

## Wireless communication

Wireless communication is an integral part of modern transportation systems: It covers train control and radio (GSM-R or TETRA), satellite navigation (GPS), mobile communication (GSM, UMTS) and internet on train (WiFi).

HUBER+SUHNER offers antennas for the complete range of communication standards between 380 MHz and 6 GHz. As a solution provider, we deliver all necessary RF components (antennas, cable assemblies, filters) for antenna applications on trains, tramways and buses.

## Roof-top railway/light rail antennas

Roof-top railway antennas must resist adverse environmental conditions. The railway industry has therefore defined several standards which these products must comply with:

- Protection by grounding all metal parts acc. to UIC 553
- High voltage protection (27.5 kV), high current protection (40 kA during 100 ms) acc. to Deutsche Bahn specifications
- Temperature and vibration requirements acc. to EN 50155
- EMC protection acc. to EN 50121-3-2
- Fire retardant, low toxicity, low smoke density materials acc. to NF F16-101/NF F16-102

In addition, our train antennas are protected against corrosion acc. to MIL-F-14072D.

We provide specific products for different applications:

- SENCITY®Rail  
Omni-directional antennas for railway applications
- SENCITY®Rail EXCEL  
Directional antennas for railway/light-rail\* applications
- SENCITY®AVANT  
Omni-directional antennas for light rail\* or bus applications

\* Light rail is an urban rail public transportation system (e.g. tramway), with lower capacity and lower speed than railway systems (usual trains, high speed trains, metro). Light rail systems often operate at lower voltage and lower current.

## SENCITY®Rail antenna family

The SENCITY®Rail antenna family provides an all-in-one wireless communication solution for all type of trains.

SENCITY®Rail antennas meet the special requirements of railway applications. They provide electrical protection against the impact of a contact with the overhead line (max. 27.5 kV and max. 40 kA/100 ms).

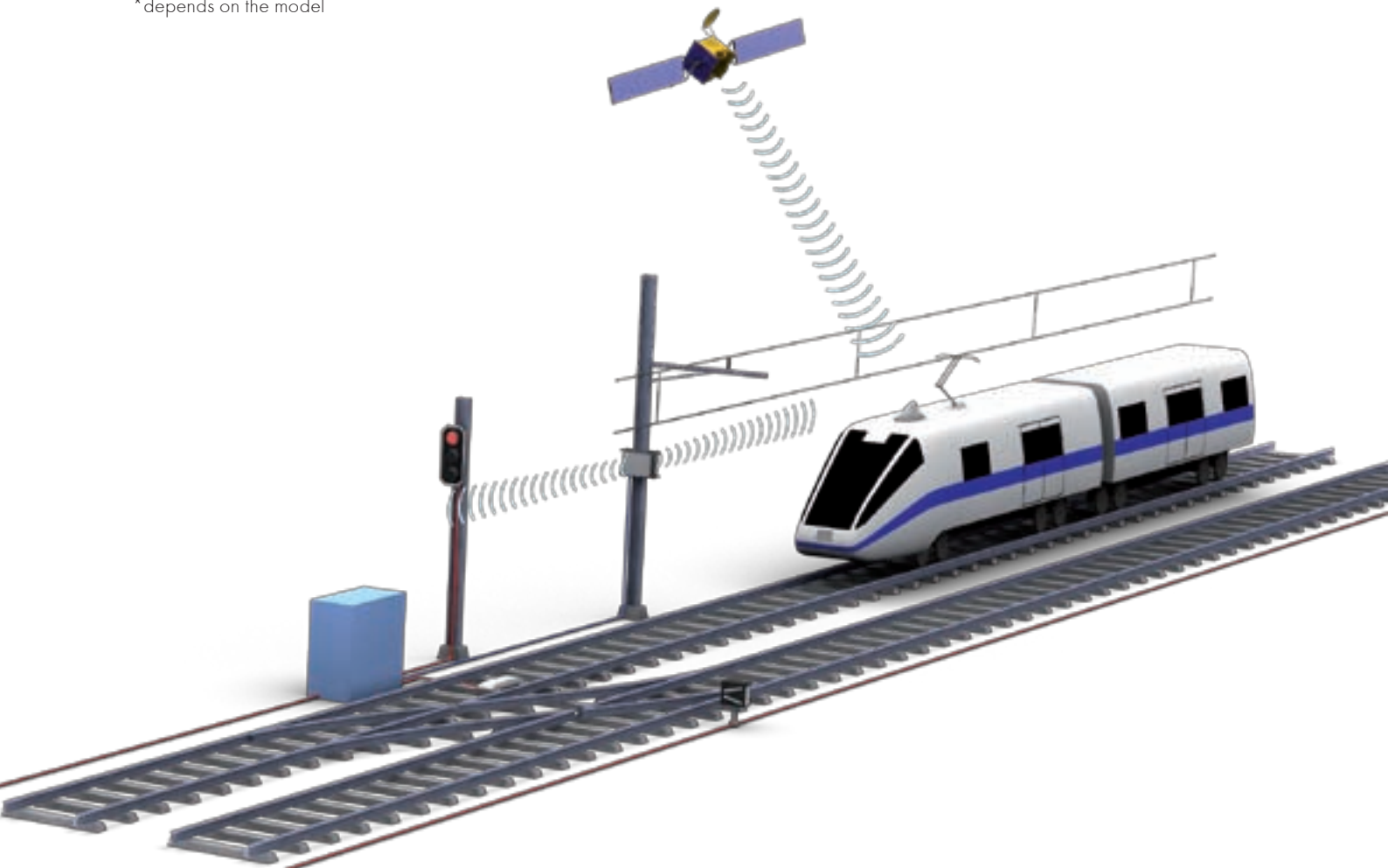
### Key features:

- Omni-directional roof-top antenna with an extremely rugged mechanical design
- Multi-band support 380 MHz to 6 GHz\*
- Embedded GPS/Galileo/Glonass antenna\*
- Low profile version available

### Target applications:

- Multi-band communication
  - AMPS 800 MHz, GSM 900, DCS 1800, PCS 1900, UMTS 2100
  - WiFi 2.4 and 5 GHz
  - WiMAX 2.6 and 3.5 GHz
- Vehicle localization with GPS/Galileo/Glonass
- Double-deck train

\*depends on the model



Type designation	Antenna family	Remarks	Freq. min. [MHz]	Freq. max. [MHz]	Gain [dBi]	Pol.
1399.17.0094	SWA-0459/360/4/25/V	TETRA support Advanced mounting options	380	960	4.0	vertical
			1710	2170	7.5	
			2400	2700	7.5	
			3400	3700	8.5	
			4900	5875	8.5	
1399.99.0026	SWA-0459/360/4/25/DFRX30	TETRA support Embedded GPS antenna with integrated LNA Advanced mounting options	380	960	4.0	vertical
			1710	2170	7.5	
			2400	2700	7.5	
			3400	3700	8.5	
			4900	5875	8.5	
			1574	1576	8.5	
1399.17.0125	SWA-0825/360/5/30/V	Low profile (40 mm)	870	960	5.0	vertical
			1710	2170	6.5	
			2400	2500	7.0	
1399.99.0037	SWA-0825/360/5/30/DFRX30	Low profile (40 mm) Embedded GPS antenna with integrated LNA	870	960	5.0	vertical
			1710	2170	6.5	
			2400	2500	7.0	
			1574	1576	7.0	
			1574	1576	7.0	
1309.17.0093	SOA 0900/360/6/0/V	GSM/GSM-R only version	870	960	6.0	vertical
1399.17.0039	SWA-0859/360/4/0/V		870	960	6.0	vertical
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			5150	5875	8.5	
1399.17.0082	SWA-0859/360/4/0/V_1	Extended frequency range 806-870 MHz	806	824	6.0	vertical
			824	960	6.0	
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
1399.17.0122	SWA-0859/360/4/0/V_3	Advanced mounting options	806	960	6.0	vertical
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			4900	5935	8.5	
1399.17.0043	SWA-0859/360/4/0/DF	Embedded GPS antenna	870	960	6.0	vertical
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			5150	5875	8.5	
			1574	1576	8.5	
1399.17.0044	SWA-0859/360/4/0/DFRX30	Embedded GPS antenna with integrated LNA	870	960	6.0	vertical
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			5150	5875	8.5	
			1574	1576	8.5	
1399.17.0107	SWA-0859/360/4/0/DFRX30_1	Embedded GPS antenna with integrated LNA Extended frequency range 806-870 MHz	806	824	6.0	vertical
			824	960	6.0	
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			1574	1576	9.5	
1399.99.0120	SWA-0859/360/4/0/DFRX30_2	Embedded GPS antenna with integrated LNA Advanced mounting options	806	960	6.0	vertical
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			4900	5935	8.5	
			1574	1576	8.5	
1399.99.0121	SWA-0859/360/4/0/DFRX30_3	Embedded GPS/Glonass antenna with integrated LNA Advanced mounting options	806	960	6.0	vertical
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			4900	5935	8.5	
			1574	1610	8.5	

