

FCC NFC REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do,
16677, Rep. of Korea

Date of Issue:

May 23, 2018

Test Site/Location:

HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1805-FC023-R3

FCC ID: A3LSMA600N

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model: SM-A600N

EUT Type: Mobile Phone

RF Output Field Strength: 21.99 dBuV/m @30 m

Frequency of Operation: 13.5596 MHz

Modulation type: ASK

FCC Classification: Low Power Communication Device – Transmitter

FCC Rule Part(s): FCC Part 15.225 Subpart C

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



Report prepared by : Jung Ki Lim
Engineer of Telecommunication testing center



Approved by : Jong Seok Lee
Manager of Telecommunication testing center

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1805-FC023	May 10, 2018	- First Approval Report
HCT-RF-1805-FC023-R1	May 17, 2018	- Added the orientation of worst case (on page 12,14) - Update the frequency stability procedure and edit typo - A description of the configuration of the radiated measurement test settings has been added.
HCT-RF-1805-FC023-R2	May 18, 2018	- Added note for AC Power line conducted emission on page 21.
HCT-RF-1805-FC023-R3	May 23, 2018	- Added the travel adaptor information (page 4.) - Added description the worst case of Power line Conducted emission (page 21.)

Table of Contents

1. GENERAL INFORMATION	4
2. EUT DESCRIPTION	4
3. TEST METHODOLOGY	5
3.1 EUT CONFIGURATION	5
3.2 EUT EXERCISE	5
3.3 GENERAL TEST PROCEDURES	5
3.4 DESCRIPTION OF TEST MODES	5
4. INSTRUMENT CALIBRATION.....	6
5. FACILITIES AND ACCREDITATIONS	6
5.1 FACILITIES	6
5.2 EQUIPMENT	6
6. ANTENNA REQUIREMENTS	6
7. MEASUREMENT UNCERTAINTY	7
8. TEST SUMMARY	8
9. RADIATED MEASUREMENT	9
9.1. RADIATED EMISSION 9 kHz – 30 MHz	10
9.2. RADIATED EMISSION 30 MHz – 1000 MHz	13
10. EMISSION BANDWIDTH PLOT	15
11. FREQUENCY STABILITY	16
12. POWERLINE CONDUCTE EMISSIONS	21
13. LIST OF TEST EQUIPMENT	30
13.1 LIST OF TEST EQUIPMENT(Conducted Test)	30
13.2 LIST OF TEST EQUIPMENT(Radiated Test).....	31

1. GENERAL INFORMATION

Applicant: SAMSUNG Electronics Co., Ltd.
Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID: A3LSMA600N
EUT Type: Mobile Phone
Model: SM-A600N
Date(s) of Tests: April 09, 2018 ~ May 09, 2018
Place of Tests: HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model:	SM-A600N
EUT Type	Mobile Phone
Power Supply	DC 3.85 V
Battery Information	Model: EB-BJ800ABA Type: Li-ion Battery
Travel Adapter Information	Model: EP-TA50EWE Input: 100 - 240V Output: 5.0V, 1.55A Manufacture: SAMSUNG
Frequency of Operation	13.5596 MHz
Transmit Power	21.99 dBuV/m @30 m
Modulation Type	ASK
Antenna Specification	Antenna type: FPCB

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) is used in the measurement of the test device.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.225 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10. (Version: 2013).

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The 10 m semi anechoic chamber used to collect the Conducted and Radiated 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 (Version: 2014). Detailed description of test facilities was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned loop, dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

Parameter	Expanded Uncertainty (\pm dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70

8. TEST SUMMARY

The results in this report apply only to sample tested

Regulation	Test Type	Range	Result
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(a)	Radiated Electric Field Emissions	13.553MHz to 13.567MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(b)	Radiated Electric Field Emissions	13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(c)	Radiated Electric Field Emission	13.110 MHz to 13.410 MHz and 13.710 MHz to 14.010 MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.209 (d)	Radiated Electric Field Emissions	9kHz to 30MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.209	Radiated Electric Field Emissions	30MHz to 1GHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.207	AC power conducted emissions	150kHz to 30MHz	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.225(e)	Frequency Stability	0.01% of nominal	Pass
Title 47 of the CFR: Part 15 Subpart (c), Clause 15.215(c)	20 dB Bandwidth	-	Pass

9. RADIATED MEASUREMENT

Requirement(s): 15.209, 15.225

Except as provided elsewhere in this paragraph the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Minimum Standard: FCC Part 15.225 / 15.209

Rule Part	Frequency (MHz)	Limit
Part 15.209	0.009 ~ 0.490	2400/F(kHz) uV/m@300 m
	0.490 ~1.705	24000/F(kHz) uV/m@30 m
	1.705 ~ 30	30 uV/m@30 m
	30 ~ 88	100 ** uV/m@3 m
	88 ~ 216	150 ** uV/m@3 m
	216 ~ 960	200 ** uV/m@3 m
	Above 960	500 uV/m@3 m

