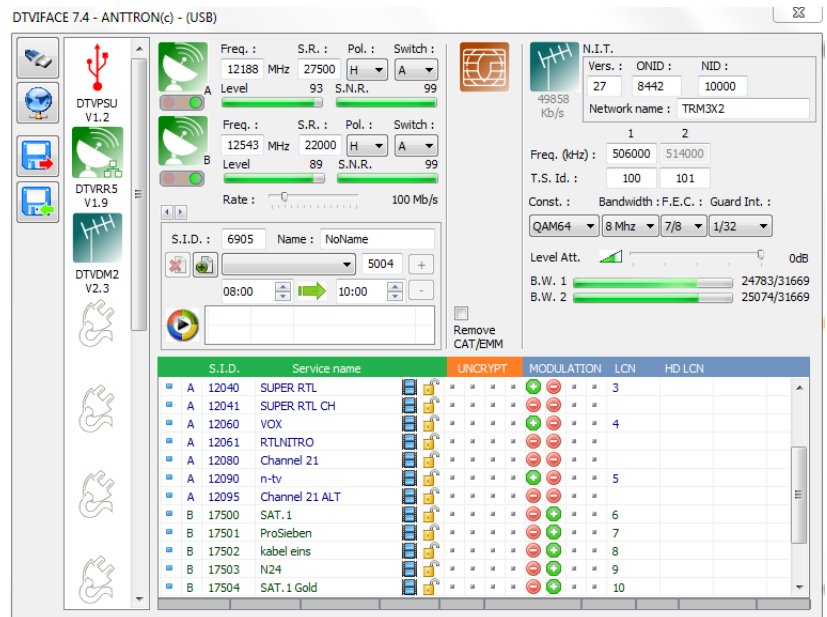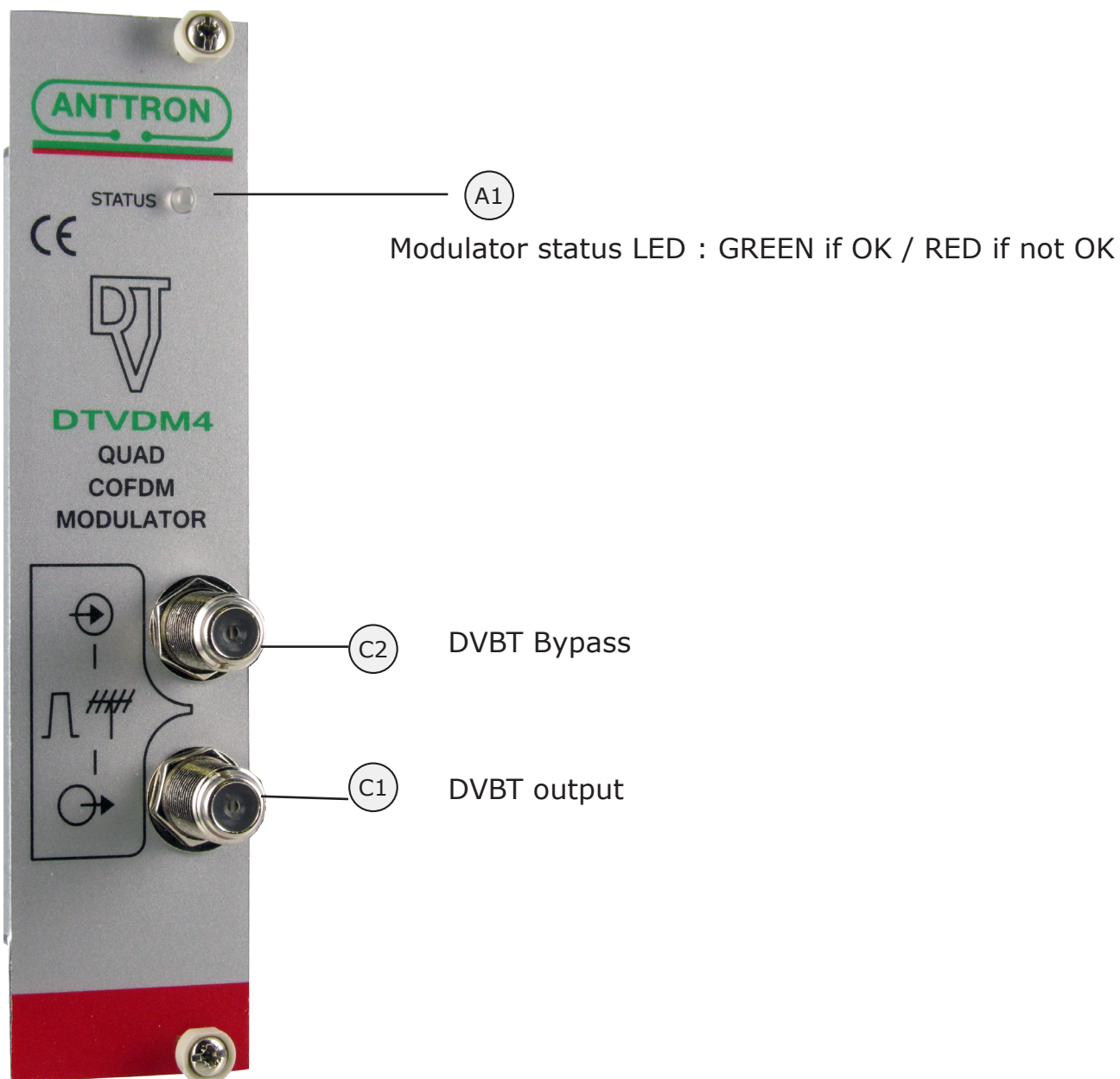# ANTTRON

