SPECIFICATION FOR ATE

Sl No	Description/Spec required by LRDE	Qty	Specification offered by	Remarks / Deviation		red in Price only
	Brief Description of ATE – Quantity 1 Lot		Vendor		Unit Price	Total Price
	 INTRODUCTION Automated Test Suite Equipment (ATE) has to enable the operator to test and validate T/R modules (TRM) for their functionalities as applicable for Active Phased Array Antenna Unit (AAAU). The ATE includes fault isolation procedures, test recording and printing capabilities. The ATE includes the following equipment items: ATE Core - for testing T/R modules in C- and X-band as per the TRM specs (will be provided after finalization of vendor) Interface Test Adapters (ITAs) for TRMs Screen Display 					
	1. SCOPE OF WORK (SOW)					
	1.1 Scope The SOW herein describes the tasks required to be performed by the Contractor and its sub-Contractors, and also the LRDE tasks and obligations attributed to the system requirements, design, development, modification and adaptation, coordination, monitoring, assembly, test and delivery of the AUTOMATIC TEST EQUIPMENT. This document is a technical requirements document for generic ATE consisting of instruments, custom interfaces along with necessary Unit Under Test (UUT) test adapters and test software for the ATE.					
	1.2 Tasks The following is a summary of the tasks required to be performed by the Contractor within the framework of this proposal:					

- Unit Engineering.
- Hardware development
- Test Software Development
- Integration of Hardware & Software items
- Integration Support
- Test and Evaluation.
- Documentation.

1.3 Unit Integration and Testing

It is the responsibility of the vendor to integrate and Test the system in full at LRDE site with LRDE's participation. The Vendor has to provide detailed Installation, Integration and Acceptance Test procedures document. The System should be fully integrated as per Integration document and tested as per Acceptance Test Procedure (ATP). ATP will be conducted at LRDE premises on sample TRM units provided by LRDE.

The schedule for Integration and testing should be informed to the User at least two weeks in advance. All functionality of the system should be tested at LRDE's premises for the demonstration of tests.

1.4 Vendor's Proposed Approach to Design Document (ADD)

Vendor should submit a detailed description on the proposed unit design architecture, unit description, software tools and details on how the proposed unit would meet the specifications along with the quotation (Technical bid). Vendor shall enclose Data sheets of the equipments to support their design.

1.5 General terms and Conditions

The vendor needs to configure the system as per the requirements and should give complete solution for this system. The system should essentially meet the requirements to test input/output signals, communication links and data transfer capability. Vendor is however allowed to make changes depending upon the configuration on mutual concurrence with LRDE. The user should have flexibility to scale-up the system for future requirements for different TRMs of different

frequency bands and functionalities. Hence necessary provision should be available with the system under development. 1.6 Warranty for hardware items Three year of comprehensive warranty on all hardware items including Test and measurement instruments and software which are provided by the Vendor only, from the date of acceptance at LRDE. Supplier of ATE should have local Repair facility with ISO 9001 compliance and Calibration facility accredited to NABL standards. 1.7 Training Once the system is installed and operational, a 5 days training class shall be held for at least 6 LRDE scientists. Lecture and lab material shall be presented with the focus on the system operations with LRDE's consultation. 1.8 On site application support Supplier shall provide a minimum of 15 working days of onsite application support to assist LRDE engineers. System engineer familiar with the test methodology used shall be able to deliver the support. This shall follow immediately after the installation and training. Supplier should have a local Application expert to support ATE system, to address any application issues within 48hrs of registering complaint via telephone by LRDE.

1.9 Vendor Requirements

Long term support and maintenance for at least 10 years shall be provided and allow future expansion and modifications after supply and commissioning of ATE. Vendor should provide long term support and maintenance that is needed for Defense products, as the usage life is at least a decade for the products.

Note: Vendor's qualification will depend on his expertise as the ATE developer which should be supported by the documents.

Vendor has to have at least 3 years of experience in successful development and deployment of ATE's which has to be supported with documents.

1.10 CRITICAL DESIGN REVIEW &MILESTONE TABLE

The supplier shall conduct Critical Design Review (CDR) approximately 8 weeks ARO. The purpose of the CDR is to review the final design of the ATE prior to the starting the system build process. The CDR shall consist of reviewing the following topics. All changes shall be documented and mutually agreed to.

- Suppliers milestones scheduled for major components
- Software development plan
- Hardware development plan
- Review of progress against milestone chart
- Review of performance data and specification compliance
- Review of acceptance test procedure

SI No	Milestone / Delivery	Months ARO
1	Contract Award	D
2	PDR	D + 1
3	CDR	D+3
4	ATP and Delivery	D+8 months

2. ATE Application Principles

ATE shall allow testing the TRMs automatically without any manual handling once the TRM is connected to ATE. All control commands should be given through PC-GUI.

2.1	ATE Main Features			
ATE i	ncludes the following features:			
a.	Computer controlled system built around a PC computer environment.			
b.	Dedicated test equipment to interface with the units.			
c.	Off-the-shelf commercial test equipment controllable through PC.			
d.	Enables the operator to isolate faulty TRM, as applicable, in diagnostic mode.			
e.	Self-Test capability to determine the system status and assist the operator in isolating malfunctioning items.			
f.	Self-Calibration capability to make sure RF Paths and levels of ATE are properly calibrated every time the ATE is switched ON.			
g.	Provides reports on units tested at the station and same should be recorded on hard disk.			
h.	Monitors and interface (mouse and keyboard) to operate and monitor the system's operation through a self-explanatory GUI.			
i.	Housed in 19" racks convenient for technician access.			
1		l		

Mechanical and cable Interface Test Adapters (ITAs) to support both

n. S-Parameters, Noise Figure, Spectrum, Pulse Profile, DC

p. High Throughput and High Accuracy as mentioned in tech specs.
q. High Repeatability and Traceability as mentioned in tech specs.
r. The measurement involves complex switching, programming the various instruments for the measurements, presentation of data etc.

s. The switch matrix subsystem as mentioned in tech specs.

unit and sub-unit testing.
k. Modular Hardware Architecture

characteristics

1. Higher port count with integrated test set (8-30)

m. Single Connection Multiple Measurements

o. Flexible and Open Software Architecture

2.2 Environmental Conditions

ATE equipment should be used in environmentally controlled (air-conditioned) test laboratories.

o Ambient Temperature: 0°c to 55°c.

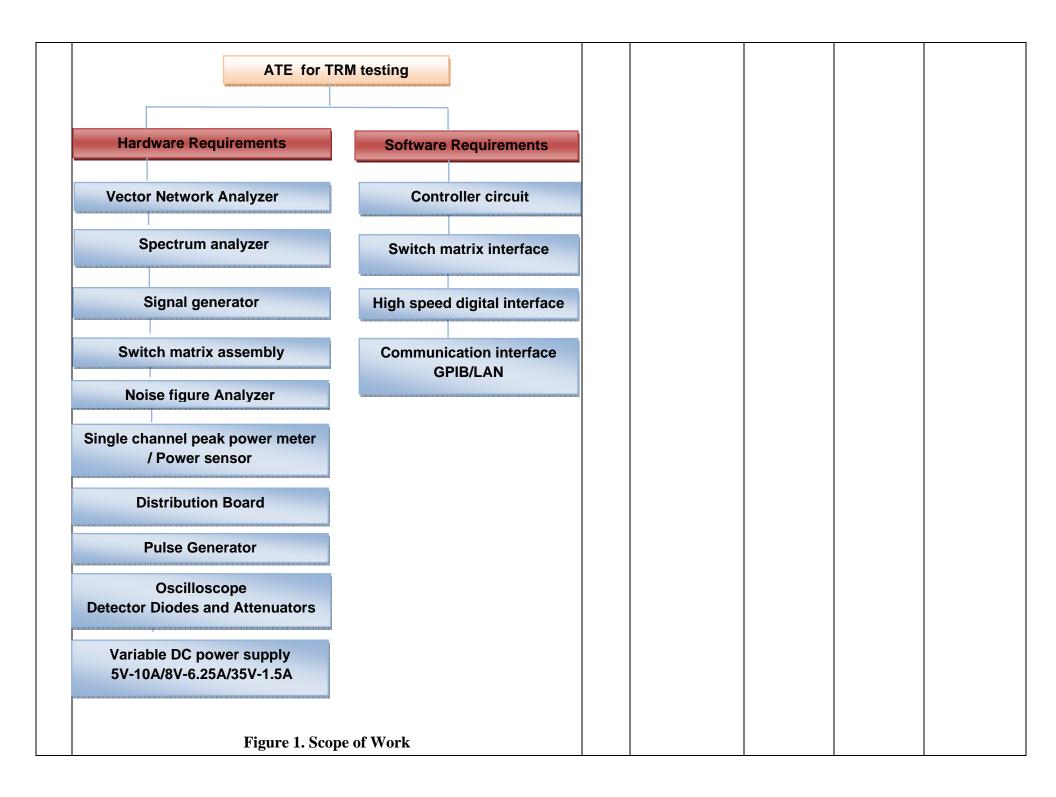
o Relative Humidity: 20% to 90% RH

3. ATE CORE - GENERAL DESCRIPTION

The ATE Core should be PC based, computer controlled system, consisting of rack mounted standard test equipment and dedicated test equipment tester replaceable units (TRUs), and peripheral equipment. It should includes stimulus, measurement, control, switching and display capabilities, software for pre- and post- processing and TRM connection capabilities for functional, diagnostic and performance testing of the TRMs when connected to the ATE Core via the appropriate ITA for functional performance tests of the unit and system under test. It should produce and save automatically detailed test report for each test carried out in the PC. It should be able to test T/R modules in C- and X-band (detailed specifications of TRM and control signals will be provided to the selected vendor). The storage provision should be there for at least 200 sets of testing carried out.

Figure 1 shows broad scope of work illustrating the hardware and software requirements for development of ATE. Out of these items provided by LRDE to the vendor are:

- Pulsed Vector Network Analyzer
- Spectrum Analyzer
- Signal Generator
- Noise Figure Analyzer with noise source
- Oscilloscope
- Interface Control Diagrams of TRM controller circuit



4 Brief Specifications of C- and X- band TRMs

Herein the specifications for the C- and X-band TRMS to be tested are given briefly:-

FREQ: C Band and X bands

TX peak power: 25W peak (~44dBm) (maximum)

Pulse width: 2us to 150us

TX input power level: 0dBm +/- 3dB RF pulse rise/fall time: < 50ns Input VSWR (TX): 1.5:1(Max)

Output VSWR (TX)/Input VSWR (Rx): 2:1 (Max)

Rx gain: 28dB ± 2dB (max)

Rx gain ripple: ± 1dB over the frequency range (C- Band or X-Band) Refer to

Specs for Frequency range

Rx output P1dB: 4dBm (max)

Rx NF: 3.5dB (max)

RX isolation at Rx OFF state: 60dB min Isolation between Rx channels: 50dB min Phase shifter: 6 bits, R.M.S. phase error < 4deg Digital Attenuator: 6 bits (C-band)/5bits (X-band)

TR switch isolation : < 50dB
TR switch switching time : <0.2us

Connector type: SMP series Blind mate male connectors as per Mil std C-

39012

No of devices to tested: upto 8 TRMS sequentially.

5 ATE CORE INTERFACE DEFINITION

5.1 Operating Electrical Power Interface

The ATE Core shall operate from the variable power sources, as defined herein. The ATE Electrical Power interface is:

- 5V, 250mA
- -5V, 15mA
- 8V, 100mA
- 28V, 500mA

The supplies will be routed through micro-D and D type connectors.

NOTE: The TRM interface may differ for both the bands, hence suitable adaptors need to be provided.

5.2 ATE Core Interface with DUT

Each UUT shall be mounted, using a mechanical adapter; where appropriate, to a work surface. The cooling air (supplied from user's cooling system), will be provided to the UUT, where applicable, through this mechanical adapter. The UUT functional connectors will be connected to the ATE through the ATE Interface Panel via a UUT -dedicated ITA. Routing of power, control, stimulus and measurement between the ATE Core and the UUTs shall be accomplished by the ATE Core's Interface Panel. The Interface Panel should include a mass receiver connector to which each of the UUT Interface Test Adapters (ITAs) can be connected.

5.3 Man Machine Interface (MMI)

The Man Machine interface with the ATE Core mainly consists of the ATE PC Controller's keyboard and display screen. Operator commands are transmitted via the keyboard according to test procedure instructions, mainly by prompts appearing on the display. On/Off Power to the ATE is manually controlled by the operator via the Supply Control Panel according to procedure instructions and prompts appearing on the display.

