Exercise on capture and validation of an AP30/30A notice for its submission to the Bureau

Álvaro de Vega
Space Services Department
alvaro.devega@itu.int

WORKSHOP ON WRC-19 AGENDA ITEM 1.4
17th – 21st February 2020
Nairobi, Kenya

Resolution COM5/3 (WRC-19) = Resolution 559 (WRC-19)

- **Main idea:** To replace national BSS assignments related to Appendices **30** and **30A** for administrations in Regions 1 and 3 Plan with low EPM in order to improve their EPM values.

- **Conditions:** This procedure can only be applied once by an administration with:
  1. No frequency assignments included in the List or for which complete Appendix **4** information has been received by the Bureau in accordance with the provisions of § 4.1.3 of Appendix **30**; and
  2. At least 50% of the total number of EPM values of the national assignments in the Regions 1 and 3 Plan in Appendix **30** are equal to or below –10 dB.

- **Procedure for application of Resolution 559 (WRC-19):**
  1. Administration to submit Appendix **4** information in accordance with § 4.1.3 of Appendices **30** and **30A**, in particular:
     - *Request to use the special procedure in the cover letter of the submission;*
     - *Service area limited to the national territory of the administration;*
     - *A set of maximum 20 test-points inside the national territory;*
     - *A minimal ellipse determined by the set of test-points (the Bureau may create it);*
     - *Ten consecutive odd or even channels with standard frequencies in the same polarization with a bandwidth of 27 MHz;*
     - *A corresponding submission for Appendix **30A** with the same above principles.*
  2. Coordinate with affected administrations and include assignments in the List.
  3. Request subsequent WRCs to consider the inclusion of these assignments in the Appendices **30** and **30A** Plans as a replacement of its national assignments appearing in the Plans.

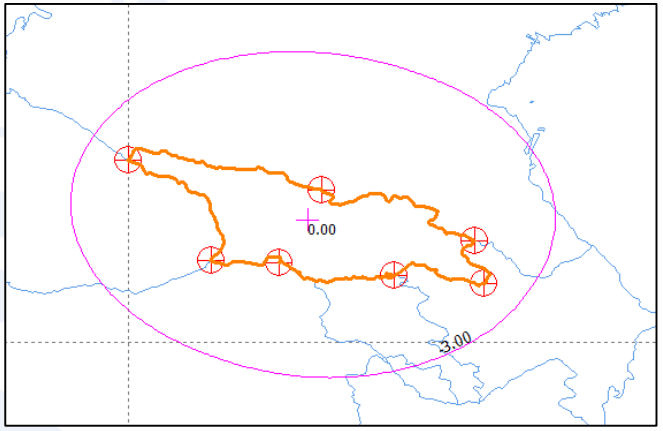
Resolution 559 (WRC-19) - Conditions

- **Conditions:** This procedure can only be applied once by an administration with:

1. No frequency assignments included in the List or for which complete Appendix **4** information has been received by the Bureau in accordance with the provisions of § 4.1.3 of Appendix **30**:

Administration has not sent any submission under Appendix 30 to the Bureau

2. At least 50% of the total number of EPM values of the national assignments in the Regions 1 and 3 Plan in Appendix **30** are equal to or below –10 dB:



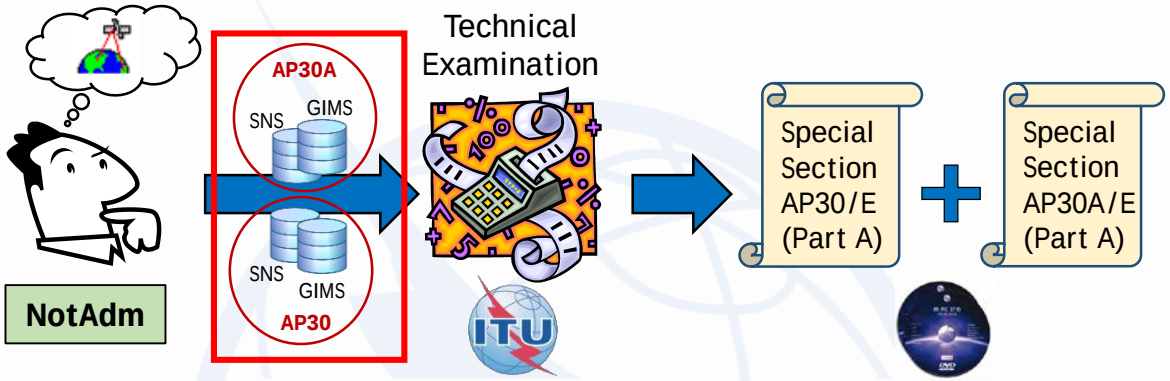
Example: Administration of Georgia

- **Number of channels:** 10
- **Channel numbers:** 1, 3, 5, 7, 9, 11, 13, 15, 17, 19
- **Polarization:** Circular right-hand
- **Number of test-points:** 7
- **54.29 % of their EPM values are below -10 dB!**

Ch. No / TP (Long; Lat)	1	3	5	7	9	11	13	15	17	19
40E ; 43.39N	-17.965	-18.3	-18.363	-18.422	-18.483	-18.543	-18.602	-18.661	-18.709	-18.71
41.55E ; 41.53N	-16.759	-17.096	-17.158	-17.217	-17.277	-17.337	-17.397	-17.455	-17.503	-17.503
42.81E ; 41.49N	-12.415	-12.754	-12.814	-12.871	-12.929	-12.987	-13.043	-13.1	-13.146	-13.146
43.59E ; 42.84N	-7.242	-7.552	-7.6	-7.645	-7.691	-7.737	-7.782	-7.827	-7.864	-7.864
44.95E ; 41.25N	-7.914	-8.225	-8.271	-8.314	-8.359	-8.404	-8.448	-8.491	-8.527	-8.527
46.44E ; 41.89N	-9.037	-9.327	-9.372	-9.414	-9.458	-9.501	-9.544	-9.587	-9.622	-9.622
46.63E ; 41.11N	-9.681	-9.975	-10.019	-10.061	-10.105	-10.148	-10.191	-10.233	-10.268	-10.267

Procedure for application of Resolution 559 (WRC-19)

1 ***Initial characteristics***

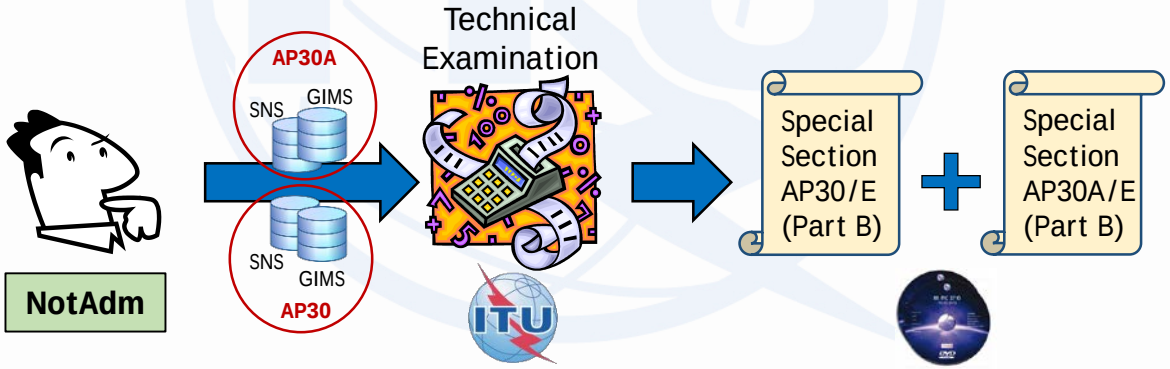


Publication of Affected Administrations!

2 ***…Coordination with affected Administrations…***

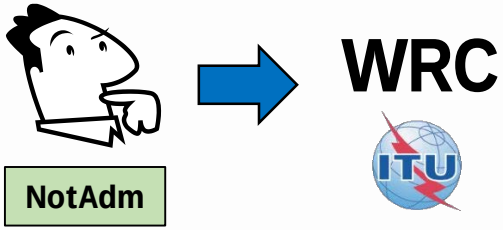
Maximum 8 years to complete coordination

3 ***Final characteristics***



Inclusion of assignments in the Regions 1 & 3 ***List***

4 ***Request next WRC to include AP30/30A assignments into the Plan (in accordance with § 4 of Attachment 1 to Resolution 559)***



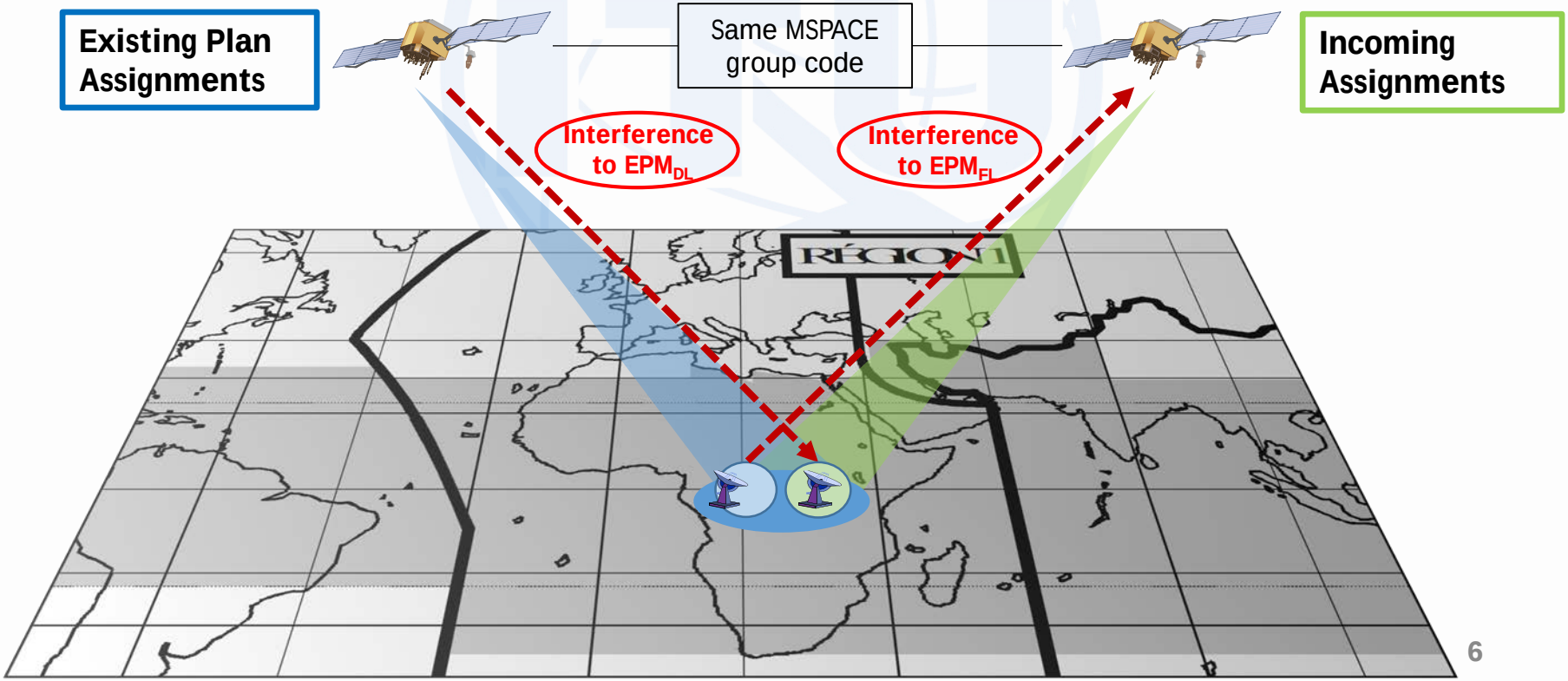
Inclusion of assignments in the Regions 1 & 3 ***Plan***

Practical information for submissions

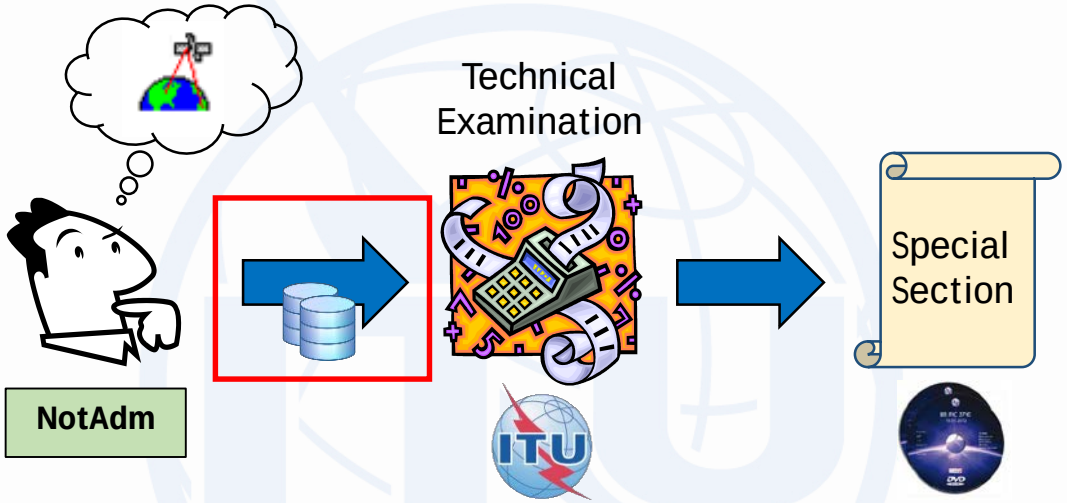
- Orbital positions:
  - *Further west than 37.2W; or*
  - *35.99°W to 33.51°W, 32.49°W to 30.01°W, 28.99°W to 26.01°W, 23.99°W to 20.01°W, 17.99°W to 14.01°W, 11.99°W to 8.01°W, 5.99°W to 4.01°W, 3.99°W to 2.01°W, 0.01°E to 3.99°E, 6.01°E to 8.99°E and 9.01°E to 10°E.*
- Elevation angle: desirable from **20 degrees**
- Frequency bands and channels:
  - Downlink: **11.7-12.5 GHz**
    - Possible channels: 1 to 40
    - Ten consecutive odd or even channels with standard Appendix **30** assigned frequencies in the same polarization (Linear, Circular right or left).
  - Feeder-link:
    - **17.3-18.1 GHz**
      - Possible channels: 1 to 40
      - Ten consecutive odd or even channels with standard Appendix **30A** assigned frequencies in the same polarization (Linear, Circular right or left).
    - **14.5-14.8 GHz**
      - Possible channels: 1 to 14
      - The maximum of ten channels with standard Appendix **30A** assigned frequencies could have different polarization (Linear, Circular right or left).
- Bandwidth: **27 MHz**
- EIRP: **58.4 dBW** for the downlink and **84 dBW** for the feeder-link. Then run GIBC/AP3030A for AP30 Hard Limits and increase EIRP for the downlink, if possible.
- **Grouping** existing Plan assignments and incoming assignments
- At the end of the first day of the workshop, you should have chosen an **orbital position** (for both AP30 and AP30A), **10 channels for downlink**, **10 channels for feeder-link**, **polarization for downlink** and **polarization for feeder-link**. Please use these values in the generation of the submissions.

Practical information for submissions

- Grouping existing Plan assignments and incoming assignments:
  - *Interference from Plan assignments and incoming assignments and vice versa will not be taken into account*
  - *For interference to other networks, the worst interference signal (from Plan assignments and incoming assignments) is selected*
- **If Plan and incoming assignments are not grouped, they will interfere with each other!**

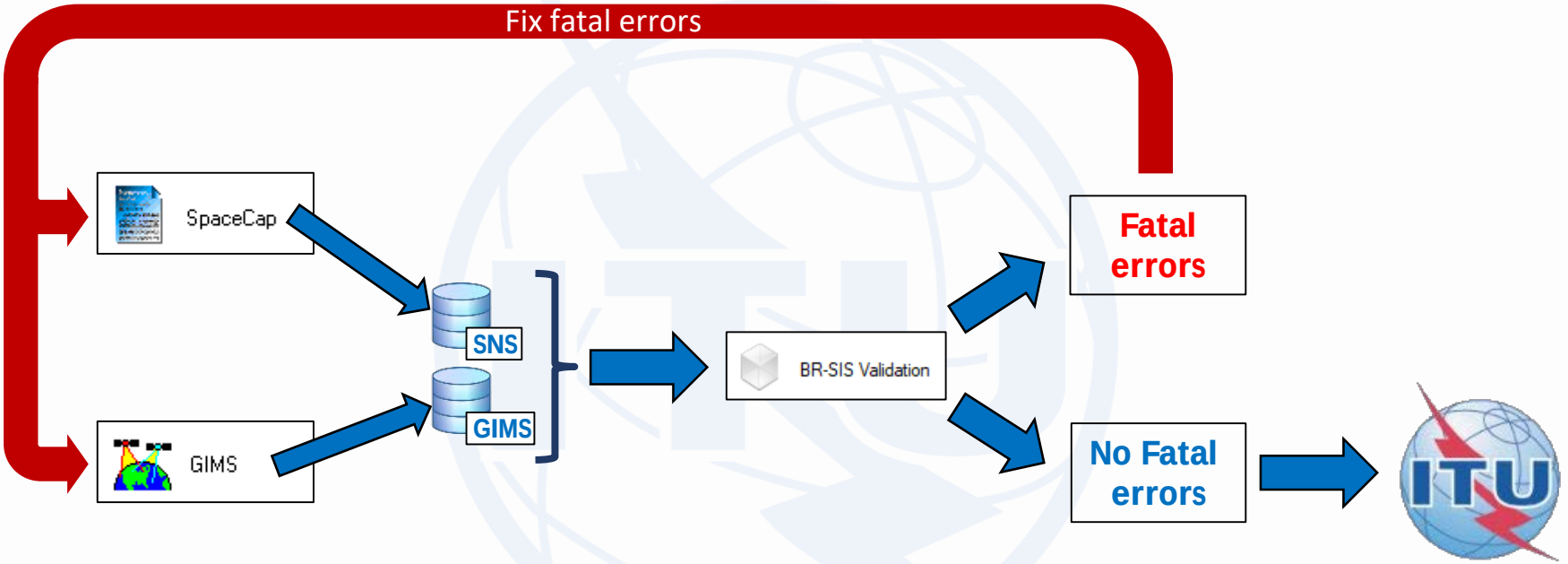


Treatment of Article 4 Submissions



- Submission of validated Appendix **4** data: **GIMS + SNS** databases
- BR validates GIMS + SNS databases:
  - ***Validation OK*** → *Acknowledgement by telefax + further processing of the notice*
  - ***Validation not OK*** → *Notice is returned to the notifying administration*

Capture and validation of a submission



1. Capture AP4 data with SpaceCap and GIMS and generate SNS and GIMS databases
2. Validate with GIMS:
   a. If there is any fatal error → correct with SpaceCap and/or GIMS and validate
   b. If there is no fatal error → submission is ready to be sent to the Bureau

Exercise: Generate submission to apply the special procedure in Resolution 559

Main Steps:

1. **Assign MSPACE group code to existing Plan assignments (to both AP30 and AP30A)**
2. **AP30 submission:**
   - a) Generate GIMS database with graphical information with GIMS
     - Gain contour (-3 dB ellipse) + Service area (national territory)
   - b) Generate SNS database with SpaceCap
   - c) Run BR-SIS Validation with SNS and GIMS databases
3. **AP30A submission:**
   - a) Generate GIMS database with graphical information with GIMS
     - Gain contour (-3 dB ellipse) + Service area (national territory)
   - b) Generate SNS database with SpaceCap
   - c) Run BR-SIS Validation with SNS and GIMS databases
4. **Run GIBC/Appendix 30 30A to check Hard Limits**
   - a) For AP30 submission
   - b) For AP30A submission

Annex 1 – Proposed MSPACE group codes to existing Plan assignments and incoming assignments

Annex 2 - Submission AP30A in 14 GHz

Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

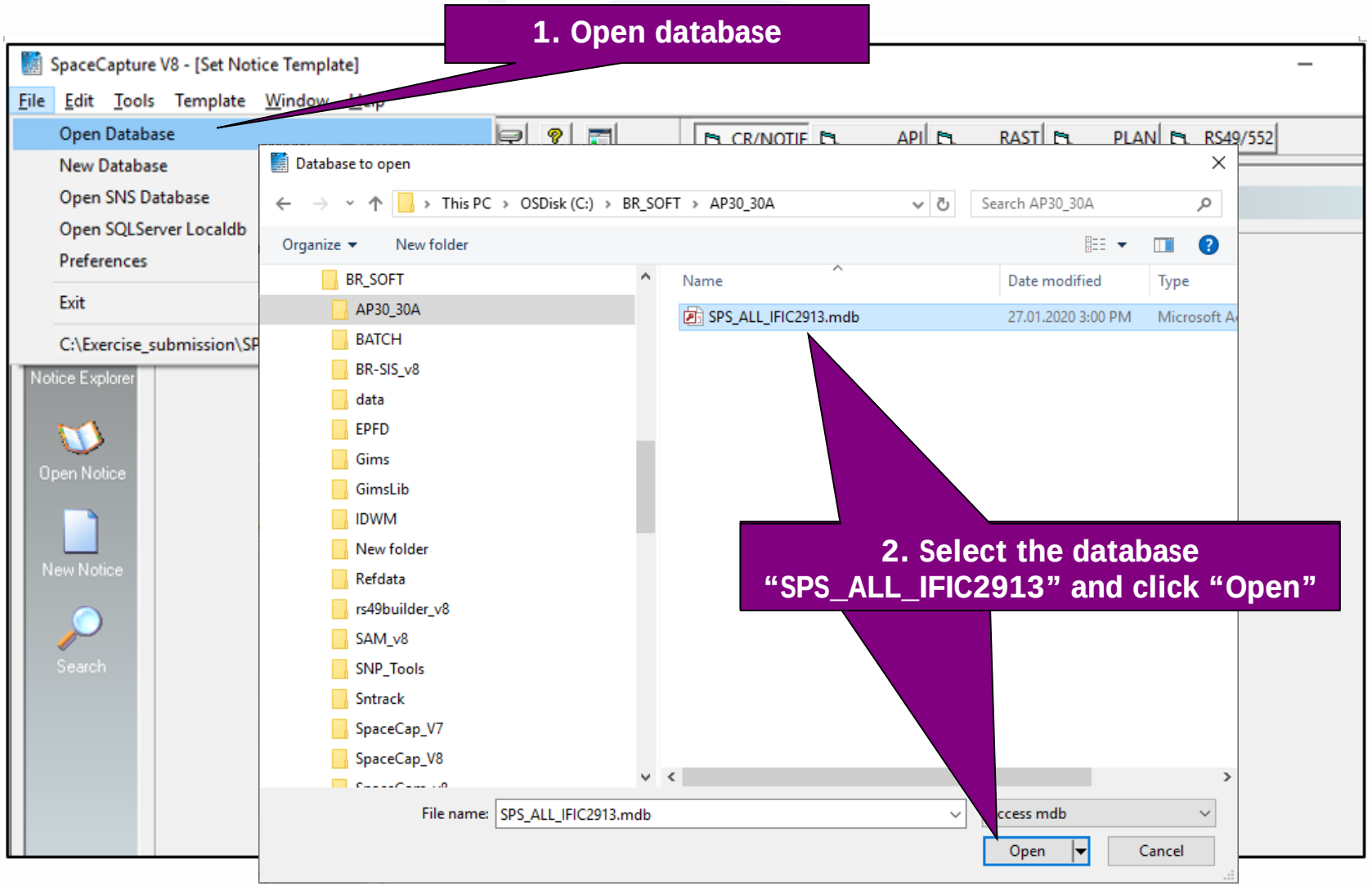
4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

1. Assign MSPACE group code to existing Plan assignments

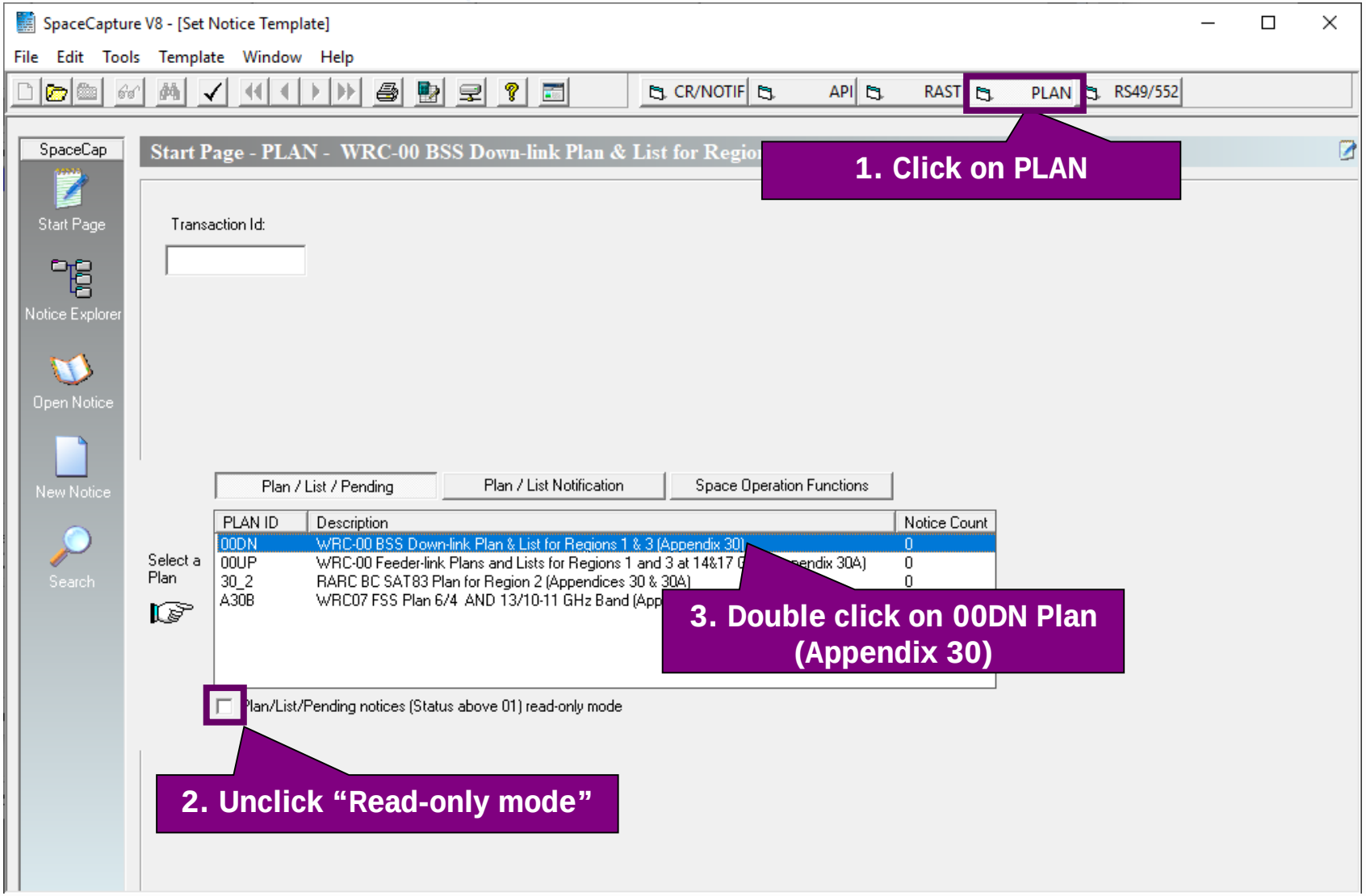
1. Create a new folder named “AP30_30A” in your local drive under C:\BR_SOFT
2. From the USB key: Copy grefdb2913.mdb located in \\BRIFIC2913\Databases\GIMS_Data into C:\BR_SOFT\AP30_30A
3. From the USB key: Copy SPS_ALL_IFIC2913.mdb located in \\BRIFIC2913\Databases\AP30_30A into C:\BR_SOFT\AP30_30A
4. In C:\BR_SOFT\AP30_30A, select file SPS_ALL_IFIC2913.mdb and click on right button of the mouse
5. Go to Properties
6. Uncheck “Read-only” and click on “Apply” and “OK”

1. Assign MSPACE group code to existing Plan assignments

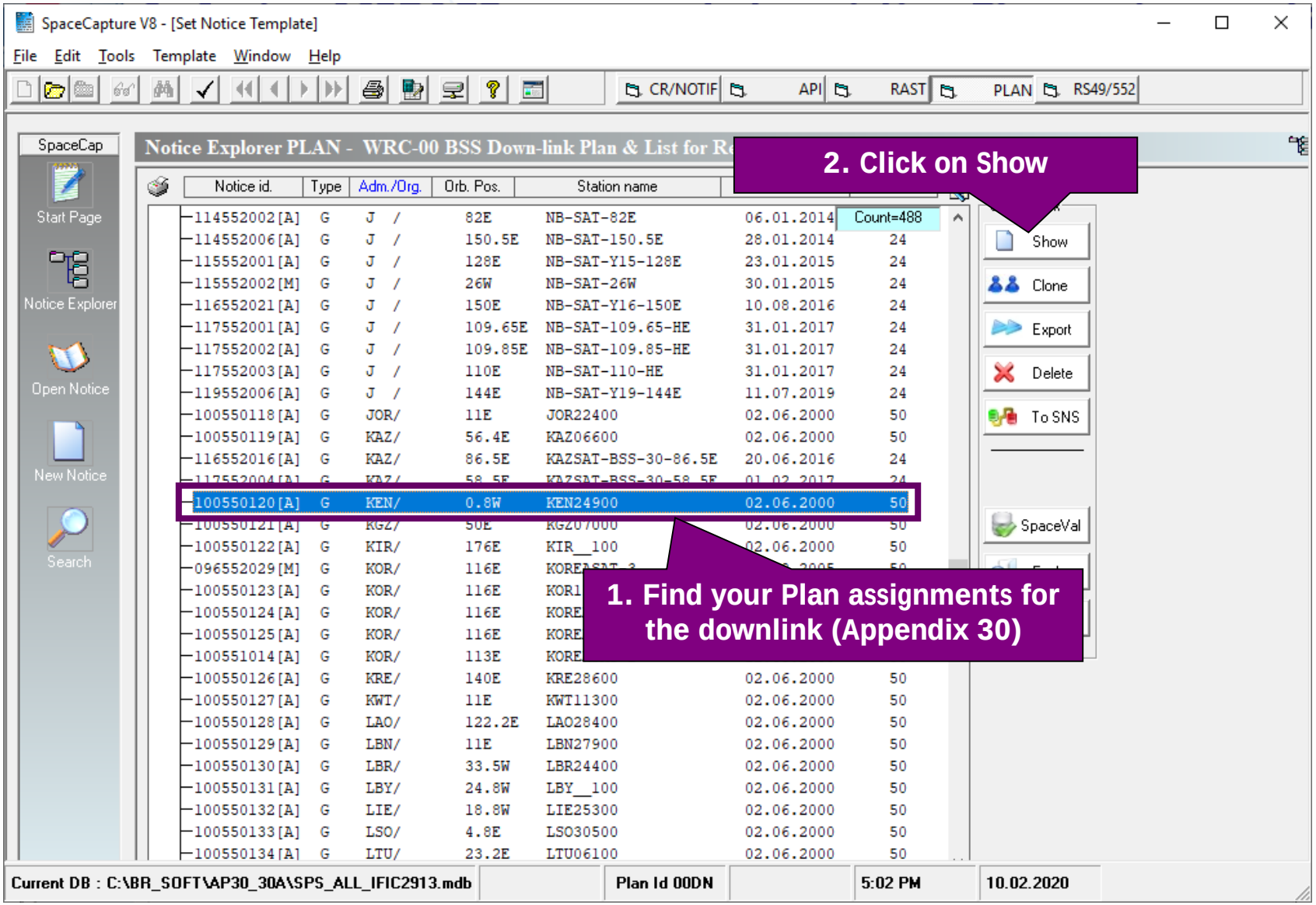
Open SpaceCap



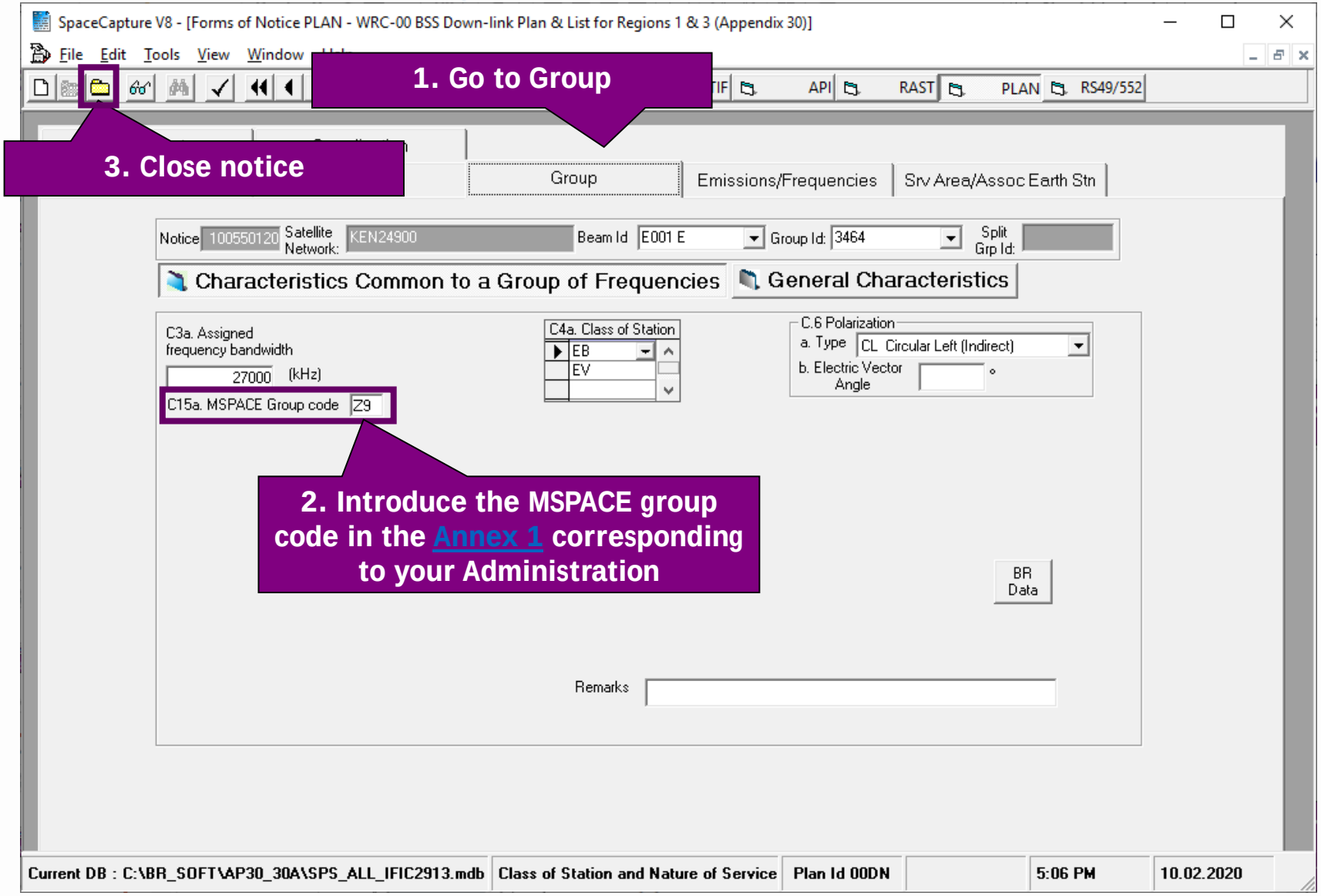
1. Assign MSPACE group code to existing Plan assignments



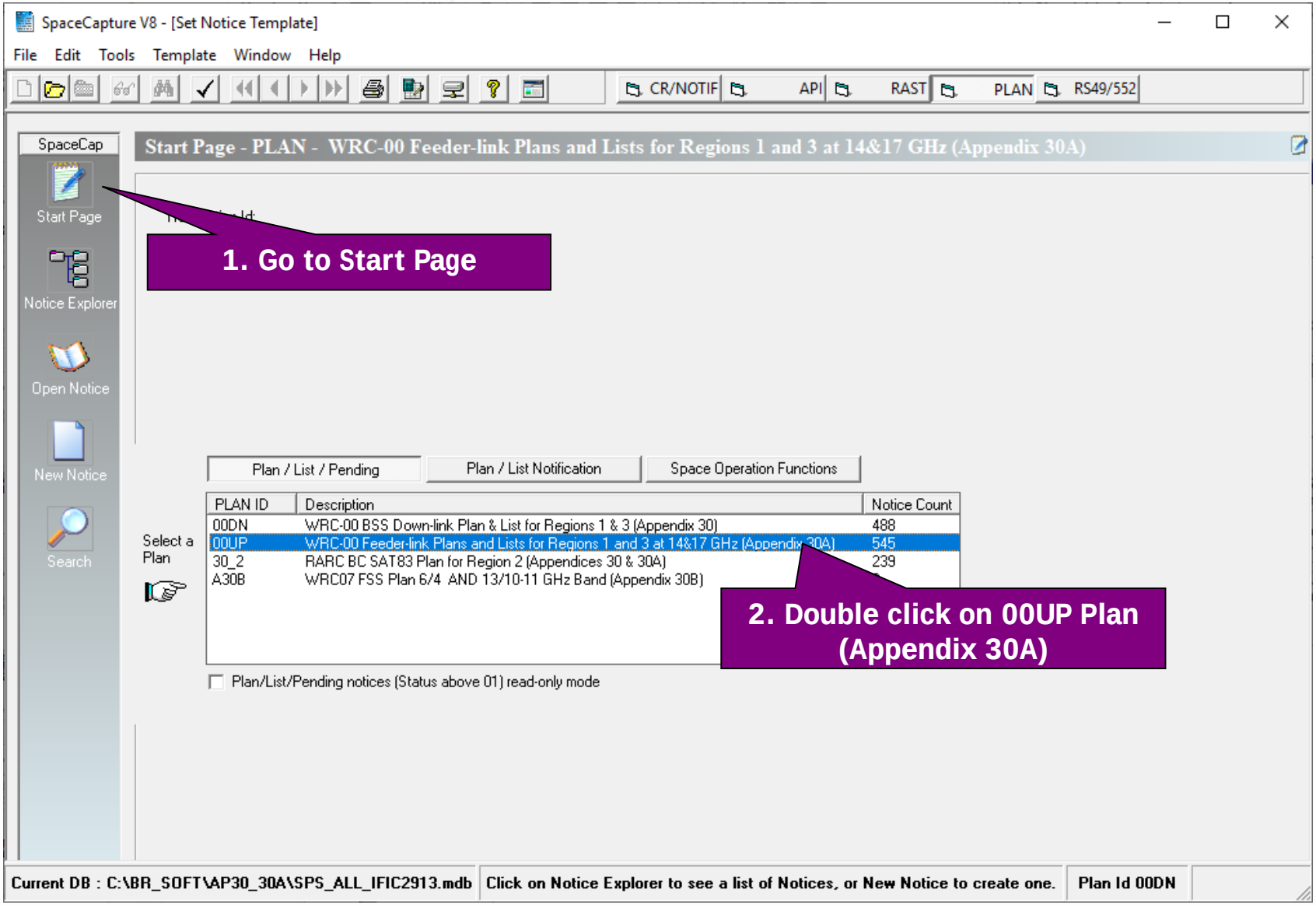
1. Assign MSPACE group code to existing Plan assignments



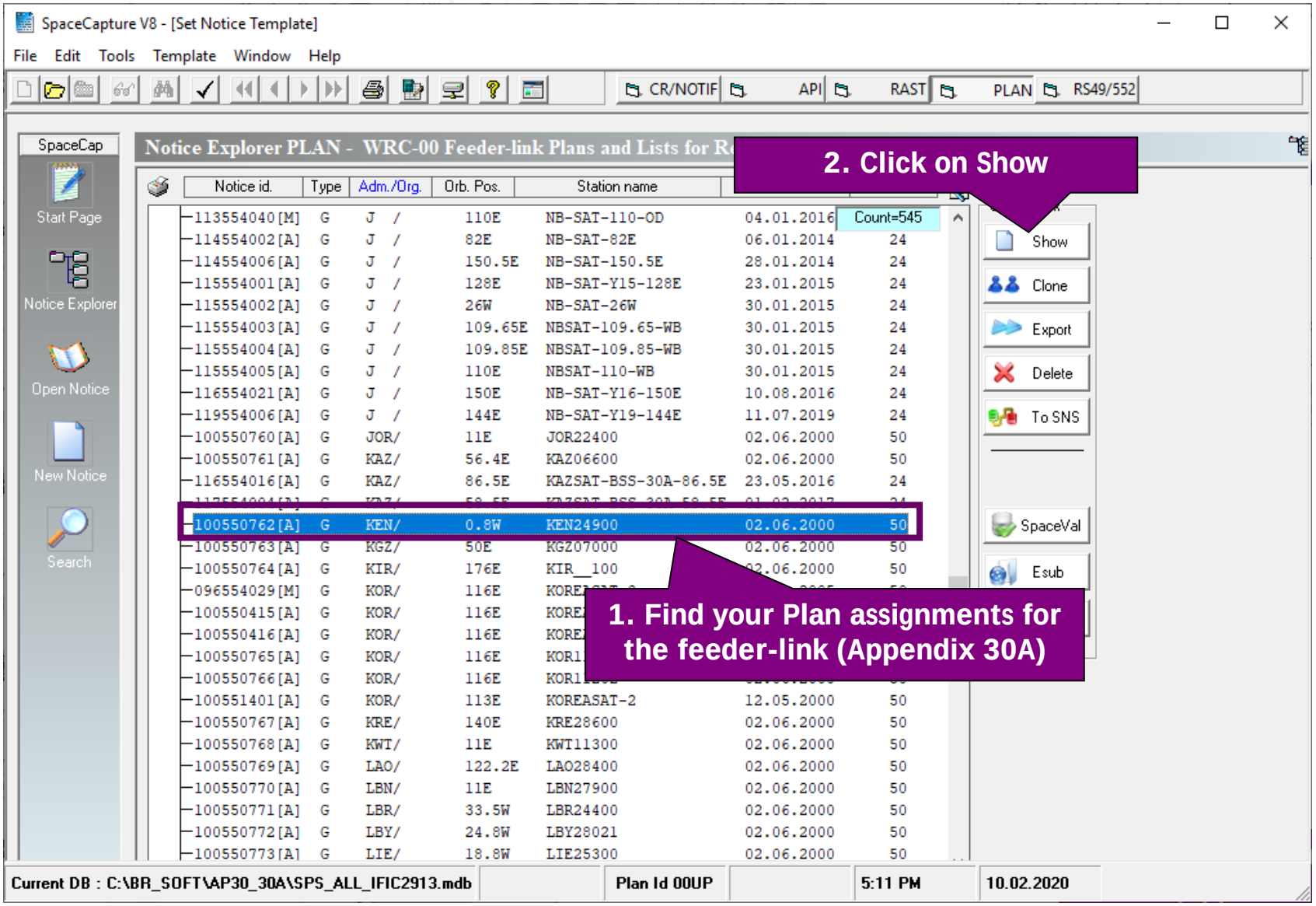
1. Assign MSPACE group code to existing Plan assignments



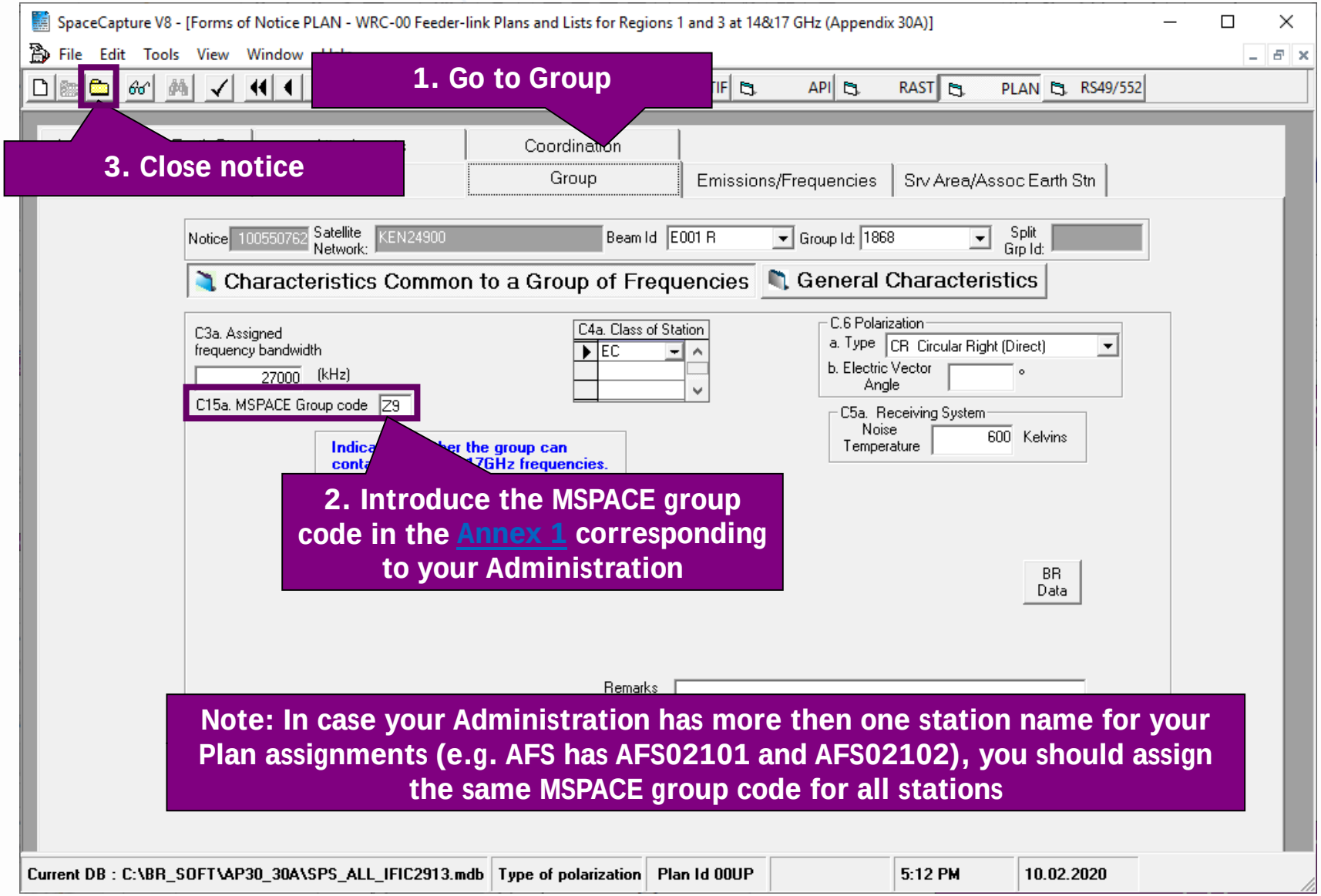
1. Assign MSPACE group code to existing Plan assignments



1. Assign MSPACE group code to existing Plan assignments



1. Assign MSPACE group code to existing Plan assignments



Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

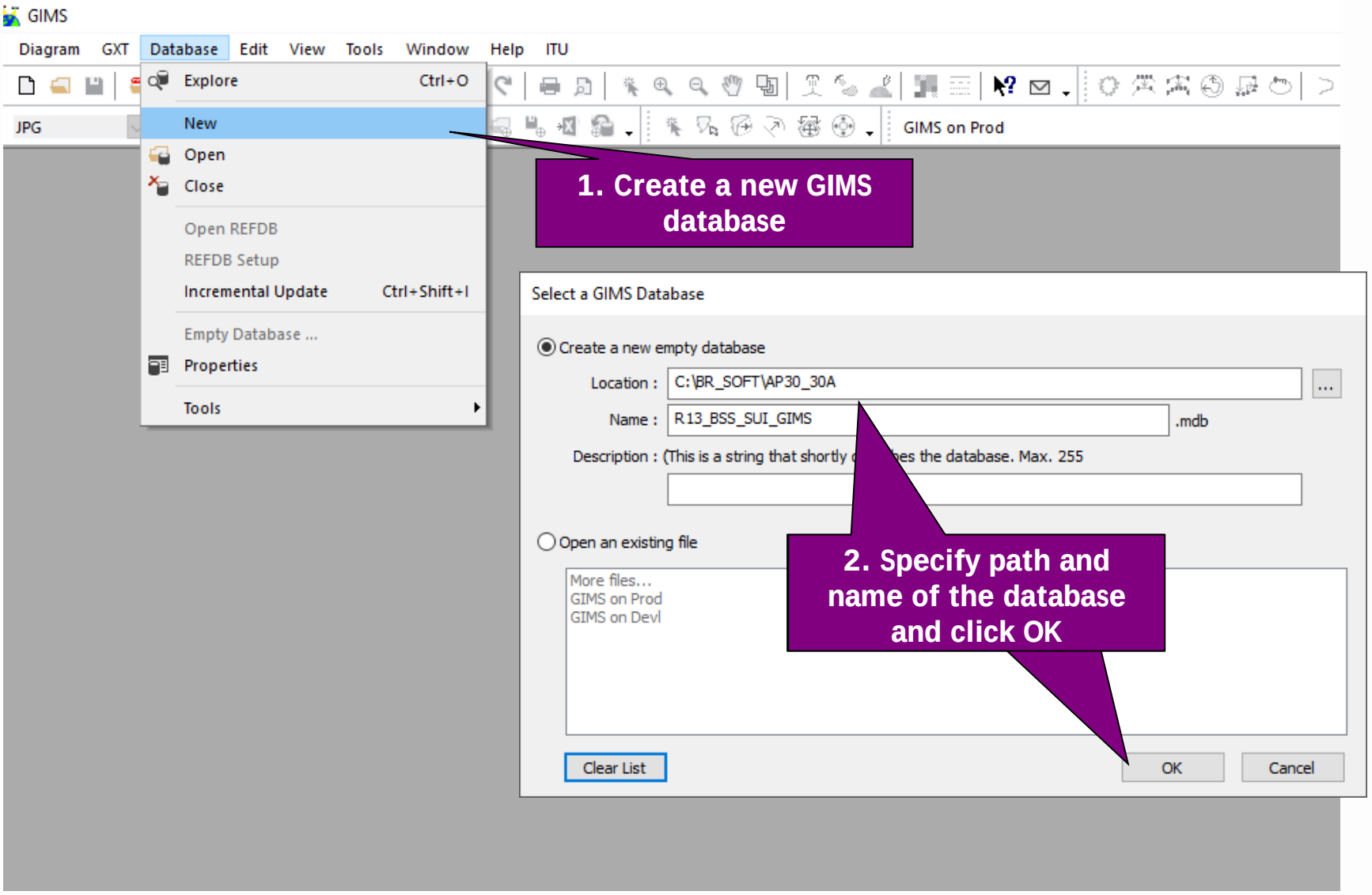
3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

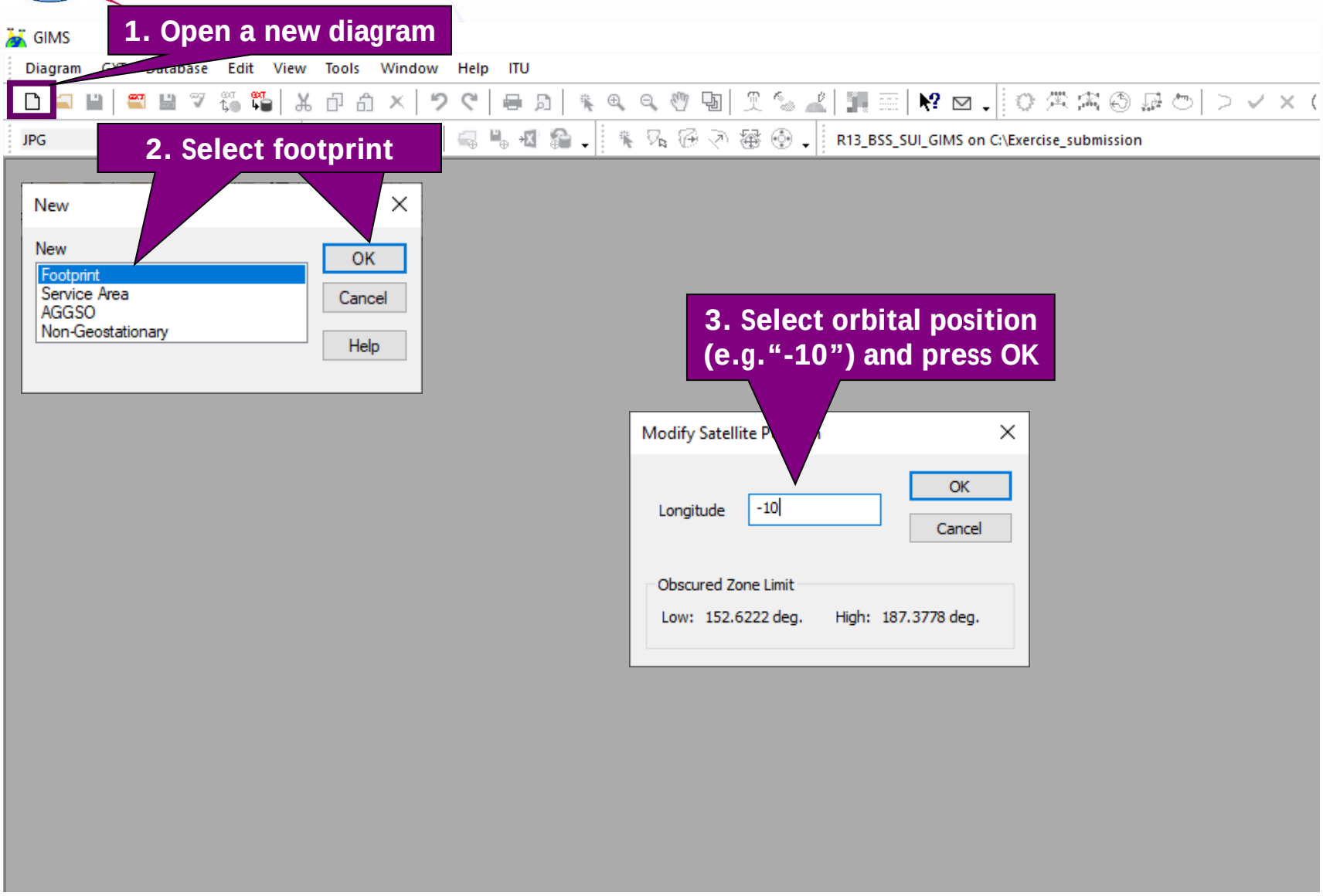
4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

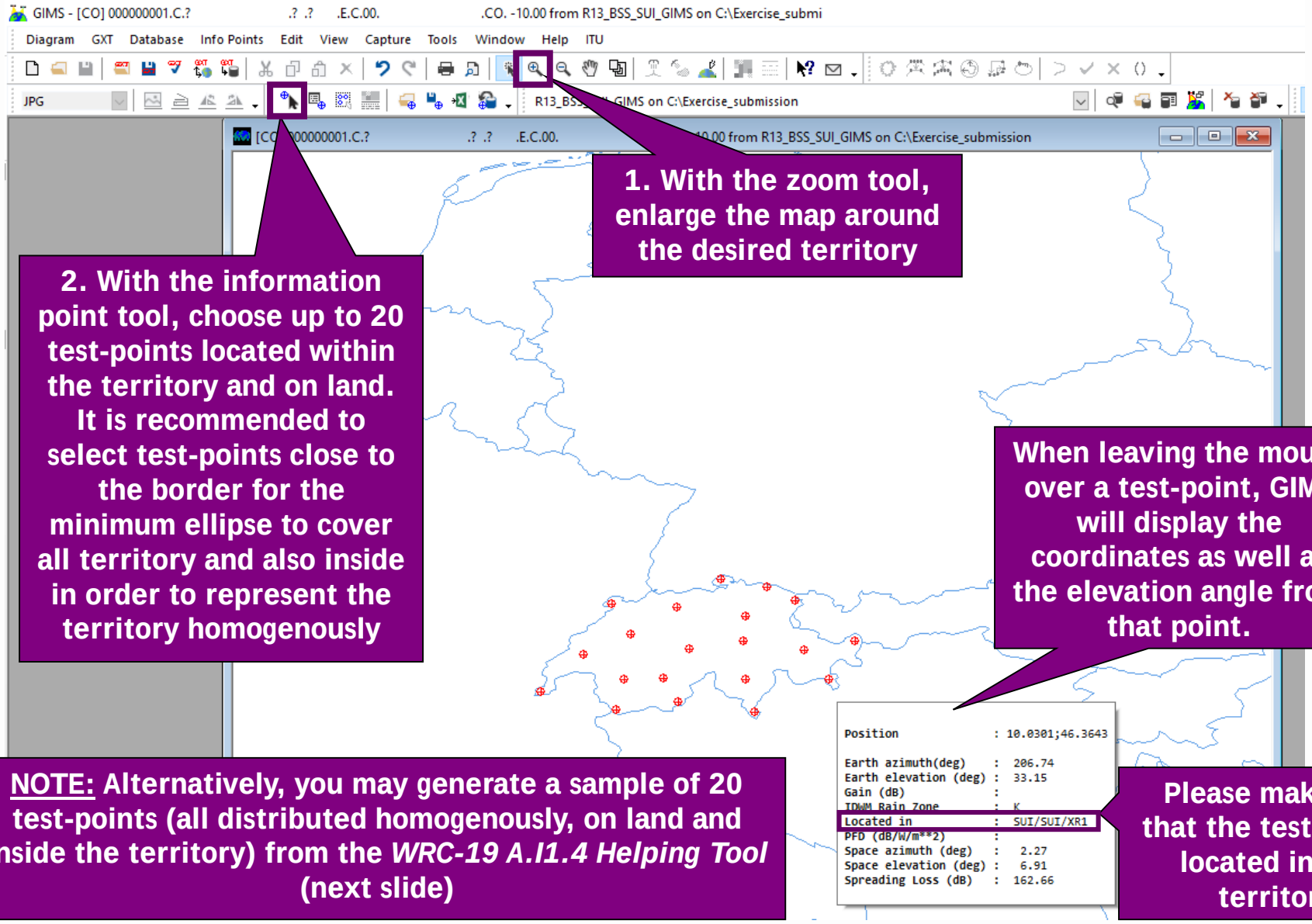
2.a) AP30: Generate GIMS database (GAIN CONTOUR)



2.a) AP30: Generate GIMS database (GAIN CONTOUR)



2.a) AP30: Generate GIMS database (GAIN CONTOUR)



NOTE: Alternatively, you may generate a sample of 20 test-points (all distributed homogenously, on land and inside the territory) from the *WRC-19 A.I1.4 Helping Tool* (next slide)

2.a) AP30: Generate GIMS database (GAIN CONTOUR)

1. Go to Sample set of Test-points

WRC-19 A.I1.4 Helping Tools. (Not official released by the Bureau) - 10.02.2020

Exit About

Elevation Angle | C/N | EPM vs Required C/(N+I) | My New EPM Values | New PLAN Characteristics | View MSPACE Output | Existing Freq. Assignments | New Downlink Positions | New Feeder-link Positions | Sample set of Test-points

KEN Kenya (Republic of)

2. Select your Administration code

Sample set of test-points

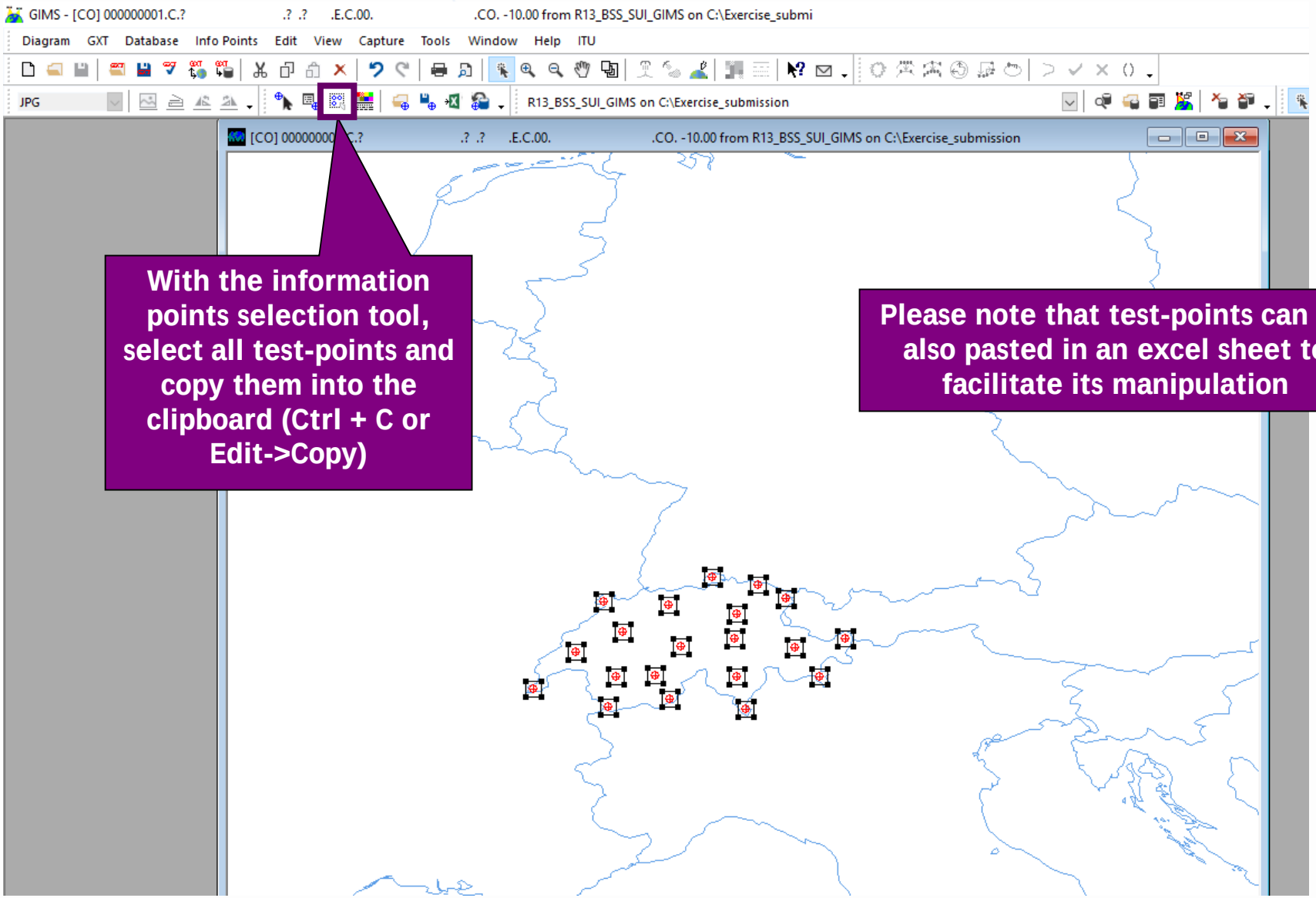
LON	LAT	Rain_Zone
35.1735	4.6192	TBD
34.2895	4.0888	TBD
35.3061	1.8344	TBD
34.2453	-0.5525	TBD
36.2786	-2.0112	TBD
38.0909	-3.3815	TBD
39.1518	-4.2656	TBD
40.5221	-1.9228	TBD
41.2735	-1.6576	TBD
40.6105	1.6576	TBD
41.2735	3.7793	TBD
39.6822	3.1605	TBD
37.0742	4.0888	TBD
37.9583	1.525	TBD
36.8974	-0.8178	TBD
39.3286	-0.3315	TBD
36.146	0.6409	TBD
36.146	3.5141	TBD
38.6655	-1.746	TBD
38.0025	2.8953	TBD

Display

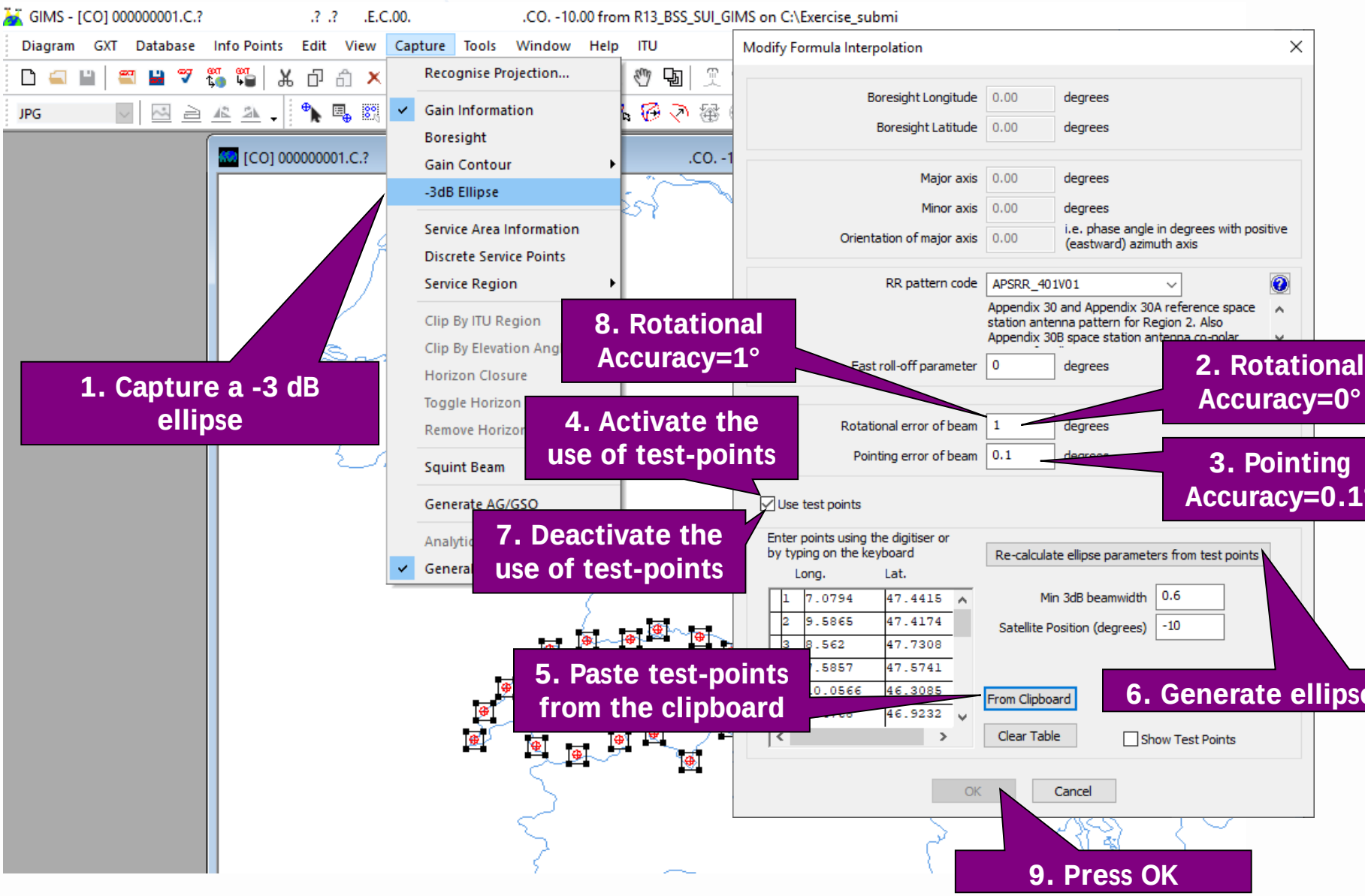
The tool will display the set of 20 test-points over your territory in the map

3. Select the coordinates of the test points and press Ctrl + C. Go back to GIMS and press Ctrl + V (copy and paste test-points). You may delete, modify or add new test-points in GIMS (max.20)

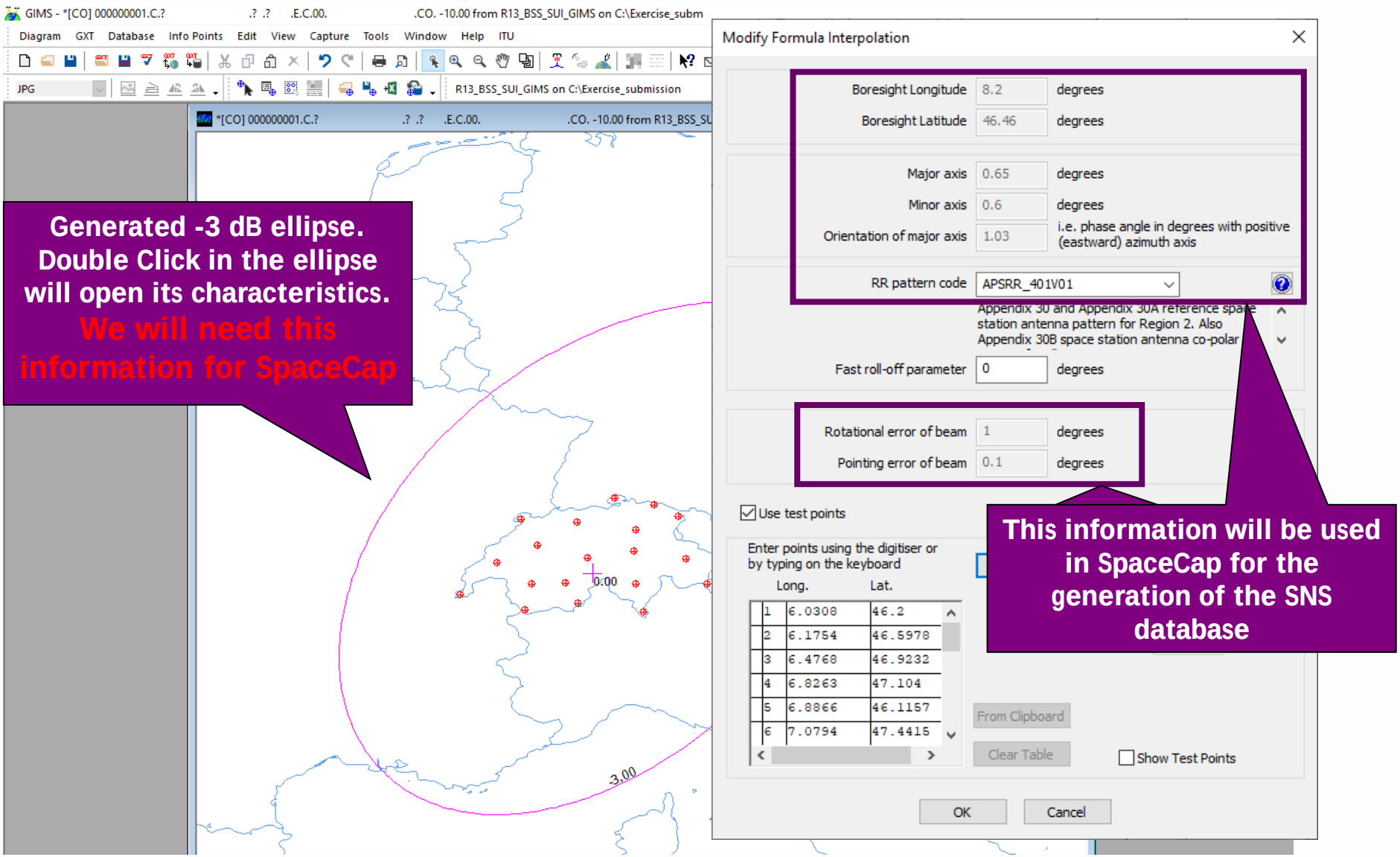
2.a) AP30: Generate GIMS database (GAIN CONTOUR)



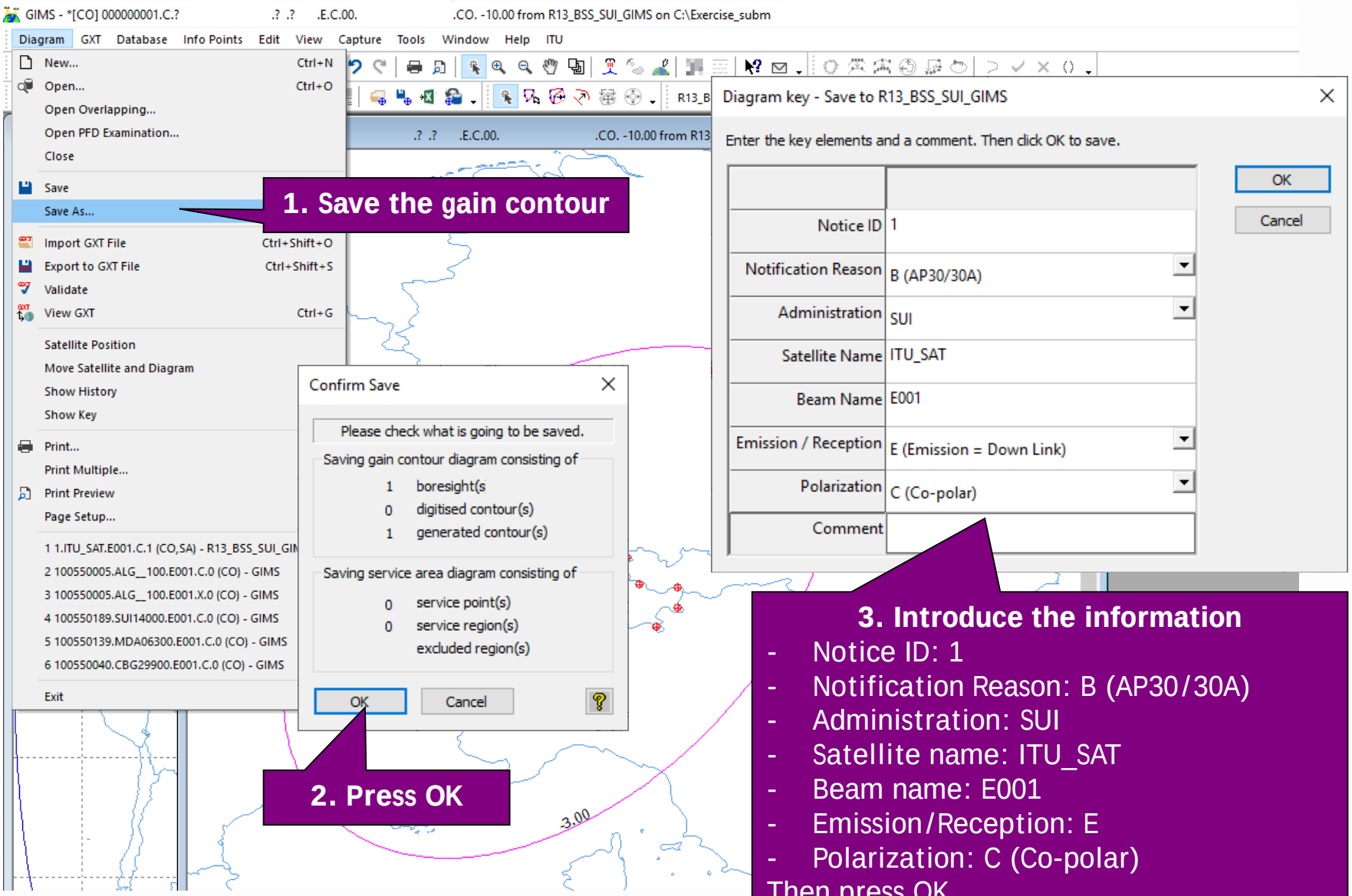
2.a) AP30: Generate GIMS database (GAIN CONTOUR)



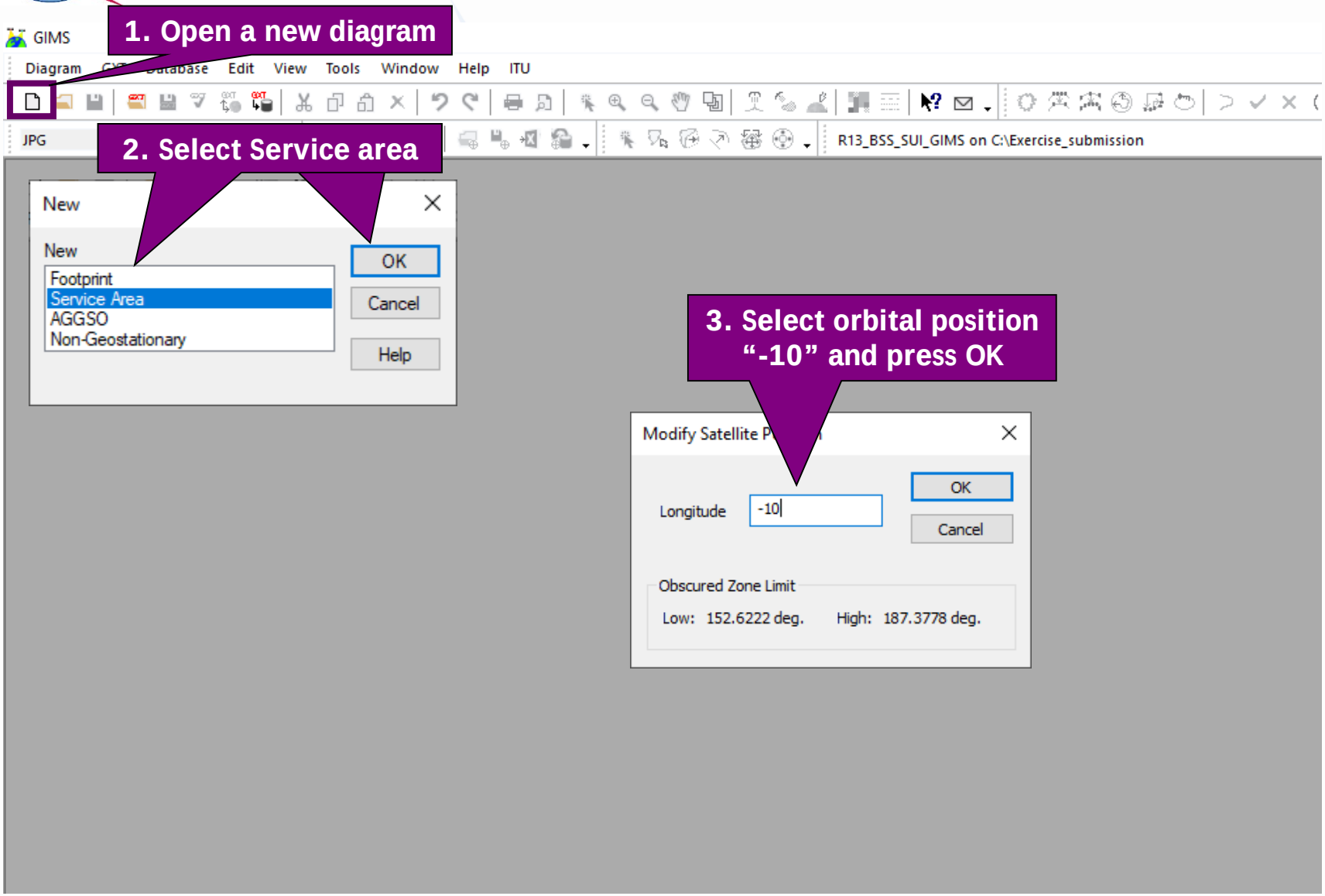
2.a) AP30: Generate GIMS database (GAIN CONTOUR)



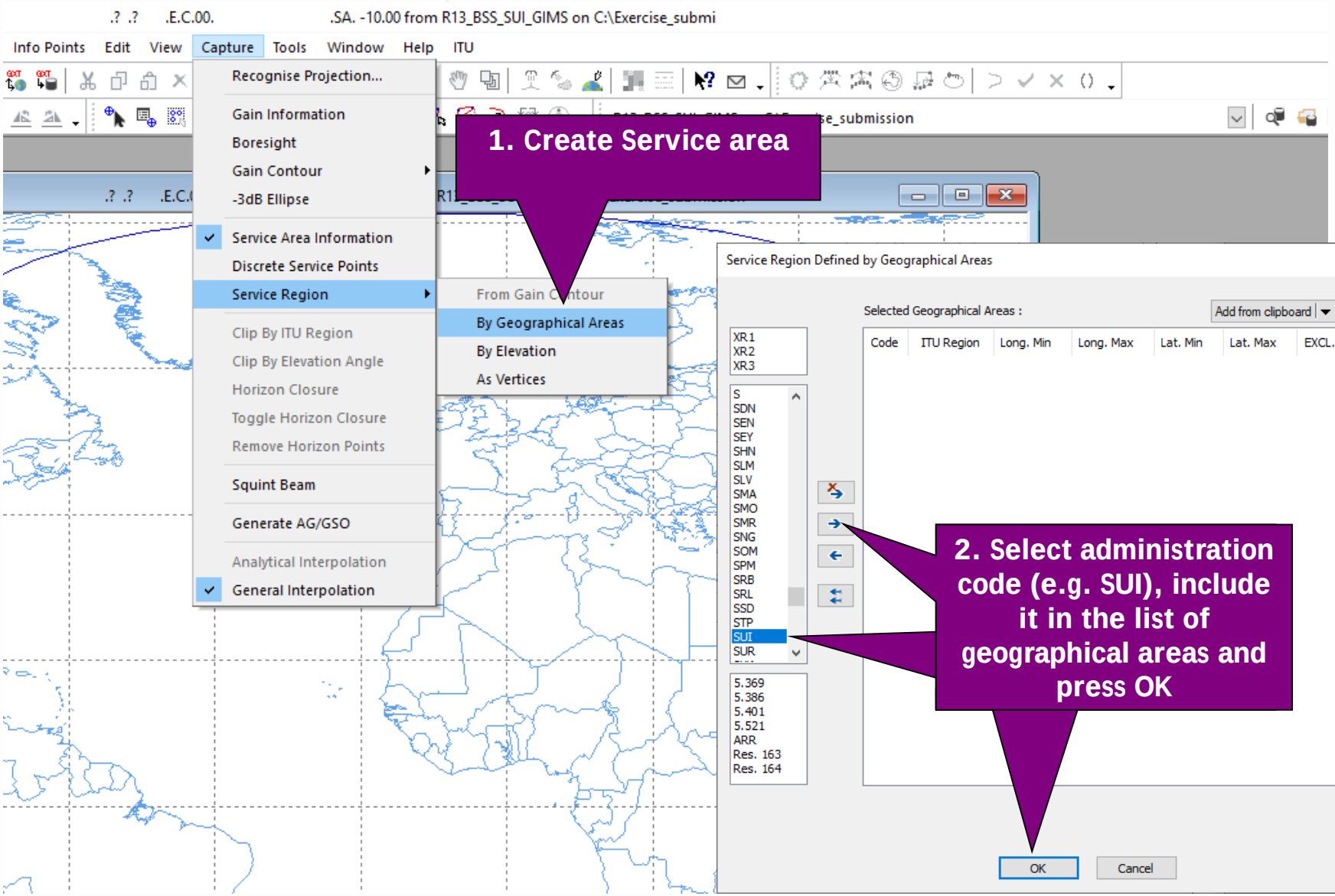
2.a) AP30: Generate GIMS database (GAIN CONTOUR)



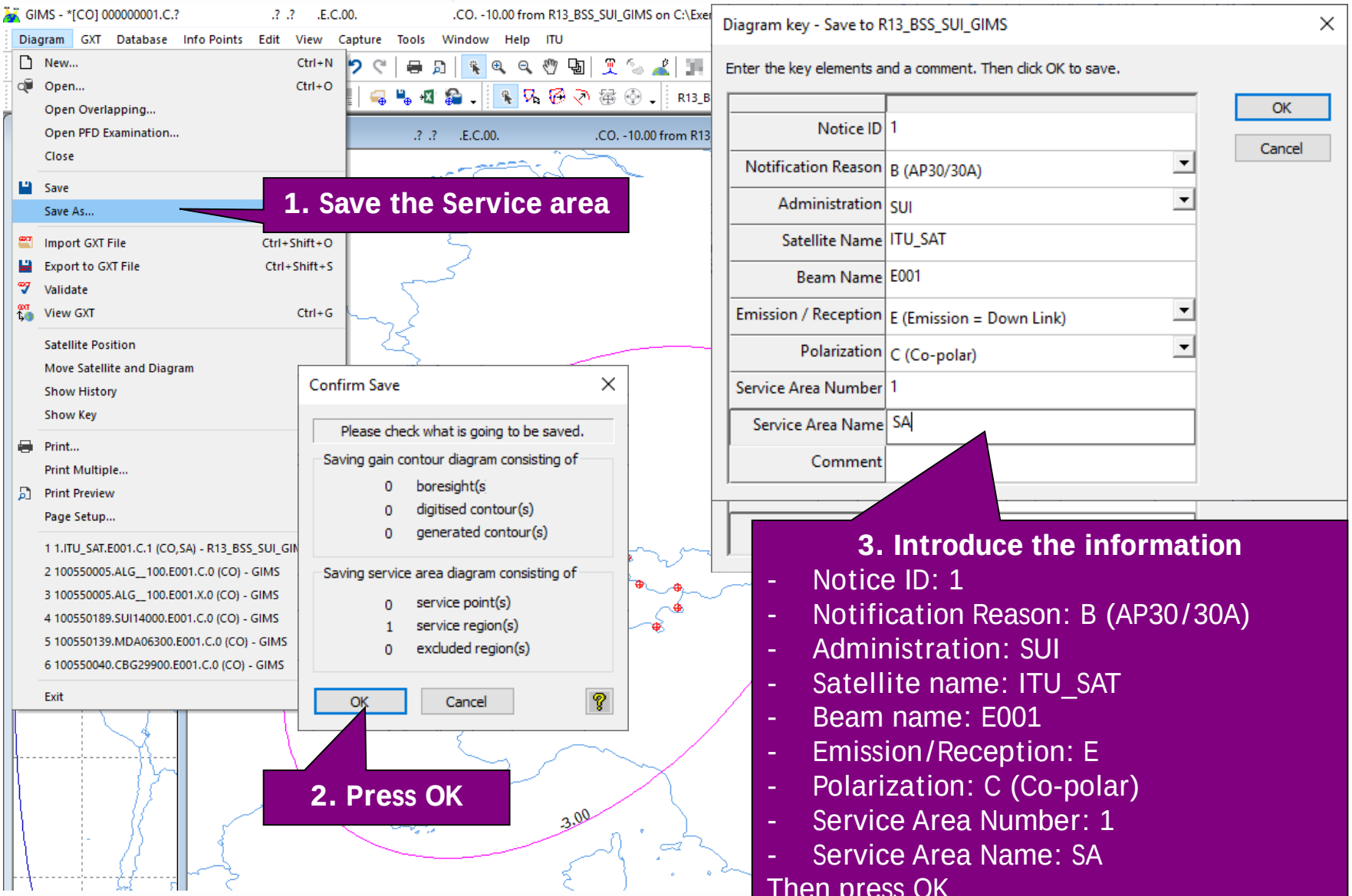
2.a) AP30: Generate GIMS database (SERVICE AREA)



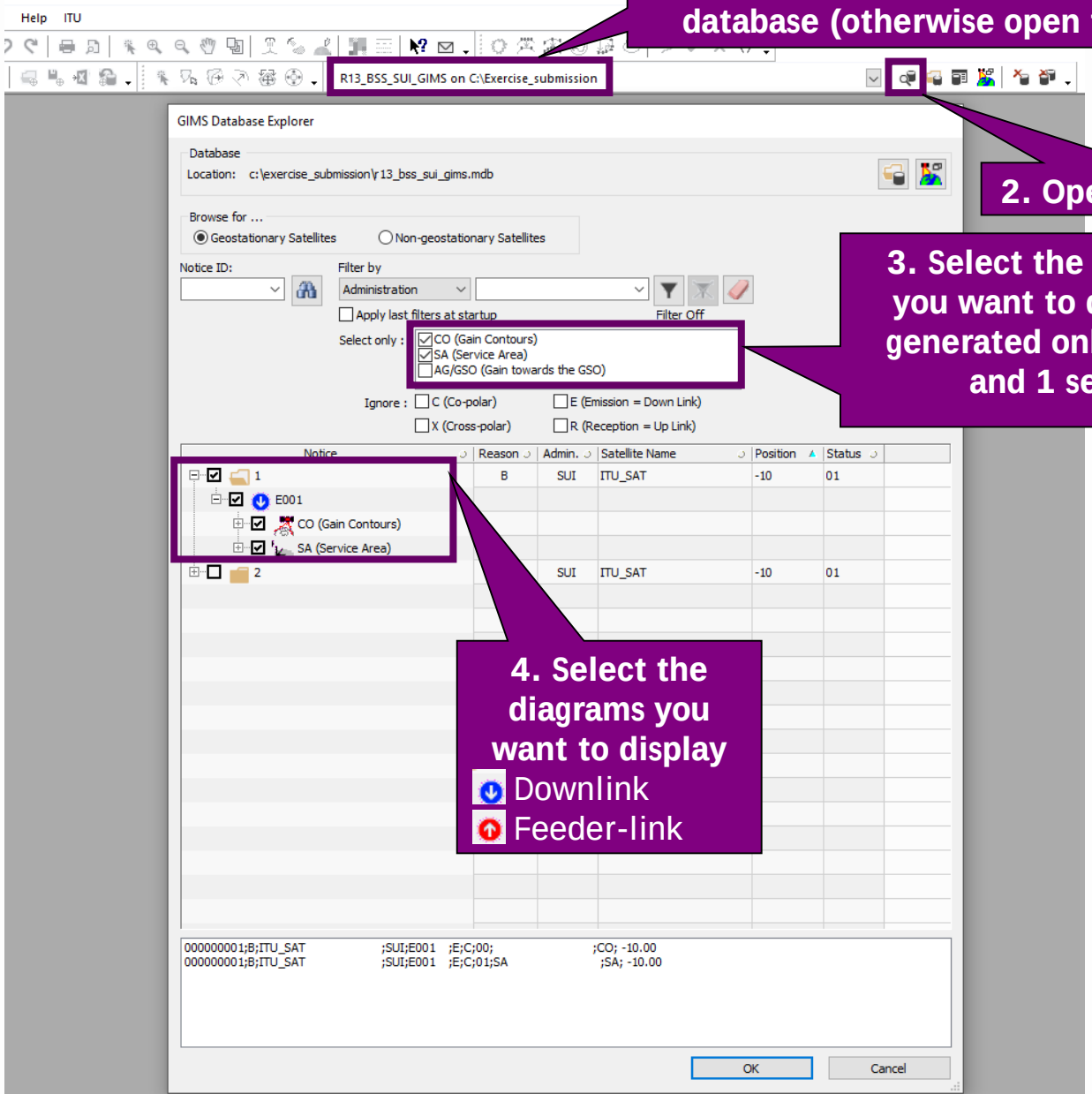
2.a) AP30: Generate GIMS database (SERVICE AREA)



2.a) AP30: Generate GIMS database (SERVICE AREA)



2.a) AP30: Generate GIMS database (HOW TO OPEN DIAGRAMS)



1. Be sure you are connected to the desired database (otherwise open the database first)

2. Open the diagrams

3. Select the type of diagrams you want to display (we have generated only 1 gain contour and 1 service area)

4. Select the diagrams you want to display
   - Downlink
   - Feeder-link

Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

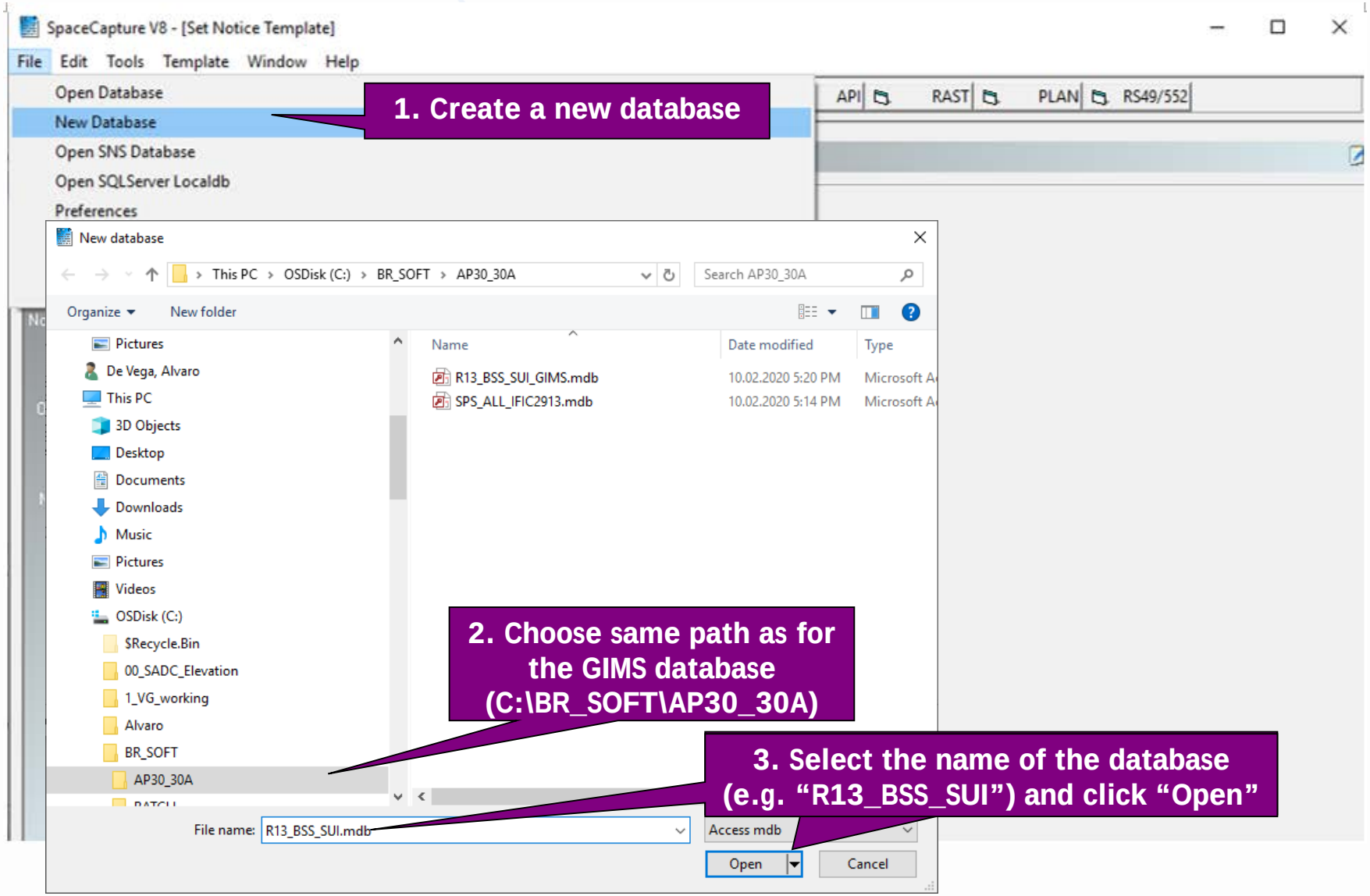
3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

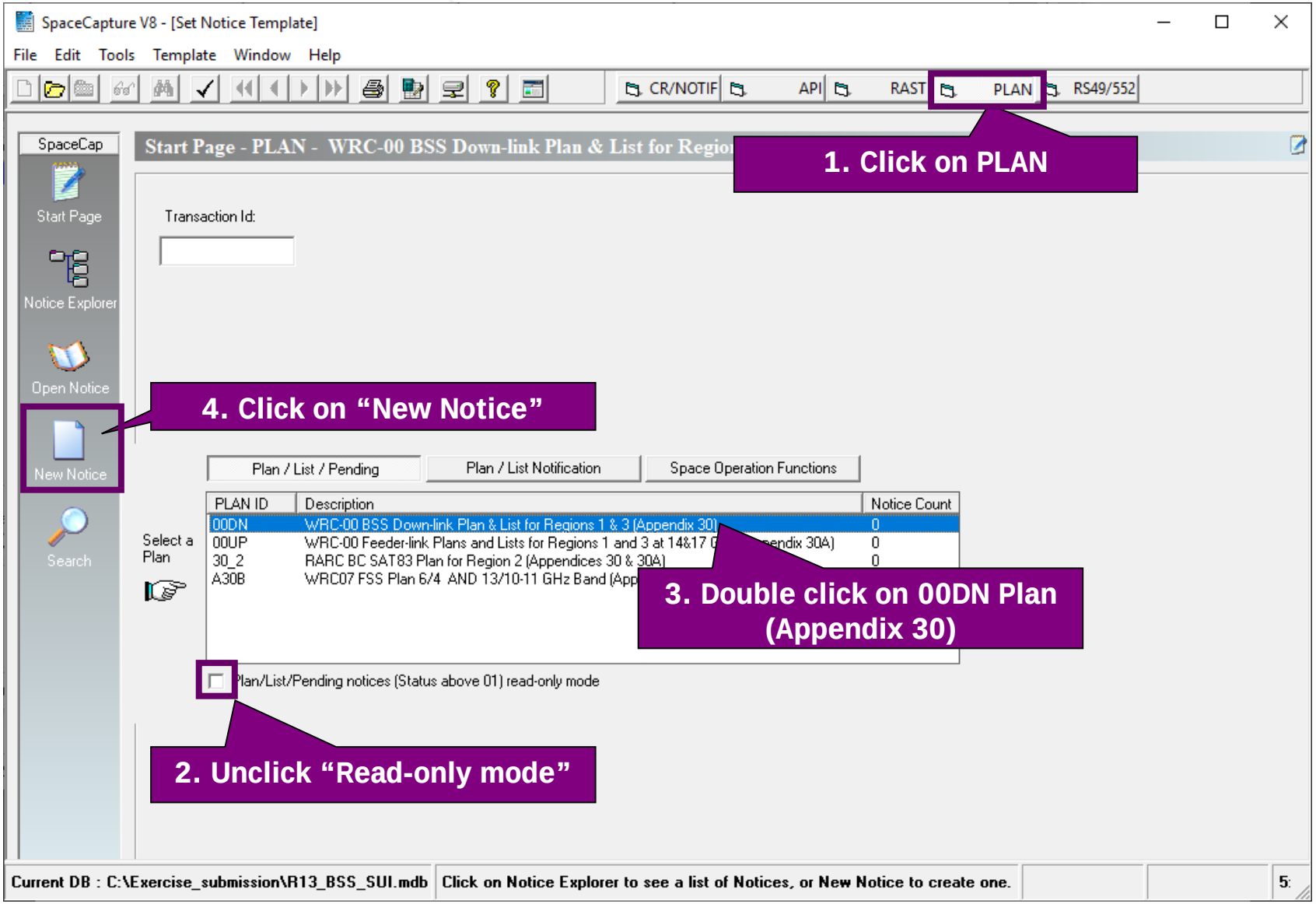
4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

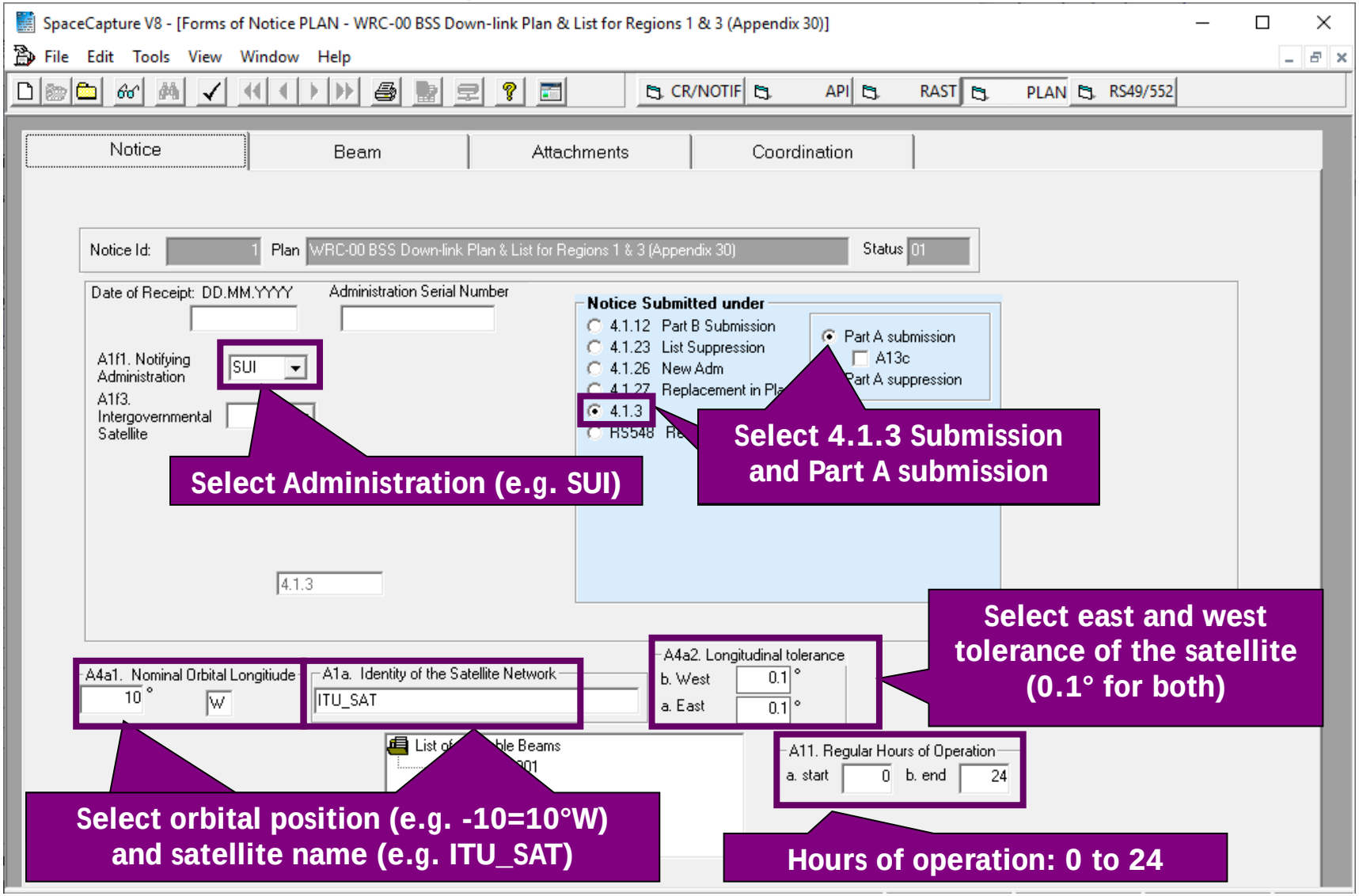
2.b) AP30: Generate SNS database (CREATE DATABASE)



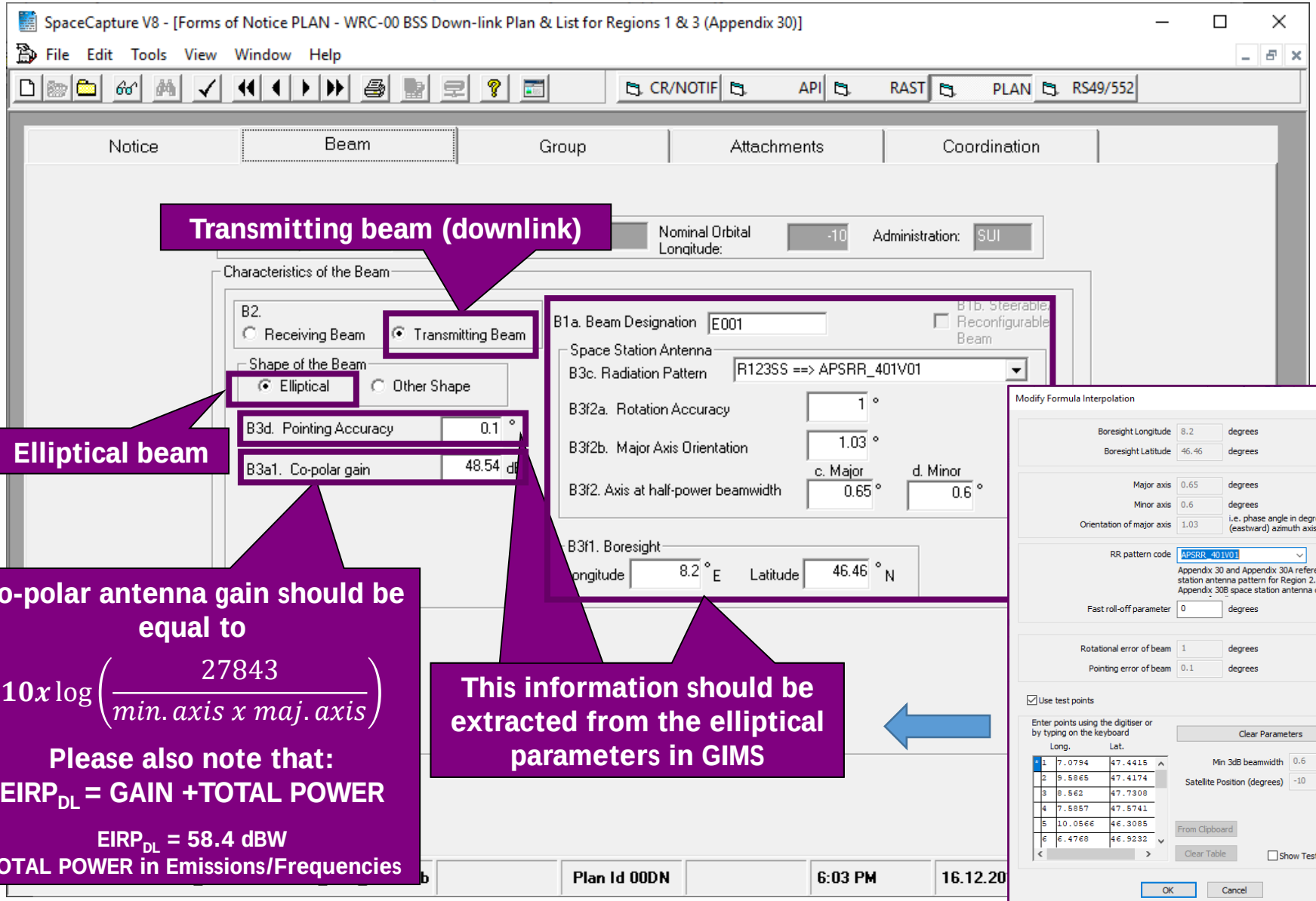
2.b) AP30: Generate SNS database (CREATE NOTICE)



2.b) AP30: Generate SNS database (NOTICE LEVEL)



2.b) AP30: Generate SNS database (BEAM LEVEL)



Elliptical beam

Co-polar antenna gain should be equal to

$$10x\log\left(\frac{27843}{min.axis\ x\ maj.axis}\right)$$

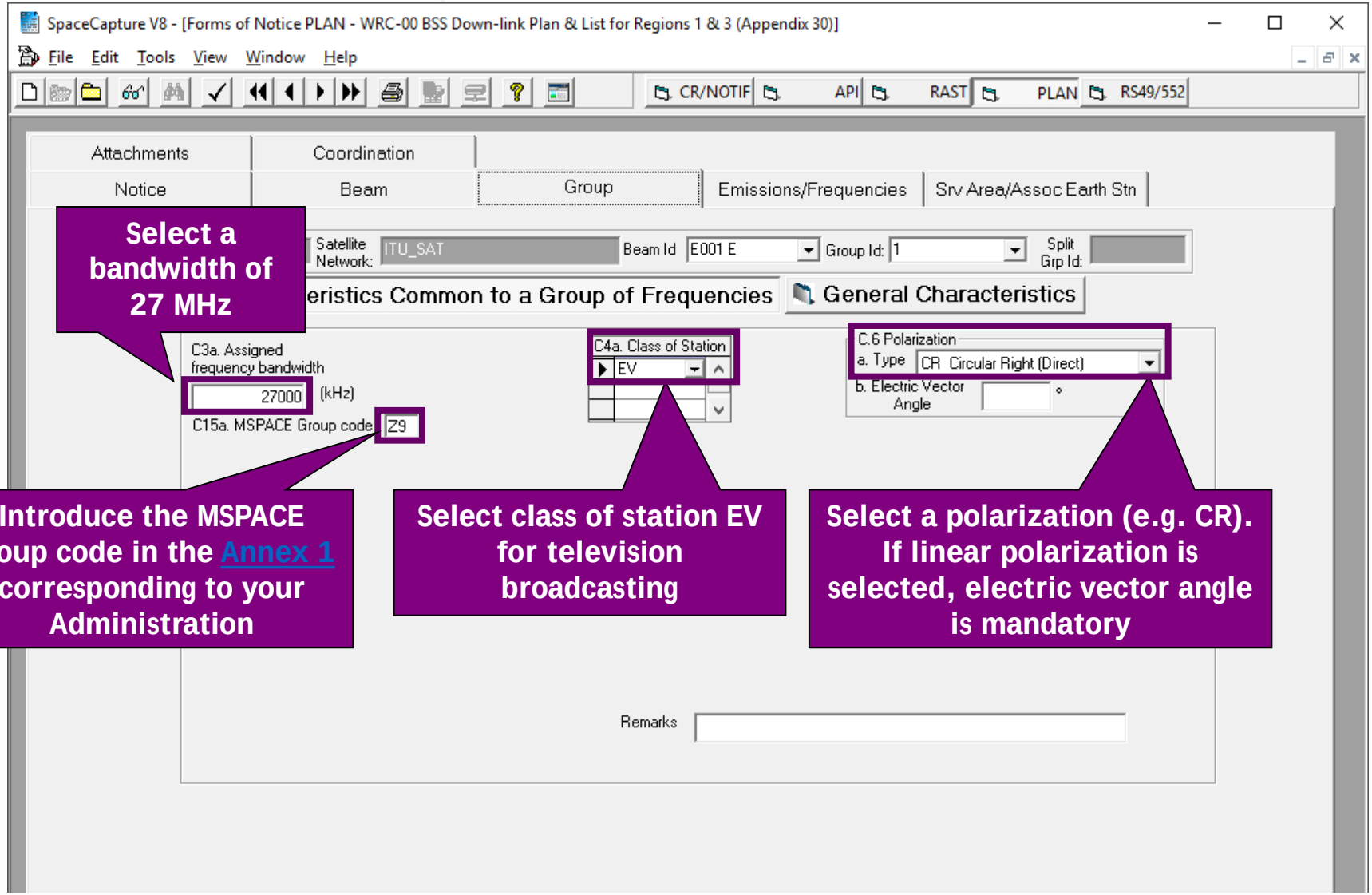
Please also note that:

$EIRP_{DL}$ = GAIN +TOTAL POWER

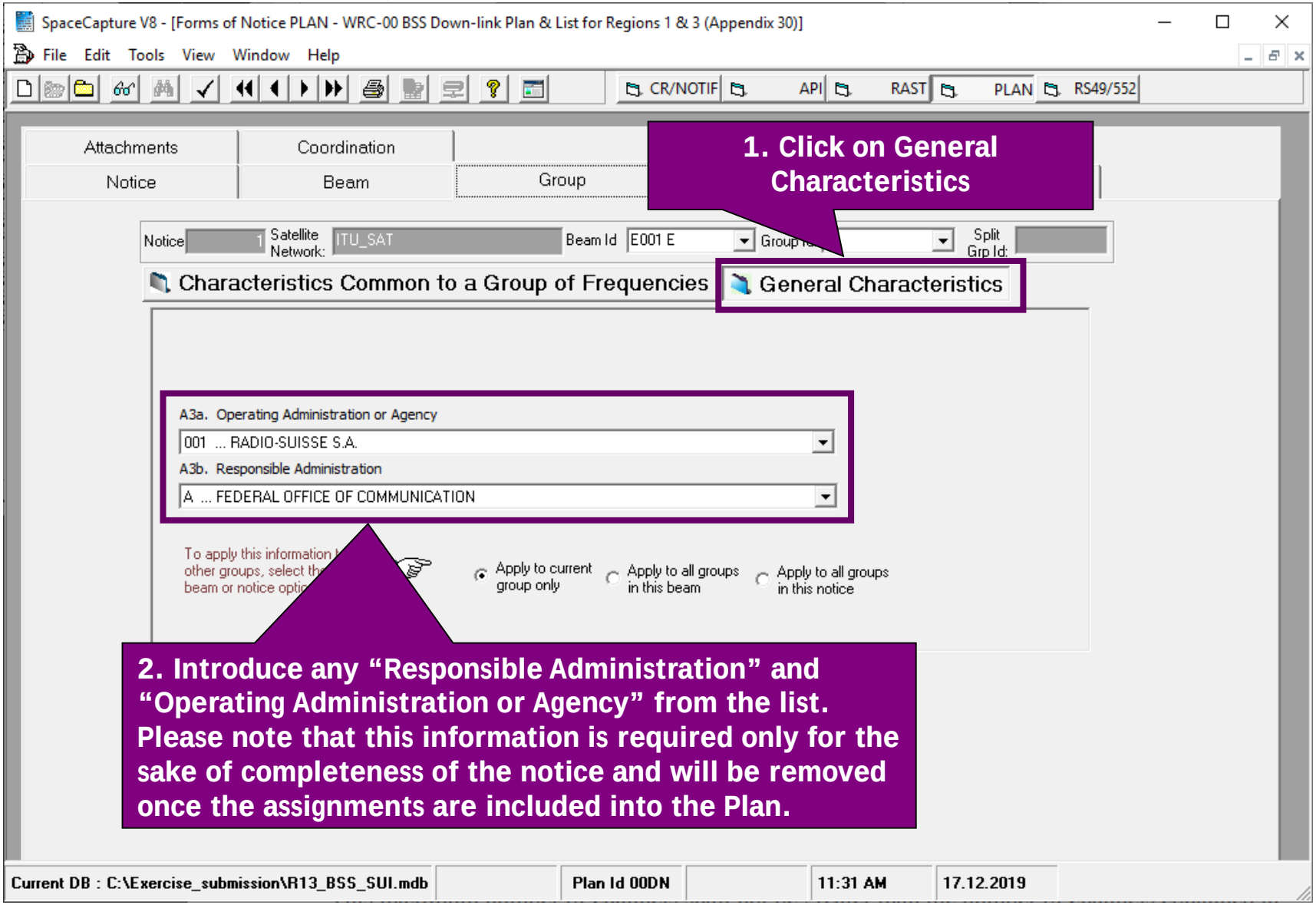
$EIRP_{DL}$ = 58.4 dBW
TOTAL POWER in Emissions/Frequencies

