











# MHF<sup>®</sup> Series - Micro RF Coaxial Connectors

↓ Click the photos below to get more detailed product information.

Product name		MHF <sup>®</sup> I LK	MHF <sup>®</sup> I	MHF <sup>®</sup> I	MHF <sup>®</sup> III	MHF <sup>®</sup> -A
Appearance						
		<b>MHF I with mechanical lock</b>	<b>Best Insertion Loss</b>	<b>Most Cable O.D. options</b>	<b>low profile 1.60 mm</b>	<b>Shortest mated height with 3x3 mm footprint</b>
Plug part number		-	20767-001R	20670-001R-**	20609-002R	20428-001R
Receptacle part number		20279-001E-** (3 pads) 20441-001E-01 (4 pads)			20369-001E-**	20429-001E
Maximum height (mm)		2.9	3.0	2.5	1.6	1.45
Outside dimension of receptacle (mm)		3.0 x 3.0			2.0 x 2.0	3.0 x 3.0
Coax O.D. (Center Conductor AWG)	2.00 mm (26)		●			
	1.80 mm (30)	●		●		
	1.37 mm (30)	●		●		
	1.32 mm (32)	●		●		
	1.13 mm (32)	●		●		●
	0.95 mm (33)					
	0.81 mm (33)					
	0.81 mm (36)	●		●	●	
	0.64 mm (36)				●	
0.48 mm (38)						
Frequency		DC - 9 GHz			DC - 6 GHz	
VSWR (L=100mm)	DC - 3GHz	1.3 max.(PLUG) /1.3 max.(RECE)			1.3 max.	
	3GHz - 6GHz	1.5 max.(PLUG) /1.4 max.(RECE)			1.5 max.	
	6GHz - 9GHz	1.9 max.(PLUG) /1.8 max.(RECE)		1.6 max.(PLUG) 1.8 max.(RECE)	-	
	9GHz - 12GHz	-				
	12GHz - 15GHz	-				
Service temp. (Celsius)	-40 degree - 90 degree					
Characteristic impedance	50ohm					
Rated voltage	AC60V					
Contact resistance	20m ohm max.					
Withstand voltage	AC200V/min					
Insulation resistance	500M ohm min./DC100V					







# MHF<sup>®</sup> Series - Micro RF Coaxial Connectors

↓ Click the photos below to get more detailed product information.

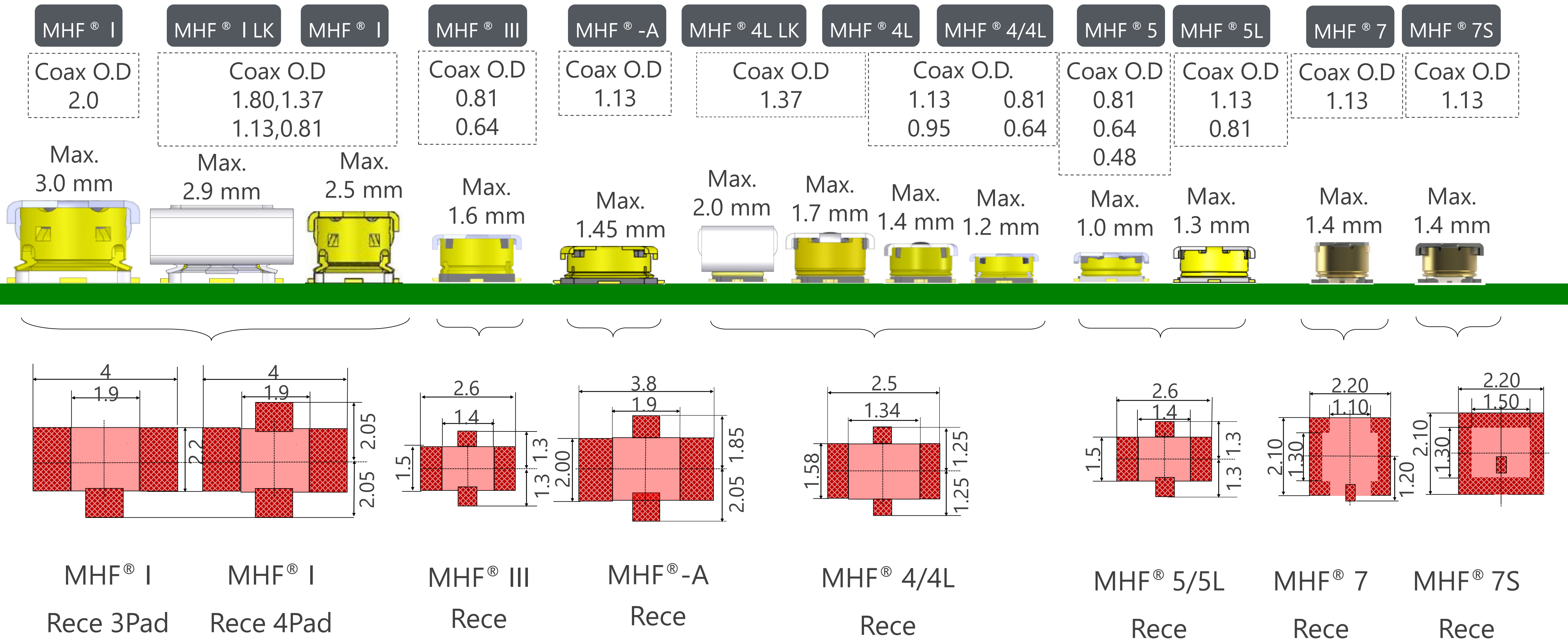
Product name		MHF <sup>®</sup> 4L LK	MHF <sup>®</sup> 4L	MHF <sup>®</sup> 4L	MHF <sup>®</sup> 4L	MHF <sup>®</sup> 4
Appearance						
		<b>MHF 4L with Mechanical lock</b>	<b>Best Insertion Loss and VSWR</b>	<b>Industry Standard for M.2</b>	<b>Industry Standard for M.2</b>	<b>low profile 1.20 mm</b>
Plug part number		-	20632-001R-37	20565-001R-13	20572-001R-08	20611-001R
Receptacle part number		20449-001E-**(MHF 4) 20579-001E(MHF 4L)				
Maximum height (mm)		2.0	1.7	1.4	1.2	1.2
Outside dimension of receptacle (mm)		2.0 x 2.0				
Coax O.D. (Center Conductor AWG)	2.00 mm (26)					
	1.80 mm (30)					
	1.37 mm (30)	●	●			
	1.32 mm (32)					
	1.13 mm (32)			●		
	0.95 mm (33)			●		
	0.81 mm (33)					
	0.81 mm (36)				●	●
	0.64 mm (36)				●	
0.48 mm (38)						
Frequency		DC - 12 GHz				DC - 6 GHz
VSWR (L=100mm)	DC - 3 GHz	1.3 max.				
	3 GHz - 6 GHz	1.4 max.		1.45 max		1.5 max.
	6 GHz - 9 GHz	1.5 max.		1.6 max.		-
	9 GHz - 12 GHz	1.6 max.		1.9 max.	1.8 max.	-
	12 GHz - 15 GHz			-		
Service temp. (Celsius)		-40 degree - 90 degree				
Characteristic impedance		50ohm				
Rated voltage		AC60V				
Contact resistance		20m ohm max.				
Withstand voltage		AC200V/min				
Insulation resistance		500M ohm min./DC100V				

# MHF® Series - Micro RF Coaxial Connectors

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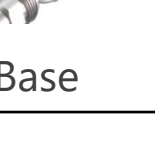





Product name		MHF® 5L	MHF® 5L	MHF® 5	MHF® 5	MHF® 7	MHF® 7S			
Appearance										
		<b>Improved Insertion Loss and VSWR through 15GHz</b>	<b>Improved Insertion Loss and VSWR through 15GHz</b>	<b>low profile 1.00 mm</b>	<b>low profile 1.00 mm</b>	<b>good performance through 45GHz</b>	<b>Unique shielded design increases EMC performance</b>			
Plug part number		20668-001R-13	20714-001R-81	20711-001R-81	20615-002R-48	20939-001R-13	20980-001R-13			
Receptacle part number		20566-001E-01				20921-001E	20981-001E-02			
Maximum height (mm)		1.3		1.0		1.4				
Outside dimension of receptacle (mm)		2.0 x 2.0				2.1 x 2.0		2.0 x 2.0		
Coax O.D.(Center Conductor AWG)	2.00 mm (26)									
	1.80 mm (30)									
	1.37 mm (30)									
	1.32 mm (32)									
	1.13 mm (30)					●				
	1.13 mm (32)	●					●			
	0.95 mm (33)									
	0.81 mm (33)		●							
	0.81 mm (36)			●						
	0.64 mm (36)			●						
0.48 mm (38)					●					
Frequency		DC - 15GHz		DC - 12GHz		DC - 45GHz		DC - 15GHz		
VSWR (L=100mm)	DC -3GHz	1.3 max.				DC~5GHz	1.2 max.			
	3GHz - 6GHz	1.4 max.		1.5 max.		5GHz~10GHz	1.35 max.		1.35 max.	
	6GHz - 9GHz	1.5 max.		1.6 max.		10GHz~15GHz	1.50 max.		1.4 max.	
	9GHz - 12GHz	1.5 max.	1.8 max.		1.6 max.		15GHz~20GHz	1.68 max.		1.45 max.
	12GHz - 15GHz	1.6 max.			-		20GHz~45GHz	1.68 max.		1.50 max.
Service temp. (Celsius)		-40 degree - 90 degree								
Characteristic impedance		50ohm								
Rated voltage		AC60V								
Contact resistance		20m ohm max.								
Withstand voltage		AC200V/min								
Insulation resistance		500M ohm min./DC100V								

# Micro RF coax connector : Foot pattern





# Accessory overview

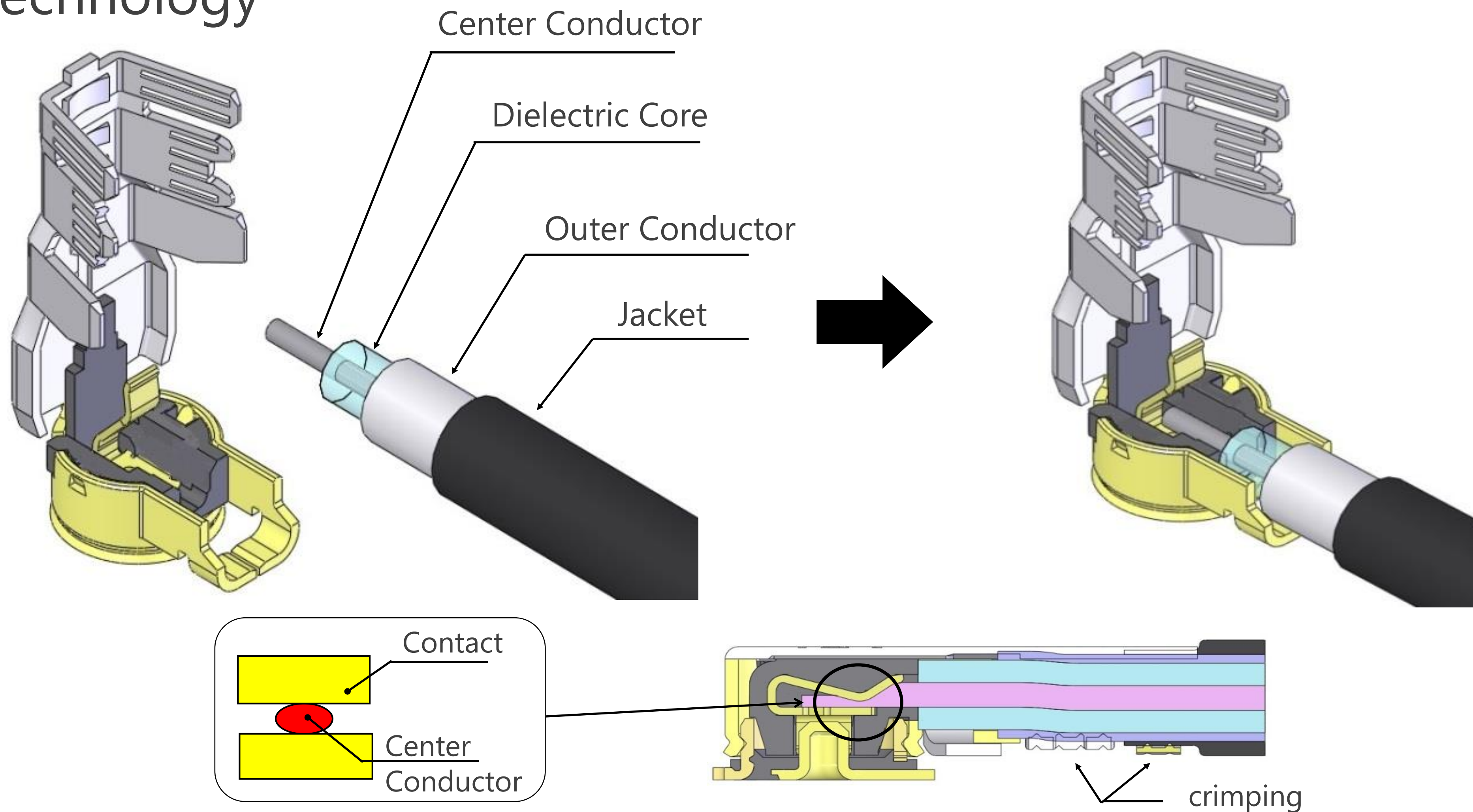
Product			MHF® I	MHF® I LK	MHF® III	MHF® -A	MHF® 4	MHF® 4L	MHF® 4L LK	MHF® 5	MHF® 7	MHF® 7S		
SMA adapter	for Plug	Durability (cycles)												
		for electrical performance check	3K		90193-001	90285-001	90413-001	90449-001		90543-0001	91106-0001	91255-0001		
		for voltage check	10K		90194-001	90286-001	-	90449-003-01		90586-0001	91245-0001	91245-0001		
	for Receptacle	High cycle	for electrical performance check	500		90193-002	90285-002	90413-002	90449-002		90543-0002	91107-0001	91256-0001	
			Normal	10K		90539-001	90491-001	90539-001	90698-0001		90793-0001	-	-	
		Narrow pitch	Wire	100		90577-0100 (100mm) 90577-0350 (350mm)	-	90577-0100 (100mm) 90577-0350 (350mm)				91137-J300	91197-0300	
			Probe	10K		90575-0001	-	90575-0001	90576-0001		90847-0001	91145-0001	91145-0001	
			Detachable	Base	200K		90684-0001							-
		Probe		10K		90416-001	-	90416-001	90683-0001		90690-0001	-	-	
		Hand tool	Mating and unmating tool			90224-001 90885-0001 (for 20767-001R)	-	-	-	90435-001	90609-0001 (for 20572-001R-08 / 20565-001R-13)  90873-0001 (for 20632-001R-37)	-	90612-0001	-
Unmating tool				90192-001	-	90287-001	90411-001	-	-	-	-	-	-	
Mating tool				-	-	-	-	-	-	-	90624-0001	-	-	
Mating and unmating tweezers				-	-	90501-001	-	90482-001	90616-0008 90615-0013	-	-	91187-0002	-	
Locking and unlocking tool				-	91026-0001	-	-	-	-	91166-0001	-	-	-	



