

Amendments for Spec: No: SATD/CARRIER MONITORING STATION / SEPT/2008			
Sr No	Page no	index no	Query
	5	2.l(s)	Downlink path injection calibration #
		2.l (q)	Antenna pattern verification. #
	5	2.l (r)	Transponder gain measurement. #
1		Query	Please confirm that the Antenna Pattern Measurement verification and Transponder Gain Measurements discussed in Section l q) and r) are not a part of the base line system
		Answer	The offered software should have this feature so that these facilities can be added as & when the additional equipment are installed
	14	IX (vi)	Spectrum analyzer should have auto calibration function ensuring overall level accuracy of +/- 1 db (10 MHz to 8 GHz), +/- 1.5 db (8.1 GHz to 15 GHz), +/- 2 db (> 15 GHz)
	14	IX (1-a)	Frequency range:10 kHz to 18 GHz
	14	XIX (# 8)	Spectrum Analyzer (0-18 GHz)
2		Query	Some of the unit requirements are inconsistent and some times in excess of what the system requires. For example the spectrum analyzers are stated as starting at either 10 MHz(section IX point vi), 10 KHz (section IX 1a) or DC(section XIX #8). Yet the lowest frequency signal they will see is C band receive frequencies at 3700 MHz from the antennas. can the unit level requirements be considered as guidelines as long as the system level performance is met.
		Answer	Frequency range may be read as from 10 KHz to 18 GHz in respect of Spectrum analyzer.
	25	XIV (3.2)	The waveform monitor should have two selectable inputs to receive two numbers of Standard Definition serial digital with passive loop through. The format of the digital signal should comply with SMPTE 259M and ITU-R656 standards.
3		Query	The specifications for 16 x 2 router is another example that poses similar issues to the above. Two different hardware interfaces are specified where the system would be only use one, and the insertion loss values should be based on the system's requirements rather than the units. The waveform monitor is required to have two inputs(XIV,3.2) but the block diagram shows only a single input used etc.
		Answer	One input is in use. The other is to be kept as spare.
4		Query	Hardware quantities are provided but values for measurement rates and throughput are not. It may be possible to optimize the system design if these rates could be provided(e.g. only one spectrum analyzer may be required to meet the performance requirement, or fewer IRDs)
		Answer	No, quantities are firm .
5	37,36	Query	The block diagram shows six IRD . The equipment list calls up eight. The block diagram shows four of the IRDs connected to "spare" down converter outputs that don't exist on real hardware rather than connecting to the 4 x 8 router . Please specify.
		Answer	Two IRD s are spare (cold standby)
	21	XII (B)	Complete ETR 290/101 tests with user defined priorities at all 3 levels.
6	21	Query	Its not clear what portions of the system's measurements are to be automated and which should be simply available manually. Section XII b) for example calls up the entire suite of ETR 290/101 tests be available. Was it intended that all these tests be automated? Is there a more specific list of system measurements ? This could have a very significant impact on the cost if all are to be automated

