

# Request For Proposal

## High Level Induced Transient Susceptibility Test-Set for Spacecraft EMC Test Equipment

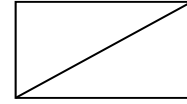


March 25, 2020

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# **High Level Induced Transient Susceptibility Test-Set for Spacecraft EMC Test Equipment**

## **IMPORTANT**

1. This RFP should be kept in confidentiality and should neither be copied nor distributed to the third parties.
2. The questions and opinions on this RFP can be asked or suggested to Korea Aerospace Research Institute before submission of the proposal.
3. This RFP should be returned to Korea Aerospace Research Institute with bidder's proposal.
4. This RFP shall be legal bind after the contract is awarded unless the bidder explicitly expresses the differences from the RFP in the compliance sheet.

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## **PART I. Overview**

### **1. Overview of the project**

- 1.1. Korea Aerospace Research Institute (hereinafter referred to as "KARI") is located at Daeduk Research Complex, 140 km south of Seoul.
- 1.2. KARI has a satellite assembly, integration and test center (hereinafter referred to as "AITC") for joint use by corporations and research institutes for the purpose of the effective development of domestic satellites. And basic facilities and equipment for satellite assembly and test have been supplied, installed and used.
- 1.3. The purpose of this project is to install waveform generators set including generators, system accessories, controller and software etc. to perform all test items defined in DO-160G section 22(detailed requirements are defined PART II) and MIL-STD-461G CS117. These equipments will be installed in KARI EMC chamber.
- 1.4. The main undertakings of the project are to perform factory and site acceptance tests, install, guarantee quality and training, etc.
- 1.5. The supplier should submit the business showings of the installing the Test Equipment for Induced Transient Susceptibility.
- 1.6. All the descriptions in this RFP are minimum requirements and the supplier can suggest the better one to improve the overall performance and cost. But in this case, the proposal should clearly indicate the improvements from KARI's requirements.

## 2. Procedures of the project

2.1. The project shall be proceeded with five parts as follows:

2.1.1. Organization of waveform generator set including system accessories, controller and software etc.

2.1.2. Factory acceptance test & safety plan verification

2.1.3. Transportation

2.1.4. Installation at KARI

2.1.5. Final acceptance test at KARI according to supplied test procedure & previous test results

2.2. The participants shall submit the detailed work schedule for article

2.2.1. Specially, the work schedule at KARI shall be confirmed by KARI for avoiding overlap with KARI's other test schedules.

2.3. The format of proposal

2.3.1. The participants shall submit 6 copies of a detailed proposal to KARI according to the format and contents satisfying the requirements stipulated in this RFP.

2.3.2. The compliance sheet with the requirement of this RFP shall certainly be included in the proposal.

2.3.3. The price of the system shall be broken down.

2.3.4. The participants shall make out a proposal with their own writing.

2.3.5. The language shall be English or Korean.

2.4. The proposal shall be delivered to KARI before the due date for submission.

2.5. All proposals and documents submitted shall become the property of KARI.

### 3. Requisites of participants

3.1. The participants shall supply information about themselves.

3.2. The participants shall have experience of installation, operation, arranging, integration of waveform generators set for lightning induced transient susceptibility test to be installed in EMC test facility in Korea.

### 4. Scope of the contract

4.1. The project is on turnkey base and the proposal shall include the following;

4.1.1. Engineering work of the equipment

4.1.2. Manufacture, assembly and turnkey delivery of the equipment

4.1.3. Parts and particular instruments necessary to operate the equipment

4.1.4. Installation work and acceptance test at factory & KARI site

4.1.5. Project management, site operation, cooperation with KARI

4.1.6. Basic principle, operation, warranty, maintenance, repair, safety and training for the equipment

4.1.7. Relevant books and manuals

4.1.8. Other necessary matters required for acquiring and installing the equipment (including checking of AITC building interface and construction)

## **PART II. TECHNICAL REQUIREMENTS**

### **I. General**

Waveform generators set for induced transient susceptibility test will be installed in EMC chamber in KARI.

This system is for Induced Transient Susceptibility test defined in RTCA DO-160G Section 22 and MIL-STD-461G CS117. This test system shall be designed and almost complied in accordance with RTCA DO-160G Section 22.0 and MIL-STD-461G CS117.

### **II. Configuration of Goods**

1. Generator : 1 set
2. System Accessories : 1 set
  - 2.1. AUX Connector(for safety circuit)
  - 2.2. Test Cables(for EUT Connection)
  - 2.3. User manual, conformity declaration and verification protocol
3. System Controller and Software(Demo Disks GENECS and TEMA) : 1 set

### **III. DETAIL SPECIFICATION**

1. Following waveforms shall be generated by transient generator. Test level is defined in 5. Acceptance Test and DO-160G Section 22.

