

Success with Precision

Telephony, radio and internet using satellites – the ever increasing uses in the SatCom industry combined with the increasing demands on transmission capacity and operating conditions have led to a considerable growth in available dual channel rotary joints in the past few years. Such rotary joints are particularly important for SatCom applications, as they allow the simultaneous transmission of broadcasting and received signals through a single component between the base unit in the moving system (e.g. the aircraft, ship, vehicle) and the antenna adjusted in the direction of the satellite.

The trend for higher frequency bands and increasing capacity require new solutions such as compact waveguide-coaxial transmission line combinations, which could not be implemented previously. With all applications, the environmental conditions are also intensifying – for example the requirements on temperature range, moisture content, installation height, vibration and shock as well as corrosion resistance. On one hand, the solution can be found in a demanding interplay of ultra-precise milled and rotary parts, which are produced on modern SPINNER CNC machinery or in cooperation with specially selected precision suppliers. And on the other hand, in exact simulation methods, with which the design of such joints can be developed and verified according to the high demands.

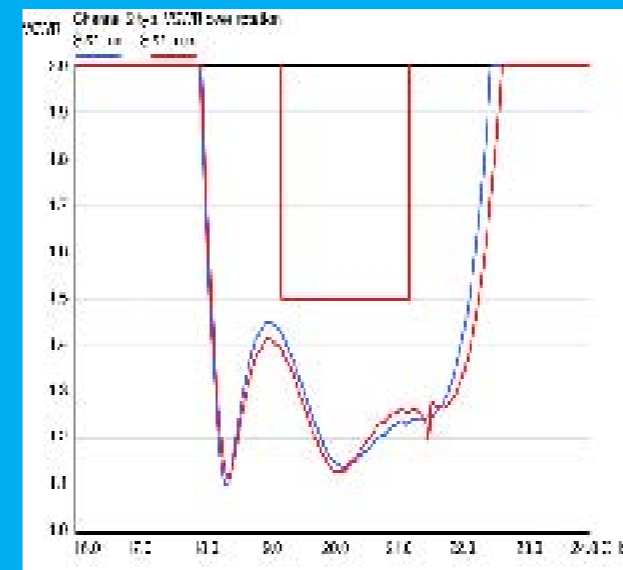
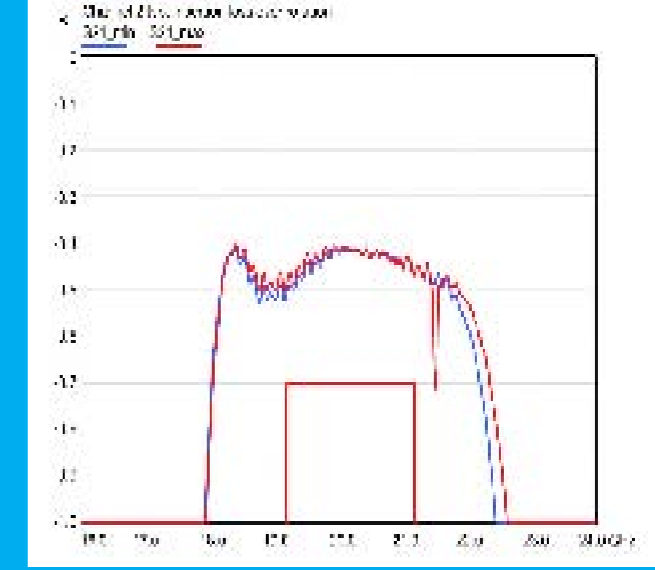
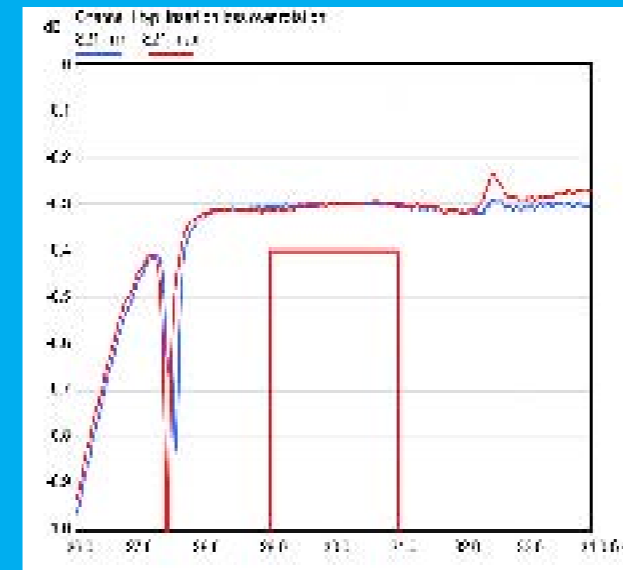
Wherever possible, SPINNER relies on precision, highly-integrated components, which combine many functions and are made up of minimal parts, thus minimizing the number of connections. This technology allows very good insertion loss values to be achieved, as a lower number of transition resistances also arise at the connections which have been reduced to a minimum. But the main advantage is that the precision



increases due to the lower number of fits, meaning the produced components can be created in good compatibility with the simulated geometries. This in turn allows the exact specification of RF values with just a slight individual need for adjustment of the end product. In comparison to years ago, adjusting elements are no longer considered a necessary evil and established empirically in the product development process. Instead, at the beginning of the design, they are consciously planned in reduced numbers in order to generate specifically determined product features or to

compensate economically for remaining incalculabilities in the μm sector.

To create precision engineering and microsystems, whose typical representative is a dual channel SatCom family, new production areas have been created, which deal specifically with connecting technology and the positioning of small components, offering the right conditions, such as cleanroom assembly. The high level of training at SPINNER, the exact description of all procedures, the consistent training of employees and the motivation of only wanted to achieve the best enable high-



Channel designation	Channel 1	Channel 2
Interface type	UBR320 (UG-599)	2.92mm female
Interface orientation	style I	style L
Frequency range	29.0 to 31.0 GHz	19.2 to 21.2 GHz
Average power capability ^{SR1)}	50 W	5 W
VSWR, max.	1.25	1.5
VSWR variation over rotation, max.	0.1	0.1
Insertion loss, max.	0.4 dB	0.7 dB
Insertion loss variation over rotation, max.	0.2 dB	0.2 dB
Phase variation over rotation, max.	2.0 deg.	2.0 deg.
Isolation, min.	65 dB	

quality production of smaller and medium-sized series through to larger production orders of many different products. The substantiated knowledge about functions and interactions of abstract components, which are often difficult to access for lay people in the field of radio technology, puts SPINNER at the peak of the RF industry and makes a high demand on its employees. A current product from the SPINNER SatCom dual channel portfolio is the rotary joint described below, which is optimized for use in the airborne SatCom sector and allows high transmission capacities even at great altitudes. Using non-contacting transmission technology in the coaxial and waveguide sector, signals can be transmitted securely and extremely durably in all fields of use. The product confirms to the demands of conventional aerospace standards in all fields.

Radio frequency channel characteristics
 SR1 Conditions: - Operating altitude if not pressurized, max. 55000 ft
 - The waveguide flange of the rotary joint must not exceed the defined maximum ambient temperature.