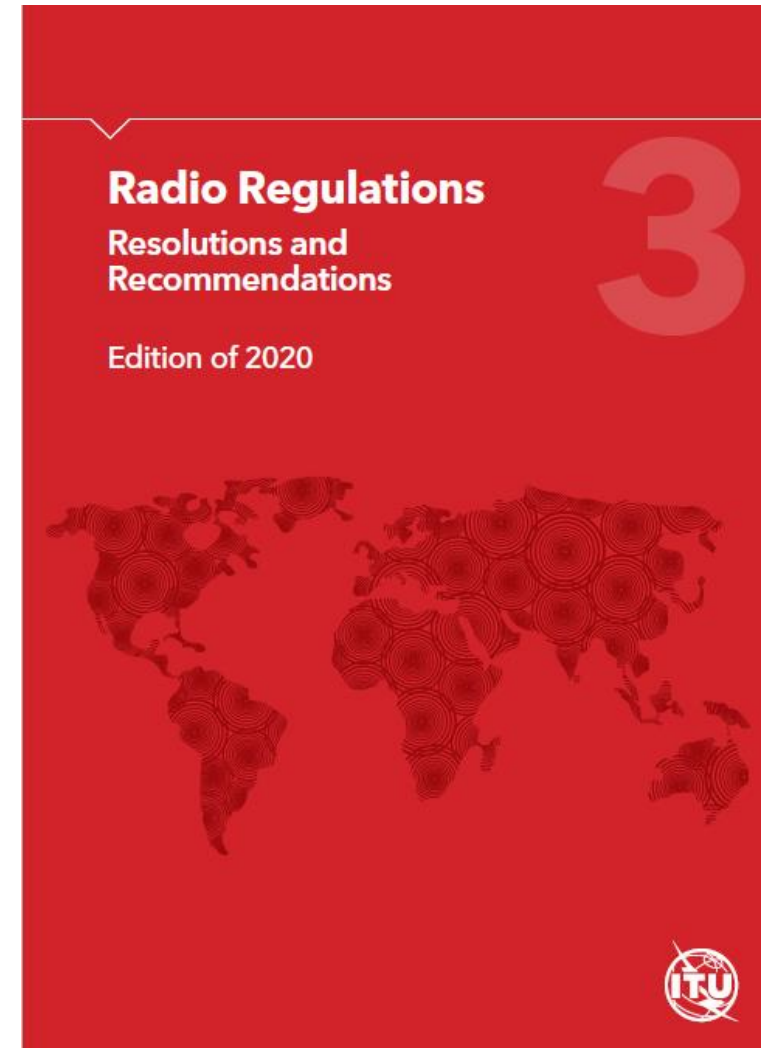


Regulatory Procedure for Non-GSO satellite networks identified as short-duration mission under Resolution 32 (WRC-19)

