

EMI CERTIFICATION REPORT

Applicant:

SAMSUNG ELECTRONICS CO., LTD

416. Maetan-3dong, Yeongtong-gu, Suwon-si,
Gyeonggi-do, 442-742, Korea

Date of Issue: November 16, 2011

Test Report No.: HCTE1111FE13

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

A3LGTS5690L

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : 850/1900 GSM/GPRS and WCDMA Phone with Bluetooth,
WLAN and EDGE
Model(s) : GT-S5690L
Port / Connector(s) : USB Data Port / Headset Port

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2003. (See Test Report if any modifications were made for compliance)

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

HCT certifies that no party to application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862



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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test (E.U.T) is **850/1900 GSM/GPRS and WCDMA Phone with Bluetooth, WLAN and EDGE, Model: GT-S5690L** manufactured by **SAMSUNG ELECTRONICS CO., LTD.** Its basic purpose is used for communications.

Model (s)	GT-S5690L
FCC ID	A3LGTS5690L
E.U.T Type	850/1900 GSM/GPRS and WCDMA Phone with Bluetooth, WLAN and EDGE
TX Frequency	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 826.40 MHz to 846.60 MHz (WCDMA 850) 1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900)
RX Frequency	869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 871.40 MHz to 891.60 MHz (WCDMA 850) 1 932.4 MHz to 1 987.6 MHz (WCDMA 1 900)

1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Manufacturer	Model Number	FCC ID / DoC	Connected To
850/1900 GSM/GPRS and WCDMA Phone with Bluetooth, WLAN and EDGE	SAMSUNG	GT-S5690L	A3LGTS5690L	Notebook PC
Notebook PC	SAMSUNG	NT-R519	DoC	E.U.T Notebook PC adaptor
Notebook PC adaptor	DELTA (JIANG SU)	SADP-90FH BAD-9019S	-	Notebook PC
Mouse	Microsoft	Intellimouse optical USB and PS/2 compatible	DoC	Notebook PC
Headset	-	-	-	E.U.T
USB cable	-	-	-	E.U.T Notebook PC
SD card (4 GB)	Sandisk	-	-	E.U.T

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
850/1900 GSM/GPRS and WCDAM Phone with Bluetooth, WLAN and EDGE	Micro USB	Y	Y	(P,D)1.0
	Headset jack	-	N	(D)1.6
	USB data	Y	Y	(P,D)1.0
Notebook PC	USB (Mouse)	-	Y	(D)1.8

* The marked "(D)" means the data cable and "(P)" means the power cable.

1.5 Noise Suppression Parts on Cable. (I/O cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
850/1900 GSM/GPRS and WCDAM Phone with Bluetooth, WLAN and EDGE	Micro USB	N	-	Y	Both End
	Headset jack	N	-	Y	E.U.T End
	USB data	N	-	Y	Both End
Notebook PC	USB (Mouse)	Y	Notebook PC End	Y	Notebook PC End

1.6 Test Methodology

Both Conducted and Radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at an antenna to E.U.T distance of 3 m

1.7 Test Facility

The 10 m semi anechoic chamber used to collect the test data is located at the 105-1, Jangam-Ri, Majang-Myeon, Icheon-Si, Kyoungki-Do, Korea. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4.

Detailed description of test facilities was submitted to the Commission and accepted dated Sep. 03, 2010 (Registration Number: 90661)

