Technical examination of Appendices 30 and 30A submissions

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BR Space Services Department
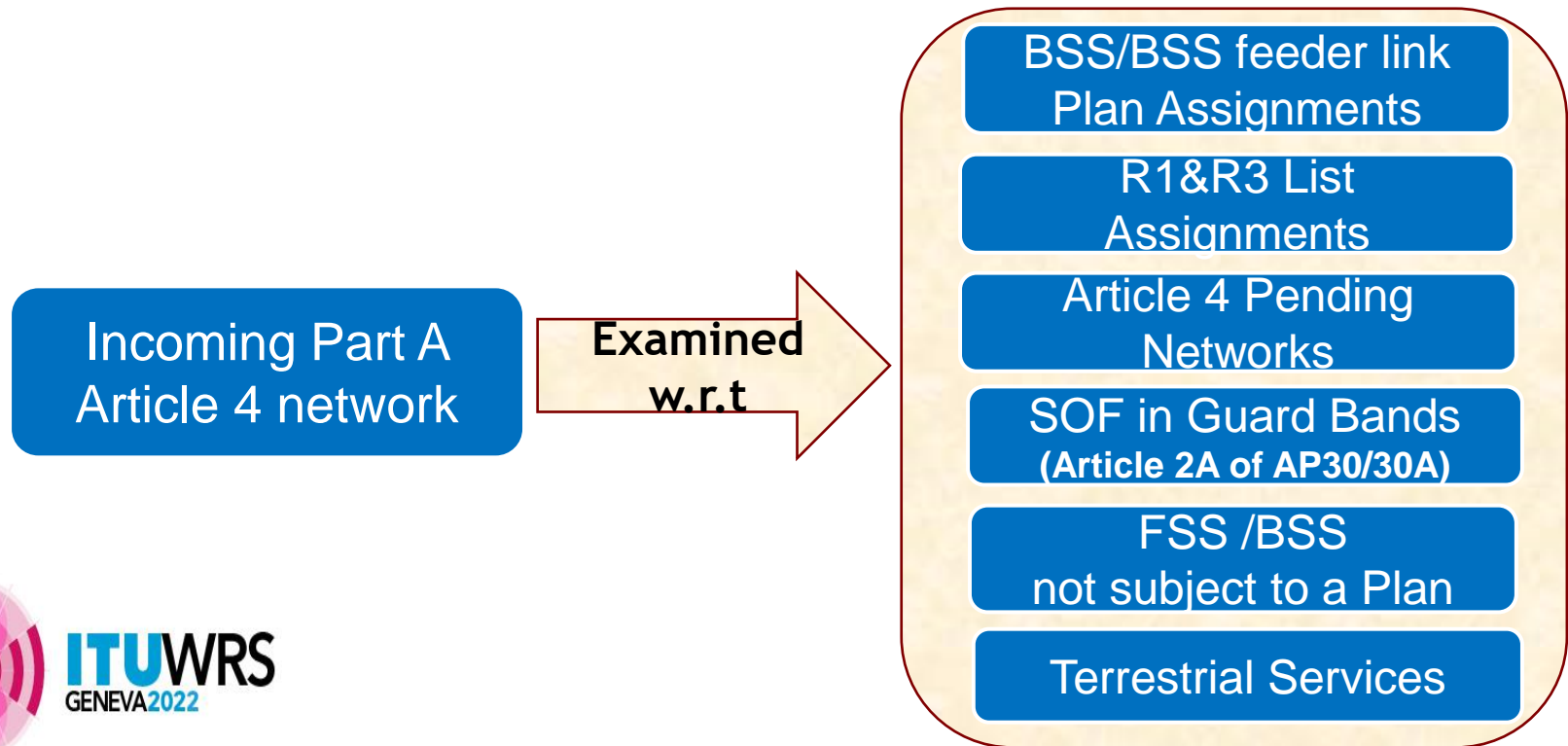**International Telecommunication Union**
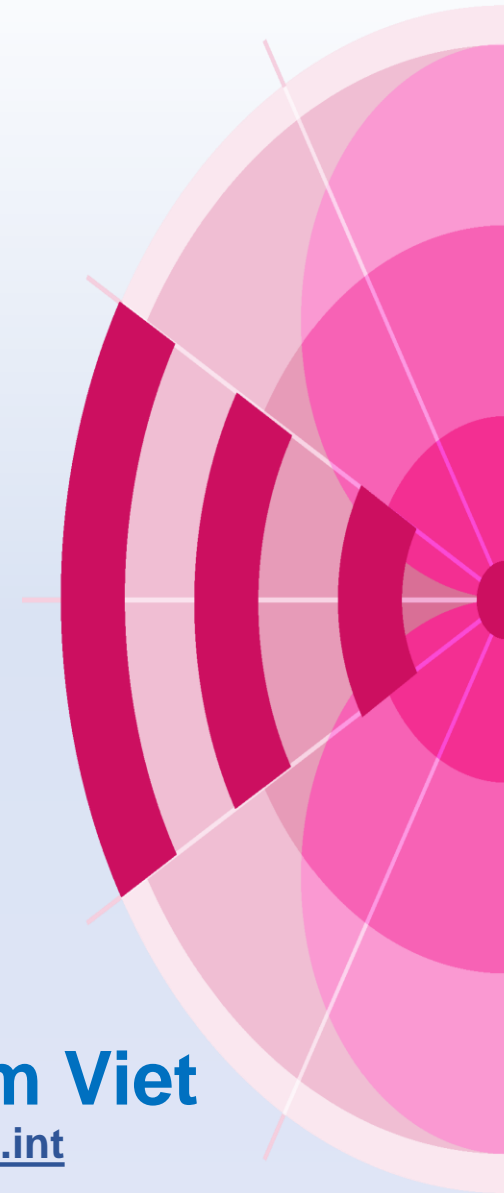
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#ITUWRS

