

Check CDMU OBS image in EEPROM (checksum calculation)
 File: H_FCP_OBS_1263.xls
 Author: t.loureiro-hp



Procedure Summary

Objectives

This Herschel OBSM nominal procedure is used to conduct a CDMU On-Board SW EEPROM image integrity verification. The whole OBS on-board image is checked via checksum calculation. The procedure covers verification of both 'Image 1' and 'Image 2'.

The memory ckeck is commanded using TC(6,9) and the checksums calculated on-board are received on ground in TM(6,10) packets.

This procedure doesn't use OBSM generated command stacks, but command stacks generated by MOIS from the procedure itself.

Summary of Constraints

CDMU in Operational Mode

Execution of service 6 TCs will be delayed when there is an ongoing:

- TC(6,2) Load Memory Using Absolute Addresses
- TC(6,5) Dump Memory Using Absolute Addresses
- TC(6,9) Check Memory Using Absolute Addresses
- TC(8,4,1,1) Copy Memory

Spacecraft Configuration

Start of Procedure

CDMU in operational mode

End of Procedure

Same as start except:
 - CDMS OBS 'Image 1' or/and 'Image 2' integrity verified via checksum calculation

Reference File(s)

Input Command Sequences

Output Command Sequences

OFCP126E
 OFCP126F

Referenced Displays

ANDs GRDs SLDs
 (None)

Configuration Control Information

DATE	FOP ISSUE	VERSION	MODIFICATION DESCRIPTION	AUTHOR	SPR REF
26/01/09	2	1	Created	Istefanov-hp	

Status : Version 2 - Unchanged
 Last Checkin: 16/04/09

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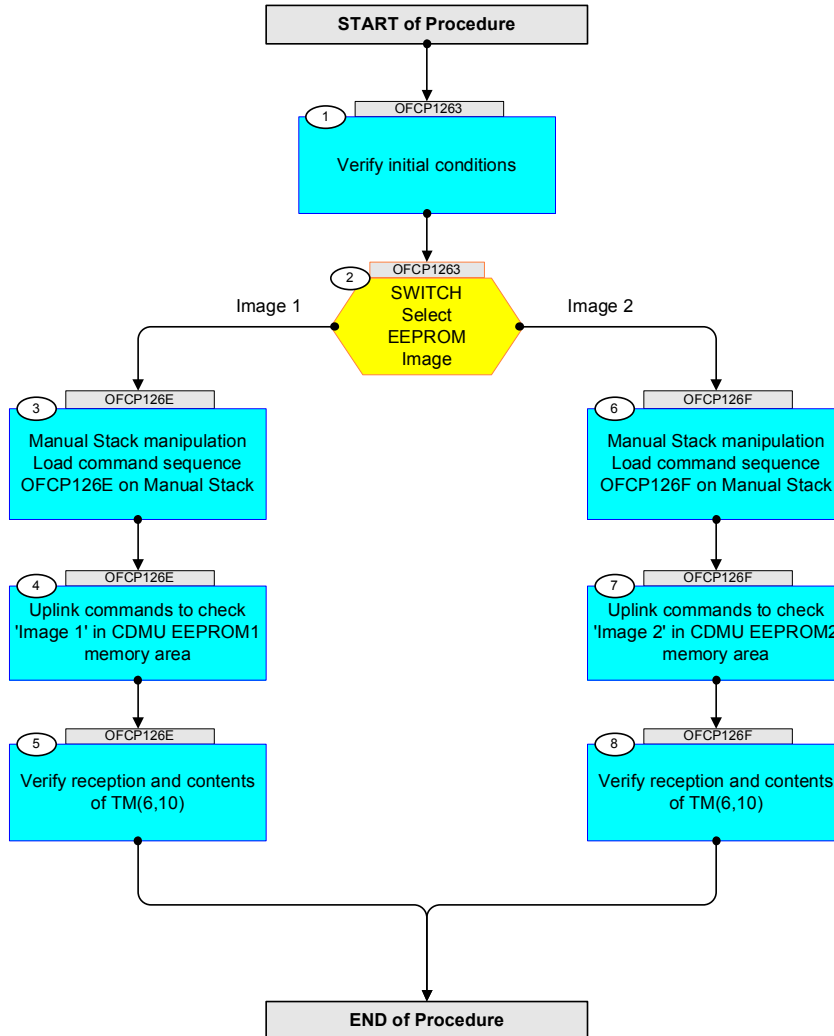


16/04/09	2.3	2	Updated checksums for Herschel OBS 3.10.0.0.□ Removed checksum values from procedure body.□ Added attachment with the expected checksum values at the end of procedure.	t.loureiro-hp	
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Procedure Flowchart Overview



