

TIA CAT 6 Perm. Link

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6	69	NA	12345678S 12345678	N/A	90m 295ft	<44	<498	1.0	65.0	3.0	19.0	62.1	64.2	62.0	59.0	61.2
								4.0	64.1	3.5	21.0	60.6	52.2	61.8	58.3	49.2
								8.0	59.4	5.0	21.0	54.4	46.1	57.0	52.1	43.1
								10.0	57.8	5.6	21.0	52.3	44.2	55.5	49.9	41.2
								16.0	54.6	7.0	20.0	47.6	40.1	52.2	45.2	37.1
								20.0	53.1	7.9	19.5	45.2	38.2	50.7	42.8	35.2
								25.0	51.5	8.9	19.0	42.7	36.2	49.1	40.2	33.2
	74	NA	12345678S 12345678S	N/A	90m 295ft	<44	<498	31.25	50.0	10.0	18.5	40.0	34.3	47.5	37.6	31.3
								62.5	45.1	14.4	16.0	30.8	28.3	42.7	28.3	25.3
								100.0	41.8	18.6	14.0	23.4	24.2	39.3	20.8	21.2
								125.0	40.3	21.0	13.0	19.4	22.2	37.7	16.8	19.3
								200.0	36.9	27.4	11.0	9.9	18.2	34.3	7.2	15.2
								250.0	35.3	31.1	10.0	4.6	16.2	32.7	2.0	13.2

NOTE:
All limits derived from the TIA/EIA-568-B.2.1 (Approved June 2002).
* When attenuation is greater than 3 dB

TIA CAT 5e Perm Link

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5e	69	NA	12345678S 12345678	N/A	90m 295ft	<45	<498	1.0	60.0	3.0	19.0	57.0	58.6	57.0	54.9	55.6
								4.0	54.8	3.9	19.0	50.9	46.6	51.8	47.9	43.6
								8.0	50.0	5.7	19.0	44.5	40.6	47.0	41.5	37.6
								10.0	48.5	6.2	19.0	42.3	38.6	45.5	39.3	35.6
								16.0	45.2	7.9	19.0	37.3	34.5	42.2	34.3	31.5
								20.0	43.7	8.9	19.0	34.8	32.6	40.7	31.8	29.6
								25.0	42.1	10.0	18.0	32.1	30.7	39.1	29.1	27.7
	69	NA	12345678S 12345678S	N/A	90m 295ft	<45	<498	31.25	40.5	11.2	17.1	29.3	28.7	37.5	26.3	25.7
								62.5	35.7	16.2	14.1	19.4	22.7	32.7	16.4	19.7
								100.0	32.3	21.0	12.0	11.3	18.6	29.3	8.3	15.6

NOTE:
All limits derived from TIA/EIA-568B specifications.
* When attenuation is greater than 3 dB

TIA CAT6 Channel

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6	69	NA	12345678S 12345678	N/A	100m 328ft	<50	<555	1.0	65.0	3.0	19.0	62.0	63.3	62.0	59.0	60.3
								4.0	63.0	4.0	19.0	59.0	51.2	60.5	56.5	48.2
								8.0	58.2	5.6	19.0	52.5	45.2	55.6	49.9	42.2
								10.0	56.6	6.3	19.0	50.2	43.2	54.0	47.7	40.3
								16.0	53.2	8.0	19.0	45.2	39.2	50.6	42.5	36.2
								20.0	51.6	9.0	17.5	42.6	37.2	49.0	39.9	34.2
								25.0	50.0	10.1	17.0	39.9	35.3	47.4	37.2	32.3
	74	NA	12345678S 12345678S	N/A	100m 328ft	<50	<555	31.25	48.4	11.4	16.5	37.0	33.3	45.7	34.3	30.4
								62.5	43.4	16.5	14.0	26.9	27.3	40.6	24.1	24.3
								100.0	39.9	21.3	12.0	18.6	23.2	37.1	15.8	20.3
								125.0	38.3	24.6	11.0	14.2	21.3	35.4	11.3	18.3
								200.0	34.8	31.5	9.0	3.2	17.2	31.9	0.3	14.2
								250.0	33.1	36.0	8.0	-2.8	15.3	30.2	-5.8	12.3

NOTE:
All limits derived from the TIA/EIA-568-B.2.1 (Approved June 2002).
* When attenuation is greater than 3 dB

TIA CAT 5e Channel

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	Limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S 12345678	N/A	100m 328ft	<50	<555	1.0	60.0	3.0	17.0	57.0	57.4	57.0	54.0	54.4
								4.0	53.6	4.5	17.0	49.1	45.3	50.6	46.1	42.4
								8.0	48.6	6.3	17.0	42.3	39.3	45.6	39.3	36.3
								10.0	47.0	7.1	17.0	39.9	37.4	44.0	36.9	34.4
								16.0	43.6	9.1	17.0	34.5	33.3	40.6	31.5	30.3
								20.0	42.0	10.2	17.0	31.8	31.4	39.0	28.8	28.4
								25.0	40.4	11.4	16.0	28.9	29.4	37.4	25.9	26.4
	69	NA	12345678S 12345678S	N/A	100m 328ft	<50	<555	31.25	38.7	12.9	15.1	25.9	27.5	35.7	22.9	24.5
								62.5	33.6	18.6	12.1	15.0	21.5	30.6	12.0	18.5
								100.0	30.1	24.0	10.0	6.1	17.4	27.1	3.1	14.4

