

FCC NFC REPORT

Certification

Date of Issue:

April 18, 2019

Location:

HCT CO., LTD.,

74, Seoicheon-ro 578beon-gil, Majang-myeon,

Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1904-FC019-R1

Applicant Name:

SAMSUNG Electronics Co., Ltd.

Address:

129, Samsung-ro, Yeongtong-gu,

Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

FCC ID:

A3LSCV43

APPLICANT:

SAMSUNG Electronics Co., Ltd.

Model:

SCV43

EUT Type:

Mobile Phone

RF Output Field Strength:

16.99 dBuV/m @30 m

Frequency of Operation:

13.5601 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 : Kwon Jeong

Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1904-FC019	April 15, 2019	- First Approval Report
HCT-RF-1904-FC019-R1	April 18 2019	- Revised the limit in page 19 - Added the reader mode test

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1. EUT DESCRIPTION

Model	SCV43
EUT Type	Mobile Phone
Power Supply	DC 3.85 V
Battery Information	Model: EB-BA505ABU Type: Li-ion battery
Travel Adapter Information	Model : EP-TA200 Manufacture: SOLU M
Frequency of Operation	13.5605 MHz Reader Mode: 13.5601 MHz
Transmit Power	16.58 dBuV/m @30 m Reader Mode: 16.99 dBuV/m @30 m
Modulation Type	ASK
Antenna type	Internal Antenna
Date(s) of Tests	March 22, 2019 ~ April 08, 2019 and April 18 2019 (Only Reader mode test)

2. 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.

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.

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.

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 6.6.5 of ANSI C63.10. (Version: 2013).

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.

3. 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 equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil,

Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned 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."

5. 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

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

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

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

7. DESCRIPTION OF TESTS

7.1. Radiated Test

Limit (Operation within the band 13.110 MHz – 14.010 MHz)

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
13.553 – 13.567	15,848	30
13.410 ≤ f ≤ 13.553 13.567 ≤ f ≤ 13.710	334	30
13.110 ≤ f ≤ 13.410 13.710 ≤ f ≤ 14.010	106	30

Note:

1. 15,848 uV/m = 84.0 dBuV/m
2. 334 uV/m = 50.47 dBuV/m
3. 106 uV/m = 40.51 dBuV/m

Limit (Radiated Spurious Emissions)

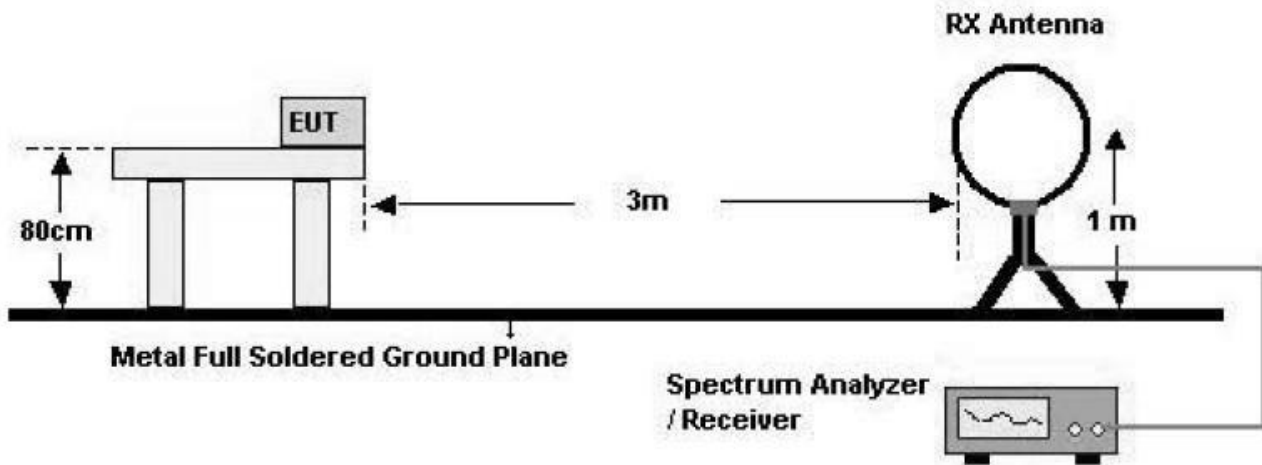
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	**100	3
88-216	**150	3
216-960	**200	3
Above 960	500	3

**:

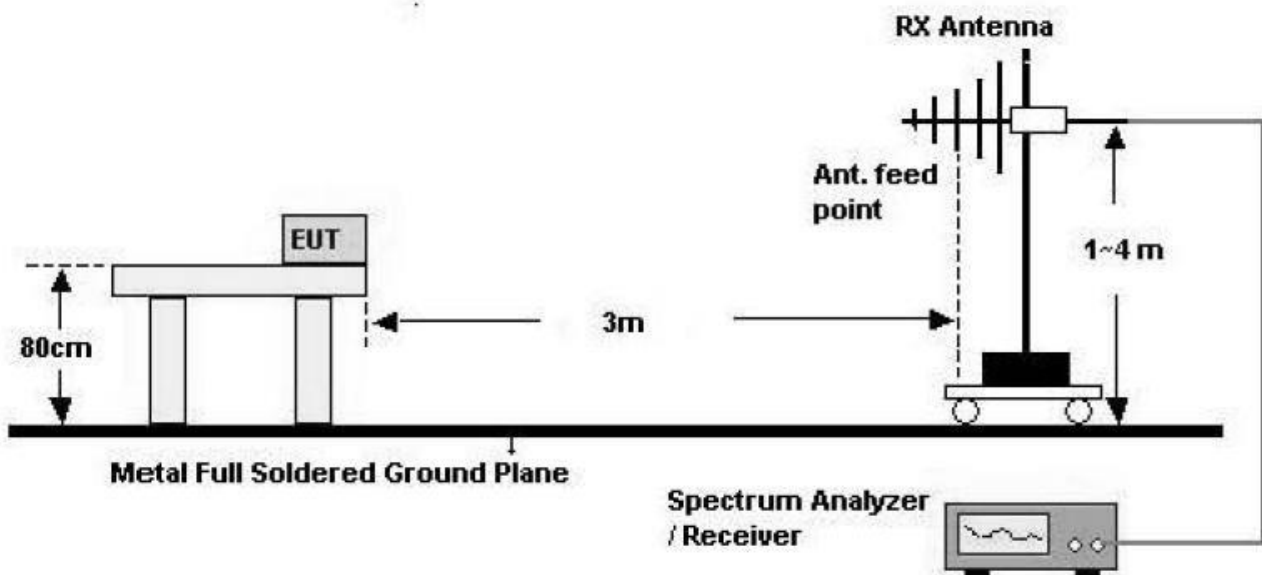
Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part,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

