Nemko Korea Co., Ltd.

155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-852 KOREA, REPUBLIC OF
TEL : + 82 31 330 1700 FAX : + 82 31 322 2332

FCC EVALUATION REPORT FOR CERTIFICATION

Applicant :

Samsung Electronics Co., Ltd.
129, Samsung-ro, Yeongtong-gu, Suwon-si,
Gyeonggi-do, Korea 443-742
Attn : Mr. Jaywooo Lee

Dates of Issue : March 14, 2014
Test Report No. : NK-14-E-179
Test Site : Nemko Korea Co., Ltd.
EMC site, Korea

FCC ID	***A3LBN8109990A***
Brand Name	SAMSUNG
Contact Person	**Samsung Electronics Co., Ltd.** **129, Samsung-ro, Yeongtong-gu, Suwon-si,** **Gyeonggi-do, Korea 443-742** **Mr. Jaywoo Lee** **Telephone No. : + 82 31 277 2569**

Applied Standard:	FCC Part 15 Subpart B & 2, ICES-003
Classification :	FCC Part 15 Spread Spectrum Transmitter
EUT Type:	Magic Presenter_Dongle

The device bearing the brand name and FCC ID 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 C63.4-2009.
The test results of this report are deemed satisfactory evidence of compliance with Industry Canada Interference-Causing Equipment Standard ICES-003.
I attest to the accuracy of data and 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.

Mar 14, 2014
Tested By : Yeonsuk Jung
Engineer

Mar. 14. 2014
Reviewed By : Changsoo Choi
Technical Manager

TABLE OF CONTENTS

SCOPE

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15.

Responsible Party :	Samsung Electronics Co., Ltd.
Contact Person :	Mr. Jaywoo Lee Tel No.: + 82 31 277 2569
Manufacturer :	Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea 443-7420

- FCC ID: A3LBN8109990A
- Model: BN81-09990A
- EUT Type: Magic Presenter_Dongle
- Brand Name: SAMSUNG
- Electric Rating: d.c. 5 V (Battery)
- Test Voltage: a.c. 120 V, 60 Hz
- Port/Connector: -
- Classification: FCC Part 15 Spread Spectrum Transmitter
- Applied Standard: FCC Part 15 Subpart B & Part 2, ICES-003
- Test Procedure(s): ANSI C63.4 (2009)
- Dates of Test: February 17, 2014 to March 02, 2014
- Place of Tests: Nemko Korea Co., Ltd. EMC Site
- Test Report No.: NK-14-E-179

INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4-2009) was used in determining radiated and conducted emissions emanating from **Samsung Electronics Co., Ltd.**
FCC ID : **A3LBN8109990A, Magic Presenter_Dongle.**

These measurement tests were conducted at ***Nemko Korea Co., Ltd. EMC Laboratory***.
The site address is 155 & 159, Osan-Ro, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 449-852 KOREA, REPUBLIC OF
The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18 miles) south-southeast from central Seoul.
It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.
The detailed description of the measurement facility was found to be in compliance with the requirements of §2.948 according to ANSI ANSI C63.4 (2009).

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Fig. 1. The map above shows the Seoul in Korea vicinity area.
The map also shows Nemko Korea Corporation Ltd. EMC Lab and Incheon Airport.

TEST CONDITIONS & EUT INFORMATION

Operating During Test

The EUT was connected to Laptop computer and tested at fairing With the Magic Presenter_Pointer was continuous operation state.

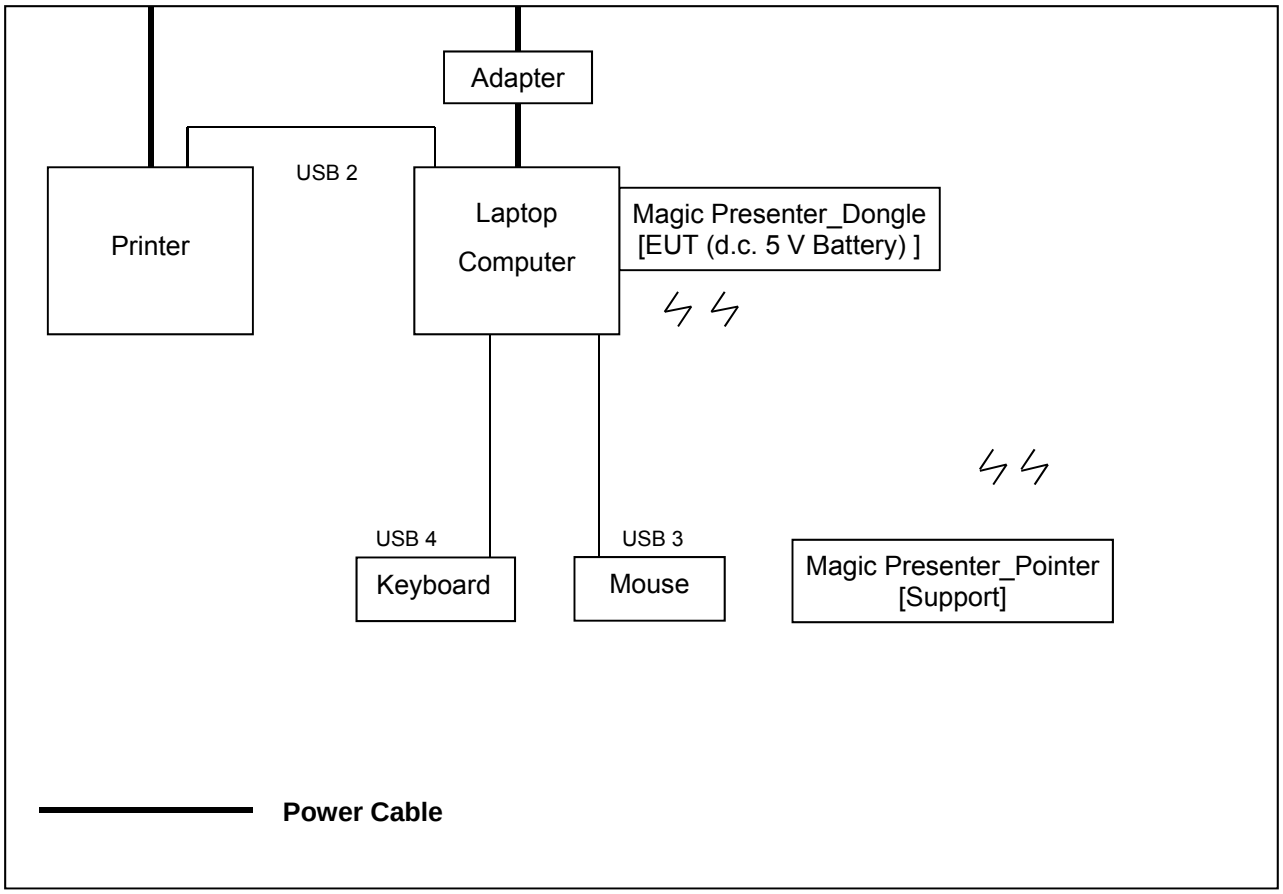
Support Equipment

Magic Presenter_Dongle (EUT)	Samsung Electronics Co., Ltd. Model : BN81-09990A Direct shielded USB 1 cable	FCC ID : A3LBN8109990A S/N : N/A
Magic Presenter_Pointer (Support)	Samsung Electronics Co., Ltd. Model : BN81-09939A	S/N : N/A
Laptop Computer	Samsung Electronics Co., Ltd. Model : NT-RF510	S/N : ZZVL93EB301744D
Adapter	Chicony Power Technology co., Ltd. Model : A10-090P1A 1.0 m unshielded Power cable	S/N : CNBA4400215ADON812700N8
Printer	CANON VIETNAM CO.,LTD Model : iP2770 1.5 m shielded USB 2 cable	S/N : QC3-2772-DB01-01
Mouse	DELL Model :MO56UO 1.7 m shielded USB 3 cable	S/N : FOU00B85
Keyboard	SILITEK YET FOUNDATE Model : SK-2875 1.9 m shielded USB 4 cable	S/N : N/A

EUT Information

Rated Voltage	d.c. 5 V
Size (W x H x D)	20.1 mm x 71.3 mm x 10.4 mm
Weight	9.4 g (without battery)

Setup Drawing



SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specification:

Name of Test	Paragraph No.	Result	Remark
Conducted Emission	15.107(a)	Complies	
Radiated Emission	15.109(g)	Complies	Below 1 GHz

RECOMMENDATION / CONCLUSION

The data collected shows that the **Samsung Electronics Co., Ltd.**

FCC ID : A3LBN8109990A, Magic Presenter_Dongle.

The highest emission observed was at **0.16 MHz** for conducted emissions with a AV margin of **7.9 dB**, at **490.79 MHz** for radiated emissions with a margin of **8.1 dB**.

SAMPLE CALCULATION

$$dB\mu N = 20 \log_{10}(\mu N/m)$$

$$\mu N = 10^{(dB\mu N/20)}$$

EX. 1.

@165.0 MHz Class B limit = 30.0 dB μN/m

Reading = 38.2 dB μN(calibrated level)

Antenna factor + Cable Loss + Amplifier Gain = -12.9 dB

Total = 25.30 dB μN/m

Margin = 30.0 – 25.30 = 4.70

4.70 dB below the limit

DESCRIPTION OF TESTS

Conducted Emissions

The Line conducted emission test facility is located inside a 4 m x 7 m x 2.5 m shielded enclosure.
It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.
A 1 m x 1.5 m wooden table 0.8 m height is placed 0.4 m away from the vertical wall and 0.5 m away from the side of wall of the shielded room.
Rohde & Schwarz (ESH2-Z5) and Rohde & Schwarz (ESH3-Z5) of the 50 ohm / 50 uH Line Impedance Stabilization Network(LISN) are bonded to the shielded room.
The EUT is powered from the Rohde & Schwarz (ESH3-Z5) LISN and the support equipment is powered from the Rohde & Schwarz (ESH2-Z5) LISN.
Power to the LISN s are filtered by high-current high insertion loss power line filters.
The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure. All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1 / 2 ".
If d.c. power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISNs, All interconnecting cables more than 1 m were shortened by non-inductive bundling (serpentine fashion) to a 1 m length.
Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT.
The spectrum was scanned from 150 kHz to 30 MHz with 20 ms sweep time.
The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30).
The detector functions were set to quasi-peak mode & average mode.
The bandwidth of receiver was set to 9 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.
Each emission was maximized by; switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux a.c. outlet, if applicable; whichever determined the worst case emission.
Each EME reported was calibrated using the R&S signal generator.

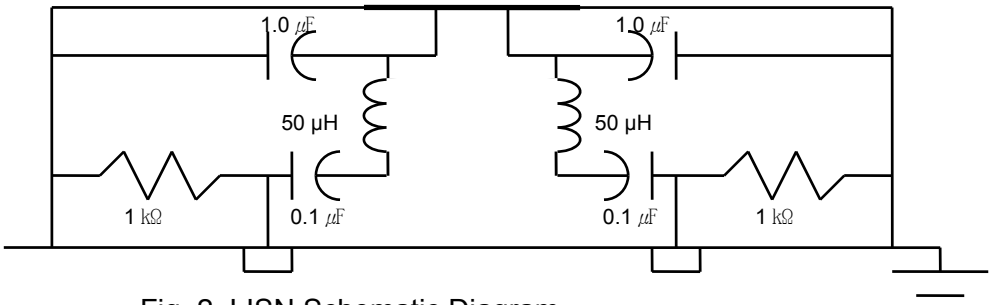


Fig. 2. LISN Schematic Diagram

DESCRIPTION OF TESTS

Radiated Emissions

Measurement were made at 10 meter Semi-Anechoic Chamber using broad band antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found.
The test receiver was scanned from 30 MHz to 1000 MHz using TRILOG Broadband Test Antenna (Schwarzbeck, VULB 9163) in semi anechoic chamber.
The test equipment was placed on a wooden table.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition.
Each frequency found during measurements was reexamined and investigated using EMI test receiver. (ESU 40)
The detector function were set to quasi-peak mode and the bandwidth of the receiver were set to 120 kHz depending on the frequency or type of signal.
The half wave dipole antenna was tuned to the frequency found during preliminary radiated measurements.
The EUT support equipment and interconnecting cables were re configured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8 m high non- metallic (1.0 x 1.5) meter table.
The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission.
The turn table containing the Technology was rotated; the antenna height was varied 1 to 4 meter and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by : switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and of support equipment, and powering the monitor from the floor mounted outlet box and computer aux a.c. outlet, if applicable; whichever determined the worst case emission.
Each EME reported was calibrated using the R/S signal generator.

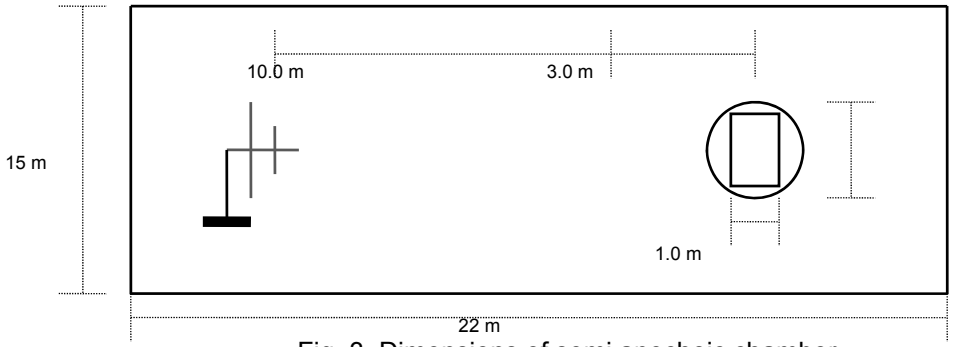


Fig. 3. Dimensions of semi anechoic chamber

Conducted Emissions

FCC ID : A3LBN8109990A

Frequency	Level (dBμV)		Factor	Line	Limit (dBμV)		Margin (dB)	
(MHz)	Q-Peak	Average	(dB)		Q-Peak	Average	Q-Peak	Average
0.16	52.8	47.6	0.09	N	65.5	55.5	12.7	7.9
0.35	40.8	30.7	0.19	N	59.0	49.0	18.2	18.3
0.58	35.1	22.9	0.20	N	54.8	44.8	19.7	21.9
0.95	31.6	22.6	0.22	N	50.7	40.7	19.1	18.1
2.78	28.9	23.7	0.33	N	56.0	46.0	27.1	22.3
15.73	36.4	31.4	1.52	N	56.0	46.0	19.6	14.6

Table 1. Line Conducted Emissions Tabulated Data

NOTES:

1. ***Measurements using quasi-peak mode & average mode.***
2. ***All modes of operation were investigated and the worst -case emission are reported. See attached Plots.***
3. ***LINE : L1 = Line , N = Neutral***
4. ***The limit for Class B device is on the FCC Part section 15.107(a).***

Tested by : ***Yeonsuk Jung***

TEST DATA

Radiated Emissions (Below 1 GHz)

FCC ID : A3LBN8109990A

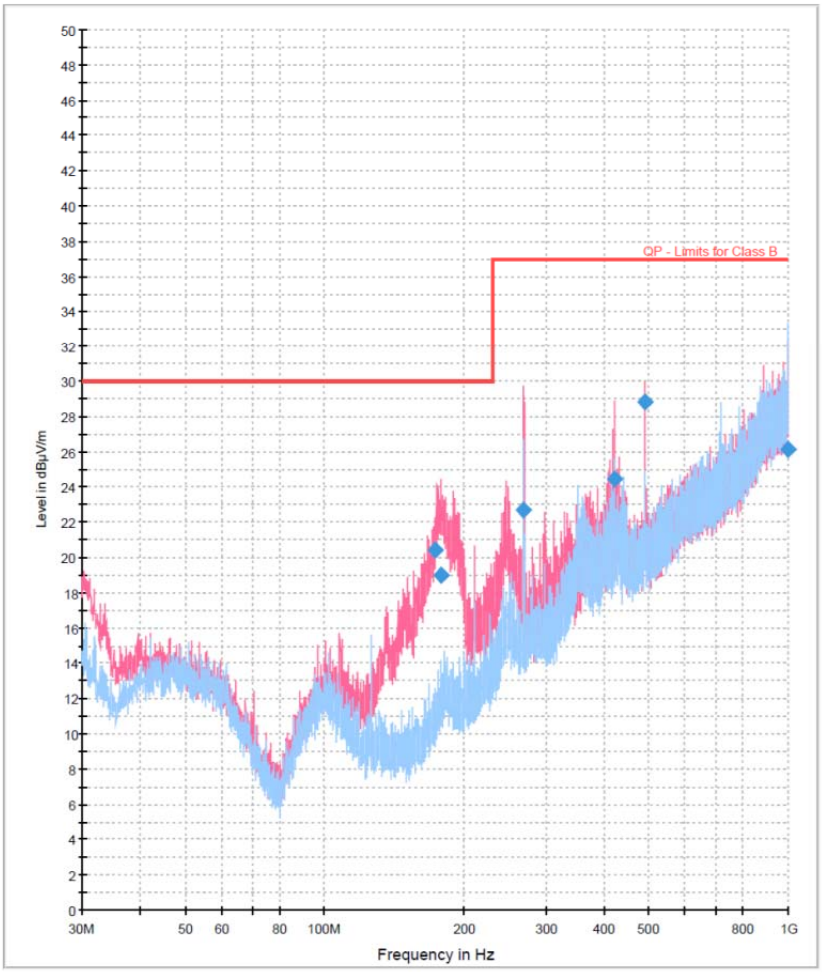
Test Report

Common Information

Test Description:	Radiated Emission(NK-14-E-179)
Test Site:	Nemko 10m Chamber
Test Standard:	FCC Part 15 Subpart B Class B
Environment Conditions:	a.c. 120 V, 60 Hz
Operator Name:	Yeonsuk, Jung
Comment:	MODEL : BN81-09990A

1. Electric Field Strength (30M-1GHz)_final

1. Electric Field Strength (30M-1GHz)_final



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Test 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)
173.172000	20.4	15000.0	120.000	130.0	V	178.0	-25.5	9.6
178.749500	19.0	15000.0	120.000	130.0	V	99.0	-25.2	11.0
269.493000	22.7	15000.0	120.000	100.0	V	-12.0	-20.1	14.3
422.607500	24.5	15000.0	120.000	100.0	V	18.0	-15.1	12.5
490.798500	28.9	15000.0	120.000	100.0	V	4.0	-13.2	8.1
997.381000	26.1	15000.0	120.000	330.0	H	40.0	-5.5	10.9

(continuation of the "Final Result 1" table from column 9 ...)

Frequency (MHz)	Limit (dBµV/m)	Comment
173.172000	30.0	
178.749500	30.0	
269.493000	37.0	
422.607500	37.0	
490.798500	37.0	
997.381000	37.0	

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Table 2. Radiated Measurements at 10 meters

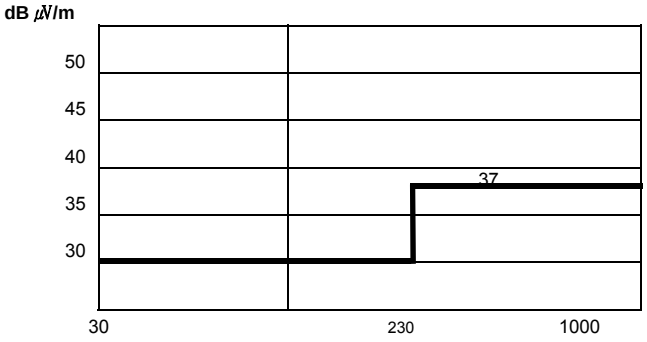


Fig. 4. Limits at 10 meters

NOTES:

1. All modes were measured and the worst-case emission was reported.

2. Below 1 GHz, the radiated limits are shown on Figure 4.

3. CISPR 22 limit will be applied for radiated emission test

NOTES:

1. *Pol. H = Horizontal V = Vertical

2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.

3. Measurements using quasi-peak mode below 1 GHz.

4. The limit for Class B device is on the FCC Part section 15.109(g).

Tested by : **Yeonsuk Jung**

PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Line)***

NEMKO KOREA (NK-14-E-179) 24 Feb 2014 14:02

Conducted Emissions

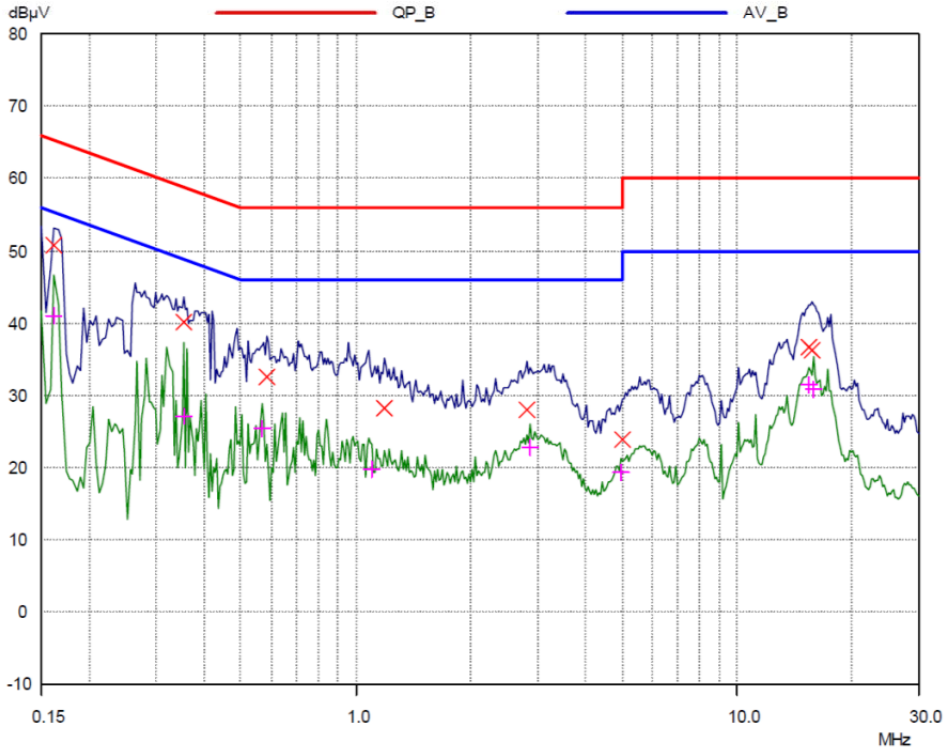
EUT:	EUT
Manuf:	Samsung Electronics Co., Ltd.
Op Cond:	a.c. 120 V, 60 Hz
Operator:	Yeonsuk, Jung
Test Spec:	FCC Part 15 Subpart B Class B
Comment:	MODEL : BN81-09990A
	LINE : LINE-PE
Result File:	179l1.dat : Class B

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	2	150kHz	30MHz	ESH3_Z5_Line

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	60 dB



PLOTS OF EMISSIONS

- ***Conducted Emission at the Mains port (Neutral)***

NEMKO KOREA (NK-14-E-179) 24 Feb 2014 14:13

Conducted Emissions

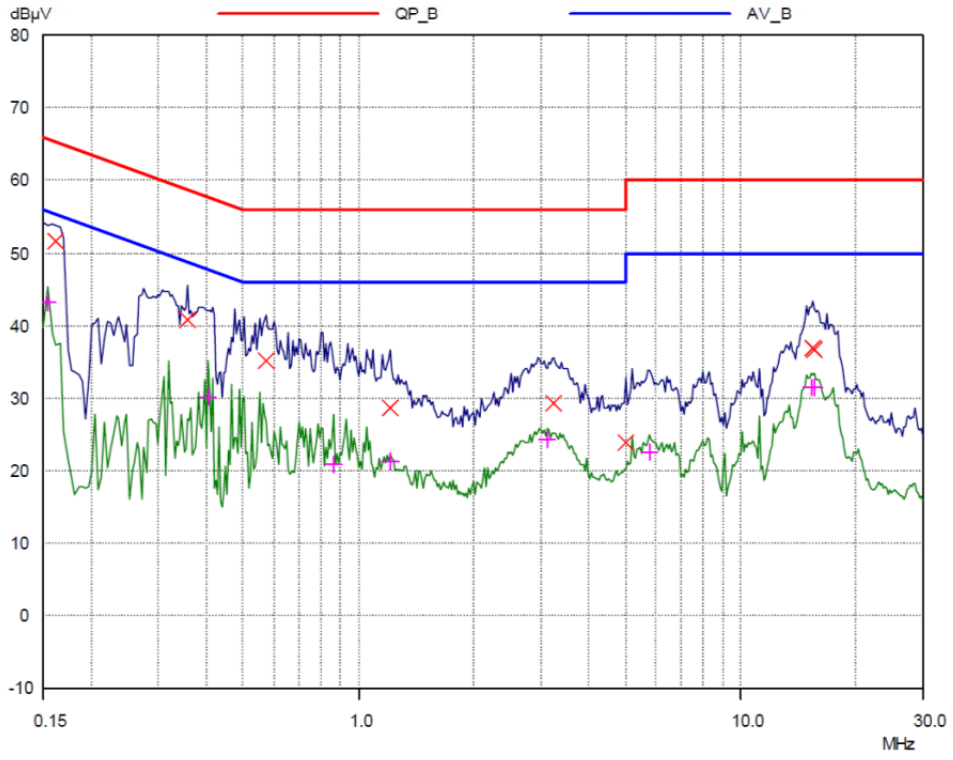
EUT:	EUT
Manuf:	Samsung Electronics Co., Ltd.
Op Cond:	a.c. 120 V, 60 Hz
Operator:	Yeonsuk, Jung
Test Spec:	FCC Part 15 Subpart B Class B
Comment:	MODEL : BN81-09990A
	LINE : NEUTRAL-PE
Result File:	179n1.dat : Class B

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150kHz	30MHz	3.9063kHz	9kHz	PK+AV	20msec	20 dB	OFF	60dB

Transducer	No.	Start	Stop	Name
	1	150kHz	30MHz	ESH3_Z5_Neutral

Final Measurement:		
	Detectors:	X QP / + AV
	Meas Time:	1sec
	Subranges:	8
	Acc Margin:	60 dB



ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95 %

1. Conducted Uncertainty Calculation

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	R_S	0.17	normal 1	1.00	0.17	1	0.17
Receiver reading	Ri	±0.02	normal 2	2.00	0.01	1	0.01
Attenuation AMN-Receiver	L_C	±0.10	rectangular	$\sqrt{3}$	0.06	1	0.06
AMN Voltage division factor	L_{AMN}	±0.09	normal 2	2.00	0.05	1	0.05
Sine wave voltage	dV_{SW}	±0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dV_{PA}	±0.92	normal 2	2.00	0.50	1	0.50
Pulse repetition rate response	dV_{PR}	±0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	dVNF	±0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
AMN Impedance	dZ	±2.00	normal 2	2.00	1.00	1	1.00
Mismatch	M	+0.70 -0.76	U-Shaped	$\sqrt{2}$	0.52	1	0.52
Remark	Using 50 Ω / 50 uH AMN						
Combined Standard Uncertainty	Normal			*uc* = 1.26 dB			
Expended Uncertainty U	Normal (*k* = 2)			*U* = 2.5 dB (CL is 95 %)			

2. Radiation Uncertainty Calculation

Source of Uncertainty	Xi	Uncertainty of Xi		Coverage factor k	u(Xi) (dB)	Ci	Ci u(Xi) (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	**RS**	0.11	normal 1	1.00	0.11	1	0.11
Receiver reading	**Ri**	±0.02	normal 2	2.00	0.01	1	0.01
Sine wave voltage	**dVsw**	±0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	**dVpa**	±0.92	normal 2	2.00	0.46	1	0.46
Pulse repetition rate response	**dVpr**	±0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	**dVnf**	±0.50	normal 2	2.00	0.25	1	0.25
Antenna Factor Calibration	A_F	±2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Cable Loss	C_L	±1.00	normal 2	2.00	0.50	1	0.50
Antenna Directivity	A_D	±0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Antenna Factor Height Dependence	A_H	±2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Antenna Phase Centre Variation	A_P	±0.20	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	A_i	±0.25	rectangular	$\sqrt{3}$	0.14	1	0.14
Site Imperfections	S_i	±4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	D_V	±0.60	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	D_{bal}	±0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarization	D_{Cross}	±0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Mismatch	**M**	+0.98 -1.11	U-Shaped	$\sqrt{2}$	0.74	1	0.74
Combined Standard Uncertainty	Normal			*uc* = 2.62 dB			
Expended Uncertainty U	Normal (*k* = 2)			5.2 dB (CL is 95 %)			

LIST OF TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Due to Calibration	Calibration Interval
1	Test Receiver & Analysis	R & S	ESCS30	100302	Oct. 06 2014	1 year
2	Software	R & S	ESxS-K1	Version 2.12	-	-
3	LISN	R & S	ESH3-Z5	833874/006	Oct. 06 2014	1 year
4	ESH2-Z5 Artificial Mains Network	R & S	ESH2-Z5	100227	Apr. 03 2014	1 year
5	EMI Test Receiver	R&S	ESU 40	100202	Apr. 03 2014	1 year
6	Software	R&S	EMC32	Version 8.53.0	-	-
7	Signal Conditioning Unit	R&S	SCU 01	10030	Apr. 03 2014	1 year
8	TRILOG Broadband Test Antenna	SCHWARZBECK	VULB 9163	9163-423	May. 21 2013	2 year
9	ATTENUATOR	FAIRVIEW	SA3N5W-06	N/A	Apr. 03 2014	1 year
10	Controller	innco SYSTEMS GmbH	CO2000-G	CO2000/562/23890210/L	N/A	N/A
11	Open Switch an Control Unit	R&S	OSP-120	100015	N/A	N/A
12	Antenna Mast(Left)	innco systems GmbH	MA4000-EP	N/A	N/A	N/A
13	Turn Table	innco systems GmbH	DT3000-3T	N/A	N/A	N/A