

# ITU-R activities and how WMO Members can engage

Training Workshop on Radio Frequency matters  
for the Asia-Pacific Region

Alec Casey, Environment and Climate Change Canada

Kirsty McBeath, UK Met Office

3-4 March 2025



WORLD  
METEOROLOGICAL  
ORGANIZATION

# Contents

1. What is radio frequency coordination and why should NMHSs care?
2. WMO Resolution 31 (Cg-19)
3. Radio frequency dependencies and spectrum management
4. Lessons learned and helpful resources
5. Concluding remarks

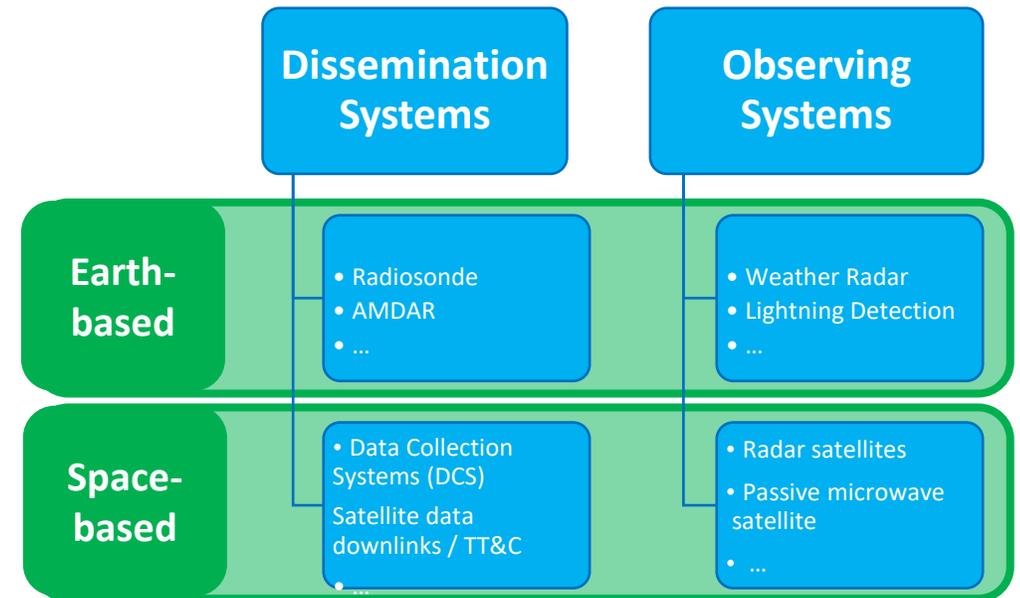
# What is radio frequency coordination?

- Radio-frequency (RF) coordination is a process that aims to provide rational and efficient use of radio spectrum
- The objective of RF coordination is to:
  - **Maximize the shared use** of radio spectrum
  - **Minimize interference** between radiocommunication services and their applications
- RF coordination is necessary to manage radio spectrum – a **finite resource**, which is in **high demand**



# Why Should NMHSs Care?

- Radio spectrum touches virtually all aspects of our business.
  - Nearly all meteorological, hydrological and environmental observing networks rely on radio spectrum to acquire and/or disseminate observations
  - Dissemination of forecasts and warnings to the public also relies on spectrum
- Without adequate access to spectrum we cannot effectively monitor our environment to generate accurate weather, water and climate forecasts
- Our dependence on RF spectrum continues to grow – especially related to space-based Earth observation



# WMO Resolution 31 (Cg-19)

- [Resolution 31 \(Cg-19\)](#), adopted by Congress in Spring 2023, highlights the importance of radio frequencies for meteorological and related environmental activities.
- It urges all **WMO Members to do their utmost to ensure the availability and protection of suitable radio-frequency bands** required for meteorological and related environmental operations and research.

**Resolution 31 (Cg-19)**  
**WMO Position on the World Radiocommunication Conference 2023 (WRC-23)**  
**Agenda**

THE WORLD METEOROLOGICAL CONGRESS,

**Having considered:**

- (1) [Recommendation 4 \(EC-76\)](#) - WMO Position on the World Radiocommunication Conference 2023 (WRC-23) Agenda,
- (2) The Recommendation by the President of WMO on the adoption of the updated WMO Position on the World Radiocommunication Conference 2023 (WRC-23) Agenda,

