

# MWX2 Series

## Flexible cable assemblies for measuring instruments

Cable assemblies developed for intensive use in microwave/millimeter-wave measurements, with high phase stability against bending (Continuous operating temperature range from -30 to +85 °C).

Flexibility and low repulsion reduce loads on measured objects.

Four cable types are available for max. 26.5, 40, 50, 67 GHz use.

### How to select

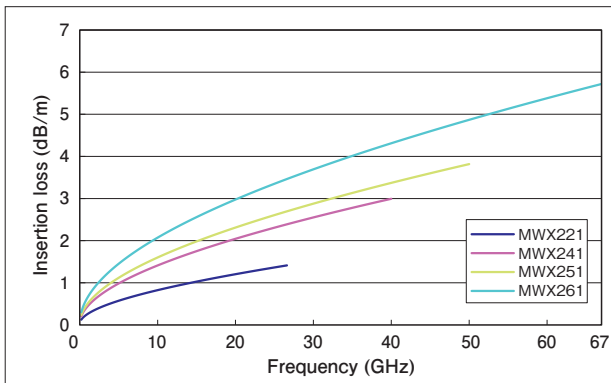
#### 1. Simple criteria for connector selection

- Choose a suitable connector for your measuring instrument.
- The smaller the connector, the higher the maximum operating frequency.
- The larger the connector, the higher the power rating.

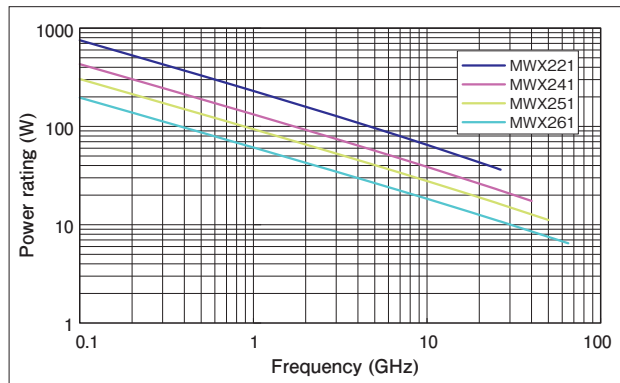
#### 2. Power rating

The diagram to the below shows the relationship between frequency and power rating. The values are calculated at 25 °C and at sea level. The power rating will need to be corrected for different ambient temperatures and altitude. Power ratings may decrease, depending on the connector selected.

MWX2 series typical insertion loss



Power rating of MWX2 series at sea level



\*The above figures are measured values for reference only.

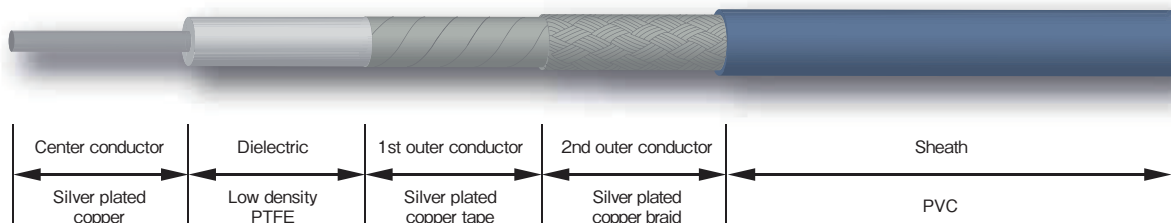
### Connector compatibility

Cable type	Cable maximum operating frequency (GHz)	Compatible connector													
		18.5 GHz		18.0 GHz	26.5 GHz			40.0 GHz		50.0 GHz	67.0 GHz				
		SMA (m)	SMA (m) swept	N (m)	N (m) swept	3.5 mm (m)	3.5 mm (f)	3.5 mm (m) swept	2.92 mm (m)	2.92 mm (f)	2.92 mm (m) swept	2.4 mm (m)	2.4 mm (f)	1.85 mm (m)	1.85 mm (f)
MWX221	26.5 GHz	●	●	●	●	●	●	●							
MWX221 (armored type)		●		●		●	●								
MWX241 (armored type)	40.0 GHz	●		●				●	●						
MWX241 (non-armored type, custom-made)		●		●				●	●	●					
MWX251 (armored type)	50.0 GHz										●	●			
MWX261 (armored type)	67.0 GHz													●	●

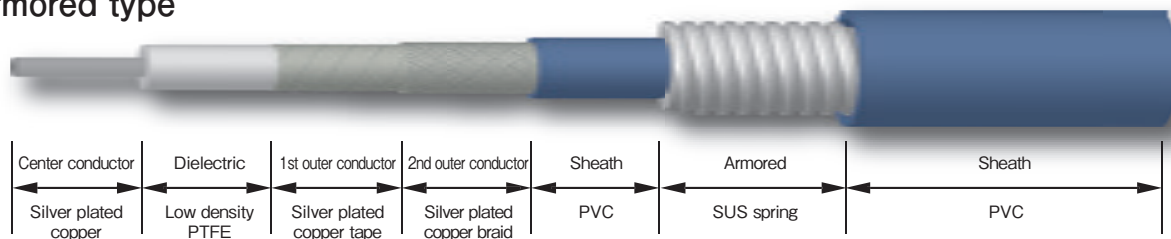
\*Armored type: Armored with a protection sheath to reduce damage caused by mechanical movement.

