

Title: **PLM EQM EMC Test Procedure**

CI-No: *151000*

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|------------------------|---|-------|--------------------|
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| Issue | Date | Sheet | Description of Change | Release |
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1 Scope

1.1 Objective

This procedure describes the activities to be carried out for the Radiated Susceptibility (RS) test of the three instruments HIFI, PACS and SPIRE on PLM EQM level as specified in the Instrument PLM EQM Level Test Procedure, AD11. In addition a CS test is planned for HIFI as far as it fits in the 5 days allocated for this instrument.

1.2 Flow

Due to the total allocated testing time of 20 working days the complete test is subdivided in 4 parts allowing each instrument to allocate 5 working days for their dedicated RS testing and performance evaluation activities, plus extra 5 days, allocated as contingency.

The test flow shall consider the offline evaluation time needed to decide whether susceptibility has been detected and the evaluation of its criticality with ASPI and ESA. This is in order to have sufficient time to decide whether additional testing is necessary at the end of the first 15 days or not.

Although Astrium baseline is to perform only RS tests, the test flow considers the wish of HIFI to add some instrument level CS tests to the nominal RS testing program as far as this allows to keep the window of 5 working days. Then, in parallel to the additional HIFI CS testing activities (ref. HIFI-CR 0128 v.1) the HIFI offline characterisation could be performed.

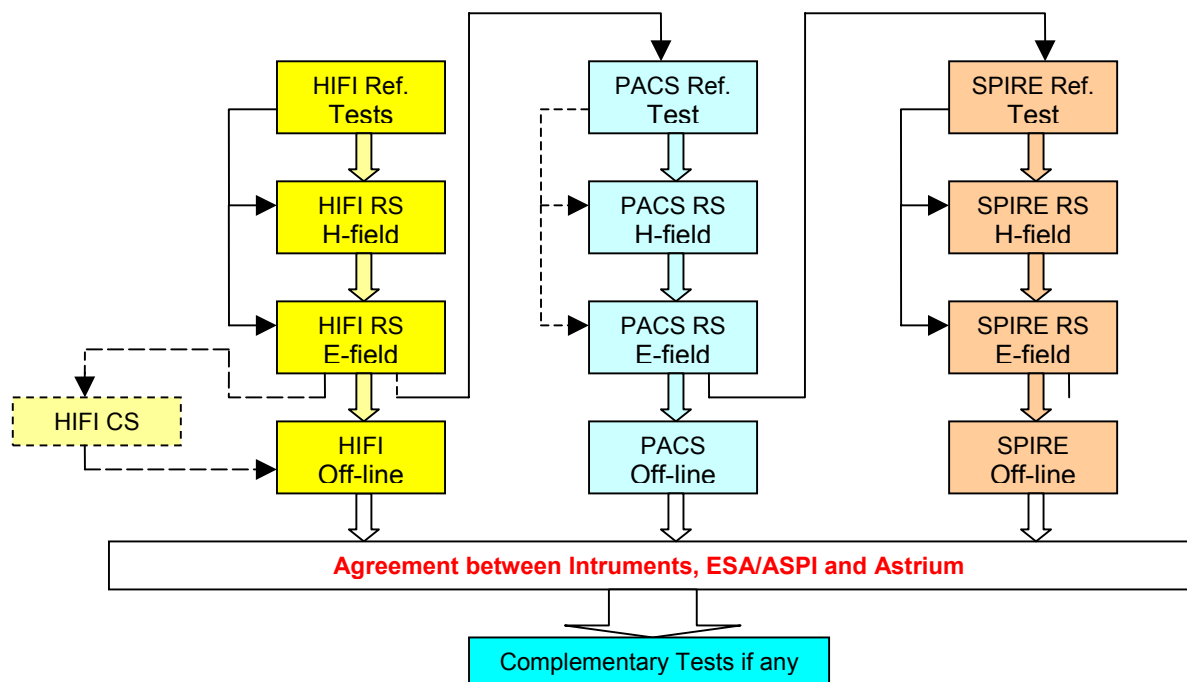


Figure 1.2-1: PLM EQM RS Test Flow

2 Documents/Drawings

2.1 Applicable Documents

The following documents in their latest issue are applicable to this procedure:

| | | | |
|------|-------------------------|--|-----------|
| AD1 | HP-2-ASED-PL-00007 | Herschel PA Plan | Issue 2.1 |
| AD2 | HP-2-ASED-PL-0023 | Herschel Contamination Control Plan | Issue 2 |
| AD3 | SCI-PT-IIDA-04624 | Herschel/Planck Instrument Interface Document, IID Part A | Issue 3.3 |
| AD4 | SCI-PT-IIDB/HIFI-02125 | Instrument Interface Control Document Part B, Instrument HIFI | Issue 3.2 |
| AD5 | SCI-PT-IIDB/SPIRE-02124 | Instrument Interface Control Document Part B, Instrument SPIRE | Issue 3.3 |
| AD6 | SCI-PT-IIDB/PACS-02126 | Instrument Interface Control Document Part B, Instrument PACS | Issue 3.3 |
| AD7 | HP-2-ASED-PL-0021 | Herschel PLM EQM AIT Plan | Issue 2.2 |
| AD8 | HP-2-ASED-PR-0012 | Herschel PLM/EQM General AIT Procedure | Issue 1 |
| AD9 | H-P-1-ASPI-SP-0037 | HERSCHEL/PLANCK EMC Specification | Issue 4 |
| AD10 | H-P-1-ASPI-PL-0038 | HERSCHEL/PLANCK EMC/ESD Control Plan | Issue 3 |
| AD11 | HP-2-ASED-PR-0051 | Instrument PLM EQM Level Test Procedure | Issue 1.1 |
| AD12 | HP-2-ASED-PL-0037 | EMC Test Plan | Issue 2 |

2.2 Reference Documents

In this section all documents are given which either

- could serve as reference for the PLM EQM RS test as well as for complementary tests, or
- may be referred in the test report for clarification/justification of an outcome (result) of the test.

| | | | |
|-----|---|--|-----------|
| RH1 | SRON-U/HIFI/PR/2004-001 | HIFI EMC Test Specification | Issue 1.3 |
| RH2 | SRON-G/HIFI/PR/2005-101 | HIFI EQM IST & EMC Test Procedure | Issue 1.4 |
| RH3 | SRON-U/HIFI/SP/2005-003 | HIFI EQM Grounding Configuration | Issue 1.0 |
| RP1 | PACS-ME-PL-015 | PACS EMC/ ESD Control Plan and Procedure | Issue 1.2 |
| RP2 | PACS-ME-TP-021 | PACS Integrated Module Test Procedure | Issue 1.2 |
| RS1 | Spire EMC Test Sequence for EQM Testing | SPIRE-RAL-NOT-002402 | Issue 1.0 |
| RS2 | Spire Cooler Recycling SCOS Procedure | SPIRE –RAL-PRC-002267 | Issue 1.0 |

3 Configuration

3.1 PLM EQM Configuration

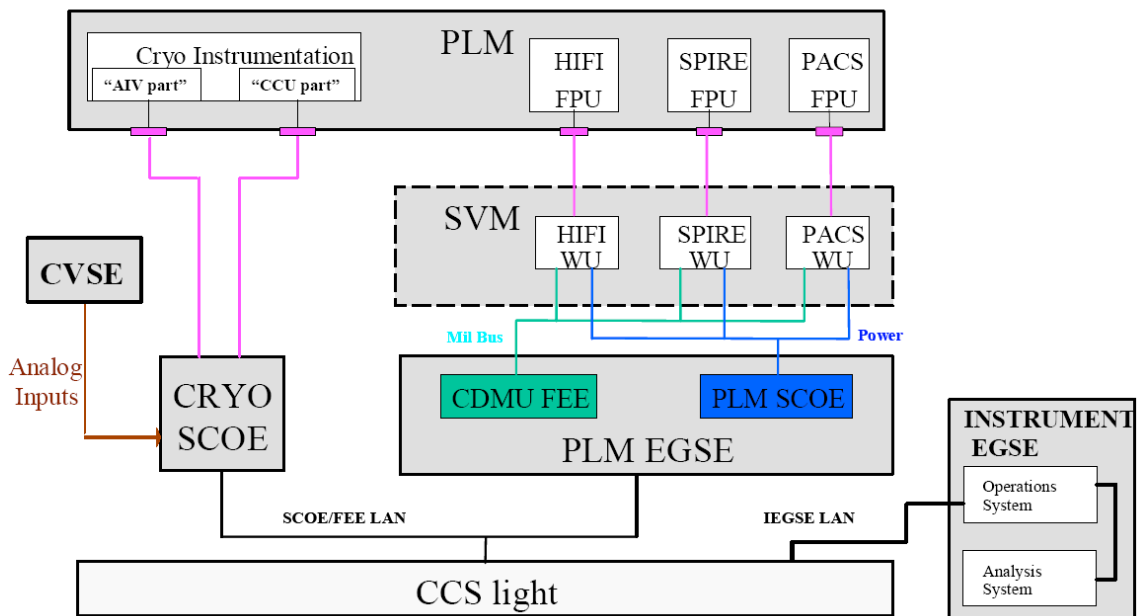


Figure 3.1-1: Principle PLM EQM Configuration

The configuration is the fully Integrated EQM Cryostat in combination with the EGSE and SCOE in accordance to the figure 3.1-1. A detailed description of the configuration can be found in the Instrument PLM EQM Level Test Procedure, AD11.

The actual hardware and software configuration of the GSE shall be validated at the TRR and reported in the test report.

3.2 GSE Configuration

A detailed description of the configuration can be found in the Instrument PLM EQM Level Test Procedure, AD11.

In addition there are some antennas cabling etc. and electrical test equipment necessary from the EMC facility in order to generate and measure the EMI levels. All test hardware shall be calibrated and shall be within the calibration period during the test time.

The test equipment list shall be completed during the test included in the test report.

| Test Equipment List | | | | | |
|----------------------------|---------------|------------------|---------------|-------------------|--------------------|
| Item | Manuf. | Model No. | SN No. | Invent No. | Next Calib. |
| | | | | | |

Table 3-1: Test Equipment List

3.3 Facility

The activities detailed in this procedure shall be carried out in the EADS Astrium clean room in Ottobrunn.

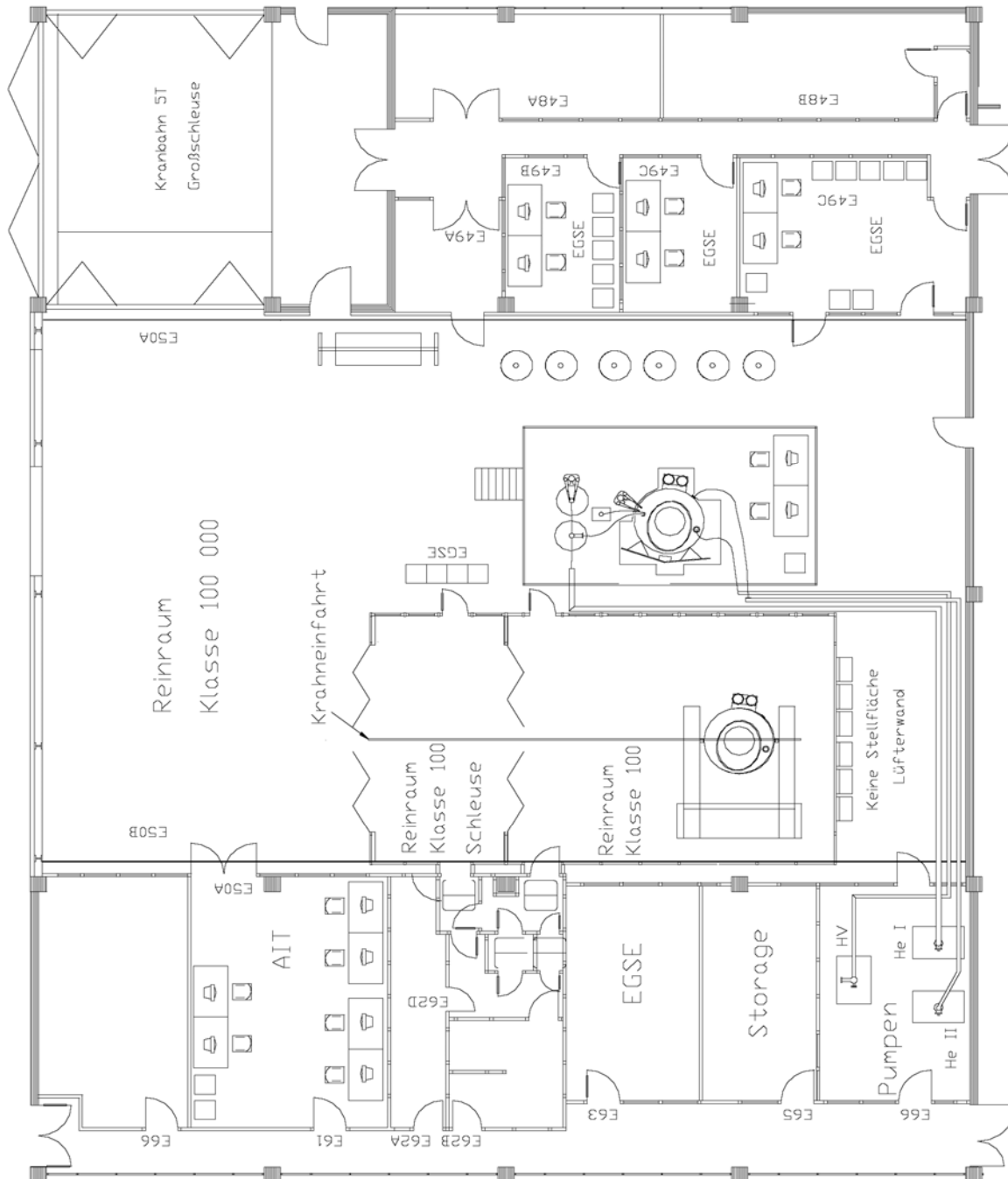


Figure 3.3-1: Set-up in Astrium Clean Room

4 Conditions

4.1 General Requirements

General instructions are given in the Herschel PLM EQM General AIT Procedure, AD8, and have to be respected accordingly.

In addition, the temperature of the lid must be stabilised before each test and set to a certain value (to be defined by the instruments before start of test). The temperature adjustment can be done by varying the He flow rate through the lid.

4.2 Environmental Conditions

All activities specified in the procedure have to be performed in a clean room class 100 000.

Temperature: 22°C +/- 3°C

Relative Humidity: 40% to 55%

The cleanliness requirements will be observed throughout the activities, and the overall contamination control requirements identified in the Herschel Contamination Control Plan, AD2, will be observed.

