

FCC WPT REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
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16677, Rep. of Korea

Date of Issue:
June 14, 2021

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-
si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2106-FC018

FCC ID: A3LSMG990B

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model: SM-G990B/DS

Additional Model: SM-G990B

EUT Type: Mobile Phone

**Frequency of Operation
& Max. Transmit Power:** 110 kHz ~ 148 kHz(Power sharing) : 8.158 dBuV/m @300 m

FCC Classification: Part 15 Low Power Transmitter Below 1705 kHz (DCD)

FCC Rule Part(s): FCC Part 15, Subpart C (15.209)

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 No.: HCT-RF-2106-FC018

REVIEWED BY



Report prepared by : Woong Jin Kim
Engineer of Telecommunication Testing Center

Report approved by : Kwon Jeong
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2106-FC018	June 14, 2021	- First Approval Report

Table of Contents

REVIEWED BY	2
1. EUT DESCRIPTION	5
2. TEST METHODOLOGY	6
EUT CONFIGURATION	6
EUT EXERCISE	6
GENERAL TEST PROCEDURES	6
3. INSTRUMENT CALIBRATION.....	7
4. FACILITIES AND ACCREDITATIONS	7
FACILITIES	7
EQUIPMENT	7
5. ANTENNA REQUIREMENTS	7
6. MEASUREMENT UNCERTAINTY	8
7. Worst case configuration.....	9
8. TEST SUMMARY	11
9. RADIATED EMISSION MEASUREMENT	12
10. POWERLINE CONDUCTED EMISSIONS.....	20
11. EMISSION BANDWIDTH PLOT	29
12. LIST OF TEST EQUIPMENT	33
13. Annex A_TEST SETUP PHOTO	34

1. EUT DESCRIPTION

Model	SM-G990B/DS
Additional Model	SM-G990B
EUT Type	Mobile Phone
Power Supply	DC 4.20 V
Frequency of Operation	110 kHz ~ 148 kHz(Power sharing)
Max. Transmit Power	8.158 dBuV/m @300 m
Date(s) of Tests	April 24, 2021~ June 10, 2021
Serial number	Radiated: 544a5f8570207ece Conducted: 524d0f145f1e7ece

2. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Device (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 15.247 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 below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. 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).

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."

- (1) The antennas of this E.U.T are permanently attached.
- (2) 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 (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)	5.05

7. Worst case configuration

Mode	EUT State	Position of Client device	Battery of Client device	Client device
Power sharing	Charging from EUT to Client device (See Note 3)	Aligned	1 % ~ 20 %	Phone (See Note 2)
			20 % ~ 50 %	
			90 % ~ 100 %	
		Cross	1 % ~ 20 %	
			20 % ~ 50 %	
			90 % ~ 100 %	
	Charging from EUT(Charging from TA) to Client device	Aligned	1 % ~ 20 %	
			20 % ~ 50 %	
			90 % ~ 100 %	
		Cross	1 % ~ 20 %	
			20 % ~ 50 %	
			90 % ~ 100 %	

Note:

1. Client device:

Of Phone and Wearable device, we tested on Phone.

2. Phone(Client device):

- Model : SM-G986B/DS

- Manufacturer : SAMSUNG

- FCC ID : A3LSMG986B

3. EUT can operate the power sharing mode when battery level is over 30%.

Because test results are not different between fully charged status and battery level 30% status(EUT condition), test were performed fully charged condition.

4. All position of loop antenna were investigated and the worst position results are reported.

- Position : Horizontal, Vertical, Parallel to the ground plane

- Worst Position : Horizontal

5. The EUT was tested in three orthogonal axis(X, Y, Z) and the worst position results are reported.

- Axis : X, Y, Z

- Worst Axis : X

6. SM-G990B/DS, SM-G990B were tested and the worst case results are reported.

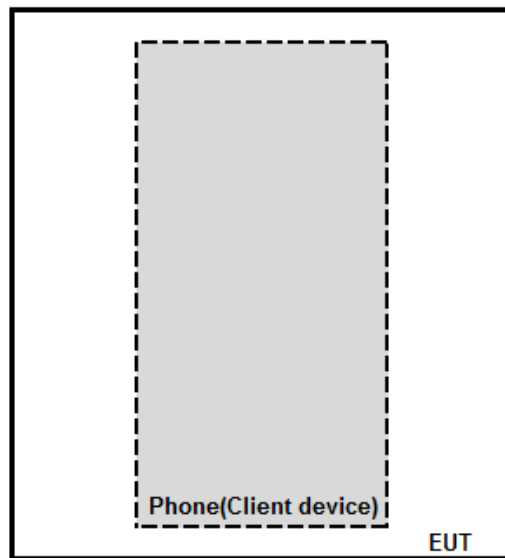
(Worst case : SM-G990B/DS)

AC Power line Conducted Emissions

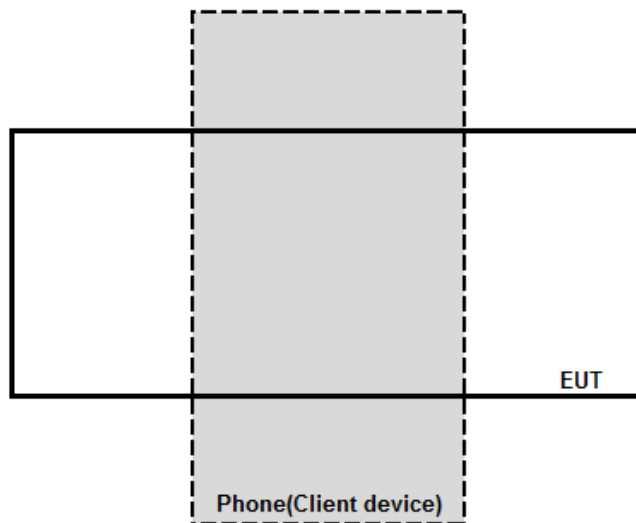
1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : EUT + External accessories(Earphone, etc) + Travel Adapter + Phone(Client device)
 , EUT + Travel Adapter + Phone(Client device)
 - Worst case : EUT + Travel Adapter + Phone(Client device)
2. SM-G990B/DS, SM-G990B were tested and the worst case results are reported.
(Worst case : SM-G990B/DS)

Test Setup Diagram:

Aligned



Cross



8. TEST SUMMARY

Test Description	FCC Rule	Limit	Condition	Result
Radiated emission	§15.209	cf. Section 9	Radiated	Pass
AC Power Line Conducted Emission	§15.207	cf. Section 10		Pass
Emission bandwidth.	§2.1049	<u>See note1</u>		<u>See note1</u>

Note:

1. For reporting purposes only.

9. RADIATED EMISSION MEASUREMENT

Test Settings

1. Analyzer frequency set to the frequency of the radiated spurious emission of interest.
2. RBW :
 - 9kHz – 150kHz : 300Hz
 - 150kHz – 30MHz : 10kHz
 - 30MHz – 1GHz : 100kHz
3. VBW : $\geq 3 \times$ RBW
4. Sweep time : Auto couple
5. Detector : Peak
6. Trace : Maxhold
7. Trace was allowed to stabilize

Limit(FCC)

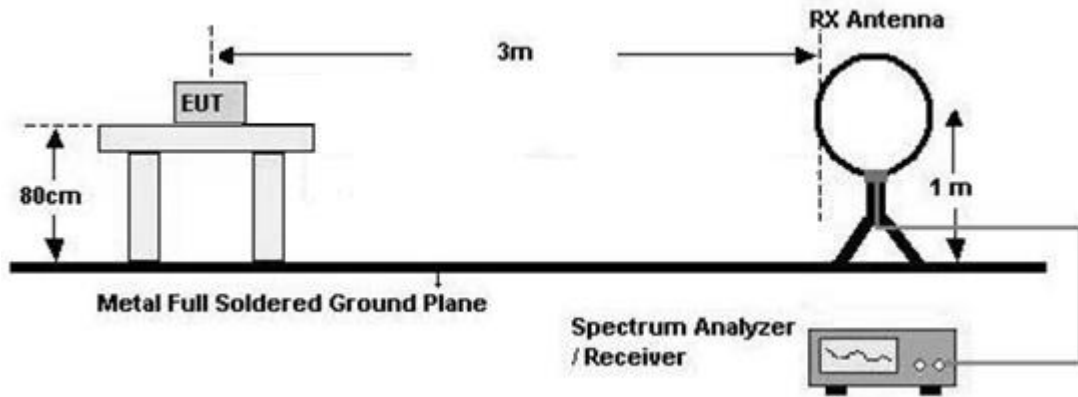
Except as provided elsewhere in this paragraph the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

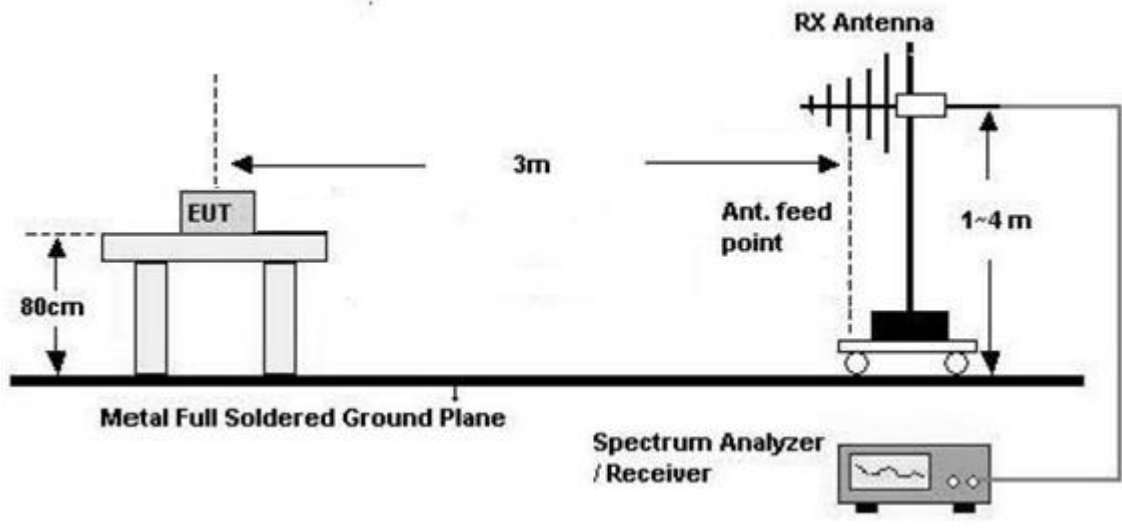
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part,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

Test Set-up

Below 30 MHz



30 MHz - 1 GHz



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 3 m 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 and Parallel to the ground plane in detecting antenna.
5. The limit is converted from microvolts/meter to decibel microvolts/meter. Sample Calculation:
 - * Result level(dBμV/m@30m)
= Reading level(dBμV/m@3m) + Ant factor(dB/m) + Cable Loss(dB) – Distance Correction Factor.
6. Distance Correction
 - * 0.009 MHz – 0.490 MHz :
 $40\log(3\text{ m}/300\text{ m}) = - 80\text{ dB}$
 - * 0.490 MHz – 30MHz :
 $40\log(3\text{ m}/30\text{ m}) = - 40\text{ dB}$
7. Plots were taken without using any correction factors.
8. The worst case plots are reported.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1GHz)

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. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
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. Spectrum Setting
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 30 MHz – 1 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 100 kHz
 - VBW \geq 3 x RBW
7. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Result

Frequency (kHz)	Reading Level (dBuV/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10.46	32.163	19.10	0.53	-80.00	-28.207	47.22	75.42
# 113.20	65.799	19.30	0.53	-80.00	5.629	26.53	20.90
115.15	34.002	19.30	0.53	-80.00	-26.168	26.38	52.55
340.95	44.929	19.20	0.53	-80.00	-15.341	16.95	32.29
3513.00	9.758	19.50	0.53	-40.00	-10.212	29.54	39.75

Note

1. “#” Fundamental Frequency
2. EUT Mode: Charging from EUT to Phone
3. Position: Aligned
4. 30 MHz – 1GHz : No Critical peaks found
5. The fundamental frequency(110kHz – 148kHz) varies depending on the position of client device.
All fundamental frequency were investigated and the worst results are reported.

