



Republic of the Philippines  
Department of Science and Technology

**ADVANCED SCIENCE AND TECHNOLOGY INSTITUTE**



ASTI-FM 03-11  
REV 0/2 APR 2018

**DOST-ASTI Bids and Awards Committee  
Invitation to Bid (Public Bidding)**

<b>ITB No:</b>	18-06-1900	<b>Date:</b>	June-07-2018
<b>PR No:</b>	PDH2-18-05-5780	<b>Date:</b>	May-03-2018
<b>Source of Funds:</b>	Product Development Hub2		
<b>Total ABC:</b>	Php 80,000,000.00		
<b>Time, Date &amp; Venue of Pre-bid Conference:</b>	June 21, 2018, 1:30 PM at DOST-ASTI		
<b>Time and Date of Submission of Bids:</b>	July 03, 2018, 12:00 PM		
<b>Time, Date &amp; Venue of Opening Bids:</b>	July 03, 2018, 1:30 PM at DOST-ASTI		
<b>Date of availability of Complete Set of Documents:</b>	June 13, 2018		
<b>Deadline of Potential Bidder's Clarifications:</b>	June 23, 2018		
<b>Deadline of ASTI's Supplemental Bid Bulletin:</b>	June 25, 2018		
<b>Delivery Schedule:</b>			

The Advanced Science and Technology Institute (ASTI), through its Bids and Awards Committee (BAC), hereby invites all interested bidders to submit their bids for the item(s) listed below. Guidelines regarding the format, eligibility, technical and financial documents needed are described in the Instruction to Bidders of the Philippine Bidding Documents

Bidding will be conducted through open competitive bidding procedures using a non discretionary "pass/fail" criterion as specified in the 2016 R-IRR of RA 9184.

A complete set of Bidding Documents may be purchased by interested bidders upon payment of a fee for the Bidding Documents. It is also downloadable for free of charge at DOST-ASTI's website - [www.asti.dost.gov.ph](http://www.asti.dost.gov.ph)

For further inquiries, contact ASTI's BAC Secretariat via email at [bac-sec@asti.dost.gov.ph](mailto:bac-sec@asti.dost.gov.ph). Interested bidders may also call the number - (632)-426-7423 and look for ASTI's BAC Secretariat.

Respectfully,  
  
**Pedro B. Mangahas**  
BAC Chairman

NO.	TECHNICAL SPECIFICATIONS	QTY	UNIT	UNIT PRICE(Php)	TOTAL PRICE(Php)
1	<p><b>EMS (Susceptibility/ Immunity) Measurement Test System</b> Electromagnetic Susceptibility (EMS) TURNKEY SYSTEM This purchase requisition is for a Turnkey EMS Test System inclusive of design, supply, integrate, install and commission with the existing Electro Magnetic Interference (EMI) Test System. The test system shall be for full compliance, fully automated, controlled by a modular based test system software for testing various electronic and electrical equipment according to latest editions of the following standards:- IEC 61000 4-2/ Electrostatic Discharge (ESD) Immunity IEC 61000-4-3/ Radio Frequency (RF) Radiated Immunity IEC 61000-4-4/ Electrical Fast Transients (EFT)/Burst Immunity IEC 61000-4-5/ Surge/Combination Wave Immunity</p>	1	lot	80000000.00	80,000,000.00

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IEC 61000-4-6/ RF Conducted Immunity  
IEC 61000-4-8/ Power Frequency Magnetic Field Immunity  
IEC 61000-4-9/ Pulse Frequency Magnetic Field Immunity  
IEC 61000-4-11/ Voltage Dip, Interruption, Variation Immunity  
IEC61000-6-1/ Residential, Commercial, light Industrial Immunity  
ISO 11452-2/ Automotive RF Radiated Immunity  
ISO 11452-4/ Automotive Bulk Current Injection  
CISPR 14-2  
CISPR 20  
CISPR 24  
CISPR 35

Bidders must be able to provide a turnkey solution for a complete EMS test setup. Bid price should be inclusive of all costs necessary (permits, taxes and duties, etc.) DDP (Delivered Duty Paid). DDP will be based on the rules of Inco terms 2010.

