PRASAR BHARTI
(India's Public Service Broadcaster)
Directorate general of Doordarshan
Doordarshan Bhawan, Copernicus Marg
New Delhi -110001

File No. 19(2)2020-21E1 (P) TV   **Date: 27/08/2020**

M/s ---**Prospective Bidders**-----

Subject: Draft Technical Specifications for SITC of Automated PLAYOUT Facility for DD Channels.

The Draft specification of the upcoming tenders is enclosed herewith to offer comments if any by prospective bidders. Budgetary quote of the item is also required, same may also be submitted alongwith comments on Draft Specifications, by due date at e-mail ddpurchase401@yahoo.co.in or on following Address:

> Assistant Engineer
> Room No. 403,
> Directorate General: Doordarshan,
> Doordarshan Bhawan, Copernicus Marg,
> New Delhi -110001 (India)
> Telephone: 011- **2311 4401**

Specification For: Draft Technical Specifications for SITC of Automated PLAYOUT Facility for DD Channels

Specification No.: SD 06/2020 Dated: 10.08.2020

 Due Date to offer Comments: 10.09.2020

 Encl.: As above (34 Pages)

> Prabhat Kumar Singh
> Assistant Engineer
> For DG: DD

PRASAR BHARATI
India's Public Service Broadcaster
DIRECTORATE GENERAL: DOORDARSHAN

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD CHANNELS

Specifications No.: SD 06/2020
Dated: 10.08.2020

1.   **SCOPE:**

The specifications aim at Supply, Installation, Testing and Commissioning (SITC) of Broadcast Quality Integrated Automated Playout System for Transmission of round the clock DD Channels at Doordarshan Kendra Delhi in HD and SD mode.
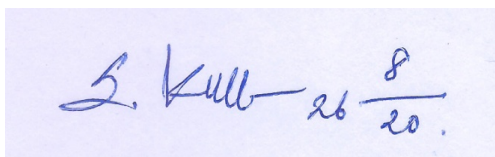
The Integrated Playout System and its associated technical facilities will include the following broad scope of work:-

   i)   Equipment Area for housing the electronics of the equipment etc. in 19" standard rack(s),

   ii)   Transmission Desk with Monitoring Facility through Video Monitor & Multi-viewer.

   iii)   Ingest Desk with Monitoring Facility through Video Monitor & Multi-viewer.

   iv)   Miscellaneous works like-necessary partitioning, painting and minor repair if any, augmentation of air-conditioning system   within the facility for equipment area should be part of the offer.

2.   **GENERAL:**

   a) The General specifications of the System applicable to all the equipment are given in **Appendix-I**.

   b) **The offered system should be from an internationally reputed manufacturer and each quoted item should be field proven and in use by leading broadcasters. The bidder should essentially submit the list of the broadcasters to whom the quoted models have been**

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020

supplied. **The tenders without the proper user list shall liable to be rejected.**

c) Supply, Installation, Testing and Commissioning of this Integrated Automated Playout Facility should be implemented on **turnkey basis**.

d) It will be the responsibility of the bidder to ensure after-sale service and guarantee for all equipment from respective manufacturers.

e) Any substandard equipment included in the offer may cause rejection of the complete offer with the sole responsibility of bidder.

f) The offered system should be capable of working in SDTV (4:3 and 16:9 aspect ratio) and HDTV (16:9 aspect ratio). The SDTV standard is 625 lines conforming to SMPTE 259M and ITU-R BT 601(amended up to date) (SD-SDI 270Mbps). The HDTV standard is 1920x1080/50/I conforming to SMPTE 292M and ITU-R BT. 709 (CIF) (amended up to date) (HD-SDI: 1.485 Gbps).

g) The bidder is required to submit the system design including layout drawing, rack layout, technical furniture design along with the bid.

h) The successful bidder will be required to prepare and submit the final system design in consultation with Doordarshan immediately after award of the contract/work order and get it approved by DG: Doordarshan before implementation/execution.

i) The bidder shall submit only one solution (Single BOM) for the offered system. BOM shall not contain any alternate item/items for the item mentioned in the BOM. Bid with alternate item(s) is liable to be rejected.

j) The bill of material (BOM) required is given in **Appendix-II**. The bidder is required to provide the complete list of items & accessories etc. offered to meet the specifications requirement in the following Proforma:
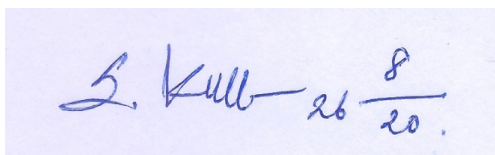
Sr. No.	Description/Name of the item	Make	Model	Part No., if any	Qty.
1.	2.	3.	4.	5.	6.

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3.   **ACCOMADATION, POWER SUPPLY, AIR CONDITIONING & SYSTEM INTEGRATION:**

a)   The system is required to be installed at Room No.323 at Doordarshan Kendra, Tower-B, Doordarshan Bhawan New Delhi.

b)   The necessary partitioning within the facility for equipment area is required to be done by the bidder. The bidder is required to use metallic frame with glass, MDF board & aluminium composite panels for the partitioning works. Further, painting and minor repair, if any, within the facility will also be part of the offer. The bidder should workout the area required for installation of the proposed facility as per their system design. A layout plan should also be submitted along with the bid.

c)   The bidder can visit proposed site on any working day with prior permission from Deputy Director General (Engg.),Doordarshan Kendra New Delhi.

d)   The accommodation is already equipped with house lights. However, special lights for proper illumination of operation desks and equipment racks should be provided by the firm. Adequate quantity of LED light fittings to give proper illumination needed for operation should also be offered.

e)   Doordarshan will provide three-phase UPS power supply (phase to neutral 230 volt ±5%, @50 Hz) at single point in the facility. Further distribution of power supply to the equipment, working desks etc. have to be planned and executed by the bidder.

f)   The power cables to be used for internal wiring for various purposes should be fire retardant and of the best quality having adequate rating with sufficient headroom.

g)   The successful bidder will be required to submit the power supply distribution schematic to Doordarshan for approval prior to execution of the work.

h)   The accommodation being provided is already Air Conditioned. However, the bidder should install one number of commercial/ industrial grade split air conditioner of approx. 3 ton capacity. The air-conditioner will supplement the existing air-conditioning system and will run on essential power supply with Diesel Generator backup.

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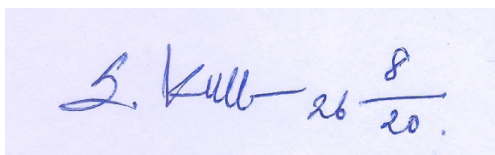
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i) The bidder has to use high grade cables & connectors for video, audio, data and power interconnection of all the equipment. The video cable should be similar to Belden make for rack wiring and other applications. The BNC connectors of high quality similar to Neutrik make should be used.

j) Technical Block diagram and Line diagrams of the Signal, Control and Power chain etc. should be properly displayed in the facility.

k) Essential input and output signals will be made through HD patch panel for flexibility in the facility for emergency operation. Only high quality patch panels with suitable numbers of the patch cords are also required to be included in the offer.