DTVDM2-DTVDM4

Twin and quad DVBT modulators for DTVRack

This manual is also applicable for DTVDM2 and DTVDM4 modules in the compact headends, TRM3x2, TRM3x2CI and TRM6x4, TM300, TM400 etc....

PROGRAMMING AND INSTALLATION GUIDE V1.0

A1 — Modulator status LED : GREEN if OK / RED if not OK

C2 — DVBT Bypass

C1 — DVBT output

**DTVDM2/4 :** this modules perform the following function in the DTVRack

a) It receives the transport stream from the 'backplane' in the DTVRack.
b) The programs in these transportstream or then filtered and modulated in
DVBT on the 2 (DTVDM2) or 4 (DTVDM4) available DVBT channels. The 2 or 4
DVBT channels are adjacent.
c) The output frequency and modulation type can be choosen. LCN and HD
LCN channel numbers can be assigned to the programs. Also the output level
of the modulator can be adjusted.

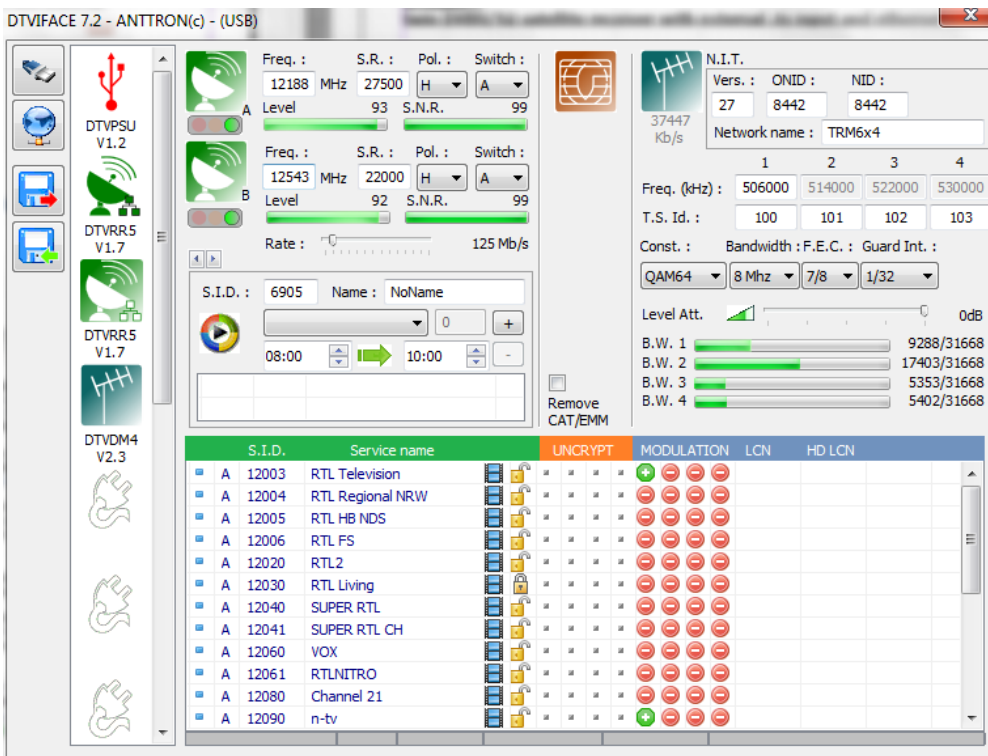1. Accessing the parameters of a DTVDM2/DTVDM4 module.

