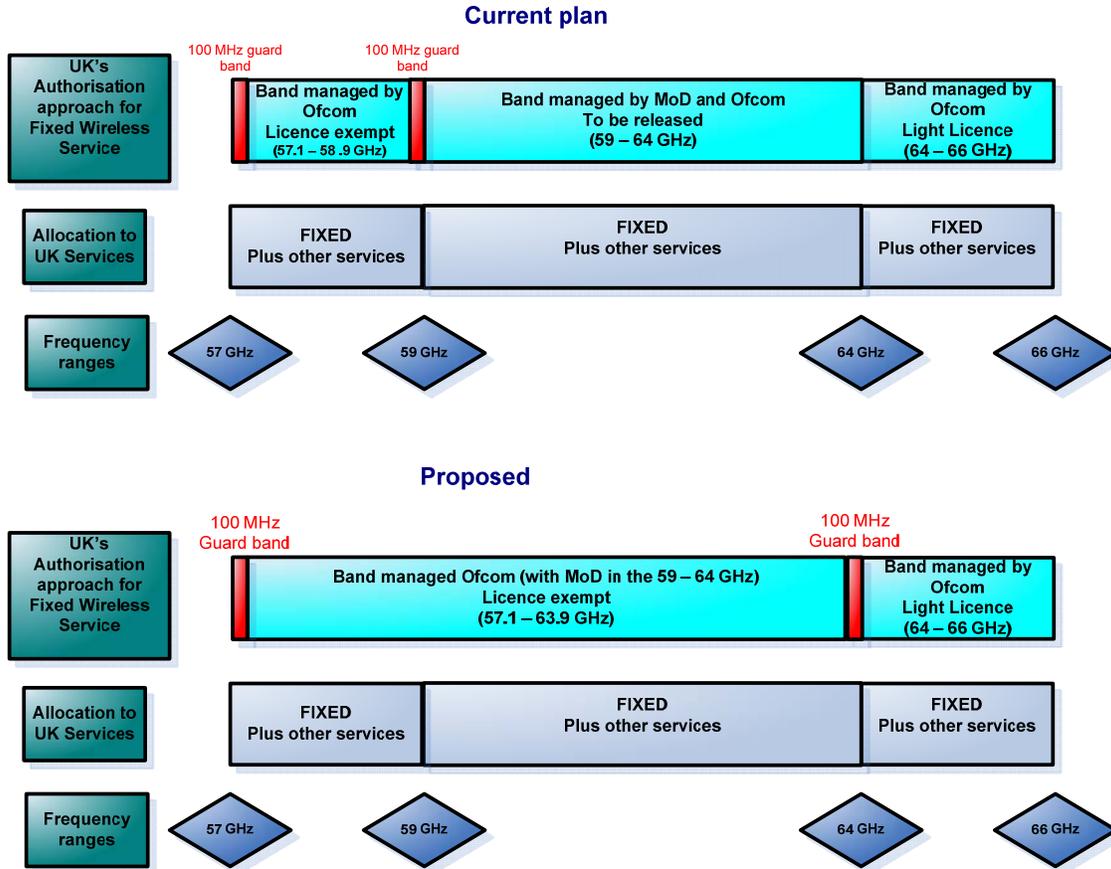


Figure 1: Spectrum plan for the 57 – 64 GHz band

3.8 In order to remove the current channel plan for the 57 – 59 GHz band, to provide greater flexibilities, Ofcom will need to revise the current exemption regulations. This is discussed in more detail in section 4.

3.9 Under the above configuration, equipment would be permitted to operate anywhere in the 60 GHz spectrum band providing that the occupied bandwidth of a given application does not stray into the adjacent guard bands.

Question 1: Do you agree

- a. *With the proposal shown in figure 1 to combine the existing 57 – 59GHz band with the new 59 – 64 GHz band for Fixed Wireless Systems? – see also question 3*
- b. *that the CEPT channel plan given in ECC/REC/(09)01 should not be mandated with the exception of two 100MHz guard bands at the band ends to protect adjacent users? and that a flexible band structure is appropriate for facilitating access to the 57 – 64 GHz band?*

Equipment and Antennas

- 3.10 FWS equipment eligible for operation would have to be compliant with the essential requirements of the RTTE Directive 1995/5/EC (CE marked). This is a requirement for all radio equipment in the European Community.
- 3.11 In line with the wider objective of pursuing technology neutrality, Ofcom does not intend to apply technological restrictions to the equipment that may be deployed e.g. channel bandwidth, modulation type, link capacity.