NOTE:
All limits derived from TIA/EIA-568-A addendum #5 and TIA/EIA 568-B. There were no changes in requirements for the Channel between addendum 5 and 568-B.
* When attenuation is greater than 3 dB

TIA CAT 6 BL (1999)

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6	69	NA	12345678S 12345678	N/A	94m 308ft	<45	<518	1.0 4.0 8.0 10.0 16.0 20.0 25.0 31.25 62.5 100.0 125.0 200.0 250.0	65.0 64.1 59.4 57.8 54.6 53.1 51.5 50.0 45.2 41.9 40.3 36.9 35.4	3.0 3.7 5.2 5.8 7.3 8.2 9.2 10.4 14.9 19.2 21.7 28.1 31.8	19.0 19.0 19.0 19.0 19.0 19.0 18.3 17.6 15.5 14.1 13.4 12.0 11.3	63.0 60.4 54.2 52.1 47.3 44.9 42.3 39.6 30.2 25.2 18.6 19.2 3.5	63.1 53.2 47.1 45.2 41.1 39.2 37.2 35.3 29.3 25.2 23.3 19.2 17.2	62.0 61.8 57.0 55.5 52.2 50.7 49.1 47.6 42.7 39.3 37.7 34.3 32.7	60.0 58.1 51.9 49.7 44.9 42.5 39.9 37.2 27.7 20.1 16.0 6.3 0.9	60.1 50.2 44.1 42.2 38.1 36.2 34.2 32.3 26.3 22.2 20.3 16.2 14.2

NOTE:
All limits derived from the ANSI/TIA/EIA Category 6 draft 5, May 1999 specifications. (This is an old draft. It remains within the DSP to support legacy systems)
* When attenuation is greater than 3 dB

TIA CAT 5e BL (1999)

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5e	69	NA	12345678S 12345678	N/A	94m 308ft	<45	<518	1.0 4.0 8.0 10.0 16.0 20.0 25.0 31.25 62.5 100.0	60.0 54.8 50.0 48.5 45.2 43.7 42.1 40.6 35.7 32.3	3.0 4.0 5.7 6.4 8.1 9.1 10.3 11.6 16.7 21.6	17.0 17.0 17.0 17.0 17.0 17.0 16.3 15.6 13.5 12.1	57.0 50.8 44.4 42.1 37.1 34.5 31.8 29.0 18.9 10.7	60.0 48.0 41.9 40.0 35.9 34.0 32.0 30.1 24.1 20.0	57.0 51.8 47.1 45.6 42.2 40.7 39.1 37.5 32.6 29.3	54.0 47.8 41.4 39.2 34.1 31.5 28.8 25.9 15.9 7.7	57.0 45.0 38.9 37.0 32.9 31.0 29.0 27.1 21.1 17.0

NOTE:
All limits derived from TIA/EIA-568-A addendum #5 specifications. (This is an obsolete standard. It remains within the DSP to support legacy systems)
* When attenuation is greater than 3 dB

TIA CAT 5 BL (TSB-95)

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	Limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S 12345678	N/A	94m 308ft	<45	<518	1.0 4.0 8.0 10.0	60.0 51.8 47.1 45.5	3.0 4.0 5.7 6.4	15.0 15.0 15.0 15.0	57.0 47.8 41.4 39.1	57.0 45.0 38.9 37.0	N/A	N/A	54.4 42.4 36.3 34.4
ScTP 100 Ω Cat5	69		12345678S 12345678S					16.0 20.0 25.0 31.5 62.5 100.0	42.3 40.7 39.1 37.6 32.7 29.3	8.1 9.1 10.3 11.6 16.7 21.6	15.0 15.0 14.3 13.6 11.5 10.1	34.1 31.6 28.9 26.0 15.9 7.7	32.9 31.0 29.0 27.1 21.1 17.0			30.3 28.4 26.4 24.5 18.5 14.4

NOTE:
All limits derived from TSB-95 specifications. (This is an obsolete standard. It remains within the DSP to support legacy systems)
* When attenuation is greater than 3 dB

TIA CAT 5 BL (TSB-67)

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S 12345678	N/A	94m 308ft	<50	N/A	1.0 4.0 8.0 10.0 16.0 20.0 25.0 31.25 62.5 100.0	60.0 51.8 47.1 45.5 42.3 40.7 39.1 37.6 32.7 29.3	3.0 4.0 5.7 6.3 8.2 9.2 10.3 11.5 16.7 21.6	N/A	N/A	N/A	N/A	N/A	N/A

NOTE:
All limits derived from TIA TSB-67 Cat 5 Basic Link Specifications. (This is an obsolete standard. It remains within the DSP to support legacy systems)

TIA CAT 5 CH (TSB-95)

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL*	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	Limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S 	N/A	100m 328ft	<50	<555	1.0	60.0	3.0	15.0	57.0	57.0	N/A	N/A	54.4
	69							4.0	50.6	4.5	15.0	46.1	45.0			42.4
			12345678					8.0	45.6	6.3	15.0	39.3	38.9			36.3
ScTP 100 Ω Cat5	69		12345678S 					10.0	44.0	7.0	15.0	36.9	37.0			34.4
								16.0	40.6	9.2	15.0	31.6	32.9			30.3
			12345678S					20.0	39.0	10.3	15.0	28.8	31.0			28.4
								25.0	37.4	11.4	14.0	26.0	29.0			26.4
								31.5	35.7	12.8	13.1	22.9	27.1			24.5
								62.5	30.6	18.5	10.1	12.0	21.1			18.5
								100.0	27.1	24.0	8.0	3.1	17.0			14.4

NOTE:
All limits derived from TSB-95 specifications. (This is an obsolete standard. It remains within the DSP to support legacy systems)
* When attenuation is greater than 3 dB

TIA CAT 5 CH (TSB-67)

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S 	N/A	100m 328ft	<50	N/A	1.0	60.0	3.0	N/A	N/A	N/A	N/A	N/A	N/A
								4.0	50.6	4.5						
			12345678					8.0	45.6	6.3						
ScTP 100 Ω Cat5	69		12345678S 					10.0	44.0	7.0						
								16.0	40.6	9.2						
			12345678S					20.0	39.0	10.3						
								25.0	37.4	11.4						
								31.25	35.7	12.8						
								62.5	30.6	18.5						
								100.0	27.1	24.0						

NOTE:
All limits derived from TIA TSB-67 Cat 5 Channel Specifications. (This is an obsolete standard. It remains within the DSP to support legacy systems)

TIA CAT 3 Basic Link

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S 	N/A	94m 308ft	<50	N/A	1.0	40.1	3.3	N/A	N/A	N/A	N/A	N/A	N/A
UTP 100 Ω Cat 4	66							4.0	30.7	6.1						
UTP 100 Ω Cat 3	62		12345678					8.0	25.9	8.8						
								10.0	24.3	10.0						
ScTP 100 Ω Cat5	69		12345678S 					16.0	21.0	13.2						
ScTP 100 Ω Cat4	69															
ScTP 100 Ω Cat3	60		12345678S													

NOTE:
All limits derived from TIA TSB-67 Cat 3 Basic Link Specifications. (This is an obsolete standard. It remains within the DSP to support legacy systems)

TIA CAT 3 Perm. Link

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S 	N/A	90m 295ft	<44	<498	1.0	40.1	3.5	N/A	N/A	N/A	N/A	N/A	N/A
UTP 100 Ω Cat 4	66							4.0	30.7	6.2						
UTP 100 Ω Cat 3	62		12345678					8.0	25.9	8.9						
								10.0	24.3	9.9						
ScTP 100 Ω Cat5	69		12345678S 					16.0	21.0	13.0						
ScTP 100 Ω Cat4	69															
ScTP 100 Ω Cat3	60		12345678S													

NOTE:
All limits derived from TIA/EIA 568-B.

TIA CAT 3 Channel

[illegible]

TIA TSB-75 MUTO LINK

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100Ω Cat 5	69	NA	12345678S 12345678	N/A	94m 308ft	<50	N/A	1.0 4.0 8.0 10.0	61.2 51.8 47.1 45.5	15.0 15.0 15.0 15.0	N/A	N/A	N/A	N/A	N/A	N/A
ScTP 100Ω Cat5	69		12345678S 12345678S					16.0 20.0 25.0 31.25 62.5 100.0	42.3 40.7 39.1 37.6 32.7 29.3	15.0 15.0 15.0 15.0 15.0 15.0						
NOTE: All limits derived from TIA TSB-67 Cat 5 Basic Link Specifications except Attenuation limits are length corrected to a floor limit of 15dB.																

ISO11801 PL max Class C

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
4 Pair Wire Map																
UTP 100 Ω Cat 3	62	NA	12345678S	<40	90m	<43	<498	1.0	40.1	3.1	15.0	N/A	N/A	N/A	N/A	N/A
UTP 100 Ω Cat 4	666				295ft			4.0	30.7	5.8	15.0					
UTP 100 Ω Cat 5	9		12345678					10.0	24.3	9.6	15.0					
								16.0	21.0	12.6	15.0					
ScTP 100 Ω Cat 3	60		12345678S													
ScTP 100 Ω Cat 4	69															
ScTP 100 Ω Cat 5	69		12345678S													
ScTP 120 Ω Cat 3	77		12345678S													
ScTP 120 Ω Cat 4	77															
ScTP 120 Ω Cat 5	77		12345678S													
STP 150 Ω	78		12345678S													
			12345678S													

NOTE:

All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**

Maximum length limits are: 90m for Cat3, 140m for Cat4, 150m for Cat 5, and 240m for 150 ohm STP.

Exceeding the Length, or Delay Skew limit will result in a "Warning" only.

Return Loss is not tested for STP 150 ohm cable types.

