TEST REPORT

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1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
- Date of Receipt : 2019-07-25

2. Use of Report : -

3. Name of Product and Model : Notebook PC / NP930XCJ

4. Manufacturer and Country of Origin : Samsung Electronics Co., Ltd. / Korea

5. FCC ID : A3LNP930XCJ

6. Date of Test : 2019-09-05 to 2019-09-09

7. Test Standards : 47 CFR Part 1.1310

8. Test Results : Refer to the test result in the test report

Affirmation	Tested by Name : Kwonse Kim (Signature)	Technical Manager Name : Jaehyong Lee (Signature)

2019-10-23

KCTL Inc.

Report revision history

Date	Revision	Page No
2019-10-14	Initial report	-
2019-10-17	Updated	4,5
2019-10-21	Updated	4
2019-10-23	Updated	5,6

Note. The report No. KR19-SRF0158 is superseded by the report No. KR19-SRF0158-C.

CONTENTS

1. General information

Client	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Manufacturer	:	Samsung Electronics Co., Ltd.
Address	:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Factory	:	SESC (Samsung Electronics Suzhou Computer)
Address	:	No.198, Fangzhou Road, Suzhou Industrial Park, Jiangsu Province, 215021, China
Laboratory	:	KCTL Inc.
Address	:	65, Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea
Accreditations	:	FCC Site Designation No: KR0040, FCC Site Registration No: 687132 VCCI Registration No. : R-20080, G-20078, C-20059, T-20056 Industry Canada Registration No. : 8035A KOLAS No.: KT231

2. Device information

Equipment under test	:	Notebook PC
Model	:	NP930XCJ
Frequency range	:	110 ㎑ ~ 148 ㎑
Modulation technique	:	AM
Power source	:	AC 120 V (Output : 19V/3.42A)
Antenna specification	:	Loop Coil Antenna_Flat type
Software version	:	19H1
Hardware version	:	REV1.0
Test device serial No.	:	1BGZ91ZM800067M
Operation temperature	:	10 ℃ ~ 35 ℃

Note:

1. Certificated module is mounted in the EUT as following.

- Applicant : Intel Mobile Communications
- Contains FCC ID : PD9AX201D2
- Model : AX2201D2W
- SAR test report number : KR19-SPF0026

2.1. Accessory information

Equipment	Manufacturer	Model	Serial No.	Power source	FCC ID
Smart Phone	Samsung Electronics Co., Ltd.	SM-G960N	R39JB06Z70	DC 3.85 V	A3LSMG960KOR

2.2. Equipment Approval Considerations item 5.b) of KDB 680106 D01v03

Requirement		Device
A)	Power transfer frequency is less than 1 ㎒.	Operating frequency is between 110 ㎑ to 148 ㎑.
B)	Output power from each primary coil is less than or equal to 15 watts.	Maximum power is 7 watts.
C)	The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	The transfer system includes only single primary and secondary coils.
D)	Client device is placed directly in contact with the transmitter.	Yes.
E)	Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion)	This device is portable condition. (Refer to PAG)
F)	The aggregate H-field strengths at 15 ㎝ surrounding the device and 20 ㎝ above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.	Aggregate fields were measured at distances < 15 ㎝ / 20 ㎝ following FCC guidance provided in a lab KDB enquiry. All measurements are significantly below 50% of the limit.

