

CODE & BINNING

LH351B – 3535 Ceramic LED @85°C



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SAMSUNG ELECTRONICS

95, Samsung2-Ro, Giheung-Gu,
Yongin-City, Gyeonggi-Do 446-711, KOREA



1. Product Code Information

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
S	P	H	W	H	1	L	3	D	3	0	E	D	4	V	0	G	3

Code			PKG information	Specification					
1	2	3	Samsung Package High Power						
4	5	Color	WH	White					
6	Product Version								
7	8	Product	L3	LH351					
9	Lens type								
9			D	Dome Lens					
10	Operating condition								
10			3	Max 3 Watt					
11	Not defined								
11			0	Default					
12		CRI	C	Min. 70+					
			D	Min. 75+					
			E	Min. 80+					
			G	Min. 90+					
13	14	V _F	D1	2.6~2.7 V	D4				
			E1	2.7~2.8 V					
			F1	2.8~2.9 V					
			G1	2.9~3.0 V					
15	16	CCT	W0	2700K					
			V0	3000K					
			U0	3500K					
			T0	4000K					
			R0	5000K					
			Q0	5700K					
			P0	6500K					
			N0	7600K					
17	18	Luminous Flux	E1	80~90 lm	E8 ¹⁾				
			F1	90~100 lm		F7			
			G1	100~110 lm			G6		
			H1	110~120 lm				H5	
			J1	120~130 lm					J4
			K1	130~140 lm					
			M1	140~150 lm					
			N1	150~160 lm					
1) Digit 17 : Min. spec. Digit 18 : The number of high bin rank from Min. spec. Ex) F1 = 90~100 lm, F7 = 90~160 lm									



2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$)

Nominal CCT	Product Code	Flux Rank	Sorting Condition Flux @350mA	
			Flux Bin	Flux Range
2700K	SPHWH1L3D30ED4W0F3	F3	F1	90 ~ 100
			G1	100 ~ 110
			H1	110 ~ 120
	SPHWH1L3D30ED4WPF3	F3	F1	90 ~ 100
			G1	100 ~ 110
			H1	110 ~ 120
	SPHWH1L3D30ED4WMF3	F3	F1	90 ~ 100
			G1	100 ~ 110
			H1	110 ~ 120
	SPHWH1L3D30ED4W0G3	G3	G1	100 ~ 110
			H1	110 ~ 120
			J1	120 ~ 130
SPHWH1L3D30ED4WPG3	G3	G1	100 ~ 110	
		H1	110 ~ 120	
		J1	120 ~ 130	
SPHWH1L3D30ED4WMG3	G3	G1	100 ~ 110	
		H1	110 ~ 120	
		J1	120 ~ 130	
3000K	SPHWH1L3D30ED4V0G3	G3	G1	100 ~ 110
			H1	110 ~ 120
			J1	120 ~ 130
	SPHWH1L3D30ED4VPG3	G3	G1	100 ~ 110
			H1	110 ~ 120
			J1	120 ~ 130
SPHWH1L3D30ED4VMG3	G3	G1	100 ~ 110	
		H1	110 ~ 120	
		J1	120 ~ 130	
3500K	SPHWH1L3D30ED4U0G3	G3	G1	100 ~ 110
			H1	110 ~ 120
			J1	120 ~ 130
	SPHWH1L3D30ED4UPG3	G3	G1	100 ~ 110
			H1	110 ~ 120
			J1	120 ~ 130
SPHWH1L3D30ED4UMG3	G3	G1	100 ~ 110	
		H1	110 ~ 120	
		J1	120 ~ 130	



2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$) (Continued)

Nominal CCT	Product Code	Flux Rank	Sorting Condition Flux @350mA	
			Flux Bin	Flux Range
4000K	SPHWH1L3D30CD4T0J3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150
	SPHWH1L3D30CD4TPJ3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150
	SPHWH1L3D30CD4TMJ3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150
	SPHWH1L3D30CD4T0K3	K3	K1	130 ~ 140
			M1	140 ~ 150
			N1	150 ~ 160
	SPHWH1L3D30CD4TPK3	K3	K1	130 ~ 140
			M1	140 ~ 150
			N1	150 ~ 160
	SPHWH1L3D30CD4TMK3	K3	K1	130 ~ 140
			M1	140 ~ 150
			N1	150 ~ 160
	SPHWH1L3D30ED4T0G3	G3	G1	100 ~ 110
			H1	110 ~ 120
			J1	120 ~ 130
	SPHWH1L3D30ED4TPG3	G3	G1	100 ~ 110
			H1	110 ~ 120
			J1	120 ~ 130
SPHWH1L3D30ED4TMG3	G3	G1	100 ~ 110	
		H1	110 ~ 120	
		J1	120 ~ 130	



