



Release of the 59 – 64 GHz band

A statement on Ofcom's decision for a licence exempt
approach for Fixed Wireless Systems in the 60 GHz Band

Statement

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Section 1

Executive Summary

- 1.1 This statement presents Ofcom's decision to go ahead with opening the spectrum in the 59 – 64 GHz band for Fixed Wireless Systems (FWS) and to combine this with the existing 57 – 59 GHz band under one overall licence exempt authorisation approach for FWS. The decision creates one contiguous and flexible block of spectrum providing 6.8 GHz of available bandwidth (57.1 – 63.9 GHz) taking into account two 100 MHz guard bands. The large bandwidth available makes the new 57.1 – 63.9 GHz band (the "60 GHz band") suitable for very high capacity, short hop FWS (e.g. 100MBit/s ~ 1GBit/s Ethernet systems). In addition the technical conditions that will be implemented along with the high propagation attenuation around 60 GHz will allow sharing between a wide range of applications (e.g. FWS, ITS, Wireless HD and others).
- 1.2 In response to our consultation document there were two related areas which attracted significant comment:
- Two respondents argued that the 63 – 64 GHz band should be reserved for possible Intelligent Transport Systems (ITS) applications and that a licence exempt approach for FWS in this sub-band would be incompatible, due to interference concerns. Ofcom has considered this point carefully and concluded that these concerns are not well founded. The various technical characteristics of the systems to be deployed, along with the high gaseous absorption propagation attenuation around 60 GHz, implies that sharing should be possible between the various applications (Fixed, ITS, wireless HD & other) with a very low probability of interference. Therefore, Ofcom is content that a licence exempt approach remains appropriate for the 60 GHz band and consistent with our duty to secure optimal use of the spectrum.
 - It was suggested that a minimum FWS antenna gain of 30dBi be adopted in the technical conditions to the licence exemption. This would avoid FWS systems being deployed with wide beam antennas which could increase the probability of interference between assignments. Ofcom accepts that the adoption of a minimum antenna gain could increase confidence regarding the intra- and inter-service sharing issues, including those relating to ITS. At the same time, we consider that the likely FWS deployments will use high gain, narrow beam antennas anyway; hence, the adoption of a minimum gain limit of this nature should not hinder FWS use in this band. Accordingly, Ofcom has decided to incorporate this minimum antenna gain of 30 dBi into the technical conditions to ensure that narrow beam antennas are employed. This decision will also bring the technical conditions into line with the new ECC recommendation ECC/REC/(09)01 that replaces ERC/REC/12-09.
- 1.3 In accordance with our consultation proposals, the 60 GHz band will therefore be made available for FWS on a licence exempt basis across the UK, with the exception of three small geographical areas to protect MoD radiolocation systems against likely harmful interference.
- 1.4 The table below summarises the key points of the Ofcom policy for the new 60 GHz band:

Issue	Policy
Available Spectrum	57.1 – 63.9 GHz for Fixed Wireless Systems
Block/Channel Size	6.8 GHz block
Channel plan	None
Licence/Authorisation	Licence Exempt
Geographical area	UK, with the exclusion of three sites for the 59 – 63.9 GHz sub band: 6 km radius from the following locations: <ul style="list-style-type: none"> • Site 1: 57° 21' 3.6", -07° 23' 36.6" • Site 2: 51° 37' 16.8", -04° 58' 21" • Site 3: 52° 38' 1.8", -00° 36' 22.8"
Fees	Licence Exempt band – no fee payable
Equipment and Antennas	Must conform to essential requirements of the RTTE and the technical conditions as set out in this statement (given below).
Maximum EIRP	55 dBm
Maximum Transmitter Output Power	10 dBm
Minimum Antenna Gain	30 dBi