When in DTVIface, click on a DTVDM2 or DTVDM4 symbol to get access to the para-
meters of the modulator module.

Depending if a DTVDM2 or DTVDM4 module is chosen, following window may appear.
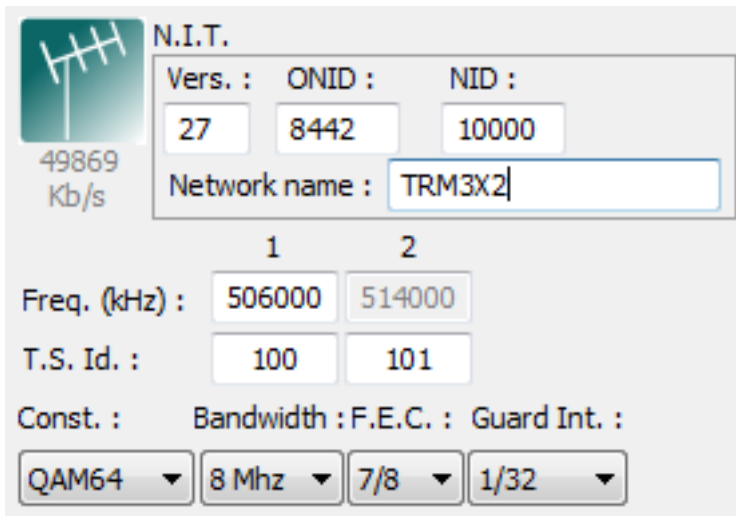
a) a module DTVDM2 is selected
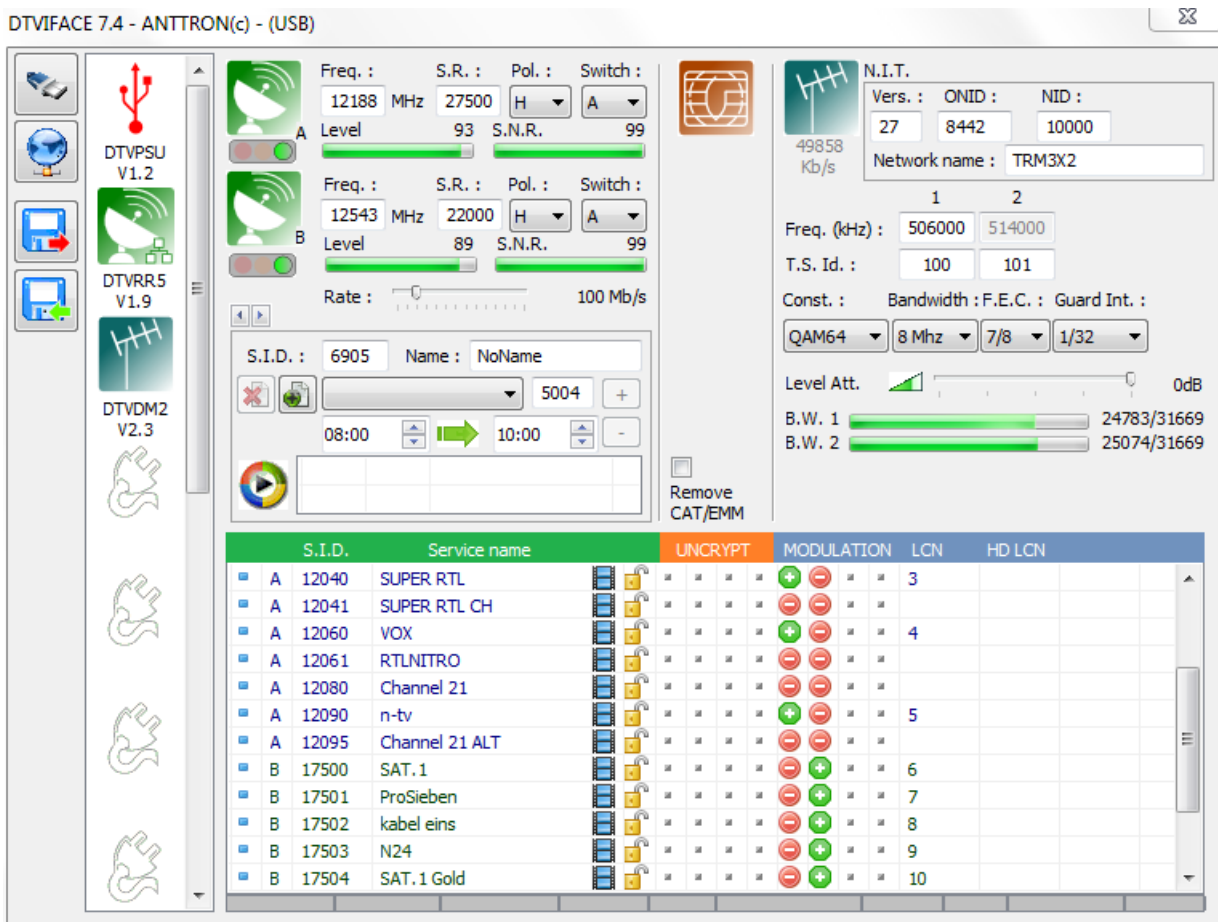
b) a module DTVDM4 is selected

