

# TEST & MEASUREMENT

Group

LUMANTEK Catalogue No.29 /2012-

DRM / FM / AM / DVB-T/T2 / DVB-S/S2 / DVB-C/C2 / DAB / DAB+  
ATSC / ATSC-MDTV / NTSC / CMMB / QAM-B / ATV / ISDB-T / DTMB / T-DMB  
CDMA / CAL / UMTS / Wifi / WiMax / PMR / GPS / Galileo / Glonass / Bluetooth / LTE

PART.1 / TEST & MEASUREMENT for DTV

WEIVER2.0

Real Time RF Capture & Posters Suite  
Closed-Loop Advanced RF Signal Simulator System

LUMANTEK



FM / AM / RDS / DVB-T/T2 / DVB-S/S2 / DVB-C / DAB / DAB+ / ATSC / ATSC-MDTV / NTSC / CMMB / QAM-B / ATV /  
ISDB-T / DTMB / T-DMB / CDMA / PAL / UMTS / Wifi / WiMax / PMR / GPS / Galileo / Glonass / Bluetooth / LTE

# WEIVER 2.0

## RF CAPTURE & PLAYBACK SYSTEM

Covering frequency from 100KHz(0.1MHz) to 2.7GHz  
Max. 56MHz bandwidth recording

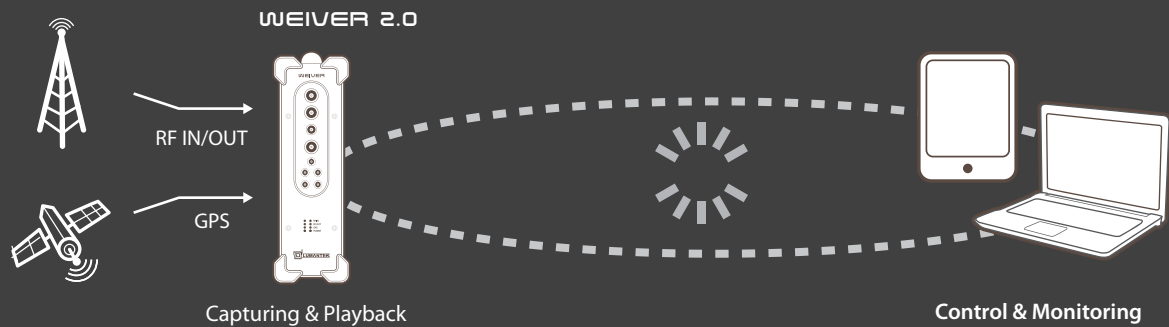
### Arbitrary Sample Rate Converter

The Lowest Power Consumption and  
Hassle-free Mobility RF Capture & Playback!



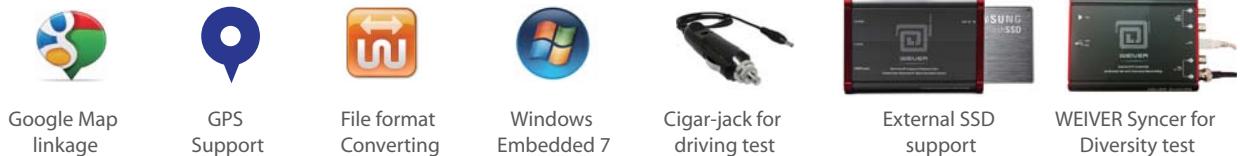
- Comprehensive real-time RF waveform capture and playback functionalities rolled up into a single, versatile package.
- Ultra small footprint and lightweight for convenience and hassle-free mobility (approx. 7kg).
- Lowest Power Consumption(available Automotive cigar power use:<70W).
- Simultaneous Capture & Playback, Auto RF Optimizer, AGC.
- Frequency range : 0.1MHz to 2.7GHz and bandwidth (1MHz to 56 MHz).
- Arbitrary Waveform Generator with I/Q.
- Instant, one-click programmable upgrades.
- External trigger function.
- 2 highly-stable, internal SSD (ROM & Storage) with lightning-fast read/write speeds.
- Flexible e-SATA connectivity for real-time capture and playback from external SSD (optional).
- Secure, versatile connectivity : Gigabit LAN 2 ports for convenient operations via the notebook.
- Built-in GPS module with data (NMEA-protocol ) compatible with 3rd party mapping services(google map).
- All-aluminum construction for industrial-strength durability.
- Attractive sales point and value for money (Low TCO).
- Versatile connectivity options available ( Ad-Hoc, Direct Connect ).
- Export feature for reporting and documentation (.xls format).





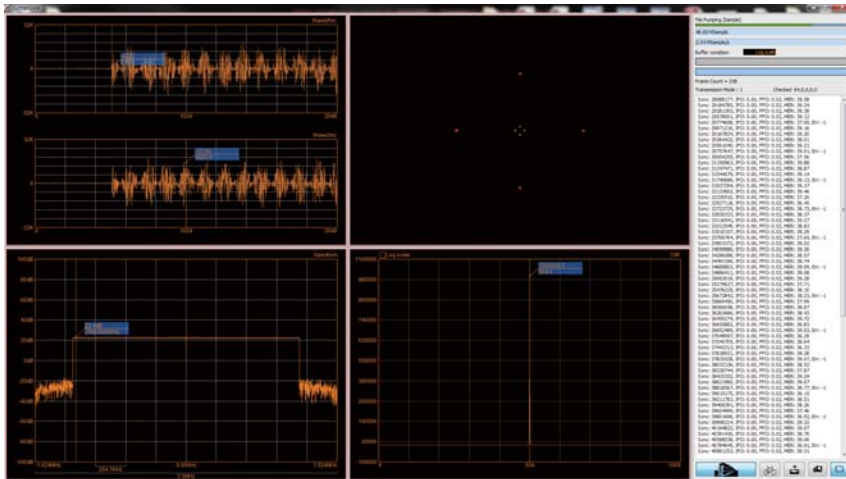
## Technical Description

The RF Down-converter can receive 0.1MHz -2.7GHz RF signal and downconverts to 75MHz IF. Capture worldwide broadcasting standards of DTV (FM, AM, ATSC, DVB-T/H, DVB-T2/S2, DVB-C, DMB, CMMB, DTMB, ISDB-T/B, OpenCable, and ATSC-M/H), Radio Broadcasting ATV (NTSC, PAL), RDS, TMC, LTE, Wifi. Weiver is equipped with a GPS module for accurate locative information to evaluate the strength of the RF signal. The GPS information is stored in the NMEA protocol and the GPRMC information is stored in a second log file. An active Antenna GPS is used. Weiver via input port enables the incoming reference signal to be synchronized at 10MHz frequency.