## SENCITY®Rail EXCEL antenna family

The SENCITY®Rail EXCEL antenna family provides a high-gain solution for trackside wireless communications on all types of trains.

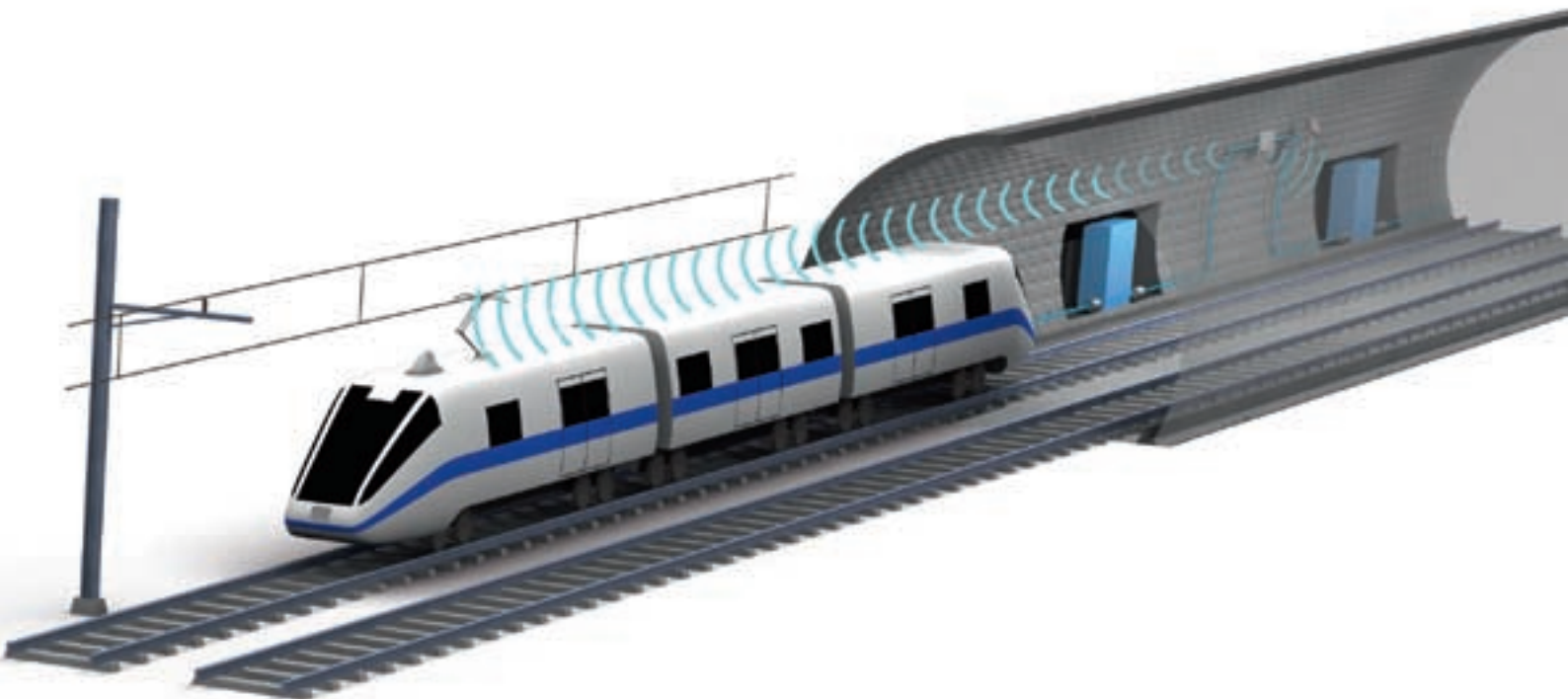
SENCITY®Rail EXCEL antennas meet the special requirements of railway applications. They provide electrical protection against the impact of a contact with the overhead line (max. 27.5 kV and max. 40 kA/100 ms).

