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# ISDB-T Test & Measurement

ISDB-T All-In-One RF Signal Generator
- ISG500

ISDB-T '1SEG.' Hand-Held Signal Analyzer
- ISA1000

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# ISDB-T All-In-One RF Signal Generator
## - ISG500

## Overview

**ISG500** is the all-in-one ISDB-T signal generator with **segmented COFDM capability** to ISDB-T standards for digital terrestrial TV system used in Japan. ISG500/500 is the most flexible solution for design evaluation and conformance test of ISDB-T receiver such as set-top box, TV, Car navigation and mobile phone which require a live modulated RF signal.

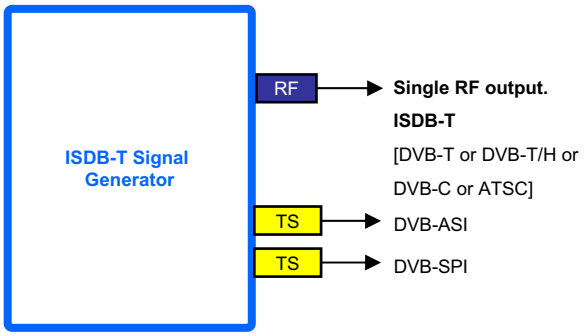
As an All-in-One ISDB-T signal generator, ISG500 is a complete solution for ISDB-T Signal generation by **the built-in ISDB-T modulator, up-converter and MPEG Generator** in a portable unit.

**Especially, ISDB-T Signal Generator supports Mobile TV Spec test for ISDB-T receiver manufacturers as below.**

- **Sensitivity Test** : Support RF Output Level 0~ -110dBm
- **C/N Noise Generation** : AWGN (Optional)
- **Fading (Echo, Doppler) Simulation** (Optional)

Most importantly, ISG500 is the best equipment for mobile TV manufacturers because of its system expansibility like DVB-H, T-DMB, Mobile DVB-T standards. It'll save your additional system cost and space in your R&D environment.

- Code: ISG500
- TS OUT : ASI,SPI
- RF OUT : **ISDB-T**
- Optional RF OUT
  : DVB-T
  : DVB-T/H
  : ATSC
  : DVB-C (QAM Annex-A/C)

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## Intended Application

- **ISDB-T Receiver Design and Manufacturing Test**
- **Simulation of ISDB-T systems**
- **Performance Verification of ISDB-T receivers**
- **Professional Evaluation Tool for ISDB-T Equipment**
- **ISDB-T Chip Development (Tuner/MPEG)**
- **ISDB-T Demonstration & Sales**
- **ISDB-T Signal Source in exhibition**

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## Features

### ● ISG500

- RF Output : Multi Standard Modulator (Supports Only Single RF)
  - ISDB-T (Default) / DVB-T, DVB-T/H or DVB-C (Optional)
- Support TMCC Information and Generation
  - Input : File (188byte TS)
  - Output : RF output
  - TMCC Information (ISDB-T Information & IIP) Generation (ARIB STD-B31)
- MPEG2 TS Output : DVB ASI/LVDS Multi Interface (For DSG500)
- Auto Level Test
- NIT Auto Set (Setting By Terrestrial Delivery Descriptor) (For DSG500)
- Support Mobile TV Spec Test
  - Sensitivity, Noise Generation and Fading Simulation (Echo/Doppler)
- PIDs Analysis
- Decoding View
- Automatic Bit-rate and Play Time Calculation
- Sequential Play
- Slide Bar (Drag & Search Video)
- Support C/N Generation
  - C/N Range : -10~+30dB (Resolution : 0.1dB)
  - Noise BW : ① 0~10MHz according from Signal CH BW (Spec.)
    ② User Select : ~ Max. 45MHz
- Support Fading Simulation (Not supported yet)
  - 6 CHs (Optional : Max. 12CHs)
  - Speed Range : 0~120km/h
  - Path Delay : 100ns~10μs (Resolution : 100ns)
  - Path Loss : 0~-25dB (Resolution : 0.1dB)

## Highlight

System Information Setting

Modulator Setting

Power Level Setting

TMCC Information & Generation

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## H/W Specification

### Modulation Characteristics (User Select)

**ISDB-T Modulator**

**Broadcasting system**
- **Digital Terrestrial TV : ARIB STD-B31**

**RF Output Frequency : 50-862 MHz (VHF/UHF)**
**RF Output Level : 0 ~ -110dBm**
**Transmission Parameter**
- **Hierarchical Layer : TV (3 layer max. )**
- **MODE : MODE 1, MODE 2, MODE 3**
- **Guard Interval : 1/4, 1/8, 1/16, 1/32**
- **Modulation Mode : DQPSK, QPSK, 16QAM, 64QAM**
- **Coding Rate : 1/2, 2/3, 3/4, 5/6, 7/8**
- **Time Interleave length : 0 to 32 (depend on broadcasting Mode and system)**
- **Number of Segments : TV (13, each layer can arbitrary be set)**
- **Partial Reception : Settable**