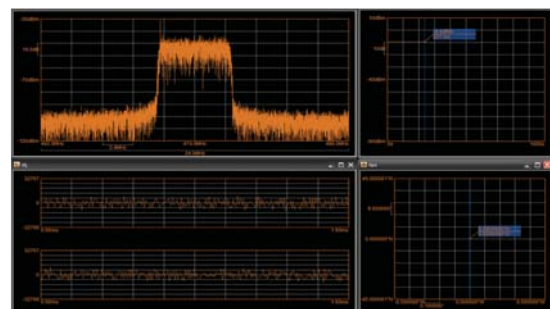
## NEW DAB/DAB+ Professional Receiver (option)

- ★ SFN Analysis ( TII/CIR )
- ★ All sub-channel decoding
- CIR ( Channel Impulse Response ) / Spectrum View / Constellation View / MER / BER



## Spectrum Analysis / RF Power / IQ Signal / GPS

In the Recording mode, the RF signal's contextual status (Spectrum, Power View, I/Q Graph and GPS locative information with Google Map) can be monitored and recorded. In the Playback mode, the recorded I/Q data can be played after the user finds the associated GPS locative information as well as the Power information from the log data. The user can simulate the RF signal conditions as exactly as it was recorded



## System Specification of WEIVER

### ● Capture Mode

#### Frequency

Frequency band	HF	48MHz to 2.7GHz
	HF_Low Noise	
	LF	0.1MHz to 48MHz
Real time bandwidth		56 MHz max. (Arbitrary BW, 1MHz step)
Frequency resolution		1KHz min.
Resolution bandwidth		3 KHz, 5 KHz, 10 KHz, 20 KHz
Warm-up time		30 minutes (typ.)
Freq. Stability vs. Temp.		±20 ppb max.
Aging per day		±1 ppb max.
Aging per Year		±50 ppb max.

#### Spectral Purity

Phase Noise@1 KHz offset		
HF	≤ -95 dBc/Hz (1 GHz)	
HF_Low Noise	≤ -90 dBc/Hz (2.7 GHz)	
LF	≤ -100 dBc/Hz (30 MHz)	
Phase Noise@10 KHz offset		
HF	≤ -100 dBc/Hz (1 GHz)	
HF_Low Noise	≤ -95 dBc/Hz (2.7 GHz)	
LF	≤ -105 dBc/Hz (30 MHz)	

#### Noise Figure

Noise Figure(1GHz)	HF	< 7 dB (Gain : 45 dB)
	HF_Low Noise	< 3 dB (Gain 45 dB)
	LF	< 7 dB (Gain 35 dB)

#### Amplitude

Phase Noise@1 KHz offset		
Input Dynamic Range(CW tone)	HF	+10 ~ -130 dBm
	HF_Low Noise	-30 ~ -130 dBm
	LF	+10 ~ -120 dBm
Input level Resolution		0.1dB
Input Level Accuracy		±1 dB max.
Gain Range	HF	-15 ~ +50 dB (min. 1 dB step)
	HF_Low Noise	+25 ~ +50 dB (min. 1 dB step)
	LF	-20 ~ +35 dB (min. 1 dB step)

#### IF band

ADC Resolution	16 bits
Sampling rate	120 MS/s
IF Frequency	150 MHz

#### Storage

Storage(default)	512 Gbyte
Storage time ( BW 8 MHz )	180 minutes
Storage time ( BW 24 MHz )	60 minutes
Storage time ( BW 48 MHz )	30 minutes

#### RF Input

RF input port	HF	50ohm, N type female, DC-coupled
	HF_Low Noise	
	LF	50ohm, BNC type female, DC-coupled
Max. DC input	±25 VDC max.	

#### Environment

Operating temperature	0 to +50 °C
Relative humidity	90%
Storage temperature	-20 to +70 °C

### ● Play Mode

#### Frequency

Frequency band	0.1 to 2700 MHz
Real time bandwidth	56MHz max. (Arbitrary BW, 1MHz step)
Frequency resolution	1Hz min.
Warm-up time	30 minutes (typ.)
Freq. Stability vs. Temp.	±20 ppb max.
Daily Aging	±1 ppb max.
Aging (PER year)	±50 ppb max.

#### Spectral Purity

Phase Noise@1 KHz offset	HF	≤ -100 dBc/Hz (30 MHz)
	HF_Low Noise	≤ -95 dBc/Hz (1 GHz)
	LF	≤ -90 dBc/Hz (2.7 GHz)
Phase Noise@10 KHz offset	HF	≤ -105 dBc/Hz (30 MHz)
	HF_Low Noise	≤ -100 dBc/Hz (1 GHz)
	LF	≤ -95 dBc/Hz (2.7 GHz)

#### Spurious Responses

2nd Harmonic	≤ -50dBc
3rd Harmonic	≤ -60dBc
other	≤ -60dBc

#### RF Output Characteristics

Gain range	-30 ~ +30dB (Input Level Basis)
Amplitude resolution	0.1dB step (Min.)
Amplitude accuracy	±1dB
Power	0dBm max.(48 to 2700 MHz) +10dBm max.(0.1 to 48 MHz)

#### RF Output

RF output port	50ohm, N type female, DC-coupled
Max. DC input	±25 VDC max.
Max. reverse RF power	1 W (Max.)

#### Environment

Operating temperature	0 to +50 °C
Relative humidity	90%
Storage temperature	-20 to +70 °C

● Hardware

Power

Input power	+18 VDC
Power Consumption	60 Watt

Adaptor spec

AC INPUT	100-240V ~ 3-1.5A, 50-60Hz
DC OUTPUT	18V / 4.5A

Mechanical

Dimensions	(L)406mm x (W)305mm x (H)100mm
Weight	6.5 kg (Approx.)

## Ordering information

### Base Unit

RF recorder and playback, 8M BW, 256Gb SSD, 100KHz~1GHz	LMTW2-MFU1
RF recorder and playback, 8M BW, 512Gb SSD, 100KHz~1GHz	LMTW2-MFU2
RF recorder and playback, 24M BW, 256Gb SSD, 100KHz~2.7GHz	LMTW2-MF1
RF recorder and playback, 24M BW, 512Gb SSD, 100KHz~2.7GHz	LMTW2-MF2

### Accessories

Power Supply Module, 100-240V
Auto DC power regulated adaptor (Car Cigar jack)
GPS Module, external antenna
Additional Cable for connecting control device
The WEIVER Tracer (Graphical Display of GPS Position and Route data)
I/Q File converter

### Option for Frequency Extensions

Frequency upgrade, 1GHz~2.7GHz	LMTW2-FU
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### Option for Player Extensions

RF playback upgrade, 24M BW, 100KHz~2.7GHz	LMTW2-PU1
RF playback upgrade, 48M BW, 100KHz~2.7GHz	LMTW2-PU2
* LMTW2-PU1 and LMTW2-PU2 may apply to LMTW2-MFU1 and LMTW2-MFU2.	

