

# Aviation

## Communication beyond the clouds

Edition 2019/01



# Communication beyond the clouds





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### Your partner for system solutions

HUBER+SUHNER is a leading international manufacturer and supplier of components and systems for electrical and optical connectivity. HUBER+SUHNER unites technical expertise in radio frequency technology, fiber optics and low frequency under one roof and offers a high-quality product range for the communication, transport and industrial markets.



## Avionics

The on-board electronics in today's passenger planes have reached a very high degree of complexity. Ensuring that the individual components function correctly is a key element for a safe flight. The high demands placed on reliability under rapidly changing, extreme environmental conditions require premium-quality radio frequency cables and connectors.

HUBER+SUHNER has many years of experience in the development, production and qualification of cables, connectors and cable systems for avionic systems. These solutions are used in many systems around the globe and have proven to be reliable and meet the toughest requirements.

### Applications

- Airplanes
- Helicopters

### Main benefits

- Customised solutions
- Ultra low weight, ruggedised
- Easy installation



### EN4604-010 KX cable

KX coaxial cables from HUBER+SUHNER are characterised by their light weight and flexibility. EN4604-010 KX cables are designed specifically for on-site assembly and comply with the EN standard. The ideal cable for installation in a demanding environment with limited space.



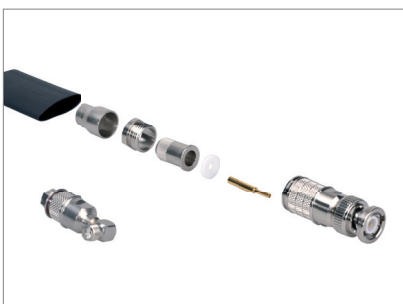
### EN4652 connectors

EN4652 connectors are suitable for use at up to 6 GHz and, in combination with KX and KW cables, create the optimal, field-configurable assembly. Thanks to clamping technology, this latest generation of connectors can be installed easily and quickly. EN4652 connectors are extremely light and comply with the prEN 4652-001:2014 qualification.



### ASN-E connectors

Robust ASN-E connectors from HUBER+SUHNER have a long-established reputation in the aviation industry and are used in production and maintenance environments by companies including AIRBUS. The connectors, which can be field assembled, comply with the MIL standard and can be used up to 6 GHz.



### ABS connectors

ABS connectors have been specially developed and designed for use by AIRBUS. The crimp and clamp version can be used up to 6 GHz. Despite offering simple installation using knurled screws, these connectors meet the stringent requirements of the aircraft industry.



## EN4604-010 KX cable

KX coaxial cables from HUBER+SUHNER are characterised by their light weight and flexibility. EN4604-010 KX cables are designed specifically for on-site assembly and comply with the EN standard. The ideal cable for installation in a demanding environment with limited space.

### Features

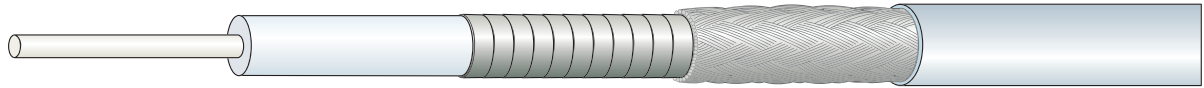
- Applicable up to 6.0 GHz
- Diameter: 5.5 mm
- Temperature range:  $-55$  to  $+200^{\circ}\text{C}$
- Connectors: N, TNC, C, and BNC

### Main benefits

- Low loss - light weight
- Easy assembling - only two connector parts

### Heritage

- AIRBUS A350, A400M, AIRBUS helicopters



1                                      2                                      3                                      4                                      5                                      6

### Construction

	Material	Diameter
1 Centre conductor	silver-plated copper wire, solid	1.40 mm (0.055 inch)
2 Dielectric	extruded low density PTFE	4.20 mm (0.165 inch)
3 Inner shield	silver-plated copper tape	4.80 mm (0.189 inch)
4 Outer shield	silver-plated copper braid	
5 Jacket	Fluorinated Ethylene Propylene (FEP)	5.50 mm (0.216 inch)
6 Marking text (EN KX CH M yy)		

### Electrical characteristics

Impedance	50 ± 1 Ω
Operating frequency	6.0 GHz
Capacitance	87 pF/m (26.5 pF/ft)
Velocity of propagation	77 %
Signal delay	4.3 ns/m (1.31 ns/ft)
Insertion loss stability vs. temperature	≤ 0.0021 /°C
Insertion loss stability vs. bending	≤ 0.20 dB
Screening effectiveness up to 18 GHz	> 90 dB (cable only)
Attenuation	see graph 1 (see page 8)
Power handling	see graph 2 (see page 8)

### Mechanical characteristics

Weight	< 72 g/m
Min. bending radius (static)	30 mm
Min. bending radius (dynamic)	50 mm
Crush resistance	800 N / 100 mm

