



The Spectrum Plan
for the Glasgow
Commonwealth Games:
Statement

Statement

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Section 1

Executive Summary

Spectrum for the Games.

- 1.1 This document represents the final update to our spectrum plan for wireless communications for the Glasgow 2014 Commonwealth Games ('the Games'). It confirms the provisional conclusion as set out in our draft plan (July 2012) that while there may be high demand for spectrum for key services we will be able to meet demand for the Games.
- 1.2 The final Spectrum Plan is largely the same as that proposed in the July 2012 consultation although with the addition of spectrum necessary to meet some specific demand for broadcasting and communication applications. This document also explains how we plan to address issues raised in response to operational arrangements for the Games.
- 1.3 Since publication of the draft spectrum plan we have worked closely with key stakeholders for Glasgow 2014, and also drawn on our own experience of managing spectrum for the London 2012 Olympic and Paralympic Games (London 2012) in order to understand better the spectrum demand and spectrum management requirements of the Games. The work has been progressed in close cooperation with Commonwealth Games Spectrum Planning Group (COGSPLAG).
- 1.4 We have decided to publish this update now as we have recently finalised arrangement for the loan of spectrum from other public sector bodies for the Games and are consequently able to address the key issue of spectrum supply raised by respondents to the draft plan.

Ofcom's Role

- 1.5 Ofcom is responsible for delivering the U.K. Government's Spectrum Guarantees by organising a full spectrum plan for the wireless-based services that the Organising Committee and the wider Games Family (defined in paragraph 2.9 and footnote 2) require for the Games, for arranging all the licences in good time in support of that plan and for ensuring that harmful interference to wireless services is managed. These responsibilities must be seen in the context of two guarantees given by the UK Government to the Commonwealth Games Federation in support of Glasgow bid for the Games. These guarantee the allocation of the spectrum required for the organisation of the Games and the waiving of fees otherwise payable for that spectrum by members of the Games Family.

Securing spectrum supply

- 1.6 To meet the demands of the Games, we have secured additional spectrum to supplement normal arrangements. The largest supply of this additional spectrum for the Glasgow 2014 Commonwealth Games has been secured from public sector bodies such as the Ministry of Defence (MOD). The work has been progressed in close cooperation with COGSPLAG.

Day-to-day spectrum use

- 1.7 We have sought to meet the UK Government's spectrum guarantees with minimum disruption to other, day-to-day users. We also recognise the importance of non-family radio use to the success of the Games. We are working closely with JFMG, who manage programme making and special events (PMSE) spectrum services on our behalf, to establish effective coordination arrangements between Games Family and other PMSE users in the Glasgow area. At present we do not anticipate revoking or varying existing spectrum licences to meet the requirements of the Glasgow 2014 Commonwealth Games, although, please see paragraphs 4.26-4.28 of this document.

Licensing

- 1.8 Although not of the scale of the London 2012 Olympic Games, we recognise that the 2014 Commonwealth Games present a special challenge to normal licensing arrangements due to the volume and variety of requests for spectrum that will be received. Consequently we have established a specific licensing regime for users covered by the Government's spectrum guarantees. The regime will provide for licences to be tailored to the specific needs of the Games Family, and designed to make the most efficient use of the available spectrum.

Interference Management

- 1.9 We expect the Games to place unprecedented pressure on the use of spectrum within Glasgow. Therefore, a dedicated pool of resources will be deployed to help ensure the Games' success by allowing key wireless services to remain as free from harmful interference as is reasonably practicable and by enforcing spectrum policy.
- 1.10 As part of our response, we will provide a 'Testing and Tagging' validation service for wireless transmitter equipment that will be used within key Games venues. The purpose of this service will be to establish whether equipment settings were consistent with the authorisation to use the equipment. Where appropriate, we will be working with the Organising Committee's security staff to ensure only wireless transmitter equipment that has successfully passed these validation checks is taken into Games venues.
- 1.11 Ofcom will deploy a network of sensors both within key Games venues and outside the venues to help us to locate the position of interfering radio signal sources. Whilst the final location of any such signal source will always require an experienced Spectrum Engineer on foot, we anticipate that a position location network should allow Ofcom to reduce significantly the time required to resolve any radio interference issues that may arise.
- 1.12 Before the Glasgow Games, we will ensure the spectrum that will be used during the games is as free from unauthorized use and unwanted emissions as is reasonably practicable.

