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**Title: 3DV EE4 Results on the Café Sequence**  
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## 1. Introduction

This document reports experimental results of EE4 on 'Cafe' sequence in response to N11831 [1]. We generated the depth video using the manual operation as described in M20001 [2], and conducted EE4 experiments with the resultant depth data. According to the recommended target bitrates of each 2-view or 3-view configuration, we selected four combinations of QP of 'Cafe' sequence, and we prepared the viewing materials for stereoscopic display test and 9-view display respectively.

Table 1. Coding conditions

Reference software		JMVC 8.3
GOP size		15
Number of frames		300
Search range		96
View number	2-view	2, 4
	3-view	2, 3, 4

## 2. 2-view Configuration

We selected the best combinations of QPs for color and depth sequences based on the target bit rates; 0.6, 0.8, 1.0, 1.5 Mbps for 'Cafe'. In the case of 2-view configuration, the total bit rate is calculated by

$$\text{Total bit rate} = \text{Rate}(L\_color) + \text{Rate}(R\_color) + \text{Rate}(L\_depth) + \text{Rate}(R\_depth)$$

Table 2 shows the total bit rates and PSNR of synthesized images for 2-view configuration. The synthesis results for View3 are obtained by the decoded pairs of reconstructed color and depth files. We allowed 5% margin for each target bitrates.

Table 2. Total bit rates and PSNR of synthesized images for 2-view configuration

Target Bit rates (Mbps)	Color		Depth		Total bit rate (kbps)	PSNR of syn. for View3 (dB)
	QP	Bit rate (kbps)	QP	Bit rate (kbps)		
0.6	44	430.20	47	163.92	594.12	30.20
0.8	40	602.17	44	221.34	823.51	31.65
1.0	39	676.77	41	314.57	991.34	32.31
1.5	34	1114.28	38	441.85	1556.13	33.33

### 3. 3-view Configuration

In the case of 3-view configuration, coding experiments are performed based on the target bit rates, 0.75, 0.9, 1.25, 2 Mbps, for 'Cafe' sequence. The total bit rate is obtained by

$$\text{Total bit rate} = \text{Rate(L\_color)} + \text{Rate(C\_color)} + \text{Rate(R\_color)} + \text{Rate(L\_depth)} + \text{Rate(C\_depth)} + \text{Rate(R\_depth)}$$

Table 3 describes the total bit rates and PSNR of synthesized images for 3-view configuration. The synthesis results for View3 are obtained by the decoded pairs of reconstructed color and depth files. Figure 1 shows the rendering results of 3<sup>rd</sup> synthesized view at different bit rates. Figure 2 shows the viewpoints for the stereoscopic viewing test according to each configuration, and Figure 3 explains the generation of virtual views for 9-view display test.

Table 3. Total bit rates and PSNR of synthesized images for 3-view configuration

Target Bit rates (Mbps)	Color		Depth		Total bit rate (kbps)	PSNR of syn. for View3 (dB)
	QP	Bit rate (kbps)	QP	Bit rate (kbps)		
0.75	45	535.76	48	217.59	753.35	29.72
0.90	42	666.00	46	249.60	915.60	30.70
1.25	38	948.63	43	354.06	1302.69	32.02
2.00	34	1431.00	38	630.10	2061.10	33.33



< R1: 0.6M, QP (44, 47) > < R2: 0.8M, QP (40, 44) > < R3: 1.0M, QP (39, 41) > < R4: 1.5M, QP (34, 38) >

(a) Results of 2-view configuration



< R1: 0.75M QP (45, 48) > < R2: 0.9M, QP (42, 46) > < R3: 1.25M, QP (38, 43) > < R4: 2.0M, QP (34, 38) >

(b) Results of 3-view configuration

Figure 1. 3<sup>rd</sup> synthesized views at different bit rates

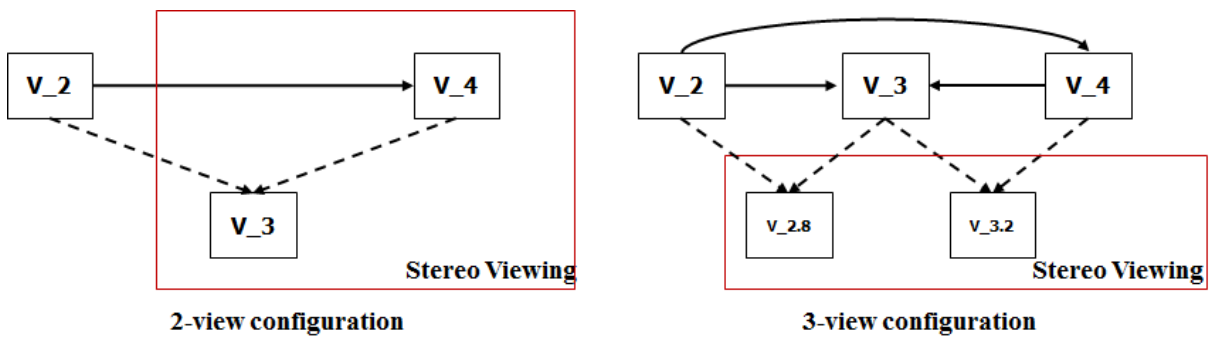


Figure 2. Stereoscopic viewing test scenario according to each configuration

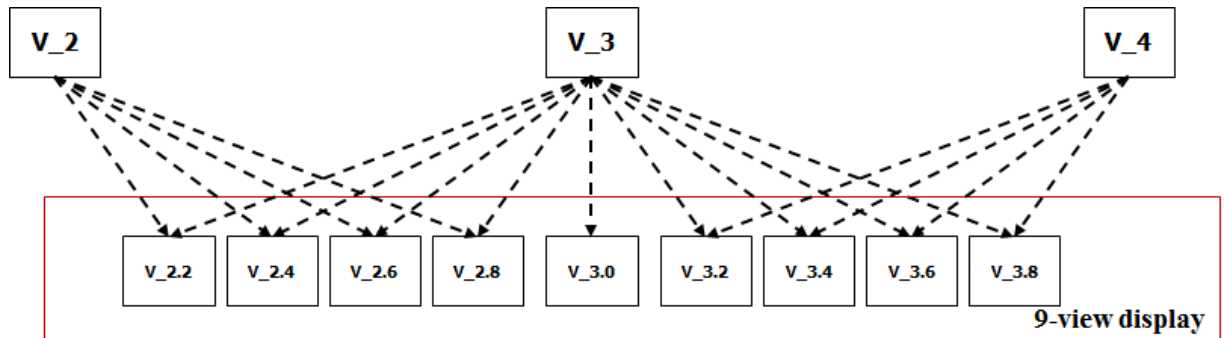


Figure 3. Virtual view generation for stereo and 9-view display tests

#### 4. Conclusion

In this contribution, we have reported the result of EE4 on ‘Café’ sequence using improved depth data. According to the target bitrates, we have shown proper QP sets and corresponding rendering results in terms of PSNR. The experimental results showed that the quality change is noticeable according to each target bit rate. Therefore, the reported QP sets need to be fixed for the future 3DVC activities. We are ready to demonstrate the visual materials of the viewing tests in 96th Geneva meeting.

#### 5. Acknowledgements

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#### 6. References

- [1] ISO/IEC JTC1/SC29/WG11 “Description of Exploration Experiments in 3D Video Coding,” N11831, Jan. 2011.
- [2] ISO/IEC JTC1/SC29/WG11 “3DV EE1 Results on Café,” M20001, March 2011.