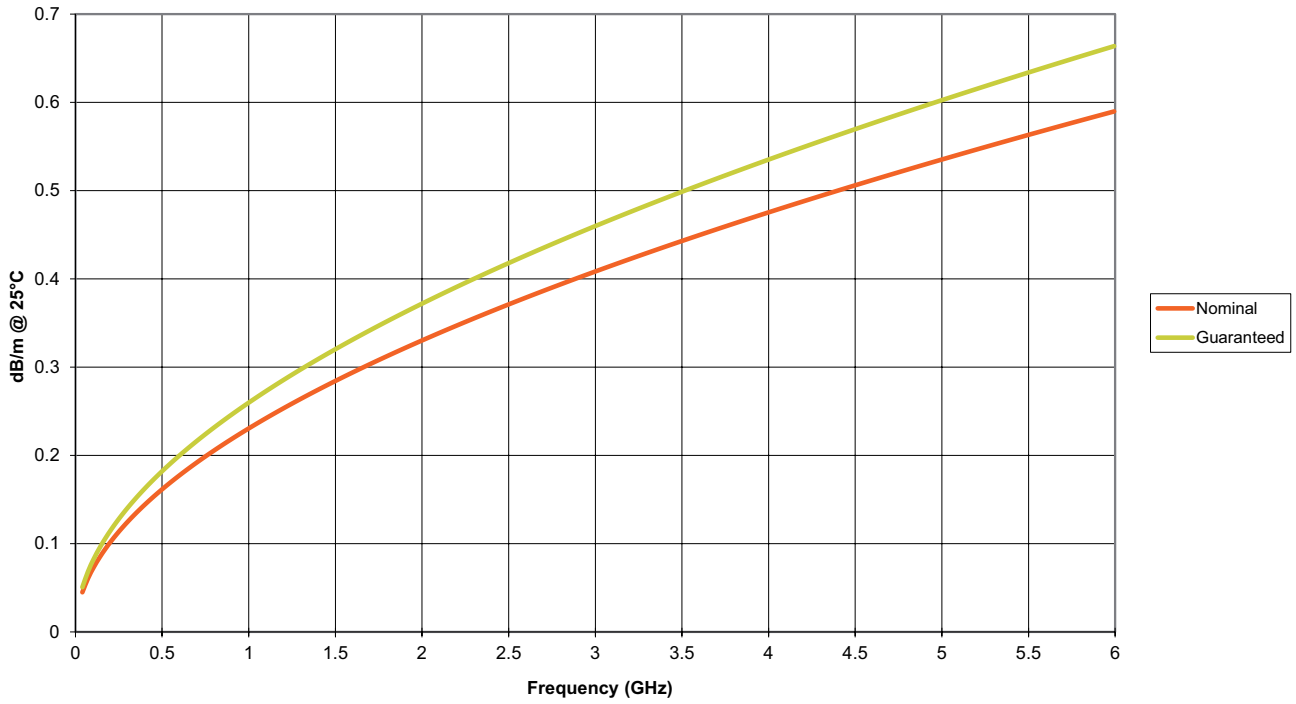
### Environmental characteristics

Operating temperature range	-55 to +200 °C (cable only)
Smoke index	Naval engineering Standard 711 and ASTM-B 622-92 (140°F for 24 hours, conditioned at 73 °F and 50 % relative humidity)
Solar radiation	MIL-STD-810, Method 505, Procedure II
Flammability/smoke density/toxicity	SAR/FAR 25/ABD 0031
Chemical resistance	British Standard 3G100, Part 2, Section 3, Class A
Halogen free product	No
Fungus	MIL-STD-810, Method 508.3
RoHS (2002/95/EC)	Compliant

# EN4604-010 KX cables - Graph

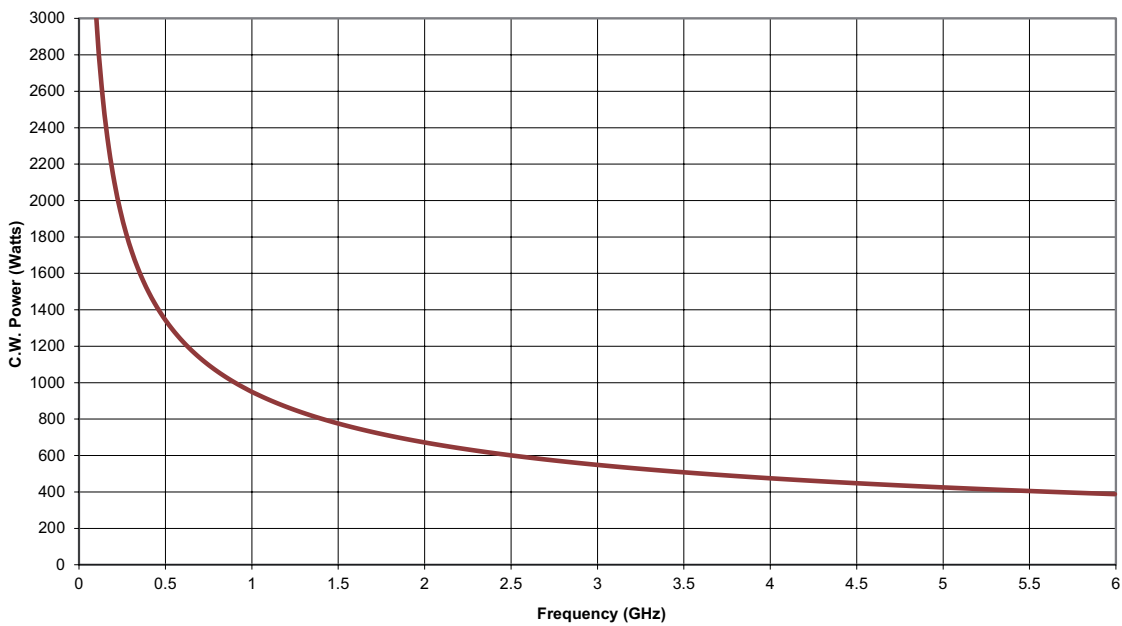
Cable attenuation

Nominal values at 25 °C ambient temperature



Power handling

Maximal values at 40 °C ambient temperature and sea level





# Summary of qualifications

## EN4604-010 KX cables

Electrical tests according to		
EN 3475-302	Voltage proof	
	- Dielectric dry	2500 VAC
	- Jacket immersion	1800 VAC
EN 3475-307	Corona extinction voltage	3000 V

Mechanical and environmental tests according to		
EN 3475-515	Crush resistance	Load 500 N
EN 3475-415	Rapid change of temperature	-55 to +200 °C
EN 3475-416	Thermal stability	

Chemical resistance according to		
EN 3475-411	Fluid resistance	Resistance to aircraft fluids
JAR/FAR 25, ABD0031	Flammability/smoke density/toxicity	

Please contact your local sales representative for full qualification test overview.