Next steps and timescale

- 1.5 To implement the licence exempt authorisation approach, and to permit access to the full 57.1 – 63.9 GHz band for FWS applications, Ofcom will need to amend the current exemption regulation, the Wireless Telegraphy (Exemption) Regulations, 2003 (SI 2003/74) and prepare a new Interface Requirement (IR). To facilitate this we intend to link these changes to the Ofcom licence exemption review currently due to start in winter 2009/2010 which will consolidate all Wireless Telegraphy Act 2006 (“WT Act”) exemption regulations.
- 1.6 Our indicative timescale for implementing the proposed authorisation approach is as follows:
- Winter 2009/10: Publication of the Ofcom consultation on licence exemptions policy proposals and consolidation of the exemption regulations;
 - Spring 2010: Policy statement and consultation on draft licence exemption regulations including the necessary changes to give legal effect to the proposal to licence exempt FWS applications in the 57.1 – 63.9 GHz band with the three exclusion zones; and
 - Summer 2010: Publication of the Final Regulatory Statement on licence exemption and exemption regulations come into force.

Section 2

Introduction

- 2.1 On 16 July 2009 Ofcom published a consultation document on making spectrum in the 59 – 64 GHz band available for FWS. The consultation document can be found at: (http://www.ofcom.org.uk/consult/condocs/59_64ghz/condoc.pdf).
- 2.2 The consultation also included a proposal to combine the 59 – 64 GHz band with the existing 57 – 59 GHz band under one overall licence exempt authorisation approach to create a new contiguous block of spectrum; 57 – 64 GHz; the '60 GHz' band.
- 2.3 The consultation was conducted in light of increasing interest from the UK market to use the 60 GHz band for FWS to provide high speed data transmission.
- 2.4 The 60 GHz band has unique propagation characteristics with a peak gaseous attenuation of 15 dB/km – i.e. the radiation from a particular radio transmitter is quickly reduced. Such high attenuation allows a high re-use of channels with a minimal risk of interference. The technical characteristics of the FWS that are likely to be deployed (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.
- 2.5 The consultation sought views on the following:
- The appropriateness of a licence exempt authorisation approach to facilitate access to the whole 60 GHz band;
 - Whether the CEPT channel plan given in ECC/REC/(09)01 should be mandated or not (with the exception of two 100 MHz guard bands at the band ends to protect adjacent users); and
 - Whether a maximum EIRP limit of 55 dBm together with a maximum transmitter output power limit of 10 dBm are the minimum technical conditions required to allow flexible use of this band by FWS while maintaining adequate protection of other services.
- 2.6 In response to the proposals set out in the consultation Ofcom received 7 non-confidential responses. These respondents are listed in Annex 1 and the responses are published on Ofcom's website at: http://www.ofcom.org.uk/consult/condocs/59_64ghz/responses/
- 2.7 Ofcom is grateful to the respondents to the consultation and has carefully considered the comments in developing the UK policy for the 60 GHz band. In developing and finalising the policy Ofcom has also had regard to its duties under the Communications Act 2003 and the WT.
- 2.8 In general good support was received for the Ofcom's proposals to make the new 60 GHz band available. In particular reference was made to the suitability of the band for high capacity radio applications and, with the incorporation of the 57 – 59 GHz band, the range of existing, cost effective, FWS equipment available on the market today from multiple manufactures.

- 2.9 A few comments were received which requested changes to the proposals. These are addressed in section 3. A list of all the issues raised together with Ofcom's response is summarised in annex 2 of this document.

Statutory framework

- 2.10 The following paragraphs set out Ofcom key principles regarding spectrum management that were followed in reaching the decisions set out in this statement.
- 2.11 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.
- 2.12 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.
- 2.13 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 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.
- 2.14 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.
- 2.15 Ofcom must also have regard 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

Main issues raised in the consultation and Ofcom's conclusions

Responses to Ofcom proposals

- 3.1 In general good support was received for the Ofcom proposals to make the new 60 GHz band available. In particular reference was made to the suitability of the band for high capacity radio applications and with the incorporation of the 57 – 59 GHz band the range of existing, cost effective, FWS equipment currently available on the market today from multiple manufactures. Only the Intelligent Transport Society for the United Kingdom and BAE systems gave less supportive comments to our proposals and, while supporting the overall aim of releasing new spectrum for high capacity FWS, raised specific concerns with regard to protecting future possible Intelligent Transport System (ITS) use in the 63 – 64 GHz sub band.
- 3.2 The following paragraphs address the main issues covered in our consultation and in the responses received:
- The appropriateness of licence exempt authorisation approach and the coexistence between ITS and FWS in the 63 – 64 GHz band;
 - Whether the CEPT channel plan given in ECC/REC/(09)01 should be mandated or not and the necessity of two 100 MHz guard bands at the band ends to protect adjacent users; and
 - The choice of technical conditions and whether a minimum antenna gain is desirable.