Frequency (kHz)	Reading Level (dBuV/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
9.00	32.694	18.90	0.53	-80.00	-27.876	48.52	76.40
# 113.20	68.328	19.30	0.53	-80.00	8.158	26.53	18.37
115.20	34.868	19.30	0.53	-80.00	-25.302	26.38	51.68
340.95	45.510	19.20	0.53	-80.00	-14.760	16.95	31.71
3054.00	13.230	19.50	0.53	-40.00	-6.740	29.54	36.28

Note

1. “#” Fundamental Frequency
2. EUT Mode: Charging from EUT to Phone
3. Position: Cross
4. 30 MHz – 1GHz : No Critical peaks found
5. The fundamental frequency(110kHz – 148kHz) varies depending on the position of client device.
All fundamental frequency were investigated and the worst results are reported.

Frequency (kHz)	Reading Level (dBuV/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
10.18	31.816	19.10	0.53	-80.00	-28.554	47.45	76.00
# 113.25	67.802	19.30	0.53	-80.00	7.632	26.52	18.89
115.25	35.592	19.30	0.53	-80.00	-24.578	26.37	50.95
340.95	46.270	19.20	0.53	-80.00	-14.000	16.95	30.95
3054.00	10.083	19.50	0.53	-40.00	-9.887	29.54	39.43

Note

1. “#” Fundamental Frequency
2. EUT Mode: Charging from EUT(Charging from TA) to Phone
3. Position: Aligned
4. 30 MHz – 1GHz : No Critical peaks found
5. The fundamental frequency(110kHz – 148kHz) varies depending on the position of client device.
All fundamental frequency were investigated and the worst results are reported.

Frequency (kHz)	Reading Level (dBuV/m)@3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11.91	32.561	19.10	0.53	-80.00	-27.809	46.08	73.89
# 113.25	65.149	19.30	0.53	-80.00	4.979	26.52	21.54
115.25	30.982	19.30	0.53	-80.00	-29.188	26.37	55.56
340.95	44.079	19.20	0.53	-80.00	-16.191	16.95	33.14
5187.00	8.946	19.60	0.53	-40.00	-10.924	29.54	40.46

Note

1. “#” Fundamental Frequency
2. EUT Mode: Charging from EUT(Charging from TA) to Phone
3. Position: Cross
4. 30 MHz – 1GHz : No Critical peaks found
5. The fundamental frequency(110kHz – 148kHz) varies depending on the position of client device.
All fundamental frequency were investigated and the worst results are reported.

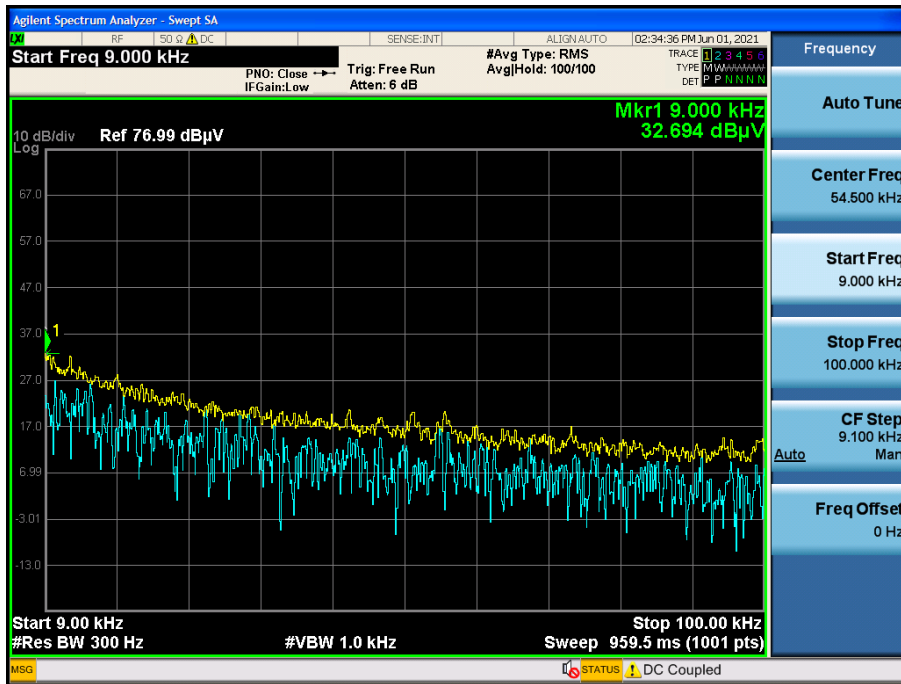
Test Plot

In order to simplify the report, the worst case results are reported.

