

EMC TEST REPORT

Project No.	LBE073255	Revision No.	None	
Applicant	Name of organization	Samsung Electronics Co., Ltd.		
	Address	416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do 443-742 Korea		
	Date of application	2007.10.12		
EUT Equipment Under Test	Type of device	Class B personal computers and peripherals		
	Equipment authorization	☐ Declaration of Conformity ☒ Certification ☐ Verification		
	FCC ID	A3LCLP310N		
	Kind of product	Printer		
	Model No.	CLP-310N		
		Variant Model No.	CLP-310, CLP-315, CLP-315N	
Applied Standards		FCC Part 15, Subpart B / ANSI C63.4-2003		
Issue date		2007.10.29		

Test result : **Complied**

The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

Tested by : Young Ju, Ryu

Y. J. Ryu

Reviewed by : No Cheon, Park

N. C. Park

This report is the test result about the sphere accredited by KOLAS which signed the Mutual Recognition Arrangement of International Laboratory Accreditation Cooperation.
The test results in this report only apply to the tested sample. This report must not be reproduced, except in full, without written permission from SEC EMC Laboratory.

SAMSUNG

SEC EMC Laboratory

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1. Summary of test results

1.1 Emission

The EUT has been tested according to the following specifications:

Applied	Test type	Applied standard	Result	Remarks
☒	Conducted Disturbance	FCC Part 15 Subpart B	Complied	Meets Class B Limit Minimum margin is 14.6 dB at 18.243 MHz
☒	Radiated Disturbance		Complied	Meets Class B Limit Minimum margin is 6.0 dB at 79.998 MHz

2. General Information

2.1 Test facility

The SEC EMC Laboratory is located on Samsung Electronics Co., Ltd. at 416 Maetan 3-Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi-Do, South Korea.

All testing are performed in Semi-anechoic chambers conforming to the site attenuation Characteristics defined by ANSI C63.4, CISPR 22, 16-1 and 16-2. and Shielded rooms.

The SEC EMC Laboratory is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

2.2 Accreditation and listing

Laboratory Qualifications		Remarks
	KOLAS(Korea Laboratory Accreditation Scheme)	Accredited : 124
	Radio Research Laboratory	Accredited : KR0004
	FCC(Federal Communications Commission)	Accredited : KR0004
	National Voluntary Laboratory Accreditation Program	Lab Code: 200623-0
	Norges Elektriske Materiellkontroll	Accredited : ELA 195
	VCCI (Voluntary Control Council for Interference by Information Technology Equipment)	C-2421,R-2224
	China Quality Certification Center	5-053, 5-054
	TUV Rhineland	H9354285
	GOST(GOSTSTANDART)	ROSTEST
	Elektrotechnicky Zkusebni Ustav	Reg. No.: 001
	IC(Industry Canada)	Assigned Code: 5871

3. Test Setup configuration

3.1 Test Peripherals

The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

Description	Model No.	Serial No.	Manufacturer	FCC ID
Printer	CLP-310N	-	Samsung	A3LCLP310N
Note PC	NP-P29	674E93AYC00024E	Samsung	A3L-NP-P29
AC Adapter	AD-9019S	CNBA4400215AD2 VH6811084	Li shin	-
USB Mouse	MS201U	69G1736	Monterey International Corp.	DoC
Earphone	-	-	COSY	-

3.2 EUT operating mode

To achieve compliance applied standard specification, the following mode(s) were made during compliance testing:

Operating Mode 1	USB Printing
Operating Mode 2	LAN Printing
Operating Mode 3	Standby

3.3 Details of Sampling

Customer selected, single unit.

3.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected;

Connected cable	Length [m]	Shielded [Y/N]	Note
Power	1.8	No	-
USB	1.8	Yes	From PC to EUT From PC to Mouse
LAN	1.0	Yes	From EUT to hub
Audio	1.0	No	From earphone to PC

3.5 EUT Description

The following features describe EUT represented by this report:

Item	Specification	Remarks
Processor	Chorus3(360MHz)	-
Standard System memory	32MB	-
Resolution	Up to 2400x600 dpi effective output	-
Paper Handling	Paper Tray(standard) 150 Sheets	-
Power Rating	110~127 VAC, 5A, 50/60 Hz	-
Power Consumption	Average : 350W Power save mode : Less than 17W	-
Printer Language	SPL-C	-
Interfaces	USB2.0, Ethernet 10/100 Tx Base	-
OS compatibility	Windows 2000/XP/2003/Vista Various Linux including Red Hat 8.0~9.0, Mandrake 9.2~10.1, SuSE 8.2~9.2 and Fedora Core 1~4 Mac OS 10.3 ~10.5 and Universal Mac	-
Modes of Operation	USB Printing, Network Printing	-
Intended Class for Emissions	Class B	-