Technical Conditions

- 3.12 In line with the above considerations, Ofcom is proposing following minimal technical conditions for FWS to safeguard the operation of other services in-band and adjacent to the 57 – 64GHz band:
- Maximum EIRP limit: + 55dBm; and
 - Maximum transmitter output power limit: + 10dBm

Question 2: Do you agree that a maximum EIRP limit of 55dBm together with a maximum transmitter output power limit of 10dBm are the minimum technical conditions required to allow flexible use of this band by FWS while maintaining adequate protection of other services?

Section 4

Authorisation approach

Introduction

- 4.1 Management of spectrum generally falls into two distinct areas (as shown in Figure 2): spectrum that is licensed to a particular user or set of users, the “full licence approach”; and spectrum where use of devices is either exempted from licensing or where the regulatory burden is reduced, the “light regulatory approach”.

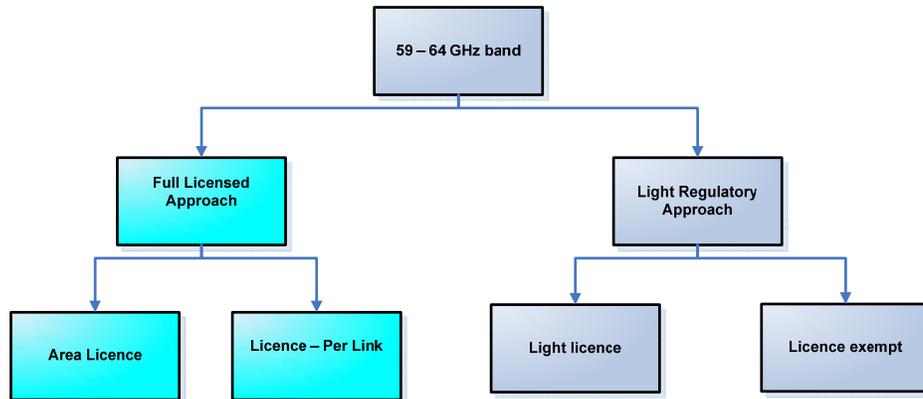


Figure 2: Management of spectrum options for the 57 – 64 GHz band

- 4.2 A full licence approach is needed where coordination is required to manage the risk of interference. However, taking into account the properties of these higher millimetre wave bands, it is proposed that a more flexible and lighter licensing approach is established.
- 4.3 A light regulatory approach could be introduced either as a light licence or licence exempt regime. Light licensing is a mechanism whereby the users of a band are provided non-exclusive licences which are typically available to all, and are either free or only have a nominal fee attached to them. There may be further obligations associated with the provision of a licence such as the need to register the location of any transmitters and possibly to co-ordinate their deployment with other registered users.
- 4.4 Under a licence exempt approach use of the band is open to all, without the need for a licence, provided that the conditions of the exemption are complied with.
- 4.5 The 60 GHz band has very high attenuation propagation characteristics, with a peak gaseous attenuation of 15dB/km, compared to other higher frequency bands such as the 70/80 GHz bands, i.e. the radiation from a particular radio transmitter is quickly reduced (as shown in annex 6). Such high absorption allows a high re-use of channels with a minimal (very low probability) risk of interference. In addition the technical characteristics of the FWS applications that are likely to be deployed (generally narrow beam-width signal characteristics) and the high gaseous absorption are such that multiple different users of FWS can co-exist without causing adverse interference. Therefore, taking these characteristics into account and the specified technical conditions Ofcom considers that there is no need for a self

coordinated light licence approach and that a licence exempt is the most appropriate approach for the 60 GHz band.

- 4.6 Annex 5 – Impact Assessment (IA) - sets out the assessment of each of the authorisation options that we have considered and summarises all advantages and disadvantages of each of these options.

Exclusion zones

- 4.7 The 59 – 64 GHz band is jointly managed by Ofcom for Fixed Service applications and the Ministry of Defence (MoD) for Mobile and Radiolocation applications. As noted in section 3, the ECC report 114 shows that a separation distance will be required to ensure a mutual co-existence between high capacity FWS and Radiolocation.
- 4.8 Therefore, in order to facilitate commercial access to this band and, at the same time, to protect MoD radiolocation systems against likely harmful interference from outdoor FWS applications, we will exclude the following three geographical areas from the licence exemption (“exclusion zones”). We propose that these exclusion zones, stated in table 1, be incorporated into the licence exemption regulation.

