TOTOKU TCF Series

THE FLEXIBLE

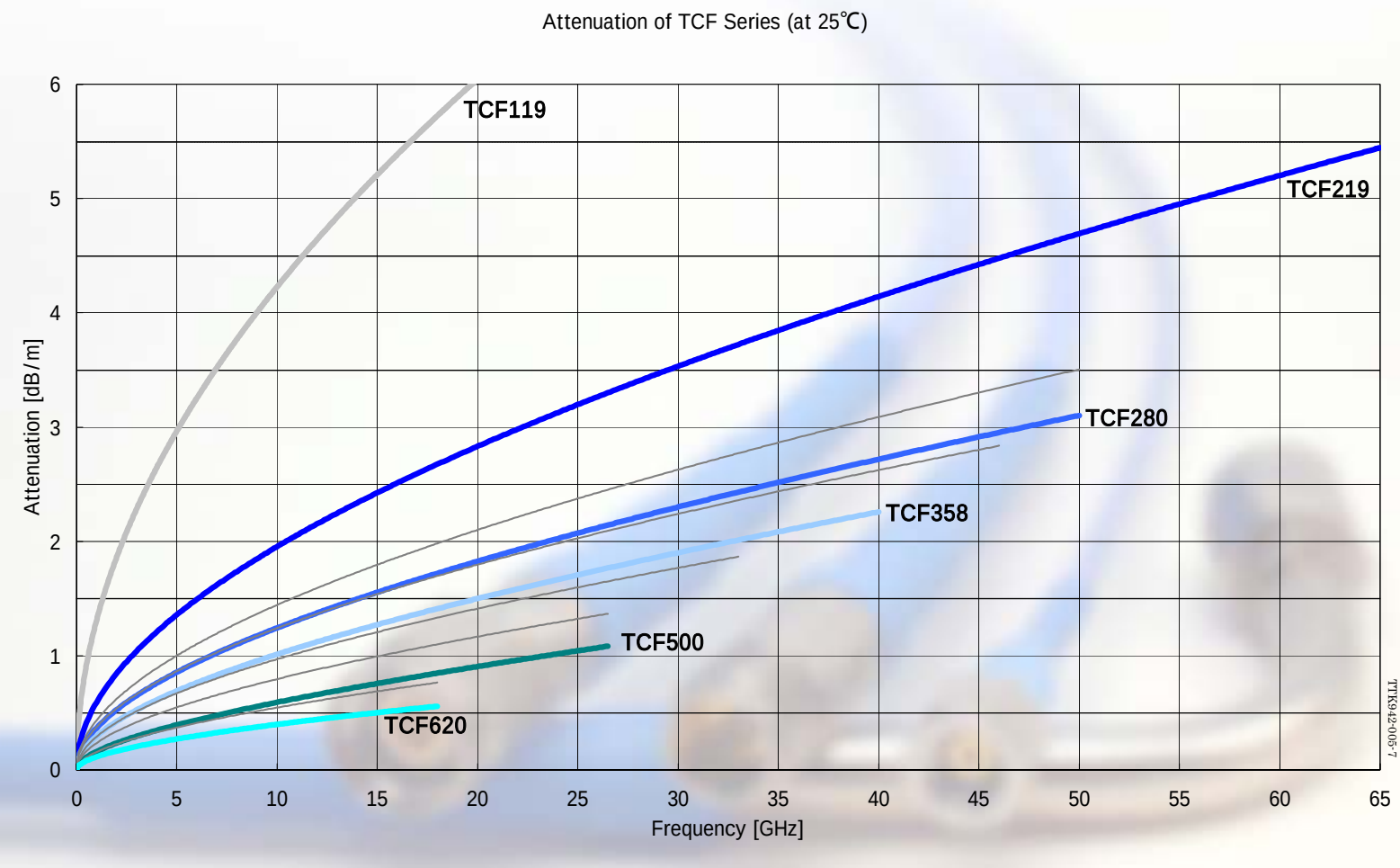
MICROWAVE CABLE ASSEMBLIES

TOTOKU

TOTOKU ELECTRIC CO., LTD.

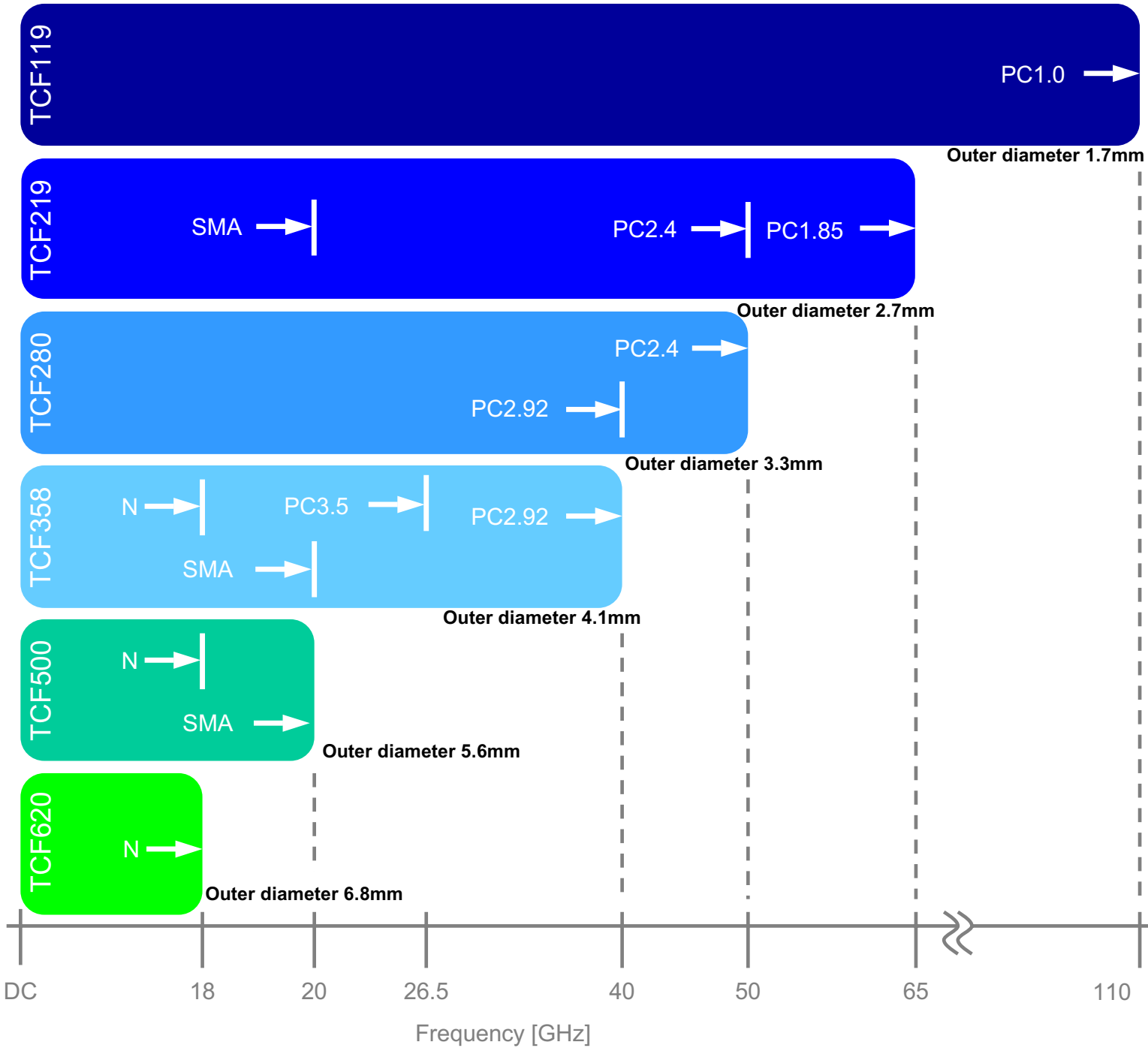
- TCF series cable was very rich in pliability.
- Applicable frequency is covered very much to high frequency with 110GHz. (110GHz is the first in the world as a flexible cable)
- The amount of low attenuation is realized using silver plated copper and E-PTFE of a low dielectric constant.
- The assembly was carried out using the connector of the design only for our TCF Series cables, and the low reflective characteristic is realized.
- It excels in the phase stability over temperature and bending.
- It can use also in ultra high-speed digital signal transmission.
- Since the connector of abundant kinds is prepared, I can offer the assembly which suited demand.

