# VENTUS 2.0 manual



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#### **Environmental Issues**

Thank you for buying a product which contributes to a reduction in pollution and thereby helps save the environment.

Our products reduce the need for travel and transport and thereby reduce pollution. Our products have either no or few consumable parts (chemicals, toner, gas, paper). Our products are low energy consuming products.

#### Waste handling:

There is need to send material back to LUMANTEK. Please contact your local dealerfor information on recycling the product by sending the main parts of the product for disassembly at local electronic waste stations.

#### **Production of products:**

Our factories employ the most efficient environmental methods for reducing waste and pollution by ensuring that the products are recyclable.

#### **OPERATOR SAFETY SUMMARY**

For your protection, please read these safety instructions completely before operating the equipment and keep this manual for future reference. The information in this summary is intended for operators. Carefully observe all warnings, precautions and instructions both on the apparatus and in the operating instructions.

#### **Equipment Markings**

The lighting flash symbol within an equilateral triangle is intended to alert the user to the presence of un insulated "dangerous voltages" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electrical shock. The exclamation mark within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions within literature accompanying the equipment.

#### Warnings

#### Water and Moisture :

Do not operate the equipment under or near water - for example near a bathtub, kitchen sink, or laundry tub, in a wet basement, near a swimming poor or in areas with high humidity. Cleaning - Unplug the apparatus from the wall outlet before cleaning or polishing. Do not use liquid cleaners or aerosol cleaners. Use a lint-free cloth lightly moistened with water for cleaning the exterior of the apparatus.

#### Ventilation :

Do not block any of the ventilation openings of the apparatus. Install in accordance with the installation instructions. Never cover the slots and openings with a cloth or other material. Never install the apparatus near heat sources such as radiator, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.Grounding or Polarization - Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plus has two blades and a third grounding prong.

The wide blade or third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician. Power-Cord Protection - Route the power cord so as to avoid it being walked on or pinched by items placed upon or against it, paying particular attention to the plugs, receptacles, at the point where the cord exits form the apparatus.

#### Attachments :

Only use attachments as recommended by the manufacture.

#### Accessories :

Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

#### Lighting :

Unplug this apparatus during lightning storms or when unused for long periods of time.

#### ISDN cables :

CAUTION - to reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.

#### Servicing :

Do not attempt to service the apparatus yourself as opening or removing covers may expose you to dangerous voltages or other hazards, and will void the warranty. Refer all servicing to qualified service personnel.

#### Damaged Equipment :

Unplug the apparatus from the outlet and refer servicing to qualified personnel under the following conditions - <u>When the power cord or plug is damaged</u> <u>or frayed If liquid has been spilled or objects have fallen</u> <u>into the apparatus If the apparatus has been exposed</u>

to rain or moisture If the apparatus has been subjected to excessive shock by being dropped, or the cabinet has been damaged If the apparatus fails to operate in accordance with the operating instruction

#### **Warranty Period**

Lumantek Test & Measurement and Broadcasting products normally carry a 1-year limited warranty (including labor and parts) Unless noted, Lumantek Digital Media products normally carry a 1-year limited warranty (including labor and parts).

#### **Return Material Authorization Policy**

No product may be returned directly to Lumantek without first contacting Lumantek for a Return Material Authorization ("RMA") Code. If it is determined that the product is defective, you will be given an RMA Code and instructions for product return for servicing or replacement. An unauthorized return such as where an RMA Code has not been issued, the product will be returned to you at your expense. Authorized returns are to be shipped prepaid and insured to the address on the RMA in an approved shipping container (original box and packaging materials or similar). To request an RMA Code, please visit on http://www.lumantek.com/ support/rma\_services\_instruction.html

#### **Warranty Limitations**

Lumantek's limited warranty provides that, subject to the following limitations, each product will be free from defects in material and workmanship and will conform to Lumantek's specification for the particular product.

#### **Limitation of Remedies**

Your exclusive remedy for any defective product is limited to the repair or replacement of the defective product.

Lumantek may elect which remedy or combination of remedies to provide in its sole discretion. Lumantek shall have a reasonable time after determining that a defective product exists to repair or replace a defective product. Lumantek's replacement product under its limited warranty will be manufactured from new and serviceable used parts. Lumantek's warranty applies to repaired or replaced products for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced product, whichever is longer.

#### **Limitation of Damages**

Lumantek's entire liability for any defective product shall in no event exceed the purchase price for the defective product. This limitation applies even if Lumantek cannot or does not repair or replace any defective product and your exclusive remedy fails of its essential purpose.

#### No Consequential or Other Damages

Notwithstanding anything else in this policy or otherwise, Lumantek will not be liable with respect to the products under any contract, negligence, strict liability or other legal or equitable theory (i) for any amount in excess of the purchase price for the defective product or (ii) for any general, consequential, punitive, incidental or special damages. These include loss of recorded data, interruption of use, the cost of recovery of lost data, lost profits and the cost of the installation or removal of any products, the installation of replacement products, and any inspection, testing, or redesign caused by any defect or by the repair or replacement of products arising from a defect in any product. This section does not limit liability for bodily injury of a person.

#### Your Use of the Product

Lumantek will have no liability for any product returned if Lumantek determines that: The product was stolen from Lumantek.

The asserted defect:

- Is not present,

- Cannot reasonably be fixed because of damage occurring when the product is in the possession of someone other than Lumantek, or

- Is attributable to misuse, improper installation, alteration (including removing or obliterating labels and opening or removing external covers (unless authorized to do so by Lumantek), accident or mishandling while in the possession of someone other than Lumantek.

The product was not sold to you as new.

The product was not used in accordance with Lumantek specifications and instructions.

The product was not used for its intended function.

#### **Additional Limitations on Warranty**

Lumantek's warranty does not cover products which have been received improperly packaged, altered, or physically damaged.

C

# VENTUS 2.0

# USB 2.0 Multi-Standard SIGGEN / Modulator



6

Frequency 30MHz ~ 2.5GHz

# 1. VENTUS 2.0 / Introduction

#### 1.1 / VENTUS System Overview

VENTUS is a product that broke away from the existing measurement system. It is designed so that it can be connected to the user's PC or notebook USB interface. It is a portable measurement system unlike the existing Signal Generator. It can be used for many purposes such as development, product demonstration, marketing, and domestic and overseas business trip purposes.

Basically, it consists of ASI-INPUT, ASI-OUTPUT port, RF Modulator, and RF Upconverter. If the user wants, any DTV SD format in the world can be used. DTV SD formats supported by VENUS are as follows.

# DVB-T/H, DVB-C (A,C), ATSC(8VSB), ATSC-M/H, OpenCable, ISDB-T/Tb, T-DMB/DAB+, CMMB, DTMB, DVB-T2, DVB-S2

#### 1.2 / VENTUS Development Concept

VENTUS solution can be used to test all DTV SD formats in the world. It is a All-in-One type measurement solution. As it is a portable product, it has maximized user convenience.



#### 1.3 / T-Pump Mode

Pump has the interface for USB IN/OUT and ASI IN/OUT RF OUT(Data). Also it has 8M Byte or 16M Byte's Hardware Buffer inside the pump. Pump's mode are RF OUT. RF OUT Raw. ASI OUT. ASI IN. ASI IN to RF OUT. Please reference below explains, VTS\_PumpMode\_t type declaration and the PumpSet Mode function.

- ✓ RF OUT Mode: This mode is that MPEG transmit stream (TS, Transport Stream), ports by USB IN, sends it as RF OUT(Data) through H/W buffer.
- RF OUT Raw Mode: This mode is received the reated byte stream at software through USB INand sends it as RF OUT (date) through H/W buffer.
- ✓ ASI OUT Mode: This mode is to get MPEG TS by USB IN, then put it out as ASI OUT through H/W buffer.
- ASI IN Mode: This mode is to get MPEG TS by ASI IN, then put it out to USB OUT through H/W buffer. Also, this mode is possible to output as selective ASI OUT at the same time.
- ASI IN to RF OUT Mode: This mode is to get MPEG TS by ASI IN, then put it out to RF OUT. Also, this mode is possible to output as selective ASI OUT at the same time.

#### 1.4 / VENTUS Basic Organization

VENTUS device is possible to transmit DTV Skill Standard by RF through USB Interface between VENTUS and PC or Notebook.



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# 2. VENTUS 2.0 / Product Description

#### 2.1 / Product Views and Dimensions



FRONT



#### **Right Side Panels Interface**

- USB LED: (On) when connected USB
- RF OUT LED: (On) under normal RF Output
- ASI IN LED: (On) when using ASI Input Port
- ASI OUT LED: (On) when using ASI Output Port

Perspective

- RF OUT (-20dBm) : RF Output Port



#### Left Side Panels Interface

- POWER SW: VENTUS power Switch
- POWER port
- Attenuator Power : Power connecting port
   > When using Amp & Attenuator, it controls by USB port
   > USB port connects Ventus
- ASI-OUT : ASI Out port
- ASI-IN : ASI Input port

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#### 2.2 / VENTUS 2.0 Package Contents





# 3. VENTUS 2.0 / SYSTEM OPERATING

#### 3.1 / VENTUS Hardware Install

As explained in Chapter 2, after checking VENTUS components, the user can use it after just connecting power and installing T-pump without installing the hardware. Connect Power and PC or Notebook's USB cable(A-B Type) to VENTUS' USB port.





#### 3.2 / VENTUS Driver Operation

For operating VENTUS, you have to install DVB-ASI In/Out Module Driver and VENTUS Modulator Driver. -> Insert the USB Flash Memory and download the Driver from USB.

Driver Name	Folder name	Description	OS
USB DTV Signal Generator	Driver.install	VENTUS 2.0 DTV Signal	Window XP / 2000 /2003 /
(LUMANTEK)		Generator	Window7

#### \* VHF/UHF RF Attenuator (Optional)

ltem	Unit	Min.	Туре	Max
Input Range	dBm	-	-20	-
Output Control Range	dBm	-110	-	+7 dBm(+3dbm over frequency of 1GHz)
Output Control Step	dB	-	0.1	-
Frequency Control Range	MHz/GHz	30MHz	-	2.5GHz
Frequency Control Step	MHz	-	0.001	-
Valid Temperature	Celsius (°C)	25	38	60
Power Supply Voltage	V	_	12V	_
Power Supply Current	mA	-	1A	1.3A

EK

# 3.3 / VENTUS Driver Installation

Upon connecting the VENTUS for the first time, "Found New Hardware Wizard" window will pop up. Check "No, not this time", then click "Next".

Found New Hardware Wizard	
	Welcome to the Found New Hardware Wizard Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission). Online privacy information
	Can Windows connect to Windows Update to search for software?
	○ Yes, this time only
	C Yes, now and every time I connect a device No, not this time
	Click Next to continue.
	< Back Next > Cancel

Select "Install from a list or specific location(Advanced)", then click "Next".

Found New Hardware Wizard	
	Welcome to the Found New Hardware Wizard This wizard helps you install software for: USB Device
	If your hardware came with an installation CD or floppy disk, insert it now.
	What do you want the wizard to do?  Install the software automatically (Recommended)  Install from a list or specific location (Advanced)  Click Next to continue
	<pre>Click Next to continue.</pre> < Back Next > Cancel

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Click [Browse] and go to the file location. It's placed at [...\VENTUS\Driver.install] in supplied USB Flash Memory. Choose the one folder between Window OS 32bit and 64 bit.

and New Hardware Wizard	Browse For Folder	2
Please choose your search and installation options.	Select the folder that contains drivers for your h	andware.
© Exact hor the best driver in these locations. Use the check boxes below to link or expand the default search, which includes local paths and removable media. The best driver found will be installed. Search removable godis (locop. CD-RDM)	Windows32bit.3	×
[2] Include the gradient in the select:     [0.VEN/TUS/MMP & Attenuator     [0.Self select; I will choose the drive to install     Denote the colore the drive down from a kit. Windows does not qualitative that	Windows32bt.4 Windows48bt.1 Windows64bt.3 Windows64bt.3 Windows64bt.3	_
Decome this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.	To view any subfolders, click a plus sign above.	Cancel

Continue installing.





Once you've finished installing driver, you need to check out the device manager. On windows XP, you can check it by going to the Control Panel, click System. And click Hardware. A Device Manager should look like the picture below.

#### 3.4 / VENTUS Multi Driver Installation

In case you need to operate more than 2 VENTUS on one computer, you must use different drivers for operating. Other USB. USB device has 2 type of VID(Vendor ID) and PID(Product ID). However, you may use separated drive for instance. In this case you need a different driver file and installation file(\*.inf ).

You can operate them upto 4 Ventus depend on your computer's spec.

#### Package Contents

C:\VENTUS\17_Multi_200806	520₩¥entus_Dri	ver_Multi			
<u>File Edit V</u> iew F <u>a</u> vorites <u>T</u> oo	ols <u>H</u> elp				
🔇 Back 🔹 🔿 👻 🎓 Search	🜔 Folders 🛛 🔓	8 3 × 19	-		
Address 🗁 C:\VENTUS\17_Multi_	2 <mark>0080620₩Ventus</mark>	_Driver_Multi			💌 🄁 Go
Name 🔺	Size	Туре	Date Modified	Attributes	
Windows32bit.1		File Folder	2008-06-25 오후 1:29	20	
🛅 Windows32bit.2		File Folder	2008-06-25 오후 1:29		
🔁 Windows32bit.3		File Folder	2008-06-25 오후 1:29		
Cindows32bit.4		File Folder	2008-06-25 오후 1:29		
🔁 Windows64bit.1		File Folder	2008-06-25 오후 1:29		
📄 Windows64bit.2		File Folder	2008-06-25 오후 1:29		
🔁 Windows64bit.3		File Folder	2008-06-25 오후 1:29		
📄 Windows64bit.4		File Folder	2008-06-25 오후 1:29		

In the latest T-pump is possible to install driver per each number like above image.

Windows 32bit(1-4): Windows 2000, XP, 2003, Vista(32 bit). Windows 64 bit(1-4): Windows XP, 2003, Vista(64 bit).



For the reference, USB device will read different devices as the port. if you connect them through PC's same port using outside hub, it will read as a different device and install driver again.

Multi- Driver installation processes same as 3.3

Windows will recognize it as a new hardware component and open the "Found New Hardware Wizard". Click on 'No, not this time', then Click 'Next'.

ound New Hardware Wizard	
	Welcome to the Found New Hardware Wizard Windows will search for current and updated software by locking on your computer, on the hardware installation (D, or on the Windows Update Web sile (with your permission). Orline privacy information
	Can Windows connect to Windows Update to search for soltware? O Yes, this time only O Yes, now and <u>e</u> very time I connect a device I No, not this time
	Click Next to continue.
	< Back Next > Cancel

Check 'Install from a list or specific location (Advanced)'. Then click 'Next'.

ound New Hardware Wizard	
	Welcome to the Found New Hardware Wizard This wizard helps you install software for:
	If your hardware came with an installation CD or floppy disk. insert it now. What do you want the wizard to do?
	<ul> <li>Install the software automatically (Recommended)</li> <li>Install from a list or specific location (Advanced)</li> </ul>
	< <u>B</u> ack: <u>N</u> ext > Cancel



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Select 'Search for best driver in these locations'. Then, Click 'Browse'

Found New Hardware Wizard	
Please choose your search and installation option	IS.
Search for the best driver in these locations.	
Use the check boxes below to limit or expand the de paths and removable media. The best driver found v	fault search, which includes local will be installed.
Search removable media (floppy, CD-ROM)	
Include this location in the search:	
C:\VENTUS\17_Multi_20080620\Ventus	_Driver_
Don't search. I will choose the driver to install. Choose this option to select the device driver from a the driver you choose will be the best match for your	Browse For Folder         ?           Selec: the folder that contains drivers for your hardware.
	🖂 🚞 Ventus_Driver_Multi 💽
	🗁 Windows32pit.1
	Windows32pit.2
< <u>B</u> ack	Windows32hit.3
	📥 Windows64nit.1
	🛅 Windows64bit.2
	🗀 Windows64bit,3 🚽

Navigate to the correct installation search path and assign the Driver path which doesn't use before.4. Assign the driver except the existing ports.

Ventus 1.0 (VID_0525&PID_3320): Ventus10_1	I.SYS	
Description	Version	Manufacturer
Ventus 1.0 (VID_0525&PID_3320): Ventus10_1.SY	5 1.8.5.16	LUMANTEK Co
Ventus 1.0 (VID_0525&PID_3320): Ventus10_2.SY	5 1.8.5.16	LUMANTEK Co
Ventus 1.0 (VID_0525&PID_3320): Ventus10_4.SY	5 1.8.5.16	LUMANTEK Co
Ventus 1.0 (VID_0525&PID_3320): Ventus10_3.SY	5 1.8.5.16	LUMANTEK Co
•		Þ
This driver is not digitally signed! Tell me why driver signing is important		

For instance, if you assian driver No.1 before, you have to choose other driver

numbers. We recommand use same number of drivers to number of devices.

The Wizard shows that the installation has been completed.



Expand the USB DTV Singal Generator Driver in the Windows Device Manager (Control Panel > System > select Hardware tab> click on Device Manager).



You can find your installed several VENTUS drivers.

#### 3.5 / VENTUS T-pump Install

After completing the installation of VENTUS device driver, install T-pump software, which is provided for the operation of VENTUS, in the PC or notebook. T-pump is a program that controls all VENTUS interfaces. It controls recording, RF transmission, ASI transmission, and DTV selection functions.

Program Name	Folder Name	Description
Setup.exe	T-pump Install	VENTUS Application



Firstly, double click "Setup.exe". Including in the USB provided



T-pump - InstallShield	Wizard	×
	Welcome to the InstallShield Wizard for T-pump	
	The InstallShield Wizard will install T-pump on your computer. To continue, click Next.	
	< <u>₿</u> ack Next> Cancel	

T-Pump install program will run.



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 -pump - InstallShield Wizard

 InstallShield Wizard Complete

 Setup has finished installing T-pump on your computer.

Continue T-pump installing.

The T-pump installation has been completed.

<u>T-pump Program location :</u> [C:\Program Files\(C)LUMANTEK\T-Pump ]

# 4. VENTUS 2.0 / T-PUMP OPERATION

After completing the installation of VENTUS device driver and T-pump software, test DTV signal transmission, and capturing and transmission using ASI input/out using the T-pump software.