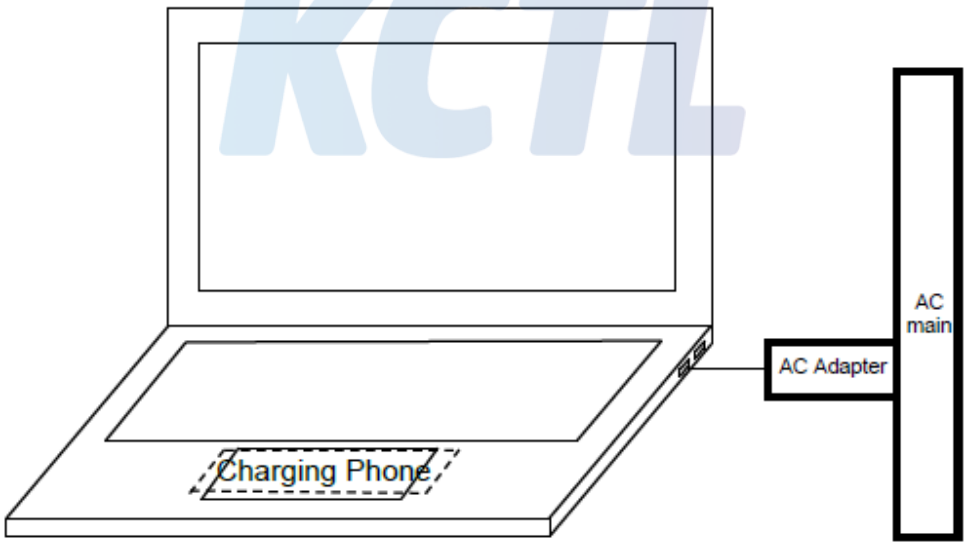
2.3. Worst-case configuration and mode

Mode 1	Test case	Description
Power Sharing mode	1	EUT position : Clamshell Charging from EUT to Phone
	2	EUT position : Clamshell Charging from AC Adaptor to EUT Charging from EUT to Phone

Note:

1. For the radiated test, test case 1, the EUT can operate power sharing mode when battery level is over 30%. The test results are not different between fully charged status and battery level 30% status (EUT), test were performed fully charged condition.
2. In case of client device, each battery status was investigated then lowest condition is reported as a worst result.
   Battery status: 1% ~ 20%, 40% ~ 60%, 80% ~ 100%
3. For the power sharing mode, test results of case 2 is worst case, so this test report described test case 2.

2.4. Test setup diagram



2.4.1 Test case 1 & 2_Charging Phone

Note:

Test case 1, EUT did not be connected to AC Adaptor in above setup diagram for the test.

3. RF Exposure
3.1. FCC Regulation

This document is prepared to show compliance with the RF Exposure requirements as required in §1.1310 of the FCC rules and Regulations.
The limit for Maximum Permissible Exposure (MPE), specified in FCC §1.1310, is listed in Table 1-1. According to FCC §1.1310: the criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b).

Table 1 – Limits for Maximum Permissible Exposure (MPE)

Frequency Range (㎒)	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [㎽/㎠]	Averaging Time [minute]
(A) Limits for Occupational / Controlled Exposure				
0.3 ~ 3.0	614	1.63	*100	6
3.0 ~ 30	1842/f	4.89/f	*900/f^2	6
30 ~ 300	61.4	0.163	1.0	6
300 ~ 1 500	/	/	f/300	6
1 500 ~ 15 000	/	/	5	6
(B) Limits for General Population / Uncontrolled Exposure				
0.3 ~ 1.34	614	1.63	*100	30
1.34 ~ 30	824/f	2.19/f	*180/f^2	30
30 ~ 300	27.5	0.073	0.2	30
300 ~ 1 500	/	/	f/1 500	30
1 500 ~ 15 000	/	/	1.0	30

*f=frequency in ㎒, *= plane-wave equivalent power density*

3.2. Test Set-up

3.2.1. Description of test setup

1) Testing was performed with a calibrated H field probe.
2) Measurement was performed on each side of the EUT as described per below table.

A	B	C	D	E	F
Right	Left	Back	Front	Top (Keyboard, Touch pad)	Bottom

3) Testing was performed at the distances and different battery level as indicated on test result table.
4) Measurement procedure was performed per FCC Guidance.

