

ITUEvents

ITU World Radiocommunication Seminar 2018

3-7 December 2018
Geneva, Switzerland

www.itu.int/go/ITU-R/WRS-18



**WRC-19 agenda items
related to space services**

**By Alexandre Vallet
Chief, Space Services
Department
Radiocommunication
Bureau**

**ITU HQ Geneva,
7 December, 2018**



Agenda of WRC-19

Electronic communications

Amateur at 54 MHz: 1.1
IMT: 1.13 (5G), Sharing with satellites:
9.1.1 (MSS 2 GHz band), 9.1.2 (BSS 1,4
GHz band), 9.1.8 (IoT)
HAPS: 1.14
FS 300 GHz: 1.15
RLAN 5 GHz: 1.16, 9.1.5

Transports

GMDSS: 1.8
AIS and VDES : 1.9
GADSS: 1.10
Trains: 1.11
ITS: 1.12 WPT: 9.1.6
Sub-orbital flights: 9.1.4

General

Recommendations: 2
Resolutions: 4
National
footnotes: 8
Director's report:
9.2
Resolution 80:
9.3
WRC-23 agenda:
10

Scientific services

400 MHz bands: 1.2
460 MHz band: 1.3
TTC for small satellites: 1.7

Satellites

ESIM 30/20 GHz: 1.5
NGSO issues: 1.6 (Q/V), 9.1.3 (C)
FSS 51.4-52.4 GHz : 9.1.9
Regulatory issues: 1.4, 7, 9.1.7



An harmonized frequency band for small satellites TTC?

Agenda item 1.7

- **The recent surge of small satellites highlighted the need for frequency bands for TTC carriers**
 - Small satellite technology tends to make them use bands below 1 GHz.
 - Domestically, some internationally allocated frequency bands may not be available to commercial users.
 - A possible solution could be to identify new specific bands for TTC of small satellites.
 - ITU-R studies on **spectrum requirements**:
 - Telemetry (downlink): 625-2500 kHz
 - Telecommand (uplink): 682-938 kHz
- **Bands proposed in draft CPM text: 137-138 MHz, 148-149.9 MHz, 403-404 MHz, 404-405 MHz.**



Earth stations in motion in the 30/20 GHz range

Agenda item 1.5

- High-Throughput Satellites currently operating in Ka-band also enable the provision of internet access in planes, ships, trains...
 - **WRC-15 already decided to enable earth stations in motion in the bands 29.5-30 GHz / 19.7-20.2 GHz, and**
 - WRC-15 also agreed to further study the bands 27.5-29.5 GHz / 17.7-19.7 GHz to meet additional demand.
 - **Main issues:**
 - Protection of terrestrial services from transmitting earth stations in motion in the band 27.5-29.5 GHz
 - *Land earth stations in motion: national or cross-border issue*
 - *Ship earth stations in motion: distance from the coast*
 - *Aircraft earth stations in motion: pfd mask*
- All solutions need to be enforceable.**
- Licencing authority for the various types of earth stations in motion

Sharing between GSO and non-GSO systems in Q/V bands



Agenda item 1.6

- A number of new non-GSO projects have restarted the interest for the use of high frequency bands around 50/40 GHz by non-GSO systems.
- **In the 50/40 GHz range, what is the current situation?**
 - No. 22.2 applies → geostationary satellites have a superior status compared to non-geostationary satellites, but...
 - ... without being quantified → legal uncertainty because of undetermined protection.
- ITU-R studies concluded that **developing epfd limits** based on the operational parameters for a single, specific, non-GSO system **results in spectrum inefficiencies** for other non-GSO systems.
- A more efficient sharing methodology has been identified so that the protection of GSO networks could be based on an assessment of **aggregate interference** from multiple non-GSO systems, with different configurations and orbits.
- This methodology relies on **limiting decreases in availability and capacity loss**.
- This agenda item also considered the protection of the Earth exploration-satellite service (passive) and radio astronomy services in adjacent bands. New unwanted emission limits to Resolution **750 (Rev.WRC-15)** have also been proposed to address compatibility issues