Section 2

Introduction

- 2.1 On 23rd July 2012 we published a consultation setting out a draft spectrum plan for wireless communications at the Glasgow 2014 Commonwealth Games ('the draft plan').¹ The consultation was accompanied by an independent study by Analysys Mason that helped to inform our view on spectrum demand for the Games.
- 2.2 Our provisional conclusion as set out in that document, supported by the Analysys Mason study, was that while there may be high demand for spectrum for key services like private mobile radio, wireless microphones and wireless cameras, we anticipated that we would be able to meet the estimated demand if spectrum supply were bolstered with some additional spectrum sourced from public sector holdings. We sought stakeholder views on the draft plan.
- 2.3 Since publication of the draft plan we have progressed our detailed preparations for Glasgow 2014. To do this we have taken into account the responses that we received to the draft plan, worked closely with key stakeholders for Glasgow 2014, and also drawn on our own experience of managing spectrum for the London 2012 Games in order to understand better the spectrum and spectrum management requirements of the Games. The work has been progressed in close cooperation with COGSPLAG.
- 2.4 This is the final update to our spectrum plan for wireless communications for the Glasgow 2014 Commonwealth Games. It explains how we plan to address the issues raised in response to our draft spectrum plan and provides a final update to that plan, indicating where changes have been made, particularly with regard to the additional spectrum we have secured. It also provides more information on spectrum management arrangements for the Games more generally. We have decided to publish this update now as we have recently finalised arrangements for the loan of spectrum from other public sector bodies for the Games and are consequently able to address the key issue of spectrum supply raised by respondents to the draft plan.
- 2.5 Some details of the plan will continue to evolve through to the end of the Games as we respond to changing circumstances. However the plan summarised here will be the basis for the great majority of the spectrum assignments and usage at the Games.

Context

- 2.6 On 9 November 2007, Glasgow was awarded the right to host the XX Commonwealth Games. These Games will take place between 23 July and 3 August 2014.
- 2.7 Around 6,500 athletes and officials from 71 nations will take part in CG 2014 which will use 15 key locations/venues (around 40 venues in total including those used for training) which are mostly within Glasgow.
- 2.8 Glasgow 2014 Ltd (hereafter 'the Organising Committee') is responsible for preparing and staging the Glasgow 2014 Commonwealth Games. Wireless technologies have a fundamental role to play both in the build-up to and during the Glasgow 2014

¹ <http://stakeholders.ofcom.org.uk/binaries/consultations/glasgow2014/summary/main.pdf>

Commonwealth Games as well as in associated activities (e.g. cultural events). The Organising Committee will continue to work closely with its partners to ensure it uses existing and proven technologies, including wireless technologies, to deliver robust and stable services.

- 2.9 Ofcom is responsible for delivering the U.K. Government's Spectrum Guarantees by organising a full spectrum plan for the wireless-based services that the Organising Committee and the wider Games Family (defined in paragraph 2.9 and footnote 2) require for the Games, for arranging all the licences in good time in support of that plan and for ensuring that harmful interference to wireless services is managed. These responsibilities must be seen in the context of two guarantees given by the UK Government to the Commonwealth Games Federation in support of Glasgow bid for the Games. These guarantee the allocation of the spectrum required for the organisation of the Games and the waiving of fees otherwise payable for that spectrum by members of the Games Family.
- 2.10 In our consultation we have recognised and acknowledged the importance of services not covered by the UK Government's spectrum guarantees to the success of the Glasgow 2014 Commonwealth Games. We have worked with stakeholders to ensure that, so far as possible, their needs are met. We have also acknowledged the importance of day-to-day wireless-dependent services for citizens and consumers. We continue to work to ensure that any spectrum requirements generated by the Glasgow 2014 Commonwealth Games and other related events and celebrations are met and coordinated with day-to-day spectrum uses.