Site Name	Site Location	Radius of exclusion zone from the centre of site location
Site 1	57° 21' 3.6", -07° 23' 36.6"	6 Km
Site2	51° 37' 16.8", -04° 58' 21"	6 Km
Site 3	52° 38' 1.8", -00° 36' 22.8"	6 Km

Table 1: Exclusion zones for the 59 – 64 GHz

- 4.9 We believe that the exemption approach for the 60 GHz band with geographic exclusion zones is workable for this band because:
- the three exclusion zones are in remote areas or where terminals are highly unlikely to be deployed;
 - the type of applications that can be deployed under this exemption will require professional installation. Therefore, installers can be made aware of the three sites to avoid installation; and
 - the applications facilitated by this exemption will be fixed. Therefore in the highly unlikely event of interference this can be easily detected and located.
- 4.10 The new band that Ofcom is proposing to open for FWS, 59 – 64 GHz (under a licence exempt approach) is adjacent to the current 57 – 59 GHz band which is also currently exempted under regulation SI 2003/74⁴ as amended. In order to allow maximum use of spectrum and support current and new technology Ofcom is proposing to combine the licence exemption for both the 59 – 64 GHz and 57 – 59 GHz bands, subject to the three proposed MoD exclusion zones in relation to the 59 – 64 GHz band. This approach will support the current technology to be deployed

⁴ <http://www.opsi.gov.uk/si/si2003/20030074.htm>

and facilitate the scope of wider band applications with high capacity in the future. This approach will provide the following benefits:

- Facilitates spectrum access to a large amount of spectrum (6.8 GHz bandwidth), under one authorisation approach, while minimising the administrative burden of licensing for Ofcom and stakeholders i.e. there will be no need to issue individual licences, register terminals and carry out detailed co-ordination; and
- Allows for the 57 – 59 GHz band to be incorporated into the considerations and have one consolidated licence exemption across the 57 – 64 GHz band (the new '60 GHz band') with no guard band required. This will facilitate a greater range of technologies e.g. those which require a wider duplex spacing.

Question 3: Do you agree with a licence exempt approach for the 60 GHz band?

Implementation

- 4.11 Implementation of the proposed "licence exempt" authorisation approach to access the 59 – 64 GHz for FWS and the review of the current exemption regulation of the 57 – 59 GHz would require amendment to the current exemption regulation: SI 2003/74; The Wireless Telegraphy (Exemption) Regulations 2003. To facilitate this we intend to link these changes to the annual licence exempt review and consolidate all Wireless Telegraphy Act exemption regulations.
- 4.12 There are currently over thirteen different exemption regulations that apply to wireless telegraphy equipment. It is Ofcom policy to try to minimise the regulatory burden on stakeholders by changing regulations only when necessary and making sure that the regulatory framework can be easily understood. Therefore we believe that any required regulations for FWS should be incorporated into this review. We are expecting to start this consultation in December 2009 with the regulations coming in to force in July 2010.
- 4.13 Our indicative timescale for implementing the proposed authorisation approach is as follows:
- October/November 2009 – Publication of a policy statement on our decision concerning this consultation;
 - December 2009 – Publication of the Ofcom yearly/consolidated policy consultation on licence exemptions;
 - March 2010 – Policy statement and consultation on draft licence exemption regulations including the necessary changes to give legal effect of the proposal to licence exempt FWS in the 57 – 64 GHz band with the three exclusion zones;
 - June 2010 – Publication of the Final Regulatory Statement on licence exemption; and
 - July 2010 - Exemption regulations come into force.

Annex 1

Responding to this consultation

How to respond

A1.1 Ofcom invites written views and comments on the issues raised in this document, to be made **by 5pm on 25 September 2009**.

A1.2 Ofcom strongly prefers to receive responses using the online web form at http://www.ofcom.org.uk/consult/condocs/59_64ghz/howtorespond/form as this helps us to process the responses quickly and efficiently. We would also be grateful if you could assist us by completing a response cover sheet (see Annex 3), to indicate whether or not there are confidentiality issues. This response coversheet is incorporated into the online web form questionnaire.

A1.3 For larger consultation responses - particularly those with supporting charts, tables or other data - please email Lorraine.Brown@ofcom.org.uk attaching your response in Microsoft Word format, together with a consultation response coversheet.

A1.4 Responses may alternatively be posted or faxed to the address below, marked with the title of the consultation.

Lorraine Brown
3rd Floor – Desk: 140
Dept: FWA
Riverside House
2A Southwark Bridge Road
London SE1 9HA

Fax: 020 7981 3990

A1.5 Note that we do not need a hard copy in addition to an electronic version. Ofcom will acknowledge receipt of responses if they are submitted using the online web form but not otherwise.

A1.6 It would be helpful if your response could include direct answers to the questions asked in this document, which are listed together at Annex 3. It would also help if you can explain why you hold your views and how Ofcom's proposals would impact on you.

Further information

A1.7 If you want to discuss the issues and questions raised in this consultation, or need advice on the appropriate form of response, please contact Lorraine Brown on: Lorraine.Brown@ofcom.org.uk

Confidentiality

A1.8 We believe it is important for everyone interested in an issue to see the views expressed by consultation respondents. We will therefore usually publish all responses on our website, www.ofcom.org.uk, ideally on receipt. If you think your response should be kept confidential, can you please specify what part or whether

all of your response should be kept confidential, and specify why. Please also place such parts in a separate annex.