#### • Upgrade Information (Version 3.1.0)

- Auto Test program works, When turn off the Ventus with ASI card.
- New option for T-DMB Mode
  - -> TM2, TM3, TM4 can transmits
- New option for CMMB Mode
  - -> Added EMM sign on Data field.
  - -> Add CAS field
  - -> The T-pump works, even CLCH information and the actual form does not match each other.
  - -> Fixed no padding data sync error rountine
  - -> Fixed the problem to apply in order the MF-ID when the Multi-MFS is deleted.
- Edit the problem when Lower than the range of frequency settings, it sets automatically set to the value of the minimum
- Full-seg stream as a stream of TMCC information without modification to the output when 1 seg
- From this version, it supporting Window Vista for USB Driver

#### • T-pump UI Overview

No	ltems	Description
1	ASI-IN, OUT, DVB-T/H etc.	Display selected Interface
2	RF-OUT	DTV Option-> When this option is selected, the interface will change
3	TS-IN / OUT	Select ASI INPUT, OUTPUT Port
4	RF Parameter	Set DTV Parameter, RF OUTPUT Mode in detail
5	BUFFER USAGE	Display hardware buffer information usage of current selected interface stream
6	Get NIT, Get PCR	Check DVB-T,H stream's NIT information
7	TS ANALYSIS	Analyses per Program and PID
8	Play / Record / ASI to RF	TS Play control, Capturing by ASI INPUT, ASI Input -> RF output
9	Frequency	Set frequency for testing
10	Bit rate	Bit Rate of the testing TS File( source, output)
	From File	Check DVB-T stream's NIT
11	Symbol rate	Input Symbol Rate under DVB-C mode
12	Amplitude	Power Level Control
13	Version Display	T-PUMP Version





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#### 4.1 / TS-IN Option : ASI Input



1. ASI Input is for input real time stream from other ASI Output Port.

RSI-IN					
RF-C	UT				
O DVB-T2	ODVB-S				
OVB-T/H(2, 8K)	O DVB-S2				
O DVB-T/H(4K)	○ ATSC				
O DVB-C	O ATSC-M/H				
O DAB+/DMB+MUX	O ISDB-T/Tb				
OpenCable	○ CMMB+MUX				
O DTMB	<b>∨</b> CW				
TS-IN 💿 A	ASI IN				
TS-OUT 🔘 A	ASI OUT				

2. First, run T-pump application. -> Then on your left side menu, click TS-IN. -> On Top Left Menu will change to ASI-IN signal.

3. When you want to capture the signal which is entering through ASI Input, Click Open icon. File browse window will pop up.



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4. Click Rec button under RECORDER tab.



#### • Detail View of RECODER tab

- ASI Loop Back

PLAYER	RECORDER	ASI⇔RF				
	📝 A	SI Loop Back	Limit Size :	50	MB 📃 Limit Time : 1	Min
RF  TS			SIZE :	0	MB REC Time	•
ERROR			STATUS :	Ready	00:00	

- ASI Loop Back

PLAYER	RECORDER ASI⇔RF			
	ASI Loop Back	🗸 Limit Size :	50	MB 📃 Limit Time : 1 Min
RF		SIZE :	0	MB REC Time
ERROR		STATUS :	Ready	00:00

- ASI Loop Back

PLAYER	RECORDER ASI⇔RF			
	ASI Loop Back	Limit Size :	50	MB 👽 Limit Time : 1 Min
RF     TO		SIZE :	0	MB REC Time
ERROR		STATUS :	Ready	00:00

5. When you want to transmit ASI Input Signal as RF, go to [ASI->RF] tab. Then you can Select RF-OUT Modulation.

#### 4.2 / TS-OUT Option : ASI Output

- 1. ASI Output is for transmitting the saved file [\*.trp, \*.tp] through ASI Output Port.
- 2. Top Left Menu in T-pump will change ASI-OUT when select TS-OUT option.
- 3. Click file open button( ) and select \*.trp or \*.tp to do ASI Out.

PLAYER	RECORDER A	SI⇔RF				
	ASI Loc	op Back 📃 Limit Siz	e:	50 MB 📃 Limi	t Time :	I Min
<ul> <li>RF</li> <li>TS</li> <li>ERROR</li> </ul>		Dpm Look in Documents Desitop My Documents Desitop My Documents	DVB-T	96.00203.000	0 # • 0	
		My Network	File pane: Files of type:	DOWN-BBC3.0503.ttp All files (*.*)	~	Qpen Carcel

4. T-pump displays Stream file analysis per Program or PID. Status is Ready on PLAYER tab.



#### 4.3 / RF Output option : CW





PLAYER	RECORDER	ASI⇔RF					
RF     TS			🔽 Loop Co	unt:	0	Current / 1	rotal
			Opran Look jn	DVB-T		- op = a	-
			My Recent Documents Desktop My Documents My Computer		C. S. LARKS (F)		
				File pame:	DOWN-BBC3_0503,trp		Qpen
			My Network	Files of type:	All files (*.*)	~	Cancel

2. Select Modulation Option in RF-OUT menu, then CW option will active.

3. Select Modulation Option in RF->OUT menu, then CW option will active.

PLAYER	RECORDER	ASI⇔RF			
	A	SI Loop Back			
RF					
ERROR			STATUS :	Ready	

4. Move from [PLAY] to [ASI->RF] tab, then click play button. It will transmit as CW.

PLAYER	RECORDER	ASI⇔RF			
	A	SI Loop Back			
RF     TS					
			STATUS :	Ready	

# 4.4 / RF Output option : CW Operation



2. Select Modulation Option in RF-OUT menu, then CW option will active.

3. Move from [PLAY] to [ASI->RF] tab, then click play button. It will transmit as CW.

PLAYER	RECORDER	ASI⇔RF			
	A	SI Loop Back			
<ul> <li>RF</li> <li>TS</li> <li>ERROR</li> </ul>			STATUS :	Ready	

#### 4.5 / RF Output Option : DVB-T/H(2, 8K)

1. DVB-T/H option is divided by 2, 8k and 4k. Select suitable option for you. Select DVB-T/H (2, 8K) on the top left of RF OUT menu in T-pump, DVB-T will be shown.

• DVB-T Parameter Value

ltems	Value
Code Rate	1/2, 2/3, 3/4, 5/6, 7/8
Const. Type	QPSK, 16 QAM, 64 QAM
IFFT	2K, 8K, 4k
Bandwidth	5, 6, 7, 8 MHz
Guard Interval	1/32, 1/16, 1/8, 1/4

Do not use under DVB-T/H(2, 8k) option (Only for DVB-T/H(4k))



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2. Select DVB-T option, Click file open button( 📥 and select [\*.trp or \*.tp] to do RF Output test.

4. If you have information to the multi-NIT with 2.4.0 version, you can check RF parameter. Like the picture below, if you click From File bottom, you will get ts file's NIT information. After, Click [Apply], automatically set all the options.

i T-Pump - VDDF12345 File Control Utility Option Help	1			
MODULATION	FILE Please, Open File			
Adapters VDDF12345	TS ANALYSIS PROGRAM PID			
01/8-T/H	🙎 ha 🧉 🔍 • 🔣 🔏 • 🕄 😹	BIT / SYMBOL RATE		
RF-OUT           ODVB-12         ODVB-5           © DVB-T/H(2, 8K)         ODVB-52           ODVB-T/H(4K)         ATSC           ODVB-T/H(4K)         ODVB-52				Source : Mbps Out : 6.032086 Mbps ☑ Remux(HW) Sym : MSps
O DAB+/DMB+MUX O ISDB-T/Tb	NI	T Information - 1 / 1	· · · · ·	<b>×</b>
OpenCable         OCMMB+MUX           DTMB         CW           TS-IN         ASI IN		ITEM	Current	NIT
Code Rate Const. Type	100.00% on	Frequency(MHz)	474.000000	Undefined
IFFT / Mode Packet Size	NULL	Code Rate	2/3	Undefined
Bandwidth Interleaver 8 MHz • •		Const. Type	64-QAM	Undefined
Guard Interval           1/32           SETTING		IFFT 4K		
BUFFER USAGE	PLAYER RECORDER	BandWidth	8 MHz	Undefined
FILE SIZE 0(MB)	RF TS	Guard Int.	1/32	Undefined
PACKET(FILE) 0	• ERROR	Inner Interl.	Native Interleaver	Undefined
		Cell ID	Undefined	Undefined
		Time Slicing	No, Time Slicing	Undefined
		MPE-FEC	No, MPE-FEC	Undefined
		Symbol Rate	9.142857 MSps	Undefined

BACK

NEXT

CANCEL



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- 5. After select a stream file, set frequency under OUTPUT menu.\* You can set frequency by direct keyboard input
- FREQUENCY

\* Or by [Frequency Table] under [Utility[ menu.

可 T-Pump - VDDF	12345		
File Control Util	lity Option Help		
MODULAT	Initialize Registry	Please	Press Si
	Frequency Table		Frequency Table
Adapters	Auto-Test	NALYSIS	Frequency Information
	Log Manager		Title : CMMB U-band
<b>D</b> .9	AB Repeat		Version : Ver 1.0
		-	Center Frequency : 474.000 MHz
			Select Frequency Vhole
			Table Title CMMB U-band
			Channel NO. 13 ▼ 474.000 ▼
			Apply Close

A sample \*.dat file will give Frequency Table information. Create a sample file and save in [C:\Program Files\(C) LUMANTEK\T-pump\FreqTable] folder. Now you can search on the frequency table window if you save it at.



6. When you use AMP & Attenuator, you must click [ON] on the amplitude window. Power level changes between +7 dBm(+3dbm over frequency of 1GHz) ~ -110 dBm per 0.5dB step by Jog Shuttle or per 0.1dB by keyboard input.

\* Maximum level is +7dBm under the frequency range of 1GHz or less Maximum level is +3dBm from the frequency range of 1GHz or more

# 4.6 / RF Output Option : DVB-T/H(4K)

1. When you select DVB-T/H(4K), DVB-T/H will appear on display window.

$\square \square \neg \square$	2. Click [SETTING] button and set like below image.		
028-178	- Inner Interleaver [S27] : 0 (Native Interleaver)		
	- DVB-H Signaling		
RF-OUT	- Select Enable Cell ID		
O DVB-T2 O DVB-S	- Cell Identifier : Input suitable stream file Cell ID.(0~65535)		
OVB-T/H(2, 8K) OVB-S2	- Select Enable S48, S49 Setting		
DVB-T/H(4K)     ATSC	- Enable Cell ID S48 : 1 (Time Slicing)		
ODVB-C OATSC-M/H	- Enable Cell ID S49 : 1 (MPE-FEC)		
O DAB+/DMB+MUX O ISDB-T/Tb			
OpenCable OCMMB+MUX ⊙DTMB √CW	Setting(More OFDM Parameters)		
TS-IN 🔘 ASI IN	Inner Interleaver		
TS-OUT O ASI OUT	- Inner Interleaver[S27] : 0		
Code Rate Const. Type	(0: Native Interleaver, 1: Indepth Interleaver)		
2/3 ▼ 64QAM ▼	DVB - H Signalling		
IFFT / Mode Packet Size	* Enable Call ID		
4K 👻 👻			
Bandwidth Interleaver	- Cell Identifier: 0 (Decimal : 0 - 65535)		
8 MHz •	Enable S48, S49 Settings 🗹		
Guard Interval	Enable C49		
1/32 - SETTING	- Effable 346		
	(0: No Time Slicing, 1: Time Slicing)		
	- Enable S49 0 🗸		
	(0: No MPE-FEC, 1: MPE-FEC)		
	Save		

\* Above setting is only for a sample stream file. Thus you can change options as you need.

3. T-pump Ver 2.2.0 updated as you could check NIT information. Click [From File] in[BIT/ SYMBOL RATE] box, then check the information of an opened \*.ts file like below images. Click [Apply], automatically set all the options.

🧑 T-Pump - VDDF12345					
File Control Utility Option Help					
MODULATION	FILE C:\Users\bigidea\Desktop\Codec43N.ts		Aut Get Get Tes NIT PCR	OUTPUT	
Adapters VDDF12345	TS ANALYSIS		PROGRAM PID		
DV8-T/H	2 to 4 to 1	NIT Information - 1 / 1	+		
RF-OUT OVB-T2 OVB-S		ITEM	Current	NIT	
OVB-T/H(2,8K) OVB-S2 OVB-T/H(4K) OATSC		Frequency(MHz)	474.000000	Undefined	
O DVB-C O ATSC-M/H DAB+/DMB+MUX O ISDB-T/Tb	52.51% on	Code Rate	2/3	Undefined	
OpenCable OCMMB+MUX ODTMB ✓ CW		Const. Type	64-QAM	Undefined	
TS-OUT O ASI OUT		IFFT	4K	Undefined	
Code Rate Const. Type 2/3  G4QAM  Const. Type		BandWidth	8 MHz	Undefined	
IFFT / Mode Packet Size		Guard Int.	1/32	Undefined	
Bandwidth Interleaver		Inner Interl.	Native Interleaver	Undefined	
B MHz  Guard Interval		Cell ID	Undefined	Undefined	
1/32 • SETTING	Code	Time Slicing	No, Time Slicing	Undefined	
BUFFER USAGE	PLAYER RECORDER ASI⇔RF	MPE-FEC	No, MPE-FEC	Undefined	
FILE SIZE 47(MB)		Symbol Rate	9.142857 MSps	Undefined	
REACTICULES 265956		APPLY	BACK NEXT	CANCEL	

4. Rest of process is same as DVB-T/H(2K, 8K) operating.



#### 4.7 / RF Output Option : DVB-C

DN8-C				
R	F-OUT			
O DVB-T2	O DVB-S			
ODVB-T/H(2, 8	K) 🔿 DVB-S2			
ODVB-T/H(4K)	○ ATSC			
OVB-C	O ATSC-M/H			
O DAB+/DMB+	HMUX 🔘 ISDB-T/Tb			
	e 🔿 CMMB+MUX			
O DTMB	CW			
TS-IN 🤇	ASI IN			
TS-OUT	ASI OUT			

- 1. Top Left Menu in T-pump will change DVB-C when select DVB-C option.
  - DVB-C Parameter Value

ltems	Value
Const. Type	16 QAM
	32 QAM
	64 QAM
	128 QAM
	256 QAM

2. Select DVB-C option, Click file open button( 🔺 ) and select .trp or .tp to do RF Output.

PLAYER	RECORDER	ASI⇔RF						
<ul> <li>RF</li> <li>TS</li> <li>ERROR</li> </ul>		Open     Look 1		Ready	) Date	C 00	urrent / To :00 / 0	tal 00:39
		Recent Places Desktop Libraries Computer	▲ 1seg_1.ts ▲ 1seg_2.ts ▲ CH20_MXTV ▲ CH22_TBS(t) ▲ CH22_TBS(t) ▲ CH24_06112 ▲ CH25_0605.t ▲ CH26_06072	V_515143KHz.ts olokyo_ch22).ts 20.ts ts t7_1857_1903.ts	3/12/2007 3: 3/12/2007 3: 8/27/2006 4: 8/23/2006 8: 11/20/2006 1 6/28/2006 1: 7/27/2006 2:	VLC media VLC media VLC media VLC media VLC media VLC media VLC media	131,527 KB 84,630 KB 9,712 KB 1,469 KB 57,074 KB 55,537 KB 18,260 KB	
		Network	<ul> <li>✓</li> <li>File <u>n</u>ame:</li> </ul>				Open	



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Code Rate	Const. Type	3
	64QAM 🔫	
IFFT / Mode	16QAM 32QAM 64QAM	
Bandwidth	128QAM 256QAM	
7.906 MHz 👻		
Guard Interval		
	SETTING	
BIT / SYMBOL	RATE	Z
Source : 9.99	9997 Mbps	
	1700	

3. Set Const. Type under RF sub menu.



4. DVB-C needs to set Symbol Rate. You can input symbol rate by keybord input.

5. After setting symbol rate, rest processing is same as DVB-T mode.

6. When you use AMP & Attenuator, you must click [ON] on the amplitude window. Power level changes between +7 dBm(+3dbm over frequency of 1GHz)~ -110 dBm per 0.5dB step by Jog Shuttle or per 0.1dB by keyboard input.



#### 4.8 / RF Output Option : DVB-S



1. Top Left Menu in T-pump will change as DVB-S when select DVB-S option.

\*DVB-S2 Parameter Value

ltems	Value
Code Rate	QPSK : 1/2, 2/3, 3/4, 5/6, 7/8
Const. Type	Mode(QPSK)
IFFT	Roll-Off(0.35)
Bit / Symbol Rate	Symbol Rate(1Msps to 45MSps)

2. Select DVB-S2 option, Click file open button( ) and select [\*.ts] to do RF Output test.

\* Code rate

Code Rate	Const. Type
7/8 🔻	QPSK 👻
1/2	Packet Size
3/4	
5/6	Interleaver
7/8 9.281 MHZ	
Guard Interval	SETTING

\* Symbol Rate



#### 4.9 / RF Output Option : DVB-S2

MODULATION	1
Adapters W2	WW12345 🔻
DV8	-52
RF-0	ουτ
<ul> <li>DVB-T2</li> <li>DVB-T/H(2, 8K)</li> <li>DVB-T/H(4K)</li> <li>DVB-C</li> <li>DAB+/DMB+MU</li> <li>OpenCable</li> <li>DTMB</li> </ul>	<ul> <li>DVB-S</li> <li>DVB-S2</li> <li>ATSC</li> <li>ATSC-M/H</li> <li>ISDB-T/Tb</li> <li>CMMB+MUX</li> <li>CW</li> </ul>
TS-IN 💿	ASI IN
TS-OUT 🔘	ASI OUT
Code Rate	Const. Type
2/3(Q,8PSK) 🔻	QPSK 👻
IFFT / Mode	Packet Size
0.35 -	188 👻
Bandwidth	Interleaver
10.210 MHz 🔻	*
Guard Interval	SETTING

1. Top Left Menu in T-pump will change as DVB-S2 when select DVB-S2 option.

#### \*DVB-S2 Parameter Value

ltems	Value	
Code Rate	QPSK : 1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10	
	8PSK : 3/5, 2/3, 3/4, 5/6, 8/9, 9/10	
Const. Type	Mode(QPSK, 8PSK)	
IFFT	Roll-Off(0.20, 0.25, 0.35)	
Bit / Symbol Rate	Symbol Rate(1Msps to 45MSps)	
Guard Interval	No Pilot Insert / Pilot Insertion	

2. Select DVB-S2 option, Click file open button( ) and select [\*.ts] to do RF Output test.

#### \* Code rate



#### \* Const\_type

Code Rate	Const. Type
2/3(Q,8PSK) 🔻	QPSK 🗸
IFFT / Mode	QPSK
0.35 -	8PSK 188
Bandwidth	Interleaver
10.210 MHz 💌	
Guard Interval	AFTENIA
No pilot inse 👻	SEITING

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* Guard Interval	* IFFT Mode	* Symbol Rate
Code Rate       Const. Type         2/3(Q,8PSK) ▼       QPSK ▼         IFFT / Mode       Packet Size         0.35 ▼       188 ▼         Bandwidth       Interleaver         10.210 MHz ▼          Guard Interval       SETTING         No pilot insertio       Interleaver	Code RateConst. Type2/3(Q,8PSK)QPSKIFFT / ModePacket Size0.351880.35Interleaver0.250.20Guard IntervalNo pilot inseSETTING	BIT / SYMBOL RATE           Source :         10.000000         Mbps           Out :         10.000000         Mbps           Remux(HW)         Remux(HW)           Sym :         7.562000         MSps