### Key features:

- High-gain directional roof-top antenna
- Directional and bidirectional types available
- Supports WiFi/WiMAX 2.4, 3.5 or 5 GHz bands

### Target applications:

- Long distance and high data rate communication between train and trackside networks



Type designation	Antenna family	Remarks	Freq. min. [MHz]	Freq. max. [MHz]	Gain [dBi]	Pol.
1324.170089	SPA-2400/40/15/10/V_3	Directional	2400	2484	14.5	vertical
			2484	2550	14.5	
			2550	2590	14.0	
			2590	2630	12.5	
			2630	2650	11.5	
1324.170070	SPA-2400/50/12/10/V	Bi-Directional	2400	2484	13.5	vertical
			2484	2550	13.0	
			2550	2600	12.0	
			2600	2630	11.0	
			2630	2650	10.0	
1336.170030	SPA-3600/50/13/15/V	Bi-Directional	3400	3800	13.5	vertical
1356.170010	SPA-5600/45/12/10/V	Directional	4900	5150	12.5	vertical
			5150	5935	12.5	
1356.170042	SPA-5600/45/12/10/V_1	Bi-Directional	4900	5150	12.0	vertical
			5150	5470	12.5	
			4900	5150	13.0	
			5150	5470	13.5	
			5470	5725	13.0	

## SENCITY®Avant antenna family

The SENCITY®AVANT antenna family provides an all-in-one wireless communication solution for light-rail vehicles.

Light rail is an urban public rail transportation system (e.g. tramway) with lower capacity and lower speed than railway systems (usual trains, high speed trains, metro).

SENCITY®AVANT antennas provide an electrical protection against the impact of a contact with the overhead line (max. 27.5 kV and max. 10 kA/100 ms).