# MHF<sup>®</sup> Harnesses

# Micro RF coax connector : Wire crimp termination technology

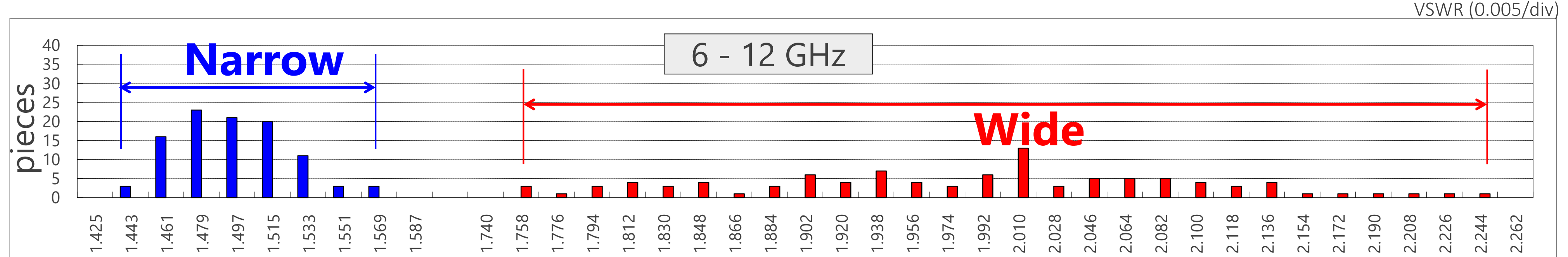
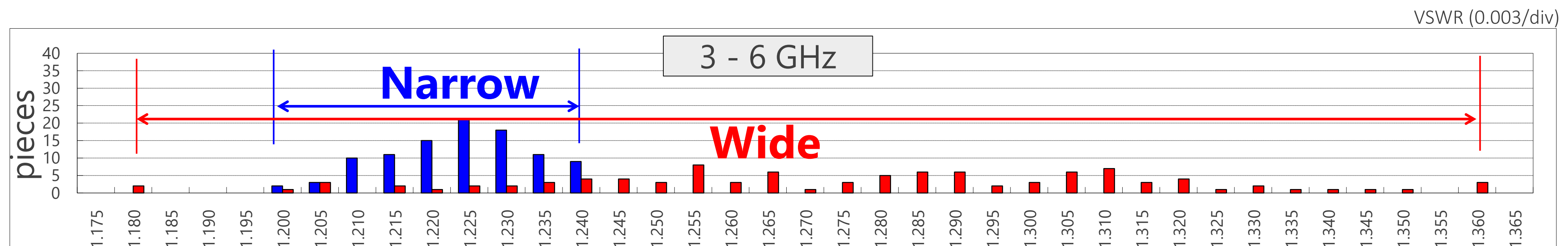
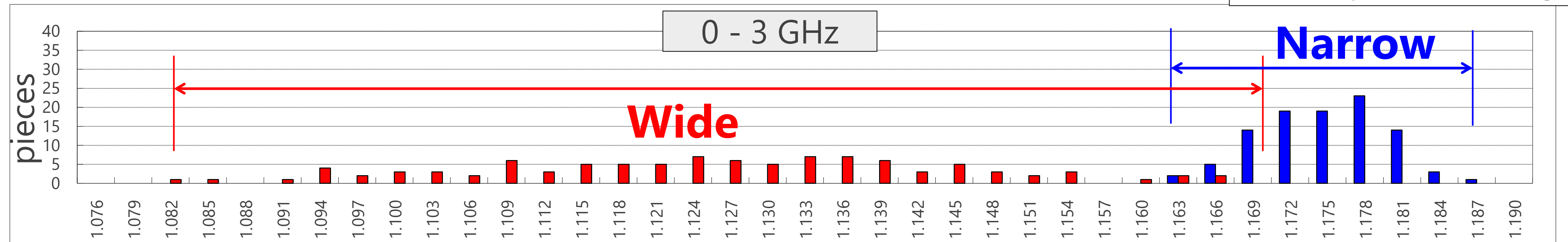
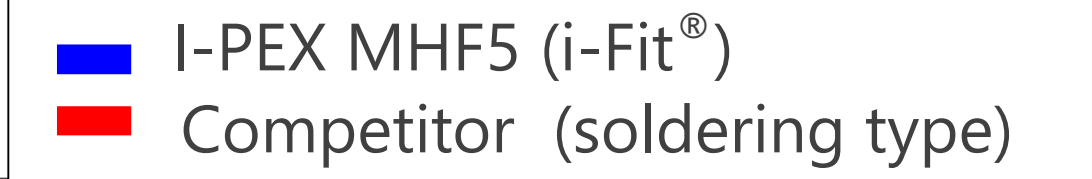
i-Fit<sup>®</sup> Technology





# Solder-less crimp "i-Fit<sup>®</sup>" advantage versus soldering types

i-Fit<sup>®</sup> offers consistently tight range of performance



VSWR S11 Histogram



# Solder-less crimp "i-Fit<sup>®</sup>" advantage versus manual soldering types

Significantly reduced tact time with i-Fit<sup>®</sup>

		I-PEX MHF "i-Fit"	Manual Soldering
Tact time	Wire strip	Same tact time	
	Termination	<b>6</b> seconds/ea.	<b>30</b> seconds/ea.
Qty of cable assemblies a worker can make per month		105,600 assemblies	21,120 assemblies
# of operator needed	1M cable assemblies/mo	10	48
	2M cable assemblies/mo	19	95

\*Calculated based on operation hours of 22days/mo (8hours/day)

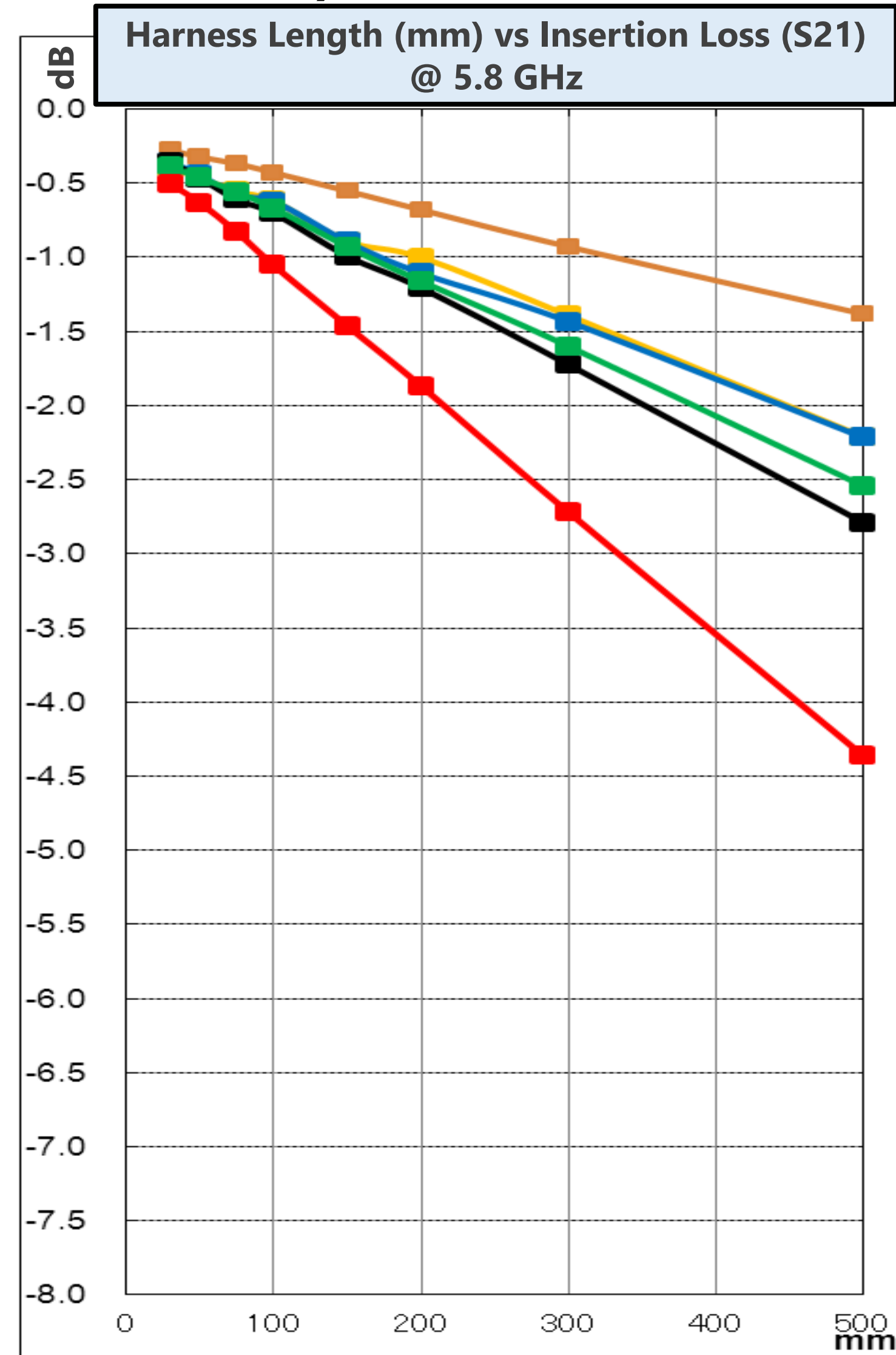
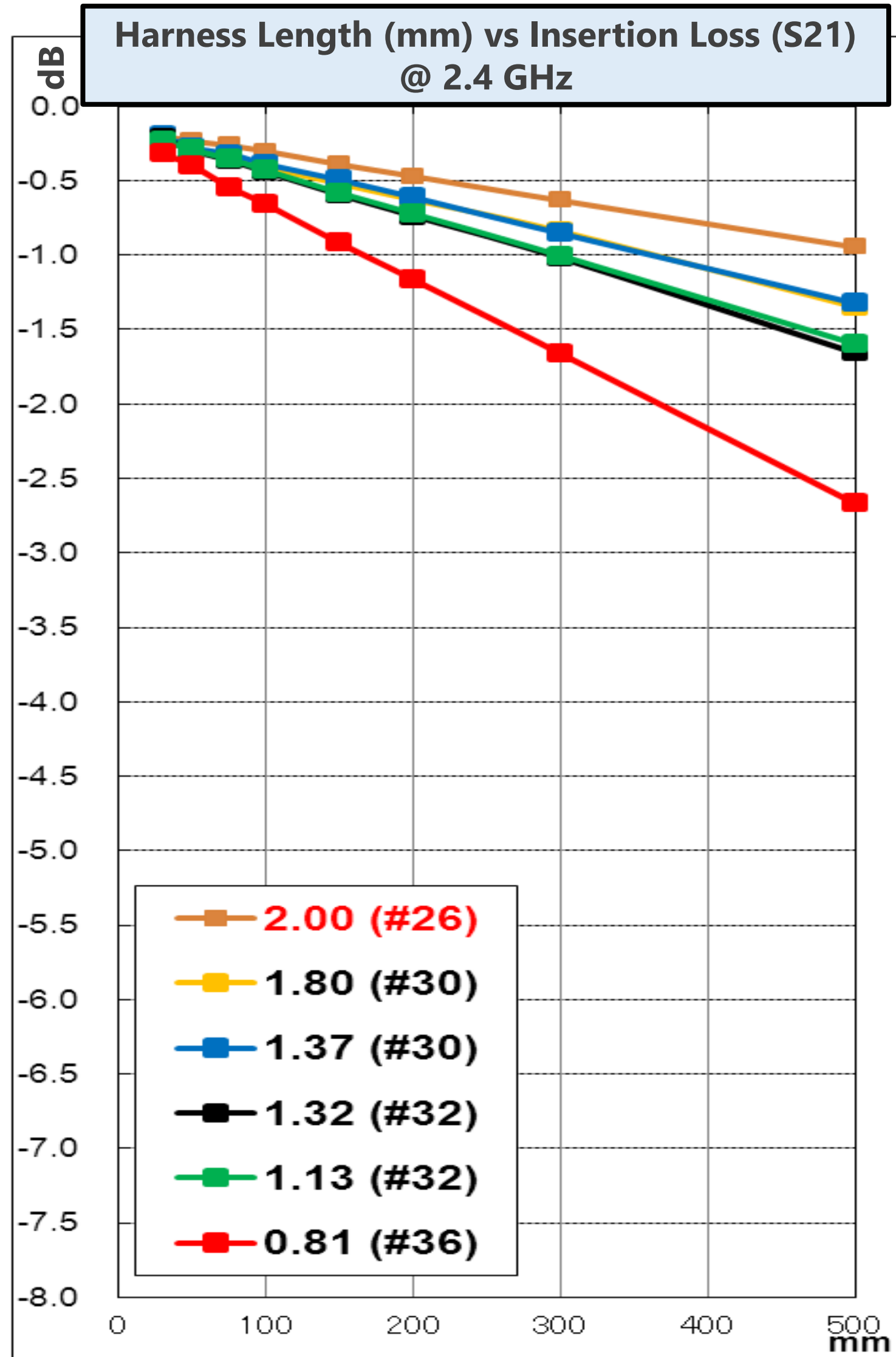


i-Fit Semi-Auto crimp tool :

I-PEX has sold over 500 units of i-Fit crimping tool.

