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NEW HYBRID JUMPER FOR REMOTE RADIO HEADS

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Анотація

В цій роботі йде мова про вирішення недоліків впровадження мережі ЛТЕ, пов'язаних із використанням перемичок і кабелів, а також їх вирішення шляхом впровадження нового продукту компанії SPINNER.

Ключові слова: гнучкі,гібридні перемикачі,антена.

Annotation

This paper deals with the solution of LTE network introduction disadvantages associated with the use of jumpers and cables, as well as their solutions through the introduction of new product SPINNER.

Keywords: flexible, Hybrid Jumper, antenna.

Introduction

Against a background of expansion of the LTE network, worldwide operators are increasingly relying on amplifiers installed close to the antenna, known as remote radio heads (RRH), especially for smaller antenna systems mounted in towers or on roofs. Previously, the transmission distance between the RRH and the antenna was usually bridged by ^{l}A inch jumpers. However, operators have met with increased difficulties due to the maximum allowable insertion loss of such links, which is why the ^{l}A inch jumpers have been deemed to be unsuitable for certain cable lengths. This is why the larger 7s inch feeder cables, which have better attenuation properties, often need to be used. The downside is that their diameter is almost twice as large. This makes them rigid in comparison to ^{x}A inch jumpers and their relatively large bending radius and high bending torque are obstacles to easy installation, particularly on the last meter before the antenna or the RRH. In reality, for installation purposes, users have often had to resort to the far more flexible ^{l}A inch jumpers again, at least where close-coupled connections need to be made. However, this approach requires quite a lot of effort to cut the $\sim/s$ inch feeder cables to length on site, strip them and attach the necessary connectors. Furthermore, assembling the cables on site is critical, given that conditions are not always ideal and that the RF parameters and durable resistance to environmental influence are essential.

COMBINED BENEFITS

SPINNER has addressed these issues by offering the market a product that combines the benefits of both cable types, thus ensuring easy assembly. The Hybrid Jumper features the good attenuation performance of the feeder cable as well as the desirable flexibility of the jumper cable. The specifications for the Hybrid Jumper are shown in ***Table 1.***

TABLE I

SPECIFICATIONS OF THE HYBRID JUMPER

Electrical Specification					
Frequency range (MHz)	380 ... 470	698 ... 960	1710 ... 1990	2000 ... 2200	2200 ... 2700
VSWR	1.07 max.	1.09 max	1.11 max	1.13 max	1.16 max.
	1.05 typ.	1.06 typ.	1.08 typ.	1.08 typ.	1.10 typ.
IM3	≤ -160 dBc max./-165 dBc typ. (@ 2 × 43 dBm)				
Environmental Specification					
Ingress protection	IP 68 (0.1 bar/24 hours/unmated) IP 68 (1 bar/1 hour/mated)				
Recommended temperature range	-70°C to +85°C | -94°F to+185°F Storage -40°C to +60°C | -40°F to+140°F Installation -55°C to +85°C | -67°F to+185°F Operation				
Types (Extracted Examples)					
Article	LF 7/8" Feeder length "L"	Assemply weight	Nominal insertion loss @		
			800 MHz	1800 MHz	2700 MHz
Cable Sizes: SF 1/2" /LF 7/8" Connectors: both ends 7-16 male					
JFJ-S12L78-7M7M-6	4000 mm	2.9 kg | 6.4 lb	0.36 dB	0.56 dB	0.72 dB
JFJ-S12L78-7M7M-8	6000 mm	3.9 kg | 8.6 lb	0.42 dB	0.68 dB	0.86 dB
JFJ-S12L78-7M7M-10	8000 mm	4.9 kg | 10.8 lb	0.50 dB	0.80 dB	1.00 dB
JFJ-S12L78-7M7M-12	10000 mm	5.9 kg | 13.0 lb	0.58 dB	0.92 dB	1.16 dB

The newly designed Hybrid Jumper includes a 7s inch feeder cable as the main line, the length of which can be freely determined. On each end, it has a one meter long ***'A*** inch jumper that is assembled on the main line with specially developed and optimized connection elements. ***Figure 1*** shows the configuration. These connection elements are tightly soldered on the outer conductors of the cables, thus ensuring high stability and excellent intermodulation properties over the whole sendee life and under any environmental conditions.

