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**( TELECOM DIVISION)**

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**SPECIFICATIONS COVER SHEET**

TITLE	:	Spares for CES/RNT in AIR Network
SPECIFICATION NO.	:	TC/SPEC/29/2010/ CES-RNT spares
DATE OF LAST UPDATION	:	Jan. 2010
NO. OF PAGES	:	4
SCHEME	:	Maintenance Spares (Non-Plan)

## 1. SYNTHESIZED IF TO C- BAND UPCONVERTER (1+1) WITH AUTO CHANGEOVER UNIT

It should be possible to operate the upconverter manually. The upconverter should not require a PC or a controller for normal operation and control. Any interface required for operation in 1+1 hot standby mode with auto changeover shall be included in the offer.

a)	Input Frequency	:	52 MHz to 88 MHz
b)	Output Frequency	:	5850 MHz to 6425 MHz
c)	Frequency setting	:	Synthesized, 125 KHz step size
d)	Frequency stability	:	Better than $\pm 1 \times 10^{-8}$ over temp. 0° to 50°C & $\pm 1 \times 10^{-9}$ or better per day
e)	Input impedance	:	75 $\Omega$
f)	Output Impedance	:	50 $\Omega$
g)	Input level	:	-15 dBm nominal
h)	Input connector	:	BNC-F
i)	Input Return loss	:	19 dB or better
j)	P1 dB Output level	:	+10 dBm or more
k)	Overall Conversion gain	:	30 dB or more
l)	Gain control	:	> 30dB in steps of 0.2 dB or smaller.
m)	Gain Slope	:	$\pm 0.05$ dB/MHz
n)	Output Return loss (VSWR)	:	19 dB or better ( $\leq 1.25 : 1$ )
o)	Amplitude / Gain stability	:	$\pm 0.25$ dB per day at constant temp.
p)	Type of conversion	:	Dual conversion spectrum non-inverted
q)	Third order IMD Product	:	-40 dBc with two equal carriers at 10 dB total output Back off from P1 dB.
r)	Phase noise	:	-70 dBc/Hz, 100 Hz away from carrier -80 dBc/Hz, 1 KHz away from carrier -100 dBc/Hz, 1 MHz away from carrier
s)	Spurious (in band)	:	-60 dBc below carrier (un-modulated)
t)	Standby operation	:	1 + 1 hot redundancy, auto change-over with manual over ride feature.
u)	Mounting	:	19" Rack
v)	Test Port	:	IF and RF
w)	Remote Interface	:	RS232/ RS485 for parameter setting
x)	Front Panel Indications	:	Power, Standby, Fault, Remote/Manual
xi)	Operating temp.	:	0 and +50°C

## 2. L Band Passive Splitter 1:4

(a)	Type of splitter	passive type
(b)	No.of outputs	Four
(c)	Division loss	$\leq 7.5$ dB Typ.
(d)	Input impedance	75 ohm
(e)	Output impedance	75 ohm
(f)	DC Pass	One In/ Out Port

## 3. L BAND LINE AMPLIFIER

1.	Frequency of operation	950 – 1450 MHz
2.	Input level	- 80 dBm to -50 dBm
3.	Input and Output Impedances	75 $\Omega$
4.	Input/output return loss	$\geq 8$ dB
5.	Noise figure (Typical)	$\leq 10$ dB
6.	Gain	$\geq 20$ dB
7.	Gain flatness (Over entire band)	$\pm 2$ dB
8.	Operating voltage (Through centre conductor of the RF cable)	14V to 24 VDC
Features :		
a) Capable of handling voltage required for LNBC.		
b) Provision for wall mount installation		

## 4. AUDIO BASE BAND DIGITAL ENCODER

The Digital encoder for base band encoding should conform to the standard and specification of the existing digital radio networking system in AIR Network. It should be possible to control/set encoder through front panel as well as through PC. **One no. Encoder shall have to be submitted to AIR within one month of opening of technical bids for testing compatibility in the existing setup.**

