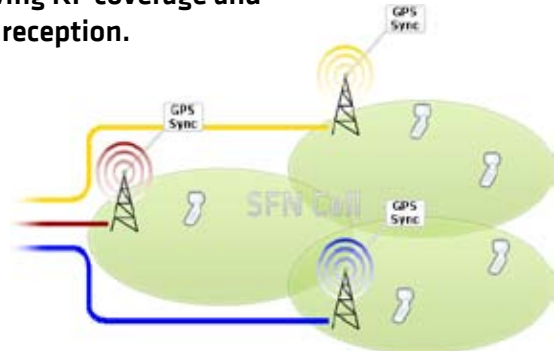


## SFN in confidence

### 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 exciters / 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

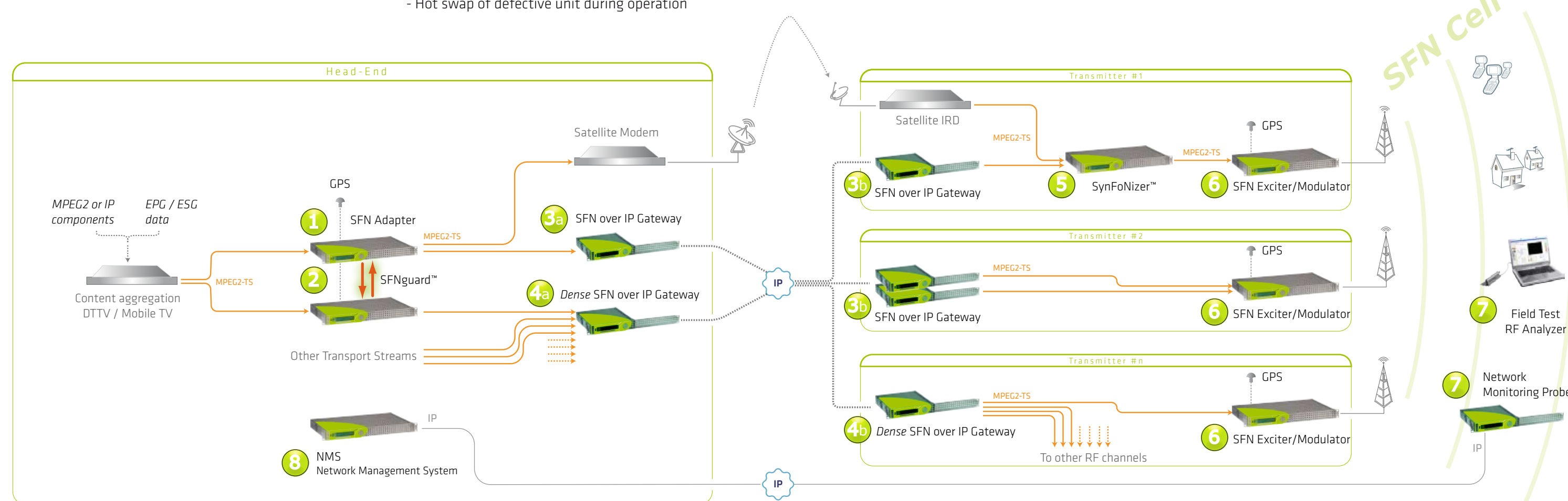
#### SynFoNizer™ : "Seamless SFN"

- 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

Data Inputs

Outputs

Availability

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

#### 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

Remote configuration

SNMP

Local alarms

Dedicated Network Management System based on Dataminer

##### System Integration

Embedded HTTP server

Full SNMP v2 support GET, SET, TRAP

Dry relay switch-over contact



ENENSYS Technologies  
Le Germanium  
80 avenue des Buttes de Coesmes  
35700 Rennes  
FRANCE  
Office (+33) 1 70 72 51 70  
Fax (+33) 2 99 36 03 84  
contact@enensys.com