



HCT CO., LTD.

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EMI CERTIFICATION REPORT

Applicant:

SAMSUNG ELECTRONICS CO., LTD
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Gyeonggi-do, 442-742, Korea

Date of Issue: August 20, 2013

Test Report No.: HCTE1308FE22

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

A3LGTS7392

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : 850/1900 GSM/GPRS Phone with BT v4.0(LE) , 802.11b/g/n and
EDGE Rx only, Hotspot
Model Name : GT-S7392
Port / Connector(s) : USB / Ear-phone Port
Date of Test : August 13, 2013 – August 19, 2013

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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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1308FE22	August 20, 2013	Initial Release

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **EUT type: 850/1900 GSM/GPRS Phone with BT v4.0(LE) , 802.11b/g/n and EDGE Rx only, Hotspot, Model: GT-S7392** manufactured by **SAMSUNG ELECTRONICS CO., LTD** Its basic purpose is used for communications.

Model	GT-S7392
FCC ID	A3LGTS7392
EUT Type	850/1900 GSM/GPRS Phone with BT v4.0(LE) , 802.11b/g/n and EDGE Rx only, Hotspot
TX Frequency	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 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)

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 Name	FCC ID / DoC	Connected To
EUT	SAMSUNG	GT-S7392	A3LGTS7392	Notebook PC Ear-phone
Notebook PC	H.P	ProBook6570b	DoC	Notebook PC adaptor
Notebook PC adaptor	DELTA ELECTRONICS (JIANGSU) LTD.	PPP012D-S	-	Notebook PC
Gateway	Axesstel	MV440	PH7MV440	Notebook PC, Adaptor
Mouse	Radio shack	Serial Mouse	FSUGMZE3	Notebook PC
USB cable	SAMSUNG	ECB-DU28BE	-	E.U.T Notebook PC
Ear-phone	SAMSUNG	EHS61ASFWE	-	E.U.T
Adaptor	Yang Ming Industrial	DA-60M12		Gateway
RJ45 cable	-	-	-	Notebook PC, Gateway
Micro SD card	SanDisk	8 GB	-	E.U.T

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Micro USB	Y	Y	(P,D)0.6
	Ear-phone	N/A	Y	(D)1.5
Notebook PC	RJ 45	N/A	N	(D)1.5
	Serial (Mouse)	N/A	Y	(D)1.8
	DC IN	N	N/A	(P)1.8
Gateway	DC IN	N	N/A	(P)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
EUT	Micro USB	N	N/A	Y	Both End
	Ear-phone	N	N/A	Y	EUT End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial (Mouse)	N	N/A	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 EUT distance of 3 m

1.7 Test Facility

Chamber used to collect the test data is located at the 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4.

Measurement Facilities	Reg. No.
Radiated Field strength measurement facility (3m)	90661(Mar. 02, 2011)
Radiated Field strength measurement facility (10m)	90661 (Sep. 03, 2010)

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

2.1 Configuration of Test System

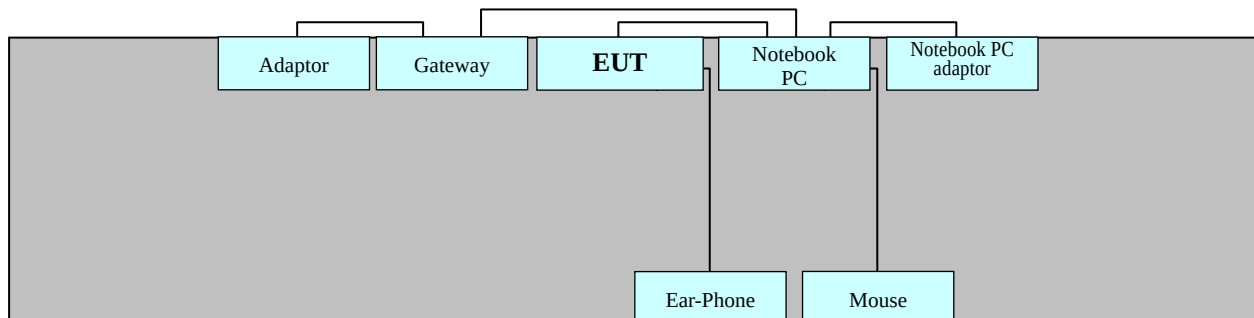
2.1.1 Conducted Emission Test

EUT was connected to LISN via Notebook PC adaptor and Base Station. 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.