# 4.10 / RF Output Option : DVB-T2

	MODULATION	FILE Open File Auto Get Get NIT PCR	Auto Get Get OUTPUT	
	Adapters W2WW10245 V	TS ANALYSIS PROGRAM PID	FREQUENCY	
			0.474.000.000Hz	
	DV8-72	B.W T2 Fames 2 Max Sub slice	BIT / SYMBOL RATE	
		FFT Max Symbols 68 Sub Slice 1	Source Mbps	
	RF-OUT	G.J 1/128 Data symbols 59 L1 repetition Advanced		
Π	DVB-T2     DVB-S	L1 MOD 4 M Version V.1.1.1 Bwt. EXt. Apply	Our: Midps	
	OVB-T/H(2, 8K) OVB-S2	PP PP7 5	Remux(Hw)	
	O DVB-T/H(4K) O ATSC	Total cells 1639268 D:\Stream\DVB-T2_Stream\T2MI\2PLP ts is opened	Sym :,- MSps	
	O DVB-C O ATSC-M/H	L1 size 2142		
	O DAB+/DMB+MUX O ISDB-T/Tb	Max Data cells 1637126	AWGN CALLON	
	OpenCable OCMMB+MUX	Used Data cells 1636200	C/N: +60.0 dB	
	O DTMB ✓ CW	dummy cells 926	вw : 04.0 мнz	
		bit rate Remain Cells Add PLP		
	TS-IN ASIIN	ID MOD COD FECTYPE BLOCKS IL Type IL Length Frame Inte		
	TS-OUT ASI OUT	0 256QAM 3/5 64K 100 0 3 1		
	Code Rate Const. Type	1 256QAM 4/5 64K 100 0 3 1		
	💌		-110 +10	
	IFFT / Mode Packet Size		シーン	
	🖌		11	
	Bandwidth Interleaver		-50	
	💌 💌		-5 -0.5 +0.5 +5	
	Guard Interval			
	>		-UCU.U dBm	
	BUFFER USAGE		VENTUS : 42 °C	
	77%		ATT PLUS : °C	
	1170	Current / Total		
	FILE SIZE 0(MB)			
	PACKET(FILE) 0	ERROR     STATUS:     Praying     Status:	(Ver. 4.0.4)	

1. Top Left Menu in T-pump will change as DVB-T2 when select DVB-T2 option.

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General					
B.W	8MHz 🚽	Bwt.	EXt.	<b>V</b>	
FFT	32К 🚽	L1 repe	tition		
G.I	1/128 🚽	Frame Clos	sing		
L1 MOD	64QAM 🚽	System ID	32769		
PP	PP7 👻	Network ID	12421		
Version	v.1.1.1 🚽 👻	Cell ID	0		
		*			

General B.W 8MHz Ŧ FFT 32K Ŧ 1K G.I 2K L1 MOD 4K 8K PP 16K Version

# **2** FFT

- FFT size in the channel
- 1K, 2K, 4K, 8K, 16K, or 32K

### 1 BW

- The bandwidth of the channel
- 1.7MHz, 5MHz, 6MHz, 7MHz, 8MHz, or 10MHz

General		
B.W	8MHz 👻	
FFT	1.7MHz 5MHz	
G.I	6MHz	
L1 MOD	7MHz 8MHz	
PP	10MHz	
Version	v.1.1.1 👻	

General	
B.W	8MHz 👻
FFT	32K 👻
G.I	1/128 👻
L1 MOD	1/32
	1/16
PP	1/8
Version	1/4
Version	1/128
	19/128
E:\LUMANTEK\	19/256 يالاو
All Parameter	is valid

General		
B.W	8MHz	-
FFT	32K	-
G.I	1/128	•
L1 MOD	64QAM	-
PP	BPSK	
Version	160AM	
	64QAM	

# GI

3

- Guard Interval
- 1/32, 1/16, 1/8, 1/4, 1/128, 19/128, or 19/256

# 4 L1 MOD

The constellation of the L1-post signalling data block.BPSK, QPSK, 16QAM, or 64QAM
# 

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General		
B.W	8MHz 👻	9
FFT	32K 👻	
G.I	1/128 👻	
L1 MOD	64QAM 👻	
PP	PP7 -	
Version	PP1 PP2	
	PP3	
E:\LUMANTEK\S	PP4 W	
All Parameter is	PP5	
	PP6	
	PP7	
	PP8	
		1

I	PP	Pilot Pa PP1, PP	ttern 2, PP3, PP4, PP5, PP6, PP7, or PP8
	Version BwtExt		DVB-T2 version v.1.1.1 Bandwidth Extension Normal carrier mode, or Extended carrier mode
	L1 repet	ition	L1 repetition flag
	Frame C	losing	
	System	ID	T2 System ID. Uniquely identifies the T2 system within the DVB network
	Network Cell ID	< ID	Uniquely identifies the current DVB network. Uniquely identifies a geographic cell in a DVB-T2 network.



# T2 Frames

- Numbers of T2 frame Per Super frame

#### Max Symbols

- The maximum number of OFDM symbols in a T2 frame including P2 symbol(s).

Data Symbols - The number of data OFDM symbols

# Max Sub Slice

- The maximum number of sub slices for type 2 data PLPs

# Sub Slice

- The total number of sub-slices for the type 2 data PLPs



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Capacity		
Total cells	1,639,268	
L1 size	2,090	
Max Data cells	1,637,178	
Used Data cells	1,636,200	
dummy cells	978	



# Total cells

- The total number of OFDM cells per T2 frame.

L1 size

- The number of L1 signalling cells in a T2 frame

Max Data cells - The maximum number of data cells excluding L1 signalling cells

Used Data cells - The number of used data cells in a T2 frame

Dummy cells - The number of dummy cells in a T2 frame

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# 4.11 / RF Output Option : DAB+/DMB+MUX

• Modulator Only

DR8+/DR8 mux							
RF-C	TUC						
O DVB-T2	O DVB-S						
OVB-T/H(2, 8K)	O DVB-S2						
OVB-T/H(4K)	○ ATSC						
O DVB-C	O ATSC-M/H						
OAB+/DMB+MU	X 🔘 ISDB-T/Tb						
OpenCable OCMMB+MU ⊙DTMB √CW							
TS-IN 🔘 🖉	ASI IN						
TS-OUT 🕥 /	ASI OUT						
Code Rate	Const. Type						
🗸	💙						
IFFT / Mode	Packet Size						
TM-1 🗸	6144 🗸						
Bandwidth	Interleaver						
1.536 MHz 😽	~						
Guard Interval	CETTINIC						
	SETTING						

1. Upper left menu in the T-pump will be changed T-DMB when T-DMB option is selected.

2. Select T-DMB option, then click file open button [ ] and select [\*.eti] to do RF Output.

PLAYER	RECORDER	ASI⇔RF					
RF     TS		97	✓ Loop Count:	0	Currer	nt / Total	
ERROR		찾는 위치(!): 내 최근 문서 바탕 화면 내 문서 내 문서 내 컴퓨터	T-DMB  AB+ DMB  DSL ETI Sound VNKC CM 20080813_KBS_1 SBS_070604_ex SBS_BIFS_PL3y	≩F,eti tersOstfo-DAB,eti 1,eti ⊾eti	Q	5 <b>(2)</b>	
		내 네트워크 환경	파일 이름( <u>N</u> ): 파일 형식( <u>T</u> ):	SBS_BIFS_PL3A,eti ETI File(+,eti)		~	열기( <u>0</u> ) 취소

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3. Click 'SETTING' button if you need TII(Transmitter Identification Information) control.

Code Rate	Const. Type	Setting(More T-DMB Para 🔀
~	🗸	Sync Offset Enable Tii
IFFT / Mode	Packet Size	Buta Enable
TM-1 🗸	6144 🗸	Byte Litable
Bandwidth	Interleaver	Main ID Sub ID
1.536 MHz 😽	~ ~	0 (0-69) 0 (0-23)
Guard Interval		
- *	SEITING	Save Cancel

4. This RF Output option doesn't need to RF setting. Simply open stream file and set frequency and then play under PLAYER tab.

5. Set frequency in the Output panel then start to transmit it as RF. In the case of using AMP & Attenuator, you can adjust power level in the Amplitude menu.

6. For using the AMP & Attenuator, user must click [ON] on the amplitude window. Power level is changed between +7 dBm(+3dbm over frequency of 1GHz) ~ -110 dBm per 0.5dB step by Jog Shuttle or per 0.1dB by keyboard input.

👹 T-Pump - VDBL18145		
<u>File Control Utility Option Help</u>		
MODULATION	FILE D:02-datastream/DMB_DAB/ETI_Total/T-DMB/SBS_BIFS_PL3A.eti	OUTPUT
Adapters VDBL18145 V	TS ANALYSIS PROGRAM PID	FREQUENCY
	DAB Hode Services	0.174.928.000Hz
OR8+/OM8 MUX	No ID Name CU Play Time	BIT / SYMBOL RATE
RF-OUT	Used Service Num Used CU	Source : 2.048000 Mbps
DVB-T2         DVB-S           DVB-T/H(2, 8K)         DVB-S2           DVB-T/H(4K)         ATSC           DVB-T/TD         OpenCable           OTMB         CW           TS-IN         ASI IN	Ensemble	Out:         2.048000         Mbps           ✓ Remux(HW)         Sym:         MSps           Awgn         Out=         Off           C/N:         + 5 □ □ dB         BW:         □ 4 . □ MHz           Amplitude         Ot=         Off
TS-OUT ASI OUT Code Rate Const. Type 	Service Info	-110 +10 -50 -5 -0.5 +0.5 +5 - 0.2 0.0 dBm
BUFFER USAGE         92%           FILE SIZE         146(MB)           PACKET(FILE)         25000	PLAYER         RECORDER         ASI⇔RF           ● RF         ● Loop Count:         0         Current / Total           ● Is         ● ERROR         ● STATUS:         Playing         00:04 / 10:00	VENTUS : 38 °C ATT PLUS : 36 °C

• Multiplexer + Modulator

1. Upper Left Menu in the T-pump will be changed T-DMB when T-DMB option is selected.

Adapters VDBL18145 V	Multiplexer					
000. (000 000	DAB Mode	Services				
	Mode I	No ID	Name	CU	Play Time	
RF-OUT	Used Service Num Used CU					
○ DVB-T2         ○ DVB-S           ○ DVB-T/H(2, 8K)         ○ DVB-S2           ○ DVB-T/H(4K)         ○ ATSC           ○ DVB-C         ○ ATSC-M/H           ⊙ DAB+/DMB+MUX         ○ ISDB-T/Tb           ○ OpenCable         ○ CMMB+MUX           ○ DTMB         ☑ CW	Ensemble D: 0x0000 LUMANTEK (LUMANTEK) Config Filo Edit					
TS-IN ASI IN TS-OUT ASI OUT	Project Save Load Service Info					
Code Rate Const. Type						
👻						
IFFT / Mode Packet Size						
TM-1 Y 6144						
Bandwidth Interleaver						
Guard Interval						

#### 2. Choose multiplex mode or non-multiplex mode

Select 'setting' button for choosing between multiplex mode and non-multiplex mode. Non-multiplex mode usage is same <4.8.1 / Modulator Only>.

Code Rate	Const. Type	
		~
IFFT / Mode	Packet Size	
TM-1 💙	6144	~
Bandwidth	Interleaver	
1.536 MHz 🗸		~
Guard Interval	SETTING	
- *	SETTING	_



# 3. File Manage Window

Click 'File' Button for adding files.ETI file(\*.eti), MP1L2 file(\*.mp2) supported.

File Edi	File Ma	anage Add		
Project Sc ve Loa	No 1 2	Service 6 2	SubCh 6 2	Path D:W02-datastreamWDMB_DABWETI_TotalWT-DMBWSBS_070604_ex1.eti D:W02-datastreamWDMB_DABWETI_TotalWT-DMBWSBS_BIFS_PL3A.eti
└ <b>─</b> →	No 1 2 3	e Add D:₩02-d D:₩02-d D:₩02-d	atastream atastream atastream	WDMB_DABWETI_TotalWT-DMBWDMBWmp2W400Hz_pad.mp2         WDMB_DABWETI_TotalWT-DMBWDMBWmp2WArirang 000.mp2         WDMB_DABWETI_TotalWT-DMBWDMBWmp2WBBCRadio1.mp2         Close

# 4. Edit Window

Select 'Edit' button for editing configurations.

Config	Config Total					
FIIO	DAB Mode	Service				
Edit	Mode I Edit	Use ID	Name (Short)	SubCh ID C	CU FileName	Time
TII	Service Used CU	1 0xE02F	KDMB (KDMB)	0x07 9	6 SBS_070604_ex1.eti	15:07
	0/11 0/864	2 0xF1E00431	SBS u TV (SBS u )	0x00 4	08 SBS_070604_ex1.eti	15:07
	0711 07004	3 0xF1E00432	SBS V-Radio (SBS )	0x02 9	6 SBS_070604_ex1.eti	15:07
Project	Ensemble	4 0xF1E00433	SBS u TTI (SBS u )	0x03 4	8 SBS_070604_ex1.eti	15:07
	ID: 0x0000	5 0xF1E00435	tbs V-Radio (tbs V-Ra)	0x06 9	6 SBS_070604_ex1.eti	15:07
Save Load		6 0xF1E00437	Hani BWS (Hani BWS)	0x08 4	8 SBS_070604_ex1.eti	15:07
	LUMANTEK Edit	7 0xF1E00001	SBS_BIFS_1(SBS_BIFS_1)	0x00 4	08 SBS_BIFS_PL3A.eti	10:00
	LIMANTEK	8 0xF1E00002	SBS_BIFS_2(SBS_BIFS_2)	0x01 4	08 SBS_BIFS_PL3A.eti	10:00
		9 0x0100	MP2-0 (MP2-0)	0x00 6	4 400Hz_pad.mp2	05:10
	FIC Option	10 0x0101	MP2-1 (MP2-1)	0x01 6	Arirang 000.mp2	05:26
		11 0x0102	MP2-2 (MP2-2)	0x02 6	4 BBCRadio 1.mp2	00:30
	Edit					
		<				>
	Reload	Service Info				
	OK Cancel					



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4-1. Click DAB mode 'edit' button for dab mode change.



4-2 Click ensemble 'edit' button for ensemble edit.

Ensemble		
ID: 0x0000	DAB Ensemble Config	
LUMANTEK Edit	Ensemble ID ECC Country ID Reference ID Ensemble ID 0x 0x 0 0x 000 0x 0000 Country (for ECC, Country ID)	Edit ensemble ID by country ID and reference ID. (Country list can help editing country ID.)
	Ensemble Name Full Name LUMANTEK Short Name LUMANTEK LUMANTEK Close	Edit ensemble full name and bit flag for short name. (Ensemble full name max : 16 character) (Bit flag max : 8)

4-3 Load service edit window for service edit.

Service Info	Load service-edit window by
C   Content of the set of	right-mouse click
<pre>&lt; etc &gt; { CAId : 0   Lical Flag : 0 }</pre>	
Component 0 > [P5:1]	
<pre>~ Type &gt; {TMId Packet mode(3)   DSCTy : MOT(60)   UAtype : Unknown(0) }</pre>	
CA > {CAFlag 0 } DAB Service 6 Config	
⊟ < SubCh : 0x08 > Service ID	
<pre>     Country ID Reference ID Service ID     COU &gt; {CU ize :          </pre>	Edit ensemble ID by ECC and country ID and reference ID. (Country list can help editing ECC and country ID.)
Full Name Hani BWS	Edit service full name and
Short Name Hani BWS	(Ensemble full name max :
Hani BWS	16 character)
	(Bit flag max : 8)

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4-4 Load component edit window for component edit.



#### 5. Tll Window

Select TII Button for edit TII information.



UMANTEK



7. Set frequency in the Output panel then start transmitting it as RF. In the case of using AMP & Attenuator, you can adjust power level in the Amplitude menu.

8. When AMP & Attenuator is used, a user must click [ON] on the amplitude window. Power level changes between +7 dBm(+3dbm over frequency of 1GHz) ~ -110 dBm per 0.5dB step by Jog Shuttle or per 0.1dB by keyboard input.

🗑 T-Pump - VDBL18145				
<u>File Control Utility Option Help</u>	l			
MODULATION	FILE Please, Open File		Auto Get Get Test NIT PCR	OUTPUT
Adapters VDBI 18145	Multiployor		FREG	UENCY
			0.1	14.928.000Hz
088+/078 my	DAB Mode	Services		
	Model	No ID Name CU	Play Time BIT / 3	SYMBOL RAIE
RE OUT	Used Service Num Used CU	1 0xE02F KDMB 96	00:08 / 15:07 Source	: Mbps
RF-OUT	5 680 / 864	2 0XF1E00431 SBS 0 TV 406 3 0xF1E00437 Hani BWS 48	00:08 / 15:07	
		4 0x0101 MP2-1 64	00:08 / 05:26 Out :	2.048000 Mbps
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ensemble	5 0x0102 MP2-2 64	00:08 / 00:30	Remux(HW)
OVB-T/H(2, 8K) OVB-S2	ID: 0x0000			
ODVB-T/H(4K) OATSC			Sym :	MSps
	LUMANTEK (LUMANTEK)			
ODVB-C OAISC-W/H			AWG	N ON - OFF
OAB+/DMB+MUX OISDB-T/Tb	Config			
	File		C/N :	÷60.0 dв
	Edit			
O DINIB	TII		BW :	UM.U MHz
TS-IN 🔿 ASI IN	Project		AMP	
TS-OUT ASI OUT	Save Load			
	C Service Info			
Code Rate Const. Type				
🗸			-110	+10
IFFT / Mode Packet Size			-	
TH 4 0 6444 0				
Randwidth Interlement				111
1.536 MHz V				-50
Current later rel			-0	-0.5 +0.5 +5
SETTING				
			*	UIU.U dBm
	<u>`</u>			
BUFFER USAGE	PLAYER RECORDER	ASI⇔RE	VENTI	IS: 41 °C
	REGORDER		ATLD	118. 40 %
97%				.us. 👐 °C
	● RF	Loop Count: 0	Current / Total	
FILE SIZE 0(MB)			00:02 / .	LUMANTEK
PACKET(FILE)		STATUS : Playing	00.03 /;	(Ver. 3. 16. 0)

# 4.12 / RF Output Option : OpenCable

OPENCRBLE				
RF-O	UT			
O DVB-T2         O DVB-S           O DVB-T/H(2, 8K)         O DVB-S2           O DVB-T/H(4K)         ATSC           O DVB-C         ATSC-M/H           O DAB+/DMB+MUX         ISDB-T/Tb				
OpenCable     OCMMB+MUX     ODTMB     CW     TS-IN     OASI IN				
TS-OUT 🔿 ASI OUT				
v	64QAM -			
IFFT / Mode	Packet Size			
•				
Bandwidth Interleaver				
6 MHZ 🔻	I=64, J=2 ▼			
Guard Interval SETTING				

1. Top Left Menu in T-pump will change QAM-B when select OpenCable option.

ltems	Value
Const. Type	64 QAM 256 QAM
CW/I/J	l=128 J=1
	I=128 J=2
	I=64 J=2
	I=128 J=3
	I=32 J=4
	I=128 J=4
	I=16 J=8
	I=128 J=5
	I=8 J=16
	I=128 J=6
	I=128 J=7
	I=128 J=8

2. Select OpenCable option, then click file open button( 🔺 and select [\*.trp, \*.tp] to do RF Output.

\*

PLAYER	RECORDER	ASI⇔RF						
RF     TS			Den	ount:	0		Current	/ Total
ERROR			Look in:	lon_tmcc		- 6	) 🏚 📂 🛄	
			Recent Places Desktop Libraries Computer Network	Name           ▲ 1seg_1.ts           ▲ 1seg_2.ts           ▲ CH20_MXTV           ▲ CH22_TBS(tok           ▲ CH24_061120.           ▲ CH25_0605.ts           ▲ CH26_060727.	515143KHz.ts cyo_ch22).ts ts 1857_1903.ts	Date           3/12/2007 3:           3/12/2007 3:           8/27/2006 4:           8/23/2006 3:           11/20/2006 1           7/27/2006 1           7/27/2006 2:	Type VLC media VLC media VLC media VLC media VLC media VLC media	Size 131,527 KB 84,630 KB 9,712 KB 1,469 KB 57,074 KB 55,537 KB 18,260 KB

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3. After selecting the file, you need to set value among 64QAM, 256QAM and CW/I/J under RF sub menu.

