

VOICE BANDWIDTH PRIVATE LINE DATA CIRCUITS CIRCUIT CONDITIONING REQUIREMENTS USING THE COLLINS CLA-101A SYSTEM

1. GENERAL

1.01 This section provides attenuation distortion and envelope delay distortion requirements for voice bandwidth private line data channels when tests are performed using the Collins CLA-101A system.

1.02 The CLA-101A system uses test frequencies spaced at 250-Hz intervals ranging from 250 Hz to 3500 Hz. The conditioning test requirements for voice bandwidth data channels are stated differently when using the CLA-101A system test equipment. This difference is due to the different test frequencies that are used. Limits have been developed for attenuation distortion and envelope delay distortion at the CLA-101A frequencies that will give reasonable assurance that the channel conditioning requirements are met within the specified frequency bands.

1.03 The limits for attenuation distortion and envelope delay distortion are given in Tables A and B of this section. These tables should be substituted for the attenuation distortion and envelope delay distortion requirements given in Section 314-410-500 when the Collins CLA-101A system is used to perform these tests. Table C provides the limits for overseas circuits.

1.04 The amplitude characteristic (attenuation distortion) of a network or interexchange facility is commonly determined by measuring the loss of a single-frequency tone as it is tuned across the bandwidth of interest. This type of measurement

is referred to as the static frequency response. A static measurement performed on private line data channels may not provide the same amplitude characteristic results as that given by using a complex test waveform, due to level and frequency sensitive devices and the presence of nonlinearities. Measurement results with differences of up to 2 dB have been obtained on some compandored facilities when using other measuring techniques. These differences result from the relative placement of filters with respect to level sensitive and nonlinear devices, and generally are larger near the limits of the frequency band. In these cases the frequency response is a function of the bandwidth of the signal on the channel. This type of response is referred to as the dynamic frequency response.

1.05 The Collins CLA-101A system uses a complex signal and performs a dynamic frequency response measurement. By comparison, the Bell System measurement technique used at this time is a static frequency response measurement.

1.06 A compandored channel will appear to have a wider bandwidth when using a dynamic frequency response measurement than with a static frequency response measurement. In some cases the customer, when using a single frequency transmission measuring set, may report that the frequency response is out of limits. However, subsequent testing using the Collins CLA-101A system may indicate the frequency response is within specified limits. In these cases, the circuit must be adjusted to meet requirements using the static frequency response technique.

TABLE A
PRIVATE LINE VOICE BANDWIDTH CIRCUIT ATTENUATION DISTORTION REQUIREMENTS (dB) USING COLLINS CLA-101A SYSTEM

FREQUENCY RANGE IN HZ	2- POINT	0		1		2		3		4	
		MID LINK END LINK	MID LINK		MID LINKS		MID LINKS		MID LINKS		
			END LINK	MID LINK	END LINK	MID LINK	END LINK	MID LINK	END LINK	MID LINK	END LINK
3002 (ALSO 2000)											
BASIC	(VB)	(VBE0)	(VBE1)	(VBM1)	(VBE2)	(VBM2)	(VBE3)	(VBM3)	(VBE4)	(VBM4)	
500-2500	-2 to +8	-1.5 to +4	-1 to +4	-1 to +3.5	-1 to +4	-1 to +3.5	-1 to +3.5	-0.8 to +3.5	-0.8 to +3.5	-0.8 to +3	-0.8 to +3
250-3000	-3 to +12	-1.5 to +6	-1.5 to +6	-1.5 to +6	-1.5 to +6	-1.5 to +5	-1.5 to +5	-1 to +4.5	-1.5 to +4.5	-1 to +4.5	-1 to +4.5
C1	(C1)	(C1E0)	(C1E1)	(C1M1)	(C1E2)	(C1M2)	(C1E3)	(C1M3)	(C1E4)	(C1M4)	
1000-2500	-1 to +3	-0.7 to +1.5	-0.6 to +1.5	-0.5 to +1	-0.5 to +1.5	-0.5 to +1	-0.5 to +1				
250-2750	-2 to +6	-1.5 to +3	-1 to +3	-1 to +3	-1 to +3	-1 to +2.5	-1 to +3	-0.8 to +2	-0.8 to +3	-0.8 to +2	-0.8 to +2
250-3000	-3 to +12	-1.5 to +6	-1.5 to +6	-1.5 to +6	-1.5 to +6	-1.5 to +5	-1.5 to +5	-1 to +4.5	-1.5 to +4.5	-1 to +4.5	-1 to +4.5
C2	(C2)	(C2E0)	(C2E1)	(C2M1)	(C2E2)	(C2M2)	(C2E3)	(C2M3)	(C2E4)	(C2M4)	
500-2750	-1 to +2.7	-0.6 to +1.4	-0.5 to +1.4	-0.5 to +1.4	-0.5 to +1.4	-0.5 to +1.4	-0.5 to +1.4	-0.5 to +1	-0.5 to +1.4	-0.5 to +1	-0.5 to +1
250-3000	-2 to +6	-1.5 to +3	-1 to +3	-1 to +3	-1 to +3	-1 to +2.5	-1 to +3	-0.8 to +2	-0.8 to +3	-0.8 to +2	-0.8 to +2
C3 ACCESS LINE*†	(C3A)(C3AC)										
500-2750		-0.5 to +1.3									
250-3000		-0.8 to +3									
C3 TRUNK*	(C3T)										
500-2750		-0.5 to +1									
250-3000		-0.8 to +2									
C4	(C4)										
500-3000		-2 to +3									
250-3250		-2 to +7									
C5	(C5)										
500-2750		-0.5 to +1.3									
250-3000		-1 to +3									