4.   ESSENTIAL REQUIREMENT OF THE SYSTEM:

a) The offered system should be based on Server Client architecture.

b) The offered system should be based upon widely accepted and field proven operating system with quick boot up for reliable operation.

c) The playout will carry both, live events such as news feed etc. and pre-recorded/ingested content.

d) The system should have multilayer graphics and dynamic text over playback or live video to produce rich on-air looks.

e) The system should be capable of working under dynamic conditions, involving last minute changes (within 10 sec) in playlist for promos, commercials &graphics etc. during transmission.

f) The offered system should be designed for high quality delivery, efficient playout, easy-to-use, flexibility and reliability. The offered system should be modular and scalable also.

g) The bidder will be required to integrate HD/SD VTRs that will be provided by Doordarshan.

h) The offered system should be so designed that direct transmission through play back from HD/SD VTRs is also possible.

i) The system should be capable of ingesting any source (Like VTR, Live feed etc.) into the storage through the server.

j) It should be possible to ingest contents from remote location. It should also be possible to access the system remotely for playlist preparation and low resolution content browsing.

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k) Monitoring facility for input sources, programme output, preview output including associated audio channels should be provided.

l) Graphic User Interface of the system should be customizable and operator friendly.

m) The system should be designed carefully to support peak load conditions and taking into account 50% increased system load. Server and network bandwidth should not be the performance bottleneck. The bidder should submit the calculation undertaken & explanation along with the bid.

n) The network is an integral part of the design. The complete network system should be designed for high quality service. The integration of the playout system should have proven deterministic QoS.

o) The network component should have adequate buffering on channels and should meet integrated highest quality & performance benchmark.

p) The indicative workflow of the system is enclosed at **Appendix-III**.

5.   MAIN FUNCTIONAL AREAS:

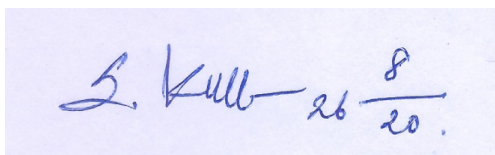The installed system will comprise of mainly following functional areas:-

5.1   Equipment Area:

The equipment area is required to be partitioned within the facility which will house all the electronics of equipment in standard 19" rack(s). The rack will be equipped with one no. of 17" Video Monitor with audio monitoring facility and one no. of XY control panel of Router. The 17" monitor will be provided by Doordarshan.

5.2   Transmission Desk with Monitoring & Graphics Facility:

This area will have a desk on which remote control system of playout server in 1+1 mode will be installed. This desk will also accommodate two nos of audio-monitoring station and two no. of single bus control panel of router with each Server System. In addition, two workstations for data/text input for built-in graphics facility will also be located on this desk. The associated monitoring facility for required Input & Output sources will be provided in front of the desk through large size Video Monitor and multi-viewer. The monitoring facility will also be equipped with two pair of speaker system for ON

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020

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AIR program monitoring. The necessary technical furniture to accommodate all the equipment will be part of the offer.

5.3 Ingest Desk with Monitoring Facility:

This area will have a desk on which two nos. of Ingest Client System for baseband ingest will be installed. Further, this system will also be utilized for file based content ingest. This desk will also accommodate one no. of audio-monitoring station and one no. of XY control panel of router with each Ingest Client System. The associated monitoring facility for required Input & Output sources will be provided in front of the desk through large size Video Monitor and multi-viewer. The necessary technical furniture for the purpose will be part of the offer.
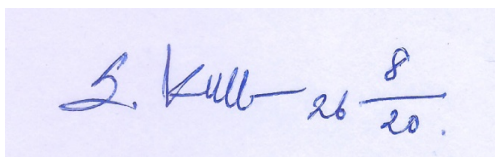
5.4 System Administrator Desk:

This desk will accommodate System Administrator workstation with Monitor, key board and mouse for purging, diagnostics, FTP Server for remote Ingest etc.

6. MAIN COMPONENTS OF THE SYSTEM:

6.1 VIDEO SERVER SYSTEM WITH STORAGE:

a) The offered Video Server and the Storage system should be a software platform using generic IT hardware and should be designed specifically for television broadcasting. It should have the following broad components:-

  (i) The system should consist of main and back-up video servers for playout operations. Each video server should be equipped with at least 6 I/O ports configured as two live HD/SD SDI input port, two preview &two program HD/SD SDI output ports for two channels HD/SD playback.

  (ii) In addition to Playout servers, the offered system includes 2 nos of Ingest servers. Each of these Servers should be equipped with 4 I/O ports configured as 2 HD/SD Baseband ingest one review& one preview HD/SD output ports.

  (iii) Main & Back-up Playout Servers and two nos. of Ingest Servers should be connected on a Central Storage system in mirror

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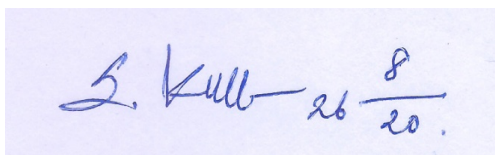
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mode each having 48 TB Storage capacity in RAID 5/6. Each offered Central storage system should be in separate box. However bidders have option to offer the central storage of 48 TB capacity distributed in Playout Server and Ingest Server. In this case, each Playout Server should have minimum 16 TB of local Media Storage in RAID 5/6 in multiple of 2/4 TBs and each Ingest Server should have minimum 32 TB Media Storage in RAID 5/6 in multiple of 2/4 TBs. Further, Storage available in Ingest Servers should work as centralized storage in mirror mode.

(iv) Besides the media storage, all the above four Servers & Central storage systems should have dual mirrored drives for OS.

(v) Database of the offered system should also be in 1+1 redundancy mode.

(vi) Media management system should also be in 1+1 redundancy mode.

Refer the indicative workflow of the system enclosed at **Appendix-III**.

b) The offered system should have media server, playout automation, scheduling and graphics as an integrated solution.

c) The offered system should be able to perform the Broadcast Quality Integrated playout operations which include Ingest of HD/SD SDI content to file in native format, automatically register and check the files that are technically compliant, store it on the storage system, maintaining database, import & create schedules and frame accurate playout of live events and file based content with rich branding. All these elements should be integrated seamlessly to work together for efficient operation.

d) The content either from live feeds or VCRs/Decks will be mix of SD and HD sources. The content should be ingested in native format i.e. SD in SD and HD in HD. Similarly, the content to the live input (s) will be mix of SD and HD. The system should be able to play SD and HD contents back-to-back and provide programme output in SD or HD format. It should, therefore, have Up/down/cross conversion of both live inputs and recorded media files in desired aspect ratio at the time of playout.

e) The system should have facility to ingest, playback, basic editing, commercial insertion, template design, character generation, scheduling etc.
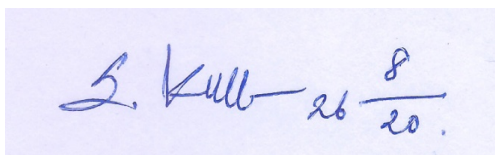
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f) It should be possible to generate independent 'ARL' (As RUN Log) for all play back events containing separately details of clips, ticker, crawl & graphics which were played and it should be possible to take the print outs of these 'ARL' for the purpose of commercial billing.

g) It should be possible to export the 'As Run Log' to the traffic department, if required.

h) It should support a wide range of native file formats with mixed format for back-to-back playout.

i) It should be frame-accurate for recorded and live event switching.

j) It should provide high quality multi-layer graphics, static as well as animated logos, lower thirds, tickers, scrolls, squeeze backs, picture in picture etc. The graphics templates should be easily modifiable.

k) It should be able to schedule and play the growing file being ingested in the system.

l) It should have self-diagnostics and should provide aural visual alarm in case of any problem with the system.

m) The offered system should control external Routers and VTR devices.

n) It should be able to control audio gain of recorded as well as live events while On Air.

o) The offered system should be able to be integrated with third party software like Media nucleus BATS for traffic and billing.

p) It should have SCTE-104 markers insertion facility for baseband video feed to manage personalized ads.

q) The offered Video Server System with Central Storage will have the following functionalities:-

(I)   INGEST:

(a) The sources to be ingested, either from VCRs/Decks or live feeds will be mix of SD and HD. It should accept SD as well as HD SDI video input without any up or down conversion.

