



INSTALLING
RELIABILITY



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PRODUCT UPDATE

SKYWAN 5G RELEASE 2.2

All information provided here is subject to change without notice. Contact your sales representative to obtain the latest product specifications and roadmap.



LEAD

ND SATCOM’s VSAT flagship product SKYWAN 5G is continuously enhanced with new features. The table below shows the features introduced with the most recent major versions and the features added with R2.2.

SW	RELEASE DATE	FEATURES
2.0	2020-11-30	ACM for MF-TDMA P2P waveform Long Term Support Release SW Deployment Subchannel DVB-S2 Outbound ACM Groups
2.1	2021-11-30	MFT 1500 ACU support Preferred Master NMS multicast software update NMS custom dashboards
2.2	2022-08-18	X.509 authentication GRE service CIR/MIR

SKYWAN 5G VSAT LEVEL 2.2 – ENHANCING SECURITY & SERVICES

Satellite communication is an integral part of communication technologies and connects the world serving a huge range of industries, businesses, governments, and individuals. A robust and disaster-resilient VSAT network acts as backbone for end-to-end connectivity and reliable operation. It is essential to ensure that the data exchange is secure, private and trusted.

SKYWAN 5G R2.2 adds with X.509 based authentication another layer of protection for trustworthy communication.



The X.509 certificate is a safeguard against malicious network impersonators as each and every network node is authenticated by an certificate authority. The X.509 standard is the common global language

for certificates used in public key infrastructure. In terms of certificates, the X.509 standard creates certificates using a public and private key pair. This key pair is used to verify someone’s identity and integrity by a challenge-response authentication protocol which ensures that only trusted nodes are able to enter the TDMA network.

SKYWAN 5G R2.2 further enhances services in the Network Management System and eases life for the operator in using them. The GRE service now offers a holistic method for the setup having both endpoints combined in a single view. Further, a bandwidth management extension is giving more control with committed and maximum information rate (CIR, MIR) per station.

SKYWAN 5G is first choice for business and mission critical wide area satcom networks whenever one of the following key characteristics is sought-after.

SECURITY

SKYWAN 5G provides sophisticated, state-of-the-art security functionalities: such as AES-256 Link Encryption, network access based on station’s unique serial number and login to the management interface requiring secured protocols (HTTPS, SSH).

SOVEREIGN CONTROL

The SKYWAN platform is inherently a hubless system that does not rely on public or a service providers infrastructure. All required hardware can easily be set up and operated at the customer’s premise.

PERFORMANCE

SKYWAN 5G is built on a carrier grade Linux delivering consistent performance and high availability. With its efficient modulation and coding, true mesh ACM, sophisticated error correction, the TDMA access scheme and data compression techniques SKYWAN 5G enables bandwidth savings and lowers operational costs.

RESILIENCE

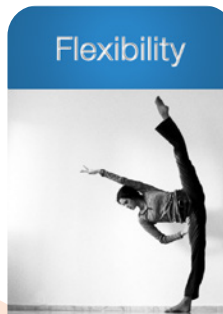
SKYWAN offers built-in geographic redundancy of the network control (master) function with seamless handover to the backup master. Multiple or even all stations can perform the master role further increasing network resilience.

FLEXIBILITY

The SKYWAN 5G all-in-one solution represents such excellence by flexibly fitting all topologies, providing any-to-all full mesh connection, transmitting with single-hop efficiency, and scaling as business grows while keeping costs in check. This MF-TDMA modem with integrated DVB-S2 receiver supports both fixed and mobility satcom applications and remains the premium standard for satellite communication.

With the SKYWAN Release 2.2., ND SATCOM continues its long history of providing secure, resilient and reliable satellite communication solutions. Besides many improvements and several new features, the highlight is for sure the integration of X.509 certificates. This completes the concept of transmission security (TRANSEC) which is inherent to the SKYWAN philosophy. We are more than happy to provide this brand new release to our customers and partners.

-- Michael Nebel, Head of Product Management at ND SATCOM





TRUSTED NETWORK ACCESS

X.509 NETWORK AUTHENTICATION

The X.509 certificate is a safeguard against malicious network impersonators as each and every network node is authenticated by an certificate authority. The X.509 standard defined by the International Telecommunication Unions’s Standardization Sector (ITU-T) is the common global language for certificates used in public key infrastructure. The standard based authentication scheme allows a seamless integration into a customer’s existing public key infrastructure. By default a SKYWAN 5G node can only become member of a SKYWAN network if its serial number is defined in the master’s network access control table. This mechanism prevents unauthorized nodes from entering the network. SKYWAN 5G R2.2 adds with X.509 based authentication another layer of protection to ensure trustworthy communication. If X.509 authentication is enabled in the network each node needs a valid certificate which was signed by an issuing certificate authority (CA). This CA could be either provided by the customer or alternatively the Network Management System (NMS) that acts as the issuing CA. When a remote station wants to enter the network the station will check the validity of the master’s certificate and the master will also check the validity of the slave’s certificate using a challenge/response procedure. If this check fails any data forwarding from or to the network node is blocked.