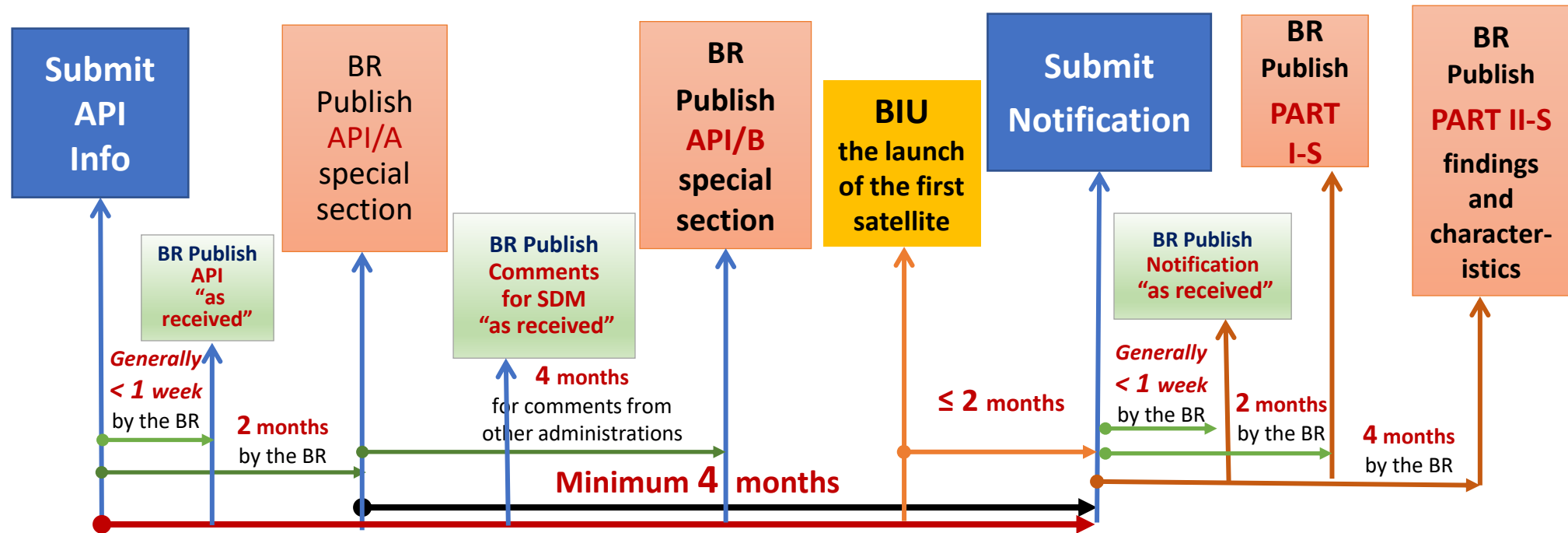


Resolution 32 (WRC-19) - Regulatory procedures for frequency assignments to NGSO networks or systems identified as short-duration mission not subject to the application of Section II of Article 9

- WRC-19 adopted new procedures contained in Resolution 32 (WRC-19) for non-geostationary-satellite networks or systems identified as short-duration mission (NGSO-SDM).
- When submitting such a network or system, the administration must identify it in the notice database, by checking the indicator for data item No. A.1.g of RR Appendix 4 via the BR capture software SpaceCap for the API as well as the notification notices.
- BR webpage for NGSO-SDM:
 - <https://www.itu.int/en/ITU-R/space/support/nonGSO/RES32/Pages/default.aspx>



ITU regulatory process for NGSO-SDM under Res 32



Total ≈ 6 Months to 7 Years !

MAXIMUM 7 YEARS !

NGSO-SDM make use of frequency bands that are not subject to coordination

- from **1.1.2021**, for all satellite networks not subject to coordination:
 - time between receipt and publication of API is reduced from 3 to 2 months,
 - time between publication of API and earliest receipt of notification is reduced from 6 to 4 months

Resolution 32 (WRC-19)

Some constrains for NGSO-SDM

- NGSO-SDM must meet the following criteria
 - Using bands **not** subject to coordination
 - total number of satellites **≤ 10**
 - Period of validity **≤ 3** years, no possibility of extension, after which the recorded assignments shall be cancelled
 - Shall comply with the conditions for use of the frequency band that is allocated to the service within which they operate;
 - Those using spectrum allocated to the amateur-satellite service shall operate in accordance with the definition of the amateur-satellite service as contained in Article 25;
 - shall have the capability to cease transmitting immediately in order to eliminate harmful interference

NGSO-SDM – specific frequency bands for the space operation service

- For the following bands used for space operation service which are normally subject to coordination under Section II of Article 9, they are exempt from coordination procedures if submitted as NGSO-SDM under Resolution 32 (WRC-19) and meet all additional conditions:
 - 137.175-137.825 MHz (space-to-Earth)
 - 148-149.9 MHz (Earth-to-space)

Space Operation Service for NGSO-SDM

Downlink: 137.025-138 MHz

- Use of 137-138 MHz for space operation service (SOS) in the downlink
 - **For non-GSO under Res 32 (SDM)**
 - The use of SOS (space-to-Earth) for NGSO-SDM shall be limited to the band **137.025-138 MHz** and must comply with Res **32** and Res **660** (WRC-19) and this use is not subject to coordination
 - Specifically, NGSO-SDM is exempt from coordination under No.**9.11A** for the band **137.175-137.825 MHz** (No. **5.209A**)
 - the **power flux-density** at any point on the Earth's surface produced by a space station of non-GSO SOS systems used for short-duration emissions in accordance with Appendix 4 shall not exceed **-140 dB(W/(m² · 4 kHz))**
 - These systems shall not cause harmful interference to, or claim protection from, the existing services to which the frequency band is allocated on a primary basis.
 - **For non-GSO not under Res 32**
 - Primary allocation for SOS downlink: 137-138 MHz
 - The use of SOS (space-to-Earth) for 137-137.825 MHz is subject to coordination under No.**9.11A**
 - The use of SOS (space-to-Earth) for 137.825-138 MHz is not subject to coordination