Potential new FSS uplink allocation in the band 51.4-52.4 GHz



Agenda item 9.1, Issue 9.1.9

- **ITU-R studies on spectrum needs:** additional FSS allocation would be beneficial to make broadband connections through high throughput satellite (HTS) systems.
- **ITU-R sharing and compatibility studies:**
 - Coexistence between FSS earth stations and FS stations can be achieved through separation distances (some kilometers).
 - Sharing through separation distances between FSS earth stations and possible IMT-2020 stations is feasible (some hundreds of meters).
 - In order to ensure protection of Earth-exploration satellite (passive) and space research (passive) services in the 52.6-54.25 GHz band, limits on unwanted emission power of FSS earth stations (depending on the elevation angle of the FSS earth station).
 - Limiting the possible FSS allocation to gateway links by establishing a minimum earth station antenna size of 4.5m.
 - Regarding the protection of future GSO EESS (passive) sensors, a minimum orbital separation in the GSO arc between the FSS and EESS space stations would be required.



Space regulatory procedures

Agenda item 7

- Issue A – A number of questions emerge concerning large non-geostationary constellations:
 - What should be the conditions for bringing into use?
 - *at least one satellite capable of transmitting or receiving the frequency assignments has been deployed in a notified orbital plane*
 - *discussions about the need to specify a minimum period of operation*
 - How to monitor the deployment of constellations?
 - *Agreement of principle about a milestone approach*
 - *Many options however remain to implement this approach*
 - How to allow for some adaptation of the orbital parameters?
 - Should there be tolerances between the actual and notified orbital parameters? If yes, what level of tolerances can be acceptable?



Space regulatory procedures

Agenda item 7

Milestone timing (*1) Number of years after the end of the seven-year regulatory period		Minimum required percentage of satellites to be deployed to meet the milestone (*2)		Deployment Factor	
M1	1	P1	A1 & F1: 10%	DF1	10
			B1: 8.33%		12
	2		C1 & D1: 10%		10
			G1: 30%		3.33
	4		E1: 10%		10
M2	3	P2	A2 & F2: 33%	DF2	3.03
	4		C2: 30%		3.33
			B2: 25%		4
	5		D2: 50%		2
	7		E2: 75%		1.34
	2+A (*3 and *4)		G2: 60%		1.66
M3	5	P3	A3: 75%	DF3	1.34
			B3: 75%		1.34
	6		F3: 100%		1
	7		C3: 90%		1.11
			D3: 100%		1
	8		E3: 100%		1
	2+A+B (*5)	G3: 100%	1		