**Recalling [Resolution 42 \(Cg-18\)](#)** – Radio frequencies for meteorological and related environmental activities,

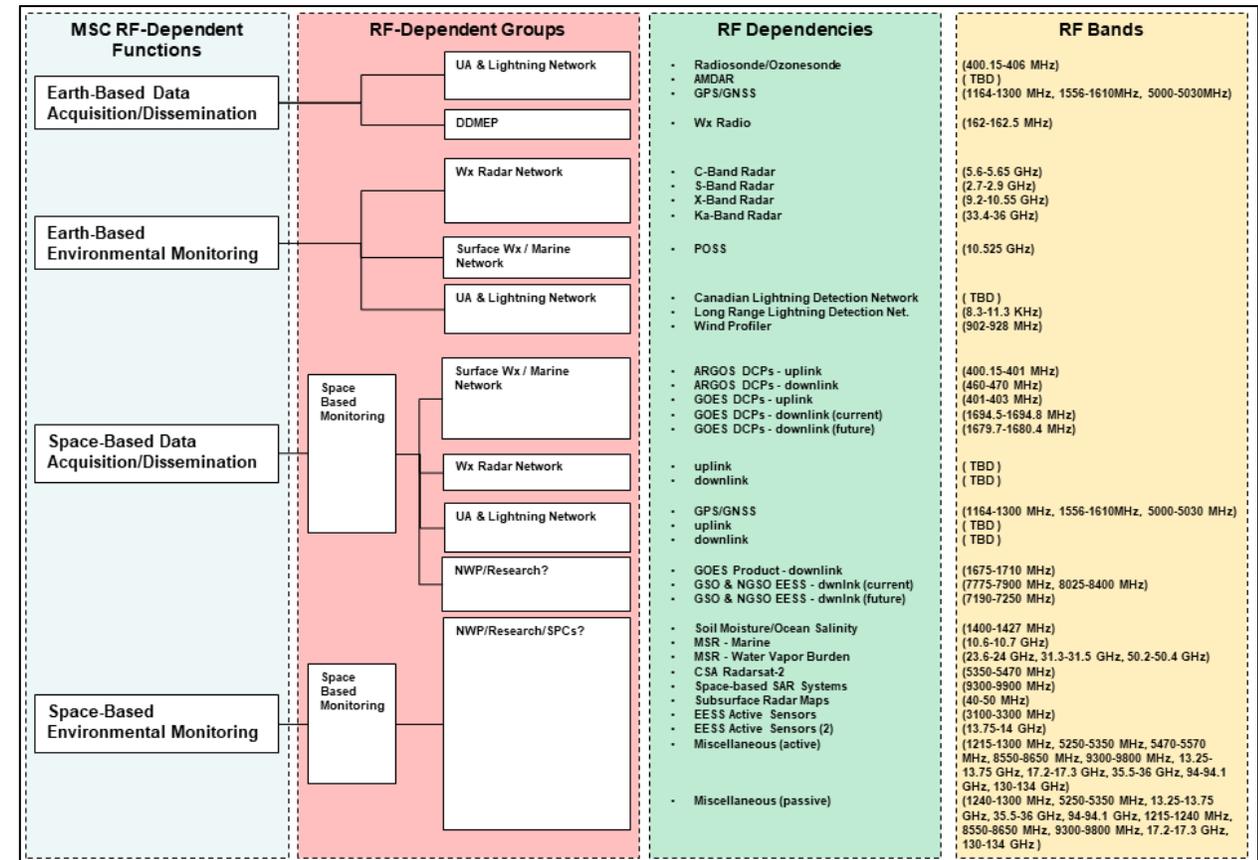
**Considering:**

- (1) The prime importance of the specific radiocommunication services for meteorological and related environmental activities required for the detection and early warning of hazards and the prevention and mitigation of natural and technological (human-induced) disasters, the safety of life and property, the protection of the environment, climate change studies and scientific research,
- (2) The importance of information provided by the Earth exploration systems including meteorological systems for a wide range of economic activities such as agriculture, transportation, construction and tourism,
- (3) The crucial importance of the allocation of suitable radio-frequency bands for the operation of surface-based meteorological observing systems, including in particular radiosondes, weather radars, radiometer and wind profiler radars,
- (4) The crucial importance of the allocation of suitable radio-frequency bands for the operation of meteorological and research and development satellites, including remote sensing, data collection and data distribution links,
- (5) Implications of losing critical radio frequencies reserved for meteorological services provided by Members in support of the above economic activities as well as protection of life and property, and potential erosion of such services,
- (6) The impact of future transmitting technology transmissions on the capability of Members to monitor and predict variables related to the availability of water resources,