## EN4652 connectors

Electrical tests according to		
EN 2591-206	Insulation resistance	5000 MΩ
EN 2591-207	Voltage proof test	1500 Vrms sea level
EN 2591-225	RF high power withstanding voltage	1000 Vrms at 5 MHz
EN 2591-226	Corona level	>315 Vrms at 70 000 ft (4.4 kPa)

Mechanical and environmental tests according to		
EN 2591-305	Rapid change of temperature	10 cycles $T_B = -65\text{ °C}, T_A = +165\text{ °C}$ $t_1 = 30\text{ min}, t_2 \leq 1\text{ min}$
EN 2591-303	Cold/low pressure and damp heat	$T_{min} = -60\text{ °C}$
EN 2591-307	Salt mist	240 h (35 °C, 5 %)
EN 2591-314	Immersion at low air pressure	2 kPa / 30 min
EN 2591-402	Shock	Method A Peak acceleration: 30 gn (300 m/s <sup>2</sup> ) Duration of nominal pulse: 11 ms
EN 2591-403	Sinusoidal and random vibrations	20 gn, 5 to 2000 Hz
EN 2591-308	Sand and dust	3.5 ± 0.5 m/s / 1 cycle (3 h)
EN 2591-417	Tensile strength	180 N

Chemical tests according to		
EN 2591-315	Fluid resistance	Resistance to aircraft fluids
EN 2591-317	Flammability	Method A

Please contact your local sales representative for full qualification test overview.



## EN4652 connectors

EN4652 connectors are suitable for use at up to 6 GHz and, in combination with KX cables, create the optimal, field-configurable assembly. Thanks to clamping technology, this latest generation of connectors can be installed easily and quickly. As a matter of course, EN4652 connectors are extremely light and comply with the prEN 4652-001:2014 qualification.

### Features

- Waterproof IP68
- Usable up to 6 GHz
- Connector marked with date code (yy.ww)
- Connectors: N, TNC, C, and BNC

### Main benefits

- Qualified according to the prEN 4652-001:2014
- Easy and fast assembling - only two connector parts

### Heritage

- AIRBUS A350, AIRBUS helicopters; EC135, NH90

## Available configurations

	Product standard	H+S part description	Style	H+S item number	max. Freq.	Fit on cable
	EN4652-110-B50	11_BNC-50-4-34/122_NE	plug	85003120	4	EN4604-010/KX
	EN4652-110-A50	11_BNC-50-6-4/122_NE	plug	85003287	4	EN4604-009/KW
	EN4652-410-B50	11_C-50-4-7/122_NE	plug	84120310	6	EN4604-010/KX
	EN4652-410-A50	11_C-50-6-1/122_NE	plug	85003152	6	EN4604-009/KW
	EN4652-310-B50	11_N-50-4-20/122_NE	plug	85003117	6	EN4604-010/KX
	EN4652-310-A50	11_N-50-6-17/122_NE	plug	85003474	6	EN4604-009/KW
	EN4652-210-B50	11_TNC-50-4-24/122_NE	plug	85003113	6	EN4604-010/KX
	EN4652-210-A50	11_TNC-50-6-7/122_NE	plug	85003124	6	EN4604-009/KW
	EN4652-111-B50	16_BNC-50-4-15/122_NE	plug	85003121	4	EN4604-010/KX
	EN4652-111-A50	16_BNC-50-6-2/122_NE	plug	85003308	4	EN4604-009/KW
	EN4652-311-B50	16_N-50-4-15/122_N	plug	85003118	6	EN4604-010/KX
	EN4652-311-A50	16_N-50-6-13/122_NE	plug	85003484	6	EN4604-009/KW
	EN4652-411-B50	16_C-50-4-4/122_NE	plug	84114106	6	EN4604-010/KX
	EN4652-411-A50	16_C-50-6-1/122_NE	plug	85003153	6	EN4604-009/KW
	EN4652-211-B50	16_TNC-50-4-102/122_NE	plug	85003114	6	EN4604-010/KX
	EN4652-211-A50	16_TNC-50-6-11/122_NE	plug	85003423	6	EN4604-009/KW
	EN4652-213-B50	21_TNC-50-4-22/122_NE	jack	85003116	6	EN4604-010/KX
	EN4652-213-A50	21_TNC-50-6-3/122_NE	jack	85003456	6	EN4604-009/KW
	EN4652-112-B50	25_BNC-50-4-17/122_NE	jack	85003122	4	EN4604-010/KX
	EN4652-112-A50	25_BNC-50-6-1/122_NE	jack	85003325	4	EN4604-009/KW
	EN4652-412-B50	25_C-50-4-5/122_NE	jack	85003123	6	EN4604-010/KX
	EN4652-412-A50	25_C-50-6-1/122_NE	jack	85003551	6	EN4604-009/KW
	EN4652-312-B50	25_N-50-4-9/122_NE	plug	85003119	6	EN4604-010/KX
	EN4652-312-A50	25_N-50-6-9/122_NE	plug	85003502	6	EN4604-009/KW
	EN4652-212-B50	25_TNC-50-4-19/122_NE	plug	85003115	6	EN4604-010/KX
	EN4652-212-A50	25_TNC-50-6-23/122_NE	plug	85003440	6	EN4604-009/KW



## ASN-E connectors

Robust ASN-E connectors from HUBER+SUHNER have a long-established reputation in the aviation industry and are used in production and maintenance environments by companies including AIRBUS. The connectors, which can be field-installed, comply with the MIL standard and can be used up to 6 GHz.