Licence exempt authorisation approach and coexistence between ITS and FWS

- 3.3 While the majority of respondents to the consultation supported a licence exempt approach, the Intelligent Transport Society for the United Kingdom and BAE systems both suggested that a licence exempt approach was not appropriate within the 63 – 64 GHz band as, in their view, this would not provide the necessary protection to ITS. Separately, Orange UK expressed a reservation that there is currently no spectrum above 57 GHz where FWS deployments are fully protected and robustly radio planned, which may require those operators who require very high reliability systems to use the lower, fully licensed and co-ordinated, frequency bands instead.
- 3.4 The Intelligent Transport Society for the United Kingdom and BAE systems argued that the 63 – 64 GHz band should be protected/reserved for future possible Intelligent Transport Systems (ITS), making reference to recent European technical and regulatory deliverables, specifically ECC Decision (09)01 addressing the use of the band 63 – 64 GHz for ITS.
- 3.5 Regarding the recent CEPT deliverables, it is important to understand that the term “designated”, as referred to in ECC Decision (02)01 (adopted 15 March 2002) and ECC Decision (09)01 (adopted 13 March 2009), is not intended to imply an exclusive reservation of the 63 – 64 GHz band for ITS. CEPT has over the recent period been

working on a range of applications that can share and access the 60 GHz band, ITS being one of these applications along with others such as Multi-gigabit wireless systems and Wireless HD, the latter of which has already been authorised under a licence exempt approach following a European Commission Decision (2009/381/EC).

- 3.6 In addition, the Intelligent Transport Society for the United Kingdom and BAE systems raised concerns with respect to potential interference to ITS, citing the results given in ECC report 113¹, which addresses compatibility studies around 63 GHz between Intelligent Transport Systems (ITS) and other systems. These two respondents also suggested that coordination and a licensing mechanism may be required if the potential for interference is to be fully avoided i.e. where FWS and ITS road side units are to be deployed in same geographical locations.
- 3.7 However, ECC Report 113 shows that sharing is possible with a minimal risk of interference and was based on a worst case interference analysis, taking into account and assuming worst case technical parameters and scenarios. In particular it is recognised and acknowledged in ECC Report 113 that actual FWS antenna performance will be far better than that assumed in the interference analysis which leads to better sharing conditions between FWS and ITS. The band 63 – 64 GHz is also part of the very high oxygen absorption peak (up to 15 dB/km) and over the 63 – 64 GHz band varies from 10 dB/km at 63 GHz to 7dB/km at 64 GHz. The worst case figure of 7dB/km which occurs at 64 GHz has been used in the interference assessments, which again overestimates any interference potential for most parts of the 63 – 64 GHz band. Further, the probability of the worst case geometrical placement of FWS and ITS road side units considered in the interference analysis is likely to be very low.
- 3.8 In addition, ECC decision (02)01 (an earlier ITS decision) states that ITS systems should be designed to enable frequency sharing with other systems and Decision (09)01 highlights that the compatibility studies performed by CEPT indicate that within the 63 - 64GHz band, ITS applications will not suffer from excessive interference resulting from other services/systems and ITS in this band is compatible with all other services.
- 3.9 Turning to the potential for interference between FWS systems, the same considerations apply as for the case of interference between FWS and ITS systems. In particular, the use of high gain antennas and the high oxygen absorption peak (which means that these links can only be used for very short hop links), mean that the probability of interference is very low. There is therefore no real need for, and little value in, adopting a fully protected, centrally coordinated approach to managing FWS deployments in this band.
- 3.10 For the various reasons outlined above, Ofcom considers that sharing will be possible between the different applications (Fixed, ITS, wireless HD & other) with a very low probability of interference. We have therefore decided that a licence exempt approach for FWS is appropriate for the 60 GHz band. In reaching this decision Ofcom accepts that a licence exempt approach will introduce a small risk of interference, when compared with a fully co-ordinated licensed approach. However, it is necessary to strike a balance between managing the risk of interference and introducing unnecessary regulation and co-ordination procedures. On balance, we have concluded that the risk of interference will be extremely small and that this

