

***OBJECTIVES OF THE
SPACE FREQUENCY
COORDINATION GROUP (SFCG)***



***FOR THE 2012
WORLD RADIOCOMMUNICATION
CONFERENCE***

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Introduction

These are the objectives of the Space Frequency Coordination Group (SFCG) member agencies relative to the space science services on the agenda of the 2012 World Radio Communication Conference (WRC-12). The contents may be used by SFCG members to inform their Administrations and Regional Organizations about the SFCG position on the various relevant WRC-12 Agenda items. The document is also meant to provide support in the WRC-12 preparation.

The presentation is organized to align with the Agenda for the WRC-12 (as approved by Council 2008 Resolution **1291**) as presented in Resolution **805 (WRC-07)**. Not all of the items in that agenda are of interest to the SFCG and therefore only those specific agenda items, relating to SFCG issues, are discussed herein.

The SFCG is concerned with the effective use and management of those radio frequency bands that are allocated by the Radio Regulations of the ITU to the space research, space operations, Earth exploration-satellite, and meteorological satellite services.

In particular SFCG promotes the use of space-based passive sensors to provide vital ecological and environmental data that is unobtainable by any other means. Such passive sensors depend for their successful operation on frequency bands that are defined by the physical laws.

SFCG also promotes spectrum efficiency and recognizes the need for and the value of sharing frequency bands between more than one radio service, in cases where mutually agreed sharing and protection criteria have been established based upon the results of ITU-R studies.

However, in frequency bands allocated to the space science services, and where sharing has been shown to be infeasible, the SFCG holds the view that such sharing should not be implemented, and would support any review by Administrations that might lead to a reduction in the number of such infeasible sharing situations in the Table of Frequency Allocations contained in the ITU Radio Regulations (RR).

Agenda Item 1.2 *“taking into account the ITU-R studies carried out in accordance with Resolution 951 (Rev.WRC-07), to take appropriate action with a view to enhancing the international regulatory framework”*

Resolution **951 (Rev.WRC-07)** calls for the ITU-R to continue studies in order to develop concepts and procedures for enhancing the Radio Regulations to meet the demands of current, emerging and future radio applications, while taking into account existing services and usage. The Resolution also invites WRC-12 to take into consideration the results of these studies, including sharing and their impact on allocations in the concerned frequency bands, and take appropriate action in accordance with Annex 2 of the Resolution. Conference preparatory meeting CPM11-1 identified Working Party 1B (WP 1B) of the ITU-R Study Group 1 as the responsible group for preparation of the draft CPM text related to this Agenda Item.

SFCG Objective

SFCG supports Methods for NOC (A1, B1) described in the CPM Report on WRC-12 Agenda item 1.2. Implications of other Methods are difficult to evaluate. In addition care should be taken to guard against this Agenda item being used as a means to broaden the WRC-12 Agenda without having been vetted and agreed by Administrations. General SFCG objectives are to avoid changes made to RR that could jeopardize the protection of science services presently provided by RR. Furthermore SFCG proposes that no change to the current definitions of science services should be introduced in RR. Particularly critical could be the possible elimination of a clear distinction between FS and MS, since it could create incompatibility scenarios. For example the applicability of RR No. **5.391** (band 2 200-2 290 MHz) must be ensured. Similarly the technical/operational characteristics that ensure compatibility in bands shared between terrestrial services and EESS (passive) should not be modified in a way that would increase the resulting global emission levels at high angles by the terrestrial services.

Agenda Item 1.3 *“to consider spectrum requirements and possible regulatory actions, including allocations, in order to support the safe operation of unmanned aircraft systems (UAS), based on the results of ITU-R studies, in accordance with Resolution 421 (WRC-07)”*

Resolution **421 (WRC-07)** calls for WRC-12 to consider, based on the results of ITU-R studies, the spectrum requirements and possible regulatory actions, including additional allocations, to support the operation and control of UAS systems.

