Communications
Regulatory Authority
State of Qatar

هيئة تنظيم الاتصالات
دولة قطر

# Spectrum Plan for FIFA World Cup™ QATAR 2022


Updated May 2022

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## Annex

Section 1

# Summary

## The FIFA World Cup 2022™

**1.1** The FIFA World Cup Qatar 2022™ (FWC 2022) will take place between 21 November and 18 December 2022. It will be staged at various locations around Qatar, concentrating on the new eight FIFA Stadiums. Wireless applications will play an important role both in the build-up to and during the Event.

## CRA Role

**1.2** The Communications Regulatory Authority "CRA" is the responsible authority for regulating and managing all the affairs relating to the radio spectrum use. As such, CRA is responsible for organizing a full spectrum plan for FWC 2022 in accordance with the Decree Law No. (34) of 2006 on the promulgation of the Telecommunications Law as amended by the Law No. (17) of 2017, the Executive By-Law for the Telecommunications Law and the CRA Strategy 2020-2024.

**1.3** This responsibility must be seen in the context of the guarantee given by the Government of the State of Qatar (Government) to the Fédération Internationale de Football Association (FIFA) in support of Qatar's bid for the Event. This guarantee the allocation of spectrum required for the organization of the Event.

## Spectrum Requirements

**1.4** CRA expects spectrum to be required primarily for three broad categories of applications:

**1.4.1** Private Mobile Radio (PMR) by Qatar 2022 Local Organizing Committee (LOC) of FWC 2022;

**1.4.2** Broadcasting by Broadcasting Services (BS), the Host Broadcaster for the Event (HB), the Media Rights Licensees (MRLs), and Rights-Holding Broadcasters (RHBs) that have contracted with the FIFA to broadcast the Event;

**1.4.3** Short Range devices such as wireless microphones, assistive listening devices, RFID, WLAN/ RLAN, etc. mainly used by the MRLs, press users, service providers and Participating Member Associations (PMAs).

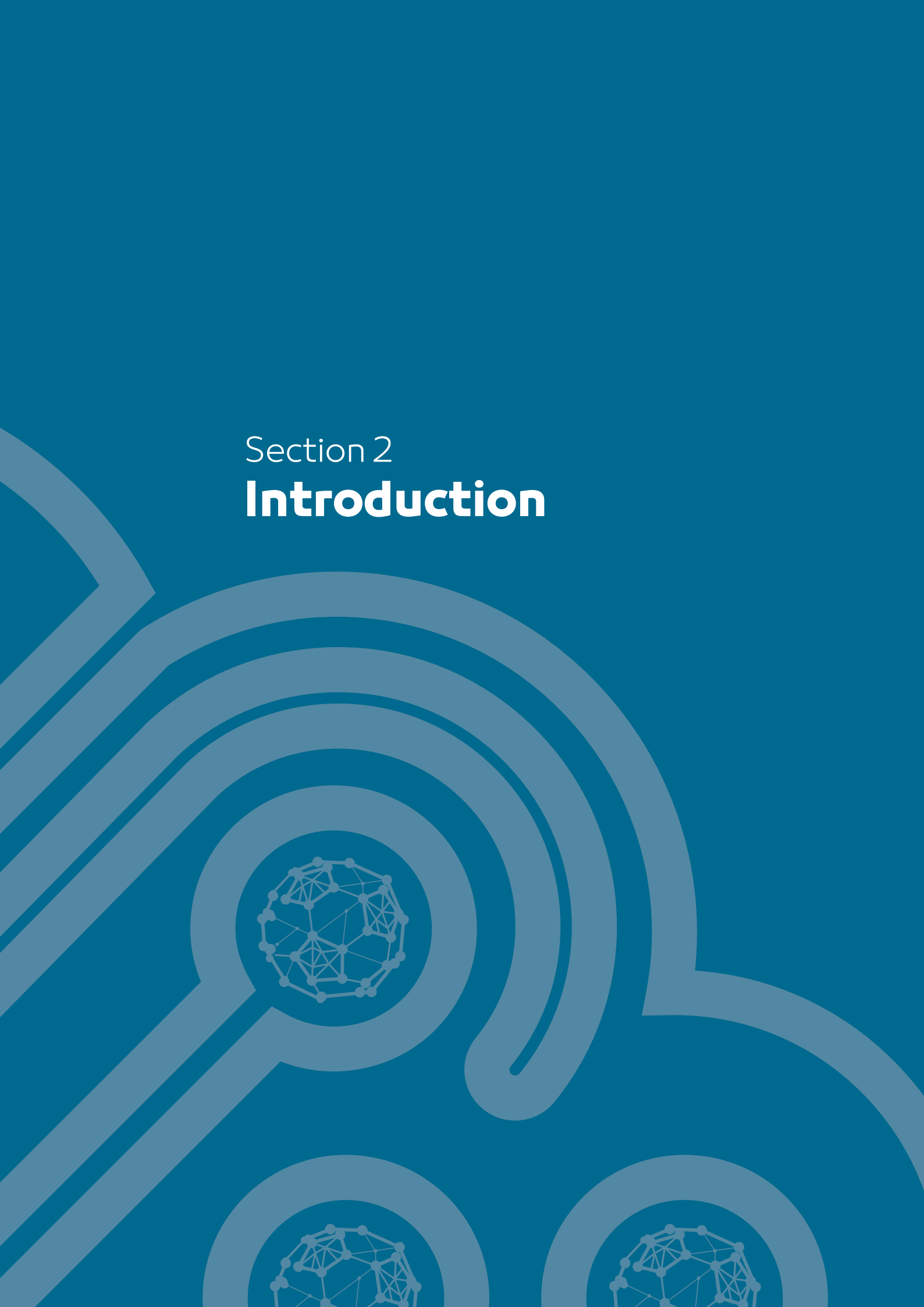
**1.5** Support services might also require more spectrum to fulfil their roles at FWC 2022.

## Stakeholders

**1.6** CRA is working closely with FIFA, Supreme Committee for Delivery and Legacy (SC), FIFA World Cup Qatar 2022 LLC (Q22) and other domestic stakeholders. CRA will continue the discussions with the other stakeholders, both in Qatar and overseas, with an interest in the use of wireless applications at FWC 2022 as appropriate.

Section 2

# Introduction



# Introduction

## The FIFA World Cupn Qatar 2022™

**2.1** On 2nd December 2010, Qatar was chosen to host FWC 2022. This will take place between 21 November and 18 December 2022.

**2.2** The FIFA World Cup, often simply called the World Cup, is an international association football competition contested by the senior men's national teams of the members of the FIFA. The championship has been awarded every four years since the inaugural tournament in 1930.

**2.3** The current format involves a qualification phase, which takes place over the preceding three years, to determine which teams qualify for the tournament phase. In the tournament phase, 32 teams, including the automatically qualifying host nation(s), compete for the title at venues within the host nation(s) over about a month.

**2.4** The World Cup is the most prestigious association football tournament in the world, as well as the most widely viewed and followed sporting event in the world, exceeding even the Olympic Games.

**2.5** 17 countries have hosted the World Cup. Brazil, France, Italy, Germany, and Mexico have each hosted twice, while Uruguay, Switzerland, Sweden, Chile, England, Argentina, Spain, the United States, Japan and South Korea (jointly), South Africa, and Russia have each hosted once. Qatar will host the 2022 tournament.

## Scope

**2.6** This document defines the spectrum plan for the FWC 2022 based on the data from the past major international sport events and the status of currently assigned spectrum in Qatar. This document sets out the current analysis of the spectrum requirements of the FWC 2022. It also explores the possibility of using spectrum more efficiently to meet those requirements.

**2.7** It also aims to promote the orderly spectrum usage by notifying stakeholders the spectrum application procedure, test and tagging implementation and the implementation of radio spectrum monitoring.

## High-Level Service Requirements as requested by the FIFA

**2.8** The following statements specify the minimum requirements to be satisfied by the Spectrum Management services provided for the FWC 2022:

**2.8.1** The LOC shall ensure that the Government (and/or relevant state, regional or municipal governmental authorities, as applicable) obtains all radio frequencies necessary for the successful delivery of the FWC 2022.

**2.8.2** A spectrum plan shall be published by the Spectrum Management service provider listing all licensed and license-exempt radio frequencies available in the host country and identifying the current category of use for each frequency or band of frequencies, including permitted transmitted power levels.

**2.8.3** Frequency bands containing frequencies which are allocatable to approved users through a license application process shall be clearly marked. Frequency bands which shall not be allocatable for use by approved stakeholders of the FWC 2022 shall be identified with a reason for non-allocation (e.g. 'reserved for military use').

**2.8.4** This spectrum plan shall be published no later than two years prior to the start of the FWC 2022.

**2.8.5** An online ordering tool shall be provided by the Spectrum Management service provider for stakeholders approved by FIFA to submit applications for the following:

- An application for use of a specific frequency or band of frequencies within a licensed frequency band in the host country
- An application for use of a specific channel within a license-exempt frequency band in the host country

**2.8.6** Applications for radio frequencies or channels shall be venue-specific such that an applicant may apply for the use of a radio frequency or channel only within a single FWC 2022 venue.