X.509 AUTHENTICATION BENEFITS

- Adds an authentication mechanism that prevents adversaries from joining a protected network or launching man-in-the-middle attacks
- Ensures identity of network nodes by a trusted Certificate Authority
- Network Management System supports the operator in effectively managing the X.509 certificates to enable seamless network operation

The NMS supports the operator in managing the X.509 certificates which are issued with limited validity period. The NMS indicates in advance when certificates are about to expire and the renewal process can be done in time to ensure seamless network operation. For this purpose the Certificate Signing Request (CSR) of the individual node is signed again by the CA and a certificate with updated validity period is issued.

The X.509 authentication option requires a license.

External Certificate Authorities					
Type	Certificate	Subject	Valid Not Before	Valid Not After	
<input type="checkbox"/>	root	AUgR2VQppAYLGM2xT	CN=Training Root Server, O=Training Root Server, L=RootCity, C=DE	2022-08-22T15:13:05+00:00	2023-08-22T15:13:05+00:00
<input type="checkbox"/>	Intermediate	AUgTIZH/YXZQs4P-	CN=Training Intermediate Server, O=Training Intermediate, L=InterCity, C=DE	2022-08-22T15:19:33+00:00	2023-08-22T15:19:33+00:00

SKYWAN NMS Certificate Authorities					
NMS Node Name	Certificate	Subject	Valid Not Before	Valid Not After	
<input type="checkbox"/>	SKYWANNMS	AWAj3iRC4AMG2FXP	CN=SKYWANNMS, O=NDSATCOM Training, L=Immenstaad, C=DE	2022-08-23T09:06:35+00:00	2023-08-23T09:06:35+00:00

TDMA SERVICE GUI: X.509 CERTIFICATE AUTHORITIES



NMS GRE SERVICE

SKYWAN 5G NMS GRE SERVICE

Generic Routing Encapsulation (GRE) provides a point-to-point path for transporting packets through an IP network by encapsulating (or tunneling) the packets. GRE tunneling is accomplished through tunnel endpoints that encapsulate or de-encapsulate traffic.

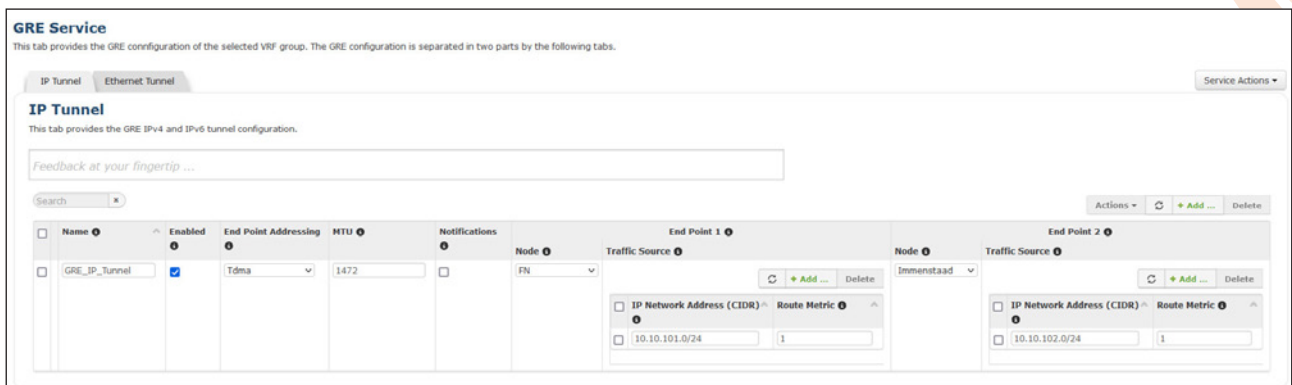
SKYWAN 5G IDU supports GRE as defined in RFC 2784 since software release 1.2.65. Per node, up to 64 GRE tunnels can be supported. The implementation of GRE in SKYWAN 5G IDUs allows the configuration of:

- IPv4 in IPv4 tunnels
- IPv6 in IPv4 tunnels (compatible to Cisco tunnel mode ipv6ip)
- Ethernet Link Layer in IPv4 tunnels

With release 2.2, the GRE tunnel setup is lifted from device level to the service level. The SKYWAN 5G NMS GRE service offers the operator a centralized easy to use view for setting up GRE tunnels. The GRE service takes care to implement the configuration in the individual devices, i.e. the GRE tunnel endpoints.