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		Answer	As far as measuring equipment are concerned all possible measurement results are required to be tabulated in NMS for generation of reports. In respect of ETR 290/101 it is to clarify that all standard ETR errors need to be tabulated in NMS and TS need to be recorded for a predefined period based on the predefined Triggers. There should also be manual override facility.	
	17	Section X item (1b)	9400-12750 MHz for Ku band	
7		Query	Section X item 1b lists the Ku band down converter receive frequency as 9400-12750 MHz The antenna(Section IV#9) and LNA specs(Section VI#1) are 10.95-12.75GHz. The video test equipments has either 1.2 GHz(TS Analyzer) or 800 MHz (IRD) of input bandwidth. Please resolve the discrepancy in Ku band receive frequencies and confirm that the requirement for a tunable down convertor is implied by these specifications.	
		Answer	The Ku-band Downlink Frequency may be read as 10.95 to 12.75 GHz. Down Convertors are to be provided to match the respective input BW of Test & Measuring equipment.	
8		Query	Client Server specifications are not given?	
		Answer	Firm may decide on the server specifications based on the requirement of Offered software for control monitoring and reporting of measurements.	
9		Query	Specifications for plotter are not given	
		Answer	This stands deleted.	
10		Query	Can mail server can be clubbed with NMS Server?	
		Answer	NO, Both should be separate. There should be fire wall in mail server to protect NMS server.	
11	11	VI(1)& 17.1(b)	Frequency band 10.95 -12.75 GHz, 9400 - 12750MHz	
		Query	The input frequency range for Ku Band antenna and Ku band redundant LNA is mentioned as 10.95 -12.75 GHz, whereas the input frequency in Ku to L band down converter is mentioned as 9400 - 12750MHz. Please clarify.	
		Answer	See answer to query no 7 and amendment at serial no 5.	
	7	III(4)	Frequency of operation for C band receive 3.7 – 4.2 GHz	
12		Query	The C band receive antennas are Linear Polarization. The freq range stated is 3.7 to 4.2 GHz. Are Doordarshan happy with this narrow range? Most Linear C band satellites require at least 3.625GHz – 4.2GHz with others covering 3.4-4.2GHz. The wider range is stated in the LNA requirement.	
		Answer	No Change in Frequency range.	
	7 & 8	III(19) & IV(16)	Focal length adjustment.	
13		Query	What is meant by Focal Length adjustment? This is not necessary on a quality antenna (which would be required for this type of system) which would be precision manufactured. Is this for some other reason?	
		Answer	Revised antenna specifications are enclosed.	
14		Query	For Redundant LNA system is 2+1 redundancy acceptable i.e. One LNA per Polarization with the backup LNA covering either polarization in the event of failure or is 1+1 Redundancy per polarization required?	
		Answer	1+1 redundancy is required for LNA at each port	
	17	X O/p Ch 1(b)	Frequency : (b) 950 MHz – 2150 MHz for Ku-band	
15		Query	For the Down converter Section the Ku Frequency Ranges do not make sense. I would suggest two bands of 10.95 – 11.7GHz and 11.7-12.75GHz using LO of 10.0 and 10.75 respectively which would give sensible L band frequency ranges of 950-1750MHz and 950-2000MHz.	

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		Answer	Two separate Down Converters can be offered if there is provision in NMS to map these accordingly for correct carrier identification. However, if any additional switching hardware is required it may also be quoted with proper block diagram.
	18	XI-1(a)	Input Frequency range 950 MHz to 1750 MHz
16		Query	I suggest that IRD input frequency range should therefore be 950-2150MHz
		Answer	No change in specs. Tenderer may quote IRDs as per the requirement of the
	31	XVII- 11.1 (a)	Voltage Range 220V AC (+10% - 15%)
17		Query	The AC power specification is stated as 220V +10% -15%. I understood the single phase AC supply in India to be 250V (which is allowed to fluctuate as high as 264V). Equipment offered with this 220V specification may not function on the India supply. Can Doordarshan confirm the Voltage ranges of their site single and 3 phase supplies? NB 3-phase is required for the Antenna System. Alternatively, is all the equipment to be supplied directly from the UPS where the output voltage could be set to 220V?
		Answer	No change in specs. 400 V AC, 3 Phase supply will be made available at the station.
18	20 UPS Specs 20	Query	The UPS inputs and outputs are described as 415V on the diagrams (corresponding to 240V single phase – as per old UK standard) whereas the PSU supply in the main section is described as 220V (corresponds to 380V 3-phase – as per old European Standard) and the Indian "National Grid" supply is believed to be 433V 3-phase / 250V single phase. Please clarify this?
		Answer	No change in specs. 400 V AC, 3 Phase supply will be made available at the station.
19		Query	NB The harmonized EU standard (for European supplied CE qualified equipment is 400 V 3-phase / 230V single phase.
		Answer	same as explained in sl. no 17/18.
20		Query	Is the UPS RC&M monitoring required to be within the same software as the Carrier Monitoring System or is this required as a separate package?
		Answer	Not compulsory to be hosted in NMS. It can be a separate.
	10	SI no1.b.	C band Dual redundant LNA system with controller
21		Query	Meaning of dual redundant?
		a.	Separate controller for V/H polarization with 1:1?
		Answer	Yes. One set of LNA with 1+1 redundant controller for each port.
		SI no2.b.	Ku band Dual redundant LNA system with controller
		Query	Meaning of dual redundant?
		a.	Separate controller for V/H polarization with 1:1?
		Answer	Yes. One set of LNA with 1+1 redundant controller for each port.
22	30	XVI.3	16 X 2 RF Router
	30	Query	5. Your specification Temperature range -25 deg C to 65 deg C whereas specification available is 0 to 45 deg C and storage temp range -20 deg C to 75 deg C
		Answer	The temperature should be read as 0 to 45 degree centigrade as listed in environmental specification at XVII (11.2) at page no 31. See amendment no 8.
	30		8 Your specifications for Switch life is 5 million cycle whereas 1 million cycle available
		Answer	Firm may quote for both type of specifications with 5 million & 1 million switch life cycle. DD will decide at the time of evaluation
	30		9. your specifications for Control Interface is serial interface which is not available
		Answer	Interface can be any one out of Ethernet, serial or web for control through NMS.