4. Set frequency in the Output panel then start transmit it as RF. In the case of using AMP & Attenuator, you can adjust power level in the Amplitude menu.

5. When you use AMP & Attenuator, you must click [ON] on the amplitude window. Power level changes between +7 dBm(+3dbm over frequency of 1GHz) ~ -110 dBm per 0.5dB step by Jog Shuttle or per 0.1dB by keyboard input.



# 4.13 / RF Output Option : ATSC

RTSC				
RF-C	TUT			
ODVB-T2     ODVB-S       ODVB-T/H(2, 8K)     ODVB-S2       ODVB-T/H(4K)     Image: ATSC       ODVB-C     ATSC-M/H       ODAB+/DMB+MUX     ISDB-T/Tb       OpenCable     CMMB+MUX       ODTMB     CW				
TS-IN O ASI IN				
TS-OUT 🕥 🖉	ASI OUT			
Code Rate	Const. Type 8VSB -			
IFFT / Mode	Packet Size			
Bandwidth 6 MHz v	Interleaver			
Guard Interval				

1. Top Left Menu in T-pump will change as ATSC when select ATSC option.

#### \* ATSC Parameter Value

ltems	Value
Const. Type	8VSB

2. Select ATSC option, Click file open button( ) and select [\*.trp] or [\*.tp] to do RF Output.



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3. This RF Output option can set only 8VSB. Simply open stream file and set frequency and then play under PLAYER tab.

4. Set frequency in the Output panel then start transmit it as RF. In the case of using AMP & Attenuator, you can adjust power level in the Amplitude menu.

5. When you use AMP & Attenuator, you must click [ON] on the amplitude window. Power level changes between +7 dBm(+3dbm over frequency of 1GHz) ~ -110 dBm per 0.5dB step by Jog Shuttle or per 0.1dB by keyboard input.



# 4.14 / RF Output Option : ISDB-T/Tb

RF-	τιιο			
	0			
O DVB-T2	O DVB-S			
O DVB-T/H(2, 8K)	O DVB-S2			
O DVB-T/H(4K)	O ATSC			
O DVB-C	AISC-M/H			
O DAB+/DMB+M	UX () ISDB-T/Tb			
OpenCable	CMMB+MUX			
O DTMB	. ⊂W			
TS-IN 🔘 ASI IN				
TS-OUT 💿	ASI OUT			
Code Rate	Const. Type			
3/4 🔻	64QAM 🔫			
IFFT / Mode	Packet Size			
8K <b>•</b>	188 👻			
Bandwidth	Interleaver			
6 MHz 🔻 🖛				
Guard Interval				
1/8 - SETTING				

1. Top Left Menu in T-pump will change as ISDB-T /B when select ISDB-T/B option.

\* ISDB-T/Tb Parameter Value

ltems	Value
Code Rate	1/2, 2/3, 3/4, 5/6, 7/8
Const. Type	QPSK, 16 QAM, 64 QAM
IFFT /Mode	2K, 8K, 4k
Guard Interval	1/4, 1/8, 1/16, 1/32

ISDB - Broad	ncorder T Jcast typ	e : [	SDB-T 13Se	g ▼ y-Alarm Broa	Mode : 8K adcasting	Guard Ir	■ nt.: 1/8 ■
Layer	Paramet	ers					
	Segmer	nts C	onstellation	Code Rate	Time Interl.	OutRate(bps)	SourceRate(bps)
A	13	-	64QAN 🔻	3/4 🔻	1 •	18255835	5350091
в	0	-	-	-	-		
с	0	-	-	-	-		
Total	13					18255835	5350091
							Done

2. T-pump Ver 2.2.0 supports the ISDB-T 1, 3, 13 Seg mode. However, 13 Seg (Full Seg) mode need to play it after creat the seperated file. In the 1 Seg , open the file and set options like above images then click [Done].

\* This supports all Non-TMCC and TMCC stream files.

PLAYER	RECORDER	ASI⇔RF						
			🗇 Open					×
DE DE	-		Look in:	non_tmcc		- (	3 🗊 📂 🛄	
● Kr				Name	*	Date	Туре	Size
TS     ERROR			Recent Places  Recent Places  Desktop  Libraries  Computer	À 1seg_1.ts     À 1seg_2.ts     A CH20_MXTV     A CH22_TBS(tr     A CH24_06112     A CH25_0605.t     A CH26_06072	_515143KHz.ts okyo_ch22).ts 0.ts s 7_1857_1903.ts	3/12/2007 3: 3/12/2007 3: 8/27/2006 4: 8/23/2006 8: 11/20/2006 1 6/28/2006 1: 7/27/2006 2:	VLC media VLC media VLC media VLC media VLC media VLC media VLC media	131,527 KB 84,630 KB 9,712 KB 1,469 KB 57,074 KB 55,537 KB 18,260 KB
				•	III			Þ
			Network	File <u>n</u> ame:			-	Open
				Files of type:	TS File(*.ts), TRP File	e(*.trp), TP File(*.tp	)), IFL Fili ▼	Cancel

3. Select ISDB-T option, Click file open button( 📥 and select \*.trp or \*.tp to do RF Output.

4. Set frequency in the Output panel then start transmit it as RF. In the case of using AMP & Attenuator, you can adjust power level in the Amplitude menu.

5. When you use AMP & Attenuator, you must click [ON] on the amplitude window. Power level changes between +7 dBm(+3dbm over frequency of 1GHz) ~ -110 dBm per 0.5dB step by Jog Shuttle or per 0.1dB by keyboard input.



### 4.15 / RF Output Option : CMMB

RF-	OUT			
<ul> <li>DVB-T2</li> <li>DVB-T/H(2, 8K)</li> <li>DVB-T/H(4K)</li> <li>DVB-C</li> <li>DAB+/DMB+MM</li> <li>OpenCable</li> <li>DTMB</li> </ul>	<ul> <li>○ DVB-S</li> <li>○ DVB-S2</li> <li>○ ATSC</li> <li>○ ATSC-M/H</li> <li>IUX</li> <li>○ ISDB-T/Tb</li> <li>④ CMMB+MUX</li> <li>✓ CW</li> </ul>			
TS-IN 🔘	ASI IN			
TS-OUT 🕥	ASI OUT			
Code Rate	Const. Type			
IFFT / Mode	Packet Size			
Bandwidth Interleaver				
8 MHz 👻				
Guard Interval	SETTING			

1. Top Left Menu in T-pump will change as CMMB when select CMMB option.

\*CMMB Parameter Value

ltems	Value
Constellation	BPSK, QPSK, 16QAM
Reed Solomon	240.240
	240.224
	240.192
	240.176
Interleaver	Mode1, Mode2, Mode3
LDPC	1/2, 3/4
Time Slot	Organized and freely use # 40.
Codec Type	Audio, Video
Bit rate	Source, out Bitrate

2. After Selecting CMMB option, Once you've selected for testing of CMMB mfs, mmx RF output to a file, on the Open button and then click the file, select the file you want.





T-Pump - VDDF12345		
<u>File Control Utility Option H</u> elp		
MODULATION	FILE F:\Ventus_Stream\WonS\Padding_Ser(12)_H.264(8)_DRA(2)_Unknown(2).mfs Auto Get Get	OUTPUT
	IG31 NII PUR	FREQUENCY
Adapters VDDF12345 -	Multiplexer	0 5 9 0 0 0 0 0 0 0 0 Hz
	ID Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot Data CAS	0.000.000.000
C).0.00 [box	0 BPSK 240, 240 Mode 1 1/2 Mode 0 1 CLCH	BIT / SYMBOL RATE
RE-OUT	1 QPSK 240, 192 Mode 1 1/2 Mode 0 2 ESG	Source :,- Mbps
	2 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	4 382208 Mbps
ODVB-T2 ODVB-S	3 QPSK 240, 192 Mode 3 1 Data Form Sign Vic CAS Stream Sign	gn
○ DVB-T/H(2, 8K) ○ DVB-S2	4 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Remux(HW)
O DVB-T/H(4K) O ATSC	5 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Sym : MSps
Opv CMMB Channel Inform	mation PSK 240, 192 Mode 3 1/2 Mode 0 4 Video	
O DAB+/DMB+MUX O ISDB-T/Tb	7 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	AWGN ON-COFF
OpenCable  OpenCable	8 QPSK 240, 192 Mode 1 1/2 Mode 0 1 Audio	с/№: + БПП дв
© DTMB ✓ CW	9 QPSK 240, 192 Mode 1 1/2 Mode 0 1 Audio	
TS-IN 💿 ASI IN	10 QPSK 240, 192 Mode 1 1/2 Mode 0 2	BW: UH.UMHz
TS-OUT ASI OUT	Information Current State	
Code Rate Const. Type	ME ID 2 Codec Type Constellation QPSK	
· ·	Audio HE-AAC	
IFFT / Mode Stream Inform	nation Error 0 Video H264 Reed Solomon 240 Status Si	gn 🖳 🚽
¥ ¥	Interleaver Mode 3	
Description of the second	Service Type Video Pitrato (Khos)	
Bandwidth Interleaver	LDPC 1/2	-50
8 MHz 🔻 👻	Used Time Slot 40 / 40 Source 0.000000 Scramble Mode 0	
Guard Interval	Out 442.368000	-5 -0.5 +0.5 +5
SETTING	File Size (MB) 13 MB Time Slot 3~6	-020.0 dBm
BUFFER USAGE	PLAYER RECORDER ASI⇔RF	VENTUS : 33 °C
0%		ATT PLUS : 32 °C
0%		
FILE SIZE 13(MB)	TS     Is     Is	
PACKET(FILE) 0	● ERROR STATUS : Ready /	(Ver. : 3. 15. 3)

CMMB UI can intuitively check the each of the stream channel information for the file MFID, type of service, Time Slot, the file size, codec information, and transmission status.

3. When you are testing manual for each channel of the CMMB, you can select the channels you want.

Constellation	BPSK, QPSK, 16QAM				
Reed Solomon	240.240 / 240.224				
	240.192 / 240.176				
Interleaver	Mode1, Mode2, Mode3				
LDPC	1/2, 3/4				
Time Slot	Organized and freely use # 40.				
Data	CLCH, ESG, Video				
Scrabling					

#### Constellation

Modulation Method : BPSK, QPSK, 16QAM B etween each frame can be set up independently, but the frame with MF\_ID 0 is set up with BPSK.

Constellation is relate to the amount of data that can carry the load (bps), 16 QAM is 2 times of QPSK, and 2 times of BPSK. In these circumstances, If 3 in the ID of the frame to Constellation, such as the following to change the BPSK will be displayed in red.

T-Pump - VDDF12345		
<u>File Control Utility Option H</u> elp		
MODULATION	FILE F:\Ventus_Stream\NonS\Padding_Ser(12)_H.264(8)_DRA(2)_Unknown(2).mfs	OUTPUT
Adapters VDDF12345	Multiplexer	
	ID Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot Data CAS	4.830.000.000m2
	0 BPSK 240, 240 Mode 1 1/2 Mode 0 1 CLCH	BIT / SYMBOL RATE
RF-OUT	1 QPSK 240, 192 Mode 1 1/2 Mode 0 2 ESG	Source :,- Mbps
	2 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Out - 4 382208 Mbps
O DVB-T2 O DVB-S	3 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video =	Demos/UND
O DVB-T/H(2, 8K) O DVB-S2	4 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Remux(Hw)
O DVB-T/H(4K) O ATSC	5 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Sym : MSps
O DVB-C O ATSC-M/H	6 QPSK 240, 192 Midde 3 1/2 Midde 0 4 Video	
O DAB+/DMB+MUX O ISDB-T/Tb	7 QPSK 240, 192 Midde 3 1/2 Midde 0 4 Video	AWGN ON - OFF
OpenCable OCMMB+MUX	0 QPSK 240, 192 Widde 1 1/2 Widde 0 1 Audio	S/N: ÷БП.П dB
© DTMB	9 QPSK 240, 192 Mode 1 1/2 Mode 0 1 Audio	
TS-IN 🔘 ASI IN		W: UN.UMHZ
TS-OUT 💿 ASI OUT	Information Current State	
Code Rate Const. Type	Codec Type	
	MF_ID 2 Constellation QPSK	
	Audio HE-ARC Reed Solomon 240, 192	-110 +20
IFFT / Mode Packet Size	Sync Error 0 Video H.264 Hode 2	
▼   ▼	Caprice Time Video	
Bandwidth Interleaver	Bitrate (Kbps) LDPC 1/2	I I I V
8 MHz 🔻 🔻	Used Time Slot 40 / 40 Source 0.000000 Scramble Mode 0	-50
Guard Interval	Out 442.368000	-0 -0.0 +0.0 +0
• SETTING	File Size (MB) 13 MB Time Slot 3 ~ 6	-020.0 dBm
BUFFER USAGE	PLAYER RECORDER ASI⇔RF	VENTUS : 33 °C
0%		ATT PLUS : 32 °C
	RF     V Loop Count: 0 Current / Total	
HLE SIZE 13(MB) PACKET(FILE) 0	● ERROR STATUS : Ready /	(Ver. : 3. 15. 3)

It change to rad line when you change QPSK to BPSK. Because of the data reduce to half Size, it can not handle the source rate.

#### Reed Solomon

In (240, k) k = 172, 196, 224, 240, k is the data that entered in the Reed Solomon. It can be set each frame independently, but 0 in the CLCH MF\_ID is sent to (240, 240).

(240, 196) is 196 bytes of 240 bytes, and 16 bytes is the parity Check bit. If the K become larger, the data weights will be higher in 240 bytes. So, the out bit rate become Higher.



T-Rump - VDDE12345	_	_				_				
File Control Utility Ontion Help									-	
	(						Auto	oot o	wt )	
MODULATION (HLE F:\Ventus_stream\ventus_stre								CR		
Adapters VDDF12345	Multiplexer									FREQUENCY
		D. I.O.I	1.1.1	1000	0	T OLI	D	040		Q.690.000.000Hz
	D Constellation	Reed Solomon	Interleaver	LUPC	Scrambling Made 0	Time Slot	Data	CAS		
	1 OPSK	240, 240	Mode 1	1/2	Mode 0	2	ESG			DIT / STINDOL IGAL
RF-OUT	2 OPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			Source :,- Mbps
OVB-T2 OVB-S	3 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video		=	Gut: 4.382208 Mbps
OVB-T/H(2, 8K) OVB-S2	4 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video		-	Remux(HW)
O DVB-T/H(4K) O ATSC	5 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			Sim: MSpe
O DVB-C O ATSC-M/H	6 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			
O DAB+/DMB+MUX O ISDB-T/Tb	7 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			AWGN ON-COFF
OpenCable OCMMB+MUX	8 QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio			
© DTMB	9 QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio			
TS-IN 💿 ASI IN	10 QPSK	240, 192	Iviode 1	1/2	Wode U	2			Ŧ	EW: UN.UMHz
TS-OUT ASLOUT	Information				1	Current Stat	to			
	mormation		0	odoo Tu		current stat	le			
Code Rate Const. Type	MF_ID	2	0	buec ry	he	Constellatio	n	QPSK	1	
* *	-		Audio	HE-	AAC			40.402		-)10 +20
IFFT / Mode Packet Size	Sync Error	0	Video	H.2	264	Reed Solon	non 2	40, 192		-
· · · · · · · · · · · · · · · · ·				-		Interleaver		Mode 3		
Bandwidth Interleaver	Service Type	Video	Bit	rate (Kb	ps)	1000		1/2		
8 MHz 👻 👻	Lined Time Cla	40/40	Course	0.00	0000	LDPC				-50
Guard Interval	Used Time Sio		Source	440.0	60000	Scramble		Mode 0	1	-5 -0.5 +0.5 +5
SETTING	File Size (MB)	13 MB	Out	442.3	08000	Time Slot		3~6		
		DECORDER								
	FLATER	RECORDER	AJI-Y KF							ATT PLUS : 32 °C
0%	● RE								°	
FILE SIZE 13(MB)	O TS			V Lo	op Count:	0	Cu	rrent / Total		
PACKET(FILE) 0	ERROR			STA	TUS : Re	eady		: /:		(Ver. : 3. 15. 3)

Once made 240,240 higher the out bit rate, When the data capacity reduced replace in QPSK BPSK can not fill yet still receive the red line.

#### • LDPC

LDPC is error-correction techniques in the CMMB Method. B etween each frams, any values can be set, but 0 in the CLCH MF\_ID is transmite 1 / 2. LDPC has two parameters(1/2. 3/4).

In conceptual theory, the 1/2 is add up 1 bite of parity input per 1 bite of input, totally make 2 bite of output.

And every per 2 bit of output transports 1 bit of information, and final, become 1/2 bit rate. And 3/4 is add up 1 bite of parity per 3 bit of input, totally make 4 bit of output, and every per 4 bit of output transports 3 bit of information, and final, become 3/4 bit rate.



Elle control Utility Option Help         MODULATION         FILE       F:Wentus_StreamWonScramble_Stream\CMMB\mmxtMFID2_15f_30832k.mmx         Adopters       VDDF12345         Multiplexer         ID       Constellation         ID       Constellation         Multiplexer         ID       Constellation         ID       Constellation         Multiplexer         ID       Constellation         ID       Constellation	Hz
MODULATION         File         F:/ventus_Stream/KonScramble_Stream/CMMB/mmxiMFID2_15f_30832k.mmx         Auto_Coti         Coti         Outrput           Adopters         VDDF12345         Multiplexer         ID         Constellation         Reed Solomon         Interleaver         LDPC         Scrambling         Time Slot         Data         CAS	]Hz
Adapters VDDF12345  Multiplexer ID Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot Data CAS	ЦHz
D Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot Data CAS	CHz
Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot Data CAS	
0 BPSK 240,240 Mode 1 1/2 Mode 0 1 CLCH BH / SIMOC Relation	
RF-OUT 2 OPSK 240.224 Mode 1 1/2 Mode 0 2 LGG Source: 0.332500 M	lbps
OVB-12 OVB-S Out: 3.124224 M	ibps
OvB-1/H(2,8K) OvB-52	)
O dvB-t/H(4k) O ATSC 6 Sym: M	ISps
	_
O DAP/DMB-MUX O ISSE/I/D 8 AWGN UNC 9	OFF
Opencable © CMM8+M0X 10 C/N: + 5 □. □	dB
11 BW: 04.0	MHz
	OFF
TS-OUT ASIOUT	_
Code Rate Const. Type ME ID 2 Codec Type 16 Dn QPSK	
Audio HE-AAC 18	+20
IFFT / Mode Packet Size Sync Error 0 Video H.264 19 hon 240, 224	-
Bandwidth Interleaver Service Type Video Bitrate (Kbps) 23 1/2	
8 MHz - Used Time Slot 7/40 Source 332:500000 24 Mode 0	
Guard Interval Out 516.096000 26 -5 -0.5 +0.5 +	5
	3m
29	
BUFFER USAGE PLAYER RECORDER ASI⇔RF 30 VENTUS : 38	°C
0% ATTPLUS: 37	°C
FILE SIZE Current / Total	
PACKET(FILE) 0 ERROR STATUS: Ready 00:00 / 10:47 (Ver. : 3. 15. 3)	in.

