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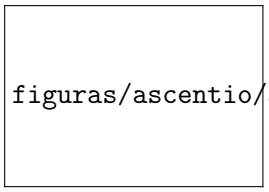

ID: SB1-B-PRO-T-D01-011 - v1.0

TITLE: X-Band Transmitter FM Test Procedure

SUMMARY: This document describes the EWC30-FM's aliveness, functional and performace test procedures.

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1. Document Information

1.1. Purpose

The purpose of this document is to detail the Satellite Communications Equipment aliveness, functional and performance test procedures for the X-Band Modulator, for de FM units. X-band filter is present in the test setup but is fully characterized in AD.01. The objective of test procedure is to ensure repeatability of results.

1.2. Scope

This document should be considered as the main reference for aliveness, functional and performance test procedure of X-Band Modulator FM units.

1.3. Notations

Not applicable to this document.

1.4. Terms and Definitions

Some key terms will be frequently used throughout the document, assuming the following definitions:

- **Verification:** Confirmation through the provision of objective evidence that the realized product is in conformance with applicable requirements.
- **RS422 or RS-422** refer in the same way to TIA/EIA-422-B specification.
- **LVDS** refer to EIA/TIA-644-A specification.

1.5. Acronyms and Abbreviations

The following acronyms and abbreviations are used in this document and should be considered as precedent over those defined in other documents in case of discrepancy or inconsistency.

ACRONYMS	DESCRIPTION
ASM	Analog Signal Monitor
BB	BaseBand
BDM	Bi-Level Discrete Monitor
BOB	Break Out Box
COMM	Communication
CEGSE	Communication Electrical Ground Support Equipment
CS	Connector Saver
DC	Direct current
DET	DETail
DUT	Device Under Test

Continued on Next Page ...

Table 1.5.0-1 – Continued

ACRONYMS	DESCRIPTION
DWL TP	Downlink Test Port
EM	Engineering Model
EGSE	Electrical Ground Support Equipment
ESD	Electrostatic Discharge
EXE	EXEcute
FC	Flight Control
GND	Ground
GS	Ground Segment
GSE	Ground Support Equipment
HV-HPC	High Voltage High Power Pulse Command
ID	IDentifier
IF	Intermediate Frequency
IP	Internet Protocol
KVM	Keyboard Video and Mouse
LED	Light-Emitting Diode
LVDS	Low Voltage Differential Signaling
MCS	Monitoring & Control Software
M&C	Monitor And Control
N/A	Not Applicable
OVP	Over Voltage Protection
PXI	PCI Extensions for Instrumentation
RDP	Remote Desktop Protocol
RF	Radio Frequency
SABIA-Mar	Satélite de Aplicaciones Basadas en la Información Ambiental del Mar
SBMA	S-Band Matrix and Attenuator
SBA	S-Band Attenuator
SBDL	Standard Balanced Digital Link
SBM	S-Band Matrix
SCL	Spacecraft Control Language
SW	Software
TBC	To Be Confirmed

Continued on Next Page ...

Table 1.5.0-1 – Continued

ACRONYMS	DESCRIPTION
TC	TeleCommand
TM	TeleMetry
TMS	TeleMetry Simulator unit
TSM	Temperature Sensor Monitor
UPL TP	Uplink Test Port
USB	Universal Serial Bus
UTC	Universal Time Coordinated
UVP	Under Voltage Limit
VM	Virtual Machine
VPN	Virtual Private Network
XBMA	X-Band Matrix and Attenuator

Table 1.5.0-1: Acronyms and Abbreviations

1.6. Applicable Documents

The following items are considered as applicable for the present document; this relationship should imply certain precedence so the modification of one of them may affect this one.

ID	CODE	VER	TITLE
AD.01	SB1-G-PRO-T-D01-002	1.0	X-Band DSN FM Filter TestProcedure
AD.02	EWC30-100-013	2.6	EWC-30 User Manual
AD.03	EWC30-100-004_EICD	1.5	EWC-30 Interface Control Document
AD.04	SB-06040705020000-TS-00001	A	X-BAND TRANSMITTER TEST SPECIFICATION
AD.05	UAM-0400-PR-00100	A	LIMPIEZA Y CUIDADOS DE CONECTORES DE RF
AD.06	SBM-GSE-HB-00004	D	COM EGSE User Manual
AD.07	SB1-D-RPT-T-D01-007	2.0	GS-GSE-FMv2.0 Verification Report
AD.08	SB1-D-RPT-T-D01-009	1.0	GS-GSE-FM v2.0 Delta FAT Report
AD.09	SB1-D-PRO-T-D01-005	1.0	GS-GSE-FM v2.0 Delta FAT Procedure
AD.10	SB1-D-RPT-T-D01-008	1.5	Control de Configuración de GS-GSE-FM(R) v2.0

Continued on Next Page ...

Table 1.6.0-1 – Continued

ID	CODE	VER	TITLE
AD.11	SB1-D-RPT-O-D01-001	1.0	Reporte Modificaciones GS-GSE-FM(R) Para Ensayos COMM-SS-FM

Table 1.6.0-1: Applicable documents

1.7. Reference Documents

The following reference documents are for information purpose only.

ID	CODE	VER	TITLE
RD.01	SB1-B-RPT-T-D01-001	1.0	SABIA-Mar COM-SS EM Functional Test Report
RD.02	SB1-B-RPT-T-D01-002	1.0	SABIA-Mar COM-SS EM Performance Test Report
RD.03	-	-	Report_SNFM1CarnelianX_FinalTest _CarnelianX_29_05_2023_16_05_23_25deg
RD.04	-	-	Report_SNFM2Carnelian_FinalTest _CarnelianX_27_06_2023_12_31_17_25deg
RD.05	SB-060407-SP-00100	A	SABIA-Mar Communication Equipment's Incoming Functional Test Specifications
RD.06	SB1-D-RPT-D-D01-002	1.5	Calculo De Enlaces RF del GS-GSE
RD.07	SB1-D-ADD-D-D01-001	1.3	GS-GSE Architectural Design Document
RD.08	SB1-D-RPT-D-D01-004	1.0	GS-GSE TMTC and Data RF ExternalInterface FMEA
RD.09	SB1-D-SUM-D-D01-002	1.2	Manual de Usuario de GS-GSE-FM v2.0
RD.10	SB-090200-SP-00100	A	SABIAMar Grounding, Bonding and Isolation design Specifications
RD.11	SB-020000-SP-00200	D	SABIA-Mar Downlink and Uplink Telemetry and Telecommand Format Specification Document
RD.12	CCSDS 732.0-B	3	Space engineering - AOS SPACE DATA LINK PROTOCOL
RD.13	CCSDS 232.0-B	3	Recommendation for Space Data System Standards - TC SPACE DATA LINK PROTOCOL
RD.14	SB1-D-ICD-D-D01-001	1.3	GS-GSE Interface Control Document
RD.15	SB-020100-RQ-00200	D	SABIA-Mar L2B Mission System Requirements Baseline Documen

Continued on Next Page . . .

Table 1.7.0-1 – Continued

ID	CODE	VER	TITLE
RD.16	SB-020100-RQ-00100	D	SABIA-Mar L2B Environmental Requirements Baseline Document
RD.17	SB-080300-RQ-00500	D	Ground Segment Baseline Requirements
RD.18	0965-ISGG-3ECIS-007	B	FILOSOFÍA DE RESISTENCIAS DE TERMINACIÓN EN LÍNEAS DIFERENCIALES RS422 Y LVDS
RD.19	ANSI/TIA/EIA-422-B-1994	B	TIA/EIA STANDARD, Electrical Characteristics of Balanced Voltage Digital Interface Circuits
RD.20	SBM-GSE-IC-00003	B	EGSE Interface Control Document
RD.21	SBM-GSE-DS-00002	C	COM EGSE Software Architecture Document
RD.22	SBM-GSE-DS-00001	C	AD-HOC Hardware documento de diseño en detalle
RD.23	SB-060407-DS-00210	A	SABIA-Mar Communication Subsystems EGSE Design
RD.24	SBM-GSE-AN-00002	A	EGSE FMEA interface
RD.25	SBM-GSE-TR-00011	B	COM EGSE FUNCTIONAL TEST REPORT
RD.26	SBM-GSE-TR-00012	A	COMMUNICATION EGSE FAT TEST REPORT
RD.27	EWC29-100-004_EICD	1.4	EICD of the X Band transceiver
RD.28	900830-S-100-022	1.0	USER MANUAL Annex EWC29 - CARNELIAN-S -Band Transceiver
RD.29	900830-S-120-008	1.0	ATR Acceptance Test Report CARNELIAN-S EM
RD.30	900830-S-120-008	1.1	ATR Acceptance Test Report CARNELIAN-X EM
RD.31	SB-030000-RP-00200	A	Reporte de Recepcion EWC-29
RD.32	SB-030000-RP-00100	A	Reporte de Recepcion EWC-30
RD.33	SB1-L-RPT-P-D01-001	1.0	Reporte De Incidencias Ensayos Funcionales SABIA-Mar COMM-SS-EM

Table 1.7.0-1: Reference documents

2. Introduction

The SABIA-Mar Flight Segment telecommunication links are composed for two separated communications channels, one for S-band (uplink & downlink), and another one for X-band (downlink). Syrlinks EWC29 and EWC30 products have been chosen to implement these links. The EWC29 product is a S-band transceiver. The EWC30 product (AD.02) is a X-band transmitter. In order to test these equipments, the CEGSE and GS-GSE-FM (R) are also used.

2.1. Test overview

This document details a subsets of procedures according to Test specification (AD.04). Procedures description, setup and step-by-step tables are presented.

The test setup used for the aliveness and functional tests are presented in figure 5.3.0-1 while the setup used in the performance tests are shown in the figures 6.0.0-1 and 6.0.0-2.

3. Procedures list

Table 3.0.0-1 shown all procedures in the order that are presented in this documents, same as the baseline execution order. If the performance tests are conducted following the functional tests, procedures SB1FS-COM-F-012-03 and SB1FS-COM-P-013-01 can be skipped.

Activity Type	Verification Task ID	Verification Task Name	Sub Task	Sub-Task Name	Duration [minutes] TBC
Deploy	SB1FS-COM-D-011	Initialization dataset and deploy	01	Electrical Verifications and Instruments Initializations	60
			02	Test Procedure dataset deploy	60
Test	SB1FS-COM-F-012	Aliveness and Functional Test	01	Setup and configuration	150
			02	Inrush and ripple measurement	240
			03	Aliveness and Functional Test	150
			04	Tests setup break	45
Test	SB1FS-COM-P-013	Performace Test	01	Setup and configuration	150
			02	Spectrum, power and BW with PXA	60
			03	CCDF measurement	60
			04	Frequency Stability	90
			05	Carrier Phase Noise	90
			06	Optimum filter confirmation And RF characterization with VSA and Cortex	90
			07	BER measurement	280
			08	Spurious in DSN Band	90
			09	Tests setup break	45

Table 3.0.0-1: Procedures list.

Appendix B shown the complete list of elements necessaries for procedures execution, and also, the elements required for each test are present in each section. By completeness a summary is presented bellow.

- Extension harness for Breakout Board:
  - DB9 to DB9 Harness for Breakout Board.
  - DB15 to DB15 Harness for Breakout Board.
  - DB25 to DB25 harness for Breakout Board.
  - DB37 to DB37 Harness for Breakout Board.
- Breakout Board with bridges and auxiliary wires:
  - DB9 Breakout Board.
  - DB15 Breakout Board.
  - DB25 Breakout Board.
  - DB37 Breakout Board.
- Digital Multimeter with probes.
- Oscilloscope with differential voltage probe and current probe.
- RF Coaxial cables of different lengths and connectors.
- RF accessories, loads, attenuators, power divider, DC-Block, etc.
- Torque wrench and fixed wrench for different RF connectors.
- Torque wrench with 5/64" or 2 mm Hex bit.
- Ground wires.
- Ethernet cables.

- ESD gloves and antistatic wrist strap.
- Pen-drive previously formatted in FAT-32 format.
- Dataset file, `SB1-B-PRO-T-D01-011_v1.0_X-BandTransmitterFM TestProcedure_dataset.zip`, available in pen-drive (with FAT32 format).

3.1. Considerations

- All tests with the DUT are carried out in a clean room. Therefore, the operators shall have the appropriate elements: ESD smock, hair cover ,shoe cover and face mask.
- In the following, when referring to **facilities** it will refer to the clean room.
- Operators handling electrical connections or instruments should do using the antistatic wrist strap attached to the facilities grounding system.
- All handling of the DUT must be carried out using ESD gloves.
- GS-GSE-FM (R) is used in this procedure.
- GS-GSE-FM (R) and CEGSE Racks have their own UPS so they do not need to be connected to a safe power supply.
- GS-GSE requirement compliance (RF interfaces and other functionalities) was verified before this test (AD.07 and AD.08).
- GS-GSE-FM (R) was modified before this test for requirement compliance (RF interfaces and other functionalities) (AD.10 and AD.11).
- GS-GSE and CEGSE are connected to facilities network to give access to support team through VPN.
- All hardware components are connected to GND before any electrical connection.
- All unused RF output ports shall be loaded.
- All RF connections are exercised according **RF connector care and cleaning** document (AD.05). Also manufacturer recommendations are taken in to account.
- Both GS-GSE and CEGSE are initialized according to their respective user manuals (RD.09 and AD.06).
- DUTs are mounted on CEGSE's metal tray.
- DUTs are connected to grounding bar.
- Only EWC30 is connected to the ad-hoc box.
- X-Band DSN filter was previously tested according to AD.01.
- CEGSE Power Supply is set to 28 Volts (Vbus of DUT).
- The design of the test setups guarantees that the RF inputs do not exceed the maximum value accepted under any equipment configuration even in conditions of minimal attenuation and maximum gain. See the annex A for details.
- All SMA connections are performed using 5 lb-inch torque wrench.
- The adjustment torque for the harnesses that connect to the savers must be less than 0.10 Nm.

- DUT's connectors and savers connection/disconnection will be logged.
- The purpose of resistance measurements is to detect whether the interface is shorted or open. After functionally checking of CEGSE, the resistances of all the interfaces were measured and a wide range was defined to cover all cases. LVDS interfaces do not follow this criteria.
- Before performing the first DUT power on of the day, validate that DUT temperature is within a range of +/-5 degrees with respect to the ambient temperature. The goal is to validate that the internal sensor is in good health.

4. SB1FS-COM-D-011 Initialization and dataset deploy

4.1. SB1FS-COM-D-011-01 Electrical Verifications and Instruments Initializations.

Task ID	SB1FS-COM-D-011-01
Task name	Electrical Verifications and Instruments Initializations
Task description	This task includes: ▪ Verification of grounding of all racks and AC power sockets to use. ▪ Verification of the facilities AC supply voltages. ▪ RF TestBed deployment. ▪ Preparation of PXA. ▪ Preparation of oscilloscope. ▪ Connection of PXI, RF TestBed and PXA to the GS-GSE-FM (R) network. ▪ RDP Connections from thin clients. See table 4.1.0-2.
Task purpose	Prepare CEGSE, GS-GSE-FM (R) and instruments for the execution of aliveness, functional and performace tests of the communication system.
Success criteria	All electrical verifications are correct. Instruments powered-on and ready to perform measurements.
Test Setup	-
Duration	60 minutes.
Data sets required	-
Prerequisites	▪ GS-GSE-FM (R) initialized according to GS-GSE test procedures (AD.09) or user manual (RD.09). ▪ GS-GSE-FM (R) configured according to Control Configuration Document (AD.10) and with their modified RF interfaces (AD.11). ▪ CEGSE initialized according to CEGSE user manual (AD.06). ▪ RF TestBed powered off and only connected to facilities GND. ▪ Hardware: The necessary items are shown in the table B.0.0-1

Table 4.1.0-1: Procedure SB1FS-COM-D-011-01 description.

Name	OW used	IP	User	Password
CEGSE	OW Data A	192.168.75.211	EGSE COM	Conae1234
TestBed-Cortex HDR-XXL	OW TMTC A	192.168.75.202	cortex	cortex
GS-GSE.WIN8	OW TMTC A	192.168.75.194	admin	Sb1.C0n43
Data Demodulator	OW TMTC A	192.168.75.161	cortex	cortex
GS-GSE.MGMT	OW TMTC A	192.168.75.193	administrator	Sb1.C0n43

Table 4.1.0-2: Initial RDP connections.

SB1FS-COM-D-011-01 Electrical Verifications and Instruments Initializations						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
	Session ID Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Record test session ID <session_ID>.	<YYYYMMDD-#N>		
1	**Grounding and AC power verification**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Check Instrumentation bench power supply voltage .	Power supply voltage between 210V and 240V.		
		DET	With the multimeter, measure the **Instrumentation bench** input voltage.			
1	2	EXE	Connect the PXA to the AC power socket and verify its ground connection.	Continuity between N connector outer shell and facilities ground.		
		DET	▪ Plug in the AC power cord from the AC power source into the rear panel of the PXA. ▪ Verify continuity between N connector ground outer shell and facilities ground by means of multimeter			
1	3	EXE	Connect the oscilloscope to the AC power socket and verify its ground connection.	Continuity between BNC connector outer shell and facilities ground.		
		DET	▪ Plug in the AC power cord from the AC power source into the rear panel of the Oscilloscope. ▪ Verify continuity between oscilloscope ground and facilities ground by means of multimeter			
1	4	EXE	Verify ground connection of Rack CEGSE.	Continuity between copper bar of Rack CEGSEand facilities ground.		

		DET	Verify continuity between copper bar of **Rack CEGSE** and facilities ground by means of multimeter.			
1	5	EXE	Verify ground connection of Rack RF TestBed.	Continuity between copper bar of Rack Testbed and facilities ground.		
		DET	Verify continuity between copper bar of **Rack RF TestBed** and facilities ground by means of multimeter.			
1	6	EXE	Verify ground connection of Rack TMTC-BB of **GS-GSE-FM (R)**.	Continuity between copper bar of Rack TMTC-BB and facilities ground.		
		DET	Verify continuity between copper bar of **Rack TMTC-BB** and facilities ground by means of multimeter. **Note:** Copper bar of Rack TMTC-BB is connected to copper bar of Rack TMTC-RF.			
1	7	EXE	Verify ground connection of Rack Data-BB of **GS-GSE-FM (R)**.	Continuity between copper bar of Rack Data-BB and facilities ground.		
		DET	Verify continuity between copper bar of **Rack Data-BB** and facilities ground by means of multimeter. **Note:** Copper bar of Rack Data-BB is connected to copper bar of Rack TMTC-RF.			
1	8	EXE	Check Rack CEGSE power supply voltage .	Power supply voltage between 210V and 240V.		
		DET	With the multimeter, measure the **Rack CEGSE** input voltage.			
1	9	EXE	Check Rack RF TestBed power supply voltage .	Power supply voltage between 210V and 240V.		
		DET	With the multimeter, measure the **Rack RF TestBed** input voltage.			
1	10	EXE	Check Rack TMTC-RF power supply voltage of **GS-GSE-FM (R)**.	Power supply voltage between 210V and 240V.		

		DET	With the multimeter, measure the **Rack TMTC-RF** input voltage. Note: Rack TMTC-RF share UPS with Rack TMTC-BB			
1	11	EXE	Check Rack Data-RF power supply voltage of **GS-GSE-FM (R)**.	Power supply voltage between 210V and 240V.		
		DET	With the multimeter, measure the **Rack Data-RF** input voltage. Note: Rack Data-RF share UPS with Rack Data-BB			

2 Installation of the Instruments

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Connect the external reference signal to the PXI.	PXI connected to the reference signal.		
		DET	Connect the **REF IN** port of the NI PXIe-5653 module to the free port of the Power Splitter DATA GS-GSE-FM (R) through the BNC male to SMA male cable SBB4.18.			
2	2	EXE	Connect the DC Block to the RF IN of PXI.	DC Block connected to PXI RF IN.		
		DET	Connect the DC Block to the RF input of NI PXIe-5605.			
2	3	EXE	Installation and power on of PXA.	PXA on.		
		DET	Press the On/Off button to turn on the PXA on. **Note1:** The PXA takes approximately 12 minutes to initialize in spectrum analyzer mode. **Note2:** It is recommended to connect an external monitor and use it as the only video output.			
2	4	EXE	Connect the external frequency reference signal to the PXA.	PXA display SENSE:EXT on lower-left corner of screen.		
		DET	Connect the **EXT REF IN** port of the PXA to the free 10 MHz port of the Power Splitter Data of GS-GSE-FM (R) through the BNC male to BNC male cable REF1.01.			
2	5	EXE	Initialize VSA software on the PXA.	VSA software initialized.		
		DET	To initialize the VSA software do the following: ▪ Press **Mode** button. ▪ Press **89601 VSA** key. ▪ Press **Start 89601B** key. **Note:** The VSA software takes approximately 5 minutes to initialize.			

2	6	EXE	Verify RF hardware input for VSA	ThisAnalyzer9 input is selected.		
		DET	In the menu VSA software of PXA do the following: ▪ Click on the **Utilities, Hardware, Analyzer:Analyzer...** tabs.			
2	7	EXE	Configure the PXA as a spectrum analyzer.	PXA configured as a spectrum analyzer.		
		DET	For this do the following: ▪ Press **Mode** button. ▪ Press **Spectrum Analyzer** key.			
2	8	EXE	Connect the DC Block to the RF input of PXA.	DC Block connected to PXA.		
		DET	Connect the DC Block to the RF input of the PXA.			
2	9	EXE	Power on the Oscilloscope.	Oscilloscope on.		
		DET	Power on the Oscilloscope by pressing the power button.			

3 RF TestBed deploy

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Verify the IF and RF connections of Data RF TestBed.	All IF and RF connections present.		
		DET	Verify the following connections: ▪ 10 dB attenuator ATT10.01 (PE7005-10) is connected to the IF input (J01) of the X-Band Upconverter. ▪ Cable PE300-60-03 is connected to the 10 dB attenuator ATT10.01. ▪ Cable PE300-60-03 is connected to IF out (J50) of the Testbed Cortex HDR.			
3	2	EXE	Connect the TestBed to the facilities safe power supply.	TestBed connected to facilities safe power supply.		
		DET	Connect the TestBed power socket to facilities safe power supply.			
3	3	EXE	Turn on the PDU of TestBed.	PDU of TestBed on		

		DET	Turn on the thermal circuit of TestBed PDU. **Note:** When the thermal breaker is turned on, the TestBed Ethernet switch is initialized.			
3	4	EXE	Turn on the components of Data RF TestBed.	Data RF TestBed components on		
		DET	▪ **Cortex HDR** turns on automatically about 15 seconds after PDU thermal circuit breakers are turned on. Verify cortex start up from front panel. If Cortex HDR does not start automatically turn it on from the front panel button. ▪ Turn on **X-Band Upconverter** from rear panel switch.			
4	**Network connections**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Connect the CEGSE to GS-GSE-FM (R) network.	CEGSE conected to GS-GSE network.		
		DET	Connect the Ethernet port 2 of **PXI** computer to **Ethernet Switch TMTC** using a port in the range between 13 and 20 or some free port of **Ethernet Switch Data**. Configure "Local Area Network" interface of CEGSE with the following parameters: ▪ IP address: 192.168.75.211 ▪ Subnet mask: 255.255.255.0 ▪ Default Gateway: 192.168.75.1			
4	2	EXE	Connect the PXA to GS-GSE network.	PXA conected to GS-GSE-FM (R) network.		
		DET	Connect the Ethernet port of **PXA** to **Ethernet Switch TMTC GS-GSE-FM (R)** using a port in the range between 13 and 20 or some free port of **Ethernet Switch Data**.			
4	3	EXE	Connect the RF TestBed to GS-GSE-FM (R) network.	RF TestBed conected to GS-GSE-FM (R) network.		
		DET	Connect an ethernet free port of **Switch TestBed** to **Ethernet Switch TMTC GS-GSE-FM (R)** using a port in the range between 13 and 20 or some free port of **Ethernet Switch Data**.			
5	**Remote Connections from Thin Client**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	**RDP connection** to CEGSE from Thin client **Operator Workstation DataA**.	Thin Client **OW DATA A** connected to CEGSE		

		DET	From the Operator Workstation DataA open the Remote Desktop Connection and connect to IP: 192.168.75.211 ▪ `User: EGSE COM` ▪ `Password: Conae1234`			
5	2	EXE	**RDP connection** to GS-GSE.MGMT VMfrom Operator Workstation TMTCA.	Operator Workstation DataA connected to GS-GSE.MGMT VM		
		DET	From the Operator Workstation TMTCA open the Remote Desktop Connection and connect to IP: 192.168.75.193 ▪ User: administrator ▪ Password: Sb1.C0n43			
5	3	EXE	**RDP connection** to Cortex HDR from Operator Workstation TMTCA.	Operator Workstation TMTCA connected to Cortex HDR.		
		DET	From the Operator Workstation TMTCA open the Remote Desktop Connection and connect to IP: 192.168.75.161 ▪ `User: cortex` ▪ `Password: cortex`			
5	4	EXE	**RDP connection** to **Testbed's** Cortex HDR from Operator Workstation TMTCA.	Operator Workstation TMTCA connected to Testbed's Cortex HDR.		
		DET	From the Operator Workstation TMTCA open the Remote Desktop Connection and connect to IP: 192.168.75.202 ▪ `User: cortex` ▪ `Password: cortex`			
5	5	EXE	**RDP connection** to GS-GSE.WIN8 VMfrom Operator Workstation TMTCA.	Operator Workstation TMTCA connected a GS-GSE.WIN8 VM		
		DET	From the Operator Workstation TMTCA open the Remote Desktop Connection and connect to IP: 192.168.75.194 ▪ `User: admin` ▪ `Password: Sb1.C0n43`			

6	**CEGSE NTP Client**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Configure the NTP client in CEGSE.	CEGSE time Synchronized to UTC time.		

	DET	In the **CEGSE**: ▪ Click on the current date time in the bottom-right of the screen. ▪ Click on **Change date and time settings...** ▪ Go to **Internet Time** tab and click on **Change settings...** ▪ Set server to **192.168.75.150** and check **"Synchronize with an Internet time server"** option. ▪ Perform a manual synchronization by clicking on **Update now** button. ▪ Verify that the clock was successfully synchronized. ▪ Press OK twice to close open windows.

Table 4.1.0-3: Procedure SB1FS-COM-D-011-01 table.

4.2. SB1FS-COM-D-011-02 Dataset Deployment Procedure

Task ID	SB1FS-COM-D-011-02
Task name	Dataset Deployment Procedure
Task description	This task includes: ▪ Copy dataset from pen-drive to CEGSE hard disk. ▪ Unzip dataset on CEGSE. ▪ Copy dataset files to the instruments and RF TestBed. ▪ Copy dataset files to GS-GSE-FM (R).
Task purpose	Deploy the necessary files for the execution of aliveness, functional and performance tests of the communication system.
Success criteria	Files from dataset deployed to its final locations.
Test Setup	-
Duration	60 minutes.
Data sets required	Dataset associated to this document, `SB1-B-PRO-T-D01-011_v1.0_X-BandTransmitterFMTestProcedure_dataset.zip`, available in pen-drive (FAT-32).
Prerequisites	Execution of procedure **SB1FS-COM-D-011-01 Electrical Verifications and Instruments Initializations**

Table 4.2.0-1: Procedure SB1FS-COM-D-011-02 description.

SB1FS-COM-D-011-02 Dataset Deployment Procedure						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Unzip dataset on PXI**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Check hard disk space on CEGSE	free space > 8 GB		
		DET	▪ Launch the File Explorer. ▪ In the navigation panel on the left side of the folder, click "Computer." ▪ Check available storage space displayed under WINDOWS(C) drive.			
1	2	EXE	Connect pendrive to PXI of CEGSE.	Pendrive connected to PXI of CEGSE.		
		DET	Connect pendrive to PXI of CEGSE.			

1	3	EXE	Create test session folder in CEGSE.	Test session folder created.		
		DET	Open window file explorer and create <session_ID> folder in directory C:/USERS/EGSE COM/Documents/COMM-SS-FM Where <session_ID> has the form <YYYYMMDD-#N> **Note:** Create COMM-SS-FM folder if not exist.			
1	4	EXE	Copy dataset from pendrive to PXI.	Dataset copied.		
		DET	Copy the file SB1-B-PRO-T-D01-011_v1.0_X-BandTransmitterFMTestProcedure_dataset.zip from pendrive to C:/USERS/EGSE COM/Documents/COMM-SS-FM/<session_ID>			
1	5	EXE	Verify MD5 Checksum of dataset in CEGSE.	Current file MD5 value is equal to MD5 value from DMS.		
		DET	In a terminal window (command prompt) run the following commands: ▪ Execute WinMD5Free sofware. ▪ On displayed windows press **"Browse .."** button ▪ Find and open **SB1-B-PRO-T-D01-011_v1.0_X-BandTransmitterFM TestProcedure_dataset.zip** in **C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>** folder. ▪ Compare MD5 with value in **SB1-B-PRO-T-D01-011_v1.0_X-BandTransmitterFM TestProcedure_dataset.md5** file in DMS for data integrity. **Note:** The comparison can be made by copying the expected value in **"Original file MD5 value"** and pressing the **"Verify"** button.			
1	6	EXE	Unzip the dataset.	Dataset unzipped.		
		DET	▪ Open File Explorer and go to **C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>** ▪ Right-click on **SB1-B-PRO-T-D01-011_v1.0_X-BandTransmitterFM TestProcedure_dataset.zip** and select **"7-Zip"** option. ▪ In the displayed menu select **Extract here** option. ▪ Verify that decompression process ends without error. **Note**: If a file with the same name already exists, replace it.			

2 Deploy dataset 1/2

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Deploy CEGSE Configuration files	Files copied.		
		DET	In the PXI, open the file explorer and do the following: ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-D-011/PXI-config ▪ Copy all files in PXI-config folder ▪ Paste files into C:/USERS/EGSE COM/Documents/CFG/ folder.			

2	2	EXE	Copy oscilloscope configuration folder to pen-drive.	Folder copied.		
		DET	In the CEGSE, open the file explorer and do the following: ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-D-011/ ▪ Copy "osc-config" folder to pendrive **Note:** Check pendrive is in FAT32 format.			
2	3	EXE	Check hard disk space on PXA	free space > 3 GB		
		DET	On the PXA: ▪ Launch the File Explorer. ▪ In the navigation panel on the left side of the folder, click "Computer." ▪ Check available storage space displayed under WINDOWS(D) drive.			
2	4	EXE	Copy configurations and screenshots folder to PXA.	Folder copied.		
		DET	In the CEGSE, open the file explorer, connect to PXA with the following address and credentials: ▪ Address: `\\192.168.75.231\Users\Instrument\Desktop` ▪ User: administrator ▪ Password: agilent4u and do the following: ▪ From C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-D-011/ copy the folder COMM-SS-FM-PXA-config and paste in "Desktop" folder of PXA			
2	5	EXE	Copy files for Noise generation to Cortex HDR of RF TestBed	File copied		
		DET	In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-D-011/cortex-testbed directory. ▪ Copy the file SB1GS-Testbed_XB_NoiseGenerator_v1.0.mcs ▪ Connect to Cortex testbed with the following address and credentials: • Address: \\192.168.75.202 • User: cortex • Password: cortex ▪ Go to to \\192.168.75.202\zds\HDR\CrtxMCS\SABIA-Mar\AIT folder ▪ Paste the copied file.			

3	Deploy dataset 2/2 (GS-GSE-FM (R))					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Create test session folder in GS-GSE.MGMT VM.	Test session folder created.		
		DET	In a terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `mkdir /verification/COMM-SS-FM/<session_ID>/ -p` Where `<session_ID>` has the form <YYYYMMDD-#N>			
3	2	EXE	Copy files to GS-GSE.MGMT VMfrom CEGSE.	files copied.		
		DET	On EGSE open Total Commander from shocut in desktop and do de following: ▪ On left side go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-D-011/GS-GSE ▪ On rigth side go "Network Neighborhood", select [Secure FTP], press F7 and connect to GS-GSE.MGMT VM with the following paremeters: • 192.168.75.193 • User: administrator • Password: Sb1.C0n43 ▪ On rigth side go to /verification/COMM-SS-FM/<session_ID> ▪ Copy the content of GS-GSE folder from CEGSE to GS-GSE.MGMT VM			
3	3	EXE	Copy files for BER measurement to Cortex HDR of GS-GSE-FM (R)	Files copied to cortex HDR		
		DET	In the CEGSE do the following: ▪ Open file explorer. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-D-011/cortex-hdr. ▪ Copy the file **data52050**. ▪ Connect to Corte HDR with the following address and credentials: • Address: \\192.168.75.161 • User: cortex • Password: cortex ▪ Go to \\192.168.75.161\zds\HDR\SPS\BER\ folder. ▪ Paste the copied file. If a file with the same name already exists, replace it.			

4	Final Steps					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Remove pendrive from the PXI of CEGSE.	Pen-drive removed.		
		DET	Remove the pen-drive from the USB port of the PXI of CEGSE.			
4	2	EXE	Connect pendrive to Oscilloscope.	Pendrive connected to Oscilloscope.		
		DET	Connect pendrive to Oscilloscope.			

Table 4.2.0-2: Procedure SB1FS-COM-D-011-02 table.

5. SB1FS-COM-F-012 Aliveness and Functional Test

Task ID	SB1FS-COM-F-012
Task name	Aliveness and Functional Test
Task description	In this procedure the EWC30 X-Band transmitter functional test is performed. First of all, CEGSE interfaces aliveness is performed, Transmitter and Filter ground connections are verified and RF and base-band DUT interfaces are connected to EGSEs. DUT monitoring and control is performed from CEGSE. Oscilloscope and PXI spectrum analyzer are configured to measure power consumption and RF signals characteristics respectively. Data frames will be sent from CEGSE to EWC30 in order to be modulated through X-Band interface. The data received in GS-GSE-FM (R) will be compared with original data.
Task purpose	Execution of EWC30 functional test.
Success criteria	▪ CEGSE and GS-GSE-FM (R), are configured according to procedure and CEGSE interfaces are in good condition. DUT telemetry is between expected values. ▪ Measurements of voltages, currents and power consumptions in different states meets the expected values. ▪ RF signals are under expected values. ▪ Data frames received at GS-GSE are the same as those sent from CEGSE. ▪ Evidences are collected.
Test sub-cases	▪ SB1FS-COM-F-012-01: Test setup and configuration ▪ SB1FS-COM-F-012-02: Inrush and ripple measurement ▪ SB1FS-COM-F-012-03: Aliveness and Functional Test ▪ SB1FS-COM-F-012-04: Tests setup break
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figures 5.0.0-1 and 5.0.0-2 ▪ General setup according to figure 5.2.0-1 for inrush and ripple measurements. Figure 5.3.0-1 for Data Downlink test.
Duration	▪ SB1FS-COM-F-012-01: 150 minutes ▪ SB1FS-COM-F-012-02: 240 minutes ▪ SB1FS-COM-F-012-03: 150 minutes ▪ SB1FS-COM-F-012-04: 45 minutes
Data sets required	▪ Payload file (`Data-885840_120s_VCh01_payload.bin`) ▪ CEGSE PXI configuration file for aliveness (`INIT_FILE_NO_ALARM_EWC30.ini`). ▪ CEGSE PXI nominal configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ PXI spectrum analyzer configuration file in `NI-RFSA-data-config` folder
Prerequisites	▪ Execution of procedure SB1FS-COM-D-011 Initialization and dataset deploy. ▪ EWC30 and DSN filter mated with the connector savers (RF and BB). ▪ EWC30 and DSN filter mounted on CEGSE metal tray. ▪ EWC30 and DSN filter connected to grounding bar. ▪ Hardware: The necessary items are shown in the table B.0.0-1

Table 5.0.0-1: Procedure SB1FS-COM-F-012 description.

figuras/CEGSE_EWC30SetupA.png

Figure 5.0.0-1: EWC-30 BB connections for inrush and ripple measurement.

figuras/CEGSE_EWC30SetupB.png

Figure 5.0.0-2: EWC-30 BB general connections.

5.1. SB1FS-COM-F-012-01 Setup and Configuration

SB1FS-COM-F-012-01 Setup and Configuration						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
	Record DUT's S/N					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Record DUT's S/N			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity in the test site.			
1	3	EXE	Check that temperature an humidity datalogger is working.	Datalogger connected and working properly		
		DET	In the Datalogger device, check the following: ▪ **Temperature** is shown in LCD Screen ▪ **Humidity** is shown in LCD Screen ▪ Press **INTERVAL** button once and check Recording interval is **5** minutes. ▪ Press **INTERVAL** button twice and check Uploading interval is **15** minutes. ▪ **REC** Mark is shown in LCD Screen.			

2	**Verification of CEGSE setup.**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Verify BB harness connections.	BB harness conected.		
		DET	Verify BB harness connections between Ad-hox box and PXI match the EWC30 configuration.			
2	2	EXE	Verify Keysight power supply configuration	V LIMIT = 28 V I LIMIT = 3 A OVP = 34 V UVP = 22 V		
		DET	In front pannel of power supply: ▪ press "LIMIT" button to read voltage and current limits. ▪ press one time "OVP/UVP" button to read OVP limit ▪ press two times "OVP/UVP" button to read UVP limit. **Note:** Adjust the value of I LIMIT if it is not the expected one. Press "LIMIT" and turn the current knob to adjust.			
2	3	EXE	Measure COM-EGSE power supply output voltage.	$Voltage \approx 28\ V$		
		DET	Set the multimeter to measure voltage and measure the voltage present on the rear terminals of the COM-EGSE power supply.			
3	**Connection of EMI/EMC filter to ad-hoc box**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Connect **H-EGSE-DUT-J11_001** harness to Ad-Hoc box.	Harness connected		
		DET	Connect **H-EGSE-DUT-J11_001** DB15 male connector to J100 connector of Ad-Hoc box.			
3	2	EXE	Connect **H-EGSE-DUT-J11_001** harness to EMI/EMC filter input.	Harness connected		
		DET	Connect **H-EGSE-DUT-J11_001** DB15 female connector to the EMI/EMC filter DB15 male connector.			
3	3	EXE	Connect **H-EGSE-DUT-J12_001** harness to EMI/EMC filter output.	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** DB15 male connector to EMI/EMC filter output.			