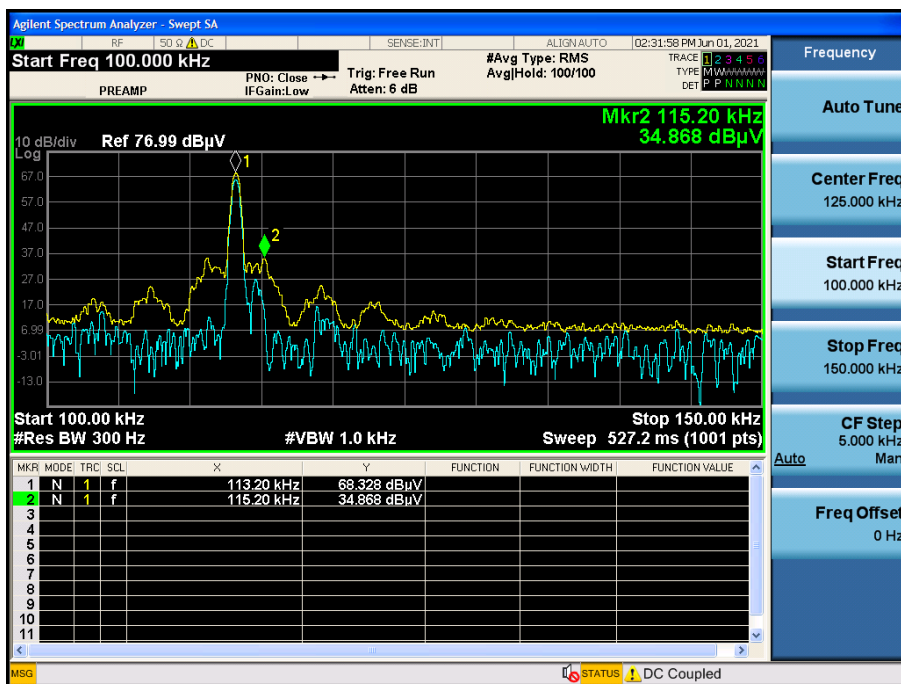
Worst case

- EUT Mode: Charging from EUT to Phone
- Position: Cross

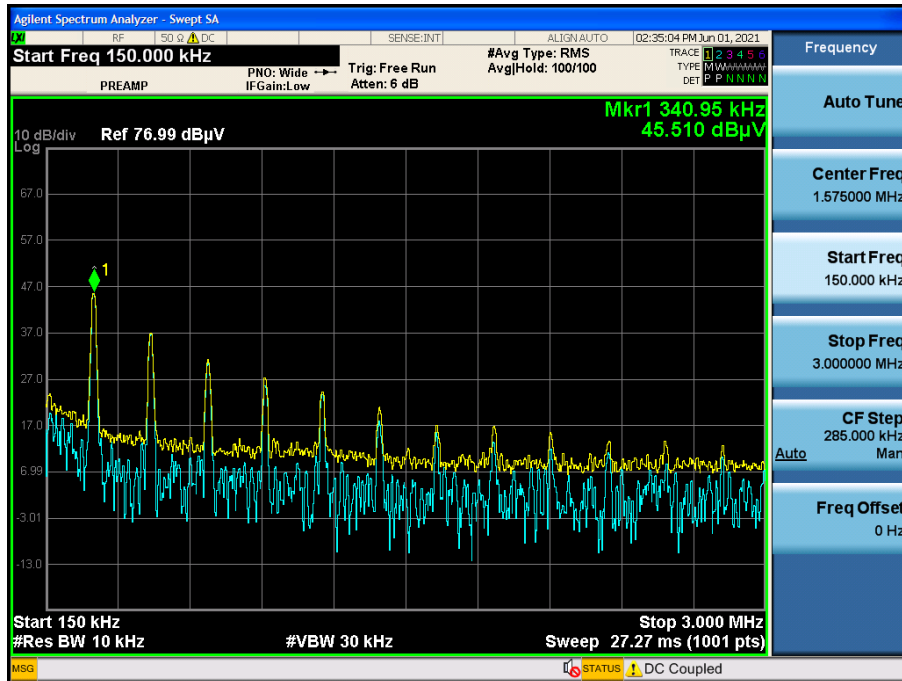
Frequency Range : 9 kHz – 100kHz



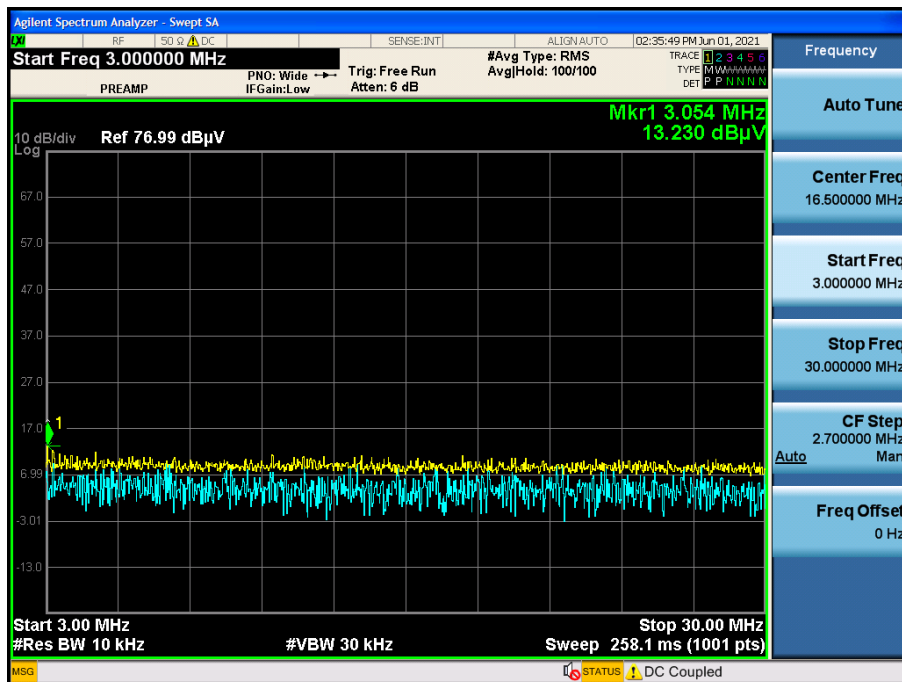
Frequency Range : 100 kHz – 150kHz



Frequency Range : 150 kHz – 3 MHz



Frequency Range : 3 MHz – 30 MHz



(30 MHz – 1GHz : No Critical peaks found)

Note :

In order to simplify the report, attached plots were only the worstcase

10. POWERLINE 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 ^(a)	56 to 46 ^(a)
0.50 to 5	56	46
5 to 30	60	50

^(a)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

Test Result & Plot (Position: Aligned)
Conducted Emissions (Line 1)

