



Contract for Harmonic Spectrum video server upgrade

**Appendix 1**  
**Customer requirement specification**

Reference no.: NRK MA2912/16E

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# 1 The overall objective

The overall objective for this tender is an upgrade of existing video servers for ingest and play-out in NRK's main continuity/play-out areas. These servers are installed in Oslo and in our backup site in Trondheim and will be used for our broadcasts on the TV channels NRK1, NRK2, NRK3, NRK Super and NRK Tegnspråk (sign language channel).

The objective is to upgrade the Harmonic Spectrum video servers we use today to be able to play out and record our new HD video compression format XAVC and to be able to support a broader range of video compression formats.

The video servers in our play-out area are controlled by the Abit automation system. The new video servers will have to comply with industry standards regarding protocols and interoperability to be integrated into this new infrastructure.

## 1.1 Servers for NRK's main continuity/play-out areas

The existing installation consists of four video servers for recording and play-out. The number of channel ports is different between the four servers. We will use the current infrastructure and partly the MediaDirectors and the MediaStores already in use.

- Play-out area Spectrum #1 (in Oslo): 6 play/record and 16 playback channels
- Play-out area Spectrum #2 (in Oslo): 8 playback channels
- Play-out area Spectrum #3 (in Oslo): 3 play/record and 3 playback channels
- Backup play-out area Spectrum (in Trondheim): 2 play/record and 4 playback channels

Details on the current installation is to be found in chapter 2.3 "Model specifications".

We would like the suppliers to respond to all points in this document.

If the Describe box is not checked and the supplier answers Yes to the requirement, no additional text is needed in the Comments box. If the answer is *Partly* or *No*, NRK would like a concise explanation, or "Not relevant" to be written where applicable.

**Please note – fill in your reply Appendix 2: Contractor solution specification – not in this document.**

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## 2. General technical specifications

### 2.1. Product specification and documentation

The Tender must contain product specification/documentation giving complete and detailed information about the product including technical specification, physical specification and power consumption.

### 2.2. Descriptions and specifications

NRK's requirements		Supplier's compliance/response				
No.	Requirement text	D e s c r i b e	Y e s	P a r t i a l l y	N o	Comment/description
	<b>INTEGRATION</b>					
1	The servers will need to be integrated with the Abit automation system in our main play-out area and in our backup play-out area. The automation system is utilizing VDCP as protocol to control the video servers.	X				
	<b>VIDEO QUALITY</b>					
2	The visual video and audible audio quality of the system must be of high broadcast quality.					

TECHNICAL AND PERFORMANCE QUALITY					
3	General: The delivered equipment must be in accordance with international standards and recommendations, where such exists.	X			
4	The system must be suited for live 24/7 broadcast operation. Please describe the level of security and redundancy offered. <ul style="list-style-type: none"> <li>• system drive</li> <li>• file system protection</li> <li>• PSU</li> <li>• network</li> <li>• video channels/video ports</li> <li>• single points of failure in the product</li> </ul>	X			
5	The system should be able to do “delayed playout”, meaning playback of ongoing recordings. How small can this delay be?	X			
6	The system should be able to do back-to-back playback of files with different file formats and codecs, without any delay. Please describe.	X			
7	The system should support 10 Gb/s Ethernet for network connectivity/file transfers.				
8	The system should support simultaneous proxy recording for all channels. Please describe format option for proxy files.				
9	Software/firmware updates must be free of charge or part of a support contract, and must be available via Internet download.	X			
10	The system must be able to record external timecode in the form of LTC or VITC. Please describe.	X			
11	Please describe how short the time can be between the stop of recording one and the start of recording two, when the two recordings are performed on the same video	X			

