Manual Calculation of Break-Even Point

for the Use of Remote Subscriber Switches

Case Study

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CASE STUDY, MANUAL CALCULATION OF ECONOMICAL BREAK-EVEN POINT FOR THE USE OF REMOTE SUBSCRIBER SWITCHES

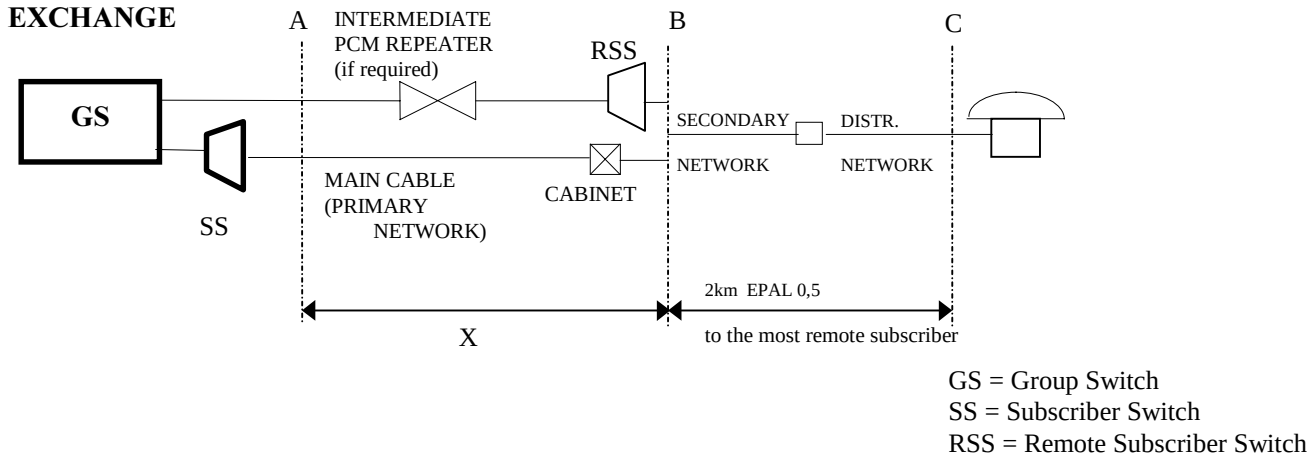

Figure 1

The task is to calculate the economical break-even point X km in 4 different cases.

CASE 1 500 new subscribers, new cable A-B, duct available.

CASE 2 2000 new subscribers, new cable A-B, duct available.

CASE 3 500 new subscribers, existing cable can be used for PCM. For the SS + cabinet alternative, a new duct is required. Same new main cable as in CASE 1.

CASE 4 2000 new subscribers, existing cable can be used for PCM. For the SS + cabinet alternative, a new duct is required. Same new cable as in CASE 2.

PCM

For PCM in Cases 1 and 2, two cable operation on a new EPBL cable is used. All pairs may be used for PCM. For various reasons, 0.7 mm cable is chosen.

The maximum PCM signal loss is 35 dB per repeater section length. For PCM in Cases 3 and 4, one cable operation is used. The existing cable can carry a maximum of 8 PCM systems with a planning given below:

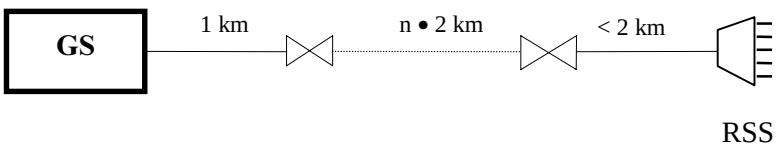

Figure 2

(This cable has, some time ago, been used as a loaded junction cable on the same route).

The number of full repeater sections n depends upon the distance GS-RSS.

LOSS BETWEEN EXCHANGE AND SUBSCRIBER

According to the transmission plan, the Reference Equivalent Loss between A and C must not exceed 8 dB. The telephone instrument is not included in this figure. This value refers only to the 2 wire part. For EPAL cable, the following loss is assumed in terms of Reference Equivalent Loss:

0.4 mm 1.60 dB/km
0.5 mm 1.21 dB/km
0.7 mm 0.79 dB/km

TRAFFIC AND GRADE OF SERVICE

Incoming + outgoing traffic per subscriber = 0.1 E. Maximum proportion of lost calls = 0.1 %.

GENERAL COMMENTS

In a real case, the provisional periods for PCM equipment would be distributed (which would favour the RSS alternative according to the PWAC method (**P**resent **W**orth of **A**nnual **Ch**arges). In order to simplify this study, it is assumed here that all PCM equipment is provided from the start.

Furthermore, in a real situation, it would be possible to use 0.4 mm cable in the secondary network in the RSS alternative. This fact also favours this alternative.

In order to further simplify, it is assumed that fault detector at the exchange is also used in case of no intermediate repeater.