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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment																																							
Beginning of Procedure																																												
OFCP1263		TC Seq. Name : OFCP1263 (CdmsObs Img check) Check CDMS OBS EEPROM Image integrity TimeTag Type: B Sub Schedule ID: <input type="checkbox"/>																																										
1		Verify initial conditions		Next Step: 2																																								
		Check: - CDMU in Operational Mode																																										
		Data Handling SOE to confirm CDMU mode																																										
2		SWITCH Select EEPROM Image type: [Switch]		Next Step: Image 1 3 Image 2 6																																								
End of Sequence																																												
OFCP126E		TC Seq. Name : OFCP126E (CdmsObs Image1 check) Check CDMS OBS EEPROM Image1 integrity TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>																																										
3		Manual Stack manipulation Load command sequence OFCP126E on Manual Stack		Next Step: 4																																								
3.1		Sequence data FP: N/A TT: N/A																																										
3.2		Check command sequence loaded																																										
		With the Manual Stack in 'Full mode', check the 17 TCs DC603180 in the loaded sequence. <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">TC #</th> <th style="text-align: left;">Memory_ID</th> <th style="text-align: left;">Start_Address</th> <th style="text-align: left;">N</th> </tr> </thead> <tbody> <tr><td>1</td><td>0080</td><td>0000</td><td>FFFF</td></tr> <tr><td>2</td><td>0080</td><td>FFFF</td><td>FFFF</td></tr> <tr><td>3</td><td>0081</td><td>FFFE</td><td>FFFF</td></tr> <tr><td>4</td><td>0082</td><td>FFFD</td><td>FFFF</td></tr> <tr><td>5</td><td>0083</td><td>FFFC</td><td>FFFF</td></tr> <tr><td>6</td><td>0084</td><td>FFFB</td><td>FFFF</td></tr> <tr><td>7</td><td>0085</td><td>FFFA</td><td>FFFF</td></tr> <tr><td>8</td><td>0086</td><td>FFF9</td><td>FFFF</td></tr> <tr><td>9</td><td>0087</td><td>FFF8</td><td>FFFF</td></tr> </tbody> </table>	TC #	Memory_ID	Start_Address	N	1	0080	0000	FFFF	2	0080	FFFF	FFFF	3	0081	FFFE	FFFF	4	0082	FFFD	FFFF	5	0083	FFFC	FFFF	6	0084	FFFB	FFFF	7	0085	FFFA	FFFF	8	0086	FFF9	FFFF	9	0087	FFF8	FFFF		
TC #	Memory_ID	Start_Address	N																																									
1	0080	0000	FFFF																																									
2	0080	FFFF	FFFF																																									
3	0081	FFFE	FFFF																																									
4	0082	FFFD	FFFF																																									
5	0083	FFFC	FFFF																																									
6	0084	FFFB	FFFF																																									
7	0085	FFFA	FFFF																																									
8	0086	FFF9	FFFF																																									
9	0087	FFF8	FFFF																																									

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		10 0088 FFF7 FFFF 11 0089 FFF6 FFFF 12 008A FFF5 FFFF 13 008B FFF4 FFFF 14 008C FFF3 FFFF 15 008D FFF2 FFFF 16 008E FFF1 FFFF 17 008F FFF0 0010			
4		Uplink commands to check 'Image 1' in CDMU EEPROM1 memory area		Next Step: 5	
		Uplink the 17 DC603180 memory check commands (one by one) with ARM-GO			
		For each TC DC603180 uplinked, a TM(6,10) packet shall be received on ground.			
		Execute Telecommand <div style="text-align: right; margin-right: 20px;">ChkMem_AbsAdd</div> <div style="text-align: right; margin-right: 20px;">DC603180</div> Command Parameter(s) : Memory_ID DH003180 0080 <hex> Start_Address DH004180 0000 <hex> N DH105180 FFFF <hex>		TC	
		TC Control Flags : <div style="text-align: right; margin-right: 20px;">GBM IL DSE --Y ---</div> Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses			
		Execute Telecommand <div style="text-align: right; margin-right: 20px;">ChkMem_AbsAdd</div> <div style="text-align: right; margin-right: 20px;">DC603180</div> Command Parameter(s) : Memory_ID DH003180 0080 <hex> Start_Address DH004180 FFFF <hex> N DH105180 FFFF <hex>		TC	
		TC Control Flags : <div style="text-align: right; margin-right: 20px;">GBM IL DSE --Y ---</div> Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses			
		Execute Telecommand <div style="text-align: right; margin-right: 20px;">ChkMem_AbsAdd</div> <div style="text-align: right; margin-right: 20px;">DC603180</div> Command Parameter(s) : Memory_ID DH003180 0081 <hex> Start_Address DH004180 FFFE <hex> N DH105180 FFFF <hex>		TC	
		TC Control Flags : <div style="text-align: right; margin-right: 20px;">GBM IL DSE --Y ---</div> Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses			

