Test 0.7.5 Verify function of PACS chopper

Objectives

Check the availability and basic functionalities of the focal plane chopper. The chopper should be operational over the entire throw regime and must generate HK data with nominal/diagnostic values. This test will be done both for nominal (fieldplate 1) and redundant mode (fieldplate 2). The test will be also done in degraded mode. The test can be conducted both in spectroscopic and photometric mode.

Reflected requirements:

- Science operation $0° - \pm 4.1°$, without accuracy check;
- Calibration operation $\pm(8.5° - 9.5°)$, without accuracy check;

Related features to check:

- DMC accepts and executes chopper move commands (absolute/relative);
- DMC can read-out chopper fieldplate sensor values;
- DMC can generate chopper HK;
- DMC can generate chopper diagnostic HK at least at readout frequency;
- using the entire setpoint interval [-XXXXX:+XXXXX; from -XX to +XX degrees];

Degraded (failure) mode operations:

- Coils switching is possible (TBC);

Priority

A (on ground)

When performed / frequency

CQM-ILT
EQM-IST
PFM-ILT
PFM-IST

Inputs, prerequisites

PACS should be switched on (primary mode), set to spectroscopy or photometry mode. The current TIP assumes spectroscopy setup.

Interconnections

A. Fulfilled By

B. Fulfilling

OGSE Setup, astr. sources, OBSW Compr./Red.

not needed;

Test Implementation Procedure (TIP)

This test consists of two parts. In the first part we go from one extreme to the other (-XXXXX to +XXXXX - default -5000 to +5000) using the relative chopper movement. In the second part we do a square-wave chopping with incremental throw, starting at 0 and stopping at -/+ XXXXX (default -/+5000), and absolute chopper movement.

Step #	Test Implementation Procedure	OGSE Setup	Products Online Analysis	Pass/Fail & Remarks
	CQM ILT TIP for req. 0.7.5 Verify function of PACS chopper			
	Default Setup for this PTD			
0.01	`Switch on PACS` (if not already done).			
0.02	`Setup spectroscopy mode` (if not already done). Default parameters of spectroscopy mode.			

0.03	`Set diagnostic HK for chopper measures at readout frequency`.
	synchronize on blue spectrometer readout
	`209 DMC_CHOP_CTRL_ST - Chopper Control Status`
	`244 DMC_CHOP_CUR_POS - Chopper: Actual position from readout by HK`
	`245 DMC_CHOP_SETPOIN - Chopper: Position servo setpoint`
	`246 DMC_CHOP_TARGET - Chopper: Final position for move`
	`247 DMC_CHOP_PID_ERR - Chopper: Current error between position and setpoint`
	`248 DMC_CHOP_PID_ACC - Chopper: Integral accumulator of servo PID algorithm`
	`249 DMC_CHOP_MAX_DIT - Chopper: Maximum Dither Value`
	`258 DMC_CHOP_OUTPUT - Current set in chopper output`
	`407 DMC_CHOPPER_TEMP - Chopper temperature sensor resistor value`
	`557 DMC_CHOP_VA - Chopper amplifier voltage side A`
	`561 DMC_CHOP_IA - Chopper amplifier current side A`
	`565 DMC_CHOP_VB - Chopper amplifier voltage side B`
			check during the test procedure the chopper diagnostic housekeepings;	

	Step 1: Move the chopper from extreme negative to extreme positive deflection by relative increment			
1.01	Increase throw from $-$X.XX deg. up to $+$X.XX deg. with steps of X.X degrees. We use the chopper relative move command.			
1.02	`Move chopper back to zero position`			
	Step 2: Square-wave chopping with absolute incremental throw			

2.01	Increase throw from 0.00 deg. up to X.XX deg. with steps of X.X degrees. Chopper alternates between +/- throws. We will use the Chopper absolute move command.
	`Loop over chopper throws:`
	`throw = throw + increment`
	`throw = -1 * throw`
	`wait Y sec (default 5sec)`
	`throw = +1 * throw`
	`wait Y sec (default 5sec)`
	`End loop`			

2.02	`Move chopper back to zero position`			
	Step 3: Degraded Mode			
3.01	If degrade mode will be carried out, then coil switching has to be done and the current limit has to be modified.			
3.02	Repeat steps 1 and 2.			
	Step 4: End of Test			
4.01	`Set PACS in default starting mode.` stop diagnostic housekeeping set PACS back to its default starting mode			

Estimated time needed

For the first step, we have XX steps $\times$ Y sec wait time. For the second step, we have XX steps $\times$ Y sec wait time. In total, this test procedure will last XXX sec.

Success criteria, required accuracy

If the FS chopper behaves like the CQM Chopper during CQM-ILTs and IMTs, then the test is successful.

Test Analysis Procedure (TAP)

The analysis relies only on diagnostic housekeeping data, no science data will be acquired. It has to be checked if fieldplate signal is coincident. The analysis will be done with the PACS Trend Analysis Tool.

Output, products

Coding Strategy

Version number

$Revision$: 1.3