

**Our experience, your advantage**

## **ALFOplus80HDX**

### **From 10 to 20 Gbps E-Band Full Outdoor**

Whether in mobile, fixed or private networks, the E-band millimetre wave solution represents a fundamental technology tool bridging the gap between fibre high capacity systems and flexible cost effective wireless transmission. ALFOplus80HDX achieves 10GBps full-duplex ultra high capacity in a single unit, and 20GBps in a 2+0 XPIC configuration.

ALFOplus80HDX provides fibre like capacity, highest deployment flexibility and homogeneous operational behaviour as traditional microwave, allowing operators to fully liaise on existing knowledge and skills, minimizing introduction costs, while modernizing the transport network.



**ALFOplus80HDX**

COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL  
= ISO 9001:2015 =

# UNIVERSAL PRODUCT ARCHITECTURE

Millimetre wave radio products have evolved in terms of functionality and physical arrangements to cover in an effective and efficient way they can be employed in any application.

ALFOplus80HDX as part of the SIAE MICROELETTRONICA Unified Product Architecture, utilizes at its core the SM-OS operating system based over three major components:

## Network Management Plane

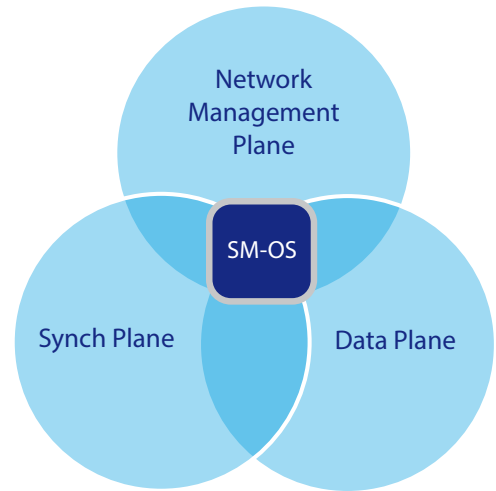
- NETCONF/Yang in SDN deployment
- SNMP v1/v2c/v3, HTTPs, SSH, SFTP
- RADIUS for centralized user management

## Data Plane

- MEF 2.0 – Carrier Ethernet Services
- IP/MPLS – L2/L3 VPN Services
- QoS/HQoS – queue management/policing and shaping

## Synch Plane

- Synchronous Ethernet
- ITU-T G.8275.1 Profiles (T-BC)
- 1 PPS in/out port



## MAIN FEATURES

- SM-OS based platform
- Up to 10 Gbps Throughput with single unit
- Integrated XPIC circuitry (2+0 up to 20 Gbps)
- Channel bandwidth up to 2000 MHz
- BPSK/4/16/64/128/256 QAM modulation schemes
- Hitless Adaptive Coding Modulation and Bandwidth
- Integrated flat antenna (ETSI only)
- AES128/256 Encryption
- 10 Gigabit and Gigabit interfaces
- L1 link aggregation
- PoE and dedicated power feeder connectors
- Multi Carrier Aggregation (Full Outdoor Aggregation with ALFOplus2; Split Mount with AGS20 ODUs)
- Network Management System: NMS5
- SDN Microwave Domain Controller: SM-DC

## Supported Configurations:

- Single Unit: 1+0 (10 Gbps)
- Two Units : 2+0 XPIC (20 Gbps)

## LAYER 2 MAIN FUNCTIONALITIES

- MEF 2.0 certified
- 8 queues with flexible scheduler (Strict Priority, WRR and mixed)
- 4 level hierarchical scheduler (H-QoS)
- Flexible QoS definition based on VLAN, IPv4, IPv6, MPLS exp bits
- Per queue WRED congestion avoidance
- Flow Based Ingress Policing (CIR & EIR definition)
- Egress shaping
- Ethernet Ring Protection G.8032
- RMON statistics per service VLAN stacking (IEEE 802.1ad QinQ)
- Link Aggregation IEEE 802.3ad
- Ethernet OAM 802.3ah/ 802.1ag/ Y.1731
- Jumbo Frames up to 12 Kbytes



# ALFOplus80HD

## 2.5 Gbps E-Band Full Outdoor



| Frequency  | 80 GHz (71-76 GHz / 81-86 GHz)  |         |          |
|--|---|---------|----------|
| Supported configurations   | (1+0), (1+1), (2+0)   |         |          |
| Modulation schemes   | BPSK / 4 / 16 / 64 QAM with ACM   |         |          |
| Traffic interfaces   | 2 x GE electrical / optical or 1 x 2.5 Gbps optical   |         |          |
| Output power (dBm) at Point C*   | Channel Spacing   |         |          |
|  | 250 MHz   | 500 MHz | 1000 MHz |
| 4 QAM  | 18  | 18      | 18       |
| 16 QAM   | 15  | 15      | -        |
| 64 QAM   | 13  | 13      | -        |
| Receiver sensitivity at BER 10 <sup>-6</sup> at point C (1+0 conf., RF filter losses included) |   |         |          |
| 4 QAM  | -73   | -70     | -64      |
| 16 QAM   | -64   | -61     | -        |
| 64 QAM   | -58   | -55     | -        |
| Frequency stability  | ±5 ppm  |         |          |
| RTPC   | up to 20 dB in 1 dB steps, software programmable  |         |          |
| ATPC   | up to 20 dB range implemented in 1 dB steps   |         |          |
| ODU connector  | RJ45 or SFP Optical Plug-in   |         |          |
| Management interfaces  | In-band or out-band management  |         |          |
| Dimensions ODU (WxHxD)   | 290 x 302,5 x 117,6 (mm) 11,4 x 11,9 x 4,6 (in)   |         |          |
| Power supply   | PoE or separated power feeding  |         |          |
| Power consumption (per terminal)   | 32W to 50W in 1+0 configuration   |         |          |
| Environmental performance  | IP65  |         |          |
| ODU weather proofing class:  | -35° C to +55 ° C   |         |          |
| ODU temperature range  |   |         |          |
| Ethernet characteristics   | MAC address switching, ageing and learning<br>VLAN / VLAN stacking (IEE 802.1ad-QinQ)<br>Ethernet QoS (IEEE 802.1p)<br>Flow Control (IEEE 802.3x)<br>RMON Statistics (RFC 2819)<br>LLF (Link Loss Forwarding)<br>ETH OAM (IEEE 802.1ag / 802.3ah / ITU-T Y.1731)<br>G.8261/8262/8264 SyncE / IEEE 1588 v2<br>Selective QinQ based on VLAN and 802.1p priority |         |          |
| Compliant with   | ETSI EN 302 217 / FCC CFR 47, Part 101 and Part 15  |         |          |

# ALFOplus80HDX

## 10 Gbps E-Band Full Outdoor



|  |  |             |               |               |               |               |             |  |
|--|--|-------------|---------------|---------------|---------------|---------------|-------------|--|
| Frequency  | 80 GHz (71-76 GHz / 81-86 GHz)   |             |               |               |               |               |             |  |
| Supported configurations   | (1+0), (1+1), (2+0), (2+0 XPIC)  |             |               |               |               |               |             |  |
| Modulation schemes   | 4 / 16 / 32 / 64 / 128 / 256 QAM with ACM  |             |               |               |               |               |             |  |
| Traffic interfaces   | 2 x 10 Gbps optical* / 4 x GE electrical / optical (*also 2.5 Gbps configurable)   |             |               |               |               |               |             |  |
| Output power (dBm) at point C*   | Channel Spacing  |             |               |               |               |               |             |  |
|  | 62,5 MHz   | 125 MHz     | 250 MHz       | 500 MHz       | 750 MHz       | 1000 MHz      | 2000 MHz    |  |
| 4 FQAM / 4 HQAM / 4 SQAM / 4 QAM   | 20   | 20          | 20            | 20            | 20            | 20            | 20          |  |
| 16 SQAM / 16QAM  | 17   | 17          | 17            | 17            | 17            | 17            | 17          |  |
| 32 QAM   | 15   | 15          | 15            | 15            | 15            | 15            | 15          |  |
| 64 QAM   | 15   | 15          | 15            | 15            | 15            | 15            | 15          |  |
| 128 QAM  | 14   | 14          | 14            | 14            | 14            | 14            | 14          |  |
| 256 QAM  | 13   | 13          | 13            | 13            | 13            | 13            | -           |  |
| Receiver sensitivity at BER 10 <sup>-6</sup> at point C (1+0 conf., RF filter losses included) |  |             |               |               |               |               |             |  |
| 4 FQAM / 4 HQAM  | -  | - / -80     | -79.5 / -76.5 | -76.5 / -73.5 | -74.5 / -71.5 | -73 / -70     | -70 / -67   |  |
| 4 SQAM / 4 QAM   | -80 / -77.5  | -77 / -47.5 | -73.5 / -71.5 | -70.5 / -68.5 | -68.5 / -66   | -67 / -65     | -64 / -62   |  |
| 16 SQAM / 16 QAM   | -74 / -71.5  | -71 / -68.5 | -68 / -65     | -65 / -62.5   | -62.5 / -60   | -61.5 / -58.5 | -58.5 / -56 |  |
| 32 QAM   | -68.5  | -65.5       | -62.5         | -59.5         | -57           | -55.5         | -53         |  |
| 64 QAM   | -65.5  | -62.5       | -59.5         | -56.5         | -54           | -52.5         | -50         |  |
| 128 QAM  | -62.5  | -59.5       | -56.5         | -53.5         | -51           | -49.5         | -46.5       |  |
| 256 QAM  | -59.5  | -56.5       | -53.5         | -50.5         | -48           | -47           | -           |  |
| Frequency stability  | ±5 ppm   |             |               |               |               |               |             |  |
| RTPC   | up to 20 dB in 1 dB steps, software programmable   |             |               |               |               |               |             |  |
| ATPC   | up to 20 dB range implemented in 1 dB steps  |             |               |               |               |               |             |  |
| ODU connector  | RJ45 or SFP Optical Plug-in  |             |               |               |               |               |             |  |
| Management interfaces  | In-band or out-band management   |             |               |               |               |               |             |  |
| Dimensions ODU (WxHxD)   | 252 x 363x 117 (mm) 9,9 x 14,3 x 4,6 (in)  |             |               |               |               |               |             |  |
| Power supply   | PoE or separated power feeding   |             |               |               |               |               |             |  |
| Power consumption (per terminal)   | 60W in 1+0 configuration   |             |               |               |               |               |             |  |
| Environmental performance  | IP67   |             |               |               |               |               |             |  |
| ODU weather proofing class   | -35° C to +55 ° C  |             |               |               |               |               |             |  |
| ODU temperature range  |  |             |               |               |               |               |             |  |
| Ethernet characteristics   | MAC address switching, ageing and learning<br>VLAN / VLAN stacking (IEE 802.1ad-QinQ)<br>Ethernet QoS (IEEE 802.1p)<br>Complete H-QoS support<br>Flow Control (IEEE 802.3x)<br>RMON Statistics (RFC 2819)<br>LLF (Link Loss Forwarding)<br>ETH OAM (IEEE 802.1ag / 802.3ah / ITU-T.Y.1731)<br>G.8261/8262/8264 SyncE / IEEE 1588 v2<br>Selective QinQ based on VLAN and 802.1p priority<br>SM-OS based feature set |             |               |               |               |               |             |  |
| Compliant with   | ETSI EN 302 217 / FCC CFR 47, Part 101 and Part 15   |             |               |               |               |               |             |  |