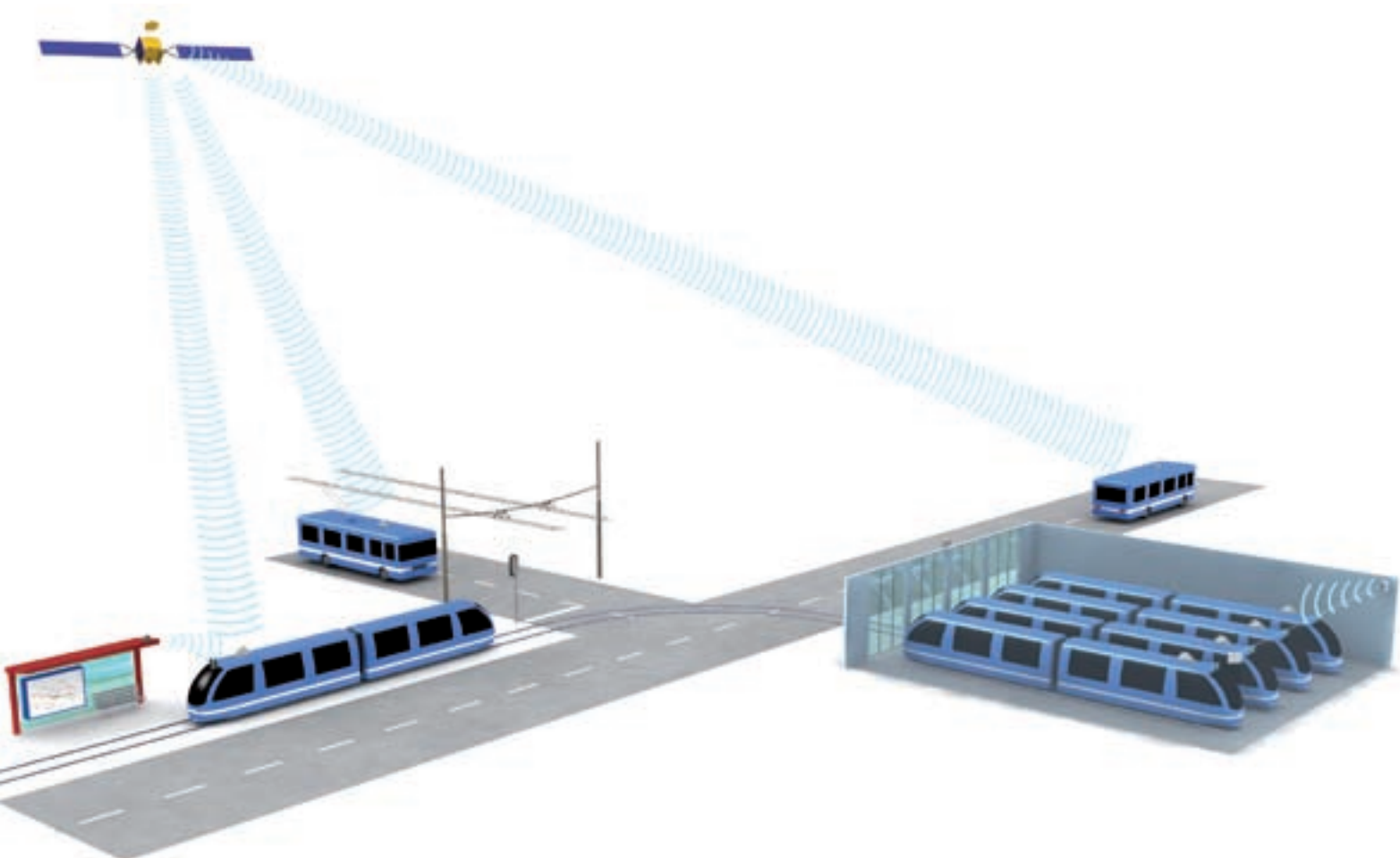
### Key features:

- Omni-directional roof-top antenna with a rugged mechanical design
- Multi-band support 806 MHz to 6 GHz
- Embedded GPS/Galileo antenna\*

### Target applications:

- Multi-band communications on tramways or buses
  - AMPS 800 MHz, GSM 900, DCS 1800, PCS 1900, UMTS 2100
  - WiFi 2.4 and 5 GHz
  - WiMAX 2.6 and 3.5 GHz
- Vehicle localization with GPS/Galileo

\*depends on the model



Type designation	Antenna family	Remarks	Freq. min. [MHz]	Freq. max. [MHz]	Gain [dBi]	Pol.
1399.170099	SWA-0860/360/4/0/V_2		806	824	6.0	vertical
			824	960	6.0	
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			4900	5150	8.5	
1399.170100	SWA-0860/360/4/0/DF_2	Embedded GPS antenna	806	824	6.0	vertical
			824	960	6.0	
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			4900	5150	8.5	
1399.170101	SWA-0860/360/4/0/DFRX30_2	Embedded GPS antenna with integrated LNA	806	824	6.0	vertical
			824	960	6.0	
			1710	2170	8.5	
			2400	2700	9.5	
			3400	3700	9.5	
			4900	5150	8.5	
			1574	1576		

## Additional antenna products

### Vehicle outdoor

Antennas on the roof of a vehicle must allow multi-band operation. This approach eliminates the need to install more than one antenna and covers also future communication standards. Easy installation and maintenance-free products are the top priorities here.



