Intermediate Line Irregularity Return Loss

EXCESS OR DEFICIENT LOADING SECTION CAPACITANCE OR INDUCTANCE

$$S = 20 \log_{10} \sqrt{1 + \frac{(f_c/f)^2 - 1}{h^2}}$$

$$h = \text{deviation from nominal} = \frac{\text{Actual - Nominal}}{\text{Nominal}}$$

Return Loss (S) at Irregularity—db

Fraction of Cutoff Frequency (f/f_c)
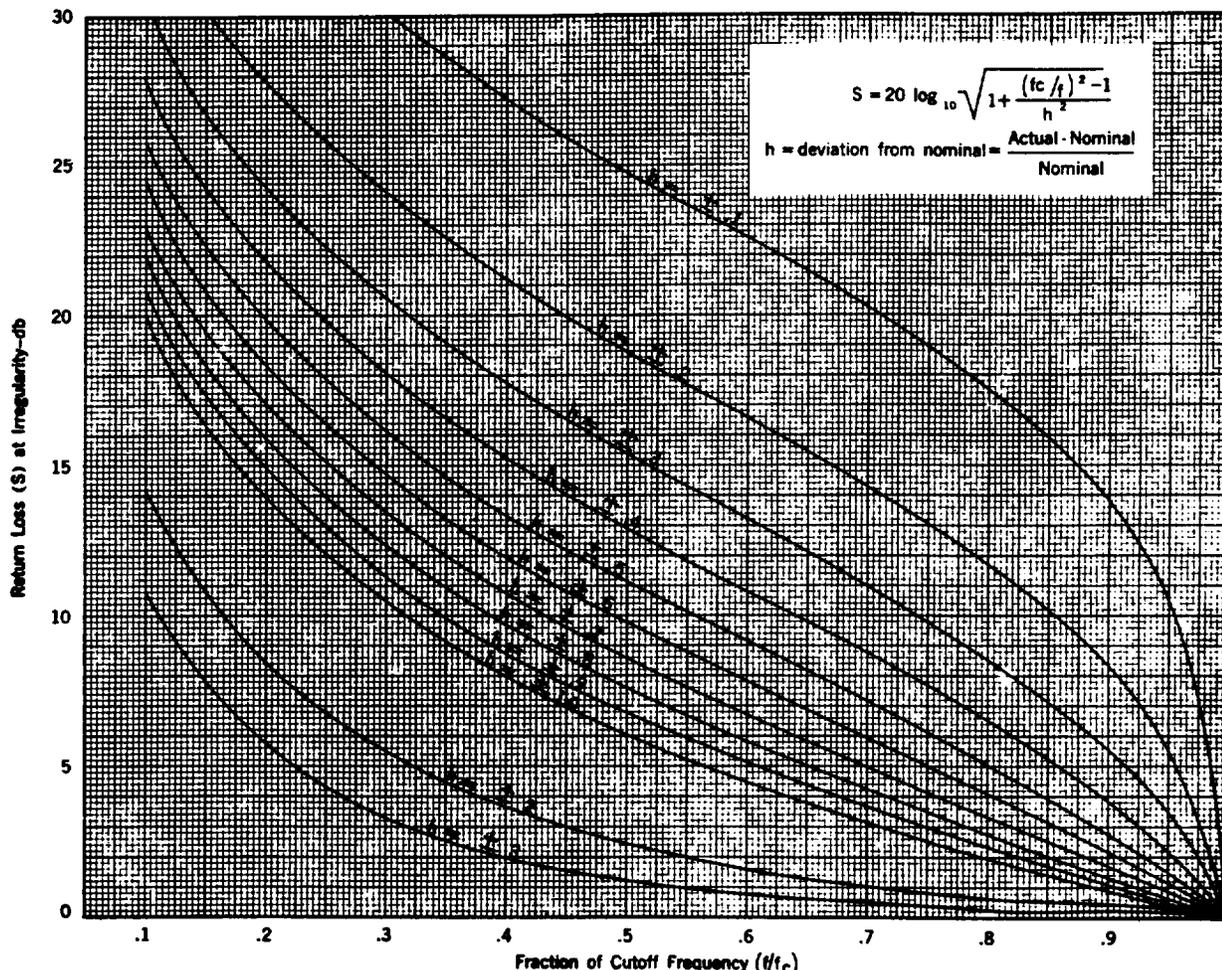
Notes: (1) These curves give the return loss due to a single abnormal irregularity of the
type mentioned in the Section title. Return losses for smaller values of "h"
are:

h*	Return Loss —db		
	$f/f_c = .2$	$f/f_c = .5$	$f/f_c = .8$
.01	54	45	37
.02	48	39	31
.05	40	31	23
.08	36	27	19
.10	34	25	17

* "h" is the deviation from nominal. In an H-loaded repeater section with an
average spacing of 6000 ft., for example, a loading section 6060 or 5940 i ..
in length would represent h = .01.

(2) Irregularities of this type will be largely a matter of coil spacing and any
change made in an already existing spacing designed to current recommendations
may be considered abnormal. As a rough rule for application of the curves any

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irregularity may be considered abnormal which will reduce the 63% structural return loss as much as 1 db. This means that the irregularity should be considered abnormal if the round trip loss from the office to the irregularity plus the return loss of the irregularity is not at least 6 db greater than the structural. (See Section 304-401-100)

(3) For convenience in applying these curves the ratio of f/f_c is given in the following table corresponding to frequencies at which singing computations are frequently made for the various types of facilities:

Facility	Cutoff Freq. (f_c)	"Critical" Freq. (f)	f/f_c
H-172 (S)	2800	2000	.715
H-106 (P)	2900	2000	.690
H-63 (P)	3700	2200	.595
H-88 (S)	4000	2900	.725
H-50 (P)	4200	2900	.692
B-88 (S)	5600	2900	.518
B-50 (P)	5900	2900	.492
H-44 (S)	5600	2200	.392
H-25 (P)	5900	2200	.372
H-44 (S)*	5600	2900	.518
H-25 (P)*	5900	2900	.492

* These figures are for H-44-25 circuits employing the wide-band filter (D-93985) instead of the usual 13-C type in case of the 22-A repeater; or employing the standard filter in case of the V1 repeater.