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23	12	VII.S No 5	4 X 8 L band Router	
		Query	2. DG:DD specifications for Insertion loss <=2 dB but specifications available +/- 1.5 dB	
		Answer	May be read as <= 3 dB. Please see amendment no 2	
			4. DG:DD specifications for Input return loss 14 dB min but specifications available 10 dB	
		Answer	No, change in specifications.	
			4. DG:DD specifications for Output return loss 12 dB min but specifications available 12 dB * Due to use of F type connectors, we will not meet the return loss requirements. To meet them, the connectors must be changed to BNC,SMA or N	
		Answer	Connector specifications BNC or F or N	
			Remote control serial interface not available	
		Answer	At least one Interface out of Ethernet, serial or web for remote control by NMS has to be there.	
24	17	SI no.6&7	Down converter C band to L band and Ku band to L band	
		Query	1. DG:DD specifications for frequency for Input Characteristics 9400 MHz to 12750 MHz but available is 10700 to 12750 MHz	
		Answer	The Ku-band Downlink Frequency may be read as 10.95 to 12.75 GHz for all the equipment	
		Query	DG:DD specifications for frequency for output Characteristics 950 MHz to 2150 MHz but available is 950-1700 MHz	
		Answer	If two separate Down Converters are offered and there is provision in NMS to map these accordingly for correct carrier identification this down converter can be accepted provided other it meets other specifications. However, if any additional switching hardware is required it may also be quoted with proper block diagram.	
		Query	X O/P Char (4) DG:DD specifications for Power output (1 dB compression) is +18 dB min but available is + 10 dB	
		Answer	No, change in specifications.	
			X Tran Char (1) DG:DD specifications for gain is 35dB+/- 3 dB whereas available is 30 dB Min.	
		Answer	This may be read as 30 dB minimum. Please see amendment no 6	
			X Tran Char (3) Amplitude response a. ± 0.25 dB/40 MHz max. whereas available is +/-0.5 dB	
		Answer	No, change in specifications.	
			X Tran Char (3b) Amplitude response b. ± 1 dB max. over L band but available is +/- 2 dB	
		Answer	No, change in specifications.	
			X Tran Char (6).DG:DD specifications for Intermediation distortion (3 rd order) with two in band signals at 0 dBm O/P, < 60 dBC whereas available is < 40 DBC	
		Answer	No, change in specifications.	
			X Tran Char (7), Spurious Signal independent is - 75 dBm whereas available is -70 dBm	
		Answer	May be read as -70 dBm.Please see amendment no 7.	
	37	diagram		
25		Query	We see two separate monitoring systems, 1 for RF and 1 for Video Decoding. We would assume that both should operate independently however from the diagram it is not clear it does. Please clarify.	Arraycom
		Answer	Yes, There should be two independent chains for RF and Video. The one set of RF and Video chain will work as per preset configuration at predefined time interval in sequential manner. The other chain will work manually on randomly selected carrier or as per preset configuration in auto mode.	