	channel and in the same codec and format.				
12	The system should support the audio to be carried embedded in the SDI stream for input and output. Please describe how many channels are supported.	X			
	<b>CODEC SUPPORT</b>				
13	The system must be able to play back MPEG IMX intra-frame 50 Mb/s, MPEG-2 4:2:2P@ML, 576i/25 video with 8x 16 or 24 bits (in 32 bits samples) audio channels in AES3, all in an MXF OP1a,eVTR wrapper.	X			
14	The system should be able to record MPEG IMX intra-frame 50 Mb/s, MPEG-2 4:2:2P@ML, 576i/25 video with 8x 16 or 24 bits (in 32 bits samples) audio channels in AES3, all in an MXF OP1a,eVTR wrapper.	X			
15	The system must be able to play back XDCAM HD422 MPEG2 long-GOP 50 Mb/s, MPEG-2 4:2:2P@HL, 1080i/25 video with 8x 16 or 24 bits audio channels, all in an MXF OP1a,RDD9 wrapper.	X			
16	The system should be able to record XDCAM HD422 MPEG2 long-GOP 50 Mb/s, MPEG-2 4:2:2P@HL, 1080i/25 video with 8x 16 or 24 bits audio channels, all in an MXF OP1a,RDD9 wrapper.	X			
17	The system must be able to play back and record Sony XAVC, 100 Mb/s, 1080i/25 video with 16 or 24 bits audio channels, all in an MXF OP1a wrapper. The number of audio channels supported must be at least 8, preferably 16.	X			
18	The system should be able to play back Panasonic AVC-Intra, 100 Mb/s, 1080i/25 video with 16 or 24 bits audio channels, all in an MXF OP1a wrapper. The number of audio channels must be at least 8, preferably 16.	X			
19	The system should support record and playback for both long-GOP and Intra-frame 1080p/50 video for both Sony XAVC and Panasonic AVC-Ultra in an MXF OP1a wrapper	X			

	with 16 or 24 bits audio channels. The number of audio channels supported must be at least 8, preferably 16. Please describe.				
20	The system must be able to implement support for future file formats and codecs in software. As an example, the Long-GOP variants of Sony XAVC and Panasonic AVC-Ultra, is highly desirable for 1080p/50 in the future.	X			
21	The video server should handle the above mentioned video formats natively, that is without transcoding.	X			
<b>SCALABILITY</b>					
22	It is preferable if the video server can be scalable with regards to the number of video channels and storage. Please describe the possibilities for expanding the offered video servers with regards to this. Please specify relevant hardware and software costs. E.g.: Describe the expansion from 8 channels and 29 TB to 16 channels and 58 TB.	X			
23	The system should support or have a strategy for supporting video over IP. Please describe.	X			

### 2.3. Model specifications

The existing four video servers are from the vendor Harmonic and have the specifications listed below. In between we have noted the wanted specifications for the upgraded servers. If relevant we'd like to benefit from any possible trade-in programs for the existing parts that need to be replaced.

#### Play-out area Spectrum #1

- 3x MediaDirector MCP-2102B

- We'd like this to be upgraded to support 10 GbE
- 4x MediaStore type MSS, model # RS1602-FS44, with 16x 300 GB drives
  - A total of 14.4 TB
  - The capacity in the upgraded server needs to be minimum the double; 28.8 TB
- 10x MediaPort MIP-5321
- 4x MediaPort MIP-5401
  - A total of 6 play/record and 16 playback channels
  - The channel counts shall be the same in the upgraded server

### **Play-out area Spectrum #2**

- 1x MediaDirector MCP-2252-41C
  - We'd like this to be upgraded to support 10 GbE
- 1x MediaStore p/n MSS-5016-12H, with 16x 1200 GB drives
  - A total of 14.4 TB
  - The capacity in the upgraded server needs to be minimum the double; 28.8 TB
- 4x MediaPort MIP-5321
  - A total of 8 playback channels
  - The channel count shall be the same in the upgraded server

### **Play-out area Spectrum #3**

- 1x MediaDirector MCP-2252-41C
  - We'd like this to be upgraded to support 10 GbE
- 1x MediaStore p/n MSS-5024-06H, with 24x 600 GB drives drives
  - A total of 10.8 TB
  - The capacity in the upgraded server doesn't need to be expanded
- 3x MIP-7300-M2H
  - A total of 3 play/record and 3 playback channels
  - The channel count shall be the same in the upgraded server

### **Backup play-out area Spectrum**

- 1x MediaDirector MCP-2252-41C
  - We'd like this to be upgraded to support 10 GbE
- 1x MediaStore p/n MSS-5024-06H, with 24x 600 GB drives drives
  - A total of 10,8 TB
  - The capacity in the upgraded server doesn't need to be expanded
- 3x MIP-7301-M2H
  - A total of 2 play/record and 4 playback channels

- The channel count shall be the same in the upgraded server

When the four servers have been upgraded they should support the following video formats in addition to the other video compression formats listed further above in chapter 2.2 “Descriptions and specifications”.

- XAVC Intra Class100, 100 Mb/s, 1080i/25 (25 fps), 1.5 Gb/s
- XAVC Intra Class100, 200 Mb/s, 1080p/50 (50 fps), 3.0 Gb/s

These two formats will be our chosen new HD formats in the years to come. First we will start with the 1080i/25 1.5 Gb/s format and then in a few years time we expect to move to the 1080p/50 3.0 Gb/s format. At that point in time we may be using a mixture of I-frame only and long-GOP of the XAVC video compression family.