2. Luminous Flux Bins ($T_j = 85^\circ\text{C}$) (Continued)

Nominal CCT	Product Code	Flux Rank	Sorting Condition Flux @350mA	
			Flux Bin	Flux Range
5000K	SPHWH1L3D30CD4RTJ3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150
	SPHWH1L3D30CD4RTK3	K3	K1	130 ~ 140
			M1	140 ~ 150
			N1	150 ~ 160
	SPHWH1L3D30DD4RTJ3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150
	SPHWH1L3D30DD4RTK3	K3	K1	130 ~ 140
			M1	140 ~ 150
			N1	150 ~ 160
5700K	SPHWH1L3D30CD4QTJ3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150
	SPHWH1L3D30CD4QTK3	K3	K1	130 ~ 140
			M1	140 ~ 150
			N1	150 ~ 160
	SPHWH1L3D30DD4QTJ3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150
	SPHWH1L3D30DD4QTK3	K3	K1	130 ~ 140
			M1	140 ~ 150
			N1	150 ~ 160
6500K	SPHWH1L3D30CD4PTJ3	J3	J1	120 ~ 130
			K1	130 ~ 140
			M1	140 ~ 150



3. Color Bins ($T_j = 85^\circ\text{C}$)

3-1) Color Binning

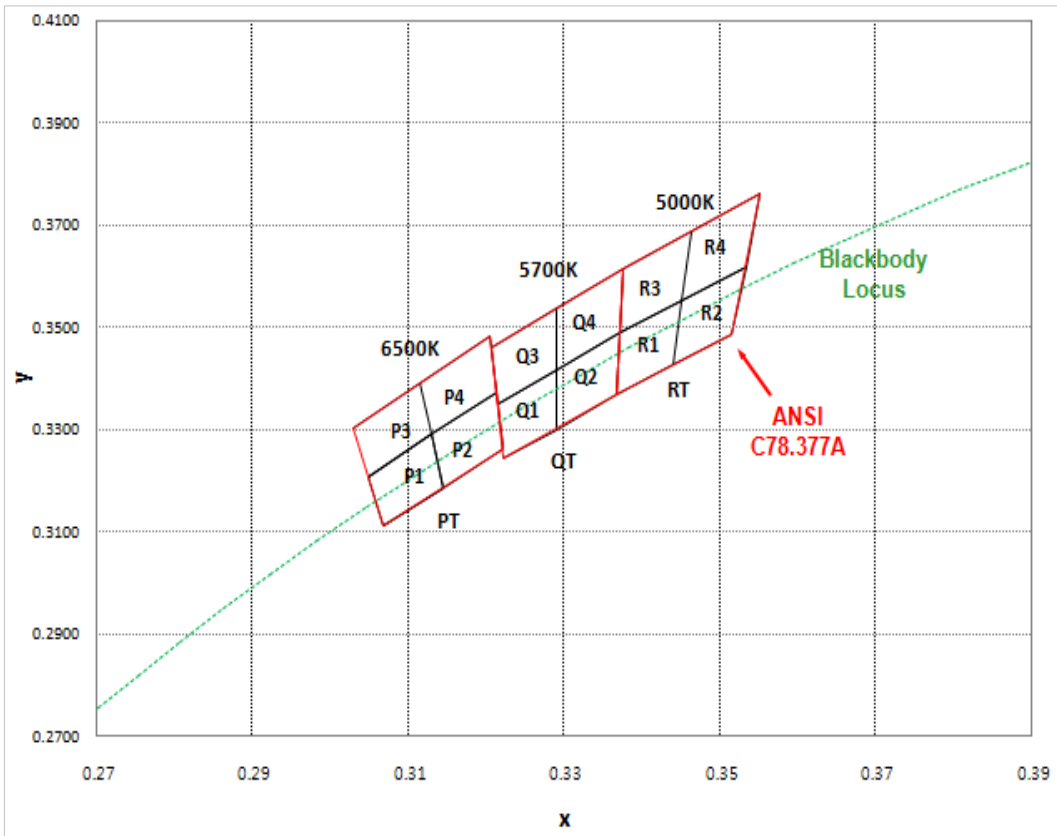
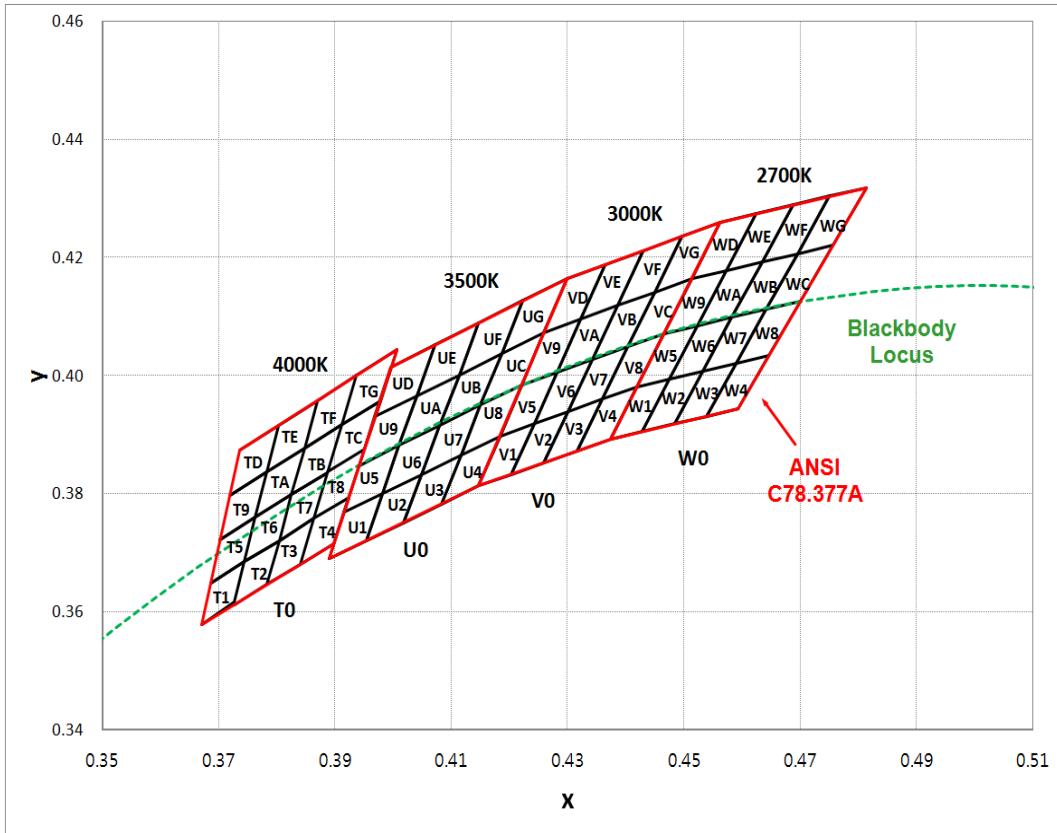
Nominal CCT	Product Code	Color Rank	Chromaticity Bins
2700K	SPHWH1L3D30ED4W0F3	W0 (Whole Bin)	W1,W2,W3,W4,W5,W6,W7,W8, W9,WA,WB,WC,WD,WE,WF,WG
	SPHWH1L3D30ED4WPF3	WP (Quarter Bin)	W6,W7,WA,WB
	SPHWH1L3D30ED4WMF3	WM (MacAdam 3-Step)	-
	SPHWH1L3D30ED4W0G3	W0 (Whole Bin)	W1,W2,W3,W4,W5,W6,W7,W8, W9,WA,WB,WC,WD,WE,WF,WG
	SPHWH1L3D30ED4WPG3	WP (Quarter Bin)	W6,W7,WA,WB
	SPHWH1L3D30ED4WMG3	WM (MacAdam 3-Step)	-
3000K	SPHWH1L3D30ED4V0G3	V0 (Whole Bin)	V1,V2,V3,V4,V5,V6,V7,V8, V9,VA,VB,VC,VD,VE,VF,VG
	SPHWH1L3D30ED4VPG3	VP (Quarter Bin)	V6,V7,VA,VB
	SPHWH1L3D30ED4VMG3	VM (MacAdam 3-Step)	-
3500K	SPHWH1L3D30ED4U0G3	U0 (Whole Bin)	U1,U2,U3,U4,U5,U6,U7,U8, U9,UA,UB,UC,UD,UE,UF,UG
	SPHWH1L3D30ED4UPG3	UP (Quarter Bin)	U6,U7,UA,UB
	SPHWH1L3D30ED4UMG3	UM (MacAdam 3-Step)	-

