

Operator Service Requirements (OSR)

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Outline

- Targeted Market
- Desired Services
- Interfaces to PON architecture
 - Central Office
 - Customer
- Network Architecture
- Environmental Considerations

Targeted Market

- FTTH: Residential
- FTTB: Business
- FTTx (cabinet and curb)
 - could be either residential or business

Services

- Need to offer Interactive Voice, Data, and Video services
- Downstream Communication for Voice and Data on one optical channel (op_ch_1)
- Downstream Video overlay on separate optical channel (op_ch_2)
 - Minimum of 25 Analog Channels Necessary to satisfy “must carry rules” (min approx. 50-250 MHz). Could be more depending on required services.
 - Remaining bandwidth can be used for digitally encoded channels
 - Switched Digital Video would be encoded in Data (1)
- Upstream Transmission on different optical channel (op_ch_3)

Lifeline Services

- What are lifeline services assuming power is interrupted?
 - FTTH: Telephony, Data with VoIP or laptops.
 - FTTB: Generally accepted that customer has their own UPS.
- Regulations for lifeline services
 - Differ from area to area (state vs. state, US vs. International, etc.)
 - Differ from regulated to non-regulated service providers
 - No regulations for backup batteries
 - Design guidelines for 8 hours on RT
- Service Providers **WILL** be required to offer lifeline services to their customers
 - Specifications that cover all scenarios cannot be written.
- Recommendation is to reduce power whenever possible in the PHY.

Central Office Interfaces

- OLT
 - 1Gb/s Ethernet (payload)
 - OC Data Rates (OC3, OC12)
 - DS3
 - STM1/STM4
 - Existing PSTN Interfaces (T1/E1)

 - Broadcast Video
 - Separate coupler for overlay optical channel
 - Optionally integrated in OLT

Customer Interfaces

- ONU/T
 - Voice: POTS
 - Voice: Optional Interface is IP Phone (RJ11 integrated in unit)
 - Voice: Optional Interface is 10/100 Base T -> (interface unit) -> IP Phone

 - Data: 10/100 Base T
 - Data: HPNA 2.0 (existing or separate POTS)
 - Data: Optional Interface is 802.11b (Wireless LAN)

 - Voice & Data FTTB: T1/E1/J1/DS1/T3/E3/J3/DS3

Customer Interfaces

- ONU/T
 - Video: Coax for analog broadcast -> TV
 - Video: Coax -> STB -> TV (digitally encoded video)
 - Video: Data Communication Connection -> STB -> TV (SDV: Switched Digital Video)
 - 10/100 Base T
 - HPNA
 - other

Network Architecture

- One (1) Fiber PON System
- 20 km reach without regeneration @ 1Gb/s payload
 - Greenfields (new home developments) are initial FTTH targets
 - Urban sprawl pushing greenfields greater distances from CO
 - Regeneration is very costly (bury RT, power, backup batteries)
- Up to 64 splits for FTTH:
 - recognize tradeoff between distance, sensitivity, and number of splits
 - Minimum requirements of 64 splits if < 10 km, 32 splits > 10 km
- Should be able to cascade splitters instead of having single splitter

Environmental Considerations

- **OLT**
 - Temperature
 - Outside operating 0 to 40C, 0 to 50C in short bursts (ref CTS, G983.3)
 - Storage, Transportation requirements exist
 - Humidity
 - 5 to 85 % relative 5 to 90% short bursts (ref CTS, G983.3)
 - EMI limits (ref CTS, IEC, Telcordia documents)
 - OSHA, FDA, Laser, other safety issues (ref CTS, G983.1, IEC, ANSI, documents)
- **ONU/ONT**
 - Temperature
 - Outside operating –5 to 45C Indoor, -40 to 45C Outdoor (ref CTS, G983.3)
 - Storage, Transportation requirements exist
 - Humidity
 - 5 to 95 % Indoor, 8 to 100% Outdoor (ref CTS, G983.3)
 - EMI limits (ref CTS, IEC, Telcordia documents)
 - OSHA, FDA, Laser, other safety issues (ref CTS, G983.1, IEC, ANSI documents)

Thank You