

RADIO FREQUENCY MATTERS

(Submitted by WMO)

Summary and purpose of document

This working paper discusses matters related to radio frequency bands used for meteorological activities, including the relevant decisions taken by the Fourteenth WMO Congress and the World Radiocommunication Conference 2003 (Geneva, June 2003).

ACTION PROPOSED

- Appendices:**
- A. Res. 3 (Cg-XIV) - Radio Frequencies for Meteorological and Related Environmental Activities
 - B. Letter to the European Commissioner for Enterprise and Information Society

RADIO FREQUENCIES FOR METEOROLOGICAL ACTIVITIES

Fourteenth WMO Congress

1. As noted with satisfaction by Fourteenth Congress, the current radio frequency allocations and regulatory provisions of the ITU Radio Regulations are addressing requirements for meteorological and related environmental activities, through specific radiocommunication services (Meteorological Aids, Meteorological Satellite, Earth Exploration-Satellite - including passive remote sensing - and Radiolocation for weather and wind profiler radars). Nonetheless, Congress stressed that the threat on the full range of radio frequency bands allocated for meteorological and related environmental systems was continuing with the increasing development and expansion of new commercial radiocommunication systems.
2. Congress re-affirmed the prime importance of radio frequency matters for meteorological and related environmental operations and research, and adopted Resolution 3 (Cg-XIV) (see Appendix I). It particularly emphasized that the utmost importance should be attached to ensuring absolute protection of the special bands allocated to space-borne passive sensing (e.g. the exclusive 23.6 - 24 GHz passive band for measurement of atmospheric water vapour), which were a unique natural resource for atmospheric measurements and had an increasing importance in meteorology (e.g. observation, NWP, climatology). Resolution 3 (Cg-XIV) was brought to the attention of the Secretary-General of ITU as well as submitted to the World Radiocommunication Conference 2003, emphasizing on "APPEALS to the International Telecommunication Union and its Member Administrations, (1) and (2) "
3. Congress strongly urged Members to actively participate in radio frequency activities, especially the preparation of World Radiocommunication Conferences (WRC) issues, conducted by their national telecommunication administrations, by regional radiocommunication organizations (CEPT for Europe, APT for Asia-Pacific, CITEL for the Americas, PATU and the Arab League for Africa and the Middle East), and by the ITU. It also requested CBS to pursue the continuous review of regulatory and technical radio frequency matters, and the Secretary-General to continue the active role of the Secretariat in coordinating and supporting radio frequency activities.
4. *The Handbook on use of radio frequency spectrum for meteorology*, which was developed in cooperation between WMO and ITU, was published as a joint WMO/ITU publication in paper and CD format and was distributed to all NMHSs.

WRC-03

5. The recent World Radiocommunication Conference 2003 (WRC-03, Geneva, 9 June-4 July 2003) had a favourable outcome as regards the several items of concern for meteorology. The active participation in the ITU preparatory activities of WMO, of several NMHSs and of meteorological satellite agencies, and the effective coordination and preparatory activities undertaken by the CBS Steering Group on Radio-Frequency Coordination, were instrumental in ensuring that meteorological requirements were recognized and supported. The main outcome of WRC-03 related to meteorology is as follows:
 - The issue of additional frequency allocation for Mobile-Satellite Services (MSS) below 1 GHz, which was a major threat since 1992 on the band 401-406 MHz for meteorological aids (radiosondes) and meteorological satellite (MetSat) operation, has been definitely closed. This decision consolidates the band 401-406 MHz as an important allocation for meteorological operations.
 - The issue of possible allocations of portions of the 1670-1710 MHz bands to the MSS, and in particular the 1683-1690 MHz sub-band, was also a major threat since 1992 that was considered by several World Radiocommunication Conferences. Meteorological systems

(MetAids and Met-Sat) operations continue to require the entire portion of the band 1 675-1 710 MHz for providing vital services. However, sharing possibilities with the MSS exist in the sub-band 1 670–1 675 MHz, provided that the small number of main MetSat Earth stations and that national MetAids operations continuing to use the sub-band 1 670–1 675 MHz be protected. WRC-03 decided to allocate the 1 668–1 675 MHz band to the MSS (Earth-to-space), while protecting stations in the meteorological aids service in China, Iran (Islamic Republic of), Japan and Uzbekistan, as well as existing Met-Sat earth stations. Administrations (i.e. countries) are invited to notify before 1 January 2004 Met-Sat earth stations which were operating in the band 1 670-1 675 MHz on 4 July 2003; they are also urged not to implement new MetAids systems in the band 1 668.4-1 675 MHz and are encouraged to migrate operations to other bands as soon as practicable. It should be noted in this regard that the target is to concentrate radiosonde operations in the sub-band 1 675-1 683 MHz. This new MSS allocation, with provisions that limit its impact on meteorological operations, definitely closes this issue. The 1675-1710 MHz band is therefore consolidated as an important allocation for meteorological operations.