4.3 Measurement Accuracies

4.3.1 Receiver Accuracies

Table 4.3.1-1 gives a **guideline** for receiver measuring bandwidths. The **actual** bandwidth of the test equipment shall be provided by the facility personnel during the EMC tests.

| Frequency Range | Proposed | Actual | Comment |
|--------------------|----------|--------|---------|
| 30 Hz - 2.5 kHz | 10 Hz | | |
| 2.5 kHz - 5 kHz | 30 Hz | | |
| 5 kHz - 50 kHz | 100 Hz | | |
| 50 kHz - 1 MHz | 1 kHz | | |
| 1 MHz - 100 MHz | 3 kHz | | |
| 100 MHz - 1 GHz | 10 kHz | | |
| 1 GHz - 18 GHz | 100 kHz | | |
| Frequency Accuracy | ± 2 % | | |
| Amplitude Accuracy | ± 2 dB | | |

Table 4-1: Receiver Measurement Bandwidth

4.4 General Precautions and Safety

4.4.1 General Safety Requirements

No special hazards are expected. The application of the standard technical rules for mechanical and electrical integration and test activities is sufficient.

Lower level procedures called up by this procedure may define their own safety requirement in the relevant chapters which must be respected accordingly

4.4.2 ESD constraints

In order to prevent ESD sensitive H/W from any possible damages by accidental electrostatic discharges an ESD protected area must be defined and setup during ESD sensitive activities:

- Floor and test bench of the ESD protected area has to be covered with anti-static mats
- During all handling activities (as transport, mounting, mating/de-mating of connectors, measurements with individual measurement devices, etc.) the operator has to work on anti static mats with correct clothing and personal grounding-straps
- Adequate ESD clothing is required:
 - Anti static coat
 - Anti static gloves
 - Anti static boots
- Transportation of ESD sensitive H/W will be made only in ESD protective bag or box.

4.5 Activities Management

4.5.1 Pre-Test Activities

At least the following tasks have to be successfully completed before start of integration and test activities according this procedure:

- This procedure released and accepted
- Formal release to start given by the board following review of relevant test procedures and test configurations.

4.5.2 Procedure Variation

Major activities deviating from the approved test procedure require the agreement of Project, AIV and PA responsible, and shall be documented via Activity Control Sheets (ACS). All ACS's generated in

the frame of the execution of this procedure shall be listed in the ACS Summary Sheet in section 9.1 of this procedure.

4.5.3 Criteria for Failure

If the results of any test performed using this procedure or a lower level procedure which this procedure refers to yields a value which lies outside the specified limits, it shall be considered as a non-conformance. Initial analysis of the result will be applied to establish whether the result is due to measurement error or incorrect specification limits. A NCR will then be raised to report the non-conformance. Depending on the magnitude of the non-conformance, and its impact, either a minor or a major NCR will be raised. In case of major NCR the test shall be continued only upon written or verbal authorisation of Customer (Alcatel and ESA). All NCR's raised in the frame of the execution of this procedure shall be listed in the NCR Summary Sheet in section 9.2 of this procedure.

The NCR process is described in the Herschel PA Plan, AD1.

4.5.4 Test Completion and Post-Test Activities

All data that has been recorded during the test activities specified in this procedure shall be collected and retained in a centralised reference volume, and will include:

- EQM PLM logbook
- Relevant CCS logs
- Photographs and plots
- Filled out test procedure
- Activity Control Sheets (ACS), if any
- Copies of NCR's, if any

All these test data shall be available for presentation at the Test Review Board (TRB) which will finally conclude on the test.

A test report shall be produced in accordance to the AIT Plan, AD7, whose contents shall be as follows:

- Brief summary of the test results
- PLM and instrument build standard summary
- "As-run" test procedure as an annex (this includes housekeeping data, temperature curves, etc.).
- List of NCR's raised
- List of ACS's generated.
- Relevant meeting minutes (e. g. TRR, TRB)

- Filled out Sign-off Sheet (see section 9.3 of this procedure).
- Evaluation of test results (might be in separate document)

4.6 PA Requirements

Quality Assurance shall monitor all operations (handling, transportation, disassembly, installation and test) as necessary to assure compliance with this procedure and the applicable requirements of the Herschel PA Plan, AD1.

In the course of this procedure PA shall pay particular attention to:

- the application of adequate protections to critical surfaces
- the records in the log-sheet
- the recording of the serial number of the test equipment used
- ensure that the test equipment used is within actual calibration cycle

PA has to make sure that NCR's are raised when applicable and treated by NRB procedure as defined in the Herschel PA Plan, AD1.

After the conclusion that an activity is successfully completed, this activity has to be signed by the responsible AIT- and PA engineer in the step by step procedure. Also relevant log sheets have to be filled out and signed.

4.7 Personnel

| Title | Function | Name*) |
|--------------------------------|---|--|
| Test Director | Overall responsible | Siegmund Idler |
| Test Conductor | EMC Test Responsibility | Clemens Kalde |
| EGSE Operator | Operate EGSE (CCS, PLM SCOE, CDMU DFE, Cryo SCOE) | S. Ilsen |
| EGSE Expert (Alcatel) | Support EGSE operator and EMC | André Luc, Guy Doubrovik |
| EMC Test Performance (IABG) | Responsible for the EMC facility and operations | Ulf Hülsenbusch |
| Mech. Operator(s) | All mech. Integration activities, handles the PLM during testing (e.g. tilting of PLM), supports instrument test team | |
| Cryo Operators | Operate the cryostat during testing and maintain the required temperatures | |
| ESA Support | Support and supervision of test activities | Filippo Marliani, Astrid Heske, Carsten Scharmberg, Walter Pinter-Krainer |
| HIFI Engineers | Support test activities and evaluate/analyse instrument data | Bert Joost v. Leeuwen, Nick Whyborn, Norbert Brüning, Albert Naber, Toni Marston |
| PACS Engineers | Support test activities and evaluate/analyse instrument data | Helmut Feuchtgruber Michael. Leininger |
| SPIRE Engineers | Support test activities and evaluate/analyse instrument data | Doug Griffin |
| PA Representative | To ensure PA requirements | Dave Hendry |
| | | |
| | | |
| | | |

*) Names to be registered prior to start of test activities

Table 4-1: Personnel

5 Test Requirements

5.1 Radiated Susceptibility H-field

The set-up and performance of the radiated H-field susceptibility.

- Frequency Range: 30 Hz to 50 kHz, IABG Loop Antenna
- 2 antenna positions for HIFI, one for SPIRE, 2 or 3 respectively for PACS (depending on mode) and different for each instrument, to be selected at start of test. Instrument harness should be illuminated. The irradiating antenna shall be placed at a test distance of 1 metre towards the satellite structure.
- Sufficient clearance of the CVV from other metallic structure has to be granted in order to avoid effects from standing waves, refer to the EMC Test Plan AD12, chapter 4.3.
- Level 120 dBpT up to 20 kHz, 110 dBpT from 20 kHz to 50 kHz. The level will be calibrated according to the frequency tables within the anechoic chamber at IABG before RS test in the cleanroom of EADS Astrium. Herewith, we have clear reference, repeatable adjustment of the right disturbance level and no impacts from satellite and EGSE structure. During the RS test at EADS Astrium, a field probe will be installed in the vicinity of the CVV for monitoring and, if possible, reporting of the field level in the frequency control tables or in annex of the test report.

➔ The particular detailed conductance of the RS test is for every instrument different defined and described in the EMC Test Plan, AD12. This is reflected in the step-by-step procedure.

If necessary, susceptibility threshold shall be predicted:

1. Adjust the frequency/frequency range at which the susceptibilities occurred.
2. Repeat the RS test manually for these frequencies and reduce the noise level until no susceptibility occurs.
3. Record the susceptibility threshold.

5.1.1 HIFI Instrument Setting

As for RS E-field tests. Please refer also to RH1. The HIFI configuration is not fully representative due to the absence of the LSU which is substituted by a LSU simulator. For the grounding configuration see RH3.

5.1.2 PACS Instrument Setting

As for RS E-field tests.

5.1.3 SPIRE Instrument Setting

As for RS E-field tests.

5.2 Radiated Susceptibility E-field

The set-up and performance of the radiated E-field susceptibility Test shall be in accordance to the MIL Std, 461 E, RS 103.

General Frequency Range: 14 kHz to 18 GHz:

14 kHz - 30 MHz, SML-01 generator, SMX-100 amp, At-3000 antenna, V- pol

30 MHz - 1 GHz, SML-01 generator SMX-100 amp., BDLP antenna, V- and H- pol

1 GHz - 6 GHz, WILTRON generator, no ampl., RGA-180 antenna, , V- and H- pol

6 GHz - 18 GHz, WILTRON generator + 1 W amplifier, RGA 180 antenna, , V- and H- pol

8 GHz Notch (ref. Table 5-1):

8.45 - 8.5 GHz, WILTRON generator + 1 W amplifier, SGH antenna, V- and H- pol

3 antenna positions for HIFI, 2 for SPIRE, and 2 for PACS and different for each instrument, to be selected at start of test. Instrument harness needs to be illuminated. The irradiating antenna shall be placed at a test distance of 1 metre towards the satellite structure.

- Sufficient clearance of the CVV from other metallic structure has to be granted in order to avoid effects from standing waves, refer to the EMC Test Plan AD12, chapter 4.3.
- Level 2 V/m (126 dB μ V/m) over the applicable frequency range except for some notches where the level shall be in accordance to the table 5-1. The level will be calibrated according to the frequency tables within the anechoic chamber at IABG before RS test in the cleanroom of EADS Astrium. Herewith, we have clear reference, repeatable adjustment of the right disturbance level and no impacts from satellite and EGSE structure. During the RS test at EADS Astrium, a field probe will be installed in the vicinity of the CVV for monitoring and, if possible, reporting of the field level in the frequency control tables or in annex of the test report.
- The E-field level shall be 30% amplitude modulated (AM) with 1 kHz square wave.

| Frequency Range | RS Level | Comment |
|-------------------------------------|----------|---------------|
| 8.45 GHz to 8.5 GHz in 10 MHz steps | 10 V/m | Spacecraft TM |

Table 5-1: RS Notches

➔ The particular detailed conductance of the RS test is for every instrument different defined and described in the EMC Test Plan, AD12. This is reflected in the step-by-step procedure.

If necessary, susceptibility threshold shall be predicted:

1. Adjust the frequency/frequency range at which the susceptibilities occurred.
2. Repeat the RS test manually for these frequencies and reduce the RS level until no susceptibility occurs.
3. Record the susceptibility threshold.

5.2.1 HIFI Instrument Setting

The HIFI configuration is not fully representative due to the absence of the LSU which is substituted by a LSU simulator. Please refer also to RH1. The HIFI instrument setting can be found in RH2, section 11.

Susceptibility tests shall be performed with:

- The reference signal switched on.
- Continuous observation during EMI stimuli. Synchronisation by operators call.
- Instrument settings

HIFI mode: Primary

LO band: 3a

LO Frequency: 807 GHz

HRS mode: High Resolution

HRS band centre frequency: 6.6 GHz

WBS: on

Observing mode: Total Power

Integration time: 1sec.

Chopper: Cold source

For the grounding configuration see RH3.

5.2.2 PACS Instrument Setting

The mode applicable for PACS has been described in the PACS Integrated Module Test Procedure, RP2.

5.2.3 SPIRE Instrument Setting

The mode applicable for SPIRE has been described in the "Spire EQM Test Sequence", RS 1.

5.3 HIFI Optional CE/CS Testing

Conducted emission and susceptibility testing shall be performed on the nominal primary power lines of the HIFI LCU and ICU as well as on selected signal lines of the Cryo Harness.

FHICU Power:

Bracket DB05, J05 PIN 2 = PLUS
 PIN 4 = RTN

FHLCU Power:

Bracket DB06, J01 PIN 2,7 = PLUS
 PIN 4,9 = RTN

FPU Signal Lines:

FP Cryo-H location: View from -Y, Bracket 311100
FP Cryo-H bundles: SIH-IH-01, J03
 SIH-IH-02, J01
 SIH-IH-05, J02

LOU Signal Lines:

LO Cryo-H location: View from -Y
LO Cryo-H bundles: SIH-IH-07, Bracket 311300, J03

For the test requirements it shall be referred to RH1

The HIFI configuration is not fully representative due to the absence of the LSU which is substituted by a LSU simulator. For the grounding configuration see RH3. The HIFI instrument setting can be found in RH2, section 11.

6 Activities Flow

The following table depicts the flow of the activities described in this procedure. The Radiated Susceptibility test for the three instruments is embedded in the overall PLM EQM integration and test flow (refer to the Instrument PLM EQM Level Test Procedure, AD11).