3.6 Clock Frequencies

Kind of Clocks	Frequency[MHz]	Kind of Clocks	Frequency[MHz]
Main Source	12	Video Source	12
CPU Internal	360	DDR	166
USB Device	12	MAC	25

3.7 Operating mode condition

The system was configured for testing in typical fashion use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables. The mode of operation utilized for testing was selected to best simulate typical EUT use. The EUT is supporting the USB and network(LAN) printing mode. In each test mode, finally we found worst case emission that is above configuration with the worst case components. So, the data of the maximum EUT operation, USB Printing was reported.

- Test Voltage : AC 120 V, 60 Hz

3.8 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus: (According to CISPR 16-4 and UKAS Lab 34.)

3.8.1 Emission

Test type		Measurement uncertainty (C.L. 95 %, k = 2)
Conducted disturbance	Mains Port	± 2.8 dB
Radiated disturbance	Horizontal	± 5.1 dB
	Vertical	± 5.09 dB

4. Results of individual test

4.1 Conducted disturbance

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.

The EUT measured in accordance with the methods described in standards.

Limits for conducted disturbance at mains ports of class A

Frequency range Limits MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	79	66
0,50 to 30	73	60

Note 1: 1 μ V is regarded as 0 dB.
Note 2: If the average limit is met in the measurement with quasi-peak detector, the measurement with average detector at the same frequency is unnecessary.
Note 3: The lower limit shall apply at the transition frequency.

Limits for conducted disturbance at the mains ports of class B

Frequency range Limits MHz	Limits dB(μ V)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Note 1: 1 μ V is regarded as 0 dB.
Note 2: The limits shall decreases linearly with the logarithm of the frequency in the range 150 - 500 kHz.
Note 3: If the average limit is met in the measurement with quasi-peak detector, the measurement with average detector is unnecessary.
Note 4: The lower limit shall apply at the transition frequency.

4.1.1 Test instrumentation

Test instrumentation used in the Conducted disturbance test was as follows:

Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Test Software	EMC 32	R&S	Ver 5.20.2	N/A	N/A
Measuring receiver	ESCI	R&S	100368	2007-06-01	12
Artificial mains network	ENV216	R&S	100117	2007-09-03	12
Artificial mains network	ESH3-Z5	R&S	100262	2007-09-03	12

4.1.2 Photograph of the test Configuration

(Front)



(Rear)



4.1.3 Test results

Operating condition	USB Printing				
Test date	2007-10-22	Test engineer		Young Ju, Ryu	
Climate condition	Ambient temperature	24.3 ℃	Relative humidity		34 %
	Atmospheric pressure	102.3 kPa			
Test place	Shielded room #1				
Note	* QP : Quasi-peak, AV: Average * Level (QP or AV) = Meter Reading(QP or AV) + Corr.(LISN Insertion loss + Cable loss) * Margin = Limit - Level				