2. Setting the parameters of the modulator

For the modulator following parameters can be set.

N.I.T

Version : enter the NIT version

ONID : enter the decimal code for the Original Network ID. The original network ID is the country where you are located.

NID: enter the network ID.

Network Name : enter the network name.

Under the N.I.T. parameters you will find the output frequency of the modulator. As the DTVDM2, DTVDM4 have adjacent output channels, you can only set the output frequency of the first channel. The frequency of the other channels is automatically adjusted, so you can not change the output frequency of the second channel (for DTVDM2) or the other 3 channels (for DTVDM4).

T.S. Id : for each channel a T.S.Id should be assigned.

Modulation parameters : furthermore, you can set the modulation parameters for the modulator. Please select the constellation, Bandwidth, F.E.C and Guard Interval.

Output level of the modulator : an internal attenuator allows to lower the output level of the modulator. The attenuator can be adjusted between 0 dB (max. output) and -20 dB.

Some remarks on setting the N.I.T parameters and T.S. Id. :

When you make a headend you will probably have more then 1 modulator in your system. In order to keep consistency throughout your complete headend, please follow these guidelines :

a) For your complete headend make sure that the N.I.T. (version / ONID / NID / Network Name) are IDENTICAL throughout the entire system.

b) For your complete headend make sure that all T.S. Id. (Transport Stream ID) are UNIQUE. Every output channel should have a unique ID in the system. Make sure that an T.S.Id. does not appear more than once in the system.

3 - Adding services (programs) to the modulator:

In the list of programs, you will find two (for DTVDM2) or four (for DTVDM4) columns with a GREEN + symbol or RED - symbol.

The columns indicate the output channels of the modulator (column 1 is first channel, column 2 is second channel (column 3 and colum 4 are third and fourth channel for DTVDM4 modulator).

If a green + symbol appears besides a certain program, this means that this program is added to that specific channel in the modulator.

The status can be changed by double-clicking the activation symbol besides the requested program.

In the most right colums you can add a LCN number or HDLCN number for channel numbering.

What means HD LCN ?

In some systems, it can happen that you want to broadcast at the same time the SD (Standard Definition) version of a progam and the HD (High Definition) version of a program.
With HD LCN numbering, you can force HD Television sets to follow the HD LCN numbering and SD Television sets to follow the LCN numbering for those programs which are transmistted in double.

Some practical example :

Suppose you have in your system the program 'Das Erste' in SD version and in HD version. Application of HD LCN would then be :

Das Erste   **LCN : 5   HDLCN : 55**
Das Erste HD   **LCN : 55 HDLCN : 5**

Television sets with HD tuner will now put Das Erste HD on number 5 and Das Erste on 55.
Television sets without HD tuner will put Das Erste HD on number 55 and Das Erste on 5.

4 - Additional information :

In the window of the DTVDM2/4 modulator you will find some usefull additional information.

To the left of N.I.T information, you will find a 'terrestrial symbol'.

The number under this symbol, gives you the total occupied bandwidth of the modulator.
Off course, this number should not exceed the maximum available bandwidth of the modulator.
The maximum available bandwidth is calculated on the maximum available bandwidth per channel x the number of channels. The maximum available bandwidh per channel is depending on the modulation parameters (Constellation / Bandwidth / F.EC./Guard Interval). You will find an overview of the maximum available bandwidh in function of the modulation parameters later in this manual.

For instance for a DTVDM4 modulator, the maximum available bandwidth is 4 x 31.6 Mbit/s = approx. 125 Mbit/s. For a DTVDM2, this is half (2 x 31.6).