GRE SERVICE BENEFITS

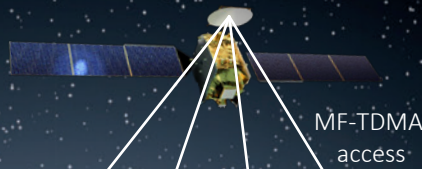
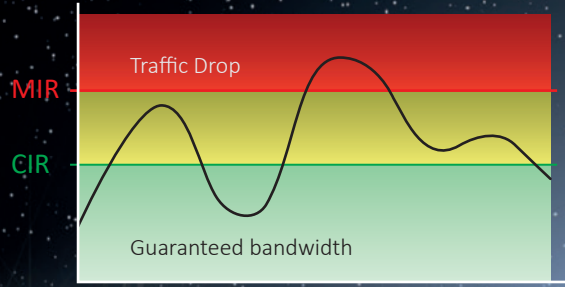
- GRE service simplifies tunnel setup and operation
- Parameter validation with instant feedback is done depending on the type of tunnel
- Validation of MTU sizes and routing information reduces the risk of misconfiguration
- Efficient monitoring based on SNMP traps



SKYWAN 5G NMS WEB-UI: GRE SERVICE, TUNNEL SETUP



Traffic Rate



CIR 2 Mbps
MIR 2.8 Mbps

CIR 4 Mbps
MIR 5 Mbps

CIR 3 Mbps
MIR 4.2 Mbps

CIR 1.5 Mbps
MIR 2 Mbps

BANDWIDTH POLICIES

BANDWIDTH MANAGEMENT: COMMITTED AND MAXIMUM INFORMATION RATE (CIR / MIR)

For many in the satellite industry, the cost of satellite bandwidth is the single largest cost-component of the operative expenditures. Bandwidth management and optimization must address the users demands with superior quality of experience, while delivering reliable services that are economical and affordable.

SKYWAN 5G technology with its efficient modulation and coding, ACM, sophisticated error correction, the TDMA access scheme and data compression techniques ensures that the users get the most out of the dedicated bandwidth. The Time Division Multiple Access (TDMA) allows to share the available bandwidth amongst several users dynamically to current demand within milliseconds, without interfering with each other. The SKYWAN bandwidth on demand function automatically assigns bandwidth to the applications according to the configured policies and quality of service configuration.

CIR / MIR BENEFITS

- Implement bandwidth guarantees and maximum information rate as agreed in the service plan
- CIR / MIR settings per station or a group of stations
- Fully dynamic or permanent bandwidth assignments are supported

The SKYWAN 5G R2.2 bandwidth management extension gives more control to the operator with Committed and Maximum Information Rate (CIR, MIR) settings to implement the service plans as agreed with the users. The bandwidth guarantees and the upper throughput limit can be assigned for a single station or is effective for a group of stations. The bandwidth assignment can be either fully dynamic based on the actual demand or permanently assigned for immediate use.

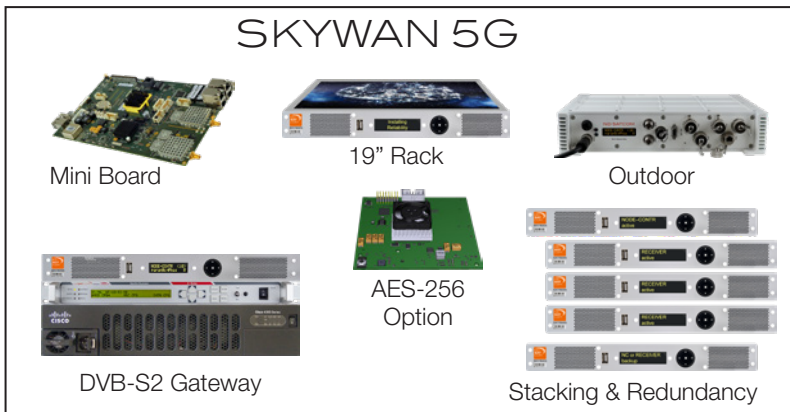
The screenshot shows the 'Bandwidth Assignment' configuration page in the NMS. It includes sections for 'Virtual Channel Groups' and 'Bandwidth Groups'. A 'Network Nodes' table is also visible, listing stations like Friedrichshafen, Immenstaad, and Markdorf with their respective bandwidth settings.