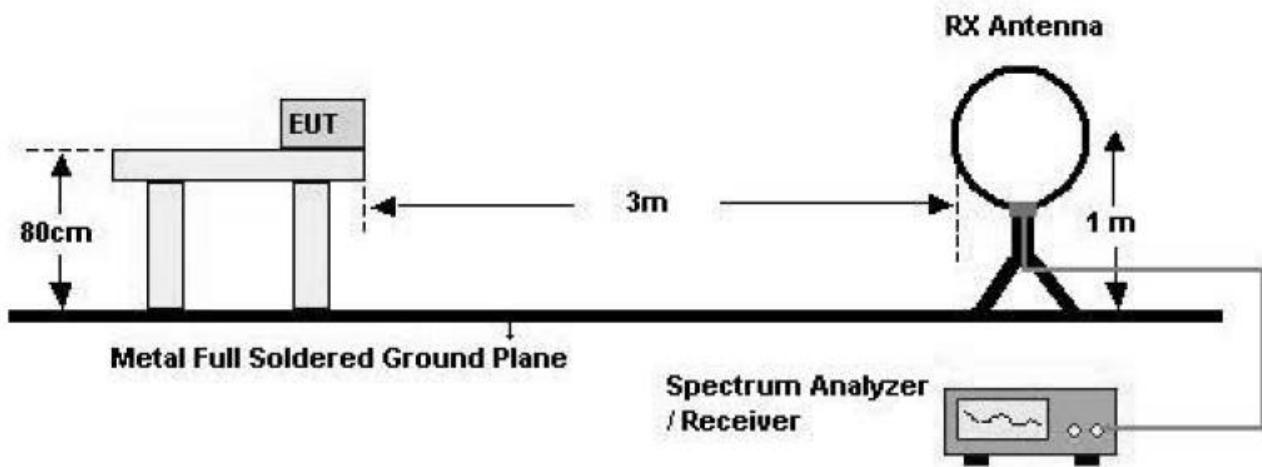
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

15.225 Operation within the band 13.110 MHz – 14.010 MHz

- (a) The field strength of any emissions within the band 13.553 MHz-13.567 MHz shall not exceed 15,848 microvolts/meter (= 84 dBuV/m) at 30 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567 MHz-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter (=50.5dBuV/m) at 30 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710 MHz-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter (=40.5 dBuV/m) at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110 MHz-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.
- (e) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.
- (f) In the case of radio frequency powered tags designed to operate with a device authorized under this section, the tag may be approved with the device or be considered as a separate device subject to its own authorization. Powered tags approved with a device under a single application shall be labeled with the same identification number as the device.

9.1. RADIATED EMISSION 9 kHz – 30 MHz

Test Set-up



Test Procedure

The EUT was placed on a non-conductive table located on semi-anechoic chamber.

The loop antenna was placed at a location 3m from the EUT. Radiated emissions were measured with the loop antenna both parallel and perpendicular to the plane of the EUT loop antenna and with x, y, z planes in EUT.

The limit is converted from microvolts/meter to decibel microvolts/meter. Sample Calculation:

Corrected Amplitude = Raw Amplitude(dB μ V/m) + ACF(dB) + Cable Loss(dB) – Distance Correction Factor

The spectrum analyzer is set to:

Frequency Range = 9 kHz ~ 1 GHz

RBW = 9 kHz (9 kHz ~ 30 MHz)

= 100 kHz (30 MHz ~ 1 GHz)

Trace Mode = max hold

Detector Mode = peak / Quasi-peak

Sweep time = auto

■ Test Results (Worst case : Y-V)

13.553 MHz-13.567 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5596	42.45	19.54	-40	21.99	84	62.01
13.5597	37.56	19.54	-40	17.10	84	66.9

13.410 MHz-13.553 MHz and 13.567 MHz-13.710 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.553	29.85	19.54	-40	9.39	50.47	41.08
13.567	28.65	19.54	-40	8.19	50.47	42.28

13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.3428	18.84	19.54	-40	-1.62	40.51	42.13
13.7718	23.68	19.54	-40	3.22	40.51	37.29

9 kHz -30 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor+Cable Loss (dB/m)	Distance Correction (dB)	Result Level (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.0613	11.7	19.54	-40	-8.76	29.54	38.3
14.1699	13.57	19.54	-40	-6.89	29.54	36.43
26.968	11.49	19.99	-40	-8.52	29.54	38.06
27.27	7.71	19.99	-40	-12.3	29.54	41.84

