1. PRE-PROCESSING AND DATA PREPARATION

Procedure	Summary	CASA/external tasks	Inputs	Outputs	Recommended	Notes
run_importfitsidi	FITS to MS Prepare and fix data and produce summary	importfitsidi	fits(s)	MS	mandatory	Will merge all fits files in the specified folder
		setToCasaOrder	MS (deleted)	new MS	no	Does not make process faster. Currently not run by the pipeline
		fixvis	MS (deleted)	new MS	mandatory	
		flagdata	MS		yes	Flags autocorrelations
		listobs	MS	listobs txt	yes	Produces summary txt file
get_msinfo	Source list, antennas, band, spw	ms.get_data vishead	MS	sources.pkl ...	Auto	Currently scattered through the pipeline. To be a single procedure. List of sources and their types stored in dictionary
check_mixed_mode	Separate continuum data in one MS and high-res spectral line data	split	MS → MS.original	MS MS_spw(i)	Auto	Thought for L-band mixed mode observations. Will keep original MS and produce additional MS for continuum and lines
hanning	Run hanning smoothing to help RFI removal	hanningsmooth or mstranform	MS (deleted)	new MS	L band only	Useful to reduce RFIs at L band
rfigui	Start rfigui to define aoflagger strategies	rfigui	MS		no	Only if you want to manually create your own aoflagger strategies
ms2mms	Convert to MMS format to run tasks in parallel	mstransform	MS (deleted)	MMS	Wide-field/full-resolution obs?	Takes time to convert but makes later calibration and imaging faster. To be tested in detail.
flag0_aoflagger	Autoflag data using predefined strategies	aoflagger	MS or MMS		L band only	Accepts user strategies per field. Can take very long if low memory available
prediag	Produce some plots of amp and phase with time and freq for each baseline	plotms	MS or MMS		no	Early development. It takes time and the plots are not very nice, but may help.
flag1_apriori	Standard flags: Lo-Mk2, edge channels, slewing (5 min for bright, 20 sec for phasecal/target)	flagdata	MS or MMS		yes	Quack times depend on observation. If you need to flag additional times, use flag2a_manual
flag2a_manual	Applies external inpfile with flag commands	flagdata	MS or MS, inputfg_a.flags		optional	Applies flag commands prepared by the user in external file to **unaveraged** data
average_1	Split dataset and average to reduce data volume	split	MS or MMS	MS or MMS listobs	optional	Averages data to 128 chan/spw and 2 sec integration times
flag_2b_manual	Applies external inpfile with flag commands	flagdata	MS or MMS inputfg_b.flags		optional	Applies flag commands prepared by the user in external file to **averaged** data

2. CALIBRATION

Proceduce	Summary	CASA/external tasks	Inputs	Outputs*	Notes
init_models	Initializes model for 3C286 and all other sources	setjy (3C286)			Initialzize models of 3C286 for L and C band
		setjy (all other)			Initialize all other sources to amp=1, phase=0
bandpass_0	Initial calibration of bandpass calibrator and create initial BP table	gaincal (K)		bpcal_d.K0	Delay (K), 180s, combine=spw, on bpcal
		gaincal (G,p)	bpcal_d.K0,	bpcal_p.G0	G, phase, 8s, on bpcal
		gaincal (G,ap)	bpcal_d.K0, bpcal_p.G0	bpcal_ap.G1	G, amp+phase, 180s, on bpcal
		bandpass	bpcal_d.K0, bpcal_p.G0, bpcal_ap.G1	bpcal.B0	bandpass, solint inf, on bpcal
flag_3_tfcropBP	Uses mode TFCROP in flagdata on bp-corrected data to flag RFIs	flagdata	bpcal.B0		Will apply BP cal if not done in previous step. correlation='ABS_ALL', ntime='90min', combinescans=True, datacolumn='corrected', winsize=3, timecutoff=4.0, freqcutoff=3.0, maxnpieces=1, usewindowstats='sum', halfwin=3
delay	Dely calibration of all calibrators	gaincal (K)	bpcal.B0	delay.K1	K, 600s, combine=’spw’
gain_0_p_ap	Phase and amplitude calibration against time for all calibrators	gaincal (G,p)	bpcal.B0, delay.K1	allcal_p.G0	G, phase, 8s, on all calibrators
		gaincal (G,ap)	bpcal.B0, delay.K1, allcal_p.G0	allcal_ap.G1	G, amp&phase, 120s, on all calibrators
		gaincal (G,p)	bpcal.B0, delay.K1	phscal_p_scan.G2	G, phase, solint=inf, on phasecal for phase referencing
fluxscale	Find abolute flux density scale by bootstraping to 3C286	fluxscale	allcal_ap.G1	allcal_ap.G1_fluxscaled fluxes.txt	Will try to not include Lo, and then De, while keeping at least 4 stations. **WARNING**: needs to find actual eMfactor using dfluxpy. Currently using a reference value
bandpass_1_sp	Re-calculate BP table including real flux densities and sp index	bandpass	delay.K1, allcal_p.G0, allcal_ap.G1_fluxscaled	bpcal_sp.B1	bandpass, solint inf, on bpcal
gain_1_amp_sp	Re-calculate amplitude calib including spectral index	gaincal (G,ap)	delay.K1, allcal_p.G0, bpcal_sp.B1	allcal_ap.G3	G, amp&phase, 180s, on all calibrators including spectrl information
applycal_all	Apply all calibration to all sources	applycal (calibrators)	delay.K1, bpcal_sp.B1, allcal_p.G0, allcal_ap.G3		Apply calibration to all **calibrators** with own solutions
		applycal (targets)	delay.K1, bpcal_sp.B1, phscal_p_scan.G2, allcal_ap.G3		Apply calibration to all **targets** using phase-reference calibrator solutions (scan-averaged phases)

* Plots are generated for all calibration tables produced.