Comparison of Attenuation with competitor

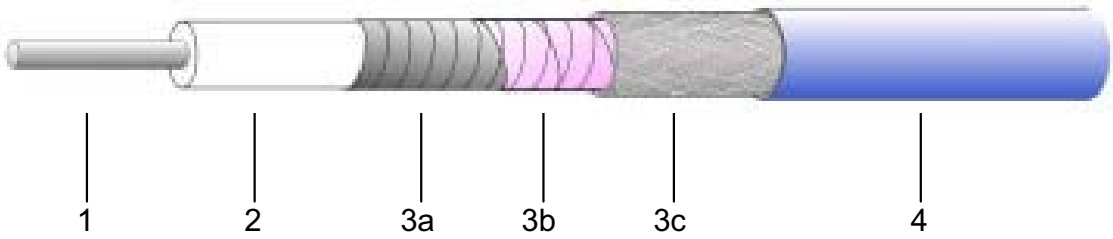


Cable Lineup

Overview



Structure



1: Inner conductor - Solid silver plated copper

2: Insulation - Porous PTFE

3: Outer conductor - a. Silver plated copper tape
b. Plastic tape
c. Silver plated copper braid

4: Jacket - FEP (blue)

Cable specification

Structure, Composition

	Inner conductor		Dielectric	Outer conductor	Jacket	
	Material	Composition [mm]	Material	Material	Material	O.D. [mm]
TCF119	SPC	1/0.287	Porous PTFE	Silvered Cu Tape and Silvered Cu Braid	FEP (Blue)	1.7
TCF219	SPC	1/0.51	Porous PTFE	Silvered Cu Tape and Silvered Cu Braid	FEP (Blue)	2.7
TCF280	SPC	1/0.70	Porous PTFE	Silvered Cu Tape and Silvered Cu Braid	FEP (Blue)	3.3
TCF358	SPC	1/0.91	Porous PTFE	Silvered Cu Tape and Silvered Cu Braid	FEP (Blue)	4.1
TCF500	SPC	1/1.40	Porous PTFE	Silvered Cu Tape and Silvered Cu Braid	FEP (Blue)	5.6
TCF620	SPC	1/1.829	Porous PTFE	Silvered Cu Tape and Silvered Cu Braid	FEP (Blue)	6.8

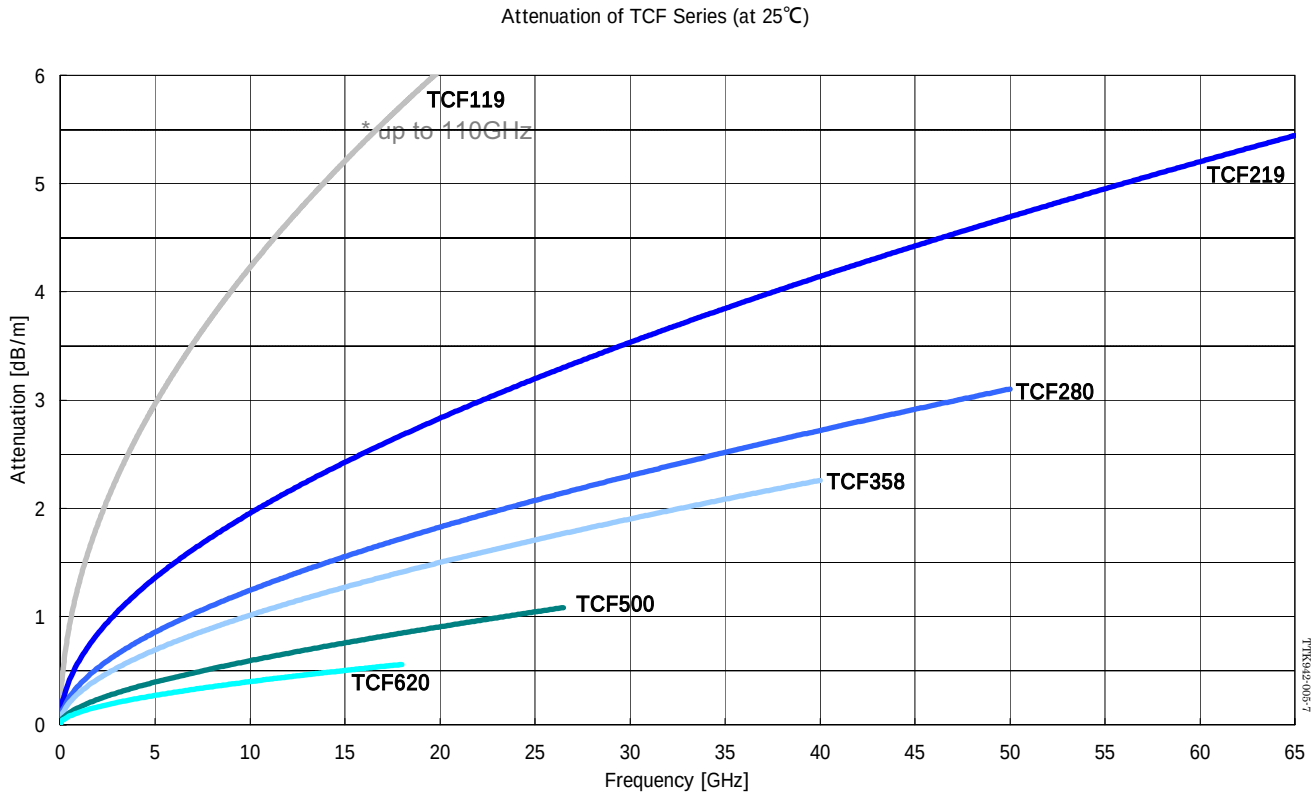
TTK942-004

Electrical, Mechanical characteristics

	Characteristic Impedance [ohm]	Capacitance [pF/m]	Time delay [ns/m]	Transission rate [%]	Moding Freq. [GHz]	Min. bending radius static [mm]	Temp. range [°C]
TCF119	50	85	4.3	78	134	10	-65 ...+125
TCF219	50	85	4.3	78	75	15	-65 ...+125
TCF280	50	85	4.3	78	52	20	-65 ...+125
TCF358	50	85	4.3	78	41	20	-65 ...+125
TCF500	50	85	4.3	78	27	25	-65 ...+125
TCF620	50	85	4.3	78	20	35	-65 ...+126

TTK942-004

Cable attenuation (Nominal)



*Attenuation of TCF119… see next page.