3	4	EXE	Connect **H-EGSE-DUT-J12_001** harness to **H-EGSE-DUT-J13_001** harness.	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** MDM15 female connector to **H-EGSE-DUT-J13_001** MDM15 male connector.			
3	5	EXE	Connect **H-EGSE-DUT-J13_001** harness to DB-15 BOB.	Harness connected to DB-15 BOB		
		DET	Connect **H-EGSE-DUT-J13_001** DB15 female connector to DB-15 BOB.			
4	**CEGSE SW Initialization**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Start CEGSE SW using EWC30 "no alarm" configuration file	SW running in EWC30 "no alarm" configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-F-012-01" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **"INIT_FILE_NO_ALARM_EWC30.ini"** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			
5	**EWC30 Vbus verification**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
5	2	EXE	Measure VBus voltage on DB-15 BOB.	Voltage=28 V		
		DET	Measure voltage between the following pairs of pins of Break Out Box: ▪ Pin 1(+) and Pin 9(-) ▪ Pin 2(+) and Pin 10(-) ▪ Pin 3(+) and Pin 11(-) ▪ Pin 4(+) and Pin 12(-) ▪ Pin 5(+) and Pin 13(-) ▪ Pin 6(+) and Pin 14(-) ▪ Pin 7(+) and Pin 15(-)			

5	3	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
5	4	EXE	Disconnect **H-EGSE-DUT-J13_001** harness to DB-15 BOB.	Harness disconnected from DB-15 BOB		
		DET	Disconnect **H-EGSE-DUT-J13_001** DB15 female connector from DB-15 BOB.			
5	5	EXE	Disconnect **H-EGSE-DUT-J12_001** harness from **H-EGSE-DUT-J13_001** harness.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J12_001** MDM15 female connector to **H-EGSE-DUT-J13_001** MDM15 male connector.			
5	6	EXE	Disconnect **H-EGSE-DUT-J12_001** harness from EMI/EMC filter output.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J12_001** DB15 male connector from EMI/EMC filter output.			
5	7	EXE	Connect the **DB-9 BOB** box to connector **J201B** of the AD-HOC box.	**DB-9 BOB** connected to Ad-Hoc box		
		DET	Use the extender cable to connect the **DB-9 BOB** to the **J201B** input.			
5	8	EXE	Connect the **DB-25 BOB** box to connector **J200** of the AD-HOC box.	**DB-25 BOB** connected to Ad-Hoc box		
		DET	Use the extender cable to connect the **DB-25 BOB** to the **J200** input.			
5	9	EXE	Connect the **DB-37 BOB** box to connector **J201A** of the AD-HOC box.	**DB-37 BOB** connected to Ad-Hoc box		
		DET	Use the extender cable to connect the **DB-37 BOB** to the **J201A** input.			
6	**TSM interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	TSM O_TX_TEMP1 interfaces aliveness.	$Voltage \approx 6V$		

		DET	Set the multimeter to measure voltage and hold the Max value. Connect the $47K\Omega$ resistor between pin **13(+)** and **31(-)** of the **DB-37 BOB**. Measure voltage across the resistor. **Note:** Multimeter must be set to register the Max value due to CEGSE reading architecture.			
7	**CEGSE power off (PXI and Ad-Hoc Box)**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
7	2	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
7	3	EXE	Turn off the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn off		
		DET	Turn off the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned off when the switch is turned off.			
7	4	EXE	Disable power supply output of CEGSE.	The LED indicator of the OUT ON output should go out.		
		DET	Press the OUT ON button to disable the power supply output. Verify that the OUT ON LED indicator turns off when pressing the button to disable the output.			
7	5	EXE	Turn off the main switch of the Ad-Hoc box.	The main switch light must be turned off		
		DET	Turn off the main switch of the Ad-Hoc box.			
7	6	EXE	Power off PXI.	PXI off.		
		DET	From the CEGSE KVM shutdown the PXI.			
8	**HV-HPC interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	HV-HPC I_STBY_2_OPE_M interface output resistance measurement	$3M\Omega < R < 30M\Omega$		

		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **1(+)** and **6(-)** of the **DB-9 BOB**.			
8	2	EXE	HV-HPC I_OPE_2_STBY_R interface output resistance measurement	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **2(+)** and **7(-)** of the **DB-9 BOB**.			
8	3	EXE	HV-HPC I_STBY_2_OPE_R interface output resistance measurement	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **3(+)** and **8(-)** of the **DB-9 BOB**.			
8	4	EXE	HV-HPC I_OPE_2_STBY_M interface output resistance measurement	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **4(+)** and **9(-)** of the **DB-9 BOB**.			
9	**ASM interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	ASM SEC_V_RF interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **3(+)** and **22(-)** of the **DB-37 BOB**.			
9	2	EXE	ASM SEC_V_NUM interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **11(+)** and **29(-)** of the **DB-37 BOB**.			
9	3	EXE	ASM OUTPUT_PWR interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **12(+)** and **30(-)** of the **DB-37 BOB**.			

10	**BDM interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	BDM O_CLK_LOCKED interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **1(+)** and **20(-)** of the **DB-37 BOB**.			
10	2	EXE	BDM O_MMU_CLK_STATUS interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **2(+)** and **21(-)** of the **DB-37 BOB**.			
10	3	EXE	BDM O_TX_STATUS interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **4(+)** and **23(-)** of the **DB-37 BOB**.			
11	**LVDS interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	LVDS I_MMU_DATA_7 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 3(+) and 15(-) of the DB-25 BOB.			
11	2	EXE	LVDS I_MMU_DATA_6 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 4(+) and 16(-) of the DB-25 BOB.			
11	3	EXE	LVDS I_MMU_DATA_5 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 5(+) and 17(-) of the DB-25 BOB.			

11	4	EXE	LVDS I_MMU_DATA_4 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 6(+) and 18(-) of the DB-25 BOB.			
11	5	EXE	LVDS I_MMU_DATA_3 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 7(+) and 19(-) of the DB-25 BOB.			
11	6	EXE	LVDS I_MMU_DATA_2 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 8(+) and 20(-) of the DB-25 BOB.			
11	7	EXE	LVDS I_MMU_DATA_1 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 9(+) and 21(-) of the DB-25 BOB.			
11	8	EXE	LVDS I_MMU_DATA_0 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 10(+) and 22(-) of the DB-25 BOB.			
11	9	EXE	LVDS I_MMU_CLK interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 11(+) and 23(-) of the DB-25 BOB.			
11	10	EXE	Disconnect the DB-9 BOB from the AD-Hoc box.	The DB-9 BOB disconnected from the AD-Hoc box.		
		DET	With the DB-9 also disconnect the extender cable from the AD-Hoc box.			

11	11	EXE	Disconnect the DB-25 BOB from the AD-Hoc box.	The DB-25 BOB disconnected from the AD-Hoc box.		
		DET	With the DB-25 also disconnect the extender cable from the AD-Hoc box.			
11	12	EXE	Disconnect the DB-37 BOB from the AD-Hoc box.	The DB-37 BOB disconnected from the AD-Hoc box.		
		DET	With the DB-37 also disconnect the extender cable from the AD-Hoc box.			
12	**GS-GSE configuration and verification**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Enable Monitor and Control in **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	Interface status in **Monitor and Control**.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Interface Status** field and select **Monitor and Control**.			
12	2	EXE	Set **N1** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N1 to redundant side.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Nadir 1 Transfer Switch Control** field and press the **Nadir 1 to Redundant 1** button. ▪ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the upper indicator of the **N1 TRANSFER SWITCH** block is **ON** and green.			
12	3	EXE	Set **N2** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N2 to redundant side.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Nadir 2 Transfer Switch Control** field and press the **Nadir 2 to Redundant 2** button. ▪ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the bottom indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			

12	3	EXE	Set attenuation of GS-GSE-FM (R) **X-Band Matrix and Attenuator** .	Attenuation of 0 dB.		
		DET	In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Go to the **Variable Attenuador Control** field and press the 0 dB button. ▪ Go to the **ATENUATOR VARIABLE** block and verify that the 0 dB indicator is green.			
12	4	EXE	Verify **X-Band DownconverterN1** configuration.	▪ RF = 8106.0 MHz ▪ Aten = 6 dB ▪ RF = ON		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter01-FM_v1.0.py` In the displayed menu, verify that the parameters are configured according to the expected values. Then enter the number 5 and press enter to exit the menu.			
12	5	EXE	Verify **X-Band DownconverterN2** configuration.	▪ RF = 8269.0 MHz ▪ Aten = 4 dB ▪ RF = ON		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter02-FM_v1.0.py` In the displayed menu, verify that the parameters are configured according to the expected values. Then enter the number 5 and press enter to exit the menu.			
12	6	EXE	Configure the **Cortex HDR**.	Cortex HDRconfigured.		
		DET	In Cortex MCS (192.168.75.161) open the configuration file from directory `D:\ZDS\Data\HDR\MCS\SABIA-Mar\:` ▪ `SB1GS-GSE-FM-R_RF-N1_v1.4.mcsif` **EWC30-FM1** is under test. ▪ `SB1GS-GSE-FM-R_RF-N2_v1.4.mcsif` **EWC30-FM2** is under test. Then enable configuration by clicking on the **Control Access** icon (key icon) and click the **OK** button. Then click on **Copy Cnf->Mon** icon and then click yes if needed.			

12	7	EXE	Clear storage in **Cortex HDR**	Cleaning done		
		DET	In Cortex MCS (192.168.75.161) do the following: ▪ Open the DMM by clicking on the **Open the global disk memory management window** icon. ▪ In the **Status** window of DMM, click on **Build or Erase** button. ▪ Select **Errase all files in all directories in all partitions** and then click on **OK** button. ▪ In the displayed window confirm erase by clicking on the **OK** button. ▪ Enable the acquisition mode by clicking on the **Configuration vs Acquisition Mode** icon and on the **Control Access**.			
13	**Instruments setup**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
13	1	EXE	Connect measurement probes to the oscilloscope	Probes connected according to detail.		
		DET	In CH1 connect current probe, in CH2 connect differential probe.			
13	2	EXE	Connect measurement probes to the AD-HOC box	Probes connected according to detail.		
		DET	▪ Connect CH1 current probe to measure EWC30 TX. ▪ Connect CH2 differential probe to measure EWC30 TX. **Note:** When the current tip is placed in the ad-hoc box the arrow on the current tip should point to the left.			
14	**DUT Connection**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
14	1	EXE	Verify ground connection of EWC-30.	EWC-30 is grounded		
		DET	▪ Visually inspect that the ground connection to the EWC-30 connector J104 and to the copper bar are properly adjusted. ▪ Verify continuity between ground connector of EWC-30 and copper bar of facilities.			
14	2	EXE	Verify ground connection of X-Band Filter.	X-Band Filter is grounded		
		DET	▪ Visually inspect that the ground connection to the X-Band Filter and to the copper bar are properly adjusted. ▪ Verify Continuity between X-Band Filter and copper bar of facilities.			

14	3	EXE	Connect W10 cable between IN Port of DSN Filter and J103 Port of EWC30.	Cable W10 connected between ports.		
		DET	▪ Connect W10 cable between IN Port of DSN Filter and J103 Port of EWC30.			
14	4	EXE	Connect W2 cable to OUT Port of DSN Filter.	W2 Cable connected to OUT Port.		
		DET	▪ Connect W2 cable to the OUT port of DSN Filter. ▪ Mount W2 cable in the sliding tray.			

15 BB harness connection to DUT

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
15	1	EXE	Connect **H-EGSE-DUT-J12_001** harness to EWC30	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** harness to connector saver J100 of the EWC30			
15	2	EXE	Connect **H-EGSE-DUT-J2_001** harness to EWC30	Harness connected		
		DET	Connect **H-EGSE-DUT-J2_001** harness to connector saver J200 of the EWC30			
15	3	EXE	Connect **H-EGSE-DUT-J3_001** harness to EWC30	Harness connected		
		DET	Connect **H-EGSE-DUT-J3_001** harness to connector saver J201 of the EWC30			

16 Mount CEGSE mechanical support in CEGSE

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
16	1	EXE	Disconnect ground of EWC30.	Ground of EWC30 disconnected		
		DET	▪ Disconnect ground wire of EWC30 from copper bar of facilities			
16	2	EXE	Disconnect ground of X-Band Filter.	Ground of X-Band Filter disconnected		

		DET	▪ Disconnect ground wire of X-Band Filter from copper bar of facilities			
16	3	EXE	Mount CEGSE mechanical support to the CEGSE rack.	CEGSE mechanical support mounted.		
		DET	Mount CEGSE mechanical support to the CEGSE rack. Take all possible precautions since the DUT is mounted on this.			
16	4	EXE	Ground EWC30.	EWC30 grounded		
		DET	▪ Visually inspect that the ground connection to the EWC30 connector J104 is properly adjusted. ▪ Connect ground wire from EWC30 to copper bar of CEGSE rack ▪ Verify continuity between ground connector of EWC30 and copper bar of CEGSE rack.			
16	5	EXE	Ground X-Band Filter.	X-Band Filter grounded		
		DET	▪ Visually inspect that the ground connection to the X-Band Filter is properly adjusted. ▪ Connect ground wire from X-Band Filter to copper bar of CEGSE rack ▪ Verify Continuity between X-Band Filter and copper bar of CEGSE rack.			
16	6	EXE	VBus grounding resistance measurement.	$R \approx 2K\Omega$		
		DET	▪ Set the multimeter to measure resistance. ▪ Connect the multimeter probes to measure resistance between negative terminal of Keysight power supply and copper bar of CEGSE.			

17 BB harness connection to Ad-hoc box and EMI/EMC filter

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
17	1	EXE	Connect **H-EGSE-DUT-J12_001** harness from EWC30 to EMI/EMC filter	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** harness to connector output of the EMI/EMC filter			
17	2	EXE	Connect **H-EGSE-DUT-J2_001** harness form EWC30 to Ad-hoc box.	Harness connected		
		DET	Connect **H-EGSE-DUT-J2_001** harness to connector J200 of the Ad-hoc box			
17	3	EXE	Connect **H-EGSE-DUT-J3_001** harness form EWC30 to Ad-hoc box.	Harness connected		

		DET	Connect **H-EGSE-DUT-J3_001** harness to connector J201A and J201B of the Ad-hoc box			
17	4	EXE	Take photos of the setup and DUT connections.	Photos taken.		
		DET	Take photos of setup and DUT connections.			
18	**RF connection to CEGSE and GS-GSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
18	1	EXE	Connect W3 cable between Coupler Port and EWC30 port of CEGSE.	Cable W3 connected between ports.		
		DET	▪ Disconnect the 50 ohm load from the EWC30 Port of CEGSE. ▪ Connect W3 cable between Coupler Port and EWC30 Port.			
18	2	EXE	Connect XRF4.02 cable to GS-GSE Data [X-Band] interface.	Cable XRF4.02 connected to GS-GSE Data [X-Band] interface.		
		DET	▪ Connect XRF4.02 cable to interface GS-GSE Data [X-Band] (N1)interface if **EWC30-FM1** is under test. ▪ Connect XRF4.02 cable to interface GS-GSE Data [X-Band] (N2)interface if **EWC30-FM2** is under test.			
18	3	EXE	Connect XRF4.02 cable to IN/OUT Port of CEGSE.	Cable XRF4.02 connected to IN/OUT Port.		
		DET	▪ Disconnect the 50 ohm load from the IN/OUT Port of CEGSE. ▪ Connect XRF4.02 cable to the IN/OUT Port of CEGSE.			
19	**Power-on CEGSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
19	1	EXE	Turn on the main switch of the Ad-Hoc box.	The main switch light must be turned on		
		DET	Turn on the main switch of the Ad-Hoc box.			
19	2	EXE	Verify Keysight power supply configuration	V LIMIT = 28 V I LIMIT = 3 A OVP = 34 V UVP = 22 V		

		DET	In front pannel of power supply: ▪ press "LIMIT" button to read voltage and current limits. ▪ press one time "OVP/UVP" button to read OVP limit ▪ press two times "OVP/UVP" button to read UVP limit. **Note:** Adjust the value of I LIMIT if it is not the expected one. Press "LIMIT" and turn the current knob to adjust.			
19	3	EXE	Enable power supply output of CEGSE.	The LED indicator of the OUT ON output is ON.		
		DET	Press the OUT ON button to enable the power supply output. Verify that the OUT ON LED indicator turns on when pressing the button.			
19	4	EXE	Turn on the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn on		
		DET	Turn on the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned on when the switch is turned on.			
19	5	EXE	Power on PXI computer.	PXI on.		
		DET	Connect the PXI to power supply and turn it on			
19	6	EXE	**RDP connection** to CEGSE from Thin client **Operator Workstation DataA**.	Thin Client **OW DATA A** connected to CEGSE		
		DET	From the Operator Workstation DataA open the Remote Desktop Connection and connect to IP: 192.168.75.211 ▪ `User: EGSE COM` ▪ `Password: Conae1234`			

20 Collect Evidences

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
20	1	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-F-012-01 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-F-012/SB1FS-COM-F-012-01 directory. ▪ Paste the copied folder.			

20	2	EXE	Save evidence photos	Evidence photos saved		
		DET	Create **pictures** folder on C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012\SB1FS-COM-F-012-01 save all photos taken during the DUT connections.			
21	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
21	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
21	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity in the test site.			

Table 5.1.0-1: SB1FS-COM-F-012-01 procedure.

5.2. SB1FS-COM-F-012-02 Inrush and ripple measurement

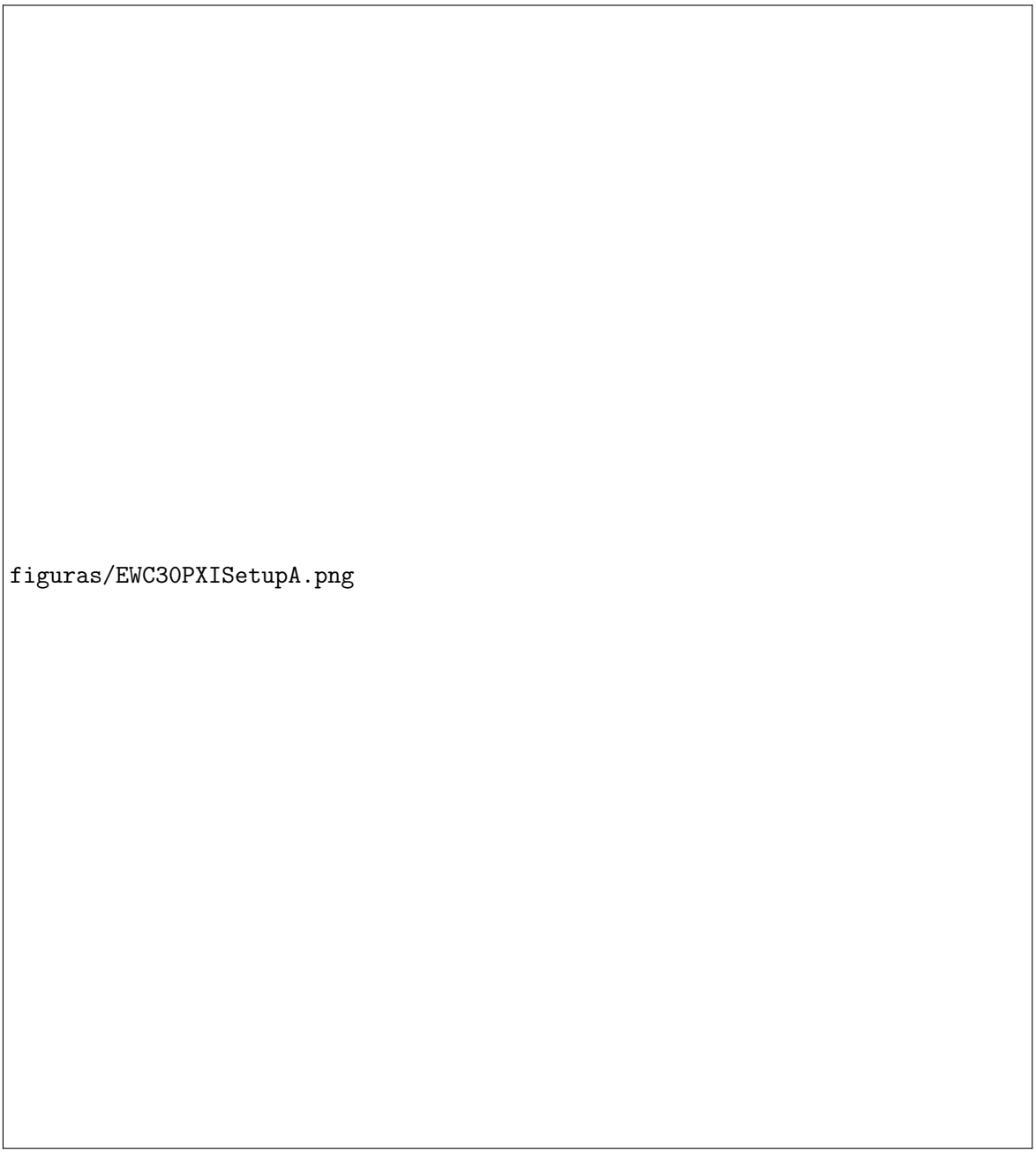

Figure 5.2.0-1: Inrush and ripple measurement setup.

SB1FS-COM-F-012-02 Inrush and ripple measurement.						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity in the test site.			
2	**CEGSE power off (PXI and Ad-Hoc Box)**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Turn off the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn off		
		DET	Turn off the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned off when the switch is turned off.			
2	2	EXE	Disable power supply output of CEGSE.	The LED indicator of the OUT ON output should go out.		
		DET	Press the OUT ON button to disable the power supply output. Verify that the OUT ON LED indicator turns off when pressing the button to disable the output.			
2	3	EXE	Turn off the main switch of the Ad-Hoc box.	The main switch light must be turned off		
		DET	Turn off the main switch of the Ad-Hoc box.			
2	4	EXE	Power off PXI.	PXI off.		

		DET	From the CEGSE KVM shutdown the PXI.			
3	**DB-15 BOB connection to EMI/EMC filter**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Disconnect **H-EGSE-DUT-J12_001** harness from EMI/EMC filter output.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J12_001** DB15 male connector from EMI/EMC filter output.			
3	2	EXE	Connect **H-EGSE-DUT-J14_001** harness to EMI/EMC filter output.	Harness connected		
		DET	Connect **H-EGSE-DUT-J14_001** DB15 male connector to EMI/EMC filter output.			
3	3	EXE	Connect **H-EGSE-DUT-J14_001** harness to DB-15 BOB.	Harness connected to DB-15 BOB		
		DET	Connect **H-EGSE-DUT-J14_001** DB15 female connector to DB-15 BOB.			
4	**Power-on CEGSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Turn on the main switch of the Ad-Hoc box.	The main switch light must be turned on		
		DET	Turn on the main switch of the Ad-Hoc box.			
4	2	EXE	Verify Keysight power supply configuration	V LIMIT = 28 V I LIMIT = 3 A OVP = 34 V UVP = 22 V		
		DET	In front pannel of power supply: ▪ press "LIMIT" button to read voltage and current limits. ▪ press one time "OVP/UVP" button to read OVP limit ▪ press two times "OVP/UVP" button to read UVP limit. **Note:** Adjust the value of I LIMIT if it is not the expected one. Press "LIMIT" and turn the current knob to adjust.			

4	3	EXE	Enable power supply output of CEGSE.	The LED indicator of the OUT ON output is ON.		
		DET	Press the OUT ON button to enable the power supply output. Verify that the OUT ON LED indicator turns on when pressing the button.			
4	4	EXE	Turn on the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn on		
		DET	Turn on the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned on when the switch is turned on.			
4	5	EXE	Power on PXI computer.	PXI on.		
		DET	Connect the PXI to power supply and turn it on			
4	6	EXE	**RDP connection** to CEGSE from Thin client **Operator Workstation DataA**.	Thin Client **OW DATA A** connected to CEGSE		
		DET	From the Operator Workstation DataA open the Remote Desktop Connection and connect to IP: 192.168.75.211 ▪ `User: EGSE COM` ▪ `Password: Conae1234`			

5	**CEGSE SW Initialization**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Start CEGSE SW using EWC30 "no alarm" configuration file	SW running in EWC30 "no alarm" configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-F-012-02" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **"INIT_FILE_NO_ALARM_EWC30.ini"** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

6	EWC30 Vbus verification					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
6	2	EXE	Measure VBus voltage on DB-15 BOB.	Voltage=28 V		
		DET	Measure voltage between the following pairs of pins of Break Out Box: ▪ Pin 1(+) and Pin 9(-) ▪ Pin 2(+) and Pin 10(-) ▪ Pin 3(+) and Pin 11(-) ▪ Pin 4(+) and Pin 12(-) ▪ Pin 5(+) and Pin 13(-) ▪ Pin 6(+) and Pin 14(-) ▪ Pin 7(+) and Pin 15(-)			
7	**CEGSE power off (PXI and Ad-Hoc Box)**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
7	2	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
7	3	EXE	Turn off the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn off		
		DET	Turn off the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned off when the switch is turned off.			
7	4	EXE	Disable power supply output of CEGSE.	The LED indicator of the OUT ON output should go out.		

		DET	Press the OUT ON button to disable the power supply output. Verify that the OUT ON LED indicator turns off when pressing the button to disable the output.			
7	5	EXE	Turn off the main switch of the Ad-Hoc box.	The main switch light must be turned off		
		DET	Turn off the main switch of the Ad-Hoc box.			
7	6	EXE	Power off PXI.	PXI off.		
		DET	From the CEGSE KVM shutdown the PXI.			

8 DB-15 BOB connection to DUT

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Connect **H-EGSE-DUT-J12_001** harness to DB-15 BOB.	Harness connected to DB-15 BOB		
		DET	Connect **H-EGSE-DUT-J12_001** DB15 male connector to DB-15 BOB.			

9 Power-on CEGSE

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Turn on the main switch of the Ad-Hoc box.	The main switch light must be turned on		
		DET	Turn on the main switch of the Ad-Hoc box.			
9	2	EXE	Verify Keysight power supply configuration	V LIMIT = 28 V I LIMIT = 3 A OVP = 34 V UVP = 22 V		
		DET	In front pannel of power supply: ▪ press "LIMIT" button to read voltage and current limits. ▪ press one time "OVP/UVP" button to read OVP limit ▪ press two times "OVP/UVP" button to read UVP limit. **Note:** Adjust the value of I LIMIT if it is not the expected one. Press "LIMIT" and turn the current knob to adjust.			

9	3	EXE	Enable power supply output of CEGSE.	The LED indicator of the OUT ON output is ON.		
		DET	Press the OUT ON button to enable the power supply output. Verify that the OUT ON LED indicator turns on when pressing the button.			
9	4	EXE	Turn on the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn on		
		DET	Turn on the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned on when the switch is turned on.			
9	5	EXE	Power on PXI computer.	PXI on.		
		DET	Connect the PXI to power supply and turn it on			
9	6	EXE	**RDP connection** to CEGSE from Thin client **Operator Workstation DataA**.	Thin Client **OW DATA A** connected to CEGSE		
		DET	From the Operator Workstation DataA open the Remote Desktop Connection and connect to IP: 192.168.75.211 ▪ `User: EGSE COM` ▪ `Password: Conae1234`			

10 PXI Spectrum Analyzer connection

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	Connect W15 cable to DWL TP of CEGSE.	W15 connected to DWL TP.		
		DET	▪ Disconnect the 50 ohm load from the DWL TP of CEGSE. ▪ Connect W15 cable to the DWL TP of CEGSE.			
10	2	EXE	Connect W15 cable to DC Block.	Cable connected.		
		DET	▪ Connect the end W15 cable to DC Block (this is connected to the RF IN of PXI).			

11 Instrument configuration

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	Start PXI spectrum analyzer.	PXI spectrum analyzer started.		

		DET	Start PXI spectrum analyzer by clicking on the **NI RFSA Soft Front Panel(64-bit)** icon on the desktop.			
11	2	EXE	Configure PXI spectrum analyzer.	PXI spectrum analyzer configured.		
		DET	▪ Load the configuration file from the `C:/USERS/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-F-012/NI-RFSA-data-config` directory. • **NI-RFSA-Data-N1.tdms if EWC30-FM1 is under test** • **NI-RFSA-Data-N2.tdms if EWC30-FM2 is under test** ▪ Select the external reference: **Device/System** -> **Freq Ref Scr** -> **Ref In**			
11	3	EXE	Configure band power measurement in PXI spectrum analyzer.	PXI spectrum analyzer configured.		
		DET	Go to **NI RFSA Soft Fron Panel** and do the following: ▪ Click on **Meas**, **Channel Power** and enter 195 MHz in **Bandwidth** field. ▪ Click **Meas, Channel Power** and enter 100 in **Number of Averages** field.			

12 EGSE Settings

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB.	Attenuation in 0 dB.		
		DET	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB attenuation position.			

13 CEGSE SW Initialization

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
13	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-F-012-02" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

14	DUT Power On					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
14	1	EXE	Verify EWC-30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
14	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		
		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
14	3	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-ON.set** from **osc-config** folder in the pendrive.			
14	4	EXE	Press "SINGLE" button	"SINGLE" button light is on		
		DET	On oscilloscope press "SINGLE" button.			
14	5	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
14	6	EXE	Take screenshot of captured signals.	`<filename.png>` saved.		
		DET	Take the screenshot of the oscilloscope by pressing save button. Take note the saved file name.			
14	7	EXE	Measure inrush current on CH1 using cursors of oscilloscope.	screenshots saved		
		DET	▪ Take screenshot of peak-current measurement. Take note of the file name. ▪ Take screenshot of peak-current duration. Take note of the file name.			

14	8	EXE	Save Waveforms.	Waveforms saved		
		DET	On oscilloscope: ▪ Press **menu** in save/recall. ▪ Push **Save waveform** from the lower-bezel menu. ▪ In Source select **all waveforms** using knob A ▪ In destination select **File** option. ▪ Press **Files details** and press **ISF format**. ▪ Select **Removable media E:** using knob A. ▪ In side-bezel menu press **OK (save)**. ▪ Take note of the saved file name.			
14	9	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
14	10	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
14	11	EXE	Verify TX power consumption.	P ≈ 8 W@standby		
		DET	Verify that product between high measurements for **CH1** and **CH2** is approximately expected value.			
15	**Verify DUT Telemetry**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
15	1	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
15	2	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			

15	3	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR < 0.5 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
15	4	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
15	5	EXE	Verify RF status of EWC30	0_CLK_LOCKED = OFF		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
15	6	EXE	Check Locked status of the base band PLL	0_MMU_CLK_STATUS = OFF		
		DET	Go to SBDL& BDM tab on CEGSE GUI and verify 0_MMU_CLK_STATUS status.			
15	7	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

16 File generation for data transmission

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
16	1	EXE	Generate down link file	file generated		
		DET	▪ On CEGSE GUI select COMM tab, then select DOWNLINK tab. ▪ Set VCID to 1 (RT HK TM) ▪ Set "Idle before" to 1330000 (≈180 seconds). ▪ Set "Idle after" to 1330000. ▪ Press to Folder icon of the “Downlink Payload File” section. ▪ Select payload file C:\Users\EGSE COM\Documents\ COMM-SS-FM\SB1FS-COM-F-012**Data-885840_120s_VCh01_payload.bin** and press OK. ▪ Press "Generate Downlink File" button. ▪ Wait until stage shows "Generated File" and "Generating File" indicator is off (15 minutes).			

17	Ripple measurement between EMI/EMC filter and Ad-Hoc Box					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
17	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
17	2	EXE	Start data transmission through the **main HV-HPC** interface	Data transmission started		
		DET	In the CEGSE SW: ▪ Go to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that **stage** box does not show **Sending X Band File** message. ▪ Switch file selector to **Send Generated Downlink File** ▪ Place the switch in **I_STBY_2_OPE_M** ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that **stage** box shows **Sending X Band File**.			
17	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
17	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
17	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR ≈ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
17	6	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I ≈ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			

17	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RIPPLE.set** from **osc-config** folder in the pendrive.			
17	8	EXE	Stop acquisition	Acquisition stopped		
		DET	Press the **Run**/**Stop** button on the oscilloscope.			
17	9	EXE	Take screenshot of captured signals.	`<filename.png>` saved.		
		DET	Take the screenshot of the oscilloscope by pressing save button. Take note the saved file name.			
17	10	EXE	Save Waveforms.	Waveforms saved		
		DET	On oscilloscope: ▪ Press **menu** in save/recall. ▪ Push **Save waveform** from the lower-bezel menu. ▪ In Source select **all waveforms** using knob A ▪ In destination select **File** option. ▪ Press **Files details** and press **ISF format**. ▪ Select **Removable media E:** using knob A. ▪ In side-bezel menu press **OK (save)**. ▪ Take note of the saved file name.			
17	11	EXE	Start acquisition	Acquisition started		
		DET	Press the **Run**/**Stop** button on the oscilloscope.			
17	12	EXE	Change oscilloscope time settings.	Oscilloscope configured.		
		DET	Change time setting to 200 $\mu s/div$ on the oscilloscope.			
17	13	EXE	Stop acquisition	Acquisition stopped		
		DET	Press the **Run**/**Stop** button on the oscilloscope.			
17	14	EXE	Take screenshot of captured signals.	`<filename.png>` saved.		

		DET	Take the screenshot of the oscilloscope by pressing save button. Take note the saved file name.			
17	15	EXE	Save Waveforms.	Waveforms saved		
		DET	On oscilloscope: ▪ Press **menu** in save/recall. ▪ Push **Save waveform** from the lower-bezel menu. ▪ In Source select **all waveforms** using knob A ▪ In destination select **File** option. ▪ Press **Files details** and press **ISF format**. ▪ Select **Removable media E:** using knob A. ▪ In side-bezel menu press **OK (save)**. ▪ Take note of the saved file name.			
17	16	EXE	Verify of peak to peak current and voltage measurement of TX on oscilloscope.	$\Delta V < 542\ mVpp$ $\Delta I < 750\ mApp$		
		DET	▪ Verify that measurements for CH1 and CH2 are as expected.			
17	17	EXE	Measure modulated power.	$P_{out} = 40\ dBm \pm 1dB.$		
		DET	Go to **NI RFSA Soft Front Panel** and do following: ▪ Wait until Avgs = 100/100 ▪ See **Measurement: Channel Power** and verify that the measured meet the expected value.			
17	18	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	Take screenshot (use paint) and save it in `C:/USERS/EGSE COM/Documents/COMM-SS-FM-FT/<session_ID>/SB1FS-COM-F-012/SB1FS-COM-F-012-02/screenshot-pxi` directory			
17	19	EXE	Send command standby to change Tx status to I_OPE_2_STBY_M	command sent		
		DET	Go to HV-HPC tab on CEGSE GUI and press **standby** button. Button turns green during 0.6 seconds.			
17	20	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

17	21	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
18	**DUT Turn Off**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
18	1	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-OFF.set** from **osc-config** folder in the pendrive.			
18	2	EXE	Press "SINGLE" button	"SINGLE" button light is on		
		DET	On oscilloscope press "SINGLE" button.			
18	3	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
18	4	EXE	Take screenshot of captured signals.	`<filename.png>` saved.		
		DET	Take the screenshot of the oscilloscope by pressing save button. Take note the saved file name.			
18	5	EXE	Measure power-down current on CH1 using cursors of oscilloscope.	screenshots saved		
		DET	▪ Take screenshot of power-down curve duration. Take note of the file name.			
18	6	EXE	Save Waveforms.	Waveforms saved		
		DET	On oscilloscope: ▪ Press **menu** in save/recall. ▪ Push **Save waveform** from the lower-bezel menu. ▪ In Source select **all waveforms** using knob A ▪ In destination select **File** option. ▪ Press **Files details** and press **ISF format**. ▪ Select **Removable media E:** using knob A. ▪ In side-bezel menu press **OK (save)**. ▪ Take note of the saved file name.			

18	7	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			

19	**Connections of oscilloscope probe between EMI/EMC filter and DUT**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
19	1	EXE	Connect measurement probe to **H-EGSE-DUT-J12_001** harness	Probe connected according to detail.		
		DET	▪ Connect CH1 current probe to the 7 positive wires (+V) of the **H-EGSE-DUT-J12_001** harness. **Note:** When the current tip is placed in the cables of harness the arrow on the current tip should point from EMI/EMC filter to DUT.			
19	2	EXE	Connect measurement probe to **DB-15 BOB**	Probe connected according to detail.		
		DET	▪ Connect positive lead of CH2 voltage probe to the **P Tip = 5** pin DB-15 BOB. ▪ Connect negative lead of CH2 voltage probe to the **N Tip = 10** pin DB-15 BOB.			

20	**CEGSE SW Initialization**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
20	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-F-012-02" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

21	**DUT Power On**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
21	1	EXE	Verify EWC-30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			

21	2	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
21	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
21	4	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
21	5	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
21	6	EXE	Verify TX power consumption.	P ≈ 8 W@standby		
		DET	Verify that product between high measurements for **CH1** and **CH2** is approximately expected value.			

22 File generation for data transmission

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
22	1	EXE	Generate down link file	file generated		
		DET	▪ On CEGSE GUI select COMM tab, then select DOWNLINK tab. ▪ Set VCID to 1 (RT HK TM) ▪ Set "Idle before" to 1330000 (≈180 seconds). ▪ Set "Idle after" to 1330000. ▪ Press to Folder icon of the “Downlink Payload File” section. ▪ Select payload file C:\Users\EGSE COM\Documents\ COMM-SS-FM\SB1FS-COM-F-012**Data-885840_120s_VCh01_payload.bin** and press OK. ▪ Press "Generate Downlink File" button. ▪ Wait until stage shows "Generated File" and "Generating File" indicator is off (15 minutes).			

