SkyEdge II BWO-II

Bandwidth Optimizer for SkyEdge II

Benefits

- Better use of satellite bandwidth
- Enabler for large profitable VSAT projects
- Fully integrated into the SkyEdge II / II-c hub
- Configuration, status and alarm supported by the SkyEdge II NMS and TotalNMS
- Value add to SkyEdge II / II-c hub - purchased if the OPEX benefits justify
- Enables growth to an existing network without adding space segment
- Fully redundant, guarantying continuous safe operation

Bandwidth Optimizer for SkyEdge II / II-c

The BWO-II is an optional component of the hub which serves the purpose of reducing the necessary space capacity of a planned VSAT network by 15% to 30%. It can also serve the purpose of enabling growth by allowing addition of VSATs to an existing network without adding space segment. The saving is achieved by applying "carrier inside a carrier" ("C-n-C") technology, which allows the placement of the outbound carrier together with the multiple inbound carriers on the same bandwidth. By design, the placement of the carriers together is performed while keeping the balance between satellite power and satellite bandwidth.

BWO-II Saves OPEX

In a typical implementation, the BWO-II is delivered with a 36 MHz cancellation capability. By a diligent selection of the MODCODs of the outbound and inbound carriers it becomes possible to make use of only one satellite transponder of 36 MHz for the whole traffic of the VSAT network. Design of the same network but without the BWO-II in place shows that the bandwidth needed is larger by 40%, so that additional 15 MHz are required in another transponder. This example represents 28% of bandwidth savings. With satellite bandwidth price of $3500 per MHz per month, the yearly saved cost reaches $630,000, which represents a very fast ROI.
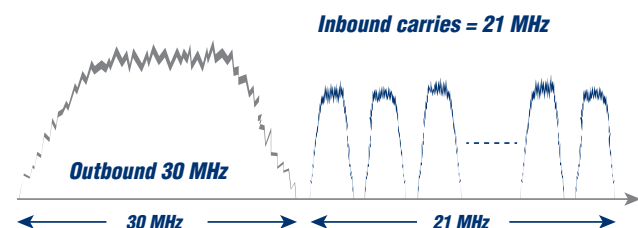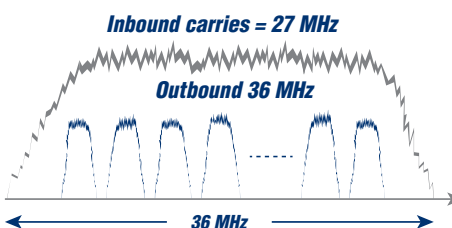
Without BWO-II - 51 MHz

Inbound carries = 21 MHz

Outbound 30 MHz

30 MHz

21 MHz

Diagram 1

With BWO-II - 36 MHz

Inbound carries = 27 MHz

Outbound 36 MHz

36 MHz

Gilat

Description of the BWO-II Solution

The BWO-II is available as an add-on to the SkyEdge II / II-c hub in a fully redundant configuration. As such, it is composed of two C-n-C boxes and an RF switch. In case that an internal fault is detected in the active box, the standby box will automatically resume the active mode by forcing the RF switch to disconnect the failed box and connect the healthy alternative. The switchover event is then shown in the SkyEdge II NMS or TotalNMS, with SkyEdge II-c.

As shown in the diagram, the output of the IPM, carrying the outbound RF signal, is directly connected to the hub RF terminal, and is also sampled by the active BWO-II box. The IPM is also directly connected to the MCRs so that critical timing information is available for the MCRs. The received signal from the hub RF terminal is connected to the input port of the BWO-II box, where it undergoes signal correlation with the samples of the transmitted outbound signal, enabling the process of signal cancellation, so that only a very small residual signal remains from the transmitted outbound signal.

By performing this cancellation, it becomes possible to provide the MCR receivers with the inbound signal as transmitted by the multiple VSATs, without a significant interference from the outbound signal, although the outbound and inbound signals occupied together the same frequency band in the satellite.

The careful design required for proper operation with the integrated BWO-II includes the cancellation of the outbound for reception of the inbound signal at the hub, as well as proper design that enables receiving the outbound signal at the VSAT.

The challenge with the outbound reception is that of making sure that the total RF signals of all the VSATs will not be received as a strong interference to the reception of the outbound signal. The solution to this challenge is hidden in the antenna sizes, the VSAT antenna and the hub antenna. While the VSAT is equipped with a small antenna (1m), the hub antenna is typically larger than 5m. The signal transmitted by the VSAT is therefore small, so that the sum of the inbound signals from all the VSATs is still very small compared to the outbound signal.

The Bandwidth Optimizer solution is mature and proven, with several successful integration cases with SkyEdge, and a few reference cases with SkyEdge II. It is therefore recommended to check viability of integration of BWO-II solution with every new VSAT network. In most cases it is very simple to analyze and decide positively due to the short period required for return on investment.
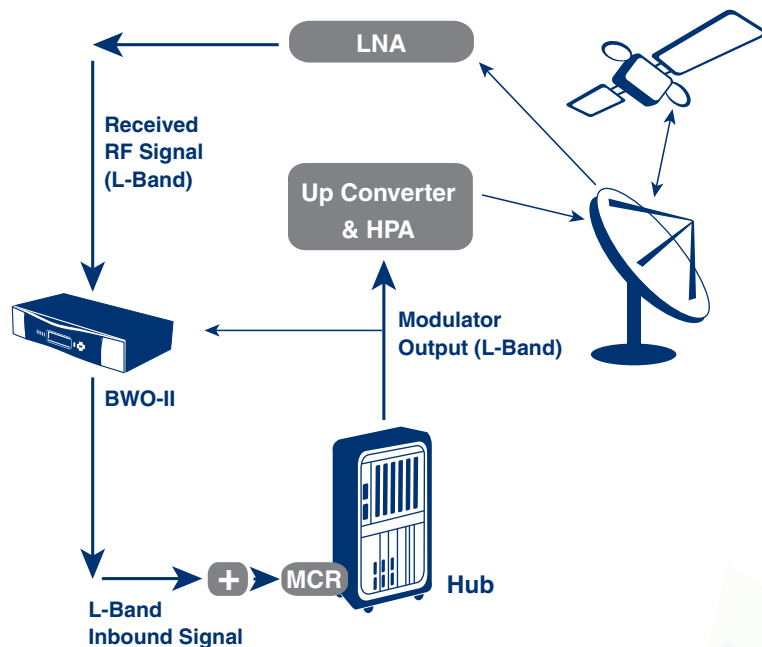
Diagram 2

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