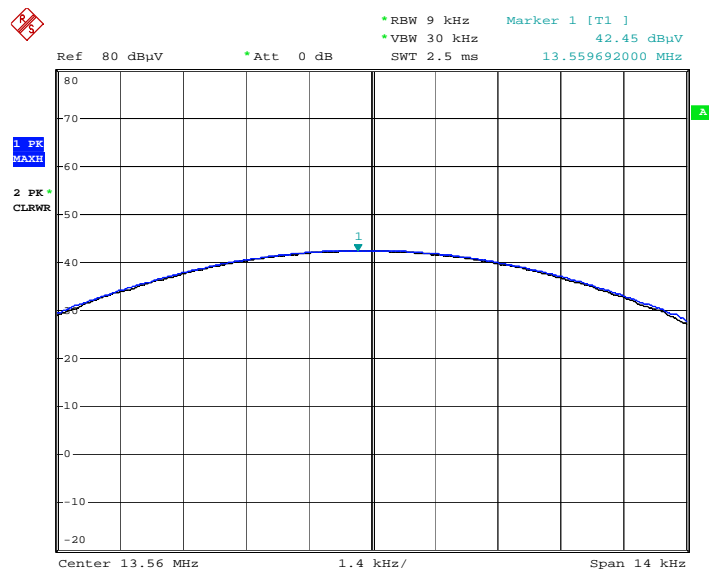
Note : The test results for below 30 MHz is correlated to an open site.

The result on OATS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

1. Distance Correction Below 30 MHz = $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
Measurement Distance : 3 m (Below 30 MHz)
2. Factor = Antenna Factor + Cable Loss
3. Result Level = Read Level + Factor + Distance Correction
4. Margin = Limit – Result Level
5. We have done x, y, z planes in EUT
6. Antenna rotated about its vertical/horizontal axis for maximum response at each azimuth position around the EUT.
7. Worst case of operating mode is type A, analog mode and 106 kbps.
8. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone+ external accessories(earphone, etc)
 - Worstcase : Stand alone

■ RESULT PLOTS (Worst case : Y-V)

Worst Plot for Radiated Emissions

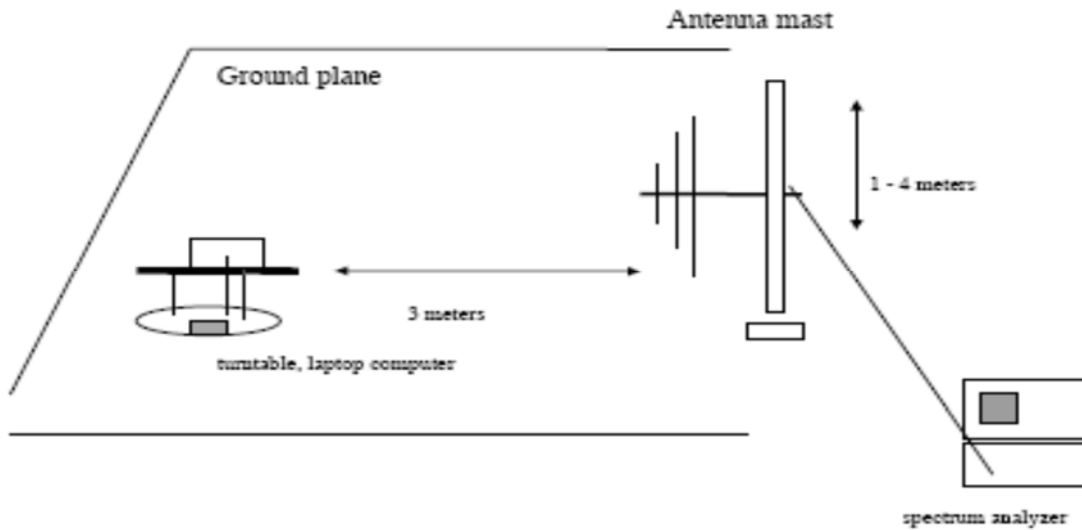


Date: 4.MAY.2018 11:13:55

Note : Only the worst case plots for Radiated Emissions.

9.2. RADIATED EMISSION 30 MHz – 1000 MHz

Test Set-up



Test Procedures: Radiated emissions were measured according to ANSI C63.10.

The EUT was set to transmit at the highest output power.

The EUT was set 3 meter away from the measuring antenna.

■ Test Results

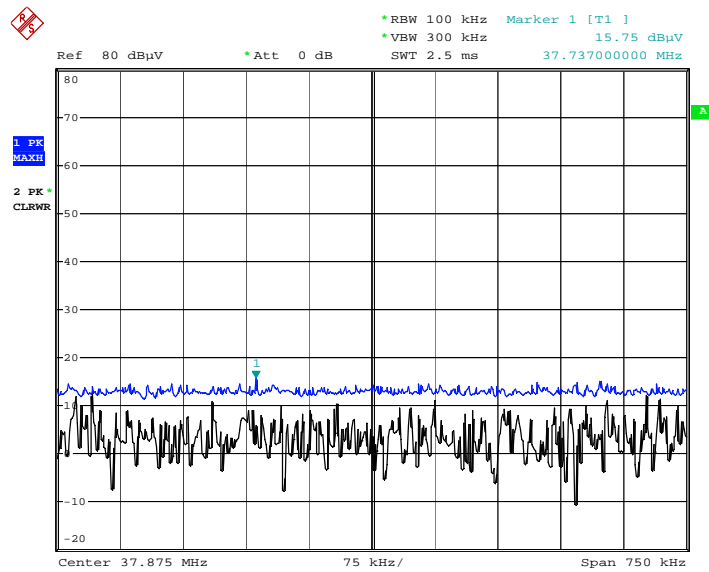
Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV	dB/m	dB	(H/V)	dBuV/m	dBuV/m	dB
* 37.737	15.75	11.72	0.66	H	28.13	40	11.87
52.2369	14.78	12.38	0.7	H	27.86	40	12.14
98.005	14.12	9.27	0.78	V	24.17	43.5	19.33
* 118.5499	14.53	11.64	0.81	H	26.98	43.5	16.52
* 127.5	13.52	12.84	0.88	H	27.24	43.5	16.26
162.83	13.51	13.41	0.95	V	27.87	43.5	15.63