### Features

- Waterproof IP68
- Usable up to 6 GHz
- According MIL-standards
- Connector marked with date code (yy.ww)

### Main benefits

- Compact and robust connectors
- Qualified according to AIRBUS standard

### Heritage

- AIRBUS A320, A330, A340, A380

## Available configurations

	Product standard	H+S part description	H+S item number	AIRBUS cables	RG cables
	ASNE0460F03	11_BNC-50-2-33	84016602	XE	RG188
	ASNE0460F01	11_BNC-50-3-75	22648697	XF	RG400
	ASNE0463F02	11_C-50-7-22	22645876	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0462F02	11_N-50-7-54	22645875	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0461F01	11_TNC-50-3-34	22645874	XF	RG400
	ASNE0461F04	11_TNC-50-7-6	22648698	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	RG165
	ASNE0461F02	11_TNC-50-7-7	22648699	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0462TF01	15_N-50-3-2	23040026	XF	RG400
	ASNE0463FC02	16_C-50-7-22	21002397	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0462FC02	16_N-50-7-33	22645878	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0461FC04	16_TNC-50-7-6	22648700	XR	RG165
	ASNE0461FC02	16_TNC-50-7-7	22649175	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0461FD02	16_TNC-50-7-11	84037376	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0462TC01	25_N-50-3-17	22648757	XF	RG400
	ASNE0462TC02	25_N-50-7-21	22645879	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0461TC01	25_TNC-50-3-32	23028307	XF	RG400
	ASNE0461TC04	25_TNC-50-7-6	22648756	XR	RG165
	ASNE0461TC02	25_TNC-50-7-7	22649176	WD, WN, FILECA 1703/94, FILOTEX® 50MFCFB	
	ASNE0461TF01	26_TNC-50-3-1	84099902	XF	RG400
	ASNE0462TE00	34_N-50-0-7	22645877	Adapter	



## ABS connectors

ABS connectors have been specially developed and designed for use by AIRBUS. The crimp and clamp version can be used at up to 6 GHz. Despite offering simple installation using knurled screws, these connectors meet the stringent requirements of the aircraft industry.

### Features

- There are crimp or clamp versions
- Usable up to 6 GHz

### Main benefits

- Customer specified solutions available
- Knurled screws for simple installation

### Heritage

- AIRBUS A400M, AIRBUS aircrafts

## Available configurations

	Product standard	H+S part description	H+S item number	AIRBUS cables	RG cables
	ABS2087F02	11_BNC-50-7-16	84047897	WD, WN, FILECA 1703/94, FILOTEX® 50MF CFB	
	ABS2101F01	11_TNC-50-4-20	84070302	KX	KX
	ABS2074F02	11_TNC-50-7-14	84047894	WD, WN, FILECA 1703/94, FILOTEX® 50MF CFB	
	ABS2088F01	11_SMA-50-4-100	84047838	KX	KX
	ABS2074FC02	16_TNC-50-7-13	84047895	WD, WN, FILECA 1703/94, FILOTEX® 50MF CFB	
	ABS2088FC01	16_SMA-50-4-164	84047837	KX	KX
	ABS070801	23_TNC-0-0-1	22645848	na	
	ABS1611T01	24_SMA-50-3-53	84040101	XF	
	ABS2088PC01	26_SMA-50-4-1	84047839	KX	KX



## On board communication

The ability to access the Internet 24/7, wherever we may be, has become a core requirement in our society. The demand for continuous availability is of great importance to business travellers in particular. The internet services available in public spaces, cars, hotels and railways, are increasingly being called for on flights. To meet this demand, airlines are increasingly offering Wi-Fi on board. Based on our extensive experience of wireless solutions in vehicles and in public spaces, HUBER+SUHNER offers a wide range of passive components such as antennas, cables, connectors and cable systems for Wi-Fi on board.

### Applications

- WiFi on board

### Main benefits

- Flame retardant
- Non toxic fumes
- Customised solutions

### Heritage

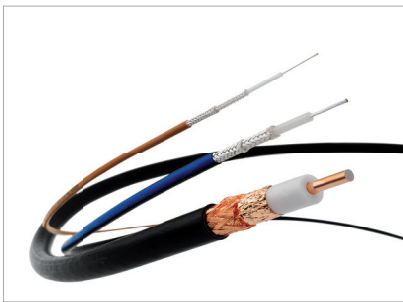
- Southwest, American, Virgin American, Delta (Northwest), Air Trans, United, US Air, Continental, Alaska, Air Canada





## WiFi antennas

HUBER+SUHNER is a leading design house and manufacturer of antennas for broadband wireless. With more than 15 years of experience in the broadband antennas market we understand our customer's applications and requirements. From initial design to high volume production HUBER+SUHNER always aims to provide superior quality and cost effective antenna solutions for custom specific applications in aircrafts and helicopters.



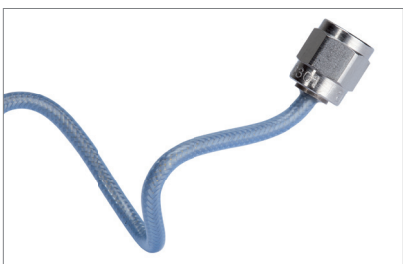
## RF cables

HUBER+SUHNER offers a wide range of coaxial cables, developed to meet the highest standards. A balanced range of flexible coaxial cables provides the best performance for demanding applications. Our premium quality cables have excellent electrical and mechanical properties and are used globally in various applications to meet the highest demands. Comprehensive, professional support in conjunction with our comprehensive product range makes HUBER+SUHNER a leading provider of radio frequency solutions in yavionic applications.