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	3	1	"To receive all downlink carriers of Doordarshan Network on various satellites with frequencies in C-band and Ku-band on both polarizations"	
26		Query	The clause No. 1 of Page No. 3 mentions "To receive all downlink carriers of Doordarshan Network on various satellites with frequencies in C-band and Ku-band on both polarizations" mentions However the specifications of the spectrum analyzer on page 14 mentions the frequency range of 10KHz to 18 GHz The clause V of the specifications of the spectrum analyzer on page 14 also mentions that "There should be a facility to detect and resolve underlying interfering carrier within the carrier under test." In order to provide a carrier under carrier monitoring we need to have a DSP and a Software based spectrum Analyzer. But in order to use a DSP based spectrum analyzer, the Frequency shall be limited to the Ku-Band i.e. 12.75 GHz and not 18 GHz because the frequency band of the LNA is up to 12.75 GHz. Please clarify whether we can propose an integrated DSP and a Software based spectrum analyzer instead of a separate stand alone spectrum analyzer or do we have to provide both?	
		Answer	Firm may quote DSP and software based spectrum analyzer provided the combination meets the objectives and measurement accuracy specified in DD Specifications. Firm should quote additional switching hardware required in bill of material accordingly along with block schematics and explanation.	
	4	B(b)	Measurement Scheduler	
27		Query	The Clause b of B on page 4 states "Measurement Scheduler" Please elaborate as to what is desired from this	
		Answer	Measurement scheduler is a GUI Utility to schedule sequence of automated measurement in terms of frequency, type of measurement set to be performed on each carrier. It is required to ensure all carriers will under go measurement at least once in 24 hrs depending on defined set of measurements.	
28	4	B(c)	Create and schedule multiple sequences of measurements	
		Query	The Clause c of B on page 4 states "Create and schedule multiple sequences of measurements" Please elaborate as to what is desired from this	
		Answer	A feature to generate & store sequences of set of measurements which can be selected as and when required for any carrier in automated scheduling.	
29	4	B(d)	"Initiate individual carrier measurements - preempts scheduled measurements"	
		Query	The Clause d of B on page 4 states "Initiate individual carrier measurements - preempts scheduled measurements" Does this means that the software locks the instrument for the critical manual measurement?	
		Answer	It means manual overrule facility to initiate individual carrier measurement after preempting scheduled.	
	4	2 I. a (vi)	By Satellite transponder and carrier"	
30		Query	The Clause a) vi) of General Features on Page 4 states "By Satellite transponder and carrier" In order to have this, The software shall need the full switch control and cannot be shared by other NMS/Video measurements. Please clarify whether to achieve this, a dedicated switch network over and above the tendered requirement is needed or not.	
		Answer	Under this clause NMS should have this feature so that it can be configured to do the predefined measurements on all carriers of particular transponder or of a particular carrier as per user requirement. Apart from this what ever is given in equipment list and block diagram is indicative. Firm should quote full complement of hardware and software to fulfill the scope of the project with proper explanations.	
	8	IV - 1	"Parabolic prime / offset focus, segmented reflector, Spun Aluminum type / fiber glass painted with white heat diffusing paint"	

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31		Query	The Ku-Band Antenna on page 8 Specifies "Parabolic prime / offset focus, segmented reflector, Spun Aluminum type / fiber glass painted with white heat diffusing paint" Please clarify that spun reflector is required or segmented is required. Can we offer Segment reflector with solid/perforated panel. It is felt that for as easily available	
		Answer	Please see amendment at sl no 11.	
	10 & 11	V & VI (4)&(6)	Gain Stability +/- 0.5 dB Max and Output return loss 1.3:1 max	
32			For the C-Band and Ku-Band LNA please let us know whether the Gain stability of +/- 1 dB and the Output Return loss 1.5:1 is acceptable. This shall meet the functional requirement. As such the L-Band routers input return loss specified is 14 dB.	
		Answer	No change in specifications of Gain Stability. O/p return loss of 1.5 dB is acceptable	
	37	diagram	diagram	
33		Query	For the C-Band and Ku-Band LNA Please clarify that the Dual redundant means 1:2 configurations? That means each Horizontal and vertical port of the antenna shall have one LNA and the third LNA shall act as redundant LNA for both these LNA. In totality there shall be three LNA in 1:2 configuration. Or alternatively 1:1 LNA for for each port and in totality four LNAs. Please clarify both the port of the antenna can be proposed. In this case there shall be two LNA for each port and in totality four LNAs. Please clarify	
		Answer	Dual redundant mean One set of LNA with 1+1 redundant controller for each port.	
	17	X	<u>Specification for C-Band to L-Band and Ku-Band to L-Band Down Converters</u>	
34		Query	For the C-Band to L-Band and Ku-band to L-Band Down converter specified on Page 17, please clarify whether a synthesized Down converter is required or a Block Down Converter is required? Also there is no requirement of redundancy stated that means only standalone converters are to be offered. Also the input and output frequency for the Ku-Band down converter is non standard and not covered in a single unit. Different units with different band can be used to cover the entire band. Please clarify?	
		Answer	Stand alone synthesized Down converter is required. To cover full band of operation more than one down converters can be offered, along with the additional hardware and software required to match the system requirement.	
	18	XI	For the IRD specifications on page 18, please clarify whether the provision of observing BER is mandatory for both pre and post correction?	
35		Query	For the IRD specifications on page 18, please clarify whether the provision of observing BER is mandatory for both pre and post correction?	
		Answer	Yes, both Pre and Post correction BER are required.	
36	24	Query	Please note that the Tektronix VM700 has become obsolete.	
		Answer	This item will be supplied by the Doordarshan. Tenderer has to make arrangement for its integration with offered NMS and Hardware.	
	29	XV(3-5)	Viewing angle: 170 degrees in Horizontal; 170 degrees in Vertical	
37		Query	For the 14"/15" LCD/TFT monitor on page 29, please clarify whether viewing angle of 120 degrees in horizontal and 100 degree in Vertical as well as the Brightness of 250cd/sq.m is acceptable? Since these are to be mounted indoors there shall be viewing issues.	
		Answer	No, change in specifications due to standardization of equipment in DD Network.	
	33	XVIII(8)	In case required by Doordarshan authorities, the tenderer will arrange the Demonstration of the offered equipment at New Delhi with in a period of 30 days from date of issue of notice to the firm, failing which their offer will be ignored without any further reference to them.	