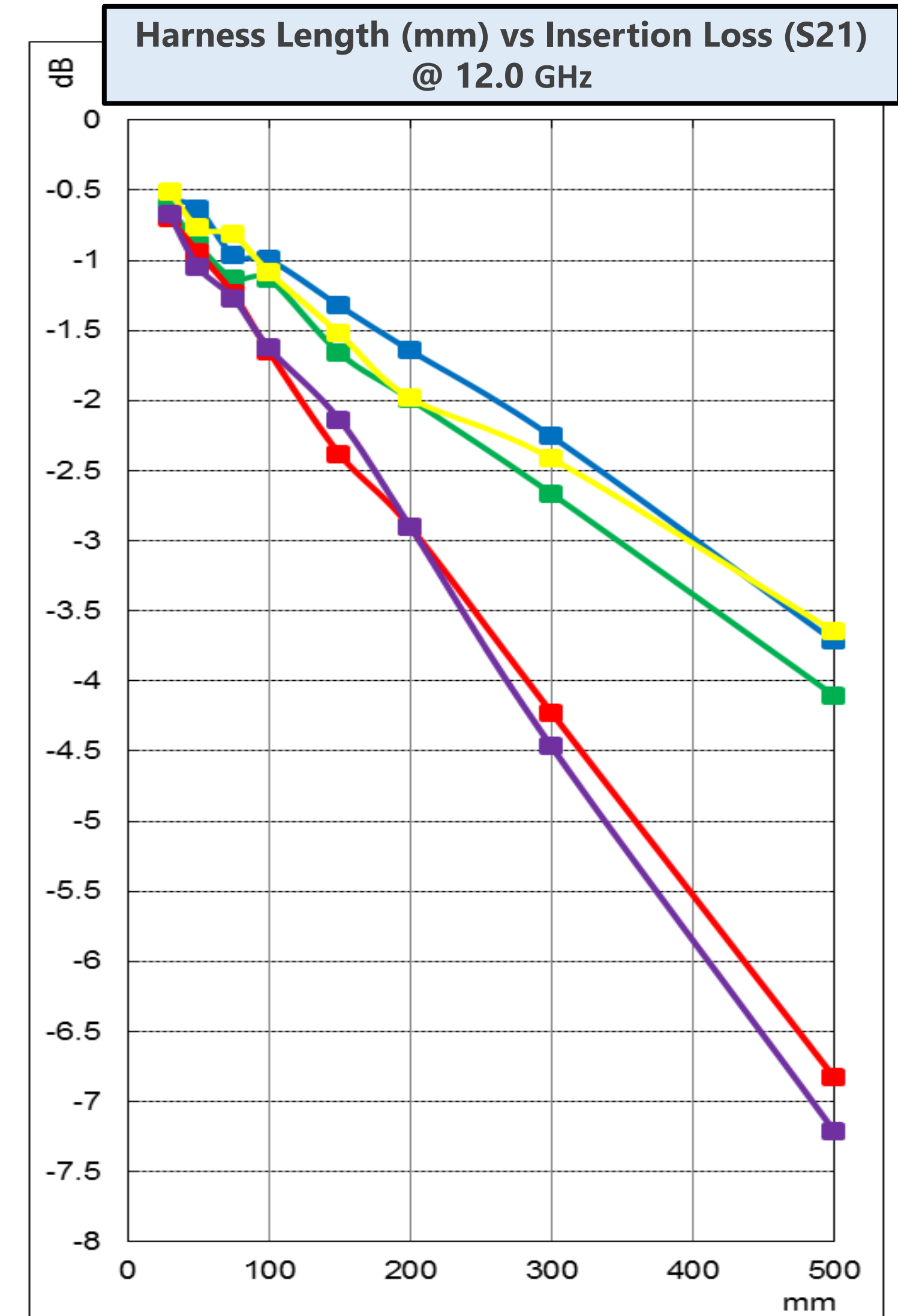
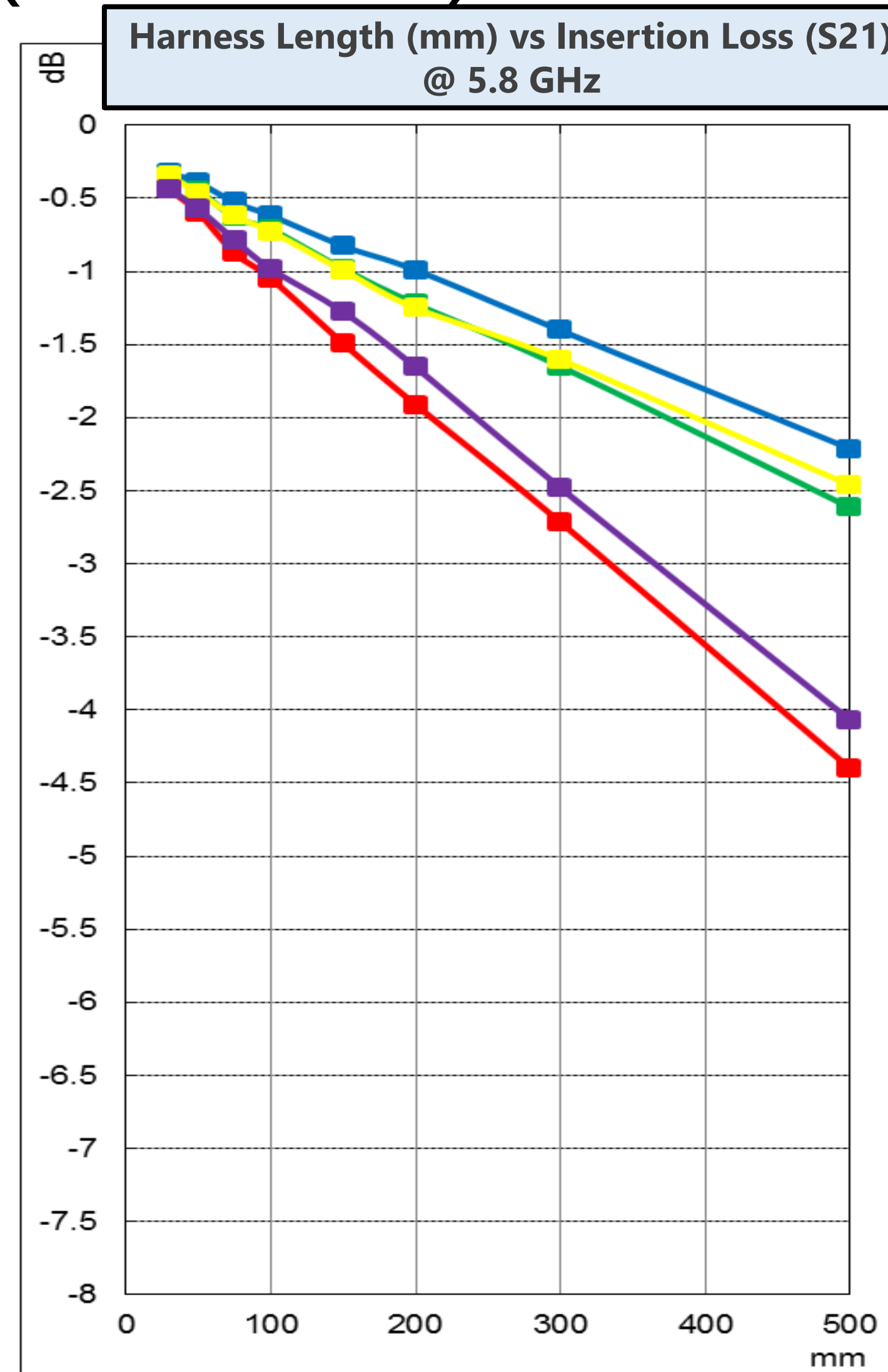
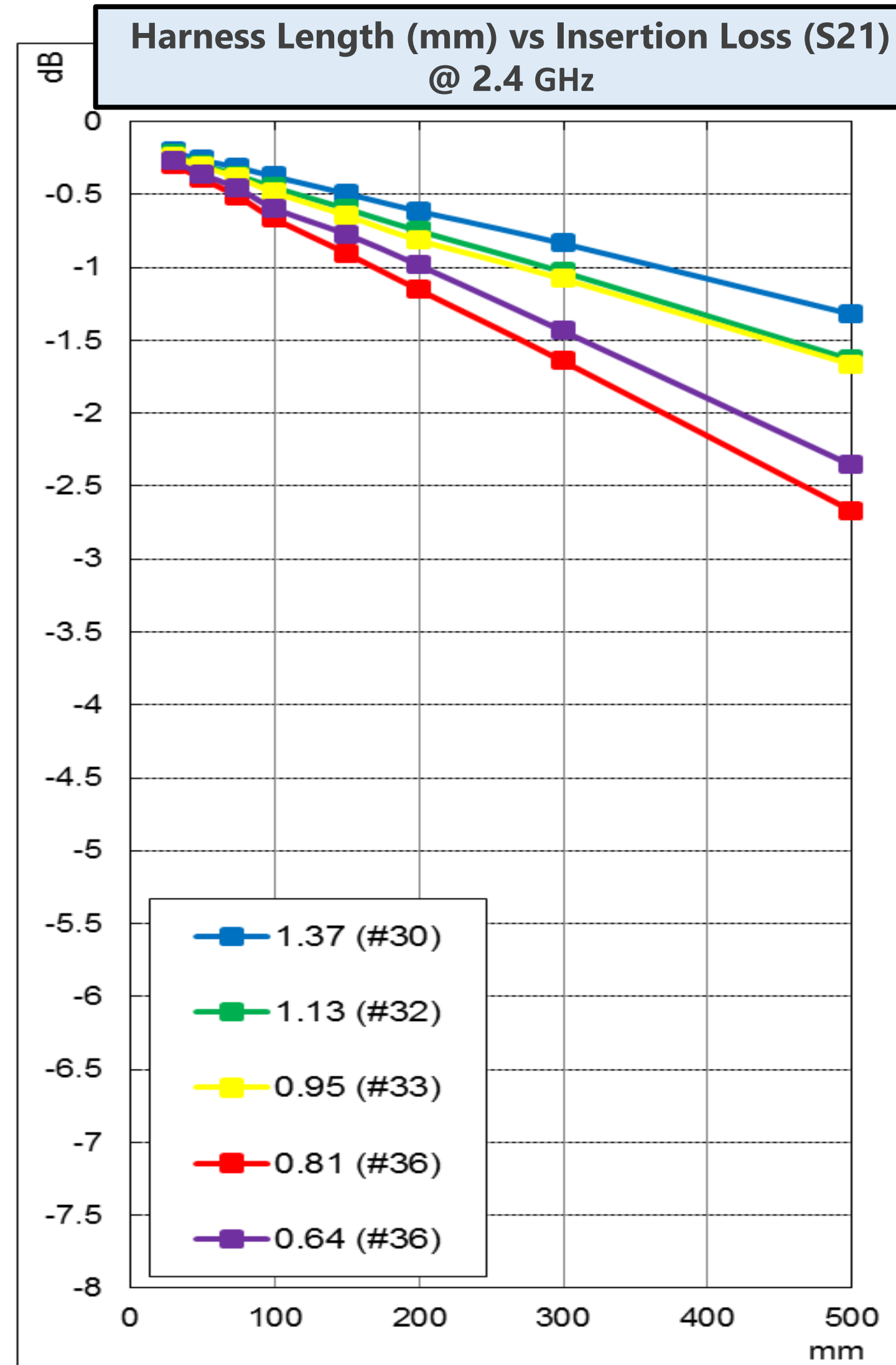
These are working in many antenna / harness makers around the world.

# Wire insertion loss (MHF<sup>®</sup> I) & Minimum bend radius



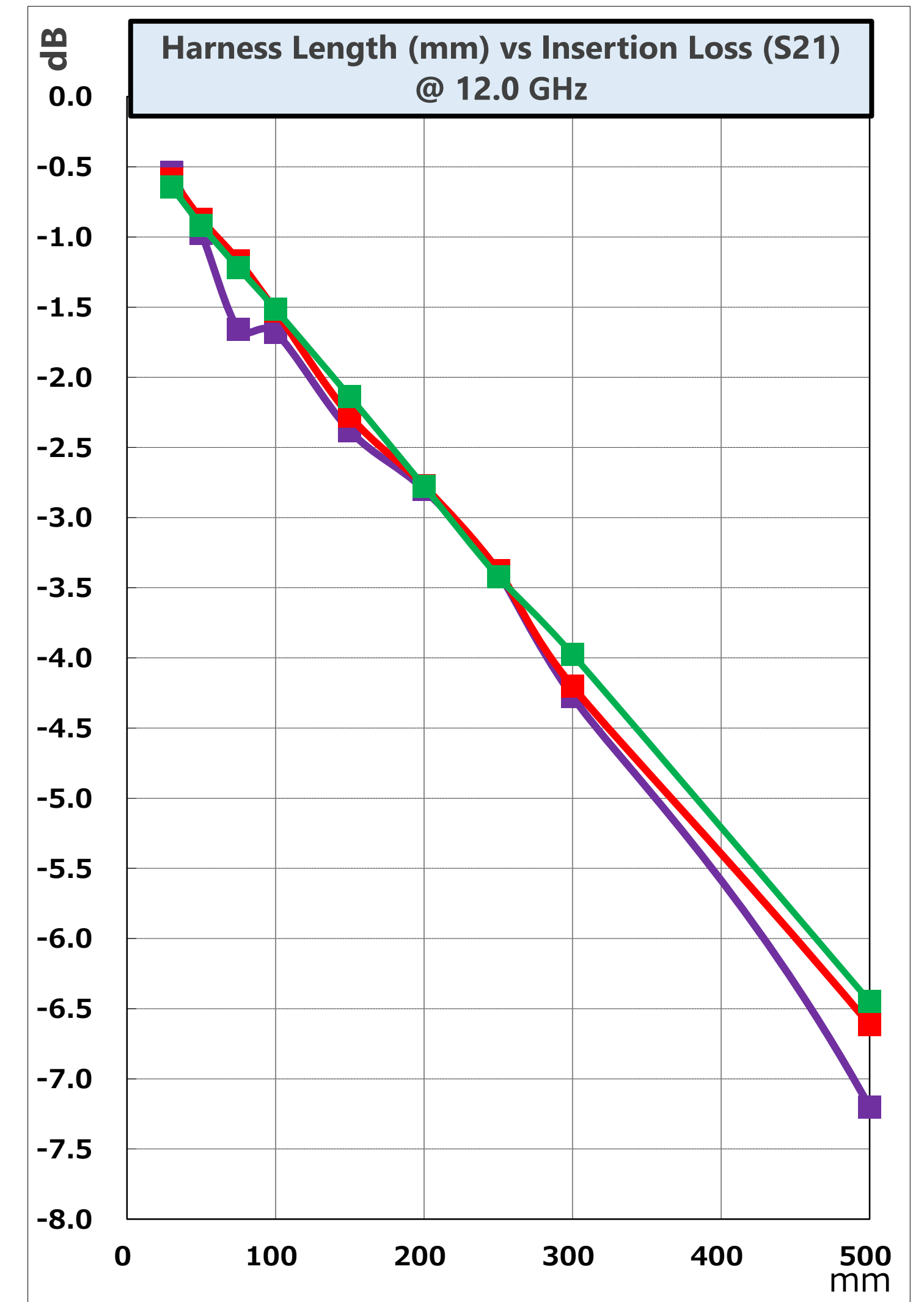
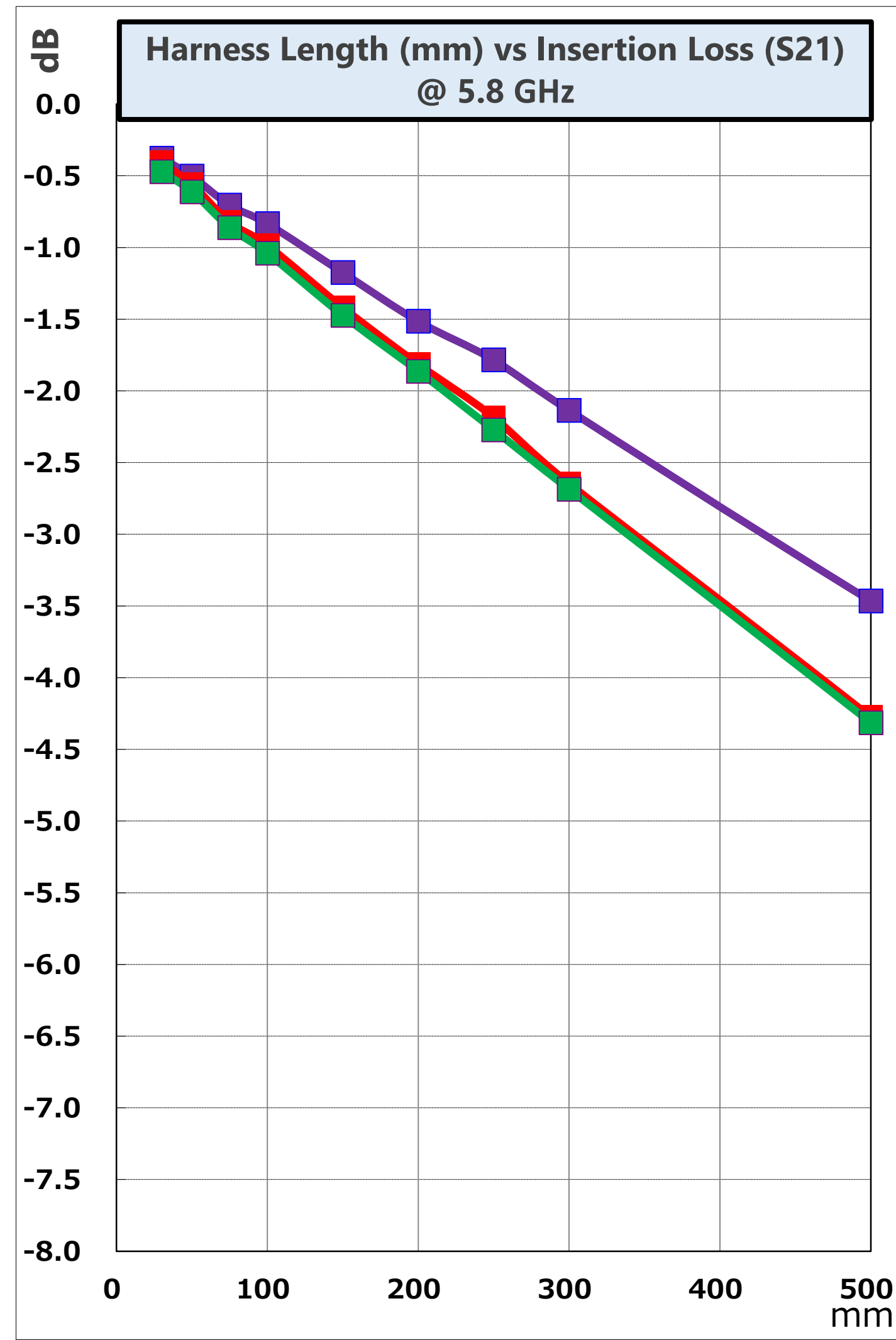
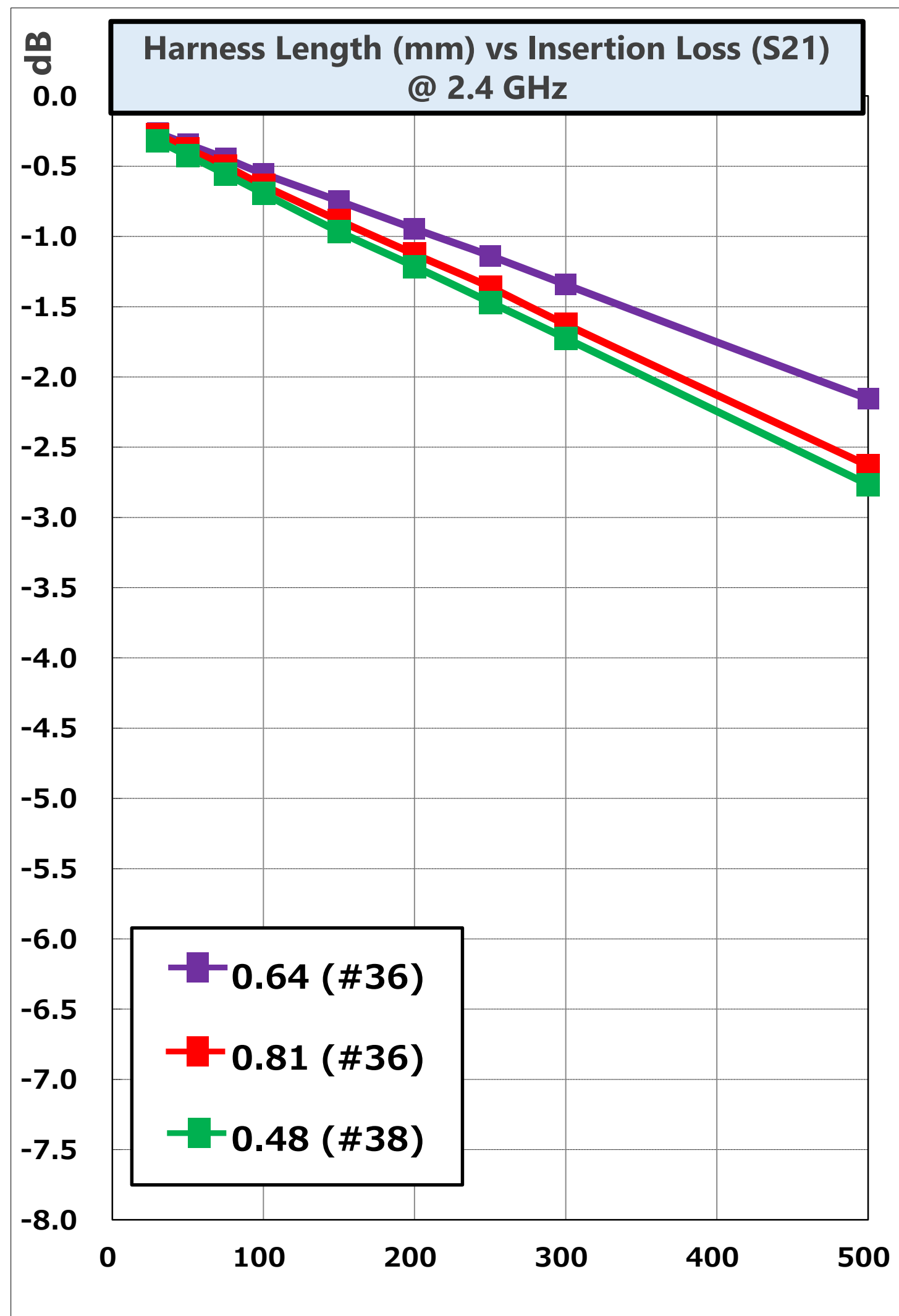
Coax O.D. (Center Conductor AWG)	Minimum bend radius (90 degrees)
2.00 mm (26)	2.0mm
1.80 mm (30)	1.8mm
1.37 mm (30)	1.3mm
1.32 mm (32)	1.3mm
1.13 mm (32)	1.1mm
0.95 mm (33)	1.0mm
0.81 mm (33)	0.8mm
0.81 mm (36)	0.6mm
0.64 mm (36)	0.5mm
0.48 mm (38)	0.3mm
0.34 mm (42)	0.3mm

