ADVANCED IN-ORBIT TEST SYSTEM

Satellite communications, earth observation, navigation and positioning and control stations

indracompany.com
AIOTS

ADVANCED IN-ORBIT TEST SYSTEM

A new generation IOT bench designed improving the performances

Overview

The In-Orbit Test product line has been developed by Indra Space since 1992. It has been widely proved on the field in front of the different platforms and customers. Advanced In-Orbit Test System (AIOTS) is a new generation IOT bench designed with the aim of improving the performances and increasing the added value for our customers. This is the result of the Indra experience in the management, design, installation, testing, maintenance and commissioning of IOT benches and stations.

Highlights

- Universal IOT bench; standard interfaces able to connect to any IOT station
- Transponder response prediction without reaching saturation point allowing small size IOT stations
- Portable configuration
- Commissioning and routine IOT campaigns
- Stand-alone and distributed IOT system configurations
- Open and close loop measurement scenarios
- Reduced test time
- Payload testing with traffic (SS option)

AIOTS is composed by an instrumentation chassis and an IOT bench controller. IOT bench is based on the use of synthetic instrumentation, implemented by means of standard PXI / PCI boards that are integrated in a 4U high instrumentation chassis. The addition of new test equipment in the system, consists of plugging the suitable board within the chassis.

IOT software is based on an Indra Core Product that is customized according to specific mission requirements. The IOT software is a client-server architecture composed by an acquisition module (server installed in the instrumentation chassis) and a MMI module (client installed in the IOT bench controller). The acquisition module is in charge of interfacing with the test bench, while the MMI is the interface with the operator.

This type of architecture allows using stand-alone configurations (one IOT bench managed by its own controller) and distributed configurations (several IOT benches located in different sites can be managed from a centralized location).

Characteristics

AIOTS  is designed in order to cope with different types of scenarios:
- Close-loop configurations (collocated scenarios)
  In these scenarios, the uplink and downlink with the satellite is performed using the same IOT station and only one IOT bench
- Open-loop configurations (non-colllocated scenarios)
  These are the scenarios needed when the uplink and downlink coverage of the transponder under tests are not the same. In this case, two IOT stations are needed. Associated to each IOT station, an IOT bench is connected. Both IOT benches work in a coordinated way.

Payload testing with traffic (SS option):
AIOTS product is complemented with spread spectrum channel measurement instrument allowing the transponder testing in the presence of traffic without disturbing the QoS.

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It provides standard IOT station interfaces able to connect to any IOT station. These interfaces are at IF level, being AIOTS design a multi-frequency solution compatible with IOT stations with different frequency range. AIOTS has been an effort to reduce the IOT campaign duration and provide high flexibility in the test stimulus and procedures used by means of DSP technology application.

Payload testing with traffic (SS option): AIOTS product is complemented with spread spectrum-channel measurement instrument allowing the transponder testing in the presence of traffic without disturbing the QoS.

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Highlights

AIOTS MEASUREMENTS

<table>
<thead>
<tr>
<th>Platform</th>
<th>T/R EIRP, frequency and modulation index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payload</td>
<td>EIRP/IPFD @ saturation, amplifier gain</td>
</tr>
<tr>
<td></td>
<td>Antenna cuts, gain flatness and group delay</td>
</tr>
<tr>
<td></td>
<td>G/T and C/I, On-board LO frequency conversion, Phase noise</td>
</tr>
</tbody>
</table>

Payload testing with traffic (SS option):

• Gain flatness
• Group delay
• Frequency error

AIOTS MEASUREMENT ACCURACY (1-σ)

| Gain  | ±0.5 dB |
| EIRP/IPFD @ saturation | ±0.5 dB |
| Gain flatness | ±0.5 dB |
| Group delay | ±50 ns |
| G/T, C/I | ±0.5 dB |
| LO frequency | ±50 Hz |

AIOTS TEST TIME DURATION

| EIRP/IPFD @ saturation, gain, amplifier gain | <60 seconds |
| Gain flatness and group delay | <60 seconds |
| G/T and C/I | <60 seconds |
| LO frequency | <60 seconds |
Indra reserves the right to modify these specifications without prior notice.