1.8 Frequency Range of Radiated Measurements

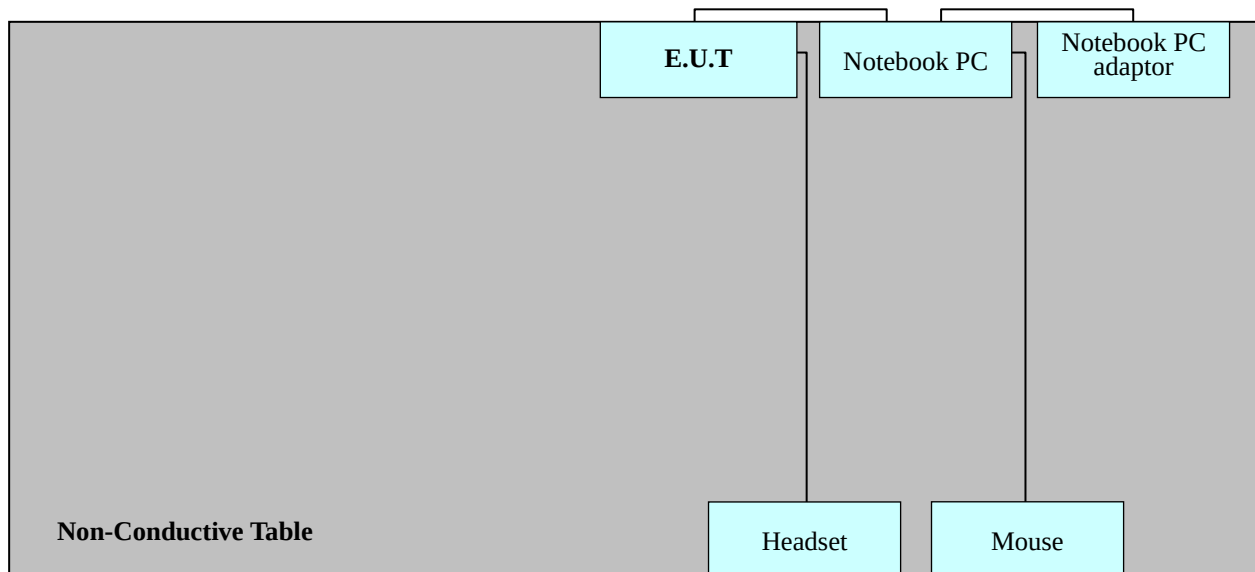
An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

2. SYSTEM TEST CONFIGURATION

- Power Line Conducted test : E.U.T was connected to LISN via Notebook PC adaptor.
Preliminary Power Line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.
- Radiated Emission test : Preliminary Radiated Emission tests were performed by using the procedure in ANSI C63.4/2003 8.3.1.1 to determine the worst operating condition. Final Radiated Emission tests were performed at 3 m semi-anechoic chamber.

[Configuration of Tested System]



Power Line: 110 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

■ It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode	The Worst Operating Condition
Data Communication	○

3. 2 Radiated Emission Test

■ It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode	The Worst Operating Condition
Data Communication	○

4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission Test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit apply to	: FCC PART 15 Subpart B Class B
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Operation Mode	: Data Communication mode
Temperature	: 23.7 °C
Humidity level	: 50.1 %
Test date	: November 15, 2011

※ **NOTE:** Refer to page 10 to page 13 for details.

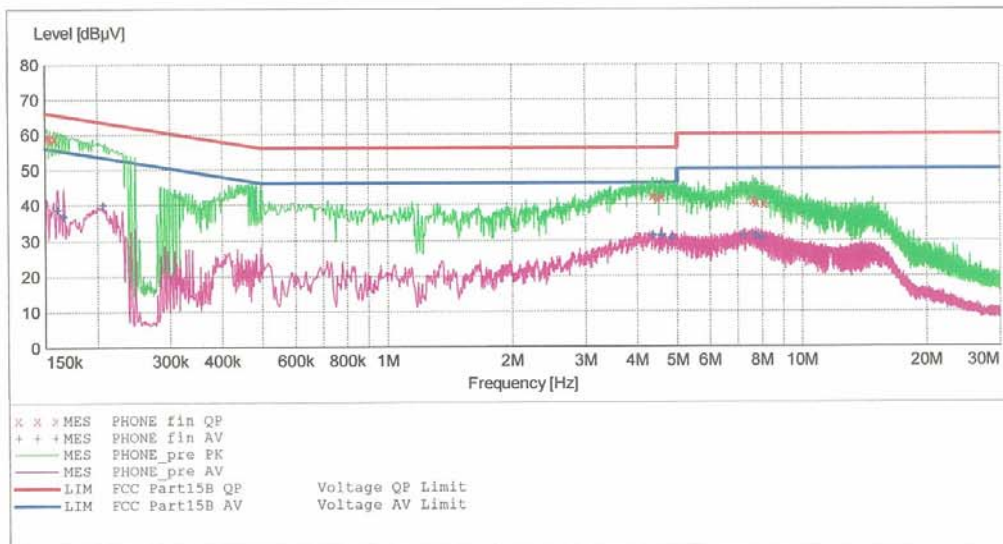
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EUT: GT-S5690L
Manufacturer: SAMSUNG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: JH-CHOI
Test Specification: FCC PART15 CLASS B
Comment: H