WPT 11 L1

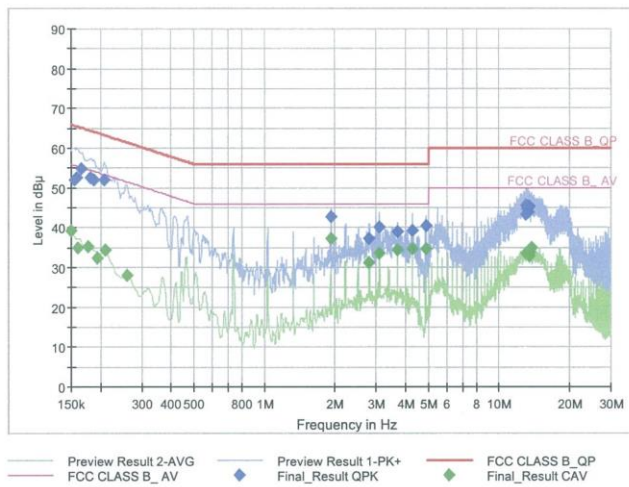
1 / 2

Test Report

Common Information

EUT : SM-G990B/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : WPT_11_L1
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV)	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.1545	52.05	65.75	13.70	9.000	L1	OFF	9.6
0.1590	52.40	65.52	13.12	9.000	L1	OFF	9.6
0.1658	54.81	65.17	10.36	9.000	L1	OFF	9.6
0.1815	52.53	64.42	11.89	9.000	L1	OFF	9.6
0.1883	51.83	64.11	12.28	9.000	L1	OFF	9.6
0.2085	51.91	63.27	11.35	9.000	L1	OFF	9.6
1.9220	42.79	56.00	13.21	9.000	L1	OFF	9.7
2.8085	37.22	56.00	18.78	9.000	L1	OFF	9.8
3.1055	40.02	56.00	15.98	9.000	L1	OFF	9.8
3.6973	39.05	56.00	16.95	9.000	L1	OFF	9.8
4.2890	39.31	56.00	16.69	9.000	L1	OFF	9.8
4.8808	40.29	56.00	15.71	9.000	L1	OFF	9.9
13.0528	43.18	60.00	16.82	9.000	L1	OFF	10.2
13.0978	45.69	60.00	14.31	9.000	L1	OFF	10.2
13.1563	44.73	60.00	15.27	9.000	L1	OFF	10.2
13.2823	45.30	60.00	14.70	9.000	L1	OFF	10.2
13.3295	43.91	60.00	16.09	9.000	L1	OFF	10.2
13.5590	45.36	60.00	14.64	9.000	L1	OFF	10.2

Final Result CAV

2021-06-03

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WPT 11 L1

2 / 2

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	39.19	56.00	16.81	9.000	L1	OFF	9.7
0.1613	34.98	55.40	20.42	9.000	L1	OFF	9.6
0.1770	35.18	54.63	19.44	9.000	L1	OFF	9.6
0.1950	32.19	53.82	21.63	9.000	L1	OFF	9.6
0.2108	34.22	53.18	18.96	9.000	L1	OFF	9.6
0.2603	27.92	51.42	23.50	9.000	L1	OFF	9.6
1.9220	37.14	46.00	8.86	9.000	L1	OFF	9.7
2.8085	31.11	46.00	14.89	9.000	L1	OFF	9.8
3.1055	33.52	46.00	12.48	9.000	L1	OFF	9.8
3.6973	34.21	46.00	11.79	9.000	L1	OFF	9.8
4.2890	34.59	46.00	11.41	9.000	L1	OFF	9.8
4.8808	34.75	46.00	11.25	9.000	L1	OFF	9.9
12.9988	33.44	50.00	16.56	9.000	L1	OFF	10.2
13.0550	33.51	50.00	16.49	9.000	L1	OFF	10.2
13.3273	34.11	50.00	15.89	9.000	L1	OFF	10.2
13.5185	33.01	50.00	16.99	9.000	L1	OFF	10.2
13.5635	33.73	50.00	16.27	9.000	L1	OFF	10.2
13.7525	34.85	50.00	15.15	9.000	L1	OFF	10.2

2021-06-03

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Conducted Emissions (Line 2)

WPT_11_N

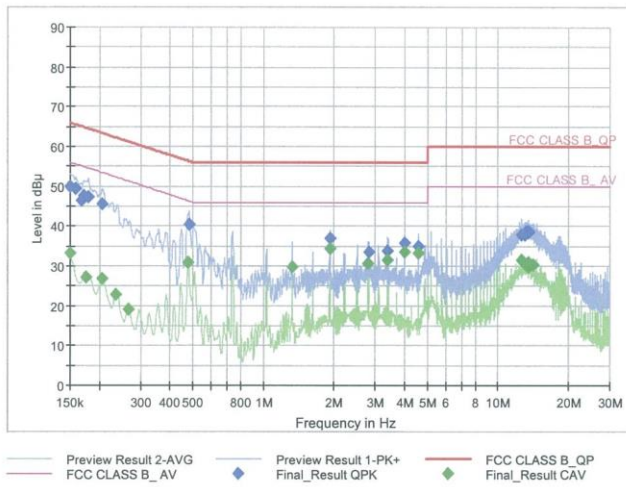
1 / 2

Test Report

Common Information

EUT : SM-G990B/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : WPT_11_N
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV)	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.1500	49.79	66.00	16.21	9.000	N	OFF	9.6
0.1590	49.31	65.52	16.21	9.000	N	OFF	9.6
0.1680	46.48	65.06	18.58	9.000	N	OFF	9.6
0.1725	47.48	64.84	17.36	9.000	N	OFF	9.6
0.1793	47.41	64.52	17.11	9.000	N	OFF	9.6
0.2063	45.67	63.36	17.68	9.000	N	OFF	9.6
0.4830	40.39	56.29	15.90	9.000	N	OFF	9.6
1.9220	36.83	56.00	19.17	9.000	N	OFF	9.7
2.8108	33.32	56.00	22.68	9.000	N	OFF	9.8
3.4003	33.83	56.00	22.17	9.000	N	OFF	9.8
3.9920	35.77	56.00	20.23	9.000	N	OFF	9.8
4.5838	34.86	56.00	21.14	9.000	N	OFF	9.9
12.5668	37.92	60.00	22.08	9.000	N	OFF	10.2
13.1203	37.65	60.00	22.35	9.000	N	OFF	10.3
13.1518	38.69	60.00	21.31	9.000	N	OFF	10.3
13.4128	38.35	60.00	21.65	9.000	N	OFF	10.3
13.4420	38.72	60.00	21.28	9.000	N	OFF	10.3
13.4735	38.36	60.00	21.64	9.000	N	OFF	10.3

Final Result CAV

2021-06-03

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WPT_11_N

2 / 2

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	33.05	56.00	22.95	9.000	N	OFF	9.6
0.1748	27.16	54.73	27.57	9.000	N	OFF	9.6
0.2063	26.71	53.36	26.64	9.000	N	OFF	9.6
0.2355	22.77	52.25	29.48	9.000	N	OFF	9.6
0.2670	19.02	51.21	32.19	9.000	N	OFF	9.6
0.4785	31.00	46.37	15.37	9.000	N	OFF	9.6
1.3303	29.77	46.00	16.23	9.000	N	OFF	9.7
1.9220	34.32	46.00	11.68	9.000	N	OFF	9.7
2.8085	30.51	46.00	15.49	9.000	N	OFF	9.8
3.4003	31.47	46.00	14.53	9.000	N	OFF	9.8
3.9920	33.39	46.00	12.61	9.000	N	OFF	9.8
4.5838	33.04	46.00	12.96	9.000	N	OFF	9.9
12.5668	31.42	50.00	18.58	9.000	N	OFF	10.2
13.1158	30.57	50.00	19.43	9.000	N	OFF	10.3
13.1450	30.38	50.00	19.62	9.000	N	OFF	10.3
13.4443	29.80	50.00	20.20	9.000	N	OFF	10.3
13.4533	30.88	50.00	19.12	9.000	N	OFF	10.3
14.0450	30.30	50.00	19.70	9.000	N	OFF	10.3

