MVDS-TROPHY.
Satellite on the ground!

UHF

L-band

IP
MPEG Transport
Streams

S/S2 or T/T2
to IP streamers

Billing
Server

IP

IP

D-Link

IP IP IP IP IP IP IP IP

DVB-S2 modulators
/multiplexers/CAS

950-2150MHz

Ku-band
DVB-S2

Omnidirectional
antenna

Block Up Converter

SD, HD and Ultra HD terrestrial DVB-S2 broadcasting

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The advantages of MVDS-TROPHY DVB-S2 terrestrial broadcasting:

1. Extremely low transmitter power (2-4W) to cover a radius up to 30km.

Due to what is achieved such energy efficiency?
The fact is that, for example, in the range of 10.7-12.5 GHz, the gain of a subscriber offset antenna of 0.6 m is equal to 36 dB or 4000 times in signal power.

For example, the T2 UHF antenna gain is, on average, 12 dB or 16 times in power.
That is, the transmitter power in the range of 10.7-12.5GHz may be less than the transmitter power in the UHF range by 300 times!

Secondly, for the receiver to work correctly in the DVB-S2 standard, you need to maintain a threshold signal-to-noise ratio above 4dB. To work in DVB-T2, it is necessary to achieve a signal-to-noise ratio above 11dB. That is, the received signal in the DVB-S2 standard can be lower by 7 dB or 5 times, compared to DVB-T2.

Thus, the theoretical energy efficiency of DVB-S2 broadcasting is higher by 36 + 7 = 43 dB or 20 thousand times! That is, the transmitter power in the range of 10.7-12.5GHz may be less than the transmitter power in the UHF band 20000 times!
Of course, the losses in the atmosphere in the range of 10.7-12.5 GHz are much higher than the losses in the UHF range. Practical broadcasting showed, however, the energy efficiency of MVDS broadcasting at least 1000 times.

Therefore, MVDS transmitter with a power of 2W serves a territory with a radius of up to 30 km.