Outline

❑Purpose of the Bureau's Technical and Regulatory Examinations

❑Protection Criteria

❑List of BR Software used for Technical Examinations

❑BR Software Packages SPS and GIBC

➢SPS Package

➢Examination flow chart with SPS

➢GIBC Package

➢Examination flow chart with GIBC

❑Annex: Step-by-step to run SPS and GIBC relating to Appendices 30 and 30A

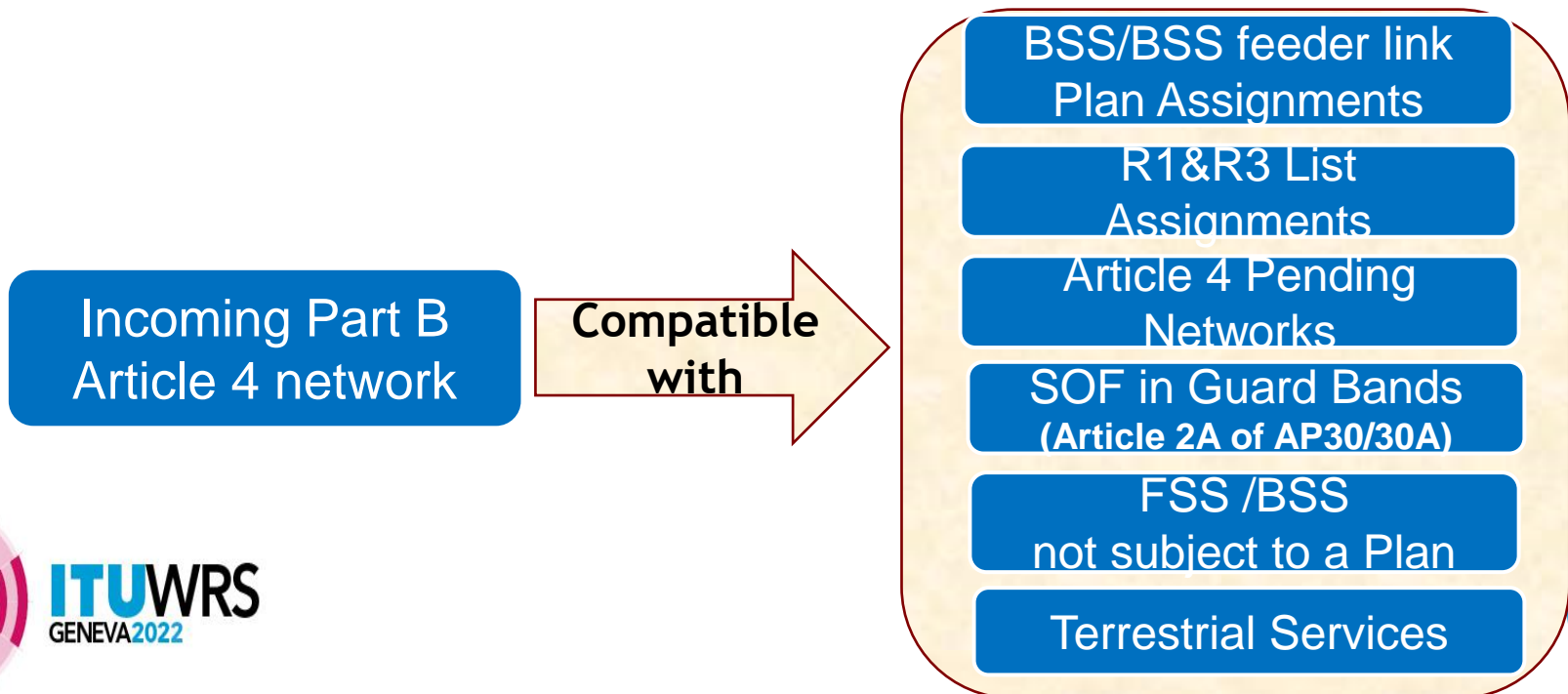# Article 4 procedure for obtaining additional capacity in Appendices 30 and 30A

Exchange to complete the Part A Notice

1
Notifying Adms to submit a Part A Notice to BR

2
BR to examine and publish the Notice in a Part A Special Section

3
Affected Adms to comment and Notifying Adms to coordinate

Exchange to complete the Part B Notice

Article 5 Procedure

4
Notifying Adms to submit Final Characteristics (Part B) to BR

5
BR to examine and, if favorable, enter the assignments into Plan/List

6
Notifying Adm to notify and bring into use

8 Years Regulatory Period

Purpose of the Bureau's Examinations (1)

- ❑ **Part A examination (*i.e. Article 4 networks submitted under §4.1.3 or §4.2.6 of AP30/30A*)**

  ➢ **Conformity with the Table of Frequency Allocations and any applicable hard limits**

  ➢ **Identification of potentially affected Administrations/Networks**

  ➢ **Establishment of reference situation for its protection against subsequent Article 4 networks in the same Plan.**
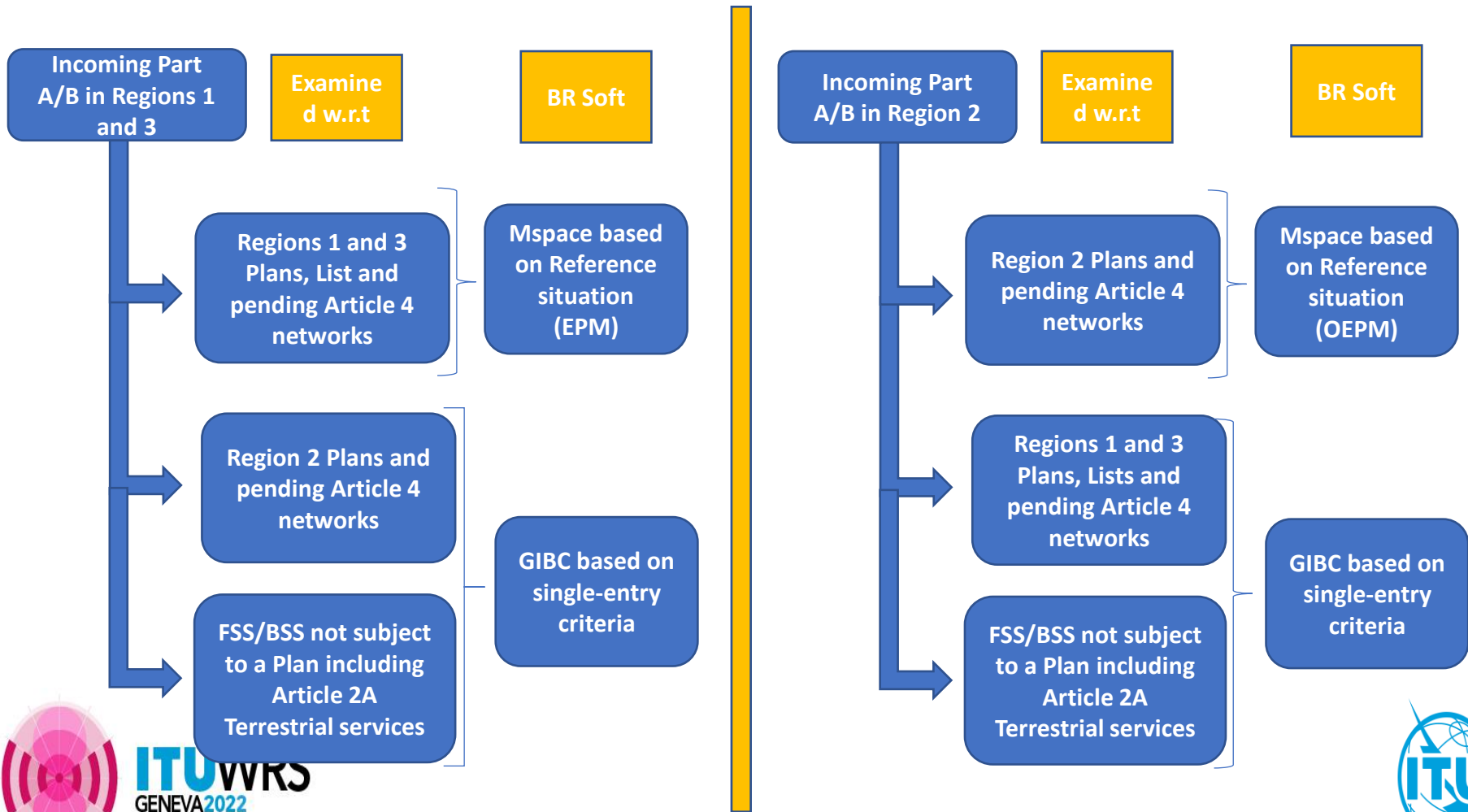
Incoming Part A Article 4 network