**1 seg. mobile TV broadcasting**

**DVB-T(COFDM) Modulator**

COFDM Modulator and VHF/UHF Up-converter (DVB-T)
Input : MPEG2 TS from host memory
**Modulation Modes QPSK, 16/64 QAM**
**Frequency Range: 50~ 862MHz (VHF/UHF)**
**RF Output Level : 0dBm ~ -110dBm**
**Output Level Step Size : 0.5dB**
Channel Bandwidth : 5/6/7/8 MHz
COFDM Spectrum : 2K, 4K and 8K carriers
Modulation Mode : QPSK, 16QAM and 64QAM
Guard Interval : 1/32, 1/16, 1/8 and 1/4
Code Rate : 1/2, 2/3, 3/4, 5/6, 7/8

**DVB-T/H Modulator**

COFDM Modulator and VHF/UHF Up-converter (DVB-T)
Input : MPEG2 TS from host memory
**Modulation Modes QPSK, 16/64 QAM**
**Frequency Range: 50~ 862MHz (VHF/UHF)**
**RF Output Level : 0dBm ~ -110dBm**
**Output Level Step Size : 0.5dB**
DVB-H TPS
Cell ID Selection
Support MPE-FEC
Support Time-Slicing
In-Depth Interleaver (2K, 4K)
Channel Bandwidth : 5/6/7/8 MHz
COFDM Spectrum : 2K, 4K and 8K carriers
Modulation Mode : QPSK, 16QAM and 64QAM
Guard Interval : 1/32, 1/16, 1/8 and 1/4
Code Rate : 1/2, 2/3, 3/4, 5/6, 7/8

**ATSC(8VSB) Modulator**

**Modulation Modes 8VSB**
**Frequency Range 50 – 862 MHz**
**RF Output Level 0 ~ -110dBm**
**Output Level Step Size 0.5dB**

**DVB-C (QAM-A/C) Modulator**

**Modulation Modes 32/64/128/256 QAM**
**Frequency Range 50 – 862 MHz**
**FEC ITU-T J83 FEC annex A/C**
**RF Output Level 0 ~ -110dBm**
**Output Level Step Size : 0.5dB**
Output Impedance 75Ω
Return Loss >20dB

### Operating specification

| | |
|---|---|
| Voltage : | AC 100 ~ 240V, 50/60Hz |
| Operating temperature : | 10 to 40 degree |
| Operating humidity : | 45 ~ 85% RH |
| Guaranteed temperature: | 15 to 35 degree |
| Guaranteed humidity : | 45 ~ 85% RH |
| Dimensions : | 519.7(W) x 435(D) x 231.8(H)mm |
| Weight : | About 17kg |

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## Ordering Information

| Base Model | Description | Notes |
|---|---|---|
| **ISG500** | ISDB-T Signal Generator built in ISDB-T modulator<br>* Frequency Range : 50 ~ 862MHz<br>* RF Level : 0 ~ -110dBm<br>* RF Level Step Size : 0.5dB<br>* Multi Modulator / Single RF | |

| Options | | Description | Notes |
|---|---|---|---|
| **Option I (Single RF)** | I-501 | DVB-T Module | |
| | I-502 | ATSC Module | |
| | I-503 | DVB-T/H Module | |
| | I-504 | DVB-C Module | |
| **Option B** | B-101 | ASI Out Module | * B-100 options after purchasing, it'll cost additional charges and delivery terms will be within 4 weeks.<br>* In case of B-201, user can use this option for Base, I-501, I-503 and I-504 with one module.<br>* It's possible to combine B-201 and I-502. But, it needs to be added one more B-201 option for Base Model, I-501, I-503 and I-504. |
| | B-102 | SPI Out Module | |
| | B-201 | AWGN Module | |
| | B-202 | Fading Module (Future Support) | |
| | B-203 | GPIB Module | |
| | B-100 | Option Upgrade Service | |

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# ISDB-T '1SEG.' Hand-Held Signal Analyzer - ISA1000

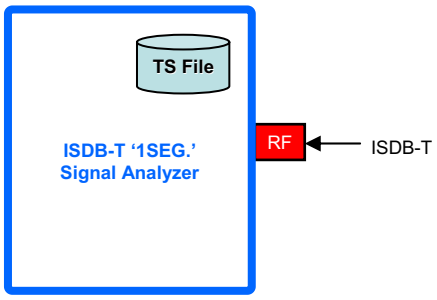
## Overview

ISDB-T "1SEG." Hand-Held Signal Analyzer is **the world's first portable test solution for Real-Time ISDB-T '1Seg' signal Analysis and Capture.**

ISA1000 enables you to analyze and interpret the live or previously recorded transport stream of ISDB-T 1SEG. It fully supports ARIB STD-B10 & B31 standard and 1SEG. Information Analysis.
Also, you can capture 1SEG. ISDB-T signal according to each region and channel with simple operation of ISA1000. And you can play this captured TS with DTVinteractive's ISDB-T Signal Generator (ISG500) to test performance of your '1SEG.' receiver.

