iDIRECT

Advancing a Connected World

Designing a GSM Backhaul Network

Case Study 11

Customer Request

- *We would like to use a Broadband VSAT–based backhaul for our 100 GSM BTS*
- *Each BTS supports a peak of 16 voice circuits*

GSM Backhaul Network Design

This case study is based on the following requirements:

- *One Traffic Type with 100 BTS*
- *Voice*
  - *Analysis has shown that through Erlang gains, Decorrelation gains, local switching, we can assume a total circuit gain of 50% using a shared TDMA solution*
  - *We assume a voice circuit consumes 12Kbps (including signaling and management traffic)*

GSM Backhaul Network Design

- *Assumptions:*
  - *A link budget has been run and it is assumed all remotes can achieve an information rate of 1000Kbps*
    - *It is assumed that the link budgets are bandwidth limited.*
    - *Adjacent carrier spacing of 1.25 used for all carriers*
  - *2D16S-170B-3/4 FEC / QPSK used for Upstream*
  - *QPSK-3/4 Min MODCOD / 16APSK-2/3 Max MODCOD used for Downstream*

Solution

GSM Backhaul Network Design

- Solution
  - D/S 5.115 MHz
  - 13 U/S x 826 KHz

  - 1 x XLC-11
  - 2 x XLC-M, 8 demod license
  - Spare parts

  - 15.85 MHz – Subject to link budgets

GSM Backhaul Network Design

- *Let's assume we can use PCMA and overlay upstream carriers over the downstream carrier using the same modulation and FECs*

- *What are the resulting space segment requirement and savings?*

- *5115 KHz / 826 KHz = 6.2*
- *6 upstream carriers can be overlaid over the downstream i.e.*

- *Total space segment required:*
  - *5115 KHz + 7 x 826 KHz* = **10897 KHz**

- *Savings:*
  - *1 – (10897 KHz / 15870 KHz)* = **31%**

Questions?

http://www.idirect.net/Applications/Cellular-Backhaul.aspx