SCAN TABLE: "FCC PART 15 B(H)"

Short Description:			FCC PART 15 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	1.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

11/15/2011 7:03PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.152010	59.20	10.1	66	6.7	---	---
0.154010	59.10	10.1	66	6.6	---	---
0.158010	58.70	10.1	66	6.9	---	---
4.372000	42.40	10.4	56	13.6	---	---
4.484000	41.40	10.5	56	14.6	---	---
4.600000	42.20	10.5	56	13.8	---	---
7.640000	41.10	10.8	60	18.9	---	---
7.764000	40.50	10.8	60	19.5	---	---
8.120000	40.20	10.8	60	19.8	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

11/15/2011 7:03PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.161010	38.60	10.1	55	16.8	---	---
0.166010	36.60	10.1	55	18.6	---	---
0.207010	39.80	10.1	53	13.5	---	---
4.388000	31.30	10.4	46	14.7	---	---
4.600000	31.20	10.5	46	14.8	---	---
4.872000	30.40	10.5	46	15.6	---	---
7.228000	31.10	10.8	50	18.9	---	---
7.748000	31.10	10.8	50	18.9	---	---
7.972000	30.50	10.8	50	19.5	---	---

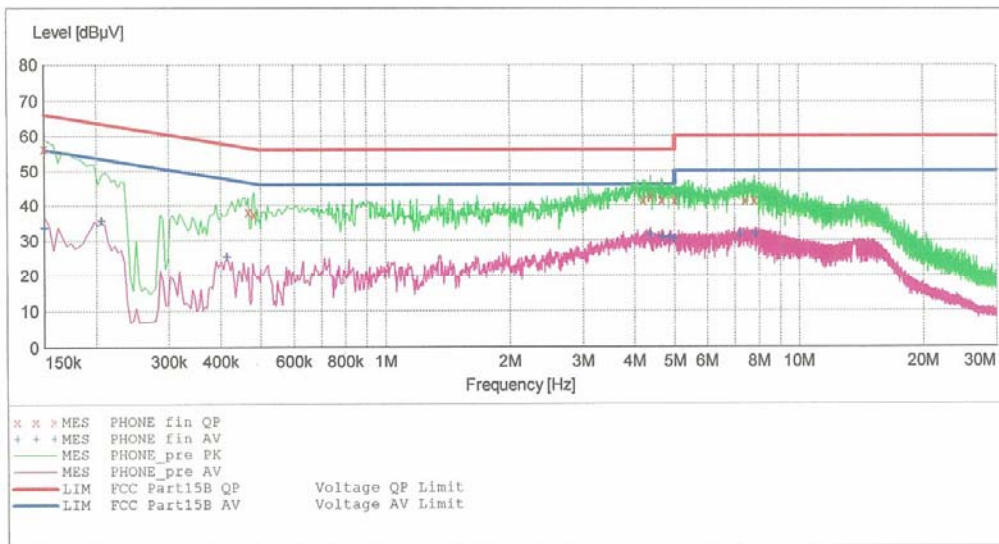
HCT

EMC

EUT: GT-S5690L
Manufacturer: SAMSUNG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: JH CHOI
Test Specification: FCC PART15 CLASS B
Comment: N

SCAN TABLE: "FCC PART 15 B(N)"

Short Description:			FCC PART 15 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