- A1.9 If someone asks us to keep part or all of a response confidential, we will treat this request seriously and will try to respect this. But sometimes we will need to publish all responses, including those that are marked as confidential, in order to meet legal obligations.
- A1.10 Please also note that copyright and all other intellectual property in responses will be assumed to be licensed to Ofcom to use. Ofcom's approach on intellectual property rights is explained further on its website at:
<http://www.ofcom.org.uk/about/accoun/disclaimer/>

Next steps

- A1.11 Following the end of the consultation period, Ofcom intends to publish a statement in October/November 2009.
- A1.12 Please note that you can register to receive free mail Updates alerting you to the publications of relevant Ofcom documents. For more details please see:
http://www.ofcom.org.uk/static/subscribe/select_list.htm

Ofcom's consultation processes

- A1.13 Ofcom seeks to ensure that responding to a consultation is easy as possible. For more information please see our consultation principles in Annex 2.
- A1.14 If you have any comments or suggestions on how Ofcom conducts its consultations, please call our consultation helpdesk on 020 7981 3003 or e-mail us at consult@ofcom.org.uk. We would particularly welcome thoughts on how Ofcom could more effectively seek the views of those groups or individuals, such as small businesses or particular types of residential consumers, who are less likely to give their opinions through a formal consultation.
- A1.15 If you would like to discuss these issues or Ofcom's consultation processes more generally you can alternatively contact Vicki Nash, Director Scotland, who is Ofcom's consultation champion:

Vicki Nash
Ofcom
Sutherland House
149 St. Vincent Street
Glasgow G2 5NW

Tel: 0141 229 7401
Fax: 0141 229 7433

Email vicki.nash@ofcom.org.uk

Annex 2

Ofcom's consultation principles

A2.1 Ofcom has published the following seven principles that it will follow for each public written consultation:

Before the consultation

A2.2 Where possible, we will hold informal talks with people and organisations before announcing a big consultation to find out whether we are thinking in the right direction. If we do not have enough time to do this, we will hold an open meeting to explain our proposals shortly after announcing the consultation.

During the consultation

A2.3 We will be clear about who we are consulting, why, on what questions and for how long.

A2.4 We will make the consultation document as short and simple as possible with a summary of no more than two pages. We will try to make it as easy as possible to give us a written response. If the consultation is complicated, we may provide a shortened Plain English Guide for smaller organisations or individuals who would otherwise not be able to spare the time to share their views.

A2.5 We will consult for up to 10 weeks depending on the potential impact of our proposals.

A2.6 A person within Ofcom will be in charge of making sure we follow our own guidelines and reach out to the largest number of people and organisations interested in the outcome of our decisions. Ofcom's 'Consultation Champion' will also be the main person to contact with views on the way we run our consultations.

A2.7 If we are not able to follow one of these principles, we will explain why.

After the consultation

A2.8 We think it is important for everyone interested in an issue to see the views of others during a consultation. We would usually publish all the responses we have received on our website. In our statement, we will give reasons for our decisions and will give an account of how the views of those concerned helped shape those decisions.

Annex 3

Consultation response cover sheet

- A3.1 In the interests of transparency and good regulatory practice, we will publish all consultation responses in full on our website, www.ofcom.org.uk.
- A3.2 We have produced a coversheet for responses (see below) and would be very grateful if you could send one with your response (this is incorporated into the online web form if you respond in this way). This will speed up our processing of responses, and help to maintain confidentiality where appropriate.
- A3.3 The quality of consultation can be enhanced by publishing responses before the consultation period closes. In particular, this can help those individuals and organisations with limited resources or familiarity with the issues to respond in a more informed way. Therefore Ofcom would encourage respondents to complete their coversheet in a way that allows Ofcom to publish their responses upon receipt, rather than waiting until the consultation period has ended.
- A3.4 We strongly prefer to receive responses via the online web form which incorporates the coversheet. If you are responding via email, post or fax you can download an electronic copy of this coversheet in Word or RTF format from the 'Consultations' section of our website at www.ofcom.org.uk/consult/.
- A3.5 Please put any parts of your response you consider should be kept confidential in a separate annex to your response and include your reasons why this part of your response should not be published. This can include information such as your personal background and experience. If you want your name, address, other contact details, or job title to remain confidential, please provide them in your cover sheet only, so that we don't have to edit your response.