The occupied bandwidth of each channel in the modulator is showed by bargraphs in the modulator window.

B.W. 1	19906/31667
B.W. 2	14016/31669
B.W. 3	30821/31667
B.W. 4	30627/31667
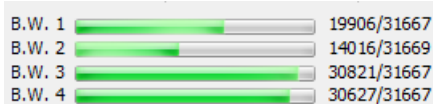
The occupied bandwidth will increase as the number of programs added to that channel is increased.
It also depends on the bandwidh of each individual program.
Please check, not to overload a channel as this will lead to 'defects' in the programs.

Please note that when no services (programs) are added to an output channel, the channel will be not active. This also means that you can decide for the DTVDM4 to act as a single, twin , triple or quad modulator, or for a DTVDM2 to use it as a single channel modulator.

If you change satellite parameters, the previously defined services for the modulator, will appear as question marks in the list. (see figure below).

▪	B	28527	Boomerang		🔒	▪	▪	▪	▪	⊖	⊖	⊖	⊖		
▪	B	28528	Boing		🔒	▪	▪	▪	▪	⊖	⊖	⊖	⊖		
▪	B	28600	MTV Live HD		🔒	▪	▪	▪	▪	⊖	⊖	⊖	⊖		
▪	B	28601	MTV Live HD		🔒	▪	▪	▪	▪	⊖	⊖	⊖	⊖		
▪	?	11110			🔓	▪	▪	▪	▪	⊖	⊖	⊖	⊕		
▪	?	11150			🔓	▪	▪	▪	▪	⊕	⊖	⊖	⊖	10	
▪	?	11160			🔓	▪	▪	▪	▪	⊖	⊖	⊕	⊖		
▪	?	11170			🔓	▪	▪	▪	▪	⊖	⊖	⊕	⊖		
▪	?	11130			🔓	▪	▪	▪	▪	⊖	⊖	⊖	⊕		

Please remove these services by double clicking the activation button . <u>No services preceeded with a question mark should be in list.</u>

5. Relative bandwidth of a program in the transport stream

In the bottom of the window, you will find a bar divided in a number of blocks.
The number of blocks is equal to the number of programs added to the modulator.

The width of the blocks is in direct relation with the bandwidth of the program.
For instance, in below window, when on program ProSieben, a certain block in the bottom turns bleu.
This blue block gives you a relative idea of the occupied bandwidth of this program in the transport stream.
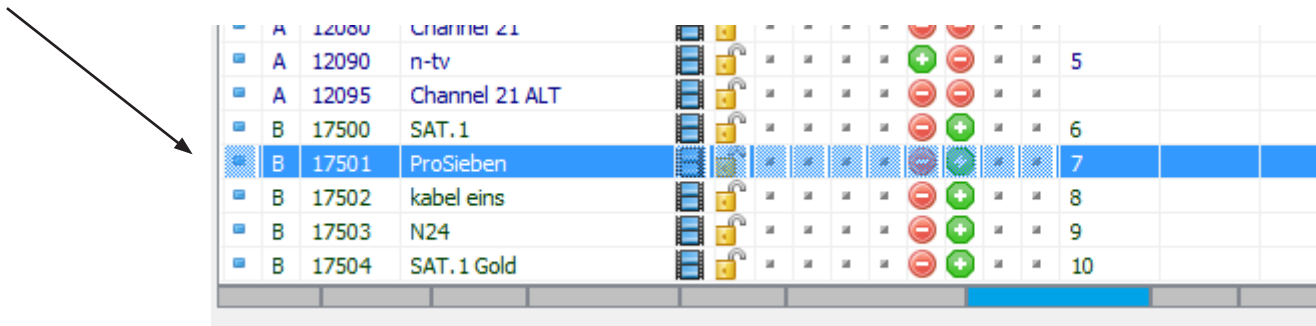
This information can be helpful in assigning the different programs to the different channels on the modulator.