**Stressing** that some radio-frequency bands are a unique natural resource due to their special characteristics and natural radiation enabling space-borne passive sensing of the atmosphere and the Earth's surface, which deserve adequate allocation to the Earth exploration-satellite service (passive) and absolute protection from interference,

# Radiofrequency (RF) Dependencies

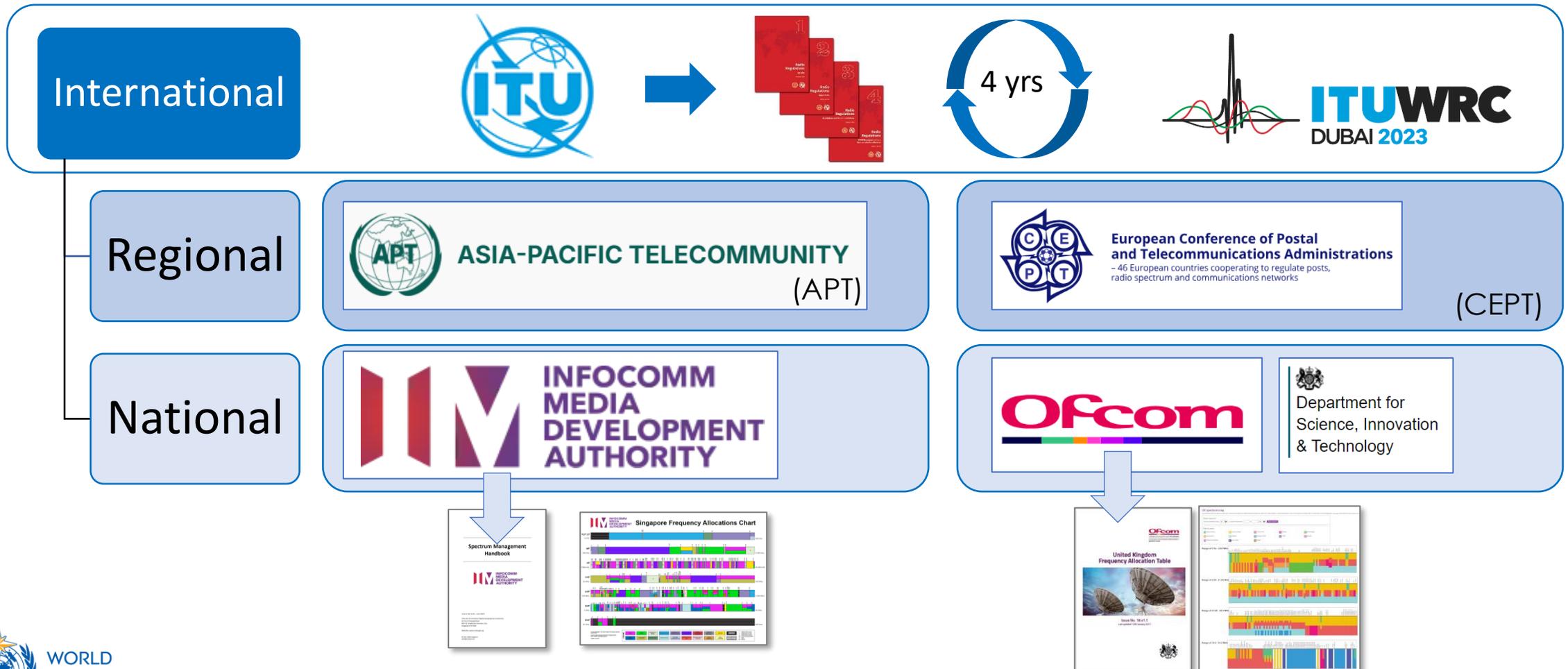
- To advocate for the protection of meteorological spectrum, it is necessary to understand your RF dependencies
- Engage experts internally and use their expertise to understand the value and criticality of spectrum for your services
  - Note: many RF dependent users have no/little awareness that they are dependent on radio spectrum!
- Ongoing process
  - Database of RF dependencies must be maintained
  - Future needs must also be considered!