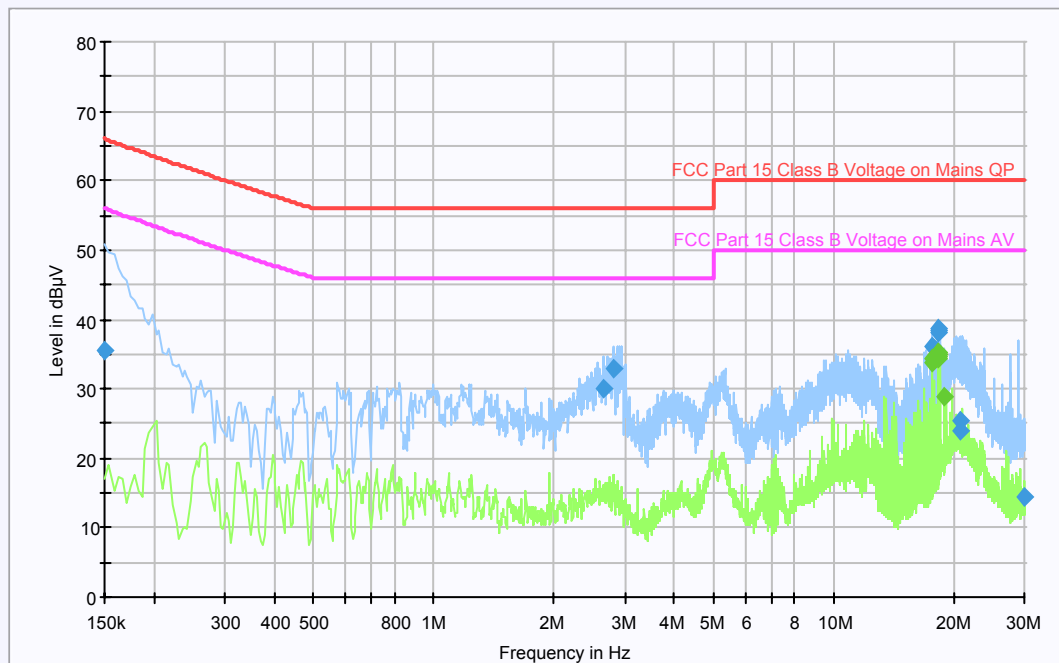
Scan Setup: FCC Part 15 Class_B with ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup:
Level Unit:

Voltage with ENV 2-Line-LISN
dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

FCC Part 15 Class_B with ENV 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150 000	35.6	N	9.6	30.4	66.0
2.649 600	30.0	N	9.7	26.0	56.0
2.820 000	33.0	N	9.7	23.0	56.0
17.696 000	36.1	N	10.1	23.9	60.0
18.243 500	38.2	L1	10.1	21.8	60.0
18.244 000	38.6	N	10.1	21.4	60.0
18.244 500	38.3	N	10.1	21.7	60.0
20.671 500	25.5	N	10.2	34.5	60.0
20.756 000	24.0	N	10.2	36.0	60.0
29.939 000	14.6	L1	10.4	45.4	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
17.693 500	34.3	N	10.1	15.7	50.0
17.695 000	33.7	N	10.1	16.3	50.0
18.241 500	34.3	N	10.1	15.7	50.0
18.242 500	35.1	N	10.1	14.9	50.0
18.243 000	35.2	N	10.1	14.8	50.0
18.243 500	35.2	N	10.1	14.8	50.0
18.244 000	35.1	N	10.1	14.9	50.0
18.244 500	34.8	N	10.1	15.2	50.0
18.914 500	28.8	N	10.2	21.2	50.0

Operating condition	Standby			
Test date	2007-10-22	Test engineer		Young Ju, Ryu
Climate condition	Ambient temperature	24.3 ℃	Relative humidity	34 %
	Atmospheric pressure	102.3 kPa		
Test place	Shielded room #1			
Note	* QP : Quasi-peak, AV: Average * Level (QP or AV) = Meter Reading(QP or AV) + Corr.(LISN Insertion loss + Cable loss) * Margin = Limit - Level			

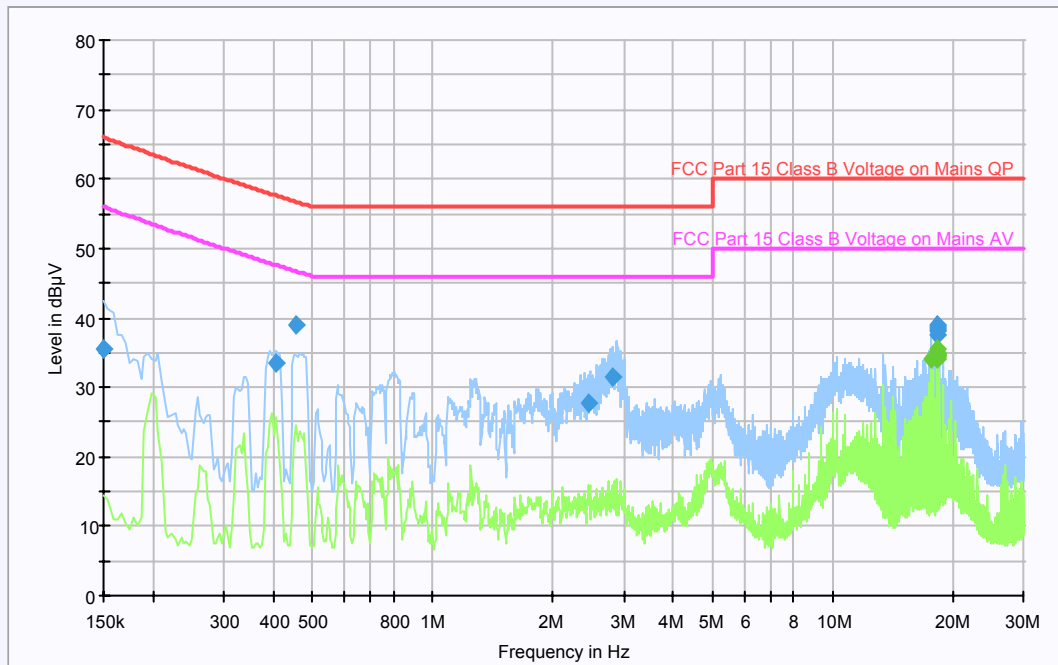
Scan Setup: FCC Part 15 Class_B with ENV 2-Line-LISN fin [EMI conducted]