23	Ripple measurement between EMI/EMC filter and DUT					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
23	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
23	2	EXE	Start data transmission through the **main HV-HPC** interface	Data transmission started		
		DET	In the CEGSE SW: ▪ Go to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that **stage** box does not show **Sending X Band File** message. ▪ Switch file selector to **Send Generated Downlink File** ▪ Place the switch in **I_STBY_2_OPE_M** ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that **stage** box shows **Sending X Band File**.			
23	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
23	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
23	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR ≈ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
23	6	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I ≈ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			

23	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RIPPLE.set** from **osc-config** folder in the pendrive.			
23	8	EXE	Stop acquisition	Acquisition stopped		
		DET	Press the **Run**/**Stop** button on the oscilloscope.			
23	9	EXE	Take screenshot of captured signals.	`<filename.png>` saved.		
		DET	Take the screenshot of the oscilloscope by pressing save button. Take note the saved file name.			
23	10	EXE	Save Waveforms.	Waveforms saved		
		DET	On oscilloscope: ▪ Press **menu** in save/recall. ▪ Push **Save waveform** from the lower-bezel menu. ▪ In Source select **all waveforms** using knob A ▪ In destination select **File** option. ▪ Press **Files details** and press **ISF format**. ▪ Select **Removable media E:** using knob A. ▪ In side-bezel menu press **OK (save)**. ▪ Take note of the saved file name.			
23	11	EXE	Start acquisition	Acquisition started		
		DET	Press the **Run**/**Stop** button on the oscilloscope.			
23	12	EXE	Change oscilloscope time settings.	Oscilloscope configured.		
		DET	Change time setting to 200 $\mu s/div$ on the oscilloscope.			
23	13	EXE	Stop acquisition	Acquisition stopped		
		DET	Press the **Run**/**Stop** button on the oscilloscope.			
23	14	EXE	Take screenshot of captured signals.	`<filename.png>` saved.		

		DET	Take the screenshot of the oscilloscope by pressing save button. Take note the saved file name.			
23	15	EXE	Save Waveforms.	Waveforms saved		
		DET	On oscilloscope: ▪ Press **menu** in save/recall. ▪ Push **Save waveform** from the lower-bezel menu. ▪ In Source select **all waveforms** using knob A ▪ In destination select **File** option. ▪ Press **Files details** and press **ISF format**. ▪ Select **Removable media E:** using knob A. ▪ In side-bezel menu press **OK (save)**. ▪ Take note of the saved file name.			
23	16	EXE	Verify of peak to peak current and voltage measurement of TX on oscilloscope.	$\Delta V < 542\ mVpp$ $\Delta I < 750\ mApp$		
		DET	▪ Verify that measurements for CH1 and CH2 are as expected.			
23	17	EXE	Measure modulated power.	$P_{out} = 40\ dBm \pm 1dB.$		
		DET	Go to **NI RFSA Soft Front Panel** and do following: ▪ Wait until Avgs = 100/100 ▪ See **Measurement: Channel Power** and verify that the measured meet the expected value.			
23	18	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	Take screenshot (use paint) and save it in `C:/USERS/EGSE COM/Documents/COMM-SS-FM-FT/<session_ID>/SB1FS-COM-F-012/SB1FS-COM-F-012-02/screenshot-pxi` directory			
23	19	EXE	Send command standby to change Tx status to I_OPE_2_STBY_M	command sent		
		DET	Go to HV-HPC tab on CEGSE GUI and press **standby** button. Button turns green during 0.6 seconds.			
23	20	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

23	21	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
24	**CEGSE power off (PXI and Ad-Hoc Box)**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
24	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
24	2	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
24	3	EXE	Turn off the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn off		
		DET	Turn off the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned off when the switch is turned off.			
24	4	EXE	Disable power supply output of CEGSE.	The LED indicator of the OUT ON output should go out.		
		DET	Press the OUT ON button to disable the power supply output. Verify that the OUT ON LED indicator turns off when pressing the button to disable the output.			
24	5	EXE	Turn off the main switch of the Ad-Hoc box.	The main switch light must be turned off		
		DET	Turn off the main switch of the Ad-Hoc box.			
24	6	EXE	Power off PXI.	PXI off.		
		DET	From the CEGSE KVM shutdown the PXI.			
25	**DB-15 BOB disconnection and DUT connection**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status

25	1	EXE	Disconnect **H-EGSE-DUT-J12_001** harness to DB-15 BOB.	Harness disconnected from DB-15 BOB		
		DET	Disconnect **H-EGSE-DUT-J12_001** DB15 male connector from DB-15 BOB.			
25	2	EXE	Disconnect **H-EGSE-DUT-J14_001** harness to DB-15 BOB.	Harness disconnected from DB-15 BOB		
		DET	Disconnect **H-EGSE-DUT-J14_001** DB15 female connector from DB-15 BOB.			
25	3	EXE	Disconnect **H-EGSE-DUT-J14_001** harness from EMI/EMC filter output.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J14_001** DB15 male connector from EMI/EMC filter output.			
25	4	EXE	Connect **H-EGSE-DUT-J12_001** harness to EMI/EMC filter output.	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** DB15 male connector to EMI/EMC filter output.			

26	**Power-on CEGSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
26	1	EXE	Turn on the main switch of the Ad-Hoc box.	The main switch light must be turned on		
		DET	Turn on the main switch of the Ad-Hoc box.			
26	2	EXE	Verify Keysight power supply configuration	V LIMIT = 28 V I LIMIT = 3 A OVP = 34 V UVP = 22 V		
		DET	In front pannel of power supply: ▪ press "LIMIT" button to read voltage and current limits. ▪ press one time "OVP/UVP" button to read OVP limit ▪ press two times "OVP/UVP" button to read UVP limit. **Note:** Adjust the value of I LIMIT if it is not the expected one. Press "LIMIT" and turn the current knob to adjust.			

26	3	EXE	Enable power supply output of CEGSE.	The LED indicator of the OUT ON output is ON.		
		DET	Press the OUT ON button to enable the power supply output. Verify that the OUT ON LED indicator turns on when pressing the button.			
26	4	EXE	Turn on the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn on		
		DET	Turn on the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned on when the switch is turned on.			
26	5	EXE	Power on PXI computer.	PXI on.		
		DET	Connect the PXI to power supply and turn it on			
26	6	EXE	**RDP connection** to CEGSE from Thin client **Operator Workstation DataA**.	Thin Client **OW DATA A** connected to CEGSE		
		DET	From the Operator Workstation DataA open the Remote Desktop Connection and connect to IP: 192.168.75.211 ▪ `User: EGSE COM` ▪ `Password: Conae1234`			

27	**Collect Evidences**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
27	1	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-F-012-02 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-F-012/SB1FS-COM-F-012-02 directory. ▪ Paste the copied folder.			

27	2	EXE	Copy oscilloscope screen-shots and .ISF files to CEGSE.	files copied.		
		DET	Unplug the pendrive from USB port of oscilloscope Plug the pendrive to USB port of CEGSEIn the CEGSE, open the file explorer and do the following: ▪ Go to pen-drive folder. ▪ Copy all folder content. ▪ Go to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID> ▪ Paste the copied files. Unplug the pendrive to USB port of CEGSE			
28	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
28	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
28	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity in the test site.			
28	3	EXE	Disconnect W15 cable from DWL Test Port of CEGSE.	W15 disconnected from DWL Test Port. DWL Test Port with RF load.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect W15 cable from the DWL Test Port of CEGSE. ▪ Connect the 50 ohm load fto the DWL Test Port of CEGSE.			
28	4	EXE	Disconnect W15 cable from DC Block.	Cable disconnected from DC Block.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect the end W15 cable from DC Block (This is connected to RF IN of PXI).			

28	5	EXE	Close PXI spectrum analyzer.	PXI spectrum analyzer closed.		
		DET	Close **NI RFSA Soft Front Panel(64-bit)**.			
28	6	EXE	Connect measurement probes to the AD-HOC box	Probes connected according to detail.		
		DET	▪ Connect CH1 current probe to measure EWC30 TX. ▪ Connect CH2 differential probe to measure EWC30 TX. **Note:** When the current tip is placed in the ad-hoc box the arrow on the current tip should point to the left.			
28	7	EXE	Connect pendrive to Oscilloscope.	Pendrive connected to Oscilloscope.		
		DET	Connect pendrive to Oscilloscope.			

Table 5.2.0-1: Procedure SB1FS-COM-F-012-02 table.

5.3. SB1FS-COM-F-012-03 Aliveness and Functional Test

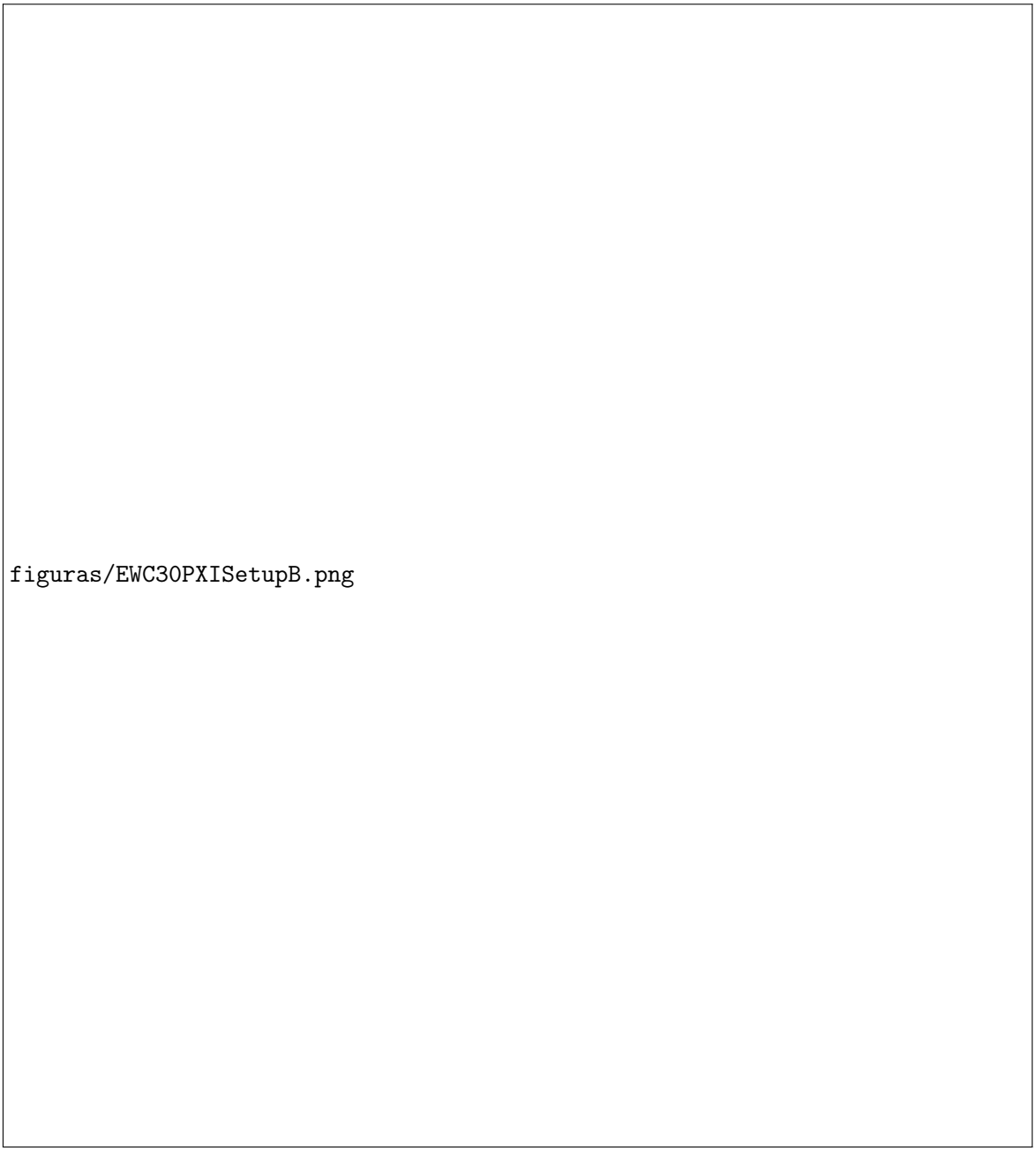

Figure 5.3.0-1: Aliveness and functional test setup.

SB1FS-COM-F-012-03 Aliveness and Functional Test						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity in the test site.			
2	**Preparation of GS-GSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Enable **N1** interface in the **X-Band Matrix and Attenuator**.	N1 interface enabled.		
		DET	Note: Skip this step if **EWC30-FM2** is under test. In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Press the **Nadir 1 to Down Converters** button. ▪ Go to the **XBMA Control Diagram** field and verify that the **bottom** indicator of the **N1 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **XBMA Control Diagram** field and verify that the **bottom** indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			
2	2	EXE	Enable **N2** interface in the **X-Band Matrix and Attenuator**.	N2 interface enabled.		
		DET	Note: Skip this step if **EWC30-FM1** is under test. In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Press the **Nadir 2 to Down Converters** button. ▪ Go to the **XBMA Control Diagram** field and verify that the **top** indicator of the **N1 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **XBMA Control Diagram** field and verify that the **top** indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			

2	3	EXE	Open **Vector**, **Spectrum** and **Recording Global** tabs in Cortex HDR.	Tabs open.		
		DET	Go to MCS Cortex (192.168.75.161), in the **Global** window, do the following: ▪ Open Vector tab. • Click in **DMU-1** (Demodulator Unit 1). • In the displayed window go to vector tab, select cumulative option and press enable button ▪ Open Spectrum • Click in **DMU-1** (Demodulator Unit 1). • In the displayed window go to Spectrum tab and press enable button. ▪ Open Recording Global • Click in **DRU-1** (Data Recording Unit 1). • In the displayed window go to Recording Global tab.			
3	**PXI Spectrum Analyzer connection**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Connect W15 cable to DWL TP of CEGSE.	W15 connected to DWL TP.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Disconnect the 50 ohm load from the DWL TP of CEGSE. ▪ Connect W15 cable to the DWL TP of CEGSE.			
3	2	EXE	Connect W15 cable to DC Block.	Cable connected.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Connect the end W15 cable to DC Block (this is connected to the RF IN of PXI).			
4	**Instrument configuration**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Start PXI spectrum analyzer.	PXI spectrum analyzer started.		
		DET	Start PXI spectrum analyzer by clicking on the **NI RFSA Soft Front Panel(64-bit)** icon on the desktop.			
4	2	EXE	Configure PXI spectrum analyzer.	PXI spectrum analyzer configured.		

		DET	▪ Load the configuration file from the `C:/USERS/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-F-012/NI-RFSA-data-config` directory. • **NI-RFSA-Data-N1.tdms if EWC30-FM1 is under test** • **NI-RFSA-Data-N2.tdms if EWC30-FM2 is under test** ▪ Select the external reference: **Device/System** -> **Freq Ref Scr** -> **Ref In**			
4	3	EXE	Configure band power measurement in PXI spectrum analyzer.	PXI spectrum analyzer configured.		
		DET	Go to **NI RFSA Soft Fron Panel** and do the following: ▪ Click on **Meas**, **Channel Power** and enter 195 MHz in **Bandwidth** field. ▪ Click **Meas, Channel Power** and enter 100 in **Number of Averages** field.			

5 EGSE Settings

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB.	Attenuation in 0 dB.		
		DET	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB attenuation position.			

6 CEGSE SW Initialization

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-F-012-03" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

7 DUT Power On

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	Verify EWC-30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
7	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		

		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
7	3	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
7	4	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
7	5	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
7	6	EXE	Verify TX power consumption.	P ≈ 8 W@standby		
		DET	Verify that product between high measurements for **CH1** and **CH2** is approximately expected value.			
8	**Verify DUT Telemetry**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Verify O_SEC_V_RF value	4.31 V < GUI value < 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
8	2	EXE	Verify O_SEC_V_NUM value	3.3 V < GUI value < 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
8	3	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR < 0.5 V		

		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
8	4	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
8	5	EXE	Verify RF status of EWC30	0_CLK_LOCKED = OFF		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
8	6	EXE	Check Locked status of the base band PLL	0_MMU_CLK_STATUS = OFF		
		DET	Go to SBDL& BDM tab on CEGSE GUI and verify 0_MMU_CLK_STATUS status.			
8	7	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

9 File generation for data transmission

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Generate down link file	file generated		
		DET	■ On CEGSE GUI select COMM tab, then select DOWNLINK tab. ■ Set VCID to 1 (RT HK TM) ■ Set "Idle before" to 1330000 (≈180 seconds). ■ Set "Idle after" to 1330000. ■ Press to Folder icon of the “Downlink Payload File” section. ■ Select payload file C:\Users\EGSE COM\Documents\ COMM-SS-FM\SB1FS-COM-F-012**Data-885840_120s_VCh01_payload.bin** and press OK. ■ Press "Generate Downlink File" button. ■ Wait until stage shows "Generated File" and "Generating File" indicator is off (15 minutes).			

10	RF measurements with the PXI Spectrum Analyzer and Data Downlink test					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
10	2	EXE	Start data transmission through the **redundant HV-HPC** interface	Data transmission started		
		DET	In the CEGSE SW: ■ Go to the **COMM** tab and then go to the **Downlink** subtab. ■ Verify that **stage** box does not show **Sending X Band File** message. ■ Switch file selector to **Send Generated Downlink File** ■ Place the switch in **I_STBY_2_OPE_R** ■ Switch **Bit Endianness** selector to **Big**. ■ Press **Send** button. ■ Verify that **stage** box shows **Sending X Band File**.			
10	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
10	4	EXE	Verify locked status in Cortex HDR	PLL, B/S, Viterbi and F/S are locked and stable.		
		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) do the following: ■ From Recording Global tab of **DRU-1** (Data Recording Unit 1) • Verify that **PLL** is locked. • Verify that **B/S** is locked. • Verify that **F/S** is locked. ■ From Vector or Spectrum tab of **DMU-1** (Demodulator Unit 1) • Verify that **Viterbi** is Locked. Verify for 15 seconds that none of them unlock.			
10	5	EXE	Start ingestion in **Cortex HDR** of **GS-GSE**	Ingestion started		
		DET	In Cortex MCS (192.168.75.161) do the following: ■ In the **Global** window, click on the DRU-1. ■ In the **Recording Global** window of DRU-1, click on **Start Recording** (Red button). ■ Verify that the sign **Recording in Progress. Awaiting for Stop Command** appears in green.			

10	6	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
10	7	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
10	8	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
10	9	EXE	Check Locked status of the base band PLL	0_MMU_CLK_STATUS = ON		
		DET	Go to SBDL& BDM tab on CEGSE GUI and verify 0_MMU_CLK_STATUS status.			
10	10	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
10	11	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I $\approx$ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			
10	12	EXE	Measure modulated power.	$P_{out} = 40\ dBm \pm 1dB.$		
		DET	Go to **NI RFSA Soft Front Panel** and do following: ▪ Wait until Avgs = 100/100 ▪ See **Measurement: Channel Power** and verify that the measured meet the expected value.			

10	13	EXE	Take screenshot of signals measurements.	<filename.png> saved.		
		DET	Take screenshot (use paint) and save it in C:/USERS/EGSE COM/Documents/ COMM-SS-FM-FT/<session_ID>/SB1FS-COM-F-012/SB1FS-COM-F-012-03/screenshot-pxi directory			
10	14	EXE	Configure Occupied Bandwidth measurement in PXI spectrum analyzer.	PXI spectrum analyzer configured.		
		DET	Go to **NI RFSA Soft Front Panel** and do the following: ▪ Click on **Meas**, **Occupied Bandwidth** and enter 99 % in **OBW Power** field. ▪ Click **Meas, Occupied Bandwidth** and enter 100 in **Number of Averages** field.			
10	15	EXE	Measure Occupied Bandwidth at 99 %.	$OBW_{99\,\%} \approx 205\ MHz$		
		DET	Go to **NI RFSA Soft Front Panel** and do following: ▪ Wait until Avgs = 100/100 ▪ See **Measurement: Occupied Bandwidth** and verify that the measured meet the expected value.			
10	16	EXE	Take screenshot of signals measurements.	<filename.png> saved.		
		DET	Take screenshot (use paint) and save it in C:/USERS/EGSE COM/Documents/ COMM-SS-FM-FT/<session_ID>/SB1FS-COM-F-012/SB1FS-COM-F-012-03/screenshot-pxi directory			
10	17	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
10	18	EXE	Stop ingestion in **Cortex HDR** of **GS-GSE**	Ingestion stopped		
		DET	In Cortex MCS (192.168.75.161) go to **Recording Global** window of DRU-1 and in the **Recorder Programming** field click on **Stop Recording** button.			
10	19	EXE	Verify LO leakage frequency.	≈ 8106 MHz for **EWC30-FM1** ≈ 8269 MHz for **EWC30-FM2**		

		DET	Go to **NI RFSA Soft Front Panel** and do following: ▪ Click on **Meas**, then on **All Meas Off** ▪ Click on **BW**, then on **FFT Windows** ▪ Select **FFT flat top** ▪ Press the **Peak Search** button ▪ Wait until Avgs = 100/100 ▪ See in window the **frequency** and verify that the measured meet the expected value.			
10	20	EXE	Send command standby to change Tx status to I_OPE_2_STBY_R	command sent		
		DET	Go to HV-HPC tab on CEGSE GUI and press **standby** button. Button turns green during 0.6 seconds.			
10	21	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
11	**Verify received data**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	Verify number of frames received in VCh63 by **Cortex HDR**	$\approx$ 2457000 frames		
		DET	In Cortex MCS (192.168.75.161) go to **Virtual Channels** window of DRU-A and verify that the **Total TM Block** column for **VC Sort value = 63** has the expected value. **Note:** The HV-HPC command to switch to operation mode occurs 5 seconds after pressing the "send" button. Switching from standby to operational takes 2.5 seconds. 15 seconds of stable engagement is expected in the Cortex HDR. The start of ingestion takes approximately 5 seconds. This causes at least 203000 idle frames to be lost.			
11	2	EXE	Verify number of frames received in VCh01 by **Cortex HDR**	VCh01 $\approx$ 885840 frames		
		DET	In Cortex MCS (192.168.75.161) go to **Virtual Channels** window of Data Recording Unit 1 (DRU-1) and verify that the **Total TM Block** column for **VC Sort value = 1** has the expected value.			
11	3	EXE	Start DATA RF flow on GS-GSE-FM (R)	DATA RF flow started.		
		DET	From SABIA-Mar Ground Segment web, click the **Status Monitor** icon, in the open tab do the following: ▪ Click on the button on the left and select **New Activity**. ▪ In the displayed window • Click on the icon corresponding to **data-rf-n1** if **EWC30-FM1** is under test. • Click on the icon corresponding to **data-rf-n2** if **EWC30-FM2** is under test. ▪ Enter 1800 and then click on the **Confirm** button. ▪ Click on the **Instant** button and then click on the **Confirm** button. ▪ Click on the **Ok** button. ▪ Finally verify in **Timeline View** that **DATA RF flow** has started.			

11	4	EXE	Wait until **Start Data RF flow** execution is finished.	Data RF flow finished.		
		DET	On the web browser go to **Status Monitor** tab, identify the current flow **data-gse-flow-rf-n1** (or **data-gse-flow-rf-n2**) and wait until the flow ends. This takes approximately 6 minutes.			
11	5	EXE	Login to Configuration Control Manager from CEGSE			
		DET	From PXI computer (192.168.75.211), open the FireFox browser and access to Configuration Control Manager web with the following parameters: ▪ URL: http://192.168.75.104:6080 ▪ User: operator-conae ▪ Password: operator-conae			
11	6	EXE	Go to Products section in CCM.	Products window is shown		
		DET	On CCM web click the number in the PRODUCTS section.			
11	7	EXE	Find last XBand Product for VC01 in CCM	product available		
		DET	On CCM web sort products by date to see newer product at the top. Identify the following XBand Product corresponding to this execution. ▪ SB1_XBandN**<X>**VC01_<passID>_<YYYYMMDDTHHMMSS>.bin Where <X> is 1 if **EWC30-FM1** is under test and 2 if **EWC30-FM2** is under test.			
11	8	EXE	Download identified products	products downloaded		
		DET	▪ Download identified products by pressing download icon. ▪ Move downloaded products to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012\SB1FS-COM-F-012-03\ folder			
11	9	EXE	Remove Transport Layer	VC ID = 1 #Frames = 885840 Generated File = On		
		DET	▪ Execute TM_Downlink_File_to_Payload_File_Converter from Desktop icon. ▪ Press the folder icon next to “File path to read” and select the downloaded file on C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012\SB1FS-COM-F-012-03 folder. ▪ In “Telemetry Selector”, select X Band ▪ Press the folder icon next to “Destination directory path” and select the C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012\SB1FS-COM-F-012-03 folder. ▪ Press the “Remove Transport Layer” button to create the final file to be compared			

11	10	EXE	Compare payload files	Files are equals		
		DET	On PXI computer: ■ Open Winmerge Software. ■ Press Ctrl + O ■ Select as first file the file C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012**Data-885840_120s_VCh01_payload.bin** ■ Select as second payload file the file C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012\SB1FS-COM-F-012-03\ **EWC30_payload_received_<yyyymmddTHHMMSS>.bin** ■ Press "compare" button on winmerge GUI. ■ Press "yes" to confirme that winmerge only show the comparison results.			

12 DUT Turn Off

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

13 CEGSE SW Shutdown

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
13	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			

14 Collect Evidences

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
14	1	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	In the CEGSE, open the file explorer, and do the following: ■ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-F-012-03 directory. ■ Copy the **EGSE COM(Root)** folder. ■ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-F-012/SB1FS-COM-F-012-03 directory. ■ Paste the copied folder.			

14	2	EXE	Copy oscilloscope screen-shots and .ISF files to CEGSE.	files copied.		
		DET	Unplug the pendrive from USB port of oscilloscope Plug the pendrive to USB port of CEGSEIn the CEGSE, open the file explorer and do the following: ▪ Go to pen-drive folder. ▪ Copy all folder content. ▪ Go to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID> ▪ Paste the copied files. Unplug the pendrive to USB port of CEGSE			
14	3	EXE	Get temperature and humidity data from datalogger.	Datalogger data obtained		
		DET	Download datalogger from the web: https://webstorage-service.com/member/login.php With credentials: ▪ User: tdgb6655 ▪ Password: Sabi4M4r To do this, execute the following steps: ▪ Click on SABIAMAR1 in Watch list ▪ In the displayed window, click on Menu and then on csv. ▪ Download the file .csv. ▪ Save the file downloaded in the test evidence directory of PXI: C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012\SB1FS-COM-F-012-03.			

15 Final Steps

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
15	1	EXE	Set the redundant side of the GS-GSE in the **XBMA**.	Selected redundant GS-GSE.		
		DET	In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Go to the **Nadir 1 Transfer Switch Control** field and press the **Nadir 1 to Redundant 1** button. ▪ Go to the **X-Band Matrix and AttenuatorControl Diagram** field and verify that the upper indicator of the **N1 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **Nadir 2 Transfer Switch Control** field and press the **Nadir 2 to Redundant 2** button. ▪ Go to the **X-Band Matrix and AttenuatorControl Diagram** field and verify that the bottom indicator of the **N2 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **Interface Status** field and select **Monitor**.			

15	2	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
15	3	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity in the test site.			
15	4	EXE	Disconnect W15 cable from DWL Test Port of CEGSE.	W15 disconnected from DWL Test Port. DWL Test Port with RF load.		
		DET	▪ Disconnect W15 cable from the DWL Test Port of CEGSE. ▪ Connect the 50 ohm load fto the DWL Test Port of CEGSE.			
15	5	EXE	Disconnect W15 cable from DC Block.	Cable disconnected from DC Block.		
		DET	▪ Disconnect the end W15 cable from DC Block (This is connected to RF IN of PXI).			
15	6	EXE	Close PXI spectrum analyzer.	PXI spectrum analyzer closed.		
		DET	Close **NI RFSA Soft Front Panel(64-bit)**.			

Table 5.3.0-1: Procedure SB1FS-COM-F-012-03 table.

5.4. SB1FS-COM-F-012-03 Tests setup break

SB1FS-COM-F-012-03 Tests setup break						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**CEGSEpower off (PXI and Ad-Hoc Box)**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify that the CEGSE SW is not running.	CEGSE SW is not running.		
		DET	In CEGSE verify that the CEGSE SW is not running.			
1	2	EXE	Turn off the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn off		
		DET	Turn off the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned off when the switch is turned off.			
1	3	EXE	Disable power supply output of CEGSE.	The LED indicator of the OUT ON output should go out.		
		DET	Press the OUT ON button to disable the power supply output. Verify that the OUT ON LED indicator turns off when pressing the button to disable the output.			
1	4	EXE	Turn off the main switch of the Ad-Hoc box.	The main switch light must be turned off		
		DET	Turn off the main switch of the Ad-Hoc box.			
1	5	EXE	Power off PXI.	PXI off.		
		DET	From the CEGSE KVM shutdown the PXI.			
1	6	EXE	Disconnect the external reference signal from PXI and GS-GSE.	Reference signal disconnected.		

		DET	▪ Disconnect cable SBB4.18 from the **REF IN** port of the NI PXIe-5653 module. ▪ Disconnect other end of cable SBB4.18 from Power Splitter Data port.			
2	**Disconnection of BB interfaces**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Disconnect harness **H-EGSE-DUT-J12_001** from EWC30	Harness disconnected		
		DET	Disconnect harness **H-EGSE-DUT-J12_001** from connector J100 of EWC30			
2	2	EXE	Disconnect **H-EGSE-DUT-J12_001** harness from **output** EMI/EMC filter.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J12_001** harness from **output** EMI/EMC filter.			
2	3	EXE	Disconnect **H-EGSE-DUT-J11_001** harness from **input** EMI/EMC filter.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J11_001** harness from **input** EMI/EMC filter.			
2	4	EXE	Disconnect harness **H-EGSE-DUT-J11_001** from Ad-hoc box	Harness disconnected		
		DET	Disconnect harness **H-EGSE-DUT-J11_001** from connector J100 of Ad-hoc box			
2	5	EXE	Disconnect harness H-EGSE-DUT-J2_001 from EWC30 and the Ad-Hoc box	harness disconnected		
		DET	▪ Disconnect **H-EGSE-DUT-J2_001** harness from connector saver J200 of the EWC30 ▪ Disconnect **H-EGSE-DUT-J2_001** harness from connector(s) J200 of the ad-hoc box.			
2	6	EXE	Disconnect harness H-EGSE-DUT-J3_001 from EWC30 and the Ad-Hoc box	harness disconnected		
		DET	▪ Disconnect **H-EGSE-DUT-J3_001** harness from connector saver J201 of the EWC30 ▪ Disconnect **H-EGSE-DUT-J3_001** harness from connector(s) J201A and J201B of the ad-hoc box.			

3	Disconnection of RF Interfaces					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Disconnect W10 cable from IN Port of DSN Filter and J103 Port of EWC30.	Cable W10 disconnected from ports.		
		DET	▪ Disconnect W10 cable from IN Port of DSN Filter and J103 Port of EWC30.			
3	2	EXE	Disconnect W2 cable from OUT Port of DSN Filter.	W2 Cable disconnected from OUT Port.		
		DET	▪ Disconnect W2 cable to the OUT port of DSN Filter.			
3	3	EXE	Disconnect W3 cable between Coupler Port and EWC30 port of CEGSE.	Cable W3 disconnected between ports.		
		DET	▪ Disconnect W3 cable between Coupler Port and EWC30 Port. ▪ Connect the 50 ohm load to the Coupler Port of CEGSE. ▪ Connect the 50 ohm load to the EWC30 Port of CEGSE.			
3	4	EXE	Disconnect XRF4.02 cable from IN/OUT Port of CEGSE.	Cable XRF4.02 disconnected from IN/OUT Port.		
		DET	▪ Disconnect XRF4.02 cable to the IN/OUT Port of CEGSE. ▪ Connect the 50 ohm load from the IN/OUT Port of CEGSE.			
3	5	EXE	Disconnect XRF4.02 cable from GS-GSE Data [X-Band] interface.	Cable XRF4.02 disconnected from Data [X-band] interface.		
		DET	▪ Disconnect XRF4.02 cable from GS-GSE Data [X-Band] (N1) or Data [X-Band] (N2) interface.			

4	Final Steps					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Get temperature and humidity data from datalogger.	Datalogger data obtained		

	DET	Download datalogger from the web: https://webstorage-service.com/member/login.php With credentials: ▪ User: tdgb6655 ▪ Password: Sabi4M4r To do this, execute the following steps: ▪ Click on SABIAMAR1 in Watch list ▪ In the displayed window, click on Menu and then on csv. ▪ Download the file .csv. ▪ Save the file downloaded in the test evidence directory of PXI: C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-F-012\SB1FS-COM-F-012-03.

Table 5.4.0-1: Procedure SB1FS-COM-F-012-03 table.

6. SB1FS-COM-P-013 Performance Test

This section details the test procedures for EWC30 transmitter. The figures 6.0.0-1 and 6.0.0-2 show the test setups. Solid lines are connections that apply to all downlink tests and dashed lines are connections that change from one test to another.

Figure 6.0.0-1: EWC30 Transmissions Test Setup

figuras/EWC30-PXA-Setup2.png

Figure 6.0.0-2: EWC30 Spurious in DSN Band Test Setup

6.1. SB1FS-COM-P-013-01 Setup and configuration

Task ID	SB1FS-COM-P-013-01
Task name	Setup and configuration
Task description	This task includes: ▪ Aliveness of the CEGSE interfaces (CEGSE power off). ▪ Verification of the GS-GSE configuration. ▪ Measurement setup with oscilloscope. ▪ Connection of RF interfaces of EWC30 ▪ Connection of BB cables between EWC30 and had-hoc box. ▪ CEGSE power on.
Task purpose	Verify CEGSE electrical interfaces. Connect EWC30 to test setup. Verify GS-GSE initial configuration.
Success criteria	▪ Both instruments, CEGSE and GS-GSE, are configured according to procedure and CEGSE interfaces are in good condition. ▪ Evidences are collected.
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1.
Duration	150 minutes.
Data sets required	▪ CEGSE PXI configuration file for aliveness (`INIT_FILE_NO_ALARM_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder
Prerequisites	▪ CEGSEinitialized according to CEGSE user manual (AD.06). ▪ Execution of procedure SB1FS-COM-D-011 Initialization and dataset deploy. ▪ EWC30 and DSN filter mated with the connector savers (RF and BB). ▪ EWC30 and DSN filter mounted on CEGSE metal tray. ▪ EWC30 and DSN filter connected to grounding bar. ▪ Hardware: The necessary items are shown in the table B.0.0-1

Table 6.1.0-1: Procedure SB1FS-COM-P-013 description.

SB1FS-COM-P-013-01 Setup and configuration						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		

		DET	Take note the environmental humidity in the test site.			
1	3	EXE	Check that temperature an humidity datalogger is working.	Datalogger connected and working properly		
		DET	In the Datalogger device, check the following: ▪ **Temperature** is shown in LCD Screen ▪ **Humidity** is shown in LCD Screen ▪ Press **INTERVAL** button once and check Recording interval is **5** minutes. ▪ Press **INTERVAL** button twice and check Uploading interval is **15** minutes. ▪ **REC** Mark is shown in LCD Screen.			
2	**Verification of CEGSE setup.**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Verify BB harness connections.	BB harness conected.		
		DET	Verify BB harness connections between Ad-hox box and PXI match the EWC30 configuration.			
2	2	EXE	Verify Keysight power supply configuration	V LIMIT = 28 V I LIMIT = 3 A OVP = 34 V UVP = 22 V		
		DET	In front pannel of power supply: ▪ press "LIMIT" button to read voltage and current limits. ▪ press one time "OVP/UVP" button to read OVP limit ▪ press two times "OVP/UVP" button to read UVP limit. **Note:** Adjust the value of I LIMIT if it is not the expected one. Press "LIMIT" and turn the current knob to adjust.			
2	3	EXE	Measure COM-EGSE power supply output voltage.	$Voltage \approx 28\ V$		
		DET	Set the multimeter to measure voltage and measure the voltage present on the rear terminals of the COM-EGSE power supply.			
3	**Connection of EMI/EMC filter to ad-hoc box**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Connect **H-EGSE-DUT-J11_001** harness to Ad-Hoc box.	Harness connected		

		DET	Connect **H-EGSE-DUT-J11_001** DB15 male connector to J100 connector of Ad-Hoc box.			
3	2	EXE	Connect **H-EGSE-DUT-J11_001** harness to EMI/EMC filter input.	Harness connected		
		DET	Connect **H-EGSE-DUT-J11_001** DB15 female connector to the EMI/EMC filter DB15 male connector.			
3	3	EXE	Connect **H-EGSE-DUT-J12_001** harness to EMI/EMC filter output.	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** DB15 male connector to EMI/EMC filter output.			
3	4	EXE	Connect **H-EGSE-DUT-J12_001** harness to **H-EGSE-DUT-J13_001** harness.	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** MDM15 female connector to **H-EGSE-DUT-J13_001** MDM15 male connector.			
3	5	EXE	Connect **H-EGSE-DUT-J13_001** harness to DB-15 BOB.	Harness connected to DB-15 BOB		
		DET	Connect **H-EGSE-DUT-J13_001** DB15 female connector to DB-15 BOB.			