Space Operation Service for NGSO-SDM

Uplink: 148-149.9 MHz

- Use of 148-149.9 MHz for space operation service (SOS) in the uplink
 - ***For non-GSO under Res 32 (SDM)***
 - May be used by NGSO SDM in accordance with Res **32** for SOS uplink
 - Not subject to coordination
 - shall not cause unacceptable interference to, or claim protection from, existing primary services within this frequency band, or impose additional constraints on the space operation and mobile-satellite services
 - Earth stations shall ensure that the power flux-density does not exceed $-149 \text{ dB(W/(m}^2 \cdot 4 \text{ kHz))}$ for more than 1% of time at the border of the territory of some countries (No.5.218A)
 - If exceeded, agreement under No.**9.21** is required (i.e. subject to coordination)
 - ***For non-GSO not under Res 32***
 - Primary allocation for SOS uplink **148-149.9 MHz**
 - Subject to agreement under No.9.21 (i.e. subject to coordination)
 - Bandwidth of any individual transmission shall not exceed 25 kHz.

Submission of Filings

- For NGSO-SDM, the required regulatory submissions are Advance Publication Information (API) and the Notification for Recording in the Master International Frequency Register (MIFR)
- Notifying administration must **identify** in the submission whether the non-GSO networks or systems is **operating as short-duration mission** in accordance with Resolution **32** (NGSO-SDM) (No. A.1.g of Appendix 4)
- Information required for the submissions are specified in Appendix **4** of the Radio Regulations
- All filings should be captured and validated using BR space software Spacecap/BRSIS Validation
 - Please download the latest version at
 - <https://www.itu.int/en/ITU-R/software/Pages/space-network-software.aspx>
- All filings should be submitted through the online e-Submission system
 - <https://www.itu.int/en/ITU-R/space/e-submission/Pages/default.aspx>

Advance Publication Information (API)

- The submission of advance publication information under No.9.1 is a mandatory procedure for all satellite network not subject to coordination
 - For non-geostationary satellite networks where the frequency bands are not subject to coordination
 - the use of inter-satellite links of a geostationary space station communicating with a non-geostationary space station which are not subject to coordination
- Cost recovery fee: 570 CHF (not applicable for filings in the amateur-satellite service)
 - Note that if payment is not received by the payment due date, the filing will be cancelled, but the invoice continues to be payable!
- NGSO-SDM
 - Must be identified as NGSO-SDM i.e. field A.1.g must be “Y” (checked in spacecap)
 - Total number of satellites ≤ 10 , Period of validity ≤ 3 years
 - Can only include frequency bands that are not subject to coordination
 - Can only include use of frequency bands in compliance with the Table of Frequency Allocation
 - submit the orbital characteristics (Appendix 4 data item A.4.b.4) planned at the early development stage of the satellite project

Procedure for commenting and resolution of difficulties

- No. 9.3 Commenting procedures
 - Comments to an API/A should be submitted to the notifying Administration and the SpaceCom comment file submitted to the Bureau within **4 months** from the date of publication of the API/A special section
 - Non-GSO SDM
 - Comments to API/A will be made promptly available “as-received”, on the ITU website (No. 9.3.1)
 - The Bureau publishes the list of administrations which have sent comments within the 4 month period in an **API/B** special section in a BR IFIC
- No. 9.4 Cooperation and Resolution of Difficulties
 - Both administrations shall endeavor to cooperate in joint efforts to resolve any difficulties and shall exchange any additional relevant information that may be available
 - Either party can request for the assistance of the Radiocommunication Bureau (No.9.3)
 - **In case of difficulties**, the administration responsible for the planned satellite network shall explore all possible means to resolve the difficulties without considering the possibility of adjustment to networks of other administrations **If no such means can be found**, it may request the other administrations to explore all possible means to meet its requirements
 - The administrations concerned shall make every possible effort to resolve the difficulties by means of mutually acceptable adjustments to their networks

As-received – comments to API/A available as-received

- All notices are published *“as received”*, **within 30 days of receipt and made freely available on ITU website:** <https://www.itu.int/ITU-R/space/asreceived/Publication/AsReceived>

Information "As Received"

