

EMC TEST REPORT

Project No.	LBE20123085	Issue No.	1
Applicant	Name of organization	Samsung Electronics Co., Ltd.	
	Address	416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742, Republic of Korea	
	Date of application	April 17, 2012	
EUT	Type of device	Class B computing devices peripheral	
	Equipment authorization	☐ Declaration of Conformity ☒ Certification ☐ Verification	
	FCC ID	A3LSGHT699	
	Kind of product	Mobile Phone	
	Model No.	SGH-T699	
	Variant Model No.	Refer to clause 3.5	
	Manufacturer	416, Maetan 3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-742, Republic of Korea	
Applied Standards		FCC Part 15, Subpart B, Class B / ANSI C63.4-2003	
Test Period		2012.06.05 ~ 2012.06.07	
Issue date		2012.06.19	

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 : Su-Young Son



Reviewed by : Tae-Young Jang



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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 (Mains port)	FCC Part 15 Subpart B / ANSI C63.4-2003	Complied	Meets Class B Limit
☒	Radiated Disturbance		Complied	Meets Class B Limit

2. General Information

2.1 Test facility

The CS & Environment center is located on Samsung Electronics Co., Ltd. at416, Maetan 3-dong,Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of 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 CS & Environment center is operated as testing laboratory in accordance with the requirements of ISO/IEC 17025:2005.

3. Test Setup configuration

3.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.

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

Description	Model No.	Serial No.	Manufacturer/ Trademark	FCC ID / DoC
Mobile Phone	SGH-T699	-	SAMSUNG	A3LSGHT699
Battery	EB-L1K6ILA	AAaC413sS/2-B	SAMSUNG	-
Headset	EHS64AVFWE	-	SAMSUNG	-
Data Cable	ECB-DU5ABE	RT1C313AS E	SAMSUNG	-
microSD Card	2GB	-	SANDISK	-
Desk-Top Computer	HP Compaq dx2200 Microtower	CNG7060LW0	HP	DoC
LCD Monitor	LS-B2430HDSF	ZQ9XH1HBC00520E	SAMSUNG	DoC
Mouse	N3+Optical	K034729902	HP	DoC
Keyboard	SDM8500P	8M000131	SAMSUNG	DoC
Gigabit Switch 8	3CFSU08	AB/9XSQ950036589	3COM	DoC

3.2 EUT operating mode

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

Operating Mode 1	USB Mode (Data Communication)
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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
Data Cable	1.0	Y	From EUT to Desk-Top Computer
Headset	1.6	N	For EUT
Power	1.8	N	For Desk-Top Computer
Power	1.8	N	For LCD TV Monitor
Power	1.8	N	For Power Supply
Power	1.8	N	From Gigabit Switch 8 to Power Supply
LAN	1.5	N	From Desk-Top Computer to Gigabit Switch 8
LAN	1.5	N	From Desk-Top Computer to Local Area Network
RGB	1.8	Y	From Desk-Top Computer to LCD TV Monitor
PS/2	1.8	Y	From Desk-Top Computer to Mouse
PS/2	1.8	Y	From Desk-Top Computer to Keyboard

3.5 EUT Description

1. The following features describe EUT represented by this report:

Item	Specification	
Frequency Range	PCS1900	TX : 1850.2 ~ 1909.8 MHz RX : 1930.2 ~ 1989.8 MHz
Operating Temperature (°C)	-20 ~ +50	
Operating Humidity (%)	0 ~ 95	

2. The variant models

-None

3.6 Clock Frequencies

Kind of Clocks	Frequency[MHz]
CPU	1 500
USB 2.0	480

3.7 Test configuration and condition

The EUT could be only powered from USB port of PC.

This EUT have no interface from PC.

For the emission test, the EUT operatedas standby and powered from PC.

The system was configured for testing in a typical fashion that a customer would normally use, and was tested while in an automated non-attendant mode.

Power source for the EUT operating was supplied by CVCF made by the Pacific.

- 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	AC Mains	± 3.24 dB
Radiated Disturbance (30 MHz ~ 1 GHz)	Horizontal	± 4.59 dB
	Vertical	± 4.64 dB
Radiated Disturbance (1 GHz ~ 6 GHz)		± 4.18 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 the mains ports

Frequency range Limits MHz	Resolution Bandwidth	Limits dB(μV)	
		Quasi-peak	Average
0,15 to 0,50	9 kHz	66 to 56	56 to 46
0,50 to 5	9 kHz	56	46
5 to 30	9 kHz	60	50