# Radiofrequency (RF) Dependencies

- NMHS applications and use of spectrum differ significantly from “typical” radio communication systems (e.g. cellular mobile networks, VHF radios), which regulators are generally more familiar with
- It is important to understand and communicate the unique characteristics of meteorological and related environmental radiocommunication systems
  - Global in nature: meteorological applications (e.g. radiosondes, Earth observation satellite data) are deployed globally, and data is shared globally
    - Note in particular the sensitivity of EESS (passive) systems!
  - Weather and climate don't know political borders
    - RF interference outside a country's borders can impact that country's NMHS operations

# The Hierarchy of Spectrum Management



# National Radiocommunication Administrations (NRAs)

- Usually national radiocommunication law delegates the authority and responsibility to manage spectrum use to one or more government bodies
- NRAs are responsible for domestic radio regulations and strive to ensure spectrum is deployed in the most suitable manner for the greater public good
  - This involves consideration of both social and economic value and benefits
- To advocate for the protection of meteorological and environmental spectrum one must engage their NRA
  - The ITU [membership page](#) contains a link to organizations registered with the ITU in each member state (NRAs are labelled as Category = "ADMIN")
  - Each NRA defines a national "focal point" with the ITU responsible for managing access to protected ITU documents (via ITU [Telecommunication Information Exchange Service \(TIES\)](#) accounts)
  - These focal points can provide guidance on how to connect with your NRA

# Radio Licensing

- All radiocommunication stations should be licensed with your NRA
- Licenses are required for transmitting stations
  - Exceptions exist for certain unlicensed devices (e.g. Wi-Fi routers)
- Receive-only stations are generally *allowed* to operate without a license,
  - They present no risk of RF interference (RFI) to other stations
- However, licensing receive-only stations is highly recommended to ensure:
  - i) receive-only stations have regulatory status and protection
  - ii) receive-only stations are known to your NRA and can be accounted for in spectrum proceedings
- Ensuring stations are filed in the ITU-R Master International Frequency Register (MIFR) is also important to ensure awareness within ITU-R context

# Spectrum Management and the WMO

- WMO's participation in spectrum management is primarily led by its Expert Team on Radio Frequency Coordination (ET-RFC) under SC-ON
  - Primary output: WMO's Position Paper on the Agenda of the upcoming ITU-R World Radiocommunication Conference (updated annually)
  - ET-RFC members participate actively in domestic proceedings and also within the ITU-R process, particularly in Study Group 7, to represent WMO interests
    - However, participation of additional NMHS representatives is desired!
- WMO is seeking to expand expertise and provide capacity development opportunities in the field of RF coordination and spectrum management
  - E.g., the recent establishment of National Focal Points on Radio Frequency Matters
- Your participation this week is a great starting point!

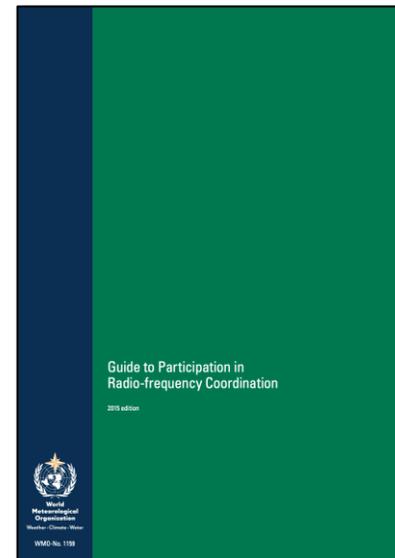
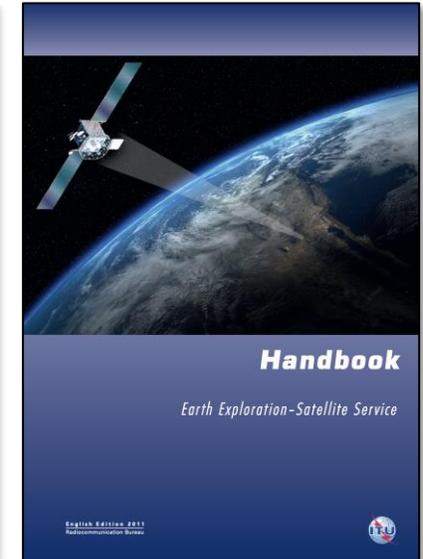
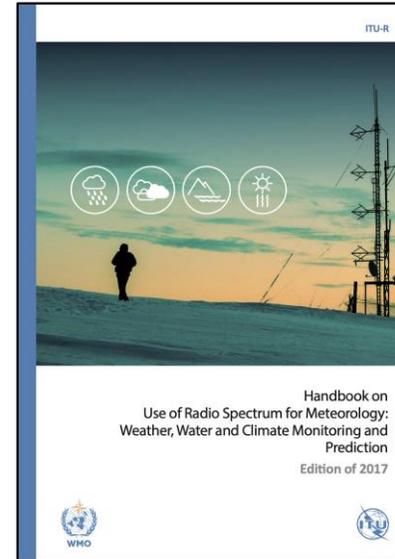