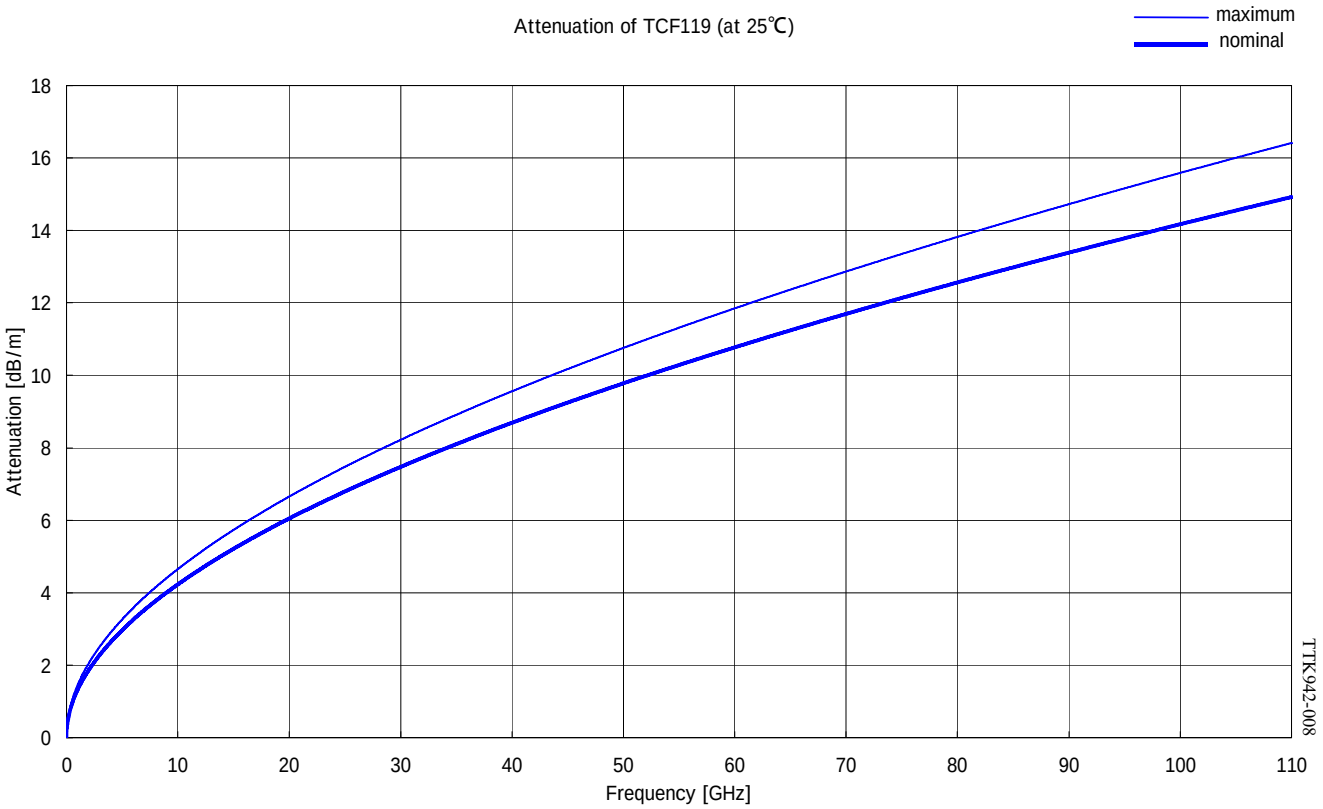
Cable attenuation

Cable attenuation (25° C) [dB/m]

= Conductor loss coefficient * √f [GHz] + Dielectric loss coefficient * f [GHz]

Conductor loss coefficient : 1.300 (Nominal) 1.430 (Maximum)

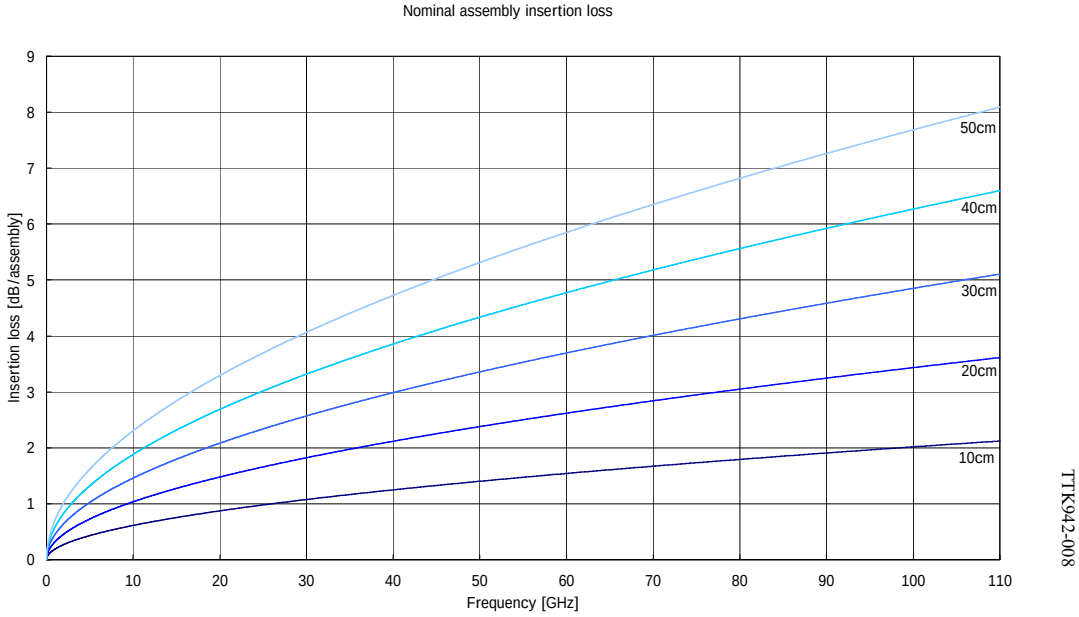
Dielectric loss coefficient : 0.0117 (Nominal) 0.0129 (Maximum)



Nominal assembly insertion loss

Assembly insertion loss (25° C)

= Cable attenuation (25° C) * assembly length + 0.06 * √f [GHz]