4 CEGSE SW Initialization

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Start CEGSE SW using EWC30 "no alarm" configuration file	SW running in EWC30 "no alarm" configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-01" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **"INIT_FILE_NO_ALARM_EWC30.ini"** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

5	EWC30 Vbus verification					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
5	2	EXE	Measure VBus voltage on DB-15 BOB.	Voltage=28 V		
		DET	Measure voltage between the following pairs of pins of Break Out Box: ▪ Pin 1(+) and Pin 9(-) ▪ Pin 2(+) and Pin 10(-) ▪ Pin 3(+) and Pin 11(-) ▪ Pin 4(+) and Pin 12(-) ▪ Pin 5(+) and Pin 13(-) ▪ Pin 6(+) and Pin 14(-) ▪ Pin 7(+) and Pin 15(-)			
5	3	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
5	4	EXE	Disconnect **H-EGSE-DUT-J13_001** harness to DB-15 BOB.	Harness disconnected from DB-15 BOB		
		DET	Disconnect **H-EGSE-DUT-J13_001** DB15 female connector from DB-15 BOB.			
5	5	EXE	Disconnect **H-EGSE-DUT-J12_001** harness from **H-EGSE-DUT-J13_001** harness.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J12_001** MDM15 female connector to **H-EGSE-DUT-J13_001** MDM15 male connector.			
5	6	EXE	Disconnect **H-EGSE-DUT-J12_001** harness from EMI/EMC filter output.	Harness disconnected		

		DET	Disconnect **H-EGSE-DUT-J12_001** DB15 male connector from EMI/EMC filter output.			
5	7	EXE	Connect the **DB-9 BOB** box to connector **J201B** of the AD-HOC box.	**DB-9 BOB** connected to Ad-Hoc box		
		DET	Use the extender cable to connect the **DB-9 BOB** to the **J201B** input.			
5	8	EXE	Connect the **DB-25 BOB** box to connector **J200** of the AD-HOC box.	**DB-25 BOB** connected to Ad-Hoc box		
		DET	Use the extender cable to connect the **DB-25 BOB** to the **J200** input.			
5	9	EXE	Connect the **DB-37 BOB** box to connector **J201A** of the AD-HOC box.	**DB-37 BOB** connected to Ad-Hoc box		
		DET	Use the extender cable to connect the **DB-37 BOB** to the **J201A** input.			
6	**TSM interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	TSM O_TX_TEMP1 interfaces aliveness.	$Voltage \approx 6V$		
		DET	Set the multimeter to measure voltage and hold the Max value. Connect the $47K\Omega$ resistor between pin **13(+)** and **31(-)** of the **DB-37 BOB**. Measure voltage across the resistor. **Note:** Multimeter must be set to register the Max value due to CEGSE reading architecture.			
7	**CEGSE power off (PXI and Ad-Hoc Box)**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
7	2	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
7	3	EXE	Turn off the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn off		

		DET	Turn off the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned off when the switch is turned off.			
7	4	EXE	Disable power supply output of CEGSE.	The LED indicator of the OUT ON output should go out.		
		DET	Press the OUT ON button to disable the power supply output. Verify that the OUT ON LED indicator turns off when pressing the button to disable the output.			
7	5	EXE	Turn off the main switch of the Ad-Hoc box.	The main switch light must be turned off		
		DET	Turn off the main switch of the Ad-Hoc box.			
7	6	EXE	Power off PXI.	PXI off.		
		DET	From the CEGSE KVM shutdown the PXI.			
8	**HV-HPC interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	HV-HPC I_STBY_2_OPE_M interface output resistance measurement	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **1(+)** and **6(-)** of the **DB-9 BOB**.			
8	2	EXE	HV-HPC I_OPE_2_STBY_R interface output resistance measurement	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **2(+)** and **7(-)** of the **DB-9 BOB**.			
8	3	EXE	HV-HPC I_STBY_2_OPE_R interface output resistance measurement	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **3(+)** and **8(-)** of the **DB-9 BOB**.			
8	4	EXE	HV-HPC I_OPE_2_STBY_M interface output resistance measurement	$3M\Omega < R < 30M\Omega$		

		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **4(+)** and **9(-)** of the **DB-9 BOB**.			
9	**ASM interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	ASM SEC_V_RF interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **3(+)** and **22(-)** of the **DB-37 BOB**.			
9	2	EXE	ASM SEC_V_NUM interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **11(+)** and **29(-)** of the **DB-37 BOB**.			
9	3	EXE	ASM OUTPUT_PWR interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **12(+)** and **30(-)** of the **DB-37 BOB**.			
10	**BDM interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	BDM O_CLK_LOCKED interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **1(+)** and **20(-)** of the **DB-37 BOB**.			
10	2	EXE	BDM O_MMU_CLK_STATUS interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **2(+)** and **21(-)** of the **DB-37 BOB**.			
10	3	EXE	BDM O_TX_STATUS interface input resistance measurement.	$3M\Omega < R < 30M\Omega$		

		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins **4(+)** and **23(-)** of the **DB-37 BOB**.			
11	**LVDS interfaces aliveness**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	LVDS I_MMU_DATA_7 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 3(+) and 15(-) of the DB-25 BOB.			
11	2	EXE	LVDS I_MMU_DATA_6 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 4(+) and 16(-) of the DB-25 BOB.			
11	3	EXE	LVDS I_MMU_DATA_5 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 5(+) and 17(-) of the DB-25 BOB.			
11	4	EXE	LVDS I_MMU_DATA_4 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 6(+) and 18(-) of the DB-25 BOB.			
11	5	EXE	LVDS I_MMU_DATA_3 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 7(+) and 19(-) of the DB-25 BOB.			
11	6	EXE	LVDS I_MMU_DATA_2 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 8(+) and 20(-) of the DB-25 BOB.			

11	7	EXE	LVDS I_MMU_DATA_1 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 9(+) and 21(-) of the DB-25 BOB.			
11	8	EXE	LVDS I_MMU_DATA_0 interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 10(+) and 22(-) of the DB-25 BOB.			
11	9	EXE	LVDS I_MMU_CLK interface input resistance measurement.	$R \approx 100\Omega$		
		DET	Set the multimeter to measure resistance. Connect the multimeter probes to pins 11(+) and 23(-) of the DB-25 BOB.			
11	10	EXE	Disconnect the DB-9 BOB from the AD-Hoc box.	The DB-9 BOB disconnected from the AD-Hoc box.		
		DET	With the DB-9 also disconnect the extender cable from the AD-Hoc box.			
11	11	EXE	Disconnect the DB-25 BOB from the AD-Hoc box.	The DB-25 BOB disconnected from the AD-Hoc box.		
		DET	With the DB-25 also disconnect the extender cable from the AD-Hoc box.			
11	12	EXE	Disconnect the DB-37 BOB from the AD-Hoc box.	The DB-37 BOB disconnected from the AD-Hoc box.		
		DET	With the DB-37 also disconnect the extender cable from the AD-Hoc box.			

12 GS-GSE configuration and verification

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Enable Monitor and Control in **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	Interface status in **Monitor and Control**.		

		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Interface Status** field and select **Monitor and Control**.			
12	2	EXE	Set **N1** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N1 to redundant side.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Nadir 1 Transfer Switch Control** field and press the **Nadir 1 to Redundant 1** button. ▪ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the upper indicator of the **N1 TRANSFER SWITCH** block is **ON** and green.			
12	3	EXE	Set **N2** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N2 to redundant side.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Nadir 2 Transfer Switch Control** field and press the **Nadir 2 to Redundant 2** button. ▪ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the bottom indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			
12	3	EXE	Set attenuation of GS-GSE-FM (R) **X-Band Matrix and Attenuator** .	Attenuation of 0 dB.		
		DET	In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Go to the **Variable Attenuador Control** field and press the 0 dB button. ▪ Go to the **ATENUATOR VARIABLE** block and verify that the 0 dB indicator is green.			
12	4	EXE	Verify **X-Band DownconverterN1** configuration.	▪ RF = 8106.0 MHz ▪ Aten = 6 dB ▪ RF = ON		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter01-FM_v1.0.py` In the displayed menu, verify that the parameters are configured according to the expected values. Then enter the number 5 and press enter to exit the menu.			

12	5	EXE	Verify **X-Band DownconverterN2** configuration.	▪ RF = 8269.0 MHz ▪ Aten = 4 dB ▪ RF = ON		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter02-FM_v1.0.py` In the displayed menu, verify that the parameters are configured according to the expected values. Then enter the number 5 and press enter to exit the menu.			
12	6	EXE	Configure the **Cortex HDR**.	Cortex HDRconfigured.		
		DET	In Cortex MCS (192.168.75.161) open the configuration file from directory `D:\ZDS\Data\HDR\MCS\SABIA-Mar\:` ▪ `SB1GS-GSE-FM-R_RF-N1_v1.4.mcs`if **EWC30-FM1** is under test. ▪ `SB1GS-GSE-FM-R_RF-N2_v1.4.mcs`if **EWC30-FM2** is under test. Then enable configuration by clicking on the **Control Access** icon (key icon) and click the **OK** button. Then click on **Copy Cnf->Mon** icon and then click yes if needed.			
12	7	EXE	Clear storage in **Cortex HDR**	Cleaning done		
		DET	In Cortex MCS (192.168.75.161) do the following: ▪ Open the DMM by clicking on the **Open the global disk memory management window** icon. ▪ In the **Status** window of DMM, click on **Build or Erase** button. ▪ Select **Errase all files in all directories in all partitions** and then click on **OK** button. ▪ In the displayed window confirm erase by clicking on the **OK** button. ▪ Enable the acquisition mode by clicking on the **Configuration vs Acquisition Mode** icon and on the **Control Access**.			

13 Instruments setup

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
13	1	EXE	Connect measurement probes to the oscilloscope	Probes connected according to detail.		
		DET	In CH1 connect current probe, in CH2 connect differential probe.			
13	2	EXE	Connect measurement probes to the AD-HOC box	Probes connected according to detail.		

	DET	▪ Connect CH1 current probe to measure EWC30 TX. ▪ Connect CH2 differential probe to measure EWC30 TX. **Note:** When the current tip is placed in the ad-hoc box the arrow on the current tip should point to the left.

14 DUT Connection

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
14	1	EXE	Verify ground connection of EWC-30.	EWC-30 is grounded		
		DET	▪ Visually inspect that the ground connection to the EWC-30 connector J104 and to the copper bar are properly adjusted. ▪ Verify continuity between ground connector of EWC-30 and copper bar of facilities.			
14	2	EXE	Verify ground connection of X-Band Filter.	X-Band Filter is grounded		
		DET	▪ Visually inspect that the ground connection to the X-Band Filter and to the copper bar are properly adjusted. ▪ Verify Continuity between X-Band Filter and copper bar of facilities.			
14	3	EXE	Connect W10 cable between IN Port of DSN Filter and J103 Port of EWC30.	Cable W10 connected between ports.		
		DET	▪ Connect W10 cable between IN Port of DSN Filter and J103 Port of EWC30.			
14	4	EXE	Connect W2 cable to OUT Port of DSN Filter.	W2 Cable connected to OUT Port.		
		DET	▪ Connect W2 cable to the OUT port of DSN Filter. ▪ Mount W2 cable in the sliding tray.			

15 BB harness connection to DUT

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
15	1	EXE	Connect **H-EGSE-DUT-J12_001** harness to EWC30	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** harness to connector saver J100 of the EWC30			
15	2	EXE	Connect **H-EGSE-DUT-J2_001** harness to EWC30	Harness connected		

		DET	Connect **H-EGSE-DUT-J2_001** harness to connector saver J200 of the EWC30			
15	3	EXE	Connect **H-EGSE-DUT-J3_001** harness to EWC30	Harness connected		
		DET	Connect **H-EGSE-DUT-J3_001** harness to connector saver J201 of the EWC30			
16	**Mount CEGSE mechanical support in CEGSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
16	1	EXE	Disconnect ground of EWC30.	Ground of EWC30 disconnected		
		DET	▪ Disconnect ground wire of EWC30 from copper bar of facilities			
16	2	EXE	Disconnect ground of X-Band Filter.	Ground of X-Band Filter disconnected		
		DET	▪ Disconnect ground wire of X-Band Filter from copper bar of facilities			
16	3	EXE	Mount CEGSE mechanical support to the CEGSE rack.	CEGSE mechanical support mounted.		
		DET	Mount CEGSE mechanical support to the CEGSE rack. Take all possible precautions since the DUT is mounted on this.			
16	4	EXE	Ground EWC30.	EWC30 grounded		
		DET	▪ Visually inspect that the ground connection to the EWC30 connector J104 is properly adjusted. ▪ Connect ground wire from EWC30 to copper bar of CEGSE rack ▪ Verify continuity between ground connector of EWC30 and copper bar of CEGSE rack.			
16	5	EXE	Ground X-Band Filter.	X-Band Filter grounded		
		DET	▪ Visually inspect that the ground connection to the X-Band Filter is properly adjusted. ▪ Connect ground wire from X-Band Filter to copper bar of CEGSE rack ▪ Verify Continuity between X-Band Filter and copper bar of CEGSE rack.			

16	6	EXE	VBus grounding resistance measurement.	$R \approx 2K\Omega$		
		DET	▪ Set the multimeter to measure resistance. ▪ Connect the multimeter probes to measure resistance between negative terminal of Keysight power supply and copper bar of CEGSE.			
17	**BB harness connection to Ad-hoc box**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
17	1	EXE	Connect **H-EGSE-DUT-J12_001** harness from EWC30 to EMI/EMC filter	Harness connected		
		DET	Connect **H-EGSE-DUT-J12_001** harness to connector output of the EMI/EMC filter			
17	2	EXE	Connect **H-EGSE-DUT-J2_001** harness form EWC30 to Ad-hoc box.	Harness connected		
		DET	Connect **H-EGSE-DUT-J2_001** harness to connector J200 of the Ad-hoc box			
17	3	EXE	Connect **H-EGSE-DUT-J3_001** harness form EWC30 to Ad-hoc box.	Harness connected		
		DET	Connect **H-EGSE-DUT-J3_001** harness to connector J201A and J201B of the Ad-hoc box			
17	4	EXE	Take photos of the setup and DUT connections.	Photos taken.		
		DET	Take photos of setup and DUT connections.			
18	**RF connection to CEGSE and GS-GSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
18	1	EXE	Connect W3 cable between Coupler Port and EWC30 port of CEGSE.	Cable W3 connected between ports.		
		DET	▪ Disconnect the 50 ohm load from the EWC30 Port of CEGSE. ▪ Connect W3 cable between Coupler Port and EWC30 Port.			
18	2	EXE	Connect XRF4.02 cable to GS-GSE Data [X-Band] interface.	Cable XRF4.02 connected to GS-GSE Data [X-Band] interface.		

		DET	▪ Connect XRF4.02 cable to interface GS-GSE Data [X-Band] (N1)interface if **EWC30-FM1** is under test. ▪ Connect XRF4.02 cable to interface GS-GSE Data [X-Band] (N2)interface if **EWC30-FM2** is under test.			
18	3	EXE	Connect XRF4.02 cable to IN/OUT Port of CEGSE.	Cable XRF4.02 connected to IN/OUT Port.		
		DET	▪ Disconnect the 50 ohm load from the IN/OUT Port of CEGSE. ▪ Connect XRF4.02 cable to the IN/OUT Port of CEGSE.			
19	**Power-on CEGSE**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
19	1	EXE	Turn on the main switch of the Ad-Hoc box.	The main switch light must be turned on		
		DET	Turn on the main switch of the Ad-Hoc box.			
19	2	EXE	Verify Keysight power supply configuration	V LIMIT = 28 V I LIMIT = 3 A OVP = 34 V UVP = 22 V		
		DET	In front pannel of power supply: ▪ press "LIMIT" button to read voltage and current limits. ▪ press one time "OVP/UVP" button to read OVP limit ▪ press two times "OVP/UVP" button to read UVP limit. **Note:** Adjust the value of I LIMIT if it is not the expected one. Press "LIMIT" and turn the current knob to adjust.			
19	3	EXE	Enable power supply output of CEGSE.	The LED indicator of the OUT ON output is ON.		
		DET	Press the OUT ON button to enable the power supply output. Verify that the OUT ON LED indicator turns on when pressing the button.			
19	4	EXE	Turn on the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn on		
		DET	Turn on the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned on when the switch is turned on.			

19	5	EXE	Power on PXI computer.	PXI on.		
		DET	Connect the PXI to power supply and turn it on			
19	6	EXE	**RDP connection** to CEGSE from Thin client **Operator Workstation DataA**.	Thin Client **OW DATA A** connected to CEGSE		
		DET	From the Operator Workstation DataA open the Remote Desktop Connection and connect to IP: 192.168.75.211 ▪ `User: EGSE COM` ▪ `Password: Conae1234`			

20 Collect Evidences

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
20	1	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-01 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-01 directory. ▪ Paste the copied folder.			
20	2	EXE	Save evidence photos	Evidence photos saved		
		DET	Create **pictures** folder on C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-01 save all photos taken during the DUT connections.			

21 Final Steps

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
21	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify that the environmental temperature level in the test site is according to the required levels.			
21	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity in the test site.			

Table 6.1.0-2: SB1FS-COM-P-013-01 procedure.

6.2. SB1FS-COM-P-013-02 Spectrum, power and BW with PXA

Task ID	SB1FS-COM-P-013-02
Task name	Spectrum, power and BW with PXA
Task description	In this test the EWC30 TX is set to modulation mode. RF Power, OBW and Frequency are measured with the PXA.
Task purpose	RF Power, OBW and Frequency measurements over X-Band signal.
Success criteria	RF Power, OBW and Frequency measurements performed.
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1 and the following optional connection: • RF input of PXA connected to **DWL TP** of CEGSE.
Duration	60 minutes.
Data sets required	▪ CEGSE PXI configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder ▪ Data file for modulation Data-4429200_600s_VCh01_wPN.bin. ▪ PXA configuration files in `COMM-SS-FM-PXA-config` folder: • EWC30TX-FM1-Downlink-MOD-v1.0.state: Data downlink spectrum. • EWC30TX-FM1-CHPOWER-v1.0.state: Data downlink channel power. • EWC30TX-FM1-OBW-v1.0.state: Data downlink occupied bandwidth. • EWC30TX-FM2-Downlink-MOD-v1.0.state: Data downlink spectrum. • EWC30TX-FM2-CHPOWER-v1.0.state: Data downlink channel power. • EWC30TX-FM2-OBW-v1.0.state: Data downlink occupied bandwidth.
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.2.0-1: Procedure SB1FS-COM-P-013-02 description.

SB1FS-COM-P-013-02 Spectrum, power and BW with PXA						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
2	**PXA Connection and configuration**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Connect XRF3.60 cable to DWL TP of CEGSE.	XRF3.60 connected to DWL TP.		
		DET	▪ Disconnect the 50 ohm load from the DWL TP of CEGSE. ▪ Connect XRF3.60 cable to the DWL TP of CEGSE.			
2	2	EXE	Connect XRF3.60 cable to DC Block on PXA.	Cable connected.		
		DET	▪ Connect the end XRF3.60 cable to DC Block (this is connected to the RF IN of PXA).			
2	3	EXE	Configure the PXA as a spectrum analyzer.	PXA configured as a spectrum analyzer.		
		DET	For this do the following: ▪ Press **Mode** button. ▪ Press **Spectrum Analyzer** key.			

2	4	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-Downlink-MOD-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-Downlink-MOD-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			
3	**CEGSE SW Initialization**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-02" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			
4	**DUT power on**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Verify EWC30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
4	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		
		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
4	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

4	4	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
4	5	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
4	6	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
4	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
4	8	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
4	9	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

5	**Switch DUT to Modulation Mode**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Start data transmission	Data transmission started		

		DET	In the CEGSE SW: ▪ Go to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in **I_STBY_2_OPE_M** ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**.			
5	2	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
5	3	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
5	4	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
5	5	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I $\approx$ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			

SB1FS-COM-P-013-02 Spectrum, power and BW with PXA						
5	6	EXE	Verify spectrum Data presence with the PXA.	Spectrum present		
		DET	Observe the spectrum of the signal on the PXA. It must correspond to a carrier with modulation as shown in the following image: figuras/data_mod.png **Note:** The image shown should be taken for illustrative purposes.			
5	7	EXE	Take screenshot of signals measurements.	DATA-MOD.png saved.		
		DET	▪ Press **Single** button. ▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-02 directory. ▪ Enter file name: DATA-MOD.png ▪ Press **Save** button. ▪ Press **Cont** button.			
5	8	EXE	Take trace of signals measurements.	<filename.trace> saved.		
		DET	▪ Press **Save** button. ▪ Press **Trace (+state)** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-02 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			

5	9	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-CHPOWER-v1.0.state**, to do this, do the following: ■ Press **Recall** button ■ Press **State** key ■ Press **From File...** key ■ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ■ Go to `SB1FS-COM-P-013` directory. ■ In the displayed window, select file `EWC30TX-FM<X>-CHPOWER-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ■ Press **Open** button.			
5	10	EXE	Measure channel power using PXA.	P = 40 dBm +/- 1dB		
		DET	On PXA instrument: ■ Wait until the Counts: **100.0 Avg**/**100.0 Hold** indicator (See image below) is complete. ■ Verify that the measurement meets the expected value. `figuras/CHPower.png` **Note:** The image shown should be taken for illustrative purposes.			

5	11	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-02 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
5	12	EXE	Save CSV of signals measurements.	`chpower.csv` saved.		
		DET	▪ Press **Save** button. ▪ Press **Data (Export)** key. ▪ Select **Meas Result** option. ▪ Press **Save As...** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-02 directory. ▪ Enter the file name: chpower.csv. ▪ Press **Save** button.			
5	13	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-OBW-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-OBW-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			

SB1FS-COM-P-013-02 Spectrum, power and BW with PXA						
5	14	EXE	Measure OBW and frequency error using PXA.	OBW ≈ 205 MHz Freq error < 500 KHz		
		DET	On PXA instrument: ▪ Wait until the Counts: **100.0 Avg**/**100.0 Hold** indicator (See image below) is complete. ▪ Verify that the OBW and Transmit Freq Error meets the expected value. The displayed Freq Error is the difference between the value configured in the PXA and the measured value. figuras/OBW.png **Note:** The image shown should be taken for illustrative purposes.			
5	15	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-02 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
5	16	EXE	Save CSV of signals measurements.	`obw.csv` saved.		
		DET	▪ Press **Save** button. ▪ Press **Data (Export)** key. ▪ Select **Meas Result** option. ▪ Press **Save As...** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-02 directory. ▪ Enter the file name: obw.csv. ▪ Press **Save** button.			

5	17	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			
5	18	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			

6 DUT Turn off

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	**Note: If the following test is executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

7 CEGSE SW shutdown

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	**Note: If the following test is executed skip this step.** When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			

8 Collect Evidences

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Copy test folder of PXA to CEGSE.	Folder copied.		
		DET	In the CEGSE, open the file explorer, connect to PXA with the following address and credentials: ▪ Address: `//192.168.75.231/d$/Users/` ▪ User: administrator ▪ Password: agilent4u and do the following: ▪ Copy the SB1FS-COM-P-013-02 folder from D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013 directory to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013` directory on CEGSE.			

8	2	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	**Note: If the following test is executed skip this step.** In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-02 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-02 directory. ▪ Paste the copied folder.			
9	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
9	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
9	3	EXE	Disconnect XRF3.60 cable from DWL Test Port of CEGSE.	XRF3.60 disconnected from DWL Test Port. DWL Test Port with RF load.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect XRF3.60 cable from the DWL Test Port of CEGSE. ▪ Connect the 50 ohm load fto the DWL Test Port of CEGSE.			
9	4	EXE	Disconnect XRF3.60 cable from DC Block.	Cable disconnected from DC Block.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect the end XRF3.60 cable from DC Block (This is connected to RF IN of PXA).			

Table 6.2.0-2: SB1FS-COM-P-013-02 procedure.

6.3. SB1FS-COM-P-013-03 CCDF Measurement

Task ID	SB1FS-COM-P-013-03
Task name	CCDF Measurement
Task description	In this test the EWC30 TX is set to modulation mode. CCDF is measured with the PXA.
Task purpose	CCDF Measurement over RF Data.
Success criteria	CCDF measurement performed.
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1 and the following optional connections: • RF input of PXA connected to **DWL TP** of CEGSE.
Duration	60 minutes.
Data sets required	▪ CEGSE PXI configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder ▪ Data file for modulation Data-4429200_600s_VCh01_wPN.bin. ▪ PXA configuration files in `COMM-SS-FM-PXA-config` folder: • EWC30TX-FM1-Downlink-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM1-CCDF-v1.0.state: CCDF of Data Downlink signal. • EWC30TX-FM2-Downlink-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM2-CCDF-v1.0.state: CCDF of Data Downlink signal.
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.3.0-1: Procedure SB1FS-COM-P-013-03 description.

SB1FS-COM-P-013-03 CCDF Measurement						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
2	**PXA Connection and configuration**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Connect XRF3.60 cable to DWL TP of CEGSE.	XRF3.60 connected to DWL TP.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Disconnect the 50 ohm load from the DWL TP of CEGSE. ▪ Connect XRF3.60 cable to the DWL TP of CEGSE.			
2	2	EXE	Connect XRF3.60 cable to DC Block on PXA.	Cable connected.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Connect the end XRF3.60 cable to DC Block (this is connected to the RF IN of PXA).			
2	3	EXE	Configure the PXA as a spectrum analyzer.	PXA configured as a spectrum analyzer.		
		DET	For this do the following: ▪ Press **Mode** button. ▪ Press **Spectrum Analyzer** key.			

2	4	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-Downlink-MOD-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-Downlink-MOD-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			

3 CEGSE SW Initialization

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	**Note: If the previous test was executed skip this step.** ▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-03" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

4 DUT power on

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Verify EWC30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
4	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		
		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
4	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	**Note: If the previous test was executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

4	4	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
4	5	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
4	6	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
4	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	**Note: If the previous test was executed skip this step.** In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
4	8	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
4	9	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

5 Switch DUT to Modulation Mode

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Start data transmission	Data transmission started		

		DET	In the CEGSE SW: ▪ Go to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in **I_STBY_2_OPE_M** ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**.			
5	2	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
5	3	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
5	4	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
5	5	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I $\approx$ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			

SB1FS-COM-P-013-03 CCDF Measurement						
5	6	EXE	Verify spectrum Data presence with the PXA.	Spectrum present		
		DET	Observe the spectrum of the signal on the PXA. It must correspond to a carrier with modulation as shown in the following image: figuras/data_mod.png **Note:** The image shown should be taken for illustrative purposes.			
5	7	EXE	Take screenshot of signals measurements.	`DATA-MOD.png` saved.		
		DET	▪ Press **Single** button. ▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-03 directory. ▪ Enter file name: DATA-MOD.png ▪ Press **Save** button. ▪ Press **Cont** button.			
5	8	EXE	Take trace of signals measurements.	`<filename.trace>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Trace (+state)** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-03 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			

5	9	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-CCDF-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-CCDF-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			
5	10	EXE	Measure CCDF using PXA.	CCDF measured		
		DET	On PXA instrument: ▪ Press Restart button to make a fresh measurement. ▪ Wait until the Counts: **100.0 M/100.0 Mpt** indicator (See image below) is complete. `figuras/DATA-CCDF.png` **Note:** The image shown should be taken for illustrative purposes.			

5	11	EXE	Verify the measured parameter	Power Average = 40 dB $\pm$ 1		
		DET	Verify that the parameter measured in the test is as expected.			
5	12	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-03 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
5	13	EXE	Save CSV of signals measurements.	`ccdf.csv` saved.		
		DET	▪ Press **Save** button. ▪ Press **Data (Export)** key. ▪ Select **Meas Result** option. ▪ Press **Save As...** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-03 directory. ▪ Enter the file name: ccdf.csv. ▪ Press **Save** button.			
5	14	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			
5	15	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			

6 DUT Turn off

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Turn off VBUS of TX	TX30X led is off.		

		DET	**Note: If the following test is executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
7	**CEGSE SW shutdown**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	**Note: If the following test is executed skip this step.** When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
8	**Collect Evidences**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Copy test folder of PXA to CEGSE.	Folder copied.		
		DET	In the CEGSE, open the file explorer, connect to PXA with the following address and credentials: ▪ Address: `//192.168.75.231/d$/Users/` ▪ User: administrator ▪ Password: agilent4u and do the following: ▪ Copy the SB1FS-COM-P-013-03 folder from D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013 directory to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013` directory on CEGSE.			
8	2	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	**Note: If the following test is executed skip this step.** **Note: In case the CEGSE SW has not been started in this test, the CEGSE logs must be saved in the test folder in which the CEGSE SW was started.** In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-03 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-03 directory. ▪ Paste the copied folder.			

9	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
9	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
9	3	EXE	Disconnect XRF3.60 cable from DWL Test Port of CEGSE.	XRF3.60 disconnected from DWL Test Port. DWL Test Port with RF load.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect XRF3.60 cable from the DWL Test Port of CEGSE. ▪ Connect the 50 ohm load fto the DWL Test Port of CEGSE.			
9	4	EXE	Disconnect XRF3.60 cable from DC Block.	Cable disconnected from DC Block.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect the end XRF3.60 cable from DC Block (This is connected to RF IN of PXA).			

Table 6.3.0-2: SB1FS-COM-P-013-03 procedure.

6.4. SB1FS-COM-P-013-04 Frequency Stability

Task ID	SB1FS-COM-P-013-04
Task name	Frequency Stability
Task description	In this test the EWC30 is put into operating mode and transmitting the LO leakage. Frequency and power of the carrier are measured with the PXA while temperature stabilizes. Ten measurements every 60 seconds are taken with the temperature stabilized. Finally, the maximum errors are calculated.
Task purpose	The objective of the test is to verify the Frequency Stability of the EWC30 transmitter.
Success criteria	Frequency stability according to test specification (AD.04): ▪ $FrequencyStability < 10\ ppm$
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1 and the following optional connection: • RF input of PXA connected to **DWL TP** of CEGSE.
Duration	90 minutes.
Data sets required	▪ CEGSE PXI configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder ▪ Data file for modulation Data-1_VCh01_payload.bin. ▪ PXA configuration files in `COMM-SS-FM-PXA-config` folder: • EWC30TX-FM1-Downlink-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM1-Downlink-CW-v1.0.state: Data Downlink CW signal. • EWC30TX-FM1-FreqStability-v1.0.state: Data Downlink Frequency Stability. • EWC30TX-FM2-Downlink-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM2-Downlink-CW-v1.0.state: Data Downlink CW signal. • EWC30TX-FM2-FreqStability-v1.0.state: Data Downlink Frequency Stability.
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.4.0-1: Procedure SB1FS-COM-P-013-04 description.

SB1FS-COM-P-013-04 Frequency Stability						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
2	**PXA Connection and configuration**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Connect XRF3.60 cable to DWL TP of CEGSE.	XRF3.60 connected to DWL TP.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Disconnect the 50 ohm load from the DWL TP of CEGSE. ▪ Connect XRF3.60 cable to the DWL TP of CEGSE.			
2	2	EXE	Connect XRF3.60 cable to DC Block on PXA.	Cable connected.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Connect the end XRF3.60 cable to DC Block (this is connected to the RF IN of PXA).			
2	3	EXE	Configure the PXA as a spectrum analyzer.	PXA configured as a spectrum analyzer.		
		DET	For this do the following: ▪ Press **Mode** button. ▪ Press **Spectrum Analyzer** key.			

2	4	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-Downlink-MOD-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-Downlink-MOD-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			

3 CEGSE SW Initialization

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	**Note: If the previous test was executed skip this step.** ▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-04" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

4 DUT power on

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Verify EWC30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
4	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		
		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
4	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	**Note: If the previous test was executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

4	4	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
4	5	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
4	6	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
4	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	**Note: If the previous test was executed skip this step.** In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
4	8	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
4	9	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

5	**Switch DUT to Modulation Mode**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Generate down link file	file generated		

		DET	▪ On CEGSE GUI select COMM tab, then select DOWNLINK tab. ▪ Set VCID to 1 (RT HK TM) ▪ Set "Idle before" to 110730 (≈15 seconds). ▪ Set "Idle after" to 110730. ▪ Press to Folder icon of the “Downlink Payload File” section. ▪ Select payload file C:\Users\EGSE COM\Documents\ COMM-SS-FM\SB1FS-COM-P-013**Data-1_VCh01_payload.bin** and press OK. ▪ Press "Generate Downlink File" button. ▪ Wait until stage shows "Generated File" and "Generating File" indicator is off (15 minutes).			
5	2	EXE	Start data transmission through the **main HV-HPC** interface	Data transmission started		
		DET	In the CEGSE SW: ▪ Go to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that **stage** box does not show **Sending X Band File** message. ▪ Switch file selector to **Send Generated Downlink File** ▪ Place the switch in **I_STBY_2_OPE_M** ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that **stage** box shows **Sending X Band File**.			
5	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
5	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
5	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR ≈ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
5	6	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I ≈ 2.46 A		

<table>
<tr><td></td><td></td><td>DET</td><td colspan="4">▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.
Note: The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).</td></tr>
<tr><td>5</td><td>7</td><td>EXE</td><td>Verify spectrum Data presence with the PXA.</td><td>Spectrum present</td><td></td><td></td></tr>
<tr><td></td><td></td><td>DET</td><td colspan="4">Observe the spectrum of the signal on the PXA. It must correspond to a carrier with modulation as shown in the following image:
figuras/data_mod.png
Note: The image shown should be taken for illustrative purposes.</td></tr>
</table>

5	8	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
5	9	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-Downlink-CW-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-Downlink-CW-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			

6 Verify frequency LO leakage

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Verify LO leakage.	$F_{out} = 8106\ MHz$. for **EWC30-FM1** $F_{out} = 8269\ MHz$. for **EWC30-FM2** P_{out}		
		DET	Press the **Peak Search** button in PXA, verify that the measured frequency meet the expected value and take note of the power value.			
6	2	EXE	Take screenshot of signals measurements.	`CW.png` saved.		
		DET	▪ Press **Single** button. ▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-04 directory. ▪ Enter file name: CW.png ▪ Press **Save** button. ▪ Press **Cont** button.			

7	DUT TX Thermal stabilization					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-FreqStability-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-FreqStability-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			
7	2	EXE	Take an initial screenshot in PXA before use Quick save button.	`CW-A` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, browse to the **D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-04\pxa-screenshot** directory. ▪ Enter File Name: CW-A. ▪ Press **Save** button. **Note:** When pressing QuickSave button a new <file name>_nnnn.png screenshot is saved. nnnn start from 0 and increase every quick save.			
7	3	EXE	Measure carrier power and frequency every 60 seconds during temperature stabilization.	measurements performed		
		DET	On PXA instrument: ▪ Press **Restart** button when PXA clock time ends in 00 seconds. ▪ Press **Quick Save** button when PXA clock time ends in 40 seconds. ▪ Register PXA screenshot file name in table 6.5.0-2. ▪ Register **O_TX_TEMPERATURE** in table 6.5.0-2. ▪ Repeat until Tx temperature remains stable for 5 minutes.			

#	Temp. Tx$[°C]$	Screen shot #	Frequency $[Hz]$	Power $[dBm]$	#	Temp. Tx$[°C]$	Screen shot #	Frequency $[Hz]$	Power $[dBm]$
1					11				
2					12				
3					13				
4					14				
5					15				
6					16				
7					17				
8					18				
9					19				
10					20				

Table 6.4.0-2: Temperature stabilization

SB1FS-COM-P-013-04 Frequency Stability						
8	**Frequency stability Measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Take an initial screenshot in PXA before use Quick save button.	`CW-B` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, browse to the **D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-04\pxa-screenshot** directory. ▪ Enter File Name: CW-B. ▪ Press **Save** button. **Note:** When pressing QuickSave button a new <file name>_nnnn.png screenshot is saved. nnnn start from 0 and increase every quick save.			
8	2	EXE	Measure carrier power and frequency every 60 seconds during temperature stabilization.	measurements performed		
		DET	On PXA instrument: ▪ Press **Restart** button when PXA clock time ends in 00 seconds. ▪ Press **Quick Save** button when PXA clock time ends in 40 seconds. ▪ Register PXA screenshot file name in table 6.5.0-2. ▪ Register **O_TX_TEMPERATURE** in table 6.5.0-2. ▪ Repeat until Tx temperature remains stable for 5 minutes.			

#	Temp. Tx$[^{\circ}C]$	Screen shot#	Frequency $[Hz]$	Power $[dBm]$	#	Temp. Tx$[^{\circ}C]$	Screen shot#	Frequency$[Hz]$	Power $[dBm]$
1					6				
2					7				
3					8				
4					9				
5					10				

Table 6.4.0-3: Frequency stability

SB1FS-COM-P-013-04 Frequency Stability						
9	**DUT Turn off**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			
9	2	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	**Note: If the following test is executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
10	**CEGSE SW shutdown**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	**Note: If the following test is executed skip this step.** When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
11	**Collect Evidences**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	Copy test folder of PXA to CEGSE.	Folder copied.		
		DET	In the CEGSE, open the file explorer, connect to PXA with the following address and credentials: ▪ Address: `//192.168.75.231/d$/Users/` ▪ User: administrator ▪ Password: agilent4u and do the following: ▪ Copy the SB1FS-COM-P-013-04 folder from D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013 directory to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013` directory on CEGSE.			

SB1FS-COM-P-013-04 Frequency Stability						
11	2	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	**Note: If the following test is executed skip this step.** **Note: In case the CEGSE SW has not been started in this test, the CEGSE logs must be saved in the test folder in which the CEGSE SW was started.** In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-04 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-04 directory. ▪ Paste the copied folder.			
12	**Error Calculation**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Compute average and maximum error in Hz and ppm	$f_{stability\_ppm} < 10ppm$		
		DET	With the last 10 measurements calculate the frequency error and the frequency stability. $f_{avg\_Hz} = \frac{\sum_{i=1}^{10} Fmeas_i}{10}$ $f_{stability\_Hz} = MAX(ABS(Fmeas_i - f_{avg\_Hz}))$ $f_{stability\_ppm} = \frac{f_{stability\_Hz}}{<X>[MHz]}$ Where **<X>** is 8106 for **EWC30-FM1** and 8269 for **EWC30-FM2**.			
13	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
13	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
13	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
13	3	EXE	Disconnect XRF3.60 cable from DWL Test Port of CEGSE.	XRF3.60 disconnected from DWL Test Port. DWL Test Port with RF load.		

		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect XRF3.60 cable from the DWL Test Port of CEGSE. ▪ Connect the 50 ohm load fto the DWL Test Port of CEGSE.			
13	4	EXE	Disconnect XRF3.60 cable from DC Block.	Cable disconnected from DC Block.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect the end XRF3.60 cable from DC Block (This is connected to RF IN of PXA).			

Table 6.4.0-4: SB1FS-COM-P-013-04 procedure.