Meeting Spectrum Demand

- 2.11 In this document we confirm our initial conclusion, as set out in the draft plan, that we will be able to meet demand for the Games and identify where we have increased spectrum supply with additional spectrum primarily sourced from public sector holdings. This is set out in detail in Section 4 to this document.
- 2.12 Many users have already submitted their draft requirements for frequencies for the Games. As expected, demand is high, reflecting the importance of wireless services to the Games. Nevertheless, our analysis suggests that the spectrum identified for use by the Games will be adequate to meet users' needs.
- 2.13 Processes for licensing and assignment are now operational (as set out in section 5 to this document) and these will allow us to clarify the detail of users' requirements in the run up to and during the Games. This final update does not therefore give detailed demand information.

Legacy

- 2.14 We have agreed with the Government that its spectrum guarantees do not extend beyond the end of the Glasgow 2014 Commonwealth Games and so do not cover legacy use. Spectrum temporarily made available by UK public sector bodies will be returned to them once the Glasgow 2014 Commonwealth Games requirement has ended. All licenses granted for the Commonwealth Games will be temporary and will expire following the end of the games.

Government endorsement

2.15 The Government's committee on UK spectrum strategy (UKSSC) asked us to publish the following endorsement of the Spectrum Statement:

'UKSSC has been fully consulted with regard to this Statement. It endorses the content and the spectrum plan laid out by Ofcom and welcomes the steps Ofcom has taken to meet the spectrum guarantees given by the Government in support of the Glasgow 2014 Commonwealth Games.'

Document Structure

2.16 The document is structured as follows:

- Section 3 summarises responses to our July 2012 consultation on our draft spectrum plan for the Games;
- Section 4 provides a final update on the spectrum plan for the Games.
- Section 5 summarises spectrum planning and licensing arrangements for the Games.
- Section 6 summarises interference management arrangements for the Games.

Section 3

Responses to Consultation

3.1 We received responses to the Consultation from the following stakeholders:

- Glasgow 2014 – the Organising Committee (OC)
- Sunset and Vine, Global TV Service – the Host Broadcaster (HB)
- BBC – BBC Scotland are the Domestic Rights Holder
- Airwave
- Met Office
- Radio Society of Great Britain
- British Entertainment Industry Radio Group

3.2 The responses have been published on our website here:

<http://stakeholders.ofcom.org.uk/consultations/glasgow2014/?showResponses=true>.

A number of issues were raised in the responses to this consultation which are summarised in this section.

Equipment Constraints

3.3 A number of respondents to the consultation expressed the view that the planning process should not be geared towards trying to move users into spectrum bands or frequencies that are not generally utilised for each type of device. Although many acknowledge that new areas such as 7GHz can be used for wireless cameras for example, the costs of re-tuning and the lack of available equipment for this band will mean that few will actively want to pursue this option.

3.4 In Section 4 we indicate that we have secured additional spectrum in the 2-3.6GHz to help to support wireless camera access in these key bands.

Spectrum Supply

3.5 Respondees generally supported Ofcom's assessment of demand and provided useful input to inform the finalisation of our plan. However, many highlighted that the Games still represented a significant spectrum management challenge and highlighted some specific issues with spectrum supply in Glasgow.

3.6 In terms of our demand assumptions most respondents agreed that they were sound, although we were advised to look again at Mobile Satellite Services. The BBC felt that a number of their BAU requirements had been missed from the Analysys Mason spectrum demand evaluation and we should ensure these are factored into future planning.

3.7 Concerns were raised over the increased squeeze on spectrum supply especially at 2GHz and 3GHz. Respondees, while they acknowledged that some equipment can operate at higher frequencies, they requested that Ofcom was mindful of the fact that

equipment will be used at frequencies where it has traditionally been used regardless of any desire to move users to higher bands where supply may be better.

