

Request For Proposal

Power Amplifier Set for Galileo Signal



November 24, 2010

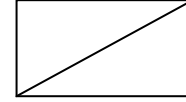
Space Test Department

Korea Aerospace Research Institute

P.O.Box 113 Yuseung, Daejeon, 305-600, KOREA

Phone : 82(42)860-2977, Fax : 82(42)860-2234

Request For Proposal
for



Power Amplifier Set for Galileo Signal

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 change the power amplifier system, remote control panel, relating cable lines and Bi-directional coupler installed in control room of the large 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 supply should submit the business showings of the installing the power amplifier & control system.
- 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 power amplifier, external directional coupler, control panel.

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 power amplifier to be installed in EMC chamber.

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

Power amplifier set will be installed in control room of EMC chamber in KARI as shown in Figure 2.1 & 2.2.

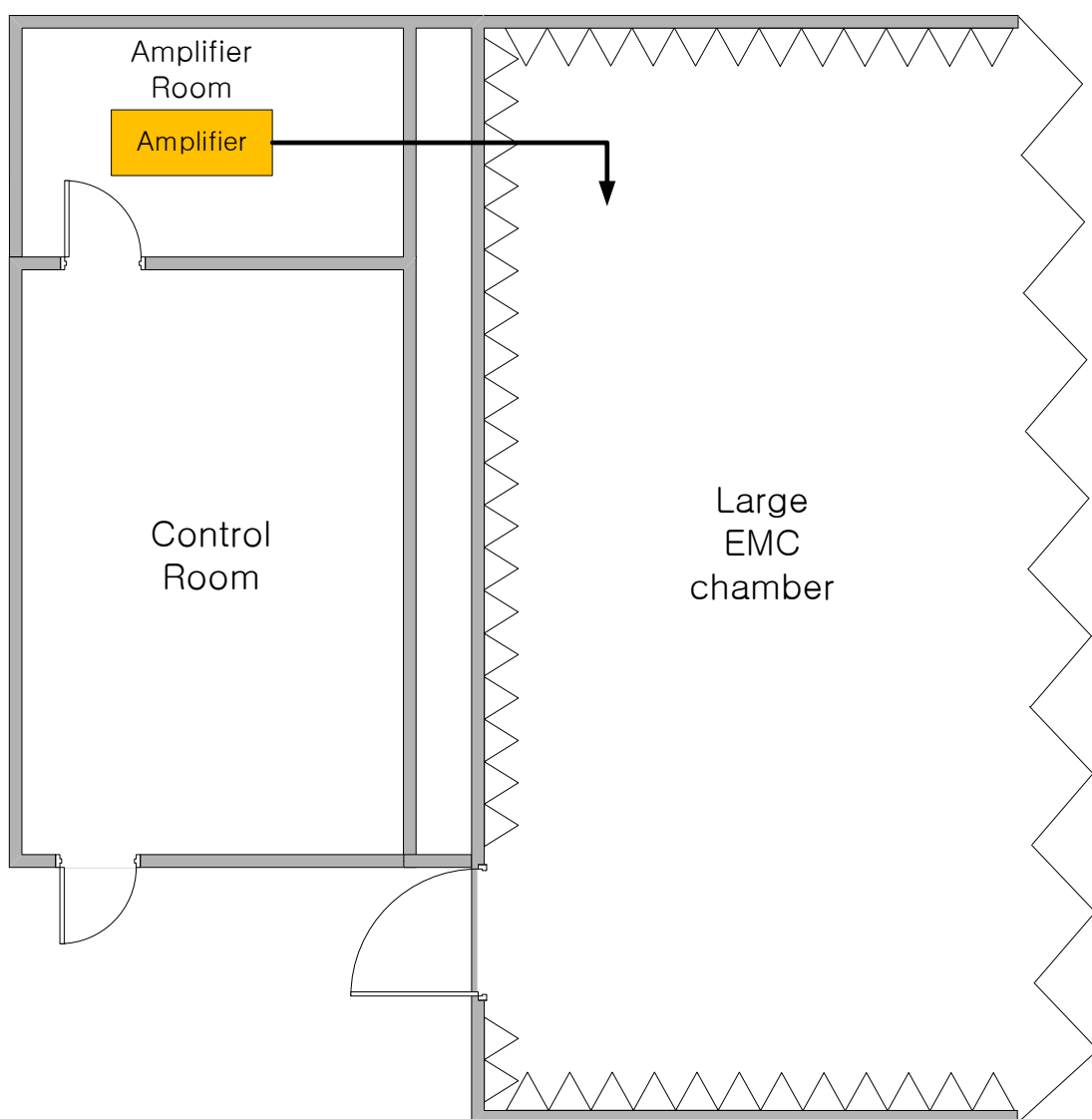


Fig. 2.1 Expected amplifier set position in EMC chamber of KARI

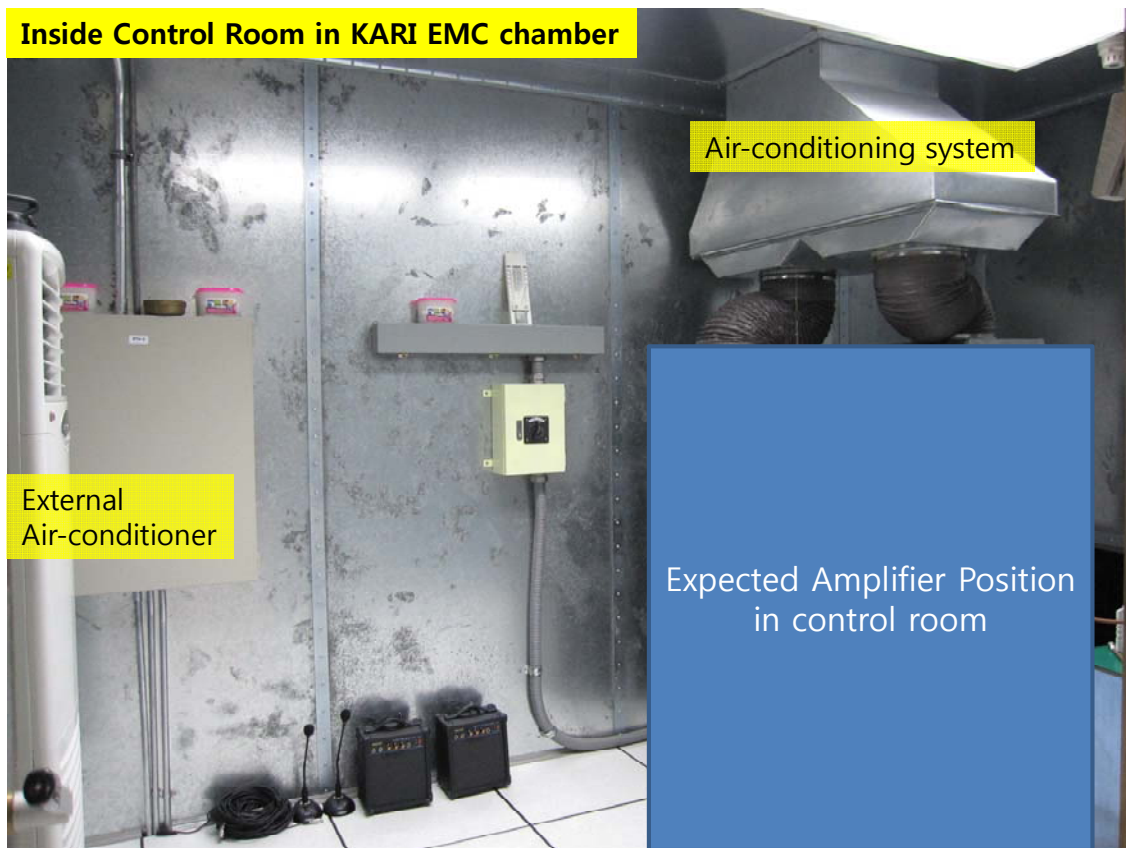


Fig. 2.2 Expected amplifier set position inside control room

II. DETAIL SPECIFICATION

1. System concept

- 1.1. Modular "construction system" enables individual combinations with almost unlimited flexibility
- 1.2. Platform concept allows compact system dimensions for customized configurations
- 1.3. Integral overall system design
- 1.4. RF adapted design
- 1.5. Rugged mechanical design

- 1.6. Required to efficient cooling
- 1.7. Flexible remote control : TTL, IEEE 488.2, RS-232C, USB and LAN
TCP/IP
- 1.8. MIL-Standard based system design in correspondence with
instrument safety regulations (VDE, CE)

2. Environment condition

- 2.1. Temperature condition
 - 2.1.1. Ambient temperature : 0°C ~ 45°C
 - 2.1.2. Storage temperature: -20°C ~ +85°C
- 2.2. Relative humidity : up to 95%
- 2.3. Location : normal laboratory environment
- 2.4. Operating altitude : up to 2000m above sea level

3. Composition

Power amplifier set is composed by following items.