Once made 240,240 higher the out bit rate, When the data capacity reduced replace in QPSK BPSK can not fill yet still receive the red line.

### • Time Slot

CMMB is transfer 1 divided by 40 seconds unit. This unit is called Time Slot.

This means that an early time slot is 40. Intuitively, If you have a lot of time slot, you can send more data.

A Time slot can have a number of frames. There are some limitations depending on Interleaving Mode.



7 T-Pump - VDDF12345							
<u>File Control Utility Option Help</u>							
MODULATION	FILE F:\Ventus_Stream\WonScramble_Stream\CMMB\mmx\WFID2_15f_30832k.mm> Auto Get Get Internet NIT PCR	OUTPUT					
Adapters VDDF12345	Multiplexer	FREQUENCY					
		0.690.000.000Hz					
	ID Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot Data CAS	BIT / SYMBOL RATE					
	1 QPSK 240, 240 Mode 1 1/2 Mode 0 1 CECH	Source: 0.332500 Mbps					
RF-OUT	2 QPSK 240, 224 Mode 1 1/2 Mode 0 4 Video	Source : 0.332500 Mbbs					
O DVB-T2 O DVB-S	3	Out: 3.124224 Mbps					
O DVB-T/H(2, 8K) O DVB-S2	4	Remux(Hw)					
ODVB-I/H(4K) OAISC	6	Sym :,- MSps					
O DAB+/DMB+MUX O ISDB-T/Tb	8	AWGN ON-OFF					
OpenCable OCMMB+MUX	9						
⊙ DTMB 🗸 CW	11						
TS-IN 🕥 ASI IN	12	BW: UN.UMHz					
TS-OUT 💿 ASI OUT	Information 14 te						
Code Rate Const. Type	Codec Type 16						
v v	MF_ID 2 Audio HE-AAC 18						
IFFT / Mode Packet Size	Sync Error 0 16400 H264 19 non 240, 224	-110 +20					
V V	Video 20 20 Mode 1	1 1 1					
Bandwidth Interleaver	Service Type Video Bitrate (Kbps) 22 1/2	1/1/XX					
8 MHz 🔻 👻	Used Time Slot 7/40 Source 332.500000 24 Mode 0	-50					
Guard Interval	Out 516.096000 26	-5 -0.5 +0.5 +5					
• SETTING	File Size (MB) 25 MB 27 3~6	-020.0 dBm					
	29						
BUFFER USAGE	PLAYER RECORDER ASI⇔RF 30 31	VENTUS : 38 °C					
0%	32 T	AIT PLUS : 37 °C					
FILE SIZE 25(MB)	Current / Total						
PACKET(FILE) 0	ERROR     STATUS:     Ready     00:00 7 10:47	(Ver. : 3. 15. 3)					

It tells about the list of the number of time slot. However, as it says, the value can not be the same as always. When selecting 6 from the list, out rate has been higher than Source rate, the setting is not properly operate.

#### Interleaver

Interleaving is a data mixing process. The buffer change depending on the size of mode. It's just because Interleaving mixing data does not affect the bit rate.

#### Scramble

Scramble is the process to random the data. It generates a random number of random columns, and the original data is added to the process. A random group of the number has column eight.

Selecting this group called the scrambling mode . Some do not care if you select a value, the scramble mode to be 0 CLCH that are set forth in the standard.

#### Now, the group is ready.

Output from the menu to test the transmission frequencies will be set up after the RF.

-> If you are using AMP & Attenuator Amplitude button, you can adjust the power level.

AMP & Attenuator AMPLITUDE ON, this must be used, must make sure that you are after.
P ower level control to be controlled, +7 dBm(+3dbm over frequency of 1GHz) ~-110dBm, and minor changes in the shuttle and a 0.5dB If you enter a number directly Adjustable unit is 0.1 dB.

3 One Multi-channel from channel to channel stream files, if you need to add a T-PUMP Multiplexer in the middle of the menu when you click the right mouse button to add or delete channels are available.



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One channel stream file open button, select Open, then again, you receive the following pop-up menu.

--> When adding Channel: (Yes), When reset the Chennel: (NO)

T-Rome		2
VES, Incert M No, Reset MP	FS file 5 file and Open MP	-5 fla
H (y)	UNLIS (M)	

In 3.1.0 Version, if the CLCH's channel information and the actual multi mfs. stream does not match with service number, then the pop up window will show as below.

C:\Prcgra	am Files\(c)LUMANTEK\T-Pump\TPump.exe
	₩₩khw₩Stream₩CMMB-Stream₩Stream from C/berlink₩754_ch_0_4_5_6-afternoon.mfs file has invalid CLCH information, Please select CMMB file again
	확인

# \* How to bitrates Setting example case with Alarm functioning.

If User set to BPSK, then see the Red BAR on time-slot, that means, try to shows "Error Alarm ", Cause by user's current setting,

bring up Output Bitrates bigger then Source bitrates. And need to re-configuration again. 16 QAM. And please re-scan, then enable to decode again.

T-Pump - VDDF1	2345		-											×
Eile Control Util	ity <u>O</u> ption <u>H</u> elp	ſ	ILE F:\Vent	us_Stream\NonS	\Padding_Se	r(12)_H.2	64(8)_DRA(2)_	Unknown(2).r	nfs	ato Oot Q	Pot OD		OUTPUT	
And and town WDD	E42346		Multiplexer							INII P	UR	FREQU	ENCY	
Adapters VDD	F12345 •		wumpiexer		12 2							0.69	3.000.000	Зн
C T	TE MUX		Constellation	Reed Solomon	Interleaver Mode 1	LDPC	Scrambling Mode 0	Time Slot	Data	CAS	Â	BIT / SY	(MBOL RATE	=
		1	QPSK	240, 240	Mode 1	1/2	Mode 0	2	ESG			Source	M	lbn
RF-C	501	2	QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			Out:	4 302200 M	bp.
O DVB-T2	O DVB-S	3	QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video		Е	Qur:	A.JOZZUO WI	op:
O DVB-T/H(2, 8K)	O DVB-S2	4	QPSK	240, 192	Mode 3	1/2	Mode U	4	Video			· · · · · · · ·		
OVB-T/H(4K)	O ATSC	c 6	OPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			Sym :	M	Sp₅
O DVB-C	O AISC-M/H	7	OPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			F		
O DAB*/DMB+MU		8	QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio			AWGN	ON-LIN	OFF
OpenCable	CMMB+MUX	9	QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio			℃/N :	÷60.0	dl
DIVID	V CW	10	QPSK	240, 192	Mode 1	1/2	Mode 0	2			~	Bw :	04.0 /	MH:
TS-IN O	ASI IN	•				m				•	•			OFF
TS-OUT 💿 /	ASI OUT		Information					Current Sta	te			AMPLI		<b>MARK</b>
Code Rate	Const. Type	1	MF_ID	2	С	odec Ty	pe	Constellation	on	QPSK	1			
<b>V</b>	<b>V</b>				Audio	HE	AAC	Reed Solo	mon	240, 192		-110		+2
IFFT / Mode	Packet Size	18	Sync Error	0	Video	H.	264	11660 00101	non		1	-		-
*	*			104.4				Interleaver		Mode 3	1	-		
Bandwidth	Interleaver	8	Service Type	Video	Bit	rate (Kl	ops)	LDPC	Г	1/2			111	
8 MHz 👻			Used Time Slot	40/40	Source	0.00	0000	LDFC		Mode 0			-50	_
Guard Interval					Out	442.3	68000	Scramble		Mode o		-5	-0.5 +0.5 +8	5
	SETTING	L	File Size (MB)	13 MB	Cui			Time Slot		3~6		- 1	320.0 dB	3m
BUFFER USAGE		F	PLAYER	RECORDER	ASI⇔RF							VENTUS	: 33	°C
	0%		<b>—</b>								-	ATT PLU	3 : 32	°C
			RF			V Lo	op Count:	0	c	Current / Total				
FILE SIZE	13(MB)					STA	JUS : R	eady		I			LUMANTE (Ver. : 3, 15, 3)	ĸ
							ent.	v com			1		Ø	

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Change set 16 QAM to BSPSK in Constellation section, Alarm (Red-Bar) is appeared, due to Bitrates Error. Then mean User's source (file) bitrates Is bigger than output bitrates, and need to be resetting.

BPSK is low bitrates, then 16 QAM and required more time slot for fulfill. But the current slot is already 40 slot, and no more Slot space available.

7 T-Pump - VDDF12345												
<u>File</u> <u>Control</u> <u>Utility</u> <u>Option</u> <u>H</u> elp												
MODULATION	FILE F:\Ven	tus_Stream\NonS	Padding_Se	r(12)_H.2	64(8)_DRA(2)_	Unknown(2).m	Ifs Auto	t NIT PC	st R		OUTPUT	
Adapters VDDF12345	Multiplexer									FREQU	NCY	
		D 101			o	<b>T O</b>				0.690	).000.000	Hz
	ID Constellation	Reed Solomon	Interleaver	LDPC	Scrambling	Time Slot	Data	CAS	ñ.			=
		240, 240	Mode 1	1/2	Mode 0	2	ESG			DIT / ST	WIDOL KAIE	
RF-OUT		240, 192	Mode 3	1/2	Mode 0	4	Video			Source :	,- Mb	ps
O DVB-T2 O DVB-S	3 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video		-	Qut:	4.382208 Mb	ps
O DVB-T/H(2, 8K) O DVB-S2	4 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video		=		Remux(HW)	
O DVB-T/H(4K) O ATSC	5 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			• \		
O DVB-C O ATSC-M/H	6 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			oym :	,- MIS	ps
O DAB+/DMB+MUX O ISDB-T/Tb	7 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			AWGN	ON - 0	FF
	8 QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio			<u> </u>		
© DTMB √ CW	9 QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio			S/N :	* 60.0	aB
	10 QPSK	240, 192	Mode 1	1/2	Mode 0	2			-	BW :	04.0 м	IHz
	•							•	_	AMDUIT		
TS-OUT O ASI OUT	Information					Current Stat	e		_	AIVIFLI		
Code Rate Const. Type		2	C	odec Ty	pe	Constallatio	-	OPSK	1			
· ·	MF_ID	-	Audio	HE-	AAC	Constellatio		aron				
IFFT / Mode Packet Size	Sync Error	0	Video	H	264	Reed Solom	non 2	240, 192		-110		+20
			video	11.2	.04	Interleaver		Mode 3	1	-		
	Service Type	Video	D:4			IIIIEIIEEVEI			1	- 1		
Bandwidth Interleaver			Bit	rate (Kb	ops)	LDPC		1/2	1	· ·	-50	
8 MHz 🔻 👻	Used Time Slo	ot 40 / 40	Source	0.00	0000	Scramble		Mode 0	1		0.5 .0.5 .5	
Guard Interval			Out	442.3	68000	Corumbic			1	-5	-0.5 +0.5 +5	
• SETTING	File Size (MB)	13 MB				Time Slot		3~6		- 5	120.0 dBr	m
BUFFER USAGE	PLAYER	RECORDER	ASI⇔RF							VENTUS	33	°C
0%								,		ATT PLUS	: 32	°C
	RF			V Lo	op Count:	0	Cu	urrent / Total				
FILE SIZE 13(MB)	• TS			STA	TUS · R	eady					UMANTE	ĸ
PACKET(FILE) 0	ERROR			014							ver. : 3. 15. 3)	

Then Delete one service (MUX FRAME) ID: 13 or whatever slot has 4 time-slot, and now, time-slot changed to 36/40 Then, We have extra 4 slot space now from Max 40 slot

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Ref:

CHIEF PER

T-Pump - VDDF12345 \_ \_ X <u>File Control Utility Option Help</u> Get Get NIT PCR OUTPUT MODULATION Auto Test FILE \\khw\Stream\CMMB-Stream\멀티\full\_MFS\_chengdu1.mfs FREQUENCY Adapters VDDF12345 -Multiplexer 1.492.000.000Hz Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot . ID Data CAS MUX **BIT / SYMBOL RATE** 3 QPSK 240, 192 1/2 Mode 3 Mode 0 4 Video ----OPSK 240 192 4 Mode 3 1/2Mode 0 Δ Video Mbps RF-OUT Source : 5 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video ----Out 4.382208 Mbps O DVB-T2 O DVB-S 6 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video ----Remux(HW) O DVB-S2 QPSK OVB-T/H(2, 8K) 7 240, 192 Mode 3 1/2 Mode 0 4 Video OVB-T/H(4K) O ATSC Sym : MSps QPSK 240, 192 Mode 1 Mode 0 ODVB-C O ATSC-M/H 9 1/2 1 Audio ----10 QPSK 240, 192 Mode 1 1/2 Mode 0 2 O DAB+/DMB+MUX O ISDB-T/Tb ----AWGN ON OFF 11 QPSK 240, 192 Mode 1 1/2 Mode 0 1 --------OpenCable CMMB+MUX +60.0 dB C/N : 12 OPSK 240, 192 Mode 3 1/2 Mode 0 Λ Video O DTMB V CW 13 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video BW : 04.0 мнг TS-IN ASI IN Þ TS-OUT 💿 ASI OUT Current State Information Code Rate Const. Type Codec Type QPSK MF\_ID 8 Constellation DRA Audio -110 +20 240, 192 Reed Solomon IFFT / Mode Packet Size Sync Error 0 Video \_\_\_\_ Mode 1 w Interleaver Audio Service Type / | -50 Bandwidth Interleaver Bitrate (Kbps) 1/2 LDPC 8 MHz -40/40 0.000000 Source Used Time Slot Mode 0 Scramble -5 -0.5 +0.5 +5 Guard Interval Out 110.592000 8 MB 27 SETTING File Size (MB) Time Slot --020.0 dBm **BUFFER USAGE** PLAYER RECORDER ASI⇔RF تعا STATUS : Ready (Ver 0% O RF CON COM FILE SIZE O TS 8(MB) 40 dBr ERROR PACKET(FILE) 0 

Then now, source bitrates is equal or less then output bitrates, then decoding is properly working.



1. Full CMMB U-Band Frequency table on T-PUMP

2. Correct Wrong Audio Codec info

3. When User open up MRF file, which has out of CMMB standard at CLCH, and pops up right standard CLCH MFS parameter for Comparing, automatically, and give Selection to user as below picture.

Inv	alid CLCH Data		×
	ITEM	Standard	Current State
	Constellation	BPSK	BPSK -
	Reed Soloman	240, 240	240, 240 🔻
	Interleaver	Mode 1	Mode 1 -
	LDPC	1/2	1/2 -
l	Scrambling	Mode 0	Mode 1 -
	Time Slot	1	1 •
	Use Default		Use Custom Parameter

We found a lot wrong parameters MFS file, who intend to make for error testing ( could be chipset designer ), or whatever reason.

That MFS is Out of CMMB standard. So When User open up unknown MFS stream from HDD, and if the MFS stream's is out of CMMB standard, and will automatically pop up the above GUI form T-PUMP. And give User Comparing table current unknown MFS with real standard MFS spec.

Customer can select one of either case, If User just intent to error testing, or possibly we could correct right standard parameter at the Popup Menu or can do Multiplexer Frame in T-PUMP. The problem, most of user (Receiver manufacture) don't know what is standard parameter of CMMB, And give them right guide. That is quite user Fridley.

#### CMMB mode

The recent USB CMMB receiver has trash out all FF date while on recording of on-air CMMB service for own optimizing of size, In Demodulator side, don't need FF data for own decoding but In modulator Side ,cannot be played if the stream has no FF data. (means not exact fit on standard PAD size) "

When User open up recorded one-air signal S-MFS, and enable to play out from VENTUS, And T-PUMP will pop up the massage as below when you try to open up " No Padding data file ", and automatically, recovered " standard PAD size " for CMMB modulation.

UMANTEK

1. Enable to open, and play out with MFS which has no padding data ( Both of S-MFS/M-MFS )

2. Enable to insert S-MFS which has no Padding data for multiplexing

3. Enable to mutiplexe in combination of S-MFS which No-padding data and S-MGS which has padding data.

4. Only CLCH is open up, and play out possible.

(Chipset company requirment)



T-Pump - VDDF12345											<b>X</b>
<u>File Control Utility Option Help</u>	)										
MODULATION	FILE \\khw\	Stream\CMMB-Stre	am\Stream fr	om\754	_ch_0_4_5_6-a	afternoon.mfs	Auto	Get Get	t		OUTPUT
							1031	NII PCI	K	FREG	QUENCY
Adapters VDDF12345	Multiplexer									0.65	30.000.000Hz
	ID Constellation	Reed Solomon	Interleaver	LDPC	Scrambling	Time Slot	Data	CAS	-		
C1.0.00 [nov	0 BPSK	240, 240	Mode 1	1/2	Mode 0	1	CLCH			BIT /	SYMBOL RATE
RF-OUT	1 QPSK	240, 192	Mode 1	1/2	Mode 0	2	ESG			Sourc	e:,- Mbps
0	2 QPSK	240, 192	Mode 3	1/2	Mode 0	4	Data		=	Out	5.266944 Mbps
ODVB-T2 ODVB-S	3 16QAM	240, 192	Mode 3	1/2	Mode 0	2	Video			ou.	Demark(MA)
OVB-T/H(2, 8K) OVB-S2	4 16QAM	240, 192	Mode 3	1/2	Mode 0	2	Video	Encrypt			Remux(Hw)
OVB-T/H(4K) OATSC	5 16QAM	240, 192	Mode 3	1/2	Mode 0	2	Video	Encrypt		Sym :	MSps
O DVB-C O ATSC-M/H	6 16QAM	240, 192	Mode 3	1/2	Mode 0	2	Video	Encrypt			
O DAB+/DMB+MUX O ISDB-T/Tb	7 QPSK	240, 192	Mode 1	1/2	Mode 0	1	Video			AWG	N ON OFF
OpenCable OCMMB+MUX	8 QPSK	240, 192	Mode 1	1/2	Mode 0	1	Video			C/N ·	+5ΠΠ dB
⊙ DTMB ✓ CW	9 QPSK	240, 192	Mode 1	1/2	Mode 0	1	Video			0,14.	
TS-IN ASLIN	10 QPSK	240, 192	Mode 1	1/2	Mode 0	2	Video		Ŧ	BW :	UH.U MHz
	•							•		AMP	
TS-OUT O ASI OUT	Information					Current State	2		_	7.111	
Code Rate Const. Type		7	Co	dec Type	e			DOK	1		
	MF_ID	· ·	Austra	HE-A	40	Constellation		1PSK			
	Cure Freeze	1	Audio	112-70		Reed Solom	on 24	0, 192	1	-110	+20
IFFI / Mode Packet Size	Sync Error	· ·	Video	H.26	4				1	-	
		Video				nterleaver	M	lode 1	3	-	
Bandwidth Interleaver	Service Type	Video	Bitr	ate (Kbp	s)	DPC		1/2	н		1111
8 MHz 👻 👻	Llood Time Slo	+ 40/40	Source	0.000	000				1		-50
Guard Interval	Used Time Sid		oouroo	440.50	2000	Scramble	M	lode 0	1	-5	-0.5 +0.5 +5
SETTING	File Size (MB)	16 MB	Out	110.59	- 2000	Time Slot		15	1		
	()								J	-	UCU.U dBm
				_							
BUFFER USAGE	PLAYER	RECORDER	ASI⇔RF							VENT	US: 40 °C
92%										ATT P	LUS : 38 °C
	RF			🗸 Loop	Count:	0	Curr	ent / Total		_	
FILE SIZE 16(MB)	O TS			STATI	IS ·		00:00	8 /:			LUMANTEK
PACKET(FILE) 0	ERROR			UNIC							(Ver. : 3. 15. 3)

The time slot is increased "8" then become full 40 slot now.