# Cable design

## Non-armored type



## Armored type



# Flexibility data

## Test method

### Test cable

MWX221, MWX021, MWX121

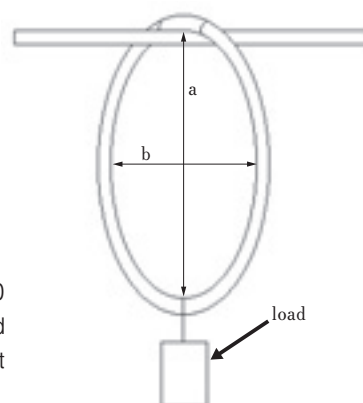
### Test condition

temperature : 24 °C

test load : 454 g

diameter of bar :  $\phi 16$  mm

A test cable measuring 1,000 mm in length was formed into a circle with an internal diameter of 300 mm. Both ends were overlapped and secured with tape measuring 50 mm in width. The circularly formed test cable was then suspended, with the overlapping end section at the top and a weight positioned at the bottom. Circularity was measured after five seconds. (Circularity is expressed as the ratio  $a/b$ .)



## Test result

Test cable	sample 1	sample 2	sample 3	average
MWX221	1.887	2.049	2.011	1.982
MWX021	1.532	1.404	1.482	1.473
MWX121	1.552	1.564	1.595	1.570

\*The above figures are measured values for reference only.

# MWX221

DC~26.5 GHz



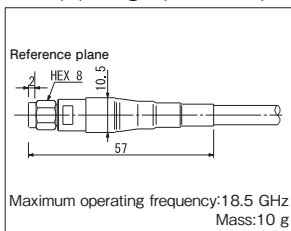
## Basic Cable Properties

Electrical properties	
Maximum operating frequency	26.5 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.4 ns/m
Shortening coefficient of wavelength (typ.)	76 %
Higher mode frequency (typ.)	27.5 GHz
VSWR (per connector/both ends of assy.)	1.153/1.33

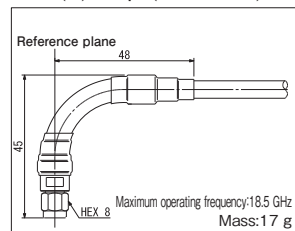
Mechanical properties	Standard type	Armored type
Cable outer diameter	6.0 mm	12.5 mm
Minimum bending radius (inner side)	20 mm	20 mm
Cable mass (typ.)	64 g/m	212 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C
Armored side pressure	—	196 N/cm

## Connector

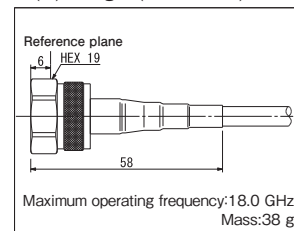
SMA (m) straight (Code:AMS)



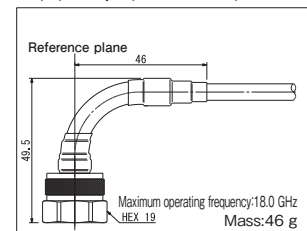
SMA (m) swept (Code:AMW)<sup>(\*)</sup>



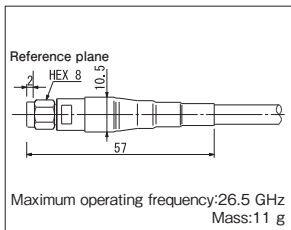
N (m) straight (Code:NMS)



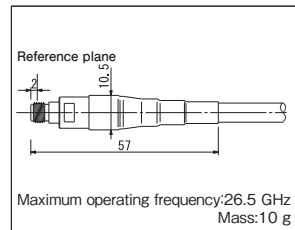
N (m) swept (Code:NMW)<sup>(\*)</sup>



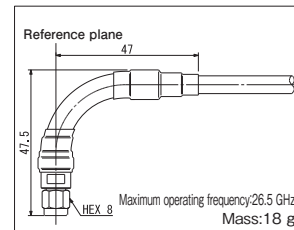
3.5 mm (m) straight (Code:DMS)



3.5 mm (f) straight (Code:DFS)



3.5 mm (m) swept (Code:DMW)<sup>(\*)</sup>



(\*) Swept is not available to armored type.

## Order form example

● Example 1

Assembly length : 1000 mm  
Connector I : SMA (m) straight  
Connector II : 3.5 mm (m) straight

Catalog No.:

MWX221-01000AMSDMS  
(See P.32 "Connector combination codes")