# Wire insertion loss (MHF<sup>®</sup> 4L)



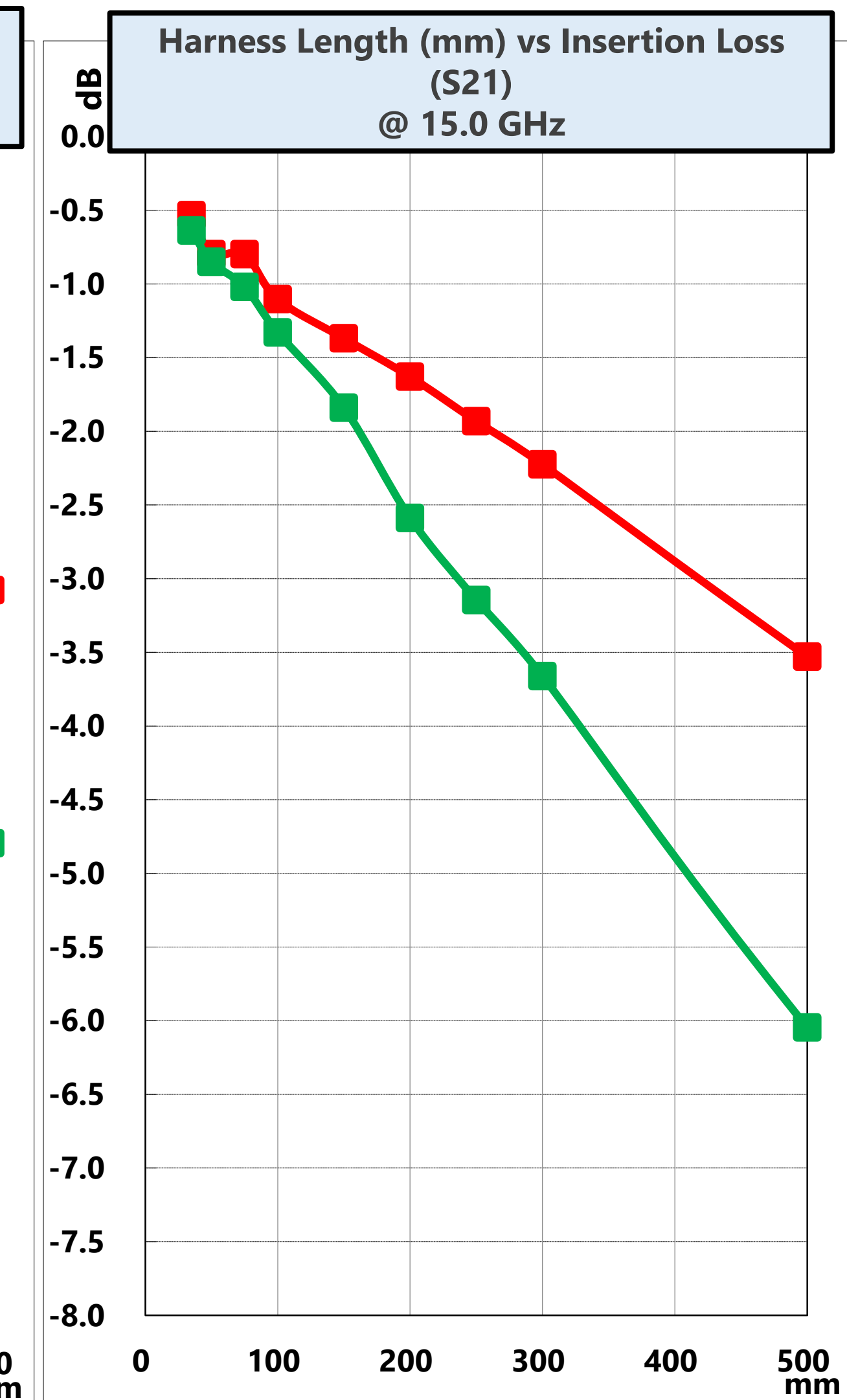
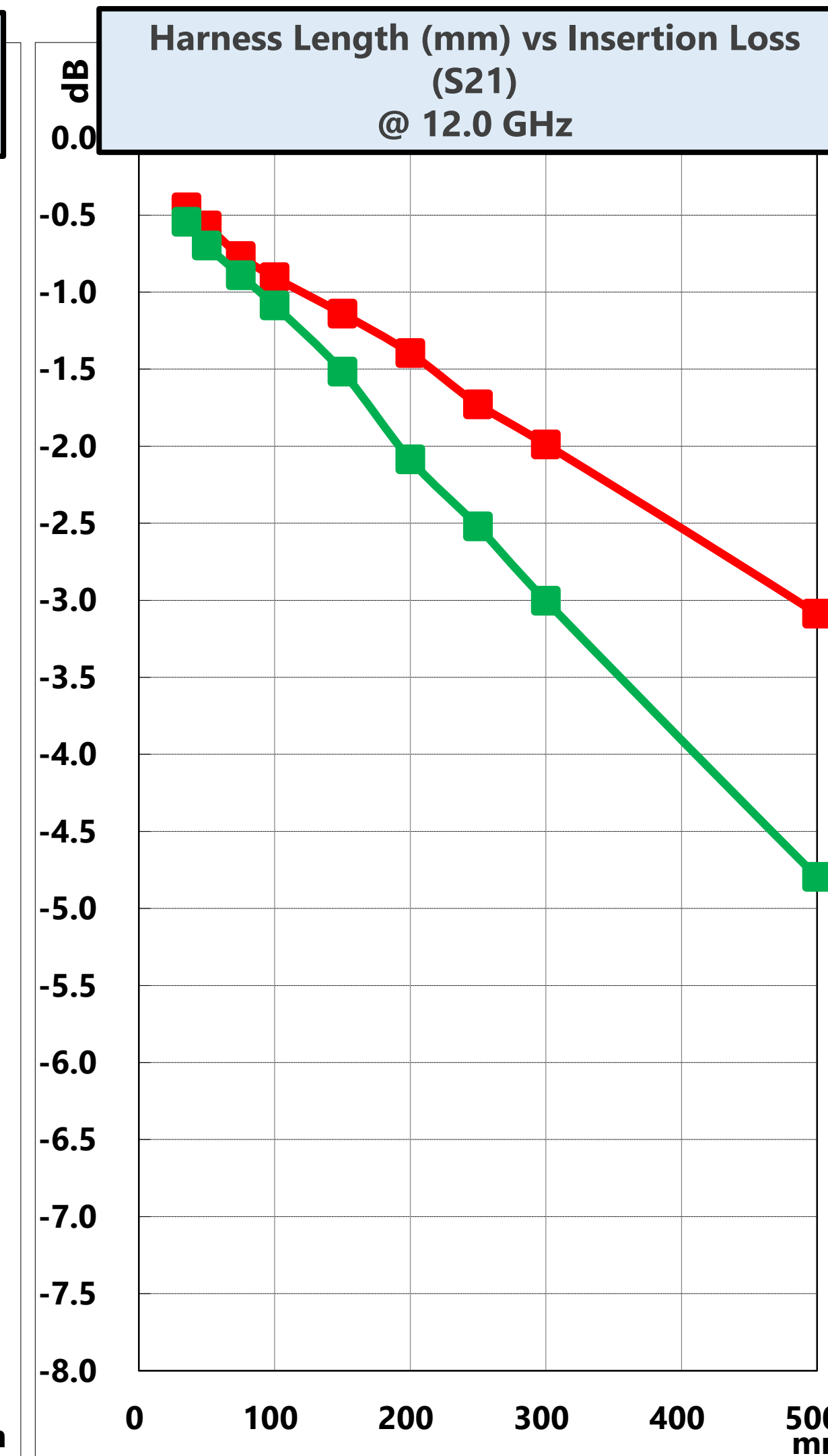
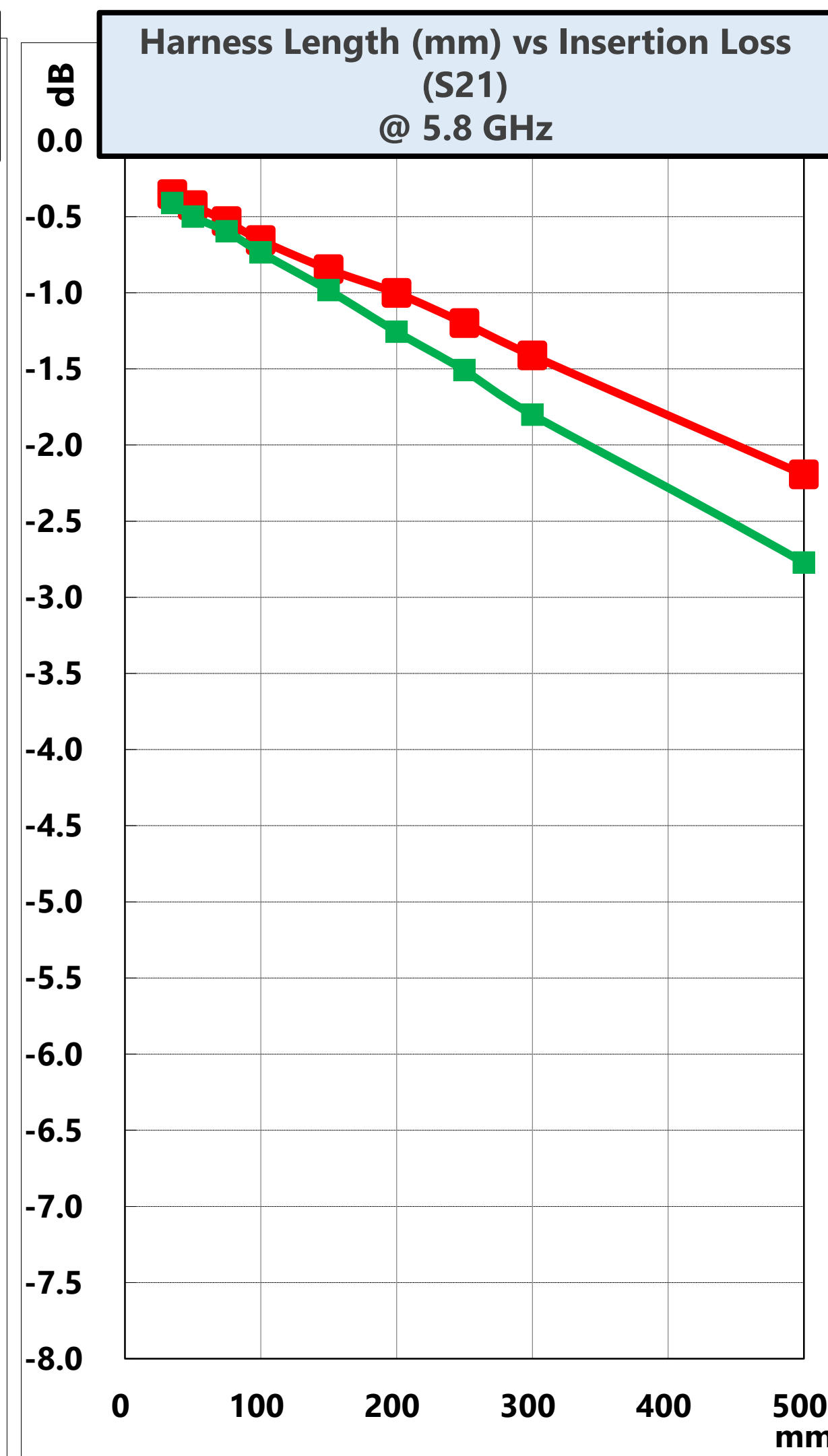
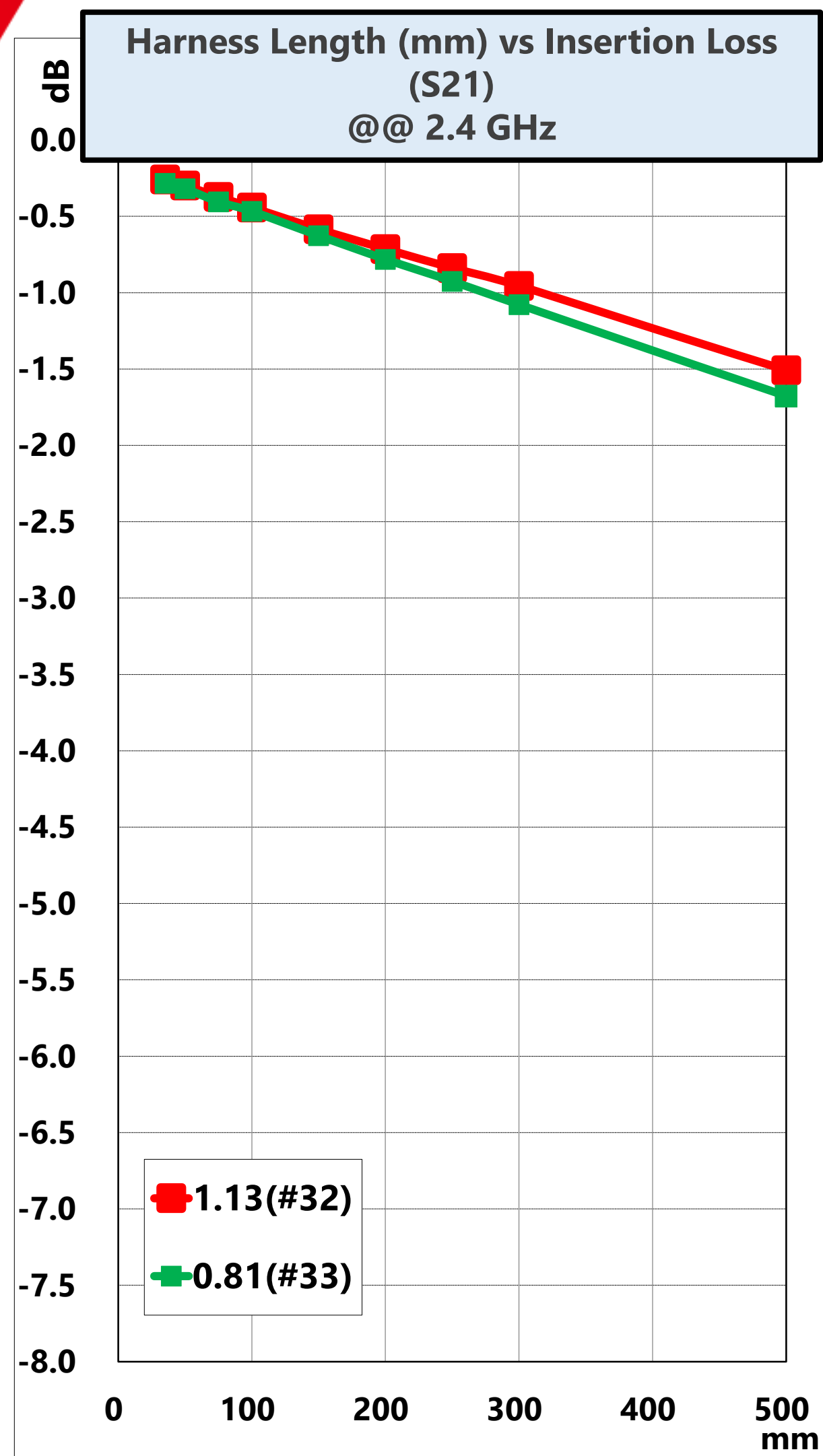