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4.16 / ATSC-M/H / Introduction of M/H Multiplexer Part in VENTUS 1.0

# • Block Diagram of M/H Multiplexer in VENTUS 1.0



Main TS Processor

- automatically controls main TS packet about timing & PCR adjustment.

M/H Service Multiplexer (associated Ensemble configuration)

- multiplex service streams with automatically building SSC tables.

- modify & re-multiplex Ensemble stream.

Pre-Processor (associated Parade configuration) - process by configured M/H FEC parameters.

TS Packet Multiplexer

- multiplex main TS packet and M/H TS packet

- output TS stream(packets) with 19.392 Mbps

#### • Concept of M/H Multiplexer in VENTUS 1.0

Ability, Just exact simulate condition like ATSC Mobile DTV on US. Air

Through editing Ensemble configuration with editing Parade configuration and choosing Parades, User enable to generate a Signal form without any limitation for broadcasting in ATSC-Mobile DTV standards specification

GUI Procedure -Setting Ensembles -> Setting Parades -> Selecting output Parades -> Starting RF output



#### • Ensemble GUI in T-Pump GUI

1 Ensemble GUI - Feature

Support Input file Single service stream (IP Packet based) - Service Mode Multiplexed ensemble stream (IP Packet based) - Ensemble mode

Support Editing

Editing of the service ID, service Name, destination IP address from each service is supported.

In service mode, the settings in the codec information (as component descriptor) is required. (ATSC A/153 Part3. 7.8.1 Reference)

- Editing support in SMT-> Service-> Component-> Component descriptor as in the Hex Code.

- A Method to transform SDP to Component descriptor can be found in ATSC A/153 Part7. Annex A.

\* Note

ATSC Main TS stream (for multiplexing with M/H TS) and Multiplexed TS stream(Main & M/H) can be used by T-Pump GUI's "File Open" button.

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2 Ensemble GUI - Feature

Support Input file Single service stream (IP Packet based) - Service Mode Multiplexed ensemble stream (IP Packet based) - Ensemble mode

### Support Editing

Editing of the service ID, service Name, destination IP address from each service is supported.

In service mode, the settings in the codec information (as component descriptor) is required. (ATSC A/153 Part3. 7.8.1 Reference)

- Editing support in SMT-> Service-> Component-> Component descriptor as in the Hex Code.
- A Method to transform SDP to Component descriptor can be found in ATSC A/153 Part7. Annex A.

#### <u>\* Note</u>

ATSC Main TS stream (for multiplexing with M/H TS) and Multiplexed TS stream(Main & M/H) can be used by T-Pump GUI's "File Open" button.

#### 3 Ensemble GUI – Area Summary

Para Ensemble	de Ense Mutiplexer	mble					
1	Ens	emble Slot 3			Mode N	ot Defin	ed
2	Total Bitrate(bps)		0	Ensemble S	tatus		Unusable
3	File Path		T			_	
	No Category	Service ID	Service Name	IP Addr		Port	Bitrate(bps)
S	election Area	of	Ensemble S	tatus			
E	nsemble Set N	0.	View Are	a			
-			U	1		Convio	
8						Servic	e view Area
Service Si	gnaling Channel						
SMT	SMT Information				Comp	onent D	escriptor View
GAT				Î			*
еп		_					*
SLT			SSC View A	rea		Ap	ply

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4 Ensemble GUI – Feature on Each Area (1)

Selection Area of Ensemble Set No.

- Ensemble Status View Area, Service View Area and SSC View Area about selected Ensemble set No. is loaded.

Ensemble Status View Area

- Mode, Total Bit-rate, Status, File Path of the selected numbers on Ensemble Set are displayed.
- Depending on the status of Mode, 'Mode Not defined', 'Service Mode', 'Ensemble Mode' is displayed.
- Status of Ensemble is displayed as 'Usable' or 'Unusable'.

5 Ensemble GUI – Feature on Each Area (2)

#### Service View Area

- Belonging to the selected settings of each service in Ensemble Set, 'Service Type', 'Service ID', 'Service Name', 'Destination IP Address', 'Destination UDP Port', 'Bit-rate' are displayed.

- Loading File (Ensemble or Service)

- "Click right mouse -> Click Insert" (Service or Ensemble file can be loaded.)
- In Service Mode, user can load additional service files "Click right mouse -> Click Insert"
- (To remove service, do "Click right mouse -> Click Delete"

- Service ID, Service Name, Destination IP Address can be edited by 'mouse left-click' in the area.

And if edited value is not allowed, the value returns to its previous value. Edited value immediately applies to the SSC View area table.

6 Ensemble GUI – Feature on Each Area (3)

SSC View area

- SSC tables(SMT, SLT, CIT, GAT) display. (RRT will be supported)

- In Ensemble mode, SSC tables show when the information is already included in the file (SMT is a mandatory table, another table may not exist in the file.)

- In Service mode, the SMT, SLT is automatically built.

- In Service mode, Component Descriptor in the "SMT Table – Service – Component" must input the hex values about codec information.



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2 Edit Ensemble GUI - Example (1): File I	nput
---	------

		Ens	emble Slot 2		Mod	e Not Defined
2	Tota	al Bitrate(bps)		0	Ensemble St	IP stream file
3		File Path				: In this area, right-click you
-	No	Category	Service ID	Service Name	IP Addr	mouse and select Insert.
-	1				~	
5						
6				<b>K</b>	Insert	
7					Delete	
_					Edit Descripto	or
ice	Signalii	ng Channel				
MT MT AT	Signalii 🕀 Si	ng Channel			C	omponent Descriptor View

lo	Category	Service ID	Service Name	IP Addr	Port	Bitrate(bps)
1	0x01 [TV]	2-1	0	239.168.1.2	49160-49163	442344
2	0x01 [TV]	2-2	1	239.168.1.4	49160-49163	296948
3	0x01 [TV]	2-3	2	239.1.35.1	8000-8003	387960
4	0x01 [TV]	2-4	3	239.1.35.1	8000-8003	385543
No	Category	Service ID	Service Name	IP Addr	Port	Bitrate(bps)
1	0x01 [TV]	2-1	0	239.168.1.2	49160-49163	442344
2	0x01 [TV]	2-2	1	239.168.1.4	49160-49163	296948
3	0x01 [TV]	2-3	2	239.1.35.1	8000-8003	387960
4	0x01 [TV]	2-4	3	239.1.35.1	8000-8003	385543
					click le <u>ft mou</u>	se on S <u>ervice II</u>
					click left mou and mo	se on Service IE odify the value
No	Category	Service ID	Service Name	IP Addr	and mo Port	se on Service IE odify the value Bitrate(bps)
No 1	Category 0x01 [TV]	Service ID 2-1	Service Name	IP Addr 239.168.1.2	Port 49160-49163	se on Service IE odify the value Bitrate(bps) 442344
No 1 2	Category 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2	Service Name	IP Addr 239.168.1.2 239.168.1.4	Port 49160-49163 49160-49163	se on Service IE odify the value Bitrate(bps) 442344 296948
No 1 2 3	Category 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1	Port 49160-49163 49160-8003	se on Service IE odify the value Bitrate(bps) 442344 296948 387960
No 1 2 3 4	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1	Port 49160-49163 49160-49163 8000-8003 8000-8003	se on Service IE odify the value Bitrate(bps) 442344 296948 387960 385543
No 1 2 3 4	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1	Port 49160-49163 49160-49163 8000-8003 8000-8003 Edit S click left mou	se on Service IE odify the value Bitrate(bps) 442344 296948 387960 385543 ervice Name ise on Service Name
No 1 2 3 4	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1	Port 49160-49163 49160-49163 8000-8003 8000-8003 Edit S click left mou area and r	se on Service IE odify the value Bitrate(bps) 442344 296948 387960 385543 ervice Name ise on Service N modify the nam
No 1 2 3 4	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4 Service ID	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1 IP Addr	Port 49160-49163 49160-49163 8000-8003 8000-8003 Edit S click left mou area and n	se on Service IE odify the value Bitrate(bps) 442344 296948 387960 385543 ervice Name use on Service N modify the nam Bitrate(bps)
No 1 2 3 4 4 No 1	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] Category 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4 Service ID 2-1	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1 IP Addr IP Addr 239.168.1.2	Port 49160-49163 49160-49163 8000-8003 8000-8003 Edit S click left mou area and n Port 49160-49163	se on Service IE odify the value Bitrate(bps) 442344 296948 387960 385543 ervice Name use on Service N modify the nam Bitrate(bps) 442344
No 1 2 3 4 4 No 1 2	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4 Service ID 2-1 2-2	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1 239.1.35.1 IP Addr 239.168.1.2 239.168.1.4	Port 49160-49163 49160-49163 8000-8003 8000-8003 Edit S click left mou area and n Port 49160-49163 49160-49163	se on Service IE odify the value Bitrate(bps) 442344 296948 387960 385543 ervice Name ise on Service N modify the nam Bitrate(bps) 442344 296948
No 1 2 3 4 4 No 1 2 3	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4 Service ID 2-1 2-2 2-3	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1 239.1.35.1 IP Addr 239.168.1.2 239.168.1.4 239.1.35.1	Port 49160-49163 49160-49163 8000-8003 8000-8003 Edit S click left mou area and r Port 49160-49163 49160-49163 8000-8003	se on Service IE bdify the value Bitrate(bps) 442344 296948 387960 385543 ervice Name ise on Service N modify the nam Bitrate(bps) 442344 296948 387960
No 1 2 3 4 No 1 2 3 4	Category 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV] 0x01 [TV]	Service ID 2-1 2-2 2-3 2-4 Service ID 2-1 2-2 2-3 2-4	Service Name	IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1 239.1.35.1 IP Addr 239.168.1.2 239.168.1.4 239.1.35.1 239.1.35.1	Port 49160-49163 49160-49163 8000-8003 8000-8003 Edit S click left mou area and n Port 49160-49163 49160-49163 8000-8003 8000-8003	se on Service IE odify the value Bitrate(bps) 442344 296948 387960 385543 ervice Name use on Service N modify the nam Bitrate(bps) 442344 296948 387960 385543

No (2), Sc ruico ID Sorvico Nor 8

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9 Edit Ensemble GUI - Example (3): Add Component Descriptor in Service Mode



#### • Parade GUI in T-Pump GUI

Parade GUI - Feature(1)

Parade Set Support

- Support to select Parade ID, NoG, TPC PRC, RS Frame Mode, SCCC Block Mode, Primary & Secondary RS Code Mode, and Select Ensemble.

- Parade ID : 0 ~ 127 specifies the ID of the range. If Parade ID set the same value, Only one can be used as the RF output at the same time.

- NoG : Number of Group can be selected from Minimum NoG to 8.
- TPC PRC : Some kind of burst mode. Can be selected from 1 to 8.
- (Parade is transmitted once every (x) M/H Frame with the data for (x) M/H Frame.)

- RS Frame Mode : "Single Frame (Primary RS Frame use only)" or "Dual Frame (Primary and Secondary RS Frame with)" can be chosen.

- SCCC Block Mode : 'Separated Block' or 'Paired Block' can be chosen.
- In the Separated Block Mode, User can choose code rate ½ or ¼ in 'SCCC Block Region A  $\sim$  D'
- In the Paired Block Mode, User can choose code rate ½ or ¼ in 'SCCC Block Region All'
- RS Code Mode : may choose one from (211,187), (223,187), (235,187) .

2 Parade GUI - Feature(2)

\* Notice for setting Parade

- Depending on the setting values in Parade, PDR and Total PDR, MDRL will change.

- PDR (Payload Data Rate) : PDR represents how many bit-rate can be included as Ensemble bit-rate. If select Ensemble to connect, T-Pump automatically calculate NoG minimum and NoG will increase NoG minimum.

It will print error message when calculated NoG minimum is over 8.

- Total PDR : Sum of Primary RS Frame's PDR and Secondary RS Frame's PDR.

- MDRL (Main Data Rate Loss) : TS bit-rate of current Parade. That represents how much the TS bit-rate in fixed output TS bit-rate as 19.392Mbps takes . It depends on NoG values.

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3 Parade GUI – Area Summary

Parade Bitrate(bps)	Ensemble				Bit-rate View Area
Main Bitrate		MHE Bitrate		Output Bitrate	
Parade Usage USE ID	NOG 0	arade Info	Parad	le 1	
P2 1		Parade ID	0	NOG NOG Minimum	0
P3 🛛 2		RS Frame Mode	Single Frame	Total PDR[bps]	0
P4 🛛 3	0	SCCC Block Mode	Paired Block 💌	MDRL[bps]	0
P5 🛛 4	0	Primary RS	Frame	Secondary F	RS Frame
P6 🛛 5	0	All Region All	Region MDRL[b	All Region	All Region
P7 🗖 6		/4 rate /1/4 r	ate 💌 Outer C	Code 1/4 rate	1/4 rate
P8 7	0	RS Code	(235, 187)	RS Co	rade Edit View Area
TNOG		PDR[bps]	0	PDR[bps]	0
M/H Slot Status Slot Number 0 Parade ID	1 2 3	4 5 6	7 6 9	10 11 12	13 14 15
Parade Usage Area	View			Sle	• ot Status View Area

4 Parade GUI – Feature on Each Area (1)

Parade Usage View area

- Loads Parade Edit View area depending on the selected Parade number.
- Shows NoG, Parade ID, Check box for RF output of each Parades. And whether Parade to RF output can be selected.
- Represents the status of the Slot Status View area by Check box for RF output.

Bit-rate View area

- Main (Legacy) TS bit-rate, Total M/H TS bit-rate and TS output bit-rate are displayed. TS output bit-rate is fixed to 19.392Mbps.
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5 Parade GUI – Feature on Each Area (2)

Parade Edit View area

- Parade Edit View area is for the setting zone. If RS-frame Ensemble is not selected, Parade cannot be activated for RF output. Each item is described in "Parade GUI – Feature" page.

Slot Status View area

- Slot Status View area shows M/H slot status of M/H Frame.

- Slot allocation order is (0, 4, 8, 12, 2, 6, 10, 14, 1, 5, 9, 13, 3, 7, 11, 15) according to standard (A/153 Part 2: 5.3.1.3 Reference)



## 6 Edit Parade GUI - Example (1): Link to Ensemble

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Parade Ensemb	e
Bitrate(Dps) Main Bitrate	MHE Bitrate Output Bitrate Edit Parade GUI - Example (2):
Parade Usage USE ID NOG	Parade Info Determine Parade whether to use for RF Output or not
	Parade ID 1 NOG 5
P3 2 0	TPC PRC 1 NOT Minimu Check Slot Status via the RF Output settings
P4 🛛 3 0	SCCC Block Mode Paired Block  MDRL[bp assigned parade ID in the M/H
P5 4 0	Primary RS Frame Seconda Slots.
	1/4 rate V Outer Code 1/4 rate V 1/4 rate V
P8 7 0	Ensemble Ensemble #2 Ensemble NULL   RS Code (235, 187)  RS Code (235, 187)
TNOG 9	PDR[bps] 786727 PDR[bps] 0
M/H Slot Status Slot Number 0 1 2	3 4 5 6 7 8 9 10 11 12 13 14 15
Parade ID 0 1 1	

2 Edit Parade GUI - Example (2): Determine Parade whether to use for RF Output or not

	Pa	rade 1	l.		
Parade ID	127		NOG	4	
TPC PRC	1	- N	IOG Minimum	3	
RS Frame Mode	Single Frame	To	tal PDR[bps]	629072	
SCCC Block Mode	Separate Blcc	-	MDRL[bps]	3667201	
Primary RS	Frame		Secondary	Prest 39	
Region A Re	gion B MD	RL[bps]	Pegion C	Region D	
1/4 rate 💌 1/4 r	ate 💌 Out	er Code	1/4 rate	1/4 rate 🔽	
Ensemble	Ensemble #1		Ensemble	Ensemble #3 💌	
RS Code	(235, 187)	-	RS Code	(235, 187) 🔽	
PDR[bps]	629072		NDR[bps]	0	

8 Edit Parade GUI - Example (3): Change According to RS Frame Mode

RS Frame Mode : Single Frame : Primary RS Frame zone is activated.

		Parad	de 1	(	
Parade	D 127			NOG	4
TPC PR	C 1		N	OG Minimum	4
RS Frame Mod	e Dual Fra	me 💌	Total PDR[bps]		625980
SCCC Block Mod	e Separate	e Blct 💌	MDRL[bps]		3667201
Primary	RS Frame			Secondary	RS Frame
Region A	Region B	MDRL[	bps]	Region C	Region S
1/4 rate 💌 1/	4 rate 💌	Outer	Code	./4 rate	1/4 rate 🔽
Ensembl	Ensemble	e #1 💌		Ensemble	Ensemble #3
RS Cod	(235, 18	7) 💌		RS Code	(235, 187)
PDR[bps	1 4993	239		PDR[bps]	126741

RS Frame Mode : Dual Frame : Primary RS Frame and Secondary RS Frame area is activated.