## Microwave assemblies

HUBER+SUHNER develops and manufactures coaxial cables and connectors for most applications and in a multitude of versions. The connector series comprise over 1700 different types which demonstrate our quality globally. Demanding customers trust the reliability and quality of HUBER+SUHNER products. These products have been tested to IEC, MIL, CECC and other standards. Our extensive know-how in RF technology enables reliable and competent technical consulting and support. You stand to benefit from a well matched cable and connector range as well as the vast experience of our engineers.



## minibend™ assemblies

Minibend is a truly flexible coaxial cable assembly which is designed for use in low profile, internal, point-to-point interconnections between RF modules within communications systems. This high performance, yet cost-effective cable assembly solution is fully tested and comes in a variety of standard lengths and connector configurations. Minibend is the perfect solution in applications where space is at a premium and when performance and reliability are key.



## WiFi antennas

HUBER+SUHNER is a leading design house and manufacturer of antennas for broadband wireless. With more than 15 years of experience in the broadband antennas market we understand our customer's applications and requirements. From initial design to high volume production HUBER+SUHNER always aims to provide superior quality and cost effective antenna solutions for custom specific applications in aircrafts and helicopters.

### Features

- MiMo-Technology (multiple-in, multiple-out)
- Frequency range up to 5.8 GHz

### Main benefits

- Compact and robust
- Excellent performance
- Omni-directional

## WiFi MiMo antenna

SWA-2456/360/6/0/MIMO\_2

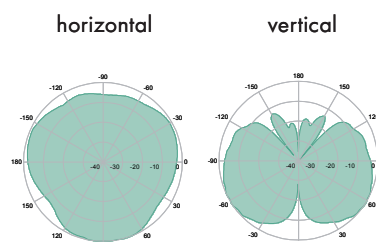
Electrical properties				
Frequency range (MHz)	2400 - 2485	2495 - 2690	5150 - 5350	5470 - 5935
Impedance	50 Ω			
VSWR	1.5			
Polarisation	vertical			
Gain	4 dBi	4 dBi	6 dBi	6 dBi
3 dB beamwidth horizontal	360°			
Isolation between ports	20 dB			
Max. power	10 W at ambient temperature 25°			

Mechanical and environmental properties	
Dimensions	281.8 × 91.8 × 31 mm
Weight	0.32 kg
Radome material	polycarbonate
Radome colour	RAL 7044 (grey)
Back/base plate material	aluminium
2002/95/EC (RoHS)	compliant
Operating temperature range	-40 to + 85 °C
Storage temperature range	-40 to + 85 °C

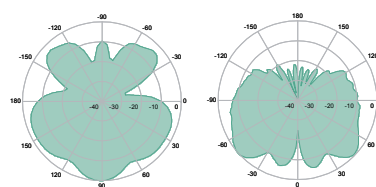
Approved acc. to DO-160F, FAR.25.853a and Boeing D6-51377 (only §4.1 and §4.7)



radiation patterns



2500 MHz



5725 MHz

## Omni-S antenna

SWA-2459/360/7/20/V\_1

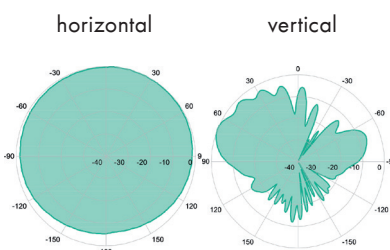
Electrical properties					
Frequency range (MHz)	2400-2500	2500-2700	3400-3700	4900-5470	5470-5935
Impedance	50 Ω				
VSWR	1.8	2	2	1.8	1.8
Polarisation	vertical				
Gain (dBi)	6	6	7	8	8
3 dB beamwidth horizontal	360°	360°	360°	150°	170°
Max. power	10 W at ambient temperature 25 °C				

Mechanical and environmental properties	
Dimensions	43 × 86 mm
Weight	0.3 kg
Radome material	PC
Radome colour	RAL 7044 (grey)
Back/base plane material	aluminium
2002/95/EC (RoHS)	compliant
Operating temperature range	-40 to + 80 °C
Storage temperature range	-40 to + 80 °C

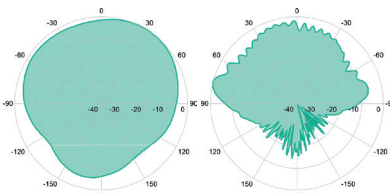
Fire retardant acc. to DIN 5510-2, BS 6853, NFF16-101/102, CEN/TS 45545 (2009).



