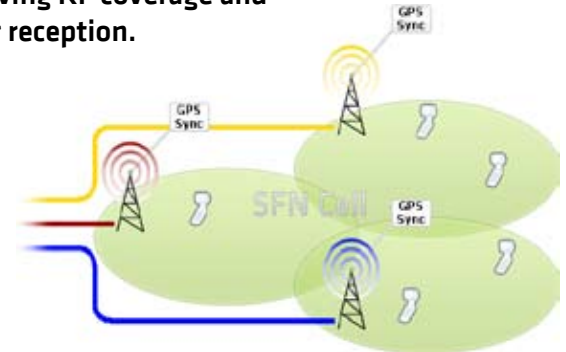


SFN in confidence

Single Frequency Networks in DVB-T, DVB-H, DTMB

SFN is a huge leverage for optimizing the use of frequency spectrum, improving RF coverage and increasing power reception.



SFN Expertise means

- Complete range of SFN products
- Uninterrupted service guarantee
- Eased installation and maintenance of SFN
- Simplified redundancy of SFN distribution
- End to end SFN synchronization preservation
- SFN network system supervision
- SFN broadcast QoS and trend monitoring
- Various training sessions, seminars, conferences

Benefits

- No more "black screen"
- Reduced hotline load while increasing user's satisfaction and quality of experience
- Secured investment in SFN system
- Simplified SFN network administration
- Interoperable solutions: SFN securing points can be used independently from each other

A short interruption in the SFN distribution has a strong impact on the user's experience. Re-synchronization of a single transmitter can last for seconds, meaning all users in the area get a black screen for an unmanageable period of time.

To prevent transmitters from receiving a corrupted or interrupted distribution stream, ENENSYS offers a set of redundancy mechanisms: acting all along the broadcast network, it turns every system interconnection in the SFN architecture into a point of strength of your network's reliability.

Points of Strength

- **Head end:**
 - High grade SFN adapters
 - SFN adaptation seamless redundancy
- **Distribution:**
 - Transport of SFN content over IP
 - Redundant distribution paths
- **Transmission:**
 - SFN from IP reception
 - Redundancy of two distribution paths with seamless switching
 - SFN excitors / modulators
- **Test and monitoring:**
 - Field testers
 - Network probes

1 High grade SFN adapter

Accurate MIP inserters

- Proven robustness and interoperability
- Remote control of every single transmitter independently:
 - Power, frequency offset, delay, ... configuration
 - No need to drive for hours to adjust SFN
- DVB-T, DVB-H or DTMB multi-standards capable

2 Secured redundant 1+1 SFN Adaptation

SFNguard™ solution for SFN adapters

- Patented 1+1 redundancy mechanism without additional equipment
- Seamless operation of SFN adapters:
 - Guaranteed MegaFrame synchronization
 - Identical and synchronized MIP packets
 - SFN adapters seamless switchover
 - Hot swap of defective unit during operation

5 Redundant SFN distribution paths

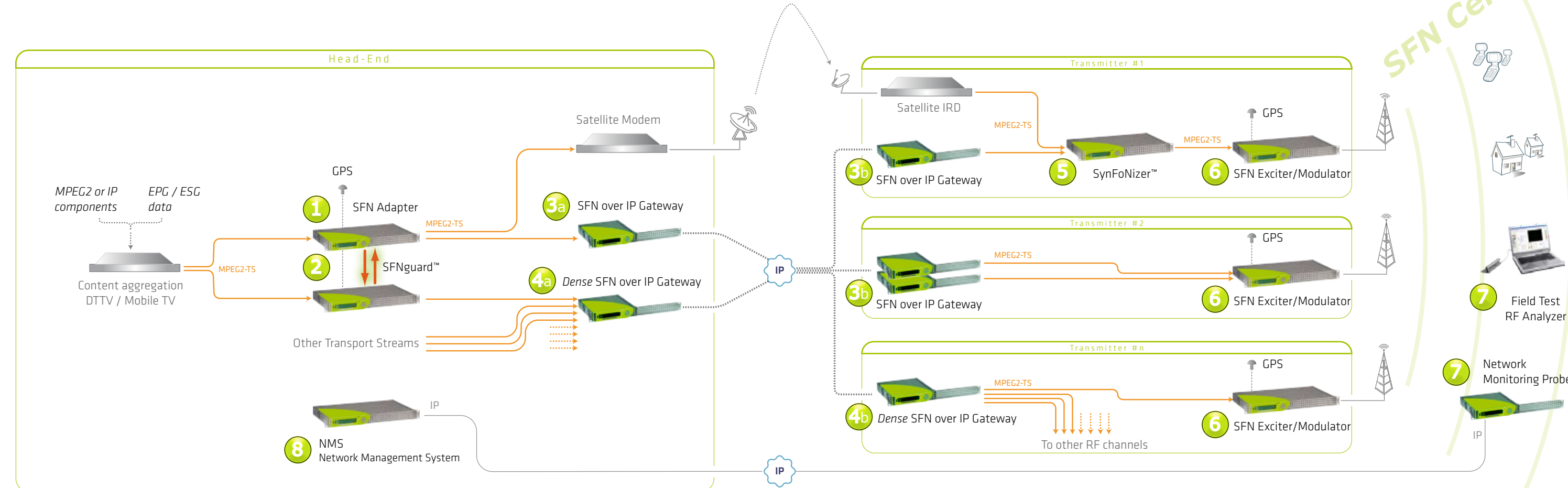
SynFoNizer™ : "Seamless SFN"