Test Configuration

Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz

Test Procedure of inband

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor = $40 \cdot \log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$

Measurement Distance : 3 m (Below 30 MHz)

7. Spectrum Setting

- Detector = Peak
- Trace = Maxhold
- RBW = 9 kHz
- VBW $\geq 3 \cdot \text{RBW}$

8. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
9. The test results for below 30 MHz is correlated to an open site.

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

Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = $40 \cdot \log(3 \text{ m}/300 \text{ m}) = -80 \text{ dB}$

Measurement Distance : 3 m

7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40 \cdot \log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$

Measurement Distance : 3 m

8. Spectrum Setting

- Frequency Range = 9 kHz ~ 30 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 9 kHz
- VBW $\geq 3 \cdot \text{RBW}$

9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. The test results for below 30 MHz is correlated to an open site.

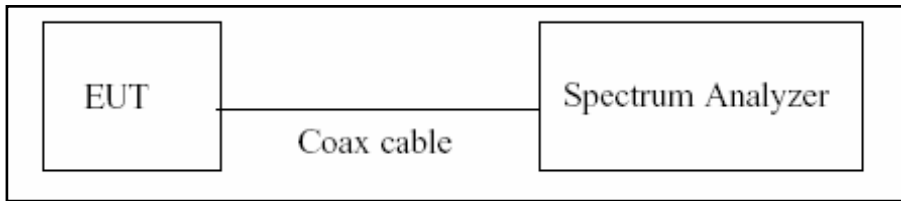
The result on OFS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

Test Procedure of Radiated spurious emissions(Above 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Spectrum Setting
 - Frequency Range = 30 MHz ~ 1 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 100 kHz
 - VBW $\geq$ 3*RBW
6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)

7.2. 20dB Bandwidth

Test Configuration



Test Procedure

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

- 1) RBW = Auto
- 2) VBW = Auto
- 3) Span = Adequately in the operating Tx.
- 4) Detector = Peak
- 5) Trace mode = Max hold
- 6) Allow the trace to stabilize

Note :

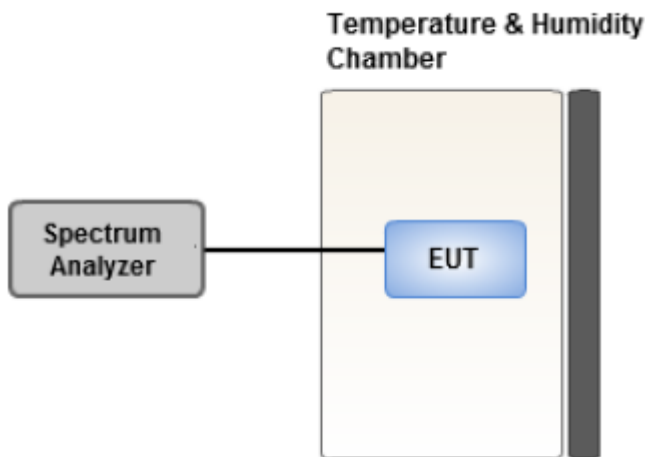
We tested Occupied Bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.

7.3. Frequency Stability

Limit

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

Test Configuration



Test Procedure.

For battery operated equipment, the equipment tests shall be performed using a new battery.

- 1) Turn the EUT OFF and place it inside the environmental temperature chamber.
For devices that have oscillator heaters, energize only the heater circuit.
- 2) 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.
- 3) 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.
- 4) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

Note:

- 1) Temperature:
The temperature is varied from -20°C to $+50^{\circ}\text{C}$ using an environmental chamber.
- 2) 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.

7.4. AC Power line Conducted Emissions

Limit

For an intentional radiator that 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 the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

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

*Decreases with the logarithm of the frequency.

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 Annex A 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

7.5. Worst case configuration and mode

Radiated test

1. 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
2. EUT Axis : Z
3. All type and bitrate were investigated and the worst case results are reported.
(Worst case : Type A, 106 kbps)
4. All position of loop antenna were investigated and the worst case configuration results are reported.
 - Position : Horizontal, Vertical, Parallel to the ground plane
 - Worstcase : Horizontal

AC Power line Conducted Emissions

1. 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

20dB Bandwidth & Frequency Stability

1. All type and bitrate were investigated and the worst case results are reported.
(Worst case : Type A, 106 kbps)

8. TEST SUMMARY

Regulation	Requirement	Result
Part 15.225 (a)	Radiated Electric Field Emissions (13.553MHz to 13.567MHz)	Pass
Part 15.225 (b)	Radiated Electric Field Emissions ($13.410 \leq f \leq 13.553$, $13.567 \leq f \leq 13.710$)	Pass
Part 15.225 (c)	Radiated Electric Field Emissions ($13.110 \leq f \leq 13.410$, $13.710 \leq f \leq 14.010$)	Pass
Part 15.209	Radiated Electric Field Emissions (9kHz to 30MHz)	Pass
Part 15.209	Radiated Electric Field Emissions (30MHz to 1GHz)	Pass
Part 15.225 (e)	Frequency Stability	Pass
Part 15.207	AC power conducted emissions (150kHz to 30MHz)	Pass
Part 15.215 (c)	20 dB Bandwidth	Pass