6.5. SB1FS-COM-P-013-05 Carrier Phase Noise

Task ID	SB1FS-COM-P-013-05
Task name	Carrier Phase Noise
Task description	In this test the EWC30 is put into operating mode and transmitting the LO leakage. Frequency and power of the carrier are measured with the PXA while temperature stabilizes. When temperature is stabilized, Phase Noise of LO leakage is measured with the PXA.
Task purpose	The objective of the test is measure EWC30 TX LO leakage phase noise.
Success criteria	Carrier phase noise according to test specification (AD.04): ▪ $PhaseNoise < 6° rms$
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1 and the following optional connection: • RF input of PXA connected to **DWL TP** of CEGSE.
Duration	90 minutes.
Data sets required	▪ CEGSE PXI configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder ▪ Data file for modulation Data-1_VCh01_payload.bin. ▪ PXA configuration files in `COMM-SS-FM-PXA-config` folder: • EWC30TX-FM1-Downlink-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM1-Downlink-CW-v1.0.state: Data Downlink CW signal. • EWC30TX-FM1-PhaseNoise-v1.0.state: Data Downlink Phase Noise. • EWC30TX-FM2-Downlink-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM2-Downlink-CW-v1.0.state: Data Downlink CW signal. • EWC30TX-FM2-PhaseNoise-v1.0.state: Data Downlink Phase Noise.
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.5.0-1: Procedure SB1FS-COM-P-013-05 description.

SB1FS-COM-P-013-05 Carrier Phase Noise						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
2	**PXA Connection and configuration**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Connect XRF3.60 cable to DWL TP of CEGSE.	XRF3.60 connected to DWL TP.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Disconnect the 50 ohm load from the DWL TP of CEGSE. ▪ Connect XRF3.60 cable to the DWL TP of CEGSE.			
2	2	EXE	Connect XRF3.60 cable to DC Block on PXA.	Cable connected.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Connect the end XRF3.60 cable to DC Block (this is connected to the RF IN of PXA).			
2	3	EXE	Configure the PXA as a spectrum analyzer.	PXA configured as a spectrum analyzer.		
		DET	For this do the following: ▪ Press **Mode** button. ▪ Press **Spectrum Analyzer** key.			

2	4	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-Downlink-MOD-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-Downlink-MOD-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			
3	**CEGSE SW Initialization**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	**Note: If the previous test was executed skip this step.** ▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-05" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			
4	**DUT power on**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Verify EWC30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
4	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		
		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
4	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	**Note: If the previous test was executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

4	4	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
4	5	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
4	6	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
4	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	**Note: If the previous test was executed skip this step.** In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
4	8	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
4	9	EXE	Check Tx status	**Standby Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			

SB1FS-COM-P-013-05 Carrier Phase Noise						
5	**Switch DUT to Modulation Mode**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Generate down link file	file generated		
		DET	▪ On CEGSE GUI select COMM tab, then select DOWNLINK tab. ▪ Set VCID to 1 (RT HK TM) ▪ Set "Idle before" to 110730 (≈15 seconds). ▪ Set "Idle after" to 110730. ▪ Press to Folder icon of the “Downlink Payload File” section. ▪ Select payload file C:\Users\EGSE COM\Documents\ COMM-SS-FM\SB1FS-COM-P-013**Data-1_VCh01_payload.bin** and press OK. ▪ Press "Generate Downlink File" button. ▪ Wait until stage shows "Generated File" and "Generating File" indicator is off (15 minutes).			
5	2	EXE	Start data transmission through the **main HV-HPC** interface	Data transmission started		
		DET	In the CEGSE SW: ▪ Go to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that **stage** box does not show **Sending X Band File** message. ▪ Switch file selector to **Send Generated Downlink File** ▪ Place the switch in **I_STBY_2_OPE_M** ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that **stage** box shows **Sending X Band File**.			
5	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
5	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
5	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR ≈ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			

5	6	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I ≈ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			
5	7	EXE	Verify spectrum Data presence with the PXA.	Spectrum present		
		DET	Observe the spectrum of the signal on the PXA. It must correspond to a carrier with modulation as shown in the following image: figuras/data_mod.png **Note:** The image shown should be taken for illustrative purposes.			

5	8	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
5	9	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-Downlink-CW-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-Downlink-CW-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			

6 Verify frequency LO leakage

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Verify LO leakage.	$F_{out} = 8106\ MHz$. for **EWC30-FM1** $F_{out} = 8269\ MHz$. for **EWC30-FM2** P_{out}		
		DET	Press the **Peak Search** button in PXA, verify that the measured frequency meet the expected value and take note of the power value.			
6	2	EXE	Take screenshot of signals measurements.	`CW.png` saved.		
		DET	▪ Press **Single** button. ▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-05 directory. ▪ Enter file name: CW.png ▪ Press **Save** button. ▪ Press **Cont** button.			

7	DUT TX Thermal stabilization					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-FreqStability-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-FreqStability-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			
7	2	EXE	Take an initial screenshot in PXA before use Quick save button.	`CW-A` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, browse to the **D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-05\pxa-screenshot** directory. ▪ Enter File Name: CW-A. ▪ Press **Save** button. **Note:** When pressing QuickSave button a new <file name>_nnnn.png screenshot is saved. nnnn start from 0 and increase every quick save.			
7	3	EXE	Measure carrier power and frequency every 60 seconds during temperature stabilization.	measurements performed		
		DET	On PXA instrument: ▪ Press **Restart** button when PXA clock time ends in 00 seconds. ▪ Press **Quick Save** button when PXA clock time ends in 40 seconds. ▪ Register PXA screenshot file name in table 6.5.0-2. ▪ Register **O_TX_TEMPERATURE** in table 6.5.0-2. ▪ Repeat until Tx temperature remains stable for 5 minutes.			

#	Temp. Tx$[^{\circ}C]$	Screen shot #	Frequency $[Hz]$	Power $[dBm]$	#	Temp. Tx$[^{\circ}C]$	Screen shot #	Frequency $[Hz]$	Power $[dBm]$
1					11				
2					12				
3					13				
4					14				
5					15				
6					16				
7					17				
8					18				
9					19				
10					20				

Table 6.5.0-2: Temperature stabilization

SB1FS-COM-P-013-05 Carrier Phase Noise						
8	**Phase Noise Measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-PhaseNoise-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-PhaseNoise-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			
8	2	EXE	Measure DANL with the PXA.	DANL saved in trace3		
		DET	On PXA instrument: ▪ Press **Restart** button to make a first carrier acquisition. ▪ Press **MeasSetup** button. ▪ Press **Meas type** key and select **DANL floor**. ▪ Press **Restart** button. ▪ Press **trace/detector** button and select **More/Copy Echange** keys. ▪ Select From **Trace 2** to **Trace 3**. ▪ Press **From Trace** key and select **Trace 2** ▪ Press **To Trace** key and select **Trace 3** ▪ Press **Copy Now** key. ▪ Press **MeasSetup** button. ▪ Press **Meas type** key and select **Phase Noise**.			
8	3	EXE	Measure Phase Noise using PXA.	$phase\ noise\ <\ 6^o rms$		
		DET	On PXA instrument: ▪ Press **Restart** button to make a fresh measurement. ▪ Wait until measurement ends. The observed measurement should be similar to the figure below. ▪ Verify that the measured value is as expected. `figuras/data-lol-phase-noise.png` **Note:** The image shown should be taken for illustrative purposes.			

8	4	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-05 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
8	5	EXE	Save trace 1 of phase noise measurement.	`1.csv` saved.		
		DET	▪ Press **Save** button. ▪ Press **Data (Export)** key. ▪ Press **Trace** key. ▪ Press **Trace 1** key. ▪ Press **Save as ...** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-05 directory. ▪ Enter as file name: 1.csv ▪ Press **Save** button.			
8	6	EXE	Save trace 2 of phase noise measurement.	`2.csv` saved.		
		DET	▪ Press **Save** button. ▪ Press **Data (Export)** key. ▪ Press **Trace** key. ▪ Press **Trace 2** key. ▪ Press **Save as ...** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-05 directory. ▪ Enter as file name: 2.csv ▪ Press **Save** button.			
8	7	EXE	Save trace 3 of phase noise measurement.	`3.csv` saved.		
		DET	▪ Press **Save** button. ▪ Press **Data (Export)** key. ▪ Press **Trace** key. ▪ Press **Trace 3** key. ▪ Press **Save as ...** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-05 directory. ▪ Enter as file name: 3.csv ▪ Press **Save** button.			

9	DUT Turn off					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			
9	2	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	**Note: If the following test is executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

10	CEGSE SW shutdown					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	**Note: If the following test is executed skip this step.** When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			

11	Collect Evidences					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	Copy test folder of PXA to CEGSE.	Folder copied.		
		DET	In the CEGSE, open the file explorer, connect to PXA with the following address and credentials: ▪ Address: `//192.168.75.231/d$/Users/` ▪ User: administrator ▪ Password: agilent4u and do the following: ▪ Copy the SB1FS-COM-P-013-05 folder from D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013 directory to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013` directory on CEGSE.			

11	2	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	**Note: If the following test is executed skip this step.** **Note: In case the CEGSE SW has not been started in this test, the CEGSE logs must be saved in the test folder in which the CEGSE SW was started.** In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-05 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-05 directory. ▪ Paste the copied folder.			
12	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
12	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
12	3	EXE	Disconnect XRF3.60 cable from DWL Test Port of CEGSE.	XRF3.60 disconnected from DWL Test Port. DWL Test Port with RF load.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect XRF3.60 cable from the DWL Test Port of CEGSE. ▪ Connect the 50 ohm load fto the DWL Test Port of CEGSE.			
12	4	EXE	Disconnect XRF3.60 cable from DC Block.	Cable disconnected from DC Block.		
		DET	**Note: If the following test is executed skip this step.** ▪ Disconnect the end XRF3.60 cable from DC Block (This is connected to RF IN of PXA).			

Table 6.5.0-3: SB1FS-COM-P-013-05 procedure.

6.6. SB1FS-COM-P-013-06 Optimum filter confirmation And RF characterization with VSA and Cortex

Task ID	SB1FS-COM-P-013-06
Task name	Optimum filter confirmation And RF characterization with VSA and Cortex
Task description	In this test the EWC30 TX is set in Modulation mode. The modulated signal is received through the N1 [X-Band] interface of the GS-GSE-FM (R) in the case of the **EWC30-FM1** and through N2 in the case of the **EWC30-FM2**. Two filter configurations in Data Demodulator (Cortex HDR) are evaluated (see table 6.6.0-2). A vector analysis of the received signals is carried out using the VSA and the Vector Script.
Task purpose	The purpose of this test is to evaluate the two filters configurations (see table 6.6.0-2) in the Cortex HDR.On the other hand, it is to perform a vector analysis of the modulated signals.
Success criteria	▪ The **A10** and **B2** filter configurations are evaluated. ▪ Vector analysis is performed. ▪ For **A10** filter configuration • EVM < 6 % • |Amplitude Error| < 0.5 dB rms • |Phase Error| < 5° rms for **EWC30-FM1**. • |Phase Error| $\leq$ 5.3° rms for **EWC30-FM2**.
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1 and the following optional connections: • RF input of PXA connected to **XB TP** of GS-GSE-FM (R).
Duration	90 minutes
Data sets required	▪ CEGSE PXI nominal configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder ▪ Data file for modulation: • Data-4429200_600s_VCh01_wPN.bin. ▪ PXA configuration files in `COMM-SS-FM-PXA-config` folder: • EWC30TX-FM1-VSA-v1.0.setx. • EWC30TX-FM2-VSA-v1.0.setx. • SB1FS-COM.csd. ▪ Vector-0.9.4 script installed in GS-GSE.MGMT VM.
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.6.0-1: Procedure SB1FS-COM-P-013-06 description.

Configuration#	Filter Type and Advanced Cfg
A10 (RD.02)	SRRC filter, Roll-off = 0.5, Asym, Comp, LPF, HBF, LMS, DEAF
B2 (RD.02)	SRRC filter, Roll-off = 0.5, Asym, Comp, LPF, HBF, CMA

Table 6.6.0-2: Filter configurations for Data demodulation.

SB1FS-COM-P-013-06 Optimum filter confirmation And RF characterization with VSA and Cortex

Executor Record

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			

1 Environmental temperature and humidity

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			

2 PXA Connection and configuration

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Connect XRF3.60 cable to DWL TP of CEGSE.	XRF3.60 connected to DWL TP.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Disconnect the 50 ohm load from the DWL TP of CEGSE. ▪ Connect XRF3.60 cable to the DWL TP of CEGSE.			
2	2	EXE	Connect XRF3.60 cable to DC Block on PXA.	Cable connected.		
		DET	**Note: If the previous test was executed skip this step.** ▪ Connect the end XRF3.60 cable to DC Block (this is connected to the RF IN of PXA).			
2	3	EXE	Configure the PXA in VSA mode.	PXA configured in VSA mode.		
		DET	For this do the following: ▪ Press **Mode** button. ▪ Press **89601 VSA** key.			

2	4	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the menu VSA software of PXA do the following: ▪ Click on **File, Recall, Recall Setup...** ▪ Go to `D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013\` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-VSA-v1.0.setx`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Click on the Open button.			
2	5	EXE	Load state definition file into VSA software.	State definition loaded.		
		DET	In the menu VSA software of PXA do the following: ▪ Click on **MeasSetup, Digital Demod Properties...** ▪ In the displayed window, click on **Recall State Definitions...** ▪ Go to `D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config` directory. ▪ Select the `SB1FS-COM-P-013\` folder. ▪ In the displayed window, select file `SB1FS-COM.csd`. ▪ Click on the Open button. ▪ Click on **View State Definitions**. ▪ Verify that the following states definition is visible (Inverse mapping). • **10 00** • **11 01** ▪ Close displayed window.			
3	**GS-GSE Preparation**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Enable Monitor and Control in **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	Interface status in **Monitor and Control**.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Interface Status** field and select **Monitor and Control**.			
3	2	EXE	Enable **N1** interface in the **X-Band Matrix and Attenuator**.	N1 interface enabled.		
		DET	Note: Skip this step if **EWC30-FM2** is under test. In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Press the **Nadir 1 to Down Converters** button. ▪ Go to the **XBMA Control Diagram** field and verify that the **bottom** indicator of the **N1 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **XBMA Control Diagram** field and verify that the **bottom** indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			

3	3	EXE	Enable **N2** interface in the **X-Band Matrix and Attenuator**.	N2 interface enabled.		
		DET	Note: Skip this step if **EWC30-FM1** is under test. In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Press the **Nadir 2 to Down Converters** button. ▪ Go to the **XBMA Control Diagram** field and verify that the **top** indicator of the **N1 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **XBMA Control Diagram** field and verify that the **top** indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			
3	3	EXE	Set attenuation of GS-GSE-FM (R) **X-Band Matrix and Attenuator** .	Attenuation of 0 dB.		
		DET	In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Go to the **Variable Attenuador Control** field and press the 0 dB button. ▪ Go to the **ATENUATOR VARIABLE** block and verify that the 0 dB indicator is green.			
3	4	EXE	Verify **X-Band DownconverterN1** configuration.	▪ RF = 8106.0 MHz ▪ Aten = 6 dB ▪ RF = ON		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter01-FM_v1.0.py` In the displayed menu, verify that the parameters are configured according to the expected values. Then enter the number 5 and press enter to exit the menu.			
3	5	EXE	Verify **X-Band DownconverterN2** configuration.	▪ RF = 8269.0 MHz ▪ Aten = 4 dB ▪ RF = ON		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter02-FM_v1.0.py` In the displayed menu, verify that the parameters are configured according to the expected values. Then enter the number 5 and press enter to exit the menu.			

3	6	EXE	Create folder for screenshots in Cortex HDR.	Folder created.		
		DET	In Cortex HDR(192.168.75.161) open window file explorer and create **cortex-screenshot-013-06** folder in directory `D:\ZDS\Data\HDR\MCS\`			
3	7	EXE	Configure the **Cortex HDR**.	Cortex HDRconfigured.		
		DET	In Cortex MCS (192.168.75.161) open the configuration file from directory `D:\ZDS\Data\HDR\MCS\SABIA-Mar\:` ▪ `SB1GS-GSE-FM-R_RF-N1_v1.4.mcs`if **EWC30-FM1** is under test. ▪ `SB1GS-GSE-FM-R_RF-N2_v1.4.mcs`if **EWC30-FM2** is under test. Then enable configuration by clicking on the **Control Access** icon (key icon) and click the **OK** button. Then click on **Copy Cnf->Mon** icon and then click yes if needed.			
3	8	EXE	Open Global, Spectrum and Vector plots in Cortex HDR of GS-GSE-FM (R).	Windows open.		
		DET	Go to MCS Cortex (192.168.75.161). According to the figures below, do the following: ▪ Global tab of DMU-1 (Demodulator Unit 1): • In the Global window, click on the DMU-1. • In the displayed window go to Global tab. ▪ Spectrum tab of DMU-1: • In the Global window, click on the DMU-1. • In the displayed window go to Spectrum tab and press enable button. ▪ Vector tab of DMU-1: • In the Global window, click on the DMU-1. • In the displayed window go to vector tab, select cumulative option and press enable button. ▪ Global tab of DRU-1: • In the Global window, click on the DRU-1 (Data Recording Unit 1). • In the displayed window go to Global tab. figuras/cortex-hdr-filter-tuning.png **Note:** The image shown should be taken for illustrative purposes.			

3	9	EXE	Verify Matched Filter parameter of Cortex HDR of GS-GSE-FM (R).	Matched Filter -> Filter = RootRaised filter Roll-Off = 0.5 Matched Filter -> Asym, Comp, DEAF, LMS, LPF and HBF checked		
		DET	Go to MCS Cortex (192.168.75.161), in Global tab of DMU-1 (Demodulator Unit 1), verify the following: ▪ Matched Filter -> Filter = RootRaised filter ▪ Roll-Off = 0.5 ▪ Matched Filter -> Asym, Comp, DEAF, LMS checked ▪ Optional Rejection Filter -> LPF and HBF checked			

4 EGSE Settings

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB.	Attenuation in 0 dB.		
		DET	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB attenuation position.			

5 CEGSE SW Initialization

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	**Note: If the previous test was executed skip this step.** ▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-06" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			

6 DUT power on

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Verify EWC30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
6	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		

		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
6	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	**Note: If the previous test was executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
6	4	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
6	5	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
6	6	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
6	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	**Note: If the previous test was executed skip this step.** In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
6	8	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
6	9	EXE	Check Tx status	**Standby Mode** indicator is ON		

		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
7	**Data transmission**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	Start data transmission for 10 minutes	Data transmission started		
		DET	In the CEGSE SW: ▪ Got to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that "stage" box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in "I_STBY_2_OPE_M" ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that "stage" box shows **Sending X Band File**. **Note:** The transmission time of the EWC30 is 10 minutes, if it ends before all mesurements are performed transmit againg when EWC30 temperature is low. **Note:** Constantly check the temperature, if it is higher than 53℃ switch the EWC30 to standby mode (by pressing I_OPE_2_STBY_M in HV-HPC tab) and wait until it cools down. Then repeat this step and resume test execution.			
7	2	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
7	3	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
7	4	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
7	5	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I $\approx$ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			

8	**VSA measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Start recording RF signal with PXA.	Recording started.		
		DET	In the menu VSA software of PXA do the following: ▪ Click on the **Control, Record** tabs.			
8	2	EXE	Save Recorded RF signal with PXA.	`<filename.sdf>` saved.		
		DET	In the menu VSA software of PXA do the following: ▪ Wait for the signal to be fully recorded. ▪ Click on the **File, Save, Save Recording...** tabs. ▪ In the displayed window, find and select the **pxa-recording** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-06 directory. ▪ Enter a name and click the **Save** button.			
8	3	EXE	Play VSA recording.	Started Playback.		
		DET	In the menu VSA software of PXA do the following: ▪ Click on the **Control, Restart** tabs.			
8	4	EXE	Measure Data characteristics in VSA	- Freq Err $< 500KHz$ - EVM [%] - Mag Err [%] - Phase Err [°] - Output power = -7.2 dBm $\pm 1\ dB$ for **EWC30-FM1** -7.3 dBm $\pm 1\ dB$ for **EWC30-FM2** - Modulation scheme = $O-QPSK(4\ states)$.		
		DET	According to the image below, do the following: ▪ In window D (QPSK Syms/Errs), verify that **Freq Err** meets the expected values (1), the displayed Freq Err is the difference between the value configured in the VSA software and the measured value. Take note of the measured values of **EVM**, **Mag Err** and **Phase Err**. ▪ In window B (Ch1: Spectrum), verify that the **output power** meets the expected values (2). ▪ In window A (QPSK Meas Time), verify that the **modulation scheme** is as expected. `figuras/downlink_EWC30.png`			

8	5	EXE	Take screenshot de VSA software.	<filename.png> saved.		
		DET	In the menu VSA software of PXA do the following: ▪ Click on the **File, Save, Save Bitmap...** tabs. ▪ In the displayed window, click on the **Save** button. ▪ In the displayed window, find and select the folder pxa-screenshot in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-06 directory. ▪ Enter a name and click on the **Save** button ▪ Close the displayed window.			
9	**A10: SRRC roll-off=0.5, Asym, Comp, LPF, HBF, LMS, DEAF filter meassurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Restart carrier acquisition on DMU-1	carrier acquisition restarted		
		DET	Go to MCS Cortex (192.168.75.161) and do the following: ▪ Select open DMU-1 Window. ▪ Press "Restart Demodulator or Modulator" unit figuras/restartIFR-HDR.png.			
9	2	EXE	Verify locked status in DPU-1 of **Cortex HDR** of **GS-GSE**	PLL is locked and stable. B/S is locked and stable. Viterbi is locked and stable. F/S is locked and stable.		
		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) and in the open DPU-1 window do the following: ▪ Verify that PLL is locked. ▪ Verify that B/S is locked. ▪ Verify that Viterbi is Locked. ▪ Verify that F/S is locked. Verify for 30 seconds that none of them unlock.			
9	3	EXE	Measure Data characteristics in **Cortex HDR** of GS-GSE	**Eb/N0:**_____ **IF Level:**_____ **EVM:**_____ **Ampli Err:**_____ **Phase Err:**_____		

		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE-FM (R), in Vector tab, do the following: ▪ Press reset button and wait 20 seconds. ▪ Read the following parameters: **Eb/N0**,**IF Level**,**EVM**, **Ampli Err** and **Phase Err.**			
9	4	EXE	Take screenshot of signal measurement.	`a10.png` saved.		
		DET	Save screenshot of MCS (192.168.75.161) in cortex-screenshot-013-06 folder with name a10.png. This could be done by pressing the **print screen key** and using the Paint software.			
9	5	EXE	Start Vector script	Vector script started YYYYMMDDHHMMSS:■		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd /verification/Vector` ▪ `date` ▪ `sh vector.sh` Then take note of date.			
9	6	EXE	Verify connection of clients in Cortex HDR	Clients conected a Cortex HDR		
		DET	According to the figure below, do the following: ▪ Go to MCS Cortex (192.168.75.161), in the Global window figuras/clientHDR.png • Verify client connection			
9	7	EXE	Stop Vector script	Vector script stoped		
		DET	▪ Wait 30 seconds ▪ Go to terminal were Vector script was executed and press Ctrl + C			

10	B2: SRRC roll-off=0.5, Asym, Comp, LPF, HBF, CMA filter meassurement					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	Configure the matched filter on Cortex HDR of GS-GSE.	Cortex HDR configured.		

		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE: ▪ In the Global tab of DMU-1 (Demodulator Unit 1) do the following: • click the **Config** button. • Set Asym = OFF • Set Comp = OFF • Set LMS = OFF • Set 4*Sr = OFF • Set DEAF = OFF • Set CMA = **ON** • Set Fast = OFF • Set XDEAF = OFF • Set LPF = OFF • Set HBF = OFF • click the **Apply** button.			
10	2	EXE	Verify locked status in DPU-1 of **Cortex HDR** of **GS-GSE**	PLL is locked and stable. B/S is locked and stable. Viterbi is locked and stable. F/S is locked and stable.		
		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) and in the open DPU-1 window do the following: ▪ Verify that PLL is locked. ▪ Verify that B/S is locked. ▪ Verify that Viterbi is Locked. ▪ Verify that F/S is locked. Verify for 30 seconds that none of them unlock.			
10	3	EXE	Measure Data characteristics in **Cortex HDR** of GS-GSE	**Eb/N0:**_____ **IF Level:**_____ **EVM:**_____ **Ampli Err:**_____ **Phase Err:**_____		
		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE-FM (R), in Vector tab, do the following: ▪ Press reset button and wait 20 seconds. ▪ Read the following parameters: **Eb/N0**,**IF Level**,**EVM**, **Ampli Err** and **Phase Err.**			
10	4	EXE	Take screenshot of signal measurement.	`b2.png` saved.		
		DET	Save screenshot of MCS (192.168.75.161) in cortex-screenshot-013-06 folder with name b2.png. This could be done by pressing the **print screen key** and using the Paint software.			
10	5	EXE	Start Vector script	Vector script started YYYYMMDDHHMMSS:■		

		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd /verification/Vector` ▪ `date` ▪ `sh vector.sh` Then take note of date.			
10	6	EXE	Verify connection of clients in Cortex HDR	Clients conected a Cortex HDR		
		DET	According to the figure below, do the following: ▪ Go to MCS Cortex (192.168.75.161), in the Global window figuras/clientHDR.png • Verify client connection			
10	7	EXE	Stop Vector script	Vector script stoped		
		DET	▪ Wait 30 seconds ▪ Go to terminal were Vector script was executed and press Ctrl + C			
10	8	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			
10	9	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
11	**Filter settings comparison.**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	Get EVM value	EVM [%] value		
		DET	From the file explorer in the GS-GSE.MGMT VM(192.168.75.193) ▪ Go to the `/opt/sao/appsharedfiles/Vector/workspace` directory ▪ Open `Vector-HDR_DMU1_Vector-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>-001.scv` file created later than the date taken in vector script start step for **option A10**. ▪ Get average value of **DMU.EVM.Calc.Normalized.percent**.			

11	2	EXE	Get EVM value	EVM [%] value		
		DET	From the file explorer in the GS-GSE.MGMT VM(192.168.75.193) ▪ Go to the `/opt/sao/appsharedfiles/Vector/workspace` directory ▪ Open `Vector-HDR_DMU1_Vector-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>-001.scv` file created later than the date taken in vector script start step for **option B2**. ▪ Get average value of **DMU.EVM.Calc.Normalized.percent**.			
11	3	EXE	Complete the reporting table.	Table filled.		
		DET	Complete the reporting table **Results for configurations filter of data demodulation** bellow.			
11	4	EXE	Verify the measured parameters	For **A10** filter configuration: - EVM < 6 % - |Amplitude Error| < 0.5 dB rms - |Phase Error| < 5° rms for **EWC30-FM1**. - |Phase Error| $\leq$ 5.3° rms for **EWC30-FM2**.		
		DET	Verify that the parameters measured in the test are as expected.			

12 DUT Power off

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			

13 CEGSE SW shutdown

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
13	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			

14 Collect Evidences

Sect.	Nbr.	Type	Activity	Expected result	Result	Status

14	1	EXE	Copy test folder of PXA to CEGSE.	Folder copied.		
		DET	In the CEGSE, open the file explorer, connect to PXA with the following address and credentials: ▪ Address: `//192.168.75.231/d$/Users/` ▪ User: administrator ▪ Password: agilent4u and do the following: ▪ Copy the SB1FS-COM-P-013-06 folder from D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013 directory to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013` directory on CEGSE.			
14	2	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	**Note: In case the CEGSE SW has not been started in this test, the CEGSE logs must be saved in the test folder in which the CEGSE SW was started.** In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-06 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-06 directory. ▪ Paste the copied folder.			
14	3	EXE	Copy screenshots folder of Cortex HDR to CEGSE.	Folder copied		
		DET	In the CEGSE: ▪ Open the file explorer and connect to Cortex HDR (192.168.75.161) with the following credentials: • Address: \\192.168.75.161 • User: cortex • Password: cortex ▪ Go to \\192.168.75.161\zds\HDR\MCS\ ▪ Copy the screenshots folder cortex-screenshot-013-06. ▪ Go to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\ <session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-06` directory of CEGSE. ▪ Paste the copied folder. ▪ Go to \\192.168.75.161\zds\HDR\MCS\ ▪ Delete the folder cortex-screenshot-013-06 from Cortex HDR.			

14	4	EXE	Copy files to CEGSEfrom GS-GSE.MGMT VM.	files copied.		
		DET	On EGSE open Total Commander from shocut in desktop and do de following: ■ On left side go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-P-013/SB1FS-COM-P-013-06/ ■ On rigth side go "Network Neighborhood", select [Secure FTP], press F7 and connect to GS-GSE.MGMT VM with the following paremeters: • 192.168.75.193 • User: administrator • Password: Sb1.C0n43 ■ On rigth side go to /opt/sao/appsharedfiles/Vector/output/ directory. ■ Find and copy `Vector-HDR-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>.tar.gz` files created after the date taken in the step where the Vector script for **option A10** was started. ■ Page files .tar.gz in C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-P-013/SB1FS-COM-P-013-06/		

15 Final Steps

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
15	1	EXE	Close **Cortex HDR of GS-GSE** configuration file.	File closed.		
		DET	In Cortex MCS close configuration file **without save changes**. Go to **File>Close** and then click **No**.			
15	2	EXE	Set **N1** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N1 to redundant side.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ■ Go to the **Nadir 1 Transfer Switch Control** field and press the **Nadir 1 to Redundant 1** button. ■ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the upper indicator of the **N1 TRANSFER SWITCH** block is **ON** and green.			
15	3	EXE	Set **N2** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N2 to redundant side.		

		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Nadir 2 Transfer Switch Control** field and press the **Nadir 2 to Redundant 2** button. ▪ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the bottom indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			
15	4	EXE	Disconnect XRF3.60 cable from DWL Test Port of CEGSE.	XRF3.60 disconnected from DWL Test Port. DWL Test Port with RF load.		
		DET	▪ Disconnect XRF3.60 cable from the DWL Test Port of CEGSE. ▪ Connect the 50 ohm load fto the DWL Test Port of CEGSE.			
15	5	EXE	Disconnect XRF3.60 cable from DC Block.	Cable disconnected from DC Block.		
		DET	▪ Disconnect the end XRF3.60 cable from DC Block (This is connected to RF IN of PXA).			
15	6	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
15	7	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			

Table 6.6.0-3: SB1FS-COM-P-013-06 procedure.

Option Cfg #	IF level	Eb/N0	EVM (Vector Script)	Unb. Ratio(max)	Phase Error (max)
A10					
B2					

Table 6.6.0-4: Results for configurations filter of data demodulation.

6.7. SB1FS-COM-P-013-07 BER measurement

Task ID	SB1FS-COM-P-013-07
Task name	BER measurement
Task description	In this test the EWC30 TX is set in Modulation mode. RF TestBed is configured as X-Band Noise generator. The modulated signal entering the GS-GSE-FM (R) through a [X-Band] interface is added to the noise entering through other [X-Band] interface in the GS-GSE-FM (R) itself. Noise level is adjusted to different test levels of Eb/N0 (seen at the cortex). For each test level, demodulation parameters in the Cortex and Vector script are recorded.
Task purpose	The purpose of this test is to evaluate BER for different levels of Eb/N0.
Success criteria	Measurements performed for all Eb/N0 levels.
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1
Duration	280 minutes
Data sets required	▪ CEGSE PXI nominal configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder ▪ Data files for modulation: • Data-4429200_600s_VCh01_wPN.bin. ▪ Data RF TestBed: • SB1GS-Testbed_XB_NoiseGenerator_v1.0.mcs ▪ Data RF Cortex HDR of GS-GSE-FM (R): • data52050 ▪ GS-GSE File: • UpConverter01_TB-FM_v1.0.py ▪ Vector-0.9.4 script installed in GS-GSE.MGMT VM.
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.7.0-1: Procedure SB1FS-COM-P-013-07 description.

SB1FS-COM-P-013-07 BER measurement						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
2	**GS-GSE Preparation**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Remove attenuators from **[X-Band] (N1)** interface of GS-GSE-FM (R)	Attenuators removed		
		DET	Note: Skip this step if **EWC30-FM1** is under test. ▪ Disconnect cable **XRF3.12** from 30 dB attenuator. ▪ Remove 30 dB attenuator from **N1** input of XBMA03. ▪ Connect cable **XRF3.12** to **N1** input of XBMA03.			
2	2	EXE	Remove attenuators from **[X-Band] (N2)** interface of GS-GSE-FM (R)	Attenuators removed		
		DET	Note: Skip this step if **EWC30-FM2** is under test. ▪ Disconnect cable **XRF3.13** from 30 dB attenuator. ▪ Remove 30 dB attenuator from **N2** input of XBMA03. ▪ Connect cable **XRF3.13** to **N2** input of XBMA03.			

2	3	EXE	Enable Monitor and Control in **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	Interface status in **Monitor and Control**.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Interface Status** field and select **Monitor and Control**.			
2	4	EXE	Enable **N1** interface in the **X-Band Matrix and Attenuator**.	N1 interface enabled.		
		DET	In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Press the **Nadir 1 to Down Converters** button. ▪ Go to the **XBMA Control Diagram** field and verify that the **bottom** indicator of the **N1 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **XBMA Control Diagram** field and verify that the **bottom** indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			
2	5	EXE	Enable **N2** interface in the **X-Band Matrix and Attenuator**.	N2 interface enabled.		
		DET	In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Press the **Nadir 2 to Down Converters** button. ▪ Go to the **XBMA Control Diagram** field and verify that the **top** indicator of the **N1 TRANSFER SWITCH** block is **ON** and green. ▪ Go to the **XBMA Control Diagram** field and verify that the **top** indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			
2	5	EXE	Set attenuation of GS-GSE-FM (R) **X-Band Matrix and Attenuator** .	Attenuation of 0 dB.		
		DET	In the XBMA App v1.0.0software run on GS-GSE.WIN8 VM(192.168.75.194): ▪ Go to the **Variable Attenuador Control** field and press the 0 dB button. ▪ Go to the **ATENUATOR VARIABLE** block and verify that the 0 dB indicator is green.			
2	6	EXE	Configure **X-Band Downconverter N1**.	▪ RF = 8106.0 MHz ▪ Aten = 0 ▪ RF = ON		
		DET	Note: Skip this step if **EWC30-FM2** is under test. In the terminal window of GS-GSE.MGMT VM (192.168.75.193) of GS-GSE-FM (N) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter01-FM_v1.0.py` In the displayed menu, do the following: ▪ Configure Aten = 0. ▪ Verify that Freq = 8106 MHz. ▪ Verify that RF = ON Then enter the number 5 and press enter to exit the menu.			

2	7	EXE	Configure **X-Band Downconverter N2**.	▪ RF = 8269.0 MHz ▪ Aten = 0 ▪ RF = ON		
		DET	Note: Skip this step if **EWC30-FM1** is under test. In the terminal window of GS-GSE.MGMT VM (192.168.75.193) of GS-GSE-FM (N) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter02-FM_v1.0.py` In the displayed menu, do the following: ▪ Configure Aten = 0. ▪ Verify that Freq = 8269 MHz. ▪ Verify that RF = ON Then enter the number 5 and press enter to exit the menu.			
2	8	EXE	Create folder for screenshots in Cortex HDR.	Folder created.		
		DET	In Cortex HDR(192.168.75.161) open window file explorer and create **cortex-screenshot-013-07** folder in directory `D:\ZDS\Data\HDR\MCS\`			
2	9	EXE	Configure the **Cortex HDR**.	Cortex HDRconfigured.		
		DET	In Cortex MCS (192.168.75.161) open the configuration file from directory `D:\ZDS\Data\HDR\MCS\SABIA-Mar\:` ▪ `SB1GS-GSE-FM-R_RF-N1_v1.4.mcs`if **EWC30-FM1** is under test. ▪ `SB1GS-GSE-FM-R_RF-N2_v1.4.mcs`if **EWC30-FM2** is under test. Then enable configuration by clicking on the **Control Access** icon (key icon) and click the **OK** button. Then click on **Copy Cnf->Mon** icon and then click yes if needed.			
2	10	EXE	Clear storage in **Cortex HDR**	Cleaning done		
		DET	In Cortex MCS (192.168.75.161) do the following: ▪ Open the DMM by clicking on the **Open the global disk memory management window** icon. ▪ In the **Status** window of DMM, click on **Build or Erase** button. ▪ Select **Errase all files in all directories in all partitions** and then click on **OK** button. ▪ In the displayed window confirm erase by clicking on the **OK** button. ▪ Enable the acquisition mode by clicking on the **Configuration vs Acquisition Mode** icon and on the **Control Access**.			

2	11	EXE	Configure Cortex HDR for BER measurement	Cortex HDR configured for BER measurement.		
		DET	Go to MCS Cortex (192.168.75.161) and do the following: ▪ In the Global window, click on the DMU-1(Demodulator Unit 1). • In the displayed window go to BER tab. • Click on Config button. • In Operating Mode select : File. • In File Number DPU1: 52050 • Click on Apply button. ▪ In the Global window, click on the DPU-1(Data Procesor Unit 1) • In the displayed window go to BER-FER tab. • Click on Config button. • In Operating Mode select : File. • In File Number: 52050 • Click on Apply button.			