**2.8.7** This online spectrum application process shall be operational for stakeholder applications no less than one year prior to the start of the FWC 2022.

**2.8.8** Priority in the selection and allocation of licensed and license-exempt spectrum shall be given to FIFA and the host broadcaster.

**2.8.9** Applications for licensed and license-exempt spectrum shall be assessed by the Spectrum Management service provider and the applicant notified of the assigned frequency or channel, including any restrictions for its use such as transmission power levels, operating locations and/or operating dates. Where the requested frequency or channel is unavailable an alternative frequency or channel shall be proposed to the applicant.

**2.8.10** The online process for stakeholders to apply for use of licensed and license-exempt spectrum shall close no later than three months prior to the start of the FWC 2022. An emergency application process shall be established by the Spectrum Management service provider in conjunction with FIFA and Q22 for spectrum applications received after the closure of the application period.

**2.9** In accordance with these requirements, CRA is responsible for organizing a full spectrum plan for the FWC 2022 and for arranging all the spectrum licenses in good time in support of the plan.

## Spectrum Management

**2.10** Spectrum is a fundamental, finite and valuable national resource which belongs to the State of Qatar, and which the CRA is charged with managing on behalf of the State.

**2.11** Spectrum is important to all sectors of the communications services industry and other strategic industries. There are international regulatory frameworks for the management of spectrum and regulators world-wide are continually reviewing the way in which spectrum policy, allocation and assignments are determined. This helps to ensure that the resource can be fairly distributed and used to optimum national and economic benefit.

**2.12** Qatar Radio Spectrum Outlook 2022 was set out for consultation in the beginning of 2020 to provide stakeholders with an overview of CRA's overall approach and planned activities related to meeting the expected demand for commercial mobile services, satellite services, broadcasting service, and program making and special events applications over the years 2020 - 2022. It outlines CRA's plans to address issues related to access to spectrum and enabling new technologies, and to make resources available to support telecommunications services and applications that are expected to require new or additional spectrum in the coming years, especially during the hosting of the FWC 2022.

## Radio Spectrum License/Authorization

**2.13** No person shall operate any radio equipment or make any use of radio frequencies, without obtaining a radio spectrum license or a radio frequency authorization from the CRA.

**2.14** The Licensee is obliged to use radio spectrum in accordance with the terms and conditions specified in the radio spectrum license or in the radio frequency authorization.

## Spectrum Fees Considerations

**2.15** The spectrum fee is currently calculated as per spectrum fee policy and fee schedule that was levied as per Decision of the Minister of Information and Communication Technology No. (15) of 2015 in place since July 8, 2015.

**2.16** The schedule is used to calculate fees for different frequency bands according to the technical parameters such as transmit power, area size and bandwidth per channel etc. for each authorized user / licensee.

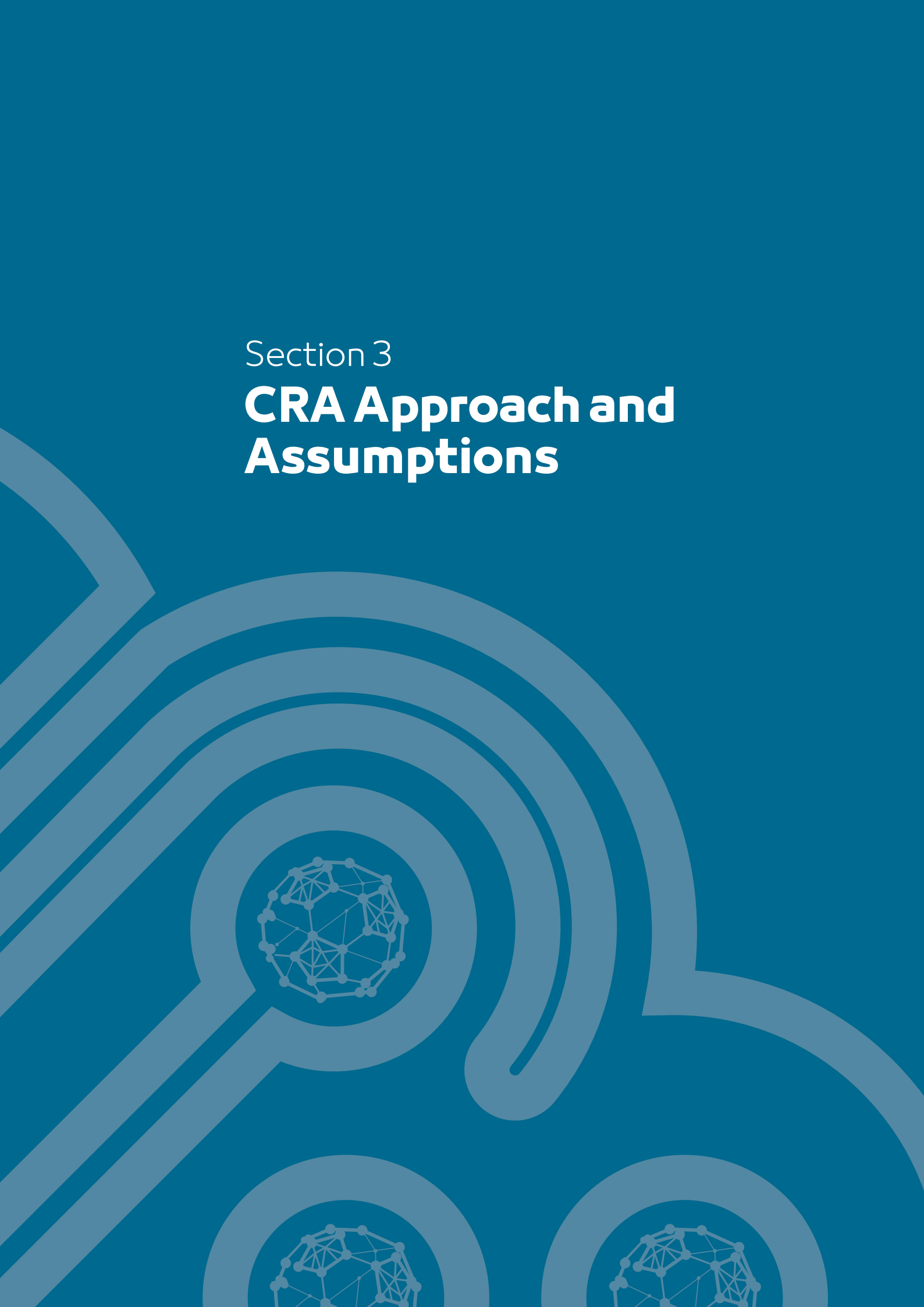
**2.17** The per MHz spectrum fee for terrestrial radio frequency services as per this decision in various bands is shown in the table in Annex 1.

**2.18** The schedule for calculating the satellite-based services in various bands as per the technical perimeters authorized for each user/ licensee is shown in Annex 2.

**2.19** However, there are some categories (like FIFA client groups) that are exempted from any applicable spectrum fees for the FIFA World Cup Qatar 2022™ and associated events.

Section 3

# CRA Approach and Assumptions



# CRA Approach and Assumptions

## Approach

**3.1** CRA approach to spectrum planning for the FWC 2022 will take into consideration the following regulatory instruments, now in force, which are already published and available on the CRA website:

**3.1.1** Qatar Radio Spectrum Policy
**3.1.2** Qatar National Frequency Allocation Plan
**3.1.3** Qatar Radio Spectrum Outlook 2022
**3.1.4** Spectrum Licensing Regulatory Framework
**3.1.5** Class License for Short Range Devices

**3.2** Different applications will require different quantum of spectrum and operate at different frequencies with different requirements to prevent interference. This will affect the ability to share spectrum in the same location with other applications.

## Assumptions

**3.3** CRA assumes to spectrum planning for the FWC 2022 the following:

**3.3.1** All spectrum requirements for Host Broadcaster (HB) will be sent to CRA by end of July 2022 and other requirements will be sent not later than three months prior to the start of the Event (September 2022) for evaluation and necessary action.

**3.3.2** Any requests received after September 2022 prior to the event or during the event would be processed on an emergency basis through an expediated workflow. However, the priority to spectrum would be given to the requests received earlier than three months period. Hence it is encouraged that all spectrum requirements are submitted as early as possible to ensure their assignment.

**3.3.3** All broadcasters will require spectrum for reporting both within and outside venues. Spectrum will be required for partners and venue setup ahead the Event;

**3.3.4** A satellite-dish farm will be deployed at a fixed location adjacent to the International Broadcast Center (IBC). RHBs might also use satellites to link competition venues back to their facilities in the IBC or at other locations. News-gathering organizations will also use satellites;

**3.3.5** Wireless equipment will be re-exported or returned outside the country, to some extent, after the end of the Event. Equipment retained in the county must be authorized before the use as per the Applicable Regulatory Framework. More information is available on CRA website (www.cra.gov.qa).

Section 4

# Spectrum for Wireless Applications

# Spectrum for Wireless Applications

## Minimum requirements for operation

**4.1.** The minimum requirements are made for reasons related to the effective and appropriate use of the radio spectrum, in particular, maximizing spectrum utilization.