Station Name	ACM Profile	Maximum Bandwidth [kbit/s]	Bandwidth Groups	Bandwidth Group Only
Friedrichshafen	default	2000	1	<input type="checkbox"/>
Immenstaad	default	400	2	<input type="checkbox"/>
Markdorf	default	600	2	<input type="checkbox"/>

SKYWAN 5G NMS WEB-UI: CIR / MIR SETTINGS

SKYWAN 5G – THE ONE BUILDING BLOCK

SKYWAN 5G – THE ONE Mastermind – is the building block and core product of ND SATCOM's VSAT offerings. It comes either as 19" rack version or as outdoor version or as board for integration in terminals powered by SKYWAN 5G. The units can be interconnected to increase inbound capacity (utilize multiple receive channels known as stacking/cascading), for hot-standby backup (1+1 / N+M node redundancy) or as part of the DVB-S2 solution. SKYWAN 5G is a scalable and flexible multi-service VSAT platform for any user and market segment seeking for reliable and cost effective communication in high quality. R2.2 is available for all SKYWAN 5G hardware units (indoor & outdoor) and all terminals powered by SKYWAN 5G.

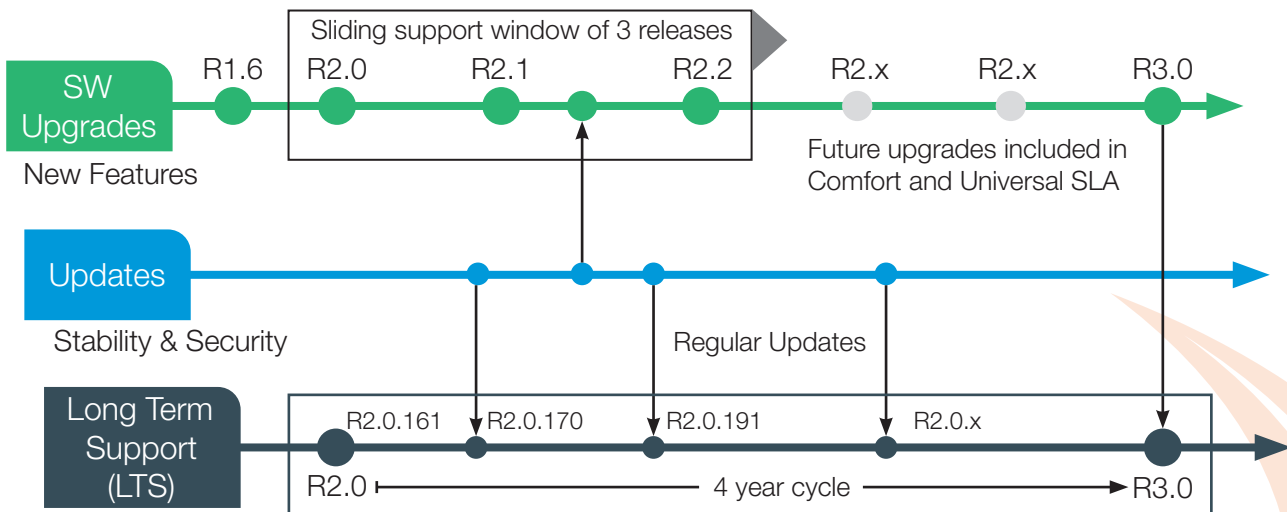


SKYWAN 5G SOFTWARE LIFECYCLE POLICY

The operator can choose for the SKYWAN 5G network either the software upgrade path with steady feature innovations or the Long Term Support based on R2.0 as indicated in the figure below.

SW Upgrade path: the network benefits from feature extensions and innovations. Support / troubleshooting by ND SATCOM Customer Support is limited to the latest three releases (today in scope: R2.0, R2.1 and R2.2).

LTS path: stable feature set and long support window. Regular maintenance updates and security patches are provided.



Committed Release Cycle

All information in this guide has been prepared with great care. ND SATCOM, however, does not accept liability for possible errors, changes and/or omissions. This technical application guide is for information purposes only and aims to support you in tackling the complexity and taking full advantage of all potential the technology has to offer. Please check www.ndsatcom.com or contact your sales partner for further information.

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