radiation patterns

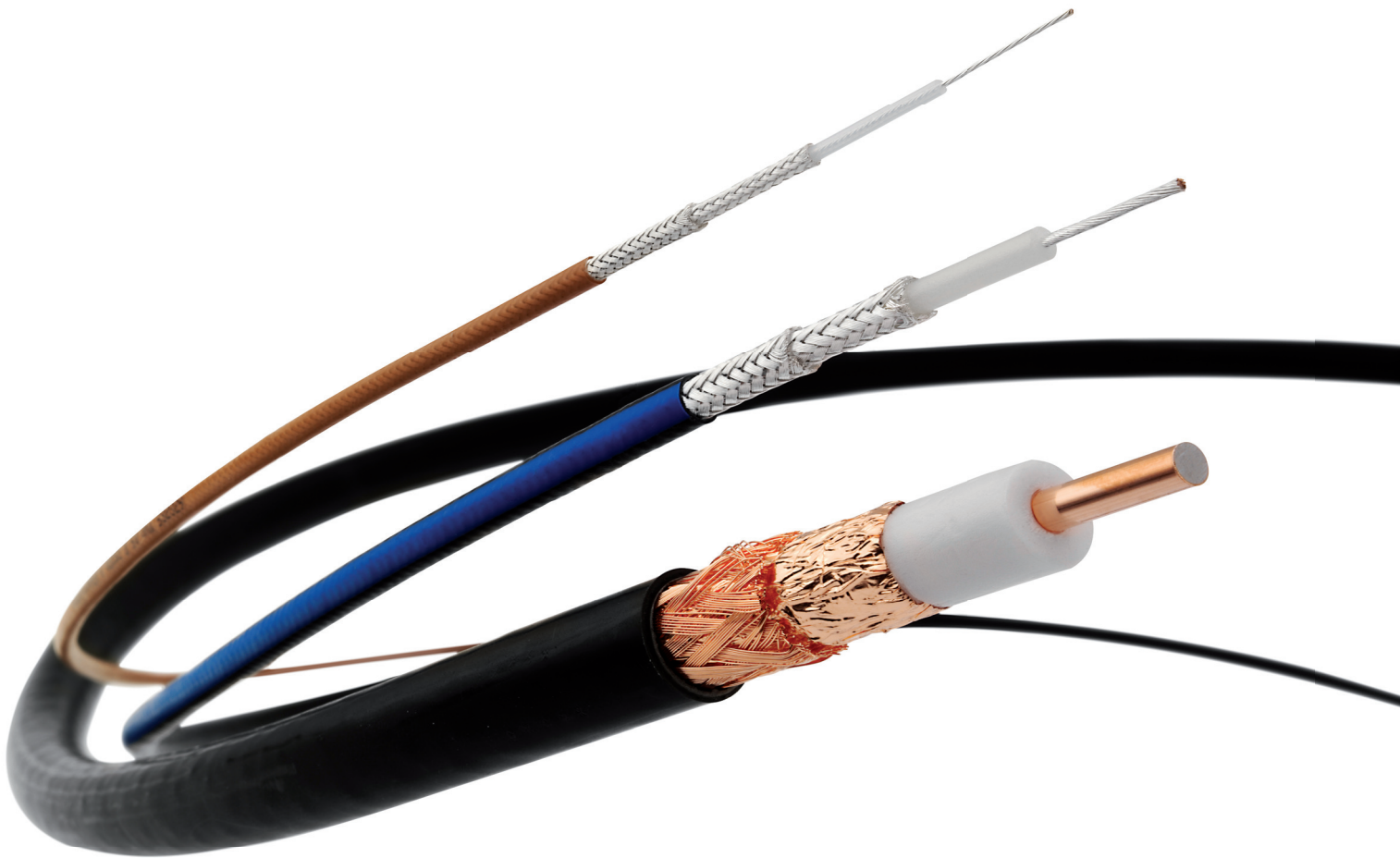


2450 MHz



5725 MHz

The antennas have been qualified in accordance with aviation standards. Please contact your local sales representative for further details.



## RF cables

HUBER+SUHNER offers a wide range of coaxial cables, developed to meet the highest standards. A balanced range of flexible coaxial cables provides the best performance for demanding applications. Our premium quality cables have excellent electrical and mechanical properties and are used globally in various applications to meet the highest demands. Comprehensive, professional support in conjunction with our comprehensive product range makes HUBER+SUHNER a leading provider of radio frequency solutions in aviation applications.

### Performance line: high-temperature coaxial cable

- High temperature range
- High performance
- RG standard

### Foam line: flexible, low-loss cable

- Lower attenuation
- Excellent shielding
- Halogen-free options

## Performance line - high-temperature coaxial cable

The PTFE/FEP cables from our RG series are designed for applications up to 200 °C and are characterised by low losses, especially at high frequencies. The cables in the ENVIROFLEX® family do not contain fluorine plastics in the dielectric or in the jacket and thus provide a robust and environmentally friendly option.

	RG	ENVIROFLEX
Dielectric material	PTFE	SPEX
Jacket material	FEP	RADOX®
Halogen free	-	✓
Low smoke	✓	✓
Flame retardancy	Not flammable	✓✓
Temperature range	✓✓✓	✓✓
Weather resistance	✓✓✓	✓✓

Outer diameter (in mm)	RG	G
2	RG_178_B/U K_01252_D	EF_178 EF_178_D
3	RG_316_/U K_02252_D	EF_316 EF_316_D
5	RG_400_/U	EF_400
5	RG_142_B/U	EF_142
10	RG_393_/U	EF_393

Temperature range  
High performance  
RG standard



## Foam line - flexible, low-attenuation cable

The SPUMA, S and SX cable families provide lowest attenuation, high flexibility and optimal shielding. The S series with LSFH™ jacket material and the radiation cross-linked SX series with the RADOX® jacket also offer extremely high flame protection.