Remark

1. Result Level = Read Level + (Antenna Factor+ Cable Loss)
2. Margin = Limit – Result Level
3. “*” is the result for restricted band.
4. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone+ external accessories(earphone, etc)
 - Worstcase : Stand alone

RESULT PLOTS (Worst case : Z-H)

Worst Plot for Radiated Emissions (Z-H)



Date: 4.MAY.2018 11:08:54

Note : Only the worst case plots for Radiated Emissions.

10. EMISSION BANDWIDTH PLOT

Requirement(s):

Test Set-up: The EUT was connected to a spectrum analyzer.

Test Procedure: The 20 dB bandwidth was measured by using a spectrum analyzer.

RBW = Auto

VBW = Auto

Span = Adequately in the operating Tx.

Detector = Peak

Trace mode = Max hold

Allow the trace to stabilize



11. FREQUENCY STABILITY

Procedure: Part 15.225, ANSI 63.10 (Version : 2013)

If required, the operating or transmitting frequency of an intentional radiator should be measured in accordance with the following procedure to ensure that the device operates outside certain precluded frequency bands and within the frequency range. No modulation needs to be supplied to the intentional radiator during these tests, unless modulation is required to produce an output, e.g., single-sideband suppressed carrier transmitters.

The frequency stability of the transmitter is measured by:

- a) Temperature: The temperature is varied from -20°C to + 50°C using an environmental chamber.
- b) For battery operated equipment, the equipment tests shall be performed using a new battery.
- c) Test Procedure
 - Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.
 - Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.
 - While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.
- d) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

[Note]

Primary Supply Voltage : The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Startup

Measurement Result:

PERATING FREQUENCY: 13.56 MHz
 REFERENCE VOLTAGE: 3.85 VDC
 DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560098	98	0.0007227
100%		-10	13.560086	86	0.0006342
100%		0	13.560072	72	0.0005310
100%		+10	13.560066	66	0.0004867
100%		+20(Ref.)	13.560059	59	0.0004351
100%		+30	13.560047	47	0.0003466
100%		+40	13.560039	39	0.0002876
100%		+50	13.560028	28	0.0002065
End. point	3.50	+20	13.560081	81	0.0005973

2 minutes

Measurement Result:

OPERATING FREQUENCY: 13.56 MHz

REFERENCE VOLTAGE: 3.85 VDC

DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560111	111	0.0008186
100%		-10	13.560094	94	0.0006932
100%		0	13.560087	87	0.0006416
100%		+10	13.560077	77	0.0005678
100%		+20(Ref.)	13.560065	65	0.0004794
100%		+30	13.560052	52	0.0003835
100%		+40	13.560049	49	0.0003614
100%		+50	13.560041	41	0.0003024
End. point	3.50	+20	13.560063	63	0.0004646

5 minutes

Measurement Result:

OPERATING FREQUENCY: 13.56 MHz
 REFERENCE VOLTAGE: 3.85 VDC
 DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560096	96	0.0007080
100%		-10	13.560084	84	0.0006195
100%		0	13.560077	77	0.0005678
100%		+10	13.560062	62	0.0004572
100%		+20(Ref.)	13.560054	54	0.0003982
100%		+30	13.560049	49	0.0003614
100%		+40	13.560041	41	0.0003024
100%		+50	13.560036	36	0.0002655
End. point	3.50	+20	13.560065	65	0.0004794

10 minutes

Measurement Result:

OPERATING FREQUENCY: 13.56 MHz
 REFERENCE VOLTAGE: 3.85 VDC
 DEVIATION LIMIT: 0.01 % = 1356 Hz

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (MHz)	Frequency Dev. (Hz)	Frequency Dev (%)
100%	3.85	-20	13.560105	105	0.0007743
100%		-10	13.560099	99	0.0007301
100%		0	13.560084	84	0.0006195
100%		+10	13.560071	71	0.0005236
100%		+20(Ref.)	13.560063	63	0.0004646
100%		+30	13.560067	67	0.0004941
100%		+40	13.560058	58	0.0004277
100%		+50	13.560050	50	0.0003687
End. point	3.50	+20	13.560062	62	0.0004572

12. POWERLINE CONDUCTE EMISSIONS

LIMIT

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. The EUT is the device operating below 30 MHz.
 - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
 - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

[NOTE]

All modes of operation were investigated and the worst case configuration results are reported.