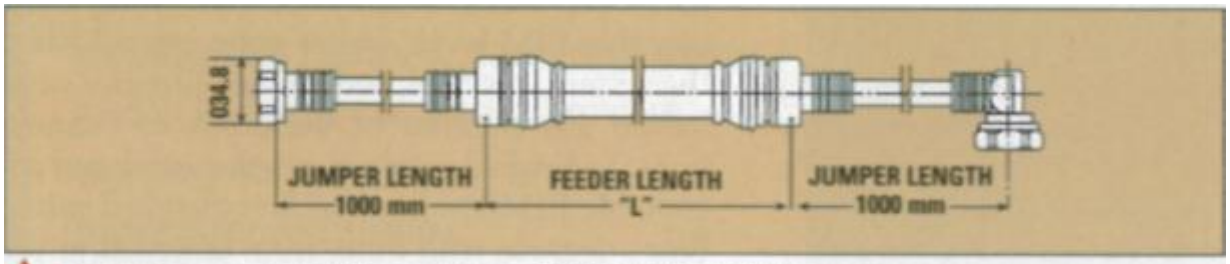

Fig. 1 Cross-section of the make-up of SPINNER's Hybrid Jumper.

COMPLETE ASSEMBLED UNITS

The traditional approach has been to join the feeder cable and jumper with a combination of connector and coupler, with at least one of them (usually the connector of the feeder cable) being assembled on site. Instead, the Hybrid Jumper is delivered as one completely assembled unit that is ready for use. The transition points are exactly matched and ensure superior VSWR values under repeatable manufacturing conditions. Typical measurements are shown in ***Figure 2.***

The Hybrid Jumper, as a complete line, has an I M3 < -160 dBc, which meets the stringent intermodulation requirements of individual pre-assem- bled ***V2*** inch jumpers over the whole service life. Furthermore, the cables go through a 100 percent test before dispatch; upon request the test log is available to the customer. The product also fully meets the requirements of the IP68 protection rating, thus ensuring resistance against environmental effects.

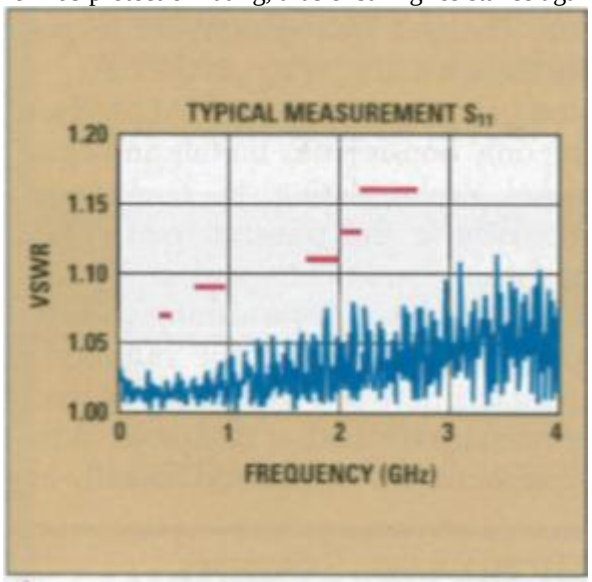

Fig. 2 Typical VSWR measurement graph.

Conclusions

By harnessing the company's technical competence and long-standing experience in order to find the optimum solutions for its customers, SPINNER's new Hybrid Jumper is a cable that is flexible where flexibility is needed, while also featuring low insertion loss. Repeatable manufacturing conditions and 100 percent testing of all relevant technical parameters guarantee high operational reliability. An additional benefit is that complete pre-assembly makes the Hybrid Jumper very easy to install and ready for immediate use. It is currently available in standard lengths from 6 to 12 m and special lengths can be manufactured and supplied upon request. Besides the most common connector combination with 2 x 7-16 connectors, the Hybrid Jumper is also available in the standard version 7-16 connector/7-16 angled connector.

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