Progressive payment terms:

1. Supply, delivery and installation of EMS Test Systems: 40 percent  
Due: 3 months and 15 calendar days after Issuance of NTP
2. Commissioning of EMS Test Systems: 30 percent  
Due: 4 months and 20 calendar days after Issuance of NTP
3. Completion of EMS Test System Training: 20 percent  
Due: 5 months and 15 calendar days after Issuance of NTP
4. Compliance of EMS Test System Factory Acceptance Test (FAT): 10 percent  
Due: 1 month and 20 calendar days after Issuance of NTP

Although the Bid will be for one (1) lot, we will be requiring that the External Provider still have to indicate the prices of each item individually (for future reference).

After Sales Service & Maintenance:

The External Provider (Principal) shall have a local service & calibration center based in the Philippines for diagnosis, maintenance and repair of test and measurement instruments. They must provide a list of their service centers.

Warranty:

During the Warranty period, the External Provider upon proper notification of the Buyer shall:

- (1) Send representatives within two (2) calendar days to verify and troubleshoot the issue upon notification. Experts shall arrive within a seven (7) calendar days at the site where the defect(s) of Supplies is (are) found to repair or replace;

- (2) Bear all expenses arising from this repair/replacement;
- (3) Must immediately notify the Buyer and/or End User in case the Supplies cannot be repaired on site;
- (4) Notify the Buyer estimated time for repair/replacement but the period for repair/replacement shall not be longer than five (5) weeks from the dispatch date of the defective and/or damaged items;
- (5) Bear all costs arising from or in connection with the repair and/or replacement, including but not limited to customs duties, taxes and transportation fees;
- (6) Bear all costs arising from and/or in connection with the delay in case the items dispatched for repair/replacement cannot be returned within the stipulated time;
- (7) Extend the warranty period in days, from the day the issue has been reported to the day the repair/replacement has been successfully made, after the verification of the issue.

Any replacement or repair provided under warranty period shall be warranted by the External Provider for at least another 3 (three) months on top of the remaining warranty period from the date of finishing repair and/or installation of replaced items. Extended warranty shall only cover the repaired part of the equipment.

Warranty: 3 years

Delivery Date: 5 months and 15 calendar days

#### A. Radiated Immunity Test System

1) 1 set RF Shielded Amplifier Room:

\*Dimensions: Approx. 3.1m x 3.1m x 3.0m (LxWxH)

\*Shielding Effectiveness (based on EN 50147-1 or MIL-STD-285)

-Shielding Effectiveness Value

\*100kHz:  $\geq 90$ dB (Magnetic Field)

\*1MHz:  $\geq 100$ dB (Magnetic Field)

\*100MHz:  $\geq 100$ dB (Electric Wave)

\*2GHz:  $\geq 100$ dB (Plane Wave)

\*10GHz:  $\geq 100$ dB (Micro Wave)

\*Construction

-Self-supporting structure

-Outside & inside shielding shall have a smooth surface.

\*Flat Floor with anti-static floor cover

-Max. load capacity: 5000 N/m<sup>2</sup>

\*Single leaf, manual door

-RF shielded. Door fingers shall not be exposed to prevent damages.

-Size: clear opening  $\geq 0.9$ m (w) x 2.0m (h)

\*Honeycomb air vents with Waveguide ventilation

-Quantity: 4 pcs

\*Power line filters: 1- $\Phi$  (2-lines) 270 VAC/ 30A (for lighting, emergency light, receptacles, EUT, etc.)

\*Power line filters: 3- $\Phi$  (4-lines) 480 VAC/ 30A (for power amplifier, etc.)  
-Attenuation (insertion loss)  $\geq 100\text{dB}$  ( $150\text{kHz} \leq f \leq 18\text{GHz}$ )

2) 1 set RF Power Amplifier:

\*General requirement:

a. To fulfil 80MHz – 1GHz, 30V/m @ 3meter distance 80%AM for horizontal & vertical (IEC 61000-4-3:2006 Ed. 3.0)

b. Fulfills 80MHz – 200MHz, 100V/m @ 1m distance for vertical for ISO 11452-2 (automotive)

c. Also fulfills 200MHz – 1GHz, 200V/m @ 1m distance for vertical and horizontal for ISO 11452-2 (automotive)