38		Query	Clause 8 of General requirement on Page 33 calls for a demonstration. Please note that this is an integrated solution with equipment sourced from multiple vendors. Hence demonstration may not be feasible. However we can provide the reference of the customer using similar solutions. Alternatively if possible a working site can be visited by DDK representatives.	
		Answer	Firms comments have been noted. However there is no change in specifications.	
39	3	3 A.(f)	Measurement of MER, Pre correction BER, Post Correction BER, Eb/No	
		Query	what is MER? What is considered as Pre-correction and Post-correction?	
		Answer	MER is Modulation Error Rate. Pre-correction BER is Bit Error Rate before application of error correction algorithm. Post-correction BER is Bit Error Rate after application of error correction algorithm.	
40	15	IX(4) a	2nd Harmonic Distortion (i) <= -70 dBc (for -40 dBm tone at Mixer I/p Freq. > 10MHz to 2.75 GHz. (ii) <= -100 dBc (for -15 dBm tone at Mixer I/p I/P Freq. > 2.75 GHz to 18GHz	
		IX(4) b	3rd Order Intermodulation Distortion i) : <= -70 dBc (for two -30 dBm tones at Mixer Input and greater than 50 KHz separation). Input Freq. 10 MHz to 18 GHz	
		Query	Please clarify what is expected under a) and b)	
		Answer	It is the measurement performance capability of Spectrum analyzer to assess accuracy of measurement. May also see the enclosed amendment at sl no. 3.	
41	17	X.1 (b)	9400 MHz – 12750 MHz for Ku-band	
		Query	Please explain/confirm the lower frequency for Ku-band at 9400MHz which is unusual	
		Answer	The Ku-band Downlink Frequency may be read as 10.95 to 12.75 GHz for all the equipment. Please see the amendment no 5.	
42		XIX. 16	Mail Server (Hardware + Software + Firewall SW + Antivirus)	
		Query	why is a Mail server required	
		Answer	Electronic Communication with different Earth stations and DSNGs are required during the measurement and to inform the corrective measures to be taken during measurements. To keep this communication separate from the main NMS server a separate Mail Server is required.	
43		XIX. 21	14"/15" LCD / TFT Colour monitor.	
		Query	for what are the 4 Colour Monitors to be used?	
		Answer	For the monitoring of SDI signal .	

