RECOMMENDATION ITU-R S.481-2*

Measurement of noise in actual traffic for systems in the fixed-satellite service for telephony using frequency-division multiplex

(1974-1978-1986)

The ITU Radiocommunication Assembly,

considering

a) that measurements by means of a generator producing white noise (Recommendation ITU-R S.482) are only possible when the radio-frequency channel is not carrying traffic;

b) that systems carrying multi-channel telephony cannot be withdrawn from service for measurement at will;

c) that protection channels, similar to those used in terrestrial radio-relay systems, are not available for maintenance purposes;

d) that maintenance measurements of the total noise (thermal and intermodulation noise) are useful for determining the quality of a system and must be made while the system is carrying traffic;

e) that it is convenient to place the channels used for this kind of measurement outside the total bandwidth of the multiplex signal;

f) that, when these measuring channels are located outside the total multiplex signal band, they should be positioned as near the limits of the total signal band as possible, to measure the intermodulation products due to the non-linearity of the system;

g) that, on the other hand, to facilitate and to minimize the cost of filter construction, the measuring channels should not be positioned too near these limits;

h) that measurements in channels about 10% above the upper limit of the total multiplex signal band are generally sensitive to changes of thermal and intermodulation noise in the radio-frequency and intermediate-frequency circuits of the equipment;

j) that it is usually necessary to use band-stop filters at the input of the system to minimize noise on the incoming circuit in the bands occupied by the measuring channels, and that it will be necessary to specify the minimum performance of these filters, both in the stopband of these filters and at the edges of the total multiplex signal band,

recommends

1 that noise occurring in links in the fixed-satellite service while actual traffic is being carried should be measured at the output of the system in relatively narrow bands situated above the total multiplex signal band;

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* Radiocommunication Study Group 4 made editorial amendments to this Recommendation in 2001 in accordance with Resolution ITU-R 44 (RA-2000).

2 that the centre frequencies of these measuring bands should be those listed in Table 1;

TABLE 1

System capacity (number of channels)	Limits of band occupied by telephone channels (kHz)	Centre frequencies, *f* of noise-measuring channels (kHz)
12	12-60	66
24	12-108	116
36	12-156	172
48	12-204	224
60	12-252	277
72	12-300	331
96	12-408	448
132	12-552	607
192	12-804	884
252	12-1 052	1 157
312	12-1 300	1 499
372	12-1 548	1 730
432	12-1 796	1 976
492	12-2 044	2 248
552	12-2 292	2 438
612	12-2 540	2 794
792	12-3 284	3 612
972	12-4 028	4 430
1 092	12-4 892	5 381
1 200	12-5 340	5 874
1 332	12-5 884	6 300
1 872	12-8 120	8 932

3 that the attenuation of the band-stop filters at the input of the system should exceed 50 dB over a minimum frequency band of ± (0.005 *f* + 2) kHz (*f* being the centre frequency in kHz of the measuring channel). The additional attenuation caused by the insertion of the band-stop filters at the upper edge of the total multiplex signal band shall not exceed 0.3 dB referred to the additional attenuation caused in the centre of the multiplex signal band;

4 that the effective bandwidth of the bandpass filters in the receiving equipment should be small enough for use with the input band-stop filter mentioned above;

5 that, in all cases where different frequency bands are used, or where there are differences between the measurement techniques, special agreements should be made between the administrations which use the same space systems of the fixed-satellite service.