\*Frequency range: 80MHz – 1GHz

\*Nominal input impedance: 50 $\Omega$

\*Power output

-min. 1000W (<400MHz)

-min. 850W (>400MHz)

\*Gain flatness:  $\pm 3.0\text{dB}$

\*With built-in or external Directional Coupler

\*Remote control via LAN or GPIB

3) 1 set RF Power Amplifier:

\*General requirement:

a. To fulfil 1GHz – 6GHz, 30V/m @ 1m distance for vertical and horizontal, 80%AM (IEC 61000-4-3:2006 Ed. 3.0)

b. Also fulfills 1GHz-4GHz, 200V/m @ 1m distance for vertical and horizontal, for ISO 11452-2 (automotive)

\*Frequency range: 1GHz - 6GHz

\*Nominal input impedance: 50 $\Omega$

\*Power output:

a. 1GHz – 2.5GHz: min. 300W

b. 2.5GHz – 6GHz: min. 100W

\*Gain flatness/Variation:  $\pm 2.0\text{dB}$

\*With built-in or external Directional Coupler

\*Remote control via LAN or GPIB

4) 1 set Power Meter:

\*4 channels

\*Frequency range: sensors dependent

\*Remote control via LAN or GPIB

\*Can be Rack Mounted with adapter

5) 2 units Power sensor:

\*One for forward power & one for reverse power

\*Frequency range: 9kHz – 6GHz

\*Power measuring range: -55dBm to +10dBm

\*SWR:  $\leq 1.15: 1$  (9kHz to 2GHz)

\*With Calibration Certificate from OEM

6) 1 set RF Switching Unit:

\*General requirement:

-Designed for EMS Measurement, switching from single signal source to multiple amplifiers, support multiple paths of power reading, support interlock interface with chamber's door

\*Must have automatic switching capability, controllable

via system software and manual front panel control

- \*Frequency range: DC – 18GHz
- \*2 x RF relay, SP6T & 4x RF Relay SPDT
- \*Remote Control via LAN or GPIB
- \*Modular in design, usable up to 40GHz, additional 12 path switching for possible future upgrade
- \*Can be Rack Mounted with adapter

7) 1 set Log-periodic antenna for IEC 61000-4-3 testing:

- \*Frequency range: 80MHz to 1000MHz
- \*Isotropic Gain @ 80MHz:  $\geq 7.3\text{dBi}$
- \*VSWR:  $< 1.5$
- \*Max input power: 2000 W
- \*With movable Stand
- \*Automatic Linear polarization with pneumatic and electric remote control

8) 1 set Log-periodic antenna for ISO 11452-2 testing:

- \*Frequency range: 80MHz to 1000MHz
- \*Isotropic Gain @ 80MHz:  $\geq 6.5\text{dBi}$
- \*VSWR:  $< 1.5$
- \*Max input power: 2000 W
- \*With movable Stand
- \*Automatic Linear polarization with pneumatic and electric remote control

9) 1 set Log-periodic antenna for IEC 61000-4-3 testing:

- \*Frequency range: 1000 - 6000 MHz
- \*Gain: typ. 10dBi
- \*VSWR:  $< 1.5$  (typ.)
- \*Max input power:
  - a. 300W (f = 1GHz)
  - b. 150W (f = 6GHz)
- \*Half-Power Beamwidth
  - a.  $46^\circ \pm 10^\circ$  (E-plane)
  - b.  $48^\circ \pm 10^\circ$  (H-plane)
- \*With antenna adapter and stand
- \*Automatic Polarization with pneumatic and electric remote control

10) 1 set Horn Antenna for ISO 11452-2 testing:

- \*Frequency range: 1GHz – 4GHz
- \*Gain: minimum 11dBi @ 1GHz
- \*VSWR:  $< 1.6$  (typ./average)
- \*Max input power: 500W @ 4GHz
- \*With antenna adapter and stand

11) 1 set Field Monitoring Equipment:

- \*Electric field sensor
- \*Isotropic detection (X,Y,Z axis reading)
- \*Frequency range: 100kHz – 6GHz
- \*Dynamic range: 0.5 to 800V/m
- \*Laser power supply
- \*With Calibration Certificate from OEM
- \*Low dielectric probe stand
- \*Fiber-optic link control line

12) EUT Table (Low Reflection Table)

- \*Dimension: 1.2m x 1.0m x 0.8m (l x w x h)

\*Permissible load: 100kg

## B. Conducted Immunity Test System

1) 1 set Power Meter

\*4 channels

\*Frequency range: sensors dependent

\*Remote control via LAN or GPIB

\*Can be Rack Mounted with adapter

2) 3 units Power sensor

\*One for forward power, one for reverse power, one for calibration path

\*Frequency range: 9kHz – 6GHz

\*Power measuring range: -55dBm to +10dBm

\*SWR:  $\leq 1.15: 1$  (9kHz to 2GHz)

\*With Calibration Certificate from OEM

3) 1 set RF Power Amplifier

\*General requirement

a. To fulfil 150kHz – 80MHz, 10Vrms 80%AM (IEC 61000-4-6:2006 Ed. 2.2)

b. Also covers ISO11452-4 (automotive) 1MHz – 400MHz, 200mA substitution test

\*Frequency range: 10kHz – 400MHz

\*Power output:  $\geq 250$  W @ 10kHz – 400MHz

\*Gain Variation / Flatness:  $\pm 3$  dB

\*With built-in or external directional coupler

\*Remote control via LAN or GPIB

4) 1 set Coupling Decoupling Network (CDN)

\*Supply Line

a. 1 Line, (a pair)

b. 2/3 Lines, Switchable, 16A

c. USB connector

d. T8S

\*With calibration sets

5) 1 set EM Clamp

\*Compliant to IEC61000-4-6 Ed. 4 requirement

\*Coupling aperture: 20mm

\*Input power rating:

a. 150kHz to 100MHz: 100W CW

b. 100MHz to 230MHz: 100W CW

c. 230MHz to 1GHz: 50W CW

\*Include calibration adapter

\*Decoupling Clamp Included, 20mm coupling aperture

6) 1 set Bulk Current Injection (BCI)

\*Compliant to IEC61000-4-6 Ed. 4 requirement

\*Current Injection Probe

a. Frequency range: 10kHz to 400MHz

b. Window diameter: 43mm

c. Outside diameter:  $>112$ mm

d. Max. input power: 1000W

e. Calibration jig included

\*Monitoring Probe

a. Frequency range: 10kHz to 400 MHz

b. Insertion loss: Typical approx. -22dB

c. Transfer impedance: typical approx.  $4\Omega$  (100kHz to

230MHz)

7) 1 set Oscilloscope

\*Input channels:  $\geq 2$

\*Analog bandwidth:  $\geq 3\text{GHz}$

\*Rise time/fall time:  $\leq 118\text{ ps}$  (10% to 90% at  $50\ \Omega$ ) or less

\*RMS noise floor at  $50\ \Omega$  (typ.)

a.  $1\text{ mV/div} \leq 0.16\text{ mV}$

b.  $20\text{ mV/div} \leq 0.35\text{ mV}$

c.  $50\text{ mV/div} \leq 0.8\text{ mV}$

d.  $200\text{ mV/div} \leq 3.40\text{ mV}$

\*Waveform arithmetic/measurement

-Peak to peak, minimum, maximum, average, RMS

### C. System Accessories

1) 1 set Integrated System Software (Radiated Immunity)

\*Functionality - Control the complete EMS test system with drivers for wide selection of measuring instruments and system components such as test receiver, spectrum analyzer, signal generator, antenna mast, turntable and etc.

\*Shall be compliance to IEC 61000-4-3 latest standard

\*Shall come with latest requirement for amplifier 2dB linearity check function

\*Measurement results shall display the results for factor measurement of level monitoring, calibration of injection level, saturation check and immunity measurement

\*Shall be able to perform 16-points uniformity test as per IEC 61000-4-3

\*Field probe position points shall be able to set from 1 points to maximum 63 points during uniformity test

\*Software shall support simultaneously 1, 2, 3 and 4 probes for uniformity test

\*Uniformity test shall be able to be saved and continued the next day by recalling the same saved file name

\*Software shall support existing R&S SMB100A RF Signal Generator

\*Software shall support at least 3 different mainstream manufacturer of RF signal generators and power meters for easy replacement during service period

\*Shall have function to export uniformity measure result, calibration reference result, linearity check result and immunity test results to excel, words.

