CCITT SGXV
Working Party XV/1
Specialists Group on Coding for Visual Telephony

Doc. # 393
Sept. 19, 1988

SOURCE: Bellcore
TITLE: Computer Evaluation of Reference Model 5

1. Introduction

As depicted in Document 339 the reference model 5 using macro blocks scheme has been implemented at Bellcore. In this document we present computer simulation results for four CCITT sequences (e.g.; Miss America, Claire, Salesman, Swing).

TABLE I

Statistics: RM5 macroblock scheme
Bit Rate : 60 Kbit/s
Sequence : Miss America

Date: Sep. 19, 1988
Frame Rate: 10 Hz
Institute: Bellcore

ITEM			15th Picture	Mean Whole Seq. (2-49)
1. RMS for luminance			3.12	3.34
2. SNR for luminance			38.25	37.69
for chrominance (u)			38.21	37.70
for chrominance (v)			39.46	38.53
3. Mean value of step size			19.89	24.11
4. Mean value of the number of non-zero coefficient			2.39	1.91
5. Mean value of the number of zeroes before last non-zero coefficient			5.48	4.80
6. Block type of MACRO	FIXED		257	232
	CODED MC		46	74
	FIXED MC		7	25
	CODED		86	65
7. Block type of Y	FIXED		1296	1127
	CODED MC		100	131
	FIXED MC		112	264
	CODED		76	61
8. Block type of UV	FIXED		701	700
	CODED		91	92
9. Number of bits	Macro attributes		505	546
	End of block		1584	1669
	Motion vectors		424	791
	Coefficients	Y	2774	2176
		U	355	272
		V	196	302
		Total	3325	2750
	Total		5838	5756

TABLE II

Statistics: RM5 macroblock scheme
Bit Rate : 60 Kbit/s
Sequence : Claire

Date: Sep. 19, 1988
Frame Rate: 10 Hz
Institute: Bellcore

ITEM			15th Picture	Mean Whole Seq. (2-80)
1. RMS for luminance			3.25	3.51
2. SNR for luminance			37.90	37.52
for chrominance (u)			38.40	38.13
for chrominance (v)			41.30	40.82
3. Mean value of step size			21.33	25.03
4. Mean value of the number of non-zero coefficient			2.35	2.61
5. Mean value of the number of zeroes before last non-zero coefficient			8.66	7.79
6. Block type of MACRO	FIXED		271	282
	CODED MC		29	46
	FIXED MC		1	9
	CODED		95	59
7. Block type of Y	FIXED		1308	1267
	CODED MC		71	121
	FIXED MC		49	101
	CODED		156	96
8. Block type of UV	FIXED		752	751
	CODED		40	41
9. Number of bits	Macro attributes		497	431
	End of block		1488	1260
	Motion vectors		240	443
	Coefficients	Y	3221	3349
		U	182	202
		V	107	104
		Total	3510	3655
	Total		5735	5789

TABLE III

Statistics: RM5 macroblock scheme
Bit Rate : 60 Kbit/s
Sequence : Salesman

Date: Sep. 19, 1988
Frame Rate: 10 Hz
Institute: Bellcore

ITEM			15th Picture	Mean Whole Seq. (2-149)
1. RMS for luminance			9.04	7.94
2. SNR for luminance			29.01	30.24
for chrominance (u)			36.51	37.47
for chrominance (v)			37.48	38.27
3. Mean value of step size			42.00	34.74
4. Mean value of the number of non-zero coefficient			1.73	2.22
5. Mean value of the number of zeroes before last non-zero coefficient			9.06	10.70
6. Block type of MACRO	FIXED		231	262
	CODED MC		45	36
	FIXED MC		11	7
	CODED		109	91
7. Block type of Y	FIXED		1201	1265
	CODED MC		96	89
	FIXED MC		128	83
	CODED		159	147
8. Block type of UV	FIXED		777	781
	CODED		15	11
9. Number of bits	Macro attributes		590	503
	End of block		1848	1517
	Motion vectors		448	345
	Coefficients	Y	2886	3413
		U	64	28
		V	55	20
		Total	3005	3461
	Total		5891	5826

TABLE IV

Statistics: RM5 macroblock scheme
Bit Rate : 60 Kbit/s
Sequence : Swing

Date: Sep. 19, 1988
Frame Rate: 10 Hz
Institute: Bellcore

ITEM			15th Picture	Mean Whole Seq. (2-125)
1. RMS for luminance			9.82	7.83
2. SNR for luminance			28.28	30.95
for chrominance (u)			29.80	32.69
for chrominance (v)			31.01	33.63
3. Mean value of step size			44.56	29.18
4. Mean value of the number of non-zero coefficient			1.20	1.92
5. Mean value of the number of zeroes before last non-zero coefficient			14.84	19.31
6. Block type of MACRO	FIXED		230	273
	CODED MC		6	8
	FIXED MC		2	2
	CODED		158	113
7. Block type of Y	FIXED		1372	1381
	CODED MC		4	20
	FIXED MC		28	22
	CODED		180	162
8. Block type of UV	FIXED		737	747
	CODED		55	45
9. Number of bits	Macro attributes		677	514
	End of block		1968	1454
	Motion vectors		64	83
	Coefficients	Y	2236	3169
		U	271	385
		V	262	224
		Total	2769	3778
	Total		5478	5829