Hardware Setup:
Level Unit:

Voltage with ENV 2-Line-LISN
dB μ V

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
150kHz - 30MHz	QuasiPeak; Average	9kHz	15s	ESCI 3

FCC Part 15 Class_B with ENV 2-Line-LISN



Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.150 000	35.4	L1	9.6	30.6	66.0
0.405 700	33.6	L1	9.6	24.0	57.6
0.454 300	38.9	L1	9.6	17.8	56.7
2.460 600	27.9	N	9.7	28.1	56.0
2.803 800	31.4	N	9.7	24.6	56.0
18.241 000	37.4	N	10.1	22.6	60.0
18.242 000	38.5	N	10.1	21.5	60.0
18.242 500	38.8	N	10.1	21.2	60.0
18.243 000	38.9	N	10.1	21.1	60.0
18.244 000	38.2	L1	10.1	21.8	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dB μ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
17.693 500	34.1	L1	10.1	15.9	50.0
18.241 500	34.1	L1	10.1	15.9	50.0
18.242 000	34.5	L1	10.1	15.5	50.0
18.242 500	34.8	L1	10.1	15.2	50.0
18.243 000	35.4	N	10.1	14.6	50.0
18.243 500	34.9	L1	10.1	15.1	50.0
18.244 000	34.8	L1	10.1	15.2	50.0
18.245 000	34.5	N	10.1	15.5	50.0

4.2 Radiated disturbance

Of those disturbances above ($L - 20\text{dB}$), where L is the limit level in logarithmic units, record at least the disturbance levels and the frequencies of the six highest disturbances.

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin. All measurements were taken utilizing quasi-peak detection unless stated otherwise.

Measurements were performed at an antenna to EUT distance of 10 meters and elevated between 1 and 4 meters. Both vertical and horizontal antenna polarizations were measured.

Limits for radiated disturbance of ITE at a measuring distance of 10 m

Frequency range Limits MHz	Quasi-peak Limits dB dB($\mu\text{V/m}$)	
	Class A	Class B
30 to 230	40	30
230 to 1000	47	37
Note 1: The lower limit shall apply at the transition frequency.		
Note 2: Additional provisions may be required for cases where interference occurs.		
Note 3: 1 $\mu\text{V/m}$ is regarded as 0 dB.		

