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DOWNLINK INTERFACILITY FEEDER CABLE FOR C, Ext C & Ku BAND

GENERIC REQUIREMENTS
No: TEC/GR/TX/SFC-001/03/FEB-2009

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HISTORY SHEET

GR Title	GR No.	Remarks
Downlink Interfacility Feeder Cable For C, Ext C & Ku Band	TEC/GR/TX/SFC-001/03/FEB-2009	Revised GR in new format , combining the two GRs: GR/SFC-01/02.MAR 2005 and GR/SFC-02/02.MAR 2005

1.0 INTRODUCTION

This document contains generic requirements for Downlink Interfacility Feeder Cable for 'C' band, Ext C band having 1/2″ and 'Ku' band having 3/8″ diameter to be used in conjunction with Low Noise Amplifiers subsystem at one end, and power divider at other end. It shall consist of flexible coaxial cable with rugged polyethylene jacket. The cable shall be provided in lengths to be indicated by customer. The cable would be supplied either pre-connectorised, or the connectorisation of the cable would be done by the customer on site, which shall be possible with standard hand-tools.

2.0 FUNTIONAL AND TECHNICAL REQUIREMENTS

2.1 MATERIAL

2.1.1 Inner conductor : Copper*

2.1.2 Outer conductor : Copper*

*Copper used shall conform to BIS standard IS-1897 (1983) "Specification for copper strip for electrical purposes" (second revision)

2.1.3 Dielectric : Foamed Polyethylene

2.1.4 Jacket : Polyethylene jacket with any light colour, and UV stabilized to protect it from degradation in sunlight.

2.2 CHARACTERISTICS

2.2.1 Nominal diameter : 1/2" for C & Ext C-band
3/8" for Ku-band

2.2.2 Frequency : 3.700 GHz to 4.200 GHz for C-band
: 4.500 GHz to 4.800 GHz for Ext. C-band
: 10.700 GHz to 12.750 GHz for Ku-band

2.2.3 Nominal characteristic impedance : 50 Ohms

2.2.4 Return loss with connectors ends of the cable : 23 db minimum for C, Ext C- band and at both 6 db minimum for Ku-band

2.2.5 Minimum bending radius : 125 mm for C & Ext C-Band
: 100 mm for Ku-Band

2.2.6 Minimum tolerable tensile force : 1200 Newton

2.2.7 Maximum attenuation over the whole band at 25°C** : 0.158 dB/m for C &Ext C-Band
: 0.52 dB/m for Ku-Band

** Variation of ± 0.2% per °C may be taken for temperature other than 25°C.

2.2.8 End connectors : N Male

2.2.9 Clamps spacing at normal, : 0.5m
critical areas and bends
(5% extra clamps for critical areas to be included)

2.2.10 Outer dimensions : To be furnished by the supplier

2.2.11 Weight : To be furnished by the supplier

3.0 QUALITY REQUIREMENTS

The feeder cable shall be manufactured in accordance with International quality management system ISO 9001:2000 for which the manufacture should be duly accredited. A quality plan describing the quality assurance system followed by the manufacturer would be required to be submitted.

And

The equipment shall meet the latest operator's quality manual on

i) Quality and reliability in product design.

ii) Guidelines for standard of workmanship for printed boards.

iii) Guidelines for standard of workmanship for printed board assemblies.

iv) Guidelines for standard of workmanship for surface mounted devices.

v) Transmission equipment general documentation.

The supplier shall furnish a certification from the manufacturer to this effect, which shall be verified at the time of technical specifications evaluation.

4.0 SAFETY REQUIREMENTS:

4.1 TEMPERATURE & HUMIDITY

4.1.1 The feeder cable systems are for installation and operation under fully exposed weather conditions. The temperatures may range from subzero to extremely hot. The feeder cable system shall be capable of working without relative humidity range from near dry to 95% condensing at 40°C. Optional compliance for temperature lower than -20°C shall be called for specific sites, on need basis.

4.2 CORROSION

4.2.1. The feeder cable system shall be capable of withstanding the effects of rains, snowfall, industrial pollution, salinity of atmosphere in coastal areas, etc.