9. TEST RESULT

9.1. Operation within the band 13.110 MHz – 14.010 MHz

Measured Frequency Range : 13.553 MHz-13.567 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5605	37.04	19.54	-40.00	16.58	84.00	67.42
13.5610	33.40	19.54	-40.00	12.94	84.00	71.06

Measured Frequency Range : 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)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5530	22.10	19.54	-40.00	1.64	50.47	48.83
13.5670	26.03	19.54	-40.00	5.57	50.47	44.90

Measured Frequency Range : 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)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.3188	9.80	19.54	-40.00	-10.66	40.51	51.17
13.7214	11.83	19.54	-40.00	-8.63	40.51	49.14

Note:

1. Without Tag

Measured Frequency Range : 13.553 MHz-13.567 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5601	37.45	19.54	-40.00	16.99	84.00	67.01
13.5610	34.60	19.54	-40.00	14.14	84.00	69.86

Measured Frequency Range : 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)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.5529	31.31	19.54	-40.00	10.85	50.47	39.62
13.5671	31.61	19.54	-40.00	11.15	50.47	39.32

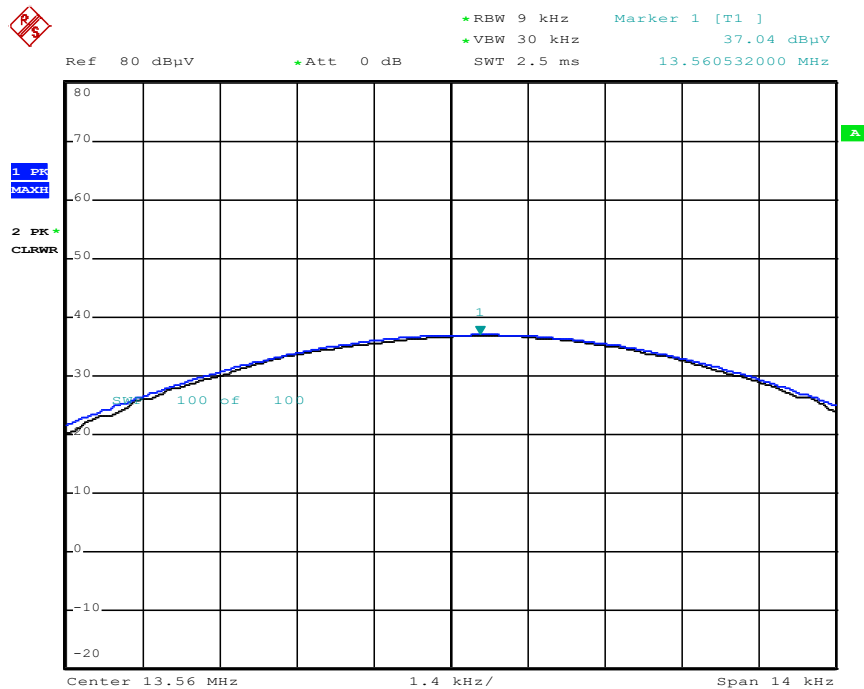
Measured Frequency Range : 13.110 MHz – 13.410 MHz and 13.710 MHz-14.010 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
13.3472	19.08	19.54	-40.00	-1.38	40.51	41.89
13.7710	19.50	19.54	-40.00	-0.96	40.51	41.47

Note:

1. With Tag

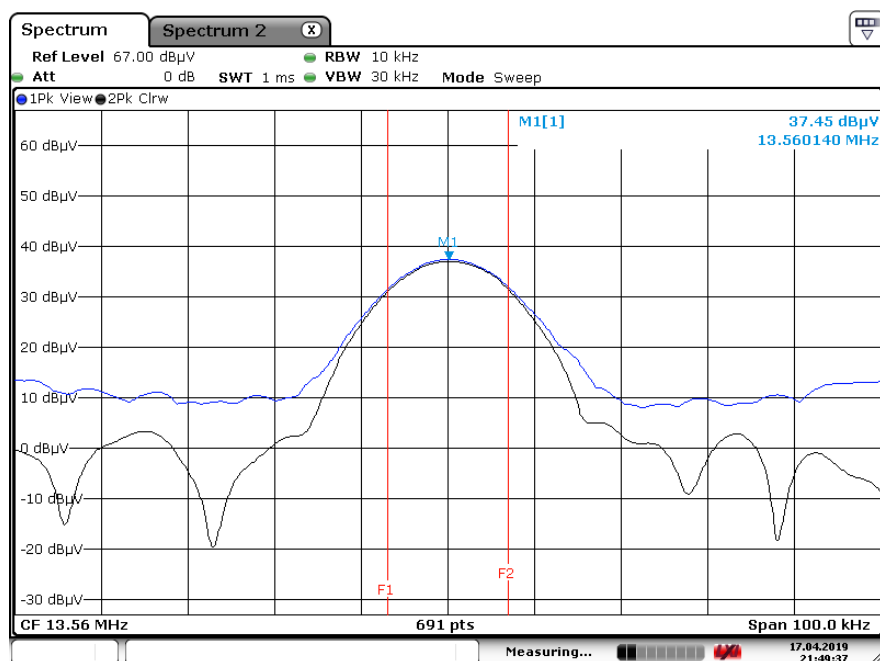
Test Plot

Without Tag



Date: 5.APR.2019 11:37:50

With Tag



Note:

Plot of worst case are only reported.