SFCG Objective

SFCG supports Method A1 for the satellite component. SFCG is concerned with the identification of possible new AMS(R)S allocations in the bands 13.25-13.4 GHz, 22.50-22.55 GHz and 23.55-23.6 GHz under Method A5 given potential interference to space science services. SFCG could support other Methods provided they would not modify the sharing situation in science services bands.

No allocations of spectrum to support UAS systems should be made in space science service bands unless acceptable sharing criteria are developed. Airborne system downlinks can be particularly troublesome for space research and EESS receive ground stations. Airborne system uplinks have the potential to interfere with space-based receivers, especially passive remote sensors.

Agenda Item 1.4 “to consider, based on the results of ITU-R studies, any further regulatory measures to facilitate introduction of new aeronautical mobile (R) service (AM(R)S) systems in the bands 112-117.975 MHz, 960-1164 MHz and 5 000-5 030 MHz in accordance with Resolutions **413 (Rev.WRC-07)**, **417 (WRC-07)** and **420 (WRC-07)**”

Resolution **420 (WRC-07)** calls for WRC-12 to consider, based on the results of ITU-R studies, AM(R)S spectrum requirements for surface applications in the 5 GHz range, in order to determine if they can be fulfilled in the band 5 091-5 150 MHz. It also calls to study the feasibility of an allocation for AM(R)S for surface applications at airports and the technical and operational issues relating to the protection of RNSS in the bands between 5 000 and 5 030 MHz.

SFCG Objective

SFCG has no particular view on Methods in the CPM Report since they provide the necessary protection of RNSS systems in the band 5000-5030 MHz under development by some SFCG member agencies.

Agenda Item 1.5 “to consider worldwide/regional harmonization of spectrum for electronic news gathering (ENG), taking into account the results of ITU-R studies, in accordance with Resolution **954 (WRC-07)**”

Resolution **954 (WRC-07)** calls for WRC-12 to address the feasibility of achieving a satisfactory degree of worldwide/regional harmonization of spectrum for ENG use in terms of the frequency bands and tuning ranges based on studies undertaken by the ITU-R and that methods should be identified for the possible harmonization of frequency bands and tuning ranges for ENG usage.

SFCG Objective

SFCG supports Method A. However, if during WRC-12 a list of bands can be identified which does not include bands critical for space science services, **SFCG could also support Methods B or D** as the identified bands and tuning ranges would be included in a WRC Resolution . SFCG opposes Method C.

In recent years in some countries there have been situations where potential interference between ENG systems and EESS systems precluded obtaining licences for EESS/SRS Earth stations. There are also other cases where harmful interference to EESS/SRS stations could be created by ENG systems, which have not been addressed in the CPM Report For example, while coordination with fixed point to point links is feasible, coordination with mobile and portable ENG applications is more critical, as

coexistence could be only achieved through an exclusion zone around an Earth station. Helicopter applications would only be feasible with a sufficiently large exclusion zone. It is critical that worldwide/regional harmonization of spectrum for ENG does not affect the use of the 2 GHz band by systems belonging to the space science services (2025-2120 MHz and 2200-2300 MHz). In addition worldwide/regional harmonization of spectrum to support ENG systems should not be made in other space science service bands unless acceptable sharing criteria are developed.

Agenda Item 1.6 *“to review No. 5.565 of the Radio Regulations in order to update the spectrum use by the passive services between 275 GHz and 3 000 GHz, in accordance with Resolution 950 (Rev. WRC-07), and to consider possible procedures for free-space optical-links, taking into account the results of ITU-R studies, in accordance with Resolution 955 (WRC-07)”*

Resolution **950 (Rev. WRC-07)** calls for WRC-12 to review RR No. **5.565**, excluding frequency allocations, in order to update the spectrum use between 275 GHz and 3 000 GHz by the passive services, taking into account the result of the ITU-R studies. Additionally, Resolution **950 (Rev. WRC-07)** also states that administrations may submit for inclusion in the Master International Frequency Register (MIFR) details on systems which operate between 275 and 3 000 GHz and which may be recorded by the Radiocommunication Bureau under RR Nos. **8.4, 11.8** and **11.12**.