¹ <http://www.erodocdb.dk/doks/doccategoryECC.aspx?doccatid=4>

needs to be set against the overall benefits offered by a licence exempt approach as described in the Impact Assessment.

Channel plan and guard band

- 3.11 Ofcom sought views on whether the CEPT channel plan given in ECC/REC/(09)01 should be mandated or not and the necessity of guard bands at the band ends to protect adjacent users.
- 3.12 Most respondents supported a flexible approach, noting that if operators wished to utilise the channel plan given in ECC Recommendation 09-01 then they could do so without the need for it to be mandated. Therefore, Ofcom will not mandate a channel plan for the 60 GHz band.
- 3.13 Regarding the introduction of guard bands, we received mixed views with respect to the necessity and the size of the guard bands at the band ends to protect adjacent users. One respondent considered that no guard bands were necessary while another considered that a 200MHz guard band at the top end of the band would be a safer approach. Ofcom has decided that in order to strike a balance between maximising the usage of the band (in order to facilitate new technologies with wide bandwidth) and providing the necessary protection to systems in adjacent bands (below 57 GHz and above 64 GHz) 100 MHz guard bands at each band edge will be included. Ofcom consider the combination of 100 MHz guard band and the unique propagation characteristics at 60 GHz will provide sufficient protection to the adjacent users as shown in Figure 1.
- 3.14 Ofcom will keep this under review and, if emerging technologies and usages of these bands show that the guard bands are unnecessary or that there is a need to increase them, then Ofcom will take the necessary action by modifying the technical restrictions in the exemptions regulations.

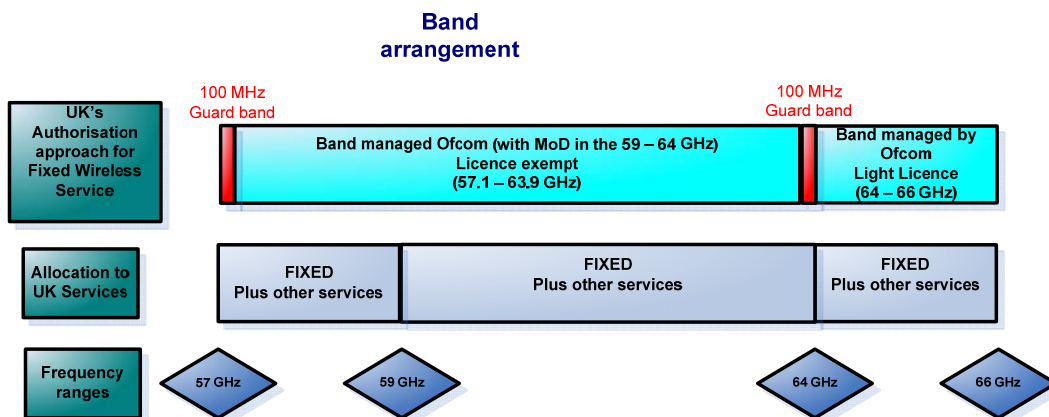


Figure 1: New Spectrum plan for the 57 – 64 GHz band

Technical and regulatory conditions

- 3.15 Some respondents proposed that a minimum antenna gain of 30dBi should be mandated (i.e. part of the technical conditions) in addition to the maximum power level and an Equivalent Isotropic Radiated Power (EIRP). This was argued as necessary to align UK conditions with CEPT technical sharing studies and to avoid FWS systems being deployed with wide beam antennas which could lead to a possible increase in the probability of interference between assignments and other applications.