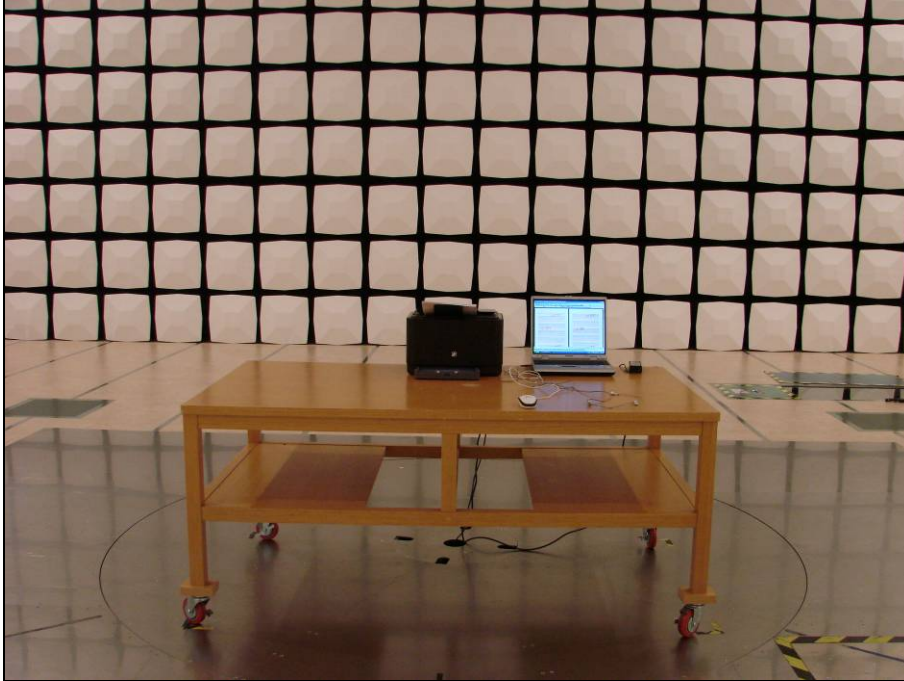
4.2.1 Test instrumentation

Test instrumentation used in the Radiated disturbance was as follows:

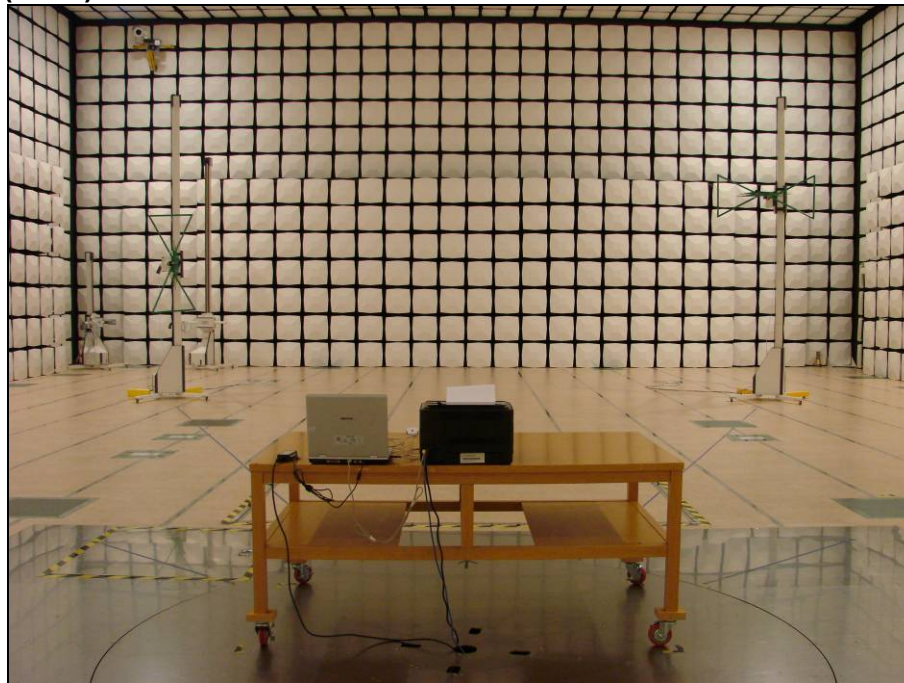
Test instrumentation	Model name	Manufacturer	Serial or Firmware (No./Ver.)	Calibration	
				Date	Interval (Month)
Bi-con Antenna	CBL6112D	SCHAFFNER	22602	2006-06-26	24
Bi-con Antenna	CBL6112D	SCHAFFNER	22601	2007-04-02	24
EMI Receiver	ESIB-26	R&S	100289	2007-03-22	12
EMI Receiver	ESIB-26	R&S	100287	2007-04-10	12
AMPLIFIER	310N	SONOMA	186467	2007-03-17	12
AMPLIFIER	310N	SONOMA	251673	2007-03-17	12
Ant Mast	MA4000	INN CO	-	N/A	N/A
Ant Mast	MA4000	INN CO	-	N/A	N/A
Mast Controller	CO2000	INN CO	-	N/A	N/A
Test software	EP5/RE	TOYO	VER 3.1.20	N/A	N/A
RF Selector	NS4900	TOYO	-	N/A	N/A
HORN ANTENNA	BBHA9120B	SCHWARZBECK	335	2007-01-08	24
HORN ANTENNA	BBHA9120C	SCHWARZBECK	352	2007-03-15	24