SFCG Objective for RES 950

SFCG supports the Method described in the CPM Report.

SFCG is in favour of revision of RR No. **5.565** to include all appropriate frequency bands within the range 275 to 1 000 GHz to be used by systems belonging to the Earth exploration-satellite (passive), space research (passive) and radio astronomy services in order to protect these bands for scientific applications now and in the future. SFCG also recognizes that propagation effects in the 1 000-3 000 GHz range are such that passive service and active services can co-exist without limitation. SFCG also supports inclusion of details in the MIFR on any systems of the science services that use these frequency bands and encourages member agencies to submit such information to the ITU-R Radiocommunication Bureau.

Resolution **955 (WRC-07)** calls for the consideration of possible procedures for free-space optical links, taking into account the results of ITU-R studies covering at least

SFCG Objective for RES 955

SFCG supports the Method in the CPM Report, which makes no change to RR (NOC). SFCG is in favour of continued unregulated use of satellite optical links.

Agenda Item 1.8 “to consider the progress of ITU-R studies concerning the technical and regulatory issues relative to the fixed service in the bands between 71 GHz and 238 GHz, taking into account Resolutions 731 (WRC-2000) and 732 (WRC-2000)”

Resolution **731 (WRC-2000)** calls for consideration by a future competent World Radiocommunication Conference of issues dealing with sharing and adjacent-band compatibility between passive and active services above 71 GHz.

Resolution **732 (WRC-2000)** calls for consideration by a future competent World Radiocommunication Conference of issues dealing with sharing between active services sharing bands above 71 GHz.

This agenda item focuses on the technical and regulatory issues for the fixed service in bands allocated to this service between 71 and 238 GHz. The intent is to deal with various fixed service bands and to develop sharing criteria between the fixed service and other active services in certain shared bands, as well as between passive and active services in both shared and adjacent bands, as needed.

SFCG Objective

SFCG supports explicit regulatory text identifying the unwanted emission limits in the passive band 86 - 92 GHz as per **Method B1**.

SFCG supports the protection of space science services in bands allocated in the 71-238 GHz frequency range, including protection of passive services from unwanted emissions from adjacent bands. Currently these protection levels are not yet included, either in the Radio Regulations or in any associated Recommendation.

SFCG opposes the suppression of Resolution 731 (WRC-2000) (Method A2) as it covers sharing and adjacent band compatibility issues between passive and active services in general and not only compatibility with the fixed service as discussed under this agenda item.

Agenda Item 1.11 “to consider a primary allocation to the space research service (Earth-to-space) within the band 22.55-23.15 GHz, taking into account the results of ITU-R studies, in accordance with Resolution 753 (WRC-07)”

Resolution **753 (WRC-07)** calls for consideration of sharing between space research service systems operating in the Earth-to-space direction and the fixed, inter-satellite and mobile services in the band 22.55-23.15 GHz, with a view to consider the inclusion of the sharing criteria within the Radio Regulations and appropriate modifications to the Table of Frequency Allocations.

SFCG Objective

SFCG supports the single Method described in the CPM Report on WRC-12 Agenda item 1.11.

SFCG supports the addition of a new SRS (Earth-to-space) primary allocation in the band 22.55-23.15 GHz with a bandwidth of 600 MHz, taking into account the results of ITU-R studies. A primary space research service allocation in the 22.55-23.15 GHz band will provide the necessary uplink (Earth-to-space) bandwidth capacity to support the potentially, many concurrent manned and unmanned exploration missions particularly in the vicinity of the Moon as well as supporting SRS missions to Lagrangian orbits and in near-Earth orbit (details are provided in Report SFCG 30-1). Furthermore, this new allocation will provide a needed companion uplink (Earth-to-space) band to the SRS downlink (space-to-Earth) allocation in the band 25.5-27.0 GHz that will be used for the transmission of mission data, command and control links. The technical studies have concluded that no constraints are needed on the SRS systems to protect existing services and that a minimum bandwidth of 600 MHz is required.