# Wire insertion loss (MHF<sup>®</sup> 5)



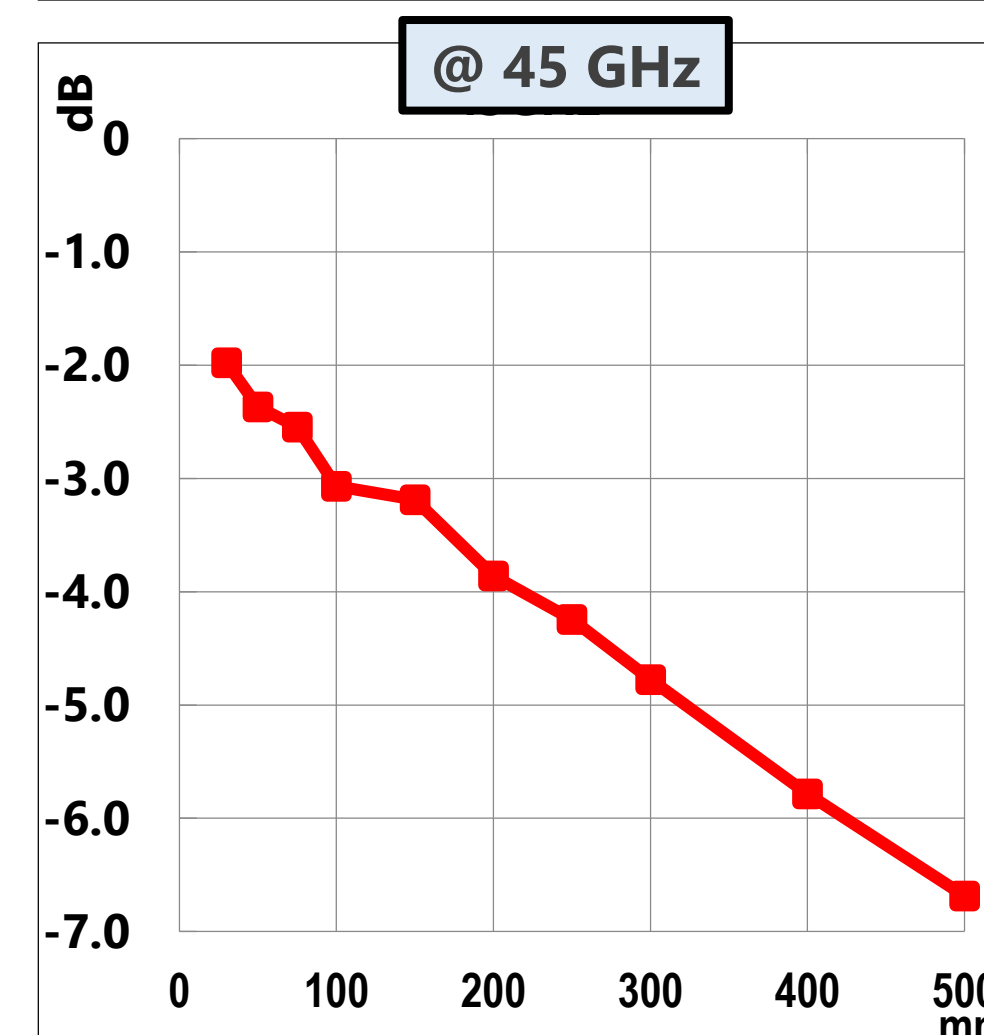
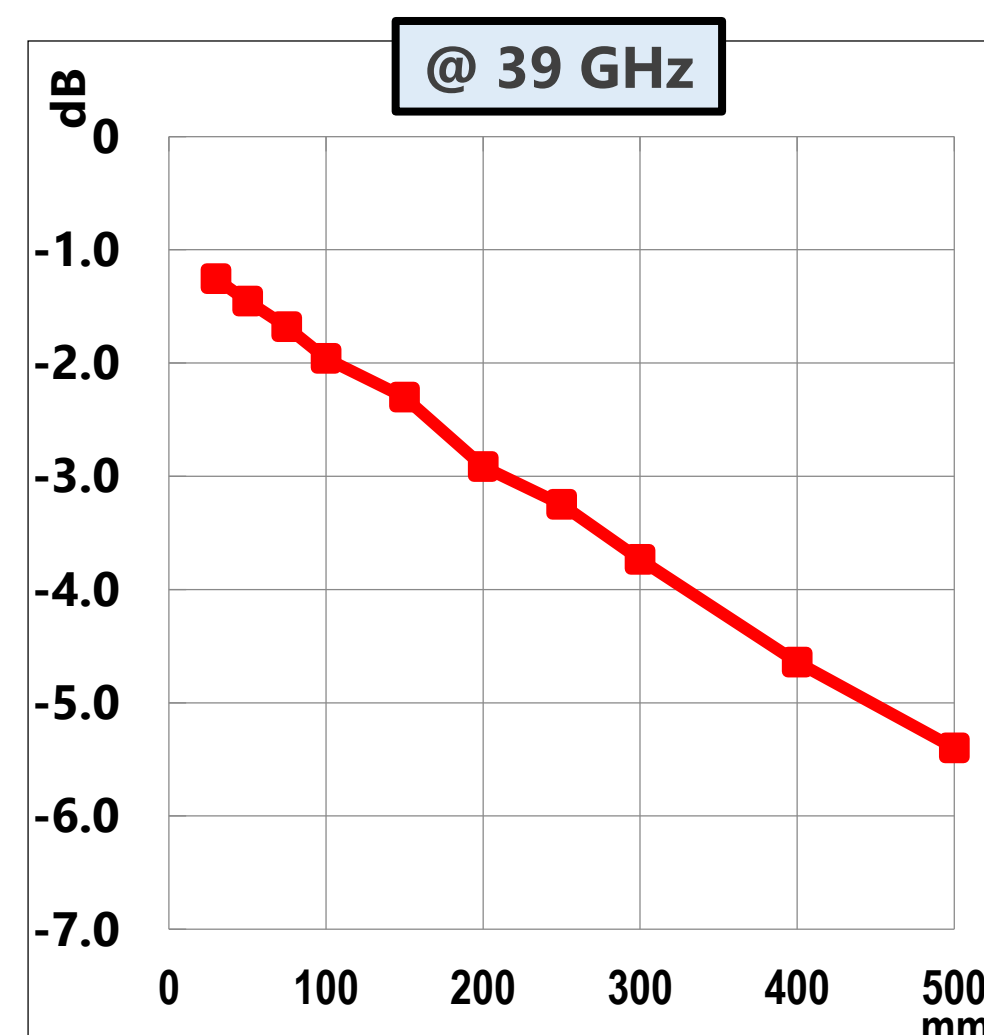
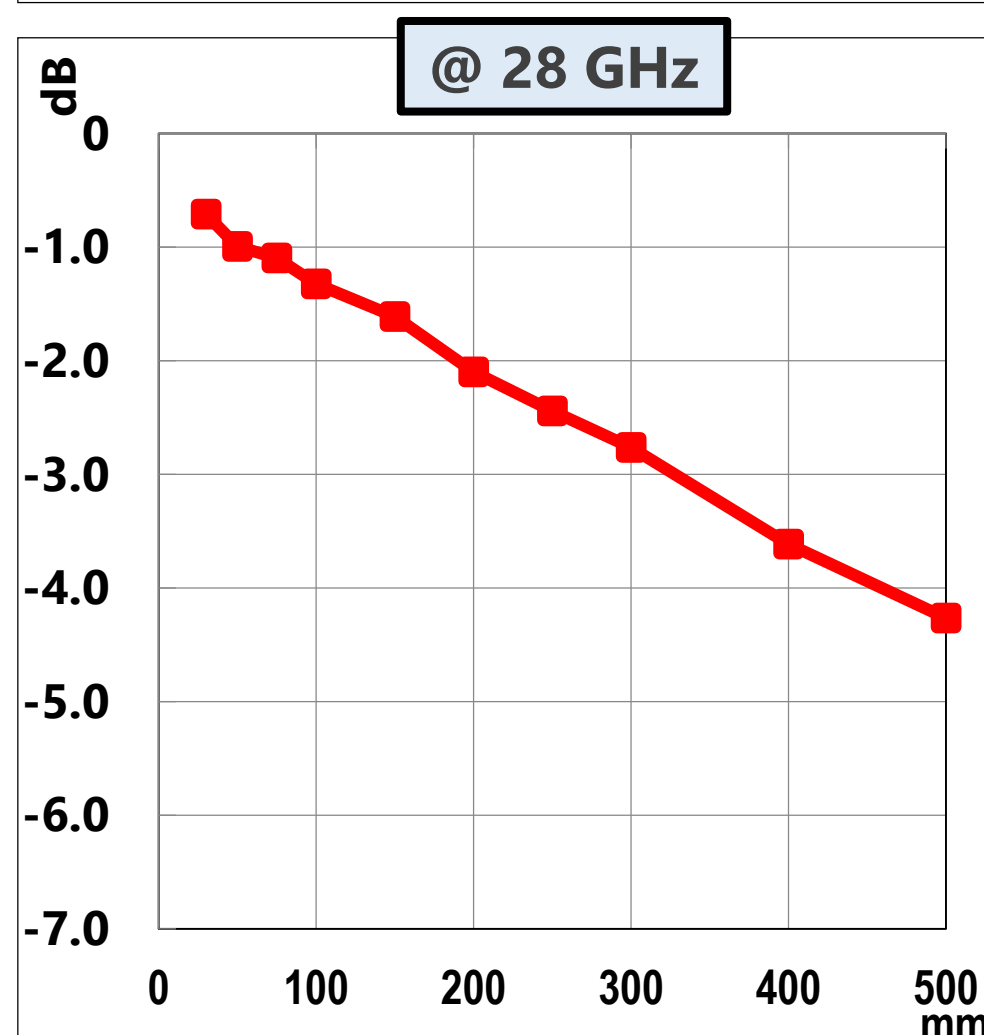