- 3.16 Ofcom agrees that the intention for FWS point to point links will be to use high gain narrow beam antennas, which is one of the main elements that assists in sharing the spectrum. Our original proposal contained both a maximum transmit power and an EIRP. Therefore, in order to achieve a high EIRP output a high gain antenna has to be employed. However, Ofcom recognises that there is a small risk that without specifically including the antenna gain in the technical conditions, it is possible that lower gain, wider beam antennas could in theory be deployed; with a consequentially reduced EIRP and reduced potential for interference.
- 3.17 Therefore, in order to provide further assurances regarding the intra and inter service sharing issues Ofcom has decided to incorporate a minimum antenna gain of 30 dBi into the technical conditions to ensure that narrow beam antennas are employed. We believe this is not a significant issue and will not compromise FWS use of the band. This will also bring the technical conditions into line with the new ECC recommendation ECC/REC/(09)01 that replaces recommendation ERC/REC/12-09.

Conclusion

- 3.18 Having considered the responses Ofcom has decided to proceed with the release of the 59 – 64 GHz band for Fixed Wireless Systems and to combine this with the existing 57 – 59 GHz band under one overall licence exempt authorisation approach for FWS. This policy is also consistent with Ofcom’s overall licence exempt framework policy published in December 2007 and Ofcom’s statutory duties under the Communications Act 2003 and WT Act. The only change we have made from the proposals set out in our consultation document is to include a 30 dBi minimum antenna gain into the technical conditions, which we consider will not impact on the viability of FWS use.
- 3.19 The 60 GHz Spectrum will be available for FWS applications across the UK on a licence exempt basis, subject to technical conditions and with the exception of three small geographical areas to protect MoD radiolocation systems against likely harmful interference from outdoor FWS applications.
- 3.20 As discussed in the consultation document 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 protect MoD radiolocation systems against likely harmful interference we will exclude the following three geographical areas from the licence exemption (“exclusion zones”) – see Table 1.

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
Site 2	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 band

- 3.21 FWS equipment eligible for operation will need to be compliant with the essential requirements of the RTTE Directive 1995/5/EC (CE marked), which is a requirement for all radio equipment.

3.22 The table below summarises the key points of the Ofcom policy for the new 60 GHz band:

Issue	Policy
Available Spectrum	Ofcom will make available the 57.1 – 63.9 GHz for Fixed Wireless Systems
Block/Channel Size	6.8 GHz block
Channel plan	None
Licence/Authorisation	Licence Exempt
Geographical area	UK, with the exclusion of three sites for the 59 – 63.9 GHz sub band: 6 km radius from the following locations: <ul style="list-style-type: none"> • Site 1: 57° 21' 3.6", -07° 23' 36.6" • Site 2: 51° 37' 16.8", -04° 58' 21" • Site 3: 52° 38' 1.8", -00° 36' 22.8"
Fees	Licence Exempt band – no fee payable
Equipment and Antennas	Must conform to essential requirements of the RTTE and the technical conditions as set out in this statement (given below).
Maximum EIRP	55 dBm
Maximum Transmitter Output Power	10 dBm
Minimum Antenna Gain	30 dBi

3.23 In order to release the 60 GHz band under a licence exemption approach Ofcom will need to update the Wireless Telegraphy (Exemption) Regulations, 2003 (SI 2003/74) as discussed in the next section.

Section 4

Next steps and timetable

- 4.1 This section describes the next steps and an indicative timetable in order to open spectrum in the 59 – 64 GHz band for FWS and to combine this with the existing 57 – 59 GHz band under one overall licence exempt authorisation approach for FWS.
- 4.2 To implement the licence exempt authorisation approach and permit access to the full 57.1 – 63.9 GHz band Ofcom will need to make amendments to the current exemption regulation, the Wireless Telegraphy (Exemption) Regulations, 2003 (SI 2003/74). To facilitate this we intend to link these changes to the forthcoming Ofcom licence exemption review. As indicated in the consultation document there are many different exemption regulations / amendments currently in force that apply to wireless telegraphy equipment. It is Ofcom policy to simplify the regulatory process by changing regulations only when necessary and making sure that the regulatory framework can be easily understood. Therefore the required regulations for FWS will be incorporated into the forthcoming consultation which will consolidate all WT Act exemption regulations, as well as consult on new exemptions for other uses. We are expecting to start this process in the winter 2009/2010.
- 4.3 In addition Ofcom will need to prepare a new Interface Requirement (IR) setting out the conditions for the 60 GHz band and notify the European Commission (EC). This notification and consultation process takes a minimum of 3 months. We plan to start this process shortly after the publication of this statement.