● Example 2 MWX221 Armored type

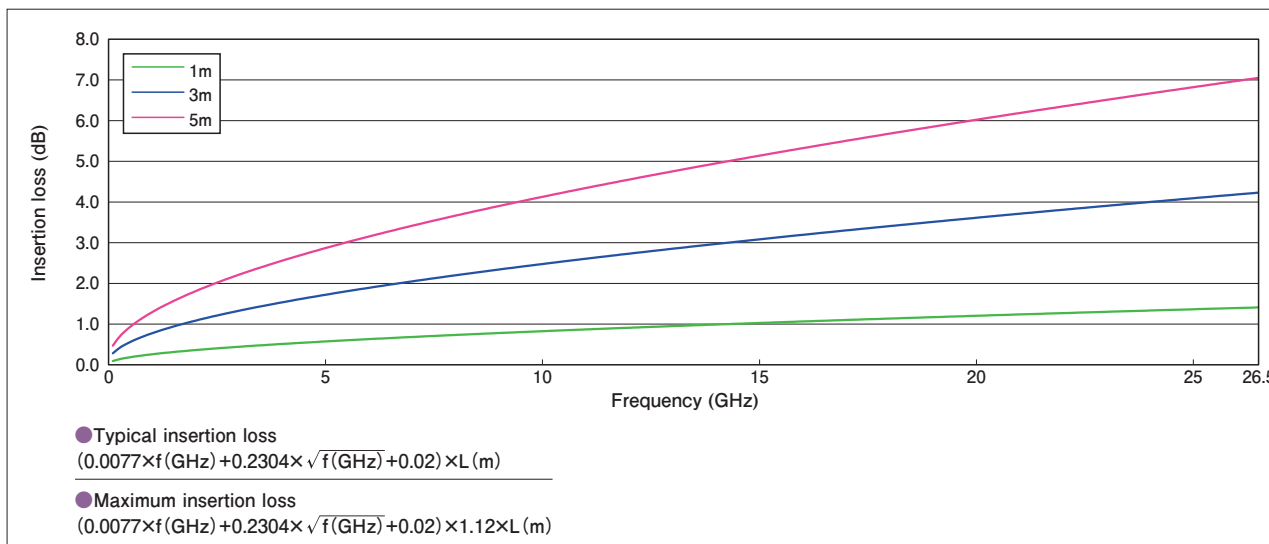
Assembly length : 1500 mm  
Connector I : N (m) straight  
Connector II : N (m) straight

Catalog No.:

MWX221-01500NMSNMS/B

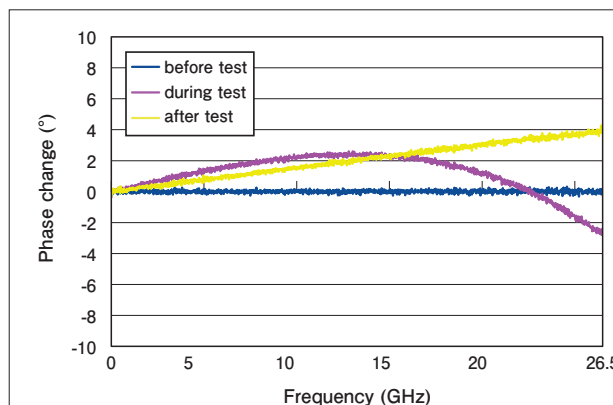
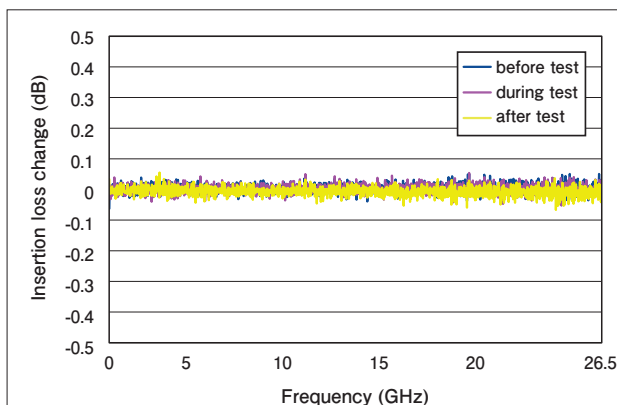
# MWX221 Technical Data

## Cable typical insertion loss



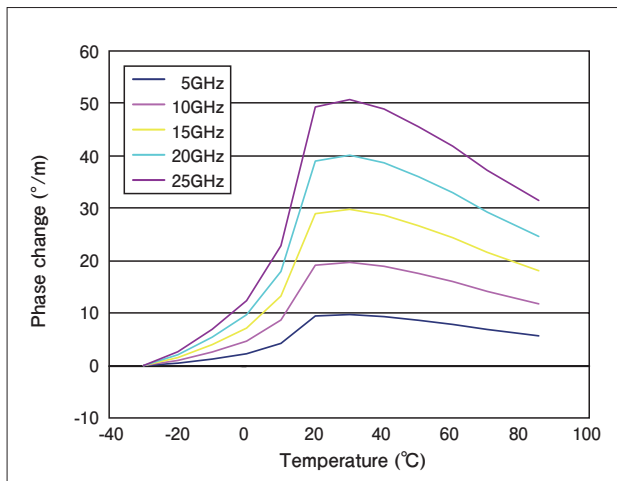
## Static bending data (insertion loss, phase)

Bending radius: 20 mm



\*The cable was wrapped 360° around a mandrel.

## MWX221 Phase change vs. temperature



## Option

- We have the capacity to deliver products with matched phases for customers who require this characteristic.

\*The above figures are measured values for reference only.