| No | Activity | Remark |
|----------|--|----------------------|
| 1 | HIFI EMC Test | See para. 7.1 |
| 1.1 | Initialise LSU simulator | |
| 1.2 | Restart instrument if has been powered down | |
| 1.3 | Perform functional test | |
| 1.4 | Configure for EMC test | |
| 1.5 | Perform RS H-field test (2 positions) | |
| 1.6 | Perform RS E-field test (3 antenna positions, each with 2 polarisations) | |
| 1.7 | Perform off-line performance evaluation via QLA | |
| | | |
| 2 | HIFI ADDITIONAL TESTS (acc. to HIFI-CR 0128) | See para. 7.2 |
| 2.1 | Prepare for CS test | |
| 2.2 | Perform CS DM steady state on ICU power lines to 50 KHz | |
| 2.3 | Perform CS DM steady state on LCU power lines to 50 KHz | |
| 2.4 | Perform CS DM steady state on ICU power lines up to 50 MHz | |
| 2.5 | Perform CS DM steady state on LCU power lines to 50 MHz | |
| 2.6 | Perform CS CM steady state on ICU power lines to 50 MHz | |
| 2.7 | Perform CS CM steady state on LCU power lines to 50 MHz | |
| 2.8 | Perform CS DM Transients test on ICU power lines | |
| 2.9 | Perform CS DM Transients test on LCU power lines | |
| 2.10 | Perform CS CM Transients test on ICU power lines | |
| 2.11 | Perform CS CM Transients test on LCU power lines | |
| 2.12 | Perform CE/CS signal bundle test for SIH-IH-01, 02 and 05 | |
| 2.13 | Perform CE/CS signal bundle test for SIH-IH-07 | |

| No | Activity | Remark |
|-----------|---|----------------------|
| 3. | PACS EMC Test | See para. 7.3 |
| 3.1 | Set-up instrument to safe mode | |
| 3.2 | Perform PACS Cooler Recycle during the night before for every testing day in photometer mode | |
| 3.3 | Perform cover flushing every morning. | |
| 3.4 | Set PACS in photometer mode and perform reference tests | |
| 3.5 | Perform RS H-field test in photometer mode (3 antenna positions). Specific threshold tests with about 30 frequencies for each antenna position are to be considered in photometer mode and shall be performed at the beginning of each an automated test session. | |
| 3.6 | Set PACS in spectrometer mode and perform reference tests | |
| 3.7 | Perform RS H-field test in spectrometer mode (2 antenna positions) | |
| 3.8 | Perform PACS Cooler Recycle during the night before for every testing day in photometer mode | |
| 3.9 | Perform cover flushing every morning. | |
| 3.10 | Set PACS in photometer mode and perform reference tests | |
| 3.11 | Perform E-field test in photometer mode (2 antenna positions x 2 polarisations) | |
| 3.12 | Set PACS in spectrometer mode and perform reference tests | |
| 3.13 | Perform E-field test in spectrometer mode (2 antenna positions x 2 polarisations) | |
| 3.14 | Perform off-line performance evaluation via QLA | |
| | | |
| 4 | SPIRE EMC Test | See para. 7.4 |
| 4.1 | Set-up instrument into REDY mode | |
| 4.2 | Perform Cooler Recycle in the evening before each testing day | |
| 4.3 | Facility setting, measurements and SPIRE health check every morning, before test | |

| No | Activity | Remark |
|----------|--|----------------------|
| 4.4 | Set SPIRE in nominal mode. | |
| 4.5 | Perform H-field test in nominal mode (1 antenna position), SWEEP case. Repeat reference as necessary. | |
| 4.6 | Perform H-field test in nominal mode (1 antenna position), SPOT case. Repeat reference as necessary. | |
| 4.7 | Perform E-field test in nominal mode (2 antenna positions each with two polarisations), SWEEP case. Repeat reference as necessary. | |
| 4.8 | Perform E-field test in nominal mode (2 antenna positions each with two polarisations), SPOT case. Repeat reference as necessary. | |
| | | |
| 5 | Pre-and Post Test Activities | See para. 7.5 |
| | Describing all activities to be done at the beginning of the day before test start prepare for CS test | |
| | Describing all activities to be done at the end of the test day before test switching Instruments OFF. | |
| | | |

Table 6-1: Test Activities Flow

7 Step by Step Procedure

7.1 HIFI EMC Test

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|------------|---------|------|-----------|---------|---|---|
| 7.1.1 | Initialise LSU simulator for 807 GHz operation | | | | | | | |
| 7.1.1.1 | Refer to RH2, para 11.4.1 | OP | | | | | | |
| 7.1.2 | Restart Instrument if has been powered down | | | | | | | |
| 7.1.2.1 | Refer to RH2, para 11.4.2 | OP | | | | | | |
| 7.1.3 | Perform functional test | | | | | | | |
| 7.1.3.1 | Perform functional test pumped (Refer to RH2, para 11.4.4.1) | OP | | | | | | |
| 7.1.3.2 | Perform functional test unpumped (refer to RH2, para 11.4.4.2) | OP | | | | | | |
| 7.1.4 | Configure for EMC test | | | | | | | |
| 7.1.4.1 | Configure HIFI for EMC test (refer to RH2, para. 11.4.4.3) | OP | | | | | | |
| 7.1.5 | Perform RS H-field test in for the frequencies and antenna positions according to the frequency control tables in para. 8. | | | | | | | |
| 7.1.5.1 | Prepare EMC set-up for a test session which shall not last longer than 15 minutes. Refer to RH2 para 11.4.4.4 | EMC/ OP | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|--|-------------|------------|------|--------------|---------|---|---|
| 7.1.5.2 | The frequencies shall be applied as "stepwise sweep" into two . sessions of 10 minutes (10 seconds script). - Application of one frequency: 10.0 sec - f2 = 1.1 x fprev from 30 Hz to 50 kHz | EMC | | | | | | |
| 7.1.5.3 | Let OP confirm application of the correct SCRIPT file (refer to RH2) (susceptibility setting), data acquisition to be started | EMC | | | | | | |
| 7.1.5.4 | After OP request start immediately the stepwise-sweep and inform OP. | EMC | | | | | | |
| 7.1.5.5 | Tell EMC the time tag for notification in the frequency control table and wait for end of the session (about 10 minutes) | OP | | | | | | |
| 7.1.5.6 | Notify the time tag provided by OP immediately in the frequency control table together with the applied frequency range (to be filled into the control table) | EMC | | | | | | |
| 7.1.5.7 | After the session (end of sweep) inform OP immediately. | EMC | | | | | | |
| 7.1.5.8 | Give to EMC the corresponding time tag to be filled in the table and store the session data with identification of - Field type (H field) - Antenna position - Polarisation - Frequency range | OP | | | | | | |
| 7.1.5.9 | Note the time tag in the frequency control table and prepare the next session until the complete frequency range, and all antenna positions/ polarisations in accordance to the frequency control table are covered. | EMC | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|----------|--|------------|---------|------|-----------|---------|---|---|
| 7.1.6 | Perform RS E-field test for the frequencies and antenna positions according to the frequency control tables in para. 8. | | | | | | | |
| 7.1.6.1 | Prepare EMC set-up for a test session which shall not last longer than 15 minutes. Refer to RH2 para 11.4.4.4 | EMC/ OP | | | | | | |
| 7.1.6.2 | The frequencies shall be applied as "stepwise sweep" over a number of test sessions <ul style="list-style-type: none"> - Application of one frequency: 10.0 sec - $f = 1.1 \times f_{prev}$ from 14 kHz to 2.5 GHz - $f = 1.05 \times f_{prev}$ from 2.5 GHz to 8.5 GHz - $f = 1.1 \times f_{prev}$ from 8.5 GHz to 18 GHz | EMC | | | | | | |
| 7.1.6.3 | Let OP confirm application of the correct SCRIPT file (refer to RH2) (susceptibility setting), data acquisition to be started | EMC | | | | | | |
| 7.1.6.4 | After OP request start immediately the stepwise-sweep and inform OP. | EMC | | | | | | |
| 7.1.6.5 | Tell EMC the time tag for notification in the frequency control table and wait for end of the session (about 10 minutes) | OP | | | | | | |
| 7.1.6.6 | Notify the time tag provided by OP immediately in the frequency control table together with the applied frequency range (to be filled into the control table) | EMC | | | | | | |
| 7.1.6.7 | After the session (end of sweep) inform OP immediately. | EMC | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|--|-------------|------------|------|--------------|---------|---|---|
| 7.1.6.8 | Give to EMC the corresponding time tag to be filled in the table and store the session data with identification of <ul style="list-style-type: none"> - Field type (E-field) - Antenna position - Polarisation - Frequency range | OP | | | | | | |
| 7.1.6.9 | Note the time tag in the frequency control table and prepare the next session until the complete frequency range, and all antenna positions/ polarisations in accordance to the frequency control table are covered. | EMC | | | | | | |

7.2 HIFI ADDITIONAL EMC Test

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|----------|--|----------|---------|------|-----------|---------|---|---|
| 7.2.1 | Prepare HIFI for Conducted Susceptibility test power lines | | | | | | | |
| 7.2.1.1 | Switch off HIFI RH2 procedure 11.4.5.5: Configure HIFI to standby RH2 procedure 2.4.4: Power-off HIFI | OP | | | | | | |
| 7.2.1.2 | Install power supplies and LISN's for the primary power lines FHICU, FHLCU, FHHRH and FHWEH | EMC | | | | | | |
| 7.2.1.3 | Connect break-out boxes to the nominal power lines of the ICU and the LCU, test connector: FHICU Power: Bracket DB05, J05 PIN 2 = PLUS PIN 4 = RTN FHLCU Power: Bracket DB06, J01 PIN 2,7 = PLUS PIN 4,9 = RTN | | | | | | | |
| 7.2.1.4 | Install T-adapters in the Cryo harness in order to enable CE/CS measurements on the FPU signal lines: FPU Signal Lines: FP Cryo-H location: View from -Y, Bracket 311100 FP Cryo-H bundles: SIH-IH-01, J03 SIH-IH-02, J01 SIH-IH-05, J02 | | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|----------|--|----------|---------|------|-----------|-----------------------------------|---|---|
| 7.2.1.5 | Install T-adapters in the Cryo harness in order to enable CE/CS measurements on the LOU signal lines: LOU Signal Lines: LO Cryo-H location: View from -Y LO Cryo-H bundles: SIH-IH-07, Bracket 311300, J03 | | | | | | | |
| 7.2.1.6 | RH2 procedure 11.4.1: Initialise LSU simulator for 807 GHz | OP | | | | | | |
| 7.2.1.7 | Switch-on ICU power and inform OP Check voltage and current | EMC | | | | | | |
| 7.2.1.8 | RH2 procedure 2.4.2.1: Power on ICU RH2 procedure 2.4.2.2: Check ICU HK RH2 procedure 2.4.2.3: Check FCU HK | OP | | | | PDU power switching to be omitted | | |
| 7.2.1.9 | Switch-on HRH power and inform OP Check voltage and current | EMC | | | | | | |
| 7.2.1.10 | RH2 procedure 2.4.2.4: Power-on HRH | OP | | | | PDU power switching to be omitted | | |
| 7.2.1.11 | Switch-on WEH power and inform OP Check voltage and current | EMC | | | | | | |
| 7.2.1.12 | RH2 procedure 2.4.2.5: Power-on WEH | OP | | | | PDU power switching to be omitted | | |
| 7.2.1.13 | Switch-on LCU power and inform OP Check voltage and current | EMC | | | | | | |
| 7.2.1.14 | RH2 procedure 2.4.2.6: Power-on LCU | OP | | | | PDU power switching to be omitted | | |
| 7.2.1.15 | RH2 procedure 11.4.1: Initialise LSU simulator | OP | | | | | | |
| 7.2.1.16 | RH2 procedure 11.4.2: Restart HIFI | OP | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|--|----------|---------|------|-----------|----------------|---|---|
| 7.2.1.17 | RH2 procedure 11.4.3.1: Perform Functional test pumped | OP | | | | | | |
| 7.2.1.18 | RH2 procedure 11.4.3.2: Perform Functional test unpumped | OP | | | | | | |
| 7.2.1.19 | RH2 procedure 11.4.3.3: Configure HIFI for EMC test | OP | | | | | | |
| 7.2.2 | Perform CS Power Lines test for the ICU, DM, Steady State, Frequency range 30 Hz to 50 kHz | | | | | | | |
| 7.2.2.1 | Install the test set-up for the ICU primary power lines, according to RH1, section 5.4.1.2.1 | EMC | | | | | | |
| 7.2.2.2 | Prepare EMC set-up The frequencies shall be applied as "step-wise-sweep" over two sessions of 10 minutes (10 seconds script). - Application of one frequency: 10.0 sec - $f2 = 1.1 \times f1$ $f3 = 1.1 \times f2$ Frequency range 30 Hz to 50 kHz | EMC | | | | Total 79 steps | | |
| 7.2.2.3 | RH2 procedure 11.4.3.4: EMC susceptibility test for the 10 minutes script file | OP | | | | | | |
| 7.2.2.4 | One minute after start of script in previous step: Inform EMC to start EMC source sweep | OP | | | | | | |
| 7.2.2.5 | Start the stepwise-sweep and inform OP. | EMC | | | | | | |
| 7.2.2.6 | Tell EMC the time tag for notification in the frequency control table and wait for end of the session | OP | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|--|-------------|------------|------|--------------|---------|---|---|
| 7.2.2.7 | Notify the time tag provided by OP immediately in the frequency control table together with the applied frequency range (to be filled into the control table) | EMC | | | | | | |
| 7.2.2.8 | After the session (end of sweep) inform OP immediately. | EMC | | | | | | |
| 7.2.2.9 | Give to EMC the corresponding time tag to be filled in the table and store the session data with identification of - CS Power Lines DM - Frequency range | OP | | | | | | |
| 7.2.2.10 | Note the time tag in the frequency control table. | EMC | | | | | | |
| 7.2.3 | Perform CS Power Lines test for the LCU, DM, Steady State, Frequency range 30 Hz to 50 kHz | | | | | | | |
| 7.2.3.1 | Install the test set-up for the LCU primary power lines, according to RH1, section 5.4.1.2.1 | EMC | | | | | | |
| 7.2.3.2 | Remaining test procedure as above | | | | | | | |
| 7.2.4 | Perform CS Power Lines test for the ICU, DM, Steady, Frequency range 50 kHz to 50 MHz | | | | | | | |
| 7.2.4.1 | Install the test set-up for the ICU primary power lines, according to RH1, section 5.4.1.2.2 | EMC | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|-------------|------------|------|--------------|----------------|---|---|
| 7.2.4.2 | Prepare EMC set-up according to RH1, section 5.4.1.2.2 The frequencies shall be applied as "step-wise-sweep" over two sessions of 10 minutes (10 seconds script). - Application of one frequency: 10.0 sec - $f_2 = 1.1 \times f_1$ $f_3 = 1.1 \times f_2$ | EMC | | | | Total 12 steps | | |
| 7.2.4.3 | RH2 procedure 11.4.3.4: EMC susceptibility test for 10 minutes | OP | | | | | | |
| 7.2.4.4 | One minute after start of script in previous step: Inform EMC to start EMC source sweep | OP | | | | | | |
| 7.2.4.5 | Start the stepwise-sweep and inform OP. | EMC | | | | | | |
| 7.2.4.6 | Tell EMC the time tag for notification in the frequency control table and wait for end of the session (about 10 minutes) | OP | | | | | | |
| 7.2.4.7 | Notify the time tag provided by OP immediately in the frequency control table together with the applied frequency range (to be filled into the control table) | EMC | | | | | | |
| 7.2.4.8 | After the session (end of sweep) inform OP immediately. | EMC | | | | | | |
| 7.2.4.9 | Give to EMC the corresponding time tag to be filled in the table and store the session data with identification of - CS Power Lines DM ICU - Frequency range | OP | | | | | | |
| 7.2.4.10 | Note the time tag in the frequency control table. Prepare the next session according to RH1, section 5.4.1.2.2. Continue from step 7.2.4.3. | EMC | | | | | | |
| 7.2.4.11 | Deleted | EMC | | | | Total 8 steps | | |
| 7.2.4.12 | Deleted | OP | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|------------------|---------|------|-----------|----------------|---|---|
| 7.2.4.13 | Deleted | EMC/O P | | | | Total 55 steps | | |
| 7.2.4.14 | Deleted | EMC | | | | | | |
| 7.2.4.15 | Deleted Repeat steps 7.2.4.4 to 7.2.4.10 | OP EMC/ OP | | | | | | |
| 7.2.5 | Perform CS Power Lines test for the LCU, DM, Steady State, Frequency range 50 kHz to 50 MHz | | | | | Total 79 steps | | |
| 7.2.5.1 | Install the test set-up for the LCU primary power lines, according to RH1, section 5.4.1.2.2 | EMC | | | | | | |
| 7.2.5.2 | Remaining test procedure as above | | | | | | | |
| 7.2.6 | Perform CS Power Lines test for the ICU, CM, Steady State, Frequency range 10 kHz to 50 MHz | | | | | Total 79 steps | | |
| 7.2.6.1 | Install the test set-up for the ICU primary power lines, according to RH1, section 5.4.2.2 | EMC | | | | | | |
| 7.2.6.2 | Prepare EMC set-up, according to RH1, section 5.4.2.2 The frequencies shall be applied as "step-wise-sweep" over a session of 5 minutes (5 minutes script) and two sessions of 10 minutes (10 seconds script). - Application of one frequency: 10.0 sec - f2 = 1.1 x f1 f3 = 1.1 x f2 | EMC | | | | | | |
| 7.2.6.3 | RH2 procedure 11.4.3.4: EMC susceptibility test. | OP | | | | | | |
| 7.2.6.4 | One minute after start of script in previous step: Inform EMC to start EMC source sweep | OP | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|--|-------------|------------|------|--------------|---------|---|---|
| 7.2.6.5 | Start the stepwise-sweep and inform OP. | EMC | | | | | | |
| 7.2.6.6 | Tell EMC the time tag for notification in the frequency control table and wait for end of the session | OP | | | | | | |
| 7.2.6.7 | Notify the time tag provided by OP immediately in the frequency control table together with the applied frequency range (to be filled into the control table) | EMC | | | | | | |
| 7.2.6.8 | After the session (end of sweep) inform OP immediately. | EMC | | | | | | |
| 7.2.6.9 | Give to EMC the corresponding time tag to be filled in the table and store the session data with identification of - CS Power Lines CM - Frequency range | OP | | | | | | |
| 7.2.6.10 | Note the time tag in the frequency control table. Prepare the next session according to RH1 section 5.4.2.2 Continue from step 7.2.6.3 | EMC | | | | | | |
| 7.2.7 | Perform CS Power Lines test for the LCU, CM, Steady State, Frequency range 10 kHz to 50 MHz | | | | | | | |
| 7.2.7.1 | Install the test set-up for the LCU primary power lines, according to RH1, section 5.4.2.2 | EMC | | | | | | |
| 7.2.7.2 | Remaining test procedure as above | | | | | | | |
| 7.2.8 | Perform CS Power Lines test for the ICU, DM, Transients | | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|---------------|--|----------|---------|------|-----------|---------|---|---|
| 7.2.8.1 | Install the test set-up for the ICU primary power lines, according to RH1, section 5.4.3 | EMC | | | | | | |
| 7.2.8.2 | Prepare EMC set-up, according to RH1, section 5.4.3 | EMC | | | | | | |
| 7.2.8.3 | RH2 procedure 11.4.3.4: EMC susceptibility test for 5 minutes | OP | | | | | | |
| 7.2.8.4 | One minute after start of script in previous step: Inform EMC to start EMC injection | OP | | | | | | |
| 7.2.8.5 | Start the EMC injection and inform OP | EMC | | | | | | |
| 7.2.8.6 | After the session inform OP immediately. | EMC | | | | | | |
| 7.2.8.7 | Give to EMC the corresponding time tag to be filled in the table and store the session data with identification of - CS Power Lines DM Transients | OP | | | | | | |
| 7.2.9 | Perform CS Power Lines test for the LCU, DM, Transients | | | | | | | |
| 7.2.9.1 | Install the test set-up for the LCU primary power lines, according to RH1, section 5.4.3 | EMC | | | | | | |
| 7.2.9.2 | Remaining test procedure as above | | | | | | | |
| 7.2.10 | Perform CS Power Lines test for the ICU, CM, Transients | | | | | | | |
| 7.2.10.1 | Install the test set-up for the ICU primary power lines, according to RH1, section 5.4.4 | EMC | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|---------------|--|-------------|------------|------|--------------|---------|---|---|
| 7.2.10.2 | Prepare EMC set-up, according to RH1, section 5.4.4 | EMC | | | | | | |
| 7.2.10.3 | RH2 procedure 11.4.3.4: EMC susceptibility test for 5 minutes | OP | | | | | | |
| 7.2.10.4 | One minute after start of script in previous step: Inform EMC to start EMC injection | OP | | | | | | |
| 7.2.10.5 | Start the EMC injection and inform OP | EMC | | | | | | |
| 7.2.10.6 | After the session inform OP immediately. | EMC | | | | | | |
| 7.2.10.7 | Give to EMC the corresponding time tag to be filled in the table and store the session data with identification of - CS Power Lines CM Transients | OP | | | | | | |
| 7.2.11 | Perform CS Power Lines test for the LCU, CM, Transients | | | | | | | |
| 7.2.11.1 | Install the test set-up for the LCU primary power lines, according to RH1 section 5.4.4 | EMC | | | | | | |
| 7.2.11.2 | Remaining test procedure as above | | | | | | | |
| 7.2.12 | Perform CE/CS Signal Bundles test for SIH-IH-01, 02 and 05, CM, current | | | | | | | |
| 7.2.12.1 | Install EMC test set-up for the cable bundle SIH-IH-01, according to RH1 section 5.5.1 | | | | | | | |
| 7.2.12.2 | Prepare EMC set-up, according to RH1, section 5.5.1 | EMC | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N | |
|-----------|---|------------|---------|------|-----------|--|--|---|--|
| 7.2.12.3 | RH2 procedure 11.4.3.4: EMC test. | OP | | | | EMC test source may remain on, as it will not influence the emission test. <u>TBC</u> | | | |
| 7.2.12.4 | One minute after start of script in previous step: Inform EMC to start EMC measurement | OP | | | | | | | |
| 7.2.12.5 | Start EMC emission measurement in the frequency range 10 kHz - 50 MHz | EMC | | | | | | | |
| 7.2.12.6 | Analyse emission data, according to RH1 section 5.5.2. | EMC | | | | | | | |
| 7.2.12.7 | Prepare EMC set-up, according to RH1, section 5.5.2 - first frequency found in analysis | EMC | | | | | Only for frequencies and levels found in previous step, otherwise skip steps | | |
| 7.2.12.8 | RH2 procedure 11.4.3.4: EMC test for TBD minutes TBD dependant on number of frequencies found in analysis | OP | | | | | | | |
| 7.2.12.9 | One minute after start of script in previous step: Inform EMC to start EMC injection | OP | | | | | | | |
| 7.2.12.10 | Start the EMC injection and inform OP | EMC | | | | | | | |
| 7.2.12.11 | After 30 seconds stop injection and inform OP | EMC | | | | | | | |
| 7.2.12.12 | Prepare next frequency found in analysis | | | | | | | | |
| 7.2.12.13 | Repeat step 7.3.16.9 to 7.3.16.11 for all other frequencies | EMC/ OP | | | | | | | |
| 7.2.12.14 | Give to EMC the corresponding time tags to be filled in the table and store the session data with identification of - CS Signal Bundles | OP | | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|---------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.2.12.15 | Repeat step 7.3.16.1 to 7.3.16.13 for the other cable bundles | EMC/ OP | | | | | | |
| 7.2.13 | Perform CE/CS Signal Bundles test for SIH-IH-07, CM, current | | | | | | | |
| 7.2.13.1 | Install EMC test set-up for the cable bundle SIH-IH-07, according to RH1 section 5.5.1 | EMC | | | | | | |
| 7.2.13.2 | Remaining test procedure as in above | | | | | | | |