3. Color Bins ($T_j = 85^\circ\text{C}$)

3-1) Color Binning

Nominal CCT	Product Code	Color Rank	Chromaticity Bins
4000K	SPHWH1L3D30CD4T0J3	T0 (Whole Bin)	T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG
	SPHWH1L3D30CD4TPJ3	TP (Quarter Bin)	T6,T7,TA,TB
	SPHWH1L3D30CD4TMJ3	TM (MacAdam 3-Step)	-
	SPHWH1L3D30CD4T0K3	T0 (Whole Bin)	T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG
	SPHWH1L3D30CD4TPK3	TP (Quarter Bin)	T6,T7,TA,TB
	SPHWH1L3D30CD4TMK3	TM (MacAdam 3-Step)	-
	SPHWH1L3D30ED4T0G3	T0 (Whole Bin)	T1,T2,T3,T4,T5,T6,T7,T8, T9,TA,TB,TC,TD,TE,TF,TG
	SPHWH1L3D30ED4TPG3	TP (Quarter Bin)	T6,T7,TA,TB
	SPHWH1L3D30ED4TMG3	TM (MacAdam 3-Step)	-
5000K	SPHWH1L3D30CD4RTJ3	RT (Half Bin)	R1,R2,R3,R4
	SPHWH1L3D30CD4RTK3		
	SPHWH1L3D30DD4RTJ3		
	SPHWH1L3D30DD4RTK3		
5700K	SPHWH1L3D30CD4QTJ3	QT (Half Bin)	Q1,Q2,Q3,Q4
	SPHWH1L3D30DD4QTJ3		
6500K	SPHWH1L3D30CD4PTJ3	PT (Half Bin)	P1,P2,P3,P4

3-2) Chromaticity Region & Coordinates





3-2) Chromaticity Region & Coordinates (Continued)

Region	CIE X	CIE Y	Region	CIE X	CIE Y	Region	CIE X	CIE Y	Region	CIE X	CIE Y
W rank (2700K)						V rank (3000K)					
W1	0.4373	0.3893	W9	0.4465	0.4071	V1	0.4147	0.3814	V9	0.4221	0.3984
	0.4418	0.3981		0.4513	0.4164		0.4183	0.3898		0.4259	0.4073
	0.4475	0.3994		0.4573	0.4178		0.4242	0.3919		0.4322	0.4096
	0.4428	0.3906		0.4523	0.4085		0.4203	0.3833		0.4281	0.4006
W2	0.4428	0.3906	WA	0.4523	0.4085	V2	0.4203	0.3833	VA	0.4281	0.4006
	0.4475	0.3994		0.4573	0.4178		0.4242	0.3919		0.4322	0.4096
	0.4532	0.4008		0.4634	0.4193		0.4300	0.3939		0.4385	0.4119
	0.4483	0.3919		0.4582	0.4099		0.4259	0.3853		0.4342	0.4028
W3	0.4483	0.3919	WB	0.4582	0.4099	V3	0.4259	0.3853	VB	0.4342	0.4028
	0.4532	0.4008		0.4634	0.4193		0.4300	0.3939		0.4385	0.4119
	0.4589	0.4021		0.4695	0.4207		0.4359	0.3960		0.4449	0.4141
	0.4538	0.3931		0.4641	0.4112		0.4316	0.3873		0.4403	0.4049
W4	0.4538	0.3931	WC	0.4641	0.4112	V4	0.4316	0.3873	VC	0.4403	0.4049
	0.4589	0.4021		0.4695	0.4207		0.4359	0.3960		0.4449	0.4141
	0.4646	0.4034		0.4756	0.4221		0.4418	0.3981		0.4513	0.4164
	0.4593	0.3944		0.4700	0.4126		0.4373	0.3893		0.4465	0.4071
W5	0.4418	0.3981	WD	0.4513	0.4164	V5	0.4183	0.3898	VD	0.4259	0.4073
	0.4465	0.4071		0.4562	0.4260		0.4221	0.3984		0.4299	0.4165
	0.4523	0.4085		0.4624	0.4274		0.4281	0.4006		0.4364	0.4188
	0.4475	0.3994		0.4573	0.4178		0.4242	0.3919		0.4322	0.4096
W6	0.4475	0.3994	WE	0.4573	0.4178	V6	0.4242	0.3919	VE	0.4322	0.4096
	0.4523	0.4085		0.4624	0.4274		0.4281	0.4006		0.4364	0.4188
	0.4582	0.4099		0.4687	0.4289		0.4342	0.4028		0.4430	0.4212
	0.4532	0.4008		0.4634	0.4193		0.4300	0.3939		0.4385	0.4119
W7	0.4532	0.4008	WF	0.4634	0.4193	V7	0.4300	0.3939	VF	0.4385	0.4119
	0.4582	0.4099		0.4687	0.4289		0.4342	0.4028		0.4430	0.4212
	0.4641	0.4112		0.4750	0.4304		0.4403	0.4049		0.4496	0.4236
	0.4589	0.4021		0.4695	0.4207		0.4359	0.3960		0.4449	0.4141
W8	0.4589	0.4021	WG	0.4695	0.4207	V8	0.4359	0.3960	VG	0.4449	0.4141
	0.4641	0.4112		0.4750	0.4304		0.4403	0.4049		0.4496	0.4236
	0.4700	0.4126		0.4813	0.4319		0.4465	0.4071		0.4562	0.4260
	0.4646	0.4034		0.4756	0.4221		0.4418	0.3981		0.4513	0.4164