4.1.1 Test instrumentation

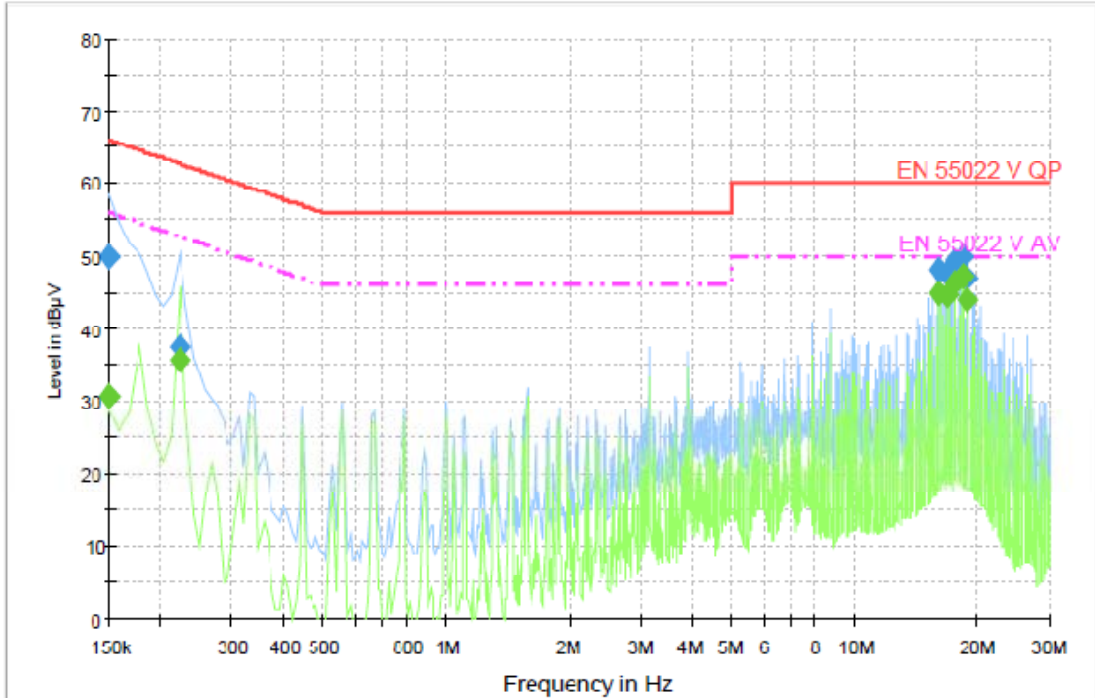
EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E4I-093	Test Receiver	ESCI	R&S	100086	2011-11-11	12
E3I-050	LISN	ESH3-Z5	R&S	100263	2011-10-12	12
E3I-259	LISN	ENV216	R&S	101369	2011-10-11	12

4.1.2 Temperature and humidity condition

Test date	2012-06-07	Test engineer	Su-Young Son
Climate condition	Ambient temperature	22.0 °C	Limit (15.0 to 35.0) °C
	Relative humidity	38.0 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	99.4 kPa	Limit (86.0 to 106.0) kPa
Test place	Shield Room (SR8)		

4.1.3 Test results

- Operating Mode 1: AC Mains



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	50.0	15000.0	9.000	On	L1	9.9	16.00	66.00
0.222000	37.4	15000.0	9.000	On	N	10.0	25.40	62.70
16.170000	48.1	15000.0	9.000	On	N	9.9	11.90	60.00
16.899000	47.5	15000.0	9.000	On	N	9.9	12.50	60.00
17.691000	49.3	15000.0	9.000	On	L1	9.8	10.70	60.00
18.366000	50.0	15000.0	9.000	On	N	10.0	10.00	60.00
18.915000	47.1	15000.0	9.000	On	N	10.0	12.90	60.00

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	30.8	15000.0	9.000	On	L1	9.9	25.20	56.00
0.222000	35.6	15000.0	9.000	On	N	10.0	17.20	52.70
16.170000	45.0	15000.0	9.000	On	N	9.9	5.00	50.00
16.899000	44.6	15000.0	9.000	On	N	9.9	5.40	50.00
17.691000	46.4	15000.0	9.000	On	L1	9.8	3.60	50.00
18.366000	46.9	15000.0	9.000	On	N	10.0	3.10	50.00
18.915000	44.0	15000.0	9.000	On	N	10.0	6.00	50.00

Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph. 'Final Result 1' is Quasi-peak final measurement results table and 'Final Result 2' is Average final measurement results table.

Note 2) Level (QP and/or AV) = Meter Reading(QP and/or AV) + Corr. (LISN Insertion Loss + Cable Loss)
 Margin (QP and/or AV) = Limit – Level (QP and/or AV)
 QP = Quasi-Peak, AV = Average

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.

Peak measurements were made over the changeable frequency range 30 MHz to 1 GHz at a measurement distance of 3m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	Resolution bandwidth	Video bandwidth	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	120 kHz	300 kHz	Continuous

Measurements within 20dB of the limit were then maximized by adjusting turntable position. Final measurements were made using quasi-peak detectors.