6 ATE Major Components

The ATE is composed of the following major equipment

- a. LRDE will provide following equipment
 - PC Controller and Laser Printer
 - Pulse vector network analyzer
 - Spectrum Analyzer
 - Signal Generator
 - Noise Figure Analyzer with noise source
 - Oscilloscope

- b. Vendor will provide following equipment
 - ATE System Rack with interconnect cables
 - Signal interface Unit
 - Switch Matrix Assembly
 - Programmable Power Supply
 - Digital controls to the TR module
 - Power meter and Power sensor
- c. Device under Test (LRDE responsibility)
 - DUT T/R Module
 - DUT Liquid Cooling system

7 Description of Work

ATE should be designed to allow multiple measurements to be made on TRM. This system is based on a Pulse Performance Network Analyzer with microwave switching, routing the signals from the DUT through the system. ATE should allow for the measurements of S-Parameters, Noise Figure, Spurious, Harmonics, Power and Pulse parameters. The Operating System and Applications software runs on a PC employing instrument and measurement drivers that are callable from Graphical User Interfaces. The switch matrix test ports can act as either stimulus ports or response ports. The ATE will be configured to allow the sequential testing of all TRM's (up to maximum of 8 in number).

The TRM – ATE should be easily configured as a full performance characterization system for Engineering, or a subset of the options can be chosen to configure a system for high volume manufacturing while providing a common set of software tools and user interface. The modularity of the system should allow LRDE to scale the test solution to meet the various manufacturing test station needs without sacrificing measurement accuracy, repeatability and RF power handling capability. Measurement capability can easily be added or removed, depending on the DUT test plan requirement, by exercising the available system options, thus preserving the investment in test plan writing and validation processes.

The test software should provides a GUI, which allows selection of 1,2 or 8 TR Modules with option to select all or some tests for each Module. This selection forms a part of the GUI provided with the Automated Software.

7.1 System Capabilities

The TRM – ATE system capabilities are divided up into several categories. These categories will be detailed to capabilities provided as part of this system. The TRM – ATE system is divided into five different subsystems including, RF Hardware, DUT Control, System Synchronization, DC Power Supplies, and RF Measurements. Each one will be discussed below.

7.1.1 RF Hardware

This section describes the RF hardware portion required to make the TRM – ATE measurements. This will be described with the RF Test Ports, Measurement Receivers, RF Stimulus Sources, and RF Switching.

7.1.1.1 RF Test Ports

The RF Test ports are the ports that are available on switch matrix to be connected to the DUT along with Phase Matched Cables provided as part of the ATE. This section will describe the frequency range, the number of ports, the power available, as well as the power to be received by these test ports.

The system shall have a switch matrix with 24 RF Test Ports.

• Frequency Range: 50MHz to 18 GHz

• No of RF ports: 22 ports.

o 14 ports for connecting to DUTs,

o 8 i/p ports to connect to any of the 14 ports

• RF Specifications:

Parameter	Specification
Frequency	50MHz to 18 GHz
Isolation	<= -85dBc between port to port
Return loss	<= -10dB between 3GHz to 12.4GHz
Insertion loss	<= -4.5dB at 18 GHz
Input power level damage	>=1WRF+dc

• External control: GPIB

• Operating temperature : 0 to 55 Deg C

Indoor Use

• Should be able to mount in a 19" rack system

7.1.1.2 Pulsed Network Analyzer

The Network Analyzer can be used for all of the pulsed S-Parameter measurements and some of the power measurements. The network analyzer used must cover C band and X band frequencies. Refer to section 3 (will be given by LRDE)

7.1.1.3 Spectrum Analyzer

The Spectrum Analyzer can be used for Spectral Analysis and some of the Power measurements. Refer section 3(will be given by LRDE)

7.1.1.4 RF Stimulus Sources

The TRM - ATE shall use the built in RF source for all of the stimulus signals. Refer section 3

7.1.1.5 RF switch/ attenuator unit for attenuating the 25W peak power from the DUT with switch driver

- LXI Class C compliance includes built-in Ethernet connectivity
- Fully-featured graphical web interface
- Control of most popular microwave switches and attenuators
- Distribution boards for ease of wiring

- Switch read back capabilities
- External power option for simultaneous switching
- Software drivers for most common programming environments
- Frequency Range: 50MHz to 18 GHz
- No of RF ports and specifications: 8 input and 8 output ports.