Cover sheet for response to an Ofcom consultation

BASIC DETAILS	
Consultation title:	
To (Ofcom contact):	
Name of respondent:	
Representing (self or organisation/s):	
Address (if not received by email):	
CONFIDENTIALITY	
Please tick below what part of your response you consider is confidential, giving your reasons why	
Nothing	<input type="checkbox"/>
Whole response	<input type="checkbox"/>
Part of the response	<input type="checkbox"/>
	<input type="checkbox"/>
Name/contact details/job title	
Organisation	
If there is no separate annex, which parts?	
If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?	
DECLARATION	
I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.	
Ofcom seeks to publish responses on receipt. If your response is non-confidential (in whole or in part), and you would prefer us to publish your response only once the consultation has ended, please tick here.	
	<input type="checkbox"/>
Name	Signed (if hard copy)

Annex 4

Consultation questions

Question 1: Do you agree

- a. *With the proposal shown in figure 1 to combine the existing 57 – 59 GHz band with the new 59 – 64 GHz band for Fixed Wireless Systems? – see also question 3*
- b. *that the CEPT channel plan given in ECC/REC/(09)01 should not be mandated with the exception of two 100 MHz guard bands at the band ends to protect adjacent users? and that a flexible band structure is appropriate for facilitating access to the 57 – 64 GHz band?*

Question 2: Do you agree that a maximum EIRP limit of 55dBm together with a maximum transmitter output power limit of 10dBm are the minimum technical conditions required to allow flexible use of this band by FWS while maintaining adequate protection of other services?

Question 3: Do you agree with a licence exempt approach for the 60 GHz band?

Annex 5

Impact Assessment

Introduction

- A5.1 The analysis presented in this annex represents an impact assessment, as defined in section 7 of the Communications Act 2003 (the Act) for the release of the 59 – 64 GHz band.
- A5.2 You should send any comments on this impact assessment to us by the closing date for this consultation. We will consider all comments before deciding whether to implement our proposals.
- A5.3 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 Act, which means that generally we have to carry out impact assessments where our 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. However, as a matter of policy Ofcom is committed to carrying out and publishing impact assessments in relation to the great majority of our policy decisions. For further information about our approach to impact assessments, see the guidelines, Better policy-making: Ofcom's approach to impact assessment, which are on our website:
http://www.ofcom.org.uk/consult/policy_making/guidelines.pdf
- A5.4 In the UK, we are responsible for the authorisation of civil use of the radio spectrum and achieve this by granting wireless telegraphy licences under the WT Act and by making Regulations exempting users of particular equipment from the requirement to hold such a licence. Under section 8(1) of the WT Act, it is an offence to install or use apparatus to transmit without holding a licence granted by us. Section 8(3) enables Ofcom to make regulations exempting apparatus from the requirement to hold a licence under Section 8(1) either absolutely or subject to such terms, provisions and limitations as may be specified. Under Section 8(4) of the WT Act we must make regulations to exempt equipment if it is unlikely to cause undue interference. For these purposes, interference with wireless telegraphy is not to be regarded as undue unless it is also harmful.
- A5.5 This Impact Assessment (IA) relates to assessing the most appropriate authorisation approach for the release of the 59 – 64 GHz.

Equality Impact Assessment

- A5.6 Ofcom has considered whether it is required to undertake a full Equality Impact Assessment for the proposals set out in this consultation document to open spectrum in the 59 – 64 GHz band for Fixed Wireless Systems (FWS) applications and to combine this with the existing 57 – 59 GHz band under one overall licence exempt authorisation approach for FWS using the whole 60 GHz band (57 – 64 GHz). On the basis of our Initial Equality Impact Assessment Screening we have determined that this is not required as the spectrum will be available to any potential user without any differentiation on who will have access.

The citizen and/or consumer interest

A5.7 Citizen and consumers will benefit from potential reduced costs (e.g. compared to wired/cable solutions which introduce civil works) and wider choice such as a LAN extension and infrastructure that the enterprise sector and other organisations could provide through the access to the 57 – 64 GHz spectrum.

Ofcom’s policy objective

A5.8 Ofcom’s objective is the optimal use of the electromagnetic spectrum. In conjunction with this objective and in accordance with the WT Act, we must exempt from the requirement to hold a WT Act licence the use of specified apparatus where it is not likely that such use will involve undue interference to wireless telegraphy.

Options considered

A5.9 The options open to us in relation to the management of radio spectrum equipment use generally fall into the following categories:

- To authorise use through the issue of a Wireless Telegraphy licence (“WT licence”) either through Area licences or light licences (with or without a data base); and
- To authorise use through exemption from the need to hold an individual WT licence.

Analysis of the different options

A5.10 The following table provide an analysis of all the options we have considered.