**4.2.** For the following wireless applications, a high-level description of how the spectrum is used for FWC 2022 is given. This, therefore, stipulates the necessary equipment parameters for the licensing of the Event.

**4.3.** The technical parameters specified in below are applied to achieve the desired level of compatibility within the Event services and with other radiocommunications services, whilst promoting enterprise, innovation and competition.

**4.4.** Necessary technical information is provided to facilitate access to the Event spectrum by making clear the assumptions that are made in planning the use of the Event spectrum.

**4.5.** In each table below, the mentioned "Reference Standard" is for guidance purposes and is assumed to be fulfilled in frequency planning and defining the equipment type. Hence, full compliance with which is not mandatory.

**4.6.** The term "Available" in the Notes in the below tables refers to the channel availability, while the frequency assignment will be on first come first serve basis.

**4.7.** The term "Limited Availability" in the Noted in the below tables refers to the channel availability with stringent constraints.

## Private Mobile Radio

**4.8** Private Mobile Radio (PMR) expected to be used to cover all activities needed to organize a successful Event. This includes private security services, sport services, transport, and the management of the venues, ceremonies, catering, spectator services and ticketing. Other PMR users will include partners, broadcasters and LOC's suppliers.

**4.9** To date, handheld radios have used analogue technologies. However, digital mobile radio (DMR) is also allowed and is available in the market.

**4.10** Users are likely to bring their own wireless equipment into Qatar. For such equipment, CRA anticipate a duplex split of 10 MHz, with the majority of radios using 6.25 kHz and 12.5 kHz channels and the rest 25 kHz channels.

**4.11** Overall, CRA believes that a TETRA trunk system, some analogue PMR base stations and a mix of DMR and analogue PMR systems will be used at FWC 2022.

**4.12** Encryption of the mobile radio is subject to approval from security agencies.

### Minimum Requirements for PMR

| Frequency Band | Duplex Spacing | Channel Bandwidth | Remarks |
|---|---|---|---|
| 360 – 380 MHz | 10 MHz | DMR 6.25 kHz<br>PMR 12.5 kHz | Available |
| 406.100 - 410.000 | 5 MHz | DMR 6.25 kHz<br>PMR 12.5 kHz | Available |
| 450 – 470 MHz | 10 MHz | DMR 6.25 kHz<br>PMR 12.5 kHz | Limited Availability |
| 418 – 420 MHz<br>428 – 430 MHz | 10 MHz | DMR 6.25 kHz<br>PMR 12.5 kHz<br>TETRA 25 kHz | Limited Assignments |
| PMR446 | | | Not Allowed |

## Wireless Microphones

**4.13** Wireless microphones are mainly used by broadcasters or event's organizers to capture interviews, music or sounds. They can be handheld, or body worn, with integrated or body-worn transmitters. Wireless microphones are generally low power (50100- mW), though some require 1 W. They are currently analogue because of the audio lag incurred when using digital technology. The bandwidth required is 200 kHz per channel.

**4.14**. Wireless Microphone systems operating on 2.4 GHz and 5 GHz bands are not allowed. On the other hand, the use of Wireless microphones which operate on 1880 – 1900 MHz will be restricted, and it is not guaranteed.

### Minimum Requirements for Wireless microphones

| Frequencies or Frequency Band Edges (MHz) | Maximum Radiated Level | Typical Channel Bandwidth | Notes | Reference Standard |
|---|---|---|---|---|
| 174.000 - 216.000 | 50 mW ERP | 200 kHz | Use of the bands is on a tuning range basis. | EN 300 422 |
| 470.000 - 694.000 | 50 mW ERP | 200 kHz | Use of the bands is on a tuning range basis. | |
| 823.000 - 826.000 | 20 mW EIRP | 200 kHz | | |
| 823.000 - 826.000 | 100 mW EIRP | 200 kHz | Restricted to body worn microphones | |
| 826.000 - 832.000 | 100 mW EIRP | 200 kHz | | |

## Audio Links

**4.15** Audio links include wireless radio equipment designed or adapted for telephony, for the purpose of carrying monophonic or stereophonic music and speech broadcasting signals or for carrying multiple talkback signals and audio distribution systems (ADS).

### Minimum Requirements for Audio Links

| Frequencies or Frequency Band Edges (MHz) | Maximum Radiated Level | Typical Channel Bandwidth | Notes | Reference Standard |
|---|---|---|---|---|
| 174.000 - 216.000 | 5 W ERP | 12.5 kHz | For on-site use | EN 300 454 |
| 470.000 - 694.000 | 5 W ERP | 12.5 kHz | For on-site use | |

## Talkback

**4.16** Talkback is an intercom system mainly used by broadcasters to give directions of the director instantly to all those concerned in making the program and production-team members such as camera operators, reporters, interviewers, presenters, sound operators, lighting operators and engineers.

**4.17** It uses PMR-like technology but, because high-quality sound is required, typically uses 200 kHz channels. However, 12.5 kHz channels can suffice, and older equipment tends to use smaller bandwidths anyway.

### Minimum Requirements for Talkback

| Frequencies or Frequency Band Edges (MHz) | Maximum Radiated Level | Typical Channel Bandwidth | Notes | Reference Standard |
|---|---|---|---|---|
| 29.700 - 47.000 | 5 W ERP | 12.5 kHz | For on-site use. | EN 300 086 |
| 146.000 - 153.000 | 5 W ERP | 12.5 kHz | For on-site use. | |
| 360.000 - 380.000 | 5 W ERP | 12.5 kHz | For on-site use. | |
| 406.200 - 410.000 | 5 W ERP | 12.5 kHz | For on-site use. | |
| 450.000 - 470.000 | 5 W ERP | 12.5 kHz | For on-site use with Limited Availability | |
| 470.000 - 694.000 | 5 W ERP | 12.5 kHz | For on-site use. | |

## Video Links

**4.18.** Wireless radio equipment designed or adapted for carrying video broadcast together with music and/or speech signals.

**4.19.** Applications include wireless cameras, portable video links and point-to-point video links.

## Minimum Requirements for Video Links

| Frequencies or Frequency Band Edges (GHz) | Maximum Radiated Level | Typical Channel Bandwidth | Notes | |
|---|---|---|---|---|
| 1.990 - 2.110 | 5 W ERP | 10 MHz | Limited to HBS (Host Broadcaster) within the perimeter fence of the venues. | EN 302 064 |
| 2.200 - 2.290 | 1 W ERP | 10 MHz | For low-power wireless cameras only. Limited to HBS (Host Broadcaster) within the perimeter fence of the venues. | |
| 2.290 - 2.300 | 1 W ERP | 10 MHz | For low-power wireless cameras only. | |
| 2.400 - 2.500 | 5 W ERP | 20 MHz | Non-Interference Non-Protection basis. Evaluation on case-by-case basis only, without guarantee for authorization. | |
| 5.470 - 5.725<br>5.725 - 5.875 | 33 dBm ERP | 20 MHz | | |
| 7.110 - 7.250 | 20 dBW ERP | Varies | Limited Availability | |
| 7.300 - 7.410 | 20 dBW ERP | Varies | Limited Availability | |
| 7.410 - 7.425 | 20 dBW ERP | Varies | Limited Availability | |
| 8.460 - 8.500 | 20 dBW ERP | Varies | Limited Availability | |
| 10.000 - 10.680 | 20 dBW ERP | Varies | Available | |
| 11.700 – 12.500 | 20 dBW ERP | Varies | Available | |
| 12.200 - 12.475 | 20 dBW ERP | Varies | Available | |
| 48.000 - 48.400 | 30 dBW ERP | 100 MHz | Available | |

## Telemetry and Telecommand Links

**4.20.** Wireless radio equipment designed or adapted for the remote control of cameras and other program making equipment and for signaling.

**4.21.** Also, they might be used to measure and record competitions and to control equipment for ceremonies.

### Minimum Requirements for Telemetry and Telecommand Links

| Frequencies or Frequency Band (MHz) | Maximum Radiated level | Typical Channel Bandwidth | Notes | Reference Standard |
|---|---|---|---|---|
| 360.000 - 380.000 | 1 W ERP | 12.5 kHz | Available | EN 300 086 |
| 403.000 – 406.000 | 1 W ERP | 6.25 kHz<br>12.5 kHz | Limited Availability | |
| 450.000 - 470.000 | 1 W ERP | 12.5 kHz | Limited Availability | |
| 470.000 - 694.000 | 1 W ERP | 12.5 kHz<br>25 kHz | Available.<br>Some specific channels within this range (Center Frequencies of 490 MHz and 506 MHz, with channel bandwidth of 8 MHz each) are exclusively used for Digital Terrestrial TV Broadcast, and they are on-air and shall not be considered for assignment for any application. | |

## Point-to-Point links

**4.22.** Point-to-point links might be required to connect venues or to provide video signals back to an outside-broadcasting truck, for example.