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	Parad	ie 1		
Parade ID	127	NOG	4	SCCC Block Mada · Saparata
TPC PRC	1	NOG Minimum	3	Block
RS Frame Mode	Single Frame	Total PDR[bps]	629072	: The Region set is separated to Region A~D
SCCC Block Mode	Separate Blo	MDRL[bps]	3667201	
Primary RS	Frame	Secondary	RS Frame	
Region A Re	gion B MDRL[	bps] Region C	Region B	
1/4 rate 🔳 1/4 r	ate 💌 Outer (	Code 1/4 rate	• 1/4 rate 💌	
Ensemble	Ensemble #1	Ensemble	Ensemble #3 💌	
RS Code	(235, 187) 💌	RS Code	(235, 187) 💌	
PDR[bps]	629072	PDR[bps]	0	

9 Edit Parade GUI - Example (4): Change According to the SCCC Block Mode

		Parade 1			
4	NOG		127	ie ID	Parad
3	OG Minimum	• N	1	PRC	TPC
629072	tal PDR[bps]	ame 💌 To	Single Fra	Node	RS Frame M
3667201	MDRL[bps]	ock 💌	Paired Blo	Mode	CCC Block M
RS Frame	Secondary		Frame	iry RS	Prima
All Region	All Region	MDRL[bps]	Region	All	al Region
r 1/4 rate v	1/4 rate	Outer Code	ate 💌	1/4 r	4 rate
Ensemble #3 💌	Ensemble	#1	Ensemble	mble	Enser
(235, 187)	RS Code	7) 💌	(235, 187	Code	RS C
0	PDR[bps]	)72	6290	(bps]	PDR

SCCC Block Mode : Paired Block : The Region change to ALL Region

• ATSC-M/H : Appendix : User Friendly GUI Example For User Centric Mind

Mutiplexer	Essemble Clat			Carulas Mada	
Total Bitra	te/bes)	730707	Encomble Stat	service mode	Isable
rotai bitra	le Dath D Hirs in				-
No. Con	D:W02-AT	SC-M_STREAMW00-	Services WFromSa	mSung_2010010	5 Wsample 1.ud
No Cate	gory Service ID	Service Name	1P Addr	Port 40160-40162	Bitrate(bps)
2 0x01	[TV] 2-2	1	239.168.1.4	49160-49163	296948
gnaling Ch SMT Info Table Secti Priva	annel rmation : ID : 0xDB[219] on Syntax Indicator te Indicator : 0x1[1]	: 0x0[0]		Component De	scriptor View

1. Open file (Required)

2. In Service Mode, Component Descriptor should be added. (Required)

3. Edit Service ID, Name, IP Address (Optional)

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2 User Friendly GUI Example (2)

Faraue		Ensemt	le			
rate(bps) Main Bitrate			MHE Bitrate	Ou	tput Bitrate	
ade Usage			Parade Info			
USE	ID	NOG	P	arade 1		
1941			Parade ID 0		NOG	5
P2	1	0	TPC PRC 1	-	OG Minimum	5
P3	2	0	RS Frame Mode Single Frame	T	tal PDR[bps]	786727
P4	3	0	SCCC Block Mode Paired Block	•	MDRL[bps]	4584001
P5	4	0	Primary RS Frame		Secondary F	IS Frame
P6	5	0	All Region All Region	MDRL[bps]	All Region	All Region
	6		1/4 rate 💌 1/4 rate 💌 0	uter Code	1/4 rate 💌	] 1/4 rate 💌
P7	0	0	Ensemple Ensemble #1		Ensemble	NULL 🔻
P8	7	0	RS Code (235, 187)		RS Code	(235, 187) 💌
TNOG	(	D	PDR[bps] 786727		PDR[bps]	0

1. Link Ensemble (Required)

2. Setting Parade ID, NOG, PRC, RS Frame Mode, SCCC Block Mode (Optional)

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**3** User Friendly GUI Example (3)

Parade Ensemb	le		
Main Bitrate	MHE Bitrate	Output Bitrate	
ade Usage	Parade Info		
USE ID NOG	Par	ade 1	
	Parade ID 0	NOG	5
P2 1 0	TPC PRC 1	NOG Minimum	5
P3 🕅 2 0	RS Frame Mode Single Frame	Total PDR[bps]	786727
P4 🕅 3 0	SCCC Block Mode Paired Block	MDRL[bps]	4584001
P5 🔲 4 0	Primary RS Frame	Secondary	RS Frame
P6 🔟 5 0	All Region All Region MDI	RL[bps] All Region	All Region
	1/4 rate 💌 1/4 rate 💌 Oute	r Code 1/4 rate	• 1/4 rate 💌
P7 0 0	Ensemble Ensemble #1	Ensemble	NULL 👻
P8 7 0	RS Code (235, 187)	RS Code	(235, 187) 💌
TNOG 5	PDR(bps] 786727	PDR[bps]	0

1. Select Output Parade (Required)

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• User Friendly GUI Example (4)

MODULATION	FILE Open File		Auto Get Get Test NIT PCR	OUTPUT
Adapters VDBL18145	Multiplexer		0 /	
RTSC-M/H	Parade Ensemb	ie	(	BIT / SYMBOL RATE
RF-OUT	Main Bitrate	MHE Bitrate	Output Bitrate	Source : 19.392658 Mbp
DVB-T2 OVB-S	Parade Usage	Parade info		Out: 19.392658 Mbr
DVB-T/H(2, 8K) OVB-S2	USE ID NOG	Parad	le 1	Remux(HW)
DVB-T/H(4K)	₽1 2 0 5			Svm : MSc
	P2 🛛 1 0	Parade ID	NOG 5	
		TPC PRC 1	NOG Minimum 5	AWGN DW- DOF
		RS Frame Mode Single Frame	Total PDR[bps] 786727	C/N: +60.0 0
	P4 🛛 3 0	SCCC Block Mode Paired Block	MDRL[bps] 4584001	ви: 0Ч.0 м
		Primary RS Frame	Secondary RS Frame	
S-OUT () ASI OUT		All Region All Region MDRL[[	All Region All Region	Ann Stilling
Code Rate Const. Type		1/4 rate T 1/4 rate T Outer (	ode 1/4rate x 1/4rate x	9
· · ·	P7 6 0	Transle Country of a		
FT / Mode Packet Size			Ensemble	
<b>-</b>		RS Code (235, 187)	RS Code (235, 187) 💌	
andwidth Interleaver	TNOG 5	PDR[bps] 786727	PDR[bps] 0	TIN
· ·	M/H Slot Status			-50
uard Interval	Slot Number 0 1 2	3 4 5 6 7 8 9	10 11 12 13 14 15	-5 -0.5 +0.5 +5
- SETTING	Parade ID 0 0	0 0	0	- 020.0 dBm
BUFFER USAGE	PLAYER RECORDER	ASI⇔RF		VENTUS : 41

- 1. Set the center frequency
- 2. Set AWGN(option) and Set Amplitude(option)
- 3. With the Play/STOP button, User can select RF output start/stop
- 4. Buffer status is used during playing

## 4.17 / AUTO TEST

- Automated test menu is applied on over T-PUMP Version 2.7.

- Regardless of Modulation option, When you select an Modulation and the Auto-Test, then the Auto option

is available to the test.

- Channel Test, Level Test, Channel/Level Test menu is available.

T-Pump - Automation Test	
1 Channel Test 2 Level Test 3 cnnel/Level Test	
Frequency Start 474.000 A MHz End 682.000 MHz Step 8,000 KHz Duration 10 Sec Level Start -80.0 A dBm End -90.0 A dBm Step 5.0 A dB Duration 10 Sec Insert Pattern Add file Add folder Delete file Delete All 10f0	N.       Path         1       D: \#Test_Stream\#CMMB\#Data\#pvr_Shan         2       D: \#Test_Stream\#CMMB\#Data\#pvr_Shan         3       D: \#Test_Stream\#CMMB\#Data\#pvr_Shan         4       D: \#Test_Stream\#CMMB\#Data\#pvr_Shan
Step(Sec)         Frequency Table(MHz)         6           60         474.000         482.000         498.000           10         538.000         546.000         554.000         562.000	506.000         514.000         522.000         530.000           610.000         618.000         626.000         634.000
1         642.000         650.000         658.000         666.000           Current Information           Frequency:         498.000 MHz           Level:         -40.0 dBm           Stream:         D:\#Test_Stream\#CMMB\#Data\#Scramble.mmx           Play Time:         00:00:23:61	674.000 682.000 Signal Deltativ Ref.20 dim -00 -00 -00 -00 -00 -00 -00 -00 -00 -0
Start Stop	Load Save

Items	Description
1 Channel Test	When testing the frequency Scan
2 Level Test	If testing the Power Level
3 Channel /Level Test	When testing Frequency and Power Level at the same time
• Frequency, Level, Insert Pattern	Frequency, Level Set window, specify the stream
5 Insert Stream	Specify Test Stream
6 Current Information	Current status

#### **Channel Test**

- When testing to specify the frequency range at regular intervals channel scan.

T-Pump - VDDF12345		
	FILE         \\khw\Stream\CMMB-Stream\멀티\full_MFS_chengdu1.mfs         Auto Test         N	et Get OUTPUT
Adapters VDDF12345 -	Multiplexer	FREQUENCY
	ID Constellation Reed Solomon Interleaver LDPC Scrambling Time Slot Data	
RE-OUT	4 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Source : Mbps
ODVB-T2 ODVB-S	5 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Out: 4.382208 Mbps
O DVB-T/H(2, 8K) O DVB-S2	7 QPSK 240, 192 Mode 3 1/2 Mode 0 4 Video	Remux(HW)
O DVB-T/H(4K) O ATSC	8 QPSK 240, 192 Mode 1 1/2 Mode 0 1 Audio	Sym: MSps
O DVB-C O ATSC-M/H	9 QPSK 240, 192 Mode 1 1/2 Mode 0 1 Audio	
O DAB+/DMB+MUX O ISDB-T/Tb	10 QPSK 240, 192 Mode 1 1/2 Mode 0 2	AWGN ON OFF
OpenCable OCMMB+MUX	11 QPSK 240, 192 Midde 1 1/2 Midde 0 1	
O DIMB CW	13 QPSK 2	
TS-IN O ASI IN	<ul> <li>Level Teal</li> <li>Channel (Level Teal)</li> </ul>	
TS-OUT 🕥 ASI OUT	Information	nsert Stream
Code Rate         Const. Type	MF_ID Start 474.000 winz End 642.000 wins	N. Path I DIWTest Stream WOME Woods Wow Shan
IFFT / Mode Packet Size	Sync Error Step 8,000 Auguston 10 Auguston 10	3 DiWTest StreamWOMMWDataWpvr Shan
v		
Bandwidth Interleaver	Service Type	
8 MHz	Used Time Slot	
SETTING	File Size (MB)	
BUFFER USAGE	PLAYER RE Add file Add file Delete file Delete Add	
0%	Step(Sec) Frequency Table(194c)	
FILE SIZE 8(MB)		06.000 514.000 522.000 530.000
PACKET(FILE) 0	0 ERROR 10 538.000 546.000 554.000 562.000 61	10.000 638.000 528.000 634.000
	1 642.000 650.000 650.000 666.000 67	F4.000 662.000 4 F
	Current Information	Signal
	Frequency : 490.000 MHz Level : -40.0 dbm Stream 1 D:WTest_Stream WCMHzWDataWScrastble.mmx Play Time : 00 : 00 : 23 : 61	Elefana bitzen - Res - Res
	Start Stop	oad Save

1 From the main menu when you select Auto-Test Automation Test is a pop-up menu.

**2** Frequency Channel Test Tab menu item specifies the start frequency and end frequency.

-> When you select an item under the Start and End, Frequency Table entries can be select from list.

juency Table	(MHz)			0		90	
474.000	482.000	490.000	498.000	506.000	514.000	522.000	530,000
538.000	546.000	554.000	562.000	610.000	618.000	626.000	634.000
642.000	650.000	658.000	666.000	674.000	682.000	•	- <b>•</b>

3 On Level entry, select the specified time to test and exit points then Specifies the interval, and the cycle. -> Start, Stop entry, Step items, Duration, select the item you will receive the following example.

TableidBui	)						
+17.0	-9.0	8.0	-7.0	-6.0	-5.0	î	-3.0
2.0	00	10.0	30,5	30.0	10.0	50.0	£0.0
-70.2	-:0.1	-9U	-100 0	-110 0			p.

Tauls(dB)				 	
0.1	1.0	5.0	inn		
					[
1				4	

ration Table(S	ec)					112 - 112	
ιc	20	30	40	x	50	:20	160
240	30C	350	420	480	542	600	
						4	

• Specifies the stream file to test.

-> You can specify multiple stream files, and specify the stream for the entire folder



• Set the auto-test is complete, select the button at the bottom of the test will start.

-> To save the settings when you test again with the test load

Start	Stop	Load	Save

#### VENTUS 2.0 / Operational Manual

#### **Level Test**

- To test at regular intervals by specifying a range of Level Power Level test case.

Bit Control Unity Option Lefe         MODULATION         Adaptors V00F12245         CONS.0         CONS.0<	T-Pump - VDDF1	2345			•						_				×
MODULATION       FILE       Water CAMBA-Stream % Eff Lule, MS _ chengdut rufts       File       Image: Camba-Stream % Eff Lule, MS _ chengdut rufts         Adopters       VODF12845       Image: Camba-Stream % Eff Lule, MS _ chengdut rufts       Image: Camba-Stream % Camba-Stream % Eff Lule, MS _ chengdut rufts	<u>File Control U</u> til	ity <u>O</u> ption <u>H</u> elp											0		
Adaptars       VD0F12345       Multiplexer         Image: Constraints       Constraints       Ref       Constraints       Ref       Ref       Image: Constraints       Ref       Ref       Image: Constraints       Ref       Image: Constraints       Ref	MODULATION		( FI	LE \\khw\S	tream\CMMB-Stre	am\멀티\full	_MFS_ch	engdu1.mfs		Ť	iest NIT	PCR	EDEQUEN	OTPOT	
Image: Second	Adapters VDD	F12345 👻		Aultiplexer									FREQUEN	ICY	
COURS         PMAR         Diff constraintion         Tenderer         Lift / SYMBOL RATE           NPS-10         OPSK         240, 192         Mode 3         12         Mode 0         4         Video													1.492.	000.00	CHz
BF-OUT       0 <td>C 19</td> <td>TE MUX</td> <td></td> <td>Constellation</td> <td>Reed Solomon</td> <td>Interleaver</td> <td>LDPC</td> <td>Scrambling</td> <td>Time Slot</td> <td>Data</td> <td>C/</td> <td>AS ^</td> <td>BIT / SVM</td> <td>BOI PATE</td> <td></td>	C 19	TE MUX		Constellation	Reed Solomon	Interleaver	LDPC	Scrambling	Time Slot	Data	C/	AS ^	BIT / SVM	BOI PATE	
PF-OUT       Source       Modes       1/2       Modes       4       View       Source       Modes       Mode			3	OPSK	240, 192	Mode 3	1/2	Mode 0	4	Video		-	5117 0111	DOLIVIL	
OVB-12       OVB-3       0       GPSK       240, 192       Mode 3       12       Mode 0       4       Video	RF-C	DUT	5	QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video		-	Source :		Vibps
OP#-TH(2, 24)       OALS       7       OPSK       240, 192       Model 0       1/2       Model 0       1       Audio       III       IIII       OPI-TH(2, 24)       IIIII       Model 0       1       Audio       IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	O DVB-T2	O DVB-S	6	QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video			Out: 4	4.382208	Nbps
OP6-Inf(440)       AISC       0	OVB-T/H(2, 8K)	ODVB-S2	7	QPSK	240, 192	Mode 3	1/2	Mode 0	4	Video				Remux(HV	v)
O'De-C       AISC-MH       9       QPSK       240, 192       Mode 1       1/2       Mode 0       1       Audio       Image: Second Control of S	O DVB-T/H(4K)	○ ATSC	8	QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio	-		Sum :		ASD4
ODAS*/DMB+MUX       OBDE.1/TD       0 OPSK       240, 192       Mode 1       1/2       Mode 0       2	O DVB-C	O ATSC-M/H	9	QPSK	240, 192	Mode 1	1/2	Mode 0	1	Audio	-	=	Synn.	,-	viops
OpenCoble       ● CMM8+MX       11       OPSK       240, 192       Mode 1       1/2       Mode 0       1	O DAB+/DMB+MU	K 🔘 ISDB-T/Tb	10	QPSK	240, 192	Mode 1	1/2	Mode 0	2	\	-		AWGN	ON -	OFF
DIMa         Cw         12         QPSK         240, 192           13         QPSK         240, 192         QPSK         QPSK         240, 192         QPSK	OpenCable	OCMMB+MUX	11	QPSK	240, 192	Mode 1	1/2	Mode 0	1		-		C/N ·		dB
TS-IN       ASIIN         TS-OUT       ASIOUT         Code Role       Const. Type         IFF1 / Mode       Pocket Size         Sync Error       0         Service Type       Audio         Used Time Slot       40/40         File Size       600         File Size       0         PLAYER       RECORDER         0       File Size (MB)         PACKET(File)       0         0       File Size (MB)         PACKET(File)       0         0       File Size (MB)	DTMB	V CW	12	QPSK	240, 192	T-Promo	Autom	tion Tout					Cas.		CIB II
IS-OUT       ASI OUT         Code Rale       Const. Type         IFFI / Mode       Packet Size         IFFI / Mode       Packet Size         Bandwidth       Interfacever         Service Type       Audio         Used Time Slot       40/40         File Size (MB)       8 MB         BUFFER USAGE       PLAYER         0%       File Size (MB)         0%       File Size (MB) <td>TS-IN 🔘</td> <td>ASI IN</td> <td>13</td> <td>QPSK</td> <td>240, 192</td> <td>1 - Friday</td> <td>ritation in a</td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td>_</td> <td>_</td> <td></td>	TS-IN 🔘	ASI IN	13	QPSK	240, 192	1 - Friday	ritation in a					_	_	_	
Information       Information       Information       Information         Code Rale       Const. Type       Importantion       Importantion       Importantion         IFFI / Mode       Packel Size       Sync Error       0         Bandwidth       Interfectore       Service Type       Audio         Service Type       Audio       Service Type       Audio         Used Time Slot       40 / 40       File Size (MB)       B MB         Buffer USAGE       PLAYER       RECORDER       Service The Econder         0/6       Service Type       Audio       Service The Slot       40 / 40         File Size (MB)       B MB       Medine       Add/the       Add/the       Detter All       Provement State Work State Wo			•				with our	Leve	See	Channel/Le	wei feint im		_	_	
Code Rate       Const. Type         IFF1 / Mode       Packel Size         Sync Error       0         Bandwidth       Interleaver         Bundwidth       Interleaver         BMHz       Service Type         Used Time Slot       40 / 40         File Size (MB)       8 MB         BUFFER USAGE       PLAYER         PCKKER(RLS)       0         BV       File Size (MB)         Bit       File Size (MB)         Buffer       Add/red         File Size (MB)       B MB         Buffer       Add/red         Size (MB)       B MB         Buffer       Add/red         Buffer       Add/red         Buffer       Add/red         Buffer       Add/red         Buffer       Good Stel.000       Stel.000       Stel.000         Buffer       Add/red       Process Width Process	13-001	431 001		Information		Frequ	INTY					Insert Str			
IFT / Mode       Packet Size         IFT / Mode       Packet Size         Sync Error       0         Service Type       Audio         Used Time Slot       40/40         Service Type       Audio         Used Time Slot       40/40         File Size (MB)       8 MB         BuffER USAGE       PLAYER         RECORDER       0         Bisson       Planet         Bisson       Planet         Bisson       Planet         BuffER USAGE       PLAYER         RECORDER       0         Bisson       Planet         Bisson       Planet         BuffER USAGE       PLAYER         RECORDER       0         Bisson       Planet         Bisson	Code Rate	Const. Type		MEID	8	Stat	474	000 A	End	682.000	A 100	Ν.		Path	
IFF / Mode       Packet Size         Burdwidth       Intericover         Burdwidth       Service Type         Audio       Service Type         Lised Time Slot       40 / 40         File Size (MB)       8 MB         PLAYER       RECORDER         Øff       Player         Burdwidth       Player         PLAYER       RECORDER         Øff       Note         Øff       Bisencor         Øff       Station         Burdwidth       Station         Burdwidth       Station         Burdwidth       Station         Burdwidth       Station         Burdwidth       Station         Station       Station         Station       Station         Station       Station         Station       Station				WF_ID	-				-		•	1 0/#	Test_StreamW	CMP4EWDataW	byr_Shan
Bandwidth Interleaver   Bandwidth Interleaver   Service Type Audio   Service Type Audio   Used Time Slot 40 / 40   File Size (MB) 8 MB   BUFFER USAGE PLAYER   PC 0   PACKET(File) 0    Packet (File) 0 Packet (File) 0 Packet (File) 0 Packet (File) 0 Packet (File) Packet (File) 0 Packet (File) 0 Packet (File)	IFFT / Mode	Packet Size	9	Sync Error	0	Step	e,	1000 - 100 - 1000	Duration	10		3 0.4	Test StreamW	CHPHE WOods H	byr Shan
Bandwidth   Interleaver   8 MHz						1 August				- 2		1. 010	Trad Social In	Crew now at	Pri Janges
Bandwidth interleaver 8 MHz Used Time Slot 40/40 Guard Interval SETTING BUFFER USAGE PLAYER RECORDER 0% File Size (MB) 8 MB BUFFER USAGE PLAYER RECORDER 0% File Size 8 (MB) PACKET(FILE) 0 File Size 8 (MB) File Size 8 (MB) PACKET(FILE) 0 File Size 8 (MB) File Size 8 (MB) PACKET(FILE) 0 File Size 8 (MB) File Size 8 (MB) Fil			5	Service Type	Audio	Leve									
8 MHz	Bandwidth	Interleaver				Stat	4	0.0	End		7 -				
Guard Interval       File Size (MB)       8 MB         BUFFER USAGE       PLAYER       RECORDER         0%       RF       Statutor         0%       RF       Statutor         18       Statutor       146/94/1         0%       FILE SIZE       8(MB) 0       Statutor         PACKET(FILE)       0       0       11         0       Statutor       Statutor       Statutor         0       0       Statutor       Statutor       Statutor         0       0       Statutor       Statutor       Statutor         0       0       Statutor       Statutor       Statutor       Statutor         0       0       Statutor       Statutor       Statutor       Statutor         0       0       Statutor       Statutor       Statutor       Statutor         0       Statutor       Statutor       <	8 MHz 👻	▼	L	Jsed Time Slot	40 / 40	510	1	111 A	Duration	10					
SETTING         File Size (MB)         8 MB           BUFFER USAGE         PLAYER         RECORDER           0%         PF         Image: Section of the Sectin of the Sectin of the Section of the Section of the Section of	Guard Interval														
BUFFER USAGE         PLAYER         RECORDER           0%         Statumers         Table/Met)           00         958.000         958.000         \$14.000         \$22.000         \$30.000           10         \$250.000         \$50.000         \$50.000         \$66.000         \$74.000         \$62.000         \$60.000         \$66.000         \$74.000         \$62.000         \$60.000         \$66.000         \$74.000         \$62.000         \$60.000         \$66.000         \$74.000         \$62.000         \$60.000         \$66.000         \$74.000         \$62.000         \$66.000         \$7		SETTING	F	File Size (MB)	8 MB	arsert.	Pattern								
BUFFER USAGE         PLAYER         RECORDER           0%         RF         Image: Control of the co			-			Add	He A	dd folder Dek	ete file De	lete Al	249				
0%         PF         0%         9%<	BUFFER USAGE		F	PLAYER	RECORDER							1			-
O/S         P.F.           FILE SIZE         8(MB)           0         11           PACKET(FILE)         0           10         538.000           11         538.000           12         538.000           13         538.000           14         538.000           15         538.000           10         538.000           11         538.000           12         538.000           13         538.000           14         538.000           15         538.000           16         538.000           17         538.000           18         538.000           19         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000           10         538.000     <		0%				Step(Sec)	6	equency Table(M	u)						
PILE SIZE       S(MB) D       IS       IS <td></td> <td>070</td> <td></td> <td>RF</td> <td></td> <td>60</td> <td></td> <td>474.000</td> <td>452.000</td> <td>000-00</td> <td>418.000</td> <td>506.000</td> <td>511.000</td> <td>\$22,000</td> <td>\$30.000</td>		070		RF		60		474.000	452.000	000-00	418.000	506.000	511.000	\$22,000	\$30.000
PACKET(FILE)       0 <t< td=""><td>FILE SIZE</td><td>8(MB)</td><td>•</td><td>ts 🦲</td><td></td><td>10</td><td>5</td><td>535.000</td><td>546 (MM)</td><td>14 mm</td><td>643.000</td><td>610.000</td><td>410.000</td><td>474 000</td><td>634.000</td></t<>	FILE SIZE	8(MB)	•	ts 🦲		10	5	535.000	546 (MM)	14 mm	643.000	610.000	410.000	474 000	634.000
1 642.000 650.000 650.000 666.000 41 ► Current Information Frequency : 490.000 Mer; Lewis : 40.0 d/m Stream : D.WTest_StreamWCMMDstaWTcramble.mm Pary Time : 00 : 00 : 23 : 61	PACKET(FILE)	0	e	ERROR		10	31	336100		04.000	364.7000	650,000	000,000	960.000	634,000
Current Information     Signal       Frequency : 490,000 Mer;     Current Antonia       Lewel : 40.0 dbm     Current Antonia       Bitweth : D:WFeiz_Stream WCMMEWDataWScramble trains     Current Antonia Current Antonia       Pary Time : 00 : 00 : 23 : 61     Current Antonia Curre		,				1		642.000	650.000 6	158.000	666.000	\$74.000	662.000	4	-
Frequency:     490.000 Mer     1 state       Lewel:     -40.0 dbm     1       Bitnem:     D:WText_Stream WCMMDWDataWScramble terms     1       Play Time 1:     00:00:23:61     1						Current	oformation			_		Smi			
Programsy: 440,000 Pter Lewel: -40,0 dbm Stream: D:WTest_StreamWCP40/WDataWScramble.tems Play Time: 00:00:23:61												T dea	No. Come		
Lewer : -40.0 dbm						Frequer	cy : 490.0	OD MAG				-81			
Stream: D.WTest_StreamWCHRDWWDataWScramble.tems Play Time 1 00:00:23:61						Lovel	-40.0	dom				40.0			
Play Time 1 00 : 00 : 23 : 61 Internet and the manual state of the second state of the						Steam	D.WT	est_StreamWCH44	emparamicra	nbie.natu		61			
						Play Tin	se: 00:0	0:23:61				102	-	Certer Hill Hall Mart	-
								- 19k			101	C GLOUD	1	Contraction of	
Start Stop Load Save						the second second	Start					Load		Sa	ve