9.2. Radiated Emission 9 kHz – 30 MHz

Measured Frequency Range : 9 kHz - 30 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
11.4994	8.94	19.54	-40.00	-11.52	29.54	41.06
13.9998	8.70	19.54	-40.00	-11.76	40.51	52.27
27.0025	7.53	19.99	-40.00	-12.48	29.54	42.02
27.3004	7.05	19.99	-40.00	-12.96	29.54	42.50

Note:

1. Without Tag

Measured Frequency Range : 9 kHz - 30 MHz						
Frequency (MHz)	Read Level (dBuV/m)@3m	Ant.Factor +Cable Loss (dB/m)	Distance Correction (dB)	Total (dBuV/m)@30m	Limit (dBuV/m)@30m	Margin (dB)
8.7150	16.38	19.54	-40.00	-4.08	29.54	33.62
9.8410	14.30	19.54	-40.00	-6.16	29.54	35.70
16.3120	11.70	19.99	-40.00	-8.31	29.54	37.85
26.9498	11.40	19.99	-40.00	-8.61	29.54	38.15

Note:

1. With Tag

9.3. Radiated Emission 30 MHz – 1000 MHz

Measured Frequency Range : 30 MHz - 1000 MHz							
Frequency (MHz)	Read Level (dBuV/m) @3m	Ant.Factor (dB/m)	Cable Loss (dB)	Ant. Pol (H/V)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)
* 37.9954	13.13	18.50	0.49	H	32.12	40.00	7.88
51.9945	11.98	18.20	0.56	H	30.74	40.00	9.26
103.5518	14.28	15.50	0.78	V	30.56	43.50	12.94
* 120.3351	13.11	17.70	0.86	H	31.67	43.50	11.83
* 136.7415	13.51	18.35	0.91	H	32.77	43.50	10.73
183.9919	12.21	18.80	0.98	V	31.99	43.50	11.51

Note:

1. '*' is the result for restricted band.
2. Without Tag

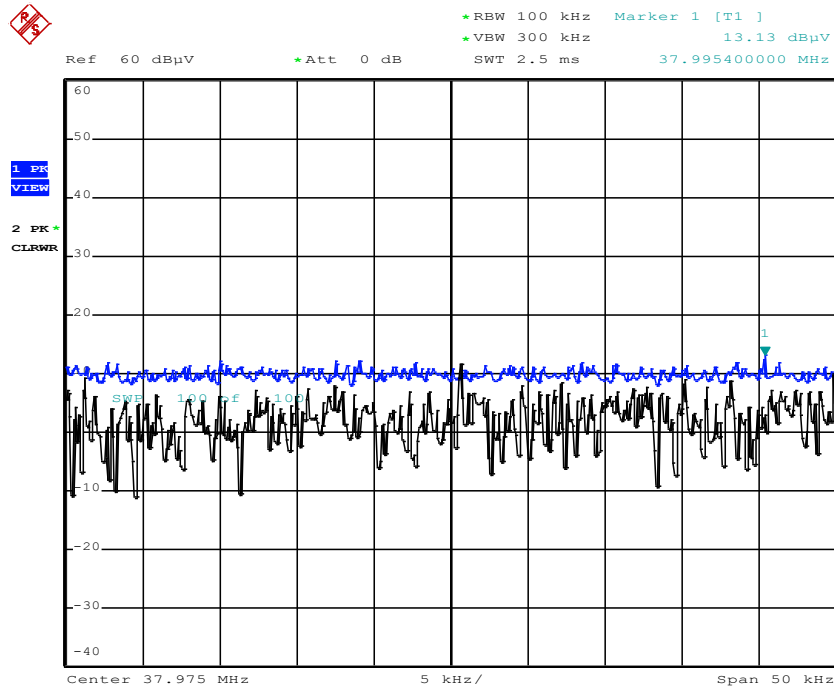
Measured Frequency Range : 30 MHz - 1000 MHz							
Frequency (MHz)	Read Level (dBuV/m) @3m	Ant.Factor (dB/m)	Cable Loss (dB)	Ant. Pol (H/V)	Total (dBuV/m)	Limit (dBuV/m)	Margin (dB)
* 37.0011	16.56	18.50	0.49	H	35.55	40.00	4.45
51.0014	16.51	18.20	0.56	H	35.27	40.00	4.73
105.0023	16.87	15.50	0.78	V	33.15	43.50	10.35
* 120.9992	16.83	17.70	0.86	H	35.39	43.50	8.11
* 137.0000	18.45	18.35	0.91	H	37.71	43.50	5.79
185.9993	17.66	18.80	0.98	V	37.44	43.50	6.06

Note:

1. '*' is the result for restricted band.
2. With Tag

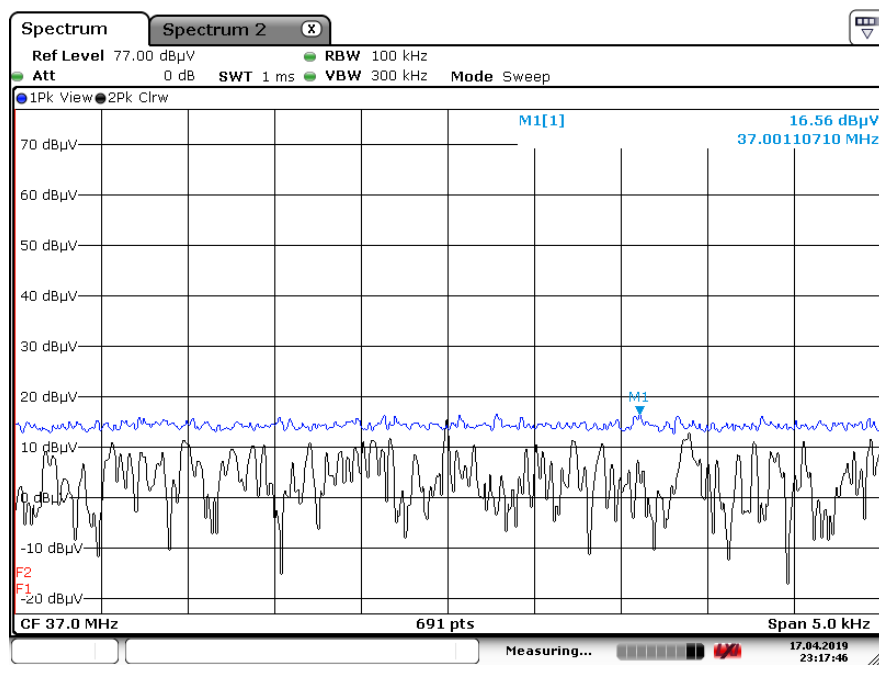
Test Plot

Without Tag



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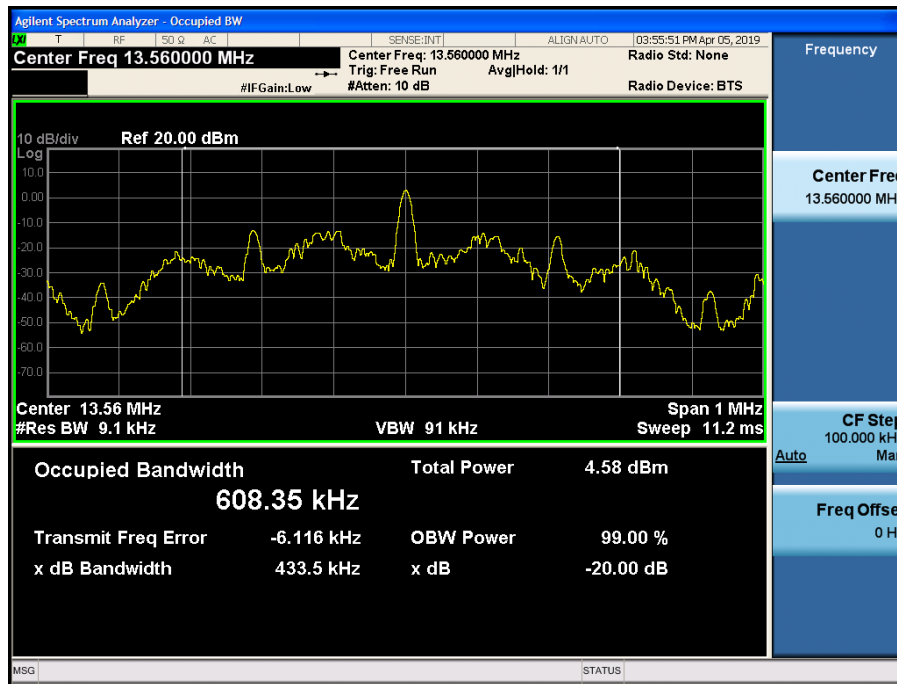
With Tag



Note:

Plot of worst case are only reported

9.4. 20 dB Bandwidth



9.5. Frequency Stability

Startup

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	13.560094	94	0.0006932
100%		-10	13.560088	88	0.0006490
100%		0	13.560079	79	0.0005826
100%		+10	13.560072	72	0.0005310
100%		+20(Ref.)	13.560066	66	0.0004867
100%		+30	13.560059	59	0.0004351
100%		+40	13.560048	48	0.0003540
100%		+50	13.560041	41	0.0003024
High	4.35	+20	13.560055	55	0.0004056
End. Point	3.45	+20	13.560063	63	0.0004646

2 minutes

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	13.560099	99	0.0007301
100%		-10	13.560084	84	0.0006195
100%		0	13.560076	76	0.0005605
100%		+10	13.560069	69	0.0005088
100%		+20(Ref.)	13.560061	61	0.0004499
100%		+30	13.560049	49	0.0003614
100%		+40	13.560043	43	0.0003171
100%		+50	13.560035	35	0.0002581
High	4.35	+20	13.560058	58	0.0004277
End. Point	3.45	+20	13.560064	64	0.0004720

5 minutes

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	13.560101	101	0.0007448
100%		-10	13.560088	88	0.0006490
100%		0	13.560069	69	0.0005088
100%		+10	13.560061	61	0.0004499
100%		+20(Ref.)	13.560049	49	0.0003614
100%		+30	13.560043	43	0.0003171
100%		+40	13.560034	34	0.0002507
100%		+50	13.560028	28	0.0002065
High	4.35	+20	13.560066	66	0.0004867
End. Point	3.45	+20	13.560051	51	0.0003761

10 minutes

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	13.560078	78	0.0005752
100%		-10	13.560070	70	0.0005162
100%		0	13.560066	66	0.0004867
100%		+10	13.560051	51	0.0003761
100%		+20(Ref.)	13.560045	45	0.0003319
100%		+30	13.560033	33	0.0002434
100%		+40	13.560030	30	0.0002212
100%		+50	13.560025	25	0.0001844
High	4.35	+20	13.560049	49	0.0003614
End. Point	3.45	+20	13.560045	45	0.0003319

9.6. POWERLINE CONDUCTE EMISSIONS

Conducted Emissions (Line 1)

