

MPE TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310
FCC ID: A3LEADT10

Equipment Under Test : Allshare Cast Hub
Model Name : EAD-T10
Serial No. : N/A
Applicant : SAMSUNG ELECTRONICS CO., LTD.
Manufacturer : SAMSUNG ELECTRONICS CO., LTD.
Date of Test(s) : 2012.04.03 ~ 2012.04.11
Date of Issue : 2012.04.17

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Logan Lee

Date

2012.04.17

Approved By:



Feel Jeong

Date

2012.04.17

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd.(Gunpo Laboratory)

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- Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

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1.2 Details of applicant

Applicant : SAMSUNG ELECTRONICS CO., LTD.
Address : 416, Maetan3-dong, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Contact Person : Kim, Jin-Kyung
Phone No. : +82 31 301 4187

1.3. Description of EUT

Kind of Product	Allshare Cast Hub
Model Name	EAD-T10
Serial Number	N/A
Power Supply	DC 5 V
Frequency Range	1) 2 412 MHz ~ 2 462 MHz (11b/g/n_HT20) 2) 5 745 MHz ~ 5 825 MHz (11a/n_HT20) 3) 5 755 MHz ~ 5 795 MHz (11n_HT40) 4) 5 180 MHz ~ 5 240 MHz (11a/n_HT20_Non DFS) 5) 5 190 MHz ~ 5 230 MHz (11n_HT40_Non DFS)
Modulation Technique	DSSS, OFDM
Number of Channels	1) 11 channel (11b/g/n_HT20) 2) 5 channel (11a/n_HT20) 3) 2 channel (11n_HT40) 4) 4 channel (11a/n_HT20-Non DFS) 5) 2 channel (11n_HT40 – Non DFS)
Antenna Type	Internal type (SISO)
Antenna Gain	1) 0.33 dB i(11b/g/n_HT20) 2), 3) -6.40 dB i(11a/n_HT20, HT40) 4), 5) 0.38 dB i(11a/n_HT20, HT40_Non DFS)

1.4. Declaration by the manufacturer

- EUT does not support DFS band from 5 260 MHz to 5 700 MHz
- We found out the test mode with the highest power level after we analyze all the data rates. So we choose 6 Mbps data rate for 11a and MCS0 for 11n_HT20 and HT40 (worst case) as a representative.

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1.5. Description of test mode

802.11 b mode:

We found out the test mode with the highest power level after we analyze all the data rates. 1 Mbps data rate is chose worst case as a representative.

802.11a/g mode:

We found out the test mode with the highest power level after we analyze all the data rates. 6 Mbps data rate is chose (worst case) as a representative.

802.11n mode:

We found out the test mode with the highest power level after we analyze all the data rates. MCS0 data rate is chose (worst case) as a representative.

1.6. Test Report Revision

Revision	Report number	Description
0	F690501/RF-RTL005450	Initial
1	F690501/RF-RTL005450-1	Revised Description of EUT

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2. RF Exposure Evaluation

2.1 Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational /Control Exposures				
300 – 1 500	--	--	F/300	6
1 500 – 100 000	--	--	5	6
(B) Limits for General Population/Uncontrol Exposures				
300 – 1 500	--	--	F/1500	30
<u>1 500 – 100 000</u>	--	--	<u>1</u>	<u>30</u>

2.1.1. Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

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2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data

Test Mode : Normal Operation

2.1.3. Output Power into Antenna & RF Exposure Evaluation Distance

Operation Mode	Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dB m)	Duty Cycle (%)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)
11b	Low	2 412	14.61	100	0.33	0.006 2
	Middle	2 437	14.53	100	0.33	0.006 1
	High	2 462	14.97	100	0.33	0.006 7
11g	Low	2 412	15.14	100	0.33	0.007 0
	Middle	2 437	14.52	100	0.33	0.006 1
	High	2 462	15.00	100	0.33	0.006 8
Non DFS 11n_HT20	Low	2 412	13.48	100	0.33	0.004 8
	Middle	2 437	13.07	100	0.33	0.004 4
	High	2 462	13.51	100	0.33	0.004 8

Operation Mode	Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dB m)	Duty Cycle (%)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)
11a	Low	5 745	6.15	100	-6.40	0.000 2
	Middle	5 785	7.56	100	-6.40	0.000 3
	High	5 825	6.95	100	-6.40	0.000 2
Non DFS 11n_HT20	Low	5 745	5.82	100	-6.40	0.000 2
	Middle	5 785	7.19	100	-6.40	0.000 2
	High	5 825	6.67	100	-6.40	0.000 2
Non DFS 11n_HT40	Low	5 755	6.94	100	-6.40	0.000 2
	High	5 795	8.19	100	-6.40	0.000 3

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Operation Mode	Channel	Channel Frequency (MHz)	Output Average Power to Antenna (dB m)	Duty Cycle (%)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)
Non DFS 11a	Low	5 180	7.25	100	0.38	0.001 2
	Middle	5 220	6.44	100	0.38	0.001 0
	High	5 240	6.73	100	0.38	0.001 0
Non DFS 11n_HT20	Low	5 180	7.06	100	0.38	0.001 1
	Middle	5 220	6.33	100	0.38	0.000 9
	High	5 240	6.63	100	0.38	0.001 0
Non DFS 11n_HT40	Low	5 190	7.39	100	0.38	0.001 2
	High	5 230	7.37	100	0.38	0.000 2

Note :

1. The power density Pd (7th column) at a distance of 20 cm calculated from the friis transmission formula is far below the limit.

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2.1.4. The highest MPE power density of 2.4 GHz band and 5 GHz band respectively

Band (MHz)	Operation Mode	Channel Frequency (MHz)	Output Average Power to Antenna (dB m)	Duty Cycle (%)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)
2 412 - 2 462	11g	2412	15.14	100	0.33	0.007 0
5 745 - 5 825	11n-HT40	5 795	8.19	100	-6.40	0.000 3
5 180 - 5 700	11n-HT40	5 190	7.39	100	0.38	0.001 2

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