RADIO DIVISION

ISSUE : MAY 2005

FEEDER CABLE FOR

900 MHz , 1800 MHz AND 2.1 GHz/UMTS

FREQUENCY BANDS

(890-960 MHz, 1710-1880 MHz

AND 1920-2170 MHz)

GENERIC REQUIREMENTS

NO. GR/FDR-13/02. SEP 2006

(SUPERSEDES GR No. GR/FDR-13/01. JAN 2003)

TELECOMMUNICATION ENGINEERING CENTRE

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HISTORY SHEET OF THE GR

The GR No. GR/FDR-13 / 01.JAN 2003 on "Feeder Cable for 900 MHz and 1800 MHz Frequency Bands (890-960 MHz and 1710-1880 MHz)" has been reviewed. As there are some changes, inclusions & deletions in the technical specification, the reviewed GR is numbered as GR No. GR /FDR -13/ 02. SEP 2006 and supersedes the GR/FDR-13/01.JAN 2003. The revised GR title is "Feeder Cable for 900 MHz , 1800 MHz and 2.1 GHz/UMTS Frequency Bands (890-960 MHz, 1710-1880 MHz and 1920-2170 MHz)". The existing Type Approval Certificate (TAC) / Technical Specification Evaluation Certificate (TSEC) would be

Validated for the remaining period of validity after conducting tests against GR clauses Nos. 2.3 (for Jacket material only), 2.5 (Return Loss for 2.1 GHz band), 2.8(Max. Attenuation) & 2.15 (Accessories).

CONTENTS

REFERENCES

TEC GR

1. TEC GR No. GR/ACC -14/02. JUN 2003 : Accessories of Antennas , Feeder Cables and Waveguide.

BSNL QA Documents

1. QM -333 : "Specification for environmental testing of electronic equipments for transmission and Switching use ".

IEC/ ISO Standards

1. IEC-60529 : (2001) Ed. 2.1 { includes amendment 1 (1999)} & with corrigendum 1 (2003) "Degrees of protection provided by enclosures (IP Code)."
2. ISO- 9001:2000 "International Quality Management System."

BIS Standards

1. IS-1897 : 1983 "Specification for Copper strip for electrical purpose" { Second Revision}
2. IS-12063 : 1987 (Reaffirmed in 2004) "Classification of degrees of protection provided by Enclosures of electrical equipment."
3. IS-14811 :2000 "Specification for Rolled Copper Plate, Sheet , strip and foils for general Engineering purposes".

GOVERNMENT OF INDIA

DEPARTMENT OF TELECOMMUNICATIONS

TELECOMMUNICATION ENGINEERING CENTRE

NEW DWLHI-110001

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NO. GR/FDR-13/02. SEP 2006

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PART –I

1.0 Scope

1.1 This document contains the generic requirements of feeder cables for radio equipment in 900 (890-960) MHz, 1800 (1710-1880) MHz and 2.1 GHz/UMTS (1920-2170) MHz Frequency Bands.

1.2 The feeder cables to be used shall be flexible coaxial cables of ½" or 7/8" or 1-1/4" or 1-5/8" foam dielectric type. These cables shall be used at radio Base station in conjunction with 900 MHz "and / or" 1800 MHz "and / or" 2.1GHz/UTMS (1920-2170) MHz antenna at one end and Radio equipment at the other end.

The purchaser shall provide the details of drum length and connectorisation for the feeder cable At the time of placing the purchase order.

2.0 Functional and Technical requirements :

2.1 Frequency of operation **:** (890-960) MHz , (1710-1880) MHz and (1920-2170 MHz)

2.2 Cable size **:** Type I ½" Foam-Dielectric Cable

(Tolerance ±5%) Type II 7/8" Foam-Dielectric Cable

Type III 1-1/4 " Foam-Dielectric Cable

Type IV 1-5/8" Foam-Dielectric Cable

2.3 Cable material **: For Foam Dielectric Cable :**

Outer Conductor : Copper* (For all cables)

Inner Conductor : Copper * or

Copper * Clad Aluminium (for Type I)

Inner Conductor : Copper * Tube

(for Type II,III & IV)

Dielectric : Foamed Polyethylene

Jacket : Black Polyethylene

(must be UV protected)

2.4 Characteristics Impedance : With connectors 50 ± 2 ohms

2.5 Return loss over the entire : 2 dB (minimum)

Band Over (890-960) MHz, (1710-1880) MHz

And (1920-2170) MHz

2.6 Minimum Bending Radius : **For Foam Dielectric cable :**

(mm)

Bending	**Type**			
Radius	½"	7/8"	1-1/4"	1-5/8"
i) Single	100	120	155	210
ii) 10 Re-bendings	130	250	380	510

2.7 Minimum **Tolerable Tensile :** **For Foam Dielectric cable :**

Force (Newton)