2.1.2 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]



Non-Conductive Table
Power Line: 120 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

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

Operation Mode: ☒ Data Communication mode

3. 2 Radiated Emission Test

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

Operation Mode: ☒ Data Communication mode

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	: 24.1 °C
Humidity Level	: 55.4 %
Test Date	: August 19, 2013

Frequency (MHz)	Transd (dB)	Conductor	Quasi-Peak			Average		
			Limit (dBuV)	Measurement Level (dBuV)	Result Level (dBuV)	Limit (dBuV)	Measurement Level (dBuV)	Result Level (dBuV)
0.202	10.0	N	64	43.9	53.9	54	28.5	38.5
0.210	9.8	H	63	45.3	55.1	53	27.0	36.8
4.256	10.1	H	56	31.6	41.7	46	-	-
4.380	10.3	N	56	-	-	46	23.6	33.9
4.524	10.2	H	56	-	-	46	24.1	34.3
4.680	10.4	N	56	31.4	41.8	46	-	-

※ **NOTE:** Refer to page 11 to page 14 for details.

1. Line H = Hot, Line N = Neutral
2. Transd = LISN factor + Cable Loss factor

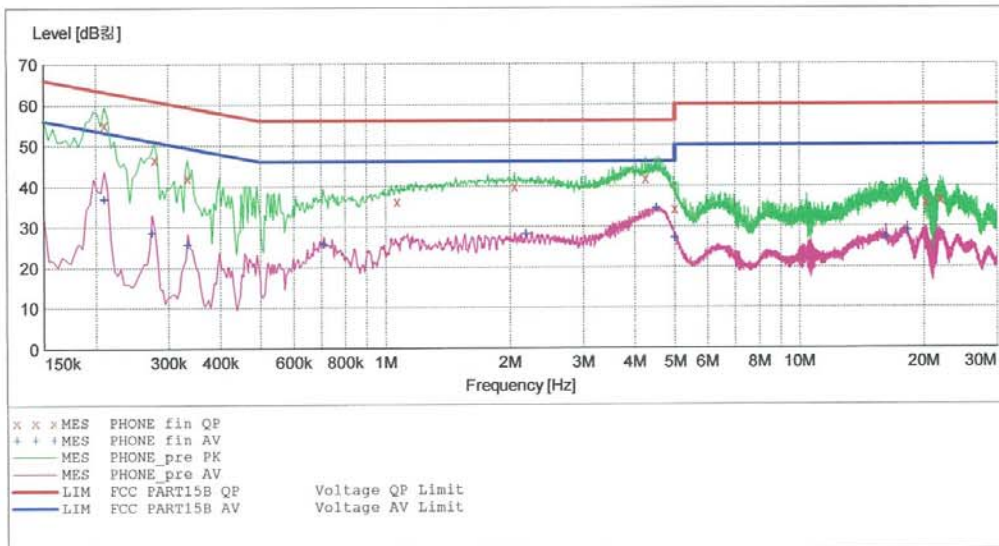
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EUT: GT-S7392
Manufacturer: SAMSUNG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: GC YOON
Test Specification: FCC PART15 B
Comment: H

SCAN TABLE: "FCC CLASS B(H)"

Short Description:			KN22 CLASS B			
Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
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"

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Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Line	PE
0.210001	55.10	9.8	63	8.1	---	---
0.278001	46.60	9.8	61	14.3	---	---
0.334001	42.20	9.8	59	17.1	---	---
1.068000	36.10	9.8	56	19.9	---	---
2.056000	39.90	9.9	56	16.1	---	---
4.256000	41.70	10.1	56	14.3	---	---
5.000000	34.20	10.2	56	21.8	---	---
20.220000	35.80	10.9	60	24.2	---	---
21.920000	36.50	11.0	60	23.5	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-08-19 8:16오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.210001	36.80	9.8	53	16.5	---	---
0.274001	28.60	9.8	51	22.4	---	---
0.334001	25.60	9.8	49	23.7	---	---
0.712000	25.60	9.8	46	20.4	---	---
2.188000	28.20	10.0	46	17.8	---	---
4.524000	34.30	10.2	46	11.7	---	---
5.000000	27.10	10.2	46	18.9	---	---
16.168000	27.20	10.8	50	22.8	---	---
18.244000	28.80	10.9	50	21.2	---	---