- Mode : Stand alone+Earphone+Travel Adapter, Stand alone+Travel Adapter

- Worstcase : Stand alone+Travel Adapter

RESULT PLOTS

Underminate the Antenna

Conducted Emissions (Line 1)

EMI Auto Test(22)

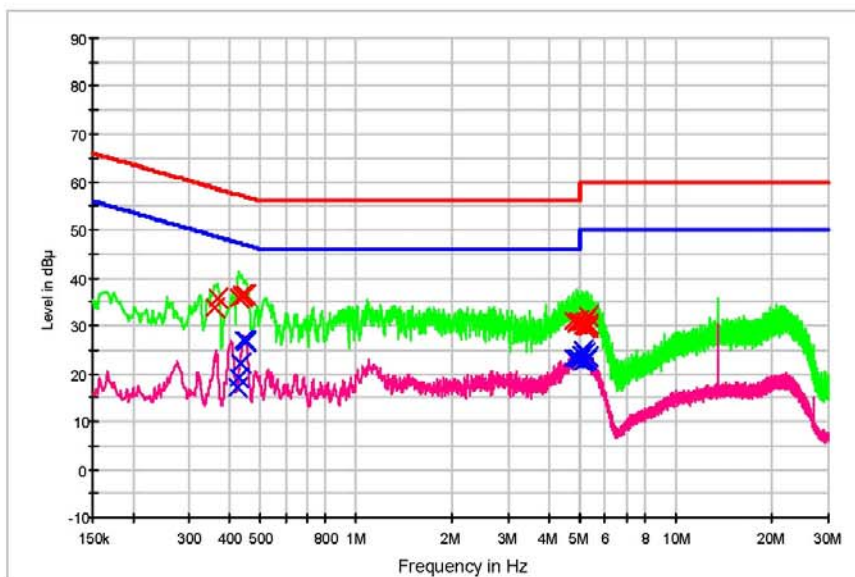
1 / 2

HCT TEST Report

Common Information

EUT: SM-A600N
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC UNTERMINATION MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG X Final Result 1-OPK X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.360000	33.8	9.000	Off	N	9.7	25.0	58.7
0.368000	35.7	9.000	Off	N	9.7	22.9	58.5
0.430000	35.7	9.000	Off	N	9.7	21.6	57.3
0.438000	36.6	9.000	Off	N	9.7	20.5	57.1
0.442000	36.1	9.000	Off	N	9.7	20.9	57.0
0.448000	36.3	9.000	Off	N	9.7	20.6	56.9
4.780000	31.0	9.000	Off	N	10.0	25.0	56.0
4.874000	30.8	9.000	Off	N	10.0	25.2	56.0
4.916000	30.5	9.000	Off	N	10.0	25.5	56.0
4.954000	31.1	9.000	Off	N	10.0	24.9	56.0
5.060000	30.8	9.000	Off	N	10.0	29.2	60.0
5.112000	29.9	9.000	Off	N	10.0	30.1	60.0
5.170000	29.8	9.000	Off	N	10.0	30.2	60.0
5.178000	31.0	9.000	Off	N	10.0	29.0	60.0
5.234000	30.2	9.000	Off	N	10.0	29.8	60.0
5.292000	30.4	9.000	Off	N	10.0	29.6	60.0
5.306000	31.9	9.000	Off	N	10.0	28.1	60.0
5.326000	29.6	9.000	Off	N	10.0	30.4	60.0

2018-04-20

오후 3:39:36

EMI Auto Test(22)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.426000	17.2	9.000	Off	N	9.7	30.1	47.3
0.430000	19.2	9.000	Off	N	9.7	28.0	47.3
0.434000	22.3	9.000	Off	N	9.7	24.9	47.2
0.444000	26.9	9.000	Off	N	9.7	20.1	47.0
0.448000	27.0	9.000	Off	N	9.7	19.9	46.9
0.452000	26.6	9.000	Off	N	9.7	20.2	46.8
4.780000	23.2	9.000	Off	N	10.0	22.8	46.0
4.916000	23.3	9.000	Off	N	10.0	22.7	46.0
4.954000	23.1	9.000	Off	N	10.0	22.9	46.0
4.992000	22.8	9.000	Off	N	10.0	23.2	46.0
5.100000	24.0	9.000	Off	N	10.0	26.0	50.0
5.112000	22.5	9.000	Off	N	10.0	27.5	50.0
5.138000	24.8	9.000	Off	N	10.0	25.2	50.0
5.170000	22.9	9.000	Off	N	10.0	27.1	50.0
5.180000	24.2	9.000	Off	N	10.0	25.8	50.0
5.234000	23.0	9.000	Off	N	10.0	27.0	50.0
5.278000	23.0	9.000	Off	N	10.0	27.0	50.0
5.294000	23.4	9.000	Off	N	10.0	26.6	50.0