(b) Ingest operations of baseband signal (from live feed and VTR etc.) and file based content should be possible in local mode. Ingest of file based content should also be possible in remote mode. Professional delivery tools for remote ingest is also part of the offer. Necessary transcoder should also be offered to convert files received from outside to house format.

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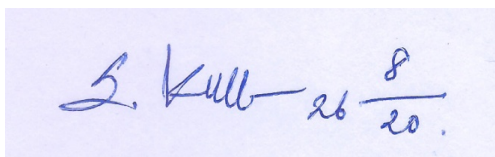
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(c) Ingest operation for baseband signal (live feed and VTR etc.) and file based content should be user selectable between auto & manual mode.

(d) It should be able to ingest SD SDI baseband signal in to DVC PRO 50 format and HD SDI baseband signal in XDCAM HD 422 format. It should also support embedded AES/EBU audio.

(e) It should also have file based Ingest of Sony XDCAM HD422 {MPEG-2 long GOP (12 frames) 4:2:2@HL} 50Mbps with 8 bit quantization data files in MXF file format. The system should offer complete compatibility with broadcast industry *.mxf file formats for content exchange. Necessary interfaces along with required hardware should be included in the offer.

(f) It should have facility to integrate **6 Nos. of NLEs** of reputed make working on Windows and Mac OS like Adobe Production Premium, Apple FCP, Avid Media Composer etc. in push-pull mode with centralized storage system through Ingest Server. Necessary interfaces along with required hardware should also be offered.

(g) The system should create, edit/ modify metadata for all the media files ingested or being ingested.

(h) Simultaneous ingest of the sources should be possible even when the playout continues from the Servers.

(i) All ingested material should automatically be mirrored in both the central storage systems and should be made available for playout server storages for playback. In case of any fault, there should not be loss of ingested content.

(j) It should have intuitive user interface for easy ingest operation.

(k) System should provide current status of ingest process to operator in time domain with an option to abort the process any time.

(l) It should be possible for operator to define source and destination for ingest through X-Y control panel of routing switcher.

(m) Necessary monitoring facility for monitoring ingesting sources including respective audio channels & its level should be provided.

(n) It should be able to control VTR/Deck etc. It should also provide VTR control interface for remote operation.
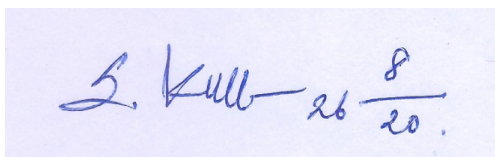
(II) GRAPHICS:

a) The offered system also includes built-in graphics facilities.

b) It should be able to import 2D static and animated graphic elements from industry-standard graphics authoring applications. It should also support insertion of animated logos.

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c) Bidder should provide necessary software and interfaces for simple import of logo graphic files and other commonly used graphic file formats through industry standard interfaces/ports.

d) The system should be able to design broadcast quality graphic templates and application should enable arranging graphic elements into templates for playout channel.

e) It should also be possible to key-in, roll, ticker and crawl graphics. System should also allow RSS feed to display on screen with suitable editing for display.

f) The system application should permit creation and saving of repeatable templates. The templates with all the associated data will be populated at the moment of going to air. These templates should collect the data from multiple sources. In case of playlist changes, the associated XML metadata should maintain the correct associations so that the proper content should be played out.

g) The system should have inbuilt multilingual character generation facility with Unicode fonts for English and Hindi. It should have full Unicode support with multiple text entry orientations including right to left and top to bottom.

h) System should support at least four layers of graphics simultaneously and each layer should be individually controllable.

i) The system should support all standard image formats (PNG, JPG, TIFF, GIF) and sequences (Targa etc.).

j) Even it should be possible to fire animation/graphics, L-band squeeze etc. easily that are not scheduled in the playlist but situation warrant them to fire as and when required during the transmission.

k) Operator should have facility to position graphics within the safe area for insertion.

l) It should have the capability for switching between logos as per the requirement during transmission.

m) Facility to create multiple windows with live feed or file based content should be available.

n) Application should also allow displaying the real time clock as graphics.

o) Basic DVE effects for standard graphics should also be provided.
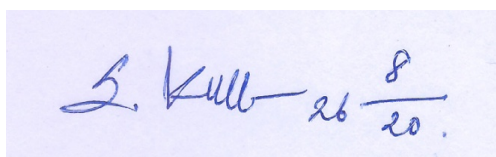
p) Full preview facility for scheduled effects of audio-video transitions and graphics in safe environment should be provided.

q) Two number of graphic client for offline graphic creation should also be offered.

r) Two numbers of Graphics creation from remote location should also be part of the offer.

(III) SCHEDULING:

a) The application for scheduling should facilitate creating play lists. It should be possible to append play list without interruption. It should also be able to import schedule from third party traffic systems to convert it into a playlist (s). Schedules include primary and secondary events. Playlist preparation should be possible from remote location also. It should be possible to preview the contents for playlist preparation remotely. At least four concurrent remote client licenses for remote playlist preparation are required to be offered.

b) It should be possible to linking various events with graphic templates, as well as adding, deleting, and replacing graphic templates to schedule. It should provide visibility of all secondary events, and the timing of all secondary events

c) It should be possible to import & export the playlist.

d) The operator should have all standard and configurable tools set for auto time line calculation etc. with alarms for any missing event or scheduling conflict etc. It should allow automatic fill up of specific time gap with predefined video, still clip from a watch folder created specifically for the purpose.

e) It should allow non-restrictive editing of playlist even during the transmission, especially when a live programme from non-controllable external source is on air whose duration is not known in advance.

f) Playlist should allow files of different resolutions and bit rates to co-exist.

g) Multiple Playlist repetition should also be possible.

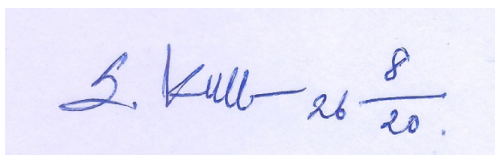h) System should provide adequate protection for accidental changes in the play list.

