

MGA Characterisation
File: H_COP_TTC_TTC7.xls
Author: E. Picallo



Procedure Summary

Objectives

This procedure describes the steps needed to perform a MGA Characterisation

Summary of Constraints

In order to support MGA characterisation, the ESA ground station measure the received AGC at front-end. The standard IFMS sampling rate could be increased (can be varied between between 0.1 to 10Hz). There is no impact using an increased sample-rate apart from disk space.

It is preferable to use a non-coherent carrier.
Ranging should be disabled (both on the spacecraft and on ground).

There is no requirement to provide the GS with the expected signal strength prior to the activity.

For Herschel a S/C slew around Z-axis is only possible if the SAA close to zero (TBC).

MGA characterisation is only feasible when SSCE (sun, S/C, earth angle) is about 15° i.e. near MGA FOV edge.

Spacecraft Configuration

Start of Procedure

CDMU in default configuration;
RX1 & RX2 ON, TC rate 4kbps
TX1 ON and TX2 OFF, TM rate 150kbps
RFDN configuration: ABAB (MGA on TX1&RX1 / LGA-1 on TX2&RX2)
ACMS mode in SCM
Sun Aspect Angle < 1°
SSCE (sun, s/c, earth) angle about 15°

End of Procedure

CDMU in default configuration;
RX1 & RX2 ON, TC rate 4kbps
TX1 ON and TX2 OFF, TM rate 150kbps
RFDN configuration: ABAB (MGA on TX1&RX1 / LGA-1 on TX2&RX2)
ACMS mode in SCM
Sun Aspect Angle < 1°
SSCE (sun, s/c, earth) angle about 15°

Reference File(s)

Input Command Sequences

Output Command Sequences

Referenced Displays

ANDs GRDs SLDs

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(None)

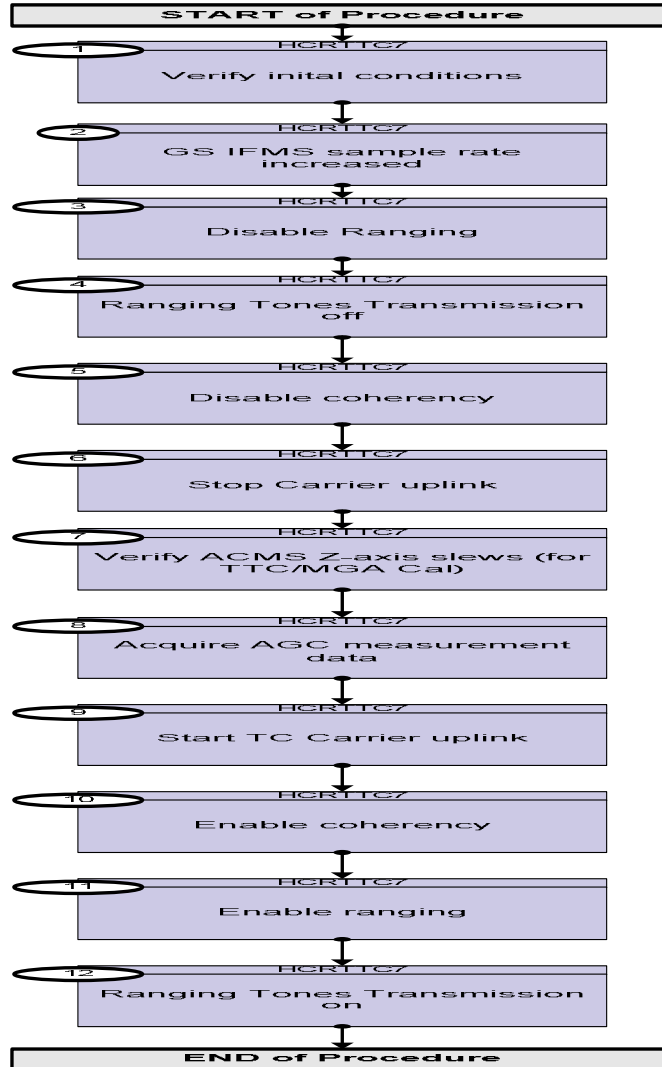
Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
02/03/09	2.1	1	Created	E. Picallo	