4.2.2 Photograph of the test Configuration

(Front)

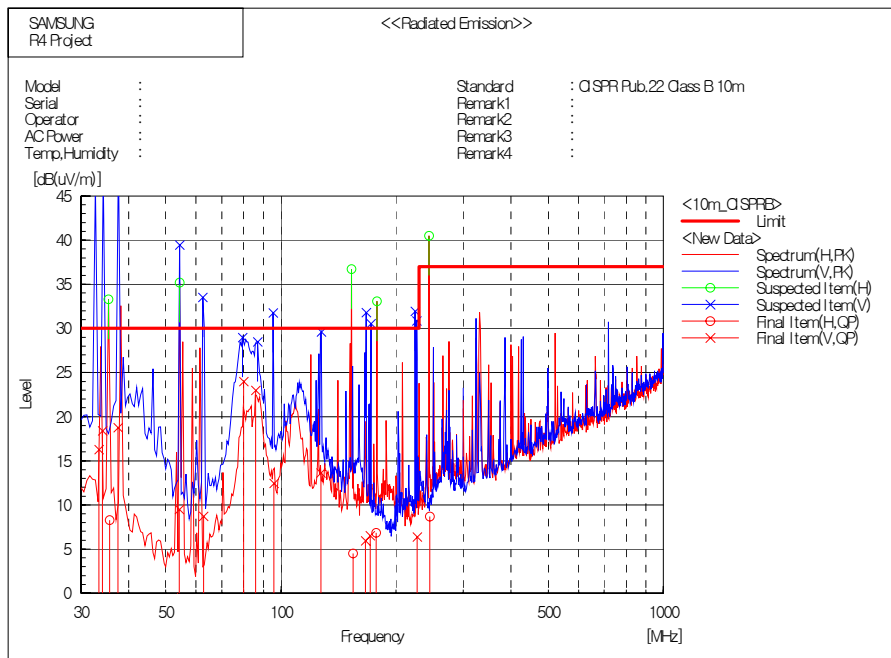


(Rear)



4.2.3 Test results (30 MHz ~ 1 GHz)

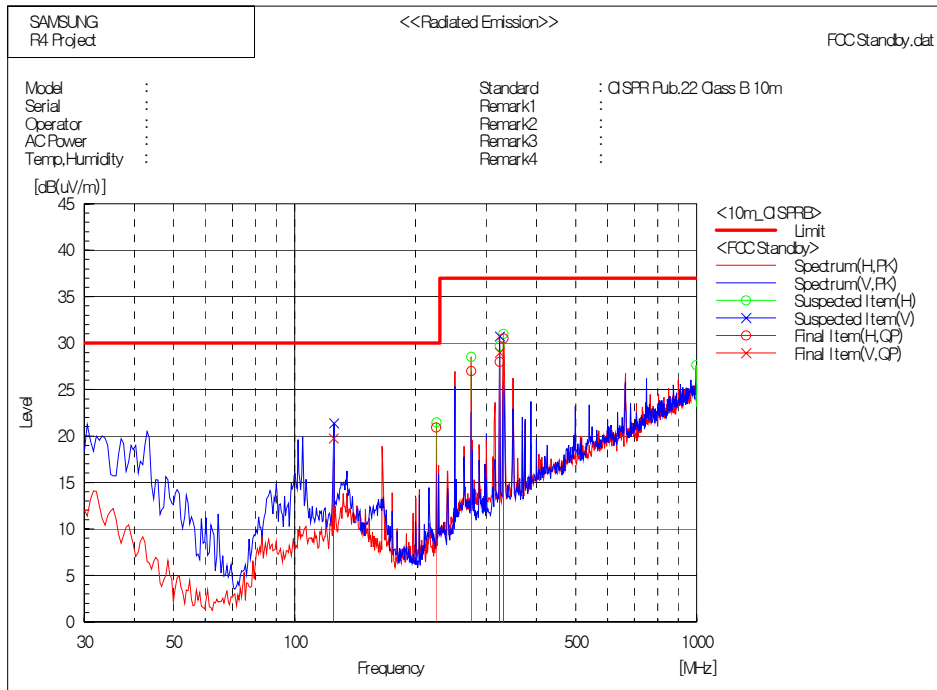
Operating condition	USB Printing			
Test date	2007-10-16	Test engineer		Young Ju, Ryu
Climate condition	Ambient temperature	23.5 ℃	Relative humidity	35 %
	Atmospheric pressure	101.8 kPa		
Test place	10m Semi-Anechoic Chamber #1			
Note	* Receiving antenna mode : Horizontal, Vertical * Test distance : 10 m (RF Semi Anechoic Chamber) * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result			