	SPUMA	SPUMA-FR & S
Dielectric material	SPE	SPE
Jacket material	PE	LSFH™
Halogen free	✓	✓
Low smoke	-	✓
Flame retardancy	-	✓✓
Temperature range	✓	✓
Weather resistance	✓✓	✓✓

Outer diameter (in mm)	SPUMA	SPUMA-FR & S
3	-	S_02162_B
4.5	SPUMA_195	S_03262_B-61
6	SPUMA_240	S_04162_B-60
10	SPUMA_400	SPUMA_400-FR-01
15	SPUMA_600	-

Low attenuation  
Excellent shielding  
High flexibility





## Microwave cable assemblies

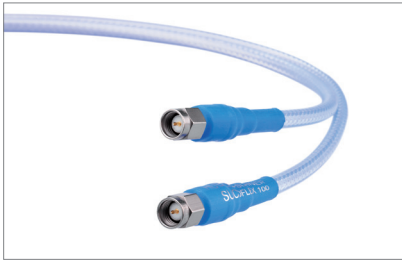
### Cables and connectors from the same manufacturer

HUBER+SUHNER develops and manufactures coaxial cables and connectors for most applications and in a multitude of versions. The connector series comprise over 1700 different types which demonstrate their qualities daily world wide. Demanding customers trust the reliability and quality of HUBER+SUHNER products. These products have been tested to IEC, MIL, CECC and other standards. Our extensive know-how in RF technology enables reliable and competent technical consulting and support. You stand to benefit from a well matched cable and connector range as well as the vast experience of our engineers.

### Microwave cable assemblies to your specifications

Make use of the HUBER+SUHNER custom design service. Increase efficiency and productivity in your company by ordering ready-to-use microwave cable assemblies from the specialists. Expert assembly by soldering, clamp or crimp technique and inspection records according to your specifications enable you to order with confidence.

## SUCOFLEX® 100



SUCOFLEX 100 series flexible microwave cable assemblies offer superior electrical and mechanical performance for static and dynamic applications. Their mechanical and climate resistance properties surpass those of standard flexible cables. This cable type is ideally used in aerospace and defence systems where high reliability and long-term stability is needed.

- The cable maintains stable electrical characteristics when exposed to bending and temperature, enabling reliable test results
- Broad frequency range: DC - 50GHz
- Armours and jacket options
- Fast availability

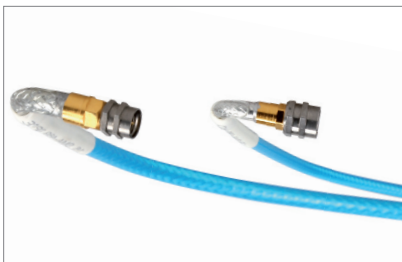
## SUCOFLEX® 200



Best in class microwave cable assembly solution for dynamic applications where a high stability performance solution is required under any kind of mechanical or environmental impact.

- Excellent electrical characteristics:
  - Very low loss: typical 1.27 dB/m at 26 GHz
  - Excellent phase stability versus temperature: 600 ppm
  - Great phase stability versus flexure
- Frequency range: up to 40 GHz
- Overall diameter: 5 mm

## SUCOFLEX® 300



The SUCOFLEX 300 lightweight, low-loss flexible microwave cable assemblies are high-end products designed to meet the stringent needs of space flights systems (e.g. satellites) and aerospace systems (aircraft, helicopters, missiles), which are subjected to extremely severe operating conditions.

- SUCOFLEX 300 series offers a consistently outstanding mechanical and electrical performance, stability and reliability up to 40 GHz
- Weight reduction of up to 40 % compared to our conventional products
- Additional aramid armouring provides high grade of protection against chafing and abrasion



## minibend™ series

minibend is a truly flexible coaxial cable assembly which is designed for use in low profile, internal, point-to-point interconnections between RF modules within communications systems. minibend replaces 0.086 inch custom semi-rigid cables with standard flexible cables, eliminating the need for predefined custom lengths and bend configurations. minibend provides you with a preassembled and tested high performance, cost-effective alternative in a variety of standard lengths and connector configurations.

minibend R is designed for use in complex, congested environments where higher cable retention force is required. minibend R's pull strength is more than 70 % greater than standard minibend. When installed and bent at the minimum bend radius, minibend R will tolerate multiple 90° rotations at the cable/connector junction. The «R» ruggedisation can be added to any minibend connector style.



## microbend™



An ultra-flexible replacement for 0.047" diameter semi-rigid cable with over 35 % less attenuation. This cable offers excellent pull strength and mechanical durability for its small size. In addition, it is electrically stable up to 90 GHz.

- Frequency range up to 90 GHz
- Triple shielded for high isolation
- Eliminates need for costly right angle connectors
- Direct replacement for 0.047" semi-rigid cables
- Stock delivery on standard lengths
- Guaranteed 10 lbs (45 N) pull force
- 35 % lower insertion loss
- Available only in a ruggedised version

## minibend™



A mechanically strong cable that replaces traditional 0.086" diameter semi-rigid cable. It offers excellent resistance to flame, corrosion, elongation and compression and has high pull strength. This cable offers extremely stable I.L. up to 65 GHz.

- Frequency range up to 65 GHz
- Triple shielded for high isolation
- Eliminates need for costly right angle connectors
- Direct replacement for 0.086" semi-rigid cables
- Stock delivery on standard lengths
- Guaranteed 15 lbs (67 N) pull force for minibend, 25 lbs (111 N) for minibend R

## minibend™L



A durable, low loss alternative to 0.086" diameter semi-rigid cable offering 30 % less attenuation. It offers excellent resistance to flame and corrosion in addition to excellent phase and amplitude stability. This cable is available for applications up to 50 GHz.

