Minutes of Meeting

Herschel

Date:	14.12.2005		
Doc.-No.:	HP-2-ASED-MN-1140		
Meeting place:	EADS Astrium OTN	Chairman:	S. Idler
Date/Time:	14.12.2005	Secretary	S. Idler
Agenda dated:	PTR Standard Agenda	Close of Meeting:	14.12.2005

Subject: PTR for SPIRE EMC Tests

Participants:	D. Griffin (RAL) C. Scharmberg (ESA) F. Marliani (ESA) C. Kalde (ASED) S. Ilsen (ASED) S. Idler (ASED)	Additional Distribution:	ESA ASP

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☐ Brief-Minutes (except following sheets) ☐ Summary of Results of Sheets 2 till

Conclusion:

The SPIRE EMC test has been successfully completed. The test objectives have been fully met. No repeat test is foreseen for EQM.

SPIRE was found to be susceptible to E-field within the 10s MHz frequency range. Specific test have been performed to investigate this effect. Final assessment requires further analyses at RAL.

For H-fields no gross susceptibility has been observed.

Reference	Results	Remarks
	PTR Agenda: 1. Introduction 2. Identification of Test Item 3. Review of Procedure Variations / Test Data / Test Reports 4. Review of NCR / RFW Status 5. Open Work / Open Actions 6. Conclusion	

Reference	Results	Remarks
	1. Introduction The SPIRE EMC test was performed from 28.11.2005 until 02.12.2005 (1st part) and from 12.12.2005 until 14.12.2005 (2nd part). The related TRR minutes are HP-2-ASED-MN-1127, dated 28.11.2005. The interim PTR of the 1st part of the EMC test is minuted in HP-2-ASED-MN-1131. The EMC test comprised the following main steps: H-field • 30Hz to 50kHz: Sweep plus spot at 260, 366, 657, 1436, 2986, 20kHz, 48.17 and 50kHz E-field • 14kHz-30MHz: Sweep • 30MHz-1GHz (horizontal): Sweep plus threshold estimation at many spot frequencies around the susceptibility peak plus detailed sweep for 200-600MHz and 30-40MHz • 30MHz-1GHz (vertical): Sweep plus threshold estimation at many spot frequencies around the susceptibility peak plus detailed sweep for 30-40MHz and 60-90MHz with different amplitudes • 1-18GHz (horizontal and vertical): Sweep (with two antenna positions) • 8.45 GHz / 8.475 GHz/ 8.5 GHz (horizontal and vertical): Spot with 10 V/m (with two antenna positions / two polarizations) • Investigation of test configuration for major ~30MHz E-Field susceptibility incl. rough estimation of susceptibility threshold.	

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	2. Identification of Test Item **Configuration of SPIRE H/W and S/W** As per HP-2-ASED-MN-1127. No change of SPIRE hardware or software during EMC test. During the SPIRE susceptibility investigations the connection between PSU and DRCU has been changed. For details see related activity control sheet (HP-2-ASED-SD-0081) **Configuration of facility** As per HP-2-ASED-MN-1127. No change during test with the exception that after the thermal behaviour and straylight test (prior to the 2nd part of the SPIRE EMC tests) the HIFI LSU simulator has been removed. During the SPIRE susceptibility investigations several rearrangements of the cryostat control harness routing have been performed and HIFI and PACS have been switched off. For details see related activity control sheet (HP-2-ASED-SD-0081) **3. Review of Procedure Variations / Test Data / Test Reports** **Procedure variations** During the test specific test parameters as e. g. sweep speed, dwell time have been optimised. Following the detection of high E-field susceptibility at 10s of MHz range several extra measurements have been performed (detailed sweeps, etc.). Details can be found in the test report. After the completion of the standard EMC test programme dedicated tests to investigate the reason of the 10s MHz susceptibility have been carried out. These activities are reported in the activity	