- 3.8 In Section 4, we indicate that we have secured additional spectrum in the 2 to 4GHz to help to support wireless camera access.
- 3.9 Respondents also did not see a big role for free-space optics technology although some say they would use it if it became relevant in the coming 18 months.

Licensing

- 3.10 Respondee acknowledged that a dedicated solution focused at meeting the requirements of the Games Family had been of real value during London 2012 and stressed the need for Ofcom to ensure that arrangements for Glasgow 2014 were appropriate for the challenge of the Games.
- 3.11 Respondee stressed that the licensing process should be simple and well advertised to dissuade unlicensed use. There was concern voiced by the BBC over JFMG's ability to be the single point of contact for such a complex licensing exercise. In terms of spectrum re-use it is recommended that robust planning is put in place and that licences could be issued for more specific time periods than for 2012.
- 3.12 Respondee said that it should be anticipated that equipment will move between venues therefore licensing and any tagging should reflect this. Licensing should also be carried out by a single entity with a single point of contact for both Games and non-Games users to allow for good co-ordination.
- 3.13 In Section 5, we set out the process that we will follow for applications for Licensing and the services for both Games Family and non Games Family users that will be provided by JFMG.

Operational Support

- 3.14 Stakeholders are expecting the same level of professional spectrum and interference management services in Glasgow as was seen at the London 2012 Games. At a more detailed level, some suggestions are made to help make the most of our lessons learned from London 2012. A desktop exercise to help work through what the actual levels of demand were in each area and to map that on to relevant sports for 2014 is thought to be of use.
- 3.15 In Section 6, we outline how we will approach interference resolution at games time.

Met Office Concerns

- 3.16 The Met Office highlighted concerns regarding the interference potential from non-standard or non-compliant 5 GHz RLANs² to weather radar operating at 5.6 GHz. Ofcom confirms that only 5 GHz RLAN equipment operating in accordance with UK exemption arrangements are authorised for use in the UK. In addition, as detailed in section 6, Ofcom will also operate enhanced interference management services for the Games to address any interference issues should they arise. Ofcom recognises the vital contribution that Met Office's rain radars will make to the Games and, as

² Radio Local Area Networks which are also sometime referred to as WiFi networks

such, we currently have no plans to use the 5600-5650 MHz band more intensively in support of the Games.

Amateur services

- 3.17 RSGB highlighted the support they had provided to London 2012, for example in supporting sharing of the 430 MHz with Games Family users. They stressed that such arrangements would take time to implement and that adequate notice would be needed to facilitate them. As set out in Section 4, lower spectrum demands means that we have no such plans. However, should demand exceed significantly our projections we may review this position, and Ofcom would engage with the amateur community at the earliest opportunity.
- 3.18 More generally the RSGB highlighted the popularity of such events with the amateur radio community and indicated a desire to engage in a dialogue with Ofcom about how such activity could be supported.

Section 4

Spectrum Plan - Final Update

Finalising the Spectrum Plan

- 4.1 As set out previously, in July 2012 we consulted on a draft spectrum plan for wireless communications at the Glasgow 2014 Commonwealth Games (“the draft plan”). Our provisional conclusion was that while there may be high demand for spectrum for key services we anticipated that we would be able to meet the estimated demand if spectrum supply was bolstered with some additional spectrum sourced from public sector holdings.
- 4.2 Since publication of the draft plan we have taken forward our detailed preparations for Glasgow 2014. To do this we have taken into account the responses we received to the draft plan, worked closely with key stakeholders for Glasgow 2014, and also drawn on our own experience of managing spectrum for the London 2012 Games in order to better understand the spectrum and spectrum management requirements of the Games. The work has been progressed in close cooperation with COGSPLAG.
- 4.3 Many users have also submitted their draft requirements for frequencies for the Games. This has enabled us to refine the demand estimates that underpinned our draft plan.
- 4.4 Consequently we are now able to confirm our initial conclusion, as set out in the draft plan, that we will be able to meet demand for the Games. The final Spectrum Plan is largely the same as that upon which we consulted in July 2012 although with the addition of additional spectrum necessary to meet some specific demand for broadcasting and communication applications. In Annex 1, we summarise the available bands.
- 4.5 In the following section we summarise developments in the plan since the July 2012 draft as they relate to key types of radio use at the Games, and highlight where additional spectrum has been sourced to supplement spectrum supply. In Annex 1 we summarise the available bands.