1 From the main menu when you select Auto-Test Automation Test is a pop-up menu.

2 In Level Test Tab menu, Specifies the start frequency in Frequency entries.

-> When you select an item under the Start and End, Frequency Table entries can be select from list.

uency Table	(MHz)						(71 m
474.000	482.000	490.000	498.000	506.000	514.000	522.000	530,000
538.000	546.000	554.000	562.000	610.000	618.000	626.000	634.000
642.000	650.000	658.000	666.000	674.000	682.000	•	

On Level entry, select the specified time to test and exit points then Specifies the interval, and the cycle.
 -> Start, Stop entry, Step items, Duration, select the item you will receive the following example.

tableid8mi							
+10		-8.0	- <i>i</i> 0	-6 U	-5 U		-3 0
-2 0	0.0	-10.2	-20.0	-30.0	-40.2	-50.0	-50.0
-70.7	-70.7	-=0.7	-100.0	-110.0		4	þ

(aziz(dB)				- 10 PP	11
0.1	1.0	50	10 0		
				 	-
					Þ

# Duration Table(Sec)

u	εU	30	1J	શ્ર	EU	:20	ເະບ
740	001	310	420	400	541	671	
	-		-		1	1	i.

• Specifies the stream file to test.

-> You can specify multiple stream files, and specify the stream for the entire folder

Insert Pattern	n			
Add file	Add folder	Delete file	Delete All	Info

5 Set the auto-test is complete, select the button at the bottom of the test will start.

-> To save the settings when you test again with the test load

Start	Stop	Load	Save
-------	------	------	------

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#### Channel / Level Test

- When testing the channel and level in both time.

T-Pump - VDDF12345			
File Control Utility Option Help		[ Auto	
MODULATION	FILE \\khw\Stream\CMMB-St	eam\멀티\full_MFS_chengdu1.mfs Test	
Adapters VDDF12345 -	Multiplexer	T	FREQUENCY
	ID Constallation Deed Colomo	Interference LDDC Committing Time Clat. Data	1.492.000.000Hz
	2 OPSK 240 192	Mode 3 1/2 Mode 0 4 Video	BIT / SYMBOL RATE
	A OPSK 240, 192	Mode 3 1/2 Mode 0 4 Video	
RF-OUT	5 OPSK 240, 192	Mode 3 1/2 Mode 0 4 Video	Source :,- Mbps
O DVB-T2 O DVB-S	6 QPSK 240, 192	Mode 3 1/2 Mode 0 4 Video	Out: 4.382208 Mbps
OVB-T/H(2, 8K) OVB-S2	7 QPSK 240, 192	Mode 3 1/2 Mode 0 4 Video	Remux(HW)
O DVB-T/H(4K) O ATSC	8 QPSK 240, 192	Mode 1 1/2 Mode 0 1 Audio	Sum : Micro
O DVB-C O ATSC-M/H	9 QPSK 240, 192	Mode 1 1/2 Mode 0 1 Audio	Wisps
O DAB+/DMB+MUX O ISDB-T/Tb	10 QPSK 240, 192	Mode 1 1/2 Mode 0 2	AWGN ON- OFF
OpenCable OCMMB+MUX	11 QPSK 240, 192	Mode 1 1/2 Mode 0 1 V	
© DTMB √ CW	12 QPSK 240, 192	T-Pump - Automation Test	
	13 QPSK 240, 192	1 m m m m m m m m m m m m m m m m m m m	
	•	Charmel/Level Seat	And and a second s
TS-OUT O ASI OUT	Information	Frequency	Inset Gream
Code Rate Const. Type		Start 474.000 unu End 642.000	Mile N. Path I. DrWTeet SceneWCMMIWDuteWove Shah
· ·	MF_ID 0		Z D. WTest_Stream WCM+6 WData Wpvr_Shan
IEET / Mode Packet Size	Sync Error 0	Step e,000 Secretary Duration to Car	4 Di WTest Stream WOMME WData Worr Shan
	Cyno Lifer	Level	
¥¥	Service Type Audio	5ml 40.0 A 14	
Bandwidth Interleaver	Gervice Type		
8 MHz 👻 👻	Used Time Slot 40 / 40	Step 10 August Duration 10 Aug	sec
Guard Interval		Tester Control	
SETTING	File Size (MB) 8 MB	asset Pattern	
		Add file Add fulder Delete file Delete All priv.	
BUFFER USAGE	PLAYER RECORDER	Step(Sec) Prequency Table(Mile)	
0%		174.000 412.000 910.000 910.000 910.000	0 506.000 514.000 522.000 530.000
		10 535.000 546.000 556.000 556.000	m 63 m 63 m 63 m 64 m 64 m
FILE SIZE 8(MB)			
PACKEI(FILE) 0	ERROR	1 642.000 650.000 658.000 666.00	0 674.000 662.000 4
		Current Information	Signal
		Frequency : 498.000 MHz	Edita Midide
		Level: -0.0 dim	
		Surger C. W C Washington and a surger	
		The Time of the state	
		Pay time: 00:00:23161	The DO IN A CONTRACT OF A DO
		Start Stop	Load Save

1 From the main menu when you select Auto-Test Automation Test is a pop-up menu.

2 In Channel/Level Test Tab menu, After you specify the start and end step, specify the frequency.

-> When you select an item under the Start and End, Frequency Table entries can be select from list.

uency Table	(MHz)			N 14	-1		PH and
474.000	482.000	490.000	498.000	506.000	514.000	522.000	530.000
538.000	546.000	554.000	562.000	610.000	618.000	626.000	634.000
642.000	650.000	658.000	666.000	674.000	682.000	•	

On Level entry, select the specified time to test and exit points then Specifies the interval, and the cycle.
 Start, Stop entry, Step items, Duration, select the item you will receive the following example.

Table(dBm)	)						
+10.0	+9.C	+8.0	+7.0	+6.0	+5.0	+4.0	+3.0
+2.0	J.0	-10.0	-20.0	-30.0	-40.0	-50.0	-60.0
-70.0	-80.0	-90.0	-100.C	-110.0		4	►

0.1	1.0	5.1	10.0	1	
					11

10	20	30	40	50	60	120	180
240	30C	360	420	480	540	600	ĺ.

• Specifies the stream file to test.

-> You can specify multiple stream files, and specify the stream for the entire folder

sert Patten	n			
Add file	Add folder	Delete file	Delete All	Info

**5** Set the auto-test is complete, select the button at the bottom of the test will start.

-> To save the settings when you test again with the test load

Start	Stop	Load	Save	
-------	------	------	------	--

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#### 4.18 / AWGN(Addictive White Gaussian Noise)

White ?

- Including All frequency spectrum.
- White Light include red, green, yellow.
- Flat Spectrum at frequency domain.

Gaussian ?

- Statistical distribution is Gaussian.

Addictive ?

- The effect is addition.

## • AWGN simulation result(Time domain sequence)



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## • AWGN simulation result (Histogram)

## • AWGN Block diagram



# • Feature

- Noise Bandwidth =  $2 \times Signal BW$ .
- Easy Setting.
- C/N : +60 ~ -30dB, 0.1dB step
- BW : Interesting signal BW, 0.1Mhz Step
- Fully digital controlled.
- Very low correlated White Noise.

## • DVB-C Test



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## CW Test



#### • CW Example

- Total Power : Constant (RF level = 0dBm)
- C/N : 0dB : Signal Power is equal to Noise Power in 4Mhz BW
- CW level(power and level is same at CW) : -3.4dBm = 0.457mW
- Noise + CW = -0.2dBm @ 4MHz BW : 0.955mW
- Noise = 0.955 0.457 = 0.498mW
- Noise power is equal to CW signal
- Small Difference is because of Measurement error and digital numerical quantization error.



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# Appendix. A Ventus User Menu Summary

## A.1 Ventus operating Procedure



## ASI-OUT Mode

Saved Stream file ASI-OUT Function.

When check CW mode, check in the ASI-OUT mode. (Reference ASI-OUT of 3-4 T-PUMP UI)

#### **DVB-C Mode**

- 1. DVB-C Stream File Open
- 2. Sub setting RF Mode
- 3. Adjust Play & AMP

#### T-DMB, ATSC, ISDB Mode

1. T-DMB, ATSC, ISDB Stream File Open

2. Adjust Play & AMP

# A.2 Create Frequency Table

In this upgrade version, you can edit Frequency Table by yourself. The saved file placed C:\Program Files\(c)LUMANTEK\T-Pump\FreqTable.+

👩 T-Pump _				
File Control	Jtility <u>H</u> elp Frequency Table Initialize Registry	FILE	Frequency Table         Frequency Information         Title       : DVB-TH         Version       : Ver 1.0         Center Frequency       : 50.500 MHz	
			Select Frequency Table Title DVB-TH Channel NO. 2 Apply Close	

A sample \*.dat file has frequency table information. If you save a sample file in [C:\Program Files\(c)LUMANTEK\T-Pump\FreqTable], you can search it in Freqeuncy Table Window.

\* Frequency Table Editting

```
//Channel No, Center Frequency, Frequency Range, FP, FS, FOSC
//$ is End Mark
//* is starting point of Frequency table
//Title, table version
|DVB-TH|Ver 1.0|
//Frequency table
*|2|50.500|
|3|57.500|
|4|64.500|
|5|177.500|
|69|858.000|$
```

You can edit frequency table by type first of sample file as \*, and last as \$.

# Appendix. B Ventus User API (VtsAPI Calling Sequence)

#### B.1 Calling Sequence

VtsAPI\_Initialize()

CountDevice()

OpenDevice()

Pump control setting Modulator setting for DAB Modulator File setting for DAB Modulator RF setting DMA tranfer

CloseDevice()

VtsAPI\_Finalize()

## B.2 Pump control setting

```
PumpSetState(VTS_PumpState_t t_PumpState) => Pump(DMA) Stop, Stop&Clear, Run
```

```
ex) Stop : PumpSetState(0/*VTS_PUMP_STATE_STOP*/)
```

```
ex) Stop & H/W buffer Clear : PumpSetState(1/*VTS_PUMP_STATE_STOP_CLR*/)
```

```
ex) Run : PumpSetState(2/*VTS_PUMP_STATE_RUN*/)
```

```
PumpSetMode (

VTS_PumpMode_t t_PumpMode,

bool b_RemuxOnOff,

VTS_TS_Format_t t_OutTsFormat,

VTS_TS_Format_t t_SrcTsFormat) => Pump Setting
```

```
ex)For DAB : PumpSetMode (
6,/*VTS_PUMP_MODE_RF_OUT_RAW*/
0,/*false*/
0,/*VTS_TS_FORMAT_188*/
0/*VTS_TS_FORMAT_188*/
)
```

#### B.3 Modulator setting

ModulatorInit(VTS\_BroadcastType\_t t\_BcType) => Modulator H/W image download

ex) DAB : ModulatorInit(11/\*VTS\_BC\_T\_DMB\*/)

#### B.4 File setting for DAB Modulator

T\_DMB\_Parse (unsigned char\* u1p\_Buff, unsigned int u4\_Size, bool b\_IsDSLFormat) => \*.eti or \*.dsl . part of \*.eti or \*.dsl passing and then DAB configure parameter

ex) \*.eti

After File open and Read, u1p\_Buff 24576 Bytes size point forward T\_DMB\_Parse(u1\_Buff, 24576, 0/\*false\*/)

ex) \*.dsl After File open and Read , u1p\_Buff 24576 Bytes size point forward T\_DMB\_Parse(u1\_Buff, 24576, 1/\*true\*/)

#### B.5 RF Setting

```
ModulatorSetRF(unsigned int u4_Hz) => Up Converter Frequency
ex) 400MHz : ModulatorSetRF (40000000)
ex) 1000MHz : ModulatorSetRF (1000000000)
AttenSetFrequency(unsigned int u4_Freq_Hz) => Atten Plus Frequency
ex) 400MHz : AttenSetFrequency(400000000)
ex) 1000MHz : AttenSetFrequency(1000000000)
AttenSetOutLevel(short s2_OutLevel_01dBm) => Atten Plus Out Level
ex) -10dBm : AttenSetOutLevel(-100)
ex) -60.5dBm : AttenSetOutLevel(-605)
```

#### B.6 DMA transfer

```
PumpGetHwBuffUsed(unsigned int* u4p_HwBuffUsed, unsigned int* u4p_RxBuffUsed)
=> H/W Buffer usage check
ex) PumpGetHwBuffUsed(&gu4_BuffUsed, NULL)
PumpGetHwBuffSize(&gu4_BuffSize)
=> H/W Buffer Total Size bring . (Ventus 1.0 8MBytes, Ventus 2.0 16MBytes)
ex)
PumpWrite(
    unsigned char* u1p_Buff,
    unsigned int u4_dwWrite,
    unsigned long* u4p_TransferedBytes,
    bool b_IsDSLFormatForDABModulator)
=> DMA Write
ex) *.eti
PumpWrite(gu1a_Buff, u4_FileReadBytes, &u4_TransferedBytes, 0/*false*/)
Ex) *.dsl
PumpWrite(gu1a_Buff, u4_FileReadBytes, &u4_TransferedBytes, 1/*true*/)
```

## B.7 all sequence

VtsAPI\_Initialize(); CountDevice(); OpenDevice(0); PumpSetState(1);//Stop Clear PumpSetMode (6, 0, 0, 0); ModulatorInit(11);//for DAB Modulator Image Download ModulatorSetRF(40000000);//400MHz AttenSetFrequency(40000000);//400MHz AttenSetOutLevel(-200);//-20dBm T\_DMB\_Parse(u1\_Buff, 24576, 0);//DAB Modulator parameter setting PumpSetState(2);//run

## Loop:

PumpGetHwBuffUsed(&gu4\_BuffUsed, NULL) //Total – Used = Free // Free >= u4\_FileReadBytes PumpWrite PumpWrite(gu1a\_Buff, u4\_FileReadBytes, &u4\_TransferedBytes, 0/\*false\*/)

PumpSetState(1);//Stop Clear

CloseDevice(); VtsAPI\_Finalize();



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