Authorisation approach	Description	For	Against
Area Licences	A Full National/regional licence(s).	Licensee has opportunity to manage interference environment however potential for harmful interference is considered to be low.	As potential for harmful interference is low (outside the MoD’s exclusion zones), this spectrum is unlikely to be scarce, so the rationale for awarding a licence in a competitive award is weak. Will not facilitate the combining of the 59 – 64 GHz and 57 – 59 GHz bands under one consistent authorisation approach.
Licence – Per link	Same as the licences for traditional fixed point to point links. Authorisation of individual links in the band through traditional centralised planning and assignment (command & control) approach currently adopted for	Consistent with existing spectrum management models in lower frequency ranges.	Administratively onerous (imposing cost on stakeholders and Ofcom to develop and implement a full licensed approach/assignment system) given low potential for harmful interference (outside the MoD’s exclusion zones).

Authorisation approach	Description	For	Against
Light licence with registration data base	<p>lower frequencies.</p> <p>A national “non-exclusive” licence - available to all – with a nominal fee and the licensee required to register their deployments in order to protect incumbent services in the band and manage coexistence between users.</p>	<p>Less intrusive regulatory approach to Area licences and licence per link (No assignment process and minimum technical restrictions).</p> <p>Information on deployments is known, which would allow easier clearance of the band in the event of a more valuable licensed use of the spectrum coming along in the future.</p>	<p>Administrative burden (imposes costs to stakeholders to register the details of their links and for Ofcom to set up and maintain a registration data base).</p> <p>Will not facilitate the combining of the 59 – 64 GHz and 57 – 59 GHz bands under one consistent authorisation approach.</p>
Light licence with no registration data base	<p>A national “non-exclusive” licence - available to all – with a nominal fee. No registration of deployments is required.</p>	<p>Less intrusive regulatory approach to the above options (no assignment process, no centrally managed data base and minimum technical restrictions).</p> <p>Simple and easy access to spectrum – i.e. lower costs for end-users.</p> <p>Information on licences (licensees) is known, which would allow easier clearance of the band in the event of a more valuable licensed use of the spectrum coming along in the future.</p>	<p>Administrative burden. Although a centrally managed data base would not be required there would still be a cost incurred by Ofcom to process and issue a licence and a cost for stakeholders to apply for a licence.</p> <p>Will not facilitate the combining of the 59 – 64 GHz and 57 – 59 GHz bands under one consistent authorisation approach.</p>
Licence exempt	<p>No need for a licence to deploy FWS systems as access to spectrum would be authorised through the licence exemption regulations.</p>	<p>Easy and fast access to the band for stakeholders and no administrative burden (no cost to stakeholders and Ofcom).</p> <p>Allows the 57 – 59 & 59 – 64 GHz bands to be combined under one authorisation</p>	<p>No information on deployments – e.g. on location and usability/density</p> <p>Potential difficulty around enforcement of the MoD’s exclusion zones i.e. we would not have detailed transmitter location records. However, this is not considered a real difficulty in practice for this band due</p>

Authorisation approach	Description	For	Against
		<p>approach. Supports innovation.</p> <p>Unlicensed use of the spectrum is unlikely to create undue interference including potential ITS applications in the 63 – 64 GHz sub-band because of the propagation characteristics of the spectrum. Therefore this is in line with Section 8(5) of the WT Act which imposes a duty on Ofcom to exempt where undue (harmful) interference is not likely. This implements a requirement of the Authorisation Directive.</p> <p>Least regulatory intrusive approach to authorisation.</p> <p>In line with the current exemption for 57 – 59 GHz band.</p>	<p>to the geographic location of the exclusion zones and the type of FWS applications to be exempted.</p> <p>Once is exempt it would be difficult to go back and change the authorisation process if a more valuable use (that needs to be licensed/coordinated) comes along in the future. However, we don't have any information at the moment on any such future uses of the spectrum.</p> <p>Terminals would not be coordinated / have interference protection.</p>

The preferred option

Licence or Licence-exempt

A5.11 An analysis of the equipment proposed for exemption shows that there is minimal risk of interference to other users of the radio spectrum including potential ITS applications within the 63 – 64 GHz (outside of the MOD exclusion zones). Therefore, in accordance with our duties under Section 8 of the WT Act, a licence exemption is proposed rather than a licence. A licence exemption approach also has the following benefits:

- Reduction of the regulatory burden; and
- Introduction of innovative applications and new technologies.

A5.12 Moreover, we have no information to suggest that a more valuable use of the spectrum, requiring a licensing regime, is likely to emerge in the near future.

- A5.13 In summary, we consider that the overall benefits (net of costs) of the licence exempt approach are likely to be greater than all the other options. The benefits and costs of authorising use through licence-exemption versus licensing are considered below on the basis that the potential for interference is very small.