Final Result

Horizontal Polarization (QP)						
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]
1	35.641	24.3	-16.0	8.3	30.0	21.7
2	53.745	22.1	-23.8	-1.7	30.0	31.7
3	154.265	23.5	-19.0	4.5	30.0	25.5
4	177.296	27.1	-20.2	6.9	30.0	23.1
5	245.383	25.5	-16.8	8.7	37.0	28.3
Vertical Polarization (QP)						
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]
1	33.449	31.5	-15.2	16.3	30.0	13.7
2	34.115	33.9	-15.5	18.4	30.0	11.6
3	37.491	36.0	-17.2	18.8	30.0	11.2
4	54.178	34.0	-24.5	9.5	30.0	20.5
5	62.792	33.7	-25.0	8.7	30.0	21.3
6	79.996	47.2	-23.2	24.0	30.0	6.0
7	85.948	44.7	-21.7	23.0	30.0	7.0
8	95.771	32.3	-19.9	12.4	30.0	17.6
9	127.116	31.7	-18.1	13.6	30.0	16.4
10	166.128	25.3	-19.4	5.9	30.0	24.1
11	171.182	26.0	-19.5	6.5	30.0	23.5
12	227.054	25.3	-18.9	6.4	30.0	23.6

Operating condition	Standby			
Test date	2007-10-16	Test engineer		Young Ju, Ryu
Climate condition	Ambient temperature	23.5 ℃	Relative humidity	35 %
	Atmospheric pressure	101.8 kPa		
Test place	10m Semi-Anechoic Chamber #1			
Note	* Receiving antenna mode : Horizontal, Vertical * Test distance : 10 m (RF Semi Anechoic Chamber) * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Result			

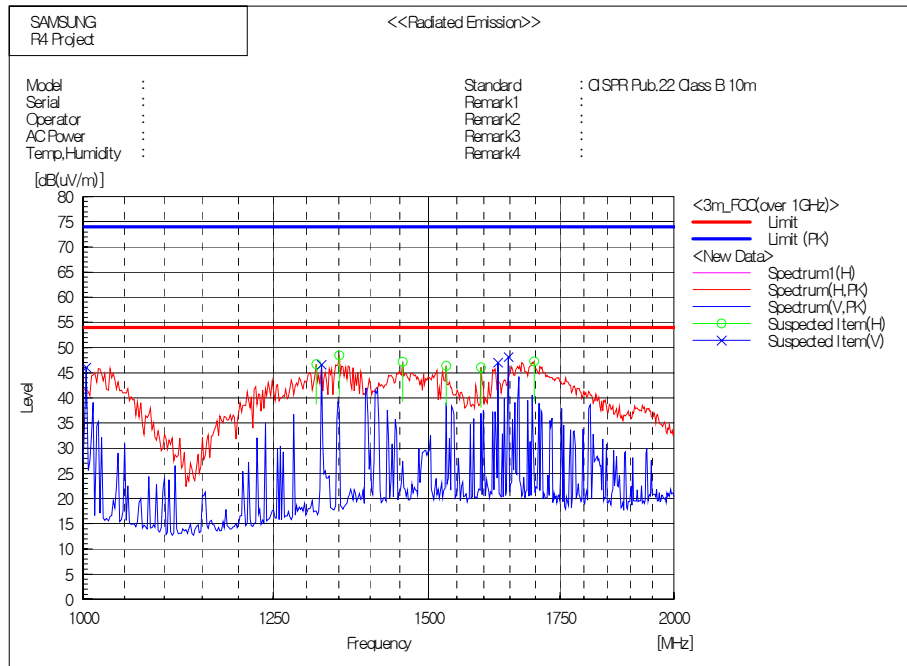


Final Result

Horizontal Polarization (QP)---						
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]
1	224.998	40.2	-19.3	20.9	30.0	9.1
2	275.110	42.4	-15.4	27.0	37.0	10.0
3	323.848	41.6	-13.6	28.0	37.0	9.0
4	330.862	43.9	-13.4	30.5	37.0	6.5
Vertical Polarization (QP)---						
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]
1	124.974	37.8	-18.0	19.8	30.0	10.2
2	323.848	42.5	-13.5	29.0	37.0	8.0