# MWX241

DC~40.0 GHz



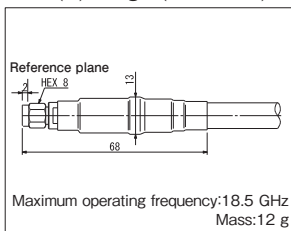
## Basic Cable Properties

Electrical properties	
Maximum operating frequency	40.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.35 ns/m
Shortening coefficient of wavelength (typ.)	77 %
Higher mode frequency (typ.)	40.5 GHz
VSWR (per connector/both ends of assy.)	1.197/1.43

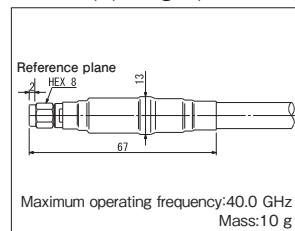
Mechanical properties	Standard type (armored type)	Non-armored type/Custom-made
Cable outer diameter	9.5 mm	4.1 mm
Minimum bending radius (inner side)	20 mm	20 mm
Cable mass (typ.)	137 g/m	35 g/m
Continuous operating temperature range	-30~+85 °C	-30~+85 °C
Armored side pressure	—	196 N/cm

## Connector

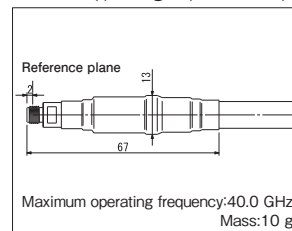
SMA (m) straight (Code:AMS)



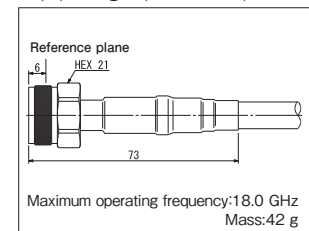
2.92 mm (m) straight (Code:KMS)



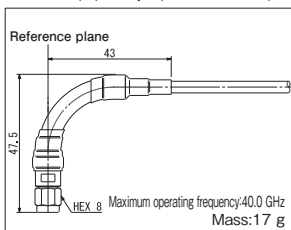
2.92 mm (f) straight (Code:KFS)



N (m) straight (Code:NMS)



2.92 mm (m) swept (custom-made)<sup>(\*)</sup>



(\*) Swept is not available to armored type.

### Order form example

● Example 1 MWX241 Armored type (standard)

Assembly length : 1000 mm  
Connector I : 2.92 mm (m) straight  
Connector II : 2.92 mm (m) straight

Catalog No.:  
MWX241-01000KMSKMS/B  
(See P.32 "Connector combination codes")

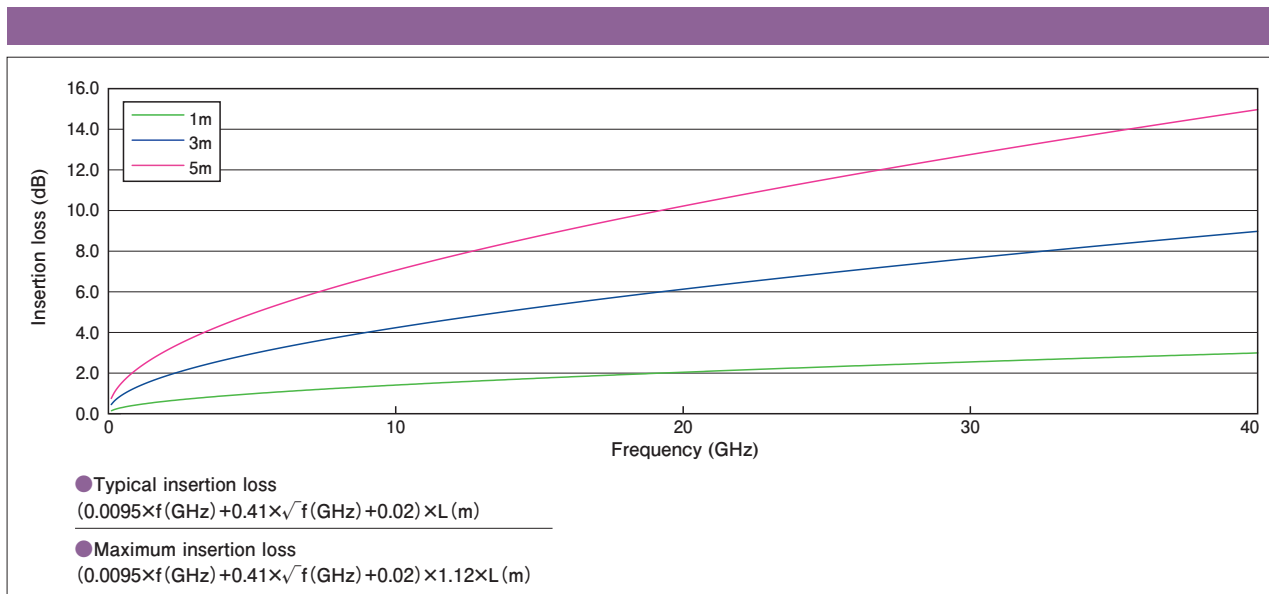
● Example 2 MWX241 Armored type (standard)

Assembly length : 1500 mm  
Connector I : SMA (m) straight  
Connector II : N (m) straight