SB1FS-COM-P-013-07 BER measurement						
2	12	EXE	Open Global,BER, Spectrum, Vector and Recording Global tabs in Cortex HDR of GS-GSE-FM (R).	tabs open.		
		DET	Go to MCS Cortex (192.168.75.161). According to the figures below, do the following: ■ Global tab of DMU-1 (Demodulator Unit 1): • In the Global window, click on the DMU-1. • In the displayed window go to Global tab. ■ BER tab of DMU-1: • In the Global window, click on the DMU-1. • In the displayed window go to BER tab. ■ Spectrum tab of DMU-1: • In the Global window, click on the DMU-1. • In the displayed window go to Spectrum tab and press enable button. ■ Vector tab of DMU-1: • In the Global window, click on the DMU-1. • In the displayed window go to vector tab, select cumulative option and press enable button. ■ BER-FER tab of DPU-1: • In the Global window, click on the DPU-1 (Data Procesor Unit 1). • In the displayed window go to BER-FER tab. ■ Global tab of DRU-1: • In the Global window, click on the DRU-1 (Data Recording Unit 1). • In the displayed window go to Recording Global tab. figuras/cortex-hdr-one-channel.png		

3	Data TestBed setting and connection					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Configure X-Band Upconverter of RF TestBed.	■ RF = 8106.0 MHz for **EWC30-FM2** ■ RF = 8269.0 MHz for **EWC30-FM1** ■ Aten = 0 dB ■ RF = OFF		

		DET	In the terminal window of GS-GSE.MGMT VM (192.168.75.193) of GS-GSE-FM (R) run the following commands: ▪ `cd /verification/COMM-SS-FM/session_ID/` ▪ `python UpConverter01_TB-FM_v1.0.py` In the displayed menu, do the following: ▪ Configure Aten = 0 dB. ▪ Configure Freq = 8269 MHz for **EWC30-FM1** and 8106 for **EWC30-FM2**. ▪ Verify that RF = OFF			
3	2	EXE	Configure the **Cortex HDR** of TestBed.	Cortex HDR configured.		
		DET	In Cortex MCS (192.168.75.202) open the configuration file SB1GS-Testbed_XB_NoiseGenerator_v1.0.mcs from directory `D:\ZDS\Data\HDR\CrtxMsc\SABIA-Mar\AIT\`, enable configuration by clicking on the **Control Access** icon (key icon) and click the **OK** button. Then click on **Copy Cnf->Mon** icon and then click yes if needed.			
3	3	EXE	Open TMU window in Cortex HDR of GS-GSE-FM (R).	Windows open.		
		DET	Go to MCS Cortex (192.168.75.202)and do the following: ▪ In the Global window, click on the TMU-1(Test Modulator Unit).			
3	4	EXE	Verify the IF and RF connections of Data RF TestBed.	All IF and RF connections present.		
		DET	Verify the following connections: ▪ 10 dB attenuator ATT10.01 (PE7005-10) is connected to the IF input (J01) of the X-Band Upconverter. ▪ Cable PE300-60-03 is connected to the 10 dB attenuator ATT10.01. ▪ Cable PE300-60-03 is connected to IF out (J50) of the Testbed Cortex HDR.			
3	5	EXE	Connect SRF3.02 cable to GS-GSE [X-Band] interface.	Cable SRF3.02 connected to [X-Band] interface.		
		DET	▪ Connect SRF3.02 cable to the Data [X-Band] (N2) interface if **EWC30-FM1** is under test. ▪ Connect SRF3.02 cable to the Data [X-Band] (N1) interface if **EWC30-FM2** is under test.			
3	6	EXE	Connect **SRF3.02** cable to RF output (J2) of Upconverter of TestBed	Cable SRF3.02 connected RF output of Upconverter		

		DET	▪ Connect SRF3.02 cable to RF output of Upconverter.			
3	7	EXE	Enable RF output of X-Band Upconverter of TestBed	RF output ON.		
		DET	Go to the X-Band Upconverter configuration menu in the terminal window and do the following: ▪ Press the 3 key and then enter. ▪ Press the 1 key and then enter ▪ Click on **Apply** button. Verify that the desired parameter was configured correctly by viewing the menu display.			
4	**EGSE Settings**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Set **10 dB step Variable Attenuator** in CEGSE to 20 dB.	Attenuation in 20 dB.		
		DET	Set **10 dB step Variable Attenuator** in CEGSE to 20 dB attenuation position.			
5	**CEGSE SW Initialization**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-07" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			
6	**DUT power on**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Verify EWC30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
6	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		

		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
6	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
6	4	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
6	5	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
6	6	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
6	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
6	8	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
6	9	EXE	Check Tx status	**Standby Mode** indicator is ON		

		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
7	**Data transmission 1**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
7	2	EXE	Start data transmission for 10 minutes	Data transmission started		
		DET	In the CEGSE SW: ▪ Got to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in "I_STBY_2_OPE_M" ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**. **Note:** The transmission time of the EWC30 is 10 minutes, if it ends before all mesurements are performed transmit againg when EWC30 temperature is low. **Note:** Constantly check the temperature, if it is higher than 53℃ switch the EWC30 to standby mode (by pressing I_OPE_2_STBY_M in HV-HPC tab) and wait until it cools down. Then repeat this step and resume test execution.			
7	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
7	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
7	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR ≈ 3.2 V		

		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
7	6	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I ≈ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			
8	**Eb/N0 ≈ 6 dB measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Adjust the Noise Power generation in Cortex HDR of TestBed in order to get an Eb/N0 close to 6 dB in Cortex HDR of GS-GSE	Eb/N0 ≈ 6 dB		
		DET	Go to Cortex HDR of RF TestBed and set an initial value of -103 dBm/Hz in Noise Level output, then adjust this, until obtain an Eb/N0 close to 6 dB in Cortex HDR of GS-GSE-FM. In MCS Cortex (192.168.75.161) of GS-GSE-FM (R), press Reset buttom and wait 20 seconds. Then, see Eb/N0 in the Vector tab of the DMU-1, in the Eb/N0 field (1) figuras/SignalAnalysis.png			

8	2	EXE	Restart carrier acquisition on DMU-1	carrier acquisition restarted		
		DET	Go to MCS Cortex (192.168.75.161) and do the following: ▪ Select open DMU-1 Window. ▪ Press "Restart Demodulator or Modulator" unit figuras/restartIFR-HDR.png.			
8	3	EXE	Verify locked status in DPU-1 of **Cortex HDR** of **GS-GSE**	PLL is locked and stable. B/S is locked and stable. Viterbi is locked and stable. F/S is locked and stable.		
		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) and in the open DPU-1 window do the following: ▪ Verify that PLL is locked. ▪ Verify that B/S is locked. ▪ Verify that Viterbi is Locked. ▪ Verify that F/S is locked. Verify for 30 seconds that none of them unlock.			
8	4	EXE	Reset Vector in DMU-1 of Cortex HDR	Vector in DMU-1 reset.		
		DET	On Cortex HDR MCS of GS-GSE-FM (R), in the Vector tab of DMU-1 press the reset button.			
8	5	EXE	Reset BER counter of Cortex HDR	Number of errors reseted.		
		DET	On Cortex HDR MCS, select DMU-1 window and Click the button BER Reset in the toolbar (Button with the 0 symbol)			
8	6	EXE	Ingest data in **Cortex HDR** of **GS-GSE-FM (R)** for two minutes.	Ingestion performed		
		DET	In Cortex MCS (192.168.75.161) ingest data for 2 minutes. It is suggested to use a stopwatch. In DRU-1 (Data Recording Unit 1), go to Recording Global window and do following: ▪ Click on **Start Recording** (Red button). ▪ Verify that the sign Recording in Progress. Awaiting for Stop Command appears in green. ▪ Wait 2 minutes of ingestion and then click on Stop Recording button.			

8	7	EXE	Take screenshot of signal measurement.	`ebno6.png` saved.		
		DET	Save screenshot of MCS (192.168.75.161) in cortex-screenshot-013-07 folder with name ebno6.png. This could be done by pressing the **print screen key** and using the Paint software.			
8	8	EXE	Measure Data characteristics in DMU-1 and DPU-1 of **Cortex HDR** of GS-GSE	**Eb/N0:_____** **IF Level:_____** **EVM:_____** **Ampli Err:_____** **Phase Err:_____** **BER:_____** **Nb. error:_____**		
		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE-FM (R) do the following: ▪ In Vector tab of DMU-1, read the following parameters: **Eb/N0**,**IF Level**,**EVM**, **Ampli Err** and **Phase Err.** ▪ In the BER-FER tab of DPU-1, read the following parameters: **BER** and **Number of error**.			
8	9	EXE	Verify number of frames received in VCh01 by **Cortex HDR**	VCh01 ≈ 885840 frames		
		DET	In Cortex MCS (192.168.75.161) go to **Virtual Channels** window of Data Recording Unit 1 (DRU-1) and verify that the **Total TM Block** column for **VC Sort value = 1** has the expected value.			
8	10	EXE	Start Vector script	Vector script started YYYYMMDDHHMMSS:■		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd /verification/Vector` ▪ `date` ▪ `sh vector.sh` Then take note of date.			
8	11	EXE	Verify connection of clients in Cortex HDR	Clients conected a Cortex HDR		
		DET	According to the figure below, do the following: ▪ Go to MCS Cortex (192.168.75.161), in the Global window figuras/clientHDR.png • Verify client connection			

8	12	EXE	Stop Vector script	Vector script stoped		
		DET	▪ Wait 30 seconds ▪ Go to terminal were Vector script was executed and press Ctrl + C			
8	13	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			
8	14	EXE	Start DATA RF flow on GS-GSE-FM (R)	DATA RF flow started.		
		DET	From SABIA-Mar Ground Segment web, click the **Status Monitor** icon, in the open tab do the following: ▪ Click on the button on the left and select **New Activity**. ▪ In the displayed window • Click on the icon corresponding to **data-rf-n1** if **EWC30-FM1** is under test. • Click on the icon corresponding to **data-rf-n2** if **EWC30-FM2** is under test. ▪ Enter 600 and then click on the **Confirm** button. ▪ Click on the **Instant** button and then click on the **Confirm** button. ▪ Click on the **Ok** button. ▪ Finally verify in **Timeline View** that **DATA RF flow** has started.			
8	15	EXE	Wait until **Start Data RF flow** execution is finished.	Data RF flow finished.		
		DET	On the web browser go to **Status Monitor** tab, identify the current flow **data-gse-flow-rf-n1** (or **data-gse-flow-rf-n2**) and wait until the flow ends. This takes approximately 6 minutes.			
8	16	EXE	Login to Configuration Control Manager from CEGSE			
		DET	From PXI computer (192.168.75.211), open the FireFox browser and access to Configuration Control Manager web with the following parameters: ▪ URL: http://192.168.75.104:6080 ▪ User: operator-conae ▪ Password: operator-conae			

8	17	EXE	Go to Products section in CCM.	Products window is shown		
		DET	On CCM web click the number in the PRODUCTS section.			
8	18	EXE	Find last XBand Product for VC01 in CCM	product available		
		DET	On CCM web sort products by date to see newer product at the top. Identify the following XBand Product corresponding to this execution. ▪ SB1_XBandN**<X>**VC01_<passID>_<YYYYMMDDTHHMMSS>.bin Where <X> is 1 if **EWC30-FM1** is under test and 2 if **EWC30-FM2** is under test.			
8	19	EXE	Download identified products	products downloaded		
		DET	▪ Download identified products by pressing download icon. ▪ Move downloaded products to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07\ebno6 folder			
8	20	EXE	Estimate BER from **data**	BER= x Error Count = #		
		DET	On CEGSE, open terminal window and execute following commands: ▪ cd C:\Users\EGSE COM\Documents\ COMM-SS-FM\ <session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07. ▪ Ber.exe -m data -i ebno6\SB1_XBandN<X>VC01_<passID>_<YYYYMMDDTHHMMSS>.bin **Note 1:** View estimated BER values with **syncronize and compare**. **Note 2:** <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**.			
8	21	EXE	Get EVM value	EVM [%] value		
		DET	From the file explorer in the GS-GSE.MGMT VM(192.168.75.193) ▪ Go to the `/opt/sao/appsharedfiles/Vector/workspace` directory ▪ Open `Vector-HDR_DMU1_Vector-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>-001.scv` file created later than the date taken in vector script start step for **Eb/N0** $\approx$ **6 dB**. ▪ Get average value of **DMU.EVM.Calc.Normalized.percent**.			

8	22	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
9	**Data transmission 2**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
9	2	EXE	Start data transmission for 10 minutes	Data transmission started		
		DET	In the CEGSE SW: ▪ Got to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in "I_STBY_2_OPE_M" ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**. **Note:** The transmission time of the EWC30 is 10 minutes, if it ends before all mesurements are performed transmit againg when EWC30 temperature is low. **Note:** Constantly check the temperature, if it is higher than 53℃ switch the EWC30 to standby mode (by pressing I_OPE_2_STBY_M in HV-HPC tab) and wait until it cools down. Then repeat this step and resume test execution.			
9	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
9	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
9	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR ≈ 3.2 V		

		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
10	**Eb/N0 $\approx$ 5 dB measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	Adjust the Noise Power generation in Cortex HDR of TestBed in order to get an Eb/N0 close to 5 dB in Cortex HDR of GS-GSE	Eb/N0 $\approx$ 5 dB		
		DET	Go to Cortex HDR of RF TestBed and adjust Noise Level output until obtain Eb/N0 close to 5 dB in Cortex HDR of GS-GSE-FM. In MCS Cortex (192.168.75.161) of GS-GSE-FM (R), press Reset buttom and wait 20 seconds. Then, see Eb/N0 in the Vector tab of the DMU-1, in the Eb/N0 field (1) figuras/SignalAnalysis.png			
10	2	EXE	Restart carrier acquisition on DMU-1	carrier acquisition restarted		
		DET	Go to MCS Cortex (192.168.75.161) and do the following: ▪ Select open DMU-1 Window. ▪ Press "Restart Demodulator or Modulator" unit figuras/restartIFR-HDR.png .			
10	3	EXE	Verify locked status in DPU-1 of **Cortex HDR** of **GS-GSE**	PLL is locked and stable. B/S is locked and stable. Viterbi is locked and stable. F/S is locked and stable.		

		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) and in the open DPU-1 window do the following: ▪ Verify that PLL is locked. ▪ Verify that B/S is locked. ▪ Verify that Viterbi is Locked. ▪ Verify that F/S is locked. Verify for 30 seconds that none of them unlock.			
10	4	EXE	Reset Vector in DMU-1 of Cortex HDR	Vector in DMU-1 reset.		
		DET	On Cortex HDR MCS of GS-GSE-FM (R), in the Vector tab of DMU-1 press the reset button.			
10	5	EXE	Reset BER counter of Cortex HDR	Number of errors reseted.		
		DET	On Cortex HDR MCS, select DMU-1 window and Click the button BER Reset in the toolbar (Button with the 0 symbol)			
10	6	EXE	Ingest data in **Cortex HDR** of **GS-GSE-FM (R)** for two minutes.	Ingestion performed		
		DET	In Cortex MCS (192.168.75.161) ingest data for 2 minutes. It is suggested to use a stopwatch. In DRU-1 (Data Recording Unit 1), go to Recording Global window and do following: ▪ Click on **Start Recording** (Red button). ▪ Verify that the sign Recording in Progress. Awaiting for Stop Command appears in green. ▪ Wait 2 minutes of ingestion and then click on Stop Recording button.			
10	7	EXE	Take screenshot of signal measurement.	`ebno5.png` saved.		
		DET	Save screenshot of MCS (192.168.75.161) in cortex-screenshot-013-07 folder with name ebno5.png. This could be done by pressing the **print screen key** and using the Paint software.			
10	8	EXE	Measure Data characteristics in DMU-1 and DPU-1 of **Cortex HDR** of GS-GSE	**Eb/N0:**_____ **IF Level:**_____ **EVM:**_____ **Ampli Err:**_____ **Phase Err:**_____ **BER:**_____ **Nb. error:**_____		

		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE-FM (R) do the following: ▪ In Vector tab of DMU-1, read the following parameters: **Eb**/**N0**,**IF Level**,**EVM**, **Ampli Err** and **Phase Err.** ▪ In the BER-FER tab of DPU-1, read the following parameters: **BER** and **Number of error**.			
10	9	EXE	Verify number of frames received in VCh01 by **Cortex HDR**	VCh01 ≈ 885840 frames		
		DET	In Cortex MCS (192.168.75.161) go to **Virtual Channels** window of Data Recording Unit 1 (DRU-1) and verify that the **Total TM Block** column for **VC Sort value = 1** has the expected value.			
10	10	EXE	Start Vector script	Vector script started YYYYMMDDHHMMSS:■		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd /verification/Vector` ▪ `date` ▪ `sh vector.sh` Then take note of date.			
10	11	EXE	Verify connection of clients in Cortex HDR	Clients conected a Cortex HDR		
		DET	According to the figure below, do the following: ▪ Go to MCS Cortex (192.168.75.161), in the Global window figuras/clientHDR.png • Verify client connection			
10	12	EXE	Stop Vector script	Vector script stoped		
		DET	▪ Wait 30 seconds ▪ Go to terminal were Vector script was executed and press Ctrl + C			
10	13	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			

10	14	EXE	Start DATA RF flow on GS-GSE-FM (R)	DATA RF flow started.		
		DET	From SABIA-Mar Ground Segment web, click the **Status Monitor** icon, in the open tab do the following: ▪ Click on the button on the left and select **New Activity**. ▪ In the displayed window • Click on the icon corresponding to **data-rf-n1** if **EWC30-FM1** is under test. • Click on the icon corresponding to **data-rf-n2** if **EWC30-FM2** is under test. ▪ Enter 600 and then click on the **Confirm** button. ▪ Click on the **Instant** button and then click on the **Confirm** button. ▪ Click on the **Ok** button. ▪ Finally verify in **Timeline View** that **DATA RF flow** has started.			
10	15	EXE	Wait until **Start Data RF flow** execution is finished.	Data RF flow finished.		
		DET	On the web browser go to **Status Monitor** tab, identify the current flow **data-gse-flow-rf-n1** (or **data-gse-flow-rf-n2**) and wait until the flow ends. This takes approximately 6 minutes.			
10	16	EXE	Login to Configuration Control Manager from CEGSE			
		DET	From PXI computer (192.168.75.211), open the FireFox browser and access to Configuration Control Manager web with the following parameters: ▪ URL: http://192.168.75.104:6080 ▪ User: operator-conae ▪ Password: operator-conae			
10	17	EXE	Go to Products section in CCM.	Products window is shown		
		DET	On CCM web click the number in the PRODUCTS section.			
10	18	EXE	Find last XBand Product for VC01 in CCM	product available		
		DET	On CCM web sort products by date to see newer product at the top. Identify the following XBand Product corresponding to this execution. ▪ SB1_XBandN**<X>**VC01_<passID>_<YYYYMMDDTHHMMSS>.bin Where <X> is 1 if **EWC30-FM1** is under test and 2 if **EWC30-FM2** is under test.			

10	19	EXE	Download identified products	products downloaded		
		DET	▪ Download identified products by pressing download icon. ▪ Move downloaded products to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07\ebno5 folder			
10	20	EXE	Estimate BER from **data**	BER= x Error Count = #		
		DET	On CEGSE, open terminal window and execute following commands: ▪ cd C:\Users\EGSE COM\Documents\ COMM-SS-FM\ <session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07. ▪ Ber.exe -m data -i ebno5\SB1_XBandN<X>VC01_<passID>_<YYYYMMDDTHHMMSS>.bin **Note 1:** View estimated BER values with **syncronize and compare**. **Note 2:** <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**.			
10	21	EXE	Get EVM value	EVM [%] value		
		DET	From the file explorer in the GS-GSE.MGMT VM(192.168.75.193) ▪ Go to the `/opt/sao/appsharedfiles/Vector/workspace` directory ▪ Open `Vector-HDR_DMU1_Vector-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>-001.scv` file created later than the date taken in vector script start step for **Eb/N0** $\approx$ **5 dB**. ▪ Get average value of **DMU.EVM.Calc.Normalized.percent**.			
10	22	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			

11 Data transmission 3

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
11	2	EXE	Start data transmission for 10 minutes	Data transmission started		

		DET	In the CEGSE SW: ▪ Got to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in "I_STBY_2_OPE_M" ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**. **Note:** The transmission time of the EWC30 is 10 minutes, if it ends before all mesurements are performed transmit againg when EWC30 temperature is low. **Note:** Constantly check the temperature, if it is higher than 53℃ switch the EWC30 to standby mode (by pressing I_OPE_2_STBY_M in HV-HPC tab) and wait until it cools down. Then repeat this step and resume test execution.			
11	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
11	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
11	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			

SB1FS-COM-P-013-07 BER measurement						
12	**Eb/N0 ≈ 4 dB measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
12	1	EXE	Adjust the Noise Power generation in Cortex HDR of TestBed in order to get an Eb/N0 close to 4 dB in Cortex HDR of GS-GSE	Eb/N0 ≈ 4 dB		
		DET	Go to Cortex HDR of RF TestBed and adjust Noise Level output until obtain Eb/N0 close to 4 dB in Cortex HDR of GS-GSE-FM. In MCS Cortex (192.168.75.161) of GS-GSE-FM (R), press Reset buttom and wait 20 seconds. Then, see Eb/N0 in the Vector tab of the DMU-1, in the Eb/N0 field (1) figuras/SignalAnalysis.png			
12	2	EXE	Restart carrier acquisition on DMU-1	carrier acquisition restarted		
		DET	Go to MCS Cortex (192.168.75.161) and do the following: ▪ Select open DMU-1 Window. ▪ Press "Restart Demodulator or Modulator" unit figuras/restartIFR-HDR.png.			
12	3	EXE	Verify locked status in DPU-1 of **Cortex HDR** of **GS-GSE**	PLL is locked and stable. B/S is locked and stable. Viterbi is locked and stable. F/S is locked and stable.		

		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) and in the open DPU-1 window do the following: ▪ Verify that PLL is locked. ▪ Verify that B/S is locked. ▪ Verify that Viterbi is Locked. ▪ Verify that F/S is locked. Verify for 30 seconds that none of them unlock.			
12	4	EXE	Reset Vector in DMU-1 of Cortex HDR	Vector in DMU-1 reset.		
		DET	On Cortex HDR MCS of GS-GSE-FM (R), in the Vector tab of DMU-1 press the reset button.			
12	5	EXE	Reset BER counter of Cortex HDR	Number of errors reseted.		
		DET	On Cortex HDR MCS, select DMU-1 window and Click the button BER Reset in the toolbar (Button with the 0 symbol)			
12	6	EXE	Ingest data in **Cortex HDR** of **GS-GSE-FM (R)** for two minutes.	Ingestion performed		
		DET	In Cortex MCS (192.168.75.161) ingest data for 2 minutes. It is suggested to use a stopwatch. In DRU-1 (Data Recording Unit 1), go to Recording Global window and do following: ▪ Click on **Start Recording** (Red button). ▪ Verify that the sign Recording in Progress. Awaiting for Stop Command appears in green. ▪ Wait 2 minutes of ingestion and then click on Stop Recording button.			
12	7	EXE	Take screenshot of signal measurement.	`ebno4.png` saved.		
		DET	Save screenshot of MCS (192.168.75.161) in cortex-screenshot-013-07 folder with name ebno4.png. This could be done by pressing the **print screen key** and using the Paint software.			
12	8	EXE	Measure Data characteristics in DMU-1 and DPU-1 of **Cortex HDR** of GS-GSE	**Eb/N0:**_____ **IF Level:**_____ **EVM:**_____ **Ampli Err:**_____ **Phase Err:**_____ **BER:**_____ **Nb. error:**_____		

		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE-FM (R) do the following: ▪ In Vector tab of DMU-1, read the following parameters: **Eb**/**N0**,**IF Level**,**EVM**, **Ampli Err** and **Phase Err.** ▪ In the BER-FER tab of DPU-1, read the following parameters: **BER** and **Number of error**.			
12	9	EXE	Verify number of frames received in VCh01 by **Cortex HDR**	VCh01 ≈ 885840 frames		
		DET	In Cortex MCS (192.168.75.161) go to **Virtual Channels** window of Data Recording Unit 1 (DRU-1) and verify that the **Total TM Block** column for **VC Sort value = 1** has the expected value.			
12	10	EXE	Start Vector script	Vector script started YYYYMMDDHHMMSS:■		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd /verification/Vector` ▪ `date` ▪ `sh vector.sh` Then take note of date.			
12	11	EXE	Verify connection of clients in Cortex HDR	Clients conected a Cortex HDR		
		DET	According to the figure below, do the following: ▪ Go to MCS Cortex (192.168.75.161), in the Global window figuras/clientHDR.png • Verify client connection			
12	12	EXE	Stop Vector script	Vector script stoped		
		DET	▪ Wait 30 seconds ▪ Go to terminal were Vector script was executed and press Ctrl + C			
12	13	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			

12	14	EXE	Start DATA RF flow on GS-GSE-FM (R)	DATA RF flow started.		
		DET	From SABIA-Mar Ground Segment web, click the **Status Monitor** icon, in the open tab do the following: ■ Click on the button on the left and select **New Activity**. ■ In the displayed window • Click on the icon corresponding to **data-rf-n1** if **EWC30-FM1** is under test. • Click on the icon corresponding to **data-rf-n2** if **EWC30-FM2** is under test. ■ Enter 600 and then click on the **Confirm** button. ■ Click on the **Instant** button and then click on the **Confirm** button. ■ Click on the **Ok** button. ■ Finally verify in **Timeline View** that **DATA RF flow** has started.			
12	15	EXE	Wait until **Start Data RF flow** execution is finished.	Data RF flow finished.		
		DET	On the web browser go to **Status Monitor** tab, identify the current flow **data-gse-flow-rf-n1** (or **data-gse-flow-rf-n2**) and wait until the flow ends. This takes approximately 6 minutes.			
12	16	EXE	Login to Configuration Control Manager from CEGSE			
		DET	From PXI computer (192.168.75.211), open the FireFox browser and access to Configuration Control Manager web with the following parameters: ■ URL: http://192.168.75.104:6080 ■ User: operator-conae ■ Password: operator-conae			
12	17	EXE	Go to Products section in CCM.	Products window is shown		
		DET	On CCM web click the number in the PRODUCTS section.			
12	18	EXE	Find last XBand Product for VC01 in CCM	product available		
		DET	On CCM web sort products by date to see newer product at the top. Identify the following XBand Product corresponding to this execution. ■ SB1_XBandN**<X>**VC01_<passID>_<YYYYMMDDTHHMMSS>.bin Where <X> is 1 if **EWC30-FM1** is under test and 2 if **EWC30-FM2** is under test.			

12	19	EXE	Download identified products	products downloaded		
		DET	▪ Download identified products by pressing download icon. ▪ Move downloaded products to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07\ebno4 folder			
12	20	EXE	Estimate BER from **data**	BER= x Error Count = #		
		DET	On CEGSE, open terminal window and execute following commands: ▪ cd C:\Users\EGSE COM\Documents\ COMM-SS-FM\ <session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07. ▪ Ber.exe -m data -i ebno4\SB1_XBandN<X>VC01_<passID>_<YYYYMMDDTHHMMSS>.bin **Note 1:** View estimated BER values with **syncronize and compare**. **Note 2:** <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**.			
12	21	EXE	Get EVM value	EVM [%] value		
		DET	From the file explorer in the GS-GSE.MGMT VM(192.168.75.193) ▪ Go to the `/opt/sao/appsharedfiles/Vector/workspace` directory ▪ Open `Vector-HDR_DMU1_Vector-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>-001.scv` file created later than the date taken in vector script start step for **Eb/N0** $\approx$ **4 dB**. ▪ Get average value of **DMU.EVM.Calc.Normalized.percent**.			
12	22	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			

13 Data transmission 4

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
13	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
13	2	EXE	Start data transmission for 10 minutes	Data transmission started		

		DET	In the CEGSE SW: ▪ Got to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in "I_STBY_2_OPE_M" ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**. **Note:** The transmission time of the EWC30 is 10 minutes, if it ends before all mesurements are performed transmit againg when EWC30 temperature is low. **Note:** Constantly check the temperature, if it is higher than 53℃ switch the EWC30 to standby mode (by pressing I_OPE_2_STBY_M in HV-HPC tab) and wait until it cools down. Then repeat this step and resume test execution.			
13	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
13	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
13	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			

SB1FS-COM-P-013-07 BER measurement						
14	**Eb/N0 ≈ 3 dB measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
14	1	EXE	Adjust the Noise Power generation in Cortex HDR of TestBed in order to get an Eb/N0 close to 3 dB in Cortex HDR of GS-GSE	Eb/N0 ≈ 3 dB		
		DET	Go to Cortex HDR of RF TestBed and adjust Noise Level output until obtain Eb/N0 close to 3 dB in Cortex HDR of GS-GSE-FM. In MCS Cortex (192.168.75.161) of GS-GSE-FM (R), press Reset buttom and wait 20 seconds. Then, see Eb/N0 in the Vector tab of the DMU-1, in the Eb/N0 field (1) figuras/SignalAnalysis.png			
14	2	EXE	Restart carrier acquisition on DMU-1	carrier acquisition restarted		
		DET	Go to MCS Cortex (192.168.75.161) and do the following: ▪ Select open DMU-1 Window. ▪ Press "Restart Demodulator or Modulator" unit figuras/restartIFR-HDR.png.			
14	3	EXE	Verify locked status in DPU-1 of **Cortex HDR** of **GS-GSE**	PLL is locked and stable. B/S is locked and stable. Viterbi is locked and stable. F/S is locked and stable.		

		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) and in the open DPU-1 window do the following: ▪ Verify that PLL is locked. ▪ Verify that B/S is locked. ▪ Verify that Viterbi is Locked. ▪ Verify that F/S is locked. Verify for 30 seconds that none of them unlock.			
14	4	EXE	Reset Vector in DMU-1 of Cortex HDR	Vector in DMU-1 reset.		
		DET	On Cortex HDR MCS of GS-GSE-FM (R), in the Vector tab of DMU-1 press the reset button.			
14	5	EXE	Reset BER counter of Cortex HDR	Number of errors reseted.		
		DET	On Cortex HDR MCS, select DMU-1 window and Click the button BER Reset in the toolbar (Button with the 0 symbol)			
14	6	EXE	Ingest data in **Cortex HDR** of **GS-GSE-FM (R)** for two minutes.	Ingestion performed		
		DET	In Cortex MCS (192.168.75.161) ingest data for 2 minutes. It is suggested to use a stopwatch. In DRU-1 (Data Recording Unit 1), go to Recording Global window and do following: ▪ Click on **Start Recording** (Red button). ▪ Verify that the sign Recording in Progress. Awaiting for Stop Command appears in green. ▪ Wait 2 minutes of ingestion and then click on Stop Recording button.			
14	7	EXE	Take screenshot of signal measurement.	`ebno3.png` saved.		
		DET	Save screenshot of MCS (192.168.75.161) in cortex-screenshot-013-07 folder with name ebno3.png. This could be done by pressing the **print screen key** and using the Paint software.			
14	8	EXE	Measure Data characteristics in DMU-1 and DPU-1 of **Cortex HDR** of GS-GSE	**Eb/N0:**_____ **IF Level:**_____ **EVM:**_____ **Ampli Err:**_____ **Phase Err:**_____ **BER:**_____ **Nb. error:**_____		

		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE-FM (R) do the following: ▪ In Vector tab of DMU-1, read the following parameters: **Eb**/**N0**,**IF Level**,**EVM**, **Ampli Err** and **Phase Err.** ▪ In the BER-FER tab of DPU-1, read the following parameters: **BER** and **Number of error**.			
14	9	EXE	Verify number of frames received in VCh01 by **Cortex HDR**	VCh01 ≈ 885840 frames		
		DET	In Cortex MCS (192.168.75.161) go to **Virtual Channels** window of Data Recording Unit 1 (DRU-1) and verify that the **Total TM Block** column for **VC Sort value = 1** has the expected value.			
14	10	EXE	Start Vector script	Vector script started YYYYMMDDHHMMSS:■		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd /verification/Vector` ▪ `date` ▪ `sh vector.sh` Then take note of date.			
14	11	EXE	Verify connection of clients in Cortex HDR	Clients conected a Cortex HDR		
		DET	According to the figure below, do the following: ▪ Go to MCS Cortex (192.168.75.161), in the Global window figuras/clientHDR.png • Verify client connection			
14	12	EXE	Stop Vector script	Vector script stoped		
		DET	▪ Wait 30 seconds ▪ Go to terminal were Vector script was executed and press Ctrl + C			
14	13	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			

14	14	EXE	Start DATA RF flow on GS-GSE-FM (R)	DATA RF flow started.		
		DET	From SABIA-Mar Ground Segment web, click the **Status Monitor** icon, in the open tab do the following: ▪ Click on the button on the left and select **New Activity**. ▪ In the displayed window • Click on the icon corresponding to **data-rf-n1** if **EWC30-FM1** is under test. • Click on the icon corresponding to **data-rf-n2** if **EWC30-FM2** is under test. ▪ Enter 600 and then click on the **Confirm** button. ▪ Click on the **Instant** button and then click on the **Confirm** button. ▪ Click on the **Ok** button. ▪ Finally verify in **Timeline View** that **DATA RF flow** has started.			
14	15	EXE	Wait until **Start Data RF flow** execution is finished.	Data RF flow finished.		
		DET	On the web browser go to **Status Monitor** tab, identify the current flow **data-gse-flow-rf-n1** (or **data-gse-flow-rf-n2**) and wait until the flow ends. This takes approximately 6 minutes.			
14	16	EXE	Login to Configuration Control Manager from CEGSE			
		DET	From PXI computer (192.168.75.211), open the FireFox browser and access to Configuration Control Manager web with the following parameters: ▪ URL: http://192.168.75.104:6080 ▪ User: operator-conae ▪ Password: operator-conae			
14	17	EXE	Go to Products section in CCM.	Products window is shown		
		DET	On CCM web click the number in the PRODUCTS section.			
14	18	EXE	Find last XBand Product for VC01 in CCM	product available		
		DET	On CCM web sort products by date to see newer product at the top. Identify the following XBand Product corresponding to this execution. ▪ SB1_XBandN**<X>**VC01_<passID>_<YYYYMMDDTHHMMSS>.bin Where <X> is 1 if **EWC30-FM1** is under test and 2 if **EWC30-FM2** is under test.			

14	19	EXE	Download identified products	products downloaded		
		DET	▪ Download identified products by pressing download icon. ▪ Move downloaded products to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07\ebno3 folder			
14	20	EXE	Estimate BER from **data**	BER= x Error Count = #		
		DET	On CEGSE, open terminal window and execute following commands: ▪ cd C:\Users\EGSE COM\Documents\ COMM-SS-FM\ <session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07. ▪ Ber.exe -m data -i ebno3\SB1_XBandN<X>VC01_<passID>_<YYYYMMDDTHHMMSS>.bin **Note 1:** View estimated BER values with **syncronize and compare**. **Note 2:** <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**.			
14	21	EXE	Get EVM value	EVM [%] value		
		DET	From the file explorer in the GS-GSE.MGMT VM(192.168.75.193) ▪ Go to the `/opt/sao/appsharedfiles/Vector/workspace` directory ▪ Open `Vector-HDR_DMU1_Vector-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>-001.scv` file created later than the date taken in vector script start step for **Eb/N0** $\approx$ **3 dB**. ▪ Get average value of **DMU.EVM.Calc.Normalized.percent**.			
14	22	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			

15 Data transmission 5

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
15	1	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
15	2	EXE	Start data transmission for 10 minutes	Data transmission started		

		DET	In the CEGSE SW: ▪ Got to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in "I_STBY_2_OPE_M" ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**. **Note:** The transmission time of the EWC30 is 10 minutes, if it ends before all mesurements are performed transmit againg when EWC30 temperature is low. **Note:** Constantly check the temperature, if it is higher than 53℃ switch the EWC30 to standby mode (by pressing I_OPE_2_STBY_M in HV-HPC tab) and wait until it cools down. Then repeat this step and resume test execution.			
15	3	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
15	4	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
15	5	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			

SB1FS-COM-P-013-07 BER measurement						
16	**Eb/N0 ≈ 2 dB measurement**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
16	1	EXE	Adjust the Noise Power generation in Cortex HDR of TestBed in order to get an Eb/N0 close to 2 dB in Cortex HDR of GS-GSE	Eb/N0 ≈ 2 dB		
		DET	Go to Cortex HDR of RF TestBed and adjust Noise Level output until obtain Eb/N0 close to 2 dB in Cortex HDR of GS-GSE-FM. In MCS Cortex (192.168.75.161) of GS-GSE-FM (R), press Reset buttom and wait 20 seconds. Then, see Eb/N0 in the Vector tab of the DMU-1, in the Eb/N0 field (1) figuras/SignalAnalysis.png			
16	2	EXE	Restart carrier acquisition on DMU-1	carrier acquisition restarted		
		DET	Go to MCS Cortex (192.168.75.161) and do the following: ▪ Select open DMU-1 Window. ▪ Press "Restart Demodulator or Modulator" unit figuras/restartIFR-HDR.png.			
16	3	EXE	Verify locked status in DPU-1 of **Cortex HDR** of **GS-GSE**	PLL is locked and stable. B/S is locked and stable. Viterbi is locked and stable. F/S is locked and stable.		