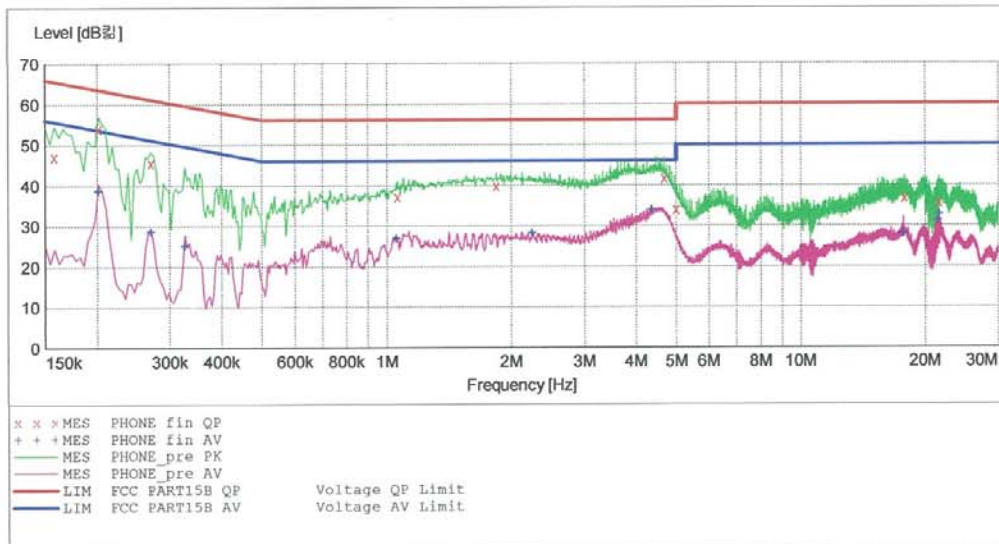
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EMC

EUT: GT-S7392
Manufacturer: SAMSUNG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: GC YOON
Test Specification: FCC PART15 B
Comment: N

SCAN TABLE: "FCC CLASS B(N)"

Short Description:			KN22 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"

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Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.158001	47.10	10.0	66	18.4	---	---
0.202001	53.90	10.0	64	9.6	---	---
0.270001	45.50	10.0	61	15.6	---	---
1.064000	37.20	10.1	56	18.8	---	---
1.844000	39.90	10.1	56	16.1	---	---
4.680000	41.80	10.4	56	14.2	---	---
5.000000	34.00	10.4	56	22.0	---	---
17.796000	36.80	11.2	60	23.2	---	---
21.584000	35.60	11.3	60	24.4	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-08-19 8:19오전

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.202001	38.50	10.0	54	15.0	---	---
0.270001	28.50	10.0	51	22.6	---	---
0.326001	25.10	10.0	50	24.4	---	---
1.056000	26.90	10.1	46	19.1	---	---
2.252000	28.20	10.2	46	17.8	---	---
4.380000	33.90	10.3	46	12.1	---	---
17.692000	27.80	11.1	50	22.2	---	---
21.408000	31.20	11.3	50	18.8	---	---
21.664000	32.60	11.3	50	17.4	---	---

4.2 Radiated Emission Test

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

-For measurement below 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

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

Operation Mode : Data Communication mode

Temperature : 23.8 °C

Humidity Level : 69.2 %

Test Date : August 13, 2013

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)			
48.000	9.26	V	1.0	12.41	3.47	40.0	25.14	14.86
62.400	12.05	V	1.0	11.51	3.55	40.0	27.11	12.89
66.000	12.42	V	1.0	11.09	3.58	40.0	27.09	12.91
78.000	16.21	H	1.0	8.55	3.66	40.0	28.42	11.58
132.000	13.86	V	1.0	12.35	3.93	43.5	30.14	13.36
209.700	13.76	H	1.0	10.17	4.21	43.5	28.14	15.36

-For measurement above 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Peak mode: Peak (RBW: 1 MHz, VBW: 1 MHz)
: Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)

Operation Mode : Data Communication mode

Temperature : 23.8 °C

Humidity Level : 69.2 %

Test Date : August 13, 2013

Frequency (GHz)	Peak			POL	Average		
	Total (dBμV/m)	Limit (dBμV/m)	Margin (dB)		Total (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2.0131	55.30	74	18.7	V	29.00	54	25.0
2.0971	52.90	74	21.1	V	28.60	54	25.4

※ NOTE:

1. Measurement above 1 GHz was performed from 1 GHz to the 5th harmonic of highest fundamental frequency. Test was measured by 12 GHz.

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 Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>Next CAL Date</u>
<u>Conducted Emission</u>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2014.04.25
☐ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2014.07.03
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	2014.04.26
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	2014.02.06
☐ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2014.07.03

Radiated Emission

-For measurement below 1 GHz

☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-

-For measurement above 1 GHz

☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☒ Power Amplifier	CBLU1183540	CERNEX	21690	1 year	2014.07.24
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13

7. CONCLUSION

The data collected shows that the **EUT type: 850/1900 GSM/GPRS Phone with BT v4.0(LE) , 802.11b/g/n and EDGE Rx only, Hotspot, FCC ID: A3LGTS7392, Model: GT-S7392** complies with §15.107 and §15.109 of the FCC rules.