7.3 PACS EMC Test

It follows the step by step procedure for the PACS EMC test. Because the test will last more than one day after the testing day the procedure shall be started from the beginning every start of the testing day in order to continue with the EMC test where it was interrupted the day before. The frequency control tables as shown in para. 8 shall be filled in during the test and will provide the correlation between the testing time and the achieved progress of the EMC test

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|--|----------|---------|------|-----------|--|---|---|
| 7.3.1 | At the beginning of the day start up instrument and set-up PACS instrument into safe mode | | | | | | | |
| 7.3.1.1 | Command "PACS_Switch_On_CCS.tcl" | OP | SAFE | | | Refer to RP2 | | |
| 7.3.2 | Perform PACS Cooler Recycle (required every day provided that the instrument has to be set in photometer mode) | | | | | | | |
| 7.3.2.1 | Refer to RP2 | OP | SAFE | | | Refer to RP2 | | |
| 7.3.3 | Perform flushing every morning | | SAFE | | | | | |
| 7.3.4 | Set PACS in photometer mode and perform reference tests | | | | | | | |
| 7.3.4.1 | Command "PHOT_setup_OBS_shell.tcl" | OP | PHOT | | | Refer to RP2 | | |
| | Command "Chop_mov_abs_obs_shell.tcl" | OP | PHOT | | | Refer to RP2. Check that science packets are generated and being displayed on QLA grating position 500000 and chopper target =25000. | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|--|-------------|------------|------|--------------|---------|---|---|
| 7.3.5 | Perform RS H-field test in photometer mode for the frequencies and antenna positions according to the frequency control tables in para. 8. | | | | | | | |
| 7.3.5.1 | Prepare EMC set-up | OP / EMC | | | | | | |
| 7.3.5.2 | Let OP confirm photometer mode | EMC | | | | | | |
| 7.3.5.3 | Perform threshold measurements on a predefined set of frequencies directly before set-up change in accordance to the normal frequency list from the frequency control table. | EMC | | | | | | |
| 7.3.5.4 | Apply the calibrated frequency according to frequency control table, switch it ON and inform OP. | EMC | | | | | | |
| 7.3.5.5 | START DATA ACQUISITION and tell EMC the time tag for notification in the frequency control table and wait 50 sec. (DWELL time). | OP | | | | | | |
| 7.3.5.6 | Notify the CCS time tag provided by OP immediately in the frequency control table. | EMC | | | | | | |
| 7.3.5.7 | After the about 50 sec (DWELL time) STOP DATA AQUISITION and give EMC the corresponding CCS time. | OP | | | | | | |
| 7.3.5.8 | Store data and give emc the corresponding file name. | EMC | | | | | | |
| 7.3.5.9 | Note CCS time. Switch RS frequency OFF and set to the next frequency step | EMC | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|----------|---------|------|-----------|--|---|---|
| 7.3.5.10 | Apply the next frequency according to frequency control table and repeat the above steps until the complete H-field is tested (3 antenna positions). A reference test shall be included in between as far as necessary (about every 90 min.). | OP/ EMC | | | | | | |
| 7.3.5.11 | Return to SAFE mode by commanding "ENTER_SAFE_Model_Shell.tcl" | OP | SAFE | | | | | |
| 7.3.6 | Set PACS in spectrometer mode and perform reference tests | | | | | | | |
| 7.3.6.1 | Command "SetupSpectroscopyEQMIMT_Shell.tcl" | OP | SPEC | | | Refer to RP2 | | |
| | Command "SPEC_Prepare_EM_C_Shell.tcl" | OP | PHOT | | | Refer to RP2. Check that science packets are generated and being displayed on QLA grating position 500000 and chopper target =25000. | | |
| 7.3.7 | Perform RS H-field test in spectrometer mode for the frequencies and antenna positions according to the frequency control tables in para. 8. | | | | | | | |
| 7.3.7.1 | Prepare EMC set-up | OP / EMC | | | | | | |
| 7.3.7.2 | Let OP confirm spectrometer mode | EMC | | | | | | |
| 7.3.7.3 | Apply the calibrated frequency according to frequency control table, switch it ON and inform OP. | EMC | | | | | | |
| 7.3.7.4 | START DATA ACQUISITION and tell EMC the time tag for notification in the frequency control table and wait 50 sec. (DWELL time). | OP | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|---------------|---|-------------|------------|------|--------------|--------------|---|---|
| 7.3.7.5 | Notify the CCS time tag provided by OP immediately in the frequency control table | EMC | | | | | | |
| 7.3.7.6 | After the about 50 sec (DWELL time) STOP DATA AQUISITION and give EMC the corresponding CCS time. | OP | | | | | | |
| 7.3.7.7 | Store data and give emc the corresponding file name. | EMC | | | | | | |
| 7.3.7.8 | Note CCS time. Switch RS frequency OFF and set to the next frequency step | EMC | | | | | | |
| 7.3.7.9 | Apply the next frequency according to frequency control table and repeat the above steps until the complete H-field is tested (2 antenna positions). A reference test shall be included in between as far as necessary (abput every 90 min.). | OP/ EMC | | | | | | |
| 7.3.7.10 | Return to SAFE mode by commanding "ENTER_SAFE_Model_Shell.tcl" | OP | SAFE | | | | | |
| 7.3.8 | Perform PACS Cooler Recycle (required every day provided that the instrument has to be set in photometer mode) | | | | | | | |
| 7.3.8.1 | Refer to RP2 | OP | SAFE | | | Refer to RP2 | | |
| 7.3.9 | Perform flushing every morning | | SAFE | | | | | |
| 7.3.10 | Set PACS in photometer mode and perform reference tests | | | | | | | |
| 7.3.10.1 | Command "PHOT_setup_OBS_shell.tcl" | OP | PHOT | | | Refer to RP2 | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|---------------|--|----------|---------|------|-----------|--|---|---|
| 7.3.10.2 | Command "Chop_mov_abs_obs_shell.tcl" | OP | PHOT | | | Refer to RP2. Check that science packets are generated and being displayed on QLA grating position 500000 and chopper target =25000. | | |
| 7.3.11 | Perform RS E-field test in photometer mode for the frequencies and antenna positions according to the frequency control tables in para. 8. | | | | | | | |
| 7.3.11.1 | Prepare EMC set-up | OP / EMC | | | | | | |
| 7.3.11.2 | Let OP confirm photometer mode | EMC | | | | | | |
| 7.3.11.3 | Apply the calibrated frequency according to frequency control table, switch it ON and inform OP. | EMC | | | | | | |
| 7.3.11.4 | START DATA ACQUISITION and tell EMC the time tag for notification in the frequency control table and wait 50 sec. (DWELL time). | OP | | | | | | |
| 7.3.11.5 | Notify the CCS time tag provided by OP immediately in the frequency control table | EMC | | | | | | |
| 7.3.11.6 | After the about 50 sec (DWELL time) STOP DATA AQUISITION and give EMC the corresponding CCS time. | OP | | | | | | |
| 7.3.11.7 | Store data and give emc the corresponding file name. | EMC | | | | | | |
| 7.3.11.8 | Note CCS time. Switch RS frequency OFF and set to the next frequency step | EMC | | | | | | |