Parameter	Specification
Frequency	50MHz to 18 GHz
Isolation	<= -60dBc between port to port
Return loss	<= -14dB between 3GHz to
	12.4GHz
Insertion loss	<= -22.5dB at 18GHz
Input power level damage	>=50W RF

7.1.1.6 DUT Control Interfaces

The DUT Control Interfaces will include the interfaces that will allow the TRM – ATE to control and synchronize measurements. The TRM – ATE system will be configured with a Digital DUT control interface.

Final design to be determined depending on the clarification of the DUT control interface requirements from LRDE.

UART based control card with at least 5 differential pair lines operating on LVDS levels at 10Mbps data rate. The card also must cater to SPI protocol as an enhancement feature.

7.1.2 System Synchronization Control

The TRM - ATE system will provide a method for synchronizing the RF measurements and the DUT control to allow for the fastest measurements to be made. This will be accomplished with a hardware-triggering scheme. This method will use the triggering capabilities of the instrumentation to achieve the fastest measurements possible.

7.1.3 DC Power Supplies

The TRM – ATE system will include programmable DC Power supplies that have the ability to provide DC power to the DUT as well as read back set voltage and supplied current. The TRM – ATE will be configured with the following power supply:

DUT Power Supply #1 5V, 250mA

DUT Power Supply #1 -5V, 15mA

DUT Power Supply #1 8 V, 100mA

DUT Power Supply #1 28V, 500mA

Main Frame Specifications:

The power supply Mainframe must be modular based system and support 4 individual power supply modules. The mainframe must be able to handle power of up to 1200 watts when power supply modules are used in the mainframe. Must be 1U in size and suited for ATE.

Must support GPIB / LAN / USB and must be LXI compliant.

Power Supply Specifications:

Power supply	Specification		
	Output ripple and noise (PARD) (From 20 Hz – 20 MHz)	Load effect regulation	Line/Source effect regulation
+5V @ 250mA and -5V @ 15A	CV peak to peak < 15 mV CV rms < 5 mV	10 mV / 5 mA	5mV / 5mA
+ 8V @ 100mA	CV peak to peak < 15 mV CV rms < 5 mV	10 mV / 5 mA	5 mV / 5 mA
+28V @ 500mA	CV peak to peak < 20mV CV rms < 10 mV	20mV / 5 mA	10 mV / 5 mA

Remote Sensing capability will be required

7.1.4 RF Measurements

The RF measurements to be performed with the TRM - ATE System include; Pulsed/CW S-Parameter measurements, Spectral Analysis, Noise Figure, and Power measurements. These measurements will all be made through the RF Test Ports to the DUT and will not require reconnection.

7.1.4.1 S-Parameter Measurements

The S-Parameter measurements will be made with the Pulsed Network Analyzer and the switch matrix. S-Parameter measurements can be made in a CW mode or in a Pulsed mode. All four S-Parameters can be measured including calculated measurements of gain flatness.

7.1.4.2 S-Parameter Calibration

There will be several calibration methods available to correct S-Parameter measurements and they include; one port calibration (short, open, load (SOL), 3 term), one path 2 port (short, open, load, thru, (SOLT) 6 term), and full two port (short, open, load, thru (SOLT), 12 term) calibration. shall provide both an E-Cal Module as well as a 3.5mm Verification Kit.

7.1.4.3 Spectral Analysis

The Spectral Analysis measurements will be made with Spectrum Analyzer. The measurements to be made including Harmonics and Spurious (known and unknown).

7.1.4.4 Noise Figure

The existing noise figure analyzer can be used to make the noise figure measurements in the RX path.

7.1.4.5 Power Measurements

Power measurements will be made with any of the two measurement receivers depending on speed and accuracy concerns. The measurement made will include the ability to measure absolute input and output powers at known frequencies as well power compression. The TRM – ATE system will include peak Power Meter for calibration purposes. The power droop and the pulse rise time and fall time measurements also can be made using