Examined w.r.t

- BSS/BSS feeder link Plan Assignments
- R1&R3 List Assignments
- Article 4 Pending Networks
- SOF in Guard Bands **(Article 2A of AP30/30A)**
- FSS /BSS not subject to a Plan
- Terrestrial Services

Purpose of BR's Examinations (2)

❑ **Part B examination (*i.e. Article 4 networks submitted under §4.1.12 or §4.2.16 of AP30/30A*).**

➢ **Conformity with the Table of Frequency Allocations and any applicable hard limits**

➢ **Part B characteristics are within the envelope of those of Part A**

➢ **Any agreement still required**

➢ **For Regions 1 & 3, Part B characteristics do not cause more interference than Part A characteristics.**

Incoming Part B Article 4 network	Compatible with	BSS/BSS feeder link Plan Assignments
		R1&R3 List Assignments
		Article 4 Pending Networks
		SOF in Guard Bands **(Article 2A of AP30/30A)**
		FSS /BSS not subject to a Plan
		Terrestrial Services

Purpose of the Bureau's Examinations (3)

❏ **Part A examination (*i.e. Article 4 networks submitted under §4.1.3 or §4.2.6 of AP30/30A*)**

➢ **Identification of potentially affected Administrations/Networks**

Purpose of the Bureau's Examinations (4)

- ❑ **Incoming Article 4 network**
  - ➢ **SNS database containing non-graphical data and GIMS database containing graphical data such as coverage and service areas.**

- ❑ **BR Databases used for Part A and Part B examinations:**
  - ➢ **Part A:**
    - ✓ **The latest SPS_ALL, SRS_ALL (non-graphical data) and GIMS REFDB (graphical data such as coverage and service areas)**
  - ➢ **Part B:**
    - ✓ **The same SPS_ALL, SRS_ALL and GIMS REFDB used for Part A for checking any missing agreements**
    - ✓ **In addition, for Regions 1&3, the latest SPS_ALL, SRS_ALL and GIMS REFDB at the time of Part B processing for examination under § 4.1.11.**
  - ➢ **In preparing the above-mentioned SPS_ALL, pay attention to:**
    - ✓ **Resolution 548: resolve 5 and associated ROP for Regions 1& 3**
    - ✓ **Rules of Procedure concerning the receivability when multiple Part A submissions are received on the same date.**

Purpose of the Bureau's Examinations (5)