Agenda Item 1.12 *“to protect the primary services in the band 37-38 GHz from interference resulting from aeronautical mobile service operations, taking into account the results of ITU-R studies, in accordance with Resolution 754 (WRC-07)”*

Resolution **754 (WRC-07)** calls for consideration of modification of the aeronautical component of the mobile service allocation in the band 37-38 GHz for protection of other primary services.

SFCG Objective

SFCG supports Method A as described in the CPM Report on WRC-12 agenda item 1.12. However **SFCG could also accept Method B** as it also ensures the protection of SRS earth stations in 37-38 GHz.

SFCG supports the exclusion of the aeronautical mobile service (AMS) from the 37-38 GHz band to protect the applications of the space research service in the band, in particular the deep-space applications. Studies have determined that sharing is feasible for specific AMS applications as long as they meet extremely restrictive pfd limits.

Agenda Item 1.19 *“to consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies, in accordance with Resolution 956 (WRC-07)”*

Resolution **956 (WRC-07)** calls for studies on whether or not there is a need for regulatory measures related to the application of cognitive radio systems (CRS) technologies and software-defined radio (SDR).

SFCG Objective

SFCG supports Methods A and B2 described in the CPM Report on WRC-12 Agenda item 1.19, however the conditions described below should be observed.

SDR and CRS are considered to be technologies, not Radiocommunication Services. These technologies will be applied within specific Radiocommunication Services, and the regulations relevant for those Services have to be applicable to SDR and CRS. Therefore, SFCG sees no need to identify or designate spectrum in the RR for either SDR or CRS. The application of CRS technology needs to follow ITU-R guidance regarding technical specifications to be developed.

SFCG is of the view that CRS should only use the spectrum allocated to the service delivered by the particular CRS application and governed by RR applicable to that technology.

Otherwise, SFCG would be concerned about potential use of CRS in the passive bands given in RR No. **5.340**, where the spectrum would appear to be unused due to the lack of intentional emitters in these bands. Technical specifications for CRS intended to operate within active services, should prohibit operation within exclusively passive spectrum bands.

SFCG supports the use of SDR technologies for the space science applications.

Agenda Item 1.20 *“to consider the results of ITU-R studies and spectrum identification for gateway links for high altitude platform stations (HAPS) in the range 5 850-7 075 MHz in order to support operations in the fixed and mobile services, in accordance with Resolution 734 (Rev. WRC-07)”*

Resolution **734 (Rev. WRC-07)** calls for studies by the ITU-R that would identify possible spectrum for gateway links to be used by high altitude platform stations (HAPS) in the range 5 850 to 7 075 MHz.

SFCG Objective

SFCG supports Method A as described in the CPM text on WRC-12 Agenda item 1.20 and opposes Method B, since overlap with EESS (passive) operations could occur. It is noted that the argument that this should be a national decision is not valid, as it will affect EESS that operates on a global basis.

SFCG does not support additional spectrum for HAPS gateway links within the portion of the band 5 850 to 7 075 MHz where passive sensors operate. Within this abovementioned frequency range passive microwave sensors may utilize channels in the 6 425 to 7 075 MHz band (RR No. **5.458**). The AMSR-E passive microwave sensor is currently operational on NASA’s AQUA mission and is also used on current and future meteorological satellites. The passive sensors utilizing this band already receive a great deal of interference from ground-based transmitters. The addition of HAPS gateways in this band would exacerbate the current situation. Sharing studies show that HAPS gateways links cannot be operated without causing interference to EESS (passive).