ISO11801 Channel Class C

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
4 Pair Wire Map																
UTP 100 Ω Cat 3	62	NA	12345678S	<40	100m	<50	<555	1.0	39.1	4.2	15.0	N/A	N/A	N/A	N/A	N/A
UTP 100 Ω Cat 4	666				328ft			4.0	29.2	7.3	15.0					
UTP 100 Ω Cat 5	9		12345678		Note*			10.0	22.7	11.5	15.0					
								16.0	19.4	14.9	15.0					
ScTP 100 Ω Cat3	60		12345678S													
ScTP 100 Ω Cat4	69															
ScTP 100 Ω Cat5	69		12345678S													
ScTP 120 Ω Cat3	77		12345678S													
ScTP 120 Ω Cat4	77															
ScTP 120 Ω Cat5	77		12345678S													
STP 150 Ω	78		12345678S													
			12345678S													

NOTE:

All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**

Maximum length limits are: 100m for Cat3, 150m for Cat4, 160m for Cat 5, and 250m for 150 ohm STP.

Exceeding the Length, or Delay Skew limit will result in a "Warning" only.

Return Loss is not tested for STP 150 ohm cable types.

ISO11801 PL max Class D

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	Next	Attn	RL	Acr	Elfext	PS Next	PS Acr	PS Elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	NA	12345678S	<40	90m	<43	<498	1.0	60.0	4.0	19.0	56.0	58.6	57.0	53.0	55.6
4 Pair Wire Map					295ft			4.0	54.8	4.0	19.0	50.8	46.6	51.8	47.8	43.6
			12345678					10.0	48.5	6.0	19.0	42.5	38.6	45.5	39.5	35.6
								16.0	45.2	7.7	19.0	37.5	34.5	42.2	34.5	31.5
ScTP 100 Ω Cat5	69		12345678S					20.0	43.7	8.6	19.0	35.0	32.6	40.7	32.0	29.6
4 Pair Wire Map								31.25	40.5	10.9	17.1	29.6	28.7	37.5	26.6	25.7
			12345678S					62.5	35.7	15.8	14.0	19.8	22.7	32.7	16.8	19.7
								100.0	32.3	20.4	12.0	11.9	18.6	29.3	8.9	15.6

NOTE:

All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**

* When attenuation is greater than 4 dB

** When attenuation is greater than 3 dB

ISO11801 Ch Class D - 2002

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	Next *	Attn *	RL **	Acr	Elfext	PS Next *	PS Acr	PS Elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5 4 Pair Wire Map	69	NA	12345678S 12345678	<40	100m 328ft	<50	<555	1.0 4.0 10.0 16.0 20.0 31.25 62.5 100.0	60.0 53.5 47.0 43.6 42.0 38.7 33.6 30.1	4.0 4.5 7.1 9.1 10.2 12.9 18.6 24.0	17.0 17.0 17.0 17.0 17.0 15.1 12.1 10.0	56.0 49.0 39.9 34.5 31.8 25.9 15.0 6.1	57.4 45.4 37.4 33.3 31.4 27.5 21.5 17.4	57.0 50.5 44.0 40.6 39.0 35.7 30.6 27.1	53.0 46.0 36.9 31.5 28.8 22.9 12.0 3.1	54.4 42.4 34.4 30.3 28.4 24.5 18.5 14.4
ScTP 100 Ω Cat5 4 Pair Wire Map	69		12345678S 12345678S													

NOTE:
All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**
* When attenuation is greater than 4 dB
** When attenuation is greater than 3 dB

ISO11801 PL max Class E

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	Next *	Attn *	RL **	Acr	Elfext	PS Next *	PS Acr	PS Elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6 4 Pair Wire Map	69	NA	12345678S 12345678	<40	90m 295ft	<43	<498	1.0 4.0 10.0 16. 20.0 31.25 62.5 100.0 125.0 155.5 175.0 200.0 250.0	65.0 64.1 57.8 54.6 53.1 50.0 45.1 41.8 40.3 38.7 37.9 36.9 35.3	4.0 4.0 5.6 7.1 7.9 10.0 14.4 18.5 20.9 23.6 25.1 27.1 30.7	19.0 21.0 21.0 20.0 19.5 18.5 16.0 14.0 13.0 12.0 11.6 11.0 10.0	61.0 60.1 52.2 47.5 45.1 40.0 30.7 23.3 19.4 15.2 12.7 9.9 4.7	64.2 52.1 44.2 40.1 38.2 34.3 28.3 24.2 22.3 20.4 19.3 18.2 16.2	62.0 61.8 55.5 52.2 50.7 47.5 42.7 39.3 37.7 36.1 35.3 34.3 32.7	58.0 57.8 49.9 45.1 42.7 37.5 28.2 20.8 16.8 12.6 10.1 7.2 2.0	61.2 49.1 41.2 37.1 35.2 31.3 25.3 21.2 19.3 17.4 16.3 15.2 13.2
ScTP 100 Ω Cat6 4 Pair Wire Map	74		12345678S 12345678S													
STP 100 Ω Cat 5 4 Pair Wire Map	78		12345678S 12345678S													

NOTE:
All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**
* When attenuation is greater than 4 dB
** When attenuation is greater than 3 dB