☐ **Space Operation Functions submitted under Article 2A of AP30/30A**

  ➢ **Conformity with the Table of Frequency Allocations**

  ➢ **Identification of affected Administrations/Networks**

Incoming Article 2A network	Examined w.r.t	BSS/BSS feed link Plan Assignments	BR Soft
		R1&R3 List Assignments	
		Article 4 Pending Networks	GIBC based on single-entry criteria
		SOF in Guard Bands (Article 2A of AP30/30A)	
		FSS /BSS not subject to a Plan	
		Terrestrial Services	
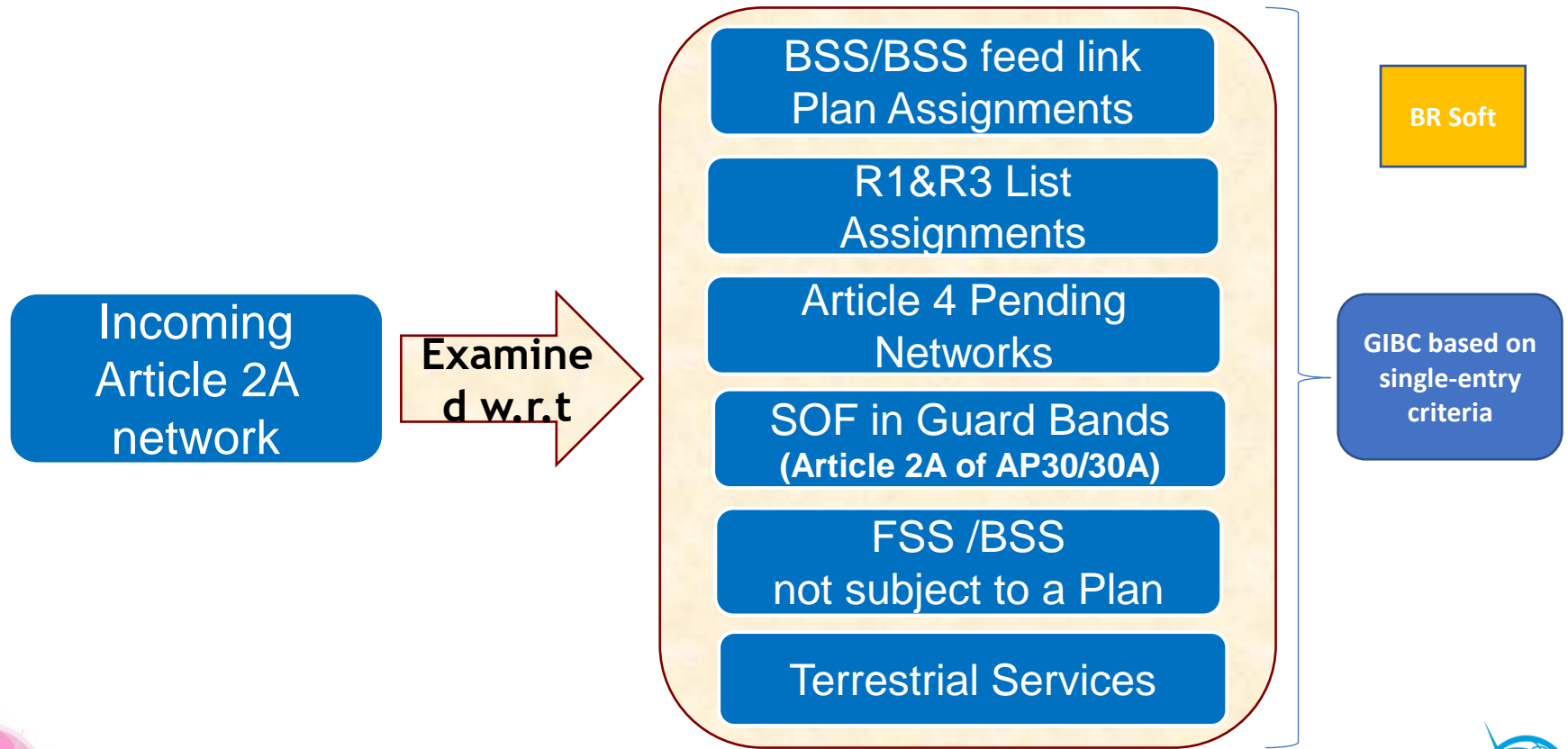
Protection Criteria Concept

Proposed network of your Administration
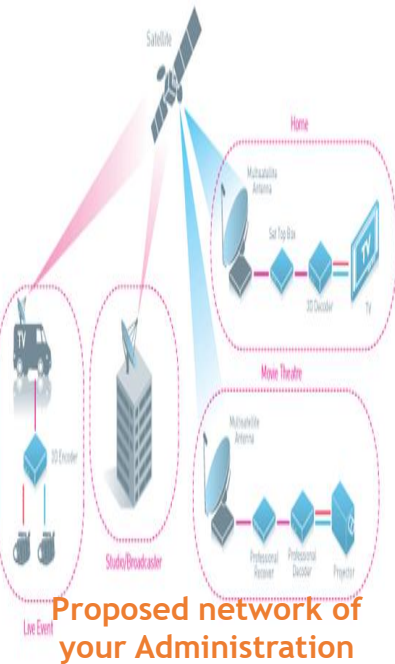
Potential incompatibility!

Based on

Protection Criteria

→ Frequency overlap

→ Orbital separation

→ EIRP Limits

→ ΔT/T

→ PFD Limits

→ EPM/OEPM

Radiocommunication Services of other Administrations

Hard Limits

✓ If exceeded ➔ Assignments concerned are no longer taken into account by the Bureau and other administrations.

✓ To preserve current and future use of a Radiocommunication Service in general.

Coordination Trigger Limits

✓ Agreements (implicit or explicit) of affected administrations is required

✓ To protect:

- **Existing assignments** of Space Services Networks:
  - BSS Plans and List - AP30/30A
  - Pending Article 4 networks
  - Non-plan BSS/FSS networks with overlapping necessary bandwidth including Article 2A network

- **Existing and future terrestrial services** on territories of administrations

Regions 1 and 3 Article 4 Downlink Network (incoming)

Hard Limits	AP30 Provision	BR Software
PFD hard limit of -103.6 dB(W/(m^2.27MHz))	§ 1 Annex 1	GIBC: Appendix 30 30A
Annex 7	Annex 7	GIMS;Brsis: Validation

Examined w.r.t	AP30 Art.4	BR Software	Criteria AP30 Annex 1
Regions 1 & 3 BSS Plan Assignments	4.1.1 a	SPS/MSPACEg	EPM PFD Orbital Separation
Regions 1 & 3 BSS List or Pending Art. 4 Assignments	4.1.1 b		
Region 2 BSS Assignments	4.1.1 c	GIBC: PFD (space)	PFD
Terrestrial Services	4.1.1 d	GIBC: PFD/EIRP GSO	PFD
Non-planned BSS/FSS Assignments, Article 2A Assignments	4.1.1 e	GIBC: PFD (space)	PFD

➢ Regions 1 and 3 Article 4 Feeder-link Network (incoming)

Hard Limits	AP30A Provision	BR Software
PFD hard limit of -76 dB(W/(m^2.27MHz))	§ 4 of Annex 1	GIBC: Appendix 30 30A
Relative off-axis E.I.R.P Limits		

Examined w.r.t	AP30A Art.4	BR Software	Criteria AP30 Annex 1
Regions 1 & 3 Feeder-link Plan Assignments	4.1.1 a	SPS/MSPACEg	EPM Orbital separation
Regions 1 & 3 Feeder-link List or Pending Article 4 Assignments	4.1.1 b		
Region 2 Feeder-link Assignments	4.1.1 c	GIBC: Appendix 8	ΔT/T
Region 2 non-planned FSS Assignments, Article 2A Assignments	4.1.1 d		

➤ Region 2 Article 4 BSS/Feeder-link Network (1) (incoming)

Hard Limits	AP30 Provision	BR Software
Annex 7	Annex 7	GIMS;Brsis: Validation

Examined w.r.t	AP30 Art.4	BR Software	Criteria AP30 Annex 1
Regions 1 & 3 BSS Plan Assignments	4.2.3 a	GIBC: PFD (space)	PFD
Regions 1 & 3 BSS List or Pending Article 4 Assignments	4.2.3 b		
Region 2 BSS Assignments	4.2.3 c	SPS/MSPACEg	OEPM
Terrestrial Services	4.2.3 d	GIBC: PFD/EIRP GSO	PFD
Non-planned BSS/FSS Assignments, Article 2A Assignments	4.2.3 e	GIBC: PFD (space) GIBC: Appendix 8	PFD $\Delta T/T$
Non-planned BSS Assignments	4.2.3 f	GIBC: PFD (space)	PFD