- Frequency range up to 50 GHz
- Triple shielded for high isolation
- Eliminates need for costly right angle connectors
- Direct replacement for 0.086" semi-rigid cables
- Stock delivery on standard lengths
- Guaranteed 15 lbs (67 N) pull force for minibend, 25 lbs (111 N) for minibend R
- Microporous dielectric for 30 % lower insertion loss, improved phase stability and higher power handling

## mini141™

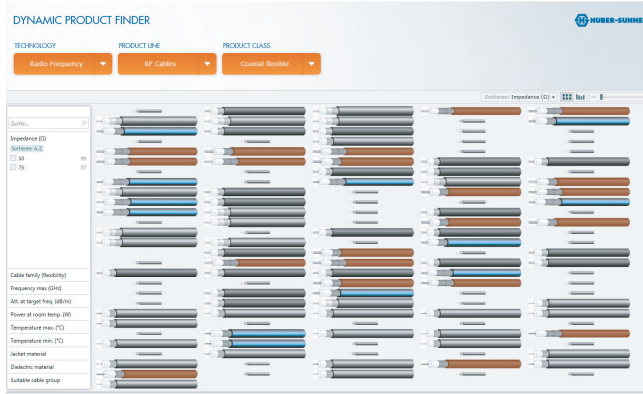


A strong, low loss alternative to 0.141" diameter semi-rigid cable offering 20 % less attenuation. It offers excellent pull strength and resistance to flame, corrosion and elongation. This cable also provides exceptional phase stability for applications up to 40 GHz.

- Frequency range up to 40 GHz
- Triple shielded for high isolation
- Eliminates need for costly right angle connectors
- Direct replacement for 0.141" semi-rigid cables
- Stock delivery on standard lengths
- Guaranteed 25 lbs (111 N) pull force
- Microporous dielectric for 20 % lower insertion loss, improved phase stability and higher power handling
- Available only in a ruggedised version

# Product selection guides

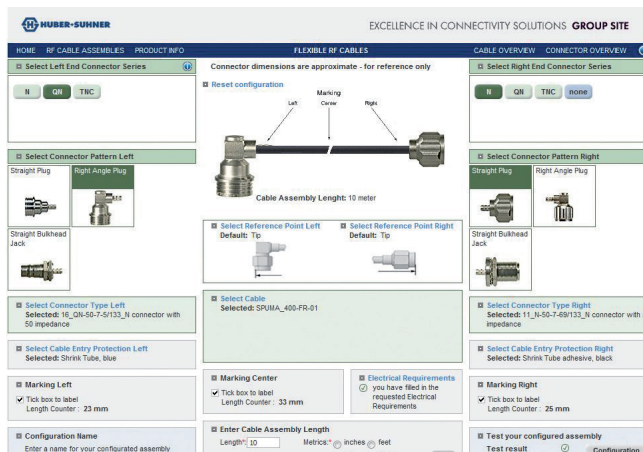
## 1. EVALUATE with our product finder



By using our «product finder» please choose the suitable cable, connector, adaptor, EMP or antenna. You will find this utility on our homepage or with following link:

<http://products.hubersuhner.com>

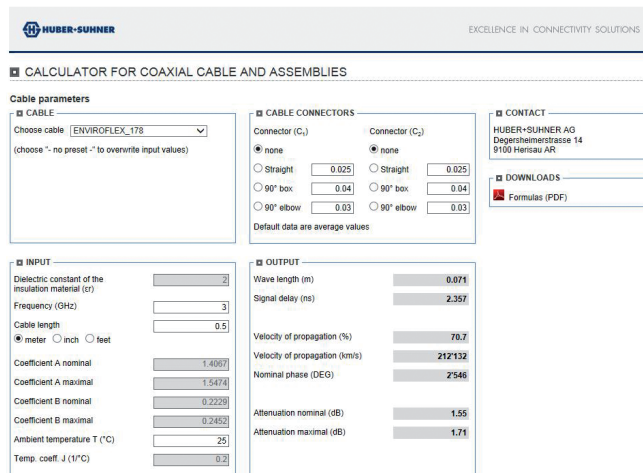
## 2. CONFIGURE with the assembly configurator



By using the «RF assembly configurator» you can define the suitable assembly. You will find this utility on our homepage or with following link:

<http://rfwebpcf.hubersuhner.com>

## 3. CALCULATE with the assembly calculator



Define the suitable assembly by using the «RF assembly calculator». You will find this utility on our homepage or with following link:

<http://rfcablecalc.hubersuhner.com>

# Further documentation



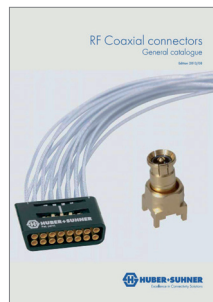
Defense  
Market brochure



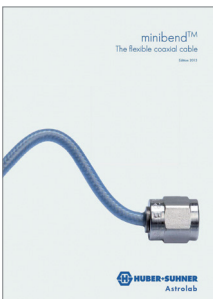
Air traffic control  
Market brochure



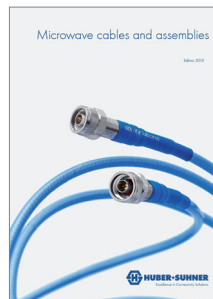
RF cables  
General catalogue



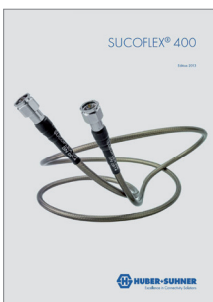
RF coaxial connectors  
General catalogue



minibend™  
Product brochure



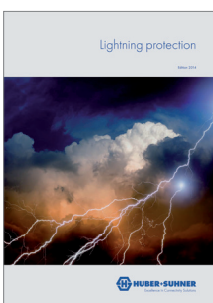
Microwave cables and assemblies  
General catalogue



SUCOFLEX® 400  
Product brochure



RF and Microwave components  
General catalogue



Lightning protection  
General catalogue



FO cabling systems  
General catalogue



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