### Option for Bandwidth Extensions

24M bandwidth extension	LMTW2-BWU
* LMTW2-BWU may apply to LMTW2-MFU1 and LMTW2-MFU2.	
48M bandwidth extension	LMTW2-BWU2
* LMTW2-BWU2 may require LMTW2-BWU for LMTW2-MFU1 and LMTW2-MFU2.	
Adjustable Bandwidth	LMTW2-BWAC

### Options for External Memory packs

256 Gbyte SSD Memory Pack, up to 300 Mbyte/s for the WEIVER	LMTW2-EMP
512 Gbyte SSD Memory Pack, up to 300 Mbyte/s for the WEIVER	LMTW2-EMPU

### Options for Drive test

The WEIVER Syncer (external trigger for multiple units)	LMTW2-EX
Additional cables for the test	

Calibration	LMTKWEC
Extended Warranty with calibration coverage, one year	LMTKWEC1W
Extended Warranty with calibration coverage, two year	LMTKWEC2W
Extended Warranty with calibration coverage, three year	LMTKWEC3W
Extended Warranty with calibration coverage, four year	LMTKWEC4W



RF CAPTURE & PLAYBACK SYSTEM Covering frequency from 30MHz to 1.012GHz  
Max. 24MHz bandwidth recording



# WEIVER

RF CAPTURE & PLAYBACK SYSTEM



## Key Features

- Comprehensive real-time RF waveform capture and playback functionalities rolled up into a single, versatile package.
- **Ultra small footprint and lightweight for convenience and hassle-free mobility (approx. 5kg).**
- **Lowest Power Consumption(available Automotive cigar power use:<50W).**
- **Simultaneous Capture & Playback, Auto RF Optimizer, AGC.**
- Frequency range : 30MHz to 1.012 GHz and bandwidth (8MHz or 24MHz).
- Arbitrary Waveform Generator with I/Q.
- Instant, one-click programmable upgrades.
- External trigger function.
- 2 highly-stable, internal SSD (ROM & Storage) with lightning-fast read/write speeds.
- Flexible e-SATA connectivity for real-time capture and playback from external SSD (optional).
- Secure, versatile connectivity : WiFi module and Gigabit LAN 2 ports for convenient operations via the notebook.
- Built-in GPS module with data (NMEA-protocol ) compatible with 3rd party mapping services(google map).
- All-aluminum construction for industrial-strength durability.
- Attractive sales point and value for money (Low TCO).
- Versatile connectivity options available ( Ad-Hoc, Wireless LAN, Direct Connect ).
- Export feature for reporting and documentation (.xls format).

## Technical Description

The RF Down-converter can receive 30MHz -1.012 GHz RF signal and downconverts to 75MHz IF. Capture worldwide broadcasting standards of DTV (ATSC, DVB-T/H, DVB-C, DMB, CMMB, DTMB, ISDB-T/B, OpenCable, and ATSC-M/H), Radio Broadcasting ATV (NTSC, PAL), RDS, TMC. Weiver is equipped with a GPS module for accurate locative information to evaluate the strength of the RF signal. The GPS information is stored in the NMEA protocol and the GPRMC information is stored in a second log file. An active Antenna GPS is used. Weiver via input port enables the incoming reference signal to be synchronized at 10MHz frequency.



iPAD Control



Google Map linkage



GPS Support



File format Converting



Windows Embedded 7



External SSD support



WEIVER Synchronizer for Diversity test



Cigar-jack for driving test

## Spectrum Analysis / RF Power / IQ Signal / GPS



In the Recording mode, the RF signal's contextual status (Spectrum, Power View, I/Q Graph and GPS locative information with Google Map) can be monitored and recorded.

In the Playback mode, the recorded I/Q data can be played after the user finds the associated GPS locative information as well as the Power information from the log data. The user can simulate the RF signal conditions as exactly as it was recorded

Sleek but sturdy Aluminum construction

Protective Bumper

1. RF Out

2. RF In

3. REF In(10 MHz)

4. Trigger In

5. GPS In

6. Multi-color LED Status  
(RF In / RF Out / GPS / Power)



## System Specification of WEIVER

### ● Capture Mode

#### Frequency

Frequency band	30MHz to 1.102 GHz
Real time bandwidth	8MHz, 24MHz
Frequency resolution	1Hz min.
Resolution bandwidth	8MHz, 24MHz (1KHz, 3KHz, 5KHz, 10KHz)
Temperature stability	±1PPM
Initial achievable accuracy	±2PPM
Aging (PER year)	±1PPM

#### IF band

Resolution	16 bits
Sampling rate	60 MS/s
Frequency	75 MHz

#### Storage

Storage(default)	256 Gbyte
Recording time ( BW 8MHz )	100 minutes(approx.)
Recording time ( BW 24MHz )	30 minutes(approx.)

#### Spectral Purity

Phase Noise@1KHz offset, 1GHz	≤ -85dBc/Hz
Phase Noise@10KHz offset, 1GHz	≤ -95dBc/Hz
Phase Noise@100KHz offset, 1GHz	≤ -100dBc/Hz

#### Amplitude

Input level accuracy	± 1dB
Input dynamic range(CW tone)	0 ~ -130dBm
Gain range	- 10 ~ +45dB
Input level resolution	0.1dB
Max. DC input	± 50 VDC

#### Noise density

Pre Amp OFF	< -145dBm/Hz
Pre Amp ON	< -160dBm/Hz

#### Environment

Operating temperature	0 to +50 °C
Relative humidity	90%
Storage temperature	-20 to +70 °C

#### RF input port

50ohm, N type female, DC-coupled
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### ● Play Mode

#### Frequency

Frequency band	38MHz to 1.012GHz
Real time bandwidth	8MHz, 24MHz
Frequency resolution	1Hz min
Temperature stability	±1PPM
Initial achievable accuracy	±2PPM
Aging (PER year)	±1PPM

#### RF Output Characteristics

Gain range	-30 ~ +30dBm (Input Level based)
Amplitude resolution	0.1dB step (Min.)
Amplitude accuracy	±1dB
Power	Max. +10dBm

#### Environment

Operating temperature	0 to +50 °C
Relative humidity	90%
Storage temperature	-20 to +70 °C

#### Overload Protection on RF Output

Max. reverse RF power	1 W (Max.)
DC Input	±50 VDC (Max.)