Space regulatory procedures

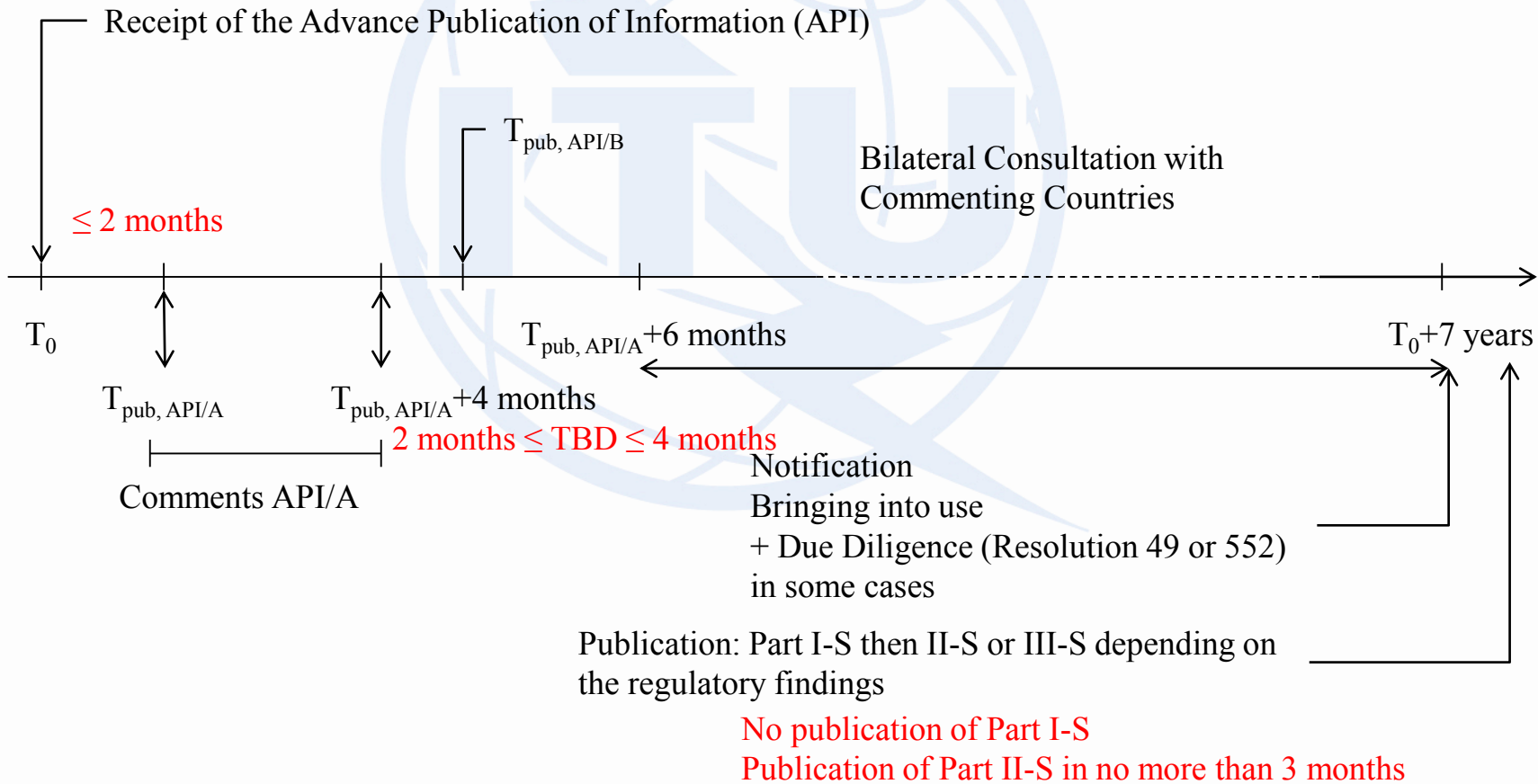
Agenda item 7

- **Issue M – Simplified regulatory regime for non-GSO satellite systems with short-duration missions:**
- A need to streamline international regulatory procedures for small satellites?
 - short development cycle
 - short lifetimes
- Many of these non-GSO satellite systems are being developed by academic institutions, amateur satellite organizations, or by developing countries that are using these satellites to build their expertise in space capability.
- A draft new WRC Resolution, together with an associated regulatory regime for non-GSO satellite systems with short-duration missions, has been developed to address this issue:
 - Total number of satellites shall not exceed [10] satellites
 - Maximum period of validity shall not exceed 3 years without any possibility of extension
 - Single launch date associated with the first launch (in the case of systems with multiple launches)
 - Launch date: date on which the first satellite is placed into its notified orbital plane
 - No notification before bringing into use (No. 11.47)
 - No suspension (No. 11.49)
 - Additional modifications to the regulatory process



Space regulatory procedures

Procedure for systems not subject to coordination





Space regulatory procedures

Agenda item 7

- **Unplanned coordination:**

- Issue B – Coordination arc for MSS in Ka-band
- Issue D – Identification of specific satellite systems under RR Nos. 9.12, 9.12A and 9.13

- **Appendix 4:**

- Issue H – Items to be provided for non-GSO systems not subject to coordination
- Issue I – Additional items for non-GSO systems with multiple orbital planes
- Issue L – Update to data elements required for epfd verification after revision of Rec. ITU-R S.1503

- **Appendices 30 and 30A:**

- Issue G – Updating of the reference situation (Regions 1 and 3) when provisionally recorded assignments are converted into definitive recorded assignments
- Issue J – Pfd limit in Section 1, Annex 1 of RR Appendix 30
- Issue K – Part B examinations under § 4.1.12 or 4.2.16 of RR Appendices 30 and 30A

- **Appendix 30B:**

- Issue E – Resolution related to RR Appendix 30B
- Issue F – Measures to facilitate entering new assignments into the RR Appendix 30B List
- Issue K – Part B examinations under § 6.21 c) of RR Appendix 30B

- **Consensual issues:**

- Issue C – Issues for which consensus was achieved in ITU-R and a single method has been identified

Draft CPM Report

**[https://www.itu.int/md/
R15-CPM19.02-C-
0001/en](https://www.itu.int/md/R15-CPM19.02-C-0001/en)**



Thank you