Elevation / Degree vs. dBi

Azimuth / Degree vs. dBi
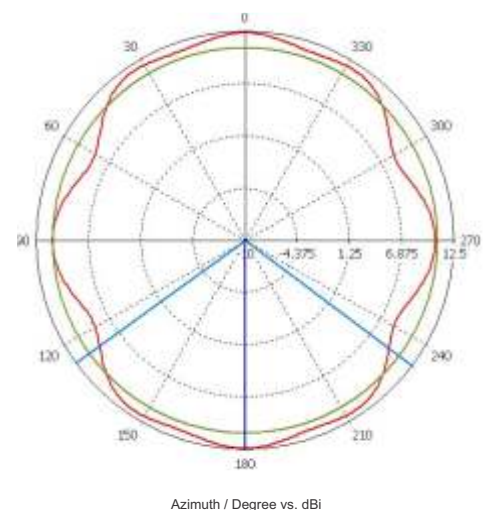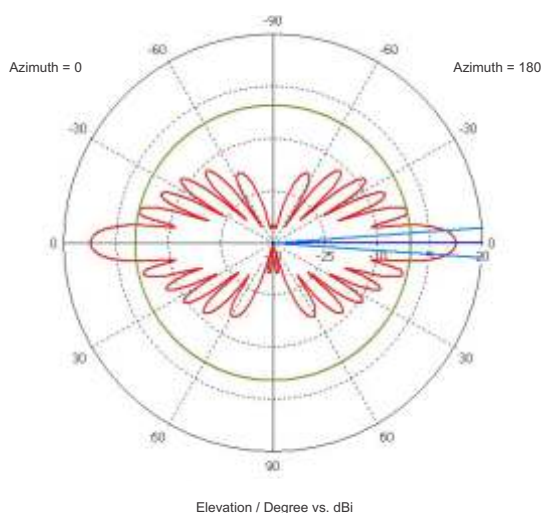
MVDS-TROPHY.
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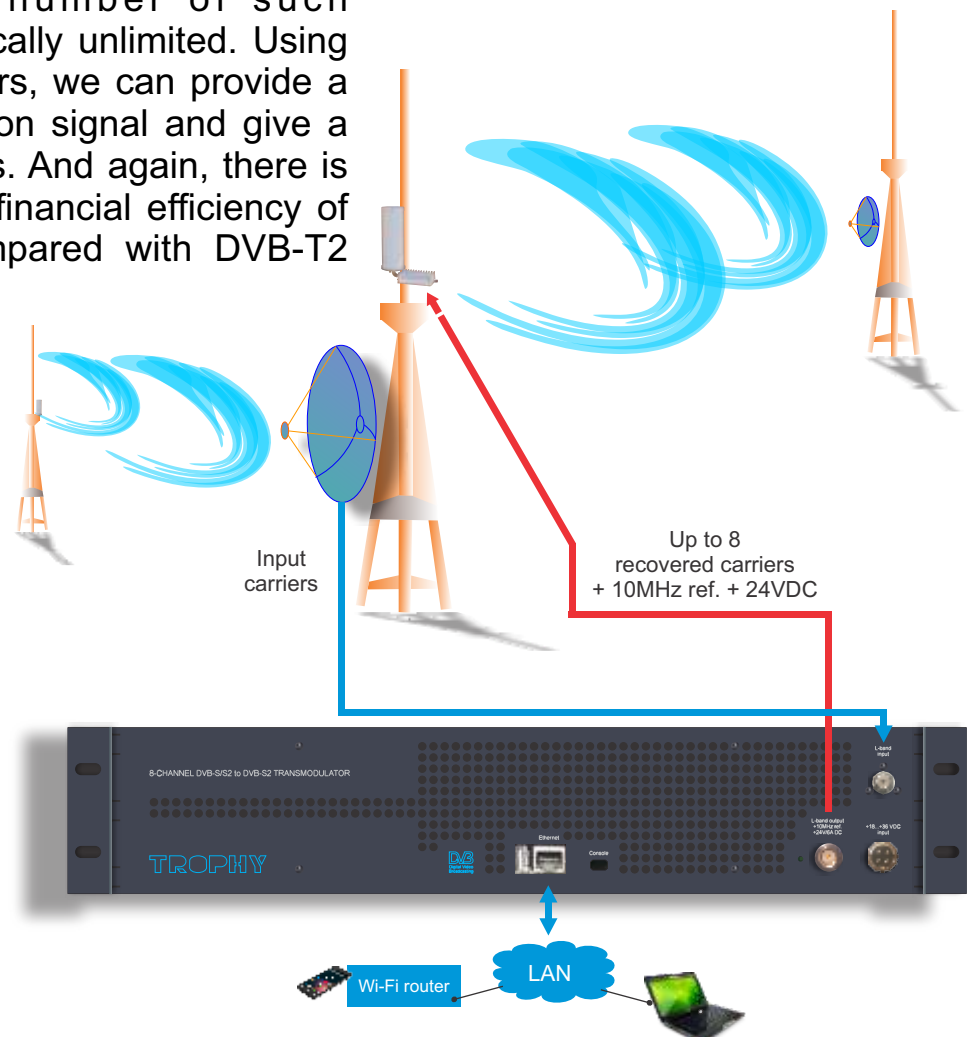## 2. The use of standard LNB's and standard satellite receiving antennas of 0.4m-0.6m.

In MVDS, we use the 8PSK signal modulation, that is phase modulations. To receive a signal, it is sufficient to use inexpensive down-converters with low linear mixer requirements.

For example, in MMDS broadcasting, amplitude modulation methods of the 16QAM and 64QAM signal are used, which implies the use of ultra-linear modes in receiving equipment. And this, in turn, leads to higher prices for down-converters.

The most significant reduction in the cost of creating a subscriber network is achieved in the 10.7-12.7 GHz band. Here can be used domestic LNB worth $1-2. In other ranges, non-standard converters have to be used, which increases the cost of down-converters and prices become comparable with MMDS converters.

3. Extremely simple and inexpensive way to retransmit the signal.

TROPHY ELECTRONICS transmodulators and, again, 2W transmitting converters and slot antennas are used to retransmit the signal with full carrier recovery. The number of such retransmissions are theoretically unlimited. Using the network of such repeaters, we can provide a huge territory with a television signal and give a signal to the "shadow" zones. And again, there is 1000 times the energy and financial efficiency of television broadcasting compared with DVB-T2 broadcasting.