#### Spectral Purity

Phase Noise@1KHz offset, 1GHz	≤ -85dBc/Hz
Phase Noise@10KHz offset, 1GHz	≤ -95dBc/Hz
Phase Noise@100KHz offset, 1GHz	≤ -100dBc/Hz

#### Spurious Responses

2nd Harmonic	≤ -45dBc
3rd Harmonic	≤ -55dBc

### ● Hardware

#### Power

Input power	+18 VDC
Power Consumption	50 Watt

#### Adaptor spec

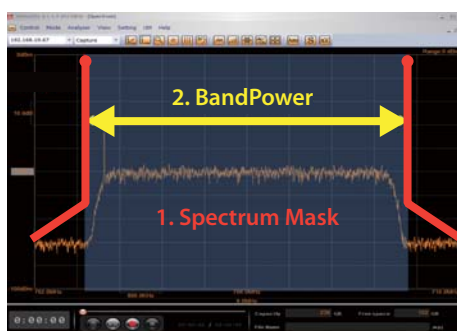
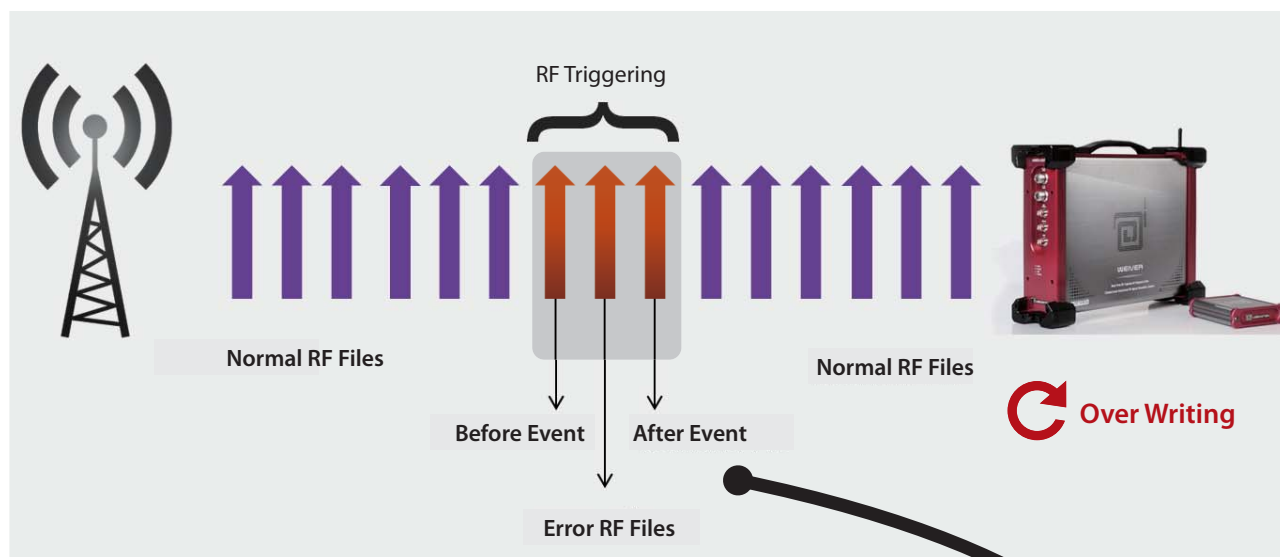
AC INPUT	100-240V ~ 3-1.5A, 50-60Hz
DC OUTPUT	18V ----- 4.5A

#### Mechanical

Dimensions	(L)370mm x (W)284mm x (H)94mm
Weight	6.5 kg (Approx.)



## WEIVER Blackbox Real-time RF Triggering & Recording System



### Criteria for an event

Case 1: When a signal violates a spectrum mask,  
Case 2: When band power violates pre-set power level,  
--> RF Triggering Start



`_event_xxxx.bbr` is triggered

## Ordering information

### Base Unit

RF recorder and playback, 8M bandwidth, 256Gb SSD

LMTW1-MF

RF recorder and playback, 8M bandwidth, 512Gb SSD

LMTW1-MFU

### Accessories

Power Supply Module, 100-240V

Auto DC power regulated adaptor (Car Cigar jack)

WiFi Antenna

GPS Module, external antenna

Additional Cable for connecting control device

The WEIVER Tracer (Graphical Display of GPS Position and Route data)

I/Q File converter

### Option for Bandwidth Extensions

24M bandwidth extension

LMTW1-BWU

### Options for External Memory packs

256 Gbyte SSD Memory Pack, up to 300 Mbyte/s for the WEIVER

LMTW1-EMP

512 Gbyte SSD Memory Pack, up to 300 Mbyte/s for the WEIVER

LMTW1-EMPU

### Options for Drive test

The WEIVER Syncer (external trigger for multiple units)

LMTW1-EX

Additional cables for the test

# WEIVER Player ▶



*Playback of real world RF signals recorded with WEIVER platform to re-generate real world RF environments that are too complex To exact simulate.*

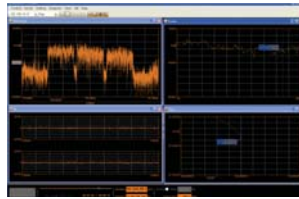
- Frequency Range : 38MHz to 1.012GHz and bandwidth (Adjustable band width from 8MHz or 24MHz)
- Arbitrary Waveform Generator with I/Q
- RF Step Attenuation : -30 ~ +30dB in 0.1dB Step (based on Input Level)
- External trigger function
- Secure, versatile connectivity : Gigabit LAN port for convenient operations via the Computer
- Front control via LCD panel
- Remote controlled from PC Monitor, Mouse, that case is operated by via the same convenient Graphical user Interface
- TCP/IP Remote control
- Front access hot swappable SSD drives for smart and easy playback



## WEIVER Player Operation



Front panel control  
& External SSD



WEIVER Operation  
via External Monitor



Hot swappable  
SSD drives



WEIVER Player Rear View

## Specification

### ● Play Mode

#### Frequency

Frequency band	38MHz to 1.012GHz
Real time bandwidth	Adjustable bandwidth from 8MHz, 24MHz
Frequency resolution	1Hz min
Temperature stability	±1PPM
Initial achievable accuracy	±2PPM
Aging (PER year)	±1PPM

#### RF Output Characteristics

Gain range	-30 ~ +30dBm (Input Level based)
Amplitude resolution	0.1dB step (Min.)
Amplitude accuracy	±1dB
Power	Max. +10dBm

#### Environment

Operating temperature	0 to +50 °C
Relative humidity	90%
Storage temperature	-20 to +70°C

#### Overload Protection on RF Output

Max. reverse RF power	1 W (Max.)
DC Input	±50 VDC (Max.)