Catalog No.:  
MWX241-01000AMSNMS/B

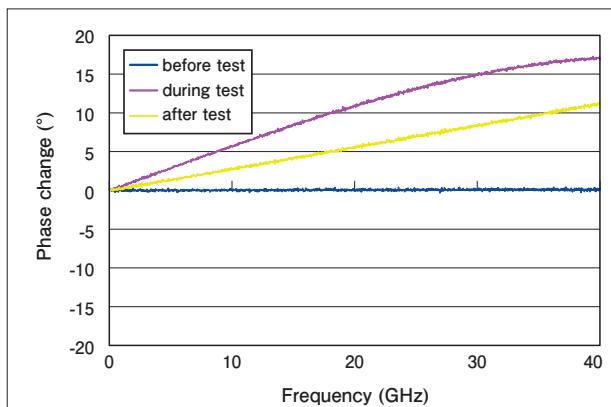
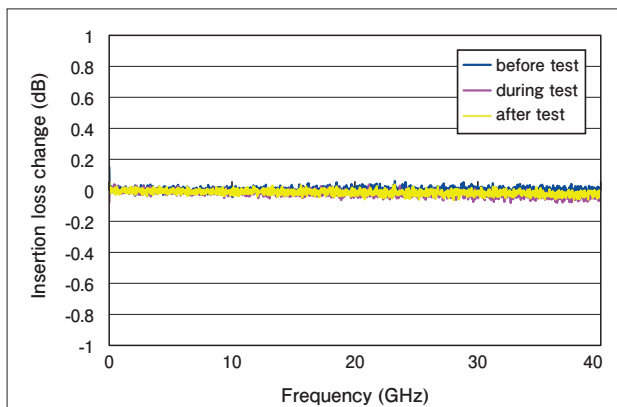
# MWX241 Technical Data

## Cable typical insertion loss



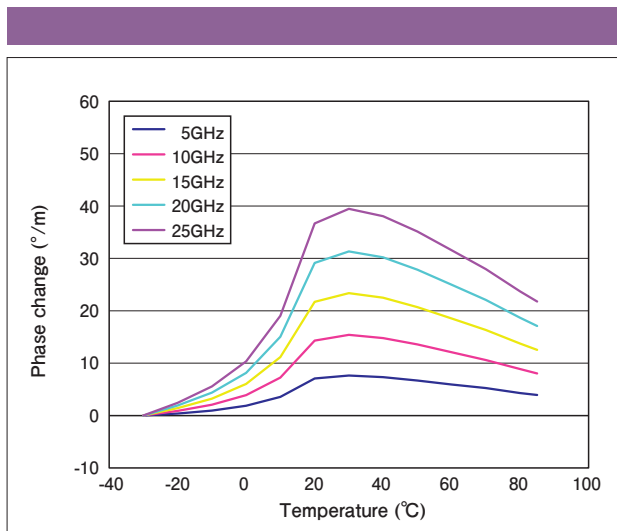
## Static bending data (insertion loss, phase)

Bending radius: 20 mm



\*The cable was wrapped 360° around a mandrel.

## MWX241 Phase change vs. temperature



## Option

- We have the capacity to deliver products with matched phases for customers who require this characteristic.

\*The above figures are measured values for reference only.

# MWX251

DC~50.0 GHz



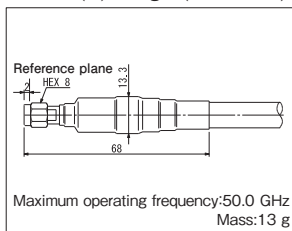
## Basic Cable Properties

Electrical properties	
Maximum operating frequency	50.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	88 pF/m
Propagation delay (typ.)	4.36 nsec/m
Shortening coefficient of wavelength (typ.)	77 %
Higher mode frequency (typ.)	50.3 GHz
VSWR (per connector/both ends of assy.)	1.197/1.43

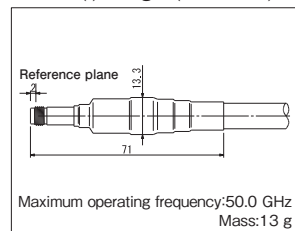
Mechanical properties	
Cable outer diameter	9.5 mm
Minimum bending radius (inner side)	20 mm
Cable mass (typ.)	129 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	196 N/cm

## Connector

2.4 mm (m) straight (Code:LMS)



2.4 mm (f) straight (Code:LFS)