- 1.1. WF1 [WaveForm(hereinafter referred to as "WF")]

- Rise Time: 6.4  $\mu$ s ( $\pm$  20 %)
- Half value time: 69  $\mu$ s ( $\pm$  20 %)
- Generator Setting Range: 20 A ~ 1800 A or wider
- Generated level with Coupler: 20 A ~ 3180 A or wider

- 1.2. WF4

- Rise Time: 6.4  $\mu$ s ( $\pm$  20 %)
- Half value time: 69  $\mu$ s ( $\pm$  20 %)
- Generator output: 70 V ~ 1700 V / 340A for Pin/Ground Injection
- Generated output with Coupler: FS 300~750 V SS 75 V~187.5 V or higher for cable induction test

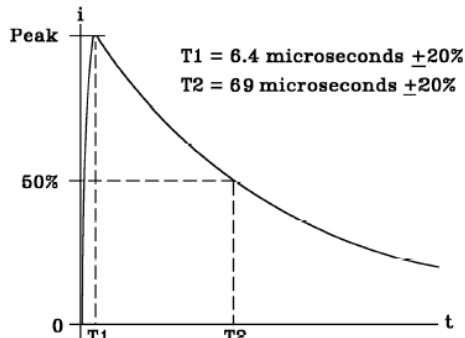
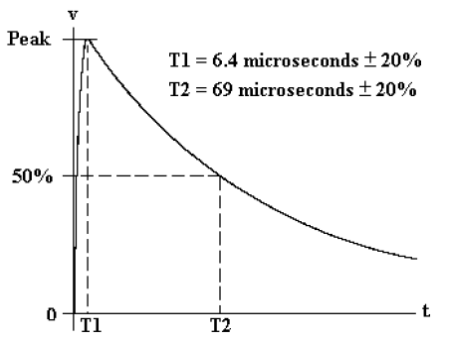
- 1.3. WF5A

- Rise Time: 40  $\mu$ s ( $\pm$  20%)
- Half value time: 120  $\mu$ s ( $\pm$  20%)

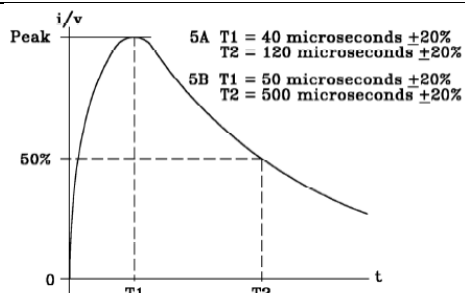


- Generator Setting Range: 80A ~ 3000A or Wider
- Generated level with Coupler: 80A ~ 10000A or Wider

#### 1.4. Waveform definition

	Waveform 1(Current)	Waveform 4(Voltage)
Configuration	 <p> <math>T1 = 6.4 \text{ microseconds} \pm 20\%</math>  <math>T2 = 69 \text{ microseconds} \pm 20\%</math> </p>	 <p> <math>T1 = 6.4 \text{ microseconds} \pm 20\%</math>  <math>T2 = 69 \text{ microseconds} \pm 20\%</math> </p>

	Waveform 5(Current/Voltage)
Configuration	 <p>           5A <math>T1 = 40 \text{ microseconds} \pm 20\%</math>  <math>T2 = 120 \text{ microseconds} \pm 20\%</math>            5B <math>T1 = 50 \text{ microseconds} \pm 20\%</math>  <math>T2 = 500 \text{ microseconds} \pm 20\%</math> </p>

## 2. System Composition

- 2.1. Waveform Generator
- 2.2. AUX Connector(for safety circuit)
- 2.3. Test Cables(for EUT Connection)
- 2.4. User manual, conformity declaration and verification protocol

## 2.5. System Controller and Software(Demo Disks GENECS and TEMA)

### 3. Environment condition

#### 3.1. Temperature condition

3.1.1. Ambient temperature : 0°C ~ 45°C

3.1.2. Storage temperature: -20°C ~ +85°C

3.2. Relative humidity : up to 95%

3.3. Location : normal laboratory environment

3.4. Operating altitude : up to 2000m above sea level

### 4. Acceptance Test

Following acceptance tests shall be performed for all delivered test systems.

#### 4.1. Acceptance test procedure

4.1.1. Unpacking

4.1.2. Visual inspection

4.1.3. Installation of the Test systems in EMC chamber

4.1.4. Electricity connection

4.1.5. Oscilloscope, RF cables, probes, couplers, load and system accessories connection fitted for each test item.

4.1.6. System control line connection

#### 4.1.7. Fill acceptance test results in the performance test report

#### 4.2. Acceptance test items, level and methods

For all test items, CI is Cable Injection, GI is Ground Injection, SS is Single Stroke and L is Level, respectively.

Detailed test specification and methods are defined in RTCA DO-160G Section 22 and MIL-STD-461G CS117.