4.2.4 Test results (1 GHz ~ 2 GHz)

Operating condition	USB Printing			
Test date	2007-10-16	Test engineer		Young Ju, Ryu
Climate condition	Ambient temperature	23.5 °C	Relative humidity	35 %
	Atmospheric pressure	101.8 kPa		
Test place	10m Semi-Anechoic Chamber #1			
Note	* Receiving antenna mode : Horizontal, Vertical * Test distance : 3 m (Semi Anechoic Chamber) * Result = Reading + c.f (Antenna factor + Cable loss- Amp Gain) * Margin = Limit – Reading			



Spectrum Selection

Horizontal Polarization						
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]
1	1314.629	57.9	-11.1	46.8	54.0	7.2
2	1350.701	59.4	-10.9	48.5	54.0	5.5
3	1454.910	57.7	-10.5	47.2	54.0	6.8
4	1531.062	56.5	-10.1	46.4	54.0	7.6
5	1595.190	55.9	-9.8	46.1	54.0	7.9
6	1697.395	56.5	-9.2	47.3	54.0	6.7
Vertical Polarization						
No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]
1	1004.008	58.6	-12.5	46.1	54.0	7.9
2	1322.645	57.8	-11.1	46.7	54.0	7.3
3	1627.255	56.6	-9.6	47.0	54.0	7.0
4	1647.295	57.6	-9.5	48.1	54.0	5.9

Appendix – EUT photography

Front View



Rear View



Label Location



Label

 Samsung Electronics Co., Ltd. Suwon, Korea, 443-742 Place:M259	Model:	CLP-310N	FCC ID:A3LCLP310N
	Volts:	AC 110-127V	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: i) This device may not cause harmful interference, and ii) This device must accept any interference received, including interference that may cause undesired operation.
	Hertz:	50/60Hz	
	Amps:	6A	This Class B digital apparatus complies with Canadian ICES-003
	Manufactured:	51Y7 E149091 I.T.E.	Cet appareil numérique de la classe B est Conforme à la norme NMB-003 du Canada. This product complies with 21 CFR Chapter 1, subchapter J.
S/N			
MADE IN KOREA REV.00			

 Samsung Electronics Co., Ltd. Suwon, Korea, 443-742 Place:M259	Model:	CLP-310	FCC ID:A3LCLP310N
	Volts:	AC 110-127V	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: i) This device may not cause harmful interference, and ii) This device must accept any interference received, including interference that may cause undesired operation.
	Hertz:	50/60Hz	
	Amps:	8A	This Class B digital apparatus complies with Canadian ICES-003
	Manufactured:	51Y7 E149091 I.T.E.	Cet appareil numérique de la classe B est Conforme à la norme NMB-003 du Canada. This product complies with 21 CFR Chapter 1, subchapter J.
S/N			
MADE IN KOREA REV.00			



Samsung Electronics Co., Ltd.
Suwon, Korea, 443-742
Place:M259

Model: **CLP-315**
Volts: **AC 110-127V**
Hertz: **50/60Hz**
Amps: **8A**
Manufactured: **51Y7**
 **E149091**
I.T.E.

FCC ID:A3LCLP310N
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
i) This device may not cause harmful interference, and
ii) This device must accept any interference received,
including interference that may cause undesired operation.
This Class B digital apparatus complies with
Canadian ICES-003
Cet appareil numérique de la classe B est
Conforme à la norme NMB-003 du Canada.
This product complies with 21 CFR Chapter 1, subchapter J.

S/N

MADE IN KOREA REV.00



Samsung Electronics Co., Ltd.
Suwon, Korea, 443-742
Place:M259

Model: **CLP-315N**
Volts: **AC 110-127V**
Hertz: **50/60Hz**
Amps: **8A**
Manufactured: **51Y7**
 **E149091**
I.T.E.

FCC ID:A3LCLP310N
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
i) This device may not cause harmful interference, and
ii) This device must accept any interference received,
including interference that may cause undesired operation.
This Class B digital apparatus complies with
Canadian ICES-003
Cet appareil numérique de la classe B est
Conforme à la norme NMB-003 du Canada.
This product complies with 21 CFR Chapter 1, subchapter J.

S/N

MADE IN KOREA REV.00