3-2) Chromaticity Region & Coordinates (Continued)

Region	CIE X	CIE Y	Region	CIE X	CIE Y	Region	CIE X	CIE Y	Region	CIE X	CIE Y
U rank (3500K)						T rank (4000K)					
U1	0.3889	0.3690	U9	0.3941	0.3848	T1	0.367	0.3578	T9	0.3702	0.3722
	0.3915	0.3768		0.3968	0.3930		0.3726	0.3612		0.3763	0.376
	0.3981	0.3800		0.4040	0.3966		0.3744	0.3685		0.3782	0.3837
	0.3953	0.3720		0.4010	0.3882		0.3686	0.3649		0.3719	0.3797
U2	0.3953	0.3720	UA	0.4010	0.3882	T2	0.3726	0.3612	TA	0.3763	0.376
	0.3981	0.3800		0.4040	0.3966		0.3783	0.3646		0.3825	0.3798
	0.4048	0.3832		0.4113	0.4001		0.3804	0.3721		0.3847	0.3877
	0.4017	0.3751		0.4080	0.3916		0.3744	0.3685		0.3782	0.3837
U3	0.4017	0.3751	UB	0.4080	0.3916	T3	0.3783	0.3646	TB	0.3825	0.3798
	0.4048	0.3832		0.4113	0.4001		0.384	0.3681		0.3887	0.3836
	0.4116	0.3865		0.4186	0.4037		0.3863	0.3758		0.3912	0.3917
	0.4082	0.3782		0.4150	0.3950		0.3804	0.3721		0.3847	0.3877
U4	0.4082	0.3782	UC	0.4150	0.3950	T4	0.384	0.3681	TC	0.3887	0.3837
	0.4116	0.3865		0.4186	0.4037		0.3898	0.3716		0.395	0.3875
	0.4183	0.3898		0.4259	0.4073		0.3924	0.3794		0.3978	0.3958
	0.4147	0.3814		0.4221	0.3984		0.3863	0.3758		0.3912	0.3917
U5	0.3915	0.3768	UD	0.3968	0.3930	T5	0.3686	0.3649	TD	0.3719	0.3797
	0.3941	0.3848		0.3996	0.4015		0.3744	0.3685		0.3782	0.3837
	0.4010	0.3882		0.4071	0.4052		0.3763	0.376		0.3802	0.3916
	0.3981	0.3800		0.4040	0.3966		0.3702	0.3722		0.3736	0.3874
U6	0.3981	0.3800	UE	0.4040	0.3966	T6	0.3744	0.3685	TE	0.3782	0.3837
	0.4010	0.3882		0.4071	0.4052		0.3804	0.3721		0.3847	0.3877
	0.4080	0.3916		0.4146	0.4089		0.3825	0.3798		0.3869	0.3958
	0.4048	0.3832		0.4113	0.4001		0.3763	0.376		0.3802	0.3916
U7	0.4048	0.3832	UF	0.4113	0.4001	T7	0.3804	0.3721	TF	0.3847	0.3877
	0.4080	0.3916		0.4146	0.4089		0.3863	0.3758		0.3912	0.3917
	0.4150	0.3950		0.4222	0.4127		0.3887	0.3836		0.3937	0.4001
	0.4116	0.3865		0.4186	0.4037		0.3825	0.3798		0.3869	0.3958
U8	0.4116	0.3865	UG	0.4186	0.4037	T8	0.3863	0.3758	TG	0.3912	0.3917
	0.4150	0.3950		0.4222	0.4127		0.3924	0.3794		0.3978	0.3958
	0.4221	0.3984		0.4299	0.4165		0.395	0.3875		0.4006	0.4044
	0.4183	0.3898		0.4259	0.4073		0.3887	0.3836		0.3937	0.4001



