



Contract for LED Video Walls for Studio 5

Appendix 1 Customer Requirement Specification

Reference no.: NRK MA2768/14E LED Video Walls for Studio 5

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Introduction

The Condensated Sale and Purchase Agreement (SSA-K condendated) henceforth named The Agreement has a structure that indicates that Appendix 1 and Appendix 2 contains the same information except for the Contractors reply to the Customers requirements.

Appendix 1 is the same and equal to Appendix 2 minus tables and columns meant for the Contractors reply. Do not write any replies in this document.

1 Customer Requirement Specification

1.1 Overall Objective

This tender includes the acquisition of LED video walls for NRK's main news studio in Oslo – Studio 5. NRK is planning to install two video walls as an important part of a new studio design in our main news studio. Other important parts of the project are to implement a rail based camera robotic system and implement Increased Mosart automation control.

Both video walls is planned to be used for graphics and live video presentation.

NRK asks for two main delivery options for two video walls:

- A. Two equal sized walls – approx. 6.5 by 2 meter.
- B. One wall - approx. 6.5 by 2 meter. The second wall approx. 3.5 by 2 meter. The smaller screen shall fit a 16:9 aspect.

To fit our budget NRK reserves the right to ask for other configurations as well.

The walls is planned be feed from one Vizrt graphic engine each. The signal format will be HDSDI 1080p50.

Our experience is that LED video walls needs a diffusor solution to avoid artefacts like moiré during camera movements in a TV studio setting.

The video walls shall be installed in a relatively small studio measuring approx. 10 by 13 meter. It is therefore essential that the installation do not occupy more floor space than necessary.

1.2 Present state

Studio 5 is today equipped with a projector. Our current plan is not to reuse the projector in the new studio design.

NRK have during last summer installed four LED video walls in Studio 3 here at our Marienlyst site in Oslo.

1.3 How to answer

NRK requires that the bidder answer every question below.

Compliance with requirements not marked with an X in the description column could be answered with a simple X in the answering column. In cases of noncompliance or partly compliance, questions should be answered with a short and concise explanation, or marked not relevant or not applicable if so.

1.4 eneral requirements

This table encompass general system requirements

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
1.	Each of the two screens should appear as one seamless surface without highly visibly joints or edges.	X				
2.	High resolution, brightness and contrast level is essential, as well as easy calibration and colour matching.	X				
3.	Hotspots, visible pixels, interference with TV cameras or other unwanted artefacts, like moiré is not accepted.	X				
4.	Small studio footprint	X				
5.	Low acoustic noise is essential. Noise level should not exceed 35dBA measured one meter in front of the screen. This also includes power supplies, converters, processors and pc's located in studio.	X				
6.	Low power consumption and heat dissipation	X				

1.5 Redundancy and stability

The main use of Studio 5 is for live prime time news broadcasts. System redundancy and stability are therefore essential features.

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
7.	The system must be designed for 24/7 operation.	X				
8.	Stable operation is mandatory.					
9.	Recommended redundancy options shall be listed with prices.	X				
10.	Essential spare parts/components must be available on site.	X				
11.	All system errors should be logged for later analysis.	X				

1.6 Floor space and screen size

Due to limited studio size, the needed floor space for the video walls is a critical factor.

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
12.	Maximum distance between studio walls and the front of the screen should not exceed 1.0 meter. Please specify minimum distance. This shall include sufficient access space for service and maintenance.	X				
13.	Regarding sizes of the walls NRK is asking for two delivery options to be offered: A. Two equal sized walls – approx. 6.5 by 2 meter. B. One wall - approx. 6.5 by 2 meter. The second wall approx. 3.5 by 2 meter. The smaller screen shall fit a 16:9 aspect.	X				
14.	Please specify the individual panel size	X				

1.7 Interfacing

This table encompass interfacing of the video walls

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
15.	A central control system for managing the projectors or LED panels shall be included. This must include a common interface for level control and white balancing.	X				
16.	Main signal interfaces shall be HD SDI 1080p50. Please specify the number of inputs for the two video wall solution options.	X				
17.	Please specify type of SDI>HDMI converter if this is needed.	X				
18.	The video wall system should be compatible with Viz video wall ER.	X				

1.8 Resolution - pixel pitch

NRK is planning to use the video wall as an active element in production. This, in combination with the small studio dimensions and HD cameras close to the video wall, demands for high resolution or small pixel pitch.

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
19.	For the LED video walls, NRK is expecting a pixel pitch less than 3,0 mm. Please specify the pixel pitch for the proposed solution. Please also offer smaller pixel pitch options if this is available.	X				
20.	There shall be a 1:1 pixel ratio between physical pixels and input signal (no scaling).					

1.9 Luminance

This table encompass requirements regarding luminance

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
21.	The video wall solution must be able to deliver minimum 150 cd/m ² measured at the studio side for a 100% white signal (- digital level 940 in a 10 bit system) at all relevant colour temperatures.	X				
22.	The luminance must be adjustable down to 100 cd/m ² without losing details in the dark areas.	X				

1.10 Contrast and reflections

The contrast is highly dependent of the studio lightning. It is therefore essential that the screen surface is reflecting as little incident light as possible

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
23.	Specular reflections (mirror-like) are not accepted.					

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
24.	Diffuse reflections must be as low as possible in order to maximize contrast level in a lit studio.					
25.	The video wall should not deliver more than 0,1 cd/m ² in a completely dark room.					

