RECOMMENDATION ITU-R F.290-3*

Maintenance measurements on radio-relay systems for telephony using frequency-division multiplex

(1959-1970-1974-1978)

The ITU Radiocommunication Assembly,

considering

that the operation of frequency-division multiplex radio-relay systems for telephony would be facilitated by maintenance procedures similar to those in existence for line networks,

recommends

that the following routine maintenance measurements should be made on radio-relay regulated line sections in accordance with ITU-T Recommendation M.500. These measurements should be made in the radio equipment terminal stations of the radio-relay system. Readjustment should be carried out in accordance with ITU-T Recommendation M.510.

1   At intervals to be determined by agreement between the administrations concerned and based on experience of the reliability of the system:

–   measurement of the loss/frequency distortion at frequencies in the baseband relative to the reference frequency** or multi-frequency check (permissible limits ±2 dB except under abnormal propagation conditions);

–   when there is no continuous recording of noise, measurement of the total noise level on the noise-measurement channels outside the baseband in accordance with Recommendation ITU-R F.398*** this measurement can be made without causing any interference in the transmission channel;

–   further measurements, e.g. group delay measurement, may be appropriate to obtain more detailed information.

2   When the measurement mentioned in § 1 gives unacceptable high noise values, or more often, when the reliability of the system makes it desirable, check the following measurements in accordance with the appropriate ITU-R Recommendations for the radio-relay system concerned, the radio-frequency channel being switched to the stand-by equipment. Measurement results should be compared with the results of the reference measurements required by ITU-T Recommendation M.450, § 3.3:

–   the deviation of the frequency at which the level is unchanged by pre-emphasis;

–   the pilot-frequency deviation;

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*   Radiocommunication Study Group 9 made editorial amendments to this Recommendation in 2001 in accordance with Resolution ITU-R 44.

**   The baseband reference frequency may be different from the frequency at which the level is unchanged by pre-emphasis and may be selected from one of the frequencies specified in § 3.1.2 of ITU-T Recommendation M.450 for each transmitted bandwidth.

***   Where a protection channel is provided, and if administrations so desire, noise measurements may be made on that channel with artificial loading, in accordance with Recommendation ITU-R F.399.

–   the nominal value (control position) of the intermediate frequency in the non-modulated condition of the system;

–   the level of the baseband reference frequency where applicable (single-frequency check);

–   the baseband amplitude variation with frequency relative to the reference frequency where applicable (multi-frequency check);

–   the level of individual interfering signals in the baseband in the non-modulated condition of the system.

3   So as to enable the overall limits for the variations of transmission equivalent (see under § 1) to be met, the difference in baseband response between two systems in diversity reception or between working and protection systems should not exceed 2 dB.

NOTE 1 – The variation of ±2 dB applies to all types of switching including baseband. The actual variation may be less for intermediate-frequency switching or for diversity switching on a single radio hop.

In order to achieve this figure consistently, it may be necessary for the amplitude/frequency response of each radio channel to be adjusted to tighter limits than those given in Recommendation ITU-R F.380, Note 7.

Administrations may find it advisable to adjust the transmission equivalent of all radio channels in the same switching system to close limits at a single mutually agreed reference frequency.