Input carriers

Up to 8 recovered carriers + 10MHz ref. + 24VDC

8-CHANNEL DVB-S/S2 to DVB-S2 TRANSMODULATOR

TROPHY

Wi-Fi router

LAN

MVDS-TROPHY.
Satellite on the ground!

## 4. The presence of a wide frequency spectrum, compared with the UHF range.

Practically, one transmitting converter provides a signal bandwidth up to 800 MHz. With such a band, it is possible to broadcast up to 1700 Mbit of useful data. For example, using the FFMPEG transcoding to H.265, it is possible to form a packet of 200SD channels (0.5 Mbit each) + 300HD channels (2 Mbit each) + 40UltraHD channels (25 Mbit each).

5. AMD-53 DVB-S2 modulators/multiplexers and original TROPHY-ACCESS CAS (Conditional Access System).

This factor allows you to install an extremely inexpensive Head-End with the highest functionality and quality.
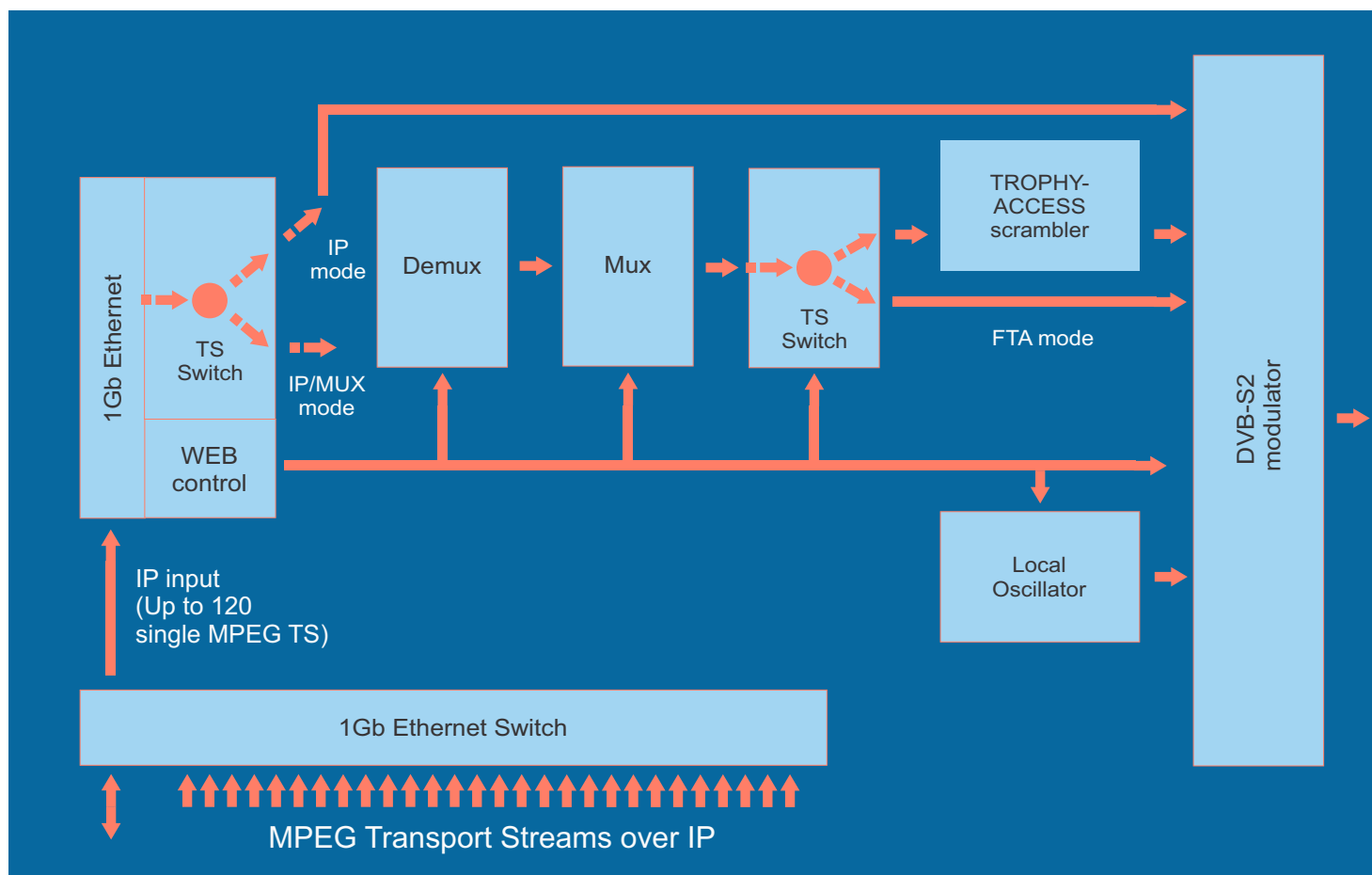
The functional diagram of MVDS Head-end
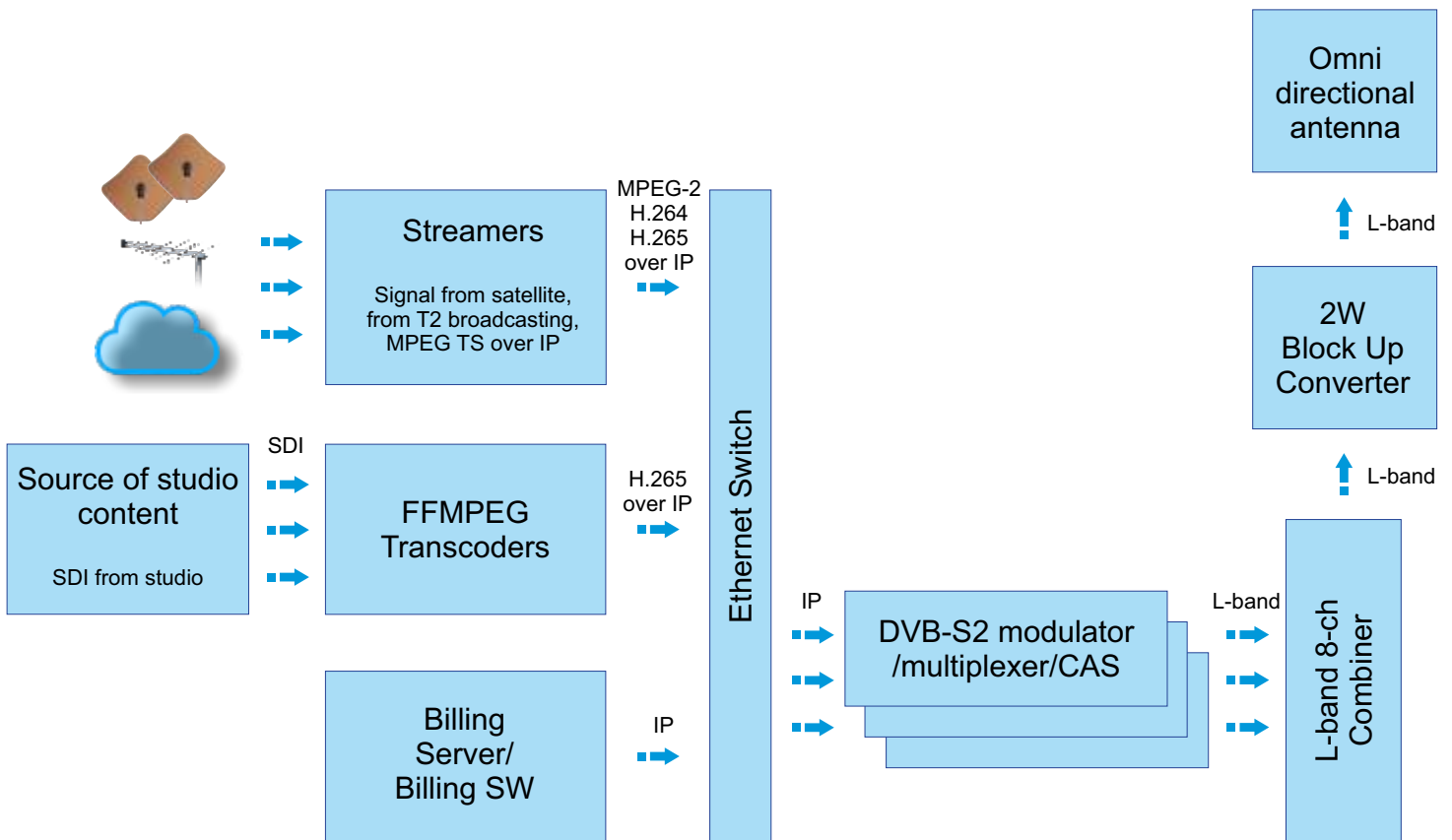
The number of Streamers and Modulators depends on the number and parameters of received signals. For example, the Streamer can receive all channels of a satellite transponder or terrestrial transponder. But, if some of these channels are closed by a Conditional Access System, then you need to know the capabilities of the corresponding CAM module.