Indicative timescale

- 4.4 Our indicative timescale for implementing the proposed authorisation approach is as follows:
 - Winter 2009/10: Publication of the Ofcom consultation on licence exemptions policy proposals and consolidate the exemption regulations;
 - Spring 2010: Policy statement and consultation on draft licence exemption regulations including the necessary changes to give legal effect to the proposal to licence exempt FWS applications in the 57.1 – 63.9 GHz band with the three exclusion zones; and
 - Summer 2010: Publication of the Final Regulatory Statement on licence exemption and exemption regulations come into force.

Annex 1

List of Respondents

- BAE SYSTEMS Advanced Technology Centre
- Bannister Consulting Ltd
- BridgeWave Communications Inc
- Huber and Suhner (UK) Ltd
- HXI - Millimetre Wave Products
- Orange UK
- The Intelligent Transport Society for the United Kingdom

Annex 2

Summary of issues raised by respondents to the consultation and Ofcom’s response

Question 1:

Do you agree

- a. With the proposals shown in figure 1² to combine the existing 57 – 59 GHz band with the new 59 – 64 GHz band? – 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?

Ofcom overall response

The majority of respondents were supportive of Ofcom proposals for the combination of the 57 – 59 GHz and 59 – 64 GHz bands and that the CEPT channel plan should not be mandated.

Issues raised	Ofcom’s response
<p>An allocation of spectrum from 63 – 64 GHz was reserved for ITS use in ECC decision (09) 01 (March 09) which refers to ECC report 113.</p> <p>We want to avoid interference with the expected new ITS applications that will operate in the 63 – 64 GHz.</p>	<p>ECC decision (09)01 does not reserve the 63 – 64 GHz band solely for ITS use or preclude other applications sharing this spectrum.</p> <p>Taking into account the technical conditions and propagation characteristics at 60 GHz Ofcom considers sharing is possible between ITS and other applications with only a very low probability of interference.</p> <p>ECC Report 113 is based on worst case interference analysis taking into account the worst case technical parameters and scenarios. In particular it is recognised and acknowledged in ECC Report 113 that the actual FWS antenna performance will be far better than that used in the interference analysis which leads to better sharing conditions between FWS and ITS. The band 63 – 64 GHz is part of the very high oxygen absorption peak (up to 15 dB/km) and over the 63 – 64 GHz band varies from 10 dB/km at 63 GHz to 7dB/km) at 64 GHz. The worst case figure of 7dB/km which occurs at 64 GHz is taken into account in the interference analysis which again overestimates any interference potential for the most part of the 63 – 64 GHz band. Also the probability of the worst case geometrical placement of FWS and ITS road side units considered in the interference analysis is likely to be very low.</p>

² Figure 1 in the consultation document which available at: http://www.ofcom.org.uk/consult/condocs/59_64ghz/condoc.pdf