Costs to stakeholders

- A5.14 Licence-exemption represents the least cost regulatory approach to the authorisation of spectrum use. If use of spectrum is authorised through a WT licence, whether it is an Area licence or light licence, stakeholders will face a direct cost in terms of the cost of acquiring a licence. This will include the stakeholder's administrative costs associated with applying for the licence and compliance with the terms and conditions of that licence.
- A5.15 If a licence was required for operating each FWS link then it is likely that stakeholders would need to make multiple applications, one for each radio or site depending on the licensing regime. This would impose administration and management costs on stakeholders.
- A5.16 Clearly, this burden will be avoided if use of spectrum is made exempt from licensing.
- A5.17 There are one-off administrative costs associated with making a statutory instrument. We consider the implementation costs to be low and more than offset by the benefits of licence-exemption. There may be a slight reduction in spectrum management costs in certain areas. This is because licence-exemption would reduce the cost incurred by us in operating a licensing regime, such as the cost of issuing licences, collecting licence fees and enforcing terms and conditions of licences.

Costs to consumers

- A5.18 Key consumers will be the stakeholders who use this spectrum; therefore the associated costs are considered above.

Preferred option

- A5.19 In our opinion licence-exemption is the preferred option to authorise the use of FWS in the 59 – 64 GHz in UK and to combine this with the 57 – 59 GHz band.

Annex 6

Propagation in the 59 – 64 GHz band

A6.1 The spectrum within the 59 – 64 GHz frequency range has unique propagation characteristics due to atmospheric oxygen attenuation that absorb the electromagnetic energy of up to 15dB/km as shown in the figures 3 below.

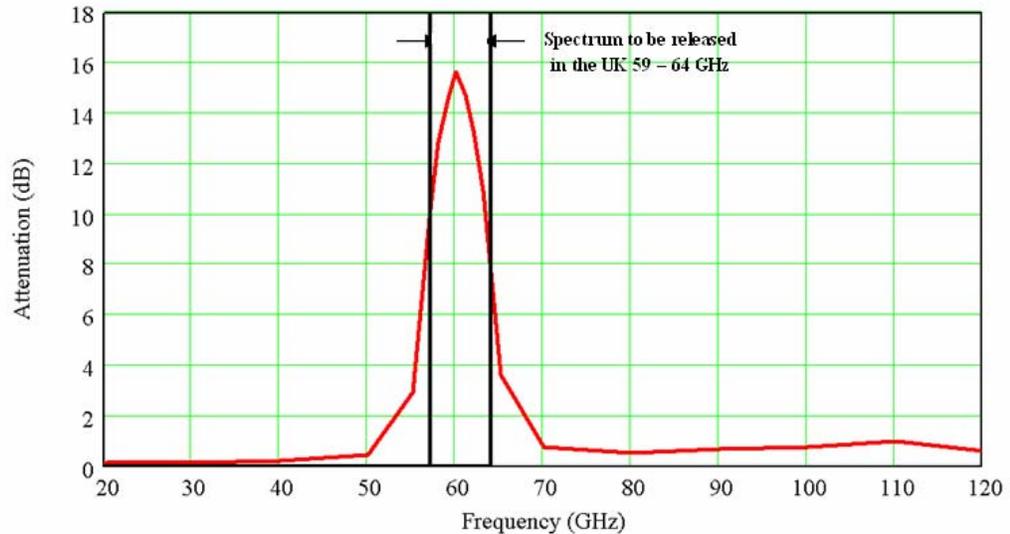


Figure 3: Oxygen attenuation versus frequency

A6.2 Because of the oxygen absorption in the 60 GHz band the radiation from a particular radio link is quickly reduced. As an example we compared the attenuation of a two links operating over a 2 km path where the first link is operating at 24 GHz (no oxygen absorption) and the second link is operating at 61 GHz. Figures 4 and 5 show the signal drop where in the figure 5 – signal operating at 61 GHz - the signal is reduced by about 40 dB at 2 km from the transmitter compare to the link operating at 24 GHz.