ISO11801 Channel Class E

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	Next *	Attn *	RL **	Acr	Elfext	PS Next *	PS Acr	PS Elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6 4 Pair Wire Map	69	NA	12345678S 12345678	<40	100m 328ft	<50	<555	1.0 4.0 10.0 16.0 20.0 31.25 62.5 100.0 125.0 155.5 175.0 200.0 250.0	65.0 63.0 56.6 53.2 51.6 48.4 43.4 39.9 38.3 36.7 35.8 34.8 33.1	4.0 4.2 6.6 8.3 9.3 11.7 16.9 21.7 24.5 27.6 29.5 31.7 35.9	19.0 19.0 19.0 18.0 17.5 16.5 14.0 12.0 11.0 10.1 9.6 9.0 8.0	61.0 58.9 50.0 44.9 42.3 36.7 26.5 18.2 13.8 9.0 6.3 3.0 -2.8	63.3 51.2 43.2 39.1 37.2 33.4 27.3 23.3 21.3 19.4 18.4 17.2 15.3	62.0 60.5 54.0 50.6 49.0 45.7 40.6 37.1 35.4 33.8 32.9 31.9 30.2	58.0 56.4 47.5 42.3 39.7 34.0 23.7 15.4 10.9 6.1 3.4 0.1 -5.8	60.3 48.2 40.3 36.2 34.2 30.4 24.3 20.3 18.3 16.4 15.4 14.2 12.3
ScTP 100 Ω Cat6 4 Pair Wire Map	74		12345678S 12345678S													
STP 100 Ω Cat 6 4 Pair Wire Map	78		12345678S 12345678S													

NOTE:
All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**
* When attenuation is greater than 4 dB
** When attenuation is greater than 3 dB

ISO11801 Perm. L Class F

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	Next *	Attn *	RL **	Acr *	Elfext	PS Next *	PS Acr *	PS Elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6 4 Pair Wire Map	69	NA	12345678S 12345678	<40	90m 295ft	<43	<498	1.0	65.0	4.0	21.0	61.0	65.0	62.0	58.0	62.0
								4.0	65.0	4.0	21.0	61.0	65.0	62.0	58.0	62.0
								10.0	65.0	5.5	21.0	59.5	62.7	62.0	56.5	59.7
								16.0	65.0	6.9	20.0	58.1	59.3	62.0	55.1	56.3
ScTP 100 Ω Cat6 4 Pair Wire Map	74		12345678S 12345678S					20.0	65.0	7.7	19.5	57.3	57.7	62.0	54.3	54.7
								31.25	65.0	9.7	18.5	55.3	54.5	62.0	52.3	51.5
								62.5	65.0	13.9	16.0	51.1	49.5	62.0	48.1	46.5
								100.0	65.0	17.7	14.0	47.3	46.0	62.0	44.3	43.0
STP 100 Ω Cat 5 4 Pair Wire Map	78		12345678S 12345678S					125.0	64.9	19.9	13.0	45.0	44.4	61.9	42.0	41.4
								155.5	63.5	22.4	12.1	41.1	42.8	60.5	38.1	39.8
								175.0	62.7	23.8	11.6	38.9	41.9	59.7	35.9	38.9
								200.0	61.9	25.6	11.0	36.3	40.9	58.9	33.3	37.9
								250.0	60.4	28.8	10.0	31.6	39.2	57.4	28.6	36.2

NOTE:
All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**
* When attenuation is greater than 4 dB
** When attenuation is greater than 3 dB

ISO11801 Channel Class F

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	Next *	Attn *	RL **	Acr	Elfext	PS Next *	PS Acr	PS Elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6 4 Pair Wire Map	69	NA	12345678S 12345678	<40	100m 328ft	<50	<555	1.0	65.0	4.0	19.0	61.0	65.0	62.0	58.0	65.0
								4.0	65.0	4.1	19.0	60.9	65.0	62.0	57.9	64.2
								10.0	65.0	6.4	19.0	58.6	60.8	62.0	55.6	57.8
								16.0	65.0	8.1	18.0	56.9	57.5	62.0	53.9	54.5
ScTP 100 Ω Cat6 4 Pair Wire Map	74		12345678S 12345678S					20.0	65.0	9.1	17.5	55.9	55.9	62.0	52.9	52.9
								31.25	65.0	11.4	16.5	53.6	52.8	62.0	50.6	49.8
								62.5	65.0	16.3	14.0	48.7	47.8	62.0	45.7	44.8
								100.0	62.9	20.8	12.0	42.1	44.4	59.9	39.1	41.4
STP 100 Ω Cat 6 4 Pair Wire Map	78		12345678S 12345678S					125.0	61.4	23.4	11.0	38.0	42.8	58.4	35.0	39.8
								155.5	60.0	26.2	10.1	33.8	41.2	57.0	30.8	38.2
								175.0	59.2	27.9	9.6	31.3	40.4	56.2	28.3	37.4
								200.0	58.3	30.0	9.0	28.4	39.4	55.3	25.4	36.4
								250.0	56.9	33.8	8.0	23.1	37.8	53.9	20.1	34.8

NOTE:
All limits derived from ISO/IEC 11801:2002, **Date: 2002-10-23**
* When attenuation is greater than 4 dB
** When attenuation is greater than 3 dB