| Step-No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|---------------|---|----------|---------|------|-----------|--|---|---|
| 7.3.11.9 | Apply the next frequency according to frequency control table and repeat the above steps until the complete E-field is tested (2 antenna positions). A reference test shall be included in between as far as necessary (about every 90 min.). | OP / EMC | | | | | | |
| 7.3.11.1 0 | Return to SAFE mode by commanding "ENTER_SAFE_Model_Shell.tcl" | OP | SAFE | | | | | |
| 7.3.12 | Set PACS in spectrometer mode and perform reference tests | | | | | | | |
| 7.3.12.1 | Command "SetupSpectroscopyEQMIMT_Shell.tcl" | OP | SPEC | | | Refer to RP2 | | |
| | Command "SPEC_Prepare_EMCC_Shell.tcl" | OP | PHOT | | | Refer to RP2. Check that science packets are generated and being displayed on QLA grating position 500000 and chopper target =25000. | | |
| 7.3.13 | Perform RS E-field test in spectrometer mode for the frequencies and antenna positions according to the frequency control tables in para. 8. | | | | | | | |
| 7.3.13.1 | Prepare EMC set-up | OP / EMC | | | | | | |
| 7.3.13.2 | Let OP confirm spectrometer mode | EMC | | | | | | |
| 7.3.13.3 | Apply the calibrated frequency according to frequency control table, switch it ON and inform OP. | EMC | | | | | | |
| 7.3.13.4 | START DATA ACQUISITION and tell EMC the time tag for notification in the frequency control table and wait 50 sec. (DWELL time). | OP | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|---------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.3.13.5 | Notify the CCS time tag provided by OP immediately in the frequency control table | EMC | | | | | | |
| 7.3.13.6 | After the about 50 sec (DWEELL time) STOP DATA AQUISITION and give EMC the corresponding CCS time. | OP | | | | | | |
| 7.3.13.7 | Store data and give emc the corresponding file name. | EMC | | | | | | |
| 7.3.13.8 | Note CCS time. Switch RS frequency OFF and set to the next frequency step | EMC | | | | | | |
| 7.3.13.9 | Apply the next frequency according to frequency control table and repeat the above steps until the complete E-field is tested (2 antenna positions). A reference test shall be included in between as far as necessary (every 90 min. TBC). | OP/ EMC | | | | | | |
| 7.3.13.1 0 | Return to SAFE mode by commanding "ENTER_SAFE_Model_Shell.tcl" | OP | SAFE | | | | | |
| 7.3.14 | Perform offline evaluation. | OP | | | | | | |

7.4 SPIRE EMC Test

It follows the step by step procedure for the SPIRE RS test. Because the test will last more that one day, after a testing day the procedure shall be started from the beginning every start of the testing day in order to continue with the EMC test where it was interrupted the day before. The frequency control tables as shown in para. 8 shall be filled in during the test and will provide the correlation between the testing time and the achieved progress of the EMC test.

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.4.1 | Start up SPIRE and set-up instrument into REDY mode | | | | | | | |
| 7.4.1.1 | Refer to RS2 | OP | REDY | | | | | |
| 7.4.2 | Perform cooler recycle at the evening of each testing day | | | | | | | |
| 7.4.2.1 | Refer to RS2 | OP | | | | | | |
| 7.4.3 | Perform facility measurements and SPIRE health check and the beginning of each testing day | | | | | | | |
| 7.4.3.1 | Refer to RS2 | OP | | | | | | |
| 7.4.4 | Set SPIRE into nominal mode | | | | | | | |
| 7.4.4.1 | Refer to RS2 | OP OP | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.4.5 | Perform H-field test in nominal mode SWEEP | | | | | | | |
| 7.4.5.1 | Perform SPIRE REFERENCE TEST (necessary about every 90 min on OP request), refer to RS2. | OP | | | | | | |
| 7.4.5.2 | Prepare RS H-field set-up with calibrated EMI values. Use the frequency tables for the definition of the respective sweep start and end frequency. The sweep shall be a step-wise sweep in accordance to the law: $f = f_{prev.} \times 1.15$. The particular single frequencies of each sweep subset will be presented by the facility personnel at test. | EMC | | | | | | |
| 7.4.5.3 | Start SWEEP SCRIPT file for the sweep SPIRE-CCS-EMC-SWEEP.tcl and 10 sec. later the EMC sweep and note the corresponding CCS time in the frequency table, both EMC and OP. | OP/ EMC | | | | | | |
| 7.4.5.4 | Stop SWEEP SCRIPT file simultaneously with the end of the EMC sweep and 1. Note the corresponding CCS time, both OP and EMC. 2. Note the STEP Number of the SWEEP, both OP and EMC. | EMC/ OP | | | | | | |
| 7.4.5.5 | Generate ASCII file with the QLA routines when after a number of sweep test cases. | OP | | | | | | |
| 7.4.5.6 | After a certain number of SWEEPs a reference test in accordance to RS 2 have to be performed. If all sweeps from the frequency table are performed go to the next step below. | OP/ EMC | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.4.6 | Perform H-field test in nominal mode, SPOT | | | | | | | |
| 7.4.6.1 | The frequency table shall be completed by OP in order to show maximum 30 SPOTS as result of this sweep test analysis. | OP | | | | | | |
| 7.4.6.2 | Perform SPIRE REFERENCE TEST in accordance to RS2. | EMC | | | | | | |
| 7.4.6.4 | Start SPOT SCRIPT file for the SPOT SPIRE-CCS-EMC-SPOT.tcl simultaneously with the start of the EMC SPOT application and note the corresponding CCS time in the frequency table, both OP and EMC. | OP | | | | | | |
| 7.4.6.5 | Stop SPOT SCRIPT file simultaneously with the EMC SPOT exactly after 3 minutes and 1. Note the corresponding CCS time, both OP and EMC 2. Note the STEP Number of the SPOT, both OP and EMC. | OP/ EMC | | | | | | |
| 7.4.6.6 | Generate ASCII file with the QLA routines when after a number of SPOT test cases | OP | | | | | | |
| 7.4.6.7 | After a certain number of SPOTs a reference test in accordance to RS 2 have to be performed. If all SPOTs from the frequency table are performed go to the next step below. | EMC / OP | | | | | | |
| 7.4.6.8 | If all applicable EMC set-ups have been performed the test is completed, otherwise go back to step 7.4.5 for a sweep with the other EMC set-up, in accordance to the frequency table in chapter 8. | EMC/ OP | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.4.7 | Perform E-field test in nominal mode, SWEEP | | | | | | | |
| 7.4.7.1 | Perform SPIRE REFERENCE TEST (necessary about every 90 min on OP request), refer to RS2. | EMC | | | | | | |
| 7.4.7.2 | Prepare RS E-field set-up for this antenna position with calibrated EMI values. Use the frequency tables for the definition of the respective sweep start and end frequency. The sweep shall be a step-wise sweep in accordance to the law: $f = f_{prev.} \times 1.15$. The particular single frequencies of each sweep subset will be presented by the facility personnel at test. | OP | | | | | | |
| 7.4.7.3 | Start SWEEP SCRIPT file for the sweep SPIRE-CCS-EMC-SWEEP.tcl and 10 sec. later the EMC sweep and note the corresponding CCS time in the frequency table, both EMC and OP. | OP/ EMC | | | | | | |
| 7.4.7.4 | Stop SWEEP SCRIPT file simultaneously with the end of the EMC sweep and 1. Note the corresponding CCS time, both OP and EMC. 2. Note the STEP Number of the SWEEP, both OP and EMC. | EMC/ OP | | | | | | |
| 7.4.7.5 | Generate ASCI file with the QLA routines when after a number of sweep test cases. | | | | | | | |
| 7.4.7.6 | After a certain number of SWEEPs a reference test in accordance to RS 2 have to be performed. If all sweeps from the frequency table are performed go to the next step below. | OP/ EMC | | | | | | |

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.4.8 | Perform E-field test in nominal mode, SPOT | | | | | | | |
| 7.4.8.1 | The frequency table shall be completed by OP in order to show maximum 30 SPOTS as result of this sweep test analysis. | OP | | | | | | |
| 7.4.8.2 | Perform SPIRE REFERENCE TEST in accordance to RS2. | EMC | | | | | | |
| 7.4.8.3 | Start SPOT SCRIPT file for the SPOT SPIRE-CCS-EMC-SPOT.tcl simultaneously with the start of the EMC SPOT application and note the corresponding CCS time in the frequency table, both OP and EMC. | OP | | | | | | |
| 7.4.8.4 | Stop SPOT SCRIPT file simultaneously exactly after 3 minutes and 1. Note the corresponding CCS time, both OP and EMC. 2. Note the STEP Number of the SPOT, both OP and EMC | OP | | | | | | |
| 7.4.8.5 | Generate ASCII file with the QLA routines when after a number of SPOT test cases | OP | | | | | | |
| 7.4.8.6 | After a certain number of SPOTs a reference test in accordance to RS 2 have to be performed. If all SPOTs from the frequency table are performed go to the next step below. | EMC / OP | | | | | | |
| 7.4.8.7 | If all antenna positions with the applicable EMC set-up or polarisation have been performed the test is completed, otherwise go back to step 7.4.7 for a sweep with the other EMC set-up or antenna position/polarisation, in accordance to the frequency table in chapter 8. | EMC/ OP | | | | | | |

7.5 Pre- and Post Test Activities

| Step- No. | Integration-Step-Description | OP / EMC | Nom Val | Tol. | Act. Val. | Comment | P | N |
|--------------|---|-------------|------------|------|--------------|---------|---|---|
| 7.5.1 | Pre- Test activities | | | | | | | |
| 7.5.1.1 | Confirm that every instrument is switched OFF. | OP / EMC | | | | | | |
| 7.5.1.2 | Switch all instruments into Standby mode. | OP / EMC | | | | | | |
| 7.5.1.3 | Hold Pointer meeting in order to clarify the steps to be performed this day (max. 30 min) | OP / EMC | | | | | | |
| 7.5.2 | Post- Test activities | | | | | | | |
| 7.5.2.1 | Confirm operational mode for the instrument under test. | OP / EMC | | | | | | |
| 7.5.2.2 | Confirm Standby mode for the instruments not under test. | OP / EMC | | | | | | |
| 7.5.2.3 | Confirm that all tests data are available and well stored, respectively available as paper copy or photo. | OP / EMC | | | | | | |
| 7.5.2.4 | Switch all instruments into standby | OP / EMC | | | | | | |
| 7.5.2.5 | Switch-all instruments OFF except if cooler recycling is required. In this case the recycled instrument shall be left in standby or safe mode respectively. | OP / EMC | | | | | | |
| 7.5.2.6 | Hold wash-up meeting (max 60 min): 1. status 2. tasks to be done next day in parallel to the normal test activities. | OP / EMC | | | | | | |

8 RS Frequency Control Tables

8.1 HIFI Frequency Control Tables H-field

| HIFI RS H-Field, Antenna Position 1 | | | | | | | | |
|-------------------------------------|-----------------------------|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 30 Hz – 1.23 kHz (< 7 min) | | | | | | | |
| 2 | 1.23 kHz - 50 kHz (< 7 min) | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.1-1: HIFI @ Susceptibility Mode // H-field // 1st Antenna Position

| HIFI RS H-Field, Antenna Position 2 | | | | | | | | |
|-------------------------------------|-----------------------------|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 30 Hz – 1.23 kHz (< 7 min) | | | | | | | |
| 2 | 1.23 kHz - 50 kHz (< 7 min) | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.1-2: HIFI @ **Susceptibility Mode** // H-field // 2nd Antenna Position

8.2 HIFI Frequency Control Tables E-field

| HIFI RS E-Field, Antenna Position 1 Horizontal Polarization | | | | | | | | |
|---|---|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 30 MHz – 1 GHz (< 7 min) | | | | | | | |
| 2 | 1 GHz – 6 GHz (< 5 min) | | | | | | | |
| 3 | 6 GHz – 18 GHz (< 3 min) | | | | | | | |
| 4 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.2-1: HIFI @ **Susceptibility Mode** // E-field // 1st Antenna Position, **Horizontal Polarization**

| HIFI RS E-Field, Antenna Position 1, Vertical Polarization | | | | | | | | |
|--|---|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 14 kHz – 600 kHz (< 8 min) | | | | | | | |
| 2 | 600 kHz – 30 MHz (< 7 min) | | | | | | | |
| 3 | 30 MHz – 1 GHz (< 7 min) | | | | | | | |
| 4 | 1 GHz – 6 GHz (< 5 min) | | | | | | | |
| 5 | 6 GHz – 18 GHz (< 3 min) | | | | | | | |
| 6 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.2-2: HIFI @ Susceptibility Mode // E-field // 1st Antenna Position, Vertical Polarization

| HIFI RS E-Field, Antenna Position 2 Horizontal Polarization | | | | | | | | |
|---|---|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 30 MHz – 1 GHz (< 7 min) | | | | | | | |
| 2 | 1 GHz – 6 GHz (< 5 min) | | | | | | | |
| 3 | 6 GHz – 18 GHz (< 3 min) | | | | | | | |
| 4 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.2-3: HIFI @ Susceptibility Mode // E-field // 2nd Antenna Position, Horizontal Polarization

| HIFI RS E-Field, Antenna Position 2, Vertical Polarization | | | | | | | | |
|--|---|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 14 kHz – 600 kHz (< 8 min) | | | | | | | |
| 2 | 600 kHz – 30 MHz (< 7 min) | | | | | | | |
| 3 | 30 MHz – 1 GHz (< 7 min) | | | | | | | |
| 4 | 1 GHz – 6 GHz (< 5 min) | | | | | | | |
| 5 | 6 GHz – 18 GHz (< 3 min) | | | | | | | |
| 6 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.2-4: HIFI @ Susceptibility Mode // E-field // 2nd Antenna Position, Vertical Polarization

| HIFI RS E-Field, Antenna Position 3 Horizontal Polarization | | | | | | | | |
|---|---|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 30 MHz – 1 GHz (< 7 min) | | | | | | | |
| 2 | 1 GHz – 6 GHz (< 5 min) | | | | | | | |
| 3 | 6 GHz – 18 GHz (< 3 min) | | | | | | | |
| 4 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.2-5: HIFI @ Susceptibility Mode // E-field // 3rd Antenna Position, Horizontal Polarization

| HIFI RS E-Field, Antenna Position 3, Vertical Polarization | | | | | | | | |
|--|---|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | 14 kHz – 600 kHz (< 8 min) | | | | | | | |
| 2 | 600 kHz – 30 MHz (< 7 min) | | | | | | | |
| 3 | 30 MHz – 1 GHz (< 7 min) | | | | | | | |
| 4 | 1 GHz – 6 GHz (< 5 min) | | | | | | | |
| 5 | 6 GHz – 18 GHz (< 3 min) | | | | | | | |
| 6 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.2-6: HIFI @ Susceptibility Mode // E-field // 3rd Antenna Position, Vertical Polarization

8.3 HIFI Control Tables Conducted Susceptibility Power Lines

| HIFI CS Test ICU Power Lines | | | | | | | | |
|------------------------------|-----------------|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.3-1: HIFI @ **Susceptibility Mode** // CS ICU Power Lines

| HIFI CS Test LCU Power Lines | | | | | | | | |
|------------------------------|-----------------|------|----------------|---------------|-------------|--------------|--------|--------------|
| i | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script File | Session Name | Sensor | Observations |
| 1 | | | | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |

Table 8.3-2: HIFI @ **Susceptibility Mode** // CS LCU Power Lines

8.4 HIFI Control Tables Conducted Susceptibility on Instrument Cryo Harness Bundles

Corresponding tables and figures to be prepared during the test because they would be specific (the CS value has to be adjusted 6 dB above the value measured at every particular frequency at given instrument Cryo Harness bundle).