### Minimum Requirements for Point-to-Point Links

| Frequencies or Frequency Band (GHz) | Maximum Radiated level | Typical Channel Bandwidth | Notes | Reference Standard |
|---|---|---|---|---|
| 6.425 – 7.125 | varies | varies | Link by link basis | EN 301126 |
| 7.145 – 7.425 | varies | varies | | |
| 7.425 – 7.725 | varies | varies | | |
| 22.000 – 23.600 | varies | varies | | |
| 71.000 – 76.000 | varies | varies | | |
| 81.000 – 86.000 | varies | varies | | |

## DECT

**4.23.** Digital Enhanced Cordless Telecommunications, usually known by the acronym DECT, is a standard primarily used for creating cordless telephone systems.

**4.24.** In PMSE, DECT devices are mainly used for talkback and intercom applications.

### Minimum Requirements for DECT

| Frequencies or Frequency Band (MHz) | Maximum Radiated level | Typical Channel Bandwidth | Notes | Reference Standard |
|---|---|---|---|---|
| 1880.00 - 1900.00 | 10 mW | 1.728 MHz | Available | EN 300 175 |
| 1900.00 - 1918.00 | 10 mW | 1.728 MHz | Available | EN 301 406 |

## Football Technology & Innovation (FTI)

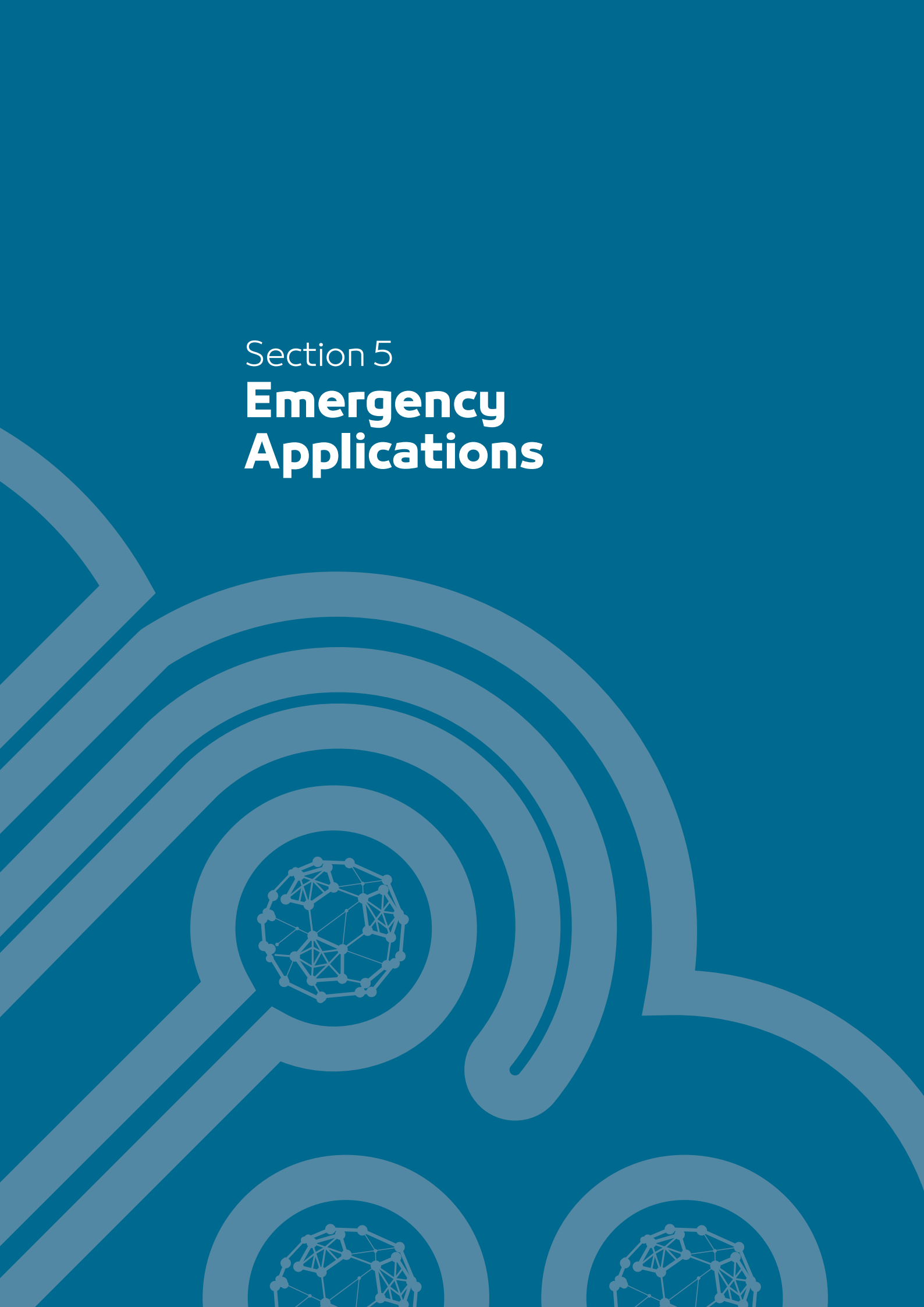
**4.23.** The Football Technology & Innovation applications are used to solve existing problems in the football world by implementing new technologies and innovations. CRA expects the same will be widely used during FIFA World Cup™ Qatar 2022.

**4.26.** Since FTI Applications are critical, they will have priority in terms of equipment/ frequency authorization.

| FTI Application | Frequencies or Frequency Band (MHz) | Maximum Radiated level | Typical Channel Bandwidth |
|---|---|---|---|
| Referee/VAR Wireless Intercom System | 1880.00 – 1918.00 | 10 mW | Link by link basis |
| Goal Line Technology | 869.40 – 869.65 | 500 mW | 25 kHz |
| Electronic Performance and Tracking Systems | 4.20 – 4.80 GHz | -70 dBm/ MHz | 500 MHz |
| | 6.00 – 8.50 GHz | -41.3 dBm/ MHz | |

Section 5

# Emergency Applications



# Emergency Applications

## Introduction

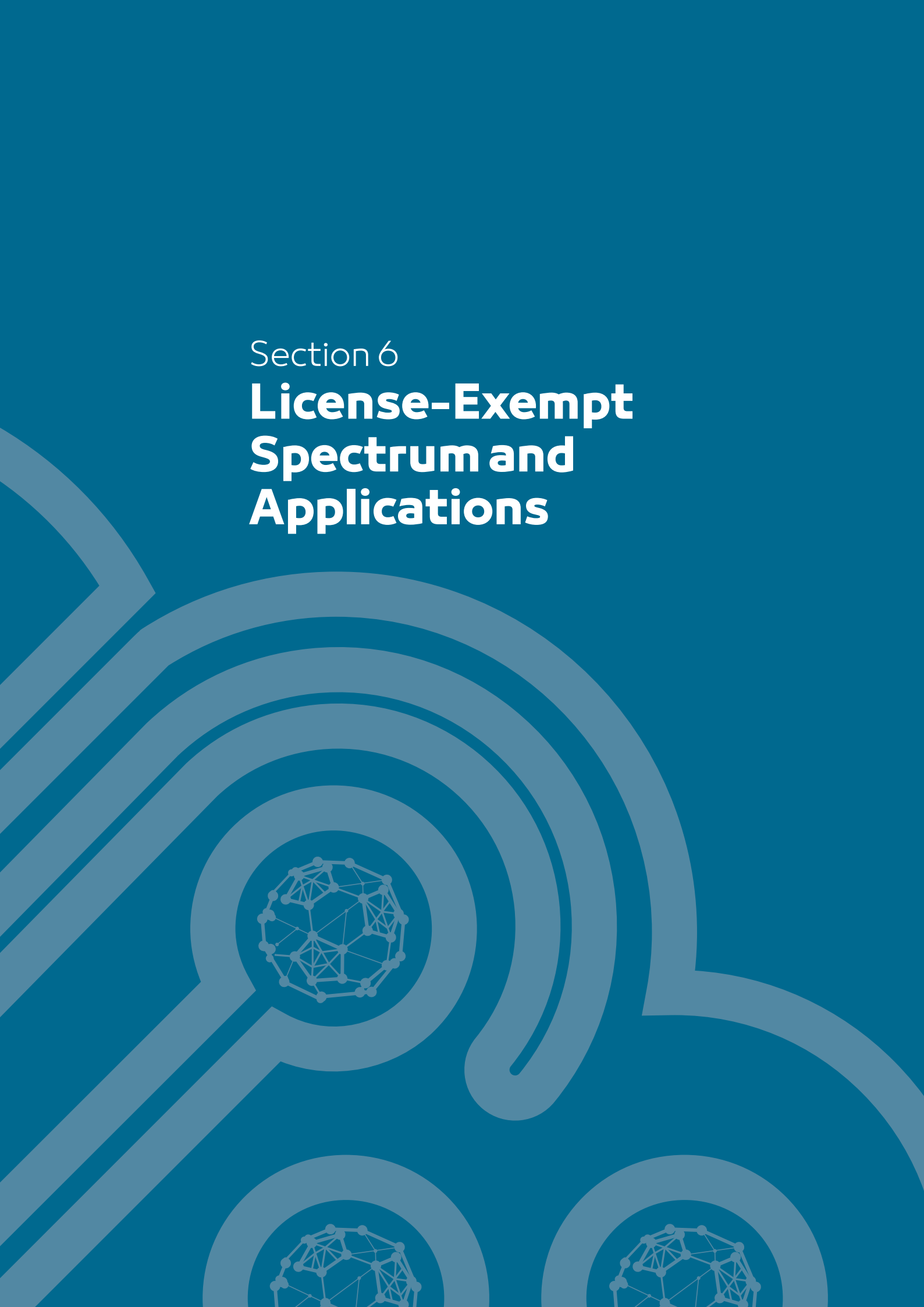
**5.1.** Any requests received after 30th of September 2022 prior to the Event or during the Event would be processed on an emergency basis through an expediated workflow.