the pe	eak power meter.		
	ATE shall contain programmable, LXI compliant power meter with		
sensor	r with the following specifications.		
Powe	r Meter:		
•	30 MHz video bandwidth		
•	Single shot real time capture at 100 Msample/s per second		
•	Key Measurements: - peak, average, peak-to-average ratio, rise time, fall time and pulse width.		
•	One screen view for pulse measurement analysis: Auto Scale, Auto Gate, Rise/Fall Time, Duty		
•	Internal Zeroing and Calibration while connecting to the DUT.		
•	Measurement Speed Via Remote Interface: ≥ 1500 readings per second.		
•	EMC Compatibility: Must comply with requirements of EMC directive 89 / 336 / EEC.		
Po	ower Sensor:		
•	Frequency Range: 50 MHz to 18 GHz		
•	Dynamic Range: - 35 to + 20 dBm		
•	Damage Level: +23 dBm (Average Power) and +30 dBm (< 1 Micro sec duration) peak power		
•	VSWR:		
	o 50 MHz to 10 GHz: 1.2		
	o 10 GHz to 18 GHz: 1.26		

7.2 Requirements for switch matrix software and ATE development

7.2.1 Shall be able to test as per the TR module test plan (Section 2.0) sequentially multiple DUTS at a time.

Option to test 2 no's of TR modules in TRG configuration

NOTE:- It should be possible to characterize the DUT even if one DUT is present.

- 7.2.2 The ATE shall provide all the external interfaces to control the DUT as described in section 7.1.1.6
- 7.2.3 The ATE will run through all the measurement sequences as per the TR Module test plan without any manual intervention once the connections are made and the electronic calibration sequences completed.
- 7.2.4 The Transmit measurements are pulsed. The ATE must run though the TR module tests plan described in section 7.2.9 and 7.2.10 under the conditions defined.
- 7.2.5 The ATE shall be able to process the measured data and shall be able to generate plots and export the measured data to Microsoft Excel spreadsheets with all necessary annotations.
- 7.2.6 Traceability of the software and the measurement/DUT shall be mandatory.
- 7.2.7 Absolute accuracy of each of the measurement is given in the following table.

Measurement	Measurement accuracy at CAL temperature(25 C)
S parameter measurements	< +/- 5deg phase;<+/- 0.5dB magnitude
Peak power measurements	<0.3dB

7.2.8 Measurement capability of the system The following parameters need to be tested on the QTRMs.

SI. No.	Parameter
1	Tx I/P Return Loss (dB)
2	Tx O/P Response Vs. Freq
3	Peak Power RF (dBm)
4	Tx O/P Rise Time (nS)
5	Tx O/P Fall Time (nS)
6	Tx/Rx Switching Time (nS)
7	Rx I/P Return Loss (dB)
8	Rx Path Gain (dB)
9	Rx Path P1dB (dBm)
10	Noise Figure (dB)
11	Rx Protection Switch Isolation (dB)
12	Rx Protection Switching Time (nS)
13	Rx RMS PSE (Deg)
14	Rx RMS Gain Variation with Phase (dB)
15	Rx RMS ASE (dB)
16	Rx RMS Phase Variation with Gain (Deg)

7.2.9 Receive path and common path measurements

• Phase control characterization

At a given frequency, the phase shifter is varied through all the 64 states and both the phase and magnitude for all the pulsed S parameters needed to be recorded.S21 data is to be analyzed to estimate RMS phase settability error & RMS $\Delta A/\Delta \Phi$.

The above measurements are required over at least 5 frequency points over the bandwidth.

Input Level	Rx input level
TX/RX mode	RX continuous
Protection	OFF(continuous)
Attenuator	0 dB setting

• Gain control (attenuator control) characterization

At a given frequency, the digital attenuator is varied through all the 64 states and both the phase and magnitude for all the pulsed S parameters needed to be recorded.S21 data is to be analyzed to estimate RMS attenuation settability error & RMS $\Delta\Phi/\Delta$ A

The above measurements are required over at least 5 frequency points over the bandwidth.

Input Level	Rx input level
TX/RX mode	RX continuous
Protection	OFF(continuous)
Phase control	0 deg setting

• Digital attenuator response time

MSB5 of the digital attenuator is pulsed and the RX output is detected and the Rise and fall times are measured.

The above measurements are required over at least 5 frequency points over the bandwidth.

Input Level	Rx input level
TX/RX mode	RX continuous
Protection	OFF(continuous)
Phase control	0 deg setting
Attenuator Control	MSB5 is pulsed.MSB4 to MSB0:low

• RX protection switch characterization

a) Rise/Fall time

Rx Protection switch control is pulsed and the rise and fall times are measured and recorded over the RX output frequency range

Input Level	Rx input level
TX/RX mode	RX continuous
Protection	Pulsed
Phase control	0 deg setting
Attenuator Control	0 dB setting

b) Isolation

With the measurement condition as above, the difference between the protection On and OFF states gives the isolation of the switch. This needs to be measured on a VNA.