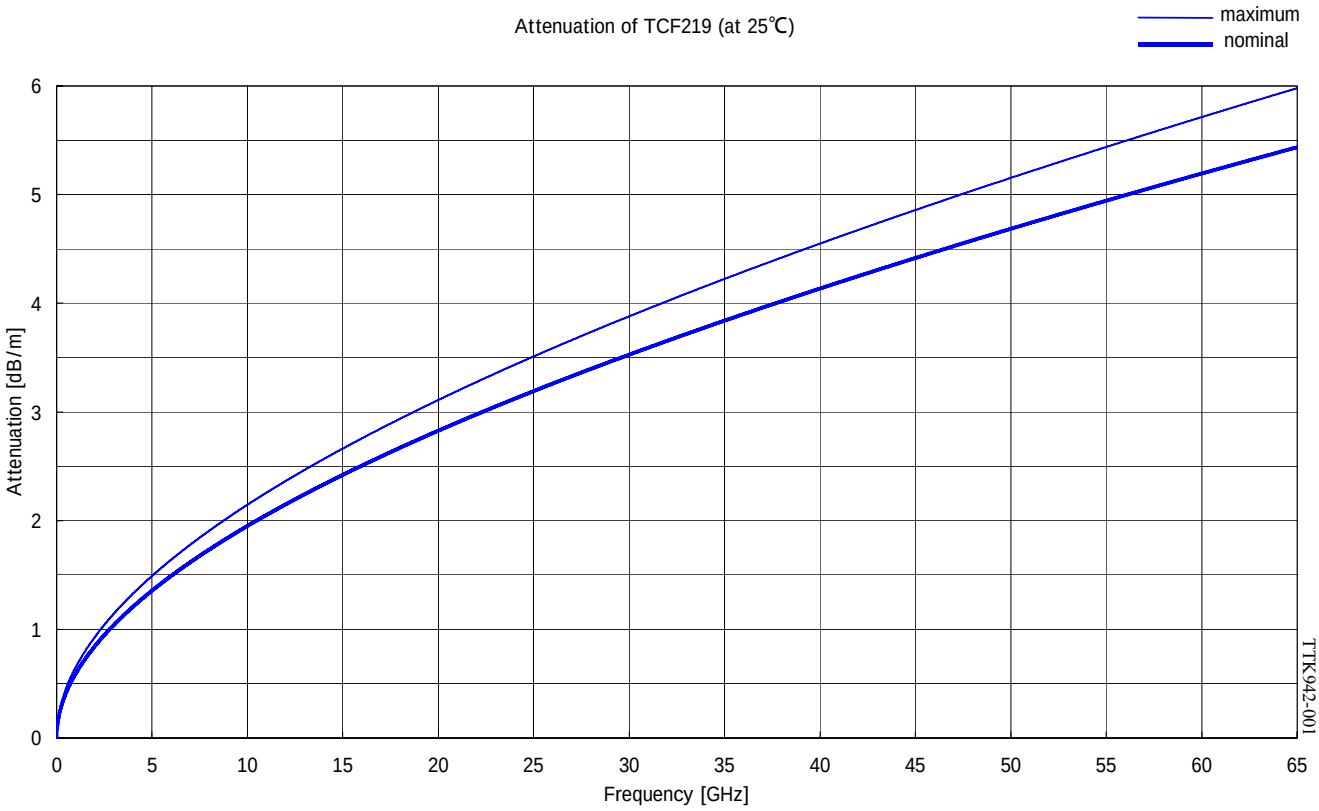
Cable attenuation

Cable attenuation (25° C) [dB/m]

= Conductor loss coefficient * √f [GHz] + Dielectric loss coefficient * f [GHz]

Conductor loss coefficient : 0.581 (Nominal) 0.639 (Maximum)

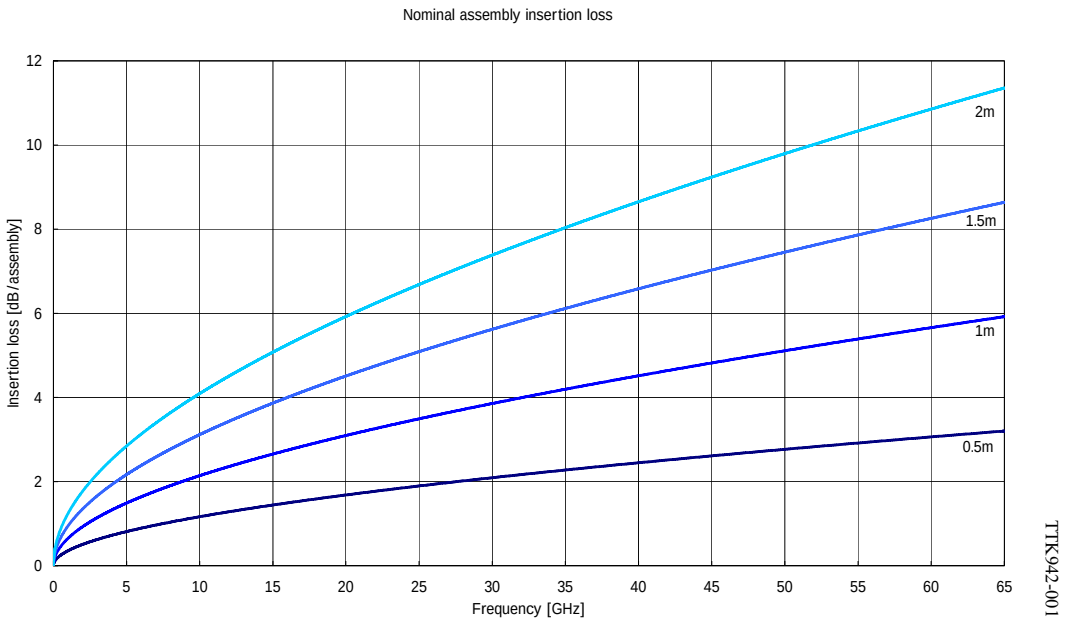
Dielectric loss coefficient : 0.0117 (Nominal) 0.0129 (Maximum)



Nominal assembly insertion loss

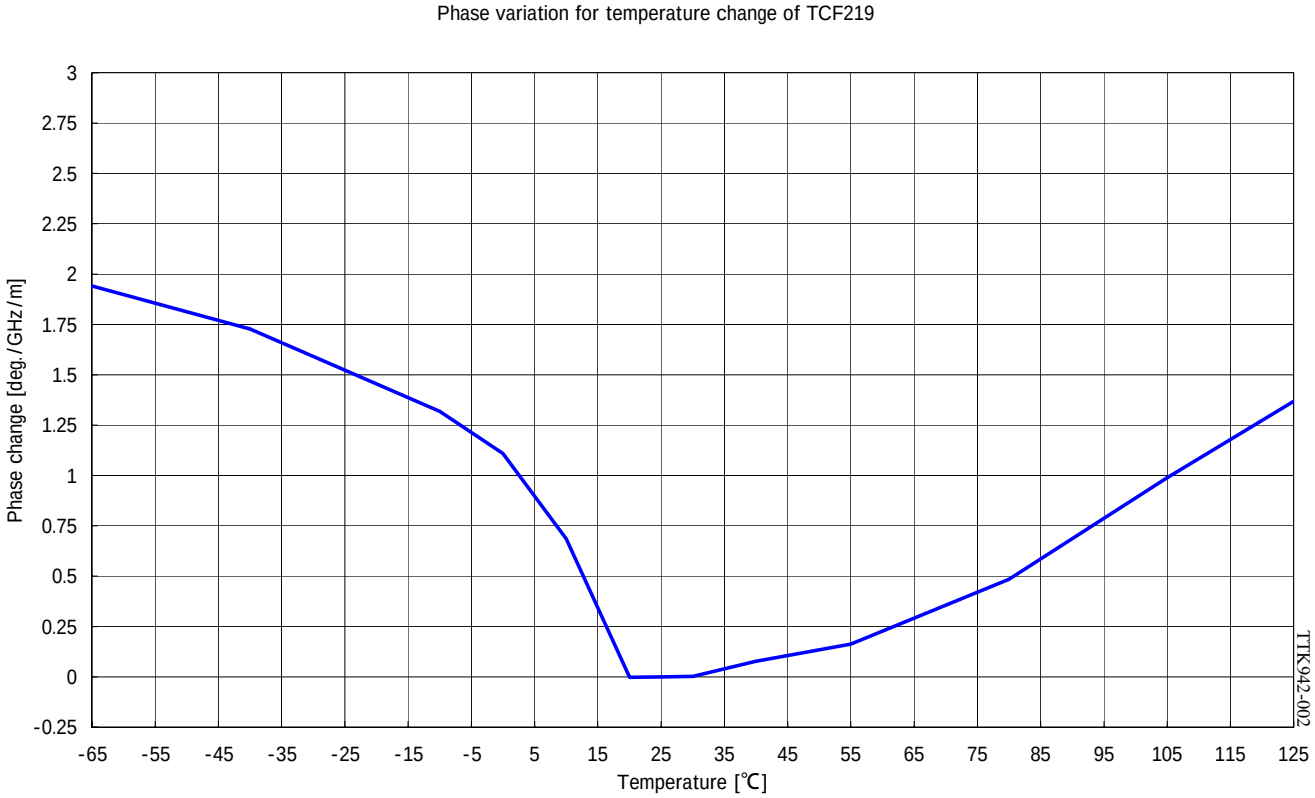
Assembly insertion loss (25° C)

