FLASH Spectral Line Data Validation Report

Last modified: 11-Nov-2020 by Hyein Yoon
Original script for WALLABY: 24-Mar-2020 by Bi-Qing For (ICRAR/UWA)

Notes for FLASH:
- This tool uses ASKAPsoft producs. FITS-datacubes are needed for getting major and minor beam sizes only (from the header).
- Not all data are availble, so some dummy files were used to run the script successfully.
- 1) Combining all info from spectra + continuum
- 2) Any other additional items to be required?

Observation

SBID	No. of Antennas	Obs Start Date/Time	Obs End Date/Time	Duration (hr)	Field	R.A.	Decl.	Total Bandwidth (MHz)
13293	36	19-Apr-2020/08:29:22.1	19-Apr-2020/14:29:30.7	6.0	FLASH_G9A_long	08:47:35.5	+00.30.00.0	288.0

- col 1: from input by user
- col 2-8: from ./metadata/mslist-*.txt
- col 9: from ./metadata/mslist-Science*.txt

Processed Image Cube

ASKAPsoft version*	Cal SBID	Frequency Range (MHz)	Central Frequency (MHz)	Channel Width (kHz)	Synthesised Beam (arcsec x arcsec)	Beam Logs	Flagged Visibilities	Flagged Antennas	Expected RMS
2020-10-09T04:21:48	1329	711.5--999.481	855.4907	18.519	30x30			 Click here	

- col 1: from ./slurmOutput/*.sh - if more than one version of ASKAPsoft is used for the whole reduction, the latest one is reported.
- col 2: from ./diagnostics/cubestats-/cubeStats*linmos.contsub.txt (mosaic contsub)
- col 3-4: from ./metadata/mslist-Science*.txt
- col 5: from FITS-datacube (CURRENT VERSION: continuum subtracted beam00 cube - Nov 22 ver.; too large beam size? depending on robust parameter?)
- col 6: from ./SpectralCube_BeamLogs/beamlogs*.txt
- col 6: Bi-qing's notes: Evaluating each channel of each beam if ASKAPSoft fails to synthesize the beam, bmaj and bmin to 30 arcsec. bmaj and bmin for the first few channels are always zero.
- col 7: from ./flagSummary/*.flagSummary
- col 8: from ./flagSummary/*.flagSummary (flagged fraction) + theoretical rms estimation (based on input values)

Beams Statistics

Beam Image Cube	Continuum Subtracted Beam Cube	Residual Beam Cube
 Min, Max, 1 percentile	 Min, Max, 1 percentile	 Min, Max, 1 percentile
Stdev, MADFM	Stdev, MADFM	Stdev, MADFM

- col 1-3: from beamMinMax Plots
- why one percentile?

Continuum Subtracted Beam Cube	
 MAD Max Flux Density	 1-percentile noise rank

- col 1: from beamMinMax Plots
- col 2: from CubeStat*contsub.txt

Mosaic Statistics

Image Cube	Continuum Subtracted Cube	Residual Cube	Number of Bad Channel	Missing Data (Channel)
			4340 Click here	Yes < 100, n= 7

- col 1-3: from cubePlots
- col 4: from CubeStat*contsub.txt

Source and Noise Spectra from five bright components

Component 01a	Component 01b	Component 02a	Component 03a	Component 03b
				
 10/33 chunks > 5-sigma	 13/33 chunks > 5-sigma	 13/33 chunks > 5-sigma	 9/33 chunks > 5-sigma	 11/33 chunks > 5-sigma

- Spectra toward five brightest components
- Deviation from noise spectra (9 MHz chunks)

Median noise flux density - noise Spectra

Low frequency (first 5,000 channels)	High frequency (last 5,000 channels)
 199 component (outside 3.2 deg)	 139 component (outside 3.2 deg)
 RA offset (red points: outside 3.2 deg)	 RA offset (red points: outside 3.2 deg)
 DEC offset (red points: outside 3.2 deg)	 DEC offset (red points: outside 3.2 deg)

- Mean noise flux density - noise spectra
- stable out to 3.2 degree

Continuum - comparison with NVSS

Continuum image	Statistics	RA/DEC offset	Flux comparison	Flux vs distance from image centre
				

- col 1: continuum image + selavy bright componenets
- col 2: size & flux histogram
- col 3: RA/DEC offset (comparison with NVSS)
- col 4: flux difference (comparison with NVSS)
- col 5: primary beam correction check (comparison with NVSS)

- data from Vizier NVSS (Condon+ 1998)
- a resolution of 45 arcsec