2021-06-03

오후 1:34:10

Test Result & Plot (Position: Cross)
Conducted Emissions (Line 1)

WPT 10 L1

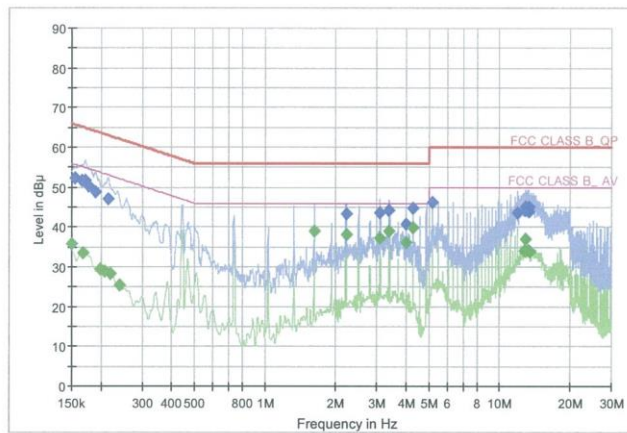
1 / 2

Test Report

Common Information

EUT : SM-G990B/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : WPT_10_L1
 Operator Name:
 Comment:

Full Spectrum



— Preview Result 2-AVG — Preview Result 1-PK+ Final_Result QPK — FCC CLASS B_QP
 — FCC CLASS B_AV ◆ Final_Result CAV

Final Result QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV)	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.1545	52.20	65.75	13.55	9.000	L1	OFF	9.6
0.1658	51.60	65.17	13.57	9.000	L1	OFF	9.6
0.1725	51.65	64.84	13.19	9.000	L1	OFF	9.6
0.1770	50.27	64.63	14.35	9.000	L1	OFF	9.6
0.1905	48.84	64.02	15.17	9.000	L1	OFF	9.6
0.2153	46.90	63.00	16.10	9.000	L1	OFF	9.6
2.2190	43.31	56.00	12.69	9.000	L1	OFF	9.7
3.1055	43.51	56.00	12.49	9.000	L1	OFF	9.8
3.4003	44.21	56.00	11.79	9.000	L1	OFF	9.8
3.9943	40.69	56.00	15.31	9.000	L1	OFF	9.8
4.2890	44.81	56.00	11.19	9.000	L1	OFF	9.8
5.1755	46.08	60.00	13.92	9.000	L1	OFF	9.9
11.9728	43.43	60.00	16.57	9.000	L1	OFF	10.1
12.8413	44.25	60.00	15.75	9.000	L1	OFF	10.2
12.8638	44.93	60.00	15.07	9.000	L1	OFF	10.2
13.1248	44.65	60.00	15.35	9.000	L1	OFF	10.2
13.3070	44.91	60.00	15.09	9.000	L1	OFF	10.2
13.3520	43.91	60.00	16.09	9.000	L1	OFF	10.2

Final_Result_CAV

2021-06-03

오후 1:22:06

WPT 10 L1

2 / 2

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	35.89	56.00	20.11	9.000	L1	OFF	9.7
0.1680	33.39	55.06	21.67	9.000	L1	OFF	9.6
0.1995	29.44	53.63	24.20	9.000	L1	OFF	9.6
0.2085	28.95	53.27	24.32	9.000	L1	OFF	9.6
0.2198	28.36	52.83	24.47	9.000	L1	OFF	9.6
0.2400	25.24	52.10	26.85	9.000	L1	OFF	9.6
1.6273	39.06	46.00	6.94	9.000	L1	OFF	9.7
2.2190	38.18	46.00	7.82	9.000	L1	OFF	9.7
3.1055	37.23	46.00	8.77	9.000	L1	OFF	9.8
3.4003	39.08	46.00	6.92	9.000	L1	OFF	9.8
3.9920	35.97	46.00	10.03	9.000	L1	OFF	9.8
4.2890	39.90	46.00	6.10	9.000	L1	OFF	9.8
12.7985	34.18	50.00	15.82	9.000	L1	OFF	10.2
12.8413	34.07	50.00	15.93	9.000	L1	OFF	10.2
12.8638	36.98	50.00	13.02	9.000	L1	OFF	10.2
13.3093	33.95	50.00	16.05	9.000	L1	OFF	10.2
13.3520	33.90	50.00	16.10	9.000	L1	OFF	10.2
13.5163	33.87	50.00	16.13	9.000	L1	OFF	10.2

2021-06-03

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Conducted Emissions (Line 2)

WPT 10 N

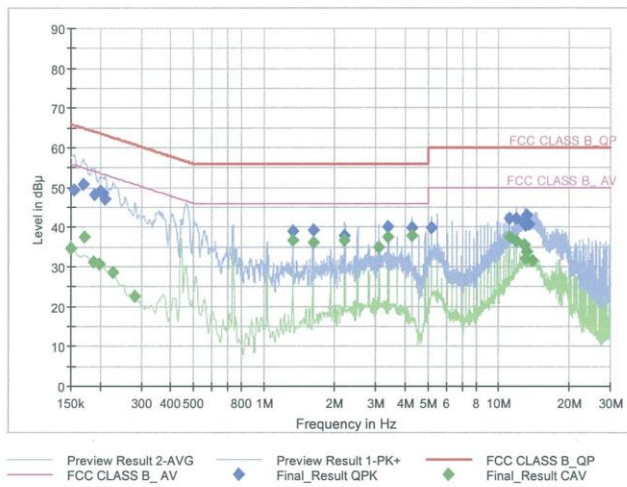
1 / 2

Test Report

Common Information

EUT : SM-G990B/DS
 Manufacturer : SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions : WPT_10_N
 Operator Name:
 Comment:

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV)	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.1545	49.31	65.75	16.44	9.000	N	OFF	9.6
0.1703	50.89	64.95	14.06	9.000	N	OFF	9.6
0.1905	48.05	64.02	15.96	9.000	N	OFF	9.6
0.2018	48.96	63.54	14.58	9.000	N	OFF	9.6
0.2063	48.43	63.36	14.93	9.000	N	OFF	9.6
0.2108	47.16	63.18	16.02	9.000	N	OFF	9.6
1.3303	38.98	56.00	17.02	9.000	N	OFF	9.7
1.6250	39.29	56.00	16.71	9.000	N	OFF	9.7
2.2168	37.69	56.00	18.31	9.000	N	OFF	9.7
3.4003	40.09	56.00	15.91	9.000	N	OFF	9.8
4.2868	39.77	56.00	16.23	9.000	N	OFF	9.8
5.1755	39.88	60.00	20.12	9.000	N	OFF	9.9
11.0885	42.11	60.00	17.89	9.000	N	OFF	10.2
11.9750	42.06	60.00	17.94	9.000	N	OFF	10.2
12.8615	40.99	60.00	19.01	9.000	N	OFF	10.2
13.1045	40.45	60.00	19.55	9.000	N	OFF	10.3
13.1585	42.93	60.00	17.07	9.000	N	OFF	10.3
13.4555	40.74	60.00	19.26	9.000	N	OFF	10.3

Final_Result_CAV

2021-06-03

오후 1:27:43

WPT 10 N

2 / 2

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	34.49	56.00	21.51	9.000	N	OFF	9.6
0.1725	37.40	54.84	17.44	9.000	N	OFF	9.6
0.1883	31.14	54.11	22.97	9.000	N	OFF	9.6
0.1995	30.64	53.63	22.99	9.000	N	OFF	9.6
0.2265	28.56	52.58	24.02	9.000	N	OFF	9.6
0.2828	22.41	50.74	28.32	9.000	N	OFF	9.6
1.3303	36.76	46.00	9.24	9.000	N	OFF	9.7
1.6250	36.20	46.00	9.80	9.000	N	OFF	9.7
2.2168	36.51	46.00	9.49	9.000	N	OFF	9.7
3.1033	34.79	46.00	11.21	9.000	N	OFF	9.8
3.4003	37.37	46.00	8.63	9.000	N	OFF	9.8
4.2868	37.74	46.00	8.26	9.000	N	OFF	9.8
11.0885	37.44	50.00	12.56	9.000	N	OFF	10.2
11.9750	36.29	50.00	13.71	9.000	N	OFF	10.2
12.8615	35.62	50.00	14.38	9.000	N	OFF	10.2
13.1068	31.89	50.00	18.11	9.000	N	OFF	10.3
13.1585	33.83	50.00	16.17	9.000	N	OFF	10.3
13.9145	31.58	50.00	18.42	9.000	N	OFF	10.3

2021-06-03

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11. EMISSION BANDWIDTH PLOT

Test Settings

1. Analyzer frequency set to the frequency of the radiated spurious emission of interest
2. RBW : 300 Hz
(Because the measured signal is CW/CW-like, adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.)
3. VBW : $\geq 3 \times$ RBW
4. Sweep time : Auto couple
5. Detector : Peak
6. Trace : Maxhold
7. Trace was allowed to stabilize

Limit

None

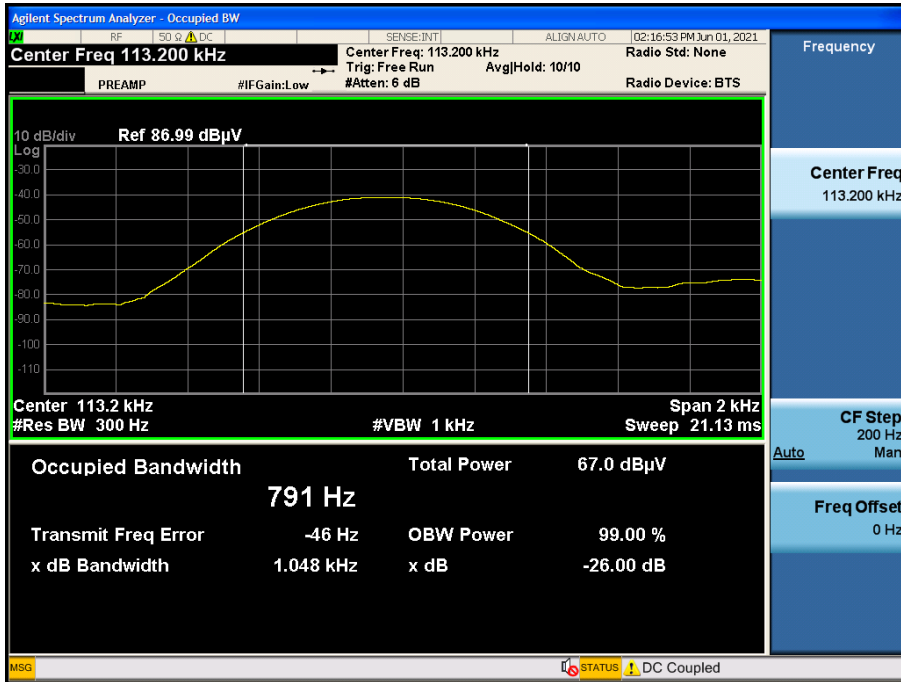
(for reporting purposes only.)

■ Test Result

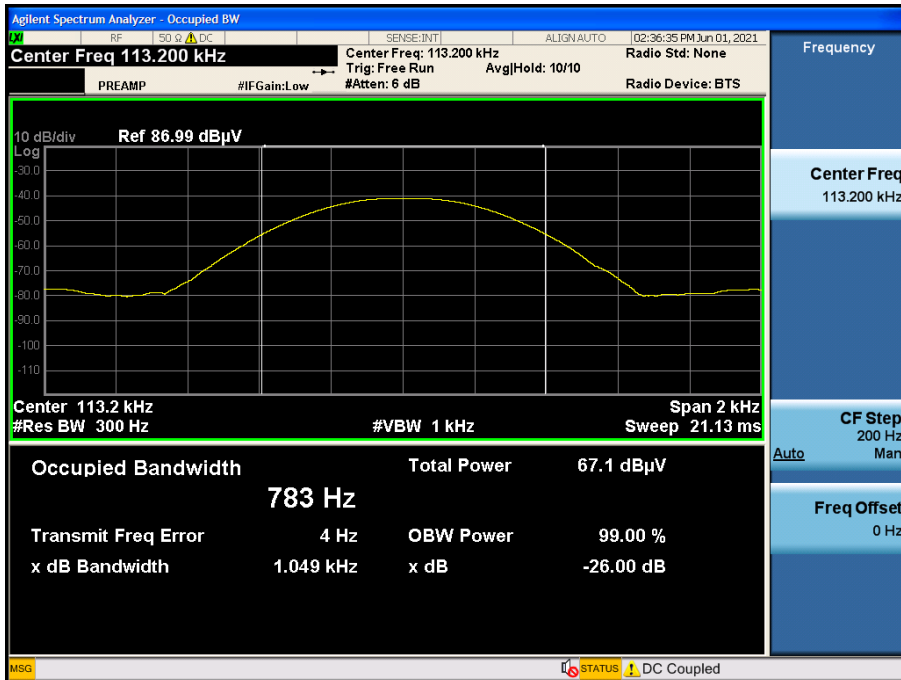
EUT Mode	Position	Test Frequency (kHz)	26dB Bandwidth (kHz)	Occupied Bandwidth (Hz)
Charging from EUT to Phone	Aligned	113.20	1.048	791
	Cross	113.20	1.049	783
Charging from EUT(Charging from TA) to Phone	Aligned	113.25	1.044	772
	Cross	133.25	1.050	773

Test Plot

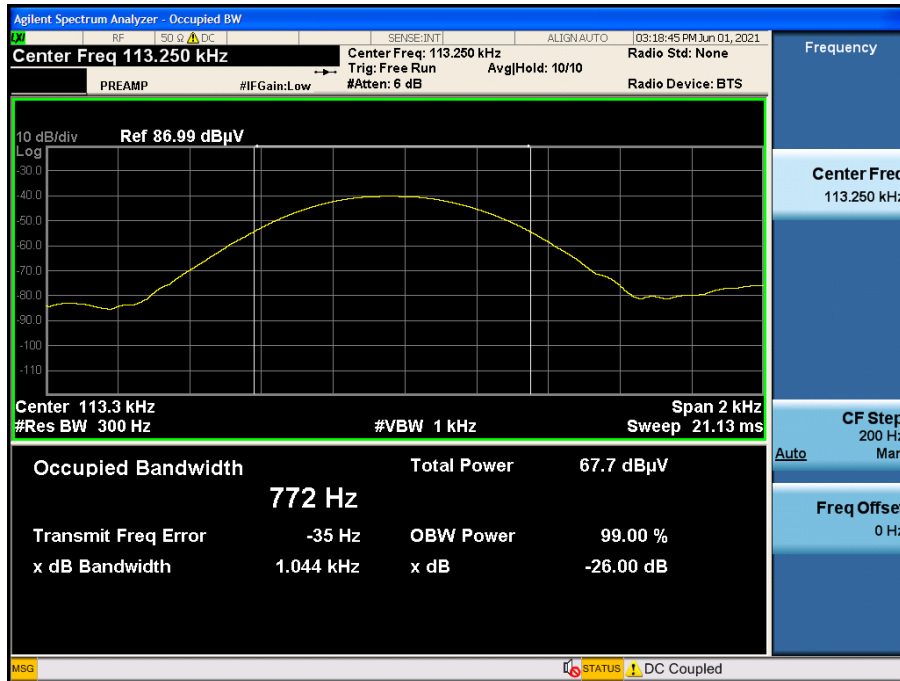
Charging from EUT to Phone – Position : Aligned



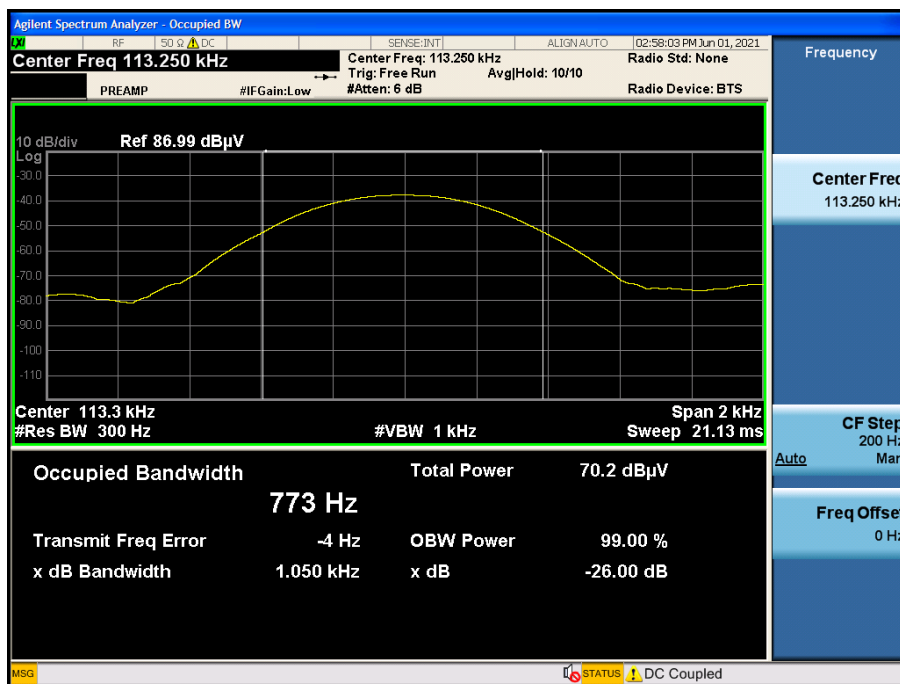
Charging from EUT to Phone – Position : Cross



Charging from EUT(Charging from TA) to Phone – Position : Aligned



Charging from EUT(Charging from TA) to Phone – Position : Cross



12. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/04/2020	Annual	102245
Rohde & Schwarz	ESR / EMI Test Receiver	09/16/2020	Annual	101910
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
Schwarzbeck	Loop Antenna	03/19/2020	Biennial	1513-333
Schwarzbeck	VULB 9168 / Hybrid Antenna	02/22/2021	Biennial	760
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	07/28/2020	Annual	102168
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210
Api tech.	18B-03 / Attenuator (3 dB)	02/03/2021	Annual	1
H.P	8493C-10 / Attenuator(10 dB)	02/03/2021	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	02/03/2021	Annual	22964

13. Annex A_TEST SETUP PHOTO

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

No.	Description
1	HCT-RF-2106-FC018-P