NFC MODE TERMINATION L1

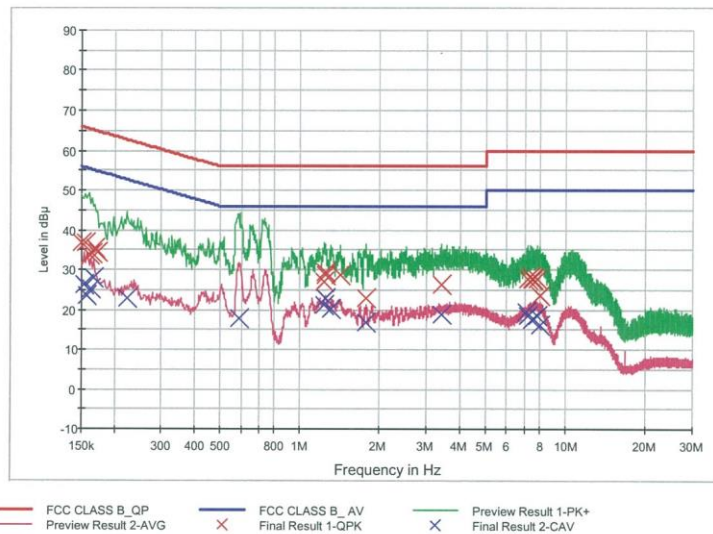
1 / 2

HCT TEST Report

Common Information

EUT: SCV43
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC MODE TERMINATION L1

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	36.7	9.000	Off	L1	9.7	29.3	66.0
0.156000	36.8	9.000	Off	L1	9.7	28.9	65.7
0.160000	33.7	9.000	Off	L1	9.7	31.7	65.5
0.164000	34.0	9.000	Off	L1	9.7	31.3	65.3
0.168000	35.3	9.000	Off	L1	9.7	29.7	65.1
0.172000	34.6	9.000	Off	L1	9.7	30.3	64.9
1.228000	26.8	9.000	Off	L1	9.8	29.2	56.0
1.244000	28.5	9.000	Off	L1	9.9	27.5	56.0
1.250000	29.3	9.000	Off	L1	9.9	26.7	56.0
1.418000	28.8	9.000	Off	L1	9.9	27.2	56.0
1.772000	22.8	9.000	Off	L1	9.9	33.2	56.0
3.412000	26.3	9.000	Off	L1	9.9	29.7	56.0
7.238000	27.6	9.000	Off	L1	10.1	32.4	60.0
7.352000	28.3	9.000	Off	L1	10.1	31.7	60.0
7.462000	27.8	9.000	Off	L1	10.1	32.2	60.0
7.534000	27.8	9.000	Off	L1	10.1	32.2	60.0
7.794000	27.5	9.000	Off	L1	10.2	32.5	60.0
8.006000	23.6	9.000	Off	L1	10.2	36.4	60.0

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NFC MODE TERMINATION L1

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	26.3	9.000	Off	L1	9.7	29.5	55.8
0.158000	23.7	9.000	Off	L1	9.7	31.9	55.6
0.162000	25.3	9.000	Off	L1	9.7	30.1	55.4
0.166000	28.0	9.000	Off	L1	9.7	27.2	55.2
0.222000	23.0	9.000	Off	L1	9.7	29.8	52.7
0.586000	17.8	9.000	Off	L1	9.8	28.2	46.0
1.228000	21.1	9.000	Off	L1	9.8	24.9	46.0
1.244000	22.8	9.000	Off	L1	9.9	23.2	46.0
1.250000	23.0	9.000	Off	L1	9.9	23.0	46.0
1.300000	20.2	9.000	Off	L1	9.9	25.8	46.0
1.766000	16.9	9.000	Off	L1	9.9	29.1	46.0
3.412000	18.7	9.000	Off	L1	9.9	27.3	46.0
7.088000	19.4	9.000	Off	L1	10.1	30.6	50.0
7.238000	18.6	9.000	Off	L1	10.1	31.4	50.0
7.462000	17.4	9.000	Off	L1	10.1	32.6	50.0
7.772000	18.4	9.000	Off	L1	10.2	31.6	50.0
7.794000	18.4	9.000	Off	L1	10.2	31.6	50.0
8.006000	16.1	9.000	Off	L1	10.2	33.9	50.0

2019-04-09

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Conducted Emissions (Line 2)

NFC MODE TERMINATION N

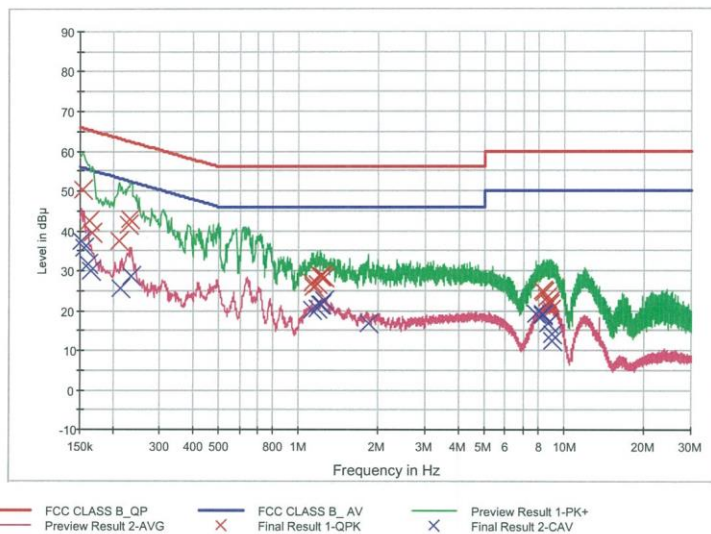
1 / 2

HCT TEST Report

Common Information

EUT: SCV43
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC MODE TERMINATION N