**5.2.** Priority to access spectrum would be given to the requests received earlier than three months period. Hence it is encouraged that all spectrum requirements are submitted as early as possible to ensure their assignment.

**5.3.** Certain parts of unassigned spectrum in each category of use as mentioned in section 4 would be reserved for such applications. This would avoid delays in conducting the coverage and interference analysis for such cases.

Section 6

# License-Exempt Spectrum and Applications



# License-Exempt Spectrum and Applications

## Introduction

**6.1** Radio equipment that complies with the technical limits covered under the Class License for Short Range Devices is exempted from obtaining a separate frequency license.

**6.2.** However, authorization from CRA is required for such equipment (and their accessories) before being used at FWC 2022 venues.

**6.3.** Some license-exempt equipment will require specific frequency assignment from CRA (for example, but not limited to, the wireless microphones) in advance.

**6.4.** All license-exempt equipment (and accessories) are subject to the applicable Test and Tagging process.

**Minimum requirements for License-Exempt equipment:**

| Frequencies or Frequency Band Edges (MHz) | Maximum Radiated Level | Typical Channel Bandwidth | Notes | Reference Standard |
|---|---|---|---|---|
| 13.553 - 13.567 | 60 dBµA/m at 10m | | RFID | EN 300 330 EN 302 291 |
| 174.000 - 216.000 | 50 mW ERP | 200 kHz | Use of the bands is on a tuning range basis. | EN 300 422 |
| 433.050 - 434.790 | 10 mW ERP | 200 kHz | | EN 300 440 |
| 470.000 - 694.000 | 50 mW ERP | 200 kHz | Use of the bands is on a tuning range basis. | EN 300 422 |
| 823.000 - 826.000 | 20 mW EIRP | 200 kHz | | EN 300 422 |
| 823.000 - 826.000 | 100 mW EIRP | 200 kHz | Restricted to body worn microphones | EN 300 422 |
| 826.000 - 832.000 | 25 mW ERP | 200 kHz | | EN 300 422 |
| 865.000 - 870.000 | 25 mW EIRP | | Duty cycle ≤ 0.1% or LBT | EN 300 220 |
| 1880.00 - 1900.00 | 250 mW EIRP | | DECT | EN 300 175 |
| 2400.00 - 2483.50 | 10 mW EIRP | | | EN 300 440 |
| 2400.00 - 2483.50 | 100 mW EIRP | 20 MHz | RLAN Applications | EN 300 328 |
| 5150.00 - 5250.50 | 200 mW EIRP | 40 MHz | RLAN Applications | EN 301 893 |
| 5250.00 - 5350.50 | 200 mW EIRP | 40 MHz | RLAN Applications | EN 301 893 |
| 5470.00 - 5725.50 | 1000 mW EIRP | 40 MHz | RLAN Applications | EN 301 893 |
| 5725.00 - 5875.50 | 25 mW EIRP | 40 MHz | RLAN Applications | EN 300 440 |
| 24050.00 - 24250.00 | 100 mW EIRP | | | EN 302 372 |

Section 7

# Excluded / Restricted Bands

# Excluded / Restricted Bands

## Introduction

**7.1** The below table shows the list of frequency bands that are not permitted for use at FWC 2022 venues since these bands are assigned exclusively for existing users in Qatar. However, some bands listed in the table are with limited availability as they are already allocated for other services.

| No. | Frequency Range (MHz) | Allocation Purpose in Qatar | Assignment Availability |
|---|---|---|---|
| 1. | 26.965 – 27.405 | Citizen Band | Limited Availability |
| 2. | 87.5 – 108 | FM Plan | Unavailable |
| 3. | 108 – 136 | Aeronautical | Unavailable |
| 4. | 144 – 146 | Amateur | Unavailable |
| 5. | 156 – 163 | Maritime | Unavailable |
| 6. | 380 – 400 | Public TETRA Network | Unavailable |
| 7. | 410 – 430 | Public TETRA Network | Limited Availability |
| 8. | 430 – 440 | Amateur | Limited Availability on Non-Protection, Non-Interference and Non-Exclusive basis |
| 9. | 440 – 450 | Public Network | Unavailable |
| 10. | 694 – 790 | Public Network | Unavailable |
| 11. | 790 – 862 | Public Network | Unavailable |
| 12. | 863 – 865 | Assigned exclusively to SC in all stadiums for Assistive Lis-tening System | Unavailable |
| 13. | 876 – 925 | Public Network | Unavailable |
| 14. | 880 – 960 | Public Network | Unavailable |
| 15. | 960 – 1215 | Aeronautical | Unavailable |

| No. | Frequency Range (MHz) | Allocation Purpose in Qatar | Assignment Availability |
|---|---|---|---|
| 16 | 1427 – 1518 | IMT System | This band maybe considered for wireless/ video links. |
| 17 | 1710 – 1880 | Public Network | Unavailable |
| 18 | 1920 – 2170 | Public Network | Unavailable |
| 19 | 2300 – 2400 | Public Network | Unavailable |
| 20 | 2500 – 2690 | Public Network | Unavailable |
| 21 | 3350 – 3400 | Public Network | Unavailable |
| 22 | 3400 – 3600 | Public Network | Unavailable |
| 23 | 3600 – 3800 | Public Network | Unavailable |
| 24 | 7900 – 8400 | Fixed Applications | Limited Availability |
| 25 | 10700 – 11700 | Fixed Applications | Unavailable |
| 26 | 12835 – 12947 | Fixed Applications | Unavailable |
| 27 | 13101 – 13213 | Fixed Applications | Unavailable |
| 28 | 14400 – 15350 | Fixed Applications | Unavailable |
| 29 | 17700 – 19700 | Fixed Applications | Unavailable |
| 30 | 24250 – 27500 | IMT System | Unavailable |
| 31 | 37000 – 43500 | IMT System | This band maybe considered for assignment |
| 32 | 66000 – 71000 | IMT System | This band maybe considered for assignment |

Section 8

# e-Spectrum Portal

# e-Spectrum Portal

## Introduction

**8.1** e-spectrum portal is an Automated Spectrum Management System which allows applicants to register (after receiving the invitation email from CRA to the eligible users) and then submit applications for different types of spectrum uses. All applicants are required to register on the e-spectrum portal before applying for any type of license category.

**8.2**. The portal supports submission of frequency license applications and registration of radio equipment under these licenses once they are issued.

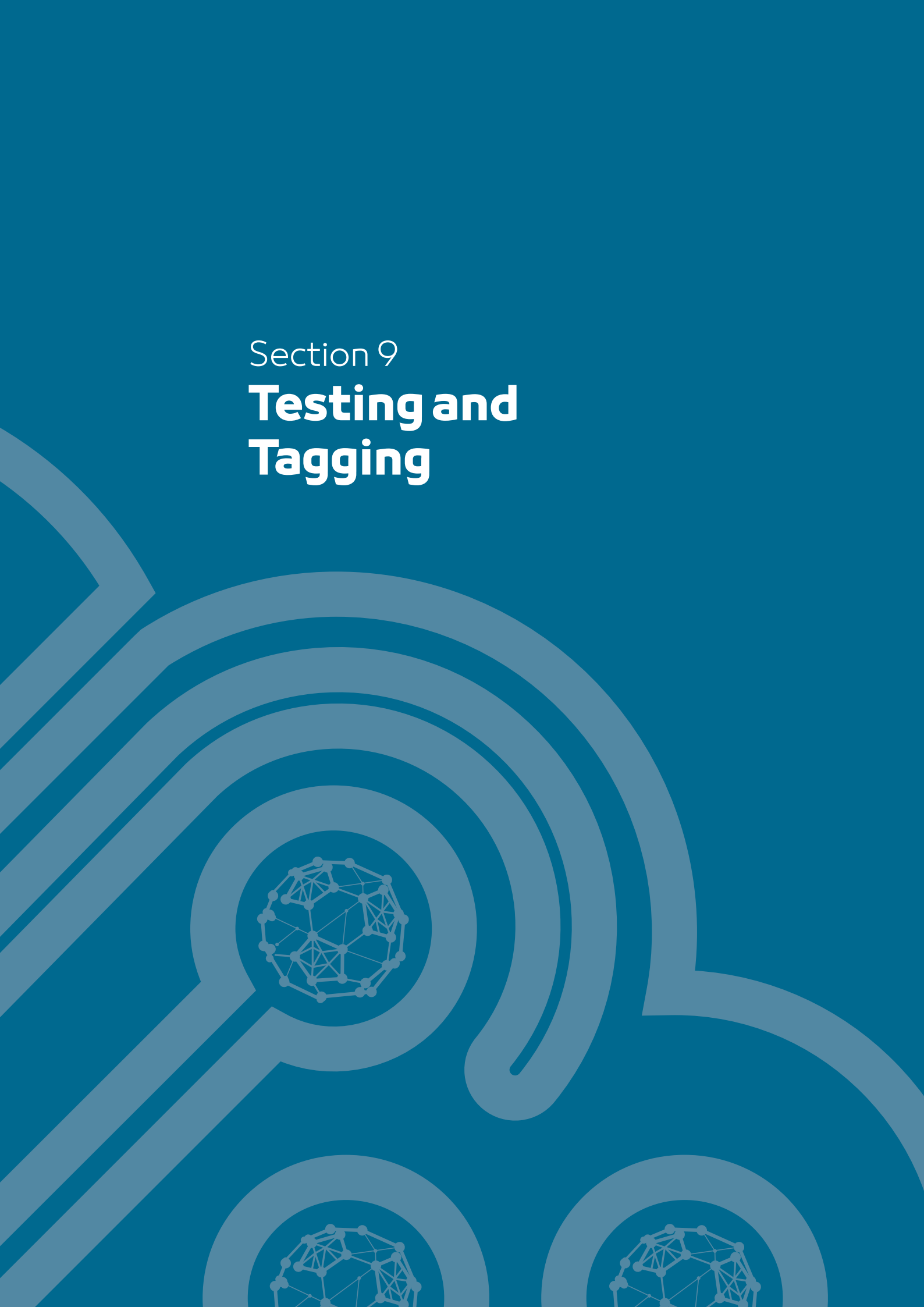
**8.3.** The portal allows submission of all license-exempt equipment registration for different categories of usage.