Agenda Item 1.22 *“to examine the effect of emissions from short-range devices on radiocommunication services, in accordance with Resolution 953 (WRC-07)”*

Resolution **953 (WRC-07)** calls for studies of the emissions from short-range devices (SRDs), in particular radio-frequency identification devices (RFIDs), inside and outside the frequency bands designated in the Radio Regulations for ISM applications, to ensure adequate protection of radiocommunication services.

SFCG Objective

SFCG supports ITU-R Recommendation(s)/WRC Resolution(s) harmonizing SRD frequencies in such a way that their use does not create a potential risk for science services. National regulations need to take into account the effect on services of international nature and this is what the ITU-R Recommendation(s)/WRC Resolution(s) should ensure. Therefore any method reflecting this concept could be supported.

SFCG supports studies of SRD emissions to ensure adequate protection of radiocommunication services, especially the space science services. SFCG particularly supports studies on the aggregate effect of SRD emissions on EESS remote sensing systems (both active and passive). SFCG stresses the fact that the aggregate effect of emissions from SRDs deployed within one country could have negative impact on space-based radiocommunication systems operated by other administrations.

Agenda Item 1.24 *“to consider the existing allocation to the meteorological-satellite service in the band 7 750-7 850 MHz with a view to extending this allocation to the band 7 850-7 900 MHz, limited to non-geostationary meteorological satellites in the space-to-Earth direction, in accordance with Resolution 672 (WRC-07)”*

Resolution **672 (WRC-07)** calls for the extension of the 7 750 to 7 850 MHz allocation to the meteorological-satellite service into the band 7 850 to 7 900 MHz in the space-to-Earth direction, limited to non-geostationary meteorological satellites.

SFCG Objective

SFCG supports the single Method described in the CPM Report on WRC-12 Agenda item 1.24.

The mission requirements for next generation non-GSO meteorological satellites in terms of observations, instruments and user-services clearly show a need to transmit higher data rates compared to current systems. SFCG supports the extension of the existing allocation of the 7 750-7 850 MHz band to the meteorological-satellite service (space-to-Earth) for use by non-geostationary satellites into the 7 850-7 900 MHz band. SFCG notes that sharing scenarios in the frequency band 7 850-7 900 MHz are similar to ones in the frequency band 7 750-7 850 MHz.

Agenda Item 1.25 “to consider possible additional allocations to the mobile-satellite service, in accordance with Resolution 231 (WRC-07)”

Resolution 231 (WRC-07) calls for additional allocations to the mobile-satellite service (MSS) with particular focus on the bands between 4 GHz and 16 GHz.

SFCG Objective

SFCG supports:

- **Method B1, NOC** for the band 7 055-7 250 MHz, specifically opposing any MSS downlink allocation in the band 7 145-7 235 MHz;
- **Method C1, NOC** for the band 8 400-8 500 MHz, specifically opposing any MSS uplink allocations in this band. Particularly critical is the aspect that no practical regulatory measures will be feasible to protect SRS missions from interference caused by mobile Earth stations and aeronautical Earth stations and that some SRS mission types could not be operated anymore.
- SFCG can only agree to new MSS allocations in the MSS candidate bands 10.5 to 10.6 GHz and 13.25 to 13.4 GHz if compatibility with the EESS (passive) in the band 10.6 to 10.7 GHz and EESS (active) in the band 13.25 to 13.4 GHz can be ensured as currently specified in preliminary draft report ITU-R M.[MSS SHARING]

Agenda Item 7 “to consider possible changes in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference: “Advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks”, in accordance with Resolution 86 (Rev.WRC-07)

This standing agenda item to the WRCs deals with any possible changes to the Radio Regulations affecting the advance publication, coordination, notification and recording of satellite networks.

SFCG Objective

SFCG supports possible changes to the Radio Regulations to improve the handling of the advance publication, coordination, notification and recording procedures for satellite networks. SFCG has identified six issues of interest to space science services.