(IV) PLAYOUT:

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(a) The playlists should be in 1+1 mode for redundancy for two SD/ HD channels. Both the playlists should work in sync for each channel. Every playlist should be dynamic and should have primary, secondary and tertiary events for video, logo, graphics and audio clips.

(b) The system should also have streaming outputs for each channels which supports protocols like RTSP, HLS, Unicast and multicast etc.

(c) The system should allow frame accurate transmission by using station black burst reference and time code.

(d) It should be possible to import schedule from third party traffic systems to convert it into a playlist(s). Schedules include primary and secondary events.

(e) The playout application must be able to pull the required content and metadata and transfer them as files over the network to the playout port it is managing.

(f) It should have user-friendly menu for preparation of play list. Last minute changes in the play list should be possible.

(g) It should have live input recording with or without graphics for deferred airing and repeat telecast.

(h) It should also be possible to preview sequences for marking IN and OUT points.

(i) It should resume the playout from the last known position in case of interruption and it should also allow the user to jump from one line in a playlist to another during broadcast, regardless of whether or not the current event has finished. In that case, remaining playlist should be automatically modified accordingly. The system should also have facility to pause and play the playlist manually.

(j) The playback of scheduled clips from the play list should be instantaneous without any delay.

(k) The system should include basic and simple edit functions like cut, dissolve etc. with audio fade-in and fade-out facilities.

(l) The system should manage available devices as per the playlist automatically and manually for each event.

(m) It should be possible to create several in & out points on the same clip to be able to play as segments.

(n) It should be possible to preview sequences for making a clip, effects etc. for scheduling.

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(o) System should also support voice over etc. as per the Playlist.

(V)   REDUNDANCY:

a) All additions and modifications with respect to playlist, content and associated metadata should also be affected automatically in back-up server. Back-up server should always be in-sync with main server for the smooth transition in case of changeover due to system failure or to allow maintenance work.

b) In case of online server port failures, automatic switching of programme from backup server should be provided so that the programme on-air is not interrupted. In case of power failure the server should bypass itself and input should be connected directly to the output.

c) The switchover to redundant system may be possible manually or automatically.

d) Facility to monitor the status of redundant hardware/ software should be provided to operator so that appropriate decision may be taken by him in case of exigencies.

e) The bidder must ensure redundancy of the system by offering redundant power supplies, fans, network ports. It should also have hot swappable components.

f) Any changes made in the master playlist should also be automatically made in the slave (redundant) system.

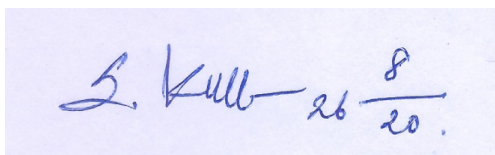g) In exigencies, it should be possible to take live feed or predefined source with single button operation.

(VI)   QUALITY CHECK:

a) It should have QC facility of all ingested media files with user definable pass/fail criteria.

6.2   CENTRAL STORAGE SYSTEM:

a) The bidder can offer the total storage of 48 TB capacity distributed in Playout Server (minimum 16 TB) and Ingest Server (32 TB).Alternatively, the bidders have an option to offer a separate

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central storage in mirror mode in RAID 5/6 having 48 TB storage capacity in each storage box along with Playout and Ingest servers.

b) Inter connectivity of all the system components should be through a suitable high speed interface like 10 Gig/FC and Gigabit Ethernet to meet system bandwidth requirement of all connect components (i.e Playout Video Servers, Ingest Video Servers, NLEs etc.)

c) Bidder should offer a separate Administrator Console for complete monitoring of the system health and other administrative works.

7.   TECHNICAL SPECIFICATIONS OF MAJOR EQUIPMENT:

a) All the equipment in the offer should be from internationally reputed and leading manufacturers of their respective industry, who have proven records of offering high class, high MTBF equipment.

b) Any substandard equipment included in the offer may cause the rejection of complete offer with the sole responsibility of bidder.

7.1   SERVER,   CLIENT,   GRAPHICS,   ADMINISTRATIVE WORKSTATIONS AND STORAGE SYSTEMS:

The bidders can offer the total storage of 48 TB capacity distributed in Playout Server (minimum 16TB in multiples of 2/4 TBs) and Ingest server (minimum 32 TB in multiples of 2/4 TBs).
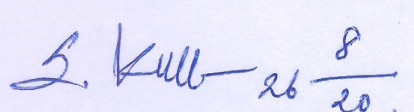***Alternatively,***
The bidder have an option to offer a separate central storage system in mirror mode having 48TB storage capacity in each storage box along with Playout and Ingest server.

7.1.1 Playout Servers:

Servers from internationally reputed manufacturers such as HP, Dell, Supermicro or equivalent only will be accepted. The bidder can offer a superior hardware configuration, if required by the system & application software to ensure full performance of the offered system. However, each Play-out server should have the following minimum configuration:-
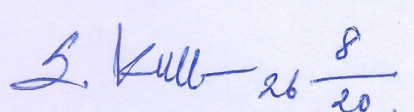
Sr.	Description	Parameter Values

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020

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Nos.			
1.	Inputs/Outputs	:	HD-SDI: 1.485 Gb/s and SD-SDI 270Mbps with embedded Audio (16, 20, 24 bits PCM @48Khz.)
2.	Reference	:	Analog Black Burst/Tri level sync
3.	Time Code	:	LTC/VITC on black
4.	CHANNEL/I/O Ports	:	Six base band ports configurable as 2 In 4 Out.
5.	Formats Supported	:	**SD**: Encoding/Decoding DVCPRO, DVC PRO 50, MPE-2@ML 4:2:2, I-Frame & Long GOP, 4-50 Mb/s. **HD**: Encoding/Decoding XDCAM HD4:2:2(50 Mb/s), MPE-2@ML 4:2:2, I-Frame & Long GOP, 20-100 Mb/s. **File based support**: XDCAM HD4:2:2(50 Mb/s)with OP1a wrapper, DVCPRO, DVC PRO 50 with MXF Op Atom or MXF OP1 a wrapper.
6.	I/O Interface	:	(i) HD/SD SDI on BNC (ii) RS422 ports for control (VTR control interface through appropriate protocol) (iii) GPI (iv) Ethernet (RJ45) (v) I/Os for connecting other standard devices
7.	Operating System	:	Microsoft Windows Server or similar
8.	Processor	:	Dual Intel® Xeon® Silver 4214 Processor or better
9.	RAM	:	64 GB or more DDR4

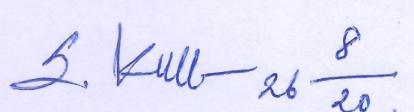*SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020*

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10.	Graphics RAM	:	2 GB or more
11.	OS Drives	:	Dual mirrored SSDs
12.	Media Storage (in case required)	:	16 TB (7.2 K Enterprise class SAS) in RAID 5/6
13.	Enclosure	:	19" Rack housing with hot swappable redundant power supply
14.	Power Supply	:	230 Volts ±5%, 50 Hz Dual Redundant
15.	Operating Temperature	:	10 to 35 Deg. Celsius ambient with free air flow

