

# SkyEdge II-c System

## Many Markets, One Platform

### Integrated Hub for Multiple Markets

A single VSAT platform that can deliver all of a network operator's services is a valuable commodity, particularly as VSAT communications grows in scope in markets including: Mobility, Backhaul, Consumer and Enterprise. To meet this need, Gilat Satellite Networks has drawn on 30 years of experience in satellite communications to bring you the multi-market SkyEdge II-c platform. This high-performance hub system, along with comprehensive network management and a family of mission-specific terminals, enables satellite service providers to support any market.

### Scalable in all Dimensions

SkyEdge II-c is designed to support the needs of any hub network operator, whether you're adding to the number of services you're offering, ramping up your network's data traffic, or increasing the number of frequency bands, carriers, satellites or satellite beams to which you connect.

This VSAT platform features a scalable distributed network architecture, enabling efficient and robust HTS ground segment deployment over any number of satellite gateway locations, data centers and network operations centers. Advanced high-density chassis architecture minimizes rack space and power.

SkyEdge II-c makes it easy to expand capacity as demand grows and extend services to new markets with minimal investment. Full service automation, including VSAT installation certification, is handled without human intervention, enabling scalable and simple service activation without a single phone call. Our simple VSAT installation, including a Do-It-Yourself option for the consumer market, reduces setup costs and thereby reduces service subsidies.

### Flexible VNO Models for Host Network Operators

SkyEdge II-c supports several managed services models for Virtual Network Operators (VNOs):

- Hardware VNOs – VNO service utilizing dedicated Tx/Rx hardware components with inbound and outbound MHz capacity
- Software VNOs – VNO service utilizing shared hub resources with inbound and outbound Mbps capacity
- Cloud VNOs – VNO service over multiple spot beams and satellites, leveraging a shared pool of network functions, data processing, and space segment spectrum

### Benefits

- Flexible hub platform supports all market segments, reducing operator risk and enabling sharing of satellite bandwidth for multiple applications
- Supports multiple VNO service models
- Highly scalable VSAT system supports any number of frequency bands, carriers, satellites or satellite beams
- Integrated and redundant hub chassis system provides high-availability service and reduces rack space and power
- Family of VSATs optimized for specific markets



SkyEdge II-c System

Using the SkyEdge II-c Total NMS management system, VNOs have full control of their terminals and full flexibility to define and manage their own services. They also gain detailed VSAT monitoring information such as VSAT status, bandwidth usage and RF levels.

## High Performance Terminals

The SkyEdge II-c VSAT portfolio features high-performance router/modems that enable next-generation, high-speed services via satellite.

Our family of VSATs utilizes multi-core processor technology and integrated acceleration, caching and security technologies to ensure a superior and secure user experience.

## Rich Feature Set

SkyEdge II-c delivers innovative transmission technologies with exceptional performance and space segment efficiencies. Wideband DVB-S2X carriers in the forward direction and adaptive transmission in the return direction, enable high on-the-move service availability and maximum bandwidth efficiency at any condition – at beam peak, beam edge, at fade and at different traffic demands. This is achieved by adaptive power control, changes to the carrier symbol rate, ModCod and spread-spectrum factor per VSAT on a per time-slot basis.

The SkyEdge II-c system employs advanced features and capabilities that help you deliver competitive services while simplifying your network operations.

- Robust bi-directional QoS – embedded in the platform, SkyEdge II-c QoS supports various rate bundles per site, wholesale (VNO level) CIR/MIR bundles, DiffServ, flow and application priority, and VoIP call admission control to ensure voice and video quality
- Multi-tiered acceleration – enables fast web surfing and application response time using TCP acceleration, HTTP acceleration, DNS caching, pre-fetching, compression and web optimization, and IP header compression
- Enhanced System Security – provides secure transmission over the satellite link by utilizing high-performance, HW-based AES-256 encryption. The system also employs X.509 terminal authentication

Certain SkyEdge II-c features particularly enhance specific applications:

**Mobility** – Beam and satellite switching, on-the-move antenna and BUC communications interfaces, and a comprehensive network management system for mobility terminals.

**Backhauling** – Unique patent-pending 3G/LTE cellular data acceleration overcomes satellite latency and enables mobile handsets to achieve maximum download speeds of up to 200Mbps

**Broadband Access** – Enhanced usage based services and integrated site level accounting deliver flexible and competitive service plans

**Enterprise** – With its rich IP Stack, SkyEdge II-c provides comprehensive IP and routing capabilities and other Enterprise-related features.



Gemini – High-speed satellite router



Scorpio – Integrated outdoor satellite router



Capricorn Outdoor – All-weather satellite router



Capricorn-4 – Ultra-high performance satellite router



Capricorn Pro – Rack-mounted satellite router



Taurus- Ultra-high-performance aero Modem

## High Availability Dense Architecture

The centralized management system and redundant hub baseband architecture facilitates support for unmanned gateway operations.

- High-Availability System – 1:N redundancy and automatic failover of all hub components ensure very high system uptime. Integrated redundant 10Gb packet switching architecture and an advanced backplane design connecting all hub components guarantee high system reliability
- Unattended Hub Operations – remote visibility, management and control of all hub elements enable centralized management, thereby drastically reducing OPEX while enabling remote expert analysis of system behavior
- High Density Hubs Reduces Rack Space and Power – compact chassis architecture for transmit modules, receive modules and servers provide high throughput performance while minimizing rack space and power
- GW diversity solutions for fade mitigation – capable of fade detection at each RF gateway and activation of a secondary diversity site with seamless RF or Layer II switching
- Disaster recovery – when an enhanced availability service is required, a secondary baseband hub, data center or NOC may be installed at a disaster recovery facility

## Chassis Design

The SkyEdge II-c hub system is designed to provide maximum service time while simplifying your network operations. The hub system comprises an advanced high-density multi-beam X-Chassis coupled with a complete network management system. The main advantages of the chassis are:

- Hot Swappable Modules – eliminating network downtime
- Backplane Design and Redundant LAN Switches – eliminate external LAN wiring complexity
- Software-defined RF Matrix – simplifies network operations and improves unattended hub operations
- Remote Management – remote control of all components simplifies support and shortens time for trouble resolution

## Unified and Centralized TotalNMS

SkyEdge II-c includes an advanced Total Network Management System, enabling full configuration, control and monitoring of all hub elements and remote terminals, regardless of their physical location.

**TotalNMS includes the following key attributes:**

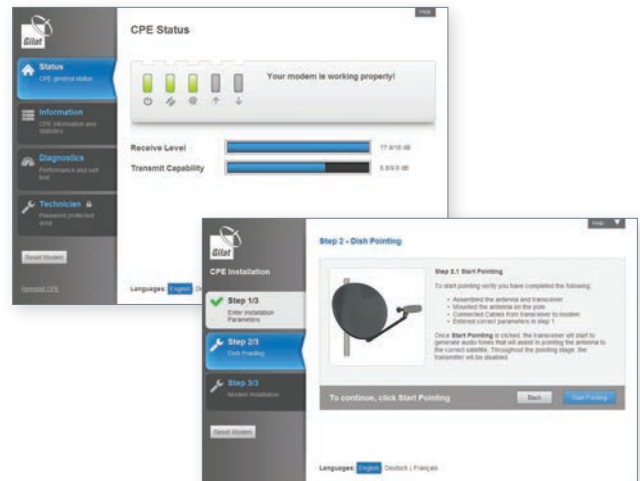
- Network Dashboard – a comprehensive set of network indicators providing real time and trending information on network throughput, utilization, and alarms
- One-Click Management – an intuitive GUI, with easy-to-use configuration tools and advanced diagnostic capabilities, providing effortless provisioning and troubleshooting for networks of any size
- Global User Access – standard web interface allowing access from any PC connected to the secured management network
- Customized User Administration – flexible and highly granular mechanism, enabling user permissions settings according to VNO service model and individual job function

- VNO Management (TotalVNO) – full support for a variety of VNO service models, providing VNOs with the capability to independently configure and monitor their own network
- Rich Northbound Interface – comprehensive API to the operator's operational and business environment, enabling simple automation of service assurance and activation processes
- Robust Accounting – detailed data usage records are delivered to the OSS/BSS, ensuring accurate service ratings and billing of end-customers

## Service Automation

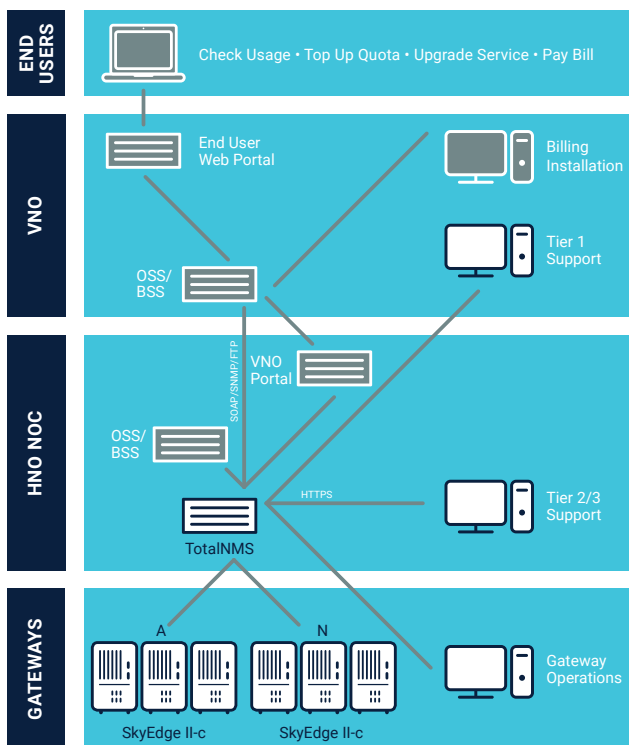
SkyEdge II-c enables full automation of service activation, providing operational simplicity and reduced OPEX. Service activation comprises antenna pointing, RF certification and auditing, and optional ISP authentication.

- Antenna Pointing – Simple VSAT installation, including Do-It Yourself options, expedites deployment and reduces costs – the VSAT terminal is designed with minimal assembly parts and an easy-to-point antenna. In addition, Ka-band and Libra terminals are equipped with audible indicators to assist in the fine antenna pointing. The VSAT terminal includes an intuitive GUI that guides the installer step by step through the installation process.



User-friendly interface simplifies service activation

- RF Certification – SkyEdge II-c VSAT Auto Pointing System (VAPS) enables automatic RF certification of VSAT installation based on local/regional beam parameters. VAPS also includes RF auditing: this allows the hub network operator to configure an automatic, periodic audit of the installed terminal base to identify antenna misalignment issues over time.
- ISP Authentication – once the VSATs pass the RF certification, it is possible to redirect web traffic to a specific ISP to complete the service activation process. The ISP will authenticate end users and enable them to update their billing information and select a service plan.



# Technical Specifications

## General

**Frequencies:** Ka, Ku, C

**Topology:**

Star, distributed hub architecture (multiple GWs, NOC)

## Forward Channel

### DVB-S2 ACM

**Carrier rate per NS:**

1.5Msps-65Msps (235Mbps)

**Modulation:**

QPSK, 8PSK, 16APSK, 32APSK

**Coding:** LDPC

**FEC:**

1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9

**Roll-off:** 1.1, 1.2

### DVB-S2X ACM

**Carrier rate per NS:**

1.5Msps-500Msps (3.5Gbps)

**Modulation:**

QPSK, 8PSK, 16APSK, 32APSK, 64APSK, 256APSK

**Coding:** LDPC

**FEC:** All FECs

**Roll-off:** 1.05, 1.1, 1.2

## Return channel MF-TDMA

### When Using DVB-S2 as

#### Forward Carrier

**Access Scheme:**

MF-TDMA, Adaptive

**Carriers rates:**

Multi Channels 128Ksps - 6Msps

**Max Data Rate:**

12Mbps (accelerated)

**Modulation:**

BPSK, QPSK, 8PSK, 16QAM

**Coding:** TPC

**TDMA FEC:** 1/2, 2/3, 3/4, 4/5, 6/7

**Roll-off:** 1.2

**Spread Spectrum FEC:**

Not Supported

### When Using DVB-S2X as Forward Carrier

**Access Scheme:**

MF-TDMA, Adaptive

**Carriers rates:** 128Ksps - 30Msps

**Max Data Rate:**

100Mbps (accelerated)

**Modulation:** BPSK, QPSK, 16QAM

**Coding:** LDPC

**TDMA FEC:**

1/4, 1/3, 2/5, 1/2, 2/3, 4/5, 6/7

**Roll-off:** 1.2, 1.1

**Spread Spectrum FEC:**

BPSK 1/4, 1/3, 2/5, 1/2

## Return (SCPC)

**SCPC Symbol Rates:** 1.5 - 40Msps

**SCPC waveform:** DVB S2 ACM

**SCPC Modulation:**

QPSK, 8PSK, 16APSK

**SCPC FEC:**

1/4, 1/3, 2/5, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9

## Features

**IP:**

IPv4/IPv6, TCP, UDP, ICMP, DHCP, NAT/PAT, DNS Caching, cRTP, IGMPv2/v3, SIP, DiffServ, VLANs, RIPv2, Static Routes, BGP

**Transparent PEP:**

Integrated: TCP Acceleration, HTTP web pre-fetching and compression, RTP header compression, SIP aware VoIP, IP header compression, Cellular GTP data acceleration

**QoS:**

Integrated, DiffServ, Multi-Level CIR//MIR (User, Group)

## Usage Services:

Integrated quota-based service definition system, Per ISP/VNO, forward & return quota, free usage time zones, quota reset, usage top-ups

**Security:**

AES-256 bit encryption, ACL Firewall, X.509 Terminal Authentication

## System Scalability

**Forward channel scalability:**

Up to 1,000 carriers, spread over any number of gateways, satellites, or beams

**Terminals:** Up to 1,000,000

## Management

**System:**

Single centralized TotalNMS

**Framework:**

ITU / IETF standards-based

**GUI Interface:**

Web-based over HTTPS

**Access Control:**

Per User permission management

**Northbound Interface:**

SOAP over HTTPS, SNMPv2c

**IDU Antenna Interface:**

Gilat's Antenna ICD, OpenAMIP

## Interface

**RF:**

Tx: 950 - 2450 MHz; Rx: 950 - 2150 MHz ; QMA / N-type, 50 ohms

**LAN:**

10/100/1000 BaseT and 10Gb optic

## Mechanics and Environment

**Certifications:**

RoHS, CE, ETSI EN 300 386  
V1.4.1:2008-04, ETSI EN 301 489-1  
V1.8.1:2008-04, ETSI EN 301 489-12  
V2.2.2:2008-09, AS/NZS CISPR 22:2006, FCC CFR 47 Part 15 Subpart B, Industry Canada ICES-003:04

**Power:**

Universal AC 110 - 240V 50 - 60Hz

Operating Conditions:

0° to +35° C, up to 90% relative humidity