Meeting spectrum demand

Private Mobile Radio, Talkback and Telemetry

- 4.6 Most demand for private mobile radio (PMR) will be met by the network being built for the Organising Committee which will operate in loan spectrum secured from MOD. Demand outside of this network will be met from spectrum in the normal bands for PMR, talkback and telemetry supplemented by a loan of spectrum from the Scottish Government in the range 450 to 470 MHz. However, it is our expectation that where requirements can be met from the Organising Committee network, stakeholders will adopt this solution.
- 4.7 For the emergency and public safety services (E&PSS) we have secured temporary access to 20 duplex channels to support the additional requirements of Airwave’s TETRA network. These channels are also on loan from MOD for the period of the Games. There is no spectrum legacy, and these channels will be returned to the MOD once the Games cease.

Wireless microphones and in-ear monitors

- 4.8 Most wireless microphones will only operate in UHF Bands IV and V, sharing with digital terrestrial television (DTT). We have fully categorised the availability of interleaved spectrum for microphones and In-Ear Monitors (IEMs) in Glasgow and at the out of Glasgow Games venues. Our assessment has taken full account of deployment plans for DTT multiplexes using DVB-T2/MPEG4 in the range 550 to 606 MHz recently awarded to Arqiva³, and plans for local television provision⁴. We have validated this available capacity against our best understanding of requirements from the main stakeholders.
- 4.9 We remain confident, based on our knowledge of available technologies and the density with which they can be deployed, that there is sufficient spectrum available for wireless microphones and IEMs.

Wireless cameras

- 4.10 In our consultation we suggested that there would be a high level of demand for spectrum for wireless cameras. The preference of most respondents to our consultation is for capacity between 2000 MHz and 4000 MHz.
- 4.11 Since publication of the draft spectrum plan Ofcom has met regularly with the Organising Committee, the Host Broadcaster (SVGTV) and other key stakeholders as they developed their own requirements, and have fully reviewed and analysed the spectrum demand requirements for the most challenging of the events i.e. the Marathon and the cycling road races.
- 4.12 We recognise that there are specific issues with the planned configuration of key systems at the Games that require operation in the 2 GHz range. We also recognise that wireless camera equipment operating above 4000 MHz may not be readily available. Consequently, to meet this demand for frequencies below 4000 MHz, we have worked with UK public sector bodies, including the MOD, the Home Office and the Scottish Office, to supplement our spectrum supply for wireless cameras especially in the range 1900– 2500 MHz and 3400– 3500 MHz. In total more than forty 10 MHz channels will be available within this range.
- 4.13 Frequencies in the range 1980-2010 MHz and 2170-2200 MHz, which are allocated to the mobile satellite services, are also well suited to applications such as wireless cameras and we have received the full cooperation of our licensees to enable temporary access to these bands. This will provide us with useful additional capacity for wireless cameras.
- 4.14 Spectrum in 2.6 GHz band (2500-2690 MHz) was awarded to support 4G mobile in March 2013⁵. As set out in our draft plan there is no requirement on licensees in this band to take our plans for Glasgow 2014 into account as they roll-out their networks.
- 4.15 We believe that with the identified additional spectrum below 4 GHz there is sufficient spectrum to meet the needs of the Games. We recognise that there remains the potential for congestion during certain events and we will continue to work with key stakeholders on their requirements to ensure that a robust plan is in place.