### Order form example

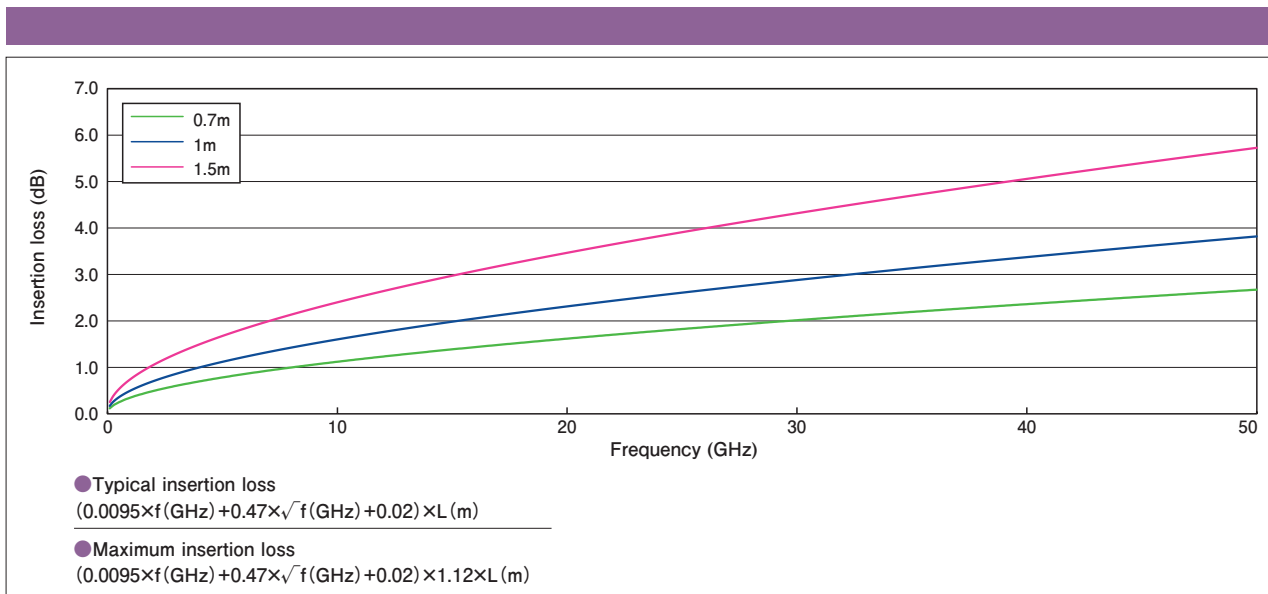
● Example 1

Assembly length : 1000 mm  
Connector I : 2.4 mm (m) straight  
Connector II : 2.4 mm (m) straight

Catalog No.:  
**MWX251-01000LMSLMS/B**  
(See P.32 "Connector combination codes")

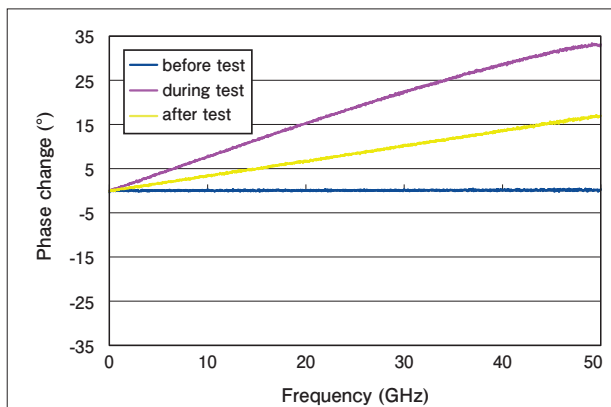
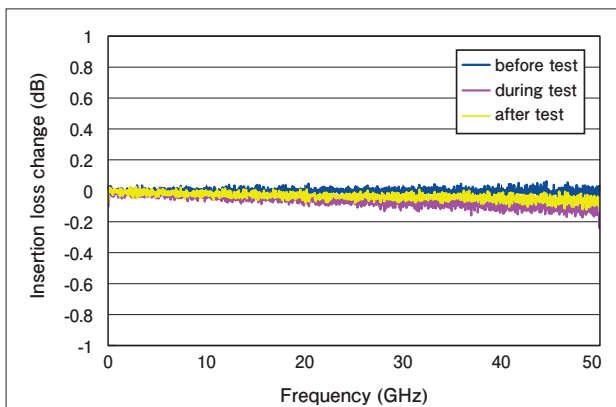
# MWX251 Technical Data

## Cable typical insertion loss



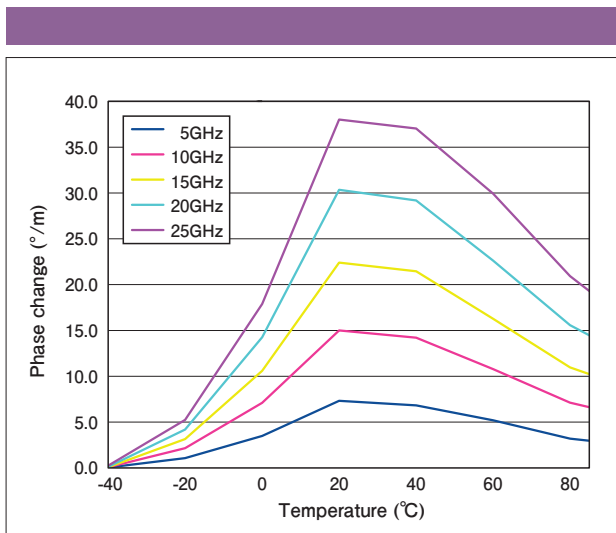
## Static bending data (insertion loss, phase)

Bending radius: 20 mm



\*The cable was wrapped 360° around a mandrel.

## MWX251 Phase change vs. temperature



## Option

- We have the capacity to deliver products with matched phases for customers who require this characteristic.

\*The above figures are measured values for reference only.



# MWX261

DC~67.0 GHz



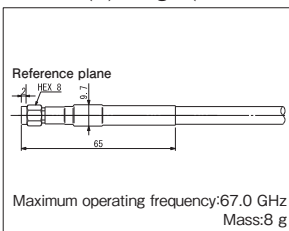
## Basic Cable Properties

Electrical properties	
Maximum operating frequency	67.0 GHz
Characteristic impedance	50±1 Ω
Capacitance (typ.)	90 pF/m
Propagation delay (typ.)	4.38 nsec/m
Shortening coefficient of wavelength (typ.)	76 %
Higher mode frequency (typ.)	67.0 GHz~
VSWR (per connector/both ends of assy.)	1.197/1.43

