



Technical justification (and Control and Performance) tips

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References



- Detailed guideline is given in Proposer's Guide (PG)
 - section 5.3 and Appendix B
- Supporting materials
 - OT Reference Manual/video tutorial
 - Technical Handbook
 - Knowledgebase articles



Technical justification

- is entered directly into OT in the TJ node of *each ScienceGoal*
- must include a quantitative description and justification of the expected source brightness, the requested sensitivity and S/N ratio, angular resolution and spectral setup
- must be self-contained
 - figures can be included in Science Justification PDF
- three major sections: sensitivity, imaging, correlator configuration





Sensitivity

- explain which sensitivity or S/N are expected for all the parts of the spectrum that are of interest, and the means by which the proposed technical setup will achieve those requests





Sensitivity

- enter values with care in other sections (“Field Setup”, “Control and Performance”, etc) prior to enter Technical Justification texts
 - OT will display warning(s) about potentially problematic setup(s)





Blue warning potentially problematic setups



Spectral | Spatial | Technical Justification

Enter a Technical Justification for this Science Goal, paying special attention to the parameters reproduced below.

Sensitivity

Requested RMS over 100.000 km/s is 500.00 uJy

For a peak flux density of 1.00 mJy , the S/N is 2.0

Achieved RMS over the total 1.875 GHz bandwidth is 86.16 uJy

For a continuum flux density of 500.00 mJy , the achieved S/N is 5802.8

For a peak line flux of 1.00 mJy , the achieved S/N over 1/3 of the source line width (100.00 km/s / 3 = 33.33 km/s) is 1.2

Note that one or more of the S/N estimates are < 3. Please double-check the RMS and/or line fluxes entered and/or address the issue below.

Line width / bandwidth used for sensitivity (100.00 km/s / 100.00 km/s) = 1.00

Note that the bandwidth used for sensitivity is larger than 1/3 of the linewidth.

The S/N achieved for a resolution element that allows the line to be resolved will be lower than that reported.

Spectral Dynamic Range (continuum flux / line rms): 1018.06

Note that the dynamic range is higher than that offered for the chosen band in this cycle. Please double-check your input and/or address the issue below.

Justify your requested RMS and resulting S/N for the spectral line and/or continuum observations.

For line observations also justify the bandwidth used for the sensitivity calculation.

The PI have to modify the setup and/or justify it





Blue warning

potentially problematic setups



- Potentially problematic setups OT will warn
 - Signal-to-Noise ratio (S/N) < 3
 - bandwidth for sensitivity > 1/3 of line width
 - spectral resolution > 1/3 of line width
 - a project aiming to study kinematics with a spectral line
 - very high spectral dynamic range
 - highly band dependent, see Proposer's Guide A9.3
- PI have to modify the setup and/or justify it, otherwise it may lead to a rejection (technically unfeasible)





Spectral Dynamic Range

Band	3	4	5	6	7	8	9	10
Limit	1000	1000	500	1000	400	250	170	150

Proposer's Guide A9.3





Problematic setups in sensitivity estimation

- *The followings are extreme examples of problematic setups but are frequently detected. Again, if they are not justified clearly, it may lead to a rejection.*
- “bandwidth used for sensitivity” is wider than target line width
- “bandwidth used for sensitivity” is given in “aggregate bandwidth” even though the SG is targeting spectral observation





Imaging & Correlator

- Imaging
 - angular resolution (AR) and largest angular scale (LAS) needed to image complex emission should be carefully justified
 - PIs should also pay attention to the expected image dynamic range (see PG A.9.1)
- Correlator configuration
 - correlator setup and the placement of spectral windows should be justified (enough resolution?)
 - check whether any of the spectral windows are severely impacted by atmospheric absorption





Needs Specific Justification

- *Any of the followings trigger an additional text box (“Choices to be justified”) at the bottom of TJ section, and the PI is requested to justify it explicitly*
- Override of OT’s sensitivity-based time estimate
- Time Constraint observations
- User-defined calibration
- Low maximum source elevation (Dec.>37deg)
- Single polarization
- Non-Nyquist Mosaic Sampling



- polarization observation toward high declination (far-north) source is *unfeasible*
 - more than three hours continuous observation is not feasible
- use appropriate unit at “Desired sensitivity per pointing”, otherwise the input value may suffer rounding issue
e.g. (bad) 0.000007 Jy \rightarrow (good) 7 μ Jy(microJy)





Take-Home Message



- double-check values you input!
- refer the documents and Knowledgebase articles
- if you have any question, please do not hesitate to consult with EA-ARC via Helpdesk