7.1.2 Ingest Servers:

Ingest Servers with storage system from internationally reputed manufacturers such as HP, Dell, Supermicro or equivalent only will be accepted. The bidder can offer a superior hardware configuration, if required by the system & application software to ensure full performance of the offered system. However, each Play-out server should have the following minimum configuration:-
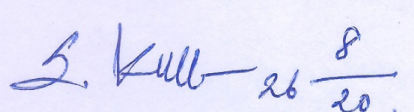
Sr. Nos.	Description		Parameter Values
1.	Inputs/Outputs	:	HD-SDI: 1.485 Gb/s and SD-SDI 270Mbps with embedded Audio (16, 20, 24 bits PCM @48Khz.)
2.	Reference	:	Analog Black Burst/Tri level sync
3.	Time Code	:	LTC/VITC on black
4.	CHANNEL/I/O Ports	:	Four base band ports configurable as 1 In 3 Out or 2 In 2 Out.
5.	Formats Supported	:	**SD**: Encoding/Decoding DVCPRO, DVC PRO 50, MPE-2@ML 4:2:2, I-Frame &

			Long GOP, 4-50 Mb/s. **HD**: Encoding/Decoding XDCAM HD4:2:2(50 Mb/s), MPE-2@ML 4:2:2, I-Frame & Long GOP, 20-100 Mb/s. **File based support**: XDCAM HD4:2:2(50 Mb/s)with OP1a wrapper, DVCPRO, DVC PRO 50 with MXF Op Atom or MXF OP1 a wrapper.
6.	I/O Interface	:	(vi) HD/SD SDI on BNC (vii) RS422 ports for control (VTR control interface through appropriate protocol) (viii) GPI (ix) Ethernet (RJ45) (x) I/Os for connecting other standard devices
7.	Operating System	:	Microsoft Windows Server or similar
8.	Processor	:	Dual Intel® Xeon® Silver 4214 Processor or better
9.	RAM	:	64 GB or more DDR4
10.	Graphics RAM	:	2 GB or more
11.	OS Drives	:	Dual mirrored SSDs
12.	Media Storage (in case required)	:	32 TB (7.2 K Enterprise class SAS) in RAID 5/6
13.	Enclosure	:	19" Rack housing with hot swappable redundant power supply
14.	Power Supply	:	230 Volts ±5%, 50 Hz Dual Redundant
15.	Operating Temperature	:	10 to 35 Deg. Celsius ambient with free

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020

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			air flow

7.1.3 Central Storage system (If required)
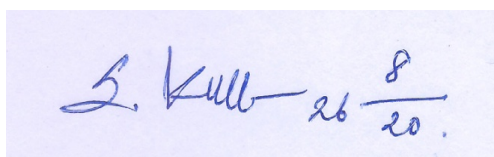
Sr. Nos.	Description		Parameter Values
1.	Operating System	:	Microsoft Windows Server or similar
2.	Processor	:	Dual Intel® Xeon® Silver 4214 Processor or better
3.	RAM	:	64 GB or more DDR4
4.	OS Drives	:	Dual mirrored SSDs
5.	Storage	:	48 TB (7.2 K Enterprise class SAS) in RAID 5/6
6.	Enclosure	:	19" Rack housing with hot swappable redundant power supply
7.	Power Supply	:	230 Volts ±5%, 50 Hz Dual Redundant
8.	Operating Temperature	:	10 to 35 Deg. Celsius ambient with free air flow

7.1.4 Client&Graphics Work Stations:
The bidder should offer required nos. of client &graphics work stations. These workstations should be equipped with necessary software and hardware. The hardware should have the following minimum configuration:-

Sr. Nos.	Description	:	Parameter Values
1.	Processor	:	Intel® Core i7 8th generation processor or similar
2.	Memory	:	8GB DDR4

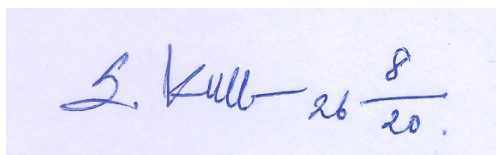*SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020*

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3.	Operating System	:	Windows® 10 Pro 64
4.	System HDD	:	500GB SATA 7200 rpm 6Gb/s 3.5" HDDs. configurable to dual boot drives.
5.	Graphics	:	On board Intel® HD Graphics 630 or similar
6.	Networking and Communications	:	2-Port 1Gb NIC
7.	Display	:	24-inch IPS LED Backlit Monitor.
8.	Accessories	:	Optical 3-Button Mouse, Key Board etc.

7.1.5 Administrative Work Stations:

The bidder should offer required nos. of administrative work stations. These workstations should be equipped with necessary software and hardware. The hardware should have the following minimum configuration:-

Sr. Nos.	Description	:	Parameter Values
1.	Processor	:	Intel® Core i7 8th generation processor or similar
2.	Memory	:	8GB DDR4
3.	Operating System	:	Windows® 10 Pro 64
4.	OS Drives	:	500 GB SSDs configurable to dual boot drives.
5.	Media storage	:	4TB SATA 7200 rpm 6Gb/s 3.5" HDD.
6.	Graphics	:	On board Intel® HD Graphics 630 or similar
7.	Networking and Communications	:	2-Port 1Gb NIC

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020

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8.	Display	:	24-inch IPS LED Backlit Monitor.
9.	Accessories	:	Optical 3-Button Mouse, Key Board etc.

7.2   32x32 HD/SD SDI ROUTING SWITCHER:

a) The bidder should offer internationally reputed 32 X 32 routing switcher. It should be capable of routing HD/SD-SDI signal with embedded audio.

b) The routing switcher facilitates effective utilization of various resources by assigning any of the sources to required destination.

c) The bidder should provide 3 nos. of XY remote control panel and 2 nos. of single bus remote control panel.

d) The router should have dual redundant power supply and system controller. It should be genlockable with local reference sync.

e) The offered router should be transparent to embedded audio.

f) The router should be configurable for Transmission playback, ingest and monitoring of various sources through RCPs.
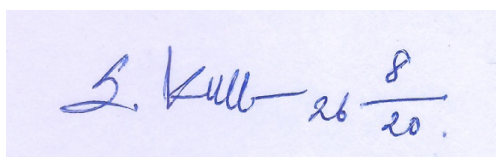
Tech Specifications of Routing Switcher:

i. Input & Output: 3G/HD/SD-SD with embedded audio
ii. Connector: BNC
iii. Reference Input: PAL Black & Burst or HD Tri-Level on BNC
iv. Impedance: 75 ohm
v. Return Loss: ≥15dB 1MHz to 1.5GHz; ≥10dB, 1.5GHz to 3GHz
vi. Signal Level: 800 mV±10%
vii. Equalization : Automatic up to 75 m or more (at 1.5Gb/s) for Belden 1694A or equivalent cable

7.3   SYNC PULSE GENERATOR (SPG):

a) Genlockable dual SPG with Auto Change-over facility should be offered along with the system.

b) The offered SPG should be able to work as Master/Slave mode, as per the requirement.

c) Both the Main & back-up units should have HD Tri-level sync, Analog Black Burst (PAL) (at least 5 user configurable HD Tri-level

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sync/Analog Black Burst (PAL) outputs, digital black, Digital Audio Reference Signal (DARS), word clock output, VITC and LTC Time code outputs.

d) It should have GPS receiver and should be supplied with GPS antenna and cable.

e) The Automatic changeover unit should have at least 9 channels of changeovers for the signals mentioned in para (c) above.