6 - Technical specifications

DVBT output (adjacent) (DTVDM2 = 2 channels) (DTVDM4 = 4 channels)	Maximum output	> 95 dBµV
	Attenuation	0 - 20 dB
	Insertion loss	< 2 dB
	Output frequency	47-862 MHz
	Constellation	QPSK/16QAM/64QAM
	FEC	1/2, 2/3, 3/4, 5/9, 7/8
	Gard interval	1/4, 1/8, 1/16, 1/32
	Mode	2K

Annex A : Constellation and maximum bit rate

Modulation	Code Rate	Guard 1/4	Guard 1/8	Guard 1/16	Guard 1/32
		Mb/s	Mb/s	Mb/s	Mb/s
QPSK	1/2	4.976471	5.529412	5.854671	6.032086
	2/3	6.635294	7.372549	7.806228	8.042781
	3/4	7.464706	8.294118	8.782007	9.048128
	5/6	8.294118	9.215686	9.757785	10.05348
	7/8	8.708824	9.676471	10.24567	10.55617
16 QAM	1/2	9.952941	11.05882	11.709341	12.06417
	2/3	13.27059	14.74510	15.61246	16.08556
	3/4	14.92941	16.58824	17.56401	18.09626
	5/6	16.58824	18.43137	19.51557	20.10695
	7/8	17.41765	19.35294	20.49135	21.11230
64 QAM	1/2	14.92941	16.58824	17.56401	18.0926
	2/3	19.90588	22.11765	23.41869	24.12834
	3/4	22.39412	24.88235	26.34602	27.14439
	5/6	24.88235	27.64706	29.27336	30.16043
	7/8	26.12647	29.02941	29.27336	31.66845

Annex B : ONID : Original Network ID

Original Network ID Range	Original Network ID	Original_Network_Name	Original_Network_Operator	
Start (HEX)	End (HEX)			
…..				
0x2024	0x2024	Australian Digital Terrestrial Television	Australian Broadcasting Authority	
0x2028	0x2028	Austrian Digital Terrestrial Television	ORS - Austrian Broadcasting Services	8232
0x2038	0x2038	Belgian Digital Terrestrial Television	BIPT	8248
0x209E	0x209E	Taiwanese Digital Terrestrial Television	Directorate General of Telecommunications	
0x20CB	0x20CB	Czech Republic Digital Terrestrial Television	Czech Digital Group	
0x20D0	0x20D0	Danish Digital Terrestrial Television	National Telecom Agency Denmark	
0x20E9	0x20E9	Estonian Digital Terrestrial Television	Estonian National Communications Board	
0x20F6	0x20F6	Finnish Digital Terrestrial Television	Telecommunicatoins Administratoin Centre, Finland	8438
0x20FA	0x20FA	French Digital Terrestrial Television	Conseil Superieur de l'AudioVisuel	8442
0x2114	0x2114	German Digital Terrestrial Television	IRT on behalf of the German DVB-T broadcasts	8468
0x2168	0x2168	Digital Terrestrial Network of Indonesia	Ministry of Communication and Information Technology of the Republic of Indonesia	
0x2174	0x2174	Irish Digital Terrestrial Television	Irish Telecommunications Regulator	
0x2178	0x2178	Israeli Digital Terrestrial Television	BEZEQ (The Israel Telecommunication Corp Ltd .)	
0x217C	0x217C	Italian Digital Terrestrial Television		8572
0x21AC	0x21AC	DTT - Latvian Digital Terrestrial Television	Electronic Communications Office	
0x2210	0x2210	Netherlands Digital Terrestrial Television	Nozema	8720
0x222A	0x222A	DTT - New Zealand Digial Terrestrial Television	TVNZ on behalf of Freeview New Zealand	
0x2242	0x2242	Norwegian Digital Terrestrial Television	Norwegian Regulator	
0x2260	0x2260	DTT - Philippines Digital Terrestrial Television	NTA (porivionally ABS-CBN)	
0x2268	0x2268	DTT Poland	Office of Electronic Communications	
0x22BE	0x22BE	Singapore Digital Terrestrial Television	Singapore Broadcasting Authority	
0x22BF	0x22BF	Telecommunications office of the Slovak republic	Telecommunications office of the Slovak republic	
0x22C1	0x22C1	DTT - Slovenian Digital Terrestrial Television	APEK	
0x22C6	0x22C6	DTT - South African Digital Terrestrial Television	South African Broadcasting Corporation Ltd. (SABC), pending formation of "DZONGA"	
0x22C7	0x22C7	DTT- Hungarian Digital Terrestrial Television	National Communications Authority, Hungary	
0x22C8	0x22C8	DTT- Portugal Digital Terrestrial Television	ANACOM- National Communications Authority	
0x22D4	0x22D4	Spanish Digital Terrestrial Television	"Spanish Broadcasting Regulator	8916
0x22F1	0x22F1	Swedish Digital Terrestrial Television	"Swedish Broadcasting Regulator "	8945
0x22F4	0x22F4	Swiss Digital Terrestrial Television	OFCOM	8948
0x233A	0x233A	UK Digital Terrestrial Television	Independent Television Commission	
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