NTC ID	Adm.	Network Org.	Station/Satellite Name	Long. Nom.	BR Registry Date	Type of submission	Reg	Act. Code
120545268	TUR		GRIZU-263A		11.11.2020	Advance publication information		A
120545267	NOR		TYVAK-182A		10.11.2020	Advance publication information		M
120545266	POL		SWIATOWID 2		10.11.2020	Advance publication information		M
120545265	J		HSU-SAT1		10.11.2020	Advance publication information		A
120545264	CHN		GALAXY-3B		06.11.2020	Advance publication information		A
120545263	J		RAISE-2		06.11.2020	Advance publication information		A
120545262	USA		RAINCUBE		05.11.2020	Advance publication information		M

Information "As Received"

Export

Reference	Adm.	Network Org.	BR Registry Date	Comment type	BR IFIC	IFIC Date
D2020-34610	D		12.11.2020	API/B	2933	10.11.2020
MRC2020-34583	MRC		10.11.2020	API/B	2930	29.09.2020
MRC2020-34580	MRC		10.11.2020	API/B	2929	15.09.2020
THA2020-34562	THA		07.11.2020	API/B	2927	18.08.2020
ARS2020-34532	ARS		05.11.2020	API/B	2929	15.09.2020
ARS2020-34523	ARS		05.11.2020	API/B	2931	13.10.2020
ARS2020-34522	ARS		05.11.2020	API/B	2930	29.09.2020
ARS2020-34520	ARS		05.11.2020	API/B	2928	01.09.2020

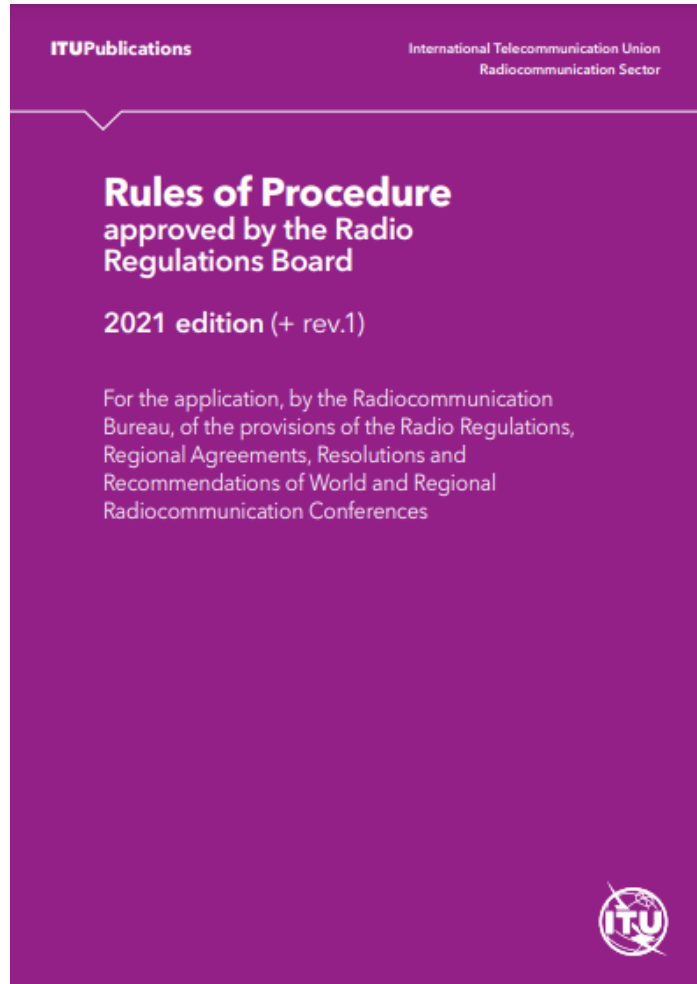
Notification for recording in the Master Register

- Notification for recording is mandatory for frequency assignments of satellite networks, as they are capable of causing harmful interference to a service of another administration (No.11.2)
- Frequency assignments for satellite networks in the amateur-satellite service shall also be notified. However, frequency assignments to earth stations in the amateur-satellite service shall not be notified.
- All frequency assignments in the notification must be covered fully within the frequency bands/direction published in the API