➢ Region 2 Article 4 BSS/Feeder-link Network (2) (incoming)

Examined w.r.t	AP30 Art.4	BR Software	Criteria AP30 Annex 1
Regions 1 & 3 Feeder-link Plan Assignments	4.2.2 a	GIBC: Appendix 8	ΔT/T
Regions 1 & 3 Feeder-link List or Pending Article 4 Assignments	4.2.2 b		
Region 2 Feeder-link Assignments	4.2.2 c	SPS/MSPACEg	OEPM
Article 2A Assignments	4.1.1 d (ref.2A.1.3)	GIBC: Appendix 8	ΔT/T

❑ Article 2A Network (incoming)

Hard Limits	Ap30 Provision	BR Software
Annex 7	Annex 7	

Examined w.r.t	Provision	BR Software	Criteria
BSS subject to a Plan	AP30/2A.1.1	GIBC: PFD (space)	PFD
Other Article 2A	AP30/2A.1.2	GIBC: Appendix 8	Coord. Arc
Terrestrial Services	AP30/2A.1.2	GIBC: PFD/EIRP GSO	PFD
Non Planned networks	AP30/2A.1.2	GIBC: Appendix 8	Coord. Arc
BSS feeder-link subject to a Plan	AP30A/2A.1.1	GIBC: Appendix 8	$\Delta T/T$
Other Article 2A	AP30A/2A.1.2	GIBC: Appendix 8	Coord. Arc
Non Planned networks	AP30A/2A.1.2	GIBC: Appendix 8	Coord. Arc

Coordination Requirements

Minimize Interference

MSPACE_G

BSS_Marg

SPS_REPORTS

SPS

What If Studies

SPS Package – Ap.30/30A Art.4, Intra-service/region Tech. Examination

Incoming Article 4 Notice {A}

GIBC

1-SpaceCap
Export the SPS_ALL database

2-SPS/MSPACE
✓ Identification of affected Networks / assignments
✓ Calculation of reference situation for the incoming Article 4 network

GIMS Databases

MSPACE Output database (*.out.mdb)

SPS_ALL Input Database {A, V, P}

3-SPS/BSS_Marg
✓ Capturing of the calculated reference situation into SPS_ALL for the incoming network for the purpose protection against subsequent Article 4 submissions
✓ Changing of the type of assignment of the incoming network from **A** to **V**
✓ Capturing of the results of MSPACE examination with respect to the affected assignments for further processing of the incoming network

SPS_ALL Output Database {V, P}

4- SpacePub

**TSUM +
BR IFIC Special Section AP30/E/, AP30A/E/
or AP30-30A/E
List of affected networks /Plan beams**

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GIBC Software Package (Graphical Interface for Batch Calculation)

Inter-service, Inter-region coordination requirements

PFD/EIRP GSO in respect of Terrestrial services

PFD (space serv.) in respect of Space services

GIBC SNS V9 - Graphical Interface for Batch Calculations

PFD/EIRP Earth Station	EPFD	Power Control	FOS	Appendix 8
Appendix 7	Appendix 30B	Appendix 30 30A	Tools / Options
PFD/EIRP GSO	PFD (space serv.)	PFD/EIRP NGSO

GIBC

Appendix 8 (ΔT/T and Coord. Arc)

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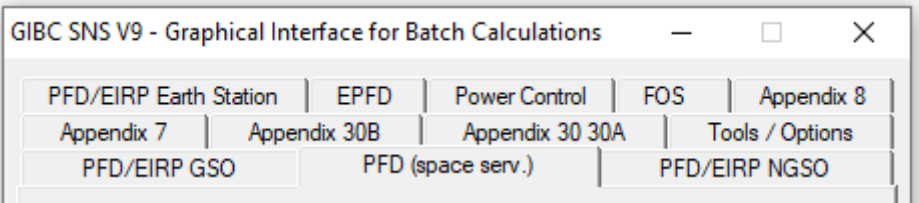
GIBC Package – Ap.30/30A Art.4, Inter-service/region Tech. Examination

GIMS Databases

SRS_ALL Database (non-planned database)

SPS_ALL Database *{Status code of Article 4 Notice}*

GIBC
Identification of potentially affected services/networks of other services and AP30/30A Regional Plan/List in the shared band.

SpacePub
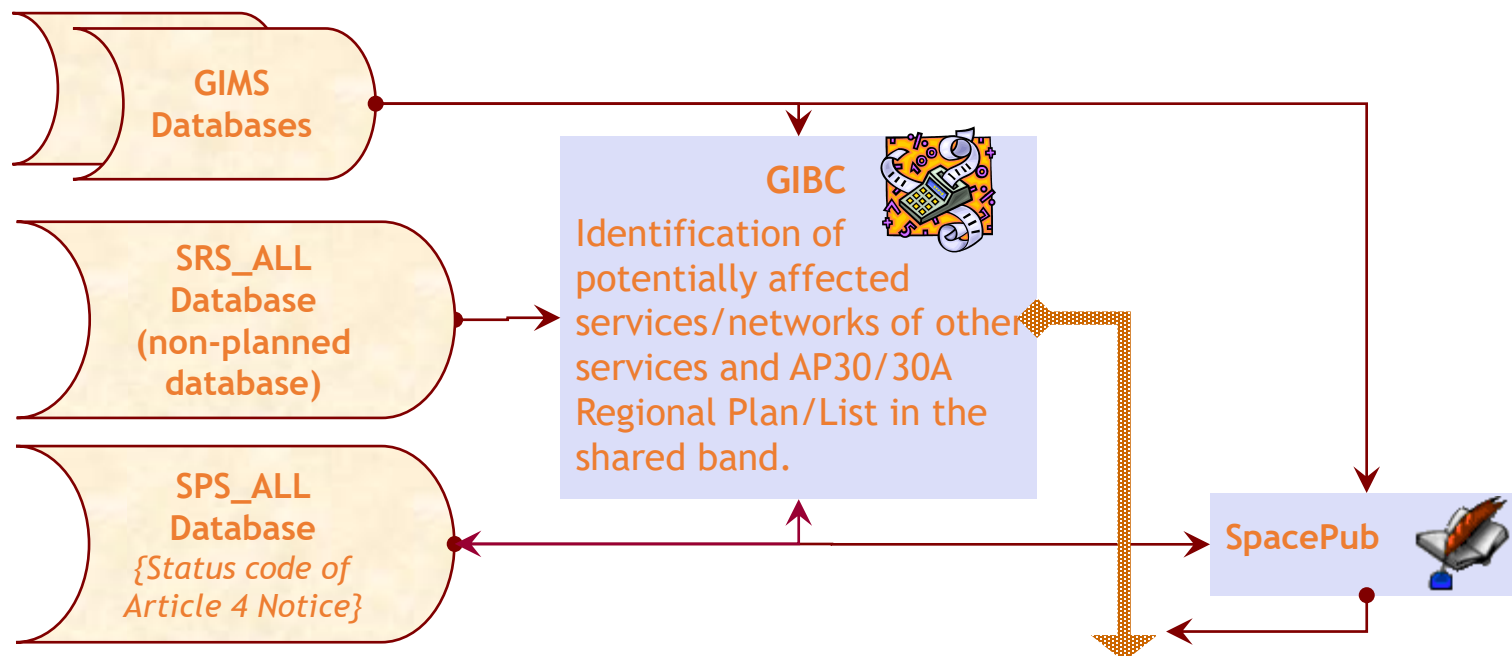
TSUM + BR IFIC Special Sections AP30/E/, AP30A/E/ or AP30-30A/E