Limits for radiated disturbance of ITE at a measuring distance of 3 m

Frequency range Limits [MHz]	Field Strength	
	$\mu\text{V/m}$	$\text{dB}(\mu\text{V/m})$
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

Peak/Average measurements were made over the changeable frequency range 1GHz to 40GHz or 5th in accordance with internal maximum operating frequency at a measurement distance of 3m for the following antenna and turntable arrangements:

Antenna Height [cm]	Antenna Polarisation	Resolution bandwidth	Video bandwidth	Turntable position [degrees]
100 ~ 400	Horizontal, Vertical	1 MHz (PK / AV)	3 MHz (PK) 10 Hz (AV)	Continuous

Limits for radiated disturbance of ITE at a measurement distance of 3 m

Class	Limits [$\text{dB}(\mu\text{V/m})$]	
	Peak	Average
A	80	60
B	74	54
Average limit 500, $20 \log 500 = 53.979 \text{ dB} \approx 54 \text{ dB}$		

Measurements within 20dB of the limit were then maximized by adjusting turntable position.

Final measurements were made using peak and average detectors.

Results checked manually; and points close to the limit line were re-measured.

4.2.1 Test instrumentation

EMC No.	Test Instrument	Model name	Manufacturer	Serial No.	Calibration	
					Date	Interval (Month)
E4I-013	EMI Test Receiver	ESU-08	R&S	100085	2012-03-22	12
E3I-130	BILOG Antenna	CBL6112D	TESEQ	25513	2010-11-12	24
E3I-175	Preamplifier	310N	SONOMA	273121	2011-12-06	12
E3I-231	Horn Antenna	3115	ETS Lindgren	00101620	2012-01-12	24

4.2.2 Temperature and humidity condition

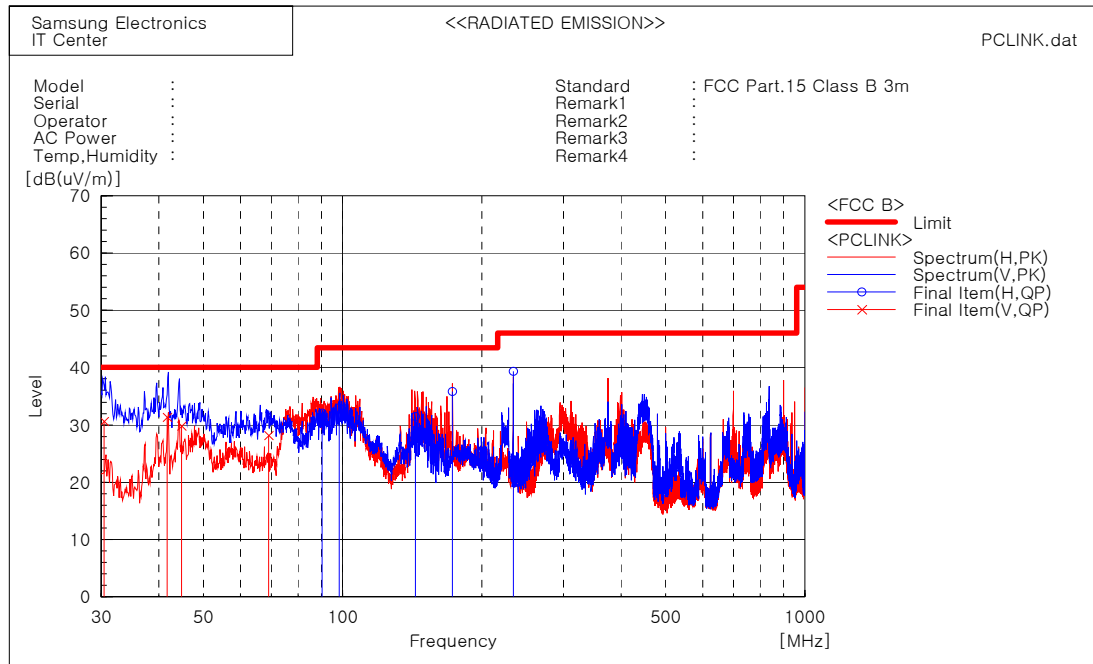
Test date	2012-06-05	Test engineer	Su-Young Son
Climate condition	Ambient temperature	21.7 °C	Limit (15.0 to 35.0) °C
	Relative humidity	42.0 % R.H.	Limit (25.0 to 75.0) % R.H.
	Atmospheric pressure	100.0 kPa	Limit (86.0 to 106.0) kPa
Test place	Semi-Anechoic Chamber (SAC4)		