CABLE PRICES PER KM INSTALLED CABLE

EPBL	0.4 mm	0.5 mm	0.7 mm
Pairs	x 1000	x 1000	x 1000
10	10	13	16
20	14	16	19
30	16	18	22
50	21	23	27
70	26	29	34
100	33	35	39
Assumed loss per km at 1 Mhz	20 dB	16dB	12dB

EPAL	0.4 mm	0.5 mm	0.7 mm
Pairs	x 1000	x 1000	x 1000
152	30	41	66
202	45	51	84
302	56	67	109
504	--	--	166
604	96	113	--
904	143	163	--
1206	185	208	--
1506	219	--	--
1806	249	--	--
2408	300	--	--

If new duct is required, add 100 % (cost share for one cable).

OTHER RELEVANT PRICES

Cabinet	500 subs	5 000
	2000 subs	20 000
RSS container with signalling, power, PCM line terminal repeater, MDF, ventilation, etc.		350 000
PCM line terminal repeater		1 500 each
Repeater case for PCM, installed		16 000/10 systems capacity
		20 000/24 systems capacity
PCM line terminal repeater		20 000 system 1
at the exchange		4 000 system 2
		4 000 system 3
		etc.
Fault detector at the exchange		12 000 *)
in a repeater case		4 000

*) Price to be divided by 3 because it is used for three different routes.

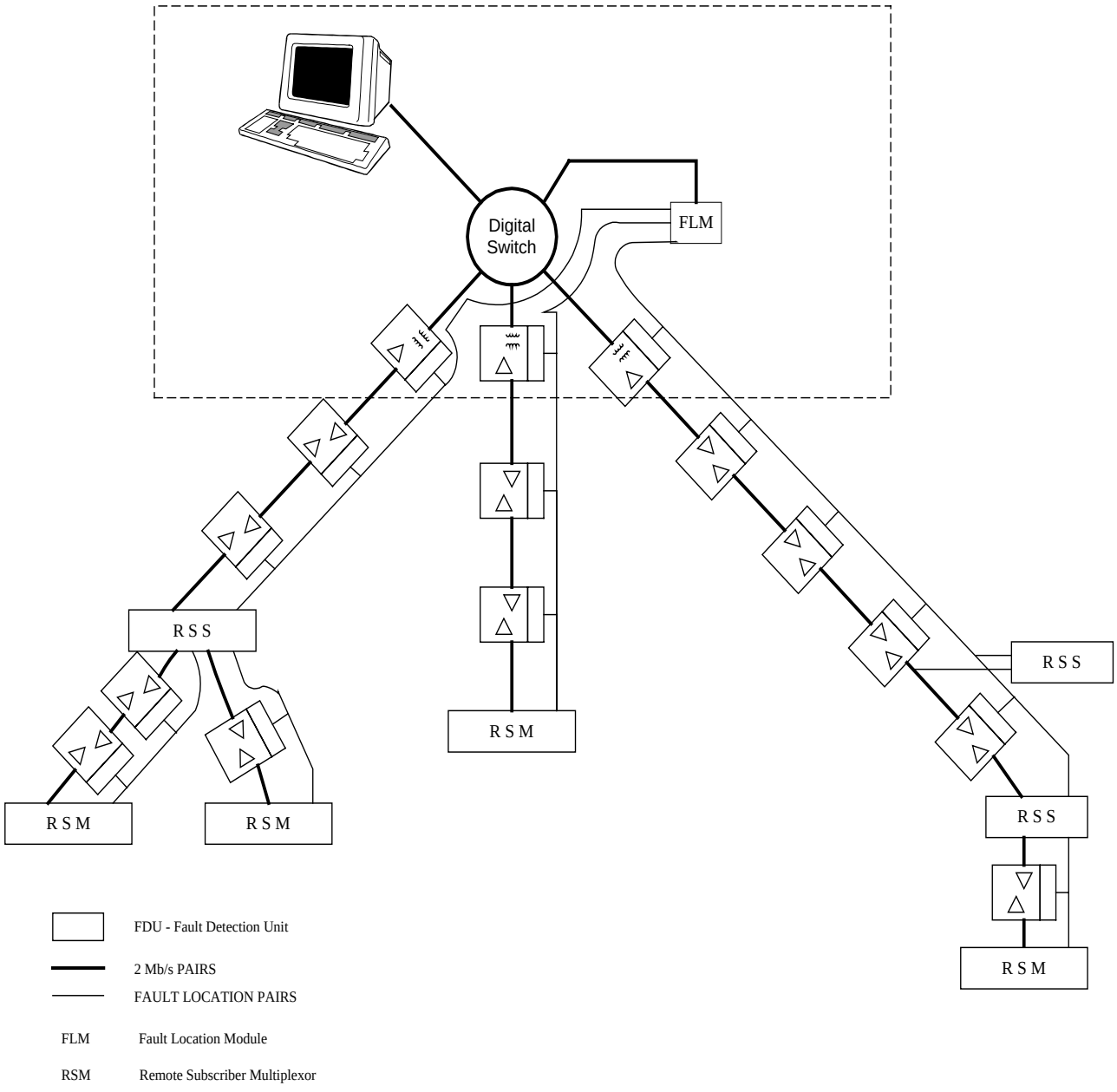

Figure 3 - Fault Location in Digital Network