\*Measurement setup shall include measurement graph, monitoring frequency, SG level, level meter level, field strength level, forward power and reverse power in one window

\*Testing measurement condition shall be able to be saved and load from measurement software

\*Fail point shall be able to be marked during immunity measurement with remarks and comments

\*Amplifier Linearity Check measurement shall be done easily in one window displaying one graph showing frequency, forward power, reverse power, power difference and Total Judgement

\*Amplifier Linearity check calibration output difference for upper and lower tolerance shall be able to be easily changed to adapt future changes in standard.

\*Software shall have one-point fast verification check function to be used for daily or weekly or monthly check of system stability compare to the reference measurement during uniformity measurement

\*Measurement of Immunity frequency shall be able to be set 3 modes :

- a. step mode (start & stop frequency) with interval in percentage or frequency
- b. point mode (dedicated frequency point)
- c. step + point mode for flexible testing

\*Modulation of Test level shall be able to be set for AM, FM, Pulse or external signal generator

\*Measurement shall be able to be paused during measurement

\*Frequency point shall be able to be freely moved during measurement process

\*Real time monitoring of forward power and reverse power shall be display on software

\*Shall have the ability to set upper & lower limit of forward and reverse power reference to the calibration power to ensure safety of system

\*Shall have the ability to set upper limit of signal generator output to protect the system

\*Software shall have function to input factor for field probe calibration factor

\*Software shall have function to input factor of forward and reverse power of the amplifier

\*Operating system compatibility: Latest Windows versions

2) 1 sets Integrated System Software (Conducted Immunity)

\*Functionality - Control the complete EMS test system with drivers for wide selection of measuring instruments and system components such as test receiver, spectrum analyzer, signal generator, antenna mast, turntable and etc.

\*Software shall support at least 3 different mainstream manufacturer of RF signal generators and power meters for easy replacement during service period

\*Shall have function of Saturation Check to perform in order to verify that the amplifier is not saturated as per new requirement in IEC 61000-4-6

\*Measurement results display to display the results for factor measurement of level monitoring, calibration of injection level, saturation check and immunity measurement

\*Shall have function to export factor level monitoring path, calibration result, saturation test result, and immunity test results to excel, words.

\*Measurement display shall include measurement graph, monitoring frequency, input level, output level, SG level, level meter level, forward power, reverse power and SWR power in one window

\*Testing measurement condition shall be able to be able to be saved and load from measurement software

\*Calibration of injection level setting shall be able to factor in level monitor path with additional factor setting



\*Saturation Check measurement shall be done easily in one window displaying one graph showing frequency, test level, SG level, monitor level, level meter level, level difference, forward power, reverse power, power difference and Total Judgement

\*In saturation check calibration, changes of power difference for upper and lower tolerance shall be able to be easily changed to adapt future changes in standard.

\*Judgement of saturation check shall be able to be selected either judge by power difference or judge by monitor level difference

\*Measurement of Immunity frequency shall be able to be set 3 modes

- a. step mode (start & stop frequency) with interval in percentage or frequency
- b. point mode (dedicated frequency point)
- c. step + point mode for flexible testing

\*Measurement of Immunity Test level shall be able to be set in Voltage, Voltage (e.m.f.) or current with start and stop test level.

\*Modulation of Test level shall be able to be set for AM, FM, Pulse or external signal generator

\*Measurement shall be able to be paused during measurement

\*Frequency point shall be able to be freely moved during measurement process

\*Software shall have real time monitoring of forward power and reverse power display on software

\*Software shall have ability to set upper & lower limit of forward and reverse power reference to the calibration power to ensure safety of system

\*Software shall have ability to set upper limit of signal generator output to protect the system

\*Software shall come with function to compare calibration factors to observe the stability of the measurement of different time

\*Shall be working with existing RF Signal Generator (R&S SMB100A)

\*Operating system compatibility: Latest Windows version

### 3) 2 sets Control PC/Laptop

\*Intel Core i7 Processor or better

\*Memory 8GB (2x4GB) or better

\*1TB 7200RPM S-ATA HDD or better

\*Integrated Intel HD Graphics 2000 or better

\*Windows 10-64bit or better

\*23" Wide Monitor

### 4) 1 set Cables

\*Optical cabling, RF cabling, GPIB adapter and cable that will be suitable for the application and implementation of the system.

