



Subscriber Demand Summary

- Real Time HD and 4K Video
- Terrestrial TV offering local events next to subscribers
- Time-shift-TV (Replay on recent TV contents)

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Internet (100Mbps+)



Satellite to Home: DBS and DTH

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- DBS: Direct Broadcasting Satellite
- DTH: Direct to Home
- Satellite Frequency: Ku Band (10.7GHz~12.75GHz)
- Ku Band Dish Diameter: 0.6~1.2 meter
- LNB output port: Single or Twin
- LNB Output Frequency: L-Band (950~2150MHz)
- DC to LNB: 13V or 18V0





Satellite to Home: equipments at each house

- Sat Ku Dish Diameter: 0.6~1.2 meter (installation time: 70 minutes)
- LNB installed on the satellite dish (installation time: 20 minutes)
- Coaxial Cable (installation time: 10 minutes)
- Sat Multiswitch if multi satellite receivers
- Digital satellite receiver (one for each TV)

The total installation time is about 100 minutes and the sat dish may break the outlooking of the house





Satellite to Home: Challenges

- Satellite signals are at geostationary orbit 37000Km above the earth's equator.
- Satellite antenna must face the satellite, a problem to apartments at the opposite side of a building.
- Coaxial Cable limits the distance between satellite antenna and satellite receiver.

The total installation time is about 100 minutes and the sat dish on the Apartment wall is not a easy job.





Advantage and Disadvantage

- Satellite MSOs
- Broadcasting hundreds of HD and 4K video
- No Replay and Internet Service
- Satellite Dish installation is not easy
- Telecom MSOs based on GPON
- Fiber radius up to 20Km
- 2-way 100Mbps-, supporting Netflix etc. OTT APK
- Difficult at 4K video: 36Mbps, 8K video: 120Mbps

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If Satellite MSOs work with Telecom FTTH MSOs, it is beyond a win-win business



Satellite TV over GPON

Broadcasting video from RF and Interactive video from GPON

Satellite MSOs

- One sat dish contents shared by up to half a million GPON subscribers in 20Km fiber distance.
- No need to repeat sat dish installation. Optical receiver next to ONU is a virtual satellite LNB. Increasing 3K or 30K subscribers easily.
- Telecom MSOs based on GPON
- Broadcasting hundreds of high quality video at 1550nm RF without consuming GPON Bandwidth. Improve GPON service, no urgent bandwidth demand for 10G PON
- Value added service at zero network change. Just jumping fiber patchcord at OLT and ONUs.

Optical LNB Proposal for Satellite MSO

- One Satellite Dish with one original single or twin or quattro LNB
- Terrestrial TV antenna (optional)
- One optical transmitter (GLB3500A-2T) converting Vertical RF, Horizontal RF and Terrestrial TV into 1550nm fiber
- One or few EDFA with WDM option for GPON OLT inputs, one EDFA can support 2048/4096 optical receivers in 20Km fiber distance.
- 1x32, 1x64, 1x128 PON fiber to the home
- Optical receiver (virtual optical LNB) can be installed in 5 minutes at any FTTH family
- Serving a community with hundreds or thousands of subscribers, even a city with 320K families.
- Option: Gigabit ethernet fiber to the home along with Satellite TV

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Why Telecom MSO needs DTT+SAT RF over ftth GPON

Better Video

- The most popular Live video contents coming from satellites.
- Local DTT offering video of events next to GPON subscribers
- No CATV headend equipments and DVB-C STBs
- More Smart TVs receiving DVB-T/DVB-S and IPTV directly
- Better business model
- OTT such as Netflix etc. consumes a lot of GPON bandwidth and pays no penny to GPON MSO.
- Share the monthly income with Satellite MSO.
- Time-shift-TV can be introduced as VoD service over GPON.

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GLB3500A-2T Optical Transmitter

LHCP and RHCP input: 950~2150MHz Terrestrial Input: 174~806MHz 13V and 18V reverse DC to LNB AGC control the RF level to Laser Aluminum die cast Housing Plug and play design Basic output: supporting 32 optical LNBs Options: supporting 128 optical LNBs directly supporting 256 optical LNBs directly 19V 2A Power adapter with UL or CE certificate **GPON OLT Input Optional**

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DC OPT OUT

Satellite Twin LNB Fiber Optic Transmitter

GLB2000A FTTH Universal LNB Optical Receiver as virtual LNB

- Installed indoor next to sat receiver
- Support 1 sat receiver in each home
- Powered by sat receiver
- LHCP and RHCP: 950~2150MHz
- Terrestrial Output: 174~806MHz
- Optical AGC: -6dBm~+1dBm
- RF Output Level: > 75dBuV@AGC range Terrestrial TV+LHCP@18V DC from satellite receiver Terrestrial TV+RHCP@13V DC from satellite receiver
 - **GPON ONU Port Optional**



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GLB3500A-2R FTTH Twin LNB Optical Receiver as virtual LNB

Aluminum indoor housing Support 2+ sat receivers in 1 home Satellite TV FTTH Optical LNB Powered by receivers/multi-switch ONU LHCP and RHCP: 950~2150MHz Terrestrial Output: 174~806MHz Optical AGC: -6dBm~+1dBm RF Output Level: > 74dBuV@AGC range Terrestrial TV+LHCP@18V DC from satellite receiver Terrestrial TV+RHCP@3V DC from satellite receiver **GPON ONU Port Optional**

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SAT+Terr

How to design the Sat over GPON system?

GLB3500A-2T transmitter can drive 32pcs optical 2NB directly.

GLB3500A-2T20 transmitter can drive 256pcs optical LNB directly.

If there are 257~4096pcs GPON subscribers, 1pcs GLB3500A-2T can be followed by 1pcs GWA3530 series EYDFA.

If there are more than 4096 subscribers, 1pcs GLB3500A-2T20 is followed by 1x8 or 1x16 fiber splitter first, then each splitted fiber is followed by one high power GWA3530 EYDFA, where one EYDFA can drive up to 4096 optical LNBs.



Thanks to **Greatway Technology Co., Limited Design House and Factory RF over Fiber transmission products** Web: www.greatwaytech.com