For your ISDB-T development, ISA1000 will be the most suitable test solution integrated with ISG500.

- **Code : ISA1000**
- **ISDB-T '1Seg.' Signal Analysis**
- **Deferred Time & Real Time**
- **RF In : ISDB-T**




## Intended Application

- ISDB-T Test & Measurement
- ISDB-T 1SEG. Receiver Development
- ISDB-T 1SEG. Receiver QC
- ISDB-T Chip Development
- ISDB-T Station Design & Verification
- ISDB-T Field Test
- 1SEG. Receiver Manufacturing

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## Features

- Support ARIB STD-B10 & B31 standard
- One touch ISDB-T Signal Capture (By Region & Service)
- Real-time 1 SEG. TS Analysis - ISDB-T RF input
- Display BER / CNR / RF Power Level parameters.
- Display TMCC parameters
- Deferred-time (Off-line) 1 SEG. TS Analysis
- Service Packet Analysis (Interval/Bandwidth/Pie Graph)
- Tree display about analysis results (channel and table)
- Channel Tree Analysis
- Service Tree Analysis
- MPEG2 TS Tables : PMT, CAT, NIT
- Displaying Hex code of Selected Packet
- User defined Tables
- PCR/ Jitter Analysis with Graphs
- Error Monitoring (TR 101 290 priority I II III)
- TS Demuxing & A/V Decoding (H.264, AAC)
- ARIB SI Tables :SDT, NIT, BAT, BIT

## Highlight

### Overall Service & Packet Analysis

Overall Service & Packet Analysis shows you the global data information on each program and overall bandwidth's occupancy of the transport stream under analysis. On the service (channel) information tree you can easily track down the information of all PIDs and services. Packet Analysis displays PID, PID type, bitrate, interval and percentage of use with a pie chart and data grids. By clicking on the PID in the grid, packet information and hex view are displayed automatically. Graph, list and its elements are dynamically updating in real time.

### PCR Jitter Analysis

ISDB-T '1SEG.' Signal Analyzer offers real time PCR timing analysis with graphical results views.

- PCR Accuracy
- PCR Arrival Interval
- Discontinuity/ Bitrate

### ARIB SI Analysis

Section Analysis provides in-depth ARIB SI analysis with tree structure that you can drill down to examine tables and service contents and detailed list of table repetition rates.

- MPEG2 TS Tables: PMT, CAT, NIT
- ARIB SI Tables : SDT, NIT, BAT, BIT

### Error Monitoring

ISDB-T '1SEG.' Signal Analyzer offers specially designed TS error monitor with "LED Light" display of the current status of all TS 101 290 Priority 1st, 2nd, and 3rd parameters. Also, a error log view with detailed information enables users track errors.

### A/V Decoding

ISDB-T '1SEG.' Signal Analyzer offers S/W MPEG A/V decoding function of transport stream files and live transport stream feed. You can double check stream contents off-hand without Set-top or hardware decoders.

* Supporting Format : MPEG4 Part10( H.264, AAC), Dolby AC3

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## H/W Specification

| | |
|---|---|
| **ISDB-T 1SEG Demodulator** | Format: ISDB-T 1SEG<br>Input Frequency Range : 470Mhz ~ 770Mhz (UHF)<br>Input Level : : -97dB(mW)~0dB(mW) (470Mhz~710Mhz)<br>-95dB(mW)~0dB(mW)(710Mhz~770Mhz)<br>Input RF Connector ; 50 ohm BNC<br>Segment UHF: 1 Segment<br>Mode Mode2, Mode 3<br>Guard Interval Mode2 (1/4, 1/8) / Mode3 (1/4, 1/8, 1/16)<br>Encoding and Coding rate QPSK (1/2, 2/3) / 16QAM (1/2)<br>Interleave Mode2 (2,4,8) / Mode3 (1,2,4)<br>Decode/FEC system : ISDB-T Compliant |

## Ordering Information

| Base Model | Description |
|---|---|
| ISA1000 | ISA1000 S/W + ISDB-T Demodulator Module + Hand-Held Frame |

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