11/15/2011 7:07PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150010	56.40	10.3	66	9.6	---	---
0.466010	38.20	10.3	57	18.3	---	---
0.482010	37.40	10.3	56	18.9	---	---
4.212000	41.40	10.6	56	14.6	---	---
4.388000	42.60	10.7	56	13.4	---	---
4.660000	41.50	10.7	56	14.5	---	---
5.000000	41.30	10.7	56	14.7	---	---
7.420000	41.30	11.0	60	18.7	---	---
7.804000	41.30	11.0	60	18.7	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

11/15/2011 7:07PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150010	33.50	10.3	56	22.5	---	---
0.206010	35.50	10.3	53	17.8	---	---
0.414010	25.30	10.3	48	22.3	---	---
4.388000	31.60	10.7	46	14.4	---	---
4.680000	30.90	10.7	46	15.1	---	---
4.880000	30.80	10.7	46	15.2	---	---
5.000000	30.50	10.7	46	15.5	---	---
7.232000	31.60	11.0	50	18.4	---	---
7.852000	31.70	11.0	50	18.3	---	---

4.2 Radiated Emission Test

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Limit Apply to : FCC PART 15 Subpart B Class B

-For measurement below 1 GHz

Detector : Quasi-Peak (6 dB Bandwidth: 120 kHz)

Operation Mode : Data Communication mode

-For measurement above 1 GHz

Setting : Peak mode: Detector- Peak(RBW: 1 MHz / VBW: 1 MHz)
: Average mode: Detector- Peak (RBW: 1 MHz / VBW: 10 Hz)

Temperature : 23.3 °C

Humidity Level : 49.0 %

Test Date : November 16, 2011

Frequency (MHz)	Reading (dBuV)	Polarity (H/V)	Antenna Height (m)	Correction Factor		Limit (dBuV/m)	Level (dBuV/m)	Margin (dB)
				Antenna (dB/m)	Cable (dB)			
30.000	13.00	V	1.0	11.07	0.93	40.0	25.0	15.0
164.200	8.32	V	1.0	12.77	2.21	43.5	23.3	20.2
239.600	20.50	H	1.0	11.30	2.70	46.0	34.5	11.5
262.900	11.95	H	1.0	12.22	2.83	46.0	27.0	19.0
481.200	12.73	H	2.0	17.56	3.91	46.0	34.2	11.8
961.000	6.96	V	1.0	24.37	5.67	54.0	37.0	17.0

※ NOTE:

1. Measurement above 1 GHz performed from 1 GHz to the 5th harmonic of highest fundamental frequency. The highest fundamental frequency is GSM 1 900 center frequency.
2. For measurement above 1 GHz, Emission noise was not founded over the ambient noise.

5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the antenna factor and cable factor.
The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dB μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB μ V/m value is mathematically converted to its corresponding level in μ V/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dB}\mu\text{V/m}$$

[Radiated Emission Limits]

Frequency of Emission (MHz)	Field Strength	
	μ V/m	dB μ 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

6. TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Serial Number</u>	<u>Next CAL Date</u>
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Conducted Emission

☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	2012.05.03
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	2012.02.01
☐ LISN	Rohde & Schwarz	ENV216	100073	2012.04.01
☒ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	2012.08.01

Radiated Emission

☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	2012.05.26
☐ EMI Test Receiver	Rohde & Schwarz	ESU26	100241	2012.08.02
☐ Trilog Antenna	Schwarzbeck	VULB9160	3125	2013.05.03
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2012.09.13
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	-
☒ Antenna master	HD GmbH	MA240	240/520	-
☒ Antenna master controller	HD GmbH	HD100	100/637BJ:00	
☒ Turn Table	HD GmbH	2090	9702/1224	-
☐ Power Amplifier	Rohde & Schwarz	SCU-18	10094	2012.09.19
☐ Communication Antenna	Schwarzbeck	USLP9142	9142-248	-
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	-	2012.04.13

7. CONCLUSION

The data collected shows that the **850/1900 GSM/GPRS and WCDAM Phone with Bluetooth, WLAN and EDGE, Model: GT-S5690L, FCC ID: A3LGTS5690L** complies with §15.107 and §15.109 of the FCC rules.