<p>Ofcom’s regulations should not inadvertently make an uncoordinated regime available which may then result in breaches of European harmonisation, particularly if that national regime is an exempt one, where loss of control inevitably occurs once exempted.</p>	<p>See question 3 response regarding a licence exempt approach.</p> <p>While not a mandatory requirement operators will be free to utilise the CEPT channel plan contained in recommendation 09-01 if they wish to do so.</p>
<p>Support the flexibilities within the 57 – 63 GHz but any regulation for the 63 – 64 GHz should take into account those technical parameters used in the development of the ECC report 113.</p>	<p>As indicated in section 3 of this statement, Ofcom will introduce a minimum antenna gain of 30 dBi to bring the technical conditions into line with ECC/REC/(09)01.</p>
<p>Severe concerns about the use of the spectrum from 59 to 64 GHz, which we understand was allocated for internal use in ECC Report 113.</p>	<p>Report 113 addresses the compatibility of both indoor and outdoor FWS. Outdoor applications are referred to as Multiple Gigabit Wireless Systems – Fixed Local Area Network Extension (MGWS-FLANE) and indoor applications are referred to as Multiple Gigabit Wireless Systems - Wireless Personal Area Network/ Wireless Local Area Network (MGWS-WPAN/WLAN).</p>
<p>Strong recommendation that Ofcom maintain coordination with the other European spectrum regulators in protecting the spectrum for ITS use.</p>	<p>The 57 – 64 GHz spectrum is available for a number of applications not just ITS.</p> <p>Ofcom has worked with Department for Transport (DfT) in developing the policy for spectrum for ITS.</p>
<p>Our only concern relates to the term ‘Fixed Wireless Systems’ and by definition its possible prohibition of 60 GHz operation for portable, unlicensed applications.</p>	<p>As indicated in section 3 of this statement Ofcom will release the 57.1 – 63.9 GHz spectrum for fixed wireless systems on a licence exempt basis subject to technical conditions.</p>
<p>The 100 MHz guard bands are unnecessary to protect adjacent users.</p> <p>The guard band at the top band edge should be doubled to 200 MHz.</p>	<p>In order to strike a balance between maximising the usage of the band (in order to facilitate new technologies with wide bandwidth) and provide the necessary protection to systems in adjacent bands (below 57 GHz and above 64 GHz) 100 MHz guard bands at each edge of the band will be included.</p> <p>Ofcom consider the combination of 100 MHz guard band and the unique propagation characteristics at 60 GHz will provide sufficient protection to the adjacent users</p> <p>Ofcom will keep this under review and if emerging technologies and usages of these bands shows that the guard band is unnecessary or that it needs to be increased Ofcom will take the necessary action to modifying the technical restrictions in the exemptions regulations.</p>
<p>Agree with 100 MHz guard band as long as the out of band emission limit is met with a wider</p>	<p>As above</p>

bandwidth system to protect adjacent band.	
Question 2:	
<p>Do you agree that a maximum EIRP limit of 55 dBm together with a maximum transmitter output power limit of 10 dBm are the minimum technical conditions required to allow flexible use of this band by FWS while maintaining adequate protection of other services?</p>	
Ofcom overall response	
<p>The majority of respondents were supportive of the minimum technical restrictions proposed, however, several respondents indicated that a minimum antenna gain of 30 dBi as given in the ECC REC 09-01 should also be mandated.</p>	
Issues raised	Ofcom's response
<p>It is our understanding that the 30 dBi minimum antenna gain requirement reflects the need for narrow beam systems as a means of ensuring minimal interference between deployed systems. This aspect needs to be considered alongside the possible deployment of nomadic systems within the band, albeit currently set at +25 dBm EIRP power levels.</p>	<p>Ofcom agrees that the intention for point to point FWS links will be to use high gain narrow beam antennas. Therefore, in order to provide further assurances regarding the intra and inter service sharing issues Ofcom will incorporate a minimum antenna gain of 30 dBi into the technical conditions to ensure that narrow beam antennas are employed. This additional condition will also bring the technical conditions into line with the new ECC new recommendation ECC/REC/ (09)01 that replaces ECC recommendation, ERC/REC/12-09.</p>
<p>Need to mandate the minimum antenna gain 30dBi as it was used in the ECC studies at least in the 63 – 64 GHz in order to minimise the risk of interference.</p>	<p>See above</p>
Question 3:	
<p>Do you agree with a licence exempt approach for the 60 GHz band?</p>	
Ofcom overall response	
<p>The majority of respondents to the consultation were supportive of Ofcom's proposal for a licence exempt approach for the 60 GHz band. Two respondents were less supportive with respect to ITS use within the 63 – 64 GHz band.</p>	
Issues raised	Ofcom's response
<p>A licence exempt approach is not appropriate especially for the 63 – 64 GHz as it will not provide the necessary protection to ITS and the FWS should not be allowed/facilitated in the 63 – 64 GHz as this band is allocated to ITS.</p>	<p>In Ofcom's view, the designation of the 63 – 64 GHz band to ITS by ECC Decision (02)01 (adopted 15 March 2002) and the ECC Decision (09)01 (adopted 13 March 2009) is not intended to be a reservation of this band solely for ITS nor it is intended to exclude other applications or uses.</p> <p>Taking into account the various technical characteristics of the systems to be deployed along with the high gaseous absorption propagation</p>