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154000	50.4	9.000	Off	N	9.8	15.4	65.8
0.162000	42.5	9.000	Off	N	9.8	22.9	65.4
0.166000	39.4	9.000	Off	N	9.8	25.8	65.2
0.210000	37.6	9.000	Off	N	9.9	25.6	63.2
0.228000	41.4	9.000	Off	N	9.9	21.1	62.5
0.232000	43.0	9.000	Off	N	9.9	19.4	62.4
1.122000	27.0	9.000	Off	N	10.0	29.0	56.0
1.132000	25.8	9.000	Off	N	10.0	30.2	56.0
1.170000	26.7	9.000	Off	N	10.0	29.3	56.0
1.206000	28.5	9.000	Off	N	10.0	27.5	56.0
1.214000	28.7	9.000	Off	N	10.0	27.3	56.0
1.250000	28.3	9.000	Off	N	10.0	27.7	56.0
8.256000	24.9	9.000	Off	N	10.4	35.1	60.0
8.336000	24.6	9.000	Off	N	10.4	35.4	60.0
8.594000	23.2	9.000	Off	N	10.4	36.8	60.0
8.798000	22.1	9.000	Off	N	10.4	37.9	60.0
8.806000	21.4	9.000	Off	N	10.4	38.6	60.0
8.934000	20.0	9.000	Off	N	10.4	40.0	60.0

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NFC MODE TERMINATION N

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	37.6	9.000	Off	N	9.8	18.3	55.9
0.156000	35.8	9.000	Off	N	9.8	19.8	55.7
0.160000	31.7	9.000	Off	N	9.8	23.7	55.5
0.164000	30.0	9.000	Off	N	9.8	25.2	55.3
0.212000	25.5	9.000	Off	N	9.9	27.7	53.1
0.234000	28.7	9.000	Off	N	9.9	23.6	52.3
1.122000	20.1	9.000	Off	N	10.0	25.9	46.0
1.170000	20.4	9.000	Off	N	10.0	25.6	46.0
1.206000	21.5	9.000	Off	N	10.0	24.5	46.0
1.214000	21.5	9.000	Off	N	10.0	24.5	46.0
1.250000	22.5	9.000	Off	N	10.0	23.5	46.0
1.824000	16.9	9.000	Off	N	10.1	29.1	46.0
7.838000	19.2	9.000	Off	N	10.4	30.8	50.0
8.256000	19.2	9.000	Off	N	10.4	30.8	50.0
8.330000	18.7	9.000	Off	N	10.4	31.3	50.0
8.672000	16.8	9.000	Off	N	10.4	33.2	50.0
8.960000	13.9	9.000	Off	N	10.4	36.1	50.0
9.018000	12.5	9.000	Off	N	10.4	37.5	50.0

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Conducted Emissions (Line 3)

NFC MODE L1

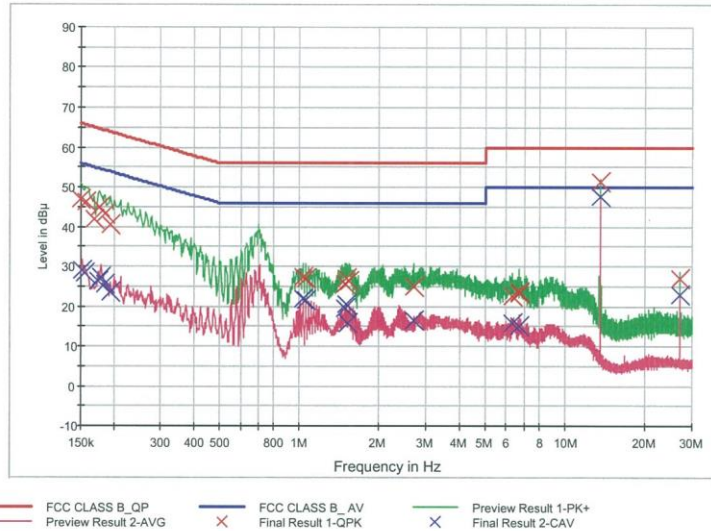
1 / 2

HCT TEST Report

Common Information

EUT: SCV43
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC MODE UNTERMINATION L1

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	46.8	9.000	Off	L1	9.7	19.2	66.0
0.158000	46.2	9.000	Off	L1	9.7	19.4	65.6
0.168000	41.7	9.000	Off	L1	9.7	23.3	65.1
0.176000	44.9	9.000	Off	L1	9.7	19.8	64.7
0.186000	43.2	9.000	Off	L1	9.7	21.0	64.2
0.194000	40.3	9.000	Off	L1	9.7	23.5	63.9
1.030000	27.4	9.000	Off	L1	9.8	28.6	56.0
1.058000	26.9	9.000	Off	L1	9.8	29.1	56.0
1.482000	25.6	9.000	Off	L1	9.9	30.4	56.0
1.506000	27.1	9.000	Off	L1	9.9	28.9	56.0
1.534000	26.3	9.000	Off	L1	9.9	29.7	56.0
2.682000	24.9	9.000	Off	L1	9.9	31.1	56.0
6.300000	22.6	9.000	Off	L1	10.1	37.4	60.0
6.694000	23.3	9.000	Off	L1	10.1	36.7	60.0
6.716000	23.7	9.000	Off	L1	10.1	36.3	60.0
6.720000	23.2	9.000	Off	L1	10.1	36.8	60.0
13.560000	51.2	9.000	Off	L1	10.4	8.8	60.0
27.122000	27.0	9.000	Off	L1	10.8	33.0	60.0

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NFC MODE L1

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Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.152000	29.1	9.000	Off	L1	9.7	26.8	55.9
0.156000	28.5	9.000	Off	L1	9.7	27.2	55.7
0.174000	26.4	9.000	Off	L1	9.7	28.4	54.8
0.178000	27.3	9.000	Off	L1	9.7	27.3	54.6
0.186000	25.6	9.000	Off	L1	9.7	28.6	54.2
0.194000	23.4	9.000	Off	L1	9.7	30.5	53.9
1.030000	22.0	9.000	Off	L1	9.8	24.0	46.0
1.056000	21.6	9.000	Off	L1	9.8	24.4	46.0
1.482000	19.6	9.000	Off	L1	9.9	26.4	46.0
1.506000	20.4	9.000	Off	L1	9.9	25.6	46.0
1.518000	15.7	9.000	Off	L1	9.9	30.3	46.0
2.684000	16.4	9.000	Off	L1	9.9	29.6	46.0
6.300000	15.8	9.000	Off	L1	10.1	34.2	50.0
6.686000	15.0	9.000	Off	L1	10.1	35.0	50.0
6.694000	15.1	9.000	Off	L1	10.1	34.9	50.0
6.720000	15.2	9.000	Off	L1	10.1	34.8	50.0
13.560000	47.6	9.000	Off	L1	10.4	2.4	50.0
27.120000	22.9	9.000	Off	L1	10.8	27.1	50.0