- Several WRC-2003 decisions addressed allocation to radiocommunication services in bands that are contiguous to bands allocated to spaceborne passive sensing. Some measures were agreed regarding the protection of passive services from unwanted emissions from active radiocommunication services, and studies would continue on this important issue.
- The next World Radiocommunication Conference is planned for 2007, and the items of its provisional agenda that are related to meteorological activities address the protection of spaceborne passive sensing (Earth exploration-satellite (passive) service and space research (passive) service) from unwanted emissions and extension of an allocation to the meteorological satellite service. Other issues may arise until the final Agenda is settled.

UWB in the 23.6-24 GHz passive band

The Secretary-General of WMO sent a letter to the European Commissioner for Enterprise and Information Society requesting measures to safeguard the current protection of the 23.6-24 GHz frequency band, in view of the potential damage on meteorological and related environmental activities with their social and economic impacts, including safety of life and property (see Appendix II). The reply from the European Commissioner has not been received yet.

Res. 3 (Cg-XIV) — RADIO FREQUENCIES FOR METEOROLOGICAL AND RELATED ENVIRONMENTAL ACTIVITIES

THE CONGRESS,

NOTING:

- (1) The Sixth Long-term Plan,
- (2) Resolution 3 (Cg-XIII) – Radio-frequencies for meteorological activities,
- (3) The current radio frequency allocations and regulatory provisions related to the Meteorological Aids, Meteorological Satellite, Earth Exploration-Satellite and Radiolocation (weather and wind profiler radars) Services in the Radio Regulations of the International Telecommunication Union (ITU),
- (4) The outcome of ITU World Radiocommunication Conferences (esp. WRC-2000),
- (5) The agenda of the forthcoming ITU World Radiocommunication Conference (WRC-2003),

CONSIDERING:

- (1) The prime importance of the specific radiocommunication services for meteorological and related environmental activities required for the safety of life and property, the protection of the environment, climate change studies and scientific research,
- (2) 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, wind profiler radars,
- (3) The crucial importance of the allocation of suitable radio-frequency bands for the operation of Meteorological and Research & Development satellites, including remote sensing, data collection and data distribution links,

STRESSING that some radio-frequency bands are a unique natural resource due to their special characteristics and natural radiation enabling spaceborne passive sensing of the atmosphere and the Earth surface, that deserve adequate allocation to the Earth Exploration Satellite Service (passive) and absolute protection from interference,

EXPRESSES its serious concern at the continuing threat to several frequency bands allocated to the Meteorological Aids, Meteorological Satellite, Earth Exploration-Satellite and Radiolocation (weather and wind profiler radars) Services posed by the development of other radiocommunication services;

REQUESTS the Commission for Basic Systems to pursue the continuous review of regulatory and technical matters related to radio-frequencies for operational and research meteorological and related environmental activities, in coordination with other technical commissions and in liaison with other relevant international bodies, in particular the Coordination Group for Meteorological Satellites (CGMS);

URGES all 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, 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 actively participate 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 radiocommunication organizations and of the ITU Radiocommunication Sector (ITU-R), especially ITU-R Study Group 7 on Science Services;
- (3) To adequately register with their national radiocommunication administrations all radiocommunication stations and radio frequencies used for meteorological and related environmental operations and research;

APPEALS to the International Telecommunication Union and its Member Administrations:

- (1) To ensure the availability and absolute protection of the radio-frequency bands which, due to their special physical characteristics, are a unique natural resource for spaceborne passive sensing of the atmosphere and the Earth surface; In this regard, the exclusive 23.6 - 24 GHz passive band that is associated with a water vapour absorption line is of crucial importance for weather, water and climate research and operations;
- (2) To give due consideration to the WMO requirements for radio frequency allocations and regulatory provisions for meteorological and related environmental operations and research;