1. SFCG supports the inclusion of a parameter required in RR Appendix 4 for non-geostationary satellite networks not subject to coordination under RR Section II of Article 9 to specify the minimum height above the Earth’s surface at which any satellite in the system transmits as shown in the single Method for Issue 1A of the CPM Report.
2. SFCG supports the inclusion of an indicator about occurrence of transmissions of a non-geostationary satellite network in RR Appendix 4, Annex 2 when in view of its service area as shown in Alternative 1 for the single Method under Issue 1B of the CPM Report.

3. With respect to Issue **2E**, SFCG understands the concerns raised by the BR with respect to changes to a satellite filing that may alter the ability to technically evaluate it at an early stage. The SFCG believes Administrations with non-geostationary satellite networks not subject to coordination should provide the most complete and accurate information to the ITU-R when Advance Publishing these networks in order for other administrations to perform meaningful analyses and make comments in a timely manner. The SFCG further supports the procedure in RR 9.3 for Administrations to cooperate in joint efforts to resolve any difficulties at the time of Advance Publication for these networks. SFCG does not favour one CPM method over the other as long as the Administrations apply the spirit of what is indicated above.
4. SFCG does not support regulatory changes requiring coordination under RR Section **II** of Article **9** for non-geostationary satellites communicating to geostationary satellites via inter-satellite links (data relay links). SFCG agrees with the findings of the Special Committee that the current Rule of Procedure governing such links should be maintained and not incorporated into the RR.
5. SFCG supports instructing the BR to continue on a permanent basis, the publishing of bringing into use dates submitted by administrations on the relevant ITU-R webpage which has been in existence on a “trial basis” since about June 2009.
6. SFCG is strongly of the view that any regulatory recognition of CGC (Complementary Ground Component) in MSS bands shared or adjacent to services used for scientific applications be conditional on sharing/co-existence feasibility being demonstrated through proper ITU-R studies.

Agenda Item 8.1 “to consider and approve the Report of the Director of the Radiocommunication Bureau:

8.1.1 “on the activities of the Radiocommunication Sector since WRC-07”

Issue C: Earth observation applications

Resolution **673 (WRC-07)** calls for ITU-R studies on possible means to improve the recognition of the essential role and global importance of Earth observation radiocommunication applications and the knowledge and understanding of administrations regarding the utilization and benefits of these applications. The results are to be included in the *Director’s Report to WRC-12* for the purpose of considering adequate actions in response to the results of these studies.

SFCG Objective

SFCG supports means to improve the recognition of Earth observation systems/applications and their benefits, including the possible improvement of protection of the radiocommunication systems that support such observations. To this end, SFCG supports appropriate modifications to Resolution **673** to make this Resolution a permanent part of the Radio Regulations acknowledging the importance of Earth observation systems. SFCG emphasises that radio based observing systems,

both terrestrial and satellite based, have a crucial role in forecasting weather, in detecting and providing warning of natural disasters and in monitoring climate change. Earth observation systems are thus essential components of all-hazards emergency and disaster early-warning and mitigation systems.

An explicit mention in the RR Article 4 of the importance of the EESS service is favoured by SFCG.

Agenda Item 8.2 “to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution 806 (WRC-07)”

SFCG Objectives with respect to the draft Agenda for WRC [2016]

- **To identify frequencies for EESS (Earth-to-space) allocations to be associated with existing EESS (space-to-Earth) allocations in the band 8 025-8 400 MHz**

Currently EESS satellites can only use the allocation at 2 025-2 110 MHz (Earth-to-space) for the satellite commanding, because no other suitable Earth-to-space allocations are available at higher frequencies. On the other hand, only very few EESS satellites can accommodate their payload data downlink in the band 2 200-2 290 MHz (space-to-Earth), because of the very limited bandwidth available there for this purpose. All this requires EESS satellites to be equipped with 2 transponders: one operating around 2 GHz for TT&C and the other operating at higher frequencies for downlinking medium/high rate payload data, typically in the band 8 025-8 400 MHz.