	attenuation around 60GHz, Ofcom considers that sharing is possible between the different applications (Fixed, ITS, wireless HD & other) with a very low probability of interference and that a licence exempt approach is appropriate for the 60 GHz band.
Reservations raised with respect to a licence exempt approach as it leaves no spectrum available above 57 GHz, in which deployments of fully protected, robustly radio planned point to point links are possible.	Ofcom accepts that a licence exempt approach will introduce a small increase in risk of interference when compared with a fully co-ordinated licensed approach, however, it is necessary to strike a careful balance between managing the risk of interference and introducing unnecessary regulation and co-ordination procedures. Ofcom believes that the band will be utilised mainly by a professional FWS market and considering the technical conditions that Ofcom will introduce and the propagation environment the risk of interference will be extremely small set against the overall benefits offered by a licence exempt approach.
Ofcom’s Impact Assessment dismisses Light Licensing as burdensome, in the logic for justifying an exempt approach. Whilst this is fine for low power devices such as those recently exempted (e.g. for indoor Wireless HD etc), the systems and circumstances here are different. In fact, industry and Ofcom already have a satisfactory working light licensing system for 71/76-81/86GHz links which could be extended if new FWS needed to use the 63-64GHz sub-band, or were sited adjacent to areas/highways with military use.	As indicated above, Ofcom considers that the FWS characteristics combined with the propagation environment at 60 GHz are not the same as in the 70/80 GHz bands. The 60 GHz band has the advantage of substantial atmospheric absorption attenuation with a peak attenuation of about 15dB/km. These factors differentiate 60GHz from other bands and substantially reduce and minimise the risk of interference between FWS and other applications.
Referring to fixed military radiolocation use, we would highlight that the 60GHz band is also subject to current developments for vehicle-related military communications that may involve the whole 59-64 GHz band and geographical areas both within and outside of the three proposed exclusion zones.	Ofcom has consulted with the MoD regarding the release of the 60 GHz band. Three sites will be excluded from the exemption approach to protect MoD radiolocation systems against likely harmful interference.
General Comments	
Issues raised	Ofcom’s response
The timetable for the release of the band for FWS applications, will in effect delay access to the band for a further 12 months.	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. We therefore believe that the required regulations for

	FWS should be incorporated into this review. We are expecting to start this process in Winter 2009/2010 with the regulations coming in to force in Summer 2010.
In formulating future pricing policy in relation to the immediately adjacent lower frequency mixed bathing bands (with reference to minimum path length), Ofcom should note the lack of effective alternatives for some operators.”	Ofcom is currently undertaking a strategic review on spectrum pricing which we intend to consult on. More information on this is available at: http://www.ofcom.org.uk/radiocomms/ifi/srsp/

Annex 3

Impact Assessment

Introduction

- A3.1 The analysis presented in this annex, when read in conjunction with this document, 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.
- A3.2 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
- A3.3 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.
- A3.4 This Impact Assessment (IA) relates to assessing the most appropriate authorisation approach for the release of the 59 – 64 GHz.

Equality Impact Assessment

- A3.5 We are required by statute to have due regard to any potential impacts our proposals may have on race, disability and gender equality – an Equality Impact Assessment (EIA) is our way of fulfilling this obligation and ensuring that we meet our duty of furthering the interests of citizens and consumers.
- A3.6 We have considered whether we are required to undertake a full Equality Impact Assessment for our decisions set out in this statement. On the basis of our Initial Equality Impact Assessment Screening, we have determined that such an assessment is not required as the spectrum will be available to any potential user without any differentiation as to who will have access.

The citizen and/or consumer interest

A3.7 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

A3.8 Ofcom’s policy 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

A3.9 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

A3.10 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 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>

Annex 4

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.