**8.4.** Users can request to schedule 'Test and Tag' appointment on the portal, CRA will then check and confirm the schedule and location of test and tag activity.

**8.5.** All details on how to submit application through the e-spectrum portal is explained in the document titled "e-Spectrum Portal Applications Process" including the processes and sub-processes.

Section 9

# Testing and Tagging



# Testing and Tagging

## Introduction

**9.1** The Test and Tagging (T&T) procedure consists of the testing of user's equipment for compliance within the technical parameters in the frequency license granted by the CRA, and their identification using tags that allow the right to use of the equipment regarding its area of operation during the event.

**9.2** This procedure allows advance information of the equipment and the radio frequencies to be utilized by the various stakeholders that participate in the Event, in addition to helping planning of the monitoring and surveillance actions during the performance of the Event, avoiding any entry of equipment that has not been inspected and/or authorized at the FWC 2022 facilities.

## High level Service Requirements from FIFA

**9.3** Applicants granted use of a licensed frequency or license-exempt channel by the CRA, shall be required to bring their RF equipment for testing and tagging, prior to that equipment's authorized use in any FWC 2022 venue.

**9.4** All RF equipment shall be registered on the e-Spectrum Portal before being tested and tagged, equipment registration will be done by the user once the license/ authorization is issued.

## CRA Procedures

**9.5** CRA will establish its Spectrum Desk Offices at all FWC 2022 Stadiums, at International Broadcast Center (IBC), Main Media Center (MMC) and at FIFA Fan Festival (Al Bidda), where T&T facilities shall be provided, prior to the event and during the event as per the Table 1 - Test and Tagging Schedule for FWC 2022.

**9.6** Roaming T&T team will also be available before and during the event, to facilitate T&T at the license holders' offices/warehouse so that equipment could be tested and tagged prior to it being transported to the respective venues. Licensee shall request (on the e-Spectrum Portal) this T&T onsite requirement / appointment after submission of their frequency license/ authorization application. The roaming T&T will be available from 20 October 2022 until 18 December 2022.

**9.7** Radio equipment (in good condition) shall be tested at these venues for conformance to license conditions (e.g. frequency, bandwidth, power level) and marked with a clearly visible tag indicating their conformance or non-conformance with a distinct color associated with each venue cluster, where the equipment is permitted to be used. Any radio equipment with physical damages in the transmitter and receiver path should be rectified prior to its T&T inspections, in order to ensure that the equipment is not tagged as non-compliant.

**9.8** Tag issued by CRA and affixed to the equipment are not allowed to be transferred from equipment to another equipment.

**9.9** Any radio equipment which does not conform to the required license conditions and without appropriate tags shall be denied entry to FWC 2022 venues until the non-conformance has been rectified by the applicant and re-verified for compliance by Testing. Non-compliant equipment will also be tagged in distinctive manner, to prohibit it from being used. Security staff will inspect devices at the entrance of all venues to ensure only authorized/ tagged radio equipment is permitted to enter inside the venue. Spot checks on radio equipment will be carried out in the venues to ensure that all radio equipment have the correct Tag affixed to the device and are operating on the correct licensed/ authorized frequency. Unauthorized equipment will be removed and confiscated by the security. Confiscated equipment will be returned to the users when they leave the country.

**9.10** CRA will exclude personal devices from the above procedure, such as mobile phones, key chains, and devices that use Bluetooth technology such as wireless keyboards, mouse and earphones.

**9.11** CRA will carry out random checks on equipment on the venue to make sure that the equipment is tagged for use in that venue and check the frequency the equipment is on.

**9.12** CRA's preliminary schedule is explained in **Table 1 - Test and Tagging Schedule for FWC 2022,** while detailed scheduled with timings for T&T at each venue shall be provided accordingly.

| Activity | T&T team | Venue | Duration | Description |
|---|---|---|---|---|
| Before Event | Venue | Central warehouse or Main Logistics Center (to be confirmed) | 20 Oct 2022 - 13 Nov 2022 | • CRA shall facilitate T&T appointment via scheduler during the duration<br>• Licensee shall choose available time slots at least 2 days in advance.<br>• 30 slots will be available daily |
| | Roaming | Licensee premises / Non-Competition Venues (NCV) / DEC (Doha Exhibition Cen-ter) / DECC (Doha Exhibi-tion and Con-vention Center) | 1 Nov 2022 - 19 Nov 2022 | • Licensee shall request this T&T onsite requirement in their application.<br>• This facility will also cater for Fan Festival / ITCC (IT Command Center)<br>• T&T time slots will be allocated as per the team availability. |

| Activity | T&T team | Venue | Duration | Description |
|---|---|---|---|---|
| During the Event | Venues | Competition Stadia / Fan Festival<br><br>IBC & MMC | 14 Nov 2022 - 18 Dec 2022<br><br>19 Oct 2022 – 18 Dec 2022 | • T&T desk offices will be established at all competition stadia, Qatar National Con-vention Center- QNCC (IBC/MMC) and Fan Festival (Al Bidda) to facilitate on site T&T for radio equipment |
| | Roaming | Non-Competition Venues / DEC / DECC | 20 Nov 2022 - 18 Dec 2022 | • T&T will be conducted at NCVs only for replacement of faulty equipment and for the repeater systems installed on venues |

Table 1 - Test and Tagging Schedule for FWC 2022

Section 10

# Spectrum Interference Monitoring

# Spectrum Interference Monitoring

## Introduction

**10.1** During the event a variety of radio applications and a substantial number of radio equipment will be present and aggregated within a limited area, which pose a real challenge to meet all spectrum demands and ensure that communications can go ahead without interference.

**10.2** Spectrum monitoring will be carried out in planned phases providing necessary audit for managing the spectrum before, during and after the event.

## High Level Service Requirements

**10.3** Spectrum monitoring support staff shall be present in the venues immediately prior to and during the FWC 2022 in order to perform monitoring, identification and resolution of any radio frequency interference detected or reported.

## CRA Procedures

**10.4** Each FWC 2022 venue shall be monitored for evidence of radio frequency interference or unauthorized use of radio frequencies by CRA. Any interference detected shall be geo-located in order to locate the source. All interfering sources shall be removed from the venue or switched off until such interference has been resolved.

**10.5** CRA will have 22 Fixed monitoring stations and 4 mobile monitoring stations for spectrum monitoring and interference investigation during the FWC 2022, in addition, dedicated Field teams with portable monitoring & direction-finding equipment will be present in each stadium during all matches. The primary venues will be monitored 247/ from the stations as well as through extensive routine monitoring planned during the events.

**10.6** CRA will execute spectrum usage monitoring and enforcement actions in the areas where activities related to FWC 2022 will be held, in order to identify in advance possible cases of harmful interference with systems whose use is expected during the event and take preventive action. CRA with the competent public security entities shall curb and eliminate the improper use of frequency and possible harmful interference with systems identified during the event.

**10.7** CRA has in place guidelines to its interference management procedures by which it manages spectrum interferences for all its licensees. The following will be the reporting procedures for any interference cases:

**10.7.1** Before the Event, any Spectrum Harmful interference complaints can be raised in the prescribed format available on CRA's website which guides the complainant to provide necessary information and relevant data for submission of the interference complaint. The complaint needs to be emailed to (interference@cra.gov.qa) for recording and resolution.