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	control sheet (HP-2-ASED-SD-0081) which is an annex to the related NCR (ASED-NC-1804). **Test data** The only gross susceptibility was found in the E-Field in the 10s of MHz range. The investigations of this susceptibility revealed that: 1. SPIRE has a susceptibility at IID-A test levels in the 10s of MHz range. (highest at around 30 MHz) 2. The configuration of the test exacerbated the susceptibility. This was concluded after the following improvements in better simulating the flight environment: a. The CCS Harness was rerouted; b. The SPIRE Mechanism EGSE harness was removed; c. The shielding of CCS harness was improved; d. The ground wires dangling from SVM were stowed against SVM panel etc. 3. The coupling mechanism into the instrument is probably via the SPIRE cryoharness. This is a preliminary assessment. A final conclusion can be made only after post processing of the measurement data. **Test reports** During the test an as-run procedure as regards instrument operation and EMC facility setups has been compiled by ASED. This report will be finalised by the end of January 2006. An ACS has been compiled for the activities related to the 10s of MHz susceptibility investigations (HP-2-ASED-SD-0081). It will be part of the corresponding NCR ASED-NC-1804. RAL will write a separate report related to the EMC test data analysis (post processing). Preliminary	

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	analysis will start next week. Completion of report planned in January 2006. **4. Review of NCR / RFW Status** The NCR status prior to start of the tests is as per the EMC TRR (HP-2-ASED-MN-1127). The following new NCR's have been raised during the EMC test: <u>ASED-NC-1800: SPIRE EMC H-Field RS results</u> During the H-Field RS testing to HP-2-ASED-PR-0033 sec 7.4.5 following QLA of the Sweep results it was observed that SPIRE was susceptible in the range 30Hz to 50 KHz. Spot frequencies were applied to establish the threshold. RAL will carry out a post processing of the measurement data and determine the susceptibility level. Closure of NCR pending processing of PACS related NCR ASED-NC-1772 (re-assessment of H-field requirements by ASP). NCR open <u>ASED-NC-1804: SPIRE E-field RS results non conformance</u> During the E-Field RS testing to HP-2-ASED-PR-0033, section 7.4.7 following QLA of the sweep results it was observed that SPIRE was susceptible in the 10s of MHz range, with a peak at about 34 MHz. Spot frequencies were applied to estimate the threshold. For conclusive assessment further analyses will be performed. In addition EMC tests at RAL on instrument/unit level might be necessary. NCR open. <u>ASED-NC-1812: SPIRE detector chain partial failure</u> During SPIRE EQM EMC testing as per HP-2-ASED-PR-0033 the instrument was in Photometry	

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	Mode and generating nominal science data. At approx 13:10 UTC the signals from half of the PLW array (24 of 48 channels) went to zero output. SPIRE requested immediate shut down of the instrument and this was performed in accordance with the switch off procedure SPIRE-RAL-PRC-002494, Annex 2. A failure investigation was then carried out as detailed in ACS HP-2-ASED-SD-0077. It finally turned out that the problem was due to QLA software malfunction and not instrument related. RAL will check. NCR open. **5. Open Work / Open Actions** Open work related to the SPIRE EMC test: • Investigation of 10s of MHz susceptibility on instrument/unit level at RAL. • Compilation of EMC test reports by ASED (operational aspects, facility report). • Post processing of RS E-field results and compilation of test report by RAL (performance aspects). • Closure of NCR's. • Re-verification of SPIRE grounding after opening of cryostat. Activity will be done with RAL support. Prior to cryostat warm up a SPIRE SFT He I will be performed for procedure validation reasons. The SPIRE and test facility configuration will not change with respect to the one existing now. The applicable procedure is SPIRE-RAL-PRC-002494, issue 1.4. This activity is part of the cryostat warm up procedure HP-2-ASED-TP-0098, issue 1.	

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	6. Conclusion The SPIRE EMC test has been successfully completed. The test objectives have been fully met. No repeat test is foreseen for EQM. SPIRE was found to be susceptible to E-field within the 10s of MHz frequency range. Specific test have been performed to investigate this effect. Final assessment requires further analyses at RAL. For H-fields no gross susceptibility has been observed.	

Action Item List

No.:	Description:	Due Date	Originator Comp./Pers.	Actionee Comp./Pers.	Source	Completion