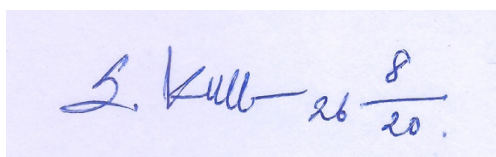f) The changeover unit should have redundant power supply unit.

7.4 MULTI–IMAGE DISPLAY PROCESSOR:

a) The offered system should have 32 nos. of auto sensing HD/SD SDI inputs and four display with HD/SD-SDI or HDMI outputs.

b) The offered system should support 1920x1080 resolutions.

c) The offered system should also display embedded audio.

d) The offered system should allow for full screen viewing of any input on both outputs.

e) The offered system should have dynamic under monitor displays and tallies via several supported protocols.

f) The offered system should be modular and 19" rack mountable with redundant power supplies.

g) The offered system should have control and configuration capabilities via Simple Network Management Protocol (SNMP) or any other similar protocol.

h) The offered system should be Genlockable.

i) The offered system should have general purpose interface I/O.

j) It should be possible for the user to configure the layout of image display.

7.5 55" VIDEO MONITOR:

a) The offered monitor should incorporate high intensity & high contrast wide screen of size 55" (diagonal) and wide viewing angle LCD Panel to view stable images from various angles - both horizontally and vertically, with no reduction in picture contrast, brightness and colour saturation.
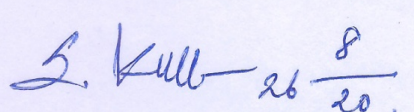
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b) The incorporated LCD panel should employ LED backlight technology to make offered monitor thinner and lighter with lower power consumption. It should have faithful colour reproduction.

c) The LCD panel of the offered monitor should be of 16:9 aspect ratio with resolution of 1920X1080 or better pixels. The offered monitor should support 16:9 and 4:3 aspect ratio format of the video signal.

d) The offered monitor should have a minimum response time and high refresh rate of 50Hz for viewing fast moving picture like sports events without motion artifacts such as blur, judder etc. It should therefore reproduce smooth, sharp and clear fast moving images.

e) The monitor should have HD/SD-SDI or HDMI input compatible with the offered multi-viewer.

f) The product should have high reliability for continuous operation.

g) The monitor should be offered with mounting unit complete in all respect.

h) The brief Technical Parameters are as under:

Sr. No.	Specifications Parameters		Parameter Values
1	Active Screen Size	:	55" diagonal
2	Aspect Ratio	:	16:9
3	Resolutions	:	1920 x 1080
4	Viewing angle (H & V)	:	178° or more
5	Brightness	:	500 Cd/m2 or better
6	Contrast		1400:1 (Typical) or better
7	Colour Resolutions	:	1.06 billion colours
8	INPUTS		
(a)	HD/SD SDI or HDMI 1.3 or better	:	1 or more compatible with offered Multiviewer

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020
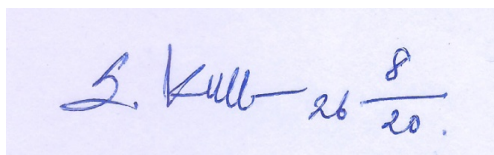
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7.6   AUDIO MONITORING STATION:

a) The Audio Monitoring Stations should be 19" rack mountable and standalone unit.

b) The offered system should have two nos. of HD/SD-SDI inputs.

c) It should have level metering of 16 de-embedded audio channels from selected HD/SD-SDI inputs.

d) It should have audio bar graph, High quality internal speakers, headphone out.

e) One no. of good quality headphone should also be supplied along with each audio monitoring station.

f) It should provide balanced stereo analog outputs on XLR connector for connection to external loudspeakers.

7.7   FRAME SYNCHRONISER CUM CONVERTER:

a) The offered frame synchronizer cum converter should have HD SDI and SD SDI switchable/selectable inputs and should provide HD SDI and SD SDI outputs. The offered unit should be 19" rack mountable and standalone unit.

b) It should have Up/Down/Cross converter and synchronizer. It should support AES/EBU, Analogue and embedded audio.

c) It should have local control panel and redundant power supply.

d) The offered frame synchronizer cum converter should have facility of audio-video processing. The facility of controlling various audio- video parameters through control panel should be available.

e) **Brief Technical Specifications:**

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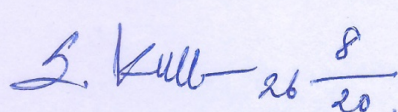| I. | Inputs | : | **HDTV** 1920x1080/50/I (16:9 aspect ratio) conforming to SMPTE 292M and ITU 709 (CIF) HD-SDI: 1.485 Gb/s and **SDTV** 576/50/I (4:3 aspect ratio) conforming to SMPTE 259M and ITU 601 SDI: 270 Mb/s. with embedded audio |
II.	Output	:	**HDTV** 1920 x 1080/50/I (16:9 aspect ratio) conforming to SMPTE 292M and ITU 709 (CIF) HD-SDI: 1.485 Gb/s and **SDTV** 576/50/I (4:3 aspect ratio) conforming to SMPTE 259M and ITU 601 SDI: 270 Mb/s.
III.	**Internal Processing**	:	4:2:2, 12 bit or better
IV.	**Audio Delay**	:	variable audio delay facility

7.8   PERIPHERAL EQUIPMENT WITH FRAME:

a) The bidder should offer card type DVDA, VDA, ADA and other required peripherals as per the system design.

b) The offered peripherals should be housed in 19" rack mount frame along with auto switchable redundant power supply and fan units.

7.9   TECHNICAL FURNITURE & INSTALLATION MATERIALS:

a) Suitable technical furniture/desk including operators chairs etc. required for the facility will be part of the offer.

b) The offered technical furniture should be designed for ergonomics and high end aesthetics.

c) All furniture should be made of high quality material. The power supply distribution panels should also be integrated with these desks.

d) All sorts of installation materials including Audio and Video rack to house storage, server etc., all sorts of connectors & cables etc., LAN switch(es), LAN I/Os etc. are required to be offered along with the bid.