ISO11801 Ch Class D - 2000

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5 4 Pair Wire Map	69	NA	12345678S 12345678	<40	100m 328ft	<50	<555	1.0	60.3	2.5	17.0	57.8	57.0	57.3	54.8	54.4
								4.0	50.6	4.5	17.0	46.1	45.0	47.6	43.1	42.4
								10.0	44.0	7.0	17.0	37.0	37.0	41.0	34.0	34.4
								16.0	40.6	9.2	17.0	31.4	32.9	37.6	28.4	30.3
ScTP 100 Ω Cat5 4 Pair Wire Map	69		12345678S 12345678S					20.0	39.0	10.3	17.0	28.7	31.0	36.0	25.7	28.4
								31.25	35.7	12.8	15.1	22.9	27.1	32.7	19.9	24.5
								62.5	30.6	18.5	12.1	12.1	21.1	27.6	9.1	18.5
								100.0	27.1	24.0	10.0	3.1	17.0	24.1	0.1	14.4
ScTP 120 Ω Cat5 4 Pair Wire Map	77		12345678S 12345678S													
STP 150 Ω 4 Pair Wire Map	78		12345678S 12345678S		150m 492ft											

NOTE:
All limits derived from ISO/IEC 11801 - 2000 channel specifications.
Return Loss is not tested for STP 150 ohm cable types.

ISO11801 PL Class D - 2000

Cable Type	nvp	Imped. limit Ω	Wire Map Required	Res. Ω	length Max	Delay Skew nS	Prop. Delay nS	Freq MHz	next dB	attn dB	RL dB	acr dB	elfext dB	PS next dB	PS acr dB	PS elfext dB
UTP 100 Ω Cat 5 4 Pair Wire Map	69	NA	12345678S 12345678	<40	90m 295ft	<43	<498	1.0 4.0 10.0 16.0	61.2 51.8 45.5 42.3	2.1 4.1 6.1 7.8	17.0 17.0 17.0 17.0	59.1 47.7 39.4 34.5	59.6 47.6 39.6 35.5	58.2 48.2 42.6 39.3	56.1 44.9 36.4 31.5	57.0 45.0 37.0 32.9
ScTP 100 Ω Cat5 4 Pair Wire Map	69		12345678S 12345678S					20.0 31.25	40.7 37.6	8.7 11.0	17.0 15.6	32.0 26.6	33.6 29.7	37.7 34.6	29.0 23.0	31.0 27.1
ScTP 120 Ω Cat5 4 Pair Wire Map	77		12345678S 12345678S					62.5 100.0	32.7 29.3	16.0 20.6	13.5 12.1	16.7 8.7	23.7 19.6	29.7 26.3	13.7 5.7	21.1 17.0
STP 150 Ω 4 Pair Wire Map	78		12345678S 12345678S		140m 459ft											

NOTE:
All limits derived from ISO/IEC 11801 - 2000 permanent link specifications.
For STP 150 ohm cable the maximum specified length is 140m.
Return Loss is not tested for STP 150 ohm cable types.

EN50173 PL Class D-2002

All test parameters and limits are the same as ISO11801 Perm. L Class D.

EN50173 Ch Class D-2002

All test parameters and limits are the same as ISO11801 Ch Class D – 2002.

EN50173 PL Class E

All test parameters and limits are the same as ISO11801 Perm. L Class E.

EN50173 Ch Class E

All test parameters and limits are the same as ISO11801 Ch Class E.

EN50173 PL Class F

All test parameters and limits are the same as ISO11801 Perm. L Class F.

EN50173 Ch Class F

All test parameters and limits are the same as ISO11801 Ch Class F.

EN50173 PL Class C-2000

All test parameters and limits are the same as ISO11801 Perm. Link Class C.

EN50173 Ch Class C-2000

All test parameters and limits are the same as ISO11801 Ch Class C.

EN50173 Ch Class D-2000

All test parameters and limits are the same as ISO11801 Ch Class D - 2000.

EN50173 PL Class D-2000

All test parameters and limits are the same as ISO11801 PL Class D - 2000.

Aus/NZ Class D Channel

All test parameters and limits are the same as ISO11801 Perm. L Class D. (Aus/NZ will be updating their version of Class D)

Aus/NZ Class D Basic Link

All test parameters and limits are the same as ISO11801 Ch Class D – 2002. (Aus/NZ will be updating their version of Class D)

Aus/NZ Class C Channel

All test parameters and limits are the same as ISO11801 Perm. L Class C.

Aus/NZ Class C Basic Link

All test parameters and limits are the same as ISO11801 Ch Class C – 2002.