The four upgraded servers should also support the following.

- 1080p/50 (3.0 Gb/s) for baseband operation and file transfers in and out for the XAVC compression format, both I-frame only and long-GOP. From the start we will utilize XAVC Intra Class100, 100 Mb/s, 1080i/25, 1.5 Gb/s. We understand that some vendors have the support for AVC/H.264, 200 Mb/s up to Profile level 5.2, 1080p/50 video on the roadmap and this is acceptable.
- Specify the video servers to support the following video compression formats: IMX 50 (play&rec), XDCAM HD422 long-GOP (play&rec), XAVC Intra Class100 (play&rec), AVC-Intra Class 100 (play). The reply must also include a list of prices for relevant hardware and software, and relevant licenses.
- Specify the video server hardware to meet the bandwidth requirements for proxy recording simultaneously with high-res. recording on all bidirectional channels.
- Specify the video server to be configured bandwidth-wise to support at least real-time file transfers of the formats IMX 50, XDCAM HD422 long-GOP, XAVC Intra Class100 and AVC-Intra Class 100 from the video server to an external shared storage (today: a Harmonic MediaGrid) of at least as many streams as can be simultaneously recorded on the server.
- Specify the video server to be configured bandwidth-wise to support real-time or faster than real-time file transfers of the formats IMX 50, XDCAM HD422 long-GOP, XAVC Intra Class100 and AVC-Intra Class 100 from an external shared storage (today: a Harmonic MediaGrid) to the video server of at least as many streams as can be simultaneously played back on the server.

## 2.4. Delivery

The supplier must specify delivery times for orders, with normal and urgent priority. The supplier undertakes to notify NRK of any deviations from normal delivery times prior to ordering so that this is applied to the order for deviations to be applicable.

The supplier guarantees that ordered products and supplementary services;

- a) will be delivered to the agreed location by the agreed time, and
- b) can be commissioned at NRK's production facility right from the agreed delivery date.

NRK reserves the right to establish relevant testing and approval criteria for the video servers.

## **2.5. Customers involvement**

If the Contractor is depending on customers involvement this must be described.

## **3. Necessary additional service/equipment**

### **3.1. Installation services**

The supplier is asked to specify the cost for installation services for the four video servers.

### **3.2. Training**

NRK will require operational and service training on-site: Describe the training that will be provided for NRK personnel that must have the expertise on hardware and software to keep servers running 24/7 and the knowledge to configure the system. Training for around 6 persons is required.

### **3.3. Spare parts**

Consumables and spare parts or functional replacements must be offered for at least five years after initial delivery of the product to NRK. The supplier must specify how long spare parts are bound to be offered.

Maximum delivery times for all spare parts must be stated.

The supplier must attach a list with prices of minimum recommended spare parts to be kept on site; one of each type of disk drives, one or two spare video channel(-s), one of each type of cables.

The supplier must maintain and make available a priced list of recommended tools, hardware and software needed in order to carry out maintenance on the product.

### 3.4. Guarantee

The normal guarantee period must be specified, and this should be at least two years for equipment under this agreement.

The scope of services during the guarantee period and any deviations must be described.

The guarantee period starts from the date on which the product is supplied to NRK.

### 3.5. Service level and Support Maintenance

NRK's estimated life expectancy of this equipment is 6-7 years and therefore the total cost of ownership (tco) has to be taken into consideration when evaluating procurement and service level agreement (SLA). To meet this role NRK's maintenance staff will as a minimum need one of the following levels of Support:

#### 3.5.1. Level 1

Mail and phone support from skilled maintenance staff available Monday to Friday between 9:00AM and 5:00PM.

Please describe your standard SLA level offered closest to the above mentioned requirements. All benefits related to this SLA, including response times, must be described.

#### 3.5.2. Level 2

Mail and phone support from skilled maintenance staff available 24/7.

Please describe your standard SLA level offered closest to the above mentioned requirements. All benefits related to this SLA, including response times, must be described.

## 4. Options

This contract includes an option for NRK to acquire up to 5 additional video servers within 36 months after signing of the contract.

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If NRK chooses to exercise this option the contractor will be asked to submit an offer with an updated Appendix 7 and Appendix 4 for this new video servers. Based on this offer NRK will evaluate if this offer is economically viable compared to issuing a new tender competition.

If NRK decide to use the option, an updated Project plan (Appendix 4) must be agreed upon. Other contractual terms will be the same.

## 5. Prices

All prices must be listed in a spreadsheet, and be attached Appendix 7, where principal and optional components of the video server are listed.