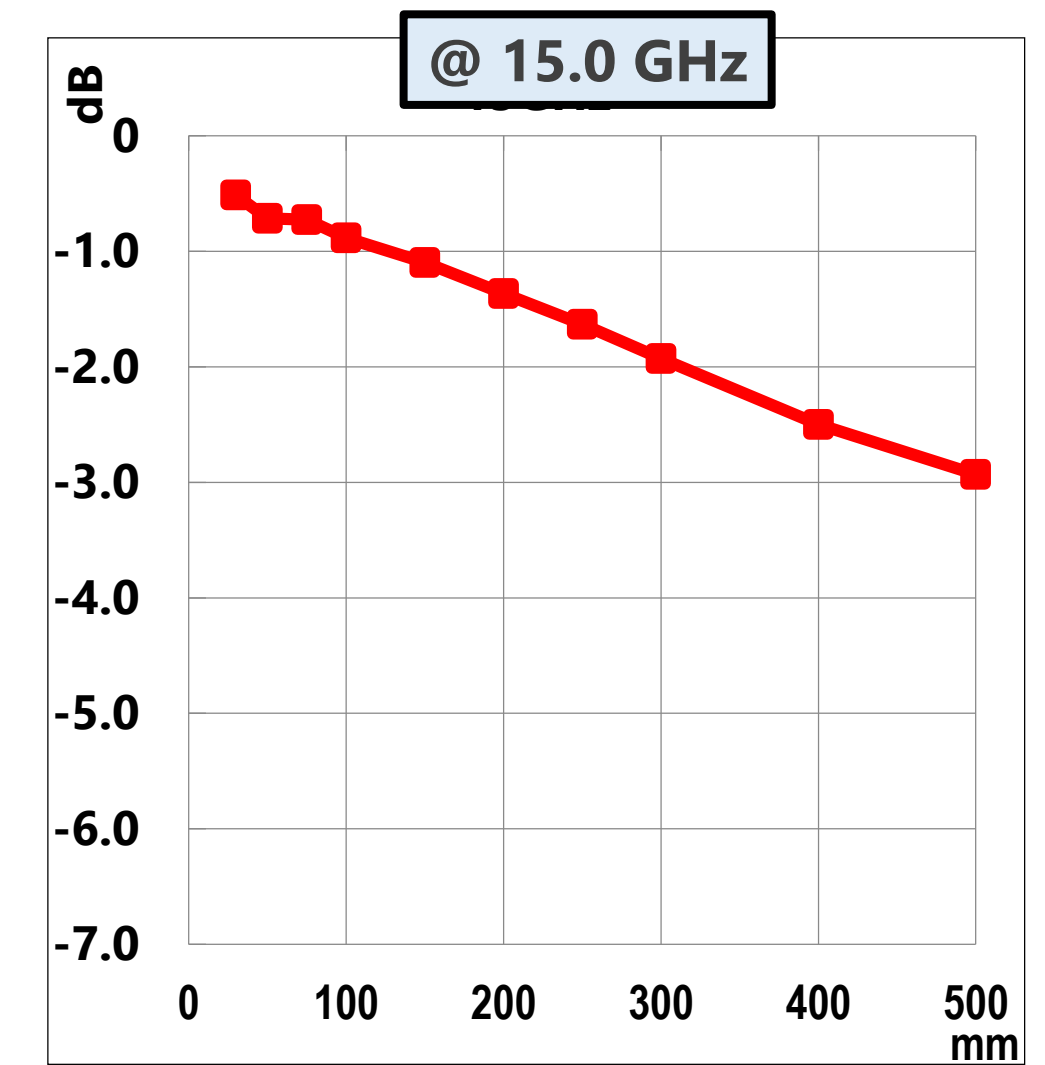
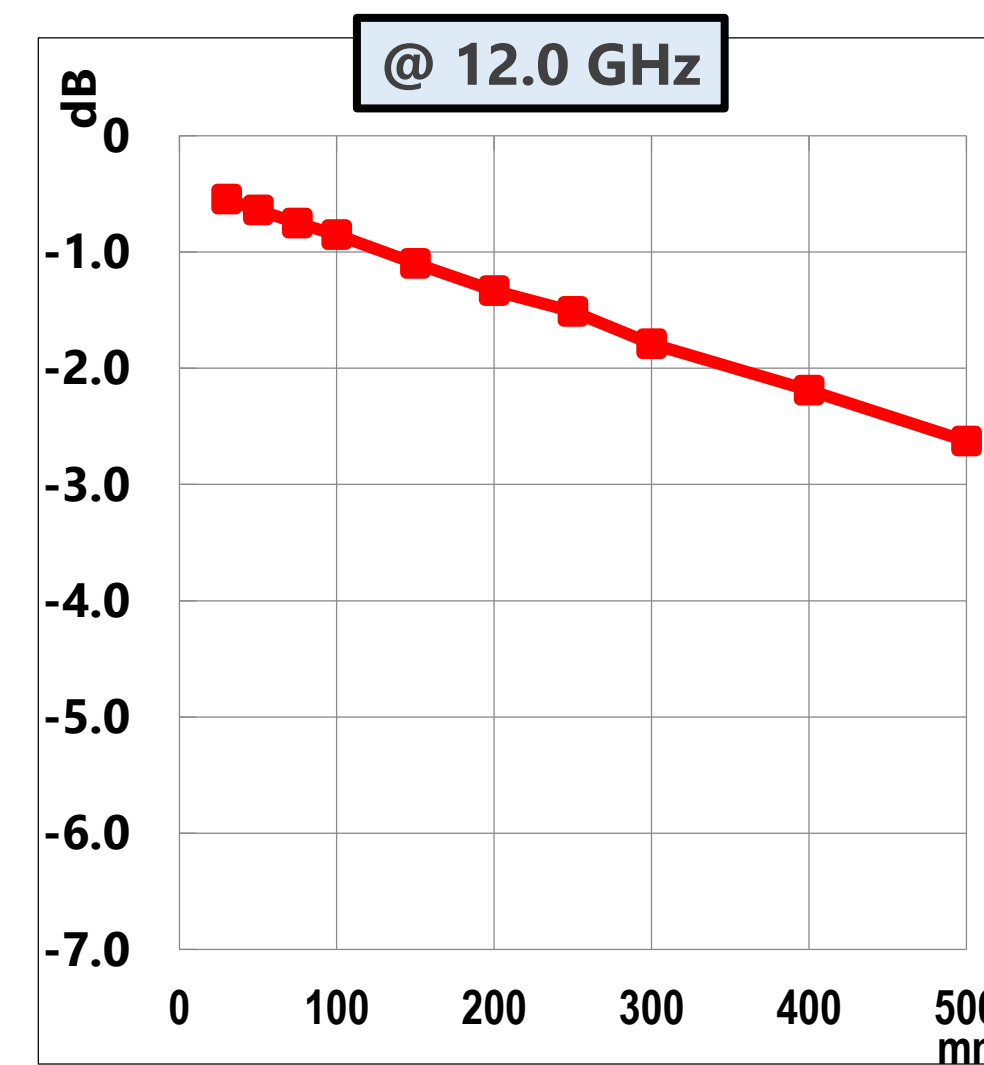
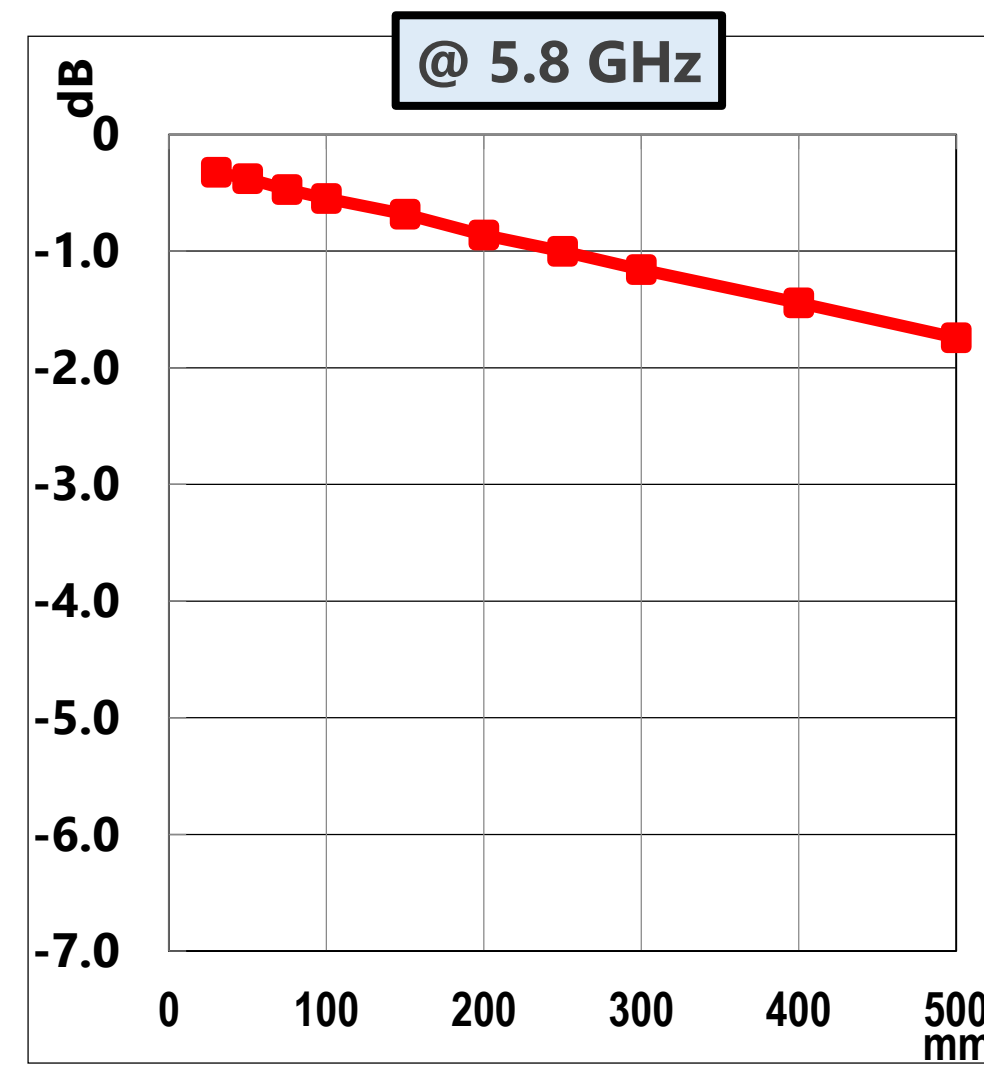
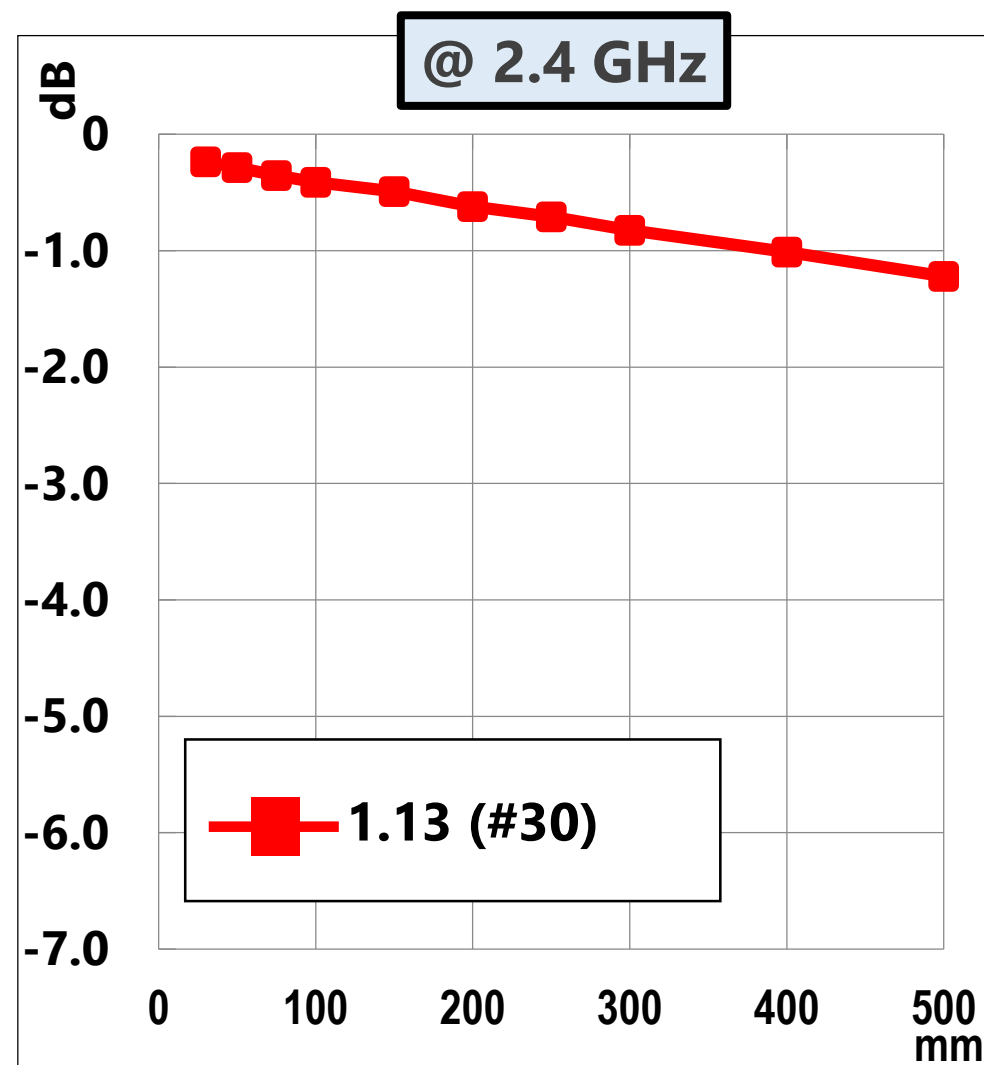