ISO11801 Perm L, Class E 1999

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	Mhz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 6 4 Pair Wire Map	69	NA	12345678S 12345678	<40	90m 295ft	<43	<498	1.0 4.0 10.0 16. 20.0	72.7 63.0 56.6 53.2 51.6	1.9 3.5 5.6 7.1 7.9	19.0 19.0 19.0 19.0 19.0	70.8 59.5 51.0 46.1 43.7	64.2 52.1 44.2 40.1 38.1	70.3 60.5 54.0 50.6 49.0	68.4 57.0 48.4 43.5 41.0	61.2 49.1 41.2 37.1 35.1
ScTP 100 Ω Cat 6 4 Pair Wire Map	74		12345678S 12345678S		90m 295ft			31.25 62.4 100.0	48.4 43.4 39.9	10.0 14.4 18.5	17.6 15.5 14.1	38.4 29.0 21.4	34.3 28.2 24.2	45.7 40.6 37.1	35.7 26.2 18.6	31.3 25.2 21.2
STP 100 Ω Cat 5 4 Pair Wire Map	78		12345678S 12345678S		90m 295ft			125.0 155.5 175.0 200.0 250.0	38.3 36.7 35.8 34.8 33.1	20.9 23.6 25.2 27.1 30.7	13.4 12.8 12.4 12.0 11.3	17.4 13.1 10.6 7.7 2.4	22.2 20.3 19.3 18.1 16.2	35.4 33.8 32.9 31.9 30.2	14.5 10.2 7.7 4.8 -0.5	19.2 17.3 16.3 15.1 13.2

NOTE:
All limits derived from ISO11801 draft specifications.

TOKEN RING, 4Mb/s

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5 UTP 100 Ω Cat 4 UTP 100 Ω Cat 3	69 66 62	90-110 90-110 90-110	12345678S 3456	N/A	100m 328ft	N/A	N/A	1.0 2.0 4.0 6.0 8.0 10.0 12.0	N/A		N/A	26.5 22.0 17.5 14.8 13.0 11.6 10.4	N/A	N/A	N/A	N/A
ScTP 10 Ω Cat 5	69	90-110	12345678S 3456 S													
STP 150 Ω	78	130-170	12345678S 3456 S	N/A	100m 328ft	N/A	N/A	1.0 2.0 4.0 6.0 8.0 10.0 12.0	N/A		N/A	28.0 23.5 19.0 16.3 14.5 13.1 11.9	N/A	N/A	N/A	N/A

NOTE:
All limits derived from IEEE 802.5q/D7 (ISO/IEC 8802-5.2)
Attenuation is a single (4MHz) frequency point measurement.
ACR is measured to 12MHz with limits derived from interpolation from specified limits.

TOKEN RING, 16Mb/s, PASSIVE

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5 UTP 100 Ω Cat 4	69 66	90-110 90-110	12345678S 3456	N/A	100m 328ft	N/A	N/A	1.0 2.0 4.0 6.0 8.0 10.0 12.0 16.0 20.0 25.0			N/A	33.5 29.1 24.5 21.9 20.1 18.6 17.4 15.5 14.1 12.6	N/A	N/A	N/A	N/A
ScTP 100 Ω Cat5	69	90-110	12345678S 3456 S													
STP 150 Ω	78	130-170	12345678S 3456 S	N/A	100m 328ft	N/A	N/A	1.0 2.0 4.0 6.0 8.0 10.0 12.0 16.0 20.0 25.0	N/A		N/A	35.0 30.6 26.0 23.4 21.6 20.1 18.9 17.0 15.6 14.1	N/A	N/A	N/A	N/A

NOTE:
All limits derived from IEEE 802.5q/D7 (ISO/IEC 8802-5.2)
Attenuation is a single (16MHz) frequency point measurement.
ACR is measured to 25MHz with limits derived from interpolation from specified limits

TOKEN RING, 16Mb/s, ACTIVE

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	90-110	12345678S	N/A	100m	N/A	N/A	1.0	N/A		N/A	32.0	N/A	N/A	N/A	N/A
UTP 100 Ω Cat 4	66	90-110			328ft			2.0				27.6				
UTP 100 Ω Cat 3	62	90-110	3456					4.0				23.0				
								6.0				20.4				
								8.0				18.6				
ScTP 100 Ω Cat5	69	90-110	12345678S					10.0		16.0		17.1				
								12.0				15.9				
			3456 S					16.0				14.0				
								20.0				12.6				
								22.0				11.9				
								25.0				11.0				
STP 150 Ω	78	130-170	12345678S	N/A	100m	N/A	N/A	1.0	N/A		N/A	33.5	N/A	N/A	N/A	N/A
					328ft			2.0				29.1				
			3456 S					4.0				24.5				
								6.0				21.9				
								8.0				20.1				
								10.0				18.6				
								12.0		16.0		17.4				
								16.0				15.5				
								20.0				14.1				
								22.0				13.4				
								25.0				12.6				

NOTE:
All limits derived from IEEE 802.5q/D7 (ISO/IEC 8802-5.2)
Attenuation is a single (16MHz) frequency point measurement.
ACR is measured to 25MHz with limits derived from interpolation from specified limits.

10BASE-T

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	90-110	12345678S	N/A	100m	N/A	N/A	5.0	30.4	11.5	N/A	N/A	N/A	N/A	N/A	N/A
UTP 100 Ω Cat 4	66	90-110			328ft			10.0	26.0	11.5						
UTP 100 Ω Cat 3	62	90-110	123 6													
ScTP 100 Ω Cat 5	69	90-110	12345678S													
			123 6 S													

NOTE:
All limits derived from IEEE Std 802.3i-1990 Supplement Specifications.
NEXT and Attenuation are measured from 5MHz to 10MHz.
NEXT limit = $26 - 15 \log_{10}(f/10)$ dB. f is the frequency in MHz over the range of 5MHz to 10MHz.
Attenuation limit is 11.5dB at all frequencies from 5MHz to 10MHz.