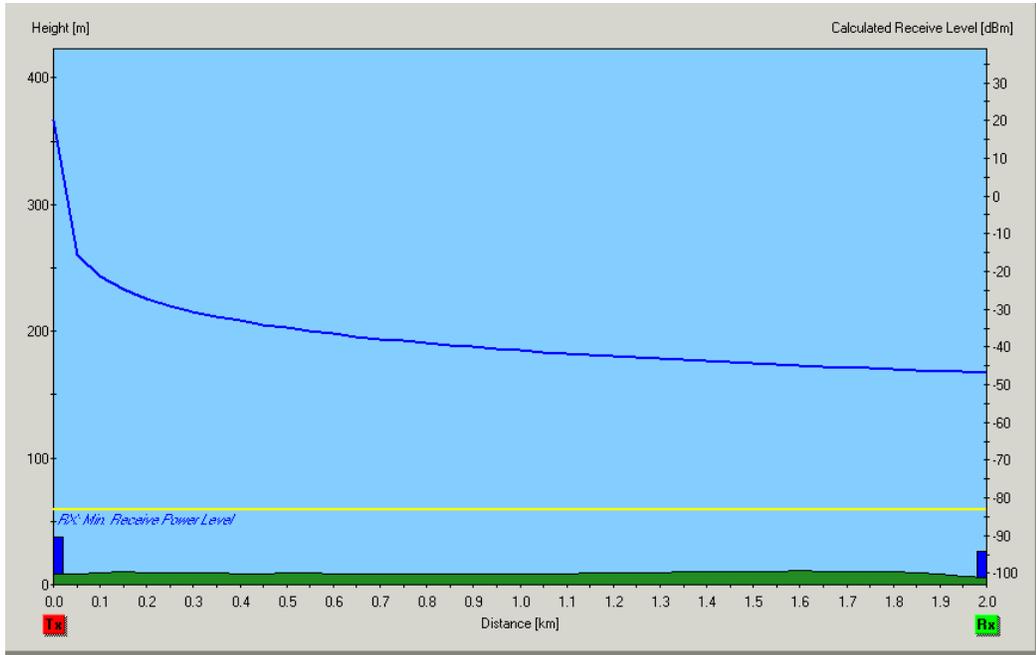


Figure 4: Path profile of a 2 km link operating at 24 GHz

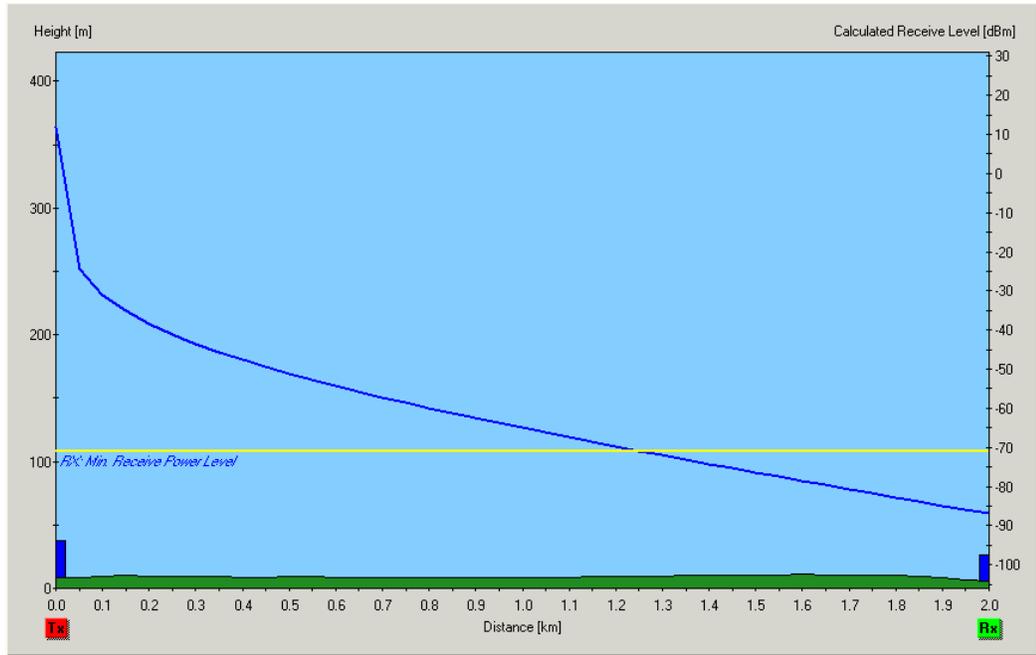


Figure 5: Path profile of a 2 km link operating at 61 GHz

Annex 7

Glossary

Band: A defined range of frequencies that may be allocated for a particular radio service, or shared between radio services.

CEPT: Conference of European Postal and Telecommunications administrations, comprising over 40 European administrations.

Coordination: This term refers to the process under which a new user seeks the agreement of existing users to share access to a particular range of frequencies while avoiding harmful interference.

dB: decibel.

dBm: A logarithmic representation of radio frequency power with respect to one milliwatt.

ECC: Electronic Communications Committee, A European committee that reports to CEPT.

ETSI: European Telecommunications Standards Institute, a European based industry group that addresses equipment standards for radio and telecommunications equipment.

EIRP: Effective Isotropic Radiated Power.

Fixed Service: A service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes between specified fixed points.

FWS: Fixed Wireless Systems.

GHz: Gigahertz: a unit of frequency equal to 1000 million Hz or cycles per second.

ITS: Intelligent Transport Systems.

Interference: The effect of unwanted signals upon the reception of a wanted signal in a radio system, resulting in degradation of performance, misinterpretation or loss of information compared with that which would have been received in the absence of the unwanted signal.

MHz: Megahertz: a unit of frequency, equal to 1,000,000 (1X10⁶) Hz or cycles per second.

RTTE: Radio Equipment and Telecommunications Terminal Equipment.