4.2.3 Test results

☐ Operating Mode 1

- Frequency range: 30 ~ 1 000 MHz

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Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	41.633	V	49.9	-18.5	31.4	40.0	8.6	100.0	119.0
2	44.762	V	49.8	-20.0	29.8	40.0	10.2	100.0	136.0
3	30.369	V	43.2	-12.5	30.7	40.0	9.3	100.0	21.0
4	69.108	V	52.1	-23.9	28.2	40.0	11.8	100.0	85.0
5	90.208	H	52.4	-20.4	32.0	43.5	11.5	199.0	127.0
6	98.368	H	51.6	-18.6	33.0	43.5	10.5	199.0	153.0
7	143.331	H	49.6	-18.2	31.4	43.5	12.1	199.0	148.0
8	172.800	H	54.9	-19.1	35.8	43.5	7.7	100.0	28.0
9	233.852	H	58.1	-18.8	39.3	46.0	6.7	100.0	95.0

Note1) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3m, Antenna Height : 1 to 4 meters

Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

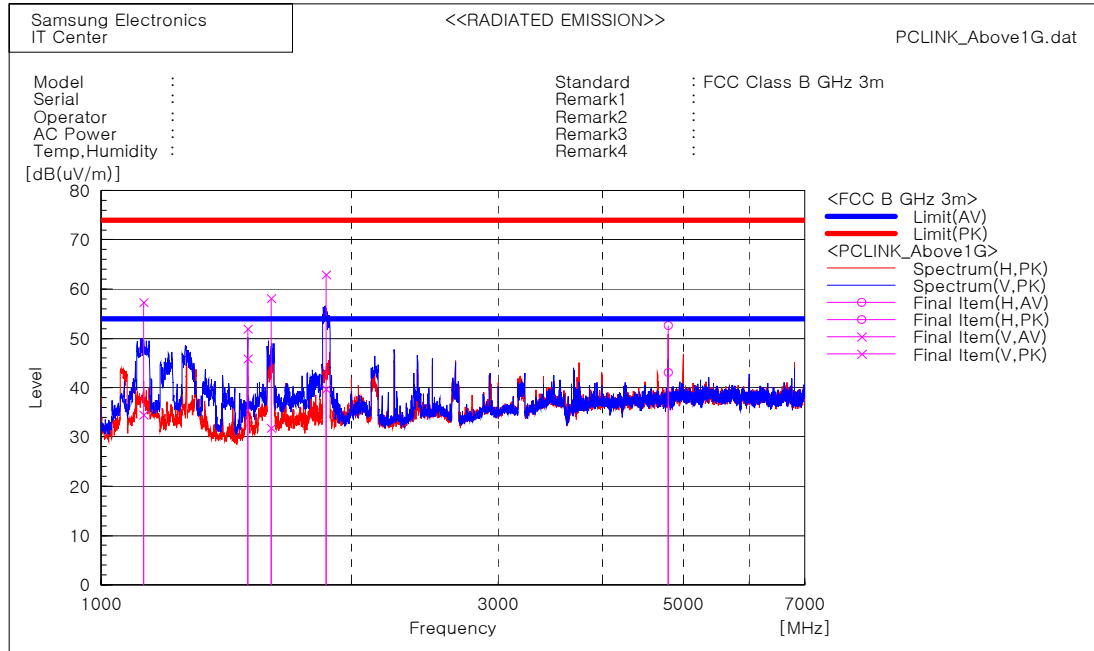
Margin (QP) = Limit - Result (QP)

QP = Quasi-Peak

□ Operating Mode 1

- Frequency range: 1 000 ~ 8000 MHz

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Final Result

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	4799.974	40.7	2.4	43.1	54.0	10.9	188.0	288.0

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	4799.974	50.2	2.4	52.6	74.0	21.4	188.0	288.0

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1125.340	46.6	-12.1	34.5	54.0	19.5	154.0	239.0
2	1499.628	56.1	-10.2	45.9	54.0	8.1	137.0	63.0
3	1601.021	41.5	-9.7	31.8	54.0	22.2	182.0	270.0
4	1864.158	47.7	-7.9	39.8	54.0	14.2	109.0	253.0

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(uV)]	c.f [dB(1/m)]	Result [dB(uV/m)]	Limit [dB(uV/m)]	Margin [dB]	Height [cm]	Angle [deg]
1	1125.340	69.3	-12.1	57.2	74.0	16.8	154.0	239.0
2	1499.628	62.1	-10.2	51.9	74.0	22.1	137.0	63.0
3	1601.021	67.8	-9.7	58.1	74.0	15.9	182.0	270.0
4	1864.158	70.9	-7.9	63.0	74.0	11.0	109.0	253.0

Note 1) Representative operating modes were selected by customer

From 7 GHz to 8GHz, No emission detected 6 dB under the average limit.

Note 2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

Level (PK and/or AV) = Reading (PK and/or AV) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (PK and/or AV) = Limit - Level (PK and/or AV)

PK = Peak, AV = Average