This information should be extracted from the elliptical parameters in GIMS

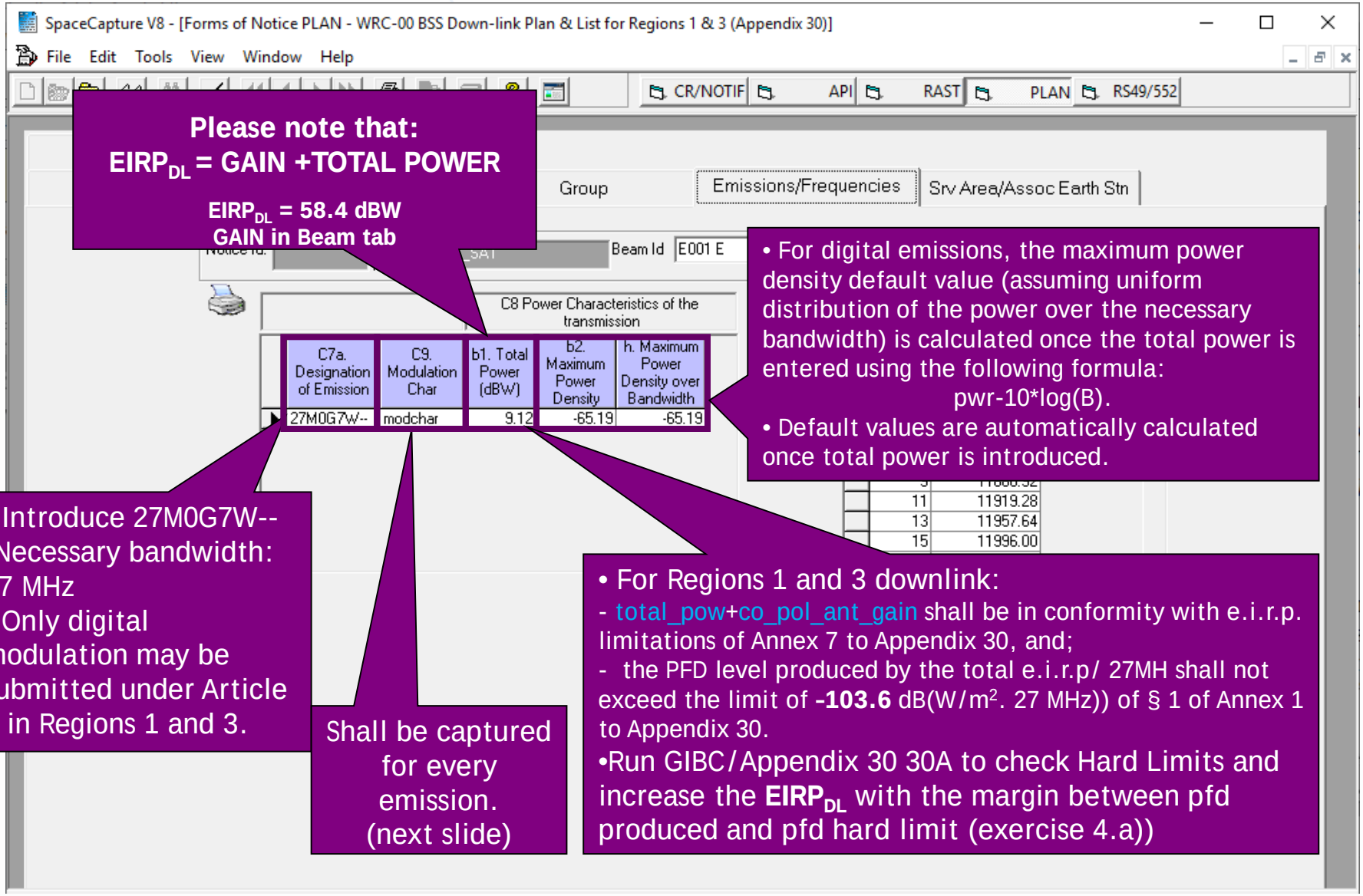
2.b) AP30: Generate SNS database (GROUP LEVEL)



2.b) AP30: Generate SNS database (GROUP LEVEL)



2.b) AP30: Generate SNS database (EMISSIONS/FREQ LEVEL)



Please note that:
$EIRP_{DL}$ = GAIN +TOTAL POWER

$EIRP_{DL}$ = 58.4 dBW
GAIN in Beam tab

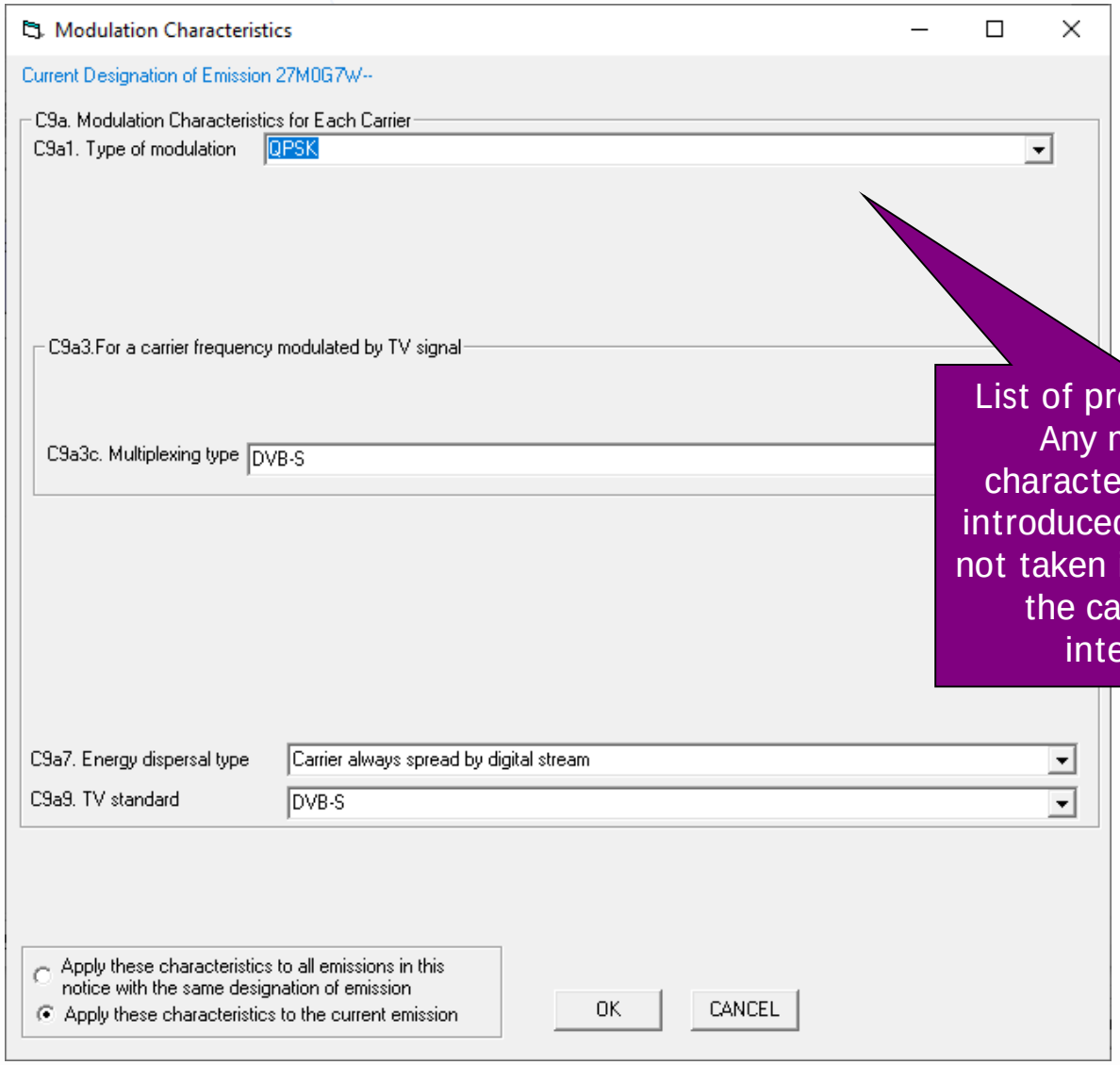
- For digital emissions, the maximum power density default value (assuming uniform distribution of the power over the necessary bandwidth) is calculated once the total power is entered using the following formula:
  pwr-10*log(B).
- Default values are automatically calculated once total power is introduced.

- Introduce 27M0G7W--
- Necessary bandwidth: 27 MHz
- Only digital modulation may be submitted under Article 4 in Regions 1 and 3.

Shall be captured for every emission. (next slide)

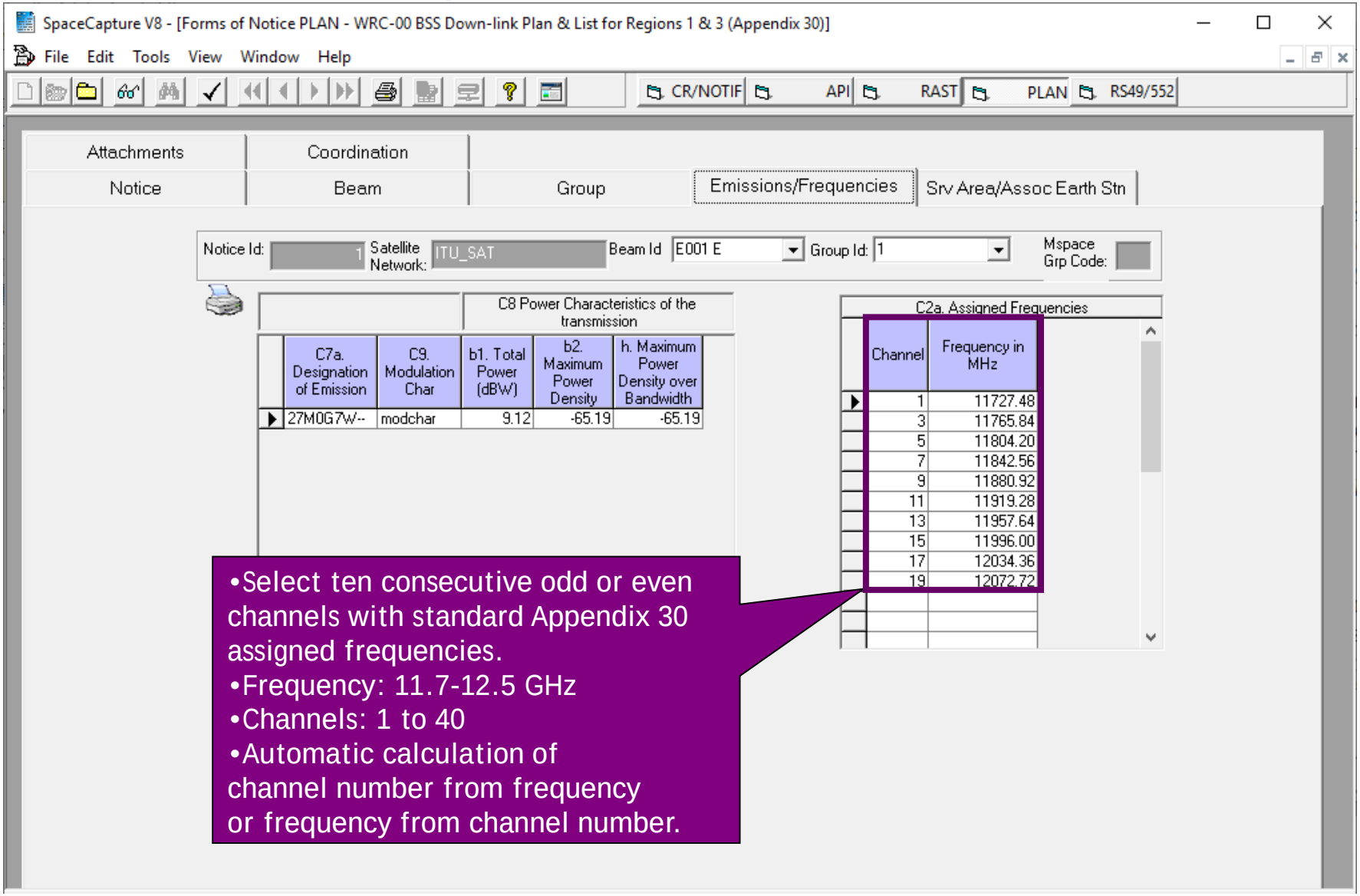
- For Regions 1 and 3 downlink:
  - total_pow+co_pol_ant_gain shall be in conformity with e.i.r.p. limitations of Annex 7 to Appendix 30, and;
  - the PFD level produced by the total e.i.r.p/ 27MH shall not exceed the limit of **-103.6** dB(W/m^2. 27 MHz)) of § 1 of Annex 1 to Appendix 30.
- Run GIBC/Appendix 30 30A to check Hard Limits and increase the **$EIRP_{DL}$** with the margin between pfd produced and pfd hard limit (exercise 4.a))

2.b) AP30: Generate SNS database (EMISSIONS/FREQ LEVEL)

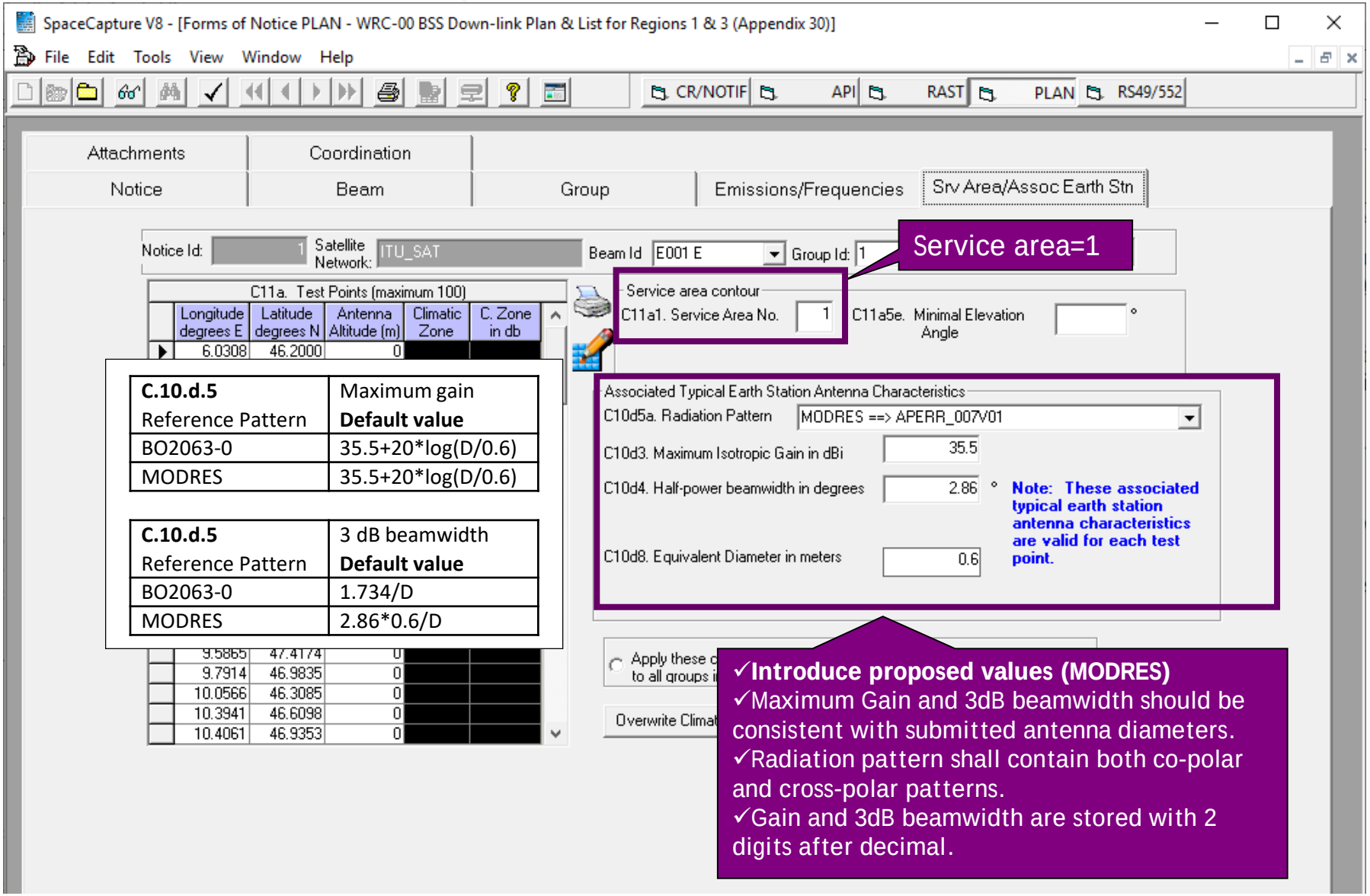


List of proposed values. Any modulation characteristics may be introduced since they are not taken into account for the calculation of interference

2.b) AP30: Generate SNS database (EMISSIONS/FREQ LEVEL)



2.b) AP30: Generate SNS database (SRV AREA/EARTH STN)

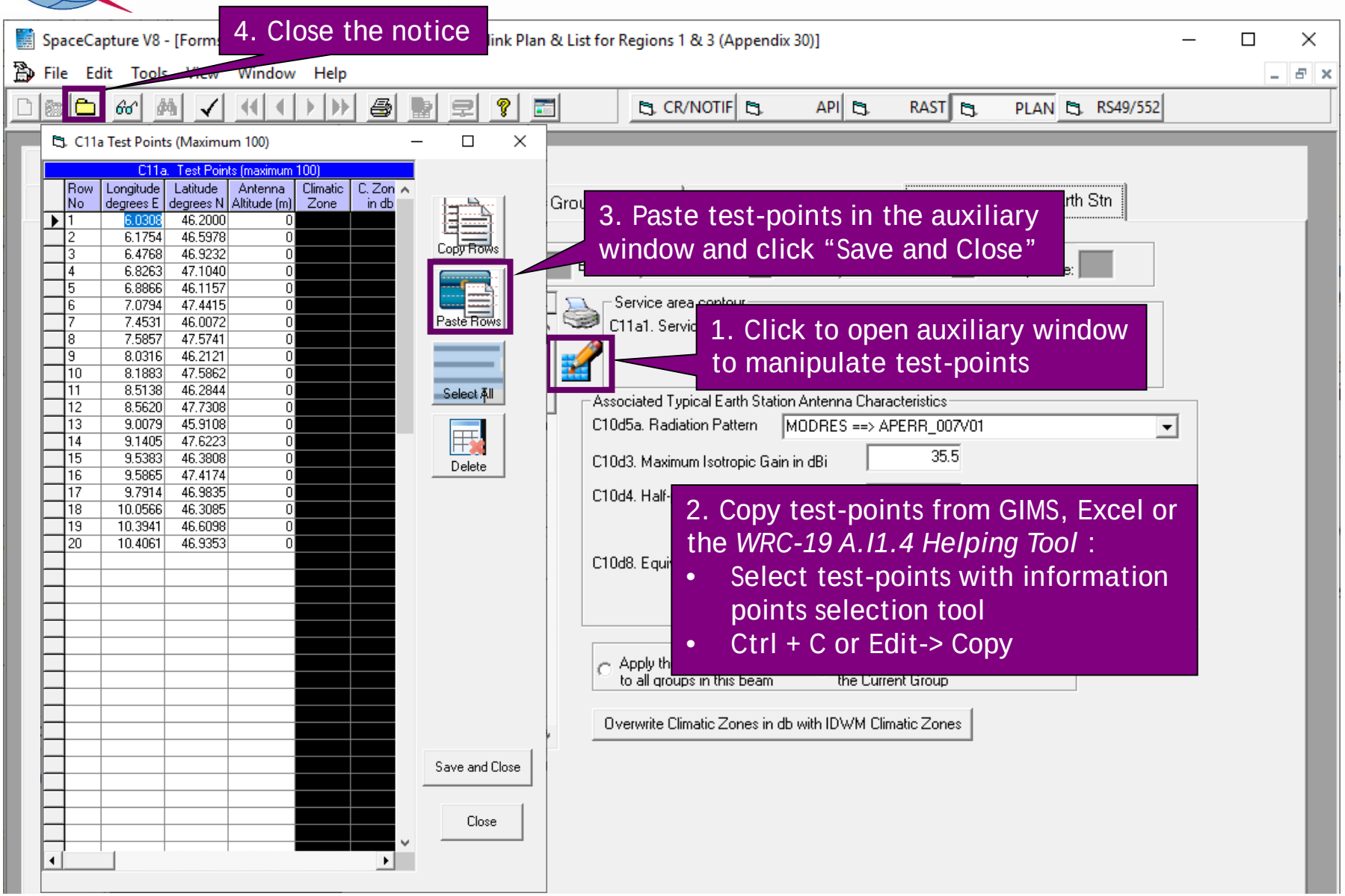


C.10.d.5 Reference Pattern	Maximum gain **Default value**
BO2063-0	35.5+20*log(D/0.6)
MODRES	35.5+20*log(D/0.6)

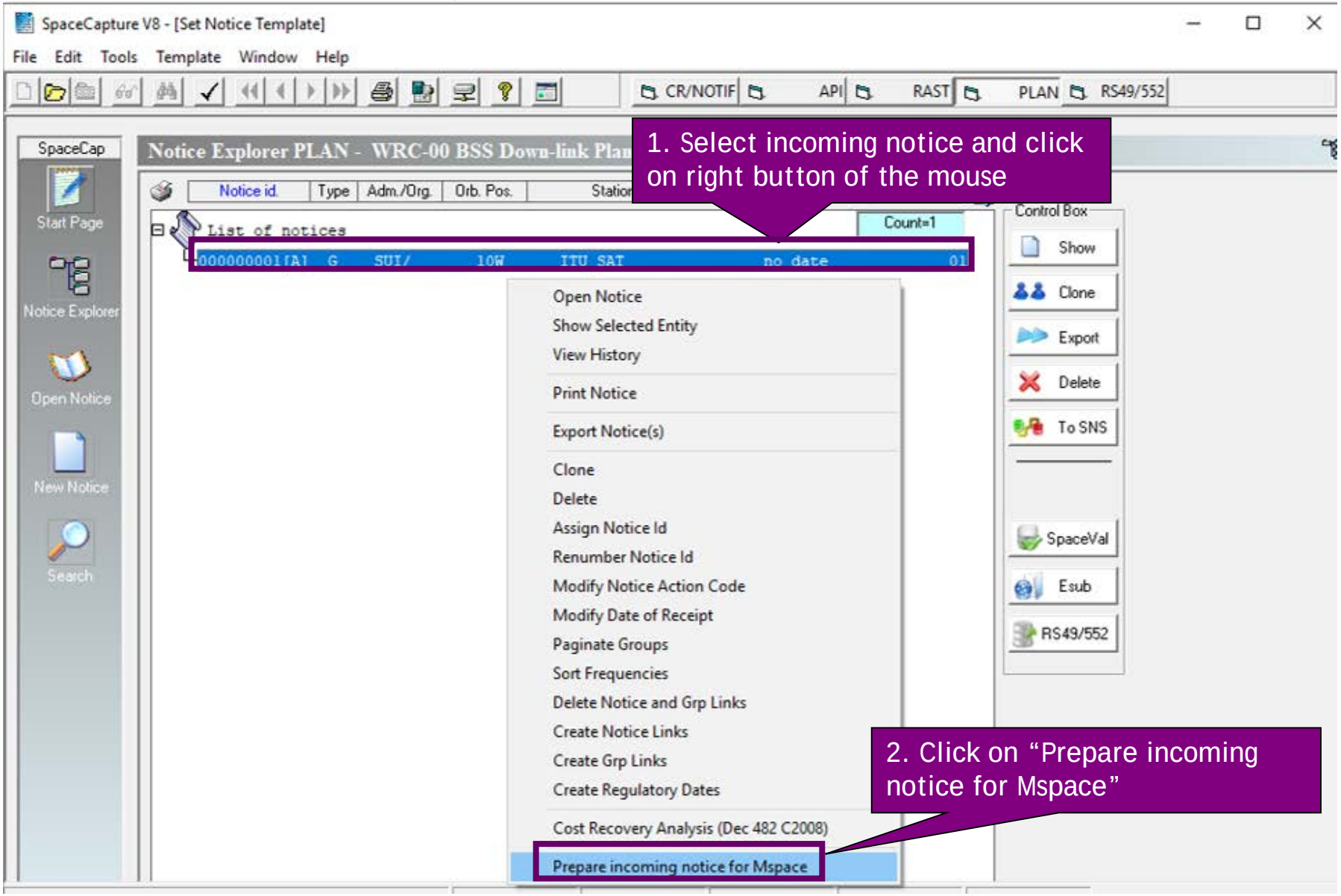
C.10.d.5 Reference Pattern	3 dB beamwidth **Default value**
BO2063-0	1.734/D
MODRES	2.86*0.6/D

✓**Introduce proposed values (MODRES)**
✓Maximum Gain and 3dB beamwidth should be consistent with submitted antenna diameters.
✓Radiation pattern shall contain both co-polar and cross-polar patterns.
✓Gain and 3dB beamwidth are stored with 2 digits after decimal.

2.b) AP30: Generate SNS database (SRV AREA/EARTH STN)



2.b) AP30: Generate SNS database (SRV AREA/EARTH STN)



Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

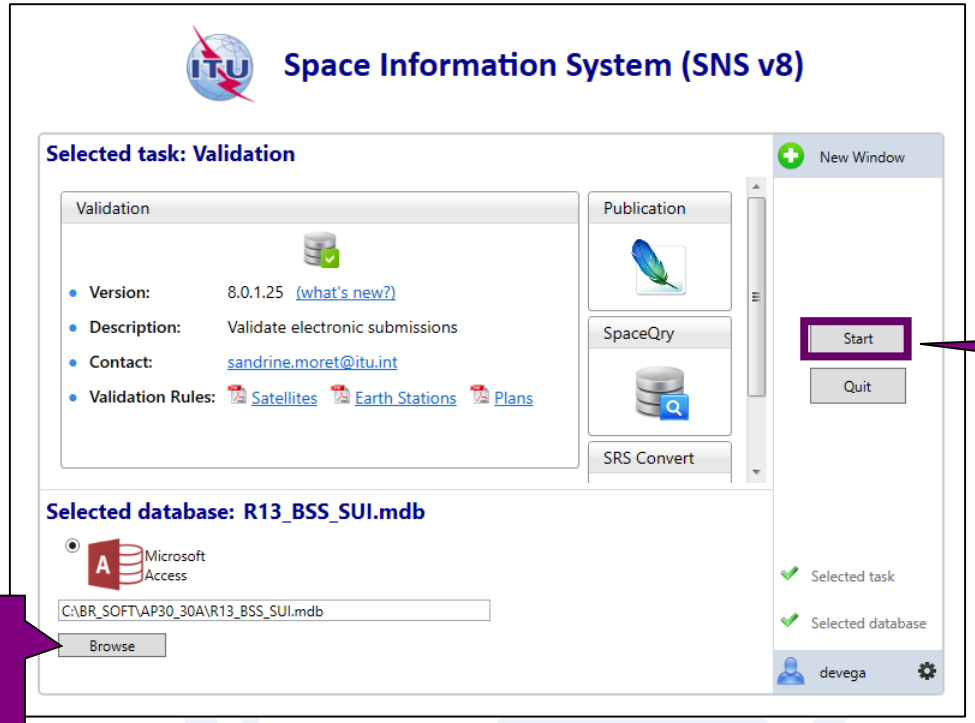
3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

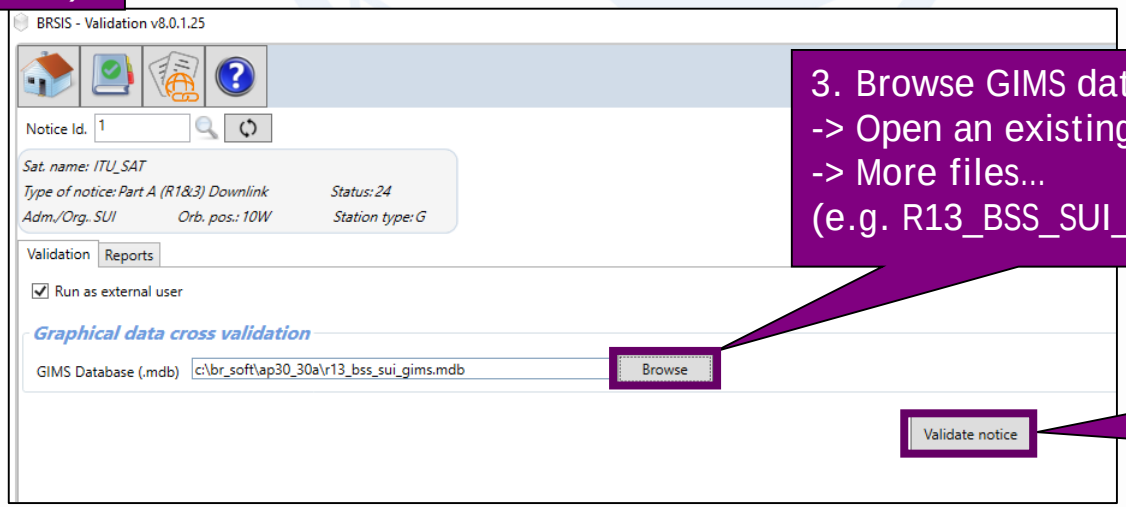
4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

2.c) AP30: Run BR-SIS Validation



1. Browse SNS database (e.g. R13_BSS_SUI.mdb")

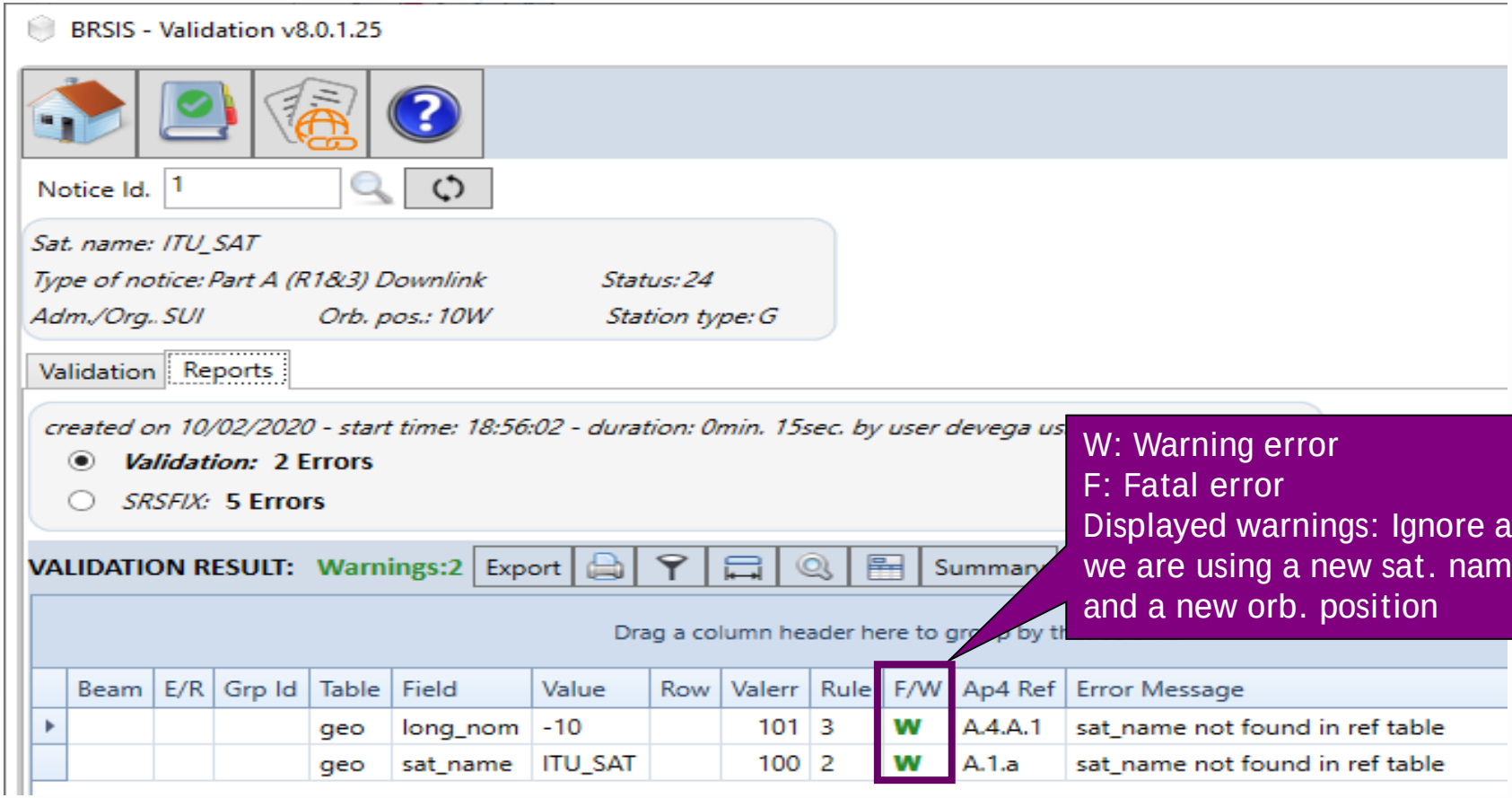
2. Click on Start



3. Browse GIMS database
-> Open an existing file
-> More files…
(e.g. R13_BSS_SUI_GIMS.mdb)

2. Click on Validate notice

2.c) AP30: Run BR-SIS Validation (REPORT)



No fatal errors should appear. If there is a fatal error, it should be corrected. Otherwise, the submission may be returned to your administration.

Warning errors should be corrected, although the submission will not be returned to your administration.

Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

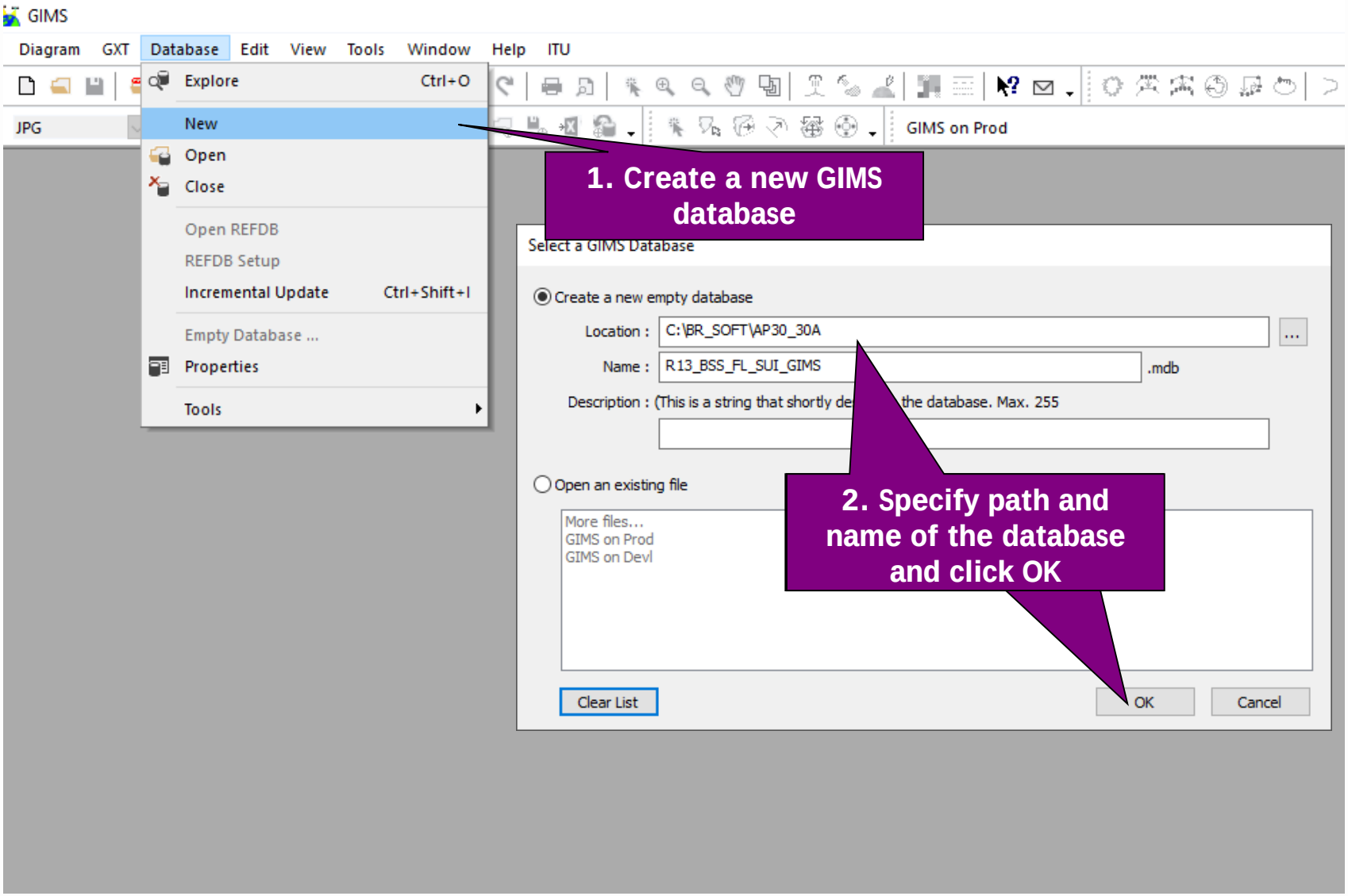
3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

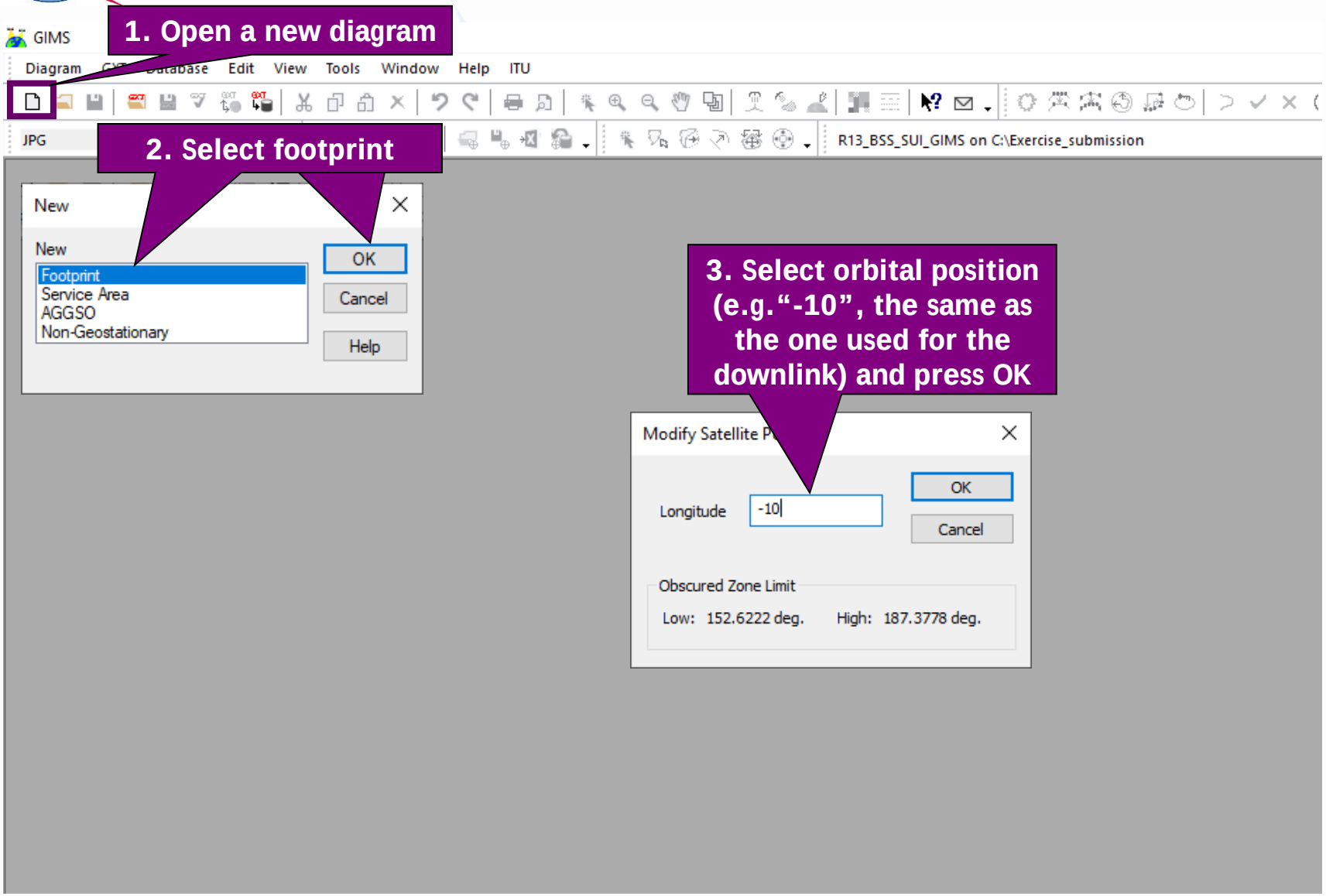
4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

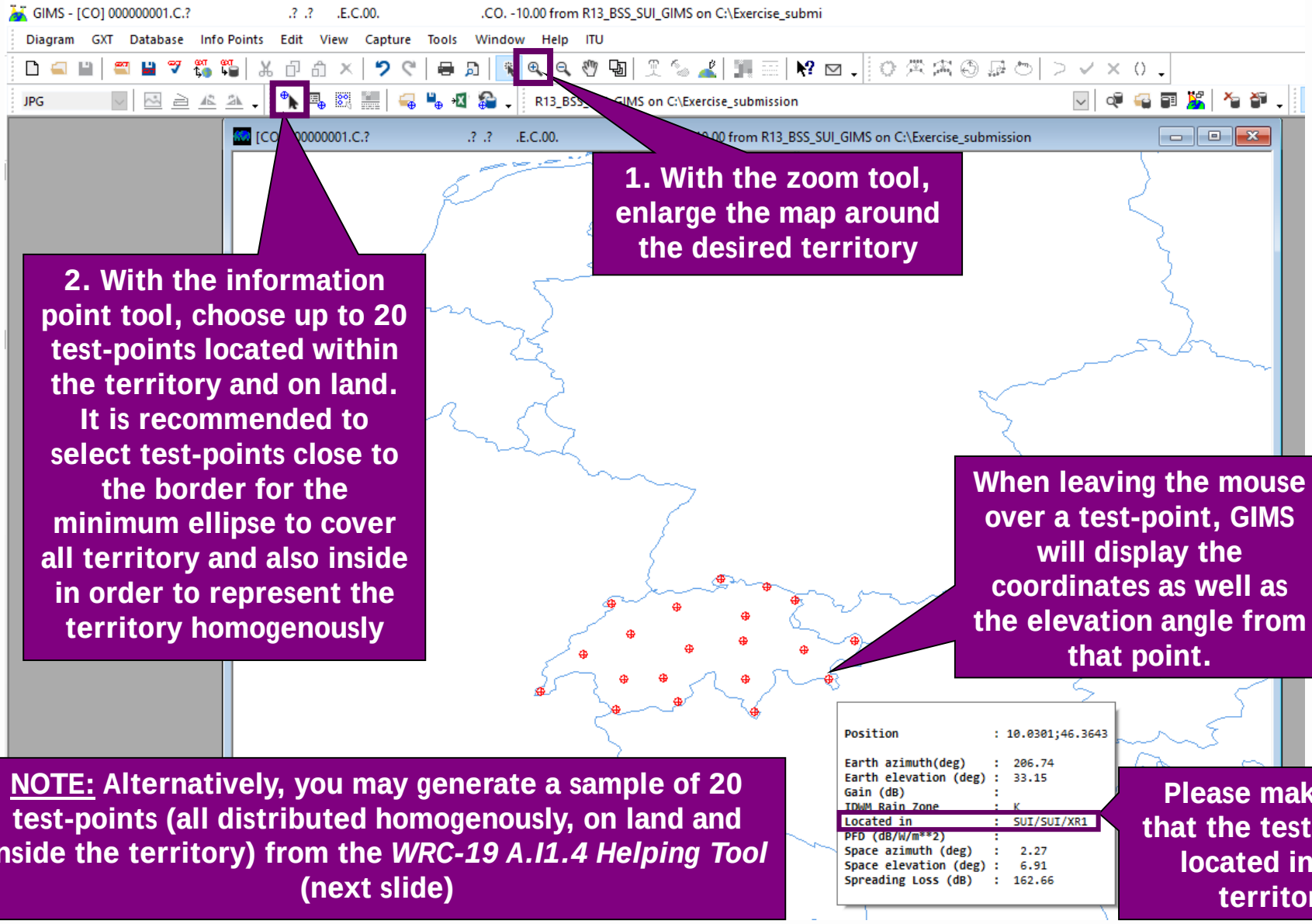
3.a) AP30A: Generate GIMS database (GAIN CONTOUR)



3.a) AP30A: Generate GIMS database (GAIN CONTOUR)



3.a) AP30A: Generate GIMS database (GAIN CONTOUR)



NOTE: Alternatively, you may generate a sample of 20 test-points (all distributed homogenously, on land and inside the territory) from the *WRC-19 A.I1.4 Helping Tool* (next slide)

2.a) AP30: Generate GIMS database (GAIN CONTOUR)

1. Go to Sample set of Test-points

WRC-19 A.I1.4 Helping Tools. (Not official released by the Bureau) - 10.02.2020

Exit About

Elevation Angle | C/N | EPM vs Required C/(N+I) | My New EPM Values | New PLAN Characteristics | View MSPACE Output | Existing Freq. Assignments | New Downlink Positions | New Feeder-link Positions | Sample set of Test-points

KEN Kenya (Republic of)

2. Select your Administration code

Sample set of test-points

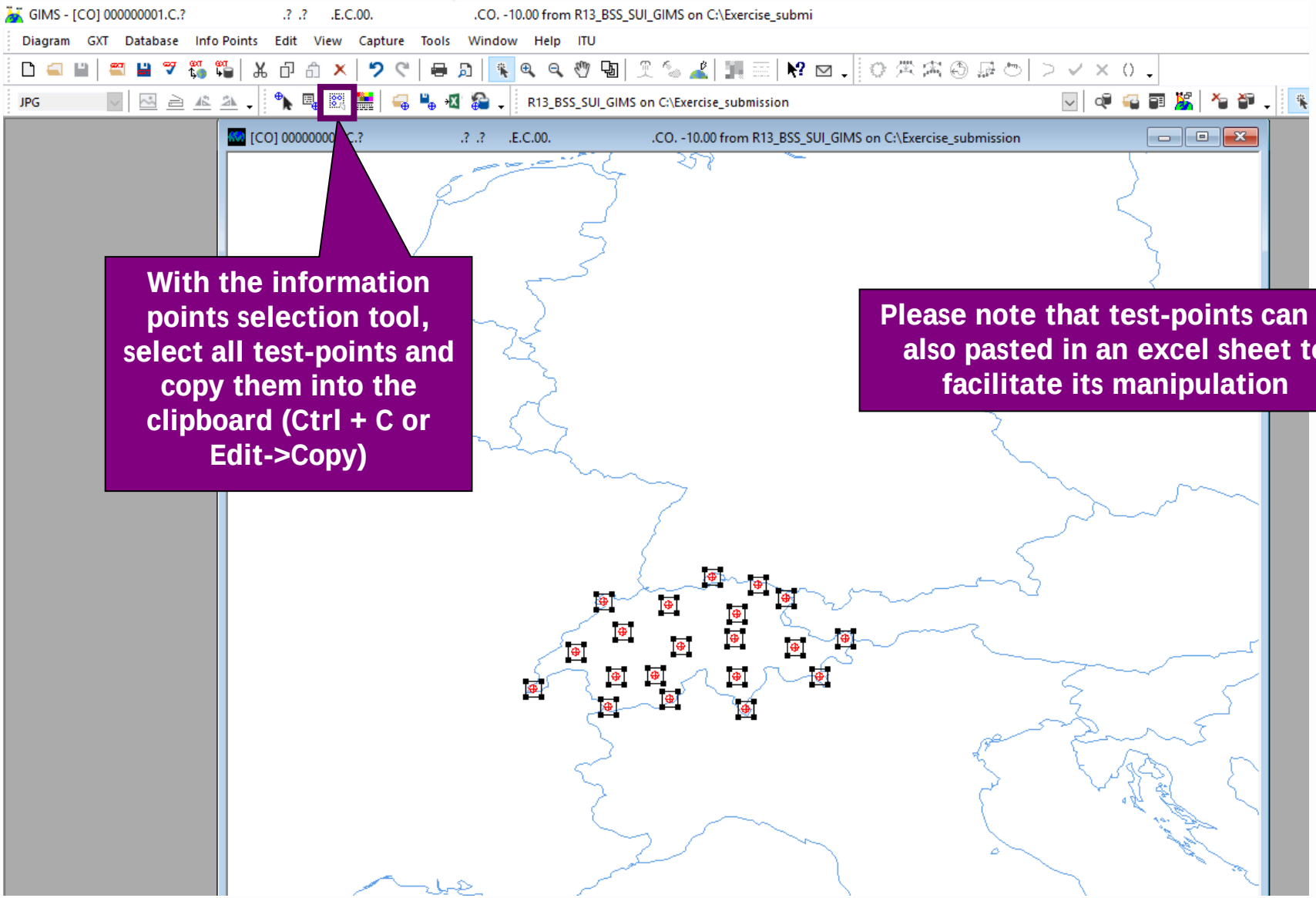
LON	LAT	Rain_Zone
35.1735	4.6192	TBD
34.2895	4.0888	TBD
35.3061	1.8344	TBD
34.2453	-0.5525	TBD
36.2786	-2.0112	TBD
38.0909	-3.3815	TBD
39.1518	-4.2656	TBD
40.5221	-1.9228	TBD
41.2735	-1.6576	TBD
40.6105	1.6576	TBD
41.2735	3.7793	TBD
39.6822	3.1605	TBD
37.0742	4.0888	TBD
37.9583	1.525	TBD
36.8974	-0.8178	TBD
39.3286	-0.3315	TBD
36.146	0.6409	TBD
36.146	3.5141	TBD
38.6655	-1.746	TBD
38.0025	2.8953	TBD

Display

The tool will display the set of 20 test-points over your territory in the map

3. Select the coordinates of the test points and press Ctrl + C. Go back to GIMS and press Ctrl + V (copy and paste test-points). You may delete, modify or add new test-points in GIMS (max.20)

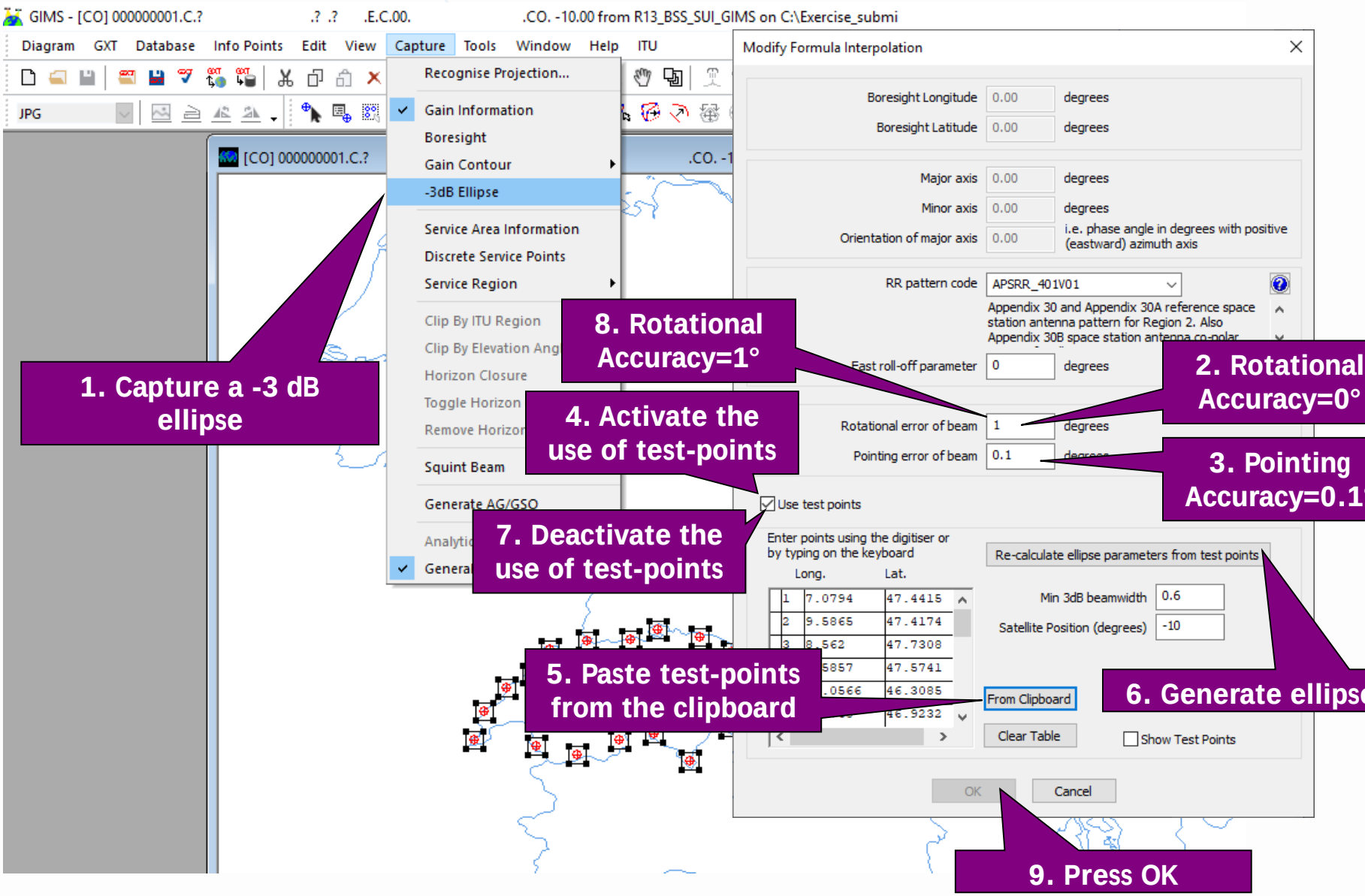
3.a) AP30A: Generate GIMS database (GAIN CONTOUR)



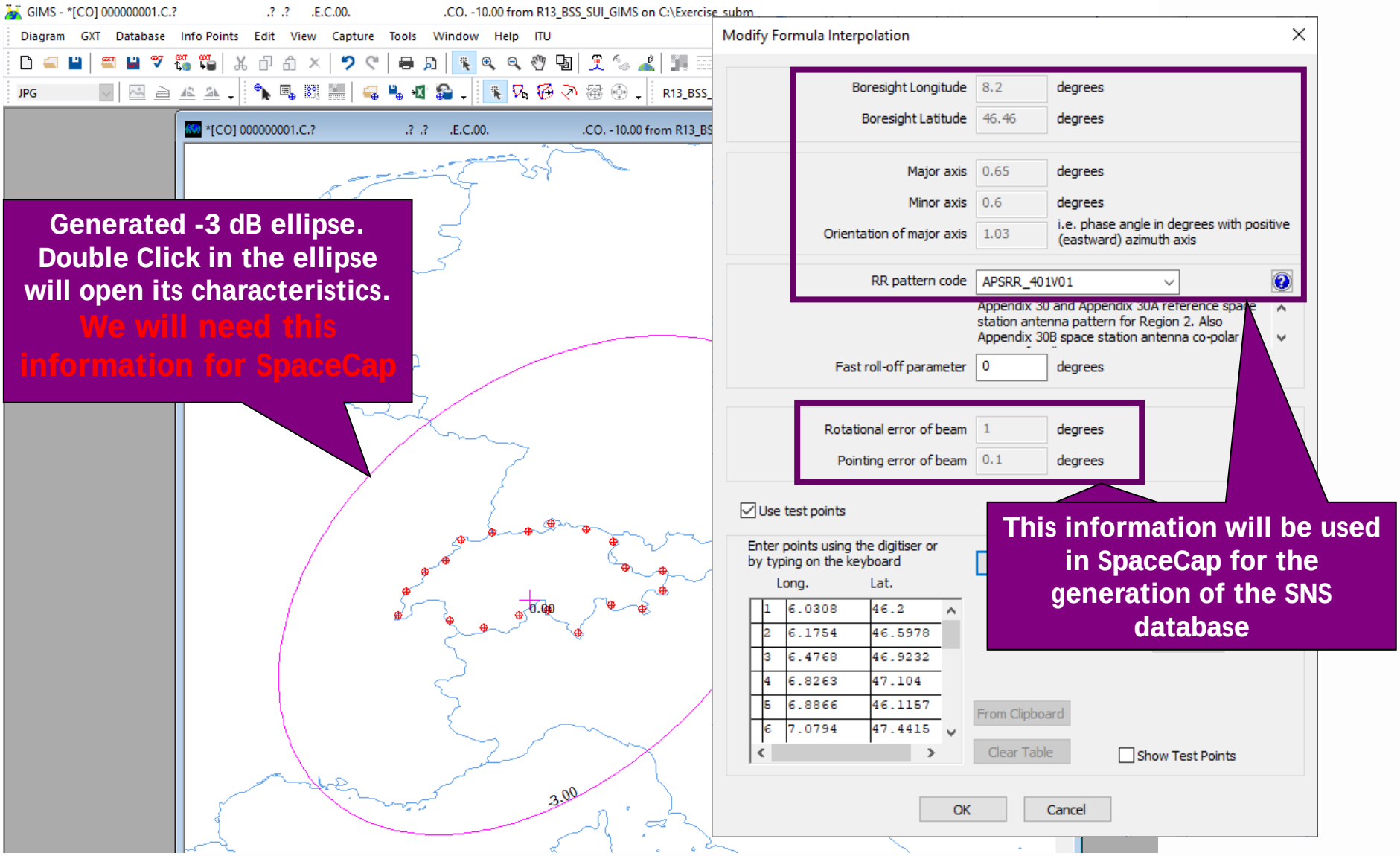
With the information points selection tool, select all test-points and copy them into the clipboard (Ctrl + C or Edit->Copy)

Please note that test-points can be also pasted in an excel sheet to facilitate its manipulation

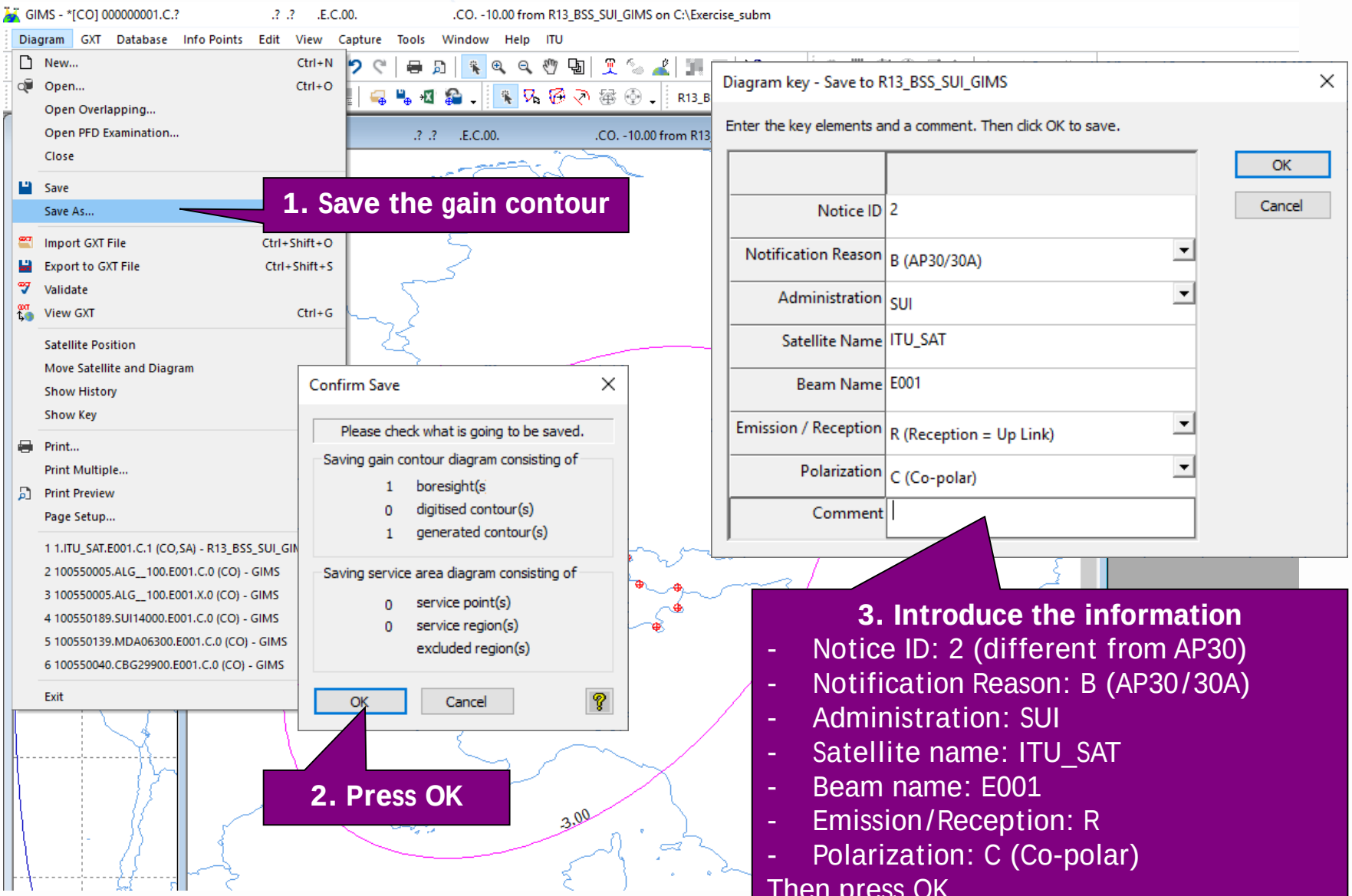
3.a) AP30A: Generate GIMS database (GAIN CONTOUR)



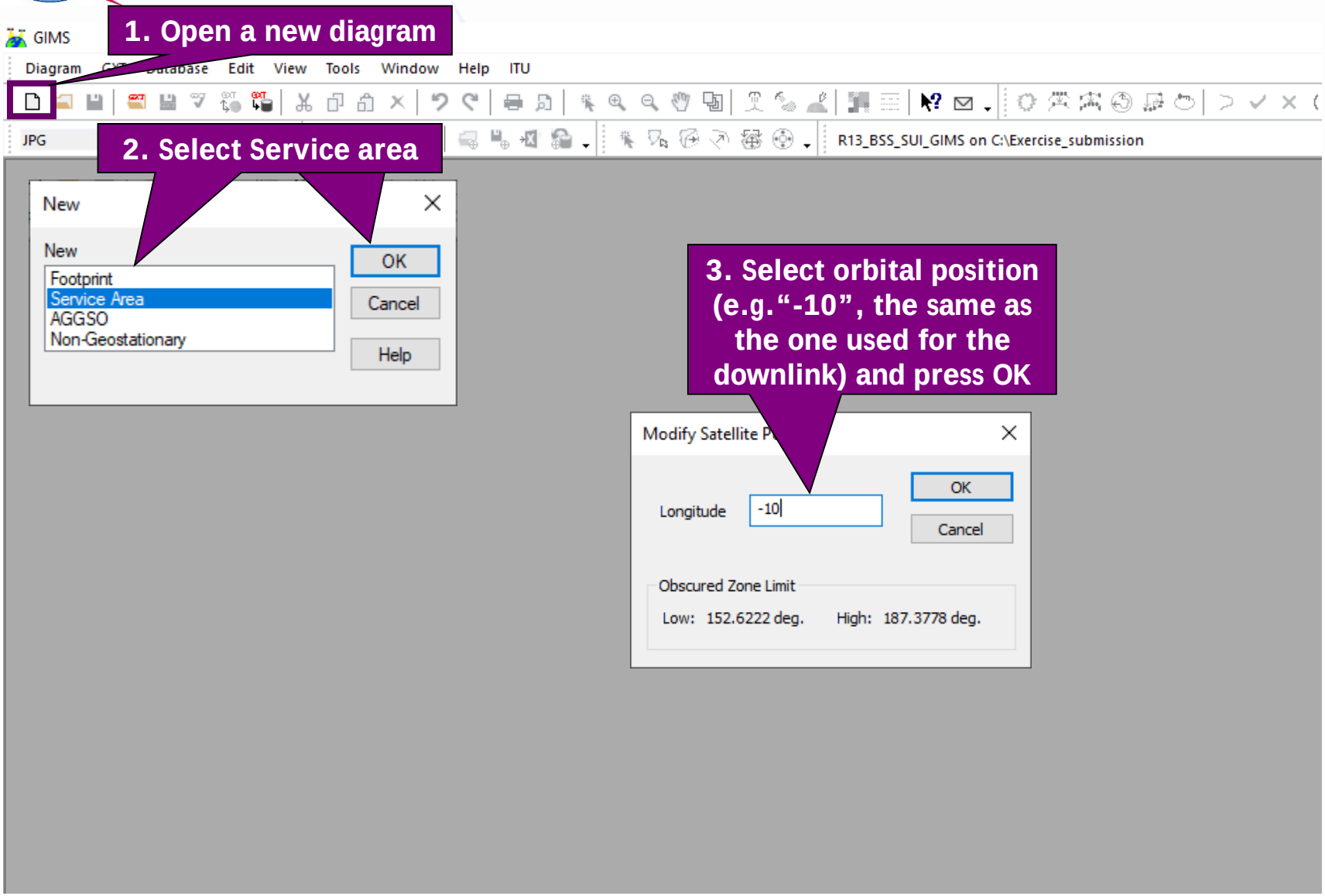
3.a) AP30A: Generate GIMS database (GAIN CONTOUR)



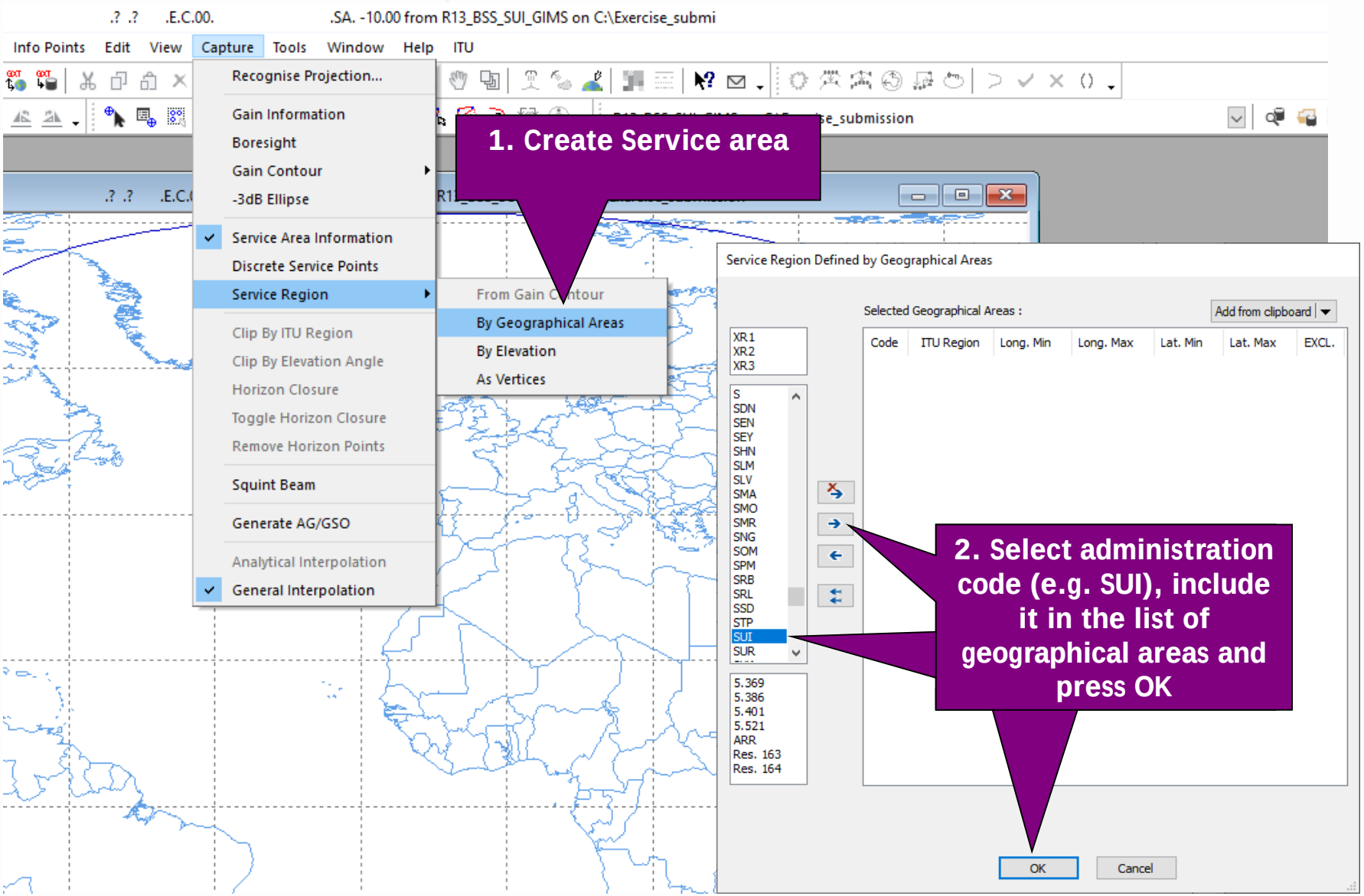
3.a) AP30A: Generate GIMS database (GAIN CONTOUR)



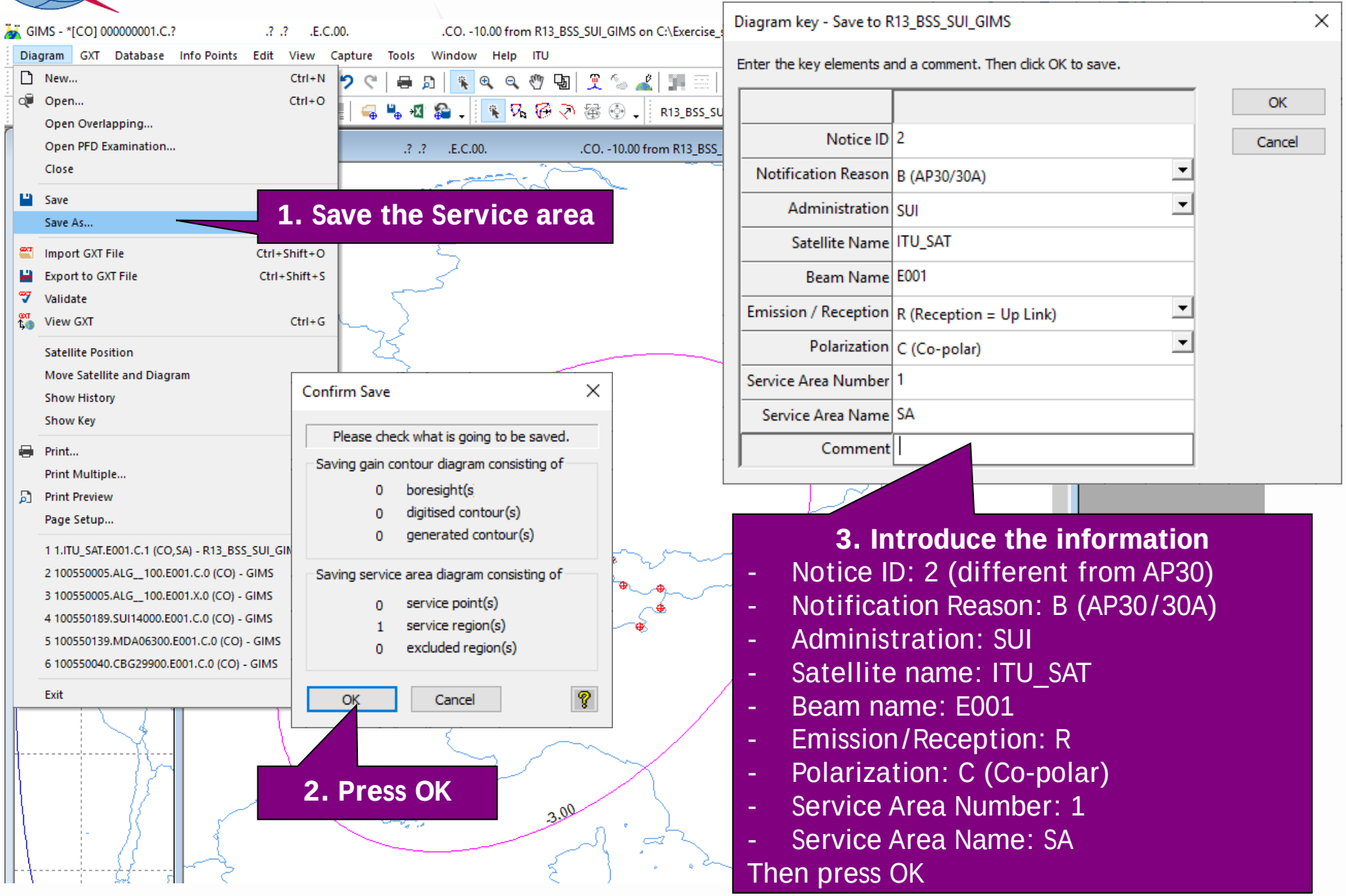
3.a) AP30A: Generate GIMS database (SERVICE AREA)



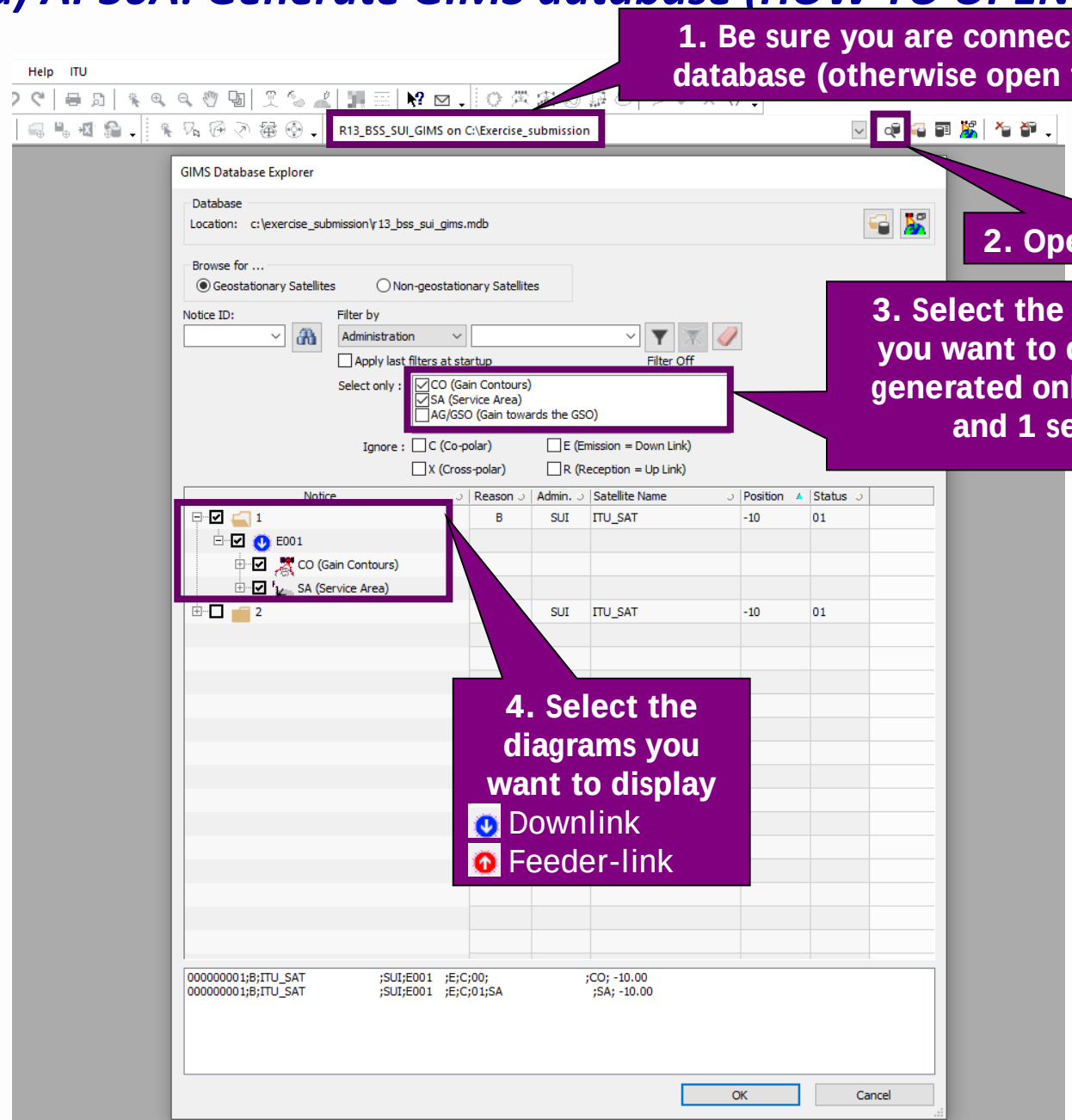
3.a) AP30A: Generate GIMS database (SERVICE AREA)



3.a) AP30A: Generate GIMS database (SERVICE AREA)



2.a) AP30A: Generate GIMS database (HOW TO OPEN DIAGRAMS)



Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

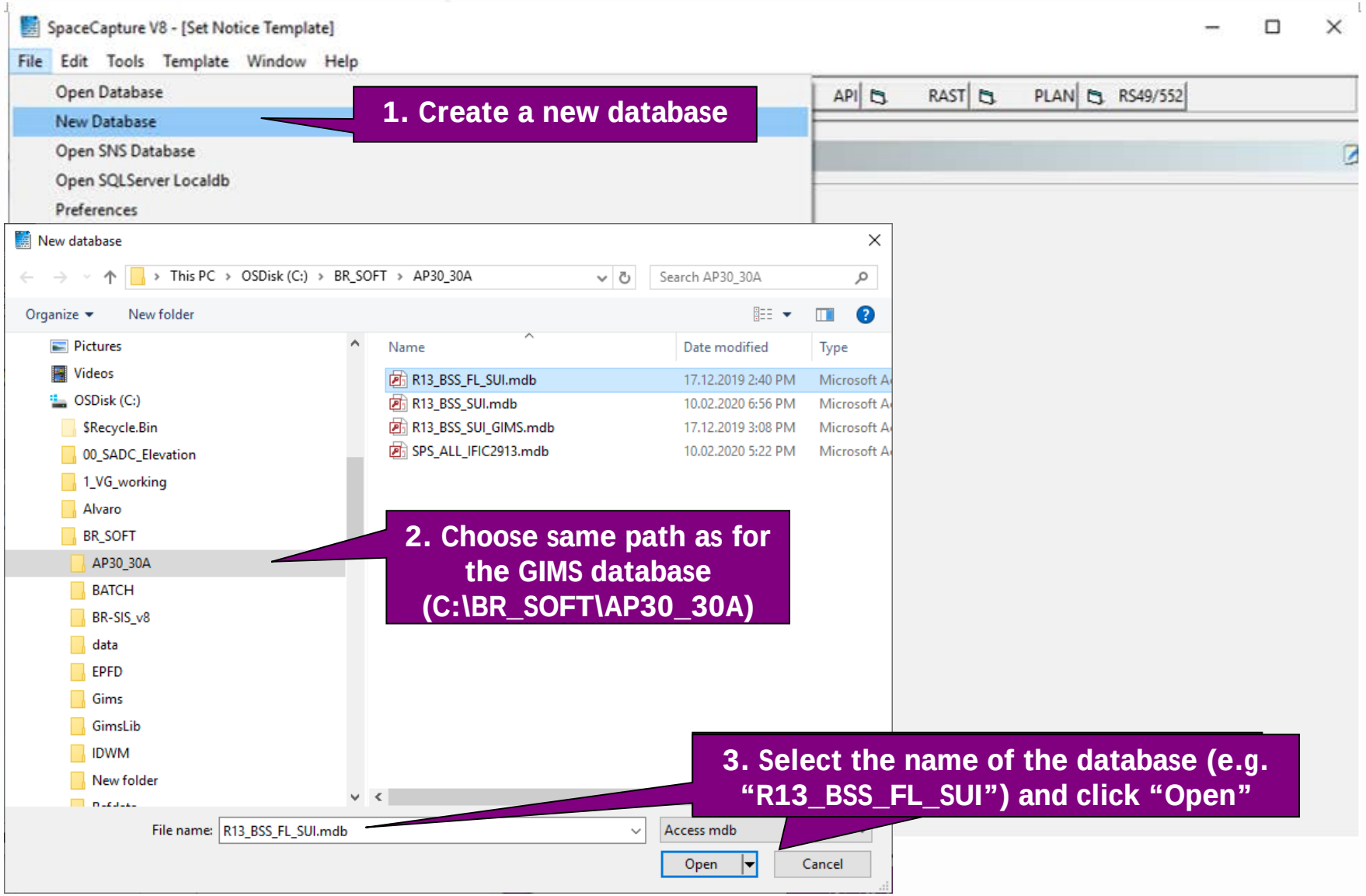
3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

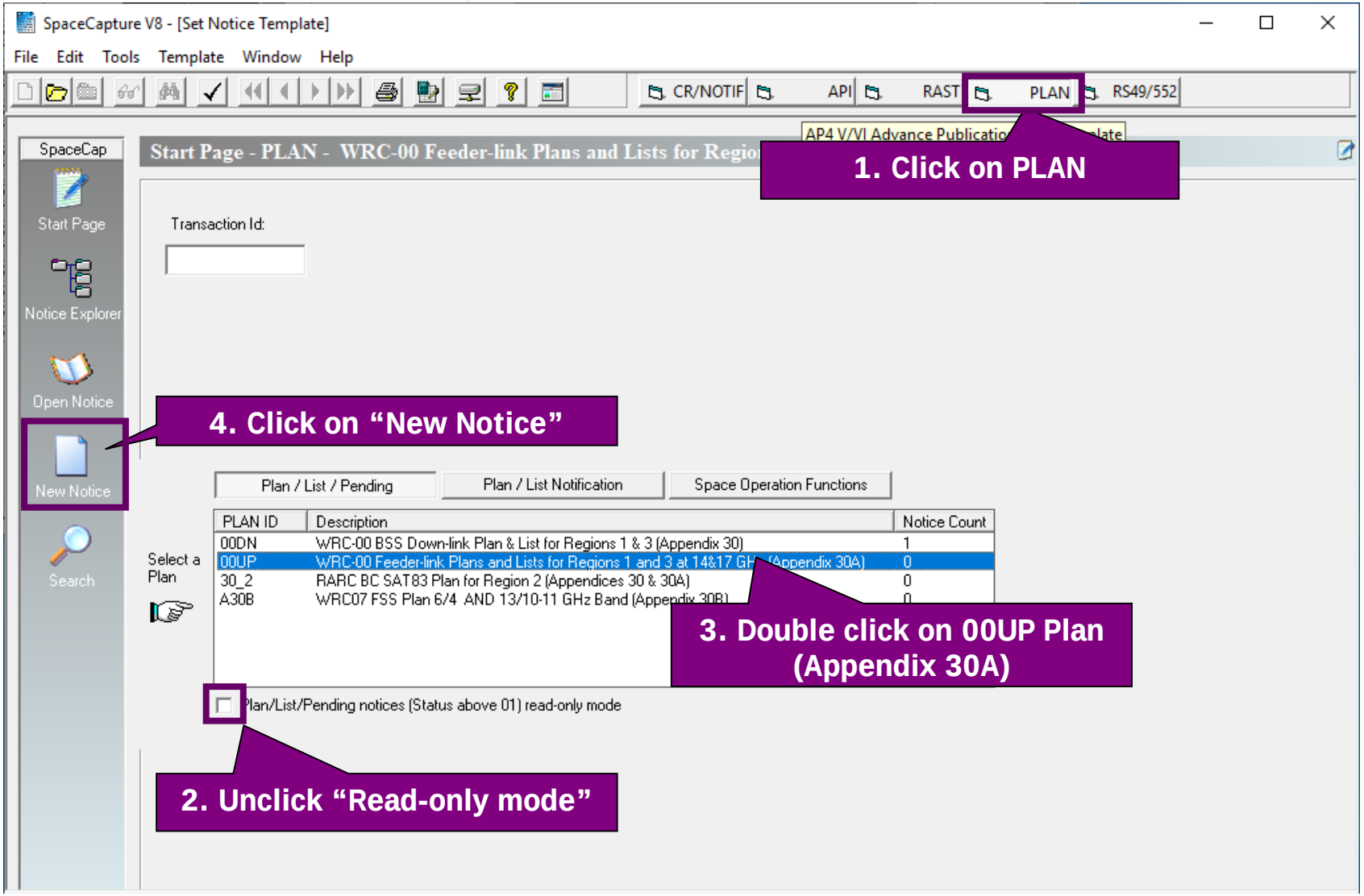
4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

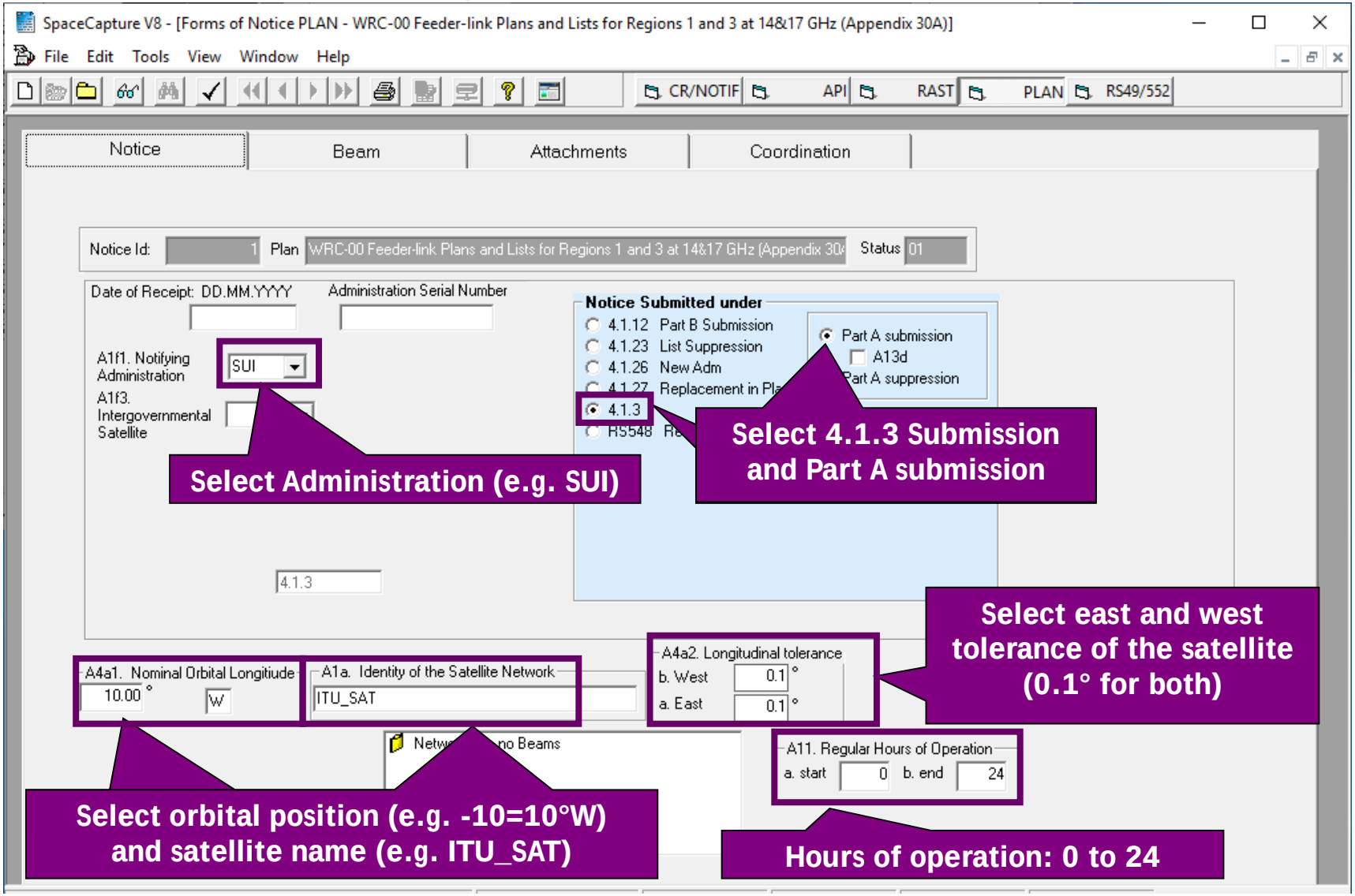
2.b) AP30A: Generate SNS database (CREATE DATABASE)



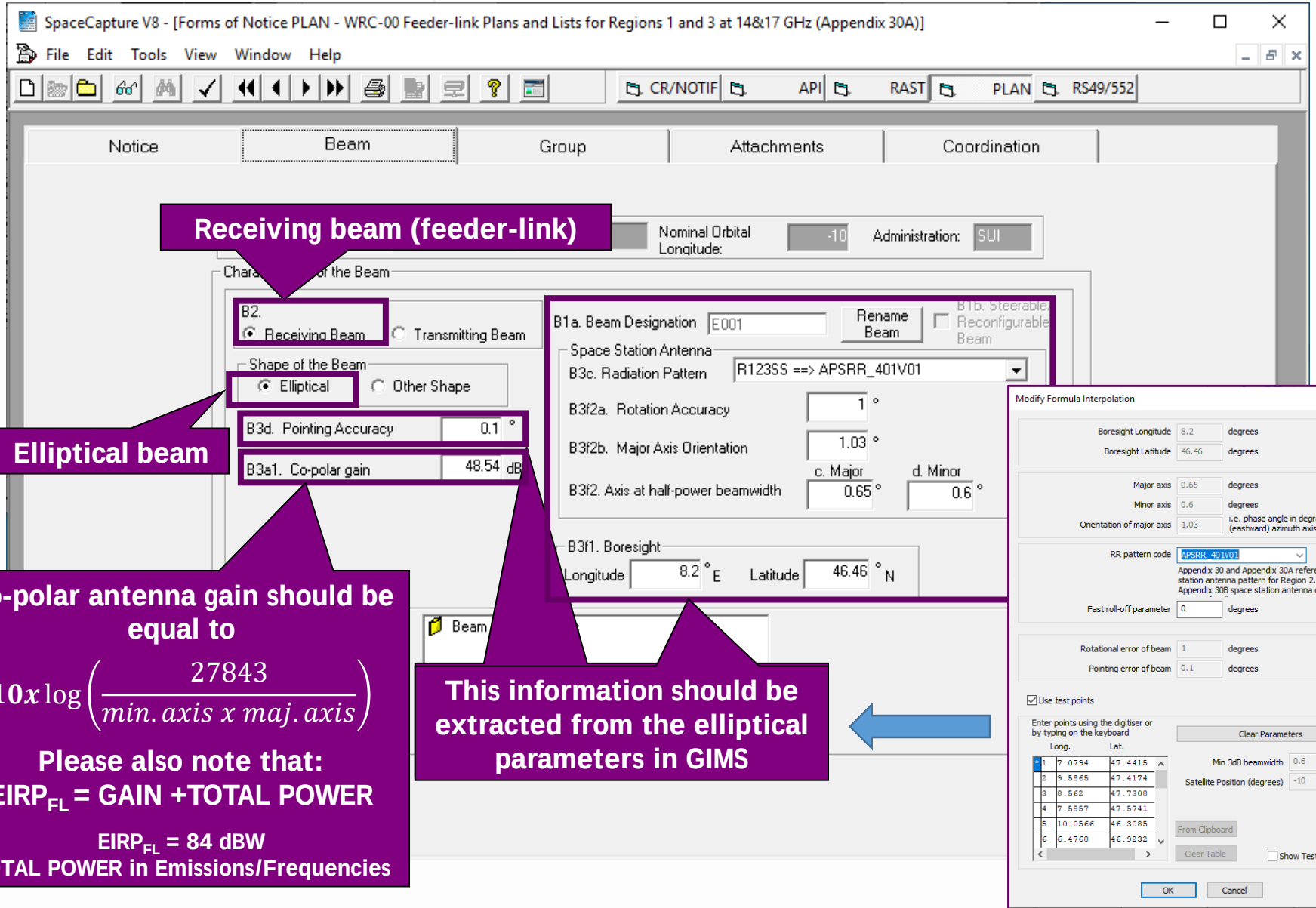
2.b) AP30A: Generate SNS database (CREATE NOTICE)



2.b) AP30A: Generate SNS database (NOTICE LEVEL)



2.b) AP30A: Generate SNS database (BEAM LEVEL)



Elliptical beam

Co-polar antenna gain should be equal to

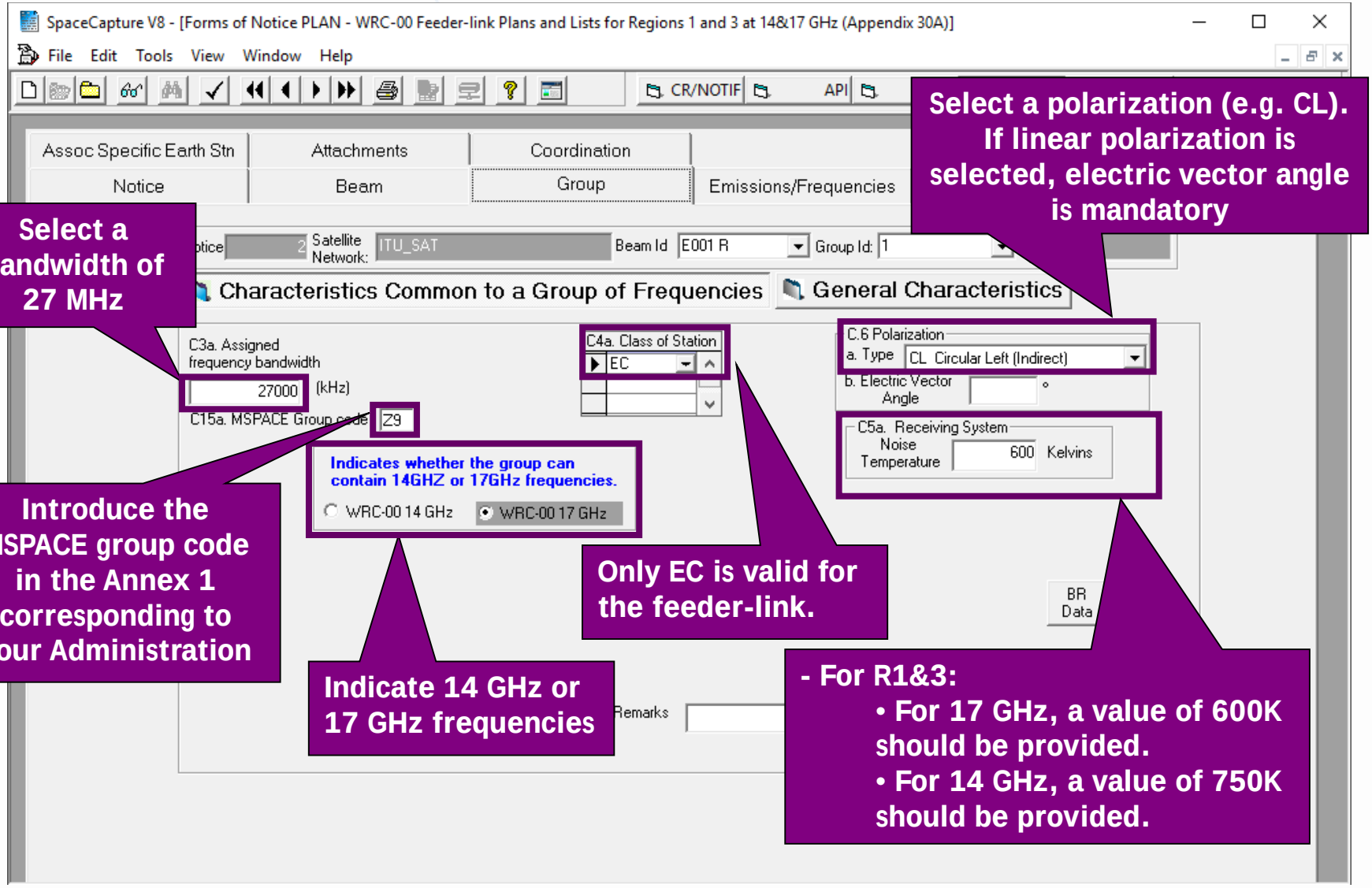
$$10x\log\left(\frac{27843}{min.axis\ x\ maj.axis}\right)$$

Please also note that:
$EIRP_{FL}$ = GAIN +TOTAL POWER

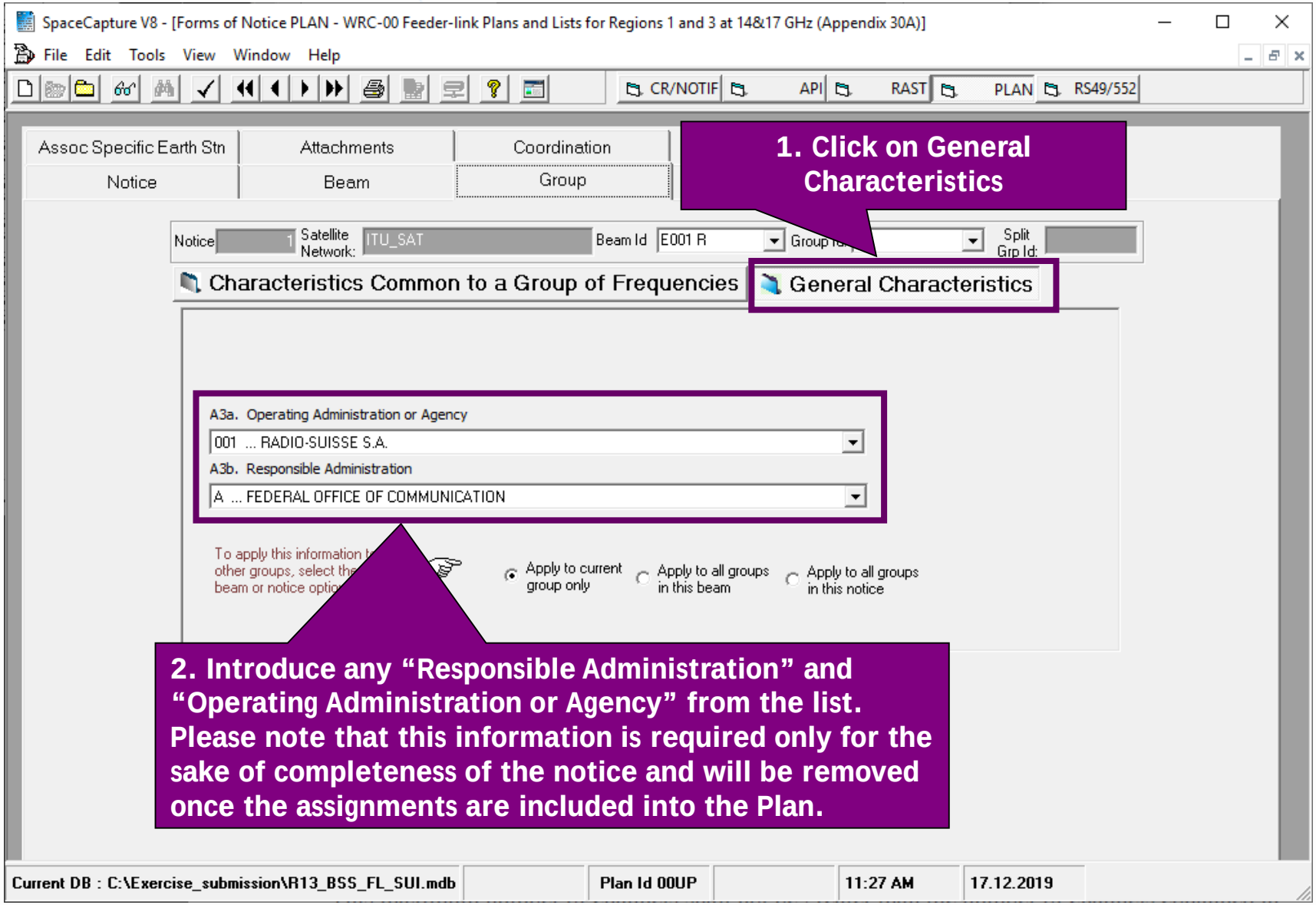
$EIRP_{FL}$ = 84 dBW
TOTAL POWER in Emissions/Frequencies

This information should be extracted from the elliptical parameters in GIMS

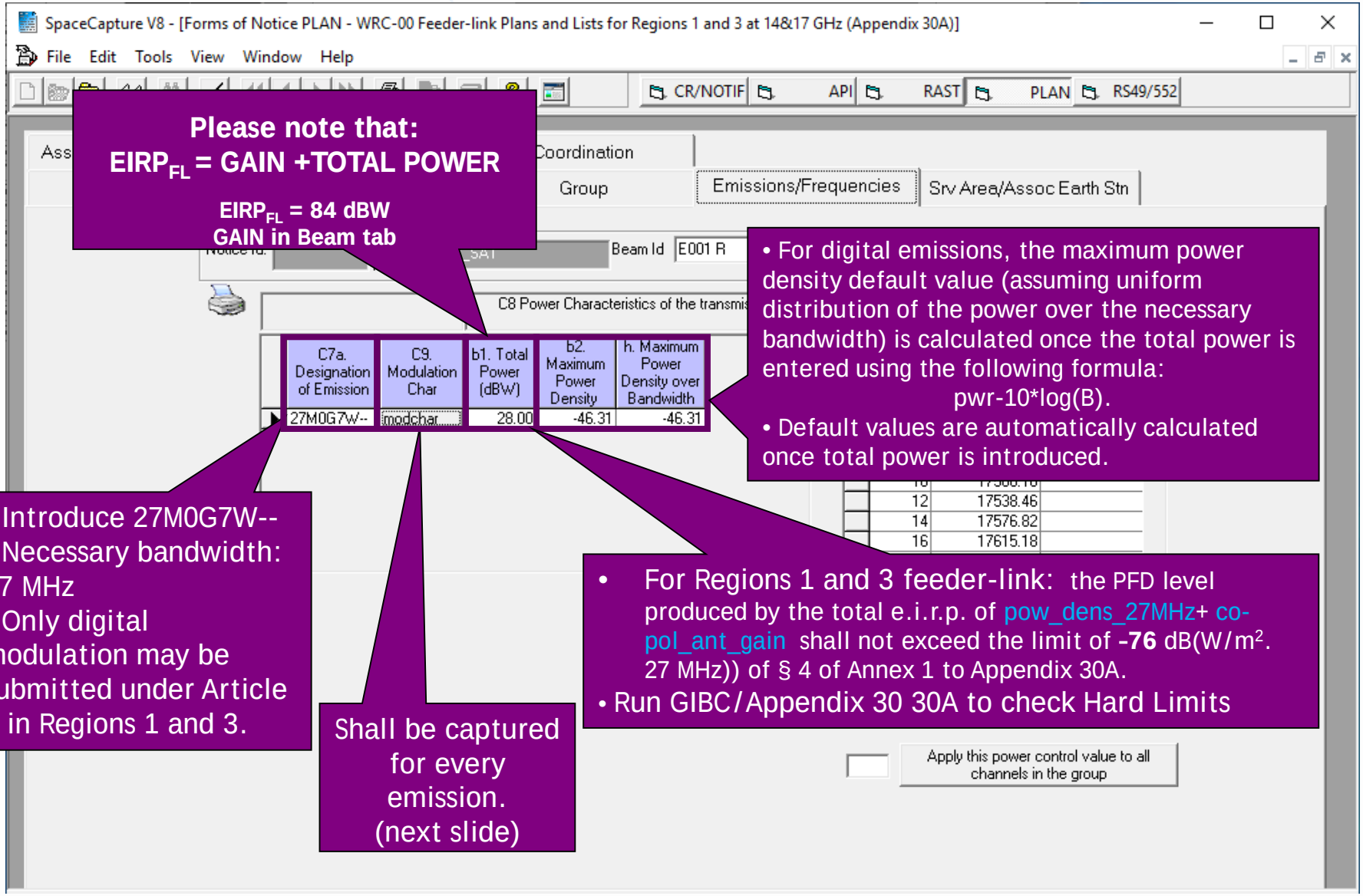
2.b) AP30A: Generate SNS database (GROUP LEVEL)



2.b) AP30A: Generate SNS database (GROUP LEVEL)



2.b) AP30A: Generate SNS database (EMISSIONS/FREQ LEVEL)



Please note that:
$EIRP_{FL}$ = GAIN +TOTAL POWER

$EIRP_{FL}$ = 84 dBW
GAIN in Beam tab

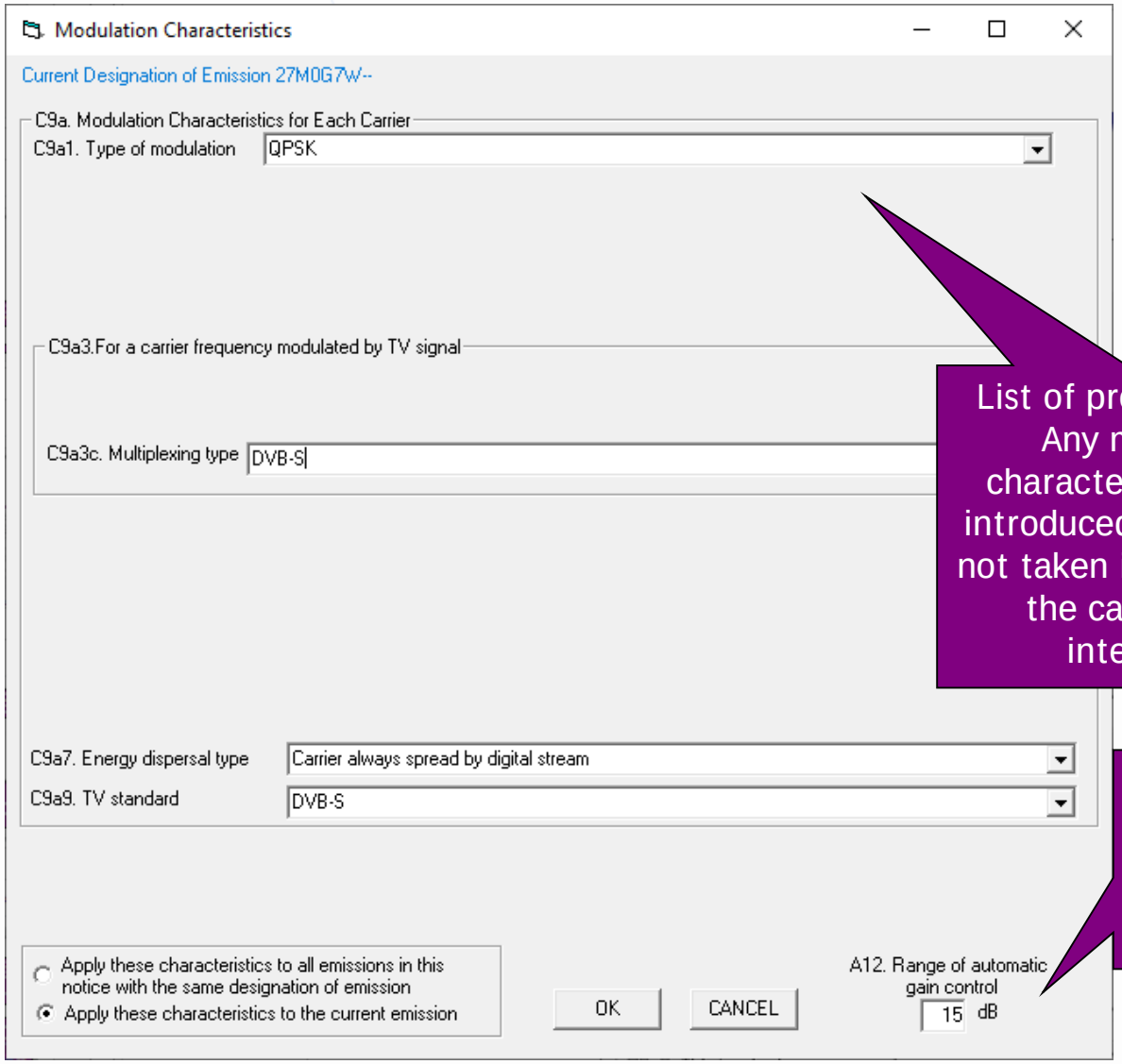
- For digital emissions, the maximum power density default value (assuming uniform distribution of the power over the necessary bandwidth) is calculated once the total power is entered using the following formula:
  pwr-10*log(B).
- Default values are automatically calculated once total power is introduced.

- Introduce 27M0G7W--
- Necessary bandwidth: 27 MHz
- Only digital modulation may be submitted under Article 4 in Regions 1 and 3.

Shall be captured for every emission. (next slide)

- For Regions 1 and 3 feeder-link: the PFD level produced by the total e.i.r.p. of pow_dens_27MHz+ co-pol_ant_gain shall not exceed the limit of **-76** dB(W/m^2. 27 MHz)) of § 4 of Annex 1 to Appendix 30A.
- Run GIBC/Appendix 30 30A to check Hard Limits

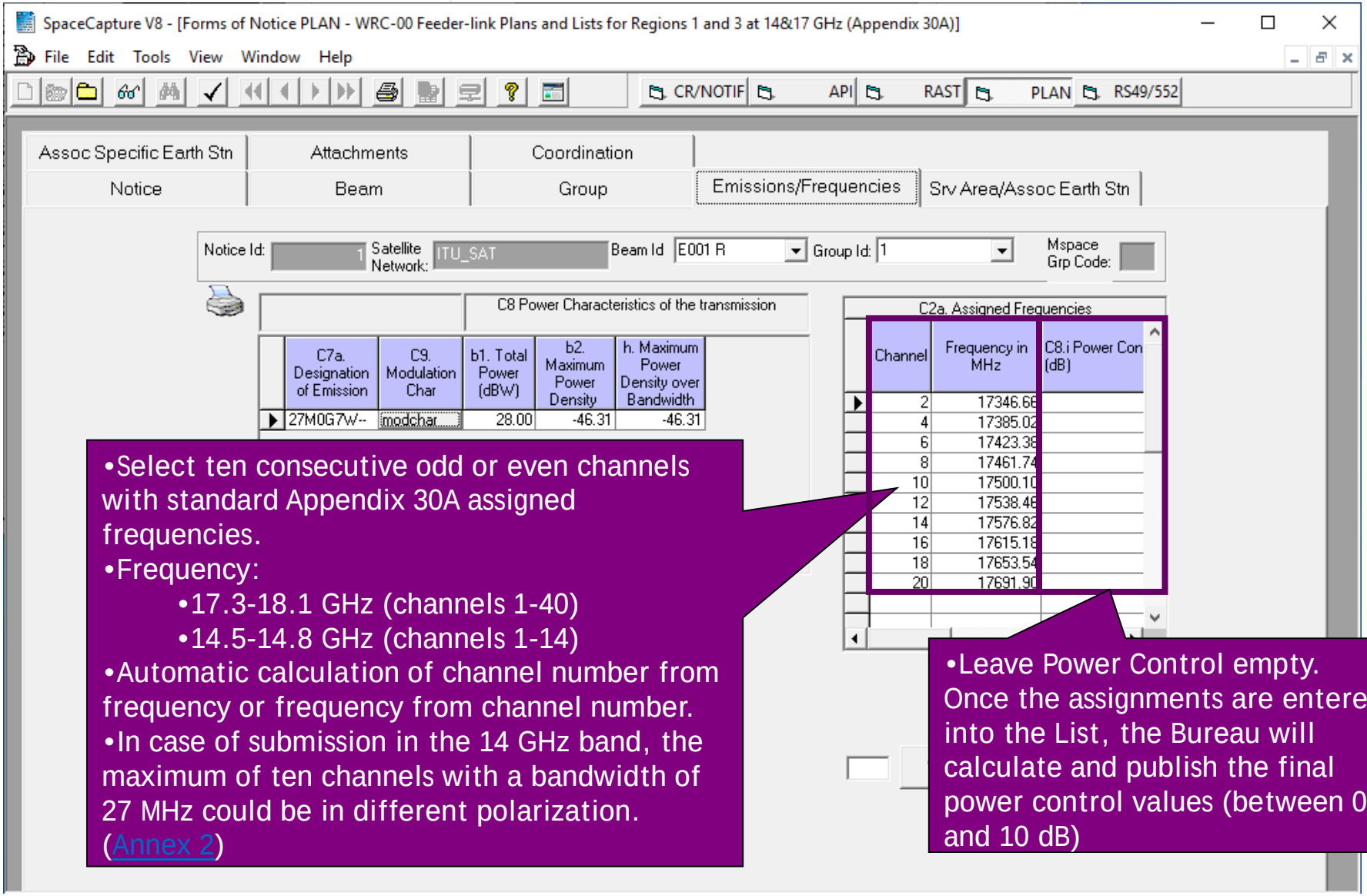
2.b) AP30A: Generate SNS database (EMISSIONS/FREQ LEVEL)



List of proposed values. Any modulation characteristics may be introduced since they are not taken into account for the calculation of interference

- Required only for the feeder-link.
- The value must be in the range 0 to 15 dB.

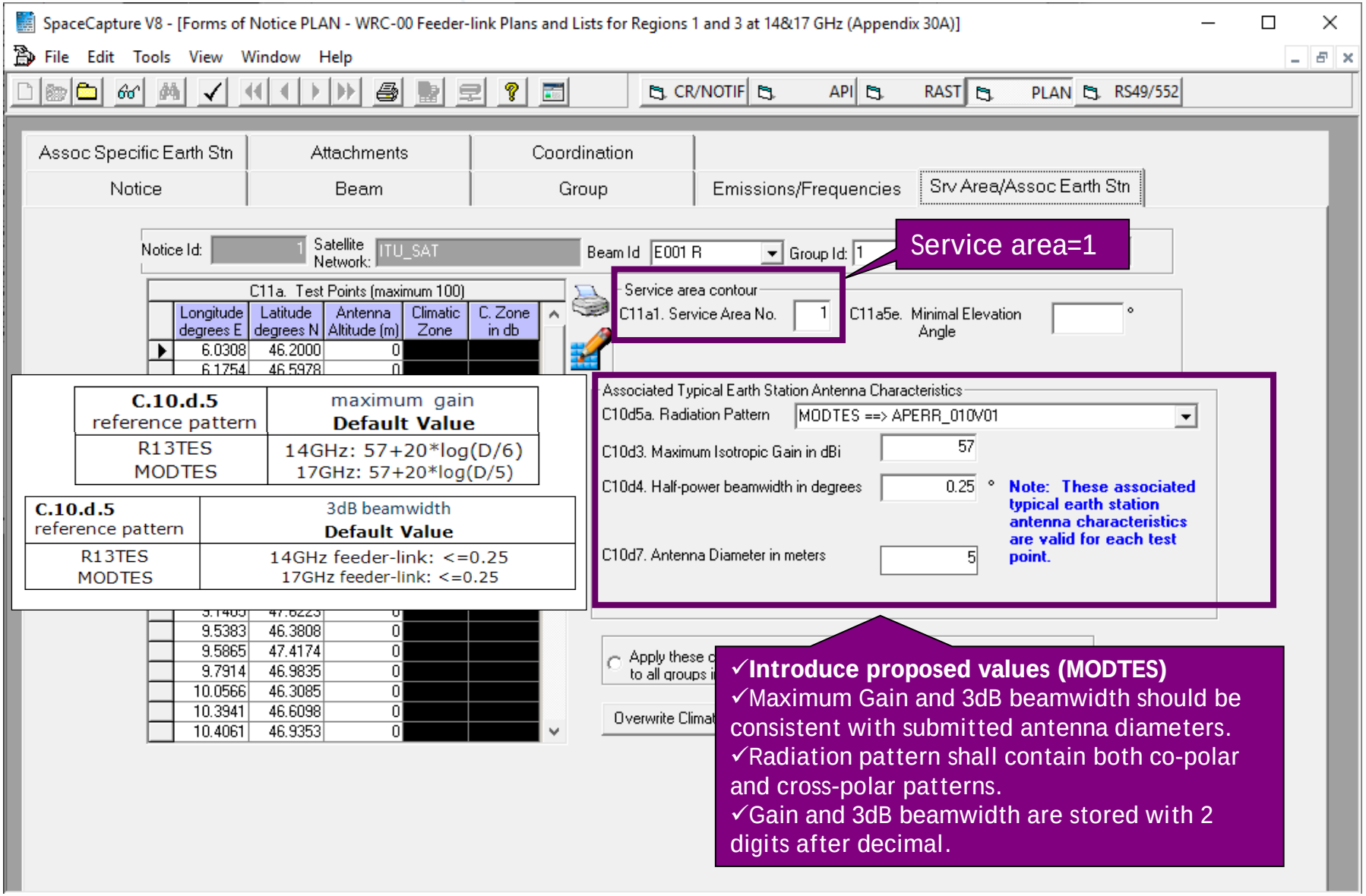
2.b) AP30A: Generate SNS database (EMISSIONS/FREQ LEVEL)



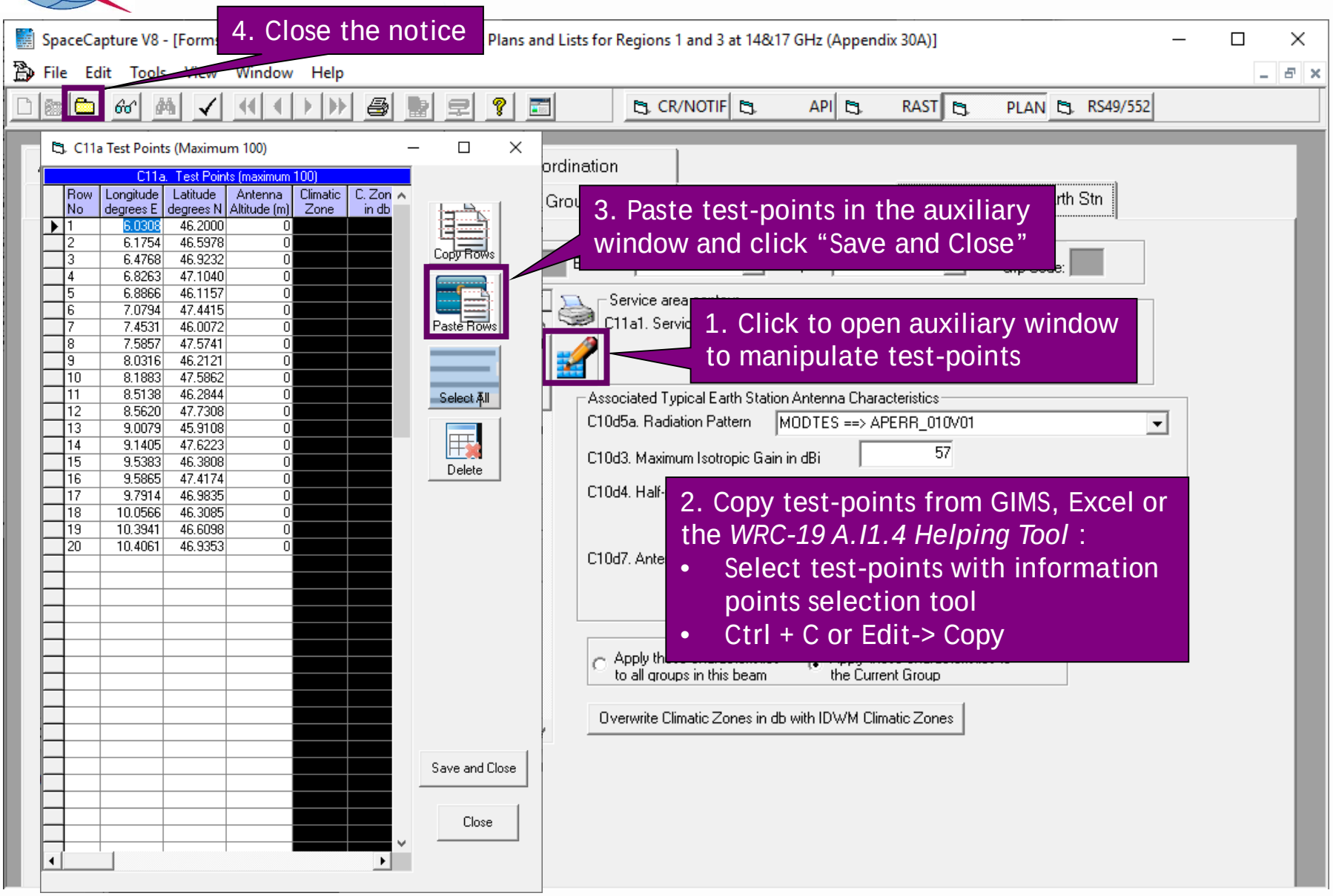
- Select ten consecutive odd or even channels with standard Appendix 30A assigned frequencies.
- Frequency:
  - 17.3-18.1 GHz (channels 1-40)
  - 14.5-14.8 GHz (channels 1-14)
- Automatic calculation of channel number from frequency or frequency from channel number.
- In case of submission in the 14 GHz band, the maximum of ten channels with a bandwidth of 27 MHz could be in different polarization. (Annex 2)

- Leave Power Control empty. Once the assignments are entered into the List, the Bureau will calculate and publish the final power control values (between 0 and 10 dB)

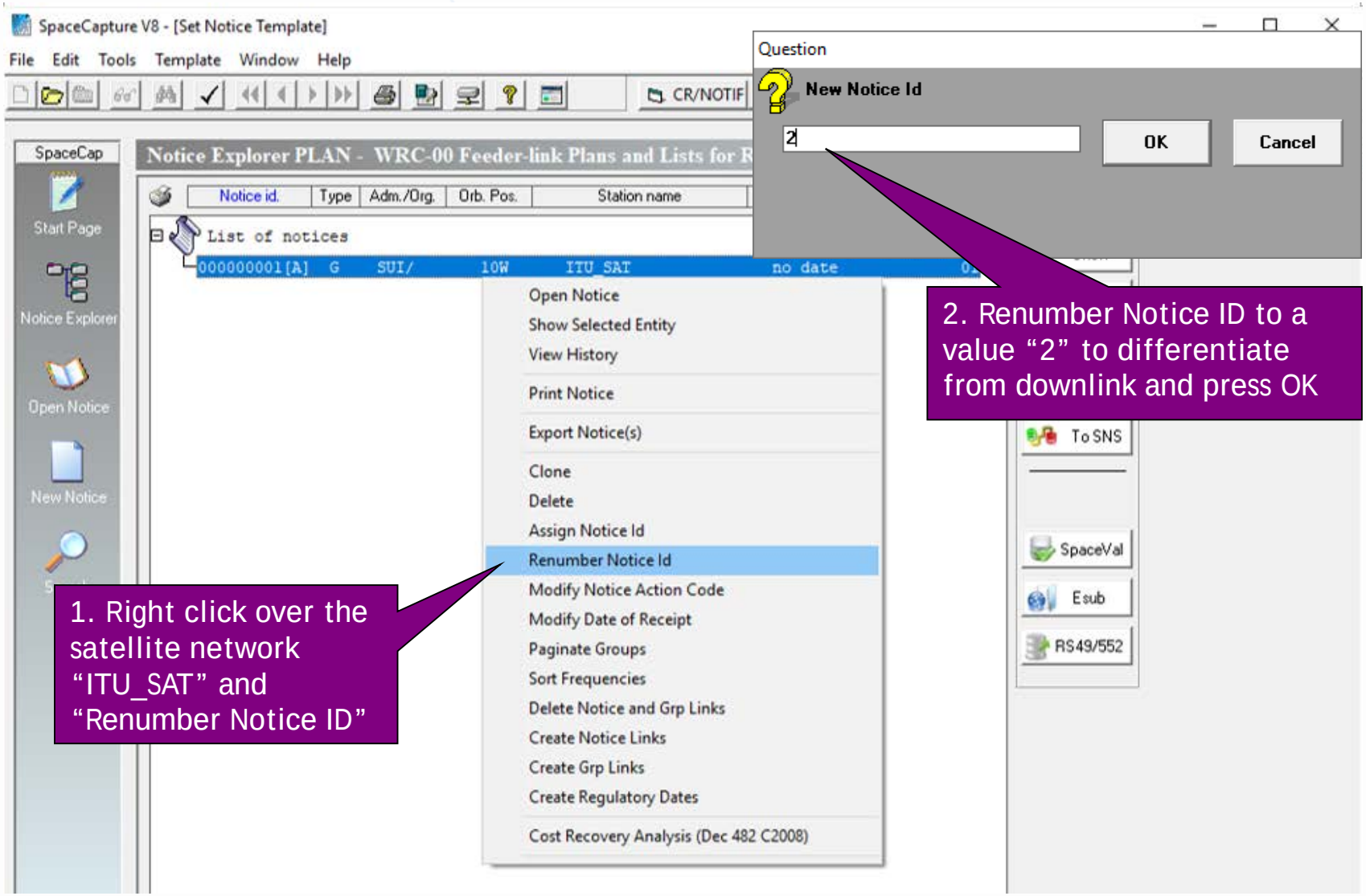
2.b) AP30A: Generate SNS database (SRV AREA/EARTH STN)



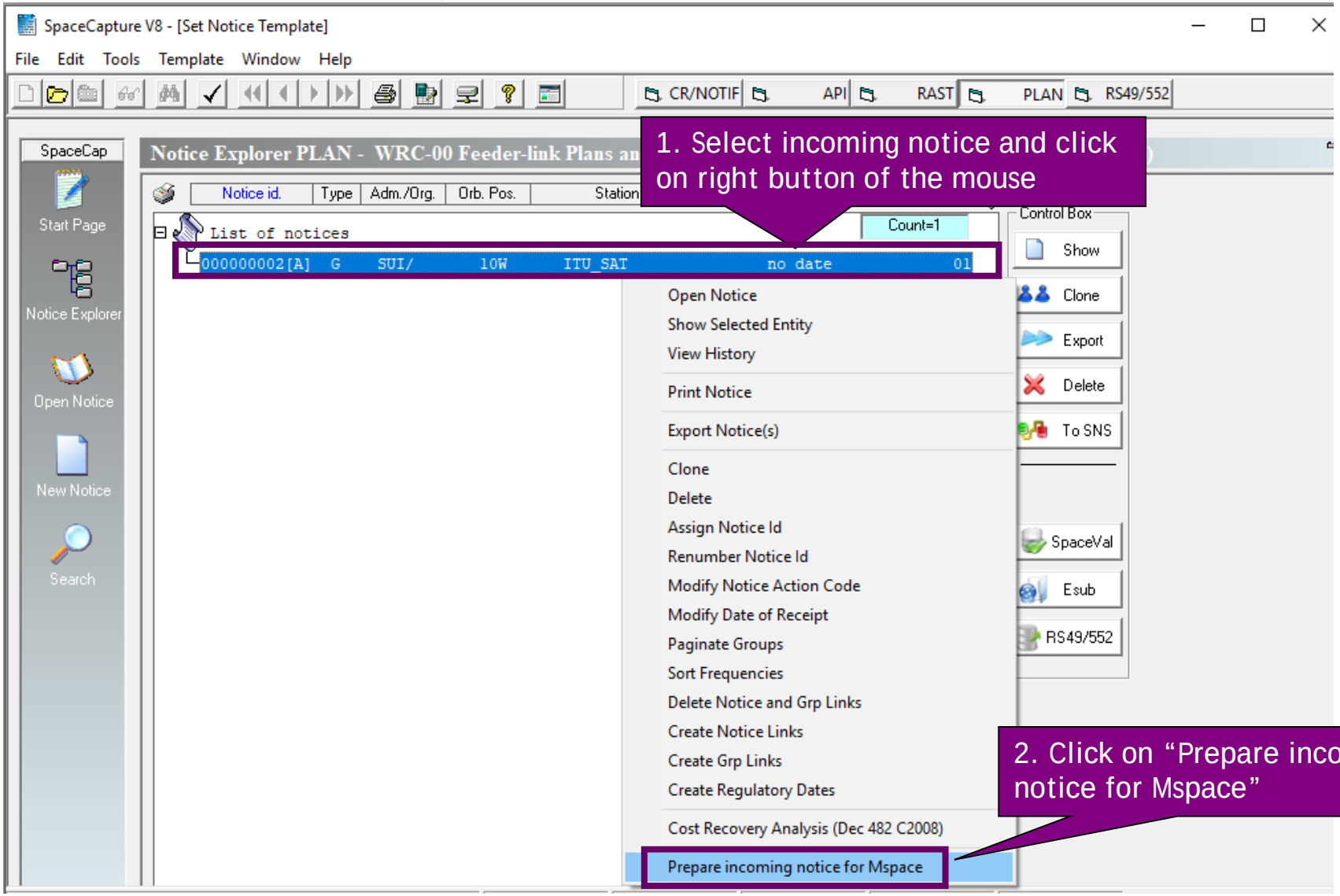
2.b) AP30A: Generate SNS database (SRV AREA/EARTH STN)



2.b) AP30A: Generate SNS database (NETWORK LEVEL)



2.b) AP30A: Generate SNS database (NETWORK LEVEL)



Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

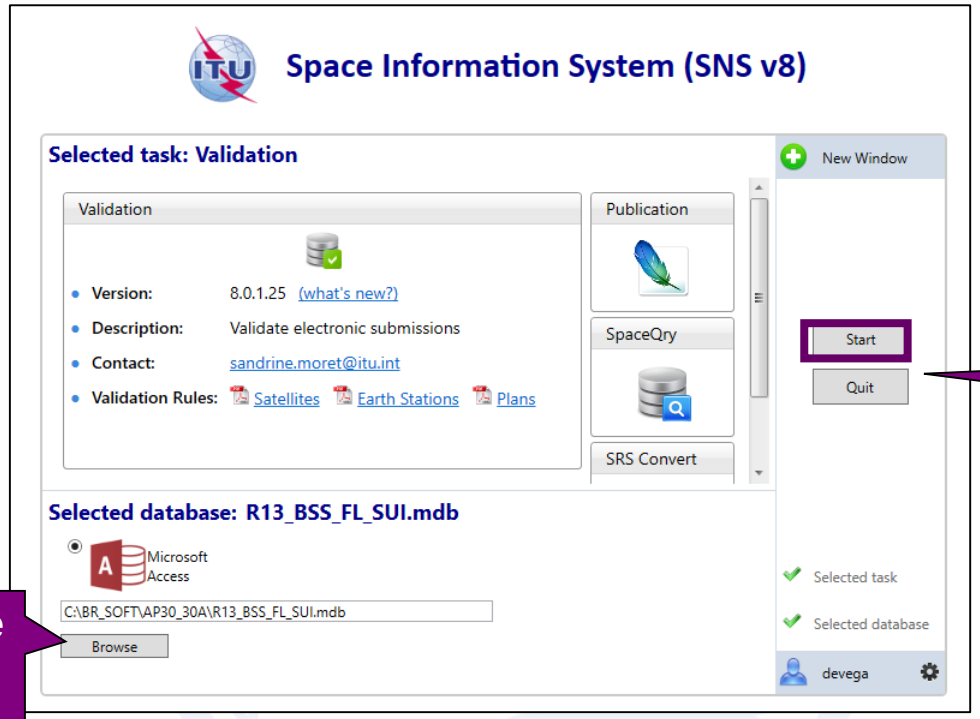
3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

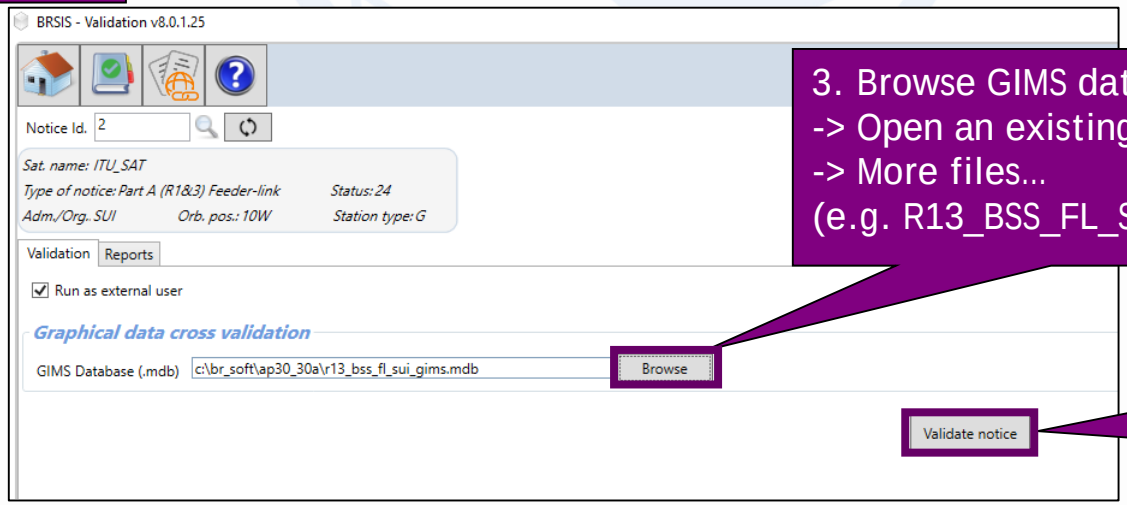
4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30A submission

2.c) AP30: Run BR-SIS Validation



1. Browse SNS database (e.g. R13_BSS_FL_SUI.mdb")

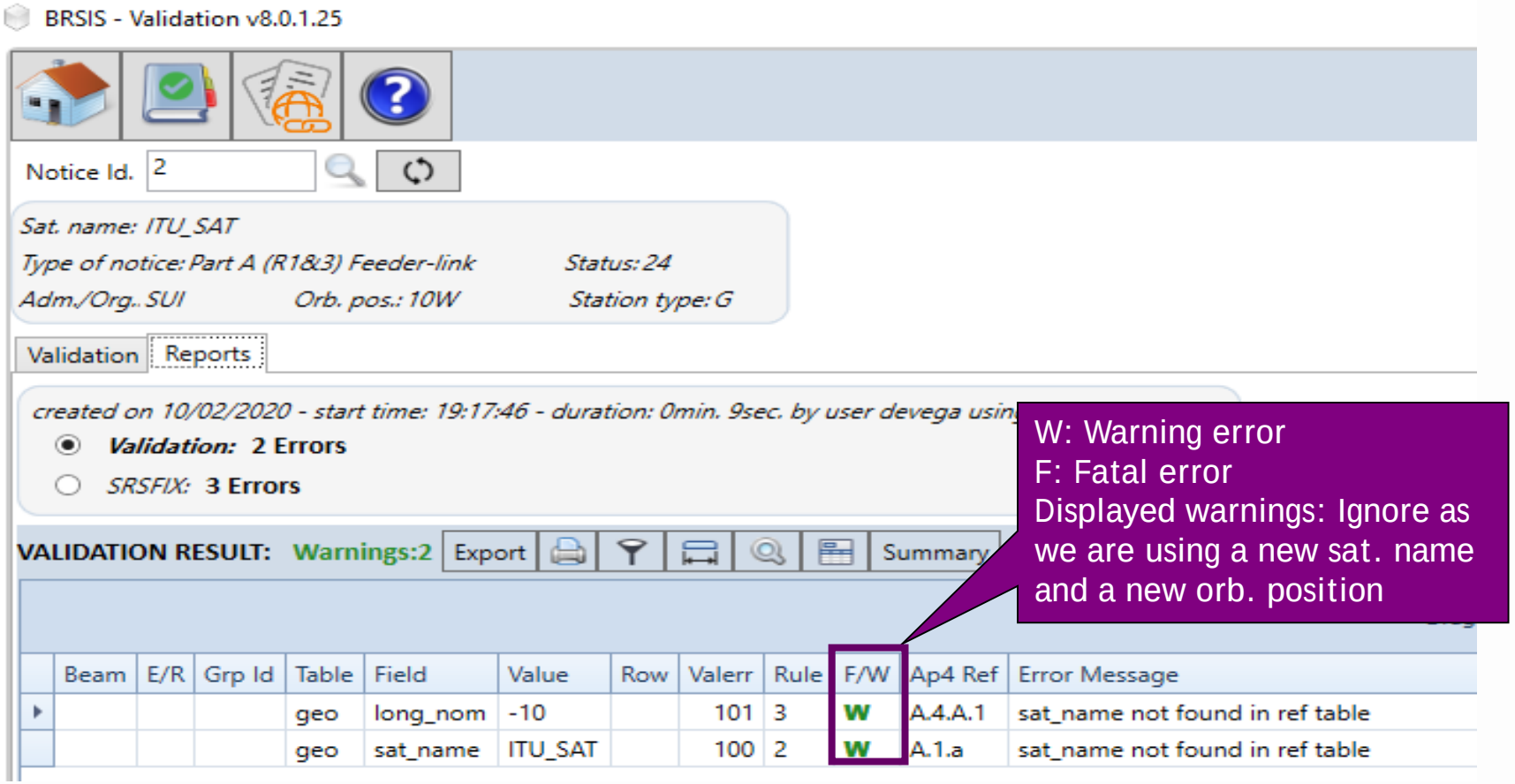
2. Click on Start



3. Browse GIMS database
-> Open an existing file
-> More files…
(e.g. R13_BSS_FL_SUI_GIMS.mdb)

2. Click on Validate notice

2.c) AP30: Run BR-SIS Validation (REPORT)



Beam	E/R	Grp Id	Table	Field	Value	Row	Valerr	Rule	F/W	Ap4 Ref	Error Message
			geo	long_nom	-10		101	3	W	A.4.A.1	sat_name not found in ref table
			geo	sat_name	ITU_SAT		100	2	W	A.1.a	sat_name not found in ref table

No fatal errors should appear. If there is a fatal error, it should be corrected. Otherwise, the submission may be returned to your administration.

Warning errors should be corrected, although the submission will not be returned to your administration.

Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30A submission

Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

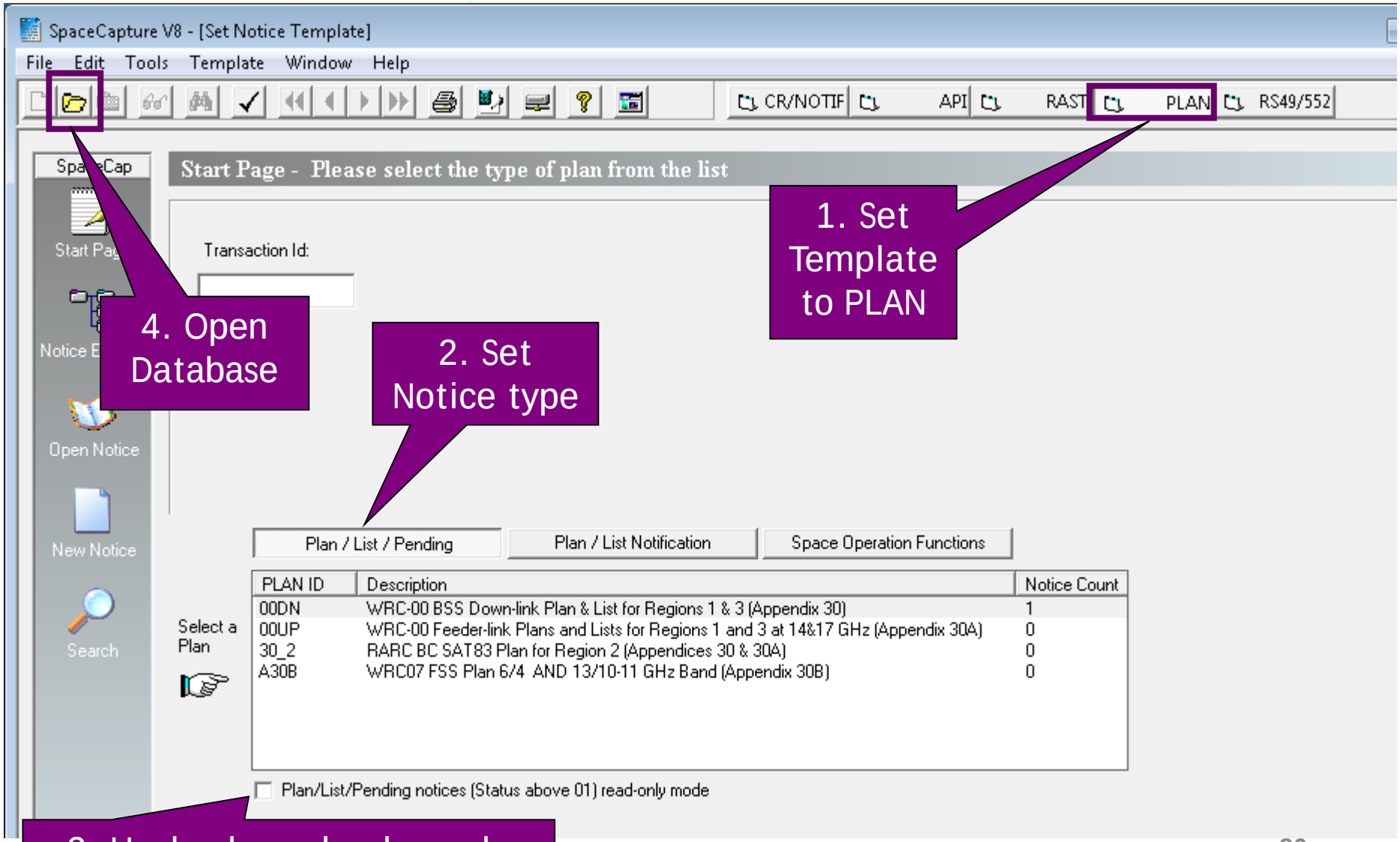
Needed databases:

- *SPS_ALL database published in latest BR IFIC containing the subject notice*
- *GIMS database of the subject notice*

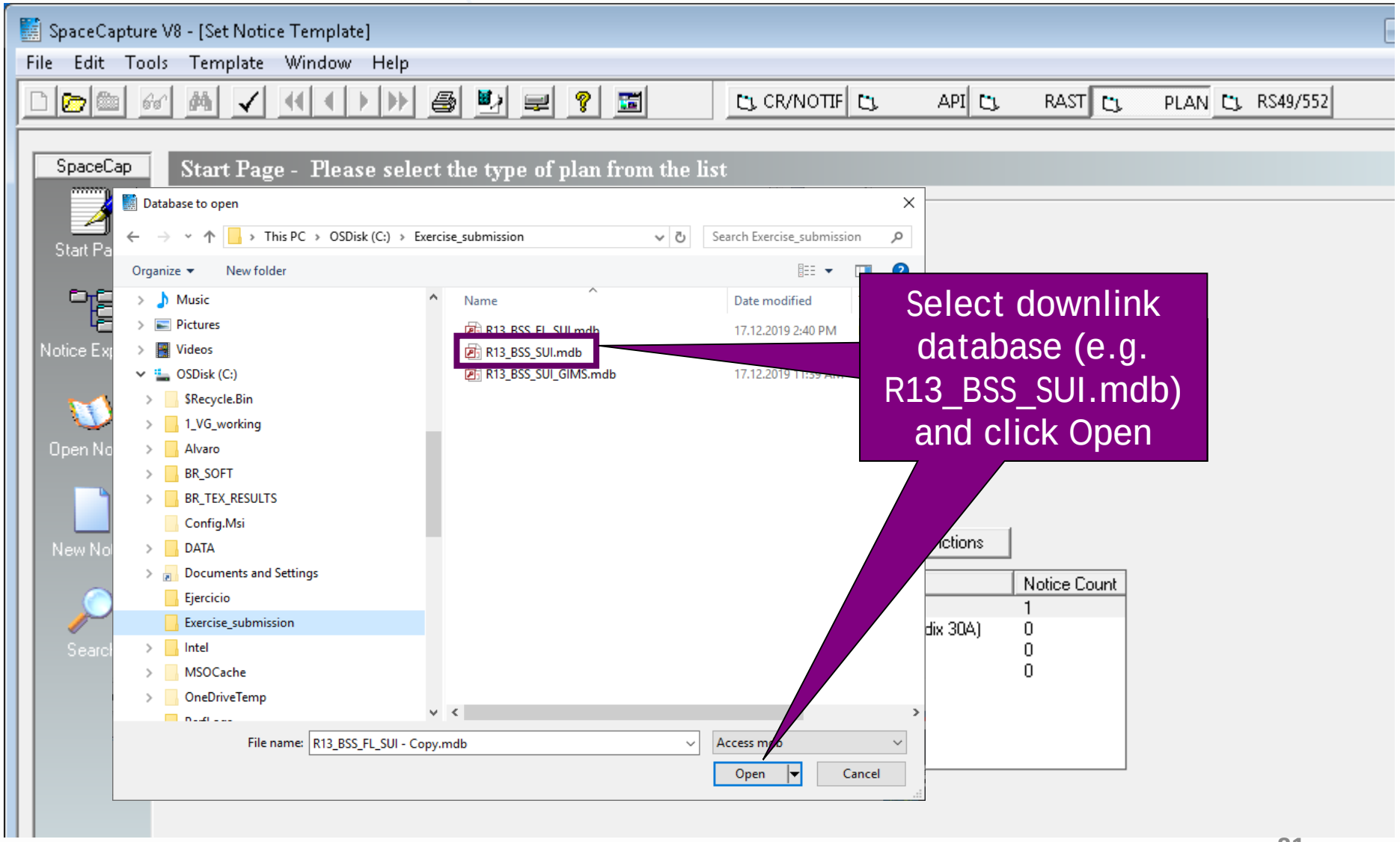
Main steps:

1. *Copy latest SPS_ALL database from last published DVD-ROM BR IFIC to your local drive. Be sure the database is not "Read-only" (right click in windows explorer, Properties).*
2. *Export incoming AP30 notice into latest SPS_ALL database with SpaceCap*
3. *Connect above-mentioned SPS_ALL database in "SRS database" in "Tool-Options" in GIBC*
4. *Connect GIMS database of the subject notice in "GIMS database" in "Tool-Options" in GIBC*
5. *Go to section "Appendix 30 30A" in GIBC*
6. *Introduce "Network ID" of the subject network (1 in the example)*
7. *Press start*
8. *Once finished, click "Open Database"*
9. *Open "ap30_30a_clc_head" and check that "f_sucess"=Y*
10. *Open "ap30_pfd_res" and check that "pfd_excess" is equal or below to 0. Otherwise, there would be an excess in the PFD produced by the subject network.*

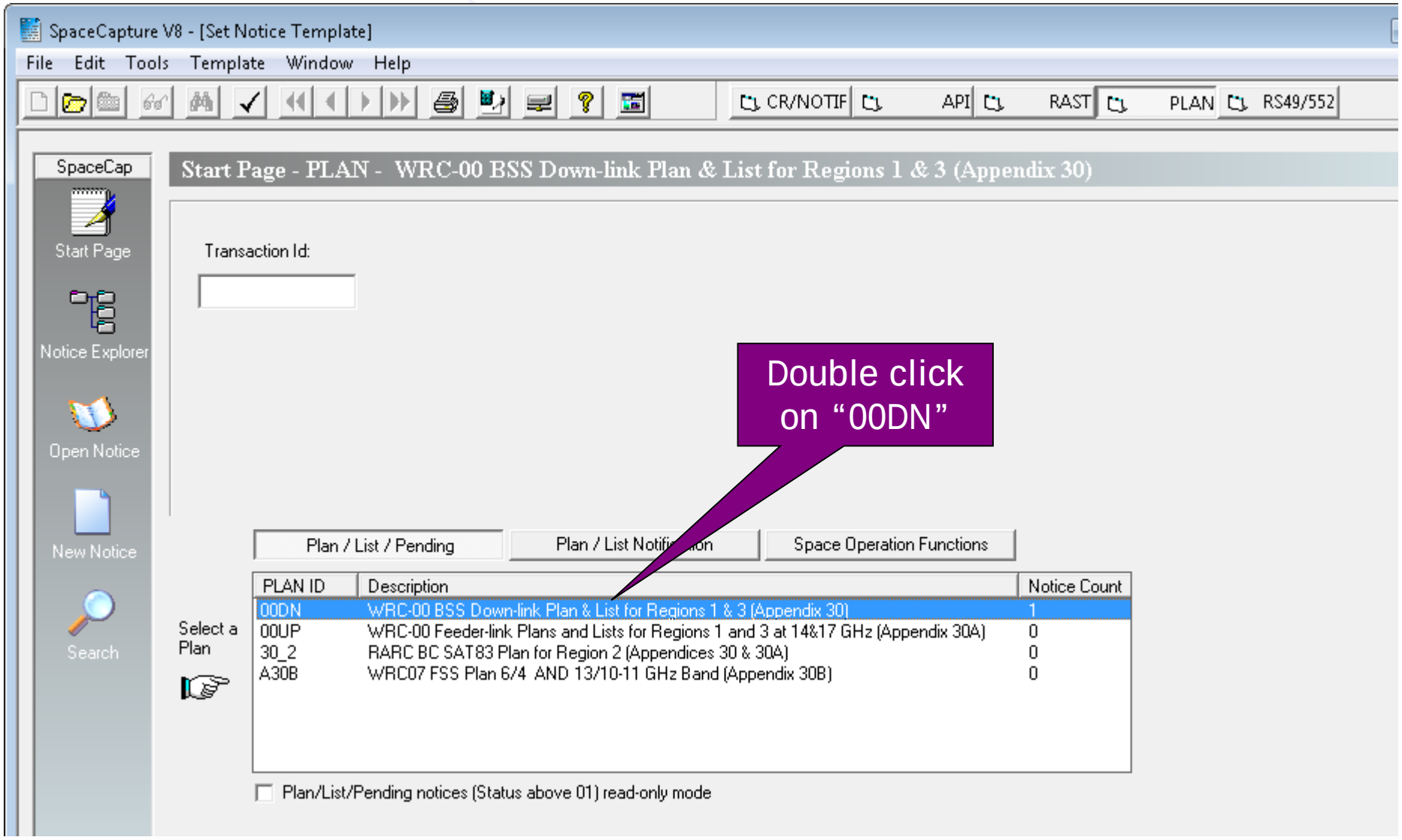
Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission



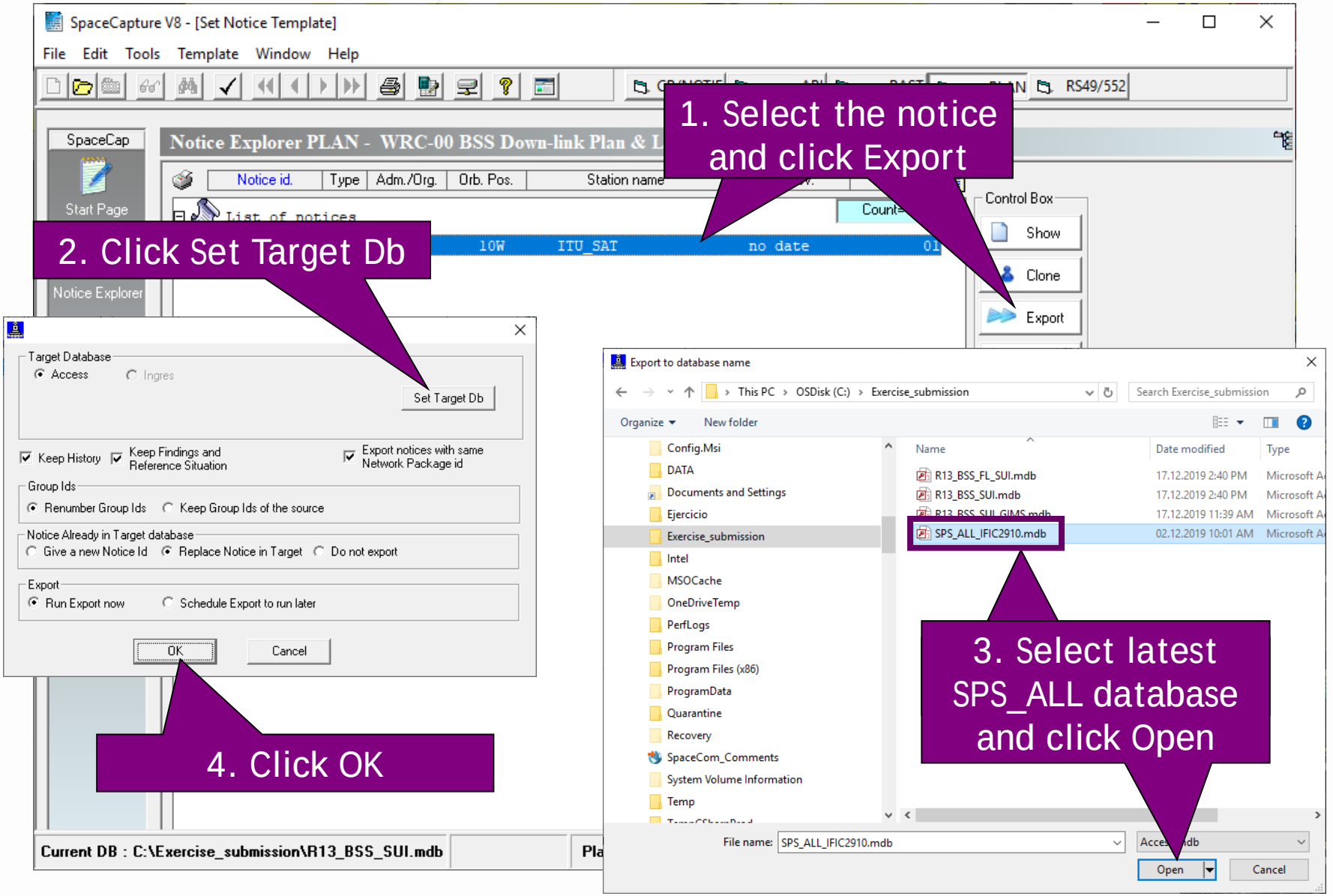
Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission



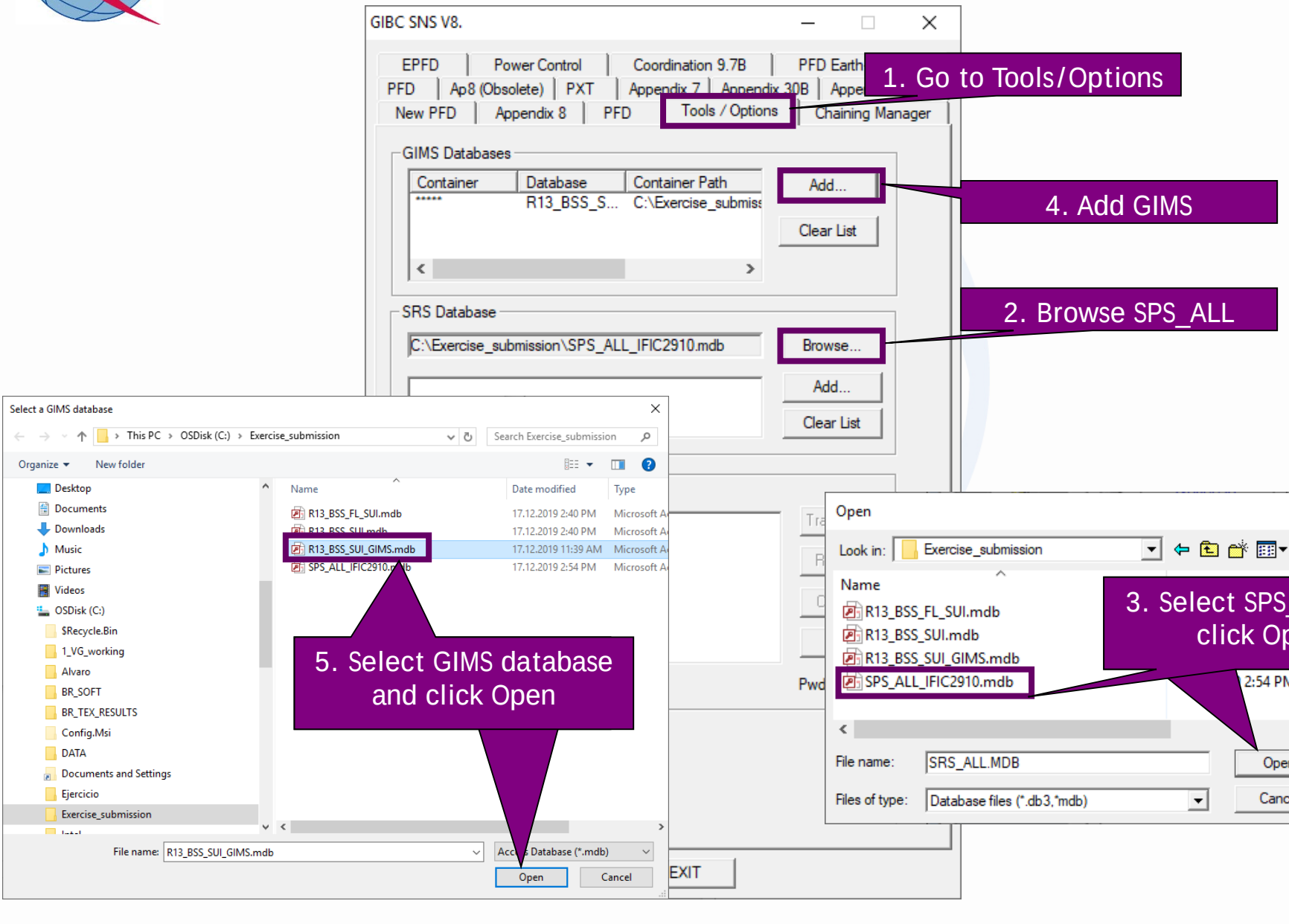
Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission



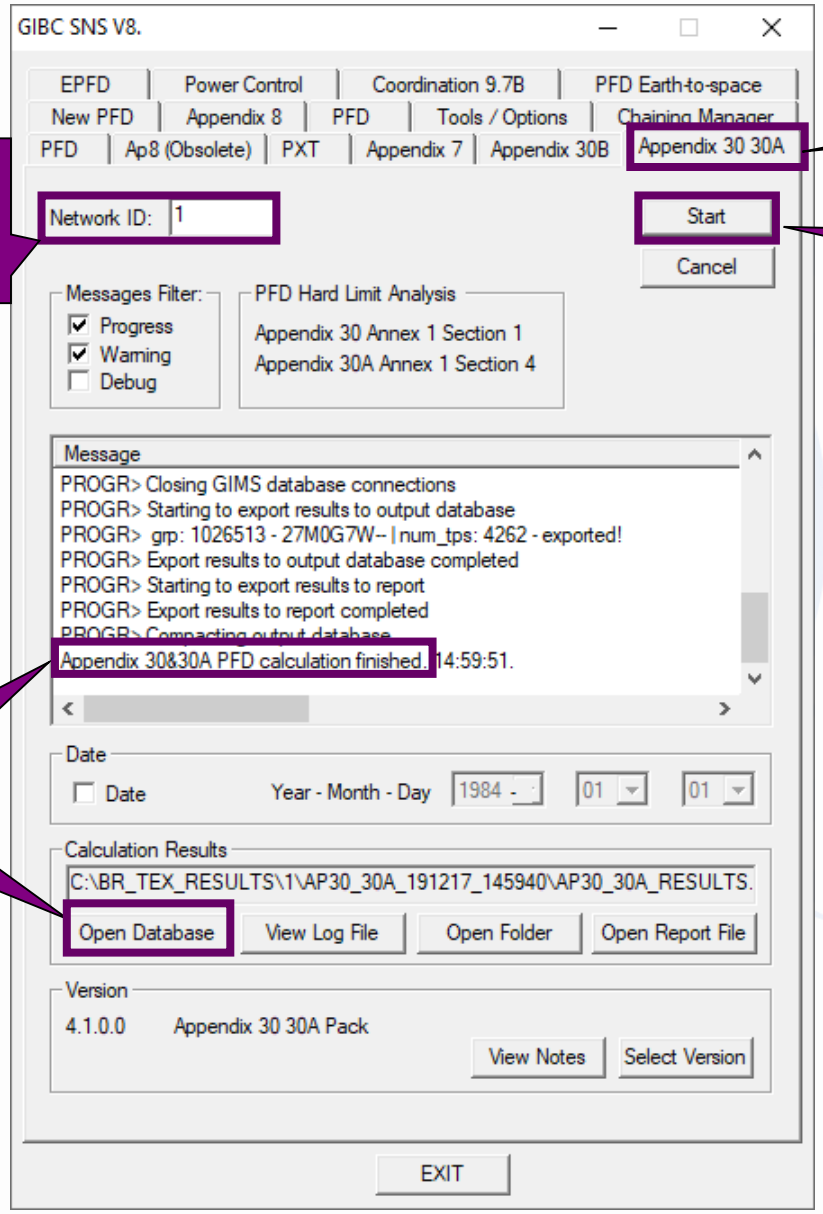
Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission



Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission



Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission



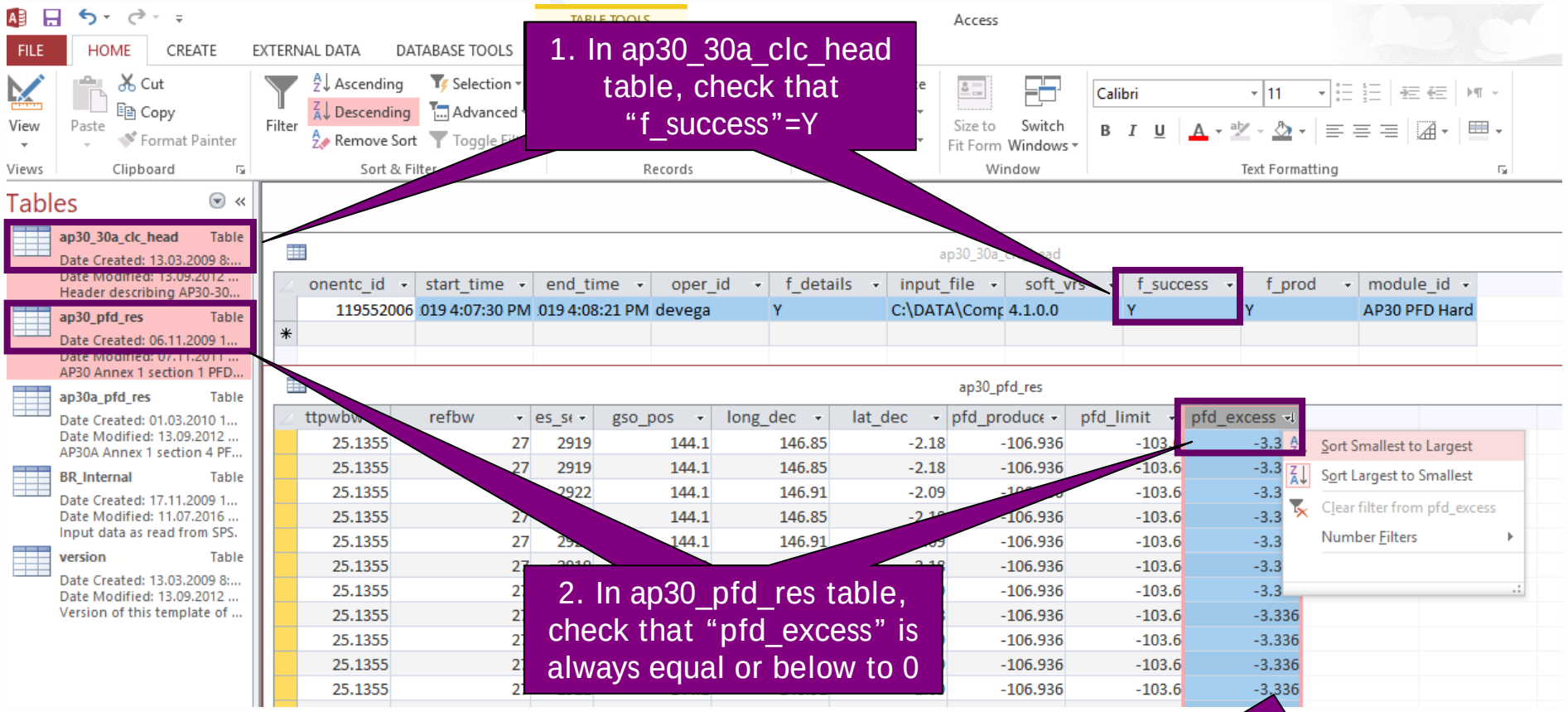
1. Go to Appendix 30 30A

2. Introduce the notice ID of the downlink network (e.g. 1)

3. Click Start

4. Once finished, open the results database

Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission



NOTE: The maximum excess (subtracting 0.1 dB), is the amount we can increase the EIRP for the downlink while complying with the AP30 Hard limits

Exercise: Generate submission to apply the special procedure in Resolution 559

1. Assign MSPACE group code to existing Plan assignments

2.a) AP30: Generate GIMS database

2.b) AP30: Generate SNS database

2.c) AP30: Run BR-SIS Validation

3.a) AP30A: Generate GIMS database

3.b) AP30A: Generate SNS database

3.c) AP30A: Run BR-SIS Validation

4.a) Run GIBC/Appendix 30 30A to check Hard Limits for AP30 submission

4.b) Run GIBC/Appendix 30 30A to check Hard Limits for AP30A submission

Run GIBC/Appendix 30 30A to check Hard Limits for AP30A submission

Needed databases:

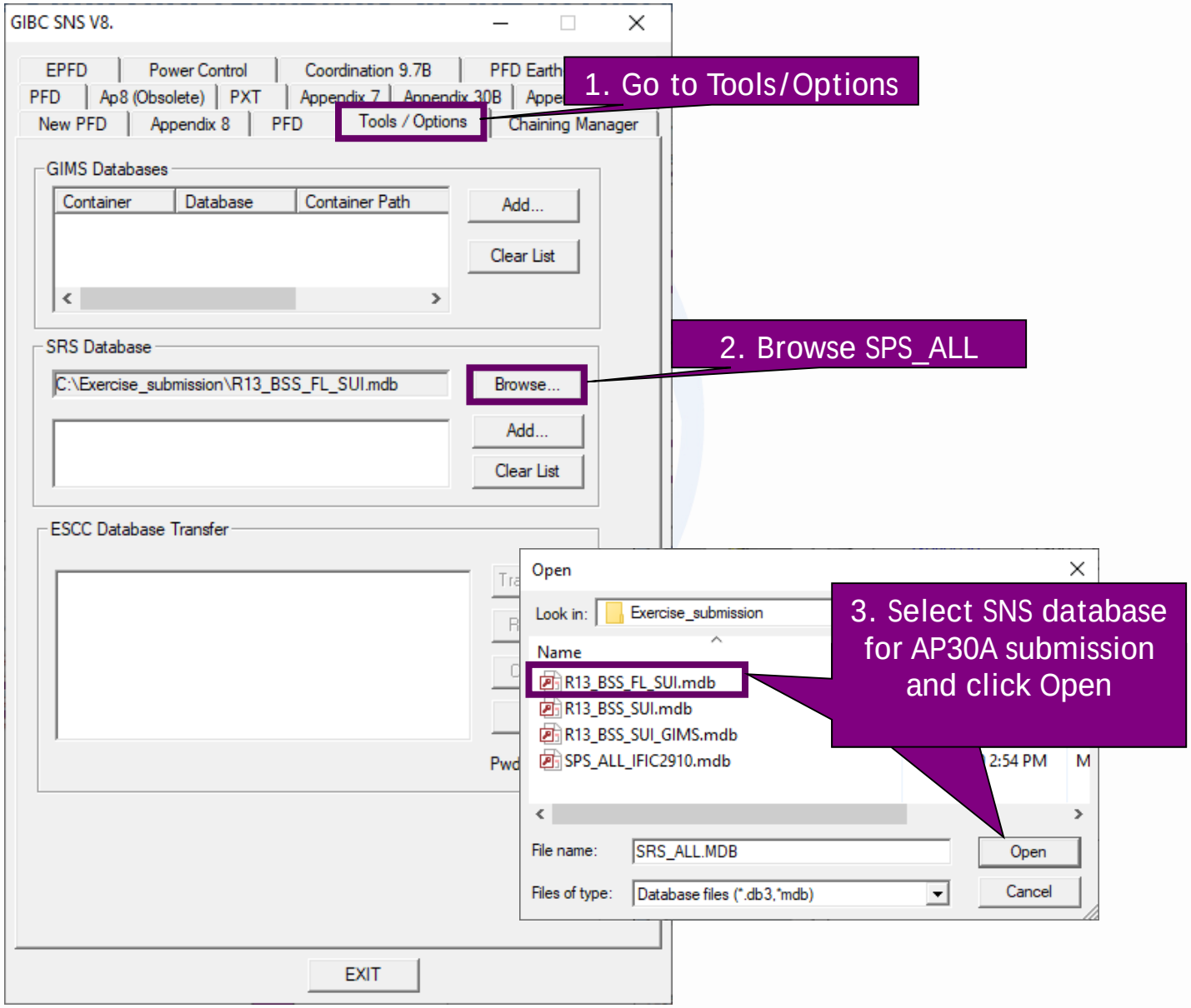
- *SNS database of the subject notice related to the AP30A submission*

Main steps:

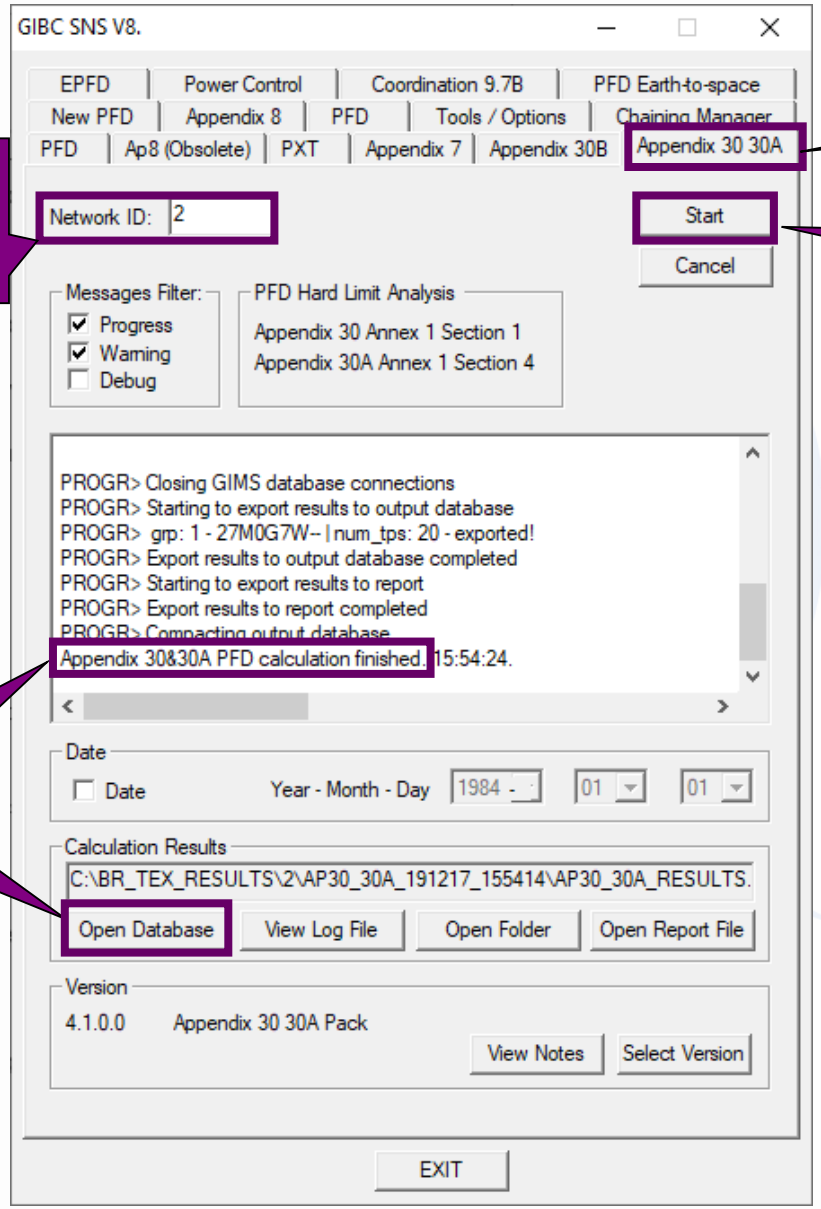
1. *Connect the SNS database in "SRS database" in "Tool-Options" in GIBC*
2. *Go to section "Appendix 30 30A" in GIBC*
3. *Introduce "Network ID" of the subject network (2 in the example)*
4. *Press start*
5. *Once finished, click "Open Database"*
6. *Open "ap30_30a_clc_head" and check that "f_sucess"=Y*
7. *Open "ap30a_pfd_res" and check that:*

- *"pfd_excess" is equal or below to 0. Otherwise, there would be an excess in the PFD produced by the subject network.*
- *"Compliance_c" is always "Y". Otherwise, there would be an excess in the co-polar component of the relative off-axis e.i.r.p. of the associated feeder-link antenna.*
- *"Compliance_x" is always "Y". Otherwise, there would be an excess in the cross-polar component of the relative off-axis e.i.r.p. of the associated feeder-link antenna.*

Run GIBC/Appendix 30 30A to check Hard Limits for AP30A submission



Run GIBC/Appendix 30 30A to check Hard Limits for AP30A submission



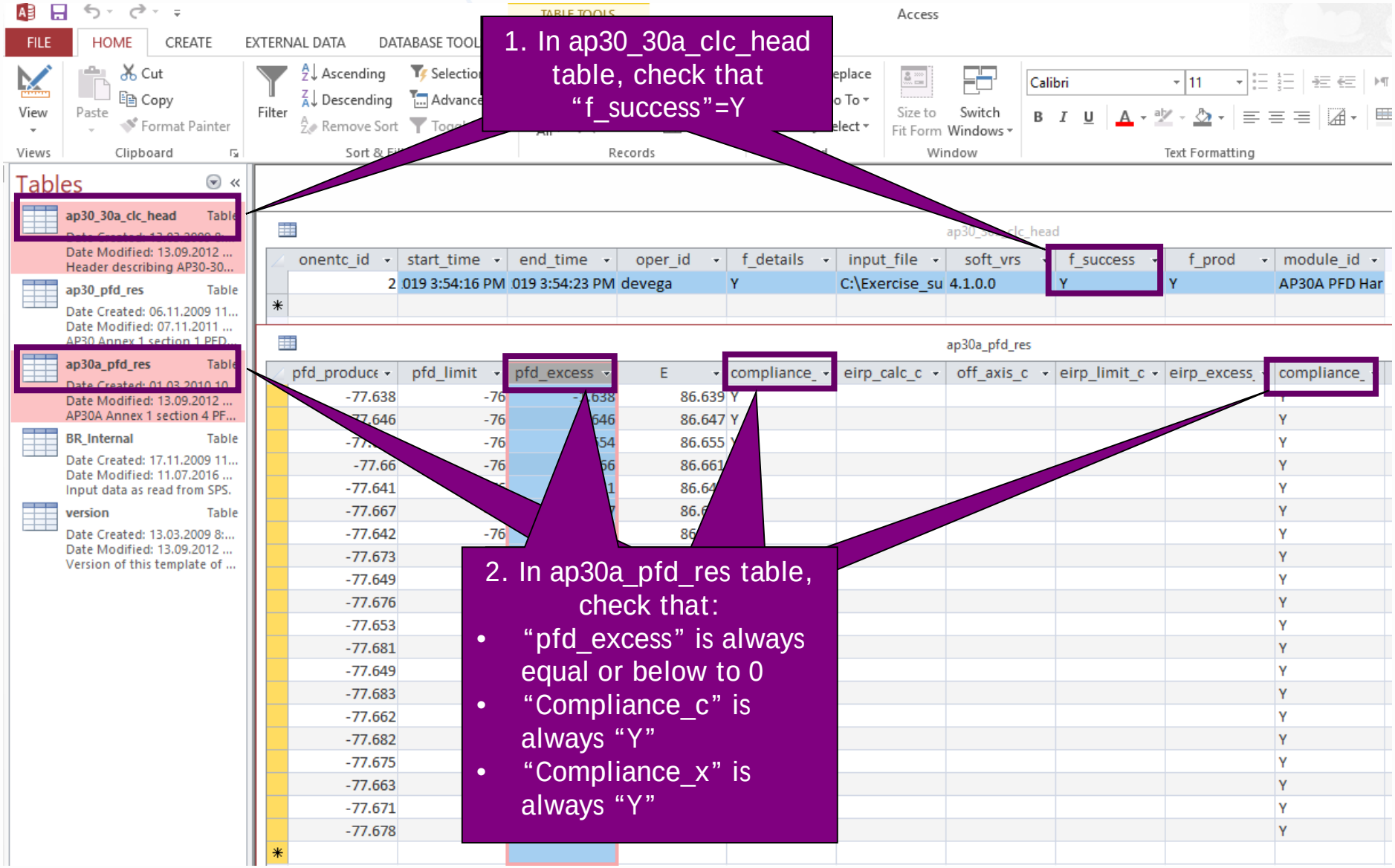
1. Go to Appendix 30 30A

2. Introduce the notice ID of the downlink network (e.g. 2)

3. Click Start

4. Once finished, open the results database

Run GIBC/Appendix 30 30A to check Hard Limits for AP30A submission



Summary of parameters for AP30 submission (1)

Level	AP4 Item	AP4 reference	Value	Conditions
Notice	Notifying Administration	A.1.f.1	*Any*	Acronym of administration
	Satellite network name	A.1.a	*Any*	Up to 30 characters (see https://www.itu.int/ITU-R/go/space-naming-convention/en)
	Nominal Orbital Longitude	A.4.a.1	*Any*	orbital positions for which the Annex 7 to Appendix 30 (Rev.WRC-15) limitations were suppressed by WRC-19
	Longitudinal tolerance west	A.4.a.2.b	0.1	-
	Longitudinal tolerance east	A.4.a.2.a	0.1	-
	Regular Hours of Operation start	A.11.a	0	-
	Regular Hours of Operation end	A.11.b	24	-
Beam	Transmitting/Receiving	B.2	Transmitting	-
	Shape of the Beam	-	Elliptical	-
	Beam designation	B.1.a	*Any*	Avoid spaces (suggested name: E001)
	Co-polar gain	B.3.a.1	*Any*	10*log(27843/(min.axis*major axis))
	Radiation Pattern	B.3.c	*Any*	Extracted from ellipse parameters in GIMS
	Pointing accuracy	B.3.d	0.1	-
	Boresight	B.3.f.1	*Any*	Extracted from ellipse parameters in GIMS
	Rotation accuracy	B.3.f.2.a	1	-
	Major axis orientation	B.3.f.2.b	*Any*	Extracted from ellipse parameters in GIMS
	Major axis at hal-power beamwidth	B.3.f.2.c	*Any*	Extracted from ellipse parameters in GIMS
	Minor axis at hal-power beamwidth	B.3.f.2.d	*Any*	Extracted from ellipse parameters in GIMS
Group	Operating Administration or Agency	A.3.a	*Any*	Just for completeness. Will be removed in Plan assignment
	Responsible Administration	A.3.b	*Any*	Just for completeness. Will be removed in Plan assignment
	Assigned frequency bandwidth	C.3.a	27000	-
	Class of station	C.4.a	EV	-
	Polarization	C.6	CR, CL or L	If linear, vector angle is mandatory

Summary of parameters for AP30 submission (2)

Level	AP4 Item	AP4 reference	Value	Conditions
Emission/freq	Assigned frequencies	C.2.a	*Any*	Ten consecutive odd or even channels with standard Appendix 30 assigned frequencies
	Designation of emission	C.7.a	27M0G7W--	27 MHz and digital
	Total Power	C.8.b.1	*Any*	PFD level shall not exceed –103.6 dB(W/m2. 27 MHz)) EIRP = total power (C.8.b.1) + Co-polar gain (B.3.a.1) Default $EIRP_{DL}$ = 58.4 dBW
	Maximum power density	C.8.b.2	*Any*	Total power-10*log(27 MHz)
	Maximum power density over bandwidth	C.8.h	*Any*	Equal to maximum power density
	Modulation Characteristics	C.9	*Any*	Just for completeness.
Srv Area/Assoc ES	Maximum isotropic gain	C.10.d.3	*Any*	Default value depending on diameter and radiation pattern (suggested: 35.5 dBi)
	Half-power beamwidth	C.10.d.4	*Any*	Default value depending on diameter and radiation pattern (suggested: 2.86 degrees)
	Radiation Pattern	C.10.d.5.a	*Any*	(suggested: MODRES)
	Equivalent antenna diameter	C.10.d.8	*Any*	Default value depending on gain and radiation pattern (suggested: 0.6 m)
	Service area No.	C.11.a.1	1	-
	Test-points coordinates	C.11.a	*Any*	Up to 20 test-points. On land and within national territory.

Summary of parameters for AP30A submission (1)

Level	AP4 Item	AP4 reference	Value	Conditions
Notice	Notifying Administration	A.1.f.1	*Any*	Acronym of administration
	Satellite network name	A.1.a	*Any*	Up to 30 characters (see https://www.itu.int/ITU-R/go/space-naming-convention/en)
	Nominal Orbital Longitude	A.4.a.1	*Any*	orbital positions for which the Annex 7 to Appendix 30 (Rev.WRC-15) limitations were suppressed by WRC-19. Same orbital position as AP30 submission.
	Longitudinal tolerance west	A.4.a.2.b	0.1	-
	Longitudinal tolerance east	A.4.a.2.a	0.1	-
	Regular Hours of Operation start	A.11.a	0	-
	Regular Hours of Operation end	A.11.b	24	-
Beam	Transmitting/Receiving	B.2	Receiving	-
	Shape of the Beam	-	Elliptical	-
	Beam designation	B.1.a	*Any*	Avoid spaces (suggested name: E001)
	Co-polar gain	B.3.a.1	*Any*	10*log(27843/(min.axis*major axis))
	Radiation Pattern	B.3.c	*Any*	Extracted from ellipse parameters in GIMS
	Pointing accuracy	B.3.d	0.1	-
	Boresight	B.3.f.1	*Any*	Extracted from ellipse parameters in GIMS
	Rotation accuracy	B.3.f.2.a	1	-
	Major axis orientation	B.3.f.2.b	*Any*	Extracted from ellipse parameters in GIMS
	Major axis at hal-power beamwidth	B.3.f.2.c	*Any*	Extracted from ellipse parameters in GIMS
	Minor axis at hal-power beamwidth	B.3.f.2.d	*Any*	Extracted from ellipse parameters in GIMS
Group	Operating Administration or Agency	A.3.a	*Any*	Just for completeness. Will be removed in Plan assignment
	Responsible Administration	A.3.b	*Any*	Just for completeness. Will be removed in Plan assignment
	Assigned frequency bandwidth	C.3.a	27000	-
	Class of station	C.4.a	EC	-
	Receiving system noise temperature	C.5.a	600 or 750	600 (for 17 GHz) or 750 (for 14 GHz)
	Polarization	C.6	CR, CL or L	If linear, vector angle is mandatory

Summary of parameters for AP30A submission (2)

Level	AP4 Item	AP4 reference	Value	Conditions
Emission/freq	Assigned frequencies	C.2.a	*Any*	Ten consecutive odd or even channels with standard Appendix 30 assigned frequencies
	Designation of emission	C.7.a	27M0G7W--	27 MHz and digital
	Total Power	C.8.b.1	*Any*	PFD level shall not exceed –76 dB(W/m2. 27 MHz)) EIRP = total power (C.8.b.1) + Co-polar gain (B.3.a.1) Default $EIRP_{FL}$ = 84 dBW
	Maximum power density	C.8.b.2	*Any*	Total power-10*log(27 MHz)
	Maximum power density over bandwidth	C.8.h	*Any*	Equal to maximum power density
	Power control	C.8.i	*Blank*	Bureau will calculate and publish the final power control values
	Modulation Characteristics	C.9	*Any*	Just for completeness.
Srv Area/Assoc ES	Maximum isotropic gain	C.10.d.3	*Any*	Default value depending on diameter and radiation pattern (suggested: 57 dBi)
	Half-power beamwidth	C.10.d.4	*Any*	Default value depending on diameter and radiation pattern (suggested: 0.25 degrees)
	Radiation Pattern	C.10.d.5.a	*Any*	(suggested: MODTES)
	Antenna diameter	C.10.d.7	*Any*	Default value depending on gain and radiation pattern (suggested: 5 m)
	Service area No.	C.11.a.1	1	-
	Test-points coordinates	C.11.a	*Any*	Up to 20 test-points. On land and within national territory.

Thank you for your attention!

Any question?

alvarode.vega@itu.int

Annex 1: Assign MSPACE group code to existing Plan assignments

adm	ntc_id	sat_name	long_nom	plan_id	MSPACE_CODE	adm	ntc_id	sat_name	long_nom	plan_id	MSPACE_CODE
AFS	100550002	AFS02100	4.8	00DN	4L	NIG	100550153	NIG11900	-19.2	00DN	4G
AFS	100550401	AFS02101	4.8	00UP	4L	NIG	100550419	NIG11901	-19.2	00UP	4G
AFS	100550402	AFS02102	4.8	00UP	4L	NIG	100550420	NIG11902	-19.2	00UP	4G
BDI	100550026	BDI27000	11	00DN	Z0	NMB	100550154	NMB02500	-18.8	00DN	4H
BDI	100550671	BDI27000	11	00UP	Z0	NMB	100550421	NMB02501	-18.8	00UP	4H
BEN	100550028	BEN23300	-19.2	00DN	Z1	NMB	100550422	NMB02502	-18.8	00UP	4H
BEN	100550673	BEN23300	-19.2	00UP	Z1	RRW	100550170	RRW31000	11	00DN	ZF
BOT	100550034	BOT29700	-0.8	00DN	Z2	RRW	100550805	RRW31000	11	00UP	ZF
BOT	100550679	BOT29700	-0.8	00UP	Z2	SDN	100550179	SDN__100	-7	00DN	4J
COD	100550051	COD__100	-19.2	00DN	Z3	SDN	100550429	SDN__101	-7	00UP	4J
COD	100550694	COD__100	-19.2	00UP	Z3	SDN	100550430	SDN__102	-7	00UP	4J
COG	100550052	COG23500	-13.2	00DN	Z4	SEY	100550181	SEY00000	42.5	00DN	4T
COG	100550695	COG23500	-13.2	00UP	Z4	SEY	100550433	SEY00001	42.5	00UP	4T
COM	100550053	COM20700	29	00DN	Z5	SEY	100550434	SEY00002	42.5	00UP	4T
COM	100550696	COM20700	29	00UP	Z5	SEY	100550814	SEY00000	42.5	00UP	4T
DJI	100550063	DJI09900	16.8	00DN	Z6	SOM	100550186	SOM31200	37.8	00DN	4Q
DJI	100550706	DJI09900	16.8	00UP	Z6	SOM	100550435	SOM31201	37.8	00UP	4Q
GAB	100550085	GAB26000	-13.2	00DN	Z7	SOM	100550436	SOM31202	37.8	00UP	4Q
GAB	100550727	GAB26000	-13.2	00UP	Z7	SSD	?	?	?	00DN	ZG
GNE	100550090	GNE30300	-18.8	00DN	Z8	SSD	?	?	?	00UP	ZG
GNE	100550731	GNE30300	-18.8	00UP	Z8	SWZ	100550194	SWZ31300	4.8	00DN	ZH
KEN	100550120	KEN24900	-0.8	00DN	Z9	SWZ	100550826	SWZ31300	4.8	00UP	ZH
KEN	100550762	KEN24900	-0.8	00UP	Z9	TCD	100550197	TCD14300	17	00DN	ZI
LSO	100550133	LSO30500	4.8	00DN	ZA	TCD	100550829	TCD14300	17	00UP	ZI
LSO	100550774	LSO30500	4.8	00UP	ZA	TUN	100550204	TUN15000	-25.2	00DN	55
MAU	100550137	MAU__100	29	00DN	ZB	TUN	100550205	TUN27200	-25.2	00DN	55
MAU	100550778	MAU__100	29	00UP	ZB	TUN	100550835	TUN15000	-25.2	00UP	55
MDG	100550140	MDG23600	29	00DN	ZC	TUN	100550836	TUN27200	-25.2	00UP	55
MDG	100550781	MDG23600	29	00UP	ZC	TZA	100550208	TZA22500	11	00DN	ZJ
MLI	100550145	MLI__100	-19.2	00DN	ZD	TZA	100550839	TZA22500	11	00UP	ZJ
MLI	100550786	MLI__100	-19.2	00UP	ZD	UGA	100550210	UGA05100	17	00DN	ZK
MOZ	100550148	MOZ30700	-1	00DN	4K	UGA	100550841	UGA05100	17	00UP	ZK
MOZ	100550417	MOZ30701	-1	00UP	4K	ZMB	100550222	ZMB31400	-0.8	00DN	ZL
MOZ	100550418	MOZ30702	-1	00UP	4K	ZMB	100550854	ZMB31400	-0.8	00UP	ZL
MWI	100550151	MWI30800	4.8	00DN	ZE	ZWE	100550223	ZWE13500	-0.8	00DN	ZM
MWI	100550791	MWI30800	4.8	00UP	ZE	ZWE	100550855	ZWE13500	-0.8	00UP	ZM

Annex 2: Submission AP30A in 14 GHz

- *In 14 GHz, possible channels are 1 to 14, so it is not possible to select 10 consecutive odd or even channels. So, it is necessary a combination of maximum 10 channels with different polarization (for example, 5 odd channels with circular right polarization and 5 even channels with circular left polarization).*

Main steps:

1. *Follow the instructions for the generation of the SNS database for the AP30A submission in exercise 3.b), selecting the first part of the channels (e.g. 5 odd channels with circular right polarization).*
2. *Once finished, close the notice and go to "Notice Explorer"*
3. *Select the AP30A notice and double click on it. The beam will be displayed.*
4. *Select the beam and double click on it. The group will be displayed.*
5. *Select the group and click on right button of the mouse. Select the option "Clone".*
6. *Press OK to create the new group in the same notice and the same beam.*
7. *Select new group (group id: 2) and click on "Show". The tab "Group" will open.*
8. *Change to the opposite polarization to group id 1 (e.g. CR vs CL, L/0 vs L/90)*
9. *Go to tab "Emissions/Frequencies" and modify the channel numbers to select the rest of the channels not included in group id 1 (e.g. 5 even channels with circular left polarization).*