3.2.2. Operational correction factor

1) WPS condition
The EUT need to be charged more than 30 minutes before it can be full charged.
Operational correction factor = 30 min / 30 min = 1.000

3.2.3. Support equipment

Client device	Model	FCCID
Mobile Phone	SM-G960N	A3LSMG960KOR

3.3. Test results

3.3.1. Test mode 1: Wireless Power Sharing (Test case 2)

- H-field measurement results

Frequency [MHz]	Distance [cm]	H-field Measurement [A/m]						Limits [A/m]
		EUT sides						
		A	B	C	D	E	F	
0.110 ~ 0.148	0	0.033 3	0.032 8	0.033 3	0.069 0	0.127 3	0.089 7	1.63
0.110 ~ 0.148	1					0.053 9		1.63
0.110 ~ 0.148	2					0.050 7		1.63
0.110 ~ 0.148	3					0.049 3		1.63
0.110 ~ 0.148	4					0.044 6		1.63
0.110 ~ 0.148	5					0.042 5		1.63
0.110 ~ 0.148	6					0.040 1		1.63
0.110 ~ 0.148	7					0.039 3		1.63
0.110 ~ 0.148	8					0.040 9		1.63
0.110 ~ 0.148	9					0.038 0		1.63
0.110 ~ 0.148	10					0.030 8		1.63

- Corrected H-field measurement results

Frequency [MHz]	Distance [cm]	H-field Measurement [A/m]						Limits [A/m]
		EUT sides						
		A	B	C	D	E	F	
0.110 ~ 0.148	0	0.033 3	0.032 8	0.033 3	0.069 0	0.127 3	0.089 7	1.63
0.110 ~ 0.148	1					0.053 9		1.63
0.110 ~ 0.148	2					0.050 7		1.63
0.110 ~ 0.148	3					0.049 3		1.63
0.110 ~ 0.148	4					0.044 6		1.63
0.110 ~ 0.148	5					0.042 5		1.63
0.110 ~ 0.148	6					0.040 1		1.63
0.110 ~ 0.148	7					0.039 3		1.63
0.110 ~ 0.148	8					0.040 9		1.63
0.110 ~ 0.148	9					0.038 0		1.63
0.110 ~ 0.148	10					0.030 8		1.63

Note:
Operating duty factor is based on averaging time of §table 1.
Corrected H-field measurement results = Measurement results(A/m) x 1.000

4 Simultaneous transmission

According to KDB 447498 D01v06, When one of the following test exclusion conditions is satisfied for all combinations of simultaneous transmission configurations, further equipment approval is not required to incorporate transmitter modules in host devices that operate in the mixed mobile and portable host platform exposure conditions.

a) The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0

b) The SAR to peak location separation ratios of all simultaneously transmitting antenna pairs operating in portable device exposure conditions are all ≤ 0.04, and the [Σ of MPE ratios] is ≤ 1.0.

Test exclusion condition a): The sum of the same evaluation positions.

$$\frac{\Sigma \text{ of Highest Reported SAR(WLAN + Bluetooth)}}{Limit} + \frac{\Sigma \text{ of SAR Field measured}}{Limit} = < 1.0$$

4.1 Simultaneous Transmission Configurations

No	Scenario
1	WLAN 2.4 ㎓ Main + Bluetooth Aux + Wireless Power Sharing
2	WLAN 5 ㎓ Main + Bluetooth Aux + Wireless Power Sharing
3	WLAN 5 ㎓ Aux + Bluetooth Aux + Wireless Power Sharing
4	WLAN 5 ㎓ MIMO + Bluetooth Aux + Wireless Power Sharing

4.2 Simultaneous Transmission Analysis

RF Exposure	Position	WLAN				Bluetooth Ant.1	Summation				Limit
		2.4 ㎓ Ant. 0	5 ㎓ Ant. 0	5 ㎓ Ant. 1	5 ㎓ MIMO						
		[①]	[②]	[③]	[④]	[⑤]	[①+⑤]	[②+⑤]	[③+⑤]	[④+⑤]	
SAR	Bottom	0.335	1.146	0.767	0.821	0.142	0.477	**1.288**	0.909	0.963	**1.60**
SAR Ratio [Summation/Limit]							0.30	**0.81**	0.57	0.60	
H-Filed	Bottom	**Wireless Power Sharing**					0.0897				**1.63**
H-Filed Ratio[results/Limit]							0.06				
Ratio Summation [SAR Ratio + H-Filed Ratio]							0.36	**0.87**	0.63	0.66	**< 1.0**

When the sum of ratios of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the 1.0 the additional equipment approval is not required.

5. Measurement Equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
E&H Field Probe	narda	EHP-200A	170WX81015	20.02.08

End of test report