8.5 PACS Frequency Control Tables H-field

| PACS RS H-field Photometer Mode 1st Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 1 | 30 Hz | | | | | | | |
| 2 | 40 Hz | | | | | | | |
| 3 | 50 Hz | | | | | | | |
| 4 | 64 Hz | | | | | | | |
| 5 | 80 Hz | | | | | | | |
| 6 | 100 Hz | | | | | | | |
| 7 | 125 Hz | | | | | | | |
| 8 | 256 Hz | | | | | | | |
| 9 | 350 Hz | | | | | | | |
| 10 | 500 Hz | | | | | | | |
| 11 | 750 Hz | | | | | | | |
| 12 | 1 kHz | | | | | | | |
| 13 | 1.5 kHz | | | | | | | |
| 14 | 2 kHz | | | | | | | |
| 15 | 2.5 kHz | | | | | | | |
| 16 | 3 kHz | | | | | | | |
| 17 | 3.5 kHz | | | | | | | |
| 18 | 4 kHz | | | | | | | |
| 19 | 4.5 kHz | | | | | | | |
| 20 | 5 kHz | | | | | | | |
| 21 | 5.5 kHz | | | | | | | |

| PACS RS H-field Photometer Mode 1st Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|----------------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 22 | 6 kHz | | | | | | | |
| 23 | 6.5 kHz | | | | | | | |
| 24 | 7 kHz | | | | | | | |
| 25 | 7.5 kHz | | | | | | | |
| 26 | 8 kHz | | | | | | | |
| 27 | 8.5 kHz | | | | | | | |
| 28 | 9 kHz | | | | | | | |
| 29 | 9.5 kHz | | | | | | | |
| 31 | 10 kHz | | | | | | | |
| 31 | 11.47 kHz | | | | | | | |
| 32 | 15.6 kHz | | | | | | | |
| 33 | 17.0 kHz | | | | | | | |
| 34 | 20.0 kHz | | | | | | | |
| 35 | 25.0 kHz | | | | | | | |
| 36 | 30 kHz | | | | | | | |
| 37 | 35 kHz | | | | | | | |
| 38 | 40 kHz | | | | | | | |
| 39 | 45.8 kHz | | | | | | | |
| 40 | 50 kHz | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 40 Hz | | | | | | | Threshold Prediction |

| PACS RS H-field Photometer Mode 1st Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|----------------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| | 100 Hz | | | | | | | Threshold Prediction |
| | 350 Hz | | | | | | | Threshold Prediction |
| | 1 kHz | | | | | | | Threshold Prediction |
| | 2.5 kHz | | | | | | | Threshold Prediction |
| | 3.5 kHz | | | | | | | Threshold Prediction |
| | 6 kHz | | | | | | | Threshold Prediction |
| | 8 kHz | | | | | | | Threshold Prediction |
| | 20 kHz | | | | | | | Threshold Prediction |
| | 30 kHz | | | | | | | Threshold Prediction |

Table 8.5-1: PACS @ Photometer Mode// H-field // 1st Antenna Position

| PACS RS H-field Photometer Mode 2 nd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 1 | 30 Hz | | | | | | | |
| 2 | 40 Hz | | | | | | | |
| 3 | 50 Hz | | | | | | | |
| 4 | 64 Hz | | | | | | | |
| 5 | 80 Hz | | | | | | | |
| 6 | 100 Hz | | | | | | | |
| 7 | 125 Hz | | | | | | | |
| 8 | 256 Hz | | | | | | | |
| 9 | 350 Hz | | | | | | | |

| PACS RS H-field Photometer Mode 2 nd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 10 | 500 Hz | | | | | | | |
| 11 | 750 Hz | | | | | | | |
| 12 | 1 kHz | | | | | | | |
| 13 | 1.5 kHz | | | | | | | |
| 14 | 2 kHz | | | | | | | |
| 15 | 2.5 kHz | | | | | | | |
| 16 | 3 kHz | | | | | | | |
| 17 | 3.5 kHz | | | | | | | |
| 18 | 4 kHz | | | | | | | |
| 19 | 4.5 kHz | | | | | | | |
| 20 | 5 kHz | | | | | | | |
| 21 | 5.5 kHz | | | | | | | |
| 22 | 6 kHz | | | | | | | |
| 23 | 6.5 kHz | | | | | | | |
| 24 | 7 kHz | | | | | | | |
| 25 | 7.5 kHz | | | | | | | |
| 26 | 8 kHz | | | | | | | |
| 27 | 8.5 kHz | | | | | | | |
| 28 | 9 kHz | | | | | | | |
| 29 | 9.5 kHz | | | | | | | |
| 31 | 10 kHz | | | | | | | |
| 31 | 11.47 kHz | | | | | | | |
| 32 | 15.6 kHz | | | | | | | |
| 33 | 17.0 kHz | | | | | | | |
| 34 | 20.0 kHz | | | | | | | |

| PACS RS H-field Photometer Mode 2 nd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|----------------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 35 | 25.0 kHz | | | | | | | |
| 36 | 30 kHz | | | | | | | |
| 37 | 35 kHz | | | | | | | |
| 38 | 40 kHz | | | | | | | |
| 39 | 45.8 kHz | | | | | | | |
| 40 | 50 kHz | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
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| | | | | | | | | |
| | | | | | | | | |
| | 40 Hz | | | | | | | Threshold Prediction |
| | 100 Hz | | | | | | | Threshold Prediction |
| | 350 Hz | | | | | | | Threshold Prediction |
| | 1 kHz | | | | | | | Threshold Prediction |
| | 2.5 kHz | | | | | | | Threshold Prediction |
| | 3.5 kHz | | | | | | | Threshold Prediction |
| | 6 kHz | | | | | | | Threshold Prediction |
| | 8 kHz | | | | | | | Threshold Prediction |
| | 20 kHz | | | | | | | Threshold Prediction |
| | 30 kHz | | | | | | | Threshold Prediction |

Table 8.5-2: PACS @ Photometer Mode// H-field // 2nd Antenna Position

| PACS RS H-field Photometer Mode 3rd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 1 | 30 Hz | | | | | | | |
| 2 | 40 Hz | | | | | | | |
| 3 | 50 Hz | | | | | | | |
| 4 | 64 Hz | | | | | | | |
| 5 | 80 Hz | | | | | | | |
| 6 | 100 Hz | | | | | | | |
| 7 | 125 Hz | | | | | | | |
| 8 | 256 Hz | | | | | | | |
| 9 | 350 Hz | | | | | | | |
| 10 | 500 Hz | | | | | | | |
| 11 | 750 Hz | | | | | | | |
| 12 | 1 kHz | | | | | | | |
| 13 | 1.5 kHz | | | | | | | |
| 14 | 2 kHz | | | | | | | |
| 15 | 2.5 kHz | | | | | | | |
| 16 | 3 kHz | | | | | | | |
| 17 | 3.5 kHz | | | | | | | |
| 18 | 4 kHz | | | | | | | |
| 19 | 4.5 kHz | | | | | | | |
| 20 | 5 kHz | | | | | | | |
| 21 | 5.5 kHz | | | | | | | |
| 22 | 6 kHz | | | | | | | |
| 23 | 6.5 kHz | | | | | | | |
| 24 | 7 kHz | | | | | | | |
| 25 | 7.5 kHz | | | | | | | |

| PACS RS H-field Photometer Mode 3rd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|----------------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 26 | 8 kHz | | | | | | | |
| 27 | 8.5 kHz | | | | | | | |
| 28 | 9 kHz | | | | | | | |
| 29 | 9.5 kHz | | | | | | | |
| 31 | 10 kHz | | | | | | | |
| 31 | 11.47 kHz | | | | | | | |
| 32 | 15.6 kHz | | | | | | | |
| 33 | 17.0 kHz | | | | | | | |
| 34 | 20.0 kHz | | | | | | | |
| 35 | 25.0 kHz | | | | | | | |
| 36 | 30 kHz | | | | | | | |
| 37 | 35 kHz | | | | | | | |
| 38 | 40 kHz | | | | | | | |
| 39 | 45.8 kHz | | | | | | | |
| 40 | 50 kHz | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | 40 Hz | | | | | | | Threshold Prediction |
| | 100 Hz | | | | | | | Threshold Prediction |
| | 350 Hz | | | | | | | Threshold Prediction |
| | 1 kHz | | | | | | | Threshold Prediction |
| | 2.5 kHz | | | | | | | Threshold Prediction |

| PACS RS H-field Photometer Mode 3rd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|----------------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| | 3.5 kHz | | | | | | | Threshold Prediction |
| | 6 kHz | | | | | | | Threshold Prediction |
| | 8 kHz | | | | | | | Threshold Prediction |
| | 20 kHz | | | | | | | Threshold Prediction |
| | 30 kHz | | | | | | | Threshold Prediction |

Table 8.5-3: PACS @ Photometer Mode// H-field // 3rd^t Antenna Position

| PACS RS H-field Spectrometer Mode 1st Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 1 | 30 Hz | | | | | | | |
| 2 | 40 Hz | | | | | | | |
| 3 | 50 Hz | | | | | | | |
| 4 | 64 Hz | | | | | | | |
| 5 | 80 Hz | | | | | | | |
| 6 | 100 Hz | | | | | | | |
| 7 | 125 Hz | | | | | | | |
| 8 | 256 Hz | | | | | | | |
| 9 | 350 Hz | | | | | | | |
| 10 | 500 Hz | | | | | | | |
| 11 | 750 Hz | | | | | | | |
| 12 | 1 kHz | | | | | | | |
| 13 | 1.5 kHz | | | | | | | |

| PACS RS H-field Spectrometer Mode 1st Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 14 | 2 kHz | | | | | | | |
| 15 | 2.5 kHz | | | | | | | |
| 16 | 3 kHz | | | | | | | |
| 17 | 3.5 kHz | | | | | | | |
| 18 | 4 kHz | | | | | | | |
| 19 | 4.5 kHz | | | | | | | |
| 20 | 5 kHz | | | | | | | |
| 21 | 5.5 kHz | | | | | | | |
| 22 | 6 kHz | | | | | | | |
| 23 | 6.5 kHz | | | | | | | |
| 24 | 7 kHz | | | | | | | |
| 25 | 7.5 kHz | | | | | | | |
| 26 | 8 kHz | | | | | | | |
| 27 | 8.5 kHz | | | | | | | |
| 28 | 9 kHz | | | | | | | |
| 29 | 9.5 kHz | | | | | | | |
| 31 | 10 kHz | | | | | | | |
| 31 | 11.47 kHz | | | | | | | |
| 32 | 15.6 kHz | | | | | | | |
| 33 | 17.0 kHz | | | | | | | |
| 34 | 20.0 kHz | | | | | | | |
| 35 | 25.0 kHz | | | | | | | |
| 36 | 30 kHz | | | | | | | |
| 37 | 35 kHz | | | | | | | |
| 38 | 40 kHz | | | | | | | |

| PACS RS H-field Spectrometer Mode 1st Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 39 | 45.8 kHz | | | | | | | |
| 40 | 50 kHz | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Table 8.5-1: PACS @ Spectrometer Mode// H-field // 1st Antenna Position

| PACS RS H-field Spectrometer Mode 2 nd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 1 | 30 Hz | | | | | | | |
| 2 | 40 Hz | | | | | | | |
| 3 | 50 Hz | | | | | | | |
| 4 | 64 Hz | | | | | | | |
| 5 | 80 Hz | | | | | | | |
| 6 | 100 Hz | | | | | | | |
| 7 | 125 Hz | | | | | | | |
| 8 | 256 Hz | | | | | | | |
| 9 | 350 Hz | | | | | | | |
| 10 | 500 Hz | | | | | | | |
| 11 | 750 Hz | | | | | | | |
| 12 | 1 kHz | | | | | | | |

| PACS RS H-field Spectrometer Mode 2 nd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 13 | 1.5 kHz | | | | | | | |
| 14 | 2 kHz | | | | | | | |
| 15 | 2.5 kHz | | | | | | | |
| 16 | 3 kHz | | | | | | | |
| 17 | 3.5 kHz | | | | | | | |
| 18 | 4 kHz | | | | | | | |
| 19 | 4.5 kHz | | | | | | | |
| 20 | 5 kHz | | | | | | | |
| 21 | 5.5 kHz | | | | | | | |
| 22 | 6 kHz | | | | | | | |
| 23 | 6.5 kHz | | | | | | | |
| 24 | 7 kHz | | | | | | | |
| 25 | 7.5 kHz | | | | | | | |
| 26 | 8 kHz | | | | | | | |
| 27 | 8.5 kHz | | | | | | | |
| 28 | 9 kHz | | | | | | | |
| 29 | 9.5 kHz | | | | | | | |
| 31 | 10 kHz | | | | | | | |
| 31 | 11.47 kHz | | | | | | | |
| 32 | 15.6 kHz | | | | | | | |
| 33 | 17.0 kHz | | | | | | | |
| 34 | 20.0 kHz | | | | | | | |
| 35 | 25.0 kHz | | | | | | | |
| 36 | 30 kHz | | | | | | | |
| 37 | 35 kHz | | | | | | | |

| PACS RS H-field Spectrometer Mode 2 nd Position | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|---------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | Session | Sensor | Observations |
| 38 | 40 kHz | | | | | | | |
| 39 | 45.8 kHz | | | | | | | |
| 40 | 50 kHz | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Table 8.5-2: PACS @ Spectrometer Mode// H-field // 2nd Antenna Position