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Conducted Emissions (Line 4)

NFC MODE N

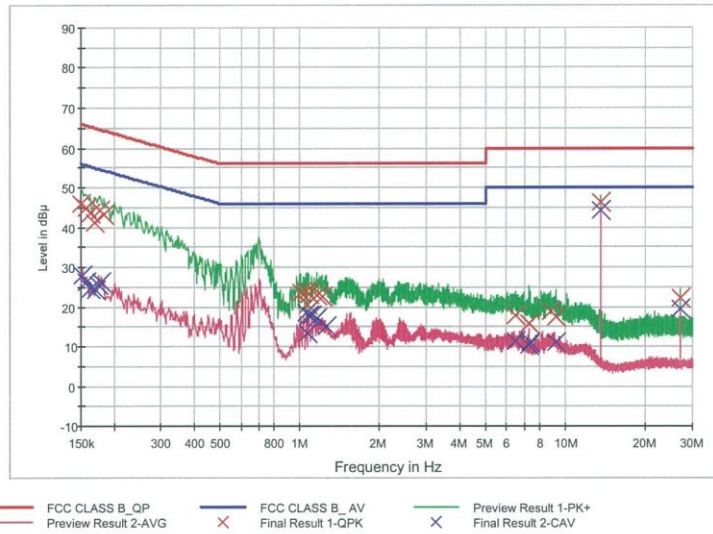
1 / 2

HCT TEST Report

Common Information

EUT: SCV43
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: NFC MODE UNTERMINATION N

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	45.9	9.000	Off	N	9.8	20.1	66.0
0.158000	45.0	9.000	Off	N	9.8	20.5	65.6
0.162000	43.4	9.000	Off	N	9.8	22.0	65.4
0.168000	41.1	9.000	Off	N	9.8	23.9	65.1
0.176000	44.2	9.000	Off	N	9.8	20.5	64.7
0.184000	43.2	9.000	Off	N	9.8	21.1	64.3
1.004000	23.6	9.000	Off	N	10.0	32.4	56.0
1.056000	23.8	9.000	Off	N	10.0	32.2	56.0
1.076000	20.7	9.000	Off	N	10.0	35.3	56.0
1.084000	23.4	9.000	Off	N	10.0	32.6	56.0
1.158000	22.8	9.000	Off	N	10.0	33.2	56.0
1.212000	22.6	9.000	Off	N	10.0	33.4	56.0
6.446000	17.9	9.000	Off	N	10.3	42.1	60.0
7.326000	15.8	9.000	Off	N	10.4	44.2	60.0
8.770000	18.9	9.000	Off	N	10.4	41.1	60.0
9.170000	17.3	9.000	Off	N	10.4	42.7	60.0
13.562000	46.4	9.000	Off	N	10.6	13.6	60.0
27.122000	22.1	9.000	Off	N	11.1	37.9	60.0

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NFC MODE N

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	28.0	9.000	Off	N	9.8	27.9	55.9
0.158000	26.2	9.000	Off	N	9.8	29.4	55.6
0.162000	24.5	9.000	Off	N	9.8	30.9	55.4
0.170000	24.1	9.000	Off	N	9.8	30.8	55.0
0.174000	25.4	9.000	Off	N	9.8	29.3	54.8
0.178000	26.3	9.000	Off	N	9.8	28.3	54.6
1.056000	18.3	9.000	Off	N	10.0	27.7	46.0
1.076000	13.5	9.000	Off	N	10.0	32.5	46.0
1.084000	17.9	9.000	Off	N	10.0	28.1	46.0
1.108000	17.9	9.000	Off	N	10.0	28.1	46.0
1.158000	17.3	9.000	Off	N	10.0	28.7	46.0
1.262000	15.1	9.000	Off	N	10.0	30.9	46.0
6.446000	11.5	9.000	Off	N	10.3	38.5	50.0
7.326000	10.3	9.000	Off	N	10.4	39.7	50.0
7.330000	11.1	9.000	Off	N	10.4	38.9	50.0
9.170000	11.1	9.000	Off	N	10.4	38.9	50.0
13.562000	44.1	9.000	Off	N	10.6	5.9	50.0
27.120000	19.3	9.000	Off	N	11.1	30.7	50.0

2019-03-30

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10. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/12/2018	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/27/2018	Annual	100033
ESPAC	SU-642 / Temperature Chamber	03/12/2019	Annual	0093008124
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY52090906
Agilent	N9030A / Signal Analyzer	01/10/2019	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/26/2018	Annual	101231
Agilent	N1911A / Power Meter	04/16/2018	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/16/2018	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/20/2018	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/07/2018	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/26/2018	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2018	Annual	07560
Chang Woo Inc.	18N-20dB / Attenuator(20 dB)	05/09/2018	Annual	8
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

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	08/23/2018	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	03/22/2019	Biennial	760
Schwarzbeck	VULB 9160 / TRILOG Antenna	08/09/2018	Biennial	9160-3368
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	09/03/2018	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/28/2018	Annual	101068-SZ
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/07/2018	Annual	8
Wainwright Instruments	WHKX7.0/18G-8SS / High Pass Filter	05/09/2018	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/29/2018	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2019	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/07/2018	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	07/17/2018	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	07/10/2018	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/10/2018	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	01/03/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/29/2018	Annual	25956

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

11. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1904-FC019-P