- Patented seamless switch between two distinct distribution networks
- Enables redundant distribution paths for SFN transmitters
- Even if I-ary and II-ary paths have different delays, SFN data is kept synchronized in case the main distribution path is broken

6 SFN Modulators / Exciters

NetMod™ broadcast modulators

- Full SFN, including optional MIP tables parsing
- Valuable integration in Transmitters with
 - SNMP, HTTP control
 - ASI / IP / satellite / GPS antenna inputs
- DVB-T, DVB-H or DTMB multi-standards capable



3 SFN streams Distribution over IP

FastCaster™ : TS over IP Gateway

- Re-use of convenient IP networks:
 - Low CAPEX, reliable distribution
 - Optimized OPEX, simple management
- Preservation of SFN over IP
 - Accurate bit rate adaptation
 - Network jitter removal

4 Multiple SFN streams Distribution over IP

GigaCaster™ : Dense TS over IP Gateway

- Able to process up to 8 MPEG2 Transport Streams in parallel (up to 16 in 1RU 19")
- Gigabit Ethernet interface to address IP backhaul
- Preservation of SFN over IP
 - Accurate bit rate adaptation on each TS
 - IP network jitter compensation on each TS

7 SFN Network Test and Monitoring

The "Omnitoring" solution

- **DiviCatch™** Field testers:
 - Drive tests (geolocalization)
 - SFN network Installation and maintenance
- **CastXplorer™** Network Monitoring Probes
 - QoS network assessment
 - SFN Network stability
 - SFN jitter and network trend detection

8 Centralized Supervision and Monitoring

Fully manageable SFN Network

- Remote control from central NMS of
 - Head-End system
 - Distribution network
 - Transmission chain
 - Probes
- Continuous feedback and instant alarms from the field using Monitoring probes

SFN solutions by SFN Experts

DVB-T, DVB-H, DTMB

SFN Adapters

NN6-MIP™

- DVB Standards
- Chinese Standard
- MIP insertion
- Hierarchy support
- Redundancy

- DVB-T or DVB-H
- DTMB (GB 20600-2006)
- Mandatory + optional tables
- With redundant inputs
- Mirrored outputs and SFN Guard

SFNguard™

Enables two SFN adapters to have bit-similar outputs for seamless switch at any time

SFN streams Distribution over IP

FastCaster™ and GigaCaster™

- MPEG2 TS over IP
- Forward Error Correction
- SFN preservation

- RTP/UDP encapsulation
- SMPTE 2022
- Network jitter removal
- Clock drift correction for SFN
- Mirrored outputs for redundancy
- Fast / Gigabit Ethernet
- Separated Data / Control interfaces
- Shared reference with Transmitter

- ASI inputs/ outputs
- IP network
- 10MHz (GPS) input

Redundant SFN Distribution paths

SynFoNizer™

- Inputs resynchronization
- SFN preservation

- Correlates streams from inputs to have one common output
- Enables seamless switch in case one distribution path fails
- 2x2 ASI inputs (MPEG2 TS)
- 2x2 mirrored ASI outputs
- Passive and advanced loopthrough

- Data Inputs
- Outputs
- Availability

SFN Modulators / Exciters

NetMod™

- OFDM modulation
- SFN support
- Broadcast quality
- Data Inputs
- Reference Inputs
- Outputs

- DVB-T, DVB-H, DTMB
- Full support with MIP optional data
- MER > 44 dB, highly stable
- Redundant ASI, IP, Satellite
- 10 MHz, 1 PPS, or GPS antenna input
- RF, IF or IQ, Main + monitoring

SFN Network Test and Monitoring

DiviCatch™ Field Testers / Analyzers

- RF Analysis
- MPEG2 Analysis
- DVB-H Analysis
- SFN Analysis
- Small and robust format

- MER, BER, constellation, SNR...
- PSI/SI, AV decoding, Recording
- Time Slicing, MFER, ESG parsing
- MIP/SIP tables parsing
- Self powered, that fits in the pocket

CastXplorer™ Network Monitoring Probes

- RF Analysis
- DVB-H, MPEG2 Analysis
- SFN jitter control

- Round-robin, sequential analysis
- Programmable thresholds
- Anticipation of failures with knowledge of trends. Stats logging
- Also tracks quality delivered to users
- Half a 19" 1RU size, low consumption
- Up to 65°C to fit street cabinet
- Embedded HTTP & SNMP servers

Equipment Control and Supervision

NMS

- Dedicated Network Management System based on Dataminer

System Integration

- Remote configuration
- Full SNMP v2 support GET, SET, TRAP
- Local alarms
- Embedded HTTP server
- Dry relay switch-over contact



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