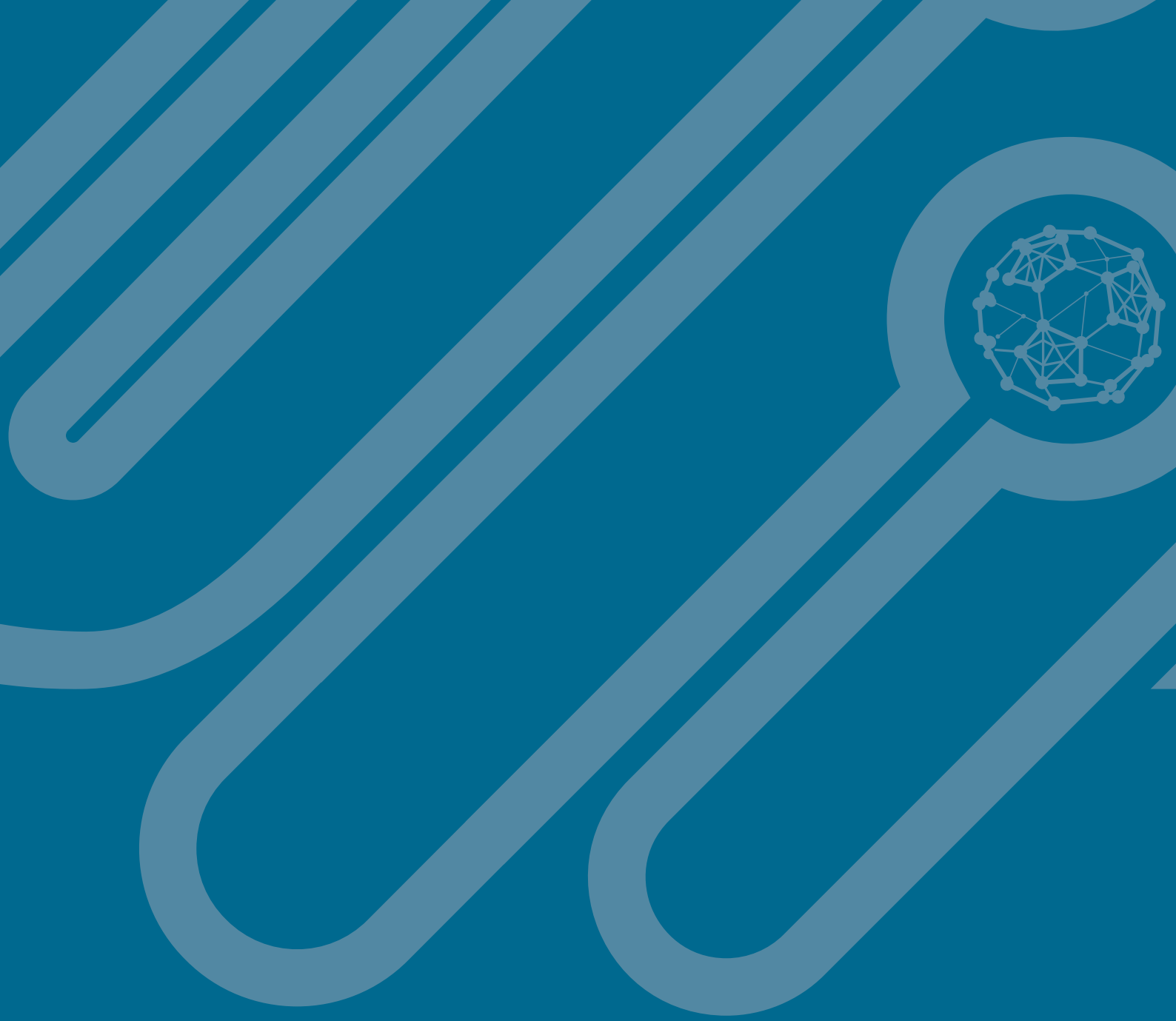
**10.7.2** A fast track comprehensive Interference resolution procedure will be in place, for any interference issues faced by the licensed users during or prior to the event. The system will include an interference hotline facility at CRA's Spectrum Desk Office at each venue. Necessary tickets will be raised and shared with the respective Venue Command & Control Offices for further necessary coordination, action and resolution.

**10.8** CRA will implement the Spectrum Monitoring activities in two phases, the pre-event monitoring (prior to the event till testing and rehearsals), and second phase will be during the event. The below table depicts the phases and planned activities for all two phases:

| Activity | Schedule | Planning & Coordination Activity | Monitoring Activity |
|---|---|---|---|
| Pre-Event Monitoring & Testing | January 2022 – August 20221 | • Identification of spots for de-ploying Monitoring Systems inside / outside Stadiums<br>• Coordination with concerned authorities for logistics and swift movement of Monitor-ing teams between venues<br>• Integration with Spectrum Monitoring central command center and Spectrum Desk Offices at Venues<br>• Launch of efficient commu-nication system for coordi-nation and sharing of infor-mation among teams | • Monitoring of all spectrum to verify availability of frequencies assigned for Event<br>• Extensive monitoring at Stadiums for stadium specific frequencies and any EMC issues<br>• Testing of local spectrum users, local organizers and agencies at all venues for conformance to licensed conditions.<br>• Resolution for interference / replacement of assignments<br>• Monitoring of satellite bands, specific to broadcast services and frequencies to be used during the event. |

| Activity | Schedule | Planning & Coordination Activity | Monitoring Activity |
|---|---|---|---|
| | October 2022 – November 2022 | • On site deployments of Mon-itoring Assets and Teams for testing<br>• Rehearsing full operation with command and commu-nication center<br>• Coordination with Venue IT Managers, Broadcasters, and Security teams for en-suring all RF equipment is tagged and authorized | • Testing & Rehearsal of all wireless communication / spectrum usage at primary venues<br>• identify any non-conformity to the regulatory requirements<br>• Resolution of any potential interference scenarios and EMC issues<br>• Enforcement actions for unauthorized / interfering sources<br>• Technical Inspection surveys inside the Stadium, IBC, Media Center |
| Monitoring During Events | November 2022 – December 2022 | • Fully operational Monitoring & Interference resolution few hours preceding and during the event | • Efficiently Identification and removal of any unauthorized use of spectrum<br>• Interference investigation and resolution through well-coordinated procedures and actions. |

Table 2 - Spectrum Monitoring Schedule for FWC 2022



Annex 1

# Annual Radio Spectrum License Fees for Terrestrial Radiocommunication Services

## Spectrum Fee

| | | Annual Radio Spectrum License Fee for Terrestrial Radio Services (QAR per MHz per year) [9,11] | | | | |
|---|---|---|---|---|---|---|
| | | Mobile services, point to multipoint fixed links, scanning telemetry/SCADA systems, broadband wireless access and broadcast transmitters | | | Any frequency license with exclusive nation-wide use[7] | Individual fixed links, radars, beacons and navigation equipment[5,6] |
| | Coverage | Small Area | Local Area | Large Area | National | |
| | *Coverage Area*[1,2] | *A ≤ 5 sakm* | *5 < A ≤500 sakm* | *500<A≤2,000 sakm* | *A > 2,000 sakm* | |
| | *Max Coverage Radius* [1,3] | *R ≤ 1 km* | *1 < R ≤ 12.5 km* | *12.5 < R ≤ 25 km* | *R > 25 km* | |
| | *Transmitter, ERP*[4] | *ERP ≤ 1 W* | *1 < ERP ≤ 5 W* | *5 < ERP ≤ 25 W* | *ERP > 25 W* | |
| Frequency Range | Frequency equal to or less than 87.5 MHz | 8,320 | 16,640 | 24,960 | 49,920 | 8,320 |
| | Frequency higher than 87.5 and equal to or less than 108 MHz | 16,666 (8,320) | 33,333 (16,640) | 50,000 (24,960) | 100,000 (49,920) | 16,666 (8,320) |
| | Frequency higher than 108 and equal to or less than 470 MHz | 8,320 | 16,640 | 24,960 | 49,920 | 8,320 |
| | Frequency higher than 470 and equal to or less than 694 MHz | 4,160 | 8,320 | 12,480 | 24,960 | 4,160 |
| | Frequency higher than 694 and equal to or less than 960 MHz | 16,666 (4,160) | 33,333 (8,320) | 50,000 (12,480) | 100,000 (24,960) | 16,666 (4,160) |
| | Frequency higher than 960 and equal to or less than 1710 MHz | 2,080 | 4,160 | 6,240 | 12,480 | 2,080 |
| | Frequency higher than 1710 and equal to or less than 2025 MHz | 12,500 (2,080) | 25,000 (4,160) | 37,500 (6,240) | 75,000 (12,480) | 12,500 (2,080) |
| | Frequency higher than 2025 and equal to or less than 2110 MHz | 2,080 | 4,160 | 6,240 | 12,480 | 2,080 |
| | Frequency higher than 2110 and equal to or less than 2200 MHz | 12,500 (2,080) | 25,000 (4,160) | 37,500 (6,240) | 75,000 (12,480) | 12,500 (2,080) |
| | Frequency higher than 2200 and equal to or less than 2400 MHz | 1,040 | 2,080 | 3,120 | 6,240 | 1,040 |
| | Frequency higher than 2400 and equal to or less than 2500 MHz[10] | 130 | 260 | 390 | 780 | 130 |
| | Frequency higher than 2500 and equal to or less than 2690 MHz | 6,667 (1,040) | 13,333 (2,080) | 20,000 (3,120) | 40,000 (6,240) | 6,667 (1,040) |
| | Frequency higher than 2690 and equal to or less than 5150 MHz | 1,040 | 2,080 | 3,120 | 6,240 | 1,040 |
| | Frequency higher than 5150 and equal to or less than 5350 MHz[10] | 130 | 260 | 390 | 780 | 130/1,040[8] |
| | Frequency higher than 5350 and equal to or less than 5470 MHz | 1,040 | 2,080 | 3,120 | 6,240 | 1,040 |
| | Frequency higher than 5470 and equal or less than 5875 MHz[10] | 130 | 260 | 390 | 780 | 130/1,040[8] |
| | Frequency higher than 5875 and equal to or less than 10000 MHz | 520 | 1,040 | 1,560 | 3,120 | 520 |
| | Frequency higher than 10 and equal to or less than 19.7 GHz | 260 | 520 | 780 | 1,560 | 260 |
| | Frequency higher than 19.7 and equal to or less than 40 GHz | 130 | 260 | 390 | 780 | 130 |
| | Frequency higher than 40 | 500 | 500 | 500 | 500 | 500 |