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Amendments for Spec: No: SATD/CARRIER MONITORING STATION / SEPT/2008			
Sr No	Page no	index no.	Query
1	7	III	Specification for 6.3 meter Motorized C-band Receive Antenna
		NEW	Specification for 6.3 meter Motorized C-band Receive Antenna (Amended). Please see Amended Specifications as per enclosed sheet.
2	12	VII.2	4 X 8 L band Router
			2. Insertion loss <=2 dB
	12	NEW	2. Insertion loss <= 3 dB
3	15	IX(4) a	2nd Harmonic Distortion (i) <= -70 dBc (for -40 dBm tone at Mixer I/p Freq. > 10MHz to 2.75 GHz. (ii) <= -100 dBc (for -15 dBm <u>time</u> at Mixer I/p I/P Freq. > 2.75 GHz to 18GHz Freq. > 10MHz to 2.75 GHz.
		NEW	2nd Harmonic Distortion (i) <= -70 dBc (for -40 dBm tone at Mixer I/p Freq. > 10MHz to 2.75 GHz. (ii) <= -100 dBc (for -15 dBm <u>tone</u> at Mixer I/p I/P Freq. > 2.75 GHz to 18GHz Freq. > 10MHz to 2.75 GHz.
4	10	NEW entry V.19	Band Pass Filter for Receive Antenna feed for C-band Receive Frequency before LNA. With 40 dB rejection from 5.85 to 7.125 GHz and 30 dB from 13.75 to 14.75 GHz. The return loss better than 1.3 : 1. Insertion loss less than 0.3 db.
	11	NEW entry VI.19	Band Pass Filter for Receive Antenna feed for Ku-band Receive Frequency before LNA. With 40 dB rejection from 5.85 to 7.125 GHz and from 13.75 to 14.75 GHz. The return loss better than 1.3 : 1. Insertion loss less than 0.3 db.
	17	SI no. 6&7	Down converter C band to L band and Ku band to L band
5	17	I/P CH. 1	1. Frequency.....(a) 3700 MHz - 4200 MHz for C-band and (b) 9400 MHz - 12750 MHz for Ku-band
		NEW	1. Frequency.....(a) 3700 MHz - 4200 MHz for C-band and (b) 10950 MHz - 12750 MHz for Ku-band
6	17	X. Tran Char (1)	1. Gain..... 35 dB, ±3 dB
		NEW	1. Gain..... 30 dB, ±3 dB
7	17	X.7(b)	Spurious Signal independent is - 75 dBm
		NEW	Spurious Signal independent is - 70 dBm
	30	XVI	Serial no. 3. 16 X 2 RF Router
8	30	XVI(5)	5. Temperature Range -25 degC to 65 degC
		NEW	5. Temperature Range 0 degC to 45 degC
9	30	XVI.6	Insertion Loss 0.2 dB for DC to 6 GHz 0.4 dB for 6 to 12 GHz 0.5 dB for 12 to 18 GHz
		NEW	Insertion Loss 0.2 dB + Splitter Loss for DC to 6 GHz 0.4 dB + Splitter Loss for 6 to 12 GHz 0.5 dB + Splitter Loss for 12 to 18 GHz
10	14	XIX.#8	Spectrum Analyzer (0-18 GHz)
		NEW	Spectrum Analyzer (10 KHz t-18 GHz)

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	14	IX (vi)	Spectrum analyzer should have auto calibration function ensuring overall level accuracy of +/- 1 db (10 MHz to 8 GHz), +/- 1.5 db (8.1 GHz to 15 GHz), +/- 2 db (> 15 GHZ)
		NEW	Spectrum analyzer should have auto calibration function ensuring overall level accuracy of +/- 1 db (10 MHz to 8 GHz), +/- 1.5 db (8.1 GHz to 15 GHz), +/- 2 db (> 15 GHZ) and firm to specify for (10 kHz to 10 MHz)
11	8	IV.1	Parabolic prime / offset focus, segmented reflector, Spun Aluminum type / fiber glass painted with white heat diffusing paint
		NEW	Parabolic prime offset focus solid segmented reflector, molded type with 16 SWG (minimum) Sheet thickness. The panel should be riveted or tug-welded Aluminum material painted with heat diffusing white paint OR fiber glass with UV protective paint/powder coating.
12	17	NEW entry X.10	Type of Up conversion: Synthesised
13	18	XI	MPEG 2/DVB Prof. IRD Specifications
		NEW	MPEG 2/DVB Prof. IRD Specifications (Amended) . Please see Amended Specifications as per enclosed sheet.

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III . SPECIFICATION FOR 6.3 Mtr MOTORIZED C-BAND RECEIVE ANTENNA (Amended)

INTRODUCTION

This antenna would be used for down linking digital signal channels . The antenna should conform to latest ITU-R recommendations for uplinking readiness.