4.3 ENGINEERING REQUIREMENTS

4.3.1 The joints in the feeder cable assembly shall have protection as per BIS standard IS 12062 {1987} "Classification of degree of protection provided by enclosures of the

electrical equipment" {equivalent to IEC-529} to meet at least the protection level of IP-65.

4.3.2 The feeder cable system shall adopt state-of-the-art technology.

4.3.3 All connectors shall be reliable and of standard type to ensure for over 500 failure-free mating operations under the environmental conditions specified.

4.3.4 The mechanical design and construction of each/units shall be inherently robust and rigid under all conditions of operations, adjustment, replacement, storage and transport and conforming to the latest operator's quality manual on "Specification for environmental testing of electronic equipments for transmission and switching use".

5.0 DESIRABLE REQUIREMENTS

5.0.1 The manufacturer shall guarantee the satisfactory performance of the equipment without any degradation in performance up to at an altitude of 3,000 meters.

5.0.2 The equipment shall be able to work without any degradation in performance in saline atmosphere near coastal areas and should be protected against corrosion.

5.0.3 The equipment shall conform to the requirements for the latest operator's quality manual for Specification for environmental testing of electronic equipments for transmission and switching use-for operation, transportation and storage, including vibration and corrosion (salt mist).

5.1 DOCUMENTATION

Technical literature in English or Hindi with complete layout, detailed block schematic and circuit diagram of various assemblies with test voltages/waveforms at different test points of the units shall be provided. All aspects of installation, operation, maintenance and repair shall be covered in the manuals. The soft copy as well as hard copy of the manuals shall also be provided. The manuals shall include the following manuals.

5.2 INSTALLATION, OPERATION AND MAINTENANCE MANUAL

a. Safety measures to be observed in handling the equipment;
b. Precautions for installation, operation and maintenance;
c. Test jigs and fixtures required, and procedures for routine maintenance preventive maintenance, troubleshooting and subassembly replacement;
d. Illustration of internal and external mechanical parts.

5.3 REPAIR MANUAL

a. List of replaceable parts used, including their sources and the approving authority;
b. Detailed ordering information for all the replaceable parts shall be listed in the manual to facilitate recording of spares as and when required;
c. Procedure with flowchart for troubleshooting and subassembly replacement shall be provided. Test fixtures and accessories required for shall also be indicated. Systematic troubleshooting charts (fault-tree) shall be given for the probable faults with their remedial actions.

5.4 ACCESSORIES

5.4.1 COMPULSORY ACCESSORIES

a. Wall gland
b. Hoisting stocking
c. Clamps
d. Flexible cables of 1 meters lengths each (23 dB return loss), along with prefabricated connectors at both ends
    i. For connecting power divider- N-female connector at one end, and SMA-male connector at the other end;
    ii. For connecting LNA-N-female connector at one end and N-male connector at the other end.

5.4.2 OPTIONAL ACCESSORIES

a. Earthing kit
b. Cutting tool
c. Flanging tool
d. Bending tool kit
e. Aluminimum foil
f. Sealing compound

5.5 MARKING

Feeder Cable shall be marked with the following information every 5/10 meters

a. Name of manufacturer
b. Year of manufacturing
c. Frequency of operation

6.0 FIELD TRIAL: Four weeks minimum

Instructions to the purchaser

1. Purchaser shall specify the required quality manuals in the tender document against the clause no. 3.0, 4.3.4 and 5.0.3.
2. Purchaser hall specify the length of the feeder cable to be procured.

7.0 GLOSSARY

BIS	**: Bureau of Indian Standards**
°C	**: Degree Celsius**
dB	**: decibel**
GHz	**: Giga Hertz**
GR	**: Generic Requirements**
IEC	**: International Electrotechnical Commission**
IP	**: International Protection**
IS	**: Indian Standard**
ISO	**: International Standardisation Organisation**
m	**: meter**
mm	**: millimeter**
QA	**: Quality Assurance**
QM	**: Quality Manual**
TEC	**: Telecommunication Engineering Centre**