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8.   **COMPLETENESS OF THE OFFERED SYSTEM:**

a) Completeness of the offered system is the responsibility of the bidder.

b) The successful bidder will be solely responsible for operationalization of the system to the satisfaction of Doordarshan.

c) In order to ensure the completeness of the system, any additional software/equipment/accessories which bidder feels necessary to complete the configuration should also be quoted. However, in such case they should provide proper justification for the additional equipment required. These items, if any, must be listed in the offered BOM.

d) If the bidder feels that the system requires additional items for better functionality, the bidder may quote such items as an optional item and provide full justification to decide its utility.
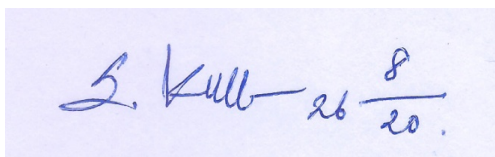
9.   **SOFTWARE:**

a) The licensed version of all software including Operating System, all application software etc. are required to be supplied in original media. **These software should be licensed in the name of Doordarshan with perpetual validity**. In case of hardware failure, it should be able to re-install all the softwares in the system with new hardware. Required recovery disc, if any for this purpose, should also be provided.

b) The bidder will provide up-gradation of all the offered software free of charge during the guarantee period. **The bidder will be required to give an undertaking to this effect along with the bid.**

10.   **COMPLIANCE:**

a) **A point by point full compliance statement in respect to all the parameters related to the concerned equipment/item(s) laid down in the specifications from the respective principal manufacturers is to be enclosed along with the offer in the format given below. Mere signature on the copy of DD specifications shall not be accepted as a compliance statement.**

SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020
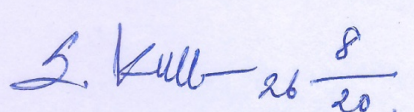
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The figures so mentioned should be supported by record of these in the technical literature enclosed with the tender and reference to the page number of enclosed literature for all features and technical specifications should be mentioned in the relevant column. Offers without the compliance statement or with incomplete compliance statement will liable to be rejected with the sole responsibility   of the bidder. **Any deviation from the specification detailed in the compliance statement is to be highlighted separately.**

Sr. No of DD specs.	DD specs.	Compliance	Performance Fig. of equipment	Reference to the Page Number of enclosed literature	Deviations, in case of non-compliance	Optional items if any reqd. to make the sys. Compliant to DD specs.	Features in the offered Product which exceeds DD
1	2	3	4	5	6	7	8

b) **In addition to above, a separate point by point compliance statement duly signed by the bidder in respect of all the points laid down in the specifications for all the equipment/item(s) should also be submitted along with the bid by the bidder in the above mentioned proforma.**

c) In addition to the above, authorization from respective principal manufacturers in respect of the equipment listed below should necessarily be submitted along with the bid:-

    (i)   Video Server System,
    (ii)   Storage System,
    (iii)   Routing Switcher,
    (iv)   Sync Pulse Generator with Change Over switch,
    (v)   Multi-image Processor,
    (vi)   Frame Synchronizer cum Converter,
    (vii)   Audio Monitoring Station,

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11. **TECHNICAL LITERATURE:**

One set of technical manuals/brochures for all the equipment are required to be provided along with the tender to facilitate the technical evaluation, otherwise the tender is liable to be ignored. The successful bidder will have to supply a set of technical, user and installation manuals with respect to each of the equipment.

12. **DEMONSTRATION:**

If necessary, the bidder may be asked for demonstration of the offered system as part of the technical evaluation. In such case the bidder will have to make suitable arrangement for the demonstration of the offered system at Doordarshan Bhawan, New Delhi, on notice of 15 days. Accordingly the bidder should be in readiness for demonstration.
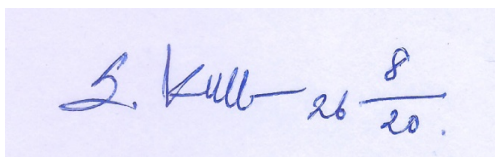
13. **GUARANTEE:**

d) With reference to the clause no.8.2 of the "General Terms And Conditions (GTC)" under ANNEXURE-II of tender document, the complete system including all items/equipment should be guaranteed for **three years of trouble free operation from the date of commissioning.**In case of any item or equipment failure including software and hardware within this period.

e) The guarantee should cover all hardware, software and modules of the complete system.

14. **DELIVERY PERIOD: 4** months.

15. **ON-SITE TRAINING AND SUPPORT:**

The bidder has to offer trainings & support as given below:

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Operation & System Administration Training: The bidder should offer Operation and System Administration Training to Engineers and Programmers for 5 working days at the installation site immediately after completion of installation.

a) *On Site Support:* The bidder should offer on- site support for 5 working days immediately after commissioning and completion of training.

Accordingly, necessary resource persons are required to be deputed for imparting the trainings. The bidder has to provide the comprehensive training material in the form of hard copies, as well as soft copies to the trainees, during the training session. The complete cost towards these training and operational support, if any, should be quoted separately.

16. INSPECTION:

The equipment shall be subjected to inspection by Doordarshan officials at New Delhi.
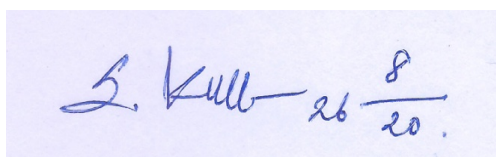
17. ENCLOSURES:

The bidder must necessarily upload the following documents along with the technical bid:

a) An undertaking as required vide clause no. 9(b).

b) Compliance statement with respect to all the points of the specifications duly signed by the OEM should be submitted for all the equipment/item(s) in the proforma mentioned in clause no. 10(a).

The reference to the page number of enclosed literature for all features and technical specifications should be essentially mentioned in the relevant column of the compliance statement.

c) A separate point by point compliance statement duly signed by the bidder in respect of all the points laid down in the specifications for all the equipment/item(s) in the proforma mentioned in clause no. 10(b).

d) Authorizations from respective principal manufacturers as required vide clause no. 10(c).

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e) Technical manuals/detailed technical literature/catalogues for all the offered products for substantiating the model no. and technical specifications.

f) Model specific user list of the offered product(s).

g) Any other document mentioned elsewhere in the tender document.

The tender is liable to be rejected in the absence of the above enclosures with the sole responsibility of the bidder.
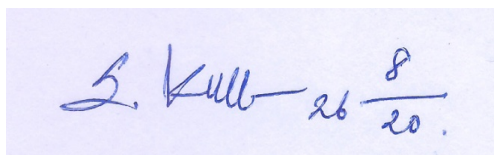
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Appendix-I

GENERAL TECHNICAL SPECIFICATIONS APPLICABLE TO THE SYSTEM

1.	**System**	: **HDTV:-** 1920x1080/50/I conforming to SMPTE 292M and ITU-R BT. 709 (CIF) (amended upto date) (HD-SDI: 1.485 Gb/s) and
		SDTV:- 625/50i (4:3 aspect ratio) conforming to SMPTE 259M and ITU-R BT. 601(amended upto date) (SDI: 270 Mb/s, PAL, 2:1 Interlace, 25 frames/s, 50 fields/s).
		The video in both the systems is associated with embedded audio.
2.	**Digital processing**	: **HDTV**: 4:2:2, Y: 74.25 MHz, Pr: 37.125 MHz, Pb: 37.125 MHz Sampling rate, 10 bit quantization.
		SDTV: 4:2:2, Y:13.5 MHz, Pr:6.75 MHz, Pb:6.75 MHz Sampling rate, 10 bit quantization.
3.	**Power supply**	: 230 ±5% Volts AC, 50 Hz
4.	**Operating temperature**	: 5 to 40 Deg. Celsius
5.	**Relative humidity**	: 30% to 85%
6.	**Mounting/Dimensions**	: Standard 19" Rack mount in case of Standalone units. Otherwise 19" Rack mounting frame housing the units with auto switchable Redundant power

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supply unit.