³ <http://stakeholders.ofcom.org.uk/consultations/600mhz-award/statement>

⁴ <http://licensing.ofcom.org.uk/tv-broadcast-licences/local/>

⁵ <http://stakeholders.ofcom.org.uk/spectrum/spectrum-awards/awards-archive/completed-awards/800mhz-2.6ghz/>

- 4.16 Noting the high demand for frequencies below 4 GHz we continue to work with the organising committee to ensure as much use as possible is supported in the 7 GHz range. More generally encourage all those who are willing and able to use frequencies above 4 GHz to do so whenever possible.

WiFi

- 4.17 The Met Office highlighted concerns regarding the interference potential from non-standard or non-compliant 5 GHz WiFi R/LAN are to weather radar operating at 5600-5650 MHz band. Ofcom confirms that only 5 GHz RLAN equipment operating in accordance with UK exemption arrangements are authorised for use in the UK. Ofcom will also operate enhanced interference management services for the Games to address any interference issues should they arise. As stated above, Ofcom recognises the vital contribution that Met Office's rain radars will make to the Games and, as such, we currently have no plans to use the 5600-5650 MHz band more intensively in support of the Games.

Ofcom's TV White Space Pilot

- 4.18 Planning is now underway for a pilot of innovative TV white space technology in the UK. The pilot will use the interleave spectrum (also known as TV white spaces) that exist between airwaves reserved for digital terrestrial TV broadcasting. The pilot is planned to commence later this year and will run through some of 2014.
- 4.19 Details of the pilot are yet to be finalised but arrangements will ensure that the requirements of the Games have priority of access to available interleaved spectrum and that appropriate measures are in place to ensure a lower possibility of harmful interference.
- 4.20 More details on our plans for white space can be found at <http://stakeholders.ofcom.org.uk/spectrum/tv-white-spaces/>

Securing spectrum supply

- 4.21 The largest supply of additional spectrum for the Glasgow 2014 Commonwealth Games has been secured from public sector bodies such as the MOD. These arrangements are essential to ensure that spectrum use during the Glasgow 2014 Commonwealth Games is efficient and properly coordinated and the risk of harmful interference to all spectrum users is minimised.
- 4.22 The plan and the arrangements for securing spectrum are coordinated by COGSPLAG. The arrangements summarised in this document have been agreed through COGSPLAG with the full cooperation of major public sector spectrum donors such as the Ministry of Defence (MOD), the Scottish Government and the Home Office and our plan has been endorsed by the government's UK Spectrum Strategy Committee, to which COGSPLAG reports.
- 4.23 Some details of the plan will continue to evolve through to the end of the Games as we respond to changing circumstances. Any such change will be coordinated through COGSPLAG. However, the plan summarised here will be the basis for the great majority of the spectrum assignments and usage at the Games.

Jamming trials and radio navigation satellite services

- 4.24 In cooperation with the UKSSC we will seek to ensure that no jamming trials are carried out during the period of the Games that could affect the availability of radionavigation satellite services (e.g. Global Positioning Service).

Day-to-day spectrum use

- 4.25 We recognise and acknowledge the importance of services not covered by the UK Government's spectrum guarantees to the success of the Glasgow 2014 Commonwealth Games and the importance of day-to-day services.
- 4.26 We have sought to meet the UK Government's spectrum guarantees with minimum disruption to other, day-to-day users. Our overall approach remains that we have first sought to allocate unencumbered spectrum, and then spectrum that will require specific measures to facilitate shared access with existing users. Only in the last resort would we temporarily remove or restrict existing users from spectrum for the duration of the Glasgow 2014 Commonwealth Games requirement.
- 4.27 Under paragraph 8(5) of Schedule 1 to the Wireless Telegraphy Act 2006, Ofcom may at any time by giving notice in writing revoke or vary a licence if it appears to us to be necessary or expedient to do so for the purpose of securing compliance with an international obligation of the UK. The Government is able to direct us for the same purpose and has advised us that it regards its guarantees to the Commonwealth Games Federation to constitute such an obligation.
- 4.28 Ofcom will endeavour to explore all options to accommodate both Games and non-Games use before revoking or varying licences. We are working closely with JFMG, who manage programme making and special events (PMSE) spectrum services on our behalf, to establish effective coordination arrangements between Games Family and other PMSE users in the Glasgow area. At present we do not anticipate revoking or varying existing spectrum licences, including those for UK-wide wireless camera use by broadcasters, to meet the requirements of the Glasgow 2014 Commonwealth Games, but should our assessments of demand and supply for spectrum change we may need to do so. We anticipate that spectrum near Games venues will be extremely congested and this may mean that the normal experience of radio use will change, particularly at times and in locations of peak Glasgow 2014 Commonwealth Games demand. We will, of course, endeavour to keep any adverse impact to a minimum and will publish as much information as possible about such impact on our website.