### 5) 1 set Rack

19" Rack and AC power distribution unit suitable to the system

## D. Transient Test Requirements

- 1) 1 set Electrostatic Discharge Tester
- \*Discharge Voltage:
    - a. 1kV to 30KV (Air)
    - b. 1kV to 30KV (Contact)
  - \*Battery &/or mains powered with display on ESD Gun.
  - \*User replaceable battery easily
  - \*ESD pulse holding time  $\geq 5s$  (IEC 61000-4-2)
  - \*Polarity: Positive/Negative/alternate
  - \*Discharge Network: 150pF/330 $\Omega$  (IEC61000-4-2)
  - \*ESD Voltage verification kit with measurement from oscilloscope
  - \*ESD Target with vertical plate as per requirements in IEC 61000-4-2
    - a. Variation of insertion loss:  $<0.5$  dB up to 1GHz
    - b. Frequency range: up to 4GHz
    - c. Input impedance: less than 2.1 ohm
    - d. Input voltage: 30 kV
    - e. Current range: 0 – 120A
    - f. Come with stand supporting ESD Gun during verification
- 2) 1 set Multi-Transient Generator
- \*Coupling/Decoupling network at mainframe: AC/DC 300V, 16A
  - \*EUT input with overcurrent protection
  - \*Built-in EUT voltage, current and frequency monitor show on front screen
  - \*Built-in temperature and humidity sensor
  - \*Front panel impulse voltage & current monitor via BNC
  - \*Large touch screen operation
  - \*Front panel input power selection buttons
  - \*IEC 61000-4-4 Electrical Fast Transient(EFT) / Burst
    - a. Burst Voltage: 500V to 4000V (level 1 – 4)
    - b. Burst Frequency: 1kHz to 1000kHz
    - c. Burst time: 0.01ms to 30ms
    - d. Rep. Time: 1ms – 1000ms
  - \*IEC 61000-4-5, Surge (1.2/50us – 8/20us)
    - General Requirement:
      - a. High energy spikes like a lightning surge can be coupled from the nearby Power line back to the local power grid. All equipment connected to the power grid will experience the high energy spikes
      - b. Surge Voltage: 500V to 4000V (level 1 – 4)
      - c. Surge Current: 250A to 2000A
      - d. Rep. Time: minimum 1 per 5 seconds @ 4kV
      - e. Phase Syn: 0° to 359°
  - \*IEC 61000-4-11, Dips & Drops
    - a. Voltage Requirement: 0% to 100% Automatic Variable
    - b. Peak In-rush: 500A
    - c. Switching Times: 1 to 5 $\mu s$  (100 $\Omega$  load)
    - d. Event Time: 50 $\mu s$  to 30s,
    - e. Phase Synchronization: 0° to 359° (1° Step)
    - f. Internal Couplers
      - i) EUT Supply: 16A max, 1- $\Phi$ ,
      - ii) EUT Vac: 0 to 250Vrms, 50/60Hz
      - iii) EUT Vdc: 20 to 300Vdc
      - iv) Ethernet control as the system may need to be moveable between SAC and CR.

\*High Speed Telecom line Coupler

- a. Maximum Surge Test Voltage: 4kV (1.2 / 50  $\mu$ s pulse as per IEC 61000-4-5)
- b. Common mode coupling to 8 symmetrical lines
- c. 25 $\Omega$ , 40 $\Omega$ , 80 $\Omega$ , 160 $\Omega$ , 320 $\Omega$  coupling elements with capacitive coupling elements
- d. Applications -Ethernet 1Gbps,
- e. 8 wire unshielded twisted pair (UTP) cable
- f. EUT Voltage: max 300Vdc
- g. EUT Current: max 1A

\*Capacitive Coupling clamp for IEC61000-4-4 (Dataline and Telecom lines)

- a. Cable Diameter: Up to 70mm
- b. Come with verification plate as per IEC 61000-4-4