= Cable attenuation (25° C) * assembly length + 0.06 * √f [GHz]



Phase characteristics

Phase variation for temperature change



Phase change After bending

The greatest variation value expected…

	Phase change [deg.]		
Bending radius [mm]→	R=50	R=30	R=15
at 18GHz	1.11	2.98	3.34
at 40GHz	2.54	6.86	7.96
at 50GHz	3.25	8.96	10.73
at 65GHz	4.25	12.31	15.23

TTK942-003

* The cable was bent by 360 degrees every radius 50mm, 30mm, and 15mm, the phase was measured in the state one minute later, and the changing value was shown.

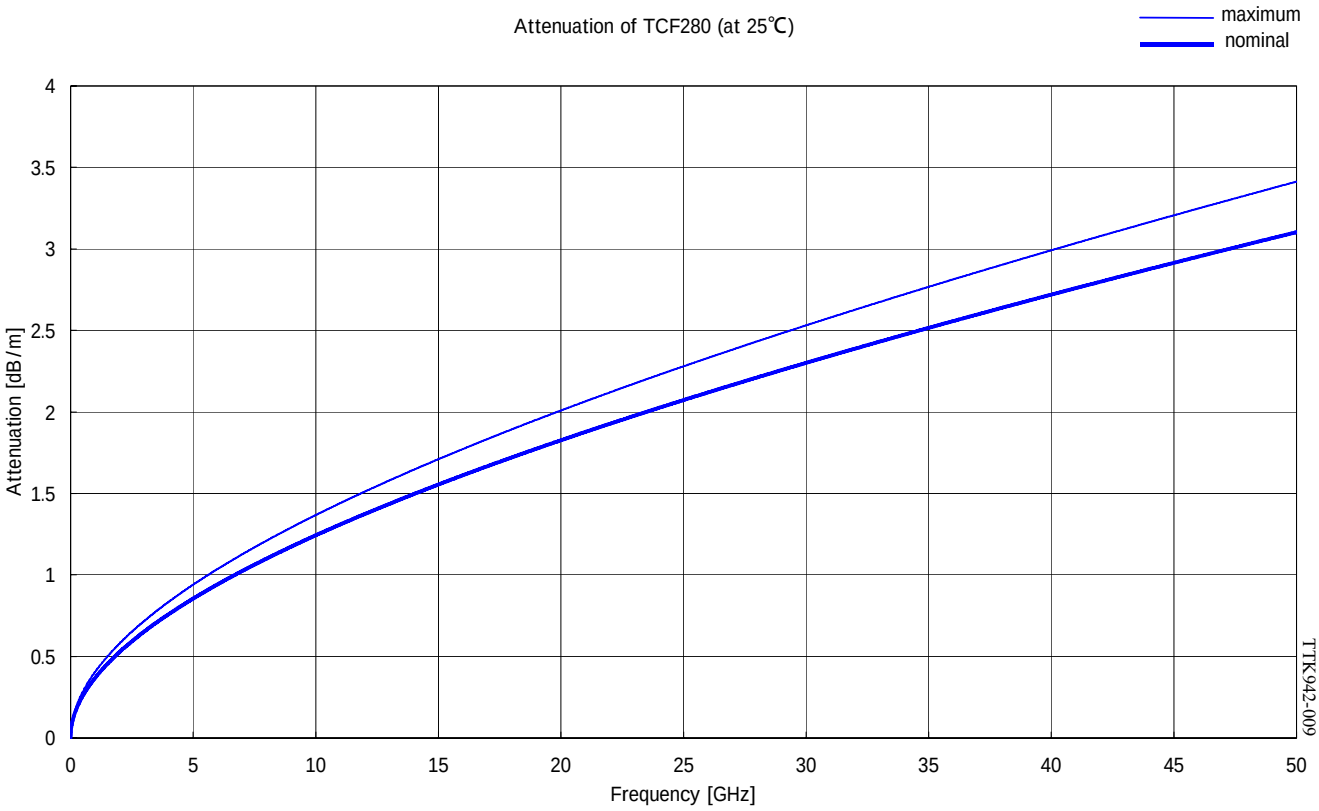
Cable attenuation

Cable attenuation (25° C) [dB/m]

= Conductor loss coefficient * √f [GHz] + Dielectric loss coefficient * f [GHz]

Conductor loss coefficient : 0.356 (Nominal) 0.392 (Maximum)

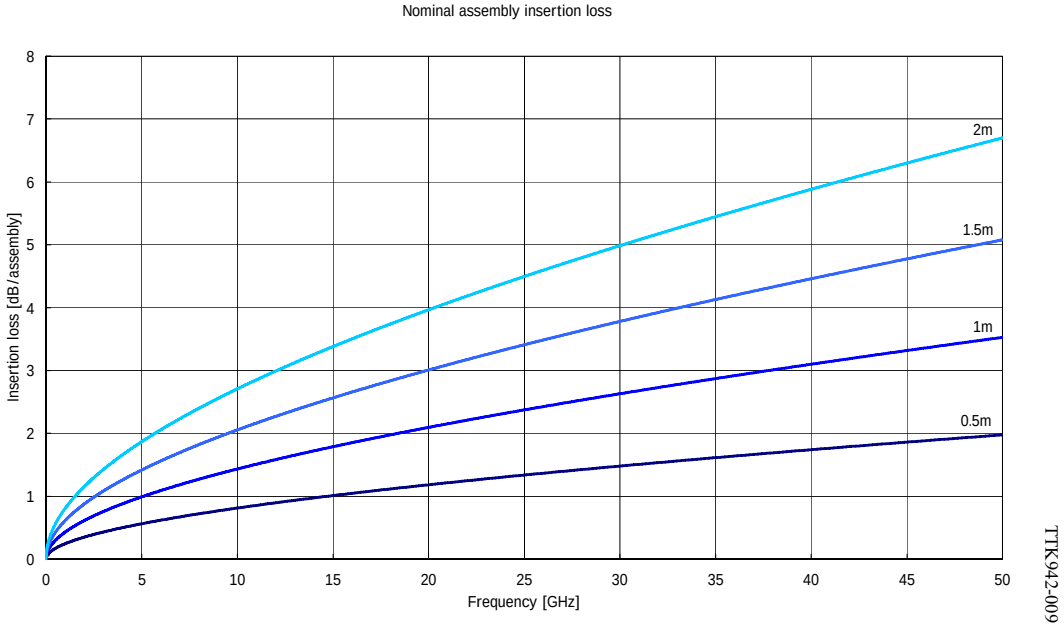
Dielectric loss coefficient : 0.0117 (Nominal) 0.0129 (Maximum)



Nominal assembly insertion loss

Assembly insertion loss (25° C)

= Cable attenuation (25° C) * assembly length + 0.06 * √f [GHz]



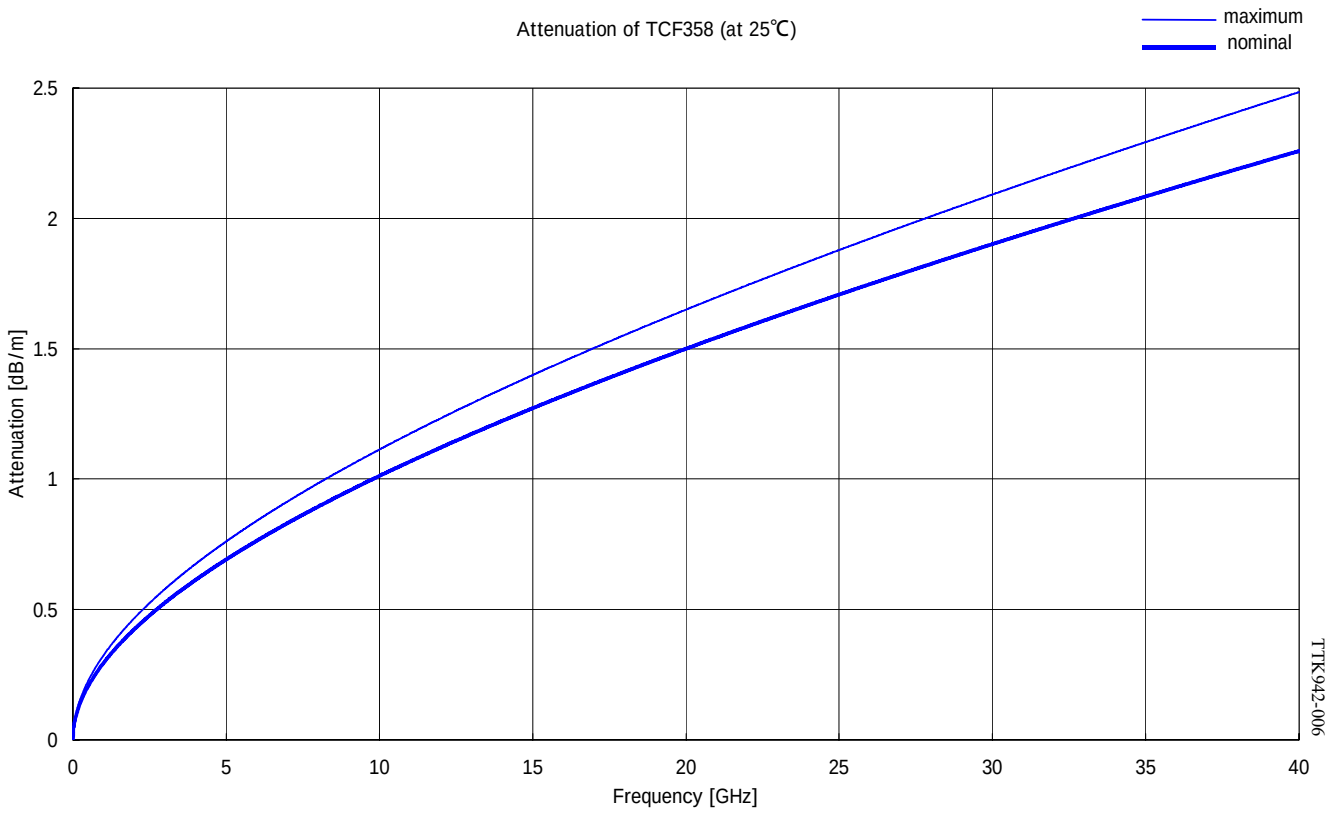
Cable attenuation

Cable attenuation (25° C) [dB/m]

= Conductor loss coefficient * √f [GHz] + Dielectric loss coefficient * f [GHz]

Conductor loss coefficient : 0.283 (Nominal) 0.311 (Maximum)

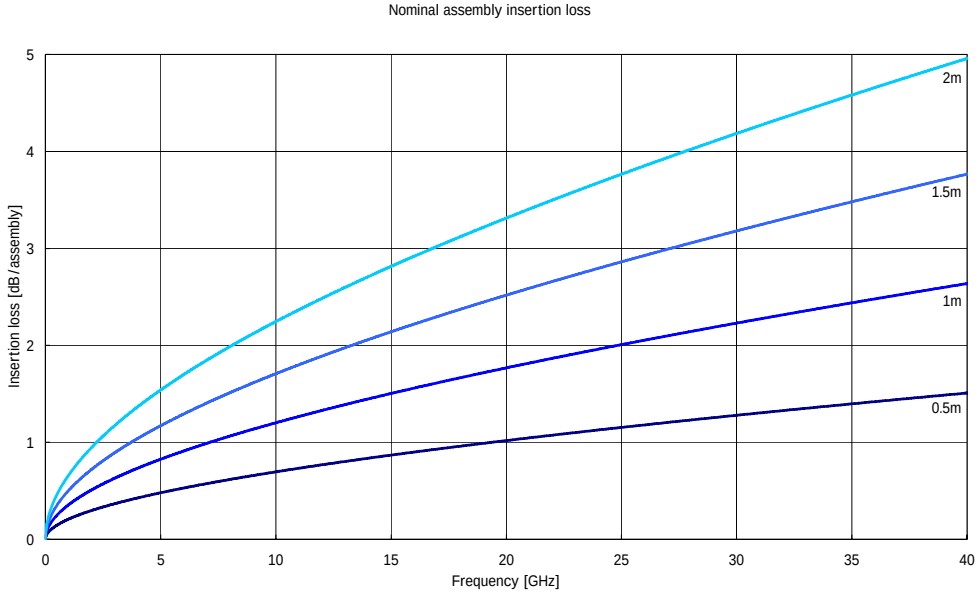
Dielectric loss coefficient : 0.0117 (Nominal) 0.0129 (Maximum)



Nominal assembly insertion loss

Assembly insertion loss (25° C)

= Cable attenuation (25° C) * assembly length + 0.06 * √f [GHz]



Cable attenuation

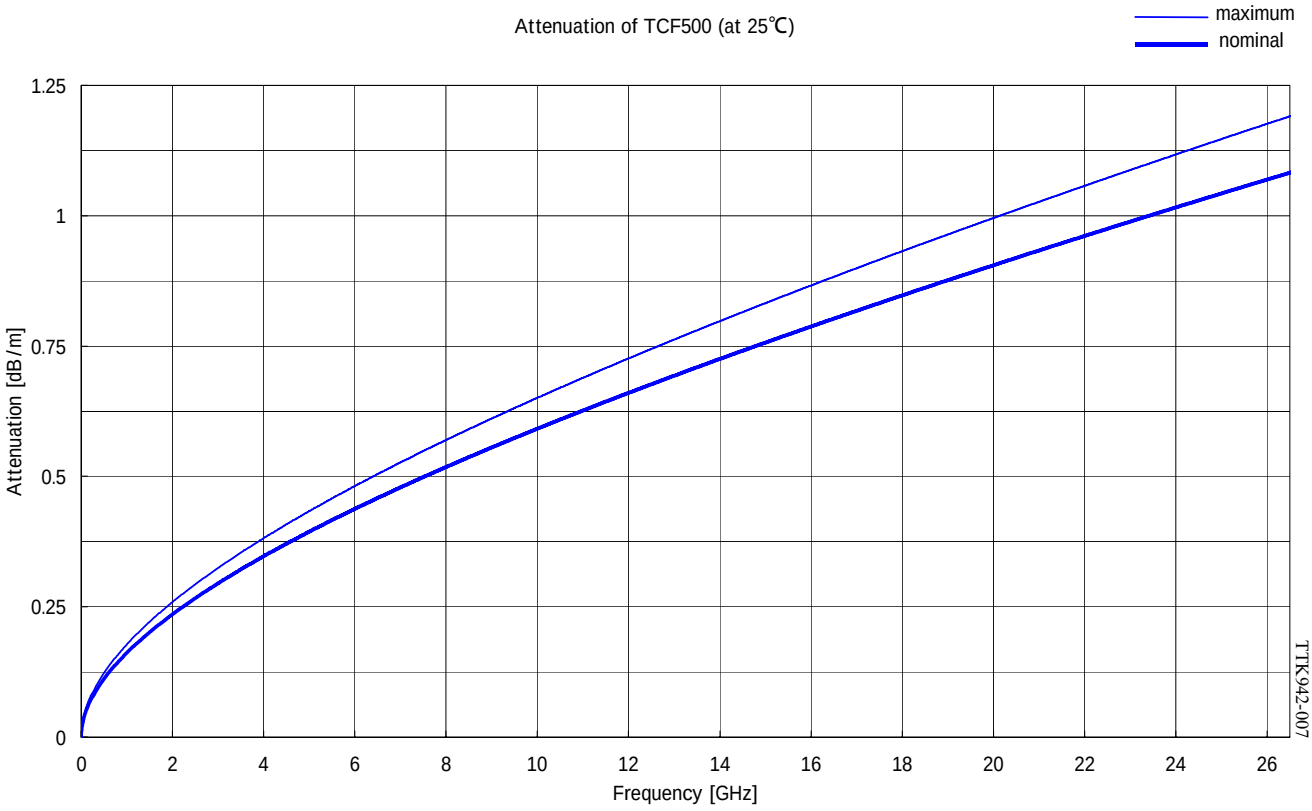
TCF500

Cable attenuation (25° C) [dB/m]

= Conductor loss coefficient * √f [GHz] + Dielectric loss coefficient * f [GHz]

Conductor loss coefficient : 0.150 (Nominal) 0.165 (Maximum)

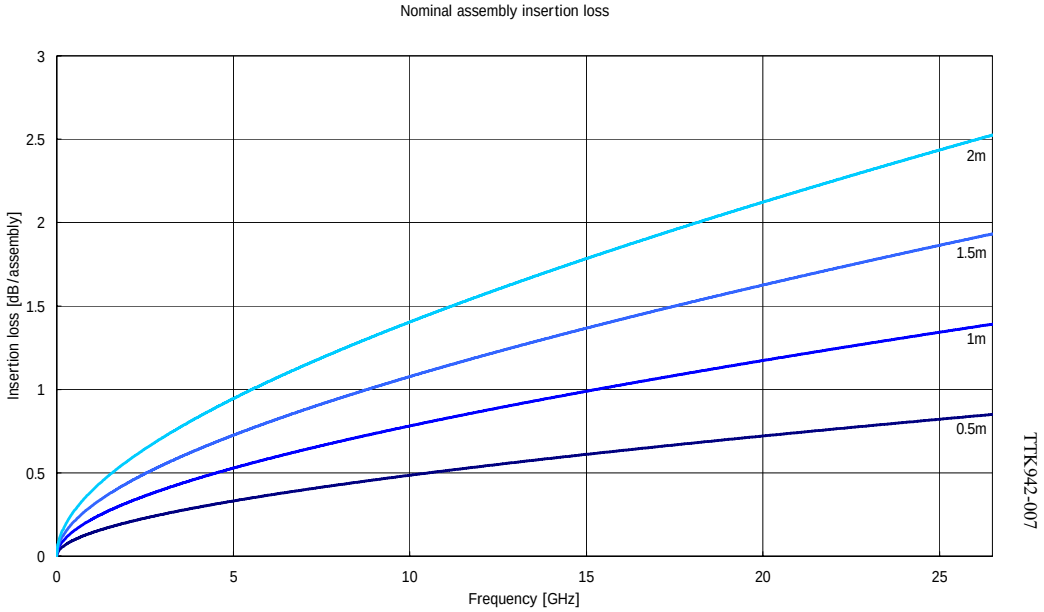
Dielectric loss coefficient : 0.0117 (Nominal) 0.0129 (Maximum)



Nominal assembly insertion loss

Assembly insertion loss (25° C)

= Cable attenuation (25° C) * assembly length + 0.06 * √f [GHz]