The capacity of one transponder is 70-80 Mbit for real broadcasting. Therefore, the number of Modulators depends on the total bitrate of the broadcasted television channels.

The final cost of the Head-end can be calculated after receiving complete information about the received and broadcasted channels.

H.265 Set-Top-Box with embedded TROPHY-ACCESS decoder

Inexpensive TROPHY TA-1005HD Set-Top-Box allows you to receive DVB-S2/T2/C programs. The receiver has a built-in TROPHY-ACCESS decoder in the DVB-S2 input.
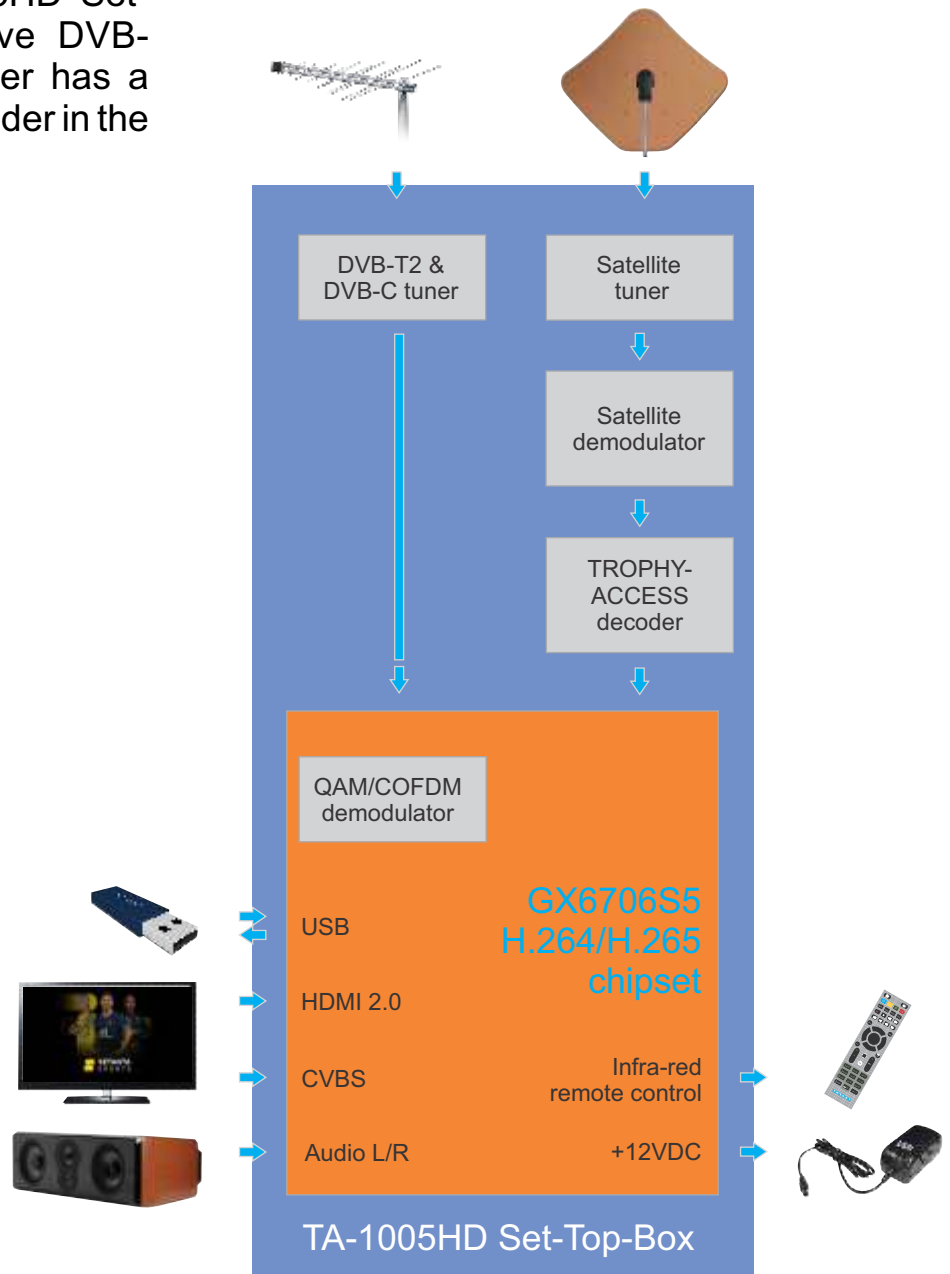
TROPHY-ACCESS CAS and BILLING-PRO software