# Wire insertion loss (MHF<sup>®</sup> 5L)

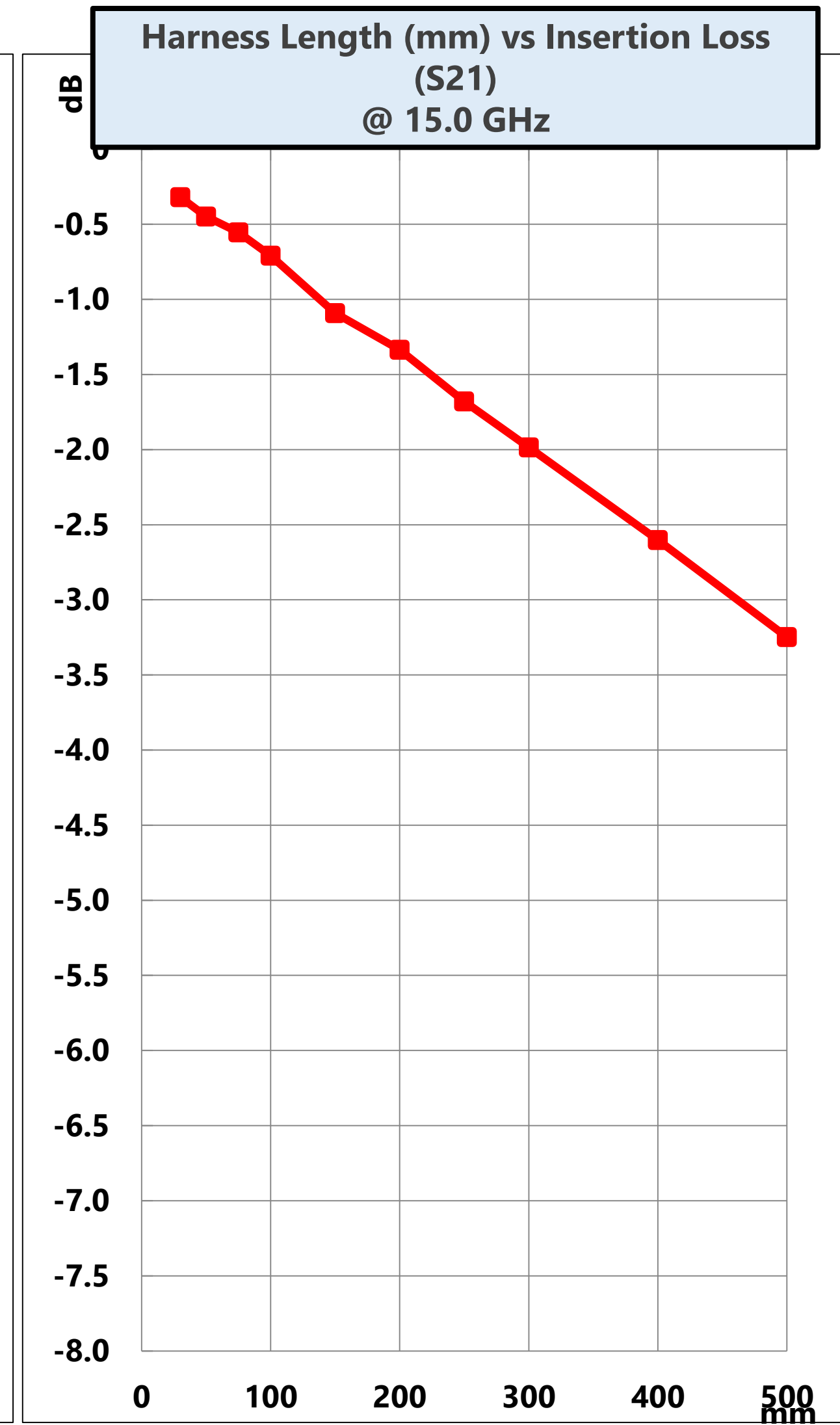
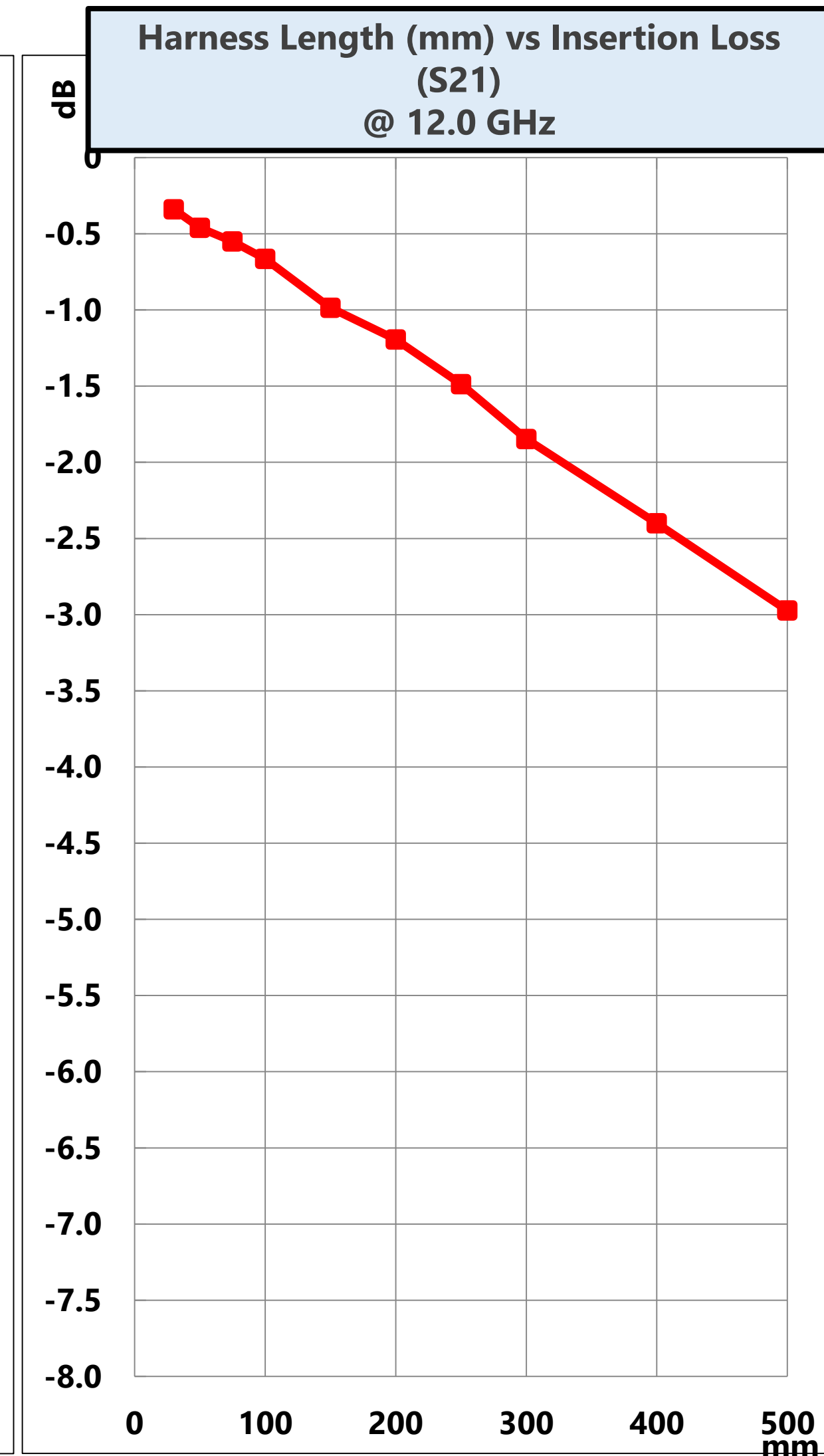
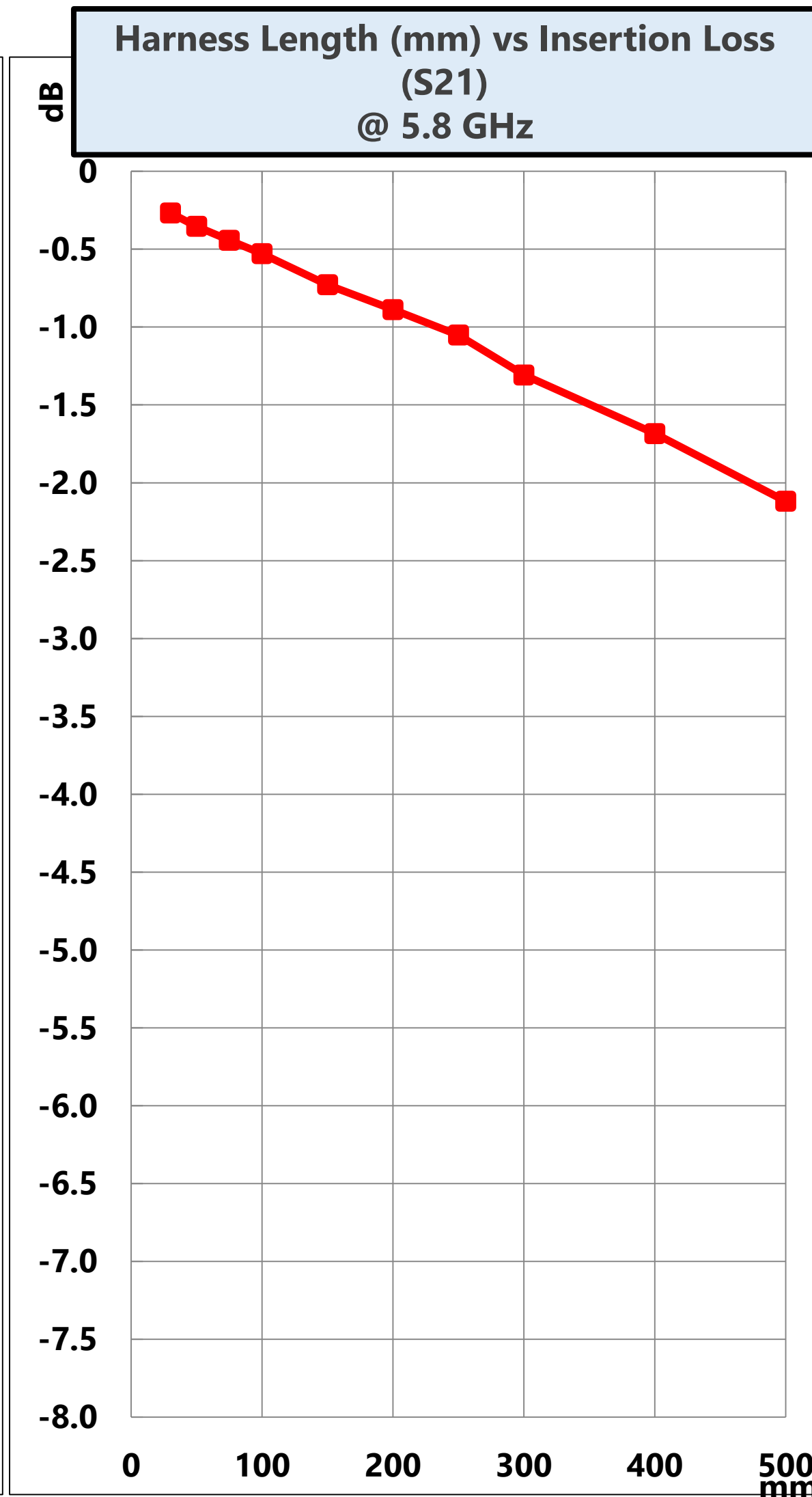
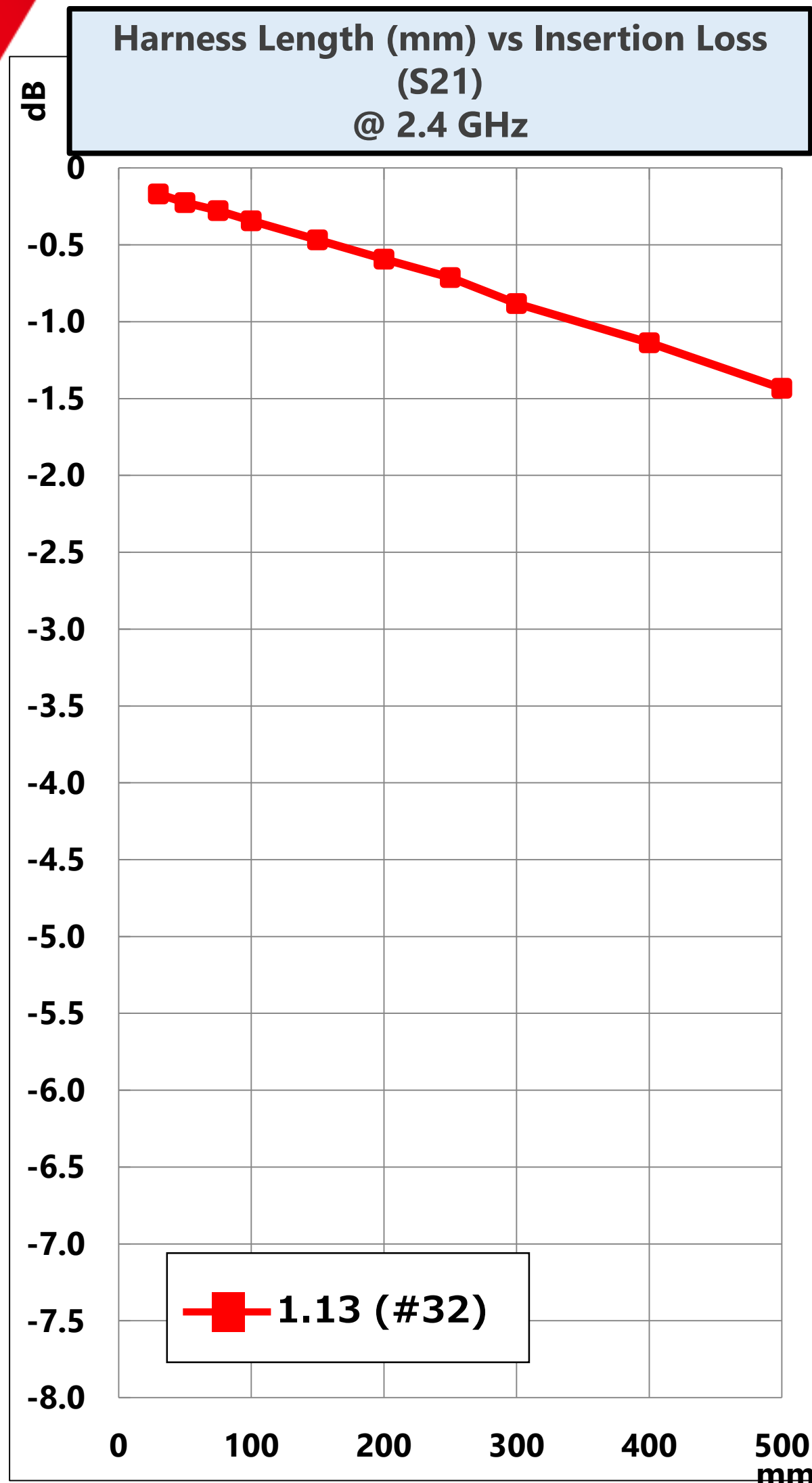


# Wire insertion loss (MHF<sup>®</sup> 7)

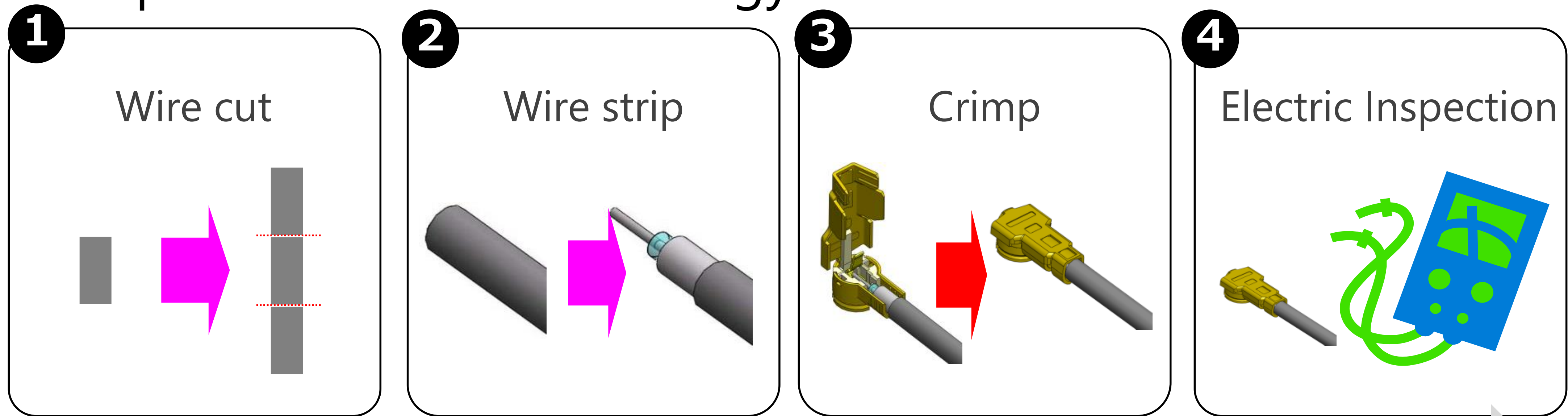
Harness Length (mm) vs Insertion Loss (S21)



# Wire insertion loss (MHF<sup>®</sup> 7S)



Yes, I-PEX provides harness assemblies!  
...And they are made with Fully Automated Machines and our patented i-Fit<sup>®</sup> technology!!!





**Fully Automated Process**

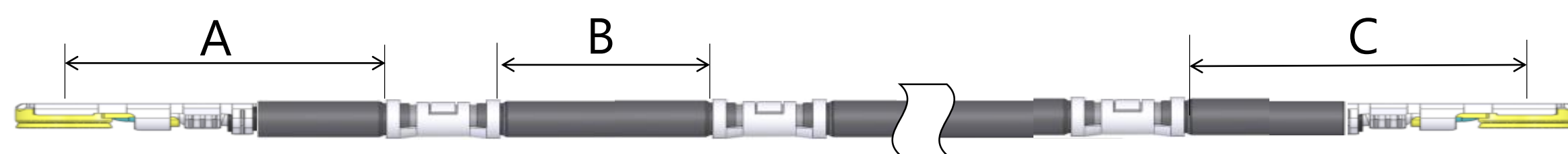




# Wire clamp and surface mount clip for grounding

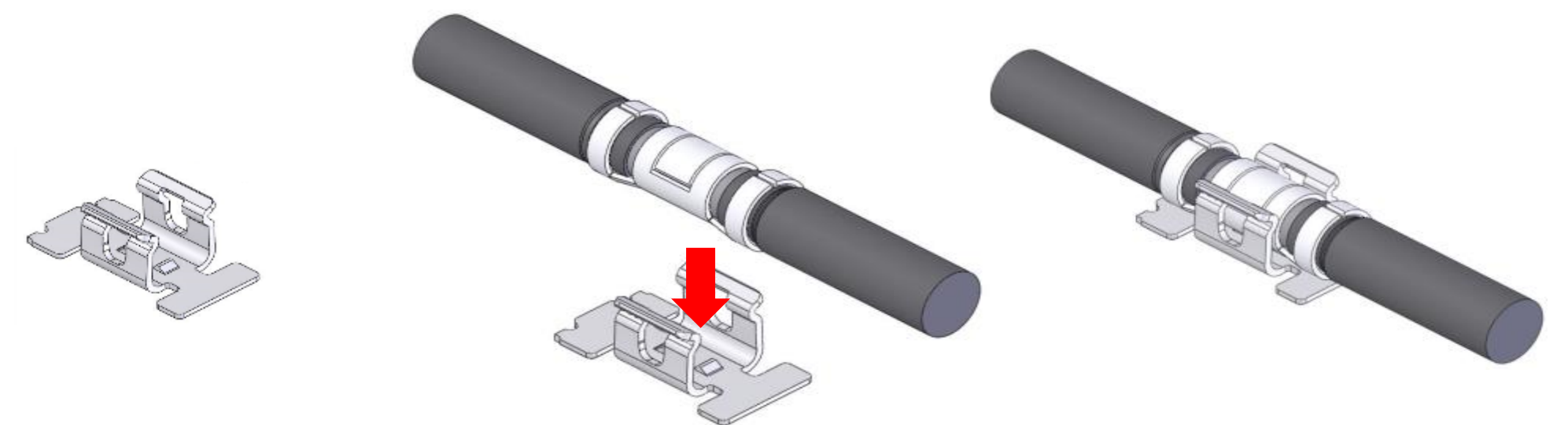
		Grounding clamp 3mm length	Grounding clamp 6mm length	Clip for grounding clamp MP-A series
Appearance				
Coax O.D. (Center Conductor AWG)	1.37 mm (30)		●	● MP-A04 (P/N 3224-0001)
	1.13 mm (32)	●	●	● MP-A02 (P/N 3182-0001)
	0.81 mm (36)	●	●	● MP-A01 (P/N 3096-0001)
	0.64 mm (36)	●	●	● MP-A03 (P/N 3186-0001)

