

THE ULTIMATE SECURE CONNECTION

Today, there is a limited number of RF connector interfaces available for use in the space OEM industry. The most commonly used interface is SMA. OEMs also use the SMA2.9 (also named K) for operating frequency up to 30 GHz or TNC connectors for high power applications. However, around 2005, the SMP interface (also called GPO) gained a lot of popularity for phased array radars due to its small size and ease of use. The stability of the space market which has resulted in unchanged global volumes has pushed customers to increase their quality expectations and expect more cost effective solutions. Finding effective ways to decrease the cost of connectors, has presents a challenge for connector manufacturers.

At Radiall, we are committed to providing unique innovative solutions at a reasonable cost. We realize that to meet the needs of customers within the space industry, we must offer high performance, low cost interconnect solutions that do not compromise quality. To understand customers concerns, we analyzed the cost related to a payload and determined that the supplying cost is extremely important for our customers. It is important to note, these costs remain low compared to the final equipment price. Also, the raw material and processing costs tend to increase over time and the complementary productivity gain possibilities are becoming rare considering the small volumes.

Using our expertise and experience in the defense and civilian aerospace markets, our commitment to being a leading supplier in the space industry enabled us to develop a new connector interface: the SMP LOCK®. "SMP" refers to compliance with SMP dimensions and "LOCK" refers to the unique quick locking system integrated within the connector to simplify installation. We also offer an interface well known and mastered by our customers which can be a SMA and SMA 2.9 alternative which can work up to 40 GHz, with an innovative locking system added. Figure 1 on the right, illustrates the mating sequence and key discrepancies with standard SMP connectors. This includes the groove on the male side (receptacle) and the locking sleeve on the plug. It is important to note that users can push the locking sleeve manually or with dedicated tools (Fig 2) when mating becomes challenging.

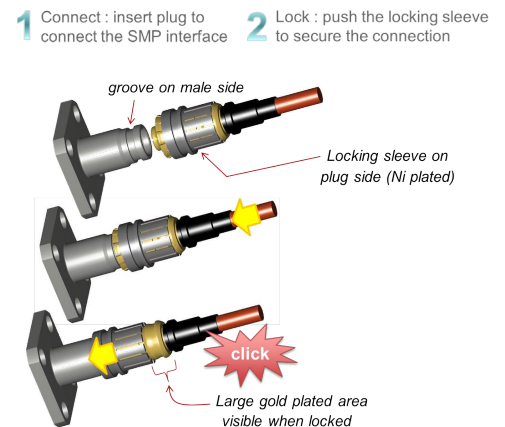


FIG. 1: Mating sequence of SMP-LOCK connectors

By eliminating the need for a torque wrench, there is no need to check the torque operation which avoids the risks of damaging the equipment by screwing a cable assembly. A key advantage of the SMP sliding connection and blind mate capability is that it allows the user to connect without any risk of damage even if the connector is not perfectly aligned. It also puts an end to the very severe integration sequences and access to the desired connector previously needed (the need for torque wrench space). Table 1 below is a summary of the key characteristics and advantages of this new interface.

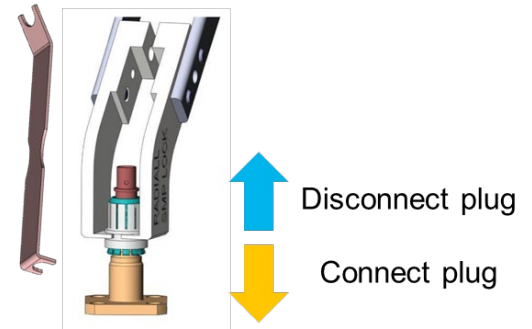


FIG. 2: Tools to connect and disconnect

TABLE 1: KEY CHARACTERISTICS OF SMP-LOCK® CONNECTORS

SMP Interface	High frequency DC-40 GHz Smaller size than SMA, SMA2.9 or BMA
Embedded EMI Ring	Excellent RF performance Improved RF leakage
Limited Detent Retention Force	Lower connection / disconnection forces Less mechanical stress Longer life cycle (durability 500 cycles)
Locking Sleeve on Plug	Greater strength of locking mechanism Withstands the more severe vibration and drop tests
Groove on Receptacles	Minor change on male interface with no additional cost
Two Step Connection	Easy to use during test phase Audible click when locked

This innovative solution enables our customers to achieve tremendous savings on integration costs, due to the quick lock connection (time saving) and the “easy to use” concept (decreasing the risk of damage to the equipment). With SMP-Lock® connectors, users can increase density of RF channels, due to the smaller size when compared to the current standard SMA and because a torque wrench is no longer required to connect female to male connectors.

This unique interface has already been selected for the Iridium constellation space program and has been tested and approved by end users. Radiall’s range of passive RF products in the CNES program include connectors, attenuators, terminations, cable assemblies and switches. These connectors will be qualified up to 22GHz by 2017 and will provide the best solution for all communication payload models.

To discover our range of innovative solutions for the space industry visit us at Space Passive Component Days (SPCD), the premier European technical conference and exhibition dedicated to Passive components for space applications.

For more information about this show, visit the conference website: <http://www.congrexprojects.com/spcd2016>.