#### Spectral Purity

Phase Noise@1KHz offset, 1GHz	≤ -85dBc/Hz
Phase Noise@10KHz offset, 1GHz	≤ -95dBc/Hz
Phase Noise@100KHz offset, 1GHz	≤ -100dBc/Hz

#### Spurious Responses

2nd Harmonic	≤ -45dBc
3rd Harmonic	≤ -55dBc

#### Environment

Operating temperature	0 to +50 °C
Relative humidity	90%
Storage temperature	-20 to +70 °C

#### Mechanical

Dimensions	(L)370mm x (W)284mm x (H)94mm
Weight	6.5 kg (Approx.)

#### Power

Input power	+18 VDC
Power Consumption	50 Watt

#### Adaptor spec

AC INPUT :	18V ..... 4.5A
DC OUTPUT :	100-240V ~ 3-1.5A, 50-60Hz

#### Calibration

1 year

#### RF output port

50ohm, N type female DC-coupled



USB 2 Multi-Standard SIGGEN / Modulator

# VENTUS 2.0



- ATSC Modulation
- DVB-T/H Modulation
- **NEW DVB-S2 Modulation**
- **NEW DVB-T2 Modulation**
- DVB-C Modulation
- DTMB Modulation
- DAB/DAB+/T-DMB Multiplexer + Modulation
- ISDB-T/B Modulations (Full-Seg/One-Seg)
- OpenCable Modulation
- ATSC MDTV Multiplexer + Modulation
- CMMB Multiplexer + Modulation
- **DAB+/ DMB Muxer**
- **FM**

*Perfect RF Quality on DVB-T2 / S2 supporting from 30MHz to 2.5GHz!*

## Key Features

- Versatile Multi-Standards in a single USB 2 portable transmitter and easy upgrade to other standards through on-line service.
- Truly short switching time to another mode.
- Integrated Power Amplifier & Attenuator : -110 dBm ~ + 7dBm(30MHz ~1GHz), -110dBm ~ +3dBm(1GHz~2.5GHz), 0.1 dB step
- Low phase noise and high MER.
- Latest User-friendly application and API (design your own application) can be downloaded from Web based download Center freely.
- Real-time signal with selectable Modulation and coding parameter.
- Integrated white noise generator (AWGN).
- TS stream player, TS Recorder, TS Analyzer.
- Remote Control via USB 2.0 from general Laptop. (Max 4 'VENTUS' units can be operated from one PC).
- Low power consumption.
- Real-Time Modulation (ASI In to RF Out) :ATSC, DVB-T/H,
- Auto temperature compensation.
- Fan-less heat dissipation design.
- High precision synthesizer (OCXO )

## Specifications

RF Signal	Frequency Range	<b>30MHz to 2.5GHz</b>
	Frequency Step	1 Hz
	Output Power	-110dBm~+7dBm(30MHz~1GHz) -110dBm~+3dBm(1GHz~2.5GHz) / 0.1dB step
	Output Power Accuracy	< +1dB
	Spectral Purity	< -60dBc@Full Bandwidth
Modulation Modes	Terrestrial DTV	DVB-T / DTMB / SDB-T fullseg / ATSC / <b>DVB-T2</b>
	Cable DTV	DVB-C / Opencable
	Satellite DTV	DVB-S / <b>DVB-S2</b>
	Mobile DTV	CMMB / ATSC-MDTV / DVB-H / T-DMB / ISDB-T 1seg / T-DMB
	Digital Sound Broadcasting	DAB / DAB+
	Multiplexer	CMMB Multiplexer / ATSC-MDTV Multiplexer
TS Generator	ASI OUT	Transport Stream Play
AWGN	All standard mode	2 times Signal Bandwidth
TS Recorder	ASI IN	Transport Stream recording / real-time modulation
System Platform	RF Output	SMA 50 $\Omega$
	DVB-ASI Output	BNC 75 $\Omega$
	DVB-ASI Input	BNC 75 $\Omega$
	Control	USB 2.0
	Power	90 VAC ~ 240 VAC, 50/60Hz
	Dimensions	170mm x 139mm x 71mm (170x139x57 atten. excluded)
	Weight	2.33Kg (1.75Kg Atten. Excluded)



## Ordering information of VENTUS 2.0

### Base Unit

Base Unit (Frequency: 30MHz ~ 900MHz)	LMTV2-MF
Extensions	
Frequency UPGRADE, 30 MHz ~ 2.5 GHz	LMTV2-HF
Step Attenuator, +7 dBm ~ -110 dBm (30MHz ~ 900MHz)	LMTV2-ATL
Step Attenuator UPGRADE, +3 dBm ~ -110 dBm (900MHz ~ 2.5GHz)	LMTV2-ATH
AWGN Noise Generator	LMTV2-AG

### Modulation systems for LUMANTEK VENTUS 2

Coder ISDB-T	LMTV2-K1
Coder DTMB	LMTV2-K2
Coder DAB / DAB+ / T-DMB	LMTV2-K3
Coder ATSC	LMTV2-K4
Coder DVB-T/H	LMTV2-K5
Coder DVB-C	LMTV2-K6
Coder J.83/B	LMTV2-K7
Coder CMMB with Muxer	LMTV2-K8
Coder ATSC-M/H with Muxer	LMTV2-K9
Option Package T2/S2	
(includes DVB-T2, DVB-T, DVB-S2, DVB-S, DVB-C)	LMTV2-PK4
Option package Audio Broadcasting	
(includes DAB/ DAB+/ T-DMB coder and Multiplexer)	LMTV2-PK5