• TX/ Rx protection switch characterization

A. Rise/Fall time

TX/Rx switch control is pulsed and the rise and fall times are measured and recorded over the RX output frequency range

Input Level	Rx input level
TX/RX mode	Pulsed
Protection	off
Phase control	0 deg setting
Attenuator Control	0 dB setting

B. Isolation

With the measurement condition as above, the difference between the protection ON and OFF states gives the isolation of the switch. This needs to be measured on a VNA

• Rx path P1dB Measurement

This measurement is needed over the frequency band

Input Level	
Tx/Rx Mode	Rx(Continuous)
Protection	OFF(Continuous)
Phase control	0 Deg. Setting
Attenuator Control	0 dB setting

NOTE: It also must support measurement of compression parameters over different frequencies with one integrated measurement where users can specify the frequency range, power range, and number of frequency and power points

• Noise Figure Measurement

(This measurement is needed over the frequency band with a $10~\mathrm{MHz}$ Frequency Step) Noise Figure

Input Level	Noise Source
Tx/Rx Mode	Rx(Continuous)
Protection	OFF(Continuous)
Phase control	0 Deg. Setting
Attenuator Control	Programmable for 64 States

• Rx path Spurious Measurement

Out-of-band spurious search up to 18 GHz.

Input Level	Rx input
Tx/Rx Mode	Rx(Continuous)
Protection	OFF(Continuous)
	, , , , , , , , , , , , , , , , , , ,
Phase control	0 Deg. Setting
Attenuator Control	0 dB setting

7.2.10 TRANSMIT PATH MEASUREMENT • TX Output Characterization (Pulsed-S parameters of TX path) a) Flatness, Peak Output, Rise/Fall times & Droop TX Path Input T/R Pulse (Pulse Width , Duty : </= TX/Rx Mode 20%, both Programmable ON(Continuous) Protection Phase control 0 Deg. Setting Attenuator Control 0 dB setting NOTE: For ease of troubleshooting, the network analyzer should have integrated pulse modulators and generators. The network analyzer shall have the capability to measure S parameters with pulse a width up to 50nS.Output is to be observed and the following are to be recorded. Rise/Fall times Pulse Profile Peak Power Pulse Droop The above measurements are to be done for 10 spot frequencies over. b) TX path output Power variation with input power: Peak Power is to be recorded over the frequency band

TX path Input	
TX/Rx Mode	T/R Pulse(Pulse Width:
	Duty: = 20%, both Programmable</td
Protection	ON
Phase control	0 Deg. Setting
Attenuator Control	0 dB setting

Output is to be observed on Spectrum Analyzer & spurious search up to 18 GHz with & without RF.

Input level	
Tx/Rx Mode	T/R Pulse
Protection	ON
Phase control	0 Deg. setting
Attenuator Control	0 dB setting

List of Deliverables

SLNo	Unit
1	Automated Test Suite Equipment with desired functionalities as listed under section 7.2
2	Power supplies for the DUT as outlined in section 7.1.3
3	24 port Switch matrix as outlined in section 7.1.1.1
4	Power meter and power sensor as per section 7.1.4.5
5	Digital controls for the DUT as per section 7.1.1.6
6	Microwave switch/ attenuator and driver as per section 7.1.1.5
7	Switch Attenuator Control Unit
	Note: For demonstration of the complete functionality as described in the automated test suite LRDE will provide all the other customer furnished equipment (Test instruments, digital controls and DUT) as outlined in section 6.

The vendor should indicate point-to-point compliance for full specifications

Only original equipment manufacturer or authorized representatives with certificate from OEM should submit quotes.

The vendor should furnish the details of similar item supplied earlier with evidence.

Note:

- 1. The above format to be submitted in duplicate after duly filling but price information to be given in only one copy
- 2. The copy of above format without price information should be enclosed to techno-commercial bid
- 3. The copy with price information must be enclosed to price bid only.
- 4. Disclosure of price information in techno-commercial bid will lead to rejection of the quote.

Contact details:

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