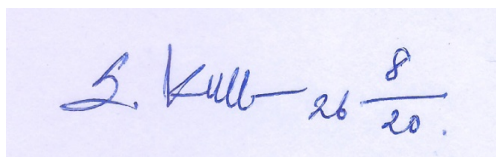|			
7.	**Connectors**	:	
(a)	Video	:	75 Ω BNC
(b)	Audio	:	3 Pin XLR/75 Ω BNC
(c)	Control	:	BNC, Mini XLR, RS-422, GPI, Ethernet etc. as applicable
8.	**Video Signal**		
(a)	Digital Video	:	0.8 Vp-p ± 10%, across 75 ohms
(b)	Reference signal	:	1080/50/I HDTV Tri-level sync and PAL black burst
9.	**Audio**	:	(a) Embedded audio unless specified otherwise
			(b) AES/ EBU
10.	**Time code**	:	VITC on black and LTC
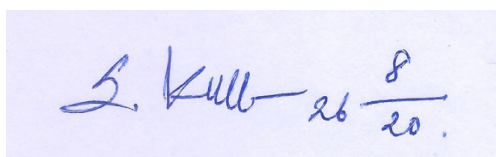
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Appendix-II

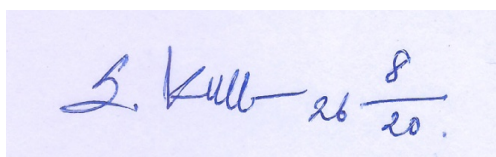## INDICATIVE BILL OF MATERIAL (BOM) REQUIRED

Sl. No.	Components	Quantity
1.	Integrated Playout System in 1+1 configuration Comprising of:	
(a)	Necessary application software for ingesting, browsing, playout, scheduling, recording, graphic insertion with machine control functionality to control VTRs etc. with database & all required functional modules and client licenses (including remote licenses) as specified with hardware.	1 Set
(b)	IT and Networking Components as per the specified system requirement such as Storage Drives, RAID Controllers, File Systems, Video and Data servers, Network Interface cards, Host bus adapters and switches etc. as required	1 Set
(c)	Storage with specified capacity including required Management Software and necessary housing.	1 Set
2.	Ingest, Playlist, Graphics and Administration Workstation terminals	9 Nos.
3.	Unicode compliant fonts for English and Hindi language	1 Set
4.	32X 32 HD/SD-SDI Router (AV) with redundant power supply & Controller along with 3 nos. of XY Control panel and 4 nos. of single bus remote control panels.	1 Set
5.	Sync Pulse Generator (SPG) with GPS receiver ,Change Over Unit and GPS antenna & Cable	1 Set
6.	Quad Display 32 Channel Multi-viewer	1 Set
7.	55" LED Monitor with mounting	3 Nos.

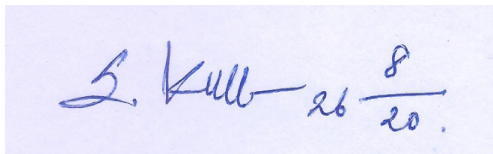*SPECIFICATIONS FOR SITC OF AUTOMATED PLAYOUT FACILITY FOR DD BHARATI CHANNEL: SD 06/2020 Dated 10.08.2020*

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8.	Audio Monitoring Station with Headphone	6 Nos.
9.	Stand alone Frame Synchronizer	2 Nos.
10.	19" rack mountable card type peripherals like DVDA, VDA, ADA etc. along with frame having redundant power supply & fan unit *(Qty. as per system design requirement)*	1 Lot
11.	2x1 Automatic Change Over Switch*(Qty. as per system design requirement)*	1 Lot
12.	Ampli-speaker	4 Nos.
13.	LTC enabled Digital clock (six digits, 2.3" height red LEDs)	2 No.
14.	Installation materials i/c associated cable, connectors, HD patch panel, patch cords, racks, LAN Switch(es), LAN I/Os, power cords etc. as required for installation and to make the system completely functional as per the specifications.	1 Lot
15.	Site preparation works – as specified	1 Job
16.	Technical Furniture for Transmission Desk, Ingest Desk & System Administration Desk	1 Lot
17.	Operator chair	8 Nos.
18.	Commercial/ industrial grade split air conditioner of approx. 3 ton capacity	1 Set
19.	Installation, testing and commissioning works	1 Job
20.	Training and On Site Support	1 Job
21.	Operation, Maintenance and service manuals	1 Set

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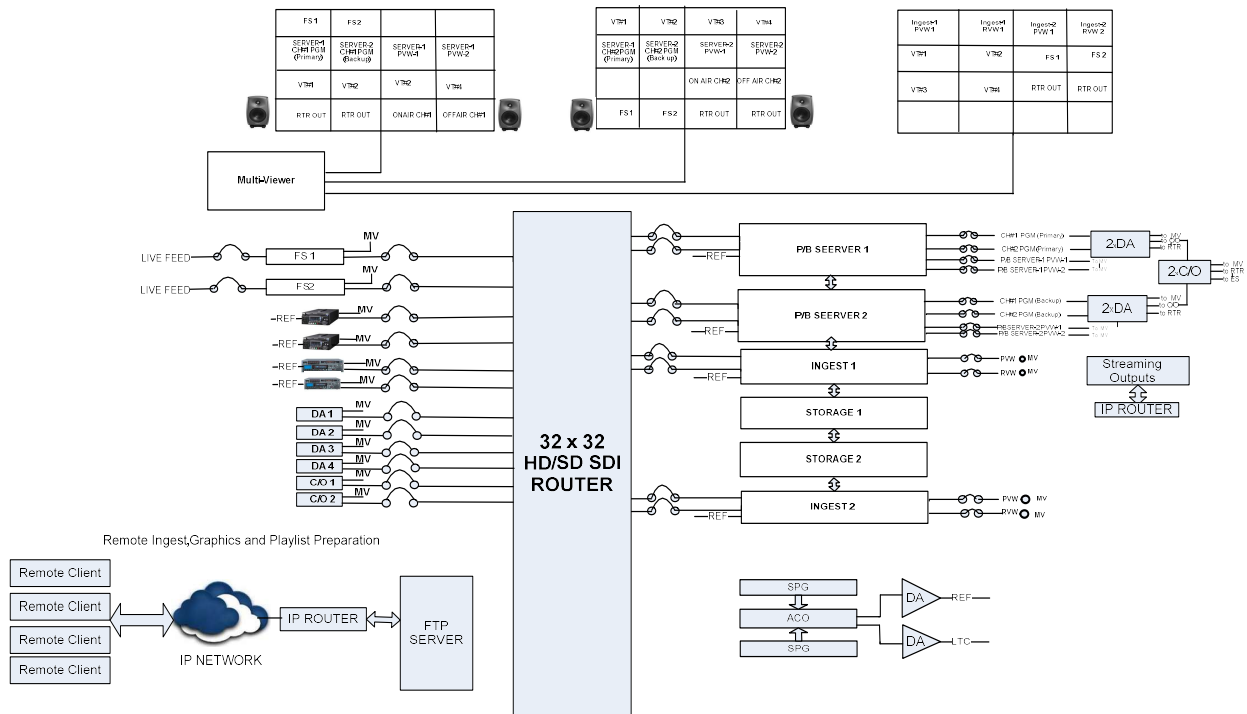
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Appendix-III

Indicative workflow for Automated Playout Facility For DD Channels

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