8.6 PACS Frequency Control Tables E-field

| I | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 1 | 0.1 MHz | V | | | | | | | |
| 2 | 0.131 MHz | V | | | | | | | |
| 3 | 0.18 MHz | V | | | | | | | |
| 4 | 0.2 MHz | V | | | | | | | |
| 5 | 0.22 MHz | V | | | | | | | |
| 6 | 0.312 MHz | V | | | | | | | |
| 7 | 0.5 MHz | V | | | | | | | |
| 8 | 1 MHz | V | | | | | | | |
| 9 | 2 MHz | V | | | | | | | |
| 10 | 4 MHz | V | | | | | | | |
| 11 | 6.88 MHz | V | | | | | | | |
| 12 | 9.623 MHz | V | | | | | | | |
| 13 | 10 MHz | V | | | | | | | |
| 14 | 12 MHz | V | | | | | | | |
| 15 | 12.8 MHz | V | | | | | | | |
| 16z | 14 MHz | V | | | | | | | |
| 17 | 16 MHz | V | | | | | | | |
| 18 | 17.28 MHz | V | | | | | | | |
| 19 | 19.246 MHz | V | | | | | | | |
| 20 | 20 MHz | V | | | | | | | |
| 21 | 20.6478 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 22 | 36 MHz | V | | | | | | | |

| I | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 23 | 38.49 MHz | V | | | | | | | |
| 24 | 40 MHz | V | | | | | | | |
| 25 | 48 MHz | V | | | | | | | |
| 26 | 60 MHz | V | | | | | | | |
| 27 | 80 MHz | V | | | | | | | |
| 28 | 100 MHz | V | | | | | | | |
| 29 | 200 Mhz | V | | | | | | | |
| 30 | 300 MHz | V | | | | | | | |
| 31 | 384.93 MHz | V | | | | | | | |
| 32 | 481 MHz | V | | | | | | | |
| 33 | 550 MHz | V | | | | | | | |
| 34 | 577.38 MHz | V | | | | | | | |
| 35 | 673.61 MHz | V | | | | | | | |
| 36 | 769.86 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 37 | 1.1 GHz | V | | | | | | | |
| 38 | 1.25 GHz | V | | | | | | | |
| 39 | 2.30959 GHz | V | | | | | | | |
| 40 | 4 GHz | V | | | | | | | |
| 41 | 5 GHz | V | | | | | | | |
| 42 | 6.15891 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 43 | 6.600 GHz | V | | | | | | | |
| 44 | 7.600 GHz | V | | | | | | | |
| 45 | 8.4685 GHz | V | | | | | | | |
| 46 | 8.600 GHz | V | | | | | | | |

| I | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 47 | 9.600 GHz | V | | | | | | | |
| 48 | 10.36375 GHz | V | | | | | | | |
| 49 | 15.173565 GHz | V | | | | | | | |
| 50 | 16.690921 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 51 | 8.45 GHz | V | | | | | | | TX Notch |
| 52 | 8.475 GHz | V | | | | | | | TX Notch |
| 53 | 8.5 GHz | V | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |
| 1 | 36 MHz | H | | | | | | | |
| 2 | 38.49 MHz | H | | | | | | | |
| 3 | 40 MHz | H | | | | | | | |
| 4 | 48 MHz | H | | | | | | | |
| 5 | 60 MHz | H | | | | | | | |
| 6 | 80 MHz | H | | | | | | | |
| 7 | 100 MHz | H | | | | | | | |
| 8 | 200 Mhz | H | | | | | | | |
| 9 | 300 MHz | H | | | | | | | |
| 10 | 384.93 MHz | H | | | | | | | |
| 11 | 481 MHz | H | | | | | | | |
| 12 | 550 MHz | H | | | | | | | |
| 13 | 577.38 MHz | H | | | | | | | |
| 14 | 673.61 MHz | H | | | | | | | |
| 15 | 769.86 MHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |

| I | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 16 | 1.1 GHz | H | | | | | | | |
| 17 | 1.25 GHz | H | | | | | | | |
| 18 | 2.30959 GHz | H | | | | | | | |
| 19 | 4 GHz | H | | | | | | | |
| 20 | 5 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 21 | 6.15891 GHz | H | | | | | | | |
| 22 | 6.600 GHz | H | | | | | | | |
| 23 | 7.600 GHz | H | | | | | | | |
| 24 | 8.4685 GHz | H | | | | | | | |
| 25 | 8.600 GHz | H | | | | | | | |
| 26 | 9.600 GHz | H | | | | | | | |
| 27 | 10.36375 GHz | H | | | | | | | |
| 28 | 15.173565 GHz | H | | | | | | | |
| 29 | 16.690921 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 30 | 8.45 GHz | H | | | | | | | TX Notch |
| 31 | 8.475 GHz | H | | | | | | | TX Notch |
| 32 | 8.5 GHz | H | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |

Table 8.6-1 : PACS @ **Photometer Mode**// E-field // 1st Antenna Position

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 1 | 0.1 MHz | V | | | | | | | |
| 2 | 0.131 MHz | V | | | | | | | |
| 3 | 0.18 MHz | V | | | | | | | |
| 4 | 0.2 MHz | V | | | | | | | |
| 5 | 0.22 MHz | V | | | | | | | |
| 6 | 0.312 MHz | V | | | | | | | |
| 7 | 0.5 MHz | V | | | | | | | |
| 8 | 1 MHz | V | | | | | | | |
| 9 | 2 MHz | V | | | | | | | |
| 10 | 4 MHz | V | | | | | | | |
| 11 | 6.88 MHz | V | | | | | | | |
| 12 | 9.623 MHz | V | | | | | | | |
| 13 | 10 MHz | V | | | | | | | |
| 14 | 12 MHz | V | | | | | | | |
| 15 | 12.8 MHz | V | | | | | | | |
| 16z | 14 MHz | V | | | | | | | |
| 17 | 16 MHz | V | | | | | | | |
| 18 | 17.28 MHz | V | | | | | | | |
| 19 | 19.246 MHz | V | | | | | | | |
| 20 | 20 MHz | V | | | | | | | |
| 21 | 20.6478 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 22 | 36 MHz | V | | | | | | | |
| 23 | 38.49 MHz | V | | | | | | | |
| 24 | 40 MHz | V | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 25 | 48 MHz | V | | | | | | | |
| 26 | 60 MHz | V | | | | | | | |
| 27 | 80 MHz | V | | | | | | | |
| 28 | 100 MHz | V | | | | | | | |
| 29 | 200 Mhz | V | | | | | | | |
| 30 | 300 MHz | V | | | | | | | |
| 31 | 384.93 MHz | V | | | | | | | |
| 32 | 481 MHz | V | | | | | | | |
| 33 | 550 MHz | V | | | | | | | |
| 34 | 577.38 MHz | V | | | | | | | |
| 35 | 673.61 MHz | V | | | | | | | |
| 36 | 769.86 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 37 | 1.1 GHz | V | | | | | | | |
| 38 | 1.25 GHz | V | | | | | | | |
| 39 | 2.30959 GHz | V | | | | | | | |
| 40 | 4 GHz | V | | | | | | | |
| 41 | 5 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 42 | 6.15891 GHz | V | | | | | | | |
| 43 | 6.600 GHz | V | | | | | | | |
| 44 | 7.600 GHz | V | | | | | | | |
| 45 | 8.4685 GHz | V | | | | | | | |
| 46 | 8.600 GHz | V | | | | | | | |
| 47 | 9.600 GHz | V | | | | | | | |
| 48 | 10.36375 GHz | V | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----------|------------------|----------|------|----------------|---------------|--------|---------|--------|---------------------|
| 49 | 15.173565 GHz | V | | | | | | | |
| 50 | 16.690921 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 51 | 8.45 GHz | V | | | | | | | TX Notch |
| 52 | 8.475 GHz | V | | | | | | | TX Notch |
| 53 | 8.5 GHz | V | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |
| 1 | 36 MHz | H | | | | | | | |
| 2 | 38.49 MHz | H | | | | | | | |
| 3 | 40 MHz | H | | | | | | | |
| 4 | 48 MHz | H | | | | | | | |
| 5 | 60 MHz | H | | | | | | | |
| 6 | 80 MHz | H | | | | | | | |
| 7 | 100 MHz | H | | | | | | | |
| 8 | 200 Mhz | H | | | | | | | |
| 9 | 300 MHz | H | | | | | | | |
| 10 | 384.93 MHz | H | | | | | | | |
| 11 | 481 MHz | H | | | | | | | |
| 12 | 550 MHz | H | | | | | | | |
| 13 | 577.38 MHz | H | | | | | | | |
| 14 | 673.61 MHz | H | | | | | | | |
| 15 | 769.86 MHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 16 | 1.1 GHz | H | | | | | | | |
| 17 | 1.25 GHz | H | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----------|------------------|----------|------|----------------|---------------|--------|---------|--------|---------------------|
| 18 | 2.30959 GHz | H | | | | | | | |
| 19 | 4 GHz | H | | | | | | | |
| 20 | 5 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 21 | 6.15891 GHz | H | | | | | | | |
| 22 | 6.600 GHz | H | | | | | | | |
| 23 | 7.600 GHz | H | | | | | | | |
| 24 | 8.4685 GHz | H | | | | | | | |
| 25 | 8.600 GHz | H | | | | | | | |
| 26 | 9.600 GHz | | | | | | | | |
| 27 | 10.36375 GHz | H | | | | | | | |
| 28 | 15.173565 GHz | H | | | | | | | |
| 29 | 16.690921 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 30 | 8.45 GHz | H | | | | | | | TX Notch |
| 31 | 8.475 GHz | H | | | | | | | TX Notch |
| 32 | 8.5 GHz | H | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |

Table 8.6-2 : PACS @ **Photometer Mode**// E-field // 2nd Antenna Position

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 1 | 0.1 MHz | V | | | | | | | |
| 2 | 0.131 MHz | V | | | | | | | |
| 3 | 0.18 MHz | V | | | | | | | |
| 4 | 0.2 MHz | V | | | | | | | |
| 5 | 0.22 MHz | V | | | | | | | |
| 6 | 0.312 MHz | V | | | | | | | |
| 7 | 0.5 MHz | V | | | | | | | |
| 8 | 1 MHz | V | | | | | | | |
| 9 | 2 MHz | V | | | | | | | |
| 10 | 4 MHz | V | | | | | | | |
| 11 | 6.88 MHz | V | | | | | | | |
| 12 | 9.623 MHz | V | | | | | | | |
| 13 | 10 MHz | V | | | | | | | |
| 14 | 12 MHz | V | | | | | | | |
| 15 | 12.8 MHz | V | | | | | | | |
| 16z | 14 MHz | V | | | | | | | |
| 17 | 16 MHz | V | | | | | | | |
| 18 | 17.28 MHz | V | | | | | | | |
| 19 | 19.246 MHz | V | | | | | | | |
| 20 | 20 MHz | | | | | | | | |
| 21 | 20.6478 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 22 | 36 MHz | V | | | | | | | |
| 23 | 38.49 MHz | V | | | | | | | |
| 24 | 40 MHz | V | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 25 | 48 MHz | V | | | | | | | |
| 26 | 60 MHz | V | | | | | | | |
| 27 | 80 MHz | V | | | | | | | |
| 28 | 100 MHz | V | | | | | | | |
| 29 | 200 Mhz | V | | | | | | | |
| 30 | 300 MHz | V | | | | | | | |
| 31 | 384.93 MHz | V | | | | | | | |
| 32 | 481 MHz | V | | | | | | | |
| 33 | 550 MHz | V | | | | | | | |
| 34 | 577.38 MHz | V | | | | | | | |
| 35 | 673.61 MHz | V | | | | | | | |
| 36 | 769.86 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 37 | 1.1 GHz | V | | | | | | | |
| 38 | 1.25 GHz | V | | | | | | | |
| 39 | 2.30959 GHz | V | | | | | | | |
| 40 | 4 GHz | V | | | | | | | |
| 41 | 5 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 42 | 6.15891 GHz | V | | | | | | | |
| 43 | 6.600 GHz | V | | | | | | | |
| 44 | 7.600 GHz | V | | | | | | | |
| 45 | 8.4685 GHz | V | | | | | | | |
| 46 | 8.600 GHz | V | | | | | | | |
| 47 | 9.600 GHz | V | | | | | | | |
| 48 | 10.36375 GHz | V | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 49 | 15.173565 GHz | V | | | | | | | |
| 50 | 16.690921 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 51 | 8.45 GHz | V | | | | | | | TX Notch |
| 52 | 8.475 GHz | V | | | | | | | TX Notch |
| 53 | 8.5 GHz | V | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |
| 1 | 36 MHz | H | | | | | | | |
| 2 | 38.49 MHz | H | | | | | | | |
| 3 | 40 MHz | H | | | | | | | |
| 4 | 48 MHz | H | | | | | | | |
| 5 | 60 MHz | H | | | | | | | |
| 6 | 80 MHz | H | | | | | | | |
| 7 | 100 MHz | H | | | | | | | |
| 8 | 200 Mhz | H | | | | | | | |
| 9 | 300 MHz | H | | | | | | | |
| 10 | 384.93 MHz | H | | | | | | | |
| 11 | 481 MHz | H | | | | | | | |
| 12 | 550 MHz | H | | | | | | | |
| 13 | 577.38 MHz | H | | | | | | | |
| 14 | 673.61 MHz | H | | | | | | | |
| 15 | 769.86 MHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 16 | 1.1 GHz | H | | | | | | | |
| 17 | 1.25 GHz | H | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----------|------------------|----------|------|----------------|---------------|--------|---------|--------|---------------------|
| 18 | 2.30959 GHz | H | | | | | | | |
| 19 | 4 GHz | H | | | | | | | |
| 20 | 5 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 21 | 6.15891 GHz | H | | | | | | | |
| 22 | 6.600 GHz | H | | | | | | | |
| 23 | 7.600 GHz | H | | | | | | | |
| 24 | 8.4685 GHz | H | | | | | | | |
| 25 | 8.600 GHz | H | | | | | | | |
| 26 | 9.600 GHz | H | | | | | | | |
| 27 | 10.36375 GHz | H | | | | | | | |
| 28 | 15.173565 GHz | H | | | | | | | |
| 29 | 16.690921 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 30 | 8.45 GHz | H | | | | | | | TX Notch |
| 31 | 8.475 GHz | H | | | | | | | TX Notch |
| 32 | 8.5 GHz | H | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |

Table 8.6-3 : PACS @ Spectrometer Mode// E-field // 1st Antenna Position

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 1 | 0.1 MHz | V | | | | | | | |
| 2 | 0.131 MHz | V | | | | | | | |
| 3 | 0.18 MHz | V | | | | | | | |
| 4 | 0.2 MHz | V | | | | | | | |
| 5 | 0.22 MHz | V | | | | | | | |
| 6 | 0.312 MHz | V | | | | | | | |
| 7 | 0.5 MHz | V | | | | | | | |
| 8 | 1 MHz | V | | | | | | | |
| 9 | 2 MHz | V | | | | | | | |
| 10 | 4 MHz | V | | | | | | | |
| 11 | 6.88 MHz | V | | | | | | | |
| 12 | 9.623 MHz | V | | | | | | | |
| 13 | 10 MHz | V | | | | | | | |
| 14 | 12 MHz | V | | | | | | | |
| 15 | 12.8 MHz | V | | | | | | | |
| 16z | 14 MHz | V | | | | | | | |
| 17 | 16 MHz | V | | | | | | | |
| 18 | 17.28 MHz | V | | | | | | | |
| 19 | 19.246 MHz | | | | | | | | |
| 20 | 20 MHz | V | | | | | | | |
| 21 | 20.6478 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 22 | 36 MHz | V | | | | | | | |
| 23 | 38.49 MHz | V | | | | | | | |
| 24 | 40 MHz | V | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|----|---------------|------|------|----------------|---------------|--------|---------|--------|---------------------|
| 25 | 48 MHz | V | | | | | | | |
| 26 | 60 MHz | V | | | | | | | |
| 27 | 80 MHz | V | | | | | | | |
| 28 | 100 MHz | V | | | | | | | |
| 29 | 200 Mhz | V | | | | | | | |
| 30 | 300 MHz | V | | | | | | | |
| 31 | 384.93 MHz | V | | | | | | | |
| 32 | 481 MHz | V | | | | | | | |
| 33 | 550 MHz | V | | | | | | | |
| 34 | 577.38 MHz | V | | | | | | | |
| 35 | 673.61 MHz | V | | | | | | | |
| 36 | 769.86 MHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 37 | 1.1 GHz | V | | | | | | | |
| 38 | 1.25 GHz | V | | | | | | | |
| 39 | 2.30959 GHz | V | | | | | | | |
| 40 | 4 GHz | V | | | | | | | |
| 41 | 5 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 42 | 6.15891 GHz | V | | | | | | | |
| 43 | 6.600 GHz | V | | | | | | | |
| 44 | 7.600 GHz | V | | | | | | | |
| 45 | 8.4685 GHz | V | | | | | | | |
| 46 | 8.600 GHz | V | | | | | | | |
| 47 | 9.600 GHz | V | | | | | | | |
| 48 | 10.36375 GHz | V | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----------|------------------|----------|------|----------------|---------------|--------|---------|--------|---------------------|
| 49 | 15.173565 GHz | V | | | | | | | |
| 50 | 16.690921 GHz | V | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 51 | 8.45 GHz | V | | | | | | | TX Notch |
| 52 | 8.475 GHz | V | | | | | | | TX Notch |
| 53 | 8.5 GHz | V | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |
| 1 | 36 MHz | H | | | | | | | |
| 2 | 38.49 MHz | H | | | | | | | |
| 3 | 40 MHz | H | | | | | | | |
| 4 | 48 MHz | H | | | | | | | |
| 5 | 60 MHz | H | | | | | | | |
| 6 | 80 MHz | H | | | | | | | |
| 7 | 100 MHz | H | | | | | | | |
| 8 | 200 Mhz | H | | | | | | | |
| 9 | 300 MHz | H | | | | | | | |
| 10 | 384.93 MHz | H | | | | | | | |
| 11 | 481 MHz | H | | | | | | | |
| 12 | 550 MHz | H | | | | | | | |
| 13 | 577.38 MHz | H | | | | | | | |
| 14 | 673.61 MHz | H | | | | | | | |
| 15 | 769.86 MHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 16 | 1.1 GHz | H | | | | | | | |
| 17 | 1.25 GHz | H | | | | | | | |

| i | Frequency | Pol. | Date | CCS Time Start | CCS Time Stop | Script | Session | Sensor | Comment |
|-----------|------------------|----------|------|----------------|---------------|--------|---------|--------|---------------------|
| 18 | 2.30959 GHz | H | | | | | | | |
| 19 | 4 GHz | H | | | | | | | |
| 20 | 5 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 21 | 6.15891 GHz | H | | | | | | | |
| 22 | 6.600 GHz | H | | | | | | | |
| 23 | 7.600 GHz | H | | | | | | | |
| 24 | 8.4685 GHz | H | | | | | | | |
| 25 | 8.600 GHz | H | | | | | | | |
| 26 | 9.600 GHz | H | | | | | | | |
| 27 | 10.36375 GHz | H | | | | | | | |
| 28 | 15.173565 GHz | H | | | | | | | |
| 29 | 16.690921 GHz | H | | | | | | | |
| | CHANGE | | | | | | | | SETUP CHANGE |
| 30 | 8.45 GHz | H | | | | | | | TX Notch |
| 31 | 8.475 GHz | H | | | | | | | TX Notch |
| 32 | 8.5 GHz | H | | | | | | | TX Notch |
| | | | | | | | | | |
| | | | | | | | | | |

Table 8.6-4 : PACS @ Spectrometer Mode// E-field // 2nd Antenna Position

8.7 SPIRE Frequency Control Tables H-field

| SPIRE RS H-Field | | | | | | | | |
|------------------|---------------------------|------|----------------|---------------|--------|------------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA / STEP | Sensor | Observations |
| 1 | 30 Hz – 750 Hz (< 5 min) | | | | | | | |
| 2 | 750 Hz – 50 kHz (< 5 min) | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |

| SPIRE RS H-Field | | | | | | | | |
|------------------|-----------|------|----------------|---------------|--------|------------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA / STEP | Sensor | Observations |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| | | | | | | | | |

Table 8.7-1: SPIRE RS H-field

8.8 SPIRE Frequency Control Tables E-field

| SPIRE RS E-Field, Antenna Position 1 Horizontal Polarization | | | | | | | | |
|--|---|------|----------------|---------------|--------|-----|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA | Sensor | Observations |
| 1 | 30 MHz – 1 GHz (< 5 min) | | | | | | | |
| 2 | 1 GHz – 6 GHz (< 3 min) | | | | | | | |
| 3 | 6 GHz – 18 GHz (< 2 min) | | | | | | | |
| 4 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |

| SPIRE RS E-Field, Antenna Position 1 Horizontal Polarization | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|-----|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA | Sensor | Observations |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |

Table 8.8-1: SPIRE @ RS E-field // Antenna Position 1, Horizontal Polarization

| SPIRE RS E-Field, Antenna Position 1, Vertical Polarization | | | | | | | | |
|---|---|------|----------------|---------------|--------|----------|--------|--------------|
| I | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA/STEP | Sensor | Observations |
| 1 | 14 kHz – 600 kHz (< 5 min) | | | | | | | |
| 2 | 600 kHz – 30 MHz (< 5 min) | | | | | | | |
| 3 | 30 MHz – 1 GHz (< 5 min) | | | | | | | |
| 4 | 1 GHz – 6 GHz (< 3 min) | | | | | | | |
| 5 | 6 GHz – 18 GHz (< 2 min) | | | | | | | |
| 6 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |

| SPIRE RS E-Field, Antenna Position 1, Vertical Polarization | | | | | | | | |
|---|-----------|------|----------------|---------------|--------|----------|--------|--------------|
| I | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA/STEP | Sensor | Observations |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |

Table 8.8-2: SPIRE @ RS E-field // Antenna Position 1, Vertical Polarization

| SPIRE RS E-Field, Antenna Position 2 Horizontal Polarization | | | | | | | | |
|--|---|------|----------------|---------------|--------|----------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA/STEP | Sensor | Observations |
| 1 | 30 MHz – 1 GHz (< 5 min) | | | | | | | |
| 2 | 1 GHz – 6 GHz (< 3 min) | | | | | | | |
| 3 | 6 GHz – 18 GHz (< 2 min) | | | | | | | |
| 4 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |

| SPIRE RS E-Field, Antenna Position 2 Horizontal Polarization | | | | | | | | |
|--|-----------|------|----------------|---------------|--------|----------|--------|--------------|
| i | Frequency | Date | CCS Start Time | CCS Stop Time | Script | QLA/STEP | Sensor | Observations |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |

Table 8.8-3: SPIRE @ RS E-field // Antenna Position 2, Horizontal Polarization

| SPIRE RS E-Field, Antenna Position 2, Vertical Polarization | | | | | | | | |
|---|---|------|----------------|---------------|--------|----------|--------|--------------|
| I | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script | QLA/STEP | Sensor | Observations |
| 1 | 14 kHz – 600 kHz (< 5 min) | | | | | | | |
| 2 | 600 kHz – 30 MHz (< 5 min) | | | | | | | |
| 3 | 30 MHz – 1 GHz (< 5 min) | | | | | | | |
| 4 | 1 GHz – 6 GHz (< 3 min) | | | | | | | |
| 5 | 6 GHz – 18 GHz (< 2 min) | | | | | | | |
| 6 | 8.45 GHz – 8.5 GHz (in steps of 10 MHz) | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |

| SPIRE RS E-Field, Antenna Position 2, Vertical Polarization | | | | | | | | |
|---|-----------------|------|----------------|---------------|--------|----------|--------|--------------|
| I | Frequency Range | Date | CCS Start Time | CCS Stop Time | Script | QLA/STEP | Sensor | Observations |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |
| 27 | | | | | | | | |
| 28 | | | | | | | | |
| 29 | | | | | | | | |
| 30 | | | | | | | | |
| 31 | | | | | | | | |
| 32 | | | | | | | | |
| 33 | | | | | | | | |
| 34 | | | | | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |

Table 8.8-4: SPIRE @ RS E-field // Antenna Position 2, Vertical Polarization

9 Summary Sheets

9.1 Procedure Variation Summary

| | | | |
|-------------------|-------------------|------------------|------|
| | Test Change | Curr. No.: | |
| | | Date | |
| | | Page | of |
| Test designation | Test Procedure | Issue | Rev. |
| Test step changed | Reason for Change | | |
| | | | |
| Prepared by: | Resp. Test Leader | Project Engineer | |
| PA/QA | Prime | Customer | |

Table 9-1: Procedure Variation Sheet

9.2 Non Conformance Report (NCR) Summary

| NCR - No. | NCR - Title | Date | Open Closed | PA sig. |
|-----------|-------------|------|----------------|------------|
| | | | | |

Table 9-1: Non-Conformance Record Sheet

9.3 Sign-off Sheet

| | Date | Signature |
|---------------------------|-------------|------------------|
| Test Manager | | |
| Operator | | |
| PA Responsible | | |
| ESA Representative | | |

I

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| | Name | Dep./Comp. | | Name | Dep./Comp. |
|---|-------------------------|--------------|---|----------------------------------|------------|
| | Alberti von Mathias Dr. | AOE22 | | Schmidt Rudolf | FAE22 |
| | Barlage Bernhard | AED11 | | Schweickert Gunn | AOE22 |
| | Bayer Thomas | AOA52 | | Sonn Nico | AOE51 |
| | Brune Holger | AOA55 | | Steininger Eric | AED32 |
| | Fehringer Alexander | AOE13 | x | Stritter Rene | AED11 |
| | Fricke Wolfgang Dr. | AED 65 | | Thörmer Klaus-Horst Dr. | OTN/AED65 |
| | Geiger Hermann | AOA52 | | Wagner Klaus | AOE22 |
| | Gerner Willi | AED11 | x | Wietbrock Walter | AET12 |
| | Grasl Andreas | OTN/AOA54 | | Wöhler Hans | AOE22 |
| | Grasshoff Brigitte | AET12 | | Wössner Ulrich | ASE442 |
| | Hauser Armin | AOE22 | | | |
| | Hendry David | Terma Resid. | | | |
| | Hengstler Reinhold | AOA 5 | x | Alcatel | ASP |
| | Hinger Jürgen | AOE22 | x | ESA/ESTEC | ESA |
| | Hofmann Rolf | ASE442 | | Instruments: | |
| | Hohn Rüdiger | AED65 | x | MPE (PACS) | MPE |
| | Huber Johann | AOA52 | x | RAL (SPIRE) | RAL |
| | Hund Walter | ASE442 | x | SRON (HIFI) | SRON |
| x | Idler Siegmund | AED312 | | Subcontractors: | |
| x | Ilse Stijn | Terma Resid. | | Air Liquide, Space Department | AIR |
| | Ivány von András | FAE22 | | Air Liquide, Space Department | AIRS |
| | Jahn Gerd Dr. | AOE22 | | Air Liquide, Orbital System | AIRT |
| x | Kalde Clemens | APE3 | | Alcatel Bell Space | ABSP |
| x | Kameter Rudolf | OTN/AOA54 | | Astrium Sub-Subsyst. & Equipment | ASSE |
| | Kettner Bernhard | AET42 | | Austrian Aerospace | AAE |
| x | Knoblauch August | AET32 | | Austrian Aerospace | AAEM |
| | Koelle Markus | AOA53 | | APCO Technologies S. A. | APCO |
| x | Kroeker Jürgen | AED65 | | Bieri Engineering B. V. | BIER |
| | Kunz Oliver Dr. | AOE22 | | BOC Edwards | BOCE |
| | Lamprecht Ernst | OTN/ASI21 | | Dutch Space Solar Arrays | DSSA |
| | Lang Jürgen | ASE442 | | EADS CASA Espacio | CASA |
| | Langenstein Rolf | AED15 | | EADS CASA Espacio | ECAS |
| | Langfermann Michael | AOA51 | | EADS Space Transportation | ASIP |
| | Mack Paul | OTN/AOA54 | | Eurocopter | ECD |
| | Müller Jörg | AOA52 | | European Test Services | ETS |
| | Müller Martin | AOA53 | | HTS AG Zürich | HTSZ |
| | Müller Ralf | FAE22 | | Linde | LIND |
| | Peltz Heinz-Willi | AOE13 | | Patria New Technologies Oy | PANT |
| | Pietroboni Karin | AED65 | | Phoenix, Volkmarsen | PHOE |
| | Platzer Wilhelm | AED22 | | Prototech AS | PROT |
| | Reichle Konrad | AOA52 | | QMC Instruments Ltd. | QMC |
| | Reuß Friedhelm | AED62 | | Rembe, Brilon | REMB |
| | Rühe Wolfgang | AED65 | | Rosemount Aerospace GmbH | ROSE |
| | Runge Axel | OTN/AOA54 | | RYMSA, Radiación y Microondas | RYM |
| | Sachsse Bernt | AED21 | | SENER Ingenieria SA | SEN |
| x | Schink Dietmar | AED44 | | Stöhr, Königsbrunn | STOE |
| x | Schlosser Christian | OTN/AOA54 | | Terma A/S, Herlev | TER |