Regulatory procedure for NGSO-SDM – Notification

- Same criteria as for API (e.g. must be identified as NGSO-SDM etc.)
- Notification information cannot be communicated to the Bureau at the same time as API, and can only be submitted after the launch of a satellite (or of the first satellite in the case of a system requiring multiple launches), but not more than 2 months after date of bringing into use
- Date of bringing into use (DBIU)
 - DBIU of a NGSO-SDM shall be defined as the launch date of the first satellite (or of the first satellite in the case of a non-GSO system requiring multiple launches)
- Additional commitment required for Notification (item A.24.a of Appendix 4) that, in the case that unacceptable interference caused by NGSO-SDM is not resolved, the administration shall undertake steps to eliminate the interference or reduce it to an acceptable level
- Findings and characteristics to be published in the BR IFIC and on BR website within no more than 4 months from the date of receipt of complete information of the Notification
- The maximum period of validity of frequency assignments of the system shall not exceed 3 years.
- Provisions concerning modifications to recorded assignment and suspension of frequency assignments cannot be applied for NGSO-SDM

Rules of Procedure relating to Resolution-32



- Section 4 of the Annex to Resolution 32 (WRC-19) indicate that the notification information relating to non-GSO networks or systems identified as short-duration mission shall be communicated to the Radiocommunication Bureau only after the launch of a satellite in the case of a satellite network or of the first satellite in the case of a system requiring multiple launches, and not later than two months after the date of bringing into use.
- However, No. 9.1 restricts the date of receipt of notification to be not earlier than four months after the publication of the API special section.
- Noting that § 4 of the Annex to Resolution 32 (WRC-19) relates to the time when the notification information has to be communicated to the Bureau, whereas No. 9.1 concerns the establishment of the formal date of receipt, **the Board decided that the Bureau shall publish such notification notices with a date of receipt established in accordance with No. 9.1, together with a note indicating the date to which the information was communicated to the Radiocommunication Bureau**, in order for Administrations to be informed of the compliance of these notices with § 4 of the Annex to Resolution 32 (WRC-19).

Bringing into use of a non-GSO satellite networks

- Reference body: Earth
 - FSS, BSS, MSS Service
 - One satellite deployed in one notified orbital plane with capability of transmitting or receiving that frequency assignment (No.11.44C)
 - Maintained for a continuous period of operation of 90 days (11.44C)
 - Adm shall identify the orbital plane number (11.44C.4)
 - Other services
 - One satellite deployed in one notified orbital plane with capability of transmitting or receiving that frequency assignment (No.11.44D)
 - Adm shall identify the orbital plane number (11.44C.4)
- Reference body: not Earth
 - One satellite deployed with capability of transmitting or receiving that frequency assignment (No.11.44E)

Amateur-satellite service

- Class of station - EA
- API must be submitted to ITU
- Notification under No.11.2 is required for the satellite network
- Notification for Earth stations in the amateur-satellite service are not required
- Note that frequency assignments in the notification must be covered by frequency bands in API, therefore avoid submitting a very narrow frequency band at the API, in case there is a change needed during the comments/consultation process
- Additional specific requirements for Amateur-satellite service spelt out in Article 25
- Administrations authorizing space stations in the amateur-satellite service shall ensure that sufficient earth command stations are established before launch to ensure that any harmful interference caused by emissions from a station in the amateur-satellite service can be terminated immediately (see No. 25.11)
- Amateur-satellite service is exempted from cost recovery fee for both the API and the notification (please refer to DEC 482)

Useful Links

- Non-GSO SDM
 - <https://www.itu.int/en/ITU-R/space/support/nonGSO/RES32/Pages/default.aspx>
- Publication of Notification of Non-GSO SDM
 - <https://www.itu.int/net/ITU-R/space/snl/bresult/radvance.asp?res32=Y>
- Webpage for Non-GSO
 - <https://www.itu.int/en/ITU-R/space/support/nonGSO/Pages/default.aspx>
- Webpage for Handbook on small satellite (under development in ITU-R WP 4A)
 - <https://www.itu.int/en/ITU-R/space/support/smallsat/sshandbook/Pages/default.aspx>

Regulatory Procedure for Non-GSO satellite networks identified as short-duration mission under Resolution 32 (WRC-19)

End of presentation

Contact:

Chuen Chern Loo

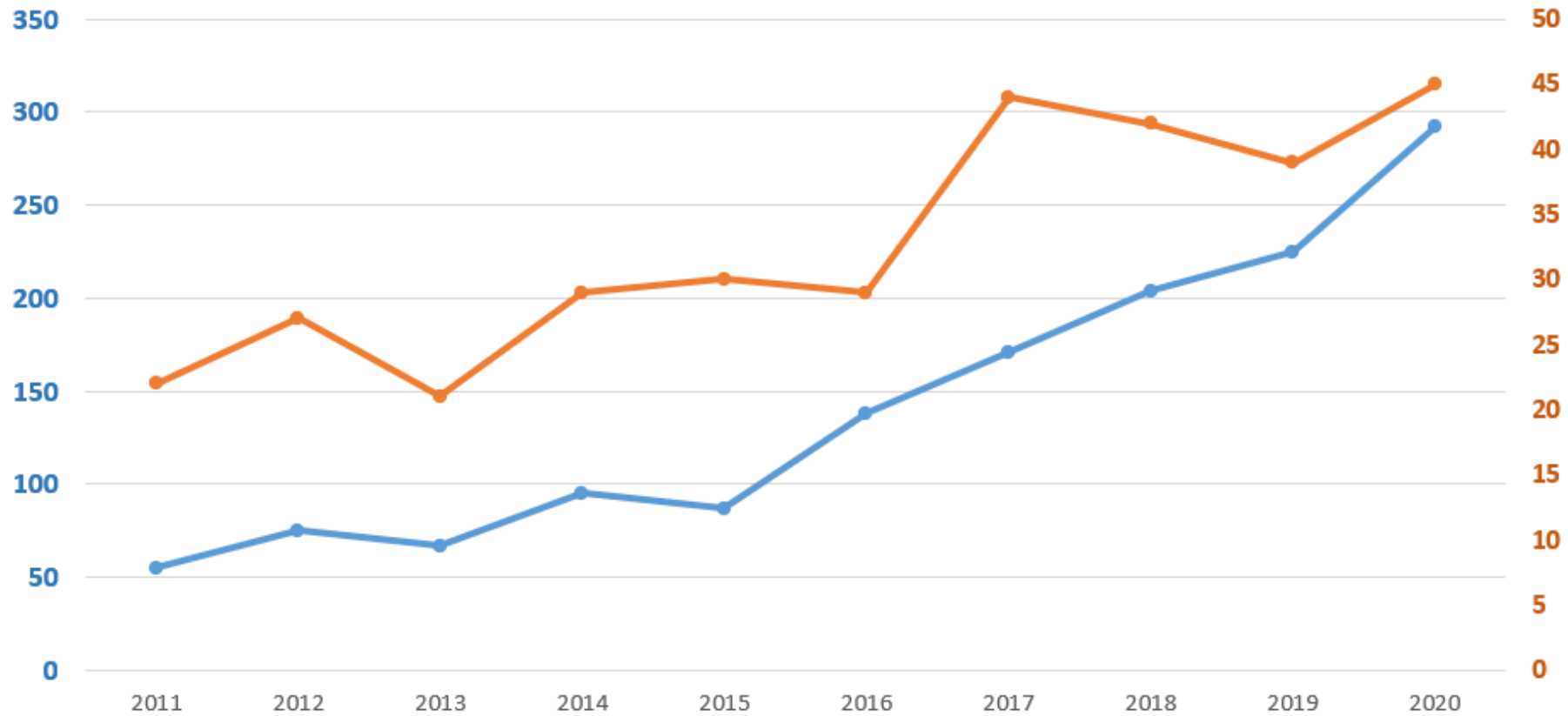
Email: chuen-chern.loo@itu.int

Head Space Publication and Registration Division,
Radiocommunication Bureau



Additional slides

API NGSO submission to ITU BR for satellite networks not subject to coordination



Left axis — Number of NGSO API Received per year

Right axis — Number of Notifying Administrations per year

Resolution 32 (WRC-19)

Summary of changes to regulatory procedures for NGSO-SDM

- For API, submit the orbital characteristics (Appendix 4 data item **A.4.b.4**) planned at the early development stage of the satellite project
- Notification information cannot be communicated to the Bureau at the same time as API, and can only be submitted after the launch of the first satellite, but not more than 2 months after date of bringing into use
- Findings and characteristics under No.11.31 to be published in the BR IFIC and on BR website within no more than 4 months from the date of receipt of complete information of the Notification
- Nos. 11.43A, 11.43B and 11.49, provisions relating to modifications of characteristics of recorded assignments and suspension of assignments cannot be applied for NGSO-SDM
- Comments to API/A to be made promptly available “as-received”, on the ITU website (No. 9.3.1)
- Additional commitment required for Notification
 - a commitment by the administration that, in the case that unacceptable interference caused by NGSO-SDM is not resolved, the administration shall undertake steps to eliminate the interference or reduce it to an acceptable level (Appendix 4 data item **A.24.a**)