Minimum distance between clamps



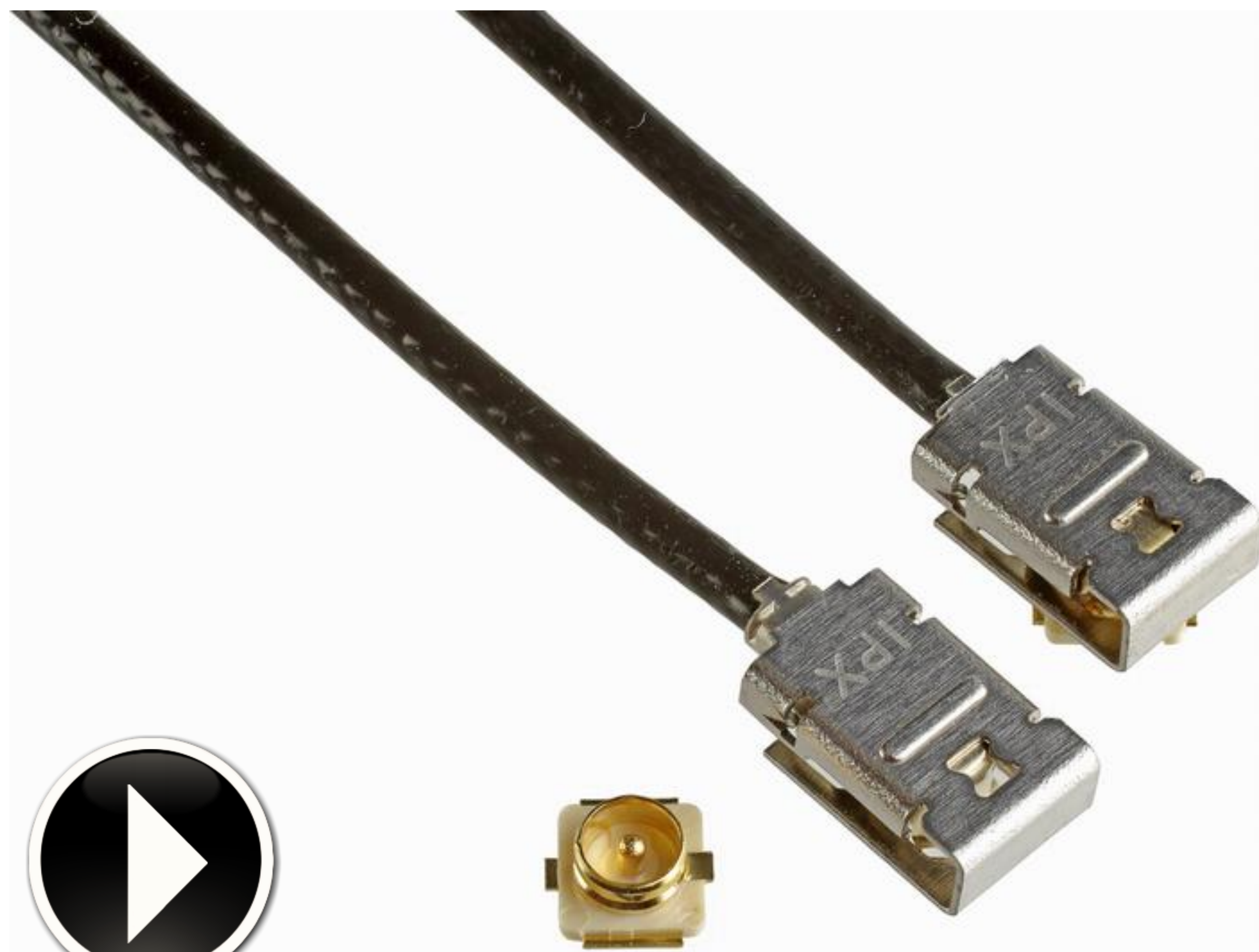
A	B	C
12mm min.	10mm min.	10mm min.

Clips are packaged in tape and reel for surface mount.

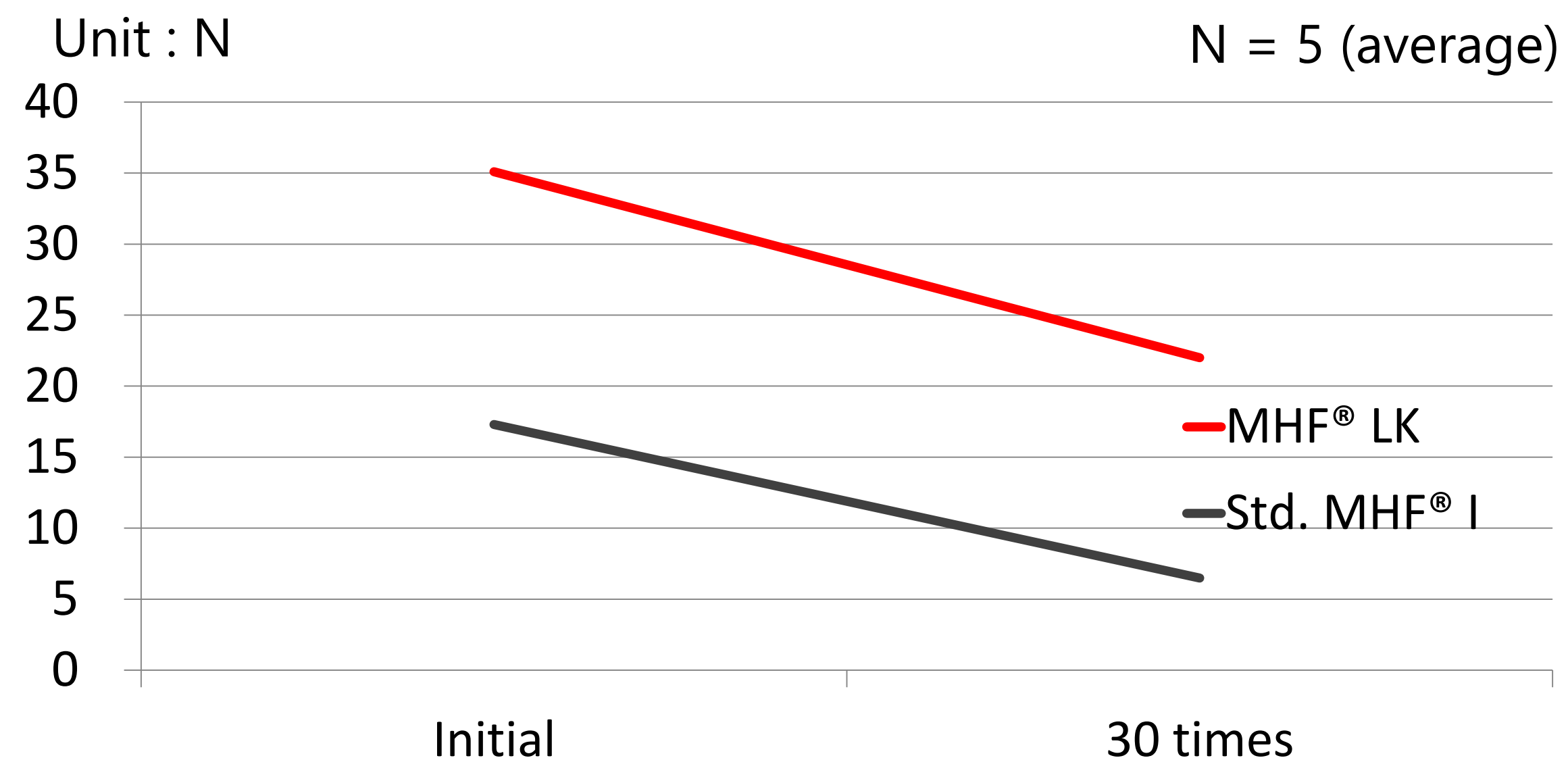


# MHF® I LK

Built-in locking function for MHF I



## Disengagement Force Comparison



Series	MHF® I LK		Standard MHF® I	
	Initial	30 times*	Initial	30 times
SPEC.	20 MIN.	10 MIN.	5 MIN.	3 MIN.


\* Reference Value





# MHF<sup>®</sup> SW Series

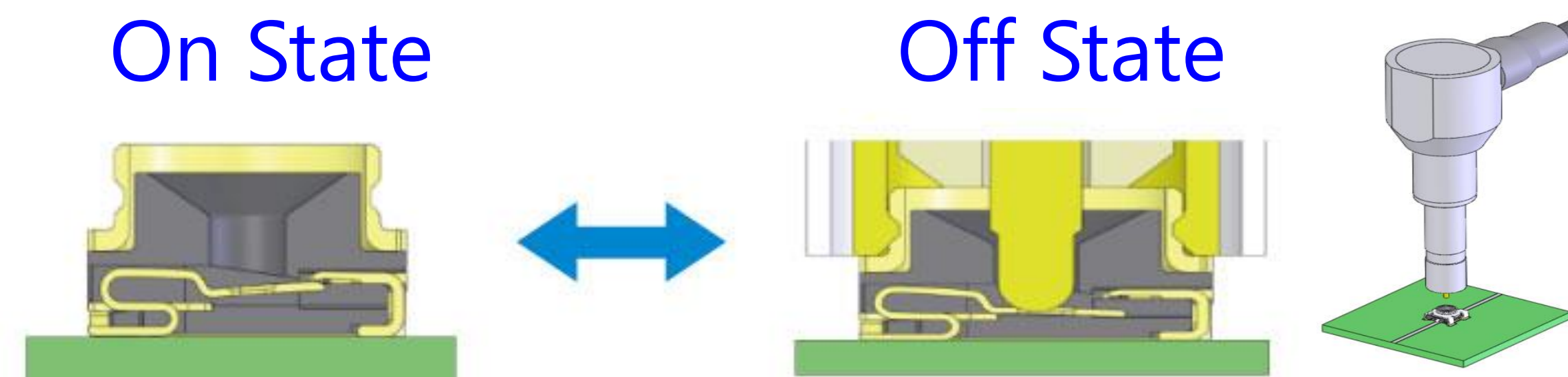


# MHF<sup>®</sup>-SW series product overview

Click the photos below to get more detailed product information.

Product name		MHF <sup>®</sup> -SW23
Feature		
	<b>Contaminant discontinuity resistant design 2.3 x 2.3 mm footprint</b>	
Part number	20549-001E/-01	
Dimension (mm)	2.3 x 2.3 x 1.35 (H)	
Rated power	2W max.	
Frequency	DC - 11.0GHz	
V.S.W.R.	DC - 3.0GHz	1.2 max. (DC - 2.5GHz)
	3.0GHz - 6.0GHz	1.3 max. (2.5 - 6.0GHz)
	6.0GHz - 11.0GHz	1.5 max.
Insertion loss	DC - 3.0GHz	0.15 dB max. (DC - 2.5GHz)
	3.0GHz - 6.0GHz	0.20 dB max. (2.5 - 6.0GHz)
	6.0GHz - 11.0GHz	0.40 dB max.
Isolation	DC - 3.0GHz	20 dB Max. (DC - 2.5GHz)
	3.0GHz - 6.0GHz	15 dB max.
	6.0GHz - 11.0GHz	12 dB max.
Service temp. (Celsius)	40 degree - 85 degree	
Characteristic impedance	50 ohm	
Contact resistance	Signal contact	100m ohm
	Ground contact	100m ohm
Insulation resistance	DC100 1000M ohm min :Initial 10M ohm min :After test	
Withstand voltage	AC 100V: 1min	


Product name		MHF <sup>®</sup> -SW23	
Appearance			
Manual probe		Friction lock	90582-**** *(0300/0400)
		Mechanical lock	-
Durability		-	1K Cycles
Probe	High cycle	without floating	
		Durability	90604-0001 10K Cycles
		with floating	
Durability		-	90605-0001 200K Cycles



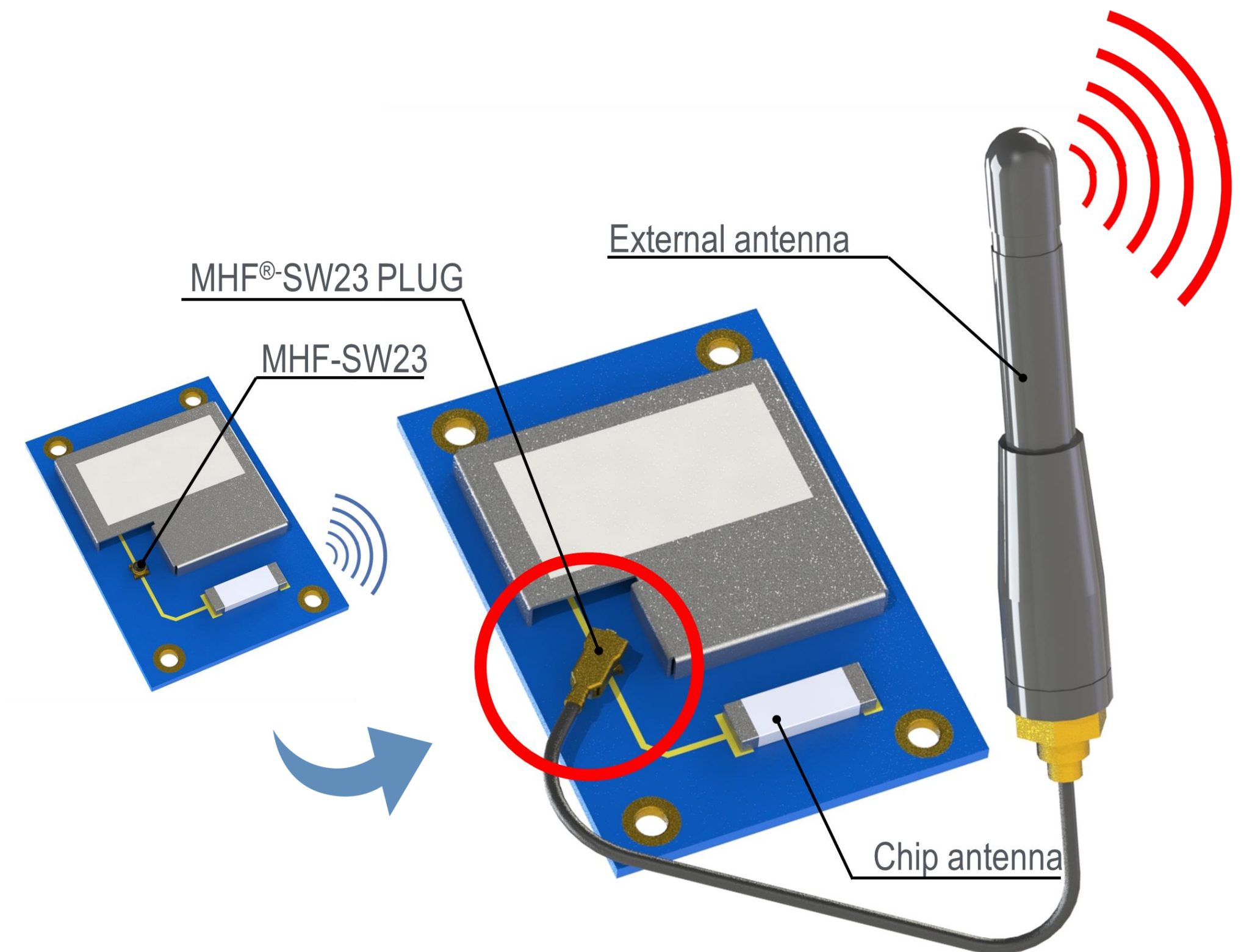


# MHF<sup>®</sup>-SW 23 Plug

Click the photo below to get more detailed product information.

Product name		MHF <sup>®</sup> 23 Plug
Appearance		
	Mating with switch connector	
Plug part number	20851-001R	
Switch connector part number	20549-001E/-01 (MHF-SW 23)	
Maximum height (mm)	3.7	
Outside dimension of switch connector	2.3 x 2.3	
Coax O.D. (Center Conductor AWG)	2.00 mm (26)	
	1.80 mm (30)	
	1.37 mm (30)	
	1.32 mm (32)	
	1.13 mm (32)	●
	0.95 mm (33)	
	0.81 mm (33)	
	0.81 mm (36)	
	0.64 mm (36)	
	0.48 mm (38)	
FPC		
Frequency	DC - 6GHz	
VSWR (L=100mm)	DC - 3GHz	1.4 max.
	3GHz - 6GHz	1.6 max.
	6GHz - 9GHz	-
	9GHz - 12GHz	-
	12GHz - 15GHz	-
Service temp. (Celsius)	-40 degree - 90 degree	
Characteristic impedance	50ohm	
Rated voltage	AC60V	
Contact resistance	20m ohm max.	
Withstand voltage	AC200V/min	
Insulation resistance	500M ohm min./DC100V	

Flexibility to use PCB antenna or external, higher gain antenna.



# Appendix : I-PEX Connectors Series

 Click icon below to see latest product information



**MHF<sup>®</sup>**



High-Frequency  
Micro **RF**  
Connectors



**CABLINE<sup>®</sup>**  
**FPL<sup>®</sup>**



High-Speed  
**Micro-Coaxial**  
Connectors



**NOVASTACK<sup>®</sup>**



High-Density  
**Board-to-Board**  
Connectors



**EVAFLEX<sup>®</sup>**  
**MINIFLEX<sup>®</sup>**



High-Density  
**FFC/FPC**  
Connectors



**ISH<sup>®</sup>**  
**IARPB<sup>®</sup>**



High-Power  
**Wire-to-Board**  
Connectors



**CUSTOM**







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