2018-04-20

오후 3:39:36

Conducted Emissions (Line 2)

EMI Auto Test(22)

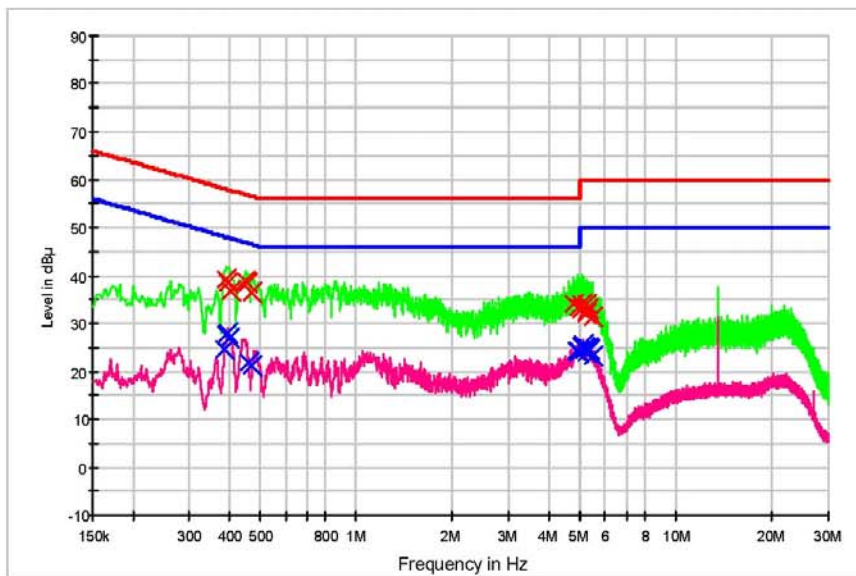
1 / 2

HCT TEST Report

Common Information

EUT: SM-A600N
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC UNTERMINATION MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG X Final Result 1-QPK X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.392000	39.1	9.000	Off	L1	9.7	18.9	58.0
0.398000	38.4	9.000	Off	L1	9.7	19.5	57.9
0.404000	36.9	9.000	Off	L1	9.7	20.8	57.8
0.450000	38.8	9.000	Off	L1	9.7	18.1	56.9
0.458000	38.4	9.000	Off	L1	9.7	18.3	56.7
0.472000	36.4	9.000	Off	L1	9.7	20.1	56.5
4.782000	34.0	9.000	Off	L1	10.0	22.0	56.0
4.952000	33.3	9.000	Off	L1	10.0	22.7	56.0
4.960000	33.3	9.000	Off	L1	10.0	22.7	56.0
5.088000	34.0	9.000	Off	L1	10.0	26.0	60.0
5.092000	33.1	9.000	Off	L1	10.0	26.9	60.0
5.136000	33.4	9.000	Off	L1	10.0	26.6	60.0
5.226000	32.4	9.000	Off	L1	10.0	27.6	60.0
5.240000	32.0	9.000	Off	L1	10.0	28.0	60.0
5.258000	34.2	9.000	Off	L1	10.0	25.8	60.0
5.282000	32.4	9.000	Off	L1	10.0	27.6	60.0
5.310000	32.9	9.000	Off	L1	10.0	27.1	60.0
5.488000	31.4	9.000	Off	L1	10.0	28.6	60.0

2018-04-20

오후 3:48:45

EMI Auto Test(22)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.388000	24.7	9.000	Off	L1	9.7	23.4	48.1
0.392000	27.5	9.000	Off	L1	9.7	20.6	48.0
0.396000	27.8	9.000	Off	L1	9.7	20.1	47.9
0.400000	27.0	9.000	Off	L1	9.7	20.8	47.9
0.460000	21.9	9.000	Off	L1	9.7	24.8	46.7
0.472000	21.3	9.000	Off	L1	9.7	25.2	46.5
4.876000	24.2	9.000	Off	L1	10.0	21.8	46.0
4.942000	24.3	9.000	Off	L1	10.0	21.7	46.0
4.958000	24.3	9.000	Off	L1	10.0	21.7	46.0
4.962000	24.1	9.000	Off	L1	10.0	21.9	46.0
5.090000	25.4	9.000	Off	L1	10.0	24.6	50.0
5.136000	25.5	9.000	Off	L1	10.0	24.5	50.0
5.182000	25.1	9.000	Off	L1	10.0	24.9	50.0
5.190000	24.6	9.000	Off	L1	10.0	25.4	50.0
5.240000	23.9	9.000	Off	L1	10.0	26.1	50.0
5.310000	24.8	9.000	Off	L1	10.0	25.2	50.0
5.352000	24.5	9.000	Off	L1	10.0	25.5	50.0
5.488000	23.3	9.000	Off	L1	10.0	26.7	50.0

2018-04-20

오후 3:48:45

**Terminate the Antenna
Conducted Emissions (Line 1)**

EMI Auto Test(22)