\*IEC 61000-4-8, IEC 61000-4-9, Power and Pulse Magnetic Field

- a. Power Field Strength: 1 to 100 A/m (level 5)
- b. Pulse Field Strength: up to 1000A/m (level 5)
- c. Minimum coil size: 1m x 1m with stand
- d. Come with Current clamp meter for calibration

\*Verification Accessories for EFT & Surge

- a. Voltage Differential Probe for surge voltage
- b. Current Probe for surge current
- c. Calibration adapters 50ohm and 1kohm for EFT
- d. Calibration adapters for direct pulse output and CDN output for IEC 61000-4-4 & -4-5

\*Windows Software for Multi-Generators with reporting capabilities

3) Programmable Power Source

\*The AC and DC power sources shall be able to provide three phases, split phase and single phases output modes.

\*The output shall be able to provide three phase AC and any single combination phase either AC or DC simultaneously.

\*The output voltage shall be 0-310 V ac (Line to Neutral), 0-540 V ac (Line to Line) and 0-425 V dc.

\*The AC total rated power output of three phase and single phase shall be  $\geq 15$  kW

\*The DC total rated power out shall be  $\geq 15$  kW.

\*The output voltage waveform shall be able to produce in sine wave, square wave, triangle wave and clipped wave

\*The frequency output shall be able to generate at DC and between 15 Hz to 1200 Hz with resolution  $\leq 0.01$  Hz.

\*The AC/DC RMS current in 3 and 2 phase modes shall be  $\geq 40$  Ampere RMS for AC mode and  $\geq 20$  Ampere RMS for DC mode.

\*The AC/DC RMS current in 1 phase mode shall be up to  $\geq 125$  Ampere for AC mode and  $\geq 62$  Ampere for DC mode.

\*The current resolution shall be  $\leq 0.01$  Ampere.

\*The current phase angle range shall be at 0 to 359.9 degree.

\*The Harmonic Distortion shall be  $\leq 0.5\%$  for 50Hz and

60Hz

- \*The output noise shall be  $\leq 150\text{mV}$  at 50Hz and 60Hz.
- \*The load regulation at AC mode shall be  $\leq 0.05\%$
- \*The efficiency of the power source shall be  $\geq 85\%$ .
- \*The power source shall have measurement function to monitor the voltage, current, power and true power on all phases.
- \*The weight Programmable power source shall be  $\leq 55$  kg for portability

#### E. EMS Room Layout

External Provider has to do installation of all grounding and provide of all necessary tables needed in the EMS test measurements. This should be supervised by a PRC Licensed Engineer (Civil and Electrical).

- \*Provide necessary peripherals of the test setup in the room for the following tests:
  - a. Harmonics and Flicker setup layout (Table only)
  - b. Conducted Transient Immunity measurement according to IEC61000-4-4, IEC61000-4-5, IEC61000-4-11
  - c. Magnetic Field Immunity measurement according to IEC61000-4-8, and IEC 61000-4-9
  - d. ESD Simulator Test measurement according to IEC61000-4-2

#### F. Other Requirements

##### 1) EMS Test and Measurement Systems Factory Acceptance Test (FAT)

- FAT shall be conducted at an established overseas factory test site. It shall cover the following fields: quantity, marking, origin, technical specifications, operation under applied standards.

\*Testing of test instruments would be carried out by External Provider as part of factory acceptance for the following tests:

- a. Radiated Immunity measurement according to CISPR 14-2, CISPR 20, CISPR 24, CISPR 35, IEC61000-4-3, and IEC61000-6-1
- b. Conducted Immunity measurement according to IEC61000-4-6
- c. Conducted Transient Immunity measurement according to IEC61000-4-4, IEC61000-4-5, IEC61000-4-11
- d. Magnetic Field Immunity measurement according to IEC61000-4-8, IEC 61000-4-9
- e. ESD Simulator Test measurement according to IEC61000-4-2
- f. Automotive RF Radiated Immunity measurement according to ISO 11452-2
- g. Automotive Bulk Current Injection measurement according to ISO 11452-4

\*External Provider shall issue a certificate of completion for the tests and putting into operation for Supplies and System stating that said verification has been performed and that the Supplies' functions have been successfully tested and they can perform in accordance with the Technical specifications as stated

in the Technical document.

\*Two (2) ASTI Project representatives shall sign on the Certificate.