- 3.1. RF Power amplifier set
- 3.2. External directional coupler
- 3.3. RF Power Amplifier System Technical Specifications

4. Electrical Specification

4.1. Power amplifier Set

Power amplifier set should have performances more than defined value in table 4.1.

Table 4.1 Electrical specification in power amplifier

Item	Specification
Frequency Range	9kHz~220MHz
Output Power	More than 3,000W at 1dB compression point over the operating frequency range
Gain	minimum 64 dB
Harmonics	12dBc for 2nd harmonic 18dBc for 3rd harmonic
Line Power	Less than 25 kVA
Spurious (at PN)	-50 dBc typical (excluding harmonics)
Class of Operation	A-linear
Overdrive Protection	up to +10 dBm for no damage
Input Impedance	50 Ohm nominal
Output Impedance	50 Ohm nominal
Input VSWR	<2:1 typical
Load VSWR	2:1 maximum
RF Input	N(female)
RF Output	standard on rear panel PN >1 kW 7/16(female)
Main Supply Power	3 × 380V AC, 60Hz

4.2. Directional Coupler

Directional coupler should have performances more than defined value in table 4.2.

Table 4.2 Electrical specification in directional coupler

Item	Specification
Frequency range	9 kHz to 1GHz
Power handling capability	3,000 W
Coupling	50 dB
Insertion loss	<0.2 dB
Ripple	±1 dB
VSWR(max.)	1.15 : 1
RF interface	7/16 inches

5. RF Power amplifier system structure

5.1. Power stage

- D/C Bias supply power source

5.2. Control stage

- Diagnostic function

5.3. Driver module

- Amplifier stage to drive high-power

5.4. Final stage

- Including output combiner

6. RF characteristic

- 6.1. System parameters specified at rated output power (harmonic distortion, spurious, power consumption etc.)
- 6.2. Standard operating range up to +45°C without degradation
- 6.3. Isolation of all individual RF transistors for optimum protection against extreme mismatch and for providing a fault tolerant system layout
- 6.4. VSWR optimized PIN-diode switches for optimum RF matching
- 6.5. Reliable continuous operation without degradation including +45°C

7. Power supply

- 7.1. Distributed design supporting a fault tolerant concept allows continued operation with degraded performance
- 7.2. Individual power drains for all output transistors
 - 7.2.1. Ideal supply conditions (individual sense lines)
 - 7.2.2. Separate current and voltage limiting
 - 7.2.3. Protection of output transistors against extreme mismatch
- 7.3. Enhanced efficiency for reduced source power requirements
- 7.4. Optimum supply and perfect protection of amplifier stages

8. Mechanical design

8.1. RF modules milled from solid

8.1.1. RF shielding

8.1.2. heat dissipation

8.1.3. RF grounding

8.2. Massive base plates

8.2.1. thermal sources (transistors and load resistors) are directly soldered onto massive base plates

8.3. All metal parts protected by surface passivation

8.3.1. protection from oxidation (corrosion)

8.3.2. excellent long term system stability

8.3.3. perfect system grounding

8.4. Compact and rugged mechanical design for mobile applications

(ground, seaborne and airborne)

9. Cooling System Design

9.1. Standard air cooling

9.1.1. special high efficiency heat sinks with double side assembling

9.1.2. highly efficient straight air flow

9.1.3. compact system layout

9.2. External Heat Exchangers convection cooling up to +50°C

9.2.1. no high capacity required for conventional air condition

9.2.2. less power consumption

9.2.3. compact size (compared to compression type)

9.3. Optimum system cooling to ensure high reliability and extended lifetime

10. Acceptance and Training

10.1. Acceptance inspection

10.1.1. Unpacking

10.1.2. Visual inspection

10.1.3. Installation of the Amplifier in EMC chamber

10.1.4. Electricity connection

10.1.5. RF cable connection

10.1.6. After attaching Dumb load which is provided by vendor, output power check

10.1.7. Remote control line connection

10.2. Training

11. Warranty and Maintenance supporting

11.1. Warranty for minimum 1 year

11.2. Maintenance supporting system

11.2.1. Occur technical obstacles

11.2.2. Receipt obstacles

11.2.3. Obstacle definition and type analysis

11.2.4. First visiting the site and find solution

11.2.5. Find detail causes

11.2.6. Domestic / Overseas repair or replace units

11.2.7. Second visiting for each type

11.2.8. Remove obstacles

11.2.9. Confirm result

11.2.10. Report and save details of obstacles and manage each case