## Rules of Application of the above Table

**A1.1** The table shall be applied by taking into account the references (111-) mentioned therein, as follows:

1. Applies to area and band-based licenses for PMR/TMR networks, cellular and FM broadcasting.
2. Applies to licenses where coverage is defined as a geographic area.
3. Applies to licenses where coverage is defined as a radius from a central point.
4. Applies to individually licensed aeronautical, maritime or PMR base stations.
5. For bidirectional fixed links, fees will take the bandwidth in both directions into account, i.e. a bidirectional fixed link with a 7 MHz assigned bandwidth will consist of two radio transmitters operating on different frequencies and both with a 7 MHz assigned bandwidth, thus the fee will be based on the combined assigned bandwidth of 14 MHz.
6. For fixed links, where two links are deployed along the same path using the same frequencies but with orthogonal polarization, the fee for the second link will be reduced by 50%.
7. Fees for point-to-point link block allocations will be set at the national coverage level.
8. The lower fee per MHz applies to non-protected fixed links operating in this frequency range.
9. The above table is not a statement of assignment policy, i.e. the presence of a fee in each cell does not indicate that a Radio Spectrum License can be obtained to operate any radio service in any frequency band.

**10.** All assignments in this band are granted on a shared and non-protected protected basis, this includes nation-wide assignments (i.e. nation-wide assignments are not exclusive to the licensee).

**11.** Numbers in brackets refer to annual spectrum fees per MHz that will apply in the event that the spectrum was awarded following an auction or similar competitive award process where the licensee has paid a market-based fee for the radio spectrum.

Annex 2

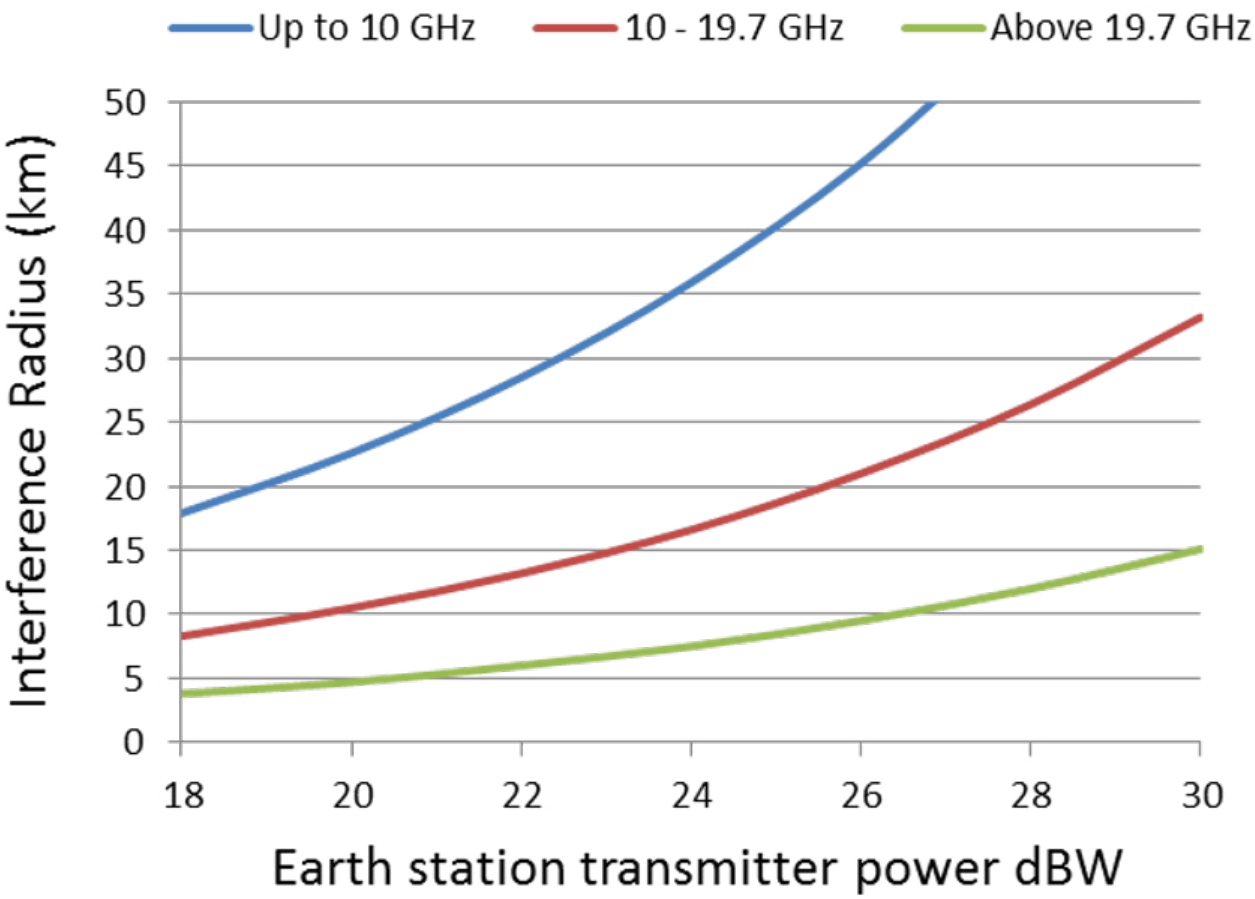
# Annual Radio Spectrum License Fees for transmitting earth stations of the Fixed Satellite Service

## Spectrum Fee

| | | Annual Radio Spectrum License Fee (QAR per MHz per year) | | | | |
|---|---|---|---|---|---|---|
| | Satellite elevation angle (ε) | ε ≥ 36° | | | | ε < 36° |
| | Interference Radius (R) | R≤20 km | 20<R≤30 km | 30<R≤40 km | R > 40 km | N/A |
| Frequency Range | Frequency higher than 5,2725 and less than or equal to 10 GHz | 520 | 1,040 | 1,560 | 3,120 | 3,120 |
| | Frequency higher than 10 and less than or equal to 12,5 GHz | 260 | 520 | 780 | 1,560 | 1,560 |
| | Frequency higher than 12,5 and less than or equal to 12,75 GHz | 8 | 8 | 8 | 8 | 8 |
| | Frequency higher than 12,75 and less than or equal to 17,3 GHz | 260 | 520 | 780 | 1,560 | 1,560 |
| | Frequency higher than 17,3 and less than or equal to 17,7 GHz | 8 | 8 | 8 | 8 | 8 |
| | Frequency higher than 17,7 and less than or equal to 19,7 GHz | 260 | 520 | 780 | 1,560 | 1,560 |
| | Frequency higher than 19,7 and less than or equal to 29,5 GHz | 130 | 260 | 390 | 780 | 780 |
| | Frequency higher than 29,5 and less than or equal to 29,9 GHz | 4 | 4 | 4 | 4 | 4 |
| | Frequency higher than 29,9 and less than or equal to 40 GHz | 130 | 260 | 390 | 780 | 780 |

## Rules of Application of the Table:

- Where two or more co-frequency earth stations operated by the same licensee are co-located (i.e. within 1 km of each other) and point to satellites at 36 degrees elevation or greater, these will be subject to a single fee based on the interference radius resulting from the aggregate transmitter power of the co-located stations. Where such earth stations are located more than 1 km apart, the applicable fee will be based on the interference radius corresponding to the aggregate transmitter power of the earth stations plus the maximum separation distance between the individual earth stations.
- In all cases the fee per operator will not exceed that associated with an interference radius of R < 40 km.
- However, if the sum of the costs of all assignments is less than QAR 500, then a minimum fee of QAR 500 is applied as the annual Radio Spectrum License Fee.
- In order to derive the interference radius and coverage factor as a function of frequency band and earth station transmitter power, the chart hereunder shall be used.
- Receive only devices and radio transmitters that are covered by Class Licenses will not be subject to Radio Spectrum Fees.


Up to 10 GHz
10 - 19.7 GHz
Above 19.7 GHz
Interference Radius (km)
50
45
40
35
30
25
20
15
10
5
0
18
20
22
24
26
28
30
Earth station transmitter power dBW

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