\*If the two (2) ASTI Project representatives, fail to sign the Certificate of Acceptance, the External Provider shall be notified in writing the reasons for the failure.

\*A maximum of six (6) participants from ASTI and EPDC, will oversee the Factory Acceptance Test (FAT), pre-delivery inspection and FAT technical training.

\*All costs shall be borne by the External Provider.

## 2) EMS Test and Measurement System Training

- A comprehensive training must be provided to at least three (3) representatives during FAT.

The program should be designed to cover the following topics:

a. Overview of EMC standards (Generic & Product Standards)

b. Overview of Test & Measurement System in EMC Lab.

c. CISPR & IEC/EN tests for general electrical/electronic & IT equipment

d. EMS Test System components and applications

e. Immunity measurements software for automated tests

f. Calibration of EMS test system setup

g. Demonstration of report generation for calibration of system and test results on CISPR & IEC/EN tests

h. Work instruction manuals for testing of demo EUTs (to be provided by the External Provider, notebook & general ITE product etc)

i. System maintenance and troubleshooting procedures

\*External Provider shall issue a certificate of completion of system training to the representatives at the end of the program.

\*Costs for the training (food, venue, training materials, etc.) shall be borne by the External Provider.

## 3) EMS Test and Measurement Systems Site Acceptance Test (SAT)

- SAT of measuring instruments shall cover the following fields: quantity, marking, origin, technical specifications, and operation under applied standards.

\*Testing of test instruments would be carried out by External Provider as part of SAT for the following tests:

a. Radiated Immunity measurement according to CISPR 14-2, CISPR 20, CISPR 24, CISPR 35, IEC61000-4-3, and IEC61000-6-1

b. Conducted Immunity measurement according to IEC61000-4-6

c. Conducted Transient Immunity measurement according to IEC61000-4-4, IEC61000-4-5, IEC61000-4-11

d. Magnetic Field Immunity measurement according to IEC61000-4-8

e. ESD Simulator Test measurement according to IEC61000-4-2

<p>f. Automotive RF Radiated Immunity measurement according to ISO 11452-2</p> <p>g. Automotive Bulk Current Injection measurement according to ISO 11452-4</p> <p>*During SAT, EMC Training must be provided to at least 10 pax.</p> <p>*External Provider and Representative shall sign on the Certificate.</p> <p>*If Representative fail to sign the Certificate of Acceptance upon completion of the tests, the representative shall immediately notify the External Provider in writing the reasons for the failure.</p> <p>*Costs for the training (food, venue, training materials, etc.) shall be borne by the External Provider.</p> <p>4) Documentation</p> <p>The External Provider is required to provide the following list of documents (in soft and hard copy):</p> <p>*Technical Literature of instruments listed in offer</p> <ol style="list-style-type: none"> <li>a. Product Datasheets.</li> <li>b. User Handbook/Operators Manual. (after award of tender)</li> <li>c. Technical Manuals (after award of tender)</li> </ol> <p>*Plan-view layout of anechoic chamber, shield room with indication of positioning and dimensions of instruments (racks) and storage space etc.</p> <p>*As-built Plans for EMS Room.</p> <p>*List of project references in Asia of similar project scale.</p> <p>*Implementation schedule of project, stating clearly milestones and stages. Joint events requiring involvement of the Buyer to be highlighted.</p> <p>*Training schedule upon project integration completion (after award of tender). Training should cover the following aspects:</p> <ol style="list-style-type: none"> <li>a. Overview of EMC standards (Generic &amp; Product Standards)</li> <li>b. Overview of Test &amp; Measurement System in EMC Lab.</li> <li>c. Work instruction manuals for testing of demo EUTs (to be provided by the External Provider, notebook &amp; general ITE product etc)</li> <li>d. System maintenance and troubleshooting procedures</li> </ol>					
<b>TOTAL APPROVED BUDGET FOR THE CONTRACT (ABC):</b>					<b>Php 80,000,000.00</b>
<b>RESERVATION CLAUSE</b>					
<p>The Advanced Science and Technology Institute reserves the right to accept or reject any proposal, to annul the bidding process, and to reject all proposals at any time prior to contract award, without thereby incurring any liability to the affected proponent or proponents.</p>					