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
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		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
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		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
5		Verify reception and contents of TM(6,10)		Next Step: END	
		Verify Packet Reception Memory Check Report - Absolute Addresses Packet Mnemonic : MemChkRepAbs APID : 16 Type : 6 Subtype : 10 PI1 : PI2 :			
		Verify Telemetry Memory_ID DE060180	= <hex>		
		Verify Telemetry Start_Address DE061180	= <hex>	(None)	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment																																							
		Verify Telemetry N DE062180	= <hex>	(None)																																								
		Verify Telemetry Checksum DE064180	= <hex>	(None)																																								
5.1		Verify checksum values																																										
		Check the received checksums against the expected values listed in Attachment 1 (worksheet "CRC checksums"). IMPORTANT: Checksum values depend on the OBS version.																																										
		Verify Telemetry Checksum DE064180	= expected value	(None)																																								
End of Sequence																																												
OFCP126F TC Seq. Name :OFCP126F (CdmsObs Image2 check) Check CDMS OBS EEPROM Image2 integrity TimeTag Type: N Sub Schedule ID: <input type="checkbox"/>																																												
6		Manual Stack manipulation Load command sequence OFCP126F on Manual Stack		Next Step: 7																																								
6.1		Sequence data FP: N/A TT: N/A																																										
6.2		Check command sequence loaded																																										
		With the Manual Stack in 'Full mode', check the 17 TCs DC603180 in the loaded sequence.																																										
		<table border="1"> <thead> <tr> <th>TC #</th> <th>Memory_ID</th> <th>Start_Address</th> <th>N</th> </tr> </thead> <tbody> <tr><td>1</td><td>0090</td><td>0000</td><td>FFFF</td></tr> <tr><td>2</td><td>0090</td><td>FFFF</td><td>FFFF</td></tr> <tr><td>3</td><td>0091</td><td>FFFE</td><td>FFFF</td></tr> <tr><td>4</td><td>0092</td><td>FFFD</td><td>FFFF</td></tr> <tr><td>5</td><td>0093</td><td>FFFC</td><td>FFFF</td></tr> <tr><td>6</td><td>0094</td><td>FFFB</td><td>FFFF</td></tr> <tr><td>7</td><td>0095</td><td>FFFA</td><td>FFFF</td></tr> <tr><td>8</td><td>0096</td><td>FFF9</td><td>FFFF</td></tr> <tr><td>9</td><td>0097</td><td>FFF8</td><td>FFFF</td></tr> </tbody> </table>	TC #	Memory_ID	Start_Address	N	1	0090	0000	FFFF	2	0090	FFFF	FFFF	3	0091	FFFE	FFFF	4	0092	FFFD	FFFF	5	0093	FFFC	FFFF	6	0094	FFFB	FFFF	7	0095	FFFA	FFFF	8	0096	FFF9	FFFF	9	0097	FFF8	FFFF		
TC #	Memory_ID	Start_Address	N																																									
1	0090	0000	FFFF																																									
2	0090	FFFF	FFFF																																									
3	0091	FFFE	FFFF																																									
4	0092	FFFD	FFFF																																									
5	0093	FFFC	FFFF																																									
6	0094	FFFB	FFFF																																									
7	0095	FFFA	FFFF																																									
8	0096	FFF9	FFFF																																									
9	0097	FFF8	FFFF																																									

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		10 0098 FFF7 FFFF 11 0099 FFF6 FFFF 12 009A FFF5 FFFF 13 009B FFF4 FFFF 14 009C FFF3 FFFF 15 009D FFF2 FFFF 16 009E FFF1 FFFF 17 009F FFF0 0010			
7		Uplink commands to check 'Image 2' in CDMU EEPROM2 memory area		Next Step: 8	
		Uplink the 17 DC603180 memory check commands (one by one) with ARM-GO			
		For each TC DC603180 uplinked, a TM(6,10) packet shall be received on ground.			
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 0090 <hex> Start_Address DH004180 0000 <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses		TC	
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 0090 <hex> Start_Address DH004180 FFFF <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses		TC	
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 0091 <hex> Start_Address DH004180 FFFE <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses		TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 0097 <hex> Start_Address DH004180 FFF8 <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 0098 <hex> Start_Address DH004180 FFF7 <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 0099 <hex> Start_Address DH004180 FFF6 <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 009A <hex> Start_Address DH004180 FFF5 <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd DC603180 Command Parameter(s) : Memory_ID DH003180 009B <hex> Start_Address DH004180 FFF4 <hex> N DH105180 FFFF <hex> TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	