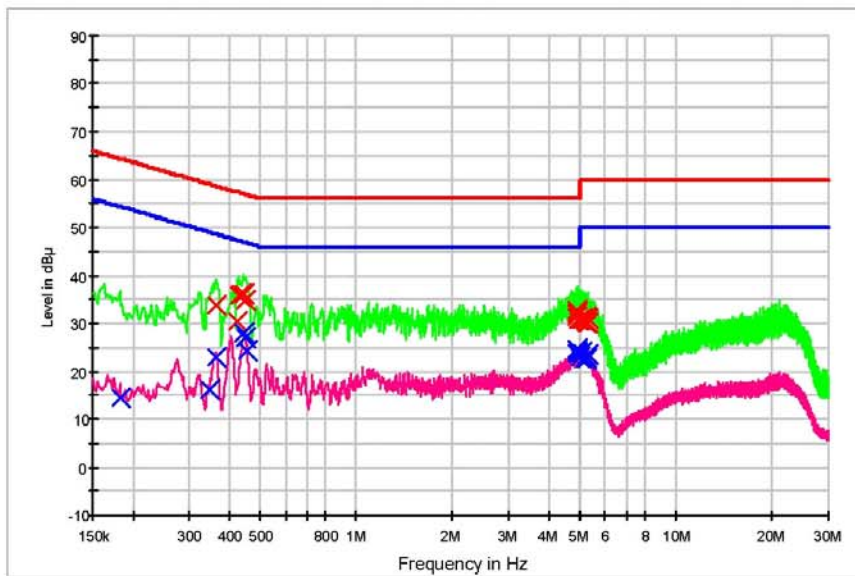
1 / 2

HCT TEST Report

Common Information

EUT: SM-A600N
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC TERMINATION MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG × Final Result 1-QPK × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.364000	33.6	9.000	Off	N	9.7	25.1	58.6
0.424000	30.3	9.000	Off	N	9.7	27.1	57.4
0.430000	35.7	9.000	Off	N	9.7	21.6	57.3
0.436000	36.0	9.000	Off	N	9.7	21.1	57.1
0.444000	36.2	9.000	Off	N	9.7	20.8	57.0
0.450000	34.9	9.000	Off	N	9.7	22.0	56.9
4.870000	31.4	9.000	Off	N	10.0	24.6	56.0
4.918000	32.0	9.000	Off	N	10.0	24.0	56.0
4.924000	32.8	9.000	Off	N	10.0	23.2	56.0
4.978000	30.6	9.000	Off	N	10.0	25.4	56.0
5.046000	30.7	9.000	Off	N	10.0	29.3	60.0
5.088000	31.1	9.000	Off	N	10.0	28.9	60.0
5.172000	30.8	9.000	Off	N	10.0	29.2	60.0
5.214000	30.3	9.000	Off	N	10.0	29.7	60.0
5.246000	30.0	9.000	Off	N	10.0	30.0	60.0
5.274000	31.3	9.000	Off	N	10.0	28.7	60.0
5.288000	31.0	9.000	Off	N	10.0	29.0	60.0
5.332000	30.1	9.000	Off	N	10.0	29.9	60.0

2018-04-20

오후 3:17:48

EMI Auto Test(22)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	14.4	9.000	Off	N	9.7	40.0	54.4
0.350000	16.1	9.000	Off	N	9.7	32.9	49.0
0.364000	22.8	9.000	Off	N	9.7	25.8	48.6
0.444000	28.0	9.000	Off	N	9.7	18.9	47.0
0.448000	27.1	9.000	Off	N	9.7	19.8	46.9
0.456000	24.2	9.000	Off	N	9.7	22.5	46.8
4.870000	23.8	9.000	Off	N	10.0	22.2	46.0
4.912000	23.7	9.000	Off	N	10.0	22.3	46.0
4.924000	24.4	9.000	Off	N	10.0	21.6	46.0
4.978000	23.6	9.000	Off	N	10.0	22.4	46.0
4.998000	23.0	9.000	Off	N	10.0	23.0	46.0
5.088000	23.7	9.000	Off	N	10.0	26.3	50.0
5.172000	22.9	9.000	Off	N	10.0	27.1	50.0
5.210000	22.8	9.000	Off	N	10.0	27.2	50.0
5.214000	22.7	9.000	Off	N	10.0	27.3	50.0
5.246000	22.9	9.000	Off	N	10.0	27.1	50.0
5.258000	22.5	9.000	Off	N	10.0	27.5	50.0
5.288000	23.5	9.000	Off	N	10.0	26.5	50.0

2018-04-20

오후 3:17:48

Conducted Emissions (Line 2)

EMI Auto Test(22)