() Figures in parentheses are classification codes which may be found on some CLRCs to indicate the conditioning requirement for each link of the circuit.

* C3 conditioning requirements apply to AUTOVON and CCSA circuits only. Refer to Sections 309-200-300 and 309-200-301 for more information.

† Classification code C3AC assumes measurement taken with compromise equalizer temporarily out of service.

TABLE B
PRIVATE LINE VOICE BANDWIDTH CIRCUIT ENVELOPE DELAY REQUIREMENTS (MICROSECONDS)
USING COLLINS CLA-101A SYSTEM

FREQUENCY RANGE IN HZ	2 POINT	0		1		2		3		4	
		MID LINK END LINK	MID LINK		MID LINKS		MID LINKS		MID LINKS		
			END LINK	MID LINK	END LINK	MID LINK	END LINK	MID LINK	END LINK	MID LINK	END LINK
3002 (ALSO 2000)											
BASIC	(VB)	(VBE0)	(VBE1)	(VBM1)	(VBE2)	(VBM2)	(VBE3)	(VBM3)	(VBE4)	(VBM4)	
750-2750	1900	1050	750	630	630	450	450	420	420	300	
C1	(C1)	(C1E0)	(C1E1)	(C1M1)	(C1E2)	(C1M2)	(C1E3)	(C1M3)	(C1E4)	(C1M4)	
1000-2500	1000	550	400	300	300	250	250	200	200	175	
750-2750	1900	1050	750	630	630	450	450	420	420	300	
C2	(C2)	(C2E0)	(C2E1)	(C2M1)	(C2E2)	(C2M2)	(C2E3)	(C2M3)	(C2E4)	(C2M4)	
1000-2500	400	240	200	150	150	125	125	100	100	80	
750-2750	1100	700	520	380	380	330	330	250	250	220	
500-2750	2500	1500	1100	800	800	690	690	600	600	450	
C3 ACCESS LINE*†	(C3A) (C3AC)										
1000-2500	100										
750-2750	240										
500-2750	600										
C3 TRUNK*	(C3T)										
1000-2500	80										
750-2750	200										
500-2750	450										
C4	(C4)										
1000-2500	260										
750-2750	450										
750-3000	1500										
500-3000	3000										
C5	(C5)										
1000-2500	90										
750-2750	240										
500-2750	530										

() Figures in parentheses are classification codes which may be found on some CLRCs to indicate the conditioning requirement for each link of the circuit.

* C3 conditioning requirements apply to AUTOVON and CCSA circuits only. Refer to Sections 309-200-300 and 309-200-301 for more information.

† Classification code C3AC assumes measurement taken with compromise equalizer temporarily out of service.

TABLE C
CONDITIONING REQUIREMENTS FOR OVERSEAS CIRCUITS
USING COLLINS CLA-101A SYSTEM

CONUS TO INTERNATIONAL CARRIER'S GATEWAY	
<i>C1 Conditioned Channel Arranged for Switching</i>	
Loss-Frequency Response*	
1000-2500 Hz	-0.6 to +1.7 dB
250-2750 Hz	-1.2 to +3.5 dB
250-3000 Hz	-1.7 to +7.0 dB
Envelope Delay Distortion	
1000-2500 Hz	370 microseconds
750-2750 Hz	710 microseconds
<i>C2 Conditioned Channel</i>	
Loss-Frequency Response*	
500-2750 Hz	-0.5 to +1.6 dB
250-3000 Hz	-1.2 to +3.5 dB
Envelope Delay Distortion	
1000-2750 Hz	185 microseconds
750-2750 Hz	475 microseconds
500-2750 Hz	1000 microseconds
INTERNATIONAL CARRIER'S GATEWAY TO GROUND STATION OR CABLE HEAD	
<i>For Either of Above Types of Circuit</i>	
Loss-Frequency Response*	
500-2750 Hz	-0.5 to +1.4 dB
250-3000 Hz	-0.8 to +3.0 dB
Envelope Delay Distortion	
1000-2500 Hz	100 microseconds
750-2750 Hz	250 microseconds
500-2750 Hz	600 microseconds

* Referred to 1000 Hz

(+) is more loss; (-) is less loss.