The TROPHY-ACCESS 3.0 Conditional Access System does not use the CSA algorithm, which ensures high reliability and the absence of the possibility of pirated viewing, called Card-sharing.
The scrambler is integrated into the hardware of TROPHY brand modulators/multiplexers.
The Decoder is integrated into the hardware of TROPHY DVB Set-Top-Boxes.
The Billing Server and DVB-BILLING PRO software provide the ability to manage subscriptions. The Decoder automatically turns off if the subscriber account balance is insufficient.
Subscription data is transmitted to the MODULATOR/MULTIPLEXER via Ethernet.

Options	
Type of CAS	Cardless, doesn't match CSA algorithm
Polynomial length	2048 bits
The size of the decoder address field	32 bits
Quantity of addressable decoders	16 millions
The number of serviced channels	without any restrictions
The number of packets serviced	without any restrictions
Automatic disconnection of the decoder	with zero balances in the account

DVB-BILLING PRO Software and Statistics Server

The DVB-BILLING PRO program is designed to manage the subscriber database and manage the subscriber decoders in large commercial DVB broadcasting networks using the TROPHY-ACCESS 3.0 Conditional Access System.
The DVB-BILLING PRO software is supplied with the Billing Server. Depending on the order, the Billing Server can be either the simplest (demo version) or the most complex, up to a group of servers assembled using cluster technology.

The main functions of the Statistics Server are:
• management of subscriber decoders;
• keeping records of subscriber payments;
• creating various reports on payments;
• integration of the Billing Server with the system of bank payment terminals and bank acquiring.

The cost of the Head-end

The final cost of the Head-end can be calculated after receiving complete information about the received and broadcasted channels.

However, the cost of the main Head-end components and the cost of subscriber receiver will be indicated below to understand the price level.

	Cost of the MVDS HEAD-END components			
No.	Name	Quantity	Price	Amount
1	AMD-53-S2 modulator/MUX https://dvb4all.com/?product=dvb-s2-modulator-multiplexer	1	$690.00	$690.00
2	Software license to enable TROPHY-ACCESS scrambler solution (for each modulator)	1	$950.00	$950.00
3	410C series Common Interface DVB to IP streamer https://dvb4all.com/?product=410c-series-common-interface-dvb-to-ip-streamers	1	$368.00	$368.00
4	1Gb Ethernet 48-ports switch	1	$320.00	$320.00
5	Billing Server	1	$4,200.00	$4,200.00
6	Billing Software	1	$5,000.00	$5,000.00
7	L-band 8-channel combiner & 10MHz ref https://dvb4all.com/?product=l-band-8-channel-combiner-10mhz-ref	1	$280.00	$280.00
8	2W Ku-band Block Up Converter, 11.7…12.5GHz https://dvb4all.com/?product=ku-band-up-converters	1	$960.00	$960.00
9	Omnidirectional Slot Antenna https://dvb4all.com/?product=omnidirectional-slot-antenna	1	$790.00	$790.00
	Cost of the TROPHY-ACCESS Set-Top-Box			
No.	Name	Quantity	Price	Amount
1	**TROPHY TA1005HD receiver** *H.264/H.265 DVB-S2/T2* *TROPHY-ACCESS 2.0 embedded decoder*	1	$23.00	$23.00
2	**TROPHY-ACCESS decoder license** https://dvb4all.com/?product=trophy-access-decoder-image	1	$5.00	$5.00