If a suitable EESS Earth-to-space allocation can be found near the EESS (space-to-Earth) band at 8 025-8 400 MHz, these two bands could be used in combination for both purposes (satellite control and payload data downlink).

This mode of operation (payload band used also for TT&C) is typically used by most of the current MSS and FSS systems during normal operations.

This EESS allocation would bring the two following main advantages:

- the EESS satellites could use a single transponder
- less EESS satellites will make use of the very crowded S-band frequencies (2 025-2 110 and 2 200-2 290 MHz), where coordination is becoming extremely difficult, due to several hundred satellites having to share the available 90 MHz.

The investigation for new available EESS (Earth-to-space) frequencies should focus on the bands allocated to SRS (Earth-to-space) around 7 200 MHz, where the sharing scenario is expected to be favourable.

- **To review No. 5.268 with a view to examining the possibility for removing the 5 km distance limitation and allowing space research service (space-to-space) use for proximity operations by space vehicles communicating with an orbiting manned space vehicles**

WARC-92 allocated the band 410-420 MHz to the space research service on a secondary basis to allow for extra vehicular activity (EVA) communications in the vicinity of Earth orbiting manned space vehicles. No. **651A** was applied to the SRS allocation specifying that use of the band by the SRS is limited to within 5 km of orbiting manned space vehicles. WRC-97 upgraded the allocation to the SRS in the 410-420 MHz band to primary status with the conditions given in No. **5.268** which include a set of power flux density limits to assure protection of the fixed and mobile services based on ITU studies and the previously agreed No. **651A** distance limitation.

The 410-420 MHz band is used today for communications by astronauts conducting EVA operations in the immediate vicinity of the International Space Station (ISS). Use of the band for proximity operations by vehicles approaching the ISS or other manned space vehicles would be advantageous as the propagation and physical properties of this frequency range enable comparable coverage performance in the highly multipath environment of the ISS. The 5 km limit was assigned during WARC-92 when the envisioned use of the band was seen as being limited to free floating astronauts working in the near vicinity of a manned space vehicle. The addition of PFD limits by WRC-97 assures the protection of systems operating in the fixed and mobile services and technically rendered the distance limit unnecessary. Vehicles approaching the ISS, whether manned or robotic, need to communicate over somewhat longer distances to ensure safe operations and docking maneuvers. It is therefore necessary to modify No. **5.268** to remove the 5 km limitation while maintaining the current PFD limits. Similarly, to allow for proximity operations with orbiting vehicles and not solely limit the use of the band for extra-vehicular activities, it is also necessary to modify No. **5.268** in such a manner to remove the EVA limitation.

- **To consider an extension of the current worldwide allocation to the Earth exploration satellite service (EESS) (active) in the frequency band 9 300 – 9 900 MHz by at least 600 MHz within the frequency range 8 700 – 10 500 MHz**

Very high resolution mapping and monitoring is required by the below applications that stipulate a substantial socio-economic benefit such as disaster relief and humanitarian aid, safety of energy supply, and cadastre.

All require an affordable, reliable and weather independent mapping capacity.

Current means other than satellites, such as airplanes, can often not provide the services required at affordable cost and timeliness. Today's weather independent radar satellites that could provide timely services are too limited in their resolution. For the above-mentioned applications, given the object characteristics to be observed, a resolution of 50 cm or below is required. Satellite technology around 9-10 GHz is well suited to meet this need, provided that a transmission bandwidth of up to 1 200 MHz can be authorised for use. The Earth Exploration-Satellite Service (EESS) has an allocation in the frequency band 9 300 – 9 900

MHz. To enable transmissions at 1 200 MHz bandwidth, additional and contiguous 600 MHz would be required extending this current allocation.

Compatibility studies with services allocated in the 8 700-10 500 MHz range and services with sensitive receivers in nearby frequency bands around this range will need to be conducted to refine the desirable range for the extension.