List of:
✓ affected Plan beams, List or Article 4 Networks in the other regional Plan/List
✓ list of affected non-planned BSS and FSS Networks
✓ list of administrations whose
✓ terrestrial services are affected

GIBC Package – Ap30/30A Art.2A, Technical Examination

GIMS
Databases

SRS_ALL
Database
(non-planned
database)

SPS_ALL
Database

GIBC

Identification of
potentially affected
services/networks of
other administration in
the shared band

SpacePub
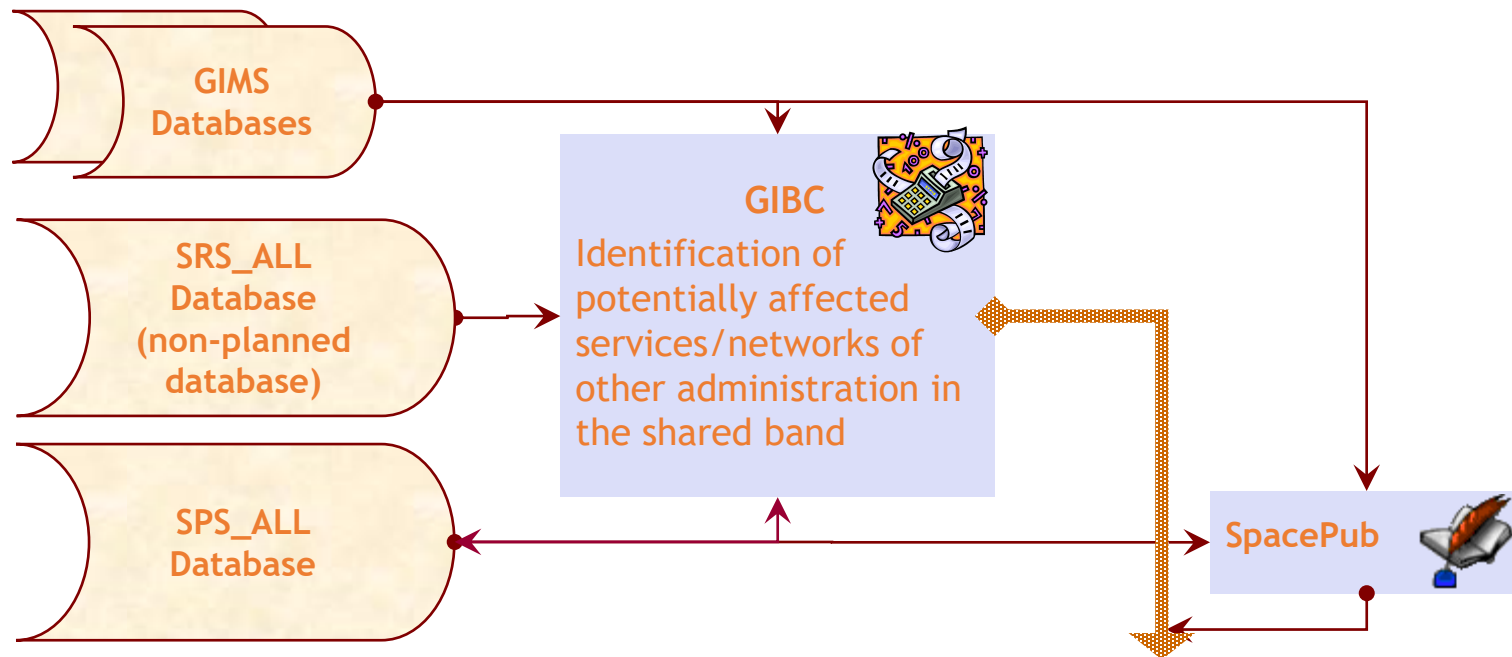
**TSUM + BR IFIC Special Sections
AP30-30A/F/C**

- ✓ list of affected Plan beams,
      List or Article 4 Networks
- ✓ list of affected non-planned BSS
      and FSS Networks
- ✓ list of administrations whose
      terrestrial services are affected

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Thank you!

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Questions to brmail@itu.int or thong.phamviet@itu.int

Annex

GIBC/Appendix30 30A
SAM >> GIBC

GIBC/Appendix 30 30A

For both downlink and feeder-link networks in Regions 1 and 3, need to run twice; first for downlink and second for feeder-link.

Networks in Region 2 are not subject to this kind of limit check.