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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
Beginning of Procedure				
<p><i>TC Seq. Name : HCR TTC7 (MGA Characterisation)</i></p> <p><i>TimeTag Type: N</i> <i>Sub Schedule ID:</i></p> <p style="text-align: center;">□</p>				
1		Verify initial conditions		Next Step: 2
		<p>To be linked with H_COP_AOC_06</p> <p>MGA characterisation is only feasible when SSCE (sun, S/C, earth angle) is about 15° i.e. near MGA FOV edge.</p> <p>The procedure H_COP_AOC_06 includes the pointings to check the MGA FOV. After commmanding OCM slew = 90° and a transition OCM to SCM , a series of fine pointing is perfomed, where three of them (SCM # 17, 31 and 32) aim for checking MGA FOV.</p>		
		Verify Telemetry <div style="text-align: right;">AcmsMode AESMG002</div>	= SCM	(None)
		Verify Telemetry <div style="text-align: right;">AcmsSubstate AESMF002</div>		(None)
		Verify Telemetry <div style="text-align: right;">Sun asp angle AESAN002</div>	< 1 degree	(None)
		Verify Telemetry <div style="text-align: right;">Sunvector X BRF AEUVX001</div>	approx. 0	(None)
		Verify Telemetry <div style="text-align: right;">Sunvector Y BRF AEUVY001</div>	approx. 0	(None)
		Verify Telemetry <div style="text-align: right;">Sunvector Z BRF AEUVZ001</div>	approx. 1	(None)
2		GS IFMS sample rate increased		Next Step: 3
		<p>In order to support MGA characterisation, the ESA ground station measure the received AGC at front-end.</p> <p>The standard IFMS sampling rate could be increased (can be varied between between 0.1 to 10Hz). There is no impact using an increased sample-rate apart from disk space.</p>		
3		Disable Ranging		Next Step: 4
		For MGA characterisation, ranging should be disabled (both on the spacecraft and on ground).		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Call procedure H_FCP_TTC_TURM to deactivate ranging mode		
		Execute Procedure: H_FCP_TTC_TURM Transponder in use Ranging Activation/Deactivation		
4		<i>Ranging Tones Transmission off</i>		Next Step: 5
		Inform ECC that ranging is disabled and that they can stop the ranging operation. Note: There is no requirement to provide the GS with the expected signal strength prior to the activity.		
5		<i>Disable coherency</i>		Next Step: 6
		For MGA characterisation, it is preferable to use a non-coherent carrier.		
		Call procedure H_FCP_TTC_TUCM to deactivate coherent mode		
		Execute Procedure: H_FCP_TTC_TUCM Transponder in use Coherent Mode Activation/Deactivation		
6		<i>Stop Carrier uplink</i>		Next Step: 7
7		<i>Verify ACMS Z-axis slews (for TTC/MGA Cal)</i>		Next Step: 8
		To be linked with H_COP_AOC_06 Slew around sun vector check MGA FOV by making revolution on 360° around z axis (only possible if the SAA close to zero). The following H_COP_AOC_06 SFP poitings aim at checking MGA FOV: -SAA = 90°, roll= 0°, 120 deg slew around sun vector, interlacing off -SAA = 90°, roll= 0°, 120 deg slew around sun vector, interlacing off -SAA = 90°, roll= 0°, 120 deg slew around sun vector, interlacing off		

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Verify Telemetry AcmsMode AESMG002	= SCM	(None)
		Verify Telemetry Sun asp angle AESAN002	< 1 degree	(None)
		Verify Telemetry Sunvector X BRF AEUVX001	approx. 0	(None)
		Verify Telemetry Sunvector Y BRF AEUVY001	approx. 0	(None)
		Verify Telemetry Sunvector Z BRF AEUVZ001	approx. 1	(None)
7.1		Verify loaded TPF for Science Mode Fine Pointing		<input type="checkbox"/>
7.2		Verify start of slew		<input type="checkbox"/>
		The TM(5,1,16427) New mode_state indicates the start of slew as a change of substate.		
		Verify Packet Reception AccAsw TM_5_1_16427 - New mode_state Packet Details: APID: 512 Type: 5 Subtype: 1 PI1: 16427 PI2: 0	A51CSTATE109	
		Verify Packet Telemetry (Pkt = A51CSTATE109) Substate Event AE5ST109	= SCM Tracking	(None)
		Verify Telemetry AcmsSubstate AESMF002	= SCM Pointing	(None)
7.3		Wait for the end of commanded pointing		<input type="checkbox"/>
		Verify Packet Reception AccAsw TM_5_1_16441 - Mode Timedevent Packet Details: APID: 512 Type: 5 Subtype: 1 PI1: 16441 PI2: 0	A51T1MEVE109	
		Verify Packet Telemetry (Pkt = A51T1MEVE109) Time_Id AE5FG109	= Time Id Tp	(None)
8		Acquire AGC measurement data		Next Step: 9

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch
		Measure the Ground station received AGC at front-end. Measure the XPND Receiver power input (AGC level)		
9		<i>Start TC Carrier uplink</i>		Next Step: 10
10		<i>Enable coherency</i>		Next Step: 11
		Call procedure H_FCP_TTC_TUCM to activate coherent mode		
		Execute Procedure: H_FCP_TTC_TUCM Transponder in use Coherent Mode Activation/Deactivation		
11		<i>Enable ranging</i>		Next Step: 12
		Call procedure H_FCP_TTC_TURM to activate ranging mode		
		Execute Procedure: H_FCP_TTC_TURM Transponder in use Ranging Activation/Deactivation		
12		<i>Ranging Tones Transmission on</i>		Next Step: END
		Inform ECC that ranging is enabled and that they can start the ranging operation. Continue while ranging is ongoing.		
End of Procedure				