# All-in-one DMB/DAB/DAB+ Ensemble Multiplexer

Ventus 1.0 /2.0/F1 Option Upgrade

Support dynamic reconfiguration

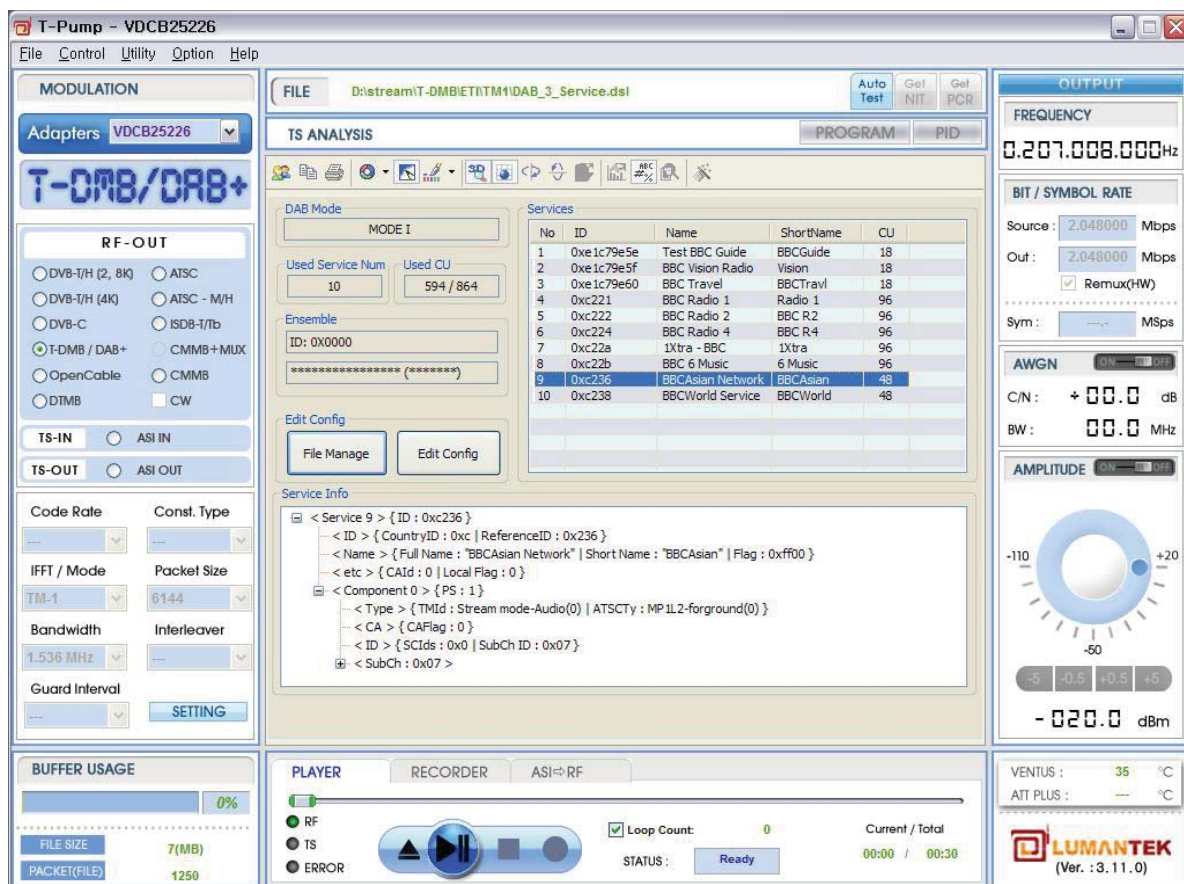
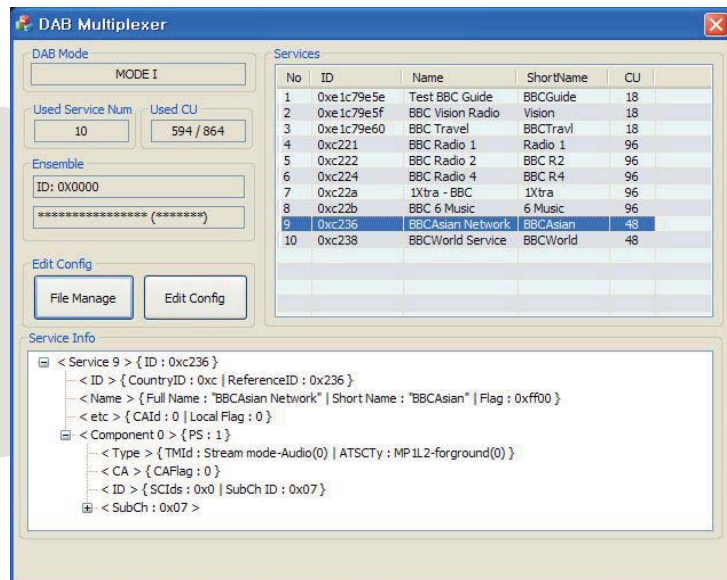
- Support file format
- ETI structure data(\*.eti)
- MP1L2 elementary stream data(\*.mp2)
- AAC elementary stream data(\*.aac)
- M4onM2(MPEG-4 on MPEG-2) TS(\*.ts)

Editable element

- DAB modes : I, II, III, IV
- Ensemble : ID, name
- Service : ID, name, link info, announcements, program type
- Component : SCID, SCIDs, name, language
- Sub-channel: ID, protection mode, FEC scheme
- Insertion extra FIG data

Compatibility

- ETSI EN 300 401 v1.4.1
- main DAB standard





# DAB/DAB+/DMB RF field Monitor & Analyzer

## USB Type Portable On-Air Analyzer

### General Information

- USB powered portable applications support
- DAB Ensemble Status Diagnostics
- RF logging/reporting, graphical signal level status
- Real time recording of sub channels for off-line applications
- FIC, MPEG2-TS/MPEG4 in-depth Analysis
- A/V service monitoring (H.264, BSAC/AAC+)
- Data service monitoring (DLS, Slide Show, BWS, BIFS, TPEG)
- Reconfiguration information display
- Field monitoring with GPS
- Services PC player for Musicam/DAB+ Audio, A/V(H.264, BSAC/AAC+), BIFS, TPEG
- SNMP Trap and SMTP Email support for Alarm
- Auto streaming function