REQUESTS the Secretary-General:

To bring this resolution to the attention of all concerned;

- (1) To pursue as a matter of high priority the coordination role of the Secretariat in radio frequency matters, especially with the Radiocommunication Sector (ITU-R) of the International Telecommunication Union, including participation of WMO in ITU-R Radiocommunication Study Groups, conference preparatory meetings and World Radiocommunication Conferences;
 - (2) To facilitate the coordination between National Meteorological and Hydrological Services and their national radiocommunication administrations, particularly in preparing the ITU World Radiocommunication conferences, by providing appropriate information and documentation;
 - (3) To assist the Commission for Basic Systems in the implementation of this resolution.
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Our ref.: 16.753-03/WB/SY/T.5-RFC

Annex: 1

Mr Erkki Liikanen
European Commissioner for Enterprise and
Information Society
European Commission
B-1049 Bruxelles/Wetstraat
Belgium

GENEVA, 26 June 2003

Dear Mr Liikanen,

I have been informed that the European Commission Directorate-General on Information Society has initiated the preparation of radio frequency regulatory measures for the introduction of automotive short-range radar devices in the European Union. The target frequency band, which is promoted for the operation of these "Ultra Wide Band" devices by the automotive manufacturers organized in the SARA group, includes the 23.6-24 GHz band, that is used worldwide by meteorological and environmental operations and research. The band 23.6-24 GHz contains an H₂O molecular absorption peak that enables the accurate measurement of the vertical water vapour content of the atmosphere from passive sensors onboard meteorological and environmental satellites. These few "passive bands" are unique natural resources that have been fully recognized by a very special regulatory measure in the ITU Radio Regulations (Footnote 5.340) stating "all emissions are prohibited in the band".

Space-borne passive sensing of the Earth's surface and atmosphere has an increasing importance in meteorology, including for mitigation of weather and climate-related disasters, and in the scientific understanding, monitoring and prediction of climate change. The impressive progress made in recent years in weather analysis, warning and forecasts, in particular for dangerous weather phenomena that affect all populations and economies, including Europe, is mainly attributable to the spaceborne observations and their assimilation in numerical models.

Spaceborne passive sensors measure very weak natural radiation, and are therefore extremely sensitive to interference; any artificial increase of the radiation "noise" has a degrading impact. As regards 24 GHz radars for automobiles, studies indicate that a density of a few cars (1-10 per km²) would corrupt the meteorological measurements. European organizations dealing with meteorological and environmental operations and research, including ECMWF, EUMETSAT, EUMETNET and ESA have already contributed several studies to the working groups and workshops organized by the European Radiocommunication Office (ERO) and the CEPT on this issue, as representatives of the so-called "victim services".

cc: Mr Yoshio Utsumi (Secretary-General, ITU)
Mr Tillmann Mohr (Director-General, EUMETSAT)
Dr Dave Burridge (Director, ECMWF)
Mr Thormod Bøe (Director, ERO)

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The Fourteenth World Meteorological Congress (Geneva, May 2003), attended by 170 Member countries, expressed concern at the continuing threat to radio frequency bands allocated for meteorological and related environmental systems. The Congress appealed to the ITU and its Member Administrations to ensure absolute protection of the special bands allocated to space-borne passive sensing (MetSat and EES), with particular attention to the exclusive 23.6 - 24 GHz passive band, which are a unique natural resource for atmospheric measurements. I am pleased to attach herewith, a copy of Congress Resolution 3.1.2/1 (Cg-XIV) - Radio frequencies for meteorological and related environmental activities - which I also submitted to the World Radiocommunication Conference (WRC-03, Geneva, 9 June-4 July 2003).

WMO supports and benefits from the development of new radio-communication technologies, but I do believe that these developments could progress without putting in jeopardy those applications that are crucial for environmental applications and increasingly important for the safety of human life and property. I note, in this regard, that a suitable band around 77 GHz has been identified for automotive radars, and that a major electronic company recently announced the development of a Monolithic Microwave Integrated Circuits chipset solution for the cost-effective production of 77 GHz band automobile radars.

Considering the crucial importance of this issue and the potential damage on meteorological and related environmental activities with their social and economic impacts, including safety of life and property, I would be grateful for all the measures you could take to safeguard the current protection of the 23.6-24 GHz frequency band.

Yours sincerely,

(M. Jarraud)
for the Secretary-General