Antenna Specifications 6.3 meter

Sl. No.	Parameters	Specifications
1	Antenna Type	Parabolic prime offset focus solid segmented reflector, molded type with 16 SWG (minimum) Sheet thickness. The panel should be riveted or tug-welded Aluminum material painted with heat diffusing white paint OR fiber glass with UV protective paint/powder coating.
2	Size of Antenna (Circular equivalent)	6.3 meter (min) (circular equivalent)
3	Feed	# 2 port Linearly polarized Receive only
4	Operating Frequency Band	
	a) C band Receive	3.7 GHz to 4.200 GHz
5	Gain	
	a) C band Receive at 4.0 GHz	46.3 dB (min.)
6	Side lobe Performance	ITU-R, S. 580-6(For Uplink readiness with change in feed, whenever required in future)
7	G/T at 10° elevation with 40° K LNA	27 dB/K (min.)
8	Azimuth Travel	180° in two segments of 120° continuous
9	Elevation Travel	5° to 90° continuous
10	Polarization Travel	± 50°
11	Azimuth Travel Rate	0.3 to 0.5 degree/sec
12	Elevation Travel Rate	0.3 to 0.5 degree/sec
13	Polarization Travel Rate	0.1 degree/sec
14	VSWR (TX / Rx)	1.30:1 (max.)
15	Wind Speed	
16	a) Gusting	95 km/h (min.)
17	b) Operational	72 km/h (min.)
	c) Survival	200 km/h (min.)
18	Polarization Discrimination across 1 dB beam width	30 dB (min.)
19	A calibrated graduation of Azimuth, Elevation and Polarization Offset should be provided in the Antenna	
20	The wind load data, foundation data for installation should be included.	

Firm may quote C and Ku band (Dual band) receive feed to receive both band simultaneously from one Satellite location.

In case of dual band Feed (Ku-band along with C-band)

21	Frequency range for Ku-band	10.95 GHz to 12.75 GHz
22	Gain for Ku-band	mid band gain minimum 53 dBi
23	G/T for Ku-band	≥33 dB/degree K at 15 degree Elevation

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**PRASAR BHARATI
(BROADCASTING CORPORATION OF INDIA)
DIRECTORATE GENERAL: DOORDARSHAN**

Amended specifications of IRD to be appended with

Spec: No: SATD/CARRIER MONITORING STATION / SEPT/2008

XI. MPEG 2/DVB Prof. IRD Specifications (Amended)

The professional IRDs in the test benches are to be used to provide SDI signals (with embedded audio signal) for monitoring of test signal. These IRDs should receive the ASI SCPC / MCPC signals in ASI format (for Encoder/Modulator test) and QPSK (for Modulator Test) and give the analog base band (Video and audio), digital (SDI, SDI Embedded, AES/EBU) and ASI signals.

The IRD should have a front panel display and one should be able to enter or edit all the parameters for a perfect reception of the signals. **There should be provision for observing the BER of the received signal before correction and signal level in the front panel. IRD should be able to descramble BISS mode 1 and BISS-E signals. Also the IRD should be able to store the channel parameters for at least 20 programmes.**

1 RF Parameter Specifications

Parameter	Specification
(a) Input Frequency Range	950 - 1750 MHz
(b) No. of Inputs	2 nos. (Independent)
(c) Tuning Step Size	125 kHz, maximum
(d) Satellite Frequency Band	C & KU-Band, selectable
(e) Input Impedance	75 Ohms
(f) Input Connector	F-Type female
(g) Input Power Range	-25 to -65 dBm per carrier
(h) Image Rejection	>30 dB
(i) Input Return Loss	7 dB, minimum
(j) Noise Figure	20 dB, maximum
(k) AFC Tuning Range	± 3 MHz (capable to lock only the required channel and prevent any possibility of locking on Non-required channel)
(l) De-Modulation Method	QPSK demodulation
(m) Variable Symbol Rates	1.5 to 40 M symbol/sec
(n) Convolution Inner FEC Rates selectable	R= 1/2, 2/3, 3/4, 5/6, 7/8, (for QPSK)
(o) IF Filter Bandwidth	Automatic Selection (dependent on Symbol Rate).

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2 Audio and Video Decompression Parameters

Parameter	Specification
(a) Video Resolution (all resolutions shall be capable of I, P & B frame decoding)	720 x 576, 704 x 576 544 x 576, 480 x 576, 352 x 576, (other standard resolution should be selectable)
(b) Video Decompression Type	MPEG-2 422P @ ML and MP @ ML
(c) Television Standard	PAL-B
(d) Audio Decompression Type	MPEG-1 layer-2 (Stereo/Musicam, i.e. Single Mono, Dual Mono, Stereo, and Joint Stereo)

3 Transport Stream O/P MPEG-2 ASI on BNC

4 Video Output Specifications

The IRD shall have two analog and two digital SDI output (SDI and SDI Embedded) and one ASI output.