### In-carriage

For in-carriage applications, passenger safety is the main criterion. Besides offering high performance, our products are also fire retardant and use low toxicity materials (acc. to NF-F-16-101 and 102).

Omni-directional as well as directional antennas are available in small form factors with different colors, connectors and mounting options.

### Carriage bridging

Linking of train coaches using antennas instead of cables reduces the service requirement when disconnecting coaches. These antennas must resist adverse environmental conditions. Wireless bridging is usually based on WiFi communication standards.

### Trackside

Trackside antennas are used for high data rate applications such as WiFi 2.4 / 5.5 GHz or WiMAX networks. Special accessories are available for different applications, e.g. brackets, lightning protectors, DC/DC blocks, power splitters and RF cable assemblies. Most antennas are described in the catalogue "Antennas - Broadband wireless WiMAX and WiFi".





Type designation	Antenna family	Remarks	Freq. min. [MHz]	Freq. max. [MHz]	Gain [dBi]	Pol.
<b>Vehicle outdoor</b>						
1399.17.0106	SWA-2459/360/7/20/V_1	Omni-directional High-current protection (10kA/100ms) EN 50155 IP65 NF-F-16-101 and 102 compliant	2400 2500 3400 4900 5470	2500 2700 3700 5470 5935	6.0 6.0 7.0 8.0 8.0	vertical
1399.17.0111 1399.17.0108	SWA-2459/360/7/20/V_2	Omni-directional Connector mounting IP68	2400 2500 3400 4900 5470	2500 2700 3700 5470 5935	6.0 6.0 7.0 8.0 8.0	vertical
1349.99.0003	SOA 4900/360/7/10/V	Omni-directional NMO mount IP 65	4900	5935	7.0	vertical
<b>In-carriage</b>						
1324.17.0071	SOA-2400/360/4/20/V_2	Omni-directional NF-F-16-101 and 102 compliant	2400	2500	4.0	vertical
1324.26.0049	SPA-2400/75/9/0/V_1	Directional NF-F-16-101 and 102 compliant	2300	2500	8.5	vertical
1356.17.0043	SOA 5600/360/3/20/V_1	Omni-directional NF-F-16-101 and 102 compliant	4900	5935	7.0	vertical
1356.26.0013	SPA-5600/60/10/0/V_1	Directional NF-F-16-101 and 102 compliant	5150 5250	5250 5875	9.5 9.5	vertical
<b>Carriage bridging</b>						
1324.17.0077	SPA-2400/75/9/0/V_2	Directional Rugged design IP65	2400	2500	9.0	vertical
1356.17.0054	SPA-5600/55/8/0/V	Directional Rugged design IP65	5150 5250 5750 5825	5250 5750 5825 5875	8.5 8.5 8.5 7.5	vertical
<b>Trackside</b>						
1324.26.0042	SPA-2400/40/11/0/BDDS	Bi-directional Including power splitter Including mast mounting bracket	2400	2500	10.5	+/-45° slant
1324.26.0056	2.4GHz SPA 2400/75/9/0/V_5	Directional NF-F-16-101 and 102 compliant Mast/wall mount IP 66/67	2400	2485	8.5	vertical
1356.26.0020	5.6 GHz SPA 5600/40/14/0/V_3	Directional NF-F-16-101 and 102 compliant Mast/wall mount IP 66/67	5150	5195	14	vertical