		DET	Go to Cortex MCS (192.168.75.161) of GS-GSE-FM (R) and in the open DPU-1 window do the following: ▪ Verify that PLL is locked. ▪ Verify that B/S is locked. ▪ Verify that Viterbi is Locked. ▪ Verify that F/S is locked. Verify for 30 seconds that none of them unlock.			
16	4	EXE	Reset Vector in DMU-1 of Cortex HDR	Vector in DMU-1 reset.		
		DET	On Cortex HDR MCS of GS-GSE-FM (R), in the Vector tab of DMU-1 press the reset button.			
16	5	EXE	Reset BER counter of Cortex HDR	Number of errors reseted.		
		DET	On Cortex HDR MCS, select DMU-1 window and Click the button BER Reset in the toolbar (Button with the 0 symbol)			
16	6	EXE	Ingest data in **Cortex HDR** of **GS-GSE-FM (R)** for two minutes.	Ingestion performed		
		DET	In Cortex MCS (192.168.75.161) ingest data for 2 minutes. It is suggested to use a stopwatch. In DRU-1 (Data Recording Unit 1), go to Recording Global window and do following: ▪ Click on **Start Recording** (Red button). ▪ Verify that the sign Recording in Progress. Awaiting for Stop Command appears in green. ▪ Wait 2 minutes of ingestion and then click on Stop Recording button.			
16	7	EXE	Take screenshot of signal measurement.	`ebno2.png` saved.		
		DET	Save screenshot of MCS (192.168.75.161) in cortex-screenshot-013-07 folder with name ebno2.png. This could be done by pressing the **print screen key** and using the Paint software.			
16	8	EXE	Measure Data characteristics in DMU-1 and DPU-1 of **Cortex HDR** of GS-GSE	**Eb/N0:**_____ **IF Level:**_____ **EVM:**_____ **Ampli Err:**_____ **Phase Err:**_____ **BER:**_____ **Nb. error:**_____		

		DET	Go to MCS Cortex (192.168.75.161) of GS-GSE-FM (R) do the following: ▪ In Vector tab of DMU-1, read the following parameters: **Eb**/**N0**,**IF Level**,**EVM**, **Ampli Err** and **Phase Err.** ▪ In the BER-FER tab of DPU-1, read the following parameters: **BER** and **Number of error**.			
16	9	EXE	Verify number of frames received in VCh01 by **Cortex HDR**	VCh01 ≈ 885840 frames		
		DET	In Cortex MCS (192.168.75.161) go to **Virtual Channels** window of Data Recording Unit 1 (DRU-1) and verify that the **Total TM Block** column for **VC Sort value = 1** has the expected value.			
16	10	EXE	Start Vector script	Vector script started YYYYMMDDHHMMSS:■		
		DET	In the terminal window of GS-GSE.MGMT VM(192.168.75.193) run the following commands: ▪ `cd /verification/Vector` ▪ `date` ▪ `sh vector.sh` Then take note of date.			
16	11	EXE	Verify connection of clients in Cortex HDR	Clients conected a Cortex HDR		
		DET	According to the figure below, do the following: ▪ Go to MCS Cortex (192.168.75.161), in the Global window figuras/clientHDR.png • Verify client connection			
16	12	EXE	Stop Vector script	Vector script stoped		
		DET	▪ Wait 30 seconds ▪ Go to terminal were Vector script was executed and press Ctrl + C			
16	13	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			

16	14	EXE	Start DATA RF flow on GS-GSE-FM (R)	DATA RF flow started.		
		DET	From SABIA-Mar Ground Segment web, click the **Status Monitor** icon, in the open tab do the following: ▪ Click on the button on the left and select **New Activity**. ▪ In the displayed window • Click on the icon corresponding to **data-rf-n1** if **EWC30-FM1** is under test. • Click on the icon corresponding to **data-rf-n2** if **EWC30-FM2** is under test. ▪ Enter 600 and then click on the **Confirm** button. ▪ Click on the **Instant** button and then click on the **Confirm** button. ▪ Click on the **Ok** button. ▪ Finally verify in **Timeline View** that **DATA RF flow** has started.			
16	15	EXE	Wait until **Start Data RF flow** execution is finished.	Data RF flow finished.		
		DET	On the web browser go to **Status Monitor** tab, identify the current flow **data-gse-flow-rf-n1** (or **data-gse-flow-rf-n2**) and wait until the flow ends. This takes approximately 6 minutes.			
16	16	EXE	Login to Configuration Control Manager from CEGSE			
		DET	From PXI computer (192.168.75.211), open the FireFox browser and access to Configuration Control Manager web with the following parameters: ▪ URL: http://192.168.75.104:6080 ▪ User: operator-conae ▪ Password: operator-conae			
16	17	EXE	Go to Products section in CCM.	Products window is shown		
		DET	On CCM web click the number in the PRODUCTS section.			
16	18	EXE	Find last XBand Product for VC01 in CCM	product available		
		DET	On CCM web sort products by date to see newer product at the top. Identify the following XBand Product corresponding to this execution. ▪ SB1_XBandN**<X>**VC01_<passID>_<YYYYMMDDTHHMMSS>.bin Where <X> is 1 if **EWC30-FM1** is under test and 2 if **EWC30-FM2** is under test.			

16	19	EXE	Download identified products	products downloaded		
		DET	▪ Download identified products by pressing download icon. ▪ Move downloaded products to C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07\ebno2 folder			
16	20	EXE	Estimate BER from **data**	BER= x Error Count = #		
		DET	On CEGSE, open terminal window and execute following commands: ▪ cd C:\Users\EGSE COM\Documents\ COMM-SS-FM\ <session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07. ▪ Ber.exe -m data -i ebno2\SB1_XBandN<X>VC01_<passID>_<YYYYMMDDTHHMMSS>.bin **Note 1:** View estimated BER values with **syncronize and compare**. **Note 2:** <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**.			
16	21	EXE	Get EVM value	EVM [%] value		
		DET	From the file explorer in the GS-GSE.MGMT VM(192.168.75.193) ▪ Go to the `/opt/sao/appsharedfiles/Vector/workspace` directory ▪ Open `Vector-HDR_DMU1_Vector-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>-001.scv` file created later than the date taken in vector script start step for **Eb/N0 ≈ 2 dB**. ▪ Get average value of **DMU.EVM.Calc.Normalized.percent**.			
16	22	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			

17 Report tables

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
17	1	EXE	Complete the reporting table.	Table filled.		
		DET	Complete the reporting table **Data demodulation table** bellow.			

18 DUT Power off

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
18	1	EXE	Turn off VBUS of TX	TX30X led is off.		

		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
19	**CEGSE SW shutdown**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
19	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
20	**Collect Evidences**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
20	1	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-07 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-07 directory. ▪ Paste the copied folder.			
20	2	EXE	Copy screenshots folder of Cortex HDR to CEGSE.	Folder copied		
		DET	In the CEGSE: ▪ Open the file explorer and connect to Cortex HDR (192.168.75.161) with the following credentials: • Address: \\192.168.75.161 • User: cortex • Password: cortex ▪ Go to \\192.168.75.161\zds\HDR\MCS\ ▪ Copy the screenshots folder cortex-screenshot-013-07. ▪ Go to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\ <session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-07` directory of CEGSE. ▪ Paste the copied folder. ▪ Go to \\192.168.75.161\zds\HDR\MCS\ ▪ Delete the folder cortex-screenshot-013-07 from Cortex HDR.			

20	3	EXE	Copy files to CEGSEfrom GS-GSE.MGMT VM.	files copied.		
		DET	On EGSE open Total Commander from shocut in desktop and do de following: ▪ On left side go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-P-013/SB1FS-COM-P-013-07/ ▪ On rigth side go "Network Neighborhood", select [Secure FTP], press F7 and connect to GS-GSE.MGMT VM with the following paremeters: • 192.168.75.193 • User: administrator • Password: Sb1.C0n43 ▪ On rigth side go to /opt/sao/appsharedfiles/Vector/output/ directory. ▪ Find and copy `Vector-HDR-100<YYYYMMDDHHMMSS>-<YYYYMMDDTHHMMSS>.tar.gz` files created after the date taken in the step where the Vector script for **Eb/E0** ≈ **6** was started. ▪ Page files .tar.gz in C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/SB1FS-COM-P-013/SB1FS-COM-P-013-07/		

21 Final Steps

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
21	1	EXE	Set **N1** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N1 to redundant side.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Nadir 1 Transfer Switch Control** field and press the **Nadir 1 to Redundant 1** button. ▪ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the upper indicator of the **N1 TRANSFER SWITCH** block is **ON** and green.			
21	2	EXE	Set **N2** to the **redundant** side in the **X-Band Matrix and Attenuator** of GS-GSE-FM (R).	N2 to redundant side.		
		DET	In the XBMA App v1.0.0 software run on GS-GSE.WIN8 VM (192.168.75.194): ▪ Go to the **Nadir 2 Transfer Switch Control** field and press the **Nadir 2 to Redundant 2** button. ▪ Go to the **X-Band Matrix and Attenuator Control Diagram** field and verify that the bottom indicator of the **N2 TRANSFER SWITCH** block is **ON** and green.			
21	3	EXE	Configure **X-Band Downconverter N1**.	▪ RF = 8106.0 MHz ▪ Aten = 6 ▪ RF = ON		

		DET	Note: Skip this step if **EWC30-FM2** is under test. In the terminal window of GS-GSE.MGMT VM (192.168.75.193) of GS-GSE-FM (N) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter01-FM_v1.0.py` In the displayed menu, do the following: ▪ Configure Aten = 6. ▪ Verify that Freq = 8106 MHz. ▪ Verify that RF = ON Then enter the number 5 and press enter to exit the menu.			
21	4	EXE	Configure **X-Band Downconverter N2**.	▪ RF = 8269.0 MHz ▪ Aten = 4 ▪ RF = ON		
		DET	Note: Skip this step if **EWC30-FM1** is under test. In the terminal window of GS-GSE.MGMT VM (192.168.75.193) of GS-GSE-FM (N) run the following commands: ▪ `cd ~/Documents/gse_scripts/xband_converters_scripts/` ▪ `python DownConverter02-FM_v1.0.py` In the displayed menu, do the following: ▪ Configure Aten = 4. ▪ Verify that Freq = 8269 MHz. ▪ Verify that RF = ON Then enter the number 5 and press enter to exit the menu.			
21	5	EXE	Close **Cortex HDR of GS-GSE** configuration file.	File closed.		
		DET	In Cortex MCS close configuration file **without save changes**. Go to **File>Close** and then click **No**.			
21	6	EXE	Close configuration menu of X-Band Upconverter of Data RF TestBed.	Menu closed.		
		DET	Go to the X-Band Upconverter configuration menu in the terminal window and do the following: Press the 5 key and then enter.			
21	7	EXE	Disable noise generation in **Cortex HDR of TestBed**.	Noise disabled.		
		DET	Go to MCS Cortex (192.168.75.202) and in Global window of TMU (Test Modulator Unit) do the following: ▪ Click on **Config** button. ▪ UnMark **Noise Enable** field. ▪ Click on **Apply** button.			

21	8	EXE	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB.	Attenuation in 0 dB.		
		DET	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB attenuation position.			
21	9	EXE	Disconnect XRF4.02 cable from IN/OUT Port of CEGSE.	Cable XRF4.02 disconnected from IN/OUT Port.		
		DET	▪ Disconnect XRF4.02 cable to the IN/OUT Port of CEGSE. ▪ Connect the 50 ohm load from the IN/OUT Port of CEGSE.			
21	10	EXE	Disconnect XRF4.02 cable from [X-Band] interface of GS-GSE-FM(R)	Cable XRF4.02 disconnected		
		DET	▪ Disconnect XRF4.02 cable from [X-Band] interface of GS-GSE-FM(R)			
21	11	EXE	Disconnect **SRF3.02** cable from RF output of Upconverter of TestBed	Cable SRF3.02 disconnected from RF output of Upconverter		
		DET	▪ Disconnect SRF3.02 cable from RF output of Upconverter.			
21	12	EXE	Disconnect SRF3.02 cable from [X-Band] interface of GS-GSE-FM(R)	Cable SRF3.02 disconnected		
		DET	▪ Disconnect SRF3.02 cable from [X-Band] interface of GS-GSE-FM(R)			
21	13	EXE	Connect attenuators to **[X-Band] (N1)** interface of GS-GSE-FM (R)	Attenuators conected		
		DET	Note: Skip this step if **EWC30-FM1** is under test. ▪ Disconnect cable **XRF3.12** from **N1** input of XBMA03. ▪ Connect 30 dB attenuators to **N1** input of XBMA03. ▪ Connect cable **XRF3.12** to 30 dB attenuator.			

21	14	EXE	Connect attenuators to **[X-Band] (N2)** interface of GS-GSE-FM (R)	Attenuators conected		
		DET	Note: Skip this step if **EWC30-FM2** is under test. ▪ Disconnect cable **XRF3.13** from **N2** input of XBMA03. ▪ Connect 30 dB attenuators to **N2** input of XBMA03. ▪ Connect cable **XRF3.13** to 30 dB attenuator.			
21	15	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
21	16	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			

Table 6.7.0-2: SB1FS-COM-P-013-07 procedure.

Eb/No	Figure	BER from file	Cortex HDR				
			BER	IF Level	EVM	Amplitude Error	Phase Error
6							
5							
4							
3							
2							

Table 6.7.0-3: Data demodulation table.

6.8. SB1FS-COM-P-013-08 Spurious in DSN Band

Task ID	SB1FS-COM-P-013-08
Task name	Spurious in DSN Band
Task description	In this test the EWC30 TX is set to modulation mode. Spurious in DSN Band is measured with the PXA.
Task purpose	Spurious in DSN Band over RF signal.
Success criteria	Spurious in DSN Band performed.
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-2 and the following optional connections: • RF input of PXA connected to **RF IN**/**OUT** of CEGSE.
Duration	90 minutes.
Data sets required	▪ CEGSE PXI configuration file for EWC30 (`INIT_FILE_EWC30.ini`). ▪ Oscilloscope configuration files in `osc-config` folder ▪ Data file for modulation Data-4429200_600s_VCh01_wPN.bin. ▪ PXA configuration files in `COMM-SS-FM-PXA-config` folder: • EWC30TX-FM1-Spurious-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM2-Spurious-MOD-v1.0.state: Data Downlink spectrum. • EWC30TX-FM-Spurious-DSN-v1.0.state: Data DownlinK Spurious in DSN Band. • EWC30TX-FM-Spurious-DSN-10KHz-v1.0.state: Data DownlinK Spurious in DSN Band.
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.8.0-1: Procedure SB1FS-COM-P-013-08 description.

SB1FS-COM-P-013-08 Spurious in DSN Band						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**Environmental temperature and humidity**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
1	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
2	**PXA Connection and configuration**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Connect XRF4.02 cable to IN/OUT Port of CEGSE.	Cable XRF4.02 connected to IN/OUT Port.		
		DET	▪ Disconnect the 50 ohm load from the IN/OUT Port of CEGSE. ▪ Connect XRF4.02 cable to the IN/OUT Port of CEGSE.			
2	2	EXE	Connect XRF4.02 cable to DC Block on PXA.	Cable connected.		
		DET	▪ Connect the end XRF4.02 cable to DC Block (this is connected to the RF IN of PXA).			
2	3	EXE	Configure the PXA as a spectrum analyzer.	PXA configured as a spectrum analyzer.		
		DET	For this do the following: ▪ Press **Mode** button. ▪ Press **Spectrum Analyzer** key.			

2	4	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM<X>-Spurious-MOD-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM<X>-Spurious-MOD-v1.0.state`. Where <X> is 1 for **EWC30-FM1** and 2 for **EWC30-FM2**. ▪ Press **Open** button.			
3	**EGSE Settings**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB.	Attenuation in 0 dB.		
		DET	Set **10 dB step Variable Attenuator** in CEGSE to 0 dB attenuation position.			
4	**CEGSE SW Initialization**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Start CEGSE SW using EWC30 Nominal configuration file	SW running in EWC30 Nominal configuration		
		DET	▪ Locate “EGSE_COM_V1.0.4.exe” program icon on the desktop. Double-click to open the icon and run the program. ▪ Write <YYYYMMDD-#N> in “User” and “SB1FS-COM-P-013-08" in “Test Code”. Click “Next”. ▪ In “Configuration File” search and load configuration file called **INIT_FILE_EWC30.ini** located in C:/USERS/EGSE COM/Documents/CFG/ folder. ▪ Click “Next” and press “OK” to confirm EWC30 configuration.			
5	**DUT power on**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
5	1	EXE	Verify EWC30 alarms status	No alarms		
		DET	All ALARMS indicators are green.			
5	2	EXE	Take note of DUT temperatures	25℃ < Temperature < 40℃		

		DET	In EGSE_COM_v1.0.4GUI move to TSM tab and read **O_TX_TEMP1**. **Note:** In the first power on of the day use range $T_{amb} \pm 5°C$			
5	3	EXE	Turn on VBUS of TX	TX30X led is on.		
		DET	**Note: If the previous test was executed skip this step.** In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
5	4	EXE	Verify O_SEC_V_RF value	4.31 V $<$ GUI value $<$ 5.3 V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_RF**. Verify that secondary voltage meets expected value.			
5	5	EXE	Verify O_SEC_V_NUM value	3.3 V $<$ GUI value $<$ 3.8V		
		DET	On CEGSE GUI got to ASM tab to read **O_SEC_V_NUM**. Verify that secondary voltage meets expected value.			
5	6	EXE	On CEGSE GUI verify O_TX_TEMP1 value	25℃ < Temperature < 40℃		
		DET	On CEGSE GUI got to TSM tab to read **O_TX_TEMP1**. Verify that temperature meets expected value.			
5	7	EXE	Load oscilloscope configuration.	Configuration loaded.		
		DET	In the oscilloscope menu load the configuration file **EWC30-TX-RUN.set** from **osc-config** folder in the pendrive.			
5	8	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I < 282 mA		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2.			
5	9	EXE	Check Tx status	**Standby Mode** indicator is ON		

		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
6	**Switch DUT to Modulation Mode**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
6	1	EXE	Start data transmission for 10 minutes	Data transmission started		
		DET	In the CEGSE SW: ▪ Got to the **COMM** tab and then go to the **Downlink** subtab. ▪ Verify that “stage” box does not show "Sending X-Band File" message. ▪ On the **Stored Downlink File** box choose the file `Data-4429200_600s_VCh01_wPN.bin` in `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\` directory. ▪ Switch file selector to **Send Stored Downlink File** ▪ Place the switch in "I_STBY_2_OPE_M" ▪ Switch **Bit Endianness** selector to **Big**. ▪ Press **Send** button. ▪ Verify that “stage” box shows **Sending X Band File**. **Note:** The transmission time of the EWC30 is 10 minutes, if it ends before all mesurements are performed transmit againg when EWC30 temperature is low. **Note:** Constantly check the temperature, if it is higher than 53℃ switch the EWC30 to standby mode (by pressing I_OPE_2_STBY_M in HV-HPC tab) and wait until it cools down. Then repeat this step and resume test execution.			
6	2	EXE	Check Tx status	**Operation Mode** indicator is ON		
		DET	Verify Tx Status in **STATE** section of CEGSE GUI.			
6	3	EXE	Verify RF status of EWC30	0_CLK_LOCKED = ON		
		DET	On CEGSE GUI got to SBDL&BDM tab and read **0_CLK_LOCKED**. Verify that indicator is on.			
6	4	EXE	Verify RF output power Telemetry (TM4)	OUTPUT_PWR $\approx$ 3.2 V		
		DET	On CEGSE GUI got to ASM tab and read **O_TX_OUTPUT_PWR** . Verify that values is as expected.			
6	5	EXE	Take note of current and voltage measurement of TX on oscilloscope.	$V \approx 28\ V$ I $\approx$ 2.46 A		
		DET	▪ Take note of HIGH (Alta) Amplitude Measurements for CH1 and CH2. **Note:** The indicated current value corresponds to an estimate obtained from the EWC30 FM1 and FM2 reports (RD.03 and RD.04).			

6	6	EXE	Verify spectrum Data presence with the PXA.	Spectrum present		
		DET	Observe the spectrum of the signal on the PXA. It must correspond to a carrier with modulation as shown in the following image: figuras/data_mod.png **Note:** The image shown should be taken for illustrative purposes.			
6	7	EXE	Take screenshot of signals measurements.	DATA-MOD.png saved.		
		DET	▪ Press **Single** button. ▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\SB1FS-COM-P-013-08 directory. ▪ Enter file name: DATA-MOD.png ▪ Press **Save** button. ▪ Press **Cont** button.			

7 Spurious in DSN Band

Sect.	Nbr.	Type	Activity	Expected result	Result	Status
7	1	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		

		DET	In the PXA menu load the configuration file **EWC30TX-FM-Spurious-DSN-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM-Spurious-DSN-v1.0.state`. ▪ Press **Open** button.			
7	2	EXE	Wait for the entire frequency range to be measured for PXA	-Entire frequency range measured -Noise PSD max $\leq$ -105 dBm/Hz		
		DET	On PXA front pannel: ▪ Press "Sweep/control" button. ▪ Press "Restart" button ▪ Wait for the entire frequency range to be measured. ▪ Verify that noise power spectral density is according to the expected value.			
7	3	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-08 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
7	4	EXE	Take trace of signals measurements.	`<filename.trace>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Trace (+state)** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-08 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			

7	5	EXE	Measure the peak value of the Noise PSD.	Peak Noise Power [dBm]		
		DET	On PXA front pannel: ▪ Press **Marker** button. ▪ Press **Select Marker** key and then **Marker2**. ▪ Press **Peak Search** button. ▪ Take note of the measured peak value			
7	6	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-08 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
7	7	EXE	In the PXA instrument load software configuration file.	Configuration loaded.		
		DET	In the PXA menu load the configuration file **EWC30TX-FM-Spurious-DSN-10KHz-v1.0.state**, to do this, do the following: ▪ Press **Recall** button ▪ Press **State** key ▪ Press **From File...** key ▪ Go to `D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config` directory. ▪ Go to `SB1FS-COM-P-013` directory. ▪ In the displayed window, select file `EWC30TX-FM-Spurious-DSN-10KHz-v1.0.state`. ▪ Press **Open** button.			
7	8	EXE	Wait for the entire frequency range to be measured for PXA	-Entire frequency range measured -Noise PSD max $\leq$ -105 dBm/Hz		
		DET	On PXA front pannel: ▪ Press "Sweep/control" button. ▪ Press "Restart" button ▪ Wait for the entire frequency range to be measured. ▪ Verify that noise power spectral density is according to the expected value.			
7	9	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		

		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-08 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
7	10	EXE	Take trace of signals measurements.	`<filename.trace>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Trace (+state)** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-trace** folder in D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-08 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
7	11	EXE	Measure the peak value of the Noise PSD.	Peak Noise Power [dBm]		
		DET	On PXA front pannel: ▪ Press **Marker** button. ▪ Press **Select Marker** key and then **Marker2**. ▪ Press **Peak Search** button. ▪ Take note of the measured peak value			
7	12	EXE	Take screenshot of signals measurements.	`<filename.png>` saved.		
		DET	▪ Press **Save** button. ▪ Press **Screen Image** key. ▪ Press **Save As** key. ▪ In the displayed window, select the **pxa-screenshot** folder in D:\Users\Instrument\Desktop\COMM-SS-FM-PXA-config\SB1FS-COM-P-013\ SB1FS-COM-P-013-08 directory. ▪ Press **Save** button. ▪ Take note of the saved file name.			
7	13	EXE	Send command **I_OPE_2_STBY_M** to change Tx status to Standby Mode.	**Standby Mode** indicator is ON		
		DET	Go to HV-HPC tab on CEGSE GUI and press **I_OPE_2_STBY_M** button. Button turns green during 0.6 seconds. Verify Tx Status in **STATE** section of CEGSE GUI.			

7	14	EXE	Wait until TM transmission is done on CEGSE	**Txfinished** is on		
		DET	On CEGSE go to COM tab. Go to DOWNLINK subtab. Wait until **Txfinished** indicator goes green.			
8	**DUT Turn off**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
8	1	EXE	Turn off VBUS of TX	TX30X led is off.		
		DET	In the CEGSE SW press **EWC30** button. In the AD-HOC box verify **TX30X** led status.			
9	**CEGSE SW shutdown**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
9	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
10	**Collect Evidences**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
10	1	EXE	Copy test folder of PXA to CEGSE.	Folder copied.		
		DET	In the CEGSE, open the file explorer, connect to PXA with the following address and credentials: ▪ Address: `//192.168.75.231/d$/Users/` ▪ User: administrator ▪ Password: agilent4u and do the following: ▪ Copy the SB1FS-COM-P-013-08 folder from D:\Users\Instrument\DesktopCOMM-SS-FM-PXA-config\SB1FS-COM-P-013 directory to `C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013` directory on CEGSE.			

10	2	EXE	Copy CEGSE log to Evidences Folder.	Folder copied.		
		DET	In the CEGSE, open the file explorer, and do the following: ▪ Go to C:/Users/EGSE COM/Desktop/LOGs/<session_ID>/SB1FS-COM-P-013-08 directory. ▪ Copy the **EGSE COM(Root)** folder. ▪ Go to C:/Users/EGSE COM/Documents/COMM-SS-FM/<session_ID>/ SB1FS-COM-P-013/SB1FS-COM-P-013-08 directory. ▪ Paste the copied folder.			
11	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
11	1	EXE	Verify environmental **temperature** levels.	+23 ℃ ± 3 ℃		
		DET	Verify in the sensor located on working table that the environmental temperature level is according to the required levels.			
11	2	EXE	Take note of the environmental humidity.	Humidity		
		DET	Take note the environmental humidity from the sensor located on working table.			
11	3	EXE	Disconnect XRF4.02 cable from IN/OUT Port of CEGSE.	Cable XRF4.02 disconnected from IN/OUT Port.		
		DET	▪ Disconnect XRF4.02 cable to the IN/OUT Port of CEGSE. ▪ Connect the 50 ohm load from the IN/OUT Port of CEGSE.			
11	4	EXE	Disconnect XRF4.02 cable from DC Block.	Cable disconnected from DC Block.		
		DET	▪ Disconnect the end XRF4.02 cable from DC Block (This is connected to RF IN of PXA).			

Table 6.8.0-2: SB1FS-COM-P-013-08 procedure.

6.9. SB1FS-COM-P-013-09 Tests Setup break

Task ID	SB1FS-COM-P-013-09
Task name	Tests Setup break
Task description	This task includes: ▪ CEGSE power off. ▪ Disconnection of BB cables between EWC30 and ad-hoc box. ▪ Disconnection of RF cables.
Task purpose	Disconnect the EWC30 from the CEGSE and remove the connections made for the test.
Success criteria	▪ EWC30 BB interfaces are not connected. ▪ EWC30 RF output is charge with 50 ohms load.
Test Setup	▪ CEGSE to DUT base-band electrical connections according to figure 5.0.0-2 ▪ General setup according to figure 6.0.0-1 without any optional connections.
Duration	45 minutes.
Data sets required	-
Prerequisites	▪ Execution of procedure **SB1FS-COM-P-013-01 Setup and Configuration** or **SB1FS-COM-F-012-01 Setup and Configuration**. ▪ Hardware: The necessary items are shown in the table B.0.0-1.

Table 6.9.0-1: Procedure SB1FS-COM-P-013-09 description.

SB1FS-COM-P-013-09 Tests Setup break						
	Executor Record					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
		WRI	Date UTC _____/_____/_____ [DDMMAA] Time UTC _____:_____:_____[HHMMSS] Executor _____ Signature _____			
1	**CEGSE power off (PXI and Ad-Hoc Box)**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
1	1	EXE	Stop the CEGSE SW by pressing the "Stop" button.	The program ends and stops		
		DET	When you finish using the program in the CEGSE, you must press the **Stop** button to stop it.			
1	2	EXE	Turn off the PSU switch of the Ad-Hoc box.	PSU LED indicator should turn off		
		DET	Turn off the PSU by pressing the switch in the center of the Ad-Hoc box. Verify that the LED on the PSU has turned off when the switch is turned off.			
1	3	EXE	Disable power supply output of CEGSE.	The LED indicator of the OUT ON output should go out.		

		DET	Press the OUT ON button to disable the power supply output. Verify that the OUT ON LED indicator turns off when pressing the button to disable the output.			
1	4	EXE	Turn off the main switch of the Ad-Hoc box.	The main switch light must be turned off		
		DET	Turn off the main switch of the Ad-Hoc box.			
1	5	EXE	Power off PXI.	PXI off.		
		DET	From the CEGSE KVM shutdown the PXI.			
1	6	EXE	Disconnect the external frequency reference signal from the PXA.	PXA display SENSE:INT on lower-left corner of screen.		
		DET	Disconnect the **EXT REF IN** port of the PXA.			
2	**Disconnection of BB Interfaces**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
2	1	EXE	Disconnect harness **H-EGSE-DUT-J12_001** from EWC30	Harness disconnected		
		DET	Disconnect harness **H-EGSE-DUT-J12_001** from connector J100 of EWC30			
2	2	EXE	Disconnect **H-EGSE-DUT-J12_001** harness from **output** EMI/EMC filter.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J12_001** harness from **output** EMI/EMC filter.			
2	3	EXE	Disconnect **H-EGSE-DUT-J11_001** harness from **input** EMI/EMC filter.	Harness disconnected		
		DET	Disconnect **H-EGSE-DUT-J11_001** harness from **input** EMI/EMC filter.			
2	4	EXE	Disconnect harness **H-EGSE-DUT-J11_001** from Ad-hoc box	Harness disconnected		

		DET	Disconnect harness **H-EGSE-DUT-J11_001** from connector J100 of Ad-hoc box			
2	5	EXE	Disconnect harness H-EGSE-DUT-J2_001 from EWC30 and the Ad-Hoc box	harness disconnected		
		DET	▪ Disconnect **H-EGSE-DUT-J2_001** harness from connector saver J200 of the EWC30 ▪ Disconnect **H-EGSE-DUT-J2_001** harness from connector(s) J200 of the ad-hoc box.			
2	6	EXE	Disconnect harness H-EGSE-DUT-J3_001 from EWC30 and the Ad-Hoc box	harness disconnected		
		DET	▪ Disconnect **H-EGSE-DUT-J3_001** harness from connector saver J201 of the EWC30 ▪ Disconnect **H-EGSE-DUT-J3_001** harness from connector(s) J201A and J201B of the ad-hoc box.			
3	**Disconnection of RF Interfaces**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
3	1	EXE	Disconnect W10 cable from IN Port of DSN Filter and J103 Port of EWC30.	Cable W10 disconnected from ports.		
		DET	▪ Disconnect W10 cable from IN Port of DSN Filter and J103 Port of EWC30.			
3	2	EXE	Disconnect W2 cable from OUT Port of DSN Filter.	W2 Cable disconnected from OUT Port.		
		DET	▪ Disconnect W2 cable to the OUT port of DSN Filter.			
3	3	EXE	Disconnect W3 cable between Coupler Port and EWC30 port of CEGSE.	Cable W3 disconnected between ports.		
		DET	▪ Disconnect W3 cable between Coupler Port and EWC30 Port. ▪ Connect the 50 ohm load to the Coupler Port of CEGSE. ▪ Connect the 50 ohm load to the EWC30 Port of CEGSE.			
3	4	EXE	Disconnect XRF4.02 cable from IN/OUT Port of CEGSE.	Cable XRF4.02 disconnected from IN/OUT Port.		

		DET	▪ Disconnect XRF4.02 cable to the IN/OUT Port of CEGSE. ▪ Connect the 50 ohm load from the IN/OUT Port of CEGSE.			
3	5	EXE	Disconnect XRF4.02 cable from DC Block.	Cable disconnected from DC Block.		
		DET	▪ Disconnect the end XRF4.02 cable from DC Block (This is connected to RF IN of PXA).			
4	**Final Steps**					
Sect.	Nbr.	Type	Activity	Expected result	Result	Status
4	1	EXE	Get temperature and humidity data from datalogger.	Datalogger data obtained		
		DET	Download datalogger from the web: https://webstorage-service.com/member/login.php With credentials: ▪ User: tdgb6655 ▪ Password: Sabi4M4r To do this, execute the following steps: ▪ Click on SABIAMAR1 in Watch list ▪ In the displayed window, click on Menu and then on csv. ▪ Download the file .csv. ▪ Save the file downloaded in the test evidence directory of PXI: C:\Users\EGSE COM\Documents\ COMM-SS-FM\<session_ID>\SB1FS-COM-P-013\SB1FS-COM-P-013-09.			

Table 6.9.0-2: SB1FS-COM-P-013-09 procedure.

A. RF Link budget

This appendix presents link budgets for **EWC30-FM1** and **EWC30-FM2** tests and has three cases. The first case uses the setups showed in figures 5.3.0-1 and 6.0.0-1. The second case use the setup showed in figure 6.0.0-1 and the third case use the setup showed in figure 6.0.0-2. This budgets are performed with the GS-GSE-FM (R). The link budget for the first case is presented in tables A.0.0-1 and A.0.0-2 this applies to **SB1FS-COM-F-012-02 Aliveness and Functional Test**, **SB1FS-COM-P-013-02 Spectrum, power and BW with PXA**, **SB1FS-COM-P-013-03 CCDF measurement**, **SB1FS-COM-P-013-04 Frequency Stability**, **SB1FS-COM-P-013-05 Carrier Phase Noise** and **SB1FS-COM-P-013-06 Optimum filter confirmation And RF characterization with VSA and Cortex** tests. In all these tests, except the first and the last, the GS-GSE-FM (R) operate as a load and the instrumentation line is connected to the CEGSE. The link budget for the second case is presented in tables A.0.0-3 and A.0.0-4 this applies to **SB1FS-COM-P-013-07 BER measurement** test. In this test, the DUT power signal is connected to the X-Band port of GS-GSE-FM (R), the Noise generator (TestBed) is connected to the other X-Band port. The link budget for the third case is presented in tables A.0.0-5 and A.0.0-6, and applies to **SB1FS-COM-P-013-08 Spurious in DSN Band** test. In this test, the DUT power signal is connected to Instrument Port.

Related to second case, X-Band Downlink budget is dimensioned in order to obtain Eb/N0 specified values (6dB to 2dB) as shown in AD.04, thus, the setup showed in figure 6.0.0-1 is obtained in order to achieve minimum specified Eb/N0 values. Eb/N0 budget shows that it can obtain Eb/N0 values from $\approx$ 6dB to $\approx$2dB setting Noise Density level from -103dBm/Hz to -99dBm/Hz, respectively. For this case Eb/N0 required are adjusted only from Cortex HDR-XXL of TestBed.

Summary tables are presented at the end of budgets showing attenuation values of components that can be configured, and power values received by the receivers under different conditions. The nominal condition corresponds to the budget shown in the "main line" table. The Maximum Level condition corresponds to the configuration that allows to achieve the highest RF power in the receivers and the PXI or PXA as applicable. For all cases are observed that in conditions of minimum attenuation and maximum gain, the maximum power values achieved not exceed the value accepted by the Data Demodulator or instrument.

For all cases, PXA is set to measure DUT power TX levels, therefore, it is configured with a references level offset.

The tables show components highlighted in red, they are not characterized, thus the indicated attenuation is an estimate. When the characterization of the components is carried out, the link calculations will be updated. The changes in the expected levels are in the order of tenths of dB.

Table A.0.0-1: EWC30-FM1 Link Budget - X-Band Data Downlink - case 1.

tables/Ensayos COMM-SS Link Budget - X-Band Data N1 Downlink.pdf

Table A.0.0-2: EWC30-FM2 Link Budget - X-Band Data Downlink - case 1.

tables/Ensayos COMM-SS Link Budget - X-Band Data N2 Downlink.pdf

Table A.0.0-3: EWC30-FM1 Link Budget - X-Band Data Downlink - case 2.

tables/Ensayos COMM-SS Link Budget -EBN0 X-Band Data N1 Downlink.pdf

Table A.0.0-4: EWC30-FM2 Link Budget - X-Band Data Downlink - case 2.

tables/Ensayos COMM-SS Link Budget -EBN0 X-Band Data N2 Downlink.pdf

Table A.0.0-5: EWC30-FM1 Link Budget - X-Band Data Downlink - case 3.

tables/Ensayos COMM-SS Link Budget -DSN X-Band Data N1 Downlink.pdf

Table A.0.0-6: EWC30-FM2 Link Budget - X-Band Data Downlink - case 3.

tables/Ensayos COMM-SS Link Budget -DSN X-Band Data N2 Downlink.pdf

B. Test elements list

Table B.0.0-1 shown all hardware items required for the execution of test procedures of this documents.

Table B.0.0-1: Required hardware items for procedures execution.

ID	Name	Type	Brand	P/N	S/N	ID CONAE	Comments
-	5/64" or 2 mm Hex bit.	Hex bit	-	-	-	-	5/64" or 2 mm Hex bit for 1/4" hex socket
-	N Torque Wrench	Torque Wrench	Pasternack	PE5011-6	-	-	Fixed Click Type Torque Wrench With 13/16" Bit For N, SC Connectors Pre-set to 14 in-lbs.
-	SMA Torque Wrench	Torque Wrench	Maury	8799D1	-	-	Torque Wrench With 5/16" Bit For SMA, SC Connectors Pre-set to 5 in-lbs.
-	Fixed wrench	Fixed wrench	-	-	-	-	To perform RF connections.
-	Screwdriver for slotted screws	Screwdriver	-	-	-	-	To perform connectors adjustments.
-	Antistatic wrist strap	Safety accessory	-	-	-	-	For operator, instrument and equipment safety.
-	Multimeter	Instrument	Agilent	U1232A	MY53110041	-	True RMS Multimeter.
PXA	Spectrum Analyzer	Instrument	Agilent	N9030A	MY53310573	021016	- Keysight N9030A PXA Signal Analyzer - N9030A 3Hz-13.6GHz -RT1 Real-time analysis up to 160 MHz BW, basic detection 89600 VSA PathWave Vector Signal Analysis v. 22.21 - 89601B-200 Basic vector signal analysis, transportable license - 89601B-AYA Vector modulation analysis, transportable license.
DC Block	DC Block on Inner Conductor N male to N Female	DC Block	Pasternack	PE8213	-	-	Instrument safety recommendation (PXA).
DC Block	DC Block on Inner Conductor SMA male to SMA Female	DC Block	Pasternack	PE8210	-	-	For instrument safety recommendation (PXI).
-	Oscilloscope	Instrument	Tektronix	DPO3054	CO21329	019203	Instrument to measure electrical signals.
-	Oscilloscope differential probe	Instrument	Tektronix	TDP0500	B012833	-	Used to measure voltage values.
-	Oscilloscope current probe	Instrument	Tektronix	TCP0030A	C000884	-	Used to measure current values.
-	47 KOhm Resistor	Connection Board	-	-	-	-	With wire and connector compatible with BOB. For electrical test of TSM Interface.
-	DB9 Breakout Board	Connection Board	Silver Engineering Inc (SEI)	SE-01021-11	6351	022265	With nine compatible bridges. For electrical and functional test of HV-HPC Interface.
-	DB25 Breakout Board	Connection Board	Silver Engineering Inc (SEI)	SE-01023-11	6357	022271	With twenty five compatible bridges. For electrical and functional test of the LVDS interface.
-	DB37 Breakout Board	Connection Board	Silver Engineering Inc (SEI)	SE-01024-11	6359	022273	With thirty-seven compatible bridges. For electrical and functional test of the TSM, ASM and BDM interface.
TestCableDB9	Auxiliary wires for Breakout Board	Adapter cable	-	-	-	-	Wires used to connect ad-hoc box to Breakout Board terminals.
TestCableDB25	Auxiliary wires for Breakout Board	Adapter cable	-	-	-	-	Wires used to connect ad-hoc box to Breakout Board terminals.
TestCableDB37	Auxiliary wires for Breakout Board	Adapter cable	-	-	-	-	Wires used to connect ad-hoc box to Breakout Board terminals.
	EMI/EMC filter	-	Veng	-	-	-	- To filter ripple of the current and voltage of the DUT.