4.1 Analog Video Output Specifications

Parameter	Specification
(a) Connector Type	BNC (75 Ohms)
(b) Quantity	2 Nos. of analog composite PAL-B CCIR Standard (one main and one for monitoring)
(c) Level (nominal)	1V p-p
(d) Level adjustment	± 5%

4.2 Digital Video Output Specifications

Parameter	Specification
(a) Serial Interface	SMPTE 259M, 270 Mb/s & SMPTE 272-1994 (10 bit)
(b) Connector Type	BNC (75 Ohms)
(c) Quantity	2 Nos. of DIGITAL output compliant to ITU-R BT.656 Standard
(d) Level	As per ITU-R BT.601 (part A)
(e) Bit rate supported	Up to 50 Mbps

Note: ASI to SDI conversion should take place directly, i.e. not through Analog to Digital converter.

4.3 Video Performance Specifications

Parameter	Specification
(a) Frequency Response	Better than +0.5 dB, -1 dB for 0-5 MHz
(c) Chroma-Luma Delay	±30 ns maximum
(d) Field Time Distortion	< 3%

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- (e) Line Time Distortion < 1%
- (f) Short Time distortion < 2%
- (g) Differential Gain < 4%
- (h) Differential Phase < 2°
- (i) Signal to Noise Ratio >60 dB (luminance weighted)

4.4 VBI Signal insertion facility

The IRD should have the provision to insert standard VITS signal using its own in-built VITS generator (as per CCIR standard)

5. Decryption Facility

The IRD should be compatible to provide BISS-E (Injected ID type decryption facility. The IRD shall have CI slot so that Conditional Access Module (CAM) can be added, if required, to receive scrambled signals.

6. Audio Output

6.1 Analog Audio

Each analog audio output shall be presented as a stereo pair. In the event of "Mono" transmissions, the same input channel will be output to both left and right connectors. In other modes ("Stereo", "Joint Stereo" and "Dual Mono"), the two encoder input channels will be output as left and right.

6.2 Analog Audio Output Specifications

Parameter	Specification
(a) Output Impedance	600Ω (balanced)
(b) Number of Outputs	4, configurable as two Stereo, Joint Stereo, Single, mono, Dual mono.
(c) Connector Type	XLR Male Socket or with suitable XLR Adapter (i.e. no terminal block)
(d) Load impedance	600 Ohms (balanced)

6.3 Digital Audio Output Specifications

Parameter	Specification
(a) Output Level	5 V nominal
(b) Output Format	AES/EBU
(c) Load Impedance	110 Ohms
(d) Connector Type	XLR male Socket or with suitable XLR adapter (i.e. no terminal block)
(b) Number of Outputs	2 Stereo Channels

6.4 Audio Performance Specifications at 256K bps and sampling rate of 48 KHz

Parameter	Specification
(a) Peak Output Level	+ 18 dBm into 600Ω balanced
(b) Clipping Level	S/W Selectable to be provided
(c) Sampling Rates	32, 44.1 and 48 KHz
(d) Frequency Response	40 Hz to 20 kHz ± 1 dB

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- (e) THD <0.3 % at 1 kHz
- (f) Dynamic range 80 dB (ITU-R/Arm weighting)
- (g) Cross talk at 1 kHz 60 dB, full scale (20 Hz to 20 kHz)
- (h) Signal to noise ratio 55 dB (min) at 0 dBm

7. Data Output

7.1 Asynchronous Serial Data

- | Parameter | Specification |
|------------------------------------|--|
| (a) Data Type | CCITI V.24 / V.28 (RS232C)
Asynchronous serial Data |
| (b) Physical Interface (Connector) | 9 pin subminiature 'D' type, Female |
| (c) Data Rate | up to 38.4 kb/s, asynchronous |

7.2 Synchronous Serial Data

- | Parameter | Specification |
|------------------------------------|---|
| (a) Data Type | CCITI V.11 (RS422)
Synchronous serial Data |
| (b) Physical Interface (Connector) | 9 pin subminiature 'D' type, Female |
| (c) Data Rate | n x 64 Kbps from 64 Kbps to
2.048Mbps |

8. LNB Power Supply & Control

- | | |
|--------------------------------|---|
| (a) LNB Voltage | Suitable voltage should be provided for polarization switching at LNB |
| (b) Current capability | 350 mA (min.) |
| (c) Over Current protection | Fold back current limiting. |
| (d) LNB Power Supply & Control | Receive Polarization Control by electrical Command Via LNBCs-IF feeder cable (Normal, High & Low band switching Pulse for KU-Band operation). |

9. Size

- | | |
|-------|----------------|
| Mount | 19" Rack Mount |
|-------|----------------|

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