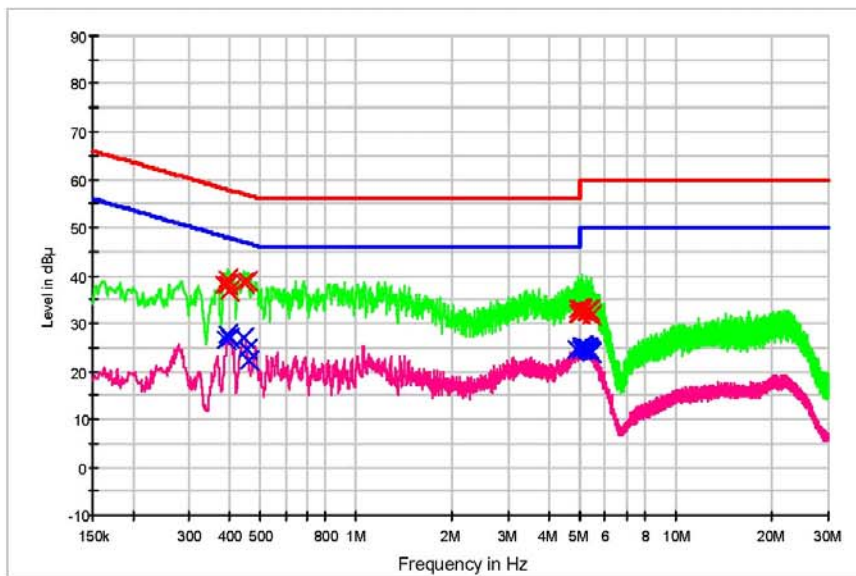
1 / 2

HCT TEST Report

Common Information

EUT: SM-A600N
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC TERMINATION MODE

FCC CLASS B_Exten Cable



— FCC CLASS B_OP — FCC CLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG X Final Result 1-QPK X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.388000	38.1	9.000	Off	L1	9.7	20.0	58.1
0.394000	39.0	9.000	Off	L1	9.7	19.0	58.0
0.398000	38.1	9.000	Off	L1	9.7	19.8	57.9
0.402000	36.7	9.000	Off	L1	9.7	21.1	57.8
0.446000	38.5	9.000	Off	L1	9.7	18.5	56.9
0.458000	38.7	9.000	Off	L1	9.7	18.0	56.7
4.930000	33.1	9.000	Off	L1	10.0	22.9	56.0
4.938000	32.1	9.000	Off	L1	10.0	23.9	56.0
5.036000	32.2	9.000	Off	L1	10.0	27.8	60.0
5.046000	32.6	9.000	Off	L1	10.0	27.4	60.0
5.062000	33.1	9.000	Off	L1	10.0	26.9	60.0
5.066000	32.6	9.000	Off	L1	10.0	27.4	60.0
5.246000	32.3	9.000	Off	L1	10.0	27.7	60.0
5.286000	32.4	9.000	Off	L1	10.0	27.6	60.0
5.290000	32.6	9.000	Off	L1	10.0	27.4	60.0
5.358000	32.6	9.000	Off	L1	10.0	27.4	60.0
5.402000	32.9	9.000	Off	L1	10.0	27.2	60.0
5.414000	31.6	9.000	Off	L1	10.0	28.4	60.0

2018-04-20

오후 3:30:05

EMI Auto Test(22)

2 / 2

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.392000	26.7	9.000	Off	L1	9.7	21.3	48.0
0.396000	27.6	9.000	Off	L1	9.7	20.3	47.9
0.400000	27.1	9.000	Off	L1	9.7	20.7	47.9
0.446000	26.8	9.000	Off	L1	9.7	20.1	46.9
0.456000	24.7	9.000	Off	L1	9.7	22.1	46.8
0.460000	22.3	9.000	Off	L1	9.7	24.4	46.7
4.882000	24.4	9.000	Off	L1	10.0	21.6	46.0
5.046000	24.5	9.000	Off	L1	10.0	25.5	50.0
5.062000	25.2	9.000	Off	L1	10.0	24.8	50.0
5.066000	24.7	9.000	Off	L1	10.0	25.3	50.0
5.104000	25.4	9.000	Off	L1	10.0	24.6	50.0
5.112000	24.9	9.000	Off	L1	10.0	25.1	50.0
5.244000	24.9	9.000	Off	L1	10.0	25.1	50.0
5.248000	24.4	9.000	Off	L1	10.0	25.6	50.0
5.286000	24.8	9.000	Off	L1	10.0	25.2	50.0
5.290000	24.7	9.000	Off	L1	10.0	25.3	50.0
5.402000	24.1	9.000	Off	L1	10.0	25.9	50.0
5.414000	23.9	9.000	Off	L1	10.0	26.1	50.0

2018-04-20

오후 3:30:05

13. LIST OF TEST EQUIPMENT

13.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/20/2017	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2017	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/30/2018	Annual	0093008124
Agilent	N9020A / Signal Analyzer	06/13/2017	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/22/2017	Annual	MY49431210
Agilent	87300B / Directional Coupler	11/20/2017	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/12/2017	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/30/2017	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2017	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A

13.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	05/02/2017	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/06/2017	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/27/2017	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/12/2017	Annual	8
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/15/2017	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/30/2017	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2018	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/12/2017	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/19/2017	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/11/2017	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/11/2017	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/10/2018	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/30/2017	Annual	25956