Table B.0.0-1: Required hardware items for procedures execution.

ID	Name	Type	Brand	P/N	S/N	ID CONAE	Comments
RACK20	Rack	-	SKB cases	3SKB-R914U24	-	016598	-Belongs to TestBed -TestBed rack to hold tests components.
GLS10-TB	Ethernet Switch	Switch	D-Link	DES-1024D	-	012821	-Belongs to TestBed -To connect network components.
PDU30	Power Distribution Unit	-	-	-	-	-	-Belongs to TestBed -Contains circuit breaker 15A.
XUP01-TB	X-Band Up-converter	Frequency Converter	Zodiac	SM01022979B	4005892003	023920	-Belongs to TestBed -It is used to frequency conversion in Data tests.
HDR10	Cortex HDR-XXL	Modulator, demodulator and processor	Zodiac Aerospace	SM01022661B	13032	021374	-Belongs to TestBed -To perform Data tests.
ATT10.01	Fixed Attenuator SMA male to SMA female	Attenuator	Pasternack	PE7005-10	-	-	-Belongs to TestBed -It is used to prevent RF power levels and/or achieve test condition values.
PE300-60-03	SMA m to SMA m 1.5m Harness	RF Auxiliary Harness	Pasternack	PE300-60	-	-	-Belongs to TestBed -To connect Cortex HDR-XXL (through J50 IF OUT) with TestBed XBUC (through ATT10.01) -To connect TestBed XBDC with TestBed XBUC (through ATT10.01).
XRF4.02	N m to N m 5m Harness	RF Auxiliary Harness	UTiFLEX	UFB197C-0-1969-7GU7GU	-	-	-Belongs to TestBed -To connect CEGSE IN/OUT port with SB N1 (N) -To connect CEGSE IN/OUT port with XB N1 (N).
SRF3.02	N m to SMA m 10m Harness	RF Auxiliary Harness	UTiFLEX	UFA 210A-0-3937-70U300	-	-	-Belongs to TestBed -To connect XBUC TB outport with XB N1/N2 (N).
XRF3.60	N m to N m 5m Harness	RF Auxiliary Harness	UTiFLEX	UFB197C-0-1969-7GU7GU	-	-	-Belongs to TestBed -To connect CEGSE IN/OUT port with SB N1 (N) -To connect CEGSE IN/OUT port with XB N1 (N).
REF1.01	BNC m to BNC m 6m Harness	Ref Harness	-	E119932 RG174/U	-	-	To connect the 10 MHz reference signal to the PXA.
SBB4.18	BNC m to SMA m 6m Harness	Ref Harness	HUBER+SUHNER	RG174/11BNC/11SMA	-	-	To connect the 10 MHz reference signal to the PXA.
W2	SMA m to SMA m 55.1cm Harness	RF Auxiliary Harness	UTiFLEX	MCJ088D-0-0217-300300TV	MRF64639 225314-044	-	-Belongs to CEGSE -To connect OUT (through CS#4) port of the DSN Filter with the EWC30 port in DUT plate.
W3	SMA m to SMA m 20cm Harness	RF Auxiliary Harness	UTiFLEX	MCJ088D-0-0079-300300TV	MFR64639 225309-002	-	-Belongs to CEGSE -To connect EWC29 port in DUT plate with the COUPLER port in DUT plate. -To connect EWC30 port in DUT plate with the COUPLER port in DUT plate.
W4	SMA m to SMA m 37.6cm Harness	RF Auxiliary Harness	UTiFLEX	MCJ088D-0-0148-300300TV	MFR64639 225312-026	-Belongs to CEGSE -	To connect COUPLER port in DUT plate with the IN port (through AD#1) in Bi-Directional Coupler.
W5	SMA m to SMA m 50cm Harness	RF Auxiliary Harness	UTiFLEX	MCJ088D-0-0197-3Q03Q0	MFR64639 351640-080	-	-Belongs to CEGSE -To connect Fixed Attenuator (through AD#2) with 1dB step Variable Attenuator port.
W6	N m to SMA m 80cm Harness	RF Auxiliary Harness	UTiFLEX	UT-141-FORM-0315-380580/A	MFR 64639 380910-007	-	-Belongs to CEGSE -To connect 10dB step Variable Attenuator port with CEGSE IN/OUT port in DUT plate.
W7	SMA f to SMA m 34.8cm Harness	RF Auxiliary Harness	UTiFLEX	MCJ088D-0-0137-38V320 PM	MFR64639 345487-048 MB48	-	-Belongs to CEGSE -To connect OUT CPL port in Bi-Directional Coupler with UPL TP port in DUT plate.
W8	SMA f to SMA m 34.8cm Harness	RF Auxiliary Harness	UTiFLEX	MCJ088D-0-0137-38V320 PM	MFR64639 345487-042 MB42	-	-Belongs to CEGSE -To connect IN CPL port in Bi-Directional Coupler with DWL TP port in DUT plate.

Table B.0.0-1: Required hardware items for procedures execution.

ID	Name	Type	Brand	P/N	S/N	ID CONAE	Comments
W10	SMA m to SMA m 50cm Harness	RF Auxiliary Harness	UTiFLEX	MCJ088D-0-0197-3Q03Q0	MFR64639 351640-017	-	-Belongs to CEGSE -To connect J103 port (through CS#2) of EWC30 with IN port (through CS#3) of the DSN Filter.
ZGBDC35-93HP	Bi-Directional Coupler	Coupler	MiniCircuits	ZGBDC35-93HP	285	-	-Belongs to CEGSE -35dB Bi-Directional Coupler 900MHz to 9000MHz up to 250W.
BW-N20W20+	20dB Fixed attenuator	Attenuator	MiniCircuits	BW-N20W20+	-	-	-Belongs to CEGSE -20dB fixed attenuator DC to 18GHz up to 20W.
8496B-001	10dB step Variable attenuator	Attenuator	Keysight	8496B-001	-	-	-Belongs to CEGSE -10 dB step Variable attenuator 0-110dB DC-18GHz 1W max. input power.
AD#1	N m to SMA f adapter	Adapter	Pasternack	PE91337	-	-	-Belongs to CEGSE -To connect W4 cable with IN port in Bi-Directional Coupler.
AD#2	N m to SMA f adapter	Adapter	Pasternack	PE91337	-	-	-Belongs to CEGSE -To connect Fixed attenuator with W5 cable.
AD#3	N m to SMA f adapter	Adapter	Pasternack	PE91337	-	-	-Belongs to CEGSE -To connect W9 cable with 1dB step Variable Attenuator port.
Adapter#1	Adapter SMA f to SMA f	Adapter	Pasternack	PE9312	-	-	-Belongs to CEGSE -To connect in the DUT plate in the Coupler position.
Adapter#3	Adapter SMA f to SMA f	Adapter	Pasternack	PE9312	-	-	-Belongs to CEGSE -To connect in the DUT plate in the position EWC30.
H-EGSE-DUT-J11_001	DB15 m to DB15 f 1m Harness	Data BB Harness	-	-	-	-	-Belongs to CEGSE -To connect J100 of CEGSE with Input of EMI/EMC filter.
H-EGSE-DUT-J12_001	DB15 m to MDM15 m 0.5m (or 0.8m) Harness	Data BB Harness	-	-	-	-	-Belongs to CEGSE -To connect Output of EMI/EMC filter with J100 of EWC30.
H-EGSE-DUT-J13_001	MDM15 f to DB15 f 0.25m (or 0.5m) Harness	Data BB Harness	-	-	-	-	-Belongs to CEGSE -To verify EMI/EMC filter.
H-EGSE-DUT-J14_001	DB15 f to DB15 m 0.50m Harness	Data BB Harness	-	-	-	-	-Belongs to CEGSE -To ripple measurements.
H-EGSE-DUT-J2_001	DB25 m to MDM25 m 0.9m Harness	Data BB Harness	-	-	-	-	-Belongs to CEGSE -To connect J200 of EWC30 with J200 of ad-hoc box.
H-EGSE-DUT-J3_001	DB37 m and DB9 m to MDM37 m 0.9m Harness	Data BB Harness	-	-	-	-	-Belongs to CEGSE -To connect J201 of EWC30 with J201A and J201B of ad-hoc box.
-	Saver MDM 15 pts	Saver	C&K	340104102B 15PS	-	-	-Belongs to XTX FM1 -To connect to J100 port of EWC30.
-	Saver MDM 25 pts	Saver	C&K	340104104B 25PS	-	-	-Belongs to XTX FM1 -To connect to J200 port of EWC30.
-	Saver MDM 37 pts	Saver	C&K	340104106B 37PS	-	-	-Belongs to XTX FM1 -To connect to J201 port of EWC30.
CS#2 -	Saver SMA	Saver	Radiall	3402 0030 2B101	-	-	-Belongs to XTX FM1 -To connect to J103 port of EWC30.
-	Saver MDM 15 pts	Saver	C&K	340104102B 15PS	-	-	-Belongs to XTX FM2 -To connect to J100 port of EWC30.
-	Saver MDM 25 pts	Saver	C&K	340104104B 25PS	-	-	-Belongs to XTX FM2 -To connect to J200 port of EWC30.
-	Saver MDM 37 pts	Saver	C&K	340104106B 37PS	-	-	-Belongs to XTX FM2 -To connect to J201 port of EWC30.

Table B.0.0-1: Required hardware items for procedures execution.

ID	Name	Type	Brand	P/N	S/N	ID CONAE	Comments
CS#2 -	Saver SMA	Saver	Radiall	3402 0030 2B101	-	-	-Belongs to XTX FM2 -To connect to J103 port of EWC30.
-	Pen-drive	Informatic	-	-	-	-	Previously formatted in FAT32 format.
-	Auxiliary Notebook	Informatic	-	-	-	-	With Windows SO, TR7 for Windows and T&D Graph installed (Datalogger programs).

figuras/asc

C. Test items characteristics

In this appendix specifications of harness used for test are presented. Other components specifications can be consulted in its respective user manuals o test reports. For RF components S parameters for work frequency obtained in measurements are presented. For base band harness pin-out is presented.

C.1. XRF4.02 N m to N m 5m Harness

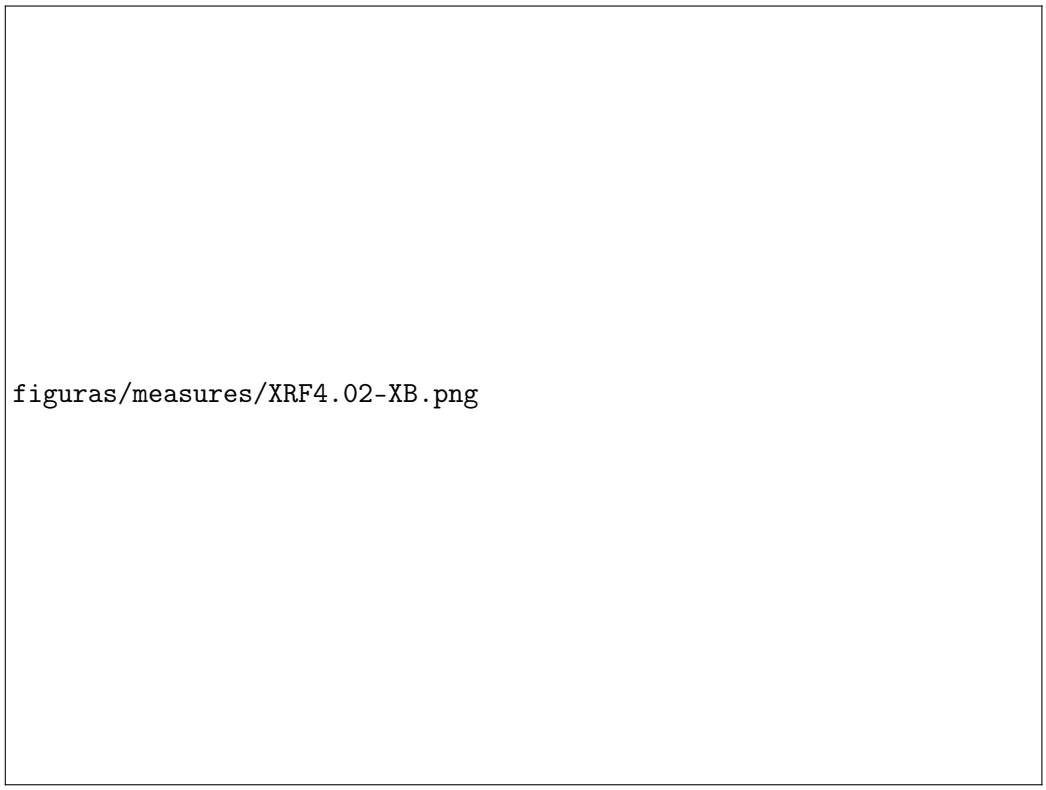

Table C.1.0-1: X-Band electrical measurements of XRF4.02 N m to N m 5m Harness.

C.2. XRF3.60 N m to SMA m 10m Harness

Table C.2.0-1: Electrical measurements of XRF3.60 N m to SMA m 10m Harness.

C.3. SRF3.02 N m to SMA m 10m Harness

Table C.3.0-1: X-Band Electrical measurements of SRF3.02 N m to SMA m 10m Harness.

C.4. W2 SMA m to SMA m 55.1cm Harness

Table C.4.0-1: S-Band and X-Band electrical measurements of W2 SMA m to SMA m 55.1cm Harness.

C.5. W3 SMA m to SMA m 20cm Harness

Table C.5.0-1: S-Band and X-Band electrical measurements of W3 SMA m to SMA m 20cm Harness.

C.6. W4 SMA m to SMA m 37.6cm Harness

Table C.6.0-1: S-Band and X-Band electrical measurements of W4 SMA m to SMA m 37.6cm Harness.

C.7. W5 SMA m to SMA m 50cm Harness

Table C.7.0-1: S-Band and X-Band electrical measurements of W5 SMA m to SMA m 50cm Harness.

C.8. W6 N m to SMA m 80cm Harness

Table C.8.0-1: S-Band and X-Band electrical measurements of W6 N m to SMA m 80cm Harness.

C.9. W7 SMA f to SMA m 34.8cm Harness

Table C.9.0-1: S-Band and X-Band electrical measurements of W7 SMA f to SMA m 34.8cm Harness.

C.10. W8 SMA f to SMA m 34.8cm Harness

Table C.10.0-1: S-Band and X-Band electrical measurements of W8 SMA f to SMA m 34.8cm Harness.

C.11. W10 SMA m to SMA m 50cm Harness

Table C.11.0-1: S-Band and X-Band electrical measurements of W10 SMA m to SMA m 50cm Harness.

C.12. W15 SMA m to SMA m 240cm Harness

Table C.12.0-1: S-Band and X-Band electrical measurements of W15 SMA m to SMA m 240cm Harness.

C.13. Fixed Attenuator BW-N20W20+

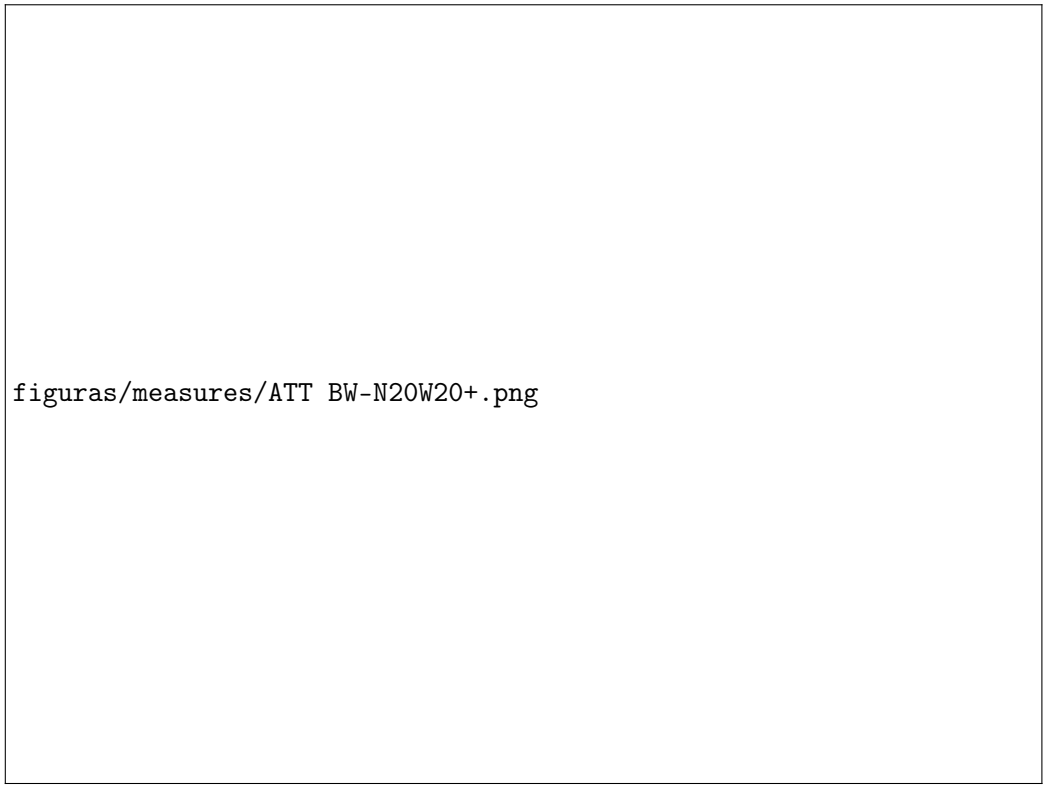

Table C.13.0-1: S-Band and X-Band electrical measurements of Fixed attenuator ATT BW-N20W20+.

C.14. Coupler bi-directional ZGBDC35-93HP+

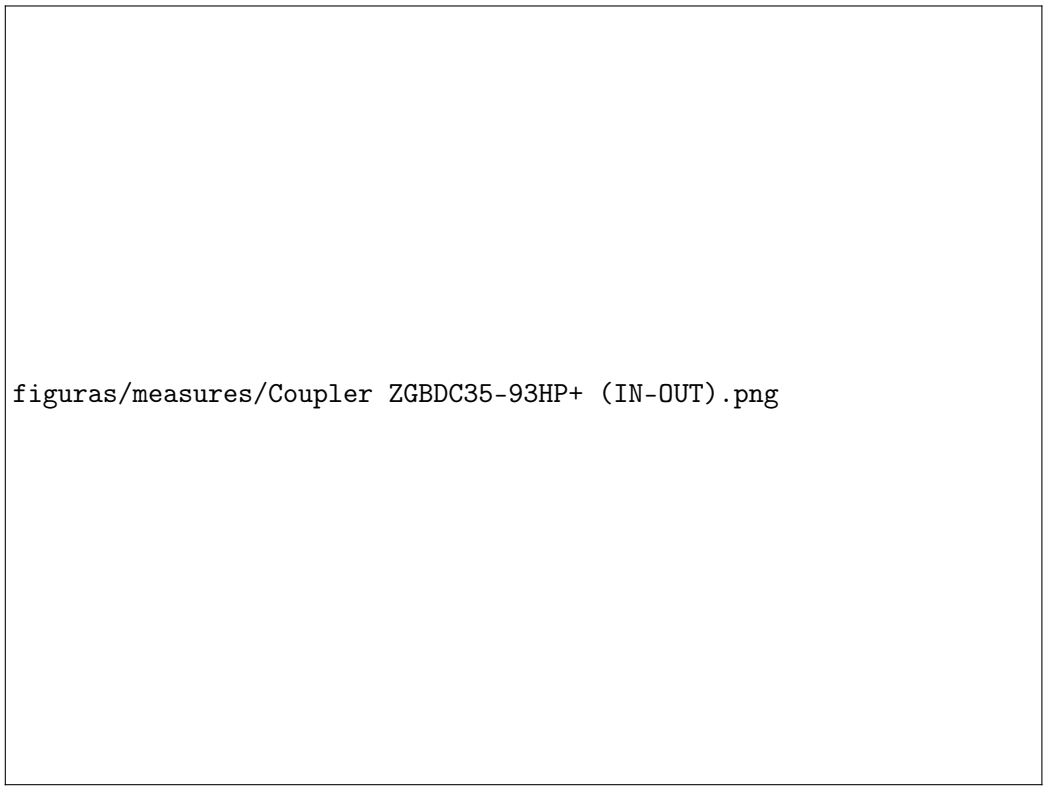

Table C.14.0-1: S-Band and X-Band electrical measurements of coupler bi-directional ZGBDC35-93HP+ (IN-OUT).

figuras/measures/Coupler ZGBDC35-93HP+ (IN-CPL IN).png

Table C.14.0-2: S-Band and X-Band electrical measurements of coupler bi-directional ZGBDC35-93HP+ (IN-CPL IN).

figuras/measures/Coupler ZGBDC35-93HP+ (OUT-CPL OUT).png

Table C.14.0-3: S-Band and X-Band electrical measurements of coupler bi-directional ZGBDC35-93HP+ (OUT-CPL OUT).

C.15. Variable Attenuator 8496B-001 (0 ATT)

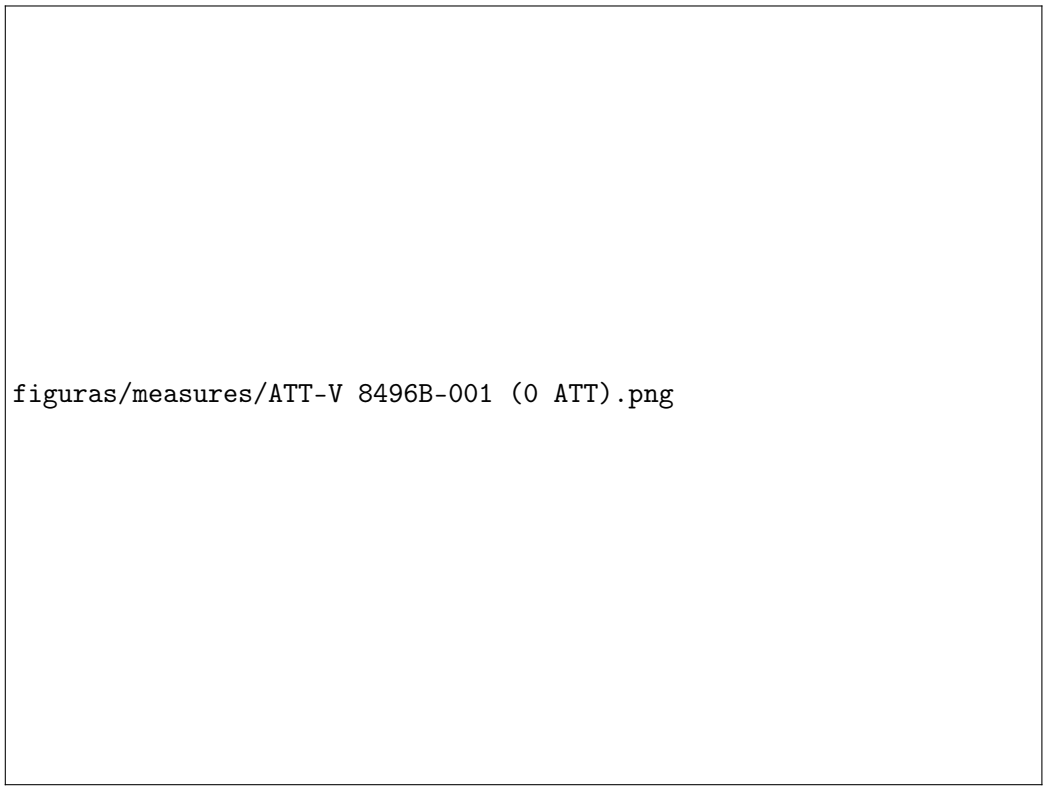

Table C.15.0-1: S-Band and X-Band electrical measurements of variable attenuator 8496B-001 (0 ATT).

C.16. DC-BLOCK PE8213

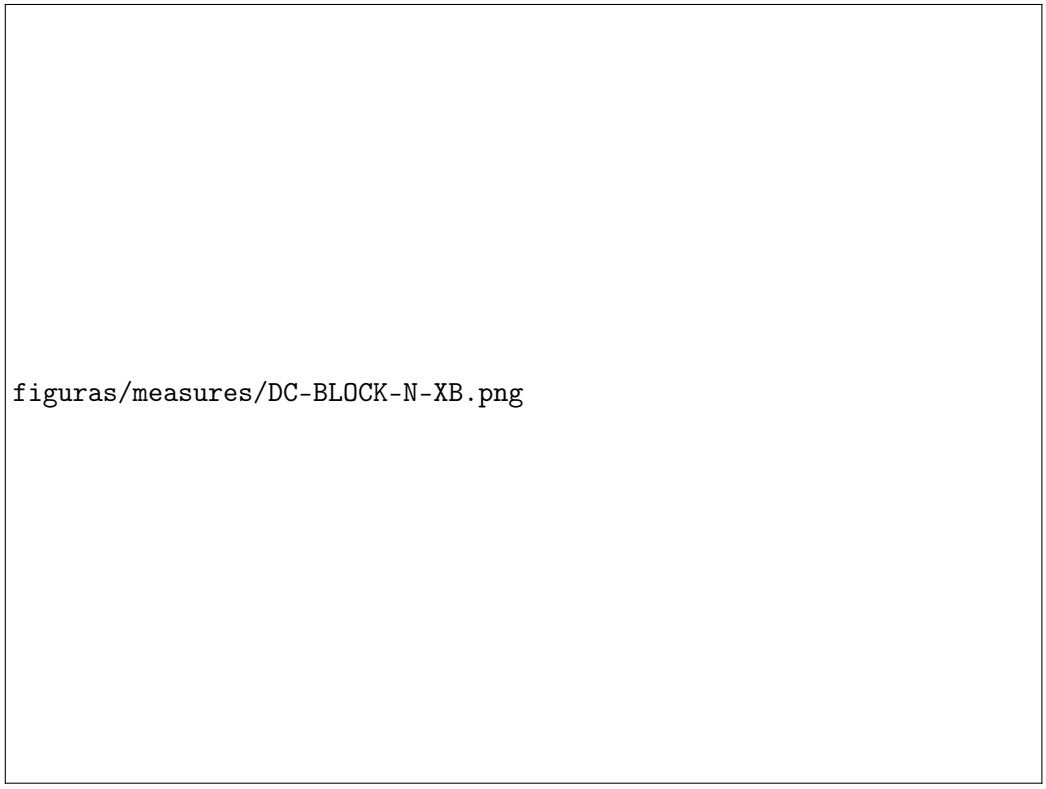

Table C.16.0-1: X-Band electrical measurements of DC-BLOCK PE8213.

C.17. DC-BLOCK PE8210

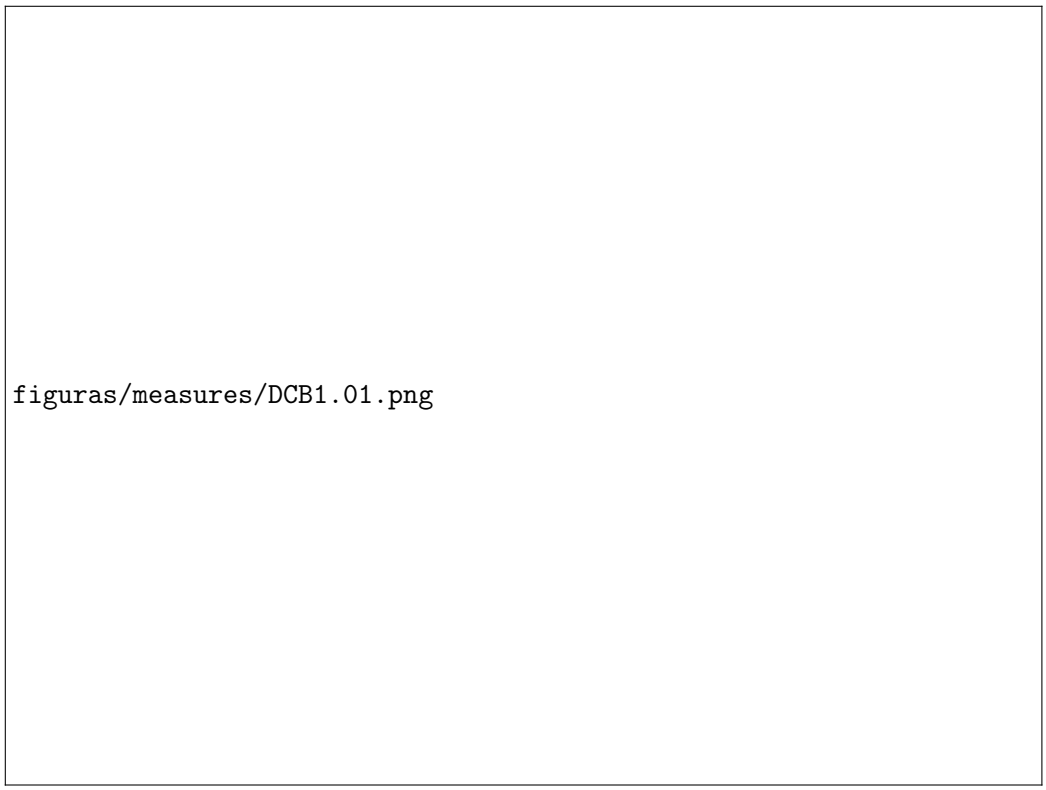

Table C.17.0-1: X-Band electrical measurements of DC-BLOCK PE8210.

C.18. Savers

TBC.

C.19. Adapters N m to SMA f

Table C.19.0-1: S-Band and X-Band electrical measurements of Adapter N m to SMA f AD#1.

Table C.19.0-2: S-Band and X-Band electrical measurements of Adapter N m to SMA f AD#2.

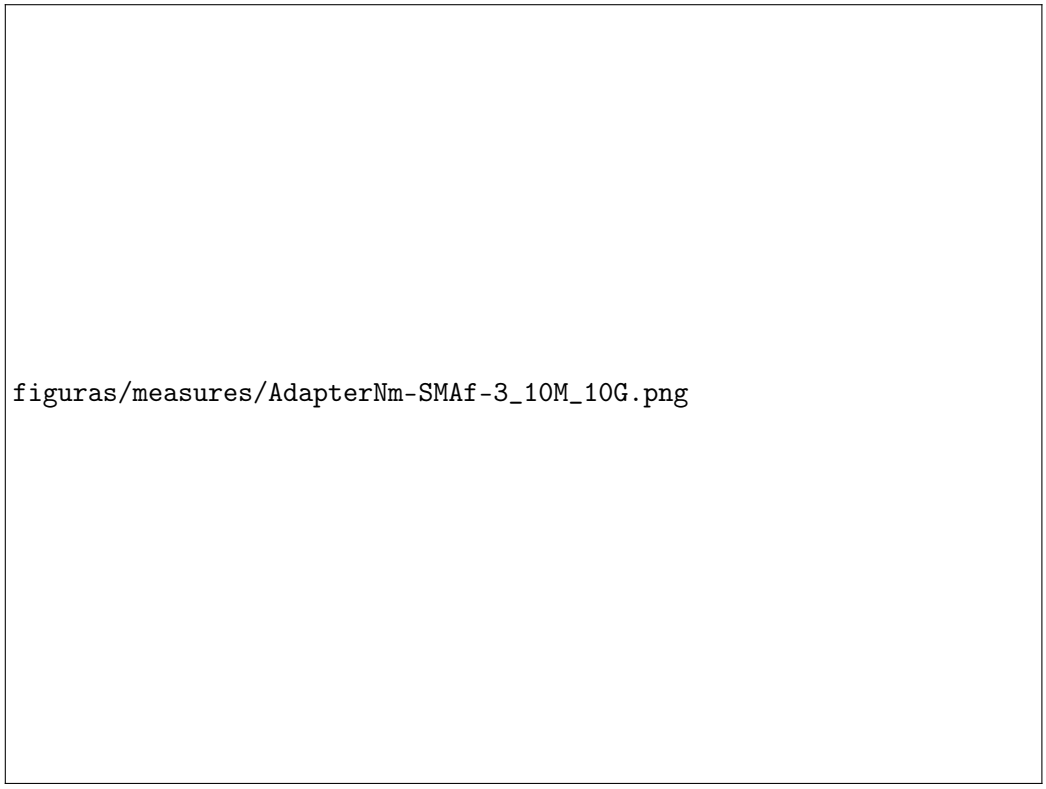

Table C.19.0-3: S-Band and X-Band electrical measurements of Adapter N m to SMA f AD#3.

C.20. Adapters SMA f to SMA f

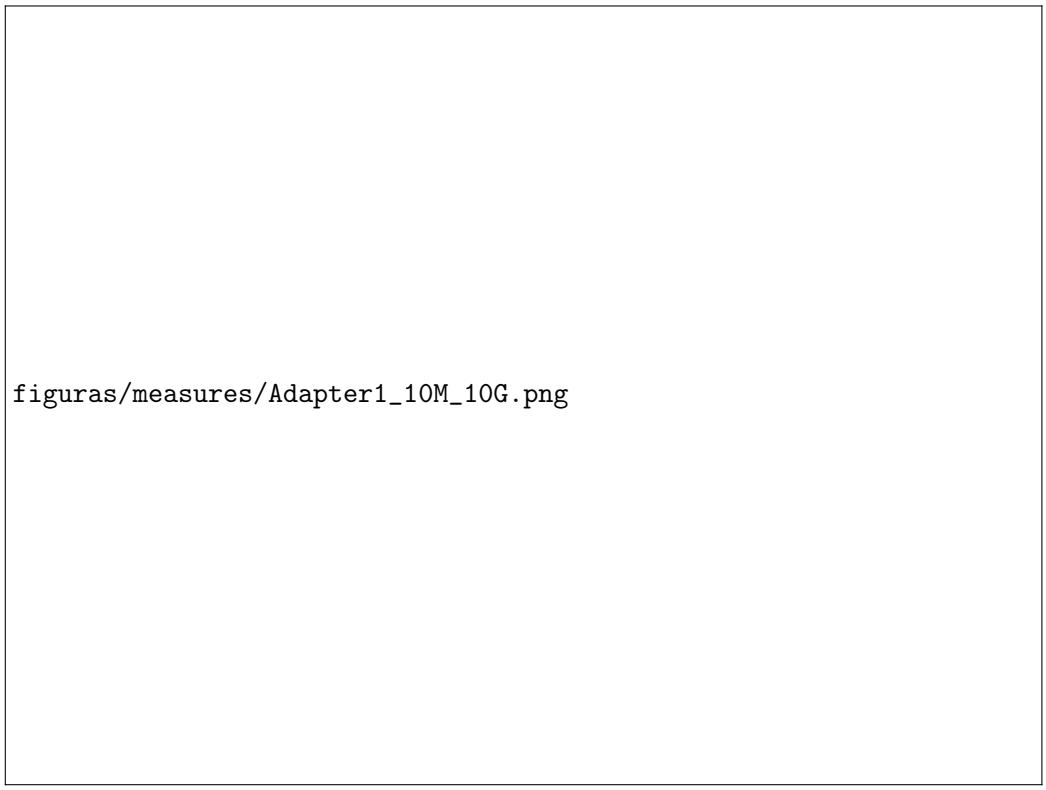

Table C.20.0-1: S-Band and X-Band electrical measurements of Adapter SMA f to SMA f #1 (Coupler port).

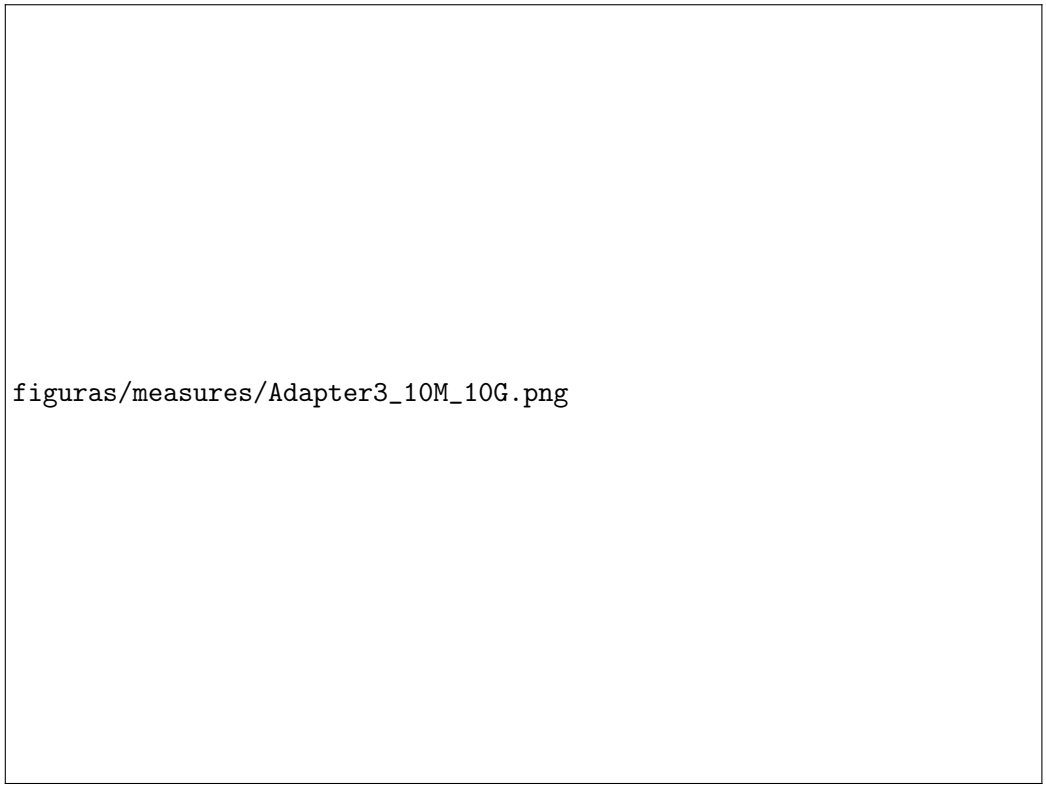

Table C.20.0-2: S-Band and X-Band electrical measurements of Adapter SMA f to SMA f #3 (EWC30 port) of COMM-SS-EM.