- a) No. of Analog audio inputs : Two mono/one stereo
- b) Digital Audio input : AES/EBU Standard (Professional)
- c) Audio Signal Bandwidth : 20 Hz to 20 KHz
- d) Input level (max.) : +12 dBu (peak)

e)	Dynamic range	:	≥ 80 dB.
f)	Compression	:	ISO/MPEG-1 layer 2
g)	Data rates	:	64, 128, 192, 256 & 384 kbps (selectable)
h)	Modes	:	Mono, Dual Mono, Joint stereo
i)	Sampling rate	:	48 KHz
j)	End to End stability (from input of encoder in the uplink to receiver output in the downlink).	:	±0.5 dB, 20 Hz-20 KHz, w.r.t. input and output levels at 1 KHz, no gain adjustment
k)	End to End gain (from input of encoder in the uplink to receiver output in the down-link)	:	± 0.5 dB at 1 KHz, no adjustment
l)	Total Harmonic Distortion (THD)	:	≤ 0.2% at 1 KHz for +8 dBu output from the receiver.
m)	Signal to Noise Ratio	:	≥ 75 dB at 1 KHz for +12 dBu output from the receiver
n)	Cross talk Isolation between the two Channels	:	≥ 70 dB w.r.t. +12 dBu output from the receiver at 1 KHz
o)	Auxiliary data channel	:	≥ 4.8 kbps
p)	Interface for aux.	:	Asynchronous, RS-232
q)	Operation	:	Encoder & Decoder independently
r)	Digital I/O	:	Transformer Coupled, balanced
s)	Power supply	:	230VAC ±10%, 50Hz ±4%
t)	Operating temp. range	:	0°C to +50°C

## 5. DIGITAL IF MODULATOR

The Digital modulator should conform to the standard and specification of the existing digital radio networking system in AIR Network. It should be possible to control/set modulator through front panel as well as through PC. **One no. modulator shall have to be submitted to AIR within one month of opening of technical bids for testing compatibility in the existing setup.**

a)	Type of Modulation	:	QPSK
b)	IF Frequency	:	52 to 88 MHz continuously adjustable in ≤ 10 Hz step.
c)	Output level	:	0 to - 20 dBm adjustable in ≤ 0.1 dB step.
d)	Channel coding	:	a) Viterbi 1/2, 3/4 selectable b) Sequential 1/2, 3/4 selectable
e)	Spurious	:	≤ -50 dBc (in band); ≤ -45 dBc (out of band)

f)	Data rate	:	64, 128, 192, 256, 384 kbps (programmable)
g)	Interface	:	V.35
h)	IF impedance	:	75 ohm
i)	Data clock source	:	Internal, external
j)	Data clock stability	:	$1 \times 10^{-6}$ or better
k)	Configuration	:	1 + 1 in hot-standby with auto c/o unit
l)	Power supply	:	230VAC $\pm 10\%$ , 50Hz $\pm 4\%$
m)	Operating temp. range	:	0°C to +50°C

## 6. Specs OF THE UPLINK FEED

i)	Type of Mounting	Prime Focus. The feed should be motorised. It should have calibrated polarization angle indication and adjustable smoothly for optimization. Feed should be suitable for mounting on 6.3 meter ECIL PDA. Three no. of feed should be mountable on 3 leg type feed mount and two no. of feeds should be mountable on 4 leg type feed mount. <b>Feed will have to be mounted by tenderers on any of the existing AIR uplink places with ECIL dish in its optimized F/D ratio position and NOCC clearance for cross pole discrimination will have be obtained by the tenderer from NOCC.</b>
ii)	Ports	Two (Orthogonal)
iii)	Polarisation	Linear (adjustable, $\pm 95^\circ$ )
iv)	Freq. Range	3.7 - 4.2 GHz D/L 5.8-6.5 GHz U/L
vi)	Return loss at Centre freq.	$\geq 17$ dB
vii)	Connector	Wave-guide WR 229 G AND 137G Flange
viii)	Cross-Polarization discrimination	$\geq 30$ dB
IX)	Power handling capacity	$\geq 2$ KW CW