Mspace
SAM >> Mspace

1. **Import your network into an appropriate SPS_ALL database by using SpaceCap.**

2. **Using SpaceCap functionality to set your network as an incoming notice for Mspace.**

3. **Do twice in case of Regions 1 and 3 downlink and feeder-link notices.**
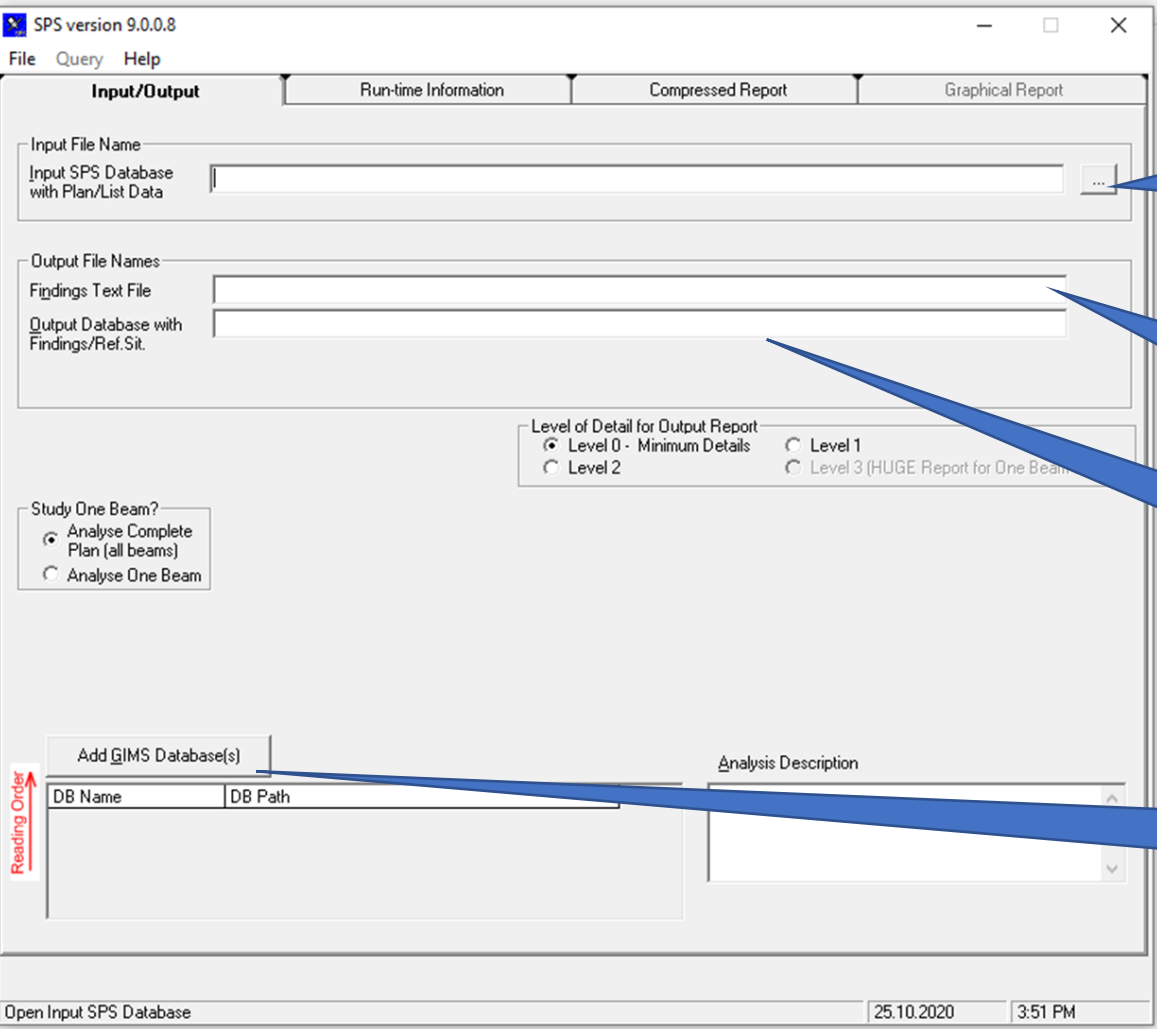
01. Connect to SPS_ALL database that contains your incoming network which has been set as incoming for Mspace
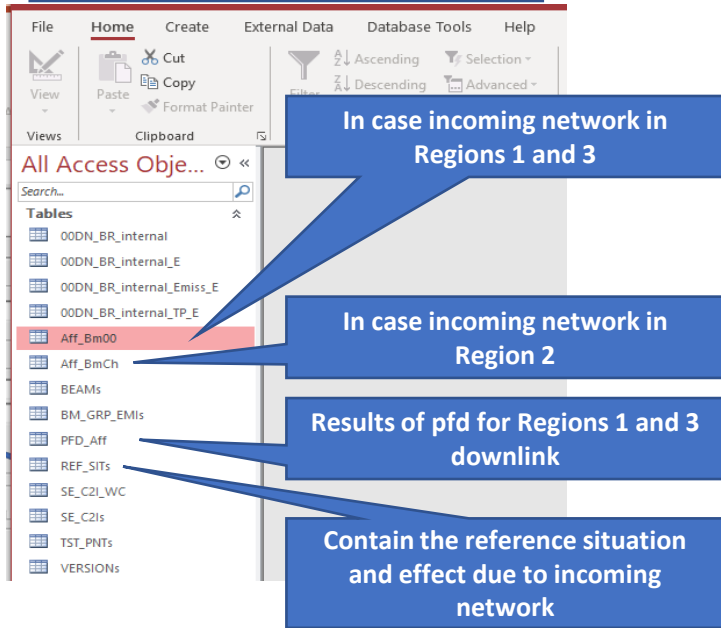
02. Give a new Finding name or accept the one proposed by Mspace

03. Give a new Output name or accept the one proposed by Mspace. This contains output of Mspace analysis

04. Add GIMS data(s). Please respect the order should you connect to more than one GIMS database!

View Mspace output results
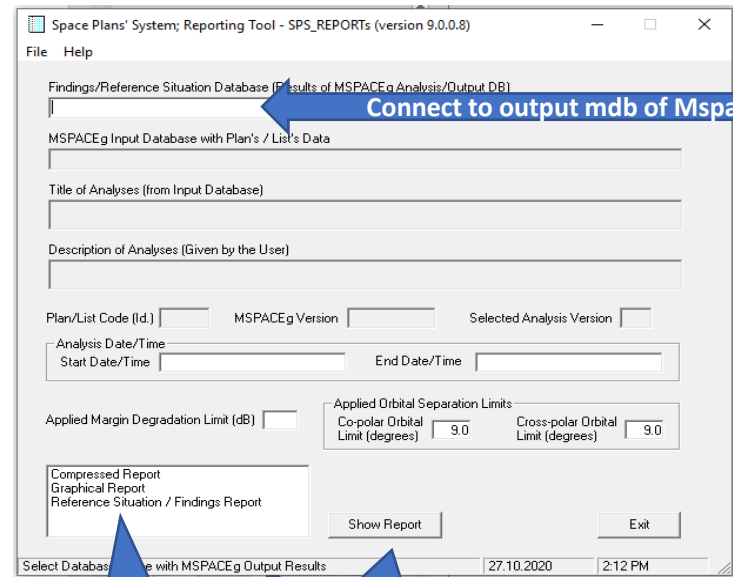
Open directly with Ms Access