100BASE-TX

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	90-110	12345678S	N/A	100m	N/A	N/A	1.0	51.0		N/A	48.5	N/A	N/A	N/A	N/A
					328ft			2.0	46.6			44.1				
			123 6					4.0	42.0			39.5				
								6.0	39.4			36.9				
ScTP 100 Ω Cat 5	69	90-110	12345678S					8.0	37.6			35.0				
								10.0	36.1			33.6				
			123 6 S					12.0	34.9			32.4				
								16.0	33.0	10.0		30.5				
STP 150 Ω	78	130-170	12345678S					20.0	31.6			29.1				
								40.0	27.0			24.5				
			3456 S					60.0	24.4			21.9				
								80.0	22.6			20.0				

NOTE:
All limits derived from 100Base-TX P802.3DU
NEXT and ACR are measured to 80MHz with limits derived from interpolation from specified limits.
Attenuation is a single point (16.0MHz) measurement.

1000BASE-T

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100Ω Cat 5	69	90-110	12345678S 12345678	N/A	100m 328 ft	<50	<570	1.0 4.0 8.0	60.3 50.6 45.6	3.0 4.5 6.3	15.0 15.0 15.0	N/A	57.0 45.0 39.0	N/A	N/A	54.4 42.4 36.4
ScTP 100Ω Cat 5	69	90-110	12345678S 12345678S					10.0	44.0	7.0	15.0		37.0			34.4
								16.0	40.7	9.2	15.0		32.9			30.3
								20.0	39.0	10.3	15.0		31.0			28.4
								25.0	37.4	11.4	14.1		29.1			26.5
								31.2	35.8	13.2	13.1		27.1			24.5
								62.4	30.7	18.9	10.0		21.1			18.5
								100.0	27.1	24.0	8.0		16.9			14.3
NOTE: All limits derived from the IEEE 802.3ab draft standard.																

TP-PMD

		Imped.	Wire Map	Res.	length	Delay Skew	Prop. Delay	Freq	next	attn	RL	acr	elfext	PS next	PS acr	PS elfext
Cable Type	nvp	limit Ω	Required	Ω	Max	nS	nS	MHz	dB	dB	dB	dB	dB	dB	dB	dB
UTP 100 Ω Cat 5	69	90-110	12345678S 78 12	N/A	100m 328ft	N/A	N/A	1.0 2.0 4.0 6.0 8.0 10.0 12.0 16.0 20.0 40.0 60.0 80.0	51.0 46.6 42.0 39.4 37.6 36.1 34.9 33.0 31.6 27.0 24.4 22.6		N/A	48.0 43.6 39.0 36.4 34.6 33.1 31.9 30.0 28.6 24.0 21.4 19.6	N/A	N/A	N/A	N/A
ScTP 100 Ω Cat 5	69	90-110	12345678S 													
STP 150 Ω	78	130-170	78 12S							10.0						

NOTE:
All limits derived from TP-PMD/306 Rev. 2.0 Specifications.
Attenuation is a single (16MHz) frequency point measurement.
NEXT and ACR are measured to 80MHz with limits derived from interpolation from specified limits.

IEEE 10BASE-2

		Impedance		DC Res.	Max
Cable Type	nvp	nom	limit Ω	Limit Ω	length
10Base2	80	50	42 - 58	48 - 65	185m
RG-58	66	50	42 - 58	48 - 65	185m
RG-58 Foam	78	50	42 - 58	48 - 65	185m

NOTE:
All limits derived from ISO/IEC 8802.3

IEEE 10BASE-5

		Impedance		DC Res.	Max
Cable Type	nvp	nom	limit Ω	Limit Ω	length
10Base5	78	50	42 - 58	48 - 65	500m
RG-8	84	50	42 - 58	48 - 65	500m

NOTE:
All limits derived from ISO/IEC 8802.3

Coax Cables

		Impedance		DC Res.	Max
Cable Type	nvp	nom	limit Ω	Limit Ω	length
10Base2	80	50	42 - 58	48 - 65	500m
10Base5	78	50	42 - 58	48 - 65	500m
RG-58	66	50	42 - 58	48 - 65	1200m
RG-58 Foam	78	50	42 - 58	48 - 65	1200m
RG-8	84	50	42 - 58	48 - 65	1200m
RG-8A/U	84	52	44 - 60	50 - 67	1200m
RG-11/U	82	75	67 - 83	70 - 89	1200m
RG-6/U	82	75	67 - 83	70 - 89	1200m
RG-59	69	75	67 - 83	70 - 89	1200m
RG-59 Foam	78	75	67 - 83	70 - 89	1200m
RG-62	84	93	85 - 101	90 - 110	1200m

NOTE:
Coax Cables: is a generic cable test for coaxial cables. Impedance and resistance limits are defined by the cable type. Maximum length is 500 meters.