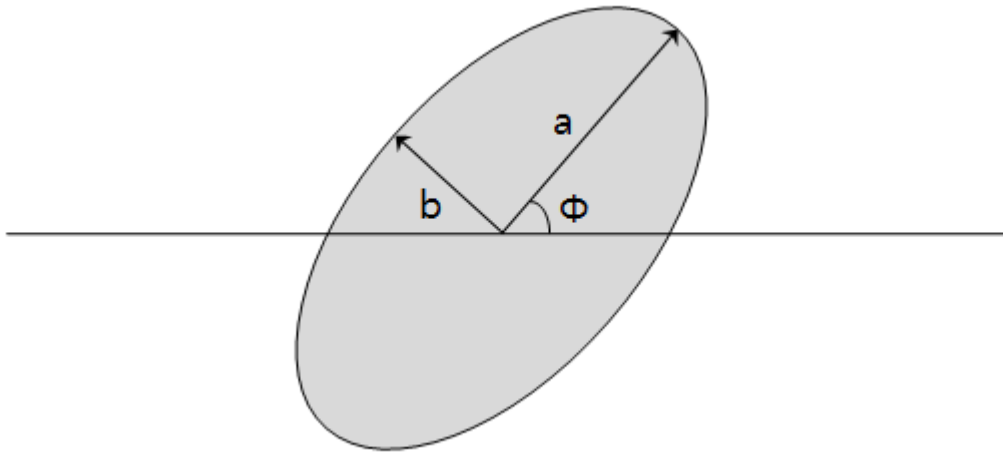
3-2) Chromaticity Region & Coordinates (Continued)

Region	CIE X	CIE Y	Region	CIE X	CIE Y	Region	CIE X	CIE Y
R rank (5000K)			Q rank (5700K)			P rank (6500K)		
R1	0.3371	0.3490	Q1	0.3215	0.3350	P1	0.3068	0.3113
	0.3451	0.3554		0.3290	0.3417		0.3144	0.3186
	0.3440	0.3427		0.3290	0.3300		0.3130	0.3290
	0.3366	0.3369		0.3222	0.3243		0.3048	0.3207
R2	0.3451	0.3554	Q2	0.3290	0.3417	P2	0.3144	0.3186
	0.3533	0.3620		0.3371	0.3490		0.3221	0.3261
	0.3515	0.3487		0.3366	0.3369		0.3213	0.3373
	0.3440	0.3427		0.3290	0.3300		0.3130	0.3290
R3	0.3376	0.3616	Q3	0.3207	0.3462	P3	0.3048	0.3207
	0.3463	0.3687		0.3290	0.3538		0.3130	0.3290
	0.3451	0.3554		0.3290	0.3417		0.3115	0.3391
	0.3371	0.3490		0.3215	0.3350		0.3028	0.3304
R4	0.3463	0.3687	Q4	0.3290	0.3538	P4	0.3130	0.3290
	0.3551	0.3760		0.3376	0.3616		0.3213	0.3373
	0.3533	0.3620		0.3371	0.3490		0.3205	0.3481
	0.3451	0.3554		0.3290	0.3417		0.3115	0.3391

Notes:

SAMSUNG ELECTRONICS maintains ± 0.005 tolerance of CCx, CCy

3-3) MacAdam 3-step Ellipse



Nominal CCT	Center		Rotation Angle	a	b
	CIE X	CIE Y			
2700K	0.4578	0.4101	53.70	0.0081	0.0042
3000K	0.4338	0.4030	53.22	0.0083	0.0041
3500K	0.4073	0.3917	54.00	0.0093	0.0041
4000K	0.3818	0.3797	53.72	0.0094	0.0040

Notes:

SAMSUNG ELECTRONICS maintains ± 0.005 tolerance of CCx, CCy



Revision History

Date	Revision History	Writer	
		Drawn	Approved
2013.12.03	New version	I.J.PYEON	Y.T.KIM
2013.12.19	<ul style="list-style-type: none">- Added New Flux Rank· 2700K (CRI80) G3 rank· 4000K (CRI70) K3 rank	I.J.PYEON	Y.T.KIM