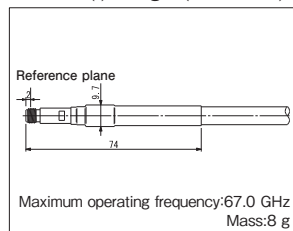
Mechanical properties	
Cable outer diameter	7.7 mm
Minimum bending radius (inner side)	20 mm
Cable mass (typ.)	75 g/m
Continuous operating temperature range	-30~+85 °C
Armored side pressure	196 N/cm

## Connector

1.85 mm (m) straight (Code:VMS)



1.85 mm (f) straight (Code:VFS)



## Order form example

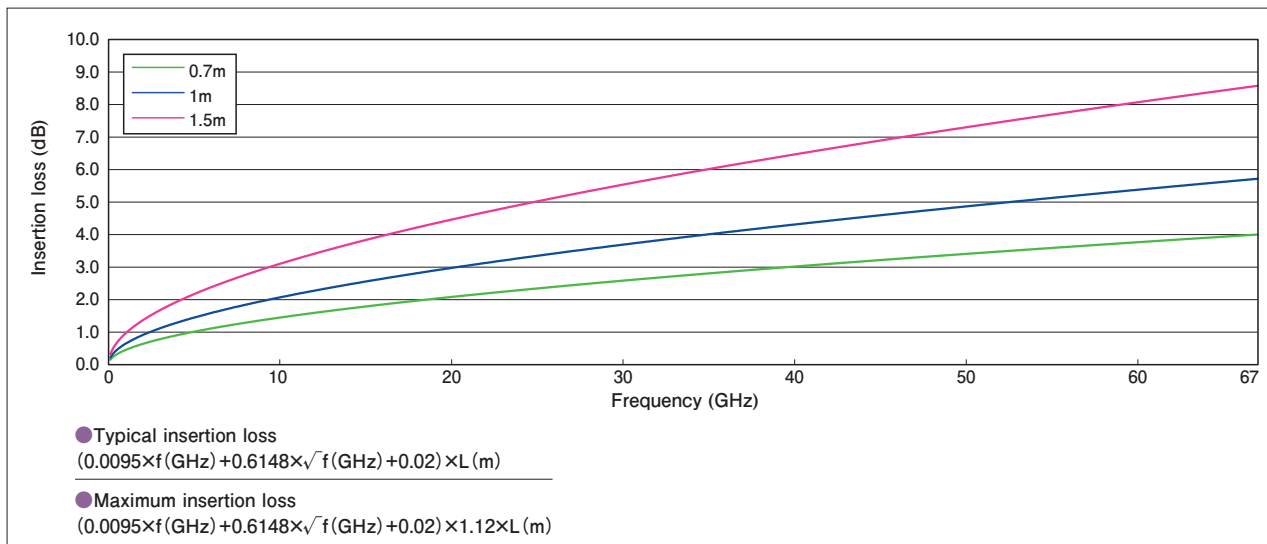
● Example 1

Assembly length : 1000 mm  
 Connector I : 1.85 mm (m) straight  
 Connector II : 1.85 mm (m) straight

Catalog No.:  
**MWX261-01000VMSVMS/B**  
 (See P.32 "Connector combination codes")

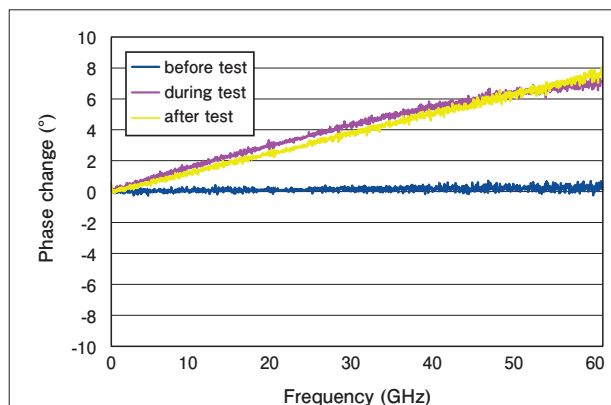
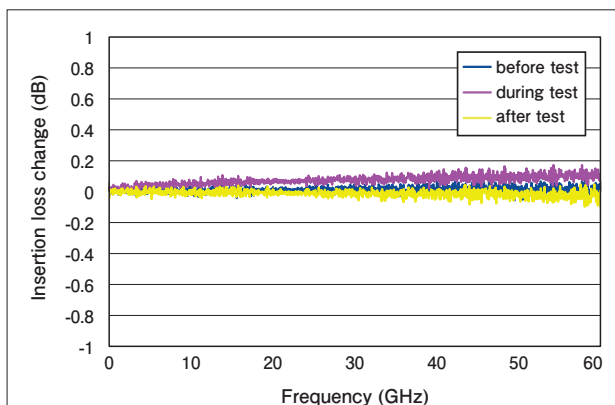
# MWX261 Technical Data

## Cable typical insertion loss



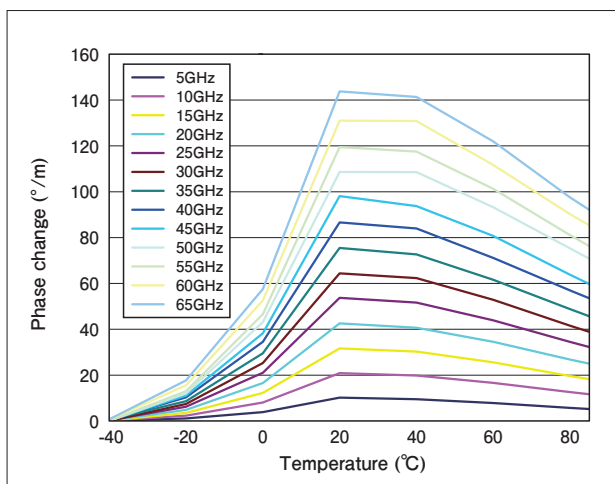
## Static bending data (insertion loss, phase)

Bending radius: 20 mm



\*The cable was wrapped 360° around a mandrel.