1.11 Colour temperature

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
26.	The colour temperature should be adjustable between 3200° Kelvin and 6500 ° Kelvin.					
27.	There should be individual adjustment of each of the three colour channels					
28.	All level adjustments should be in real time					

1.12 Uniformity

Luminance and colour temperature uniformity is essential

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
29.	The solution should have automatic colour- and luminance control					
30.	Maximum 20% variation of luminance, measured perpendicular to the screen, is accepted					
31.	Maximum +/- 10 Mired variation in colour temperature (equals +/- 100 ° Kelvin at 3200 ° Kelvin and +/- 300 ° Kelvin variation at 6500 ° Kelvin) is accepted					

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
32.	A LED video wall must be uniform with regard to white level with luminance adjusted all the way down to 100 cd/m ²					

1.13 Calibration and colour matching

Easy calibration and colour matching of the individual LED panels is essential

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
33.	The chromaticity tolerances should follow the specifications in EBU Tech 3213. The reproduction of skin tones will be emphasised in particular.					
34.	The video wall should have minimum 12 bit colour depth					
35.	Please specify the expected time before a recalibration will be needed in order to follow the specifications in EBU Tech 3213.	X				
36.	Please specify the recalibration process, including expected downtime, and all related labour and costs.	X				

1.14 Horizontal viewing angle

A wide viewing angle is an important feature

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
37.	Minimum horizontal viewing angle is 140 °					
38.	Maximum luminance loss at +/- 45 ° is 10%.					
39.	Visible colour changes within the horizontal viewing angle must be avoided.					

1.15 Power consumption and ventilation

Low power consumption will be awarded.

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
40.	Please specify the average power consumption for each of the two screen sizes.	X				
41.	Please specify the maximum power consumption for each of the two screen sizes.	X				
42.	Please describe the heat dissipation principle for the solution and the influence of the diffuser with respect to heat	X				
43.	Please specify the expected lifetime of the solution and possible implications caused by the diffuser	X				

1.16 Noise and safety

A wide viewing angle is an important feature

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
44.	Audible noise should not exceed 35dBA at any point measured 1 meter in front of the screen. This includes power supplies, converters, processors and pc's.	X				
45.	Electric noise causing radio interference or other disturbances to studio equipment is not accepted.	X				
46.	All electronic devices must be EMC tested and comply with the present requirements for CE labelling. EMC test certificate must be provided.	X				
47.	Mechanical safety must be guaranteed. Special precautions must be specified. A detailed drawing of the proposed mechanical solutions must be provided.					

1.17 Suitability with TV cameras

Suitability with TV cameras will be the main quality criteria when evaluating the offers

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
48.	There should be no visible hotspots					
49.	No moiré-effects					
50.	No flickering					
51.	No visible pixels					
52.	No pixel defects					
53.	No visible refraction in the diffusor material					
54.	No other unwanted artefacts visible during normal TV production					

2 Warranty

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
1.	The warranty period shall be two (2) years for equipment and two (2) years for software. Describe warranty period.					
2.	Policy for extended warranties. Price must be visualized in Appendix 7 section 2.3.	X				

3 Options to be offered

This table encompass subsequent purchases by the NRK within 24 months which needs compliance or compatibility to the primary delivery

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
3.	Approx. 3.5 x 2 meter video wall for a smaller TV studio with equal specification.	X				

4 Documentation, Training, Tools, Spare Parts and Service and support

4.1 Documentation

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
1.	Documentation: The Contractor shall produce service, user documentation, software/firmware upgrades available by Internet download link.	X				

4.2 Training

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
1.	NRK will utilize its own service personnel for 1 st line support. NRK requires training of service personnel for the delivered system. Prices must be specified in Appendix 7 section 2.3.	X				

4.3 Tools

This table encompasses the Tools List:

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
1.	Tools: A list of recommended tools for maintenance (hardware and software). Prices must be specified in Appendix 7 section 2.3.	X				
2.	Internet download page for software downloads.	X				

4.4 Spare Parts List and Time to Repair

This table encompasses the Spare Parts List:

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
1.	Spare parts: Present a list for the most relevant spare parts, and delivery time for such parts. The number of spare LED panels needed for 5 years (12 hours/day) of operation shall be included in the main offer. Mechanical support structure, assembly and alignment shall also be included. Prices must be specified in spread sheet, Appendix 7 section 2.3.	X				
2.	Time to repair: Describe typical Time To Repair for the most crucial elements of the system.	X				

4.5 Service and support

This table encompasses Service and support:

NRKs requirements			Suppliers fulfilment/ response			
No	Requirement description	Describe	Yes	Partly	No	Comment/response
1.	SLA: NRK rarely utilizes Service Level Agreements, but aim to do maintenance, error correction and spare parts replacement ourselves. Nevertheless, it is interesting to see what the Contractor can provide of such, and what the accompanying prices and lead times are. If the combination is good, we might choose to make use of SLA. Provide info about Service Level Grades. Prices must be specified in Appendix 7 section 2.3.	X				

5 Other information the tenderer wants to transmit to NRK

Any other suggestions/options can be inserted here:

Section 2.1.1 Equipment and software

The necessity of customizing standard software:

(If it is necessary to customize standard software to meet the requirements of the Customer in relation to the deliverables, cf. Appendix 1)

Technical platform upgrade:

(If an upgrade of the Customer's technical platform is necessary to utilize the deliverables, the Contractor shall specify the details here)

Section 2.1.2 Documentation, training, other assistance etc.

Documentation:

The documentation is to be delivered in the following medium(s) and format(s):

Training:

The group and/or number of employees to participate in training:

Training shall be provided on the following premises:

(To be filled in if training is not provided on the premises of the Customer, cf. section 2.1.2)

Section 4.3 Free Software

Free software used in connection with the deliverables:

Name of the free software	Free software license:

A copy of the license terms governing the relevant free software shall be attached.

Contractor’s review of its assessment of whether the free software can infringe rights of third parties:

Effects of distributing free software to others: