TESTING CERTIFICATE

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Certificate No.:
CTK-K-2015-00006

1. Client

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Republic of Korea
- Date of Receipt : 2014-12-19

2. Manufacturer

- Name : Samsung Electronics Co., Ltd.
- Address : 129, Samsung-ro, Yeongtong-gu Suwon-si, Gyeonggi-do, 443-742 Republic of Korea

3. Use of Report : For FCC certification

4. Test Sample / Model: Digital Set Top Box / SX022AN, SX022ANM and SX022ANC

5. Date of Test : 2014-01-06 to 2015-01-08

6. Test Standard(method) used : FCC Part 15 Subpart B

7. Testing Environment: refer to 11 pages to 29 pages

8. Test Results : refer to 11 pages to 29 pages

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Affirmation	Tested by Yoo Yoo-sang: (Signature) EMC Test Engineer	Approved by Park Young-joon: (Signature) Technical Manager

CTK Co., Ltd. is accredited by Korea Laboratory Accreditation Scheme (KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the above test item(s) and test method(s).

2015-01-14

Republic of KOREA **CTK Co., Ltd.**

REPORT REVISION HISTORY

Date	Revision	Page No
2015-01-14	Issued (CTK-K-2015-00006)	All

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1.0 General Product Description

No.	ITEM		APPLICATION	
1	Test Sample		Digital Set Top Box	
2	Model		SX022AN	
3	Variant Model		SX022ANM, SX022ANC	
4	Trade Name		SAMSUNG	
5	STB		Cable	
6	SMPS (Revision: Date)		DPS-3	
7	Dimensions (W x L x H)		250 ㎜ x 160 ㎜ x 58 ㎜	
8	Weight		1.3 kg	
9	RF - Tpye		J.83B (6 ㎒ Band-width)	
	RF – Input connector type		F type	
	RF – Output connector type		F type	
	RF – Frequency range		5 to 1002 MHz	
	RF – Input Signal level		-15 ㏈㎷ ~ + 15 ㏈㎷	
	RF – IF frequency		43.75 ㎒	
10	Ethernet port		1 x RJ-45(8P8C) Female	
11	HDMI		HDMI type A Female, HDMI	
12	Audio L/R		L/R RCA connector Female, IEC 60268-11	
13	SPDIF		IEC169-2 RCA-type Coaxial JIS F05, IEC 60874-17 Optical	
14	USB		1 x USB 2.0 on rear panel	
15	Maximum Clock Frequency		933 ㎒	
16	Electrical Ratings	AC/DC ADAPTER	Input:	AC 100 V– AC 240 V, 50 ㎐ / 60 ㎐, 1.5 A
			Output:	DC 12 V, 3 A
		EUT	Input:	DC 12 V, 3 A
			Output:	-
17	Test Voltage / Frequency		Voltage:	AC 120 V
			Frequency:	60 ㎐

1.1 Model Differences

SX022AN is Basic model.
SX022AN, SX022ANM and SX022ANC are no technical difference from each model only except for Model name because of marketing purposes.

1.2 Device Modifications

The following modifications were necessary for compliance:

Not applicable

1.3 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

Device	Model No.	Serial No.	Manufacturer
LED TV	UN22ES5003	ZV8R33FD301120F	Samsung Electronics Co., Ltd.
USB Drive	MemoRive slim	-	BMK Technology Co., Ltd
AC/DC ADAPTER	A3612_FDY	CN07XXXXXXXXXXDC07FB0032	Dongyang Inc.
Notebook	NT301E5C	JBM991DF300296X	Samsung Electronics Co., Ltd.

☒ Cable Description

No.	From		To		Type of Cable		
	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]
1	EUT	USB	USB Drive	-	-	-	-
2		ETHERNET	Notebook (Outside of test site)	ETHERNET	10.0	S	N
3		HDMI OUT	LED TV	HDMI	1.8	S	Y
4		CABLE OUT	LED TV	Antenna IN	1.8	S	N
5		SD VIDEO OUT	LED TV	VIDEO IN	1.8	U	N
6		AUDIO OUT	LED TV	AUDIO IN	1.8	U	N
7		eSATA	CABLE	-	1.5	S	N
8		HDMI IN	CABLE	-	1.8	S	Y
9		DIGITAL AUDIO OUT	CABLE	-	1.2	U	N
10		CABLE IN	Digital signal transmitter (Outside of test site)	CABLE OUT	10.0	S	N
11		DC IN	AC/DC ADAPTER	DC OUT	1.8	U	Y
12	AC/DC ADAPTER	AC POWER	AC MAIN	-	1.8	U	N
13	LED TV	AC POWER	AC MAIN	-	1.8	U	N

* Shielded or Unshielded : Unshielded=U, Shielded=S

1.4 Test Software

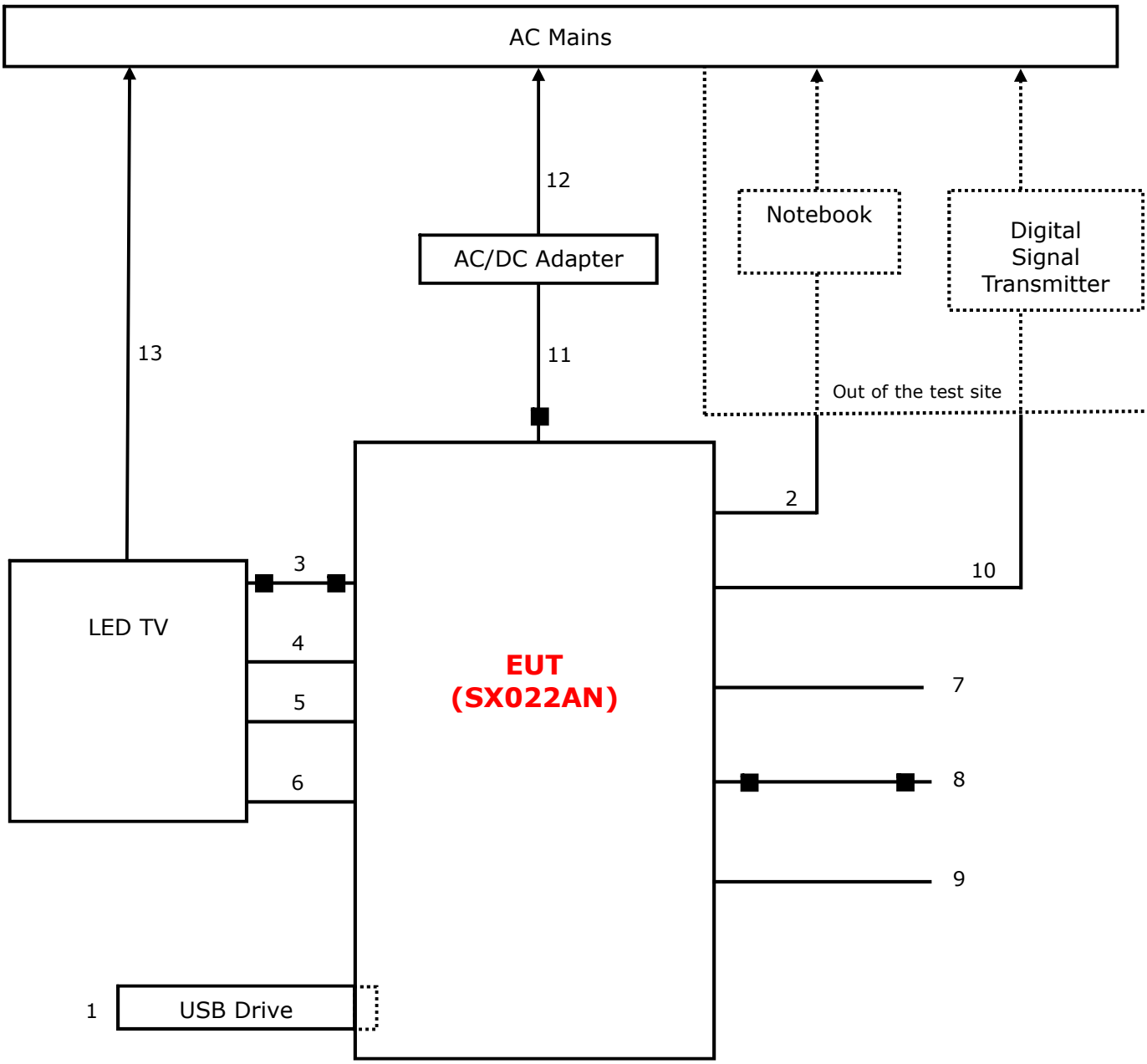
☐ EMC Test V 1.0
☐ Display Test Patterns – V1.5
☒ Ping.exe
☐ Not applicable

1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

- Practice operation
  ☒ Digital signal receiving mode
  (EUT was tuned to the RF output frequency of color bar signal generator, with a standard television color bar signal according to ITU-R BT 471-1)
  ☒ USB Play mode

1.6 Configuration



1.7 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.8 Test Facility

The measurement facility is located at (Ho-dong) 113, Yejik-ro, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.9 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room.
To find worst mode, several typical mode and typical cable position were tested.
Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)
Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed Semi-Anechoic Chamber or anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Semi-Anechoic Chamber.
Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4-2009 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2

1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	Logo
USA	FCC	FCC Part 15 & 18 EMI (Electromagnetic Interference / Emission)	805871	
JAPAN	VCCI	VCCI V-3 EMI (Electromagnetic Interference / Emission)	C-986 T-1843 R-3627 G-387	
KOREA	MSIP	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	KR0025	

1.11 Measurement Uncertainty

Compliance of the product is based on the measured value.
However, the measurement uncertainty is included for information purposes.
The measurement uncertainties given below are based on a standard uncertainty multiplied by a coverage factor of *k*=2, providing a level of confidence of approximately 95 %.

Measurement Type	Frequency Range	Expanded Uncertainty
Conducted Emission	9 ㎑ to 150 ㎑	2.78 ㏈ (C.L.: Approx. 95 %, *k*=2)
Conducted Emission	150 ㎑ to 30 ㎒	2.70 ㏈ (C.L.: Approx. 95 %, *k*=2)
Disturbance Power	30 ㎒ to 300 ㎒	3.74 ㏈ (C.L.: Approx. 95 %, *k*=2)
Radiated Emission	30 ㎒ to 1000 ㎒	3.66 ㏈ (C.L.: Approx. 95 %, *k*=2)
Radiated Emission	1 ㎓ Above	4.16 ㏈ (C.L.: Approx. 95 %, *k*=2)

2.0 EMC Test Regulations/Standards

The tests were performed according to following regulations:

Applied standard	Title	Applied	Test Result
FCC Part 15 Subpart B ☐ Class A ☒ Class B	Conducted Voltage Emissions	☒	☒ MET ☐ NOT MET
	Radiated Electric Field Emissions	☒	☒ MET ☐ NOT MET
	Antenna Power Conducted Emission	☒	☒ MET ☐ NOT MET
	Output and Spurious Conducted Level	☒	☒ MET ☐ NOT MET
	Antenna Transfer Switch	☐	☐ MET ☐ NOT MET

3.0 Results of Individual Test

3.1 Conducted Voltage Emissions of Mains ports

Test Date
2015-01-07 – 2015-01-08

Test Location
Shielded Room

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2015-02-04	☐
LISN	ENV216	Rohde & Schwarz	101235	2015-07-30	☐
LISN	ENV216	Rohde & Schwarz	101236	2015-07-30	☐
EMI Test Receiver	ESR7	Rohde & Schwarz	101088	2015-07-29	☐
LISN	ENV216	Rohde & Schwarz	101151	2015-11-07	☐
LISN	ESH3-Z5	Rohde & Schwarz	100207	2015-11-07	☐
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2015-12-05	☒
LISN	ENV216	Rohde & Schwarz	101760	2015-02-03	☒
LISN	ENV4200	Rohde & Schwarz	100042	2015-02-05	☐
LISN	ENV216	Rohde & Schwarz	101150	2015-02-04	☒
Signal Generator	8648A	HP	3847U02547	2015-05-13	☐
Matching Pad	RAM	Rohde & Schwarz	100618	2015-05-15	☐
Matching Pad	75Z-3G	JFW	1311	2015-02-21	☐
TV-Test Transmitter	SFQ	Rohde & Schwarz	100547	2015-05-13	☐
MPEG2 Measurement Generator	DVG	Rohde & Schwarz	100366	N/A	☐

Test Software
ESCI7, ESCI3 : EMC32 Ver. 8.50.0
ESR7 : EMC32 Ver. 8.53.0

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Setting
IF Band Width: 9 ㎑

Climate Condition
Temperature: (23 ± 1) ℃
Relative Humidity: (42 ± 1) %
Atmospheric Pressure: 99 ㎪

Test Result

The requirements are: ☒ MET ☐ NOT MET

[Digital signal receiving mode]

Frequency (㎒)	Measured Data (dBμV)	Margin (dB)	Remark
3.304 500	51.2	4.8	Quasi-peak

[USB Play mode]

Frequency (㎒)	Measured Data (dBμV)	Margin (dB)	Remark
3.304 500	51.3	4.7	Quasi-peak

The Result is calculated by using the following formula;

* Result = Limit – Margin (Result included the correction factor)

* Correction factor = Cable Loss + Insertion loss of LISN

Test Data

[Digital signal receiving mode - Line: L1]

Test 1 / 2

Test Report

Common Information

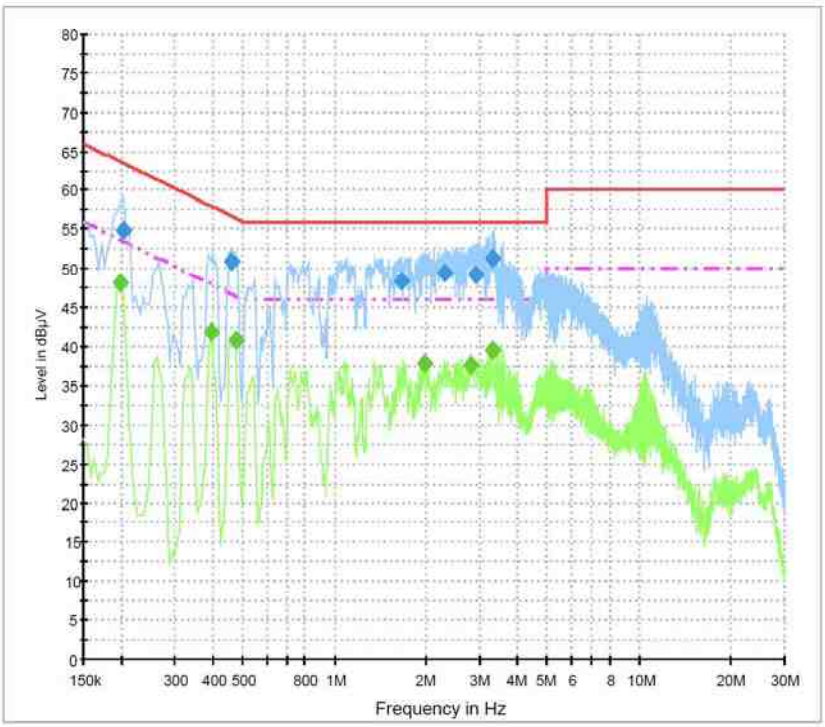
Test Model Name:	SX022AN
Test Mode:	Digital signal receiving mode
Manufacturer:	Samsung Electronics Co., Ltd.
Tester:	Yoo Yoo-sang

Hardware Setup: EMI conducted\Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1

Frequency Range:	150 kHz - 30 MHz
Receiver:	ESCI 7 [ESCI 7] @ GPIB0 (ADR 20), SN 100816/007, FW 4.42
Signal Path:	ESCI 7-ENV216 FO(101760) Correction Table: 3-2 CE Cable Loss
LISN:	ENV216 FO(101760) Correction Table (Line 0): ENV216_FO_N(101760) Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_L1



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Test 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.204000	54.8	1000.0	9.000	On	L1	9.9	8.6	63.4
0.460500	51.0	1000.0	9.000	On	L1	10.2	5.7	56.7
1.653000	48.4	1000.0	9.000	On	L1	9.9	7.6	56.0
2.301000	49.3	1000.0	9.000	On	L1	9.9	6.7	56.0
2.899500	49.1	1000.0	9.000	On	L1	9.8	6.9	56.0
3.304500	51.2	1000.0	9.000	On	L1	9.8	4.8	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	48.2	1000.0	9.000	On	L1	9.9	5.4	53.6
0.393000	41.9	1000.0	9.000	On	L1	10.1	6.1	48.0
0.474000	40.9	1000.0	9.000	On	L1	10.2	5.5	46.4
1.986000	37.9	1000.0	9.000	On	L1	9.9	8.1	46.0
2.796000	37.8	1000.0	9.000	On	L1	9.8	8.2	46.0
3.309000	39.7	1000.0	9.000	On	L1	9.8	6.3	46.0

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[Digital signal receiving mode - Line : Neutral]

Test 1 / 2

Test Report

Common Information

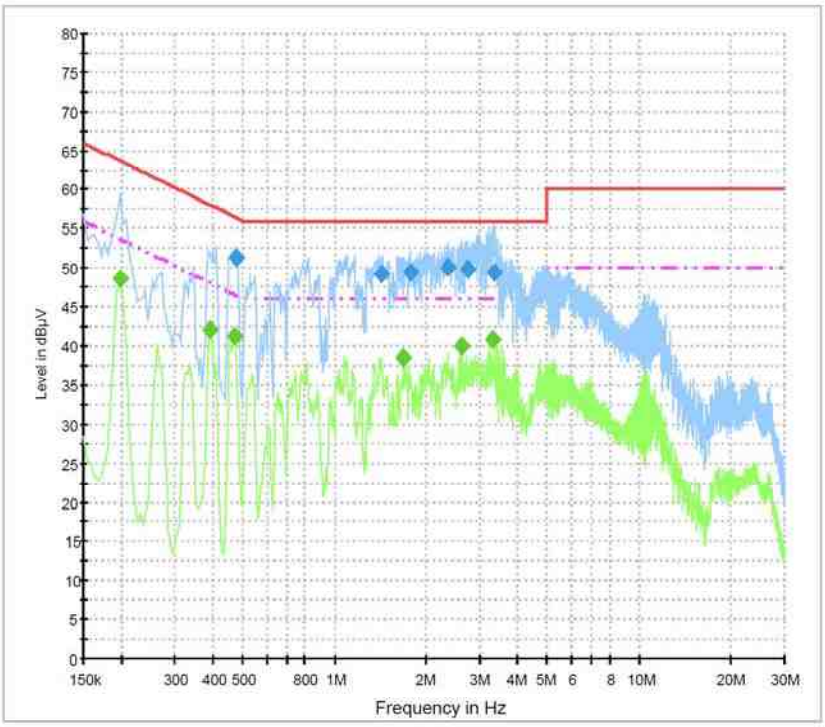
Test Model Name:	SX022AN
Test Mode:	Digital signal receiving mode
Manufacturer:	Samsung Electronics Co., Ltd.
Tester:	Yoo Yoo-sang

Hardware Setup: EMI conducted\Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1

Frequency Range:	150 kHz - 30 MHz
Receiver:	ESCI 7 [ESCI 7] @ GPIB0 (ADR 20), SN 100816/007, FW 4.42
Signal Path:	ESCI 7-ENV216 FO(101760) Correction Table: 3-2 CE Cable Loss
LISN:	ENV216 FO(101760) Correction Table (Line 0): ENV216_FO_N(101760) Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_N



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Test 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.478500	51.4	1000.0	9.000	On	N	10.2	5.0	56.4
1.432500	49.1	1000.0	9.000	On	N	9.9	6.9	56.0
1.774500	49.5	1000.0	9.000	On	N	9.9	6.5	56.0
2.346000	50.1	1000.0	9.000	On	N	9.9	5.9	56.0
2.746500	49.9	1000.0	9.000	On	N	9.9	6.1	56.0
3.363000	49.4	1000.0	9.000	On	N	9.9	6.6	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	48.7	1000.0	9.000	On	N	10.0	5.0	53.6
0.388500	42.1	1000.0	9.000	On	N	10.1	6.0	48.1
0.469500	41.4	1000.0	9.000	On	N	10.2	5.2	46.5
1.689000	38.5	1000.0	9.000	On	N	9.9	7.5	46.0
2.629500	40.1	1000.0	9.000	On	N	9.9	5.9	46.0
3.304500	40.8	1000.0	9.000	On	N	9.9	5.2	46.0

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[USB Play mode - Line: L1]

Test 1 / 2

Test Report

Common Information

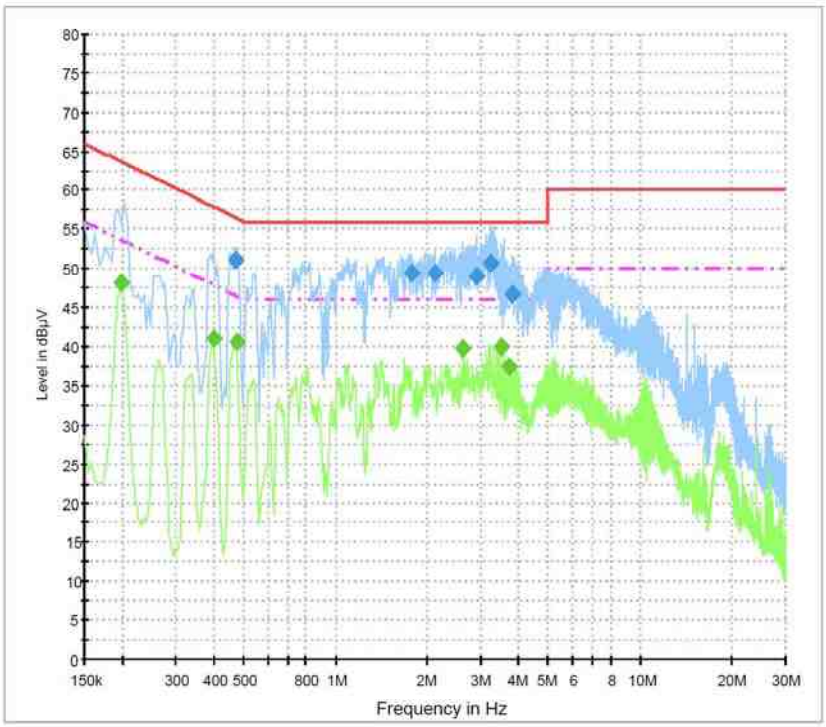
Test Model Name:	SX022AN
Test Mode:	USB Play mode
Manufacturer:	Samsung Electronics Co., Ltd.
Tester:	Yoo Yoo-sang

Hardware Setup: EMI conducted\Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1

Frequency Range:	150 kHz - 30 MHz
Receiver:	ESCI 7 [ESCI 7] @ GPIB0 (ADR 20), SN 100816/007, FW 4.42
Signal Path:	ESCI 7-ENV216 FO(101760) Correction Table: 3-2 CE Cable Loss
LISN:	ENV216 FO(101760) Correction Table (Line 0): ENV216_FO_N(101760) Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_L1



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Test 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.469500	51.0	1000.0	9.000	On	L1	10.2	5.5	56.5
1.774500	49.4	1000.0	9.000	On	L1	9.9	6.6	56.0
2.116500	49.5	1000.0	9.000	On	L1	9.9	6.5	56.0
2.899500	48.9	1000.0	9.000	On	L1	9.8	7.1	56.0
3.237000	50.7	1000.0	9.000	On	L1	9.8	5.3	56.0
3.813000	46.7	1000.0	9.000	On	L1	9.8	9.3	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	48.1	1000.0	9.000	On	L1	9.9	5.5	53.6
0.397500	41.1	1000.0	9.000	On	L1	10.1	6.8	47.9
0.474000	40.7	1000.0	9.000	On	L1	10.2	5.8	46.4
2.629500	39.7	1000.0	9.000	On	L1	9.8	6.3	46.0
3.507000	40.1	1000.0	9.000	On	L1	9.8	5.9	46.0
3.709500	37.6	1000.0	9.000	On	L1	9.8	8.4	46.0

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[USB Play mode - Line : Neutral]

Test 1 / 2

Test Report

Common Information

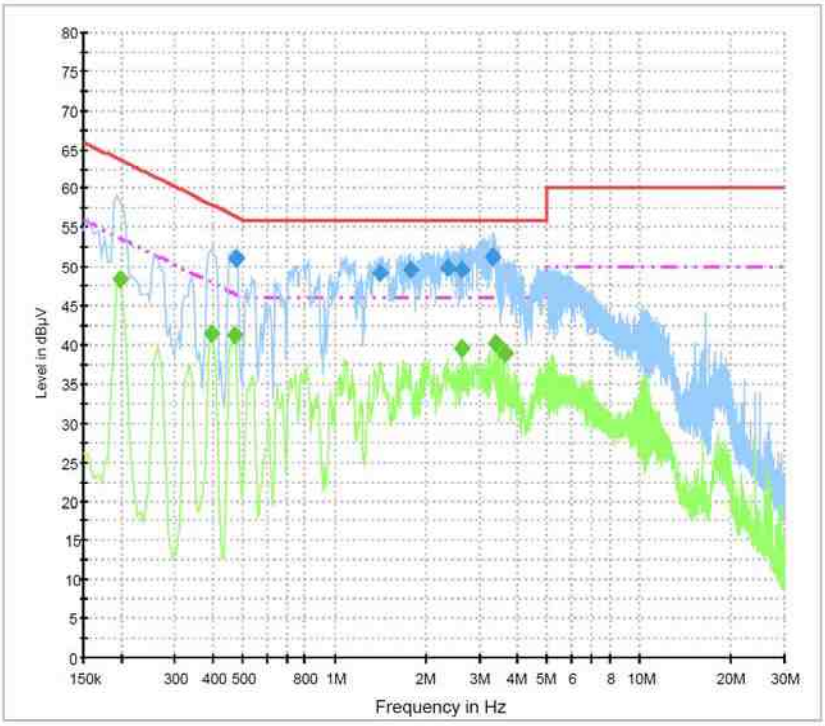
Test Model Name:	SX022ANM
Test Mode:	USB Play mode
Manufacturer:	Samsung Electronics Co., Ltd.
Tester:	Yoo Yoo-sang

Hardware Setup: EMI conducted\Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1

Frequency Range:	150 kHz - 30 MHz
Receiver:	ESCI 7 [ESCI 7] @ GPIB0 (ADR 20), SN 100816/007, FW 4.42
Signal Path:	ESCI 7-ENV216 FO(101760) Correction Table: 3-2 CE Cable Loss
LISN:	ENV216 FO(101760) Correction Table (Line 0): ENV216_FO_N(101760) Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_N



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Test 2 / 2

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.478500	51.1	1000.0	9.000	On	N	10.2	5.2	56.4
1.410000	49.2	1000.0	9.000	On	N	9.9	6.8	56.0
1.774500	49.6	1000.0	9.000	On	N	9.9	6.4	56.0
2.346000	49.8	1000.0	9.000	On	N	9.9	6.2	56.0
2.616000	49.7	1000.0	9.000	On	N	9.9	6.3	56.0
3.304500	51.3	1000.0	9.000	On	N	9.9	4.7	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.199500	48.3	1000.0	9.000	On	N	10.0	5.3	53.6
0.393000	41.5	1000.0	9.000	On	N	10.1	6.5	48.0
0.469500	41.3	1000.0	9.000	On	N	10.2	5.3	46.5
2.629500	39.6	1000.0	9.000	On	N	9.9	6.4	46.0
3.376500	40.2	1000.0	9.000	On	N	9.9	5.8	46.0
3.637500	38.9	1000.0	9.000	On	N	9.9	7.1	46.0

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3.2 Radiated Electric Field Emissions

Test Date
2015-01-07 – 2015-01-08

Test Location
☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100814	2015-12-05	☒
Bilog Antenna	CBL6111C	Schaffner	2551	2016-05-08	☒
6dB Attenuator	DNF	Rohde & Schwarz	272.4110.50-2	2015-11-07	☒
Amplifier	310	Sonoma Instrument Co.	291721	2015-02-06	☒
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2015-12-05	☒
Double Ridged Guide Antenna	3117	ETS-Lindgren	154525	2015-07-03	☒
Preamplifier	8449B	Agilent Technologies	3008A02307	2015-10-24	☒
Siganl Generator	8648A	HP	3847U02547	2015-05-13	☐
Matching Pad	RAM	Rohde & Schwarz	100618	2015-05-15	☐
Matching Pad	75Z-3G	JFW	1311	2015-02-21	☐
TV-Test Transmitter	SFQ	Rohde & Schwarz	100547	2015-05-13	☒
MPEG2 Measurement Generator	DVG	Rohde & Schwarz	100366	N/A	☒

Test Software
TOYO EMI software Ver. 5.1.0

Frequency Range of Measurement
☒ 30 ㎒ to 1 ㎓
☒ 1 ㎓ to 5 ㎓

Instrument Setting
☒ IF Band Width: 120 ㎑ (30 ㎒ to 1 ㎓)
☒ IF Band Width: 1 ㎒ (1 ㎓ to 5 ㎓)

Climate Condition
Temperature: (24 ± 1) ℃
Relative Humidity: (43 ± 1) %
Atmospheric Pressure: 99 ㎪

Test Result

The requirements are: ☒ MET ☐ NOT MET

[Below 1 ㎓: Digital signal receiving mode]

Frequency (㎒)	Measured Data (dBμV/m)	Margin (dB)	Remark
232.378	42.8	3.2	Quasi-peak

[Below 1 ㎓: USB Play mode]

Frequency (㎒)	Measured Data (dBμV/m)	Margin (dB)	Remark
230.429	41.2	4.8	Quasi-peak

The Result is calculated by using the following formula;

* Result = Reading + Correction factor

* Correction factor = Antenna Factor + Cable Loss + 6 ㏈ attenuator – Amp Gain

[Above 1 ㎓: Digital signal receiving mode]

Frequency (㎒)	Measured Data (dBμV/m)	Margin (dB)	Remark
1 017.478	62.9	11.1	Peak

[Above 1 ㎓: USB Play mode]

Frequency (㎒)	Measured Data (dBμV/m)	Margin (dB)	Remark
1 059.919	62.2	11.8	Peak

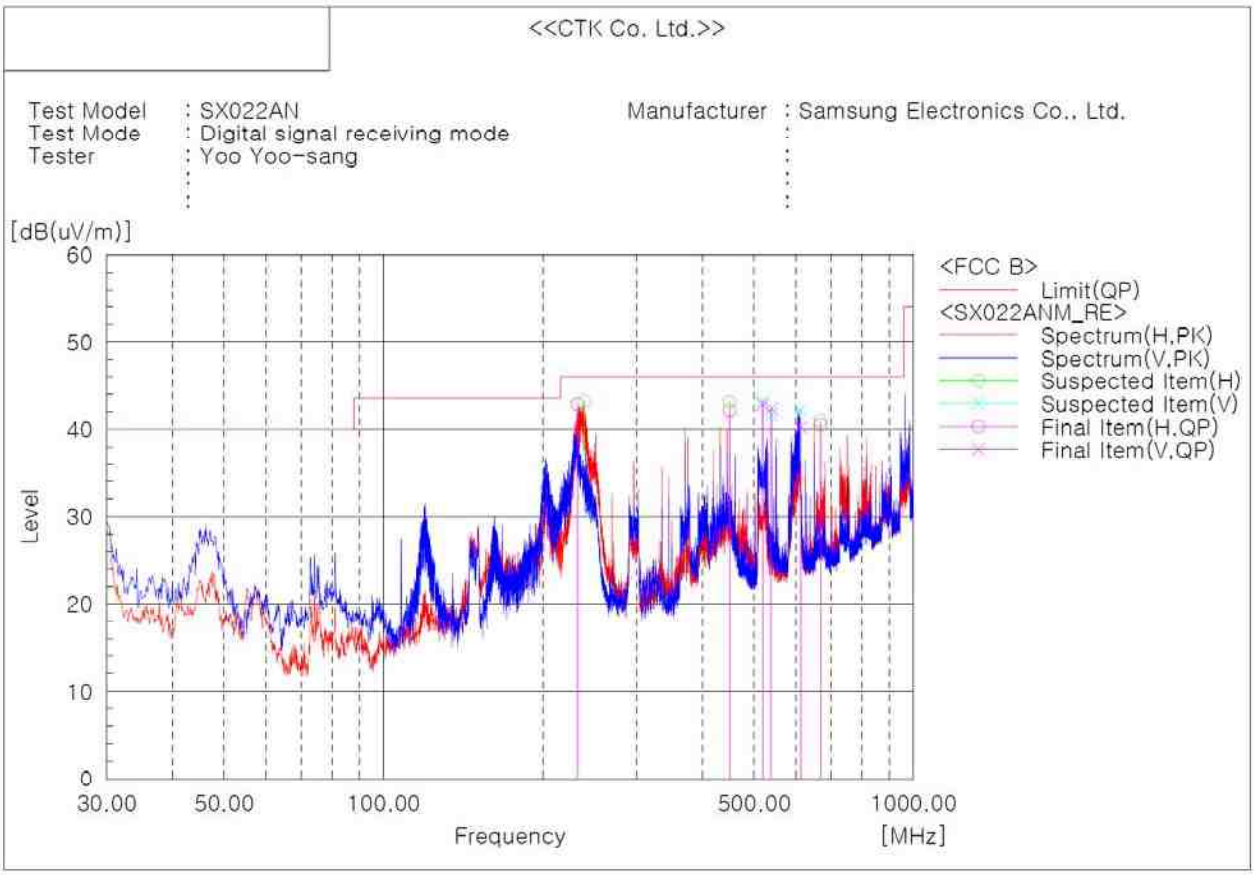
The Result is calculated by using the following formula;

* Result = Reading + Correction factor

* Correction factor = Antenna Factor + Cable Loss– Amp Gain

Test Data

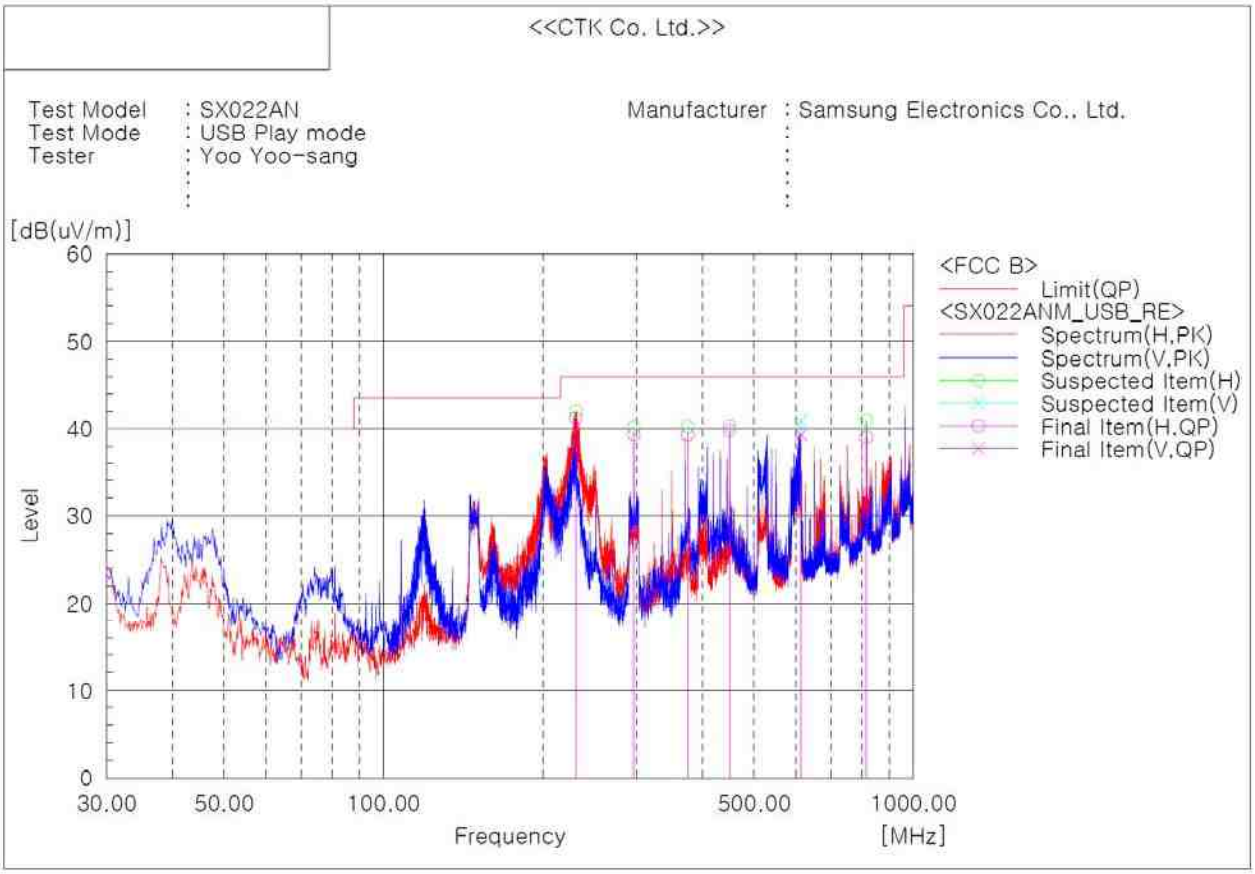
[Below 1 ㎓: Digital signal receiving mode]



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	232.378	H	54.0	-11.2	42.8	46.0	3.2	100.0	0.0
2	450.012	H	46.5	-4.4	42.1	46.0	3.9	100.0	202.0
3	519.230	V	45.5	-2.7	42.8	46.0	3.2	100.0	83.0
4	539.998	V	44.5	-2.2	42.3	46.0	3.7	100.0	308.0
5	613.083	V	40.9	-0.7	40.2	46.0	5.8	100.0	158.0
6	667.654	H	40.5	0.0	40.5	46.0	5.5	100.0	165.0

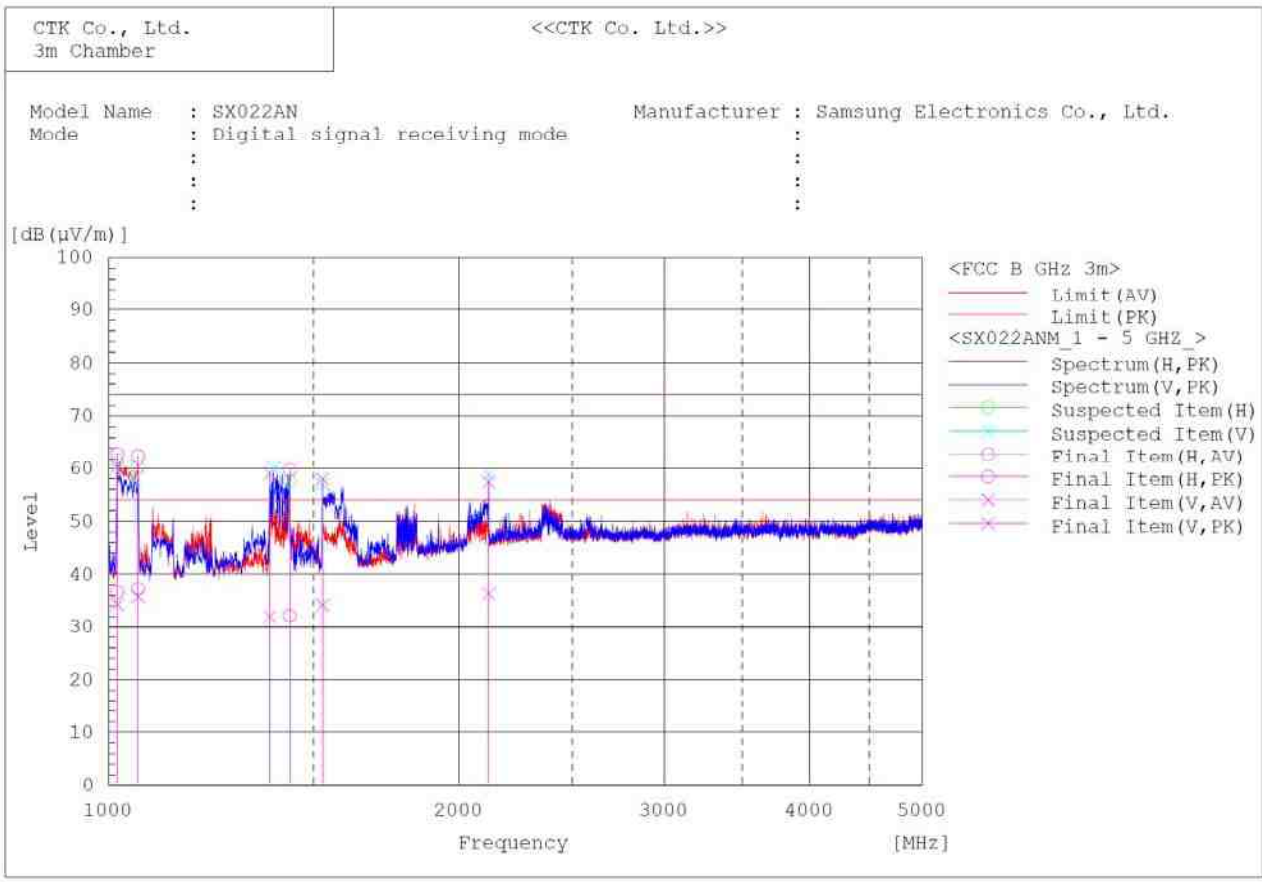
[Below 1 ㎓: USB Play mode]



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]
1	230.429	H	52.6	-11.4	41.2	46.0	4.8	100.0	271.0
2	296.750	H	48.5	-9.2	39.3	46.0	6.7	100.0	158.0
3	374.956	H	45.9	-6.6	39.3	46.0	6.7	100.0	83.0
4	450.010	H	44.2	-4.4	39.8	46.0	6.2	100.0	309.0
5	613.455	V	40.0	-0.7	39.3	46.0	6.7	100.0	350.0
6	815.917	H	36.1	2.9	39.0	46.0	7.0	100.0	195.0

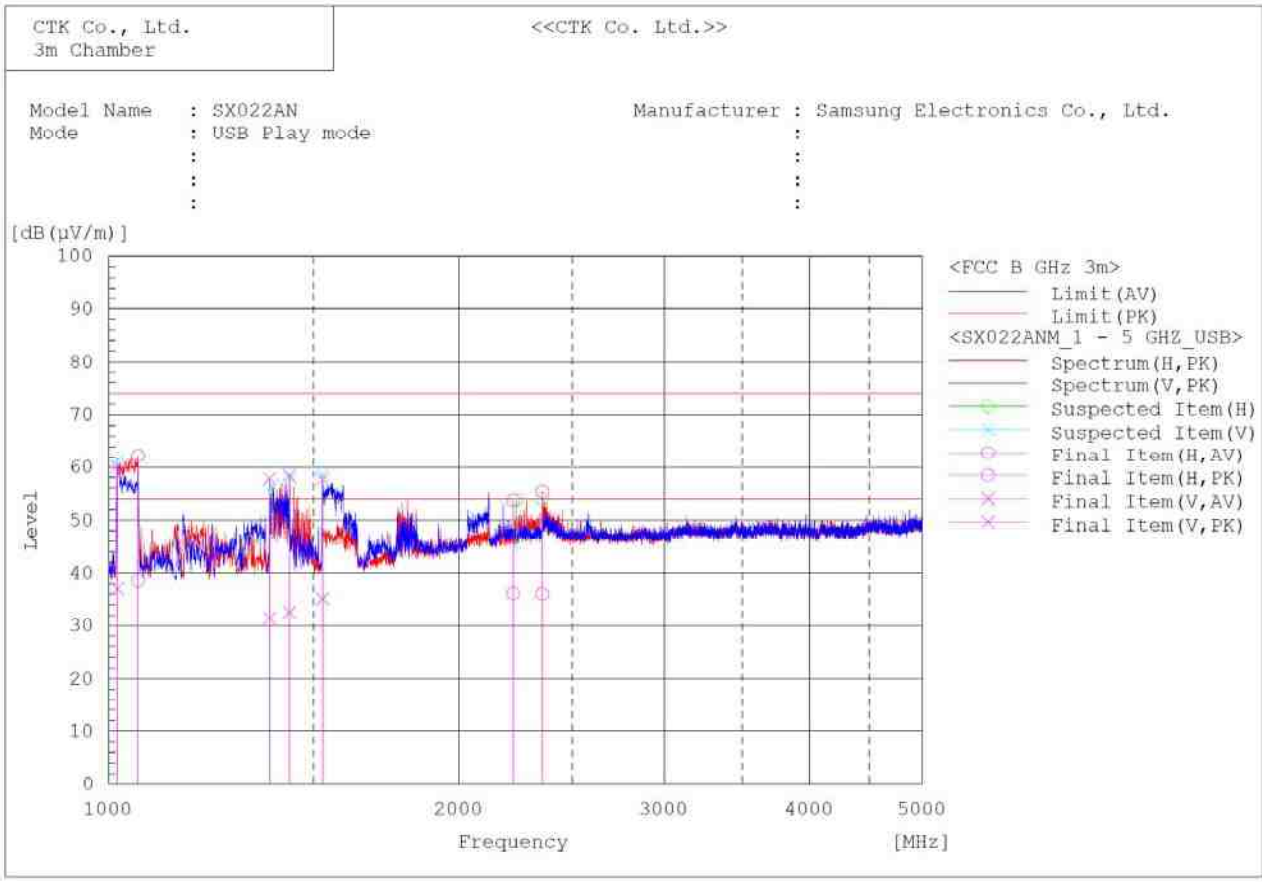
[Above 1 ㎓: Digital signal receiving mode]



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1	1017.340	V	35.2	61.5	-1.0	34.2	60.5	54.0	74.0	19.8	13.5	100.0	84.0
2	1017.478	H	37.6	63.9	-1.0	36.6	62.9	54.0	74.0	17.4	11.1	100.0	0.0
3	1059.875	H	38.0	63.3	-0.8	37.2	62.5	54.0	74.0	16.8	11.5	100.0	332.0
4	1060.231	V	36.6	61.3	-0.8	35.8	60.5	54.0	74.0	18.2	13.5	100.0	65.0
5	1375.331	V	30.6	57.7	1.3	31.9	59.0	54.0	74.0	22.1	15.0	100.0	28.0
6	1430.963	H	30.6	58.2	1.5	32.1	59.7	54.0	74.0	21.9	14.3	100.0	332.0
7	1526.688	V	32.2	56.1	1.9	34.1	58.0	54.0	74.0	19.9	16.0	100.0	28.0
8	2120.188	V	28.1	49.2	8.2	36.3	57.4	54.0	74.0	17.7	16.6	100.0	0.0

[Above 1 ㎓: USB Play mode]



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [°]
1	1017.808	V	38.0	61.1	-1.0	37.0	60.1	54.0	74.0	17.0	13.9	100.0	164.0
2	1059.919	H	39.3	63.0	-0.8	38.5	62.2	54.0	74.0	15.5	11.8	100.0	196.0
3	1374.781	V	30.1	56.5	1.3	31.4	57.8	54.0	74.0	22.6	16.2	100.0	108.0
4	1429.375	V	31.0	56.9	1.5	32.5	58.4	54.0	74.0	21.5	15.6	100.0	183.0
5	1526.438	V	33.2	55.8	1.9	35.1	57.7	54.0	74.0	18.9	16.3	100.0	146.0
6	2225.294	H	27.3	44.9	8.8	36.1	53.7	54.0	74.0	17.9	20.3	100.0	196.0
7	2357.550	H	26.4	45.8	9.6	36.0	55.4	54.0	74.0	18.0	18.6	100.0	177.0

3.3 Antenna Power Conducted Emission

Test Date
2015-01-07

Test Location
Shield room

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESU40	Rohde & Schwarz	100336	2015-05-15	☒
Signal Generator	8648A	HP	3847U02547	2015-05-13	☐
Matching Pad	RAM	Rohde & Schwarz	100618	2015-05-15	☒
Matching Pad	75Z-3G	JFW	1311	2015-02-21	☐
TV-Test Transmitter	SFQ	Rohde & Schwarz	100547	2015-05-13	☒
MPEG2 Measurement Generator	DVG	Rohde & Schwarz	100366	N/A	☒
POWER SPLITTER	RVZ	Rohde & Schwarz	100251	2015-05-15	☒

Frequency Range of Measurement
30 ㎒ to 5 ㎓

Instrument Setting
IF Band Width: 120 ㎑ (30 ㎒ – 1 ㎓)
IF Band Width: 1 ㎒ (1 ㎓ – 5 ㎓)

Climate Condition
Temperature: (24 ± 1) ℃
Relative Humidity: (47 ± 1) %
Atmospheric Pressure: 99 ㎪

Test Result
The requirements are: ☒ MET ☐ NOT MET

Test Data

[Local Oscillator]

System	Test Frequency [㎒]	Local Oscillator Frequency [㎒]		Limits [dBμV]	Tolal Loss [dB]	Reading [dBμV]	Result [dBμV]	Margin [dB]
Local Oscillator (J83.B)	453	Fundamental	496.75	51.8	13.5	13.9	27.4	24.4
		Harmonics	993.50	51.8	14.0	16.7	30.7	21.1
			1490.25	51.8	14.1	16.4	30.5	21.3
			1987.00	51.8	14.4	17.3	31.7	20.1
			2483.75	51.8	14.4	16.4	30.8	21.0
			2980.50	51.8	14.4	19.8	34.2	17.6
			3477.25	51.8	14.1	22.5	36.6	15.2
			3974.00	51.8	14.7	22.9	37.6	14.2
			4470.75	51.8	15.0	22.4	37.4	14.4
			4967.50	51.8	15.6	22.1	37.7	14.1

* Total loss = Matching Pad Loss + Cable Loss + Power Splitter loss

[Other]

System	Test Frequency [㎒]	Other Frequency [㎒]	Limits [dBμV]	Tolal Loss [dB]	Reading [dBμV]	Result [dBμV]	Margin [dB]
Other (J83.B)	453	No emission were detected at a level greater than 20 ㏈ below limit					

* Total loss = Matching Pad Loss + Cable Loss + Power Splitter loss

3.4 Output and Spurious Conducted Level

Test Date
2015-01-07

Test Location
Shielded Room

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESU40	Rohde & Schwarz	100336	2015-05-15	☒
Matching Pad	RAM	Rohde & Schwarz	100618	2015-05-15	☒
TV-Test Transmitter	SFQ	Rohde & Schwarz	100547	2015-05-13	☒
MPEG2 Measurement Generator	DVG	Rohde & Schwarz	100366	N/A	☒
Matching Pad	75Z-3G	JFW	1311	2015-02-21	☒

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Climate Condition
Temperature: (24 ± 1) ℃
Relative Humidity: (47 ± 1) %
Atmospheric Pressure: 99 ㎪

Test Procedures
The Output signal level is the maximum voltage level present at the output terminals of the EUT on a particular frequency during normal use of the device.
Measurements were made by direct connection to the spectrum analyzer and EUT with proper impedance matching.
The Cable was supported between the EUT and the measuring instrument in a straight horizontal line so it had at least 75 ㎝ clearance from any conducting surface.
The EUT was provided with a typical signal consistent with normal operation. For each channel on which the device operates and in each mode in which the device operates, the video carrier level, audio carrier level and the spurious emissions over the frequency rage was measured and recorded.

Test Result
The requirements are: ☒ MET ☐ NOT MET

Test Data

[Output Signal Test Data]

Test Channel	Frequency [MHz]	Reading [dBμV]	Cable Loss [dB]	Limits [dBμV]	Result [dBμV]	Margin [dB]
3	56.75	25.20	0.6	62.56	25.80	36.76
	61.25	40.00	0.6	75.56	40.60	34.96
	65.75	26.10	0.6	62.56	26.70	35.86
4	62.75	25.60	0.6	62.56	26.20	36.36
	67.25	40.60	0.6	75.56	41.20	34.36
	71.25	13.90	0.6	62.56	14.50	48.06

3.5 Antenna Transfer Switch

Test Date
Not Applicable

Test Location
Shielded Room

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESU40	Rohde & Schwarz	100336	2015-05-15	☐

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Climate Condition
Temperature:
Relative Humidity:
Atmospheric Pressure:

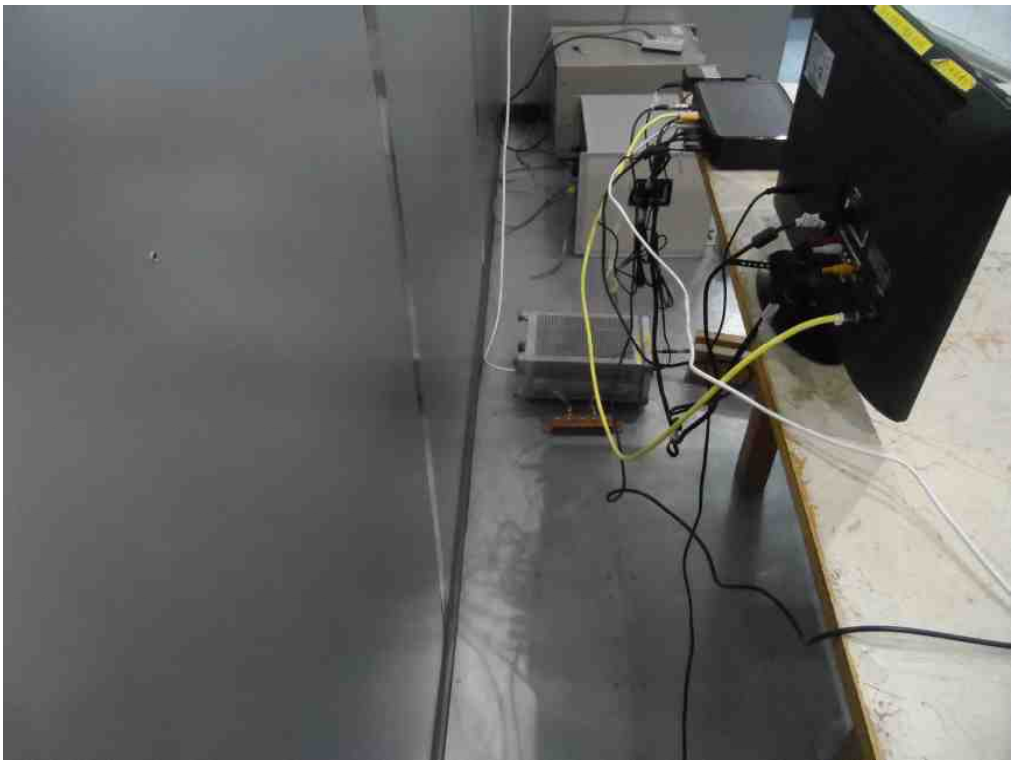
Test Procedures
The isolation of a cable TV antenna transfer switch shall be measured on the following frequencies: 54, 100, 150, 200, 250, 300, 350, 400, 450, 500 and 550 ㎒.
If the device or switch is equipped with more than two antenna input ports or terminals, repeat the following procedure until isolation for each pair of input ports has been measured.
The cable TV antenna transfer switch isolation, expressed in decibels, is the difference between the level of a signal going into the port that is used for cable TV input to the switch and the level of the same signal coming out of an antenna input port of the transfer switch.
Be sure to compare emission levels of the same frequency.
The signal levels are expressed in decibel units.

Test Result
The requirements are: ☐ MET ☐ NOT MET

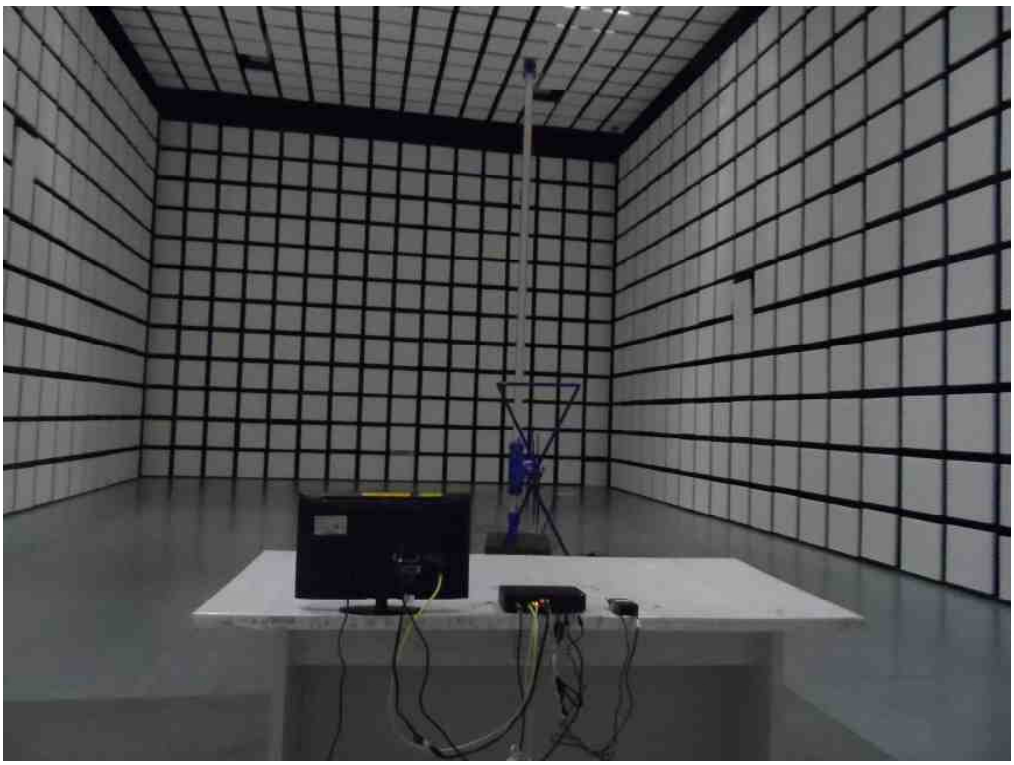
Test Data

APPENDIX A - Test Setup Photos and Configuration

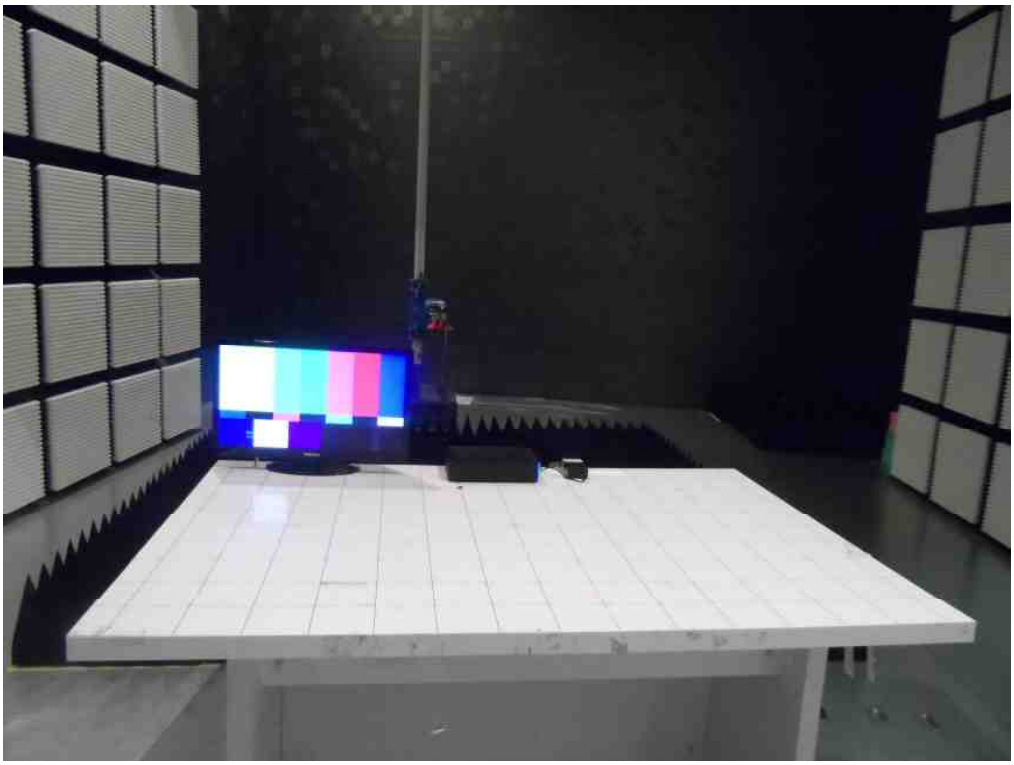
Conducted Voltage Emissions of Mains Ports

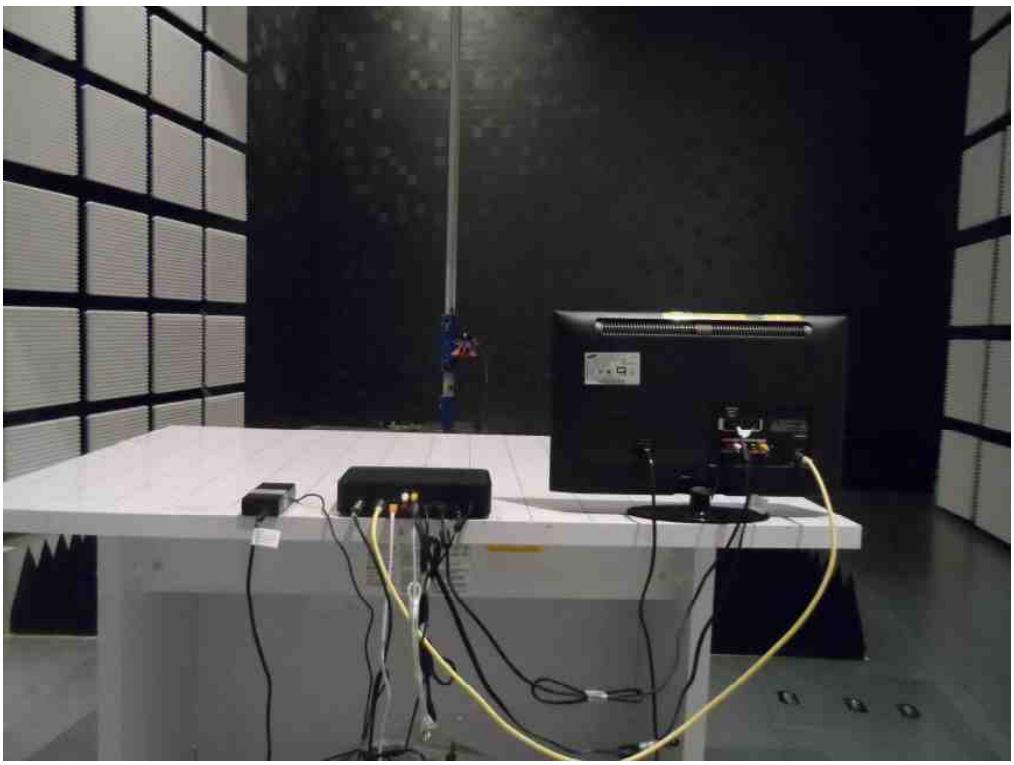


Radiated Electric Field Emissions (Below 1 ㎓)



Radiated Electric Field Emissions (Above 1 ㎓)





Antenna Power Conducted Emission

Output and Spurious Conducted Level

Antenna Transfer Switch

Not Applicable

APPENDIX B – EUT Photographs

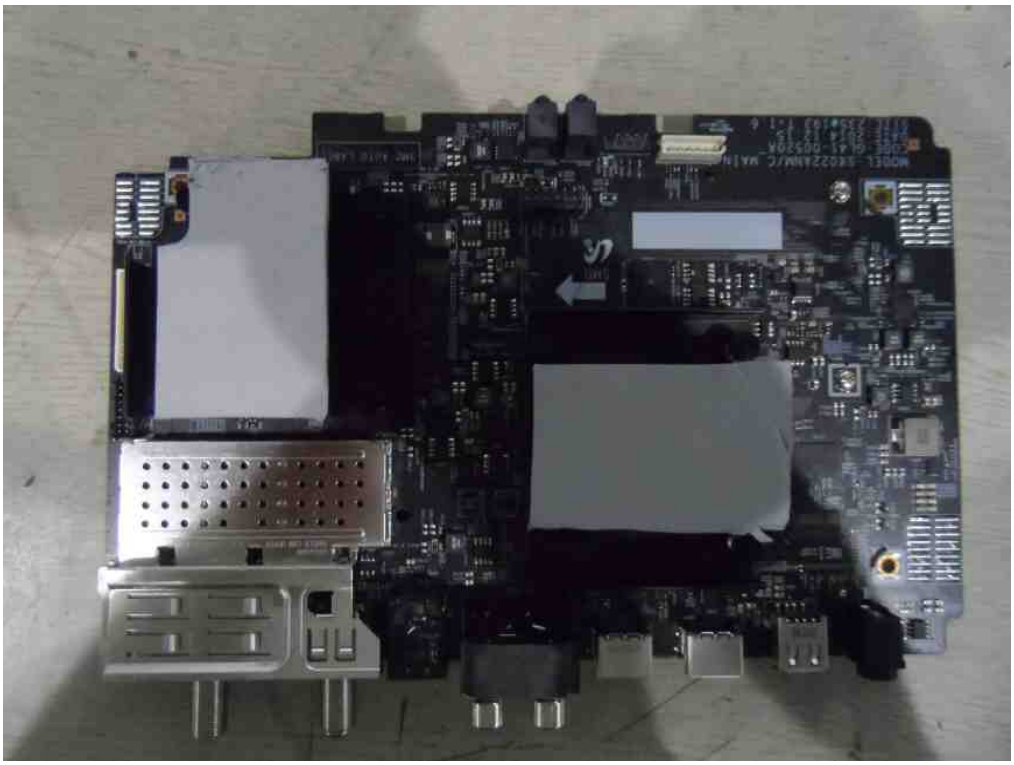
EUT External Photographs

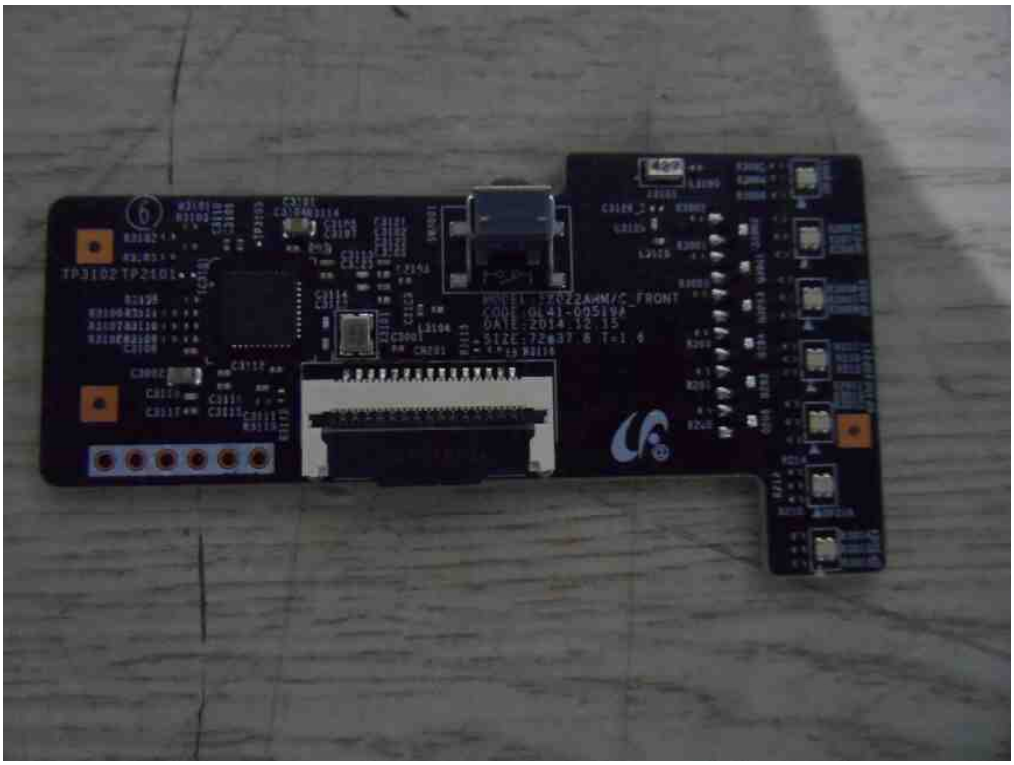
SAMSUNG
AC/DC ADAPTER
MODEL : A3612_FDY
INPUT : 100 - 240V ~
50/60Hz, 1.5A
OUTPUT : 12V ⎓ 3A
MADE IN CHINA

SAMSUNG
AC/DC ADAPTER
MODEL : A3612_FDY
INPUT : 100 - 240V ~
50/60Hz, 1.5A
OUTPUT : 12V ⎓ 3A
This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions.
1) This device may not cause harmful interference, and
2) This device must accept any interference received, including interference that may cause undesired operation.
CAUTION
US LISTED
EPS-3
MADE IN CHINA
SEC S/N: CN07XXXXXXXXXXXDC07FBC0033
Dongyang E&P Inc. 2014.11.13

EUT Internal Photographs

PCB





M-CARD™
MediaCipher™
ARRIS

SN:MA1429EXX635
UA:000-00960-13521-193
MAC:7896842C6C95
Part No:514517-018-00
MADE IN CHINA
ARRIS

xfinity
LOCK
SDSDAC-004G-1223
Instant Replay