## MWX261 Phase change vs. temperature



## Option

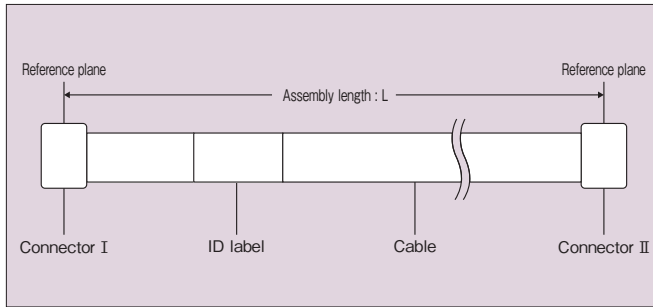
- We have the capacity to deliver products with matched phases for customers who require this characteristic.

\*The above figures are measured values for reference only.

# MWX2 Series

# Placing orders

## Catalog number



Note 1) The unit of assembly length is mm.

Shown as a five-digit number. If the number consists of fewer than five digits, remember to add zero (s) to the left of the first digit to make it five digits.

The assembly length is measured based on the reference planes, not on the connector ends, shown at the figure to the left.

Note 2) Armored-type cables will have a "/B" appended to the connector combination code.

No appended to the connector combination code when cables are not armored type.

Example 1)

**MWX221-01000 DMS DMS**

Cable.....MWX221

Assembly length.....1000 mm

Connector I ...3.5 mm (m) straight

Connector II ...3.5 mm (m) straight

Example 2)

**MWX241-02000 KMS KMS /B**

Cable.....MWX241

Assembly length.....2000 mm

Connector I ...2.92 mm (m) straight

Connector II ...2.92 mm (m) straight

Armored.....Armored-type

### Connector combination codes

Connector I \ Connector II			SMA	SMA swept	N	N swept	3.5 mm	3.5 mm	3.5 mm swept	2.92 mm	2.92 mm	2.4 mm	2.4 mm	1.85 mm	1.85 mm
			m	m	m	m	m	f	m	m	f	m	f	m	f
			AMS	AMW	NMS	NMW	DMS	DFS	DMW	KMS	KFS	LMS	LFS	VMS	VFS
SMA	m	AMS	AMSAMS	AMSAMW	AMSANMS	AMSANMW	AMSADMS	AMSADFS	AMSADMW	AMSAMKMS	AMSAMKFS	—	—	—	—
SMA swept	m	AMW	—	AMWAMW	AMWNMS	AMWNMW	AMWDMS	AMWDFS	AMWDMW	—	—	—	—	—	—
N	m	NMS	—	—	NMSNMS	NMSNMW	DMSNMS	DFSANMS	DMWNMS	KMSNMS	KFSNMS	—	—	—	—
N swept	m	NMW	—	—	—	NMWNMW	NMWDMS	NMWDFS	NMWDMW	—	—	—	—	—	—
3.5 mm	m	DMS	—	—	—	—	DMSDMS	DFSADMS	DMSADMW	—	—	—	—	—	—
3.5 mm	f	DFS	—	—	—	—	—	DFSDFS	DFSADMW	—	—	—	—	—	—
3.5 mm swept	m	DMW	—	—	—	—	—	—	DMWDMW	—	—	—	—	—	—
2.92 mm	m	KMS	—	—	—	—	—	—	—	KMSKMS	KFSKMS	—	—	—	—
2.92 mm	f	KFS	—	—	—	—	—	—	—	—	KFSKFS	—	—	—	—
2.4 mm	m	LMS	—	—	—	—	—	—	—	—	—	LMSLMS	LFSLMS	—	—
2.4 mm	f	LFS	—	—	—	—	—	—	—	—	—	—	LFSLFS	—	—
1.85 mm	m	VMS	—	—	—	—	—	—	—	—	—	—	—	VMSVMS	VFSVMS
1.85 mm	f	VFS	—	—	—	—	—	—	—	—	—	—	—	—	VFSVFS

Please provide a catalog number when placing an order.

m : male (plug)

f : female (jack)

# Delivery time of MWX2 Series

---

## Stocks of MWX221

We have following items in stock. We can ship these items immediately.

MWX221-00500AMSAMS (L:500 mm, Connector:both ends SMA (m))

MWX221-01000AMSAMS (L:1000 mm, Connector:both ends SMA (m))

MWX221-00500DMSDMS (L:500 mm, Connector:both ends 3.5 mm (m))

MWX221-01000DMSDMS (L:1000 mm, Connector:both ends 3.5 mm (m))

## Delivery time of the other items

MWX2 series will be shipped within 7 business days after received order.

\*Leadtime may be effected by larger order volume.