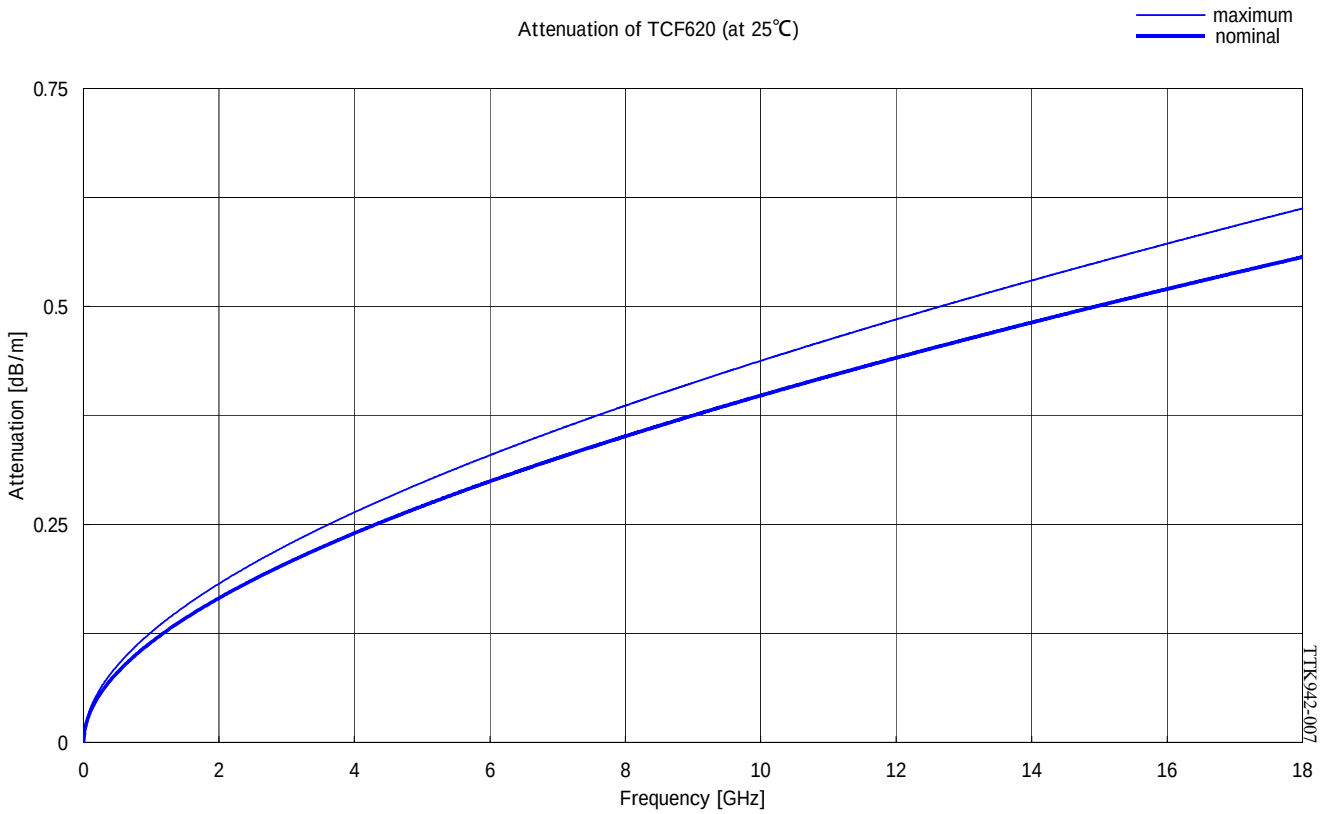
Cable attenuation

Cable attenuation (25° C) [dB/m]

= Conductor loss coefficient * √f [GHz] + Dielectric loss coefficient * f [GHz]

Conductor loss coefficient : 0.110 (Nominal) 0.121 (Maximum)

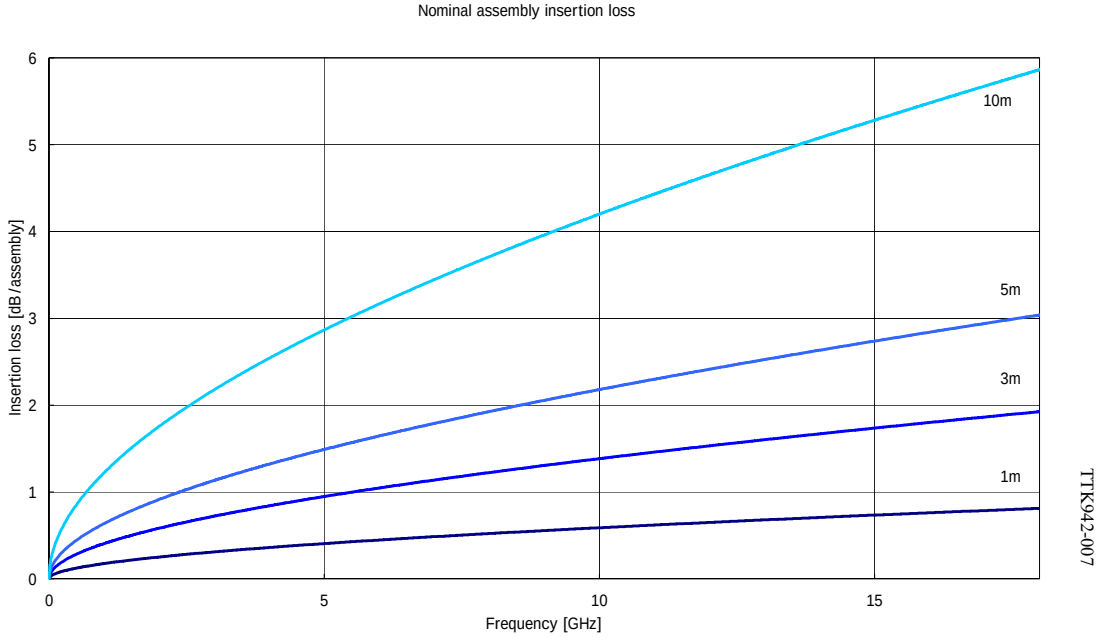
Dielectric loss coefficient : 0.005 (Nominal) 0.0055 (Maximum)



Nominal assembly insertion loss

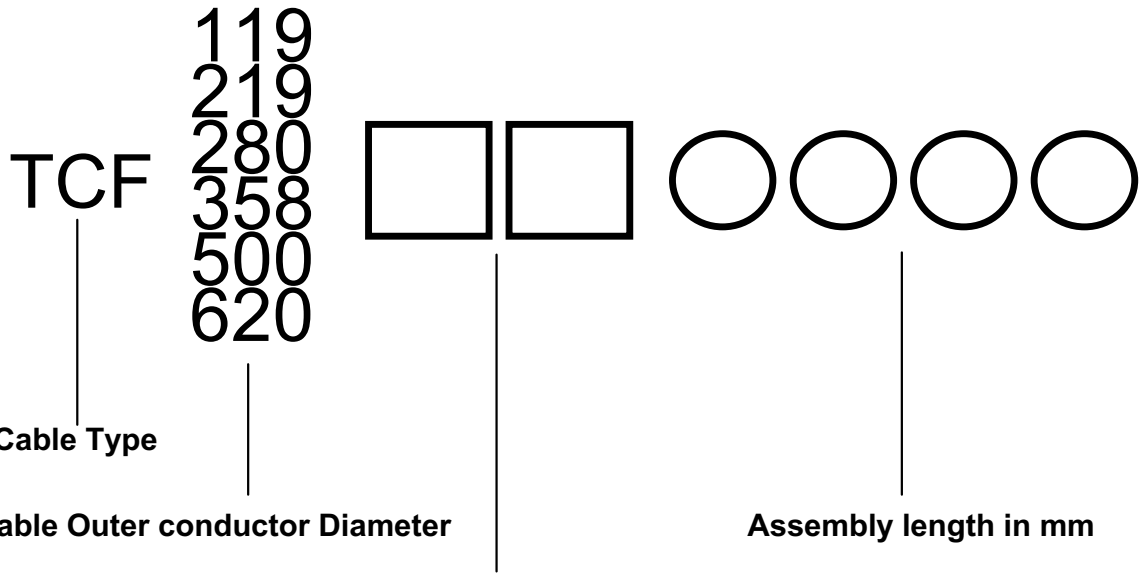
Assembly insertion loss (25° C)

= Cable attenuation (25° C) * assembly length + 0.06 * √f [GHz]



■ORDER Information

Part Number Designation



A	B	D	E	F	G
SMA-m	SMA-f	N-m	N-f	PC3.5-m	PC3.5-f
K	M	Q	R	T	U
PC2.92-m	PC2.92-f	PC2.4-m	PC2.4-f	PC1.85-m	PC1.85-f
X	Y				
PC1.0-m	PC1.0-f				

note 1 "-m" after a connector type shows a straight male connector and "-f" shows a straight female connector.
note 2 TCF cable assemblies are available with armoring. In this case, sign H is added after the Cable Outer Diameter.
note 3 TCF cable assemblies are available with bending by connector area. In this case, sign L is added after the sign of connector type.
note 4 If it is an applicable connector for TCF cable, combination is possible also for what connector.
(Being TCF280 series, such as one end PC2.92 connector and one end PC2.4...)

Please ask for details.

Examples

TCF219 TLU 1200 → TCF219 cable assembly with PC1.85mm right angle male connector and PC1.85mm female connector, 1200mm of assembly length.

TCF280 RK 500 → TCF280 cable assembly with PC2.4mm female connector and PC2.92mm male connector, 500mm of assembly length.

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