Check CDMU OBS image in EEPROM (checksum calculation)
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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
		Execute Telecommand ChkMem_AbsAdd Command Parameter(s) : Memory_ID DH003180 Start_Address DH004180 N DH105180 TC Control Flags : GBM IL DSE --Y -- --- Subsch. ID : 10 Det. descr. : Check Memory Using Absolute Addresses	DC603180	TC	
8		Verify reception and contents of TM(6,10)		Next Step: END	
		Verify Packet Reception Memory Check Report - Absolute Addresses Packet Mnemonic : MemChkRepAbs APID : 16 Type : 6 Subtype : 10 PI1 : PI2 :			
		Verify Telemetry Memory_ID DE060180	= <hex>		
		Verify Telemetry Start_Address DE061180	= <hex>	(None)	

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Step No.	Time	Activity/Remarks	TC/TLM	Display/ Branch	AIT Comment
		Verify Telemetry N DE062180	= <hex>	(None)	
		Verify Telemetry Checksum DE064180	= <hex>	(None)	
8.1		Verify checksum values			
		Check the received checksums against the expected values listed in Attachment 1 (worksheet "CRC checksums"). IMPORTANT: Checksum values depend on the OBS version.			
		Verify Telemetry Checksum DE064180	= expected value	(None)	
End of Sequence					
End of Procedure					

Herschel CDMU OBS image CRC checksums

Attachment 1

Check CDMU OBS image in EEPROM (checksum calculation)
 File: H_FCP_OBS_1263.xls
 Author: lstefanov-hp

Checksum #	EEPROM1		EEPROM2		CRC checksums
	Start address	End address	Start address	End address	OBS 3.10.0.0
1	0080.0000	0080.FFFE	0090.0000	0090.FFFE	250E
2	0080.FFFF	0081.FFFD	0090.FFFF	0091.FFFD	0EA7
3	0081.FFFE	0082.FFFC	0091.FFFE	0092.FFFC	D009
4	0082.FFFD	0083.FFFB	0092.FFFD	0093.FFFB	5723
5	0083.FFFC	0084.FFFA	0093.FFFC	0094.FFFA	4638
6	0084.FFFB	0085.FFF9	0094.FFFB	0095.FFF9	030D
7	0085.FFFA	0086.FFF8	0095.FFFA	0096.FFF8	798E
8	0086.FFF9	0087.FFF7	0096.FFF9	0097.FFF7	F157
9	0087.FFF8	0088.FFF6	0097.FFF8	0098.FFF6	FD13
10	0088.FFF7	0089.FFF5	0098.FFF7	0099.FFF5	D0E0
11	0089.FFF6	008A.FFF4	0099.FFF6	009A.FFF4	E0E2
12	008A.FFF5	008B.FFF3	009A.FFF5	009B.FFF3	1CCD
13	008B.FFF4	008C.FFF2	009B.FFF4	009C.FFF2	20DB
14	008C.FFF3	008D.FFF1	009C.FFF3	009D.FFF1	5532
15	008D.FFF2	008E.FFF0	009D.FFF2	009E.FFF0	71DF
16	008E.FFF1	008F.FFEF	009E.FFF1	009F.FFEF	8B78
17	008F.FFF0	008F.FFFF	009F.FFF0	009F.FFFF	7596

Herschel CDMU OBS image ANC32 checksums

Attachment 2

Check CDMU OBS image in EEPROM (checksum calculation)
 File: H_FCP_OBS_1263.xls
 Author: lstefanov-hp

Block #	EEPROM1		EEPROM2		ANC32 checksums
	Start address	End address	Start address	End address	OBS 3.10.0.0
1	0080.0000	0080.FFFF	0090.0000	0090.FFFF	3CE3FE35
2	0081.0000	0081.FFFF	0091.0000	0091.FFFF	3CAD91CE
3	0082.0000	0082.FFFF	0092.0000	0092.FFFF	624CDC35
4	0083.0000	0083.FFFF	0093.0000	0093.FFFF	D33C0567
5	0084.0000	0084.FFFF	0094.0000	0094.FFFF	366E0348
6	0085.0000	0084.FFFF	0095.0000	0094.FFFF	DD8E31B6
7	0086.0000	0086.FFFF	0096.0000	0096.FFFF	DF76F7BD
8	0087.0000	0087.FFFF	0097.0000	0097.FFFF	A389F996
9	0088.0000	0088.FFFF	0098.0000	0098.FFFF	9BDDD654
10	0089.0000	0089.FFFF	0099.0000	0099.FFFF	C92C926F
11	008A.0000	008A.FFFF	009A.0000	009A.FFFF	9134FC44
12	008B.0000	008B.FFFF	009B.0000	009B.FFFF	0454E0D6
13	008C.0000	008C.FFFF	009C.0000	009C.FFFF	0AEEF947
14	008D.0000	008D.FFFF	009D.0000	009D.FFFF	951B2F96
15	008E.0000	008E.FFFF	009E.0000	009E.FFFF	5F19D691
16	008F.0000	008F.FFBF	009F.0000	009F.FFBF	7CD43C87