### Player

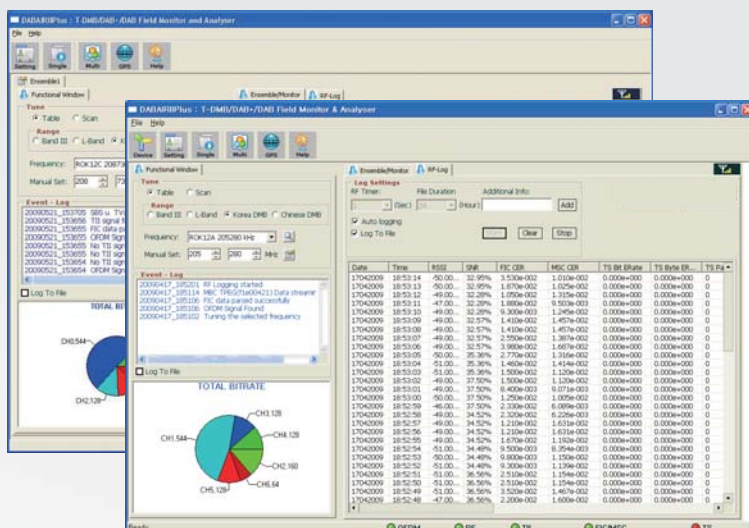
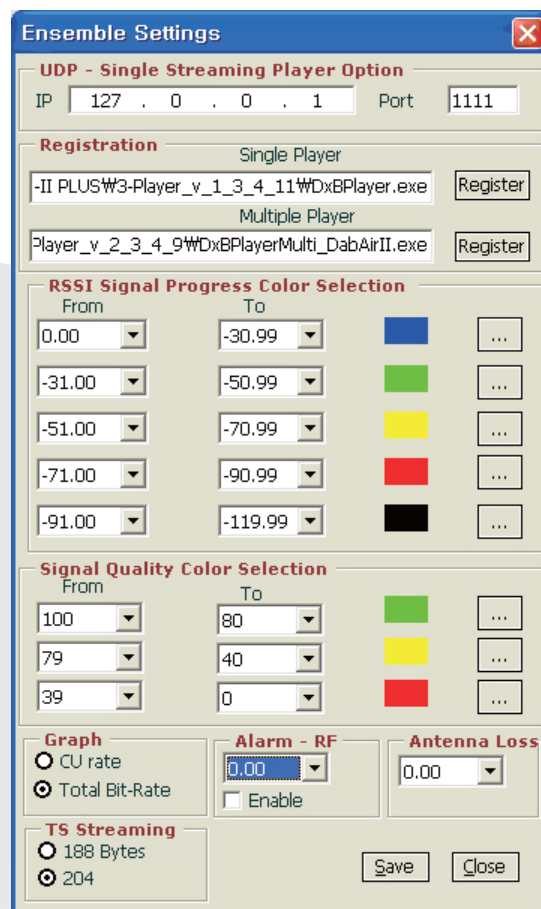
- DAB+, Musicam Audio Decoding
- A/V (H.264, BSAC/AAC+) with, or without BIFS
- MOT (BWS, Slide Show, DLS) data play
- TPEG data play

### Monitor/Analysis

- Musicam/DAB+ monitor & analysis
- MOT (BWS, Slide Show, DLS) data monitor & analysis
- MPEG2-TS/MPEG4 monitor & analysis
- BIFS monitor & analysis
- TPEG-TDC/MOT monitor & analysis

### Field Monitor

- Real time GPS synchronization with DABAir-Plus
- Off-Line MAP synchronization with field-saved data
- Display location, signal level, BER status, TPEG data on the MAP
- Off-line analysis of field-saved data



## Production Multi mode Test Transmitter

# VENTUS *F1*

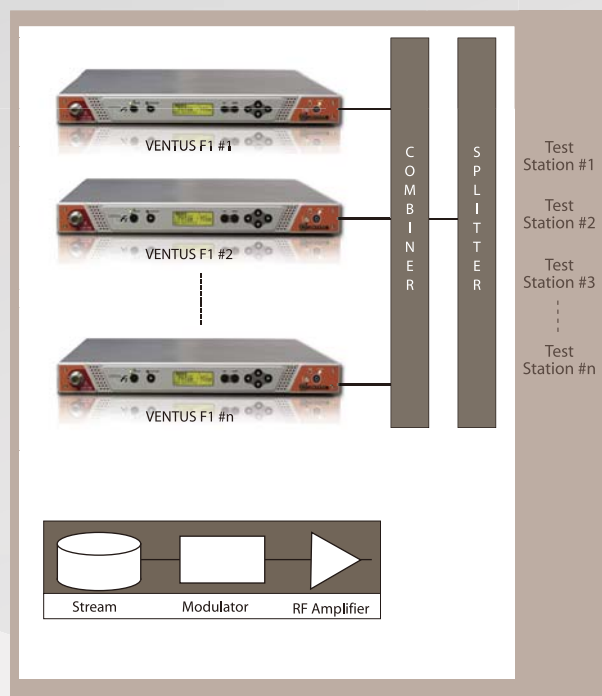
- ATSC-MDTV Modulation
- OpenCable Modulation
- CMMB Multiplexer + Modulation
- DTMB Modulation
- T-DMB/DAB+ Modulation
- DVB-T/H Modulation
- DVB-C Modulation
- ATSC Modulation
- AWGN ( White Noise Generation )
- ISDB-T/B Modulation



## Key Features

- Window Embedded XP stand alone signal generator.
- Multi-Standards in a single 1 RU Test Transmitter
- Instant, one-click programmable Modulation Option upgrades without costly downtime and unnecessary trips to the factory
- Truly short switching time to another mode.
- Frequency range 50MHz - 870 MHz in 1 Hz step.
- Integrated Power Amplifier +10 dBm to -30 dBm(Basic) ,+10 dBm to -110 dBm(Option ) , +20 dBm to -20 dBm(optional)
- Low phase noise and high MER
- Latest User-friendly application and API (design your own application) can be downloaded from Web based Download Center
- Real time signal with Selectable Modulation and coding parameter.
- Direct Stream Play out from external USB memory.
- Integrated white noise generator (option).
- TS stream player, TS Recorder, TS Analyzer.
- Best Optimized for use in mass production test system with local control from front LCD panel, and Can be remote controlled from UDP/IP and also remote controlled from PC Monitor, Mouse, that case is operated by via the same convenient Graphical user interface( T-PUMP) as is used for VENTUS F1 and VENTUS 1.0.
- Low power consumption.
- Intenal SSD (ROM & Storage) with lightning-fast read/write speeds.
- Auto temperature compensation.
- FCC & CE certified.

## Sample Block diagram in Assembly Line Factory



## Keypad and LCD on the front panel

The LCD lets you view the current settings quickly and easily. Parameters and their settings can be selected with the cursor keys and the [Enter] key.

## Easy Licence & Software Upgrades

There is no more time-consuming process for upgrading software with Ventus F1. You can perform licence upgrades for other modulations with just one clicking through on-line service of Lumantek. Also, you can download the latest T-PUMP software freely from our web based 'Download Center'.  
(<http://www.lumantek.com>)

## Remote operation with Remote Desktop or IP Network

The VENTUS F1 can be easily direct operated with a mouse, and a PC monitor through the latest T-PUMP or in a LAN network over UDP/IP. VENTUS F1 has the same highly convenient graphical user-interface that has already proven it's mettle in the VENTUS 1.0 USB 2.0 platform of instrument.