Innovation

- 4.29 We do not have a direct role in promoting innovation at the Glasgow 2014 Commonwealth Games. We will, however, support the Organising Committee and others' roles in line with our duty under the Wireless Telegraphy Act 2006 to have regard to the desirability of promoting the development of innovative services in carrying out our spectrum functions if required.

Legacy

- 4.30 We have agreed with the Government that its spectrum guarantees do not extend beyond the end of the Glasgow 2014 Commonwealth Games and so do not cover legacy. Spectrum temporarily made available by UK public sector bodies will be

returned to them once the Glasgow 2014 Commonwealth Games requirement has ended.

Section 5

Licensing Arrangements

Licensing/authorisation

- 5.1 Although not of the scale of London 2012, we recognise that the Glasgow 2014 Commonwealth Games present a special challenge to normal licensing arrangements due to the volume and variety of requests for spectrum that will be received. Respondees to the consultation also stressed the need for Ofcom to ensure that appropriate arrangements were in place for the Games.
- 5.2 We have worked closely with the Organising Committee and JFMG (who manage spectrum on our behalf for special events), and applied our own learnings from London 2012 to provide an appropriate licensing solution for Glasgow 2014.
- 5.3 As a result of those discussions, we have established a licensing regime specifically for users covered by the Government's spectrum guarantees. Applications should be made to the Organising Committee but licensing services will be provided on our behalf by JFMG. The regime will provide for licences tailored to the specific needs of the Games Family, and designed to make the most efficient use of the available spectrum.
- 5.4 In processing licence applications, JFMG will conduct detailed technical analysis to ensure compatibility between different uses of spectrum. The licences that will be issued will typically specify the location, frequency, bandwidth, modulation and power of permitted operation. Where demand for spectrum is particularly high, it may be necessary to authorise some uses at specific venues and at specific times only.
- 5.5 Ofcom will ensure that appropriate governance arrangements are in place to enable it to have appropriate oversight of the process.
- 5.6 Details of the application process are available from the Organising Committee by email at spectrum@glasgow2014.com, or by telephone 030 2014 0711 Applications should be submitted directly to the Organising Committee by email by 29th November 2013.

Non-Games Family Users.

- 5.7 In our spectrum plan we have recognised and acknowledged the importance of services not covered by the UK Government's spectrum guarantees to the success of the Glasgow 2014 Commonwealth Games. This includes use of radio in support of the many cultural events that will accompany the Games, and also "business as usual use" close to Games venues.
- 5.8 Respondees to the consultation also highlighted the need to ensure that guaranteed and non-guaranteed use is effectively coordinated with guaranteed use.
- 5.9 Applications from non Games Family users will also be managed on our behalf by JFMG. Management of both Games Family and non Games Family users by a single organisation will reduce the coordination challenge associated with this element of spectrum planning. Applications from non-guaranteed use will be through normal

BaU channels and JFMG will produce a single plan addressing requirements from both types of user.

- 5.10 All applications from non rights holders should be submitted directly to JFMG, at CWG2014@jfmq.co.uk by March 28th 2014.
- 5.11 The respondees to the consultation raised this point that licensing should be carried out by a single entity with a single point of contact for both Games and non-Games users to allow for good co-ordination.