# How to engage in Spectrum Management

- WMO members should **understand their RF dependencies** thoroughly.
- **Collaborate with National Radiocommunication Administrations (NRAs)**
  - **Participate in national and regional** discussions.
  - **Advocate for the protection** of meteorological spectrum.
  - Communicate how meteorological spectrum usage **aligns with national priorities.**

# Helpful References & Resources for NFP-RF

- [WMO Training Workshop on RF Matters \(February 2024\)](#)
- [WMO/ITU Handbook on Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction \(under revision\)](#)
- [ITU-R Handbook on Earth Exploration-Satellite Service](#)
- [WMO No. 1159: Guide to Participation in Radio-frequency Coordination](#)
- [ITU News Magazine](#) (see in particular issues 2019 No. 1 & 2023 No. 5)



# Key Lessons Learned

- Understand that spectrum management has a **steep and long learning curve**.
  - It takes time and effort to understand the process and build the networks needed to successfully influence the process
  - Don't be afraid to **ask for help!**
- Building **rapport and trust** with your NRA is critical – this is a process that takes time
  - Communicate how meteorological and other environmental uses of spectrum are essential to national priorities (e.g., disaster risk reduction, climate change)
- Ensure **all radiocommunication stations are licensed**
  - Including receive-only stations
- **Engage early** – RF matters can be complex and take time to resolve
- Implement **redundancy & succession planning**
  - Significant corporate knowledge can be lost when a spectrum manager retires

# Concluding Remarks

- The demand for spectrum demand continues to grow – as does the risk of RF interference.
- WRCs present risks, and opportunities, for the WMO, as do national regulatory proceedings.
- Active participation of WMO members in spectrum management activities is essential to ensuring risks to WMO RF dependencies are mitigated.
  - Participation is needed at domestic, regional and global levels

***“If you’re not at the table,  
you’re on the menu!”***

# Concluding Remarks



Understand both your RF dependencies and those of the global WMO community



Build your networks – domestically & internationally



Engage early – building rapport and trust with your NRA is key



Don't be afraid to ask for help – it is a steep and long learning curve



Remember to keep capacity development and succession planning in mind

# Thank you.



WORLD  
METEOROLOGICAL  
ORGANIZATION

[wmo.int](http://wmo.int)

# WMO Resolution 31 (Cg-19)

## Considering:

- (1) The prime importance of the specific radiocommunication services for meteorological and related environmental activities required for the detection and early warning of hazards and the prevention and mitigation of natural and technological (human-induced) disasters, the safety of life and property, the protection of the environment, climate change studies and scientific research
- (2) The importance of information provided by the Earth exploration systems including meteorological systems for a wide range of economic activities such as agriculture, transportation, construction and tourism,
- (3) The crucial importance of the allocation of suitable radio-frequency bands for the operation of surface-based meteorological observing systems, including in particular radiosondes, weather radars, radiometer and wind profiler radars,
- (4) The crucial importance of the allocation of suitable radio-frequency bands for the operation of meteorological and research and development satellites, including remote sensing, data collection and data distribution links,
- (5) Implications of losing critical radio frequencies reserved for meteorological services provided by Members in support of the above economic activities as well as protection of life and property, and potential erosion of such services,
- (6) The impact of future transmitting technology transmissions on the capability of Members to monitor and predict variables related to the availability of water resources,

# WMO Resolution 31 (Cg-19)

**Stressing** that some radio-frequency bands are a unique natural resource due to their special characteristics and natural radiation enabling space-borne passive sensing of the atmosphere and the Earth's surface, which deserve adequate allocation to the Earth exploration-satellite service (passive) and absolute protection from interference,

**Urges** all Members to promote the WMO positions on the relevant WRC-23 agenda items to ensure the availability and protection of suitable radio-frequency bands required for meteorological and related environmental operations and research, and in particular:

(1) To ensure that their national radiocommunication administrations are fully aware of the importance of and requirements for radio frequencies for meteorological and related activities, and to seek their support in the ITU World Radiocommunication Conferences and Radiocommunication Sector (ITU-R) activities;

(2) To participate actively in the national, regional and international activities on relevant radiocommunication regulatory issues and, in particular, to involve experts from their Services in the work of relevant regional telecommunication organizations and of ITU-R, especially ITU-R Study Groups 5 and 7 on Terrestrial (including radiolocation) and Science Services, respectively;

(3) To register adequately with their national radiocommunication administrations all radiocommunication stations and radio frequencies used for meteorological and related environmental operations and research;