##### 4.2.1. Waveform 1

Type	Injection	Event	Level 4	Level 5
Cable Bundle	CI	SS	Yes	Yes

##### 4.2.2. Waveform 4

Type	Injection	Event	L4	L5
PIN	Direct	SS	Yes	Yes
Cable Bundle	GI	SS	Yes	Yes

##### 4.2.3. Waveform 5A

Type	Injection	Event	L4	L5
PIN	Direct	SS	Yes	Yes
	CI	SS	Yes	Yes

Cable Bundle	GI	SS	Yes	Yes
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4.3. If needed by request of a purchaser, Factory Acceptance Test shall be performed in the place of production.

## 5. Remarks

5.1. Payment condition : 90% release Goods is ready to ship, 10% release installation and training is done.

5.2. Warranty must be guaranteed for at least 12 months.

5.3. The delivery should be within 6 months after receipt of PO.

5.4. Software and Rack etc must be provided by the supplier. This would be discussed between both parties.

5.5. Training and verification on delivery of goods should be provided with more than 2 weeks by well experienced engineer who has dealt with more than two system for more than five years.

5.6. All generator should be powered by Single Phase 220V, 16A.

5.7. Test system has an ability to test at least two EUTs simultaneously in parallel.

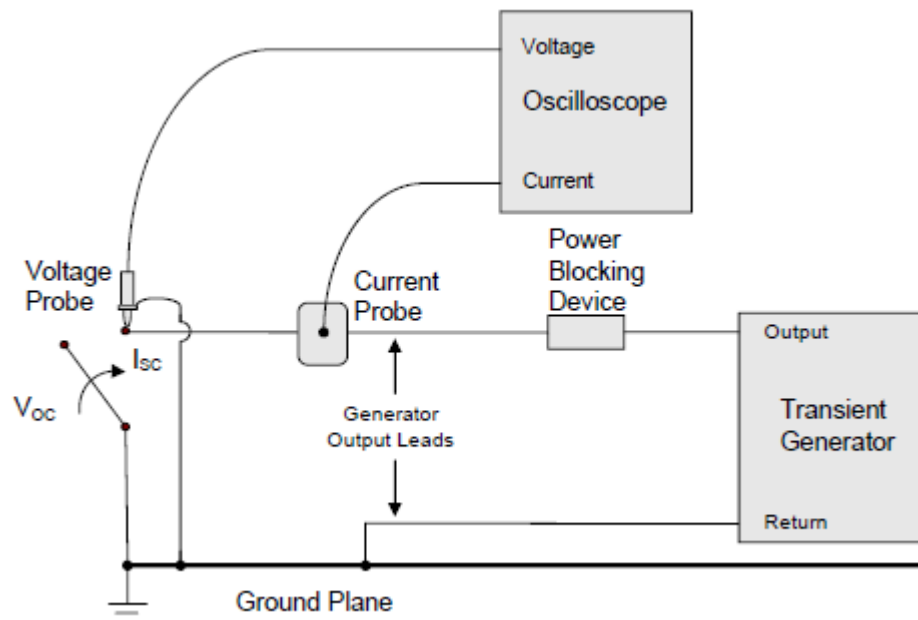
5.8. Test System does never be allowed to include any ROHS Material to harm user's health.

5.9. Supplier should provide end-user with calibration/verification data of delivery of goods. It includes WF1/WF4/WF5A and all possible test level.

## Appendix. Verification Setup For Acceptance Test

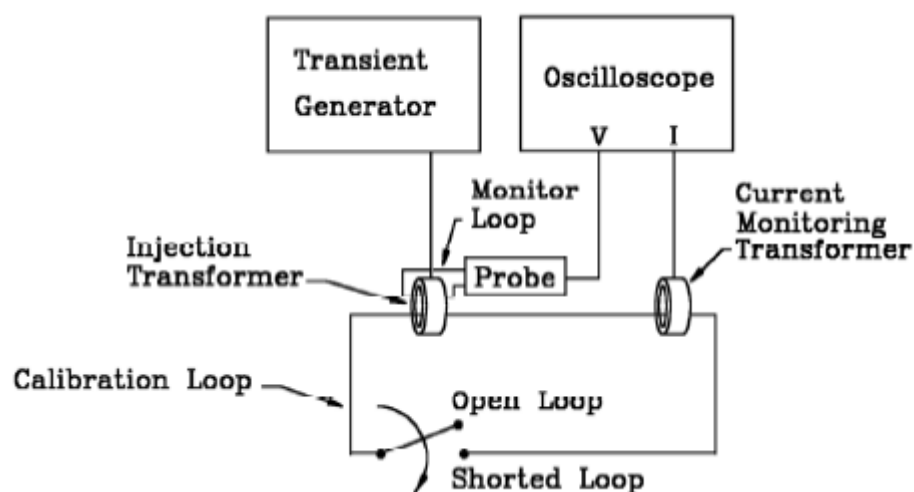
## 1. Pin Injection Calibration Setup, Signal Pins & Power Pins Direct Injection

## Method



## 2. Typical Generator Performance Verification Setup for Cable Induction

## Tests



### 3. Typical Generator Performance Verification Setup for Ground Injection Tests