WiFi

- 5.12 Use of WiFi equipment which is compliant with UK licence exemption regulation does not require a licence to operate in the UK. However, the Organising Committee do require that such equipment is registered with them before it is operated within their venues. This should be done using the standard licence application process for Games Family.
- 5.13 Stakeholders can apply for WiFi access through the Organising Committee Ratecard system.

Licence-exempt equipment

- 5.14 Certain equipment may be exempted in the UK from the requirement to be licensed under the Wireless Telegraphy Act because its use is not likely to cause harmful interference. Experience from past Games has shown, however, that the unusual concentration of such equipment in particular venues can create the potential for localised harmful interference.
- 5.15 For the Games, we consider that licence exempt equipment will not be required to be registered or otherwise authorised by Ofcom to operate in games venues. However, there may be instances where the Organising Committee does require registration and stakeholders should contact them directly in the first instance at spectrum@glasgow2014.com.

Section 6:

Interference management

6.1 We expect the Glasgow 2014 Commonwealth Games to place unprecedented pressure on the use of spectrum within Glasgow. Therefore, a dedicated pool of resources will be deployed to help ensure the Games' success by allowing key wireless services to remain as free from harmful interference as is reasonably practicable and by enforcing spectrum policy. We will use a risk-based approach to determine the appropriate operational response and ensure resources are deployed effectively.

Testing & Tagging

6.2 As part of our response, we will provide a 'Testing and Tagging' validation service for wireless transmitter equipment that will be used within key Games venues. The purpose of this service will be to establish whether equipment settings were consistent with the authorisation to use the equipment. Validation will include measuring operating frequency, transmitter power, modulation bandwidth and spurious emissions. Where appropriate, we will be working with the Organising Committee's security staff to ensure only wireless transmitter equipment that has successfully passed these validation checks is taken into Games venues.

Sensors

6.3 Ofcom will deploy a network of sensors both within key Games venues and outside the venues to help us to locate the position of interfering radio signal sources. Whilst the final location of any such signal source will always require an experienced Spectrum Engineer on foot, we anticipate that a position location network should allow Ofcom to reduce significantly the time required to resolve any radio interference issues that may arise.

6.4 Before the Glasgow Games, we will ensure the spectrum that will be used during the games is as free from unauthorised use and unwanted emissions as is reasonably practicable.

Response

6.5 We will deploy dedicated interference-resolution teams, made up of experienced Spectrum Engineers and Enforcement Officers within key Games venues to reduce our response times as far as reasonably practicable. All spectrum users will be required to operate within the terms of their authorisation, including transmitting at the specified frequency. Any found not to be doing so – which would be a criminal offence in the UK – will be required to stop transmitting and to tune to their authorised frequency or apply for one immediately. We may also take enforcement action – including removing equipment and prosecution – and the Organising Committee may revoke accreditation.

6.6 We will endeavour to manage any cases of harmful interference to wireless services that arise according to the following operational priorities:

- safety of life

- defence and national security
- Games Family users
- business-critical systems
- other members of the Commonwealth Games Federation (CGF)
- day-to-day spectrum users

Annex 1**Summary of Key Bands and Applications**

Band	Typical Applications	Popularity
52 – 82 MHz	ADS, Mass Cast	Low
143-175 MHz	PMR, Talkback	Low
427 – 470 MHz	PMR, Talkback, Telemetry	High
470 – 518 MHz	Talkback, Telemetry	Low - Medium
518 - 790 MHz	Wireless Microphones, In Ear Monitors, Talkback (Intercom)	Medium – High
1.9 – 2.5 GHz	Wireless Cameras / Video Links	High
3.4 – 3.5 GHz	Wireless Cameras / Video Links	Medium
5.8 – 6 GHz	Wireless Cameras / Video Links	Low
7.1 – 7.5 GHz	Wireless Cameras / Video Links	Medium
8.4 – 8.5 GHz	Wireless Cameras / Video Links	Low
10.3 – 10.4 GHz	Wireless Cameras / Video Links	Low