In case incoming network in Regions 1 and 3

In case incoming network in Region 2

Results of pfd for Regions 1 and 3 downlink

Contain the reference situation and effect due to incoming network

Use SPS_REPORTs from SAM

Connect to output mdb of Mspace

Select the report and click "Show Report"
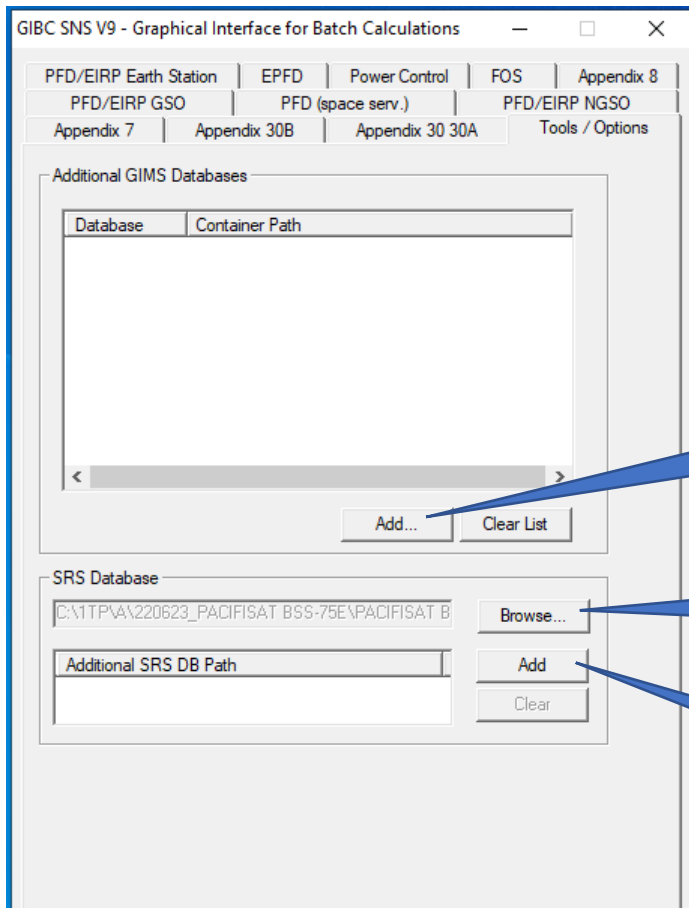
GIBC/PFD/EIRP GSO, GIBC/PFD(space serv.) and GIBC/Appendix 8

SAM >> GIBC

Set-up databases and GIMS data

01. Add GIMS data

02. Connect to SPS_ALL database that contains the network you wish to examine

03. Connect to SRS_ALL database of non-plan networks

GIBC/PFD (space serv.)

GIBC/PFD (space serv.)

Output folder of GIBC/PFD

- FNDGS.LST
- FNDGS.TXT
- FNDGS.TXT.BKP
- FNDGS_553.TXT
- FNDGS2.SORT
- FNDGS2.TXT
- FNDGS2.TXT.BKP
- FNDGS2_553.TXT
- INFO.TXT
- MSG.LST
- MSG_553.LST
- NTW.LST
- NTW_553.LST
- PARAM.TXT
- PARAM_553.TXT
- PARAM2.TXT
- PFDSPACE.LOG
- PFDSPACE_ERROR.LOG
- PXT.LST
- PXT_553.LST
- REPORT.TXT
- runpxt.bat

List of affected administrations/networks

Results of calculation

GIBC/Appendix 8

GIBC/Appendix 8

View results of GIBC/Appendix 8 in Ms Access

ap8_link_T	
ap8_link_T_partb_result	
ap8_messages	
ap8_provn_convert	
ap8_provn_freq	
ap8_strap_T	
ap8_VIEWER_E_as_stn	
ap8_VIEWER_Groups	
grp_aff_rec	
provn	
tex_version	
tr_aff_ntw	
tr_provn	
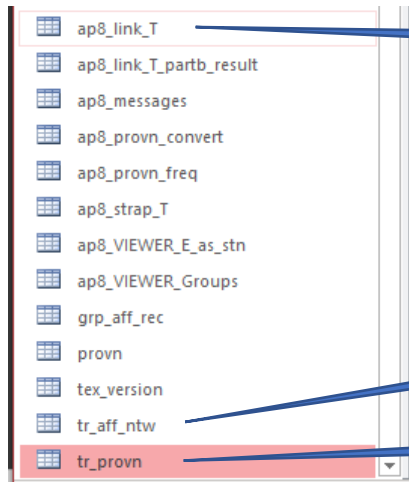
Results of calculation

List of affected networks

List of affected administrations

GIBC/Appendix 8 also contains a reporting tool.

GIBC/PFD/EIRP GSO

GIBC SNS V9 - Graphical Interface for Batch Calculations

Tabs: Appendix 7 | Appendix 30B | Appendix 30 30A | Tools / Options
PFD/EIRP Earth Station | EPFD | Power Control | FOS | Appendix 8
PFD/EIRP GSO | PFD (space serv.) | PFD/EIRP NGSO

PFD/EIRP limits applicable to GSO network

Network _____ Start

01. Enter Notice_ID

03. Click Start

Examination Options
- Examination: Triggers
- Power Control (dBW): _____
- ☐ Worst Case Only

Select "Triggers"

Messages Filter
- ☑ Progress

Before "Examination"
- ☐ Perform "Before" Comparisons
- ☐ Appendix 30 Art.4.1.11
- Add _____ Delete Clear All

Message

Calculation Results

Open Database | View Log File | Open Folder | Open Report

02. Select option as the case may be. Otherwise leave them unchecked.

- "Before" Comparisons: if incoming network is located at the same position as Plan assignment of that notifying administration.
- Appendix 30 Art.4.1.11: Check if Part B increases more interference to other networks than the corresponding Part A. Use for Part B examination.

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GIBC/PFD/EIRP GSO

View results of GIBC/PFD/EIRP GSO in Ms Access

Results of pdf calculation

List of affected administration/territory