	Type			
	½"	7/8"	1-1/4"	1-5/8"
890 MHz	7	4.20	3.38	2.44
960 MHz	7	4.40	3.45	2.55
1710 MHz	11	6.10	4.40	3.63
1805 MHz	11	6.20	4.55	3.76
1880 MHz	11	6.40	4.70	3.86
1920 MHz	11	6.5	4.75	3.91
2170 MHz	12	7.0	5.10	4.23

2.9 Connectors at both ends : **a**. N (female) or 7/16 DIN female,

b. Impedance 50 ohms

2.10 Clamp spacing at normal Areas: { 5 % extra clamps for critical areas and Bends to be included } : For ½" 7/8" 1-1/4" 1-5/8" : 1 metre

*** { Note :-** Copper as per IS : 14811 : 2000 – " Specification for Rolled Copper Plate , Sheet, strip and Foils for general Engineering purpose" / BIS No. 1897 (1983) " Specification for copper strip for electrical purpose" (second revision) }

2.11 Outer Dimension : To be furnished by the supplier .

2.12 Weight : To be furnished by the supplier.

2.13 Marking on Jacket : The name of manufacturer or trade mark, type of Feeder cable, year of manufacture and running length shall be marked legibly every metre on the jacket of feeder cable, Purchaser's logo (as applicable) shall also be marked every metre, if so specified , at the time of ordering.

2.14 Environmental condition : The feeder cables are for installation and operation under fully exposed weather conditions. The cables shall withstand wind speeds up to 200 kmph and shall also be capable of withstanding the effects of industrial pollution, salinity of atmosphere in coastal areas, storms etc. The performance shall not deteriorate beyond Values specified in this GR for testing as per Category "D" of document QM-333 Including corrosion test (Salt mist).

2.15 Accessories : The following accessories are be supplied for ½" , 7/8", 1-1/4" and 1-5/8" Foam –Dielectric coaxial cable.

(The required quality to be specified by the purchaser)

i) Wall Gland

ii) Clamp

iii) Hoisting stocking

iv) Grounding kit

v) Cutting tool

vi) Tool Kit for connectorisation of cable.

vii) UV protected weather

proofing kit (sealing)

(The accessories from S.No.i to iv are to be as per TEC GR No. GR/ACC-14/02. JUN 2003)

PART – II

3.0 General Requirements

3.1 **a)** The feeder cable shall be manufactured in accordance with international quality Management system ISO 9001 :2000 for which the manufacturer should be duly accredited. A quality plan describing the quality assurance system followed by the manufacturer Would be required to be submitted.

b) The feeder cable shall meet the latest BSNL QA Guidelines.

3.2 RF connectors used shall be reliable and of standard type to ensure failure free Operation for over 500 matings.

3.3 The joints in the feeder assembly , if any, shall have protection as per BIS Standard IS 12063 : 1987 (Reaffirmed in 2004) "Classification of degrees of protection provided by enclosures of electrical equipment " {equivalent to IEC-60529} to meet at least the protection level of IP-65.

3.4 The feeder cable shall conform to the requirements for environment specified in BSNL QA Document QM- 333 "Specification for environmental testing of electronic equipment for transmission and switching use " for operation, transportation and storage. The applicable tests shall be for environmental category "D" including corrosion (salt mist).

3.5 **Documentation :**

Documentation shall include one hard copy and one soft copy of technical literature in Hindi or English with detailed assembly and installation procedure and shall be provided along with the feeder cable .

ANNEX-I

Annex for the reference of the purchaser (Informative)

The purchaser shall clearly specify their requirements against the following clauses at the time of ordering.

1. The purchaser shall provide the details of drum length and connectorisation for the feeder cables at the time of placing the purchase order.

2. The type of connector i.e N (male) or 7/16 DIN (male) or SMA (male) , 50 ohms shall be specified by the purchaser.

3. Purchaser's logo (as applicable) shall also be marked every metre, if so specified , at the time of ordering

LIST OF ABBREVIATIONS

BIS	Bureau of Indian Standards
BSNL	Bharat Sanchar Nigam Limited
dB	Decibel
dBm	Decibel with reference to one milli-watt
GHz	Giga Hertz
GR	Generic Requirements
IEC	International Electro technical Commission
IP	International Protection : Designator for degrees of Protection in conjunction With two numerals
ISO	International Organization for Standardization
Kmph	Kilometre per hour
m	Metre
MHz	Mega Hertz
mm	Millimetre
PVC	Polyvinyl Chloride
QA	Quality Assurance
QM	Quality Manual
TAC	Type Approval Certificate
TEC	Telecommunication Engineering Centre
TNC	Threaded Neill Concelman
TSEC	Technical Specification Evaluation Certificate
UMTS	Universal Mobile Telecom System
UV	Ultra Violet

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