## Specifications

RF Signal	Frequency Range	50MHz to 870MHz, 1KHz step
	Output Power	+10dBm ~ -30dBm / +10dBm ~ -110dBm (optional) / +20dBm ~ -20dBm (optional)
		0.1dB step
	Output Power Accuracy	< +-1dB
	Spectral Purity	<-60dBc @ Full Bandwidth
Modulation Modes	Terrestrial DTV	DVB-T, DTMB, ISDB-T, ATSC
	Cable DTV	DVB-C, OpenCable
	Mobile DTV	CMMB, ATSC-Mobile DTV, DVB-H, T-DMB, ISDB-T 1seg, T-DMB
	Digital Radio Broadcasting	DAB/DAB+
	Multiplexer	CMMB Multiplexer, ATSC Mobile Multiplexer, DAB Multiplexer
AWGN	Modulation Modes	All
	Bandwidth	Upto 20MHz
	C/N	+60 ~ -30dB
ASI OUT	TS generator	188, 204 Packet, Upto 108Mbps
ASI IN	TS Recording	188, 204 Packet, Upto 160Mbps
	Real Time Modulation	ATSC, DVB-T/H/C, OpenCable
System Platform	OS	Windows Embedded XP
	Storage	40GB SSD or USB Disk
	USB 2.0	4 port of USB 2.0
	VGA	1 Port of VGA Terminal
	Ethernet	10/100BaseT, RJ-45
	Remote control	IP Network
	Power	90 VAC ~ 240 VAC, 50/60Hz
	Dimensions	427mm×44mm×450 mm (16.81in×1.73in×17.72 in)
	Weight	< 5kg





MPEG-2 Transport Stream Analyzer

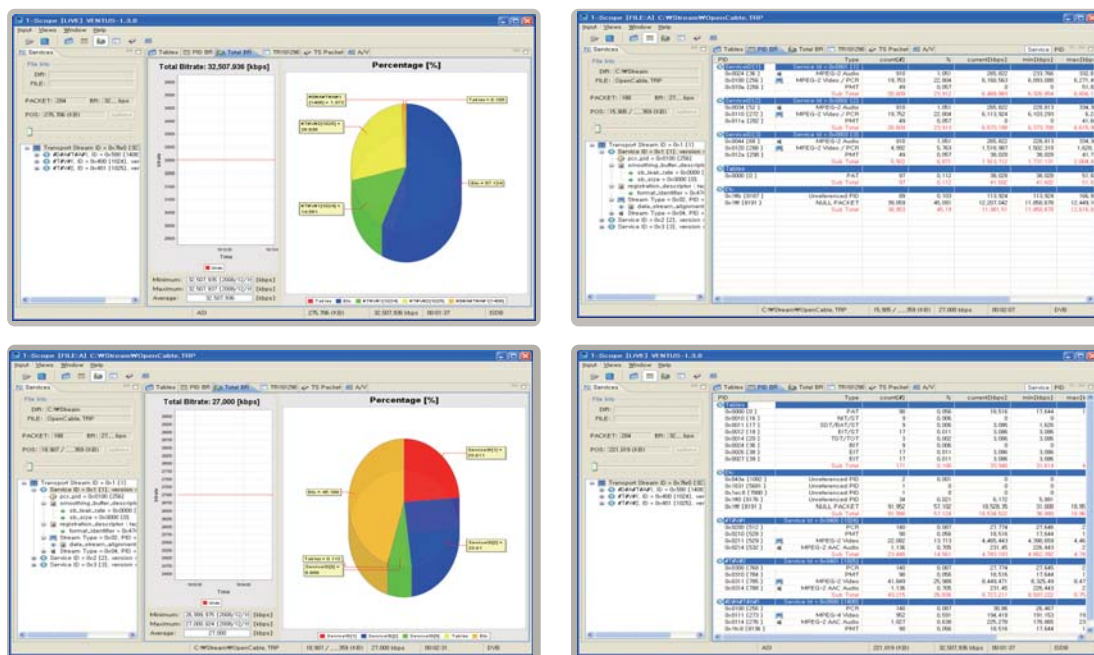
# T-SCOPE

*High Performance MPEG-2 TS Analyzing Solution without the high price tag!*

## Key Features

- ATSC, DVB-C, DVB-S, DVB-T and OpenCable DTV standards compliant.
- Multiple physical layer interface.
- Real-time and offline RF analysis: BER, MER, EVM, RF power and constellation.
- ETSI TR 101 290 Priority with real-time 3-stage error monitoring reporting and error logging.
- Diagnostic and verification of MPEG designs.
- PCR & PTS analysis, arrive time graphing, measurement display and jitter analysis.
- Triggered recording.
- Data rate analysis.
- Table and packet views.
- SI/PSI & PSIP view and interval analysis.
- CAS view: ECM and EMM repetition rate and update time.
- PES header analysis.
- Real-time A/V decoding.





A MPEG-2 Transport Stream analyzer for real-time analyzing, monitoring and decoding for VENTUS 1.0. The T-SCOPE is compatible with ATSC, DVB-C, DVB-S, DVB-T and OpenCable modulations. T-SCOPE is the best solution for OEM manufacturers who seek the best of the best for designing and verifying digital TV equipment.

## VENTUS-A DVB-ASI Input and Output Adapter for USB

### Features

- Single DVB-ASI input and single DVB-ASI output adapter for USB(half duplex)
- Packet size conversion support: 188 bytes to 204 bytes, 204 bytes to 188 bytes
- Null packet removal and insertion support
- PCR re-stamping support
- Hardware based input rated monitoring
- 8Mbytes hardware buffer reduce host CPU processing jitter
- Efficient USB DMA transfer reduces host CPU processing time
- Free SDK(API library and example application source codes) and drivers for Windows
- Same API and driver with VENTUS-1.0, DTV signal generator.
- MPEG2 TS play and capture with T-Pump software
- MPEG2 TS analysis and capture with T-Scope software

### Specification

- USB: USB 2.0, bus powered, no power supply required
- ASI input connector: 75Ω BNC, 1ea
- ASI output connector: 75Ω BNC, 1ea
- Output bit-rate: 0~108Mbps (in 1bps step)
- Input bit-rate: 0~216Mbps
- Output/Input modes: 188/204 bytes packet mode
- OS support: Windows 7, XP, 2000

### Applications

- PC based MPEG2 TS recorder, analyzer
- PC based decoder
- PSI/PSIP Generator
- IP-to-DVB and DVB-to-IP gateway
- Advertisement inserter



