7. Proposed additions and revisions to Recommendation M.1020

CHARACTERISTICS OF SPECIAL QUALITY LEASED CIRCUITS
WITH SPECIAL BANDWIDTH CONDITION

2.1 Reword § 2.8 as follows:

"2.8 Total distortion (including quantizing distortion)

On a mixed analogue/digital circuit the signal will be accompanied by quantizing distortion. An end-to-end distortion measurement made using an instrument conforming to Recommendation O.132 [5] will include contributions from random circuit noise, single tone interference and harmonic distortion. The level of random noise power at the renter's premises depends upon the length of frequency division multiplex carrier systems in the circuit. The level of quantizing distortion power depends on the number of unintegrated digital processes in the circuit.

The signal to total distortion ratio should be better than 28 dB using a sine-wave signal at -10 dBmO (see also Annex A to this Recommendation)."

2.2 Change the title of § 2.11 to:

"2.11 Harmonic and intermodulation distortion"

Add a second alinea to § 2.11 as follows:

"The limit of second and third order intermodulation products measured using an instrument complying with Recommendation O.42 is for further study."

2.3 Amend the annex to Recommendation M.1020 as follows:

Renumber the title to read:

"A.1 Random circuit noise"

Amend the first sentence as follows:

"Figure A-1/M.1020 displays random noise versus length of FDM carrier systems and is presented as a guide to the random noise performance which may be found on an international leased circuit."

The axis of the graph in Figure A-1/M.1020 which is labelled "circuit length" should be changed to "Length of FDM carrier systems".

The note to the figure should be amended to read:

"Note - At the present time the section of the circuit provided by a satellite (between earth stations) employing FDM techniques contributes approximately 10 000 pWOp (-50 dBmOp) of noise. Therefore, for the purpose of determining maintenance limits for noise measurements on leased circuits, the length of this section may be considered to be equivalent to 1,000 km in Figure A-1/M.1020."

The contribution to noise of a circuit section provided by a satellite employing TDM techniques remains as a subject for further study.

Add new section A.2 as follows:

"A.2 Total distortion

Table A-1/M.1020 is a guide to the signal-to-total distortion ratio which may be found on circuits with different analogue section lengths and numbers of quantizing distortion units (QDU). When interpreting this table, particularly for circuits with long analogue sections, it should be noted that it may be possible to increase the number of QDUs in a circuit provided the analogue sections contribute less noise than might be expected from Figure A-1/M.1020."

Add the following new Table A-1/M.1020 to the annex of Recommendation M.1020:

TABLE A-1/M.1020

Signal to total distortion ratio using a sinusoidal signal at -10 dBmO

			Distance in analogue transmission					
Type of circuit	Number of QDUs (Note 1)	Unit	321 < 320 km	641 to 640 km	1,601 to 1,600 km	2,501 to 2,500 km	5,001 to 5,000 km	10,001 to 10,000 km / 20,000 km
Analogue	0	dB	43	41	38	36	33	30	28
	1	dB	34	34	33	32	31	29	28
	2	dB	32	31	31	31	29	28	28
Composite circuit	3	dB	30	30	30	9	28	28	28
	4	dB	29	29	28	8	28	28	28
	5	dB	28	28	28	8	28	28	28

Note 1 - The number of QDUs contributed by various digital processes are given in Table 1 of Recommendation G.113 [7].